

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)
Facilitating Shared Use in the 3.1-3.55 GHz Band) WT Docket No. 19-348
)

COMMENTS OF FEDERATED WIRELESS, INC.

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I. INTRODUCTION AND SUMMARY

Federated Wireless, Inc. (“Federated Wireless”) offers these comments in response to the Federal Communication Commission’s (the “Commission” or “FCC”) Further Notice of Proposed Rulemaking (“FNPRM”) relating to future commercial shared use of the 3.1-3.55 GHz band (the “lower 3 GHz band,” and the 3.45-3.55 GHz portion the “3.45 GHz band”).¹ In its FNPRM, the FCC identifies myriad objectives that must be balanced to make the most effective use of critical mid-band spectrum for future 5G commercial services. These goals include:

- a) maximizing the use of and enabling the earliest possible access to the 3.45 GHz band for new commercial uses without disrupting critical incumbent operations;
- b) implementing an efficient coordination framework between ongoing federal operations and future commercial users;
- c) establishing technical rules for new commercial services in the 3.45 GHz band that will not negatively impact adjacent band Citizens Broadband Radio Service (“CBRS”) operations or potential future commercial uses of the 3.1-3.45 GHz portion of the band; and
- d) ensuring that the widest range of 5G equipment, networks, and services can be developed and deployed quickly and efficiently.

¹ *In the Matter of Facilitating Shared Use in the 3100-3550 MHz Band*, WT Docket No. 19-348, Further Notice of Proposed Rulemaking, FCC 20-138 (rel. Oct. 2, 2020) (“FNPRM”).

The Commission can best achieve all of these objectives by leveraging an already proven and readily available solution, namely the automated dynamic shared spectrum technology developed for the CBRS band. In fact, extension of the CBRS sharing framework is likely the only way to maximize the utility of the entire 3 GHz band for new 5G broadband services, minimize the impact to critical federal incumbent operations, and do so on a timeline that ensures that the U.S. remains competitive in the global race to 5G. Specifically, and most immediately, incorporating the 3.45 GHz band into the existing CBRS Part 96 rules, managing coordination of newly authorized commercial operations via the CBRS Spectrum Access System (“SAS”), and optimizing use of 250 MHz of contiguous, essential mid-band spectrum in the adjacent 3.45 GHz and CBRS bands will assist the FCC, the National Telecommunications and Information Administration (“NTIA”), and the Department of Defense (“DoD”), together with industry, to effectively and efficiently achieve the Commission’s stated goals in this proceeding.

As demonstrated in detail below, these ends can best be achieved by the extension of the CBRS framework, including the use of the SAS, to coordinate operations in the 3.45 GHz band, which will:

1. Streamline coordination between federal users and new 5G broadband operators and reduce administrative burdens, inefficiencies, and operational impact on all users;
2. Minimize interference between new 3.45 GHz band users and adjacent band CBRS operations, while enabling industry-led solutions for time-division duplexing (“TDD”) synchronization;
3. Accelerate the development of a robust 5G equipment ecosystem for the larger 3 GHz band; and
4. Maximize spectrum efficiency and access to spectrum by the widest possible range of users.

Absent the use of a SAS to manage coordination of the 3.45 GHz band, the rules proposed by the Commission in the FNPRM would result in two unfortunate outcomes:

1) harmful interference to operations in the adjacent CBRS band; and 2) a missed opportunity to

maximize use of the greater 3 GHz band for 5G services to the detriment of both U.S. industry and consumers.

More broadly, Federated Wireless urges the Commission to take advantage of the opportunity presented in this proceeding to lay the groundwork to optimize a significant swath of mid-band spectrum—the lower 3 GHz, the CBRS, and the 3.7 GHz bands—in a way that maximizes the utility of the spectrum for all users and the efficiency of its use. By taking the longer view and holistically approaching the technical and service rules for the 3 GHz band, the Commission will further enhance U.S. global leadership in the wireless industry, as well as in spectrum management policies and techniques. The Commission should, therefore, extend the CBRS sharing framework to incorporate immediately the 3.45 GHz band and ultimately the entire lower 3 GHz band — not only to ensure the highest and best use of the 100 MHz of critical mid-band spectrum in the 3.45 GHz band, but also to take advantage of the opportunity to optimize nearly 1 GHz of contiguous spectrum in the 3 GHz band, further accelerating U.S. leadership in 5G.

II. EXTENDING THE CBRS SHARING FRAMEWORK TO THE 3.45 GHZ BAND WILL STREAMLINE COORDINATION BETWEEN FEDERAL USERS AND NEW 5G BROADBAND OPERATORS AND MINIMIZE ADMINISTRATIVE BURDENS, INEFFICIENCIES, AND OPERATIONAL IMPACT ON ALL USERS.

A. Spectrum sharing, rather than clearing, is the only practical solution to meet both military and commercial ongoing spectrum needs.

The Commission requests comments on whether clearing the 3.45 GHz band of federal operations for exclusive commercial use is feasible and whether limited sharing through geographic coordination zones could accelerate commercial availability of the band.² Federated

² FNPRM at para. 44.

Wireless commends DoD’s efforts to explore how it can minimize operations in the band and its willingness to establish a spectrum-sharing framework that will allow both ongoing U.S. military operations to meet national security requirements, as well as the introduction of 5G services by the commercial sector.

While Federated Wireless is encouraged by DoD’s assessment that it can minimize operations in the band, we also recognize that clearing the band will be time-consuming, disruptive, and costly.³ NTIA and DoD have both noted that clearing the 3.1-3.55 GHz band completely will be impractical and would put U.S. national security at risk.⁴ To that end, NTIA and DoD have recognized that sharing of this and other federal bands will be a necessary reality.

As Federated Wireless and others have previously noted, pursuing legacy clear-and-auction approaches, including those that rely on manual coordination to facilitate limited sharing, can lead to years-long delays in the time-to-market of valuable spectrum. Such delays would be particularly costly given the urgent need for additional mid-band spectrum to support burgeoning 5G services. For example, the time-to-market for the 700 MHz band, which was authorized using traditional licensing techniques, is an important data point in comparison with sharing-based repurposing. For the 700 MHz band, the lag between the auction, the adoption of service rules, the standards setting work (Band 12 and 17 issues) and the development of technology to support the uses desired by the auction winners, took more than 18 years—and counting—to bring to market.⁵ Finding the most efficient and least disruptive sharing framework will,

³ Federated Wireless reiterates its concerns that if federal operations vacate the 3.45 GHz band and are relocated to the CBRS band, the utility of the CBRS spectrum, including recently purchased PALs, will be impaired due to increased DPA activations.

⁴ See Letter from Charles Cooper, Associate Administrator, NTIA, to Ronald Repasi, Acting Chief of OET, FCC and Donald Stockdale, Chief WTB, FCC WT Docket No. 19-348 (filed Sept. 8, 2020) (“NTIA Letter”); 2020 Department of Defense Electromagnetic Spectrum Superiority Strategy (October 2020) available at: .

⁵ The FCC first proposed to reallocate 700 MHz spectrum for wireless use in 1997 (Upper 700 MHz) and 2001 (Lower 700 MHz). Following protracted FCC proceedings, numerous auctions, and the creation of non-

therefore, be the most critical component of any plan to make this spectrum available for commercial 5G use.

B. Leveraging the existing CBRS sharing and coordination framework is the most efficient and expedient way to facilitate access to critical mid-band spectrum.

The most efficient and least risky coordination regime for the 3.45 GHz band, and the one that most quickly makes available crucial mid-band spectrum for 5G operations, would be one that leverages the existing automated dynamic shared spectrum solution developed for the adjacent CBRS band. The CBRS SAS is specifically designed to minimize coordination burdens on both incumbent federal and new commercial users. Once protection criteria are established for each class of user, the SAS could calculate within minutes the required separation distances and power levels to enable coexistence and minimize mutual interference. Should any adjustments to the protection criteria (either more or less stringent) be deemed necessary or appropriate, the SAS could automatically implement such changes on a regional or even nationwide basis within a matter of hours. The ability of the SAS to adapt to the environment and uses as time and experience demands is particularly important for ensuring federal operations can continue unimpeded. Were unexpected problems to occur, implementing adjustments in a manual coordination regime, by contrast, would be exceedingly burdensome and time-consuming, and put incumbent federal users' flexibility to operate as needed at risk.

With its distributed, cloud-based architecture the CBRS SAS is able to quickly address interference issues through its administration of the local spectrum environment and its ability to process and respond to interference reports and to unexpected spectrum demands. In the event of interference events, the SAS is also able to direct offending base stations to alter or cease

interoperable standards between 3GPP Band Classes 12 and 17, 700 MHz Lower A Block spectrum still has not been fully deployed for commercial wireless use nearly two decades later.

operations on a real-time basis. Such real-time adjustment based on new information or updated protection criteria and/or equipment standards will be far more efficient than what would be possible under a manual coordination regime.⁶

Manual network planning and coordination with each of the future licensees of the 3.45 GHz band will take months, will require significant resources, and may lead to inconsistent and inefficient outcomes. For example, the AWS-3 band, which relies on manual sharing processes, has faced substantial delays in commercial availability. After the FCC adopted a requirement for individual commercial operators to reach coordination agreements directly with incumbent federal users in 2014, the transition remains incomplete to this day six years later. On the other hand, leveraging the automated cloud computing capability of the SAS would greatly reduce the burdens of manual coordination and would significantly accelerate the deployment of new 5G services into this band.

C. Use of the SAS to manage sharing, not manual coordination, will ensure consistency and predictability for all users while ensuring federal incumbent users are able to access spectrum where and when they need it to meet their mission requirements.

There is no reason that the sharing framework between commercial 3.45 GHz licensees and federal users could not be based on Cooperative Planning Areas and Periodic Use Areas, as defined by DoD and NTIA in their September 8, 2020 letter to the Commission.⁷ However, it would be far more efficient to pre-define the protection requirements for each class of user and allow the SAS to implement and enforce on a consistent, predictable basis the operating

⁶ It is worth noting that this automated coordination process can be accomplished without any changes to commercial 5G equipment. Other than support for a simple application programming interface (“API”), commercial 5G equipment would be identical to what would otherwise be used under the rules proposed in the FNPRM. The massive size of the CBRS equipment ecosystem highlights that there are no burdensome requirements or added equipment costs associated with SAS interaction and interference management.

⁷ NTIA Letter at Enclosure 1, Enclosure 2. These areas could be added to the list of Protection Zones covered by §96.15 of the Part 96 rules.

parameters necessary to ensure co-existence in areas where commercial and federal operations are co-primary.

Similarly, when federal operations need to access spectrum on a priority basis, the SAS will quickly and efficiently adjust commercial operations for the specific time, bandwidths, and locations needed to enable DoD to maintain military readiness and national security. In the CBRS band, the SAS ensures federal users unfettered access to the necessary spectrum within five minutes. It would be unrealistic to expect manual coordination to produce similar results. An automated approach will minimize the administrative burdens and uncertainty that would certainly come from any framework that relied on manual coordination.

Use of a SAS to coordinate federal and commercial operations would also address concerns related to a National Emergency, ensuring federal users are able to meet their operational mission requirements. Whether through use of the Environmental Sensing Capability (“ESC”) network of sensors developed for the CBRS, a portal-based notification system, or a future incumbent informing capability (“IIC”) as contemplated by NTIA, federal users would be able to rely on the SAS to inform commercial users of the need to cease or adjust operations, whether on a local, regional or national basis. There is no more efficient way than through use of the SAS to coordinate any necessary adjustments to commercial use and ensure that federal use is prioritized in a timely and accurate manner.

D. Leveraging the existing SAS coordination processes will ensure both federal and commercial operations can be assured of operational security.

The Commission requests comment on what information would need to be exchanged by 3.45 GHz operators and federal users to effectuate the proposed sharing framework and whether there would be security concerns.⁸ Over a year of real-world experience in the CBRS band has

⁸ FNPRM at para 46.

shown that sensitive, classified information need not be shared on a widespread basis to enable effective sharing between military and commercial operations.

For example, CBRS SAS administrators and ESC operators have implemented efficient security mechanisms in the form of OPSEC (OPerational SECurity),⁹ per DoD requirements, and COMSEC (COMmunication SECurity),¹⁰ per industry requirements, to protect classified DoD assets as well as commercially sensitive information regarding industry operations. According to these OPSEC requirements, SAS administrators and ESC operators may not identify the exact location of incumbent federal radar operations (e.g., by triangulation), nor may they store data regarding frequency, time, and activity level of the relevant federal radars. Moreover, the SAS has been designed to prevent CBRS users from making probabilistic inferences about incumbent activity based on received authorizations, obfuscating federal radar activity. To ensure secure communications between the SAS and CBRS users, and to prevent unauthorized users from communicating with the SAS or performing denial of service (DoS) or distributed DoS (DDoS) attacks against Internet-connected SAS interfaces, the CBRS industry requires all interactions to be secured using carefully crafted digital signatures, as provided by approved certification authorities.

These same security capabilities can be readily applied to the 3.45 GHz band to ensure that ongoing federal operations remain protected and secure, while facilitating sharing between military and commercial operations. Automated systems, such as the SAS and the future IIC, will provide greater levels of operational security than would manual coordination where human intervention is required. Given the significant collaboration between the public and private

⁹ WINNF-TS-0071-V1.0.0 CBRS Operational Security.

¹⁰ WINNF-TS-0065-V1.2.0-r5.1 (towards V1.3.0) CBRS Communications Security Technical Specification.

sectors that led to the development of these automated security measures, the Commission would be wise to extend them to operate in both the CBRS and adjacent 3.45 GHz bands, where they can be readily applied or easily adapted to meet the needs of both federal incumbents and new commercial users.

E. Inefficient static exclusion zones should be avoided to maximize spectrum access for commercial systems, while aggregate interference impact from commercial systems should be considered when establishing and enforcing protection criteria for federal systems.

The Commission asks for comment on the protection levels that should be established between federal and commercial users.¹¹ Experience from the CBRS band can again be instructive. Federated Wireless has found that Citizens Broadband Service Devices (“CBSDs”) using LTE technology are able to maintain connectivity with end user devices when at least one kilometer away from incumbent radar systems, although degradation in throughput can and does occur at such distances. Unless modifications to standard equipment design are made, such as use of complex filters, throughput degradation will be difficult to avoid at closer distances.

Radar operations, on the other hand, are more susceptible to interference from commercial operations at even greater distances. Given our experience in the CBRS band, the transmission parameters of all CBSDs deployed within 1-12 kilometers of inland military bases where radar operations occur, depending on frequency channel, area morphology, and transmission power, must be managed by the SAS to avoid harmful interference to military operations. The transmit power levels proposed in the FNPRM for the 3.45 GHz band would exacerbate the impact of commercial operations on federal radars, requiring even larger separation distances. Were a one-size-fits-all exclusion zone approach used, commercial access to spectrum near military bases could be unnecessarily constrained. Management of future

¹¹ FNPRM at para. 51.

commercial 3.45 GHz operations by the SAS, which takes into account local RF conditions, will be important in order to avoid creating overly conservative exclusion zones near bases where military operations will continue in the 3.45 GHz band.

In light of these concerns, the Commission has previously found that prescribing pre-defined “separation distances based on a worst case scenario without considering factors such as the actual technical characteristics” of the operations in a particular band may produce a result that is “spectrally inefficient and overly conservative.”¹² Indeed, the “adoption of static protection zones based on worst case assumptions would overprotect” incumbents at the expense of new uses in shared bands and “would effectively prohibit new deployment in some geographic areas without any demonstration that such deployments would actually cause interference to individual incumbent stations. Such an approach would be inconsistent with the Commission’s goals as it would be likely to impede innovation and erect barriers to efficient use.”¹³ Conversely, the Commission has previously recognized that a SAS-administered model that accounts for “real-world deployment conditions” and calculates “interference effects based on average measurements will present a more realistic picture of the actual RF environment for the purpose of determining protection of incumbent systems.”¹⁴

Furthermore, in the CBRS band, aggregate interference protection levels have been established to ensure that the collective impact to federal incumbent users from commercial operations does not exceed a certain threshold. Without the use of a SAS to calculate aggregate interference from 3.45 GHz operations, it would be nearly impossible for the DoD to negotiate

¹² *Office of Engineering and Technology Seeks to Supplement the Incentive Auction Proceeding Record Regarding Potential Interference Between Broadcast Television and Wireless Services*, Public Notice, ET Docket No. 14-14, GN Docket No. 12-268, 29 FCC Rcd 712, 715 (OET 2014).

¹³ *Amendment of the Commission’s Rules With Regard to Commercial Operations in the 3550-3650 MHz Band*, GN Docket No. 12-354, Order on Reconsideration and Second Report and Order, FCC 16-55, at para. 254 (2016).

¹⁴ *Id.* at paras. 106, 250.

individually with new commercial users and ensure that their systems will be protected. And, without SAS calculations and the SAS's knowledge of the location and operating parameters of the radios it is managing, were interference to occur, it would be particularly difficult and time-consuming to identify which of the 3.45 GHz commercial systems was the cause of the problem. The Commission should therefore take advantage of the availability of the SAS as a readily implementable mechanism to ensure that federal incumbent operations are adequately protected while avoiding artificial and unnecessary constraints on spectrum availability for commercial users.

F. The CBRS ESC should be used as a transition tool to accelerate access to the 3.45 GHz band while an IIC is developed, tested, and deployed.

Federated Wireless appreciates the efforts of NTIA and DoD to develop an IIC, which may ultimately replace the existing ESC and portal-based notification systems used in the CBRS band.¹⁵ While that development work continues, however, Federated Wireless recommends that the current ESC network be extended to cover the 3.45 GHz band. Not only will extension of the ESC network provide near-term access to this spectrum, it can also serve as a transition tool as the IIC is completed and rolled-out.

As everyone is all too aware, slips in schedule for new technologies and systems occur frequently. It would behoove us to anticipate similar challenges in the development of the IIC. Leveraging an already existing and robust ESC capability that can be readily retrofitted with wider RF front-ends to extend detection coverage across the 3450-3650 MHz band would be a prudent approach and provide greater surety that this spectrum can be used on a commercial

¹⁵ See Howard Buskirk, *Working With DOD, NTIA Developing More Sophisticated Sharing Spectrum System*, Communications Daily (Oct. 19, 2020), available at: <https://communicationsdaily.com/news/2020/10/19/Working-With-DOD-NTIA-Developing-More-Sophisticated-Sharing-Spectrum-System-2010160062>.

basis in the timeframes envisioned in this proceeding, if not sooner. The existing ESC sensors are already certified to detect multiple types of radar waveforms, and the modifications needed to extend them to cover the adjacent band would not be difficult or time-consuming. Furthermore, reliance on an extended ESC network may provide DoD with more operational flexibility, reducing the need to minimize its operations near the coasts as it deploys and tests new technologies and systems in an effort to “modify its concepts of operations for testing and training”¹⁶ for the 3.45 GHz band.

III. USE OF THE SAS TO COORDINATE COMMERCIAL USE OF THE 3.45 GHZ BAND WILL MINIMIZE INTERFERENCE TO AND FROM ADJACENT CBRS BAND OPERATIONS.

A. Without coordinated management, adoption of the proposed technical rules for the 3.45 GHz band will result in harmful interference to both CBSD and ESC operations in the CBRS band.

As many commenters have already noted, were the Commission to move forward with proposed technical rules for the 3.45 GHz band, the success of the adjacent CBRS band will be jeopardized.¹⁷ The asymmetrical transmit power and out of band emissions (“OOBE”) limits, together with uncoordinated TDD operations, are likely to result in interference from 3.45 GHz emitters to CBSDs in the lower 50 MHz of the CBRS band, impacting Priority Access Licensees (“PALs”) and ultimately reducing spectrum availability for General Authorized Access (“GAA”) users as PALs are relocated to the upper part of the CBRS band. Under certain circumstances, there is also a risk of interference from CBRS emitters to 3.45 GHz operations absent effective coordination. Leveraging the SAS and the CBRS sharing framework would avoid these

¹⁶ See NTIA Letter at 2.

¹⁷ See Letter from CBRS Alliance, WT Docket 19-348 (filed Sept. 31, 2020); *See also* Letter from WISPA, WT Docket 19-348 (filed Sept. 17, 2020); Letter from NCTA, WT Docket 19-348 (filed Oct. 26, 2020).

unfortunate outcomes and aid in maximizing the utility and success of both the 3.45 GHz band and the CBRS band.

Recently, the C-Band Technical Working Group on 5G/Citizens Broadband Radio Service Coexistence (“TWG4”) submitted a study of challenges associated with CBRS and future 3.7 GHz operations, the technical rules for which are nearly identical to those proposed for the 3.45 GHz band.¹⁸ TWG4 concluded that unsynchronized operations would likely “mutually degrade the performance” of both 3.7 GHz and CBRS networks.¹⁹ The same challenges identified by TWG4 will also exist at the band edge between the 3.45 GHz band and CBRS under the proposed rules. Given that both bands will likely see TDD network deployments, there is a significant risk of asymmetrical blocking and/or OOB-related noise rise interference between nearby CBRS and 3.45 GHz base stations operating on adjacent channels when the TDD timing is not identical at both sites.

The proposed 3.45 GHz band OOB limit also presents a disruptive challenge to CBRS operations. Within the CBRS band, the OOB limits are:

- -13 dBm/MHz within 10 MHz from the operating channel edge;
- -25 dBm/MHz up to 20 MHz away from band edges (i.e., down to 3530 MHz or up to 3720 MHz); and
- -40 dBm/MHz more than 20 MHz away from band edges (below 3530 MHz and above 3720 MHz).

The proposed OOB requirement for the 3.45 GHz band, however, is -13 dBm/MHz regardless of the frequency offset. Such asymmetry will likely lead to OOB from 3.45 GHz band operations causing a rise in the noise floor in the lower portion of the adjacent CBRS band and an accompanying impairment of CBSD operations in 3550-3600 MHz.

¹⁸ See Letter from the C-Band Technical Working Group 4 (TWG-4) on 5G/CBRS Coexistence, WT Docket 18-122 (filed Oct. 12, 2020).

¹⁹ *Id.*

Furthermore, without appropriate coordination, CBRS ESC sensors could be impaired by higher power 3.45 GHz band operations, either due to overload or front-end desensitization. In such a scenario, a SAS would be forced to “activate” the affected dynamic protection area (“DPA”), unnecessarily eliminating all access to the lower 100 MHz of the CBRS band in the affected DPA neighborhood. Without knowledge of the location and operating parameters of the 3.45 GHz band emitters, the SAS will have no way to accurately model or manage this interference contribution to DoD operations. Even if such modeling were feasible, the higher OOB contribution from 3.45 GHz band is likely to limit the utility of CBRS spectrum at 3550-3600 MHz because such OOB will increase the noise floor in the lower portion of the CBRS band, such that the aggregate interference protection threshold at which the SAS must protect DoD radars will be reached more readily.

B. Extension of the CBRS sharing framework will enable industry-led solutions for TDD synchronization to be implemented, rather than mandating technology-specific solutions.

As TWG4 described, the asymmetric transmit power and OOB limits between 3.7 GHz and CBRS will be exacerbated by a lack of TDD system synchronization between networks operating in each band. The same holds true for the 3.45 GHz band and CBRS under the proposed rules. The CBRS SAS stands ready to solve this problem by leveraging what is already established for TDD configuration alignment within the CBRS band. In order to facilitate the introduction of TDD system synchronization in the CBRS band, the CBRS industry (through the CBRS Alliance) developed protocols and coexistence specifications regarding a number of critical issues, including cell phase synchronization, TDD configurations, PAL/GAA channelization, and SAS-CBSD protocol extensions.²⁰

²⁰ CBRS Coexistence Technical Specifications, CBRS-TS-2001, V3.0.0 (Feb. 18, 2020), available at: https://www.cbrsalliance.org/wp-content/uploads/2020/02/CBRS-TS-2001-V3.0.0_Approved-for-publication.pdf.

By agreeing in advance to a set of preferred TDD configurations and a process for determining which configuration should be implemented, the CBRS industry greatly reduced the expense and complexity associated with peer-to-peer manual coordination and avoided the inefficiencies associated with mandatory guard bands and separation distances. These solutions can be readily adapted to enable similar coordination between CBRS and new 3.45 GHz users, avoiding much of the interference that is anticipated without adequate coordination under the proposed rules. Extending the CBRS framework and Part 96 rules to the 3.45 GHz band will be the most expedient way to accomplish this and will allow industry to develop appropriate solutions for synchronization, rather than placing the Commission of making a predictive judgment about the technologies and deployment scenarios to be used in the 3.45 GHz band for purposes of prescribing a synchronization requirement.

IV. A HOLISTIC APPROACH TO THE LOWER 3 GHZ BAND RULES WILL MAXIMIZE SPECTRUM ACCESS FOR ALL COMMERCIAL USERS AND ACCELERATE THE DEVELOPMENT AND DEPLOYMENT OF 5G SYSTEMS AND SERVICES.

A holistic approach to managing 3 GHz spectrum would achieve two important objectives, namely: 1) supporting ongoing federal spectrum needs using a proven, automated coordination regime; and 2) accelerating and maximizing spectrum access by commercial users for a wide variety of 5G services and use cases. Supporting federal operations through use of the SAS is addressed above. Here we will focus on the opportunities for more effective use of the lower 3 GHz band and CBRS by commercial users.

As the Commission looks to establish technical and service rules for additional 3 GHz frequencies, it is essential to consider the impact of new operations on both federal incumbents and on other commercial users. The opportunity exists not only to avoid problems caused by technical rule silos, but also to revisit current rules and identify where improvements can be

made that would increase utility of this critical spectrum for all users. Consideration of the technical rules for the entire 3 GHz band will enable the Commission to arrange use of nearly 1 GHz of spectrum in a manner that will:

- a) Minimize disruption to commercial users when and where federal users need priority;
- b) Provide additional operational flexibility for commercial users, such as higher transmit power levels;
- c) Facilitate co-existence among commercial users within the band and with adjacent C-Band users; and
- d) Simplify 5G equipment design and network planning.

As a first step, Federated Wireless recommends extension of the CBRS sharing framework and Part 96 rules to the 3.45 GHz band. At a later point, inclusion of 3.1-3.45 GHz may also be possible. Once the bands are part of the same sharing scheme and subject to the same technical rules, the Commission can reevaluate the Part 96 rules to determine where the opportunity exists for improvement, including: a) adding a new device class that would permit higher transmit powers in certain blocks and/or incumbency situations; b) aligning OOB limits across 3.45 GHz, CBRS, and C-Band; and c) rearranging the band in a manner that would minimize disruption to licensed blocks from incumbent operations and maximize opportunities for network synchronization as well as equipment design and deployment. Together, these optimizations will improve the use of the entire 3 GHz band for commercial 5G systems without compromising federal operations.

A. Adding a new device class to the Part 96 rules that permits higher transmit power levels will reduce deployment costs and improve coverage.

Commercial access to the 3.1-3.7 GHz band could be improved by allowing higher transmit power than what is currently permitted under the CBRS rules. Such increased transmit power should greatly reduce deployment costs, particularly in rural and under-served areas.

AT&T has already petitioned the FCC to allow for such higher power operations in the CBRS

band by creating a third device class (“Category C”) in recognition of the opportunity to improve coverage in parts of the country.²¹ Federated Wireless supports this and similar proposals to permit higher transmit power in the combined CBRS and 3.45 GHz bands in a manner that will not negatively impact incumbent federal systems, adjacent band operations, or other CBRS users. The SAS capabilities can be leveraged to manage such higher power operations, minimize interference, and facilitate co-existence.

In addition, permitting higher transmit powers would ameliorate the performance degradation of CBRS devices near the 3.7 GHz band edge that are anticipated as a result of the current power level mismatch and associated saturation/blocking effects between the bands.

B. Harmonizing OOB limits across the 3 GHz band will simplify 5G device design and network planning.

Aligning OOB limits across the 3.45-3.55 GHz, CBRS, and 3.7 GHz bands would provide a wide range of benefits for U.S. 5G deployments, including enabling wider channels, simpler device designs, and increased scale of equipment manufacturing. The current, more stringent, CBRS OOB limits were adopted to protect the fixed satellite service (“FSS”) operations above 3.7 GHz, federal operations in 3.50-3.55 GHz, and ground-based radars below 3.5 GHz.²² Given that the FSS systems in operating in the 3.7 GHz band will be relocated to above 4.0 GHz and that federal systems in 3.50-3.55 GHz are also anticipated to be relocated, relaxation of the CBRS OOB limits may be possible without impacting adjacent band and/or co-channel operations.²³ The introduction of a uniform OOB framework for 3.1-3.7 GHz band,

²¹ Letter from Stacy Black, AT&T to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-354 (filed May 19, 2019); *see also* Petition for Reconsideration of CTIA, GN Docket No. 12-354, 7-8 (filed July 23, 2015).

²² *See In the Matter of Amendment of the Commission’s Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, GN Docket No. 12-354. Report and Order, FCC 15-47, paras. 178, 189 (rel. Apr. 21, 2015).

²³ In the event that relaxation of OOB limits in 3.1-3.7 GHz results in a negative impact to federal operations, the SAS can adjust commercial operating parameters to mitigate interference.

together with 3.7 GHz, will lead to much more efficient utilization of the entire 3 GHz band for 5G systems.

C. Consolidating licensed blocks in the upper part of the CBRS band could minimize disruption to PAL users from federal operations while facilitating coordination and co-existence with future 3.7 GHz licensees.

With the addition of the 3.45 GHz band to the CBRS Part 96 rules, current PALs and future licensed blocks could be transitioned to sub-bands where federal systems operations are less frequent, such as the upper part of the CBRS band. By moving licensed operations to the upper part of the band immediately adjacent to the 3.7 GHz band, licensees would be able to take better advantage of carrier aggregation, simpler device designs, easier RF planning, and increased scale of equipment manufacturing. Moreover, service interruptions from military operations to licensed users would also be reduced. Opportunistic access in the GAA tier could be consolidated in the lower 3 GHz sub-bands, where military operations are more likely to occur. While service interruptions might be more likely in these sub-bands in certain locations, such disruption can be balanced out by an overall increase in the amount of spectrum available for GAA and by the minimization of temporary PAL reassignments.

V. EXTENDING THE CBRS LICENSING RULES WILL MAXIMIZE SPECTRUM EFFICIENCY AND ACCESS TO SPECTRUM BY THE WIDEST POSSIBLE RANGE OF USERS.

As demonstrated above, use of the SAS developed for the CBRS band to coordinate use of the 3.45 GHz band and, in the future, the entire 3 GHz band will best facilitate robust, efficient, near-term access to this spectrum while ensuring federal incumbent users continue to have the priority, protected access they need to meet their mission requirements. Given the success we have seen in the CBRS band, with nearly 100,000 CBSDs deployed since GAA operations were authorized and 228 different entities acquiring PALs in Auction 105, Federated

Wireless recommends that the Commission not only leverage the SAS to coordinate new commercial use of the 3.45 GHz band, but that the Part 96 CBRS service rules be extended to incorporate the 3.45 GHz band to maximize the benefits of harmonizing the approach to use of this critical mid-band spectrum.

Extension of the Part 96 rules could include allocating part of the spectrum for PALs and part for GAA use, adopting 10 MHz, county-wide license, extending the “use-it or share-it” rules, and replicating the streamlined secondary market process administered by the SASs. Such an approach would promote efficiency, robust deployment, and flexibility for the widest range of prospective 5G operators and use cases, as opposed to “reverting back to the same-old, same-old” exclusive licensing approach.²⁴ It will also facilitate the optimization of the 3.1-3.7 GHz band by creating inter-changeable blocks to allow for spectrum assignment adjustments that are responsive to the specific circumstances in a particular geography and at a particular time.

VI. CONCLUSION

Federated Wireless applauds the Commission for its efforts to make additional mid-band spectrum available for commercial broadband services and its recognition of the importance of maximizing spectrum efficiency, usage, and access. The best way to address the challenges the Commission faces in this proceeding and to maximize the opportunity for 5G development and leadership is to leverage an already proven and readily available solution, namely the automated dynamic shared spectrum technology developed for the CBRS band. In fact, extension of the Part 96 CBRS sharing framework is likely the only way to maximize the utility of the entire 3 GHz band for new 5G broadband services, minimize the impact to critical incumbent

²⁴ See Comments of Commissioner Rosenworcel in *Facilitating Shared Use in the 3.1-3.55 GHz Band*, WT Docket No. 19-348, Report and Order and Further Notice of Proposed Rulemaking, FCC 20-138 (rel. Oct. 2, 2020).

operations, and ensure that U.S. remains competitive in the race to 5G. Use of a SAS to manage coordination of the lower 3 GHz band is also the best means to ensure that newly authorized commercial use of the lower 3 GHz band does not result in harmful interference to operations in the adjacent CBRS band, and will provide a tremendous opportunity to maximize use of the greater 3 GHz band for 5G services to the benefit of both U.S. industry and consumers.

Federated Wireless stands ready to assist the Commission in its efforts to ensure that the lower 3 GHz band provides maximal benefits to the U.S. wireless industry, consumers, and the broader economy, and urges the Commission to leverage the SAS and the CBRS sharing framework to deliver these benefits.

Respectfully submitted,

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