

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

In the Matter of)
)
Amendment of the Commission’s Rules with)
Regard to Commercial Operations in the 3550-) GN Docket No. 12-354
3650 MHz Band)

RESPONSE OF T-MOBILE USA, INC.

Pursuant to Section 1.429(f) of the Commission’s rules,^{1/} T-Mobile USA, Inc. (“T-Mobile”) ^{2/} submits this response to the Petitions for Reconsideration^{3/} of the Commission’s Report and Order^{4/} (“3.5 GHz Order”) in the above-captioned proceeding. T-Mobile appreciates the 3.5 GHz Order’s innovative approach to the use of the 3550-3700 MHz band (the “3.5 GHz Band”) and the efforts of the National Telecommunications and Information Administration (“NTIA”) and federal agencies to facilitate shared use of the 3.5 GHz band. Nevertheless, the rules should be changed to even better promote investment, so that the 3.5 GHz band can become a meaningful component of the Nation’s wireless ecosystem. Several parties submitted petitions for reconsideration that would help accomplish that. Accordingly, T-Mobile supports the following modifications to the rules:

- increase the license term for Priority Access Licenses (“PALs”) from three years to ten years and adopt an expectation of license renewal;

^{1/} 47 C.F.R. § 1.429(f).

^{2/} T-Mobile USA, Inc. is a wholly-owned subsidiary of T-Mobile US, Inc., a publicly traded company.

^{3/} See *Petitions for Reconsideration of Action in Rulemaking Proceedings*, Public Notice, 80 Fed. Reg. 59705 (Oct. 02, 2015) (listing the Petitions for Reconsideration filed).

^{4/} *Amendment of the Commission’s Rules with Regard to Commercial Operations in the 3550-3650 Band*, Report and Order, 30 FCC Rcd. 3959 (2015).

- make available the total number of PALs in a census tract for which applicants have applied for renewal;
- increase the out-of-band emission (“OOBE”) limits;
- increase equivalent isotropically radiated power (“EIRP”) limits and eliminate conducted power limits;
- increase the response time when an incumbent user is detected from 60 seconds; and
- continue to evaluate whether geolocation capabilities can be built into devices in the future.

I. INCREASE THE LICENSE TERM FOR PALS TO TEN YEARS AND ADOPT AN EXPECTATION OF LICENSE RENEWAL.

As T-Mobile has pointed out, growth and innovation in the 3.5 GHz band depends on a stable spectrum landscape that will provide carriers with the certainty needed for investment in networks and the development of new technologies.^{5/} The rules adopted in the *3.5 GHz Order* allow for only a three year PAL period, with no renewal mechanism.^{6/} CTIA has therefore asked the Commission to increase the license term for PALs to at least five years and adopt an expectation of license renewal.^{7/} CTIA correctly points out that deploying a network is a lengthy process involving standardizing a new frequency band, developing and certifying new equipment, acquiring sites, securing local permits and zoning, building infrastructure, and incorporating the band into consumer devices.^{8/} It argues that the current three year PAL term and lack of renewal expectancy may cause some operators to decide against investing in the band.^{9/}

^{5/} See Comments of T-Mobile USA, Inc., GN Docket No. 12-354, 4-5 (filed Jul. 14, 2014); Comments of T-Mobile USA, Inc., GN Docket No. 12-354, 2, 4-5 (filed Dec. 5, 2013); Reply Comments of T-Mobile USA, Inc., GN Docket No. 12-354, 2-3 (filed Dec. 20, 2013).

^{6/} *3.5 GHz Order* ¶ 105; 47 C.F.R. § 96.25(b)(3).

^{7/} CTIA-The Wireless Association Petition for Reconsideration, GN Docket No. 12-354, 2-3 (filed Jul. 23, 2015) (“CTIA Petition”).

^{8/} CTIA Petition at 3.

^{9/} CTIA Petition at 3.

T-Mobile agrees with CTIA that the Commission should increase the license term and adopt a renewal expectancy. However, to truly encourage investment in the band, the Commission should issue PALs on a 10-year basis with a renewal expectancy, similar to the licenses it issues in other wireless services. The resounding success of the wireless industry has been built on licensees' access to spectrum that they can incorporate into their networks on a long-term basis. A ten year license term coupled with a renewal expectancy has served well in the context of other wireless services, leading to robust markets, substantial investment, and the development of new technologies. In contrast, without the ability to use spectrum on a longer-term basis, including a renewal expectancy, licensees will lack certainty as to whether they will have access to the spectrum they use to serve their customers, which will deter investment and innovation in the band. While the Commission need not abandon the three-tier approach it adopted in this proceeding, it should attempt to replicate the licensing conditions for PAL holders that made the wireless industry as strong as it is today.

II. MAKE AVAILABLE THE TOTAL NUMBER OF PALS IN A TRACT FOR WHICH APPLICANTS HAVE APPLIED FOR RENEWAL.

In the *3.5 GHz Order*, the Commission decided that, in a given census tract for a specific auction, it would make available one fewer PAL than the total number of PALs applied for, up to a maximum of seven.^{10/} CTIA asks the Commission to reconsider this approach, noting that it risks systematically phasing out PALs with each subsequent auction.^{11/} By way of illustration, CTIA describes a situation in which two PAL licensees, who collectively hold all seven PAL licenses in a census tract, seek to maintain their licenses in the next auction. In this scenario, the Commission's rules would mandate that only six licenses be made available for auction, and one

^{10/} *3.5 GHz Order* ¶ 133; 47 C.F.R. § 96.29.

^{11/} CTIA Petition at 4.

of the licensees would be forced to migrate part of its PAL use to GAA use.^{12/} The rules would therefore leave PAL licensees uncertain as to whether they will be able to maintain their operations after the initial license period expires.^{13/} This uncertainty will be exacerbated by the short license terms and lack of renewal expectancy the rules specify.

T-Mobile recognizes that for the initial licensing process, making one fewer license available than applicants request will allow the Commission to employ competitive bidding to select licensees. As a practical matter, the rule is probably unnecessary for initial licensing – multiple applicants are likely to seek eligibility to bid on all licenses, creating nationwide mutual exclusivity. However, after initial licensing, the new rules will disadvantage licensees that have made an investment in the 3.5 GHz band by reducing the number of PALs available – a “musical chairs” result that is not in the public interest. As noted above, after an initial auction process, existing licensees should have a renewal expectancy. So, if there are seven PALs in a census tract, all seven should be entitled to renew their authorizations without being subject to an auction in which fewer licenses are available. If, after renewal applications are submitted and processed, there remain licenses available because licensees have elected not to renew their authorizations, the Commission can retain the authority to make available, through competitive bidding, one fewer license than new applicants request, up to the number of vacant PALs. While not a substitute for renewal expectancy, this approach will provide PAL licensees a more stable environment, which is necessary to dedicate significant resources to and promote the use of the 3.5 GHz band.

^{12/} CTIA Petition at 4.

^{13/} Of course, if the FCC adopts a renewal expectancy, it would not be necessary to re-auction the licenses. Providing a renewal expectancy is the preferred outcome.

III. INCREASE THE OUT-OF-BAND EMISSION LIMITS.

In the *3.5 GHz Order*, the Commission set stringent out-of-band emission and interference limits for Citizens Broadband Radio Service Devices (“CBSDs”). In particular, it set a -13 dBm/MHz emission limit for frequencies from 0 to 10 megahertz outside the channel edge; a -25 dBm/MHz emission limit for frequencies more than 10 megahertz outside the channel edge, down to 3530 MHz and up to 3720 MHz; and a -40 dBm/MHz emission limit below 3530 and above 3720 MHz.^{14/} The Commission received two petitions for reconsideration challenging those limits.^{15/} On the one hand, the Satellite Industry Association (“SIA”) asked that the Commission limit emissions to -40 dBm/MHz in any spectrum above 3680 MHz, as it proposed in the *Further Notice of Proposed Rulemaking*,^{16/} in order to reduce what SIA believes will be harm to C-band FSS operations.^{17/} On the other hand, CTIA argues that the Commission should increase the OOB limits in order to allow the most efficient use of the spectrum by licensees operating 20 megahertz LTE channels.^{18/}

The Commission should grant CTIA’s petition and reject the SIA request. As CTIA demonstrates, 20 megahertz LTE channels would have to be at least 20 megahertz from the channel-edge to meet the -25 dBm/MHz limit without significantly reducing power levels.^{19/} The reduced power necessary to meet the -25 dBm/MHz limit would in turn reduce coverage of

^{14/} *3.5 GHz Order* ¶ 184.

^{15/} Nokia challenged these OOB limits as applied to End User Devices. Nokia Networks Petition for Reconsideration, GN Docket No. 12-354, 10-12 (filed Jul. 23, 2015) (“Nokia Petition”).

^{16/} *See Amendment of the Commission’s Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, Further Notice of Proposed Rulemaking, GN Docket No. 12-354, 29 FCC Rcd. 4273, ¶ 83 (2014) (“*Further Notice of Proposed Rulemaking*”).

^{17/} *See* Satellite Industry Association Petition for Reconsideration, GN Docket No. 12-354, 3-5 (filed Jul. 23, 2015).

^{18/} CTIA Petition at 5-6.

^{19/} CTIA Petition at 5.

those 20 megahertz channels and would depress operators' desire to deploy those channels. To avoid these issues, the Commission should, as CTIA suggests (1) apply the -25 dBm/MHz emission limit only for frequencies more than 20 megahertz outside each channel band edge; (2) apply the -13 dBm/MHz limit at frequencies from 0-20 megahertz outside the assigned channel-edge; and (3) eliminate the -40 dBm/MHz limit below 3530 MHz and above 3720 MHz.^{20/} If Commission nonetheless determines that the -40 dBm/MHz limit below 3530 MHz and above 3720 MHz is necessary to protect adjacent operations, T-Mobile agrees with CTIA that it should increase the transition gap to 40 megahertz so that 20 megahertz LTE channels can operate with less power backoff.

T-Mobile also agrees with CTIA that the Commission should allow for average power measurements using an RMS detector instead of a peak detector – as it does for most other licensed mobile operations – because use of a peak detector would require LTE technologies to operate at lower transmit power levels, thereby inhibiting the 3.5 GHz band's ability to support mobile broadband.^{21/}

IV. INCREASE EIRP LIMITS AND ELIMINATE CONDUCTED POWER LIMITS.

In the *3.5 GHz Order*, the Commission adopted the following EIRP limits for CBSDs: 30 dBm for Category A CBSDs, 40 dBm for Category B non-rural CBSDs, and 47 dBm for Category B rural CBSDs.^{22/} These EIRP limits are too low and will limit the coverage that each small cell can achieve, thereby driving up network costs and risking decreased investment in the band.

^{20/} CTIA Petition at 5-6.

^{21/} CTIA Petition at 6.

^{22/} *3.5 GHz Order* ¶¶ 206, 209.

T-Mobile therefore supports Verizon’s Petition for Reconsideration, which asks that the Commission increase the maximum EIRP to 36 dBm for Category A CBSDs, to 49 dBm for Category B non-rural CBSDs, and to 56 dBm for Category B rural CBSD.^{23/} Verizon correctly notes that the reduced coverage resulting from the adopted EIRP limits will increase network costs for three reasons: “[f]irst, the licensee will need to purchase more small cells to provide quality coverage to the desired service area”; “[s]econd, it will need to pay more to lease more spaces on towers, buildings and other locations for installing the additional cell sites”; and “[t]hird, it will need to spend more on the backhaul facilities (whether fiber or microwave) needed to connect each of those additional sites to the network.”^{24/} Therefore, to allow for more economical, efficient small cell deployment, the Commission should make the adjustments Verizon proposes.

In addition, T-Mobile agrees with Verizon that the Commission should eliminate the limit on conducted power and rely only on EIRP limits to govern power levels.^{25/} Verizon correctly observes that EIRP is a function of conducted power and antenna gain, and thus a limit of EIRP necessarily limits conducted power as well.^{26/} As Verizon notes, relying only on EIRP would grant operators the flexibility to optimize coverage patterns using different antenna

^{23/} T-Mobile recognizes that the size of the exclusion zones for government stations were based on the EIRP limits adopted in the *3.5 GHz Order*. Increasing the EIRP limits need not change the size of the exclusion zones; federal operations will still be protected at the same levels as the rules provide. Nevertheless, T-Mobile supports continued efforts by the FCC and NTIA to reduce the size of the exclusion zones in a manner that will protect federal operations while maximizing the use of the 3.5 GHz band for non-federal use.

^{24/} Verizon Petition for Reconsideration, GN Docket No. 12-354, 3-4 (filed Jul. 23, 2015) (“Verizon Petition”).

^{25/} Verizon Petition at 4-5.

^{26/} Verizon Petition at 4-5.

patterns and gain levels while still appropriately limiting power levels.^{27/} As described above, optimizing coverage allows for lower network costs, benefitting both carriers and consumers.

V. INCREASE RESPONSE TIME WHEN AN INCUMBENT USER IS DETECTED FROM 60 SECONDS.

In the *3.5 GHz Order*, the Commission required that PAL holders and General Authorized Access (“GAA”) users relocate or suspend CBSD operations within 60 seconds of an Environmental Sensing Capability detecting a federal incumbent and relaying that information to the SAS.^{28/} Nokia and others asked that the Commission increase the time allowed for PAL and GAA users to suspend or relocate operations when incumbents are present.^{29/} These parties argue that the 60 seconds the Commission has allotted is far too short.^{30/}

T-Mobile agrees. As Nokia states, when detected, incumbent radar operations will likely require the suspension/relocation of a large number of CBSDs – for instance, it is likely that all CBSDs supported by a single network management system will have to be suspended or relocated when an incumbent radar operation is detected.^{31/} It will simply not be possible to relocate or suspend such a large number of CBSDs in one minute.^{32/} In fact, Nokia estimates that for a network management system supporting 10,000 cells with 100 CBSDs supporting 100 cells

^{27/} Verizon Petition at 4-5.

^{28/} *3.5 GHz Order* ¶ 261; 47 C.F.R. § 96.15(b)(4).

^{29/} Nokia Petition at 3 (stating that the “suspension and relocation durations should be relaxed from 60 seconds to 10 minutes”); Motorola Solutions, Inc. Petition for Reconsideration, GN Docket No. 12-354, 3 (filed Jul. 23, 2015) (“Motorola Petition”) (stating that the FCC should “modify[] the required channel vacation period from 60 seconds to 600 seconds for all PAL and GAA users”); Wireless Innovation Forum Petition for Reconsideration, GN Docket No. 12-354, 3-4 (filed Jul. 22, 2015) (“Forum Petition”) (stating that the “FCC should modify the reconfiguration response time specified in Part 96.15(b)(4) from 60 seconds to a response time of 600 seconds”).

^{30/} Nokia Petition at 4-6; Forum Petition at 3-4.

^{31/} Nokia Petition at 4-5.

^{32/} Nokia Petition at 5.

each, it would take over five minutes to suspend or relocate CBSD operations.^{33/} In contrast, there is no evidence that the additional time it takes to relocate or suspend CBSD operations will have any impact on the federal offshore radar operations that may be affected. In light of the foregoing, T-Mobile agrees that the Commission should relax the incumbent-detection-to-suspension/relocation duration from 60 seconds to allow sufficient time to complete the transition.

VI. CONTINUE TO EVALUATE GEOLOCATION CAPABILITIES.

The Commission notes that in order for a “SAS to accurately predict and evaluate potential interference and channel availability, it must receive and store accurate location information for all CBSDs.”^{34/} In the *3.5 GHz Order*, the Commission decided to allow CBSD location information to be reported to a SAS as part of a CBSD’s initial registration either via automated geolocation technologies or by a professional installer.^{35/} The National Association of Broadcasters (“NAB”) asks that the Commission eliminate the rule allowing CBSD location to be determined by a professional installer, arguing that professional installation is unreliable and will lead to location inaccuracies.^{36/} Instead, NAB asks that the Commission adopt rules requiring that automated geolocation capabilities be built into CBSDs.^{37/}

T-Mobile agrees with NAB that accurate location information is essential to coordinate users in the 3.5 GHz band and that conceptually, the more accurate CBSD information, the better the SAS will be able to maximize use of the 3.5 GHz band. However, technology is not yet

^{33/} Nokia Petition at 5.

^{34/} *3.5 GHz Order* ¶ 215.

^{35/} *3.5 GHz Order* ¶ 219; 47 C.F.R. § 96.39(a).

^{36/} National Association of Broadcasters Petition for Reconsideration, GN Docket No. 12-354, 1, 3-5 (filed Jul. 23, 2015) (“NAB Petition”).

^{37/} NAB Petition at 8.

mature enough to support a proposed requirement for automated geolocation capability at reasonable costs. While the Commission should not change its geolocation rule now, it should continue to monitor developments in order to potentially require those capabilities in the future.

VII. CONCLUSION

T-Mobile continues to support the Commission's efforts to promote use of the 3.5 GHz band. In order to encourage investment and the full exploitation and utilization of the band, the Commission should: (1) increase the license term for PALs from three years to ten years and adopt an expectation of license renewal; (2) make available the total number of PALs in a census tract for which applicants have applied for renewal; (3) increase the OOB limits for CBSDs; (4) increase EIRP limits and eliminate conducted power limits for CBSDs; and (5) increase the response time when an incumbent user is detected from 60 seconds. In addition, the Commission should defer consideration of a requirement that geolocation capabilities be built into devices.

Respectfully submitted,

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