

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

In the Matter of)
)
Expanding the Economic and Innovation) GN Docket No. 12-268
Opportunities of Spectrum Through Incentive)
Auctions)

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

The National Cable & Telecommunications Association (NCTA) submits these supplemental comments in response to the *Band Plan Public Notice* in the above referenced proceeding, through which the Commission seeks comment on variations of the “Down from 51” plan for the 600 MHz band.¹ As NCTA has demonstrated in its prior submissions in this proceeding, the band plan ultimately adopted by the Commission should promote the use of both licensed and unlicensed wireless broadband systems. We are concerned that the alternative plans proposed in the *Band Plan Public Notice* would shortchange unlicensed use.

INTRODUCTION

In the *NPRM* in this proceeding the Commission proposed a band plan that splits the uplink and downlink spectrum, with television broadcast in the “duplex gap” in between.² As an alternative, the Commission offered a Down from 51 band plan in which the duplex gap would be available for unlicensed operations.³ NCTA supported this alternative approach, with certain

¹ *Wireless Telecommunications Bureau Seeks to Supplement the Record on the 600 MHz Band Plan*, GN Docket No. 12-268, Public Notice, DA 13-1157 (Wireless Tel. Bur., May 17, 2013) (*Band Plan Public Notice*).

² *See Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, GN Docket No. 12-268, Notice of Proposed Rulemaking, 27 FCC Rcd 12357, 12401-02, ¶¶125-126 (2012) (*NPRM*).

³ *Id.* at 12421, ¶¶178-179.

revisions, and urged the Commission to create a sufficiently large duplex gap to meaningfully support unlicensed operations while remaining faithful to the Spectrum Act.⁴

Concluding that the band plans on record limit the amount of market variation that can be achieved, the Wireless Telecommunications Bureau has proposed three new alternatives in the *Band Plan Public Notice*: a “Down from 51 Reversed” band plan;⁵ a “Down from 51 with TV in the Duplex Gap in Constrained Markets” variation;⁶ and a “Down from 51 Time Division Duplex (TDD) Approach.”⁷ NCTA appreciates the complexity of creating a band plan that meets the multiple objectives in this proceeding. We are concerned, however, that the plans proposed in the *Band Plan Public Notice* either do not designate sufficient spectrum in the duplex gap for unlicensed operations or unwisely propose to use the duplex gap for television operations. By contrast, the Commission’s original Down from 51 plan with NCTA’s proposed modifications carefully balances the need for licensed and unlicensed spectrum and accommodates the potential disparity in the amount of spectrum that may be available for wireless broadband in different markets.

I. THE 600 MHz BAND PLAN SHOULD INCORPORATE SUFFICIENT CONTIGUOUS SPECTRUM FOR UNLICENSED OPERATIONS

NCTA and other interested parties in this proceeding have demonstrated the importance of enabling the use of unlicensed spectrum in the 600 MHz band.⁸ Consumers increasingly rely

⁴ See NCTA Comments at 4-11; *see also* NCTA Reply Comments at 3-8.

⁵ *Band Plan Public Notice*, DA 13-1157, at 3-5.

⁶ *Id.* at 5.

⁷ *Id.* at 5-6.

⁸ See, e.g., NCTA Reply Comments at 1-3; NCTA Comments at 2-4; CEA Comments at 26; Free Press Comments at 8-11; Google/Microsoft Comments at 7-21; Public Interest Spectrum Coalition Comments at 8-11.

on Wi-Fi to carry more Internet traffic to their devices and to receive fixed broadband service.⁹ The rate at which Wi-Fi traffic has grown proves Wi-Fi is an “essential element of the wireless broadband ecosystem.”¹⁰ This skyrocketing use of Wi-Fi, however, is creating congestion in existing unlicensed bands and thus an urgent need for additional unlicensed spectrum.¹¹ This proceeding provides the Commission with the unique opportunity to make available contiguous lower band unlicensed spectrum, which possesses the critical propagation and penetration characteristics that will be an important complement to the bands currently available for Wi-Fi.¹² Designating some of the 600 MHz band for unlicensed Wi-Fi operations will enable the provision of more robust services that will benefit consumers.

Congress clearly anticipated that some of the reclaimed broadcast spectrum in the 600 MHz band would be made available for unlicensed operations. In particular, Congress

⁹ See Comcast/NBCUniversal Comments at 31; Consumer Federation of America Comments at 15; NCTA Comments at 3; *see also* NCTA Reply Comments at 2 (noting consumers are also able to harness the benefits of Wi-Fi on-the-go, including in outdoor areas, due to substantial investments in Wi-Fi deployment by cable operators). There are also benefits of Wi-Fi offload for licensed wireless services. *See* Comcast/NBCUniversal Comments at 35-37; Consumer Federation of America Comments at 15; Free Press Comments at 11-12; Google/Microsoft Comments at 13-16.

¹⁰ *See* Rob Alderfer, CableLabs, *WiFi Spectrum: Exhaust Looms*, at 6-7 (May 2013) (citing *Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2011-2016*, CISCO), NCTA Comments in ET Docket No. 13-49, Attachment A (filed May 28, 2013).

¹¹ The Commission has recognized this need for additional unlicensed spectrum and is considering ways to make more unlicensed spectrum available for Wi-Fi in the 5 GHz band, but that band alone is unlikely to meet the demand for unlicensed operations, particularly given the competing uses for the band. *See e.g.*, *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, Notice of Proposed Rulemaking, 28 FCC Rcd 1769 (2013); *see also* NCTA Reply Comments at 2, n.7; Alderfer, *supra* note 10 at 8-13.

¹² *See, e.g.*, Free Press Comments at 10 (“The spectrum at issue in this proceeding has different characteristics from the higher frequency spectrum that has customarily been set aside for unlicensed use, and has the potential to generate even greater innovation and connectivity because of its superior propagation and ability to deliver non-line-of-sight coverage.” (citing Richard Thanki, *The Economic Significance of Licence-Exempt Spectrum to the Future of the Internet*, 10-12, 17 (2012)); Google/Microsoft Comments at 24 (“Unlicensed access in the 600 MHz spectrum band therefore offers a substantial improvement for consumers and businesses that need longer-range communications and whole-home or whole-office coverage.”); *see also* NCTA Reply Comments at Attachment, Dirk Grunwald and Kenneth Baker, *FCC Broadcast Incentive Auction: A Band Plan for Maximizing Spectrum Utility*, 9-14 (2013).

authorized the Commission to permit the use of guard bands for unlicensed use and otherwise recognized the importance of unlicensed use of spectrum in parallel with the auction of spectrum for licensed uses.¹³ In authorizing the allocation of guard bands for unlicensed use, Congress expected the Commission to use that authority effectively and productively.¹⁴ That objective would be frustrated by the adoption of a band plan that hampered or limited the utility of those bands for that purpose.¹⁵

II. THE ALTERNATIVE BAND PLANS SHORTCHANGE UNLICENSED SPECTRUM NEEDS AND ARE OTHERWISE FLAWED

Each of the alternative plans proposed in the *Band Plan Public Notice* would unnecessarily shortchange the goal of making 600 MHz frequencies available for unlicensed operations.

A. Down From 51 Reversed

Under the Down from 51 Reversed plan, the upper 600 MHz frequencies would be used for base station (downlink) rather than handset (uplink) transmissions.¹⁶ Reversing the assignment of downlink and uplink operations requires the establishment of a new guard band to prevent interference with the adjacent uplink frequencies in the 700 MHz band.¹⁷ This plan does

¹³ 47 U.S.C. §§ 1453, 1453(c); *see also* Comcast/NBCUniversal Comments at 44 (“... by allowing the Commission to adopt technically *reasonable* guard bands, Congress employed statutory language that permits the Commission to consider other policy goals – including facilitating unlicensed use – as part of its analysis of what is reasonable to protect licensees.”); Google/Microsoft Comments at 28, 32-36; NCTA Comments at 16-17; NCTA Reply Comments at 9.

¹⁴ *See* NCTA Comments at 16-17; *see also* NCTA Reply Comments at 9.

¹⁵ *Id.*

¹⁶ *Band Plan Public Notice*, DA 13-1157, at 3-5.

¹⁷ By contrast, the original Down from 51 plan did not require such a guard band. *See NPRM* at 12421, ¶178. The need to separate adjacent channel uplink and downlink bands is an accepted part of spectrum planning. *See, e.g., Service Rules for Advanced Wireless Services in the 2000-2020 MHz and 2180-2200 MHz Bands*, WT Docket Nos. 12-70 and 04-356, ET Docket No. 10-142, Report and Order and Order of Proposed Modification, 27 FCC Rcd 16102, at 16127, ¶65 (2012) (adopting special out of band emission and power rules for the AWS-4 band designed to protect Upper H Block downlink operations from AWS-4 uplink use, recognizing that the proposed

not allow for sufficient unlicensed spectrum and unnecessarily introduces challenges not present in NCTA's plan.

First, the need for an additional guard band would fragment the unassigned portions of the 600 MHz band. That, in turn, would greatly reduce its utility for unlicensed operations.¹⁸ As NCTA has explained, a single block of contiguous channels in a duplex gap would facilitate a more robust and diverse array of unlicensed services than would multiple fragmented bands of channels.¹⁹ More specifically, a contiguous block of spectrum will allow for a greater range of unlicensed devices, higher throughput,²⁰ advanced techniques for managing out-of-band emissions and the potential for a common "control channel" across markets.²¹ It would also support wide-area wireless Internet systems, home and enterprise wireless networking, smart city networks (used to support traffic monitors, police cameras and utilities), machine-to-machine applications, and voice and short message service operations.²²

Such services would not be sustainable in the narrow and fragmented guard bands that would result from the Down from 51 Reversed plan. Indeed, it is possible that the new guard band between the 600 MHz and 700 MHz bands may not be used at all – wasting valuable spectrum capacity – or it may be used for low power unlicensed operations.

licensing scheme "raises particularly difficult technical issues because it may result in an uplink band (2000-2025 MHz) adjacent to a downlink band"); 47 U.S.C. § 1451(b)(4) (prohibiting the Commission from auctioning the lower H Block spectrum at 1915-1920 MHz for uplink operations if it determines that such use would cause harmful interference to downlink operations in the adjacent PCS band).

¹⁸ See NCTA Comments at 6-9. NCTA notes that the Commission has made lower band spectrum available for unlicensed operations in the television "white spaces" proceeding. *Id.* at 6. However, the fragmented and non-uniform nature of the available spectrum under those rules limits the utility of that spectrum for current and anticipated unlicensed technologies.

¹⁹ See NCTA Reply Comments at 4.

²⁰ See NCTA Comments at 9 ("Both consumers who use unlicensed spectrum for Wi-Fi broadband and carriers that use it for offload will benefit from these faster transmission speeds.")

²¹ *Id.* at 6; see also NCTA Reply Comments at 6-9.

²² See NCTA Comments at 9.

Second, the need to allocate spectrum to a guard band between the 600 MHz and 700 MHz bands would leave less spectrum for the duplex gap within the 600 MHz band, reducing the protection for broadcast and mobile wireless operations in that band from harmful interference. Smaller guard bands between uplink and downlink spectrum, as contemplated in the Down from 51 Reversed plan, do not provide the superior interference protection of a large duplex gap.²³ As Grunwald and Baker explained, a duplex gap is needed to reduce the likelihood that a handset's transmitter will receive interference from its receiver and allows the cellular base station to both transmit and receive simultaneously.²⁴ Too-small duplex gaps, as may be created in the Down from 51 Reversed plan, will require unnecessary increased and expensive filtering technology for mobile units.²⁵

B. Down From 51 with TV in the Duplex Gap in Constrained Markets

This proposal is similar to the proposal in the *NPRM*, except that instead of unlicensed operations in the duplex gap, television operations would be permitted in the duplex gap in constrained markets.²⁶ While this would reduce the potential for interference created by situating 700 MHz mobile wireless uplink operations adjacent to 600 MHz mobile downlink use, it would almost completely eliminate any meaningful opportunity for designation of spectrum for unlicensed use, contrary to what Congress envisioned.²⁷

²³ See, e.g., *NPRM*, 27 FCC Rcd at 12421, ¶178 (noting that a wider duplex gap could enhance mobile performance).

²⁴ Grunwald and Baker, *supra* note 12 at 21.

²⁵ *Id.*

²⁶ *Band Plan Public Notice*, DA 13-1157, at 5. In the *NPRM* the Commission notes the possibility of introducing television operations in the duplex gap in a Down from 5 plan if the duplex gap is sufficiently large. *Id.*

²⁷ Under this proposal, the only opportunity for unlicensed operations would be in the guard band between the 600 MHz downlink and the television band. The limited amount of spectrum likely to be available in this guard band would not allow for the deployment and use of Wi-Fi.

This approach would also create a greater potential for interference risks to broadcasters.²⁸ As Commissioner Pai recognized, “[t]he record contains overwhelming support for a band plan . . . that does not contemplate broadcast operations in the duplex gap.”²⁹ Broadcasters, major wireless carriers, and prominent equipment manufacturers, working together in a cooperative manner, similarly agree that the Commission should “[a]void broadcast television stations in the duplex gap.”³⁰ Moreover, they argue that the Commission should “[p]reclude any operations in the duplex gap or guard bands that would result in harmful interference to adjacent licensed services.”³¹ This is because, rather than preventing harmful interference, allowing broadcasters to operate in the duplex gap would create a greater interference risk.³²

C. Down From 51 TDD Approach

The third alternative in the *Band Plan Public Notice* would use a Down from 51 band plan framework with unpaired TDD blocks. As in the Down from 51 Reversed approach, this plan would include a guard band between the 700 MHz uplink and the 600 MHz TDD block. Another guard band would be located between the TDD block and television operations.³³ There would be no duplex gap at all and no designation of spectrum for unlicensed operations, except

²⁸ See NCTA Comments at 5, 7-8.

²⁹ *Statement of Commissioner Ajit Pai on the Public Notice of the Wireless Telecommunications Bureau to Supplement the Record on the 600 MHz Band Plan*, GN Docket No. 12-268, News Release, at 1 (rel. May 17, 2013).

³⁰ Letter from Joan Marsh, Vice President, Federal Regulatory, AT&T, Inc., *et al.*, to Gary Epstein, Incentive Auction Task Force Chair, and Ruth Milkman, Wireless Bureau Chief, FCC, GN Docket No. 12-268, at 1 (Jan. 24, 2013).

³¹ *Id.*

³² See NCTA Comments at 4-8. By contrast, using the duplex gap for unlicensed operations will improve performance for both mobile wireless licensed and unlicensed operations by permitting the use of orthogonal frequency-division multiplexing (OFDM) power shaping at the band edges. See Grunwald and Baker, *supra* note 12 at 29.

³³ *Band Plan Public Notice*, DA 13-1157, at 5-6.

for the possible use of guard bands for that purpose. The elimination of any unlicensed spectrum is contrary to Congressional intent and would ignore the well-documented need for unlicensed spectrum with the propagation characteristics that the 600 MHz band offers, as noted above. To the extent unlicensed operations were permitted in the guard bands, the fragmented nature of the spectrum presents the same shortcomings as the fragmented nature of unlicensed spectrum in a Down from 51 Reversed plan. Given the predominance of frequency division duplex (FDD) technology by U.S. providers, moreover,³⁴ this band plan would be incompatible with the trajectory of the US mobile industry and could limit the value of the band.

D. NCTA's Plan Offers a Better Alternative

In the *Band Plan Public Notice* the Wireless Telecommunications Bureau asserts that “[t]he Down from 51 proposals in the record generally limit the amount of market variation that can be achieved,”³⁵ but NCTA’s Down from 51 proposal addresses this issue without sacrificing a contiguous duplex gap suitable for unlicensed operations.³⁶ The wider duplex gap envisioned by NCTA’s proposal can vary with the number of cleared television channels, consistent with the Commission’s goal of accommodating the potentially varying amounts of spectrum across markets.³⁷ The plan also enables asymmetric uplink and downlink bandwidth allocations if required and is flexible with regard to the possible reallocation of channel 37 radioastronomy and

³⁴ While TDD is used for LTE outside the United States, in the U.S., FDD is the overwhelming mode of choice. See, Ed Oswald, *Is Clearwire the Savior of Global LTE?*, ExtremeTech, available at <http://www.extremetech.com/extreme/129090-is-clearwire-the-savior-of-global-lte> (“[s]o far Clearwire is the only US operator to move forward with TDD-LTE”).

³⁵ *Id.* at 2.

³⁶ See NCTA Reply Comments at 6-7; see also NCTA Comments at 10; Grunwald & Baker, *supra* note 12, at 26-27.

³⁷ See NCTA Comments at 10.

Wireless Medical Telemetry Service.³⁸ Additionally, as Grunwald and Baker point out, the band plan proposed by NCTA, which proposes a minimum of 20 megahertz of unlicensed spectrum, “can vary with the number of cleared TV channels, consistent with the FCC’s desire to accommodate the potential for varying supply across markets.”³⁹

In addition to addressing market variations, the NCTA proposal also overcomes the limitations of the alternative plans presented in the *Band Plan Public Notice*. NCTA’s proposal limits interference to broadcasters by removing them from the duplex gap. Unlike the Down from 51 Reversed approach, moreover, NCTA’s plan does not create spectral inefficiencies by placing uplink and downlink bands nearby, creating a need for an extra guard band. Finally, NCTA’s plan creates a wide duplex gap between the 600 MHz uplink and downlink bands, enhancing mobile performance.

³⁸ *Id.*

³⁹ Grunwald & Baker, *supra* note 12, at 26-27.

CONCLUSION

NCTA's plan, which modifies the Commission's initial Down from 51 plan to include a significant duplex gap, carefully balances the need to make spectrum available for licensed and unlicensed operations. The alternative proposals in the *Band Plan Public Notice* fail to designate sufficient spectrum for unlicensed use and otherwise create unwanted engineering complexities. A significant duplex gap designated for unlicensed use will help satisfy the rapidly growing need for unlicensed spectrum, configured in a manner that makes the best use of that spectrum. NCTA's band plan also ensures the efficient use of the 600 MHz band in a way that the alternative plans do not while preserving the flexibility necessary to accommodate differing amounts of available spectrum in multiple markets.

Respectfully submitted,

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