One Large Undertaking: How CBRS came to be in the USA

Dave Wright

November 4, 2020
Dave Wright
President | CBRS Alliance

Dave played an instrumental role in the formation of the CBRS Alliance, collaborating with other founding members to create a robust multi-stakeholder organization focused on the optimization of LTE and 5G services in the CBRS band. He served as the Alliance’s first Secretary from its launch in August 2016 and was elected as the President of the Alliance in February 2018.

For his “day job”, Dave leads CommScope’s policy and standards initiatives, ensuring the intersection of CommScope’s technology and product innovations with suitable regulatory environments and technical specifications. Dave is a spectrum champion, advocating for unlicensed, licensed, and dynamic sharing frameworks—recognizing the vital role that all spectrum management regimes play in our increasingly wireless world.

Dave began his odyssey in networking/telecom/mobile/wireless in the early ‘90s while serving in the US Marine Corps. He then transitioned to the commercial sector as a systems engineer. In the intervening years he has spent much of his time in Technical Marketing, Standards Development, and Policy Advocacy. Dave is a Cisco Certified Internetworking Expert (CCIE) Emeritus (#2062), a Certified Wireless Network Administrator (CWNA), and a CBRS Certified Professional Installer (CPI).
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What is CBRS? 3-Tiered Spectrum Sharing in the US

Opens **150 MHz** of prime mid-band spectrum for widespread commercial use

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<thead>
<tr>
<th>Tier 1</th>
<th>Incumbents</th>
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<tbody>
<tr>
<td></td>
<td>Military radar: Ship-based</td>
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<td>FSS Rx</td>
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Incumbents are protected from harmful interference from PAL and GAA

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<tr>
<th>Tier 2</th>
<th>Priority Access Licenses (PAL)</th>
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<td>PAL</td>
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PAL has priority over GAA, licensed via auction, 10 MHz blocks, up to 7 licenses

<table>
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<tr>
<th>Tier 3</th>
<th>General Authorized Access (GAA)</th>
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<td>GAA</td>
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GAA can use any available spectrum, yields to PAL and incumbents

3550 3600 3650 3700 MHz
Supporting a Wide Range of Use Cases

- Fixed Wireless Broadband
- Mobile Capacity Augmentation
- Alternative Mobile Footprint
- Private LTE
- In-Building Cellular

SERVICE PROVIDERS

ENTERPRISES AND MSPs
It’s been a Busy Year…

• Many Tens of Thousands of Base Stations
• Category A (low power) & Category B (higher power)
• Indoor and Outdoor
• Mobile Broadband, Fixed Wireless, Private, & Inbuilding Cellular use cases

Ecosystem Expanding Rapidly

• Equipment Authorizations (100+ Base Stations, 140+ Client Devices)
• 5 authorized SAS Administrators
• ~2000 Certified Professional Installers
• OnGo 5G NR Specs (Release 3)
Bringing OnGo to market required close industry and government collaboration. There’s been an unprecedented amount of coordination and joint development.

- Dynamic Protection Areas (DPAs)
- Environmental Sensing Capability (ESC) and Portal Activation
- NTIA (ITS) Testing of SAS & ESC Systems

No reports of harmful interference to incumbent operations since ICD authorization in September 2019.
Dynamic Coordination from “Experiment” to Commercial Reality
Priority Access License (PAL) Auction

“The 3.5 GHz auction has concluded, and I can say unequivocally: It was a resounding success.”

FCC Chairman Ajit Pai

“This auction has already exceeded my most optimistic estimates.”

Sasha Javid, COO

There were a total of 228 bidders who secured licenses.

$4.58 Billion
Challenges and Lessons Learned

- It was a Large and Entirely New Undertaking – and therefore took a good amount of time to develop, test, authorize, and commercialize

- Additional complexities associated with sharing with military systems (e.g. Operational Security), early government/industry engagement is key

- Sensor-based approach has introduced other “knock-on” impacts – e.g. protection of sensors from interference, next generation military systems, etc...
  - Informing Incumbent Capability (IIC) is now the focus for the 3450-3550 MHz band, and may be applicable to CBRS as well

- Pending introduction of high power TDD services above 3700 MHz (C-Band) and below 3550 MHz (3450-3550 MHz)
Global Activity

- **Private / Local Spectrum Allocations**
  - Large and growing list of countries making some spectrum in mid-band (particularly 3.4 - 4.2 GHz) available*

  e.g. UK, Germany, France (2.6 GHz), Brazil, Belgium, The Netherlands, Sweden, Poland, Croatia, and Slovenia

- The CBRS sharing framework is specific to 3550-3700 MHz in the United States and tailored to protect the unique incumbencies in the US
  
  \[Where\ \text{dynamic\ coordination\ is\ implemented,\ we\ encourage\ the\ exploration\ of\ existing\ protocol\ interfaces,\ such\ as\ the\ WInnForum\ SAS-CBSD\ interface}\]

- However, much of the Alliance’s experience and work products may be helpful / relevant in these other countries and bands. Examples include:
  - Formation of a large and diverse ecosystem
  - Private Network Deployment Guides
  - Neutral Host Architectures (NHN, MOCN, etc...)
  - Private Cellular Identifiers (Shared HNI, IMSI Blocks, etc...)

* Private Mobile Networks, October 2020, GSA