3.5 GHz CBRS Systems: Introduction to Regulation and Function

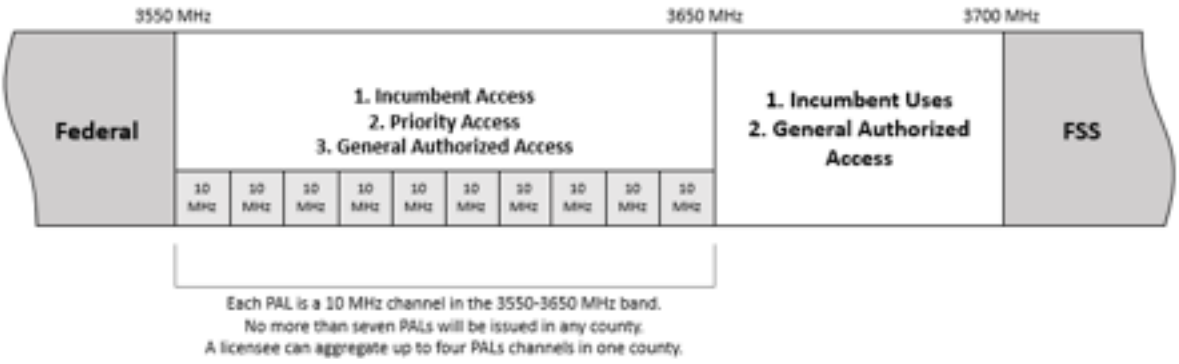
A new radio service has entered the broadband scene, the Citizens Broadband Radio Service (CBRS). This new service in the 3.5 GHZ (3500 MHz) band can accommodate traditional carrier operations, but only in a way that permits sharing with unaffiliated private and commercial interests, with no requirement for licensing. User compatibility is achieved with a combination of permission tiers and a spectrum access scheme where designated entities manage users on-the-fly to avoid conflicts. Very wide bandwidths are available for applications such as 5G; at the same time as narrow band operations such as internet-of-things (IoT) are being accommodated. The spectrum used is capable of service to mobile and fixed users both in building and at conventional cell service distances.

The CBRS Concept Explained

In 2015, the FCC 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.

In order to ensure consistency and compliance, the FCC has mandated that every system must operate under the umbrella of an SAS provider. Further, to enter the SAS system, each transmitter installation must be made under the supervision of a specially trained and credentialed Certified Professional Installer (CPI). The CPI is empowered to assign SAS connectivity if the system meets all FCC and SAS provider requirements. Subsequent system changes require the sign off of a CPI, as well.



Tier 1 – Incumbent Access

Incumbent Access users include authorized federal users in the 3550-3700 MHz band, Fixed Satellite Service (space-to-Earth) earth stations in the 3600-3650 MHz band, and, for a finite period, grandfathered wireless broadband licensees in the 3650-3700 MHz band. Incumbent Access users receive protection against harmful interference from Priority Access Licensees and General Authorized Access users.

Tier 2 – Priority Access

The Priority Access tier consists of Priority Access Licenses (PALs) that will be licensed on a county-by-county basis through competitive bidding. Each PAL consists of a 10 megahertz channel within the 3550-3650 MHz band. PALs are 10-year renewable licenses. For purposes of the PAL service, counties are defined using the United States Census Bureau's 2017 counties. Up to seven PALs may be licensed in any given county, subject to a four PAL channel aggregation cap for any licensee. PALs must meet a substantial performance requirement by the end of the initial license term. PALs must protect and accept interference from Incumbent Access users but receive protection from General Authorized Access users. Technical rules for PALs can be found in Subpart E of Part 96.

Tier 3 – General Authorized Access (GAA)

The GAA tier is licensed-by-rule to permit open, flexible access to the band for the widest possible group of potential users. GAA users can operate throughout the 3550-3700 MHz band. GAA users must not cause harmful interference to Incumbent Access users or Priority Access Licensees and must accept interference from these users. GAA users also have no expectation of interference protection from other GAA users. Technical rules for GAA users can be found in Subpart E of Part 96.

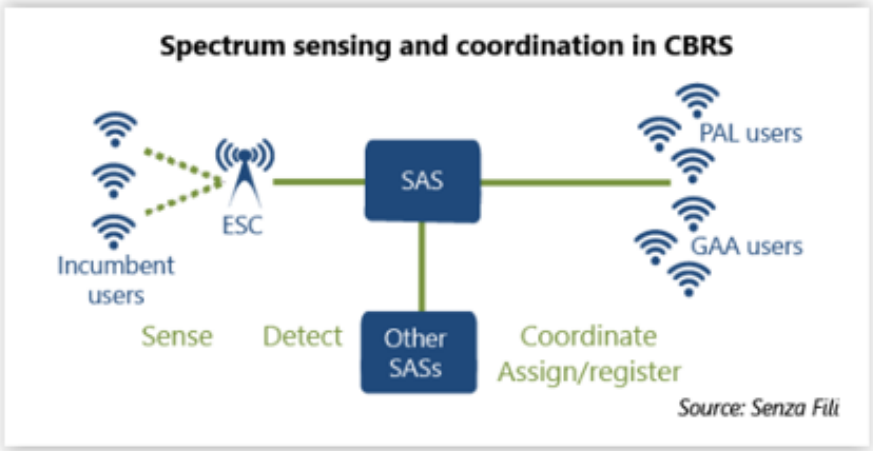
Partition & Disaggregation

PAL licensees can partition and disaggregate their licenses. PAL licensees may also partially assign or transfer their licenses. Holders of PALs may enter into de facto transfer leasing arrangements for a portion of their licensed spectrum.

Spectrum Manager Leasing and Light-Touch Leasing

PAL licensees can engage in spectrum manager leasing for any bandwidth or duration of time within the terms of the license. An SAS Administrator may choose to accept leasing notifications and support leasing arrangements under a light-touch leasing procedure.

The PAL light-touch leasing rules build-on and incorporate the spectrum manager leasing process, but do not replace the spectrum manager leasing process.



About the SAS/ESC System:

Automated frequency coordinators, known as Spectrum Access Systems (SASs), will facilitate sharing among the three tiers of authorized users in the 3.5 GHz band and authorize the use of PALs and GAA operations with information from an approved Environmental Sensing Capability (ESC) sensor. Following Auction 105, SAS Administrators will assign channels to PALs. The SASs will "assign geographically contiguous PALs held by the same Priority Access Licensee to the same channels in each geographic area" and "assign multiple channels held by the same Priority Access Licensee to contiguous frequencies within the same License Area," to the extent feasible. See 47 CFR 96.25.

SAS Administrators must be capable to receiving and responding to interference complaints from Fixed Satellite Service (FSS) earth station licensees in the 3600-3700 MHz band. SAS Administrators are required to implement and enforce additional protection criteria for C-Band FSS earth stations used for telemetry, tracking, and control using the same methods used to protect in-band FSS earth stations.

An Environmental Sensing Capability (ESC) is a system that detects and communicates the presence of a signal from an Incumbent user to a SAS to facilitate shared spectrum access. ESCs will detect federal frequency use in and adjacent to the 3.5 GHz band and transmit that information to the SASs.

LBA Services for CBRS Deployment

LBA can provide FCC required CPI installation certifications for Citizens Broadband Radio Service (CBRS) deployments across the country. Our CBRS technical team field and office personnel are fully trained and hold Certified Professional Installer (CPI) credentials. They are qualified and available to set up, certify, and "turn-on" CBRS installations with SAS providers as mandated under FCC Part 96.

Key technical personnel are also certified in 5G and other technologies. Our experience in wireless communications spans over 50 years.

Available services from LBA for CBRS deployments include system audits, turn-up, SAS certification, compliance coordination and other non-SAS compliance requirements such as network planning, NIER RF Safety Studies, RF Interference, AM Compliance and even putting CBRS systems on AM radio towers with innovative AM colocation solutions.

Source note: Technical Note 129 has referenced information at https://www.fcc.gov/wireless/bureau-divisions/mobility-division/35-ghz-band/35-ghz-band-overview which may be accessed for FCC changes and additional detail.

Technical Note 129

https://www.lbagroup.com/resources/Citizens-Broadband-Radio-Service-Overview-Technical-Note-129