

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

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

**COMMENTS OF THE
NATIONAL CABLE & TELECOMMUNICATIONS ASSOCIATION**

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The National Cable & Telecommunications Association (“NCTA”)¹ submits these comments in response to the Further Notice of Proposed Rulemaking in the above referenced matter.²

INTRODUCTION AND SUMMARY

NCTA agrees with the Commission that small cell operations hold great promise to help address the skyrocketing demand for wireless broadband. Indeed, cable companies are among the largest operators of small cell networks today, providing consumers with access to over a quarter-million Wi-Fi hotspots nationwide. But while the 3.5 GHz band can be a promising home for future small cell deployments, the Commission must ensure that C-Band operations in the 3.7-4.2 GHz bands do not suffer harmful interference. Cable companies depend on the 3.7-4.2 GHz band for the delivery of video and increased use of the 3550-3650 MHz band and the adjacent 3650-3700 MHz band might raise interference concerns that require careful

¹ NCTA is the principal trade association for the U.S. cable industry, representing cable operators serving more than 90 percent of the nation’s cable television households and more than 200 cable program networks. The cable industry is the nation’s largest provider of broadband service after investing over \$210 billion since 1996 to build two-way interactive networks with fiber optic technology. Cable companies also provide state-of-the-art competitive voice service to more than 27 million customers.

² *Amendment of the Commission’s Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, Further Notice of Proposed Rulemaking, 29 FCC Rcd. 4273 (2014) (“FNPRM”).

examination before moving forward. The Commission should not undertake any measures that would jeopardize C-Band operations in the 3.7-4.2 GHz bands.

Assuming that interference to the 3.7-4.2 GHz bands can be avoided or sufficiently mitigated, the Commission should consider changes to its current proposal to make new small cell wireless operations in the 3.5 GHz band more efficient and economically viable.

First, the Commission should significantly reduce the size of the exclusion zones it has proposed for incumbent federal tier users. These exclusion zones, which would cover up to one third of the continental United States and substantial portions of cable operator footprints, would deny more than half of all Americans access to the 3.5 GHz band. Because these exclusion zones assume that commercial operations would take the form of traditional macrocell deployments rather than small cell networks, the Commission should work quickly to determine appropriately sized exclusion zones for this band instead of codifying severe operating restrictions.

In addition, the Commission should implement geographic areas for Priority Access Licenses (“PALs”) that more closely align with small cell deployments. Issuing PALs on the basis of the census tracts would create license areas that are a poor fit for small cell networks. This is because census tract boundaries often divide the geographic areas that will benefit most from small cell operations, and because census tracts will often be too large to efficiently accommodate small cell deployments.

Once the Commission makes these changes, it should move quickly to issue final rules for the 3.5 GHz band. These rules should include the Commission’s proposals to require similar technical and operating characteristics for devices regardless of whether they access spectrum that is assigned to a priority access licensee or allotted for General Authorized Access (“GAA”)

use. Doing so will increase the likelihood that the industry will be able to develop affordable 3.5 GHz devices for consumers, and will provide flexibility for small cell operators to use the spectrum that is available in a particular area as efficiently as possible.

I. THE FCC MUST ENSURE THAT INCUMBENT COMMERCIAL USERS OF THE 3.7–4.2 GHZ BAND ARE PROTECTED FROM HARMFUL INTERFERENCE

While NCTA supports opening the 3.5 GHz Band to new uses in appropriate circumstances, as a threshold matter, the Commission must ensure that the technical and operational rules ultimately adopted also protect adjacent licensed incumbent users from harmful interference. In particular, NCTA, whose members use satellite services in adjacent bands for the transmission and reception of television programming nationwide, has an interest in ensuring that such programming remains free from harmful interference.³

Currently, C-Band satellites operate in the 3700-4200 MHz band. These satellites are an essential component of the infrastructure used by the cable industry to distribute programming to the tens of millions of cable customers in the United States. Almost every national cable programming network and many regional networks are uplinked to C-Band FSS satellites and distributed to satellite dishes located at thousands of cable system headends scattered throughout the country.

Interference-free C-Band satellite reception thus is critical to ensuring cable customers can continue to enjoy uninterrupted satellite-delivered programming. As we observed in our initial Comments in this proceeding,⁴ studies have suggested that C-Band satellites are highly

³ Given the proximity to the 3700 MHz band, particular attention should be paid to potential implementations in the 3650-3700 MHz band.

⁴ Comments of the National Cable & Telecommunications Association, GN Docket No. 12-354, at 6-7 (filed Feb. 20, 2013) (“NCTA NPRM Comments”). Unless otherwise indicated, all comments cited herein were filed in GN Dkt. No. 12-354.

susceptible to interference at reception sites such as those located at cable headends,⁵ and instances of wireless interference to satellite delivery of programming have been documented.⁶ A number of parties have submitted additional analyses in this proceeding.⁷ To this end, the Commission should ensure, through rigorous analysis of such technical studies, that undesirable technical characteristics resulting from any new operations in the 3.5 GHz band (e.g., out-of-band and spurious emissions, undue spectral density, and excessive output power in combination with transmitting antenna directional gain) can be appropriately limited, thereby protecting incumbents from harmful interference.⁸

NCTA recognizes that the 3650-3700 MHz band is currently licensed on a non-exclusive basis, is used extensively by wireless Internet service providers (“WISPs”), and users must provide protection to incumbent FSS operations. However, the Commission must evaluate the potential impact on cable programming reception resulting from the introduction of *new* users in both the 3550-3650 MHz band and the 3650-3700 MHz band.

⁵ See, e.g., ITU Radiocommunication Sector, *Sharing studies between IMT-Advanced systems and geostationary satellite networks in the fixed-satellite service in the 3400-4200 and 4500-4800 MHz frequency bands*, Report ITU-R M.2109 (2007), available at http://www.itu.int/dms_pub/itu-r/opb/rep/R-REP-M.2109-2007-PDF-E.pdf (visited Feb. 12, 2013); ITU Radiocommunication Sector, *Studies on compatibility of broadband wireless access systems and fixed-satellite service networks in the 3400-4200 MHz band*, Report ITU-R S.2199 (2010), available at http://www.itu.int/dms_pub/itu-r/opb/rep/R-REP-S.2199-2010-PDF-E.pdf (visited Feb. 12, 2013).

⁶ International Associations of the Satellite Communications Industry, *Position Paper on Interference in C-band by Terrestrial Wireless Applications to Satellite Applications* at 3-4, ITU Workshop on Market Mechanisms for Spectrum Management (2007), available at http://www.itu.int/osg/spu/stn/spectrum/workshop_proceedings/Background_Papers_Final/C-band%20Interference%20-%20Global%20Position%20Paper%20for%20ITU%20%20%20%20%20%20spectrum%20workshop.pdf (visited Feb. 12, 2013).

⁷ See, e.g., Joint Content Interests Reply Comments at Attachment A (Alion Report) (filed April 5, 2013); Letter to Marlene H. Dortch, Secretary, FCC, from CBS Corp., et al. (“Content Interests”) at Attachment A (“Comsearch Paper”) (filed May 8, 2013); Letter to Marlene H. Dortch, Secretary, FCC, from Aparna Sridhar, Telecom Policy Counsel, Google, Inc. (filed Sept. 3, 2013); Letter to Marlene H. Dortch, Secretary, FCC, from Patricia Cooper, President, Satellite Industry Association (filed Feb. 1, 2014).

⁸ See generally, NCTA NPRM Comments at 4-6.

As a result, before it adopts any rules in this proceeding, we urge the Commission to analyze interference studies and tests to determine whether or not the proposed new service will cause harmful interference to other services.

II. ADDITIONAL SPECTRUM FOR WI-FI NETWORKS WILL DELIVER IMPORTANT BENEFITS FOR CONSUMERS

Assuming that harmful interference to the 3.7-4.2 GHz bands can be avoided or sufficiently mitigated, the Commission should consider changes to its initial proposal to make the 3.5 GHz band more usable for small cell deployment.

As the FNPRM recognizes, consumer demand for wireless broadband continues to soar.⁹ This is particularly true for small cell Wi-Fi networks. Indeed, as NCTA previously has explained, Wi-Fi now carries more Internet traffic to consumers' smartphones, tablets, laptops, and PCs than licensed wireless and wired connections combined.¹⁰

Much of the growth in Wi-Fi comes from the cable industry, which has invested hundreds of millions of dollars in Wi-Fi-based small cell networks to bring wireless connections to consumers. Cable companies have now deployed more than 250,000 Wi-Fi access points in urban and rural areas across the nation. Moreover, the CableWiFi® platform, which enables qualified subscribers from participating cable companies to connect to each other's Wi-Fi networks at no additional charge, is collectively one of the largest Wi-Fi networks in the world.¹¹

Cable operators have made these substantial investments in order to meet the needs of customers who increasingly depend on Wi-Fi access points to provide connectivity for an increasing number of devices. As Wi-Fi use continues to increase, however, cable companies and other Wi-Fi network operators will need access to additional spectrum to accommodate the

⁹ FNPRM ¶ 1.

¹⁰ NCTA NPRM Comments at 6-7.

¹¹ See CABLE WI-FI®, <http://www.cablewifi.com>.

traffic that results from this growing demand.¹² Accordingly, NCTA shares the Commission’s view that small cell networks using the 3.5 GHz band – which will have characteristics similar to Wi-Fi access points – can be an important resource to help “address wireless coverage and capacity issues” by making new spectrum resources available to consumers.¹³ In order to realize this goal, the Commission should ensure that its rules encourage investment in the 3.5 GHz band by taking the steps outlined below.

III. THE COMMISSION SHOULD SIGNIFICANTLY REDUCE THE SIZE OF EXCLUSION ZONES FOR FEDERAL INCUMBENT SYSTEMS

As the Commission has recognized, the exclusion zones proposed in the NTIA Fast Track Report to protect federal Incumbent Access tier operations would cover 6 out of every 10 Americans.¹⁴ Nevertheless, the Commission proposes to codify these exclusion zones “as a starting point” to analyze whether they are appropriate.¹⁵ Because the record is already clear that they are not, the Commission should move quickly to substantially reduce or eliminate the proposed exclusion zones before issuing final rules.

Operating rules for a wireless service that deny access to most Americans simply will not attract the investment needed for widespread network deployments.¹⁶ Indeed, as NCTA has previously explained, the large exclusion zones proposed in the Fast Track Report – or anything

¹² Indeed, as NCTA has explained, existing spectrum used by Wi-Fi networks is rapidly becoming overcrowded, and many cases may soon be exhausted in densely populated areas. *See* Comments of the National Cable & Telecommunications Association filed in ET Docket No. 13-49 (May 28, 2013) and Exhibit A, Rob Alderfer, WiFi Spectrum: Exhaust Looms, CABLELABS (May 2013).

¹³ FNPRM ¶ 1.

¹⁴ *Id.* ¶¶ 12, 138 (citing NTIA, *An Assessment of the Near-Term Viability of Accommodating Wireless Broadband Systems in the 1675-1710 MHz, 1755-1780 MHz, 3500-3650 MHz, 4200-4220 MHz, and 4380-4400 MHz Bands* (rel. October 2010) (“Fast Track Report”), available at http://www.ntia.doc.gov/files/ntia/publications/fasttrackevaluation_11152010.pdf).

¹⁵ *Id.* ¶ 141.

¹⁶ *See, e.g.*, NCTA NPRM Comments at 10; Comments of Qualcomm Inc. at iii (filed Feb. 20, 2013) (“Qualcomm NPRM Comments”); NPRM Reply Comments of Google, Inc. at 3-5 (filed Apr. 5, 2013); Letter from Gerard J. Waldron, Counsel, Microsoft, to Marlene Dortch, Secretary, FCC, at 2 (Apr. 7, 2014).

close to them – would be the most significant barrier to using the 3.5 GHz band for Wi-Fi-like operations.¹⁷ These exclusion zones, which would cover approximately one third of the continental United States, would prevent deployment in substantial portions of cable provider footprints. To make matters worse, the restricted areas include many major markets where spectrum exhaustion in the 2.4 GHz band is most common.¹⁸

The Commission need not and should not adopt these expansive exclusion zones. Critically, although the Commission has proposed to adopt NTIA’s recommendations for exclusion zones, the NTIA analysis included two assumptions about commercial spectrum use that will not apply to operations in the 3.5 GHz band. First, NTIA assumed that commercial operations would deploy “high power, macrocell networks” rather than the small cell deployments contemplated by the FNPRM.¹⁹ Indeed, as the Commission has recognized, the record already overwhelmingly indicates “that the size of Exclusion Zones as estimated by NTIA should be re-evaluated given the proposal to apply the small cell model.”²⁰ For example, detailed analysis submitted by Qualcomm in this proceeding demonstrates that the Commission can reduce exclusion zones from hundreds of miles to tens of miles.²¹

Second, NTIA’s interference analysis evaluated not only the potential for harmful interference from commercial operations to federal incumbents, but also interference from

¹⁷ NCTA NPRM Comments at 9-10.

¹⁸ *Id.* at 10.

¹⁹ FNPRM ¶ 138 (citing Fast Track Report).

²⁰ *Id.* ¶ 140 and n. 249 (citing NCTA NPRM Comments at 10; NPRM Comments of AT&T Services, Inc. at 12; NPRM Comments of the Consumer Electronics Association at 8; NPRM Comments of InterDigital at 3-4; NPRM Comments of Motorola Solutions at 7); NPRM Comments of Nokia Siemens Networks US LLC at 22-23; Qualcomm NPRM Comments at 16-17; NPRM Comments of Shared Spectrum Company at 3-4; NPRM Comments of Telecommunications Industry Association at 3).

²¹ *See* Qualcomm NPRM Comments at 2, 17.

federal systems to commercial deployments.²² Under the three-tier licensing framework proposed by the Commission, however, commercial users are secondary to federal incumbents, and must accept harmful interference caused by federal incumbent operations.

For this reason, the Commission should set exclusion zones based solely on the need to protect incumbents rather than codifying assumptions about what might constitute “acceptable” levels of interference to commercial operations using today’s technology. This will enable the market to decide whether to deploy commercial operations in a particular spectrum environment. Indeed, doing so may well lead to significant innovation in device performance and spectrum utilization, just as occurred after the Commission opened up the 2.4 GHz band, formerly regarded as a “junk” band, for wireless broadband use.

IV. CENSUS TRACTS ARE A POOR FIT FOR SMALL CELL DEPLOYMENTS, WHICH WILL PROVIDE COVERAGE SIMILAR TO WI-FI ACCESS POINTS

The Commission proposes to issue PALs based on the census tracts used for the 2010 census.²³ The Commission believes that census tracts would be suited for PAL deployments because they would “reflect[] the unique technical characteristics of small cells.”²⁴ As the Commission has recognized, 3.5 GHz deployments will have coverage and deployment characteristics similar to Wi-Fi networks used today.²⁵ Based on cable operators’ experience deploying these Wi-Fi networks, it seems evident that census tracts will be a poor fit for small cell operations, and we urge the Commission to consider a licensing approach that is more reasonably tailored to these deployments.

²² See Fast Track Report at 1-7.

²³ FNPRM ¶ 44; *Id.*, Appendix A, § 96.23(c)(1).

²⁴ *Id.* ¶ 44.

²⁵ See *In re Amendment of the Commission’s Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, GN Docket No. 12-354, Notice of Proposed Rulemaking and Order, 27 FCC Rcd 15597 ¶ 33 (2012).

As other parties in this proceeding have explained, the boundaries imposed by census tract licensing will present challenges for small cell deployments.²⁶ This is because census tract edges “generally follow visible and identifiable features” such as major roads – even though these features often divide the very areas where it will make the most sense from a network coverage perspective to deploy access points.²⁷ Additionally, because the draft rules require 3.5 GHz devices to comply with a -80 dBm/10 MHz signal level threshold anywhere along the census tract boundary,²⁸ small cell deployments simply would not be feasible in those areas unless the operator obtains a license in each relevant census tract or is able to negotiate co-existence conditions with each of its neighbors to provide relief from the -80 dBm boundary condition.

For example, a network operator that seeks to deploy small cell service to DuPont Circle in Washington, D.C., using the priority access tier would need to obtain PALs for four different census tracts – 55, 42.02, 53.01, and 107. This is because, as illustrated in Figure 1 below, the boundaries for those census tracts follow major avenues as they radiate outward from the circle. Failing to obtain even one of these census tract licenses would make serving any portion of the area challenging, because the boundary conditions that otherwise would most likely apply would preclude operations along the streets where large groups of network users are most likely to congregate.

²⁶ FNPRM ¶ 45 and n. 81 (citing AT&T Licensing PN Reply Comments at 6-7; Verizon Licensing PN Comments at 6-7; Reply Comments of T-Mobile USA, Inc. in response to Licensing PN in GN Docket No. 12-354 (filed December 20, 2013) at 7-8; Google Licensing PN Comments at 5-8.).

²⁷ See U.S. Census Bureau, 2010 Geographic Terms and Concepts, *at* https://www.census.gov/geo/reference/gtc/gtc_ct.html (last visited July 14, 2014).

²⁸ See FNPRM Appendix A, § 96.38(c).

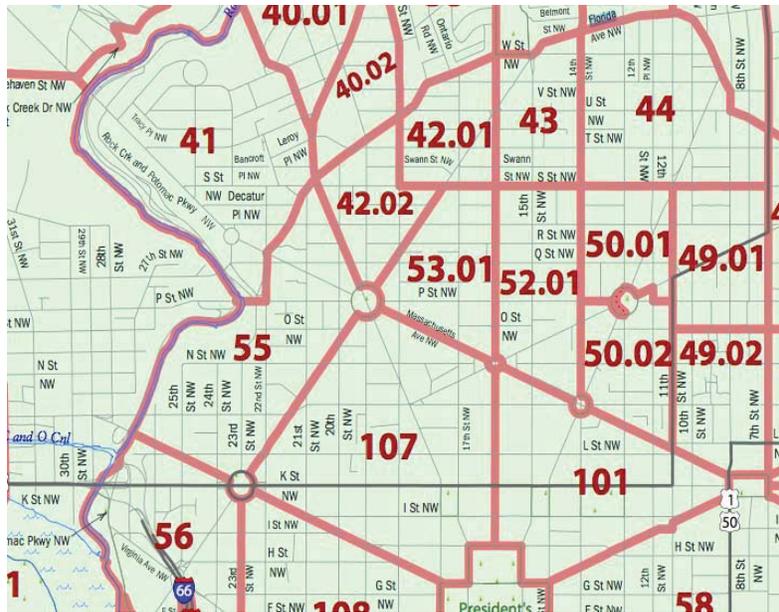


Figure 1: 2010 Census Tract Reference Map for Portions of Washington, D.C.²⁹

Finally, while the Commission has recognized that parties have voiced concerns with using census tracts based in part on “their relatively small size” in very densely populated environments,³⁰ it is equally true that census tracts can be far too large to accommodate small cell deployments efficiently. Indeed, as the Commission itself explained earlier in this proceeding, census tracts can be as large as thousands of square miles.³¹

This could mean that a priority access licensee intending only to serve a specific location would nevertheless obtain license rights for a much larger geographic area, potentially excluding other operators from using this spectrum throughout the tract. If the Commission decides to move forward with census tract licensing in these situations despite the concerns above, it will be imperative that the Commission enable GAA access to this spectrum on an opportunistic basis in

²⁹ United States Census Bureau, 2010 Census – Census Tract Reference Map: District of Columbia, DC *available at* http://www2.census.gov/geo/maps/dc10map/tract/st11_dc/c11001_district_of_columbia/DC10CT_C11001_001.pdf.

³⁰ See FNPRM ¶ 45.

³¹ See FCC, Public Notice, *Commission Seeks Comment on Licensing Models and Technical Requirements in the 3550-3650 MHz Band*, 28 FCC Rcd 15300 (2013).

areas where the priority access channel is unused in order to maximize the chances that operators will be able to use this spectrum efficiently.³²

V. TECHNICAL RULES FOR PAL AND GAA OPERATIONS SHOULD BE AS SIMILAR AS POSSIBLE TO ENABLE EFFICIENT AND UTILITY MAXIMIZING DEPLOYMENTS

NCTA supports the Commission’s proposals to apply similar technical requirements for device operations regardless of whether the devices are accessing spectrum in the PAL tier or GAA tier. These similarities include transmit power limits,³³ device security obligations,³⁴ and equipment authorization requirements.³⁵ In addition, NCTA supports the Commission’s proposal to require all devices to be capable of operating throughout the 3.5 GHz band regardless of whether the device is assigned frequencies in the GAA tier or the PAL tier.³⁶

By requiring similar operating parameters for all devices in the 3.5 GHz band, manufacturers can realize economies of scale, reducing cost and increasing the likelihood that consumer devices will include the capability to operate in this band. Doing so will also help provide operators with flexibility to deploy networks in the most efficient manner possible, and to adjust those networks over time in response to evolving technical capabilities and/or market demands.

For example, a network operator might initially obtain a PAL for a particular area but then subsequently determine that GAA operations are suitable for deployments in that location. Conversely, an operator using GAA spectrum may seek to convert a deployment to a PAL area in order to take advantage of Quality of Service guarantees or other PAL features. And operators

³² FNPRM ¶ 36.

³³ *See Id.*, Appendix A, § 96.38.

³⁴ *See Id.*, Appendix A, § 96.36(e).

³⁵ *See Id.*, Appendix A, § 96.39.

³⁶ *See id.* ¶ 64.

may elect to deploy a heterogeneous mix of PAL and GAA small cells depending on spectrum availability and operating conditions. Requiring all devices to have similar operating capabilities – including the ability to operate throughout the band – will greatly facilitate these efforts.

CONCLUSION

Assuming the Commission can ensure that C-Band operations in the 3.7-4.2 GHz bands do not suffer harmful interference, it should adopt final rules for the 3.5 GHz band that will maximize the likelihood that cable companies and other small cell operators will be able to use this band for widespread commercial deployments. Accordingly, for the reasons stated above, the Commission should (1) recalculate the size of the proposed exclusion zones to account for small cell operations; (2) issue priority access licenses using geographic areas better suited to small cell deployments; and (3) ensure that its technical rules for PAL and GAA operations are as similar as possible.

Respectfully submitted,

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