

SCWS Private Networks Workshop

Mark Reudink, Head of Technology Strategy

May 2022

A comprehensive portfolio of infrastructure that is unique and unmatched.



40,000+

towers

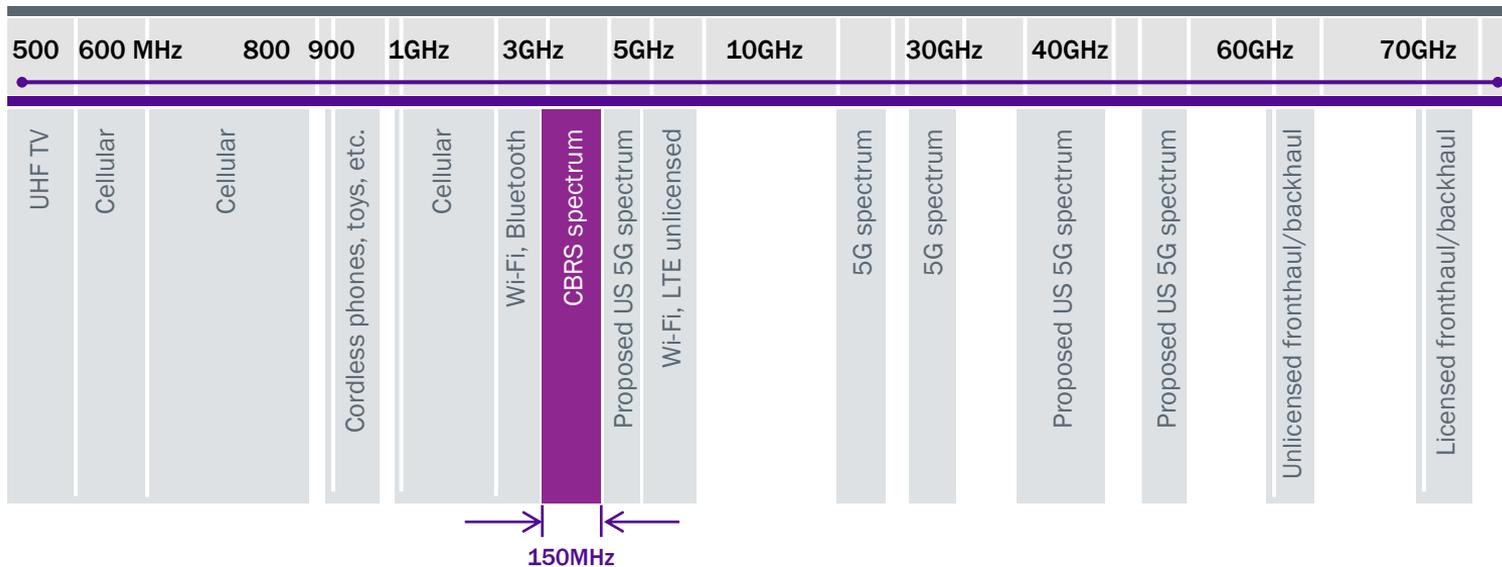
~115,000

small cells on air or under contract

80,000+

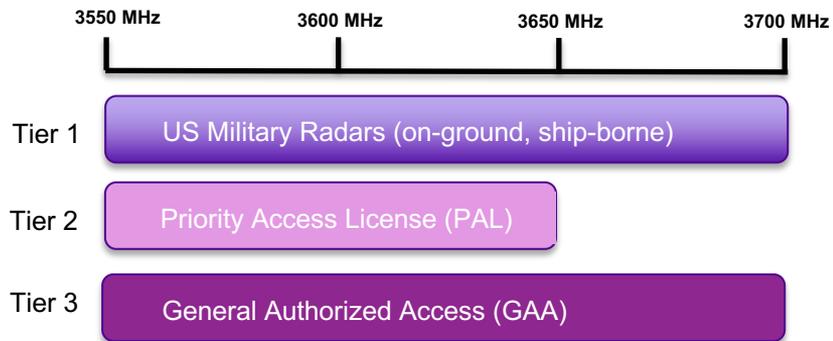
route miles of fiber

CBRS spectrum will change the way we connect.

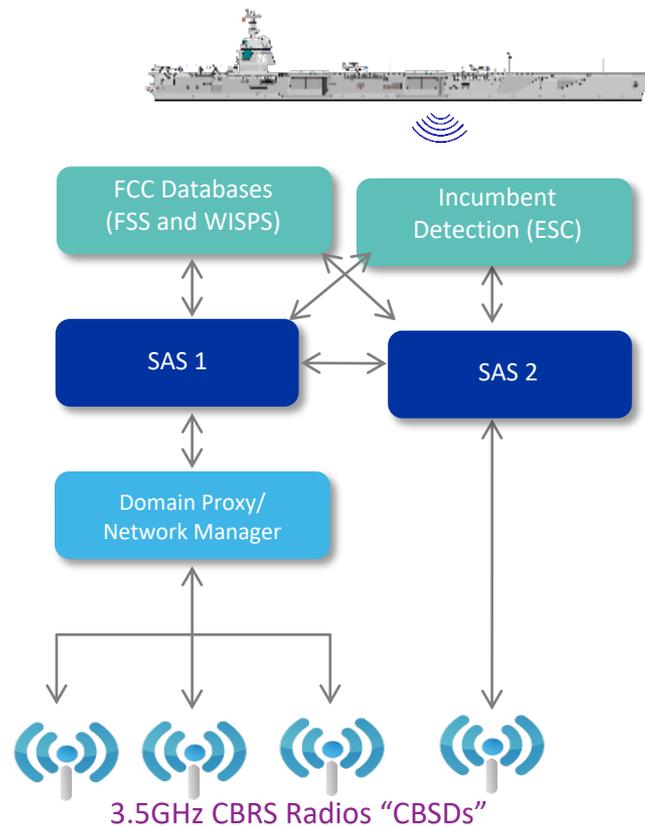


CBRS: Short for Citizens Broadband Radio Service. CBRS may go by many names, The Innovation Band, Band 48, or OnGo. It opens up a mix of licensed and unlicensed spectrum that can be used to improve wireless connectivity.

CBRS Shared Spectrum Overview



- FCC allows for 3 tiers of spectrum users with an LTE/5G Ecosystem
- 15 x 10MHz channels in the 3.5 GHz band (3550 – 3700 MHz)
- Free to use with subscription to a Spectrum Access System (1) and Environmental Sensing Capability (2); SAS and ESC available by subscription



PAL Auction Winners

- Wireless Carriers – Verizon, AT&T, TMO, Dish
- Cable Companies – Charter, Comcast, Cable One
- Utilities
- Wireless Internet Service Providers
- Universities – Texas A&M, Duke University, Virginia Tech, University of Virginia
- Enterprises – John Deere, Chevron, Oxy

Utility CBRS Bidder	Utility Type	PAL Licenses Acquired	Counties Acquired	Total Acquired County Pop (Million)	Total Cost (\$ Million)	\$/MHz-Pop
Alabama Power Co.	IOU	271	103	6.542	\$18.88	\$0.1370
Guadalupe Valley Electric	CO-OP	31	15	0.368	\$3.65	\$0.4744
Exelon	IOU	0	0	-	-	-
HECO	IOU	10	4	1.344	\$9.50	\$0.3107
Illinois Electric Cooperative	CO-OP	15	4	0.067	\$1.13	\$0.4826
Muscatine Power and Water	MUNI	2	1	0.043	\$0.04	\$0.0492
Orange County REMC	CO-OP	8	2	0.053	\$0.07	\$0.0351
Ravalli County Electric	CO-OP	7	2	0.163	\$0.26	\$0.0425
SDG&E	IOU	3	2	3.561	\$21.27	\$0.5748
SCE	IOU	20	15	22.102	\$118.95	\$0.5127
TECO	IOU	4	2	1.279	\$0.48	\$0.0187
Utility Auction Totals	11	371	150	35.522	\$174.23	\$0.3615
U.S. Totals	200	22,631	3,141	328.240	\$4,585.66	\$0.2170
Utilities as a % of U.S. Totals	5.50%	1.64%	4.78%	10.82%	3.80%	166.57%

CBRS is making new use cases possible.

Enterprise

Hospitality

Cellular coverage & connectivity for digital guest services

Office Spaces

Secure, IT managed, private LTE networks to boost productivity

Healthcare

Asset tracking & secure transfer of digitized medical records

Multi Dwelling Units

Building security, energy management & enhanced tenant experiences

Commercial

Entertainment Venues

Enhanced fan engagement, value added premier services (AR/VR), improved coverage & capacity, Neutral host

Retail Malls

Enhanced shopper experience with personalized digital engagement

Theme Parks

Dedicated staff & personnel communications and asset tracking

Education Campuses

Secure and seamless LTE connectivity for staff and students

Industrial IoT

Manufacturing

Factory automation, low latency M2M communication & interference free connectivity

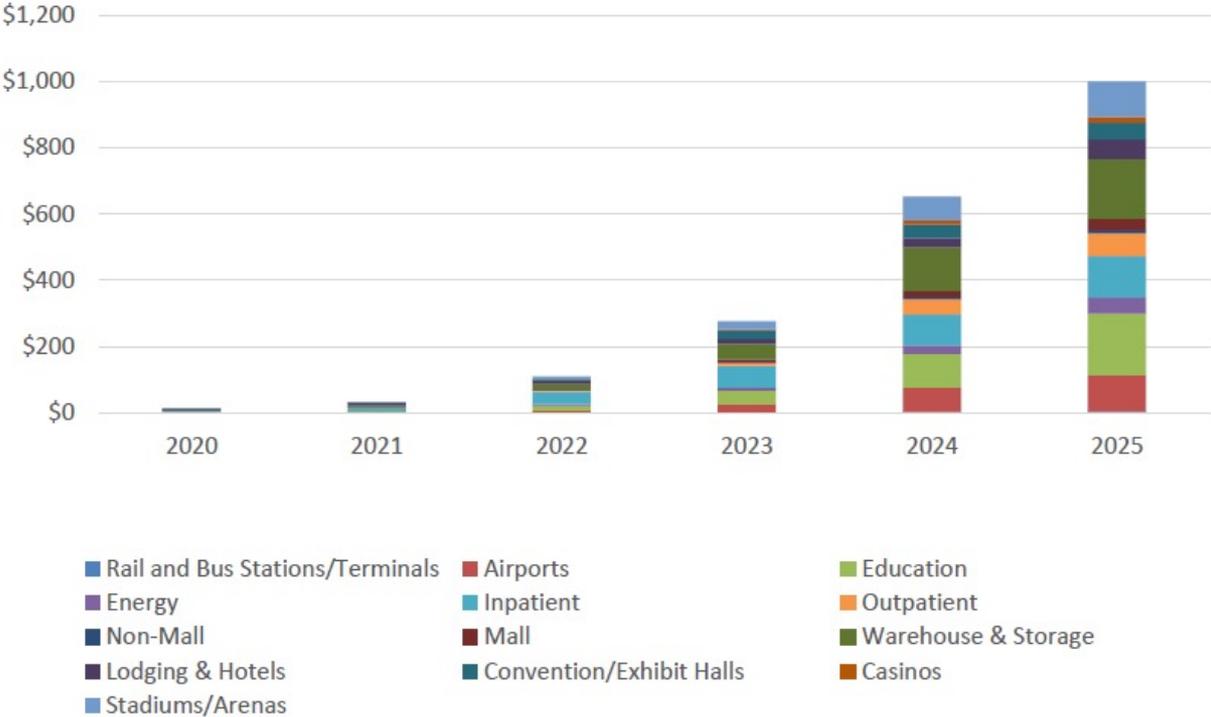
Oil & Gas, Power & Utilities

Extended coverage, seamless mobility, reliable private networks with unique RF needs. Automated data collection over wide distances & remote surveillance

Transportation Hubs

Automated guided vehicles & robotic platforms. Big data analytics require low latency, high-performance wireless connectivity

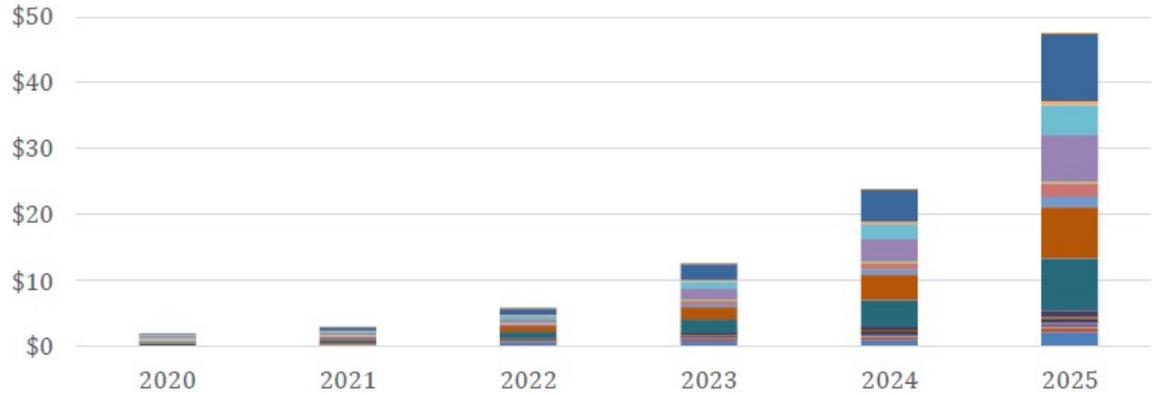
Spending on CBRS by Building Category 2020-2025



Source: iGR, 2020

CBRS Spending in Manufacturing

- Miscellaneous
- Furniture and Related Products
- Transportation Equipment
- Electrical Equip., Appliances, and Components
- Computer and Electronic Products
- Machinery
- Fabricated Metal Products
- Primary Metals
- Nonmetallic Mineral Products
- Plastics and Rubber Products
- Chemicals
- Petroleum and Coal Products
- Printing and Related Support
- Paper
- Wood Products
- Leather and Allied Products
- Apparel
- Textile Product Mills
- Textile Mills
- Beverage and Tobacco Products
- Food



Source: iGR, 2020

Thank you

For further information please contact:

Mark Reudink

(206)-336-7390

mark.reudink@crowncastle.com