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July 29, 2014

VIA ELECTRONIC FILING

Mr. Julius Knapp
Chief Engineer
Office of Engineering and Technology
Federal Communications Commission
445 12th Street SW
Washington, DC 20554

**Re: Comcast Corporation Petition for Waiver of Section 15.407(a)(1)(i) of the FCC's Rules for Outdoor Access Points Operating in the U-NII-1 Band—
SUPPLEMENT**

Revision of Part 15 of the Commission's Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band, ET Docket No. 13-49

Dear Mr. Knapp:

Pursuant to section 1.3 of the Commission's rules, 47 C.F.R. § 1.3, and the *First Report and Order* in ET Docket No. 13-49, Comcast Corporation ("Comcast") hereby petitions the Federal Communications Commission ("Commission") for a waiver¹ of section 15.407(a)(1)(i) of the Commission's rules, 47 C.F.R. §15.407(a)(1)(i). Specifically, Comcast requests that the Commission authorize it to deploy and operate outdoors in the 5150-5250 MHz ("U-NII-1") band up to 3,583 new access points certified to operate in the 5725-5825 MHz ("U-NII-3") band. Comcast requests authorization to operate such U-NII-3 access points in U-NII-1 with up to 250 mW of conducted power and a power spectral density ("PSD") of 11 dBm/MHz with a 6 dBi gain antenna, rather than limiting the maximum EIRP above 30 degrees elevation to 125 mW (21 dBm) EIRP as required by section 15.407(a)(1)(i). This total number includes access points that Comcast has already purchased but has not yet installed and access points that Comcast intends to purchase and install in the next twelve months to keep pace with customer demand. Comcast submits this supplement to its waiver request filed July 2, 2014 at the request of Commission staff. In addition to this filing, Comcast seeks a waiver with respect to its existing U-NII-3 deployments (see Comcast's "*Deployed AP Waiver Request*").

¹ *Revision of Part 15 of the Commission's Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band, First Report and Order, ET Docket No. 13-49, FCC 14-30, 29 FCC Rcd. 4127 at ¶¶ 41-42 (rel. Apr. 1, 2014) ("5 GHz Order").*

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On April 1, 2014, the Commission released its 5 GHz Order in which it, *inter alia*, allowed “fixed access point outdoor operations at a conducted power level of up to 1 W (30 dBm), and a PSD of 17 dBm/MHz with an allowance for a 6 dBi antenna gain (*i.e.* a total 36 dBm EIRP)” in the U-NII-1 band, provided such devices “limit[] the maximum EIRP above 30 degrees elevation to 125 mW (21 dBm) EIRP.”²

Recognizing that many network operators have deployed U-NII-3 access points that could be reprogrammed to operate in U-NII-1 and therefore “quickly begin more flexible operation,” the Commission determined that it would allow existing outdoor U-NII-3 access points to operate in U-NII-1 under two conditions.³ First, network operators may apply for a permissive change, demonstrating compliance with the new U-NII-1 rules.⁴ Second, network operators may, within 30 days of the effective date of the new rules, apply for a waiver of certain of those rules.⁵ Specifically, the Commission stated:

[I]f the waiver is designed to enable such existing deployments to operate within the U-NII-1 band with up to 250 mW of conducted power and a PSD of 11 dBm/MHz with a 6 dBi gain antenna, then we believe we can make a quick and likely favorable good cause determination sufficient to grant the waiver request, barring any unforeseen circumstances in a given case. We believe that providing the following about the waiver petitioner’s existing deployments will be important to our ability to assess waiver requests: the number of devices installed, general location of each deployment, ability to reprogram the devices, and ability to adjust operating power from a central network management system.⁶

The Commission concluded that such waiver requests “are likely to serve the public interest because granting them is highly unlikely to create any risk of harmful interference, given the small numbers involved and the limited departure from the new technical requirements for the U-NII-1 band.”⁷

In its *Deployed AP Waiver Request*, Comcast has applied for such a waiver to allow its deployed outdoor access points currently authorized to operate in the U-NII-3 band to operate in the U-NII-1 band with up to 250 mW of conducted power and a PSD of 11 dBm/MHz with a 6 dBi gain antenna, rather than limiting the maximum EIRP above 30 degrees elevation to 125 mW (21 dBm) EIRP as required by 47 C.F.R. § 15.407(a)(1)(i).

² *Id.* ¶ 37.

³ *Id.* ¶ 39.

⁴ *Id.* ¶ 40.

⁵ *Id.* ¶ 41.

⁶ *Id.*

⁷ *Id.*

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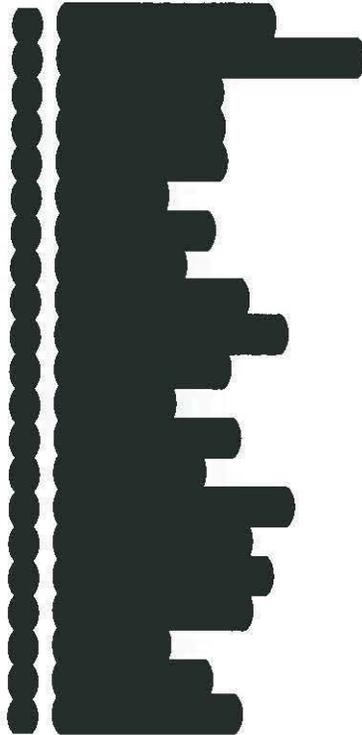
In addition to its waiver request with respect to deployed U-NII-3 access points, Comcast also requests a waiver to permit it to deploy over the next twelve months an additional 3,583 U-NII-3 access points and to operate those access points outdoors in the U-NII-1 band at 250 mW of conducted power and a PSD of 11 dBm/MHz with a 6 dBi gain antenna. This total number includes U-NII-3 access points that Comcast has already purchased and that are awaiting deployment—including spares that Comcast has purchased to replace existing access points—as well as additional access points that Comcast intends to purchase and install over the next twelve months in order to meet growing customer demand for its Wi-Fi services. Comcast is working closely with its equipment vendors to ensure the rapid development and certification of new equipment capable of operating outdoors in the U-NII-1 band with the antenna specifications set forth in section 15.407(a)(1)(i) of the Commission's rules. However, the development and certification of such devices will take time, during which Comcast expects that customer demand for its Wi-Fi service will continue to skyrocket. Recognizing that there will be a period of time during which Comcast wishes to expand its Wi-Fi network using the U-NII-1 band, but new U-NII-1-certified devices are not yet available for deployment, Comcast seeks authorization to operate an additional 3,583 U-NII-3-certified access points in the U-NII-1 band at 250 mW of conducted power and a PSD of 11 dBm/MHz with a 6 dBi gain antenna. Comcast also respectfully requests authorization to seek a similar waiver in the future if its business needs require the deployment of additional U-NII-3 access points before U-NII-1 equipment certified to operate under the Commission's new rules becomes available.

This waiver would serve the public interest by providing Comcast with immediate flexibility to use the U-NII-1 band, in addition to the U-NII-3 band, to provide outdoor Wi-Fi access to its customers. A waiver for a limited number of access points that Comcast has already purchased and intends to purchase would also help to ensure that Comcast can continue to meet its customers' needs for outdoor Wi-Fi access while equipment manufacturers develop and certify devices that meet the new section 15.407(a)(1)(i) rules. As with the waiver for existing U-NII-3 access points contemplated expressly in the 5 GHz Order, a limited waiver for an additional 3,583 of Comcast access points is highly unlikely to create any additional risk of harmful interference. This is a modest number of access points compared to the millions of devices considered in the technical analyses filed by the National Cable & Telecommunications Association and Globalstar, and the proposed departure from the technical rules for operation set forth in section 15.407(a)(1)(i) is limited.

As in its *Deployed AP Waiver Request*, Comcast provides the following information about the 3,583 access point deployments that it plans to make within the next twelve months and for which it seeks a waiver to permit outdoor U-NII-1 operation at 250 mW without meeting the antenna pattern requirement of section 15.407(a)(1)(i):

- **General location of each deployment.** Comcast intends to deploy and operate additional access points in the following states over the next twelve months:

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The location of these planned deployments, but not the total number of access points, may change depending on the business needs in each region. Comcast respectfully requests that it be permitted to update the Office of Engineering and Technology if it determines that deploying any of the above access points at a different location better suits its business needs. Comcast also requests that, if the Commission determines not to grant the request for waiver with respect to the access points which Comcast has not yet purchased, it consider separately whether to grant Comcast's request for waiver with respect to those access points that Comcast has already purchased and that are awaiting installation.

- **Ability to reprogram the devices.** Comcast has access to some access point configuration settings, while others remain locked in the device firmware. For example, Comcast does not have the ability to change the country of operation or to enable operation on channels or at power levels that were not authorized under the product's FCC certification. Comcast does have the ability to configure attenuation settings, and therefore can cause the device to operate below its maximum authorized transmit power. Comcast can also disable the 5 GHz radio while maintaining

⁸ Note that Comcast has already installed these [redacted] access points, which are currently operating in U-NII-3. Because Comcast had not yet deployed these access points at the time that it submitted its July 2, 2014 waiver request, it includes them here, rather than in the *Deployed AP Waiver Request*.

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operation in 2.4 GHz. Comcast is also able to prevent general users from associating with the access point, while allowing access only by authorized technicians.

- **Ability to adjust operating power from a central network management system.** In the event that Comcast's U-NII-1 access point operations were to cause harmful interference to an incumbent operator, Comcast could use its centralized network management system to reconfigure its U-NII-1 devices in any of the ways described above. In particular, Comcast could reduce the transmit power, disable the 5 GHz radio, or prevent access by client devices, all from its central network management system. Comcast's network management system includes the use of a master configuration file. Once that file is updated with new settings, all operating devices can be rebooted such that they will obtain and implement the updated configuration.

Comcast respectfully requests that the Commission act promptly on this request for waiver. Upon approval of its request for waiver, the manufacturers of the network equipment used by Comcast will file a permissive change request and demonstrate compliance with operating rules described herein. Should you require further information, please do not hesitate to contact me.

Respectfully Submitted,

/s/ David Don

David Don