EXHIBIT 5

AUDITED CONSOLIDATED ANNUAL 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								
	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
(Dollars in millions, except per share amounts)									
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.

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.

Year Ended December 31, 2018	U.S. Cellular	TDS Telecom: Wireline	TDS Telecom: Cable	TDS Telecom: 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.

(Dollars in millions)		Contract Assets
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.

(Dollars in millions)		Contract Liabilities
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.

(Dollars in millions)		Service Revenue
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.

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.

	U.S. Cellular	Wireline	Cable	Total
(Dollars in millions)				
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.

	U.S. Cellular	Wireline	Cable	Other	Total
(Dollars in millions)					
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:

				December 31, 2018			December 31, 2017		
	Issuance date	Maturity date	Call date (any time on or after)	Principal Amount	Less Unamortized discount and debt issuance costs	Total	Principal Amount	Less Unamortized discount and debt issuance costs	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:

(Dollars in millions)		Purchase Obligations
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.

	Common Shares	Series A Common Shares	Common Treasury Shares
(Shares in millions)			
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. President and Chief Executive Officer (principal executive officer)	Douglas W. Chambers Senior Vice President - Finance and Chief Accounting 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.