

**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 )

**COMMENTS OF T-MOBILE USA, INC.**

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T-Mobile USA, Inc. (“T-Mobile”)<sup>1/</sup> submits these comments in response to the November 1, 2013, Public Notice issued by the Commission in the above-referenced proceeding,<sup>2/</sup> soliciting further input on an alternative licensing framework (“Revised Framework”) for the use of 3550-3650 MHz band (“3.5 GHz Band”), following the FCC’s 2012 Notice of Proposed Rulemaking (“*NPRM*”) in this proceeding.<sup>3/</sup> T-Mobile continues to support the FCC’s efforts to make additional spectrum, including the 3.5 GHz Band, available for small cell technologies that will operate with mobile broadband networks and appreciates the improvements proposed in the Revised Framework. In order to exploit the full potential of the 3.5 GHz Band, however, the Commission should ensure that its framework provides a clear and stable regulatory environment for all entities that encourages investment and results in the development of a robust equipment market.

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<sup>1/</sup> T-Mobile USA, Inc. is a wholly-owned subsidiary of T-Mobile US, Inc., a publicly traded company.

<sup>2/</sup> See *Commission Seeks Comment on Licensing Models and Technical Requirements in the 3550-3650 MHz Band*, Public Notice, GN Docket No. 12-354, FCC 13-144 (rel. Nov. 1, 2013) (“*Public Notice*”).

<sup>3/</sup> See *Amendment of the Commission’s Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, Notice of Proposed Rulemaking, 12 FCC Rcd 15594 (2012) (“*NPRM*”).

## I. INTRODUCTION AND SUMMARY

T-Mobile continues to be interested in the 3.5 GHz Band in order to support the growth of its network. As T-Mobile pointed out in response to the *NPRM*, the 3.5 GHz Band holds great potential for small cell applications, such as offloading, and carriers' backhaul needs.<sup>4/</sup> In addition, the 3.5 GHz Band can be used as a component of mobile broadband providers' heterogeneous access networks, which use a mix of technologies, frequencies and cell sizes to address the coverage and capacity needs of providers' networks.<sup>5/</sup>

The Revised Framework builds upon and improves the licensing and technical proposals in the *NPRM*. For instance, while the Revised Framework retains the three-tier model proposed in the *NPRM*, it would expand the eligibility for Priority Access Licenses ("PALs") to a broad class of users including carriers like T-Mobile.<sup>6/</sup> T-Mobile appreciates these improvements, but suggests that this framework can be further modified to remove complexities and provide additional certainty to all 3.5 GHz Band users, particularly those in the Priority Access tier, that will foster use of the band.

Like most spectrum users, T-Mobile requires a stable spectrum landscape in which to operate. T-Mobile thus urges the Commission to re-examine adoption of the two-tiered Licensed Shared Access ("LSA") approach to the 3.5 GHz Band, under which a single licensee would have access to the licensed spectrum when the incumbent operator is not using it.<sup>7/</sup> Even with the modifications proposed in the Revised Framework, the two-tiered LSA approach continues to be the least complex and most effective way to promote full deployment of the 3.5 GHz Band.

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<sup>4/</sup> See Comments of T-Mobile USA, Inc., GN Docket No. 12-354, at 4-5 (filed Feb. 20, 2013).

<sup>5/</sup> See Reply Comments of T-Mobile USA, Inc., GN Docket No. 12-354, at 2-3 (filed April 5, 2013) ("T-Mobile Reply Comments").

<sup>6/</sup> See *Public Notice* ¶ 9.

<sup>7/</sup> See T-Mobile Reply Comments at 3-7.

As T-Mobile has explained, the LSA architecture would be consistent with spectrum management techniques undertaken elsewhere and would better ensure a predictable quality of service for 3.5 GHz Band users.<sup>8/</sup>

If the Commission adopts the three-tiered approach discussed in the *Public Notice*, T-Mobile recommends several changes that will enhance the utility of the spectrum and make the Commission's administration of the band less complex. *First*, PALs should be available to all eligible entities on a multi-year basis, and such multi-year PAL holders should be subject to build-out requirements and be afforded a renewal expectancy. T-Mobile agrees that PALs should cover 10 megahertz blocks, but suggests that they be issued using areas larger than a census-tract, such as counties. *Second*, the Commission should make a consistent amount of spectrum, specifically 60 megahertz, available for Priority Access use and ensure that the Spectrum Access System ("SAS") only allows General Authorized Access ("GAA") use of Priority Access spectrum when it is unassigned or affirmatively unused. *Third*, the SAS should be limited to identifying when spectrum is available for use by either a PAL licensee or GAA devices; the SAS should not be able to control or modify the technical or operational parameters of a PAL network. *Fourth*, the Commission should adopt regulatory requirements that ensure that the 3.5 GHz Band is fully utilized. *Fifth*, T-Mobile agrees that critical access users in the GAA tier should be afforded interference protection within the confines of their facilities. *Sixth*, the Commission should not limit PAL base stations to a maximum 24 dBm transmit power. And, *finally*, the entire 150 megahertz of the 3550-3700 MHz band should be included in the FCC's Revised Framework.

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<sup>8/</sup> See *id.* at 2.

## II. COMMENTS

### A. Priority Access Tier

#### 1. Open Eligibility for Priority Access Licenses

Rather than limiting the Priority Access tier to certain “mission critical” users as it proposed in the *NPRM*, the Commission would now expand the Priority Access tier to allow any prospective licensee who meets basic FCC qualifications to be eligible to apply for a PAL.<sup>9/</sup> T-Mobile supports this expansion. As it and others explained in the earlier phase of this proceeding, there are many entities besides mission critical users which require the certainty that licensed spectrum provides.<sup>10/</sup> As explained further below, however, the Commission should not abbreviate the basic qualification information it requires of entities that wish to hold PAL licenses. Those entities will be responsible, for example, for protecting important incumbent operations and for cooperating with other Priority Access and GAA users. In order to safeguard the integrity of operations in the 3.5 GHz Band, the Commission must therefore ensure that these entities are as qualified as other FCC license holders.

#### 2. Priority Access Licenses

The Commission’s Revised Framework envisions a “building block” approach to the Priority Access tier in which relatively small PAL rights – in time, geography, and frequency – could be aggregated to meet licensees’ diverse spectrum needs.<sup>11/</sup> The FCC also proposes opening “windows” on an annual basis for applications for PALs and, at the close of each

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<sup>9/</sup> See *Public Notice* ¶ 11.

<sup>10/</sup> See, e.g., Comments of AT&T, GN Docket No. 12-354, at 7-9 (filed Feb. 20, 2013); Comments of Ericsson, GN Docket No. 12-354, at 5 (filed Feb. 20, 2013); Comments of PCIA-The Wireless Infrastructure Association and the DAS Forum, A Membership Section of PCIA, GN Docket No. 12-354, at 5 (filed Feb. 20, 2013); Reply Comments of Nokia Siemens Networks US LLC, GN Docket No. 12-354, at 2-3 (filed April 5, 2013).

<sup>11/</sup> See *Public Notice* ¶ 12.

window, holding an auction to assign PALs where it receives mutually exclusive applications.<sup>12/</sup> While T-Mobile supports making PAL or other rights to use the 3.5 GHz Band spectrum on a licensed basis available by auction when necessary, the conditions proposed by the Commission on that use, as well as its proposals for administering and licensing PALs can be changed to better encourage the potential use of the 3.5 GHz Band. In contrast, the current proposal could invite speculation by allowing an entity to accumulate consecutive one-year licenses with no clear requirement to use the spectrum.

*Time.* The Commission states that PALs would be issued for a one-year term, at the end of which the license would automatically terminate and would not be renewed.<sup>13/</sup> Licensees, however, would be able to aggregate consecutive PALs to obtain multi-year rights to spectrum within a given geographic area, up to a predetermined cap,<sup>14/</sup> although the Commission does not suggest how many one-year terms could be aggregated. The proposed one-year term is intended to facilitate immediate use by eliminating burdensome administrative rules associated with longer-term licenses, including renewal, discontinuance, and performance requirements, while the ability to “stack” multiple one-year terms would provide additional long-term stability to entities that require it.<sup>15/</sup>

The Commission’s attempt to satisfy both of these goals may not promote the most intensive use of the 3.5 GHz Band. T-Mobile agrees that Priority Access licensees must have an opportunity to use the 3.5 GHz Band over multiple years. Licensees will generally not invest in infrastructure if they can only use it for one year. However, if PALs are issued for more than

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<sup>12/</sup> See *id.* ¶ 23.

<sup>13/</sup> See *Public Notice* ¶ 13.

<sup>14/</sup> See *id.* ¶ 24.

<sup>15/</sup> See *id.* ¶¶ 13, 24.

one year, 3.5 GHz Band spectrum may remain fallow in the absence of construction or service requirements. Accordingly, the Commission should issue PALs on a multi-year basis, similar to the 10-year licenses commonly issued in other wireless services and should adopt construction or service obligations. Licensees that fail to meet their build-out obligations would lose their PALs, and any “recaptured” spectrum could then be made immediately available in the annual auction that the Commission contemplates conducting.

*Geography.* The Commission seeks comment on the appropriate geographic units for PALs, adding that census tracts may be appropriate because small cells, which are low power and small in size, can provide coverage in targeted geographic areas.<sup>16/</sup> Moreover, the Commission notes that census tracts can nest and be aggregated into larger geographic areas and could be easily incorporated into a dynamic SAS that the FCC envisions would manage frequency assignments and automatically enforce access to the Priority Access and GAA tiers.

While census tract-based licenses may be appropriate for some entities, they will be burdensome for carriers like T-Mobile, who may wish to secure access to 3.5 GHz Band spectrum throughout a market to meet their small cell requirements. As the Commission recognizes, there are currently over 74,000 census tracts in the United States, each of which vary in size depending on the population density of the region.<sup>17/</sup> Evaluating the volumes of information that would be required to determine which licenses will best suit T-Mobile’s business needs would involve significant time and administrative resources and the large number of licensees would be unwieldy to manage in the context of an auction. To ease these burdens, T-Mobile recommends the use of larger geographic areas, such as counties. While generally bigger than census tracks, counties are usually smaller than areas that the Commission uses to

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<sup>16/</sup> See *id.* ¶¶ 14-16.

<sup>17/</sup> See *id.* ¶ 15.

issue licenses. Moreover, counties are generally aligned with entities' other business plans. Unless the Commission allows the issuance of PALs that cover areas larger than census-tracts or counties, it should also permit package bidding. Package bidding will allow auction participants to bid on and obtain complementary licenses efficiently and secure a critical geographic mass, which in turn will allow participants to gain economies of scale and scope for equipment, lowering costs and speeding implementation.

*Frequency Bandwidth.* The Commission proposes 10 megahertz unpaired channels as the standard PAL bandwidth.<sup>18/</sup> T-Mobile does not object to 10 megahertz license blocks. The Commission should also permit aggregation of those blocks as 10 megahertz blocks and larger can best support a variety of wireless broadband technologies. In fact, data intensive applications such streaming video are optimized using wider channels.<sup>19/</sup> As discussed further below, the ability to use contiguous 10 megahertz blocks also means that the identity of blocks must remain constant; the SAS should not be able to reconfigure blocks on real-time basis. Applications that may be supported by contiguous 10 megahertz blocks may not operate on non-contiguous spectrum, or will not be provided as efficiently.

*Administrability.* In administering PALs, the Commission seeks comment on the amount and type of information it should collect from potential Priority Access licensees in order to ensure that the FCC meets its license eligibility obligations under the Communications Act.<sup>20/</sup> T-Mobile suggests that the Commission seek from PAL licensees the same type of information it

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<sup>18/</sup> See *id.* ¶ 17.

<sup>19/</sup> See *Service Rules for Advanced Wireless Services in the 2000-2020 MHz and 2180-2200 MHz Bands, et al.*, Report and Order and Order of Proposed Modification, 27 FCC Rcd 16102, ¶ 42 (2012) (noting that 10 megahertz blocks “will encourage technologies that utilize wider bandwidth” and that “use of wide, contiguous blocks of spectrum will support continued innovation and deployment of mobile broadband technologies, such as [LTE], to meet higher data rates and wider bandwidths”).

<sup>20/</sup> See *Public Notice* ¶¶ 19-21.

does from other wireless licensees in the auctions context, including their qualifications, ownership structure, and any other information the Commission deems necessary. While the FCC’s goal of reducing the complexity of use for the 3.5 GHz Band is laudable, PAL licensees must still be responsible for their operations, and the Commission must hold them to the same type of obligations as other licensees.

### **3. Assignment of Priority Access Licenses**

The Commission proposes that PAL holders have no renewal expectancy – licenses would automatically terminate at the end of the one-year term and would not be renewable. It also does not anticipate adopting construction or service requirements for PALs “due to the impracticability of enforcing such requirements.”<sup>21/</sup> The proposed assignment mechanism, however, is unrealistic. In order for licensees to invest in 3.5 GHz Band equipment, they must be provided with regulatory certainty that they can continue to operate under their existing licenses over the long term. Therefore, as noted above, PALs must be available over a multi-year term. After the term ends, and assuming that the licensee has met the applicable performance requirements, it should be able to expect to renew its authorization. Once a licensee has made the investment in infrastructure and the underlying facilities are part of its network, it should not be faced with the uncertainty of attempting to re-acquire spectrum in an auction. The Commission does not impose that uncertainty for other licensed spectrum and it should not do so here.

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<sup>21/</sup> *Public Notice* ¶ 24.

## **B. Band Plan**

### **1. Designated Spectrum**

Under the Revised Framework, the Commission envisions that a specified amount of spectrum would be designated for GAA access in each geographic area and seeks comment on whether the GAA reservation should be defined in terms of a proportional ratio that can scale with the quantity of spectrum available in a given location or time rather than as a fixed (megahertz) bandwidth.<sup>22/</sup> It also suggests that when Priority Access rights have not been issued due to, for example, a lack of demand or the spectrum is not actually in use, the SAS would automatically make that spectrum available for GAA use locally.

The Commission should make a consistent amount of spectrum available for Priority Access use. In particular, T-Mobile suggests making 60 megahertz of 3.5 GHz Band spectrum available for Priority Access use and providing GAA users with the remaining spectrum.<sup>23/</sup> A specific set-aside of spectrum for Priority Access use will provide the best chance to have 3.5 GHz Band spectrum available for licensed service throughout the country, affording potential users the certainty they need to invest in the wide deployment of the band and creating economies of scope and scale.

While T-Mobile generally supports sharing of the 3.5 GHz Band between GAA and Priority Access users (as well as incumbents), the SAS must not be able to allow GAA operations on assigned and operational PAL channels. Doing so would defeat the purpose of allowing licensed use of the spectrum and would be no different than PAL users being permitted to operate where incumbent stations are in use. The Commission should ensure that the SAS

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<sup>22/</sup> See *id.* ¶ 28.

<sup>23/</sup> As noted below, T-Mobile supports making the entire 3550-3700 MHz band available under Commission's proposed structure.

only allows GAA use of Priority Access spectrum when it is unassigned or affirmatively unused. Determining if Priority Access spectrum is assigned will be straightforward. However, to determine whether spectrum covered by a PAL is actually in use, the SAS should be required to query whether a construction or performance notification has been submitted by the PAL user. If such a notification has been submitted, the PAL spectrum should not be available for GAA use.<sup>24/</sup> In any case, the SAS must also undergo thorough testing and trial runs to ensure that it operates as intended.

## 2. Spectrum Access System

The FCC suggests that the SAS would dynamically assign GAA users and Priority Access licensees shares of the band, but the exact spectral location of a given authorization within the band would not be fixed – *e.g.*, a licensee with a PAL could be reassigned from 3550-3560 MHz to 3630-3640 MHz.<sup>25/</sup> T-Mobile strongly opposes permitting the SAS to dynamically assign spectrum to Priority Access licensees. In order for T-Mobile or other licensees to move their operations from one frequency block to another, it must take base stations off the air and retune the facility.<sup>26/</sup> While retuning base stations may only involve a brief period of “down-time,” to provide for the most efficient use of spectrum, base units cannot be retuned in the instantaneous manner that the FCC contemplates.

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<sup>24/</sup> As noted above, T-Mobile proposes that any holder of a multi-year PAL be required to comply with construction or performance obligations. Once it does, and provides notification to the Commission, it should be protected from GAA operations. The SAS could still assign PAL spectrum not in use that is held by entities with authorizations for only one year, unless those PAL holders, at their option, also report construction or satisfaction of performance obligations.

<sup>25/</sup> See *Public Notice* ¶ 30.

<sup>26/</sup> See, *e.g.*, *Improving Public Safety Communications in the 800 MHz Band, Report and Order, et al.*, Fifth Report and Order, Fourth Memorandum Opinion and Order, and Order, 19 FCC Rcd 14969, ¶ 147, n.395 (2004) (acknowledging that reconfiguration of the 800 MHz band would require the retuning of base station equipment that could result in “down-time”).

Moreover, allowing the SAS to dynamically assign frequencies to Priority Access licensees will frustrate sound spectrum planning and assumes that the 3.5 GHz Band will be used for identical applications between and among different entities. However, and as T-Mobile has noted before, the 3.5 GHz Band may be used for, among other purposes, backhaul and small-cell base station operations. These two functions, among others, involve different power levels, interference protection criteria and other technical parameters and cannot be controlled by a third party. Moreover, in order to optimize spectrum utilization, Priority Access licensees will bid on particular channels in a market to, for example, take advantage of contiguous spectrum and the related favorable transmission capacity. SAS assignment of fungible spectrum blocks would defeat those efficiencies and other spectrum configurations licensees may find useful.

More generally, the role of the SAS should be limited to identifying when spectrum is available for use by either PAL operators or GAA devices. The Commission envisions an expansive role for the SAS, with it controlling key systems parameters.<sup>27/</sup> This is unnecessarily complex and will impede innovation and the deployment of technology. Just as the SAS should not be able to dictate the channel blocks on which Priority Access licensees operate, it also must not be able to adjust system parameters like transmit power, particularly when the SAS will not and cannot know the purpose for which the 3.5 GHz Band is being used. Carriers, and any entity likely to seek PAL rights, carefully plan and dynamically adjust the parameters under which their networks operate, often on a real-time basis in order to achieve the most efficient and intensive use of spectrum they are permitted to use. That careful planning would be frustrated by having a third party like an SAS be able to dictate the operating parameters of any component of a network. The Commission must, therefore, limit the role of the SAS to identifying whether

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<sup>27/</sup> See *Public Notice* ¶ 44.

spectrum is currently used by an incumbent or a PAL operator and any applicable protection requirements in order to allow operators and devices to determine whether the spectrum is available for Priority Access or GAA operations. PAL operators in particular must maintain flexibility regarding how to best deploy their operations to balance the competing needs of protecting incumbents while maximizing use of the spectrum.

### **C. Ensuring Productive Spectrum Use**

The FCC seeks comment on whether the PAL-based allocation model would provide sufficient incentives to ensure that Priority Access rights are allocated to the parties that would make the most productive use of the 3.5 GHz Band.<sup>28/</sup> As noted above, T-Mobile disagrees that short-term licenses with no renewal expectancy will “provide licensees with incentives to make actual and consistent use of the spectrum.”<sup>29/</sup> To the contrary, more complete deployment of the spectrum will only occur if PAL holders are provided with multi-year rights to use the spectrum paired with obligations to construct and operate facilities.

### **D. Localized Critical Access Use**

Recognizing that many critical access facilities (*e.g.*, hospitals) generally only need access within specific buildings and therefore may not require exclusive access to even a full census tract of Priority Access tier spectrum, the Commission seeks comment on whether it would be possible to allow such critical users to receive interference protections, like Priority Access users, within a limited portion of the GAA pool inside the confines of their facilities. The FCC also asks whether this approach should be limited to “critical access” facilities.<sup>30/</sup> T-Mobile acknowledges the important services that critical access facilities provide and their need

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<sup>28/</sup> See *id.* ¶¶ 33-35.

<sup>29/</sup> *Id.* ¶ 33.

<sup>30/</sup> See *id.* ¶¶ 36-40.

for reliable, interference-free spectrum to deliver such services. It therefore supports the Commission's proposal to allow critical access users to receive interference protection within a portion of the GAA pool inside the confines of their facilities through the SAS. This approach, however, should be limited, as the Commission suggests, to qualified critical access facilities.

#### **E. Technical Issues**

The FCC seeks comment on certain preliminary values for base station transmit power, the acceptable interference environment, and technical flexibility for users, including the extent to which the FCC's technical rules can facilitate the coexistence of disparate technologies and network topologies in the 3.5 GHz Band.<sup>31/</sup> In particular, the Commission recommends limiting small cell base stations operating in the 3.5 GHz Band to a maximum 24 dBm transmit power.<sup>32/</sup>

This proposed power level is unnecessarily low for PAL users. The *Public Notice* assumes that the SAS will be dynamically configuring power levels to promote sharing. However, as noted above, the SAS should **not** have the ability to configure system operations, particularly with respect to PAL users. Therefore, it is not accurate to assume that the SAS will be promoting shared use of spectrum employed by PAL systems. To the contrary, the entity licensed for PAL use will manage the spectrum and it should have the flexibility to use higher powered transmitters where appropriate.

Nevertheless, T-Mobile recognizes that the 3.5 GHz Band should be maximized for small cell use and that use of too-high-powered transmitters by PAL users may defeat that goal. Accordingly, T-Mobile proposes that the Commission adopt a maximum transmit power for Priority Access licensees of 37 dBm (5 watts), which has been used by the Third Generation

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<sup>31/</sup> See *id.* ¶¶ 45-48.

<sup>32/</sup> See *id.* ¶ 45.

Partnership Project (“3GPP”) for small cell studies.<sup>33/</sup> A lower power level is appropriate for GAA users, who will presumably seek to use spectrum on a more opportunistic, localized basis. GAA users should, therefore, be limited to 24 dBm transmit power as the Commission suggests. This power level generally coincides with the power levels for “local” area base stations presumed by 3GPP.<sup>34/</sup>

#### **F. Extension to the 3650-3700 MHz Band**

Finally, the Commission seeks comment on whether and how the Revised Framework could be extended to the 3650-3700 MHz band, including what provisions would need to be made for incumbents and how much transition time would be required.<sup>35/</sup> As discussed above, T-Mobile supports extending the framework adopted in this proceeding to the entire 3550-3700 MHz band. This extension will create 150 megahertz of contiguous spectrum and, as the Commission has recognized, increase the utility of the band, benefitting existing operators, attracting new providers, and fostering a large, innovative equipment market.<sup>36/</sup> Incumbent non-government users will be able to secure PAL authorizations for operations that require interference protection. They should also be permitted to continue to operate in the GAA band, subject to the ability of their equipment to comply with applicable regulations including preventing access to Priority Access spectrum.

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<sup>33/</sup> See, e.g., 3GPP, *3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Small cell enhancements for E-UTRA and E-UTRAN - Physical layer aspects (Release 12)*, at 51, 54 (2013), available at [http://www.3gpp.org/ftp/specs/archive/36\\_series/36.872/36872-c00.zip](http://www.3gpp.org/ftp/specs/archive/36_series/36.872/36872-c00.zip). T-Mobile proposes this level for base station operations. Higher power levels may be appropriate for backhaul operations, which would be less likely to interfere with other users.

<sup>34/</sup> See 3GPP, *3GPP TS 36.104 V11.4.0: 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception (Release 11)*, at 24 (2013), available at [http://www.3gpp.org/ftp/specs/archive/36\\_series/36.104/36104-b40.zip](http://www.3gpp.org/ftp/specs/archive/36_series/36.104/36104-b40.zip).

<sup>35/</sup> See *Public Notice* ¶ 51.

<sup>36/</sup> See *NPRM* ¶¶ 78-80.

### III. CONCLUSION

T-Mobile continues to believe that the 3.5 GHz Band holds great potential to help carriers meet their small cell needs. In order to fully realize those benefits, the Commission should reconsider the LSA approach for accessing the 3.5 GHz Band, rather than an unnecessarily complex three-tier mechanism. If the Commission nonetheless adopts such an approach, it should take the actions outlined above to reduce uncertainty and maximize efficient use of the band.

Respectfully submitted,

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