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

In the Matter of
Amendment of the Commission’s Rules with Regard to Commercial Operations in the 3550-3650 MHz Band

To: The Commission

COMMENTS OF MICROSOFT CORPORATION

Microsoft Corp. submits these comments in response to the Second Further Notice of Proposed Rulemaking in the above-referenced proceeding, in which the Commission seeks to build on its recently established rules for the Citizens Broadband Radio Service (CBRS) in the 3550-3700 (3.5 GHz) band.¹

The Commission’s new rules for the 3.5 GHz band will help meet the nation’s burgeoning need for wireless connectivity. Microsoft applauds the Commission’s creation of a broad framework that recognizes the value of unlicensed-like, opportunistic access. The “few focused issues” raised in this Second FNPRM each impact the practical amount of spectrum available for General Authorized Access (GAA) use across the 3.5 GHz band, either through potential additions (use-it-or-share it implementation) or subtractions (secondary markets for Priority Access licenses and the size of the exclusion zones for protected fixed satellite service earth stations).

Whether there is enough available spectrum for GAA use in all License Areas is the most critical factor companies will consider when deciding whether or not to invest in the development of GAA technologies. To these ends, the Commission should allow any vacant Priority Access channel to remain available for GAA use until a Priority Access licensee requests access to that channel. This use-it-or-share-it approach is an important spectrum management policy innovation that will increase the efficiency of spectrum usage within a given band. Accordingly, the Commission’s definition of “use” of Priority Access channels should be engineering-based and one that promotes maximum opportunistic access in the 3.5 GHz band, where the Spectrum Access System (SAS) plays the central role. The specific details, including any algorithms, should be developed through the Multi-Stakeholder Group.

Microsoft doesn’t see the need for the Commission to either apply or modify its secondary market rules to the 3.5 GHz spectrum band. Specifically, GAA serves the same general purpose as secondary markets with respect to increasing the spectral efficiency of the band by providing multiple parties with access to the band. Therefore, in this instance secondary market rules are unnecessary and could actually decrease the overall use of the band if it fosters speculation in Priority Access licensees that end up not being utilized.

Finally, Microsoft believes the size and shape of the exclusion zones around the protected fixed satellite service earth stations should be no more than is technically necessary to protect the incumbent operations. The combination of more realistic propagation models, use of sensors, and the inherent capability of SAS will allow for more precise exclusion zones to be established.

I. THE COMMISSION SHOULD ADOPT AN ENGINEERING DEFINITION OF “USE”

The 3.5 GHz Report and Order advances the innovative and important spectrum management policy of use-it-or-share-it. “When Priority Access rights have not been issued (e.g.,
due to lack of demand) or the spectrum is not actually in use by a Priority Access licensee, the SAS will automatically make that spectrum available for GAA use on a local and granular basis”²

Opportunistic access to PA spectrum on a granular basis within a census tract where there may be exclusion zones in the 3650-3700 MHz range might help to convince some firms that there will be enough GAA spectrum available within densely populated coordination zones to be willing to risk investment. For this reason, the Commission should allow GAA devices opportunistic access to unused Priority Access channels within a census tract until a Priority Access licensee affirmatively requests access to its spectrum from the SAS. The SAS would then re-direct the GAA user(s) to another channel. The Commission is best served by employing an engineering-based definition of use, where the SAS play the central role. The specific details, including any algorithms, should be developed through the Multi-Stakeholder Group.

The Commission correctly (and importantly) recognizes the very real possibility that Priority Access licensees may deploy low-cost CBSDs merely to trigger license protections, regardless of whether the licensees actually plan to use the spectrum.³ Similarly, Priority Access licensees may choose to hold on to vacant channels until such time that the channel is scheduled to be put into use. Priority Access licensees have an economic incentive to engage in such “license saving” (or “spectrum warehousing”) because it would crowd out competing GAA products, thereby forcing consumers to pay monthly fees for licensed access. Such an outcome is doubly contrary to the public interest: it would result in reduced use of the 3.5 GHz band; and

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² Second FNPRM ¶ 419
³ Second FNPRM ¶ 423.
it would leave some channels on the band entirely vacant. Microsoft urges the Commission to actively prohibit such license saving.

The authority for rules prohibiting such activity can be found in general grants of authority, see 47 U.S.C. §154(i), as well as in specific delegations of authority for the Commission to police willful interference with authorized radio communications. Section 333 of the Communications Act, 47 U.S.C. §333, provides the Commission with the authority to prohibit persons from “willfully or maliciously interfer[ing] with or caus[ing] interference to any radio communications of any station licensed or authorized…” It should be possible for the Commission to apply the statute in such a way that a Priority Access licensee cannot game the licensing system and the technology to interfere with the use of GAA devices on vacant channels.

In this regard, Microsoft urges the Commission to reject the economic definition of “use.” This definition would allow Priority Access licensees to exclude GAA devices from opportunistically accessing the channel regardless of whether the licensee ever actually used the spectrum. Such a definition would support spectrum warehousing by allowing Priority Access licensees to hoard spectrum and exclude opportunistic, GAA access. Allowing such behavior would result in a highly inefficient use of spectrum and is not consistent with the Commission’s goal of optimizing spectrum use in the 3.5 GHz band. Microsoft disagrees with any suggestions

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4 See Second FNPRM at ¶ 425 (“Under this approach, actual operation as a PAL licensee would not be a trigger for excluding GAA use. A PAL licensee would have the right, but not the obligation, to exercise its option and thus exclude GAA access from the PAL.”).

that a vacant 3.5 GHz channel should serve as a guard band.\(^6\) Allowing geographically and/or spectrally adjacent channels to serve as a guard band for a PA licensed channel would undercut the innovative Part 96 technical rules, such as received signal strength limits and reception limits which promote spectral flexibility and efficiency.\(^7\)

II. **SECONDARY MARKETS ARE UNNECESSARY ON THE 3.5 GHz BAND**

Microsoft also urges the Commission to reject requests to apply the Commission’s secondary market rules to the transfer of Priority Access licenses.\(^8\) Although secondary markets are beneficial in other contexts, such markets are unnecessary in the 3.5 GHz band due to the presence of GAA.

The Commission adopted its secondary market rules “to facilitate significantly broader access to valuable spectrum resources by enabling a wide array of facilities-based providers of broadband and other communications services to enter into spectrum leasing arrangements with Wireless Radio Service licensees.”\(^9\) The Commission reasoned that development of secondary markets enhances and complements several of its initiatives, including “efforts to encourage the development of broadband services for all Americans, promote increased facilities-based competition among service providers, enhance economic opportunities and access for the

\(^{(continued…)}\)

the band. It protects higher tier users from those beneath and optimizes frequency use to allow maximum capacity and coexistence for both GAA and Priority Access users.”).

\(^6\) Second FNPRM at ¶ 422.

\(^7\) See 47 C.F.R. ¶ 96.41(d)-(f).

\(^8\) Second FNPRM at ¶ 431.

provision of communications services by designated entities, and enable development of additional and innovative services in rural areas.”

GAA accomplishes all of these goals. Unlike Priority Access, GAA is available to all consumers, and it does not require them to pay a recurring fee to the license holder. Such opportunistic access helps ensure that high-speed wireless Internet service is available to Americans regardless of their income. Moreover, GAA is available even in the most remote locations, fulfilling the Commission’s desire to provide high-quality wireless service in rural areas. Accordingly, GAA fulfills the same general policy goals as secondary markets.

It bears emphasis that GAA is more effective than secondary markets at accomplishing the Commission’s goals. Allowing secondary markets for Priority Access licenses would encourage companies to obtain far more Priority Access spectrum than they need, in the hopes of making a profit on that spectrum. GAA spectrum, in contrast, does not entail such speculation, and instead empowers the end users to use spectrum without any intermediaries.

III. COMMISSION SHOULD ADOPT BALANCED PROTECTIONS FOR FSS

Microsoft understands that certain Fixed Satellite Service (“FSS”) earth stations must be protected from interference. However, this protection should only be what is technically necessary and not unnecessarily encumber spectrum that could otherwise be used for GAA.

FSS earth stations in the 3650-3700 MHz band should not be overprotected. In census tracts where seven PA licenses are assigned, five of the eight GAA channels will be located in the 3650-3700 MHz range. Accordingly, it is vital to ensure that as much spectrum as possible is available in that band in as many locations as possible. The majority of these protected fixed

10 Id.
satellite service earth stations are located in coastal states. Large exclusion zones in 3650-3700 MHz that extend over large population centers in coastal areas will discourage the development of a GAA device ecosystem, as many companies will be hesitant to invest if the addressable market appears limited.

In 2005, when the Commission adopted rules that provided for nationwide, non-exclusive, licensing of terrestrial operations, in the 3650-3700 MHz band, it drew a 150 km round protection zone around grandfathered primary satellite earth stations. At the time, the Commission recognized that the “simplified circular protection zone that we are imposing here employs a high degree of worst-case conservatism that, in many instances, could result in prohibiting the use of transmitters in less-than-worst-case circumstances where, in reality, there would be no likelihood of interference to FSS earth stations.” In light of more accurate propagations models, the availability of sensors, and the inherent capability of a SAS, the Commission should revisit the size and shape of each exclusion zone to that which is technically necessary to protect the licensed satellite operations.

Similarly, it is possible to protect FSS earth stations in the C-Band from interference without imposing large exclusion zones on 3.5 GHz GAA use. Microsoft agrees with Google that

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11 [https://www.fcc.gov/cbrs-protected-fss-sites](https://www.fcc.gov/cbrs-protected-fss-sites)


13 Id.
it is possible for an SAS to effectively protect FSS stations on the 3700-4200 MHz band from interference.\textsuperscript{14}

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Microsoft agrees that the Commission’s new 3.5 GHz rules will “add much-needed capacity to meet the ever-increasing demands of wireless innovation.”\textsuperscript{15} To fully maximize the potential of this band, the Commission should ensure that as much spectrum as possible is actually used by consumers, and is not warehoused by Priority Access licensees or set aside in exclusion zones larger than technically necessary for protected fixed satellite service operations.

Respectfully submitted,

/s/

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July 15, 2015

\textsuperscript{14} See Ex Parte Letter of Google, GN Docket No. 12-354 (Jan. 20, 2015) ("Using the sample methodology proposed by the Commission, a SAS such as Google’s can perform the computations needed to assess the potential interference to FSS caused by each individual PA or GAA entrant in less than 1 microsecond of processor time.")

\textsuperscript{15} Report and Order at ¶ 1.