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	)	GN Docket No. 12-354
	)	
	)	

REPLY COMMENTS OF WI-FI ALLIANCE

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Wi-Fi Alliance hereby submits these reply comments in the above-referenced proceeding in which the Federal Communications Commission ("FCC" or "Commission") proposes rules that would govern a new Citizens Broadband Radio Service ("CBRS") in the 3550-3650 MHz band ("3.5 GHz Band").[1/] The record in this proceeding indicates that the Commission should modify certain of its proposed rules in order to encourage small cell deployments, including reducing the size of Exclusion Zones, setting aside sufficient spectrum for general authorized access ("GAA") use, eliminating the reservation for Contained Access Users ("CAUs"), extending the CBRS rules to the 3650-3700 MHz band, and limiting protections for fixed satellite service ("FSS") earth stations. Moreover, as Wi-Fi Alliance stated in its initial comments, the FCC must continue to evaluate additional opportunities to meet the growing need for capacity for small cell devices.

[1/] *See Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, Further Notice of Proposed Rulemaking, 29 FCC Rcd. 4273 (2014) ("*FNPRM*").

I. SUMMARY AND INTRODUCTION

As Wi-Fi Alliance asserted in its initial comments,[2/] unlicensed spectrum is rapidly becoming a critical component of the wireless ecosystem and a significant driver of the U.S. economy. Wi-Fi Alliance therefore appreciates the actions the Commission has taken to date to identify additional spectrum for unlicensed operations, including Wi-Fi deployment. Despite these efforts – including in the 5 GHz and 600 MHz proceedings – there continues to be a need for additional capacity, a need which will only grow as Wi-Fi-enabled devices reach near ubiquity. Wi-Fi Alliance therefore applauds the Commission's efforts to make additional spectrum available in the 3.5 GHz Band for GAA use.

However, as both Wi-Fi Alliance and other commenters recognize, more work needs to be done to ensure that sufficient spectrum is made available for small cell deployments in the 3.5 GHz Band. In particular, the record reflects near unanimous agreement that the FCC should amend its proposed rules to reexamine the size of the Exclusion Zones, which are based on outdated analyses and offer more protection than necessary for incumbent federal users. Moreover, Wi-Fi Alliance and others agree that the Commission should reserve a minimum of 50 percent of available spectrum in a given census tract for GAA use, eliminate the potential reservation of spectrum for CAUs, and extend the new rules it adopts in this proceeding to the 3650-3700 MHz band, all of which will maximize the potential capacity for GAA operations. Finally, other commenters echo Wi-Fi Alliance's call for a limit on the protection zones provided for FSS licensees and for a requirement that protection be limited to those stations that are in actual use, steps which will ensure that there is adequate protection for incumbent FSS stations while maximizing the spectrum that is available for Citizen Broadband Service Device

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[2/] *See* Comments of Wi-Fi Alliance, GN Docket No. 12-354 (filed July 14, 2014) ("Wi-Fi Alliance Comments").

("CBSD") operations. Wi-Fi Alliance appreciates the Commission's efforts in this proceeding to make additional spectrum available for unlicensed operations and remains hopeful that access to the 3.5 GHz Band, modified as suggested by Wi-Fi Alliance and others, can be an important first step by which the FCC can facilitate the development of innovative sharing technologies.

II. THE RECORD REFLECTS NEAR UNANIMOUS AGREEMENT THAT THE PROPOSED EXCLUSION ZONES SHOULD BE REEXAMINED AND REDUCED

Wi-Fi Alliance's comments asserted that the proposal to adopt geographic Exclusion Zones based on the models suggested in the National Telecommunications and Information Administration ("NTIA")'s Fast Track Report should be reexamined.[3/] There is near unanimous agreement that the proposed Exclusion Zones should be reexamined and reduced.[4/] For instance, CTIA—The Wireless Association ("CTIA") agrees that excluding such large swaths of the country from commercial use "will largely destroy the attractiveness of the 3.5 GHz Band and

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[3/] *See* Wi-Fi Alliance Comments at 14-16; *see also FNPRM* ¶¶ 5-6, 137-142; NTIA, *An Assessment of the Near-Term Viability of Accommodating Wireless Broadband Systems in the 1675-1710 MHz, 1755-1780 MHz, 3500-3650 MHz, 4200-4220 MHz, and 4380-4400 MHz Bands* (Oct. 2010) ("Fast Track Report"), *available at* http://www.ntia.doc.gov/files/ntia/publications/fasttrackevaluation_11152010.pdf.

[4/] *See, e.g.*, Comments of 4G Americas, GN Docket No. 12-354, at 2-4 (filed July 14, 2014) ("4G Americas Comments"); Comments of Alcatel-Lucent, GN Docket No. 12-354, at 6-9 (filed July 14, 2014); Comments of AT&T Services, Inc., GN Docket No. 12-354, at 34-39 (filed July 14, 2014) ("AT&T Comments"); Comments of CTIA—The Wireless Association, GN Docket No. 12-354, at 11-13 (filed July 14, 2014) ("CTIA Comments"); Comments of Dynamic Spectrum Alliance, White Space Alliance, and Public Interest Spectrum Coalition, GN Docket No. 12-354, at 1, 4 (filed July 14, 2014) ("DSA, WSA, and PISC Comments"); Comments of Google, Inc., GN Docket No. 12-354, at 2-10 (filed July 14, 2014) ("Google Comments"); Comments of Microsoft Corporation, GN Docket No. 12-354, at 6-9 (filed July 14, 2014) ("Microsoft Comments"); Comments of Motorola Mobility LLC, GN Docket No. 12-354, at 12-15 (filed July 14, 2014) ("Motorola Mobility Comments"); Comments of Motorola Solutions, Inc., GN Docket No. 12-354, at 9-10 (filed July 14, 2014) ("MSI Comments"); Comments of the National Cable & Telecommunications Association, GN Docket No. 12-354, at 5-10 (filed July 14, 2014); Comments of Nokia Solutions and Networks US LLC, GN Docket No. 12-354, at 5-11 (filed July 14, 2014) ("Nokia Solutions and Networks"); Comments of Qualcomm Incorporated, GN Docket No. 12-354, at 7-8 (filed July 14, 2014); Comments of Shared Spectrum Company, GN Docket No. 12-354, at 6-9 (filed July 11, 2014) ("SSC Comments"); Comments of Southern Company Services, Inc., GN Docket No. 12-354, at 2-3 (filed July 14, 2014); Comments of Telcordia Technologies, Inc. d/b/a/ iconectiv, GN Docket No. 12-354, at 6-7 (filed July 14, 2014) ("iconectiv Comments"); Comments of White Space Alliance, GN Docket No. 12-354, at 2 (filed July 11, 2014) ("White Space Alliance Comments"); Comments of The Wireless Innovation Forum, GN Docket No. 12-354, at 2-7 (filed July 10, 2014); Comments of the Wireless Internet Service Providers Association, GN Docket No. 12-354, at 17-20 (filed July 14, 2014) ("WISPA Comments").

render it essentially non-viable for commercial purposes."[5/] In order to make the band successful, there must be an opportunity to create a significant enough market size to attract investment by, among others, manufacturers and technology companies. Unless the Exclusion Zones shrink, the market will simply be too small to attract the needed level of investment. 4G Americas agrees, noting that reduction of the size of the Exclusion Zones is "a critical component to acceptance of this band"[6/] and concurs with Microsoft Corporation ("Microsoft") that adoption of the smallest possible Exclusion Zones is "essential for convincing the private sector to make the significant investments necessary to develop and manufacture devices capable of leveraging 3.5 GHz GAA spectrum,"[7/] including Wi-Fi-enabled devices.

Moreover, commenters also agree that reexamination of the size of the Exclusion Zones is warranted since they rely on outdated technical findings. As Google recognizes, the Exclusion Zones are based on the assumption that commercial networks would incorporate high-power, high-site macrocell operations.[8/] Because the FCC proposes systems with different technical characteristics, it should not adopt NTIA's recommendations, particularly because the record already contains detailed analysis confirming that the protection required for small-cell deployments would be substantially less restrictive than what NTIA mapped.[9/] In addition, WISPA agrees that, rather than adopt overly broad Exclusion Zones, the Commission should adopt "interference protection criteria that are based on real-world incumbent use,"[10/] while Telcordia Technologies, Inc. further adds that additional knowledge regarding use of the 3.5

5/ CTIA Comments at 11 (internal citations omitted); *see also* Google Comments at 8-9; WISPA Comments at 17-19.

6/ 4G Americas Comments at 3.

7/ Microsoft Comments at 6.

8/ *See* Google Comments at 2-10.

9/ *Id*. at 3.

10/ WISPA Comments at 17 (internal citations omitted); *see also* White Space Alliance Comments at 2.

GHz Band by federal users, such as time or general location of use, could allow more efficient sharing of the spectrum with commercial users.[11/]

Based on this consensus, the Commission should reassess the size of the proposed Exclusion Zones in order to better balance the goals of ensuring successful small cell deployment in the 3.5 GHz Band while still providing necessary protections for incumbent users. In so doing, the Commission will make the market for 3.5 GHz equipment and deployment – including Wi-Fi-enabled device deployment – more attractive for investors and innovators.

III. COMMENTERS SUPPORT THE COMMISSION'S PROPOSAL TO RESERVE SPECTRUM SPECIFICALLY FOR GAA USE

In its comments, Wi-Fi Alliance supported the Commission's proposal to adopt a framework that includes a GAA tier that would permit GAA users to operate on a range of frequencies determined by the Spectrum Access System ("SAS").[12/] Wi-Fi Alliance similarly supported the FCC's proposal to reserve 50 percent of available bandwidth in the 3.5 GHz Band for GAA use in any geographic area, with additional frequencies to be made available when not in use by Priority Access License ("PAL") licensees.[13/]

Commenters agree that the FCC should set aside spectrum specifically for GAA use.[14/] As Motorola Mobility notes, reserving a minimum of 50 percent of the available spectrum in any given census tract for GAA use "will provide meaningful capacity for GAA operations while permitting other tiers of users to operate without limitations."[15/] Moreover, as the Shared

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11/ *See* iconectiv Comments at 6-7.

12/ *See* Wi-Fi Alliance Comments at 5-6; *see also FNPRM* ¶¶ 19, 29, 43, 56.

13/ *See* Wi-Fi Alliance Comments at 6; *see also FNPRM* ¶ 28, 56.

14/ *See, e.g.*, AT&T Comments at 19-24; DSA, WSA, and PISC Comments at 2; Comments of InterDigital, Inc., GN Docket No. 12-354, at 4-6 (filed July 8, 2014) ("InterDigital Comments"); Microsoft Comments at 3; Motorola Mobility Comments at 3-5; SSC Comments at 9-11; Comments of Utilities Telecom Council, GN Docket No. 12-354, at 9 (filed July 14, 2014) ("UTC Comments").

15/ Motorola Mobility Comments at 4.

Spectrum Company points out, permitting a minimum of 50 percent of available bandwidth for GAA use will enable the deployment of a number of innovative technologies in the 3.5 GHz Band.[16/] Commenters also agree that the Commission should make additional frequencies available for GAA use on an opportunistic basis when not in use by PAL licensees.[17/] As Microsoft states, adopting this "use it or share it" approach will help ensure that sufficient spectrum is available for use by GAA devices.[18/] In addition, as Dynamic Spectrum Alliance, White Space Alliance, and Public Interest Spectrum Coalition note in their joint filing, requiring sharing of spectrum that remains unused will maximize spectrum utilization.[19/]

Contrary to the assertions made by the Telecommunications Industry Association, permitting GAA users to access unused PAL channels – but not *vice versa* – will not effectively give GAA users "superior" rights over PAL licensees.[20/] GAA users would be prohibited by the SAS from using PAL frequencies when they are in use. PAL licensee rights to use spectrum for which they are authorized will always be superior to GAA access.

IV. THE RECORD SHOWS THAT THE COMMISSION SHOULD REEVALUATE THE CONTAINED ACCESS USER PROTECTION PROPOSAL

As Wi-Fi Alliance asserted in its comments, the Commission should not adopt its proposal to allow CAUs – *e.g.*, hospitals, public safety organizations, and local governments – to request up to 20 megahertz of reserved frequencies from the GAA pool for indoor use within

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16/ *See* SSC Comments at 9.

17/ *See, e.g.*, DSA, WSA, and PISC Comments at 2-3; Google Comments at 18-19; Microsoft Comments at 5; SSC Comments at 9-11; Comments of T-Mobile USA, Inc., GN Docket No. 12-354, at 5 (filed July 14, 2014); Comments of Verizon, GN Docket No. 12-354, at 10-11 (filed July 14, 2014) ("Verizon Comments").

18/ Microsoft Comments at 5.

19/ DSA, WSA, and PISC Comments at 2-3.

20/ *See* Comments of the Telecommunications Industry Association, GN Docket No. 12-354, at 2-3 (filed July 14, 2014).

their facilities.[21/] Other commenters likewise expressed concern about the CAU proposal.[22/] As Microsoft and Sony Electronics, Inc. ("Sony") assert, adding what amounts to a fourth tier to the 3.5 GHz Band framework would needlessly complicate operations in the band and would have the effect of shrinking – or in some cases eliminating – the spectrum available for GAA use in a geographic area.[23/] Moreover, Motorola Mobility agrees that there are additional questions that need to be addressed regarding the proposal, including whether and how a SAS could determine which frequencies are set aside for CAUs.[24/] Although the commenters representing utility interests urge the Commission to adopt the proposal in order to protect the operations of critical communications systems,[25/] Ericsson, Sony, and the Wireless Internet Service Providers Association ("WISPA") agree with Wi-Fi Alliance that – in situations where a CAU might require exclusive spectrum access – the Commission can better accommodate those users by permitting them to obtain or lease PALs.[26/]

V. COMMENTERS SUPPORT EXTENDING THE CBRS RULES TO THE 3650-3700 MHZ BAND

Wi-Fi Alliance's comments supported the proposal to incorporate the 3650-3700 MHz

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21/ *See* Wi-Fi Alliance Comments at 7-8; *see also FNPRM* ¶¶ 58-61.

22/ *See, e.g.*, Comments of Ericsson, GN Docket No. 12-354, at 15-16 (filed July 14, 2014) ("Ericsson Comments"); Microsoft Comments at 3-5; Comments of Mobile Future, GN Docket No. 12-354, at 1, 7-8 (filed July 14, 2014); Motorola Mobility Comments at 16-17; Comments of Sony Electronics, Inc., GN Docket No. 12-354, at 2 (filed July 14, 2014) ("Sony Comments"); Verizon Comments at 20; WISPA Comments at 27-29.

23/ *See* Microsoft Comments at 4; Sony Comments at 2. *See also* Verizon Comments at 20 ("The Commission should therefore not go down the path of earmarking spectrum for a particular class of users. That is especially true here given the added complications that the CAF proposal would create under a system of dynamic frequency assignment.").

24/ *See* Motorola Mobility Comments at 16-17; *see also* Microsoft Comments at 4-5 (noting additional unanswered questions that the FCC should address regarding the CAU proposal).

25/ *See, e.g.*, Comments of American Petroleum Institute, GN Docket No. 12-354, at 7-8 (filed July 14, 2014) ("API Comments"); Comments of The Energy Telecommunications and Electrical Association, GN Docket No. 12-354, at 10-12 (filed July 11, 2014) ("ENTELEC Comments"); Comments of Exelon Corporation, GN Docket No. 12-354, at 5 (filed July 14, 2014) ("Exelon Comments"); UTC Comments at 5-8.

26/ *See* Ericsson Comments at 15-16; Sony Comments at 2; WISPA Comments at 27-28.

band into the proposed CBRS regulatory regime, which will create a 150-megahertz block of spectrum in which existing 3650-3700 MHz band licensees as well as new licensees can expand their services.[27/] Commenters agree that the new CBRS rules should extend to the 3650-3700 MHz band, which will result in numerous public interest benefits.[28/] Shared Spectrum Company, for instance, agrees that including both the 3550-3650 MHz and 3650-3700 MHz bands in the CBRS regulatory regime will enable manufacturers to realize economies of scale and investors and operators to innovate and flourish.[29/] Similarly, Motorola Solutions, Inc. asserts that the additional CBRS spectrum will enhance spectrum utilization and encourage further innovation in equipment and services.[30/] Moreover, as Google states, incorporating a full 150 megahertz of spectrum increases the likelihood that the 3.5 GHz Band will be commercially attractive for wireless operations and will also provide additional flexibility to accommodate CBSD users in the presence of incumbent federal operations.[31/]

Numerous parties express concern that incorporating the 3650-3700 MHz band into the CBRS framework would be overly disruptive to incumbent operations in the band.[32/] Although Wi-Fi Alliance agrees that the CBRS rules should be extended in a manner that takes into consideration incumbents operating in the 3650-3700 MHz band today, it has already observed

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27/ *See* Wi-Fi Alliance Comments at 10-11; *see also FNPRM* ¶¶ 163-169.

28/ *See, e.g.*, AT&T Comments at 20-23; Google Comments at 19-20; InterDigital Comments at 3-4; Motorola Mobility Comments at 3-5; MSI Comments at 2-3; Nokia Solutions and Networks Comments at 11; SSC Comments at 9; Comments of Spectrum Bridge, Inc., GN Docket No. 12-354, at 9 (filed July 14, 2014) ("SBI Comments").

29/ *See* SSC Comments at 9.

30/ *See* MSI Comments at 2.

31/ *See* Google Comments at 19.

32/ *See, e.g.*, API Comments at 4-7; Comments of Blooston 3.65 GHz Coalition, GN Docket No. 12-354 (filed July 14, 2014); ENTELEC Comments at 6; Exelon Comments at 1-4; Comments of Siemens Industry, Inc., GN Docket No. 12-354, at 1-5 (filed July 14, 2014); Comments of Sprint Corporation, GN Docket No. 12-354 (filed July 14, 2014); UTC Comments at 11-19.

that a database can accommodate any temporary mandated protection of grandfathered wireless Internet service providers ("WISPs") just as it accommodates permanent incumbents in the 3.5 GHz Band.[33/] Others agree. For instance, Spectrum Bridge, Inc. asserts that the SAS "is an excellent means of facilitating a transition process that incorporates the 3650-3700 MHz band into the regulatory scheme."[34/] Moreover, as InterDigital notes, the proposed rules will sufficiently protect the investments of incumbents in the 3650-3700 MHz band.[35/] Google likewise anticipates that co-existence with legacy WISP operations will be feasible in the band, particularly because most CBRS operations therein will be low-power, high-density deployments in urban areas (rather than rural and remote areas where WISPs most commonly operate).[36/]

VI. COMMENTERS AGREE THAT THE COMMISSION SHOULD NOT PROVIDE OVERLY BROAD PROTECTION FOR FSS EARTH STATIONS

Although it recognized the need for the Commission to require CBSDs to avoid causing harmful interference to currently operational grandfathered FSS earth stations, Wi-Fi Alliance argued in its comments that the proposed rules should not offer overly broad protection for incumbent operations in the 3.5 GHz Band.[37/] The record reflects agreement that the CBRS rules should be narrowly tailored to ensure protection for FSS stations while maximizing the spectrum that is available for CBSDs.[38/] As WISPA states, the Commission can avoid arbitrary protection zones that overprotect FSS earth stations by taking into account relevant factors to create "real

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33/ *See* Wi-Fi Alliance Comments 11.

34/ *See* SBI Comments at 9.

35/ *See* InterDigital Comments at 4.

36/ *See* Google Comments at 19-20.

37/ *See* Wi-Fi Alliance Comments at 11-14; *see also FNPRM* ¶¶ 145-151.

38/ *See, e.g.*, InterDigital Comments at 12-15; Motorola Mobility Comments at 15-16; Nokia Solutions and Networks Comments at 11; Sony Comments at 5; WISPA Comments at 20.

world" protection zones.[39/] Sony, Nokia Solutions and Networks, and InterDigital agree that certain mitigation strategies could be employed to minimize or eliminate geographic protection around FSS earth station operations, including incorporating information regarding the geo-location position of the station, terrain, the separation distance between the station and the CBSD device, and technical parameters like antenna height and power levels.[40/] As InterDigital argues, incorporating technical and operational information into the SAS can improve the estimation accuracy of the size and shape of the required Exclusion Zone.[41/]

Commenters also agree that the Commission should only protect FSS stations that are in actual use.[42/] As WISPA asserts, by adopting its proposal to inform the SAS Administrators on an annual basis that the earth stations are in actual use in order to retain interference protection, the Commission can help ensure that "non-operating earth stations do not foreclose areas that could otherwise be served by PALs and GAA users without the need to obtain prior consent."[43/] Thus, as Motorola Mobility states, limiting primary FSS operations in the 3.5 GHz Band to existing usage only can result in more robust use of the band for CBRS.[44/]

Concerns raised by certain commenters regarding spectrum sharing do not militate against adoption of narrowly tailored protection criteria. For instance, the Satellite Industry Association ("SIA") and Baron Services, Inc. argue that the Commission should adopt more stringent out-of-band emissions ("OOBE") limits if it permits CBSDs to operate in close

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39/ *See* WISPA Comments at 20.

40/ *See* InterDigital Comments at 13; Nokia Solutions and Networks Comments at 11; Sony Comments at 5 and Appendix at 6; WISPA Comments at 20.

41/ *See* InterDigital Comments at 14-15.

42/ *See, e.g.*, Motorola Mobility Comments at 15-16; WISPA Comments at 20.

43/ WISPA Comments at 20.

44/ *See* Motorola Mobility Comments at 15-16.

proximity to C-Band and S-Band operations (respectively).[45/] However, as described above, adopting protection zones based on real-world technical and operational criteria will ensure that there is adequate protection for incumbent operations while also maximizing the amount of spectrum available for CBSD users. In addition, SIA questions whether the SAS can manage aggregate interference from multiple CBSDs.[46/] However, as Wi-Fi Alliance has asserted, the SAS can be capable of dynamically managing access to GAA spectrum, particularly if incumbent systems were required to provide the same type of information to the SAS that GAA licensees will be required to provide, including, for example, operator identification, device identification, and geo-location information.[47/] Indeed, comments filed by spectrum sharing stakeholders indicate that the SAS is capable of managing interference to incumbents.[48/] Further, as InterDigital points out, requiring both incumbents and CBSDs to provide information to the SAS can permit the SAS to calculate the size of the required protection zone on an individualized basis.[49/] Thus, the record shows that SAS management can provide adequate protection for

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45/ *See* Comments of Baron Services, Inc., GN Docket No. 12-354, at 5-8 (filed July 14, 2014); Comments of the Satellite Industry Association, GN Docket No. 12-354, at 15-19 (filed July 14, 2014) ("SIA Comments").

46/ *See* SIA Comments at 6-13.

47/ *See* Wi-Fi Alliance Comments at 15-16.

48/ *See, e.g.*, Comments of Cantor Telecom, GN Docket No. 12-354, at 10-13 (filed July 14, 2014) (stating that existing spectrum exchange and geo-location database technology can deliver the FCC's vision for the 3.5 GHz Band and that a database can be implemented in less than six months); Comments of Federated Wireless, Inc., GN Docket No. 12-354, at 12-18 (filed July 14, 2014) (arguing that the SAS should be permitted to dynamically determine the appropriate Exclusion Zones as well as dynamically manage interference to incumbents); iconectiv Comments at 6-7 (stating that the SAS can verify the identity of CBSDs using a certificate-based authentication or verification of a shared secret); SBI Comments at 1-6 (stating that expanding upon the functionality currently implemented in the TV White Spaces database to enable three-tier access is well within the technical capabilities of an SAS and that the SAS is scalable to support a virtually unlimited number of CAF venues).

49/ *See* InterDigital Comments at 14.

incumbents while maximizing the availability of spectrum for GAA use, which will lead to increased deployment of small cell technologies to the benefit of businesses and consumers.[50/]

VII. CONCLUSION

As Wi-Fi Alliance and other commenters recognize, the Commission should modify its proposed rules for the 3.5 GHz Band in order to ensure that the rules are narrowly crafted to protect incumbent users while ensuring the successful deployment of small cell operations in the band. While Wi-Fi Alliance is encouraged by the Commission's actions in this proceeding, the need for more spectrum for unlicensed operations continues to grow. It is therefore important for the Commission to continue to identify opportunities – both in this proceeding and elsewhere – to make additional spectrum available for use by these devices.

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50/ *See* Wi-Fi Alliance Comments at 16.