CBRS, What Is It?

−Jim McCoy, Senior Director, Edge Technology Solutions, Black Box Corporation

It is the Federal Communications Commission's (FCC) name and abbreviation for a 150 MHz block of frequency in the 3.5 GHz band. In this case the FCC chose Citizen's Broadband Radio Service and CBRS.

FCC Spectrum Review

Years ago the FCC began to proactively review their allocations of spectrum to different uses to 1) determine if the spectrum was fully utilized geographically or if additional users could 'share,' and 2) determine if the original allocation was no longer necessary due to technology obsolescence. Recently, the FCC has placed special emphasis on the review of frequencies below 6 GHz as they are acknowledged as most economically viable for use with wireless mobility services.

FCC Identifies CBRS Spectrum

The FCC identified the 150 MHz of spectrum in the 3.5 GHz band reserved exclusively for US Navy radars as underutilized. Clearly this band was only sparsely used along U.S. coastlines, and could be reused/shared if proper interference protection could be proved for incumbent users. The FCC coordinated with the Department of Defense (DoD), the National Telecommunications and Information Administration (NTIA), and commercial industry to approve the Environmental Sensing Capabilities (ESC). This is a network of sensors along the coast that listen for radars connected with a national database coordinating all users of CBRS radio channels e.g. the Spectrum Access System (SAS). This approach ensures protection for the radars and allows maximum (real-time) flexibility for all users.

Further, the FCC wanted to ensure maximum adoption and utilization of CBRS. The 3.5 GHz CBRS band has been valued at $15.6 billion and opens the door to a huge market opportunity for Mobile Network Operators (MNOs), enterprises, industrial players, and the broader U.S. economy. Industry groups representing the MNOs and the Wi-Fi industry lobbied for control of the entire CBRS band. The FCC ultimately decided to auction 7 of the 15 CBRS channels Priority

Access Licenses (PAL) in June 2020. The remaining 8 CBRS channels will remain General Authorized Access (GAA). There will be no unlicensed users, but GAA is available to anyone — given professional network installation and proper registration with a SAS.

Verizon has publicly stated their intent to participate in the auction process for PAL channels, and their plans to use LTE technology. MNO participation in CBRS ensures availability of compatible devices (smartphones, tablets, modems, etc.) as well as robust network equipment.

Initial Commercial Deployments (ICD) for CBRS started in October 2019. With ICD, companies like Amdocs, CommScope, Federated Wireless, Nokia, Ericsson, Google, and Sony have started to invest and create businesses using OnGo.

Two segments are poised for early adoption. The first segment is secure mission critical voice/data/IoT applications that do not require access by any general public users, i.e. private LTE networks. The second segment is all other enterprises that don't want to wait on the MNOs to provide public access. The early adopters of private LTE over CBRS will be hospitals, hotels/casinos, public venues, warehouses, and industrial/manufacturing.

OnGo Certification

OnGo™ is a brand of the CBRS Alliance. It represents uncompromised wireless connectivity, enabled by spectrum sharing in the 3.5 GHz band. The CBRS Alliance has developed the OnGo Certification Program to ensure seamless integration and deployment of OnGo wireless solutions, and to support widespread market adoption of OnGo technologies. OnGo Certified is a recognized seal of approval for OnGo products, indicating that they have met a high set of industry standards for interoperability and security. For enterprises deploying Private LTE or Industrial IoT, the OnGo Certified brand indicates they are purchasing a product that will work as advertised when installed.

Understanding Citizens Broadband Radio Service

	Mobility	CBRS	WLAN
FCC Assigned Name	600, 700, Cellular, PCS, AWS, WCS, EBRS	CBRS	ISM, UNII-1, UNII-2, UNII-2e, UNII-3
Frequency Band MHz	600, 700, 850, 1900, 2100, 2300, 2600	3500	2400, 5500
Standards Organization	3GPP	CBRS Alliance, 3GPP	IEEE
Specifications	3GPP Rel 8 thru 14	3GPP Rel 13+	802.11, currently 'ax' or Wi-Fi 6
Certifications	By OEM and MNO	OnGo certified	Wi-Fi certified
License Requirements	MNO per FCC Auctions	MNO per FCC Auction (PAL 7 @ 10 MHz each), Enterprise per FCC 'registration' (GAA 8 @ 10 MHz each)	Unlicensed
Previous Users	Relocated to other Spectrum	Remain with 'protection' from interference via SAS	Remain, All users must accept interference
Technologies	LTE, TD-LTE; Transition to 5G-NR (3GPP Rel 15+)	TD-LTE; Transition to 5G-NR (3GPP Rel 15+)	Wi-Fi, LTE-LAA, ZigBee, UWB, DECT, proprietary, microwave ovens, etc.
KPI Issues	NA: deterministic control of all OTA functions	NA: deterministic control of all OTA functions	Latency, jitter, capacity, QoS, security/privacy, roaming/handoff/ mobility, device driver SW
Ownership	MNO owned WWAN	MNO owned WWAN, MNO owned WLAN, Enterprise owned WWAN, or Enterprise owned WLAN (all permutations)	Enterprise owned WLAN
Installation	Certified/professional only	Certified/professional only	Self install allowed
Administration	MNO Only	Enterprise and professional (SAS)	Typically enterprise

As of July 2019, 3GPP has approved support for the 5G-NR air interface in the CBRS band, paving the way for mobile 5G deployments using CBRS. Abbreviations and Definitions are available at https://www.wirelessinnovation.org/fcc-definitions