PETER RYSAVY REPLY COMMENTS ON CBRS NPRM
GN Docket Number 17-258
December 4, 2024

I. SUMMARY

These are reply comments of Peter Rysavy of Rysavy Research on the CBRS NPRM.

- **A.** From a technical perspective, moving CBRS to 3.1–3.3 GHz will yield tremendous advantages.
- **B.** Until practical and effective spectrum sharing technologies are available, exclusively licensed, full-power spectrum with wide radio channels remains the most effective resource for 5G networks with best results for consumers.
- **C.** Through diligent efforts by the National Spectrum Consortium, NTIA, and DOD, participants are making significant progress in developing new methods to share spectrum. But the realities of implementation are complex and development will take years.
- **D.** CBRS proponents overstate the success of the framework in promoting innovation. Deployments of new applications are fewer than cited numbers.

II. MOVING CBRS TO 3.1–3.3 GHZ

I agree with the band plan proposed in AT&T's comments to:

- Move CBRS to 3.1–3.3 GHz
- Establish a regulatory framework for the cleared 3.55–3.70 GHz band consistent with the adjacent 3.7 and 3.45 GHz bands

From a technical perspective, this band plan would yield tremendous advantages. Specifically, it would:

- Recognize that the significance of the the 3 GHz band has fundamentally shifted from ten years ago when CBRS was first conceived.
- Acknowledge that mib-band frequencies are critical for successful 5G operation over large coverage areas by providing an optimum balance of capacity, performance, and coverage.
- Increase the amount of spectrum available for CBRS from 150 MHz to 200 MHz. General Authorized Access (GAA) users would have access to 200 MHz and Priority Access License (PAL) users up to 70 MHz.
- Employ DOD's preferred database approach, as articulated in the Emerging Mid-Band Radar Spectrum Sharing (EMBRSS) report, for spectrum sharing management below 3.45 GHz.
- Add 150 MHz of badly needed spectrum for 5G operation.
- Create a contiguous swath of 530 MHz of 5G spectrum able to operate at full-power with wide radio channels.
- Harmonize U.S. mid-band spectrum use with the rest of the world, consistent with the 3GPP spectrum band n77, defined for operation between 3.3 and 4.2 GHz.

- Leverage the coordination methods developed for 3.45–3.55 GHz for a new and simplified sharing framework in 3.55–3.70 GHz.

Conversely, the disadvantages of keeping CBRS in the current 3.55–3.70 GHz band are:

- Fragmentation of spectrum use from 3.45 to 3.98 GHz.
- Difficulty in using the CBRS band due to lower priority than incumbents, low-power levels, narrow channels, and complexity associated with integration with the Spectrum Access Systems.
- The United States being in a weaker competitive position with mobile broadband technology and associated innovation.

The current CBRS Environmental Sensing Capability (ESC) would need to be adapted for the 3.1–3.3 GHz band to accommodate different incumbents. Alternatively, NTIA has proposed the Incumbent Informing Capability (IIC), which could facilitate spectrum sharing. CBRS systems in some cases already use the TARDyS3[1] scheduling system in lieu of the ESC to inform SASs about incumbent use. TARDyS3, conceptually similar to the IIC, could be used directly or in an evolved form, either as a precursor to or replacement for the IIC.

III. BENEFITS OF FULL POWER, WIDE CHANNELS, AND EXCLUSIVE LICENSING

I agree with CTIA comments that licensed, full-power spectrum is critical for supporting our wireless future. I also agree with CTIA's comments about the importance of wide radio channels.

I wrote in detail on this topic in my 2022 paper, 5G Mid-Band Spectrum: The Benefits of Full Power, Wide Channels, and Exclusive Licensing[2]. The paper explains in detail how and why exclusively licensed, full power, and wide swaths of spectrum are needed to power robust 5G networks. The paper also notes economic and environmental benefits of such spectrum.

Until practical and effective spectrum sharing technologies are available, dedicated spectrum remains the most effective resource for 5G networks.

IV. TECHNICAL CHALLENGES OF SPECTRUM SHARING

I agree with CTIA comments about how CBRS limitations have "yet to foster significant investment or innovation of any of the wide variety of potential users of the band."

I analyzed CBRS and the complexities of spectrum sharing generally in a 2024 article for Fierce Network magazine, titled, "Dynamic Spectrum Sharing Realities."[3] I stated in the article that the idea of making an underused resource available to other entities sounds

[1] Details at https://www.fcc.gov/document/new-tardys3-portal-and-list-protected-facilities-35-ghz-band
[2] Available at https://rysavy.com/wp-content/uploads/2022/11/2022-11-5g-midband-spectrum.pdf.
[3] Available at https://www.fierce-network.com/wireless/op-ed-dynamic-spectrum-sharing-realities.

efficient, but the realities of implementation are complex; development will take years; and the resulting solution could be suboptimal unless participants agree on key principles.

Recognizing the value of spectrum sharing in specific scenarios—provided that appropriate technical approaches are implemented and realistic timelines are employed—I became a member of the National Spectrum Consortium and joined the Partnering to Advance Trusted and Holistic Spectrum Solutions (PATHSS) workgroup. This workgroup is developing new spectrum-sharing approaches as part of the National Spectrum Strategy. However, significant work remains before any new spectrum sharing approach can be deployed.

V. CBRS PROPONENTS OVERSTATE THEIR SUCCESS

I agree with CTIA's comments that "CBRS proponents overstate the success of the framework in promoting innovation."

In December 2022 I wrote to the OnGo Alliance, which supports CBRS commercialization. I explained that, based on my research, most CBRS deployments appeared to be Category B and related to Part 90Z transition to CBRS, specifically previous users of the 3650–3700 MHz band. I requested that the OnGo Alliance provide a breakdown of the percentage of CBSDs attributed to Part 90Z transitions versus new CBRS deployments.

The OnGo Alliance never responded to my query.

I wrote OnGo Alliance again in February of 2023. Again, OnGo Alliance never responded.

My conclusion is that CBRS proponents, when reporting the number of deployments, present a misleading number of base stations deployed.

The limited success of CBRS could have been predicted from auction results. The C-band auction raised $80.9 billion in auction revenue for 280 MHz of spectrum. In contrast, the market valued 70 MHz of licensed CBRS spectrum at $4.6 billion. On a per-MHz basis, this represents only one-quarter of C-band, demonstrating the significantly higher value of licensed spectrum operating at full power. The subsequent auction of 3.45–3.55 GHz spectrum raised $21.8 billion, also much higher than CBRS on a per MHz basis.