

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of)	
)	
Wireless Telecommunications Bureau and)	GN Docket Nos. 14-177, 15-319, 17-183,
Office of Engineering and Technology)	and 17-258
Seek Comment Pursuant to the Spectrum)	
Pipeline Act of 2015)	

**COMMENTS of RUCKUS NETWORKS,
a company of ARRIS U.S. HOLDINGS, INC.**

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September 10, 2018

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Ruckus Networks, a company of ARRIS U.S. Holdings, Inc., is pleased to provide these comments in response to the Wireless Telecommunication Bureau’s (WTB) and Office of Engineering and Technology’s (OET) Public Notice requesting public input prior to their report to Congress.¹

I. INTRODUCTION

Ruckus Networks has been, and continues to be, an active and leading participant in the realization of the Commission’s innovative vision for the 3.5 GHz Citizens Broadband Radio Service (CBRS) band. We are active in the Wireless Innovation Forum’s (WInnForum) Spectrum Sharing Committee (SSC), serving on the Steering Group and chairing the CBSD Test Task Group within Working Group 4. Ruckus was a founding member of the CBRS Alliance, serves

¹ *Wireless Telecommunications Bureau and Office of Engineering and Technology Seek Comment Pursuant to the Spectrum Pipeline Act of 2015*, GN Docket Nos. 14-177, *et al.*, Public Notice, DA 18-841 (Aug. 10, 2018).

on the Board and currently fills the Presidency, chairs the Marketing Working Group, and leads the In-Building Task Group. Ruckus was honored to receive the FCC's first CBRS Device (CBSD) authorization on September 6, 2018 for our Q710 and Q910 small cell products. This strong level of engagement and leadership demonstrates our substantial commitment to, and investment in, the 3.5 GHz CBRS band.

Ruckus Networks has also been a strong advocate for unlicensed services in the 5925-7125 MHz range on the condition that existing incumbent operations are appropriately protected.

In these comments, Ruckus Networks highlights the following points for the Commission to consider in its report to Congress:

- The industry response to the 2015 rules outlining the framework for commercial services in the 3550-3700 MHz band has been very impressive and reflects the flexibility of use cases and deployment models enabled by those rules.
- The 2015 rules for commercial shared use with protected federal operations has led to an unprecedented level of government/industry collaboration and cooperative development, laying a strong foundation for future programs. The Commission should look for other opportunities to preserve and extend this collaboration.
- The impacts of any future changes to the existing rules for the CBRS band are unknowable but changes that limit access to the Priority Access tier are likely to dampen interest in the band. The Commission should act quickly to finalize the rules.
- The 2015 rules were intended to enable a quick path to commercial deployments in the band. For a variety of reasons, the authorization of commercial services is taking longer than anticipated. Ruckus urges all parties to enable commercial service as quickly as possible and to evaluate ways to expedite the realization of future federal/commercial sharing programs.
- Ruckus supports the opening of spectrum in the 5925-7125 MHz band for unlicensed services under a sharing regime that would appropriately protect the incumbent operations and encourages the Commission to quickly open a Notice of Proposed Rulemaking (NPRM).

II. COMMENTS ON THE RESULTS OF THE 2015 RULE CHANGES RELATING TO FREQUENCIES BETWEEN 3550 AND 3650

A. Industry Response

As a result of the CBRS spectrum access framework enacted by the Commission in 2015 and reaffirmed in 2016, the industry enthusiastically responded with the initial formation of the Spectrum Sharing Committee within WinnForum to operationalize the framework at a radio technology “agnostic” level and the subsequent creation of the CBRS Alliance to focus on the operation of LTE services in the band. WinnForum now has 93 members, and CBRS Alliance has 104 members. These industry organizations are a direct result of the rule changes, and especially the Commission’s encouragement for multi-stakeholder groups to cooperatively develop the specifications and programs needed for CBRS services to be deployed on a broad scale.

WinnForum and the CBRS Alliance have both finalized their Release 1 specifications which provide all of the requirements, technical standards, and supporting programs that are necessary for the commencement of commercial services in the band. These organizations have also defined and launched the program to test and certify RAN infrastructure (CBSDs and/or Domain Proxies) for the ecosystem with a number of devices having already been submitted to Authorized Test Labs (ATLs) for certification. WinnForum’s Working Group 4 also worked diligently to develop the test code that was the basis for the Spectrum Access System (SAS) lab testing that the National Telecommunications and Information Administration’s (NTIA) Institute for Telecommunication Sciences (ITS) branch is currently conducting on behalf of the Commission.

In addition to WinnForum and the CBRS Alliance, other standards development organizations (SDOs) and industry trade organizations (ITOs) have made significant technical,

certification, and/or advocacy contributions towards commercializing CBRS. These include: 3GPP, MulteFire Alliance, Small Cell Forum, Wireless Broadband Alliance, Dynamic Spectrum Alliance, CTIA, CableLabs, and WISPA.

Outside of these multi-stakeholder SDOs and ITOs, individual companies have made their own independent investments of time, money, and personnel to develop, test, and market products, solutions, and services for the CBRS band.

In summary, the industry response to the CBRS rules put forward by the Commission has been overwhelming, in terms of the numbers of participants, the various industry sectors represented, the total investments made thus far, and the sustained commitment over a number of years.

B. Commercial/Federal and Industry/Government Cooperative Development

When the 2015 CBRS rules were unanimously approved, Chairman Wheeler noted in his statement that those rules were the result of effective collaboration between the Commission, NTIA, and DoD – particularly with the United States Navy.² He went on to discuss the almost yearlong collaborative efforts between the Commission’s staff and those other Federal agencies which had gone into refining the rules for protection of the Federal incumbents in the band. This collaboration among the Commission, NTIA, and DoD has continued over the three plus years since the 2015 rules were issued. The results from this interagency cooperation have been

² *Amendment of the Commission’s Rules with Regard to Commercial Operations in the 3550-4650 MHz Band*, Report and Order and Second Further Notice of Proposed Rulemaking, 30 FCC Rcd. 3959, 4136 (2015) (Statement of Chairman Tom Wheeler).

impressive, including a number of innovations such as the use of Dynamic Protection Areas as enacted by an order from WTB and OET following a recommendation from NTIA³.

While industry has continued to primarily interface with the Commission as the federal agency responsible for oversight of commercially available spectrum, the efforts to operationalize the CBRS framework have also involved an unprecedented level of interaction and collaboration among industry, NTIA, and DoD. As the multi-stakeholder organization which took on the role of operationalizing the federal incumbent protections via the Environmental Sensing Capability (ESC) and which also assumed responsibility for the security of the communications between CBRS component systems, WinnForum has involved NTIA and DoD participants and observers at relevant meetings and crafted the ESC, operational security, and communications security specifications based on those interactions with these federal agencies.

Indeed, Assistant Secretary of Commerce, and NTIA Administrator, David Redl noted this groundbreaking level of industry/government collaboration during his prepared remarks at a recent NTIA Spectrum Symposium.⁴ Assistant Secretary Redl specifically noted the close and regular work done between and amongst WinnForum, the Commission, NTIA (including ITS), and DoD to complete the standards and the certification framework for the SAS and ESC systems. The depth of this new collaboration between industry and DoD was further underscored by Mr. Tom Taylor of the DoD Chief Information Officer's (CIO) office who noted at an

³ *Promoting Investment in the 3550-3700 MHz Band*, GN Docket No. 17-258, Order, DA 18-538 (May 22, 2018).

⁴ David J. Redl, Assistant Secretary for Communications and Information, NTIA, Remarks at the NTIA Spectrum Policy Symposium (June 12, 2018), <https://www.ntia.doc.gov/spechttestimony/2018/remarks-assistant-secretary-redl-ntia-spectrum-policy-symposium>.

industry event earlier this year that: “We’ve worked with industry representatives and we’ve come up with a sound, trusted engineering plan [for federal/commercial sharing in the CBRS band].”⁵

Assistant Secretary Redl again emphasized the positive results from these federal/commercial interactions at an industry conference on September 6, 2018, commenting: “Through industry and government collaboration, the older, static model of exclusion zones are being replaced by a dynamic sharing model that will allow multiple spectrum uses across time and geography. Along with SAS and Environmental Sensing Capability technology, we are now putting systems in place that can allow CBRS to flourish.”⁶

This close and regular collaboration amongst the federal agencies and between industry and these government agencies has been a result of the 2015 rule changes. Leaders within the Commission, NTIA, and DoD have all remarked that sharing approaches similar to those implemented in CBRS will play a critical role in opening up additional federally-held spectrum for new commercial uses. This is especially the case in the frequency bands below 10 GHz, which are virtually all allocated, with the large majority of the allocations being for federal use. In particular, DoD officials have noted their preference for sharing approaches rather than the

⁵ Paul Kirby, *Large Carrier Reps Willing to Discuss Various CBRS License Areas*, TR Daily (Feb. 13, 2018), <https://irus.wolterskluwer.com/news/tr-daily/large-carrier-reps-willing-to-discuss-various-cbrs-license-areas/46341/> and <https://policyforum.att.com/event/the-3-5-ghz-future-innovation-showcase/>.

⁶ David J. Redl, Assistant Secretary for Communications and Information, NTIA, Remarks at Silicon Flatirons (September 6, 2018), <https://www.ntia.doc.gov/speechtestimony/2018/remarks-assistant-secretary-redl-silicon-flatirons>.

traditional “clear and repurpose” regimes, which typically require major upheaval and modification to federal systems in order to operate in new frequencies.

Ruckus Networks urges the Commission and the other federal agencies to consider ways by which the collaboration that has developed around the CBRS band can be extended and strengthened going forward. We believe that industry organizations such as WinnForum and the CBRS Alliance should continue to play key roles in the industry participation in such ongoing efforts. A very near-term opportunity to continue this collaboration exists in the analysis that is currently being done by NTIA and DoD to evaluate the possibility for commercial services in the 3450-3550 MHz range. We believe early industry engagement will be helpful in this regard.

C. Impacts of Any Future Rule Changes

As noted previously, a broad and diverse group of companies and organizations came together within WinnForum and the CBRS Alliance to operationalize the CBRS rules as enacted in 2015 and affirmed in 2016. The breadth and diversity reflected in the membership of these multi-stakeholder organizations reflects the flexibility in use cases and deployment models that were supported by the rules. In October of 2017, the Commission issued a Notice of Proposed Rulemaking (NPRM) related to the CBRS rules in response to petitions that were received in the summer of 2017.⁷ This NPRM contemplates changes to the rules including the Priority Access License (PAL) geographic area and term length, performance requirements for PAL license

⁷ *Promoting Investment in the 3500-3700 MHz Band; Petitions for Rulemaking Regarding the Citizens Broadband Radio Service*, Notice of Proposed Rulemaking and Order Terminating Petitions, 32 FCC Rcd. 8071 (2017); *see* Petition of CTIA for Rulemaking to Amend the Commission’s Rules Regarding the Citizens Broadband Radio Service in the 3550-3700 MHz Band, RM-11788 (June 16, 2017); Petition of T-Mobile USA, Inc. for Rulemaking To Maximize Deployment of 5G Technologies in the Citizens Broadband Radio Service, RM 11798 (June 19, 2017).

holders, and relaxed emission limits. As we noted in our NPRM Comments⁸ and Reply Comments,⁹ Ruckus Networks believes that any changes to the existing CBRS rules should be for the benefit of all the participants in the band, and not favor any specific industry sector over others.

In prepared remarks at the Resurgent Conference in early August of this year, Chairman Pai pointed out “[t]he benefits that flow when the FCC steps back and puts its faith in the market” and further highlighted how it is “[p]ermissionless innovation made possible by competitive free markets that best guarantees consumer welfare.”¹⁰ Ruckus Networks believes that these free market principles apply directly to the rule changes being contemplated for the CBRS band and urges the Commission to only enact rule changes that will both foster innovation and allow market forces, not government regulations, to determine outcomes.

Ruckus is particularly concerned that rule changes that would have the effect of limiting access to the PAL tier could dampen interest in the band and cause some participants to abandon their planned operations and services at this very late stage in the process. One observable result of the NPRM is that it has created a great deal of market uncertainty as industry waits to learn what the final rules will be. This uncertainty has been further exacerbated by the very long time that has elapsed since the NRPM was issued and comments and reply comments were filed with no resulting ruling. Ruckus Networks appreciates the Commission’s efforts to bring about and

⁸ Comments of Ruckus Networks, a company of ARRIS U.S. Holdings, Inc., GN Docket No. 17-258, at 2-3 (Dec. 28, 2017) (“Ruckus Comments”).

⁹ Reply Comments of Ruckus Networks, a company of ARRIS U.S. Holdings, Inc., GN Docket No. 17-258, at 11-12 (Jan. 29, 2018).

¹⁰ Ajit Pai, Chairman, FCC, Remarks at the Resurgent Conference 1 (Aug. 3, 2018), <https://docs.fcc.gov/public/attachments/DOC-353259A1.pdf>.

arrive at consensus positions on the issues raised, but, as Ruckus underscored in its December 2017 Comments, “[t]he Commission should act quickly to conclude this rulemaking and expeditiously move forward with the authorization of GAA operations in the band.”¹¹

D. The Vision for an Expedited Path to Commercial Service

A foundational precept of the innovative sharing framework that the Commission implemented with the 2015 rules was that the time needed to deploy new commercial services would be significantly shorter than with traditional “clear and repurpose” approaches.¹² Ruckus Networks agrees that dynamic, shared-access frameworks that enable quicker and easier access to spectrum are critical to the future growth and continued strength of America’s wireless services, and that such frameworks also demonstrate continuing international leadership by the United States. This is especially important as we progress into the “5G era” with the growing need for mid-band spectrum and spectrum management frameworks that will enable and encourage dense deployments of small cells by a wide range of participants.

¹¹ Ruckus Comments at 2.

¹² In fact, the July 2012 report from the President’s Council of Advisors on Science and Technology (PCAST), which led to the initial studies on the 3550-3650 MHz band for federal/commercial sharing, highlighted in its opening statement that: “Demonstrating that the United States can move quickly to create easier access to spectrum will not only spur the domestic economy, but will help us maintain international leadership in this crucial area of modern technological innovation and commerce.” Executive Office of the President, President’s Council of Advisors on Science and Technology, *Report to the President: Realizing the Full Potential of Government-Held Spectrum to Spur Economic Growth* iii (July 2012), https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/pcast_spectrum_report_final_july_20_2012.pdf.

Ruckus Networks is very pleased that the Commission has recently laid out a path to initial commercial deployments in the band,¹³ but had originally expected that such operations would have commenced by this time. Going forward, we hope that all of the parties involved in the standardization and authorization of CBRS services, federal and industry, will work together to launch initial commercial services in 2018 and proceed swiftly to full commercial operations in the band shortly thereafter, while ensuring that all of the component systems and incumbent protections are functioning as intended. We also urge all of the involved parties, federal and industry, to contemplate the lessons learned through this “first of a kind” process and whether steps may be taken in future programs to expedite the realization of commercial services in bands shared with federal incumbents.

III. COMMENTS ON PROPOSALS TO PROMOTE AND IDENTIFY ADDITIONAL SPECTRUM BANDS THAT CAN BE SHARED BETWEEN INCUMBENT USES AND NEW LICENSED AND UNLICENSED SERVICES BETWEEN 6 GHZ AND 57 GHZ

In response to the Commission’s Notice of Inquiry (NOI) seeking comment on expanding flexible use in mid-band spectrum between 3.7 and 24 GHz¹⁴, Ruckus Networks strongly supported, and continues to support, unlicensed operations in the 5925-7125 MHz range on the condition that incumbent operations are appropriately protected. There is a critical need for additional mid-band unlicensed spectrum to meet the current and near-term demand from

¹³ See *Wireless Telecommunications Bureau and Office of Engineering and Technology Establish Procedure and Deadline for Filing Spectrum Access System Initial Commercial Deployment Proposals*, GN Docket No. 15-319, Public Notice, DA 18-783 (rel. July 27, 2018).

¹⁴ *Expanding Flexible Use in Mid-Band Spectrum*, Notice of Inquiry, 32 FCC Rcd. 6373 (2017).

services including Wi-Fi, unlicensed cellular (e.g. LTE-LAA and 5G NR-U), and Internet of Things (IOT).

Ruckus Networks believes that the Automated Frequency Coordination (AFC) sharing framework that Ruckus and other parties have supported in the record¹⁵ will be effective in meeting the unlicensed services need while preserving current and future incumbent operations. We are encouraged by the interactions between some of the entities advocating unlicensed access and some incumbents, as these interactions are very helpful in the formulation of proposals that best meet the needs of all interested parties. We encourage the Commission to move quickly to issue a Notice of Proposed Rulemaking (NPRM) on unlicensed operation in 5925-7125 MHz.

IV. CONCLUSION

The industry response and federal/industry collaboration that have occurred as a result of the 2015 rules for the 3550-3700 MHz band has been very impressive and unprecedented. Ruckus Networks urges the Commission to seek opportunities to both continue and extend the multi-stakeholder efforts and engagement among industry and federal entities. Any future rule changes to the 3550-3700 MHz band should benefit all of the diverse industry sectors that have made significant efforts to operationalize the band based on the current rules. Future programs to enable new commercial services on a shared basis with existing federal incumbents should evaluate ways to expedite the development and approval processes.

¹⁵ See Letter from Paul Margie, Counsel to Apple Inc., Broadcom Inc., Facebook, Inc., Hewlett Packard Enterprise, and Microsoft Corporation, to Marlene Dortch, Secretary, FCC, GN Docket No. 17-183, at 5-9 (Aug. 2, 2018).

Automated Frequency Coordination mechanisms will allow new unlicensed commercial services in the 5925-7125 MHz band while preserving the incumbent operations. The Commission should issue an NPRM on this matter.

Very respectfully,

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