UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549
FORM 10-K

(Mark One)

[x] ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the fiscal year ended December 31, 2018

OR

[ ] TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the transition period from to

Commission file number 001-14157

TELEPHONE AND DATA SYSTEMS, INC.

(Exact name of Registrant as specified in its charter)

Delaware	**36-2669023**
(State or other jurisdiction of incorporation or organization)	(IRS Employer Identification No.)

30 North LaSalle Street, Suite 4000, Chicago, Illinois 60602

(Address of principal executive offices) (Zip code)

Registrant's telephone number, including area code: (312) 630-1900

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Name of each exchange on which registered
Common Shares, $.01 par value	New York Stock Exchange
6.625% Senior Notes due 2045	New York Stock Exchange
6.875% Senior Notes due 2059	New York Stock Exchange
7.000% Senior Notes due 2060	New York Stock Exchange
5.875% Senior Notes due 2061	New York Stock Exchange

Securities registered pursuant to Section 12(g) of the Act: None

	Yes	No
Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act.	[x]	[ ]
Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Exchange Act.	[ ]	[x]
Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days.	[x]	[ ]
Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T during the preceding 12 months (or for such shorter period that the registrant was required to submit such files).	[x]	[ ]
Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K.	[ ]	

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of “large accelerated filer,” “accelerated filer,” “smaller reporting company,” and "emerging growth company" in Rule 12b-2 of the Exchange Act.			
Large accelerated filer	[x]	Accelerated filer	[ ]
Non-accelerated filer	[ ]	Smaller reporting company	[ ]
		Emerging growth company	[ ]

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act.	[ ]

	Yes	**No**
Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act).	[ ]	[x]

As of June 30, 2018 , the aggregate market values of the registrant’s Common Shares and Series A Common Shares held by non-affiliates were approximately $2 billion and $2 million , respectively. For purposes hereof, it was assumed that each director, executive officer and holder of 10% or more of any class of voting equity security of Telephone and Data Systems, Inc. (TDS) is an affiliate. The June 30, 2018 , closing price of the Common Shares was $27.42 as reported by the New York Stock Exchange. Because trading in the Series A Common Shares is infrequent, the registrant has assumed for purposes hereof that each Series A Common Share has a market value equal to one Common Share because the Series A Common Shares are convertible on a share-for-share basis into Common Shares.

The number of shares outstanding of each of the registrant’s classes of common stock, as of January 31, 2019 , is 106,539,000 Common Shares, $.01 par value, and 7,284,900 Series A Common Shares, $.01 par value.

DOCUMENTS INCORPORATED BY REFERENCE

Those sections or portions of the registrant's 2018 Annual Report to Shareholders (Annual Report), filed as Exhibit 13 hereto, and of the registrant’s Notice of Annual Meeting of Shareholders and Proxy Statement (Proxy Statement) to be filed prior to April 30, 2019 , for the 2019 Annual Meeting of Shareholders scheduled to be held May 23, 2019, are herein incorporated by reference into Parts II and III of this report.

Telephone and Data Systems, Inc.

Annual Report on Form 10-K
For the Period Ended December 31, 2018

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Telephone and Data Systems, Inc.
30 NORTH LASALLE STREET, SUITE 4000,
CHICAGO, ILLINOIS 60602
TELEPHONE (312) 603-1900

PART I

Item 1. Business

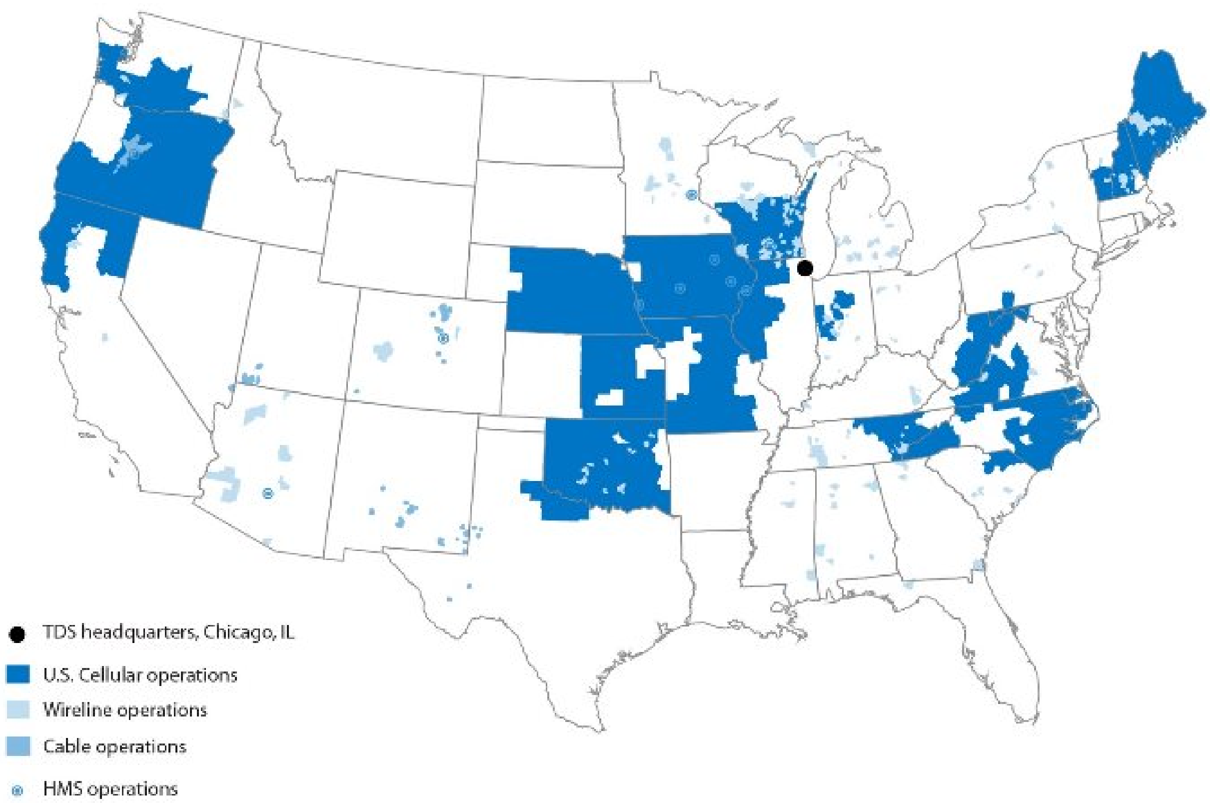
Telephone and Data Systems, Inc. (TDS) is a diversified telecommunications company providing high-quality communications services to customers with 5.0 million wireless connections and 1.2 million wireline and cable connections at December 31, 2018 . TDS conducts all of its wireless operations through its majority-owned subsidiary, United States Cellular Corporation (U.S. Cellular). As of December 31, 2018 , TDS owned 82% of the combined total of the outstanding Common Shares and Series A Common Shares of U.S. Cellular and controlled 96% of the combined voting power of both classes of U.S. Cellular common stock. TDS provides broadband, video and voice services through its wholly-owned subsidiary, TDS Telecommunications LLC (TDS Telecom). TDS was incorporated in 1968 and is incorporated in Delaware. TDS Common Shares trade under the ticker symbol “TDS” on the New York Stock Exchange (NYSE). U.S. Cellular Common Shares trade on the NYSE under the ticker symbol “USM.”

Under listing standards of the NYSE, TDS is a “controlled company” as such term is defined by the NYSE. TDS is a controlled company because over 50% of the voting power for the election of directors of TDS is held by the trustees of the TDS Voting Trust.

TDS has three business segments: U.S. Cellular and TDS Telecom’s Wireline and Cable. TDS operations also include the operations of its wholly-owned hosted and managed services (HMS) subsidiary, which operates under the OneNeck IT Solutions brand, and its wholly-owned printing subsidiary Suttle-Straus, Inc. (Suttle-Straus). HMS' and Suttle-Straus’ financial results were not significant to TDS’ operations. All of TDS’ segments operate only in the United States, except for HMS, which includes an insignificant foreign operation.

TDS re-evaluated internal reporting roles with regard to its HMS business unit and, as a result, changed its reportable segments. Effective January 1, 2018, HMS was considered a non-reportable segment and is no longer being reported under TDS Telecom. Additional information about TDS’ segments is incorporated herein by reference from Note 18 — Business Segment Information in TDS’ Annual Report to Shareholders, filed as Exhibit 13 hereto.

The map below highlights TDS’ consolidated areas of operations:



U.S. CELLULAR OPERATIONS

General

U.S. Cellular, incorporated under the state laws of Delaware in 1983, provides wireless telecommunications services to customers with 5.0 million connections in 22 states collectively representing a total population of 31 million . U.S. Cellular operates in one reportable segment, and all of its wireless operating markets are in the United States. U.S. Cellular's strategy is to attract and retain wireless customers through a value proposition comprised of a high-quality network, outstanding customer service, and competitive devices, plans, and pricing, all provided with a local focus.

Customers, Services and Products

Customers. U.S. Cellular provides service to postpaid and prepaid customers from a variety of demographic segments. U.S. Cellular focuses on retail consumers, government entities, and small-to-mid-size business customers in industries such as construction, retail, agriculture, professional services and real estate. These customers are served primarily through U.S. Cellular's retail and direct sales channels. U.S. Cellular builds customer loyalty by offering high-quality network services, outstanding customer-focused support services, competitive pricing, and other benefits as discussed further in "Marketing, Customer Service, and Sales and Distribution Channels" below.

Services. U.S. Cellular's customers are able to choose from a variety of national plans with voice, messaging and data usage options and pricing that are designed to fit different customer needs, usage patterns and budgets. Helping a customer find the right plan is an important element of U.S. Cellular's brand positioning. In 2018, U.S. Cellular introduced the Unlimited with Payback plan that provides a monthly bill credit to postpaid customers if they have used less than 3 gigabytes of data per line. U.S. Cellular's national plans price all domestic calls as local calls, regardless of where they are made or received in the United States, with no long distance or roaming charges, made possible by roaming agreements with other wireless carriers. See "Network Technology, Roaming, and System Design" section below for further discussion related to roaming.

U.S. Cellular's portfolio of smartphones, tablets and other connected devices is a key part of its strategy to deliver wireless devices that allow customers to stay productive, entertained and connected on the go; these devices are backed by U.S. Cellular's high-speed fourth generation (4G) Long-Term Evolution (LTE) network. U.S. Cellular's 4G LTE network features smartphone messaging, data and internet services that allow customers to access the internet; text, picture and video message; utilize GPS navigation; and browse and download thousands of applications to customize their wireless devices to fit their lifestyles. U.S. Cellular's Voice over Long-Term Evolution (VoLTE) technology, which has been launched successfully in multiple markets, enables customers to utilize the 4G LTE network for both voice and data services, and offers enhanced services such as high definition voice and simultaneous voice and data sessions. U.S. Cellular also offers advanced wireless solutions to consumers and business and government customers, including a growing suite of connected machine-to-machine (M2M) solutions and software applications across the categories of monitor and control (e.g., sensors and cameras), business automation/operations (e.g., e-forms), communication (e.g., enterprise messaging, back-up router for business continuity services) and asset management (e.g., telematics, fleet management). U.S. Cellular intends to continue to further enhance these offerings for customers in 2019 and beyond.

Devices and Products. U.S. Cellular offers a comprehensive range of wireless devices such as handsets, tablets, mobile hotspots, home phones and routers for use by its customers. U.S. Cellular offers wireless devices that are compatible with its 4G LTE and third generation (3G) networks and are compliant with the Federal Communications Commission (FCC) enhanced wireless 911 requirements. In addition, U.S. Cellular also offers a wide range of accessories, including wireless essentials such as cases, screen protectors, chargers, and memory cards as well as an assortment of consumer electronics such as headphones, smart speakers, wearables and home automation products (e.g., cameras, sensors, and thermostats).

Throughout 2018, new postpaid handset sales to retail consumers were made primarily under equipment installment plans (EIP); business and government customers may continue to purchase equipment under alternative plans subject to a service contract. For certain installment plans, after a specified period of time or number of payments, the customer may have the right to upgrade to a new device prior to reaching the end of the installment term, thus enabling customers to access the latest smartphones and provide a better overall customer experience.

U.S. Cellular also offers accessories for purchase on installment plans. These plans allow new and existing postpaid customers to purchase certain accessories payable over a specified time period. These accessory installment plans are available through U.S. Cellular company-owned retail stores, telesales channels, and agent channels using direct fulfillment with U.S. Cellular's inventory.

U.S. Cellular continues to offer device service programs that provide customers a simple process to replace a defective device. U.S. Cellular also offers its Trade-In program where U.S. Cellular buys consumers' used equipment, Device Protection+ program, which includes overnight delivery of a replacement device for damaged, lost and stolen devices, Device Protection+ Advanced program, which includes 100GB of data backup, TechSupport+, and AppleCare services for Apple iOS customers.

U.S. Cellular offers a full array of iconic smartphones with options for both Android and iOS customers. U.S. Cellular continues to bolster its expanding smartphone portfolio with the Samsung Galaxy S® 9/9+ and Note 9, the iPhone® XS/XS Max and XR, the LG V40 ThinQ, and the Motorola Z3 Play. Along with the iconic devices, U.S. Cellular supports the larger ecosystem of Samsung and Apple devices, such as the Samsung Galaxy Watch, the Samsung Gear Sport and the Apple Watch Series 4. For tablets, U.S. Cellular offers the full complement of iPads and the Samsung Galaxy Tab series. U.S. Cellular's smartphone offerings play a significant role in attracting customers and driving data service usage and revenues. U.S. Cellular also offers additional services and products that utilize U.S. Cellular's network, including feature phones, mobile hotspots, LTE wireless routers, LTE wireless cameras, and home phones.

U.S. Cellular purchases wireless devices and accessory products from a number of original equipment manufacturers and distributors, including Samsung, Apple, Motorola, LG, Kyocera, Inseego, Netgear, Tessco, Voicecomm and Superior. U.S. Cellular manages relationships with its suppliers to ensure best possible pricing and identifies opportunities for promotional support. U.S. Cellular does not own significant product warehousing and distribution infrastructure; rather, it contracts with third party providers for the majority of its product warehousing, distribution and direct customer fulfillment activities. U.S. Cellular also contracts with third party providers for services related to its device service programs.

U.S. Cellular continuously monitors the financial condition of its wireless device and accessory suppliers. Since U.S. Cellular has a diversified portfolio of products from more than one supplier, U.S. Cellular does not expect the financial condition of any single supplier to affect its ability to offer a competitive portfolio of wireless devices and accessories for sale to customers.

Marketing, Customer Service, and Sales and Distribution Channels

Marketing and Advertising. U.S. Cellular's marketing plan is focused on acquiring, retaining and growing customer relationships by maintaining a high-quality wireless network, providing outstanding customer service, and offering a comprehensive portfolio of services and products built around customer needs at fair prices with a local focus. U.S. Cellular believes that creating positive relationships with its customers enhances their wireless experience and builds customer loyalty. U.S. Cellular currently offers several customer-centric programs and services to customers.

To attract potential new customers and retain existing customers, and increase their usage of U.S. Cellular's services, U.S. Cellular's advertising is directed at increasing the public awareness of the U.S. Cellular brand, knowledge of the outstanding network that works in places where other carriers do not have coverage, and understanding of the wireless services it offers. U.S. Cellular supplements its advertising with a focused public relations program that improves overall brand sentiment and awareness, encourages engagement, supports sales of services and products, and builds preference and loyalty for the U.S. Cellular brand. The approach combines national and local media relations in mainstream and social media channels with market-wide activities, events, and sponsorships.

U.S. Cellular focuses its charitable giving on initiatives relevant to consumers in its service areas. These initiatives include programs that focus on STEM (Science, Technology, Engineering and Math) activities for youth in the communities U.S. Cellular serves and often involve collaboration with organizations such as the Boys and Girls Clubs of America.

Customer Service. U.S. Cellular manages customer retention by focusing on outstanding customer service through the development of processes that are customer-friendly, extensive training of frontline sales and support associates and the implementation of retention programs.

U.S. Cellular currently operates four regional customer care centers in its operating markets with personnel who are responsible for customer service activities, and a national financial services center with personnel who perform credit and other customer payment activities. U.S. Cellular also contracts with third parties that provide additional customer care and financial services support.

Sales and Distribution Channels. U.S. Cellular supports a multi-faceted distribution program, including retail sales, direct sales, third-party national retailers, and independent agents, plus a website and telesales.

Company retail store locations are designed to market wireless services and products to the consumer and small business segments in a setting familiar to these types of customers. As of December 31, 2018 , retail sales associates work in 259 U.S. Cellular-operated retail stores and kiosks. Direct sales representatives sell traditional wireless services as well as Internet of Things (IoT) and M2M products and solutions to medium- and large-sized businesses and government entities. Additionally, the U.S. Cellular website enables customers to purchase wireless devices online.

U.S. Cellular maintains an ongoing training program to improve the effectiveness of retail sales associates and direct sales representatives by focusing their efforts on obtaining customers by facilitating the sale of appropriate packages for the customer's expected usage and value-added services that meet the individual needs of the customer.

U.S. Cellular has relationships with exclusive and non-exclusive agents (collectively "agents"), which are independent businesses that obtain customers for U.S. Cellular on a commission basis. At December 31, 2018 , U.S. Cellular had contracts with these businesses aggregating 436 locations. U.S. Cellular provides support and training to its agents to increase customer satisfaction and to ensure a consistent customer experience. U.S. Cellular's agents are generally in the business of selling wireless devices, wireless service packages and other related products. No single agent accounted for 10% or more of U.S. Cellular's operating revenues during the past three years.

U.S. Cellular services and products also are offered through third-party national and on-line retailers. Wal-Mart, Sam's Club, Family Dollar and Dollar General offer U.S. Cellular services and products at select retail locations in U.S. Cellular's service areas. U.S. Cellular continues to explore new relationships with additional third-party retailers as part of its strategy to expand distribution.

Seasonality. Seasonality in operating expenses may cause operating income to vary from quarter to quarter. U.S. Cellular's operating expenses tend to be higher in the fourth quarter due to increased marketing and promotional activities during the holiday season.

Competition

The wireless telecommunication industry is highly competitive. U.S. Cellular competes directly with several wireless service providers in each of its markets. In general, there are between two and four competitors in each wireless market in which U.S. Cellular provides service, excluding resellers and mobile virtual network operators (MVNO). In its footprint, U.S. Cellular competes to varying degrees against each of the national wireless companies: Verizon Wireless, AT&T Mobility, Sprint, and T-Mobile USA, in addition to a few smaller regional carriers in specific areas of its footprint. All of the national competitors have substantially greater financial and other resources than U.S. Cellular. In addition, U.S. Cellular competes with other companies that use alternative communication technology and services to provide similar services and products.

Since each of these wireless competitors operates on systems using spectrum licensed by the FCC and has comparable technology and facilities, competition among wireless service providers for customers is principally on the basis of types of services and products, price, size of area covered, network quality, network speed and responsiveness of customer service. U.S. Cellular employs a customer satisfaction strategy that includes maintaining an outstanding wireless network throughout its markets. U.S. Cellular owns and operates low-band spectrum (less than 1 GHz) that covers the majority of its footprint and enables more efficient coverage in rural areas (compared to spectrum above 1 GHz), which strengthens its network quality positioning. To the extent existing competitors or new entrants hold or acquire such spectrum in U.S. Cellular markets, U.S. Cellular could face increased competition over time. In addition, industry deployment of fifth generation (5G) technology could introduce increased competition from industry participants on bases such as network speed and new product offerings.

The use of national advertising and promotional programs by the top four wireless service providers is a source of additional competitive and pricing pressures in all U.S. Cellular markets, even if those operators do not provide direct service in a particular market. Over the past year, competition among top carriers has continued to be robust, with the top four carriers offering unlimited plans as well as device price reductions. In addition, in the current wireless environment, U.S. Cellular’s ability to compete depends on its ability to continue to offer national voice and data plans. U.S. Cellular provides wireless services comparable to the national competitors, but the national wireless companies operate in a wider geographic area and are able to provide such services over a wider area on their own networks than U.S. Cellular can offer on its network. Although U.S. Cellular offers similar coverage area as these competitors, U.S. Cellular incurs roaming charges for data sessions and calls made in portions of the coverage area which are not part of its network, thereby increasing its cost of operations. U.S. Cellular depends on roaming agreements with other wireless carriers to provide voice and data roaming capabilities in areas not covered by U.S. Cellular’s network. Similarly, U.S. Cellular provides roaming services on its network to other wireless carriers’ customers who travel within U.S. Cellular’s coverage areas and receives revenue from other carriers for the provision of these services.

Convergence of connectivity is taking place on many levels, including wireless devices that can act as wireless or wireline replacement devices and the incorporation of wireless “hot spot” technology in wireless devices making internet access seamless regardless of location. Although less directly a substitute for other wireless services, wireless data services such as Wi-Fi may be adequate for those who do not need mobile wide-area roaming or full two-way voice services. If the trend toward convergence continues, U.S. Cellular is at a competitive disadvantage to larger competitors, including the national wireless carriers, traditional cable companies, MVNOs and other potential large new entrants with much greater financial and other resources in adapting to such convergence. Cable companies have begun to compete in the wireless market. Most notably, Comcast and Charter currently offer wireless services.

U.S. Cellular’s approach in 2019 and in future years will be to focus on the unique needs and attitudes of its customers towards wireless service. U.S. Cellular will deliver high-quality services and products at competitive prices and intends to continue to differentiate itself by seeking to provide an overall outstanding customer experience, founded on a high-quality network. U.S. Cellular’s ability to compete successfully in the future will depend upon its ability to anticipate and respond to changes related to new service offerings, consumer preferences, competitors’ pricing strategies and new product offerings, technology, demographic trends, economic conditions and its access to adequate spectrum resources.

Network Technology, Roaming, and System Design

Technology. Wireless telecommunication systems transmit voice, data, graphics and video through the transmission of signals over networks of radio towers using radio spectrum licensed by the FCC. Access to local, regional, national and worldwide telecommunications networks is provided through system interconnections. A high-quality network, supported by continued investments in that network, will remain an important factor for U.S. Cellular to remain competitive.

VoLTE technology allows customers to utilize a 4G LTE network for both voice and data services, and offers enhanced services such as high definition voice and simultaneous voice and data sessions. In addition, the deployment of VoLTE technology expands U.S. Cellular’s ability to offer roaming services to other wireless carriers. VoLTE technology has been launched successfully in California, Iowa, Oregon, Washington and Wisconsin, and deployments in several additional operating markets will occur in 2019.

5G technology is expected to help address customers’ growing demand for data services as well as create opportunities for new services requiring high speed and reliability as well as low latency. U.S. Cellular is committed to continuous technology innovation and continues to prepare for deployment of 5G technology beginning in 2019, including commencing a trial utilizing 5G standards and equipment on its core LTE network in the fourth quarter of 2018. U.S. Cellular is partnering with leading companies in the wireless infrastructure and handset ecosystem to provide rich 5G experiences for customers. In addition, in the markets where U.S. Cellular commercially deploys 5G technology, which will include communities of various sizes, customers using U.S. Cellular’s 4G LTE network will experience increased network speed due to U.S. Cellular's modernization efforts. The deployment of 5G technology will require substantial investments in spectrum and U.S. Cellular’s networks to remain competitive.

Roaming. A secondary source of revenue for U.S. Cellular is from customers of other wireless operators who roam on its network. Inter-carrier roaming agreements are negotiated between the wireless operators to enable customers who are in a wireless service area other than the customer's home service area to place or receive a call or text message, or to use data services, in that service area. U.S. Cellular has entered into reciprocal roaming agreements with operators of other wireless systems covering virtually all systems with Code Division Multiple Access (CDMA) technology in the United States. In addition, U.S. Cellular has entered into reciprocal 4G LTE roaming agreements with national wireless companies and, as a result, a majority of U.S. Cellular customers currently have access to nationwide 4G LTE service.

Another digital technology, Global System for Mobile Communication (GSM), has a larger installed base of customers worldwide. U.S. Cellular customers now have the ability to roam on GSM carriers with voice, data and text messaging in Canada, Mexico and internationally. Both CDMA and GSM technologies are being succeeded by 4G LTE, VoLTE and 5G technology.

System Design and Construction. U.S. Cellular designs and constructs its systems in a manner it believes will permit it to provide high-quality service to substantially all types of compatible wireless devices. Designs are based on engineering studies which relate to specific markets, in support of the larger network. Network reliability is given careful consideration and extensive backup redundancy is employed in many aspects of U.S. Cellular's network design. Route diversity, redundant equipment, ring topology and extensive use of emergency standby power also are used to enhance network reliability and minimize service disruption from any particular network element failure.

In accordance with its strategy of building and strengthening its operating market areas, U.S. Cellular has selected high-capacity, carrier-class digital wireless switching systems that are capable of serving multiple markets through a single mobile telephone switching office. Centralized equipment, used for network and data management, is located in high-availability facilities supported by multiple levels of power and network redundancy. U.S. Cellular's systems are designed to incorporate Internet Protocol (IP) packet-based Ethernet technology, which allows for increased data capacity and a more efficient network. Interconnection between the mobile telephone switching office and the cell sites utilizes Ethernet technology for nearly all 4G LTE sites, over fiber or microwave links.

As a result of increasing demand for high–speed data and the deployment of 5G technology, U.S. Cellular expects to acquire additional spectrum licenses and to make significant investments in its network to provide sufficient capacity and throughput.

Construction of wireless systems is capital-intensive, requiring substantial investment for land and improvements, buildings, towers, mobile telephone switching offices, cell site equipment, transport equipment, engineering and installation. U.S. Cellular primarily uses its own personnel to engineer each wireless system it owns and operates, and engages contractors to construct the facilities.

The costs (inclusive of the costs to acquire licenses) to develop the systems which U.S. Cellular operates have historically been financed primarily through proceeds from debt offerings, with cash generated by operations, and proceeds from the sales of wireless interests and other non-strategic assets.

Business Development Strategy

U.S. Cellular operates a regional wireless network. U.S. Cellular's interests in wireless licenses include both direct interests whereby U.S. Cellular is the licensee and investment interests in entities which are licensees; together, these direct and investment interests involve operating and non-operating licenses covering 30 states and a total population of approximately 50 million at December 31, 2018 .

U.S. Cellular's business development strategy is to obtain interests in or access to wireless licenses in its current operating markets and in areas that are adjacent to or in close proximity to its other wireless licenses, thereby building larger geographic operating market areas. U.S. Cellular believes that the acquisition of additional licenses within its current operating markets will enhance its network capacity and speed to meet its customers' growing demand for data services. From time to time, U.S. Cellular has divested outright or included in exchanges for other wireless interests certain consolidated and investment interests that were considered less essential to its current and expected future operations. As part of its business development strategy, U.S. Cellular may periodically be engaged in negotiations relating to the acquisition, exchange or disposition of companies, strategic properties, investment interests or wireless spectrum.

The FCC conducts auctions through which additional spectrum is made available for the provision of wireless services. Historically, U.S. Cellular has participated in certain FCC auctions both directly and indirectly through its limited partnership interests. At its open meeting on August 2, 2018, the FCC adopted a public notice establishing procedures for two auctions of Millimeter Wave spectrum licenses in the 28 GHz and 24 GHz bands. The 28 GHz auction (Auction 101), which commenced on November 14, 2018 and closed on January 24, 2019, offered two 425 MHz licenses in the 28 GHz band over portions of the United States that do not have incumbent licensees. The 24 GHz auction (Auction 102) will offer up to seven 100 MHz licenses in the 24 GHz band in Partial Economic Areas covering most of the United States. Upfront payments for Auction 102 were due by February 19, 2019, and bidding in Auction 102 is scheduled to begin on March 14, 2019. U.S. Cellular filed applications to participate in both auctions on September 18, 2018, and was announced as a qualified bidder for Auction 101 on October 31, 2018. The FCC has not announced qualified bidders for Auction 102. Also, at the open meeting on August 2, 2018, the FCC adopted a Further Notice of Proposed Rulemaking in preparation for an additional Millimeter Wave auction offering licenses in the 37, 39 and 47 GHz bands. FCC statements indicate plans to hold this auction in the second half of 2019. The spectrum auctioned in each of these Millimeter Wave auctions is expected to be used primarily to deliver 5G technology.

TDS TELECOM OPERATIONS

General

TDS Telecom operates Wireline and Cable subsidiaries that provide communications services to 1.2 million connections. TDS Telecom's business objective is to provide a wide range of communications services to both residential and commercial customers.

Growth Strategy

Both Wireline and Cable share a common growth strategy to provide high-speed data services bundled with video entertainment and voice services. In Wireline, TDS Telecom is focused on investing in fiber to the home technologies to provide high-speed internet services of up to 1 G igabit per second (Gbps) to new and existing markets. Increased fiber deployment provides the opportunity to deliver more robust residential and commercial products which drives future growth. F iber builds in locations outside of its current markets allows TDS Telecom to target the most attractive markets to increase its total footprint. TDS Telecom has completed the construction of a fiber network in an initial out-of-territory market which has provided the basis for expanding this strategy. Therefore, several additional new locations are currently being built with fiber to expand its footprint into attractive markets that are underserved today. Similarly, in its Cable markets, TDS Telecom is also focused on providing high-speed data services, offering up to 600 Megabits per second (Mbps) data speeds over its DOCSIS 3.0 network, and investing in fiber-to-home construction in new housing developments in these fast growing markets.

TDS Telecom may also seek to grow its operations through the acquisition of businesses that support and complement its existing markets or create entirely new clusters of markets where TDS Telecom can succeed. TDS Telecom intends to avoid markets served by other fiber overbuilders or municipalities which have constructed their own networks with fiber to the home .

Core Network

In order to provide IP-based services, TDS Telecom has developed and deployed an inter-regional data routing infrastructure using owned and leased fiber capacity which allows it to leverage its multi-terabit core network in both Wireline and Cable operations. This configuration, along with the continued development of an IP network that interconnects substantially all the existing service territories, allows for next generation IP service offerings.

The TDS Telecom core network continues to standardize equipment and processes to increase efficiency in maintaining its network. TDS Telecom utilizes centralized monitoring and management of its network to reduce costs and improve service reliability. Network standardization has aided TDS Telecom in operating its 24-hours-a-day / 7-days-per-week Network Management Center, which continuously monitors the network in an effort to proactively identify and correct network faults prior to any customer impact.

Wireline

Operations

TDS Telecom is a broadband-centric telecommunications company that operates as an Incumbent Local Exchange Carrier (ILEC) in 25 states and as a Competitive Local Exchange Carrier (CLEC) in Illinois, Michigan, Minnesota, New Hampshire, and Wisconsin. Wireline operations provide telecommunications services to both residential and commercial customers. Wireline also provides services to wholesale customers, which are primarily interexchange carriers (companies that provide long-distance telephone and data services between local exchange areas) and wireless carriers that compensate TDS Telecom for the use of its facilities to originate and terminate their voice and data transmissions. Wireline operations are located across nearly 900 rural, suburban, and metropolitan communities within the U.S, with the largest concentrations of customers in the Upper Midwest and the Southeast.

Customers, Services and Products

Wireline generates revenues by providing the following services and products:

- Broadband: Fiber technology is being deployed to select markets to provide internet speeds of up to 1 Gbps. In certain non-fiber markets, TDS Telecom is deploying fiber-to-the-node and copper-based vectoring / pair bonding technology to increase data speeds reaching up to 100 Mbps. Premium security and support services are available to enhance the customers' high-speed internet experience.
- Video: TDS TV is a comprehensive all-digital TV service available in select TDS markets that provides customers with connected-home digital video recorders (DVR), video-on-demand (VOD), TV Everywhere (TVE) and other enhanced applications and features. Where TDS TV is not available, TDS Telecom partners with a satellite TV provider to offer digital television.
- Voice: Call plans include local and long-distance telephone service, VoIP and enhanced services like find me follow me, collaboration, instant messaging and more. Many features are bundled with calling plans to give customers the best value.
- Network access services are provided to interexchange and wireless carriers for transporting data and voice traffic on TDS Telecom's network.

Wireline is focusing its investments on broadband as the core growth component of its service offerings. Wireline believes that its residential and business customers have a strong preference to purchase complementary telecommunications services from a single provider. The Wireline residential customer strategy is to provide broadband, video and voice services either individually or through value-added bundling of these services. Wireline has found that by delivering the best broadband speeds combined with a robust video experience, it can build customer loyalty and promote growth. The commercial focus is to provide a suite of advanced IP-based data and voice services to customers primarily ranging in size from sole proprietors to small- and medium-sized businesses.

To attract and retain customers in the video business, TDS Telecom is developing a next generation video platform called TDS TV+ which will enhance the customer experience by adding interfaces to mobile devices, personalized content recommendations, and network-based DVR functionality. TDS TV+ will be offered in its Wireline and Cable operations and will offer video content and features not available on existing TDS platforms.

Residential . Wireline residential customer operations provide high-speed data, video and voice services. TDS Telecom features a wide range of reliable, affordable speeds to fit every lifestyle and every budget, including 1 Gbps internet. In selected residential markets, Wireline's marketing and promotional strategies include a focus on its Internet Protocol Television (IPTV) service offering under the brand TDS TV. This IP based video offering is intended to counter intensifying competition for video services. In markets where IPTV is not offered, TDS Telecom has partnered with a satellite TV provider to allow for triple or double play bundling. Approximately 78% of ILEC customers have at least two services.

Commercial . Wireline commercial customer operations provide broadband, IP-based services, and hosted voice and collaboration services to small- to medium-sized businesses. Wireline operations provide commercial customers with secure and reliable internet access, data connections and advanced voice service with VoIP features. TDS Telecom's commercial service focus is to lead with superior broadband bundled with a voice product from a suite of solutions.

Wholesale . Wireline operations continue to provide a high level of service to traditional interexchange and wireless carriers. Wireline's wholesale market focus is on access revenues, which is the compensation received from the interexchange carriers for carrying data and voice traffic on TDS Telecom's networks. Federal Connect America Fund (CAF) and state Universal Service Fund (USF) revenues, which support the cost of providing telecommunication services in underserved high cost areas, are also included in wholesale service revenues.

In 2017, TDS began receiving $75 million per year for 10 years (with incremental funding for transition in the early years for certain states) for operating and maintaining its network along with the obligation to provide broadband service at various speeds to about 160,000 locations. In 2018, the FCC authorized and issued an order for TDS Telecom to receive an additional $3 million of support per year for ten years retroactive to January 2017. Continuing regulatory changes may affect the amounts of future Wireline wholesale revenues. See additional information in Risk Factors and information incorporated by reference from Exhibit 13 to this Form 10-K, Annual Report section "Regulatory Matters".

Access Technology and System Design

Wireline operates an integrated, highly-reliable network that consists of central office host and remote sites, primarily equipped with digital and IP switches. Fiber optic and copper cable connect the host central offices with remote switches and ultimately with end customers. Wireline continues to upgrade and expand its telecommunications network to respond to the needs of its customers for greater bandwidth and advanced technologies. Broadband service is provided to 96% of Wireline's ILEC service addresses. The network is transitioning from its legacy circuit-switched network to a highly reliable IP-based broadband network to facilitate the integration of broadband, video and voice services.

Wireline pursues a plan to deploy fiber-to-the-home technology, which enables significantly greater broadband speeds to selected residential subdivisions and to commercial customers, when the investment is economically justified. Fiber technology is deployed to provide internet speeds of up to 1 Gbps. In addition, in non-fiber markets, data speeds are increased through the use of fiber-to-the-node and copper bonding / vectoring technology. Approximately 49% of Wireline service addresses were capable of 25 Mbps or greater broadband speeds at the end of 2018 .

Competition

The competitive environment in the telecommunications industry has changed significantly as a result of technological advances, customer expectations, and changes to regulation. Wireline continues to seek to develop and maintain an efficient cost structure to ensure that it can compete with price-based initiatives from competitors. Wireline faces significant challenges, including competition from cable, low-cost voice providers, other wireline and wireless providers as well as decreases in compensation received for the use of TDS Telecom's networks.

Wireline has experienced customer connection and access minute declines due to competition from wireless carriers offering local and nationwide voice and data plans, from cable providers offering voice and data services via cable modems, from fiber overbuilders, and from other low cost voice providers.

Cable companies have developed technological improvements that have allowed them to extend their competitive operations beyond major markets and have enabled them to provide a broader range of data and voice services over their cable networks. Cable companies have aggressively pursued the bundling of data, video and voice products at discounted prices to attract customers from traditional telephone companies. In addition, cable companies continue to add value to their internet offerings by increasing speeds at little to no additional cost to the customer. Wireline estimates that 80% of its ILEC service addresses face active competition from cable providers at December 31, 2018 . Cable companies are increasingly targeting commercial customers.

Wireless telephone service providers offering feature-rich wireless devices and improved network quality constitute a significant source of voice and broadband competition. A growing segment of customers have chosen to completely forego the use of traditional wireline telephone service and instead rely solely on wireless service for voice communications services. This trend is more pronounced among residential customers, which comprise approximately 66% of Wireline connections as of December 31, 2018 . Some small businesses have followed the residential path by choosing wireless service and disconnecting wireline voice service.

While TDS Telecom positions itself as a high-quality telecommunications provider, it is also experiencing competition from Regional Bell Operating Companies (RBOCs) in areas where TDS Telecom competes as a CLEC. Approximately 20% of TDS Telecom's customer connections are within CLEC operations. The RBOCs are continuing to implement technological changes that could impede TDS Telecom’s access to facilities used to provide CLEC telecommunications services. In addition, the RBOCs have petitioned the FCC to stop enforcing requirements that allow CLECs to access that infrastructure at wholesale rates. To mitigate these risks, TDS Telecom has refocused the business on serving customers who do not require leased facilities.

Cable

Operations

TDS Telecom entered the cable business with TDS' acquisition of Baja Broadband in 2013. Subsequently, in 2014, TDS acquired substantially all of the assets of a group of companies operating as BendBroadband, headquartered in Bend, Oregon. TDS Telecom’s cable business leverages its Wireline core competencies in network management and customer focus, and operates under two brand names: TDS Cable in Colorado, New Mexico, Texas, and Utah; and BendBroadband in Oregon.

Similar to Wireline, the Cable strategy is to expand its broadband services and leverage that growth by bundling with video and voice services. Through investment in plant upgrades and improvements in programming and customer service levels, TDS Telecom intends to strengthen its markets and continue to grow its revenue base.

Customers, Services and Products

Residential. Cable offers advanced broadband, video and voice services. These services are actively bundled at competitive prices to encourage cross-selling within Cable’s customer base and to attract new customers. Approximately 56% of residential customers subscribe to a bundle of services.

- Broadband: DOCSIS 3.0 technology is deployed to nearly all of Cable’s service addresses which allows it to offer enhanced transmission speeds. TDS Telecom is offering 600 Mbps in almost all its markets with up to 1 Gbps service available in select markets. Access to 24/7 technical support and security features is also provided to broadband customers. The implementation of DOCSIS 3.1 technology is currently underway and will offer significantly higher speeds of up to 1 Gbps.
- Video: Customers have access to basic service, premium programming and high-definition television combined with DVR service. Cable introduced “CatchTV,” a branded whole-home DVR solution.
- To attract and retain customers in the video business, TDS Telecom is developing a next generation video platform called TDS TV+ which will enhance the customer experience by adding interfaces to mobile devices, personalized content recommendations and network-based DVR functionality. TDS TV+ will be offered in its Wireline and Cable operations and will offer video content and features not available on existing TDS platforms.
- Voice: Telephony service uses IP to transport digitized voice signals over the same private network that brings cable television and broadband services to customers. All residential voice service customers have access to direct international calling and can subscribe to various long distance plans.

Commercial. Business services are delivered over a robust network to provide broadband products, multi-line phone solutions and video. Cable provides advanced business services, including data networking, Ethernet, broadband access and VoIP services, to small- and medium-sized businesses.

Access Technology and System Design

Cable’s telecommunication systems are designed to transmit broadband, video and voice services using a hybrid fiber-coaxial network that consists of optical fiber transport from a headend facility to nodes where coaxial cable is then used to reach residential and business customers. In certain markets, Cable has an all-fiber network to the home or business. These fiber-rich networks offer substantial bandwidth capacity and, through the use of DOCSIS 3.0 and next generation DOCSIS 3.1 technology, enable Cable to offer robust broadband and voice services as well as traditional and two-way video services. All Cable markets are connected to TDS Telecom’s core network. This allows Cable to leverage existing internet connectivity, voice services, and support systems, which enhances reliability and redundancy and builds greater dependability as a service provider.

Competition

The strategy of the Cable segment is focused on broadband to capitalize on the data needs of consumers. Cable seeks to be the leading provider of broadband and video services in its targeted markets. From a broadband perspective, Cable competes against the incumbent local telephone providers which primarily offer DSL-based services. Cable offers a superior, higher bandwidth data product using its DOCSIS technology. Video competition is primarily from satellite providers, and on a limited basis, telephone companies that offer video services and compete for broadband and voice customers. Other telecommunications providers, including internet-based VoIP providers and wireless providers may compete directly for both residential and commercial voice and broadband service customers. Changes in consumer behavior or new technologies or both could cause consumers to reduce or cancel their cable video services and instead seek to obtain video on demand over the internet or through new technologies. Cable systems are operated under non-exclusive franchises; therefore, competing cable systems may be built in the same area.

TDS — REGULATION

TDS' operations are subject to federal, state and local regulation. Key regulatory considerations are discussed below.

U.S. Cellular

TDS provides various wireless services, including voice and data services, pursuant to licenses granted by the FCC. The construction, operation and transfer of wireless systems in the United States are regulated to varying degrees by the FCC pursuant to the Communications Act of 1934, as amended (Communications Act). The FCC currently does not require wireless carriers to comply with a number of statutory provisions otherwise applicable to common carriers that provide, originate or terminate interstate or international telecommunications. However, the FCC has enacted regulations governing construction and operation of wireless systems, licensing (including renewal of licenses) and technical standards for the provision of wireless services under the Communications Act.

Wireless licenses segmented by geographic areas are granted by the FCC. The completion of acquisitions, involving the transfer of control of all or a portion of a wireless system, requires prior FCC approval. The FCC determines on a case-by-case basis whether an acquisition of wireless licenses is in the public interest. Wireless licenses are granted generally for a ten year term or, in some cases, for a twelve or fifteen year term. The FCC establishes the standards for conducting comparative renewal proceedings between a wireless license holder seeking renewal of its license and challengers filing competing applications. All of U.S. Cellular's licenses for which it applied for renewal since 1995 have been renewed. U.S. Cellular expects to continue to meet the criteria of the FCC's license renewal process.

As part of its data services, U.S. Cellular provides internet access. Such internet access services may be subject to different regulatory requirements than other wireless services.

Although the Communications Act generally pre-empts state and local governments from regulating the entry of, or the rates charged by, wireless carriers, certain state and local governments regulate other terms and conditions of wireless services, including billing, termination of service arrangements, imposition of early termination fees, advertising, network outages, the use of handsets while driving, zoning, land use, privacy, data security and consumer protection. Further, the Federal Aviation Administration also regulates the siting, lighting and construction of transmitter towers and antennae.

Wireline

The FCC generally exercises jurisdiction over all facilities of, and services offered by, TDS Telecom's ILECs as telecommunications common carriers, to the extent they provide, originate or terminate interstate or international telecommunications. State public utility commissions generally exercise jurisdiction over intrastate telecommunications facilities and services. In addition, the Wireline business is subject to various other state and local laws, including laws relating to privacy, data security and consumer protection.

The Communications Act requires, among other things, that telecommunications common carriers offer interstate services when requested at just and reasonable rates at terms and conditions that are non-discriminatory. Maximum rates for regulated interstate services are prescribed by the FCC. In many states, local rates paid by end user customers and intrastate access charges paid by carriers continue to be subject to state commission approval.

TDS Telecom's CLEC operations are subject to similar but reduced regulation compared to ILECs.

In addition to traditional circuit-switched voice service that is fully regulated as a telecommunications common carrier service, TDS Telecom also provides interconnected VoIP, which is currently subject to less regulation.

Cable

As a cable multiple systems operator (MSO), Cable is subject to regulation by the FCC, covering matters such as technical operations, administrative requirements, consumer protection, access by people with disabilities, customer privacy and content. The operation of cable systems requires the MSO to obtain franchises from state or local governmental authorities to occupy public rights of way with network facilities. These franchises typically are nonexclusive and limited in time, contain various conditions and limitations, and provide for the payment of fees to the local authority, determined generally as a standard percentage of revenues.

TDS' Cable operations also provide interconnected VoIP and broadband services, including internet access. The interconnected VoIP and internet regulatory matters and issues described above under "Wireline" are substantially similar for cable providers.

General

Reference is made to Exhibit 13 to this Form 10-K under “Regulatory Matters” for information regarding any significant recent developments and proposals relating to the foregoing regulatory matters.

TDS — OTHER ITEMS

Debt Securities

The following securities trade on the NYSE: TDS’ 6.625% Senior Notes due 2045 trade under the symbol “TDI,” TDS’ 6.875% Senior Notes due 2059 trade under the symbol “TDE,” TDS’ 7.0% Senior Notes due 2060 trade under the symbol “TDJ” and TDS’ 5.875% Senior Notes due 2061 trade under the symbol “TDA.”

Employees

TDS had approximately 9,400 full-time and part-time employees as of December 31, 2018 , less than 1% of whom were represented by labor organizations. TDS considers its relationship with its employees to be good.

Location and Company Information

TDS executive offices are located at 30 North LaSalle Street, Suite 4000, Chicago, Illinois 60602. TDS’ telephone number is 312-630-1900. TDS’ website address is www.tdsinc.com. TDS files with, or furnishes to, the Securities and Exchange Commission (SEC) annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, as well as various other information. Investors may access, free of charge, through the Investor Relations portion of the website, TDS' annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and amendments to such reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended (Exchange Act), as soon as reasonably practical after such material is filed electronically with the SEC. The public may also view electronic filings of TDS by accessing SEC filings at www.sec.gov.

U.S. Cellular executive offices are located at 8410 West Bryn Mawr Avenue, Chicago, Illinois 60631. U.S. Cellular’s telephone number is 773-399-8900. U.S. Cellular’s website address is www.uscellular.com. U.S. Cellular files with, or furnishes to, the SEC annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, as well as various other information. Investors may access, free of charge, through the Investor Relations portion of the website, U.S. Cellular’s annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, and amendments to such reports filed or furnished pursuant to Section 13(a) or 15(d) of the Exchange Act as soon as reasonably practical after such material is filed electronically with the SEC. The public may also view electronic filings of U.S. Cellular by accessing SEC filings at www.sec.gov.

Item 1A. Risk Factors

PRIVATE SECURITIES LITIGATION REFORM ACT OF 1995
SAFE HARBOR CAUTIONARY STATEMENT

This Annual Report on Form 10-K, including exhibits, contains statements that are not based on historical facts and represent forward-looking statements, as this term is defined in the Private Securities Litigation Reform Act of 1995. All statements, other than statements of historical facts, that address activities, events or developments that TDS intends, expects, projects, believes, estimates, plans or anticipates will or may occur in the future are forward-looking statements. The words “believes,” “anticipates,” “estimates,” “expects,” “plans,” “intends,” “projects” and similar expressions are intended to identify these forward-looking statements, but are not the exclusive means of identifying them. Such forward-looking statements involve known and unknown risks, uncertainties and other factors that may cause actual results, events or developments to be significantly different from any future results, events or developments expressed or implied by such forward-looking statements. Such risks, uncertainties and other factors include those set forth below under “Risk Factors” in this Form 10-K. Each of the following risks could have a material adverse effect on TDS’ business, financial condition or results of operations. However, such factors are not necessarily all of the important factors that could cause actual results, performance or achievements to differ materially from those expressed in, or implied by, the forward-looking statements contained in this document. Other unknown or unpredictable factors also could have material adverse effects on future results, performance or achievements. TDS undertakes no obligation to update publicly any forward-looking statements whether as a result of new information, future events or otherwise. You should carefully consider the following risk factors and other information contained in, or incorporated by reference into, this Form 10-K to understand the material risks relating to TDS’ business.

Risk Factors

1) Intense competition in the markets in which TDS operates could adversely affect TDS’ revenues or increase its costs to compete.

Competition in the wireless industry is intense and is expected to intensify in the future due to multiple factors such as increasing market penetration, decreasing customer churn rates, introduction of new products, new competitors and changing prices. There is competition in pricing; handsets and other devices; network quality, coverage, speed and technologies, including 5G technology; distribution; new entrants; and other categories. In particular, wireless competition includes aggressive promotional pricing to induce customers to switch carriers, which could result in switching activity and churn. TDS’ ability to compete effectively will depend, in part, on its ability to anticipate and respond to various competitive factors affecting the telecommunications industry. In addition, unlimited plans and other data pricing constructs across the industry may limit TDS’ ability to monetize future growth in data usage. TDS anticipates that these competitive factors may cause the prices for services and products to decline and the costs to compete to increase. Most of TDS’ competitors are national or global telecommunications companies that are larger than TDS, possess greater financial and other resources, possess more extensive coverage areas and more spectrum within their coverage areas, and market other services with their communications services that TDS does not offer. TDS' competitors are actively marketing their deployment of 5G and as a result, are raising consumer awareness of the technology. If TDS cannot keep pace with its competitors in deploying 5G or other comparable offerings, or if TDS' deployment of 5G technology does not result in significant incremental revenues, TDS' financial condition, results of operations or ability to do business could be adversely affected. Further, other companies that currently are less competitive may also add more efficient low-band spectrum to become more competitive in TDS’ primary markets. In particular, to the extent that existing competitors or new entrants acquired low-band (600 MHz) spectrum or deploy newer wireless technologies in TDS markets, TDS could face increased competition over time. In addition, TDS may face competition from technologies that may be introduced in the future. New technologies, services and products that are more commercially effective than the technologies, services and products offered by TDS may be developed. Further, new technologies may be proprietary such that TDS is not able to adopt such technologies. There can be no assurance that TDS will be able to compete successfully in this environment.

Sources of competition to TDS’ wireless business typically include two to four competing wireless telecommunications service providers in each market, wireline telecommunications service providers, cable companies, resellers (including MVNO), and providers of other alternate telecommunications services. Many of TDS’ wireless competitors and other competitors have substantially greater financial, technical, marketing, sales, purchasing and distribution resources than TDS.

Sources of competition to TDS’ Wireline ILEC business include, but are not limited to, resellers of local exchange services, interexchange carriers, RBOCs, direct broadcast satellite providers, wireless communications providers, cable companies, access providers, CLECs, fiber overbuilders, VoIP providers and providers using other emerging technologies. The Wireline CLEC business sources of competition include the sources identified above as well as the ILEC in each market, which enjoys competitive advantages, including its wireline connection to virtually all of the customers and potential customers of Wireline’s CLEC business, its established brand name, its lower overhead costs, and its substantial financial resources. Wireline’s CLEC business is typically required to discount services to win potential customers. Further, this business may be negatively impacted if it cannot provide levels of bandwidth prospective customers demand due in large part to lack of availability of IP-based wholesale services at competitive prices. In the future, TDS expects the number of its physical access lines served to continue to be adversely affected by wireless voice and broadband substitution, by cable company competition, and potentially by fiber overbuilders.

Some of the specific risks presented by certain Wireline competitors include:

- Cable companies - continued deployment of broadband technologies such as DOCSIS 3.0 and 3.1 and their further evolution that substantially increase broadband speeds, and offering these speeds to customers at relatively low prices, including speed upgrades for no additional charge, and competition for video services.
- Wireless - the trend of customers “substituting” their wireline voice and broadband connections with a wireless device and wireless voice and broadband services continues.
- RBOCs - continue to be formidable competitors given their full suite of services, experience and strong financial resources.
- VoIP providers - are able to offer voice service at a very low price point.
- Fiber overbuilders - municipalities, neighboring ILECs, or other providers offering the same or higher data speeds at similar or lower price points.
- Other providers - competition to IPTV and broadband from broadcast television, satellite providers and on-line video services.

TDS’ Cable business also provides broadband, video and voice services. Cable’s business faces sources of competition similar to the Wireline business, but with some differences. In particular, Cable does not typically compete against another cable company for broadband services, but competes against fiber overbuilders and ILECs that primarily offer DSL-based services and may also offer fiber-based and other premium and enhanced data services. Cable provides VoIP services rather than traditional wireline voice connections and faces competition from other VoIP providers, but also faces competition from ILECs providing traditional wireline voice connections. With respect to video, Cable also competes against broadcast television, direct broadcast satellite providers, on-line video services, and wireline providers which have begun to upgrade their networks to provide video services in addition to voice and high-speed internet access services.

Sources of competition for HMS’ business primarily include large technology companies, as well as smaller independent firms that focus on mid-market companies. In addition, new entrants may emerge and grow rapidly creating additional sources of competition or companies may choose to insource their IT services. The IT services market is large and complex, with a diverse array of segments in which performance and market dynamics vary considerably. As a result of these dynamics the IT services market is a highly competitive environment. Due to the competitive environment, in order to win new customer engagements, HMS may be required to assume greater potential contractual risk obligations, such as risks relating to the consequences of data breaches or unauthorized disclosure of confidential customer information. In the event of such incidents, the HMS business could be materially adversely affected.

If TDS does not adapt to compete effectively in such a highly competitive environment, such competitive factors could result in product, service, pricing or cost disadvantages and could have an adverse effect on TDS’ business, financial condition or results of operations.

2) A failure by TDS to successfully execute its business strategy (including planned acquisitions, spectrum acquisitions, fiber builds, divestitures and exchanges) or allocate resources or capital effectively could have an adverse effect on TDS’ business, financial condition or results of operations.

The successful execution of business strategies, the optimal allocation within TDS’ portfolio of assets and optimal capital allocation decisions depend on various internal and external factors, many of which are not in TDS’ control. TDS’ ability to achieve projected financial results by implementing and executing its business strategies and optimally allocating its assets and capital could be affected by such factors. Such factors include but are not limited to pricing practices by competitors, relative scale, purchasing power, roaming and other strategic agreements, wireless device availability, timing of introduction of wireless devices, access to spectrum, emerging technologies, programming and retransmission costs, mid-market demand for cloud and hosted services, changes in tax or import tariff regulations and other factors. In addition, there is no assurance that U.S. Cellular’s, TDS Telecom’s or HMS' strategies will be successful. Even if TDS executes its business strategies as intended, such strategies may not be successful in the long term at achieving growth in customers, revenues, net income, or generating portfolio returns greater than TDS’ cost of capital. In addition, if at some point a change in asset allocation is desired, TDS may be unable to alter asset allocation to meet growth and return goals in a timely and efficient manner. In such case, there would be an adverse effect on TDS’ business, financial condition and results of operations. TDS’ current forecast indicates that TDS will not achieve a return on capital that exceeds its cost of capital in the foreseeable future. See Item 1. Business for additional information on TDS’ business strategy.

U.S. Cellular is a regional wireless carrier, but competes primarily against much larger national wireless carriers with much greater resources. Its business strategy in attempting to attract and retain wireless customers through a value proposition comprised of a high-quality network, outstanding customer service, and competitive devices, plans and pricing, all provided with a local focus has not resulted in, and in the future may not result in, performance that achieves returns in line with or above its cost of capital. U.S. Cellular’s current forecast indicates that U.S. Cellular will not achieve a return on capital that exceeds its cost of capital in the foreseeable future. U.S. Cellular also might be unable to adopt technologies, services and products as fast as its larger competitors. As a result, consumers who are eager to adopt new technologies, services and products more quickly may select U.S. Cellular’s competitors rather than U.S. Cellular as their service provider. To the extent that U.S. Cellular does not attract or retain these types of customers, U.S. Cellular could be at a competitive disadvantage and have a customer base that generates lower profit margins relative to its competition.

Wireline and Cable each provide broadband, video and voice services and, as a result, have certain risks in common, but also have certain risks that are specific to that segment. Both Wireline and Cable strive to offer the most competitive broadband connection in its markets in order to capitalize on data growth and the customers' need for higher broadband speeds. Wireline's DSL-based services have several limitations compared to DOCSIS technologies employed by cable companies. Where it is cost-effective, Wireline is deploying fiber technology which offers advantages over cable to provide broadband. Wireline is also faced with other significant challenges, including customer connection and access minute declines in traditional wireline voice services as well as decreases in intercarrier compensation received for the use of its networks. Wireline must continually adjust its cost structure as a result of these challenges. A failure to develop and maintain an efficient cost structure would have an adverse effect on the Wireline and Cable businesses. The inability to execute timely on its fiber deployments could have an adverse effect on Wireline's business. In addition, failure to deploy plant upgrades and new technology could result in opportunities for overbuilders to move into Wireline and Cable territories that are not upgraded and build similar or superior networks, which could have an adverse effect on TDS' business. Wireline and Cable's current forecasts indicate that Wireline and Cable will not achieve returns on capital that exceed their costs of capital in the foreseeable future.

Wireline's IPTV product and Cable's video service have significant costs and risks relating to programming and retransmission. Such costs have been increasing and these costs may not be able to be fully passed on to customers. In addition, both businesses are limited in their ability to obtain programming at favorable costs and terms due to their small scale. If Wireline or Cable fails to negotiate agreeable costs or terms with certain broadcast TV stations and cable networks, any resulting service interruptions could have an adverse effect on TDS' business. Further, changes in consumer behavior and/or new technologies are causing consumers to reduce or cancel their video services and instead seek to obtain video on demand over the internet or through new technologies. A wide range of regulatory or other issues also affect both businesses, including matters pertaining to set-top boxes, equipment connectivity, content regulation, closed captioning, pole attachments, privacy, copyright, technical standards, and municipal entry into video and broadband.

Although Cable's business development strategy includes evaluating opportunities for possible further acquisitions of desirable cable companies on attractive terms to increase the scale of its business, there is no assurance that such acquisitions will be available, or that this strategy will be successful.

HMS provides a wide range of IT services and has risks that are not shared with the other business segments. HMS' business strategy is to create, deliver and support a platform of IT products and services tailored for mid-sized business customers. HMS' current forecast indicates that it will not achieve a return on capital that exceeds its cost of capital in the foreseeable future. The HMS business is faced with a number of risks in its pursuit of its strategy, including: the rate of outsourcing IT needs and moving to the cloud by mid-sized business customers; the ability to sell recurring revenue services; the ability to attract new or retain existing customers; whether potential customers ascribe sufficient value to HMS' more customized cloud and hosted services compared to more commodity based offerings of larger competitors; HMS' limited scale when competing with larger competitors; and the impact of IT wage inflation on the profitability of on-shore support services.

A failure by TDS to execute its business strategies successfully or to allocate resources or capital optimally could have an adverse effect on TDS' businesses, financial condition or results of operations.

3) Uncertainty in TDS' future cash flow and liquidity or the inability to access capital, deterioration in the capital markets, other changes in TDS' performance or market conditions, changes in TDS' credit ratings or other factors could limit or restrict the availability of financing on terms and prices acceptable to TDS, which could require TDS to reduce its construction, development or acquisition programs, reduce the amount of spectrum licenses acquired, and/or reduce or cease share repurchases and/or the payment of dividends.

TDS and its subsidiaries operate capital-intensive businesses. Historically, TDS has used internally-generated funds and also has obtained substantial funds from external sources for general corporate purposes. In the past, TDS' existing cash and investment balances, funds available under its revolving credit agreements, receivables securitization agreement, funds from other financing sources, including a term loan and other long-term debt, and cash flows from operating and certain investing and financing activities, including sales of assets or businesses, provided sufficient liquidity and financial flexibility for TDS to meet its normal day-to-day operating needs and debt service requirements, to finance the build-out and enhancement of markets and to fund acquisitions. There is no assurance that this will be the case in the future. It may be necessary from time to time to increase the size of the existing revolving credit agreements, to put in place new credit agreements, or to obtain other forms of financing in order to fund potential expenditures. TDS' liquidity would be adversely affected if, among other things, TDS is unable to obtain short or long-term financing on acceptable terms, TDS makes significant spectrum license purchases, TDS makes significant capital investments, TDS makes significant business acquisitions, the Los Angeles SMSA Limited Partnership (LA Partnership) discontinues or significantly reduces distributions compared to historical levels, or Federal USF and/or other regulatory support payments decline.

TDS' credit rating currently is sub-investment grade. TDS has incurred negative free cash flow (defined as Cash flows from operating activities less Cash paid for additions to property, plant and equipment) at times in the past and this could occur in the future. TDS may require substantial additional capital for, among other uses, funding day-to-day operating needs including working capital, acquisitions of providers of cable, wireless or wireline telecommunications services, IT services or other businesses, spectrum license or system acquisitions, capital expenditures, debt service requirements, the repurchase of shares, the payment of dividends, or making additional investments. There can be no assurance that sufficient funds will continue to be available to TDS or its subsidiaries on terms or at prices acceptable to TDS. Insufficient cash flows from operating activities, changes in TDS' credit ratings, defaults of the terms of debt or credit agreements, uncertainty of access to capital, deterioration in the capital markets, reduced regulatory capital at banks which in turn limits their ability to borrow and lend, other changes in the performance of TDS or in market conditions or other factors could limit or restrict the availability of financing on terms and prices acceptable to TDS, which could require TDS to reduce its acquisition, capital expenditure and business development programs, reduce the acquisition of spectrum licenses, and/or reduce or cease share repurchases and/or the payment of dividends. TDS cannot provide assurance that circumstances that could have a material adverse effect on its liquidity or capital resources will not occur. Any of the foregoing would have an adverse impact on TDS' businesses, financial condition or results of operations.

4) TDS has a significant amount of indebtedness which could adversely affect its financial performance and in turn adversely affect its ability to make payments on its indebtedness, comply with terms of debt covenants and incur additional debt.

TDS has a significant amount of indebtedness and may need to incur additional indebtedness. TDS' level of indebtedness could have important consequences. For example, it (i) may limit TDS' ability to obtain additional financing for working capital, capital expenditures or general corporate purposes, particularly if the ratings assigned to its debt securities by rating organizations are revised downward; (ii) will require TDS to dedicate a substantial portion of its cash flow from operations to the payment of interest and principal on its debt, reducing the funds available to TDS for other purposes including expansion through acquisitions, capital expenditures, marketing spending and expansion of its business; and (iii) may limit TDS' flexibility to adjust to changing business and market conditions and make TDS more vulnerable to a downturn in general economic conditions as compared to TDS' competitors. TDS' ability to make scheduled payments on its indebtedness or to refinance it will depend on its financial and operating performance, which, in turn, is subject to prevailing economic and competitive conditions and other factors beyond its control. In addition, TDS' leverage may put it at a competitive disadvantage to some of its competitors that are not as leveraged.

The TDS and U.S. Cellular revolving credit agreements, the U.S. Cellular term loan agreement and the U.S. Cellular receivables securitization agreement require TDS or U.S. Cellular, as applicable, to comply with certain affirmative and negative covenants, including certain financial covenants. Depending on the actual financial performance of TDS and U.S. Cellular, there is a risk that TDS and/or U.S. Cellular could fail to satisfy the required financial covenants. If TDS or U.S. Cellular breach a financial or other covenant of any of these agreements, it would result in a default under that agreement, and could involve a cross-default under other debt instruments. This could in turn cause the affected lenders to accelerate the repayment of principal and accrued interest on any outstanding debt under such agreements and, if they choose, terminate the agreement. If appropriate, TDS and U.S. Cellular may request the applicable lenders for an amendment of financial covenants in the TDS and/or U.S. Cellular agreements, in order to provide additional financial flexibility to TDS and U.S. Cellular, and may also seek other changes to such agreements. There is no assurance that the lenders will agree to any amendments. If the lenders agree to amendments, this may result in additional payments or higher interest rates payable to the lenders and/or additional restrictions. Restrictions in such debt instruments may limit TDS' operating and financial flexibility.

As a result, TDS' level of indebtedness, restrictions contained in debt instruments and/or possible breaches of covenants, defaults, and acceleration of indebtedness could have an adverse effect on TDS' business, financial condition, revenues, results of operations and cash flows.

5) Changes in roaming practices or other factors could cause TDS' roaming revenues to decline from current levels, roaming expenses to increase from current levels and/or impact TDS' ability to service its customers in geographic areas where TDS does not have its own network, which could have an adverse effect on TDS' business, financial condition or results of operations.

TDS' revenues include roaming revenues related to the use of TDS' network by other wireless carriers' customers who travel within TDS' coverage areas. Changes in FCC rules or actions, industry practices or the network footprints of carriers due to mergers, acquisitions or network expansions could have an adverse effect on TDS' roaming revenues. For example, consolidation among other carriers which have network footprints that currently overlap TDS' network could decrease the amount of roaming revenues for TDS.

Similarly, TDS' wireless customers can access another carrier's digital system automatically only if the other carrier allows TDS' customers to roam on its network. TDS relies on roaming agreements with other carriers to provide roaming capability to its customers in areas of the U.S. and internationally outside of its service areas and to improve coverage within selected areas of TDS' network footprint. Such agreements cover traditional voice services as well as data services. Although TDS currently has long-term roaming agreements with certain other carriers, these agreements generally are subject to renewal and termination if certain events occur. FCC rules and orders impose certain requirements on wireless carriers to offer certain roaming arrangements to other carriers. However, carriers frequently disagree on what is required. Although TDS has entered into 4G LTE and VoLTE roaming agreements with national carriers, there is no assurance that TDS will be able to maintain these agreements and/or enter into new agreements with other carriers to provide roaming services using 4G LTE or other technologies or that it will be able to do so on reasonable or cost-effective terms. Additionally, as other carriers begin to deploy 5G on their respective networks, there is no assurance that TDS will be able to enter into 5G roaming agreements with other carriers at reasonable or cost-effective terms.

Some competitors may be able to obtain lower roaming rates than TDS is able to obtain because they have larger data usage or call volumes or may be able to reduce roaming charges by providing service principally over their own networks. In addition, the quality of service that a wireless carrier delivers to a TDS customer while roaming may be inferior to the quality of service TDS provides, the price charged for an international roaming call may not be competitive with prices other wireless carriers charge for such call, TDS' customers may not be able to use some of the advanced features, such as voicemail notification or data applications, that TDS customers enjoy when making calls on TDS' network, and TDS customers' service experience may be negatively impacted, particularly when accessing data services, upon reaching a defined allotment of high-speed usage. TDS' rate of adoption of new technologies, such as those enabling high-speed data and voice services, could affect its ability to enter into or maintain roaming agreements with other carriers. In addition, TDS' wireless technology may not be compatible with technologies used by other carriers, which may limit the ability of TDS to enter into voice or data roaming agreements with such other carriers. Carriers whose customers roam on TDS' network could switch their business to new operators or, over time, to their own networks. Changes in roaming usage patterns, rates for roaming usage, or roaming relationships with other carriers could have an adverse effect on TDS' roaming revenues and/or expenses.

To the extent that other carriers expand their networks in TDS' service areas, the roaming arrangements between TDS and these other carriers could become less strategic for them. That is, these other carriers will have fewer or less extensive geographic areas where roaming services are required by their customers and, as a result, the roaming arrangements could become less critical to serving their customer base. This presents a risk to TDS in that, to the extent TDS is not able to enter into economically viable roaming arrangements with these other carriers, this could impact TDS' ability to service its customers in geographic areas where TDS does not have its own network.

If TDS' roaming revenues decline, or its roaming expenses increase, or if TDS is unable to obtain or maintain roaming agreements with other carriers that contain pricing and other terms that are competitive and acceptable to TDS and that satisfy TDS' quality and interoperability requirements, its business, financial condition or results of operations could be adversely affected.

6) A failure by TDS to obtain access to adequate radio spectrum to meet current or anticipated future needs and/or to accurately predict future needs for radio spectrum could have an adverse effect on TDS' business, financial condition or results of operations.

TDS' wireless business depends on the ability to use portions of the radio spectrum licensed by the FCC. TDS could fail to obtain access to sufficient spectrum capacity, including spectrum needed to support 5G technology, in new or existing markets, whether through FCC auctions or other transactions, in order to meet the anticipated spectrum requirements associated with increased demand for existing services, especially increases in customer demand for data services, and to enable deployment of next-generation services. TDS believes that this increased demand for data services reflects a trend that will continue for the foreseeable future. Data usage, including usage under unlimited plans, could exceed current forecasts resulting in a need for increased investment in spectrum or network. TDS could fail to accurately forecast its future spectrum requirements considering changes in plan offerings, customer usage patterns, technology requirements and the expanded demands of new services. Such a failure could have an adverse impact on the quality of TDS' services or TDS' ability to roll out such future services in some markets, or could require that TDS curtail existing services in order to make spectrum available for next-generation services. Spectrum constrained providers could be effectively capped in increasing market share. As spectrum constrained providers gain customers, they use up their network capacity. Since they lack spectrum, they can respond to demand only by adding cell sites, which is capital intensive, adds fixed operating costs, is limited by zoning considerations, and ultimately may not be cost effective.

TDS may acquire access to spectrum through a number of alternatives, including acquisitions, exchanges and participation in spectrum auctions. TDS may participate in spectrum auctions conducted by the FCC in the future. As required by law, the FCC has conducted auctions for licenses to use some parts of the radio spectrum. The decision to conduct auctions, and the determination of what spectrum frequencies will be made available for auction and the determination of geographic size of licenses, are made by the FCC pursuant to laws that it administers. The FCC may not be able to allocate spectrum sufficient to meet the demands of all those wishing to obtain licenses for new market entry or to expand their spectrum holdings to meet the expanding demand for data services or to address other spectrum constraints. Due to factors such as geographic size of licenses and auction bidders that may raise prices beyond acceptable levels, TDS may not be successful in FCC auctions in obtaining access to the spectrum that it believes is necessary to implement its business and technology strategies.

In addition, newly auctioned spectrum may not be compatible with existing spectrum, and vendors may not create suitable products to use such spectrum. Further, access to spectrum licenses won in FCC auctions may not be available on a timely basis. Such access is dependent upon the FCC actually granting licenses won, which can be delayed for various reasons. Furthermore, newly licensed spectrum may not be available for immediate use since the radio operations of incumbent users, including in some cases government agencies, may need to be relocated to other portions of the radio spectrum, and/or the newly licensed spectrum may be subject to sharing and coordination obligations. TDS also may seek to acquire radio spectrum through purchases and exchanges with other spectrum licensees. However, TDS may not be able to acquire sufficient spectrum through these types of transactions, and TDS may not be able to complete any of these transactions on favorable terms.

7) To the extent conducted by the FCC, TDS may participate in FCC auctions for additional spectrum or for funding in certain Universal Service programs in the future directly or indirectly and, during certain periods, will be subject to the FCC's anti-collusion rules, which could have an adverse effect on TDS.

From time to time, the FCC has conducted auctions through which additional spectrum is made available for the provision of wireless services, or through which universal service support funding is dispersed. TDS has participated in such auctions in the past and may participate in other auctions conducted by the FCC in the future. FCC anti-collusion rules place certain restrictions on business communications and disclosures by participants in an FCC auction. These anti-collusion rules may restrict the normal conduct of TDS' business, TDS' acquisition, divestiture, exchange and other corporate development activity and/or disclosures by TDS relating to an FCC auction. The restrictions could have an adverse effect on TDS' business, financial condition or results of operations.

8) Failure by TDS to timely or fully comply with any existing applicable legislative and/or regulatory requirements or changes thereto could adversely affect TDS' business, financial condition or results of operations.

TDS' operations are subject to varying degrees of regulation by the FCC, state public utility commissions and other federal, state and local regulatory agencies and legislative bodies. Changes in the administration of the various regulatory agencies and legislative bodies could result in different policies with respect to many federal laws and regulations, including but not limited to changes to fiscal and tax policies, trade policies and tariffs on import goods. New or amended regulatory requirements could increase TDS' costs and divert resources from other initiatives. Adverse decisions, increased regulation, or changes to existing regulation by regulatory bodies could negatively impact TDS' operations by, among other things, permitting greater competition or limiting TDS' ability to engage in certain sales or marketing activities, or retention and recruitment of skilled resources. New regulatory mandates or enforcement may require unexpected or increased capital expenditures, lost revenues, higher operating expenses or other changes. Court decisions and rulemakings could have a substantial impact on TDS' operations, including rulemakings on broadband access to the internet, intercarrier access compensation, state and federal support funding, and treatment of VoIP traffic or unbundled network elements. Litigation and different objectives among federal and state regulators could create uncertainty and delay TDS' ability to respond to new regulations. Further, wireless licenses are subject to renewal by the FCC and could be revoked in the event of a violation of applicable laws or regulatory requirements. Also, although FCC rules relating to net neutrality have been repealed, some state legislators and regulators are seeking to or have already enacted state laws to reinstate net neutrality regulations and other rules. Interpretation and application of these rules, including conflicts between federal and state laws, may result in additional costs for compliance and may limit opportunities to derive profits from certain business practices or resources. Additionally, in June 2018, California adopted the California Consumer Privacy Act (CCPA). The CCPA is a broad data privacy law which grants consumers new rights over their own personal data and allows access, porting, and data deletion. The CCPA also authorizes the California State Attorney General to enforce those rights including assessing civil penalties. TDS is required to comply with the CCPA requirements by January 1, 2020. TDS is evaluating the effects that compliance with the CCPA will have on its business. Compliance with the CCPA, and with similar legislation that could be adopted by other states or the federal government, could increase U.S. Cellular's costs and divert resources from other initiatives. For additional information related to TDS' regulatory environment, see Risk Factor Number 15 below and "Regulatory Matters" in Exhibit 13 to this Form 10-K.

TDS attempts to timely and fully comply with all regulatory requirements. However, TDS is unable to predict the future actions of the various legislative and regulatory bodies that govern TDS, but such actions could have adverse effects on TDS' business. Any failure by TDS to timely or fully comply with any regulatory requirements could adversely affect TDS' financial condition, results of operations or ability to do business.

9) An inability to attract people of outstanding talent throughout all levels of the organization, to develop their potential through education and assignments, and to retain them by keeping them engaged, challenged and properly rewarded could have an adverse effect on TDS' business, financial condition or results of operations.

TDS' businesses are highly technical and competition for skilled talent in the telecommunications and IT services industries is intense. Due to competition and/or limited supply for qualified management, technical, sales and other personnel, there can be no assurance that TDS will be able to continue to attract and/or retain people of outstanding potential for the development of its business. The loss of the services of existing key personnel due to competition and/or retirements as well as the failure to recruit additional qualified personnel in a timely manner could have an adverse effect on TDS' business, financial condition or results of operations.

The market for highly skilled leaders in the telecommunications industry also is extremely competitive. The future success of TDS and its businesses depends in substantial part on TDS' ability to recruit, hire, motivate, develop, and retain talented and highly skilled leaders for all areas of its organization. The loss of any of TDS' key leaders could have an adverse effect on its business, financial condition or results of operations. Effective succession planning is also important to TDS' long-term success. Failure to ensure effective transfer of knowledge and smooth transition involving key employees could also adversely affect TDS' business, financial condition and results of operations.

10) TDS' assets and revenue are concentrated primarily in the U.S. telecommunications industry. Consequently, its operating results may fluctuate based on factors related primarily to conditions in this industry.

The U.S. telecommunications industry is facing significant change and an uncertain operating environment. TDS' focus on the U.S. telecommunications industry, together with its positioning relative to larger competitors with greater resources within the industry, may represent increased risk for investors due to the lack of diversification. This could have an adverse effect on TDS' ability to attain and sustain long-term, profitable revenue growth and could have an adverse effect on its business, financial condition or results of operations.

11) TDS' smaller scale relative to larger competitors that may have greater financial and other resources than TDS could cause TDS to be unable to compete successfully, which could adversely affect its business, financial condition or results of operations.

There has been a trend in the telecommunications, IT services and related industries towards consolidation of service providers through acquisitions, reorganizations and joint ventures. This trend could continue, leading to larger competitors over time. TDS has smaller scale efficiencies compared to larger competitors. TDS may be unable to compete successfully with larger companies that have substantially greater financial, technical, marketing, sales, purchasing and distribution resources or that offer more services than TDS, which could adversely affect TDS' revenues and costs of doing business. Specifically, TDS' smaller scale relative to most of its competitors could have the following impacts, among others:

- Low profit margins and returns on investment that are below TDS' cost of capital;
- Increased operating costs due to lack of leverage with vendors;
- Inability to successfully deploy 5G or other wireless technologies, or to realize significant incremental revenues from their deployment ;
- Limited opportunities for strategic partnerships as potential partners are focused on wireless, wireline, cable and IT services companies with greater scale and scope;
- Limited access to content and programming;
- Limited ability to influence industry standards;
- Reduced ability to invest in research and development of new services and products;
- Vendors may deem TDS non-strategic and not develop or sell services and products to TDS, particularly where technical requirements differ from those of larger companies;
- Limited access to intellectual property; and
- Other limited opportunities such as for software development or third party distribution.

TDS' telecommunications businesses increasingly depend on access to content for data and access to new wireless devices being developed by vendors. TDS' ability to obtain such access depends in part on other parties. If TDS is unable to obtain timely access to new content or wireless devices being developed by vendors, its business, financial condition or results of operations could be adversely affected.

As a result of the foregoing, TDS' smaller scale relative to larger competitors could adversely affect TDS' business, financial condition or results of operations.

12) Changes in various business factors, including changes in demand, customer preferences and perceptions, price competition, churn from customer switching activity and other factors, could have an adverse effect on TDS' business, financial condition or results of operations.

Changes in any of several factors could have an adverse effect on TDS' business, financial condition or results of operations. These factors include, but are not limited to:

- Demand for or usage of services, particularly data services;
- Customer preferences, including internet speed and type of wireless devices;
- Customer perceptions of network quality and performance;
- The pricing of services, including an increase in price-based competition;
- Access to and cost of programming;
- The overall size and growth rate of TDS' customer base;
- Penetration rates;
- Churn rates;
- Selling expenses;
- Net customer acquisition and retention costs;
- Customers' ability to pay for services and the potential impact on bad debts expense;
- Roaming agreements and rates;
- Third-party vendor support;
- Capacity constraints;
- The mix of services and products offered by TDS and purchased by customers;
- The costs of providing services and products; and
- Mid-market demand for cloud and hosted services.

13) Advances or changes in technology could render certain technologies used by TDS obsolete, could put TDS at a competitive disadvantage, could reduce TDS' revenues or could increase its costs of doing business.

The telecommunications and IT services industries are experiencing significant changes in technologies and services expected by customers. In the telecommunications industry, this is evidenced by evolving industry standards, ongoing improvements in the capacity and quality of digital technology, shorter development cycles for new services and products, and enhancements and changes in end-user requirements and preferences. Widespread deployment of new technologies, including 5G technology, could cause the technology used on TDS' wireless networks, traditional circuit-switched or IP-based networks, and cable networks to become less competitive or obsolete. Also, high-speed wireless networks (wireless broadband) represent a product offering and opportunity for TDS' wireless business, but also represent a risk for TDS' Wireline and Cable businesses as customers may elect to substitute their wireline or cable broadband connection for wireless broadband. Further, fixed-mobile convergence services that combine wireline broadband services with mobile services represent a competitive threat. If the trend toward convergence continues, TDS is at a competitive disadvantage to larger competitors, including the national wireless carriers and other potential large new entrants with much greater financial and other resources in adapting to such convergence. In addition, the IT services market is characterized by rapidly changing technology and services. Future technological changes or advancements may enable other technologies to equal or exceed TDS' current levels of service and render its system infrastructure obsolete. For example, the timing, cost, and availability of CDMA enabled devices and other CDMA ecosystem support needs, including voice roaming on other carrier networks, may inhibit TDS' ability to maintain 3G wireless voice service until it is fully replaced by VoLTE. TDS may not be able to respond to such changes and implement new technology on a timely or cost-effective basis, which could reduce its revenues or increase its costs of doing business. If TDS cannot keep pace with these technological changes or other changes in the telecommunications or IT services industries over time, its financial condition, results of operations or ability to do business could be adversely affected.

14) Complexities associated with deploying new technologies present substantial risk and TDS' investments in unproven technologies may not produce the benefits that TDS expects.

TDS' wireless business has completed the transition to 4G LTE and has implemented 4G LTE as well as VoLTE roaming agreements with national carriers. VoLTE technology has been launched successfully in California, Iowa, Oregon, Washington and Wisconsin, and deployments in several additional markets will occur in 2019. In addition, TDS' wireless business has successfully tested 5G technology in both indoor and outdoor environments. The deployment of 5G technology will require substantial investments in TDS' wireless networks to remain competitive in the industry. Transition to 5G or other new technologies involves significant time, cost and risk, and anticipated products and revenues may not be realized. Furthermore, the wireless business experiences rapid technology changes and new services and products. If TDS fails to effectively deploy new wireless technologies, services or products on a timely basis, this could have an adverse impact on TDS' business, financial condition and results of operations.

TDS' Wireline business is deploying fiber-to-the-home technology, advanced wireline, broadband, and TDS TV+ services through fiber-to-the-node, copper bonding and vectoring technology. A significant amount of the product development and integration risks are borne by TDS. Further, the simultaneous rollout of these advanced services and technologies increases the execution risk. If TDS fails to effectively deploy new technologies and products on a timely basis, this could have an adverse impact on TDS' business, financial condition and results of operations.

Cable's business is also subject to complexities associated with deploying new technologies, such as DOCSIS 3.1, and involves substantial risk, including rapid technology changes. If Cable's business does not respond appropriately to technology changes, its competitive position may be adversely affected.

The HMS business is also continuously evaluating and deploying advances in technology relating to IT services. If HMS fails to effectively deploy new technologies and products on a timely basis, this could have an adverse impact on its business, financial condition and results of operations.

Furthermore, it is not certain that TDS' investments in various new, unproven technologies and the related service and product offerings will be effective. The markets for some of these services, products and solutions may still be emerging and the overall potential for these markets, including revenues to be realized, may be uncertain. If customer demand for these new services, products and solutions does not develop as expected, TDS' business, financial condition or results of operations could be adversely affected.

15) TDS receives regulatory support and is subject to numerous surcharges and fees from federal, state and local governments, and the applicability and the amount of the support and fees are subject to great uncertainty, which could have an adverse effect on TDS' business, financial condition or results of operations.

Telecommunications companies may be designated by states, or in some cases by the FCC, as an Eligible Telecommunications Carrier (ETC) to receive universal service support payments if they provide specified services in "high cost" areas. U.S. Cellular has been designated as an ETC in certain states and received $92 million in high cost support for service to high cost areas in 2018. TDS Telecom also received support under the Connect America Fund support program. In 2018, TDS Telecom received $86 million under all federal regulatory support programs.

In 2011, the FCC released an order (USF Order) to: reform its universal service and intercarrier compensation mechanisms; establish a new, broadband-focused support mechanism; and propose further rules to advance reform. For a discussion of the USF Order and risks to such regulatory support, see "Regulatory Matters - FCC Mobility Fund Phase II Order" in Exhibit 13 to this Form 10-K, which is incorporated by reference herein. If the foregoing regulatory support is reduced from current levels, this could have an adverse effect on TDS' business, financial condition or operating results.

In 2016, the FCC released an order modifying the existing USF program under which TDS Telecom receives annual support revenue in exchange for meeting defined build-out obligations. Build-out obligations under this program will require capital expenditures which are expected to be significant. There is no assurance that these build-outs will be fully funded by the support revenue received under the program. In addition, failure to meet the defined build-out obligations could result in reduced support revenue . For developments that will result in changes to the FCC's Alternative Connect America Cost Model (A-CAM) program see "Regulatory Matters - FCC Connect America Fund," in Exhibit 13 to this Form 10-K, which is incorporated by reference herein.

Telecommunications providers pay a variety of surcharges and fees on their gross revenues from interstate and intrastate services, including USF fees and common carrier regulatory fees.

The division of services between interstate services and intrastate services, including the divisions associated with Federal USF fees, is a matter of interpretation and may in the future be contested by the FCC or state authorities. The FCC also may change in the future the basis on which Federal USF fees are charged. The Federal government and many states also apply transaction-based taxes to sales of telecommunications services and products and to purchases of telecommunications services from various carriers. In addition, state regulators and local governments have imposed and may continue to impose various surcharges, taxes and fees on telecommunications services. The applicability of these surcharges and fees to TDS' services is uncertain in many cases and jurisdictions may contest whether TDS has assessed and remitted those monies correctly. Periodically, state and federal regulators may increase or change the surcharges and fees TDS currently pays. In some instances, TDS passes through these charges to its customers. However, Congress, the FCC, state regulatory agencies or state legislatures may limit the ability to pass through transaction-based tax liabilities, regulatory surcharges and regulatory fees imposed on TDS to customers. TDS may or may not be able to recover some or all of those taxes from its customers and the amount of taxes may deter demand for its services or increase its cost to provide service which could have an adverse effect on its business, financial condition or operating results.

16) Performance under device purchase agreements could have a material adverse impact on TDS' business, financial condition or results of operations.

TDS has entered into purchase commitments with certain vendors and may enter into similar purchase commitments with other vendors in the future. If TDS is unable to sell all of the devices that it is required to purchase under such agreements, or if it is unable to sell them at the prices it projects, its business, financial condition or results of operations could be adversely affected.

17) Changes in TDS' enterprise value, changes in the market supply or demand for wireless licenses, wireline or cable markets or IT service providers, adverse developments in the businesses or the industries in which TDS is involved and/or other factors could require TDS to recognize impairments in the carrying value of its licenses, goodwill, franchise rights and/or physical assets or require re-evaluation of the indefinite-lived nature of such assets.

A large portion of TDS' assets consists of indefinite-lived intangible assets in the form of licenses and goodwill. TDS also has substantial investments in long-lived assets such as property, plant and equipment and franchise rights. TDS reviews its licenses, goodwill and other long-lived assets for impairment annually or whenever events or circumstances indicate that the carrying amount of such assets may not be fully recoverable. An impairment loss may need to be recognized to the extent the carrying value of the assets exceeds the fair value of such assets. The amount of any such impairment loss could be significant and could have an adverse effect on TDS' reported financial results for the period in which the loss is recognized. The estimation of fair values requires assumptions by management about factors that are uncertain. Different assumptions for these factors could create materially different results.

18) Costs, integration problems or other factors associated with acquisitions, divestitures or exchanges of properties or licenses and/or expansion of TDS' businesses could have an adverse effect on TDS' business, financial condition or results of operations.

As part of TDS' operating strategy, TDS from time to time may be engaged in the acquisition, divestiture or exchange of companies, businesses, strategic properties, wireless spectrum or other assets. TDS may change the markets in which it operates and the services that it provides through such acquisitions, divestitures and/or exchanges. In general, TDS may not disclose the negotiation of such transactions until a definitive agreement has been reached. These transactions commonly involve a number of risks, including:

- Identification of attractive companies, businesses, properties, spectrum or other assets for acquisition or exchange, and/or the selection of TDS' businesses or assets for divestiture or exchange;
- Competition for acquisition targets and the ability to acquire or exchange businesses at reasonable prices;
- Inability to make acquisitions that would achieve sufficient scale to be competitive with competitors with greater scale;
- Possible lack of buyers for businesses or assets that TDS desires to divest and the ability to divest or exchange such businesses or assets at reasonable prices;
- Ability to negotiate favorable terms and conditions for acquisitions, divestitures and exchanges;
- Significant expenditures associated with acquisitions, divestitures and exchanges;
- Risks associated with integrating new businesses or markets, including risks relating to cybersecurity and privacy;
- Ability to enter markets in which TDS has limited or no direct prior experience and competitors have stronger positions;
- Ability to integrate and manage TDS' different business operations and services, including wireless services, traditional wireline services, cable businesses and hosted and managed services businesses;
- Uncertain revenues and expenses associated with acquisitions, with the result that TDS may not realize the growth in revenues, anticipated cost structure, profitability, or return on investment that it expects;
- Difficulty of integrating the technologies, services, products, operations and personnel of the acquired businesses, or of separating such matters for divested businesses or assets;
- Diversion of management's attention;

- Disruption of ongoing business;
- Impact on TDS’ cash and available credit lines for use in financing future growth and working capital needs;
- Inability to retain key personnel;
- Inability to successfully incorporate acquired assets and rights into TDS’ service offerings;
- Inability to maintain uniform standards, controls, procedures and policies;
- Possible conditions to approval by the FCC, the Federal Trade Commission and/or the Department of Justice; and
- Impairment of relationships with employees, customers or vendors.

No assurance can be given that TDS will be successful with respect to its acquisition, divestiture or exchange strategies or initiatives. If TDS is not successful with respect to its acquisitions, divestitures or exchanges, its business, financial condition or results of operations could be adversely affected.

19) A failure by TDS to complete significant network construction and systems implementation activities as part of its plans to improve the quality, coverage, capabilities and capacity of its network, support and other systems and infrastructure could have an adverse effect on its operations.

TDS’ business plan includes significant construction activities and enhancements to its network, support and other systems and infrastructure. Additionally, the deployment of new wireless technologies, including 5G, may require substantial investments in TDS' wireless network. As TDS deploys, expands and enhances its wireless network, it may need to acquire additional spectrum. Also, as TDS continues to build out and enhance its network, TDS must, among other things, continue to:

- Lease, acquire or otherwise obtain rights to cell and switch sites, transport facilities, data centers relating to IT services or other facilities;
- Obtain zoning variances or other local governmental or third-party approvals or permits for network construction;
- Complete and update the radio frequency design, including cell site design, frequency planning and network optimization, for each of TDS’ wireless markets; and
- Improve, expand and maintain customer care, network management, billing and other financial and management systems.

Any difficulties encountered in completing these activities, as well as problems in vendor equipment availability, technical resources, system performance or system adequacy, could delay implementation and deployment of new technologies, delay expansion of operations and product capabilities in new or existing markets or result in increased costs. Failure to successfully deploy new technologies, including 5G, and/or build-out and enhance TDS’ network, support facilities and other systems and infrastructure in a cost-effective manner, and in a manner that satisfies customer expectations, could have an adverse effect on TDS’ business, business prospects, financial condition or results of operations.

TDS’ Wireline and Cable businesses are devoting an increasing amount of capital for fiber overbuilds and out of territory construction. Difficulties in gaining acceptance from new market communities could cause delays or additional costs. Any difficulties in scaling up project management, engineering and construction resources could delay construction and expansion of operations in new or existing markets or result in increased costs. Failure to gain acceptance in new communities and successfully scale up resources could have an adverse effect on TDS’ business, business prospects, financial condition or results of operations.

20) Difficulties involving third parties with which TDS does business, including changes in TDS’ relationships with or financial or operational difficulties of key suppliers or independent agents and third party national retailers who market TDS’ services, could adversely affect TDS’ business, financial condition or results of operations.

TDS has relationships with independent agents and third party national retailers who market TDS’ services. If such relationships are seriously harmed or if such parties experience financial difficulties, including bankruptcy, TDS’ business, financial condition or results of operations could be adversely affected.

TDS depends upon certain vendors to provide it with equipment (including wireless devices), services or content to continue its network construction and upgrades, and to operate its business. TDS does not have operational or financial control over such key suppliers and has limited influence with respect to the manner in which these key suppliers conduct their businesses. If these key suppliers experience financial difficulties or file for bankruptcy or experience other operational difficulties, they may be unable to provide equipment, services or content to TDS on a timely basis, or at all, or they may otherwise fail to honor their obligations to TDS. Furthermore, consolidation among key suppliers may result in less competition and higher prices or the discontinuation of support for equipment owned by TDS.

Regulations regarding the use of “conflict minerals” mined from the Democratic Republic of Congo and adjoining countries may affect some of TDS’ suppliers. These regulations may limit the availability of conflict free minerals and, as a result, TDS may not be able to obtain products in sufficient quantities or at competitive prices from its vendors who utilize such minerals in the manufacture of products. In such cases, TDS may be unable to maintain and upgrade its network or provide services and products to its customers in a competitive manner, or could suffer other disruptions to its business. In that event, TDS’ business, financial condition or results of operations could be adversely affected.

In addition, operation of TDS’ supply chain and management of its inventory require accurate forecasting of customer growth and demand, which has become increasingly challenging. If overall demand for wireless devices or the mix of demand for wireless devices is significantly different than TDS’ expectations, TDS could face inadequate or excess supplies of particular models of wireless devices. This could result in lost sales opportunities or an excess supply of inventory. Either of these situations could adversely affect TDS’ revenues, costs of doing business, results of operations or financial condition.

Also, TDS has other arrangements with third parties, including arrangements pursuant to which TDS outsources certain support functions to third party vendors. Operational problems associated with such functions, including any failure by the vendor to provide the required level of service under the outsourcing arrangements, including possible cyber-attacks or other breaches of network or information technology security or privacy, could have adverse effects on TDS' business, financial condition or results of operations.

21) TDS has significant investments in entities that it does not control. Losses in the value of such investments could have an adverse effect on TDS' financial condition or results of operations.

TDS has significant investments in entities that it does not control, including equity investments and interests in certain variable interest entities. TDS' interests in such entities do not provide TDS with control over the business strategy, financial goals, network build-out plans or other operational aspects of these entities. TDS cannot provide assurance that these entities will operate in a manner that will increase or maintain the value of TDS' investments, that TDS' proportionate share of income from these investments will continue at the current level in the future or that TDS will not incur losses from the holding of such investments. Losses in the values of such investments or a reduction in income from these investments could adversely affect TDS' financial condition or results of operations. In addition, certain investments have historically contributed significant cash flows to TDS and a reduction or suspension of such cash flows could adversely affect TDS' financial condition.

22) A failure by TDS to maintain flexible and capable telecommunication networks or information technology, or a material disruption thereof, could have an adverse effect on TDS' business, financial condition or results of operations.

TDS relies extensively on its telecommunication networks and information technology to operate and manage its businesses, process transactions and summarize and report results. These networks and technology become obsolete over time and must be upgraded, replaced and/or otherwise enhanced over time. Enhancements must be more flexible and dependable than ever before. All of this is capital intensive and challenging. A failure by TDS to maintain flexible and capable telecommunication networks or information technology could have an adverse effect on TDS' business, financial condition or results of operations.

The increased provision of data services, including IPTV, has introduced significant new demands on TDS' network and also has increased complexities related to network management. As it relates to Wireline's networks, the transition to new IP-based networks from well-established time-division multiplexing networks requires new support tools and technician skills. Further, this transition requires the use of more leased facilities and partnerships which require enhanced network monitoring and controls. The IP-based networks also generally require more electronics on customers' premises which introduces more technical risks and makes diagnostics and repairs more difficult.

Further, the increased provision of data services on TDS' networks has created an increased level of risk related to quality of service. This is due to the fact that many customers increasingly rely on data communications to execute and validate transactions. As a result, redundancy and geographical diversity of TDS' network facilities are critical to providing uninterrupted service. Also, the speed of repair and maintenance procedures in the event of network interruptions is critical to maintaining customer satisfaction. TDS' ability to maintain high-quality, uninterrupted service to its customers is critical, particularly given the increasingly competitive environment and customers' ability to choose other service providers.

In addition, TDS' networks and information technology and the networks and information technology of vendors on which TDS relies are subject to damage or interruption due to various events, including power outages, computer, network and telecommunications failures, computer viruses, security breaches, hackers and other cyber security risks, catastrophic events, natural disasters, errors or unauthorized actions by employees and vendors, flawed conversion of systems, disruptive technologies and technology changes.

23) TDS has experienced and, in the future, expects to experience cyber-attacks or other breaches of network or information technology security of varying degrees on a regular basis, which could have an adverse effect on TDS' business, financial condition or results of operations.

TDS experiences cyber-attacks of varying degrees on a regular basis. These include cyber-attacks intended to wrongfully obtain private and valuable information, or cause other types of malicious events, including denial of service attacks which may cause TDS' services to be disrupted or unavailable to customers. TDS maintains administrative, technical and physical controls, as well as other preventative actions, to reduce the risk of security breaches. Although to date TDS has not discovered a material security breach, these efforts may be insufficient to prevent a material security breach stemming from future cyber-attacks. If TDS' or its vendors' networks and information technology are not adequately adapted to changes in technology or are damaged or fail to function properly, and/or if TDS' or its vendors' security is breached or otherwise compromised, TDS could suffer adverse consequences, including theft, destruction or other loss of critical and private data, including customer and/or employee data, interruptions or delays in its operations, inaccurate billings, inaccurate financial reporting, and significant costs to remedy the problems. If TDS' or its vendors' systems become unavailable or suffer a security breach of customer or other data, TDS may be required to expend significant resources and take various actions to address the problems, including notification under data privacy laws and regulations, may be subject to fines, sanctions and litigation, and its reputation and operating results could be adversely affected. Such events may also cause TDS to fail to satisfy service level commitments or trigger contractual obligations to customers of its IT services. TDS continues to experience denial of service attacks. Although TDS has implemented and continues to enhance its protection and recovery measures in response to such attacks, these efforts may be insufficient to prevent a material denial of service attack in the future. Any material disruption in TDS' networks or information technology, including security breaches, could have an adverse effect on TDS' business, financial condition or results of operations.

24) Changes in facts or circumstances, including new or additional information, could require TDS to record adjustments to amounts reflected in the financial statements, which could have an adverse effect on TDS' business, financial condition or results of operations.

The preparation of financial statements requires TDS to make estimates and assumptions that affect the reported amounts of assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. TDS bases its estimates on historical experience and on various other assumptions and information that are believed to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities. Actual results may differ from estimates under different assumptions or conditions. Changes in facts or circumstances, including new or additional information, could require TDS to record charges in excess of amounts accrued in the financial statements, if any, which could have an adverse effect on TDS' business, financial condition or results of operations.

25) Disruption in credit or other financial markets, a deterioration of U.S. or global economic conditions or other events could, among other things, impede TDS' access to or increase the cost of financing its operating and investment activities and/or result in reduced revenues and lower operating income and cash flows, which would have an adverse effect on TDS' business, financial condition or results of operations.

Disruptions in the credit and financial markets, declines in consumer confidence, increases in unemployment, declines in economic growth, increased tariffs on import goods and uncertainty about corporate earnings could have a significant negative impact on the U.S. and global financial and credit markets and the overall economy. Such events could have an adverse impact on financial institutions resulting in limited access to capital and credit for many companies. Furthermore, economic uncertainties make it very difficult to accurately forecast and plan future business activities. Changes in economic conditions, changes in financial markets, changes in U.S. trade policies, deterioration in the capital markets or other factors could have an adverse effect on TDS' business, financial condition, revenues, results of operations and cash flows.

26) Settlements, judgments, restraints on its current or future manner of doing business and/or legal costs resulting from pending and future litigation could have an adverse effect on TDS' business, financial condition or results of operations.

TDS is regularly involved in a number of legal and policy proceedings before the FCC and various state and federal courts. Such legal and policy proceedings can be complex, costly, protracted and highly disruptive to business operations by diverting the attention and energies of management and other key personnel.

The assessment of legal and policy proceedings is a highly subjective process that requires judgments about future events. Additionally, amounts ultimately received or paid upon settlement or resolution of litigation and other contingencies may differ materially from amounts accrued in the financial statements. Depending on a range of factors, these or similar proceedings could impose restraints on TDS' current or future manner of doing business. Such potential outcomes could have an adverse effect on TDS' financial condition, results of operations or ability to do business.

27) The possible development of adverse precedent in litigation or conclusions in professional studies to the effect that radio frequency emissions from wireless devices and/or cell sites cause harmful health consequences, including cancer or tumors, or may interfere with various electronic medical devices such as pacemakers, could have an adverse effect on TDS' wireless business, financial condition or results of operations.

Media reports and certain professional studies have suggested that certain radio frequency emissions from wireless devices may be linked to various health problems, including cancer or tumors, and may interfere with various electronic medical devices, including hearing aids and pacemakers. TDS is a party to and may in the future be a party to lawsuits against wireless carriers and other parties claiming damages for alleged health effects, including cancer or tumors, arising from wireless phones or radio frequency transmitters. Concerns over radio frequency emissions may discourage use of wireless devices or expose TDS to potential litigation. In addition, the FCC or other regulatory authorities may adopt regulations in response to concerns about radio frequency emissions. Any resulting decrease in demand for wireless services, costs of litigation and damage awards or regulation could have an adverse effect on TDS' business, financial condition or results of operations.

In addition, some studies have indicated that some aspects of using wireless devices while driving may impair drivers' attention in certain circumstances, making accidents more likely. These concerns could lead to potential litigation relating to accidents, deaths or serious bodily injuries, any of which could have an adverse effect on TDS' business, financial condition or results of operations.

28) Claims of infringement of intellectual property and proprietary rights of others, primarily involving patent infringement claims, could prevent TDS from using necessary technology to provide products or services or subject TDS to expensive intellectual property litigation or monetary penalties, which could have an adverse effect on TDS' business, financial condition or results of operations.

TDS faces possible effects of industry litigation relating to patents, other intellectual property or otherwise, that may restrict TDS' access to devices or network equipment critical to providing services to customers. If technology that TDS uses in products or services were determined by a court to infringe a patent or other intellectual property right held by another person, TDS could be precluded from using that technology and could be required to pay significant monetary damages. TDS also may be required to pay significant royalties to such person to continue to use such technology in the future. The successful enforcement of any intellectual property rights, or TDS' inability to negotiate a license for such rights on acceptable terms, could force TDS to cease using the relevant technology and offering services incorporating the technology. Any litigation to determine the validity of claims that TDS' products or services infringe or may infringe intellectual property rights of another, regardless of their merit or resolution, could be costly and divert the effort and attention of TDS' management and technical personnel. Regardless of the merits of any specific claim, TDS cannot give assurance that it would prevail in litigation because of the complex technical issues and inherent uncertainties in intellectual property litigation. Although TDS generally seeks to obtain indemnification agreements from vendors that provide it with technology, there can be no assurance that any claim of infringement will be covered by an indemnity or that TDS will be able to recover all or any of its losses and costs under any available indemnity agreements. Any claims of infringement of intellectual property and proprietary rights of others could prevent TDS from using necessary technology to provide its services or subject TDS to expensive intellectual property litigation or monetary penalties, which could have an adverse effect on TDS' business, financial condition or results of operations.

29) Certain matters, such as control by the TDS Voting Trust and provisions in the TDS Restated Certificate of Incorporation, may serve to discourage or make more difficult a change in control of TDS or have other consequences.

The TDS Restated Certificate of Incorporation and the TDS bylaws contain provisions which may serve to discourage or make more difficult a change in control of TDS without the support of the TDS Voting Trust and the TDS Board of Directors or without meeting various other conditions.

The TDS Restated Certificate of Incorporation authorizes the issuance of different series of common stock, which have different voting rights. The TDS Series A Common Shares have the power to elect approximately 75% (less one) of the directors and have ten votes per share in matters other than the election of directors. The TDS Common Shares (with one vote per share) vote as a separate group only with respect to the election of 25% (plus one) of the directors. In addition, the total percentage voting power in matters other than the election of directors of the Series A Common Shares and Common Shares are fixed, at 56.7% and 43.3%, respectively, subject to adjustment due to changes in the number of outstanding Series A Common Shares.

A substantial majority of the outstanding TDS Series A Common Shares are held in the TDS Voting Trust which expires on June 30, 2035. The TDS Voting Trust was created to facilitate the long-standing relationships among the trustees' certificate holders. By virtue of the number of shares held by them, the voting trustees have the power to elect eight directors based on the current TDS Board of Directors' size of twelve directors, and control a majority of the voting power of TDS with respect to matters other than the election of directors.

The existence of the TDS Voting Trust is likely to deter any potential unsolicited or hostile takeover attempts or other efforts to obtain control of TDS and may make it more difficult for shareholders to sell shares of TDS at higher than market prices. The trustees of the TDS Voting Trust have advised TDS that they intend to maintain the ability to keep or dispose of voting control of TDS.

The TDS Restated Certificate of Incorporation also authorizes the TDS Board of Directors to designate and issue TDS Undesignated Shares in one or more classes or series of preferred or common stock from time to time. Generally, no further action or authorization by the shareholders is necessary prior to the designation or issuance of the additional TDS Undesignated Shares authorized pursuant to the TDS Restated Certificate of Incorporation unless applicable laws or regulations would require such approval in a given instance. Such TDS Undesignated Shares could be issued in circumstances that would serve to preserve control of TDS' then existing management.

In addition, the TDS Restated Certificate of Incorporation includes a provision which authorizes the TDS Board of Directors to consider various factors, including effects on customers, taxes, and the long-term and short-term interests of TDS, in the context of a proposal or offer to acquire or merge the corporation, or to sell its assets, and to reject such offer if the TDS Board of Directors determines that the proposal is not in the best interests of the corporation based on such factors.

The provisions of the TDS Restated Certificate of Incorporation and the TDS bylaws and the existence of various classes of capital stock could prevent shareholders from profiting from an increase in the market value of their shares as a result of a change in control of TDS by delaying or preventing such change in control.

The provisions of the TDS Restated Certificate of Incorporation and the existence of different classes of capital stock and voting rights could result in the exclusion of TDS Common Shares from certain major stock indices at some point in the future, unless TDS is grandfathered by such stock indices or qualifies for some other exception.

30) The market price of TDS' Common Shares is subject to fluctuations due to a variety of factors.

Factors that may affect the future market price of TDS' Common Shares include:

- General economic conditions, including conditions in the credit and financial markets;
- Industry conditions;
- Fluctuations in TDS' quarterly customer additions, churn rate, revenues, results of operations or cash flows;
- Variations between TDS' actual financial and operating results and those expected by analysts and investors; and
- Announcements by TDS' competitors.

Any of these or other factors could adversely affect the future market price of TDS' Common Shares, or could cause the future market price of TDS' Common Shares to fluctuate from time to time.

31) Any of the foregoing events or other events could cause revenues, earnings, capital expenditures and/or any other financial or statistical information to vary from TDS' forward-looking estimates by a material amount.

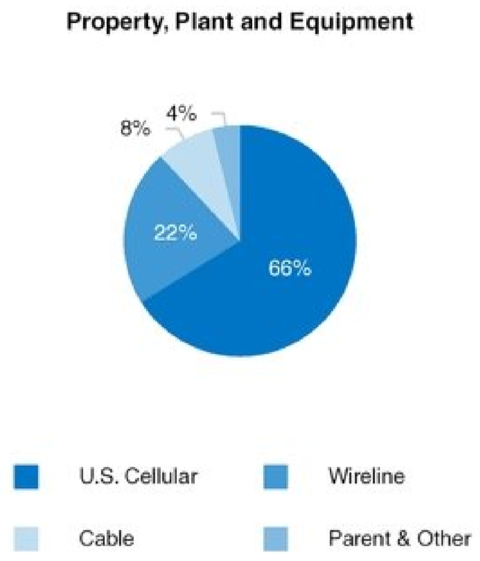
From time to time, TDS may disclose forward-looking information, including estimates of future operating revenues; various measures of income before income taxes; and/or capital expenditures. Any such forward-looking information includes consideration of known or anticipated changes to the extent disclosed, but dynamic market conditions and/or other unknown or unanticipated events, including but not limited to the risks discussed above, could cause such estimates to differ materially from the actual amounts.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

TDS has properties located throughout the United States. As of December 31, 2018 , TDS' Property, plant and equipment, net of accumulated depreciation, was as follows:



U.S. Cellular's mobile telephone switching offices, cell sites, cell site equipment, call centers and retail stores are located primarily in U.S. Cellular's operating markets and are either owned or leased by U.S. Cellular.

Wireline owns or leases its physical assets consisting of telephone distribution networks, network electronic equipment and land and buildings.

Cable owns or leases its physical assets consisting of cable distribution networks, headends, customer premises equipment, and land and buildings.

Parent and Other fixed assets consist of assets, which are either owned or leased, at TDS Corporate, HMS, and Suttle-Straus.

As of December 31, 2018 , Property, plant and equipment, net of accumulated depreciation, totaled $2,202 million at U.S. Cellular, $751 million at Wireline, $266 million at Cable, and $128 million at Parent & Other. See Note 9 — Property, Plant and Equipment in the Notes to Consolidated Financial Statements for additional information.

Item 3. Legal Proceedings

TDS is involved or may be involved from time to time in legal proceedings before the FCC, other regulatory authorities, and/or various state and federal courts. If TDS believes that a loss arising from such legal proceedings is probable and can be reasonably estimated, an amount is accrued in the financial statements for the estimated loss. If only a range of loss can be determined, the best estimate within that range is accrued; if none of the estimates within that range is better than another, the low end of the range is accrued. The assessment of the expected outcomes of legal proceedings is a highly subjective process that requires judgments about future events. The legal proceedings are reviewed at least quarterly to determine the adequacy of accruals and related financial statement disclosures. The ultimate outcomes of legal proceedings could differ materially from amounts accrued in the financial statements. See Note 13 — Commitments and Contingencies in the Notes to Consolidated Financial Statements for further information.

Item 4. Mine Safety Disclosures

Not applicable.

PART II

Item 5. Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities

Market, holder, dividend and performance graph information is incorporated by reference from Exhibit 13 to this Form 10-K, Annual Report section entitled "Shareholder Information."

TDS paid quarterly dividends per outstanding share of $0.160 in 2018 , $0.155 in 2017 and $0.148 in 2016 . TDS increased the dividend per share to $0.165 in the first quarter of 2019 . TDS has no current plans to change its policy of paying dividends.

Information relating to Issuer Purchases of Equity Securities is set forth below.

On August 2, 2013, the Board of Directors of TDS authorized, and TDS announced by Form 8-K, a $250 million stock repurchase program for TDS Common Shares. Depending on market conditions, such shares may be repurchased in compliance with Rule 10b-18 of the Exchange Act, pursuant to Rule 10b5-1 under the Exchange Act, or pursuant to accelerated share repurchase arrangements, prepaid share repurchases, private transactions or as otherwise authorized. This authorization does not have an expiration date. TDS did not determine to terminate the foregoing Common Share repurchase program, or cease making further purchases thereunder, during the fourth quarter of 2018 .

TDS determines whether to repurchase shares from time to time based on many considerations, including cash needed for other known or possible requirements, the stock price, market conditions, debt rating considerations, business forecasts, business plans, macroeconomic conditions, share issuances under compensation plans, provisions in governing and legal documents and other legal requirements, and other facts and circumstances. Subject to these considerations, TDS may approve the repurchase of its shares from time to time when circumstances warrant.

The maximum dollar value of shares that may yet be purchased under this program was $ 199 million as of December 31, 2018 . There were no purchases made by or on behalf of TDS, and no open market purchases made by any "affiliated purchaser" (as defined by the SEC) of TDS, of TDS Common Shares during the quarter ended December 31, 2018 .

Item 6. Selected Financial Data

Incorporated by reference from Exhibit 13 to this Form 10-K, Annual Report section entitled "Selected Consolidated Financial Data."

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations

Incorporated by reference from Exhibit 13 to this Form 10-K, Annual Report section entitled "Management's Discussion and Analysis of Financial Condition and Results of Operations."

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

Incorporated by reference from Exhibit 13 to this Form 10-K, Annual Report section entitled "Market Risk."

Item 8. Financial Statements and Supplementary Data

Incorporated by reference from Exhibit 13 to this Form 10-K, Annual Report sections entitled "Consolidated Statement of Operations," "Consolidated Statement of Comprehensive Income," "Consolidated Statement of Cash Flows," "Consolidated Balance Sheet," "Consolidated Statement of Changes in Equity," "Notes to Consolidated Financial Statements," "Management's Report on Internal Control Over Financial Reporting," "Report of Independent Registered Public Accounting Firm," and "Consolidated Quarterly Information (Unaudited)."

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure

None.

Item 9A. Controls and Procedures

Evaluation of Disclosure Controls and Procedures

TDS maintains disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act) that are designed to ensure that information required to be disclosed in its reports filed or submitted under the Exchange Act is processed, recorded, summarized and reported within the time periods specified in the SEC's rules and forms, and that such information is accumulated and communicated to TDS' management, including its principal executive officer and principal financial officer, as appropriate, to allow for timely decisions regarding required disclosure. In designing and evaluating the disclosure controls and procedures, management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving the desired control objectives.

As required by SEC Rule 13a-15(b), TDS carried out an evaluation, under the supervision and with the participation of management, including its principal executive officer and principal financial officer, of the effectiveness of the design and operation of TDS' disclosure controls and procedures as of the end of the period covered by this Annual Report. Based on this evaluation, the principal executive officer and principal financial officer have concluded that TDS' disclosure controls and procedures were effective as of December 31, 2018 , at the reasonable assurance level.

Management's Report on Internal Control over Financial Reporting

Management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act. TDS' internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with accounting principles generally accepted in the United States of America (GAAP). TDS' internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the issuer; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with GAAP, and that receipts and expenditures of the issuer are being made only in accordance with authorizations of management and, where required, the board of directors of the issuer; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the issuer's assets that could have a material effect on the interim or annual consolidated financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Under the supervision and with the participation of TDS' management, including its principal executive officer and principal financial officer, TDS conducted an evaluation of the effectiveness of its internal control over financial reporting as of December 31, 2018 , based on the criteria established in the 2013 version of *Internal Control — Integrated Framework* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Management has concluded that TDS maintained effective internal control over financial reporting as of December 31, 2018 , based on criteria established in the 2013 version of *Internal Control — Integrated Framework* issued by the COSO.

The effectiveness of TDS' internal control over financial reporting as of December 31, 2018 , has been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in the firm's report which is incorporated by reference into Item 8 of this Annual Report on Form 10-K from Exhibit 13 filed herewith.

Changes in Internal Control over Financial Reporting

There were no changes in TDS' internal control over financial reporting during the fourth quarter of 2018 that have materially affected, or are reasonably likely to materially affect, TDS' internal control over financial reporting, except as follows: TDS implemented internal controls during the fourth quarter of 2018 to ensure that, upon adoption of the new lease accounting standard, leases will be properly evaluated and any impacts to the financial statements will be recognized in accordance with this new accounting standard effective January 1, 2019.

Item 9B. Other Information

The following information is being provided to update prior disclosures made pursuant to the requirements of Form 8-K, Item 2.03 – Creation of a Direct Financial Obligation or an Obligation Under an Off-Balance Sheet Arrangement of a Registrant.

TDS entered into a revolving credit agreement on May 10, 2018. A description of TDS' revolving credit agreement is included in TDS' Current Report on Form 8-K dated May 10, 2018, and is incorporated by reference herein.

Neither TDS nor U.S. Cellular borrowed or repaid any cash amounts under their revolving credit facilities in the fourth quarter of 2018 or through the filing date of this Form 10-K, and had no cash borrowings outstanding under their revolving credit facilities as of December 31, 2018 , or as of the filing date of this Form 10-K.

Further, U.S. Cellular did not borrow or repay any cash amounts under its receivables securitization facility in the fourth quarter of 2018 or through the filing date of this Form 10-K, and had no cash borrowings outstanding under its receivables securitization facility as of December 31, 2018 , or as of the filing date of this Form 10-K.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

Incorporated by reference from Proxy Statement sections entitled “Election of Directors,” “Corporate Governance,” “Executive Officers” and “Section 16(a) Beneficial Ownership Reporting Compliance.”

Item 11. Executive Compensation

Incorporated by reference from Proxy Statement section entitled “Executive and Director Compensation.”

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters

Incorporated by reference from Proxy Statement sections entitled “Security Ownership of Certain Beneficial Owners and Management” and “Securities Authorized for Issuance under Equity Compensation Plans.”

Item 13. Certain Relationships and Related Transactions, and Director Independence

Incorporated by reference from Proxy Statement sections entitled “Corporate Governance” and “Certain Relationships and Related Transactions.”

Item 14. Principal Accountant Fees and Services

Incorporated by reference from Proxy Statement section entitled “Fees Paid to Principal Accountants.”

PART IV

Item 15. Exhibits and Financial Statement Schedules

(a) The following documents are filed as part of this report:

(1) Financial Statements

Consolidated Statement of Operations	Annual Report*
Consolidated Statement of Comprehensive Income	Annual Report*
Consolidated Statement of Cash Flows	Annual Report*
Consolidated Balance Sheet	Annual Report*
Consolidated Statement of Changes in Equity	Annual Report*
Notes to Consolidated Financial Statements	Annual Report*
Management's Report on Internal Control Over Financial Reporting	Annual Report*
Report of Independent Registered Public Accounting Firm — PricewaterhouseCoopers LLP	Annual Report*
Consolidated Quarterly Information (Unaudited)	Annual Report*

*Incorporated by reference from Exhibit 13.

(2) Financial Statement Schedules

	Location
Los Angeles SMSA Limited Partnership and Subsidiary Financial Statements	S-1
Report of Independent Registered Public Accounting Firm — Ernst & Young LLP	S-2
Consolidated Balance Sheets	S-3
Consolidated Statements of Income	S-4
Consolidated Statements of Changes in Partners' Capital	S-5
Consolidated Statements of Cash Flows	S-6
Notes to Consolidated Financial Statements	S-7

All other schedules have been omitted because they are not applicable or not required or because the required information is shown in the financial statements or notes thereto.

(3) Exhibits

The exhibits set forth below are filed as a part of this Report. Compensatory plans or arrangements are identified below with an asterisk.

Exhibit Number	Description of Documents
3.1	TDS’ Restated Certificate of Incorporation, dated January 24, 2012, is hereby incorporated by reference to Exhibit 1 to TDS’ Registration Statement on Form 8-A/A dated January 24, 2012.
3.2	TDS Restated Bylaws are hereby incorporated by reference to Exhibit 3.1 to TDS’ Current Report on Form 8-K dated August 15, 2018.
4.1	TDS’ Restated Certificate of Incorporation is hereby incorporated as Exhibit 3.1.
4.2	TDS Restated Bylaws are hereby incorporated as Exhibit 3.2.
4.3(a)	Indenture for Senior Debt Securities between TDS and The Bank of New York Mellon Trust Company, N.A., formerly known as The Bank of New York Trust Company, N.A., as successor to BNY Midwest Trust Company (BNY) dated November 1, 2001, is hereby incorporated by reference to Exhibit 4 to TDS’ Quarterly Report on Form 10-Q for the quarter ended September 30, 2001.
4.3(b)	Third Supplemental Indenture dated March 31, 2005, by and between TDS and BNY, establishing TDS’ 6.625% Senior Notes due 2045, is hereby incorporated by reference to Exhibit 4.1 to TDS’ Current Report on Form 8-K dated March 23, 2005.
4.3(c)	Fourth Supplemental Indenture dated November 16, 2010, by and between TDS and BNY, establishing TDS’ 6.875% Senior Notes due 2059, is hereby incorporated by reference to Exhibit 4.1 to TDS’ Current Report on Form 8-K dated November 16, 2010.
4.3(d)	Fifth Supplemental Indenture dated March 21, 2011, by and between TDS and BNY, establishing TDS’ 7% Senior Notes due 2060, is hereby incorporated by reference to Exhibit 4.1 to TDS’ Current Report on Form 8-K dated March 21, 2011.
4.3(e)	Sixth Supplemental Indenture dated November 26, 2012, by and between TDS and BNY, establishing TDS’ 5.875% Senior Notes due 2061, is hereby incorporated by reference to Exhibit 4.1 to TDS’ Current Report on Form 8-K dated November 26, 2012.
4.4(a)	Revolving Credit Agreement, among TDS, Wells Fargo National Association, as administrative agent, and the other lenders thereto, dated as of May 10, 2018, including Schedules and Exhibits, including the form of the subsidiary Guaranty, is hereby incorporated by reference to Exhibit 4.1 to TDS’ Current Report on Form 8-K dated May 10, 2018.
4.4(b)	First Amendment to Revolving Credit Agreement among TDS, Wells Fargo National Association, as administrative agent, and the other lenders thereto, dated as of January 30, 2019.
4.5(a)	Revolving Credit Agreement, among U.S. Cellular, Toronto Dominion (Texas) LLC, as administrative agent, and the other lenders thereto, dated as of May 10, 2018, including Schedules and Exhibits, including the form of the subsidiary Guaranty and Subordination Agreement, is hereby incorporated by reference to Exhibit 4.1 to U.S. Cellular's Form 8-K dated May 10, 2018.
4.5(b)	First Amendment to Revolving Credit Agreement, among U.S. Cellular, Toronto Dominion (Texas) LLC, as administrative agent, and the other lenders thereto, dated as of January 30, 2019, is hereby incorporated by reference to Exhibit 4.3(b) to U.S. Cellular's Annual Report on Form 10-K for the year ended December 31, 2018.
4.6(a)	Indenture for Senior Debt Securities dated June 1, 2002, between U.S. Cellular and BNY is hereby incorporated by reference to Exhibit 4.1 to Form S-3 dated May 31, 2013 (File No. 333-188971).
4.6(b)	Form of Third Supplemental Indenture dated as of December 3, 2003, between U.S. Cellular and BNY, relating to $444,000,000 of U.S. Cellular’s 6.7% Senior Notes due 2033, is hereby incorporated by reference to Exhibit 4.1 to U.S. Cellular’s Current Report on Form 8-K dated December 3, 2003.
4.6(c)	Form of Fifth Supplemental Indenture dated as of June 21, 2004, between U.S. Cellular and BNY, relating to $100,000,000 of U.S. Cellular’s 6.7% Senior Notes due 2033, is hereby incorporated by reference to Exhibit 4.1 to U.S. Cellular’s Current Report on Form 8-K dated June 21, 2004.
4.6(d)	Form of Sixth Supplemental Indenture dated as of May 9, 2011, between U.S. Cellular and BNY, relating to $342,000,000 of U.S. Cellular’s 6.95% Senior Notes due 2060, is hereby incorporated by reference to Exhibit 4.1 to U.S. Cellular’s Current Report on Form 8-K dated May 9, 2011.
4.6(e)	Form of Seventh Supplemental Indenture dated as of December 8, 2014, between U.S. Cellular and BNY, relating to $275,000,000 of U.S. Cellular’s 7.25% Senior Notes due 2063, is hereby incorporated by reference to Exhibit 2 to U.S. Cellular’s Registration Statement on Form 8-A dated December 2, 2014.
4.6(f)	Form of Eighth Supplemental Indenture dated as of November 23, 2015, between U.S. Cellular and BNY, relating to $300,000,000 of U.S. Cellular’s 7.25% Senior Notes due 2064, is hereby incorporated by reference to Exhibit 2 to U.S. Cellular’s Registration Statement on Form 8-A dated November 17, 2015.

4.7	Indenture for Subordinated Debt Securities between TDS and BNY is hereby incorporated by reference to Exhibit 4.1 to TDS' Current Report on Form 8-K dated September 16, 2013.
4.8	Indenture for Subordinated Debt Securities between U.S. Cellular and BNY is hereby incorporated by reference to Exhibit 4.1 to U.S. Cellular's Current Report on Form 8-K dated September 16, 2013.
4.9(a)	Amended and Restated Term Loan Credit Agreement, among U.S. Cellular and CoBank, ACB, as administrative agent, and the other lenders thereto, dated as of June 15, 2016, including Schedules and Exhibits, including the forms of the subsidiary Guaranty and Subordination Agreement, is hereby incorporated by reference to Exhibit 4.1 to U.S. Cellular's Form 8-K dated June 15, 2016.
4.9(b)	First Amendment to Amended and Restated Term Loan Credit Agreement, among U.S. Cellular, CoBank, ACB, as administrative agent, and the other lenders thereto, dated as of May 10, 2018, is hereby incorporated by reference to Exhibit 4.2 to U.S. Cellular's Form 8-K dated May 10, 2018.
4.9(c)	Second Amendment to Amended and Restated Term Loan Credit Agreement, among U.S. Cellular, CoBank, ACB, as administrative agent, and the other lenders thereto, dated as of January 30, 2019, is hereby incorporated by reference to Exhibit 4.6(c) to U.S. Cellular's Annual Report on Form 10-K for the year ended December 31, 2018.
4.10	Master Indenture for asset-backed notes by and among USCC Master Note Trust, USCC Services, LLC and U.S. Bank National Association, as Indenture Trustee, dated December 20, 2017, is hereby incorporated by reference to Exhibit 4.1 to U.S. Cellular's Form 8-K dated December 20, 2017.
4.11	Supplemental Indenture for Series 2017-VFN Floating Rate Asset-Backed Notes by and among USCC Master Note Trust, USCC Services, LLC and U.S. Bank National Association, dated December 20, 2017, is hereby incorporated by reference to Exhibit 4.2 to U.S. Cellular's Form 8-K dated December 20, 2017.
9.1	Amendment and Restatement (dated April 22, 2005) of Voting Trust Agreement dated June 30, 1989, is hereby incorporated by reference to the Exhibit filed on Amendment No. 3 to Schedule 13D dated May 2, 2005, filed by the trustees of such voting trust with respect to TDS Common Shares.
10.1(a)*	TDS Amended and Restated 2004 Long-Term Incentive Plan is hereby incorporated by reference to Exhibit 10.1 to TDS' Current Report on Form 8-K dated April 11, 2005.
10.1(b)*	First Amendment to TDS Amended and Restated 2004 Long-Term Incentive Plan is hereby incorporated by reference to Exhibit 10.3 to TDS' Current Report on Form 8-K dated December 10, 2007.
10.1(c)*	Second Amendment to TDS Amended and Restated 2004 Long-Term Incentive Plan is hereby incorporated by reference to Exhibit 10.4 to TDS' Current Report on Form 8-K dated December 10, 2007.
10.1(d)*	Third Amendment to TDS Amended and Restated 2004 Long-Term Incentive Plan is hereby incorporated by reference to Exhibit 10.1 to TDS' Current Report on Form 8-K dated December 22, 2008.
10.2(a)*	Telephone and Data Systems, Inc. 2011 Long-Term Incentive Plan is hereby incorporated by reference to Exhibit B to TDS' Notice of Annual Meeting of Shareholders and Proxy Statement dated April 18, 2014.
10.2(b)*	Amendment No. 1 to Telephone and Data Systems, Inc. 2011 Long-Term Incentive Plan is hereby incorporated by reference to Exhibit A to TDS' Notice of Annual Meeting of Shareholders and Proxy statement dated April 18, 2014.
10.2(c)*	Amendment No. 2 to Telephone and Data Systems, Inc. 2011 Long-Term Incentive Plan.
10.3(a)*	TDS Supplemental Executive Retirement Plan, as amended and restated, effective January 1, 2009, is hereby incorporated by reference to Exhibit 10.1 to TDS' Current Report on Form 8-K dated August 27, 2008.
10.3(b)*	Amendment Number One to the Telephone and Data Systems, Inc. Supplemental Executive Retirement Plan, is hereby incorporated by reference to Exhibit 10.2 to Telephone and Data Systems, Inc.'s Current Report on Form 8-K dated March 15, 2012.
10.3(c)*	Amendment Number Two to the Telephone and Data Systems, Inc. Supplemental Executive Retirement Plan, is hereby incorporated by reference to Exhibit 10.3 to Telephone and Data Systems, Inc.'s Current Report on Form 8-K dated November 3, 2014.
10.4*	TDS' Amended and Restated Compensation Plan for Non-Employee Directors, dated December 7, 2017, is hereby incorporated by reference to Exhibit 10.4 to TDS' Annual Report on Form 10-K for the year ended December 31, 2017.
10.5*	TDS Bonus Deferral and Stock Unit Match Program and Election Form is hereby incorporated by reference to Exhibit 10.6 to TDS' Annual Report on Form 10-K for the year ended December 31, 2012.
10.6*	U.S. Cellular 2005 Long-Term Incentive Plan, as amended, is hereby incorporated by reference to Exhibit C to U.S. Cellular's Notice of Annual Meeting of Shareholders and Proxy Statement dated April 15, 2009.

10.7(a)*	U.S. Cellular 2013 Long-Term Incentive Plan is hereby incorporated by reference to Exhibit B to U.S. Cellular's Notice of Annual Meeting of Shareholders and Proxy Statement dated April 12, 2016.

10.7(b)*	Amendment No. 1 to U.S. Cellular 2013 Long-Term Incentive Plan is hereby incorporated by reference to Exhibit A to U.S. Cellular's Notice of Annual Meeting of Shareholders and Proxy Statement dated April 12, 2016.
10.7(c)*	Amendment No. 2 to U.S. Cellular 2013 Long-Term Incentive Plan is hereby incorporated by reference to Exhibit 10.11(c) to U.S. Cellular's Annual Report on Form 10-K for the year ended December 31, 2018.
10.8(a)*	U.S. Cellular Executive Deferred Compensation Interest Account Plan is hereby incorporated by reference to Exhibit 10.1 to U.S. Cellular’s Current Report on Form 8-K dated December 10, 2007.
10.8(b)*	First Amendment to U.S. Cellular Executive Deferred Compensation Interest Account Plan is hereby incorporated by reference to Exhibit 10.6 to U.S. Cellular’s Current Report on Form 8-K dated December 9, 2008.
10.8(c)*	Second Amendment to U.S. Cellular Executive Deferred Compensation Interest Account Plan is hereby incorporated by reference to Exhibit 10.12(c) to U.S. Cellular’s Annual Report on Form 10-K for the year ended December 31, 2012.
10.8(d)*	Election Form for U.S. Cellular Executive Deferred Compensation Interest Account Plan is hereby incorporated by reference to Exhibit 10.12(d) to U.S. Cellular’s Annual Report on Form 10-K for the year ended December 31, 2012.
10.9*	U.S. Cellular Form of Long-Term Incentive Plan Executive Deferred Compensation Agreement —Phantom Stock Account for officers is hereby incorporated by reference to Exhibit 10.5 to U.S. Cellular’s Current Report on Form 8-K dated May 14, 2013.
10.10(a)*	TDS 2007 Deferred Compensation Agreement between TDS and Kenneth R. Meyers dated December 26, 2006, is hereby incorporated by reference to Exhibit 99.1 to TDS’ Current Report on Form 8-K dated January 1, 2007.
10.10(b)*	Amendment to TDS 2007 Deferred Compensation Agreement between TDS and Kenneth R. Meyers is hereby incorporated by reference to Exhibit 10.4 to TDS Current Report on Form 8-K dated December 22, 2008.
10.11*	Form of TDS Corporate Officer Long-Term Incentive Plan Stock Option Award Agreement for Officers, is hereby incorporated by reference to Exhibit 10.3 to TDS’ Quarterly Report on Form 10-Q for the quarter ended March 31, 2016.
10.12*	Form of TDS Corporate Officer Long-Term Incentive Plan Restricted Stock Unit Award Agreement is hereby incorporated by reference to Exhibit 10.2 to TDS’ Current Report on Form 8-K dated May 1, 2015.
10.13*	Form of 2016 TDS Performance Share Award Agreement, is hereby incorporated by reference to Exhibit 10.1 to TDS’ Current Report on Form 8-K dated June 16, 2016.
10.14*	Form of 2017 TDS Performance Share Award Agreement, is hereby incorporated by reference to Exhibit 10.2 to TDS' Current Report on Form 8-K dated May 24, 2017.
10.15*	Form of 2018 TDS Performance Share Award Agreement, is hereby incorporated by reference to Exhibit 10.1 to TDS' Current Report on Form 8-K dated March 14, 2018.
10.16*	TDS Incentive Plan is hereby incorporated by reference to Exhibit A to TDS’ Notice of Annual Meeting of Shareholders and Proxy Statement dated April 12, 2017.
10.17*	TDS 2018 Officer Bonus Program is hereby incorporated by reference to Exhibit 10.1 to TDS’ Current Report on Form 8-K dated March 23, 2018.
10.18*	Amended and Restated Guidelines for the determination of Annual Bonus for President and Chief Executive Officer of TDS are hereby incorporated by reference to Exhibit 10.1 to TDS’ Current Report on Form 8-K dated November 18, 2009.
10.19*	Guidelines for the determination of Annual Bonus for President and Chief Executive Officer of U.S. Cellular are hereby incorporated by reference to Exhibit 10.2 to U.S. Cellular’s Current Report on Form 8-K dated August 19, 2014.
10.20*	Form of TDS Deferred Compensation Agreement is hereby incorporated by reference to Exhibit 10.1 to TDS’ Current Report on Form 8-K dated December 21, 2009.
10.21*	Change of Election Form for TDS Deferred Compensation Agreement is hereby incorporated by reference to Exhibit 10.2 to TDS’ Current Report on Form 8-K dated December 21, 2009.
10.22*	Pre 2005 Form of Deferred Compensation Agreement used by TDS Telecommunications LLC is hereby incorporated by reference to Exhibit 10.28 to TDS’ Annual Report on Form 10-K for the annual period ended December 31, 2009.
10.23(a)*	Post 2004 TDS Telecommunications LLC Executive Deferred Compensation Program, as amended and restated effective January 1, 2008, is hereby incorporated by reference to Exhibit 10.29 to TDS’ Annual Report on Form 10-K for the annual period ended December 31, 2009.

10.23(b)*	First Amendment to TDS Telecommunications LLC Executive Deferred Compensation Program dated October 8, 2008, is hereby incorporated by reference to Exhibit 10.30 to TDS' Annual Report on Form 10-K for the annual period ended December 31, 2009.
10.24*	Current Initial Election Form and Post 2004 Payment Election Form for TDS Telecommunications LLC Executive Deferred Compensation Program is hereby incorporated by reference to Exhibit 10.31 to TDS' Annual Report on Form 10-K for the annual period ended December 31, 2009.
10.25*	Current Annual Election Form for TDS Telecommunications LLC Executive Deferred Compensation Program is hereby incorporated by reference to Exhibit 10.32 to TDS' Annual Report on Form 10-K for the annual period ended December 31, 2009.
10.26*	Form of U.S. Cellular 2013 Long-Term Incentive Plan 2018 Performance Award Agreement for the President and Chief Executive Officer of U.S. Cellular, is hereby incorporated by reference to Exhibit 10.2 to U.S. Cellular's Current Report on Form 8-K dated March 12, 2018.
10.27*	Form of U.S. Cellular Long-Term Incentive Plan Restricted Stock Unit Award Agreement for the President and Chief Executive Officer of U.S. Cellular, is hereby incorporated by reference to Exhibit 10.2 to U.S. Cellular's Current Report on Form 8-K dated April 3, 2017.
10.28*	Letter Agreement dated July 25, 2013, between U.S. Cellular and Kenneth R. Meyers is hereby incorporated by reference to Exhibit 10.1 to U.S. Cellular's Current Report on Form 8-K dated July 25, 2013.
10.29**	Master Service Agreement entered into by United States Cellular Corporation and Amdocs Software Systems Limited on August 17, 2010, to develop a Billing and Operational Support System (B/OSS) with a new point-of-sale system to consolidate billing on one platform, is hereby incorporated by reference to Exhibit 10.8 to U.S. Cellular's Quarterly Report on Form 10-Q dated September 30, 2010.
10.30**	Software License and Maintenance Agreement entered into by United States Cellular Corporation and Amdocs Software Systems Limited on August 17, 2010, to develop a Billing and Operational Support System (B/OSS) with a new point-of-sale system to consolidate billing on one platform, is hereby incorporated by reference to Exhibit 10.9 to U.S. Cellular's Quarterly Report on Form 10-Q dated September 30, 2010.
10.31**	Master Statement of Work, dated as of November 25, 2014, between U.S. Cellular and Amdocs Software Systems, Ltd., is hereby incorporated by reference from Exhibit 10.26 to U.S. Cellular's Annual Report on Form 10-K for the year ended December 31, 2014.
10.32	Series 2017-VFN Note Purchase Agreement by and among USCC Receivables Funding LLC, as transferor, USCC Master Note Trust, as issuer, USCC Services, LLC, as Servicer, U.S. Cellular as guarantor, and Royal Bank of Canada, as administrative agent for owners of the notes, dated December 20, 2017, is hereby incorporated by reference to Exhibit 10.1 to U.S. Cellular's Form 8-K dated December 20, 2017.
10.33	Performance Guaranty and Parent Undertaking Agreement by U.S. Cellular in favor of the Guaranteed Parties defined therein, dated December 20, 2017, is hereby incorporated by reference to Exhibit 10.2 to U.S. Cellular's Form 8-K dated December 20, 2017.
10.34	Amended and Restated Trust Agreement between USCC Receivables Funding LLC, as transferor, and Wilmington Trust, National Association, as Trustee, is hereby incorporated by reference to Exhibit 10.3 to U.S. Cellular's Form 8-K dated December 20, 2017.
10.35*	Form of Consulting Agreement Effective June 1, 2018, between TDS and Douglas D. Shuma is hereby incorporated by reference to Exhibit 10.1 to TDS' Current Report on Form 8-K/A dated February 23, 2018, as filed with the SEC on May 23, 2018.
10.36*	Summary of Letter Agreement between TDS and Douglas W. Chambers is hereby incorporated by reference to Exhibit 10.1 to TDS' Current Report on Form 8-K/A dated February 23, 2018, as filed with the SEC on June 4, 2018.
13	Incorporated portions of 2018 Annual Report to Shareholders.
21	Subsidiaries of TDS.
23.1	Consent of Independent Registered Public Accounting Firm—PricewaterhouseCoopers LLP.
23.2	Consent of Independent Registered Public Accounting Firm—Ernst & Young LLP.
31.1	Principal executive officer certification pursuant to Rule 13a-14 of the Securities Exchange Act of 1934.
31.2	Principal financial officer certification pursuant to Rule 13a-14 of the Securities Exchange Act of 1934.

32.1	Principal executive officer certification pursuant to Section 1350 of Chapter 63 of Title 18 of the United States Code.
32.2	Principal financial officer certification pursuant to Section 1350 of Chapter 63 of Title 18 of the United States Code.
101.INS	XBRL Instance Document
101.SCH	XBRL Taxonomy Extension Schema Document
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document
101.LAB	XBRL Taxonomy Extension Label Linkbase Document
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document
*	Indicates a management contract or compensatory plan or arrangement
**	Portions of this Exhibit have been omitted and filed separately with the Securities and Exchange Commission as part of an application for confidential treatment pursuant to the Securities Exchange Act of 1934, as amended. The application for confidential treatment has been granted.

Item 16. Form 10-K Summary

None.

LOS ANGELES SMSA LIMITED PARTNERSHIP AND SUBSIDIARY FINANCIAL STATEMENTS

TDS' subsidiary, U.S. Cellular, owns a 5.5% limited partnership interest in the Los Angeles SMSA Limited Partnership and Subsidiary, and accounts for such interest by the equity method. The partnership's consolidated financial statements were obtained by U.S. Cellular as a limited partner.

Report of Independent Registered Public Accounting Firm

To the Partners of Los Angeles SMSA Limited Partnership

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Los Angeles SMSA Limited Partnership and Subsidiary (the Partnership) as of December 31, 2018 and 2017, the related consolidated statements of income, changes in partners' capital and cash flows for each of the three years in the period ended December 31, 2018, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Partnership at December 31, 2018 and 2017, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2018 in conformity with U.S. generally accepted accounting principles.

Adoption of New Accounting Standards

ASU No. 2016-15

As discussed in Note 2 to the consolidated financial statements, on January 1, 2018 the Partnership retrospectively changed its method of presenting certain cash receipts and cash payments in the accompanying consolidated statements of cash flows as a result of the adoption of Financial Accounting Standards Board (FASB) Accounting Standards Update (ASU) No. 2016-15, *Statement of Cash Flows (Topic 230): Classification of Certain Cash Receipts and Cash Payments.*

ASU No. 2014-09

As discussed in Note 2 to the consolidated financial statements, effective January 1, 2018 the Partnership changed its method for recognizing revenue as a result of the adoption of ASU No. 2014-09, *Revenue from Contracts with Customers (Topic 606)* , and the amendments in ASUs 2015-14, 2016-08, 2016-10 and 2016-12, using the modified retrospective method.

Basis for Opinion

These financial statements are the responsibility of the Partnership's management. Our responsibility is to express an opinion on the Partnership’s financial statements based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Partnership in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB and in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ Ernst & Young LLP

We have served as the Partnership’s auditor since 2014.

Orlando, Florida
February 22, 2019

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Los Angeles SMSA Limited Partnership and Subsidiary

Consolidated Balance Sheets - As of December 31, 2018 and 2017

(Dollars in Thousands)		**2018**		2017
ASSETS				
CURRENT ASSETS:				
Due from affiliate	**$**	**256,812**	$	218,838
Accounts receivable, net of allowances of $21,886 and $26,916		**434,399**		423,285
Prepaid expenses and other		**203,571**		40,916
Total current assets		**894,782**		683,039
PROPERTY, PLANT AND EQUIPMENT - NET		**1,998,538**		1,936,038
WIRELESS LICENSES		**2,075,448**		2,075,448
OTHER ASSETS - NET		**432,483**		349,484
TOTAL ASSETS	**$**	**5,401,251**	$	5,044,009
LIABILITIES AND PARTNERS' CAPITAL				
CURRENT LIABILITIES:				
Accounts payable and accrued liabilities	**$**	**142,805**	$	158,099
Contract liabilities and other		**175,863**		174,965
Financing obligation		**13,185**		12,926
Deferred rent		**13,347**		8,360
Total current liabilities		**345,200**		354,350
LONG TERM LIABILITIES:				
Financing obligation		**111,868**		111,318
Deferred rent		**143,586**		141,410
Other liabilities		**29,264**		7,841
Total long term liabilities		**284,718**		260,569
Total liabilities		**629,918**		614,919
PARTNERS' CAPITAL				
General Partner's interest		**1,908,533**		1,771,636
Limited Partners' interest		**2,862,800**		2,657,454
Total partners' capital		**4,771,333**		4,429,090
TOTAL LIABILITIES AND PARTNERS' CAPITAL	**$**	**5,401,251**	$	5,044,009

See notes to consolidated financial statements.

Los Angeles SMSA Limited Partnership and Subsidiary

Consolidated Statements of Income - For the Years Ended December 31, 2018 , 2017 , and 2016

(Dollars in Thousands)	**2018**	2017	2016
OPERATING REVENUES:			
Service revenues	**$ 3,766,062**	$ 3,791,371	$ 3,996,989
Equipment revenues	**1,153,954**	982,251	930,690
Other	**275,896**	246,322	256,917
Total operating revenues	**5,195,912**	5,019,944	5,184,596
OPERATING EXPENSES:			
Cost of service (exclusive of depreciation)	**1,115,475**	1,107,614	1,070,302
Cost of equipment	**1,212,952**	1,174,858	1,193,924
Depreciation	**369,874**	355,696	356,848
Selling, general and administrative	**1,095,048**	1,168,978	1,278,205
Total operating expenses	**3,793,349**	3,807,146	3,899,279
OPERATING INCOME	**1,402,563**	1,212,798	1,285,317
OTHER INCOME:			
Interest income (expense), net	**13,332**	2,857	(6,552)
Other	**2,702**	1,631	–
Total other income	**16,034**	4,488	(6,552)
NET INCOME	**$ 1,418,597**	$ 1,217,286	$ 1,278,765
Allocation of Net Income:			
General Partner	**$ 567,439**	$ 486,914	$ 511,507
Limited Partners	**$ 851,158**	$ 730,372	$ 767,258

See notes to consolidated financial statements.

Los Angeles SMSA Limited Partnership and Subsidiary

Consolidated Statements of Changes in Partners' Capital - For the Years Ended December 31, 2018 , 2017 , and 2016

(Dollars in Thousands)

	General Partner	Limited Partners			
	AirTouch Cellular Inc.	AirTouch Cellular Inc.	Cellco Partnership	United States Cellular Investment Corporation of Los Angeles	Total Partners' Capital
BALANCE - January 1, 2016	$ 1,433,215	$ 1,515,626	$ 437,131	$ 197,067	$ 3,583,039
Distributions	(210,000)	(222,075)	(64,050)	(28,875)	(525,000)
Net Income	511,507	540,917	156,009	70,332	1,278,765
BALANCE - January 1, 2017	$ 1,734,722	$ 1,834,468	$ 529,090	$ 238,524	$ 4,336,804
Distributions	(450,000)	(475,875)	(137,250)	(61,875)	(1,125,000)
Net Income	486,914	514,912	148,509	66,951	1,217,286
BALANCE - December 31, 2017	$ 1,771,636	$ 1,873,505	$ 540,349	$ 243,600	$ 4,429,090
ASC 606 opening balance sheet adjustment	67,058	70,914	20,453	9,221	167,646
Distributions	(497,600)	(526,212)	(151,768)	(68,420)	(1,244,000)
Net Income	567,439	600,067	173,069	78,022	1,418,597
BALANCE - December 31, 2018	$ 1,908,533	$ 2,018,274	$ 582,103	$ 262,423	$ 4,771,333

See notes to consolidated financial statements.

Los Angeles SMSA Limited Partnership and Subsidiary

Consolidated Statements of Cash Flows - For the Years Ended December 31, 2018 , 2017 , and 2016

(Dollars in Thousands)	**2018**	2017	2016
CASH FLOWS FROM OPERATING ACTIVITIES:			
Net Income	**$ 1,418,597**	$ 1,217,286	$ 1,278,765
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation	**369,874**	355,696	356,848
Imputed interest on financing obligation	**11,686**	12,374	12,284
Provision for uncollectible accounts	**43,847**	56,505	71,925
Changes in operating assets and liabilities:			
Accounts receivable	**(39,867)**	(36,907)	(153,704)
Prepaid expenses and other	**(614,263)**	(388,907)	(68,871)
Accounts payable and accrued liabilities	**(2,541)**	(54,321)	24,685
Contract liabilities and other	**25,715**	14,531	(6,099)
Deferred rent	**8,956**	(5,159)	(4,010)
Other liabilities	**22,716**	7,683	41
Net cash provided by operating activities	**1,244,720**	1,178,781	1,511,864
CASH FLOWS FROM INVESTING ACTIVITIES:			
Capital expenditures	**(575,351)**	(434,350)	(449,005)
Fixed asset transfers out	**130,228**	15,648	23,453
Acquisition of wireless licenses	**—**	—	(1,697)
Collections on deferred purchase price and purchased receivables	**9,331**	86,009	83,453
Collection on beneficial interest - net	**483,924**	229,330	—
Change in due from affiliate	**(37,974)**	63,008	(281,846)
Net cash provided by (used in) investing activities	**10,158**	(40,355)	(625,642)
CASH FLOWS FROM FINANCING ACTIVITIES:			
Change in due to affiliate	**—**	—	(348,724)
Repayments of financing obligation	**(10,878)**	(13,426)	(12,498)
Distributions	**(1,244,000)**	(1,125,000)	(525,000)
Net cash used in financing activities	**(1,254,878)**	(1,138,426)	(886,222)
CHANGE IN CASH	**—**	—	—
CASH - Beginning of year	**—**	—	—
CASH - End of year	**$ —**	$ —	$ —
CASH PAID FOR INTEREST	**$ —**	$ —	$ 2,576
NONCASH TRANSACTIONS FROM INVESTING ACTIVITIES:			
Accruals for capital expenditures	**$ 13,004**	$ 25,757	$ 15,621

See notes to consolidated financial statements.

Los Angeles SMSA Limited Partnership and Subsidiary

Notes to Consolidated Financial Statements – For the Years Ended December 31, 2018 , 2017 , and 2016
(Dollars in Thousands)

1. ORGANIZATION AND MANAGEMENT

The consolidated financial statements include the accounts of the Los Angeles SMSA Limited Partnership (Los Angeles SMSA) and Los Angeles Edge LLC, a wholly owned subsidiary of Los Angeles SMSA (collectively, the "Partnership"). The principal activity of Los Angeles SMSA, formed in 1984, is to provide cellular service in the Los Angeles metropolitan statistical area. Los Angeles Edge LLC was formed during 2015 and was a bankruptcy remote special purpose entity (SPE), created for the purpose of selling wireless device payment plan agreement receivables to third parties (see Note 4). The Los Angeles Edge LLC entity was dissolved on March 29, 2018 and as of this date the Partnership consists of only Los Angeles SMSA.

In accordance with the partnership agreement, AirTouch Cellular Inc., an affiliate of Cellco Partnership (Cellco), and general partner of the Partnership, is responsible for managing the operations of the Partnership.

The partners and their respective ownership percentages of the Partnership as of December 31, 2018 were as follows:

General Partner:	
AirTouch Cellular Inc.	40%
Limited Partners:	
AirTouch Cellular Inc.	42.3%
Cellco Partnership	12.2%
United States Cellular Investment Corporation of Los Angeles	5.5%

Cellco is an indirect, wholly owned subsidiary of Verizon Communications Inc. (Verizon). Substantially all of the Partnership's transactions represent transactions with, or processed by, Cellco and/or certain other affiliates (collectively, Verizon Wireless).

2. SIGNIFICANT ACCOUNTING POLICIES

Consolidation – The method of accounting applied to investments involves an evaluation of all significant terms of the investments that explicitly grant or suggest evidence of control or influence over the operations of the investee. The consolidated financial statements include the Partnership's subsidiary which was a variable interest entity (VIE) where Los Angeles SMSA was deemed to be the primary beneficiary. All significant intercompany accounts and transactions have been eliminated (see Note 4).

Use of estimates – The consolidated financial statements are prepared using U.S. generally accepted accounting principles (GAAP), which requires management to make estimates and assumptions that affect reported amounts and disclosures. Actual results could differ from those estimates.

Examples of significant estimates include: the allowance for uncollectible accounts, the recoverability of property, plant and equipment, the recoverability of wireless licenses and other long-lived assets, fair values of financial instruments, and beneficial interest.

Revenue recognition – The Partnership earns revenue from contracts with customers, primarily through the provision of telecommunications services and through the sale of wireless equipment. These revenues are accounted for under Accounting Standards Update (ASU) 2014-09, *Revenue from Contracts with Customers* (Topic 606), which we adopted on January 1, 2018, using the modified retrospective approach. This standard update, along with related subsequently issued updates, clarifies the principles for recognizing revenue and develops a common revenue standard for GAAP. The standard update also amended the guidance for the recognition of costs to obtain customer contracts such that incremental costs of obtaining customer contracts will be deferred and amortized consistent with the transfer of the related good or service.

We also earn revenues that are not accounted for under Topic 606 from leasing arrangements (such as those from towers) and the interest on equipment financed under a device payment plan agreement when sold to the customer by an authorized agent.

The Partnership earns revenue primarily by providing access to and usage of our telecommunications network and selling equipment. Performance obligations in a typical contract, as determined in accordance with Topic 606, with a customer include service and equipment.

We offer our wireless services through a variety of plans on a postpaid or prepaid basis. For wireless service, we recognize revenue using an output method, either as the service allowance units are used or as time elapses, because it reflects the pattern by which we satisfy our performance obligation through the transfer of service to the customer. Monthly service is generally billed in advance, which results in a contract liability. See Note 3 for additional information. For postpaid plans where monthly usage exceeds the allowance, the overage usage represents options held by the customer for incremental services and the usage-based fee is recognized when the customer exercises the option (typically on a month-to-month basis), which is recorded as a contract asset.

We sell wireless devices and accessories. Equipment revenue is generally recognized when the products are delivered to and accepted by the customer, as this is when control passes to the customer. In addition to offering the sale of equipment on a standalone basis, we have two primary offerings through which customers pay for a wireless device, in connection with a service contract: fixed-term plans and device payment plans.

Under a fixed-term plan, the customer is sold the wireless device without any upfront charge or at a discounted price in exchange for entering into a fixed-term service contract (typically for a term of 24 months or less). This plan is currently only offered to business channel customers.

Under a device payment plan, the customer is sold the wireless device in exchange for a non-interest bearing installment note, which is repaid by the customer, typically over a 24-month term, and concurrently enters into a month-to-month contract for wireless service. Customers may be offered certain promotions that provide billing credits applied over a specified term, contingent upon the customer maintaining service. The credits are included in the transaction price, which are allocated to the performance obligations based on their relative selling price, and are recognized when earned.

A financing component exists in both our fixed-term plans and device payment plans because the timing of the payment for the device, which occurs over the contract term, differs from the satisfaction of the performance obligation, which occurs at contract inception upon transfer of device to the customer. We periodically assess, at the contract level, the significance of the financing component inherent in our fixed-term and device payment plan receivable based on qualitative and quantitative considerations related to our customer classes. These considerations include assessing the commercial objective of our plans, the term and duration of financing provided, interest rates prevailing in the marketplace, and credit risks of our customer classes, all of which impact our selection of appropriate discount rates. Based on current facts and circumstances, we determined that the financing component in our existing Wireless direct channel device payments and fixed-term contracts with customers is not significant and therefore is not accounted for separately. See Note 4 for additional information on the interest on equipment financed on a device payment plan agreement when sold to the customer by an authorized agent in our indirect channel.

Roaming revenue reflects service revenue earned by the Partnership when customers not associated with the Partnership operate in the service area of the Partnership and use the Partnership’s network. The roaming rates with third-party carriers associated with those customers are based on agreements with such carriers. The roaming rates and methodology to determine roaming revenues charged by the Partnership to Verizon Wireless are established by Verizon Wireless on a periodic basis and may not reflect current market rates (see Note 8).

Other revenues primarily consist of certain fees billed to customers for surcharges and elected services. The Partnership recognizes taxes imposed by governmental authorities on revenue-producing transactions between the Partnership and its customers, which are passed through to the customers, on a net basis.

Wireless contracts – Total contract revenue, which represents the transaction price for service and equipment, is allocated between service and equipment revenue based on their estimated standalone selling prices. The Partnership estimates the standalone selling price of the device or accessory to be its retail price excluding subsidies or conditional purchase discounts. The Partnership estimates the standalone selling price of service to be the price that is offered to customers on month-to-month contracts that can be cancelled at any time without penalty (i.e., when there is no fixed-term for service) or when service is procured without the concurrent purchase of a device. In addition, the Partnership also assesses whether the service term is impacted by certain legally enforceable rights and obligations in the contract with customers, such as penalties that a customer would have to pay to early terminate a fixed-term contract or billing credits that would cease if the month-to-month wireless service is canceled. The assessment of these legally enforceable rights and obligations involves judgment and impacts the determination of the transaction price and related disclosures.

From time to time, customers may be offered certain promotions that provide customers on device payment plans with the right to upgrade to a new device after paying a specified portion of their device payment plan agreement amount and trading in their device in good working order. The Partnership accounts for this trade-in right as a guarantee obligation. The full amount of the trade-in right's fair value is recognized as a guarantee liability and results in a reduction to the revenue recognized upon the sale of the device. The guarantee obligation was insignificant to the consolidated financial statements at December 31, 2018 and 2017. The total transaction price is reduced by the guarantee obligation, which is accounted for outside the scope of Topic 606, and the remaining transaction price is allocated between the performance obligations within the contract.

Fixed-term plans generally include the sale of a wireless device at subsidized prices. This results in the creation of a contract asset at the time of sale, which represents the recognition of equipment revenue in excess of amounts billed.

For device payment plans, billing credits are accounted for as consideration payable to a customer and are included in the determination of total transaction price, resulting in a contract liability.

Verizon Wireless may provide a right of return on products and services for a short time period after a sale. These rights are accounted for as variable consideration when determining the transaction price, and accordingly the Partnership recognizes revenue based on the estimated amount to which the Partnership expects to be entitled after considering expected returns. Returns and credits are estimated at contract inception and updated at the end of each reporting period as additional information becomes available. Verizon Wireless also may provide credits or incentives on our products and services for contracts with resellers, which are accounted for as variable consideration when estimating the amount of revenue to recognize. These amounts are insignificant to the consolidated financial statements.

For certain bundled offerings/transactions involving third-party service providers, the Partnership evaluates gross versus net considerations by assessing indicators of control. These promotions have not been significant.

Operating expenses – Operating expenses include expenses incurred directly by the Partnership, as well as an allocation of selling, general and administrative, and other operating expenses incurred by Verizon Wireless on behalf of the Partnership. Employees of Verizon Wireless provide services on behalf of the Partnership. These employees are not employees of the Partnership, therefore, operating expenses include direct and allocated charges of salary and employee benefit costs for the services provided to the Partnership. Verizon Wireless believes such allocations are calculated in accordance with the Partnership agreement and are determined using a reasonable method of allocating such costs (see Note 8). In 2018 and 2017, allocations were principally based on total subscribers; in 2016, allocations were based on total subscribers, the Partnership's percentage of certain revenue streams, and customer gross additions or minutes-of-use. The impact of the change in allocation factors was insignificant to the consolidated financial statements.

Cost of roaming, included in cost of service, reflects costs incurred by the Partnership when customers associated with the Partnership operate and use a network in a service area not associated with the Partnership. The roaming rates with third-party carriers are based on agreements with such carriers. The roaming rates and methodology to determine roaming costs charged to the Partnership by Verizon Wireless are established by Verizon Wireless on a periodic basis and may not reflect current market rates (see Note 8).

Cost of equipment is recorded upon sale of the related equipment at Verizon Wireless's cost basis. Inventory is wholly owned by Verizon Wireless until the moment of sale and is not recorded in the consolidated financial statements of the Partnership.

Maintenance and repairs – The cost of maintenance and repairs, including the cost of replacing minor items not constituting substantial betterments, is charged principally to cost of service as these costs are incurred.

Advertising costs – Costs for advertising products and services as well as other promotional and sponsorship costs are allocated from Verizon Wireless and are charged to selling, general and administrative expenses in the periods, in which they are incurred (see Note 8).

Income taxes – The Partnership is treated as a pass-through entity for income tax purposes and, therefore, is not subject to federal, state or local income taxes. Accordingly, no provision has been recorded for income taxes in the Partnership's consolidated financial statements. The results of operations, including taxable income, gains, losses, deductions and credits, are allocated to and reflected on the income tax returns of the respective partners.

The Partnership files partnership income tax returns in the U.S. federal jurisdiction and various state and local jurisdictions. The Partnership remains subject to examination by tax authorities for tax years as early as 2015. It is reasonably possible that various current tax examinations will conclude or require reevaluations of the Partnership's tax positions during this period. An estimate of the range of the possible change cannot be made until these tax matters are further developed or resolved.

Due from affiliate – Due to/from affiliate principally represents the Partnership's cash position with Verizon Wireless. Verizon Wireless manages, on behalf of the Partnership, all operating, investing and financing activities, of the Partnership. As such, the change in due from affiliate is reflected as an investing activity in the consolidated statements of cash flows.

In addition, cost of equipment and other operating expenses incurred by Verizon Wireless on behalf of the Partnership, as well as property, plant and equipment and wireless license transactions with affiliates, are charged to the Partnership through this account. Interest income on due from affiliate is based on the short term Applicable Federal Rate which was approximately 2.3%, 1.2% and 0.7% for the years ended December 31, 2018, 2017 and 2016, respectively. Interest expense on balances due to affiliate is based on the short-term Applicable Federal Rate of approximately 2.3% in 2018. In previous years, interest expense on due to affiliate balances was based on Verizon Wireless's average cost of borrowing from Verizon which was approximately 4.7% and 4.8% in 2017 and 2016, respectively. Included in interest income (expense), net is interest income of $12,666, $5,928, and $1,390 for the years ended December 31, 2018, 2017 and 2016, respectively, related to due to from affiliate. Interest expense of $0, $0, and $2,683 was incurred during the years ended December 31, 2018, 2017, and 2016, respectively, all of which was capitalized.

Allowance for uncollectible accounts – Accounts receivable are recorded in the consolidated financial statements at cost, net of an allowance for credit losses, with the exception of indirect-channel device payment plan loans. We maintain allowances for uncollectible accounts receivable, including our direct-channel device payment plan agreement receivables, for estimated losses resulting from the failure or inability of customers to make required payments. Indirect-channel device payment loans are considered financial instruments and are initially recorded at fair value net of imputed interest, and credit losses are recorded as incurred. However, loan balances are assessed annually for impairment and an allowance is recorded if the loan is considered impaired.

The Partnership's allowance for uncollectible accounts receivable is based on management's assessment of the collectability of specific customer accounts and includes consideration of the credit worthiness and financial condition of those customers. The Partnership records an allowance to reduce the receivables to the amount that is reasonably believed to be collectible. The Partnership also records an allowance for all other receivables based on multiple factors including historical experience with bad debts, the general economic environment and the aging of such receivables. Similar to traditional service revenue accounting treatment, the Partnership records direct device payment plan agreement bad debt expense based on an estimate of the percentage of equipment revenue that will not be collected. This estimate is based on a number of factors including historical write-off experience, credit quality of the customer base and other factors such as macroeconomic conditions. The Partnership monitors the aging of accounts with device payment plan agreement receivables and writes-off account balances if collection efforts are unsuccessful and future collection is unlikely.

Property, plant and equipment, and depreciation – Property, plant and equipment is recorded at cost. Property, plant and equipment is depreciated on a straight-line basis.

Leasehold improvements are amortized over the shorter of the estimated life of the improvement or the remaining term of the related lease, calculated from the time the asset was placed in service.

When depreciable assets are retired or otherwise disposed of, the related cost and accumulated depreciation are deducted from the property, plant and equipment accounts and any gains or losses on disposition are recognized in income. Transfers of property, plant and equipment between Verizon Wireless and affiliates are recorded at net book value on the date of the transfer with an offsetting entry included in due from affiliate.

Interest associated with the construction of network-related assets is capitalized. Capitalized interest is reported as a reduction in interest expense and depreciated as part of the cost of the network-related assets.

Verizon Wireless continues to assess the estimated useful lives of property, plant and equipment and though the timing and extent of current deployment plans are subject to ongoing analysis and modification, we believe that the current estimates of useful lives are reasonable.

Other assets – Other assets, net primarily includes beneficial interest and long-term device payment plan agreement receivables, net of allowances of $13,142 and $12,261 at December 31, 2018 and 2017, respectively (see Note 4).

Impairment – All long-lived assets are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of the asset may not be recoverable. If any indications of impairment are present, the Partnership would test for recoverability by comparing the carrying amount of the asset group to the net undiscounted cash flows expected to be generated from the asset group. If those net undiscounted cash flows do not exceed the carrying amount, the next step would be to determine the fair value of the asset and record an impairment, if any. The Partnership re-evaluates the useful-life determinations for these long-lived assets each year to determine whether events and circumstances warrant a revision to their remaining useful lives.

Wireless licenses – Wireless licenses provide the Partnership with the exclusive right to utilize the designated radio frequency spectrum to provide wireless communications services. In addition, Verizon Wireless maintains wireless licenses that provide the Partnership with the right to utilize the designated radio frequency spectrum to provide wireless communications services to the Partnership's customers. While licenses are issued for a fixed time, generally ten years, such licenses are subject to renewal by the Federal Communications Commission (FCC). License renewals, which are managed by Verizon Wireless, have historically occurred routinely and at nominal cost. Moreover, Verizon Wireless determined that there are currently no legal, regulatory, contractual, competitive, economic or other factors that limit the useful life of the wireless licenses. As a result, wireless licenses are treated as an indefinite-lived intangible asset. The useful life determination for wireless licenses is re-evaluated each year to determine whether events and circumstances continue to support an indefinite useful life. When evaluating for impairment, Verizon Wireless and the Partnership (to the extent it owns more than one license) aggregate wireless licenses into one single unit of accounting, since they are utilized on an integrated basis.

The average remaining renewal period of the Partnership's wireless license portfolio was 7.6 years as of December 31, 2018.

Interest expense, if any, incurred while qualifying activities are performed to ready wireless licenses for their intended use is capitalized as part of wireless licenses. The capitalization period ends when the development is discontinued or substantially complete and the license is ready for its intended use.

Verizon Wireless, tests its' wireless licenses balance for potential impairment annually or more frequently if impairment indicators are present. In 2018, Verizon Wireless performed a quantitative impairment assessment for its aggregate wireless licenses, which consisted of comparing the estimated fair value of its aggregate wireless licenses to the aggregated carrying amount as of the test date.

In 2017 and 2016, Verizon Wireless performed a qualitative impairment assessment to determine whether it is more likely than not that the fair value of aggregate wireless licenses was less than the carrying amount. As part of the assessment, several qualitative factors were considered, including market transactions, the business enterprise value of Verizon Wireless, macroeconomic conditions (including changes in interest rates and discount rates), industry and market considerations (including industry revenue and EBITDA (earnings before interest, taxes, depreciation and amortization) margin projections), the projected financial performance of Verizon Wireless, as well as other factors.

In addition, Verizon Wireless allocates to the Partnership, based on a reasonable methodology, any impairment loss recognized by Verizon Wireless for licenses included in Verizon Wireless's national footprint. Verizon Wireless's impairment assessments in 2018, 2017, and 2016 indicated that the fair value of its wireless licenses exceeded the carrying value and, therefore did not result in an impairment.

In 2018, 2017 and 2016, the Partnership also performed a qualitative impairment assessment similar to that described for its aggregate wireless licenses and confirmed the licenses were not impaired.

Financial instruments – The carrying value of the Partnership's wireless device payment plan agreement receivables and beneficial interest approximates fair value.

Fair value measurements – Fair value of financial and non-financial assets and liabilities is defined as an exit price, representing the amount that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants. The three-tier hierarchy for inputs used in measuring fair value, which prioritizes the inputs used in the methodologies of measuring fair value for assets and liabilities, is as follows:

Level 1 - Quoted prices in active markets for identical assets or liabilities

Level 2 - Observable inputs other than quoted prices in active markets for identical assets and liabilities

Level 3 - No observable pricing inputs in the market

Financial assets and financial liabilities are classified in their entirety based on the lowest level of input that is significant to the fair value measurements. The assessment of the significance of a particular input to the fair value measurements requires judgment, and may affect the valuation of the assets and liabilities being measured and their categorization within the fair value hierarchy. As of December 31, 2018, 2017, and 2016, the Partnership did not have any assets or liabilities measured at fair value on a recurring basis.

Distributions – The Partnership is required to make distributions to its partners based upon the Partnership's operating results, due to/from affiliate status and financing needs as determined by the General Partner at the date of the distribution, which are typically made in arrears.

Variable interest entities (VIEs) – VIEs are entities that lack sufficient equity to permit the entity to finance its activities without additional subordinated financial support from other parties, have equity investors that do not have the ability to make significant decisions relating to the entity's operations through voting rights, do not have the obligation to absorb the expected losses or do not have the right to receive the residual returns of the entity. The Partnership consolidates the assets and liabilities of VIEs when it is deemed to be the primary beneficiary. The primary beneficiary is the party that has the power to make the decisions that most significantly affect the economic performance of the VIE and has the obligation to absorb losses or the right to receive benefits that could potentially be significant to the VIE.

Recently adopted accounting standards – In August 2016, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update (ASU) 2016-15, *Statement of Cash Flows (Topic 230): Classification of Certain Cash Receipts and Cash Payments* . This standard update addresses eight specific cash flow issues with the objective of reducing the existing diversity in practice for these issues. Among the updates, this standard update requires cash receipts from payments on a transferor's beneficial interests in securitized trade receivables to be classified as cash inflows from investing activities. This standard update is effective as of the first quarter of 2019; however, early adoption is permitted, and as allowed the Partnership early adopted in the first quarter of 2018. The amendment relating to beneficial interests in securitization transactions impacted the Partnership's presentation of collections of certain beneficial interest from sales of wireless device payment plan agreement receivables in the Partnership's consolidated statements of cash flows. Upon adoption of this standard update in the first quarter of 2018, the Partnership retrospectively reclassified approximately $39,848 and $212,987 of deferred purchase price and beneficial interest collections, respectively, from cash flows from operating activities to cash flows from investing activities in the Partnership's consolidated statements of cash flows for the year ended December 31, 2017 and $81,670 of deferred purchase price for the year ended December 31, 2016.

In May 2014, the FASB issued ASU 2014-09, *Revenue from Contracts with Customers (Topic 606)* . This standard update, along with related subsequently issued updates, clarifies the principles for recognizing revenue and develops a common revenue standard for GAAP. The standard update also amends current guidance for the recognition of costs to obtain customer contracts such that incremental costs of obtaining customer contracts are deferred and amortized consistent with the transfer of the related good or service. The standard update intends to provide a more robust framework for addressing revenue issues; improve comparability of revenue recognition practices across entities, industries, jurisdictions and capital markets; and provide more useful information to users of financial statements through improved disclosure requirements. The Partnership adopted this standard update on January 1, 2018 using the modified retrospective method. As this method requires that the cumulative effect of initially applying the standard be recognized at the date of adoption, the Partnership recorded the cumulative effect of $167,646 as an adjustment to the January 1, 2018 opening balance of Partners' capital.

See Note 3 for additional information related to revenues and contract costs, including qualitative and quantitative disclosures required under Topic 606.

The cumulative effect of the changes made to our consolidated balance sheet for the adoption of Topic 606 was as follows:

(dollars in thousands)	At December 31, 2017	Adjustments due to Topic 606	At January 1, 2018
Accounts receivable, net of allowances	423,285	313	423,598
Prepaid expenses and other	40,916	84,068	124,984
Other assets - net	349,484	59,194	408,678
Contract liabilities and other	174,965	(24,816)	150,149
Other liabilities	7,841	745	8,586
Partners' capital	4,429,090	167,646	4,596,736

Recently issued accounting standards – In June 2016, the FASB issued ASU 2016-13, *Financial Instruments - Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments.* This standard update requires that certain financial assets be measured at amortized cost net of an allowance for estimated credit losses such that the net receivable represents the present value of expected cash collection. In addition, this standard update requires that certain financial assets be measured at amortized cost reflecting an allowance for estimated credit losses expected to occur over the life of the assets. The estimate of credit losses must be based on all relevant information including historical information, current conditions and reasonable and supportable forecasts that affect the collectability of the amounts. This standard update is effective as of the first quarter of 2020; however, early adoption is permitted. The Partnership is currently evaluating the impact that this standard update will have on its various financial instruments that include, but are not limited to, device payment plan agreement receivables and service receivables.

In February 2016, the FASB issued ASU 2016-02, *Leases (Topic 842)* . This standard update was issued to increase transparency and improve comparability by requiring entities to recognize assets and liabilities on the balance sheet for all leases, with certain exceptions. In addition, through improved disclosure requirements, the standard update will enable users of financial statements to further understand the amount, timing, and uncertainty of cash flows arising from leases. This standard update allows for a modified retrospective application and is effective as of the first quarter of 2020; however, early adoption is permitted. Entities are allowed to apply the modified retrospective approach (1) retrospectively to each prior reporting period presented in the financial statements with the cumulative-effect adjustment recognized at the beginning of the earliest comparative period presented or (2) retrospectively at the beginning of the period of adoption through a cumulative-effect adjustment. The Partnership will adopt this standard on January 1, 2019 using the modified retrospective approach with a cumulative-effect adjustment to opening retained earnings recorded at the beginning of the period of adoption. Therefore, upon adoption, the Partnership will recognize and measure leases without revising comparative period information or disclosure. The modified retrospective approach includes a number of optional practical expedients that entities may elect to apply.

The Partnership has completed its assessment of the transition practical expedients offered by the standard. These practical expedients lessen the transitional burden of implementing the standard update by not requiring a reassessment of certain conclusions reached under existing lease accounting guidance. Accordingly, we will apply these practical expedients and will not reassess: (1) whether an expired or existing contract is a lease or contains an embedded lease; (2) lease classification of an expired or existing lease; (3) initial direct costs for an existing lease; and (4) whether an existing or expired land easement is or contains a lease if it has not historically been accounted for as a lease. We have identified and implemented a new system solution to meet the requirements of the new standard and have identified and implemented processes and internal controls to meet the standards reporting and disclosure requirements.

Upon adoption of this standard, there will be a significant impact in our consolidated balance sheet as the Partnership expects to recognize a right-of-use asset and liability related to substantially all operating lease arrangements of between $665 million and $765 million. The Partnership's current operating lease portfolio included in this range is primarily comprised of network equipment including towers, distributed antenna systems and small cells, real estate, and equipment leases. In addition, the Partnership expects a lower amount of lease costs to qualify as initial direct costs under the new standard which will result in an immediate recognition of expense instead of recognition of expense over time.

Subsequent events – Events subsequent to December 31, 2018 have been evaluated through February 22, 2019, the date the consolidated financial statements were available to be issued.

3. REVENUE AND CONTRACT COSTS

The Partnership earns revenue from contracts with customers, primarily through the provision of telecommunications and other services and through the sale of wireless equipment. The Partnership accounts for these revenues under Topic 606, which was adopted on January 1, 2018, using the modified retrospective approach. Revenue is disaggregated on the consolidated Statements of Income by products and services, which we view as the relevant categorization of revenues for the Partnership. There are also revenues earned that are not accounted for under Topic 606 including from leasing arrangements (such as those for towers), and the interest on equipment financed on a device payment plan agreement when sold to the customer by an authorized agent. During 2018, revenues from arrangements that were not accounted for under Topic 606 were insignificant to the consolidated financial statements.

The Partnership applied the new revenue recognition standard to customer contracts not completed at the date of initial adoption. For incomplete contracts that were modified before the date of adoption, the Partnership elected to use the practical expedient available under the modified retrospective method, which allows us to aggregate the effect of all modifications when identifying satisfied and unsatisfied performance obligations, determining the transaction price and allocating transaction price to the satisfied and unsatisfied performance obligations for the modified contract at transition. Results for reporting periods beginning after January 1, 2018 are presented under Topic 606, while amounts reported for prior periods have not been adjusted and continue to be reported under accounting standards in effect for those periods.

Prior to the adoption of Topic 606, we were required to limit the revenue recognized when a wireless device was sold to the amount of consideration that was not contingent on the provision of future services, which was typically limited to the amount of consideration received from the customer at the time of sale. Under Topic 606, the total consideration in the contract is allocated between wireless equipment and service based on their relative standalone selling prices. This change primarily impacts our arrangements that include sales of wireless devices at subsidized prices in conjunction with a fixed-term plan, also known as the subsidy model, for service. Accordingly, under Topic 606, generally more equipment revenue is recognized upon sale of the equipment to the customer and less service revenue is recognized over the contract term than was previously recognized under the prior " *Revenue Recognition* " (Topic 605) standard. At the time the equipment is sold, this allocation results in the recognition of a contract asset equal to the difference between the amount of revenue recognized and the amount of consideration received from the customer. As of January 2017, we no longer offer consumers new fixed-term plans with subsidized equipment pricing; however, we continue to offer fixed-term plans to our business customers.

Topic 606 also requires the deferral of incremental costs incurred to obtain a customer contract, which are then amortized to expense, as a component of selling, general and administrative expense, over the respective periods of expected benefit. As a result, a significant amount of our sales commission costs, which were historically expensed as incurred under previous accounting, are now deferred and amortized under Topic 606.

Finally, under Topic 605, at the time of the sale of a device, we imputed risk adjusted interest on the device payment plan agreement receivables. We recorded the imputed interest as a reduction to the related accounts receivable and interest income was recognized over the financed device payment term. Under Topic 606, while there continues to be a financing component in both the fixed-term plans and device payment plans, also known as the installment model, we have determined that this financing component for our customer classes in the direct channel is not significant and therefore we no longer impute interest for these contracts. This change results in additional revenue recognized upon the sale of wireless devices and no interest income recognized over the device payment term.

A reconciliation of the adjustments from the adoption of Topic 606 relative to Topic 605 on certain impacted financial statement line items in our consolidated statement of income and balance sheet were as follows:

(dollars in thousands)	At December 31, 2018 As reported	Balances without adoption of Topic 606	Adjustments
ASSETS			
CURRENT ASSETS:			
Due from affiliate	$ 346,326	$ 331,618	$ 14,708
Accounts receivable, net of allowances	434,399	423,383	11,016
Prepaid expenses and other	177,520	55,387	122,133
OTHER ASSETS NET	369,021	280,809	88,212
LIABILITIES AND PARTNERS' CAPITAL			
Contract liabilities and other	$ 175,863	$ 198,085	$ (22,222)
LONG TERM LIABILITIES:			
Other liabilities	29,264	35,443	(6,179)
PARTNERS' CAPITAL			
General Partners' interest	$ 1,908,533	$ 1,802,744	$ 105,789
Limited Partners' interest	2,862,800	2,704,118	158,682

(dollars in thousands)	Twelve Months Ended December 31, 2018 As reported	Balances without adoption of Topic 606	Adjustments
OPERATING REVENUE:			
Service revenues	$ 3,766,062	$ 3,818,424	$ (52,362)
Equipment revenues	1,153,954	1,060,106	93,848
Other	275,896	278,334	(2,438)
Total Operating Revenues	5,195,912	5,156,864	39,048
OPERATING EXPENSES:			
Cost of equipment	$ 1,212,952	$ 1,206,710	$ 6,242
Selling, general and administrative	1,095,048	1,159,066	(64,018)
NET INCOME	$ 1,418,597	$ 1,321,773	$ 96,824

Remaining performance obligations – When allocating the total contract transaction price to identified performance obligations, a portion of the total transaction price may relate to service performance obligations which were not satisfied or are partially satisfied as of the end of the reporting period. Below we disclose information relating to these unsatisfied performance obligations. The Partnership has elected to apply certain practical expedients available under Topic 606, including the option to exclude the expected revenues arising from unsatisfied performance obligations related to contracts that have an original expected duration of one year or less, which primarily relate to certain month-to-month service contracts.

Additionally, certain contracts provide customers the option to purchase additional services. The fee related to the additional services is recognized when the customer exercises the option (typically on a month-to-month basis).

Customer contracts are generally either month-to-month and cancellable at any time (typically under a device payment plan) or contain terms greater than one month (typically under a fixed-term plan). Additionally, customers may incur charges based on usage or may purchase additional optional services in conjunction with entering into a contract which can be cancelled at any time and therefore are not included in the transaction price. When a service contract is longer than one month, the service contract term will generally be two years or less.

The customers also include other telecommunications companies who utilize Verizon Wireless's network to resell wireless service to their respective end customers. Reseller arrangements occur on a month-to-month basis or include a stated contract term, which generally extends longer than two years. Arrangements with a stated contract term generally include an annual minimum revenue commitment over the term of the contract for which revenues will be recognized in future periods.

At December 31, 2018, the transaction price related to unsatisfied performance obligations expected to be recognized for 2019, 2020 and thereafter was $445,832, $162,829 and insignificant, respectively.

Accounts receivable and contract balances – The timing of revenue recognition may differ from the time of billing to the customers. Receivables presented in the consolidated balance sheet represent an unconditional right to consideration. Contract balances represent amounts from an arrangement when either the Partnership has performed, by transferring goods or services to the customer in advance of receiving all or partial consideration for such goods and services from the customer, or the customer has made payment to the Partnership in advance of obtaining control of the goods and/or services promised to the customer in the contract.

Contract assets primarily relate to the Partnership's rights to consideration for goods or services provided to the customers but for which there is not an unconditional right at the reporting date. Under a fixed-term plan, the total contract revenue is allocated between wireless services and equipment revenues, as discussed above. In conjunction with these arrangements, a contract asset is created, which represents the difference between the amount of equipment revenue recognized upon sale and the amount of consideration received from the customer. The contract asset is recognized as accounts receivable as wireless services are provided and billed. The Partnership has the right to bill the customer as service is provided over time, which results in the right to the payment being unconditional. The contract asset balances are presented in the consolidated balance sheet as prepaid expenses and other and other assets - net. The Partnership assesses the contract assets for impairment on an annual basis and will recognize an impairment charge to the extent the carrying amount is not recoverable. The impairment charge related to contract assets was insignificant for the year ended December 31, 2018. The December 31, 2018 contract asset balance included increases throughout the year resulting from new contracts offset by contract assets reclassified to a receivable and insignificant other changes.

Contract liabilities arise when customers are billed and the Partnership receives consideration in advance of providing the goods or services promised in the contract. The majority of the contract liability at January 1, 2018 was recognized during 2018 as these contract liabilities primarily relate to advanced billing for fixed monthly fees for service that are recognized within the following month. Other insignificant contract liabilities include deferrals of upfront fees that are recognized straight line over the contract term or material right period. The contract liability balances are presented in the consolidated balance sheet as contract liabilities and other and other liabilities.

The balance of receivables, contract assets and contract liabilities recorded in our consolidated balance sheet were as follows:

(dollars in thousands)	At January 1, 2018	At December 31, 2018
Receivables [(1)]	$ 211,388	$ 206,856
Device payment plan agreement receivables [(2)]	1,678	162,619
Contract assets	46,964	41,193
Contract liabilities	148,797	178,905

(1) Balances do not include receivables related to the following contracts: leasing arrangements (such as towers) and the interest on equipment financed on a device payment plan agreement when sold to the customer by an authorized agent.

(2) Included in device payment plan agreement receivables presented in Note 4. Balances do not include receivables related to contracts completed prior to January 1, 2018 and receivables derived from the sale of equipment on a device payment plan through an authorized agent.

Contract costs – As discussed in Note 2, Topic 606 requires the recognition of an asset for incremental costs to obtain a customer contract, which are then amortized to expense, over the respective periods of expected benefit. The Partnership recognizes a contract asset for incremental deferred commission expenses paid to internal sales personnel and agents in conjunction with obtaining customer contracts, as well as a contract asset for incremental deferred commission expense paid to affiliated markets when customers purchase equipment from affiliated markets. The costs are only deferred when it is determined the commissions are, in fact, incremental and would not have been incurred absent the customer contract. Costs to obtain a contract are amortized and recorded ratably as commission expense over the period representing the transfer of goods or services to which the assets relate. Costs to obtain contracts are amortized over two to three years, as such costs are typically incurred each time a customer upgrades.

We determine the amortization periods for our costs incurred to obtain a customer contract at a portfolio level due to the similarities within these customer contract portfolios.

Other costs, such as general costs or costs related to past performance obligations, are expensed as incurred.

Deferred contract costs are classified as current or non-current within prepaid expenses and other assets, respectively. The balances of deferred contract costs as of December 31, 2018, included in our consolidated balance sheet were as follows:

(dollars in thousands)	2018
Prepaid expenses	$ 99,062
Other assets	70,062
Total	$ 169,124

For the year ended December 31, 2018, the Partnership recognized expense of $97,782 associated with the amortization of deferred contract costs, primarily within selling, general and administrative expense in the consolidated statements of income.

The Partnership assesses deferred contract costs for impairment on an annual basis. An impairment charge is recognized to the extent the carrying amount of a deferred cost exceeds the remaining amount of consideration expected to be received in exchange for the goods and services related to the cost, less the expected costs related directly to providing those goods and services that have not yet been recognized as expenses. There have been no impairment charges recognized for the year ended December 31, 2018.

4. WIRELESS DEVICE PAYMENT PLANS

Under the Verizon Wireless device payment program, eligible Partnership customers can purchase wireless devices under a device payment plan agreement. Customers that activate service on devices purchased under the device payment program pay lower service fees as compared to those under fixed-term service plans, and their device payment plan charge is included on their wireless monthly bill. As of January 2017, the Partnership no longer offers consumers new fixed-term service plans for phones; however, the Partnership continues to offer fixed-term plans to business customers.

Wireless device payment plan agreement receivables – The following table displays device payment plan agreement receivables, net, that are recognized in the accompanying consolidated balance sheets as of December 31, 2018 and 2017:

	2018	2017
Device payment plan agreement receivables, gross	**$ 332,680**	$ 311,677
Unamortized imputed interest	**(7,196)**	(15,430)
Device payment plan agreement receivables, net of unamortized imputed interest	**325,484**	296,247
Allowance for credit losses	**(24,869)**	(33,897)
Device payment plan agreement receivables, net	**$ 300,615**	$ 262,350
Classified on the consolidated balance sheets:		
Accounts receivable, net	**$ 159,289**	$ 140,895
Other assets, net	**$ 141,326**	$ 121,455
Device payment plan agreement receivables, net	**$ 300,615**	$ 262,350

Verizon Wireless may offer certain promotions that allow a customer to trade in their owned device in connection with the purchase of a new device. Under these types of promotions, the customer receives a credit for the value of the trade-in device. In addition, Verizon Wireless may provide the customer with additional future credits that will be applied against the customer’s monthly bill as long as service is maintained. The Partnership recognizes a liability for the trade-in device measured at fair value, which is determined by considering several factors, including the weighted-average selling prices obtained in recent resales of similar devices eligible for trade-in. Future credits are recognized when earned by the customer. Device payment plan agreement receivables, net does not reflect the trade-in device liability. At December 31, 2018 and 2017, the amount of trade-in liability was insignificant to the consolidated financial statements.

From time to time, customers may be offered certain marketing promotions that allow customers to upgrade to a new device after paying down a specified portion of the required device payment plan agreement amount as well as trading in their device in good working order. When a customer enters into a device payment plan agreement with the right to upgrade to a new device, the Partnership accounts for this trade-in right as a guarantee obligation. At December 31, 2018 and 2017, the amount of the trade-in right guarantee obligation was insignificant to the consolidated financial statements.

For indirect channel contracts with customers, we impute risk adjusted interest on the device payment plan agreement receivables. We record the imputed interest as a reduction to the related accounts receivable. Interest income, which is included within other revenue in the consolidated statements of income, is recognized over the financed device payment term. See Note 3 for additional information on financing considerations with respect to direct channel contracts with customers.

When originating device payment plan agreements, Verizon Wireless uses internal and external data sources to create a credit risk score to measure the credit quality of a customer and to determine eligibility for the device payment program. If a customer is either new to Verizon Wireless or has less than 210 days of customer tenure (a new customer), the credit decision process relies more heavily on external data sources. If the customer has 210 days or more of customer tenure (an existing customer), the credit decision process relies on internal data sources. The Partnership’s experience has been that the payment attributes of longer-tenured customers are highly predictive in estimating their ability to pay in the future. External data sources include obtaining a credit report from a national consumer credit reporting agency, if available. Internal data and/or credit data obtained from the credit reporting agencies is used to create a custom credit risk score. The custom credit risk score is generated automatically (except with respect to a small number of applications where the information needs manual intervention) from the applicant’s credit data using Verizon Wireless proprietary custom credit models, which are empirically derived and demonstrably and statistically sound. The credit risk score measures the likelihood that the potential customer will become severely delinquent and be disconnected for non-payment. For a small portion of new customer applications, a traditional credit report is not available from one of the national credit reporting agencies because the potential customer does not have sufficient credit history. In those instances, alternate credit data is used for the risk assessment.

Based on the custom credit risk score, we assign each customer to a credit class, each of which has specified offers of credit including an account level spending limit and either a maximum amount of credit allowed per device or a required down payment percentage. During the fourth quarter of 2018 the Partnership moved all customers, new and existing, from a required down payment percentage, between zero and 100%, to a maximum amount of credit per device.

Subsequent to origination, the Partnership monitors delinquency and write-off experience as key credit quality indicators for its portfolio of device payment plan agreement receivables and fixed-term service plans. The extent of collection efforts with respect to a particular customer are based on the results of proprietary custom empirically derived internal behavioral-scoring models that analyze the customer's past performance to predict the likelihood of the customer falling further delinquent. These customer-scoring models assess a number of variables, including origination characteristics, customer account history and payment patterns. Based on the score derived from these models, accounts are grouped by risk category to determine the collection strategy to be applied to such accounts. The Partnership continuously monitors collection performance results and the credit quality of device payment plan agreement receivables based on a variety of metrics, including aging. The Partnership considers an account to be delinquent and in default status if there are unpaid charges remaining on the account on the day after the bill's due date.

As of December 31, 2018 and 2017, the balance and aging of the device payment plan agreement receivables on a gross basis was as follows:

		2018		2017
Unbilled	**$**	**317,307**	$	292,834
Billed:				
Current		**12,270**		15,500
Past Due		**3,103**		3,343
Device payment plan agreement receivables, gross	**$**	**332,680**	$	311,677

Activity in the allowance for credit losses for the device payment plan agreement receivables was as follows:

		2018		2017
Balance at January 1	**$**	**33,897**	$	36,026
Provision for uncollectible accounts		**23,932**		42,873
Write-offs		**(21,035)**		(40,181)
Allowance related to receivables sold		**(16,803)**		(3,800)
Other		**4,878**		(1,021)
Balance at December 31	**$**	**24,869**	**$**	**33,897**

Receivables purchase agreement – In 2015 and 2016, Verizon Wireless established programs pursuant to a Receivables Purchase Agreement (original RPA), to sell from time to time, on an uncommitted basis, eligible device payment plan agreement receivables to a group of primarily relationship banks (Purchasers) on both a revolving and non-revolving basis, collectively the Programs. Under the Programs, Los Angeles SMSA would transfer the eligible receivables to Los Angeles Edge (Seller or SPE), who would transfer the device payment plan agreement receivables to the Purchasers for upfront cash proceeds and additional consideration upon settlement of the receivables, referred to as the deferred purchase price. In December 2017, the original RPA and all other related transaction documents were terminated and as of December 31, 2017 neither Verizon Wireless nor the Los Angeles SMSA have continuing involvement with any of the receivables sold under the original RPA program.

There were no sales of device payment plan agreement receivables under the Programs during 2017. During 2016, the Partnership sold $178,981 of receivables, net of allowance and imputed interest, under the original RPA. The Partnership received cash proceeds from new transfers of $132,483 and cash proceeds from reinvested collections of $36,855 and recorded a deferred purchase price of $23,873. The deferred purchase price assets obtained as a result of sales under the original RPA were recorded in our consolidated balance sheets as an other asset at fair value, based on the remaining device payment amounts expected to be collected, adjusted, as applicable, for the time value of money and by the timing and estimated value of the device trade-in in connection with upgrades. The estimated value of the device trade-in considered prices expected to be offered to the Partnership by independent third parties. This estimate contemplated changes in value after the launch of a device. The fair value measurements were considered to be Level 3 measurements within the fair value hierarchy. The collection of the deferred purchase price was contingent on collections from customers.

The sales of receivables under the original RPA did not have a significant impact on our consolidated statements of income. The cash proceeds received from the Purchasers were recorded within Cash flows provided by operating activities on the consolidated statements of cash flows.

Collections of deferred purchase price were $86,009 during 2017, and $83,453 during 2016. During 2017, Verizon Wireless repurchased all outstanding receivables previously sold to the Purchasers in exchange for the obligation to pay the associated deferred purchase price to the wholly-owned subsidiaries that are bankruptcy remote special purpose entities (Sellers). At December 31, 2017, the deferred purchase price receivable was fully satisfied. Collections following the repurchase of receivables was $9,331 during 2018, and insignificant during 2017. Collections of both deferred purchase price and repurchased receivables were recorded within cash flows used in investing activities in the consolidated statements of cash flows.

Asset Backed Securities – Beginning in September of 2016, Verizon Wireless (through its affiliates) has and continues to offer notes and enter into financing facilities collateralized by device payment plan agreement receivables (collectively, “Asset Backed Securities” or “ABS” arrangements) with a number of financial institutions, and through registered debt. In connection with these ABS arrangements, Los Angeles SMSA transfers device payment plan receivables to a Trust entity through a two-step transfer - in which Los Angeles SMSA first sells eligible device payment plan receivables to Verizon ABS LLC, a securitization SPE wholly owned and consolidated by Verizon Wireless pursuant to a Receivable Purchase Agreement (RPA), and from Verizon ABS LLC to a designated Trust entity (also wholly owned and consolidated by Verizon Wireless). Los Angeles SMSA has also entered into Transfer and Servicing Agreements with the Verizon ABS LLC and Verizon Wireless governing the ongoing servicing of the receivables after their sale to Verizon ABS LLC.

The receivables sold to the Trust entities through this two step transfer are no longer considered assets of the Partnership. The proceeds received from the ABS arrangements are recorded within cash flows from operating activities on the consolidated statements of cash flows.

Under the terms of the ABS arrangements, the lenders make advances under asset-backed loans backed by device payment plan agreement receivables. There is a two year revolving period, which may be extended, during which Verizon Wireless may transfer additional receivables to Verizon ABS LLC. Subject to certain conditions, Verizon Wireless may also remove receivables from Verizon ABS LLC. Verizon Wireless may prepay the outstanding amounts of the loans without penalty, but in certain cases, with breakage costs. In such instances, as a result of the True-up Trust agreements between Verizon Wireless, Los Angeles SMSA, and the other Verizon legal entities originating device payment plan receivables (collectively, the “Originators”), each Originator is required to contribute a proportional portion of the prepayment based on its respective share of the debt. In consideration for any such prepayment contributions, the Partnership receives additional beneficial interest in the sold receivables. Additionally, the Partnership may receive repayments of beneficial interest in the form of proportional draw downs as well as excess cash collections.The Partnership collections on beneficial interest - net are recorded within cash flows from investing activities on the Partnership’s consolidated statement of cash flows.

During 2018, 2017 and 2016, Verizon Wireless sold $830,795, $706,729 and $389,800, respectively, of device payment plan agreement receivables related to the Partnership, net of allowances and imputed interest, to Verizon ABS LLC, and received proceeds of $358,148, $368,238 and $331,454 respectively, beneficial interest and insignificant gains and losses. The Partnership recorded a short-term beneficial interest of $43,684 in prepaid expenses and other for 2018, none in 2017 or 2016, as well as a long-term beneficial interest of $138,074, $174,077 and $56,359 for 2018, 2017, and 2016, respectively, which was recorded within other assets - net on the consolidated balance sheets.

Variable interest entities (VIEs) – Under the ABS arrangements, the Trust’s sole business consists of holding collected receivables that are sold by the Partnership to Verizon Wireless affiliates under the terms of the ABS arrangements. The activity of servicing the receivables and distribution of the cash collected is the activity that has the most significant impact on the Trust. Verizon Wireless is the master and special servicer for the receivables but does not have a direct variable interest in the Trust. The Partnership holds a beneficial interest in the Trust, which represents the residual interest in the Trust and, as such are, variable interests. Since Verizon Wireless maintains decision making rights as servicer and has an obligation to absorb losses, it is the primary beneficiary in the Trust.

Beneficial interest – Under the ABS arrangements, the beneficial interest is initially recorded at fair value, based on the remaining device payment amounts expected to be collected, adjusted, as applicable, for the time value of money and credit risk. The initial fair value measurements are considered to be Level 3 measurements within the fair value hierarchy. The collection of the beneficial interest is contingent on collections from customers.

Continuing involvement – Verizon Wireless has continuing involvement with the sold receivables as it services the receivables pursuant to the ABS arrangements on behalf of the Partnership. Verizon Wireless services the related receivables, including facilitating customer payment collection in exchange of an insignificant servicing fee. While servicing the receivables, the same policies and procedures are applied to the sold receivables that apply to owned receivables, and the Partnership continues to maintain normal relationships with its customers. The credit quality of the customers Verizon Wireless continues to service was consistent throughout the periods presented.

In addition, the Partnership has continuing involvement related to the sold receivables as the Partnership is responsible for absorbing additional credit losses pursuant to the agreements. Credit losses on receivables sold were $17,359 during 2018, $11,176 during 2017 and insignificant to the consolidated financial statements during 2016. The Partnership’s maximum exposure to loss related to the sold receivables is limited to the amount of the outstanding beneficial interest, which was $181,757 and $174,077 as of December 31, 2018 and 2017, respectively. The maximum exposure to loss represents an estimated loss that would be incurred under severe, hypothetical circumstances whereby the Partnership would not receive the total portion of the proceeds withheld by the Trust. As the Partnership believes the probability of these circumstances occurring is remote, the maximum exposure to loss is not an indication of the Partnership’s expected loss.

The outstanding device payment plan agreement receivables derecognized from the Partnership’s consolidated balance sheets, but which Verizon Wireless continues to service, was $690,576 and $629,686 at December 31, 2018 and 2017, respectively.

5. PROPERTY, PLANT AND EQUIPMENT, NET

Property, plant and equipment consists of the following at December 31, 2018 and 2017:

	2018	2017
Land	**$ 7,716**	$ 7,716
Buildings and improvements (15-45 years)	**1,108,936**	1,031,746
Wireless plant and equipment (3-50 years)	**4,084,825**	4,383,737
Furniture, fixtures and equipment (3-10 years)	**58,986**	62,653
Leasehold improvements (5-7 years)	**494,914**	466,657
	5,755,377	5,952,509
Less: accumulated depreciation	**(3,756,839)**	(4,016,471)
Property, plant and equipment, net	**$ 1,998,538**	$ 1,936,038

Capitalized network engineering costs of $28,812 and $23,414, were recorded during the years ended December 31, 2018 and 2017, respectively. Construction in progress, included in certain classifications shown above, principally consisting of wireless plant and equipment, and amounted to $156,637 and $122,335, as of December 31, 2018 and 2017, respectively. Depreciation expense of $369,869, $355,692 and $354,329 was recorded during the years ended December 31, 2018, 2017and 2016, respectively.

6. TOWER MONETIZATION TRANSACTION

During March 2015, Verizon completed a transaction with American Tower Corporation (ATC), pursuant to which, ATC acquired exclusive rights to lease and operate approximately 11,300 of Verizon Wireless's wireless towers and corresponding ground leases for an upfront payment of $5.0 billion (not in thousands). Under the terms of the lease agreements, ATC has exclusive rights to lease and operate the towers over an average term of approximately 28 years. As the ATC leases expire, ATC has fixed-price purchase options to acquire these towers based on their fair market values at the end of the lease terms. Verizon Wireless has subleased capacity on the towers from ATC for a minimum of ten years at current market rates, with options to renew. The Partnership participated in this arrangement and has leased 538 towers to ATC for an upfront payment of $221,653, which was accounted for as deferred rent and as a financing obligation. The $95,634 accounted for as deferred rent represents unearned rental income and relates to the portion of the towers for which the right-of-use has passed to ATC. The deferred rent is being recognized on a straight-line basis over the Partnership's average lease term of 30 years. The $126,635 accounted for as a financing obligation relates to the portion of the towers that continue to be occupied and used for the Partnership's network operations. The Partnership makes a sublease payment to ATC of $1.9 per month per site, with annual increases of 2%. During 2018, 2017, and 2016, the Partnership made $12,914, $13,426 and $12,498, respectively, of sublease payments to ATC, which are recorded as repayments of financing obligation on the consolidated statements of cash flows. The Partnership continues to include the towers in property, plant and equipment, net in the consolidated balance sheets and depreciates them accordingly. In addition, the minimum future payments for the ground leases of approximately $227,408 have been included in our operating lease commitments. As part of the rights obtained during the transaction, ATC is responsible for the payment of the leases, and we do not expect to be required to make payments unless ATC becomes unable to do so.

At December 31, 2018 and 2017, the balance of deferred rent was $84,944 and $85,618, respectively. At December 31, 2018 and 2017, the balance of the financing obligation was $125,053 and $124,244, respectively.

7. CURRENT LIABILITIES

Accounts payable and accrued liabilities consist of the following as of December 31, 2018 and 2017.

	2018	2017
Accounts payable	**$ 130,669**	$ 144,549
Accrued liabilities	**12,137**	13,550
Accounts payable and accrued liabilities	**$ 142,806**	$ 158,099

Contract liabilities and other consists of the following as of December 31, 2018 and 2017:

	2018	2017
Contract liabilities	$ 160,626	$ 145,795
Customer deposits	14,737	26,693
Guarantee liability, net	500	2,477
Contract liabilities and other	$ 175,863	$ 174,965

8. TRANSACTIONS WITH AFFILIATES AND RELATED PARTIES

In addition to fixed-asset purchases, substantially all of service revenues, equipment revenues, other revenues, cost of service, cost of equipment and selling, general and administrative expenses of the Partnership represent transactions processed by Verizon Wireless, on behalf of the Partnership, or represent transactions with affiliates. These transactions consist of: (1) revenues and expenses that pertain to the Partnership, which are processed by Verizon Wireless and directly attributed to or directly charged to the Partnership; (2) roaming revenue when customers of Verizon Wireless use the network of the Partnership or roaming cost when the Partnership's customers use the network of Verizon Wireless; (3) certain revenues and expenses that are processed or incurred by Verizon Wireless, that are allocated to the Partnership principally based on total subscribers in 2018 and 2017 and based on factors such as total subscribers, the Partnership's percentage of revenue streams, and gross customer additions or minutes of use in 2016; and (4) service arrangements with Verizon Wireless where the Partnership has the ability to utilize certain spectrum. These transactions do not necessarily represent arm's-length transactions and may not represent all revenues and costs that would be present if the Partnership operated on a stand-alone basis. Verizon Wireless periodically reviews the methodology and allocation bases for allocating certain revenues, operating costs and selling, general and administrative expenses to the Partnership. Resulting changes, if any, in the allocated amounts have historically not been significant, other than the roaming revenue and cost impacts discussed below.

Service revenues – Service revenues include monthly customer billings processed by Verizon Wireless on behalf of the Partnership and roaming revenues relating to customers of other affiliated markets that are specifically identified to the Partnership. For the years ended December 31, 2018, 2017 and 2016, roaming revenues were $527,038, $510,521, and $486,262, respectively. During 2017, Verizon Wireless updated its roaming rates and methodology for determining roaming volumes charged for postpaid, prepaid and reseller roaming revenue, resulting in a net decrease of $145,797 in roaming revenue as compared to prior periods. Service revenues also include usage and certain revenue reductions, including revenue concessions and bill incentive credits, that are processed by Verizon Wireless, and allocated to the Partnership based on certain factors deemed appropriate by Verizon Wireless.

Equipment revenues – Equipment revenues include equipment sales processed by Verizon Wireless and specifically identified to the Partnership, as well as certain handset and accessory revenues, contra-revenues including equipment concessions, and equipment manufacturer rebates that are processed by Verizon Wireless and allocated to the Partnership based on certain factors deemed appropriate by Verizon Wireless. The Partnership also recognizes commission revenue on the sale of devices to customers whose service contract is with an affiliate market.

Cost of service – Cost of service includes roaming costs relating to the Partnership's customers roaming in other affiliated markets. For the years ended December 31, 2018, 2017 and 2016 roaming costs were $651,083, $637,264, and $619,985, respectively. During 2017, Verizon Wireless updated its roaming rates and methodology for determining roaming amounts charged for postpaid, prepaid and reseller roaming cost, resulting in a net decrease of $182,169 to roaming cost as compared to prior periods. Cost of service also includes cost of telecom and long-distance that are incurred by Verizon Wireless and allocated to the Partnership based on certain factors deemed appropriate by Verizon Wireless. The Partnership also has service arrangements to utilize additional spectrum owned by Verizon Wireless. See Notes 2 and 9 for further information regarding these arrangements.

Cost of equipment – Cost of equipment is recorded at Verizon Wireless's cost basis (see Note 2). Cost of equipment includes certain costs related to handsets, accessories and other costs incurred by Verizon Wireless and allocated to the Partnership based on certain factors deemed appropriate by Verizon Wireless.

Selling, general and administrative – Selling, general and administrative expenses include commissions, customer billing, customer care, and salaries that are specifically identified to the Partnership, as well as costs incurred by Verizon Wireless and allocated to the Partnership based on certain factors deemed appropriate by Verizon Wireless. The Partnership was allocated $94,132, $100,183, and $113,300 in advertising costs for the years ended December 31, 2018, 2017 and 2016, respectively.

Property, plant and equipment – Property, plant and equipment includes assets purchased by Verizon Wireless and directly charged to the Partnership as well as assets transferred between Verizon Wireless and the Partnership (see Note 2).

9. COMMITMENTS

Verizon Wireless, on behalf of the Partnership, and the Partnership itself have entered into operating leases for facilities and equipment used in their operations. Lease contracts include renewal options that include rent payment adjustments based on the Consumer Price Index, as well as annual and end-of-lease term adjustments. Rent expense is recorded on a straight-line basis. The noncancellable lease term used to calculate the amount of the straight-line rent expense is generally determined to be the initial lease term, including any optional renewal terms that are reasonably assured of occurring. Leasehold improvements related to these operating leases are amortized over the shorter of their estimated useful lives or the noncancellable lease term. For the years ended December 31, 2018, 2017 and 2016, the Partnership incurred a total of $147,944, $134,337 and $125,754 respectively, of rent expense related to these operating leases, which is included in cost of service and selling, general and administrative expenses in the accompanying statements of income depending on the nature of the facility and equipment.

Aggregate future minimum rental commitments under noncancellable operating leases, excluding renewal options that are not reasonably assured of occurring, for the years shown are as follows:

Years	Amount
2019	$ 140,933
2020	120,811
2021	101,862
2022	85,934
2023	72,359
2024 and thereafter	406,711
Total minimum payments	$ 928,610

The Partnership has also entered into certain agreements with Verizon Wireless to utilize certain spectrum from Verizon Wireless that overlaps the Los Angeles metropolitan statistical area. Total expense under these spectrum service arrangements amounted to $126,288 in 2018, $125,608 in 2017, and $124,943 in 2016 which is included in cost of service in the consolidated statements of income.

Based on the terms of these service arrangements as of December 31, 2018, future spectrum service arrangement obligations to Verizon Wireless are as follows:

Years	Amount
2019	$ 116,359
2020	106,439
2021	106,996
2022	107,562
2023	108,138
2024 and thereafter	867,690
Total minimum payments	$ 1,413,184

10. CONTINGENCIES

Verizon Wireless and the Partnership are subject to lawsuits and other claims, including class actions, product liability, patent infringement, intellectual property, antitrust, partnership disputes and claims involving relations with resellers and agents. Verizon Wireless is also currently defending lawsuits filed against it and other participants in the wireless industry, alleging various adverse effects as a result of wireless phone usage. Various consumer class-action lawsuits allege that Verizon Wireless violated certain state consumer-protection laws and other statutes and defrauded customers through misleading billing practices or statements. These matters may involve indemnification obligations by third parties and/or affiliated parties covering all or part of any potential damage awards against Verizon Wireless and the Partnership and/or insurance coverage. All of the above matters are subject to many uncertainties, and the outcomes are not currently predictable.

The Partnership may incur or be allocated a portion of the damages that may result upon adjudication of these matters if the claimants prevail in their actions. At December 31, 2018 and 2017, the Partnership had no accrual for any pending matters. An estimate of the reasonably possible loss or range of loss with respect to these matters as of December 31, 2018 cannot be made at this time due to various factors typical in contested proceedings, including: (1) uncertain damage theories and demands; (2) a less-than-complete, factual record; (3) uncertainty concerning legal theories and their resolution by courts or regulators and (4) the unpredictable nature of the opposing party and its demands. Verizon Wireless and the Partnership continuously monitor these proceedings as they develop and will adjust any accrual or disclosure as needed. It is not expected that the ultimate resolution of any pending regulatory or legal matter in future periods will have a material effect on the financial condition of the Partnership, but it could have a material effect on the results of operations for a given reporting period.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

TELEPHONE AND DATA SYSTEMS, INC.

By: /s/ LeRoy T. Carlson, Jr.
LeRoy T. Carlson, Jr.
President and Chief Executive Officer
(principal executive officer)

By: /s/ Douglas W. Chambers
Douglas W. Chambers
Senior Vice President - Finance and Chief Accounting Officer
(principal financial officer and principal accounting officer)

By: /s/ Anita J. Kroll
Anita J. Kroll
Vice President and Controller

Dated: February 22, 2019

Power of Attorney

Each person whose signature appears below constitutes and appoints LeRoy T. Carlson, Jr. as his or her true and lawful attorney-in-fact and agent, with full power of substitution and resubstitution for him or her and in his or her name, place, and stead, in any and all capacities to sign any and all amendments to this Annual Report on Form 10-K under the Securities Exchange Act of 1934, as amended, and to file the same, with all exhibits thereto, and other documents in connection therewith with the Securities and Exchange Commission, granting unto said attorney-in-fact and agent full power and authority to do so and perform each and every act and thing requisite or necessary to be done in and about the premises, as fully to all intents and purposes as he or she might or could do in person, hereby ratifying and confirming all the said attorney-in fact and agent or any of them, or their or his substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

Signature	Title	Date
/s/ LeRoy T. Carlson, Jr. LeRoy T. Carlson, Jr.	Director	February 22, 2019
/s/ Letitia G. Carlson, M.D. Letitia G. Carlson, M.D.	Director	February 22, 2019
/s/ Prudence E. Carlson Prudence E. Carlson	Director	February 22, 2019
/s/ Walter C. D. Carlson Walter C. D. Carlson	Director	February 22, 2019
/s/ James W. Butman James W. Butman	Director	February 22, 2019
/s/ Clarence A. Davis Clarence A. Davis	Director	February 22, 2019
/s/ Kim D. Dixon Kim D. Dixon	Director	February 22, 2019
/s/ Kenneth R. Meyers Kenneth R. Meyers	Director	February 22, 2019
/s/ George W. Off George W. Off	Director	February 22, 2019
/s/ Christopher D. O’Leary Christopher D. O’Leary	Director	February 22, 2019
/s/ Mitchell H. Saranow Mitchell H. Saranow	Director	February 22, 2019
/s/ Gary L. Sugarman Gary L. Sugarman	Director	February 22, 2019

Exhibit 4.4(b)

FIRST AMENDMENT TO CREDIT AGREEMENT - TECHNICAL

THIS FIRST AMENDMENT TO CREDIT AGREEMENT - TECHNICAL (this " ***Amendment*** "), is entered into as of January 30, 2019 among TELEPHONE AND DATA SYSTEMS, INC., a Delaware corporation (the " ***Borrower*** "), the other Loan Parties party hereto, and WELLS FARGO BANK, NATIONAL ASSOCIATION, as Administrative Agent.

R E C I T A L S:

A. The Borrower, the Lenders, the Swing Line Lender, the L/C Issuer and the Administrative Agent entered into that certain Credit Agreement dated as of May 10, 2018 (as amended, restated or substituted from time to time, the " ***Credit Agreement*** "). Capitalized terms used and not otherwise defined herein shall have the meanings ascribed to them in the Credit Agreement.

B. The Administrative Agent and the Borrower have jointly identified a mistake in Section 7.02(c) of the Credit Agreement. Pursuant to the terms of the last paragraph of Section 10.01 of the Agreement, the Borrower and the Administrative Agent now desire to modify the Agreement to cure such mistake, subject to the performance and observance in full of each of the covenants, terms and conditions and in reliance upon all of the representations and warranties of the Loan Parties, set forth herein.

NOW, THEREFORE, in consideration of the premises and the covenants, terms and conditions, and in reliance upon the representations and warranties, in each case contained herein, the parties hereto agree hereby as follows:

ARTICLE I

Section 1.01 AMENDMENT TO SECTION 7.02. Section 7.02(c) of the Credit Agreement is amended and restated to read in its entirety as follows:

> (c) in addition to Investments permitted by subsections (a) and (b) preceding, Investments of the Borrower or any Subsidiary in any Subsidiary (except Investments pursuant to this subsection (c) in (x) the Excluded Subsidiary and any of its Subsidiaries, and (y) a Securitization Entity and any of its Subsidiaries are not permitted unless such Investments are made during a Guaranty Release Period) so long as in each case such Investments are (i) made in the ordinary course of business to fund operating expenses of such Subsidiary (including, without limitation, purchases of inventory in the ordinary course of business and capital expenditures incurred in the ordinary course of business consistent with past practices but only to the extent they are Ordinary Capital Expenditures) and (ii) consistent with past practices of the Borrower and its Subsidiaries; provided that, for the avoidance of doubt, the foregoing shall permit intercompany obligations, including intercompany loans, incurred in the ordinary course of business by and among the Borrower or any wholly-owned Subsidiary of the Borrower, on the one hand, and any other wholly-owned Subsidiary of the Borrower, on the other hand, in each case only to the extent arising from time to time in connection with any Receivables Securitization otherwise permitted under this Agreement.

ARTICLE II

Section 2.01 REPRESENTATIONS AND WARRANTIES TRUE; NO EVENT OF DEFAULT . By its execution and delivery hereof, each Loan Party represents and warrants that, as of the date hereof:

(a) the representations and warranties of the Loan Parties contained in Article V of the Credit Agreement or any other Loan Document, or which are contained in any document furnished in connection herewith or therewith, shall be true and correct in all material respects (or, to the extent any such representation or warranty is qualified as to "materiality" or "Material Adverse Effect" shall be true and correct in all respects) on and as of the Amendment Effective Date (as defined below), after giving effect to the amendments contemplated in this Amendment as if such representations and warranties were being made on and as of the Amendment Effective Date, except to the extent that such representations and warranties specifically refer to an earlier date, in which case they shall be true and correct as of such earlier date, and the representations and warranties contained in subsections (a) and (b) of Section 5.05 of the Credit Agreement shall be deemed to refer to the most recent statements furnished pursuant to subsections (a) and (b), respectively, of Section 6.01 of the Credit Agreement;

(b) no event has occurred and is continuing which constitutes a Default;

(c) (i) each Loan Party has all requisite power and authority and all requisite governmental licenses, authorizations, consents and approvals to execute, deliver and perform its obligations under this Amendment, (ii) this Amendment has been duly executed and delivered by each Loan Party, and (iii) this Amendment and the Credit Agreement, as amended hereby, constitute a legal, valid and binding obligation of such Loan Party, enforceable against each Loan Party that is a party thereto in accordance with their respective terms, except as enforceability is limited by bankruptcy, insolvency, reorganization, moratorium or other applicable laws relating to or affecting generally the enforcement of creditors' rights and except to the extent that availability of the remedy of specific performance or injunctive relief is subject to the discretion of the court before which any proceeding therefor may be brought;

(d) the execution, delivery and performance of this Amendment and the Credit Agreement, as amended hereby, and the consummation of any transactions contemplated herein or therein, have been duly authorized by all necessary corporate or other organizational action, and do not and will not (i) contravene any material term of any of such Person's Organization Documents; (ii) conflict with or result in any breach or contravention of, or the creation of any Lien under, or require any payment to be made under (A) any Contractual Obligation, including, but not limited to, any bonds, debentures, notes, loan agreements or other similar instruments, to which such Person is a party or affecting such Person or the properties of such Person or any of its Subsidiaries or (B) any order, injunction, writ or decree of any Governmental Authority or any arbitral award to which such Person or its property is subject; or (iii) violate any applicable law to which such Person is subject, except in each case referred to in subsections (ii) and (iii) above to the extent that any such conflict, breach, contravention, creation, requirement or violation could reasonably be expected to have a Material Adverse Effect;

(e) no approval, consent, exemption, authorization, or other action by, or notice to, or filing with, any Governmental Authority or any other Person is necessary or required in connection with the execution, delivery or performance by, any Loan Party of this Amendment other than those already obtained or performed; and

(f) the Organization Documents of the Loan Parties and the resolutions of such Loan Parties attached to the officer's certificate most recently delivered to the Administrative Agent have not been modified or rescinded and remain in full force and effect.

ARTICLE III

Section 3.01 CONDITIONS PRECEDENT TO EFFECTIVENESS . The parties hereto agree that this Amendment shall not be effective until the satisfaction of each of the following conditions precedent:

(a) the Administrative Agent shall have received a copy of this Amendment duly completed, executed and delivered by the Borrower and the other Loan Parties;

(b) the Administrative Agent shall receive evidence of concurrent consummation of a related amendment among United States Cellular Corporation and Toronto Dominion (Texas) LLC, as administrative agent, which shall be in form and substance reasonably acceptable to the Administrative Agent;

(c) the Administrative Agent shall receive evidence of concurrent consummation of a related amendment among United States Cellular Corporation, and CoBank, ACB, as administrative agent, which shall be in form and substance reasonably acceptable to the Administrative Agent;

(d) the Administrative Agent shall have received payment of all reasonable and invoiced out-of-pocket fees and expenses incurred by the Administrative Agent and its Affiliates (including the reasonable and invoiced fees, charges and disbursements of a single counsel for the Administrative Agent in reasonable detail, and one local counsel in each relevant jurisdiction), in connection with the preparation, negotiation, execution, delivery and administration of this Amendment; and

(e) each of the representations and warranties made in this Amendment shall be true and correct in all material respects (or, to the extent any such representation or warranty is qualified as to "materiality" or "Material Adverse Effect" shall be true and correct in all respects) on and as of the Amendment Effective Date (as defined below), both before and after giving effect to the amendments contemplated by this Amendment as if such representations and warranties were being made on and as of the Amendment Effective Date, except to the extent that such representations and warranties specifically refer to an earlier date, in which case they shall be true and correct as of such earlier date, and the representations and warranties contained in subsections (a) and (b) of Section 5.05 of the Credit Agreement shall be deemed to refer to the most recent statements furnished pursuant to subsections (a) and (b), respectively, of Section 6.01 of the Credit Agreement.

ARTICLE IV

Section 4.01 MISCELLANEOUS .

(a) RATIFICATION OF LOAN DOCUMENTS . Except for the specific amendments, releases, consents and waivers expressly set forth in this Amendment, the terms, provisions, conditions and covenants of the Credit Agreement and the other Loan Documents remain in full force and effect and are hereby ratified and confirmed, and the execution, delivery and performance of this Amendment shall not in any manner operate as a waiver of, consent to or amendment of any other term, provision, condition or covenant of the Credit Agreement or any other Loan Document.

(b) AMENDMENT EFFECTIVE DATE . This Amendment shall become effective when the Administrative Agent has received counterparts of this Amendment executed by the Borrower, the other Loan Parties, and the Administrative Agent and each of the conditions precedent set forth in Section 3.01 in this Amendment has been satisfied (the " ***Amendment Effective Date*** "), whether or not this Amendment has been executed and delivered by each and every Lender named on a signature pages attached hereto.

(c) REFERENCES TO THE CREDIT AGREEMENT . Upon the effectiveness of this Amendment, each reference in the Credit Agreement to "this Agreement", "hereunder" or in any other Loan Document to the "Credit Agreement" or "thereunder", or words of like import shall mean and be a reference to the Credit Agreement, as affected and amended hereby.

(d) EXECUTION IN COUNTERPARTS . This Amendment may be executed in counterparts (and by different parties hereto in different counterparts), each of which shall constitute an original, but all of which when taken together shall constitute a single contract. Delivery of an executed counterpart of a signature page of this Amendment by facsimile or other electronic imaging means (e.g. "pdf" or "tif") shall be effective as delivery of a manually executed counterpart of this Amendment.

(e) GOVERNING LAW; BINDING EFFECT . THIS AMENDMENT SHALL BE GOVERNED BY, AND CONSTRUED IN ACCORDANCE WITH, THE LAW OF THE STATE OF NEW YORK. This Amendment shall be binding upon the parties hereto and their respective successors and assigns.

(f) HEADINGS . Section headings in this Amendment are included herein for convenience of reference only and shall not constitute a part of this Amendment for any other purpose.

(g) TIME OF THE ESSENCE . Time is of the essence of this Amendment and the Loan Documents.

(h) LOAN DOCUMENT . This Amendment is a Loan Document and subject to the terms of the Credit Agreement.

(i) **ENTIRE AGREEMENT . THIS AMENDMENT, TOGETHER WITH THE CREDIT AGREEMENT AND OTHER LOAN DOCUMENTS, REPRESENTS THE FINAL AGREEMENT AMONG THE PARTIES AND MAY NOT BE CONTRADICTED BY EVIDENCE OF PRIOR, CONTEMPORANEOUS, OR SUBSEQUENT ORAL AGREEMENTS OF THE PARTIES. THERE ARE NO UNWRITTEN ORAL AGREEMENTS AMONG THE PARTIES.**

REMAINDER OF PAGE LEFT INTENTIONALLY BLANK

IN WITNESS WHEREOF, the parties hereto have caused this Amendment to be duly executed and delivered by their proper and duly authorized officers effective as of the Amendment Effective Date.

TELEPHONE AND DATA SYSTEMS, INC.

By: /s/ Peter L. Sereda
Peter L. Sereda
Senior Vice President – Finance

By: /s/ John M. Toomey
John M. Toomey
Vice President and Treasurer

TDS TELECOMMUNICATIONS LLC

By: /s/ Douglas W. Chambers
Douglas W. Chambers
Chief Accounting Officer

M.C.T. COMMUNICATIONS, INC.

By: /s/ Peter L. Sereda
Peter L. Sereda
Vice President

ONENECK DATA CENTER HOLDINGS, LLC

By: /s/ Peter L. Sereda
Peter L. Sereda
Vice President and Treasurer

ONENECK IT SOLUTIONS, LLC

By: /s/ Peter L. Sereda
Peter L. Sereda
Vice President and Treasurer

AFFILIATE FUND

By: /s/ Peter L. Sereda

Peter L. Sereda
President

AIRADIGM COMMUNICATIONS, INC.

By: /s/ Joseph R. Hanley

Joseph R. Hanley
Chairman

NATIONAL TELEPHONE & TELEGRAPH COMPANY

By: /s/ Peter L. Sereda

Peter L. Sereda
Vice President and Treasurer

WELLS FARGO BANK, NATIONAL ASSOCIATION ,
as Administrative Agent

By: /s/ Monica Trautwein
Name: Monica Trautwein
Title: Director

AMENDMENT NUMBER TWO
TO THE
TELEPHONE AND DATA SYSTEMS, INC.
2011 LONG-TERM INCENTIVE PLAN

WHEREAS, Telephone and Data Systems, Inc., a Delaware corporation (the " **Company** ") has adopted and maintains the Telephone and Data Systems, Inc. 2011 Long-Term Incentive Plan (the " **Plan** ") for the benefit of certain employees;

WHEREAS, pursuant to Section 8.2 of the Plan, the Board of Directors of the Company (the " **Board** ") may amend the Plan as it shall deem advisable, subject to any requirement of shareholder approval, including under applicable law or the principal national stock exchange on which the Common Shares of the Company (the " **Common Shares** ") are then traded;

WHEREAS, the Board desires to amend the Plan to broaden the circumstances under which employees of the Company who are not officers may pay for the Common Shares to be purchased pursuant to the exercise of a stock option by authorizing the Company to withhold Common Shares which would otherwise be delivered in connection with such exercise; and

WHEREAS, such amendment is not subject to any required shareholder approval.

NOW, THEREFORE, BE IT RESOLVED, that effective as of February 21, 2019, the second sentence of Section 4.1(d) of the Plan hereby is amended to read as follows:

> The holder of a Stock Option may pay for the shares of Common Stock to be purchased pursuant to the exercise of such Stock Option (A) in cash, (B) by delivery (either actual delivery or by attestation procedures established by the Company) of previously-owned whole shares of Common Stock having an aggregate Fair Market Value, determined as of the date of exercise, equal to the aggregate purchase price payable by reason of such exercise, (C) by authorizing the Company to withhold whole shares of Common Stock which otherwise would be delivered having an aggregate Fair Market Value, determined as of the date of exercise, equal to the aggregate purchase price payable by reason of such exercise (in the case of such withholding in respect of a holder other than an Officer , notwithstanding any provision to the contrary within an agreement evidencing a Stock Option granted prior to February 21, 2019) , (D) to the extent legally permissible, in cash by a broker-dealer acceptable to the Company to whom the holder has submitted an irrevocable notice of exercise or (E) by a combination of (A), (B) and (C).

* * * * * *

IN WITNESS WHEREOF, the undersigned has executed this Amendment Number Two as of this 21st day of February, 2019.

TELEPHONE AND DATA SYSTEMS, INC.

By: /s/ LeRoy T. Carlson, Jr.

Its: President and Chief Executive Officer

SIGNATURE PAGE TO
AMENDMENT NUMBER TWO TO
TELEPHONE AND DATA SYSTEMS, INC.
2011 LONG-TERM INCENTIVE PLAN

Telephone and Data Systems, Inc.

Financial Reports Contents **Page No.**

Telephone and Data Systems, Inc.
Management's Discussion and Analysis of Financial Condition and Results of Operations

Executive Overview

The following Management's Discussion and Analysis (MD&A) should be read in conjunction with the audited consolidated financial statements and notes of Telephone and Data Systems, Inc. (TDS) for the year ended December 31, 2018 , and with the description of TDS' business included herein. Certain numbers included herein are rounded to millions for ease of presentation; however, certain calculated amounts and percentages are determined using the unrounded numbers.

This report contains statements that are not based on historical facts, including the words "believes," "anticipates," "estimates," "expects," "plans," "intends," "projects" and similar expressions. These statements constitute and represent "forward looking statements" as this term is defined in the Private Securities Litigation Reform Act of 1995. Such forward looking statements involve known and unknown risks, uncertainties and other factors that may cause actual results, events or developments to be significantly different from any future results, events or developments expressed or implied by such forward looking statements. See Private Securities Litigation Reform Act of 1995 Safe Harbor Cautionary Statement for additional information.

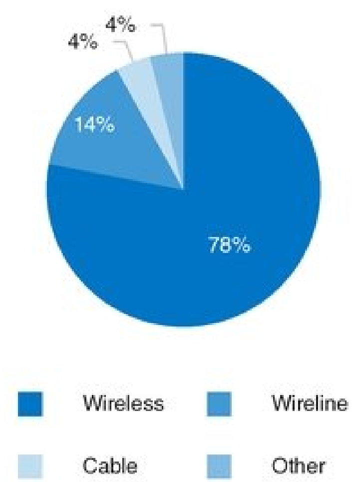
TDS uses certain "non-GAAP financial measures" and each such measure is identified in the MD&A. A discussion of the reason TDS determines these metrics to be useful and a reconciliation of these measures to their most directly comparable measures determined in accordance with accounting principles generally accepted in the United States of America (GAAP) are included in the Supplemental Information Relating to Non-GAAP Financial Measures section within the MD&A of this Form 10-K Report.

General

TDS is a diversified telecommunications company that provides high-quality communications services to approximately 6 million connections nationwide. TDS provides wireless services through its 82% -owned subsidiary, United States Cellular Corporation (U.S. Cellular). TDS also provides wireline and cable services, through its wholly-owned subsidiary, TDS Telecommunications LLC (TDS Telecom). TDS' segments operate almost entirely in the United States. See Note 18 — Business Segment Information in the Notes to Consolidated Financial Statements for additional information about TDS' segments.

TDS re-evaluated internal reporting roles with regard to its hosted and managed services (HMS) business unit and, as a result, changed its reportable segments. Effective January 1, 2018, HMS was considered a non-reportable segment and is no longer being reported under TDS Telecom. Prior periods have been recast to conform to this revised presentation.

2018 Operating Revenues by Segment



TDS Mission and Strategy

TDS' mission is to provide outstanding communications services to its customers and meet the needs of its shareholders, its people, and its communities. In pursuing this mission, TDS seeks to grow its businesses, create opportunities for its associates and employees, and build value over the long-term for its shareholders. Across all of its businesses, TDS is focused on providing exceptional customer experiences through best-in-class services and products and superior customer service.

TDS' long-term strategy calls for the majority of its capital to be reinvested in its operating businesses to strengthen their competitive positions and financial performance, while also returning value to TDS shareholders through the payment of a regular quarterly cash dividend and share repurchases.

Throughout 2018 , TDS continued to focus on investing in the networks that are the backbone of its commitment to provide outstanding communications services to its customers. TDS believes these investments strengthen its competitive position and improve operating performance. Looking ahead to 2019 , TDS will continue to execute on its strategies to build strong, competitive businesses providing high-quality, data-focused services and products.

Invest in the business to improve returns and pursue initiatives that align with long-term strategies

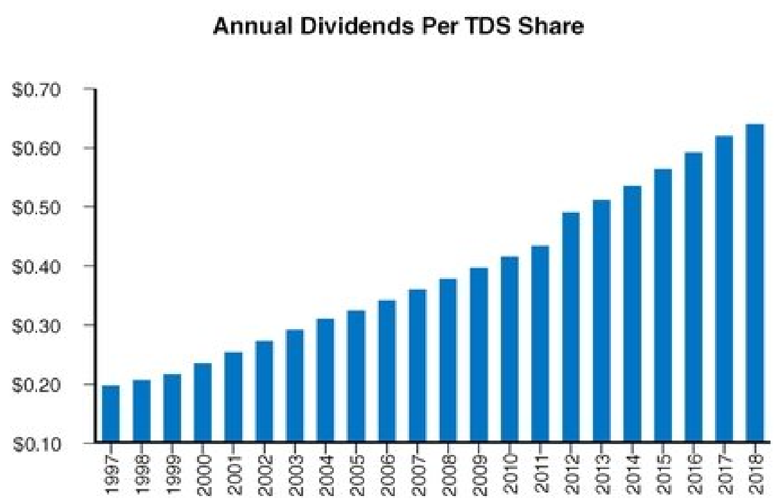
Consistent with its strategy, TDS made significant investments in 2018 to improve the performance of its networks. U.S. Cellular added capacity to its 4G LTE network responding to customers' growing use of data. U.S. Cellular enhanced its service and product offerings by commercially deploying VoLTE technology in California, Iowa, Oregon, Washington and Wisconsin and deployments in several additional operating markets will occur in 2019. VoLTE technology allows customers to utilize a 4G LTE network for both voice and data services, and offers enhanced services such as high definition voice and simultaneous voice and data sessions. In addition, the deployment of VoLTE technology expands U.S. Cellular's ability to offer roaming services to other wireless carriers.

U.S. Cellular continues to engage in efforts related to the development of 5G standards and identifying potential use cases for 5G technology. When deployed commercially, 5G technology is expected to help address customers' growing demand for data services and create opportunities for new services requiring high speed and reliability as well as low latency. In the fourth quarter of 2018, U.S. Cellular began conducting a trial utilizing 5G standards and equipment on its core LTE network.

TDS Telecom's Wireline business continues to focus on driving growth in its broadband and video services by investing in fiber inside existing markets and in new out-of-territory markets. With support from the FCC's A-CAM program, Wireline will deploy higher speed broadband services to more rural areas. TDS Telecom's Cable business continues to increase its broadband penetration by making network capacity investments and by offering more advanced services in its markets. TDS Telecom's Wireline and Cable businesses also are investing in a next generation video platform called TDS TV+ to enhance video services.

Return value to shareholders

During 2018 , TDS paid $72 million in regular quarterly cash dividends. TDS increased the dividend per share paid to its investors by 3% in 2018 which marks the 44 th consecutive year of dividend increases and in February 2019, TDS increased its quarterly dividend per share from $0.16 to $0.165. There were no TDS or U.S. Cellular share repurchases in 2018 . As of December 31, 2018 , $199 million was available for share repurchase under the announced TDS stock repurchase program. There is no assurance that TDS will continue to increase the dividend rate or pay dividends and no assurance that TDS or U.S. Cellular will make any significant amount of share repurchases in the future.



Significant Financial and Operating Matters

The following is a summary of certain selected information contained in the comprehensive MD&A that follows. The overview does not contain all of the information that may be important. You should carefully read the entire MD&A and not rely solely on the highlights.

- Net income available to TDS common shareholders was $135 million in 2018 , compared to $153 million in 2017 . Diluted earnings per share was $1.17 in 2018 compared to $1.37 a year ago.
- Total additions to Property, plant and equipment were $767 million including expenditures to enhance and maintain TDS' wireless network coverage, invest in information technology to support existing and new services and products, maintain and enhance existing infrastructure including build-out requirements to meet state broadband and A-CAM programs, build a TDS TV+ platform, and expand fiber deployment.

Terms Used by TDS

The following is a list of definitions of certain industry terms that are used throughout this document:

- **4G LTE** – fourth generation Long-Term Evolution, which is a wireless technology that enables more network capacity for more data per user as well as faster access to data compared to third generation (3G) technology.
- **5G** – fifth generation wireless technology that is expected to help address customers' growing demand for data services as well as create opportunities for new services requiring high speed and reliability as well as low latency.
- **Account** – represents an individual or business financially responsible for one or multiple associated connections. An account may include a variety of types of connections such as handsets and connected devices.
- **Alternative Connect America Cost Model (A-CAM)** – a USF support mechanism for rate-of-return carriers, which provides revenue support annually for ten years beginning in 2017. This support comes with an obligation to build defined broadband speeds to a certain number of locations.
- **ASU 2014-09** – the Financial Accounting Standards Board (FASB) Accounting Standards Update (ASU) 2014-09, Revenue from Contracts with Customers, including any subsequent modifications to such guidance. This ASU replaces existing revenue recognition rules with a single comprehensive model to use in accounting for revenue arising from contracts with customers.
- **Auctions 101 and 102** – Auction 101 is an FCC auction of 28 GHz spectrum licenses that started in November 2018 and concluded in January 2019. Auction 102 is an FCC auction of 24 GHz spectrum licenses that is expected to start in early 2019. The spectrum auctioned in each of these auctions, referred to as Millimeter Wave spectrum, is expected to be used primarily to deliver 5G technology.
- **Auctions 1000, 1001, and 1002** – Auction 1000 is an FCC auction of 600 MHz spectrum licenses that started in 2016 and concluded in 2017 involving: (1) a “reverse auction” in which broadcast television licensees submitted bids to voluntarily relinquish spectrum usage rights in exchange for payments (referred to as Auction 1001); (2) a “repacking” of the broadcast television bands in order to free up certain broadcast spectrum for other uses; and (3) a “forward auction” of licenses for spectrum cleared through this process to be used for wireless communications (referred to as Auction 1002).
- **Broadband Connections** – refers to the number of Wireline customers provided high-capacity data circuits via various technologies, including DSL and dedicated internet circuit technologies or the Cable billable number of lines into a building for high-speed data services.
- **Churn Rate** – represents the percentage of the connections that disconnect service each month. These rates represent the average monthly churn rate for each respective period.
- **Connected Devices** – non-handset devices that connect directly to the U.S. Cellular network. Connected devices include products such as tablets, wearables, modems, and hotspots.
- **DOCSIS** – Data Over Cable Service Interface Specification is an international telecommunications standard that permits the addition of high-bandwidth data transfer to an existing cable TV (CATV) system. DOCSIS 3.1 is a system specification that increases data transmission rates.
- **EBITDA** – refers to earnings before interest, taxes, depreciation, amortization and accretion and is used in the non-GAAP metric Adjusted EBITDA throughout this document. See Supplemental Information Relating to Non-GAAP Financial Measures within this MD&A for additional information.
- **Eligible Telecommunications Carrier (ETC)** – designation by states for providing specified services in “high cost” areas which enables participation in universal service support mechanisms.
- **Free Cash Flow** – non-GAAP metric defined as Cash flows from operating activities less Cash paid for additions to property, plant and equipment. See Supplemental Information Relating to Non-GAAP Financial Measures within this MD&A for additional information.
- **Gross Additions** – represents the total number of new connections added during the period, without regard to connections that were terminated during that period.
- **IPTV Connections** – represents the number of Wireline customers provided video services using IP networking technology.
- **ManagedIP Connections** – refers to the number of telephone handsets, data lines and IP trunks providing communications using IP networking technology.
- **Net Additions** – represents the total number of new connections added during the period, net of connections that were terminated during that period.
- **OIBDA** – refers to operating income before depreciation, amortization and accretion and is used in the non-GAAP metric Adjusted OIBDA throughout this document. See Supplemental Information Relating to Non-GAAP Financial Measures within this MD&A for additional information.
- **Partial Economic Areas** – service areas of certain FCC licenses based on geography.
- **Postpaid Average Billings per Account (Postpaid ABPA)** – non-GAAP metric which is calculated by dividing total postpaid service revenues plus equipment installment plan billings by the average number of postpaid accounts and by the number of months in the period. See Supplemental Information Relating to Non-GAAP Financial Measures within this MD&A for additional information.
- **Postpaid Average Billings per User (Postpaid ABPU)** – non-GAAP metric which is calculated by dividing total postpaid service revenues plus equipment installment plan billings by the average number of postpaid connections and by the number of months in the period. See Supplemental Information Relating to Non-GAAP Financial Measures within this MD&A for additional information.
- **Postpaid Average Revenue per Account (Postpaid ARPA)** – metric which is calculated by dividing total postpaid service revenues by the average number of postpaid accounts and by the number of months in the period.
- **Postpaid Average Revenue per User (Postpaid ARPU)** – metric which is calculated by dividing total postpaid service revenues by the average number of postpaid connections and by the number of months in the period.
- **Retail Connections** – the sum of U.S. Cellular postpaid connections and U.S. Cellular prepaid connections.

- **Tax Act** – refers to comprehensive federal tax legislation enacted on December 22, 2017, which made broad changes to the U.S. tax code. Now titled H.R.1, the Tax Act was originally identified as the Tax Cuts and Jobs Act of 2017.
- **Universal Service Fund (USF)** – a system of telecommunications collected fees and support payments managed by the FCC intended to promote universal access to telecommunications services in the United States.
- **U.S. Cellular Connections** – individual lines of service associated with each device activated by a customer. Connections include all types of devices that connect directly to the U.S. Cellular network.
- **Video Connections** – generally, a home or business receiving video programming counts as one video connection. In counting bulk residential or commercial connections, such as an apartment building or a hotel, connections are counted based on the number of units/rooms within the building receiving service.
- **Voice Connections** – refers to the individual circuits connecting a customer to Wireline's central office facilities or the Cable billable number of lines into a building for voice services.
- **VoLTE** – Voice over Long-Term Evolution is a technology specification that defines the standards and procedures for delivering voice communications and related services over 4G LTE networks.
- **Wireline Residential Revenue per Connection** – is calculated by dividing total Wireline residential revenue by the average number of Wireline residential connections and by the number of months in the period.

Results of Operations — TDS Consolidated

Year Ended December 31,	2018[1]	2017	2016	2018 vs. 2017	2017 vs. 2016
(Dollars in millions)					
Operating revenues					
U.S. Cellular	**$ 3,967**	$ 3,890	$ 3,990	**2 %**	(3)%
TDS Telecom	**927**	919	882	**1 %**	4 %
All other [2]	**215**	235	283	**(9)%**	(17)%
Total operating revenues	**5,109**	5,044	5,155	**1 %**	(2)%
Operating expenses					
U.S. Cellular	**3,809**	4,194	3,942	**(9)%**	6 %
TDS Telecom	**834**	803	803	**4 %**	–
All other [2, 3]	**261**	155	302	**68 %**	(49)%
Total operating expenses	**4,904**	5,152	5,047	**(5)%**	2 %
Operating income (loss)					
U.S. Cellular	**158**	(304)	48	**N/M**	N/M
TDS Telecom	**93**	116	79	**(20)%**	47 %
All other [2, 3]	**(46)**	80	(19)	**N/M**	N/M
Operating income (loss)	**205**	(108)	108	**N/M**	N/M
Investment and other income (expense)					
Equity in earnings of unconsolidated entities	**160**	137	140	**17 %**	(2)%
Interest and dividend income	**26**	15	11	**67 %**	42 %
Interest expense	**(172)**	(170)	(170)	**(1)%**	–
Other, net	**2**	4	3	**(22)%**	30 %
Total investment and other income (expense)	**16**	(14)	(16)	**N/M**	17 %
Income (loss) before income taxes	**221**	(122)	92	**N/M**	N/M
Income tax expense (benefit)	**46**	(279)	40	**N/M**	N/M
Net income	**175**	157	52	**11 %**	N/M
Less: Net income attributable to noncontrolling interests, net of tax	**40**	4	9	**N/M**	(55)%
Net income attributable to TDS shareholders	**$ 135**	$ 153	$ 43	**(12)%**	N/M
Adjusted OIBDA (Non-GAAP) [4]	**$ 1,079**	$ 996	$ 964	**8 %**	3 %
Adjusted EBITDA (Non-GAAP) [4]	**$ 1,267**	$ 1,152	$ 1,118	**10 %**	3 %
Capital expenditures	**$ 767**	$ 694	$ 630	**11 %**	10 %

N/M - Percentage change not meaningful

1 As of January 1, 2018, TDS adopted ASU 2014-09 using a modified retrospective approach. Under this method, the new accounting standard is applied only to the most recent period presented. See Note 2 — Revenue Recognition in the Notes to Consolidated Financial Statements for additional information.

2 Consists of corporate and other operations and intercompany eliminations.

3 During the third quarter of 2017, U.S. Cellular recorded a goodwill impairment of $370 million while TDS recorded a goodwill impairment of the U.S. Cellular reporting unit of $227 million. Prior to 2009, TDS accounted for U.S. Cellular's share repurchases as step acquisitions, allocating a portion of the share repurchase value to TDS' Goodwill. Further, goodwill of the U.S. Cellular reporting unit was impaired at the TDS level in 2003 but not at U.S. Cellular. Consequently, U.S. Cellular's goodwill on a stand-alone basis and any resulting impairments of goodwill does not equal the TDS consolidated goodwill related to U.S. Cellular. The TDS adjustment of $143 million is included in "All other". During the third quarter of 2017, TDS also recorded a goodwill impairment of $35 million related to its HMS operations, included in "All other". For further information on the goodwill impairment see Note 7 — Intangible Assets in the Notes to Consolidated Financial Statements.

4 Refer to Supplemental Information Relating to Non-GAAP Financial Measures within this MD&A for a reconciliation of this measure.

Refer to individual segment discussions in this MD&A for additional details on operating revenues and expenses at the segment level.

Equity in earnings of unconsolidated entities

Equity in earnings of unconsolidated entities represents TDS’ share of net income from entities in which it has a noncontrolling interest and that are accounted for using the equity method. TDS’ investment in the Los Angeles SMSA Limited Partnership (LA Partnership) contributed $77 million , $66 million and $71 million to Equity in earnings of unconsolidated entities in 2018 , 2017 and 2016 , respectively.

Income tax expense (benefit)

The effective tax rate on Income (loss) before income taxes for 2018 was 21.0% . The effective tax rate is lower than a normalized rate inclusive of federal and state tax, due primarily to an income tax accounting method change that accelerated depreciation on certain assets for the 2017 tax year, resulting in a discrete tax benefit recorded in the third quarter of 2018.

TDS’ effective tax rate on Income (loss) before income taxes for 2017 was not meaningful due to the effect of the Tax Act combined with the tax impact of the impairment of goodwill in the U.S. Cellular and HMS reporting units, since portions of the goodwill balance are not amortizable for income tax purposes. The effective tax rate for 2016 was 43.2% and was consistent with a normalized tax rate inclusive of federal and state tax – note that the federal statutory rate prior to the Tax Act was 35% .

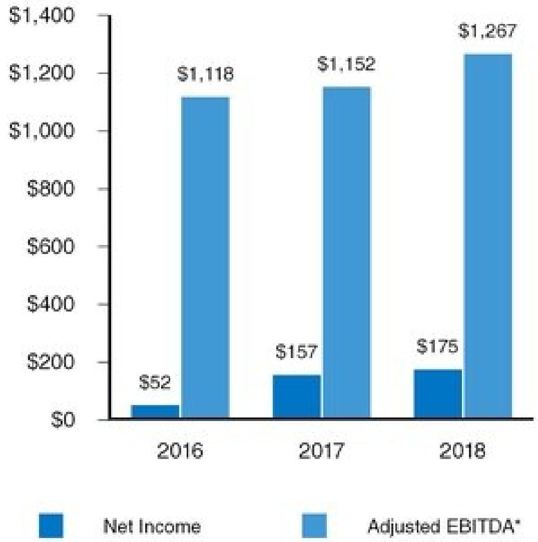
See Note 5 — Income Taxes in the Notes to Consolidated Financial Statements for additional information.

Net income attributable to noncontrolling interests, net of tax

Year Ended December 31,	2018	2017	2016
(Dollars in millions)			
U.S. Cellular noncontrolling public shareholders’	$ 26	$ 2	$ 8
Noncontrolling shareholders’ or partners’	14	2	1
Net income attributable to noncontrolling interests, net of tax	$ 40	$ 4	$ 9

Net income attributable to noncontrolling interests, net of tax includes the noncontrolling public shareholders’ share of U.S. Cellular’s net income, the noncontrolling shareholders’ or partners’ share of certain U.S. Cellular subsidiaries’ net income and other TDS noncontrolling interests.

Earnings
(Dollars in millions)



2018 - 2017 Commentary

Net income and Adjusted EBITDA increased from 2017 to 2018 due primarily to improved operating results at U.S. Cellular and an increase in income from equity investments. Net income also increased due to the recognition of a loss on impairment of goodwill related to the U.S. Cellular and HMS reporting units recognized in the third quarter of 2017. The loss on impairment of goodwill is not included as a component of Adjusted EBITDA.

2017 - 2016 Commentary

Net income increased from 2016 to 2017 due primarily to the reduction of income tax expense as result of the Tax Act partially offset by a loss on impairment of goodwill at the U.S. Cellular and HMS reporting units. Income tax expense and the loss on impairment of goodwill are added back into Adjusted EBITDA. The increase in Adjusted EBITDA was due primarily to a combination of improved operating results at TDS Telecom and cost savings initiatives at U.S. Cellular.

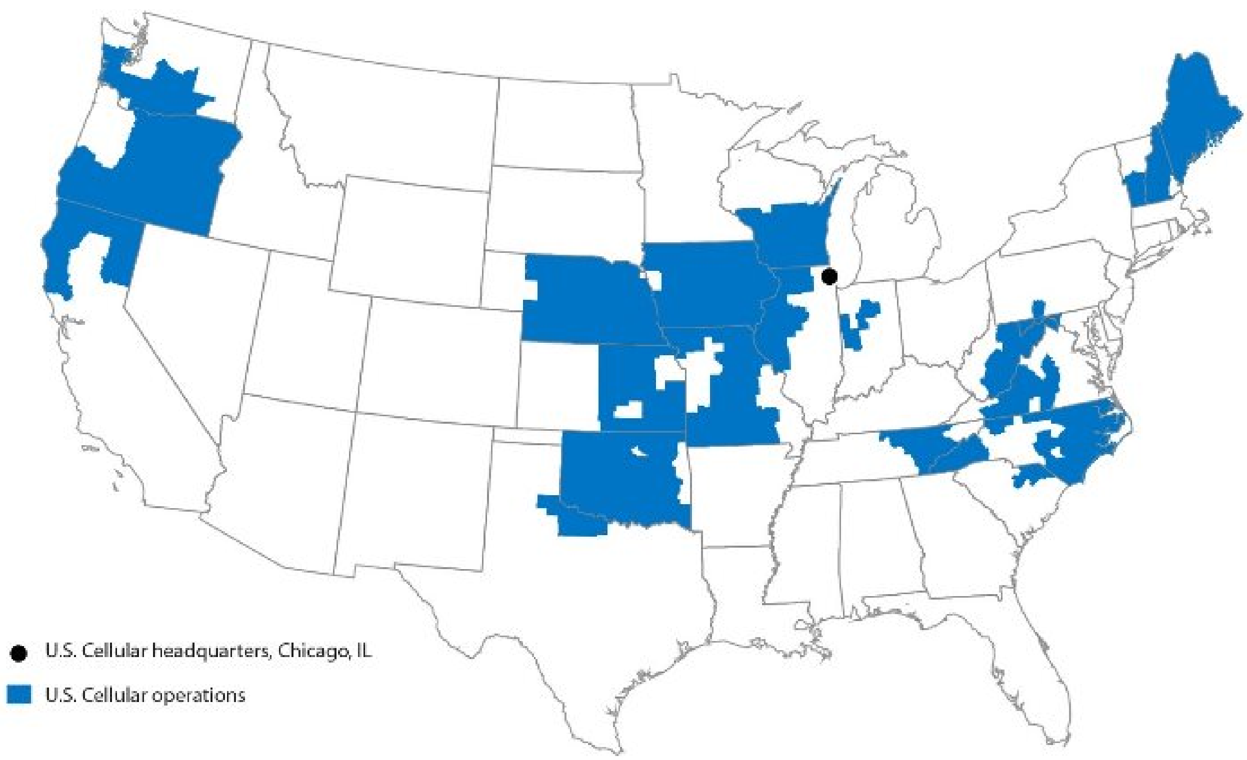
*Represents a non-GAAP financial measure. Refer to Supplemental Information Relating to Non-GAAP Financial Measures within this MD&A for a reconciliation of this measure.

U.S. CELLULAR OPERATIONS

Business Overview

U.S. Cellular owns, operates, and invests in wireless markets throughout the United States. U.S. Cellular is an 82% -owned subsidiary of TDS. U.S. Cellular's strategy is to attract and retain wireless customers through a value proposition comprised of a high-quality network, outstanding customer service, and competitive devices, plans, and pricing, all provided with a local focus.

OPERATIONS



- Serves customers with 5.0 million connections including 4.5 million postpaid, 0.5 million prepaid and 0.1 million reseller and other connections
- Operates in 22 states
- Employs approximately 5,600 associates
- 6,531 cell sites including 4,129 owned towers in service

Trends and Developments

U.S. Cellular's mission is to provide exceptional wireless communication services which enhance consumers' lives, increase the competitiveness of local businesses, and improve the efficiency of government operations in the mid-sized and rural markets served.

Network and Technology:

- U.S. Cellular continues to devote efforts to enhance its network capabilities. VoLTE technology has been launched successfully in California, Iowa, Oregon, Washington and Wisconsin, and deployments in several additional operating markets will occur in 2019. VoLTE technology allows customers to utilize a 4G LTE network for both voice and data services, and offers enhanced services such as high definition voice and simultaneous voice and data sessions. In addition, the deployment of VoLTE technology expands U.S. Cellular's ability to offer roaming services to other wireless carriers.
- 5G technology is expected to help address customers' growing demand for data services as well as create opportunities for new services requiring high speed and reliability as well as low latency. U.S. Cellular is committed to continuous technology innovation and continues to prepare for deployment of 5G technology beginning in 2019, including commencing a trial utilizing 5G standards and equipment on its core LTE network in the fourth quarter of 2018. U.S. Cellular is partnering with leading companies in the wireless infrastructure and handset ecosystem to provide rich 5G experiences for customers. In addition, in the markets where U.S. Cellular commercially deploys 5G technology, which will include cities and towns large and small, customers using U.S. Cellular's 4G LTE network will experience increased network speed due to U.S. Cellular's modernization efforts.

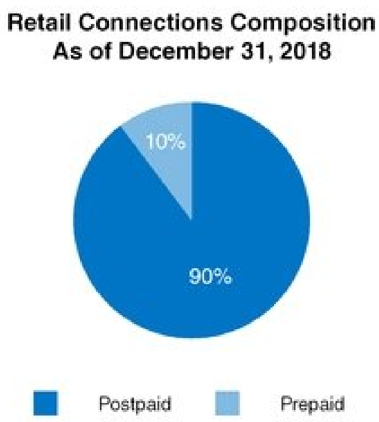
Asset Management:

- U.S. Cellular assesses its existing wireless interests on an ongoing basis with a goal of improving the competitiveness of its operations and maximizing its long-term return on capital. As part of this strategy, U.S. Cellular actively seeks attractive opportunities to acquire wireless spectrum, including pursuant to FCC auctions. In 2018, U.S. Cellular acquired $26 million of spectrum licenses through purchase and exchange transactions and divested $12 million of spectrum licenses covering non-strategic areas through sale and exchange transactions. In October 2018, the FCC announced that U.S. Cellular was a qualified bidder for Auction 101, which covered spectrum licenses that are expected to be used primarily to deliver 5G technology. Auction 101 closed on January 24, 2019 but the results of the auction have not yet been announced.

Services and Products:

- U.S. Cellular's customers are able to choose from a variety of national plans with voice, messaging and data usage options and pricing that are designed to fit different customer needs, usage patterns and budgets. In 2018, U.S. Cellular introduced the Unlimited with Payback plan that provides a monthly bill credit to postpaid customers if they have used less than 3 gigabytes of data per line.
- U.S. Cellular offers a comprehensive range of wireless devices such as handsets, tablets, modems, and hotspots. In addition, U.S. Cellular also offers a wide range of accessories, including wireless basics such as cases, screen protectors, chargers, and memory cards as well as an assortment of consumer electronics such as headphones, smart speakers, wearables and home automation products (e.g. cameras, sensors, and thermostats). U.S. Cellular offers certain of these products for purchase on installment plans, which allow new and existing postpaid customers to purchase these products payable over a specified time period.

Operational Overview



As of December 31,	2018	2017	2016
Retail Connections – End of Period			
Postpaid	**4,472,000**	4,518,000	4,482,000
Prepaid	**516,000**	519,000	484,000
Total	**4,988,000**	5,037,000	4,966,000

Year Ended December 31,	2018	2017	2016
Postpaid Activity and Churn			
Gross Additions			
Handsets	**475,000**	490,000	479,000
Connected Devices	**150,000**	198,000	294,000
Total Gross Additions	**625,000**	688,000	773,000
Net Additions (Losses)			
Handsets	**23,000**	38,000	(70,000)
Connected Devices	**(69,000)**	(2,000)	143,000
Total Net Additions (Losses)	**(46,000)**	36,000	73,000
Churn			
Handsets	**0.98%**	0.99%	1.18%
Connected Devices	**2.96%**	2.52%	2.11%
Total Churn	**1.25%**	1.21%	1.31%

2018 - 2017 Commentary

Postpaid net additions decreased in 2018 due primarily to lower gross additions, as well as an increase in tablet churn. The decrease in connected devices gross additions reflects U.S. Cellular's decision to discontinue promotions of heavily discounted tablets in 2018.

2017 - 2016 Commentary

Postpaid net additions decreased in 2017 mainly due to lower connected devices net additions which reflected both lower tablet gross additions and an increase in tablet churn. The decline in tablet gross additions reflects industry-wide trends including (i) reduced consumer demand for network-connected tablets, and (ii) carriers including U.S. Cellular have curtailed promotions of heavily discounted tablets designed to stimulate demand due to poor economics. The decrease in connected devices net additions was partially offset by an improvement in handsets net additions driven by both higher gross additions and a decrease in churn.

Postpaid Revenue

Year Ended December 31,		2018		2017		2016
Average Revenue Per User (ARPU)	**$**	**44.98**	$	44.38	$	46.96
Average Billings Per User (ABPU) [1]	**$**	**58.67**	$	55.60	$	56.12
Average Revenue Per Account (ARPA)	**$**	**118.93**	$	118.96	$	124.09
Average Billings Per Account (ABPA) [1]	**$**	**155.11**	$	149.02	$	148.29

[1] Postpaid ABPU and Postpaid ABPA are non-GAAP financial measures. Refer to Supplemental Information Relating to Non-GAAP Financial Measures within this MD&A for a reconciliation of these measures.

2018 - 2017 Commentary

On January 1, 2018, U.S Cellular adopted the provisions of ASU 2014-09, using a modified retrospective method. Under this method, the new accounting standard is applied only to the most recent period presented, recognizing the cumulative effect of the accounting change as an adjustment to retained earnings at January 1, 2018. See Note 2 — Revenue Recognition in the Notes to Consolidated Financial Statements for additional details.

Postpaid ARPU increased in 2018 due primarily to several factors including: increases in device protection plan and regulatory recovery revenues as well as having proportionately more handset connections, which on a per-unit basis contribute more revenue than tablet connections. Such factors were partially offset by the impact of adopting the provisions of ASU 2014-09, as well as the impact of overall price reductions on plan offerings. Postpaid ARPA decreased slightly in 2018 due primarily to a decrease in postpaid connections per account driven by higher tablet churn. Application of the new accounting standard had the impact of reducing ARPU and ARPA by $0.21 and $0.55, respectively.

Under equipment installment plans, customers pay for their wireless devices in installments over a period of time. In order to show the trend in estimated cash collections from postpaid customer billings for service and equipment, U.S. Cellular has presented Postpaid ABPU and Postpaid ABPA, which are calculated as Postpaid ARPU and Postpaid ARPA plus average monthly installment plan billings per connection and account, respectively.

Postpaid ABPU and ABPA increased in 2018 due primarily to (i) an increase in equipment installment plan billings driven by increased penetration of equipment installment plans and (ii) a higher average price per device sold.

2017 - 2016 Commentary

Postpaid ARPU and Postpaid ARPA decreased in 2017 due primarily to industry-wide price competition resulting in overall price reductions on plan offerings.

Equipment installment plan billings increased in 2017 due to increased penetration of equipment installment plans. Postpaid ABPU decreased in 2017 as the increase in equipment installment plan billings was more than offset by the decline in Postpaid ARPU discussed above. Postpaid ABPA, however, increased slightly in 2017 as the increase in equipment installment plan billings more than offset the decline in Postpaid ARPA discussed above.

Financial Overview — U.S. Cellular

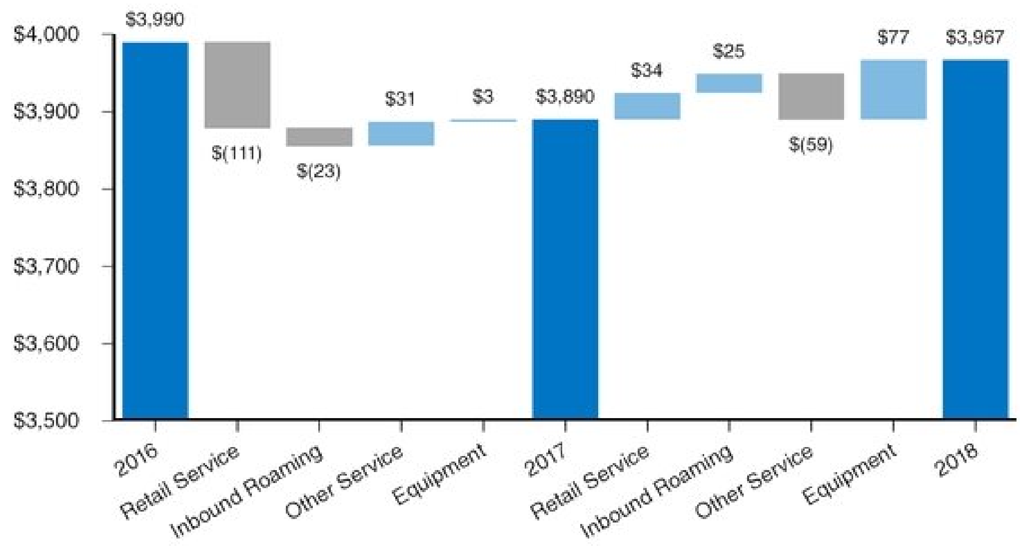
Year Ended December 31,	2018 [1]	2017	2016	2018 vs. 2017	2017 vs. 2016
(Dollars in millions)					
Retail service	**$ 2,623**	$ 2,589	$ 2,700	**1 %**	(4)%
Inbound roaming	**154**	129	152	**20 %**	(15)%
Other	**201**	260	229	**(23)%**	13 %
Service revenues	**2,978**	2,978	3,081	**–**	(3)%
Equipment sales	**989**	912	909	**8 %**	–
Total operating revenues	**3,967**	3,890	3,990	**2 %**	(3)%
System operations (excluding Depreciation, amortization and accretion reported below)	**758**	732	760	**4 %**	(4)%
Cost of equipment sold	**1,031**	1,071	1,081	**(4)%**	(1)%
Selling, general and administrative	**1,388**	1,412	1,480	**(2)%**	(4)%
Depreciation, amortization and accretion	**640**	615	618	**4 %**	–
Loss on impairment of goodwill	**—**	370	—	**N/M**	N/M
(Gain) loss on asset disposals, net	**10**	17	22	**(40)%**	(22)%
(Gain) loss on sale of business and other exit costs, net	**—**	(1)	—	**N/M**	N/M
(Gain) loss on license sales and exchanges, net	**(18)**	(22)	(19)	**20 %**	(17)%
Total operating expenses	**3,809**	4,194	3,942	**(9)%**	6 %
Operating income (loss)	**$ 158**	$ (304)	$ 48	**N/M**	N/M
Net income	**$ 164**	$ 15	$ 49	**N/M**	(70)%
Adjusted OIBDA (Non-GAAP) [2]	**$ 790**	$ 675	$ 669	**17 %**	1 %
Adjusted EBITDA (Non-GAAP) [2]	**$ 963**	$ 820	$ 816	**17 %**	1 %
Capital expenditures	**$ 515**	$ 469	$ 446	**10 %**	5 %

N/M - Percentage change not meaningful

1 As of January 1, 2018, U.S. Cellular adopted ASU 2014-09 using a modified retrospective approach. Under this method, the new accounting standard is applied only to the most recent period presented. See Note 2 — Revenue Recognition in the Notes to Consolidated Financial Statements for additional information

2 Refer to Supplemental Information Relating to Non-GAAP Financial Measures within this MD&A for a reconciliation of this measure.

Operating Revenues
(Dollars in millions)



Service revenues consist of:

- Retail Service – Charges for access, airtime, recovery of regulatory costs and value added services, including data services and products
- Inbound Roaming – Charges to other wireless carriers whose customers use U.S. Cellular's wireless systems when roaming
- Other Service – Amounts received from the Federal USF and tower rental revenues. Imputed interest on equipment installment plan contracts is included in 2017; however, it is not included in 2018 due to the impact of adopting the provisions of ASU 2014-09

Equipment revenues consist of:

- Sales of wireless devices and related accessories to new and existing customers, agents, and third-party distributors

Key components of changes in the statement of operations line items were as follows:

2018 - 2017 Commentary

Total operating revenues

Retail service revenues increased in 2018 primarily as a result of the changes in Postpaid ARPU as previously discussed in the Operational Overview section.

Inbound roaming revenues increased in 2018 primarily driven by data traffic, with significantly higher usage partially offset by lower rates.

Other service revenues decreased year over year, reflecting the exclusion of imputed interest income in 2018 due to the impact of adopting the provisions of ASU 2014-09. The impact of imputed interest income was $73 million in 2017. Federal USF revenues remained flat year over year at $92 million. See the Regulatory Matters section in this MD&A for a description of the Phase II Connect America Mobility Fund (MF2 Order) and its expected impacts on U.S. Cellular's Federal USF support.

Equipment sales revenues increased in 2018 due primarily to the impact of adopting the provisions of ASU 2014-09 and an increase in the average revenue per device sold. Such factors were partially offset by a decrease in the number of devices sold.

See Note 2 — Revenue Recognition in the Notes to Consolidated Financial Statements for additional details on the financial statement impact of ASU 2014-09.

System operations expenses

System operations expenses increased in 2018 due primarily to higher maintenance, utility and cell site rent expenses largely reflecting the growth in cell sites and other network facilities as U.S. Cellular continues to add capacity, enhance quality, and deploy new technologies.

Cost of equipment sold

Cost of equipment sold decreased in 2018 due primarily to a decrease in the number of devices sold, partially offset by an increase due to a higher average cost per device sold. Loss on equipment, defined as Equipment sales revenues less Cost of equipment sold, was $42 million and $159 million for 2018 and 2017, respectively.

Selling, general and administrative expenses

Selling, general and administrative expenses decreased in 2018 due primarily to lower sales commissions.

Depreciation, amortization and accretion

Depreciation, amortization, and accretion increased in 2018 due to additional network assets being placed into service as well as an increase in amortization expense related to billing system upgrades.

(Gain) loss on asset disposals, net

Loss on asset disposals, net decreased primarily as a result of fewer disposals of certain network assets.

(Gain) loss on license sales and exchanges, net

Net gains in 2018 and 2017 were due to gains recognized on license sale and exchange transactions with various third parties.

2017 - 2016 Commentary

Total operating revenues

Service revenues decreased as a result of (i) a decrease in retail service revenues driven by industry-wide price competition resulting in overall price reductions on plan offerings; and (ii) a decrease in inbound roaming revenue mainly due to lower roaming rates. Such reductions were partially offset by an increase in imputed interest income due to an increase in the total number of active equipment installment plans.

Federal USF revenue remained flat year over year at $92 million. See the Regulatory Matters section in this MD&A for a description of the FCC Mobility Fund Phase II Order (MF2 Order) and its expected impacts on U.S. Cellular's current Federal USF support.

Equipment sales revenues increased by a modest amount year over year reflecting an increase in average revenue per device sold, a mix shift to higher end smartphone devices and, to a lesser extent, an increase in accessories revenues. Such increases were almost entirely offset by a decrease in the number of devices sold, a reduction in guarantee liability amortization for equipment installment contracts as a result of changes in plan offerings, and lower device activation fees.

System operations expenses

System operations expenses decreased in 2017 as a result of (i) a decrease in customer usage expenses driven mainly by decreased circuit costs; and (ii) a decrease in roaming expenses driven primarily by lower roaming rates, partially offset by increased data roaming usage.

Cost of equipment sold

Cost of equipment sold decreased mainly due to a reduction in the number of devices sold partially offset by a mix shift from feature phones and connected devices to higher cost smartphones. Loss on equipment was $159 million and $172 million for 2017 and 2016, respectively.

Selling, general and administrative expenses

Selling expenses decreased by $26 million due to lower advertising expenses, including a decrease in sponsorship expenses related to the termination of a naming rights agreement in 2016. Such reductions were partially offset by an increase in commissions expenses.

General and administrative expenses decreased by $42 million mainly due to lower expenses for bad debts and phone programs, along with reductions in numerous other general and administrative expense categories.

Loss on impairment of goodwill

In 2017, U.S. Cellular recorded a $370 million loss on impairment related to goodwill. See Note 7 — Intangible Assets in the Notes to Consolidated Financial Statements for additional information.

(Gain) loss on asset disposals, net

Loss on asset disposals, net decreased primarily as a result of fewer disposals of certain network assets.

(Gain) loss on license sales and exchanges, net

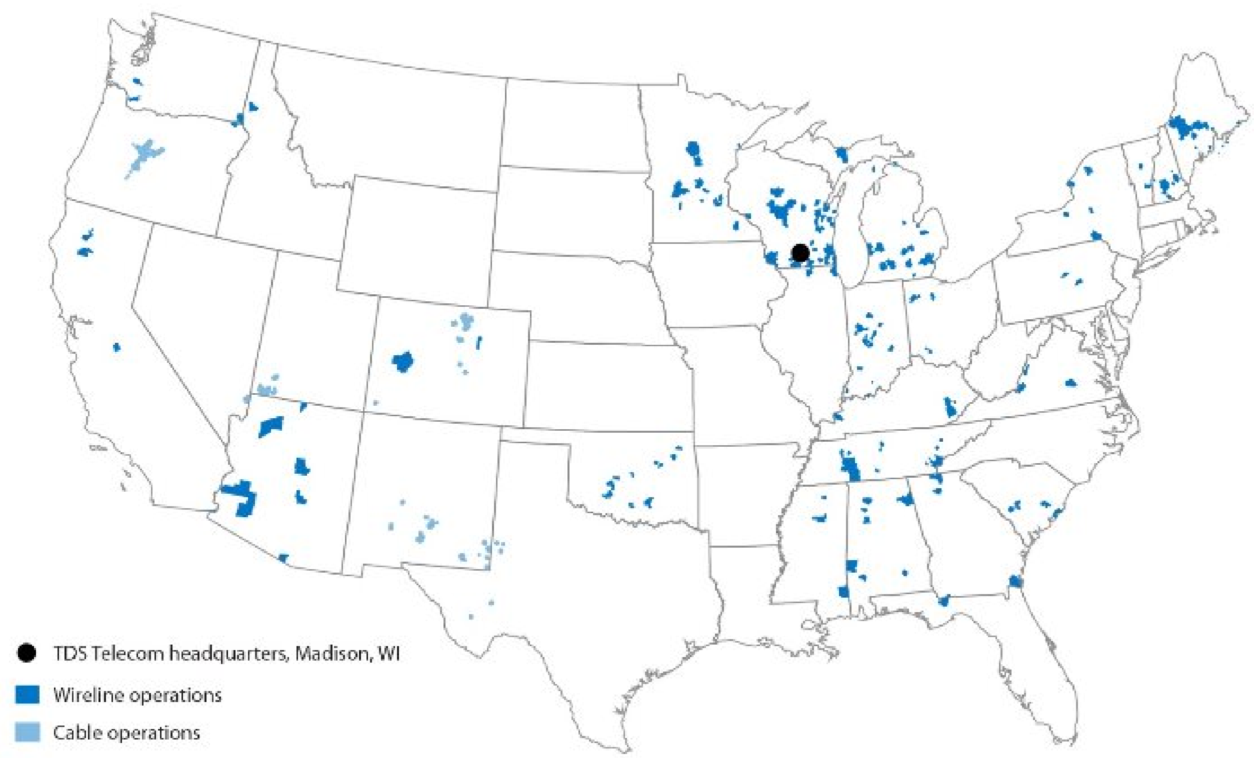
The net gains in 2017 and 2016 were due to license exchange transactions with third parties.

TDS TELECOM OPERATIONS

Business Overview

TDS Telecom operates in two segments: Wireline and Cable. TDS Telecom's business objective is to provide a wide range of communications services to both residential and commercial customers.

OPERATIONS



- TDS Telecom provides broadband, video and voice services to 1.2 million connections in 31 states.
- Employs approximately 2,700 employees.
- Wireline operates incumbent local exchange carriers (ILEC) and competitive local exchange carriers (CLEC) in 27 states.
- Cable operates primarily in Colorado, New Mexico, Texas, Utah and Oregon.

Trends and Developments

Growth Initiatives:

- In 2018 TDS Telecom acquired the communications network of Merrimac Communications, Ltd., and i n 2017, acquired the fiber assets of Sun Prairie Utilities supporting its fiber deployment strategy for growth. Several additional new locations are currently being built with fiber to expand its footprint into attractive markets that are underserved today.
- TDS Telecom is also pursuing a strategy to invest in fiber construction in markets within its current footprint. Increased fiber deployment provides the opportunity to deliver more robust residential and consumer products which drives growth.
- In 2017 TDS Telecom acquired several small cable companies to further grow its markets. TDS Telecom will continue to pursue cable acquisitions that meet its criteria of having favorable competitive environments, attractive market demographics and the ability to grow broadband penetration.

Technology & Support Systems:

- TDS Telecom’s Wireline segment continues to upgrade and expand its network to respond to the needs of its customers for greater bandwidth and advanced technologies. At December 31, 2018, fiber has been deployed to approximately 26% of ILEC service addresses. Fiber technology allows broadband speeds of up to 1 Gigabit per second (Gbps). In non-fiber markets, TDS Telecom has deployed advanced technologies to increase data speeds up to 100 Megabits per second (Mbps) to reach approximately 28% of ILEC service addresses. TDS Telecom continues to utilize federal and state funding mechanisms in order to extend broadband service to unserved and underserved markets.
- TDS Telecom’s Cable segment continues to make capacity investments in line with its strategy to increase broadband penetration in its markets. DOCSIS 3.0 technology is deployed to nearly all of Cable’s service addresses which allows it to offer enhanced transmission speeds and TDS Telecom has been enabling a next generation DOCSIS 3.1 broadband network which will be launched in the first half of 2019. TDS Telecom’s Cable segment is offering up to 1 Gbps service in its largest markets.

Services and Products:

- TDS Telecom’s Wireline segment strives to be the preferred broadband provider in its ILEC markets. As such, TDS Telecom continues to invest in its network to offer higher speed data service. As of December 31, 2018, TDS Telecom was able to provide broadband service to 96% of its ILEC physical access lines. At December 31, 2018, 71% of the service addresses in its ILEC markets had 10 Mbps or faster service available and 49% of the service addresses in its ILEC markets had 25 Mbps or faster service available.
- TDS Telecom’s Wireline segment offers IPTV, branded as TDS TV, in order to leverage its high-speed network. TDS TV provides customers with connected-home DVRs, video-on-demand (VOD) and TV Everywhere. TDS Telecom offers TDS TV in 31 markets, enabling 226,000 or roughly 29% of its service addresses. Where TDS TV is not available, TDS Telecom partners with a satellite TV provider to allow for triple or double play bundling. TDS Telecom plans additional fiber expansion.
- TDS Telecom's commercial service focus is on small- to medium-sized businesses and its sales efforts emphasize advanced IP–based data and voice services.
- TDS Telecom’s Cable segment seeks to expand broadband services and leverage that growth by bundling with video and voice services. In addition to providing enhanced broadband speeds through DOCSIS 3.0 technology, TDS Telecom also provides customers with a whole home entertainment solution branded as CatchTV.

Financial Overview — TDS Telecom

Year Ended December 31,	2018[1]	2017	2016	2018 vs. 2017	2017 vs. 2016
(Dollars in millions)					
Operating revenues					
Wireline	$ 699	$ 714	$ 698	(2)%	2 %
Cable	230	206	185	12 %	11 %
TDS Telecom operating revenues [2]	927	919	882	1 %	4 %
Operating expenses					
Wireline	604	606	621	–	(2)%
Cable	231	198	183	17 %	8 %
TDS Telecom operating expenses [2]	834	803	803	4 %	–
TDS Telecom operating income	$ 93	$ 116	$ 79	(20)%	47 %
Net income	$ 89	$ 138	$ 54	(35)%	N/M
Adjusted OIBDA (Non-GAAP) [3]	$ 303	$ 314	$ 278	(4)%	13 %
Adjusted EBITDA (Non-GAAP) [3]	$ 313	$ 323	$ 283	(3)%	14 %
Capital expenditures	$ 232	$ 201	$ 162	15 %	24 %

Numbers may not foot due to rounding.

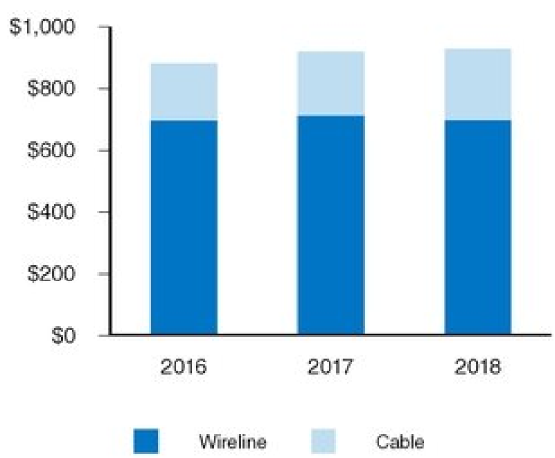
N/M - Percentage change not meaningful

1 As of January 1, 2018, TDS adopted ASU 2014-09 using a modified retrospective approach. Under this method, the new accounting standard is applied only to the most recent period presented. See Note 2 — Revenue Recognition in the Notes to Consolidated Financial Statements for additional information.

2 Includes eliminations between the Wireline and Cable segments.

3 Refer to supplemental Information Relating to Non-GAAP Financial Measures within this MD&A for a reconciliation of this measure.

Operating Revenues
(Dollars in millions)



2018 - 2017 Commentary

Operating revenues increased in 2018 due to Cable broadband and Cable and Wireline video connection growth and higher Wireline support revenue provided through the A-CAM program. Wireline wholesale access revenue and legacy voice and commercial products revenues decreased.

2017 - 2016 Commentary

Operating revenues increased in 2017 for much the same reasons as in 2018.

Total operating expenses

Operating expenses increased in 2018 due primarily to amortization of Cable franchise rights. See Note 1 — Summary of Significant Accounting Policies and Recent Accounting Pronouncements in the Notes to Consolidated Financial Statements for additional information related to Cable franchise rights. Operating expenses also increased due to higher Wireline and Cable video programming costs and Wireline network maintenance. In addition, operating expenses increased due to the impacts of adopting the provisions of ASU 2014-09. See Note 2 — Revenue Recognition in the Notes to Consolidated Financial Statements for additional information.

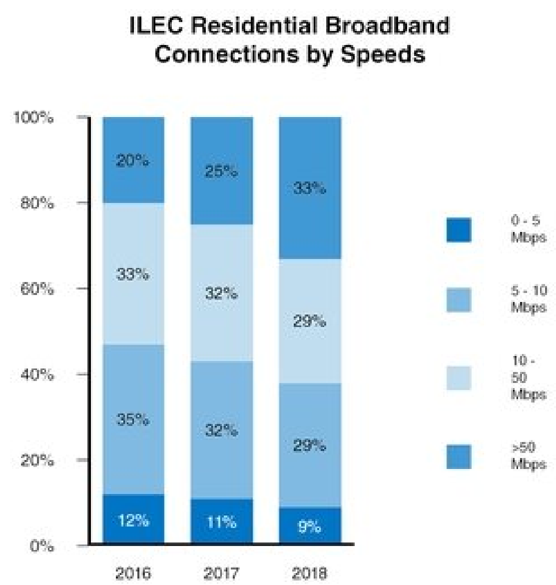
Operating expenses were unchanged in 2017 .

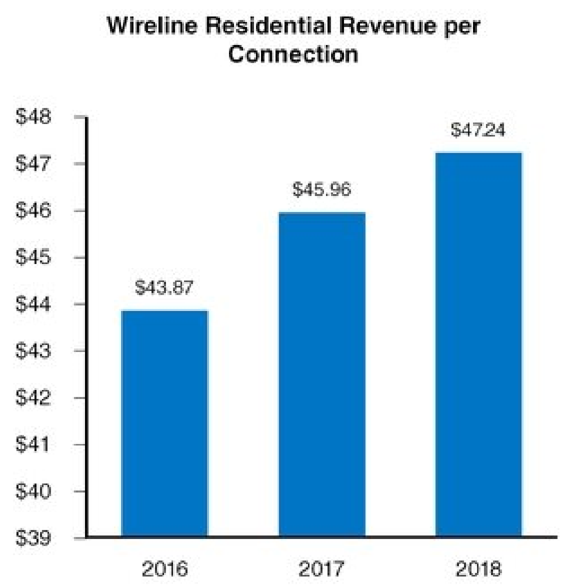
WIRELINE OPERATIONS

Business Overview

TDS Telecom’s Wireline business provides broadband, video and voice services. These services are provided to residential, commercial, and wholesale customers in a mix of rural, small town and suburban markets, with the largest concentration of its customers in the Upper Midwest and the Southeast. TDS Telecom’s strategy is to offer its residential customers broadband, video, and voice services through value-added bundling. In its commercial business, TDS Telecom’s focus is on small- to medium-sized businesses and its sales efforts emphasize advanced IP-based data and voice services.

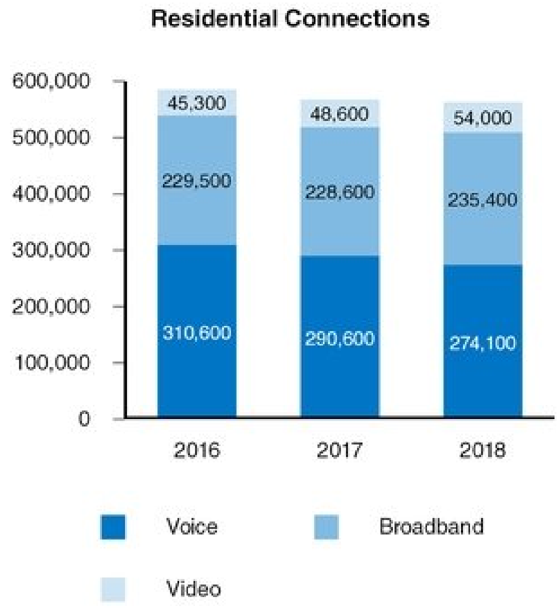
Operational Overview

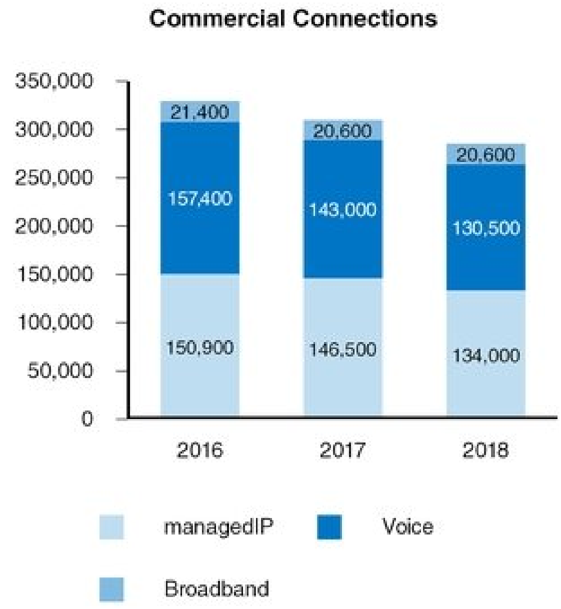




Residential broadband customers are increasingly choosing higher speeds in ILEC markets with 62% choosing speeds of 10 Mbps or greater and 33% choosing speeds of 50 Mbps or greater.

Increases in broadband speeds and broadband and video connection growth drove increases in average residential revenue per connection.





Total residential connections decreased by 1% as declines in voice connections outpaced the growth in broadband and video connections.

Total commercial connections decreased by 8% due primarily to decreases in voice connections in CLEC markets and managedIP.

Financial Overview — Wireline

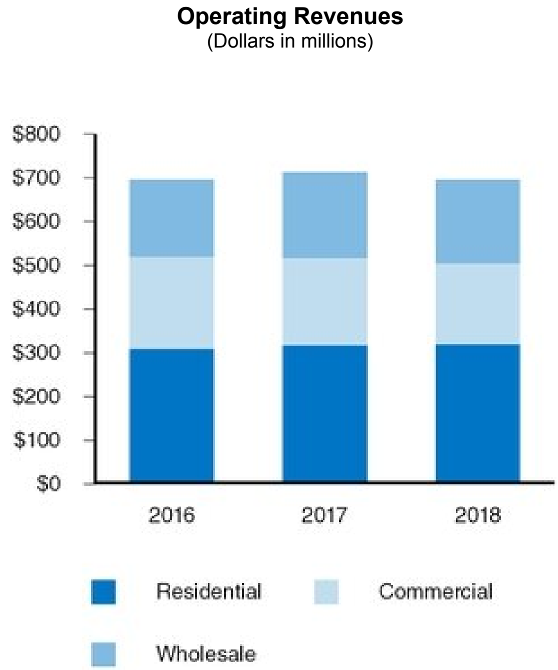
Year Ended December 31,	2018[1]	2017	2016	2018 vs. 2017	2017 vs. 2016
(Dollars in millions)					
Residential	$ 321	$ 319	$ 309	1 %	3 %
Commercial	184	199	212	(7)%	(6)%
Wholesale	191	195	175	(2)%	12 %
Service revenues	697	713	696	(2)%	2 %
Equipment and product sales	2	1	2	35 %	(33)%
Total operating revenues	699	714	698	(2)%	2 %
Cost of services (excluding Depreciation, amortization and accretion reported below)	266	258	258	3 %	–
Cost of equipment and products	1	2	2	(31)%	(16)%
Selling, general and administrative	197	194	200	1 %	(3)%
Depreciation, amortization and accretion	142	151	159	(5)%	(5)%
(Gain) loss on asset disposals, net	(3)	1	2	N/M	(35)%
(Gain) loss on license sales and exchanges, net	—	—	(1)	N/M	N/M
Total operating expenses	604	606	621	–	(2)%
Operating income	95	108	77	(13)%	41 %
Income before income taxes	$ 106	$ 117	$ 83	(9)%	41 %
Adjusted OIBDA (Non-GAAP) [2]	$ 234	$ 260	$ 237	(10)%	10 %
Adjusted EBITDA (Non-GAAP) [2]	$ 243	$ 269	$ 242	(9)%	11 %
Capital expenditures	$ 176	$ 146	$ 108	20 %	35 %

Numbers may not foot due to rounding.

N/M - Percentage change not meaningful

1 As of January 1, 2018, TDS adopted ASU 2014-09 using a modified retrospective approach. Under this method, the new accounting standard is applied only to the most recent period presented. See Note 2 — Revenue Recognition in the Notes to Consolidated Financial Statements for additional information.

2 Refer to Supplemental Information Relating to Non-GAAP Financial Measures within this MD&A for a reconciliation of this measure.



Residential revenues consist of:

- Broadband services, including fiber-based and other digital, premium and enhanced data services
- IPTV and satellite video services
- Voice services

Commercial revenues consist of:

- High-speed and dedicated business internet services
- Voice services

Wholesale revenues consist of:

- Network access services primarily to interexchange and wireless carriers for carrying data and voice traffic on TDS Telecom's network and special access services to carriers and others
- Federal and State USF support

Key components of changes in the statement of operations items were as follows:

2018 - 2017 Commentary

Total operating revenues

Residential revenues increased in 2018 due primarily to growth in video and broadband connections and price increases, partially offset by declines in voice connections. Average voice connections declined 7% while average video connections grew 12%.

Commercial revenues decreased in 2018 due to declining connections and services mostly in CLEC markets.

Wholesale revenues decreased in 2018 due primarily to decreases in network access and special access services, partially offset by increased support received from the A-CAM program.

In January 2017, the FCC modified the USF high cost support program. Under this program, known as A-CAM, TDS received approximately $75 million in annual support which replaced approximately $50 million in annual USF support received in 2016. In 2018, TDS Telecom accepted an additional $3 million of support per year. TDS receives additional transition support payments in certain states. TDS Telecom received $86 million and $82 million in support payments in 2018 and 2017, respectively. The A-CAM support comes with an obligation to build defined broadband speeds to reach approximately 160,000 locations.

Cost of services

Cost of services increased in 2018 due to higher programming charges related to growth in video and contractor charges, partially offset by a decrease in the costs of purchasing unbundled network elements, provisioning circuits and providing long-distance services.

Selling, general and administrative

Selling, general and administrative increased in 2018 due to increases in legal expense and other taxes, partially offset by decreases in employee related expenses.

Depreciation, amortization and accretion

Depreciation, amortization and accretion decreased as certain assets became fully depreciated.

2017 - 2016 Commentary

Total operating revenues

Residential revenues increased in 2017 due primarily to growth in broadband revenues. Sales of higher tiered services and price increases for broadband increased revenues $9 million. IPTV average connections grew 13% increasing revenues $5 million, while average voice connections declined by 4% decreasing revenues by $6 million.

Commercial revenues decreased in 2017 due to declining connections mostly in CLEC markets.

Wholesale revenues increased in 2017 due primarily to increased support received from the A-CAM program.

Cost of services

Cost of services decreased in 2017 due to reduced costs of provisioning circuits, purchasing unbundled network elements and providing long-distance services, offset by increased charges related to growth in IPTV.

Selling, general and administrative

Selling, general and administrative decreased in 2017 due to decreases in employee related expense and in contributions to the Federal Universal Service Fund.

Depreciation, amortization and accretion

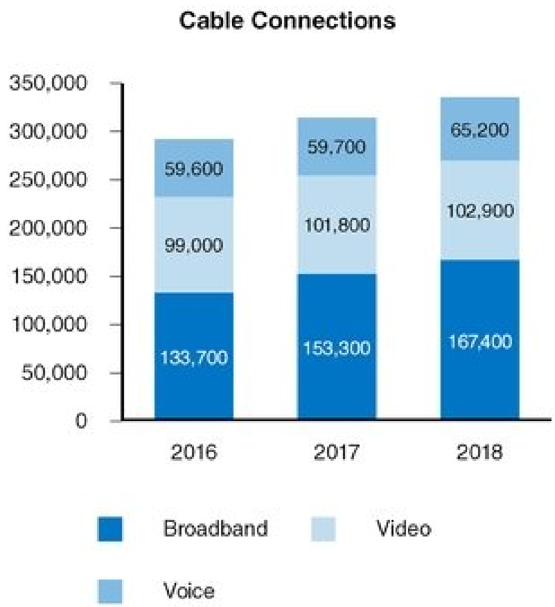
Depreciation, amortization and accretion decreased in 2017 as certain assets became fully depreciated.

CABLE OPERATIONS

Business Overview

TDS Telecom's Cable strategy is to expand its broadband services and leverage that growth by bundling with video and voice services. TDS Telecom seeks to be the leading provider of broadband services in its targeted markets by leveraging its core competencies in network management and customer focus.

Operational Overview



Cable connections grew 7% in 2018 due primarily to a 9% increase in broadband connections.

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Financial Overview — Cable

Year Ended December 31,	2018[1]	2017	2016	2018 vs. 2017	2017 vs. 2016
(Dollars in millions)					
Residential	$ 188	$ 169	$ 147	11 %	15 %
Commercial	42	37	38	13 %	(4)%
Total operating revenues	230	206	185	12 %	11 %
Cost of services (excluding Depreciation, amortization and accretion reported below)	104	98	94	6 %	4 %
Selling, general and administrative	57	54	51	6 %	6 %
Depreciation, amortization and accretion	69	44	37	57 %	21 %
(Gain) loss on asset disposals, net	1	2	2	(33)%	(7)%
Total operating expenses	231	198	183	17 %	8 %
Operating income (loss)	$ (2)	$ 8	$ 2	N/M	N/M
Income (loss) before income taxes	$ (1)	$ 8	$ 2	N/M	N/M
Adjusted OIBDA (Non-GAAP) [2]	$ 69	$ 54	$ 41	28 %	33 %
Adjusted EBITDA (Non-GAAP) [2]	$ 70	$ 54	$ 41	29 %	33 %
Capital expenditures	$ 56	$ 55	$ 54	2 %	2 %

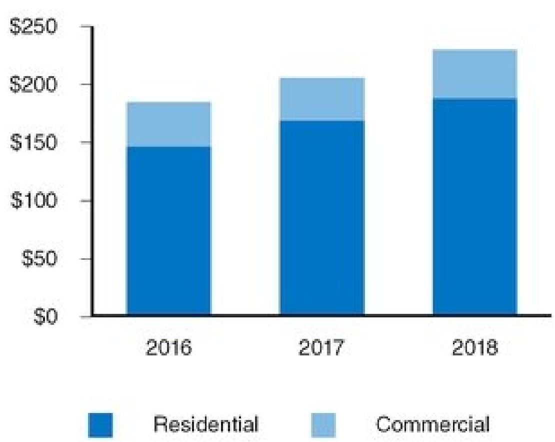
Numbers may not foot due to rounding.

N/M - Percentage change not meaningful

1 As of January 1, 2018, TDS adopted ASU 2014-09 using a modified retrospective approach. Under this method, the new accounting standard is applied only to the most recent period presented. See Note 2 — Revenue Recognition in the Notes to Consolidated Financial Statements for additional information.

2 Refer to Supplemental Information Relating to Non-GAAP Financial Measures within this MD&A for a reconciliation of this measure.

Operating Revenues
(Dollars in millions)



Residential and Commercial revenues consist of:

- Broadband services, including high-speed internet, security and support services
- Video services including premium programming in HD, multi-room and TV Everywhere offerings
- Voice services

Key components of changes in the statement of operations items were as follows:

2018 - 2017 Commentary

Total operating revenues

Residential revenues increased in 2018 due to tuck-in acquisitions, growth in connections and customers purchasing higher value bundles.

Commercial revenues increased in 2018 due primarily to video price increases and increased advertising sales.

Cost of services

Cost of services increased in 2018 due primarily to increases in video programming fees partially offset by a decrease in employee related expense.

Selling, general and administrative

Selling, general and administrative expenses increased in 2018 due to increased employee related expenses, IT-related expenses from a billing conversion and support and higher property and other taxes.

Depreciation, amortization and accretion

Depreciation, amortization and accretion increased in 2018 due to the amortization of franchise rights, a reduction in depreciable lives of customer premise equipment, and increases in plant. Effective January 1, 2018, Cable changed its estimated useful life for video franchise rights from indefinite-lived to 15 years due primarily to the effects of increasing competition and advancements in technology for delivering and consuming video programming, resulting in an additional $17 million in depreciation in 2018. See Note 1 — Summary of Significant Accounting Policies and Recent Accounting Pronouncements in the Notes to Consolidated Financial Statements for additional information on franchise rights.

2017 - 2016 Commentary

Total operating revenues

Revenues increased in 2017 due primarily to growth in broadband connections and price increases. A change in classification of certain bulk broadband and video connections increased residential revenues and reduced commercial revenues by $6 million in 2017.

Cost of services

Cost of services increased in 2017 due primarily to increases in programming fees.

Selling, general and administrative

Selling, general and administrative expenses increased in 2017 due to increased IT-related expenses and acquisition expense.

Liquidity and Capital Resources

Sources of Liquidity

TDS and its subsidiaries operate capital-intensive businesses. Historically, TDS has used internally-generated funds and also has obtained substantial funds from external sources for general corporate purposes. In the past, TDS' existing cash and investment balances, funds available under its revolving credit agreements, receivables securitization agreement, funds from other financing sources, including a term loan and other long-term debt, and cash flows from operating, and certain investing and financing activities, including sales of assets or businesses, provided sufficient liquidity and financial flexibility for TDS to meet its normal day-to-day operating needs and debt service requirements, to finance the build-out and enhancement of markets and to fund acquisitions. There is no assurance that this will be the case in the future. See Market Risk for additional information regarding maturities of long-term debt.

Although TDS currently has a significant cash balance, TDS has incurred negative free cash flow at times in the past and this could occur in the future. However, TDS believes that existing cash and investment balances, funds available under its revolving credit agreements, receivables securitization agreement and expected cash flows from operating and investing activities will provide sufficient liquidity for TDS to meet its normal day-to-day operating needs and debt service requirements for the coming year.

TDS may require substantial additional capital for, among other uses, funding day-to-day operating needs including working capital, acquisitions of providers of cable, wireless or wireline telecommunications services, IT services or other businesses, spectrum license or system acquisitions, capital expenditures, debt service requirements, the repurchase of shares, the payment of dividends, or making additional investments. TDS, through U.S. Cellular, plans to participate in spectrum auctions in 2019 (see Regulatory Matters - Millimeter Wave Spectrum Auctions), and expects capital expenditures to increase in 2019 relative to 2018 levels, due primarily to continued fiber investments at TDS Telecom and investments at U.S. Cellular to enhance network speed and capacity and begin deploying 5G. It may be necessary from time to time to increase the size of the existing revolving credit agreements, to put in place new credit agreements, or to obtain other forms of financing in order to fund potential expenditures. TDS' liquidity would be adversely affected if, among other things, TDS is unable to obtain short- or long-term financing on acceptable terms, TDS makes significant spectrum license purchases, TDS makes significant business acquisitions, the LA Partnership discontinues or significantly reduces distributions compared to historical levels, or Federal USF and/or other regulatory support payments decline.

TDS' credit rating currently is sub-investment grade. There can be no assurance that sufficient funds will continue to be available to TDS or its subsidiaries on terms or at prices acceptable to TDS. Insufficient cash flows from operating activities, changes in TDS' credit ratings, defaults of the terms of debt or credit agreements, uncertainty of access to capital, deterioration in the capital markets, reduced regulatory capital at banks which in turn limits their ability to borrow and lend, other changes in the performance of TDS or in market conditions or other factors could limit or restrict the availability of financing on terms and prices acceptable to TDS, which could require TDS to reduce its acquisition, capital expenditure and business development programs, reduce the acquisition of spectrum licenses, and/or reduce or cease share repurchases and/or the payment of dividends. Any of the foregoing developments would have an adverse impact on TDS' businesses, financial condition or results of operations. TDS cannot provide assurance that circumstances that could have a material adverse effect on its liquidity or capital resources will not occur.

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Cash and Cash Equivalents

Cash and cash equivalents include cash and money market investments. The primary objective of TDS' Cash and cash equivalents investment activities is to preserve principal. Cash held by U.S. Cellular is for its operational needs and acquisition, capital expenditure and business development programs. TDS does not have direct access to U.S. Cellular cash unless U.S. Cellular pays a dividend on its common stock. U.S. Cellular has no current intention to pay a dividend to its shareholders.

Cash and Cash Equivalents
(Dollars in millions)

At December 31, 2018 , TDS' consolidated Cash and cash equivalents totaled $921 million compared to $619 million and $900 million at December 31, 2017 and December 31, 2016 , respectively.

The majority of TDS' Cash and cash equivalents is held in bank deposit accounts and in money market funds that purchase only debt issued by the U.S. Treasury or U.S. government agencies across a range of eligible money market investments that may include, but are not limited to, government agency repurchase agreements, government agency debt, U.S. Treasury repurchase agreements, U.S. Treasury debt, and other securities collateralized by U.S. government obligations. TDS monitors the financial viability of the money market funds and direct investments in which it invests and believes that the credit risk associated with these investments is low.

Financing

Revolving Credit Agreements

TDS and U.S. Cellular have unsecured revolving credit agreements available for general corporate purposes including acquisitions, spectrum purchases and capital expenditures. In May 2018 , TDS entered into a new $400 million revolving credit agreement with certain lenders and other parties and U.S. Cellular entered into a new $300 million revolving credit agreement with certain lenders and other parties. Amounts under the revolving credit agreements may be borrowed, repaid and reborrowed from time to time until maturity in May 2023 . As a result of the new agreements, TDS' and U.S. Cellular's previous revolving credit agreements due to expire in June 2021 were terminated. As of December 31, 2018 , there were no outstanding borrowings under the revolving credit agreements, except for letters of credit, and TDS and U.S. Cellular's unused capacity under their revolving credit agreements was $399 million and $298 million , respectively. The continued availability of the revolving credit agreements requires TDS and U.S. Cellular to comply with certain negative and affirmative covenants, maintain certain financial ratios and provide representations on certain matters at the time of each borrowing. TDS and U.S. Cellular believe they were in compliance as of December 31, 2018 , with all of the financial covenants and requirements set forth in their revolving credit agreements. See Financial Covenants below.

See Note 11 — Debt in the Notes to Consolidated Financial Statements for additional information regarding the revolving credit agreements.

Term Loan

In January 2015, U.S. Cellular entered into an unsecured senior term loan credit agreement. In July 2015 , U.S. Cellular borrowed the full amount of $225 million available under this agreement in two separate draws. This term loan credit agreement was amended and restated in June 2016, and further amended in May 2018 . Principal reductions are due and payable in quarterly installments of $3 million beginning in March 2016 through December 2021, and the remaining unpaid balance will be due and payable in January 2022 . This agreement was entered into for general corporate purposes, including working capital, spectrum purchases and capital expenditures.

The continued availability of the term loan agreement requires U.S. Cellular to comply with certain negative and affirmative covenants, maintain certain financial ratios and make representations regarding certain matters at the time of each borrowing, that are substantially the same as those in U.S. Cellular's revolving credit agreement described above. TDS believes that U.S. Cellular was in compliance as of December 31, 2018 , with all of the financial covenants and requirements set forth in the term loan agreement. See Financial Covenants below.

See Note 11 — Debt in the Notes to Consolidated Financial Statements for additional information regarding the term loan.

Receivables Securitization Agreement

In December 2017, U.S. Cellular, through its subsidiaries, entered into a $200 million credit agreement to permit securitized borrowings using its equipment installment receivables for general corporate purposes. U.S. Cellular entered into a performance guaranty whereby U.S. Cellular guarantees the performance of certain wholly-owned subsidiaries of U.S. Cellular under the agreement. Amounts under the receivables securitization agreement may be borrowed, repaid and reborrowed from time to time until maturity in December 2019, which may be extended from time to time as specified therein. As of December 31, 2018 , there were no outstanding borrowings under the receivables securitization agreement, and the entire unused capacity of $200 million was available, subject to sufficient collateral to satisfy the asset borrowing base provisions of the agreement. As of December 31, 2018 , the USCC Master Note Trust (Trust) held $63 million of assets available to be pledged as collateral for the receivables securitization agreement. The continued availability of the receivables securitization agreement requires U.S. Cellular to comply with certain negative and affirmative covenants, maintain certain financial ratios and provide representations on certain matters at the time of each borrowing. TDS believes that U.S. Cellular was in compliance as of December 31, 2018 , with all of the financial covenants and requirements set forth in its receivables securitization agreement. See Financial Covenants below.

See Note 11 — Debt in the Notes to Consolidated Financial Statements for additional information regarding the receivables securitization agreement.

Financial Covenants

As noted above, the TDS and U.S. Cellular revolving credit agreements, the U.S. Cellular senior term loan agreement and the U.S. Cellular receivables securitization agreement require TDS or U.S. Cellular, as applicable, to comply with certain affirmative and negative covenants, which include certain financial covenants. In particular, under these agreements, TDS and U.S. Cellular are required to maintain the Consolidated Interest Coverage Ratio at a level not lower than 3.00 to 1.00 as of the end of any fiscal quarter. TDS and U.S. Cellular also are required to maintain the Consolidated Leverage Ratio at a level not to exceed 3.25 to 1.00 as of the end of any fiscal quarter through June 30, 2019. From July 1, 2019 and thereafter , the Consolidated Leverage Ratio is not to exceed 3.00 to 1.00 as of the end of any fiscal quarter. TDS and U.S. Cellular believe they were in compliance as of December 31, 2018 , with all such financial covenants.

Other Long-Term Financing

TDS and U.S. Cellular each have an effective shelf registration statement on Form S-3 to issue senior or subordinated debt securities. The proceeds from any such issuances may be used for general corporate purposes, including: the possible reduction of other short-term or long-term debt; spectrum purchases; capital expenditures; in connection with acquisition, construction and development programs; for working capital; to provide additional investments in subsidiaries; or the repurchase of shares. The TDS shelf registration permits TDS to issue at any time and from time to time senior or subordinated debt securities in one or more offerings in an indeterminate amount. The U.S. Cellular shelf registration statement permits U.S. Cellular to issue at any time and from time to time senior or subordinated debt securities in one or more offerings, up to the amount registered, which is currently $500 million. The ability of TDS or U.S. Cellular to complete an offering pursuant to such shelf registration statements is subject to market conditions and other factors at the time.

TDS believes that it and/or its subsidiaries were in compliance as of December 31, 2018 , with all covenants and other requirements set forth in the TDS and U.S. Cellular long-term debt indentures. The TDS and U.S. Cellular long-term debt indentures do not include any financial covenants. TDS and U.S. Cellular have not failed to make nor do they expect to fail to make any scheduled payment of principal or interest under such indentures.

The total long-term debt principal payments due for the next five years are $209 million , which represent 8% of the total gross long-term debt obligation at December 31, 2018 . Refer to Market Risk — Long-Term Debt for additional information regarding required principal payments and the weighted average interest rates related to TDS' Long-term debt.

TDS and U.S. Cellular, at their discretion, may from time to time seek to retire or purchase their outstanding debt through cash purchases and/or exchanges for other securities, in open market purchases, privately negotiated transactions, tender offers, exchange offers or otherwise. Such repurchases or exchanges, if any, will depend on prevailing market conditions, liquidity requirements, contractual restrictions and other factors. The amounts involved may be material.

See Note 11 — Debt in the Notes to Consolidated Financial Statements for additional information on long-term financing.

Credit Ratings

In certain circumstances, TDS’ and U.S. Cellular’s interest cost on their various agreements may be subject to increase if their current credit ratings from nationally recognized credit rating agencies are lowered, and may be subject to decrease if the ratings are raised. The agreements do not cease to be available nor do the maturity dates accelerate solely as a result of a downgrade in TDS’ or U.S. Cellular’s credit rating. However, downgrades in TDS’ or U.S. Cellular’s credit rating could adversely affect their ability to renew the agreements or obtain access to other credit agreements in the future.

TDS and U.S. Cellular are rated at sub-investment grade. TDS and U.S. Cellular’s credit ratings as of December 31, 2018 , and the dates such ratings were re-affirmed were as follows:

Rating Agency	Rating	Outlook
Moody's (TDS) (re-affirmed September 2018)	Ba2	stable outlook
Moody's (U.S. Cellular) (re-affirmed September 2018)	Ba1	stable outlook
Standard & Poor's (re-affirmed October 2018)	BB	stable outlook
Fitch Ratings (re-affirmed April 2018)	BB+	stable outlook

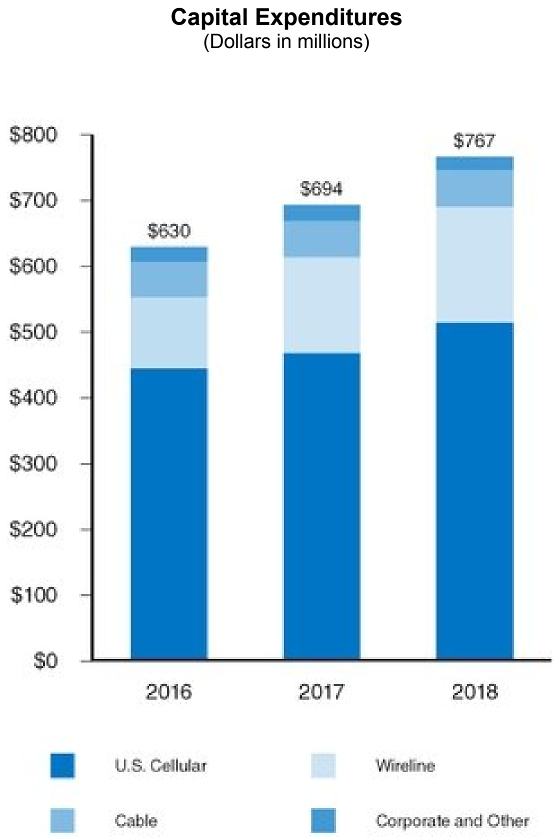
Capital Requirements

The discussion below is intended to highlight some of the significant cash outlays expected during 2019 and beyond and to highlight the spending incurred in prior years for these items. This discussion does not include cash required to fund normal operations, and is not a comprehensive list of capital requirements. Significant cash requirements that are not routine or in the normal course of business could arise from time to time.

Capital Expenditures

TDS makes substantial investments to acquire, construct and upgrade telecommunications networks and facilities to remain competitive and as a basis for creating long-term value for shareholders. In recent years, rapid changes in technology and new opportunities (such as 4G LTE and VoLTE technology in the Wireless business and fiber in the Wireline business) have required substantial investments in potentially revenue-enhancing and cost-saving upgrades to TDS’ networks to remain competitive; this is expected to continue in 2019 and future years with the deployment of 5G technology and the continued deployment of VoLTE in the Wireless business, and the continued deployment of fiber in the Wireline business.

Capital expenditures (i.e., additions to property, plant and equipment and system development expenditures), which include the effects of accruals and capitalized interest, in 2018 , 2017 and 2016 were as follows:



U.S. Cellular’s capital expenditures in 2018 were $515 million compared to $469 million in 2017 and $446 million in 2016 . In 2018 , these cap ital expenditures were used for the following purposes:

- Enhance and maintain U.S. Cellular's network coverage, including continuing to deploy VoLTE technology in certain markets and providing additional capacity to accommodate increased data usage by current customers; and
- Invest in information technology to support existing and new services and products.

Capital expenditures for 2019 are expected to be between $625 million and $725 million. In addition to the purposes listed above, these expenditures are expected to be used to enhance network speed and begin deploying 5G technology.

TDS Telecom’s capital expenditures in 2018 were $232 million compared to $201 million in 2017 and $162 million in 2016 . In 2018 , these capital expenditures were used for the following purposes:

- Maintain and enhance existing infrastructure including build-out requirements to meet state broadband and A-CAM programs;
- Upgrade broadband capacity and speeds;
- Support success-based spending to sustain IPTV, broadband and Cable growth;
- Build a TDS TV+ platform; and
- Expand fiber deployment inside and outside of current footprint.

Capital expenditures in 2019 are expected to be between $300 million and $350 million. These expenditures are expected to be used for similar purposes as those listed above.

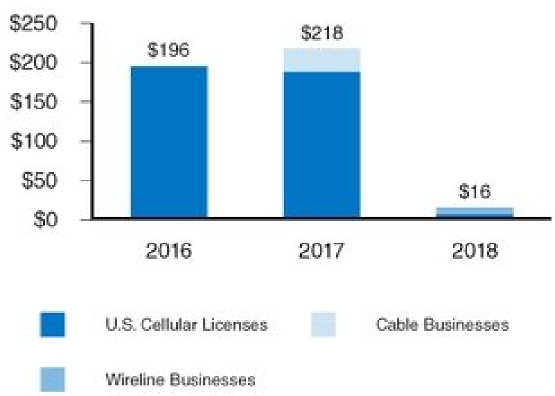
TDS plans to finance its capital expenditures program for 2019 using primarily Cash flows from operating activities, existing cash balances and, if required, its receivables securitization and/or revolving credit agreements.

Acquisitions, Divestitures and Exchanges

TDS may be engaged from time to time in negotiations (subject to all applicable regulations) relating to the acquisition, divestiture or exchange of companies, properties, wireless spectrum and other possible businesses. In general, TDS may not disclose such transactions until there is a definitive agreement.

In July 2016, the FCC announced U.S. Cellular as a qualified bidder in the FCC's forward auction of 600 MHz spectrum licenses, referred to as Auction 1002. In April 2017, the FCC announced by way of public notice that U.S. Cellular was the winning bidder for 188 licenses for an aggregate purchase price of $329 million. Prior to commencement of the forward auction, U.S. Cellular made an upfront payment to the FCC of $143 million in June 2016. U.S. Cellular paid the remaining $186 million to the FCC and was granted the licenses during the second quarter of 2017. In the table below, the $143 million deposit is included with the 2016 Cash payments for acquisitions.

Cash Payments for Acquisitions
(Dollars in millions)



TDS assesses its business interests on an ongoing basis with a goal of improving the competitiveness of its operations and maximizing its long-term return on capital. As part of this strategy, TDS reviews attractive opportunities to acquire additional wireless operating markets and wireless spectrum, including pursuant to FCC auctions; and telecommunications, cable or other possible businesses.

TDS also may seek to divest outright or include in exchanges for other interests those interests that are not strategic to its long-term success. Total Cash received from divestitures and exchanges was $29 million , $21 million and $21 million in 2018 , 2017 and 2016 , respectively.

Variable Interest Entities

TDS consolidates certain "variable interest entities" as defined under GAAP. See Note 14 — Variable Interest Entities in the Notes to Consolidated Financial Statements for additional information related to these variable interest entities. TDS may elect to make additional capital contributions and/or advances to these variable interest entities in future periods in order to fund their operations.

Common Share Repurchase Programs

TDS and U.S. Cellular have repurchased their common shares and U.S. Cellular expects to continue to repurchase its common shares, subject to any available repurchase program. Share repurchases made under the TDS and U.S. Cellular programs were as follows:

Year Ended December 31,	Number of Shares	Average Cost Per Share	Dollar Amount (in millions)
2018			
U.S. Cellular Common Shares	—	$ —	$ —
TDS Common Shares	—	—	—
2017			
U.S. Cellular Common Shares	—	$ —	$ —
TDS Common Shares	—	—	—
2016			
U.S. Cellular Common Shares	154,449	$ 34.55	$ 5
TDS Common Shares	111,700	22.56	3

Depending on its future financial performance, construction, development and acquisition programs, and available sources of financing, TDS and U.S. Cellular may not have sufficient liquidity or capital resources to make significant share repurchases. Therefore, there is no assurance that TDS and U.S. Cellular will make any significant share repurchases in the future.

For additional information related to the current TDS and U.S. Cellular repurchase authorizations, see Note 16 — Common Shareholders' Equity in the Notes to Consolidated Financial Statements.

Off-Balance Sheet Arrangements

TDS had no transactions, agreements or other contractual arrangements with unconsolidated entities involving "off-balance sheet arrangements," as defined by SEC rules, that had or are reasonably likely to have a material current or future effect on its financial condition, results of operations, liquidity, capital expenditures or capital resources.

Dividends

TDS paid quarterly dividends per outstanding share of $0.160 in 2018 , $0.155 in 2017 and $0.148 in 2016 . TDS increased the dividend per share to $0.165 in the first quarter of 2019 . See Note 16 — Common Shareholders' Equity in the Notes to Consolidated Financial Statements for additional information. TDS has no current plans to change its policy of paying dividends.

Contractual and Other Obligations

At December 31, 2018 , the resources required for contractual obligations were as follows:

	Total	Payments Due by Period			
		Less Than 1 Year	1 - 3 Years	3 - 5 Years	More Than 5 Years
(Dollars in millions)					
Long-term debt obligations [1]	$ 2,506	$ 20	$ 31	$ 158	$ 2,297
Interest payments on long-term debt obligations	5,680	167	332	316	4,865
Operating leases [2]	1,490	170	300	236	784
Capital leases	16	1	2	1	12
Purchase obligations [3]	1,737	1,444	215	53	25
	$ 11,429	$ 1,802	$ 880	$ 764	$ 7,983

1 Includes current and long-term portions of debt obligations. The total long-term debt obligation differs from Total long-term debt, net due to capital leases, debt issuance costs, unamortized discounts related to U.S. Cellular's 6.7% Senior Notes, and unamortized discounts related to the Installment payment agreement. See Note 11 — Debt in the Notes to Consolidated Financial Statements for additional information.

2 Includes future lease costs related to telecommunications plant facilities, office space, retail sites, cell sites, data centers and equipment. See Note 13 — Commitments and Contingencies in the Notes to Consolidated Financial Statements for additional information.

3 Includes obligations payable under non-cancellable contracts, commitments for device purchases, network facilities and transport services, agreements for software licensing, long-term marketing programs, as well as certain agreements to purchase goods or services. Where applicable, TDS calculates its obligation based on termination fees that can be paid to exit the contract.

The table above excludes potential liabilities related to "unrecognized tax benefits" as defined by GAAP because TDS is unable to predict the outcome or period of settlement of such liabilities. Such unrecognized tax benefits were $49 million at December 31, 2018 . See Note 5 — Income Taxes in the Notes to Consolidated Financial Statements for additional information on unrecognized tax benefits.

See Note 13 — Commitments and Contingencies in the Notes to Consolidated Financial Statements for additional information.

Consolidated Cash Flow Analysis

TDS operates a capital- and marketing-intensive business. TDS makes substantial investments to acquire wireless licenses and properties and to construct and upgrade communications networks and facilities as a basis for creating long-term value for shareholders. In recent years, rapid changes in technology and new opportunities have required substantial investments in potentially revenue-enhancing and cost-saving upgrades to TDS' networks. TDS utilizes cash on hand, cash from operating activities, cash proceeds from divestitures and dispositions of investments, and short-term and long-term debt financing to fund its acquisitions (including spectrum licenses), construction costs, operating expenses and share repurchases. Cash flows may fluctuate from quarter to quarter and year to year due to seasonality, the timing of acquisitions and divestitures, capital expenditures and other factors. The following discussion summarizes TDS' cash flow activities in 2018 , 2017 and 2016 .

2018 Commentary

TDS' Cash, cash equivalents and restricted cash increased $305 million in 2018 . Net cash provided by operating activities was $1,017 million in 2018 due to net income of $175 million plus non-cash items of $906 million and distributions received from unconsolidated entities of $153 million , including $68 million in distributions from the LA Partnership. This was partially offset by changes in working capital items which decreased net cash by $217 million . The working capital changes were influenced primarily by a $149 million increase in equipment installment plan receivables, which are expected to continue to increase and further require the use of working capital in the near term . The adoption of ASU 2014-09 on January 1, 2018, caused fluctuations in working capital items in the Consolidated Balance Sheet; however, the adoption of ASU 2014-09 had no impact on the Consolidated Statement of Cash Flows.

Cash flows used for investing activities were $680 million . Cash paid in 2018 for additions to property, plant and equipment totaled $776 million . This was partially offset by cash received from the redemption of short-term Treasury bills of $100 million .

Cash flows used for financing activities were $32 million , reflecting ordinary activity such as the payment of dividends and the scheduled repayments of debt, partially offset by cash proceeds from reissuance of Common Shares pursuant to stock-based compensation plans.

2017 Commentary

TDS' Cash, cash equivalents and restricted cash decreased $282 million in 2017. Net cash provided by operating activities was $776 million in 2017 due to net income of $157 million plus non-cash items of $742 million (including a $262 million loss on impairment of goodwill and a $369 million decrease in the deferred income tax liability) and distributions received from unconsolidated entities of $136 million, including $62 million in distributions from the LA Partnership. This was partially offset by changes in working capital items which decreased net cash by $259 million. The working capital changes were due primarily to a $261 million increase in equipment installment plan receivables.

Cash flows used for investing activities were $981 million. Cash paid in 2017 for additions to property, plant and equipment totaled $685 million. Cash paid for acquisitions and licenses was $218 million which included the remaining $186 million due to the FCC for licenses U.S. Cellular won in Auction 1002. Cash paid for investments was $100 million which included the purchase of short-term Treasury bills. This was partially offset by Cash received from divestitures and exchanges of $21 million.

Cash flows used for financing activities were $77 million, reflecting ordinary activity such as the payment of dividends and the scheduled repayments of debt.

2016 Commentary

TDS' Cash, cash equivalents and restricted cash decreased $85 million in 2016. Net cash provided by operating activities was $782 million in 2016 due to net income of $52 million plus non-cash items of $882 million and distributions received from unconsolidated entities of $93 million, including $29 million in distributions from the LA Partnership. This was partially offset by changes in working capital items which decreased cash by $245 million. The working capital changes were due to a $246 million increase in equipment installment plan receivables.

The net cash provided by operating activities was offset by cash flows used for investing activities of $808 million. Cash paid in 2016 for additions to property, plant and equipment totaled $636 million. In June 2016, U.S. Cellular made a deposit of $143 million to the FCC for its participation in Auction 1002. Cash paid for acquisitions and licenses in 2016 was $53 million partially offset by Cash received from divestitures and exchanges of $21 million.

Cash flows used for financing activities were $59 million in 2016, reflecting ordinary activity such as the payment of dividends and the scheduled repayments of debt.

Consolidated Balance Sheet Analysis

The following discussion addresses certain captions in the consolidated balance sheet and changes therein. This discussion is intended to highlight the significant changes and is not intended to fully reconcile the changes. Changes in financial condition during 2018 were as follows:

Cash and cash equivalents

See the Consolidated Cash Flow Analysis above for a discussion of cash and cash equivalents.

Short-term investments

Short-term investments decreased $83 million due to the maturity of U.S. Treasury Bills with original maturities of six months, partially offset by the purchase of additional U.S. Treasury Bills.

Accounts receivable — customers and agents

Accounts receivable — customers and agents increased $131 million due primarily to an increase in equipment installment plan receivables as well as ceasing to record deferred imputed interest as a result of the adoption of ASU 2014-09. See Note 2 — Revenue Recognition in the Notes to Consolidated Financial Statements for additional information.

Assets held for sale

Assets held for sale increased $44 million due primarily to the transfer of Licenses to Assets held for sale as a result of sale and exchange agreements that U.S. Cellular entered into in 2018. These agreements closed in the first quarter of 2019.

Other assets and deferred charges

Other assets and deferred charges increased $194 million due primarily to the creation of contract cost assets as a result of the adoption of ASU 2014-09. See Note 2 — Revenue Recognition in the Notes to Consolidated Financial Statements for additional information.

Deferred income tax liability, net

Deferred income tax liability, net, increased $88 million due primarily to the adoption of ASU 2014-09 increasing the net basis of assets on a U.S. GAAP basis without a corresponding increase in tax basis, as well as the impact of full expensing of qualified property additions following the enactment of the Tax Act.

Treasury shares

Treasury shares decreased $150 million due primarily to restricted stock units vesting and the exercise of stock options.

Noncontrolling interests

Noncontrolling interests increased $110 million due primarily to the issuance of U.S. Cellular stock pursuant to benefit plans, U.S. Cellular's 2018 Net income, and the adoption of ASU 2014-09 which increased U.S. Cellular's Retained earnings on January 1, 2018.

Application of Critical Accounting Policies and Estimates

TDS prepares its consolidated financial statements in accordance with GAAP. TDS' significant accounting policies are discussed in detail in Note 1 — Summary of Significant Accounting Policies and Recent Accounting Pronouncements and Note 2 — Revenue Recognition in the Notes to Consolidated Financial Statements.

Management believes the application of the following critical accounting policies and the estimates required by such application reflect its most significant judgments and estimates used in the preparation of TDS' consolidated financial statements. Management has discussed the development and selection of each of the following accounting policies and related estimates and disclosures with the Audit Committee of TDS' Board of Directors.

Intangible Asset Impairment

Licenses and Goodwill represent a significant component of TDS' consolidated assets. These assets are considered to be indefinite-lived assets and, therefore, are not amortized but rather are tested annually for impairment. TDS performs annual impairment testing of Licenses and Goodwill as of November 1 of each year, or more frequently if triggering events are present. Significant negative events, such as changes in any of the assumptions described below as well as decreases in forecasted cash flows, could result in an impairment in future periods. Licenses are tested for impairment at the level of reporting referred to as a unit of accounting. Goodwill is tested for impairment at the level of reporting referred to as a reporting unit.

See Note 7 — Intangible Assets in the Notes to Consolidated Financial Statements for information related to Licenses and Goodwill activity in 2018 and 2017.

Wireless Licenses – U.S. Cellular

U.S. Cellular performs its annual impairment assessment of Licenses as of November 1 of each year, or more frequently if there are events or circumstances that cause U.S. Cellular to believe the carrying value of Licenses exceeds their fair value on a more likely than not basis. For purposes of its impairment testing of Licenses, U.S. Cellular separated its FCC licenses into eight units of accounting. The eight units of accounting consisted of one unit of accounting for developed operating market licenses (built licenses) and seven geographic non-operating market licenses (unbuilt licenses). U.S. Cellular performed a qualitative impairment assessment in 2018 , and a quantitative impairment assessment in 2017 , to determine whether an impairment existed.

In 2018, U.S. Cellular considered several qualitative factors, including analysts' estimates of license values which contemplated recent spectrum auction results, recent U.S. Cellular and other market participant transactions and other industry and market factors. Based on this assessment, U.S. Cellular concluded that it was more likely than not that the fair value of the licenses in each unit of accounting exceeded their respective carrying values. Therefore, no impairment of licenses existed and no Step 1 quantitative impairment evaluation was completed.

In 2017, a market approach was used to value the spectrum license portfolio. Within each unit of accounting, the licenses were segregated by type and by similar geographical area. The market approach develops an indication of fair value by calculating estimated market values using observable license purchase and auction transactions as a basis for such values for each pool of licenses. The sum of the fair values of the discrete pools represents the estimated fair value of U.S. Cellular's licenses. Based on the assessment, the fair values of the license units of accounting exceeded their respective carrying values by amounts ranging from 16% to greater than 100%. Therefore, no impairment of licenses existed.

Goodwill – TDS Telecom

TDS Telecom has recorded Goodwill as a result of the acquisition of wireline and cable businesses. For purposes of the 2018 and 2017 Goodwill impairment tests, TDS Telecom had two reporting units: Wireline and Cable.

Based on the results of the TDS Telecom annual Goodwill impairment assessment performed as of November 1, 2018 , the fair values of the Wireline and Cable reporting units exceeded their carrying values. Therefore, no impairment of Goodwill was recorded for these reporting units.

The discounted cash flow approach and guideline public company method were used to value the Wireline and Cable reporting units. The discounted cash flow approach uses value drivers and considers risks specific to the industry as well as current economic factors. The most significant assumptions made in this process were the revenue growth rate (shown as a compound annual growth rate in the table below), the terminal revenue growth rate and the discount rate. The guideline public company method develops an indication of fair value by calculating average market pricing multiples for selected publicly-traded companies. The developed multiples were applied to applicable financial measures of the respective reporting unit to determine fair value. The discounted cash flow approach and guideline public company method were weighted to arrive at the total fair value used for impairment testing. The weighting of methods was consistently applied in both 2018 and 2017 .

For purposes of the discounted cash flow approach, the following table represents key assumptions used in estimating the fair value of the Wireline and Cable reporting units as of November 1, 2018 . There are uncertainties associated with these key assumptions and potential events and/or circumstances that could have a negative effect on the key assumptions described below.

Key Assumptions	Wireline	Cable
Revenue growth rate [1]	(2.9)%	7.5%
Terminal revenue growth rate [1]	— %	2.0%
Discount rate [2]	6.0 %	9.0%

1 There are risks that could negatively impact the projected revenue growth rates, including but not limited to the success of new and existing products/services, competition, and operational difficulties. TDS Telecom's reporting units use internally generated forecasts. These internally generated forecasts consider such things as observed demand, market factors and competitive knowledge.

2 The weighted average cost of capital is derived based on a set of guideline public companies and is an indicator of the cost of capital for a market participant in TDS Telecom's industries. The weighted average cost of capital may increase if borrowing costs rise, market participants weight more of their capital structure towards equity vs. debt, long-term risk free interest rates increase, or other elements affecting the estimated cost of equity or debt increase. To the extent that the weighted average cost of capital of market participants increases or Wireline or Cable's risk in relation to its peers increases, this would decrease the estimated fair value of the reporting units.

Provided all other assumptions remained the same, the Wireline and Cable discount rates would have to increase to 9.6% and 10.6% , respectively, to yield estimated fair values equal to their respective carrying values at November 1, 2018 . Further, provided all other assumptions remained the same, the Wireline and Cable terminal revenue growth rate assumptions would need to decrease to negative 5.8% and negative 0.1% , respectively, to yield an estimate of fair value equal to the carrying value of the respective reporting units at November 1, 2018 .

The Goodwill balances of the reporting units tested for impairment as of November 1, 2018 , and the percentage by which the estimated fair value of the corresponding reporting units exceeded their carrying values, as a percentage of carrying value, was as follows:

Reporting unit	Goodwill balance		Excess of estimated Fair Value over Carrying Value
(Dollars in millions)			
Wireline	$	409	28.4%
Cable	$	100	16.2%

Income Taxes

The amounts of income tax assets and liabilities, the related income tax provision and the amount of unrecognized tax benefits are critical accounting estimates because such amounts are significant to TDS' financial condition and results of operations.

The preparation of the consolidated financial statements requires TDS to calculate a provision for income taxes. This process involves estimating the actual current income tax liability together with assessing temporary differences resulting from the different treatment of items for tax purposes. These temporary differences result in deferred income tax assets and liabilities, which are included in TDS' Consolidated Balance Sheet. TDS must then assess the likelihood that deferred income tax assets will be realized based on future taxable income and, to the extent management believes that realization is not likely, establish a valuation allowance. Management's judgment is required in determining the provision for income taxes, deferred income tax assets and liabilities and any valuation allowance that is established for deferred income tax assets.

TDS recognizes the tax benefit from an uncertain tax position only if it is more likely than not that the tax position will be sustained on examination by the taxing authorities based on the technical merits of the position. The tax benefits recognized in the financial statements from such a position are measured based on management's judgment as to the possible outcome that has a greater than 50% cumulative likelihood of being realized upon ultimate resolution.

See Note 5 — Income Taxes in the Notes to Consolidated Financial Statements for details regarding TDS' income tax provision, deferred income taxes and liabilities, valuation allowances and unrecognized tax benefits, including information regarding estimates that impact income taxes.

Equipment Installment Plans

TDS sells devices and certain accessories to customers under installment contracts over a specified time period and, under certain of these plans, offers the customer a trade-in right. Customers on an installment contract who elect to trade-in the device will receive a credit in the amount of the outstanding balance of the installment contract, provided the customer trades-in an eligible used device in good working condition and purchases a new device from TDS. Equipment revenue under these contracts is recognized at the time the device is delivered to the customer for the amount allocated to the equipment under ASU 2014-09. See Note 4 — Equipment Installment Plans in the Notes to Consolidated Financial Statements for additional information.

Trade-In Right

TDS values the trade-in right as a guarantee liability. This liability is initially measured at fair value and is determined based on assumptions including the probability and timing of the customer upgrading to a new device and the fair value of the device being traded-in at the time of trade-in. TDS reevaluates its estimate of the guarantee liability quarterly. A significant change in any of the aforementioned assumptions used to compute the guarantee liability would impact the amount of revenue recognized under these plans and the timing thereof. In 2018 and 2017 , TDS assumed the earliest contractual time of trade-in, or the minimum amount of payments as specified in the device installment contract, for all customers on installment contracts with trade-in rights.

When a customer exercises the trade-in option, both the outstanding receivable and guarantee liability balances related to the respective devices are reduced to zero, and the value of the used device that is received in the transaction is recognized as inventory. If the customer does not exercise the trade-in option at the time of eligibility, TDS begins amortizing the liability and records this amortization as additional equipment revenue.

Allowance for doubtful accounts

TDS maintains an allowance for doubtful accounts for estimated losses that result from the failure of its customers to make payments due under the equipment installment plans and accessory installment plans. The allowance is estimated based on historical experience, account aging and other factors that could affect collectability. When it is probable that an account balance will not be collected, the account balance is charged against the allowance for doubtful accounts. To the extent that actual loss experience differs significantly from historical trends, the required allowance amounts could differ from the original estimates.

Other Items

Inflation

Management believes that inflation affects TDS' business to no greater or lesser extent than the general economy.

Seasonality

TDS' profitability historically has been lower in the fourth quarter as a result of U.S. Cellular's significant marketing and promotional activity during the holiday season.

Recently Issued Accounting Pronouncements

See Note 1 — Summary of Significant Accounting Policies and Recent Accounting Pronouncements in the Notes to Consolidated Financial Statements for information on recently issued accounting pronouncements.

Certain Relationships and Related Transactions

See Note 20 – Certain Relationships and Related Transactions in the Notes to Consolidated Financial Statements.

Regulatory Matters

FCC Mobility Fund Phase II Order

In October 2011, the FCC adopted its USF/Intercarrier Compensation Transformation Order (USF Order). Pursuant to this order, U.S. Cellular's then current Federal USF support was to be phased down at the rate of 20% per year beginning July 1, 2012. The USF Order contemplated the establishment of a new mobile USF program (i.e., the Phase II Connect America Mobility Fund or "MF2") and provided for a pause in the phase down if that program was not timely implemented by July 2014. MF2 was not operational as of July 2014 and, therefore, as provided by the USF Order, the phase down was suspended at 60% of the baseline amount until such time as the FCC had taken steps to establish the MF2. In February 2017, the FCC adopted the MF2 Order addressing the framework for MF2 and the resumption of the phase down. The MF2 Order establishes a support fund of $453 million annually for ten years to be distributed through a market-based, multi-round reverse auction. For areas that receive support under MF2, legacy support to MF2 Auction winners will terminate and be replaced with MF2 support effective the first day of the month following release of the public notice closing the auction. Legacy support in areas where the legacy support recipient is not an MF2 winner will be subject to phase down over two years unless there is no winner in a particular census block, in which case it will be continued for one legacy support recipient only. The MF2 Order further states that the phase down of legacy support for areas that were not eligible for support under MF2 will commence on the first day of the month following the completion of the auction and will conclude two years later.

In August 2017, the FCC adopted the MF2 Challenge Process Order, which laid out procedures for establishing areas that would be eligible for support under the MF2 program. This included a collection process to be followed by a challenge window, a challenge response window, and finally adjudication of any coverage disputes. In September 2017, the FCC issued a public notice initiating the collection of 4G LTE coverage data. Responses submitting the collected data were due on January 4, 2018.

On February 27, 2018, the FCC issued public notices providing detailed challenge procedures and a schedule for the challenge process. Pursuant to these notices, the challenge window began on March 29, 2018, and closed on November 26, 2018. Under the MF2 Challenge Process Order, no earlier than thirty days after the FCC processes the challenges, the FCC would open a thirty-day challenge response window. Following the challenge response window, the FCC would then adjudicate any disputes. This entire process must be completed before an auction can be commenced.

On December 7, 2018, the FCC announced that it is investigating whether one or more carriers had violated the MF2 mapping rules and submitted incorrect maps. Pending the outcome of this investigation, the FCC suspended the challenge process.

U.S. Cellular cannot predict at this time when the MF2 auction will occur, when the phase down period for its existing legacy support from the Federal USF will commence, or whether the MF2 auction will provide opportunities to U.S. Cellular to offset any loss in existing support.

FCC Connect America Fund

In 2017, TDS began receiving $75 million per year for 10 years (with incremental funding for transition in the early years for certain states) for operating and maintaining its network along with the obligation to provide broadband service at various speeds to about 160,000 locations. In May 2018, TDS Telecom accepted an offer issued by the FCC to receive an additional $3 million of support per year for ten years retroactive to January 2017 along with corresponding build-out obligations. In December 2018, the FCC issued an order authorizing additional funding to companies that currently receive A-CAM support if they expand the number of locations that offer 25/3 Mbps broadband service in their service areas. To provide A-CAM companies sufficient time to meet the increased deployment obligations a modified term of support and deployment of ten years, beginning January 1, 2019, and running until December 31, 2028, will be offered. The order became effective when it was published in the Federal Register on February 19, 2019. Once the Wireline Competition Bureau issues a notice announcing revised support amounts and corresponding buildout obligations for acceptance, A-CAM companies will have 30 days to accept the offer of additional support. TDS Telecom could receive almost $200 million in new funding. In total, A-CAM support would then exceed $1 billion in funding over the 12-year implementation horizon.

FCC Rulemaking – Restoring Internet Freedom

In December 2017, the FCC approved rules reversing or revising decisions made in the FCC's 2015 Open Internet and Title II Order (Restoring Internet Freedom). The 2017 action reversed the FCC's 2015 decision to reclassify Broadband Internet Access Services as telecommunications services subject to regulation under Title II of the Telecommunications Act. The 2017 action also reversed the FCC's 2015 restrictions on blocking, throttling and paid prioritization, and modified transparency rules relating to such practices. Parties are pursuing legal proceedings challenging the 2017 actions. TDS cannot predict the outcome of these proceedings or the impact on its business.

A number of states, including certain states in which TDS operates, have adopted or considered laws intended to reinstate aspects of the foregoing net neutrality regulations that were reversed or revised by the FCC in 2017. To the extent such laws are enacted, it is expected that legal proceedings will be pursued challenging such laws. TDS cannot predict the outcome of these proceedings or the impact on its business.

Millimeter Wave Spectrum Auctions

At its open meeting on August 2, 2018, the FCC adopted a public notice establishing procedures for two auctions of spectrum licenses in the 28 GHz and 24 GHz bands. The 28 GHz auction (Auction 101) commenced on November 14, 2018 and closed on January 24, 2019. Auction 101 offered two 425 MHz licenses in the 28 GHz band over portions of the United States that do not have incumbent licensees. The 24 GHz auction (Auction 102) will offer up to seven 100 MHz licenses in the 24 GHz band in Partial Economic Areas covering most of the United States. Upfront payments for Auction 102 were due by February 19, 2019, and bidding in Auction 102 is scheduled to begin on March 14, 2019. U.S. Cellular filed applications to participate in both auctions on September 18, 2018, and was announced as a qualified bidder for Auction 101 on October 31, 2018. The FCC has not announced qualified bidders for Auction 102.

Also, at the open meeting on August 2, 2018, the FCC adopted a Further Notice of Proposed Rulemaking in preparation for an additional Millimeter Wave auction offering licenses in the 37, 39 and 47 GHz bands. FCC statements indicate plans to hold this auction in the second half of 2019.

Private Securities Litigation Reform Act of 1995

Safe Harbor Cautionary Statement

This Management's Discussion and Analysis of Financial Condition and Results of Operations and other sections of this Annual Report contain statements that are not based on historical facts and represent forward-looking statements, as this term is defined in the Private Securities Litigation Reform Act of 1995. All statements, other than statements of historical facts, that address activities, events or developments that TDS intends, expects, projects, believes, estimates, plans or anticipates will or may occur in the future are forward-looking statements. The words "believes," "anticipates," "estimates," "expects," "plans," "intends," "projects" and similar expressions are intended to identify these forward-looking statements, but are not the exclusive means of identifying them. Such forward-looking statements involve known and unknown risks, uncertainties and other factors that may cause actual results, events or developments to be significantly different from any future results, events or developments expressed or implied by such forward-looking statements. Such risks, uncertainties and other factors include, but are not limited to, those set forth below. See "Risk Factors" in TDS' Annual Report on Form 10-K for the year ended December 31, 2018 , for a further discussion of these risks. Each of the following risks could have a material adverse effect on TDS' business, financial condition or results of operations. However, such factors are not necessarily all of the important factors that could cause actual results, performance or achievements to differ materially from those expressed in, or implied by, the forward-looking statements contained in this document. Other unknown or unpredictable factors also could have material adverse effects on future results, performance or achievements. TDS undertakes no obligation to update publicly any forward-looking statements whether as a result of new information, future events or otherwise. Readers should evaluate any statements in light of these important factors.

- *Intense competition in the markets in which TDS operates could adversely affect TDS' revenues or increase its costs to compete.*
- *A failure by TDS to successfully execute its business strategy (including planned acquisitions, spectrum acquisitions, fiber builds, divestitures and exchanges) or allocate resources or capital effectively could have an adverse effect on TDS' business, financial condition or results of operations.*
- *Uncertainty in TDS' future cash flow and liquidity or the inability to access capital, deterioration in the capital markets, other changes in TDS' performance or market conditions, changes in TDS' credit ratings or other factors could limit or restrict the availability of financing on terms and prices acceptable to TDS, which could require TDS to reduce its construction, development or acquisition programs, reduce the amount of spectrum licenses acquired, and/or reduce or cease share repurchases and/or the payment of dividends.*
- *TDS has a significant amount of indebtedness which could adversely affect its financial performance and in turn adversely affect its ability to make payments on its indebtedness, comply with terms of debt covenants and incur additional debt.*
- *Changes in roaming practices or other factors could cause TDS' roaming revenues to decline from current levels, roaming expenses to increase from current levels and/or impact TDS' ability to service its customers in geographic areas where TDS does not have its own network, which could have an adverse effect on TDS' business, financial condition or results of operations.*
- *A failure by TDS to obtain access to adequate radio spectrum to meet current or anticipated future needs and/or to accurately predict future needs for radio spectrum could have an adverse effect on TDS' business, financial condition or results of operations.*
- *To the extent conducted by the FCC, TDS may participate in FCC auctions for additional spectrum or for funding in certain Universal Service programs in the future directly or indirectly and, during certain periods, will be subject to the FCC's anti-collusion rules, which could have an adverse effect on TDS.*
- *Failure by TDS to timely or fully comply with any existing applicable legislative and/or regulatory requirements or changes thereto could adversely affect TDS' business, financial condition or results of operations.*
- *An inability to attract people of outstanding talent throughout all levels of the organization, to develop their potential through education and assignments, and to retain them by keeping them engaged, challenged and properly rewarded could have an adverse effect on TDS' business, financial condition or results of operations.*
- *TDS' assets and revenue are concentrated primarily in the U.S. telecommunications industry. Consequently, its operating results may fluctuate based on factors related primarily to conditions in this industry.*
- *TDS' smaller scale relative to larger competitors that may have greater financial and other resources than TDS could cause TDS to be unable to compete successfully, which could adversely affect its business, financial condition or results of operations.*
- *Changes in various business factors, including changes in demand, customer preferences and perceptions, price competition, churn from customer switching activity and other factors, could have an adverse effect on TDS' business, financial condition or results of operations.*

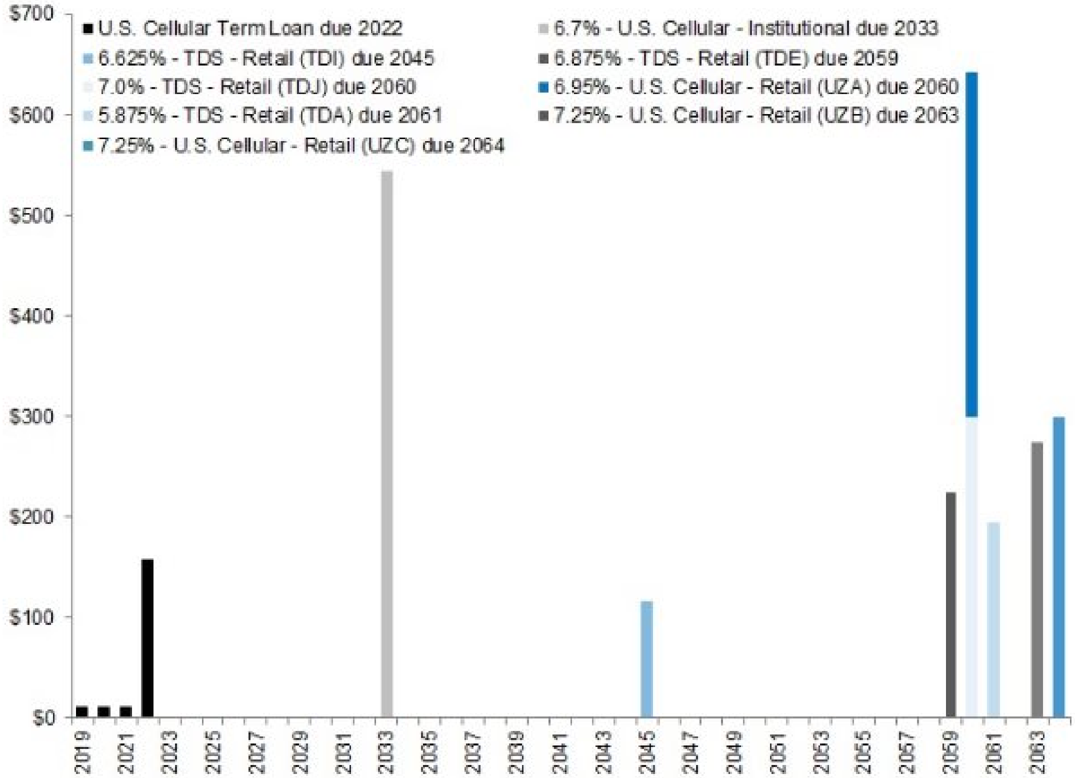
- *Advances or changes in technology could render certain technologies used by TDS obsolete, could put TDS at a competitive disadvantage, could reduce TDS' revenues or could increase its costs of doing business.*
- *Complexities associated with deploying new technologies present substantial risk and TDS' investments in unproven technologies may not produce the benefits that TDS expects.*
- *TDS receives regulatory support and is subject to numerous surcharges and fees from federal, state and local governments, and the applicability and the amount of the support and fees are subject to great uncertainty, which could have an adverse effect on TDS' business, financial condition or results of operations.*
- *Performance under device purchase agreements could have a material adverse impact on TDS' business, financial condition or results of operations.*
- *Changes in TDS' enterprise value, changes in the market supply or demand for wireless licenses, wireline or cable markets or IT service providers, adverse developments in the businesses or the industries in which TDS is involved and/or other factors could require TDS to recognize impairments in the carrying value of its licenses, goodwill, franchise rights and/or physical assets or require re-evaluation of the indefinite-lived nature of such assets.*
- *Costs, integration problems or other factors associated with acquisitions, divestitures or exchanges of properties or licenses and/or expansion of TDS' businesses could have an adverse effect on TDS' business, financial condition or results of operations.*
- *A failure by TDS to complete significant network construction and systems implementation activities as part of its plans to improve the quality, coverage, capabilities and capacity of its network, support and other systems and infrastructure could have an adverse effect on its operations.*
- *Difficulties involving third parties with which TDS does business, including changes in TDS' relationships with or financial or operational difficulties of key suppliers or independent agents and third party national retailers who market TDS' services, could adversely affect TDS' business, financial condition or results of operations.*
- *TDS has significant investments in entities that it does not control. Losses in the value of such investments could have an adverse effect on TDS' financial condition or results of operations.*
- *A failure by TDS to maintain flexible and capable telecommunication networks or information technology, or a material disruption thereof, could have an adverse effect on TDS' business, financial condition or results of operations.*
- *TDS has experienced and, in the future, expects to experience cyber-attacks or other breaches of network or information technology security of varying degrees on a regular basis, which could have an adverse effect on TDS' business, financial condition or results of operations.*
- *Changes in facts or circumstances, including new or additional information, could require TDS to record adjustments to amounts reflected in the financial statements, which could have an adverse effect on TDS' business, financial condition or results of operations.*
- *Disruption in credit or other financial markets, a deterioration of U.S. or global economic conditions or other events could, among other things, impede TDS' access to or increase the cost of financing its operating and investment activities and/or result in reduced revenues and lower operating income and cash flows, which would have an adverse effect on TDS' business, financial condition or results of operations.*
- *Settlements, judgments, restraints on its current or future manner of doing business and/or legal costs resulting from pending and future litigation could have an adverse effect on TDS' business, financial condition or results of operations.*
- *The possible development of adverse precedent in litigation or conclusions in professional studies to the effect that radio frequency emissions from wireless devices and/or cell sites cause harmful health consequences, including cancer or tumors, or may interfere with various electronic medical devices such as pacemakers, could have an adverse effect on TDS' wireless business, financial condition or results of operations.*
- *Claims of infringement of intellectual property and proprietary rights of others, primarily involving patent infringement claims, could prevent TDS from using necessary technology to provide products or services or subject TDS to expensive intellectual property litigation or monetary penalties, which could have an adverse effect on TDS' business, financial condition or results of operations.*
- *Certain matters, such as control by the TDS Voting Trust and provisions in the TDS Restated Certificate of Incorporation, may serve to discourage or make more difficult a change in control of TDS or have other consequences.*
- *The market price of TDS' Common Shares is subject to fluctuations due to a variety of factors.*
- *Any of the foregoing events or other events could cause revenues, earnings, capital expenditures and/or any other financial or statistical information to vary from TDS' forward-looking estimates by a material amount.*

Market Risk

Long-Term Debt

As of December 31, 2018 , the majority of TDS' long-term debt was in the form of fixed-rate notes with remaining maturities ranging up to 46 years. Fluctuations in market interest rates can lead to significant fluctuations in the fair value of these fixed-rate notes.

The following chart presents the scheduled principal payments on long-term debt by maturity dates at December 31, 2018 :



The following table presents the scheduled principal payments on long-term debt, capital lease obligations, and other installment arrangements, and the related weighted average interest rates by maturity dates at December 31, 2018 :

	Principal Payments Due by Period	
	Long-Term Debt Obligations 1	Weighted-Avg. Interest Rates on Long-Term Debt Obligations 2
(Dollars in millions)		
2019	$ 21	3.2%
2020	21	3.2%
2021	12	5.0%
2022	158	5.0%
2023	—	6.6%
Thereafter	2,300	6.9%
Total	$ 2,512	6.7%

1 The total long-term debt obligation differs from Long-term debt in the Consolidated Balance Sheet due to unamortized debt issuance costs on all non-revolving debt instruments, unamortized discounts related to U.S. Cellular's 6.7% Senior Notes, and unamortized discounts related to the Installment payment agreement. See Note 11 — Debt in the Notes to Consolidated Financial Statements for additional information.

2 Represents the weighted average interest rates at December 31, 2018 , for debt maturing in the respective periods.

Fair Value of Long-Term Debt

At December 31, 2018 and 2017 , the estimated fair value of long-term debt obligations, excluding capital lease obligations, other installment arrangements, the current portion of such long-term debt and debt financing costs, was $2,309 million and $2,499 million , respectively. See Note 3 — Fair Value Measurements in the Notes to Consolidated Financial Statements for additional information.

Other Market Risk Sensitive Instruments

The substantial majority of TDS’ other market risk sensitive instruments (as defined in Item 305 of SEC Regulation S-K) are short-term, including Cash and cash equivalents. Accordingly, TDS believes that a significant change in interest rates would not have a material effect on such other market risk sensitive instruments.

Supplemental Information Relating to Non-GAAP Financial Measures

TDS sometimes uses information derived from consolidated financial information but not presented in its financial statements prepared in accordance with U.S. GAAP to evaluate the performance of its business. Certain of these measures are considered “non-GAAP financial measures” under U.S. Securities and Exchange Commission Rules. Specifically, TDS has referred to the following measures in this Form 10-K Report:

- EBITDA
- Adjusted EBITDA
- Adjusted OIBDA
- Free cash flow
- Postpaid ABPU
- Postpaid ABPA

Following are explanations of each of these measures:

EBITDA, Adjusted EBITDA and Adjusted OIBDA

EBITDA, Adjusted EBITDA and Adjusted OIBDA are defined as net income adjusted for the items set forth in the reconciliation below. EBITDA, Adjusted EBITDA and Adjusted OIBDA are not measures of financial performance under GAAP and should not be considered as alternatives to Net income or Cash flows from operating activities, as indicators of cash flows or as measures of liquidity. TDS does not intend to imply that any such items set forth in the reconciliation below are non-recurring, infrequent or unusual; such items may occur in the future.

Adjusted EBITDA is a segment measure reported to the chief operating decision maker for purposes of making decisions about allocating resources to the segments and assessing their performance. See Note 18 — Business Segment Information in the Notes to Consolidated Financial Statements for additional information.

Management uses Adjusted EBITDA and Adjusted OIBDA as measurements of profitability and, therefore, reconciliations to applicable GAAP income measures are deemed appropriate. Management believes Adjusted EBITDA and Adjusted OIBDA are useful measures of TDS’ operating results before significant recurring non-cash charges, gains and losses, and other items as presented below as they provide additional relevant and useful information to investors and other users of TDS’ financial data in evaluating the effectiveness of its operations and underlying business trends in a manner that is consistent with management’s evaluation of business performance. Adjusted EBITDA shows adjusted earnings before interest, taxes, depreciation, amortization and accretion, and gains and losses, while Adjusted OIBDA reduces this measure further to exclude Equity in earnings of unconsolidated entities and Interest and dividend income in order to more effectively show the performance of operating activities excluding investment activities. The following table reconciles EBITDA, Adjusted EBITDA and Adjusted OIBDA to the corresponding GAAP measures, Net income or Income (loss) before income taxes and Operating income (loss). Income tax expense is not provided at the individual segment level for Wireline and Cable. TDS calculates income tax expense for TDS Telecom in total.

TDS - CONSOLIDATED	2018[1]	2017	2016
(Dollars in millions)			
Net income (GAAP)	**$ 175**	$ 157	$ 52
Add back or deduct:			
Income tax expense (benefit)	**46**	(279)	40
Interest expense	**172**	170	170
Depreciation, amortization and accretion	**883**	844	850
EBITDA (Non-GAAP)	**1,276**	892	1,112
Add back or deduct:			
Loss on impairment of goodwill	**—**	262	—
(Gain) loss on asset disposals, net	**9**	21	27
(Gain) loss on sale of business and other exit costs, net	**—**	(1)	(1)
(Gain) loss on license sales and exchanges, net	**(18)**	(22)	(20)
Adjusted EBITDA (Non-GAAP)	**1,267**	1,152	1,118
Deduct:			
Equity in earnings of unconsolidated entities	**160**	137	140
Interest and dividend income	**26**	15	11
Other, net	**2**	4	3
Adjusted OIBDA (Non-GAAP)	**1,079**	996	964
Deduct:			
Depreciation, amortization and accretion	**883**	844	850
Loss on impairment of goodwill	**—**	262	—
(Gain) loss on asset disposals, net	**9**	21	27
(Gain) loss on sale of business and other exit costs, net	**—**	(1)	(1)
(Gain) loss on license sales and exchanges, net	**(18)**	(22)	(20)
Operating income (loss) (GAAP)	**$ 205**	$ (108)	$ 108

U.S. CELLULAR	2018[1]	2017	2016
(Dollars in millions)			
Net income (GAAP)	**$ 164**	$ 15	$ 49
Add back or deduct:			
Income tax expense (benefit)	**51**	(287)	33
Interest expense	**116**	113	113
Depreciation, amortization and accretion	**640**	615	618
EBITDA (Non-GAAP)	**971**	456	813
Add back or deduct:			
Loss on impairment of goodwill	**—**	370	—
(Gain) loss on asset disposals, net	**10**	17	22
(Gain) loss on sale of business and other exit costs, net	**—**	(1)	—
(Gain) loss on license sales and exchanges, net	**(18)**	(22)	(19)
Adjusted EBITDA (Non-GAAP)	**963**	820	816
Deduct:			
Equity in earnings of unconsolidated entities	**159**	137	140
Interest and dividend income	**15**	8	6
Other, net	**(1)**	—	1
Adjusted OIBDA (Non-GAAP)	**790**	675	669
Deduct:			
Depreciation, amortization and accretion	**640**	615	618
Loss on impairment of goodwill	**—**	370	—
(Gain) loss on asset disposals, net	**10**	17	22
(Gain) loss on sale of business and other exit costs, net	**—**	(1)	—
(Gain) loss on license sales and exchanges, net	**(18)**	(22)	(19)

Operating income (loss) (GAAP)	**$ 158**	$ (304)	$ 48

TDS TELECOM	2018[1]	2017	2016
(Dollars in millions)			
Net income (GAAP)	**$ 89**	$ 138	$ 54
Add back or deduct:			
Income tax expense (benefit)	**16**	(13)	32
Interest expense	**(2)**	—	(1)
Depreciation, amortization and accretion	**212**	195	196
EBITDA (Non-GAAP)	**315**	319	280
Add back or deduct:			
(Gain) loss on asset disposals, net	**(2)**	3	4
(Gain) loss on license sales and exchanges, net	**—**	—	(1)
Adjusted EBITDA (Non-GAAP)	**313**	323	283
Deduct:			
Interest and dividend income	**8**	5	3
Other, net	**2**	3	3
Adjusted OIBDA (Non-GAAP)	**303**	314	278
Deduct:			
Depreciation, amortization and accretion	**212**	195	196
(Gain) loss on asset disposals, net	**(2)**	3	4
(Gain) loss on license sales and exchanges, net	**—**	—	(1)
Operating income (GAAP)	**$ 93**	$ 116	$ 79

Numbers may not foot due to rounding.

WIRELINE	2018[1]	2017	2016
(Dollars in millions)			
Income before income taxes (GAAP)	**$ 106**	$ 117	$ 83
Add back or deduct:			
Interest expense	**(2)**	—	(1)
Depreciation, amortization and accretion	**142**	151	159
EBITDA (Non-GAAP)	**247**	267	241
Add back or deduct:			
(Gain) loss on asset disposals, net	**(3)**	1	2
(Gain) loss on license sales and exchanges, net	**—**	—	(1)
Adjusted EBITDA (Non-GAAP)	**243**	269	242
Deduct:			
Interest and dividend income	**7**	5	3
Other, net	**3**	3	3
Adjusted OIBDA (Non-GAAP)	**234**	260	237
Deduct:			
Depreciation, amortization and accretion	**142**	151	159
(Gain) loss on asset disposals, net	**(3)**	1	2
(Gain) loss on license sales and exchanges, net	**—**	—	(1)
Operating income (GAAP)	**$ 95**	$ 108	$ 77

Numbers may not foot due to rounding.

CABLE	2018[1]	2017	2016
(Dollars in millions)			
Income (loss) before income taxes (GAAP)	**$ (1)**	$ 8	$ 2
Add back:			
Depreciation, amortization and accretion	**69**	44	37
EBITDA (Non-GAAP)	**69**	52	38
Add back or deduct:			
(Gain) loss on asset disposals, net	**1**	2	2
Adjusted EBITDA (Non-GAAP)	**70**	54	41
Deduct:			
Interest and dividend income	**1**	—	—
Adjusted OIBDA (Non-GAAP)	**69**	54	41
Deduct:			
Depreciation, amortization and accretion	**69**	44	37
(Gain) loss on asset disposals, net	**1**	2	2
Operating income (loss) (GAAP)	**$ (2)**	$ 8	$ 2

Numbers may not foot due to rounding.

1 As of January 1, 2018, TDS adopted ASU 2014-09 using a modified retrospective approach. Under this method, the new accounting standard is applied only to the most recent period presented. See Note 2 — Revenue Recognition in the Notes to Consolidated Financial Statements for additional information.

Free Cash Flow

The following table presents Free cash flow. Free cash flow is a non-GAAP financial measure which TDS believes may be useful to investors and other users of its financial information in evaluating liquidity, specifically, the amount of net cash generated by business operations after deducting Cash paid for additions to property, plant and equipment.

	2018	2017	2016
(Dollars in millions)			
Cash flows from operating activities (GAAP)	**$ 1,017**	$ 776	$ 782
Less: Cash paid for additions to property, plant and equipment	**776**	685	636
Free cash flow (Non-GAAP)	**$ 241**	$ 91	$ 146

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Postpaid ABPU and Postpaid ABPA

U.S. Cellular presents Postpaid ABPU and Postpaid ABPA to reflect the revenue shift from Service revenues to Equipment and product sales resulting from the increased adoption of equipment installment plans. Postpaid ABPU and Postpaid ABPA, as previously defined, are non-GAAP financial measures which U.S. Cellular believes are useful to investors and other users of its financial information in showing trends in both service and equipment and product sales revenues received from customers.

	2018[1]	2017	2016
(Dollars and connection counts in millions)			
Calculation of Postpaid ARPU			
Postpaid service revenues	**$ 2,417**	$ 2,389	$ 2,517
Average number of postpaid connections	**4.48**	4.49	4.47
Number of months in period	**12**	12	12
Postpaid ARPU (GAAP metric)	**$ 44.98**	$ 44.38	$ 46.96
Calculation of Postpaid ABPU			
Postpaid service revenues	**$ 2,417**	$ 2,389	$ 2,517
Equipment installment plan billings	**735**	604	491
Total billings to postpaid connections	**$ 3,152**	$ 2,993	$ 3,008
Average number of postpaid connections	**4.48**	4.49	4.47
Number of months in period	**12**	12	12
Postpaid ABPU (Non-GAAP metric)	**$ 58.67**	$ 55.60	$ 56.12
Calculation of Postpaid ARPA			
Postpaid service revenues	**$ 2,417**	$ 2,389	$ 2,517
Average number of postpaid accounts	**1.69**	1.67	1.69
Number of months in period	**12**	12	12
Postpaid ARPA (GAAP metric)	**$ 118.93**	$ 118.96	$ 124.09
Calculation of Postpaid ABPA			
Postpaid service revenues	**$ 2,417**	$ 2,389	$ 2,517
Equipment installment plan billings	**735**	604	491
Total billings to postpaid accounts	**$ 3,152**	$ 2,993	$ 3,008
Average number of postpaid accounts	**1.69**	1.67	1.69
Number of months in period	**12**	12	12
Postpaid ABPA (Non-GAAP metric)	**$ 155.11**	$ 149.02	$ 148.29

Numbers may not foot due to rounding

1 As of January 1, 2018, TDS adopted ASU 2014-09 using a modified retrospective approach. Under this method, the new accounting standard is applied only to the most recent period presented. See Note 2 — Revenue Recognition in the Notes to Consolidated Financial Statements for additional information.

Financial Statements

Telephone and Data Systems, Inc.
Consolidated Statement of Operations

Year Ended December 31,	2018	2017	2016
(Dollars and shares in millions, except per share amounts)			
Operating revenues			
Service	**$ 3,999**	$ 3,979	$ 4,050
Equipment and product sales	**1,110**	1,065	1,105
Total operating revenues	**5,109**	5,044	5,155
Operating expenses			
Cost of services (excluding Depreciation, amortization and accretion reported below)	**1,206**	1,164	1,189
Cost of equipment and products	**1,130**	1,195	1,240
Selling, general and administrative	**1,694**	1,689	1,762
Depreciation, amortization and accretion	**883**	844	850
Loss on impairment of goodwill	**—**	262	—
(Gain) loss on asset disposals, net	**9**	21	27
(Gain) loss on sale of business and other exit costs, net	**—**	(1)	(1)
(Gain) loss on license sales and exchanges, net	**(18)**	(22)	(20)
Total operating expenses	**4,904**	5,152	5,047
Operating income (loss)	**205**	(108)	108
Investment and other income (expense)			
Equity in earnings of unconsolidated entities	**160**	137	140
Interest and dividend income	**26**	15	11
Interest expense	**(172)**	(170)	(170)
Other, net	**2**	4	3
Total investment and other income (expense)	**16**	(14)	(16)
Income (loss) before income taxes	**221**	(122)	92
Income tax expense (benefit)	**46**	(279)	40
Net income	**175**	157	52
Less: Net income attributable to noncontrolling interests, net of tax	**40**	4	9
Net income attributable to TDS shareholders	**135**	153	43
TDS Preferred dividend requirement	**—**	—	—
Net income available to TDS common shareholders	**$ 135**	$ 153	$ 43
Basic weighted average shares outstanding	**112**	111	110
Basic earnings per share available to TDS common shareholders	**$ 1.20**	$ 1.39	$ 0.39
Diluted weighted average shares outstanding	**114**	112	111
Diluted earnings per share available to TDS common shareholders	**$ 1.17**	$ 1.37	$ 0.39

The accompanying notes are an integral part of these consolidated financial statements.

Telephone and Data Systems, Inc.
Consolidated Statement of Comprehensive Income

Year Ended December 31,	2018	2017	2016
(Dollars in millions)			
Net income	**$ 175**	$ 157	$ 52
Net change in accumulated other comprehensive income			
Change in net unrealized gain on equity investments	**—**	—	1
Change related to retirement plan			
Amounts included in net periodic benefit cost for the period			
Net actuarial gains	**—**	2	2
Prior service cost	**(10)**	(3)	—
Amortization of prior service cost	**(1)**	(2)	(2)
	(11)	(3)	—
Change in deferred income taxes	**3**	1	—
Change related to retirement plan, net of tax	**(8)**	(2)	—
Net change in accumulated other comprehensive income	**(8)**	(2)	1
Comprehensive income	**167**	155	53
Less: Net income attributable to noncontrolling interests, net of tax	**40**	4	9
Comprehensive income attributable to TDS shareholders	**$ 127**	$ 151	$ 44

The accompanying notes are an integral part of these consolidated financial statements.

Telephone and Data Systems, Inc.
Consolidated Statement of Cash Flows

Year Ended December 31,	2018	2017	2016
(Dollars in millions)			
Cash flows from operating activities			
Net income	$ 175	$ 157	$ 52
Add (deduct) adjustments to reconcile net income to net cash flows from operating activities			
Depreciation, amortization and accretion	883	844	850
Bad debts expense	101	95	102
Stock-based compensation expense	54	46	42
Deferred income taxes, net	33	(369)	22
Equity in earnings of unconsolidated entities	(160)	(137)	(140)
Distributions from unconsolidated entities	153	136	93
Loss on impairment of goodwill	—	262	—
(Gain) loss on asset disposals, net	9	21	27
(Gain) loss on license sales and exchanges, net	(18)	(22)	(20)
Other operating activities	4	2	(1)
Changes in assets and liabilities from operations			
Accounts receivable	(39)	(61)	(23)
Equipment installment plans receivable	(149)	(261)	(246)
Inventory	(5)	6	4
Accounts payable	2	(7)	36
Customer deposits and deferred revenues	8	(4)	(52)
Accrued taxes	(29)	37	60
Other assets and liabilities	(5)	31	(24)
Net cash provided by operating activities	1,017	776	782
Cash flows from investing activities			
Cash paid for additions to property, plant and equipment	(776)	(685)	(636)
Cash paid for acquisitions and licenses	(16)	(218)	(53)
Cash received for investments	100	—	—
Cash paid for investments	(17)	(100)	—
Cash received from divestitures and exchanges	29	21	21
Federal Communications Commission deposit	—	—	(143)
Other investing activities	—	1	3
Net cash used in investing activities	(680)	(981)	(808)
Cash flows from financing activities			
Issuance of long-term debt	—	—	2
Repayment of long-term debt	(20)	(17)	(12)
TDS Common Shares reissued for benefit plans, net of tax payments	42	4	9
U.S. Cellular Common Shares reissued for benefit plans, net of tax payments	18	1	6
Repurchase of TDS Common Shares	—	—	(3)
Repurchase of U.S. Cellular Common Shares	—	—	(5)
Dividends paid to TDS shareholders	(72)	(69)	(65)
Distributions to noncontrolling interests	(6)	(4)	(1)
Other financing activities	6	8	10
Net cash used in financing activities	(32)	(77)	(59)
Net increase (decrease) in cash, cash equivalents and restricted cash	305	(282)	(85)
Cash, cash equivalents and restricted cash			
Beginning of period	622	904	989
End of period	$ 927	$ 622	$ 904

The accompanying notes are an integral part of these consolidated financial statements.

Telephone and Data Systems, Inc.
Consolidated Balance Sheet — Assets

December 31,	2018	2017
(Dollars in millions)		
Current assets		
Cash and cash equivalents	$ 921	$ 619
Short-term investments	17	100
Accounts receivable		
Customers and agents, less allowances of $71 and $61, respectively	992	861
Other, less allowances of $2 and $2, respectively	107	100
Inventory, net	150	145
Prepaid expenses	103	112
Income taxes receivable	12	2
Other current assets	28	27
Total current assets	2,330	1,966
Assets held for sale	54	10
Licenses	2,195	2,232
Goodwill	509	509
Other intangible assets, net of accumulated amortization of $168 and $142, respectively	253	279
Investments in unconsolidated entities	480	453
Property, plant and equipment		
In service and under construction	12,074	11,742
Less: Accumulated depreciation and amortization	8,728	8,318
Property, plant and equipment, net	3,346	3,424
Other assets and deferred charges	616	422
Total assets [1]	$ 9,783	$ 9,295

The accompanying notes are an integral part of these consolidated financial statements.

Telephone and Data Systems, Inc.
Consolidated Balance Sheet — Liabilities and Equity

December 31,	2018	2017
(Dollars and shares in millions, except per share amounts)		
Current liabilities		
Current portion of long-term debt	**$ 21**	$ 20
Accounts payable	**365**	368
Customer deposits and deferred revenues	**197**	223
Accrued interest	**11**	11
Accrued taxes	**44**	64
Accrued compensation	**127**	126
Other current liabilities	**114**	106
Total current liabilities	**879**	918
Liabilities held for sale	**1**	—
Deferred liabilities and credits		
Deferred income tax liability, net	**640**	552
Other deferred liabilities and credits	**541**	495
Long-term debt, net	**2,418**	2,437
Commitments and contingencies		
Noncontrolling interests with redemption features	**11**	1
Equity		
TDS shareholders' equity		
Series A Common and Common Shares		
Authorized 290 shares (25 Series A Common and 265 Common Shares)		
Issued 133 shares (7 Series A Common and 126 Common Shares)		
Outstanding 114 shares (7 Series A Common and 107 Common Shares) and 111 shares (7 Series A Common and 104 Common Shares), respectively		
Par Value ($.01 per share)	**1**	1
Capital in excess of par value	**2,432**	2,413
Treasury shares, at cost, 19 and 22 Common Shares, respectively	**(519)**	(669)
Accumulated other comprehensive loss	**(10)**	(1)
Retained earnings	**2,656**	2,525
Total TDS shareholders' equity	**4,560**	4,269
Noncontrolling interests	**733**	623
Total equity	**5,293**	4,892
Total liabilities and equity [1]	**$ 9,783**	$ 9,295

The accompanying notes are an integral part of these consolidated financial statements.

1 The consolidated total assets as of December 31, 2018 and 2017, include assets held by consolidated variable interest entities (VIEs) of $ 848 million and $ 765 million, respectively, which are not available to be used to settle the obligations of TDS. The consolidated total liabilities as of December 31, 2018 and 2017, include certain liabilities of consolidated VIEs of $ 21 million for which the creditors of the VIEs have no recourse to the general credit of TDS. See Note 14 — Variable Interest Entities for additional information.

Telephone and Data Systems, Inc.
Consolidated Statement of Changes in Equity

	TDS Shareholders							
	Series A Common and Common shares	Capital in excess of par value	Treasury shares	Accumulated other comprehensive income (loss)	Retained earnings	Total TDS shareholders' equity	Noncontrolling interests	Total equity
(Dollars in millions, except per share amounts)								
December 31, 2017	**$ 1**	**$ 2,413**	**$ (669)**	**$ (1)**	**$ 2,525**	**$ 4,269**	**$ 623**	**$ 4,892**
Cumulative effect of accounting changes	—	—	—	(1)	165	164	31	195
Net income attributable to TDS shareholders	—	—	—	—	135	135	—	135
Net income attributable to noncontrolling interests classified as equity	—	—	—	—	—	—	28	28
Other comprehensive loss	—	—	—	(8)	—	(8)	—	(8)
TDS Common and Series A Common share dividends ($0.64 per share)	—	—	—	—	(72)	(72)	—	(72)
Dividend reinvestment plan	—	1	25	—	(14)	12	—	12
Incentive and compensation plans	—	—	125	—	(83)	42	—	42
Adjust investment in subsidiaries for repurchases, issuances and other compensation plans	—	1	—	—	—	1	54	55
Stock-based compensation awards	—	17	—	—	—	17	—	17
Distributions to noncontrolling interests	—	—	—	—	—	—	(3)	(3)
December 31, 2018	**$ 1**	**$ 2,432**	**$ (519)**	**$ (10)**	**$ 2,656**	**$ 4,560**	**$ 733**	**$ 5,293**

The accompanying notes are an integral part of these consolidated financial statements.

Telephone and Data Systems, Inc.
Consolidated Statement of Changes in Equity

	TDS Shareholders								
(Dollars in millions, except per share amounts)	Series A Common and Common shares	Capital in excess of par value	Treasury shares	Accumulated other comprehensive income (loss)	Retained earnings	Total TDS shareholders' equity	Preferred shares	Noncontrolling interests	Total equity
December 31, 2016	**$ 1**	**$ 2,386**	**$ (698)**	**$ 1**	**$ 2,454**	**$ 4,144**	**$ 1**	**$ 605**	**$ 4,750**
Net income attributable to TDS shareholders	—	—	—	—	153	153	—	—	153
Net income attributable to noncontrolling interests classified as equity	—	—	—	—	—	—	—	4	4
Other comprehensive loss	—	—	—	(2)	—	(2)	—	—	(2)
TDS Common and Series A Common Share dividends ($0.62 per share)	—	—	—	—	(69)	(69)	—	—	(69)
Redemption of Preferred shares	—	—	—	—	—	—	(1)	—	(1)
Dividend reinvestment plan	—	—	13	—	(1)	12	—	—	12
Incentive and compensation plans	—	—	16	—	(12)	4	—	—	4
Adjust investment in subsidiaries for repurchases, issuances and other compensation plans	—	13	—	—	—	13	—	18	31
Stock-based compensation awards	—	14	—	—	—	14	—	—	14
Distributions to noncontrolling interests	—	—	—	—	—	—	—	(4)	(4)
December 31, 2017	**$ 1**	**$ 2,413**	**$ (669)**	**$ (1)**	**$ 2,525**	**$ 4,269**	**$ —**	**$ 623**	**$ 4,892**

The accompanying notes are an integral part of these consolidated financial statements.

Telephone and Data Systems, Inc.
Consolidated Statement of Changes in Equity

	TDS Shareholders								
	Series A Common and Common shares	Capital in excess of par value	Treasury shares	Accumulated other comprehensive income	Retained earnings	Total TDS shareholders' equity	Preferred shares	Noncontrolling interests	Total equity
(Dollars in millions, except per share amounts)									
December 31, 2015	**$ 1**	**$ 2,365**	**$ (727)**	**$ —**	**$ 2,487**	**$ 4,126**	**$ 1**	**$ 577**	**$ 4,704**
Net income attributable to TDS shareholders	—	—	—	—	43	43	—	—	43
Net income attributable to noncontrolling interests classified as equity	—	—	—	—	—	—	—	9	9
Other comprehensive income	—	—	—	1	—	1	—	—	1
TDS Common and Series A Common Share dividends ($0.59 per share)	—	—	—	—	(65)	(65)	—	—	(65)
Repurchase of Common Shares	—	—	(3)	—	—	(3)	—	—	(3)
Dividend reinvestment plan	—	2	7	—	—	9	—	—	9
Incentive and compensation plans	—	(5)	25	—	(11)	9	—	—	9
Adjust investment in subsidiaries for repurchases, issuances and other compensation plans	—	7	—	—	—	7	—	20	27
Stock-based compensation awards	—	16	—	—	—	16	—	—	16
Tax windfall (shortfall) from stock awards	—	1	—	—	—	1	—	—	1
Distributions to noncontrolling interests	—	—	—	—	—	—	—	(1)	(1)
December 31, 2016	**$ 1**	**$ 2,386**	**$ (698)**	**$ 1**	**$ 2,454**	**$ 4,144**	**$ 1**	**$ 605**	**$ 4,750**

The accompanying notes are an integral part of these consolidated financial statements.

Telephone and Data Systems, Inc.
Notes to Consolidated Financial Statements

Note 1 Summary of Significant Accounting Policies and Recent Accounting Pronouncements

Nature of Operations

Telephone and Data Systems, Inc. (TDS) is a diversified telecommunications company providing high-quality communications services to customers with 5.0 million wireless connections and 1.2 million wireline and cable connections at December 31, 2018 . TDS conducts all of its wireless operations through its 82% -owned subsidiary, United States Cellular Corporation (U.S. Cellular). TDS provides wireline and cable services through its wholly-owned subsidiary, TDS Telecommunications LLC (TDS Telecom).

TDS has the following reportable segments: U.S. Cellular, Wireline, and Cable. TDS' non-reportable other business activities are presented as "Corporate, Eliminations and Other", which includes the operations of TDS' wholly-owned hosted and managed services (HMS) subsidiary, which operates under the OneNeck IT Solutions brand, and its wholly-owned printing subsidiary Suttle-Straus, Inc. (Suttle-Straus). HMS' and Suttle-Straus' financial results were not significant to TDS' operations. All of TDS' segments operate only in the United States, except for HMS, which includes an insignificant foreign operation. See Note 18 — Business Segment Information for summary financial information on each business segment.

Change in Reportable Segments

TDS re-evaluated internal reporting roles with regard to its HMS business unit and, as a result, changed its reportable segments. Effective January 1, 2018, HMS was considered a non-reportable segment and is no longer being reported under TDS Telecom. This change enables TDS Telecom to continue to successfully execute on the Wireline and Cable segments' shared strategy to be the preferred service provider in its markets. Additionally, this change allows HMS to leverage TDS' corporate IT resources, to improve operations and customer service, and better position itself for growth. Prior periods have been recast to conform to this revised presentation. See Note 18 — Business Segment Information for additional information on TDS' reportable segments.

Principles of Consolidation

The accounting policies of TDS conform to accounting principles generally accepted in the United States of America (GAAP) as set forth in the Financial Accounting Standards Board (FASB) Accounting Standards Codification (ASC). Unless otherwise specified, references to accounting provisions and GAAP in these notes refer to the requirements of the FASB ASC. The consolidated financial statements include the accounts of TDS and subsidiaries in which it has a controlling financial interest, including U.S. Cellular and TDS Telecom. In addition, the consolidated financial statements include certain entities in which TDS has a variable interest that requires consolidation under GAAP. See Note 14 — Variable Interest Entities for additional information relating to TDS' VIEs. All material intercompany accounts and transactions have been eliminated.

Use of Estimates

The preparation of consolidated financial statements in conformity with GAAP requires management to make estimates and assumptions that affect (a) the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and (b) the reported amounts of revenues and expenses during the reported period. Actual results could differ from those estimates. Significant estimates are involved in accounting for goodwill and indefinite-lived intangible assets, income taxes and equipment installment plans.

Cash, Cash Equivalents and Restricted Cash

Cash and cash equivalents include cash and highly liquid investments with original maturities of three months or less. Cash and cash equivalents subject to contractual restrictions are classified as restricted cash. The following table provides a reconciliation of Cash and cash equivalents and restricted cash reported in the Consolidated Balance Sheet to the total of the amounts in the Consolidated Statement of Cash Flows.

December 31,	**2018**	2017
(Dollars in millions)		
Cash and cash equivalents	**$ 921**	$ 619
Restricted cash included in Other current assets	**6**	3
Cash, cash equivalents and restricted cash in the statement of cash flows	**$ 927**	$ 622

Accounts Receivable and Allowance for Doubtful Accounts

U.S. Cellular's accounts receivable consist primarily of amounts owed by customers for wireless services and equipment sales, including sales of certain devices and accessories under installment plans, by agents for sales of equipment to them and by other wireless carriers whose customers have used U.S. Cellular's wireless systems.

TDS Telecom's accounts receivable primarily consist of amounts owed by customers for services and products provided, by state and federal governments for grants and support funds including Alternative Connect America Cost Model (A-CAM), and by interexchange carriers for long-distance traffic, which TDS Telecom carries on its network.

The allowance for doubtful accounts is the best estimate of the amount of probable credit losses related to existing billed and unbilled accounts receivable. The allowance is estimated based on historical experience, account aging and other factors that could affect collectability. Accounts receivable balances are reviewed on either an aggregate or individual basis for collectability depending on the type of receivable. When it is probable that an account balance will not be collected, the account balance is charged against the allowance for doubtful accounts. TDS does not have any off-balance sheet credit exposure related to its customers.

Inventory

Inventory consists primarily of wireless devices stated at the lower of cost, which approximates cost determined on the first-in first-out basis, or net realizable value. Net realizable value is determined by reference to the stand-alone selling price.

Licenses

Licenses consist of direct and incremental costs incurred in acquiring Federal Communications Commission (FCC) licenses to provide wireless service.

TDS has determined that wireless licenses are indefinite-lived intangible assets and, therefore, not subject to amortization based on the following factors:

- Radio spectrum is not a depleting asset.
- The ability to use radio spectrum is not limited to any one technology.
- TDS and its consolidated subsidiaries are licensed to use radio spectrum through the FCC licensing process, which enables licensees to utilize specified portions of the spectrum for the provision of wireless service.
- TDS and its consolidated subsidiaries are required to renew their FCC licenses every ten years or, in some cases, every twelve or fifteen years. To date, all of TDS' license renewal applications have been granted by the FCC. Generally, license renewal applications filed by licensees otherwise in compliance with FCC regulations are routinely granted. If, however, a license renewal application is challenged either by a competing applicant for the license or by a petition to deny the renewal application, the license will be renewed if the licensee can demonstrate its entitlement to a "renewal expectancy." Licensees are entitled to such an expectancy if they can demonstrate to the FCC that they have provided "substantial service" during their license term and have "substantially complied" with FCC rules and policies. TDS believes that it is probable that its future license renewal applications will be granted.

U.S. Cellular performs its annual impairment assessment of Licenses as of November 1 of each year or more frequently if there are events or circumstances that cause U.S. Cellular to believe the carrying value of Licenses exceeds their fair value on a more likely than not basis. For purposes of its impairment testing of Licenses, U.S. Cellular separated its FCC licenses into eight units of accounting. The eight units of accounting consisted of one unit of accounting for developed operating market licenses (built licenses) and seven geographic non-operating market licenses (unbuilt licenses).

U.S. Cellular performed a qualitative impairment assessment in 2018 and a quantitative impairment assessment in 2017 to determine whether the licenses were impaired. Based on the impairment assessments performed, U.S. Cellular did not have an impairment of its Licenses in 2018 or 2017 . See Note 7 — Intangible Assets for additional details related to Licenses.

Goodwill

TDS has Goodwill as a result of its acquisition of wireline and cable companies. TDS performs its annual impairment assessment of Goodwill as of November 1 of each year or more frequently if there are events or circumstances that cause TDS to believe the carrying value of individual reporting units exceeds their respective fair values on a more likely than not basis. Goodwill impairment loss will be measured as the amount by which a reporting unit's carrying amount exceeds its fair value. The loss recognized should not exceed the total amount of goodwill allocated to that reporting unit.

For purposes of conducting its Goodwill impairment tests, TDS Telecom identified two reporting units: Wireline and Cable. The discounted cash flow approach and guideline public company method were used to value the Wireline and Cable reporting units for the annual impairment tests. Based on the annual impairment assessments performed, Wireline and Cable did not have an impairment of their Goodwill in 2018 or 2017 .

In 2017, TDS recorded goodwill impairments related to its U.S. Cellular and HMS reporting units, which reduced the carrying value of their respective Goodwill to zero.

See Note 7 — Intangible Assets for additional details related to Goodwill.

Franchise Rights

TDS Telecom has franchise rights as a result of acquisitions of cable businesses. Franchise rights are intangible assets that provide their holder with the right to operate a business in a certain geographical location as sanctioned by the franchiser, usually a government agency. Franchise rights are generally granted for ten year periods and may be renewed for additional terms upon approval by the granting authority. TDS anticipates that future renewals of its franchise rights will be granted. Effective January 1, 2018, TDS prospectively changed its estimated useful life for franchise rights from indefinite-lived to 15 years , due primarily to the effects of increasing competition and advancements in technology for delivering and consuming video programming. Commensurate with this change, TDS reviewed its franchise rights for impairment, and noted there was no impairment as of January 1, 2018. As a result, Depreciation, amortization and accretion increased $17 million , calculated on a straight-line basis, and Net income decreased $13 million or $0.11 per share (Basic and Diluted) for the year ended December 31, 2018 . TDS reviews franchise rights for impairment whenever events or changes in circumstances indicate that the assets might be impaired. TDS re-evaluates the useful life of franchise rights each year to determine if changes in technology or other business changes would warrant a revision of its remaining useful life.

See Note 7 — Intangible Assets for additional details related to franchise rights.

Investments in Unconsolidated Entities

For its equity method investments for which financial information is readily available, TDS records its equity in the earnings of the entity in the current period. For its equity method investments for which financial information is not readily available, TDS records its equity in the earnings of the entity on a one quarter lag basis.

Property, Plant and Equipment

Property, plant and equipment is stated at the original cost of construction or purchase including capitalized costs of certain taxes, payroll-related expenses, interest and estimated costs to remove the assets.

Expenditures that enhance the productive capacity of assets in service or extend their useful lives are capitalized and depreciated. Expenditures for maintenance and repairs of assets in service are charged to Cost of services or Selling, general and administrative expense, as applicable. Retirements and disposals of assets are recorded by removing the original cost of the asset (along with the related accumulated depreciation) from plant in service and charging it, together with net removal costs (removal costs less an applicable accrued asset retirement obligation and salvage value realized), to (Gain) loss on asset disposals, net. Certain Wireline segment assets use the group depreciation method. Accordingly, when a group method asset is retired in the ordinary course of business, the original cost of the asset and accumulated depreciation in the same amount are removed, with no gain or loss recognized on the disposition.

TDS capitalizes certain costs of developing new information systems. Software licenses that qualify for capitalization as an asset are accounted for as the acquisition of an intangible asset and the incurrence of a liability to the extent that the license fees are not fully paid at acquisition.

Depreciation and Amortization

Depreciation is provided using the straight-line method over the estimated useful life of the related asset, except for certain Wireline segment assets, which use the group depreciation method. The group depreciation method develops a depreciation rate based on the average useful life of a specific group of assets, rather than each asset individually. TDS depreciates leasehold improvement assets associated with leased properties over periods ranging from one to thirty years; such periods approximate the shorter of the assets' economic lives or the specific lease terms.

Useful lives of specific assets are reviewed throughout the year to determine if changes in technology or other business changes would warrant accelerating the depreciation of those specific assets. There were no material changes to useful lives of property, plant and equipment in 2018 , 2017 or 2016 . See Note 9 — Property, Plant and Equipment for additional details related to useful lives.

Impairment of Long-Lived Assets

TDS reviews long-lived assets for impairment whenever events or changes in circumstances indicate that the assets might be impaired.

U.S. Cellular has one asset group for purposes of assessing property, plant and equipment for impairment based on the fact that the individual operating markets are reliant on centrally operated data centers, mobile telephone switching offices and a network operations center. U.S. Cellular operates a single integrated national wireless network. The cash flows generated by this single interdependent network represent the lowest level for which identifiable cash flows are largely independent of the cash flows of other groups of assets and liabilities.

TDS Telecom has two asset groups of Wireline and Cable for purposes of assessing property, plant and equipment for impairment based on their integrated network, assets and operations. The cash flows generated by each of these groups is the lowest level for which identifiable cash flows are largely independent of the cash flows of other groups of assets and liabilities.

Agent Liabilities

U.S. Cellular has relationships with agents, which are independent businesses that obtain customers for U.S. Cellular. At December 31, 2018 and 2017 , U.S. Cellular had accrued $59 million and $61 million , respectively, for amounts due to agents. These amounts are included in Other current liabilities in the Consolidated Balance Sheet.

Debt Issuance Costs

Debt issuance costs include underwriters' and legal fees and other charges related to issuing various borrowing instruments and other long–term agreements, and are amortized over the respective term of each instrument. Debt issuance costs related to TDS' and U.S. Cellular's revolving credit agreements and U.S. Cellular's receivables securitization agreement are recorded in Other assets and deferred charges in the Consolidated Balance Sheet. All other debt issuance costs are presented as an offset to the related debt obligation in the Consolidated Balance Sheet.

Asset Retirement Obligations

TDS accounts for asset retirement obligations by recording the fair value of a liability for legal obligations associated with an asset retirement in the period in which the obligations are incurred. At the time the liability is incurred, TDS records a liability equal to the net present value of the estimated cost of the asset retirement obligation and increases the carrying amount of the related long-lived asset by an equal amount. Until the obligation is fulfilled, TDS updates its estimates relating to cash flows required and timing of settlement. TDS records the present value of the changes in the future value as an increase or decrease to the liability and the related carrying amount of the long-lived asset. The liability is accreted to future value over a period ending with the estimated settlement date of the respective asset retirement obligation. The carrying amount of the long-lived asset is depreciated over the useful life of the related asset. Upon settlement of the obligation, any difference between the cost to retire the asset and the recorded liability is recognized in the Consolidated Statement of Operations. See Note 10 — Asset Retirement Obligations for additional information.

Treasury Shares

Common Shares repurchased by TDS are recorded at cost as treasury shares and result in a reduction of equity. When treasury shares are reissued, TDS determines the cost using the first-in, first-out cost method. The difference between the cost of the treasury shares and reissuance price is included in Capital in excess of par value or Retained earnings.

Revenue Recognition

Revenues from sales of equipment and products are recognized when control has transferred to the customer. Service revenues are recognized as the related service is provided.

See Note 2 — Revenue Recognition for additional information on TDS' policies related to Revenues.

Advertising Costs

TDS expenses advertising costs as incurred. Advertising costs totaled $230 million , $228 million and $263 million in 2018 , 2017 and 2016 , respectively.

Income Taxes

TDS files a consolidated federal income tax return. Deferred taxes are computed using the liability method, whereby deferred tax assets are recognized for future deductible temporary differences and operating loss carryforwards, and deferred tax liabilities are recognized for future taxable temporary differences. Both deferred tax assets and liabilities are measured using the enacted tax rates in effect when the temporary differences are expected to reverse. Temporary differences are the differences between the reported amounts of assets and liabilities and their tax bases. Deferred tax assets and liabilities are adjusted for the effects of changes in tax laws and rates on the date of enactment. Deferred tax assets are reduced by a valuation allowance when it is more likely than not that some portion or all of the deferred tax assets will not be realized. TDS evaluates income tax uncertainties, assesses the probability of the ultimate settlement with the applicable taxing authority and records an amount based on that assessment. Deferred taxes are reported as a net non-current asset or liability by jurisdiction. Any corresponding valuation allowance to reduce the amount of deferred tax assets is also recorded as non-current. See Note 5 — Income Taxes for additional information.

Stock-Based Compensation and Other Plans

TDS has established long-term incentive plans, dividend reinvestment plans, and a non-employee director compensation plan. The dividend reinvestment plan of TDS is not considered a compensatory plan and, therefore, recognition of compensation costs for grants made under this plan is not required. All other plans are considered compensatory plans; therefore, recognition of costs for grants made under these plans is required.

TDS recognizes stock compensation expense based upon the fair value of the specific awards granted using established valuation methodologies. The amount of stock compensation cost recognized on either a straight-line basis or graded attribution method is based on the portion of the award that is expected to vest over the requisite service period, which generally represents the vesting period. Stock-based compensation cost recognized has been reduced for estimated forfeitures. Forfeitures are estimated at the time of grant and revised, if necessary, in subsequent periods if actual forfeitures differ from those estimates. See Note 17 — Stock-Based Compensation for additional information.

Recently Adopted Accounting Pronouncements

In March 2017, the FASB issued Accounting Standards Update 2017-07, *Compensation - Retirement Benefits: Improving the Presentation of Net Periodic Pension Cost and Net Periodic Postretirement Benefit Cost* (ASU 2017-07). ASU 2017-07 requires TDS to report the service cost component in the same line item or items as other compensation costs arising from services rendered by the pertinent employees during the period. The other components of net periodic benefit cost must be presented separately from the service cost component and outside of Operating income in the Consolidated Statement of Operations. The new accounting standard also specifies that only the service cost component of net benefit cost is eligible for capitalization. TDS adopted ASU 2017-07 retrospectively on January 1, 2018, and prior periods have been recast to reflect ASU 2017-07. As a result of the adoption of ASU 2017-07, Selling, general and administrative expenses in 2017 and 2016 increased by $3 million from previously reported amounts, with a corresponding increase in Other, net in the Consolidated Statement of Operations. This change did no t have an impact on Income before income taxes, Net income, or Earnings per share in 2017 or 2016, nor did it have a cumulative impact to Retained earnings as of the date presented.

Recently Issued Accounting Pronouncements

In February 2016, the FASB issued Accounting Standards Update 2016-02, *Leases* (ASU 2016-02) and has since amended the standard with Accounting Standards Update 2018-01, *Leases: Land Easement Practical Expedient for Transition to Topic 842* , Accounting Standards Update 2018-10, *Codification Improvements to Topic 842, Leases* , Accounting Standards Update 2018-11, *Leases: Targeted Improvements,* and Accounting Standards Update 2018-20, *Leases: Narrow-Scope Improvements for Lessors* . ASU 2016-02, as amended, requires lessees to record a right-of-use asset and lease liability for almost all leases. This ASU does not substantially impact the lessor accounting model. However, some changes to the lessor accounting guidance were made to align with lessee accounting changes within ASC 842, *Leases* and certain key aspects of ASC 606, *Revenue from Contracts with Customers* . TDS will adopt ASU 2016-02, as amended, using a modified retrospective method on January 1, 2019. Under this method, a cumulative effect adjustment is recognized upon adoption and the guidance is applied prospectively. TDS elected transitional practical expedients for existing leases which eliminated the requirements to reassess existing lease classification and initial direct costs, and whether contracts contain leases. TDS also elected the practical expedient related to land easements that allows it to carry forward the accounting treatment for pre-existing land easement agreements. TDS has implemented new systems, processes and controls to adopt ASU 2016-02, as amended, and has implemented a new lease management and accounting system to assist in the application of the new standard. Nearly all of TDS' leases are classified as operating leases, although it does have a small number of finance leases. The adoption of ASU 2016-02, as amended, will add approximately $1.0 billion in right-of-use assets and approximately $1.1 billion in lease liabilities to the Consolidated Balance Sheet as of January 1, 2019, with the difference primarily representing accrued rent recognized prior to adoption. The adoption of ASU 2016-02 is not expected to have a material impact on TDS' results of operations in 2019.

In June 2016, the FASB issued Accounting Standards Update 2016-13, *Financial Instruments - Credit Losses: Measurement of Credit Losses on Financial Instruments* (ASU 2016-13). ASU 2016-13 requires entities to use a new forward-looking, expected loss model to estimate credit losses. It also requires additional disclosure relating to the credit quality of trade and other receivables, including information relating to management's estimate of credit allowances. TDS is required to adopt ASU 2016-13 on January 1, 2020, using the modified retrospective approach. Early adoption is permitted as of January 1, 2019; however, TDS does not intend to adopt early. TDS is evaluating the effects that adoption of ASU 2016-13 will have on its financial position, results of operations and disclosures.

In June 2018, the FASB issued Accounting Standards Update 2018-07 *, Compensation - Stock Compensation: Improvements to Nonemployee Share-Based Payment Accounting* (ASU 2018-07). ASU 2018-07 expands the scope of ASC 718, *Compensation—Stock Compensation* , which currently only includes share-based payments issued to employees, to also include share-based payments issued to nonemployees for goods and services. TDS is required to adopt ASU 2018-07 on January 1, 2019, using the modified retrospective approach. Early adoption is permitted. The adoption of ASU 2018-07 will not have an impact on TDS' financial position or results of operations.

In August 2018, the FASB issued Accounting Standards Update 2018-14, *Compensation - Retirement Benefits - Defined Benefit Plans - General: Disclosure Framework - Changes to the Disclosure Requirements for Defined Benefit Plans* (ASU 2018-14). ASU 2018-14 modifies the disclosure requirements for employers that sponsor defined benefit pension or other postretirement plans. The amendments in ASU 2018-14 were developed as part of the FASB's broader disclosure framework project, which aims to improve the effectiveness of disclosure requirements. TDS is required to adopt ASU 2018-14 retrospectively on January 1, 2020. Early adoption is permitted. The adoption of ASU 2018-14 will not impact TDS' financial position or results of operations. TDS is evaluating the effects that adoption of ASU 2018-14 will have on its disclosures.

In August 2018, the FASB issued Accounting Standards Update 2018-15, *Intangibles - Goodwill and Other - Internal-Use Software: Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That Is a Service Contract* (ASU 2018-15). ASU 2018-15 aligns the requirements for capitalizing implementation costs incurred in a hosting arrangement that is a service contract with the existing guidance for capitalizing implementation costs for an arrangement that has a software license. The service element of a hosting arrangement will continue to be expensed as incurred. Any capitalized implementation costs will be amortized over the period of the service contract. TDS is required to adopt ASU 2018-15 on January 1, 2020, either retrospectively or prospectively to eligible costs incurred on or after the date that this guidance is first applied. Early adoption is permitted. The adoption of ASU 2018-15 is not expected to have a significant impact on TDS' financial position or results of operations.

Note 2 Revenue Recognition

Change in Accounting Policy

In May 2014, the FASB issued Accounting Standards Update 2014-09, *Revenue from Contracts with Customers* and has since amended the standard with Accounting Standards Update 2015-14, *Revenue from Contracts with Customers: Deferral of the Effective Date* , Accounting Standards Update 2016-08, *Revenue from Contracts with Customers: Principal versus Agent Considerations* (Reporting Revenue Gross versus Net), Accounting Standards Update 2016-10, *Revenue from Contracts with Customers: Identifying Performance Obligations and Licensing* , Accounting Standards Update 2016-12, *Revenue from Contracts with Customers: Narrow-Scope Improvements and Practical Expedients* , and Accounting Standards Update 2016-20, *Technical Corrections and Improvements to Topic 606, Revenue from Contracts with Customers* , collectively referred to hereinafter as ASU 2014-09. These standards replace existing revenue recognition rules with a single comprehensive model to use in accounting for revenue arising from contracts with customers. In February 2017, the FASB issued Accounting Standards Update 2017-05, *Other Income – Gains and Losses from the Derecognition of Nonfinancial Assets: Clarifying the Scope of Asset Derecognition Guidance and Accounting for Partial Sales of Nonfinancial Assets* (ASU 2017-05). ASU 2017-05 clarifies how entities account for the derecognition of a nonfinancial asset and adds guidance for partial sales of nonfinancial assets. TDS adopted the provisions of ASU 2014-09 and ASU 2017-05 and applied them to all contracts as of January 1, 2018, using a modified retrospective method. Under this method, the new accounting standard is applied only to the most recent period presented, recognizing the cumulative effect of the accounting change as an adjustment to the beginning balance of retained earnings. Accordingly, prior periods have not been recast to reflect the new accounting standard. The cumulative effect of applying the provisions of ASU 2014-09 resulted in an increase of $164 million in retained earnings as of January 1, 2018. ASU 2017-05 had no impact to retained earnings as of January 1, 2018.

As a practical expedient, TDS groups similar contracts or similar performance obligations together into portfolios of contracts or performance obligations if doing so does not result in a significant difference from applying the new accounting standard to the individual contracts. TDS applies this grouping method for the following types of transactions: device activation fees, contract acquisition costs, contract fulfillment costs, and certain customer promotions. Contract portfolios will be recognized over the respective expected customer lives or terms of the contracts.

The line items impacted by the adoption of ASU 2014-09 and ASU 2017-05 in the Consolidated Statement of Operations and the Consolidated Balance Sheet are presented below.

Consolidated Statement of Operations

Year Ended December 31, 2018	Results under prior accounting standards	Adjustment	As reported
(Dollars in millions, except per share amounts)			
Operating revenues			
Service	$ 4,108	$ (109)	$ 3,999
Equipment and product sales	1,014	96	1,110
Total operating revenues	5,122	(13)	5,109
Cost of equipment and products	1,129	1	1,130
Selling, general and administrative	1,697	(3)	1,694
(Gain) loss on license sales and exchanges, net	(17)	(1)	(18)
Total operating expenses	4,907	(3)	4,904
Operating income (loss)	215	(10)	205
Income (loss) before income taxes	231	(10)	221
Income tax expense (benefit)	48	(2)	46
Net income	183	(8)	175
Less: Net income attributable to noncontrolling interests, net of tax	42	(2)	40
Net income attributable to TDS shareholders	141	(6)	135
Net income available to TDS common shareholders	141	(6)	135
Basic earnings per share available to TDS common shareholders	$ 1.25	$ (0.05)	$ 1.20
Diluted earnings per share available to TDS common shareholders	$ 1.22	$ (0.05)	$ 1.17

Numbers may not foot due to rounding.

The decrease in Service revenues and the increase in Equipment and product sales revenues are driven primarily by differences in the timing and classification of revenue recognized for certain arrangements with multiple performance obligations and ceasing to record deferred imputed interest and the resulting interest income on equipment installment contracts. Under prior accounting standards, revenues were allocated to deliverables using the relative selling price method, where consideration was allocated to each element on the basis of its relative selling price. Revenue recognized for the delivered items was limited to the amount due from the customer that was not contingent upon the delivery of additional products or services. Under ASU 2014-09, the revenue allocation of the transaction price is based on the relative standalone selling prices of the individual performance obligations in the customer's contract, and the resulting revenue attributable to each is recognized as control over the performance obligation is transferred to the customer. This has resulted in increased Equipment and product sales revenues as more revenue is allocated to discounted equipment than under prior accounting standards. Under prior accounting standards, TDS deferred imputed interest related to equipment installment plan receivable contracts that exceeded twelve months, and recognized the corresponding interest income over the contract period in Service revenues. Under the provisions of ASU 2014-09, TDS has determined that equipment installment plan contracts do not contain a significant financing component, and accordingly, TDS ceased recording deferred imputed interest and the resulting interest income on equipment installment contracts upon the adoption of ASU 2014-09.

Cost of equipment and products increased due to a change in timing of recognition of cost of goods sold in the agent channel. Under prior accounting standards, Equipment and product sales to agents and the related Cost of equipment and products were recognized when equipment was sold through from the agent to end user customers. In accordance with the provisions of ASU 2014-09, such amounts are recognized when TDS delivers the equipment to the agent. Fluctuations in Selling, general and administrative expenses are due to the capitalization and amortization of contract acquisition and contract fulfillment costs under ASU 2014-09.

Under ASU 2017-05, (Gain) loss on license sales and exchanges, net is calculated by subtracting the carrying amount of the distinct asset being disposed from the consideration measured and allocated to that distinct asset. With respect to license exchange transactions, the consideration, or transaction price, is the fair value of the licenses received. Under prior accounting standards, the transaction price was typically the fair value of the licenses surrendered.

Consolidated Balance Sheet

As of December 31, 2018	Results under prior accounting standards	Adjustment	As reported
(Dollars in millions)			
Accounts receivable			
Customers and agents, less allowances	$ 928	$ 64	$ 992
Prepaid expenses	128	(25)	103
Other current assets	24	4	28
Total current assets	2,286	44	2,330
Licenses	2,194	1	2,195
Investments in unconsolidated entities	463	17	480
Other assets and deferred charges	435	181	616
Total assets	9,540	243	9,783
Customer deposits and deferred revenues	218	(21)	197
Other current liabilities	110	4	114
Total current liabilities	895	(16)	879
Deferred income tax liability, net	583	57	640
Other deferred liabilities and credits	526	15	541
Retained earnings	2,499	157	2,656
Total TDS shareholders' equity	4,403	157	4,560
Noncontrolling interests	704	29	733
Total equity	5,107	186	5,293
Total liabilities and equity	$ 9,540	$ 243	$ 9,783

Numbers may not foot due to rounding.

As a result of adoption of ASU 2014-09, TDS recorded short-term and long-term contract assets and contract liabilities in its Consolidated Balance Sheet as of December 31, 2018 . Under ASU 2014-09, the timing of recognition of revenue for each performance obligation may differ from the timing of the customer billing, creating a contract asset or contract liability. See Contract Balances below for additional information. Contract assets are included in Other current assets if short-term in nature or Other assets and deferred charges if long-term in nature. Short-term contract liabilities are classified as Customer deposits and deferred revenues and long-term contract liabilities are included in Other deferred liabilities and credits. Accounts receivable increased as a result of TDS ceasing to record deferred imputed interest. Certain prepaid expenses decreased due to a change in timing of recognition of sales of equipment to agents. Investments in unconsolidated entities increased due to the cumulative effect of applying the provisions of ASU 2014-09 to certain of TDS' equity method investments as of January 1, 2018. Deferred income tax liabilities, net, increased due to the provisions of ASU 2014-09 increasing the net basis of assets on a U.S. GAAP basis, without a corresponding increase in tax basis. Contract cost assets have also been created as a result of ASU 2014-09 due to capitalization of fulfillment costs and costs to obtain a new contract. See Contract Cost Assets below for additional information.

Nature of goods and services

The following is a description of principal activities from which TDS generates its revenues.

Services and products	Nature, timing of satisfaction of performance obligations, and significant payment terms
Wireless services	Wireless service includes voice, messaging and data services. Revenue is recognized in Service revenues as wireless service is provided to the customer. Wireless services generally are billed and paid in advance on a monthly basis.
Wireless devices and accessories	U.S. Cellular offers a comprehensive range of wireless devices such as handsets, tablets, mobile hotspots, home phones and routers for use by its customers, as well as accessories. U.S. Cellular also sells wireless devices to agents and other third-party distributors for resale. U.S. Cellular frequently discounts wireless devices sold to new and current customers. U.S. Cellular also offers customers the option to purchase certain devices and accessories under installment contracts over a specified time period. For certain equipment installment plans, after a specified period of time, the customer may have the right to upgrade to a new device. Such upgrades require the customer to enter into an equipment installment contract for the new device, and transfer the existing device to U.S. Cellular. U.S. Cellular recognizes revenue in Equipment and product sales revenues when control of the device or accessory is transferred to the customer, which is generally upon delivery.
Wireless roaming	U.S. Cellular receives roaming revenues when other wireless carriers' customers use U.S. Cellular's wireless systems. U.S. Cellular recognizes revenue in Service revenues when the roaming service is provided to the other carrier's customer.
Wireless Eligible Telecommunications Carrier (ETC) Revenues	Telecommunications companies may be designated by states, or in some cases by the FCC, as an ETC to receive support payments from the Universal Service Fund if they provide specified services in "high cost" areas. ETC revenues recognized in the reporting period represent the amounts which U.S. Cellular is entitled to receive for such period, as determined and approved in connection with U.S. Cellular's designation as an ETC in various states.
Wireless tower rents	U.S. Cellular receives tower rental revenues when another carrier leases tower space on a U.S. Cellular owned tower. U.S. Cellular recognizes revenue in Service revenues in the period during which the services are provided.
Activation fees	TDS charges its end customers activation fees in connection with the sale of certain services and equipment. Activation fees are deferred and recognized over the period benefitted.
Wireline services	Wireline services include broadband, video and voice services. Revenue is recognized in Service revenues as service is provided to the customer. Wireline services are generally billed and paid in advance on a monthly basis.
Wireline wholesale revenues	Wholesale revenues include network access services primarily to interexchange and wireless carriers for carrying data and voice traffic on TDS Telecom's network, special access services and state and federal support payments, including A-CAM. Wholesale revenues are recorded as the related service is provided.
Cable services	Cable services include broadband, video and voice services. Revenue is recognized in Service revenues as service is provided to the customer. Cable services are generally billed and paid in advance on a monthly basis.
IT hardware sales	TDS recognizes equipment revenue when it no longer has any requirements to perform, when title has passed and when the products are accepted by the customer.
Hosted and managed services	HMS Service revenues consist of cloud and hosting solutions, managed services, Enterprise Resource Planning (ERP) application management, colocation services, and IT hardware related maintenance and professional services. Revenues related to these services are recognized as services are provided.

Significant Judgments

Revenues from sales of equipment and products are recognized when control has transferred to the customer. Service revenues are recognized as the related service is provided. Services are deemed to be highly interrelated when the method and timing of transfer and performance risk are the same. Highly interrelated services that are determined to not be distinct have been grouped into a single performance obligation. Each month of services promised is a performance obligation. The series of monthly service performance obligations promised over the course of the contract are combined into a single performance obligation for purposes of the allocation.

TDS has made judgments regarding transaction price, including but not limited to issues relating to variable consideration, time value of money and returns. When determined to be significant in the context of the contract, these items are considered in the valuation of transaction price at contract inception or modification, as appropriate.

Multiple Performance Obligations

U.S. Cellular and TDS Telecom sell bundled service and equipment offerings. In these instances, TDS recognizes its revenue based on the relative standalone selling prices for each distinct service or equipment performance obligation, or bundles thereof. TDS estimates the standalone selling price of the device or accessory to be its retail price excluding discounts. TDS estimates the standalone selling price of wireless service to be the price offered to customers on month-to-month contracts.

Equipment Installment Plans

U.S. Cellular equipment revenue under equipment installment plan contracts is recognized at the time the device is delivered to the customer for the amount allocated to the equipment under ASU 2014-09.

Incentives

Discounts and incentives that are deemed cash are recognized as a reduction of Operating revenues concurrently with the associated revenue.

U.S. Cellular issues rebates to its agents and end customers. These incentives are recognized as a reduction to revenue at the time the corresponding revenue is recognized. The total potential rebates and incentives are reduced by U.S. Cellular’s estimate of rebates that will not be redeemed by customers based on historical experience of such redemptions.

From time to time, U.S. Cellular may offer certain promotions to incentivize customers to switch to, or to purchase additional services from, U.S. Cellular. Under these types of promotions, an eligible customer may receive an incentive in the form of a discount off additional services purchased shown as a rebate or credit to the customer’s monthly bill. U.S. Cellular accounts for the future discounts as material rights at the time of the initial transaction by allocating and deferring a portion of service and equipment revenue based on the relative proportion of the future discounts in comparison to the aggregate initial purchase. The deferred revenue will be recognized as service revenue in future periods.

Amounts Collected from Customers and Remitted to Governmental Authorities

TDS records amounts collected from customers and remitted to governmental authorities on a net basis within a tax liability account if the tax is assessed upon the customer and TDS merely acts as an agent in collecting the tax on behalf of the imposing governmental authority. If the tax is assessed upon TDS, then amounts collected from customers as recovery of the tax are recorded in Service revenues and amounts remitted to governmental authorities are recorded in Selling, general and administrative expenses in the Consolidated Statement of Operations. The amounts recorded gross in revenues that are billed to customers and remitted to governmental authorities totaled $90 million , $80 million and $85 million for 2018 , 2017 and 2016 , respectively.

Disaggregation of Revenue

In the following table, revenue is disaggregated by type of service and timing of revenue recognition. Service revenues are recognized over time and Equipment sales are point in time.

		TDS Telecom				
Year Ended December 31, 2018	**U.S. Cellular**	**Wireline**	**Cable**	**TDS Telecom Total**	**Corporate, Eliminations and Other**	**Total**
(Dollars in millions)						
Revenues from contracts with customers:						
Type of service:						
Retail service	$ 2,623	$ —	$ —	$ —	$ —	$ 2,623
Inbound roaming	154	—	—	—	—	154
Residential	—	321	188	509	—	509
Commercial	—	184	42	226	—	226
Wholesale	—	191	—	191	—	191
Other service	135	—	—	(1)	72	206
Service revenues from contracts with customers	2,912	696	230	925	72	3,909
Equipment and product sales	989	2	—	2	119	1,110
Total revenues from contracts with customers [1]	$ 3,901	$ 698	$ 230	$ 927	$ 191	$ 5,019

Numbers may not foot due to rounding.

1 These amounts do not include revenues outside the scope of ASU 2014-09; therefore, revenue line items in this table will not agree to amounts presented in the Consolidated Statement of Operations.

Contract Balances

For contracts that involve multiple element service and equipment offerings, the transaction price is allocated to each performance obligation based on its relative standalone selling price. When payment is collected in advance of delivery of goods or services, a contract liability is recorded. A contract asset is recorded when revenue is recognized in advance of TDS' right to receive consideration. Once there is an unconditional right to receive the consideration, TDS bills the customer under the terms of the respective contract and the amounts are recorded as receivables.

TDS recognizes Equipment and product sales revenue when the equipment is delivered to the customer and a corresponding contract asset or liability is recorded for the difference between the amount of revenue recognized and the amount billed to the customer in cases where discounts are offered. The contract asset or liability is reduced over the contract term as service is provided and billed to the customer.

The accounts receivable balance related to amounts billed and not paid on contracts with customers, net of allowances, is shown in the table below. Bad debts expense recognized for the year ended December 31, 2018 , related to receivables was $100 million .

	December 31, 2018
(Dollars in millions)	
Accounts receivable	
Customer and agents	$ 987
Other	73
Total [1]	$ 1,060

1 These amounts do not include accounts receivable related to revenues outside the scope of ASU 2014-09; therefore, accounts receivable line items presented in this table will not agree to amounts presented in the Consolidated Balance Sheet.

The following table provides a rollforward of contract assets from contracts with customers, which are recorded in Other current assets and Other assets and deferred charges in the Consolidated Balance Sheet.

	Contract Assets
(Dollars in millions)	
Balance at December 31, 2017	$ —
Change in accounting policy	28
Contract additions	24
Terminated contracts	(1)
Reclassified to receivables	(40)
Balance at December 31, 2018	$ 11

The following table provides a rollforward of contract liabilities from contracts with customers, which are recorded in Customer deposits and deferred revenues and Other deferred liabilities and credits in the Consolidated Balance Sheet.

	Contract Liabilities
(Dollars in millions)	
Balance at December 31, 2017	$ —
Change in accounting policy - Deferred revenues reclassification [1]	209
Change in accounting policy - Retained earnings impact	(22)
Contract additions	190
Terminated contracts	(2)
Revenue recognized	(172)
Balance at December 31, 2018	$ 203

1 This amount represents TDS' obligation to transfer goods or services to customers for which it had received payment and classified as deferred revenue at December 31, 2017.

Transaction price allocated to the remaining performance obligations

The following table includes estimated service revenue expected to be recognized in the future related to performance obligations that are unsatisfied (or partially unsatisfied) at the end of the reporting period. The estimates represent service revenue to be recognized when services are delivered to customers pursuant to service plan contracts. These estimates are based on contracts in place as of December 31, 2018 , and may vary from actual results due to future contract modifications. As a practical expedient, revenue related to contracts of less than one year, generally month-to-month contracts, are excluded from these estimates.

	Service Revenue
(Dollars in millions)	
2019	$ 411
2020	128
Thereafter	72
Total	$ 611

TDS has certain contracts at U.S. Cellular and TDS Telecom in which it bills an amount equal to a fixed per-unit price multiplied by a variable quantity (e.g., roaming agreements with other carriers). Because TDS invoices for such items in an amount that corresponds directly with the value of the performance completed to date, TDS may recognize revenue in that amount. As a practical expedient, these contracts are excluded from the estimate of future revenues expected to be recognized related to performance obligations that are unsatisfied as of the end of a reporting period.

Contract Cost Assets

TDS expects that incremental commission fees paid as a result of obtaining contracts are recoverable and therefore TDS capitalizes these costs. As a practical expedient, costs with an amortization period of one year or less are not capitalized. TDS also incurs fulfillment costs, such as installation costs, where there is an expectation that a future benefit will be realized. Capitalized commission fees and fulfillment costs are amortized based on the transfer of the goods or services to which the assets relate, typically the contract term which ranges from fourteen months to five years. Contract cost asset balances, which are recorded in Other assets and deferred charges in the Consolidated Balance Sheet, were as follows:

	December 31, 2018
(Dollars in millions)	
Costs to obtain contracts	
Sales commissions	$ 154
Fulfillment costs	
Installation costs	10
Total contract cost assets	$ 164

Amortization of contract cost assets was $124 million for the year ended December 31, 2018 , and was included in Selling, general and administrative expense. There was no impairment loss recognized for the year ended December 31, 2018 , related to contract cost assets.

Note 3 Fair Value Measurements

As of December 31, 2018 and 2017 , TDS did not have any material financial or nonfinancial assets or liabilities that were required to be recorded at fair value in its Consolidated Balance Sheet in accordance with GAAP.

The provisions of GAAP establish a fair value hierarchy that contains three levels for inputs used in fair value measurements. Level 1 inputs include quoted market prices for identical assets or liabilities in active markets. Level 2 inputs include quoted market prices for similar assets and liabilities in active markets or quoted market prices for identical assets and liabilities in inactive markets. Level 3 inputs are unobservable. A financial instrument’s level within the fair value hierarchy is based on the lowest level of any input that is significant to the fair value measurement. A financial instrument’s level within the fair value hierarchy is not representative of its expected performance or its overall risk profile and, therefore, Level 3 assets are not necessarily higher risk than Level 2 assets or Level 1 assets.

TDS has applied the provisions of fair value accounting for purposes of computing the fair value of financial instruments for disclosure purposes as displayed below.

	Level within the Fair Value Hierarchy	December 31, 2018		December 31, 2017	
		Book Value	Fair Value	Book Value	Fair Value
(Dollars in millions)					
Cash and cash equivalents	1	$ 921	$ 921	$ 619	$ 619
Short-term investments	1	17	17	100	100
Long-term debt					
Retail	2	1,753	1,596	1,753	1,783
Institutional	2	534	531	534	522
Other	2	182	182	194	194

The fair values of Cash and cash equivalents and Short-term investments approximate their book values due to the short-term nature of these financial instruments. Long-term debt excludes capital lease obligations, other installment arrangements, the current portion of Long-term debt and debt financing costs. The fair value of “Retail” Long-term debt was estimated using market prices for TDS’ 7.0% Senior Notes, 6.875% Senior Notes, 6.625% Senior Notes and 5.875% Senior Notes, and U.S. Cellular’s 7.25% 2063 Senior Notes, 7.25% 2064 Senior Notes and 6.95% Senior Notes. TDS’ “Institutional” debt consists of U.S. Cellular’s 6.7% Senior Notes which are traded over the counter. TDS’ “Other” debt consists of a senior term loan credit agreement and other borrowings with financial institutions. TDS estimated the fair value of its Institutional and Other debt through a discounted cash flow analysis using the interest rates or estimated yield to maturity for each borrowing, which ranged from 5.03% to 8.00% and 4.74% to 7.13% at December 31, 2018 and 2017 , respectively.

Note 4 Equipment Installment Plans

TDS sells devices to customers under equipment installment plans over a specified time period. For certain equipment installment plans, after a specified period of time or amount of payments, the customer may have the right to upgrade to a new device and have the remaining unpaid equipment installment contract balance waived, subject to certain conditions, including trading in the original device in good working condition and signing a new equipment installment contract. TDS values this trade-in right as a guarantee liability. The guarantee liability is initially measured at fair value and is determined based on assumptions including the probability and timing of the customer upgrading to a new device and the fair value of the device being traded-in at the time of trade-in. When a customer exercises the trade-in option, both the outstanding receivable and guarantee liability balances related to the respective device are reduced to zero, and the value of the used device that is received in the transaction is recognized as inventory. If the customer does not exercise the trade-in option at the time of eligibility, TDS begins amortizing the liability and records this amortization as additional equipment revenue. As of December 31, 2018 and 2017 , the guarantee liability related to these plans was $11 million and $15 million , respectively, and is reflected in Customer deposits and deferred revenues in the Consolidated Balance Sheet.

The following table summarizes equipment installment plan receivables as of December 31, 2018 and 2017 .

December 31,	**2018**	2017
(Dollars in millions)		
Equipment installment plan receivables, gross	**$ 974**	$ 873
Deferred interest	**—**	(80)
Equipment installment plan receivables, net of deferred interest	**974**	793
Allowance for credit losses	**(70)**	(65)
Equipment installment plan receivables, net	**$ 904**	$ 728
Net balance presented in the Consolidated Balance Sheet as:		
Accounts receivable — Customers and agents (Current portion)	**$ 565**	$ 428
Other assets and deferred charges (Non-current portion)	**339**	300
Equipment installment plan receivables, net	**$ 904**	$ 728

TDS uses various inputs, including internal data, information from credit bureaus and other sources, to evaluate the credit profiles of its customers. From this evaluation, a credit class is assigned to the customer that determines the number of eligible lines, the amount of credit available, and the down payment requirement, if any. Customers assigned to credit classes requiring no down payment represent a lower risk category, whereas those assigned to credit classes requiring a down payment represent a higher risk category. The balance and aging of the equipment installment plan receivables on a gross basis by credit category were as follows:

	December 31, 2018			December 31, 2017		
	Lower Risk	**Higher Risk**	**Total**	Lower Risk	Higher Risk	Total
(Dollars in millions)						
Unbilled	**$ 904**	**$ 17**	**$ 921**	$ 807	$ 20	$ 827
Billed — current	**35**	**1**	**36**	31	1	32
Billed — past due	**15**	**2**	**17**	12	2	14
Equipment installment plan receivables, gross	**$ 954**	**$ 20**	**$ 974**	$ 850	$ 23	$ 873

The activity in the allowance for credit losses for equipment installment plan receivables was as follows:

	2018	2017
(Dollars in millions)		
Allowance for credit losses, beginning of year	**$ 65**	$ 50
Bad debts expense	**64**	62
Write-offs, net of recoveries	**(59)**	(47)
Allowance for credit losses, end of year	**$ 70**	$ 65

T DS recorded out-of-period adjustments in 2016 due to errors related to equipment installment plan transactions occurring in 2015. These adjustments had the impact of increasing Equipment and product sales revenues by $2 million , decreasing bad debts expense, which is a component of Selling, general and administrative expense, by $2 million and increasing Income before income taxes by $4 million in 2016.

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Note 5 Income Taxes

TDS' current income taxes balances at December 31, 2018 and 2017 , were as follows:

December 31,	2018	2017
(Dollars in millions)		
Federal income taxes receivable (payable)	**$ 6**	$ (17)
Net state income taxes receivable	**6**	2

Income tax expense (benefit) is summarized as follows:

Year Ended December 31,	2018	2017	2016
(Dollars in millions)			
Current			
Federal	**$ 10**	$ 77	$ 17
State	**3**	13	1
Deferred			
Federal	**24**	(366)	20
State	**9**	(3)	2
Total income tax expense (benefit)	**$ 46**	$ (279)	$ 40

In December 2017, the Tax Act was signed into law. Following the guidance of the FASB's Accounting Standards Update 2018-05, *Income Taxes: Amendments to SEC Paragraphs Pursuant to SEC Staff Accounting Bulletin No. 118* , Income tax expense (benefit) for the year ended December 31, 2017, included a provisional estimate for the impact of the Tax Act on TDS' 2017 depreciation deduction. During 2018, TDS completed a full analysis of depreciation deductions related to fixed assets placed in service during 2017 and Income tax expense (benefit) for 2018 included a benefit of $4 million related to this adjustment.

A reconciliation of TDS' income tax expense computed at the statutory rate to the reported income tax expense, and the statutory federal income tax expense rate to TDS' effective income tax expense rate is as follows:

Year Ended December 31,	2018		2017		2016	
	Amount	**Rate**	Amount	Rate	Amount	Rate
(Dollars in millions)						
Statutory federal income tax expense and rate	**$ 46**	**21.0 %**	$ (43)	35.0 %	$ 32	35.0 %
State income taxes, net of federal benefit [1]	**11**	**4.9**	6	(5.2)	2	2.5
Effect of noncontrolling interests	**(1)**	**(0.4)**	(2)	1.7	(1)	(0.8)
Federal income tax rate change [2]	**(16)**	**(7.1)**	(314)	257.5	—	—
Change in federal valuation allowance [3]	**(1)**	**(0.3)**	(5)	4.3	2	2.6
Goodwill impairment [4]	**—**	**—**	71	(58.2)	—	—
Nondeductible compensation	**9**	**4.1**	10	(8.1)	3	2.7
Other differences, net	**(2)**	**(1.2)**	(2)	2.1	2	1.2
Total income tax expense (benefit) and rate	**$ 46**	**21.0 %**	$ (279)	229.1 %	$ 40	43.2 %

1 State income taxes, net of federal benefit, include changes in unrecognized tax benefits as well as adjustments to the valuation allowance.

2 Federal income tax rate change due to the Tax Act reducing the federal income tax rate from 35% to 21% resulting in a tax benefit in 2018 due primarily to an income tax accounting method change that accelerated tax depreciation on certain assets for the 2017 tax year. The $314 million tax benefit in 2017 related to adjusting the deferred tax liability to the lower tax rate upon enactment of the Tax Act.

3 Change in federal valuation allowance in 2018 includes a change in judgment related to net operating loss carryforwards that are now realizable due to an internal restructuring, offset by current year interest expense carryforwards not expected to be realized.

4 Goodwill impairment reflects an adjustment to increase 2017 income tax expense by $71 million related to a portion of the impaired goodwill that is not amortizable for income tax purposes. See Note 7 — Intangible Assets for additional information related to the goodwill impairment.

Significant components of TDS' deferred income tax assets and liabilities at December 31, 2018 and 2017 , were as follows:

December 31,	2018	2017
(Dollars in millions)		
Deferred tax assets		
Net operating loss (NOL) carryforwards	$ 159	$ 167
Stock-based compensation	31	42
Compensation and benefits - other	8	9
Deferred rent	22	21
Other	90	70
Total deferred tax assets	310	309
Less valuation allowance	(135)	(147)
Net deferred tax assets	175	162
Deferred tax liabilities		
Property, plant and equipment	390	368
Licenses/intangibles	237	221
Partnership investments	134	123
Other	54	—
Total deferred tax liabilities	815	712
Net deferred income tax liability	$ 640	$ 550
Presented in the Consolidated Balance Sheet as:		
Deferred income tax liability, net	$ 640	$ 552
Other assets and deferred charges	—	(2)
Net deferred income tax liability	$ 640	$ 550

At December 31, 2018 , TDS and certain subsidiaries had $2,843 million of state NOL carryforwards (generating a $146 million deferred tax asset) available to offset future taxable income. The state NOL carryforwards expire between 2019 and 2038 . Certain subsidiaries had federal NOL carryforwards (generating a $13 million deferred tax asset) available to offset their future taxable income. The federal NOL carryforwards generally expire between 2019 and 2037 , with the exception of federal NOLs generated after 2017, which do not expire. A valuation allowance was established for certain state NOL carryforwards and federal NOL carryforwards since it is more likely than not that a portion of such carryforwards will expire before they can be utilized.

A summary of TDS' deferred tax asset valuation allowance is as follows:

	2018	2017	2016
(Dollars in millions)			
Balance at beginning of year	$ 147	$ 122	$ 113
Charged to income tax expense	(5)	25	9
Charged to Retained earnings	(7)	—	—
Balance at end of year	$ 135	$ 147	$ 122

A reconciliation of the beginning and ending amount of unrecognized tax benefits is as follows:

	2018	2017	2016
(Dollars in millions)			
Unrecognized tax benefits balance at beginning of year	$ 46	$ 42	$ 39
Additions for tax positions of current year	8	6	11
Additions for tax positions of prior years	2	1	3
Reductions for tax positions of prior years	(1)	(1)	(1)
Reductions for lapses in statutes of limitations	(6)	(2)	(10)
Unrecognized tax benefits balance at end of year	$ 49	$ 46	$ 42

Unrecognized tax benefits are included in Accrued taxes and Other deferred liabilities and credits in the Consolidated Balance Sheet. If these benefits were recognized, they would have reduced income tax expense in 2018 , 2017 and 2016 by $39 million , $37 million and $28 million , respectively, net of the federal benefit from state income taxes.

TDS recognizes accrued interest and penalties related to unrecognized tax benefits in Income tax expense (benefit). The amounts charged to income tax expense related to interest and penalties resulted in an expense of less than $1 million in 2018 , an expense of $3 million in 2017 and a benefit of $1 million in 2016 . Net accrued liabilities for interest and penalties were $19 million and $19 million at December 31, 2018 and 2017 , respectively, and are included in Other deferred liabilities and credits in the Consolidated Balance Sheet.

TDS and its subsidiaries file federal and state income tax returns. With only limited exceptions, TDS is no longer subject to federal and state income tax audits for the years prior to 2013 .

Note 6 Earnings Per Share

Basic earnings per share available to TDS common shareholders is computed by dividing Net income available to TDS common shareholders by the weighted average number of common shares outstanding during the period. Diluted earnings per share available to TDS common shareholders is computed by dividing Net income available to TDS common shareholders by the weighted average number of common shares outstanding during the period adjusted to include the effects of potentially dilutive securities. Potentially dilutive securities primarily include incremental shares issuable upon the exercise of outstanding stock options and the vesting of performance and restricted stock units.

The amounts used in computing earnings per common share and the effects of potentially dilutive securities on the weighted average number of common shares were as follows:

Year Ended December 31,	**2018**	2017	2016
(Dollars and shares in millions, except per share amounts)			
Basic earnings per share available to TDS common shareholders:			
Net income available to TDS common shareholders used in basic earnings per share	**$ 135**	$ 153	$ 43
Adjustments to compute diluted earnings:			
Noncontrolling interest adjustment	**(2)**	—	—
Net income available to TDS common shareholders in diluted earnings per share	**$ 133**	$ 153	$ 43
Weighted average number of shares used in basic earnings per share:			
Common Shares	**105**	104	103
Series A Common Shares	**7**	7	7
Total	**112**	111	110
Effects of dilutive securities	**2**	1	1
Weighted average number of shares used in diluted earnings per share	**114**	112	111
Basic earnings per share available to TDS common shareholders	**$ 1.20**	$ 1.39	$ 0.39
Diluted earnings per share available to TDS common shareholders	**$ 1.17**	$ 1.37	$ 0.39

Certain Common Shares issuable upon the exercise of stock options, vesting of performance and restricted stock units or conversion of preferred shares were not included in average diluted shares outstanding for the calculation of Diluted earnings per share available to TDS common shareholders because their effects were antidilutive. The number of such Common Shares excluded was 3 million shares, 4 million shares and 4 million shares for 2018 , 2017 , and 2016 , respectively.

Note 7 Intangible Assets

Information related to TDS' Licenses, Goodwill and Other intangible assets is presented below. Prior to 2009, TDS accounted for U.S. Cellular's share repurchases as step acquisitions, allocating a portion of the share repurchase value to TDS' Licenses and Goodwill. Further, a goodwill impairment loss on the U.S. Cellular reporting unit was recognized in 2003 at TDS but not at U.S. Cellular. Consequently, U.S. Cellular's Licenses and Goodwill on a stand-alone basis do not equal the TDS consolidated Licenses and Goodwill related to U.S. Cellular.

Licenses

On occasion, TDS reviews attractive opportunities to acquire additional wireless spectrum, including pursuant to FCC auctions. TDS also may seek to divest outright or include in exchanges wireless spectrum that is not strategic to its long-term success. Activity related to TDS' Licenses is presented below.

(Dollars in millions)	U.S. Cellular	Wireline	Cable	Total
Balance at December 31, 2016	$ 1,890	$ 2	$ 3	$ 1,895
Acquisitions	331	—	—	331
Transferred to Assets held for sale	(10)	—	—	(10)
Exchanges - Licenses received	25	—	—	25
Exchanges - Licenses surrendered	(9)	—	—	(9)
Balance at December 31, 2017	2,227	2	3	2,232
Acquisitions	8	—	—	8
Transferred to Assets held for sale [1]	(51)	—	—	(51)
Divestitures	(11)	—	—	(11)
Exchanges - Licenses received	18	—	—	18
Exchanges - Licenses surrendered	(1)	—	—	(1)
Balance at December 31, 2018	$ 2,190	$ 2	$ 3	$ 2,195

1 Licenses classified as Assets held for sale in 2018 are included in transactions which closed in the first quarter of 2019.

Auction 1002

In July 2016, the FCC announced U.S. Cellular as a qualified bidder in the FCC's forward auction of 600 MHz spectrum licenses, referred to as Auction 1002. Prior to commencement of the forward auction, U.S. Cellular made an upfront payment to the FCC of $143 million in June 2016 to establish its initial bidding eligibility. In April 2017, the FCC announced by way of public notice that U.S. Cellular was the winning bidder for 188 licenses for an aggregate purchase price of $329 million . U.S. Cellular paid the remaining $186 million to the FCC and was granted the licenses during the second quarter of 2017.

Goodwill

Activity related to TDS' Goodwill is presented below.

(Dollars in millions)	U.S. Cellular	Wireline	Cable	Other	Total
Balance at December 31, 2016	$ 227	$ 409	$ 95	$ 35	$ 766
Acquisitions	—	—	5	—	5
Loss on impairment	(227)	—	—	(35)	(262)
Balance at December 31, 2017	—	409	100	—	509
Other	—	—	—	—	—
Balance at December 31, 2018	$ —	$ 409	$ 100	$ —	$ 509

Accumulated impairment losses in prior periods were $334 million for U.S. Cellular, $29 million for Wireline, and $88 million for Other.

Goodwill Interim Impairment Assessment

U.S. Cellular

Based on 2017 developments, including wireless expansion plans announced by other companies and the results of the FCC's forward auction of 600 MHz spectrum licenses and other FCC actions, U.S. Cellular anticipated increased competition for customers in its primary operating markets from new and existing market participants over the long term. In addition, the widening adoption of unlimited data plans and other data pricing constructs across the industry, including U.S. Cellular's introduction of unlimited plans in 2017, may limit the industry's ability to monetize future growth in data usage. These factors when assessed and considered as part of U.S. Cellular's annual planning process conducted in the third quarter of each year caused management to revise its long-range financial forecast in the third quarter of 2017. Based on the factors noted above, management identified a triggering event and performed a quantitative goodwill impairment test on an interim basis.

TDS used a one-step quantitative approach that compared the fair value of the U.S. Cellular reporting unit to its carrying value. A discounted cash flow approach was used to value the reporting unit, using value drivers and risks specific to U.S. Cellular and the industry and current economic factors. The cash flow estimates incorporated certain assumptions that market participants would use in their estimates of fair value and may not be indicative of U.S. Cellular specific assumptions. However, the discount rate used in the analysis considers any additional risk a market participant might place on integrating the U.S. Cellular reporting unit into its operations.

The results of the interim goodwill impairment test indicated that the carrying value of the U.S. Cellular reporting unit exceeded its fair value. Therefore, TDS recognized a loss on impairment of goodwill of $227 million to reduce the carrying value of goodwill for the U.S. Cellular reporting unit to zero in the third quarter of 2017.

Other

During the third quarter of 2017, due to slower than expected service revenue growth and revenue mix trending towards a higher proportion of lower margin revenue streams, management identified a triggering event related to its HMS operations and performed a quantitative goodwill impairment test on an interim basis.

TDS used a one-step quantitative approach that compared the fair value of its HMS operations to the carrying value. TDS used the discounted cash flow approach and guideline public company method to value the HMS operations. The discounted cash flow approach uses value drivers and considers risks specific to the industry as well as current economic factors. The guideline public company method develops an indication of fair value by calculating average market pricing multiples for selected publicly-traded companies. The developed multiples were applied to applicable financial measures of the HMS operations to determine fair value. The discounted cash flow approach and guideline public company method were weighted to arrive at the total fair value used for impairment testing.

The results of the interim goodwill impairment test indicated that the carrying value of the HMS operations exceeded its fair value. Therefore, TDS recognized a loss on impairment of goodwill of $35 million to reduce the carrying value of goodwill for the HMS operations to zero in the third quarter of 2017.

Other intangible assets

Activity related to TDS' Other intangible assets is presented below.

	December 31, 2018			December 31, 2017		
	Gross Amount	**Accumulated Amortization**	**Net Amount**	Gross Amount	Accumulated Amortization	Net Amount
(Dollars in millions)						
Franchise rights	**$ 255**	**$ (17)**	**$ 238**	$ 255	$ —	$ 255
Customer lists and Trade name	**166**	**(151)**	**15**	166	(142)	24
Total	**$ 421**	**$ (168)**	**$ 253**	$ 421	$ (142)	$ 279

As discussed in Note 1 — Summary of Significant Accounting Policies and Recent Accounting Pronouncements, effective January 1 2018, TDS prospectively changed its assessment of useful life for its franchise rights from indefinite-lived to 15 years . Amortization expense for intangible assets was $26 million , $11 million , and $14 million for the years ended December 31, 2018, 2017, and 2016, respectively. Based on the current balance of finite-lived intangible assets, the estimated amortization expense is $24 million , $21 million , $19 million , $19 million and $18 million for the years 2019 through 2023, respectively.

Note 8 Investments in Unconsolidated Entities

Investments in unconsolidated entities consist of amounts invested in entities in which TDS holds a noncontrolling interest. On January 1, 2018, TDS adopted Accounting Standards Update 2016-01, *Financial Instruments – Overall: Recognition and Measurement of Financial Assets and Financial Liabilities* (ASU 2016-01) using the modified retrospective approach. Accordingly, prior periods have not been recast to reflect the new accounting principle. Equity securities are measured at fair value with changes in value recognized in Net income. The cumulative effect of applying the provisions of ASU 2016-01 resulted in an increase of $1 million in retained earnings as of January 1, 2018.

TDS' Investments in unconsolidated entities are accounted for using either the equity method or measurement alternative method as shown in the table below. The measurement alternative method was elected for investments without readily determinable fair values formerly accounted for under the cost method. The measurement alternative value represents cost minus any impairments plus or minus any observable price changes. TDS did no t have an impairment or observable price change related to these investments in 2018 .

December 31,	**2018**	2017
(Dollars in millions)		
Equity method investments:		
Capital contributions, loans, advances and adjustments	**$ 116**	$ 116
Cumulative share of income	**1,930**	1,753
Cumulative share of distributions	**(1,587)**	(1,434)
Total equity method investments	**459**	435
Measurement alternative method investments	**21**	18
Total investments in unconsolidated entities	**$ 480**	$ 453

The following tables, which are based on information provided in part by third parties, summarize the combined assets, liabilities and equity, and results of operations of TDS' equity method investments:

December 31,	**2018**	2017
(Dollars in millions)		
Assets		
Current	**$ 920**	$ 705
Due from affiliates	**379**	323
Property and other	**5,010**	4,852
Total assets	**$ 6,309**	$ 5,880
Liabilities and Equity		
Current liabilities	**$ 436**	$ 436
Deferred credits	**180**	181
Long-term liabilities	**225**	208
Long-term capital lease obligations	**—**	1
Partners' capital and shareholders' equity	**5,468**	5,054
Total liabilities and equity	**$ 6,309**	$ 5,880

Year Ended December 31,	**2018**	2017	2016
(Dollars in millions)			
Results of Operations			
Revenues	**$ 6,801**	$ 6,585	$ 6,769
Operating expenses	**4,985**	4,985	5,068
Operating income	**1,816**	1,600	1,701
Other income (expense), net	**9**	(3)	(13)
Net income	**$ 1,825**	$ 1,597	$ 1,688

Note 9 Property, Plant and Equipment

TDS' Property, plant and equipment in service and under construction, and related accumulated depreciation and amortization, as of December 31, 2018 and 2017 , were as follows:

December 31,	Useful Lives (Years)	2018	2017
(Dollars in millions)			
Land	N/A	**$ 55**	$ 55
Buildings	5-40	**523**	519
Leasehold and land improvements	1-30	**1,245**	1,214
Cable and wire	15-35	**1,884**	1,802
Network and switching equipment	3-13	**2,423**	2,361
Cell site equipment	7-25	**3,460**	3,411
Office furniture and equipment	3-10	**378**	480
Other operating assets and equipment	3-12	**193**	194
System development	1-7	**1,486**	1,387
Work in process	N/A	**427**	319
Total property, plant and equipment, gross		**12,074**	11,742
Accumulated depreciation and amortization		**(8,728)**	(8,318)
Total property, plant and equipment, net		**$ 3,346**	$ 3,424

Depreciation and amortization expense totaled $839 million , $817 million and $820 million in 2018 , 2017 and 2016 , respectively. In 2018 , 2017 and 2016 , (Gain) loss on asset disposals, net included charges of $9 million , $21 million and $27 million , respectively, related to disposals of assets, trade-ins of older assets for replacement assets and other retirements of assets from service in the normal course of business.

During the second quarter of 2016, TDS recorded an out-of-period adjustment attributable to 2014 and 2015 related to the over-depreciation of certain assets in the Wireline segment. TDS has determined that this adjustment was not material to the prior annual periods and also was not material to 2016 results. As a result of this out-of-period adjustment, Depreciation, amortization and accretion expense decreased by $4 million in 2016.

Note 10 Asset Retirement Obligations

U.S. Cellular is subject to asset retirement obligations associated with its leased cell sites, switching office sites, retail store sites and office locations. Asset retirement obligations generally include obligations to restore leased land, towers, retail store and office premises to their pre-lease conditions.

TDS Telecom owns poles, cable and wire and certain buildings and also leases office space and property used for housing central office switching equipment and fiber cable. These assets and leases often have removal or remediation requirements associated with them. For example, TDS Telecom's poles, cable and wire are often located on property that is not owned by TDS Telecom and may be subject to the provisions of easements, permits, or leasing arrangements. Pursuant to the terms of the permits, easements, or leasing arrangements, TDS Telecom is often required to remove these assets and return the property to its original condition at some defined date in the future.

Asset retirement obligations are included in Other deferred liabilities and credits in the Consolidated Balance Sheet.

In 2018 and 2017 , U.S. Cellular and TDS Telecom performed a review of the assumptions and estimated costs related to asset retirement obligations. The results of the reviews (identified as Revisions in estimated cash outflows) and other changes in asset retirement obligations during 2018 and 2017 , were as follows:

	2018	2017
(Dollars in millions)		
Balance at beginning of year	**$ 283**	$ 266
Additional liabilities accrued	**2**	1
Revisions in estimated cash outflows	**6**	(1)
Acquisition of assets	**—**	1
Disposition of assets	**(1)**	(1)
Accretion expense	**18**	17
Transferred to Liabilities held for sale	**(1)**	—
Balance at end of year	**$ 307**	$ 283

Note 11 Debt

Revolving Credit Agreements

At December 31, 2018 , TDS and U.S. Cellular had revolving credit agreements available for general corporate purposes, including acquisitions, spectrum purchases and capital expenditures. In May 2018 , TDS entered into a new $400 million revolving credit agreement with certain lenders and other parties and U.S. Cellular entered into a new $300 million revolving credit agreement with certain lenders and other parties. As a result of the new agreements, TDS' and U.S. Cellular's previous revolving credit agreements due to expire in June 2021 were terminated. Amounts under the revolving credit agreements may be borrowed, repaid and reborrowed from time to time until maturity in May 2023 . As of December 31, 2018 , there were no outstanding borrowings under the revolving credit agreements, except for letters of credit. Interest expense representing commitment fees on the unused portion of the revolving lines of credit was $2 million in each of 2018 , 2017 and 2016 . The commitment fees are based on the unsecured senior debt ratings assigned to TDS and U.S. Cellular by certain ratings agencies.

The following table summarizes the revolving credit agreements as of December 31, 2018 :

	TDS	U.S. Cellular
(Dollars in millions)		
Maximum borrowing capacity	$ 400	$ 300
Letters of credit outstanding	$ 1	$ 2
Amount borrowed	$ —	$ —
Amount available for use	$ 399	$ 298

Borrowings under the revolving credit agreements bear interest either at a London Inter-bank Offered Rate (LIBOR) plus 1.75% or at an alternative Base Rate as defined in the revolving credit agreement plus 0.75% , at TDS' or U.S. Cellular's option. TDS and U.S. Cellular may select a borrowing period of either one, two, three or six months (or other period of twelve months or less if requested by TDS or U.S. Cellular and approved by the lenders). TDS' and U.S. Cellular's credit spread and commitment fees on their revolving credit agreements may be subject to increase if their current credit ratings from nationally recognized credit rating agencies are lowered, and may be subject to decrease if the ratings are raised.

In connection with U.S. Cellular's revolving credit agreement, TDS and U.S. Cellular entered into a subordination agreement dated May 10, 2018 , together with the administrative agent for the lenders under U.S. Cellular's revolving credit agreement. Pursuant to this subordination agreement, (a) any consolidated funded indebtedness from U.S. Cellular to TDS will be unsecured and (b) any (i) consolidated funded indebtedness from U.S. Cellular to TDS (other than "refinancing indebtedness" as defined in the subordination agreement) in excess of $105 million and (ii) refinancing indebtedness in excess of $250 million will be subordinated and made junior in right of payment to the prior payment in full of obligations to the lenders under U.S. Cellular's revolving credit agreement. As of December 31, 2018 , U.S. Cellular had no outstanding consolidated funded indebtedness or refinancing indebtedness that was subordinated to the revolving credit agreement pursuant to the subordination agreement.

The continued availability of the revolving credit agreements requires TDS and U.S. Cellular to comply with certain negative and affirmative covenants, maintain certain financial ratios and make representations regarding certain matters at the time of each borrowing.

The revolving credit agreements include the following financial covenants:

- Consolidated Interest Coverage Ratio may not be less than 3.00 to 1.00 as of the end of any fiscal quarter.
- Consolidated Leverage Ratio may not be greater than the ratios indicated as of the end of any fiscal quarter for each period specified below:

Period	Ratios
From the agreement date of May 10, 2018 through June 30, 2019	3.25 to 1.00
From July 1, 2019 and thereafter	3.00 to 1.00

Certain TDS and U.S. Cellular wholly-owned subsidiaries have jointly and severally unconditionally guaranteed the payment and performance of the obligations of TDS and U.S. Cellular under the revolving credit agreements pursuant to a guaranty dated May 10, 2018 . Other subsidiaries that meet certain criteria will be required to provide a similar guaranty in the future. TDS and U.S. Cellular believe that they were in compliance with all of the financial and other covenants and requirements set forth in their revolving credit agreements as of December 31, 2018 .

Term Loan

In July 2015 , U.S. Cellular borrowed $225 million on a senior term loan credit agreement in two separate draws. This agreement was entered into in January 2015, amended and restated in June 2016, and further amended in May 2018 . The interest rate on outstanding borrowings is reset at one, three or six month intervals at a rate of LIBOR plus 250 basis points . This credit agreement provides for the draws to be continued on a long-term basis under terms that are readily determinable. U.S. Cellular has the ability and intent to carry the debt for the duration of the agreement. Principal reductions are due and payable in quarterly installments of $3 million beginning in March 2016 through December 2021, and the remaining unpaid balance will be due and payable in January 2022 . The senior term loan credit agreement contains financial covenants and subsidiary guarantees that are consistent with the revolving credit agreements described above. This agreement was entered into for general corporate purposes, including working capital, spectrum purchases and capital expenditures. U.S. Cellular believes that it was in compliance with all of the financial and other covenants and requirements set forth in its term loan credit agreement as of December 31, 2018 .

In connection with U.S. Cellular’s term loan credit agreement, TDS and U.S. Cellular entered into a subordination agreement in June 2016 together with the administrative agent for the lenders under U.S. Cellular’s term loan credit agreement, which is substantially the same as the subordination agreement for U.S. Cellular as described above under the “Revolving Credit Agreements.” As of December 31, 2018 , U.S. Cellular had no outstanding consolidated funded indebtedness or refinancing indebtedness that was subordinated to the term loan agreement pursuant to this subordination agreement.

Receivables Securitization Agreement

In December 2017, U.S. Cellular, through its subsidiaries, entered into a $200 million credit agreement to permit securitized borrowings using its equipment installment receivables for general corporate purposes, including acquisitions, spectrum purchases and capital expenditures. In connection with the receivables securitization agreement, U.S. Cellular formed a wholly-owned subsidiary, USCC Master Note Trust (Trust), which qualifies as a bankruptcy remote entity. Under the terms of the agreement, U.S. Cellular, through its subsidiaries, transfers eligible equipment installment receivables to the Trust. The Trust then utilizes the transferred assets as collateral for notes payables issued to third party financial institutions. Since U.S. Cellular retains effective control of the transferred assets in the Trust, any activity associated with this receivables securitization agreement will be treated as a secured borrowing. Therefore, TDS will continue to report equipment installment receivables and any related balances on the Consolidated Balance Sheet. Cash received from borrowings under the receivables securitization agreement will be reported as Debt. Refer to Note 14 — Variable Interest Entities for additional information.

U.S. Cellular entered into a performance guaranty whereby U.S. Cellular guarantees the performance of certain wholly-owned subsidiaries of U.S. Cellular under the receivables securitization agreement. Amounts under the receivables securitization agreement may be borrowed, repaid and reborrowed from time to time until maturity in December 2019 , which may be extended from time to time as specified therein. As of December 31, 2018 , there were no outstanding borrowings under the receivables securitization agreement, and the entire unused capacity of $200 million was available, subject to sufficient collateral to satisfy the asset borrowing base provisions of the agreement. As of December 31, 2018 , the Trust held $63 million of assets available to be pledged as collateral for the receivables securitization agreement.

The continued availability of the receivables securitization agreement requires U.S. Cellular to comply with certain negative and affirmative covenants, maintain certain financial ratios and provide representations on certain matters at the time of each borrowing. The covenants include the same financial covenants for U.S. Cellular as described above under the “Revolving Credit Agreements.” TDS believes that U.S. Cellular was in compliance as of December 31, 2018 , with all of the financial covenants and requirements set forth in its receivables securitization agreement.

Other Long-Term Debt

Long-term debt as of December 31, 2018 and 2017 , was as follows:

	Issuance date	Maturity date	Call date (any time on or after)	December 31, 2018 Principal Amount	December 31, 2018 Less Unamortized discount and debt issuance costs	December 31, 2018 Total	December 31, 2017 Principal Amount	December 31, 2017 Less Unamortized discount and debt issuance costs	December 31, 2017 Total
(Dollars in millions)									
TDS Unsecured Senior Notes									
6.625%	Mar 2005	Mar 2045	Mar 2010	**$ 116**	**$ 3**	**$ 113**	$ 116	$ 3	$ 113
6.875%	Nov 2010	Nov 2059	Nov 2015	**225**	**7**	**218**	225	7	218
7.000%	Mar 2011	Mar 2060	Mar 2016	**300**	**9**	**291**	300	9	291
5.875%	Dec 2012	Dec 2061	Dec 2017	**195**	**7**	**188**	195	7	188
U.S. Cellular Unsecured Senior Notes									
6.700%	Dec 2003 and June 2004	Dec 2033	Dec 2003 and June 2004	**$ 544**	**$ 14**	**$ 530**	$ 544	$ 15	$ 529
6.950%	May 2011	May 2060	May 2016	**342**	**11**	**331**	342	11	331
7.250%	Dec 2014	Dec 2063	Dec 2019	**275**	**10**	**265**	275	10	265
7.250%	Nov 2015	Dec 2064	Dec 2020	**300**	**10**	**290**	300	10	290
Term Loan	Jul 2015	Jan 2022		**191**	**1**	**190**	203	2	201
Capital lease obligations				**6**	**—**	**6**	5	—	5
Installment payment agreement				**15**	**1**	**14**	23	1	22
Other long-term notes		Through 2021		**3**	**—**	**3**	4	—	4
Total long-term debt				**$ 2,512**	**$ 73**	**$ 2,439**	$ 2,532	$ 75	$ 2,457
Long-term debt, current						**$ 21**			$ 20
Long-term debt, noncurrent						**$ 2,418**			$ 2,437

TDS may redeem its callable notes and U.S. Cellular may redeem its 6.95% Senior Notes, 7.25% 2063 Senior Notes and 7.25% 2064 Senior Notes, in whole or in part at any time after the respective call date, at a redemption price equal to 100% of the principal amount redeemed plus accrued and unpaid interest. U.S. Cellular may redeem the 6.7% Senior Notes, in whole or in part, at any time prior to maturity at a redemption price equal to the greater of (a) 100% of the principal amount of such notes, plus accrued and unpaid interest, or (b) the sum of the present values of the remaining scheduled payments of principal and interest thereon discounted to the redemption date on a semi-annual basis at the Treasury Rate plus 30 basis points.

Interest on the Senior Notes outstanding at December 31, 2018 , is payable quarterly, with the exception of U.S. Cellular's 6.7% Senior Notes for which interest is payable semi-annually.

The annual requirements for principal payments on long-term debt are approximately $21 million , $21 million , $12 million , $158 million and less than $1 million for the years 2019 through 2023, respectively.

The covenants associated with TDS and its subsidiaries' long-term debt obligations, among other things, restrict TDS' ability, subject to certain exclusions, to incur additional liens, enter into sale and leaseback transactions, and sell, consolidate or merge assets.

TDS' and U.S. Cellular's long-term debt notes do not contain any provisions resulting in acceleration of the maturities of outstanding debt in the event of a change in TDS' or U.S. Cellular's credit rating. However, a downgrade in TDS' or U.S. Cellular's credit rating could adversely affect its ability to obtain long-term debt financing in the future.

Note 12 Employee Benefit Plans

Defined Contribution Plans

TDS sponsors a qualified noncontributory defined contribution pension plan. The plan provides benefits for certain employees of TDS Corporate, TDS Telecom and U.S. Cellular. Under this plan, pension costs are calculated separately for each participant and are funded annually. Total pension costs were $16 million in 2018 and 2017 , and $17 million in 2016 . In addition, TDS sponsors a defined contribution retirement savings plan (401(k) plan). Total costs incurred from TDS' contributions to the 401(k) plan were $28 million in 2018 and $27 million in 2017 and 2016 .

TDS also sponsors an unfunded nonqualified deferred supplemental executive retirement plan for certain employees to offset the reduction of benefits caused by the limitation on annual employee compensation under the tax laws.

Other Post-Retirement Benefits

TDS sponsors a defined benefit post-retirement plan that provides medical benefits to retirees and that covers certain employees of TDS Corporate and TDS Telecom, which is not significant to TDS' financial position or operating results. The plan is contributory, with retiree contributions adjusted annually. TDS recognizes the funded status of the plan as a component of Other assets and deferred charges in the Consolidated Balance Sheet as of December 31, 2018 and 2017 . Changes in the funded status are included in Accumulated other comprehensive income (loss) in the Consolidated Balance Sheet before affecting such amounts for income taxes to the extent that such changes are not recognized in earnings as a component of net periodic benefit cost.

The post-retirement benefit fund invests mainly in mutual funds that hold U.S. equities, international equities, and debt securities. The post-retirement benefit fund does not hold any debt or equity securities issued by TDS, U.S. Cellular or any related parties. The fair value of the plan assets of the post-retirement benefit fund was $55 million and $59 million as of December 31, 2018 and 2017 , respectively. The total plan benefit obligations were $49 million and $45 million as of December 31, 2018 and 2017 , respectively. Therefore, the total funded status was an asset of $6 million and $14 million as of December 31, 2018 and 2017 , respectively.

TDS is not required to set aside current funds for its future retiree health insurance benefits. The decision to contribute to the plan assets is based upon several factors, including the funded status of the plan, market conditions, alternative investment opportunities, tax benefits and other circumstances. In accordance with applicable income tax regulations, annual contributions to fund the costs of future retiree medical benefits may not exceed certain thresholds. TDS has not determined whether it will make a contribution to the plan in 2019 .

Note 13 Commitments and Contingencies

Purchase Obligations

TDS has obligations payable under non-cancellable contracts, commitments for device purchases, network facilities and transport services, agreements for software licensing, long-term marketing programs, as well as certain agreements to purchase goods or services. Where applicable, TDS calculates its obligation based on termination fees that can be paid to exit the contract. Future minimum payments required under these commitments as of December 31, 2018 are as follows:

	Purchase Obligations
(Dollars in millions)	
2019	$ 1,444
2020	137
2021	78
2022	39
2023	14
Thereafter	25
Total	$ 1,737

Subsequent to December 31, 2018, TDS committed to purchase assets from a third party in the amount of $129 million , subject to regulatory approval. This amount is not included in the 2019 purchase obligations above, which are stated as of December 31, 2018.

Lease Commitments

TDS and its subsidiaries have leases for certain plant facilities, office space, retail store sites, cell sites, data centers and data-processing equipment which are accounted for as operating leases. Certain leases have renewal options and/or fixed rental increases. Renewal options that are reasonably assured of exercise are included in determining the lease term. Any rent abatements or lease incentives, in addition to fixed rental increases, are included in the calculation of rent expense and calculated on a straight-line basis over the defined lease term. For 2018 , 2017 and 2016 , rent expense for noncancellable long-term leases was $189 million , $183 million and $177 million , respectively; and rent expense under cancellable short-term leases was $12 million in each respective year.

TDS and its subsidiaries are also the lessors for tower and colocation space and certain plant facilities which are accounted for as operating leases. The leased assets are included in Property, plant and equipment on the Consolidated Balance Sheet.

As of December 31, 2018 , future minimum rental payments required under operating leases and rental receipts expected under operating leases that have noncancellable lease terms in excess of one year were as follows:

	Operating Leases Future Minimum Rental Payments	Operating Leases Future Minimum Rental Receipts
(Dollars in millions)		
2019	$ 170	$ 59
2020	158	48
2021	142	35
2022	126	23
2023	110	10
Thereafter	784	7
Total	$ 1,490	$ 182

Indemnifications

TDS enters into agreements in the normal course of business that provide for indemnification of counterparties. The terms of the indemnifications vary by agreement. The events or circumstances that would require TDS to perform under these indemnities are transaction specific; however, these agreements may require TDS to indemnify the counterparty for costs and losses incurred from litigation or claims arising from the underlying transaction. TDS is unable to estimate the maximum potential liability for these types of indemnifications as the amounts are dependent on the outcome of future events, the nature and likelihood of which cannot be determined at this time. Historically, TDS has not made any significant indemnification payments under such agreements.

Legal Proceedings

TDS is involved or may be involved from time to time in legal proceedings before the FCC, other regulatory authorities, and/or various state and federal courts. If TDS believes that a loss arising from such legal proceedings is probable and can be reasonably estimated, an amount is accrued in the financial statements for the estimated loss. If only a range of loss can be determined, the best estimate within that range is accrued; if none of the estimates within that range is better than another, the low end of the range is accrued. The assessment of the expected outcomes of legal proceedings is a highly subjective process that requires judgments about future events. The legal proceedings are reviewed at least quarterly to determine the adequacy of accruals and related financial statement disclosures. The ultimate outcomes of legal proceedings could differ materially from amounts accrued in the financial statements.

TDS has accrued less than $1 million and $1 million with respect to legal proceedings and unasserted claims as of December 31, 2018 and 2017 , respectively. TDS has not accrued any amount for legal proceedings if it cannot estimate the amount of the possible loss or range of loss. TDS is unable to estimate any contingent loss in excess of the amounts accrued.

The United States Department of Justice (DOJ) has notified TDS that it is conducting inquiries of U.S. Cellular and TDS under the federal False Claims Act. The DOJ is investigating U.S. Cellular's participation in spectrum auctions 58, 66, 73 and 97 conducted by the FCC. U.S. Cellular is a limited partner in several limited partnerships which qualified for the 25% bid credit in each auction. TDS and U.S. Cellular are cooperating with the DOJ's review. TDS and U.S. Cellular believe that U.S. Cellular's arrangements with the limited partnerships and the limited partnerships' participation in the FCC auctions complied with applicable law and FCC rules. At this time, TDS cannot predict the outcome of this review.

Note 14 Variable Interest Entities

Consolidated VIEs

TDS consolidates VIEs in which it has a controlling financial interest as defined by GAAP and is therefore deemed the primary beneficiary. A controlling financial interest will have both of the following characteristics: (a) the power to direct the VIE activities that most significantly impact economic performance; and (b) the obligation to absorb the VIE losses and the right to receive benefits that are significant to the VIE. TDS reviews these criteria initially at the time it enters into agreements and subsequently when events warranting reconsideration occur. These VIEs have risks similar to those described in the "Risk Factors" in TDS' Form 10-K for the year ended December 31, 2018.

During 2017, U.S. Cellular formed USCC EIP LLC (Seller/Sub-Servicer), USCC Receivables Funding LLC (Transferor) and the Trust, collectively the special purpose entities (SPEs), to facilitate a securitized borrowing using its equipment installment plan receivables. Under a Receivables Sale Agreement, U.S. Cellular wholly-owned, majority-owned and unconsolidated entities, collectively referred to as "affiliated entities", will transfer device equipment installment plan contracts to the Seller/Sub-Servicer. The Seller/Sub-Servicer will aggregate device equipment installment plan contracts, and perform servicing, collection and all other administrative activities related to accounting for the equipment installment plan contracts. The Seller/Sub-Servicer will sell the eligible equipment installment plan receivables to the Transferor, a bankruptcy remote entity, which will subsequently sell the receivables to the Trust. The Trust, which is bankruptcy remote and isolated from the creditors of U.S. Cellular, will be responsible for issuing asset-backed variable funding notes (Notes), which are collateralized by the equipment installment plan receivables owned by the Trust. Given that U.S. Cellular has the power to direct the activities of these SPEs, and that these SPEs lack sufficient equity to finance their activities, U.S. Cellular is deemed to have a controlling financial interest in the SPEs and, therefore, consolidates them. All transactions with third parties (e.g., issuance of the asset-backed variable funding notes) will be accounted for as a secured borrowing due to the pledging of equipment installment plan contracts as collateral, significant continuing involvement in the transferred assets, subordinated interests of the cash flows, and continued evidence of control of the receivables. Refer to Note 11 — Debt , Receivables Securitization Agreement for additional details regarding the securitization agreement for which these entities were established.

The following VIEs were formed to participate in FCC auctions of wireless spectrum and to fund, establish, and provide wireless service with respect to any FCC licenses won in the auctions:

- Advantage Spectrum, L.P. (Advantage Spectrum) and Sunshine Spectrum, Inc., the general partner of Advantage Spectrum; and
- King Street Wireless, L.P. (King Street Wireless) and King Street Wireless, Inc., the general partner of King Street Wireless.

These particular VIEs are collectively referred to as designated entities. The power to direct the activities that most significantly impact the economic performance of these VIEs is shared. Specifically, the general partner of these VIEs has the exclusive right to manage, operate and control the limited partnerships and make all decisions to carry on the business of the partnerships. The general partner of each partnership needs the consent of the limited partner, an indirect TDS subsidiary, to sell or lease certain licenses, to make certain large expenditures, admit other partners or liquidate the limited partnerships. Although the power to direct the activities of these VIEs is shared, TDS has the most significant level of exposure to the variability associated with the economic performance of the VIEs, indicating that TDS is the primary beneficiary of the VIEs. Therefore, in accordance with GAAP, these VIEs are consolidated.

During 2018, U.S. Cellular received liquidating distributions from Aquinas Wireless, L.P. (Aquinas Wireless). Subsequent to the final distribution date, Aquinas Wireless had no remaining assets and was dissolved.

TDS also consolidates other VIEs that are limited partnerships that provide wireless service. A limited partnership is a variable interest entity unless the limited partners hold substantive participating rights or kick-out rights over the general partner. For certain limited partnerships, U.S. Cellular is the general partner and manages the operations. In these partnerships, the limited partners do not have substantive kick-out or participating rights and, further, such limited partners do not have the authority to remove the general partner. Therefore, these limited partnerships are also recognized as VIEs and are consolidated under the variable interest model.

The following table presents the classification and balances of the consolidated VIEs' assets and liabilities in TDS' Consolidated Balance Sheet.

December 31,	**2018**	2017
(Dollars in millions)		
Assets		
Cash and cash equivalents	**$ 9**	$ 3
Short-term investments	**17**	—
Accounts receivable	**609**	473
Inventory, net	**5**	4
Other current assets	**5**	3
Licenses	**647**	648
Property, plant and equipment, net	**88**	89
Other assets and deferred charges	**347**	304
Total assets	**$ 1,727**	$ 1,524
Liabilities		
Current liabilities	**$ 31**	$ 36
Deferred liabilities and credits	**15**	12
Total liabilities	**$ 46**	$ 48

Unconsolidated VIEs

TDS manages the operations of and holds a variable interest in certain other limited partnerships, but is not the primary beneficiary of these entities and, therefore, does not consolidate them under the variable interest model.

TDS’ total investment in these unconsolidated entities was $4 million at December 31, 2018 and 2017 , and is included in Investments in unconsolidated entities in TDS’ Consolidated Balance Sheet. The maximum exposure from unconsolidated VIEs is limited to the investment held by TDS in those entities.

Other Related Matters

TDS made contributions, loans and/or advances to its VIEs totaling $152 million , $821 million , and $98 million during 2018 , 2017 , and 2016 , respectively; of which $116 million in 2018 and $790 million in 2017 are related to USCC EIP LLC as discussed above. TDS may agree to make additional capital contributions and/or advances to these or other VIEs and/or to their general partners to provide additional funding for operations or the development of licenses granted in various auctions. TDS may finance such amounts with a combination of cash on hand, borrowings under its revolving credit agreement and/or other long-term debt. There is no assurance that TDS will be able to obtain additional financing on commercially reasonable terms or at all to provide such financial support.

The limited partnership agreements of Advantage Spectrum and King Street Wireless also provide the general partner with a put option whereby the general partner may require the limited partner, a subsidiary of U.S. Cellular, to purchase its interest in the limited partnership. The general partner’s put options related to its interests in King Street Wireless will become exercisable in 2019. The general partner’s put options related to its interest in Advantage Spectrum will become exercisable in 2021 and 2022. The greater of the carrying value of the general partner's investment or the value of the put option, net of any borrowings due to TDS, is recorded as Noncontrolling interests with redemption features in TDS’ Consolidated Balance Sheet. Also in accordance with GAAP, minority share of income or changes in the redemption value of the put options, net of interest accrued on the loans, are recorded as a component of Net income attributable to noncontrolling interests, net of tax, in TDS’ Consolidated Statement of Operations.

During the first quarter of 2018, TDS recorded an out-of-period adjustment attributable to 2016 and 2017 due to errors in the application of accounting guidance applicable to the calculation of Noncontrolling interests with redemption features related to King Street Wireless, Inc. This out-of-period adjustment had the impact of increasing Net income attributable to noncontrolling interests, net of tax, by $6 million and decreasing Net income attributable to TDS shareholders by $6 million in 2018 . TDS determined that this adjustment was not material to any of the periods impacted.

Note 15 Noncontrolling Interests

The following schedule discloses the effects of Net income attributable to TDS shareholders and changes in TDS' ownership interest in U.S. Cellular on TDS' equity for 2018 , 2017 and 2016 :

Year Ended December 31,	2018	2017	2016
(Dollars in millions)			
Net income attributable to TDS shareholders	**$ 135**	$ 153	$ 43
Transfer (to) from the noncontrolling interests			
Change in TDS' Capital in excess of par value from U.S. Cellular's issuance of U.S. Cellular shares	**(30)**	(12)	(16)
Change in TDS' Capital in excess of par value from U.S. Cellular's repurchase of U.S. Cellular shares	**—**	—	1
Net transfers (to) from noncontrolling interests	**(30)**	(12)	(15)
Change from net income attributable to TDS shareholders and transfers (to) from noncontrolling interests	**$ 105**	$ 141	$ 28

Mandatorily Redeemable Noncontrolling Interests in Finite-Lived Subsidiaries

TDS' consolidated financial statements include certain noncontrolling interests that meet the GAAP definition of mandatorily redeemable financial instruments. These mandatorily redeemable noncontrolling interests represent interests held by third parties in consolidated partnerships, where the terms of the underlying partnership agreement provide for a defined termination date at which time the assets of the subsidiary are to be sold, the liabilities are to be extinguished and the remaining net proceeds are to be distributed to the noncontrolling interest holders and TDS in accordance with the respective partnership agreements. The termination dates of these mandatorily redeemable noncontrolling interests range from 2085 to 2092 .

The estimated aggregate amount that would be due and payable to settle all of these noncontrolling interests, assuming an orderly liquidation of the finite-lived consolidated partnerships on December 31, 2018 , net of estimated liquidation costs, is $17 million . This amount excludes redemption amounts recorded in Noncontrolling interests with redemption features in the Consolidated Balance Sheet. The estimate of settlement value was based on certain factors and assumptions which are subjective in nature. Changes in those factors and assumptions could result in a materially larger or smaller settlement amount. The corresponding carrying value of the mandatorily redeemable noncontrolling interests in finite-lived consolidated partnerships at December 31, 2018 , was $4 million , and is included in Noncontrolling interests in the Consolidated Balance Sheet. The excess of the aggregate settlement value over the aggregate carrying value of these mandatorily redeemable noncontrolling interests is due primarily to the unrecognized appreciation of the noncontrolling interest holders' share of the underlying net assets in the consolidated partnerships. Neither the noncontrolling interest holders' share, nor TDS' share, of the appreciation of the underlying net assets of these subsidiaries is reflected in the consolidated financial statements.

Note 16 Common Shareholders' Equity

Common Stock

Series A Common Shares are convertible on a share-for-share basis into Common Shares. In matters other than the election of directors, each Series A Common Share is entitled to ten votes per share, compared to one vote for each Common Share. The Series A Common Shares are entitled to elect eight directors, and the Common Shares elect four . TDS has reserved 7,288,000 Common Shares at December 31, 2018 , for possible issuance upon conversion of Series A Common Shares.

The following table summarizes the number of Common and Series A Common Shares issued.

(Shares in millions)	Common Shares	Series A Common Shares	Common Treasury Shares
Balance at December 31, 2015	126	7	24
Dividend reinvestment, incentive and compensation plans	—	—	(1)
Balance at December 31, 2016	126	7	23
Dividend reinvestment, incentive and compensation plans	—	—	(1)
Balance at December 31, 2017	126	7	22
Dividend reinvestment, incentive and compensation plans	—	—	(3)
Balance at December 31, 2018	126	7	19

On August 2, 2013, the Board of Directors of TDS authorized a $250 million stock repurchase program for the purchase of TDS Common Shares from time to time pursuant to open market purchases, block transactions, private purchases or otherwise, depending on market conditions. This authorization does not have an expiration date.

In November 2009, U.S. Cellular announced by Form 8-K that the Board of Directors of U.S. Cellular authorized the repurchase of up to 1,300,000 Common Shares on an annual basis beginning in 2009 and continuing each year thereafter, on a cumulative basis. In December 2016, the U.S. Cellular Board amended this authorization to provide that, beginning on January 1, 2017, the authorized repurchase amount with respect to a particular year will be any amount from zero to 1,300,000 Common Shares, as determined by the Pricing Committee of the Board of Directors, and that if the Pricing Committee did not specify an amount for any year, such amount would be zero for such year. The Pricing Committee has not specified any increase in the authorization since that time. The Pricing Committee also was authorized to decrease the cumulative amount of the authorization at any time, but has not taken any action to do so at this time. As of December 31, 2018 , the total cumulative amount of Common Shares authorized to be purchased is 5,901,000 . The authorization provides that share repurchases will be made pursuant to open market purchases, block purchases, private purchases, or otherwise, depending on market prices and other conditions. This authorization does not have an expiration date.

Tax-Deferred Savings Plan

At December 31, 2018 ,TDS has reserved 90,000 Common Shares for issuance under the TDS Tax-Deferred Savings Plan, a qualified profit-sharing plan pursuant to Sections 401(a) and 401(k) of the Internal Revenue Code. Participating employees have the option of investing their contributions and TDS' contributions in a TDS Common Share fund, a U.S. Cellular Common Share fund or certain unaffiliated funds.

Note 17 Stock-Based Compensation

TDS Consolidated

The following table summarizes stock-based compensation expense recognized during 2018 , 2017 and 2016 :

Year Ended December 31,	2018	2017	2016
(Dollars in millions)			
Stock option awards	**$ 5**	$ 10	$ 16
Restricted stock unit awards	**30**	29	24
Performance share awards	**17**	5	—
Deferred compensation bonus and matching stock unit awards	**—**	1	1
Awards under Non-Employee Director compensation plan	**2**	1	1
Total stock-based compensation, before income taxes	**54**	46	42
Income tax benefit	**(14)**	(17)	(16)
Total stock-based compensation expense, net of income taxes	**$ 40**	$ 29	$ 26

At December 31, 2018 , unrecognized compensation cost for all stock-based compensation awards was $52 million and is expected to be recognized over a weighted average period of 1.7 years .

The following table provides a summary of the classification of stock-based compensation expense included in the Consolidated Statement of Operations for the years ended:

December 31,	2018	2017	2016
(Dollars in millions)			
Selling, general and administrative expense	**$ 49**	$ 42	$ 39
Cost of services expense	**5**	4	3
Total stock-based compensation	**$ 54**	$ 46	$ 42

TDS' tax benefits realized from the exercise of stock options and the vesting of other awards totaled $15 million in 2018 .

TDS (Excluding U.S. Cellular)

The information in this section relates to stock-based compensation plans using the equity instruments of TDS. Participants in these plans are employees of TDS Corporate and TDS Telecom and Non-employee Directors of TDS. Information related to plans using the equity instruments of U.S. Cellular are shown in the U.S. Cellular section following the TDS section.

Under the TDS Long-Term Incentive Plans, TDS may grant fixed and performance based incentive and non-qualified stock options, restricted stock, restricted stock units, and deferred compensation stock unit awards to key employees.

TDS had reserved 13,129,000 Common Shares at December 31, 2018 , for equity awards granted and to be granted under the TDS Long-Term Incentive Plans in effect. At December 31, 2018 , the only types of awards outstanding are fixed non-qualified stock option awards, restricted stock unit awards, performance share awards and deferred compensation stock unit awards.

TDS has also established a Non-Employee Directors' compensation plan under which it has reserved 253,000 TDS Common Shares at December 31, 2018 , for issuance as compensation to members of the Board of Directors who are not employees of TDS.

TDS uses treasury stock to satisfy requirements for shares issued pursuant to its various stock-based compensation plans.

Long-Term Incentive Plan – Stock Options

Stock options granted to key employees are exercisable over a specified period not in excess of ten years. Stock options generally vest over periods up to three years from the date of grant. Stock options outstanding at December 31, 2018 , expire between 2019 and 2028 . However, vested stock options typically expire 30 days after the effective date of an employee's termination of employment for reasons other than retirement. Employees who leave at the age of retirement have 90 days (or one year if they satisfy certain requirements) within which to exercise their vested stock options. The exercise price of options equals the market value of TDS common stock on the date of grant.

TDS estimated the fair value of stock options granted in 2018 , 2017 and 2016 using the Black-Scholes valuation model and the assumptions shown in the table below:

	2018	2017	2016
Expected life	**6.3 years**	6.4 years	6.2 years
Expected annual volatility rate	**28.6%**	30.4%	30.3%
Dividend yield	**2.5%**	2.2%	2.0%
Risk-free interest rate	**2.9%**	2.0%	1.3%
Estimated annual forfeiture rate	**3.3%**	2.5%	2.7%

Pre-vesting forfeitures and expected life are estimated based on historical experience related to similar awards, giving considerations to the contractual terms of the stock-based awards, vesting schedules and expectations of future employee behavior. TDS believes that its historical experience provides the best estimates of future pre-vesting forfeitures and future expected life. The expected volatility assumption is based on historical volatility of TDS' common stock over a period commensurate with the expected life. The dividend yield assumption is equal to the dividends declared in the most recent year as a percentage of the share price on the date of grant. The risk-free interest rate assumption is determined using the U.S. Treasury Yield Curve Rate with a term length that approximates the expected life of the stock options.

A summary of TDS stock options (total and portion exercisable) and changes during 2018 is presented in the tables and narrative below.

Common Share Options	**Number of Options**	**Weighted Average Exercise Prices**	**Aggregate Intrinsic Value (in millions)**	**Weighted Average Remaining Contractual Life (in years)**
Outstanding at December 31, 2017	7,861,000	$ 27.49		
(5,927,000 exercisable)		$ 27.04		
Granted	545,000	$ 25.70		
Exercised	(2,449,000)	$ 25.87		
Forfeited	(166,000)	$ 28.62		
Expired	(1,028,000)	$ 34.51		
Outstanding at December 31, 2018	4,763,000	$ 26.57	$ 28	5.1
(3,270,000 exercisable)		$ 26.12	$ 21	3.5

The weighted average grant date fair value per share of the TDS stock options granted in 2018 , 2017 and 2016 was $6.33 , $7.06 and $7.24 , respectively. The aggregate intrinsic value of TDS stock options exercised in 2018 , 2017 and 2016 was $14 million , $1 million and $4 million , respectively. The aggregate intrinsic value at December 31, 2018 , presented in the table above represents the total pre-tax intrinsic value (the difference between TDS' closing stock prices and the exercise price, multiplied by the number of in-the-money options) that would have been received by option holders had all options been exercised on December 31, 2018 .

Long-Term Incentive Plans – Restricted Stock Units

TDS also grants restricted stock unit awards to key employees. Each outstanding restricted stock unit is convertible into one Common Share Award. The restricted stock unit awards currently outstanding were granted in 2016 , 2017 and 2018 and will vest in 2019 , 2020 and 2021 , respectively.

TDS estimates the fair value of restricted stock units by reducing the grant-date price of TDS' shares by the present value of the dividends expected to be paid on the underlying shares during the requisite service period, discounted at the appropriate risk-free interest rate, since employees are not entitled to dividends declared on the underlying shares while the restricted stock is unvested. The fair value is then recognized as compensation cost on a straight-line basis over the requisite service periods of the awards, which is generally the vesting period.

A summary of TDS nonvested restricted stock units and changes during 2018 is presented in the table below:

Common Restricted Stock Units	Number		Weighted Average Grant Date Fair Value
Nonvested at December 31, 2017	1,175,000	$	27.01
Granted	444,000	$	23.87
Vested	(322,000)	$	27.56
Forfeited	(85,000)	$	26.73
Nonvested at December 31, 2018	1,212,000	$	25.73

The total fair values as of the respective vesting dates of restricted stock units vested during 2018 , 2017 and 2016 were $9 million , $9 million and $10 million , respectively. The weighted average grant date fair value per share of the restricted stock units granted in 2018 , 2017 and 2016 was $23.87 , $25.97 and $27.87 , respectively.

Long-Term Incentive Plans – Performance Share Awards (Performance Shares)

Beginning in 2016, TDS granted performance shares, specifically performance stock units, to certain TDS executive officers. Each recipient may be entitled to shares of TDS common stock equal to 0% to 200% of a communicated target award depending on the achievement of predetermined performance-based and market-based operating targets over a three year period. Performance-based operating targets include Total Revenue and Return on Capital. Market-based operating targets are measured against TDS' total shareholder return relative to a defined peer group. Performance shares accumulate dividend equivalents, which are forfeitable if the performance metrics are not achieved. If the predetermined performance-based and market-based operating targets are met, awards granted in 2016 , 2017 and 2018 and will vest in 2019 , 2020 and 2021 , respectively.

TDS estimates fair value of performance-based operating targets using TDS' closing stock price on the date of grant. An estimate of the number of performance shares expected to vest based upon achieving the performance-based operating targets is made and the fair value is expensed on a straight-line basis over the requisite service period. Each reporting period these estimates are reviewed and stock compensation expense is adjusted accordingly to reflect the new estimates of total awards expected to vest. If any part of the performance shares does not vest as a result of the established performance-based operating targets not being achieved, the related stock compensation expense is reversed.

TDS estimates the market-based operating target's fair value using an internally developed valuation model. This estimated fair value approximated TDS' closing stock price at the date of grant for market-based share awards granted in 2018 , 2017 and 2016 . This market-based operating target value determined at the date of grant is expensed on a straight-line basis over the requisite service period and the stock compensation expense is not adjusted during the performance period for the subsequent changes in the value of the market-based share awards and will not be reversed even if the market-based operating target is not achieved.

A summary of TDS nonvested performance shares and changes during 2018 is presented in the table below:

Common Performance Shares	Number		Weighted Average Grant Date Fair Value
Nonvested at December 31, 2017	216,000	$	28.56
Granted	142,000	$	25.70
Forfeited	(15,000)	$	28.57
Accumulated dividend equivalents	7,000	$	27.59
Nonvested at December 31, 2018	350,000	$	27.38

No performance shares vested during 2018 , 2017 or 2016 . The weighted average grant date fair value per share of the performance shares granted in 2018 , 2017 and 2016 was $25.70 , $27.79 , and $29.45 , respectively.

Long-Term Incentive Plans – Deferred Compensation Stock Units

Certain TDS employees may elect to defer receipt of all or a portion of their annual bonuses and to receive a company matching contribution on the amount deferred. All bonus compensation that is deferred by employees electing to participate is immediately vested and is deemed to be invested in TDS Common Share units. The amount of TDS' matching contribution depends on the portion of the annual bonus that is deferred. Participants receive a 25% stock unit match for amounts deferred up to 50% of their total annual bonus and a 33% match for amounts that exceed 50% of their total annual bonus; such matching contributions also are deemed to be invested in TDS Common Share units and vest over three years.

The total fair values of deferred compensation stock units that vested during 2018 , 2017 and 2016 were less than $1 million in each respective year. The weighted average grant date fair value per share of the deferred compensation stock units granted in 2018 , 2017 and 2016 was $28.96 , $27.13 and $27.94 , respectively. As of December 31, 2018 , there were 101,000 vested but unissued deferred compensation stock units valued at $3 million .

Compensation of Non-Employee Directors

TDS issued 32,000 , 27,000 and 27,000 Common Shares under its Non-Employee Director plan in 2018 , 2017 and 2016 , respectively.

Dividend Reinvestment Plans

TDS had reserved 981,000 Common Shares at December 31, 2018 , for issuance under Automatic Dividend Reinvestment and Stock Purchase Plans and 217,000 Series A Common Shares for issuance under the Series A Common Share Automatic Dividend Reinvestment Plan. These plans enabled holders of TDS' Common Shares to reinvest cash dividends in Common Shares and holders of Series A Common Shares to reinvest cash dividends in Series A Common Shares. The purchase price of the shares is 95% of the market value, based on the average of the daily high and low sales prices for TDS' Common Shares on the New York Stock Exchange for the ten trading days preceding the date on which the purchase is made. These plans are considered non-compensatory plans; therefore, no compensation expense is recognized for stock issued under these plans.

U.S. Cellular

The information in this section relates to stock-based compensation plans using the equity instruments of U.S. Cellular. Participants in these plans are employees of U.S. Cellular and Non-employee Directors of U.S. Cellular. Information related to plans using the equity instruments of TDS are shown in the previous section.

U.S. Cellular has established the following stock-based compensation plans: Long-Term Incentive Plans and a Non-Employee Director compensation plan.

Under the U.S. Cellular Long-Term Incentive Plans, U.S. Cellular may grant fixed and performance based incentive and non-qualified stock options, restricted stock, restricted stock units, and deferred compensation stock unit awards to key employees. At December 31, 2018 , the only types of awards outstanding are fixed non-qualified stock option awards, restricted stock unit awards, performance share awards and deferred compensation stock unit awards.

Under the Non-Employee Director compensation plan, U.S. Cellular may grant Common Shares to members of the Board of Directors who are not employees of U.S. Cellular or TDS.

At December 31, 2018 , U.S. Cellular had reserved 13,286,000 Common Shares for equity awards granted and to be granted under the Long-Term Incentive Plans and 137,000 Common Shares for issuance under the Non-Employee Director compensation plan.

U.S. Cellular uses treasury stock to satisfy requirements for Common Shares issued pursuant to its various stock-based compensation plans.

Long-Term Incentive Plans – Stock Options

Stock options granted to key employees are exercisable over a specified period not in excess of ten years. Stock options generally vest over a period of three years from the date of grant. Stock options outstanding at December 31, 2018 , expire between 2019 and 2026 . However, vested stock options typically expire 30 days after the effective date of an employee's termination of employment for reasons other than retirement. Employees who leave at the age of retirement have 90 days (or one year if they satisfy certain requirements) within which to exercise their vested stock options. The exercise price of options equals the market value of U.S. Cellular Common Shares on the date of grant.

U.S. Cellular did not grant stock option awards in 2018 or 2017 . U.S. Cellular estimated the fair value of stock options granted during 2016 using the Black-Scholes valuation model and the assumptions shown in the table below.

	2016
Expected life	4.7 years
Expected annual volatility rate	30.5%
Dividend yield	—%
Risk-free interest rate	1.2%
Estimated annual forfeiture rate	9.4%

Pre-vesting forfeitures and expected life are estimated based on historical experience related to similar awards, giving consideration to the contractual terms of the stock-based awards, vesting schedules and expectations of future employee behavior. U.S. Cellular believes that its historical experience provides the best estimates of future pre-vesting forfeitures and future expected life. The expected volatility assumption is based on the historical volatility of U.S. Cellular's common stock over a period commensurate with the expected life. The dividend yield assumption is zero because U.S. Cellular has never paid a dividend, except a special cash dividend in June 2013, and has expressed its intention to retain all future earnings in the business. The risk-free interest rate assumption is determined using the U.S. Treasury Yield Curve Rate with a term length that approximates the expected life of the stock options.

The fair value of options is recognized as compensation cost using an accelerated attribution method over the requisite service periods of the awards, which is generally the vesting period.

A summary of U.S. Cellular stock options outstanding (total and portion exercisable) and changes during 2018 is presented in the table below:

Common Share Options	Number of Options	Weighted Average Exercise Price	Aggregate Intrinsic Value (in millions)	Weighted Average Remaining Contractual Life (in years)
Outstanding at December 31, 2017	3,495,000	$ 41.10		
(2,475,000 exercisable)		$ 40.79		
Exercised	(2,318,000)	$ 39.45		
Forfeited	(19,000)	$ 43.12		
Expired	(352,000)	$ 47.29		
Outstanding at December 31, 2018	806,000	$ 43.10	$ 7	6.0
(420,000 exercisable)		$ 42.39	$ 4	5.7

The weighted average grant date fair value per share of the U.S. Cellular stock options granted in 2016 was $12.77 . The aggregate intrinsic value of U.S. Cellular stock options exercised in 2018 , 2017 and 2016 was $19 million , $1 million and $4 million , respectively. The aggregate intrinsic value at December 31, 2018 , presented in the table above represents the total pre-tax intrinsic value (the difference between U.S. Cellular's closing stock price and the exercise price multiplied by the number of in-the-money options) that would have been received by option holders had all options been exercised on December 31, 2018 .

Long-Term Incentive Plans – Restricted Stock Units

Restricted stock unit awards granted to key employees generally vest after three years. The restricted stock unit awards currently outstanding were granted in 2016 , 2017 and 2018 and will vest in 2019 , 2020 and 2021 , respectively.

U.S. Cellular estimates the fair value of restricted stock units based on the closing market price of U.S. Cellular shares on the date of grant. The fair value is then recognized as compensation cost on a straight-line basis over the requisite service periods of the awards, which is generally the vesting period.

A summary of U.S. Cellular nonvested restricted stock units at December 31, 2018 , and changes during the year then ended is presented in the table below:

Common Restricted Stock Units	Number	Weighted Average Grant Date Fair Value
Nonvested at December 31, 2017	1,483,000	$ 39.67
Granted	559,000	$ 38.19
Vested	(395,000)	$ 37.30
Forfeited	(78,000)	$ 39.78
Nonvested at December 31, 2018	1,569,000	$ 39.74

The total fair value of restricted stock units that vested during 2018 , 2017 and 2016 was $16 million , $11 million and $15 million , respectively. The weighted average grant date fair value per share of the restricted stock units granted in 2018 , 2017 and 2016 was $38.19 , $38.04 and $43.32 , respectively.

Long-Term Incentive Plans – Performance Share Awards (Performance Shares)

Beginning in 2017, U.S. Cellular granted performance shares, specifically performance stock units, to key employees. The performance shares vest after three years. Each recipient may be entitled to shares of U.S. Cellular common stock equal to 50% to 200% of a communicated target award depending on the achievement of predetermined performance-based operating targets over the performance period, which is a one year period beginning on January 1 in the year of grant to December 31 in the year of grant. The remaining time through the end of the vesting period is considered the "time-based period". Performance-based operating targets include Simple Free Cash Flow, Consolidated Total Operating Revenues and Postpaid Handset Voluntary Defections. Subject to vesting during the time-based period, the performance share award agreement provides that in no event shall the award be less than 50% of the target opportunity as of the grant date. The performance shares awards currently outstanding that were granted in 2017 and 2018 and will vest in 2020 and 2021 , respectively.

U.S. Cellular estimates the fair value of performance shares using U.S. Cellular's closing stock price on the date of grant. An estimate of the number of performance shares expected to vest based upon achieving the performance-based operating targets is made and the aggregate fair value is expensed on a straight-line basis over the requisite service period. Each reporting period, during the performance period, the estimate of the number of performance shares expected to vest is reviewed and stock compensation expense is adjusted as appropriate to reflect the revised estimate of the aggregate fair value of the performance shares expected to vest.

A summary of U.S. Cellular's nonvested performance shares and changes during 2018 is presented in the table below:

Common Performance Shares	Number	Weighted Average Grant Date Fair Value
Nonvested at December 31, 2017	342,000	$ 36.92
Granted	357,000	$ 38.81
Change in units based on approved performance factors	111,000	$ 36.92
Forfeited	(42,000)	$ 37.37
Nonvested at December 31, 2018	768,000	$ 37.78

No performance shares vested during 2018 or 2017 . The weighted average grant date fair value per share of the performance shares granted in 2018 and 2017 was $38.81 and $36.92 , respectively.

Long-Term Incentive Plans – Deferred Compensation Stock Units

Certain U.S. Cellular employees may elect to defer receipt of all or a portion of their annual bonuses and to receive a company matching contribution on the amount deferred. All bonus compensation that is deferred by employees electing to participate is immediately vested and is deemed to be invested in U.S. Cellular Common Share stock units. The amount of U.S. Cellular's matching contribution depends on the portion of the annual bonus that is deferred. Participants receive a 25% match for amounts deferred up to 50% of their total annual bonus and a 33% match for amounts that exceed 50% of their total annual bonus; such matching contributions also are deemed to be invested in U.S. Cellular Common Share stock units and vest over three years.

The total fair value of deferred compensation stock units that vested during 2018 , 2017 and 2016 was less than $1 million in each respective year. The weighted average grant date fair value per share of the deferred compensation stock units granted in 2018 , 2017 and 2016 was $40.72 , $36.02 and $41.31 , respectively. As of December 31, 2018 , there were 33,000 vested but unissued deferred compensation stock units valued at $2 million .

Compensation of Non-Employee Directors

U.S. Cellular issued 18,000 , 15,000 and 13,000 Common Shares in 2018 , 2017 and 2016 , respectively, under its Non-Employee Director compensation plan.

Note 18 Business Segment Information

U.S. Cellular and TDS Telecom are billed for services they receive from TDS, consisting primarily of information processing, accounting and finance, and general management services. Such billings are based on expenses specifically identified to U.S. Cellular and TDS Telecom and on allocations of common expenses. Management believes the method used to allocate common expenses is reasonable and that all expenses and costs applicable to U.S. Cellular and TDS Telecom are reflected in the accompanying business segment information on a basis that is representative of what they would have been if U.S. Cellular and TDS Telecom operated on a stand-alone basis. TDS has re-evaluated internal reporting roles with regard to its HMS business unit and, as a result, has changed its reportable segments. Effective January 1, 2018, HMS is no longer reported under TDS Telecom, but is reported as a part of Corporate, Eliminations and Other. Prior periods have been recast to conform to the revised presentation.

Financial data for TDS' reportable segments for 2018 , 2017 and 2016 , is as follows. See Note 1 — Summary of Significant Accounting Policies and Recent Accounting Pronouncements for additional information.

		TDS Telecom				
Year ended or as of December 31, 2018[1]	**U.S. Cellular**	**Wireline**	**Cable**	**TDS Telecom Total [2]**	**Corporate, Eliminations and Other**	**Total**
(Dollars in millions)						
Operating revenues						
Service	$ 2,978	$ 697	$ 230	$ 925	$ 96	$ 3,999
Equipment and product sales	989	2	—	2	119	1,110
Total operating revenues	3,967	699	230	927	215	5,109
Cost of services (excluding Depreciation, amortization and accretion expense reported below)	758	266	104	369	79	1,206
Cost of equipment and products	1,031	1	—	1	98	1,130
Selling, general and administrative	1,388	197	57	254	52	1,694
Depreciation, amortization and accretion	640	142	69	212	31	883
(Gain) loss on asset disposals, net	10	(3)	1	(2)	1	9
(Gain) loss on license sales and exchanges, net	(18)	—	—	—	—	(18)
Operating income (loss)	158	95	(2)	93	(46)	205
Equity in earnings of unconsolidated entities	159	—	—	—	1	160
Interest and dividend income	15	7	1	8	3	26
Interest expense	(116)	2	—	2	(58)	(172)
Other, net	(1)	3	—	2	1	2
Income (loss) before income taxes	215	106	(1)	105	(99)	221
Income tax expense (benefit) [3]	51			16	(21)	46
Net income	164			89	(78)	175
Add back:						
Depreciation, amortization and accretion	640	142	69	212	31	883
(Gain) loss on asset disposals, net	10	(3)	1	(2)	1	9
(Gain) loss on license sales and exchanges, net	(18)	—	—	—	—	(18)
Interest expense	116	(2)	—	(2)	58	172
Income tax expense (benefit) [3]	51			16	(21)	46
Adjusted EBITDA [4]	$ 963	$ 243	$ 70	$ 313	$ (9)	$ 1,267
Investments in unconsolidated entities	$ 441	$ 4	$ —	$ 4	$ 35	$ 480
Total assets	$ 7,274	$ 1,304	$ 639	$ 1,934	$ 575	$ 9,783
Capital expenditures	$ 515	$ 176	$ 56	$ 232	$ 20	$ 767

Year ended or as of December 31, 2017	U.S. Cellular	TDS Telecom: Wireline	TDS Telecom: Cable	TDS Telecom Total [2]	Corporate, Eliminations and Other	Total
(Dollars in millions)						
Operating revenues						
Service	$ 2,978	$ 713	$ 206	$ 917	$ 84	$ 3,979
Equipment and product sales	912	1	—	1	152	1,065
Total operating revenues	3,890	714	206	919	235	5,044
Cost of services (excluding Depreciation, amortization and accretion expense reported below)	732	258	98	355	77	1,164
Cost of equipment and products	1,071	2	—	2	122	1,195
Selling, general and administrative [5]	1,412	194	54	248	29	1,689
Depreciation, amortization and accretion	615	151	44	195	34	844
Loss on impairment of goodwill [6]	370	—	—	—	(108)	262
(Gain) loss on asset disposals, net	17	1	2	3	1	21
(Gain) loss on sale of business and other exit costs, net	(1)	—	—	—	—	(1)
(Gain) loss on license sales and exchanges, net	(22)	—	—	—	—	(22)
Operating income (loss)	(304)	108	8	116	80	(108)
Equity in earnings of unconsolidated entities	137	—	—	—	—	137
Interest and dividend income	8	5	—	5	2	15
Interest expense	(113)	—	—	—	(57)	(170)
Other, net [5]	—	3	—	3	1	4
Income (loss) before income taxes	(272)	117	8	125	25	(122)
Income tax expense (benefit) [3]	(287)			(13)	21	(279)
Net income (loss)	15			138	4	157
Add back:						
Depreciation, amortization and accretion	615	151	44	195	34	844
Loss on impairment of goodwill [6]	370	—	—	—	(108)	262
(Gain) loss on asset disposals, net	17	1	2	3	1	21
(Gain) loss on sale of business and other exit costs, net	(1)	—	—	—	—	(1)
(Gain) loss on license sales and exchanges, net	(22)	—	—	—	—	(22)
Interest expense	113	—	—	—	57	170
Income tax expense (benefit) [3]	(287)			(13)	21	(279)
Adjusted EBITDA [4]	$ 820	$ 269	$ 54	$ 323	$ 9	$ 1,152
Investments in unconsolidated entities	$ 415	$ 4	$ —	$ 4	$ 34	$ 453
Total assets	$ 6,841	$ 1,260	$ 644	$ 1,897	$ 557	$ 9,295
Capital expenditures	$ 469	$ 146	$ 55	$ 201	$ 24	$ 694

Year ended or as of December 31, 2016	U.S. Cellular	TDS Telecom: Wireline	TDS Telecom: Cable	TDS Telecom Total [2]	Corporate, Eliminations and Other	Total
(Dollars in millions)						
Operating revenues						
Service	$ 3,081	$ 696	$ 185	$ 880	$ 89	$ 4,050
Equipment and product sales	909	2	—	2	194	1,105
Total operating revenues	3,990	698	185	882	283	5,155
Cost of services (excluding Depreciation, amortization and accretion expense reported below)	760	258	94	352	77	1,189
Cost of equipment and products	1,081	2	—	2	157	1,240
Selling, general and administrative [5]	1,480	200	51	250	32	1,762
Depreciation, amortization and accretion	618	159	37	196	36	850
(Gain) loss on asset disposals, net	22	2	2	4	1	27
(Gain) loss on sale of business and other exit costs, net	—	—	—	—	(1)	(1)
(Gain) loss on license sales and exchanges, net	(19)	(1)	—	(1)	—	(20)
Operating income (loss)	48	77	2	79	(19)	108
Equity in earnings of unconsolidated entities	140	—	—	—	—	140
Interest and dividend income	6	3	—	3	2	11
Interest expense	(113)	1	—	1	(58)	(170)
Other, net [5]	1	3	—	3	(1)	3
Income (loss) before income taxes	82	83	2	85	(75)	92
Income tax expense (benefit) [3]	33			32	(25)	40
Net income (loss)	49			54	(51)	52
Add back:						
Depreciation, amortization and accretion	618	159	37	196	36	850
(Gain) loss on asset disposals, net	22	2	2	4	1	27
(Gain) loss on sale of business and other exit costs, net	—	—	—	—	(1)	(1)
(Gain) loss on license sales and exchanges, net	(19)	(1)	—	(1)	—	(20)
Interest expense	113	(1)	—	(1)	58	170
Income tax expense (benefit) [3]	33			32	(25)	40
Adjusted EBITDA [4]	$ 816	$ 242	$ 41	$ 283	$ 19	$ 1,118
Investments in unconsolidated entities	$ 413	$ 4	$ —	$ 4	$ 34	$ 451
Total assets	$ 7,110	$ 1,229	$ 599	$ 1,831	$ 505	$ 9,446
Capital expenditures	$ 446	$ 108	$ 54	$ 162	$ 22	$ 630

Numbers may not foot due to rounding.

1 As of January 1, 2018, TDS adopted ASU 2014-09 using a modified retrospective approach. Under this method, the new accounting standard is applied only to the most recent period presented. As a result, 2018 amounts include the impacts of ASU 2014-09, but prior periods remain as previously reported, except as specifically stated. See Note 2 — Revenue Recognition for additional information.

2 TDS Telecom Total includes eliminations between the Wireline and Cable segments.

3 Income tax expense (benefit) is not provided at the individual segment level for Wireline and Cable. TDS calculates income tax expense for "TDS Telecom Total".

4 Adjusted earnings before interest, taxes, depreciation, amortization and accretion (Adjusted EBITDA) is a segment measure reported to the chief operating decision maker for purposes of making decisions about allocating resources to the segments and assessing their performance. Adjusted EBITDA is defined as net income, adjusted for the items set forth in the reconciliation above. TDS believes Adjusted EBITDA is a useful measure of TDS' operating results before significant recurring non-cash charges, gains and losses, and other items as presented above as they provide additional relevant and useful information to investors and other users of TDS' financial data in evaluating the effectiveness of its operations and underlying business trends in a manner that is consistent with management's evaluation of business performance.

5 ASU 2017-07, regarding net periodic pension cost and net periodic postretirement benefit cost was adopted as of January 1, 2018, and applied retrospectively. All prior year numbers have been recast to conform to this standard.

6 During 2017, U.S. Cellular recorded a goodwill impairment of $370 million while TDS recorded a goodwill impairment of the U.S. Cellular reporting unit of $227 million . Prior to 2009, TDS accounted for U.S. Cellular's share repurchases as step acquisitions, allocating a portion of the share repurchase value to TDS' Goodwill. Further, goodwill of the U.S. Cellular reporting unit was impaired at the TDS level in 2003 but not at U.S. Cellular. Consequently, U.S. Cellular's goodwill on a stand-alone basis and any resulting impairments of goodwill does not equal the TDS consolidated goodwill related to U.S. Cellular. The TDS adjustment of $143 million is included in "Corporate, Eliminations and Other." During 2017, TDS also recorded a goodwill impairment of $35 million related to its HMS operations included in "Corporate, Eliminations and Other." For further information on the goodwill impairment see Note 7 — Intangible Assets .

Note 19 Supplemental Cash Flow Disclosures

Following are supplemental cash flow disclosures regarding interest paid and income taxes paid.

Year Ended December 31,	**2018**	2017	2016
(Dollars in millions)			
Interest paid	**$ 168**	$ 167	$ 168
Income taxes paid, net of refunds received	**40**	56	(39)

Following are supplemental cash flow disclosures regarding transactions related to stock-based compensation awards. In certain situations, TDS and U.S. Cellular withhold shares that are issuable upon the exercise of stock options or the vesting of restricted shares to cover, and with a value equivalent to, the exercise price and/or the amount of taxes required to be withheld from the stock award holder at the time of the exercise or vesting. TDS and U.S. Cellular then pay the amount of the required tax withholdings to the taxing authorities in cash.

TDS:

Year Ended December 31,	**2018**	2017	2016
(Dollars in millions)			
Common Shares withheld	**676,364**	120,560	126,747
Aggregate value of Common Shares withheld	**$ 21**	$ 3	$ 4
Cash receipts upon exercise of stock options	**48**	7	13
Cash disbursements for payment of taxes	**(6)**	(3)	(4)
Net cash receipts from exercise of stock options and vesting of other stock awards	**$ 42**	$ 4	$ 9

U.S. Cellular:

Year Ended December 31,	**2018**	2017	2016
(Dollars in millions)			
Common Shares withheld	**1,549,800**	144,755	308,010
Aggregate value of Common Shares withheld	**$ 73**	$ 6	$ 13
Cash receipts upon exercise of stock options	**29**	5	12
Cash disbursements for payment of taxes	**(11)**	(4)	(6)
Net cash receipts from exercise of stock options and vesting of other stock awards	**$ 18**	$ 1	$ 6

Note 20 Certain Relationships and Related Transactions

The following persons are partners of Sidley Austin LLP, the principal law firm of TDS and its subsidiaries: Walter C.D. Carlson, a trustee and beneficiary of a voting trust that controls TDS, the non-executive Chairman of the Board and member of the Board of Directors of TDS and a director of U.S. Cellular, a subsidiary of TDS; William S. DeCarlo, the General Counsel of TDS and an Assistant Secretary of TDS and certain subsidiaries of TDS; and Stephen P. Fitzell, the General Counsel of U.S. Cellular and TDS Telecom and an Assistant Secretary of certain subsidiaries of TDS. Walter C.D. Carlson does not provide legal services to TDS or its subsidiaries. TDS, U.S. Cellular and their subsidiaries incurred legal costs from Sidley Austin LLP of $10 million , $11 million and $9 million in 2018 , 2017 and 2016 , respectively.

The Audit Committee of the Board of Directors of TDS is responsible for the review and evaluation of all related-party transactions as such term is defined by the rules of the New York Stock Exchange.

Reports of Management

Management's Responsibility for Financial Statements

Management of Telephone and Data Systems, Inc. has the responsibility for preparing the accompanying consolidated financial statements and for their integrity and objectivity. The statements were prepared in accordance with accounting principles generally accepted in the United States of America and, in management's opinion, were fairly presented. The financial statements included amounts that were based on management's best estimates and judgments. Management also prepared the other information in the annual report and is responsible for its accuracy and consistency with the financial statements.

PricewaterhouseCoopers LLP, an independent registered public accounting firm, has audited these consolidated financial statements in accordance with the standards of the Public Company Accounting Oversight Board (United States) and has expressed herein its unqualified opinion on these financial statements.

/s/ LeRoy T. Carlson, Jr.	/s/ Douglas W. Chambers
LeRoy T. Carlson, Jr.	Douglas W. Chambers
President and	Senior Vice President - Finance and
Chief Executive Officer	Chief Accounting Officer
(principal executive officer)	(principal financial officer and principal
	accounting officer)

/s/ Anita J. Kroll
Anita J. Kroll
Vice President and Controller

Management's Report on Internal Control Over Financial Reporting

Management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act. TDS' internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with accounting principles generally accepted in the United States of America (GAAP). TDS' internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the issuer; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with GAAP, and that receipts and expenditures of the issuer are being made only in accordance with authorizations of management and, where required, the Board of Directors of the issuer; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the issuer's assets that could have a material effect on the interim or annual consolidated financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Under the supervision and with the participation of TDS' management, including its principal executive officer and principal financial officer, TDS conducted an evaluation of the effectiveness of its internal control over financial reporting as of December 31, 2018 , based on the criteria established in the 2013 version of *Internal Control — Integrated Framework* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Management has concluded that TDS maintained effective internal control over financial reporting as of December 31, 2018 , based on criteria established in the 2013 version of *Internal Control — Integrated Framework* issued by the COSO.

The effectiveness of TDS' internal control over financial reporting as of December 31, 2018 , has been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in the firm's report included herein.

/s/ LeRoy T. Carlson, Jr.	/s/ Douglas W. Chambers
LeRoy T. Carlson, Jr.	Douglas W. Chambers
President and	Senior Vice President - Finance and
Chief Executive Officer	Chief Accounting Officer
(principal executive officer)	(principal financial officer and principal
	accounting officer)

/s/ Anita J. Kroll

Anita J. Kroll
Vice President and Controller

Report of Independent Registered Public Accounting Firm

To the Board of Directors and Shareholders of Telephone and Data Systems, Inc.:

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of Telephone and Data Systems, Inc. and its subsidiaries (“the Company”) as of December 31, 2018 and 2017 , and the related consolidated statements of operations, comprehensive income, changes in equity, and cash flows for each of the three years in the period ended December 31, 2018 , including the related notes (collectively referred to as the “consolidated financial statements”). We also have audited the Company's internal control over financial reporting as of December 31, 2018 , based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, based on our audits and the report of other auditors, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2018 and 2017 , and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2018 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2018 , based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the COSO.

We did not audit the financial statements of Los Angeles SMSA Limited Partnership, a 5.5% equity investment of the Company, which is reflected in the consolidated financial statements of the Company as an equity method investment of $262,100,000 and $244,400,000 as of December 31, 2018 and 2017 , respectively, and income from equity investments of $76,900,000 , $66,200,000 and $71,400,000 for each of the three years in the period ended December 31, 2018 . The financial statements of Los Angeles SMSA Limited Partnership were audited by other auditors whose report thereon has been furnished to us, and our opinion on the financial statements expressed herein, insofar as it relates to the amounts included for Los Angeles SMSA Limited Partnership, is based solely on the report of the other auditors.

Change in Accounting Principle

As discussed in Note 2 to the consolidated financial statements, the Company changed the manner in which it accounts for revenues from contracts with customers in 2018.

Basis for Opinions

The Company's management is responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in Management's Report on Internal Control over Financial Reporting appearing under Item 9A. Our responsibility is to express opinions on the Company’s consolidated financial statements and on the Company's internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits and the report of other auditors provide a reasonable basis for our opinions.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ PricewaterhouseCoopers LLP
Chicago, Illinois
February 22, 2019

We have served as the Company's auditor since 2002.

Telephone and Data Systems, Inc.
Selected Consolidated Financial Data

Year Ended or at December 31,	2018[1]	2017	2016	2015	2014
(Dollars and shares in millions, except per share amounts)					
Statement of Operations data					
Operating revenues	**$ 5,109**	$ 5,044	$ 5,155	$ 5,210	$ 5,018
Loss on impairment of goodwill	**—**	262	—	—	88
(Gain) loss on sale of business and other exit costs, net	**—**	(1)	(1)	(136)	(16)
(Gain) loss on license sales and exchanges, net	**(18)**	(22)	(20)	(147)	(113)
Operating income (loss) [2]	**205**	(108)	108	427	(185)
Income tax expense (benefit)	**46**	(279)	40	172	(5)
Net income (loss)	**175**	157	52	263	(147)
Net income (loss) attributable to noncontrolling interests, net of tax	**40**	4	9	44	(11)
Net income (loss) attributable to TDS shareholders	**135**	153	43	219	(136)
Net income (loss) available to common shareholders	**$ 135**	$ 153	$ 43	$ 218	$ (136)
Basic earnings (loss) per share attributable to TDS shareholders	**$ 1.20**	$ 1.39	$ 0.39	$ 2.02	$ (1.26)
Diluted earnings (loss) per share attributable to TDS shareholders	**$ 1.17**	$ 1.37	$ 0.39	$ 1.98	$ (1.26)
Dividends per Common and Series A Common Share	**$ 0.64**	$ 0.62	$ 0.59	$ 0.56	$ 0.54
Balance Sheet data					
Total assets	**$ 9,783**	$ 9,295	$ 9,446	$ 9,422	$ 8,854
Net long-term debt, excluding current portion	**2,418**	2,437	2,433	2,440	1,941
Total TDS shareholders' equity	**$ 4,560**	$ 4,269	$ 4,144	$ 4,126	$ 3,926

1 As of January 1, 2018, TDS adopted ASU 2014-09 using a modified retrospective approach. Under this method, the new accounting standard is applied only to the most recent period presented. As a result, 2018 amounts include the impacts of ASU 2014-09, but prior periods remain as previously reported, except as specifically stated. See Note 2 — Revenue Recognition for additional information.

2 ASU 2017-07, regarding net periodic pension cost and net periodic postretirement benefit cost was adopted as of January 1, 2018, and applied retrospectively. All prior year numbers have been recast to conform to this standard.

Telephone and Data Systems, Inc.
Consolidated Quarterly Information (Unaudited)

2018[1]	Quarter Ended March 31	June 30	September 30	December 31
(Dollars in millions, except per share amounts)				
Operating revenues	$ 1,225	$ 1,255	$ 1,297	$ 1,332
(Gain) loss on asset disposals, net	2	2	—	5
(Gain) loss on license sales and exchanges, net	(7)	(11)	—	—
Operating income	80	61	51	13
Income tax expense (benefit)	24	21	5	(2)
Net income	57	44	53	20
Net income attributable to TDS shareholders	39	33	46	16
Basic earnings per share attributable to TDS shareholders	$ 0.35	$ 0.30	$ 0.41	$ 0.14
Diluted earnings per share attributable to TDS shareholders	$ 0.34	$ 0.29	$ 0.41	$ 0.14

2017	Quarter Ended March 31	June 30	September 30	December 31
(Dollars in millions, except per share amounts)				
Operating revenues	$ 1,238	$ 1,247	$ 1,251	$ 1,308
Loss on impairment of goodwill [2]	—	—	262	—
(Gain) loss on asset disposals, net	4	6	6	5
(Gain) loss on license sales and exchanges, net	(17)	(2)	—	(3)
Operating income (loss) [3]	81	27	(233)	16
Income tax expense (benefit) [4]	34	10	(5)	(319)
Net income (loss)	43	12	(231)	334
Net income (loss) attributable to TDS shareholders	37	10	(181)	287
Basic earnings (loss) per share attributable to TDS shareholders	$ 0.34	$ 0.09	$ (1.64)	$ 2.59
Diluted earnings (loss) per share attributable to TDS shareholders	$ 0.33	$ 0.09	$ (1.64)	$ 2.54

Due to rounding, the sum of quarterly results may not equal the total for the year.

1 As of January 1, 2018, TDS adopted ASU 2014-09 using a modified retrospective approach. Under this method, the new accounting standard is applied only to the most recent period presented. As a result, 2018 amounts include the impacts of ASU 2014-09, but prior periods remain as previously reported, except as specifically stated. See Note 2 — Revenue Recognition for additional information.

2 See Note 7 — Intangible Assets for additional information on Loss on impairment of goodwill.

3 ASU 2017-07, regarding net periodic pension cost and net periodic postretirement benefit cost was adopted as of January 1, 2018, and applied retrospectively. All prior year numbers have been recast to conform to this standard.

4 In December 2017, the Tax Act was enacted. The Tax Act reduced the federal income tax rate from 35% to 21%. See Note 5 — Income Taxes for additional information.

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Telephone and Data Systems, Inc.
Shareholder Information

Stock and Dividend Information

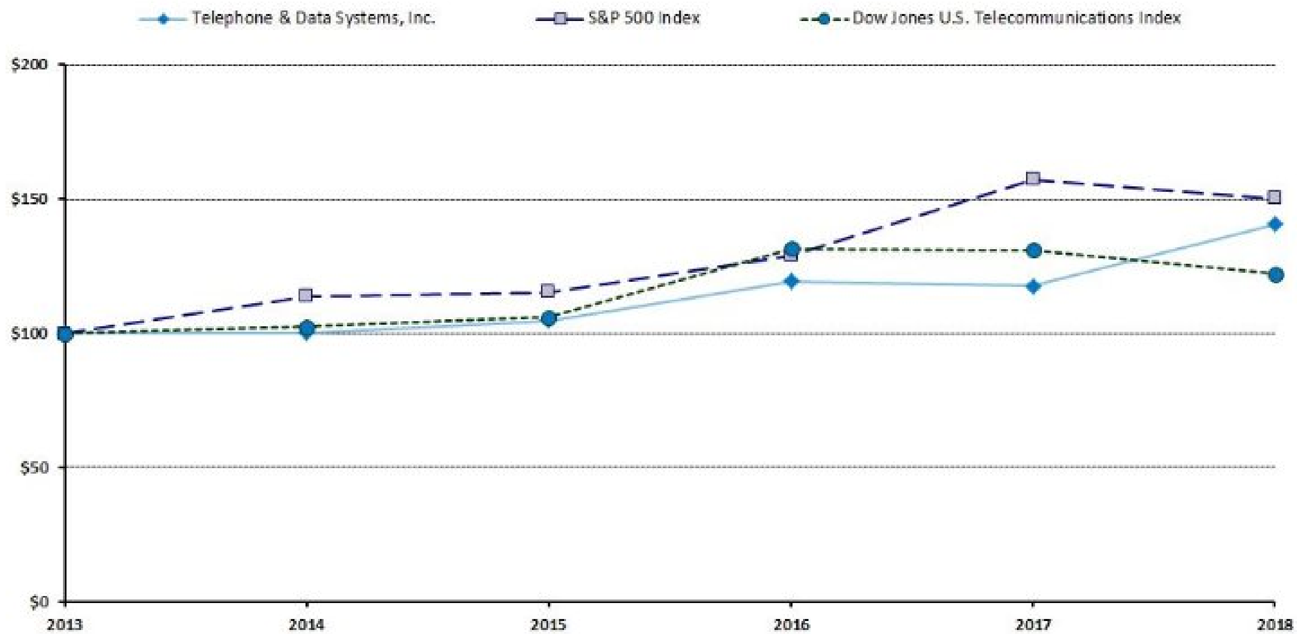
TDS' Common Shares are listed on the New York Stock Exchange under the symbol “TDS.” As of January 31, 2019 , the last trading day of the month, TDS Common Shares were held by 1,223 record owners, and the Series A Common Shares were held by 68 record owners.

TDS has paid cash dividends on its common stock since 1974, and paid dividends of $0.64 per Common and Series A Common Share during 2018 . During 2017 , TDS paid dividends of $0.62 per Common and Series A Common Share.

The Common Shares of United States Cellular Corporation, an 82% -owned subsidiary of TDS, are listed on the NYSE under the symbol “USM.”

Stock Performance Graph

The following chart provides a comparison of TDS’ cumulative total return to shareholders (stock price appreciation plus dividends) during the previous five years to the returns of the Standard & Poor's 500 Composite Stock Price Index and the Dow Jones U.S. Telecommunications Index.



Note: Cumulative total return assumes reinvestment of dividends.

		2013		2014		2015		2016		2017		2018
Telephone and Data Systems Common Shares (NYSE: TDS)	$	100	$	100.02	$	104.70	$	119.29	$	117.64	$	140.68
S&P 500 Index		100		113.69		115.26		129.05		157.22		150.33
Dow Jones U.S. Telecommunications Index		100		102.39		105.99		131.38		131.02		122.20

The comparison above assumes $100.00 invested at the close of trading on the last trading day preceding the first day of 2013 , in TDS Common Shares, S&P 500 Index and the Dow Jones U.S. Telecommunications Index.

Dividend Reinvestment Plan

TDS’ dividend reinvestment plans provide its common shareholders with a convenient and economical way to participate in the future growth of TDS. Holders of record of ten (10) or more Common Shares may purchase Common Shares with their reinvested dividends at a five percent discount from market price. Common Shares may also be purchased on a monthly basis through optional cash payments by participants in this plan. The initial ten (10) shares cannot be purchased directly from TDS. An authorization card and prospectus will be mailed automatically by the transfer agent to all registered record holders with ten (10) or more shares. Once enrolled in the plan, there are no brokerage commissions or service charges for purchases made under the plan.

Investor relations

TDS' annual report, SEC filings and news releases are available to investors, securities analysts and other members of the investment community. These reports are provided, without charge, upon request to our Investor Relations department at the address below. Investors may also access these and other reports through the Investor Relations portion of the TDS website (*www.tdsinc.com*).

Questions regarding lost, stolen or destroyed certificates, consolidation of accounts, transferring of shares and name or address changes should be directed to:

Julie Mathews, IRC, Director — Investor Relations
Telephone and Data Systems, Inc.
30 North LaSalle Street, Suite 4000
Chicago, IL 60602
312.592.5341
julie.mathews@tdsinc.com

General inquiries by investors, securities analysts and other members of the investment community should be directed to:

Jane W. McCahon, Senior Vice President — Corporate Relations and Corporate Secretary
Telephone and Data Systems, Inc.
30 North LaSalle Street, Suite 4000
Chicago, IL 60602
312.592.5379
jane.mccahon@tdsinc.com

Directors and executive officers
See “Election of Directors” and “Executive Officers” sections of the Proxy Statement issued in 2019 for the 2019 Annual Meeting.

Principal counsel
Sidley Austin LLP, Chicago, Illinois

Transfer agent
Computershare Trust Company, N.A.
462 South 4th Street, Suite 1600
Louisville, KY 40202
312.360.5326

Independent registered public accounting firm
PricewaterhouseCoopers LLP

Visit TDS' web site at *www.tdsinc.com*

Exhibit 21

TELEPHONE AND DATA SYSTEMS, INC.
SUBSIDIARY COMPANIES
December 31, 2018

SUBSIDIARY COMPANIES	STATE OF ORGANIZATION
U.S. CELLULAR	
UNITED STATES CELLULAR CORPORATION	DELAWARE
BANGOR CELLULAR TELEPHONE, L.P.	DELAWARE
CALIFORNIA RURAL SERVICE AREA #1, INC.	CALIFORNIA
CEDAR RAPIDS CELLULAR TELEPHONE, L.P.	DELAWARE
CELLVEST, INC.	DELAWARE
CENTRAL CELLULAR TELEPHONES, LTD.	ILLINOIS
CHAMPLAIN CELLULAR, INC.	NEW YORK
COMMUNITY CELLULAR TELEPHONE COMPANY	TEXAS
CROWN POINT CELLULAR, INC.	NEW YORK
DUBUQUE CELLULAR TELEPHONE, L.P.	DELAWARE
HARDY CELLULAR TELEPHONE COMPANY	DELAWARE
INDIANA RSA # 5, INC.	INDIANA
INDIANA RSA NO. 4 LIMITED PARTNERSHIP	INDIANA
INDIANA RSA NO. 5 LIMITED PARTNERSHIP	INDIANA
IOWA RSA # 3, INC.	DELAWARE
IOWA RSA # 9, INC.	DELAWARE
IOWA RSA # 12, INC.	DELAWARE
JACKSONVILLE CELLULAR PARTNERSHIP	NORTH CAROLINA
JACKSONVILLE CELLULAR TELEPHONE COMPANY	NORTH CAROLINA
KANSAS #15 LIMITED PARTNERSHIP	DELAWARE
KENOSHA CELLULAR TELEPHONE, L.P.	DELAWARE
LAB465, LLC	ILLINOIS
MADISON CELLULAR TELEPHONE COMPANY	WISCONSIN
MAINE RSA # 1, INC.	MAINE
MAINE RSA # 4, INC.	MAINE
MCDANIEL CELLULAR TELEPHONE COMPANY	DELAWARE
MINNESOTA INVCO OF RSA # 7, INC.	DELAWARE
NEWPORT CELLULAR, INC.	NEW YORK
NH #1 RURAL CELLULAR, INC.	NEW HAMPSHIRE
OREGON RSA #2, INC.	OREGON
PCS WISCONSIN, LLC	WISCONSIN
RACINE CELLULAR TELEPHONE COMPANY	WISCONSIN
TENNESSEE NO. 3, LIMITED PARTNERSHIP	TENNESSEE
TEXAHOMA CELLULAR LIMITED PARTNERSHIP	TEXAS
TEXAS INVCO OF RSA # 6, INC.	DELAWARE
TOWNSHIP CELLULAR TELEPHONE, INC.	DELAWARE
UNITED STATES CELLULAR INVESTMENT CO. OF OKLAHOMA CITY, LLC.	OKLAHOMA
UNITED STATES CELLULAR INVESTMENT COMPANY, LLC	DELAWARE
UNITED STATES CELLULAR INVESTMENT CORPORATION OF LOS ANGELES	INDIANA
UNITED STATES CELLULAR OPERATING COMPANY LLC	DELAWARE
UNITED STATES CELLULAR OPERATING COMPANY OF BANGOR	MAINE
UNITED STATES CELLULAR OPERATING COMPANY OF CEDAR RAPIDS	DELAWARE
UNITED STATES CELLULAR OPERATING COMPANY OF CHICAGO, LLC	DELAWARE

UNITED STATES CELLULAR OPERATING COMPANY OF DUBUQUE	IOWA
UNITED STATES CELLULAR OPERATING COMPANY OF KNOXVILLE	TENNESSEE
UNITED STATES CELLULAR OPERATING COMPANY OF MEDFORD	OREGON
UNITED STATES CELLULAR OPERATING COMPANY OF YAKIMA	WASHINGTON
UNITED STATES CELLULAR TELEPHONE COMPANY (GREATER KNOXVILLE), L.P.	TENNESSEE
USCC DISTRIBUTION CO., LLC	DELAWARE
USCC EIP LLC	DELAWARE
USCC FINANCIAL L.L.C.	ILLINOIS
USCC FIRST RESPONDER, INC.	DELAWARE
USCC MASTER NOTE TRUST	DELAWARE
USCC PURCHASE, LLC	DELAWARE
USCC RECEIVABLES FUNDING LLC	DELAWARE
USCC SERVICES, LLC	DELAWARE
USCC WIRELESS INVESTMENT, INC.	DELAWARE
USCCI CORPORATION	DELAWARE
USCIC OF FRESNO	CALIFORNIA
USCOC NEBRASKA/KANSAS, INC.	DELAWARE
USCOC NEBRASKA/KANSAS, LLC	DELAWARE
USCOC OF CENTRAL ILLINOIS, LLC	ILLINOIS
USCOC OF CHICAGO REAL ESTATE HOLDINGS, LLC	DELAWARE
USCOC OF CUMBERLAND, LLC	DELAWARE
USCOC OF GREATER IOWA, LLC	DELAWARE
USCOC OF GREATER MISSOURI, LLC	DELAWARE
USCOC OF GREATER NORTH CAROLINA, LLC	DELAWARE
USCOC OF GREATER OKLAHOMA, LLC	OKLAHOMA
USCOC OF JACK/WIL, INC.	DELAWARE
USCOC OF JACKSONVILLE, LLC	DELAWARE
USCOC OF LACROSSE, LLC	WISCONSIN
USCOC OF OREGON RSA # 5, INC.	DELAWARE
USCOC OF PENNSYLVANIA RSA NO. 10-B2, LLC	DELAWARE
USCOC OF RICHLAND, INC.	WASHINGTON
USCOC OF ROCHESTER, INC.	DELAWARE
USCOC OF SOUTH CAROLINA RSA # 4, INC.	SOUTH CAROLINA
USCOC OF TEXAHOMA, INC.	TEXAS
USCOC OF VIRGINIA RSA # 3, INC.	VIRGINIA
USCOC OF WASHINGTON-4, INC.	DELAWARE
VERMONT RSA NO. 2-B2, INC.	DELAWARE
WASHINGTON RSA # 5, INC.	WASHINGTON
WESTELCOM CELLULAR, INC.	NEW YORK
WESTERN SUB-RSA LIMITED PARTNERSHIP	DELAWARE
YAKIMA MSA LIMITED PARTNERSHIP	DELAWARE
TDS TELECOMMUNICATIONS	
TDS TELECOMMUNICATIONS LLC	DELAWARE
INCUMBENT LOCAL EXCHANGE COMPANIES	
AMELIA TELEPHONE CORPORATION	VIRGINIA
ARCADIA TELEPHONE COMPANY	OHIO
ARIZONA TELEPHONE COMPANY	ARIZONA
ARVIG TELEPHONE COMPANY	MINNESOTA
ASOTIN TELEPHONE COMPANY	WASHINGTON

BADGER TELECOM, LLC	DELAWARE
BLACK EARTH TELEPHONE COMPANY, LLC	DELAWARE
BLUE RIDGE TELEPHONE COMPANY	GEORGIA
BONDUEL TELEPHONE COMPANY, LLC	DELAWARE
BRIDGE WATER TELEPHONE COMPANY	MINNESOTA
BURLINGTON, BRIGHTON & WHEATLAND TELEPHONE COMPANY, LLC	DELAWARE
BUTLER TELEPHONE COMPANY, INC.	ALABAMA
CALHOUN CITY TELEPHONE COMPANY, INC.	MISSISSIPPI
CAMDEN TELEPHONE AND TELEGRAPH COMPANY, INC.	GEORGIA
CAMDEN TELEPHONE COMPANY, INC.	INDIANA
CENTRAL STATE TELEPHONE COMPANY, LLC	DELAWARE
CHATHAM TELEPHONE COMPANY	MICHIGAN
COBBOSSEECONTEE TELEPHONE COMPANY	MAINE
COMMUNICATION CORPORATION OF MICHIGAN	MICHIGAN
COMMUNICATIONS CORPORATION OF INDIANA	INDIANA
COMMUNICATIONS CORPORATION OF SOUTHERN INDIANA	INDIANA
CONCORD TELEPHONE EXCHANGE, INC.	TENNESSEE
CONTINENTAL TELEPHONE COMPANY	OHIO
DELTA COUNTY TELE-COMM, INC.	COLORADO
DEPOSIT TELEPHONE COMPANY, INC.	NEW YORK
DICKEYVILLE TELEPHONE, LLC	DELAWARE
EASTCOAST TELECOM OF WISCONSIN, LLC	DELAWARE
EDWARDS TELEPHONE COMPANY, INC.	NEW YORK
GRANTLAND TELECOM, LLC	DELAWARE
HAMPDEN TELEPHONE COMPANY	MAINE
HAPPY VALLEY TELEPHONE COMPANY	CALIFORNIA
HARTLAND & ST. ALBANS TELEPHONE COMPANY	MAINE
HOLLIS TELEPHONE COMPANY, INC.	NEW HAMPSHIRE
HOME TELEPHONE COMPANY, INC.	INDIANA
HORNITOS TELEPHONE CO.	CALIFORNIA
HUMPHREYS COUNTY TELEPHONE COMPANY	TENNESSEE
ISLAND TELEPHONE COMPANY	MICHIGAN
KEARSARGE TELEPHONE COMPANY	NEW HAMPSHIRE
LESLIE COUNTY TELEPHONE COMPANY	KENTUCKY
LEWIS RIVER TELEPHONE COMPANY, INC.	WASHINGTON
LEWISPORT TELEPHONE COMPANY	KENTUCKY
LITTLE MIAMI COMMUNICATIONS CORPORATION	OHIO
LUDLOW TELEPHONE COMPANY	VERMONT
MAHANOY & MAHANTANGO TELEPHONE COMPANY	PENNSYLVANIA
MCCLELLANVILLE TELEPHONE COMPANY, INC.	SOUTH CAROLINA
MCDANIEL TELEPHONE COMPANY	WASHINGTON
MERRIMACK COUNTY TELEPHONE COMPANY	NEW HAMPSHIRE
MID-AMERICA TELEPHONE, LLC	OKLAHOMA
MID-PLAINS TELEPHONE, LLC	DELAWARE
MID-STATE TELEPHONE COMPANY	MINNESOTA
MIDWAY TELEPHONE COMPANY, LLC	DELAWARE
MOSINEE TELEPHONE COMPANY, LLC	DELAWARE
MT. VERNON TELEPHONE COMPANY, LLC	DELAWARE
MYRTLE TELEPHONE COMPANY, INC.	MISSISSIPPI
NELSON-BALL GROUND TELEPHONE COMPANY	GEORGIA
NEW CASTLE TELEPHONE COMPANY	VIRGINIA

NORTHFIELD TELEPHONE COMPANY	VERMONT
NORWAY TELEPHONE COMPANY, INC.	SOUTH CAROLINA
OAKMAN TELEPHONE COMPANY, INC.	ALABAMA
OAKWOOD TELEPHONE COMPANY	OHIO
OKLAHOMA COMMUNICATION SYSTEMS, LLC	OKLAHOMA
PEOPLES TELEPHONE COMPANY, INC.	ALABAMA
PERKINSVILLE TELEPHONE COMPANY, INC.	VERMONT
PORT BYRON TELEPHONE COMPANY	NEW YORK
POTLATCH TELEPHONE COMPANY	IDAHO
QUINCY TELEPHONE COMPANY	FLORIDA
RIVERSIDE TELECOM, LLC	DELAWARE
S & W TELEPHONE COMPANY, INC.	INDIANA
SALEM TELEPHONE COMPANY	KENTUCKY
SCANDINAVIA TELEPHONE COMPANY, LLC	DELAWARE
SHIAWASSEE TELEPHONE COMPANY	MICHIGAN
SOMERSET TELEPHONE COMPANY	MAINE
SOUTHEAST MISSISSIPPI TELEPHONE COMPANY, INC.	MISSISSIPPI
SOUTHEAST TELEPHONE CO. OF WISCONSIN, LLC	DELAWARE
SOUTHWESTERN TELEPHONE COMPANY	ARIZONA
ST. STEPHEN TELEPHONE COMPANY	SOUTH CAROLINA
STOCKBRIDGE & SHERWOOD TELEPHONE COMPANY, LLC.	DELAWARE
STRASBURG TELEPHONE COMPANY	COLORADO
SUGAR VALLEY TELEPHONE COMPANY	PENNSYLVANIA
TELLICO TELEPHONE COMPANY, INC.	TENNESSEE
TENNESSEE TELEPHONE COMPANY	TENNESSEE
TENNEY TELEPHONE COMPANY, LLC	DELAWARE
THE FARMERS TELEPHONE COMPANY, LLC	DELAWARE
THE HOME TELEPHONE COMPANY OF PITTSBORO, INC.	INDIANA
THE ISLAND TELEPHONE COMPANY	MAINE
THE MERCHANTS AND FARMERS TELEPHONE COMPANY	INDIANA
THE STATE LONG DISTANCE TELEPHONE COMPANY, LLC	DELAWARE
THE VANLUE TELEPHONE COMPANY	OHIO
THE WEST PENOBSCOT TELEPHONE & TELEGRAPH COMPANY	MAINE
TIPTON TELEPHONE COMPANY, INC.	INDIANA
TOWNSHIP TELEPHONE COMPANY, INC.	NEW YORK
TRI-COUNTY TELEPHONE COMPANY, INC.	INDIANA
UNION TELEPHONE COMPANY	NEW HAMPSHIRE
UTELCO, LLC	DELAWARE
VERNON TELEPHONE COMPANY, INC.	NEW YORK
VIRGINIA TELEPHONE COMPANY	VIRGINIA
WARREN TELEPHONE COMPANY	MAINE
WAUNAKEE TELEPHONE COMPANY, LLC	DELAWARE
WEST POINT TELEPHONE COMPANY, INCORPORATED	INDIANA
WILLISTON TELEPHONE COMPANY	SOUTH CAROLINA
WILTON TELEPHONE COMPANY, INC.	NEW HAMPSHIRE
WINSTED TELEPHONE COMPANY	MINNESOTA
WINTERHAVEN TELEPHONE COMPANY	CALIFORNIA
WOLVERINE TELEPHONE COMPANY	MICHIGAN
OTHER COMPANIES	
TDS LONG DISTANCE CORPORATION	DELAWARE

TDS METROCOM, LLC	DELAWARE
TDS TELECOM SERVICE LLC	IOWA
TRI-COUNTY COMMUNICATIONS CORPORATION	INDIANA
TDS GROUP	
AFFILIATE FUND	DELAWARE
AIRADIGM COMMUNICATIONS, INC.	WISCONSIN
INTERLINX COMMUNICATION, LLC	DELAWARE
M.C.T. COMMUNICATIONS, INC.	NEW HAMPSHIRE
NATIONAL TELEPHONE & TELEGRAPH COMPANY	DELAWARE
ONENECK DATA CENTER HOLDINGS LLC	DELAWARE
ONENECK IT SERVICES CORPORATION	DELAWARE
ONENECK IT SOLUTIONS LLC	DELAWARE
ONENECK UK LIMITED	UNITED KINGDOM
SUTTLE-STRAUS, INC.	WISCONSIN
TDS BROADBAND LLC	DELAWARE
TDS BROADBAND SERVICE LLC	DELAWARE
ZOLO BROADCASTING LLC	DELAWARE
TONAQUINT NETWORKS, LLC	DELAWARE

Exhibit 23.1

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statements on Form S-3 (Nos. 333-188965, 333-211486, 333-219698, and 333-219697) and Form S-8 (Nos. 333-58127, 333-105676, 333-179702, 333-179703, 333-185143, 333-190330, 333-197793 and 333-226550) of Telephone and Data Systems, Inc. of our report dated February 22, 2019 , relating to the financial statements and the effectiveness of internal control over financial reporting, which appears in the 2018 Annual Report to Shareholders, which is incorporated by reference in this Annual Report on Form 10-K.

/s/ PricewaterhouseCoopers LLP
Chicago, Illinois
February 22, 2019

Exhibit 23.2

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in the following Registration Statements of Telephone and Data Systems, Inc.:

(1)	Registration Statement (Form S-3 No. 333-188965)
(2)	Registration Statement (Form S-3 No. 333-211486)
(3)	Registration Statement (Form S-8 No. 333-58127)
(4)	Registration Statement (Form S-8 No. 333-105676)
(5)	Registration Statement (Form S-8 No. 333-179702)
(6)	Registration Statement (Form S-8 No. 333-179703)
(7)	Registration Statement (Form S-8 No. 333-185143)
(8)	Registration Statement (Form S-8 No. 333-190330)
(9)	Registration Statement (Form S-8 No. 333-197793)
(10)	Registration Statement (Form S-3 No. 333-219697)
(11)	Registration Statement (Form S-3 No. 333-219698); and
(12)	Registration Statement (Form S-8 No. 333-226550);

of our report dated February 22, 2019 , with respect to the consolidated financial statements of Los Angeles SMSA Limited Partnership and Subsidiary included in this Annual Report (Form 10-K) of Telephone and Data Systems, Inc. for the year ended December 31, 2018 .

/s/ Ernst & Young LLP

Orlando, Florida
February 22, 2019

Exhibit 31.1

Certification of principal executive officer

I, LeRoy T. Carlson, Jr., certify that:

1. I have reviewed this annual report on Form 10-K of Telephone and Data Systems, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant’s other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
    a. designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
    b. designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
    c. evaluated the effectiveness of the registrant’s disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
    d. disclosed in this report any change in the registrant’s internal control over financial reporting that occurred during the registrant’s most recent fiscal quarter (the registrant’s fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant’s internal control over financial reporting; and
5. The registrant’s other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant’s auditors and the audit committee of the registrant’s board of directors (or persons performing the equivalent functions):
    a. all significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant’s ability to record, process, summarize and report financial information; and
    b. any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant’s internal control over financial reporting.

Date: February 22, 2019

/s/ LeRoy T. Carlson, Jr.

LeRoy T. Carlson, Jr.
President and Chief Executive Officer
(principal executive officer)

Exhibit 31.2

Certification of principal financial officer

I, Douglas W. Chambers, certify that:

1. I have reviewed this annual report on Form 10-K of Telephone and Data Systems, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
    a. designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
    b. designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
    c. evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
    d. disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
    a. all significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
    b. any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: February 22, 2019

/s/ Douglas W. Chambers

Douglas W. Chambers
Senior Vice President - Finance and Chief Accounting Officer
(principal financial officer
and principal accounting officer)

Exhibit 32.1

Certification Pursuant to Section 1350 of Chapter 63
of Title 18 of the United States Code

I, LeRoy T. Carlson, Jr., the principal executive officer of Telephone and Data Systems, Inc., certify that (i) the annual report on Form 10-K for the year ended December 31, 2018 , fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934 and (ii) the information contained in the Form 10-K fairly presents, in all material respects, the financial condition and results of operations of Telephone and Data Systems, Inc.

/s/ LeRoy T. Carlson, Jr.

LeRoy T. Carlson, Jr.

February 22, 2019

A signed original of this written statement required by Section 906 of the Sarbanes-Oxley Act of 2002 has been provided to Telephone and Data Systems, Inc. and will be retained by Telephone and Data Systems, Inc. and furnished to the Securities and Exchange Commission or its staff upon request.

Exhibit 32.2

Certification Pursuant to Section 1350 of Chapter 63
of Title 18 of the United States Code

I, Douglas W. Chambers, the principal financial officer of Telephone and Data Systems, Inc., certify that (i) the annual report on Form 10-K for the year ended December 31, 2018 , fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934 and (ii) the information contained in the Form 10-K fairly presents, in all material respects, the financial condition and results of operations of Telephone and Data Systems, Inc.

/s/ Douglas W. Chambers

Douglas W. Chambers

February 22, 2019

A signed original of this written statement required by Section 906 of the Sarbanes-Oxley Act of 2002 has been provided to Telephone and Data Systems, Inc. and will be retained by Telephone and Data Systems, Inc. and furnished to the Securities and Exchange Commission or its staff upon request.