



February 2014

# SPECTRUM MANAGEMENT

## FCC's Use and Enforcement of Buildout Requirements

# GAO Highlights

Highlights of [GAO-14-236](#), a report to congressional requesters

## Why GAO Did This Study

Radio frequency spectrum is a natural resource used to provide a variety of communication services, such as mobile voice and data. The popularity of smart phones, tablets, and other wireless devices among consumers, businesses, and government users has increased the demand for spectrum. FCC takes a number of steps to promote efficient and effective use of spectrum. One such step is to establish buildout requirements, which specify that an entity granted a license must begin using the assigned spectrum within a specified amount of time or face penalties, such as loss of the license.

GAO was asked to review buildout requirements and the efficient use of spectrum. This report (1) describes the buildout requirements FCC established for wireless services, (2) assesses the extent to which FCC follows its process to enforce buildout requirements, and (3) examines stakeholder opinions on the extent that commonly cited goals for buildout requirements have been met. GAO reviewed FCC regulations and guidance on buildout requirements and examined FCC license data on outcomes of buildout requirements for 5 out of about 45 wireless services selected to ensure variety in type of use and buildout requirement, among other criteria. GAO also interviewed FCC officials, commercial spectrum licensees, industry associations, and spectrum policy experts.

GAO is making no recommendations in this report. FCC reviewed a draft of this report and provided technical comments that GAO incorporated as appropriate.

View [GAO-14-236](#). For more information, contact Mark Goldstein at (202) 512-2834 or [goldsteinm@gao.gov](mailto:goldsteinm@gao.gov).

February 2014

## SPECTRUM MANAGEMENT

### FCC's Use and Enforcement of Buildout Requirements

#### What GAO Found

The Federal Communications Commission (FCC) has established buildout requirements—which require a licensee to build the necessary infrastructure and put the assigned spectrum to use within a set amount of time—for most wireless services, including cellular and personal communication services. FCC tailors the buildout requirements it sets for a wireless service based on the physical characteristics of the relevant spectrum and comments of stakeholders, among other factors. Therefore, buildout requirements vary across wireless services. For example, a buildout requirement can set the percentage of a license's population or geographic area that must be covered by service or can describe the required level of service in narrative terms rather than numeric benchmarks. Buildout requirements also vary by how much time a licensee has to meet a requirement and whether it has to meet one requirement or multiple requirements in stages.

FCC's enforcement process for wireless-service licenses with buildout requirements primarily relies on information provided by licensees, and FCC followed its process for the five wireless services GAO reviewed. Specifically, FCC requires licensees to self-certify that they have met buildout requirements. If a licensee does not do so, FCC automatically terminates the license. Some stakeholders GAO interviewed said that self-certification is an effective way for FCC to enforce buildout requirements because it is public and transparent. GAO examined FCC license data for five wireless services and found that buildout requirements were met for 75 percent of those licenses, and FCC generally terminated those that did not. As part of enforcement, FCC also grants or dismisses licensees' requests to extend the deadline for meeting a requirement. FCC may grant an extension if the licensee shows that it cannot meet a deadline due to causes beyond its control, like a lack of available equipment. For the five wireless services examined, GAO found that extensions were requested for 9 percent of licenses, and FCC granted 74 percent of these requests. FCC officials said that the Commission seeks to be aggressive but pragmatic when enforcing buildout requirements, including being flexible on deadlines when needed. Some licensees and industry associations GAO interviewed said that extensions can provide needed flexibility when unexpected problems occur. Some concerns were raised, however, that granting extensions can undermine buildout requirements by creating an impression that they will not be strictly enforced.

Stakeholders GAO interviewed generally said that buildout requirements are effective in meeting two of four goals commonly cited in FCC documents and statute—encouraging licensees to provide services in a timely manner and preventing the warehousing of spectrum. Stakeholders had mixed views on the effectiveness of buildout requirements in meeting two other goals—promoting innovative services and promoting services to rural areas—largely because they believed that other tools could better address these goals. Other tools stakeholders mentioned include greater use of spectrum licenses that allow a wider array of uses and providing licensees with subsidies to serve rural areas. Nearly all the licensees and industry associations GAO interviewed said they support FCC having buildout requirements, while spectrum policy experts GAO interviewed were mixed in their support of the requirements. Experts who did not support buildout requirements said that the requirements are set too weak or that other tools could better meet FCC goals, among other reasons.

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**Abbreviations**

APA	Administrative Procedure Act
EA	economic area
FCC	Federal Communications Commission
GHz	gigahertz
MHz	megahertz
NTIA	National Telecommunications and Information Administration
PCS	personal communications service
ULS	Universal Licensing System
WTB	Wireless Telecommunications Bureau

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February 26, 2014

The Honorable Michael F. Doyle  
House of Representatives

The Honorable Peter Welch  
House of Representative

Radio frequency spectrum is a natural resource used to provide a variety of communication services, such as mobile voice and data, to consumers, businesses, and federal, state, and local government users. The popularity of smart phones, tablets, and other wireless devices has created an explosion in the demand for and use of spectrum. However, most of the usable spectrum in the United States has already been allocated to existing services and assigned to users. Since there are virtually no “green fields” of favorable spectrum currently available to help address the increased demand by the general public and government users, Congress, regulators, and entities that rely on spectrum are looking for ways to promote more efficient use of this resource.<sup>1</sup>

The Federal Communications Commission (FCC)—the agency that regulates spectrum use for commercial and other nonfederal users—manages spectrum through *allocation* and *assignment*.<sup>2</sup>

- *Allocation* involves designating bands of spectrum for specific types of services or classes of users, such as for commercial or government use.<sup>3</sup>

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<sup>1</sup>For many mobile radio systems, the 300 megahertz (MHz) to 3 gigahertz (GHz) spectrum range is the portion of the spectrum where scarcity concerns are the greatest. While other, higher-frequency spectrum is available as green field or underutilized spectrum, these bands are less favorable for traditional wireless networks.

<sup>2</sup>The Department of Commerce’s National Telecommunications and Information Administration (NTIA) is responsible for managing the federal government’s use of the radio frequency spectrum.

<sup>3</sup>A band is a range of frequencies in the spectrum that are used or set aside for a specific purpose (such as the 1,710–1,755 MHz band that FCC allocated for fixed and mobile services and designated for Advanced Wireless Services to support Third Generation (3G) mobile broadband and advanced-wireless services).

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- *Assignment* provides a license to a specific entity, like a wireless carrier or trucking company, to use a specific portion of spectrum after it has been allocated. FCC uses a competitive-bidding process, or auctions, to assign some licenses to entities that submit the highest bids for licensing in specific bands of spectrum.

FCC takes a number of steps in both the allocation and assignment processes to promote efficient and effective use of spectrum. Buildout requirements—also known as construction or coverage requirements—are among the tools that FCC uses to work toward its goal of efficient spectrum use; in its fiscal year 2014 budget request, FCC said that enforcing the Commission’s regulations, specifically citing buildout requirements, is one action it takes to achieve its strategic goal to maximize the benefits of spectrum. Buildout requirements specify that an entity granted a license must build the necessary infrastructure and put the assigned spectrum to use within a specified amount of time or face penalties, typically termination of all or part of the license.<sup>4</sup> Buildout requirements are designed to ensure that licensees put spectrum to use within a specific period rather than let it sit idle.

Given the high demand for spectrum, you asked us to review buildout requirements and the efficient use of spectrum. While FCC sets buildout requirements for many types of spectrum licenses, we focused our review on the buildout requirements for wireless services, as these services account for a majority of spectrum licenses—nearly 2 million licenses as of December 2013.<sup>5</sup> This report (1) describes the buildout requirements established by FCC for spectrum licenses for wireless services, (2) assesses the extent to which FCC follows its process to enforce buildout requirements for wireless services, and (3) examines stakeholder opinions on the extent that goals for buildout requirements have been met. To answer these questions, we reviewed FCC regulations and guidance on buildout requirements for services that use spectrum. We also interviewed FCC officials to understand which wireless services have buildout requirements, the general process used to establish buildout

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<sup>4</sup>47 C.F.R. § 1.946(c).

<sup>5</sup>Wireless services include cellular telephone, paging, personal communications services, and other commercial and private radio services. FCC also sets buildout requirements for satellite, broadcast, and public safety communications spectrum licenses, which we did not include in the scope of our review.

requirements, and the steps FCC takes to monitor and enforce buildout requirements for wireless services.

To determine the extent to which FCC enforces buildout requirements for wireless services, we examined FCC data and documents on buildout requirements for 5 out of about 45 wireless services (see table 1). We selected these wireless services to ensure variety in type of service or use, type of buildout requirement, how licenses are assigned (e.g., auctions), and the number of licenses in the service. We also considered recommendations from FCC officials and other interviewees when selecting wireless services.

**Table 1: Description of Selected Wireless Services**

Service	Use	Frequency	Assignment process
Broadband personal communications service (PCS)	Mobile voice and data services, including cell phone, text messaging, and Internet	1,850 to 1,990 MHz	Auction
220 MHz phase II	Various uses, including paging services and two-way radio systems	220 to 222 MHz	Auction
39 GHz	Fixed point-to-point communications used, for example, to provide "backhaul" <sup>a</sup> and backbone links for other communications systems; also used for point-to-multipoint systems as part of private wireless networks	38.6 to 40.0 GHz	Auction
Fixed microwave	Fixed point-to-point communications to carry voice, data, video, and other information, often as backhaul <sup>a</sup>	Various frequencies above 928 MHz	Administrative process—assigned on a first-come, first-served basis
Industrial/business private land mobile radio, below 700 MHz (private land mobile radio)	Radio systems used by companies to support business operations like dispatching and remote monitoring of equipment	Various frequencies below 700 MHz, not including 220 MHz	Administrative process—generally assigned on a non-exclusive, shared basis <sup>b</sup>

Source: GAO analysis of FCC information.

<sup>a</sup>"Backhaul" is the telecommunications industry term that refers to connections between a central telecommunications network and other nodes outside the central network, such a cell phone tower.

<sup>b</sup>The private land mobile radio service includes public safety licenses, but we excluded these licenses from our analysis. We focused our review on wireless services licensed by the Wireless Telecommunications Bureau (WTB), which account for a majority of spectrum licenses.

For the five selected wireless services, we analyzed data from FCC's Universal Licensing System (ULS) to examine license outcomes and FCC

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enforcement actions related to buildout requirements.<sup>6</sup> For each selected wireless service, we analyzed data for licenses with buildout requirements on or before December 31, 2012.<sup>7</sup> For each license, we examined outcomes related to buildout requirements (e.g., met requirement or did not meet requirement and was terminated) and outcomes related to requesting an extension of a buildout deadline. To assess the reliability of the ULS data, we interviewed FCC officials, reviewed system documentation, and conducted electronic data testing. We determined that these data were sufficiently reliable for our purposes.

To gather stakeholder opinions on the effectiveness of buildout requirements, we interviewed a sample of 28 industry stakeholders including spectrum policy experts, industry associations, and licensees. We selected experts based on participation in recent GAO spectrum policy reviews, publications on spectrum policy, and recommendations from other interviewees, and we selected industry associations and licensees to cover the five selected wireless services. To determine the goals for buildout requirements, we reviewed applicable law, FCC documents from recent rulemakings, and other FCC budget and performance documents; we identified four goals for buildout requirements that were frequently cited in these source documents. We conducted semi-structured interviews with the 28 stakeholders to gather their opinions on whether buildout requirements were effective or ineffective in meeting the frequently cited goals as well as for reasons or examples to support these opinions. We also obtained stakeholders' views about what changes to buildout requirements and what alternative tools FCC could use to better meet the goals, if any. Findings from our interviews with selected industry stakeholders should not be used to support generalizations about the overall effectiveness of buildout requirements or what alternatives FCC might use. To supplement these interviews, we reviewed filings made by licensees, industry associations, and other companies and associations in two FCC proceedings since 2010 that sought comments on buildout requirements for wireless

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<sup>6</sup>ULS operates as a single, seamless licensing system for all wireless services to process licenses in a uniform manner. ULS also serves as the central, consolidated repository for application and license data for wireless services.

<sup>7</sup>Due to the high volume of licenses in the fixed microwave and industrial/business private land mobile radio services, we limited our analysis to new licenses with buildout requirements during calendar year 2012.

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services. See appendix I for a more detailed explanation of our scope and methodology.

We conducted this performance audit from February 2013 through February 2014 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.

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## Background

Radio frequency spectrum is used to provide an array of commercial and governmental services, like mobile voice and data, air-traffic control, broadcast television and radio, and public safety activities. In the United States, responsibility for spectrum management is divided between two agencies: FCC and the Department of Commerce's National Telecommunications and Information Administration (NTIA). FCC manages spectrum use for nonfederal users, including commercial, private, and state and local government users under authority provided in the Communications Act.<sup>8</sup> NTIA manages spectrum for federal government users and acts for the President with respect to spectrum management issues.<sup>9</sup>

FCC is an independent regulatory agency composed of five commissioners appointed by the President and confirmed by the Senate. The commissioners delegate many of FCC's day-to-day responsibilities, including processing applications for licenses and analyzing consumer complaints, to the agency's 7 bureaus and 10 offices. According to its fiscal year 2014 budget request, FCC has just over 1,700 full-time equivalent staff in Washington, D.C., and other locations; FCC requested \$359 million for its fiscal year 2014 budget.

Among other duties, FCC bureaus responsible for granting spectrum licenses administer service rules that outline technical and operating

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<sup>8</sup>Communications Act of June 19, 1934, ch. 652, as amended, codified at 47 U.S.C. ch. 5, subch. II (the Communications Act).

<sup>9</sup>National Telecommunications and Information Administration Organization Act, Pub. L. No. 102-538, title I, 106 Stat. 3533, codified as amended at 47 U.S.C. ch. 8.

requirements for spectrum licenses. Service rules may be set at the time FCC allocates spectrum into bands for a specific type of service or group of users. FCC develops rules through a process defined by the Administrative Procedure Act (APA).<sup>10</sup> The APA process requires FCC to provide the public with notice of its proposed and final rules and with an opportunity to comment as the rules are developed. All comments and information gathered by FCC constitute the public record to support rulemakings and are electronically maintained in a docket. FCC maintains the dockets in an electronic system that is available to the public on its website.<sup>11</sup>

After spectrum is allocated and service rules are set, depending on the type of service or user, one of four FCC bureaus assigns licenses to users (see table 2). For example, the Wireless Telecommunications Bureau (WTB) develops and executes policies and procedures for the licensing of all wireless services (except wireless public safety services), and the Media Bureau administers television and radio broadcast licenses.

**Table 2: FCC Bureaus That License Spectrum**

<b>Bureau</b>	<b>Licensing responsibilities</b>
International Bureau	International telecommunications and satellite services.
Media Bureau	Electronic media, broadcast television, and radio.
Public Safety and Homeland Security Bureau	Services used by public safety entities such as police and fire departments.
Wireless Telecommunications Bureau	All domestic wireless services (other than public safety) including cellular telephone, paging, fixed microwave, and mobile broadband services.

Source: FCC.

Licenses for wireless services are assigned through competitive bidding (auctions) or administrative processes. The assignment process used depends in large part upon whether applications for licenses are mutually exclusive—that is, on whether granting a license to one entity would

<sup>10</sup>5 U.S.C. § 553.

<sup>11</sup>The public dockets for FCC are maintained on the Electronic Comment Filing System, which is accessible on the Internet at <http://apps.fcc.gov/ecfs>.

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preclude granting a license to another entity for the same portion of the spectrum in the same geographic location.

- For licenses that are mutually exclusive, FCC typically uses auctions to assign licenses for commercial wireless services. Auctions are a market-based mechanism used to assign a license to the entity that submits the highest bid.<sup>12</sup> In the report, we refer to these licenses as market-based licenses.
- For licenses that are not mutually exclusive, primarily public-safety and private-wireless licenses, FCC generally assigns licenses through administrative processes. For example, FCC distributes some licenses on a first-come, first-served basis, where licenses are assigned based on when the license applications were submitted.<sup>13</sup> To maximize the number of spectrum users, FCC often requires license applicants to coordinate. License applicants retain a private third-party firm, known as a frequency coordinator, to select a frequency that minimizes interference to existing licensees. We refer to these licenses as site-based licenses.

FCC uses its ULS database to assign and track licenses for wireless services. ULS operates as a single licensing system used by FCC and licensees to apply for, modify, cancel, and take other actions on licenses for all wireless services in a uniform manner.

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<sup>12</sup>Since 1994, when FCC first implemented its auction authority, spectrum auctions have generated nearly \$52 billion in net offsetting receipts for the U.S. Treasury.

<sup>13</sup>Congress authorized FCC to impose and collect application processing fees. 47 U.S.C. § 158. These application fees are intended to cover FCC's costs related to licensing communication service providers. For example, as of August 23, 2013, the new license fee for a private point-to-point microwave license is \$270.

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## FCC Establishes Buildout Requirements for Most Wireless Services

FCC has established buildout requirements for most wireless services, including paging, cellular, land mobile radio, and wireless communications services (see appendix II).<sup>14</sup> FCC officials said that the Commission makes every effort to ensure efficient use of each spectrum license, and, in line with these efforts, FCC uses buildout requirements to help ensure that spectrum is put to use. FCC establishes buildout requirements for wireless services through its rulemaking process, and the buildout requirement for each wireless service is tailored to the particular service. According to FCC officials, they take into account, when setting buildout requirements, (1) stakeholders' comments about the proposed requirements in the notice of proposed rulemaking; (2) the characteristics of the relevant spectrum in terms of propagation of the signal through space and its interaction with obstacles, which could affect the infrastructure costs for the intended coverage;<sup>15</sup> and (3) the types of service in adjacent spectrum, including considerations of harmful interference with those services.

Buildout requirements have three common features, which vary based on the differences in wireless services.

- *Type of requirement.* This refers to the benchmark or outcome that a licensee must meet. There are three types of requirements. A population or geographic coverage requirement sets the percentage of the licensee's population or geographic area, respectively, that must be covered by service. A construction requirement requires that the system operate consistent with the rules governing the service, specified in the license, by a specific time. Lastly, a "substantial service" requirement describes the level of service that must be provided in narrative terms rather than in absolute, numeric benchmarks, such as with a coverage

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<sup>14</sup>FCC has not set buildout requirements for only a few wireless services including personal radio services like citizens band (CB) radio and family radio services, which both use two-way communications similar to walkie-talkies. An individual license is not required to use many personal radio services; rather, FCC certifies devices that may be used for these services, generally through the rulemaking process (commonly termed "licensing by rule"). Anyone who is eligible is thus authorized to purchase and operate technically compliant and FCC-approved devices in accordance with the operational requirements of the rules.

<sup>15</sup>Different frequency radio signals propagate differently. Signals at lower frequencies, for instance, can travel through buildings and other objects better than signals at higher frequencies. Different propagation characteristics are better suited for different services, and can thus influence the licensee's infrastructure needs and costs.

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requirement.<sup>16</sup> When FCC establishes a substantial service requirement, it sometimes includes “safe harbors” in the rulemaking documents. Safe harbors illustrate specific ways that a licensee could demonstrate substantial service for a particular wireless service, such as constructing a certain number of point-to-point links or serving populations that are outside areas served by other licensees.

- *Number of benchmarks.* This refers to whether the licensee must complete the buildout requirement by one deadline, or whether the licensee must complete multiple requirements in stages with corresponding deadlines. When FCC sets more than one benchmark and thus deadline for a license, it refers to the requirements as the interim and final requirements or as the first requirement, second requirement, and so forth.
- *Length of buildout period.* This refers to the length of time from the grant of a license to the buildout deadline or deadlines.

We examined five wireless services, which have buildout requirements that vary in each of the features discussed above (see table 3). Licenses in these five services are subject to all three types of requirements described above. For example, FCC set a substantial service requirement for 39 GHz licenses. In the rulemaking proceeding for 39 GHz, FCC stated that setting a substantial service requirement would permit flexibility in licensees’ system design, as the types of possible service vary tremendously and may develop in unpredictable ways. For some services, FCC gave licensees the option to choose the type of requirement. For Broadband PCS, FCC set a population coverage requirement, but also provided the alternative of meeting a substantial service requirement. In terms of the number of benchmarks, FCC set two benchmarks for the Broadband PCS (depending on the license) and 220 MHz services and set a single benchmark for the other three services we selected. The lengths of the buildout period for the five services range from 12 months (for industrial/business private land mobile radio) to 10 years (for all three market-based services).

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<sup>16</sup>“Substantial service” is defined in regulation as “service which is sound, favorable, and substantially above a level of mediocre service which just might minimally warrant a renewal.” 47 C.F.R. § 22.940(a)(1)(i).

**Table 3: FCC Buildout Requirements for Selected Wireless Services, as of January 2014**

Service	Buildout requirement(s)	Features of buildout requirement(s)
Broadband PCS	<p><u>30 MHz Licenses</u>: Provide service to at least 1/3 of the population in licensed area within 5 years of initial license grant, and 2/3 of the population within 10 years of initial license grant.</p> <p>Alternatively, licensees may provide substantial service to their licensed area within the appropriate 5- and 10-year benchmarks.</p>	<p>Type: Population coverage requirement, with substantial service alternative</p> <p>Number of benchmarks: 2</p> <p>Length: 5 and 10 years</p>
	<p><u>10/15 MHz Licenses</u>: Provide service to at least 1/4 of the population in licensed area within 5 years of initial license grant, or alternatively substantial service within 5 years of initial license grant.</p>	<p>Type: Population coverage requirement, with substantial service alternative</p> <p>Number of benchmarks: 1</p> <p>Length: 5 years</p>
220 MHz phase II auctioned licenses	<p><u>Nationwide Licenses</u>: Provide coverage to a composite area of 750,000 square kilometers or 37.5 percent of the U.S. population within 5 years of initial license grant, and 1,500,000 square kilometers or 75 percent of the population within 10 years of initial license grant.</p> <p>Alternatively, nationwide licensees may meet the construction requirements by demonstrating an appropriate level of substantial service at the 5- and 10-year benchmarks.</p>	<p>Type: Population or geographic coverage requirement, with substantial service alternative</p> <p>Number of benchmarks: 2</p> <p>Length: 5 and 10 years</p>
	<p><u>Economic Area (EA) or Regional Licenses</u>: Provide coverage to at least 1/3 of the population in the licensed area within 5 years of initial license grant, and 2/3 of the population within 10 years of initial license grant.</p> <p>Alternatively, EA or Regional licensees may meet their construction requirements by providing an appropriate level of substantial service at 5- and 10- year benchmarks.</p>	<p>Type: Population coverage requirement, with substantial service alternative</p> <p>Number of benchmarks: 2</p> <p>Length: 5 and 10 years</p>
39 GHz geographic licenses	Provide substantial service to its licensed area within 10 years of initial license grant.	<p>Type: Substantial service requirement</p> <p>Number of benchmarks: 1</p> <p>Length: 10 years</p>
Industrial/business private land mobile radio below 700 MHz	Must be placed into operation within 12 months of license grant.	<p>Type: Construction requirement</p> <p>Number of benchmarks: 1</p> <p>Length: 12 months</p>
Fixed microwave	Must be placed in operation within 18 months of initial license grant.	<p>Type: Construction requirement</p> <p>Number of benchmarks: 1</p> <p>Length: 18 months</p>

Source: GAO analysis and presentation of FCC information.

Under some circumstances, a particular license may not be subject to a buildout requirement, even if FCC established buildout requirements in the wireless-service rules for the license. For the three market-based services we examined, for example, a licensee can divide its license into smaller pieces by disaggregating or partitioning, which divides the

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assigned spectrum into smaller amounts of bandwidth or smaller geographical areas, respectively. In such cases, some of the resultant licenses may not have buildout requirements because the requirements are met by one of the other pieces of the original license. For example, for Broadband PCS licenses, parties seeking to disaggregate a license must decide which party will be responsible for meeting the buildout requirements or agree to share responsibility for meeting the requirements. Additionally, fixed-microwave and private land-mobile-radio licenses that authorize certain temporary or itinerant use of the spectrum, such as construction work or event planning, would not normally include a buildout requirement, since the license does not permit any long-term or ongoing operations.

In other circumstances, licenses for industrial/business private land mobile radio and fixed microwave site-based services can authorize the use of multiple frequencies. For industrial/business private land-mobile-radio licenses, for example, the purpose of authorizing multiple frequencies is to improve the efficiency of a multi-user system in which users can use any available channel; it is similar to a multi-lane highway in which cars can use any lane. In such cases, FCC sets a buildout requirement for each frequency authorized by the license. If a licensee fails to construct for a given frequency, FCC automatically terminates the authorization to use that frequency as of the buildout deadline. If all the frequencies for a license are terminated, FCC will terminate the license.<sup>17</sup>

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<sup>17</sup>There is an intermediate step for terminating site-based licenses. Each frequency authorized by a license is identified by a location number. So, as noted, if a buildout requirement for a frequency is not met, then the frequency is terminated. Next, if all of the frequencies at a particular location are terminated, the location is terminated. Finally, if all of the locations for a license are terminated, then the license is terminated. Also, as noted in the next section, FCC places licenses in a termination-pending mode for 30 days before terminating a license.

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## FCC Enforces Buildout Requirements through Automated Processes and Staff Reviews and Followed Its Process for Selected Wireless Services

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### FCC Enforces Buildout Requirements Primarily in Response to Licensee Actions

To enforce buildout requirements for wireless services, FCC requires licensees to self certify that they met buildout requirements and automatically terminates licenses that fail to do so, in line with FCC rules. Through ULS—the computerized system FCC and licensees use to process and track licenses for all wireless services—licensees submit notifications to inform FCC that a requirement is met.<sup>18</sup> However, if the licensee does not notify FCC that it met a buildout requirement in a timely manner, FCC takes steps through ULS to terminate the license. Specifically, ULS is programmed to automatically carry out steps to terminate a license. Thirty days after a buildout deadline, ULS puts a license into “termination pending” mode. FCC releases a weekly public notice of all the market-based and site-based licenses that entered termination-pending mode. If a licensee does not file a petition for reconsideration within 30 days of the public notice demonstrating that it timely met the requirement, ULS will automatically terminate the license

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<sup>18</sup>Licensees must notify FCC within 15 days of the buildout deadline. 47 C.F.R. § 1.946(d). FCC officials noted that the Commission’s rules provide that filings due on a weekend, holiday, or day that the Commission closes early and does not reopen may be timely filed on the next business day; as a result, some required notifications dated more than 15 days after a license’s buildout deadline may be timely.

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effective as of the buildout deadline.<sup>19</sup> Once terminated, the license is then made available for re-assignment or re-auction.<sup>20</sup>

Beyond the automated steps involving the termination of licenses discussed above, FCC primarily enforces buildout requirements for wireless services by responding to information provided by licensees. In particular, licensees submit information to FCC in ULS through filings, which FCC responds to through automatic processes or staff reviews, depending on the type of filing.<sup>21</sup> While FCC responds to licensee filings, it does not actively monitor licensee performance on buildout requirements for wireless services; that is, FCC does not send teams out to determine the extent of a licensee's buildout. Through ULS, FCC officials told us they have the ability to examine outcomes related to the buildout requirements. While FCC enforces buildout requirements for individual licenses, it does not maintain a comprehensive program that monitors overall licensee compliance with buildout requirements within a service or across services.

*Automatic processes.* For licensee filings that do not require evaluation, FCC automates the responses to be carried out in ULS. In general, two specific filings—the required notification for site-based services and request to cancel a license—are automatically reviewed in ULS. According to FCC officials, no formal review is needed for required notifications for site-based licenses because the licensee is certifying that it met the conditions laid out in the license. In addition, a licensee may apply to cancel a license at any time, including before or after a buildout requirement is due. Unless a licensee has other pending applications, an application to cancel a license is automatically approved.

*Staff reviews.* In contrast, some licensee filings require evaluation, so FCC staff must review these notifications and requests. In particular, FCC staff review is required for notifications for market-based licenses (that is,

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<sup>19</sup>The ULS auto termination process was implemented on February 1, 2006, for licenses with buildout deadlines that fell on or after that date.

<sup>20</sup>A license is made available for such reassignment unless FCC rules provide that the spectrum covered by the license would automatically revert to another license holder.

<sup>21</sup>FCC may also take enforcement action in response to complaints filed by third parties or based on information obtained through other avenues.

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licenses assigned through auctions), as well as all requests for extensions and requests to accept late-filed required notifications.

- *Required notification.* As with site-based services, a market-based licensee must file a required notification to notify FCC that it met its buildout requirement. Compared to the specific parameters set in site-based licenses, FCC officials said that market-based licenses tend to give licensees more flexibility in how to use spectrum or deploy service; therefore, FCC requires additional documentation—like information on the technology used in a system—to help assess whether a licensee met its buildout requirement. FCC specifies what additional documentation is required in the rules for a wireless service or a public notice. For example, Broadband PCS licensees must submit maps and other supporting documents showing compliance with the 5- and 10-year benchmarks. FCC can also ask a licensee to send additional information if needed to determine if the licensee met the buildout requirement.
- *Request for an extension.* A licensee can also request an extension of the buildout deadline. A request for an extension must be filed before the licensee reaches the buildout deadline for a license. The criteria for when extension requests may be granted are laid out in regulation.<sup>22</sup> For example, FCC will not grant an extension request where delay has been caused solely by a failure to obtain financing. In general, the regulation states that FCC may grant an extension request if the licensee shows that its failure to meet a buildout deadline is due to causes beyond its control. For example, extension requests can be granted for issues such as a lack of available equipment for a band or interference problems with other spectrum users. FCC staff review each request to determine whether an extension is justified. If an extension request is granted, FCC changes the buildout deadline for a license in ULS, but if the request is dismissed, the original buildout deadline stands. If a licensee still needs additional time after being granted an extension, the licensee can request an additional extension.

Beyond individual licensee requests, FCC can grant blanket extensions when warranted for a wireless service or group of

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<sup>22</sup>47 C.F.R. § 1.946(e).

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licenses. According to FCC officials, FCC has considered a blanket extension for most or all of the licenses in a service in cases where it has observed a relatively high number of extension requests. A licensee or stakeholder may also ask FCC to consider a blanket extension. FCC granted a blanket extension of the 5-year buildout requirement for 220 MHz phase II licenses.<sup>23</sup> When the buildout requirements for these licenses started to come due in 2004, numerous licensees filed extension requests. Licensees and others said that there was insufficient equipment to provide voice communications in the 220 MHz band, so licensees collectively would not be able to meet their buildout requirements. In the order granting the extension, FCC stated that a 3-year extension was warranted because, among other reasons, it would provide time for the equipment market to develop.

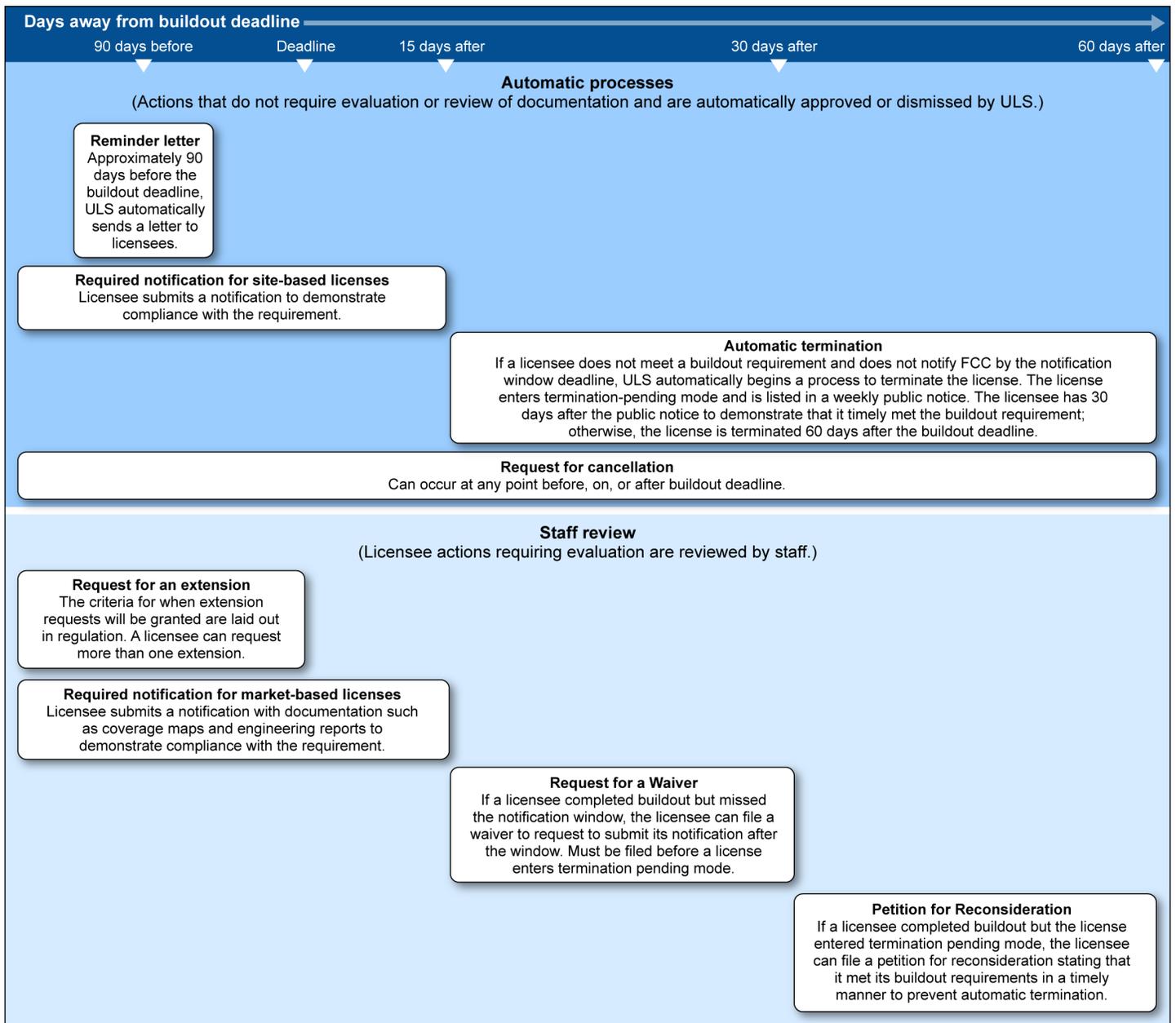
- *Waiver or petition for reconsideration.* Licensees can also file requests to submit late-filed required notifications in limited situations. Specifically, a licensee can file a waiver request or petition for reconsideration if it met a buildout requirement but did not file a required notification on time. For example, if the license has entered termination-pending mode, a licensee can file a petition for reconsideration within 30 days of being listed in the weekly public notice to prevent the license from terminating. In the petition, a licensee must provide the date on which it met the buildout requirement, any supporting documentation required by the rules, and the reason the notification was not filed on time. To be granted a waiver, a licensee must submit any required documentation to demonstrate how it met the buildout requirement and must meet the waiver standard set forth in FCC rules.

Figure 1 provides further information on the timing of filings related to buildout requirements.

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<sup>23</sup>Specifically, FCC extended the buildout deadline for (1) all 220 MHz phase II economic area, regional, and nationwide licenses that timely sought an extension of the applicable construction deadline, if the deadline had expired as of the date of the release of the FCC order granting the extension; (2) all 220 MHz phase II economic area, regional, and nationwide licenses with 5-year construction deadlines falling after the release date of the order; and (3) the phase II 220 MHz licenses covered by a notification of substantial service filed by one entity. *Dismissal of 220 MHz Service Phase II Construction Notifications*, 19 FCC Rcd. 18,095 (2004); *Request of Warren C. Havens for Waiver or Extension of the Five Year Construction Requirement for 220 MHz Service*, 19 FCC Rcd. 12,994 (2004).

**Figure 1: Overview of FCC Enforcement of Buildout Requirements for Wireless Services**



Sources: GAO and FCC.

Industry associations and licensees we interviewed generally thought FCC's enforcement process works well. Many stakeholders we

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interviewed said that FCC's self-certification process is appropriate. For example, one expert, three licensees, and officials from an industry association indicated that the public, transparent nature of the required notifications makes self-certification an effective way to enforce buildout requirements. One expert said that self-certification is the most efficient method for FCC to collect and manage buildout information, as licensees are in the best position to gather and report this information. Moreover, a few licensees and industry associations indicated no other approach would be feasible given the high volume of wireless-service licenses and FCC resource constraints. Furthermore, most of the industry associations and licensees we interviewed said that FCC's ULS system is easy to use. For example, one licensee said that the mechanics of uploading information in ULS for required notifications and requests for extension are straightforward.

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### FCC Followed Its Enforcement Process for Selected Wireless Services, Although a Few Delays Could Pose Problems for Some Licensees

For the five wireless services we reviewed, buildout requirements were met for many licenses, and when buildout requirements were not met, FCC generally terminated the licenses. Across the five services, we found that buildout requirements were met for 75 percent of licenses (19,582 of 26,217). For 3 of the 5 services we examined, buildout requirements were met for a majority of licenses (see table 4). For the other services, buildout requirements were met for half of the 39 GHz licenses and 19 percent of 220 MHz licenses. When licensees did not meet the buildout requirements, FCC generally proceeded as expected by terminating the licenses. A few of our selected services have a relatively high percent of licenses terminated because licensees did not meet their buildout requirements due to special circumstances. For example, FCC terminated 21 percent of the fixed microwave licenses we examined, but we found that a single licensee held nearly all—1,955 of 2,179—of the terminated licenses.

**Table 4: Buildout Requirement Outcomes for Licenses, by Wireless Service, Data as of September 1, 2013**

Service	Number (%) of licenses where the buildout requirement was met	Buildout requirement not met		Number (%) of licenses that did not reach the buildout deadline <sup>c</sup>	Total
		Number (%) of licenses terminated <sup>a</sup>	Number (%) of licenses with other outcomes <sup>b</sup>		
Broadband PCS	3,121 (88%)	57 (2%)	22 (1%)	358 (10%)	<b>3,558</b>
220 MHz phase II	181 (19%)	529 (55%)	134 (14%)	119 (12%)	<b>963</b>
39 GHz	839 (50%)	489 (29%)	13 (1%)	331 (20%)	<b>1,672</b>
Fixed microwave	6,299 (60%)	2,179 (21%)	1,388 (13%)	612 (6%)	<b>10,478</b>
Private land mobile radio	9,142 (96%)	326 (3%)	39 (<1%)	39 (<1%)	<b>9,546</b>
All market-based services	4,141 (67%)	1,075 (17%)	169 (3%)	808 (13%)	<b>6,193</b>
All site-based services	15,441 (77%)	2,505 (13%)	1,427 (7%)	651 (3%)	<b>20,024</b>
<b>Total</b>	<b>19,582 (75%)</b>	<b>3,580 (14%)</b>	<b>1,596 (6%)</b>	<b>1,459 (6%)</b>	<b>26,217</b>

Source: GAO analysis of ULS data.

Notes: See appendix I for additional information on the scope and methodology for the analysis.

Percentages may total to more than 100 due to rounding.

<sup>a</sup>For the two site-based services (fixed microwave and private land mobile radio), the licenses in the license-terminated column are those for which all frequencies authorized by the license were terminated and thus the license was terminated.

<sup>b</sup>Licenses in the other-outcomes category include those that did not meet their buildout requirement and remained active for some period of time after the buildout deadline.

<sup>c</sup>Licenses in the did-not-reach-buildout-deadline category include those that were (1) canceled on or before the buildout deadline, (2) terminated before the buildout deadline, or (3) expired on or before the buildout deadline.

However, buildout requirements were not met for some licenses, and the licenses were not terminated—that is, licenses in the “other outcomes” category in table 4. In two services—fixed microwave and private land mobile radio—there were mixed outcomes because licenses can authorize use of multiple frequencies. Such licenses can be terminated, in part, with the remainder being active or having no requirements. For example, a licensee could meet the requirement for some frequencies but not others, resulting in the termination of some frequencies but not the license; there were 1,216 fixed-microwave (12 percent) and 13 private land-mobile-radio (less than 1 percent) licenses with this outcome. Also, a licensee could have some frequencies terminated and not have a buildout requirement for other frequencies; 66 fixed-microwave licenses (1 percent) and 17 private land-mobile-radio licenses (less than 1 percent) fit this description.

The remaining licenses in the other-outcomes category are instances where a buildout requirement was not met but a license remained active

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after the buildout deadline, mostly for good reasons. Examining ULS license data and other FCC documents, we found that there were reasonable explanations—like a licensee canceling a license during the automatic termination process or filing a required notification that FCC has yet to approve or dismiss—for why most of these licenses were not terminated on the buildout deadline. For example, we found that 106 fixed-microwave licenses in the other-outcomes category were canceled during the automatic termination process—that is, within 60 days of the buildout deadline.<sup>24</sup> For the 220 MHz phase II licenses with other outcomes, 110 licenses were canceled during the automatic termination process, and 24 licenses had pending required notifications in ULS. While there were good reasons why most licenses remained active, there were a few instances where ULS contained no explanation. For the Broadband PCS licenses, for example, ULS did not contain information explaining why 16 licenses were not terminated on the buildout deadline.<sup>25</sup> The automatic termination process in ULS did not occur until 2006, after the buildout deadlines for the 16 Broadband PCS licenses. Therefore, FCC officials said that while these licenses were terminated automatically by rule on the deadline, ULS was not updated to reflect the termination for several months after their buildout deadlines.

Lastly, some licenses with buildout requirements did not reach their buildout deadlines; as a result, FCC did not have to enforce the buildout requirements for these licenses. A license could not reach its buildout deadline for three reasons. First, the license could be canceled by the licensee on or before the buildout deadline. A license can be canceled by a licensee, for example, if it ceases operations and no longer needs the license. Second, FCC could terminate a license before its buildout deadline if the licensee fails to fulfill a condition of the license or violates a rule.<sup>26</sup> Third, the license could expire on or before the buildout deadline. For example, a buildout deadline could be extended past the license expiration date and the licensee could fail to renew the license. The

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<sup>24</sup>These 106 licenses make up the remaining 1 percent of fixed-microwave licenses in the other-outcomes category in Table 4. For private land mobile radio, the 9 remaining other-outcome licenses include 6 licenses that were canceled during the auto termination process and 3 licenses that were in termination-pending mode as of September 1, 2013.

<sup>25</sup>The remaining 6 licenses in the other-outcomes category were canceled during the auto termination process.

<sup>26</sup>For example, a license may be automatically terminated if the licensee has failed to meet a payment condition for a license obtained through the auction process.

number of licenses in this category varies by service, though a higher percentage of market-based licenses did not reach their buildout deadline compared to site-based licenses.

As discussed above, FCC’s enforcement of buildout requirements also involves granting or dismissing extension requests. Across the 5 wireless services we examined, 9 percent of licenses had an extension request. However, this percentage varied substantially across the services (see table 5). Extensions were requested for all of the 39 GHz licenses and half of the 220 MHz phase II licenses. Our analysis of FCC and licensee documents for both services indicated that buildout was largely impeded by lack of available equipment. As shown in table 4 above, both these services also had a relatively high percent of licenses terminated for not meeting buildout requirements. By contrast, less than 1 percent of fixed-microwave and private land-mobile-radio licenses requested extensions. One fixed-microwave licensee we interviewed said that it typically constructs the infrastructure for a new license within 2 to 4 months, so it has not needed to request an extension of the 18-month buildout requirement.

**Table 5: Number of Licenses That Did and Did Not Request Extensions by Wireless Service, Data as of September 1, 2013**

Service	Number (%) of licenses that did request an extension	Number (%) of licenses that did not request an extension	Total
Broadband PCS	182 (5%)	3,376 (95%)	<b>3,558</b>
220 MHz phase II	482 (50%)	481 (50%)	<b>963</b>
39 GHz	1,672 (100%)	0 (0%)	<b>1,672</b>
Fixed microwave	26 (<1%)	10,452 (100%)	<b>10,478</b>
Private land mobile radio	21 (<1%)	9,525 (100%)	<b>9,546</b>
All market-based services	2,336 (38%)	3,857 (62%)	<b>6,193</b>
All site-based services	47 (<1%)	19,977 (100%)	<b>20,024</b>
<b>Total</b>	<b>2,383 (9%)</b>	<b>23,834 (91%)</b>	<b>26,217</b>

Source: GAO analysis of ULS data.

Notes: See appendix I for additional information on the scope and methodology for the analysis. Percentages may total to more than 100 due to rounding.

We found that FCC granted most extension requests it received for the five wireless services we examined, as shown in table 6. FCC officials said that the Commission seeks to be aggressive but pragmatic in its enforcement of buildout requirements and is flexible on deadlines when it needs to be. FCC officials said that the high rate is due in part to high-

quality extension requests. More specifically, they said a licensee typically takes steps before submitting a request—through both internal work and informal discussions with FCC staff—to determine whether it is likely to receive an extension and thus worth the resources to seek an extension. Due to this upfront work, FCC officials said that licensees are likely to submit high-quality extension requests and refrain from submitting unjustified extension requests, which leads to a high percentage of granted requests.

**Table 6: Number of Extension Requests Granted and Dismissed by Wireless Service, Data as of September 1, 2013**

Service	Number (%) granted	Number (%) dismissed	Total
Broadband PCS	80 (42%)	109 (58%)	189
220 MHz phase II	365 (54%)	315 (46%)	680
39 GHz	1,688 (83%)	345 (17%)	2,033
Fixed microwave	25 (61%)	16 (39%)	41
Private land mobile radio	150 (96%)	6 (4%)	156
All market-based services	2,133 (74%)	769 (27%)	2,902
All site-based services	175 (89%)	22 (11%)	197
<b>Total</b>	<b>2,308 (74%)</b>	<b>791 (26%)</b>	<b>3,099</b>

Source: GAO analysis of ULS data.

Notes: See appendix I for additional information on the scope and methodology for the analysis.

Since a licensee can request more than one extension for a license, the total number of extension requests for each service is greater than the total number of licenses that requested extensions presented in table 5.

Percentages may total to more than 100 due to rounding.

Not surprisingly, we also found that buildout requirements were more likely to be met when all extension requests for a license were granted (see table 7). For Broadband PCS, buildout requirements were met for 84 percent of licenses with granted extension requests while buildout requirements were met for 40 percent of licenses with dismissed extension requests. For 39 GHz, the difference is starker, as buildout requirements were met for 63 percent of licenses with granted extension requests, and buildout requirements were not met for any of the licenses with both granted and dismissed extension requests.<sup>27</sup> Two of the 39 GHz licensees we interviewed said they benefitted from being granted an

<sup>27</sup>A licensee may request more than one extension of a buildout deadline, thus a licensee could have requests both granted and dismissed.

extension, as the additional time enabled both licensees to meet the buildout requirements for many of their licenses.

**Table 7: Outcomes of Licenses by Wireless Service and Extension Request Outcome, Data as of September 1, 2013**

Service	Buildout requirement outcome	Request outcome			Total
		Number (%) granted	Number (%) dismissed	Number (%) both granted and dismissed <sup>a</sup>	
Broadband PCS	Met	63 (84%)	43 (40%)	0 (0%)	106
	Not met or other	12 (16%)	64 (60%)	0 (0%)	76
	<b>Total</b>	<b>75 (100%)</b>	<b>107 (100%)</b>	<b>0 (0%)</b>	<b>182</b>
220 MHz phase II	Met	43 (23%)	2 (2%)	8 (5%)	53
	Not met or other	142 (77%)	128 (99%)	159 (95%)	429
	<b>Total</b>	<b>185 (100%)</b>	<b>130 (100%)</b>	<b>167 (100%)</b>	<b>482</b>
39 GHz	Met	839 (63%)	0 (0%)	0 (0%)	839
	Not met or other	488 (37%)	0 (0%)	345 (100%)	833
	<b>Total</b>	<b>1,327 (100%)</b>	<b>0 (0%)</b>	<b>345 (100%)</b>	<b>1,672</b>
Fixed microwave	Met	10 (100%)	4 (25%)	0 (0%)	14
	Not met or other	0 (0%)	12 (75%)	0 (0%)	12
	<b>Total</b>	<b>10 (100%)</b>	<b>16 (100%)</b>	<b>0 (0%)</b>	<b>26</b>
Private land mobile radio	Met	17 (100%)	1 (33%)	1 (100%)	19
	Not met or other	0 (0%)	2 (67%)	0 (0%)	2
	<b>Total</b>	<b>17 (100%)</b>	<b>3 (100%)</b>	<b>1 (100%)</b>	<b>21</b>

Source: GAO analysis of ULS data.

Notes: See appendix I for additional information on the scope and methodology for the analysis.

Percentages may total to more than 100 due to rounding.

<sup>a</sup>Since a licensee can request more than one extension, a license could have requests with different outcomes, that is, both granted and dismissed.

Many experts, licensees, and industry associations we interviewed said that extensions can be beneficial, but some concerns were raised. Some licensees and industry associations we interviewed said that extensions of buildout requirements can provide needed flexibility and be in the public interest. Officials from one industry association said that licensees sometimes encounter an unexpected problem—such as interference with other licensees—and need more time to complete the buildout. Officials from a few industry associations said that extensions provide flexibility when a company has a problem that calls for an extension, especially if a large amount of capital has been invested in the buildout. However, a few licensees and industry associations said that FCC can be

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inconsistent in granting extensions or that the threshold used to grant extensions was unclear. One licensee and officials from two industry associations, for example, said that FCC has granted many extensions in the past but is now less willing to do so. With respect to the guidance on extensions, officials from one industry association said that FCC's process provides no certainty as to whether a licensee will get an extension, as they felt that the threshold FCC uses to grant extensions is not clear. FCC officials stated that they review requests for extensions on a case-by-case basis and analyze whether each request meets the legal standard necessary to receive an extension.<sup>28</sup> They added that because the facts are different for each case, an outside party or licensee might observe that the outcomes for extensions were inconsistent, even when the criteria are consistent. Moreover, a few experts had negative opinions on the frequency with which extensions are granted. One expert said that FCC's extensions have set a precedent of extending buildout requirements, which has created an impression that the requirements are not necessarily enforced. Similarly, according to another expert, while the extensions that FCC grants seem reasonable, granting extensions can undermine the purpose of the buildout requirements.

Though infrequent, instances involving FCC delays in reviewing filings—both required notifications and extension requests—can pose problems for licensees. As noted above, we found that 24 220 MHz phase II licenses had filed required notifications that were waiting to be approved or dismissed by FCC. Nineteen of these pending required notifications were filed 4 or more years ago. A few licensees we interviewed said that such delays in processing required notifications for market-based wireless services can create uncertainty. For example, two licensees said that FCC delays in approving a required notification could cause problems or delay the selling or leasing of a license. For extension requests, another licensee said that delays in FCC's response creates risks for licensees and can cause a licensee to expedite construction and spend additional money in case the extension is not granted and the original buildout deadline stands. FCC officials said that they aim to complete reviews as quickly as possible, but do not have a target time for completing reviews. For required notifications, they added that the time needed to complete a review varies depending on the volume of licenses in a service (as many required notifications could be submitted at the same time), the staff

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<sup>28</sup>See 47 C.F.R. §§ 1.925, 1.946.

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resources available, whether a notification contains sufficient information, and what other priorities face FCC or WTB at a given time. For requests for extensions, FCC officials said reviews can take more time compared to other filings as FCC must determine whether the request meets the criteria for an extension and often has to ask a licensee for additional information to better understand the request, among other things. For the 19 filings that have been pending for 4 or more years mentioned above, FCC noted that all these filings aim to demonstrate that the licensees are providing substantial service, and the filings remain pending due to resource limitations, workload priorities, and novel policy, legal, and technical issues the filings present.

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## Stakeholders Generally Support Buildout Requirements but Identified Changes and Alternative Tools That They Thought Could Better Meet Goals

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### Most Selected Stakeholders Supported Buildout Requirements but Thought the Requirements More Effectively Met Some Goals Than Others

Nearly all licensees and industry associations we interviewed said that they support FCC's having buildout requirements for wireless services because the requirements help ensure that spectrum will be put to use. In particular, all 10 licensees we spoke with said that they support having buildout requirements for spectrum licenses. Licensees mostly said that the buildout requirements are effective in preventing spectrum warehousing by making licensees accountable for putting the spectrum to use within a specified time frame. For example, one licensee elaborated that there needs to be some kind of buildout requirement in place or the potential for companies to hold spectrum without providing service would increase. Similarly, the majority of industry associations that we spoke with—6 out of 9—support buildout requirements for the same reasons that the licensees cited. However, one association that opposed buildout requirements said the requirements are cumbersome for licensees.

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Officials at another industry association were ambivalent, saying that the effectiveness of buildout requirements depends on the type of wireless service, as the requirements make more sense for site-based wireless services than market-based wireless services.

In contrast, spectrum policy experts we spoke with were more mixed in their opinions, with most experts being either ambivalent about or unsupportive of buildout requirements. Two experts who opposed buildout requirements said that there are better alternatives for promoting spectrum efficiency, such as spectrum sharing and encouraging more industry competition. Five experts said that they were ambivalent about the requirements for several reasons, including that the requirements are set too weak or undermined by FCC's granting extensions; as previously mentioned, extensions were requested for 9 percent of licenses we examined, and FCC granted 74 percent of these extension requests. In addition, three experts said that the presence of buildout requirements can lower auction revenues collected by FCC. According to one expert, buildout requirements could force a licensee to deploy a network that might not be the most efficient, which could lower the licensee's expected profits and thus willingness to pay for the license. Only one expert specifically supported buildout requirements without qualification, stating that the requirements make licensees consider whether they will put the wireless license to use before they decide to acquire it.

Beyond these broader stakeholder opinions on buildout requirements, stakeholder opinions on the effectiveness of buildout requirements in meeting commonly cited goals for the requirements were more varied. Of four goals commonly cited for buildout requirements, stakeholders tended to report that buildout requirements are effective in meeting two of these goals: encouraging licensees to provide service in a timely manner and preventing warehousing of spectrum. The stakeholders had mixed views on the effectiveness of buildout requirements in meeting the other two goals: promoting innovative services and promoting services to rural areas.<sup>29</sup>

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<sup>29</sup>FCC officials told us that buildout requirements are one tool in a framework used to meet its broad goal of promoting the efficient use of spectrum. Beyond this more general goal, we reviewed statutes, FCC budget and performance documents, and FCC reports and orders from recent rulemaking proceedings to identify four commonly cited goals for buildout requirements for wireless-service licenses.

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- *Encouraging licensees to provide service in a timely manner.* Many of the stakeholders whom we interviewed said that the buildout requirements were effective in meeting this goal. More specifically, 9 of 10 licensees and 7 of 9 industry associations said that the requirements were effective in meeting this goal because, for example, they impose construction deadlines that require licensees to put the spectrum to use or surrender the license. In contrast, experts were mixed in their opinions, with 4 of 9 experts saying the requirements were ineffective.<sup>30</sup> For example, one expert said that buildout requirements are not effective in encouraging timely service because FCC does not set buildout requirements that are overly onerous in terms of how long licensees have to meet benchmarks.
  - *Preventing the warehousing of spectrum.* Many stakeholders said that the buildout requirements were effective in meeting this goal. In particular, 7 of 10 licensees and 6 of 9 industry associations said that buildout requirements are effective, while experts were mixed. One licensee we interviewed said that buildout requirements can create legitimate pressure for licensees to use the spectrum or offer it for lease or sale in the secondary market, through which FCC enables licensees to lease or sell portions of the licensed spectrum rights to others. In contrast, 4 of 9 experts said that buildout requirements are ineffective or neither effective nor ineffective in helping FCC meet this goal.<sup>31</sup> For example, one expert said that despite having buildout requirements, FCC's enforcement gives licensees an opportunity to take their time in putting the licensed spectrum to use because the licensees can apply for waivers and extensions and the buildout requirements themselves are not very strict. However, licensees and experts we interviewed generally said they did not believe that spectrum warehousing is a major problem, in their experience. One licensee, for example, said that it does not have an incentive to warehouse spectrum because of high consumer demand for its services.

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<sup>30</sup>Of the remaining experts, two said that the requirements were effective, one replied don't know, and two did not provide an opinion for this goal.

<sup>31</sup>Specifically, three experts said effective, one said neither, and three said ineffective, while two experts did not provide an opinion for the goal.

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- *Promoting the provision of innovative services throughout the license areas.* All three groups of stakeholders were mixed in their views on the effectiveness of buildout requirements in promoting innovative services. Licensees and industry associations mostly reported that they thought buildout requirements were neither effective nor ineffective in meeting this goal, and a majority of the experts said that buildout requirements are ineffective in promoting innovative services. For example, three licensees said that innovative services are not directly related to buildout requirements because market forces, such as consumer demand and competition, are what drive innovation. Moreover, two licensees and three experts said that buildout requirements could actually be counter-productive by causing licensees to use older or less innovative technologies to deploy service more quickly.
  - *Encouraging the provision of services to rural areas.* Stakeholders were mixed in their views about whether buildout requirements help promote services in rural areas. For example, four licensees said that the buildout requirements were effective while four said they were ineffective, and five experts said that the requirements were effective while two experts said they were ineffective. The licensees and industry association representatives noted that building out to rural areas is difficult and expensive and the high costs associated with construction in these areas are rarely recovered by providing service to sparsely populated areas with few customers. A few stakeholders across all three groups added that geographic coverage requirements are more effective in promoting rural service than population coverage requirements. For example, one industry association said that geographic coverage requirements better promote rural buildout, particularly for licenses covering large geographic areas; if a large geographic-area license has a population coverage requirement, a licensee might be able to meet the requirement by serving the relatively densely populated areas and leaving the rural areas unserved.

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## Stakeholders Identified a Variety of Changes and Alternative Tools That They Thought Could Better Meet Commonly Cited Goals for Buildout Requirements

### Changes to Buildout Requirements

While buildout requirements are generally supported, some stakeholders we spoke with said that the requirements were not effective in meeting some of the commonly cited goals, in particular promoting innovative services and services to rural areas, as discussed above. Therefore, 22 of 28 stakeholders we spoke with identified changes that they said could improve the effectiveness of buildout requirements for wireless services to meet the goals identified above, in particular for market-based services.<sup>32</sup> The most frequently mentioned changes or enhancements include the following:

- *More clarity.* Four licensees, two industry associations, and three experts said additional clarity could make buildout requirements more effective. The four licensees, for example, reported that more clarity in the service rules could allow both FCC and licensees to better meet goals by removing uncertainty. Specifically, stakeholders said more clarity could be provided through greater detail about what could constitute substantial service<sup>33</sup> or about the engineering parameters licensees should use in their required notifications. According to one licensee, any clarification on a required process or rule is helpful, and for buildout requirements, more specific guidance might help eliminate some back and forth needed for FCC to approve a required notification. FCC officials said that the Commission sets specific requirements for waivers and extension requests, as well as specific buildout requirements, and that it reviews licensee

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<sup>32</sup>Stakeholders that identified changes to current buildout requirements included 9 of 10 licensees, 6 of 9 associations, and 7 of 9 experts.

<sup>33</sup>Greater detail could include setting safe harbors for particular wireless services with substantial service requirements. As noted earlier, FCC has established safe harbors for some services; safe harbors illustrate specific ways that a licensee could demonstrate substantial service, such as constructing a certain number of point-to-point links or serving populations that are outside areas served by other licensees.

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notifications and requests on a case-by-case basis.

- *More robust and transparent enforcement.* Three industry associations, two experts, and a licensee said that the self-certification process, while efficient and appropriate, could be bolstered by more visible enforcement, such as using spot checks to verify licensees' required notifications. For example, one expert said that to ensure effectiveness of the buildout requirements, FCC could conduct random spot checks to see that licensees are providing services upon meeting the buildout requirement. Similarly, to increase transparency, an industry association said that FCC could better educate licensees about the administrative aspects of filing requests or notifications and then conduct spot checks and issue fines if licensees are not providing services. These licensees and industry associations also said that more consistent enforcement entails more transparency and consistency in FCC's processes for granting extensions and waivers.
- *Different penalties.* Some stakeholders—two licensees and two experts—said that FCC could change the penalty for not meeting a buildout requirement. Many licensees, industry associations, and experts said that the penalty of license termination was too strict. Specifically, officials from one industry association said that with termination, licensees face the loss of all their investment in constructing infrastructure if they have to surrender the license for not meeting buildout requirements. Some of these stakeholders favored a use-it-or-share-it approach whereby a licensee would have to make spectrum for which it did not meet a buildout requirement available to others through leasing or sharing. According to one expert, use it or share it could create opportunities for other users to benefit by using spectrum that is lying fallow more immediately, even if only temporarily, or providing a stronger incentive for a licensee to make secondary market arrangements to put spectrum to use.
- *More opportunities to align licensees' goals with buildout requirements.* Two licensees and one industry association noted that FCC's buildout requirements do not necessarily align with a licensee's business plans, particularly for market-based services. Two licensees said FCC could provide more upfront feedback to licensees on whether a licensee's plan to meet a buildout requirement would be accepted by the Commission. These licensees said that through such early interaction with FCC,

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licensees might invest in building their systems and meet buildout requirements in tandem, rather than potentially having to invest in additional infrastructure simply to meet a buildout requirement to save a license. For example, one licensee said it currently has to consider two parallel tracks—its business plan and FCC buildout requirements—when building a system, a situation that can increase costs and make buildout less efficient. The licensee believed it could more efficiently construct its system if these two tracks could be brought closer together early in the license term. FCC officials told us that licensees can engage with FCC to obtain informal guidance before filing notifications to discuss the sufficiency of their plans and avoid potential problems. One industry association also said that FCC could provide licensees with additional ways to demonstrate meeting a buildout requirement, beyond a single requirement or safe harbor for substantial service, to distinguish licensees that are warehousing spectrum from those who are working to put it to use.

## Alternative Tools

In addition to changes to buildout requirements, stakeholders from each of the three groups we spoke with identified alternatives to buildout requirements that they said could better meet the four commonly cited goals, including provision of innovative services and service to rural areas. We also identified additional support for stakeholder-identified tools and other tools through a review of our previous reports on spectrum management and comments filed in response to FCC proceedings related to buildout requirements for spectrum licenses.<sup>34</sup> Some alternative tools could be used in place of buildout requirements, and others could complement the buildout requirements with the intent to better meet the goals and promote efficient use of spectrum. Table 8 summarizes the alternatives to buildout requirements that stakeholders identified as tools that could better meet each of the four commonly cited goals.

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<sup>34</sup>We reviewed FCC dockets 07-293 *In the Matter of Establishment of Rules and Policies for the Digital Audio Radio Satellite Service in the 2310-2360 MHz Frequency Band*, and 12-268 *In the Matter of Expanding the Economic and Innovation Opportunities of Spectrum through Incentive Auctions*. FCC requested comments on the proposed buildout requirements in the draft rules. The comment periods for these proceedings closed in 2010 and 2013, respectively.

**Table 8: Stakeholder-Identified Replacements for and Complements to FCC Buildout Requirements**

Goal	Secondary markets	Reliance on market forces	Flexible use licenses	Spectrum sharing	Smaller license areas	Subsidies	Spectrum usage fees
Encouraging licensees to provide timely service	X	X	X	X			
Promoting innovative services		X	X				
Providing service to rural areas					X	X	
Preventing warehousing of spectrum	X			X			X

Source: GAO analysis of interviews and reports.

- Secondary markets.** FCC enables licensees to make transactions through secondary markets, such as leasing spectrum rights to other licensees; this process facilitates licensees selling or leasing unneeded spectrum rights by negotiating their own terms.<sup>35</sup> Three licensees and two experts said that these transactions could promote the provision of timely service by allowing for accelerated transactions to a licensee that wants to deploy wireless services sooner and without the additional time needed for FCC review of the transaction. Some of these licensees and experts also said that this alternative may help better meet the goal of preventing spectrum warehousing by allowing a licensee, which does not want to deploy service in the spectrum in the near future, to recover costs by leasing or selling the spectrum rights to others that want to put the spectrum to use more immediately.
- Reliance on market forces.** A few licensees and experts said that relying more on market forces could help spur competition and ultimately encourage licensees to provide timely and innovative services. FCC already relies on market forces to some degree by, for example, auctioning licenses. Three licensees and two experts we spoke with said that FCC could further implement or bolster policies to promote competition that better motivate licensees to

<sup>35</sup>See also GAO, *Telecommunications: Enhanced Data Collection Could Help FCC Better Monitor Competition in the Wireless Industry*, [GAO-10-779](#) (Washington, D.C.: July 27, 2010).

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build or expand their networks and provide services more quickly than buildout requirements alone. Furthermore, one expert said that FCC already promotes competition among existing licensees as well as encouraging entry for others through the auctioning process, so buildout requirements are not needed in settings where there is sufficient competition to encourage licensees to acquire and put spectrum to use.

- *Flexible-use licenses.* With traditional licenses, the use or service is limited to the specific terms of the license (e.g., broadcast a television signal in a specific geographic market), but flexible-use licenses allow for a wider array of uses without having to seek additional FCC authorization.<sup>36</sup> Therefore, several stakeholders we spoke with said that FCC could do more to allow flexible-use licenses and that this might speed up wireless service deployment and help meet the goal of promoting timely service. FCC officials said that the Commission does propose to issue flexible-use licenses when circumstances permit but that flexible-use licenses are not appropriate for allowing certain services in specific bands, such as broadcast services in a mobile wireless band, or when technical limitations of a band limits flexibility. According to stakeholders, flexible-use licenses could also help promote innovative services. One licensee, for example, said that flexible-use licenses allow it to update its networks and technology without changing bands or asking FCC to modify licenses.
- *Spectrum sharing.* Through our interviews and review of two FCC proceedings, three experts and one licensee reported that enabling spectrum sharing may encourage licensees to put licensed spectrum to use while allowing them to increase efficiency in their business plans. This cooperative use of spectrum, with multiple users agreeing to access the same spectrum at different times or locations, could allow licensees to provide service more quickly and help prevent warehousing of spectrum.<sup>37</sup> For example, one licensee said that having a spectrum-sharing policy would be a good supplement to buildout requirements; specifically, if a licensee does not meet its buildout

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<sup>36</sup>See also GAO, *Spectrum Management: Incentives, Opportunities, and Testing Needed to Enhance Spectrum Sharing*, [GAO-13-7](#) (Washington, D.C.: Nov. 14, 2012).

<sup>37</sup>See also [GAO-13-7](#).

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requirements, FCC could require that the licensee negotiate sharing or leasing for the unused part of the license to help put it to use in timely manner. Similarly, one expert said sharing could enable others to put spectrum to use in cases where the licensee is not ready to use the spectrum, thus putting the spectrum to use more quickly, and might help discourage licensees from warehousing spectrum.

- *Smaller license areas.* Through our interviews and review of FCC proceedings, two licensees and two experts we spoke with said smaller geographic area licenses could better encourage service to rural areas. One licensee said that for market-based services, auctioning smaller-sized licenses could allow entities, such as rural wireless licensees, to bid on the specific areas they want to serve. One industry association commented that a larger inventory of smaller, and likely more affordable, licenses might attract the small and rural providers that best know and can best serve rural areas. Also, as previously discussed, another industry association commented that licensing exclusively by larger blocks could disfavor competition and discourage deployment of services in rural and less densely populated areas.
- *Subsidies.* Through interviews, two licensees and two experts said that using subsidies would be a more effective way to help promote service to rural areas. One example of a subsidy is the Universal Service Fund, in which FCC establishes programmatic goals and distributes a subsidy to assist in efforts to increase nationwide access to advanced wireless services.<sup>38</sup> Two experts said that the buildout requirements are vague and represent a crude and untargeted approach to addressing a specific goal like promoting services to underserved and unserved areas in rural locations. For example, one expert said that while a specially designed buildout requirement may be effective in prompting a licensee to provide service to rural areas, using a subsidy to procure an entity that is willing to provide service would be a more direct and effective way to meet the goal. One licensee said that

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<sup>38</sup>In 2011, the FCC set a budget of \$4.5 billion annually over six years (2011-2016) for the high-cost program within the Universal Service Fund and, among other reforms, established support for mobile voice and broadband. GAO, *Telecommunications: FCC Has Reformed the High-Cost Program, but Oversight and Management Could be Improved*, [GAO-12-738](#) (Washington, D.C.: July 25, 2012).

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buildout requirements have a limited ability to promote service to rural areas since it is often not economical for a licensee to build a system in areas that are sparsely populated; in these cases, subsidies can better encourage licensees to serve these areas.

- *Spectrum usage fees.* A few licensees we interviewed said spectrum usage fees may be a good alternative to buildout requirements to help prevent spectrum warehousing, particularly for licenses not obtained through auctions. Usage fees could help encourage licensees to use spectrum more efficiently or pursue sharing opportunities once they bear the opportunity cost of letting licensed spectrum sit idle.<sup>39</sup> For example, one licensee said that if spectrum is made available for free, a licensee may have less incentive to put it to use or use it efficiently compared to a licensee that bought its spectrum at auction. For this reason, a few licensees noted that when FCC began using auctions to assign spectrum, there was a debate about whether buildout requirements were needed for auctioned licenses since those who paid to acquire spectrum have demonstrated their commitment to use the spectrum by paying for it.

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## Agency Comments

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

As agreed with your office, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the report date. At that time, we will send copies to the Chairman of the Federal Communications Commission and the appropriate congressional committees. In addition, the report will be available at no charge on GAO's website at <http://www.gao.gov>.

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<sup>39</sup>See [GAO-13-7](#). In this report, FCC officials said that the Commission has proposed spectrum usage fees at various times including in its congressional budget submission, but FCC has not received legislative authority to implement such a program.

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If you or your staff have any questions about this report, please contact me at (202) 512-2834 or [goldsteinm@gao.gov](mailto:goldsteinm@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix IV.

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

Mark L. Goldstein  
Director, Physical Infrastructure

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# Appendix I: Objectives, Scope, and Methodology

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This report examines Federal Communications Commission (FCC) buildout requirements for wireless services and the efficient use of spectrum. In particular, this report provides information on (1) the buildout requirements established by FCC for spectrum licenses for wireless services, (2) the extent that FCC follows its process to enforce buildout requirements for wireless services, and (3) stakeholder opinions on the extent that goals for buildout requirements have been met.

To describe FCC buildout requirements for wireless services, we reviewed FCC regulations and guidance on buildout requirements for services that use spectrum. We also interviewed FCC officials to understand which services have buildout requirements, the general process used to set buildout requirements for a service, and what factors FCC considers when setting buildout requirements for a service. According to FCC, the Wireless Telecommunications Bureau (WTB) is responsible for granting and monitoring licenses for wireless services that use spectrum. For this review, we focused on guidance and processes related to buildout requirements for licenses for wireless services, which amounts to nearly 2 million licenses.<sup>1</sup>

To describe FCC's enforcement process, we reviewed FCC regulations and guidance to determine the steps FCC takes to monitor and enforce buildout requirements for wireless services. In addition, we interviewed FCC officials to learn about different parts of the enforcement process to determine licensee responsibilities and actions, FCC responsibilities and actions, and which FCC actions are automated in the Universal Licensing System (ULS) licensing database.

To examine FCC's enforcement of buildout requirements for wireless services, we selected five wireless services and analyzed data on them from FCC's ULS database. We selected the five services to ensure variety in type of service or use, type of buildout requirement (e.g., population coverage or substantial service), how licenses were assigned (e.g., auctions), and the number of licenses in the service. We also considered recommendations from FCC officials and other interviewees when selecting among wireless services. As a result, we selected three

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<sup>1</sup>Wireless services include cellular telephone, paging, personal communications services, and other commercial and private radio services. FCC also sets buildout requirements for satellite, broadcast, and public-safety communications spectrum licenses that are administered by other bureaus, which we did not study in detail for this review.

market-based services—broadband personal communications service (PCS), 220 megahertz (MHz) phase II, and 39 gigahertz (GHz)—and two site-based services—industrial/business private land mobile radio below 700 MHz and fixed microwave.<sup>2</sup> Tables 1 and 3 in the report provide information on how each selected service aligns with the criteria we used to select wireless services. The results of the data analysis for these five services are not generalizable to other wireless services.

For the five selected wireless services, we analyzed data for licenses that would have buildout requirements on or before December 31, 2012.<sup>3</sup> We picked December 31, 2012, to allow sufficient time after the buildout deadline for any licensee or FCC action—such as FCC review of a licensee’s notification that it met the requirement—to occur and be entered in ULS. For the market-based services, we included all licenses that would have a buildout requirement on or before December 31, 2012, based on the auction dates for the licenses and the length of the buildout requirement in regulation. For example, we included Broadband PCS licenses awarded at auctions between 1995 and 2007; since these licenses have a 5-year buildout requirement, the buildout deadlines fell between 2000 and 2012.<sup>4</sup> For site-based services, we similarly sought to include licenses that would have buildout requirements due on or before December 31, 2012. However, due to the high volume of licenses in these two services, we limited our analysis to new licenses that would have a buildout requirement during calendar year 2012; that is, we did not include modifications to existing licenses, for which FCC also includes buildout requirements. Private land-mobile-radio licenses below 700

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<sup>2</sup>FCC uses radio service codes to categorize licenses by wireless service in ULS, which we used to identify licenses in our selected wireless services. For the three market-based services, broadband PCS licenses are coded CW, 220 MHz phase II licenses are coded QA, and 39 GHz licenses are coded TN. For the two site-based services, multiple radio service codes corresponded to each selected service. We excluded radio service codes for public safety licenses or licenses that have a strong or dominant federal use, such as commercial aviation. As a result, only industrial/business private land-mobile-radio licenses coded IG and YG and fixed-microwave licenses coded CF and MG were included for these two services.

<sup>3</sup>For the selected wireless services, we excluded licenses for special temporary authority (STA). According to FCC, STA licenses are granted for short periods of time, including emergency situations, so the licenses are not subject to buildout requirements.

<sup>4</sup>All broadband PCS licenses have a 5-year buildout requirement either as a first requirement (for 30 MHz licenses) or as the only requirement (for 10 and 15 MHz licenses). We excluded broadband PCS licenses awarded at auction 78 in 2008 from the analysis since no buildout requirements would come due until 2013.

MHz, for example, have a 12-month buildout requirement, so we included new licenses granted during calendar year 2011 that would have a buildout deadline during calendar year 2012. Appendix III contains additional information on the number and type of licenses in each wireless service included in our analysis, such as the auction numbers and dates for market-based services.

For each service, we analyzed license data to determine the outcomes of buildout requirements and examine FCC's enforcement of buildout requirements. We used license and application data from the ULS public access downloads as of September 1, 2013.<sup>5</sup> In particular, we examined (1) the number of licenses that did and did not have buildout requirements; (2) the outcomes for licenses that had buildout requirements; (3) the number of licenses with requests for extensions; and (4) for licenses with requests, whether the request was granted or dismissed.

With respect to the outcomes for licenses that had buildout requirements, we examined the number of licenses in each wireless service that:

- met the requirement, including whether it met the requirement on time or late;<sup>6</sup>
- did not meet the requirement and was terminated;
- did not meet the requirement and remained active after the buildout deadline; and
- did not reach the buildout deadline, meaning that the license was (1) canceled on or before the buildout deadline, (2) otherwise

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<sup>5</sup>FCC updates ULS database downloads for specific wireless radio services on a weekly basis. The downloads are available at <http://wireless.fcc.gov/uls/index.htm?job=transaction&page=weekly>.

<sup>6</sup>Licenses must notify FCC within 15 days of the buildout deadline. 47 C.F.R. § 1.946(d). We categorized a license as meeting the buildout requirement "on time" if its buildout date was within 15 days of the buildout deadline. FCC officials noted that the Commission's rules provide that filings due on a weekend, holiday, or day that the Commission closes early and does not reopen may be timely filed on the next business day; as a result, some required notifications dated more than 15 days after a license's buildout deadline may be timely.

terminated before the buildout deadline, or (3) expired on or before the buildout deadline.

For licenses with outcomes that did not appear to align with FCC's enforcement process, we conducted additional research to understand the circumstances for these licenses. Specifically, (1) licenses that met the buildout requirement late and (2) licenses that did not meet the requirement and were not terminated on the buildout deadline. For these licenses, we reviewed additional information using ULS's online license search to determine whether FCC followed its enforcement processes. We also asked FCC officials about the general circumstances surrounding these licenses. Overall, a small percentage of licenses had one of these outcomes.

Since some licenses had more than one buildout requirement and thus could have more than one outcome, we developed rules to classify these licenses. For market-based licenses with more than one buildout requirement on or before December 31, 2012, we generally classified the license's buildout outcome by the outcome for the second buildout requirement. For example, if a first buildout requirement was met but the license was canceled before the second buildout requirement, we classified the outcome as "canceled on or before buildout requirement." However, to be classified as "met," both the first and second requirement had to be met for a license. For the site-based services, a license can authorize multiple frequencies, and each frequency could have a buildout requirement. For each site-based license, we assessed the outcomes for all frequencies and used this information to report an outcome for the license. For example, if the buildout requirements were met for all frequencies, we classified the outcome as "met." If the buildout requirements were met for some frequencies but not met for other frequencies (meaning that those frequencies were terminated), we classified the license as "some met/some not met." When examining extension requests for licenses in all five services, we assessed whether any extension request was filed for the license.

Based on interviews with FCC officials, as well as reviewing system documentation and electronic data testing, we determined that these data were sufficiently reliable for our purposes. Appendix III contains detailed results of the analysis of ULS data for each of the five selected wireless services.

To assess the effectiveness of FCC's enforcement, we also selected and interviewed a sample of industry associations and licensees. We

conducted semi-structured interviews with industry associations and licensees to gather their opinions on FCC's enforcement process, including the clarity of FCC guidance on buildout requirements, the timeliness of FCC responses to licensee requests and other applications, and their experiences with ULS. We selected both industry associations and licensees to cover the five selected wireless services, and we further selected licensees to ensure variety in licensee type and size. The opinions from these industry associations and licensees are not generalizable.

To gather stakeholder opinions on the effectiveness of buildout requirements, we selected and interviewed a sample of industry stakeholders, including spectrum policy experts, industry associations, and licensees. To determine the goals for buildout requirements, we reviewed statute, FCC documents from recent rulemakings, and other FCC budget and performance documents to identify frequently cited goals for buildout requirements. In addition to the general goal of promoting efficient or productive use of spectrum, we identified the following four goals:

- encouraging licensees to provide service in a timely manner,
- promoting the provision of innovative services throughout the license areas,
- encouraging provision of services to rural areas, and
- preventing the warehousing of spectrum.

We conducted semi-structured interviews with stakeholders to gather their opinions on the extent that buildout requirements meet each of the four goals as well as reasons or examples to support these opinions (see table 9). We also asked what changes, if any, could make buildout requirements more effective and what alternative tools FCC could use to more directly or better meet the four goals. To select experts, we included individuals based on participation in recent GAO reviews on spectrum policy, publications on spectrum policy, and recommendations

from other interviewees.<sup>7</sup> In particular, we sought to interview individuals who appeared at least twice across the criteria or participated in at least two recent GAO reviews. We selected industry associations and licensees as described above. The views of the selected stakeholders we interviewed are not generalizable.

**Table 9: Organizations and Individuals Interviewed**

<b>Industry associations</b>
Central Station Alarm Association
Competitive Carriers Association
Enterprise Wireless Alliance
Fixed Wireless Communications Coalition
Forest Industries Telecommunications
Land Mobile Communications Coalition
PCIA – The Wireless Infrastructure Association
Telecommunications Industry Association
Utilities Telecom Council
<b>Experts</b>
Coleman D. Bazelon, The Brattle Group
Michael Calabrese, New American Foundation
Peter Cramton, University of Maryland
Donald Evans, Fletcher, Heald & Hildreth, PLC
Harold Feld, Public Knowledge
Thomas W. Hazlett, George Mason University School of Law
William Lehr, Massachusetts Institute of Technology
Gregory L. Rosston, Stanford Institute for Economic Policy Research
Scott Wallsten, Technology Policy Institute
<b>Licensees</b>
CSpire
Day Wireless Systems

<sup>7</sup>We considered experts interviewed for GAO, *Commercial Spectrum: Plans and Actions to Meet Future Needs, Including Continued Use of Auctions*, [GAO-12-118](#) (Washington, D.C.: Nov. 23, 2011), *Spectrum Management: Incentives, Opportunities, and Testing Needed to Enhance Spectrum Sharing*, [GAO-13-7](#) (Washington, D.C.: Nov. 14, 2012), and *Spectrum Management: FCC’s Licensing Approach in the 11, 18, and 23 Gigahertz Bands Currently Supports Spectrum Availability and Efficiency*, [GAO-13-78R](#) (Washington, D.C.: Nov. 20, 2012).

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**Appendix I: Objectives, Scope, and Methodology**

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IDT Spectrum
National Rural Telecommunications Cooperative
North Dakota Network Co.
Peñasco Valley Telephone Cooperative, Inc.
Southern Company
Sprint
T-Mobile
Verizon

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Source: GAO.

To supplement these interviews, we reviewed our previous reports on spectrum management and filings in two recent FCC proceedings that sought comments on buildout requirements for wireless services. We identified and reviewed filings in the dockets for the following two proceedings: 07-293, *In the Matter of Establishment of rules and policies for the Digital Audio Radio Satellite Service in the 2310-2360 MHz Frequency Band*<sup>8</sup> and 12-268, *In the Matter of Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*.<sup>9</sup> For each proceeding, we reviewed filings made by licensees, industry associations, and other companies and associations and summarized opinions on whether buildout requirements are effective and any changes that could be made to improve buildout requirements.

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<sup>8</sup>Federal Communication Commission Requests Comment on Revision of Performance Requirements for 2.3 GHz Wireless Communications Service, FCC document 10-46 (2010).

<sup>9</sup>*In the Matter of Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, FCC document 12-118 (2012). Due to the high number of filings in this docket, we did not review filings made by individuals.

# Appendix II: Buildout Requirements for Spectrum Licenses

## Buildout Requirements for Services Licensed by the Wireless Telecommunications Bureau and the Public Safety and Homeland Security Bureau

**Table 10: Buildout Requirements for Private and Commercial Land-Mobile Radio Services, as of January 2014**

Radio service/frequency band	Construction/coverage requirements	Radio service code	47 C.F.R. Section
220 MHz (Public Safety)	Construct and place into operation within 12 months of initial license grant date, or the authorization cancels automatically and must be returned to the Commission. Alternatively, may apply for extended implementation - up to 3 years may be authorized for constructing and placing a system in operation.	QM	90.725(f), 90.727
220 MHz Phase I (Nationwide Licenses)	Construct and place into operation at least 10 percent of designated geographic areas within 2 years of initial license grant, 40 percent within 4 years, 70 percent within 6 years, and 100 percent of the designated geographic areas within 10 years of initial license grant. Each benchmark has a requirement for base stations to be operational in specific urban areas.	NC	90.725(a)
220 MHz Phase I (Non-Nationwide Licenses)	Construct and place into operation within 12 months of initial license grant date.	QD, QO, QT	90.725(f), 90.757(b)
220 MHz Phase II (Nationwide Licenses)	Provide coverage to a composite area of 750,000 square kilometers or 37.5 percent of the US population within 5 years of initial license grant, and 1,500,000 square kilometers or 75 percent of the population within 10 years of initial license grant. Alternatively, nationwide licensees may meet the construction requirements by demonstrating an appropriate level of substantial service at the 5- and 10-year benchmarks.	QA	90.769
220 MHz Phase II (Economic Area or Regional Licenses)	Provide coverage to at least 1/3 of the population in the licensed area within 5 years of initial license grant, and 2/3 of the population within 10 years of initial license grant. Alternatively, Economic Area or Regional licensees may meet their construction requirements by providing an appropriate level of substantial service at 5- and 10- year benchmarks.	QA	90.767

**Appendix II: Buildout Requirements for  
Spectrum Licenses**

<b>Radio service/frequency band</b>	<b>Construction/coverage requirements</b>	<b>Radio service code</b>	<b>47 C.F.R. Section</b>
Below 700 MHz (except 220 MHz)	Must be placed into operation within 12 months of license grant, or the authorization cancels automatically and must be returned to the Commission. Alternatively, a local government in the Public Safety Pool may apply for extended implementation - up to 5 years may be authorized for constructing and placing a system in operation.	IG, IK, YG, YK, PW, YW, RS	90.155, 90.629
700 MHz Narrowband Public Safety (except State Licenses)	Construct and place into operation within 12 months of initial grant. Alternatively, may apply for extended implementation - up to 5 years may be authorized for constructing and placing a system in operation.	SG, SY	90.551, 90.155(b)
700 MHz Narrowband Public Safety State Licenses	State must certify substantial service to 1/3 of its population by June 13, 2014, and 2/3 of its population by June 13, 2019. Licensee must certify that the radio system has been approved and funded for implementation by the deadline date.	SL	90.529
800 and 900 MHz Trunked (Excluding Specialized Mobile Radio)	Construct and place into operation within 1 year of initial license grant. Alternatively, may apply for extended implementation - up to 5 years may be authorized for constructing and placing a system in operation.	YB, YE, YF, YI, YJ, YO, YP, YU	90.631(e), 90.629
800 and 900 MHz Conventional (Excluding Specialized Mobile Radio)	Construct and place into operation within 1 year of initial license grant. Alternatively, may apply for extended implementation - up to 5 years may be authorized for constructing and placing a system in operation.	GB, GE, GF, GI, GJ, GO, GP, GU	90.633(c), 90.629
800 and 900 MHz Trunked (Specialized Mobile Radio)	Construct and place into operation within 1 year of license grant.	YX, YS, YM, YL	90.631(e-f)
800 and 900 MHz Conventional (Specialized Mobile Radio)	Construct and place into operation within 1 year of license grant.	GX, GR, GM, GL	90.633(c)
800 MHz Geographic (Economic Area) (Channel Blocks D through V)	Provide coverage to at least 1/3 of the population in the licensed area within 3 years of initial license grant, and 2/3 of the population within 5 years of initial license grant. Alternatively, licensees may provide substantial service to the licensed area within 5 years of initial license grant.	YC, YH	90.685(b)
800 MHz Geographic (Economic Area) (Channel Blocks A, B, C)	Provide coverage to at least 1/3 of the population in the licensed area within 3 years of initial license grant, and 2/3 of the population within 5 years of initial license grant. In addition, licensees must construct 50 percent of the total number of channels in their spectrum block in at least one location in their licensed area within 3 years of initial grant and retain such usage for the remainder of the construction period. Alternatively, licensees may provide substantial service to the licensed area within 5 years of initial license grant. In addition, licensees must construct 50 percent of the total number of channels in their spectrum block in at least one location in their licensed area within 3 years of initial grant and retain such usage for the remainder of the construction period.	YC, YH	90.685(b)

**Appendix II: Buildout Requirements for  
Spectrum Licenses**

<b>Radio service/frequency band</b>	<b>Construction/coverage requirements</b>	<b>Radio service code</b>	<b>47 C.F.R. Section</b>
900 MHz Geographic (Major Trading Area)	Provide coverage to at least 1/3 of the population in the licensed area within 3 years of initial license grant, and 2/3 of the population within 5 years of initial license grant. Alternatively, licensees may provide substantial service to their licensed area within 5 years of initial license grant. If substantial service at 5 years is elected, licensees must notify FCC within 3 years that it is electing the substantial service option at 5 years.	YD	90.665(c)
4940-4990 MHz (Public Safety 4.9 GHz)	Fixed point-to-point stations must be placed into operation within 18 months of initial license grant, or the authorization for that station cancels automatically. There is no time limit for which base and temporary fixed stations authorized under a 4940-4990 MHz band license must be placed in operation.	PA	90.1209
Intelligent Transportation Service, Dedicated Short Range Communications Service Roadside Units	Construct and place into operation within 12 months from the date of registration. Licensees must notify the Commission when registered units are placed in operation within their construction period.	IQ (Public-Safety), QQ (Non-Public Safety)	90.155(i)

Source: FCC.

**Table 11: Buildout Requirements for Location and Monitoring Services, as of January 2014**

<b>Radio service/frequency band</b>	<b>Construction/coverage requirements</b>	<b>Radio service code</b>	<b>47 C.F.R. Section</b>
Geographic Licenses (Economic Area)	Multilateration location service available to 1/3 of the population within 5 years of initial license grant and 2/3 of the population within 10 years of initial license grant. Alternatively, licensees may provide substantial service to their licensed area within the appropriate 5- and 10-year benchmarks.	LS	90.155(d)
Site-Based Licenses	Construct and place into operation within 12 months of license grant.	LN, LW	90.155(a)

Source: FCC.

**Appendix II: Buildout Requirements for  
Spectrum Licenses**

**Table 12: Buildout Requirements for Cellular Services, as of January 2014**

<b>Radio service/frequency band</b>	<b>Construction/coverage requirements</b>	<b>Radio service code</b>	<b>47 C.F.R. Section</b>
First system on each channel block, markets 1-90	At least partially constructed and begin providing service to subscribers within 36 months of initial license grant.	CL	22.946(a), 22.947
First system on each channel block, all markets except for markets 1-90 and Gulf of Mexico Exclusive Zone.	At least partially constructed and begin providing service to subscribers within 18 months of initial license grant.	CL	22.946(a), 22.947
Unserved Areas or Specific Facilities	Construct and place into operation within 12 months.	CL	22.946(c), 22.947

Source: FCC.

**Table 13: Buildout Requirements for Broadband Personal Communications Service (PCS), as of January 2014**

<b>Radio service/frequency band</b>	<b>Construction/coverage requirements</b>	<b>Radio service code</b>	<b>47 C.F.R. Section</b>
30 MHz Licenses	Service to at least 1/3 of the population in licensed area within 5 years of initial license grant, and 2/3 of the population within 10 years of initial license grant. Alternatively, licensees may provide substantial service to their licensed area within the appropriate 5- and 10-year benchmarks.	CW	24.203(a)
10/15 MHz Licenses	Service to at least 1/4 of the population in licensed area within 5 years of initial license grant, or alternatively substantial service within 5 years of initial license grant.	CW	24.203(b)

Source: FCC.

**Appendix II: Buildout Requirements for  
Spectrum Licenses**

**Table 14: Buildout Requirements for Narrowband Personal Communications Service (PCS), as of January 2014**

<b>Radio service/frequency band</b>	<b>Construction/coverage requirements</b>	<b>Radio service code</b>	<b>47 C.F.R. Section</b>
Nationwide Licenses	Provide coverage to a composite area of 750,000 square kilometers or 37.5 percent of the US population within 5 years of initial license grant, and 1,500,000 square kilometers or 75 percent of the population within 10 years of initial license grant. As an alternative to the construction requirements listed above, all narrowband PCS licensees may provide substantial service to their licensed area within 10 years of initial license grant. Licensees electing substantial service must notify FCC at the 5 year benchmark that they plan to satisfy the substantial service requirement.	CN	24.103(a),(d)
Regional Licenses	Provide coverage to a composite area of 150,000 square kilometers or 37.5 percent of the population of the service area within 5 years of initial license grant, and 300,000 square kilometers or 75 percent of the population within 10 years of initial license grant. As an alternative to the construction requirements listed above, all narrowband PCS licensees may provide substantial service to their licensed area within 10 years of initial license grant. Licensees electing substantial service must notify FCC at the 5 year benchmark that they plan to satisfy the substantial service requirement.	CN	24.103(b), (d)
Major Trading Area Licenses	Provide coverage to a composite area of 75,000 square kilometers or 25 percent of geographic area, or 37.5 percent of the population in licensed area within 5 years of initial license grant; and 150,000 square kilometers or 50 percent of the geographic area, or 75 percent of the population within 10 years of initial license grant. As an alternative to the construction requirements listed above, all narrowband PCS licensees may provide substantial service to their licensed area within 10 years of initial license grant. Licensees electing substantial service must notify FCC at the 5 year benchmark that they plan to satisfy the substantial service requirement.	CN	24.103(c), (d)
1910-1915/1990-1995 MHz PCS	Substantial service showing within 10 years of the date of initial issuance or renewal.	CY	24.203(d)

Source: FCC.

**Appendix II: Buildout Requirements for  
Spectrum Licenses**

**Table 15: Buildout Requirements for Paging and Radiotelephone Services, as of January 2014**

<b>Radio service/frequency band</b>	<b>Construction/coverage requirements</b>	<b>Radio service code</b>	<b>47 C.F.R. Section</b>
Site-Based Licenses - Part 22	Construct within 1 year of license grant.	CA, CB, CD, CG, CO, CR	22.511
Site-Based Licenses - Part 90, 929-930 MHz, Exclusive Channels	Construct within 1 year of license grant.	GS	90.493(b), 22.511
Site-Based - Part 90, 929-930 MHz, Shared Channels	Construct and place into operation within 12 months of license grant.	GS	90.155(a)
Geographic Area Commercial Aviation Air-Ground Systems	Licenses authorized to use more than one megahertz (1 MHz) of the 800 MHz commercial aviation air-ground spectrum allocation must make a showing of substantial service within 5 years of grant of authorization. Substantial service may be demonstrated, but is not limited to, either of the following "safe harbor" provisions: (1) Construction and operation of 20 ground stations with at least one ground station located in each of the 10 Federal Aviation Administration regions; or, (2) Provision of service to the airspace of 25 of the 50 busiest airports.	CJ	22.873
Geographic Area Paging Licenses	Provide coverage to 1/3 of the population within the licensed area within 3 years of initial license grant, and 2/3 of the population within 5 years of initial license grant. Alternatively, licensees may provide substantial service to the licensed area within 5 years of initial license grant. Licensees electing the substantial service option must notify FCC of their intention to do so within their 3-year construction benchmark.	CP, CZ, GC	22.503(k)

Source: FCC.

**Appendix II: Buildout Requirements for  
Spectrum Licenses**

**Table 16: Buildout Requirements for Miscellaneous Wireless Communication Services, as of January 2014**

Radio service/frequency band	Construction/coverage requirements	Radio service code	47 C.F.R. Section
Lower 700 MHz (Block A 698-704 and 728-734 MHz; Block B 704-710 and 734-740 MHz; Block E 722-728 MHz)	<p>Provide signal coverage and offer service for at least 35 percent of the geographic area of each of its license authorizations no later than June 13, 2013 (or within four years of initial license grant if later than June 13, 2009). If licensee fails to do so, the license authorization will be reduced by 2 years and licensee may lose authority to operate in remaining unserved areas and other penalties may apply.</p> <p>Provide service over at least 70 percent of the geographic area of authorization by the end of the license term. If licensee fails to do so, licensee's authorization for unserved areas will terminate automatically and may be subject to license termination and other penalties.</p> <p>If results of first auction in which licensees for such authorizations in Blocks A, B, and E are offered do not satisfy the reserve price for the applicable block, licensee must provide signal coverage and offer service over at least 40 percent of the population no later than June 13, 2013 (or within 4 years of initial license grant if later than June 13, 2009). If licensee fails to do so, the license authorization will be reduced by two years and licensee may lose authority to operate in remaining unserved areas and other penalties may apply.</p> <p>Provide signal coverage and offer service to at least 75 percent of the population by the end of the license term. If licensee fails to do so, licensee's authorization for unserved geographic portions will terminate automatically and licensee may be subject to license termination and other penalties.</p>	WY	27.13, 27.14(g)(1), 27.14(g)(2), 27.14(i)
700 MHz Lower Band (Block C 710-716, 740-746 MHz and Block D 716-722 MHz)	Provide substantial service to its licensed area within 10 years of initial license grant.	WZ	27.13, 27.14(a)
700 MHz Upper Band (Block C 746-757 MHz and 776-787 MHz)	<p>Provide signal coverage and offer service over at least 40 percent of the population no later than June 13, 2013 (or within four years of initial license grant if later than June 13, 2009). If licensee fails to do so, the license authorization will be reduced by 2 years and licensee may lose authority to operate in remaining unserved areas and other penalties may apply.</p> <p>Provide signal coverage and offer service to at least 75 percent of the population by the end of the license term. If licensee fails to do so, licensee's authorization for unserved geographic portions will terminate automatically and licensee may be subject to license termination and other penalties.</p>	WU	27.14(h)

**Appendix II: Buildout Requirements for  
Spectrum Licenses**

<b>Radio service/frequency band</b>	<b>Construction/coverage requirements</b>	<b>Radio service code</b>	<b>47 C.F.R. Section</b>
700 MHz Upper Band (Block D 758-763, 788-793 MHz)	Provide signal coverage and offer service over at least 75 percent of the nationwide Upper D Block population within 4 years from June 13, 2009, 95 percent of the population of the nationwide license area within 7 years, and 99.3 percent of the population of the nationwide license area within ten years.	WP	27.14(m)
700 MHz Guard Bands	Provide substantial service to its licensed area within 10 years of initial license grant. Submit an annual report providing information about the manner in which its spectrum is being utilized.	WX	27.13, 27.14(a), 27.607
1.3 GHz (1390-1392 MHz), Market Area	Provide substantial service to its licensed area within 10 years of initial license grant.	BA	27.13, 27.14(a)
1.4 GHz (1392-1395 MHz and 1432-1434 MHz), Market Area	Provide substantial service to its licensed area within 10 years of initial license grant.	BB	27.13, 27.14(a)
1.6 GHz (1670-1675 MHz), Market Area	Provide substantial service to its licensed area within 10 years of initial license grant.	BC	27.13, 27.14(a)
Advanced Wireless Service (AWS) (1710-1755 MHz and 2110-2155 MHz)	Provide substantial service to its licensed area within the prescribed license term. Authorizations will have a term not to exceed 10 years from the initial license grant, except that authorizations issued on or before December 31, 2009, will have a term of 15 years.	AW	27.13, 27.14
AWS-4 (2000-2020 MHz and 2180-2200 MHz)	Within 4 years from the date of license, provide reliable signal coverage and offer service to at least 40 percent of its total AWS-4 population. Within 7 years of the date of license, provide reliable signal coverage and offer service to at least 70 percent of the population in each of its license areas.	AD	27.13, 27.14

**Appendix II: Buildout Requirements for  
Spectrum Licenses**

<b>Radio service/frequency band</b>	<b>Construction/coverage requirements</b>	<b>Radio service code</b>	<b>47 C.F.R. Section</b>
2.3 GHz Wireless Communications Services (WCS) (2305-2320 MHz and 2345-2360 MHz)	<p>Licensees operating mobile or point-to-multipoint systems must provide reliable signal coverage and offer service to at least 40 percent of the license area's population within 48 months and to at least 75 percent of the license area's population within 78 months. If a licensee demonstrates that 25 percent or more of the license area's population is within a zone requiring coordination with an aeronautical mobile telemetry facility or with the National Aeronautics and Space Administration's Deep Space Network facility in Goldstone, California, the population benchmarks are reduced to 25 and 50 percent, respectively.</p> <p>Licensees operating point-to-point fixed systems, except those deployed in the Gulf of Mexico license area, must construct and operate a minimum of 15 point-to-point links per million persons (one link per 67,000 persons) in a license area within 48 months, and 30 point-to-point links per million persons (one link per 33,500 persons) in a licensed area within 78 months. Licensees operating point-to-point fixed systems in the Gulf of Mexico license area must demonstrate that they have constructed and are operating a minimum of 15 point-to-point links at 48 months and 78 months.</p>	WS	27.13, 27.14(p)
Broadband Radio Service	Provide substantial service to its licensed area by May 1, 2011.	BR	27.14
Educational Broadband Service	Provide substantial service to its licensed area by November 1, 2011.	ED	27.14

Source: FCC.

**Appendix II: Buildout Requirements for  
Spectrum Licenses**

**Table 17: Buildout Requirements for Maritime Public Coast Services, as of January 2014**

<b>Radio service/frequency band</b>	<b>Construction/coverage requirements</b>	<b>Radio service code</b>	<b>47 C.F.R. Section</b>
Very High Frequency (VHF), Geographic Licenses	Provide substantial service to its licensed area within 5 years of initial license grant and again within 10 years.	PC	80.49(a)(1)
VHF, Site-Based Licenses	Construct and place into operation within 12 months from date of grant.	MC	80.49(a)(1)
Low Frequency, Medium Frequency, High Frequency Site-Based Licenses	Construct and place into operation within 12 months from date of grant.	MC	80.49(a)(2)
Automated Maritime Telecommunications System (AMTS), Site-Based	Construct and place into operation within 2 years from date of grant.	MC	80.49(a)(3)
AMTS, Geographic Licenses	Provide substantial service to its licensed area within 10 years of initial license grant.	PC	80.49(a)(3)
Public Fixed	Applies only to licenses with station class of APC. Construct and place into operation within 12 months from date of grant.	MK	80.49(b)

Source: FCC.

**Table 18: Buildout Requirements for Aviation Services, as of January 2014**

<b>Radio service/frequency band</b>	<b>Construction/coverage requirements</b>	<b>Radio service code</b>	<b>47 C.F.R. Section</b>
Aeronautical advisory Unicom and Radionavigation Land Stations (excluding radionavigation land test stations)	Place into operation within 12 months after initial license grant.	AF, AR	87.45

Source: FCC.

**Appendix II: Buildout Requirements for  
Spectrum Licenses**

**Table 19: Buildout Requirements for Fixed-Microwave Services, as of January 2014**

<b>Radio service/frequency band</b>	<b>Construction/coverage requirements</b>	<b>Radio service code</b>	<b>47 C.F.R. Section</b>
Fixed Microwave and Electronic Message Services (Site-Based)	Place in operation within 18 months of initial license grant.	CE, CF (except 39 GHz RSA), CT (Fixed locations only), MG, MW, PE, WA, WM, WR	101.63
Multichannel Video and Distribution and Data Services	Provide substantial service to its licensed area within 5 years of initial license grant and 10 years of initial license grant.	DV	101.1413
Local Multipoint Distribution Service	Provide substantial service to its licensed area within 10 years of initial license grant.	LD	101.1011
39 GHz Geographic Licenses	Provide substantial service to its licensed area within 10 years of initial license grant.	TN (39 GHz RSA)	101.17
24 GHz Geographic Licenses	Provide substantial service to its licensed area within 10 years of initial license grant.	TZ	101.527
Multiple Address Systems (Geographic)	Provide service to at least 1/5 of the population in its licensed area or substantial service within 5 years of initial license grant and make a showing of continued substantial service within 10 years of initial license grant.	MS	101.1325(b)

Source: FCC.

**Table 20: Buildout Requirements for Broadcast Auxiliary Services, as of January 2014**

<b>Radio service/frequency band</b>	<b>Construction/coverage requirements</b>	<b>Radio service code</b>	<b>47 C.F.R. Section</b>
Site-Based	Construct and place into operation within 18 months of initial license grant.	AB, AI, AS, TB, TI, TP, TS, TT	74.34(a)
Site-Based	Construct and place into operation within 12 months of initial license grant.	RP	74.34(b)

Source: FCC.

**Table 21: Buildout Requirements for Personal Radio Service, as of January 2014**

<b>Radio service/frequency band</b>	<b>Construction/coverage requirements</b>	<b>Radio service code</b>	<b>47 C.F.R. Section</b>
218-219 MHz (formerly Interactive Video and Data Service)	Provide substantial service within 10 years of license grant. File a report informing the Commission of the status of its system.	ZV	95.833(a)

Source: FCC.

## Buildout Requirements for Services Licensed by the Media Bureau

**Table 22: Buildout Requirements for Broadcast Services, as of January 2014**

Radio service/frequency band	Construction/coverage requirements	47 C.F.R. Section
New TV, AM, FM, or International Broadcast; low power TV; TV translator; TV booster; FM translator; or FM booster station, or to make changes in such existing stations	Three years from the date of issuance of the original construction permit within which construction shall be completed and application for license filed.	73.3598
Low power FM station	Eighteen months from the date of issuance of the construction permit within which construction shall be completed and application for license filed.	73.3598

Source: FCC.

## Buildout Requirements for Services Licensed by the International Bureau

**Table 23: Buildout Requirements for Satellite Services, as of January 2014**

Radio service/frequency band	Construction/coverage requirements	47 C.F.R. Section
Earth stations	Twelve months from the date of the license grant.	25.133
Receive only earth stations	Six months after coordination has been completed.	25.133
Geostationary orbit satellite systems <sup>a</sup>	From the date the license is issued: 1 year: Enter into a binding non-contingent contract to construct the licensed satellite system. 2 years: Complete the critical design review of the licensed satellite system. 3 years: Begin the construction of the satellite. 5 years: Launch and operate the satellite.	25.164 25.137(d) <sup>b</sup>

**Appendix II: Buildout Requirements for  
Spectrum Licenses**

<b>Radio service/frequency band</b>	<b>Construction/coverage requirements</b>	<b>47 C.F.R. Section</b>
Non-geostationary orbit satellite systems <sup>a</sup>	<p>From the date the license is issued:</p> <p>1 year: Enter into a binding non-contingent contract to construct the licensed satellite system.</p> <p>2 years: Complete the critical design review of the licensed satellite system.</p> <p>2 years, 6 months: Begin the construction of the first satellite in the licensed satellite system.</p> <p>3 years, 6 months: Launch and operate the first satellite in the licensed satellite system.</p> <p>6 years: Bring all the satellites in the licensed satellite system into operation.</p>	<p>25.164</p> <p>25.137(d)<sup>b</sup></p>
Digital Audio Radio Services satellite systems	<p>From the date the license is issued:</p> <p>1 year: Complete contracting for construction of first space station or begin space station construction.</p> <p>2 years: If applied for, complete contracting for construction of second space station or begin second space station construction.</p> <p>4 years: In orbit operation of at least one space station.</p> <p>6 years: Full operation of the satellite system.</p>	25.144
Direct Broadcast Satellite systems	<p>From the date the license is issued:</p> <p>1 year: Complete contracting for construction of the satellite station(s).</p> <p>6 years: Satellite stations to be in operation.</p>	25.148(b)

Source: FCC.

<sup>a</sup>Not to include Direct Broadcast and Digital Audio Radio Services satellite systems.

<sup>b</sup>Applies to non-U.S.-licensed satellite systems requesting access to the market in the United States.

# Appendix III: Outcomes of Buildout Requirements for Selected Wireless Services

Tables 24 to 37 provide results from our analysis of FCC's ULS data for licenses for five selected wireless services. Among other things, these tables tabulate the number of licenses by auction, buildout requirement outcomes (e.g., whether a license met the buildout requirement), and extension request outcomes. Appendix I contains information on the scope and methodology of this analysis.

**Table 24: Number of Licenses, by Wireless Service**

Service	Number of licenses
Broadband PCS	4,212
220 MHz	1,231
39 GHz	2,173
Fixed microwave	10,561
Private land mobile radio, below 700 MHz, except 220 MHz (private land mobile radio)	10,278
<b>Total</b>	<b>28,455</b>

Source: GAO analysis of ULS data.

**Table 25: Number of Market-Based Licenses, by Wireless Service and Auction**

Service	Auction number and title	Auction dates	Number of licenses
Broadband PCS	4: Broadband PCS A and B Block	12/05/1994-03/13/1995	760
	5: Broadband PCS C Block	12/18/1995-05/06/1996	640
	10: Broadband PCS C Block Reauction	07/03/1996-07/16/1996	15
	11: Broadband PCS D, E, & F Block	08/26/1996-01/14/1997	1,885
	22: C, D, E, and F Block Broadband PCS	03/23/1999-04/15/1999	483
	35: C and F Block Broadband PCS	12/12/2000-01/26/2001	171
	58: Broadband PCS	01/26/2005-02/15/2005	224
	71: Broadband PCS	05/16/2007-05/21/2007	34
		Service total	4,212
220 MHz	18: 220 MHz	09/15/1998-10/22/1998	859

**Appendix III: Outcomes of Buildout Requirements for Selected Wireless Services**

Service	Auction number and title	Auction dates	Number of licenses
	24: 220 MHz	06/08/1999-06/30/1999	292
	43: Multi-Radio Service	01/10/2002-01/17/2002	4
	72: 220 MHz	06/20/2007-06/26/2007	76
		Service total	1,231
39 GHz	30: 39GHz	04/12/2000-05/08/2000	2,173
		Service total	2,173
		<b>Total</b>	<b>7,616</b>

Source: GAO analysis of ULS data and FCC information.

**Table 26: Number of Site-Based Licenses, by Wireless Service**

Service	License grant dates	Number of licenses
Fixed microwave	07/01/2010 to 06/31/2011	10,561
Private land mobile radio	01/01/2011 to 12/31/2011	10,278
<b>Total</b>		<b>20,839</b>

Source: GAO analysis of ULS data and FCC information.

**Table 27: Number of Licenses that Did and Did Not Have a Buildout Requirement, by Wireless Service**

Service	Buildout requirement on or before 12/31/12		No buildout requirement		Buildout requirement after 12/31/12		Total
	Count	Percent	Count	Percent	Count	Percent	
Broadband PCS	3,558	84.5%	650	15.4%	4	0.1%	<b>4,212</b>
220 MHz	963	78.2	212	17.2	56	4.5	<b>1,231</b>
39 GHz	1,672	76.9	501	23.1	0	0.0	<b>2,173</b>
Fixed microwave	10,478	99.2	22	0.2	61	0.6	<b>10,561</b>
Private land mobile radio	9,546	92.9	608	5.9	124	1.2	<b>10,278</b>
<b>Total</b>	<b>26,217</b>	<b>92%</b>	<b>1,993</b>	<b>7%</b>	<b>245</b>	<b>1%</b>	<b>28,455</b>

Source: GAO analysis of ULS data.

Notes: Licenses may have a buildout requirement after December 31, 2012, because, among other reasons, a licensee was granted a request for an extension to move the buildout deadline.

Percentages may total to more than 100 due to rounding.

**Appendix III: Outcomes of Buildout  
Requirements for Selected Wireless Services**

**Table 28: Buildout Requirement and Extension Request Outcomes for Select Broadband PCS Licenses**

	Outcome	No request for extension	Granted but not dismissed request for extension	Dismissed but not granted request for extension	Total	Percentage of licenses with requirements
<i>Met requirement</i>	On time	2,972	62	41	<b>3,075</b>	86.4%
	Late	43	1	2	<b>46<sup>a</sup></b>	1.3
<i>Did not meet requirement</i>	Terminated on deadline	40	10	7	<b>57</b>	1.6
	Not terminated on deadline	18	1	3	<b>22<sup>b</sup></b>	0.6
	Terminated before deadline	11	0	0	<b>11</b>	0.3
	Canceled on or before deadline	292	1	54	<b>347</b>	9.8
<b>Total for licenses with requirements</b>		<b>3,376</b>	<b>75</b>	<b>107</b>	<b>3,558</b>	<b>100%</b>
<i>Other</i>	No buildout requirement	650	0	0	<b>650</b>	
	Deadline after 12/31/12	4	0	0	<b>4</b>	
<b>Total for all licenses</b>		<b>4,030</b>	<b>75</b>	<b>107</b>	<b>4,212</b>	

Source: GAO analysis of ULS data.

<sup>a</sup>Further research on these 46 licenses indicated that there were reasonable explanations for the buildout date being more than 15 days after the buildout deadline. For instance, FCC terminated 4 licenses and later returned them to active status in response to a petition for reconsideration. For another 21 licenses, FCC canceled and later reinstated the licenses. FCC “tolled” or suspended the buildout period to account for the time the licenses were not active, so the buildout date was more than 2 years after the buildout deadline.

<sup>b</sup>Of these 22 licenses, 6 licenses were canceled within 60 days after the buildout deadline before the automatic termination process was complete. However, the ULS information for the remaining licenses did not include information explaining why the licenses were not terminated on the buildout deadline.

**Table 29: Number of Extension Requests for Select Broadband PCS Licenses**

Number of extension requests	Total number of licenses	Percentage
0	4,030	95.7%
1	175	4.2
2	7	0.2
<b>Total</b>	<b>4,212</b>	<b>100%</b>

Source: GAO analysis of ULS data.

Note: Percentages may not total to 100 due to rounding.

**Appendix III: Outcomes of Buildout  
Requirements for Selected Wireless Services**

**Table 30: Buildout Requirement and Extension Request Outcomes for Select 220 MHz Phase II Licenses**

	Outcome	No request for extension	Granted but not dismissed request for extension	Dismissed but not granted request for extension	Both Granted and dismissed request for extension	Total	Percentage of licenses with requirements
<i>Met requirement</i>							
	On time	122	43	2	8	<b>175</b>	18.2%
	Late	6	0	0	0	<b>6<sup>a</sup></b>	0.6
<i>Did not meet requirement</i>							
	Terminated on deadline	139	111	124	155	<b>529</b>	54.9
	Not terminated on deadline	105	29	0	0	<b>134<sup>b</sup></b>	13.9
	Terminated before deadline	1	0	0	1	<b>2</b>	0.2
	Canceled on or before deadline	105	1	0	0	<b>106</b>	11.0
	Expired on or before deadline	3	1	4	3	<b>11</b>	1.1
<b>Total for licenses with requirements</b>		<b>481</b>	<b>185</b>	<b>130</b>	<b>167</b>	<b>963</b>	<b>100%</b>
<i>Other</i>							
	No buildout requirement	212	0	0	0	<b>212</b>	
	Deadline after 12/31/12	56	0	0	0	<b>56</b>	
<b>Total for all licenses</b>		<b>749</b>	<b>185</b>	<b>130</b>	<b>167</b>	<b>1,231</b>	

Source: GAO analysis of ULS data.

Note: Percentages may not total to 100 due to rounding.

<sup>a</sup>Further research on these 6 licenses indicated that FCC had terminated 3 licenses and later returned them to active status in response to petitions for reconsideration; the buildout dates entered in ULS were the dates of the petitions for reconsideration. For the other 3 licenses, the required notification was filed within 30 days of the buildout deadline with a waiver request to accept the late notification, in line with FCC policy.

<sup>b</sup>Of the 134 licenses that did not meet their buildout requirement and were not terminated, 110 licenses were canceled within 60 days after the buildout deadline, before the auto termination process was complete. Licensees for the remaining 24 licenses have submitted required notifications that are pending; FCC has yet to accept or dismiss the notifications. Licensees submitted the required notifications for 19 of these licenses before September 1, 2009.

Appendix III: Outcomes of Buildout Requirements for Selected Wireless Services

**Table 31: Number of Extension Requests for Select 220 MHz Phase II Licenses**

Number of extension requests	Total number of licenses	Percentage
0	749	60.8%
1	315	25.6
2	141	11.5
3	21	1.7
4	5	0.4
<b>Total</b>	<b>1,231</b>	<b>100%</b>

Source: GAO analysis of ULS data.

**Table 32: Buildout Requirement and Extension Request Outcomes for Select 39 GHz Licenses**

	Outcome	No request for extension	Granted but not dismissed request for extension	Dismissed but not granted request for extension	Both granted and dismissed request for extension	Total	Percentage of licenses with requirements
<i>Met requirement</i>	On time	0	837	0	0	837	50.1%
	Late	0	2	0	0	2 <sup>a</sup>	0.1
<i>Did not meet requirement</i>	Terminated on deadline	0	144	0	345	489	29.2
	Not terminated on deadline	0	13	0	0	13 <sup>b</sup>	0.8
	Canceled on or before deadline	0	308	0	0	308	18.4
	Expired on or before deadline	0	23	0	0	23	1.4
<b>Total for licenses with requirements</b>		<b>0</b>	<b>1,327</b>	<b>0</b>	<b>345</b>	<b>1,672</b>	<b>100%</b>
<i>Other</i>	No buildout requirement	496	5	0	0	501	
<b>Total for all licenses</b>		<b>496</b>	<b>1,332</b>	<b>0</b>	<b>345</b>	<b>2,173</b>	

Source: GAO analysis of ULS data.

<sup>a</sup>Further research on these 2 licenses provided no information on why the late-filed required notifications were accepted by FCC. For both licenses, the required notifications were filed 17 days after the buildout deadline.

<sup>b</sup>Licenses for all 13 licenses who did not meet their buildout requirement but whose licenses were not terminated have submitted a required notification that is pending; FCC has yet to accept or dismiss the notifications. Licensees submitted the required notifications for these 13 licenses between September 2011 and September 2012.

Appendix III: Outcomes of Buildout Requirements for Selected Wireless Services

**Table 33: Number of Extension Requests for Select 39 GHz Licenses**

Number of extension requests	Total number of licenses	Percentage
0	496	22.8%
1	1,321	60.8
2	356	16.4
<b>Total</b>	<b>2,173</b>	<b>100%</b>

Source: GAO analysis of ULS data.

**Table 34: Buildout Requirement and Extension Request Outcomes for Select Fixed-Microwave Licenses**

	Outcome	No request for extension	Granted but not dismissed request for extension	Dismissed but not granted request for extension	Total	Percentage of licenses with requirements
<i>Met</i>	On time	6,195	10	4	<b>6,209</b>	59.3%
	Late	90	0	0	<b>90<sup>a</sup></b>	0.9
<i>Both met and did not meet</i>	Met for some and did not meet for other frequencies	1,215	0	1	<b>1,216</b>	11.6
<i>Did not meet</i>	All frequencies terminated	2,172	0	7	<b>2,179</b>	20.8
	Some frequencies terminated/some without requirement	62	0	4	<b>66</b>	0.6
	Not terminated on deadline	106	0	0	<b>106<sup>b</sup></b>	1.0
	Terminated before deadline	12	0	0	<b>12</b>	0.1
	Canceled on or before deadline	600	0	0	<b>600</b>	5.7
	<b>Total for licenses with requirements</b>		<b>10,452</b>	<b>10</b>	<b>16</b>	<b>10,478</b>
<i>Other</i>	No buildout requirement	22	0	0	<b>22</b>	
	Deadline after 12/31/12	47	14	0	<b>61</b>	
<b>Total for all licenses</b>		<b>10,521</b>	<b>24</b>	<b>16</b>	<b>10,561</b>	

Source: GAO analysis of ULS data.

Note: Includes licenses granted between July 1, 2010, and June 30, 2011.

<sup>a</sup>Further research on a sample of 9 of these licenses indicated that FCC approved a petition for reconsideration for each of the 9 met-late licenses.

<sup>b</sup>We examined the number of days between the cancellation dates and the buildout deadlines for the licenses that did not meet their buildout requirement but were not terminated; since these licenses can have more than one buildout deadline, we constructed a proxy buildout deadline 584 days (i.e., 18 months) from a license grant date. We found that all the licenses had a cancellation date within 60 days of the proxy buildout deadline, meaning that the licensee canceled the license before the automatic termination process was completed.

Appendix III: Outcomes of Buildout Requirements for Selected Wireless Services

**Table 35: Number of Extension Requests for Select Fixed-Microwave Licenses**

Number of requests for a license	Total number of licenses	Percentage
0	10,521	99.6%
1	39	0.4
2	1	0.0
<b>Total</b>	<b>10,561</b>	<b>100%</b>

Source: GAO analysis of ULS data.

**Table 36: Buildout Requirement and Extension Request Outcomes for Select Industrial/Business Private Land-Mobile-Radio Licenses**

	Outcome	No request for extension	Granted but not dismissed request for extension	Dismissed but not granted request for extension	Both granted and dismissed request for extension	Total	Percentage of all licenses with requirements
<i>Met</i>	On time	8,862	17	1	1	<b>8,881</b>	93.0%
	Late	261	0	0	0	<b>261<sup>a</sup></b>	2.7
<i>Both met and did not meet</i>	Met for some and did not meet for other frequencies	13	0	0	0	<b>13</b>	0.1
<i>Did not meet</i>	All frequencies terminated	324	0	2	0	<b>326</b>	3.4
	Some frequencies terminated/some without requirement	17	0	0	0	<b>17</b>	0.2
	Not terminated on deadline	9	0	0	0	<b>9<sup>b</sup></b>	0.1
	Terminated before deadline	12	0	0	0	<b>12</b>	0.1
	Canceled on or before deadline	27	0	0	0	<b>27</b>	0.3
	<b>Total for licenses with requirements</b>		<b>9,525</b>	<b>17</b>	<b>3</b>	<b>1</b>	<b>9,546</b>
<i>Other</i>	No buildout requirement	608	0	0	0	<b>608</b>	
	Deadline after 12/31/12	37	85	0	2	<b>124</b>	
<b>Total for all licenses</b>		<b>10,170</b>	<b>102</b>	<b>3</b>	<b>3</b>	<b>10,278</b>	

**Appendix III: Outcomes of Buildout Requirements for Selected Wireless Services**

Source: GAO analysis of ULS data.

Note: Includes licenses granted between January 1, 2011, and December 31, 2011.

<sup>a</sup>Further research on a sample of 27 licenses that met their buildout requirements late indicated that FCC approved a petition for reconsideration or a waiver to file late for 25 licenses. The online ULS records for the remaining 2 licenses did not contain information explaining why the buildout date was more than 15 days after the buildout deadline; the required notifications for these 2 licenses were 17 and 26 days late.

<sup>b</sup>We conducted further research on the 9 licenses that did not meet their buildout requirement but were not terminated, including examining the number of days between the cancellation dates and the buildout deadlines. Since these licenses can have more than one buildout deadline, we constructed a proxy buildout deadline 365 days from each license grant date. Six of the licenses were canceled after their buildout deadlines, all within 60 days of the proxy buildout deadline, meaning that the licensee canceled the license before the automatic termination process was complete. The other 3 licenses were active as of September 1, 2013, but all 3 were in termination-pending mode.

**Table 37: Number of Extension Requests for Select Industrial/Business Private Land-Mobile-Radio Licenses**

<b>Number of extension requests</b>	<b>Total number of licenses</b>	<b>Percentage</b>
0	10,170	98.9%
1	62	0.6
2	44	0.4
3	2	0.0
<b>Total</b>	<b>10,278</b>	<b>100%</b>

Source: GAO analysis of ULS data.

Note: Percentages may not total to 100 due to rounding.

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# Appendix IV: GAO Contact and Staff Acknowledgments

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## GAO Contact

Mark L. Goldstein, (202) 512-2834 or [goldsteinm@gao.gov](mailto:goldsteinm@gao.gov).

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## Staff Acknowledgments

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