

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

In the Matter of )  
Facilitating Shared Use in the 3100-3550 MHz ) WT Docket No. 19-348  
Band )

**COMMENTS OF VERIZON**

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## EXECUTIVE SUMMARY

This proceeding is the result of a laudable all-of-government approach that has resulted in this *Further Notice* to open the 3.45-3.55 GHz band for 5G. It is now the Commission's opportunity to work with DoD and NTIA, and with commercial stakeholders, to craft a cooperative framework and service and technical rules that will quickly unleash 3.45-3.55 GHz spectrum for commercial 5G, while maintaining the critical defense operations that currently use the spectrum. To that end, the public interest will be best served by a straightforward and rapid process that frees up the 3.45-3.55 GHz band for shared commercial access and 5G service under rules that support robust, full-power deployments.

***The 3.45-3.55 GHz Band is Critical for Maintaining U.S. Leadership in 5G.*** With its optimal combination of coverage and capacity, mid-band spectrum is a “sweet spot” for 5G. Reallocating spectrum in the 3.45-3.55 GHz band for shared commercial use and adopting rules that support robust full-power 5G deployments will further harmonize U.S. allocations with global trends to take advantage of the economies of scale in network equipment and consumer devices. This step is critical for U.S. operators to continue to lead in 5G.

***A Coordination Framework Based on the AWS-3 Model is the Right Approach.*** DoD and NTIA have provided a clear vision for the 3.45-3.55 GHz band: commercial 5G deployments, at full-power levels, while still enabling DoD to access the band – where and when necessary – to advance the national security missions. To do so, the Commission should adopt a framework that:

- Reinforces DoD's commitment to minimize operations in the 3.45-3.55 GHz band and to enable the band for full-power commercial use to the maximum extent possible.
- Provides as much transparency as possible, as early as possible, so that commercial operators can understand – at a granular level – the nature of government systems that

will impact 3.45-3.55 GHz commercial operations and the scope of restrictions licensees will face as a result of these ongoing federal uses.

- Creates certainty to the extent possible in order to stimulate investment in spectrum deployments.
- Focuses on simplicity over complex, unproven, or unnecessary mechanisms.

The simplest and most efficient coordination notification mechanism is based on the AWS-3 model. This framework will protect government systems and enable prompt and robust commercial access to the band. At the same time, the Commission should reject any proposal to establish a sensing-based notification mechanism for the 3.45-3.55 GHz band, which would unnecessarily slow down commercial deployments in the band.

***Service and Technical Rules Should Enable Robust 5G Operations.*** We generally support the specific proposals put forward in the *Further Notice* that will provide for a light-touch, flexible use licensing regime and technical rules harmonized with the 3.7 GHz Service. The Commission should adopt the 3.7 GHz Service rules for power levels and out-of-band emissions limits. The Commission should reject calls to extend any 3.5 GHz Citizens Broadband Radio Service (“CBRS”)-specific service or technical rules into the 3.45-3.55 GHz band. In particular, the Commission should not authorize any opportunistic use of the band, which would unnecessarily complicate the deployment of licensed 5G services in the band. As the Commission acknowledged in its Spectrum Pipeline Report to Congress, “[i]t is too soon to know whether other bands may be suitable for licensed or unlicensed use based on the techniques used in the 3.5 GHz band.”

***Non-Federal Secondary Users Should be Relocated – Without Relocation Payments – Prior to License Grants.*** To ensure that the 3.45-3.55 GHz band is put to use as quickly as possible, the Commission should sunset existing secondary operations in the band and should not

deviate from its well-established policy that requires secondary stations to cease operations and relocate at their own expense when a new primary licensee begins operation.

## TABLE OF CONTENTS

|   |    |
|---|----|
| EXECUTIVE SUMMARY .....   | i  |
| I. THE 3.45-3.55 GHz BAND IS CRITICAL SPECTRUM FOR SECURING U.S. LEADERSHIP IN 5G. ....   | 2  |
| II. THE 3.45-3.55 GHz COORDINATION FRAMEWORK IDENTIFIED IN THE <i>FURTHER NOTICE</i> OFFERS A PROMISING APPROACH – IF SUPPORTED BY ADDITIONAL MEANINGFUL STEPS. ....        | 4  |
| A. Commercial Stakeholders Require Pre-Auction Transparency to Evaluate the Government Encumbrances. ....   | 5  |
| B. New Licensees Require Predictability to Encourage the Investment Needed to Deploy Next-Generation 5G Networks. ....  | 7  |
| C. Simple Coordination Will Speed Deployments in the Band. ....   | 9  |
| III. THE FCC SHOULD ADOPT 3.7 GHz-STYLE TECHNICAL AND SERVICE RULES TO SUPPORT ROBUST FULL POWER 5G DEPLOYMENTS. ....   | 11 |
| A. The Technical Rules in the 3.45-3.55 GHz Band Should Align with the 3.7 GHz Rules that are Already Geared Toward Supporting True 5G. ....                                | 11 |
| B. The Licensing Rules Should Promote Investment in Robust Wide-Area 5G Deployments. ....   | 15 |
| IV. NON-FEDERAL SECONDARY OPERATIONS IN THE 3.45-3.55 GHz BAND SHOULD BE SUBJECT TO RELOCATION DEADLINES AND EXCLUDED FROM THE <i>EMERGING TECHNOLOGIES</i> FRAMEWORK. .... | 20 |
| V. CONCLUSION.....  | 22 |

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With this proceeding, the Commission continues to aggressively move forward unleashing mid-band spectrum for 5G and other advanced wireless services. At Verizon, we welcome the opportunity to work with the FCC, DoD, and NTIA to enable commercial access to the 3.45-3.55 GHz band, develop a sound coordination framework to protect remaining federal operations, and auction 3.45-3.55 GHz licenses in 2021.<sup>1</sup>

**I. THE 3.45-3.55 GHz BAND IS CRITICAL SPECTRUM FOR SECURING U.S. LEADERSHIP IN 5G.**

We commend the Commission on a remarkable year of mid-band activity<sup>2</sup> and for this current, critical mid-band initiative: commercial access to the 3.45-3.55 GHz band for licensed, flexible use service. This *Further Notice* is the result of a bipartisan, all-of-government commitment to 5G in the 3 GHz band. In the MOBILE NOW Act, Congress directed NTIA to

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<sup>1</sup> *Facilitating Shared Use in the 3100-3550 MHz Band*, Report and Order and Further Notice of Proposed Rulemaking, 35 FCC Rcd 11078 (2020) (“*Order*” or “*Further Notice*” or “*FNPRM*”).

<sup>2</sup> See, e.g., *Expanding Flexible Use of the 3.7 to 4.2 GHz Band*, Report and Order and Order of Proposed Modification, 35 FCC Rcd 2343 (2020) (“*3.7 GHz Service Order*”); *Auction of Flexible-Use Service Licenses in the 3.7–3.98 GHz Band for Next-Generation Wireless Services; Notice and Filing Requirements, Minimum Opening Bids, Upfront Payments, and Other Procedures for Auction 107*, Public Notice, 35 FCC Rcd 8404 (2020); *Auction of Priority Access Licenses in the 3550-3650 MHz Band Closes; Winning Bidders Announced for Auction 105*, Public Notice, 35 FCC Rcd 9287 (WTB 2020).

study the feasibility of allowing commercial wireless service to share frequencies between 3.1-3.55 GHz.<sup>3</sup> NTIA did just that and found that the 3.45-3.55 GHz band would be the “most promising portion for sharing in the near term.”<sup>4</sup> The White House and DoD launched America’s Mid-Band Initiative Team (“AMBIT”) earlier this year and just 15 weeks later announced a decision to “make 100 megahertz of mid-band spectrum currently used by the military available for sharing with the private sector for use in development of 5G technologies.”<sup>5</sup> We recognize and applaud the leadership and hard work that has led us to this day. The 100 megahertz swath from 3.45-3.55 GHz is the next critical spectrum band for 5G in the United States.

The FCC should promptly reallocate the 100 megahertz in the 3.45-3.55 GHz band on a co-primary basis for non-federal fixed and mobile (except aeronautical mobile) services.<sup>6</sup> As the Commission itself has stated, “[m]id-band spectrum is particularly well-suited for 5G buildout due to its desirable coverage, capacity, and propagation characteristics.”<sup>7</sup> The rest of the world knows this too. As the *Order* and *Further Notice* notes, the International Telecommunication Union (“ITU”) has allocated portions of the 3 GHz band for fixed and mobile use in all three

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<sup>3</sup> Consolidated Appropriations Act, 2018, Pub. L. 115-141, Division P, the Repack Airwaves Yielding Better Access for Users of Modern Services (RAY BAUM’S) Act, Title VI (the Making Opportunities for Broadband Investment and Limiting Excessive and Needless Obstacles to Wireless Act or MOBILE NOW Act); MOBILE NOW Act § 605(a).

<sup>4</sup> *Order* and *FNPRM* ¶ 7.

<sup>5</sup> C. Todd Lopez, *AMBIT Gambit Pays Off, Advances U.S. 5G Efforts*, DOD News (Aug. 10, 2020), <https://www.defense.gov/Explore/News/Article/Article/2306902/ambit-gambit-pays-off-advances-us-5g-efforts/>.

<sup>6</sup> *FNPRM* ¶ 40.

<sup>7</sup> *Id.* ¶ 42.

ITU regions.<sup>8</sup> Australia, Canada, France, Germany, Hong Kong, Italy, Japan, Qatar, South Korea, Spain, Sweden, and the United Kingdom all have auctioned, assigned, or are in the process of auctioning or assigning, spectrum for 5G in the lower 3 GHz range.<sup>9</sup>

Reallocating spectrum in the lower 3 GHz band for commercial use and adopting rules that support robust full-power 5G deployments will harmonize the United States' allocations with global trends to take advantage of the economies of scale in network equipment and consumer devices. The United States cannot afford to be locked out of these global trends as it seeks to maintain its leadership in 5G.

The demand for 5G will require investment, innovation, new deployments, and yes, more spectrum resources. We commend Congress, the Executive Branch, and the FCC for taking action to advance 5G in the lower 3 GHz band.

## **II. THE 3.45-3.55 GHz COORDINATION FRAMEWORK IDENTIFIED IN THE *FURTHER NOTICE* OFFERS A PROMISING APPROACH – IF SUPPORTED BY ADDITIONAL MEANINGFUL STEPS.**

The AMBIT agreement delivers a clear vision for the 3.45-3.55 GHz: commercial 5G deployments, at full-power levels, while still enabling DoD to access the band – where and when necessary – to advance the national security missions. The *Further Notice* states that commercial systems will be entitled to protection against harmful interference from federal operations, except in “enumerated circumstances and locations.”<sup>10</sup> Commercial operations will not be entitled to protection from harmful interference (1) in Cooperative Planning Areas (“CPAs”); (2) in Periodic Use Areas (“PUAs”); and (3) during times of National Emergency.<sup>11</sup>

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<sup>8</sup> *Id.*

<sup>9</sup> *FNPRM* ¶ 42 n.89.

<sup>10</sup> *Id.* ¶ 38.

<sup>11</sup> *Id.* ¶ 45.

The government has provided some information about these circumstances and locations already, but to achieve a successful auction and massive investment and deployments in the band, the coordination framework must be implemented with meaningful information sharing and cooperation.

As an initial matter, we commend DoD’s commitment to minimize operations in the 3.45-3.55 GHz band and to enable the band “for full-power commercial use to the maximum extent possible.”<sup>12</sup> In announcing AMBIT’s agreement on the 3.45-3.55 GHz band, DoD Chief Information Officer Dana Deasy said, “DoD is proud of the success of the AMBIT and is committed to working closely with industry after the FCC auction to ensure timely access to the band while protecting national security.”<sup>13</sup> We look forward to working with DoD, NTIA, and the FCC to make this band a reality for 5G.

As the Commission, NTIA, and DoD consider the specific coordination framework that will make sharing between commercial and federal users in the 3.45-3.55 GHz band a reality, three principles should drive the conversation: transparency, predictability, and simplicity.

**A. Commercial Stakeholders Require Pre-Auction Transparency to Evaluate the Government Encumbrances.**

We support as much transparency as possible, as early as possible, to understand the nature of government operations that will impact 3.45-3.55 GHz commercial operations and the scope of restrictions licensees will need to address as a result of remaining federal operations.

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<sup>12</sup> Letter from Charles Cooper, Associate Administrator, NTIA, to Ronald T. Repasi, Acting Chief, Office of Engineering and Technology & Donald Stockdale, Chief, Wireless Telecommunications Bureau, FCC, at 1 (Sept. 8, 2020) (“NTIA Letter”).

<sup>13</sup> Dana Deasy, Chief Information Officer, DoD, *Department of Defense Statement on Mid-Band Spectrum*, Speech (Aug. 10, 2020) (“Remarks of Dana Deasy”), <https://www.defense.gov/Newsroom/Speeches/Speech/Article/2307288/department-of-defense-statement-on-mid-band-spectrum/>.

To that end, we commend the announcements to date regarding plans for information sharing and coordination. NTIA and DoD intend to hold workshops prior to the auction to receive input from and provide information to industry stakeholders.<sup>14</sup> NTIA indicates that that these workshops will address commercial network planning and deployments in order to minimize impacts from incumbent federal operations on future commercial operations. We welcome that conversation.

But commercial operators will need to understand the systems that DoD will continue to operate in the band and the protection criteria that DoD believes are necessary for those systems in each CPA and PUA. We appreciate NTIA's statement that "[p]rior to auction, NTIA and DOD will develop specific criteria for each CPA. These would include an understanding of the continued DoD operations (radiating), DoD protection criteria (as required), DoD areas of operation, and the affected license areas and blocks."<sup>15</sup> As part of this disclosure, DoD should make available shapefiles (geographic polygons) to reflect the extent of remaining government operations and provide information at a granular level. At a minimum, DoD should disclose which areas are encumbered at a census tract or county level.

In the event that publicly-released transition plans lack key information necessary for potential bidders to accurately value the spectrum, due to the need to protect classified national security information, the FCC, NTIA, and the DoD should implement a process under which trusted agents receive the additional technical data in advance of the auction.<sup>16</sup> Such a process

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<sup>14</sup> NTIA Letter at 3.

<sup>15</sup> *Id.* at Enclosure 2.

<sup>16</sup> *FNPRM* ¶ 46.

would allow for closer cooperation between the DoD and industry stakeholders and lead to more efficient use of this valuable spectrum band.

We also commend NTIA for having already set an April 16, 2021 deadline for affected federal agencies to submit transition plans to NTIA and the Technical Panel.<sup>17</sup> Verizon looks forward to reviewing those transition plans once they are publicly available. Further, we support use of the Spectrum Relocation Fund and auction proceeds to enable the relocation and upgrade of federal systems that transition to accommodate commercial use of the 3.45-3.55 GHz band.<sup>18</sup> The transition plans are a first step to funding those upgrades.

Finally, we support DoD's plan to develop mutually acceptable coordination agreements with individual licensees "to identify methods to further increase the commercial utility of the spectrum" in and around each CPA or PUA.<sup>19</sup> Individual coordination agreements will allow for more efficient use of the spectrum because they can be tailored to meet the requirements of the commercial licensee and DoD for each CPA or PUA.<sup>20</sup>

**B. New Licensees Require Predictability to Encourage the Investment Needed to Deploy Next-Generation 5G Networks.**

Occasional access to the band in PUAs and access "during times of National Emergency" by their nature create uncertainty as to commercial use of the band, and the coordination framework should strive to provide the maximum amount of predictability concerning what

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<sup>17</sup> *Id.*; NTIA Letter at 3.

<sup>18</sup> *FNPRM* ¶ 109 (proposing to set the reserve price for any auction of 3.45-3.55 GHz band licenses at 110% of expected federal relocation costs, based on the estimate of relocation costs provided to the Commission by NTIA under the Commercial Spectrum Enhancement Act).

<sup>19</sup> NTIA Letter at Enclosures 2 & 3.

<sup>20</sup> *FNPRM* ¶ 46.

circumstances and conditions will restrict licensees' access to spectrum.<sup>21</sup> Commercial operators require certainty to stimulate investment in spectrum deployments. So, as an initial matter DoD should confirm that the CPAs and PUAs listed in NTIA's letter represent the total universe of CPAs and PUAs that DoD will require in the contiguous United States.<sup>22</sup>

With regard to the PUAs, commercial licensees should be given as much advance notice as possible before DoD begins operations.<sup>23</sup> DoD has announced that it "will publish expected activation periods, the advanced notice which DoD must provide affected licensees when coordinating the activation of PUAs, and the method of coordinating via advance notification of affected licensees."<sup>24</sup> The coordination and notification requirements should be subject to discussion with stakeholders prior to auction and should be clear and unambiguous so that DoD and commercial entities have a predictable process in place to govern the intermittent and periodic use of the band by DoD.

It is not possible to plan when a national emergency will occur and under what circumstances federal use of commercial spectrum would be exercised. Nonetheless, as part of the NTIA and DoD workshop process, DoD should submit a proposal identifying what constitutes a national emergency for these purposes, notification procedures, which entity can

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<sup>21</sup> *Id.*

<sup>22</sup> Unlike in the 37 GHz band, where the rules allow federal operators to add additional sites in the future, here DoD should identify before the auction all areas that will be affected by CPAs and PUAs and should be limited to those areas once the rules are adopted. *See Use of Spectrum Bands Above 24 GHz For Mobile Radio Services*, Fifth Report and Order, 34 FCC Rcd 2556, 2562 ¶ 16 (2019).

<sup>23</sup> *FNPRM* ¶ 47 (seeking comment on the appropriate coordination regime).

<sup>24</sup> NTIA Letter at Enclosure 3.

invoke the procedures, the scope of activity, and the time period to suspend or modify commercial operations.<sup>25</sup>

### **C. Simple Coordination Will Speed Deployments in the Band.**

An overarching goal of the AMBIT process is to “ensure timely access to the band while protecting national security.”<sup>26</sup> To speed the deployment of commercial 5G systems in the band, the FCC, NTIA, and DoD should avoid unnecessary complexity in the coordination framework. Simplicity should be the driving factor in decisions on the coordination framework. It would be contrary to the public interest to adopt an experimental and unnecessary framework that would increase uncertainty and the amount of time it takes for providers to deploy 5G in the band.

The simplest and most efficient coordination mechanism is based on the AWS-3 model.<sup>27</sup> Dana Deasy, DoD Chief Information Officer, announced that DoD expects the FCC to adopt rules that are “similar to AWS-3, where for the most part the spectrum will be available for commercial use without limits, while simultaneously minimizing impact to DoD operations.”<sup>28</sup> The static-oriented framework will protect federal systems and enable prompt and robust commercial access to the band.

The FCC should reject any proposal to establish a sensing-based notification mechanism for the 3.45-3.55 GHz band.<sup>29</sup> For example, the development and use of the Environmental

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<sup>25</sup> FNPRM ¶ 53.

<sup>26</sup> Remarks of Dana Deasy.

<sup>27</sup> *The Federal Communications Commission and the National Telecommunications and Information Administration: Coordination Procedures in the 1695-1710 MHz and 1755-1780 MHz Bands*, Public Notice, 29 FCC Rcd 8527 (WTB 2014) (setting forth the joint NTIA-FCC procedures governing the coordination of the 1695-1710 MHz and 1755-17080 MHz bands).

<sup>28</sup> Remarks of Dana Deasy.

<sup>29</sup> FNPRM ¶ 51 (seeking comment on what “sensing or notification-based mechanisms would facilitate successful and automated coordination between federal and non-federal operations”).

Sensing Capability (ESC) as part of the 3.5 GHz CBRS band provides insight as to why a sensing-based mechanism is not the best approach here. First, it took many years to develop and test the ESC. The nation does not have years to wait on 5G deployments in the 3.45-3.55 GHz band. U.S. providers need access to this spectrum as quickly as possible to maintain leadership in 5G. Second, the ESC in the CBRS band is limited to particular geographic areas along the coast. A sensing-based notification mechanism in the 3.45-3.55 GHz band would impact significantly more geography, which would be far more challenging to implement. Such a sensing mechanism would involve a huge number of sensors, closely spaced in order to accurately characterize incumbent usage. Thus, the sensing mechanism is a complicated, imprecise method of protecting incumbent operations. These complexities have been borne out by the use of the ESC in the real world, which has led to challenges for commercial operators seeking to deploy in markets near protected areas. In fact, at a recent industry event a representative of an ESC operator suggested that the ESC be scrapped altogether in favor of an incumbent-informing system.<sup>30</sup> A better and more straightforward approach is to build a network based on signal threshold at a geographic boundary.

Rather than developing a sensing-based notification mechanism, or attempting to shoehorn the existing and problematic ESC into the 3.45-3.55 GHz band,<sup>31</sup> NTIA, DoD, and the

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<sup>30</sup> Andrew Clegg, Spectrum Engineering Lead, Google, Remarks at the Federal Communications Bar Association’s Wireless Telecommunications Committee webinar titled “Commercial Wireless in the 3.45-3.55 GHz Band” (Oct. 13, 2020); *see also* Joan Marsh, *Gambling with our 5G Future*, AT&T Blog (Oct. 19, 2020, 11:45AM) (“In a recent panel discussion, one industry expert argued that the entire [ESC] system should be scrapped. It turns out that DSS may not be so dynamic after all. In short, DSS is far from ready for 5G prime time.”).

<sup>31</sup> *FNPRM* ¶ 52 (seeking comment on whether sensing and notification-based mechanisms used in the 3.5 GHz band also be used in this band to enable successful coordination between federal and non-federal operations in the 3.45-3.55 GHz band).

FCC should adopt a straightforward, easy to implement coordination regime as envisioned by AMBIT.<sup>32</sup> This will ensure that this valuable spectrum can be redirected to support 5G deployments as soon as possible.

We expect that the workshops, followed by mutually acceptable coordination agreements with licensees, will deliver a cooperative framework to facilitate 5G deployments while protecting federal systems. CPAs in particular are well suited to AWS-3 coordination-type procedures. Meanwhile, PUAs will be used by DoD on a periodic basis and as such, may be well-suited to an incumbent-informing approach, under which DoD would provide licensees with advance notice that it intends to activate service in a PUA. Such an approach, however, even if automated, need not delay commercial use of the 3.45-3.55 GHz band.<sup>33</sup>

### **III. THE FCC SHOULD ADOPT 3.7 GHz-STYLE TECHNICAL AND SERVICE RULES TO SUPPORT ROBUST FULL POWER 5G DEPLOYMENTS.**

#### **A. The Technical Rules in the 3.45-3.55 GHz Band Should Align with the 3.7 GHz Rules that are Already Geared Toward Supporting True 5G.**

The Commission is right to align the technical rules in this band with the 3.7 GHz technical rules to promote maximum flexibility for 5G deployments.<sup>34</sup> And the Commission should steer clear of restrictive rules that would limit the suitability of the band for large-scale 5G deployments or otherwise negate equipment harmonization and carrier aggregation

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<sup>32</sup> Remarks of Dana Deasy.

<sup>33</sup> *FNPRM* ¶ 53 (noting that NTIA is considering “the development [of] an automated, real-time, incumbent-informing spectrum sharing system (‘incumbent-informing system’) that NTIA would operate in conjunction with DoD to notify commercial entities when the latter would need to cease operations” (citation omitted)).

<sup>34</sup> *Id.* ¶ 72.

opportunities across the 3.7 GHz and 3.45-3.55 GHz services. Specifically, the Commission should adopt the following technical rules:

***Power Limits for Base and Mobile Stations.*** We agree with the Commission that base station limits of 1640 watts and 3280 watts of equivalent isotropically radiated power (“EIRP”) per megahertz in non-rural and rural areas, respectively, are appropriate for the 3.45-3.55 GHz band.<sup>35</sup> These limits will support robust deployment of 5G services in the band, and the higher power level in rural areas will promote broader coverage by extending the reach of cell site deployments. The Commission should reject its alternative base station power limit proposal that would be a “mix and match” of conducted power and EIRP.<sup>36</sup> Setting the limit solely based on EIRP is a technology neutral approach and is all that is necessary because EIRP provides the clearest method to determine the interference impact to a receiver. The Commission should also adopt 1 Watt EIRP as the maximum power limit for mobile stations consistent with the 3.7 GHz Service rules, which will ensure that a wide range of devices can be developed and deployed in the band.<sup>37</sup>

***Base Station Out-of-Band Emissions.*** The OOBE limit for the 3.45-3.55 GHz band should be -13 dBm/MHz at the authorized channel edge and beyond the band edge, consistent with the 3.7 GHz Service. As the Commission explained for 3.7 GHz Service operations, the -13 dBm/MHz OOBE limit is “widely accepted as being adequate for reducing unwanted emissions into adjacent bands.”<sup>38</sup> This limit is “consistent with the emission limits [the Commission has]

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<sup>35</sup> *Id.* ¶ 73.

<sup>36</sup> *Id.* ¶ 74.

<sup>37</sup> *Id.* ¶ 76.

<sup>38</sup> *3.7 GHz Service Order*, 35 FCC Rcd at 2471 ¶ 344.

established for other mobile broadband services and the emission limits established for 5G technologies by standards bodies.”<sup>39</sup> The proposed graduated emissions mask beyond the band edge is not necessary to protect operations in adjacent frequencies. Unlike the 3.5 GHz band that used a graduated emissions mask to protect Fixed Satellite Service stations in the adjacent band, the 3.45-3.55 GHz band has no such constraints. And, with respect to federal operations, commercial mobile operations in most areas where critical military operations might occur in the adjacent band will already be identified under the coordination framework, and thus a more restrictive OOB limit in the 3.45-3.55 GHz band is not needed. Ultimately, more stringent, graduated limits will only serve to isolate the U.S. equipment market and make U.S. infrastructure and devices more expensive and service more costly for consumers.

***Mobile Out-of-Band Emissions.*** The OOB limit for the 3.45-3.55 GHz band should be -13 dBm/MHz at the authorized channel edge. The Commission should also relax the emission limit within the first five megahertz of the channel edge by varying the resolution bandwidth used when measuring the emission, as it did with the 3.7 GHz Service rules.<sup>40</sup> For emissions within 1 megahertz from the channel edge, the minimum resolution bandwidth would be either one percent of the emission bandwidth of the fundamental emission of the transmitter or 350 kilohertz. In the bands between one and five megahertz removed from the licensee’s authorized frequency block, the minimum resolution bandwidth would be 500 kilohertz.

***Field Strength Limit.*** Consistent with the 3.7 GHz Service rules, the Commission should adopt a -76 dBm/m<sup>2</sup>/MHz power flux density (PFD) limit at a height of 1.5 meters above ground

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<sup>39</sup> *Id.*

<sup>40</sup> *Id.* 35 FCC Rcd at 2473 ¶ 348.

at the border of the licensees' service area boundaries.<sup>41</sup> We also support allowing licensees to agree voluntarily to higher field strength limits at their common boundaries,<sup>42</sup> as in other bands. These technical rules will promote market-based solutions that will maximize efficient spectrum use and help achieve reliable service along market boundaries.

***Antenna Height Limits.*** The Commission should extend the flexible antenna height rules that apply to the AWS-1 and AWS-3 bands to operations in the new mid-band flexible use spectrum, as proposed.<sup>43</sup> This approach does not set specific maximum heights, but allows licensees to deploy their networks for optimal coverage and use. Licensees will still need to comply with the Part 17 rules governing hazards to air navigation and with field strength limits at market and international boundaries, which may as a practical matter limit some antenna heights, but otherwise they will have flexibility to maximize service coverage and reliability.

***Application of General Part 27 Technical Rules.*** The Commission should apply the additional technical rules applicable to all Part 27 services to the 3.45-3.55 GHz band, including rules related to equipment authorization, RF safety, frequency stability, antenna structures and air navigation safety, and disturbance of AM broadcast antenna patterns.<sup>44</sup> These rules should apply to licensees that acquire their licenses through partitioning and disaggregation, as well as through competitive bidding. Harmonized rules across bands serve the public interest by ensuring that market forces, not the disparate impact of varying rules, drive the growth of wireless services.

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<sup>41</sup> *FNPRM* ¶ 86.

<sup>42</sup> *Id.*

<sup>43</sup> *Id.* ¶ 87.

<sup>44</sup> *Id.* ¶ 89 (proposing to apply sections 27.51 (equipment authorization), 27.52 (RF safety), 27.54 (frequency stability), 27.56 (antennas structures; air navigation safety), and 27.63 (disturbance of AM broadcast station antenna patterns)).

**B. The Licensing Rules Should Promote Investment in Robust Wide-Area 5G Deployments.**

To deliver on the promise that the 3.45-3.55 GHz band holds for U.S. 5G deployments, the Commission should adopt licensing and service rules that provide certainty and enable licensees to intensively, efficiently, and fully utilize their spectrum holdings. Licenses in the 3.45-3.55 GHz band should be granted under a traditional licensing model known to promote investment and innovation.<sup>45</sup>

*Exclusive, Geographic Licensing by PEA.* We agree with the Commission that valuable mid-band spectrum in the 3.45-3.55 GHz band “should be made available for exclusive, as opposed to shared, non-federal use where possible.”<sup>46</sup> The Commission should thus license the band on an exclusive, geographic area basis.<sup>47</sup>

Partial Economic Areas (“PEAs”) are appropriate for the 3.45-3.55 GHz geographic license area.<sup>48</sup> The lower 3 GHz band will play a crucial role in tomorrow’s integrated 5G networks, and licensing by PEA best aligns the band with other 5G bands including the 3.7 GHz Service, enabling carrier aggregation of 3.45 GHz and 3.7 GHz spectrum on a license-by-license basis. The Commission has concluded time and again that licensing at the PEA level is flexible enough to support both large and small geographic license area sizes: small enough to permit entry by providers that wish to offer localized wireless broadband service, and large and scalable enough to suit providers seeking to serve customers on a larger geographic scale.<sup>49</sup> Licensing by

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<sup>45</sup> *Id.* ¶ 92.

<sup>46</sup> *Order* ¶ 22.

<sup>47</sup> *FNPRM* ¶ 56.

<sup>48</sup> *Id.* ¶ 96.

<sup>49</sup> *See Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Report and Order, 29 FCC Rcd 6567, 6575 ¶ 18 (2014).

PEA also enables notable technical and economic efficiency, as compared to other geographic areas, such as counties. For example, smaller geographic areas would drive more border coordination and higher expenses due to the increased power levels in 3.4-3.55 GHz band compared to the 3.5 GHz band. In addition, smaller geographic areas would make it more difficult for participants to obtain contiguous geographic coverage. The 3.5 GHz band is an outlier in the Commission’s 5G spectrum and the Commission should not carry county-based licensing into the 3.45-3.55 GHz band.

Additionally, it is critical that the Commission dismiss calls to extend or implement any “use-or-share,” “licensed-by-rule,” or “opportunistic use” framework in the band.<sup>50</sup> CBRS-type use-or-share rules would result in an underlay for opportunistic access to licensed spectrum by non-licensed users in the band. This would complicate and delay full-power 5G deployments in 3.45-3.55 GHz by adding additional operations to an already complicated undertaking. There is no basis to assume the FCC could develop and impose workable coexistence rules for underlay operations with applicable enforcement mechanisms, in a reasonable time frame, that could work well for the full range of possible use cases and that avoids precluding full-power 5G deployments in the band. As the Commission acknowledged in its Spectrum Pipeline Report to Congress, “[i]t is too soon to know whether other bands may be suitable for licensed or unlicensed use based on the techniques used in the 3.5 GHz band.”<sup>51</sup>

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<sup>50</sup> *FNPRM* ¶ 96.

<sup>51</sup> *Report to Congress Pursuant to Section 1008 of the Spectrum Pipeline Act of 2015, As Amended by the Ray Baum’s Act of 2018, et al.*, Report, 33 FCC Rcd 11033, 11046 ¶ 26 (WTB & OET 2018).

Finally, we support NTIA and DoD's plan to conduct additional analysis of Alaska, Hawaii, and the U.S. Territories and Possessions,<sup>52</sup> but we nevertheless suggest that the Commission include these areas in the auction of 3.45-3.55 GHz spectrum. The Commission can make clear that these areas may be encumbered and allow bidders to assign a value to potential future access to these areas. These geographic areas were not included in the 3.7 GHz Service, and potential bidders should have the opportunity to acquire 3.45-3.55 GHz band spectrum in these areas, albeit subject to NTIA and DoD findings regarding sharing. Residents of these geographic areas would be best served if licensees are positioned to take advantage of any access the NTIA and DoD are able to provide as soon as possible. Otherwise, if the Commission were to wait to auction these areas until NTIA and DoD complete their review, assuming these areas are made available for commercial service, consumers could have to wait a significant amount of time to benefit from mid-band 5G.

**20 Megahertz Block Sizes.** The Commission should adopt its proposal to license the 3.45-3.55 GHz band via 20 megahertz blocks to align with the 3.7 GHz band.<sup>53</sup> As the FCC notes, "20 megahertz blocks provide flexibility for manufacturers and licensees to tailor applications in the band to suit future needs."<sup>54</sup> Given the nature of the 5G use cases expected for the 3.45-3.55 GHz band, 20 megahertz blocks will allow providers to aggregate blocks for wide channelization and high throughput. This proposed approach will better support the deployment of wide-area mobile services than 10 megahertz blocks as were used in the 3.5 GHz band.

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<sup>52</sup> NTIA Letter at 2; *FNPRM* ¶ 97.

<sup>53</sup> *FNPRM* ¶ 54.

<sup>54</sup> *Id.* (citation omitted).

**Unpaired Configuration.** The FCC should license the 3.45-3.55 GHz band on an unpaired basis – consistent with the approach taken in the 3.7 GHz band (and the 3.5 GHz band).<sup>55</sup> Licensees will use time division duplexing (“TDD”) within the band. This technology enables smart-antenna adaptive-beam technologies for highly directive antenna gain, and allows users to maximize flexibility to manage uplink and downlink traffic ratios. The Commission should refrain from adopting administrative measures to keep track of how spectrum blocks are being used, however.

3.45-3.55 GHz licensees also should not be required to coordinate operations with CBRS operations.<sup>56</sup> As was the case when the Commission declined to require coordination between 3.7 GHz Service licensee and CBRS users, here the emission limits the Commission is proposing to use are “consistent with other mobile service bands that have proven successful in coexisting with a variety of adjacent services.”<sup>57</sup> And the flexible nature of the equipment that will operate in the CBRS band and the coordination by the SAS should allow flexibility to access different channels in any location that might be near a higher-powered 3.45-3.55 GHz deployment. Moreover, synchronization of two different carriers can be implemented using traditional 3GPP methods based on an absolute timing reference, thus there is no need to require some other coordination mechanism.

**No Guard Bands.** There is no need to adopt a guard band at either end of the 3.45-3.55 GHz band – consistent with the approach taken in the 3.7 GHz band.<sup>58</sup> As the Commission notes, it is preferable to use technical solutions to protect adjacent bands, rather than making

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<sup>55</sup> *Id.* ¶ 55.

<sup>56</sup> *Id.*

<sup>57</sup> *3.7 GHz Service Order*, 35 FCC Rcd at 2486 ¶ 397.

<sup>58</sup> *FNPRM* ¶ 58.

valuable mid-band spectrum unusable to serve as a guard band. Similar to its framework in the 3.7 GHz band, the Commission's proposed OOB limits will protect the adjacent bands without the need for a guard band.

***15-Year License Term with Renewal Expectancy.*** A 15-year license term, with a renewal expectancy, as was adopted for the 3.7 GHz Service, is the right approach here.<sup>59</sup> New licensees in the 3.45-3.55 GHz band will need to coordinate operations with DoD. Although we expect that DoD will work as quickly as possible to relocate its systems out of the band, coordination for the systems that will remain in the band on a permanent or temporary basis will still take time. This militates in favor of a longer initial license term to ensure that prospective licensees are incentivized to invest in the band, knowing they will have adequate time to deploy their services and seek a return on that investment.<sup>60</sup> We also support the application of the general Part 27 renewal requirements in the 3.45-3.55 GHz band.<sup>61</sup>

***Performance Requirements.*** The same performance requirements and compliance procedures adopted for the 3.7 GHz Service should be adopted for the 3.45-3.55 GHz band.<sup>62</sup> There the Commission adopted specific quantifiable benchmarks for different types of operations. Applying this framework to the 3.45-3.55 GHz band should similarly provide flexibility to new licensees in satisfying the performance requirements, while ensuring the spectrum is timely and robustly put to use.

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<sup>59</sup> *Id.* ¶ 98.

<sup>60</sup> *Id.*

<sup>61</sup> *Id.* ¶ 99.

<sup>62</sup> *Id.* ¶ 100.

***Case-by-Case Review of Spectrum Acquisitions.*** Consistent with the Commission’s proposal, there should not be a pre-auction, bright line for the 3.45-3.55 GHz band that restricts the ability of entities to participate in and acquire spectrum at auction.<sup>63</sup> As the Commission observes, pre-auction limits unnecessarily restrict the ability of entities to participate in Commission auctions. But 3.45-3.55 GHz spectrum should be added to the spectrum screen, as the proposed power levels and flexible use framework are similar to those adopted in the 3.7 GHz band.<sup>64</sup> And the Commission rightly proposes a case-by-case review of long-form applications to ensure that “the public interest benefits of having a spectrum screen applicable to secondary market transactions are not rendered ineffective.”<sup>65</sup>

***Competitive Bidding.*** We support the Commission’s proposal to assign 3.45-3.55 GHz flexible use licenses through competitive bidding. As with previous auctions, the Commission should conduct any auction in conformity with the Part 1, Subpart Q general competitive bidding rules.<sup>66</sup>

#### **IV. NON-FEDERAL SECONDARY OPERATIONS IN THE 3.45-3.55 GHz BAND SHOULD BE SUBJECT TO RELOCATION DEADLINES AND EXCLUDED FROM THE *EMERGING TECHNOLOGIES* FRAMEWORK.**

The FCC took an important step by removing secondary non-federal radiolocation and amateur allocations from the 3.3-3.55 GHz band.<sup>67</sup> With this action, wireless stakeholders will be able to deploy on this spectrum immediately upon licensing. To ensure that these non-federal

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<sup>63</sup> *Id.* ¶ 94.

<sup>64</sup> *Id.* ¶ 95.

<sup>65</sup> *Id.*

<sup>66</sup> *Id.* ¶ 108.

<sup>67</sup> *Order* ¶¶ 27, 33.

secondary incumbents relocate their systems in a timely manner, the Commission should adopt interim benchmarks.<sup>68</sup> And the FCC should require secondary users to clear the band prior to 3.45-3.55 GHz license grants, which often occur within three months of the close of the auction. We recommend that the FCC set the sunset date as not later than 60 days after the conclusion of the auction to ensure that all secondary users have complied with the relocation deadline no later than the time the FCC grants the licenses.

Additionally, the FCC should decline to consider requiring flexible use licensees to reimburse secondary commercial radiolocation operators for vacating the band.<sup>69</sup> Requiring the reimbursement of relocation expenses for these secondary operations runs contrary to *Emerging Technologies* policy and the “well established principle that secondary licensees are not entitled to relocation or reimbursement.”<sup>70</sup> Under the Commission’s *Emerging Technologies* policies, “only stations with primary status are entitled to relocation,”<sup>71</sup> thus, the Commission does “not require relocation reimbursement for secondary licensees.”<sup>72</sup> Instead, the Commission “requires secondary stations to cease operations and relocate at their own expense when a new primary

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<sup>68</sup> *FNPRM* ¶¶ 60, 69.

<sup>69</sup> *Id.* ¶ 63.

<sup>70</sup> See, e.g., *Improving Public Safety Communications in the 800 MHz Band, et al.*, Memorandum Opinion and Order, 20 FCC Rcd 16015, 16070 ¶ 107 (2005).

<sup>71</sup> *Amendment of Part 2 of the Commission’s Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems, et al.*, Third Report and Order, Third Notice of Proposed Rulemaking and Second Memorandum Opinion and Order, 18 FCC Rcd 2223, 2256 ¶ 72 (2003) (“Because secondary operations, by definition, cannot cause harmful interference to primary operations, new entrants are not required to relocate secondary operations.”) (citation omitted).

<sup>72</sup> *Improving Public Safety Communications in the 800 MHz Band*, Second Memorandum Opinion and Order, 22 FCC Rcd 10467, 10489 ¶ 57 n.145 (2007).

