



STATE OF MICHIGAN

GRETCHEN WHITMER
GOVERNOR

DEPARTMENT OF TECHNOLOGY, MANAGEMENT & BUDGET
LANSING

TRICIA L. FOSTER
DIRECTOR

Connecting Michigan Communities Grant Application

Please read through the entire Connecting Michigan Communities Grant Information and Application – 2019 package before you begin to respond to the application questions. This will help ensure you understand the full scope of the application as well as the details you will need to provide to complete the application.

Application Deadline: All grant applications are due by 4:00PM EST, Friday, August 30, 2019.

Submission Guidelines: Completed application and supporting documentation must be received by the Department of Technology, Management, and Budget (DTMB), Center for Shared Solutions by 4:00 p.m. on Friday, August 30, 2019, to be considered for funding. Applicants should email their applications and all attachments in PDF format to DTMB-CMICGrant@michigan.gov. Applicants will receive an email confirmation of their submission within 48 business hours. Please fill out the entire application and clearly label any attachments with the question/statement number from the application form. Award decisions are estimated to be made in the fourth quarter of 2019.

Questions and Contact: If you have questions after reviewing the application and supporting documentation, please see the Frequently Asked Questions (FAQ) document available on the grant website at: www.michigan.gov/CMICGrant. The FAQ will be updated throughout the application process. Questions and comments can also be submitted via email to: DTMB-CMICGrant@michigan.gov.

Application Checklist

This checklist is part of your application and should be returned along with your completed application and attachments.

Application Submission Checklist:

- ☐ Read the entire application package.
- ☐ Public application is complete and file name meets the standards.
- ☐ Non-Public application is complete and file name meets the standards.
- ☐ Confidential Treatment Form is complete.
- ☐ Attachments have been gathered and file names meet the standards.
 - ☐ Attachment 1: Map of proposed service area in PDF format (including both last mile coverage and middle mile routes)
 - ☐ Attachment 2: GIS-compatible file of the proposed service area (including both last mile coverage and middle mile routes)
 - ☐ Attachment 3: Spreadsheet of census blocks that are part of the proposed service area
 - ☐ Attachment 4: Match commitment letters or evidence
 - ☐ Attachment 5: Applicant organizational chart
 - ☐ Attachment 6: Resumes of key officers, management personnel, and proposed project management team
 - ☐ Attachment 7: Audited financial statements.
 - ☐ Attachment 8: Evidence of network scalability
 - ☐ Attachment 9: Five-year, stand-alone project financial plan/forecast
 - ☐ Attachment 10: Affidavit of commitment to offer the proposed service and cost in the proposed service area for a minimum of five years after project completion
 - ☐ Attachment 11: Budgetary engineering designs, diagrams, and maps that show the proposed project
 - ☐ Attachment 12: Letters of support
 - ☐ Attachment 13: Demonstration of customer interest in the proposed project
 - ☐ Attachment 14: Statements of impact/support from CAIs (if applicable)
 - ☐ Attachment 15: Evidence of application for a SPIN (if applicable)
 - ☐ Attachment 16: Statements of impact/support from businesses (if applicable)

NOTE: Attachments must be submitted following the designated naming structure. Applicants are to use the name of their organization followed by the attachment number and file type (e.g. ABCTelecom_Attachment_1.xlsx).

Application

Applicant and Project Information, Contact Information, and Summary

1. Project Name: Comcast Buchanan Township
2. Applicant Name: Comcast of California/Connecticut/Michigan, a wholly owned subsidiary of Comcast Corporation
DBA (if applicable): Comcast
Mailing Address: 41112 Concept Dr. Plymouth 48170
3. Primary Grant Contact: Jeff Snyder
Primary Contact Organization (if not part of the applicant's organization): Comcast
Primary Contact Phone Number: [REDACTED]
Primary Contact Email Address: [REDACTED]
4. Application Author Name: Greg Gomolka Application
Author Email: [REDACTED]
5. Eligibility Status: Please select the means by which the applicant is eligible to apply for the grant:
☐ Licensed under the Michigan Telecommunications Act (1991 PA 179, MCL 484.2101 to 484.2603)
☒ Franchise holder under the Uniform Video Services Local Franchise Act (2006 PA 480, MCL 484.3301 to 484.3315)
☐ Broadband service provider currently providing service in Michigan
6. Are you registered with the [Michigan Public Service Commission's Intrastate Telecommunications Service Providers Registry \(ITSP\)](#)?
☒ **Yes** ☐ No ☐ Unsure
7. Have you provided broadband coverage data to Connect Michigan in the last five years?
☐ Yes ☒ **No** ☐ Unsure
8. Applicant Identification Numbers: Please provide the following identification numbers for the applicant (if available):

Federal Employer Identification Number [REDACTED]
Michigan Tax Identification Number: [REDACTED]
Michigan Vendor Identification Number: NONE
Federal Communications Commission Registration Number (FRN): [REDACTED]

Service Provider Identification Number (SPIN):

9. Project Summary (250 words max.):

This project will enable Comcast to extend service to 91 unserved homes in the River Pointe Development located in Buchanan Township. In a funding partnership with the State of Michigan, Comcast of California/Connecticut/Michigan or its subsidiary, will provide unserved areas with Internet levels up to 1 gigabit per second download and 35 megabits per second upload prior to September 20th, 2023. Providing broadband service to this unserved residential area of Buchanan Township will enable residents to engage in on-line banking, utilize telemedicine, improve and increase educational opportunities for students, provide for the use of smart devices in the home increasing efficiencies for lighting and heating, and encourage the use of technology by the older population.

Locations Passed and Proposed Service:

Attachment 1: Map of proposed service area in PDF format (including both last mile coverage and middle mile routes)

Name of Attachment 1:

ATTACHMENT 1: Comcast_BUCHANAN TOWNSHIP_Attachment_1.PDF MAP 1 – Redacted

Attachment 2: GIS-compatible file of the proposed service area (including both last mile coverage and middle mile routes)

Name of Attachment 2:

ATTACHMENT 2: Comcast_ BUCHANAN TOWNSHIP _Attachment_2.GIS MAP 1 – Redacted

Attachment 3: Spreadsheet of census blocks that are part of the proposed service area.

Name of Attachment 3:

ATTACHMENT 3: Comcast_BUCHANAN TOWNSHIP _Attachment_3.pdf

10. Please provide a brief description of the proposed service area (250 words max.):

River Pointe Development is located northeast of Buchanan, Michigan on the St. Joseph River. The development has 91 home sites. The area is bordered by St. Joseph River to the west, Range Line Road to the east, East River Road to the south, and farm fields to the north. The entrance to the River Pointe Development is located on Range Line Road.

11. Does the project include a middle mile component:

X Yes ☐ No

12. Locations Passed: Please indicate the total number of locations by type that will be able to receive improved broadband services as a result of the proposed project:

Households: 91

Businesses: 0

Community Anchor Institutions: 0

13. Are any vacant lots included in the total number of locations passed listed above?

X Yes ☐ No

If yes, these vacant lots should be anticipated for growth in the next five years according to a local, county, or regional master plan or economic development plan. Please list the name of the relevant plan and the jurisdiction implementing the plan.

Plan: Berrien County Community Development Plan

Jurisdiction: Buchanan Township

14. Please list the jurisdictions impacted by the proposed service area:

City(ies)/Village(s):

Township(s):

Buchanan Township

County(ies):

Berrien

State House District(s):

District 78

State Senate District(s):

District 21

15. Please provide a brief description of the broadband service to be provided including, but not limited to, the technology to be used, will bandwidth be dedicated or shared, etc. (250 words max.):

The proposed project will be built using Data Over Cable Service Interface Specification (DOCSIS) 3.1 technology. DOCSIS is an international telecommunications standard that permits the addition of high-bandwidth data transfer to an existing cable television system. CableLabs, a non-profit production innovation and research and development lab, developed the DOCSIS technology. Comcast contributed to the development of this technology and was joined by companies such as 3/Com, ARRIS, Cisco, Motorola and Net Gear.

DOCSIS 3.1 was introduced in 2013 with a maximum downstream capacity of 10 Gbps and maximum upstream capacity of 1-2 Gbps. DOCSIS architecture includes 2 primary components – a cable modem, located at a customer's home or business, and a cable modem termination system (CMTS), located at the cable system head end. Comcast leases the cable modem to customers as a component of the service, or customers can provide their own modem, and the CMTS for this proposed project is located in Comcast's head end.

Comcast broadband customers have the ultimate in coverage and control of their home Wi-Fi through our xFi app. xFi is a personalized home Wi-Fi experience that gives customers the fastest speeds, best coverage, and ultimate control of their home.

Project Costs and Budget

16. Total eligible project cost: \$350,257.00

17. Total grant request: \$244,243.00

Attachment 4: Match commitment letters or evidence

Name of Attachment 4:

ATTACHMENT 4: Comcast_BUCHANAN TOWNSHIP_Attachment_4.pdf

18. Total matching funds: Please complete the table below summarizing the source, amount, and type of matching funds contributed to the project. Applicants should also indicate if the match is secured or not. Attach additional sheets if necessary.

Source	Amount	Type	Secured?
Comcast		<input checked="" type="checkbox"/> Cash <input type="checkbox"/> In-Kind	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
		<input type="checkbox"/> Cash <input type="checkbox"/> In-Kind	<input type="checkbox"/> Yes <input type="checkbox"/> No
		<input type="checkbox"/> Cash <input type="checkbox"/> In-Kind	<input type="checkbox"/> Yes <input type="checkbox"/> No
		<input type="checkbox"/> Cash <input type="checkbox"/> In-Kind	<input type="checkbox"/> Yes <input type="checkbox"/> No
		<input type="checkbox"/> Cash <input type="checkbox"/> In-Kind	<input type="checkbox"/> Yes <input type="checkbox"/> No
		<input type="checkbox"/> Cash <input type="checkbox"/> In-Kind	<input type="checkbox"/> Yes <input type="checkbox"/> No

19. If matching funds or in-kind contributions listed above are not yet secured, please describe the process remaining to secure the funds and the anticipated timeline to do so, (250 words max.):

Comcast is committed to funding the following capital expenses related to the application. This grant application proposes to serve households in Buchanan Township. These funds are included in our Fiscal Year 2019-2020 budget for capital related expenses such as the extension of our network to serve the proposed project area.

20. Project Budget: Please use the following table to provide a budget for the proposed project. Please use the recommended categories in the table where possible, creating other categories where anticipated expenses do not fall within one of the recommended categories.

Use of Funds	Match Amount	Grant Amount	Total
Buildings and Labor	\$0.00	\$0.00	\$0.00
Last Mile Construction Labor	Redacted	Redacted	Redacted
Middle Mile Construction Labor	Redacted	Redacted	Redacted
Construction Material	Redacted	Redacted	Redacted
Customer Premise Equipment	Redacted	Redacted	Redacted
Customer Premise Installation	Redacted	Redacted	Redacted
Electronics	Redacted	Redacted	Redacted
Permits	\$480.00	\$1,120.00	\$1,600.00
Professional Services and Engineering	\$840.00	\$1,960.00	\$2,800.00
Other:			\$0.00
Other:			\$0.00
Other:			\$0.00
Other:			\$0.00
Other:			\$0.00
Total			\$350,257.00

21. Please briefly describe why this project needs funding from the CMIC Grant program and why the project could not proceed without this funding, (250 words max.):

Comcast utilizes an internal return on investment model in order to determine the viability of an expansion project. The Connecting Michigan Communities grant will enable the project to meet a five-year payback based on this internal model.

Experience and Financial Wherewithal

Attachment 5: Applicant organizational chart

Name of Attachment 5:

ATTACHMENT 5: Comcast_ BUCHANAN TOWNSHIP Attachment_5.pdf

Attachment 6: Resumes of key officers, management personnel, and proposed project management team

Name of Attachment 6:

ATTACHMENT 6: Comcast_ BUCHANAN TOWNSHIP _Attachment_6.pdf

22. Please provide a brief history of your organization including experience relevant to the proposed project, (250 words max.):

Comcast is a global media and technology company and is one of the nation's largest providers of high-speed internet services. Through our predecessors, we have developed, managed and operated cable systems since 1963. Comcast has operated its cable systems in Berrien County since 2002. Since that time, Comcast completed network infrastructure improvements which enabled customers to receive advanced services including gigabit Internet service. This grant will enable Comcast to provide these services throughout the proposed project area.

Attachment 7: Audited financial statements

Name of Attachment 7:

ATTACHMENT 7: Comcast_ BUCHANAN TOWNSHIP _Attachment_7.pdf

23. Please provide a brief statement to accompany your attached audited financial statements and documentation, (250 words max.):

Comcast Corporation (Nasdaq: CMCSA) is a global media and technology company with three primary businesses: Comcast Cable, NBCUniversal, and Sky. Comcast Cable is one of the United States' largest video, high-speed internet, and phone providers to residential customers under the Xfinity brand, and also provides these services to businesses. It also provides wireless and security and automation services to residential customers under the Xfinity brand. NBCUniversal is global and operates news, entertainment and sports cable networks, the NBC and Telemundo broadcast networks, television production operations, television station groups, Universal Pictures, and Universal Parks and Resorts. Sky is one of Europe's leading media and entertainment companies, connecting customers to a broad range of video content through its pay television services. It also provides communications services, including residential high-speed internet, phone, and wireless services. Sky operates the Sky News broadcast network and sports and entertainment networks, produces original content, and has exclusive content rights. Please see the attached 10k filing for detailed information.

Long-Term Viability and Scalability

Attachment 8: Evidence of network scalability

Name of Attachment 8:

ATTACHMENT 8: Comcast_ BUCHANAN TOWNSHIP _Attachment_8.pdf

24. Please provide a description and evidence that the proposed infrastructure is scalable to meet the anticipated future connectivity demands of the proposed service area. Please indicate the end-user connection speed to which the proposed network is designed to scale. This information must be certified by the equipment manufacturer or a professional engineer, (250 words max.):

The proposed project will be built using Data Over Cable Service Interface Specification (DOCSIS) 3.1 technology. DOCSIS is an international telecommunications standard that permits the addition of high-bandwidth data transfer to an existing cable television system.

The design for the proposed project is based upon the current industry standards as developed by the Society for Cable Television Engineers (SCTE) and Comcast standards of broadband deployment. The proposed project is fully scalable and will be capable of providing broadband download speeds in excess of 1 Gbps with minor modifications. Comcast's high-speed, high-capacity data services operate across our private, diverse network. With over 160,000 national route miles of fiber, it is the largest facilities based last mile alternative to similar last mile providers of data services. Comcast utilizes ARRIS cable modems and CMTS devices both of which have been certified by CableLabs for use with DOCSIS technology. For more information on the certification process and a detailed listing of devices, please visit www.cablelabs.com/specs/certification.

Attachment 9: Five-year, stand-alone project financial plan/forecast

Name of Attachment 9:

ATTACHMENT 9:

Comcast_BUCHANAN TOWNSHIP_Attachment_9.pdf - Redacted

Attachment 10: Affidavit of commitment to offer the proposed service and cost in the proposed service area for a minimum of five years after project completion.

Name of Attachment 10:

ATTACHMENT 10:

Comcast_ BUCHANAN TOWNSHIP _Attachment_10.pdf

25. Please provide a brief narrative to accompany your attached five-year stand-alone project financial plan/forecast, (400 words max.):

As one of the largest high-speed Internet, video and phone providers in the United States, Comcast has a proven record of success. Please see attachment 9 for details regarding the five-year stand-alone project financial plan and forecast.

Readiness

Attachment 11: Budgetary engineering designs, diagrams, and maps that show the proposed project. Design documents must clearly demonstrate the applicant's complete understanding of the project and ability to provide the proposed solution. This information must be certified by a Professional Engineer registered in Michigan.

Name of Attachment 11:

ATTACHMENT 11: Comcast_ BUCHANAN TOWNSHIP _Attachment_11.pdf - Redacted

26. Please provide a brief statement to accompany your attached engineering designs, diagrams, and maps indicating your readiness to build, manage, and operate the proposed network, (250 words max.):

The design for the proposed project area is based upon the current industry standards as developed by the Society for Cable Television Engineers (SCTE) and Comcast standards of broadband deployment. The designs have been reviewed and approved by a certified Professional Engineer registered in Michigan. Comcast has operated, developed and managed the cable systems in Berrien County since 2002 and has fully deployed the DOCSIS 3.1 technology throughout the service area.

27. Please use the table below to complete a project schedule outlining individual tasks and their timing by quarter and year. All projects must be complete by September 30, 2023.

Task	2020			2021				2022				2023		
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
Survey, Design, Engineering	X	XX												
Financing	XX	X												
Material Ordering		XX	X											
Outside Plant Construction		X	XXX	X										
Certification/Activation				X	X									
Address Release				X	X									

28. Please indicate the anticipated date upon which service to the last location in the proposed project area will be turned on: August 1, 2021

29. Please list any factors that would change or delay the proposed schedule:

Factors that could change or delay the schedule include timing of grant award notification, pole attachment make-ready work required to install facilities, permitting delays, inability to acquire needed equipment, railroad right-of-way access, and unusual or severe weather.

30. Have all the required local/city/county/state approvals necessary for this project to proceed been obtained?

☐ Yes ☒ No

If not, what remains to be done and what is required for completing the process of obtaining approvals? Include this information in the project schedule.

Comcast will obtain the necessary right-of-way permits to construct this project upon notification the grant is awarded.

31. Have state environmental review requirements been met, if applicable?

☐ Yes ☐ No Not applicable

If not, what remains to be done and what is required for completing the process of obtaining approvals? Include this information in the project schedule.

32. Does this project affect/is the project located in or near local, state, or federal historic or potentially historic, architectural, or archeological resources?

☐ Yes ☒ **No**

If not, what remains to be done and what is required for completing the process of obtaining approvals? Include this information in the project schedule.

33. Please briefly describe how the proposed project will leverage existing broadband networks, where practical, or be built in conjunction with other broadband infrastructure project(s), (250 words max.):

Comcast proposes to extend existing broadband infrastructure to the proposed project area. By extending the cable plant to the proposed project area, Comcast will be able to provide the same services in the proposed project area as in the adjacent existing service area.

Community and Economic Development

Attachment 12: Community letters of support

Name of Attachment 12:

ATTACHMENT 12: Comcast_ BUCHANAN TOWNSHIP _Attachment_12.pdf

Attachment 13: Demonstration of customer interest in the proposed project

Name of Attachment 13:

ATTACHMENT 13: Comcast_ BUCHANAN TOWNSHIP _ Attachment_13.pdf

34. Please provide a brief statement to accompany the demonstration of customer interest you have attached to this application. This description should include the method used for gauging customer interest and the results, (250 words max.):

Comcast has partnered with the Berrien County Broadband Working Group, Pokagon Fund and Southwest Michigan Planning Council to identify unserved areas in Berrien County. Comcast also tracked requests for service from Berrien County residents and businesses located in unserved areas. In addition, an analysis of the FCC National Broadband Map was completed in order to ensure the proposed project area didn't include any providers meeting the minimum threshold of 10/1.

Attachment 14: Statements of impact/support from CAIs (if applicable)

Name of Attachment 14:

ATTACHMENT 14: Comcast_BUCHANAN TOWNSHIP_ Attachment_14.pdf

35. In the table below, please list the specific community anchor institutions (CAIs) to be served by the proposed project, (attach additional sheets if necessary). Please also attach statements or evidence from these CAIs regarding the benefits of the proposed connectivity solution and how it will impact the organizations.

CAI Name	Address	Type (e.g. healthcare, library, school, etc.)

Attachment 15: Evidence of application for a SPIN (if applicable)

Name of Attachment 15:

36. If the proposed project includes connections to schools or libraries, please provide your SPIN or evidence of application for a SPIN from the FCC/Universal Service Administrative Company (USAC) and demonstration of your knowledge of E-rate and working with the FCC/USAC, (250 words max.):

The proposed project doesn't include any connections to a school or library.

37. Please briefly summarize how the proposed service will impact the following sectors in the community:

Public safety:

Providing broadband service to proposed area will allow residents better access to emergency contact information, agencies, and resources.

Healthcare:

The introduction of telemedicine and access to electronic health records in rural areas will enable families to connect with doctors from around the country. Many hospitals and medical professionals have embraced telemedicine in for remote monitoring.

Education:

E-learning makes education accessible to everyone and providing those opportunities and access to critical resources to all communities is critical. Broadband access brings the world of education home for students of all ages.

Government entities:

Residents will have increased access to and be able to use the online tools and resources provided by local, state and federal governmental agencies.

Libraries:

Comcast has a long history of working and partnering with local libraries helping to build strong relationships in neighborhoods, towns and cities that we serve. The proposed project will enable residents in the project area to access on-line tools and resources provided by the local library.

Attachment 16: Statements of impact/support from businesses (if applicable)

Name of Attachment 16:

38. Please provide a brief description of businesses needing improved broadband service in the proposed project area and the level of improvement needed. Please also attach statements or evidence from any impacted businesses regarding the benefits of the proposed connectivity solution and how it will impact the business, (250 words max.):

The proposed project area does not include any existing businesses. However, the proposed project will be fully capable of supporting future business in the project area. Broadband access will help facilitate potential home-based business activity such as e-commerce, marketing, order fulfillment, and communications.

39. If the proposed service area has a significant agricultural presence, please briefly describe how the proposed service will impact farmers and the agriculture community, (250 words max.):

The proposed project area does not include existing agricultural sites.

40. Is broadband included in a local, county, or regional economic development plan, master plan, or similar up-to-date planning document, or does the community in which the proposed service is to be deployed have a specific broadband/technology plan in place?

Yes ☒ **No**

If yes, please list the name of the relevant plan and the jurisdiction implementing the plan.

Plan Name:

Jurisdiction:

Affordability and Service Limitations

41. Using the table below, please indicate the download and upload speeds of the services to be offered in the proposed service area offered over the initial five years of the project (attach additional sheets if necessary). The non-discounted/rack rate monthly pricing of unbundled internet-only service should be included for each service offered, as well as the monthly data allowance for customers (if applicable):

Detailed below are the standard speed tiers and pricing for standalone Xfinity Internet service (i.e. non-promotion and not part of a multi-product bundle) as of the submittal of this application. Comcast cannot in good faith indicate that the pricing structure will remain the same over the next five years. Comcast does anticipate speed increases to some or all of the tiers over the next five years.

	Name	Download/ Upload	Monthly Price	Monthly Data
Residential	Internet Essentials*	15 Mbps/ 2 Mbps	\$9.95	1 Terrabyte
Residential	Performance Starter	25 Mbps/ 2 Mbps	\$50.00	1 Terrabyte
Residential	Performance	60 Mbps/ 5 Mbps	\$70.00	1 Terrabyte
Residential	Blast!	150 Mbps/ 10 Mbps	\$80.00	1 Terrabyte
Residential	Extreme	250 Mbps/ 20 Mbps	\$90.00	1 Terrabyte
Residential	Extreme Pro	400 Mbps/ 10 Mbps	\$100.00	1 Terrabyte
Residential	Gigabit Internet	1 Gbps/ 35 Mbps	\$110.00	1 Terrabyte
Residential	Gigabit Pro	2Gbps/2Gbps	\$299.95	Unlimited
Commercial	Starter Internet	25 Mbps/ 5 Mbps	\$69.96	Unlimited
Commercial	Business Internet 75	75 Mbps/ 15 Mbps	\$99.95	Unlimited
Commercial	Business Internet 150	150 Mbps/ 20 Mbps	\$139.95	Unlimited
Commercial	Business Internet 300	300 Mbps/ 25 Mbps	\$199.95	Unlimited
Commercial	Business Internet 1 Gig	1 Gbps/ 35 Mbps	\$499.95	Unlimited

Prices for any offerings discussed in this application, are subject to change. The schedule above represents the standard broadband pricing in Michigan as of 8/30/19.

* Internet Essentials is available to customers meeting the program's eligibility requirements.

Please note, the above commercial products are generally used by small to midsize business. Comcast also offers Metro-Ethernet service to larger businesses. Comcast is MEF-2 certified and is capable of offering 10 Gbps utilizing Metro-Ethernet. Prices for this service are individualized for each customer based upon the unique needs of the customer.

42. Do you participate in the federal Lifeline program?

☐ Yes ☒ No

43. Do you plan to offer a lower-cost monthly subscription plan for low-income households in the proposed service area?

☒ **Yes** ☐ No

If yes, please briefly describe the program including the type of service to be offered, the monthly cost for qualifying household, and how you plan to determine household eligibility for such a program, (400 words max.):

Everywhere Comcast deploys its network, it makes available Internet Essentials, which is the nation's largest and most comprehensive broadband adoption program for low-income Americans. Internet Essentials was launched in 2011 and provides low-cost high-speed Internet service for \$9.95 per month plus tax; the option to purchase an Internet-ready computer for under \$150; and multiple options to access free digital literacy training in print, online, and in person. Comcast has connected more than 8 million low-income Americans in 2 million households to the transformative power of the Internet. Residents are eligible for Internet Essentials if they receive assistance from Medicaid, public housing assistance, SNAP, TANF, SSI, NSLP/Head Start, LIHEAP, WIC, VA Pension, or Tribal assistance. Other eligibility requirements apply. The state-of-the-art Internet Essentials website easily allows our partners to help spread the word about Internet Essentials and provides online digital skills training materials at no cost.

Please visit www.internetessentials.com for more information.

44. Does any of the proposed service area include (wholly or partially) an eligible distressed area (a list of eligible distressed areas can be found here: https://www.michigan.gov/mshda/0,4641,7-141-48987_75951-181277--,00.html)?

☐ Yes ☒ **No**

If yes, please list the distressed community(ies) impacted by the proposed service area:

Adoption Strategy

45. Please briefly describe any proposed digital literacy training events, materials, and/or resources that will be provided to residents or businesses impacted by the proposed connectivity. This description should include commitments from any partners included in the digital literacy training and the anticipated outcomes from related activities, (400 words max.):

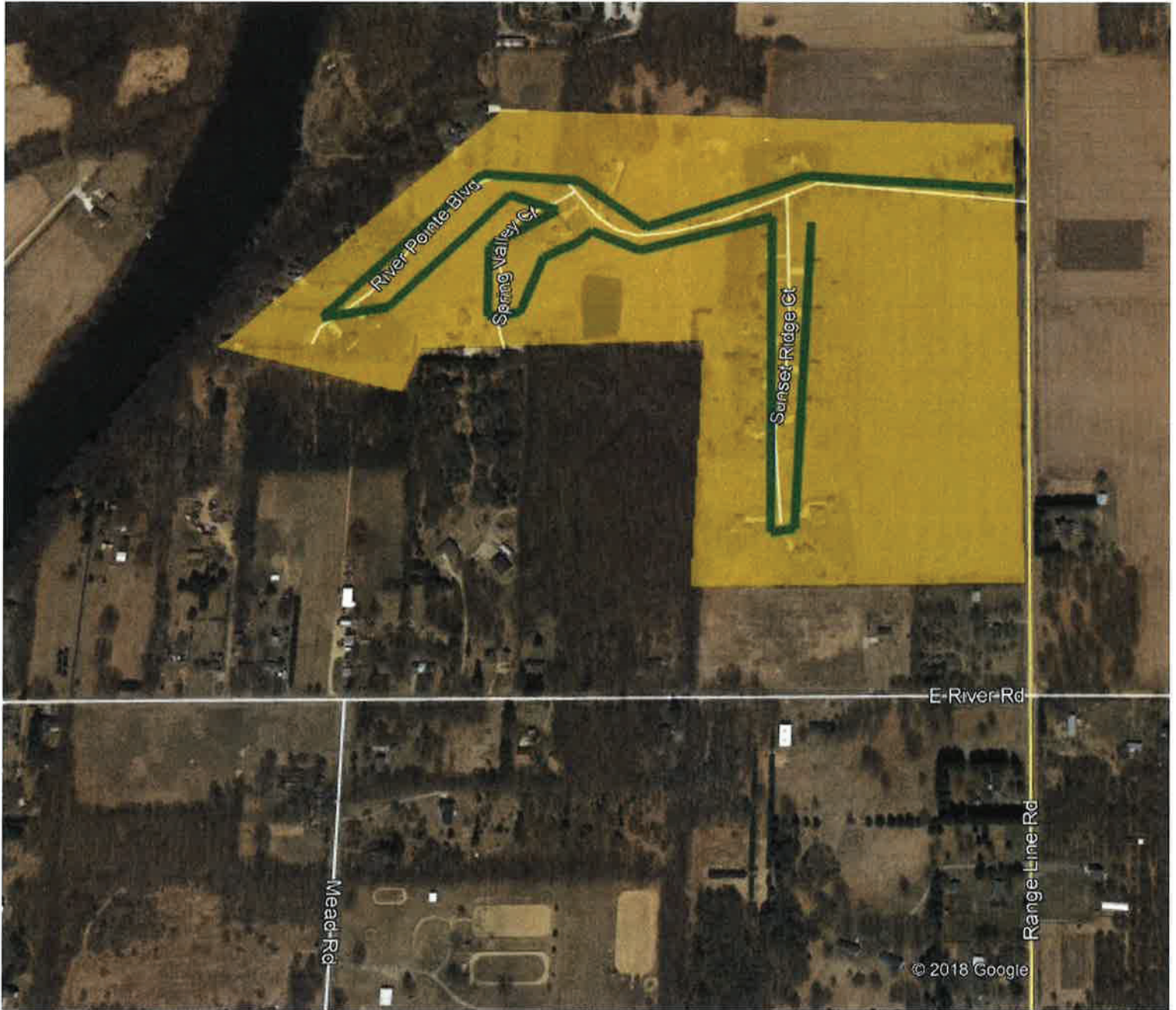
Everywhere Comcast deploys its network, it makes available Internet Essentials, which is the nation's largest and most comprehensive broadband adoption program for low-income Americans. Internet Essentials was launched in 2011 and provides low-cost high-speed Internet service for \$9.95 per month plus tax; the option to purchase an Internet-ready computer for under \$150; and multiple options to access free digital literacy training in print, online, and in person. Comcast has connected more than 8 million low-income Americans in 2 million households to the transformative power of the Internet. Residents are eligible for Internet Essentials if they receive assistance from Medicaid, public housing assistance, SNAP, TANF, SSI, NSLP/Head Start, LIHEAP, WIC, VA Pension, or Tribal assistance. Other eligibility requirements apply.

46. Please briefly describe the materials and method(s) to be used for providing residents and businesses with information promoting the use of an internet connection for improving quality of life, access to resources, economic opportunity, etc., in the proposed service area. Partnerships with local CAIs that build awareness for enriching online opportunities for residents and businesses are highly encouraged. Examples of these opportunities include, but are not limited to, telehealth applications, access to government services, e-learning, job and career readiness programs, public safety information, cybersecurity training, etc., (400 words max.):

Comcast will provide residents in the proposed project area with detailed information mailed to their homes regarding the availability and benefits of Internet service. Additionally, Comcast will provide this information to the Southwest Michigan Planning Council, the Pokagon Fund and the Berrien County Broadband Working Group for dissemination to the residents of the proposed project area. Additionally, trainings will be made available as part of the Internet Essentials program as described above.

Attachment 1: Map of proposed service area in PDF format (including both last mile coverage and middle mile routes)

**ATTACHMENT 1: Comcast BUCHANAN
TOWNSHIP_Attachment_1.pdf MAP 1**



Attachment 2: GIS-compatible file of the proposed service area (including both last mile coverage and middle mile routes)

Attachment 2: Comcast BUCHANAN TOWNSHIP_GIS MAP1

Please see separate attachment included for attachment 2 GIS format map1



Attachment 3: Spreadsheet of census blocks that are part of the proposed service area.

**ATTACHMENT 3: Comcast BUCHANAN
TOWNSHIP_Attachment_3.pdf**

CENSUS BLOCKS
260210201003001

Attachment 4: Match commitment letters or evidence

**ATTACHMENT 4: Comcast BUCHANAN
TOWNSHIP_Attachment_4.pdf**



August 22, 2019

Department of Technology, Management & Budget
George W Romney Building
111 South Capitol Avenue
Lansing, Michigan 48933

Re: Confirmation of Applicant Match

Dear Administrators of the Connecting Michigan Communities Grant Program:

Comcast is committed to funding the following capital expenses related to the Connecting Michigan Communities Grant Program. This grant application proposed to serve the River Pointe Development northeast of Buchanan, MI on the St. Joseph River.

These funds are included in our Fiscal 2019-2020 budget for capital related expenses such as the extension of our network to serve the proposed project area.

Total Project Cost: \$350,257

Comcast Contribution: [REDACTED]

We look forward to the opportunity to provide the proposed project area with broadband service.

Sincerely,

Kristi Flood

Sr. Director Business Operations

Comcast – Greater Chicago Region

Attachment 5: Applicant organizational chart

**ATTACHMENT 5: Comcast BUCHANAN
TOWNSHIP_Attachment_5.pdf**

APPLICANT ORGANIZATIONAL CHART

The following individuals will oversee the proposed project and are structured as noted below.

Name	Role	Phone	E-Mail
Bryan Mark	VP – Technical Operations	224-229-6125	Bryan_Mark@comcast.com
John Colucci	VP - Construction	224-229-4562	John_Colucci@comcast.com
Kristi Flood	Sr. Director - Business Operations	224-229-4080	Kristi_Flood@comcast.com
Brian Jorgensen	Construction/ Project Manager	224-229-5572	Brian_Jorgenson@comcast.com

Attachment 6: Resumes of key officers, management personnel,
and proposed project management team

**ATTACHMENT 6: Comcast BUCHANAN
TOWNSHIP_Attachment_6.pdf**

BRYAN MARK, VICE PRESIDENT, TECHNICAL OPERATIONS

Bryan Mark serves as the Regional Vice President of Operations for Comcast's Greater Chicago Region. He is responsible for the direction of over 2,500 Comcast employees in Illinois, Northwest Indiana and Southwest Michigan. Mark's primary responsibilities include leading technical, network maintenance, construction and workforce operations for the Greater Chicago Region service area. He is a 23-year veteran of the telecommunications industry beginning his career with Ameritech as an installation technician. There he held several management positions with increasing responsibility in training and technical operations. He joined AT&T Broadband in 1999 as Project Manager. Bryan has a wide range of experience within Comcast that allow him to view operations end-to-end. Most recently, he held positions as Regional Director of Operations, Director of Technical Operations for the City of Chicago and Western suburbs and Area Vice President of Field Operations. Bryan attended Ohio State University and is a graduate of the Comcast Executive Leadership Forum and Field Executive Boot Camp.

JOHN COLUCCI, REGIONAL VICE PRESIDENT OF CONSTRUCTION

John Colucci is a 38-year telecommunications veteran who is currently the Regional Vice President of Construction for Comcast's Greater Chicago Region. John is responsible for Construction operations for over 51,000 mile of telecommunications plant in Illinois, Northwest Indiana and Southwest Michigan. John previously held the position of Vice president of Operations for the South Area of the Greater Chicago Region. John currently sits on the Board of Directors of the Greater Chicago Region Society of Cable Television Engineers and is a graduate of the Comcast Executive Leadership Forum as well.

KRISTI FLOOD, SENIOR DIRECTOR OF OPERATIONS

Kristi Flood serves as the Senior Director of Operations in Comcast's Greater Chicago Region. She leads a team of 20 finance professionals and her responsibilities include financial planning, reporting and control within the region. Kristi has been with Comcast since 2006 via the acquisition of Cimco Communications. In her role as Sr. Director, she has focused on the support, alignment and partnership with Comcast's key operations including Comcast Business, Technical Operations, Engineering, Capital and Business Development. She has almost 25 years of experience with increasing responsibility in the finance and accounting functions including roles at Comverse, Inc, CSG Systems, Lucent Technologies, Citibank and First Chicago. In addition, Kristi has worked both domestically and internationally, with stints in Australia and the United Kingdom. Kristi received her Bachelor of Science degree in Finance from DePaul University in Chicago and her Master of Science degree in Accounting from Babson College in Wellesley, MA. She is a graduate of the Lucent Technologies Financial Leadership Development Program, Half the Sky Leadership Development Program, the Comcast Financial Leadership Exchange Program and the Comcast Execution Leadership Career Advancement Program. She is a member of WICT and Comcast's Women's Network.

BRIAN JORGENSEN, CONSTRUCTION MANAGER

Brian Jorgensen currently serves as the Construction Manager for the Greater Chicago Region. Brian is responsible for building and maintaining the infrastructure for Southwest Michigan, Northwest Indiana and Illinois. Brian has been in the industry for 32-years holding positions in Operations and as Network Manager. Brian currently sits on the Board of Directors for the Michiana Chapter for the Society of Cable Television Engineers. Brian attended Porter and Chester Institute of technology and completed several SCTE courses through Advanced Technician.

Attachment 7: Audited financial statements

**ATTACHMENT 7: Comcast BUCHANAN
TOWNSHIP_Attachment_7.pdf**

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

(Mark One)

☒ [S]

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
FOR THE FISCAL YEAR ENDED DECEMBER 31, 2018

OR

☐

TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
FOR THE TRANSITION PERIOD FROM TO

COMCAST

Registrant, State of incorporation, Address and
Telephone Number

Commission File Number

I.R.S. Employer Identification No.

001-32871

27-0000798

001-36438

14-1682529

SECURITIES REGISTERED PURSUANT TO SECTION 12(h) OF THE ACT:

Comcast Corporation -

Title of Each Class

Name of Each Exchange on Which Registered

Class A Common Stock, \$0.01 par value
2.0% Exchangeable Subordinated Debentures due 2029
5.50% Notes due 2029
9.455% Guaranteed Notes due 2022

NASDAQ Global Select Market
New York Stock Exchange
New York Stock Exchange
New York Stock Exchange

NBCUniversal Media, LLC - NONE

SECURITIES REGISTERED PURSUANT TO SECTION 12(g) OF THE ACT:

Comcast Corporation - NONE

NBCUniversal Media, LLC - NONE

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act.

Comcast Corporation

Yes ☒ [X]

No ☐

NBCUniversal Media, LLC

Yes ☐

No ☒

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act.

Comcast Corporation

Yes ☒ [X]

No ☐

NBCUniversal Media, LLC

Yes ☒ [X]

No ☐

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports) and (2) has been subject to such filing requirements for the past 90 days.

Comcast Corporation

Yes ☒ [X]

No ☐

NBCUniversal Media, LLC

Yes ☒ [X]

No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files).

Comcast Corporation

Yes ☒ [X]

No ☐

NBCUniversal Media, LLC

Yes ☒ [X]

No ☐

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendments to this Form 10-K.

Comcast Corporation NBCUniversal Media, LLC

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See definition of "large accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act:

Comcast Corporation

☐ Large accelerated filer☒ Accelerated filer☐ Non-accelerated filer☐ Smaller reporting company☐ Emerging growth company☐

NBCUniversal Media, LLC Large accelerated filer ☐ Accelerated filer ☒ Non-accelerated filer ☐ Smaller reporting company ☒ Emerging growth company ☐
If an emerging growth company, indicate by check mark whether the registrant has elected **not** to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act.

Comcast Corporation ☐

NBCUniversal Media, LLC ☐

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act).

Comcast Corporation Yes ☒ No ☐

NBCUniversal Media, LLC Yes ☒ No ☐

As of June 30, 2018, the aggregate market value of the Comcast Corporation common stock held by non-affiliates of the registrant was \$149.068 billion.

Indicate the number of shares outstanding of each of the registrant's classes of stock, as of the latest practicable date:

As of December 31, 2018, there were 4,516,518,147 shares of Comcast Corporation Class A common stock and 9,444,375 shares of Class B common stock outstanding.

Not applicable for NBCUniversal Media, LLC.

NBCUniversal Media, LLC meets the conditions set forth in General Instruction I(b)(a), (b) and (d) of Form 10-K and is therefore filing this form with the reduced disclosure format.

DOCUMENTS INCORPORATED BY REFERENCE

Comcast Corporation - Part III - The registrant's definitive Proxy Statement for its annual meeting of shareholders presently scheduled to be held in June 2019.

NBCUniversal Media, LLC- NONE

Comcast Corporation

2018 Annual Report on Form 10-K

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This Annual Report on Form 10-K is a combined report being filed separately by Comcast Corporation ("Comcast") and NBCUniversal Media, LLC ("NBCUniversal"). Comcast owns all of the common equity interests in NBCUniversal, and NBCUniversal meets the conditions set forth in General Instruction I(1)(a), (b) and (d) of Form 10-K and is therefore filing its information within this Form 10-K with the reduced disclosure format. Each of Comcast and NBCUniversal is filing on its own behalf the information contained in this report that relates to itself, and neither company makes any representation as to information relating to the other company. Where information or an explanation is provided that is substantially the same for each company, such information or explanation has been combined in this report. Where information or an explanation is not substantially the same for each company, separate information and explanation has been provided. In addition, separate consolidated financial statements for each company, along with notes to the consolidated financial statements, are included in this report.

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Unless indicated otherwise, throughout this Annual Report on Form 10-K, we refer to Comcast and its consolidated subsidiaries, including NBCUniversal and its consolidated subsidiaries as "we," "us" and "our;" Comcast Cable Communications, LLC and its consolidated subsidiaries as "Comcast Cable;" Comcast Holdings Corporation as "Comcast Holdings;" NBCUniversal, LLC as "NBCUniversal Holdings;" and Sky Limited (formerly Sky plc) and its consolidated subsidiaries as "Sky".

This Annual Report on Form 10-K is for the year ended December 31, 2018. This Annual Report on Form 10-K modifies and supersedes documents filed before it.

The Securities and Exchange Commission ("SEC") allows us to "incorporate by reference" information that we file with it, which means that we can disclose important information to you by referring you directly to those documents. Information incorporated by reference is considered to be part of this Annual Report on Form 10-K. In addition, information that we file with the SEC in the future will automatically update and supersede information contained in this Annual Report on Form 10-K.

Our registered trademarks include Comcast, NBCUniversal and the Comcast and NBCUniversal logos. This Annual Report on Form 10-K also contains other trademarks, service marks and trade names owned by us, as well as those owned by others.

Part I

Item 1: Business

We are a global media and technology company with three primary businesses: Comcast Cable, NBCUniversal and Sky. We were incorporated under the laws of Pennsylvania in December 2001. Through our predecessors, we have developed, managed and operated cable systems since 1963. Through transactions in 2011 and 2013, we acquired NBCUniversal, and in the fourth quarter of 2018, we acquired Sky.

We present our operations for (1) Comcast Cable in one reportable business segment, referred to as Cable Communications; (2) NBCUniversal in four reportable business segments: Cable Networks, Broadcast Television, Filmed Entertainment and Theme Parks (collectively, the "NBCUniversal segments"); and (3) Sky in one reportable business segment.

Cable Communications: Consists of the operations of Comcast Cable, which is one of the nation's largest providers of high-speed internet, video, voice, and security and automation services ("cable services") to residential customers under the Xfinity brand; we also provide these and other services to business customers and sell advertising.

Cable Networks: Consists primarily of our national cable networks that provide a variety of entertainment, news and information, and sports content, our regional sports and news networks, our international cable networks, our cable television studio production operations, and various digital properties.

Broadcast Television: Consists primarily of the NBC and Telemundo broadcast networks, our NBC and Telemundo owned local broadcast television stations, the NBC Universo national cable network, our broadcast television studio production operations, and various digital properties.

Filmed Entertainment: Consists primarily of the operations of Universal Pictures, which produces, acquires, markets and distributes filmed entertainment worldwide; our films are also produced under the Illumination, DreamWorks Animation and Focus Features names.

Theme Parks: Consists primarily of our Universal theme parks in Orlando, Florida; Hollywood, California; and Osaka, Japan. In addition, along with a consortium of Chinese state-owned companies, we are developing a Universal theme park and resort in Beijing, China.

Sky: Consists of the operations of Sky, one of Europe's leading entertainment companies, which primarily includes a direct-to-consumer business, providing video, high-speed internet, voice and wireless phone services, and a content business, operating entertainment networks, the Sky News broadcast network and Sky Sports networks.

Our other business interests consist primarily of a wireless phone service, which we launched in mid-2017 under the Xfinity Mobile brand, and Comcast Spectacor, which owns the Philadelphia Flyers and the Wells Fargo Center arena in Philadelphia, Pennsylvania.

For financial and other information about our reportable business segments, refer to Item 7: Management's Discussion and Analysis of Financial Condition and Results of Operations and Note 2 to each of Comcast's and NBCUniversal's consolidated financial statements included in this Annual Report on Form 10-K.

Available Information and Websites

Comcast's phone number is (215) 286-1700, and its principal executive offices are located at One Comcast Center, Philadelphia, PA 19103-2838. NBCUniversal's phone number is (212) 664-4444, and its principal executive offices are located at 30 Rockefeller Plaza, New York, NY 10112-0015. Comcast and NBCUniversal's Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and any amendments to such reports filed with or furnished to the SEC under Sections 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), are available free of charge on the SEC's website at www.sec.gov and on Comcast's website at www.comcastcorporation.com as soon as reasonably practicable after such reports are electronically filed with the SEC. The information posted on our websites is not incorporated into our SEC filings.

Description of Our Businesses

Cable Communications Segment

Cable Services

Cable Communications offers high-speed internet, video, voice, and security and automation services in the United States individually and as bundled services at a discounted rate over its cable distribution system to residential and business customers. Cable Communications generates revenue primarily from residential and business customers that subscribe to its cable services, which are marketed individually and as bundled services, and from the sale of advertising. Cable Communications' bundled service offerings aim to meet the needs of the various segments of its customer base, ranging from high-speed internet services packaged with video or streaming services that include a limited number of channels, to a quad product bundle, consisting of four high-speed internet, video, voice, and security and automation services. We also offer a wireless phone service as a component of our bundled services, which is reported in Corporate and Other. Subscription rates and related charges vary according to the services and features customers receive and the types of equipment they use, and customers are typically billed in advance on a monthly basis. A portion of Cable Communications' residential customers are subject to minimum-term contracts for their cable services, which are typically 2 years in length. Substantially all business customers are initially under minimum-term contracts, which typically range from 2 to 5 years. Customers with minimum-term contracts may only discontinue service in accordance with the terms of their contracts.

As of December 31, 2018, our cable systems had 30.3 million total customer relationships, including 28.0 million residential customer relationships and 2.3 million business customer relationships, and passed more than 57 million homes and businesses. Homes and businesses are considered passed if we can connect them to our distribution system without further extending the transmission lines and are estimated based on the best available information. As of December 31, 2018, total customer relationships penetration of homes and businesses passed was 53%.

The Areas We Serve

The map below highlights Cable Communications' cable distribution footprint as of December 31, 2018 and the designated market areas ("DMAs") where there are 250,000 or more customer relationships. The locations that are balded represent the DMAs in which it operates that were also included in the top 25 U.S. television DMAs as of December 31, 2018.

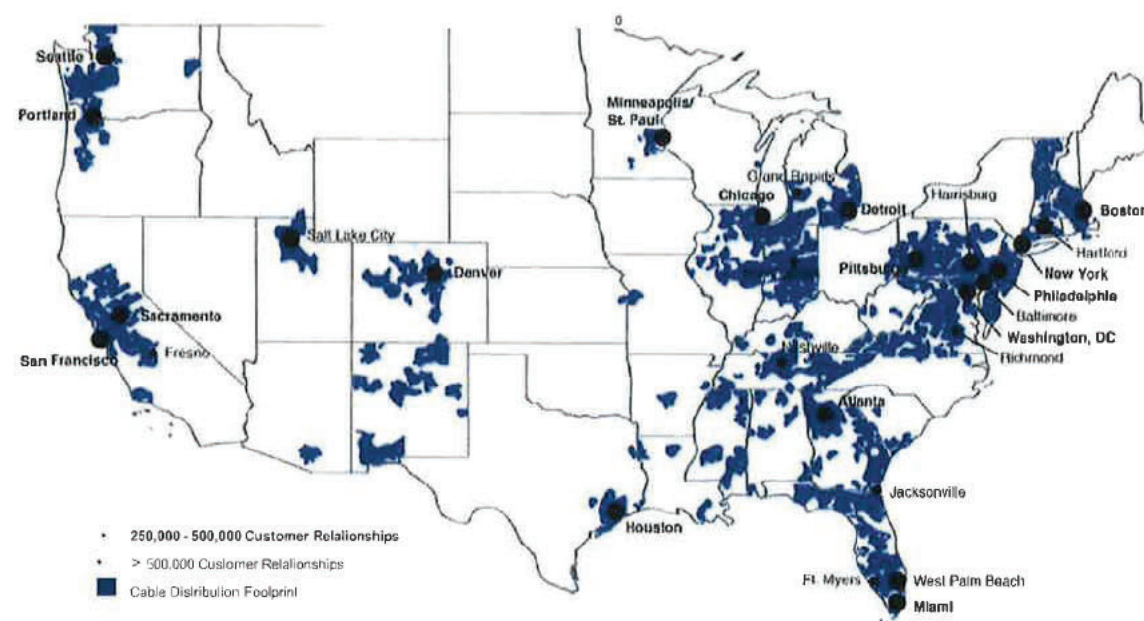


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High-Speed Internet Services

Cable Communications offers high-speed internet services with downstream speeds that range up to 1 gigabit per second ("Gbps") and fiber-based speeds that range up to 2 Gbps. These services include access to an online portal and mobile apps, which provide email, an address book, calendars and online security features.

Throughout its footprint, Cable Communications is deploying wireless gateways that combine a customer's wireless router, cable modem and voice adapter to improve the performance of multiple IP-enabled devices used at the same time within the home, provide faster internet speeds and create an in-home Wi-Fi network. Customers may personalize and manage their Wi-Fi network remotely with our xFi branded whole-home application and online portal, which includes viewing and changing their Wi-Fi password, identifying which devices are connected to their in-home network, setting parental controls and schedules, as well as other features, with our wireless gateways. Cable Communications continues to expand its network of residential, outdoor and business Wi-Fi hotspots.

As of December 31, 2018, 25.1 million residential customers subscribed to our high-speed internet services.

Video Services

Cable Communications offers a broad variety of video services that provide access to hundreds of channels depending on the customer's level of service. Levels of service typically range from a limited basic service with access to between 20 and 40 channels to a full service with access to more than 300 channels. Video services generally include programming provided by national broadcast networks, local broadcast stations, and national and regional cable networks, as well as government and public access programming. Packages that include extensive amounts of foreign-language programming and other specialty tiers of programming with sports, family and international themes are also offered. Cable Communications tailors its video services for particular programming preferences, demographics and geographic areas according to applicable local and federal regulatory requirements.

Video customers may also subscribe to premium networks, such as HBO, Showtime, Starz and Cinemax, that generally provide, without commercial interruption, movies, original programming, live and taped sporting events and concerts, and other features.

Video services generally include access to a video on demand service ("On Demand") and an interactive, on-screen program guide. Our On Demand service provides video customers with over 160,000 programming choices over the course of a month, including approximately 70,000 in high definition. A substantial portion of On Demand content is available at no additional charge. Other content, primarily movies and special-events programming, such as sporting events and concerts, can be rented or in some cases purchased to own digitally.

Cable Communications' HD service provides customers with high-resolution picture quality, improved audio quality and a wide-screen format through an HD set-top box, and includes a broad selection of HD programming choices, including major broadcast networks, national and regional cable networks, and premium networks. DVR services allow video customers to record and store programs and play them at whatever time is convenient, and they also provide the ability to pause and rewind live television. HD and DVR, individually or together, are referred to as advanced services.

Cable Communications' Internet Protocol ("IP") and cloud-enabled video platform, referred to as the XI platform, provides customers with integrated search functionality, including the use of a voice-activated remote control, personalized recommendations and access to, and integration of content from, certain third-party internet applications, such as Netflix, Amazon Prime Video and YouTube. Cloud DVR technology is offered in substantially all of our markets. Cloud DVR technology allows video customers to record programming via their set-top box using cloud-based servers and view those recordings on mobile devices via mobile apps.

Certain video customers have access to streaming services through mobile apps and an online portal that allow them to view certain live programming and On Demand content and to browse program listings. Depending on the customer's level of service, these services may require an additional monthly fee. Cable Communications also launched a streaming video cable service throughout its footprint that allows high-speed internet customers to purchase its video cable service and stream live programming to a computer, tablet, smartphone or other device for a monthly fee.

As of December 31, 2018, 21.0 million residential customers subscribed to our video services.

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Voice Services

Cable Communications offers voice services using interconnected Voice over Internet Protocol ("VoIP") technology. The voice services provide either unlimited or usage-based local and domestic long-distance calling and include options for international calling plans, voicemail, voicemail transcriptions, text messaging, caller ID and call waiting. For customers with high-speed internet services, voice services also include the ability to access and manage voicemail, text messaging and other account features through an on line portal or mobile apps.

As of December 31, 2018, 10.2 million residential customers subscribed to our voice services.

Business Services

Cable Communications offers a variety of products and services to businesses. The high-speed internet services for business services customers provide downstream speeds that range up to 1 Gbps and fiber-based speeds that range up to 10 Gbps. Small business services offerings primarily include high-speed internet services, as well as voice and video services, similar to those provided to residential customers. It also offers video monitoring solutions and cloud-based services that provide file sharing, online backup and web conferencing, among other features. Cable Communications also offers Ethernet network services that connect multiple locations and provide higher downstream and upstream speed options to medium-sized customers and larger enterprises, as well as advanced voice services, along with video solutions that serve hotels and other large venues. In addition, cellular backhaul services are provided to mobile network operators to help them manage their network bandwidth.

Recently, Cable Communications has expanded its enterprise service offerings to include a software-defined networking product for medium-sized and enterprise customers. Enterprise customers may also receive support services related to Wi-Fi networks, router management, network security, business continuity risks and other services. Enterprise service offerings are primarily provided to Fortune 1000 companies and other large enterprises with multiple locations both within and outside of Cable Communications' cable distribution footprint, where we have agreements with other companies to use their networks to provide coverage outside of its service areas.

Advertising

As part of Cable Communications' distribution agreements with cable networks, it generally receives an allocation of scheduled advertising time that is sold through its advertising business to local, regional and national advertisers. In most cases, the available advertising units are sold by our sales force. In some cases, it works with representation firms as an extension of its sales force to sell a portion of the advertising units allocated to it. Cable Communications also represents the advertising sales efforts of other multichannel video providers in some markets. In addition, it generates revenue from the sale of advertising on its digital platforms. It also provides technology, tools, data-driven services and marketplace solutions to customers in the media industry, which allow advertisers to more effectively engage with their target audiences.

Other

Cable Communications offers security and automation services that provide home monitoring services and the ability to manage other functions within the home, such as lighting and room temperature, through our on line portal, mobile apps or the Xi platform. As of December 31, 2018, 1.3 million residential customers subscribed to our security and automation services.

Technology

Cable Communications' cable distribution system uses a hybrid fiber-optic and coaxial cable network that we believe is sufficiently flexible and scalable to support its future technology requirements. This network provides the two-way transmissions that are essential to providing high-speed internet services, interactive video services such as On Demand, voice services, and security and automation services.

Cable Communications continues to focus on technology initiatives to design, develop and deploy next-generation media and content delivery platforms, such as the Xi platform and related cloud DVR technology, that use IP technology and its own cloud network servers to deliver video and advanced search capabilities, including through a voice-activated remote control, and that allow access to certain third-party internet applications.

Cable Communications continues to deploy wireless gateways to improve the performance of multiple IP-enabled devices used at the same time within the home, provide faster internet speeds and create an in-home Wi-Fi network. In addition, it continues to expand its network of residential, outdoor and business Wi-Fi hotspots.

Cable Communications is deploying 1 Gbps high-speed internet services that leverage DOCSIS 3.1 technology across its footprint and will continue to expand the capacity of its DOCSIS 3.1 infrastructure, including the implementation of DOCSIS FDX that will enable multi-gigabit services to be launched through its existing network.

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Sources of Supply

For high-speed internet services, Cable Communications licenses software products, such as email and security software, and content, such as news feeds for its online portal, from a variety of suppliers. Under its contracts with these suppliers, it generally pays on a fixed-fee basis, on a per subscriber basis in the case of software product licenses or on a video advertising revenue share basis in the case of content licenses.

To offer video services, Cable Communications licenses a substantial portion of programming from cable networks and broadcast networks, as well as from local broadcast television stations. It attempts to secure long-term programming distribution agreements with these programming providers. The fees associated with these programming distribution agreements are generally based on the number of customers who are able to watch the programming and the platforms on which the content is provided. It seeks to include in distribution agreements the rights to offer such programming through multiple delivery platforms, such as through its On Demand service, online portal, mobile apps and streaming services.

For voice services, software products such as voicemail and text messaging are licensed from a variety of suppliers under multiyear contracts. The fees paid are generally based on the consumption of the related services.

Cable Communications purchases from a limited number of suppliers a significant number of set-top boxes and certain other customer premise equipment, network equipment and services to provide cable services to residential and business customers.

Cable Communications uses two primary vendors to provide customer billing for cable services to residential and business customers.

Customer and Technical Services

Cable Communications' customer service call centers provide 24/7 call-answering capability, telemarketing and other services. Its technical services group performs various tasks, including installations, plant maintenance and upgrades to its cable distribution system.

Sales and Marketing

Cable Communications offers services directly to residential and business customers through its customer service call centers, retail stores, customer service centers, websites, door-to-door selling, telemarketing, and third-party outlets, as well as through advertising via direct mail, television and the internet.

NBCUniversal Segments

NBCUniversal is one of the world's leading media and entertainment companies that develops, produces and distributes entertainment, news and information, sports, and other content for global audiences, and owns and operates theme parks worldwide.

Cable Networks

NBCUniversal's Cable Networks segment consists of a diversified portfolio of national cable networks that provide a variety of entertainment, news and information, and sports content, regional sports and news networks, international cable networks, and cable television studio production operations. It also owns various digital properties, which include brand-aligned websites.

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The table below presents a summary of NBCUniversal's national cable networks and their advertising reach to U.S. households.

Cable Network	Approximate U.S. Households as of December 31, 2018 (in millions)(a)	Description of Programming
USA Network	90	General entertainment
E!	88	Entertainment and pop culture
Syfy	87	Imagination-based entertainment
MSNBC	86	News and information
CNBC	85	Business and financial news
Bravo	87	Entertainment, culture and arts
NBC Sports Network	83	Sports
Oxygen	72	Crime, mystery and suspense for women
Golf Channel	71	Golf competition and golf entertainment
Universal Kids	56	Children's entertainment
The Olympic Channel	33	Olympic sports events and Olympic-themed original content
CNBC World	31	Global financial reviews

(a) Household data is based on The Nielsen Company's December 2018 Household Universal Estimate report, which is derived from information provided by SNL Kagan. The Nielsen report includes estimates based on subscribers to both traditional and certain virtual multichannel video providers. The Nielsen report is not based on information provided by us and is included solely to permit comparisons between our cable networks and those operated by our peers.

The regional sports and news networks together serve more than 27 million households across the United States, including in markets such as Baltimore/Washington, Boston, Chicago, Philadelphia, Portland, Sacramento and San Francisco.

NBCUniversal's Cable Networks segment generates revenue primarily from the distribution and licensing of its programming and from the sale of advertising on its networks and digital properties. It markets and distributes cable network programming in the United States and internationally to multichannel video providers, including both traditional providers of linear programming and virtual providers who provide streaming services for linear programming. It also markets and distributes cable network programming to subscription video on demand services, such as those offered by Amazon, Hulu and Netflix. These distributors may provide its content on television, including via video on demand services, online and through mobile apps.

NBCUniversal's cable networks produce their own programs or acquire the rights to programming from third parties, including sports programming rights that are discussed below under the heading "Broadcast Television." NBCUniversal's cable television studio production operations identify, develop and produce original content for its own cable networks and third parties. It licenses its owned content, including programming from its cable network production operations, to cable and broadcast networks and subscription video on demand services. It also sells its owned content on standard-definition DVDs and Blu-ray discs (together, "DVDs") and through digital distribution services such as iTunes.

Broadcast Television

NBCUniversal's Broadcast Television segment operates the NBC and Telemundo broadcast networks, which together serve viewers and advertisers in all 50 states. The Broadcast Television segment also includes owned NBC and Telemundo local broadcast television stations, the NBC Universo national cable network, broadcast television studio production operations, and various digital properties, which primarily include brand-aligned websites. The Broadcast Television segment generates revenue primarily from the sale of advertising on its networks and digital properties, from the licensing of its programming, and from the fees received under retransmission consent agreements and associated fees received from NBC-affiliated and Telemundo-affiliated local broadcast television stations.

NBC Network

The NBC network distributes entertainment, news and sports programming that reaches viewers in virtually all U.S. television households through more than 200 affiliated stations across the United States, including NBCUniversal's 11 owned NBC-affiliated local broadcast television stations. The NBC network's programming library consists of rights of varying nature to more than 100,000 episodes of popular television content, including current and classic titles, unscripted programming, sports, news, long-form and short-form programming, and locally produced programming from around the world.

The NBC network produces its own programs or acquires the rights to programming from third parties. NBCUniversal has various contractual commitments for the licensing of rights to multiyear programming, primarily sports programming. The most significant sports programming commitments include the U.S. broadcast rights for the summer and winter Olympic Games through 2032 and

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agreements with the NFL to produce and broadcast a specified number of regular season and playoff games, including *Sunday Night Football* through the 2022-23 season and two Super Bowl games, the first of which was in 2018. It also has U.S. broadcast rights to a specified number of NHL games through the 2020-21 season, English Premier League soccer through the 2021-22 season, certain NASCAR events through 2024 and certain PGA TOUR and other golf events through 2030. NBCUniversal's sports programming agreements also include the rights to distribute content on its national cable networks, including the NBC Sports Network and Golf Channel, on its regional sports networks, and online, including through its mobile apps.

The broadcast television studio production operations develop and produce original content, including scripted and unscripted programming series and talk shows. This original content is licensed to broadcast networks, cable networks and local broadcast television stations owned by NBCUniversal and third parties, as well as to subscription video on demand services, and it is sold on DVDs and through digital distribution services both in the United States and internationally. The broadcast television studio production operations also produce first-run syndicated shows for local markets that are broadcast on local broadcast television stations in the United States on a market-by-market basis. They currently distribute some of their television programs after their initial broadcast, as well as older television programs from their library, to local broadcast television stations and cable networks in the off-network syndication market.

NBC Local Broadcast Television Stations

As of December 31, 2018, NBCUniversal owned and operated 11 NBC-affiliated local broadcast television stations, including stations in 8 of the top 10 general markets, that collectively reached approximately 32 million U.S. television households and represent approximately 29% of U.S. television households. In addition to broadcasting the NBC network's national programming, its local broadcast television stations produce news, sports, public affairs and other programming that addresses local needs and acquire syndicated programming from other sources.

Telemundo

Telemundo is a leading Hispanic media company that produces, acquires and distributes Spanish-language content in the United States and internationally. Telemundo's operations include the Telemundo network, its 28 owned local broadcast television stations and the NBC Universo national cable network.

The Telemundo network is a leading Spanish-language broadcast network featuring original telenovelas, movies, news, specials and sporting events. Telemundo develops original programming primarily through its production studio and also acquires the rights to programming from third parties. It holds the Spanish-language U.S. broadcast rights to FIFA World Cup soccer through 2026.

Telemundo Local Broadcast Television Stations

As of December 31, 2018, Telemundo owned 28 local broadcast television stations affiliated with the Telemundo network, including stations in 18 of the top 20 U.S. Hispanic markets, which collectively reached approximately 70% of U.S. Hispanic television households as of December 31, 2018. Telemundo also owns an independent television station in Puerto Rico.

Filmed Entertainment

NBCUniversal's Filmed Entertainment segment primarily produces, acquires, markets and distributes filmed entertainment worldwide. It also generates revenue from Fandango, a movie ticketing and entertainment business, from the sale of consumer products, from the production and licensing of live stage plays, and from the distribution of filmed entertainment produced by third parties.

Films are produced both by the Filmed Entertainment segment alone and jointly with other studios or production companies, as well as with other entities. NBCUniversal's films are produced primarily under the Universal Pictures, Illumination, DreamWorks Animation and Focus Features names. Films are marketed and distributed worldwide primarily through NBCUniversal's own marketing and distribution operations. The Filmed Entertainment segment also acquires distribution rights to films produced by others, which may be limited to particular geographic regions, specific forms of media or certain periods of time. The Filmed Entertainment segment's content includes theatrical films, direct-to-video movies and its film library, which is comprised of more than 5,000 movies in a variety of genres.

The Filmed Entertainment segment has entered into, and may continue to enter into, film cofinancing arrangements with third parties, including both studio and nonstudio entities, to jointly finance or distribute certain of our film productions. These arrangements can take various forms, but in most cases involve the grant of an economic interest in a film to an investor. Investors generally assume the full risks and rewards of ownership proportionate to their ownership in the film.

The majority of the Filmed Entertainment segment's produced and acquired films are initially distributed for exhibition in movie theaters. After their release in movie theaters, it sells and licenses films through various methods. It distributes its films globally by selling them on DVDs to retail stores, rental kiosks and subscription by mail services and by selling them through digital distribution services and video on demand services provided by multichannel video providers, including the Cable Communications

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segment. It also licenses its films, including selections from its film library, to cable, broadcast and premium networks, to subscription video on demand services, and to video on demand and pay-per-view services. The number of films licensed through subscription video on demand services is increasing as consumers continue to seek additional ways to view the Filmed Entertainment segment's content.

Theme Parks

NBCUniversal's Theme Parks segment consists primarily of Universal theme parks in Orlando, Florida; Hollywood, California; and Osaka, Japan. Universal Orlando includes two theme parks, Universal Studios Florida and Universal's Islands of Adventure, our water park, Volcano Bay, as well as Universal CityWalk Orlando, a dining, retail and entertainment complex. Universal Orlando also features on-site themed hotels in which we own a noncontrolling interest. The Universal theme park in Hollywood, California consists primarily of Universal Studios Hollywood, as well as Universal CityWalk Hollywood. The Universal theme park in Osaka, Japan consists primarily of Universal Studios Japan. NBCUniversal is also developing a Universal theme park in Beijing, China along with a consortium of Chinese state-owned companies. In addition, the Theme Parks segment licenses the right to use the Universal Studios brand name and other intellectual property, and also provides other services, to third parties that own and operate the Universal Studios Singapore theme park on Sentosa Island, Singapore.

The Theme Parks segment generates revenue primarily from ticket sales and guest spending at Universal theme parks. The Theme Parks segment licenses the right to use a substantial amount of intellectual property from third parties for its themed elements in rides, attractions and merchandising.

Sky Segment

Sky is one of Europe's leading entertainment companies operating in seven territories, including four of the five largest pay television markets in Western Europe: the United Kingdom ("U.K."), Italy, Germany and Spain. The majority of Sky's revenue is derived from its direct-to-consumer video business, which has 23.6 million retail customers, and primarily involves the distribution of a wide array of video channels to customers. Sky owns a diverse portfolio of pay television channels that offer entertainment, news, sports and movies, which are included in Sky's subscription video services and are also licensed through various distribution partnerships to third-party video providers that reach an additional 4 million households. Sky also provides high-speed internet, voice and wireless phone services in select countries.

Video Services

Sky's video services include a direct-to-home ("DTH") video service that is delivered through a combination of both satellite transmission and broadband connection and is marketed under the Sky brand in the U.K., Ireland, Italy, Germany and Austria. It also offers an over-the-top ("OTT") video service providing video content over the internet which is marketed as a distinct brand in these countries, as well as in Spain and Switzerland.

Sky's DTH video service is sold directly to customers in packages that include a diverse selection of Sky's owned entertainment and sports channels, channels owned by third parties and all local free-to-air public broadcasting channels. In addition to live-linear content, Sky's platform also provides access to On Demand and prior season libraries. Sky's video service offerings are tailored by country, with separate packages offered in each market. Basic packages include up to approximately 170 pay television channels in the U.K. and Ireland, approximately 84 channels in Italy, and approximately 44 channels in Germany and Austria. Specialty tiers for children's, sports, movie and HD programming are available for additional fees. Sky's video services also have pay-per-view programming for certain live sporting events and allow customers, as well as those without a subscription, to buy or rent programming for a fee.

Sky's DTH video service is primarily distributed to its customers through a set-top box video platform, including through Sky Q, which is Sky's next-generation video platform. Sky's customers have the ability to record several shows at once, to download content and recordings to watch offline on compatible devices, and for Sky Q households, to pause in one room and carry on in another. Sky Q customers are offered personalized content recommendations and the use of a voice activated remote control, as well as integrated access to content from other providers such as Netflix, Spotify, Vevo and YouTube.

Sky's OTT video service offers packages for purchase ranging from daily, weekly or monthly access for entertainment, sports, movies and children's programming. The entertainment package includes certain of Sky's owned premium channels and up to 500 TV On Demand programming series. The sports package provides access to Sky's owned sports channels and the movie package includes access to over 1,000 films. The children's package includes thousands of hours of child-friendly on demand programming.

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Television Channels

Sky's owned entertainment channels include Sky One, Sky Arts and Sky Atlantic in the U.K. and Ireland; Sky Atlantic, Sky Uno and Sky Arte in Italy; and Sky Atlantic and Sky 1 in Germany and Austria. It also owns premium sports channels under the Sky Sports brand and premium movie channels under the Sky Cinema brand, including family and children's movie channels. Sky also broadcasts several Sky branded free-to-air channels, including Sky News in the U.K. and Ireland, Sky TG24 in Italy and Sky Sport News in Germany.

Sky acquires the rights to programming for its channels from third parties, in some cases on an exclusive basis, and produces its own programming. Sky has various contractual commitments for the licensing of rights to multiyear programming, primarily sports programming and exclusive entertainment programming. Its most significant sports programming commitments include the U.K. broadcast rights for English Premier League soccer games through 2022; German broadcast rights to Bundesliga and Union des Associations Europeennes de Football ("UEFA") through 2021; and Italian broadcast rights to UEFA and Lega Nazionale Professionisti Serie A through 2021. Its most significant entertainment programming commitments include exclusive rights with HBO, Showtime, Warner Bros. and NBCUniversal. Sky is also increasingly creating and investing in original dramas that are broadcast simultaneously across all territories and sold to other markets through its syndication business.

In addition to including its channels as part of its video services, Sky derives revenue from the distribution of some of its channels on third-party platforms through both wholesale arrangements and arrangements with partners who distribute Sky's owned channels as agents to their respective customer bases.

Other Services

Sky offers high-speed internet and voice services in the U.K. and Ireland. Sky offers fiber-to-the-home ("FTTH"), fiber-to-the-cabinet and standard copper digital subscriber line ("DSL") broadband services, with average download speeds of 63 Mbps in the U.K. and 1 Gbps in Ireland. In the U.K., Sky uses a combination of its own core fiber network and wholesaling arrangements over third-party telecommunication providers' networks and also rents the "last mile" network from a third-party network operator. In Italy, Sky offers a bundled offering of its video service with high-speed internet and phone services through co-marketing agreements with several Italian broadband and telecommunications providers, and plans to launch FTTH services using Open Fiber to provide high-speed internet access and voice services later in 2019.

Sky offers wireless phone services to customers in the U.K. as a virtual mobile operator using its own core fiber network while renting Telefonica's radio access.

Other than those that subscribe to Sky's OTT video service, customers generally are required to subscribe for an initial contractual term of at least 1 year and may only discontinue service in accordance with the terms of their contracts. Subscription rates and related charges vary according to the services and features customers receive and the types of equipment they use, and customers are typically billed in advance on a monthly basis. Sky's video, high-speed internet, voice and wireless phone services may be sold individually or in bundles.

Advertising

Sky sells advertising and sponsorships across its owned channels and where it represents the sales efforts of third-party channels. Sky also sells targeted advertising in the U.K., Ireland and Italy, and generates revenue from on line and mobile advertising and advertising across its On Demand services.

Technology and Sources of Supply

For a majority of customers, Sky's DTH video platform is delivered via one-way digital satellite transmission for the distribution of linear television channels, augmented by a set-top box with local DVR storage and high speed two-way broadband connectivity to provide access to a broad range of On Demand and other services. The Sky platform also incorporates Wi-Fi connectivity for in-home distribution enabling wires-free multi-room consumption, and Sky has also developed a range of back-end and client software applications that provide customers with access to its content across multiple third-party devices and On Demand in and out of the home. Sky's OTT video service is delivered via the internet.

Sky relies on various telecommunications providers to deliver its video, high-speed internet, voice and wireless phone services to its customers. For example, Sky relies on satellites leased from third parties to provide most of its video services. In addition, pursuant to the current regulatory regime in the U.K. and Italy, Sky is able to access networks owned by third-party telecommunication providers for a fee to provide its high-speed internet and phone services in most cases, on regulated terms.

To offer video services, in addition to its owned channels, Sky licenses programming from third-party programming providers that operate television channels. Sky attempts to secure long-term programming distribution agreements with these programming providers. The fees associated with these programming distribution agreements are generally based on the number of customers who are able to watch the programming and the platforms on which Sky provides the content. Sky seeks to include in its distribution

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agreements the rights to offer such programming through multiple delivery platforms, such as through its On Demand services, on line portal, mobile apps and streaming services.

Customer and Technical Services

Sky's customer service operations are increasingly a digital first offering. Its technical services group performs various tasks, including installations, plant maintenance and upgrades to its distribution system.

Sales and Marketing

Sky offers direct-to-consumer services to retail customers through customer service call centers, customer service centers, websites, telemarketing, a limited number of retail outlets, as well as through advertising via direct mail, television and the internet.

Corporate and Other

We are also pursuing other business development initiatives, such as a wireless phone service, which we launched in the second quarter of 2017, using our virtual network operator rights to provide the service over Verizon's wireless network and our existing network of in-home and outdoor Wi-Fi hotspots. The wireless phone service is offered only as part of Comcast Cable's bundled service offerings to residential customers that subscribe to its high-speed internet service within its cable distribution footprint and may in the future also be offered to our small business customers on similar terms. The wireless phone service has success-based working capital requirements, primarily associated with the procurement of handsets, which customers are able to pay for upfront or finance interest-free over 24 months, and other equipment.

Our other business interests consist primarily of the operations of Comcast Spectacor, which owns the Philadelphia Flyers and the Wells Fargo Center arena in Philadelphia, Pennsylvania.

Competition

All of our businesses operate in intensely competitive, consumer-driven and rapidly changing environments and compete with a growing number of companies that provide a broad range of communications products and services, and entertainment, news and information products and services to consumers. Technological changes are further intensifying and complicating the competitive landscape and challenging existing business models. In particular, consumers are increasingly turning to online sources for viewing and purchasing content, which has and likely will continue to reduce the number of our video customers and subscribers to our cable networks even as it makes our high-speed internet services more valuable to consumers. In addition, the increasing number of entertainment choices available has intensified audience fragmentation, which has and likely will continue to adversely affect the audience ratings of our cable networks and broadcast television programming.

Cable Communications Segment

High-Speed Internet Services

Cable Communications competes with a number of companies offering internet services, including:

- wireline phone companies and other providers of wireline internet service
- wireless phone companies and other providers of wireless internet service
- municipal broadband networks and power companies
- satellite broadband providers

Phone companies such as AT&T, CenturyLink, Frontier and Verizon have built and are continuing to build fiber-based network infrastructure farther into their networks, which allows them to provide data transmission speeds that exceed those that can be provided with traditional DSL technology, and are offering these higher-speed services in many of our service areas. Certain companies that offer DSL service have increased data transmission speeds, lowered prices or created bundled services to compete with our high-speed internet services.

Certain other companies have launched FTTH networks that provide high-speed internet services in a limited number of areas in which we operate, and certain municipalities in our service areas are also building fiber-based networks.

Various wireless companies are offering internet services using a variety of network types, including 3G and 4G, and recently 5G, wireless broadband services and Wi-Fi networks. These networks work with devices such as smartphones, laptops, tablets and mobile wireless routers, as well as wireless data cards. A growing number of commercial venues, such as retail malls, restaurants

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and airports, also offer Wi-Fi service. Numerous local governments are also considering or actively pursuing publicly subsidized Wi-Fi and other internet access networks. The availability of these wireless offerings could negatively impact the demand for our high-speed internet services.

Video Services

Cable Communications competes with a number of different sources in the United States that provide news, sports, information and entertainment programming to consumers, including:

- DBS providers, including AT&T's DIRECTV and DISH Network, that transmit satellite signals to substantially all U.S. households to provide video programming and other information similar to our video services

- phone companies, including AT&T and Verizon, that have built and continue to build fiber-based networks that provide cable services similar to ours, which overlap a substantial portion of our service areas, and that in some cases offer bundled offerings that include wireless phone services

- online video distributors including:

 - virtual multichannel video providers who offer streaming services for linear programming that generally involve smaller packages of programming networks at prices lower than our traditional video service package offerings

 - subscription video on demand services, such as those offered by Amazon, Hulu and Netflix, that offer online services and devices that enable internet streaming and downloading of movies, television shows and other video programming

 - premium, cable and broadcast networks that provide content directly to consumers

- other providers that build and operate wireline communications systems in the same communities that we serve, including those operating as franchised cable operators

- satellite master antenna television systems that offer to their subscribers both improved reception of local broadcast television stations and much of the programming offered by our cable systems and generally serve MDUs, office complexes and residential developments

- other companies, such as local broadcast television stations, that provide multiple channels of free over-the-air programming, as well as video rental services and home entertainment and gaming products

Many of these competitors also have significant financial resources and have further intensified competition through mergers and acquisitions.

Voice Services

Cable Communications' voice services compete with wireline and wireless phone companies, including incumbent local exchange carriers ("ILECs") and competitive local exchange carriers ("CLECs"), and other internet-based and VoIP service providers. Certain phone companies, such as the ILECs AT&T and Verizon, have longstanding customer relationships, and extensive existing facilities and network rights-of-way. A few CLECs also have existing local networks and significant financial resources. In addition, we are increasingly competing with other phone service providers as customers replace traditional wireline phone services with wireless and internet-based phone services, such as Skype.

Business Services

Cable Communications' business services primarily compete with a variety of phone companies, including ILECs and CLECs and WAN Managed Service Providers. These companies either operate their own network infrastructure or use all or part of another carrier's network. It also competes with satellite operators who offer video services to businesses and VoIP companies that target businesses of all sizes. Our video monitoring services compete with companies that provide video surveillance services that use both traditional and cloud-based/digital solutions.

NBCUniversal Segments

Cable Networks and Broadcast Television

NBCUniversal's cable networks, broadcast networks and owned local broadcast television stations compete for viewers' attention and audience share with all forms of programming provided to viewers, including cable, broadcast and premium networks; subscription video on demand services; local broadcast television stations; home entertainment products; pay-per-view and video on demand services; online activities, such as social networking and viewing user-generated content; gaming products; and other forms of entertainment, news and information.

NBCUniversal's cable networks, broadcast networks and owned local broadcast television stations compete for the acquisition of programming and for on-air and creative talent with other cable and broadcast networks, local television stations, and subscription video on demand services. The market for programming is very competitive, particularly for sports programming, where the cost for such programming is significant.

NBCUniversal's cable networks compete with other cable networks and programming providers for carriage of their programming by traditional and virtual multichannel video providers and subscription video on demand services. Its broadcast networks compete with the other broadcast networks in markets across the United States to secure affiliations with independently owned television stations, which are necessary to ensure the effective distribution of broadcast network programming to a nationwide audience.

In addition, NBC Universal's cable television and broadcast television studio production operations compete with other production companies and creators of content for the acquisition of story properties, for creative, performing and technical personnel, and for distribution of, and consumer interest in, their content.

Filmed Entertainment

The filmed entertainment business competes for audiences for its films and other entertainment content with other major studios and, to a lesser extent, with independent film producers, as well as with alternative forms of entertainment. The competitive position of the filmed entertainment business primarily depends on the number of films produced, their distribution and marketing success, and consumer response. The filmed entertainment business also competes to obtain creative, performing and technical talent, including writers, actors, directors and producers, as well as scripts for films. The filmed entertainment business also competes with the other major studios and other producers of entertainment content for the exhibition of its films in theaters and the distribution of its films on premium networks and on subscription video on demand services.

Theme Parks

NBCUniversal's theme parks business competes with other multi-park entertainment companies. It also competes with other providers of entertainment, lodging, tourism and recreational activities. To help maintain the competitiveness of our theme parks, we have invested and continue to invest in existing and new theme park attractions, hotels and infrastructure.

Sky Segment

Sky faces competition from a broad range of companies engaged in media, entertainment and communications services in Europe, including cable operators, providers of both paid-for and free-to-air programming, service providers making use of new fiber optic networks, other satellite television providers, digital terrestrial television providers, telecommunications providers, other internet service providers, content aggregators, home entertainment products companies, companies developing new technologies and devices, and other suppliers and providers of news, information, sports and entertainment that deliver streaming and downloading online video services. Sky's competitive position may be negatively impacted by an increase in the capacity of, or developments in, the means of delivery which its competitors use to provide their services. Sky's competitors also include organizations that are publicly funded, in whole or in part, which fulfill a public service broadcasting mandate.

Sky competes for the acquisition of programming content with a wide range of providers, particularly for sports programming, where the cost for such programming is significant.

Advertising

The cable communications business, cable networks, broadcast networks, owned local broadcast television stations and Sky compete for the sale of advertising with other television networks and stations, as well as with all other advertising platforms, such as digital, radio and print media. The willingness of advertisers to purchase advertising from us may be adversely affected by lower audience ratings at NBCUniversal's cable networks, broadcast networks and owned local broadcast television stations and Sky's owned channels. Declines in audience ratings also can be caused by increased competition for the leisure time of viewers and by

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audience fragmentation resulting from the increasing number of entertainment choices available, including content from subscription video on demand services and other digital sources. In addition, advertising revenue is adversely affected by the growing use of technologies, such as DVRs and video on demand services, which give consumers greater flexibility to watch programming on a time-delayed or on-demand basis or to fast-forward or skip advertisements within programming.

Seasonality and Cyclicity

Each of our businesses is subject to seasonal and cyclical variations. In our Cable Communications segment, our results are impacted by the seasonal nature of residential customers receiving our cable services in college and vacation markets. This generally results in fewer net customer relationship additions in the second quarter of each year.

Revenue in our Cable Communications, Cable Networks and Broadcast Television segments is subject to cyclical advertising patterns and changes in viewership levels. Advertising revenue in the U.S. is generally higher in the second and fourth quarters of each year, due in part to increases in consumer advertising in the spring and in the period leading up to and including the holiday season. Advertising revenue in the U.S. is also cyclical, with a benefit in even-numbered years due to advertising related to candidates running for political office and issue-oriented advertising. Revenue in our Cable Networks and Broadcast Television segments fluctuates depending on the timing of when our programming is aired, which typically results in higher advertising revenue in the second and fourth quarters of each year.

Our revenue and operating costs and expenses (comprised of total costs and expenses, excluding depreciation and amortization expense and other operating gains) are cyclical as a result of our periodic broadcasts of major sporting events, such as the Olympic Games, which affect our Cable Networks and Broadcast Television segments, and the Super Bowl, which affects our Broadcast Television segment. In particular, our advertising revenue increases due to increased demand for advertising time and our distribution revenue increases in the period of these broadcasts. Our operating costs and expenses also increase as a result of our production costs for these broadcasts and the amortization of the related rights fees.

Revenue in our Filmed Entertainment segment fluctuates due to the timing, nature and number of films released in movie theaters, on DVDs, and through various other distribution platforms. Release dates are determined by several factors, including competition and the timing of vacation and holiday periods. As a result, revenue tends to be seasonal, with increases experienced each year during the summer months and around the holiday season. Content licensing revenue in our Cable Networks, Broadcast Television and Filmed Entertainment segments also fluctuates due to the timing of when our content is made available to licensees.

Revenue in our Theme Parks segment fluctuates with changes in theme park attendance that result from the seasonal nature of vacation travel and weather variations, local entertainment offerings and the opening of new attractions, as well as with changes in currency exchange rates. Our theme parks generally experience peak attendance during the spring holiday period, the summer months when schools are closed and the holiday season.

Our Sky segment results are impacted by the seasonal nature of residential customers receiving our DTH and OTT video services, including the start of the new soccer seasons and the Christmas holiday. This generally results in greater net customer relationship additions and higher subscriber acquisition costs in the fourth quarter of each year due to higher marketing expenses. Growth in Sky's wireless phone business is also similarly impacted by seasonal trends, as well as by the length of consumer cycles to upgrade their handsets.

Exclusive tier one sports rights, such as domestic and UEFA Champions League soccer, Formula 1, and English cricket, play a key role within Sky's wider content strategy. In Europe broadcasting rights for tier one sports are usually tendered through a competitive auction process, with the winning bidder or bidders acquiring rights over a three to five-year period. This creates some level of cyclicity for Sky, although the staggered timing of tier one sports rights auctions usually gives Sky time to react to any material changes in the competitive dynamics of the prevailing market.

The results of Sky's advertising business are subject to cyclical advertising patterns and changes in viewership levels. This includes seasonally higher audience levels in winter months and increased competition during major sporting events where public service broadcasters lease the rights, such as the Olympic Games and the FIFA World Cup™. The results for Sky's content business are also subject to fluctuations as a result of changes in timing, nature and quantity of original programming distributed to other markets.

Legislation and Regulation

The Communications Act of 1934, as amended (the "Communications Act"), and FCC regulations and policies affect significant aspects of our businesses that operate in the United States. These businesses are also subject to other regulation by federal, state and local authorities and to agreements we enter into with local cable franchising authorities. In addition, our international businesses are subject to the laws and the jurisdiction of the foreign regulatory authorities where they operate.

Legislators and regulators at all levels of government frequently consider changing, and sometimes do change, existing statutes, rules or regulations, or interpretations of existing statutes, rules or regulations, or prescribe new ones, any of which may significantly affect our businesses. These legislators and regulators have been active in considering rulemakings and legislation, and they, along with some state attorneys general and foreign governmental authorities, have also been active in conducting inquiries and reviews, regarding our services. Any future legislative, judicial, regulatory or administrative actions may increase our costs or impose additional restrictions on our businesses, some of which may be significant. The U.S. Congress may consider proposals to address communications issues, including whether it should rewrite the entire Communications Act to account for changes in the communications marketplace, whether it should enact new, pellucid open internet requirements, and whether it should fund new broadband infrastructure. We are unable to predict the outcome or effects of any of these potential actions or any other legislative or regulatory proposals on our businesses.

The following paragraphs summarize material existing and potential future legal and regulatory requirements affecting our businesses, although reference should be made to the Communications Act, FCC regulations and other legislation and regulations for further information.

Cable Communications Segment

High-Speed Internet Services

We provide high-speed internet services to our customers. Many of these services are subject to a number of regulatory obligations described below. As an internet service provider ("ISP"), we are also subject to a requirement to implement certain network capabilities to assist law enforcement in conducting surveillance of persons suspected of criminal activity. From time to time, the FCC considers imposing new regulatory obligations on ISPs. New broadband regulations, if adopted, may have adverse effects on our businesses.

Open Internet Regulations

In 2015, the FCC reclassified broadband internet access service as a "telecommunications service" subject to new open internet regulations and certain common carrier regulations under Title II of the Communications Act. These included, among other things, prohibiting ISPs from blocking access to lawful content; impairing or degrading lawful internet traffic on the basis of content, applications or services ("throttling"); prioritizing certain internet traffic in exchange for consideration ("paid prioritization"); and generally prohibiting ISPs from unreasonably interfering with or unreasonably disadvantaging consumers' ability to access and use the lawful internet content, applications, services or devices of their choosing or edge providers' ability to make lawful content, applications, services or devices available to consumers ("general conduct").

In 2017, the FCC reversed its prior classification of broadband internet access service as a Title II telecommunication service and classified it as an "information service" under Title I. In addition, it eliminated its prior no-blocking, no-throttling, no paid-prioritization and general conduct rules, stating that jurisdiction to regulate ISP conduct would rest at the FTC. In addition, it revised the transparency rule to require ISPs to disclose any blocking and throttling practices, and any paid or affiliated prioritization practices associated with their broadband offerings. We have disclosed that we do not block, throttle, or engage in affiliated or paid prioritization, and have committed not to block, throttle, or discriminate against lawful content. The FTC has authority to enforce these public commitments, and the FCC has authority to enforce compliance with its transparency rule. The Order also preempted any state and local laws and regulations that conflict with the FCC's deregulatory policies.

The FCC's 2017 decision is currently on appeal in federal court. In addition, several states have passed or introduced legislation, or have adopted executive orders, that impose Open Internet requirements in a variety of ways. Certain of these state initiatives have been challenged in court, and additional challenges may be filed. Such attempts by the states to regulate have the potential to create a patchwork of differing and/or conflicting state regulations. Congress may also consider legislation addressing these regulations and the regulatory framework for broadband internet access services. We cannot predict whether or how the rules might be changed, the impact of potential new legislation or the outcome of any litigation.

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Broadband Deployment/Infrastructure Initiatives

In 2018, the FCC adopted rules aimed at removing barriers to the deployment of broadband infrastructure, including the preemption of certain state and local laws or regulations that may unreasonably impede the deployment of wireless broadband networks. These orders are being challenged in federal court, and we cannot predict the outcome of the litigation. If the orders are upheld, some of these reforms may create regulatory imbalances that favor wireless services over wireline broadband services like our own. The FCC is considering similar reforms for wireline networks, including our networks, as part of its ongoing efforts to promote broadband deployment. We cannot predict whether or how any FCC rules might be changed, how state or local laws or regulations may be impacted, or how such changes may affect our business. In addition, as part of any federal infrastructure program, governmental subsidies or funding of additional internet broadband networks may be encouraged. We cannot predict how successful those efforts will be and how they might affect our business.

Municipally Owned Broadband Networks

A number of local municipalities operate municipally owned broadband networks and there may be further efforts by local governments to expand or create government-owned networks. Certain states have enacted laws that restrict or prohibit local municipalities from operating municipally owned broadband networks, and there may be efforts in other state legislatures to restrict the development of government-owned networks, although some may choose to ease or facilitate such networks. We cannot predict how successful those efforts will be and how they might affect our business.

Video Services

Program Carriage

FCC regulations prohibit us from unreasonably restraining the ability of an unaffiliated video programming network to compete fairly by discriminating against the network on the basis of its non-affiliation in the selection, terms or conditions for its carriage. In addition, Cable operators and other multichannel video programming distributors ("MVPDs") in the United States are prohibited from requiring as a condition of carriage a financial interest in, or exclusive distribution rights for, a video programming network. We have been involved in program carriage disputes at the FCC and may be subject to new complaints in the future.

Must-Carry/Retransmission Consent

Cable operators are required to carry, without compensation, programming transmitted by most local commercial and noncommercial broadcast television stations. As an alternative to this "must-carry" requirement, local broadcast television stations may choose to negotiate with the cable operator for "retransmission consent," under which the station gives up its must-carry rights and instead seeks to negotiate a carriage agreement with the cable operator, which frequently will involve payments to the station. We currently pay certain local broadcast television stations in exchange for their required consent for the retransmission of the stations' broadcast programming to our video services customers and expect to continue to be subject to demands for increased payments and other concessions from local broadcast television stations. In 2017, the FCC adopted an order relaxing the broadcast media ownership rules and is considering additional revisions to the rules, which could lead to further broadcast television station consolidation. The FCC also adopted an order authorizing voluntary implementation of a new broadcast technical standard that permits broadcasters to seek carriage of signals using the new standard through retransmission consent. Together, these actions may impact retransmission consent negotiations and the fees we pay broadcasters. For information on must-carry and retransmission consent issues relating to our broadcast television business, see "NBCUniversal Segments - Broadcast Television" below and refer to the "Must-Carry/Retransmission Consent" discussion within that section.

Pricing and Packaging

We are subject to rate regulation of charges for certain of our video service, equipment and installation in certain communities in Massachusetts, but all of the other areas we serve have unregulated prices. In addition to the FCC's rate regulation rules, certain state entities monitor and may challenge the marketing and advertising of our services. For example, in 2016, the Washington State Attorney General filed a lawsuit, currently being litigated in state court, alleging that our service protection plan, an optional plan that protects customers from incurring charges for service visits to diagnose and repair installed in-home wiring for residential cable services, violates state consumer protection laws. We cannot predict the outcome of this litigation or whether other states may file similar suits.

Pole Attachments

The FCC regulates the rates, terms and conditions that most pole-owning utility companies charge cable operators and telecommunications carriers for allowing attachments to their poles. States are permitted to preempt FCC jurisdiction and regulate the rates, terms and conditions of attachments themselves, and many states in which we operate have done so and have generally followed the FCC's pole attachment rate standards, which set rates for telecommunications service pole attachments to levels at or near the rates for cable service attachments. The rates, terms and conditions of some municipal and cooperative pole owners, however, are not regulated by the FCC or states.

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Franchising

Cable operators generally operate their cable systems under nonexclusive franchises granted by local or state franchising authorities. While the terms and conditions of franchises vary materially from jurisdiction to jurisdiction, franchises typically last for a fixed term, obligate the franchisee to pay franchise fees and meet service quality, customer service and other requirements, and are terminable if the franchisee fails to comply with material provisions. Franchising authorities also may establish reasonable requirements for public, educational and governmental access programming. The Communications Act also contains provisions governing the franchising process, including renewal procedures designed to protect incumbent franchisees against arbitrary denials of renewal, including unreasonable renewal conditions. We believe that our franchise renewal prospects are generally favorable but cannot guarantee the future renewal of any individual franchise. In response to a remand by the U.S. Court of Appeals for the Sixth Circuit, the FCC has proposed to clarify that in-kind contribution requirements in a cable franchise are generally subject to the statutory five percent cap on franchise fees and reaffirm that state and local authorities are barred from imposing duplicative franchise and/or fee requirements on the operation of cable systems to provide non-cable services. We cannot predict the outcome of this proceeding or its impact on our businesses.

Voice Services

We provide voice services using VoIP technology. The FCC has adopted a number of regulations for providers of nontraditional voice services such as ours, including regulations relating to privacy of customer proprietary network information, local number portability duties and benefits, disability access, E911, law enforcement assistance, outage reporting, Universal Service Fund contribution obligations, rural call completion, back-up power, service discontinuance and certain regulatory filing requirements. The FCC has not yet ruled on whether VoIP services such as ours should be classified as an "information service" or a "telecommunications service" under the Communications Act. The classification determination is important because telecommunications services are regulated more extensively than information services. Recently, the U.S. Court of Appeals for the Eighth Circuit held that VoIP is an information service and preempted state regulation of VoIP, but that ruling is limited to the seven states located in the Eighth Circuit. State regulatory commissions and legislatures in other jurisdictions may continue to consider imposing regulatory requirements on our voice services as long as the regulatory classification of VoIP remains unsettled at the federal level.

Voice Interconnection

Because the FCC has not determined the appropriate classification of our voice services, providers of VoIP services typically either secure CLEC authorization or obtain interconnection to traditional wireline phone company networks by contracting with an existing CLEC, which has the right, as a telecommunications carrier, to request and obtain interconnection with the traditional wireline phone companies. We have arranged for such interconnection rights through affiliated CLECs. If a regulatory or judicial authority were to deny our ability to interconnect through one of our affiliated CLECs, our ability to provide voice services and compete in the area in question would be negatively impacted. The FCC regulates the arrangements by which telecommunications carriers compensate one another for exchanged traffic and has affirmed the right of CLECs to collect intercarrier compensation when providing interconnection for VoIP providers.

Wireless Service

In 2017, we began offering a wireless voice and data service. We offer this service using our mobile virtual network operator ("MVNO") rights to provide the service over Verizon's wireless network. MVNOs are subject to many of the same FCC regulations as facilities-based wireless carriers (e.g., E911 services, local number portability, etc.), as well as certain state or local regulations. The FCC or other regulatory authorities may adopt new or different regulations for MVNOs and/or mobile broadband providers in the future, or impose new taxes or fees, which could adversely affect our wireless phone service offering or our business generally.

Universal Service

The federal Universal Service program generally requires us and other phone service providers to pay a fee based on revenue from interstate and international services into a fund used to subsidize the provision of voice services and broadband-capable voice networks in high-cost areas, the provision of voice services to low-income consumers, and the provision of internet, voice and telecommunications services to schools, libraries and certain health care providers. Some states also have analogous programs that support service in high-cost areas or to low-income consumers.

The FCC has shifted its focus away from supporting traditional telephone service, and toward subsidizing deployment of broadband-capable networks and broadband facilities. This shift could assist some of our competitors. For example, the FCC has revised the high-cost federal Universal Service mechanism to support broadband-capable networks and substantially has revised the program that provides Universal Service support for services to schools and libraries to begin phasing out support for voice services, with greater support directed to broadband services and the deployment of Wi-Fi networks. Similarly, the FCC has expanded its Lifeline subsidy program for low-income consumers to include broadband services in addition to voice services. The FCC or Congress

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may revisit these subsidy programs and how they are funded. We cannot predict whether or how these programs will be changed in the future.

NBCUniversal Segments

Cable Networks

Program Access

The Communications Act and FCC regulations generally prevent cable networks affiliated with cable operators from favoring cable operators over competing MVPDs. The FCC and Congress have considered proposals that would require companies that own multiple cable networks to make each of their networks available individually when negotiating distribution agreements with MVPDs and potentially with online video distributors. We currently offer our cable networks both on a bundled basis and, when requested, individually. We have been involved in program access disputes at the FCC and may be subject to new complaints in the future.

Children's Programming

Under federal regulations, the amount of commercial content that may be shown on cable networks, broadcast networks and broadcast television stations during programming originally produced and broadcast primarily for an audience of children under 13 years of age is limited, and certain television station programming must serve the educational and informational needs of children under 17 years of age. In 2018, the FCC initiated a proceeding to review its regulations regarding children's programming, and we cannot predict the outcome of this proceeding.

Broadcast Television

Licensing

Local broadcast television stations may be operated only in accordance with a license issued by the FCC upon a finding that the grant of the license will serve the public interest, convenience and necessity. The FCC grants broadcast television station licenses for specific periods of time, which may be renewed with or without conditions. The FCC recently renewed all of our broadcast television station licenses without conditions. Although our licenses have been renewed, there can be no assurance that we will always obtain renewal grants.

Local Television Ownership

The FCC recently revised its rules to generally permit a licensee to own up to two broadcast stations in the same OMA as long as at least one of the stations is not among the top four-ranked stations in the OMA based on audience share. In addition, the new rules permit a licensee to own up to two stations ranked in the top four in a OMA based on a case-by-case analysis of the circumstances surrounding the proposed combination. These recent changes are subject to judicial appeal. These ownership restrictions do not apply if the signal coverage of the stations involved do not overlap in the same market. As part of its 2018 quadrennial review of media ownership regulations, the FCC raised questions about the two-station-per-OMA ownership limit and the criteria by which top-four combinations should be assessed.

National Television Ownership

The Communications Act and FCC regulations limit the number of broadcast television stations one entity may own or control nationally. No entity may have an attributable interest in broadcast television stations that reach, in the aggregate, more than 39% of all U.S. television households. The FCC also has a rule that affords a 50% discount to UHF stations (channels 14 and above) in calculating the extent of an individual station owner's holdings under the national cap. The FCC has initiated a proceeding to consider whether to retain the 50% discount and whether to modify the national television ownership limit. Our owned broadcast television station reach does not exceed the current limit even without considering the discount for UHF stations, but elimination of the 50% discount without an increase in the 39% national cap would place us closer to the national cap and limit our flexibility to acquire stations in the future.

Foreign Ownership

The Communications Act generally limits foreign ownership in a broadcast television station to 20% direct ownership and 25% indirect ownership, although the limit on indirect ownership can be waived if the FCC finds it to be in the public interest.

Dual Network Rule

Each of the four major broadcast television networks -ABC, CBS, Fox and NBC - is prohibited from being under common ownership or control with another of the four. As part of its 2018 quadrennial review of media ownership regulations, the FCC raised questions about whether the dual network rule remains necessary in the public interest.

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Must Carry/Retransmission Consent

Every three years, each commercial television station must elect for each cable system in its OMA either must carry or retransmission consent. A similar regulatory scheme applies to satellite providers. For the current three-year period, which commenced on January 1, 2018, all of our owned NBC broadcast television stations and our owned Telemundo broadcast television stations elected retransmission consent.

Indecency

A federal statute and FCC regulations prohibit the broadcast of obscene material on television stations at any time and indecent or profane material between the hours of 6 a.m. and 10 p.m. From time to time, we have received and may receive in the future letters of inquiry from the FCC prompted by complaints alleging that certain programming on our owned local broadcast television stations included indecent or profane material.

Filmed Entertainment

Our filmed entertainment business is subject to "trade practice laws" in effect in 25 states and Puerto Rico relating to theatrical distribution of motion pictures. In countries outside the United States, a variety of existing or contemplated laws and regulations may affect our ability to distribute and license motion picture and television products, as well as consumer merchandise products. The ability of countries to deny market access or refuse national treatment to products originating outside their territories is regulated under various international agreements.

Theme Parks

Our theme parks are subject to various regulations, including laws and regulations regarding environmental protection, privacy and data protection, consumer product safety and theme park operations, such as health, sanitation, safety and fire standards, as well as liquor licenses.

Sky Segment

Sky is subject to regulation primarily under Austrian, German, Irish, Italian, U.K. and European Union ("EU") law, including telecommunications- and media-specific regulation described below, as well as regulation under generally applicable laws, such as competition, consumer protection, data protection and taxation. Sky is currently, and may be in the future, subject to proceedings or investigations from regulatory and antitrust authorities in the jurisdictions in which it operates. In addition, in connection with our acquisition of Sky, we have made certain legally binding commitments with respect to Sky's operations, including for example, to maintain annual funding for Sky News in an amount no lower than Sky News' 2017 fiscal year expenditures, as adjusted by inflation, until 2029.

Platform Services

In the U.K., under the U.K. Communications Act of 2003, Sky is required to ensure that agreements to provide electronic program guide ("EPG") and conditional access ("CA") services to other programming providers are on fair, reasonable, and non-discriminatory terms, among other things, so that those providers' content is available on Sky's satellite platform via the EPG on Sky's set-top boxes. Sky also has voluntarily committed to Ofcom, the U.K. regulator, to provide access control services to third parties that enable them to provide interactive services. Sky is subject to similar EPG and CA obligations in Germany under the Interstate Treaty on Broadcasting and Telemedia, as amended by the 20th State Broadcasting Amendment Treaty (the "RStV").

Television Channels

Sky holds a number of licenses and authorizations for its portfolio of pay TV channels. In the U.K., as a broadcast licensee, Sky is subject to various codes issued by Ofcom affecting the content and delivery of these channels. These codes include, for example, Ofcom's Broadcasting Code, the Code on the Scheduling of Television Advertising, and the Cross-Promotion Code. Sky also holds various nationwide broadcast licenses in Germany, and must comply with the RStV; the applicable laws of the federal state in Germany that has granted the broadcasting license; and with the Interstate Treaty on the Protection of Minors. These include regulations regarding media concentration, television advertising, accessibility, airtime for commercials and teleshopping, sponsorship, and the requirement for a clear distinction between program content and advertising. Sky is also a holder of broadcasting licenses in Austria and is subject to broadcast regulations under the Austrian Act on Audiovisual Media Services, such as regulations governing content, advertisements, and the protection of children. In addition, Sky is subject to Austrian rules on media plurality, which prohibit broadcasters in Austria from exceeding certain media coverage thresholds. In Italy, Sky must comply with various requirements regarding broadcast authorizations, including provisions that protect media plurality, obligations requiring broadcasters to guarantee equal treatment between political parties during elections, advertising limits, the protection of children and parental controls, the protection of IP rights, and consumer protections. NBCUniversal's international television channels are subject to similar regulations in jurisdictions in which they operate.

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High-Speed Internet and Voice Services

Sky provides broadband and voice services in the U.K. and Ireland pursuant to wholesale distribution agreements that third-party broadband and telecommunications companies are required to make available under applicable laws in those jurisdictions. Material changes to these regulations could affect Sky's business. Sky is also subject to EU open internet regulations, which prohibit the blocking, throttling, or discrimination of online content, applications, and services and require ISPs to disclose their traffic management, throughput limitations, and other practices impacting quality of service in customer contracts.

Other Areas of Regulation

Intellectual Property

Copyright, trademark, unfair competition, patent, trade secret and other proprietary-rights laws of the United States and other countries help protect our intellectual property rights. In particular, unauthorized copying, distribution, and piracy of programming and films over the internet, through devices, software and websites, and through counterfeit DVDs, and other platforms, interfere with the market for copyrighted works and present challenges for NBCUniversal's cable networks, broadcast television and filmed entertainment businesses and Sky's businesses. We have actively engaged in the enforcement of our intellectual property rights and likely will continue to expend substantial resources to protect our content. Although many legal protections exist to combat such practices, the extent of copyright protection and the use of technological protections are controversial. Modifications to existing laws, a weakening of these protections, or a failure of existing laws, in the United States or internationally, to adapt to new technologies could have an adverse effect on our ability to license and sell our programming.

U.S. copyright laws also require that our video business contribute a percentage of revenue to a federal copyright royalty pool in exchange for retransmitting copyrighted material in broadcast signals under a cable compulsory license and that we pay standard industry licensing fees for the public performance of music in the programs we create or distribute. The cable compulsory license royalties we pay are subject to audit by copyright owners, and we cannot predict how any disputes regarding our royalty calculations will impact those fees in the future. In addition, the Copyright Office has initiated a rulemaking to consider how royalty payments should be calculated under the cable compulsory license. We cannot predict the outcome of this rulemaking, but there is a risk that it could result in higher royalty payments. It is also possible that Congress will eliminate or modify the cable compulsory license in the future, which could impact the retransmission of broadcast signals over cable systems. The music fees we pay are typically renegotiated when we renew licenses with performing rights organizations. The landscape for music licensing is constantly changing. New performing rights organizations have formed to seek higher royalties for the use of music they represent, and other organizations seek royalties for performance rights for which no compensation is currently required. We cannot predict how renegotiation of cultural rights and future changes in music royalties will affect the music fees that we pay.

Privacy and Data Security Regulation

The Communications Act generally restricts cable operators' nonconsensual collection and disclosure to third parties of cable customers' personally identifiable information, except for rendering service, conducting legitimate business activities related to the service, and responding to legal requests. We are also subject to various state and federal regulations that provide privacy protections for customer proprietary network information related to our voice services.

The FTC generally exercises oversight of consumer privacy protections using its enforcement authority over unfair and deceptive acts or practices.

In addition, certain states have exercised oversight of consumer privacy protections in their respective states. The FTC and state attorney generals regularly initiate efforts to update or enforce transparency requirements about the collection and use of consumer information, which may require ongoing review of new and rapidly evolving technologies and methods for delivering content and advertising to ensure that appropriate notice is given to consumers and consent is obtained where required.

In May 2018, the EU's General Data Protection Regulation ("GDPR"), which broadly regulates the processing of personal data collected from individuals in the EU regardless of whether the processing actually takes place in the EU, came into effect. GDPR and the Member States' legislation implementing the GDPR, affect our ability to process certain personal data. We cannot predict how regulators will interpret the scope or requirements of GDPR.

Privacy and data security legislation remained a priority issue in 2018 in many U.S. states and localities, as well as foreign jurisdictions outside of the EU. For example, California enacted the California Consumer Privacy Act ("CCPA"), which broadly regulates the sale of the consumer information of California residents and grants California residents certain rights to, among other things, access and delete data about them in certain circumstances. CCPA goes into effect on January 1, 2020, and compliance with the CCPA may increase the cost of providing our services in California. Other states are considering similar proposals. Such attempts by the states to regulate have the potential to create a patchwork of differing and/or conflicting state regulations.

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Additionally, there are pending federal legislative proposals that, if enacted, could create new consumer privacy protections or impose new requirements on entities that collect and use consumer personal information, including us. We cannot predict whether such legislation will be enacted at the federal or state level and, if so, the impact of any such laws on our business.

We are also subject to stringent data security and data retention requirements that apply to website operators and on-line services directed to children under 13 years of age, or that knowingly collect or post personal information from children under 13 years of age. In addition, we are subject to state and federal laws and regulations regarding data security that primarily apply to any person's sensitive personal information that could be used to commit identity theft. Most states have security breach notification laws that generally require a business to give notice to consumers and government agencies when certain information has been disclosed to an unauthorized party due to a security breach, and the FCC has adopted security breach rules for voice services. Several states have also enacted general data security requirements to safeguard consumer information, including the proper disposal of consumer information.

We are also subject to state and federal "do not call" laws regarding telemarketing and state and federal laws regarding unsolicited commercial emails, as well as FCC regulations relating to automated telemarketing calls, texts and SMS messages.

FCC Spectrum Auction and Repacking

In 2017, as a result of an incentive auction conducted by the FCC to repurpose television broadcast spectrum for mobile broadband use, NBCUniversal sold broadcast spectrum rights associated with television stations in three of its markets. Those stations vacated their sold spectrum but continue to operate by sharing channels with other NBCUniversal stations in those markets. The FCC assigned 23 of NBCUniversal's other television stations that did not sell their spectrum rights to new channels; those stations are in the process of transitioning to their new channels in a post-auction repacking process that is scheduled to conclude in the third quarter of 2020, and the FCC will reimburse those stations for a portion of their reasonable relocation costs (subject to a nationwide aggregate limit of \$2.75 billion). As a result of the repacking process, Comcast will have to make changes to its cable systems to accommodate broadcasters on their newly assigned channels, and will be reimbursed by the FCC for a portion of those related costs (subject to a nationwide aggregate limit of \$2.75 billion).

In addition, we acquired 73 new mobile broadband licenses in this auction for \$1.7 billion. We will be obligated to meet certain regulatory requirements concerning the use of these licenses over the coming years.

FCC SG Spectrum Proceedings and Other Wireless Laws and Regulations

In multiple regulatory proceedings, the FCC is currently considering establishing and/or modifying its rules to make available additional spectrum that will likely be used to provide the next generation of commercial wireless broadband services, commonly referred to as SG services. Some of this spectrum is currently used for satellite delivery of broadcast and cable programming to cable headends and broadcast stations, including our own, and there is a risk that such satellite delivery could be disrupted if the FCC were to adopt certain proposals. In addition, there is potential for new legislation or FCC regulations that could enable wireless providers to offer video and other services over their networks subject to different, and possibly fewer, regulatory obligations than the services we provide. We cannot predict what rules or legislation, if any, will ultimately be adopted or how any such changes would affect our businesses.

State and Local Taxes

Some states and localities have imposed or are considering imposing, through both legislative and administrative channels, new or additional taxes or fees on, or limiting or eliminating incentives or credits earned or monetized by, the businesses operated by our Cable Communications and NBCUniversal segments, or imposing adverse methodologies by which taxes, fees, incentives or credits are computed, earned or monetized. These include combined reporting or other changes to general business taxes, central assessments for property tax and taxes and fees on the businesses operated or services provided by our Cable Communications and NBCUniversal segments. In some situations, DBS providers and other competitors that deliver their services over a high-speed internet connection do not face the same state tax and fee burdens. Congress has also considered, and may consider again, proposals to bar or limit states from imposing taxes on these DBS providers or other competitors that are equivalent to the taxes or fees that we pay. The Internet Tax Freedom Act, which prohibits most states and localities from imposing sales and other taxes on our internet access charges, was made permanent by 2016 legislation; however, some jurisdictions have or may assert that certain taxes akin to right-of-way fees are not preempted by Internet Tax Freedom Act.

Environmental Matters

Certain of our business operations are subject to environmental laws and regulations since they involve air emissions, wastewater discharges and the use, disposal and cleanup of toxic and hazardous substances. Any failure to comply with environmental requirements could result in monetary fines, civil or criminal sanctions, third-party claims or other costs or liabilities. Environmental requirements have become more stringent over time, and pending or proposed new regulations could impact our operations or costs.

U.K. Exit from the European Union

The telecommunications and media regulatory framework applicable to Sky and NBCUniversal's businesses in the U.K. and the EU may be subject to greater uncertainty in the event that the U.K. leaves the EU. We cannot predict the extent of any potential changes to the regulatory framework involving U.K. and EU regulation of telecommunications and media, or changes to certain mutual recognition arrangements for media and broadcasting.

Other Regulations

U.S. states and localities, and various regulatory authorities actively regulate other aspects of our businesses, including accessibility to our video and voice services and broadcast television programming for people with disabilities, customer service standards, inside wiring, cable equipment, leased access, loudness of commercial advertisements, advertising, Emergency Alert System, equal employment opportunity and other employment-related laws, lottery programming, recordkeeping and public file requirements, regulatory fees and technical standards relating to the operation of cable systems and television stations. In addition, our international businesses are subject to various international regulations, including those that cover television broadcasting, programming and advertising. We are occasionally subject to enforcement actions and investigations at the FCC and other federal, state, and local agencies, as well as foreign governments and regulatory authorities, which can result in us having to pay fines to the agency or being subject to other sanctions.

Employees

As of December 31, 2018, we had approximately 184,000 full-time and part-time employees calculated on a full-time equivalent basis. Of these employees, approximately 88,000, 64,000 and 30,000 were associated with our cable communications business, our NBCUniversal businesses and our Sky business, respectively. We also use freelance and temporary employees in the normal course of our business.

Caution Concerning Forward-Looking Statements

The SEC encourages companies to disclose forward-looking information so that investors can better understand a company's future prospects and make informed investment decisions. In this Annual Report on Form 10-K, we state our beliefs of future events and of our future financial performance. In some cases, you can identify these so-called "forward-looking statements" by words such as "may," "will," "should," "expects," "believes," "estimates," "potential," or "continue," or the negative of these words, and other comparable words. You should be aware that these statements are only our predictions. In evaluating these statements, you should consider various factors, including the risks and uncertainties listed in "Risk Factors" and in other reports we file with the SEC.

Additionally, we operate in a highly competitive, consumer-driven and rapidly changing environment. This environment is affected by government regulation; economic, strategic, political and social conditions; consumer response to new and existing products and services; technological developments; and, particularly in view of new technologies, the ability to develop and protect intellectual property rights. Our actual results could differ materially from our forward-looking statements as a result of any of such factors, which could adversely affect our businesses, results of operations or financial condition. We undertake no obligation to update any forward-looking statements.

Item 1A: Risk Factors

Our businesses currently face a wide range of competition, and our businesses and results of operations could be adversely affected if we do not compete effectively.

All of our businesses operate in intensely competitive, consumer-driven and rapidly changing environments and compete with a growing number of companies that provide a broad range of communications products and services and entertainment, news and information content to consumers. Online video distribution platforms are further intensifying and complicating the competitive landscape and influencing consumer behavior, which is discussed in the risk factor immediately below under the heading "Changes in consumer behavior driven by online video distribution platforms for viewing content could adversely affect our businesses and challenge existing business models."

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Competition for Cable Communications' cable services consists primarily of phone companies with fiber-based networks and DBS providers that typically offer features, pricing and packaging for services comparable to ours. Some of these competitors are also offering smaller packages of channels at price points lower than our standard packages, both through traditional and online video distribution platforms, which could cause us to offer more customized programming packages that may be less profitable. Consolidation between phone companies (which are also wireless distributors) and content providers in the United States provides competitors with the ability to offer free or lower cost streaming services for viewing their content, potentially on an exclusive basis, through unlimited data-usage plans for their internet or wireless phone services. Additional companies, some with significant financial resources, continue to enter or are seeking to enter the video distribution market, either by offering OTT streaming services or selling devices that aggregate viewing of various OTT services.

Sky faces competition in video, high-speed internet and voice services from cable and/or telecommunications providers in each of its European markets. More providers in Europe now offer customers bundles of services, which has increased competition. The intensity of this competition has increased in recent years, including as a result of OTT streaming services.

Cable Communications' and Sky's high-speed internet services compete primarily against phone companies with fiber-based networks offering speeds and pricing comparable to ours. Wireless internet services, such as 4G and 5G wireless broadband services, satellite-delivered internet services and Wi-Fi networks, and devices such as smartphones, tablets, wireless data cards, and mobile wireless routers that connect to such devices, also may compete with our high-speed internet services, particularly as wireless technology evolves. Some municipalities in the United States own and operate their own broadband networks, and additional municipalities may do so as well. Cable Communications' and Sky's wireline voice services are facing increased competition as customers replace wireline phones with wireless and internet-based phone services.

We continue to seek ways to enhance the value of Cable Communications' cable services network, such as by growing high-speed internet services and business services and by launching additional services, such as our security and automation services. Sky also is seeking ways to enhance the value of its services. There can be no assurance that we can execute on these and other initiatives in a manner sufficient to grow or maintain our Cable Communications or Sky segment revenue, maintain Cable Communications or Sky segment operating margins or to compete successfully in the future.

Each of NBCUniversal's businesses and Sky also face substantial and increasing competition from providers of similar types of content, as well as from other forms of entertainment and recreational activities. NBCUniversal and Sky must compete to obtain talent, content and other resources required in operating these businesses.

The ability of all of our businesses to compete effectively depends on our perceived image and reputation among our various constituencies, including our customers, consumers, advertisers, investors and government authorities. Our ability to compete will be negatively affected if we do not provide our customers with a satisfactory customer experience.

There can be no assurance that we will be able to compete effectively against existing or newer competitors or that competition will not have an adverse effect on our businesses. For a more detailed description of the competition facing our businesses, see Item 1: Business and refer to the "Competition" discussion within that section.

Changes in consumer behavior driven by online video distribution platforms for viewing content could adversely affect our businesses and challenge existing business models.

Distribution platforms for viewing and purchasing content over the internet have been, and will likely continue to be, developed that further increase the number of competitors that all our businesses face and challenge existing business models. These distribution platforms are driving changes in consumer behavior as consumers seek more control over when, where and how they consume content and access communications services, and how much they pay for such content.

Consumers are increasingly turning to online sources for viewing and purchasing content, which has and likely will continue to reduce the number of Cable Communications' video customers and subscribers to NBCUniversal's cable networks even as it makes Cable Communications' high-speed internet services more important to consumers. While these changes are primarily affecting our U.S. businesses today, there can be no assurance that they will not also affect Sky's businesses to a similar extent in the future, even with Sky offering a standalone OTT video streaming service. Although we have attempted to adapt our video service offerings to changing consumer behaviors, for example, by deploying the XI platform and adding apps such as Netflix and Amazon Prime Video on set-top boxes, virtual multichannel video providers, online video distributors and programming networks providing their content directly to consumers over the internet rather than through traditional video distribution services continue to emerge, gain consumer acceptance and displace traditional video distribution services. Many of these service offerings charge no fee or a lower fee than traditional video packages for access to their content, which could have an adverse effect on demand for Cable Communications' and Sky's video services, including for expanded video packages, premium networks, and DVR and On Demand services.

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An increasing number of companies offering OTT streaming services, including some with exclusive high-quality original video programming, as well as programming networks offering content directly to consumers over the internet, have increased the number of entertainment choices available to consumers, which has intensified audience fragmentation. The increase in entertainment choices adversely affects the audience ratings of NBCUniversal's cable networks and broadcast television programming and Sky's owned television channels. Time-shifting technologies, such as video on demand services and DVR and cloud-based recording services, also reduce the viewing of content through traditional and virtual multichannel video providers, which has caused and likely will continue to cause audience ratings declines for NBCUniversal's cable networks and broadcast television programming and Sky's owned television channels, and may adversely affect the price and amount of advertising that advertisers are willing to purchase from us and the amount NBCUniversal and Sky receive for distribution of their content.

The success of any of these ongoing or future developments or our failure to effectively anticipate or adapt to emerging competitors or changes in consumer behavior, including among younger consumers, could have an adverse effect on our competitive position, businesses and results of operations.

A decline in advertisers' expenditures or changes in advertising markets could negatively impact our businesses.

Our cable communications, cable networks, broadcast television, and Sky businesses compete for the sale of advertising time with other television networks and stations, as well as with all other advertising platforms, such as digital media, radio and print. We derive substantial revenue from the sale of advertising, and a decline in expenditures by advertisers, including through traditional linear television distribution models, could negatively impact our results of operations. Declines can be caused by the economic prospects of specific advertisers or industries, increased competition for the leisure time of viewers, such as from social media and video games, and audience fragmentation, increased viewing of ad-free content through online video distribution platforms, regulatory intervention regarding where advertising may be placed, or the economy in general. In addition, advertisers' willingness to purchase advertising from us may be adversely affected by lower audience ratings, which many of NBCUniversal's networks and Sky's television channels have experienced and likely will continue to experience. Advertising sales and rates also are dependent on the methodology used for audience measurement and could be negatively affected if methodologies do not accurately reflect actual viewership levels. For example, certain methods of viewing content, such as viewing content through many online video distribution platforms or delayed viewing on DVRs, might not be counted in audience measurements or may generate less, if any, revenue than traditional linear television distribution methods, which could have an adverse effect on our advertising revenue.

Our businesses depend on keeping pace with technological developments.

Our success is, to a large extent, dependent on our ability to acquire, develop, adopt and leverage new and existing technologies, and our competitors' use of certain types of technology and equipment may provide them with a competitive advantage. For example, current and new wireless internet technologies such as 4G and 5G wireless broadband services continue to evolve rapidly to allow for greater speed and reliability, and some companies and municipalities are building advanced fiber-based networks that provide very fast internet access speeds. We expect other advances in communications technology to occur in the future. If we choose technology or equipment that is not as effective or attractive to consumers as that employed by our competitors, if we fail to employ technologies desired by consumers before our competitors do so, or if we fail to execute effectively on our technology initiatives, our businesses and results of operations could be adversely affected. We also will continue to incur additional costs as we execute our technology initiatives, such as the U.S. deployment of DOCSIS 3.1 and DOCSIS FDX, our Xi and Sky Q set-top boxes, cloud DVR and wireless gateways. There can be no assurance that we can execute on these and other initiatives in a manner sufficient to grow or maintain our revenue or to compete successfully in the future. We also may generate less revenue or incur increased costs if changes in our competitors' product offerings require that we offer certain of our existing services or enhancements at a lower or no cost to our customers or that we increase our research and development expenditures.

We are subject to regulation by federal, state, local and foreign authorities, which impose additional costs and restrictions on our businesses.

In the United States, federal, state and local governments extensively regulate the high-speed internet, video and voice services industries. Our broadcast television business is also highly regulated by U.S. laws and regulations. NBCUniversal's cable networks, filmed entertainment and theme parks businesses are also subject to various other laws and regulations at the international, federal, state and local levels. Sky's business is subject to various telecommunications and media-specific regulations in most of the countries where it operates. The FCC and certain state attorneys general and foreign governmental authorities also have been active in conducting inquiries and reviews regarding our services, and this trend likely will continue. Failure to comply with the laws and regulations applicable to our businesses could result in administrative enforcement actions, fines, and civil and criminal liability.

Legislators and regulators at all levels of government, including foreign authorities, frequently consider changing, and sometimes do change, existing statutes, rules or regulations, or interpretations of existing statutes, rules or regulations, or prescribe new ones, any of which may significantly affect our businesses. These legislators and regulators have been active in considering rulemakings and legislation regarding our services. For example, some states have passed or introduced legislation or executive orders that

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impose various open internet and data privacy requirements. Such attempts by the states to regulate portions of our businesses have the potential to create a patchwork of differing and/or conflicting state regulations. These requirements and any future legislative, judicial, regulatory or administrative actions may increase our costs or impose additional restrictions on our businesses, some of which may be significant. The U.S. Congress may consider proposals to address communications issues, including whether it should rewrite the entire Communications Act to account for changes in the communications marketplace, whether it should enact new, permanent open internet requirements and whether it should fund new broadband infrastructure. We are unable to predict the outcome or effects of any of these potential actions or any other legislative or regulatory proposals on our businesses. Any changes to the legal and regulatory framework applicable to any of our services or businesses could have an adverse impact on our businesses and results of operations. For a more extensive discussion of the significant risks associated with the regulation of our businesses, see Item 1: Business and refer to the "Legislation and Regulation" discussion within that section.

Programming expenses for our video services are increasing, which could adversely affect Cable Communications' and Sky's video businesses.

We expect programming expenses for our video services to continue to be the largest single expense item for our Cable Communications and Sky segments and to increase for the foreseeable future. Our programming expenses may also increase as we add programming to our video services or distribute existing programming to more of our customers or through additional delivery platforms, such as On Demand or streaming services. Additionally, Cable Communications pays certain local broadcast television stations in exchange for their required consent for the retransmission of broadcast network programming to video services customers; we expect to continue to be subject to increasing demands for payment and other concessions from local broadcast television stations. These market factors may be exacerbated by increased consolidation in the media industry, which may further increase our programming expenses. If we are unable to raise our customers' rates or offset programming cost increases through the sale of additional services or cost management initiatives, the increasing cost of programming could have an adverse effect on our Cable Communications and Sky segments' results of operations.

Moreover, as our contracts with content providers expire, there can be no assurance that they will be renewed on acceptable terms, if renewed at all, in which case we may be unable to provide such content as part of Cable Communications' or Sky's video services, and our businesses and results of operations could be adversely affected.

NBCUniversal's and Sky's success depends on consumer acceptance of their content, and their businesses may be adversely affected if their content fails to achieve sufficient consumer acceptance or the costs to create or acquire content increase.

Most of NBCUniversal's, as well as Sky's, businesses create and acquire media and entertainment content, the success of which depends substantially on consumer tastes and preferences that change in often unpredictable ways. The success of these businesses depends on our ability to consistently create, acquire, market and distribute NBCUniversal's cable network and broadcast television programming, Sky's owned television channels, filmed entertainment, theme park attractions and other content that meet the changing preferences of the broad domestic and international consumer markets. We have invested, and will continue to invest, substantial amounts in our content, including in the production of original content on NBCUniversal's cable networks and broadcast television networks and Sky's owned television channels, in our films and for theme park attractions, before learning the extent to which it will earn consumer acceptance.

NBCUniversal and Sky also obtain a significant portion of their content from third parties, such as movie studios, television production companies, sports organizations and other suppliers, including in the case of Sky, sometimes on an exclusive basis. Competition for popular content, particularly for sports programming, is intense, and we may have to increase the price we are willing to pay or be outbid by our competitors for popular content. Entering into or renewing contracts for such programming rights or acquiring additional rights may result in significantly increased costs. Particularly with respect to long-term contracts for sports programming rights for NBCUniversal and Sky, our results of operations and cash flows over the term of a contract depend on a number of factors, including the strength of the advertising market, audience size, the ability to secure distribution from and impose surcharges or obtain carriage on multichannel video providers for NBCUniversal's content, and the timing and amount of rights payments. There can be no assurance that revenue from these contracts will exceed our costs for the rights, as well as the other costs of producing and distributing the programming. If our content does not achieve sufficient consumer acceptance, or if we cannot obtain or retain rights to popular content on acceptable terms, or at all, NBCUniversal's and Sky's businesses may be adversely affected.

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The loss of NBCUniversal's programming distribution agreements, or the renewal of these agreements on less favorable terms, could adversely affect our businesses.

NBCUniversal's cable networks depend on their ability to secure and maintain distribution agreements with traditional and virtual multichannel video providers. Increasingly, NBCUniversal's cable networks, broadcast television and filmed entertainment businesses are entering into agreements to license their prior season and library content on other distribution platforms, including subscription video on demand services. If NBCUniversal's programming does not attract sufficient viewers, traditional and virtual multichannel video providers may decide not to distribute NBCUniversal's broadcast and cable networks, and OTT video streaming services may not license programming we create. In addition, the number of subscribers to NBCUniversal's cable networks has been, and may continue to be reduced, as a result of multichannel video providers offering smaller packages of channels as part of their virtual or traditional television programming packages and by overall reduced viewing of television programming through multichannel video providers.

NBCUniversal's broadcast television networks depend on their ability to secure and maintain network affiliation agreements with third-party local broadcast television stations in the markets where it does not own the affiliated local broadcast television station. In addition, every three years, each of its owned local broadcast television stations must elect, with respect to its retransmission by multichannel video providers within its OMA, either "must-carry" status, in which the distributor's carriage of the station is mandatory and does not generate any compensation for the local station, or "retransmission consent," in which the station gives up its right to mandatory carriage and instead seeks to negotiate the terms and conditions of carriage with the distributor, including the amount of compensation, if any, paid to the station by such distributor. For the current three-year period, which commenced on January 1, 2018, all of our owned NBC broadcast television stations and our owned Telemundo broadcast television stations elected retransmission consent. However, certain illegal online entities may stream our broadcast television content online without our consent and without paying any compensation to us.

There can be no assurance that any of our distribution agreements will be renewed in the future on acceptable terms, or at all. The loss of any of these agreements, or the renewal of these agreements on less favorable terms, could reduce NBCUniversal's revenues and the reach of our television programming and its attractiveness to advertisers, which in turn could adversely affect NBCUniversal's cable networks, broadcast television and filmed entertainment businesses.

Less favorable regulation, the loss of Sky's transmission agreements with satellite or telecommunications providers or the renewal of these agreements on less favorable terms, could adversely affect Sky's businesses.

Sky relies on various telecommunications providers to deliver its video, high-speed internet, voice and wireless phone services to its customers. For example, Sky relies on satellites leased from third parties to provide most of its video services. In addition, pursuant to the current regulatory regime in the U.K. and Italy, Sky is able to access networks owned by third-party telecommunication providers to provide its high-speed internet and phone services, in most cases, on regulated terms, including price. These regulated terms could become less favorable. Moreover, while Sky is able to receive wholesale fiber access on fair, reasonable and non-discriminatory terms, pricing terms are not regulated. If Sky is unable to enter into or renew its transmission agreements with satellite or telecommunications operators on commercially reasonable terms or if these operators were to terminate their agreements, Sky may be unable to deliver some of its services to customers in one or more of the countries in which it operates.

The loss of Sky's wholesale distribution agreements with traditional multichannel video providers could adversely affect Sky's businesses.

Sky benefits from its ability to secure and maintain wholesale distribution agreements for its television channels with traditional multichannel video providers. There can be no assurance that any of its distribution agreements will be renewed in the future on acceptable terms, or at all. The loss of any of these agreements, or the renewal of these agreements on less favorable terms, could reduce Sky's revenues and the reach of its television programming and its attractiveness to advertisers, which in turn could adversely affect Sky's businesses.

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We rely on network and information systems and other technologies, as well as key properties, and a disruption, cyber attack, failure or destruction of such networks, systems, technologies or properties may disrupt our businesses.

Network and information systems and other technologies, including those related to our network management, customer service operations, and programming delivery, and technology embedded in our products and services, are critical to our business activities. Cyber threats and attacks are directed at both known and newly discovered software and hardware vulnerabilities and are constantly evolving, which increases the difficulty of detecting and successfully defending against them. Cyber threats and attacks can have cascading impacts that unfold with increasing speed across networks, information systems and other technologies. Network, information systems and technology-related events, including those caused by us, such as process breakdowns, security architecture or design vulnerabilities, or by third parties, such as computer hackings, cyber attacks, computer viruses, worms or other destructive or disruptive software, denial of service attacks, malicious social engineering or other malicious activities, or power outages, natural disasters, infectious disease outbreaks, terrorist attacks or other similar events, could result in a degradation or disruption of our products and services, excessive call volume to call centers, theft or misuse of our intellectual property or other assets, a reduction in demand for our theme parks, disruption of the security of our internal systems and products and services or satellite transmission signals, the compromise of confidential or technical business information or damage to our equipment, data, properties and reputation. In addition, severe weather events such as hurricanes and wild fires have impacted our services, products and properties from time to time in the past and will in the future. The occurrence of these events may result in large expenditures to repair or replace the damaged properties, products, services, networks or information systems to protect them from similar events in the future, and any such events could lead to litigation or otherwise have an adverse effect on our results of operations.

In addition, we obtain certain confidential, proprietary and personal information about our customers, personnel and vendors, and may in some cases provide this information to third parties, in connection with our business. While we generally obtain assurances that these third parties will protect this information, there is a risk that this information may be compromised. Any security breaches, such as misappropriation, misuse, leakage, falsification or accidental release or loss of information maintained in our third-party's information technology systems, including customer, personnel and vendor data, could damage our reputation and require us to expend significant capital and other resources to remedy any such security breach, could lead to litigation or could cause regulators to impose fines or other remedies for failure to comply with relevant customer privacy rules.

The risk of systems-related events and security breaches occurring continues to intensify in many of our businesses, and our businesses may be at a disproportionately heightened risk of these events occurring, due to the nature of our businesses and because we maintain certain information necessary to conduct our business in digital form. In the ordinary course of our business, there are frequent attempts to cause such systems-related events and security breaches. We have experienced minor systems-related events that, to date, have not resulted in any significant degradation or disruption to our network or information systems or our products, services or operations. While we develop and maintain systems, and operate an extensive security program, seeking to prevent systems-related events and security breaches from occurring, the development, maintenance and operation of these systems and programs is costly and requires ongoing monitoring and updating as technologies change and efforts to overcome security measures become more sophisticated and evolve rapidly. Despite our efforts to prevent these events and security breaches, there can be no assurance that they will not occur in the future or will not have an adverse effect on our businesses. Moreover, the amount and scope of insurance we maintain against losses resulting from any such events or security breaches likely would not be sufficient to cover our losses or otherwise adequately compensate us for any disruptions to our business that may result, and the occurrence of any such events or security breaches could have an adverse effect on our business.

Our businesses depend on using and protecting certain intellectual property rights and on not infringing the intellectual property rights of others.

We rely on our intellectual property, such as patents, copyrights, trademarks and trade secrets, as well as licenses and other agreements with our vendors and other third parties, to use various technologies, conduct our operations and sell our products and services. Legal challenges to our intellectual property rights and claims of intellectual property infringement by third parties could require that we enter into royalty or licensing agreements on unfavorable terms, incur substantial monetary liability, or be enjoined preliminarily or permanently from further use of the intellectual property in question, from importing into the United States or other jurisdictions in which we operate hardware that uses such intellectual property or from the continuation of our businesses as currently conducted. We may need to change our business practices if any of these events occur, which may limit our ability to compete effectively and could have an adverse effect on our results of operations. Even if we believe any such challenges or claims are without merit, they can be time-consuming and costly to defend and divert management's attention and resources away from our businesses. Moreover, if we are unable to obtain or continue to obtain licenses from our vendors and other third parties on reasonable terms, our businesses could be adversely affected.

In addition, intellectual property constitutes a significant part of the value of NBCUniversal's and Sky's businesses, and their success is highly dependent on protecting the intellectual property rights of the content they create or acquire against third-party misappropriation, reproduction or infringement. The unauthorized reproduction, distribution or display of copyrighted material

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negatively affects our ability to generate revenue from the legitimate sale of our content, as well as from the sale of advertising in connection with our content, and increases our costs due to our active enforcement of our intellectual property rights.

Piracy and other unauthorized uses of content are made easier, and the enforcement of intellectual property rights more challenging, by technological advances that allow the conversion of programming, films and other content into digital formats, which facilitates the creation, transmission and sharing of high-quality unauthorized copies. In particular, piracy of programming and films through unauthorized distribution on DVDs, peer-to-peer computer networks and other platforms continues to present challenges for NBCUniversal's cable networks, broadcast television and filmed entertainment businesses. It also presents similar challenges for Sky's businesses, including as a result of illegal retransmission of sports events. While piracy is a challenge in the United States, it is particularly prevalent in many parts of the world that lack developed copyright laws, effective enforcement of copyright laws and technical protective measures like those in effect in the United States. If any U.S. or international laws intended to combat piracy and protect intellectual property rights are repealed or weakened or are not adequately enforced, or if the legal system fails to adapt to new technologies that facilitate piracy, we may be unable to effectively protect our rights, the value of our intellectual property may be negatively impacted and our costs of enforcing our rights may increase.

We may be unable to obtain necessary hardware, software and operational support.

We depend on third-party vendors to supply us with a significant amount of the hardware, software and operational support necessary to provide certain of our products and services. Some of these vendors represent our primary source of supply or grant us the right to incorporate their intellectual property into some of our hardware and software products. While we actively monitor the operations and financial condition of key vendors in an attempt to detect any potential difficulties, there can be no assurance that we would timely identify any operating or financial difficulties associated with these vendors or that we could effectively mitigate our risks with respect to any such difficulties. If any of these vendors experience operating or financial difficulties, if our demand exceeds their capacity or if they are otherwise unable to meet our specifications or provide the equipment, products or services we need in a timely manner (or at all), or at reasonable prices, our ability to provide some products or services may be adversely affected and we may incur additional costs.

Weak economic conditions may have a negative impact on our businesses.

A substantial portion of our revenue comes from customers whose spending patterns may be affected by prevailing economic conditions. Weak economic conditions in the United States or globally could adversely affect demand for any of our products and services and have a negative impact on our results of operations. For example, customers may reduce the level of cable services to which they subscribe, or may discontinue subscribing to one or more of Cable Communications' cable services or Sky's services. This risk may be increased by the expanded availability of free or lower cost competitive services, such as OTT video services, or substitute services for high-speed internet and voice services, such as mobile phones and Wi-Fi networks. Weak economic conditions also may have a negative impact on our advertising revenue, the performance of our films and home entertainment releases, and attendance and spending in our theme parks.

Weak economic conditions and disruption in the global financial markets may also have an impact on the ability of third parties to satisfy their obligations to us or increase our exposure to currency fluctuations in countries where we operate. In addition, in connection with our acquisition of Sky, we incurred and assumed a significant amount of additional debt. If our businesses are negatively impacted by weak economic conditions, we may not be able to reduce the amount of our debt outstanding as quickly as expected. Further, a significant increase in interest rates or disruption in the global financial markets may affect our ability to obtain financing or to refinance existing debt on acceptable terms, if at all, and could increase the cost of our borrowings.

Acquisitions and other strategic initiatives present many risks, and we may not realize the financial and strategic goals that we had contemplated.

From time to time, we make acquisitions and investments and may pursue other strategic initiatives, including our 2018 acquisition of Sky and 2017 launch of a wireless phone service using virtual network operator rights. In connection with such acquisitions and strategic initiatives, we may incur unanticipated expenses, fail to realize anticipated benefits and synergies, have difficulty incorporating an acquired or new line of business, disrupt relationships with current and new employees, customers and vendors, incur significant debt, or have to delay or not proceed with announced transactions or initiatives. Additionally, federal regulatory agencies such as the FCC or DOJ or international regulators may impose restrictions on the operation of our businesses as a result of our seeking regulatory approvals for any significant acquisitions and strategic initiatives, or may dissuade us from pursuing certain transactions. The occurrence of any of these events could have an adverse effect on our business and results of operations.

Unfavorable litigation or governmental investigation results could require us to pay significant amounts or lead to onerous operating procedures.

We are subject from time to time to a number of lawsuits both in the United States and in foreign countries, including claims relating to competition, intellectual property rights (including patents), employment and labor matters, personal injury and property.

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damage, customer privacy, regulatory requirements, advertising, marketing and selling practices, and credit and collection issues. We also spend substantial resources complying with various regulatory and government standards, including any related investigations and litigation. We may incur significant expenses defending any such suit or government charge and may be required to pay amounts or otherwise change our operations in ways that could adversely impact our businesses, results of operations or financial condition.

Labor disputes, whether involving employees or sports organizations, may disrupt our operations and adversely affect our businesses.

Many of NBCUniversal's employees, including writers, directors, actors, technical and production personnel and others, as well as some of our on-air and creative talent employees, are covered by collective bargaining agreements or works councils. Most of NBCUniversal's collective bargaining agreements are industry-wide agreements, and we may lack practical control over the negotiations and terms of the agreements. If we are unable to reach agreement with a labor union before the expiration of a collective bargaining agreement, our employees who were covered by that agreement may have a right to strike or take other actions that could adversely affect us, which could disrupt our operations and reduce our revenue, and the resolution of any disputes may increase our costs. There can be no assurance that we will renew our collective bargaining agreements as they expire or that we can renew them on favorable terms or without any work stoppages.

In addition, our cable networks and broadcast television networks have programming rights agreements of varying scope and duration with various sports organizations to broadcast and produce sporting events, including certain NFL, NHL, NBA and MLB games. Labor disputes in these and other sports organizations could have an adverse effect on our businesses.

The loss of key management personnel or popular on-air and creative talent could have an adverse effect on our businesses.

We rely on certain key management personnel in the operation of our businesses. While we maintain long-term and emergency transition plans for key management personnel and believe we could either identify internal candidates or attract outside candidates to fill any vacancy created by the loss of any key management personnel, the loss of one or more of our key management personnel could have a negative impact on our businesses.

In addition, our cable networks, broadcast television, filmed entertainment and Sky businesses depend on the abilities and expertise of on-air and creative talent. If we fail to attract or retain on-air or creative talent, if the costs to attract or retain such talent increase materially, if we need to make significant termination payments, or if these individuals lose their current appeal, our businesses could be adversely affected.

We face risks relating to doing business internationally that could adversely affect our businesses.

We, primarily through Sky and NBCUniversal, operate our businesses worldwide. There are risks inherent in doing business internationally, including global financial market turmoil; economic volatility and global economic slowdown; currency exchange rate fluctuations and inflationary pressures; the requirements of local laws and customs relating to the publication and distribution of content and the display and sale of advertising; import or export restrictions and changes in trade regulations; difficulties in developing, staffing and managing foreign operations; issues related to occupational safety and adherence to diverse local labor laws and regulations; and potentially adverse tax developments. Sky's businesses in particular are also subject to risks relating to uncertainties and effects of the implementation of the United Kingdom's referendum to withdraw membership from the EU (referred to as "Brexit"), including financial, legal, tax and trade implications. In addition, doing business internationally subjects us to risks relating to political or social unrest, as well as corruption and government regulation, including U.S. laws such as the Foreign Corrupt Practices Act and the U.K. Bribery Act, that impose stringent requirements on how we conduct our foreign operations. If any of these events occur, our businesses may be adversely affected.

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Our Class B common stock has substantial voting rights and separate approval rights over several potentially material transactions, and our Chairman and CEO has considerable influence over our company through his beneficial ownership of our Class B common stock.

Our Class B common stock has a non-dilutable 33 1/3% of the combined voting power of our Class A and Class B common stock. This non-dilutable voting power is subject to proportional decrease to the extent the number of shares of Class B common stock is reduced below 9,444,375, which was the number of shares of Class B common stock outstanding on the date of our 2002 acquisition of AT&T Corp.'s cable business, subject to adjustment in specified situations. Stock dividends payable on the Class B common stock in the form of Class B or Class A common stock do not decrease the non-dilutable voting power of the Class B common stock. The Class B common stock also has separate approval rights over several potentially material transactions, even if they are approved by our Board of Directors or by our other shareholders and even if they might be in the best interests of our other shareholders. These potentially material transactions include mergers or consolidations involving us, transactions (such as a sale of all or substantially all of our assets) or issuances of securities that require shareholder approval, transactions that result in any person or group owning shares representing more than 10% of the combined voting power of the resulting or surviving corporation, issuances of Class B common stock or securities exercisable or convertible into Class B common stock, and amendments to our articles of incorporation or by-laws that would limit the rights of holders of our Class B common stock. Brian L. Roberts, our chairman and CEO, beneficially owns all of the outstanding shares of our Class B common stock and, accordingly, has considerable influence over our company and the potential ability to transfer effective control by selling the Class B common stock, which could be at a premium.

Item 1B: Unresolved Staff Comments

None.

Item 2: Properties

We believe that substantially all of our physical assets were in good operating condition as of December 31, 2018. Our corporate headquarters and Cable Communications segment headquarters are located in Philadelphia, Pennsylvania at One Comcast Center. We own 80% interests in entities whose primary assets are the Comcast Center and the Comcast Technology Center, which is adjacent to the Comcast Center. The Comcast Technology Center opened in 2018 and is a center for Cable Communications' technology and engineering workforce, as well as the home of our NBCUniversal and Telemundo owned local broadcast stations in Philadelphia, Pennsylvania. We also have leases for numerous business offices, warehouses and properties throughout the United States that house divisional information technology operations.

Cable Communications Segment

Our principal physical assets consist of operating plant and equipment, including cable system signal receiving, encoding and decoding devices, headends and distribution networks, and equipment at or near our customers' homes. Our distribution network consists primarily of headends, content distribution servers, coaxial and fiber-optic cables, lasers, routers, switches and related electronic equipment. Our cable plant and related equipment generally are connected to utility poles under pole rental agreements with local public utilities, although in some areas the distribution cable is buried in underground ducts or trenches. Customer premise equipment consists primarily of set-top boxes, cable modems and wireless gateways. The physical components of cable systems require periodic maintenance and replacement.

Our cable system signal reception sites, which consist primarily of antenna towers and headends, and our microwave facilities are located on owned and leased parcels of land, and we own or lease space on the towers on which certain of our equipment is located. We own most of our service vehicles.

Our high-speed internet network consists of fiber-optic cables owned or leased by us and related equipment. We also operate national and regional data centers with equipment that is used to provide services, such as email and web services, to our high-speed internet and voice customers, as well as cloud services to our video customers. In addition, we maintain network operations centers with equipment necessary to monitor and manage the status of our services and network.

We own or lease buildings throughout the U.S. that contain customer service call centers, retail stores and customer service centers, warehouses and administrative space. We also own a building that houses our digital media center. The digital media center contains equipment that we own or lease, including equipment related to network origination, video transmission via satellite and terrestrial fiber-optics, broadcast studios, post-production services and interactive television services.

NBCUniversal Segments

NBCUniversal's corporate headquarters are located in New York, New York at 30 Rockefeller Plaza and include offices and studios, which are used by Headquarters and Other and the Cable Networks and Broadcast Television segments. NBCUniversal owns the space it occupies at 30 Rockefeller Plaza. NBCUniversal also leases space in 10 Rockefeller Plaza which includes *The Today Show* studio, production facilities and offices used by the Broadcast Television segment. Telemundo's leased headquarters and production facilities are located in Miami, Florida and are used by the Broadcast Television segment and Headquarters and Other. The Universal City owned location in California includes offices, studios, and theme park and retail operations which are owned by NBCUniversal and used by all NBCUniversal segments. Our owned CNBC headquarters and production facilities and disaster recovery center are located in Englewood Cliffs, New Jersey and are used by the Cable Networks and Broadcast Television segments and Headquarters and Other. We also own or lease offices, studios, production facilities, screening rooms, retail operations, warehouse space, satellite transmission receiving facilities and data centers in numerous locations in the United States and around the world, including property for our owned local broadcast television stations. In addition, we own theme parks and own or lease related facilities in Orlando, Florida; Hollywood, California; and Osaka, Japan, which are used in the Theme Parks segment, and are building a new theme park in Beijing, China.

Sky Segment

Sky's corporate headquarters are located in Middlesex, United Kingdom. Sky owns the space it occupies at Middlesex. Sky leases the Sky Deutschland headquarters located in Unterföhring, Germany and the Sky Italia headquarters located in Milan, Italy.

Additionally, Sky owns and leases offices, production facilities and studios, broadcasting facilities and customer support centers throughout Europe, including in the U.K., Ireland, Germany, Italy and Austria.

Other

The Wells Fargo Center, a large, multipurpose arena in Philadelphia, Pennsylvania that we own, was the principal physical operating asset of our other businesses as of December 31, 2018.

Item 3: Legal Proceedings

Refer to Note 17 to Comcast's consolidated financial statements included in this Annual Report on Form 10-K for a discussion of recent developments related to our legal proceedings.

NBCUniversal is subject to legal proceedings and claims that arise in the ordinary course of its business and it does not expect the final disposition of these matters to have a material adverse effect on its results of operations, cash flows or financial condition, although any such matters could be time-consuming and costly and could injure its reputation.

Item 4: Mine Safety Disclosures

Not applicable.

Attachment 8: Evidence of network scalability

**ATTACHMENT 8: Comcast
BUCHANAN
TOWNSHIP_Attachment_8.pdf**

<https://www.cablelabs.com/technologies/docsis-3-1>

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DOCSIS® 3.1 Technology

Because the world's cable networks must continue to meet the technical requirements for the latest entertainment and communication experiences, as well as provide a platform for future innovations.

[What is DOCSIS 3.1 technology?](#)

[Why do we need DOCSIS® 3.1?](#)

[What problems are we solving?](#)

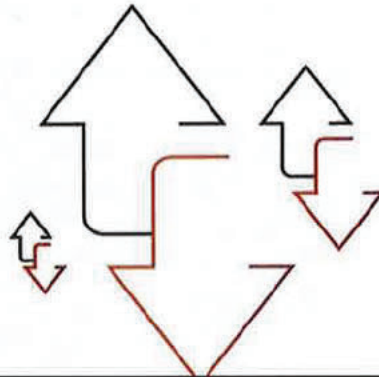
[Ramping up to 10G and beyond](#)

[Learn More](#)



What is DOCSIS 3.1 technology?

Officially released by CableLabs in 2013, the [DOCSIS 3.1 specifications](#) are the current industry standard for providing high-quality internet access over hybrid fiber coax (HFC) networks. With this release, cable high-speed data can now reach download speeds of up to 10 Gbps (gigabits per second), enabling a wide variety of online experiences and tools that have become a part of our daily routines, such as 4K video streaming, video conferencing and multi-player online gaming. As impressive as this may sound, it's only a pit stop in the race toward 10G—the multi-gigabit super network of tomorrow.



Attachment 9: Five-year, stand-alone project financial plan/forecast

**ATTACHMENT 9: Comcast BUCHANAN
TOWNSHIP_Attachment_9.pdf**

	YR1	YR2	YR3	YR4	YR5
Revenue					
Expenses					
Grant	\$244,243				
Construction	(\$350,257)				
Cash Flow					
Cumulative Cash Flow					

Attachment 10: Affidavit of commitment to offer the proposed service and cost in the proposed service area for a minimum of five years after project completion.

**ATTACHMENT 10: Comcast
BUCHANAN TOWNSHIP_
Attachment_10.pdf**

APPLICANT AFFIDAVIT

I, John Crowley, certify that I am duly authorized by the governing body of the applicant to submit this application and included materials; that the applicant has the capacity to carry out the proposed project; that the proposed project is designed to meet the identified needs of the project area; that all of the information submitted as part of this application is true and correct to the best of my knowledge; and that I am an authorized agent of the applicant.

Signature: _____

Name: John Crowley

Title: Regional Senior Vice-President

Attachment 11: Budgetary engineering designs, diagrams, and maps that show the proposed project. Design documents must clearly demonstrate the applicant's complete understanding of the project and ability to provide the proposed solution. This information must be certified by a Professional Engineer registered in Michigan.

**ATTACHMENT 11: Comcast
BUCHANAN
TOWNSHIP_Attachment_11.pdf**



August 30, 2019

COMCAST
41112 Concept Drive
Plymouth, MI 48170

Attention: Mr. Jeff Snyder, Manager of External Affairs

**RE: MICHIGAN DTMB CONNECTING MICHIGAN COMMUNITIES GRANT ATTACHMENT 11
CERTIFICATION, NEW BUCHANAN TOWNSHIP**

Dear Jeff:

Per your request, we have reviewed the information COMCAST has compiled for Attachment 11 for the above referenced site for the Connecting Michigan Communities Grant submittal. We find the information provided acceptable for submittal and certify that the information presented meets the intent for the budgetary engineering designs, diagrams and maps outlining the proposed project.

If you have any questions, please feel free to contact me.

Very truly yours,



Steve C. Carlisle, PE, Principal
scarlisle@gowightman.com

BENTON HARBOR

▲ 2303 PIPESTONE ROAD
BENTON HARBOR, MI 49022
☎ 269.927.0100

ALLEGAN

▲ 1670 LINCOLN ROAD (M-40)
ALLEGAN, MI 49010
☎ 269.673.8465

KALAMAZOO

▲ 433 E. RANSOM STREET
KALAMAZOO, MI 49007
☎ 269.327.3532

GOWIGHTMAN.COM

DOCSIS 3.1 was introduced in 2013 with a maximum downstream capacity of 10 Gbps and maximum upstream capacity of 1-2 Gbps. DOCSIS architecture includes 2 primary components – a cable modem, located at a customer's home or business, and a cable modem termination system (CMTS), located at the cable system head end. Comcast leases the cable modem to customers as a component of the service, or customers can provide their own modem, and the CMTS for this proposed project is located in Comcast's head end.

Comcast utilizes ARRIS cable modems and CMTS devices both of which have been certified by CableLabs for use with DOCSIS technology. For more information on the certification process and a detailed listing of devices, please visit www.cablelabs.com/specs/certification.

XB6

- Model Numbers: TG3482G and CGM4140COM
- Gigabit Ethernet Ports: 2
- Dual-Band WiFi Option: Yes
- Maximum Data Throughput: 1 Gbps
- WPS (WiFi Protected Setup): Yes
- Gateway/ Network Management Tool (<http://10.0.0.1>): Yes
- Xfinity xFi Eligible: Yes
- Two Total Telephone Ports: Yes
- Battery Backup Capability (Xfinity Voice Only): Yes
- Link Cordless Phones (CAT-iq 2.0*): Yes
- Home Hotspot Capable: Yes
- Compatible with Xfinity Home: Yes

XB3

- **Model Numbers: TG3482G and CGM4140COM**
- **Gigabit Ethernet Ports: 2**
- **Dual-Band WiFi Option: Yes**
- **Maximum Data Throughput: 1 Gbps**
- **WPS (WiFi Protected Setup): Yes**
- **Gateway/ Network Management Tool (<http://10.0.0.1>): Yes**
- **Xfinity xFi Eligible: Yes**
- **Two Total Telephone Ports: Yes**
- **Battery Backup Capability (Xfinity Voice Only): Yes**
- **Link Cordless Phones (CAT-iq 2.0*): Yes**
- **Home Hotspot Capable: Yes**
- **Compatible with Xfinity Home: Yes**



Attachment 12: Community letters of support

**ATTACHMENT 12: Comcast
BUCHANAN TOWNSHIP_
Attachment_12.pdf**

Date: August 30, 2019

The Southeast Shore
Blagica Bottigliero
Founder
PO Box 91
New Buffalo, MI 49117-1147

To Whom It May Concern:

I am writing to support Comcast's application for the Connect Michigan Communities (CMIC) grant program. Areas of the Berrien County community continue to struggle without access to high speed internet service. With internet speeds in the area being 5Mbps or lower, many residents require high speed service to access telemedicine, do homework assignments, online shopping, and much more.

Comcast continues to work with residents and local officials to provide broadband solutions throughout the county.

I ask that the committee give strong consideration to approving the funding requested by Comcast to further develop broadband outreach in Berrien County.

This would be in concert with many economic discussions and progress happening in and around the area. We can no longer rely on tourism as a main source of our economy. With close proximity to Chicago, St. Joseph, Grand Rapids and other cities, the addition of broadband wouldn't just benefit the community and its residents, but also companies who want to open up shop in the area.

Sincerely,

A handwritten signature in black ink that reads "Blagica Bottigliero". The signature is written in a cursive style with a large, stylized 'B' at the beginning.



Southwest Michigan Planning Commission

August 27, 2019

Michigan Department of Technology Management and Budget
DTMB-CMICGRANT@michigan.gov

RE: Comcast Berrien County Connect Michigan Communities Grant Application

To Whom It May Concern:

I am writing to support Comcast's application for the Connect Michigan Communities (CMIC) grant program. Areas of the Berrien County community continue to struggle without access to high-speed internet service. It is common for many residents to require high-speed service to access telemedicine, do homework assignments, online shopping, and much more. Yet, with internet speeds in the area being 5Mbps or lower, depending on where you live the opportunity for Berrien County residents to access important needs is limited.

Comcast continues to work with residents and local officials to provide broadband solutions throughout the county.

I ask that the committee give strong consideration to approving the funding requested by Comcast to further develop broadband outreach in Berrien County.

Sincerely,

K. John Egelhaaf, AICP
Executive Director



THE POKAGON FUND

August 27, 2019

To Whom It May Concern:

I am writing on behalf of The Pokagon Fund (TPF) to support Comcast's application for the Connect Michigan Communities (CMIC) grant program.

Areas of the Berrien County and, in particular, Harbor Country (Chikaming, New Buffalo and Three Oaks Townships and the municipalities within those townships) continue to struggle without access to high speed internet service. With internet speeds in the area being 5Mbps or lower, many residents require high speed service.

In 2018, TPF led a Harbor Country Community Needs Assessment. One of four major themes resulting from the assessment was the need for quality internet and cell service. Comcast is a key player in the effort to meet that need. Comcast continues to work with local residents and officials to provide broadband solutions throughout the county and in Harbor Country. TPF supports Comcast's grant request as one of the necessary parties to develop and implement broadband solutions.

TPF suggests that Comcast be strong consideration to receive the funding it has requested to further develop broadband outreach in Berrien County and Harbor Country.

Sincerely,



John Krsul
Interim Executive Director
The Pokagon Fund

Attachment 13: Demonstration of customer interest in the proposed project

**ATTACHMENT 13: Comcast
BUCHANAN TOWNSHIP
_Attachment_13.pdf**

Date: 8/22/19

River Pointe Development
Craig & Marcella Rudell
Title: Owners
4701 River Pointe Blvd
Niles, MI 49120

To Whom It May Concern:

We are writing to you to voice my support of Comcast's application for a Connect Michigan Communities grant to expand its gigabit network to River Pointe Subdivision. River Pointe has been underserved for many years, and it has negatively impacted daily workplace functions and online communications. Currently, the maximum download speed available is well below 5 megabits.

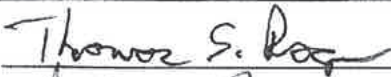
Comcast has recognized the importance of having high-speed internet available to the residents of our community.

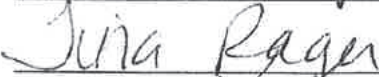
Therefore we strongly encourage you to provide the funding requested by Comcast in order to enhance internet speed in our area.

Sincerely:




BELOW ARE THE SIGNATURES OF HOMEOWNERS IN RIVER POINTE WHO HAVE SUFFERED WITH INEPT INTERNET AND WOULD ENCOURAGE YOU TO PROVIDE THE FUNDING REQUESTED BY COMCAST:









RIVER POINTE DEVELOPMENT

HOME OWNER SIGNATURES CONTINUED:

Debra A. Bruck

Dean A. Bruck

M. A. H.

T. H.

Nathan Humphreys

Betsy Humphreys

[Signature]

Kristi Ball

Melvin Hayes

Ryan Hays

John Hedges

[Signature]

Gregory Struble

[Signature]

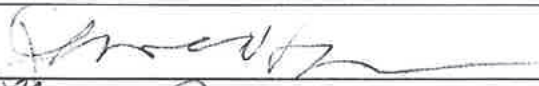


Patricia G. Johnson

Brian D. Johnson

Tracy Day

RIVER POINTE DEVELOPMENT

HOME OWNER SIGNATURES CONTINUED:

	
Shanti Dalson	Cheryl A. Hinrichs
Robert Michalak	Karen Arnold
Suzanne Michalak	
Russell Hunt	
Melvin Wood	
Andrea van der Laan	
Ray van der Laan	
Charlene Betz	
Paul Betz	
Lloyd L. Miller	
Liz Miller	
Mary Miluk	
Patti Quick	
	
Fred E. Hansen	
Ron Hansen	