



Advanced Spectrum Policy Course

Lecture 7: Competition & Use Cases

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Advanced Spectrum Policy

1. Introduction
2. Lecture 1 NRAO Panel Discussion
3. Lecture 2 Federal Spectrum Policy
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Lecture 7: Competition and New Use Cases

7.1. FCC Experimental Licensing System (ELS)

7.2. Citizens Broadband Radio Service (CBRS)

7.2.1. Tiered Access Model

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7.1. FCC Experimental Licensing System (ELS)

The screenshot shows the FCC OET Experimental Licensing System (ELS) homepage. The header includes the FCC logo, "Federal Communications Commission", and navigation links: Search, RSS, Updates, E-Filing, Initiatives, Consumers, Find People. Below the header is the "Office of Engineering and Technology" banner. The main content area is titled "OET Experimental Licensing System" and includes a welcome message, "Notes of Interest" with links to update browser bookmarks and pay fees, and a section for "Innovation Zones". The left sidebar contains sections for "Filing Options" (License Renewal, New License/Modification, Assignment of License, Transfer of Control, Special Temporary Authority, Attachments, Correspondence, Application, 159 Form, Objection), "Reports" (Application Status, Sign Search, Generic Search, Point Radius Search), and "Miscellaneous" (FRN, Notification Website, Innovation Zone Portal, Manual, Software).

FCC Federal Communications Commission

Search | RSS | Updates | E-Filing | Initiatives | Consumers | Find People

Office of Engineering and Technology

[OET Home Page](#) | [FCC > FCC E-filing > ELS](#)

OET Experimental Licensing System

Welcome and thank you for visiting the OET Experimental Licensing Branch Electronic Filing Home Page. The pages to the left are designed to provide the public a means to electronically file and report on the various Experimental Licensing Applications.

Notes of Interest:

Please update your browser bookmarks for the Experimental Licensing System (ELS) to our new location:
<https://apps.fcc.gov/els> at your earliest convenience.

Fee applications should be paid using the Form 159 at the time of filing to avoid fee system problems. Applicants should use the Return to 159 form link if needed. Applications not paid within 10 days of filing may need to be dismissed and refiled if there are any fee payment complications.

Add this RSS feed to your reader to receive notifications of ELS license and Special Temporary Authority grants.

There are several free online services that will convert Microsoft Word and Excel documents to Adobe PDF. Some examples include, but are not limited to:

- [Doc 2 PDF](#)
- [Primo Online](#)

You may also purchase license software to convert documents to PDF by visiting [Adobe](#).

Innovation Zones:

Information for the FCC Innovation Zones can be found at the following page: [On the login page under the "Quick Search" section, click the link, "Innovation Zone Experiments"](#)

STA FILERS: [Please review these guidelines](#) before completing an Application for Special Temporary Authority.

Forgot to pay for your application or need a copy of the FCC Form 159? Select the Return to 159 link on the menu. Please note that this feature is available only if your application is not in a final status.

Credit card payment over the Web is available. This can be used for any type of submission, and is the preferred method of payment for short-turnaround STAs.

Filing Options

- [Form 405 - License Renewal](#)
- [Form 442 - New License/Modification of License](#)
- [Form 702 - Assignment of License](#)
- [Form 703 - Transfer of Control](#)
- [Special Temporary Authority](#)
- [Add Attachments](#)
- [Reply to Correspondence](#)
- [Amend/Complete Application](#)
- [Return to 159 Form](#)
- [File an Informal Objection](#)

Reports

- [Application Status](#)
- [Call Sign Search](#)
- [Generic Search](#)
- [Point Radius Search](#)

Miscellaneous

- [Get FRN](#)
- [ELS Notification Website](#)
- [Innovation Zone Portal](#)
- [User's Manual](#)
- [Get Software](#)

FCC, OET
Experimental
Licensing
System,
<https://apps.fcc.gov/oetcf/els/index.cfm>

7.1. FCC Experimental Licensing System (ELS)



Code of Federal Regulations

A point in time eCFR system



Title 47

Displaying title 47, up to date as of 4/11/2025. Title 47 was last amended 4/11/2025. [view historical versions](#)

Enter a search term or CFR reference (eg. fishing or 1 CFR 1.1)



Title 47 / Chapter I / Subchapter A / Part 1 / Subpart F / Application
Requirements and Procedures / § 1.931

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ECFR CONTENT

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EDITORIAL NOTE ON PART 1

Editorial Note: Nomenclature changes to part 1 appear at 63 FR 54077, Oct. 8, 1998.

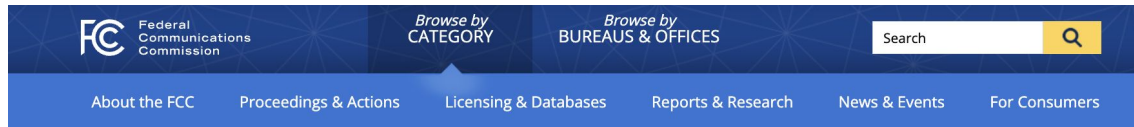
§ 1.931 Application for special temporary authority.

(a) Wireless Telecommunications Services.

- (1) In circumstances requiring immediate or temporary use of station in the Wireless Telecommunications Services, carriers may request special temporary authority (STA) to operate new or modified equipment. Such requests must be filed electronically using FCC Form 601 and must contain complete details about the proposed operation and the circumstances that fully justify and necessitate the grant of STA. Such requests should be filed in time to be received by the Commission at least 10 days prior to the date of proposed operation or, where an extension is sought, 10 days prior to the expiration date of the existing STA. Requests received less than 10 days prior to the desired date of operation may be given expedited consideration only if compelling reasons are given for the delay in submitting the request. Otherwise, such late-filed requests are considered in turn, but action might not be taken prior to the desired date of operation. Requests for STA for operation of a station used in a Contraband Interdiction System, as defined in § 1.9003, will be afforded

47 CFR § 1.931,
[https://www.ecfr.gov/
current/title-47/chapte
r-I/subchapter-A/part-
1/subpart-F/subject-gr
oup-ECFR8fff3365c42e
e11/section-1.931](https://www.ecfr.gov/current/title-47/chapter-I/subchapter-A/part-1/subpart-F/subject-group-ECFR8fff3365c42ee11/section-1.931)

7.1. FCC Experimental Licensing System (ELS)



Home / Reports & Research / Guides

Special Temporary Authority Licensing

Special Temporary Authority

The Federal Communications Commission (FCC) grants Special Temporary Authority (STA) to permit immediate or temporary operation of certain radio facilities during emergencies or other urgent conditions. Few radio services can file manually, most are required to file electronically, refer to 47 C.F.R. § 1.913 for electronic filing requirements.

STA may be granted in the following circumstances:

1. In emergency situations, such as natural disasters;
2. To permit restoration or relocation of existing facilities to continue communication service;
3. For a temporary, non-recurring service where a regular authorization is not appropriate;
4. In other situations involving circumstances which are of such extraordinary nature that delay in the instruction of temporary operation would seriously prejudice the public interest. For more information on STAs, refer to 47 C.F.R. § 1.931.

[STA Term](#) [STA Conditions](#) [Forms & Fees](#) [Payment](#) [Fee Exemptions](#) [Instructions for Electronic Filing](#)

STAs are granted with a fixed expiration date, usually six months, or for the term necessary to cover a special event, etc. STAs do not have grace periods and are valid only through their expiration date. [See instructions for how to file an STA.](#)

The Commission may grant extensions of an STA for a period of 180 days, but the applicant must show that extraordinary circumstances warrant such an extension. Such requests, other than those for market-based service licenses (i.e., services where licenses are issued through an auction), should be filed electronically using FCC Form 601 Main Form with a purpose of Renewal/Modification. Market-based services STAs must be filed manually.



Date Last Updated/Reviewed: Thursday, March 30, 2017

Tags:

[Licensing & Registration](#) - [Wireless Services](#)

FCC, Special Temporary Authority Licensing,
<https://www.fcc.gov/research-reports/guides/special-temporary-authority-licensing>

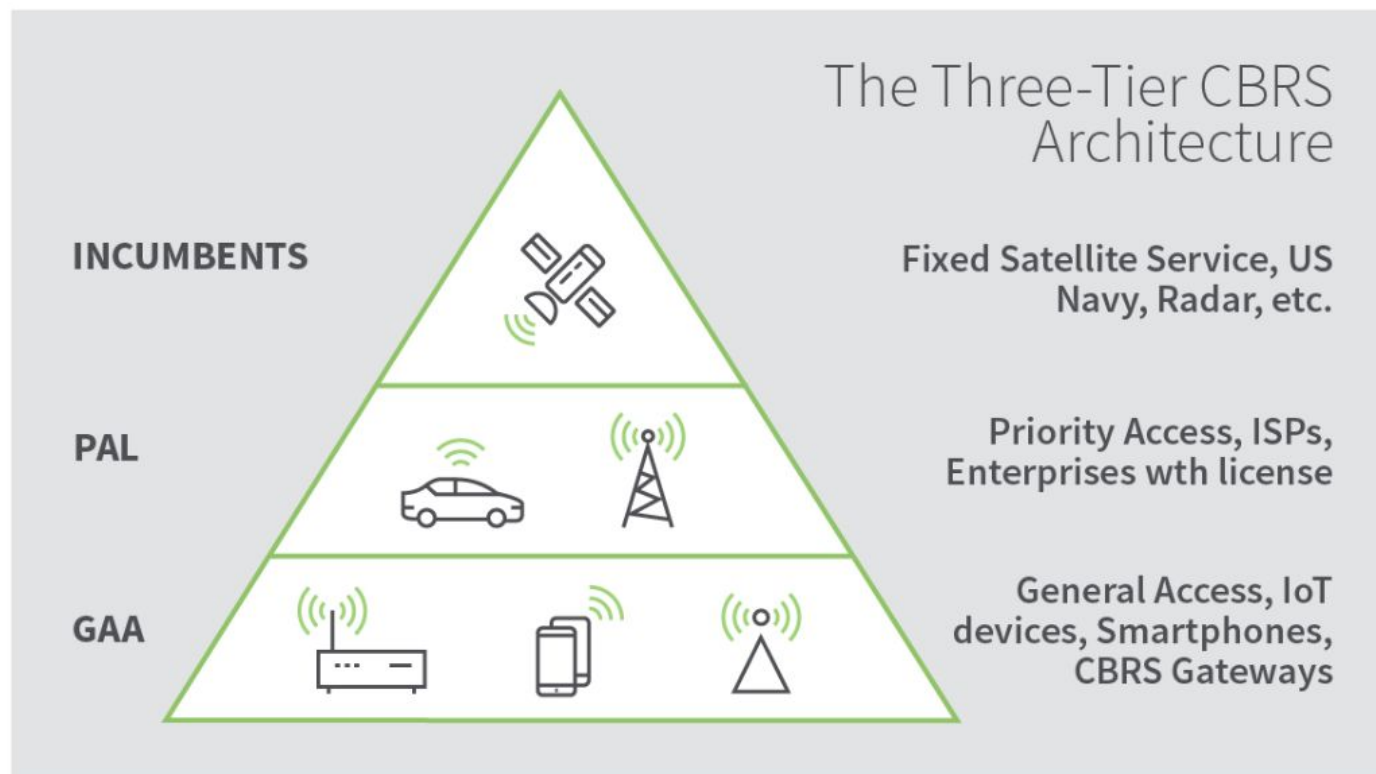
7.2. Citizens Broadband Radio Service (CBRS)

7.2.1. Tiered Access Model

7.2.2. Auction 105 Results

7.2.3. CBRS Device Deployment

7.2.1. Tiered Access Model



5GStore, “CBRS: Revolutionizing Wireless Communication with Shared Spectrum,” July 24, 2023, <https://5gstore.com/blog/2023/07/24/cbbs-revolutionizing-wireless-communication-with-shared-spectrum/>.

7.2.1. Tiered Access Model

The screenshot shows the FCC website's navigation bar with the FCC logo and links to 'Browse by CATEGORY' and 'Browse by BUREAUS & OFFICES'. Below the navigation bar is a search bar and a menu with links: 'About the FCC', 'Proceedings & Actions', 'Licensing & Databases', 'Reports & Research', 'News & Events', and 'For Consumers'. The breadcrumb trail reads 'Home / Wireless / Mobility Division / 3.5 GHz Band'. The main heading is '3.5 GHz Band Overview'. On the left, under 'Wireless Telecommunications', there is a sidebar with links: '3.5 GHz Band Overview', 'Releases', '3.5GHz Band - Protected Fixed Satellite Service (FSS) Earth Stations', '3.5 GHz Band - Protected FSS Earth Station API Specification Version 1', and '3.5GHz Band - Protected Fixed Satellite Service (FSS) Earth Stations API'. The main content area contains two paragraphs. The first paragraph states that in 2015, the Commission adopted rules for shared commercial use of the 3550-3700 MHz band (3.5 GHz band), established the Citizens Broadband Radio Service (CBRS), and created a three-tiered access and authorization framework. The second paragraph describes the Spectrum Access System (SAS) and Environmental Sensing Capability (ESC). Below the text are five buttons: 'Tiers', 'Band Plan for 3.5 GHz Band', 'Secondary Markets for Priority Access Licenses', 'Spectrum Access System', and 'Environmental Sensing Capability'.

Wireless Telecommunications

3.5 GHz Band Overview

Releases

3.5GHz Band - Protected Fixed Satellite Service (FSS) Earth Stations

3.5 GHz Band - Protected FSS Earth Station API Specification Version 1

3.5GHz Band - Protected Fixed Satellite Service (FSS) Earth Stations API

In 2015, the Commission adopted rules for shared commercial use of the 3550-3700 MHz band (3.5 GHz band). The Commission established the Citizens Broadband Radio Service (CBRS) and created a three-tiered access and authorization framework to accommodate shared federal and non-federal use of the band. Rules governing the Citizens Broadband Radio Service are found in Part 96 of the Commission's rules.

Access and operations will be managed by an automated frequency coordinator, known as a Spectrum Access System (SAS). When managing spectrum access, SASs may incorporate information from an Environmental Sensing Capability (ESC), a sensor network that detects transmissions from Department of Defense radar systems and transmits that information to the SAS. Both SASs and ESCs must be approved by the Commission. SASs will coordinate operations between and among users in three tiers of authorization in the 3.5 GHz band: Incumbent Access, Priority Access, and General Authorized Access.

For more information about the history of 3.5 GHz band and Citizens Broadband Radio Service, search EDOCS or ECFS for Docket Numbers 12-354, 17-258, 15-319, and 19-244.

Tiers Band Plan for 3.5 GHz Band Secondary Markets for Priority Access Licenses

Spectrum Access System Environmental Sensing Capability

FCC, Citizens Broadband Radio Service,
<https://www.fcc.gov/wireless/bureau-divisions/mobility-division/citizens-band-radio-service-cbrs>

7.2.2. Auction 105 Results

 Public Reporting System

Dashboard
Auction Data -
Announcements
Auction Summary
Bids
Bids (zipped)
Results
Results (zipped)
Results by License
Results by License (zipped)
Unassigned Licenses
County Status
County Status (zipped)
Bidder Status
Bidder Status (zipped)
Bidder Counties
Bidder Counties (zipped)
Bidders

Auction 105 - 3.5 GHz

Auction 105 is the Federal Communications Commission's auction of Priority Access Licenses (PALs) in the 3550-3650 MHz band. Auction 105 offered the greatest number of spectrum licenses ever made available for bidding in a single auction and was intended to further deployment of fifth-generation (5G) wireless, the Internet of Things (IoT), and other advanced spectrum-based services in the United States. See the [Auction 105 website](#) for more information.

Auction ID	105	Qualified Bidders	271
Auction Description	3.5 GHz	Winning Bidders	228
Date Opened	07/23/2020	Licenses Won	20,625
Date Closed	08/25/2020	FCC Held Licenses	2,006
Rounds Completed	76	Total Licenses	22,631

Gross Proceeds	\$4,585,663,345
Bidding Credit Discounts	\$42,431,006
Net Proceeds	\$4,543,232,339

FCC, Auction 105 Results, <https://auctiondata.fcc.gov/public/projects/auction105>

7.2.2. Auction 105 Results

 Public Reporting System										
Dashboard Auction Data - Announcements Auction Summary Bids Bids (zipped) Results Results (zipped) Results by License Results by License (zipped) Unassigned Licenses County Status County Status (zipped) Bidder Status Bidder Status (zipped) Bidder Counties Bidder Counties (zipped) Bidders										
Auction 105 - 3.5 GHz: Auction Data - Bids Search Download CSV (654028 rows) Your request exceeds the limit of 9000 records. Please add filters (e.g. a specific round number) to reduce the number of records to download To customize your report, you can click on [x] to hide columns in the table below.										
Auction ID	Round	Bidder	FRN	Market	Market Name	Bidding Units	Quantity	Price	Price Point	
Showing first 1000 of 654028 rows										
105	76	Wetterhorn Wireless L.L.C.	0029527702	AK-020	Anchorage	2,900	2	\$117,000	1.00	
105	76	Verizon Wireless Network Procurement LP	0029515327	AK-020	Anchorage	2,900	4	\$117,000	1.00	
105	76	SAL Spectrum, LLC	0017163254	AK-020	Anchorage	2,900	1	\$117,000	1.00	
105	76	Wetterhorn Wireless L.L.C.	0029527702	AK-050	Bethel	170	2	\$3,800	1.00	
105	76	Wetterhorn Wireless L.L.C.	0029527702	AK-068	Denali	50	1	\$1,100	1.00	
105	76	Wetterhorn Wireless L.L.C.	0029527702	AK-090	Fairbanks North Star	980	2	\$22,000	1.00	
105	76	Alaska Communications Internet, LLC	0022389845	AK-105	Hoonah-Angoon	50	4	\$2,400	1.00	
105	76	Snowcloud Services, LLC	0022113310	AK-105	Hoonah-Angoon	50	3	\$2,400	1.00	
105	76	Wetterhorn Wireless L.L.C.	0029527702	AK-110	Juneau	310	1	\$24,000	1.00	
105	76	Alaska Communications Internet, LLC	0022389845	AK-110	Juneau	310	4	\$24,000	1.00	
105	76	Snowcloud Services, LLC	0022113310	AK-110	Juneau	310	2	\$24,000	1.00	1
105	76	SPITwSPOTS, Inc	0022431860	AK-122	Kenai Peninsula	550	0	\$115,000	0.00	

FCC, Auction 105 Results, <https://auctiondata.fcc.gov/public/projects/auction105/reports/bids>

7.2.2. Auction 105 Results



Tech ▼ Wireless ▼ Software ▼ IT Infrastructure ▼ Digital Transformation ▼

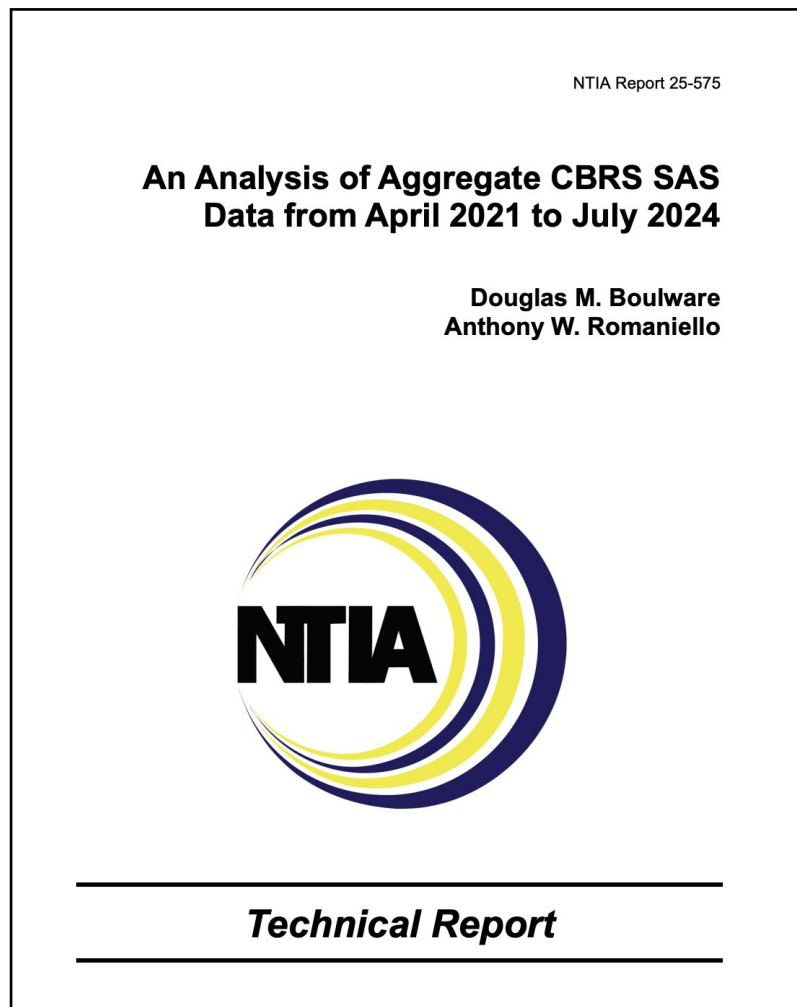
	Company	Bidding Entity	Numb
1	Verizon	Verizon Wireless Network Procurement	557
2	Dish Network	Wetterhorn Wireless	5,492
3	Charter	Spectrum Wireless Holdings	210
4	Comcast	XF Wireless Investment	830
5	Cox	Cox Communications	470
6	Southern California Edison	Southern California Edison Company	20
7	Windstream	Windstream Services	1,014
8	Mediacom	Mediacom	576
9	Nextlink Internet	AMG Technology Investment Group	1,072
10	JBG SMITH	SEAD	7
11	Sempra Energy	San Diego Gas and Electric Company	3
12	ATN International	SAL Spectrum	1,569
13	Claro Puerto Rico	Puerto Rico Telephone Company	231

14	Alabama Power	Alabama Power Company	271
15	Shentel	Shenandoah Cable Television	262
16	VTX1 Companies	VTX Communications	112
17	Viaero	NE Colorado Cellular	558
18	U.S. Cellular	United States Cellular Corporation	243
19	Watch Communications	W.A.T.C.H. TV Company	517
20	Cable One	Cable One	547

Source: The FCC

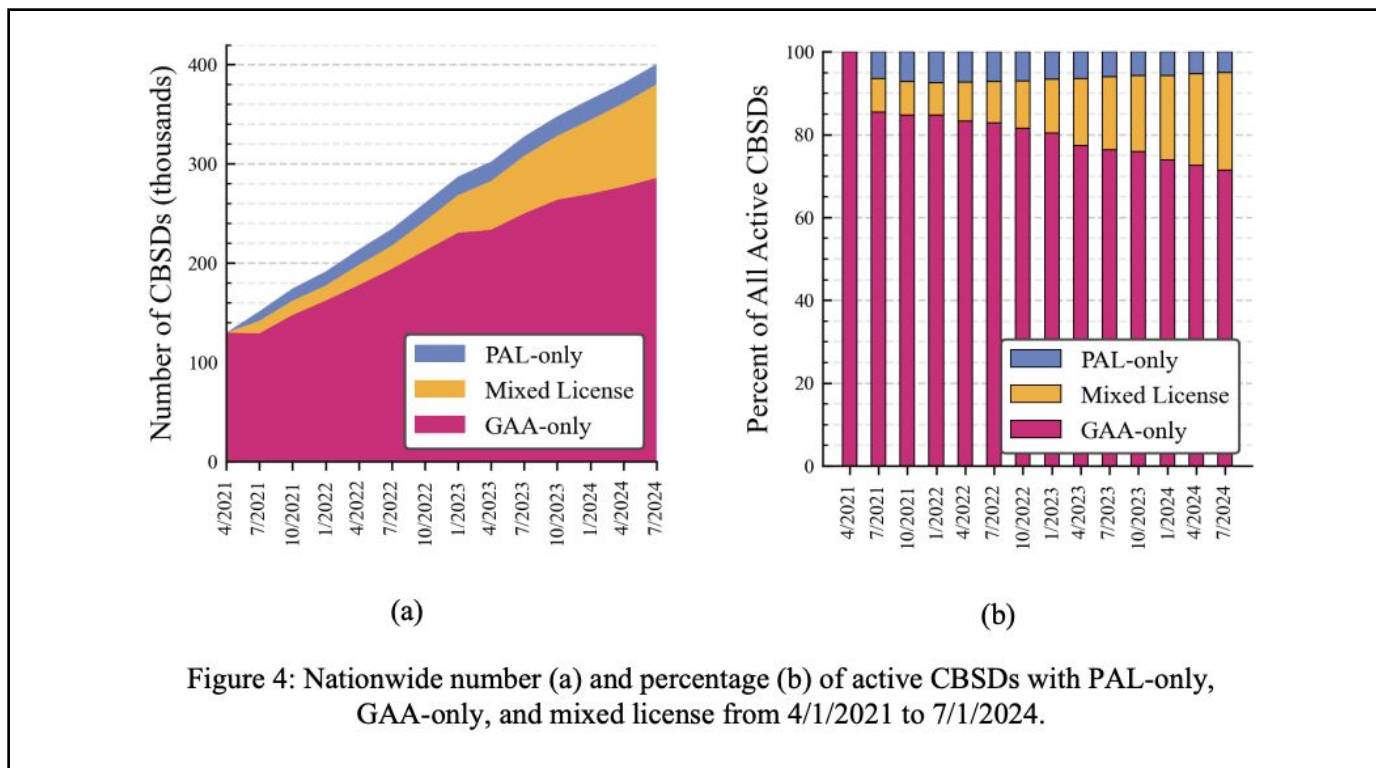
Mike Dano, "Verizon, Dish, Charter, Comcast: Here are the 20 biggest CBRS Auction Winners," Sept. 2, 2020, LightReading, <https://www.lightreading.com/5g/verizon-dish-charter-comcast-here-are-the-20-biggest-cbrs-auction-winners>

7.2.3. CBRS Device Deployment



NTIA, Douglas M. Boulware and Anthony W. Romaniello, "An Analysis of Aggregate CBRS SAS Data from April 2021 to July 2024," NTIA Report 25-575, <https://www.ntia.gov/report/2024/analysis-aggregate-cbrs-sas-data-april-2021-july-2024>; and <https://www.ntia.gov/sites/default/files/reports/an-analysis-of-aggregate-cbrs-sas-data-from-april-2021-to-july-2024.pdf>

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7.2.3. CBRS Device Deployment

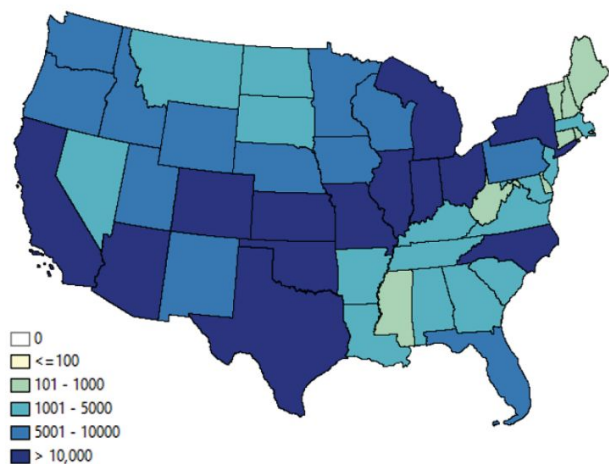


Figure 19: Number of active CBSDs by state for CONUS on 7/1/2024.

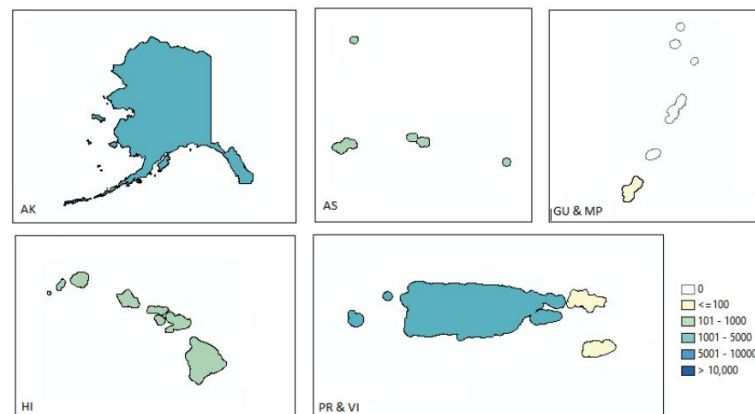
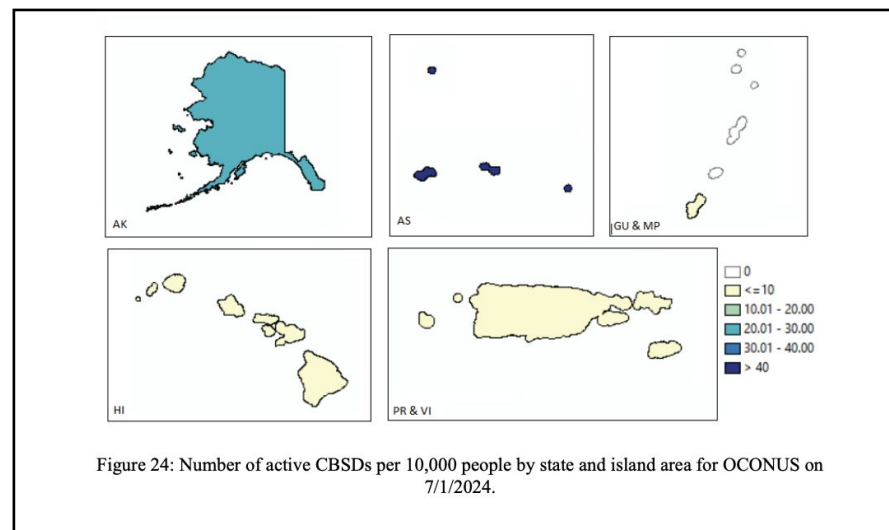
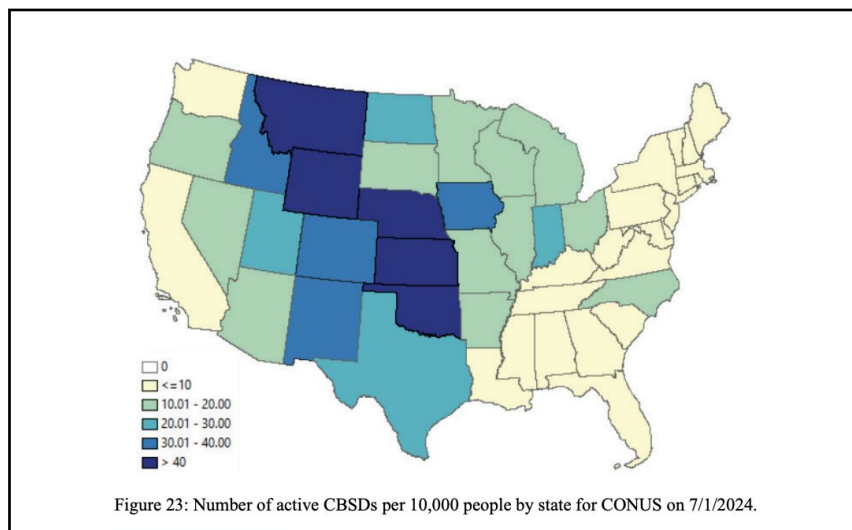


Figure 20: Number of active CBSDs by state and island area for OCONUS on 7/1/2024.

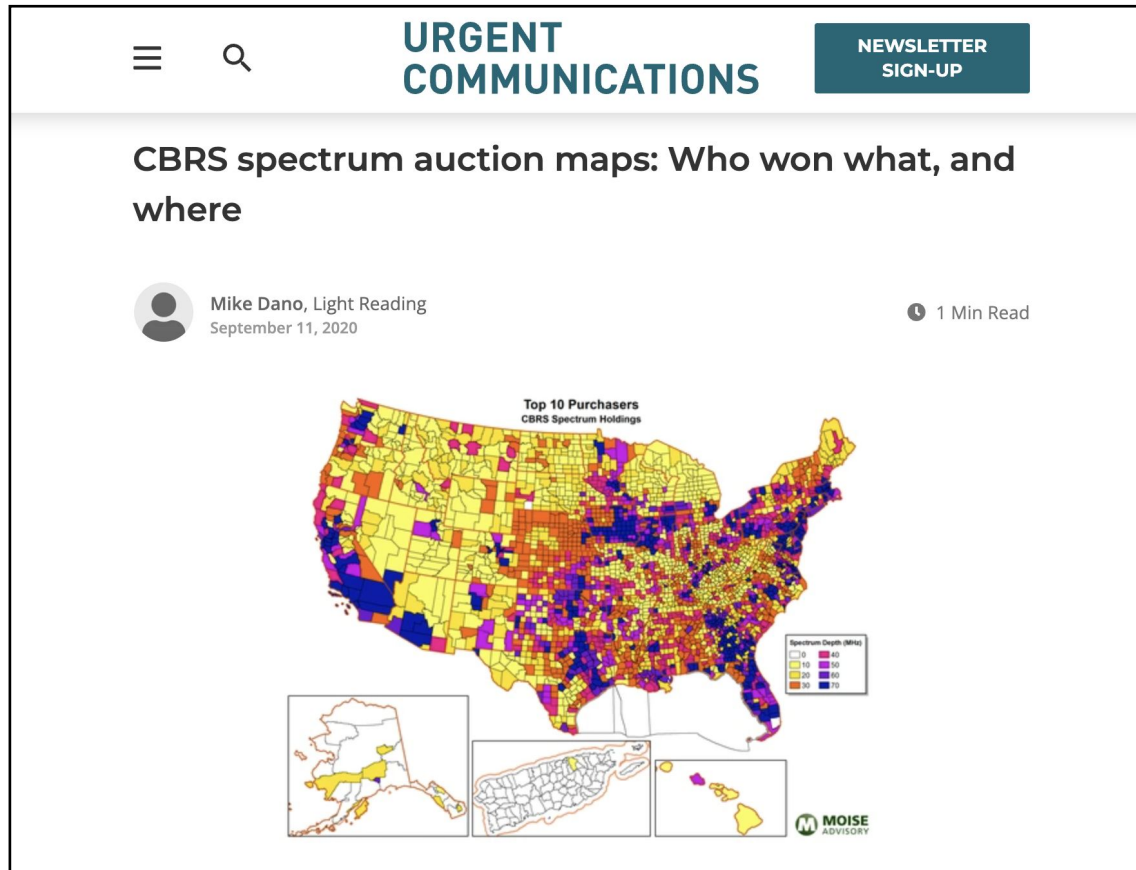
NTIA, Douglas M. Boulware and Anthony W. Romaniello, "An Analysis of Aggregate CBRS SAS Data from April 2021 to July 2024," NTIA Report 25-575, <https://www.ntia.gov/report/2024/analysis-aggregate-cbrs-sas-data-april-2021-july-2024>; and <https://www.ntia.gov/sites/default/files/reports/an-analysis-of-aggregate-cbrs-sas-data-from-april-2021-to-july-2024.pdf>

7.2.3. CBRS Device Deployment



NTIA, Douglas M. Boulware and Anthony W. Romaniello, “An Analysis of Aggregate CBRS SAS Data from April 2021 to July 2024,” NTIA Report 25-575, <https://www.ntia.gov/report/2024/analysis-aggregate-cbrs-sas-data-april-2021-july-2024>; and <https://www.ntia.gov/sites/default/files/reports/an-analysis-of-aggregate-cbrs-sas-data-from-april-2021-to-july-2024.pdf>

7.3. In the News



Mike Dano, “CBRS Spectrum Auction Maps: Who Won What, and Where”, Urgent Communications, Sept. 11, 2020, <https://urgentcomm.com/coverage-interference/cbrs-spectrum-auction-maps-who-won-what-and-where>.

7.4. Assignment

Read the 2024 CBRS Report from NTIA. Does the band look like it has successful deployments? Is it a good use of the spectrum? How would you evaluate spectrum efficiency or the opportunity costs of using the spectrum a different way?

- NTIA, Douglas M. Boulware and Anthony W. Romaniello, “An Analysis of Aggregate CBRS SAS Data from April 2021 to July 2024,” NTIA Report 25-575,
<https://www.ntia.gov/report/2024/analysis-aggregate-cbrs-sas-data-april-2021-july-2024>; and
<https://www.ntia.gov/sites/default/files/reports/an-analysis-of-aggregate-cbrs-sas-data-from-april-2021-to-july-2024.pdf>

7.5. Learning Objectives

Analyze emerging spectrum use cases enabled by frameworks like the Experimental Licensing System and Citizens Broadband Radio Service (CBRS). Understand the tiered access model, auction outcomes, and real-world deployment of CBRS devices in promoting competition and innovation.



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