



# HTNG CBRS BUSINESS MODELS

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# 1 Introduction

The Citizens Broadband Radio Service (CBRS) offers a new opportunity to the hospitality industry to integrate mobile broadband access within operations and to benefit customers. In this document, we address business models that can support the functionality and funding of a wireless network in this band. This document assumes the reader is familiar with CBRS from a technical perspective; to learn more about CBRS, please visit this [link](#) to review HTNG's CBRS for Hospitality introductory whitepaper. As private LTE business models evolve, the ecosystem and the market also mature so it is possible the business models described herein may change.

## 1.1 Overview

The ability to utilize this frequency band for the public has recently been enabled through the FCC, along with the efforts of the telecommunications industry and organizations such as the CBRS Alliance and the Wireless Innovation Forum. With trial network deployments starting in early 2019, the ecosystem of network components, user equipment and operators continues to ramp up.

There are several connectivity network needs, requirements and drivers leading to a decision for a CBRS infrastructure deployment:

- CBRS systems may be more cost effective than alternatives in certain circumstances of coverage and capacity
- There are opportunities for cost recovery from service providers depending on the business model
- If Wi-Fi capacity or security is insufficient, CBRS-enabled systems may be a cost-effective alternative
- In CBRS deployments, the hospitality company can own the data, similar to Wi-Fi
- Mobile network operators can use CBRS-enabled networks to augment licensed bands for coverage or capacity.
- CBRS may improve applications that benefit and enhance customer service and experience (e.g. automation, robotics, in-room (voice, video, data), AR/VR, way-finding, interactive displays, parking enhancements and security)
- CBRS for enhances security for business applications (e.g. PoS) and building management (e.g. video surveillance)

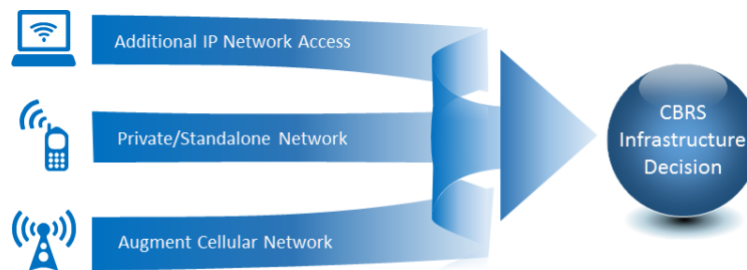


Figure 1 CBRS Benefits

## 2 Business Models

The following business models describe the business aspects of deploying a CBRS Network based on the Use Cases addressed in the [CBRS for Hospitality White Paper](#). Each model describes what entity is financially responsible, what entity provides the upfront equipment and installation work, and what entity is responsible for ongoing monitoring and managing of the systems.

These business models compare hotels owners, managers and technology companies and examine their relationship with each other. These relationships detail several different scenarios of who owns the CBRS Network and who manages it:

- Hotel Owner as the primary financier and maintainer with a standalone system
- CBRS Service Provider as an owner and a maintainer
- Hotel Owner as primary owner, supported by a CBRS Service Provider as maintainer
- Hotel Operator/Manager as primary owner, supported by a CBRS Service Provider as maintainer

Essentially, all of the business models reviewed in this document strive to answer these questions:

- Who pays the upfront capital expense (CAPEX)?
- Who sources equipment, installs it and activates it on the cellular networks?
- Who pays the ongoing operating expense (OPEX)?
- Who is responsible for monitoring the equipment and fixing it if it breaks?
- Is a return on the network investment possible? If so, how?

## 2.1 Private LTE – Hospitality Property Owned and Operated

This business model covers both owner and third party (CBRS Service Provider) financed standalone CBRS networks for private LTE installations. Private LTE does not provide cellular connectivity for guest devices, but it can provide Internet connectivity for hotel owned devices. It is possible for hotel owners and operators to share the investment in the network similar to Wi-Fi networks. In this Private LTE case, the user devices are owned and controlled by the hotel.

**Table 1 Hospitality Owned and Operated CBRS**

Assumptions:	Hotel Owner	Hotel Operator / Manager	CBRS Service Provider	Comments
<b>Legend:</b> P – who pays ; O – who operates system or performs the work; S – secondary responsibility for operation or work				
<b>System Purchase and Deployment (CAPEX)</b>				
Structured Wiring	P	P,O	N/A	
Electronics (LAN, Small Cells, User Devices)	P	P,O	N/A	User devices can be allowed on the network at the owner's discretion.
Design & Deployment	P	P,O	N/A	
<b>System Operation and Maintenance (OPEX)</b>				
Backhaul		P,O	N/A	
Operation and Management (NOC, EPC)		P,O	N/A	
Maintenance		P,O	N/A	Maintenance is simplified in this case.
Manage MNOs	N/A	N/A	N/A	

### Benefits for the hotel:

- Self-organizing, plug and play functionality with an Internet connection
- Scalable based on need and size of the property
- No MNO dependencies (backhaul, handsets)
- Control of the system, quality and costs (hotel is essentially the MNO)
- Staff communications are flexible and controlled
- CAPEX recovery is possible through improved operational efficiencies
- Additional guest- and staff-facing capabilities such as push-to-talk and over-the-top services
- User data owned by the hospitality company can be used for analytics to improve operations and marketing

### Considerations for the hotel:

- Requires GPS connectivity, potentially requiring additional cabling (or line of sight)
- Emergency responder communication is not supported (e.g. 911)
- The hotel is responsible for connectivity
- The hotel is responsible for managing devices, SIMs, privacy and other issues



- No roaming to a cellular network (restricted to the hotel’s premises)
- The hotel needs to subscribe to a Spectrum Access System
- Technical expertise is needed to manage the network

## 2.2 Private LTE – CBRS as a Service

Since CBRS is a shared spectrum (not the traditionally owned and operated licensed spectrum by MNOs), enterprises can own and operate the end-to-end connectivity system, similar to Wi-Fi but with more control. With Private LTE over CBRS, a property or brand can operate a service specific to or for exclusive users, applications and devices. See HTNG’s [CBRS for Hospitality White Paper](#) for a full description of Private LTE. A Private LTE system requires a connection to dedicated LTE core infrastructure called an EPC which will likely be a cloud-based (not on premise) service. In this business model, the Service Provider owns and operates the EPC core and also owns and operates the premise’s edge infrastructure. The Hotel Owner/Operator then pays for the complete LTE service. There is no MNO requirement or role in this model unless capacity sharing or specific roaming arrangements are established. In this case, the CBRS service provider could be an MNO or a third party operator.

**Table 2 CBRS as a Service**

Assumptions:	Hotel Owner	Hotel Operator / Manager	CBRS Service Provider	Comments
<b>Legend:</b> P – who pays ; O – who operates system or performs the work; S – secondary responsibility for operation or work				
<b>System Purchase and Deployment (CAPEX)</b>				
Structured Wiring			P,O	
Electronics (LAN, Small Cells, User Devices)			P,O	
Design & Deployment			P,O	
<b>System Operation and Maintenance (OPEX)</b>				
Backhaul	P	P	O	
Operation and Management (NOC, EPC)	P	P	O	
Maintenance	P	P	O	
Manage MNOs			O	Optional

### Benefits for the hotel:

- No upfront CAPEX for the hospitality company
- Network management and operation is outsourced
- Scalable based on need and size of the property
- No MNO dependencies (backhaul, handsets)
- Staff communications are flexible and controlled (e.g. location-based services, business analytics)



- The hospitality company may be able to contract lease agreements based on space requirements
- CAPEX recovery is possible through improved operational efficiencies
- Additional guest and staff-facing capabilities such as push-to-talk and over-the-top services
- Opportunity for revenue from operators using a neutral host model
- User data owned by the hospitality company can be used for analytics to improve operations and marketing

**Considerations for the hotel:**

- Requires GPS connectivity, potentially requiring additional cabling (or line of sight)
- Emergency responder communications are not supported (e.g. 911)
- The hotel is responsible for managing user devices
- No roaming to a cellular network (restricted to the hotel's premise or network)
- Define and manage Key Performance Indicators (KPIs) and Service Level Agreements (SLAs)



## 2.3 Private LTE – Hospitality Property Owned, Third Party Managed

Similar to the Private LTE - CBRS as a Service described above, both the edge and core of the system are dedicated for private use. In this business model, the edge of the CBRS network (equipment on premises) is owned by the property. An outside party is providing the core infrastructure and operating the end-to-end system as a service for the property owner. There is also the potential for franchises or brands to host or own the core EPC services and the edge equipment with the third party operating the edge network elements integrating into the common core. In this case, the CBRS service provider could be an MNO.

**Table 3 Hotel Owned, 3rd Party Managed CBRS**

Assumptions:	Hotel Owner	Hotel Operator / Manager	CBRS Service Provider	Comments
<b>Legend:</b> P – who pays ; O – who operates system or performs the work; S – secondary responsibility for operation or work				
<b>System Purchase and Deployment (CAPEX)</b>				
Structured Wiring	P		O	
Electronics (LAN, Small Cells, User Devices)	P		O	
Design & Deployment	P		O	
<b>System Operation and Maintenance (OPEX)</b>				
Backhaul	P		O	
Operation and Management (NOC, EPC)	P		O	
Maintenance	P		O	
Manage MNOs			O	Optional

### Benefits for the hotel:

- Scalable based on the need and size of the property
- No MNO dependencies or recurring costs (backhaul, handsets)
- Staff communications are flexible (e.g. location-based services, business analytics)
- The hospitality company does not need any expertise to operate the system
- User data is owned by the hospitality company
- CAPEX recovery is possible through improved operational efficiencies

### Considerations for the hotel:

- Significant upfront CAPEX
- Emergency responder communications are not supported (e.g. 911)
- No roaming to a cellular network (restricted to the hotel's premises)



### 3 Carrier Offload and/or Roaming Utilizing CBRS

To enable interoperability with MNOs, carrier offload and/or roaming agreements are required, however this not common today (outside of MNO to MNO or MVNO to MNO relationships). Where they exist, they have been driven by very large/multiple venue site deployments or high-traffic areas. These MNO interoperability agreements may not be feasible until CBRS is widely available in handsets. Once these agreements, and the necessary interconnections to the MNO network cores are in place, the CBRS network will act as an extension of the MNOs' networks - an in-building cellular solution. This may result in MNOs paying ongoing fees to the venue or hospitality company to support their subscribers.

Similar to several cases above, this could result in an MNO acting as the CBRS service provider (third party operator). Further, each of the previous business models could utilize the system for carrier offload and roaming, with the appropriate agreements and carrier interfaces.

Generating revenue as a result of a CBRS network is possible, but depends on:

- Location of the property
- Foot traffic
- Size of the property
- Amount of properties included as part of a package
- MNO ability and willingness to participate

Agreements generally cover revenue sharing between the MNO and the owner of the technology system, which could be a third party or the hotel owner.

## 4 Conclusion

For decades, hospitality property owners, managers and brands have strived to develop, manage and control their wireless networks. Cellular connectivity has been the default wireless access technology; yet, coverage, control of the licensed carriers and network expense limit their application to larger marquee properties. The introduction of license-free Wi-Fi networks has greatly revolutionized the ability to provide high-speed Internet access to guests and in supporting hotel operations, but Wi-Fi remains insecure and lacks mobility.

CBRS networks will be the first to provide a secure Private LTE network supporting IP (data) access to users with complete mobility and within the property's control. These networks will also enable interoperability with the licensed carriers' networks, once the interconnect agreements are in place, extending cellular functionality at the property - all from the CBRS network.

The business models addressed in this document detail responsibilities, capital recovery and potential revenue models for the two applicable use cases from the CBRS for Hospitality White Paper. Similarities to Wi-Fi networks are strong given the property's control of the assets, frequency band uses, as well as the network elements structure and services from third party experts. The CBRS network and its operation is paid for by the property with cost recovery through operational efficiencies (saving costs) and potential revenue from cellular carriers for providing their subscribers access and service.

The CBRS Workgroup is pleased to present this Business Model and the companion CBRS for Hospitality White Paper, under the aegis of HTNG, to support the needs of the hospitality industry.