

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

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



COMMENTS OF WHITESPACE ALLIANCE

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Dated: July 14, 2015

COMMENTS OF THE WHITESPACE ALLIANCE

Dear Ms. Dortch:

The undersigned on behalf of the WhiteSpace Alliance write in support of the Commission's adoption of a three-tier access system for the 3550-3700 MHz (3.5 GHz) Band, modeled on the recommendations of the President's Council of Advisors on Science and Technology. This framework enables Incumbent Access, Priority Access (PA) and General Authorized Access (GAA) use and permits spectrum sharing among both licensed and GAA users while protecting incumbents. Implementing rules that embrace the principles described below, within the three-tier framework, will enable greater access to wireless communications and create significant commercial and consumer benefits. WhiteSpace Alliance¹ (WSA) respectfully submits its Comments in the above-captioned Proceeding. WSA commends the FCC for its roadmap to making the entirety of the 3.5 GHz Band available for the commercial use in phases.

- WSA (www.WhiteSpaceAlliance.org) is a global organization that promotes the development, deployment and use of products and services that utilize white spaces and spectrum sharing technologies as a means of efficiently using underutilized spectrum to provide advanced broadband capabilities. WSA promotes the opportunistic use of spectrum which, using geo-location databases or together with sensing technologies and beaconing approaches, that can operate on vacant, unused or unassigned frequencies (as is the case at present in the U.S. with television white spaces), as well as on frequencies that may be allocated for shared spectrum use (as in the 3.5 GHz Band).

¹ WhiteSpace Alliance (www.WhiteSpaceAlliance.org)

- WhiteSpace Alliance has endorsed the United States President's Council of Advisors on Science and Technology (PCAST) report² promoting spectrum sharing and more efficient use of spectrum through new cognitive radio technologies and transceiver standards³. WSA is developing technologies that allow spectrum sharing between various kinds of systems over many bands and in many different markets.
- WSA has previously filed comments on the FCC's 3.5 GHz NPRM as well as participated in the workshop conducted on January 14th 2014, the links to which may be found here^{4,5}

The WhiteSpace Alliance would like to further make the Following Comments:

EXCLUSION ZONES

- WSA commends the FCC and the NTIA for their continued efforts to reduce the Exclusion Zones. WSA understands that the Federal Services operating in these bands are extremely important and appreciates the balancing act played by the commission to create a commercial use case for this spectrum while ensuring that the Federal Systems can operate without interference.
- WSA urges the commission that any geographic exclusion zones should be based on actual deployment scenarios and sized solely to protect incumbent users. The Commission should minimize exclusion zones for incumbents as much as possible, by

² http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast_spectrum_report_final_july_20_2012.pdf

³ <http://www.dailymarkets.com/stock/2013/01/28/whitespace-alliance-endorses-pcast-report-on-spectrum-sharing/>

⁴ <http://apps.fcc.gov/ecfs/document/view?id=7022122443>

⁵ <http://apps.fcc.gov/ecfs/document/view?id=7521065290>

adopting requirements that are based only on the interference tolerance of incumbent operations and not the tolerance of potential new operations. While incumbents in the 3.5 GHz band have a right to reasonable protection from harmful interference, providers operating under the new rules should be allowed – consistent with their own business plans – to operate in environments where they may encounter interference. This approach conforms to the general, highly successful principle that secondary users are not entitled to interference protection from users with higher priority rights and therefore must adjust to the interference environment as they find it.

ENVIRONMENT SENSING CAPABILITY

- WSA commends the FCC for allowing the Environment Sensing Capability (ESC) to enable the CBRS Devices (CBSD) to operate within the Exclusion Zones.
- WSA companies have all the know-how needed to implement ESC Devices that may provide sensing information to the Spectrum Access System (SAS) on the presence of the Incumbents.
- WSA companies have started working to create a Standard on Spectrum Characterization and Occupancy Sensing (SCOS) for ESC Devices within the IEEE 802.22 Working Group under the Project IEEE P802.22.3.⁶
- WSA encourages the Govt. to participate in this Standards development process to create an interoperable specification that is acceptable to both, the Government as well as the industry.

⁶ IEEE P802.22.3 Project Authorization on Spectrum Characterization and Occupancy Sensing
http://www.ieee802.org/22/P802_22_3_PAR_Detail_Approved.pdf

BEACONING APPROACHES TO SPECTRUM SHARING

- WSA believes that the FCC should not ignore another readily available mechanism for Spectrum Sharing, namely the *Wireless Beacon*.⁷
- The FCC should consider beaconing as an optional method, to be used in conjunction with a Spectrum Access System (SAS) to enable spectrum sharing, for ensuring reasonable incumbent protection while shrinking the proposed exclusion zones.
- WSA Members are currently developing an interoperability standard for the Advanced Beaconing System under the IEEE 802.22.1⁸ Revision Project for spectrum sharing in the 3.5 GHz Band.
- WSA would welcome the participation of the Government Team to create such an interoperable standard that would meet the requirements of the FCC and the NTIA.
- There are several advantages of using a Beaconing Approach. These advantages may be listed as follows:
 1. The Advanced Beacon System may operate outside the Frequency Bands of the Federal Systems of the Incumbent Users. For example, High Frequency (HF), Very High Frequency (VHF) or Ultra High Frequency (UHF) Bands may be used where the propagation of a Beacon Signal is likely to be favorable to cover the required distances that may exceed the exclusion zones. Hence data storage or disclosure issues are considerably reduced.

⁷ <http://apps.fcc.gov/ecfs/document/view?id=7521065290>

⁸ IEEE P802.22.1 Revision Standard on Advanced Beaconing for Spectrum Sharing
http://www.ieee802.org/22/P802.22.1_revision_PAR_Approved.pdf

2. The Advanced Beacon Signal Detection is likely to be more reliable due to pre-defined Signal Structure that may be detected even at negative Signal to Noise Ratios (SNRs)
3. Authentication Features may be embedded inside the Beacon Signature which will enhance security of the system
4. The Advanced Beacon System could be made scalable to accommodate multiple Incumbent Systems operating in the same area.

ADOPTION OF A THREE TIER SYSTEM AND USE IT OR SHARE IT

APPROACH

- WSA is pleased with FCC' s decision to adopt the Three Tier System from the Start.
- WSA has continued to promote greater spectrum efficiencies in all its previous comments to the FCC. WSA welcomes FCC' s decision of allowing the General Authorized Access (GAA) CBSDs to operate in frequency bands and at locations where the Priority Access Licenses (PAL) devices have not deployed.
- Given the nation's growing demand for wireless bandwidth, WSA is pleased with the Commission decision to move forward with a three-tier system from the start. Immediate adoption of a three-tier framework for accessing the 3550-3700 MHz band will benefit the economy by enabling more intensive use of the band, by promoting additional rural broadband deployment, and by lowering entry barriers for a diverse range of users and innovative uses. The Spectrum Access System (SAS) technology is capable of implementing the three-tier system, and the approaches required to protect first-tier incumbents can be applied equally effectively to secondary user protection. WSA

welcomes FCC's decision to include the 3650-3700 MHz band as well as the 3550-3650 MHz band. As the Commission has suggested, there will be "long term gains and significant public interest benefits to extending the rules proposed here to the 3650-3700 MHz band, both in terms of terms of spectrum efficiency and availability, and economies of scale for equipment across the full 150 megahertz." Moreover, co-existence with legacy wireless Internet service provider (WISP) operations will be feasible, especially given that most new deployments in this band will to be lower-power, small cell operations. To the extent necessary, a database can accommodate any mandated protection of grandfathered WISPs just as it accommodates permanent incumbents.

- We support the Commission's proposal to set aside a substantial portion of the band for GAA use on a nationwide basis. Allowing a balance of licensed and GAA access will both, enable significant investment in small cell networks and encourage the wireless broadband innovation enabled as a result of unlicensed access.
- We also agree that all certified devices should operate across the entire band and that the SAS should be permitted to dynamically assign channels to PAL and GAA users. Such an approach will support economies of scale for devices and will ensure that devices operating on PA spectrum do not get "stranded" if the licensee fails to renew its priority access rights.
- WSA welcomes the Commission's decision to enable GAA use of unused spectrum across the entire band. Priority Access Licensees should be entitled to protection from GAA users in the areas where they are offering service or preparing to deploy service, but if the PAL licensees offer service only in a portion of the licensed area, then the remaining area should be open for shared use by GAA users on a non-interfering basis.

Adopting this approach will be particularly important if the Commission elects to assign PAL licenses on a census-tract basis: census tracts can be geographically large while licensed small cell deployments may be geographically limited within a tract. In order to maximize spectrum utilization, the Commission should require sharing of spectrum that remains unused.

- FCC model of selecting one less Licensee from the number of PAL seeker is a good. However, this should not result in reduction of the competition by redistribution of the same amount of spectrum amongst fewer Licensees
- The Commission should not require *every* end-user devices to register with an SAS, provided that an Access Point or a Network Manager acts as a Proxy and prescribes the zone of operation of the end-user equipment and that access point is itself registered with an SAS in compliance with the relevant rules. Requiring all end-user devices to register with the SAS has the potential to cause significant increases in the cost of consumer equipment.

III. CONCLUSION

Private sector access to the 3.5 GHz band and the initiation of the Citizens Broadband Service hold great potential for successful spectrum sharing that meets the demands of wireless broadband users. We commend the FCC and the NTIA for their path breaking regulations to create the CBRS using Spectrum Sharing Technology Innovations. We are happy to continually work with the FCC to optimize the CBRS Rules and provide any technology know-how to better utilize this spectrum while not interfering with the incumbent users.

Respectfully submitted,
WHITESPACE ALLIANCE

By: /s/ Apurva N. Mody

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