



December 2016

TELECOMMUNICATIONS

Information on Low Power Television, FCC's Spectrum Incentive Auction, and Unlicensed Spectrum Use

Accessible Version

GAO Highlights

Highlights of [GAO-17-135](#), a report to congressional requesters

Why GAO Did This Study

In 2012, Congress authorized FCC to conduct an incentive auction of broadcast television spectrum whereby eligible broadcasters can voluntarily relinquish their spectrum usage rights in return for compensation. This auction will make spectrum available for new uses such as mobile broadband and will also potentially affect LPTV and translator stations. In addition to conducting the auction, FCC proposed preserving at least one vacant television channel in all areas that could be used by unlicensed devices to ensure the public continues to have access to the benefits associated with these devices.

GAO was asked to review the possible effects of the auction on LPTV and translator stations and their viewers. This report examines: (1) LPTV and translator stations and how FCC's incentive auction might affect their viewers, (2) selected stakeholders' views on actions FCC has proposed to mitigate the possible effects of the auction on such stations, and (3) selected stakeholders' views on the expected outcomes of preserving a vacant television channel for unlicensed use. GAO reviewed relevant FCC proceedings and comments associated with those proceedings; surveyed a non-generalizable sample of 330 LPTV and translator station representatives with available e-mail addresses; and interviewed officials from FCC and industry stakeholders selected to represent various types of organizations, such as broadcast industry associations and technology companies. GAO provided FCC with a draft of this report. FCC's technical comments have been incorporated.

View [GAO-17-135](#). For more information, contact Mark Goldstein at (202) 512-2834 or goldsteinm@gao.gov.

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What GAO Found

As of May 2016, there were 2,063 low power television (LPTV) stations and 3,660 translator stations in the United States and its territories, serving diverse communities. However, some LPTV and translator stations may be displaced and need to find a new channel or discontinue operation after the Federal Communications Commission's (FCC) ongoing incentive auction of broadcast television spectrum. By statute, these stations were not designated as eligible to participate in the auction; consequently, they cannot voluntarily relinquish their spectrum usage rights in return for compensation. LPTV stations may serve rural communities with limited access to full-power stations and niche communities in urban areas, whereas translator stations retransmit the programming of other stations, mostly to viewers in rural areas who cannot otherwise receive television signals. After the auction, FCC intends to reorganize the television stations remaining on the air so that they will occupy a smaller range of channels, thus freeing up spectrum for other uses. LPTV and translator stations are not guaranteed a channel during the reorganization. FCC has acknowledged that the auction and channel reorganization may negatively affect an unknown number of LPTV and translator stations and that some viewers will lose service, and concluded the success of the auction outweighs these concerns. Broadcast industry associations and others have raised concerns about viewers' losing access to programming and emergency alert information these stations provide.

Selected stakeholders viewed FCC's actions to mitigate the effects of the incentive auction on LPTV and translator stations as helpful in some circumstances, but overall as insufficient. FCC's actions include using its software to identify channels that will be available for displaced stations following the auction and allowing channel sharing. While broadcast industry associations generally supported these measures in comments to FCC, some representatives told GAO that the actions will not do much to mitigate the effects of the incentive auction on LPTV and translator stations. Moreover, in response to GAO's non-generalizable survey, representatives of LPTV and translator stations generally indicated FCC's actions have limited usefulness.

According to selected stakeholders, FCC's proposal to preserve a vacant television channel in all areas throughout the country for unlicensed use, such as Wi-Fi Internet, could result in the loss of some existing broadcast service, but could have various benefits. Of the stakeholders GAO contacted, the broadcast industry associations generally opposed the proposal, while the technology companies supported it. According to a broadcast industry association, the proposal will force some LPTV and translator stations off the air because there will be one less channel where a displaced station can relocate, and many rural and underserved communities will likely lose access to the broadcast stations on which they rely. On the other hand, technology companies and other supporters of the vacant channel proposal maintain that preserving at least one vacant channel for unlicensed use will contribute to innovation and the development of new technologies. Proponents also said that preserving a vacant channel could help expand Wi-Fi more thoroughly giving people and businesses greater connectivity and could help extend coverage to people who might not have affordable access to the Internet.

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Abbreviations

ATSC	Advanced Television Systems Committee
CDBS	Consolidated Database System
FCC	Federal Communications Commission
LPTV	low power television
MHz	megahertz
NAB	National Association of Broadcasters
NPRM	notice of proposed rulemaking
the 2012 act	the Middle Class Tax Relief and Job Creation Act of 2012
UHF	ultra high frequency
VHF	very high frequency

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December 5, 2016

The Honorable Anna G. Eshoo
Ranking Member
Subcommittee on Communications and Technology
Committee on Energy and Commerce
House of Representatives

The Honorable Joe Barton
House of Representatives

There are thousands of low power television (LPTV) and translator stations located throughout the country that serve distinct television viewing audiences.¹ LPTV stations serve both rural audiences and niche communities within larger urban areas and may provide locally oriented television programming such as non-English language, ethnic, religious, or other programming. Translator stations retransmit programming from another station—such as a major network (ABC, CBS, Fox, or NBC)—mostly to viewers in rural and mountainous areas who cannot receive signals because of terrain or distance. According to the Federal Communications Commission (FCC), LPTV and translator stations have always operated in an environment where they could be displaced from their operating channel and, if no new channel assignment is available, forced to go silent.²

¹Low power television stations transmit over a smaller area, and most are subject to fewer regulatory requirements than full-power stations. In addition, they operate at lower power levels: The maximum effective radiated power level for a digital low power television station will range from 3 kilowatts for very high frequency (VHF) channels to 15 kilowatts for ultra high frequency (UHF) channels, 47 C.F.R § 74.735(b), while the maximum effective radiated power level for a digital full-power television station ranges from 10 kilowatts for VHF to 1,000 kilowatts for UHF. *In the Matter of Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions, Office of Engineering and Technology Releases and Seeks Comment on Updated OET-69 Software, Office of Engineering and Technology Seeks to Supplement the Incentive Auction Proceeding Record Regarding Potential Interference Between Broadcast Television and Wireless Services*, 30 FCC Rcd 12049, October 26, 2015, Released, October 21, 2015, Adopted, Third Report and Order and First Order on Reconsideration.

²*In the Matter of Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, 30 FCC Rcd 6746, June 19, 2015, Released, June 17, 2015, Adopted, Second Order on Reconsideration.

The Middle Class Tax Relief and Job Creation Act of 2012 (the 2012 act) authorized FCC to conduct an auction of broadcast television spectrum³ to help meet the nation's accelerating spectrum needs.⁴ This auction is referred to as an incentive auction because eligible television broadcasters can voluntarily relinquish some or all of their spectrum usage rights in return for compensation in the incentive auction, which depending on the station and market could potentially be hundreds of millions of dollars. Following the auction's conclusion, FCC intends to reorganize the television broadcast spectrum band so that the stations that remain on the air will occupy a smaller range of channels. LPTV and translator stations were not designated as eligible in statute to participate in the auction. FCC has stated that some LPTV and translator stations may be displaced as a result of the auction or reorganization of the television broadcast band and these stations will need to find a new channel (from the fewer number of channels available) or discontinue operations altogether. FCC stated that making more spectrum available for new flexible uses such as mobile broadband services will benefit consumers by easing congestion of the airwaves, thus expediting the development of new, more robust wireless services and applications and spurring job creation and economic growth.

According to FCC, the auction and reorganization of the television broadcast band will also likely result in fewer television channels available for use by either unlicensed devices (such as Wi-Fi Internet and Bluetooth) or wireless microphones.⁵ Separately, in a June 2015 notice of proposed rulemaking (NPRM),⁶ FCC proposed to preserve at least one

³Pub. L. No. 112-96, § 6402, 126 Stat. 156, 224 (codified at 47 U.S.C. § 309(j)(8)(G)).

⁴Spectrum is a finite natural resource of electromagnetic radiation lying between the frequencies of 3 kilohertz and 300 gigahertz. A television broadcast channel consists of 6 megahertz (MHz) of spectrum. Spectrum is necessary for essential government functions and missions such as national defense, homeland security, weather services, and aviation communication, as well as commercial services such as television broadcasting and mobile voice and data.

⁵Unlicensed devices are low power radio transmitters, which under 47 C.F.R. part 15 are allowed to operate on spectrum frequencies allocated to other services on the basis that unlicensed devices do not cause harmful interference and have no rights to protection from interference. 47 C.F.R. § 15.5(b).

⁶*In the Matter of Amendment of Parts 15, 73, and 74 of the Commission's Rules to Provide for Preservation of One Vacant Channel in the UHF Television Band for Use By White Space Devices and Wireless Microphones; Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions, (Vacant Channel NPRM)* 30 FCC Rcd 6711, June 16, 2015, Released, June 11, 2015, Adopted.

vacant channel to help ensure the public continues to have access across the nation to the significant public benefits associated with these devices. Although this is a separate proceeding from the incentive auction and not directly contingent on the auction, if adopted, this proposal could further decrease the number of channels available for LPTV and translator stations to relocate.

FCC stated that it has taken into consideration the potential impact of the auction and reorganization of the television broadcast band on LPTV stations and is not required to conduct additional analysis. According to FCC officials, when Congress authorized FCC to conduct the incentive auction, it signaled a change in priorities away from LPTV and translator station service since only full-power and Class A television stations⁷ were designated as eligible to participate in the auction in the 2012 act. In 2011, we recommended that FCC explore options for assessing how LPTV and translator stations have contributed to FCC's policy goals of localism and diversity, potentially including an evaluation of existing data that FCC could use and additional data that should be collected to inform such an assessment.⁸ However, FCC did not implement this recommendation. In discussing this prior recommendation with us, FCC officials said that an assessment of the impact of LPTV and translator stations on localism and diversity is not consistent with the implementation of the incentive auction as specified by the 2012 act, which will cause consolidation among and elimination of an undetermined number of those stations.

You asked us to review the possible effects of FCC's spectrum incentive auction on LPTV and translator stations and their viewers. This report examines (1) what is known about LPTV and translator stations and how FCC's spectrum incentive auction might affect viewers' access to the stations' services, (2) selected stakeholder views on actions FCC has proposed or taken to mitigate the possible effects of the incentive auction on LPTV and translator stations, and additional stakeholder proposals for doing so, and (3) selected stakeholder views on the expected outcomes

⁷Class A stations may not exceed the maximum effective radiated power level of low power television stations, but are classified as a primary service and must meet requirements that are not applied to LPTV stations, including broadcasting an average of at least 3 hours of locally produced programming each week. 47 U.S.C. § 336 (f)(2).

⁸GAO, *Telecommunications: Enhanced Data Collection and Analysis Could Inform FCC's Efforts to Complete the Digital Transition of Low-Power Television Stations and Reallocate Spectrum*, [GAO-11-790](#) (Washington, D.C.: Sept. 7, 2011).

of preserving a vacant channel for unlicensed use of the television broadcast spectrum.

To address these objectives, we reviewed FCC's documents related to the incentive auction—including its June 2014 incentive auction report and order,⁹ December 2015 LPTV and translator report and order,¹⁰ and vacant channel notice of proposed rulemaking¹¹—and selected comments and other filings associated with these proceedings.¹² We also reviewed relevant statutes and regulations, including the Middle Class Tax Relief and Job Creation Act of 2012,¹³ and obtained data as of May 25, 2016, from FCC's Consolidated Database System (CDBS) to determine the number of LPTV and translator stations in the U.S. and its territories along with their communities of license. To determine the reliability of FCC's data, we reviewed FCC user guides and forms for CDBS and interviewed knowledgeable FCC officials regarding data entry and analysis procedures. We determined the data were reliable for our purposes.

In addition, we conducted a web-based survey of 330 LPTV and translator station representatives for whom we were able to obtain e-mail addresses. After preparing draft survey questions and response categories, we spoke with representatives from three broadcast industry associations and a translator station representative chosen for their broad industry perspective and expertise in particular segments of the industry

⁹*In the Matter of Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions, (Incentive Auction Report and Order)* 29 FCC Rcd 6567, June 2, 2014, Released, May 15, 2014, Adopted.

¹⁰*In the Matter of Amendment of Parts 73 and 74 of the Commission's Rules to Establish Rules for Digital Low Power Television and Television Translator Stations; Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions; Amendment of Part 15 of the Commission's Rules to Eliminate the Analog Tuner Requirement, (LPTV and Translator Report and Order)* 30 FCC Rcd 14927, December 17, 2015, Released, December 16, 2015, Adopted.

¹¹*Vacant Channel NPRM*, 30 FCC Rcd 6711, June 16, 2015, Released, June 11, 2015, Adopted.

¹²Other types of filings were letters and notices of *ex parte* presentations. An *ex parte* presentation discusses the merits or outcome of a proceeding, and if written, is not served on all the parties to a proceeding, and if it is oral, it is made without advance notice to the parties or an opportunity for them to be present. These notices could include copies of written presentations and summaries of oral presentations.

¹³Pub. L. No. 112-96, 126 Stat. 156 (codified at 47 U.S.C. § 309(j)(8)(G)).

to determine whether selected questions were answerable by station representatives and whether the answer choices provided were appropriate, and updated our survey accordingly. We then pre-tested our survey with four representatives of LPTV and/or translator stations—selected to provide for variety in type of station (LPTV and translator), number of stations represented, and geography—to ensure that our survey questions and skip pattern were clear and logical and that respondents could answer the questions without undue burden. In the course of pre-testing our survey we also obtained information that we present in this report. Through our survey, we obtained information on: (1) LPTV station programming, (2) ownership of LPTV and translator stations, and (3) station representatives' views on actions that FCC has proposed or taken and actions Congress or others could take to mitigate the effects of the incentive auction on LPTV and translator stations. We administered the survey from June 2016 through August 2016 and received 115 responses. These responses represent 535 of the 2,063 LPTV stations and 1,515 of the 3,660 translator stations in the U.S. and its territories. In our report, we generally provide survey results based on the number of respondents to each question. Because not all respondents answered every question of the survey, the total number of respondents may be fewer than 115 for some results. The results of our survey are not generalizable, and we did not verify respondents' answers.

We also interviewed officials from FCC and additional stakeholders that we selected to represent a range of views from various types of organizations. We selected stakeholders based on our review of comments filed in FCC's incentive auction and vacant channel proposal proceedings, as well as based on the recommendations of other organizations we interviewed. We interviewed six broadcast industry associations and three station ownership groups that own LPTV and/or translator stations chosen to represent entities with a variety of programming types. Additionally, we interviewed two technology companies, a technology industry association, and a public interest group chosen to present additional views on FCC's vacant channel proposal. More details about our scope and methodology, including a complete list of stakeholders we interviewed, can be found in appendix I. A copy of our survey and selected results can be found in appendix II.

We conducted this performance audit from January 2016 to December 2016 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe

that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

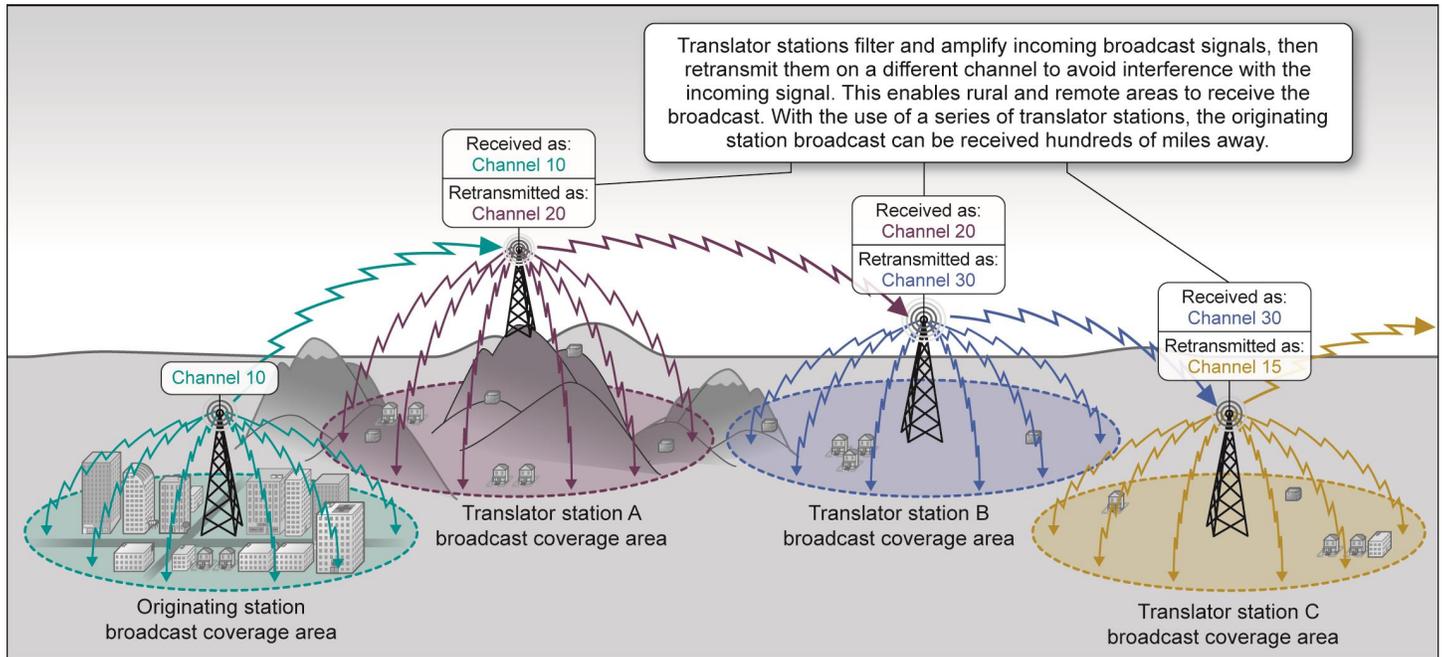
Background

LPTV stations, as indicated by their name, operate at lower power levels and transmit over smaller areas than full-power television stations. FCC established a licensing process for LPTV stations in 1982 to add to programming diversity and provide opportunities for locally oriented television service in small communities.¹⁴ LPTV stations may originate programming and, according to FCC, have created opportunities for new entry into television broadcasting, provided a means of local self-expression, and permitted fuller use of the broadcast spectrum. Translator stations retransmit programming from another station—such as a major network (ABC, CBS, FOX, or NBC)—to audiences unable to receive signals directly, usually because of distance or terrain barriers, such as mountains, that limit the signal’s ability to travel long distances. FCC rules prohibit translator stations from originating any programming.¹⁵ As shown in figure 1, some translator stations are part of a “daisy chain” in which multiple translator stations relay signals from one translator station to another, allowing the originating station’s signal to be received a few hundred miles away despite distance or other terrain obstacles.

¹⁴*An Inquiry into the Future Role of Low Power Television Broadcasting and Television Translators in the National Telecommunications System*, 51 R.R.2d 476 (1982).

¹⁵47 C.F.R. § 74.731(b) and (f).

Figure 1: Illustration of a Translator Station Daisy Chain



Source: GAO. | GAO-17-135

LPTV and translator service is secondary, meaning these stations may not cause interference to, and must accept interference from, primary services including primary television stations, which are full-power and Class A television stations.¹⁶ When interference with a full-power station cannot be remedied by adjusting an antenna or other technological methods, LPTV and translator stations must vacate the channel either by requesting FCC’s permission to move to another channel or by requesting permission to turn off their broadcast signal while searching for another channel. LPTV stations generally do not have “must-carry” rights—that is, cable and satellite providers are generally not required to carry signals

¹⁶47 C.F.R. § 74.702(b).

from LPTV stations, but cable and satellite providers may agree to do so.¹⁷

The 2012 act authorized FCC to conduct an incentive auction for broadcast television spectrum.¹⁸ This auction comprises two separate but interdependent auctions—a “reverse auction” to determine the amount of compensation that each broadcast television licensee¹⁹ would accept in return for voluntarily relinquishing some or all its spectrum rights; and a “forward auction” to determine the price companies are willing to pay for the relinquished spectrum. The spectrum being auctioned is in the UHF range, which currently consists of channels 14 through 51, except for channel 37. According to FCC, the spectrum being auctioned has excellent propagation characteristics that allow signals to cover large geographic areas and penetrate walls and other structures.²⁰ As shown in figure 2, at the time of this report, the incentive auction was ongoing and FCC expected it to conclude at the earliest in late 2016.

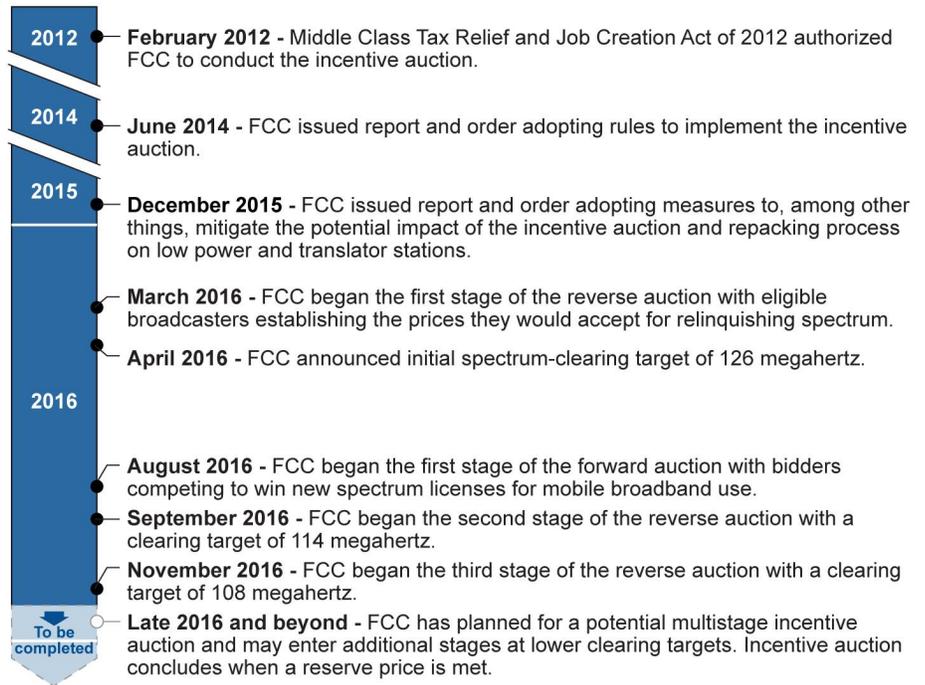
¹⁷Federal law requires cable and satellite operators to carry the signal of qualified LPTV stations serving their markets. 47 U.S.C. §§ 534 and 535. Federal law further set forth the qualifications that LPTV stations must meet in order to trigger the cable must-carry requirement, including (1) the community of license of the LPTV station and the franchise area of the cable system are both outside the largest 160 markets on June 30, 1990, (2) the population of the LPTV station’s community of license was not larger than 35,000 as of that date, and (3) there is no full-power television station licensed to any community within the county served by the cable system. 47 U.S.C. § 534 (h)(2). Similar requirements exist for satellite operators. 47 U.S.C. § 338.

¹⁸Pub. L. No. 112-96, § 6402, 126 Stat. 156, 224 (codified at 47 U.S.C. § 309(j)(8)(G)).

¹⁹The 2012 act defines broadcast television licensee as the licensee of (1) a full-power television station; or (2) a low power television station that has been accorded primary status as a Class A television licensee. Pub. L. No. 112-96, § 6001(6), 126 Stat. 156, 202.

²⁰*Incentive Auction Report and Order*, 29 FCC Rcd 6567, June 2, 2014, Released, Adopted, May 15, 2014.

Figure 2: Selected Key Dates Related to the Federal Communications Commission’s (FCC) Ongoing Spectrum Incentive Auction

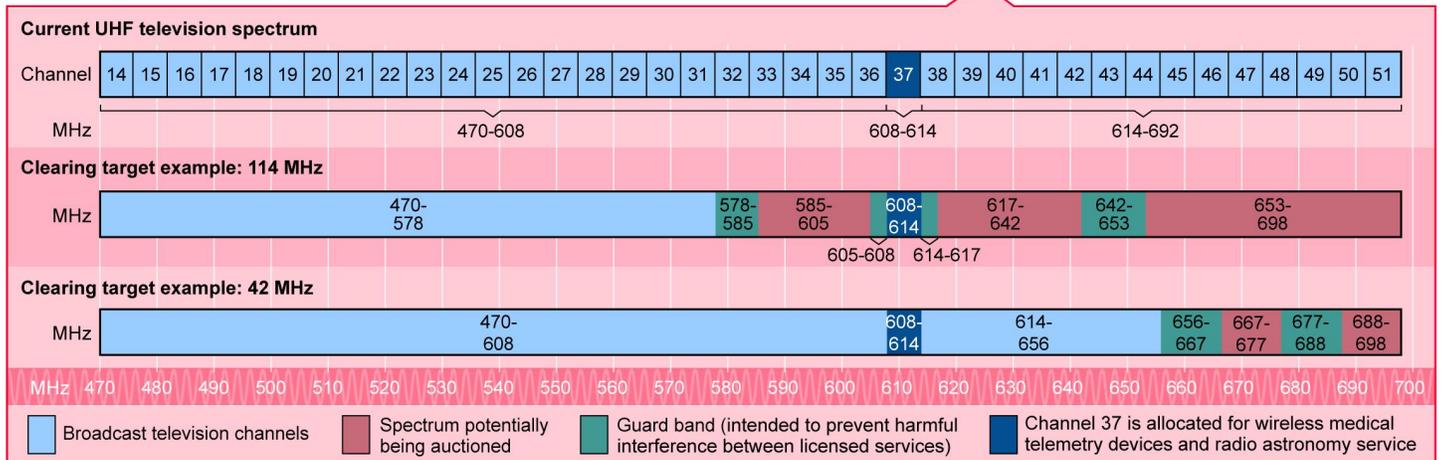


Source: GAO presentation of Federal Communications Commission information. | GAO-17-135

After the auction concludes, FCC reported it intends to reorganize the television broadcast band on a smaller range of channels to free up a portion of the spectrum; FCC refers to this reorganization as “repacking.” Relocating the remaining stations on lower channels allows for new, flexible-use spectrum licenses suitable for providing mobile broadband services. In April 2016, FCC announced an initial spectrum clearing target—the amount of spectrum FCC aimed to clear and repurpose in the auction and repack—of 126 MHz. In November 2016, after the first and second stages of the forward auction concluded without meeting the reserve price, FCC announced a new clearing target of 108 MHz, requiring television stations to use channels 2 through 32. As shown in figure 3, the number of channels available for both television stations and spectrum available for mobile broadband services varies depending on the clearing target.

Figure 3: Illustration of Broadcast Television Spectrum and Examples of the Incentive Auction’s Spectrum-Clearing Targets

Frequency band	Very low frequency	Low frequency	Medium frequency	High frequency	Very high frequency (VHF)	Ultra high frequency (UHF)	Super high frequency	Extremely high frequency
Examples of general use	Maritime navigation signals	Navigational aids	AM radio, Maritime radio	Shortwave radio	Broadcast television, FM radio	Broadcast television, Mobile telephone	Space and satellite communications, Microwave systems	Radio astronomy
Frequency	3 Kilohertz (kHz)	30 kHz	300 kHz	3 Megahertz (MHz)	30 MHz	300 MHz	3 Gigahertz (GHz)	30 GHz



Source: GAO analysis of information from the Federal Communications Commission and National Telecommunications and Information Administration. | GAO-17-135

Note: Television channels 2–13 operate in three bands in the VHF spectrum. Channels 2–4 operate in 54–72 MHz, channels 5–6 operate in 76–88 MHz, and channels 7–13 operate in 174–216 MHz.

The 2012 act authorized FCC to repack the remaining eligible stations and directed FCC to make all reasonable efforts to preserve the coverage area and population served of each eligible broadcast television licensee when making channel reassignments or reallocations following the incentive auction.²¹ In June 2014, FCC released the incentive auction report and order adopting rules to implement the incentive auction and subsequent repacking process.²² In the report and order, FCC stated that, as required by Congress in the 2012 act, FCC will preserve or protect the coverage area and population served by eligible broadcast television

²¹Pub. L. No. 112-96, § 6403(b)(2), 126 Stat. 156, 226.

²²*Incentive Auction Report and Order*, 29 FCC Rcd 6567, June 2, 2014, Released, May 15, 2014, Adopted.

licensees. Further, FCC concluded that protecting other categories of facilities, including LPTV and translator stations, which are—secondary in nature and not entitled to protection from primary services under FCC’s current rule—would unduly constrain FCC’s flexibility in the repacking process and undermine the likelihood of meeting FCC’s objectives for the incentive auction. FCC recognized the decision not to extend repacking protection and not to guarantee channels for LPTV and translator stations will result in some viewers losing service, may negatively affect the investments displaced LPTV and translator licensees have made in their existing facilities, and may cause displaced licensees that choose to move to a new channel to incur the cost of doing so. Although FCC does not know the number of affected LPTV and translator stations, FCC concluded that these concerns are outweighed by the detrimental impact that protecting LPTV and translator stations would have on the repacking process and on the success of the incentive auction. In two separate cases in December 2015, LPTV licensees and an individual party brought suit against FCC over the incentive auction and its potential impact, claiming, among other things, that FCC denied protections to LPTV stations in the auction and repacking process and that FCC’s actions violated the 2012 act.²³ In 2016, the U.S. Court of Appeals for the District of Columbia Circuit dismissed the petition for review in one case and sustained FCC’s orders in the other case. At the time of our review a separate, late-filed lawsuit raising similar concerns was ongoing.²⁴

In addition to adopting rules related to the incentive auction and subsequent repacking process, the incentive auction report and order announced a number of actions intended to make a significant amount of spectrum available for unlicensed use, including permitting unlicensed operations (1) on channel 37 in locations sufficiently removed from incumbent users to protect from harmful interference²⁵ and (2) in the

²³Pub. L. No. 112-96, 122 Stat. 156, 201(2012). See *Mako Communications, LLC; Beach TV Properties, Inc. v. FCC*, No. 15-1264 and 15-1280, (D.C. Cir. 2015) (These two cases were consolidated) and *Free Access & Broadcast Telemedia, LLC, et al., v. FCC*, No. 15-1346, (D.C. Cir. 2016 – unpublished opinion).

²⁴*Free Access & Broadcast Telemedia, LLC, et al. v. FCC, No 16-1100* (D.C. Cir. 2016).

²⁵Channel 37 is allocated for both wireless medical telemetry service (WMTS) devices and radio astronomy service (RAS). WMTS is used for remote monitoring of patient’s vital signs and other important health parameters (such as pulse and respiration rates) inside medical facilities. RAS is a receive-only service that uses highly sensitive receivers to examine and study radio waves of cosmic origin.

spectrum guard bands.²⁶ Additionally, FCC indicated in the incentive auction report and order that it anticipated there would be at least one channel in all areas throughout the country not assigned to a television station that could be used by unlicensed devices. In June 2015, FCC issued an NPRM to this effect, proposing to preserve at least one vacant channel in the UHF television band throughout the country.²⁷ The NPRM proposes that the channel preserved would be a UHF channel above channel 20, and the specific vacant channel preserved could vary depending on the particular area.²⁸ This proposal, known as the vacant channel proposal, would require LPTV and translator stations displaced by the repacking process to demonstrate that any new or modified facilities needed for a station to relocate to another channel would not eliminate the last remaining vacant channel in an area.²⁹ FCC tentatively concluded that the vacant channel proposal would ensure the public continues to have access to the significant benefits provided by unlicensed devices and wireless microphones across the country. According to FCC officials at the time of our review, it had not taken further action on the vacant channel NPRM and those matters were still under consideration.

Unlicensed devices that operate in the television spectrum band are sometimes referred to as white space devices because they operate in spectrum “white spaces”—buffer zones FCC established to mitigate

²⁶Guard bands are designed to prevent harmful interference between licensed services. The “duplex gap” is one such guard band and is the spectrum between the wireless broadband uplink and downlink bands.

²⁷*Vacant Channel NPRM*, 30 FCC Rcd 6711, June 16, 2015, Released, June 11, 2015, Adopted.

²⁸According to FCC officials, FCC indicated that it would revise this proposal to propose preservation of a UHF vacant channel to apply to Channels 14 and above if the rules for unlicensed device operations were revised in a subsequent proceeding, which they were in August 2015. *In the Matter of Amendment of Part 15 of the Commission’s Rules for Unlicensed Operations in the Television Bands, Repurposed 600 MHz Band, 600 MHz Guard Band and Duplex Gap, and Channel 37*, 30 FCC Rcd 9551, August 11, 2015, Released, August 6, 2015, Adopted.

²⁹The NPRM goes on to propose that applications that do not comply with this requirement be dismissed. *Vacant Channel NPRM*, 30 FCC Rcd 6711, June 16, 2015, Released, June 11, 2015, Adopted.

unwanted interference between adjacent stations.³⁰ According to FCC, unlicensed devices are an important part of the nation's communications capabilities, serve to augment the operations of licensed services, and meet the needs of a wide range of wireless applications including Wi-Fi, Bluetooth, baby monitors, and garage door openers. The Consumer Electronics Association reported in 2014 that devices using unlicensed spectrum generate approximately \$62 billion annually in retail-level sales and that further estimated growth in the market for devices that rely on unlicensed spectrum was "extremely strong."³¹

LPTV and Translator Stations Provide Programming and Information That Might Not Be Available to Over-the-Air Viewers after the Auction

LPTV and Translator Stations Are Diverse in Their Programming and Owned by Various Types of Entities

Through analysis of FCC data, our survey of LPTV and translator station representatives, and meetings with stakeholders as discussed below, we obtained information on LPTV and translator stations, including (1) the number of such stations and their communities of license,³² (2) types of programming and hours of broadcasting, and (3) ownership. Information obtained through our survey is non-generalizable.

³⁰The term "white space" devices refer to unlicensed devices operating on television channels pursuant to 47 C.F.R Part 15, subpart H. The term "wireless microphones" refers to wireless microphones and other low power auxiliary stations licensed pursuant to 47 C.F.R. Part 74, subpart H, and such similar devices authorized on an unlicensed basis pursuant to waiver.

³¹Consumer Electronics Association, *Unlicensed Spectrum and the U.S. Economy: Quantifying the Market Size and Diversity of Unlicensed Devices*, (May 2014).

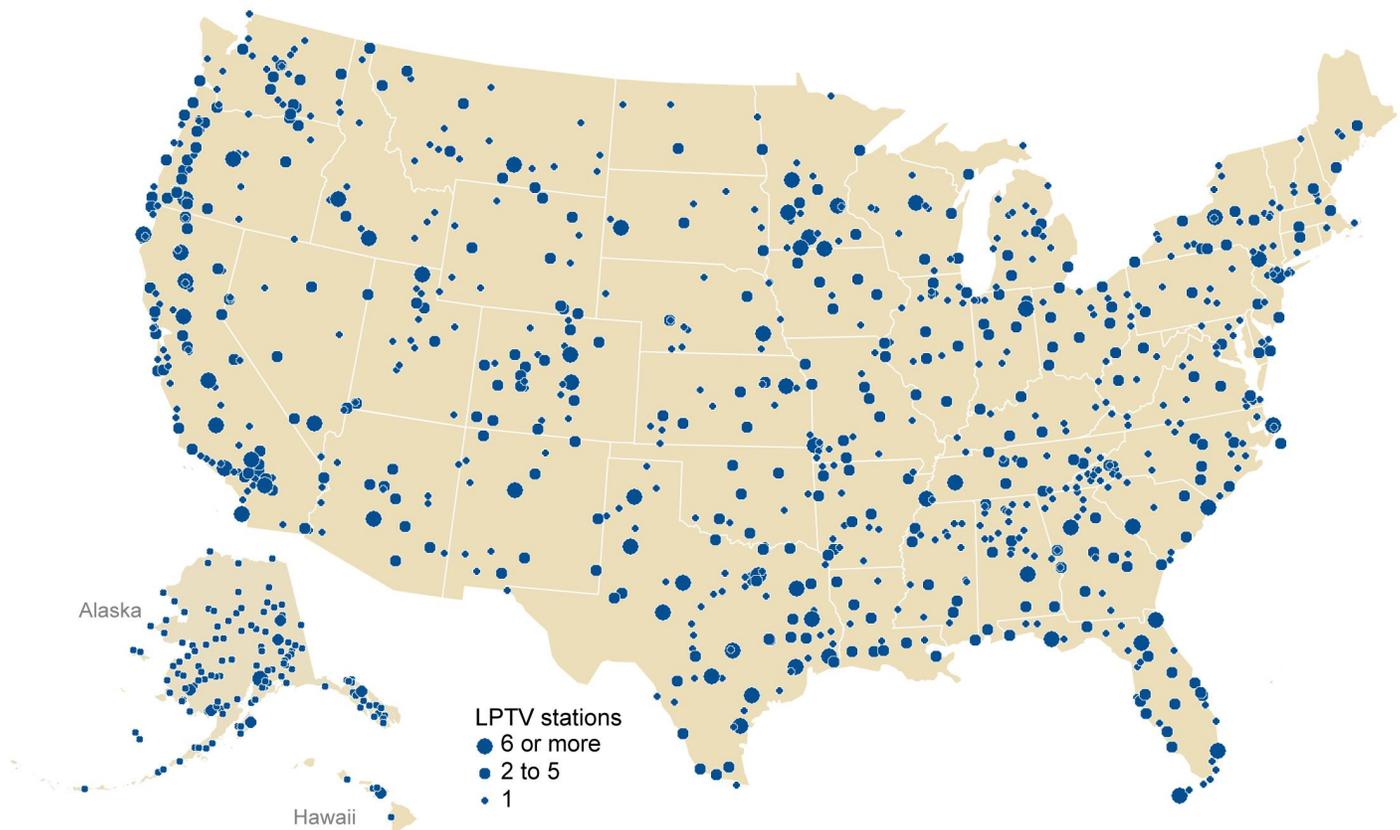
³²According to FCC officials, the community of license is the city and state provided by applicants to FCC. FCC does not assign communities of license to LPTV and translator stations as it does for full-power and Class A stations. The city and state included in the information provided by the LPTV and translator stations may or may not be within the area served.

Number of Stations and Communities of License

According to our analysis of FCC data, there were 2,063 LPTV stations and 3,660 translator stations in the U.S. and its territories as of May 25, 2016.³³ LPTV stations' communities of license are shown in figure 4.

According to one broadcast industry association we interviewed, LPTV stations serve a wide range of diverse audiences, including those in both rural counties with limited access to full-power stations and in large urban areas.

Figure 4: Low Power Television (LPTV) Stations' Communities of License as of May 2016



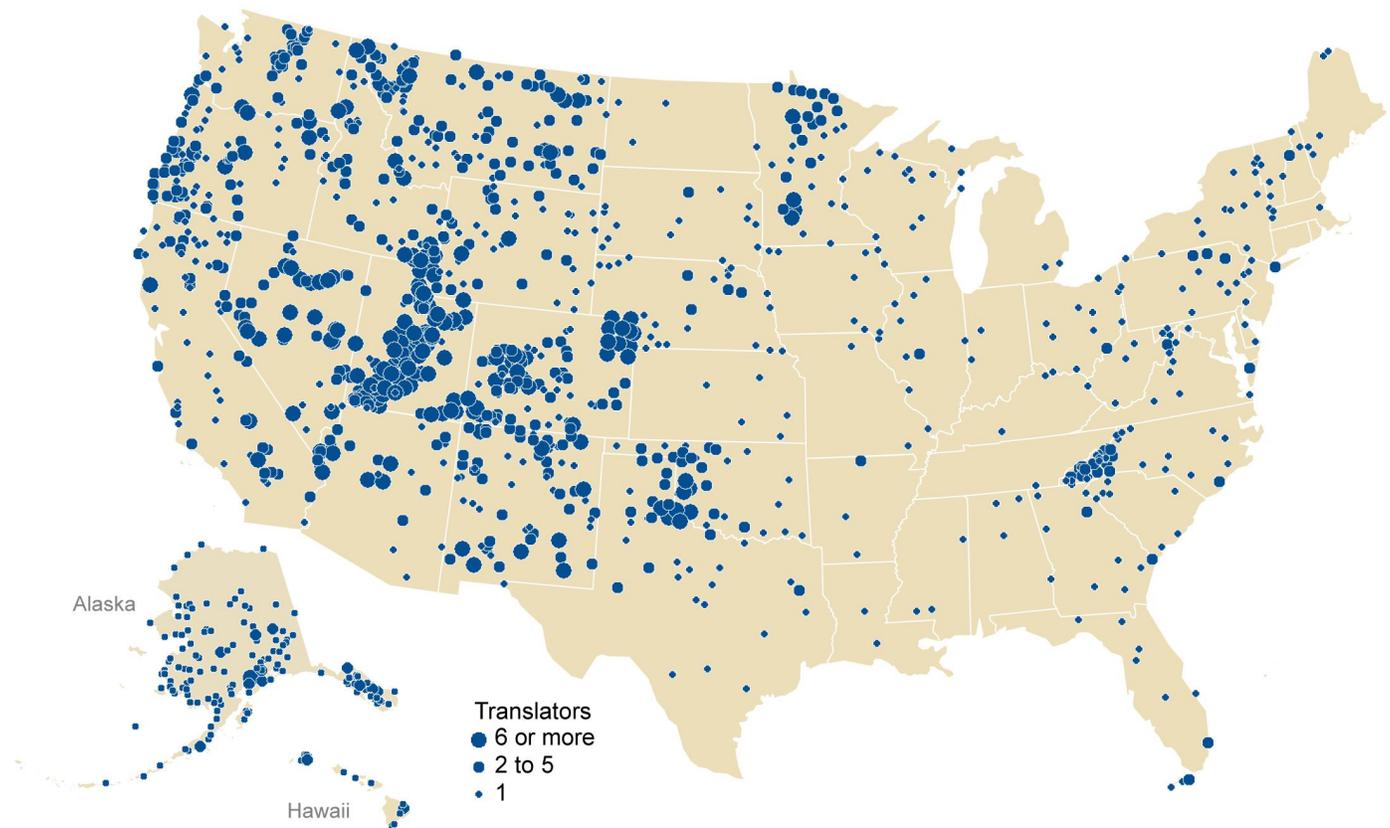
Source: GAO analysis of Federal Communications Commission data. | GAO-17-135

³³We previously reported that in addition to originating programming, LPTV stations may act as translator stations by retransmitting programming from a primary station. The number of such stations is unknown. [GAO-11-790](#).

Note: LPTV stations' communities of license are also located in the U.S. territories.

According to our analysis of FCC data, translator stations' communities of license are shown in figure 5. Translator stations tend to be concentrated in both rural and mountainous areas where they serve communities that cannot receive signals from full-power stations because they are too far away or because terrain blocks the signals.

Figure 5: Translator Stations' Communities of License as of May 2016



Source: GAO analysis of Federal Communications Commission data. | GAO-17-135

Note: Translator stations' communities of license are also located in the U.S. territories.

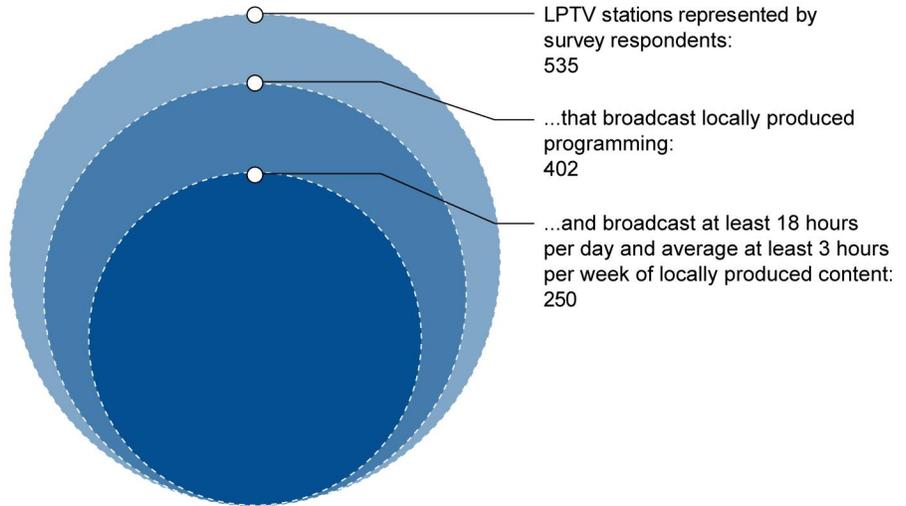
Programming and Hours of Broadcasting

According to FCC officials, pursuant to the First Amendment, FCC does not generally monitor broadcast stations' content and programming choices and because the few public service obligations LPTV stations have do not pertain to programming provided. Therefore FCC does not

collect information on the programming provided by LPTV stations or their hours of broadcasting, and we did not identify other sources of such data. In our non-generalizable survey of LPTV and translator station representatives, respondents representing 535 of the 2,063 LPTV stations in the U.S. and its territories provided information about the types of programming broadcast by the stations they represent (see fig. 6). Survey respondents indicated that most of these stations broadcast locally produced programming, and almost half of the stations represented by survey respondents broadcast at least 18 hours per day and an average of 3 hours per week of locally produced content, two factors similar to requirements for Class A status under the Community Broadcaster Protection Act of 1999.³⁴

³⁴The Community Broadcaster Protection Act of 1999 set forth the following requirements for LPTVs to qualify for Class A status: (1) during the 90 days preceding enactment, broadcast a minimum of 18 hours per day; (2) during the 90 days preceding enactment, broadcast an average of at least 3 hours per week of programming that was produced within the market area served by such station, or the market area served by a group of commonly controlled low power stations that carry common local programming produced within the market area served by such group; (3) during the 90 days preceding enactment, be in compliance with FCC's requirements applicable to LPTV stations; and (4) from and after the date of application for a Class A license, be in compliance with FCC's operating rules for full-power television stations. Pub. L. No. 106-113, § 5008, 113 Stat. 1501, 1501A-594 (codified at 47 U.S.C. § 336(f)(2)). For the purposes of our survey we defined locally produced programming as programming produced within the market area served by a particular station or in the market area served by a group of commonly controlled low power stations that carry common local programming produced within the market area served by such a group.

Figure 6: Broadcasting by Low Power Television (LPTV) Stations Represented by Survey Respondents



Source: GAO survey of LPTV and translator stations. | GAO-17-135

Data Table for Figure 6: Broadcasting by Low Power Television (LPTV) Stations Represented by Survey Respondents

Description	Number of stations
LPTV stations represented by survey respondents:	535
...that broadcast locally produced programming:	402
...and broadcast at least 18 hours per day and average at least 3 hours per week of locally produced content:	250

The locally produced programming broadcast by LPTV stations may be diverse and is broadcast in a variety of languages. Through our survey we identified examples of such content, including:

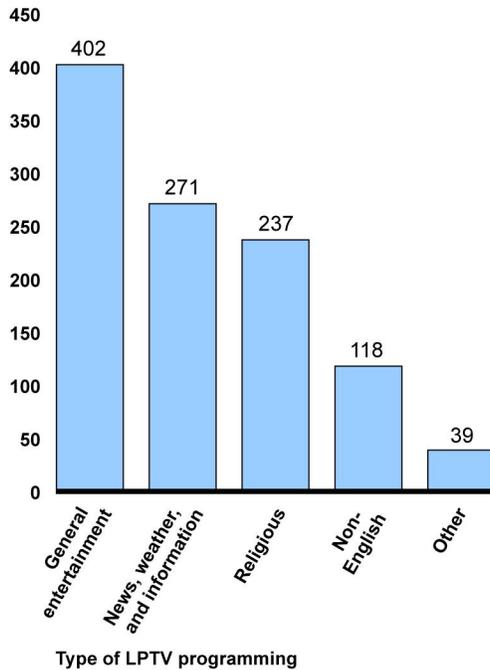
- programming in languages such as Bosnian, Hmong, Italian, Polish, Spanish, and various Native American languages;
- local news, weather, and traffic;
- local sports;
- local information, including community events, political debates, and volunteer opportunities;

- local recreational and tourism information such as skiing, fishing, and hunting reports;
- public health programming;
- arts and special interest programming such as art and cooking shows; and
- children’s programming.

Additionally, survey respondents provided information about programming broadcast by the stations they represent that is not locally produced. As shown in figure 7, the most common type of non-locally produced programming broadcast by LPTV stations represented by survey respondents is general entertainment.

Figure 7: Broadcast of Non-Locally Produced Programming by Low Power Television (LPTV) Stations Represented by Survey Respondents

Stations (out of 535 LPTV stations represented by survey respondents)



Source: GAO survey of LPTV and translator stations. | GAO-17-135

Data Table for Figure 7: Broadcast of Non-Locally Produced Programming by Low Power Television (LPTV) Stations Represented by Survey Respondents

Type of LPTV programming	Number of stations (out of 535 surveyed stations)
GE	402
NWI	271
Religious	237
Non-English	118
Other	39

Table 1 provides examples of these different types of programming that is not locally produced. These examples are from our survey, comments to FCC, and interviews.

Table 1: Examples of Low Power Television (LPTV) Programming That Is Not Locally Produced

Programming category	Examples
General entertainment	Movies and classic television Infomercials and home shopping Children’s programming Arts programming
News, weather, and information	Regional, national, and international news programming Regional and national weather programming International news and information from Africa, China, Korea, Mexico, and the Middle East Informational programming of interest to certain communities such as Native American communities
Religious	Christian programming, including church services, discussions, lectures, Bible study, and music Spanish-language religious programming, including programming from Central and South America Islamic religious programming
Non-English language	Arabic; Armenian; Cambodian; Chinese; Farsi; Japanese; Korean; Malay; Filipino; Russian; Samoan; Spanish; Vietnamese; various Indian languages such as Hindi; and various Native American languages

Source: GAO survey of LPTV and translator stations, comments to FCC, and interviews with broadcast industry associations and station ownership groups. | GAO-17-135

Moreover, LPTV stations that broadcast digitally may simultaneously transmit multiple signals and therefore can broadcast different content on multiple sub-channels.³⁵ For example, representatives of a station ownership group told us about programming they broadcast on digital sub-channels in the Los Angeles area. On one digital sub-channel, they broadcast programming imported from Central America that is the primary news source for many of the about 2 million immigrants from Central America living in the area, according to these representatives. On another digital sub-channel, they broadcast programming imported from Cambodia, which is the only Cambodian station in the U.S. and reaches between 50,000 and 70,000 Cambodian speakers in the area, according to these representatives.

³⁵Digital technology uses the radiofrequency spectrum more efficiently than analog technology and, as a result, provides greater flexibility in terms of the television content that television stations can provide. Television stations can transmit a single analog signal in the 6 MHz of radio spectrum allocated to each television station. In contrast, with digital technology, television stations can use that 6 MHz of spectrum to simultaneously transmit multiple signals in standard definition digital format, a concept known as “multicasting.”

Ownership

FCC collects information biennially on racial and ethnic minority and female broadcast ownership for certain commercial stations.³⁶ FCC's reports based on this data collection do not present data on the number of stations owned by different types of entities such as for-profit, not-for-profit, and governmental. Further, while full-power, Class A, and LPTV stations are required to provide this information, FCC officials told us that translator stations are not required to submit this information and that, according to the most recent report based on these filings, about one third of LPTV stations did not file the required reports.³⁷

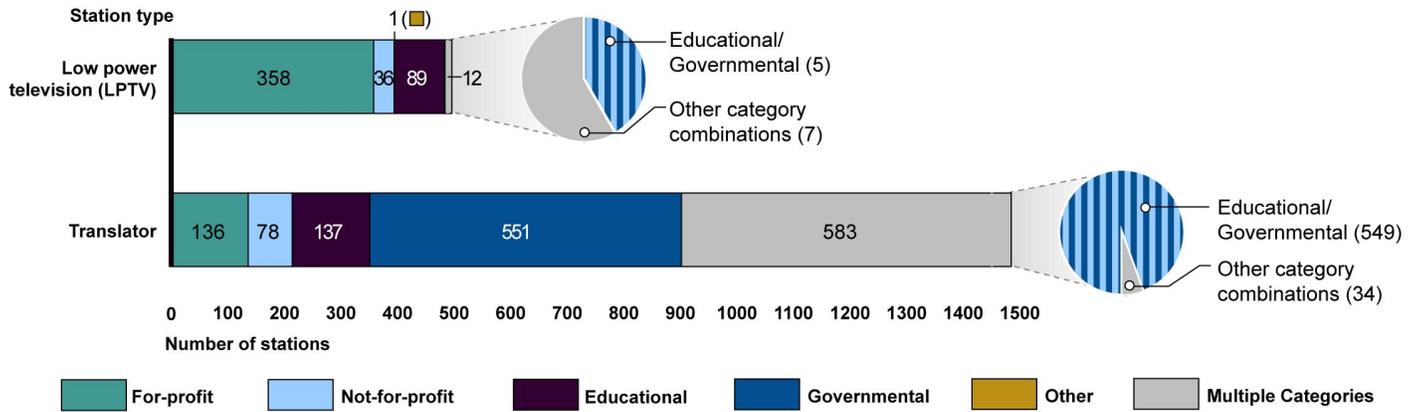
Our survey collected information on the types of entities that own the LPTV and translator stations represented by respondents. As shown in figure 8, most of the 535 LPTV stations represented by survey respondents are owned by for-profit entities, while more than a third of the 1,515 translator stations represented by survey respondents are owned by governmental entities.³⁸ Ownership of translator stations tends to vary depending on factors such as the direct market size of full-power stations and geography, according to representatives we interviewed from a broadcast industry association. For example, in New Mexico and Oregon, where the direct market for full-power stations is less populous, full-power stations may own and operate translator stations to extend the reach of their programming. In mountainous areas where geography may limit the reach of full-power stations, translator stations tend to be locally owned by governmental entities or other community organizations, according to a broadcast industry association we interviewed.

³⁶47 C.F.R. § 73.3615(a).

³⁷*Promoting Diversification of Ownership in the Broadcasting Services, Report on Ownership of Commercial Broadcast Stations*, 29 FCC Rcd 7835, June 27, 2014, Released.

³⁸Governmental entities include cities, counties, tribes, and community entities such as community translator associations. Not all station representatives indicated the type of entity or entities that own the station(s) they represent, so numbers do not add to the total number of stations represented by survey respondents.

Figure 8: Types of Entities That Own the Low Power Television (LPTV) and Translator Stations Represented by Survey Respondents



Source: GAO survey of LPTV and translator stations. | GAO-17-135

Note: Some survey respondents indicated that the stations they represent are owned by entities that fit in multiple categories such as educational and governmental or some other combination.

Data Table for Figure 8: Types of Entities That Own the Low Power Television (LPTV) and Translator Stations Represented by Survey Respondents

	For-profit	Not-for-profit	Educational	Governmental	Other	Educational/governmental	Other category combinations
Low power television (LPTV)	358	36	89	0	1	5	7
Translator	136	78	137	551	0	549	34

Ownership type and structure may affect stations' vulnerability in the auction even in areas where spectrum is available following the auction, according to various stakeholders as discussed below.

- Government- and community-owned stations typically rely on municipal budgets and tax revenues to operate, and in some cases the community served would have to raise taxes or dues to obtain the capital necessary to relocate, according to representatives from two broadcast industry associations we interviewed and three survey respondents.
- Stations owned by for-profit, not-for-profit, and educational entities may not be able to afford the capital costs required to relocate, particularly when the entity operates on a small budget, according to two broadcast industry associations we interviewed and two survey respondents. For example, while some translator stations may be owned by station ownership groups that own a portfolio of stations—

including full-power stations, Class A stations, or both—of the 115 station representatives who completed our survey, more than two-thirds (81) represent 10 stations or fewer, and 33 respondents represent a single station. Further, according to a station ownership group we interviewed securing financing to fund relocation costs is difficult because investors are unwilling to invest in LPTV and translator stations because of their uncertain future.

- Some station owners, regardless of the type of ownership entity, use revenue from stations in more populated areas to supplement funding for the operation of stations in less populated areas. For example, station representatives who operate three LPTV stations serving Native American communities told us that the stations serving less populated areas would not be able to operate without supplemental revenue from the stations serving more populated areas.³⁹ According to these representatives, these stations provide diverse programming such as locally produced Native American cultural programming, educational programming, information on tribal affairs, and programming in multiple Native American languages.

The Incentive Auction Could Affect Viewers' Ability to Receive LPTV and Translator Stations' Programming and Televised Emergency Information

We found LPTV and translator station viewers may lose access to programming or emergency alert information through several possible ways, including the following:

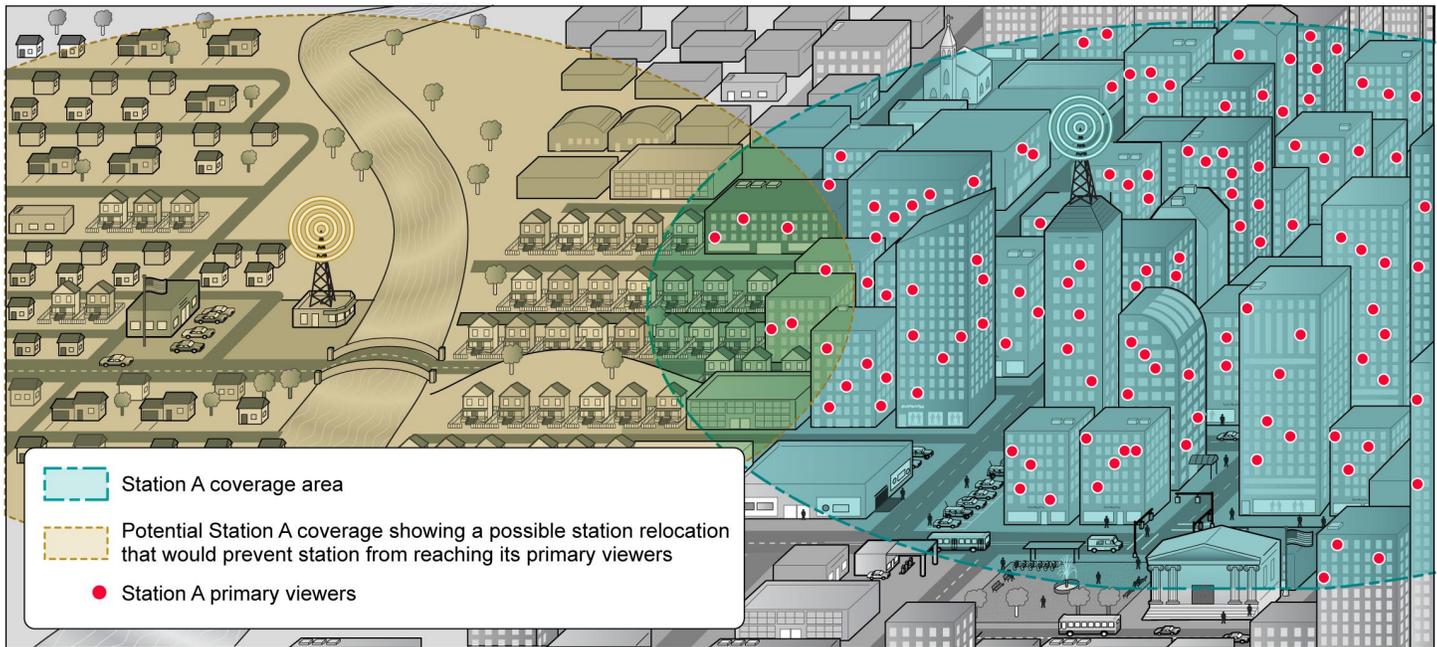
- *Alternatives to broadcast programming are cost-prohibitive or unavailable:* Many LPTV and translator station viewers are economically or geographically disadvantaged and may not be able to afford other options for accessing programming such as for satellite television or broadband Internet, according to two broadcast industry associations we interviewed and six survey respondents, among others. For example, one survey respondent, a county treasurer/recorder in a rural area, described the situation for viewers of the county's translator stations. The county charges each household \$30 per year for television service. The survey respondent said that there are many county residents who are elderly, on fixed incomes, or otherwise low-income and cannot afford to pay a higher

³⁹We obtained information from these station representatives while pre-testing our survey.

monthly television subscription fee, such as satellite service. Further, some viewers live in areas where paid television service or broadband service, or both are unavailable, according to one broadcast industry association we interviewed, a station ownership group, and one survey respondent.

- *Niche programming:* Viewers of locally produced programming and niche programming, such as the programming described above, may lose access to this programming, and similar programming may not be available through the remaining over-the-air broadcast channels according to three broadcast industry associations and a station ownership group we interviewed. For example, if an LPTV station broadcasting non-English-language programming in a city is displaced in the incentive auction and cannot find an available channel in the repack, its viewers may have no other options for similar programming. Moreover, LPTV stations that provide niche programming to a particular audience in a particular area could be forced out of business following the incentive auction and repack even if they are able to find available spectrum in the repack. For example, a non-English language channel may exist to serve a segment of the population that resides in a small pocket of an urban area. If displaced, that channel may be unable to relocate to a replacement channel that would reach its primary viewers, as shown in figure 9. Without access to its primary viewers, the station may not be able to raise the funds necessary to continue operation.

Figure 9: Illustration of Situation Where a Station That Relocates after the Incentive Auction Would be Unable to Reach All of Its Primary Viewers



Source: GAO. | GAO-17-135

- Televised emergency alerts:* Some viewers in geographically remote areas receive broadcast television signals only from a station or stations that are not protected in the incentive auction and repack, meaning the station might be unable to relocate and thus cease broadcasting. Viewers in these areas may no longer have access to televised emergency alerts. Of the 2,050 LPTV and translator stations represented by survey respondents, more than 10 percent (211) serve areas that receive no service from full-power or Class A stations, according to survey respondents. Moreover, of the 1,515 translator stations represented by survey respondents, 433 rebroadcast signals received from another translator station and 212 send signals to another translator station. This interconnectedness among translator stations could compound these stations' vulnerability in the auction, according to representatives of a broadcast industry association that represents translator stations. Although it is possible for LPTV or translator stations to serve as the only source of televised emergency alerts, FCC considered whether such stations should have special priority in the repacking process and declined to adopt any such measures. In particular, in a 2012 NPRM FCC sought comment on whether the public interest would be served by establishing a set of selection priorities to choose among applications of displaced LPTV

and translator stations and on the types of selection priorities to adopt.⁴⁰ In the incentive auction report and order, FCC declined to adopt the particular selection priorities suggested by commenters in the NPRM, including providing priority for stations that are primary Emergency Alert System providers.⁴¹

As noted previously, FCC has acknowledged that the incentive auction will potentially displace some LPTV and translator stations.⁴² FCC officials told us they have not systematically analyzed the potential displacement impact on LPTV or translator stations because of Congress's determination not to include these stations in the auction or protect them in the repacking process.⁴³ As discussed below, FCC has taken some actions to try to mitigate the auction's effects on these stations.

Selected Stakeholders View FCC's Actions as Having Limited Usefulness and Have Proposed Additional Actions to Mitigate the Auction's Effects

Selected Stakeholders View FCC's Actions as Helpful in Some Circumstances but Insufficient

According to FCC officials, FCC's actions to mitigate the effects of the incentive auction include: (1) channel sharing, (2) the digital transition deadline, (3) FCC's optimization software, and (4) cross-border

⁴⁰*In the Matter of Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, 27 FCC Rcd 12357, Released, October 2, 2012, Adopted, September 28, 2012.

⁴¹*Incentive Auction Report and Order*, 29 FCC Rcd 6567, June 2, 2014, Released, May 15, 2014, Adopted.

⁴²*Incentive Auction Report and Order*, 29 FCC Rcd 6567, Released, June 2, 2014, Adopted, May 15, 2014. *LPTV and Translator Report and Order Auctions; Amendment of Part 15 of the Commission's Rules to Eliminate the Analog Tuner Requirement*, 30 FCC Rcd 14927, December 17, 2015, Released, December 16, 2015, Adopted.

⁴³FCC officials told us that while the auction will by definition result in fewer channels available for television stations, the impact on LPTV and translator stations depends in large part on the outcome of the auction.

coordination.⁴⁴ While broadcast industry associations generally expressed support for these measures in comments to FCC, some representatives of these groups told us and stated in comments to FCC that the actions will not do much to mitigate the effects of the incentive auction on LPTV and translator stations.⁴⁵ Moreover, we asked the 115 representatives of 535 LPTV and 1,515 translator stations who responded to our survey to rate the usefulness of these four measures, and, in all but one case, the number of both LPTV and translator stations represented by respondents was greater for those who rated the action as not useful. Furthermore, those who rated these measures as useful often did so with caveats.

Channel Sharing

In the LPTV and translator report and order, FCC announced that it will allow channel sharing among LPTV and translator stations and proposed allowing channel sharing between LPTV and translator stations and full-power and Class A stations.⁴⁶ Stations that enter into such agreements may divide the capacity of the shared channel however they would like, as long as each station retains spectrum usage rights sufficient to transmit at least one standard definition programming stream at all times, but will continue to be licensed separately and will separately be subject to FCC's obligations, rules, and policies.⁴⁷ According to FCC, these measures have the potential to be beneficial to LPTV and translator stations, and some broadcast industry associations expressed support of these measures in comments to FCC. However, all of the broadcast industry associations with whom we discussed the issue stated that allowing LPTV and translator stations to enter into channel-sharing

⁴⁴FCC officials discussed additional rule changes outlined in the incentive auction report and order that were intended to mitigate the effects of the incentive auction on LPTV and translator stations. For example, FCC adopted rules permitting LPTV and translator stations to continue operations on their existing channel assignment until the forward-auction bidder is ready to build. This rule and other actions can be found in the incentive auction report and order, *Incentive Auction Report and Order*, 29 FCC Rcd 6567, June 2, 2014, Released, May 15, 2014, Adopted.

⁴⁵Throughout the report we use "some" when three or more stakeholder sources combined supported a particular idea or statement.

⁴⁶*LPTV and Translator Report and Order*, 30 FCC Rcd 14927, December 17, 2015, Released, December 16, 2015, Adopted.

⁴⁷*LPTV and Translator Report and Order*, 30 FCC Rcd 14927, December 17, 2015, Released, December 16, 2015, Adopted.

agreements will not be helpful in a meaningful way.⁴⁸ For example, a representative from one broadcast industry association told us that channel sharing would likely require stations to degrade their signal, which may inhibit multicasting and the use of high-definition signals, and another broadcast industry association told us that stations will use channel sharing only as a last resort. Additionally, as shown in table 2 below, survey respondents representing more stations rated channel sharing as not useful, than useful.

⁴⁸An industry association representing translator stations said that channel sharing might be helpful for LPTV stations but will not be helpful for translator stations.

Table 2: Views on Usefulness of Channel Sharing Provided by Survey Respondents Representing Low Power Television (LPTV) and Translator Stations

Usefulness rating	Number of LPTV stations represented	Number of translator stations represented	Key responses
Useful	195	292	<p>Channel sharing may help LPTV and translator stations stay in business; for many, it may be the only alternative.</p> <p>Channel sharing may help LPTV and translator stations stay in business, but it will reduce the visibility and identity of stations, and it may be cost prohibitive for many stations.</p>
Not useful	285	924	<p>It is unlikely that there will be stations with which to share channels because (1) there are no other stations in the area we serve, (2) there are likely to be too few stations in the area we serve remaining after the auction, and/or (3) remaining stations may not be able to share due to technical limitations or may not want to share.</p> <p>Channel sharing may undermine the business case because it may limit multicasting and/or degrade picture quality.</p> <p>Channel sharing may be cost prohibitive. For example, one survey respondent reported that another station would have charged \$1,000,000 to share an antenna.</p>

Source: GAO survey of LPTV and translator stations. | GAO-17-135

Optimization Software

In the LPTV and translator report and order, FCC announced it will use its incentive auction and repacking optimization software to identify channels that will be available for displaced stations. FCC plans to publish a list of available channels 60 days prior to the beginning of the LPTV and translator displacement window, and displaced stations will be able to use this information when applying for replacement channels.⁴⁹ While FCC stated in the LPTV and translator report and order that this proposal garnered considerable support from broadcast industry associations, representatives from the four broadcast industry associations that mentioned this measure to us said that it will be minimally helpful. Specifically, one broadcast industry association told us that it will provide almost no help to LPTV stations, and another stated that the measure is hollow and will have limited effect, if any. Additionally, as shown in table 3 below, survey respondents representing more stations rated this measure as not useful, than rated it as useful.

⁴⁹LPTV and Translator Report and Order, 30 FCC Rcd 14927, December 17, 2015, Released, December 16, 2015, Adopted.

Table 3: Views on Usefulness of Optimization Software Provided by Survey Respondents Representing Low Power Television (LPTV) and Translator Stations

Usefulness rating	Number of LPTV stations represented	Number of translator stations represented	Key responses
Useful	169	449	May save LPTV and translator station owners' time and money, especially if there is no charge. Will hire consulting engineers or use in-house engineers, but this software may simplify the process of identifying new channels.
Not useful	318	747	Will still need to hire consulting engineers or use in-house engineers. The translator network on which our station(s) rely is complex and best engineered by those with on-the-ground experience with the network. It is unlikely that there will be sufficient spectrum in our area following the auction; software will not change that.

Source: GAO survey of LPTV and translator stations. | GAO-17-135

Digital Transition Deadline

In the LPTV and translator report and order, FCC extended the deadline by which analog LPTV and translator stations must complete the transition to digital so that stations would not have to make significant capital investments to meet the digital transition deadline, only to face possible displacement in the auction and repack process.⁵⁰ According to FCC, the September 2015 deadline had been established in anticipation of the auction being conducted in 2014. While FCC cited broad support from the LPTV and translator industry for this measure, two broadcast industry associations stated in comments to FCC that this action was more a common sense policy change than an action to mitigate the effects of the auction. These commenters said it was only fair for FCC to extend the date given the cost associated with transitioning to digital and then potentially relocating after the auction. As shown in table 4 below, survey respondents representing more stations rated extending the digital transition deadline as not useful, than useful.

⁵⁰The report and order extended the deadline from September 2015 until 12 months following the completion of the 39-month post-auction transition period for full-power and Class A stations reassigned to a new channel. *LPTV and Translator Report and Order*, 30 FCC Rcd 14927, December 17, 2015, Released, December 16, 2015, Adopted.

Table 4: Views on Usefulness of Extending the Digital Transition Deadline Provided by Survey Respondents Representing Low Power Television (LPTV) and Translator Stations

Usefulness rating	Number of LPTV stations represented	Number of translator stations represented	Key Responses
Useful	212	201	This extension will enable stations to avoid the capital investment required to meet the digital transition deadline only to face possible displacement in the auction and repack process, an outcome that could require additional capital outlay or loss of the station. Some stations may need additional time to transition to digital.
Not useful	228	974	Our stations are already broadcasting in digital.

Source: GAO survey of LPTV and translator stations. | GAO-17-135

Cross-Border Coordination

In the LPTV and translator report and order, FCC addressed commenters’ suggestions that FCC develop a streamlined approach to coordinating with foreign governments on the interference and application approval process to address situations where stations’ signals may cross an international border, such as into Canada or Mexico. FCC stated that the cross-border coordination process is continual and that FCC has used its existing processes to keep Canada and Mexico fully informed on the incentive auction coordination issues. FCC further stated that it intends to make efforts to streamline the cross-border coordination processes so that it will not delay the post-auction displacement application process for LPTV and translator stations. As shown in table 5 below, a greater portion of LPTV stations were represented by survey respondents that rated this measure as useful than not useful, whereas the opposite is true for translator stations. However, regarding cross-border coordination, survey respondents provided similar responses regardless of the rating they provided.

Table 5: Views on Usefulness of Improving Cross-Border Coordination Provided by Survey Respondents Representing Low Power Television (LPTV) and Translator Stations

Usefulness rating	Number of LPTV stations represented	Number of translator stations represented	Key responses
Useful	267	293	Our stations are on the border, and cross-border coordination can take years. Any streamlining that reduces delay would be helpful. Our stations are not on the border, but this seems like it would help stations that are.

Usefulness rating	Number of LPTV stations represented	Number of translator stations represented	Key responses
Not useful	165	651	Given history of cross-border coordination, skeptical that any streamlining will be possible. Our stations are not near the border.

Source: GAO survey of LPTV and translator stations. | GAO-17-135

Stakeholders Suggested a Variety of Actions to Help Mitigate the Potential Impact of the Auction

In addition to the measures discussed above, the broadcast industry associations and station ownership groups we interviewed and the station representatives who responded to our survey identified other actions they believe FCC or Congress could take that could help mitigate the effects of the incentive auction on LPTV and translator stations. The proposals that arose the most frequently in the interviews and survey were: (1) reconsidering various aspects of the auction, (2) providing funding for relocation costs incurred by LPTV and translator stations displaced in the auction, (3) allowing LPTV and translator stations to operate with alternative technical standards, and (4) providing LPTV and translator stations an opportunity to obtain primary interference protection status, which would protect these stations from future displacement by primary services.⁵¹

Reconsider Various Aspects of the Auction

The suggestions that arose most frequently related to FCC reconsidering various aspects of the incentive auction. For example, 15 survey respondents suggested that FCC protect LPTV and translator stations in the incentive auction and repack; 12 survey respondents suggested that FCC or Congress provide compensation for lost spectrum rights to displaced LPTV and translator stations; 7 survey respondents suggested that FCC provide protection in the auction and repack for certain types of stations such as rural translator stations, tribally owned stations, and

⁵¹ Suggestions that arose less frequently include granting must-carry rights for LPTV and translator stations displaced in the auction; granting certain LPTV and/or translator stations priority in the post-auction repack and beyond; altering distance, coverage overlap, or interference standards, and allowing LPTV and translator stations facing financial challenges to remain off the air for a certain time period. Similar proposals were also raised in comments to FCC, and FCC declined to address them, concluding that FCC had already resolved the issues in prior orders.

stations broadcasting locally produced content; 6 survey respondents suggested that FCC or Congress cancel the auction; and 5 survey respondents suggested that FCC provide LPTV and translator stations more time to move channels. Regarding these and similar suggestions raised in the incentive auction proceeding, FCC stated in the LPTV and translator report and order that the proposed measures were fully considered in the incentive auction rulemaking proceeding and subsequent orders and FCC declined to revisit them.

Provide Funding for Relocation Expenses

The second most frequent suggestion related to FCC or Congress providing funding for relocation costs incurred by LPTV and translator stations that are displaced in the auction, either through a grant program or through reimbursement of expenses. While FCC has studied the costs associated with relocating eligible full-power and Class A stations that are reassigned to new channels during the repack process,⁵² FCC officials told us that because Congress did not make LPTV or translator stations eligible to be reimbursed for certain relocation costs, the officials have not studied the costs associated with relocating LPTV and translator stations. A broadcast industry association we interviewed indicated that the costs for relocating LPTV and translator stations vary widely depending on a number of factors such as the distance of the move; whether a new tower will be required; and the availability of engineers, tower crews, and equipment. Of the 83 survey respondents that represent LPTV stations, 28 respondents reported estimated relocation costs ranging from \$25,000 to over \$600,000 per station. Of the 50 survey respondents that represent translator stations, 15 respondents reported estimated relocation costs for their stations ranging from approximately \$8,500 to approximately \$37,500, with an additional \$100,000 per site if microwave equipment were required.⁵³ FCC addressed similar suggestions in the LPTV and translator report and order and in previous orders related to the incentive auction and stated that the decision whether to authorize such funding is

⁵²Widely, Inc., *Response to the Federal Communications Commission for the Broadcaster Transition Study Solicitation* (Dec. 30, 2013).

⁵³According to representatives from one broadcast industry association, microwave equipment would allow stations to use microwave frequencies rather than television channels to retransmit programming to other translator stations.

Congress's prerogative and that the 2012 act limits reimbursement to full-power and Class A stations.⁵⁴

Permit Use of Alternative Technical Standards

Half of the broadcast industry associations we interviewed, all of the station ownership groups we interviewed, and 13 survey respondents proposed various measures by which FCC would allow LPTV and translator stations to operate with different technical standards or network architectures.⁵⁵ Proposals include enabling broadcasters to seek innovative ways to use their spectrum and adopting Advanced Television Systems Committee (ATSC) 3.0.⁵⁶ ATSC 3.0 is an alternative technical standard for digital broadcast television that, according to proponents, has the potential to enhance the viewing experience, provide for more robust signaling, expand diverse programming opportunities, enhance emergency alert capabilities, and provide for new service offerings. Additionally, some broadcast industry association representatives we interviewed stated that timely adoption of ATSC 3.0 or other alternative technical standards for digital broadcast television would enable many LPTV and translator stations to survive the auction because stations would be more efficient in their use of spectrum, freeing more spectrum for broadcast use in the repack. In the LPTV and translator report and order, FCC stated that consideration of alternative technical standards, including ATSC 3.0, is outside of the scope of the incentive auction proceeding and is better left for future proceedings.⁵⁷ In April 2016, several broadcast industry stakeholders filed a joint petition for rulemaking asking FCC to amend its rules to allow broadcasters to use

⁵⁴Middle Class Tax Relief and Job Creation Act of 2012, Pub. L. No. 112-96 § 6402, 126 Stat. 156, 224 (codified at 47 U.S.C. § 309(j)(8)(G)). *LPTV and Translator Report and Order*, 30 FCC Rcd 14927, Released, December 17, 2015, Adopted, December 16, 2015. *Incentive Auction Report and Order*, 29 FCC Rcd 6567, June 2, 2014, Released, May 15, 2014, Adopted.

⁵⁵According to FCC officials, network architecture is the method of deploying equipment for broadcasting a television signal. For instance, many stations transmit their signals on their assigned channel from one location on one antenna.

⁵⁶ATSC is an international non-profit organization developing voluntary standards for digital television. ATSC works to coordinate television standards among different communications media focusing on digital television, interactive systems, and broadband multimedia communications.

⁵⁷*LPTV and Translator Report and Order*, 30 FCC Rcd 14927, December 17, 2015, Released, December 16, 2015, Adopted.

ATSC 3.0, and later that month FCC issued a public notice seeking comment on the petition, with comments due in June 2016. According to FCC officials, these comments are under consideration and FCC could decide to issue an NPRM; however, as of September 2016, FCC has not announced a timeline for doing so.

Provide Opportunity to Obtain Primary Interference Protection Status

Two broadcast industry associations and a station ownership group we interviewed as well as some survey respondents suggested that FCC provide an opportunity for LPTV and/or translator stations to obtain primary interference protection status, such as Class A status or some other designation, to avoid future displacement by primary users. Some proponents stated that such a measure would provide more certainty for the industry going forward, which in turn would enable investment in the industry. In the LPTV and translator report and order, FCC declined all proposals that would allow LPTV and/or translator stations to obtain primary interference protection status before the completion of the post-auction transition period, but stated that FCC may consider at a later date whether to allow LPTV and/or translator stations to obtain primary status after the completion of this period.

Selected Stakeholders Expressed Varying Views on Outcomes of Preserving a Vacant Television Channel

Through our interviews with selected stakeholders—including six broadcast industry associations, three station ownership groups, two technology companies, a technology industry association, and a public interest group—and analyzing comments filed with FCC, we identified four primary expected outcomes of preserving a vacant television channel:⁵⁸ (1) loss of existing broadcast service, (2) development of new

⁵⁸As described previously, FCC's vacant channel NPRM stated that if adopted, following the incentive auction, FCC intended to preserve a vacant channel for use by white space devices, such as Wi-Fi Internet and Bluetooth, and wireless microphones. According to the proposal, this vacant channel would not be assigned to a television station in the repacking process following the incentive auction. As of September 2016, FCC was accepting input on the vacant channel proposal and officials told us FCC has not announced a timeline for making a final decision on the proposal. *Vacant Channel NPRM*, 30 FCC Rcd 6711, June 16, 2015, Released, June 11, 2015, Adopted.

technologies and innovation, (3) improvement of Wi-Fi Internet, and (4) improvement of rural broadband service. FCC officials told us these outcomes are the main outcomes stakeholders discuss in comments submitted to FCC. The broadcast industry associations and station ownership groups generally opposed the proposal, while the technology companies, the technology industry association, and the public interest group were proponents of the proposal. As discussed below, stakeholders expressed varying views about the expected outcomes.

Loss of Existing Broadcast Service

Representatives from all the broadcast industry associations told us that preserving a vacant channel will result in a loss of existing broadcast television service for viewers. For example, a representative from one broadcast industry association told us the vacant channel proposal will force existing LPTV and translator stations off the air because there will be one less channel where a displaced LPTV or translator station can relocate and that many rural and underserved communities will likely lose access to the broadcast stations on which they rely. Additionally, representatives of the three station ownership groups we interviewed also expressed concern that the vacant channel proposal would result in a loss of existing broadcast service. A representative from one of these groups told us the vacant channel proposal will exacerbate the challenges faced by LPTV stations by taking at least one more channel and preventing them from relocating there following a stations displacement after the incentive auction.

In the vacant channel NPRM, FCC stated a tentative conclusion that the proposal, if adopted, would not be a significant burden in terms of the availability of channels for future use for broadcasters, including LPTV and translator stations. The NPRM further stated that the impact will be limited because multiple vacant channels will still exist in all or most areas after the channel repack. FCC officials told us they have not conducted a systematic analysis on the expected effects of the vacant channel proposal on LPTV and translator stations, but noted they proposed preserving a vacant channel because of the overall potential public-interest benefits expected from doing so. The officials noted that FCC used available information including comments filed with FCC to inform the proposal and that they sought additional comment on the proposals and tentative conclusions contained in the NPRM. The officials told us that the National Association of Broadcasters (NAB) and Google had each submitted filings to FCC that included analysis on the expected loss of service effects of preserving a vacant channel and that the studies

reached very different conclusions. According to NAB's analysis, the number of LPTV and translator stations that would go off the air if the vacant channel proposal were adopted ranged from 347 stations to 433 stations, depending on the amount of spectrum that FCC ultimately clears in the auction.⁵⁹ The analysis concluded that FCC's proposal would have a devastating impact on LPTV and translator stations and the viewers who rely on those stations to receive over-the-air signals. On the other hand, Google's analysis found that FCC's vacant channel proposal would have minimal impact on LPTV and translator stations. Google analyzed five markets selected for a variety of reasons including, to represent areas with large numbers of LPTV and translator stations, mountainous terrain, large rural areas, and urban areas to identify which LPTV and translator stations, if any, would be unable to continue operations as a result of FCC's proposed rule. Google concluded that for the typical viewer, in the majority of scenarios, no LPTV or translator station will be affected. The analysis also indicated that in 72 percent of the nearly 400 counties included in the analysis, not a single station would be affected, and that even in the specific counties likely to be the most affected, the preservation of a vacant channel will have only a small impact. Both NAB and Google have submitted comments to FCC critiquing the other's conclusions.

Development of New Technologies and Innovation

Proponents of FCC's vacant channel proposal whom we interviewed and who commented on the proposal generally expect it will contribute to innovation and the development of new technologies. In our analysis of comments filed with FCC by proponents of the vacant channel proposal, at least five groups expressed the idea that preserving vacant channels would help the development of new technologies. For example, one of these commenters noted that ensuring unlicensed devices have nationwide access to spectrum in the reallocated television spectrum band will promote investment and innovation in these technologies. In comments filed by another proponent of the proposal, the group stated reserving at least one vacant television channel in every market nationwide for public use on an unlicensed basis is essential to spurring investment and achieving the enormous public interest benefits of developing new personal portable devices. The commenter went on to state that ensuring a substantial amount of unlicensed spectrum on a

⁵⁹As discussed previously, according to our analysis of FCC data, there were 2,063 LPTV stations and 3,660 translator stations in the U.S. and its territories as of May 25, 2016.

nationwide basis is critical for developing markets for new, innovative, and affordable chips, devices, applications, and services.

Three of the four proponents of the proposal to preserve a vacant channel whom we interviewed told us that three channels for unlicensed use are needed to develop new technology and that preserving a vacant television channel would contribute to this needed amount of spectrum.⁶⁰ As discussed previously, FCC's incentive auction report and order announced a number of actions intended to make more spectrum available for unlicensed use, including permitting unlicensed operations on channel 37 (in locations sufficiently removed from incumbent users to protect from harmful interference) and in the spectrum guard bands. Taken together, these measures will provide two of the three channels that, according to proponents of the vacant channel proposal, are needed to develop new technologies. For example, one of the proposal's proponents told us that unless FCC guarantees there will be three channels available nationwide for unlicensed use, it is very unlikely that new mobile uses will move forward into production. This proponent explained that for companies to invest the money needed to develop new unlicensed technologies and innovate, companies need certainty that sufficient spectrum will be available to invest the tens of millions of dollars needed for development. This proponent also commented that this is particularly important because insufficient spectrum (i.e., less than three channels) in even a single major market, such as Los Angeles, would result in companies not investing money to develop new technologies. This proponent said that FCC's adopting the vacant channel proposal would help provide this certainty by providing a third channel for nationwide unlicensed use.

Improvement of Wi-Fi Internet

All representatives from the four organizations we interviewed who are proponents of the vacant channel proposal expect the proposal could result in improving Wi-Fi Internet.⁶¹ Specifically, they told us that the proposal could improve Wi-Fi because of the characteristics associated

⁶⁰The fourth proponent of the proposal told us that the business model for white space devices requires at least two TV channels be available on a nationwide basis.

⁶¹Wi-Fi (wireless fidelity) signals are radio waves that provide Internet access to devices equipped with compatible wireless hardware. Each Wi-Fi access point is identified by a unique hardware address. Nearby compatible devices are able to receive this information and use it to request Internet access.

with the UHF television spectrum band. They noted that while traditional Wi-Fi has a relatively limited range and can be blocked by walls or other environmental barriers, Wi-Fi operating in the UHF television spectrum band can travel much farther and penetrate obstacles such as buildings and hills. Representatives of two groups supporting the vacant channel proposal told us that because of the long-range characteristics and ability to travel farther through obstructions, Wi-Fi could be expanded more thoroughly throughout homes and businesses giving people greater connectivity. One of these proponents also added that this could help extend coverage to people who might not have affordable access to the Internet.

Improvement of Rural Broadband Service

Stakeholders we interviewed supporting FCC's vacant channel proposal generally expect the proposal could result in improved and expanded broadband Internet service in rural areas. Specifically, three of the four proponents of the proposal we interviewed told us that preserving a vacant channel could contribute to improved and expanded broadband in rural areas by allowing people to connect their homes and businesses wirelessly to the Internet. One proponent told us that in rural areas, unlicensed spectrum use allows consumers to connect to the Internet wirelessly from their home or business. They noted that this use of spectrum is currently occurring and that preserving a vacant channel could help lower costs and improve the technology, thus improving and expanding broadband in rural areas.

Agency Comments

We provided a draft of this report to FCC for review and comment. FCC provided technical comments, which we incorporated into the report as appropriate.

We are sending copies of this report to the Chairman of FCC and appropriate congressional committees. In addition, the report is available at no charge on GAO's website at <http://www.gao.gov>.

If you or members of your staff have any questions about this report, please contact me at (202) 512-2834 or goldsteinm@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Major contributors to this report are listed in appendix III.

A handwritten signature in black ink, appearing to read 'M. Goldstein', with a long horizontal flourish extending to the right.

Mark L. Goldstein Director, Physical Infrastructure Issues

Appendix I: Objectives, Scope, and Methodology

This report focuses on the possible effects of the Federal Communication Commission's (FCC) spectrum incentive auction on low power television (LPTV) and translator stations and their viewers. Specifically, our objectives were to examine (1) what is known about LPTV and translator stations and how FCC's spectrum incentive auction might affect viewers' access to the stations' services, (2) selected stakeholder views on actions has proposed or taken to mitigate the possible effects of the incentive auction on LPTV and translator stations, and additional stakeholder proposals for doing so, and (3) selected stakeholder views on the expected outcomes of preserving a vacant channel for unlicensed use of the television broadcast spectrum.

To determine what is known about LPTV and translator stations and how FCC's spectrum incentive auction might affect viewers' access to these services, we reviewed FCC documents related to the incentive auction, including FCC's June 2014 incentive auction report and order¹ and FCC's December 2015 LPTV and translator report and order.² We obtained data from FCC's Consolidated Database System (CDBS) as of May 25, 2016, to determine the number of LPTV and translator stations in the U.S. and its territories along with the communities of license. We determined the data were reliable for our purposes after reviewing FCC user guides and forms for CDBS and interviewing knowledgeable FCC officials regarding data entry and analysis procedures. We also conducted a web-based survey of LPTV and translator stations to obtain information on LPTV station programming, ownership of LPTV and translator stations, and station representatives' views on actions that FCC has proposed or taken and actions Congress or others could take to mitigate the effects of the incentive auction on LPTV and translator stations. For the web-based survey, we obtained LPTV's and translator station representatives' e-mail addresses from CDBS; however, because CDBS did not include e-mail addresses for representatives of all of the 2,063 LPTV and 3,660 translator stations, we sent survey invitations for all LPTV and translator station representatives for whom we could obtain e-mail addresses. We supplemented the e-mail addresses obtained from CDBS with addresses obtained from station representatives and in total identified 330 valid e-mail addresses for LPTV and translator station representatives. Because

¹*Incentive Auction Report and Order*, 29 FCC Rcd 6567, June 2, 2014, Released, May 15, 2014, Adopted.

²*LPTV and Translator Report and Order*, 30 FCC Rcd 14927, December 17, 2015, Released, December 16, 2015, Adopted.

the e-mail addresses do not represent all LPTV and translator stations, the results of our survey are not generalizable and are only used for descriptive purposes. After preparing draft survey questions and response categories, we spoke with representatives from three broadcast industry associations and a translator station representative chosen for their broad industry perspective and expertise in particular segments of the industry to determine whether selected questions were answerable by station representatives and whether the response categories provided were appropriate, and updated our survey accordingly. We then pre-tested our survey with four representatives of LPTV and/or translator stations—selected to provide for variety in type of station (LPTV and translator), number of stations represented, and geography—to ensure that our survey questions and skip pattern were clear and logical and that respondents could answer the questions without undue burden. In the course of pre-testing our survey, we also obtained information that we present in this report. We administered the survey from June 2016 through August 2016 and received 115 responses. These responses represent 535 of the 2,063 LPTV stations, and 1,515 of the 3,660 translator stations in the U.S. and its territories. In our report, we provide survey results based on the number of respondents to each question. Because not all respondents answered every question of the survey, the total number of respondents may be fewer than 115 for some results. The results of our survey are not generalizable, and we did not verify respondents' responses. We also interviewed officials from FCC to determine what information they had regarding LPTV and translator stations and how the incentive auction might affect viewers' access to these services.

To determine stakeholder views on actions FCC has proposed or taken to mitigate the possible effects of the incentive auction on LPTV and translator stations, and additional stakeholder proposals for doing so, we reviewed selected comments and other filings associated with the incentive auction proceeding. We selected the comments for review by performing keyword searches on filings submitted between October 9, 2014, (when FCC sought comment on a number of issues related to LPTV and translator stations, including additional means to mitigate the potential impact of the incentive auction and repacking process on these stations) and April 1, 2016, to allow additional time to include comments filed after end of the formal comment process. We reviewed filings from entities that filed more than one comment, reply to comment, letter, or notice of *ex parte* in this time period. We also interviewed broadcast industry associations and station ownership groups that own LPTV and/or translator stations, as shown in table 6. We selected stakeholders to

represent a range of views from various types of organizations based on our review of comments filed in FCC’s incentive auction proceeding, as well as based on recommendations from other organizations we interviewed. We chose three station ownership groups that own LPTV and/or translator stations and that broadcast a variety of programming types. Through our web-based survey, we also obtained station representatives’ views on actions that FCC has proposed or taken and that Congress or others could take to mitigate the effects of the incentive auction on LPTV and translator stations. In our report, we use “some” when three or more stakeholder sources combined supported a particular idea or statement.

Table 6: Stakeholders Interviewed

Stakeholder category	Stakeholder
Station ownership groups	Excellence in Christian Broadcasting Sinclair Broadcasting Group Venture Technologies Group
Broadcast industry associations	Advanced Television Broadcasting Alliance Association of Public Television Stations LPTV Spectrum Rights Coalition National Association of Broadcasters National Translator Association Spectrum Evolution
Technology companies and technology industry association	Google Microsoft Wi-Fi Alliance
Public interest group	New America Foundation’s Open Technology Institute

Source: GAO. | GAO-17-135

To identify selected stakeholder views on the expected outcomes of preserving a vacant channel for unlicensed use of the television broadcast spectrum, we reviewed FCC’s June 2015 notice of proposed rulemaking where FCC proposes to preserve one vacant channel in the ultra high frequency television band for use by white space devices and wireless microphones, and we reviewed selected comments and other filings association with this proceeding.³ We selected comments and other filings for review, by performing keyword searches on filings

³*Vacant Channel NPRM*, 30 FCC Rcd 6711, June 16, 2015, Released, June 11, 2015, Adopted.

submitted between October 9, 2014, and April 1, 2016, and we reviewed filings from entities that filed more than one comment, reply to comment, letter, or notice of *ex parte* in this time period. We also interviewed stakeholders, as shown in table 6 above.

We also reviewed relevant statutes and regulations, including the Middle Class Tax Relief and Job Creation Act of 2012,⁴ which authorized FCC to conduct the spectrum incentive auction. We searched various web-based databases to identify existing articles, peer-reviewed journals, trade and industry articles, government reports, and conference papers related to these topics.⁵ We identified articles from 2010 to 2016 and examined summary-level information that we believed to be germane to our report. It is possible that we may not have identified all of the reports with findings relevant to our objectives.

⁴Pub. L. No. 112-96, 126 Stat. 156 (codified at 47 U.S.C. § 309(j)(8)(G)).

⁵For example, databases we searched included ProQuest and ProQuest Academic, Ei Compendex, Nexis, and Gale Group databases, trade & industry, computers, and newsletter.

Appendix II: Survey of Low Power Television and Translator Stations

The questions we asked in our survey of low power television (LPTV) and translator stations are shown below. In this appendix, we include all the survey questions and aggregate results of responses to the closed-ended questions; we do not provide information on responses provided to the open-ended questions. However, all respondents did not have the opportunity to answer each question because of skip patterns. Furthermore, some respondents may have decided not to respond to a particular question. For a more detailed discussion of our survey methodology see appendix I.

Station Identification

1. Do you represent any licensed LPTV stations as of May 31, 2016? Please do not include Class A stations, translator stations, or stations for which you have a construction permit that are not yet in service.

Response	Number of responses
Yes	83
No	32
No answer/not checked	0

1a. If yes, how many?

Total: 535

1b. If yes, please enter the call sign(s) for the LPTV station(s) you represent or upload a document with this information.

(Written responses not included)

1c. If yes, do any of the LPTV stations you represent broadcast at least 18 hours per day?

Response	Number of responses
Yes	79
No	2
No answer/not checked	34

1d. If yes, how many?

Total: 451

1e. If yes, do any of these stations also broadcast at least 3 hours of locally produced programming per week? For the purposes of this survey, "locally produced" means produced within the market area served by a particular station or the market area served by a group of commonly controlled low power stations that carry common local programming produced within the market area served by such group.

Response	Number of responses
Yes	63
No	12
No answer/not checked	40

1f. If yes, how many?

Total: 251

2. Do you represent any licensed translator stations as of May 31, 2016? Please do not include stations for which you have a construction permit that are not yet in service.

Response	Number of responses
Yes	50
No	61
No answer/not checked	4

2a. If yes, how many?

Total: 1,515

2b. If yes, please enter the call sign(s) for the translator station(s) you represent or upload a document with this information.

(Written responses not included)

2c. If yes, how many of the translator stations you represent receive incoming signals from LPTV (excluding Class A) or translator stations rather than from a full-power or Class A station? If you are uncertain, please write "uncertain" in the box.

Total: 433

Respondents indicating "uncertain": 10

2d. If yes, how many of the translator stations you represent send outgoing signals to LPTV (excluding Class A) or translator stations? If you are uncertain, please write "uncertain" in the box.

Total: 212

Respondents indicating "uncertain": 10

Ownership Information

3. Do you represent any LPTV and/or translator stations that are owned by an educational entity (including government-owned, for-profit, and not-for-profit educational entities)?

Response	Number of responses
Yes	23
No	90
No answer/not checked	2

3a. If yes, how many?

Total number of LPTV stations represented: 95

Total number of translator stations represented: 720

4. Do you represent any LPTV and/or translator stations that are owned by a for-profit non-educational entity (including for-profit corporation, sole proprietorship, limited partnership, general partnership)?

Response	Number of responses
Yes	63
No	51
No answer/not checked	1

4a. If yes, how many?

Total number of LPTV stations represented: 364

Total number of translator stations represented: 136

5. Do you represent any LPTV and/or translator stations that are owned by a not-for-profit non-educational corporation?

Response	Number of responses
Yes	17
No	98
No answer/not checked	0

5a. If yes, how many?

Total number of LPTV stations represented: 40

Total number of translator stations represented: 112

6. Do you represent any LPTV and/or translator stations that are owned by a governmental or community entity (including tribe, state, county, city, municipality, and community organization)? Please do not include government-owned educational entities.

Response	Number of responses
Yes	23
No	91
No answer/not checked	1

6a. If yes, how many?

Total number of LPTV stations represented: 8

Total number of translator stations represented: 1,134

7. Do you represent any LPTV and/or translator stations that are owned by a type of entity other than those listed above?

Response	Number of responses
Yes	1
No	100
No answer/not checked	14

7a. If yes, please specify other type of entity.

(Written responses not included)

7b. If yes, how many?

Total number of LPTV stations represented: 1

Total number of translator stations represented: 0

Programming and Service Information

The following questions seek information about the types of programming provided in the past 12 months by the LPTV station(s) you represent. Many LPTV stations broadcast programming that falls under multiple categories – please include these stations in your answers to each question.

8. Do any of the LPTV stations you represent broadcast locally produced programming? For the purposes of this survey, "locally produced" means produced within the market area served by a particular station or the market area served by a group of commonly controlled low power stations that carry common local programming produced within the market area served by such group.

Response	Number of responses
Yes	69
No	9
No answer/not checked	37

8a. If yes, how many?

Total number of LPTV stations represented: 264

8b. If yes, what kinds of locally produced programming do the LPTV stations you represent broadcast? (For example, non-English-language, religious, news, weather, information, sports, etc.) Please specify the non-English-language(s) if applicable.

(Written responses not included)

9. Do any of the LPTV stations you represent broadcast non-English-language programming that is not locally produced?

Response	Number of responses
Yes	30
No	48
No answer/not checked	37

9a. If yes, how many?

Total number of LPTV stations represented: 118

9b. If yes, what kinds of not locally produced non-English-language programming? Please specify the language(s).

(Written responses not included)

10. Do any of the LPTV stations you represent broadcast religious programming that is not locally produced?

Response	Number of responses
Yes	32
No	38
No answer/not checked	45

10a. If yes, how many?

Total number of LPTV stations represented: 237

10b. If yes, what kinds of not locally produced religious programming?

(Written responses not included)

11. Do any of the LPTV stations you represent broadcast news, weather, and information programming that is not locally produced?

Response	Number of responses
Yes	44
No	31
No answer/not checked	40

11a. If yes, how many?

Total number of LPTV stations represented: 271

11b. If yes, what kinds of not locally produced news, weather, and information programming?

(Written responses not included)

12. Do any of the LPTV stations you represent broadcast general entertainment programming that is not locally produced? (For example, general entertainment programming may include classic TV, sports, home shopping, infomercials, etc.)

Response	Number of responses
Yes	64
No	13
No answer/not checked	38

12a. If yes, how many?

Total number of LPTV stations represented: 402

12b. If yes, what kinds of not locally produced general entertainment programming?

(Written responses not included)

13. Do any of the LPTV stations you represent broadcast programming that is not locally produced other than the types listed above?

Response	Number of responses
Yes	13
No	58
No answer/not checked	44

13a. If yes, how many?

Total number of LPTV stations represented: 39

13b. If yes, what kinds of not locally produced programming other than the types listed above?
(Written responses not included)

14. Do any of the stations you represent provide service to an area that only receives service from LPTV and/or translator stations (excluding Class A stations) - that is, the area receives no full-power or Class A service?

Response	Number of responses
Yes	42
No	49
Uncertain	18
No answer/not checked	6

14a. If yes, please list the call sign(s) of the station(s) you represent for which this is the case along with the estimated population within the coverage contour for each call sign. If you represent more than 10 such stations or if you would prefer, please upload a document with this information.

Number of unique call signs provided: 211
(Written responses not included)

14b. If yes, do any of those stations provide the only service in the area - that is, the area receives no other full-power, Class A, LPTV, or translator service?

Response	Number of responses
Yes	12
No	2
Uncertain	0
No answer/not checked	101

14c. If yes, please list the call sign(s) of the station(s) you represent for which this is the case along with the estimated population within the coverage contour for each call sign. If you represent more than 10 such stations or if you would prefer, please upload a document with this information.

Number of unique call signs provided: 27
(Written responses not included)

15. If you would like to provide additional information on the programming provided by the station(s) you represent that is not included in the questions above, please do so in the box below.
(Written responses not included)

Perspectives Related to the Incentive Auction

16. Have you estimated relocation expenses for the station(s) you represent in the event of relocation following FCC's auction and subsequent channel "repack"?

Response	Number of responses
Yes	47
No	61
No answer/not checked	7

16A. If yes, please provide your estimate(s) of relocation expenses, including the types of expenses included.
(Written responses not included)

17. If FCC had allowed LPTV and translator stations to participate in the auction, would any of the stations you represent have chosen to relinquish spectrum in return for compensation?

Response	Number of responses
Yes	32
No	44
Uncertain	34
No answer/not checked	5

17a. If yes, how many of the stations you represent would have chosen to relinquish spectrum in return for compensation?

Total number of LPTV stations represented: 98

Total number of translator stations represented: 10

17b. If yes, please explain your response.

(Written responses not included)

18. FCC has announced it is taking or will take the following actions related to the incentive auction. How useful do you think these actions will be in mitigating possible effects of the incentive auction on the LPTV and/or translator station(s) you represent? Please explain your answer.

(Written responses not included)

Action	Response	Number of respondents (LPTV)	Number of respondents (translator)
a. Extending channel sharing to LPTV and translator stations	Very useful	14	7
	Moderately useful	13	8
	Not useful	34	21
	Uncertain	15	9
	Not applicable	0	1
	No answer/not checked	39	69
b. Using FCC's incentive auction optimization and repacking software to identify new channels for displaced stations after the incentive auction	Very useful	26	18
	Moderately useful	16	8
	Not useful	21	13
	Uncertain	15	6
	Not applicable	0	0
	No answer/not checked	37	70
c. Extending the analog-to-digital transition date for LPTV and translator stations from September 1, 2015 to after the post-auction transition period	Very useful	25	8
	Moderately useful	10	7
	Not useful	26	15
	Uncertain	4	3
	Not applicable	14	12
	No answer/not checked	36	70
d. Streamlining cross-border coordination processes with Mexico and Canada so it will not delay the post-auction displacement application process for LPTV and translator stations	Very useful	24	12
	Moderately useful	6	7
	Not useful	15	7
	Uncertain	13	5
	Not applicable	18	12
	No answer/not checked	39	72

19. Are there any other actions FCC could take going forward to help mitigate possible effects of the incentive auction on LPTV and translator stations?

Response	Number of responses
Yes	84
No	5
No answer/not checked	26

19a. If yes, please specify.

(Written responses not included)

20. Are there any other actions Congress or another entity could take going forward to help mitigate possible effects of the incentive auction on LPTV and translator stations?

Response	Number of responses
Yes	87
No	7
No answer/not checked	21

20a. If yes, please specify.

(Written responses not included)

21. If you would like to expand upon any of your responses to the questions above, or would like to provide any other comments about the possible effects of FCC's spectrum incentive auction on LPTV and translator stations, please do so in the box below.

(Written responses not included)

Appendix III: GAO Contact and Staff Acknowledgments

GAO Contact

Mark Goldstein, (202) 512-2834 or goldsteinm@gao.gov

Staff Acknowledgments

In addition to the individual named above, Sally Moino (Assistant Director), Aaron Kaminsky, (Analyst in Charge), David Hooper, John Mingus, Josh Ormond, Rebecca Rygg, Kelly Rubin, Andrew Stavisky, and Michelle Weathers made key contributions to this report.

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