Getting Started:
Citizen Broadband Radio Service for Private LTE Networks

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Summary

The universe of mobile communications just became larger. With Federal Communications Commission authorization of Citizen Broadband Radio Service, private organizations now can augment existing wireless communication capabilities with available 3.5 GHz spectrum.

This document will help enterprises and other organizations ask the right questions to prepare for planning a private broadband wireless network deployment.

Greater Wireless Spectrum, Flexibility, and Control

Wireless communication has become the "fourth utility"—as essential as power, water, and Internet connectivity to organizations. Although demand for mobile communication seems limitless, wireless spectrum is a finite and increasingly scarce resource. To address current and future needs for wireless spectrum, in April 2015 the Federal Communications Commission (FCC) formally established Citizen Broadband Radio Service (CBRS). The service allocates 150 MHz of spectrum in the 3.5 GHz band and allows private organizations to share its use with incumbent military radar and fixed satellite stations. The CBRS spectrum is technology-independent and can be used for LTE, Wi-Fi, 5G and other types of wireless deployments.

However, for the first time, dynamic spectrum sharing makes unused spectrum available for commercial use while ensuring interference protection and continuous availability for incumbent users. Private, commercial users can access CBRS spectrum through a cloud-based allocation service. Single or combinations of 10MHz channels up to 150MHz spectrum and 1 Gbps+ speeds are available. Once granted, private users have exclusive use of the spectrum at their locations.

The OnGo Ecosystem

The OnGo™ ecosystem includes implementers, operators, components, and services that organizations can use for deployments on CBRS. OnGo CBRS LTE technology puts the power of wireless networks into private organizations' hands, enabling them to empower operations and expand business opportunities. Built on existing industry standards, OnGo enables interoperability between mobile communication, IoT, video, and industrial devices, applications, and systems. With OnGo technology and OnGo-certified solutions, organizations gain flexible, dedicated, and controlled wireless CBRS spectrum for private use.

Organizations can choose how they use OnGo solutions. For example:

- **In-building use:** Organizations that rely on wireless connectivity for any day-to-day operations will benefit from OnGo.
- **Public spaces:** OnGo enables organizations to provide connectivity without compromise to tenants, patients, tourists, shoppers, and customers.
- **Industrial IoT:** Businesses and municipalities that rely on machine-to-machine communication or sensors to enable smart infrastructure will benefit.

Identifying Primary Considerations

OnGo private LTE networks have the same network planning, design, capacity, and usage considerations as traditional wireless networks. You can prepare for an OnGo private LTE deployment by asking the following questions. Defining your needs in advance will save time and enable a deployment partner to more accurately scope and recommend the best solution.

- **How will the network be used?** Is it for internal use only? For employees and key partners? Or can visitors, external partners, or guests also use the network?
- **Who will be connecting to the network?** Depending on how the network is used as above, decide who will connect to the network. Will users be employees, external to the company, or require privileged access to critical business assets? Are intended users members of special groups requiring nonstop wireless connectivity, such as executive leadership, IT, security, or development efforts? Understanding their roles and access privileges will enable you to ensure proper authentication and security.
- **What will be connecting to the network?** This can include gateways, internal communication channels, and applications, as well as IoT devices, cameras, and mobile user devices. Are they static devices or mobile? Fixed and mobile devices will have slightly different network architectures and device management requirements.
- **How many users, devices, or IoT nodes will require access?** Depending on whether the answer is hundreds or thousands, scoping the network correctly will be crucial to performance.
- **In what type of environment will the system be deployed?** Indoors? Outdoors? Both? Is the environment a combination of private and public spaces? These factors will influence the choice of specific network elements.
- **How do you prefer to install, own, and operate the network?** For example, does your organization prefer to capitalize some—or all—of the equipment or subscribe to services? Will your internal team manage the core network or are managed services more attractive? OnGo deployments provide the flexibility to match service deployment with your business model.

Choosing the Right Network Elements

After defining network capabilities needed for your private LTE deployment, the next step is to identify the network elements that are best suited to deliver them. These network elements include endpoint devices, a radio system and access points, and core network services.
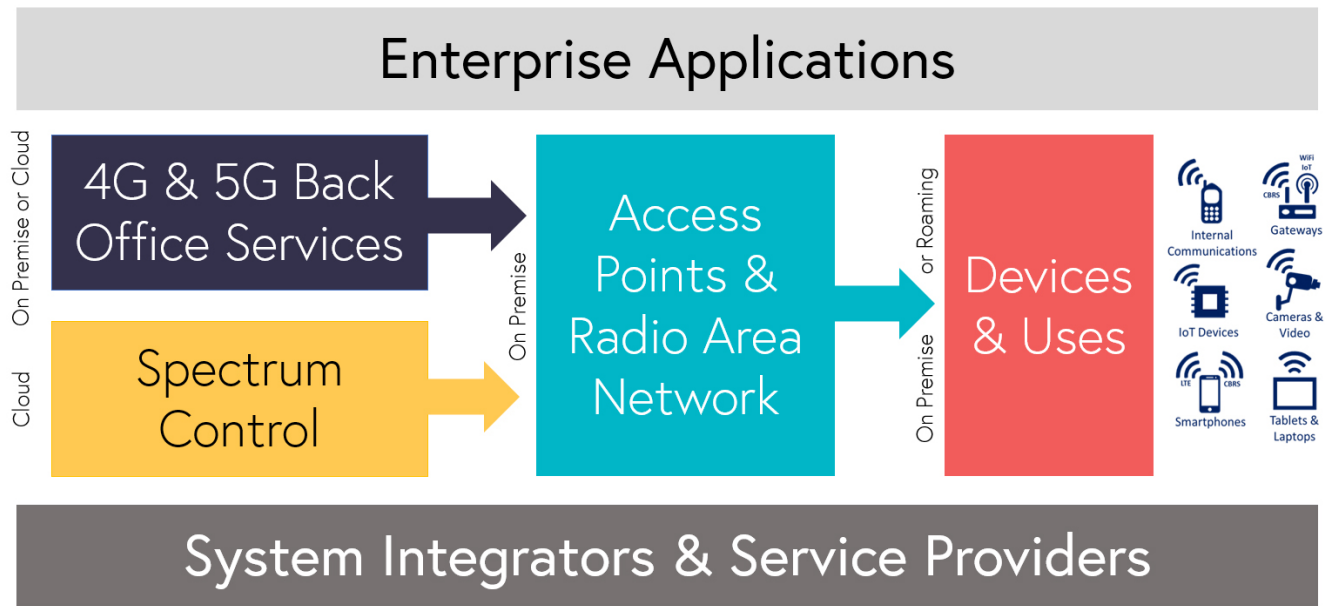
Figure 1. Ecosystem service providers and system integrators help organizations design and deploy OnGo networks to best meet specific enterprise needs.

Endpoint Devices

Endpoint devices are service terminals—they connect users and IoT data to the wireless spectrum. Devices can include mobile phones, tablets, laptops, IoT devices, internal communication systems or applications, modems, cameras, gateways, or routers to other networks and systems. The inherent chipset within each device must support 3.5GHz CBRS band (Band 48) either out of the box or by adding a module. Devices might need additional software updates from operators to enable the CBRS band.

Because OnGo uses LTE as its foundational technology, endpoint devices that support CBRS band 48 already include industry standards for security, interoperability, and service provision. In many cases, existing equipment can be converted to the OnGo network without replacement. For example, many deployed IoT endpoints use

standardized modem modules. Depending on their capabilities, it might be possible to simply replace the internal modem with a CBRS-capable upgrade. There are also numerous options for devices to support multiple network types—such as cellular and Wi-Fi—for mobility or redundancy.

If endpoint devices are OnGo certified, they will have dedicated physical or virtual SIMs that authorize access to the OnGo network. They also will meet industry standards for security and authentication.

Radio System and Access Points

Like traditional wireless and Wi-Fi networks, OnGo access point deployments require coverage design to ensure appropriate coverage and capacity. An OnGo network can be deployed as an individual or multiunit installation, and it can augment existing Wi-Fi or cellular systems.

OnGo-certified access points, also known as Citizens Broadband Radio Service Devices (CBSDs), are certified by the CBRS Alliance for LTE functionality and interoperability in the 3.5GHz frequency. Standards-based interoperability gives organizations maximum design flexibility to design the right network for their use cases.

Access points connect with a cloud-based Spectrum Access System (SAS), which uses advanced analysis and computing technologies to authorize access to available shared spectrum. The SAS includes an environmental sensing capability (ESC) that detects the presence of incumbent users to avoid interference from commercial users. SAS authorization gives the CSBDs access to up to 15 channels of 10MHz spectrum.

Private organizations must establish an agreement with one or more SAS operators to access the shared CBRS spectrum. The channels suggested by SAS operators help prevent interference and ensure quality of service, especially in outdoor and public locations where other users of the spectrum might be operating. As owners of their locations, organizations can use SAS guidance to better manage access point deployment and reduce interference.

Core Network Services

Finally, LTE networks require core network services to manage devices, enable mobility, and support voice, video, data, and application services. Core network services solutions can be physically deployed on premises, contracted as a service, cloud-based, or delivered as a hybrid solution. Because OnGo private LTE deployments are so flexible, organizations can choose to purchase or subscribe to core services for the solution that best fits their technical and budget requirements.

The same core network services used for a private LTE network deliver additional expandability, enabling organizations to move seamlessly from private to public connectivity via OnGo. For example, users can roam from public networks to OnGo private LTE networks or from OnGo private LTE networks to public networks.

Core network services can even interoperate with other bands and technologies to provide connectivity failover, expand capacity, and eventually accommodate 5G-based technologies. OnGo ecosystem service providers, system integrators, and vendors help organizations find the best solution for each deployment.

The Future of Robust Wireless Connectivity

Private LTE wireless coverage is an innovative method for organizations to gain robust, highly scalable connectivity with granular control to meet growing wireless demands. By identifying your primary use cases and answering these questions, you can save time and maximize the value of your chosen private LTE solutions.

Learn more about the CBRS Alliance and its OnGo ecosystem of technology partners and providers at www.cbrsalliance.org.

About the CBRS Alliance
The CBRS Alliance believes that LTE-based solutions in the 3.5 GHz band, utilizing shared spectrum, can enable both in-building and outdoor coverage and capacity expansion at massive scale. In order to maximize the full potential of spectrum sharing, the CBRS Alliance enables a robust ecosystem through the management of the OnGo brand, and the OnGo Certification Program. For more information, please visit www.cbrsalliance.org and learn more about the expanded business opportunities OnGo is enabling.