

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

In the Matter of)	
)	
Amendment of Part 15 of the Commission's Rules for Unlicensed White Space Devices)	ET Docket No. 16-56 RM-11745
)	

**NOTICE OF PROPOSED RULEMAKING
AND
ORDER**

Adopted: February 25, 2016

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Comment Date: (45 days after the date of publication in the Federal Register)

Reply Date: (75 days after the date of publication in the Federal Register)

By the Commission:

I. INTRODUCTION

1. Unlicensed white space devices are used to provide a variety of wireless services, including broadband data. These devices operate in the bands currently allocated for television broadcasting, where the propagation range is well suited to providing high data throughput service to unserved and under-served areas of the country at relatively low cost. White space devices operate on television channels that are not assigned for broadcasting and other protected services in a geographic area. To ascertain which TV channels are available for their use, white space devices transmit their geographic location to a Commission-recognized database that, in turn, transmits to the device a list of vacant channels at its location on which it can operate.

2. By this Notice, the Commission is proposing to amend Part 15 subpart H of its rules to improve the quality of the geographic location and other data submitted for fixed white space devices operating on unused frequencies in the TV Bands and, in the future, the new 600 MHz Band for wireless services (600 MHz Band).¹ The proposals are designed to improve the integrity of the white space database system and, as white space device deployments grow, to increase the confidence of all spectrum users of these frequency bands that the white space geolocation/database spectrum management scheme fully protects licensees and other authorized users. The proposed rules would eliminate the professional installer option for fixed white space devices² and require that each fixed white space device incorporate a geo-location capability to determine its location. This Notice also proposes options to accommodate fixed white space device installations in locations where an internal geo-location capability is not able to provide this information. Further, we clarify and propose to modify other rules regarding fixed white space device registration to ensure the integrity of the information provided by white space device users.

¹ The TV Bands consist of the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz, and 470-698 MHz, excluding 608-614 MHz. 47 CFR § 73.603(a), (c). The broadcast television incentive auction will recover a portion of the current TV Bands for new 600 MHz band wireless services and condense (*i.e.*, repack) the remaining television broadcast stations into the new television band. The specific frequency range for the 600 MHz Band wireless service will depend on the amount of spectrum recovered by the incentive auction. *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Report and Order, 29 FCC Rcd 6567 (2014) (*Incentive Auction R&O*).

² 47 CFR § 15.711(c).

The proposals in this Notice will improve the accuracy and reliability of the fixed white space device data recorded in the white space databases and assure that the potential to cause interference to protected services is minimized.

3. We are issuing this Notice in response to a petition submitted by the National Association of Broadcasters (NAB Petition).³ NAB alleges that there are data errors in the registrations records for fixed devices in the white space databases, argues that the accuracy of this data is critical for avoiding interference to licensed users of the spectrum, and requests that the Commission undertake rulemaking and other actions to correct and avoid such errors.

4. In the accompanying Order, we decline to suspend operation of the white space databases pending completion of this rulemaking or to adopt temporary measures to ensure the integrity of each existing and new entry in the database, as requested by NAB in its petition.⁴ While we agree that some measures to improve white space database accuracy warrant consideration at this time, we find that the proactive measures taken thus far by the Commission and the database administrators, the current state of the databases' accuracy, and our continuing oversight are sufficient to proceed without the need to impose the safeguards proposed by NAB, particularly in light of the disruption these proposals would cause to the white space devices initiative.

II. BACKGROUND

5. The Commission's Part 15 rules allow unlicensed fixed and personal/portable white space devices to transmit in the TV Bands and the new 600 MHz Band at locations where frequencies are not used by licensed services and certain additional types of authorized operations.⁵ The rules are designed so that white space devices operating pursuant to instructions from a database do not cause interference to full power television, Class A, low power, and TV translator stations and a number of additional operations (collectively "protected services").⁶ After the incentive auction, white space devices will also need to protect new wireless operations in the 600 MHz Band.⁷ The Commission recently modified the white space device rules to provide additional flexibility and guidance for operating in the repacked broadcast television band as well as the new 600 MHz Band after the incentive auction.⁸

6. The rules provide for three types of white space devices: fixed and Mode I and Mode II

³ National Association of Broadcasters, Emergency Motion for Suspension of Operations and Petition for Rulemaking, RM-11745, March 19, 2015 (NAB Petition). The Commission sought comment on this petition. *Consumer & Governmental Affairs Bureau Reference Information Center Petition for Rulemaking Filed*, Public Notice, Report No. 3016, (CGB April 1, 2015).

⁴ NAB Petition at 12-13.

⁵ The term "white space" refers to a TV channel in a geographic area that is not used by a licensed service or other protected operations such that an unlicensed device can operate on that channel without causing interference. The rules for operation of white space devices are set forth in Part 15, subpart H of the rules, Sections 15.701-15.717 ("white space rules"), 47 CFR part 15 subpart H.

⁶ The additional operations that use the TV bands and are protected from interference from white space devices include 1) broadcast auxiliary service stations, 2) low power auxiliary service devices (licensed wireless microphones and certain other types of devices used in motion picture program production), 3) wireless medical telemetry service (WMTS) stations, 4) television signal receive sites of multiple video program distributors (MVPDs) and low power TV/TV translator stations, 5) land mobile stations operating in eleven cities on TV channels 14-20, 6) radio astronomy sites (channel 37), and 7) Offshore Radiotelephone Service stations (Gulf of Mexico region). 47 CFR §§ 15.712, 15.713.

⁷ *Incentive Auction R&O*, 29 FCC Rcd at 6570, para. 1.

⁸ *Unlicensed Operations in the Television Bands, Repurposed 600 MHz Band, 600 MHz Guard Bands and Duplex Gap, and Channel 37*, Report and Order, 30 FCC Rcd 9551 (2015) (*Part 15 Report and Order*).

personal/portable devices.⁹ To prevent harmful interference to protected services, the rules generally require that white space devices provide their location (*i.e.*, geographic coordinates) to a white space database and operate only on location specific channels provided by that database.¹⁰ The location for fixed white space devices may be determined either through an internal geo-location capability or by a professional installer.¹¹ Mode II personal/portable white space devices are required to determine their location from an internal geo-location capability.¹² Mode I personal/portable white space devices do not use an internal geo-location capability, but instead may only operate when connected to a fixed or Mode II white space device and only on the same channels as that controlling white space device (*i.e.*, master-client relationship).¹³

7. White space devices must provide varying degrees of identifying information to a white spaces database.¹⁴ Fixed white space devices must register with a database and in addition to its location, must also provide the device's identifying information (FCC identification number and manufacturer serial number),¹⁵ antenna height, the name of its owner, and contact information for the party responsible for its operation.¹⁶ Mode II personal/portable white space devices do not need to register with a database (*e.g.*, the database does not create a record of the owner and contact information) and are only required to provide their location and the device's identifying information to a database. Mode I personal/portable white space devices are only required to provide the device's identifying information.

8. The Commission has designated ten entities as white space database administrators and approved the database systems of five of those entities to provide service to white space devices.¹⁷ Each white space database system contains records and other information that enable it to determine lists of available channels for the white space devices it serves.¹⁸ The databases are required to synchronize their records on a daily basis or more often, as appropriate, to ensure consistency in the records of protected services and the channel lists they provide to white space devices.¹⁹

9. On March 19, 2015, the National Association of Broadcasters submitted an Emergency Petition for Suspension of Operations and Petition for Rulemaking in which it requests that the Commission amend its rules for fixed white space devices to correct "serious design flaws" in the white space database system.²⁰ First, NAB proposes that the rules be modified to require the incorporation of

⁹ 47 CFR § 15.703(i)-(j).

¹⁰ 47 CFR § 15.711(c)-(e).

¹¹ 47 CFR § 15.711(c).

¹² 47 CFR § 15.711(d).

¹³ The list of available channels provided to a Mode I device by a fixed or Mode II device is based on the location of the master device that provides the list of channels. 47 CFR § 15.711(e).

¹⁴ 47 CFR § 15.713(h).

¹⁵ 47 CFR § 15.713(a).

¹⁶ 47 CFR § 15.713(g).

¹⁷ The Commission has designated as database administrators Spectrum Bridge, Inc., iconectiv, Google, Inc., Keybridge Global, LLC, LStelcom, Inc., RadioSoft, Inc. (RadioSoft, Inc. has now become a subsidiary of LStelcom and will not operate a separate database), Comsearch, Neustar, Inc., Airity, Inc. and Microsoft Corporation. *Unlicensed Operation in the TV Bands*, Order, 26 FCC Rcd 554 (2011) and *Unlicensed Operation in the TV Bands*, Order, 26 FCC Rcd 10599 (2011). Database systems currently approved to provide service are those of Spectrum Bridge, Inc., iconectiv, Keybridge Global, LLC, Google, Inc., and LStelcom, Inc./RadioSoft, Inc.

¹⁸ 47 CFR § 15.713.

¹⁹ 47 CFR § 15.715(l).

²⁰ NAB Petition at 1.

geo-location capability in every fixed and mobile white space device and to eliminate the option for professional installation for fixed devices. NAB argues that the white space concept is premised on accurate location information and that the “professional installer” option for fixed devices provides an opportunity to manually input a location that does not coincide with that device’s actual location. Thus, it contends, the current rule fails to ensure that the fixed white space device location information in the databases is accurate. Second, NAB requests that we modify the rules to require that the database administrators confirm the integrity of the white space device’s registration information and confirm the email addresses and telephone numbers of the contact person before allowing a fixed device registration to be completed. NAB alleges that the databases contain many instances of blank or incorrect names in fields identifying device owners and contact persons and invalid device serial numbers. It opines that this situation increases the likelihood of interference to protected services. Finally, NAB states that the various white space databases should have the same number of fixed white space device registrations and that each of these registrations should contain identical information across the databases, but that is not the case. NAB also asks that the Commission suspend operations of the white space databases pending completion of the requested rulemaking, or in the alternative, adoption of temporary measures to ensure the integrity of each existing and new entry into the databases. Eleven parties submitted comments in response to NAB’s Petition.²¹

10. On July 17, 2015, NAB and four white space device manufacturers²² (collectively “NAB and the Manufacturers”) submitted an *ex parte* letter to the Chief of the Commission’s Office of Engineering and Technology stating that they have worked cooperatively to address many of the issues raised in NAB’s Petition.²³ These parties jointly propose a plan (NAB and Manufacturers’ Plan) to eliminate the location accuracy issues identified by NAB by requiring all fixed white space devices to incorporate a geo-location capability or be under control of a device that includes that capability. They state that the Commission should transition to a system that would not require or would minimize any human intervention in determining the geolocation information for devices. The NAB and Manufacturers’ Plan also includes specific provisions for serving multiple fixed devices from a single geo-location device and for indoor operation of low power fixed devices, and it also suggests adjustments to the separation distances between fixed devices and television service contours to account for changes in location accuracy. Their plan would grandfather existing fixed white space device inventory and provide sufficient transition time for manufacturers to incorporate these changes by allowing existing devices to continue to operate and be deployed during the transition.

11. On August 11, 2015, the Commission released the *Part 15 Report and Order* in which it made certain changes to the rules for unlicensed white space devices to allow for more robust service and

²¹ Four commenters support NAB’s Petition and seven commenters are opposed. Supporting commenters are the ABC Television Affiliates Association, the CBS Television Network Affiliates Association, the FBC Television Affiliates Association, and the NBC Television Affiliates (together, the Affiliates Associations), AT&T Services Inc. (AT&T), CP Communications, LLC (CP Communications), and Karl Voss, Chief Engineer, KAET, Phoenix (Karl Voss). Commenters opposed or disagreeing with NAB’s Petition are Adaptrum, Inc., Carlson Wireless Technologies, Inc., 6Harmonics, KTS Wireless, Inc., and Meld Technology, Inc. (collectively the “Joint White Space Manufacturers”), the Dynamic Spectrum Alliance (DSA), Google, Inc., Microsoft Corporation, Spectrum Bridge, Inc., the Whitespace Alliance (WSA), and the Wireless Internet Service Providers Association (WISPA). Karl Voss and NAB also submitted reply comments.

²² The four white space device manufacturers are: Adaptrum, Inc., Carlson Wireless Technologies, KTS Wireless and MELD Technology

²³ Letter from Haiyun Tang, Adaptrum, Inc.; James Carlson, Carlson Wireless Technologies, Inc.; Larry W. Koos, Koos Technical Services, Inc.; Jordan Du Val, MELD Technology, Inc.; and Rick Kaplan, National Association of Broadcasters, to Julius P. Knapp, Chief, Office of Engineering and Technology, RM-11745 (filed Jul. 17, 2015) (NAB and Manufacturers’ Plan). The letter indicates that white space devices manufactured by Adaptrum, Carlson, KTS and MELD represent 95% of deployed devices registered in white space databases.

efficient spectrum use. In that action, the Commission acknowledged the NAB Petition and the NAB and Manufacturers' Plan but did not act on the issues addressed in those submissions, stating that it intended to commence a new proceeding to address those issues.²⁴

III. NOTICE OF PROPOSED RULEMAKING

12. Accurate location information is the linchpin for minimizing the risk of harmful interference in the white space spectrum sharing scheme. The location that a white space device reports to its database is used to determine the channels that the device can use without causing harmful interference to any protected services. The success of the database access paradigm in preventing harmful interference to licensed and other protected services thus depends in significant part on the accuracy of the location data provided to a database by the white space devices it serves. In addition, if harmful interference were to occur to a protected service, it is important that the contact information for the device operator is accurately maintained in the database.

13. NAB states that its review of the fixed white space device registrations in the white space databases shows that inaccurate data and/or the potential for entry of inaccurate data is an issue for fixed device registrations. Several database administrators take issue with NAB's characterization of the state of the databases. For example, Spectrum Bridge comments that each manufacturer tests their white space devices prior to shipping. Such testing involves registering the white space device to ensure proper operation and that such registrations typically use a common set of locations, chosen because of the expected result from the databases.²⁵ While we agree that there are legitimate reasons for many of the database entries identified by NAB as erroneous, we nevertheless undertook our own independent review of the fixed white space device registrations. This review revealed that there were, in fact, some data issues that needed to be addressed such as no entries in required fields and some obviously erroneous data that was not necessarily associated with a test record.²⁶ Once contacted by the Commission, the white space database administrators quickly took remedial actions to correct or delete all records with obviously false or erroneous identification and contact information.

14. To ensure that such errors do not recur, the OET staff has worked with the White Space Database Administrators Group, which includes all of the designated white space database administrators, to craft a synopsis, now posted on the FCC's website, of the Commission's Part 15 database validation requirements for fixed white space device registration data.²⁷ These validation requirements prescribe a set of basic criteria for acceptable entries in each of the fixed white space device registration data fields and are intended to provide a baseline filter to avoid common errors in the entry process. For example, these requirements specify that fields may not be left blank or that phone numbers cannot have a 555 exchange.

15. There remain in the databases a number of fixed white space device registrations with locations that are different from the place where the device is actually operated. These registrations are for test devices operated by white space device manufacturers to simulate the devices' operation in geographic areas where channel availability will differ. OET staff has discussed this practice with the manufacturers and database administrators and has been assured that measures such as operation in enclosed facilities are taken with these test devices to ensure that they do not cause interference to protected services. To date we are not aware of any interference from operation of fixed white space test

²⁴ *Part 15 Report and Order*, 30 FCC Rcd at 9560, footnote 37.

²⁵ Spectrum Bridge Comments at 3-4, Google Comments at 2-3.

²⁶ For example, telephone numbers with a 555 exchange, blank contact information fields, and multiple instances of devices with the same serial number were in the database.

²⁷ The "Validation Requirements for Fixed White Space Registrations" are available on the OET white space web page at <https://www.fcc.gov/general/white-space-database-administration>.

devices at a location different from the test location where the device is registered. OET staff are working with the database administrators and manufacturers to develop controls and practices that will allow the manufacturers to fully exercise their equipment in a test mode while ensuring that interference does not occur. We invite suggestions on ways to handle test records in the database so that they are clearly identified.

16. With respect to the issue of differing numbers of fixed white space device registration records in each of the databases, we note that our analysis revealed that such discrepancies were the result of differences in the length of time each database retained records for inactive devices. Spectrum Bridge asserts that the different data retention policies of the various white space database administrators is the result of differing interpretations of the Commission's Second Report and Order in the White Space proceeding.²⁸ It explains that paragraph 211 of that document stated that if a fixed device does not check the database for three months, the database administrator is required to remove the device's registration from the database. However, that requirement was not codified in the rules, and, according to Spectrum Bridge, some of the database administrators claim that it was not clear that the obligation to remove the registration after this three-month period was, in fact, a requirement.²⁹ The Commission subsequently issued a clarification in its recent *Part 15 Report and Order*, by codifying the requirement into the rules.³⁰ The white space database administrators have now all implemented the data deletion policy which remedies the synchronization issue pointed out by NAB.

17. We recognize that incorrect data for fixed white space devices increases the likelihood of interference and diminishes our ability to resolve any interference that may occur, and we must therefore take corrective actions to improve conditions as deployment of unlicensed white space devices grows. We are not persuaded by arguments that we do not need to take action to modify our rules since the incorrect data has not resulted in interference.³¹ Because only a relatively small number of fixed white space devices have been deployed, the number of opportunities for interference has been small. It is obvious, however, that if the location provided by a fixed white space device to a database is incorrect, the list of available channels provided by the database to the device could include channels that are used by protected services and harmful interference could occur. Similarly, incorrect entries for the data identifying a device and the parties to contact regarding its operation can impede the resolution of interference, if any were to occur. Because we expect white space device deployments to continue to grow, it is important to improve the quality and integrity of the information in the databases to avoid the potential of harmful interference to protected services.

18. In this Notice, we propose and seek comment on revisions to the geo-location and registration requirements for fixed white space devices. We propose to adopt many of the recommendations outlined in the NAB and Manufacturers' Plan and believe that our approach will improve the integrity of the white space database system and better ensure efficient and beneficial use of white spaces while protecting licensees and other authorized users. Specifically, we propose to eliminate the current option for a professional installer to determine and enter the geographic coordinates for a fixed

²⁸ Spectrum Bridge Comments at 3, *citing Unlicensed Operation in the TV Broadcast Bands; Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band*, Second Report and Order and Memorandum Opinion and Order, 23 FCC Rcd 16807, 16880, para. 211 (2008).

²⁹ Spectrum Bridge Comments at 2-3.

³⁰ *Part 15 Report and Order*, 30 FCC Rcd at 9658, para. 259. The provision to delete registrations of fixed white space devices that have not contacted the database for three months was codified at 47 CFR § 15.715(o).

³¹ Dynamic Spectrum Alliance Comments at 1, Spectrum Bridge Comments at 2, Adaptrum Comments at 1, Google Comments at 5, Microsoft Comments at 1, WISPA Comments at 3, White Space Manufacturers Comments at 4, and Whitespace Alliance Comments at 2.

white space device.³² We propose to require that these devices obtain their coordinates from a geo-location capability incorporated into the fixed white space device or from an external geo-location source to which the fixed white space device is connected. We also propose to require the database administrators to verify for each registered fixed white space device the email address and phone number provided for the contact person before providing service to the fixed device. These changes are intended to ensure the accuracy of fixed white space device location and contact information reported to the white space databases. Interested parties are requested to comment on and offer suggestions for alternatives to all aspects of these proposed rule changes and plans for improving the quality of fixed white space device registration data reported to the white space databases.

A. Location Data

19. Under the current rules, the geographic coordinates and antenna height above ground of a fixed white space device “shall be determined at the time of installation and first activation from a power-off condition by either an incorporated geo-location capability or a professional installer.”³³ To date, most fixed white space devices certified by the Commission do not incorporate a geo-location capability and thus the geographic coordinates for most fixed white space devices now in the market are determined by a professional installer. The rules also state that the geographic coordinates and antenna height above ground “may be stored internally in the white space device...either by means of the device’s incorporated geo-location capability or through the services of a professional installer.”³⁴ The rules do not address how this information is to be provided to the database administrators when the fixed device is registered, whether electronically directly from the device to the database or manually entered into the database by the party responsible for providing the registration information. Under the current rules, we have seen numerous instances where questionable location data have been provided to the databases for fixed white space devices, and this undermines the integrity of the interference protection scheme we adopted.

20. Our objective in this proceeding is to improve the accuracy of the geo-location data provided to the databases and thus ensure the integrity of and confidence in the system. We propose to do this by modifying Section 15.711(c) to eliminate the option for professional installation of fixed white space devices, thereby eliminating the possibility that manual data entry could cause incorrect location data to be stored in the white space device or provided to a database. We propose instead to require that fixed white space devices include a geo-location capability that can automatically determine its geographic coordinates, *e.g.*, without manual intervention.³⁵ We also propose that the geographic coordinates shall be stored automatically in the fixed white space device and transmitted electronically directly from the device to the database, rather than entered manually in the database, thereby further reducing the possibility of introducing data errors.³⁶ We believe that in the long term, as fixed white space device deployments increase, this approach will make it easier to install and register these devices and to reduce the risk of interference caused by inaccurate data. We seek comment on these proposals.

³² This proposed change is based upon the circumstances specific to fixed white space devices and white spaces databases. We note that the Commission permits professional installation for a variety purposes. See, *e.g.*, 47 CFR §§ 15.203, 15.231 (a), 15.247 (c), 15.407 (a), 96.39 (a), 96.45 (a).

³³ 47 CFR § 15.711(c)(1).

³⁴ *Id.*

³⁵ The rules already require Mode II personal portable/devices to incorporate in the device a geo-location capability. 47 CFR § 15.711(d).

³⁶ We are not proposing to change the rule that allows a fixed white space device without a direct connection to the internet to use another fixed white space with an internet connection as a pass through for its data. 47 CFR § 15.711(c).

21. We propose that when a fixed white space device is moved to another location or its coordinates become altered, the device's geographic coordinates and antenna height above ground must be re-established and the device re-registered with a database. With regard to the geographic coordinates, we propose that they be re-established using an incorporated geo-location capability. We seek comment on these proposals and on whether a re-registration requirement should apply to any change in location or only those changes where the coordinates differ by more than the accuracy requirement (± 50 meters) from the last registered location.³⁷ With respect to the antenna height above ground, we seek comment on whether we should require that this height be determined automatically using the fixed device's incorporated geo-location capability (e.g., GPS).³⁸ Because the vertical height accuracy of GPS is typically less than the horizontal location accuracy,³⁹ we also seek comment on whether we should allow users (including professional installers and operators) to override an automatically determined height if it proves to be inaccurate, or whether we should simply allow users to manually enter the antenna height above ground in all cases.⁴⁰

22. We also propose to modify the current rule that requires a fixed white space device to contact the database at least once a day to verify that its operating channels continue to be available for its use.⁴¹ We propose to require a fixed white space device to check its coordinates once each day, except when not in operation, and to report its geographic location to the database when it makes its daily request for a list of available channels.⁴² The daily geo-location re-check operation would provide multiple observations that could be used to reduce the uncertainty of the device's location. Should the geographic coordinates reported each day be treated by the white space database as a modification of the registration record (i.e., the registration record is updated each day)? Should the registration record be updated only if the difference in location exceeds 50 meters?⁴³ We do not expect this requirement to be burdensome to a user since we are proposing that it be performed automatically through the device itself by simply activating and accessing its geo-location capability. What would be the impact on device manufacturers and database administrators? We seek comment on these proposals.

³⁷ 47 CFR § 15.712

³⁸ We note here that the Commission recently decided not to consider antenna directivity for fixed white space devices in determining channel availability. *See Part 15 Report and Order*, 30 FCC Rcd at 9579, para. 67. The Commission has received petitions asking it to reconsider this decision and, if we were to do so, we would consider in that proceeding how the information necessary to permit such operations would be included in the white space databases.

³⁹ *See e.g.*, Global Positioning System Standard Positioning Service Performance Standard, 4th Edition, September 2008 which states that, ". . . well-designed GPS receivers have been achieving horizontal accuracy of 3 meters or better and vertical accuracy of 5 meters or better 95% of the time." (Page v). Available at: <http://www.gps.gov/technical/ps/2008-SPS-performance-standard.pdf>

⁴⁰ The antenna height above ground for fixed white space devices is limited to 30 meters, except that the antenna height above ground may not exceed 10 meters for fixed white space devices operating in the TV bands or 600 MHz guard bands at 40 milliwatts EIRP or less, or for fixed devices operating across multiple contiguous TV channels at 100 milliwatts EIRP or less. 47 CFR § 15.709(g)(i). If the antenna height above ground reported to the database exceeds the applicable height limit, the database will not provide a list of available channels to the device. Thus, a fixed white space device that complies with the limit on antenna height above ground would not be able to operate if it reports to the database an automatically determined antenna height above ground that is inaccurate and in excess of the height limit.

⁴¹ 47 CFR § 15.711(c)(2)(iii).

⁴² *Id.*

⁴³ 47 CFR § 15.712.

23. We recognize, as does NAB and many of the commenters, that there will be many important applications for fixed white space devices in which the device needs to be installed where an incorporated geo-location capability will not function.⁴⁴ For example, a GPS receiver may not be able to determine its location when located deep within a building, but may have no difficulty doing so when located near a window or outside. We believe it is essential that our rules not preclude or otherwise unnecessarily restrict the installation of fixed white space devices in such cases. To accommodate such situations, the revised rules will need to provide flexibility to allow a geo-location capability to be provided through an alternate source. Thus, we propose to permit fixed white space devices to obtain their geographic coordinates from an external source that is connected to the fixed white space device when the internal geo-location capability does not function.⁴⁵ We also propose that, in cases where the geo-location capability is provided by an external source connected to the fixed white space device, the fixed device and external geo-location source would be required to communicate using a secure method that ensures that the fixed device obtains information only from a source that has been approved for that function by the Commission's equipment certification program.⁴⁶ If the fixed white space device is unable to verify that the external source from which it is receiving geo-location data is an approved source, the fixed device would not be allowed to use that received data when reporting its location to the database. Should each fixed white space device be associated with specific external geo-location sources or should manufacturers have the flexibility to design fixed white space devices to operate with a variety of geo-location sources as long as such sources are approved for use with the fixed white space device? We seek comment on these proposals.

24. If we permit a fixed white space device to rely on an external geo-location source, we have to consider how such an arrangement would ensure that our objective would be met, namely that the geographic coordinates for each fixed white space device are reasonably accurate and will ensure the integrity of and confidence in the interference protection scheme under these rules. To address this concern, the NAB and Manufacturers' Plan makes specific suggestions for how fixed devices should rely on an external geo-location source for determining the geographic coordinates of a fixed white space device.⁴⁷ They suggest that the external geo-location source would be required to be connected at all times to the fixed white space device, and that the fixed white space device would be required to cease transmitting if the connection to the external geo-location source is disconnected or ceased to function properly. NAB and the Manufacturers suggest that the connection between the fixed white space device and the external geo-location source could be by Ethernet, USB, serial port or other connection, and a fixed device would be required to be located within 100 meters of the geo-location source. The parties also suggest that a separate geo-location source may be connected to, *i.e.*, to serve, more than one fixed device at the same general location (*e.g.*, within the same building) as long as the white space devices it serves are all located no more than 100 meters from the geo-location source. We request comment on

⁴⁴ WISPA Comments at 7, White Space Manufacturers Comments at 2, and Whitespace Alliance Comments at 6. The White Space Manufacturers are Carlson Wireless Technologies, Inc., 6Harmonics, KTS Wireless, Inc., and Meld Technology, Inc. The Whitespace Alliance includes device manufacturers, chip manufacturers, service providers, research laboratories and database operators.

⁴⁵ We use the phrase "external geo-location source" to refer to a device that has the ability to determine its own geographic coordinates and provide them to a fixed white space device.

⁴⁶ Applications for FCC equipment certification for fixed white space devices that have the capability to use geographic coordinates obtained from a separate source would be required to include a detailed description of the security and device authentication protocol used between the fixed device and geo-location determining source. If the geo-location determining source approved for operation with a fixed device were to be replaced or modified or a new source added, a permissive change certification application would need to be filed for the fixed device to add the new geo-location source.

⁴⁷ NAB and Manufacturers' Plan at 3-4 (proposed text of Section 15.711).

these specific suggestions.⁴⁸ Do the methods suggested by the NAB and Manufacturers' Plan provide sufficient flexibility in the design of fixed devices without compromising our goal of ensuring that a device operates at the location reported to its databases. Is it necessary for a fixed white space device to be connected to its external geo-location source by a cable? One alternative to the NAB and Manufacturers' Plan might be to permit the connection to the geo-location source via wireless. We seek comment on this alternative. Because allowing wireless connections may create a path for entering erroneous location data, however, we ask commenters to address whether safeguards tailored to the wireless environment are needed to ensure location data is within the required accuracy guidelines (*i.e.*, that the device providing the location information is not at a location far away from the fixed device), and, if so, what they should be. We also seek comment on the appropriate method of obtaining the antenna height above ground for indoor fixed devices (*e.g.*, automatic determination or manual entry) that is reported to the white space database.⁴⁹

25. As an alternative to using any type of external geo-location source (whether wired or wireless), a fixed white space device could use a separate antenna connected by a long cable to enable use of its internal geo-location capability. What requirements would be necessary to ensure that the coordinates and location uncertainty reported to the white space database are accurate? Would the suggestions in the NAB and Manufacturers' plan be appropriate for this situation?

26. The NAB and Manufacturers' Plan also suggests that the rules include a special provision for low power, *i.e.*, 40 mW or less EIRP, fixed white space devices with an internal geo-location capability that operate indoors where their geo-location capability does not function. Under this provision, the rules would allow a fixed white space device operating with 40 mW or less EIRP to establish its location with the device at a point immediately outside the indoor or other enclosure where the device's geo-location capability does not function, and then to register with its database after the device is installed at its fixed location using the location established at the outdoor point. In such applications, the device would use its incorporated geo-location capability to establish and store internally the coordinates of an outdoor position as close as possible to the location where it will be installed and also record the time that it obtained those coordinates. The device would then be installed at its fixed location and register with its database within 30 minutes using the coordinates of the outdoor location. If the device does not complete its registration within the 30 minute period, it would need to start over (including deleting its currently stored coordinates), re-establish its coordinates at a location where its geo-location capability functions (presumably the same outdoor position), and initiate a new 30 minute time period. The apparent purpose of the 30 minute period is to ensure that the user does not have time to transport the device far away. We seek comment on these suggestions and ask whether this is a workable alternative that would provide additional flexibility in the methods for determining geo-location without increasing the potential for inaccurate locations to be recorded in the databases and/or increase the potential for interference.⁵⁰

⁴⁸ For example, we could modify Section 15.711(c) by adding the following provision: "A fixed white space device may be located no more than 100 meters from an external geo-location source and connected by Ethernet, USB, serial port or other connection. An external geo-location source may be connected to more than one fixed white space device at the same location provided that all of the fixed devices being served are located no more than 100 meters from the external geo-location source."

⁴⁹ We note that the NAB and Manufacturer's Plan specifies the maximum of 100 meters between a fixed white space device and its geolocation source as an absolute distance. Thus, under that Plan, the separation distance could be completely or partly in the vertical direction.

⁵⁰ For example, we could modify Section 15.711(c) by adding the following provision: "*Indoor operation of low power fixed white space devices.* A fixed white space device operating with 40 mW or less EIRP may establish its location at a point immediately outside the indoor or other enclosure where its geolocation capability is impaired. In such cases, the fixed device shall use its incorporated geo-location capability to establish the coordinates of an

(continued...)

27. Is 40 mW the appropriate power level at which to define a low power fixed white space device or would 100 mW be more appropriate?⁵¹ Could fixed white space devices easily incorporate such a geo-location and storage capability? Does the 30 minute period suggested by NAB and the Manufacturers provide an appropriate amount of time after the coordinates are established at an outdoor location for the installer to re-locate the device to its nearby permanent operating location, connect the device to the electric power service and Internet, activate the device, enter and transmit the device's registration information to a database, and complete any other steps necessary for the installation?⁵² Although a 30 minute period could provide an opportunity to move a device a significant distance from the location where its coordinates are established, does it appropriately balance the need for properly completing the installation and registration of a device while limiting the opportunity for relocating the device to a faraway place where it could cause interference? We request comment on whether 30 minutes would be adequate to complete the above registration steps, and we also invite suggestions for alternatives, including other approaches.

28. In addition, if we were to adopt such a procedure, we seek comment on where the responsibility lies in verifying that the fixed white space device registration occurs within the allowable 30 minute time period. Should the capability reside in the fixed white space device whereby after 30 minutes the data would automatically be erased if the device is not successfully registered with a database or should an associated time stamp for the geo-location data be transmitted to the database which would not permit the registration to proceed if outside the 30 minute window? Should we allow other methods of transferring location data to fixed white space devices—for example, could an outdoor location sensor, such as a GPS receiver, write an encrypted file to an SD Card or USB memory stick that could then be plugged into a fixed white space device? How would such a connection ensure that a fixed device would be located no more than 100 meters from its geo-location source? Also, under such a scheme, what methods could be used to ensure registration within 30 minutes of determining the fixed white space device's location?

29. We observe that low power fixed white space devices operating indoors where their incorporated geo-location capability does not function would not be able to re-check their coordinates daily and transmit them to the database when verifying their available channel list, as proposed above, unless each day the device was uninstalled and moved to the outdoor location to repeat the entire initial location-determining procedure. Thus we seek comment on whether in such situations we should allow these devices to use the coordinates previously obtained at an outdoor position and stored in the device until such time as the device is moved or disconnected from its power supply, at which point the device would again re-establish its coordinates using its incorporated geo-location capability? If using previously obtained coordinates in this manner would not serve the public interest, does the impracticality of

(Continued from previous page) _____
outdoor position as close as possible to the location where it will be installed, and store internally the geographic coordinates of that location and the time that it obtained those coordinates. The fixed white space device shall be installed at its operating location and register with the white space database within 30 minutes of the time the outdoor location was recorded using the coordinates of the outdoor location. If the fixed device does not complete its registration within the 30 minute period, it must re-start the process (*i.e.*, re-establish and record its geographic coordinates, including deleting its currently stored coordinates), and initiate a new 30 minute time period. After the fixed device is successfully installed and registered with the database, the fixed device may use its internally stored coordinates when accessing the database for a list of available channels. If the fixed white space device is moved or disconnected from its power supply, the device must re-establish its coordinates using its incorporated geo-location capability or an external geo-location source as permitted under this section.”

⁵¹ Personal/portable white space devices may operate at power levels up to 100 mW EIRP. 47 CFR § 15.709(a)(2)(ii).

⁵² For this process, it would not be necessary to complete the registration confirmation process, proposed below in this Notice, within the 30 minute period.

obtaining updated coordinates on a daily basis warrant a rejection of this proposal? Are there other methods for updating the location information of these devices, short of using a wired external geo-location source, which could be employed successfully?

30. NAB and the Manufacturers suggest changing the required geo-location accuracy for white space devices from ± 50 meters to ± 100 meters. They also ask for a corresponding 100 meter increase in the minimum required separation distance between white space devices and TV contours.⁵³ In the *Part 15 Report and Order* released subsequent to the submission of NAB's petition, the Commission adopted rules to account for geo-location uncertainty greater than ± 50 meters by requiring the white space database to increase the required separation distances from protected services by the amount the device's reported location uncertainty exceeds ± 50 meters.⁵⁴ Because the Commission has adopted rules that provide flexibility to manufacturers and operators of white space devices that use less accurate geo-location methods, we tentatively conclude that it is not necessary to modify the default location accuracy requirement from ± 50 meters to ± 100 meters. We seek comment on this tentative conclusion. Should parties disagree, we seek comment on what changes we should make and how they should be implemented.

31. We note that NAB and the Manufacturers also are requesting an increase in protection distances that is greater than their requested increase in geo-location uncertainty.⁵⁵ Thus, if we were to specify a less accurate geo-location requirement, we seek comment on how much the protection distances should change. We note that NAB and the Manufacturers' Plan only discuss increasing the separation distance from TV contours, and we thus seek comment on whether and by what amount distances from any other protected service may need to be increased. We also seek comment on whether rule changes would be needed to account for indoor operations. How could we ensure that the reported geo-location uncertainty of an indoor device is accurate? For example, given the suggestion to limit the distance between an indoor white space device and a geo-location source to 100 meters, should a device that obtains its location from a separate geo-location source automatically add a certain amount, such as 100 meters, to its geo-location uncertainty when providing its location to the database? How would such a requirement apply for a device that is moved outdoors to obtain its coordinates and then moved back to an indoor location?

32. We also recognize, as do NAB and the Manufacturers, that it is important to provide manufacturers with sufficient time to design new products, obtain Commission certification, and commence manufacturing.⁵⁶ It is equally important to allow manufacturers to sell existing devices that allow the public to continue providing service until new products are available in the marketplace. We propose that effective six months after the effective date of the new rules, new applications for certification of fixed white space devices must comply with any rules we adopt in this proceeding requiring incorporated geo-location capability. Further, we propose that within one year after the effective date of any new rules, manufacturers would no longer be able to manufacture and import fixed white space devices that do not comply with the new requirements. In order to allow manufacturers to deplete any inventory of devices that do not comply with the new requirements, we propose to permit the

⁵³ NAB and Manufacturers' Plan at 1-2.

⁵⁴ *Part 15 Report and Order*, 30 FCC Rcd at 9581-9583, paras. 75-78.

⁵⁵ The suggestion is to increase the default geo-location accuracy from ± 50 meters to ± 100 meters – an increase of 50 meters, along with an increase in protection distance between white space devices and TV contours of 100 meters.

⁵⁶ NAB and the Manufacturers propose that new requirements would apply to fixed white space devices manufactured either one year after final rules are adopted or January 31, 2017, whichever is later. They did not suggest a cutoff date for filing applications for certification of equipment under the current rules. NAB and Manufacturers' Plan at 1-2.

marketing of these devices for up to eighteen months after the effective date of the new rules. Alternatively, we seek comment whether we should specify only certification and marketing cutoff dates (e.g., six months for certification and 12 or 18 months for marketing), and allow manufacturers to decide their manufacturing and importation cutoff dates. Consistent with NAB and the Manufacturers' Plan, we propose to permit users of fixed white space devices that do not comply with new rules to continue to operate their devices indefinitely.⁵⁷ Because the majority of fixed white space devices in operation today do not include a geo-location capability, they would continue to rely on professional installation and manual entry of geographic coordinates into the device or the database. Because these devices would not be able to easily recheck their coordinates every day and transmit them to the database, we seek comment on whether allowing their continued operation would pose any concerns about the integrity of the data in the database.

33. We also propose that the Commission would treat equipment changes that simply add an incorporated geo-location capability to an existing certificated device as a permissive change.⁵⁸ Treating such changes in this way will expedite application processing with little risk of increasing the interference potential of these devices. We seek comment on these proposed timeframes for implementing any new requirements for incorporating a geo-location capability into all fixed white space devices and whether they are appropriate to provide for a smooth transition to new devices.

34. Finally, we invite comment on the expected costs and benefits of the rule changes proposed in this section and whether the benefits will outweigh the costs. Parties who make specific suggestions for implementing the proposals also should address the costs and benefits associated with their suggestions.

B. Device Identification, Contact Information and Other Data Issues

35. Section 15.713(g) of the rules requires that fixed devices, prior to operating for the first time or after changing location, register with the white space database. The party responsible for the device must ensure that the registration information, listed below, is current and up-to-date for the device being registered.⁵⁹

- 1) FCC identifier (FCC ID) of the device;
- 2) Manufacturer's serial number of the device;
- 3) Device's geographic coordinates (latitude and longitude (NAD 83));
- 4) Device's antenna height above ground level (meters);
- 5) Name of the individual or business that owns the device;
- 6) Name of a contact person responsible for the device's operation;
- 7) Address for the contact person;
- 8) E-mail address for the contact person;
- 9) Phone number for the contact person.

36. We emphasize that the party responsible for registering a fixed white space device must provide all of this information to the database and the information must be current and kept up-to-date. The registration information serves several purposes. The FCC identifier allows the database administrator to know that the device has been approved by the Commission for operation; the device serial number allows the database administrator to deny service to specific devices for cause under the rules; and the identification of the device owner and a contact person responsible for the device's

⁵⁷ This proposal is consistent with the NAB and Manufacturers' Plan. *Id.*

⁵⁸ This proposal is consistent with the NAB and Manufacturers' Plan. *Id.* The provisions for permissive changes are set forth in Section 2.1043 of the rules, 47 CFR § 2.1043.

⁵⁹ 47 CFR § 15.713(g).

operation allows the database administrator to contact someone who has physical control of a device to resolve any interference or other problems that might arise.

37. The current rules assign responsibility for the accuracy of the registration information either to the party who provides the information to the database⁶⁰ or to the party who is responsible for the white space device.⁶¹ Because the rules are not clear as to which party is responsible for the white space device, and thus for entering and maintaining the registration information, we seek comment on whether the responsible party should be the owner, the contact person, or some other party. At the same time, the current rules also assign some responsibility to the database administrators for the accuracy of the registration information. For example, database administrators are required to verify that the FCC identifier (FCC ID) of a device seeking access to its services is valid.⁶² Database administrators also must respond in a timely manner to verify, correct and/or remove, as appropriate, data if the Commission or another party notifies them of inaccuracies in the database.⁶³ We have already taken additional steps to ensure that the database administrators are an “additional line of defense against flawed database entries,” as suggested by NAB in its petition.⁶⁴ As discussed above, Commission staff has worked with the database administrators to develop and implement a set of database validation requirements for fixed device registration data.⁶⁵

38. We believe that it is appropriate to ask database administrators to do more to verify the validity of fixed device registration data. We propose to require the white space database that originates a registration request for a fixed device to confirm the e-mail address and telephone number entered for the contact person. We also propose that the database not provide service to the device nor share the registration information with other approved white space databases⁶⁶ until it receives a confirming response from the party responsible for the device registration. Further, we propose that the white space database confirm the contact person’s information if any of the identifying information is modified (*e.g.*, updating the e-mail address or phone number). Under these proposals, a white space database administrator would be allowed to implement the confirmation requirement using a method of its choosing as long as that method obtains a confirming response that 1) the party addressed in the message is responsible for the operation of the subject fixed device, and 2) the e-mail address and telephone number for that party are correct and appropriate to reach that party in a timely manner. For example, a database could fulfill this requirement by sending an e-mail message to the entered e-mail address, request a simple confirming response, and then activate the registration upon receipt of the confirmation. An alternative might be to send a code with a text that would be acknowledged before the registration would be activated. Options that relied on telephone contact would also be acceptable. We believe a single confirmation process could suffice to verify both the e-mail address and telephone number for the contact person. We invite comment on these options and proposal.

39. Finally, we invite comment on the expected costs and benefits of the rule changes proposed in this section and whether the benefits will outweigh the costs. Parties who make specific suggestions for implementing the proposals also should address the costs and benefits associated with their suggestions.

⁶⁰ 47 CFR § 15.711(c)(1).

⁶¹ 47 CFR § 15.713(g)(2).

⁶² 47 CFR § 15.713(a)(1).

⁶³ 47 CFR § 15.715(i).

⁶⁴ NAB Petition at 15.

⁶⁵ *See supra* para. 12.

⁶⁶ The Commission requires all database administrators to share with each other on a daily basis fixed device registration information to ensure consistency in the records. 47 CFR § 15.715(l).

C. Other Issues

40. We believe that it is unnecessary to propose to amend our rules to incorporate new accountability and/or enforcement measures, including periodic audits, to ensure the integrity of the registration information for fixed devices as requested by NAB.⁶⁷ As discussed above, the current rules already place responsibility for the accuracy of the data entered for fixed device registrations on the party responsible for the device and hold database administrators responsible for verifying, correcting and removing inaccurate data. These existing rules and the proposals set forth in this Notice—along with the ongoing oversight of Commission staff working with the database administrators to develop new solutions for avoiding data errors and to review database entries—are sufficient and appropriate for addressing these issues. Accordingly, we deny NAB’s request that we adopt new accountability measures for the data entered in fixed white space device registrations.

IV. ORDER

41. We decline to suspend operation of the white space databases pending completion of this rulemaking or the adoption of temporary certification mechanisms to ensure the integrity of each existing and new entry in the database, as requested by NAB in its petition.⁶⁸ As discussed in the Notice, we have already taken steps with the database administrators to resolve the outstanding data errors in fixed white space device registrations and established guidelines whereby they will verify new fixed device registrations. We believe that there are no outstanding issues that would warrant suspension of operation of the databases or disruption of service from the existing population of fixed white space devices to their users while we undertake this rulemaking. Thus, we deny the Emergency Motion for Suspension of Operations.

V. PROCEDURAL MATTERS

A. Paperwork Reduction Analysis

42. The NPRM contains proposed new information collection requirements. The Commission, as part of its continuing effort to reduce paperwork burdens, invites the general public and OMB to comment on the proposed information collection requirements contained in this document, as required by the PRA. In addition, pursuant to the Small Business Paperwork Relief Act, we seek specific comment on how we might further reduce the information collection burden for small business concerns with fewer than 25 employees.

B. Initial Regulatory Flexibility Analysis

43. As required by the RFA, the Commission has prepared an Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on small entities of the policies and rules proposed in the FNPRM. The analysis is found in Appendix B. We request written public comment on the analysis. Comments must be filed in accordance with the same deadlines as comments filed in response to the NPRM, and must have a separate and distinct heading designating them as responses to the IRFA. The Commission’s Consumer and Governmental Affairs Bureau, Reference Information Center, will send a copy of this Notice of Proposed Rulemaking, including the IRFA, to the Chief Counsel for Advocacy of the Small Business Administration.

C. Filing Requirements

44. Pursuant to sections 1.415 and 1.419 of the Commission’s rules, 47 CFR §§ 1.415, 1.419, interested parties may file comments and reply comments on or before the dates indicated on the first

⁶⁷ NAB Petition at 14-15.

⁶⁸ *Id.* at 12-13.

page of this document. Comments may be filed using the Commission's Electronic Comment Filing System (ECFS). *See Electronic Filing of Documents in Rulemaking Proceedings*, 63 FR 24121 (1998).

- Electronic Filers: Comments may be filed electronically using the Internet by accessing the ECFS: <http://fjallfoss.fcc.gov/ecfs2/>.
- Paper Filers: Parties who choose to file by paper must file an original and one copy of each filing. If more than one docket or rulemaking number appears in the caption of this proceeding, filers must submit two additional copies for each additional docket or rulemaking number.

Filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail. All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.

- All hand-delivered or messenger-delivered paper filings for the Commission's Secretary must be delivered to FCC Headquarters at 445 12th St., SW, Room TW-A325, Washington, DC 20554. The filing hours are 8:00 a.m. to 7:00 p.m. All hand deliveries must be held together with rubber bands or fasteners. Any envelopes and boxes must be disposed of before entering the building.
- Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9300 East Hampton Drive, Capitol Heights, MD 20743.
- U.S. Postal Service first-class, Express, and Priority mail must be addressed to 445 12th Street, SW, Washington DC 20554.

45. The proceeding this Notice initiates shall be treated as a "permit-but-disclose" proceeding in accordance with the Commission's *ex parte* rules.⁶⁹ Persons making *ex parte* presentations must file a copy of any written presentation or a memorandum summarizing any oral presentation within two business days after the presentation (unless a different deadline applicable to the Sunshine period applies). Persons making oral *ex parte* presentations are reminded that memoranda summarizing the presentation must (1) list all persons attending or otherwise participating in the meeting at which the *ex parte* presentation was made, and (2) summarize all data presented and arguments made during the presentation. If the presentation consisted in whole or in part of the presentation of data or arguments already reflected in the presenter's written comments, memoranda or other filings in the proceeding, the presenter may provide citations to such data or arguments in his or her prior comments, memoranda, or other filings (specifying the relevant page and/or paragraph numbers where such data or arguments can be found) in lieu of summarizing them in the memorandum. Documents shown or given to Commission staff during *ex parte* meetings are deemed to be written *ex parte* presentations and must be filed consistent with rule 1.1206(b). In proceedings governed by rule 1.49(f) or for which the Commission has made available a method of electronic filing, written *ex parte* presentations and memoranda summarizing oral *ex parte* presentations, and all attachments thereto, must be filed through the electronic comment filing system available for that proceeding, and must be filed in their native format (*e.g.*, .doc, .xml, .ppt, searchable .pdf). Participants in this proceeding should familiarize themselves with the Commission's *ex parte* rules.

⁶⁹ 47 C.F.R. §§ 1.1200 *et seq.*

46. **People with Disabilities:** To request materials in accessible formats for people with disabilities (braille, large print, electronic files, audio format), send an e-mail to fcc504@fcc.gov or call the Consumer & Governmental Affairs Bureau at 202-418-0530 (voice), 202-418-0432 (tty).

47. *Availability of Documents.* Comments, reply comments, and ex parte submissions will be publically available online via ECFS.⁷⁰ These documents will also be available for public inspection during regular business hours in the FCC Reference Information Center, which is located in Room CY-A257 at FCC Headquarters, 445 12th Street, SW, Washington, DC 20554. The Reference Information Center is open to the public Monday through Thursday from 8:00 a.m. to 4:30 p.m. and Friday from 8:00 a.m. to 11:30 a.m.

48. *Additional Information.* For additional information on this proceeding, contact Hugh Van Tuyl of the Office Engineering and Technology, [Hugh Van Tuyl@fcc.gov](mailto:Hugh.Van.Tuyl@fcc.gov), (202) 418-7506.

VI. ORDERING CLAUSES

49. IT IS ORDERED that pursuant to Sections 1, 4(i), 7(a), 302(a), 303(f), and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. Sections 151, 154(i), 157(a), 302a(a), 303(f), and 303(r), this Notice of Proposed Rule Making IS ADOPTED.

50. IT IS FURTHER ORDERED that, pursuant to Sections 4(i), 302(a), 303(f) and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. Sections 154(i), 302a(a), 303(f) and 303(r), the National Association of Broadcasters' Emergency Motion for Suspension of Operations IS DENIED.

51. IT IS FURTHER ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, SHALL SEND a copy of this Notice of Proposed Rule Making, including the Initial Regulatory Flexibility Analysis to the Chief Counsel for Advocacy of the Small Business Administration.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary

⁷⁰ Documents will generally be available electronically in ASCII, Microsoft Word, and/or Adobe Acrobat.

APPENDIX A

Proposed Rules

Part 15 of Title 47 of the Code of Federal Regulations is proposed to be amended as follows:

1. The authority citation of Part 15 continues to read as follows:

AUTHORITY: 47 U.S.C. 154, 302, 303, 304, 307, 336, and 544A.

2. Section 15.711 is amended by revising paragraphs (b)(1) and (c) to read as follows:

§ 15.711 **Interference avoidance methods.**

* * * * *

(b) *Geo-location requirement.*

(1) *Accuracy.* Fixed and Mode II white space devices shall determine their location and their geo-location uncertainty (in meters), with a confidence level of 95%.

* * * * *

(c) *Requirements for fixed white space devices.*

(1) The geographic coordinates of a fixed white space device shall be determined automatically by an incorporated geo-location capability prior to its initial service transmission at a given location and each time the device is activated from a power-off condition to determine the available channels and the corresponding maximum permitted power for each available channel at its geographic coordinates, taking into consideration the device's geo-location uncertainty. The fixed white space device shall check its location once each day, except when not in operation, and store this information automatically in the device.

(2) If the fixed white space device is located where the incorporated geo-location capability does not function, the fixed device may obtain its geographic coordinates from an external geo-location source that is connected to the fixed device using a secure method that ensures that the external geo-location source has been approved for that function by the Commission's equipment certification program.

(3) The fixed white space device shall transmit electronically its geographic coordinates and antenna height above ground to the white space database from which it obtains its list of available channels for operation at the time it registers. The fixed white space device shall electronically transmit this information to the white space database on a daily basis when the device requests a list of the available channels for operation.

(4) If a fixed white space device is moved to another location or its stored geographic coordinates become altered, the device shall re-establish its:

(i) Geographic coordinates; and

(ii) Registration with the white space database based on the device's new coordinates and antenna height above ground level.

(5)(i) Each fixed white space device must access a white space database over the Internet to determine the available channels and the corresponding maximum permitted power for each available channel that is available at its geographic coordinates, taking into consideration the fixed device's antenna height above ground level and geo-location uncertainty, prior to its initial service transmission at a given location.

(ii) Operation is permitted only on channels and at power levels that are indicated in the white space database as being available for each white space device. Operation on a channel must cease immediately or power must be reduced to a permissible level if the database indicates that the channel is no longer available at the current operating level.

(iii) Each fixed white space device shall access the database at least once a day to verify that the operating channels continue to remain available. Each fixed white space device must adjust its use of channels in accordance with channel availability schedule information provided by its database for the 48-hour period beginning at the time the device last accessed the database for a list of available channels.

(iv) Fixed white space devices without a direct connection to the Internet. A fixed white space device may not operate on channels provided by a white space database for another fixed device. A fixed white space device that has not yet been initialized and registered with a white space database consistent with §15.713 of this part, but can receive the transmissions of another fixed white space device, may transmit to that other fixed white space device on either a channel that the other white space device has transmitted on or on a channel which the other white space device indicates is available for use to access the database to register its location and receive a list of channels that are available for it to use. Subsequently, the newly registered fixed white space device must only use the channels that the database indicates are available for it to use.

* * * * *

- 3. Section 15.713 is amended by revising paragraph (g)(3)(iii) and adding paragraph (g)(4) to read as follows:

§ 15.713 **White Space Database.**

* * * * *

(g) *Fixed white space device registration.*

* * * * *

(3) * * *

* * * * *

(iii) Device's geographic coordinates (latitude and longitude (NAD 83)) including the location uncertainty, in meters;

(4) The white space database that receives a fixed white space device registration shall confirm the e-mail address and telephone number of the contact person responsible for the operation of the fixed device. The database shall not provide service to the fixed device nor share the registration information with other approved white space databases until it receives a confirming response from the contact person verifying their information. If the registration record is modified to identify a new contact person or to provide a new e-mail address or telephone number, the white space database shall verify the new information before continuing to provide service to the fixed white space device.

* * * * *

Appendix B

Initial Regulatory Flexibility Analysis

As required by the Regulatory Flexibility Act of 1980, as amended (RFA),¹ the Commission has prepared this present Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on a substantial number of small entities by the policies and rules proposed in this *Notice of Proposed Rule Making (NPRM)*. Written public comments are requested on this IRFA. Comments must be identified as responses to the IRFA and must be filed by the deadlines for comments on the *NPRM* provided in paragraph 38 of the item. The Commission will send a copy of the *NPRM*, including this IRFA, to the Chief Counsel for Advocacy of the Small Business Administration (SBA).² In addition, the *NPRM* and IRFA (or summaries thereof) will be published in the Federal Register.³

A. Need for, and Objectives of, the Proposed Rules

The *NPRM* proposes to amend Part 15 of the Commission's rules to improve the quality of the geographic location and other data submitted for fixed white space devices operating on unused frequencies in the TV Bands and, in the future, the new 600 MHz Band for wireless services. The proposals are designed to improve the integrity of the white space database system and, as white space device deployments grow, to increase the confidence of all spectrum users of these frequency bands that the white space geolocation/database spectrum management scheme fully protects licensees and other authorized users.

The *NPRM* responds to a petition submitted by the National Association of Broadcasters (NAB) alleging that there are data errors in the registration records for fixed devices in the white space databases, and requesting that the Commission undertake rulemaking and other actions to correct and avoid such errors.

B. Legal Basis

The proposed action is taken pursuant to Sections 1, 4(i), 7(a), 302(a), 303(f), and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. Sections 151, 154(i), 157(a), 302(a), 303(f), and 303(r).

C. Description and Estimate of the Number of Small Entities to Which the Proposed Rules Will Apply

The RFA directs agencies to provide a description of, and where feasible, an estimate of the number of small entities that may be affected by the proposed rules, if adopted.⁴ The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction."⁵ In addition, the term "small business" has the

¹ See 5 U.S.C. § 603. The RFA, see 5 U.S.C. § 601 – 612, has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), Pub. L. No. 104-121, Title II, 110 Stat. 857 (1996).

² See 5 U.S.C. § 603(a).

³ See 5 U.S.C. § 603(a).

⁴ See 5 U.S.C. § 603(b)(3).

⁵ See 5 U.S.C. § 601(6).

same meaning as the term “small business concern” under the Small Business Act.⁶ A “small business concern” is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the Small Business Administration (SBA).⁷

Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing. The Census Bureau defines this category as follows: “This industry comprises establishments primarily engaged in manufacturing radio and television broadcast and wireless communications equipment. Examples of products made by these establishments are: transmitting and receiving antennas, cable television equipment, GPS equipment, pagers, cellular phones, mobile communications equipment, and radio and television studio and broadcasting equipment.”⁸ The SBA has developed a small business size standard for Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing, which is: all such firms having 750 or fewer employees. According to Census Bureau data for 2007, there were a total of 939 establishments in this category that operated for part or all of the entire year. Of this total, 912 had less than 500 employees and 17 had more than 1000 employees.⁹ Thus, under that size standard, the majority of firms can be considered small.

D. Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements for Small Entities

White space devices are unlicensed devices that operate in the TV bands, and in the future, the 600 MHz band, at locations where frequencies are not in use by licensed services. The rules provide for three types of white space devices: fixed, and Mode I and Mode II personal/portable devices. To prevent harmful interference to protected services, the rules generally require that white space devices provide their geographic coordinates to a white space database and operate only on location specific channels provided by that database. The location for fixed white space devices may be determined either through an internal geo-location capability or by a professional installer.¹⁰ Additionally, a fixed white space device must register with a database and, in addition to its location, must also provide the device’s identifying information (FCC identification number and manufacturer serial number), antenna height, the name of its owner, and contact information for the party responsible for its operation.

Most RF transmitting equipment, including white space devices, must be authorized through the certification procedure. Certification is an equipment authorization issued by the Commission or by a designated TCB based on an application and test data submitted by the responsible party (*e.g.*, the manufacturer or importer). The *NPRM* does not propose to change the authorization procedure for white space devices, but it does propose to establish new technical requirements or modify existing technical

⁶ See 5 U.S.C. § 601(3) (incorporating by reference the definition of “small-business concern” in the Small Business Act, 15 U.S.C. § 632). Pursuant to 5 U.S.C. § 601(3), the statutory definition of a small business applies “unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register.”

⁷ See 15 U.S.C. § 632.

⁸ The NAICS Code for this service 334220. See 13 C.F.R 121/201. See also http://factfinder.census.gov/servlet/IBQTable?_bm=y&-fds_name=EC0700A1&-geo_id=&-skip=300&-ds_name=EC0731SG2&-lang=en

⁹ See http://factfinder.census.gov/servlet/IBQTable?_bm=y&-geo_id=&-fds_name=EC0700A1&-skip=4500&-ds_name=EC0731SG3&-lang=en

¹⁰ Mode I and Mode II personal/portable devices have differing requirements which are not described herein because the *NPRM* addresses only fixed white space devices.

requirements for white space devices. Specifically, the *NPRM* proposes the following changes to the fixed white space device compliance requirements:

Fixed white space device geo-location requirements

The proposed rules would eliminate the professional installer option for fixed white space devices. Instead, a fixed white space device would be required to include a geo-location capability that can determine its geographic coordinates without manual intervention. The proposed rules would also require that the geographic coordinates be stored automatically in the fixed white space device and transmitted electronically directly from the device to the databases. In addition, a fixed white space device would be required to check its coordinates once each day using its geo-location capability and to report its geographic location to the database daily when it makes a request for a list of available channels.

The *NPRM* also proposes options to accommodate fixed white space device installations in locations where an internal geo-location capability is not able to provide this information. It proposes to permit fixed white space devices to obtain their geographic coordinates from an external source that is connected to the fixed white space device when the internal geo-location capability does not function. It also proposes that in cases where the geo-location capability is provided by an external source connected to the fixed white space device, the fixed device and external geo-location source would be required to communicate using a secure method that ensures that the fixed device obtains information only from a source that has been approved for that function by the Commission's equipment certification program.

Transition requirements for fixed white space device rule changes

The *NPRM* proposes that, effective six months after the effective date of the new rules, new applications for certification of fixed white space devices must comply with any rules the Commission adopts in this proceeding requiring incorporated geo-location capability. The *NPRM* also proposes that, within one year after the effective date of any new rules, manufacturers would no longer be able to manufacture and import fixed white space devices that do not comply with the new requirements. In order to allow manufacturers to deplete any inventory of devices that do not comply with the new requirements, the *NPRM* proposes to permit the marketing of these devices for up to eighteen months after the effective date of the new rules. In addition, the *NPRM* proposes to permit fixed white space devices that do not comply with new rules to continue to operate indefinitely. Further, it proposes that the Commission would treat equipment changes that simply add an incorporated geo-location capability to an existing certificated device as a permissive change.

Fixed white space device registration requirements

The *NPRM* proposes to require the white space database that receives the initial registration request for a fixed device to confirm the e-mail address and telephone number entered for the contact person. It also proposes that the database not provide service to the device nor share the registration information with other approved white space databases until it receives a confirming response from the party responsible for the device registration. The *NPRM* further, proposes that the white space database confirm the contact person's information if any of the identifying information is modified (*e.g.*, updating the e-mail address or phone number). A white space database administrator would be allowed to implement the confirmation requirement using a method of its choosing as long as that method obtains a confirming response that 1) the party addressed in the message is responsible for the operation of the subject fixed device, and 2) the e-mail address and telephone number for that party are correct and appropriate to reach that party in a timely manner.

E. Steps Taken to Minimize the Significant Economic Impact on Small Entities, and Significant Alternatives Considered

The RFA requires an agency to describe any significant, specifically small business, alternatives that it has considered in reaching its proposed approach, which may include the following four alternatives (among others): “(1) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance and reporting requirements under the rule for such small entities; (3) the use of performance rather than design standards; and (4) an exemption from coverage of the rule, or any part thereof, for such small entities.”¹¹

The proposed requirement for all fixed white space devices to incorporate a geo-location capability would require changes to previously approved devices, because most approved fixed devices rely on the use of a professional installer and do not have a geo-location capability. As discussed above, the *NPRM* proposes transition and grandfathering provisions to minimize the impact on fixed white space device manufacturers and users. It proposes that manufacturers could continue to apply for certification of devices under the current rules for up to six months after the effective date of any new rules, and that changes that simply add an incorporated geo-location capability to an existing certificated device would be processed under the streamlined “permissive change” rules.¹² The *NPRM* also proposes that parties could continue to manufacture and import devices that comply with the current rules for up to one year after the effective date of any new rules. In order to allow manufacturers to deplete any inventory of devices that do not comply with new requirements, the *NPRM* proposes to permit the marketing of these devices for up to eighteen months after the effective date of any new rules. Additionally, the *NPRM* proposes to permit fixed white space devices that do not comply with any new rules adopted in this proceeding to continue to operate indefinitely.

F. Federal Rules that May Duplicate, Overlap, or Conflict with the Proposed Rules

None.

¹¹ 5 U.S.C. § 603(c)(1) – (c)(4).

¹² 47 CFR § 2.1043.