SIRIUS XM RADIO INC.

(Exact name of company as specified in its charter)

ANNUAL REPORT

For the Fiscal Year Ended December 31, 2019

Explanatory Note

Sirius XM Radio Inc. ("Sirius XM") is furnishing this Annual Report for the fiscal year ended December 31, 2019 (the "Annual Report") in order to comply with the reporting obligations in the indentures governing its 3.875% Senior Notes due 2022, 4.625% Senior Notes due 2023, 4.625% Senior Notes due 2024, 5.375% Senior Notes due 2025, 5.375% Senior Notes due 2026, 5.00% Senior Notes due 2027 and 5.50% Senior Notes due 2029 (collectively, the "Notes").

Before making any investment decisions in Sirius XM or Sirius XM Holdings Inc. ("Holdings"), investors should read the following consolidated financial statements and Management's Discussion and Analysis of Financial Condition and Results of Operations ("MD&A") of Sirius XM in conjunction with Holdings' Annual Report on Form 10-K for the fiscal year ended December 31, 2019 and Holdings' other reports available through the Securities and Exchange Commission website at www.sec.gov and our website at www.siriusxm.com, and with Sirius XM's other reports available through our website. Holdings' Annual Report on Form 10-K for the fiscal year ended December 31, 2019 is hereby incorporated by reference except for Section 9A and Exhibits 31.1, 31.2, 32.1 and 32.2 contained therein. Sirius XM is a wholly-owned subsidiary of Holdings and Holdings has no operations independent of Sirius XM. Refer to Note 1 to the consolidated financial statements included within this Annual Report for an explanation of differences between Sirius XM and Holdings' consolidated financial statements.

The terms "Sirius XM," "we," "us," "our," and the "Company," as used herein and unless otherwise stated or indicated by context, refer to Sirius XM Radio Inc. and its subsidiaries. "Pandora" refers to Sirius XM's wholly owned subsidiary Pandora Media, LLC (the successor to Pandora Media, Inc.) and its subsidiaries.

SIRIUS XM RADIO INC. AND SUBSIDIARIES
ANNUAL REPORT
TABLE OF CONTENTS

SELECTED FINANCIAL DATA

The operating and balance sheet data included in the following selected financial data has been derived from our audited consolidated financial statements. The data below includes Pandora's results for the year ended December 31, 2019 (since the date of the Pandora Acquisition on February 1, 2019). This selected financial data should be read in conjunction with the audited Consolidated Financial Statements and related notes thereto, and “Management's Discussion and Analysis of Financial Condition and Results of Operations” included in this Annual Report.

	As of and for the Years Ended December 31,				
(in millions)	2019	2018	2017	2016	2015
Statements of Comprehensive Income Data (1):					
Total revenue	$ 7,794	$ 5,771	$ 5,425	$ 5,017	$ 4,570
Net income attributable to Sirius XM Radio Inc.'s sole stockholder	$ 898	$ 1,176	$ 648	$ 746	$ 510
Balance Sheet Data:					
Cash and cash equivalents	$ 106	$ 54	$ 69	$ 214	$ 112
Restricted investments	$ 14	$ 11	$ 10	$ 10	$ 10
Total assets (2) (3)	$ 19,096	$ 16,214	$ 14,889	$ 13,180	$ 11,569
Long-term debt, net of current portion (3)	$ 7,917	$ 6,885	$ 6,741	$ 5,843	$ 5,444
Stockholder equity (2)	$ 7,136	$ 6,224	$ 5,062	$ 4,396	$ 3,356

(1) Net income (loss) per share for Sirius XM is not presented since Sirius XM is a wholly-owned subsidiary of Holdings.

(2) For the year ended December 31, 2016, we recorded $294 as an increase to our Deferred tax assets and decrease to our Accumulated deficit as a result of the adoption of Accounting Standards Update 2016-09, *Compensation-Stock Compensation (Topic 718)*.

(3) The 2015 balance reflects the adoption of Accounting Standards Update 2015-03, *Interest- Imputation of Interest (Subtopic 835-30): Simplifying the Presentation of Debt Issuance Costs,* and Accounting Standards Update 2015-15, *Presentation and Subsequent Measurement of Debt Issuance Costs Associated with Line-of-Credit Agreements.* As a result of our adoption of these ASUs, Total Assets was reduced by $7 for the year ended December 31, 2015 and Long-term debt, net of current portion, was reduced by $7 for the year ended December 31, 2015.

MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

All amounts referenced in this discussion and analysis are in millions, except subscriber amounts are in thousands and per subscriber and per installation amounts are in ones, unless otherwise stated.

The following discussion and analysis of our financial condition and results of operations should be read in conjunction with our audited consolidated financial statements and related notes included elsewhere in this Annual Report and with Holdings' Annual Report on Form 10-K for the year ended December 31, 2019.

Special Note Regarding Forward-Looking Statements

We have made various statements in this Annual Report that may constitute "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995. Forward-looking statements may also be made in our other reports furnished to holders of the Notes, in our press releases and in other documents. In addition, from time to time, we, through our management, may make oral forward-looking statements. For example, these forward-looking statements may include, among other things, our statements about our outlook and our future results of operations and financial condition; share repurchase plans; the impact of economic and market conditions; and the impact of our acquisition of Pandora. The words "will likely result," "are expected to," "will continue," "is anticipated," "estimated," "believe," "intend," "plan," "may," "should," "could," "would," "likely," "projection," "outlook" and similar expressions are intended to identify forward-looking statements. Forward-looking statements are subject to risks and uncertainties, including those identified above, which could cause actual results to differ materially from such statements. We caution you that the risk factors described above are not exclusive. There may also be other risks that we are unable to predict at this time that may cause actual results to differ materially from those in forward-looking statements. New factors emerge from time to time, and it is not possible for us to predict which will arise or to assess with any precision the impact of each factor on our business or the extent to which any factor, or combination of factors, may cause actual results to differ materially from those contained in any forward-looking statements. We believe these factors include but are not limited to those described under "Part I - Item 1A. Risk Factors" in Holdings' Annual Report on Form 10-K for the fiscal year ended December 31, 2019. These factors should not be construed as exhaustive and should be read in conjunction with the other cautionary statements that are included Holdings' Annual Report on Form 10-K and in this Annual Report. Readers are cautioned not to place undue reliance on these forward-looking statements, which speak only as of the date on which they are made. We undertake no obligation to update publicly or revise any forward-looking statements, except as required by law. New factors emerge from time to time, and it is not possible for us to predict which will arise or to assess with any precision the impact of each factor on our business or the extent to which any factor, or combination of factors, may cause actual results to differ materially from those contained in any forward-looking statements.

Executive Summary

We operate two complementary audio entertainment businesses - our Sirius XM business and our Pandora business.

Sirius XM

Our Sirius XM business features music, sports, entertainment, comedy, talk, news, traffic and weather channels, as well as infotainment services, in the United States on a subscription fee basis. The Sirius XM service is distributed through our two proprietary satellite radio systems and through the internet via applications for mobile devices, home devices and other consumer electronic equipment. Satellite radios are primarily distributed through automakers, retailers and our website. Our Sirius XM service is also available through our user interface, which we call "360L," that combines our satellite and streaming services into a single, cohesive in-vehicle entertainment experience. The primary source of revenue from our Sirius XM business is generated from subscription fees, with most of our customers subscribing to monthly, quarterly, semi-annual or annual plans. We also derive revenue from advertising on select non-music channels, direct sales of our satellite radios and accessories, and other ancillary services. As of December 31, 2019, our Sirius XM business had approximately 34.9 million subscribers.

In addition to our audio entertainment businesses, we provide connected vehicle services to several automakers and directly to consumers through aftermarket devices. These services are designed to enhance the safety, security and driving experience of consumers. We also offer a suite of data services that includes graphical weather, fuel prices, sports schedules and scores and movie listings, a traffic information service that includes information as to road closings, traffic flow and incident data to consumers with compatible in-vehicle navigation systems, and real-time weather services in vehicles, boats and planes.

Sirius XM also holds a 70% equity interest and 33% voting interest in Sirius XM Canada Holdings Inc. ("Sirius XM Canada"). Sirius XM Canada's subscribers are not included in our subscriber count or subscriber-based operating metrics.

Pandora

Our Pandora business operates a music, comedy and podcast streaming discovery platform, offering a personalized experience for each listener wherever and whenever they want to listen, whether through mobile devices, car speakers or connected devices. Pandora enables listeners to create personalized stations and playlists, discover new content, hear artist- and expert-curated playlists, podcasts and select Sirius XM content as well as search and play songs and albums on-demand. Pandora is available as an ad-supported radio service, a radio subscription service, called Pandora Plus, and an on-demand subscription service, called Pandora Premium. As of December 31, 2019, Pandora had approximately 6.2 million subscribers. The majority of revenue from our Pandora business is generated from advertising on our Pandora ad-supported radio service. In addition, through AdsWizz, Pandora provides a comprehensive digital audio advertising technology platform, which connects audio publishers and advertisers. As of December 31, 2019, our Pandora business had approximately 63.5 million monthly active users.

Liberty Media

As of December 31, 2019, Liberty Media beneficially owned, directly and indirectly, approximately 72% of the outstanding shares of Holdings' common stock. As a result, Holdings is a “controlled company” for the purposes of the NASDAQ corporate governance requirements.

Results of Operations

Actual Results

Set forth below are our results of operations for the year ended December 31, 2019 compared with the year ended December 31, 2018 and for the year ended December 31, 2018 compared with the year ended December 31, 2017. The inclusion of Pandora's results in the year ended December 31, 2019 (since the date of the Pandora Acquisition on February 1, 2019) may render direct comparisons with results for prior periods less meaningful. The results of operations are presented for each of our reporting segments for revenue and cost of services and on a consolidated basis for all other items.

	For the Years Ended December 31,			2019 vs 2018 Change		2018 vs 2017 Change	
	2019	2018	2017	Amount	%	Amount	%
Revenue							
Sirius XM:							
Subscriber revenue	$ 5,644	$ 5,264	$ 4,990	$ 380	7 %	$ 274	5 %
Advertising revenue	205	188	160	17	9 %	28	18 %
Equipment revenue	173	155	132	18	12 %	23	17 %
Other revenue	165	164	143	1	1 %	21	15 %
Total Sirius XM revenue	6,187	5,771	5,425	416	7 %	346	6 %
Pandora:							
Subscriber revenue	476	—	—	476	nm	—	nm
Advertising revenue	1,131	—	—	1,131	nm	—	nm
Total Pandora revenue	1,607	—	—	1,607	nm	—	nm
Total consolidated revenue	7,794	5,771	5,425	2,023	35 %	346	6 %
Cost of services							
Sirius XM:							
Revenue share and royalties	1,431	1,394	1,210	37	3 %	184	15 %
Programming and content	444	406	388	38	9 %	18	5 %
Customer service and billing	398	382	385	16	4 %	(3)	(1)%
Transmission	112	96	83	16	17 %	13	16 %
Cost of equipment	29	31	35	(2)	(6)%	(4)	(11)%
Total Sirius XM cost of services	2,414	2,309	2,101	105	5 %	208	10 %
Pandora:							
Revenue share and royalties	860	—	—	860	nm	—	nm
Programming and content	18	—	—	18	nm	—	nm
Customer service and billing	77	—	—	77	nm	—	nm
Transmission	58	—	—	58	nm	—	nm
Total Pandora cost of services	1,013	—	—	1,013	nm	—	nm
Total consolidated cost of services	3,427	2,309	2,101	1,118	48 %	208	10 %
Subscriber acquisition costs	427	470	499	(43)	(9)%	(29)	(6)%
Sales and marketing	937	484	438	453	94 %	46	11 %
Engineering, design and development	280	123	112	157	128 %	11	10 %
General and administrative	524	354	335	170	48 %	19	6 %
Depreciation and amortization	468	301	299	167	55 %	2	1 %
Acquisition and other related costs	84	3	—	81	nm	3	nm
Total operating expenses	6,147	4,044	3,784	2,103	52 %	260	7 %
Income from operations	1,647	1,727	1,641	(80)	(5)%	86	5 %
Other (expense) income:							
Interest expense	(384)	(350)	(346)	(34)	(10)%	(4)	(1)%
Loss on extinguishment of debt	(57)	—	(44)	(57)	nm	44	100 %
Other (expense) income	(24)	44	13	(68)	(155)%	31	238 %
Total other (expense) income	(465)	(306)	(377)	(159)	(52)%	71	19 %
Income before income taxes	1,182	1,421	1,264	(239)	(17)%	157	12 %
Income tax expense	(284)	(245)	(616)	(39)	(16)%	371	60 %
Net income	$ 898	$ 1,176	$ 648	$ (278)	(24)%	$ 528	81 %

nm - not meaningful

Sirius XM Revenue

Refer to page 9 for our discussion on Sirius XM revenue.

Pandora Revenue

Pandora revenue includes actual results for the period from the acquisition date to December 31, 2019. Refer to page 10 for our discussion on Pandora revenue.

Sirius XM Cost of Services

Refer to page 11 for our discussion on Sirius XM cost of services.

Pandora Cost of Services

Pandora cost of services includes actual results for the period from the acquisition date to December 31, 2019. Refer to page 13 for our discussion on Pandora cost of services.

Operating Costs

Subscriber Acquisition Costs are costs associated with our satellite radio service and include hardware subsidies paid to radio manufacturers, distributors and automakers; subsidies paid for chipsets and certain other components used in manufacturing radios; device royalties for certain radios and chipsets; product warranty obligations; and freight. The majority of subscriber acquisition costs are incurred and expensed in advance of acquiring a subscriber. Subscriber acquisition costs do not include advertising costs, marketing, loyalty payments to distributors and dealers of satellite radios or revenue share payments to automakers and retailers of satellite radios.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, subscriber acquisition costs were $427 and $470, respectively, a decrease of 9%, or $43, and decreased as a percentage of total revenue. The decrease was driven by reductions to OEM hardware subsidy rates, lower subsidized costs related to the transition of chipsets, and a decrease in the volume of satellite radio installations.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, subscriber acquisition costs were $470 and $499, respectively, a decrease of 6%, or $29, and decreased as a percentage of total revenue. The decrease was driven by reductions to OEM hardware subsidy rates, lower subsidized costs related to the transition of chipsets, and a decrease in the volume of satellite radio installations.

We expect subscriber acquisition costs to fluctuate with OEM installations; however, the subsidized chipsets cost is expected to decline as we transition to a new generation of chipsets. We intend to continue to offer subsidies and other incentives to induce OEMs to include our technology in their vehicles.

Sales and Marketing includes costs for marketing, advertising, media and production, including promotional events and sponsorships; cooperative and artist marketing; and personnel related costs including salaries, commissions, and sales support. Marketing costs include expenses related to direct mail, outbound telemarketing, email communications, and digital performance media.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, sales and marketing expenses were $937 and $484, respectively, an increase of 94%, or $453, and increased as a percentage of total revenue. The increase was primarily due to the inclusion of Pandora, and additional subscriber communications and acquisition campaigns.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, sales and marketing expenses were $484 and $438, respectively, an increase of 11%, or $46, and increased as a percentage of total revenue. The increase was primarily due to additional subscriber communications, retention programs and acquisition campaigns as well as higher personnel-related costs.

We anticipate that sales and marketing expenses will increase as we expand programs to retain our existing subscribers, win back former subscribers, and attract new subscribers.

Engineering, Design and Development consists primarily of compensation and related costs to develop chipsets and new products and services, including streaming and connected vehicle services, research and development for broadcast information systems and the design and development costs to incorporate Sirius XM radios into new vehicles manufactured by automakers.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, engineering, design and development expenses were $280 and $123, respectively, an increase of 128%, or $157, and increased as a percentage of total revenue. The increase was driven primarily by the inclusion of Pandora.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, engineering, design and development expenses were $123 and $112, respectively, an increase of 10%, or $11, and increased as a percentage of total revenue. The increase was driven by the continued development of our Sirius XM streaming product and connected vehicle services.

We expect engineering, design and development expenses to decrease due to lower personnel-related costs, partially offset by increased costs to develop our infrastructure, products and services.

General and Administrative primarily consists of compensation and related costs for personnel and facilities, and include costs related to our finance, legal, human resources and information technologies departments.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, general and administrative expenses were $524 and $354, respectively, an increase of 48%, or $170, and increased as a percentage of total revenue. The increase was driven by the inclusion of Pandora and by a $25 legal settlement associated with Do-Not-Call litigation.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, general and administrative expenses were $354 and $335, respectively, an increase of 6%, or $19, and decreased as a percentage of total revenue. The increase was primarily driven by higher personnel-related costs, information technology costs, and a one-time charge for sales and use taxes. These increases were partially offset by lower legal costs.

We expect our general and administrative expenses to decrease in absence of the legal settlement and due to lower professional services costs, partially offset by increases to support the growth of our business..

Depreciation and Amortization represents the recognition in earnings of the cost of assets used in operations, including our satellite constellations, property, equipment and intangible assets, over their estimated service lives.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, depreciation and amortization expense was $468 and $301, respectively, an increase of 55%, or $167, and increased as a percentage of total revenue. The increase was driven by the amortization of definite life intangibles resulting from the Pandora Acquisition and higher depreciation costs related to additional assets placed in-service.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, depreciation and amortization expense was $301 and $299, respectively, an increase of 1%, or $2, and decreased as a percentage of total revenue. The increase was driven by additional assets placed in-service, partially offset by acceleration of amortization related to a shorter useful life of certain software during 2017.

Acquisition and Other Related Costs represents expenses associated with the Pandora Acquisition and related reorganization costs.

- *2019 vs. 2018*: For the year ended December 31, 2019 and 2018, acquisition and other related costs were $84 and $3, respectively.
- *2018 vs. 2017*: For the year ended December 31, 2018 acquisition and related costs was $3. There were no acquisition and other related costs in 2017.

Other Income (Expense)

Interest Expense includes interest on outstanding debt.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, interest expense was $384 and $350, respectively, an increase of 10%, or $34. The increase was primarily driven by higher average debt due to the issuances of Sirius XM's 5.500% Senior Notes due 2029 and 4.625% Senior Notes due 2024 as well as the inclusion of Pandora debt, partially offset by the redemption of Sirius XM's 6.00% Senior Notes due 2024, lower interest rates and an increase in capitalized interest associated with construction of new satellites.

- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, interest expense was $350 and $346, respectively, an increase of 1%, or $4. The increase was primarily due to higher average debt outstanding, partially offset by an increase in capitalized interest associated with the construction of new satellites.

Loss on Extinguishment of Debt includes losses incurred as a result of the retirement of certain debt.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, loss on extinguishment of debt, was $57 and $0, respectively. During the year ended December 31, 2019, we recorded losses due to the redemption of $1,500 in principal amount of Sirius XM's 6.00% Senior Notes due 2024 and the repurchase of $151 principal amount of Pandora's 1.75% Convertible Senior Notes due 2020. There was no loss on extinguishment of debt in 2018.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, loss on extinguishment of debt, was $0 and $44, respectively. During the year ended December 31, 2017, we recorded losses due to the redemption of Sirius XM's 4.25% Senior Notes due 2020, 5.75% Senior Notes due 2021, and 5.25% Senior Secured Notes due 2022.

Other (Expense) Income primarily includes realized and unrealized gains and losses, interest and dividend income, our share of the income or loss from equity investments, and transaction costs related to non-operating investments.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, other (expense) income was $(24) and $44, respectively. Other expense for the year ended December 31, 2019 was driven by losses on other investments of $21 and loss on the fair value of Pandora's 2023 Notes of $21; partially offset by interest earned on our loan to Sirius XM Canada of $10, trading gains associated with the investments held for our Deferred Compensation Plan of $4 and interest income of $3. Other income for the year ended December 31, 2018 was driven by unrealized gains of $43 from a fair value adjustment of our investment in Pandora, and interest earned on our loan to Sirius XM Canada of $10, partially offset by losses on other investments of $10.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, other income was $44 and $13, respectively. Other income for the year ended December 31, 2018 was driven by unrealized gains of $43 from a fair value adjustment of our investment in Pandora, and interest earned on our loan to Sirius XM Canada of $10, partially offset by losses on other investments of $10. Other income for the year ended December 31, 2017, included interest earned on our loan to Sirius XM Canada, and our share of Sirius XM Canada's net income, partially offset by transaction costs associated with our investment in Pandora.

Income Taxes

Income Tax Expense includes the change in our deferred tax assets, current federal and state tax expenses, and foreign withholding taxes.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, income tax expense was $284 and $245, respectively, and our effective tax rate was 24.0% and 17.2%, respectively.

  Our effective tax rate of 24.0% for the year ended December 31, 2019 was primarily impacted by the recognition of excess tax benefits related to share-based compensation and benefits related to state and federal research and development and certain other credits, partially offset by the impact of nondeductible officers' compensation. Our effective tax rate of 17.2% for the year ended December 31, 2018 was primarily impacted by the recognition of excess tax benefits related to share based compensation and a benefit related to state and federal research and development credits.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, income tax expense was $245 and $616, respectively, and our effective tax rate was 17.2% and 48.7%, respectively. On December 22, 2017, the U.S. government enacted comprehensive tax legislation commonly referred to as the Tax Cut and Jobs Act (the “Tax Act”). The Tax Act made broad and complex changes to the U.S. tax code, including, accelerated depreciation that will allow for full expensing of qualified property. The Tax Act also reduced the U.S. federal corporate income tax rate from 35% to 21%.

  Our effective tax rate of 17.2% for the year ended December 31, 2018 was primarily impacted by the reduced federal tax rate to 21%, the recognition of excess tax benefits related to share based compensation and a benefit related to state and federal research and development credits. Our effective tax rate of 48.7% for the year ended December 31, 2017 was negatively impacted by the revaluation of our net deferred tax assets, excluding after tax credits, as of December 31, 2017 as a result of the reduction of the federal corporate income tax rate. This was offset by the recognition of excess tax benefits related to share based compensation and a benefit related to federal research and development credits, under the Protecting Americans from Tax Hikes Act of 2015. Based on this revaluation, we recorded an additional tax expense of $185 to reduce our net deferred tax asset balance for the year ended December 31, 2017.

Unaudited Pro Forma Results

Set forth below are our pro forma results of operations for the year ended December 31, 2019 compared with the year ended December 31, 2018 and for the year ended December 31, 2018 compared with the year ended December 31, 2017. These pro forma results are based on estimates and assumptions, which we believe are reasonable. They are not the results that would have been realized had the Pandora Acquisition actually occurred on January 1, 2017 and are not indicative of our consolidated results of operations in future periods. The pro forma results primarily include adjustments related to amortization of acquired intangible assets, depreciation of property and equipment, acquisition costs, fair value gain or loss on the Pandora investment and associated tax impacts. Please refer to the Footnotes to Results of Operations (pages 16 through 21) following our discussion of results of operations.

	For the Years Ended December 31,			2019 vs 2018 Change		2018 vs 2017 Change	
	2019	2018	2017	Amount	%	Amount	%
Revenue	(Pro Forma)	(Pro Forma)	(Pro Forma)				
Sirius XM:							
Subscriber revenue	$ 5,644	$ 5,264	$ 4,990	$ 380	7 %	$ 274	5 %
Advertising revenue	205	188	160	17	9 %	28	18 %
Equipment revenue	173	155	132	18	12 %	23	17 %
Other revenue	172	171	150	1	1 %	21	14 %
Total Sirius XM revenue	6,194	5,778	5,432	416	7 %	346	6 %
Pandora:							
Subscriber revenue	527	478	315	49	10 %	163	52 %
Advertising revenue	1,200	1,092	1,071	108	10 %	21	2 %
Total Pandora revenue	1,727	1,570	1,386	157	10 %	184	13 %
Total consolidated revenue	7,921	7,348	6,818	573	8 %	530	8 %
Cost of services							
Sirius XM:							
Revenue share and royalties	1,431	1,394	1,210	37	3 %	184	15 %
Programming and content	444	406	388	38	9 %	18	5 %
Customer service and billing	398	382	385	16	4 %	(3)	(1)%
Transmission	112	96	83	16	17 %	13	16 %
Cost of equipment	29	31	35	(2)	(6)%	(4)	(11)%
Total Sirius XM cost of services	2,414	2,309	2,101	105	5 %	208	10 %
Pandora:							
Revenue share and royalties	945	929	826	16	2 %	103	12 %
Programming and content	18	11	14	7	64 %	(3)	(21)%
Customer service and billing	85	95	66	(10)	(11)%	29	44 %
Transmission	63	50	48	13	26 %	2	4 %
Total Pandora cost of services	1,111	1,085	954	26	2 %	131	14 %
Total consolidated cost of services	3,525	3,394	3,055	131	4 %	339	11 %
Subscriber acquisition costs	427	470	499	(43)	(9)%	(29)	(6)%
Sales and marketing	973	883	799	90	10 %	84	11 %
Engineering, design and development	294	266	228	28	11 %	38	17 %
General and administrative	540	517	528	23	4 %	(11)	(2)%
Depreciation and amortization	483	465	452	18	4 %	13	3 %
Total operating expenses	6,242	5,995	5,561	247	4 %	434	8 %
Income from operations	1,679	1,353	1,257	326	24 %	96	8 %
Other (expense) income:							
Interest expense	(386)	(377)	(375)	(9)	(2)%	(2)	(1)%
Loss on extinguishment of debt	(57)	(17)	(53)	(40)	(235)%	36	68 %
Other (expense) income	(23)	8	16	(31)	(388)%	(8)	(50)%
Total other (expense) income	(466)	(386)	(412)	(80)	(21)%	26	6 %
Income before income taxes	1,213	967	845	246	25 %	122	14 %
Income tax expense	(291)	(123)	(510)	(168)	(137)%	387	76 %
Net income	$ 922	$ 844	$ 335	$ 78	9 %	$ 509	152 %
Adjusted EBITDA	$ 2,427	$ 2,131	$ 2,006	$ 296	14 %	$ 125	6 %

nm - not meaningful

Sirius XM Revenue

Sirius XM Subscriber Revenue includes fees charged for self-pay and paid promotional subscriptions, U.S. Music Royalty Fees and other ancillary fees.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, subscriber revenue was $5,644 and $5,264, respectively, an increase of 7%, or $380. The increase was primarily driven by higher U.S. Music Royalty Fees due to a higher music royalty rate, higher self-pay subscription revenue as a result of a 3% increase in the daily weighted average number of subscribers and higher revenue from our connected vehicle services.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, subscriber revenue was $5,264 and $4,990, respectively, an increase of 5%, or $274. The increase was primarily driven by higher U.S. Music Royalty Fees due to a higher music royalty rate and higher self-pay subscription revenue as a result of a 5% increase in the daily weighted average number of subscribers. Subscriber revenue was negatively impacted by $95 for the year ended December 31, 2018 due to the adoption of Accounting Standards Update ("ASU") 2014-09, effective January 1, 2018.

We expect subscriber revenues to increase based on the growth of our subscriber base, increases in the average price charged and the sale of additional services to subscribers.

Sirius XM Advertising Revenue includes the sale of advertising on Sirius XM's non-music channels.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, advertising revenue was $205 and $188, respectively, an increase of 9%, or $17. The increase was primarily due to a greater number of advertising spots sold and transmitted as well as increases in rates charged per spot.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, advertising revenue was $188 and $160, respectively, an increase of 18%, or $28. The increase was primarily due to a greater number of advertising spots sold and transmitted as well as increases in rates charged per spot.

We expect our Sirius XM advertising revenue to continue to grow as more advertisers are attracted to our national platform and growing subscriber base.

Sirius XM Equipment Revenue includes revenue and royalties from the sale of satellite radios, components and accessories.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, equipment revenue was $173 and $155, respectively, an increase of 12%, or $18. The increase was driven by an increase in royalty revenue due to our transition to a new generation of chipsets.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, equipment revenue was $155 and $132, respectively, an increase of 17%, or $23. The increase was driven by an increase in royalty revenue due to our transition to a new generation of chipsets.

We expect equipment revenue to increase as royalty revenue associated with certain new chipsets increases.

Sirius XM Other Revenue includes service and advisory revenue from our Sirius XM Canada, our connected vehicle services, and ancillary revenues.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, other revenue was $172 and $171, respectively, an increase of 1%, or $1. The increase was primarily driven by higher royalty revenue generated from Sirius XM Canada, partially offset by a decrease in data usage revenue generated from our connected vehicle services.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, other revenue was $171 and $150, respectively, an increase of 14%, or $21. The increase was primarily driven by higher revenue generated from our connected vehicle services and from Sirius XM Canada.

We expect other revenue to increase due to additional revenues generated from our connected vehicle services.

Pandora Revenue

Pandora Subscriber Revenue includes fees charged for Pandora Plus and Pandora Premium subscriptions.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, Pandora subscriber revenue was $527 and $478, respectively, an increase of 10%, or $49. The increase was primarily due to a greater weighted average number of subscribers and an increase in the average price per paid subscriber due to the growth of Pandora Premium.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, Pandora subscriber revenue was $478 and $315, respectively, an increase of 52%, or $163. The increase was primarily due to an increase in the weighted average number of subscribers and an increase in the average price per paid subscriber due to the growth of Pandora Premium.

We expect Pandora subscriber revenues to increase with the growth in our Pandora subscriber base.

Pandora Advertising Revenue is generated primarily from audio, display and video advertising.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, Pandora advertising revenue was $1,200 and $1,092, respectively, an increase of 10%, or $108. The increase was primarily due to growth in our off-platform advertising revenue, increased sell-through percentage, increases in the average price per ad and revenue growth in the AdsWizz business.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, Pandora advertising revenue was $1,092 and $1,071, respectively, an increase of 2%, or $21. The increase was primarily due to increases in the average price per ad and increases in our off-platform revenue.

We expect our Pandora advertising revenue to continue to increase due to our off-platform advertising opportunities.

Total Consolidated Revenue

Total Consolidated Revenue for the years ended December 31, 2019 and 2018, was $7,921 and $7,348, respectively, an increase of 8%, or $573. Total Consolidated Revenue for the years ended December 31, 2018 and 2017, was $7,348 and $6,818, respectively, an increase of 8%, or $530.

Sirius XM Cost of Services

Sirius XM Cost of Services includes revenue share and royalties, programming and content, customer service and billing and transmission expenses.

Sirius XM Revenue Share and Royalties include royalties for transmitting content, including streaming royalties, as well as automaker, content provider and advertising revenue share.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, revenue share and royalties were $1,431 and $1,394, respectively, an increase of 3%, or $37, but decreased as a percentage of total Sirius XM revenue. The increase was driven by overall greater revenues subject to royalties and revenue share. The increase was partially offset by a $69 charge during the second quarter of 2018 related to the legal settlement that resolved all outstanding claims, including ongoing audits, under Sirius XM's statutory license for sound recordings for the period January 1, 2007 through December 31, 2017.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, revenue share and royalties were $1,394 and $1,210, respectively, an increase of 15%, or $184, and increased as a percentage of total Sirius XM revenue. The increase was driven by an increase in the statutory royalty rate applicable to our use of post-1972 recordings, which increased from 11% in 2017 to 15.5% in 2018, and overall greater revenues subject to revenue share with the automakers. Included in the increase was a $69 charge related to the legal settlement that resolved outstanding claims, including ongoing audits, under our statutory license for sound recordings for the period January 1, 2007 through December 31, 2017. In 2017, we recorded $45 of expense related to music royalty legal settlements and related reserves. The increase was partially offset by approximately $88 for the year ended December 31, 2018, related to the adoption of ASU 2014-09, which established Accounting Standard Codification (ASC) Topic 606, *Revenue - Revenue from Contracts with Customers,* effective as of January 1, 2018.

We expect our Sirius XM revenue share and royalty costs to increase as our revenues grow.

Sirius XM Programming and Content includes costs to acquire, create, promote and produce content. We have entered into various agreements with third parties for music and non-music programming that require us to pay license fees and other amounts.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, programming and content expenses were $444 and $406, respectively, an increase of 9%, or $38, and increased as a percentage of total Sirius XM revenue. The increase was primarily driven by higher content licensing costs as well as greater personnel-related costs.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, programming and content expenses were $406 and $388, respectively, an increase of 5%, or $18, but decreased as a percentage of total Sirius XM revenue. The increase was driven primarily by personnel-related costs, and higher music licensing costs.

We expect our Sirius XM programming and content expenses to increase as we offer additional programming and renew or replace expiring agreements.

Sirius XM Customer Service and Billing includes costs associated with the operation and management of internal and third party customer service centers, and our subscriber management systems as well as billing and collection costs, bad debt expense, and transaction fees.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, customer service and billing expenses were $398 and $382, respectively, an increase of 4%, or $16, but decreased as a percentage of total Sirius XM revenue. The increase was driven by increased transaction fees from a larger subscriber base and higher bad debt expense.

- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, customer service and billing expenses were $382 and $385, respectively, a decrease of 1%, or $3, and decreased as a percentage of total Sirius XM revenue. The decrease was primarily driven by lower call center costs due to lower agent rates, increased customer self-service and improved non-pay processes driving lower bad debt expense, partially offset by increased transaction fees from a larger subscriber base and personnel-related costs.

We expect our Sirius XM customer service and billing expenses to increase as our subscriber base grows.

Sirius XM Transmission consists of costs associated with the operation and maintenance of our terrestrial repeater networks; satellites; satellite telemetry, tracking and control systems; satellite uplink facilities; studios; and delivery of our Internet streaming and connected vehicle services.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, transmission expenses were $112 and $96, respectively, an increase of 17%, or $16, and increased as a percentage of total Sirius XM revenue. The increase was primarily driven by higher cloud hosting and costs associated with our streaming services and higher repeater network costs.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, transmission expenses were $96 and $83, respectively, an increase of 16%, or $13, and increased as a percentage of total Sirius XM revenue. The increase was primarily driven by higher wireless costs associated with our connected vehicle services and higher streaming costs.

We expect our Sirius XM transmission expenses to increase as costs associated with our investments in streaming grow.

Sirius XM Cost of Equipment includes costs from the sale of satellite radios, components and accessories and provisions for inventory allowance attributable to products purchased for resale in our direct to consumer distribution channels.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, cost of equipment was $29 and $31, respectively, a decrease of 6%, or $2, and decreased as a percentage of equipment revenue. The decrease was primarily due to lower direct sales to satellite radio and connected vehicle consumers, partially offset by an increase in our inventory reserve.

- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, cost of equipment was $31 and $35, respectively, a decrease of 11%, or $4, and decreased as a percentage of equipment revenue. The decrease was primarily due to lower direct satellite radio sales to consumers.

We expect our Sirius XM cost of equipment to fluctuate primarily as a result of sales of satellite radios and connected vehicle devices.

Pandora Cost of Services

Pandora Cost of Services includes revenue share and royalties, programming and content, customer service and billing, and transmission expenses.

Pandora Revenue Share and Royalties includes licensing fees paid for streaming music or other content to our subscribers and listeners as well as revenue share paid to third party ad servers. We make payments to third party ad servers for the period the advertising impressions are delivered or click-through actions occur, and accordingly, we record this as a cost of service in the related period.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, revenue share and royalties were $945 and $929, respectively, an increase of 2%, or $16, but decreased as a percentage of total Pandora revenue. The increase was primarily attributable to higher revenue share driven by growth of our off platform revenue, partially offset by lower royalty costs resulting from renegotiated agreements with record labels, music and sound recording copyright holders and distributors.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, revenue share and royalties were $929 and $826, respectively, an increase of 12%, or $103, but decreased as a percentage of total Pandora revenue. The increase was due to minimum guarantee accruals related to our direct license agreements with major and independent labels, distributors, performing rights organizations and publishers.

We expect our Pandora revenue share and royalty costs to increase as off-platform revenue increases.

Pandora Programming and Content includes costs to produce live listener events and promote content.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, programming and content expenses were $18 and $11, respectively, an increase of 64%, or $7, and increased as a percentage of total Pandora revenue. The increase was primarily attributable to higher personnel-related and content costs.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, programming and content expenses were $11 and $14, respectively, a decrease of 21%, or $3, and decreased as a percentage of total Pandora revenue. The decrease was primarily attributable to lower content costs.

We expect our Pandora programming and content costs to increase as we offer additional programming and continue to produce live listener events and promote content.

Pandora Customer Service and Billing includes transaction fees on subscription purchases through mobile app stores and bad debt expense.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, customer service and billing expenses were $85 and $95, respectively, a decrease of 11%, or $10, and decreased as a percentage of total Pandora revenue. The decrease was primarily driven by lower bad debt expense due to recoveries and lower transaction fees.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, customer service and billing expenses were $95 and $66, respectively, an increase of 44%, or $29, and increased as a percentage of total Pandora revenue. The increase was primarily driven by higher transaction fees and bad debt expense from higher average subscriber balances.

We expect our Pandora customer service and billing costs to increase as our subscriber base grows.

Pandora Transmission includes costs associated with content streaming, maintaining our streaming radio and on-demand subscription services and creating and serving advertisements through third-party ad servers.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, transmission expenses were $63 and $50, respectively, an increase of 26%, or $13, and increased as a percentage of total Pandora revenue. The increase was primarily driven by web hosting and personnel-related costs.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, transmission expenses were $50 and $48, respectively, an increase of 4%, or $2, and decreased as a percentage of total Pandora revenue. The increase was primarily driven by web hosting costs.

We expect our Pandora transmission costs to increase with growth in our subscriber base and off-platform advertising.

Operating Costs

Subscriber Acquisition Costs are costs associated with our satellite radio service and include hardware subsidies paid to radio manufacturers, distributors and automakers; subsidies paid for chipsets and certain other components used in manufacturing radios; device royalties for certain radios and chipsets; product warranty obligations; and freight. The majority of subscriber acquisition costs are incurred and expensed in advance of acquiring a subscriber. Subscriber acquisition costs do not include advertising costs, marketing, loyalty payments to distributors and dealers of satellite radios or revenue share payments to automakers and retailers of satellite radios.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, subscriber acquisition costs were $427 and $470, respectively, a decrease of 9%, or $43, and decreased as a percentage of total revenue. The decrease was driven by reductions to OEM hardware subsidy rates, lower subsidized costs related to the transition of chipsets, and a decrease in the volume of satellite radio installations.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, subscriber acquisition costs were $470 and $499, respectively, a decrease of 6%, or $29, and decreased as a percentage of total revenue. The decrease was driven by reductions to OEM hardware subsidy rates, lower subsidized costs related to the transition of chipsets, and a decrease in the volume of satellite radio installations.

We expect subscriber acquisition costs to fluctuate with OEM installations; however, the subsidized chipsets cost is expected to decline as we transition to a new generation of chipsets. We intend to continue to offer subsidies and other incentives to induce OEMs to include our technology in their vehicles.

Sales and Marketing includes costs for marketing, advertising, media and production, including promotional events and sponsorships; cooperative and artist marketing; and personnel related costs including salaries, commissions, and sales support. Marketing costs include expenses related to direct mail, outbound telemarketing, email communications, and digital performance media.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, sales and marketing expenses were $973 and $883, respectively, an increase of 10%, or $90, and increased as a percentage of total revenue. The increase was primarily due to additional acquisition campaigns and subscriber communications as well as higher personnel-related costs.

- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, sales and marketing expenses were $883 and $799, respectively, an increase of 11%, or $84, and increased as a percentage of total revenue. The increase was primarily due to additional subscriber communications, retention programs and acquisition campaigns, as well as higher personnel-related costs.

We anticipate that sales and marketing expenses will increase as we expand programs to retain our existing subscribers, win back former subscribers, and attract new subscribers and listeners.

Engineering, Design and Development consists primarily of compensation and related costs to develop chipsets and new products and services, including streaming and connected vehicle services, research and development for broadcast information systems and the design and development costs to incorporate Sirius XM radios into new vehicles manufactured by automakers.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, engineering, design and development expenses were $294 and $266, respectively, an increase of 11%, or $28, and increased as a percentage of total revenue. The increase was driven by higher personnel-related costs.

- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, engineering, design and development expenses were $266 and $228, respectively, an increase of 17%, or $38, and increased as a percentage of total revenue. The increase was driven by the continued development of our streaming products and connected vehicle services as well as higher personnel-related costs.

We expect engineering, design and development expenses to decrease due to lower personnel-related costs, partially offset by increased costs to develop our infrastructure, products and services.

General and Administrative primarily consists of compensation and related costs for personnel and facilities, and include costs related to our finance, legal, human resources and information technologies departments.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, general and administrative expenses were $540 and $517, respectively, an increase of 4%, or $23, but decreased as a percentage of total revenue. The increase was primarily driven by a $25 legal settlement associated with Do-Not-Call litigation and higher rent, partially offset by lower personnel-related costs.

- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, general and administrative expenses were $517 and $528, respectively, a decrease of 2%, or $11, and decreased as a percentage of total revenue. The decrease was primarily driven by lower personnel-related costs offset by higher legal and consulting costs.

We expect our general and administrative expenses to decrease in absence of the legal settlement and due to lower professional services costs, partially offset by increases to support the growth of our business.

Depreciation and Amortization represents the recognition in earnings of the cost of assets used in operations, including our satellite constellations, property, equipment and intangible assets, over their estimated service lives.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, depreciation and amortization expense was $483 and $465, respectively, an increase of 4%, or $18, but decreased as a percentage of total revenue. The increase was driven by higher depreciation costs related to additional assets placed in-service.

- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, depreciation and amortization expense was $465 and $452, respectively, an increase of 3%, or $13, and decreased as a percentage of total revenue. The depreciation increase was driven by additional assets placed in-service, partially offset by acceleration of amortization related to a shorter useful life of certain software during 2017.

Other (Expense) Income

Interest Expense includes interest on outstanding debt.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, interest expense was $386 and $377, respectively, an increase of 2%, or $9. The increase was primarily driven by higher average debt due to the issuances of Sirius XM's 5.500% Senior Notes due 2029 and 4.625% Senior Notes due 2024, partially offset by the redemption of Sirius XM's 6.00% Senior Notes due 2024, the repurchase of the Pandora 1.75% Convertible Senior Notes due 2020, and lower interest rates.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, interest expense was $377 and $375, respectively, an increase of 1%, or $2. The increase was primarily due to higher average debt outstanding, partially offset by an increase in capitalized interest associated with the construction of new satellites.

Loss on Extinguishment of Debt, includes losses incurred as a result of the redemption of certain debt.

- *2019 vs. 2018*: For the year ended December 31, 2019, we recorded a $57 loss due to the redemption of $1,500 in principal amount of Sirius XM's 6.00% Senior Notes due 2024 and the repurchase of $151 principal amount of Pandora's 1.75% Convertible Senior Notes due 2020. During the year ended December 31, 2018, we recorded a $17 loss on extinguishment of debt primarily due to the exchange of Pandora's 1.75% Convertible Senior Notes due 2020 for new 1.75% Convertible Senior Notes due 2023.

- *2018 vs. 2017*: For the year ended December 31, 2018, Pandora recorded a $17 loss on extinguishment of debt primarily due to the exchange of Pandora's 1.75% Convertible Senior Notes due 2020 for new 1.75% Convertible Senior Notes due 2023. During the year ended December 31, 2017, we recorded a $53 loss on extinguishment of debt due to the redemption of Sirius XM's 4.25% Senior Notes due 2020, 5.75% Senior Notes due 2021, and 5.25% Senior Secured Notes due 2022.

Other (Expense) Income primarily includes realized and unrealized gains and losses, interest and dividend income, our share of the income or loss from equity investments, and transaction costs related to non-operating investments.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, other (expense) income was $(23) and $8, respectively. Other expense for the year ended December 31, 2019 was driven by losses on other investments of $21 and loss on the fair value of Pandora's 2023 Notes of $21; partially offset by interest earned on our loan to Sirius XM Canada of $10, trading gains associated with the investments held for our Deferred Compensation Plan of $4 and interest income of $3. Other income for the year ended December 31, 2018 was driven by interest earned on our loan to Sirius XM Canada of $10 and interest income of $8, partially offset by losses on other investments of $10.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, other (expense) income was $8 and $16, respectively. During the year ended December 31, 2018, other income was driven by interest earned on our loan to Sirius XM Canada of $10 and interest income of $8, partially offset by losses on other investments of $10. During the year ended December 31, 2017, other income was driven by interest earned on our loan to Sirius XM Canada and gains associated with short-term investments.

Income Taxes

Income Tax Expense includes the change in our deferred tax assets, current federal and state tax expenses, and foreign withholding taxes.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, income tax expense was $291 and $123, respectively, and our effective tax rate was 24.0% and 12.7%, respectively. The effective tax rate of 24.0% was primarily impacted by the recognition of excess tax benefits related to share-based compensation and benefits related to state and federal research and development and certain other credits, partially offset by the impact of nondeductible officers' compensation. The effective tax rate of 12.7% was primarily impacted by the recognition of excess tax benefits related to share-based compensation and a benefit related to state and federal research and development credits under the Protecting Americans from Tax Hikes Act of 2015.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, income tax expense was $123 and $510, respectively, and our effective tax rate was 12.7% and 60.4%, respectively. The effective tax rate of 12.7% for the year ended December 31, 2018 was primarily impacted by the reduced federal tax rate to 21%, the recognition of excess tax benefits related to share-based compensation and a benefit related to state and federal research and development credits. The effective tax rate of 60.4% for the year ended December 31, 2017 was negatively impacted by the revaluation of our net deferred tax assets, excluding after tax credits, as of December 31, 2017, as a result of the reduction of the federal corporate income tax rate. This was offset by the recognition of excess tax benefits related to share-based compensation and a benefit related to federal research and development credits under the Protecting Americans from Tax Hikes Act of 2015. Based on this revaluation, we recorded an additional tax expense of $185 to reduce our net deferred tax asset balance for the year ended December 31, 2017.

Footnotes to Pro Forma Results of Operations

The following tables reconcile our results of operations as reported to our *pro forma* results of operations for the years ended December 31, 2019, 2018, and 2017 which includes the Pandora pre-acquisition financial information for the applicable periods and the effects of purchase price accounting. These pro forma results are based on estimates and assumptions, which we believe are reasonable. They are not the results that would have been realized had the Pandora Acquisition actually occurred on January 1, 2017 and are not indicative of our consolidated results of operations in future periods. The pro forma results primarily include adjustments related to amortization of acquired intangible assets, depreciation of property and equipment, acquisition costs, fair value gain or loss on the Pandora investment and associated tax impacts.

	Unaudited for the Year Ended December 31, 2019				
	As Reported	Predecessor Financial Information (a)	Purchase Price Accounting and Pro Forma Adjustments	Ref	Pro Forma
Revenue					
Sirius XM:					
Subscriber revenue	$ 5,644	$ —	$ —		$ 5,644
Advertising revenue	205	—	—		205
Equipment revenue	173	—	—		173
Other revenue	165	—	7	(b)	172
Total Sirius XM revenue	6,187	—	7		6,194
Pandora:					
Subscriber revenue	476	46	5	(c)	527
Advertising revenue	1,131	68	1	(c)	1,200
Total Pandora revenue	1,607	114	6		1,727
Total consolidated revenue	7,794	114	13		7,921
Cost of services					
Sirius XM:					
Revenue share and royalties	1,431	—	—		1,431
Programming and content	444	—	—		444
Customer service and billing	398	—	—		398
Transmission	112	—	—		112
Cost of equipment	29	—	—		29
Total Sirius XM cost of services	2,414	—	—		2,414
Pandora:					
Revenue share and royalties	860	71	14	(d)	945
Programming and content	18	—	—		18
Customer service and billing	77	8	—		85
Transmission	58	5	—		63
Total Pandora cost of services	1,013	84	14		1,111
Total consolidated cost of services	3,427	84	14		3,525
Subscriber acquisition costs	427	—	—		427
Sales and marketing	937	36	—		973
Engineering, design and development	280	14	—		294
General and administrative	524	16	—		540
Depreciation and amortization	468	6	9	(e)	483
Acquisition and other related costs	84	1	(85)	(f)	—
Total operating expenses	6,147	157	(62)		6,242
Income (loss) from operations	1,647	(43)	75		1,679
Other (expense) income:					
Interest expense	(384)	(2)	—		(386)
Loss on extinguishment of debt	(57)	—	—		(57)
Other (expense) income	(24)	1	—		(23)
Total other (expense) income	(465)	(1)	—		(466)
Income (loss) before income taxes	1,182	(44)	75		1,213
Income tax expense	(284)	—	(7)	(g)	(291)
Net income	$ 898	$ (44)	$ 68		$ 922

(a) Represents Pandora's results for the period January 1, 2019 through January 31, 2019.

(b) This adjustment eliminates the impact of additional revenue associated with certain programming agreements recorded as part of the merger of Sirius and XM (the "XM Merger").

(c) This adjustment relates to the amortization of deferred subscription and deferred advertising revenue that was fair valued in purchase accounting.

(d) This adjustment includes the impact of additional expense associated with minimum guarantee royalty contracts recorded as part of the Pandora Acquisition.

(e) This adjustment includes the impact of the additional amortization associated with the acquired intangible assets recorded as part of the Pandora Acquisition that are subject to amortization, partially offset by normal depreciation associated with assets revalued in purchase accounting.
(f) This adjustment eliminates the impact of acquisition and other related costs.
(g) This adjustment to income taxes was calculated by applying Sirius XM's statutory tax rate at December 31, 2019 to the pro forma adjustments of $75 and Pandora's pre-acquisition loss before income tax of $(44).

	Unaudited for the Year Ended December 31, 2018				
	As Reported	Predecessor Financial Information (h)	Purchase Price Accounting and Pro Forma Adjustments	Ref	Pro Forma
Revenue					
Sirius XM:					
Subscriber revenue	$ 5,264	$ —	$ —		$ 5,264
Advertising revenue	188	—	—		188
Equipment revenue	155	—	—		155
Other revenue	164	—	7	(i)	171
Total Sirius XM revenue	5,771	—	7		5,778
Pandora:					
Subscriber revenue	—	478	—		478
Advertising revenue	—	1,092	—		1,092
Total Pandora revenue	—	1,570	—		1,570
Total consolidated revenue	5,771	1,570	7		7,348
Cost of services					
Sirius XM:					
Revenue share and royalties	1,394	—	—		1,394
Programming and content	406	—	—		406
Customer service and billing	382	—	—		382
Transmission	96	—	—		96
Cost of equipment	31	—	—		31
Total Sirius XM cost of services	2,309	—	—		2,309
Pandora:					
Revenue share and royalties	—	929	—		929
Programming and content	—	11	—		11
Customer service and billing	—	95	—		95
Transmission	—	50	—		50
Total Pandora cost of services	—	1,085	—		1,085
Total consolidated cost of services	2,309	1,085	—		3,394
Subscriber acquisition costs	470	—	—		470
Sales and marketing	484	399	—		883
Engineering, design and development	123	143	—		266
General and administrative	354	169	(6)	(j)	517
Depreciation and amortization	301	61	103	(k)	465
Acquisition and other related costs	3	12	(15)	(l)	—
Total operating expenses	4,044	1,869	82		5,995
Income (loss) from operations	1,727	(299)	(75)		1,353
Other (expense) income:					
Interest expense	(350)	(27)	—		(377)
Loss on extinguishment of debt	—	(17)	—		(17)
Other (expense) income	44	7	(43)	(m)	8
Total other (expense) income	(306)	(37)	(43)		(386)
Income (loss) before income taxes	1,421	(336)	(118)		967
Income tax expense	(245)	8	114	(n)	(123)
Net income	$ 1,176	$ (328)	$ (4)		$ 844

(h) Represents Pandora’s results for the period January 1, 2018 through December 31, 2018.
(i) This adjustment eliminates the impact of additional revenue associated with certain programming agreements recorded as part of the XM Merger.

(j) This adjustment eliminates the impact of contract termination fees.

(k) This adjustment includes the impact of the additional amortization associated with the acquired intangible assets recorded as part of the Pandora Acquisition that are subject to amortization, partially offset by normal depreciation associated with assets revalued in purchase accounting.

(l) This adjustment eliminates the impact of transaction related costs, recorded by Pandora, to advisers for the planned acquisition by Sirius XM.

(m) This adjustment eliminates the unrealized gain for the fair value adjustment of our preferred stock investment in Pandora.

(n) This adjustment to income taxes was calculated by applying Sirius XM's statutory tax rate at December 31, 2018 to the pro forma adjustments of $(118) and Pandora's loss before income tax of $(336).

	Unaudited for the Year Ended December 31, 2017				
	As Reported	Predecessor Financial Information (o)	Purchase Price Accounting and Pro Forma Adjustments	Ref	Pro Forma
Revenue					
Sirius XM:					
Subscriber revenue	$ 4,990	$ —	$ —		$ 4,990
Advertising revenue	160	—	—		160
Equipment revenue	132	—	—		132
Other revenue	143	—	7	(p)	150
Total Sirius XM revenue	5,425	—	7		5,432
Pandora:					
Subscriber revenue	—	315	—		315
Advertising revenue	—	1,075	(4)	(q)	1,071
Other revenue	—	77	(77)	(q)	—
Total Pandora revenue	—	1,467	(81)		1,386
Total consolidated revenue	5,425	1,467	(74)		6,818
Cost of services					
Sirius XM:					
Revenue share and royalties	1,210	—	—		1,210
Programming and content	388	—	—		388
Customer service and billing	385	—	—		385
Transmission	83	—	—		83
Cost of equipment	35	—	—		35
Total Sirius XM cost of services	2,101	—	—		2,101
Pandora:					
Revenue share and royalties	—	862	(36)	(q)	826
Programming and content	—	14	—		14
Customer service and billing	—	73	(7)	(q)	66
Transmission	—	59	(11)	(q)	48
Total Pandora cost of services	—	1,008	(54)		954
Total consolidated cost of services	2,101	1,008	(54)		3,055
Subscriber acquisition costs	499	—	—		499
Sales and marketing	438	379	(18)	(q)	799
Engineering, design and development	112	127	(11)	(q)	228
General and administrative	335	374	(181)	(q)	528
Depreciation and amortization	299	63	90	(r)	452
Total operating expenses	3,784	1,951	(174)		5,561
Income (loss) from operations	1,641	(484)	100		1,257
Other (expense) income:					
Interest expense	(346)	(29)	—		(375)
Loss on extinguishment of debt	(44)	(9)	—		(53)
Other (expense) income	13	3	—		16
Total other (expense) income	(377)	(35)	—		(412)
Income (loss) before income taxes	1,264	(519)	100		845
Income tax expense	(616)	1	105	(s)	(510)
Net income	$ 648	$ (518)	$ 205		$ 335

(o) Represents Pandora's results for the period January 1, 2017 through December 31, 2017.

(p) This adjustment eliminates the impact of additional revenue associated with certain programming agreements recorded as part of the XM Merger.

(q) This adjustment eliminates the impact of revenues and expenses attributable to Pandora's Ticketfly business which was disposed of on September 1, 2017 and Pandora's Australia and New Zealand business activities which were discontinued in the year ended December 31, 2017.

(r) This adjustment includes the impact of the additional amortization associated with the acquired intangible assets recorded as part of the Pandora Acquisition that are subject to amortization, partially offset by normal depreciation associated with assets revalued in purchase accounting.

(s) This adjustment to income taxes was calculated by applying Sirius XM's statutory tax rate at December 31, 2017 to the pro forma adjustments of $100 and Pandora's loss before income tax of $(519).

Recent Accounting Pronouncements

- In May 2014, the Financial Accounting Standards Board ("FASB") issued *ASU 2014-09, Revenue - Revenue from Contracts with Customers.*
- In February 2016, the FASB issued ASU 2016-02, *Leases (Topic 842)*.
- In February 2018, the FASB issued ASU 2018-02, *Income Statement - Reporting Comprehensive Income (Topic 220): Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income.*
- In June 2018, the FASB issued ASU 2018-07, *Compensation-Stock Compensation (Topic 718): Improvements to Nonemployee Share-Based Payment Accounting.*
- In August 2018, the FASB issued ASU 2018-15, *Intangibles-Goodwill and Other-Internal-Use Software (Subtopic 350-40): Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That Is a Service Contract*.

For additional information regarding "Recent Accounting Pronouncements," refer to Note 2 to our consolidated financial statements in Part II, Item 8, of this Annual Report on Form 10-K.

Key Financial and Operating Performance Metrics

In this section, we present certain financial performance measures some of which are presented as Non-GAAP items, which include free cash flow and adjusted EBITDA. We also present certain operating performance measures. Our adjusted EBITDA excludes the impact of share-based payment expense and certain purchase price accounting adjustments related to the XM Merger and the Pandora Acquisition. Additionally, when applicable, our adjusted EBITDA metric excludes the effect of significant items that do not relate to the on-going performance of our business. We use these Non-GAAP financial and operating performance measures to manage our business, to set operational goals and as a basis for determining performance-based compensation for our employees. See the accompanying glossary on pages 29 through 32 for more details and for the reconciliation to the most directly comparable GAAP measure (where applicable).

We believe these Non-GAAP financial and operating performance measures provide useful information to investors regarding our financial condition and results of operations. We believe these Non-GAAP financial and operating performance measures may be useful to investors in evaluating our core trends because they provide a more direct view of our underlying costs. We believe investors may use our adjusted EBITDA to estimate our current enterprise value and to make investment decisions. We believe free cash flow provides useful supplemental information to investors regarding our cash available for future subscriber acquisitions and capital expenditures, to repurchase or retire debt, to acquire other companies and our ability to return capital to stockholders. By providing these Non-GAAP financial and operating performance measures, together with the reconciliations to the most directly comparable GAAP measure (where applicable), we believe we are enhancing investors' understanding of our business and our results of operations.

Our Non-GAAP financial measures should be viewed in addition to, and not as an alternative for or superior to, our reported results prepared in accordance with GAAP. In addition, our Non-GAAP financial measures may not be comparable to similarly-titled measures by other companies. Please refer to the glossary (pages 29 through 32) for a further discussion of such Non-GAAP financial and operating performance measures and reconciliations to the most directly comparable GAAP measure (where applicable). Subscribers and subscription related revenues and expenses associated with our connected vehicle services and Sirius XM Canada are not included in our subscriber count or subscriber-based operating metrics.

Table of Contents

Set forth below are our subscriber balances as of December 31, 2019 compared to December 31, 2018 and as of December 31, 2018 compared to December 31, 2017.

	As of December 31,			2019 vs 2018 Change		2018 vs 2017 Change	
(subscribers in thousands)	2019	2018 (1)	2017 (2)	Amount	%	Amount	%
Sirius XM							
Self-pay subscribers	29,978	28,915	27,513	1,063	4 %	1,402	5 %
Paid promotional subscribers	4,931	5,124	5,223	(193)	(4)%	(99)	(2)%
Ending subscribers	34,909	34,039	32,736	870	3 %	1,303	4 %
Traffic users	9,334	8,606	7,489	728	8 %	1,117	15 %
Sirius XM Canada subscribers	2,707	2,644	2,565	63	2 %	79	3 %
Pandora							
Monthly active users - all services	63,508	69,399	74,693	(5,891)	(8)%	(5,294)	(7)%
Self-pay subscribers	6,165	5,914	5,478	251	4 %	436	8 %
Paid promotional subscribers	49	756	—	(707)	(94)%	756	nm
Ending subscribers	6,214	6,670	5,478	(456)	(7)%	1,192	22 %

nm - not meaningful
(1) Includes Pandora's results as of December 31, 2018.
(2) Includes Pandora's results as of December 31, 2017.

The following table contains our Non-GAAP pro forma financial and operating performance measures which are based on our adjusted results of operations for the years ended December 31, 2019, 2018, and 2017.

	For the Years Ended December 31,			2019 vs 2018 Change		2018 vs 2017 Change	
(subscribers in thousands)	2019	2018	2017	Amount	%	Amount	%
Sirius XM							
Self-pay subscribers	1,063	1,402	1,562	(339)	(24)%	(160)	(10)%
Paid promotional subscribers	(193)	(99)	(172)	(94)	95 %	73	(42)%
Net additions	870	1,303	1,390	(433)	(33)%	(87)	(6)%
Weighted average number of subscribers	34,314	33,345	31,866	969	3 %	1,479	5 %
Average self-pay monthly churn	1.7%	1.7%	1.8%	—%	— %	(0.1)%	(6)%
ARPU (1)	$ 13.82	$ 13.34	$ 13.25	$ 0.48	4 %	$ 0.09	1 %
SAC, per installation	$ 22.91	$ 25.66	$ 29.53	$ (2.75)	(11)%	$ (3.87)	(13)%
Pandora							
Self-pay subscribers	251	436	1,139	(185)	(42)%	(703)	(62)%
Paid promotional subscribers	(707)	756	—	(1,463)	(194)%	756	nm
Net additions	(456)	1,192	1,139	(1,648)	(138)%	53	5 %
Weighted average number of subscribers	6,654	6,080	4,885	574	9 %	1,195	24 %
ARPU	$ 6.61	$ 6.53	$ 5.34	$ 0.08	1 %	$ 1.19	22 %
Ad supported listener hours (in billions)	13.44	14.79	16.28	(1.35)	(9)%	(1.49)	(9)%
Advertising revenue per thousand listener hours (RPM)	$ 80.41	$ 71.60	$ 65.54	$ 8.81	12 %	$ 6.06	9 %
Licensing costs per thousand listener hours (LPM)	$ 38.94	$ 37.80	$ 35.68	$ 1.14	3 %	$ 2.12	6 %
Licensing costs per paid subscriber (LPU)	$ 4.06	$ 4.47	$ 3.63	$ (0.41)	(9)%	$ 0.84	23 %
Total Company							
Adjusted EBITDA	$ 2,427	$ 2,131	$ 2,006	$ 296	14 %	$ 125	6 %
Free cash flow (2)	$ 1,647	$ 1,517	$ 1,560	$ 130	9 %	$ (43)	(3)%

nm - not meaningful
(1) ARPU for Sirius XM excludes subscriber revenue from our connected vehicle services of $159, $111, and $84 for the years ended December 31, 2019, 2018, and 2017, respectively.
(2) Free cash flow has not been adjusted to include Pandora's pre-acquisition results.

Sirius XM

Subscribers. At December 31, 2019, we had approximately 34.9 million subscribers, an increase of approximately 0.9 million subscribers, or 3%, from the approximately 34.0 million subscribers as of December 31, 2018. The increase in total subscribers was primarily due to growth in our self-pay subscriber base, which increased by approximately 1.1 million. The increase in self-pay subscribers was primarily driven by trial conversions by owners and lessees of new and used vehicles as well as subscriber win back programs, partially offset by deactivations.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, net additions were 0.9 million and 1.3 million, respectively, a decrease of 33%, or 0.4 million. Self-pay net additions decreased primarily due to a flat churn rate on a growing subscriber base and lower gross add win-backs, offset by increases in trial conversions. The reduction of paid promotional subscribers increased due to lower shipments and trial starts from automakers offering paid promotional subscriptions.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, net additions were 1.3 million and 1.4 million, respectively, a decrease of 6%, or 0.1 million. Self-pay net additions decreased primarily due to a growing subscriber base and lower gross add win-backs, offset by improvements in churn rate and increases in trial conversions. The reduction of paid promotional subscribers decreased due to higher shipments from automakers offering paid promotional subscriptions.

Traffic Users. We offer services that provide graphic information as to road closings, traffic flow and incident data to consumers with compatible in-vehicle navigation systems.

Average Self-pay Monthly Churn is derived by dividing the monthly average of self-pay deactivations for the period by the average number of self-pay subscribers for the period. (See accompanying glossary on pages 29 through 32 for more details.)

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, our average self-pay monthly churn rate was 1.7%.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, our average self-pay monthly churn rate was 1.7% and 1.8%, respectively. The decrease was due to improvements in non-pay and voluntary churn.

ARPU is derived from total earned subscriber revenue (excluding revenue derived from our connected vehicle services) and net advertising revenue, divided by the number of months in the period, divided by the daily weighted average number of subscribers for the period. (See the accompanying glossary on pages 29 through 32 for more details.)

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, ARPU was $13.82 and $13.34, respectively. The increase was driven by increases in the U. S. Music Royalty Fee, increases in self-pay revenue and higher advertising revenue.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, ARPU was $13.34 and $13.25, respectively. The increase in certain of our subscription rates, including the U. S. Music Royalty Fee, and higher advertising revenue was negatively impacted by the adoption of the new revenue standard, effective as of January 1, 2018 of $0.24, and the growth in subscription discounts offered through customer acquisition and retention programs.

SAC, Per Installation, is derived from subscriber acquisition costs and margins from the sale of radios, components and accessories (excluding connected vehicle services), divided by the number of satellite radio installations in new vehicles and shipments of aftermarket radios for the period. (See the accompanying glossary on pages 29 through 32 for more details.)

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, SAC, per installation, was $22.91 and $25.66, respectively. The decrease was driven by our transition to a new generation of chipsets and reductions to OEM hardware subsidy rates.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, SAC, per installation, was $25.66 and $29.53, respectively. The decrease was driven by reductions to OEM hardware subsidy rates, our transition to a new generation of chipsets as well as the impact of the adoption of the new revenue standard, effective as of January 1, 2018, of $0.26.

Pandora

Monthly Active Users. At December 31, 2019, Pandora had approximately 63.5 million monthly active users, a decrease of 5.9 million monthly active users, or 8%, from the 69.4 million monthly active users as of December 31, 2018. The decrease in monthly active users was driven by an increase in ad-supported listener churn and a decrease in the number of new users.

Subscribers. At December 31, 2019, Pandora had approximately 6.2 million subscribers, a decrease of 0.5 million, or 7%, from the approximately 6.7 million subscribers, as of December 31, 2018.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, net additions were (0.5) million and 1.2 million, respectively, a decrease of 138%, or 1.6 million. Net additions decreased due to a loss of paid promotional subscribers from the expiration of an agreement with T-Mobile.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, net additions were 1.2 million and 1.1 million, respectively, an increase of 5%, or 0.1 million. Net additions increased as a result of an influx in paid promotional subscribers from an agreement with T-Mobile in 2018, partially offset by a decline in the number of new self-pay subscribers.

ARPU is defined as average monthly revenue per paid subscriber on our Pandora subscription services. (See the accompanying glossary on pages 58 through 61 for more details.)

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, ARPU was $6.61 and $6.53, respectively. The increase was primarily driven by an increase in the number of Pandora Premium subscribers while the number of lower price Pandora Plus subscribers decreased.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, ARPU was $6.53 and $5.34, respectively. The increase was primarily driven by an increase in the number of Pandora Premium subscribers while the number of lower price Pandora Plus subscribers decreased.

Ad supported listener hours are a key indicator of our Pandora business and the engagement of our Pandora listeners. We include ad supported listener hours related to Pandora's non-radio content offerings in the definition of listener hours.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, ad supported listener hours was 13.44 billion and 14.79 billion, respectively. The decline in ad supported listener hours was primarily driven by a decrease in ad-supported listeners.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, ad supported listener hours was 14.79 billion and 16.28 billion, respectively. The decline in ad supported listener hours was primarily driven by a decrease in ad-supported listeners.

RPM is a key indicator of our ability to monetize advertising inventory created by our listener hours on the Pandora services. Ad RPM is calculated by dividing advertising revenue by the number of thousands of listener hours of our Pandora advertising-based service.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, RPM was $80.41 and $71.60, respectively. The increase was a result of an increase in the average price per ad and increased sell-through percentage.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, RPM was $71.60 and $65.54, respectively. The increase was a result of an increase in the average price per ad and increased sell-through percentage.

LPM is tracked for our non-subscription, ad-supported service across all Pandora delivery platforms. The content acquisition costs included in our ad LPM calculations are based on the rates set by our license agreements with record labels, performing rights organizations and music publishers or the applicable rates set by the Copyright Royalty Board if we have not entered into a license agreement with the copyright owner of a particular sound recording.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, LPM was $38.94 and $37.80, respectively. The increase was primarily driven by higher eligible advertising revenue and increases to track rates.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, LPM was $37.80 and $35.68, respectively. The increase was primarily driven by increases to track rates and higher eligible advertising revenue.

LPU is defined as average monthly licensing costs per paid subscriber on our Pandora subscription services. LPU is a key measure of our ability to manage costs for our subscription services.

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, LPU was $4.06 and $4.47, respectively. The decrease was due to lower minimum guarantees associated with our direct license agreements with major and independent labels, distributors, performing rights organizations and publishers.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, LPU was $4.47 and $3.63, respectively. The increase was primarily driven by increases in content acquisition costs associated with Pandora Premium and minimum guarantee accruals related to our direct license agreements with major and independent labels, distributors, performing rights organizations and publishers.

Total Company

Adjusted EBITDA. EBITDA is defined as net income before interest expense, income tax expense and depreciation and amortization. Adjusted EBITDA excludes the impact of other income, loss on extinguishment of debt, acquisition related costs, other non-cash charges, such as certain purchase price accounting adjustments, share-based payment expense, loss on disposal of assets, and legal settlements and reserves related to the historical use of sound recordings. (See the accompanying glossary on pages 29 through 32 for a reconciliation to GAAP and for more details.)

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, adjusted EBITDA was $2,427 and $2,131, respectively, an increase of 14%, or $296. The increase was due to: growth of 8% in total revenue which was primarily a result of the increase in our subscriber base; additional revenues from the U.S. Music Royalty Fee; an increase in advertising revenue; and lower subscriber acquisition costs. The increases were partially offset by higher revenue share and royalty, sales and marketing, programming and content, transmission, engineering, design and development costs, and general and administrative costs.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, adjusted EBITDA was $2,131 and $2,006, respectively, an increase of 6%, or $125. The increase was due to: growth of 8% in total revenue which was primarily a result of the increase in our subscriber base; additional revenues from the U.S. Music Royalty Fee; an increase in advertising revenue; and lower subscriber acquisition costs. The increases were partially offset by higher revenue share and royalty, sales and marketing, programming and content, transmission, and general and administrative costs.

Free Cash Flow includes cash provided by operations, net of additions to property and equipment, restricted and other investment activity and the return of capital from an investment in an unconsolidated entity. (See the accompanying glossary on pages 29 through 32 for a reconciliation to GAAP and for more details.)

- *2019 vs. 2018*: For the years ended December 31, 2019 and 2018, free cash flow was $1,647 and $1,517, respectively, an increase of $130, or 9%. The increase was impacted by the one-time lump sum payment of $150 to resolve all outstanding claims under our statutory license for sound recordings for the period January 1, 2007 through December 31, 2017, paid during 2018; partially offset by a payment of $25 for a legal settlement paid during 2019.
- *2018 vs. 2017*: For the years ended December 31, 2018 and 2017, free cash flow was $1,517 and $1,560, respectively, a decrease of $43, or 3%. The decrease was driven primarily by the one-time lump sum payment of $150 to resolve all outstanding claims under our statutory license for sound recordings for the period January 1, 2007 through December 31, 2017, an increase in additions to property and equipment due to the timing of payments for new satellite construction, and the timing of payments to vendors; partially offset by higher net cash provided by operating activities resulting from improved operating performance.

Liquidity and Capital Resources

Cash Flows for the year ended December 31, 2019 compared with the year ended December 31, 2018 and for the year ended December 31, 2018 compared with the year ended December 31, 2017.

The following table presents a summary of our cash flow activity for the periods set forth below:

	For the Years Ended December 31,				
	2019	2018	2017	2019 vs 2018	2018 vs 2017
Net cash provided by operating activities	$ 1,875	$ 1,760	$ 1,764	$ 115	$ (4)
Net cash used in investing activities	(3)	(379)	(1,147)	376	768
Net cash used in financing activities	(1,817)	(1,395)	(762)	(422)	(633)
Net increase (decrease) in cash, cash equivalents and restricted cash	55	(14)	(145)	69	131
Cash, cash equivalents and restricted cash at beginning of period	65	79	224	(14)	(145)
Cash, cash equivalents and restricted cash at end of period	$ 120	$ 65	$ 79	$ 55	$ (14)

Cash Flows Provided by Operating Activities

Cash flows provided by operating activities increased by $115 to $1,875 for the year ended December 31, 2019 from $1,760 for the year ended December 31, 2018. Cash flows provided by operating activities decreased by $4 to $1,760 for the year ended December 31, 2018 from $1,764 for the year ended December 31, 2017.

Our largest source of cash provided by operating activities is cash generated by subscription and subscription-related revenues. We also generate cash from the sale of advertising on Pandora, advertising on certain non-music channels on Sirius XM and the sale of satellite radios, components and accessories. Our primary uses of cash from operating activities include revenue share and royalty payments to distributors, programming and content providers, and payments to radio manufacturers, distributors and automakers. In addition, uses of cash from operating activities include payments to vendors to service, maintain and acquire listeners and subscribers, general corporate expenditures, and compensation and related costs.

Cash Flows Used in Investing Activities

Cash flows used in investing activities in the year ended December 31, 2019 were primarily due to spending primarily for capitalized software and hardware, and to construct replacement satellites offset by cash received from the Pandora Acquisition of $313 and from the sale of short-term investments of $73. Cash flows used in investing activities in the year ended December 31, 2018 were primarily due to spending primarily for capitalized software and hardware, and to construct replacement satellites of $355. Cash flows used in investing activities in the year ended December 31, 2017 were primarily due to spending primarily for capitalized software and hardware and to construct replacement satellites of $288 as well as our investment in Pandora of $480, loans to related parties of $131, payments to acquire additional ownership in related parties (including transaction costs) of $132 and the acquisition of Automatic for $107 (net of cash and restricted cash acquired). We spent $214, $166 and $140 on capitalized software and hardware as well as $82, $132 and $100 to construct replacement satellites during the years ended December 31, 2019, 2018 and 2017, respectively.

Cash Flows Used in Financing Activities

Cash flows used in financing activities consists of the issuance and repayment of long-term debt, the purchase of common stock under Holdings' share repurchase program and the payment of cash dividends. Proceeds from long-term debt have been used to fund our operations, construct and launch new satellites, invest in other infrastructure improvements and purchase shares of Holdings' common stock.

Cash flows used in financing activities in the year ended December 31, 2019 were primarily due to the purchase and retirement of shares of Holdings' common stock under Holdings' repurchase program for $2,159, the redemption of Sirius XM's 6.00% Senior Notes due 2024 in aggregate amount of $1,546, repayment under the Credit Facility of $439, the repurchase for $152 of Pandora's 1.75% Convertible Senior Notes due 2020 and the payment of cash dividends on Holdings' common stock of $226, partially offset by cash provided by the issuance of $2,715 in aggregate principal amount of 5.500% Senior Notes due 2029, net of costs. Cash flows used in financing activities in the year ended December 31, 2018 were primarily due to the purchase and retirement for $1,314 of shares of Holdings' common stock under Holdings' repurchase program, repayment under the Credit Facility of $136 and the payment of cash dividends on Holdings' common stock of $201. Cash flows used in financing activities in the year ended December 31, 2017 were primarily due to the redemption of $1,500 aggregate principal amount of then-outstanding notes, the purchase and retirement for $1,409 of shares of Holdings' common stock under Holdings' repurchase program, the payment of cash dividends of $190, and net repayments of $90 under the Credit Facility, partially offset by the issuance of $1,000 aggregate principal amount of 3.875% Senior Notes due 2022 and $1,500 in aggregate principal amount of 5.00% Senior Notes due 2027.

Future Liquidity and Capital Resource Requirements

Based upon our current business plans, we expect to fund operating expenses, capital expenditures, including the construction of replacement satellites, working capital requirements, interest payments, taxes and scheduled maturities of our debt with existing cash, cash flow from operations and borrowings under our Credit Facility. As of December 31, 2019, $0 was outstanding under our Credit Facility. As the amount available for future borrowing is reduced by $1 related to letters of credit issued for the benefit of Pandora, $1,749 was available for future borrowing under our Credit Facility. We believe that we have sufficient cash and cash equivalents, as well as debt capacity, to cover our estimated short-term and long-term funding needs, including amounts to construct, launch and insure replacement satellites, as well as fund Holdings' stock repurchases, future dividend payments on Holdings' common stock and strategic opportunities.

Our ability to meet our debt and other obligations depends on our future operating performance and on economic, financial, competitive and other factors. We continually review our operations for opportunities to adjust the timing of expenditures to ensure that sufficient resources are maintained.

We regularly evaluate our business plans and strategy. These evaluations often result in changes to our business plans and strategy, some of which may be material and significantly change our cash requirements. These changes in our business plans or strategy may include: the acquisition of unique or compelling programming; the development and introduction of new features or services; significant new or enhanced distribution arrangements; investments in infrastructure, such as satellites, equipment or radio spectrum; and acquisitions and investments, including acquisitions and investments that are not directly related to our existing business.

We may from time to time purchase our outstanding debt through open market purchases, privately negotiated transactions or otherwise. Purchases or retirement of debt, if any, will depend on prevailing market conditions, liquidity requirements, contractual restrictions and other factors. The amounts involved may be material.

Holdings' Capital Return Program

As of December 31, 2019, Holdings' board of directors had authorized for repurchase an aggregate of $14,000 of Holdings' common stock. As of December 31, 2019, Holdings' cumulative repurchases since December 2012 under Holdings' stock repurchase program totaled $12,834, and $1,166 remained available for additional repurchases under Holdings' existing stock repurchase program authorization.

Shares of common stock may be purchased from time to time on the open market and in privately negotiated transactions, including in accelerated stock repurchase transactions and transactions with Liberty Media and its affiliates. We intend to fund the additional repurchases through a combination of cash on hand, cash generated by operations and future borrowings.

On January 30, 2020, Holdings' board of directors declared a quarterly dividend on Holdings' common stock in the amount of $0.01331 per share of Holdings' common stock payable on February 28, 2020 to Holdings' stockholders of record as of the close of business on February 12, 2020. Holdings' board of directors expects to declare regular quarterly dividends, in an aggregate annual amount of $0.05324 per share of Holdings' common stock.

Debt Covenants

The indentures governing our senior notes and Pandora's convertible notes and the agreement governing the Credit Facility include restrictive covenants. As of December 31, 2019, we were in compliance with such covenants. For a discussion of our “Debt Covenants,” refer to Note 12 to our consolidated financial statements in this Annual Report.

Off-Balance Sheet Arrangements

We do not have any significant off-balance sheet arrangements other than those disclosed in Note 15 to our consolidated financial statements in this Annual Report that are reasonably likely to have a material effect on our financial condition, results of operations, liquidity, capital expenditures or capital resources.

Contractual Cash Commitments

For a discussion of our "Contractual Cash Commitments," refer to Note 15 to our consolidated financial statements in this Annual Report.

Related Party Transactions

For a discussion of "Related Party Transactions," refer to Note 11 to our consolidated financial statements in this Annual Report.

Critical Accounting Policies and Estimates

Our consolidated financial statements are prepared in accordance with GAAP, which requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the periods. Accounting estimates require the use of significant management assumptions and judgments as to future events, and the effect of those events cannot be predicted with certainty. The accounting estimates will change as new events occur, more experience is acquired and more information is obtained. We evaluate and update our assumptions and estimates on an ongoing basis and use outside experts to assist in that evaluation when we deem necessary. We have identified all significant accounting policies in Note 2 to our consolidated financial statements in Part II, Item 8, of this Annual Report on Form 10-K.

Intangible Assets and Purchase Accounting. We perform purchase price accounting upon an acquisition. We allocate the purchase consideration to the identifiable assets acquired and liabilities assumed based on their fair values at the acquisition date. The excess of the purchase consideration over the fair value of assets acquired and liabilities assumed is recorded as goodwill. The determination of the acquisition date fair value of the assets acquired and liabilities assumed required us to make significant estimates and assumptions regarding projected revenues and related growth rates, royalty rates, customer attrition rates, discount rates and the remaining useful lives of intangible and other long-term assets. Our intangible assets include goodwill, other indefinite-lived assets (our FCC licenses and trademarks) and definite-lived assets. Our annual impairment assessment of our goodwill and our indefinite-lived assets is performed as of the fourth quarter of each year. We also review our intangible assets for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset is not recoverable. If an impairment exists, the impairment is measured as the amount by which the carrying amount of an intangible asset exceeds its implied fair value.

- *Goodwill:* ASC 350, *Intangibles - Goodwill and Other*, states that an entity should perform its annual or interim goodwill impairment test by comparing the fair value of a reporting unit with its carrying amount and recognize an impairment charge for the amount by which the carrying amount exceeds the reporting unit's fair value. Under the updated guidance, the requirements for any reporting unit with a zero or negative carrying amount to perform a qualitative assessment is eliminated.

- *Indefinite-lived Assets:* ASC 350-30-35, *Intangibles - General Intangibles Other than Goodwill*, provides for an option to first perform a qualitative assessment to determine whether it is more likely than not that an asset is impaired. If the qualitative assessment supports that it is more likely than not that the fair value of the asset exceeds its carrying value, a company is not required to perform a quantitative impairment test. If the qualitative assessment does not support that the fair value of the asset exceeds its carrying value, then a quantitative assessment is performed.

- *Definite-lived:* We carry our definite-lived assets at cost less accumulated amortization.

Useful Life of Broadcast/Transmission System. Our satellite system includes the costs of our satellite construction, launch vehicles, launch insurance, capitalized interest, spare satellites, terrestrial repeater network and satellite uplink facilities. We monitor our satellites for impairment whenever events or changes in circumstances indicate that the carrying amount of the asset is not recoverable.

We operate two in-orbit Sirius satellites, FM-5 and FM-6, which launched in 2009 and 2013, respectively, and estimate they will operate effectively through the end of their depreciable lives in 2024 and 2028, respectively.

We operate three in-orbit XM satellites, XM-3, XM-4 and XM-5. We estimate that our XM-3 and XM-4 satellites launched in 2005 and 2006, respectively, will reach the end of their depreciable lives in 2020 and 2021, respectively. We have entered into agreements for the design, construction and launch of two new satellites, SXM-7 and SXM-8, which we plan to launch into geostationary orbits in 2020 as replacements for XM-3 and XM-4. Our XM-5 satellite was launched in 2010, is used as an in-orbit spare for the Sirius and XM systems and is expected to reach the end of its depreciable life in 2025.

Our satellites have been designed to last fifteen-years. Our in-orbit satellites may experience component failures which could adversely affect their useful lives. We monitor the operating condition of our in-orbit satellites and if events or circumstances indicate that the depreciable lives of our in-orbit satellites have changed, we will modify the depreciable life accordingly. If we were to revise our estimates, our depreciation expense would change.

Income Taxes. Deferred income taxes are recognized for the tax consequences related to temporary differences between the carrying amount of assets and liabilities for financial reporting purposes and the amounts used for tax purposes, based on enacted tax laws and statutory tax rates applicable to the periods in which the differences are expected to affect taxable income.

We assess the recoverability of deferred tax assets at each reporting date and, where applicable, a valuation allowance is recognized when, based on the weight of all available evidence, it is considered more likely than not that all, or some portion, of the deferred tax assets will not be realized. Our assessment includes an analysis of whether deferred tax assets will be realized in the ordinary course of operations based on the available positive and negative evidence, including the scheduling of deferred tax liabilities and forecasted income from operations. The underlying assumptions we use in forecasting future taxable income require significant judgment. In the event that actual income from operations differs from forecasted amounts, or if we change our estimates of forecasted income from operations, we could record additional charges or reduce allowances in order to adjust the carrying value of deferred tax assets to their realizable amount. Such adjustments could be material to our consolidated financial statements.

As of December 31, 2019, we had a valuation allowance of $70 relating to deferred tax assets that are not more likely than not to be realized due to the timing of certain state net operating loss limitations and acquired net operating losses that were not likely to be utilized.

ASC 740, *Income Taxes*, requires a company to first determine whether it is more likely than not that a tax position will be sustained based on its technical merits as of the reporting date, assuming that taxing authorities will examine the position and have full knowledge of all relevant information. A tax position that meets this more likely than not threshold is then measured and recognized at the largest amount of benefit that is greater than fifty percent likely to be realized upon effective settlement with a taxing authority. If the tax position is not more likely than not to be sustained, the gross amount of the unrecognized tax position will not be recorded in the financial statements but will be shown in tabular format within the uncertain income tax positions. Changes in recognition or measurement are reflected in the period in which the change in judgment occurs due to the following conditions: (1) the tax position is “more likely than not” to be sustained, (2) the tax position, amount, and/or timing is ultimately settled through negotiation or litigation, or (3) the statute of limitations for the tax position has expired. A number of years may elapse before an uncertain tax position is effectively settled or until there is a lapse in the applicable statute of limitations. We record interest and penalties related to uncertain tax positions in Income tax expense in our consolidated statements of comprehensive income. As of December 31, 2019, the gross liability for income taxes associated with uncertain tax positions was $406.

Glossary

Monthly active users - the number of distinct registered users on the Pandora services, including subscribers, which have consumed content within the trailing 30 days to the end of the final calendar month of the period. The number of monthly active users on the Pandora services may overstate the number of unique individuals who actively use our Pandora service, as one individual may use multiple accounts. To become a registered user on the Pandora services, a person must sign-up using an email address or phone number, or access our service using a device with a unique identifier, which we use to create an account for our service.

Average self-pay monthly churn - the Sirius XM monthly average of self-pay deactivations for the period divided by the average number of self-pay subscribers for the period.

Adjusted EBITDA - EBITDA is defined as net income before interest expense, income tax expense and depreciation and amortization. We adjust EBITDA to exclude the impact of other expense (income) as well as certain other charges discussed below. Adjusted EBITDA is a Non-GAAP financial measure that excludes or adjusts for (if applicable): (i) certain adjustments as a result of the purchase price accounting for the XM Merger and the Pandora Acquisition, (ii) predecessor net income adjusted for certain expenses, including depreciation and amortization, other income (loss), and share-based payment expense for January 2019 and the twelve months ended December 31, 2018 and 2017, (iii) share-based payment expense and (iv) other significant operating expense (income) that do not relate to the on-going performance of our business. We believe adjusted EBITDA is a useful measure of the underlying trend of our operating performance, which provides useful information about our business apart from the costs associated with our capital structure and purchase price accounting. We believe investors find this Non-GAAP financial measure useful when analyzing our past operating performance with our current performance and comparing our operating performance to the performance of other communications, entertainment and media companies. We believe investors use adjusted EBITDA to estimate our current enterprise value and to make investment decisions. As a result of large capital investments in our satellite radio system, our results of operations reflect significant charges for depreciation expense. We believe the exclusion of share-based payment expense is useful as it is not directly related to the operational conditions of our business. We also believe the exclusion of the legal settlements and reserves, acquisition related costs, and loss on extinguishment of debt, to the extent they occur during the period, is useful as they are significant expenses not incurred as part of our normal operations for the period.

Adjusted EBITDA has certain limitations in that it does not take into account the impact to our statements of comprehensive income of certain expenses, including share-based payment expense and certain purchase price accounting for the XM Merger and the Pandora Acquisition. We endeavor to compensate for the limitations of the Non-GAAP measure presented by also providing the comparable GAAP measure with equal or greater prominence and descriptions of the reconciling items, including quantifying such items, to derive the Non-GAAP measure. Investors that wish to compare and evaluate our operating results after giving effect for these costs, should refer to net income as disclosed in our consolidated statements of comprehensive income. Since adjusted EBITDA is a Non-GAAP financial performance measure, our calculation of adjusted EBITDA may be susceptible to varying calculations; may not be comparable to other similarly titled measures of other companies; and should not be considered in isolation, as a substitute for, or superior to measures of financial performance prepared in accordance with GAAP. The reconciliation of net income to the adjusted EBITDA is calculated as follows:

	For the Years Ended December 31,		
	2019	2018	2017
Net income:	$ 898	$ 1,176	$ 648
Add back items excluded from Adjusted EBITDA:			
Legal settlements and reserves	25	69	45
Acquisition and other related costs [(1)]	84	3	—
Share-based payment expense	229	133	124
Depreciation and amortization	468	301	299
Interest expense	384	350	346
Loss on extinguishment of debt	57	—	44
Other expense (income)	24	(44)	(13)
Income tax expense	284	245	616
Purchase price accounting adjustments:			
Revenues	13	7	7
Operating expenses	(14)	—	—
Pro forma adjustments [(2)]	(25)	(109)	(110)
Adjusted EBITDA	$ 2,427	$ 2,131	$ 2,006

(1) Acquisition and other related costs include $21 of share-based compensation expense for the year ended December 31, 2019.

(2) Pro forma adjustment for the year ended December 31, 2019 includes Pandora's January 2019 Net income of $(44) plus Depreciation and amortization of $6, Share-based payment expense of $11, Acquisition and other related costs of $1, and Interest expense of $2 offset by Other expense (income) of $1. Pro forma adjustment for year ended December 31, 2018 includes Pandora's Net income for the year ended December 31, 2018 of $(328) plus Depreciation and amortization of $61, Share-based payment expense of $111, Loss on extinguishment of debt of $17, Interest expense of $27, transaction related costs recorded by Pandora related to its acquisition by Sirius XM of $12, and contract termination fees of $6, offset by Other expense (income) of $7 and Income tax benefit of $8. Pro forma adjustment for year ended December 31, 2017 includes Pandora's Net income for the year ended December 31, 2017 of $(518) plus Depreciation and amortization of $63, Share-based payment expense of $128, Interest expense of $29, contract termination fees of $23, loss on extinguishment of debt of $9 and activity related to discontinued operations of $160, offset by Other expense (income) of $3 and Income tax benefit of $1.

Free cash flow - is derived from cash flow provided by operating activities, net of additions to property and equipment and purchases of other investments. Free cash flow is a metric that our management and board of directors use to evaluate the cash generated by our operations, net of capital expenditures and other investment activity. In a capital intensive business, with significant investments in satellites, we look at our operating cash flow, net of these investing cash outflows, to determine cash available for future subscriber acquisition and capital expenditures, to repurchase or retire debt, to acquire other companies and to evaluate our ability to return capital to stockholders. We exclude from free cash flow certain items that do not relate to the on-going performance of our business, such as cash flows related to acquisitions, strategic and short-term investments, and net loan activity with related parties and other equity investees. We believe free cash flow is an indicator of the long-term financial stability of our business. Free cash flow, which is reconciled to "Net cash provided by operating activities," is a Non-GAAP financial measure. This measure can be calculated by deducting amounts under the captions "Additions to property and equipment" and deducting or adding Restricted and other investment activity from "Net cash provided by operating activities" from the consolidated statements of cash flows. Free cash flow should be used in conjunction with other GAAP financial performance measures and may not be comparable to free cash flow measures presented by other companies. Free cash flow should be viewed as a supplemental measure rather than an alternative measure of cash flows from operating activities, as determined in accordance with GAAP. Free cash flow is limited and does not represent remaining cash flows available for discretionary expenditures due to the fact that the measure does not deduct the payments required for debt maturities. We believe free cash flow provides useful supplemental information to investors regarding our current cash flow, along with other GAAP measures (such as cash flows from operating and investing activities), to determine our financial condition, and to compare our operating performance to other communications, entertainment and media companies. Free cash flow is calculated as follows:

	For the Years Ended December 31,		
	2019	2018	2017
Cash Flow information			
Net cash provided by operating activities	$ 1,875	$ 1,760	$ 1,764
Net cash used in investing activities	$ (3)	$ (379)	$ (1,147)
Net cash used in financing activities	$ (1,817)	$ (1,395)	$ (762)
Free Cash Flow			
Net cash provided by operating activities	$ 1,875	$ 1,760	$ 1,764
Equity-related transactions for Holdings [(a)]	142	120	92
Additions to property and equipment	(363)	(355)	(288)
Purchases of other investments	(7)	(8)	(8)
Free cash flow	$ 1,647	$ 1,517	$ 1,560

(a) Subsequent to our corporate reorganization in November 2013, certain equity-related transactions are reported as related party transactions within our consolidated statements of cash flows. For the years ended December 31, 2019 and 2018, this included payments of $150 and $120, respectively, for taxes paid in lieu of shares issued for stock-based compensation and proceeds from the exercise of stock options of $8 during the years ended December 31, 2019. These equity-related transactions are classified as Cash flows used in financing activities within Holdings' consolidated statements of cash flows, and therefore, are adjusted to reflect free cash flow at Sirius XM.

ARPU - Sirius XM ARPU is derived from total earned subscriber revenue (excluding revenue associated with our connected vehicle services), advertising revenue, divided by the number of months in the period, divided by the daily weighted average number of subscribers for the period. Pandora ARPU is defined as average monthly subscriber revenue per paid subscriber on our Pandora subscription services.

Subscriber acquisition cost, per installation - or SAC, per installation, is derived from subscriber acquisition costs and margins from the sale of radios and accessories (excluding connected vehicle services), divided by the number of satellite radio installations in new vehicles and shipments of aftermarket radios for the period. SAC, per installation, is calculated as follows:

	For the Years Ended December 31,		
	2019	2018	2017
Subscriber acquisition costs, excluding connected vehicle services	$ 427	$ 470	$ 499
Less: margin from sales of radios and accessories, excluding connected vehicle services	(144)	(122)	(96)
	$ 283	$ 348	$ 403
Installations	12,355	13,563	13,662
SAC, per installation [(a)]	$ 22.91	$ 25.66	$ 29.53

(a) Amounts may not recalculate as a result of rounding.

Ad supported listener hours - is based on the total bytes served over our Pandora advertising supported platforms for each track that is requested and served from our Pandora servers, as measured by our internal analytics systems, whether or not a listener listens to the entire track. For non-music content such as podcasts, episodes are divided into approximately track-length parts, which are treated as tracks. To the extent that third-party measurements of advertising hours are not calculated using a similar server-based approach, the third-party measurements may differ from our measurements.

RPM - is calculated by dividing advertising revenue, excluding AdsWizz and other off-platform revenue, by the number of thousands of listener hours on our Pandora advertising-based service.

LPM - is calculated by dividing advertising licensing costs by the number of thousands of listener hours on our Pandora advertising-based service.

LPU - is calculated by dividing subscriber licensing costs by the number of paid subscribers on our Pandora subscription services.

Report of Independent Registered Public Accounting Firm

To the Board of Directors
Sirius XM Radio Inc. and subsidiaries:

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of Sirius XM Radio Inc. and subsidiaries (the Company) as of December 31, 2019 and 2018, the related consolidated statements of comprehensive income, stockholder equity, and cash flows for each of the years in the three-year period ended December 31, 2019, and the related notes (collectively, the consolidated financial statements). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2019 and 2018, and the results of its operations and its cash flows for each of the years in the three-year period ended December 31, 2019, in conformity with U.S. generally accepted accounting principles.

Change in Accounting Principle

As discussed in Note 2 to the consolidated financial statements, the Company changed its method of accounting for leases effective January 1, 2019 due to the adoption of Accounting Standard Update (ASU) 2016-02 and all related amendments, which established Accounting Standard Codification (ASC) Topic 842, *Leases*.

Also as discussed in Note 2 to the consolidated financial statements, the Company changed its method of accounting for revenue recognition effective January 1, 2018 due to the adoption of ASU 2014-09 and all related amendments, which established ASC Topic 606, *Revenue - Revenue from Contracts with Customers*.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these consolidated financial statements based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the 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 and in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the 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. We believe that our audits provide a reasonable basis for our opinion.

/s/ KPMG LLP

We have served as the Company's auditor since 2008.

New York, New York
February 4, 2020

SIRIUS XM RADIO INC. AND SUBSIDIARIES
(a wholly-owned subsidiary of Sirius XM Holdings Inc.)
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME

	For the Years Ended December 31,		
(in millions)	**2019**	**2018**	**2017**
Revenue:			
Subscriber revenue	$ 6,120	$ 5,264	$ 4,990
Advertising revenue	1,336	188	160
Equipment revenue	173	155	132
Other revenue	165	164	143
Total revenue	7,794	5,771	5,425
Operating expenses:			
Cost of services:			
Revenue share and royalties	2,291	1,394	1,210
Programming and content	462	406	388
Customer service and billing	475	382	385
Transmission	170	96	83
Cost of equipment	29	31	35
Subscriber acquisition costs	427	470	499
Sales and marketing	937	484	438
Engineering, design and development	280	123	112
General and administrative	524	354	335
Depreciation and amortization	468	301	299
Acquisition and other related costs	84	3	—
Total operating expenses	6,147	4,044	3,784
Income from operations	1,647	1,727	1,641
Other (expense) income:			
Interest expense	(384)	(350)	(346)
Loss on extinguishment of debt	(57)	—	(44)
Other (expense) income	(24)	44	13
Total other (expense) income	(465)	(306)	(377)
Income before income taxes	1,182	1,421	1,264
Income tax expense	(284)	(245)	(616)
Net income attributable to Sirius XM Radio Inc.'s sole stockholder	$ 898	$ 1,176	$ 648
Foreign currency translation adjustment, net of tax	14	(29)	19
Total comprehensive income attributable to Sirius XM Radio Inc.'s sole stockholder	$ 912	$ 1,147	$ 667

See accompanying notes to the consolidated financial statements.

SIRIUS XM RADIO INC. AND SUBSIDIARIES
(a wholly-owned subsidiary of Sirius XM Holdings Inc.)
CONSOLIDATED BALANCE SHEETS

(in millions, except per share data)	As of December 31, 2019	2018
ASSETS		
Current assets:		
Cash and cash equivalents	$ 106	$ 54
Receivables, net	670	233
Inventory, net	11	22
Related party current assets	22	11
Prepaid expenses and other current assets	194	158
Total current assets	1,003	478
Property and equipment, net	1,626	1,513
Intangible assets, net	3,467	2,501
Goodwill	3,828	2,290
Related party long-term assets	8,400	9,001
Deferred tax assets	166	293
Operating lease right-of-use assets	466	—
Other long-term assets	140	138
Total assets	$ 19,096	$ 16,214
LIABILITIES AND STOCKHOLDER EQUITY		
Current liabilities:		
Accounts payable and accrued expenses	$ 1,151	$ 736
Accrued interest	160	128
Current portion of deferred revenue	1,930	1,932
Current maturities of debt	2	3
Operating lease current liabilities	46	—
Related party current liabilities	4	4
Total current liabilities	3,293	2,803
Long-term deferred revenue	130	149
Long-term debt	7,917	6,885
Related party long-term liabilities	—	4
Deferred tax liabilities	70	47
Operating lease liabilities	456	—
Other long-term liabilities	94	102
Total liabilities	11,960	9,990
Commitments and contingencies (Note 15)		
Stockholder equity:		
Common stock, par value $0.001 per share; 9,000 shares authorized; 0.001 shares issued and outstanding at December 31, 2019 and December 31, 2018, respectively	—	—
Accumulated other comprehensive income (loss), net of tax	8	(6)
Additional paid-in capital	8,680	8,680
Accumulated deficit	(1,552)	(2,450)
Total stockholder equity	7,136	6,224
Total liabilities and stockholder equity	$ 19,096	$ 16,214

See accompanying notes to the consolidated financial statements.

SIRIUS XM RADIO INC. AND SUBSIDIARIES
(a wholly-owned subsidiary of Sirius XM Holdings Inc.)
CONSOLIDATED STATEMENTS OF STOCKHOLDER EQUITY

For the Years Ended December 31, 2019

(in millions)	Common Stock Shares	Common Stock Amount	Accumulated Other Comprehensive Income (Loss)	Additional Paid-in Capital	Accumulated Deficit	Total Stockholder Equity
Balance at January 1, 2017	1	$ —	$ —	$ 8,680	$ (4,284)	$ 4,396
Comprehensive income, net of tax	—	—	19	—	648	667
Balance at December 31, 2017	1	$ —	$ 19	$ 8,680	$ (3,636)	$ 5,063
Cumulative effect of change in accounting principles	—	—	4	—	10	14
Comprehensive income, net of tax	—	—	(29)	—	1,176	1,147
Balance at December 31, 2018	1	$ —	$ (6)	$ 8,680	$ (2,450)	$ 6,224
Comprehensive income, net of tax	—	—	14	—	898	912
Balance at December 31, 2019	1	$ —	$ 8	$ 8,680	$ (1,552)	$ 7,136

See accompanying notes to the consolidated financial statements.

SIRIUS XM RADIO INC. AND SUBSIDIARIES
(a wholly-owned subsidiary of Sirius XM Holdings Inc.)
CONSOLIDATED STATEMENTS OF CASH FLOWS

	For the Years Ended December 31,		
(in millions)	**2019**	**2018**	**2017**
Cash flows from operating activities:			
Net income	$ 898	$ 1,176	$ 648
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation and amortization	468	301	299
Non-cash interest expense, net of amortization of premium	11	9	9
Provision for doubtful accounts	53	51	56
Amortization of deferred income related to equity method investment	(3)	(3)	(3)
Loss on extinguishment of debt	57	—	44
Loss (gain) on unconsolidated entity investments, net	21	10	(5)
Gain on fair value instrument	21	(43)	—
Dividend received from unconsolidated entity investment	2	2	4
Share-based payment expense	250	133	124
Deferred income taxes	260	257	584
Changes in operating assets and liabilities:			
Receivables	(137)	(42)	(74)
Inventory	11	(2)	2
Related party, net	(152)	(102)	(74)
Prepaid expenses and other current assets	(3)	(20)	50
Other long-term assets	4	10	7
Operating lease right-of-use assets	(14)	—	—
Accounts payable and accrued expenses	109	(37)	21
Accrued interest	32	(9)	23
Deferred revenue	(58)	70	42
Operating lease liabilities	36	—	—
Other long-term liabilities	9	(1)	7
Net cash provided by operating activities	1,875	1,760	1,764
Cash flows from investing activities:			
Additions to property and equipment	(363)	(355)	(288)
Purchases of other investments	(7)	(8)	(8)
Acquisition of business, net of cash acquired	313	(2)	(108)
Sale of short-term investments	73	—	—
Investments in related parties and other equity investees	(19)	(17)	(612)
Repayment from (loan to) related party	—	3	(131)
Net cash used in investing activities	(3)	(379)	(1,147)
Cash flows from financing activities:			
Intercompany financing activities	(2,382)	(1,515)	(1,599)
Revolving credit facility, net of deferred financing costs	(439)	136	(90)
Proceeds from long-term borrowings, net of costs	2,715	—	2,473
Principal payments of long-term borrowings	(1,666)	(16)	(1,513)
Payment of premiums on redemption of debt	(45)	—	(33)
Net cash used in financing activities	(1,817)	(1,395)	(762)
Net increase (decrease) in cash, cash equivalents and restricted cash	55	(14)	(145)
Cash, cash equivalents and restricted cash at beginning of period	65	79	224
Cash, cash equivalents and restricted cash at end of period(1)	$ 120	$ 65	$ 79

See accompanying notes to the consolidated financial statements.

SIRIUS XM RADIO INC. AND SUBSIDIARIES
(a wholly-owned subsidiary of Sirius XM Holdings Inc.)
CONSOLIDATED STATEMENTS OF CASH FLOWS - Continued

	For the Years Ended December 31,		
(in millions)	2019	2018	2017
Supplemental Disclosure of Cash and Non-Cash Flow Information			
Cash paid during the period for:			
Interest, net of amounts capitalized	$ 337	$ 345	$ 310
Income taxes paid	$ 10	$ 6	$ 28
Non-cash investing and financing activities:			
Capital lease obligations incurred to acquire assets	$ —	$ —	$ 3
Holdings' shares issued related to acquisition of a business	$ 2,355	$ —	$ —
Accumulated other comprehensive income (loss), net of tax	$ 14	$ (29)	$ 19

(1) The following table reconciles cash, cash equivalents and restricted cash per the statement of cash flows to the balance sheet. The restricted cash balances are primarily due to letters of credit which have been issued to the landlords of leased office space. The terms of the letters of credit primarily extend beyond one year.

(in millions)	December 31, 2019	December 31, 2018	December 31, 2017	December 31, 2016
Cash and cash equivalents	$ 106	$ 54	$ 69	$ 214
Restricted cash included in Other long-term assets	14	11	10	10
Total cash, cash equivalents and restricted cash at end of period	$ 120	$ 65	$ 79	$ 224

See accompanying notes to the consolidated financial statements.

SIRIUS XM RADIO INC. AND SUBSIDIARIES
(a wholly-owned subsidiary of Sirius XM Holdings Inc.)
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
(UNAUDITED)
(Dollars and shares in millions, except per share amounts)

(1) Business & Basis of Presentation

Business

We operate two complementary audio entertainment businesses - our Sirius XM business and our Pandora business.

Sirius XM

Our Sirius XM business features music, sports, entertainment, comedy, talk, news, traffic and weather channels, as well as infotainment services, in the United States on a subscription fee basis. The Sirius XM service is distributed through our two proprietary satellite radio systems and through the internet via applications for mobile devices, home devices and other consumer electronic equipment. Satellite radios are primarily distributed through automakers, retailers and our website. Our Sirius XM service is also available through our user interface, which we call “360L,” that combines our satellite and streaming services into a single, cohesive in-vehicle entertainment experience. The primary source of revenue from our Sirius XM business is generated from subscription fees, with most of our customers subscribing to monthly, quarterly, semi-annual or annual plans. We also derive revenue from advertising on select non-music channels, direct sales of our satellite radios and accessories, and other ancillary services. As of December 31, 2019, our Sirius XM business had approximately 34.9 million subscribers.

In addition to our audio entertainment businesses, we provide connected vehicle services to several automakers and directly to consumers through aftermarket devices. These services are designed to enhance the safety, security and driving experience of consumers. We also offer a suite of data services that includes graphical weather, fuel prices, sports schedules and scores and movie listings, a traffic information service that includes information as to road closings, traffic flow and incident data to consumers with compatible in-vehicle navigation systems, and real-time weather services in vehicles, boats and planes.

Sirius XM also holds a 70% equity interest and 33% voting interest in Sirius XM Canada Holdings Inc. ("Sirius XM Canada"). Sirius XM Canada's subscribers are not included in our subscriber count or subscriber-based operating metrics.

Pandora

Our Pandora business operates a music, comedy and podcast streaming discovery platform, offering a personalized experience for each listener wherever and whenever they want to listen, whether through mobile devices, car speakers or connected devices. Pandora enables listeners to create personalized stations and playlists, discover new content, hear artist- and expert-curated playlists, podcasts and select Sirius XM content as well as search and play songs and albums on-demand. Pandora is available as an ad-supported radio service, a radio subscription service, called Pandora Plus, and an on-demand subscription service, called Pandora Premium. As of December 31, 2019, Pandora had approximately 6.2 million subscribers. The majority of revenue from our Pandora business is generated from advertising on our Pandora ad-supported radio service. In addition, through AdsWizz Inc., Pandora provides a comprehensive digital audio advertising technology platform, which connects audio publishers and advertisers. As of December 31, 2019, our Pandora business had approximately 63.5 million monthly active users.

Liberty Media

As of December 31, 2019, Liberty Media Corporation (“Liberty Media”) beneficially owned, directly and indirectly, approximately 72% of the outstanding shares of Holdings' common stock. As a result, Holdings is a “controlled company” for the purposes of the NASDAQ corporate governance requirements.

SIRIUS XM RADIO INC. AND SUBSIDIARIES
(a wholly-owned subsidiary of Sirius XM Holdings Inc.)
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS - Continued
(Dollars and shares in millions, except per share amounts)

Basis of Presentation

The accompanying consolidated financial statements have been prepared in accordance with U.S. generally accepted accounting principles ("GAAP"). All significant intercompany transactions have been eliminated in consolidation. Certain numbers in our prior period consolidated financial statements and footnotes have been reclassified or consolidated to conform to our current period presentation. Music Royalty Fee revenue was reported as Other revenue in our December 31, 2018 and 2017 Annual Reports. This revenue was reclassified to Subscriber revenue to conform with the current period presentation.

	For the Year Ended December 31, 2018			For the Year Ended December 31, 2017		
	As Reported	Reclassification	Current Report	As Reported	Reclassification	Current Report
Subscriber revenue	$ 4,594	$ 670	$ 5,264	$ 4,472	$ 518	$ 4,990
Advertising revenue	188	—	188	160	—	160
Equipment revenue	155	—	155	132	—	132
Other revenue	834	(670)	164	661	(518)	143
Total revenue	$ 5,771	$ —	$ 5,771	$ 5,425	$ —	$ 5,425

The consolidated financial statements for Sirius XM for the annual period ended December 31, 2019 are essentially identical to the consolidated financial statements included in Holdings' Form 10-K for the annual period ended December 31, 2019, filed with the SEC on February 4, 2020, with the following exceptions:

- As a result of our corporate reorganization effective November 15, 2013, all of the outstanding shares of Sirius XM's common stock were converted, on a share for share basis, into identical shares of common stock of Holdings and all equity-related transactions, including repurchases of Holdings' common stock, dividend payments on shares of Holdings' common stock, the issuance of equity related to stock-based compensation to Sirius XM employees, Holdings' directors and third parties, the issuance of Holdings' common stock related to the recapitalization of Sirius XM Canada and the issuance of Holdings' common stock related to the Pandora Acquisition have been reported as related party transactions within Sirius XM's consolidated financial statements. Refer to Note 11 for additional information related to related party transactions.
- As a result of the Pandora Acquisition effective February 1, 2019, we assumed Pandora's 1.75% Convertible Senior Notes due 2023 (the "Pandora 2023 Notes"). Upon the occurrence of certain events, the Pandora 2023 Notes can be convertible into shares of Holdings' common stock. Holdings allocates the principal amount of the Pandora 2023 Notes between liability and equity components. We have elected to measure the Pandora 2023 Notes at fair value with changes in fair value recorded within Sirius XM's consolidated statements of operations. Additionally, the different basis for the Pandora 2023 Notes between Holdings and SiriusXM results in a deferred tax liability at Holdings whereas none exists at SiriusXM. Refer to Note 12 for more information regarding the Pandora 2023 Notes.

This Annual Report should be read together with Holdings' Annual Report on Form 10-K for the year ended December 31, 2019, which was filed with the SEC on February 4, 2020.

Public companies, including our parent Holdings, are required to disclose certain information about their reportable operating segments. Operating segments are defined as significant components of an enterprise for which separate financial information is available and is evaluated on a regular basis by the chief operating decision maker in deciding how to allocate resources to an individual segment and in assessing performance of the segment. We have determined that we have two reportable segments as our chief operating decision maker, our Chief Executive Officer, assesses performance and allocates resources based on the financial results of these segments. Refer to Note 17 for information related to our segments.

We have evaluated events subsequent to the balance sheet date and prior to the furnishing of this Annual Report for the year ended December 31, 2019 and have determined that no events have occurred that would require adjustment to our consolidated financial statements. For a discussion of subsequent events that do not require adjustment to our consolidated financial statements refer to Note 18.

(Dollars and shares in millions, except per share amounts)

Use of Estimates

The preparation of financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the amounts reported in the financial statements and footnotes. Estimates, by their nature, are based on judgment and available information. Actual results could differ materially from those estimates. Significant estimates inherent in the preparation of the accompanying consolidated financial statements include asset impairment, depreciable lives of our satellites, share-based payment expense, income taxes, and the purchase accounting related to the Pandora Acquisition (defined below).

(2) Summary of Significant Accounting Policies

In addition to the significant accounting policies discussed in this Note 2, the following table includes our significant accounting policies that are described in other notes to our consolidated financial statements, including the number and page of the note:

Significant Accounting Policy	Note #	Page #
Acquisition	3	F-14
Fair Value Measurements	4	F-16
Goodwill	7	F-18
Intangible Assets	8	F-18
Property and Equipment	9	F-20
Equity Method Investments	11	F-24
Share-Based Compensation	14	F-28
Legal Reserves	15	F-32
Income Taxes	16	F-35

Cash and Cash Equivalents

Our cash and cash equivalents consist of cash on hand, money market funds, certificates of deposit, in-transit credit card receipts and highly liquid investments purchased with an original maturity of three months or less.

Revenue Recognition

Revenue is measured according to Accounting Standards Codification ("ASC") 606, *Revenue - Revenue from Contracts with Customers*, and is recognized based on consideration specified in a contract with a customer, and excludes any sales incentives and amounts collected on behalf of third parties. We recognize revenue when it satisfies a performance obligation by transferring control over a service or product to a customer. We report revenues net of any tax assessed by a governmental authority that is both imposed on, and concurrent with, a specific revenue-producing transaction between a seller and a customer in our consolidated statements of comprehensive income. Collected taxes are recorded within Other current liabilities until remitted to the relevant taxing authority. For equipment sales, we are responsible for arranging for shipping and handling. Shipping and handling costs billed to customers are recorded as revenue and are reported as a component of Cost of equipment.

The following is a description of the principal activities from which we generate our revenue, including from self-pay and paid promotional subscribers, advertising, and sales of equipment.

Subscriber revenue consists primarily of subscription fees and other ancillary subscription based revenues. Revenue is recognized on a straight line basis when the performance obligations to provide each service for the period are satisfied, which is over time as our subscription services are continuously transmitted and can be consumed by customers at any time. Consumers purchasing or leasing a vehicle with a factory-installed satellite radio may receive between a three and twelve month subscription to our service. In certain cases, the subscription fees for these consumers are prepaid by the applicable automaker. Prepaid subscription fees received from automakers or directly from consumers are recorded as deferred revenue and amortized to revenue ratably over the service period which commences upon sale. Activation fees are recognized over one month as the activation fees are non-refundable and do not provide for a material right to the customer. There is no revenue recognized for unpaid trial subscriptions. In some cases we pay a loyalty fee to the automakers when we receive a certain amount of payments from self-pay customers acquired from that automaker. These fees are considered incremental costs to obtain a contract and are, therefore, recognized as an asset and amortized to Subscriber acquisition costs over an average subscriber life. Revenue share and loyalty fees paid to an automaker offering a paid trial are accounted for as a reduction of revenue as the payment does not provide a distinct good or service.

Music royalty fee primarily consists of U.S. music royalty fees ("MRF") collected from subscribers. The related costs we incur for the right to broadcast music and other programming are recorded as Revenue share and royalties expense. Fees received from subscribers for the MRF are recorded as deferred revenue and amortized to Subscriber revenue ratably over the service period.

We recognize revenue from the sale of advertising as performance obligations are satisfied, which generally occurs as ads are delivered. Agency fees are calculated based on a stated percentage applied to gross billing revenue for our advertising inventory and are reported as a reduction of advertising revenue. Additionally, we pay certain third parties a percentage of advertising revenue. Advertising revenue is recorded gross of such revenue share payments as we control the advertising service, including the ability to establish pricing, and we are primarily responsible for providing the service. Advertising revenue share payments are recorded to Revenue share and royalties during the period in which the advertising is transmitted.

Equipment revenue and royalties from the sale of satellite radios, components and accessories are recognized upon shipment, net of discounts and rebates. Shipping and handling costs billed to customers are recorded as revenue. Shipping and handling costs associated with shipping goods to customers are reported as a component of Cost of equipment. Other revenue primarily includes revenue recognized from royalties received from Sirius XM Canada.

Customers pay for the services in advance of the performance obligation and therefore these prepayments are recorded as deferred revenue. The deferred revenue is recognized as revenue in our consolidated statement of comprehensive income as the services are provided. Changes in the deferred revenue balance during the period ended December 31, 2019 was not materially impacted by other factors.

As the majority of our contracts are one year or less, we have utilized the optional exemption under ASC 606-10-50-14 and will not disclose information about the remaining performance obligations for contracts which have original expected durations of one year or less. As of December 31, 2019, less than ten percent of our total deferred revenue balance related to contracts that extended beyond one year. These contracts primarily include prepaid data trials which are typically provided for three to five years as well as for self-pay customers who prepay for their audio subscriptions for up to three years in advance. These amounts are recognized on a straight-line basis as our services are provided.

Revenue Share

We share a portion of our subscription revenues earned from self-pay subscribers with certain automakers. The terms of the revenue share agreements vary with each automaker, but are typically based upon the earned audio revenue as reported or gross billed audio revenue.

Royalties

In connection with our businesses, we must enter into royalty arrangements with two sets of rights holders: holders of musical compositions copyrights (that is, the music and lyrics) and holders of sound recordings copyrights (that is, the actual recording of a work). Our Sirius XM business and our Pandora business use both statutory and direct music licenses as part of their businesses. We also license varying rights - such as performance and mechanical rights - for use in our Sirius XM and Pandora businesses based on the various radio and interactive services they offer. The music rights licensing arrangement for our Sirius XM and Pandora businesses are complex.

We pay performance royalties for our Sirius XM business and our Pandora business to holders and rights administrators of musical compositions copyrights, including performing rights organizations and other copyright owners. These performance royalties are contained in direct license agreements and are generally fixed fees per year.

For our interactive music services offered by our Pandora business, we pay mechanical royalties to copyright holders at the rates determined by the Copyright Royalty Board (the "CRB") in accordance with the statutory license set forth in Section

115 of the United States Copyright Act. These mechanical royalties are calculated as the greater of a percentage of our revenue or a percentage of our payments to record labels.

For our satellite radio business, we pay performance royalties to owners of sound recordings based on a percentage of our subscription revenue (subject to certain exclusions) through SoundExchange. We pay these royalties at a statutory rate established by the CRB.

For our streaming music and interactive music services offered by our Pandora business, we pay royalties to owners of sound recordings based on either a per-performance fee based on the number of sound recordings transmitted, a percentage of revenue associated with the applicable service, or a per-subscriber minimum amount. The royalty rates paid by our Pandora business are primarily stipulated in direct license agreements with record companies. The performance royalty rates paid to owners of sound recordings by our Sirius XM business for streaming music are primarily set by the CRB.

Programming Costs

Programming costs which are for a specified number of events are amortized on an event-by-event basis; programming costs which are for a specified season or include programming through a dedicated channel are amortized over the season or period on a straight-line basis. We allocate a portion of certain programming costs which are related to sponsorship and marketing activities to Sales and marketing expense on a straight-line basis over the term of the agreement.

Advertising Costs

Media is expensed when aired and advertising production costs are expensed as incurred. Advertising production costs include expenses related to marketing and retention activities, including expenses related to direct mail, outbound telemarketing and email communications. We also incur advertising production costs related to cooperative marketing and promotional events and sponsorships. During the years ended December 31, 2019, 2018 and 2017, we recorded advertising costs of $392, $267 and $263, respectively. These costs are reflected in Sales and marketing expense in our consolidated statements of comprehensive income.

Subscriber Acquisition Costs

Subscriber acquisition costs consist of costs incurred to acquire new subscribers which include hardware subsidies paid to radio manufacturers, distributors and automakers, including subsidies paid to automakers who include a satellite radio and a prepaid subscription to our service in the sale or lease price of a new vehicle; subsidies paid for chipsets and certain other components used in manufacturing radios; device royalties for certain radios and chipsets; commissions paid to retailers and automakers as incentives to purchase, install and activate radios; product warranty obligations; freight; and provisions for inventory allowance attributable to inventory consumed in our automotive and retail distribution channels. Subscriber acquisition costs do not include advertising costs, loyalty payments to distributors and dealers of radios and revenue share payments to automakers and retailers of radios.

Subsidies paid to radio manufacturers and automakers are expensed upon installation, shipment, receipt of product or activation and are included in Subscriber acquisition costs because we are responsible for providing the service to the customers. Commissions paid to retailers and automakers are expensed upon either the sale or activation of radios. Chipsets that are shipped to radio manufacturers and held on consignment are recorded as inventory and expensed as Subscriber acquisition costs when placed into production by radio manufacturers. Costs for chipsets not held on consignment are expensed as Subscriber acquisition costs when the automaker confirms receipt.

Research & Development Costs

Research and development costs are expensed as incurred and primarily include the cost of new product development, chipset design, software development and engineering. During the years ended December 31, 2019, 2018 and 2017, we recorded research and development costs of $231, $106 and $97, respectively. These costs are reported as a component of Engineering, design and development expense in our consolidated statements of comprehensive income.

Accumulated Other Comprehensive Income (Loss), net of tax

Accumulated other comprehensive income of $8 was primarily comprised of the cumulative foreign currency translation adjustments related to Sirius XM Canada (refer to Note 11 for additional information). During the year ended December 31, 2019, we recorded a foreign currency translation adjustment gain of $14, which is recorded net of tax of $5. During the years ended December 31, 2018 and 2017, we recorded foreign currency translation adjustment (loss) gain of $(29) and $19, respectively, net of tax.

Recent Accounting Pronouncements

In August 2018, the Financial Accounting Standards Board ("FASB") issued ASU 2018-15, *Intangibles—Goodwill and Other—Internal-Use Software (Subtopic 350-40): Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That Is a Service Contract*. This ASU aligns the requirements for capitalizing implementation costs incurred in a hosting arrangement with the requirements for capitalizing implementation costs incurred to develop or obtain internal-use software. The implementation costs incurred in a hosting arrangement that is a service contract should be presented as a prepaid asset in the balance sheet and expensed over the term of the hosting arrangement to the same line item in the statement of income as the costs related to the hosting fees. The guidance in this ASU is effective for fiscal years beginning after December 15, 2019, including interim periods within those fiscal years, and early adoption is permitted including adoption in any interim period. The amendments should be applied either retrospectively or prospectively to all implementation costs incurred after adoption. This ASU will not have a material impact on our consolidated statements of operations.

Recently Adopted Accounting Policies

ASU 2016-02, Leases (Topic 842). In February 2016, FASB issued ASU 2016-02 which requires companies to recognize lease assets and liabilities arising from operating leases in the statement of financial position. This ASU does not significantly change the previous lease guidance for how a lessee should recognize, measure, and present expenses and cash flows arising from a lease. Additionally, the criteria for classifying a finance lease versus an operating lease are substantially the same as the previous guidance. This ASU was effective for fiscal years beginning after December 15, 2018, including interim periods within those fiscal years, and early adoption was permitted. In July 2018, the FASB issued ASU 2018-11, *Leases (Topic 842) Targeted Improvements*, amending certain aspects of the new leasing standard. The amendment allows an additional optional transition method whereby an entity records a cumulative effect adjustment to opening retained earnings in the year of adoption without restating prior periods. We adopted this ASU on January 1, 2019 and elected the additional transition method per ASU 2018-11. Our leases consist of repeater leases, facility leases and equipment leases. We elected the package of practical expedients permitted under the transition guidance within the new standard.

Adoption of the new standard resulted in the recording of additional lease assets and lease liabilities of approximately $347 and $369, respectively, as of January 1, 2019. The standard did not impact our consolidated statements of operations, consolidated statements of cash flows or debt. Additionally, we did not record a cumulative effect adjustment to opening retained earnings.

(Dollars and shares in millions, except per share amounts)

The effect of the changes made to our consolidated balance sheet as of January 1, 2019 for the adoption of ASU 2016-02 is included in the table below.

Balance Sheet	Balance at December 31, 2018	Adjustments Due to ASU 2016-02	Balance at January 1, 2019
Assets:			
Operating lease right-of-use assets	$ —	$ 347	$ 347
Liabilities:			
Accounts payable and accrued expenses	$ 736	$ (1)	$ 735
Operating lease current liabilities	—	30	30
Operating lease liabilities	—	339	339
Other long-term liabilities	102	(21)	81

ASU 2014-09, Revenue - Revenue from Contracts with Customers. In May 2014, the FASB issued ASU 2014-09 which requires entities to recognize revenues when control of the promised goods or services is transferred to customers at an amount that reflects the consideration to which the entity expects to be entitled to in exchange for those goods or services. In addition, the standard requires disclosure of the nature, amount, timing and uncertainty of revenue and cash flows arising from contracts with customers. We adopted ASU 2014-09, and all related amendments, which established ASC Topic 606 (the "new revenue standard"), effective as of January 1, 2018. We adopted the new revenue standard using the modified retrospective method by recognizing the cumulative effect of initially applying the new revenue standard to all non-completed contracts as of January 1, 2018 as an adjustment to opening Accumulated deficit in the period of adoption. Results for reporting periods beginning after January 1, 2018 are presented under the new revenue standard, while prior period amounts are not adjusted and continue to be reported in accordance with our historic accounting under Topic 605.

The new revenue standard primarily impacts how we account for revenue share payments and also has other immaterial impacts.

Revenue Share - Paid Trials

We previously recorded revenue share related to paid trials as Revenue share and royalties expense. Under the new revenue standard, we have recorded these revenue share payments as a reduction to revenue as the payments do not transfer a distinct good or service to us.

Other Impacts

Other impacts of the new revenue standard include:

- Activation fees were previously recognized over the expected subscriber life using the straight-line method. Under the new revenue standard, activation fees have been recognized over a one month period from activation as the activation fees are non-refundable and they do not convey a material right. As of January 1, 2018, we reduced deferred revenue related to activation fees of $8, net of tax, to Accumulated deficit.

- Loyalty payments to OEMs were previously expensed when incurred as Subscriber acquisition costs. Under the new revenue standard, these costs have been capitalized in Prepaid expenses and other current assets as costs to obtain a contract and these costs will be amortized to Subscriber acquisition costs over an average self-pay subscriber life of that OEM. As of January 1, 2018, we capitalized previously expensed loyalty payments of $10, net of tax, to Prepaid expenses and other current assets by reducing Accumulated deficit.

These changes do not have a material impact to our financial statements.

(Dollars and shares in millions, except per share amounts)

The following tables illustrate the impacts of adopting ASU 2014-09 on our consolidated statement of comprehensive income.

	For the Year Ended December 31, 2018		
Income Statement	Current Report	Impact of Adopting ASU 2014-09	Balances Without Adoption of ASU 2014-09
Revenues			
Subscriber revenue [1]	$ 5,264	$ 95	$ 5,359
Expenses			
Revenue share and royalties	1,394	88	1,482
Subscriber acquisition costs	470	4	474
Income tax expense	(245)	—	(245)
Net Income	$ 1,176	$ 3	$ 1,179

(1) Music Royalty Fee revenue was reported as Other revenue in our December 31, 2018 and 2017 Annual Reports on Form 10-K. This revenue was reclassified to Subscriber revenue to conform with the current period presentation. Refer to Note 1 for more information.

ASU 2018-02, Income Statement - Reporting Comprehensive Income (Topic 220): Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income. In February 2018, the FASB issued ASU 2018-02 to amend its standard on comprehensive income to provide an option for an entity to reclassify the stranded tax effects of the Tax Cuts and Jobs Act (the "Tax Act") that was passed in December 2017 from accumulated other comprehensive income ("AOCI") directly to retained earnings. The stranded tax effects result from the remeasurement of deferred tax assets and liabilities which were originally recorded in comprehensive income but whose remeasurement is reflected in the income statement. The guidance is effective for interim and fiscal years beginning after December 15, 2018, with early adoption permitted. We elected to adopt ASU 2018-02 effective January 1, 2018 and reclassified the stranded tax effects due to the Tax Act of $4 related to the currency translation adjustment from our investment balance and note receivable with Sirius XM Canada from AOCI to Accumulated deficit. The adoption did not have any impact on our consolidated statement of comprehensive income.

ASU 2018-07, Compensation-Stock Compensation (Topic 718): Improvements to Nonemployee Share-Based Payment Accounting. In June 2018, the FASB issued ASU 2018-07 which simplifies the accounting for share-based payments made to nonemployees so that the accounting for such payments is substantially the same as those made to employees, with certain exceptions. Under this ASU, equity-classified share based awards to nonemployees will be measured at fair value on the grant date of the awards, entities will need to assess the probability of satisfying performance conditions if any are present, and awards will continue to be classified according to ASC 718 upon vesting which eliminates the need to reassess classification upon vesting, consistent with awards granted to employees, unless the award is modified after the service has been rendered, any other conditions necessary to earn the right to benefit from the instruments have been satisfied, and the nonemployee is no longer providing services. The guidance is effective for fiscal years beginning after December 15, 2018, including interim periods within those fiscal years, and early adoption is permitted. We elected to early adopt ASU 2018-07 effective July 1, 2018 and remeasured our unsettled liability-classified nonemployee awards at their January 1, 2018 fair value by recording a retrospective cumulative effect adjustment to opening Accumulated deficit and reclassified our previously liability-classified awards to equity.

(3) Acquisition

On February 1, 2019, through a series of transactions, Pandora Media, Inc., became an indirect wholly owned subsidiary of Sirius XM and continues to operate as Pandora Media, LLC (the "Pandora Acquisition"). In connection with the Pandora Acquisition, Holdings purchased all of the outstanding shares of the capital stock of Pandora for $2,355 by converting each outstanding share of Pandora common stock into 1.44 shares of Holdings' common stock and we also canceled our preferred stock investment in Pandora for $524 for total consideration of $2,879. Net cash acquired was $313. As part of the Pandora Acquisition, Holdings unconditionally guaranteed all of the payment obligations of Pandora under its outstanding 1.75% convertible senior notes due 2020 and 1.75% convertible senior notes due 2023.

(Dollars and shares in millions, except per share amounts)

The table below shows the value of the consideration paid in connection with the Pandora Acquisition:

		Total
Pandora common stock outstanding		272
Exchange ratio		1.44
Holdings' common stock issued		392
Price per share of Holdings common stock	$	5.83
Value of Holdings' common stock issued to Pandora stockholders	$	2,285
Value of replacement equity awards attributable to pre-combination service	$	70
Consideration of Holdings' common stock and replacement equity awards for pre-combination service	$	2,355
Sirius XM's Pandora preferred stock investment (related party fair value instrument) canceled	$	524
Total consideration for Pandora Acquisition	$	2,879
Value attributed to par at $0.001 par value	$	1
Balance to capital in excess of par value	$	2,354

The table below summarizes the fair value of the assets acquired and liabilities assumed as of the acquisition date:

Acquired Assets:		
Cash and cash equivalents	$	313
Receivables, net		353
Prepaid expenses and other current assets		109
Property and equipment		65
Intangible assets		1,107
Goodwill		1,538
Deferred tax assets		117
Operating lease right-of-use assets		104
Long term assets		7
Total assets	$	3,713
Assumed Liabilities:		
Accounts payable and accrued expenses	$	324
Deferred revenue		37
Operating lease current liabilities		28
Current maturities of debt		151
Long-term debt (a)		218
Operating lease liabilities		69
Other long-term liabilities		7
Total liabilities	$	834
Total consideration	$	2,879

(a) Includes the fair value of Pandora's 2023 Notes

The Pandora Acquisition was accounted for using the acquisition method of accounting. As of December 31, 2019, the purchase price allocation has been finalized. The excess purchase price over identifiable net tangible and intangible assets of $1,553 has been recorded to Goodwill in our consolidated balance sheets as of December 31, 2019. A total of $776 has been allocated to identifiable intangible assets subject to amortization and relates to the assessed fair value of the acquired customer relationships and software and technology and is being amortized over the estimated weighted average useful lives of 8 and 5 years, respectively. A total of $331 has been allocated to identifiable indefinite lived intangible assets and relates to the assessed fair value of the acquired trademarks. The fair value assessed for the majority of the remaining assets acquired and liabilities assumed equaled their carrying value. Goodwill represents synergies and economies of scale expected from the combination of services. Goodwill has been allocated to the Pandora segment. Additionally, in connection with the Pandora Acquisition, we acquired gross net operating loss ("NOL") carryforwards of approximately $1,287 for federal income tax purposes that are available to offset future taxable income. The acquired NOL's are limited by Section 382 of the Internal Revenue Code. Those limitations are not expected to impact our ability to fully utilize those NOL's within the carryforward period.

(Dollars and shares in millions, except per share amounts)

We recognized acquisition related costs of $84 that were expensed in Acquisition and other related costs in our consolidated statements of comprehensive income during the year ended December 31, 2019.

Pro Forma Financial Information

Pandora was consolidated into our financial statements starting on the acquisition date, February 1, 2019. The aggregate revenue and net loss of Pandora consolidated into our financial statements since the date of acquisition was $1,607 and $303, respectively, for the year ended December 31, 2019. The following pro forma financial information presents our results as if the Pandora Acquisition had occurred on January 1, 2017:

	For the Years Ended December 31,		
	2019	2018	2017
Total revenue	$ 7,921	$ 7,348	$ 6,818
Net income	$ 922	$ 844	$ 335

These pro forma results are based on estimates and assumptions, which we believe are reasonable. They are not the results that would have been realized had the acquisition actually occurred on January 1, 2017 and are not indicative of our consolidated results of operations in future periods. The pro forma results primarily include adjustments related to amortization of acquired intangible assets, depreciation of property and equipment, acquisition costs, fair value gain or loss on the Pandora investment and associated tax impacts.

(4) Fair Value Measurements

The fair value of a financial instrument is the amount at which the instrument could be exchanged in an orderly transaction between market participants. As of December 31, 2019 and 2018, the carrying amounts of cash and cash equivalents, receivables, and accounts payable approximated fair value due to the short-term nature of these instruments. ASC 820, *Fair Value Measurements and Disclosures*, establishes a fair value hierarchy for input into valuation techniques as follows:

i. Level 1 input: unadjusted quoted prices in active markets for identical instrument;

ii. Level 2 input: observable market data for the same or similar instrument but not Level 1, including quoted prices for identical or similar assets or liabilities in markets that are not active or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the assets or liabilities; and

iii. Level 3 input: unobservable inputs developed using management's assumptions about the inputs used for pricing the asset or liability.

Investments are periodically reviewed for impairment and an impairment is recorded whenever declines in fair value below carrying value are determined to be other than temporary. In making this determination, we consider, among other factors, the severity and duration of the decline as well as the likelihood of a recovery within a reasonable timeframe.

Our assets and liabilities measured at fair value were as follows:

	December 31, 2019				December 31, 2018			
	Level 1	Level 2	Level 3	Total Fair Value	Level 1	Level 2	Level 3	Total Fair Value
Assets:								
Pandora investment [(a)]	—	$ —	—	$ —	—	$ 523	—	$ 523
Liabilities:								
Debt [(b)]	—	$ 8,378	—	$ 8,378	—	$ 6,633	—	$ 6,633

(Dollars and shares in millions, except per share amounts)

(a) During the year ended December 31, 2017, Sirius XM completed a $480 investment in Pandora. Prior to the Pandora Acquisition, we elected the fair value option to account for this investment. This investment was canceled in conjunction with the Pandora Acquisition. Refer to Note 3 for information on this acquisition.

(b) The fair value for non-publicly traded instruments is based upon estimates from a market maker and brokerage firm. Refer to Note 12 for information related to the carrying value of our debt as of December 31, 2019 and 2018.

(5) Receivables, net

Receivables, net, includes customer accounts receivable, receivables from distributors and other receivables. We do not have any customer receivables that individually represent more than ten percent of the receivables.

Customer accounts receivable, net, includes receivables from our subscribers, advertising customers and other customers, and is stated at amounts due, net of an allowance for doubtful accounts. Our allowance for doubtful accounts is based upon our assessment of various factors. We consider historical experience, the age of the receivable balances, current economic conditions, industry experience and other factors that may affect the counterparty's ability to pay. Bad debt expense is included in Customer service and billing expense in our consolidated statements of comprehensive income.

Receivables from distributors primarily include billed and unbilled amounts due from automakers for services included in the sale or lease price of vehicles, as well as billed amounts due from wholesale distributors of our satellite radios. Other receivables primarily include amounts due from manufacturers of our radios, modules and chipsets where we are entitled to subsidies and royalties based on the number of units produced. We have not established an allowance for doubtful accounts for our receivables from distributors or other receivables as we have historically not experienced any significant collection issues with automakers or other third parties.

Receivables, net, consists of the following:

	December 31, 2019	December 31, 2018
Gross customer accounts receivable	$ 546	$ 105
Allowance for doubtful accounts	(14)	(7)
Customer accounts receivable, net	$ 532	$ 98
Receivables from distributors	113	107
Other receivables	25	28
Total receivables, net	$ 670	$ 233

(6) Inventory, net

Inventory consists of finished goods, refurbished goods, chipsets and other raw material components used in manufacturing radios and connected vehicle devices. Inventory is stated at the lower of cost or market. We record an estimated allowance for inventory that is considered slow moving or obsolete or whose carrying value is in excess of net realizable value. The provision related to products purchased for resale in our direct to consumer distribution channel and components held for resale by us is reported as a component of Cost of equipment in our consolidated statements of comprehensive income. The provision related to inventory consumed in our OEM channel is reported as a component of Subscriber acquisition costs in our consolidated statements of comprehensive income.

Inventory, net, consists of the following:

	December 31, 2019	December 31, 2018
Raw materials	$ 3	$ 5
Finished goods	13	23
Allowance for obsolescence	(5)	(6)
Total inventory, net	$ 11	$ 22

(Dollars and shares in millions, except per share amounts)

(7) Goodwill

Goodwill represents the excess of the purchase price over the estimated fair value of the net tangible and identifiable intangible assets acquired in business combinations. Our annual impairment assessment of our two reporting units is performed as of the fourth quarter of each year, and an assessment is performed at other times if an event occurs or circumstances change that would more likely than not reduce the fair value of a reporting unit below its carrying amount. ASC 350, *Intangibles - Goodwill and Other*, states that an entity should perform its annual or interim goodwill impairment test by comparing the fair value of a reporting unit with its carrying amount and recognize an impairment charge for the amount by which the carrying amount exceeds the reporting unit's fair value.

As of December 31, 2019, there were no indicators of impairment, and no impairment losses were recorded for goodwill during the years ended December 31, 2019 and 2018. As of December 31, 2019, the cumulative balance of goodwill impairments recorded was $4,766, which was recognized during the year ended December 31, 2008 and is included in the carrying value of the goodwill allocated to our Sirius XM reporting unit.

As a result of the Pandora Acquisition, we recorded additional goodwill of $1,538 during the year ended December 31, 2019 at our Pandora reporting unit. The goodwill of the acquired company is not deductible for tax purposes. Refer to Note 3 for information on this acquisition.

Refer to the table below for our goodwill activity for the years ended December 31, 2019 and 2018:

	Sirius XM	Pandora	Total
Balance at December 31, 2017	$ 2,287	$ —	$ 2,287
Acquisition	3	—	3
Balance at December 31, 2018	2,290	—	2,290
Acquisition	—	1,538	1,538
Balance at December 31, 2019	$ 2,290	$ 1,538	$ 3,828

(8) Intangible Assets

Our intangible assets include the following:

		December 31, 2019			December 31, 2018		
	Weighted Average Useful Lives	Gross Carrying Value	Accumulated Amortization	Net Carrying Value	Gross Carrying Value	Accumulated Amortization	Net Carrying Value
Indefinite life intangible assets:							
FCC licenses	Indefinite	$ 2,084	$ —	$ 2,084	$ 2,084	$ —	$ 2,084
Trademarks	Indefinite	251	—	251	251	—	251
Definite life intangible assets:							
OEM relationships	15 years	220	(90)	130	220	(76)	144
Licensing agreements	12 years	45	(42)	3	45	(38)	7
Software and technology	7 years	35	(25)	10	35	(20)	15
Due to Pandora Acquisition:							
Indefinite life intangible assets:							
Trademarks	Indefinite	$ 331	$ —	$ 331	$ —	$ —	$ —
Definite life intangible assets:							
Customer relationships	8 years	403	(49)	354	—	—	—
Software and technology	5 years	373	(69)	304	—	—	—
Total intangible assets		$ 3,742	$ (275)	$ 3,467	$ 2,635	$ (134)	$ 2,501

(Dollars and shares in millions, except per share amounts)

Indefinite Life Intangible Assets

We have identified our FCC licenses and XM, Pandora and Automatic trademarks as indefinite life intangible assets after considering the expected use of the assets, the regulatory and economic environment within which they are used and the effects of obsolescence on their use. As part of the Pandora Acquisition, we also identified $331 related to its trademarks, for which the fair value was determined using the relief from royalty method as of the acquisition date.

We hold FCC licenses to operate our satellite digital audio radio service and provide ancillary services. Each of the FCC licenses authorizes us to use radio spectrum, a reusable resource that does not deplete or exhaust over time.

ASC 350-30-35, *Intangibles - Goodwill and Other*, provides for an option to first perform a qualitative assessment to determine whether it is more likely than not that an asset is impaired. If the qualitative assessment supports that it is more likely than not that the fair value of the asset exceeds its carrying value, a quantitative impairment test is not required. If the qualitative assessment does not support the fair value of the asset, then a quantitative assessment is performed. Our annual impairment assessment of our identifiable indefinite lived intangible assets is performed as of the fourth quarter of each year. An assessment is performed at other times if an event occurs or circumstances change that would more likely than not reduce the fair value of the asset below its carrying value. If the carrying value of the intangible assets exceeds its fair value, an impairment loss is recognized in an amount equal to that excess.

We completed qualitative assessments of our FCC licenses and XM, Pandora and Automatic trademarks during the fourth quarter of 2019, 2018 and 2017. As of the date of our annual assessment for 2019, 2018 and 2017, our qualitative impairment assessment of the fair value of our indefinite intangible assets indicated that the fair value of such assets substantially exceeded their carrying value and therefore was not at risk of impairment. No impairment loss was recognized for intangible assets with indefinite lives during the years ended December 31, 2019, 2018 and 2017.

Definite Life Intangible Assets

Definite-lived intangible assets are amortized over their respective estimated useful lives to their estimated residual values, in a pattern that reflects when the economic benefits will be consumed, and are reviewed for impairment under the provisions of ASC 360-10-35, *Property, Plant and Equipment/Overall/Subsequent Measurement*. We review intangible assets subject to amortization for impairment whenever events or circumstances indicate that the carrying amount of an asset may not be recoverable. If the sum of the expected cash flows, undiscounted and without interest, is less than the carrying amount of the asset, an impairment loss is recognized in an amount by which the carrying amount of the asset exceeds its fair value. No impairments were recorded for intangible assets with definite lives during the years ended December 31, 2019, 2018 and 2017.

Amortization expense for all definite life intangible assets was $141, $23 and $38 for the years ended December 31, 2019, 2018 and 2017, respectively. We retired definite lived intangible assets of $390 during the year ended December 31, 2018 primarily related to fully amortized subscriber relationships and acquired proprietary software. There were no retirements of definite lived intangible assets during the years ended December 31, 2019 and 2017. As part of the Pandora Acquisition, $776 was allocated to identifiable intangible assets subject to amortization and related to the assessed fair value of customer relationships and software and technology, which was determined by using the multi-period excess earnings method and the relief from royalty method, respectively, as of the acquisition date.

The expected amortization expense for each of the fiscal years 2020 through 2024 and for periods thereafter is as follows:

Years ending December 31,	**Amount**
2020	$ 152
2021	146
2022	144
2023	134
2024	69
Thereafter	156
Total definite life intangible assets, net	$ 801

(Dollars and shares in millions, except per share amounts)

(9) Property and Equipment

Property and equipment, including satellites, are stated at cost, less accumulated depreciation. Equipment under capital leases is stated at the present value of minimum lease payments. Depreciation is calculated using the straight-line method over the following estimated useful life of the asset:

Satellite system	15 years
Terrestrial repeater network	5 - 15 years
Broadcast studio equipment	3 - 15 years
Capitalized software and hardware	2 - 7 years
Satellite telemetry, tracking and control facilities	3 - 15 years
Furniture, fixtures, equipment and other	2 - 7 years
Building	20 or 30 years
Leasehold improvements	Lesser of useful life or remaining lease term

We review long-lived assets, such as property and equipment, for impairment whenever events or changes in circumstances indicate the carrying amount may not be recoverable. Recoverability of assets to be held and used is measured by a comparison of the carrying amount of an asset to the estimated undiscounted future cash flows expected to be generated by the asset. If the carrying amount of an asset exceeds the estimated future cash flows, an impairment charge is recognized in an amount by which the carrying amount exceeds the fair value of the asset. We did not record any impairments during the years ended December 31, 2019, 2018 and 2017.

(Dollars and shares in millions, except per share amounts)

Property and equipment, net, consists of the following:

	December 31, 2019	December 31, 2018
Satellite system	$ 1,587	$ 1,587
Terrestrial repeater network	100	98
Leasehold improvements	105	58
Broadcast studio equipment	137	111
Capitalized software and hardware	1,086	824
Satellite telemetry, tracking and control facilities	87	76
Furniture, fixtures, equipment and other	89	97
Land	38	38
Building	63	63
Construction in progress	505	412
Total property and equipment	3,797	3,364
Accumulated depreciation and amortization	(2,171)	(1,851)
Property and equipment, net	$ 1,626	$ 1,513

Construction in progress consists of the following:

	December 31, 2019	December 31, 2018
Satellite system	$ 371	$ 296
Terrestrial repeater network	7	5
Capitalized software and hardware	107	77
Other	20	34
Construction in progress	$ 505	$ 412

Depreciation and amortization expense on property and equipment was $327, $278 and $261 and for the years ended December 31, 2019, 2018 and 2017, respectively. We retired property and equipment of $9, $35 and $79 during the years ended December 31, 2019, 2018 and 2017, respectively.

We capitalize a portion of the interest on funds borrowed to finance the construction and launch of our satellites. Capitalized interest is recorded as part of the asset's cost and depreciated over the satellite's useful life. Capitalized interest costs were $17, $12 and $5 for the years ended December 31, 2019, 2018 and 2017, respectively, which related to the construction of our SXM-7 and SXM-8 satellites. We also capitalize a portion of share-based compensation related to employee time for capitalized software projects. Capitalized share-based compensation costs were $13 for the year ended December 31, 2019. We did not capitalize any share-based compensation for the years ended December 31, 2018 and 2017.

(Dollars and shares in millions, except per share amounts)

Satellites

As of December 31, 2019, we owned a fleet of five satellites. The chart below provides certain information on our satellites as of December 31, 2019:

Satellite Description	Year Delivered	Estimated End of Depreciable Life
SIRIUS FM-5	2009	2024
SIRIUS FM-6	2013	2028
XM-3	2005	2020
XM-4	2006	2021
XM-5	2010	2025

Each satellite requires an FCC license and prior to the expiration of each license, we are required to apply for a renewal of the FCC satellite licenses. The renewal and extension of our licenses is reasonably certain at minimal cost, which is expensed as incurred.

The following table outlines the years in which each of our satellite licenses expires:

FCC satellite licenses	Expiration year
SIRIUS FM-5	2025
SIRIUS FM-6	2022
XM-3	2021
XM-4	2022
XM-5	2026

(10) Leases

We have operating and finance leases for offices, terrestrial repeaters, data centers and certain equipment. Our leases have remaining lease terms of less than 1 year to 18 years, some of which may include options to extend the leases for up to 5 years, and some of which may include options to terminate the leases within 1 year. We elected the practical expedient to account for the lease and non-lease components as a single component. Additionally, we elected the practical expedient to not recognize right-of-use assets or lease liabilities for short-term leases, which are those leases with a term of twelve months or less at the lease commencement date.

The components of lease expense were as follows:

	For the Year Ended December 31, 2019
Operating lease cost	$ 80
Finance lease cost	4
Sublease income	(3)
Total lease cost	$ 81

(Dollars and shares in millions, except per share amounts)

Supplemental cash flow information related to leases was as follows:

	For the Year Ended December 31, 2019
Cash paid for amounts included in the measurement of lease liabilities:	
Operating cash flows from operating leases	$ 70
Financing cash flows from finance leases	$ 3
Right-of-use assets obtained in exchange for lease obligations:	
Operating leases	$ 83

Supplemental balance sheet information related to leases was as follows:

	December 31, 2019
Operating Leases	
Operating lease right-of-use assets	$ 466
Operating lease current liabilities	46
Operating lease liabilities	456
Total operating lease liabilities	$ 502

	December 31, 2019
Finance Leases	
Property and equipment, gross	$ 15
Accumulated depreciation	(12)
Property and equipment, net	$ 3
Current maturities of debt	$ 1
Long-term debt	1
Total finance lease liabilities	$ 2

	December 31, 2019
Weighted Average Remaining Lease Term	
Operating leases	9 years
Finance leases	2 years

	December 31, 2019
Weighted Average Discount Rate	
Operating leases	5.3%
Finance leases	1.7%

(Dollars and shares in millions, except per share amounts)

Maturities of lease liabilities were as follows:

	Operating Leases	Finance Leases
Year ending December 31,		
2020	$ 69	$ 1
2021	74	1
2022	71	—
2023	68	—
2024	59	—
Thereafter	303	—
Total future minimum lease payments	644	2
Less imputed interest	(142)	—
Total	$ 502	$ 2

(11) Related Party Transactions

In the normal course of business, we enter into transactions with related parties such as Liberty Media and Sirius XM Canada. Prior to the Pandora Acquisition, we also had an investment in Pandora that was a related party transaction.

Liberty Media

As of December 31, 2019, Liberty Media beneficially owned, directly and indirectly, approximately 72% of the outstanding shares of Holdings' common stock. Liberty Media has one executive, one senior advisor and one of its directors on our board of directors. Gregory B. Maffei, the President and Chief Executive Officer of Liberty Media, is the Chairman of our board of directors.

Sirius XM Holdings

Sirius XM is a wholly-owned subsidiary of Holdings. Holdings has no operations independent of Sirius XM. All equity-related transactions, including repurchases of Holdings' common stock, dividend payments on shares of Holdings' common stock, the issuance of equity related to share based compensation for Sirius XM employees, Holdings' directors and third parties and the issuance of Holdings' common stock related to the recapitalization of Sirius XM Canada and the Pandora Acquisition have been reported as related party transactions within our consolidated financial statements. The share based compensation for Sirius XM employees, Holdings' directors and third parties has been recorded in our consolidated financial statements. The Related party long-term assets balance as of December 31, 2019 and 2018 of Sirius XM includes $7,948 and $8,041 respectively, primarily for net amounts due from Holdings in connection with these equity-related transactions.

During the year ended December 31, 2019, we used $2,382 of our cash for the purchase and retirement of shares of Holdings' common stock under Holdings' repurchase program and payment of a cash dividend on Holdings' common stock, partially offset by the sale of a capped call security. This amount is included in our Related party long-term asset balance as a receivable due from Holdings.

Sirius XM Canada

In 2017, we completed a recapitalization of Sirius XM Canada (the “Transaction”), which is now a privately held corporation. Following the Transaction, we hold a 70% equity interest and 33% voting interest in Sirius XM Canada. The total consideration from Sirius XM to Sirius XM Canada during the year ended December 31, 2017 was $309, which included $130 in cash and Holdings issued $179 of its common stock to the holders of the shares of Sirius XM Canada acquired in the Transaction. We own 591 shares of preferred stock of Sirius XM Canada, which has a liquidation preference of one Canadian dollar per share. We also made a loan to Sirius XM Canada in the aggregate amount of $131 in connection with the Transaction. The loan is denominated in Canadian dollars and is considered a long-term investment with any unrealized gains or losses reported within Accumulated other comprehensive (loss) income. During the years ended December 31, 2019 and 2018, Sirius XM Canada repaid less than $1 and $3 of the principal amount of the loan, respectively.

In connection with the Transaction, we also entered into a Services Agreement and an Advisory Services Agreement with Sirius XM Canada. Each agreement has a thirty year term. Pursuant to the Services Agreement, Sirius XM Canada currently pays Sirius XM 25% of its gross revenues on a monthly basis and pursuant to the Advisory Services Agreement, Sirius XM Canada pays Sirius XM 5% of its gross revenues on a monthly basis.

Sirius XM Canada is accounted for as an equity method investment, and its results are not consolidated in our consolidated financial statements. Sirius XM Canada does not meet the requirements for consolidation as we do not have the ability to direct the most significant activities that impact Sirius XM Canada's economic performance.

Our related party long-term assets balance as of December 31, 2019 and 2018 included the carrying value of our investment balance in Sirius XM Canada of $321 and $311, respectively, and, as of December 31, 2019 and 2018, also included $131 and $126, respectively, for the long-term value of the outstanding loan to Sirius XM Canada.

Sirius XM Canada paid gross dividends to us of $2, $2 and $4 during the years ended December 31, 2019, 2018 and 2017, respectively. Dividends are first recorded as a reduction to our investment balance in Sirius XM Canada to the extent a balance exists and then as Other (expense) income for any remaining portion.

We recorded revenue from Sirius XM Canada as Other revenue in our consolidated statements of comprehensive income of $98, $97 and $87 for the years ended December 31, 2019, 2018 and 2017, respectively.

Pandora

The $523 preferred stock investment in Pandora as of December 31, 2018 was canceled in conjunction with the Pandora Acquisition. Refer to Note 3 for information on this acquisition.

(Dollars and shares in millions, except per share amounts)

(12) Debt

Our debt as of December 31, 2019 and 2018 consisted of the following:

						Carrying value[a] at	
Issuer / Borrower	Issued	Debt	Maturity Date	Interest Payable	Principal Amount at December 31, 2019	December 31, 2019	December 31, 2018
Pandora (b) (c)	December 2015	1.75% Convertible Senior Notes	December 1, 2020	semi-annually on June 1 and December 1	$ 1	$ 1	$ —
Sirius XM (d)	July 2017	3.875% Senior Notes	August 1, 2022	semi-annually on February 1 and August 1	1,000	995	994
Sirius XM (d)	May 2013	4.625% Senior Notes	May 15, 2023	semi-annually on May 15 and November 15	500	498	497
Pandora (b) (e)	June 2018	1.75% Convertible Senior Notes	December 1, 2023	semi-annually on June 1 and December 1	193	238	—
Sirius XM (d) (h)	May 2014	6.00% Senior Notes	July 15, 2024	semi-annually on January 15 and July 15	—	—	1,490
Sirius XM (d) (i)	July 2019	4.625% Senior Notes	July 15, 2024	semi-annually on January 15 and July 15	1,500	1,485	—
Sirius XM (d)	March 2015	5.375% Senior Notes	April 15, 2025	semi-annually on April 15 and October 15	1,000	993	992
Sirius XM (d)	May 2016	5.375% Senior Notes	July 15, 2026	semi-annually on January 15 and July 15	1,000	992	991
Sirius XM (d)	July 2017	5.00% Senior Notes	August 1, 2027	semi-annually on February 1 and August 1	1,500	1,488	1,487
Sirius XM (d) (g)	June 2019	5.500% Senior Notes	July 1, 2029	semi-annually on January 1 and July 1	1,250	1,236	—
Sirius XM (f)	December 2012	Senior Secured Revolving Credit Facility (the "Credit Facility")	June 29, 2023	variable fee paid quarterly	—	—	439
Sirius XM	Various	Finance leases	Various	n/a	n/a	2	5
Total Debt						7,928	6,895
Less: total current maturities						2	3
Less: total deferred financing costs						9	7
Total long-term debt						$ 7,917	$ 6,885

(a) The carrying value of the obligations is net of any remaining unamortized original issue discount.
(b) Holdings has unconditionally guaranteed all of the payment obligations of Pandora under these notes.
(c) We acquired $152 in principal amount of the 1.75% Convertible Senior Notes due 2020 as part of the Pandora Acquisition. On February 14, 2019, Pandora announced a tender offer to repurchase for cash any and all of its outstanding 1.75% Convertible Senior Notes due 2020 at a price equal to 100% of the aggregate principal amount thereof plus accrued and unpaid interest thereon to, but not including, the repurchase date. On March 18, 2019, we purchased $151 in aggregate principal amount of the 1.75% Convertible Senior Notes due 2020 that had been validly tendered and not validly withdrawn in the repurchase offer. We recorded a $1 Loss on extinguishment of debt in connection with this transaction. In addition, we unwound a capped call security acquired as part of the Pandora Acquisition in March 2019 for $3.
(d) All material domestic subsidiaries, including Pandora and its subsidiaries, that guarantee the Credit Facility have guaranteed these notes.
(e) We acquired $193 in principal amount of the 1.75% Convertible Senior Notes due 2023 as part of the Pandora Acquisition. We elected to record the 1.75% Convertible Senior Notes due 2023 at fair value which will be remeasured each reporting period. The changes in fair value will be recorded in our consolidated statements of operations. The 1.75% Convertible Senior Notes due 2023

were not convertible into Holdings' common stock and not redeemable as of December 31, 2019. As a result, we have classified the debt as Long-term within our consolidated balance sheets.

(f) The $1,750 Credit Facility expires in June 2023. Our obligations under the Credit Facility are guaranteed by certain of our material domestic subsidiaries, including Pandora and its subsidiaries, and are secured by a lien on substantially all of our assets and the assets of our material domestic subsidiaries. Interest on borrowings is payable on a monthly basis and accrues at a rate based on LIBOR plus an applicable rate. We are also required to pay a variable fee on the average daily unused portion of the Credit Facility which is payable on a quarterly basis. The variable rate for the unused portion of the Credit Facility was 0.25% per annum as of December 31, 2019. Our outstanding borrowings under the Credit Facility are classified as Long-term debt within our consolidated balance sheets due to the long-term maturity of this debt. Additionally, the amount available for future borrowing under the Credit Facility is reduced by letters of credit issued for the benefit of Pandora, which were $1 as of December 31, 2019.

(g) On June 7, 2019, we issued $1,250 aggregate principal amount of the 5.500% Senior Notes due 2029 with a net original issuance discount and deferred financing costs in the aggregate of $16.

(h) On July 18, 2019, we redeemed $1,500 in outstanding principal amount of the 6.00% Senior Notes due 2024 for an aggregate purchase price, including premium and interest, of $1,546. We recognized $56 to Loss on extinguishment of debt, consisting primarily of unamortized discount, deferred financing fees and redemption premium, as a result of this redemption.

(i) On July 2, 2019 we issued $1,500 aggregate principal amount of the 4.625% Senior Notes due 2024 with a net original issuance discount and deferred financing costs in the aggregate of $19.

Covenants and Restrictions

Under the Credit Facility, we must comply with a debt maintenance covenant that it cannot exceed a total leverage ratio, calculated as consolidated total debt to consolidated operating cash flow, of 5.0 to 1.0. The Credit Facility generally requires compliance with certain covenants that restrict our ability to, among other things, (i) incur additional indebtedness, (ii) incur liens, (iii) pay dividends or make certain other restricted payments, investments or acquisitions, (iv) enter into certain transactions with affiliates, (v) merge or consolidate with another person, (vi) sell, assign, lease or otherwise dispose of all or substantially all of our assets, and (vii) make voluntary prepayments of certain debt, in each case subject to exceptions.

The indentures governing our notes restrict our non-guarantor subsidiaries' ability to create, assume, incur or guarantee additional indebtedness without such non-guarantor subsidiary guaranteeing each such series of notes on a pari passu basis. The indentures governing the notes also contain covenants that, among other things, limit our ability and the ability of its subsidiaries to create certain liens; enter into sale/leaseback transactions; and merge or consolidate.

Under our debt agreements, the following generally constitute an event of default: (i) a default in the payment of interest; (ii) a default in the payment of principal; (iii) failure to comply with covenants; (iv) failure to pay other indebtedness after final maturity or acceleration of other indebtedness exceeding a specified amount; (v) certain events of bankruptcy; (vi) a judgment for payment of money exceeding a specified aggregate amount; and (vii) voidance of subsidiary guarantees, subject to grace periods where applicable. If an event of default occurs and is continuing, our debt could become immediately due and payable.

The indentures governing the Pandora Convertible Notes contain covenants that limit Pandora’s ability to merge or consolidate and provide for customary events of default, which include nonpayment of principal or interest, breach of covenants, payment defaults or acceleration of other indebtedness and certain events of bankruptcy.

At December 31, 2019 and 2018, we were in compliance with our debt covenants.

Pandora Convertible Notes

Pandora's 1.75% Convertible Senior Notes due 2020 (the “Pandora 2020 Notes”) and Pandora's 1.75% Convertible Senior Notes due 2023 (the “Pandora 2023 Notes” and, together with the Pandora 2020 Notes, the “Pandora Convertible Notes”) are unsecured, senior obligations of Pandora. Holdings has guaranteed the payment and performance obligations of Pandora under the Pandora Convertible Notes and the indentures governing the Pandora Convertible Notes.

The Pandora 2020 Notes will mature on December 1, 2020, unless earlier repurchased or redeemed by Pandora or converted in accordance with their terms. Upon consummation of the Pandora Acquisition, the conversion rate applicable to the Pandora 2020 Notes was 87.7032 shares of Holdings’ common stock per $1,000 principal amount of the Pandora 2020 Notes. Pandora has irrevocably elected and determined to settle all conversion obligations from and after February 1, 2019 with respect to the Pandora 2020 Notes solely in cash. During the years ended December 31, 2019, Pandora purchased $151 in aggregate principal amount of the Pandora 2020 Notes. See footnote (c) to the table above.

The Pandora 2023 Notes will mature on December 1, 2023, unless earlier repurchased or redeemed by Pandora or converted in accordance with their terms. Upon consummation of the Pandora Acquisition, the conversion rate applicable to the Pandora 2023 Notes was 150.4466 shares of Holdings' common stock per $1,000 principal amount of the Pandora 2023 Notes.

(13) Stockholder Equity

Common Stock, par value $0.001 per share

We are authorized to issue up to 9,000 shares of common stock. As of December 31, 2019 and 2018, there were 1 shares of common stock of Sirius XM issued and outstanding, which were owned by Holdings.

Preferred Stock, par value $0.001 per share

We are authorized to issue up to 50 shares of undesignated preferred stock with a liquidation preference of $0.001 per share. There were no shares of preferred stock issued or outstanding as of December 31, 2019 and 2018.

(14) Benefit Plans

We recognized share-based payment expense of $250, $133 and $124 for the years ended December 31, 2019, 2018 and 2017, respectively. This amount includes $21 of share-based compensation expense recorded in Acquisition and other related costs in our consolidated statements of comprehensive income during the year ended December 31, 2019.

We account for equity instruments granted in accordance with ASC 718, *Compensation - Stock Compensation*. ASC 718 requires all share-based compensation payments to be recognized in the financial statements based on fair value. We use the Black-Scholes-Merton option-pricing model to value stock option awards and have elected to treat awards with graded vesting as a single award. Share-based compensation expense is recognized ratably over the requisite service period, which is generally the vesting period. We measure restricted stock awards and units using the fair market value of the restricted shares of common stock on the day the award is granted. Stock-based awards granted to employees, non-employees and members of our board of directors include stock options and restricted stock units.

Fair value as determined using the Black-Scholes-Merton model varies based on assumptions used for the expected life, expected stock price volatility, expected dividend yield and risk-free interest rates. For the years ended December 31, 2019, 2018 and 2017, we estimated the fair value of awards granted using the hybrid approach for volatility, which weights observable historical volatility and implied volatility of qualifying actively traded options on our common stock. The expected life assumption represents the weighted-average period stock-based awards are expected to remain outstanding. These expected life assumptions are established through a review of historical exercise behavior of stock-based award grants with similar vesting periods. Where historical patterns do not exist for non-employees, contractual terms are used. Dividend yield is based on the current expected annual dividend per share and our stock price. The risk-free interest rate represents the daily treasury yield curve rate at the grant date based on the closing market bid yields on actively traded U.S. treasury securities in the over-the-counter market for the expected term. Our assumptions may change in future periods.

2015 Long-Term Stock Incentive Plan

In May 2015, our stockholders approved the Sirius XM Holdings Inc. 2015 Long-Term Stock Incentive Plan (the “2015 Plan”). Employees, consultants and members of our board of directors are eligible to receive awards under the 2015 Plan. The 2015 Plan provides for the grant of stock options, restricted stock awards, restricted stock units and other stock-based awards that the compensation committee of our board of directors deems appropriate. Stock-based awards granted under the 2015 Plan are generally subject to a graded vesting requirement, which is generally three to four years from the grant date. Stock options generally expire ten years from the date of grant. Restricted stock units include performance-based restricted stock units (“PRSUs”), the vesting of which are subject to the achievement of performance goals and the employee's continued employment and generally cliff vest on the third anniversary of the grant date. Each restricted stock unit entitles the holder to receive one share of common stock upon vesting. As of December 31, 2019, 165 shares of common stock were available for future grants under the 2015 Plan.

In connection with the Pandora Acquisition, we assumed all shares available for issuance (including any shares that later become available for issuance in accordance with the terms of the applicable plans) under each of the 2014 Stock Incentive Plan of AdsWizz Inc., the Pandora Media, Inc. 2011 Equity Incentive Plan, the Pandora Media, Inc. 2004 Stock Plan and the TheSavageBeast.com, Inc. 2000 Stock Incentive Plan, which were previously approved by stockholders of Pandora or the applicable adopting entity. All shares available under these stock plans became additional shares available for grant pursuant to the terms of the 2015 Plan (as adjusted, to the extent appropriate, to reflect the application of the exchange ratio). Subject to certain limitations set forth in the 2015 Plan, such shares may be used for awards under the 2015 Plan.

(Dollars and shares in millions, except per share amounts)

Other Plans

We maintain six additional share-based benefit plans — the Sirius XM Radio Inc. 2009 Long-Term Stock Incentive Plan, the Amended and Restated Sirius Satellite Radio 2003 Long-Term Stock Incentive Plan, the 2014 Stock Incentive Plan of AdsWizz Inc., the Pandora Media, Inc. 2011 Equity Incentive Plan, the Pandora Media, Inc. 2004 Stock Plan and the TheSavageBeast.com, Inc. 2000 Stock Incentive Plan. Excluding dividend equivalent units granted as a result of a declared dividend, no further awards may be made under these plans.

The following table summarizes the weighted-average assumptions used to compute the fair value of options granted to employees and members of our board of directors:

	For the Years Ended December 31,		
	2019	2018	2017
Risk-free interest rate	2.4%	2.7%	1.8%
Expected life of options — years	3.41	4.38	4.59
Expected stock price volatility	26%	23%	24%
Expected dividend yield	0.8%	0.7%	0.7%

The following table summarizes stock option activity under our share-based plans for the years ended December 31, 2019, 2018 and 2017:

	Options	Weighted-Average Exercise Price Per Share	Weighted-Average Remaining Contractual Term (Years)	Aggregate Intrinsic Value
Outstanding at the beginning of January 1, 2017	333	$ 3.50		
Granted	26	$ 5.49		
Exercised	(73)	$ 3.21		
Forfeited, cancelled or expired	(6)	$ 4.07		
Outstanding as of December 31, 2017	280	$ 3.76		
Granted	32	$ 6.59		
Exercised	(65)	$ 3.35		
Forfeited, cancelled or expired	(4)	$ 4.76		
Outstanding as of December 31, 2018	243	$ 4.22		
Options granted in connection with Pandora Acquisition	7	$ 3.85		
Granted	15	$ 6.10		
Exercised	(53)	$ 3.65		
Forfeited, cancelled or expired	(4)	$ 5.58		
Outstanding as of December 31, 2019	208	$ 4.46	5.58	$ 560
Exercisable as of December 31, 2019	148	$ 3.96	4.77	$ 472

The weighted average grant date fair value per share of stock options granted during the years ended December 31, 2019, 2018 and 2017 was $1.26, $1.45 and $1.17, respectively. The total intrinsic value of stock options exercised during the years ended December 31, 2019, 2018 and 2017 was $146, $215 and $167, respectively.

In connection with the Pandora Acquisition, each option granted by Pandora under its stock incentive plans to purchase shares of Pandora common stock, whether vested or unvested, was assumed and converted into an option to purchase shares of

(Dollars and shares in millions, except per share amounts)

Holdings' common stock, with appropriate adjustments (based on the 1.44 exchange ratio) to the exercise price and number of shares of Holdings' common stock subject to such option, and has the same vesting schedule and exercise conditions as in effect as of immediately prior to the closing of the Pandora Acquisition; provided, that any Pandora stock option that had an exercise price per share that was equal to or greater than the value, at the closing of the Pandora Acquisition, of Holdings' common stock issued as merger consideration in exchange for each share of Pandora common stock, was canceled without payment. We recorded $8 to Goodwill related to pre-acquisition replacement equity awards attributable to pre-combination service.

We recognized share-based payment expense associated with stock options of $60, $67 and $78 for the years ended December 31, 2019, 2018 and 2017, respectively.

The following table summarizes the restricted stock unit, including PRSU, activity under our share-based plans for the years ended December 31, 2019, 2018 and 2017:

	Shares	Grant Date Fair Value Per Share
Nonvested at the beginning of January 1, 2017	30	$ 4.03
Granted	12	$ 5.35
Vested	(9)	$ 3.92
Forfeited	(2)	$ 4.42
Nonvested as of December 31, 2017	31	$ 4.54
Granted	18	$ 6.40
Vested	(13)	$ 4.43
Forfeited	(1)	$ 4.99
Nonvested as of December 31, 2018	35	$ 5.50
Units granted in connection with Pandora Acquisition	48	$ 5.83
Granted	38	$ 6.01
Vested	(38)	$ 5.53
Forfeited	(8)	$ 5.85
Nonvested as of December 31, 2019	75	$ 5.95

The total intrinsic value of restricted stock units, including PRSUs, vesting during the years ended December 31, 2019, 2018 and 2017 was $235, $85 and $48, respectively. During the years ended December 31, 2019, 2018 and 2017, we granted 6, 5 and 1 PRSUs to certain employees, respectively. We believe it is probable that the performance target applicable to these PRSUs will be achieved.

In connection with the Pandora Acquisition, each unvested restricted stock unit granted by Pandora under its stock incentive plans was assumed and converted into an unvested restricted stock unit of Holdings, with appropriate adjustments (based on the 1.44 exchange ratio) to the number of shares of Holding's common stock to be received, and has the same vesting schedule and settlement date as in effect as of immediately prior to the closing of the Pandora Acquisition. We recorded $62 to Goodwill related to pre-acquisition replacement equity awards attributable to pre-combination service.

In connection with the cash dividends paid during the years ended December 31, 2019, 2018 and 2017, we granted less than 1 restricted stock units, including PRSUs, in accordance with the terms of existing award agreements. These grants did not result in any additional incremental share-based payment expense being recognized during the years ended December 31, 2019, 2018 and 2017.

We recognized share-based payment expense associated with restricted stock units, including PRSUs, of $190, $66 and $46 for the years ended December 31, 2019, 2018 and 2017, respectively.

Total unrecognized compensation costs related to unvested share-based payment awards for stock options and restricted stock units, including PRSUs, granted to employees, members of our board of directors and third parties at December 31, 2019 and 2018 was $415 and $254, respectively. The total unrecognized compensation costs at December 31, 2019 are expected to be recognized over a weighted-average period of 2.4 years.

401(k) Savings Plans

Sirius XM Radio Inc. 401(k) Savings Plan

We sponsor the Sirius XM Radio Inc. 401(k) Savings Plan (the "Sirius XM Plan") for eligible employees. The Sirius XM Plan allows eligible employees to voluntarily contribute from 1% to 50% of their pre-tax eligible earnings, subject to certain defined limits. We match 50% of an employee's voluntary contributions per pay period on the first 6% of an employee's pre-tax salary up to a maximum of 3% of eligible compensation. We may also make additional discretionary matching, true-up matching and non-elective contributions to the Sirius XM Plan. Employer matching contributions under the Sirius XM Plan vest at a rate of 33.33% for each year of employment and are fully vested after three years of employment for all current and future contributions. Our cash employer matching contributions are not used to purchase shares of Holdings' common stock on the open market, unless the employee elects Holdings' common stock as their investment option for this contribution. We recognized expenses of $9, $9 and $8 for the years ended December 31, 2019, 2018 and 2017, respectively, in connection with the Sirius XM Plan.

Pandora Media, LLC 401(k) Profit Sharing Plan and Trust

Pandora sponsors the Pandora Media, LLC 401(k) Profit Sharing Plan and Trust (the "Pandora Plan") for eligible employees. The Pandora Plan allows eligible employees to voluntarily contribute from 1% to 75% of their pre-tax eligible earnings, subject to certain defined limits. As of December 31, 2019, there was no employer matching of employee contributions under the Pandora Plan.

Sirius XM Holdings Inc. Deferred Compensation Plan

The Sirius XM Holdings Inc. Deferred Compensation Plan (the "DCP") allows members of Holdings' board of directors and certain eligible employees to defer all or a portion of their base salary, cash incentive compensation and/or board of directors' cash compensation, as applicable. Pursuant to the terms of the DCP, Holdings or any of its subsidiaries may elect to make additional contributions beyond amounts deferred by participants, but is under no obligation to do so. Holdings has established a grantor (or "rabbi") trust to facilitate the payment of its obligations under the DCP.

Contributions to the DCP, net of withdrawals, for the years ended December 31, 2019, 2018 and 2017 were $7, $8 and $8, respectively. As of December 31, 2019 and 2018, the fair value of the investments held in the trust were $34 and $22, respectively, which is included in Other long-term assets in our consolidated balance sheets and classified as trading securities. Trading gains and losses associated with these investments are recorded in Other (expense) income within our consolidated statements of comprehensive income. The associated liability is recorded within Other long-term liabilities in our consolidated balance sheets, and any increase or decrease in the liability is recorded in General and administration expense within our consolidated statements of comprehensive income. For the years ended December 31, 2019 and 2018, we recorded unrealized gains (losses) on investments held in the trust of $3 and $(1), respectively.

(Dollars and shares in millions, except per share amounts)

(15) Commitments and Contingencies

The following table summarizes our expected contractual cash commitments as of December 31, 2019:

	2020	2021	2022	2023	2024	Thereafter	Total
Debt obligations	$ 2	$ 1	$ 1,000	$ 693	$ 1,500	$ 4,750	$ 7,946
Cash interest payments	396	390	390	339	321	703	2,539
Satellite and transmission	87	4	2	1	1	1	96
Programming and content	333	228	144	84	42	97	928
Sales and marketing	56	28	21	9	3	8	125
Satellite incentive payments	8	9	9	9	9	46	90
Operating lease obligations	72	72	64	56	42	173	479
Advertising sales commitments	20	15	—	—	—	—	35
Royalties, minimum guarantees and other	512	233	162	17	7	—	931
Total [1]	$ 1,486	$ 980	$ 1,792	$ 1,208	$ 1,925	$ 5,778	$ 13,169

(1) The table does not include our reserve for uncertain tax positions, which at December 31, 2019 totaled $12.

Debt obligations. Debt obligations include principal payments on outstanding debt and finance lease obligations.

Cash interest payments. Cash interest payments include interest due on outstanding debt and capital lease payments through maturity.

Satellite and transmission. We have entered into agreements with several third parties to design, build, launch and insure two satellites, SXM-7 and SXM-8. We also have entered into agreements with third parties to operate and maintain satellite telemetry, tracking and control facilities and certain components of our terrestrial repeater networks.

Programming and content. We have entered into various programming and content agreements. Under the terms of these agreements, our obligations include fixed payments, advertising commitments and revenue sharing arrangements. In certain of these agreements, the future revenue sharing costs are dependent upon many factors and are difficult to estimate; therefore, they are not included in our minimum contractual cash commitments.

Sales and marketing. We have entered into various marketing, sponsorship and distribution agreements to promote our brands and are obligated to make payments to sponsors, retailers, automakers, radio manufacturers and other third parties under these agreements. Certain programming and content agreements also require us to purchase advertising on properties owned or controlled by the licensors.

Satellite incentive payments. Boeing Satellite Systems International, Inc., the manufacturer of certain of our in-orbit satellites, may be entitled to future in-orbit performance payments upon XM-3 and XM-4 meeting their fifteen-year design life, which we expect to occur. Boeing may also be entitled to up to $10 of additional incentive payments if our XM-4 satellite continues to operate above baseline specifications during the five years beyond the satellite's fifteen-year design life.

Maxar Technologies (formerly Space Systems/Loral), the manufacturer of certain of our in-orbit satellites, may be entitled to future in-orbit performance payments upon XM-5, SIRIUS FM-5 and SIRIUS FM-6 meeting their fifteen-year design life, which we expect to occur.

Operating lease obligations. We have entered into both cancelable and non-cancelable operating leases for office space, terrestrial repeaters, data centers and equipment. These leases provide for minimum lease payments, additional operating expense charges, leasehold improvements and rent escalations that have initial terms ranging from one to fifteen years, and certain leases have options to renew. Total rent recognized in connection with leases for the years ended December 31, 2019, 2018 and 2017 was $75, $43 and $43, respectively.

Advertising Sales Commitments. We have entered into agreements with third parties that contain minimum advertising sales guarantees and require that we make guaranteed payments. As of December 31, 2019, we had future minimum guarantee commitments of $35, of which $20 will be paid in 2020 and the remainder will be paid thereafter. On a quarterly basis, we record the greater of the cumulative actual expense incurred or the cumulative minimum guarantee based on our forecast for the minimum guarantee period. The minimum guarantee period is the period of time that the minimum guarantee relates to, as specified in the agreement, which may be annual or a longer period.

Royalties, Minimum Guarantees and Other. We have entered into music royalty arrangements that include fixed payments. Certain of our content agreements also contain minimum guarantees and require that we make upfront minimum guaranteed payments. During the year ended December 31, 2019, we prepaid $25 in content costs related to minimum guarantees. As of December 31, 2019, we had future fixed minimum guarantee commitments of $265, of which $249 will be paid in 2020 and the remainder will be paid thereafter. On a quarterly basis, we record the greater of the cumulative actual content costs incurred or the cumulative minimum guarantee based on forecasted usage for the minimum guarantee period. The minimum guarantee period is the period of time that the minimum guarantee relates to, as specified in each agreement, which may be annual or a longer period. The cumulative minimum guarantee, based on forecasted usage, considers factors such as listening hours, revenue, subscribers and other terms of each agreement that impact our expected attainment or recoupment of the minimum guarantees based on the relative attribution method.

Several of our content agreements also include provisions related to the royalty payments and structures of those agreements relative to other content licensing arrangements, which, if triggered, could cause our payments under those agreements to escalate. In addition, record labels, publishers and performing rights organizations ("PROs") with whom we have entered into direct license agreements have the right to audit our content payments, and any such audit could result in disputes over whether we have paid the proper content costs.

We have also entered into various agreements with third parties for general operating purposes.

In addition to the minimum contractual cash commitments described above, we have entered into other variable cost arrangements. These future costs are dependent upon many factors and are difficult to anticipate; however, these costs may be substantial. We may enter into additional programming, distribution, marketing and other agreements that contain similar variable cost provisions. We also have a surety bond of approximately $45 primarily used as security against non-performance in the normal course of business. We do not have any other significant off-balance sheet financing arrangements that are reasonably likely to have a material effect on our financial condition, results of operations, liquidity, capital expenditures or capital resources.

Legal Proceedings

In the ordinary course of business, we are a defendant or party to various claims and lawsuits, including those discussed below.

We record a liability when we believe that it is both probable that a liability will be incurred, and the amount of loss can be reasonably estimated. We evaluate developments in legal matters that could affect the amount of liability that has been previously accrued and make adjustments as appropriate. Significant judgment is required to determine both probability and the estimated amount of a loss or potential loss. We may be unable to reasonably estimate the reasonably possible loss or range of loss for a particular legal contingency for various reasons, including, among others, because: (i) the damages sought are indeterminate; (ii) the proceedings are in the relative early stages; (iii) there is uncertainty as to the outcome of pending proceedings (including motions and appeals); (iv) there is uncertainty as to the likelihood of settlement and the outcome of any negotiations with respect thereto; (v) there remain significant factual issues to be determined or resolved; (vi) the relevant law is unsettled; or (vii) the proceedings involve novel or untested legal theories. In such instances, there may be considerable uncertainty regarding the ultimate resolution of such matters, including the likelihood or magnitude of a possible eventual loss, if any.

Telephone Consumer Protection Act Suits. On March 13, 2017, Thomas Buchanan, individually and on behalf of all others similarly situated, filed a class action complaint against Sirius XM in the United States District Court for the Northern District of Texas, Dallas Division. The plaintiff alleges that Sirius XM violated the Telephone Consumer Protection Act of

1991 (the "TCPA") by, among other things, making telephone solicitations to persons on the National Do-Not-Call registry, a database established to allow consumers to exclude themselves from telemarketing calls unless they consent to receive the calls in a signed, written agreement, and making calls to consumers in violation of our internal Do-Not-Call registry. The plaintiff is seeking various forms of relief, including statutory damages of five hundred dollars for each violation of the TCPA or, in the alternative, treble damages of up to fifteen hundred dollars for each knowing and willful violation of the TCPA and a permanent injunction prohibiting us from making, or having made, any calls to land lines that are listed on the National Do-Not-Call registry or our internal Do-Not-Call registry.

Following a mediation, in April 2019, Sirius XM entered into an agreement to settle this purported class action suit. The settlement resolves the claims of consumers for the period October 2013 through January 2019. As part of the settlement, Sirius XM paid $25 into a non-reversionary settlement fund from which cash to class members, notice, administrative costs, and attorney's fees and costs will be paid. The settlement also contemplates that Sirius XM will provide three months of service to its All Access subscription package for those members of the class that elect to receive it, in lieu of cash, at no cost to those class members and who are not active subscribers at the time of the distribution. The availability of this three-month service option will not diminish the $25 common fund. As part of the settlement, Sirius XM will also implement certain changes relating to its "Do-Not-Call" practices and telemarketing programs. On January 28, 2020, the Court issued an order and final judgment approving the settlement.

Pre-1972 Sound Recording Litigation. On October 2, 2014, Flo & Eddie Inc. filed a class action suit against Pandora in the federal district court for the Central District of California. The complaint alleges a violation of California Civil Code Section 980, unfair competition, misappropriation and conversion in connection with the public performance of sound recordings recorded prior to February 15, 1972 (which we refer to as, "pre-1972 recordings"). On December 19, 2014, Pandora filed a motion to strike the complaint pursuant to California's Anti-Strategic Lawsuit Against Public Participation ("Anti-SLAPP") statute, which following denial of Pandora's motion was appealed to the Ninth Circuit Court of Appeals. In March 2017, the Ninth Circuit requested certification to the California Supreme Court on the substantive legal questions. The California Supreme Court accepted certification. In May 2019, the California Supreme Court issued an order dismissing consideration of the certified questions on the basis that, following the enactment of the Orrin G. Hatch-Bob Goodlatte Music Modernization Act, Pub. L. No. 115-264, 132 Stat. 3676 (2018) (the "MMA"), resolution of the questions posed by the Ninth Circuit Court of Appeals was no longer "necessary to . . . settle an important question of law."

The MMA grants a potential federal preemption defense to the claims asserted in the aforementioned lawsuits. In July 2019, Pandora took steps to avail itself of this preemption defense, including making the required payments under the MMA for certain of its uses of pre-1972 recordings. Based on the federal preemption contained in the MMA (along with other considerations), Pandora asked the Ninth Circuit to order the dismissal of the *Flo & Eddie, Inc. v. Pandora Media, Inc.* case. On October 17, 2019, the Ninth Circuit Court of Appeals issued a memorandum disposition concluding that the question of whether the MMA preempts Flo and Eddie's claims challenging Pandora's performance of pre-1972 recordings "depends on various unanswered factual questions" and remanded the case to the District Court for further proceedings.

After Flo & Eddie filed its action in 2014 against Pandora, several other plaintiffs commenced separate actions, both on an individual and class action basis, alleging a variety of violations of common law and state copyright and other statutes arising from allegations that Pandora owed royalties for the public performance of pre-1972 recordings. Many of these separate actions have been dismissed or are in the process of being dismissed. None of the remaining pending actions is likely to have a material adverse effect on our business, financial condition or results of operations.

We believe we have substantial defenses to the claims asserted in these actions, and we intend to defend these actions vigorously.

Copyright Royalty Board Proceeding to Determine the Rate for Statutory Webcasting. Pursuant to Sections 112 and 114 of the Copyright Act, the CRB initiated a proceeding in January 2019 to set the rates and terms by which webcasters may perform sound recordings via digital transmission over the internet and make ephemeral reproductions of those recordings during the 2021-2025 rate period under the authority of statutory licenses provided under Sections 112 and 114 of the Copyright Act. We filed a petition to participate in the proceeding on behalf of our Sirius XM and Pandora businesses, as did other webcasters including Google Inc. and the National Association of Broadcasters. SoundExchange, a collective organization that collects and distributes digital performance royalties to artists and copyright holders, represents the various copyright owner participants in the proceeding, including Sony Music Entertainment, Universal Music Group, and Warner

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Music Group. Because the proceeding focuses on setting statutory rates for non-interactive online music streaming (commonly identified as "webcasting"), the proceeding will set the rates that our Pandora business pays for music streaming on its free, ad-supported tier, and that our Sirius XM business pays for streaming on its subscription internet radio service. This proceeding will not set the rates that we pay for our other music offerings (satellite radio, business establishment services) or that we pay for interactive streaming on our Pandora Plus and Pandora Premium services.

In September 2019, the participants filed written direct statements, including proposed rates and terms for the 2021-2025 period. We and other webcaster participants proposed rates below the existing statutory rates, which for commercial webcasters are currently set at $0.0018 per performance for non-subscription transmissions (such as offered by our Pandora ad-supported business) and $0.0024 per performance for subscription transmissions (such as offered by our Sirius XM internet radio service). SoundExchange has proposed increasing the commercial webcasting rates to $0.0028 per performance for non-subscription transmissions and $0.0031 per performance for subscription transmissions.

In January 2020, the participants filed written rebuttal statements, responding to each other's proposals. Discovery in the matter is ongoing, and a multi-week hearing has been set to begin before the CRB in March 2020. The CRB's initial determination of the rates and terms for the 2021-2025 period is required to be delivered in December 2020.

Other Matters. In the ordinary course of business, we are a defendant in various other lawsuits and arbitration proceedings, including derivative actions; actions filed by subscribers, both on behalf of themselves and on a class action basis; former employees; parties to contracts or leases; and owners of patents, trademarks, copyrights or other intellectual property. None of these other matters, in our opinion, is likely to have a material adverse effect on our business, financial condition or results of operations.

(16) Income Taxes

There is no current U.S. federal income tax provision, as all federal taxable income was offset by utilizing U.S. federal net operating loss carryforwards. The current state income tax provision is primarily related to taxable income in certain states that have suspended or limited the ability to use net operating loss carryforwards or where net operating losses have been fully utilized. Income tax expense is the sum of current income tax plus the change in deferred tax assets and liabilities.

Sirius XM and its wholly-owned subsidiaries are included in the consolidated federal income tax returns of Holdings. Holdings files a consolidated federal income tax return with its wholly-owned subsidiaries, including Sirius XM and Pandora. Income tax expense consisted of the following:

	For the Years Ended December 31,		
	2019	2018	2017
Current taxes:			
Federal	$ —	$ —	$ —
State	(24)	12	(32)
Total current taxes	(24)	12	(32)
Deferred taxes:			
Federal	(230)	(259)	(564)
State	(30)	2	(20)
Total deferred taxes	(260)	(257)	(584)
Total income tax expense	$ (284)	$ (245)	$ (616)

The difference in Income before income taxes in the respective consolidated statements of comprehensive income of Sirius XM and Holdings fully relates to the accounting for the convertible debentures. Income tax expense for Sirius XM and Holdings was the same for the years ended December 31, 2018 and 2017. The following table presents a reconciliation of the U.S. federal statutory tax rate and our effective tax rate:

(Dollars and shares in millions, except per share amounts)

	For the Years Ended December 31,		
	2019	2018	2017
Federal tax expense, at statutory rate	21.0 %	21.0 %	35.0 %
State income tax expense, net of federal benefit	3.9 %	3.6 %	2.8 %
Change in valuation allowance	0.3 %	1.0 %	(0.1)%
Tax credits	(2.7)%	(6.8)%	(1.7)%
Share-based compensation	(2.4)%	(3.1)%	(2.9)%
Impact of nondeductible officers' compensation	1.6 %	0.7 %	0.3 %
Federal tax reform - deferred rate change	— %	— %	14.6 %
Other, net	2.3 %	0.8 %	0.7 %
Effective tax rate	24.0 %	17.2 %	48.7 %

On December 22, 2017, the U.S. government enacted comprehensive tax legislation commonly referred to as the Tax Act. The Tax Act made broad and complex changes to the U.S. tax code, including, accelerated depreciation that will allow for full expensing of qualified property. The Tax Act also reduced the U.S. federal corporate income tax rate from 35% to 21%.

Our effective tax rate of 24.0% for the year ended December 31, 2019 was primarily impacted by the recognition of excess tax benefits related to share-based compensation and benefits related to state and federal research and development and certain other credits, partially offset by the impact of nondeductible officers' compensation. Our effective tax rate of 17.2% for the year ended December 31, 2018 was primarily impacted by the recognition of excess tax benefits related to share based compensation and a benefit related to state and federal research and development credits. Our effective tax rate of 48.7% for the year ended December 31, 2017 was negatively impacted by the revaluation of our net deferred tax assets, excluding after tax credits, as of December 31, 2017 as a result of the reduction of the federal corporate income tax rate. This was offset by the recognition of excess tax benefits related to share-based compensation and a benefit related to federal research and development credits, under the Protecting Americans from Tax Hikes Act of 2015.

Deferred income taxes are recognized for the tax consequences related to temporary differences between the carrying amount of assets and liabilities for financial reporting purposes and the amounts used for tax purposes at each year-end, based on enacted tax laws and statutory tax rates applicable to the periods in which the differences are expected to affect taxable income. The ultimate realization of deferred tax assets is dependent upon the generation of future taxable income during the periods in which those temporary differences can be carried forward under tax law. Our evaluation of the realizability of deferred tax assets considers both positive and negative evidence, including historical financial performance, scheduled reversal of deferred tax assets and liabilities, projected taxable income and tax planning strategies. The weight given to the potential effects of positive and negative evidence is based on the extent to which it can be objectively verified. A valuation allowance is recognized when, based on the weight of all available evidence, it is considered more likely than not that all, or some portion, of the deferred tax assets will not be realized.

(Dollars and shares in millions, except per share amounts)

The tax effects of temporary differences that give rise to significant portions of the deferred tax assets and deferred tax liabilities, shown before jurisdictional netting, are presented below:

	For the Years Ended December 31,	
	2019	2018
Deferred tax assets:		
Net operating loss carryforwards and tax credits	$ 1,010	$ 952
Deferred revenue	81	89
Accrued bonus	34	27
Expensed costs capitalized for tax	14	16
Investments	22	12
Stock based compensation	72	55
Other	23	6
Total deferred tax assets	1,256	1,157
Deferred tax liabilities:		
Depreciation of property and equipment	(228)	(230)
FCC license	(519)	(515)
Other intangible assets	(340)	(102)
Other	(3)	2
Total deferred tax liabilities	(1,090)	(845)
Net deferred tax assets before valuation allowance	166	312
Valuation allowance	(70)	(66)
Total net deferred tax asset	$ 96	$ 246

Net operating loss carryforwards and tax credits increased as a result of the recognition of $1,287 of net operating losses from the Pandora Acquisition and accelerated depreciation that allowed for full expensing on qualified property under the Tax Act offset by the utilization of net operating losses related to current year taxable income. For the years ended December 31, 2019 and 2018, we recorded $33 and $97 for state and federal tax credits, respectively. As of December 31, 2019, our gross federal net operating loss carryforwards were approximately $2,694.

As of December 31, 2019 and 2018, we had a valuation allowance related to deferred tax assets of $70 and $66, respectively, which were not likely to be realized due to the timing of certain federal and state net operating loss limitations. During the year ended December 31, 2019, our allowance increased primarily due to time limitations associated with federal research and development credits.

ASC 740, *Income Taxes*, requires a company to first determine whether it is more likely than not that a tax position will be sustained based on its technical merits as of the reporting date, assuming that taxing authorities will examine the position and have full knowledge of all relevant information. A tax position that meets this more likely than not threshold is then measured and recognized at the largest amount of benefit that is greater than fifty percent likely to be realized upon effective settlement with a taxing authority. If the tax position is not more likely than not to be sustained, the gross amount of the unrecognized tax position will not be recorded in the financial statements but will be shown in tabular format within the uncertain income tax positions. Changes in recognition or measurement are reflected in the period in which the change in judgment occurs due to the following conditions: (1) the tax position is “more likely than not” to be sustained, (2) the tax position, amount, and/or timing is ultimately settled through negotiation or litigation, or (3) the statute of limitations for the tax position has expired. A number of years may elapse before an uncertain tax position is effectively settled or until there is a lapse in the applicable statute of limitations. We record interest and penalties related to uncertain tax positions in Income tax expense in our consolidated statements of comprehensive income.

As of December 31, 2019 and 2018, the gross liability for income taxes associated with uncertain tax positions was $406 and $387, respectively. If recognized, $297 of unrecognized tax benefits would affect our effective tax rate. Uncertain tax positions are recognized in Other long-term liabilities which, as of December 31, 2019 and 2018, were $12 and $9, respectively, including accrued interest. No penalties have been accrued.

(Dollars and shares in millions, except per share amounts)

We have state income tax audits pending. We do not expect the ultimate outcome of these audits to have a material adverse effect on our financial position or results of operations. We also do not currently anticipate that our existing reserves related to uncertain tax positions as of December 31, 2019 will significantly increase or decrease during the year ending December 31, 2020. Various events could cause our current expectations to change. Should our position with respect to the majority of these uncertain tax positions be upheld, the effect would be recorded in our consolidated statements of comprehensive income as part of the income tax provision. We recorded interest expense of $2 and $1 for the years ended December 31, 2019 and 2018, respectively, related to unrecognized tax benefits.

Changes in our uncertain income tax positions, from January 1 through December 31 are set forth below:

	2019	2018
Balance, beginning of year	$ 387	$ 334
Increases in tax positions for prior years	—	65
Increases in tax positions for current years	31	15
Decreases in tax positions for prior years	(12)	(27)
Balance, end of year	$ 406	$ 387

(17) Segments and Geographic Information

In accordance with FASB ASC Topic 280, *Segment Reporting*, we disaggregate our operations into two reportable segments: Sirius XM and Pandora. The change in segment reporting was due to the acquisition of Pandora. The financial results of these segments are utilized by the chief operating decision maker, who is our Chief Executive Officer, for evaluating segment performance and allocating resources. We report our segment information based on the "management" approach. The management approach designates the internal reporting used by management for making decisions and assessing performance as the source of our reportable segments. For additional information on our segments refer to Note 1.

Segment results include the revenues and cost of services which are directly attributable to each segment. There are no indirect revenues or costs incurred that are allocated to the segments. There are planned intersegment advertising campaigns which will be eliminated. We had less than $1 of intersegment advertising revenue during the year ended December 31, 2019.

Segment revenue and gross profit were as follows during the period presented:

	For the Year Ended December 31, 2019		
	Sirius XM	Pandora	Total
Revenue			
Subscriber revenue	$ 5,644	$ 476	$ 6,120
Advertising revenue	205	1,131	1,336
Equipment revenue	173	—	173
Other revenue	165	—	165
Total revenue	6,187	1,607	7,794
Cost of services [(a)]	(2,378)	(1,005)	(3,383)
Segment gross profit	$ 3,809	$ 602	$ 4,411

The reconciliation between reportable segment gross profit to consolidated income before income tax is as follows:

(Dollars and shares in millions, except per share amounts)

	For the Year Ended December 31, 2019
Segment Gross Profit	$ 4,411
Subscriber acquisition costs	(427)
Sales and marketing [(a)]	(859)
Engineering, design and development [(a)]	(231)
General and administrative [(a)]	(466)
Depreciation and amortization	(468)
Share-based payment expense	(229)
Acquisition and other related costs	(84)
Total other (expense) income	(450)
Consolidated income before income taxes	$ 1,197

(a) Share-based payment expense of $44 related to cost of services, $78 related to sales and marketing, $49 related to engineering, design and development and $58 related to general and administrative has been excluded.

A measure of segment assets is not currently provided to the Chief Executive Officer and has therefore not been provided.

As of December 31, 2019, long-lived assets were predominantly located in the United States. No individual foreign country represented a material portion of our consolidated revenue during the year ended December 31, 2019.

(18) Subsequent Events

Holdings' Capital Return Program

On January 30, 2020, Holdings' board of directors declared a quarterly dividend on Holdings' common stock in the amount of $0.01331 per share of Holdings' common stock payable on February 28, 2020 to Holdings' stockholders of record as of the close of business on February 12, 2020.

(Dollars and shares in millions, except per share amounts)

(19) Quarterly Financial Data--Unaudited

Our quarterly results of operations are summarized below:

	For the Three Months Ended			
	March 31	June 30	September 30	December 31
2019 (1)				
Total revenue	$ 1,744	$ 1,977	$ 2,011	$ 2,062
Cost of services	$ (748)	$ (882)	$ (881)	$ (916)
Income from operations	$ 333	$ 439	$ 476	$ 399
Net income	$ 166	$ 266	$ 236	$ 230
2018 (1)				
Total revenue	$ 1,375	$ 1,432	$ 1,468	$ 1,496
Cost of services	$ (535)	$ (637)	$ (565)	$ (572)
Income from operations	$ 424	$ 362	$ 482	$ 459
Net income	$ 290	$ 292	$ 343	$ 251

(1) Net income per share for Sirius XM is not presented since Sirius XM is a wholly-owned subsidiary of Holdings.