



CBRS FAQ

1) What is CBRS?

- a. CBRS stands for Citizens Broadband Radio Service. (Not to be confused with the other CBRS (Citizens Band Radio Service) or CB Radio). The FCC established this band in 2015 and created a three-tiered approach to sharing the spectrum among federal and non-federal users of the band. CBRS is the 3.5 GHz band, more specifically 3550 to 3700 MHz. Great information on the band can be found directly at the FCC website: (<https://www.fcc.gov/wireless/bureau-divisions/mobility-division/35-ghz-band/35-ghz-band-overview>)

2) Why should anyone care about CBRS?

- a. This is a first-of-its-kind dynamic spectrum sharing model that is widely viewed as an “experiment” of sorts to see whether this method of access to spectrum will allow fair sharing among all potential users of this radio spectrum. The FCC in the United States is at the forefront of using this dynamic sharing method, and many countries around the world are watching closely. If successful, it’s believed that other countries and other spectrum bands will follow a similar model in the future.

3) What was in this frequency band in the past?

- a. The FCC released the 3.65 GHz spectrum in 2005, making 50 MHz available for terrestrial wireless broadband operations (<https://www.fcc.gov/wireless/bureau-divisions/broadband-division/3650-3700-mhz-radio-service>). The FCC allowed this operation by issuing an unlimited number of Non-exclusive Nationwide (NN) licenses. The operator then simply registers any devices they deploy with the FCC ULS database. This helped to ensure that only equipment certified for use in this band was being deployed.

4) What’s happening now?

- a. CBRS is expanding the available spectrum by 100 MHz to a total of 150 MHz (3550 to 3700 MHz). This comes with rules around how the spectrum is used. Rules in this band are found in Part 96. Using this band requires the equipment to communicate with an automated frequency coordination system, also called a Spectrum Access System (SAS).

5) What kind of applications or use cases will CBRS be used for?

- a. Service providers will use CBRS to replace last-mile fiber access and upgrade or update their existing networks to take advantage of higher transmit power and more spectrum availability to deliver enhanced fixed wireless services and point-to-multipoint service. Enterprises and managed service providers could use the 3.5 GHz band for IoT connectivity, in some cases replacing Wi-Fi or to offer additional services (maybe services requiring QoS that Wi-Fi cannot handle). Supporters of CBRS say the economics of this technology are much better than those of traditional distributed antenna systems (DAS). This band has been dubbed the “innovation band” by the FCC because it’s expected that new imaginative services will be enabled by availability of more cheap spectrum. Private LTE systems and neutral host models may become a common use case, if agreements with larger carriers can be reached.

6) Who will be providing software, equipment or services to support CBRS?

- a. Many of the large equipment providers will be providing equipment that will operate in this band. Many of these vendors are using 3GPP standards like LTE in their CBRS equipment, and in fact Qualcomm has included CBRS spectrum in their latest chipsets. Cambium Networks is providing CBRS equipment in the 450 platform now, and will provide a solution utilizing LTE protocol with cnRanger later in the year.

7) What types of radio equipment are allowed to operate in CBRS?

- a. Only radio equipment that has been issued a grant under FCC Part 96 rules is allowed to operate in CBRS spectrum. There are many variations of LTE equipment already certified. Cambium Networks 450 platform is the *only* other (non-3GPP) technology that is defined in the rules and is allowed to operate in CBRS. This is the same platform that operates in 3.65 GHz (under Part 90 subpart Z) can be software upgraded to operate in CBRS.

8) What is a Spectrum Access System (SAS)?

- a. A SAS is a complex tool that acts as an automated frequency coordinator. In this case, it is coordinating all radio equipment that will operate in the CBRS band. It continually monitors all equipment operating in the band.

9) Is there more than one SAS out there?

- a. As of this writing (February, 2020) there are four SAS Administrators approved: Federated Wireless, Google, CommScope and Sony. Because there is more than one SAS operating, the SAS Administrators must coordinate spectrum not only among all of the transmitting devices *within* their purview, but also devices being managed by the others. This occurs during each overnight period, known as a Coordinated Periodic Activity Among SASs (CPAS), so the entire system is aware of all devices operating in the band.

10) What information about my equipment is sent to the SAS?

- a. There are several parameters that are required in order for the SAS to properly manage and coordinate the spectrum. The CBSD-ID, the location, height, antenna characteristics and transmit power levels are a few of them. No user data, customer names, or any other identifying information is collected. Only information about the potential interference levels are actually shared between SAS admins, so individual operator data is kept anonymous.

11) How does the SAS allocate spectrum?

- a. The Spectrum Access System (SAS), is an automated frequency coordinator that manages spectrum sharing on a dynamic, as-needed basis across three tiers of access:
 - i. Tier 1 is incumbent users such as the federal government, fixed satellite users.
 - ii. Tier 2 is Priority Access License (PAL) users—licensed wireless users who acquire spectrum through an auction. The SAS will ensure PAL users do not cause harmful interference to Tier 1 users and will protect PAL users from interference by General Authorized Access (GAA) users.
 - iii. Tier 3 is GAA users who will deploy “lightly-licensed” devices. The SAS will ensure GAA users do not cause harmful interference into Tier 1 incumbents and Tier 2 PAL users.
- b. If spectrum is not being used by one tier it can be accessed by another via the SAS—securely and without harmful interference.

12) What's the difference between GAA and PAL?

- a. PAL (as the name indicates) is licensed to give interference protection from GAA users. These licenses will be auctioned in 10 MHz channels. Up to 70 MHz of PAL spectrum will be available in a given county (these 70 MHz will come from the lower 100 MHz of the CBRS band, 3550-3650 MHz). The license term

is 10 years, and will be renewable. A single bidder can obtain up to 4 licenses. They are generic blocks of spectrum (i.e. you don't bid on a specific frequency). Any frequency not being used by a PAL license is automatically considered GAA, and can be used by any qualifying GAA user. PAL licenses will be purchased at auction, which is expected to start June 25, 2020. The rules and additional information surrounding this auction are posted at the FCC website here: <https://www.fcc.gov/auction/105>. There are a LOT more details surrounding the PALs, and the overall auction process (including minimum bids, downpayment requirements, etc.), so please read the fact sheets, and bidding process rules to be prepared if interested.

13) What is Environmental Sensing Capability (ESC)?

- a. The Environmental Sensing Capability (ESC) is a network of sensors used to detect federal frequency use in the 3550–3650 MHz band in protection zones where U.S. Navy radar systems can operate, primarily along the Pacific, Atlantic and Gulf coasts. The ESC informs the SAS of radar operation and the SAS reacts to ensure there is no interference between CBRS and radar operations. As of now, there are two ESC networks that have been approved. Federated Wireless operates one of them, and CommScope and Google jointly operate the other one.

14) What do I need to implement CBRS in my network?

- a. You'll need equipment that has been certified to operate in the CBRS band. There are several types or categories of equipment that are allowed to operate in the band. A User Equipment (UE) device that operates under 23 dBm EIRP (typically a handset) is not required to be registered to a SAS, but can communicate via a CBRS network. Anything that's higher power needs to register and maintain connection to a SAS, and is known as a CBSD (CBRS Device). There are two categories of CBSD: Category A are devices that operate at < 30 dBm EIRP, and Category B operate at < 47 dBm EIRP. Cambium Networks PMP 450 platform devices are all considered Category B CBSD.

15) What is the CPI (Certified Professional Installer) requirement?

- a. FCC Part 96 rules require that applicable CBRS Devices (CBSDs) be professionally installed. A Certified Professional Installer (CPI) may physically install the CBSD her/himself or may take the responsibility for accuracy of the data entered into the CBSD by another installer. All Category B CBSDs require CPI. Category A CBSDs installed above six meter Height Above Average Terrain (HAAT) and unable to self-geolocate also require CPI.

16) Where can I get certified to be a CPI?

- a. All of the SAS vendors offer CPI training, and all of them will provide the required information for you to achieve certification to install devices in CBRS. Cambium Networks does not recommend one vs. another.
- b. Federated Wireless: <https://federatedwireless.com/certified-professional-installer/>
- c. Google: <https://www.coursera.org/learn/google-cbrs-cpi-training>
- d. CommScope: <https://www.commscope.com/solutions/cbrs-certified-professional-installer/>

Last updated: February 3, 2020

If there are additional questions that you'd like to ask, please feel free to post them at our CBRS community forum pages (<https://community.cambiumnetworks.com/t5/CBRS/bd-p/CBRS>), and we'll be happy to discuss them with you there.