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February 18, 2021

VIA ELECTRONIC FILING

Marlene H. Dortch
Secretary
Federal Communications Commission
45 L Street, NE
Washington, DC 20554

**Re: *Facilitating Shared Use in the 3100-3550 MHz Band, WT Docket No. 19-348;*
*Promoting Investment in the 3500-3700 MHz Band, GN Docket No. 17-258***

Dear Ms. Dortch:

On February 16, 2021, David Don and I of Comcast Corporation (“Comcast”) met with Erin Boone, Wireless Advisor to Commissioner Simington. During the meeting, and as detailed in the presentation attached as Appendix A, Comcast explained that the 3.45-3.55 GHz (“3.45 GHz”) band presents the Commission with the opportunity to build on its recent success in bringing mid-band spectrum to market by adopting a licensing framework with rules designed to foster innovation and broad deployment in the band by a wide array of users.¹ Comcast noted last year’s successful 3.55-3.7 GHz (“3.5 GHz”) Citizens Broadband Radio Service (“CBRS”) auction of Priority Access Licenses (“PAL”) in which the Commission crafted rules that attracted an unprecedented diversity of applicants and licensees,² including for non-traditional use cases.³

With a pipeline of mid-band spectrum now in place to support the deployment of 5G services by large, nationwide mobile network operators in the C-Band, Comcast urged the Commission to refocus on promoting two of the core statutory objectives of spectrum auctions:

¹ See generally *Facilitating Shared Use in the 3100-3550 MHz Band*, Report and Order and Further Notice of Proposed Rulemaking, 35 FCC Rcd. 11078 (2020) (“*Further Notice*”). Unless otherwise noted, all comments and reply comments cited in this filing refer to those filed in WT Docket No. 19-348 on or around November 20, 2020 and December 7, 2020, respectively.

² See *FCC Announces Winning Bidders of 3.5 GHz Band Auction*, FCC Press Release (Sept. 2, 2020), <https://docs.fcc.gov/public/attachments/DOC-366624A1.pdf>.

³ See, e.g., Sue Marek, *Marek’s Take: Private Networks, Fixed Wireless are Winners in CBRS Auction*, FierceWireless (Sept. 8, 2020), <https://www.fiercewireless.com/wireless/marek-s-take-private-networks-fixed-wireless-are-winners-cbrs-auction> (noting potential innovative CBRS use cases for PAL winners, including bundling connectivity with agricultural and landscaping equipment and/or real estate properties, deploying private LTE networks to support electrical grids and IoT applications, and others); Rajat Ghai, *CBRS Use-Cases With Focus on Localized Indoor Mobile Access (LIMA) Mobility and Service Continuity*, Technical Paper, SCTE-ISBE Cable-Tec Expo (2018), <https://www.nctatechnicalpapers.com/Paper/2018/2018-cbrs-use-cases> (detailing a variety of innovative CBRS uses, including “new business models” like neutral host networks and industrial IoT).

innovation and competition.⁴ Now is the opportune time for the Commission to return to advancing its core objectives by adopting rules for the 3.45 GHz band that are designed to attract a broad diversity of auction participants, leading to a similarly broad diversity of licensees and non-traditional use cases that foster creative ways to help close the digital divide, among other things.⁵

I. Key Licensing Rules for the 3.45 GHz Band

The goal for CBRS was to create an “innovation band,” by making the regulatory framework “hospitable to a wide variety of users, deployment models, and business cases, including some solutions to market needs not adequately served by our conventional licensed or unlicensed rules.”⁶ The rules the Commission adopted for CBRS delivered on this promise, with the PAL auction attracting a record 271 qualified applicants and 228 winning bidders, over one-third of which were WISPs seeking to serve rural communities to help close the digital divide.⁷ Cable operators like Comcast also participated robustly, as did other entities that do not traditionally hold spectrum licenses, including Deere & Company, Chevron, Texas A&M University, and many others.⁸ The Commission auctioned 20,625 licenses – more than any other single Commission auction in history. By comparison, in the two below-6 GHz auctions preceding the PAL auction, which relied on more traditional licensing rules, there were only a fraction of the number of winners – just 50 winners in the 2017 600 MHz auction,⁹ and 31

⁴ See 47 U.S.C. § 309(j)(3)(B).

⁵ See *Further Notice*, Statement of Commissioner Jessica Rosenworcel (“[W]e should take a long look at what we learned in CBRS about spectrum auctions, license sizes, and sharing rather than reflexively reverting back to the same-old, same-old.”); *id.*, Statement of Commissioner Geoffrey Starks (“The number and variety of new licensees, coupled with the unlicensed use already underway in the band, promise to make the 3.5 GHz band a source of tremendous innovation and opportunity. It therefore makes sense to consider whether a similar approach might work in the adjacent 3.45 GHz band.”); see also *Further Notice* ¶ 72 (seeking comment on whether “the technical rules for this band” should “more closely resemble those for the Citizens Broadband Radio Service in the 3.5 GHz band”).

⁶ *Amendment of the Commission’s Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, Report and Order and Second Further Notice of Proposed Rulemaking, 30 FCC Rcd. 3959 ¶¶ 2, 6 (2015).

⁷ *WISPA’s 10 Takeaways from the CBRS Auction*, Press Release (Sept. 9, 2020), http://wispa.org/news_manager.php?page=22547 (“WISPA PAL Auction Press Release”).

⁸ *Verizon, Dish & Cable Top List of CBRS Auction Winners*, FierceWireless (Sept. 2, 2020), <https://www.fiercewireless.com/operators/verizon-dish-cable-top-list-cbrs-auction-winners> (describing the robust participation by “[n]on-traditional bidders,” as opposed to “the usual suspects who turn up for U.S. spectrum auctions”); see also Wireless Internet Service Providers Association Comments at 11 (noting that “[t]he top 10 winning bidders included . . . utilities and real estate companies”) (“WISPA Comments”); Iyad Tarazi, *PAL Auction: It’s a Wrap*, Federated Wireless (Aug. 27, 2020), <https://federatedwireless.com/pal-auction-its-a-wrap> (“The wide participation across market segments that don’t normally participate in spectrum auctions, including Cable, WISP, Energy and Enterprise, is an absolute validation of the shared spectrum model and its capacity to create a vibrant expanded wireless market.”).

⁹ *Incentive Auction Closing and Channel Reassignment Public Notice*, Public Notice, 32 FCC Rcd. 2786 (WTB 2017).

winners in the 2015 AWS-3 auction.¹⁰ Most recently, the 3.7 GHz auction attracted only 57 qualified applicants – approximately *one-fifth* as many as the PAL auction.¹¹ The Commission should build on the success of the CBRS auction as it adopts rules for the 3.45 GHz band.

County-Based Licensing. Comcast emphasized that county-based licenses are the most effective way to encourage competition and network investment in both urban and rural communities, which is why the county-based CBRS auction had more than four times more participants than other recent spectrum auctions,¹² and why rural areas were not left behind.¹³ Commenters similarly observe that counties accommodate applicants of all sizes, promoting investment in deployment by smaller entities by keeping barriers to entry relatively low, *while still allowing those seeking to cover entire PEAs to do so by aggregating multiple county licenses.*¹⁴ Indeed, the Commission explained in the CBRS context that counties are “the basic building blocks” of both PEAs and other geographic areas, “making them suitable for aggregation for licensees that wish to operate over large areas.”¹⁵ As with the CBRS band, “this flexibility makes counties an appropriate middle ground for this band.”¹⁶ Moreover, as the Commission previously found, counties “are large enough for network deployers to achieve scale economies for both fixed and mobile services . . . [and] cover a large enough geographic footprint to incentivize investment in wider area geographic deployments.”¹⁷ In short, “using counties nationwide will support licensee diversity and increased investment.”¹⁸ Promoting broad participation by applicants of all sizes will help to ensure that the 3.45 GHz auction attracts sufficient investment to cover federal relocation costs.¹⁹

¹⁰ *Auction of Advanced Wireless Services (AWS-3) Licenses Closes; Winning Bidders Announced for Auction 97*, Public Notice, 30 FCC Rcd. 630 (WTB 2015).

¹¹ *Auction of Flexible-Use Service Licenses in the 3.7-3.98 GHz Band; 57 Applicants Qualified to Bid in Auction 107*, Public Notice, 35 FCC Rcd. 12829 (OEA & WTB 2020).

¹² Charter & Cox Comments at 2.

¹³ *WISPA PAL Auction Press Release* (“Instead of the auction being focused on the metro areas, 91% of all the licenses got sold, revealing that significant interest and investment went to the rural areas of America, too.”).

¹⁴ Southern Linc Comments at 4-7; *see also* NCTA Comments at 6 (“[C]ounties serve as the building blocks for traditional license areas such as Economic Areas and Cellular Market Areas and carriers may aggregate them to achieve coverage that aligns with their existing footprints.”); U.S. Cellular Comments at 13-14 (same).

¹⁵ *Promoting Investment in the 3550-3700 MHz Band*, Report and Order, 33 FCC Rcd. 10598 ¶ 29 (2018) (“*2018 CBRS Order*”).

¹⁶ *Id.*

¹⁷ *2018 CBRS Order* ¶ 26. Even CTIA acknowledged that “counties . . . offer a middle-ground approach that should provide opportunities for a wide array of fixed and mobile broadband providers,” and that county-size licenses, along with other reforms adopted in the *2018 CBRS Order*, would enable “targeted use cases while allowing the deployment of wide-area networks for the provisioning of 5G.” *See* Letter from Scott K. Bergmann, SVP, Regulatory Affairs, CTIA to Marlene H. Dortch, Secretary, FCC, GN Docket No. 17-258, at 3-4 (Oct. 16, 2018).

¹⁸ *2018 CBRS Order* ¶ 41.

¹⁹ By contrast, the potential problems associated with licensing this band on a Partial Economic Area (“PEA”) basis are well documented in the record. PEAs are so large that the licenses would be too expensive for all but the

Spectrum Aggregation Limit. Comcast also observed that a consensus has emerged that a spectrum aggregation limit of 40 megahertz is appropriate for the 3.45 GHz band.²⁰ With 100 megahertz in play in each license area, a 40-megahertz limit would ensure at least three licensees per market and thereby play an important role in shaping the next several decades of mobile wireless competition.²¹ A spectrum aggregation limit is preferable to a post-auction spectrum screen at the long-form application stage, which would not protect against the aggregation of 3.45 GHz band licenses by a handful of large bidders.²² The Commission adopted a 40-megahertz spectrum aggregation limit in the CBRS context to promote “diversity among users that likely will be operating in this band, and foster competition and innovation,”²³ and it worked. The limit was reached in 2,099 counties (approximately one-third of all counties) in the PAL auction, thereby playing a meaningful and significant role in the diversity of auction winners. Moreover, as the Commission has recognized, *ex ante* spectrum aggregation limits “provide greater certainty and efficiency in the process of licensing through competitive bidding.”²⁴

II. Protecting Investments in CBRS

Comcast further explained that it will be crucial to ensure that new 3.45 GHz services do not harm adjacent CBRS operations.²⁵ To do so, the Commission should adopt power limits lower than those proposed in the *Further Notice*, while also requiring 3.45 GHz licensees that use time division duplexing (“TDD”) to synchronize with each other and with CBRS operations that also use TDD.

Comcast specifically called the Commission’s attention to the concern that the power limits proposed in the *Further Notice* are high enough to seriously risk harming adjacent CBRS

largest bidders. *See, e.g.*, U.S. Cellular Reply Comments at 10-13; OTI & PK Comments at 9-12; Google Comments at 5.

²⁰ CCA Comments at 5-6; Southern Linc Comments at 8; Charter & Cox Comments at 3; NCTA Comments at 22-25.

²¹ CCA Comments at 5-6.

²² NCTA Comments at 23-24; *see also* 47 U.S.C. § 309(j)(3)(B) (directing the Commission to “avoid[] excessive concentration of licenses” in spectrum auctions).

²³ *See 2018 CBRS Order* ¶ 107; *see also Amendment of the Commission’s Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, Report and Order and Second Further Notice of Proposed Rulemaking, 30 FCC Rcd. 3959 ¶ 117 (2015) (“We conclude that a limit of 40 out of the maximum of 70 megahertz of PALs that may be available in each license area will facilitate competition, innovation, and the efficient use of the 3.5 GHz Band, ensuring that it is assigned in a manner that serves the public interest, convenience, and necessity.”); *id.* ¶ 120 (stating that “[s]uch diversity is important to encourage innovation in technologies and business models,” which “may well lead to positive spillovers in the development of other spectrum bands in the future”); *id.* ¶ 121 (finding that “the potential costs of such a spectrum aggregation limit will be low,” and that it is “unlikely that th[e] spectrum aggregation limit would curtail potential business models and use cases in the band”).

²⁴ *Policies Regarding Mobile Spectrum Holdings, Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Report and Order, 29 FCC Rcd. 6133 ¶ 140 (2014).

²⁵ *See* 47 U.S.C. § 303(f) (requiring that the Commission “[m]ake such regulations . . . as it may deem necessary to prevent interference between stations”).

operations, thereby undermining billions of dollars in CBRS investment.²⁶ Lower power levels would also better align with the CBRS rules, thereby generating many of the same benefits as discussed above with respect to county-based licensing, particularly for entities deploying in both bands.²⁷ Stakeholders who oppose lower power limits as potentially hindering 5G deployment have failed to adequately substantiate such claims. As evidenced by Verizon's robust participation in the CBRS auction, having spent more than any other applicant, low power limits are not a barrier to large carrier participation and 5G.²⁸ The record does not demonstrate why 5G deployment considerations warrant power limits for the 3.45 GHz band that are *more than 650 times greater* than they are for CBRS base stations.²⁹

Comcast further stressed that lower power limits are necessary but not sufficient to protect CBRS operations. CableLabs has demonstrated that lowering the EIRP of 3.45 GHz base stations mitigates but does not prevent interference to CBRS base stations.³⁰ Numerous commenters support a TDD synchronization requirement for this reason.³¹ Requiring TDD synchronization would not be a new or novel approach given that regulators around the world have taken similar steps to address analogous issues.³²

III. Federal Relocation Costs

Finally, Comcast discussed the recent estimates from the National Telecommunications and Information Administration (“NTIA”) as to the transition costs for federal incumbents.³³

²⁶ See Sony Comments at 4 (noting that CBRS ESCs have not been tested to demonstrate that they can reject such high-power signals, and if they are saturated, CBRS PAL availability would be diminished); see also WISPA Comments at 24-25; Federated Wireless Comments at 9, 13.

²⁷ NCTA Reply Comments at 5.

²⁸ See Press Release, Federal Communications Commission, FCC Announces Winning Bidders of 3.5 GHz Band Auction (Sept. 2, 2020), <https://docs.fcc.gov/public/attachments/DOC-366624A1.pdf>.

²⁹ NCTA Reply Comments at 5.

³⁰ Letter from Danielle Piñeres, Vice President & Associate General Counsel, NCTA – The Internet & Television Association, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 19-348, GN Docket No. 17-258, Attachment at 5 (Feb. 8, 2021).

³¹ NCTA Comments at 17; Charter & Cox Comments at 3; CBRS Alliance Comments at 6; U.S. Cellular Comments at 29; Federated Wireless Comments at 14-15.

³² See NCTA Comments at 18-19; Report of C-Band Technical Working Group 4, 5G/CBRS Coexistence, GN Docket No. 18-122, at 40-43 (Appendix D) (Oct. 12, 2020), <https://ecfsapi.fcc.gov/file/1012676927498/C-Band%20TWG4%205G-CBRS%20Coexistence%20Cover%20Letter%20and%20Report%202020-10-12.pdf>; see also GSMA, *5G Synchronisation: Guidelines and Recommendations for the Coexistence of TDD Networks in the 3.5 GHz Range* (April 2020), <https://www.gsma.com/spectrum/wp-content/uploads/2020/04/3.5-GHz-5G-TDD-Synchronisation.pdf>; Charter and Cox Comments at 3-4 (arguing that the Commission has ample authority to adopt such a requirement).

³³ Letter from Carolyn Roddy, Deputy Assistant Secretary for Communications and Information, performing the delegated duties of the Assistant Secretary of Commerce for Communications and Information, to Hon. Ajit Pai, Chairman, FCC, Attachment (Jan. 14, 2021), https://www.ntia.doc.gov/files/ntia/publications/ntia_letter_to_fcc_chairman_re_estimated_costs_for_3450-3550_mhz_1-14-21.pdf (estimating that federal relocation costs may total over \$13 billion).

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Because the Commission has proposed to “set the reserve price for any auction of 3.45-3.55 GHz band licenses at 110% of the expected federal relocation costs, based on the estimate of relocation costs provided to the Commission by NTIA,”³⁴ an unduly high estimate may create the risk of depressing auction participation. For this reason, Comcast urged the Commission to work with NTIA to ensure that detailed information about how NTIA arrived at this estimate is publicly disclosed in the record for review and analysis by stakeholders.³⁵

* * * * *

The 3.45 GHz band is a prime opportunity for the Commission to learn from and build upon its recent successful spectrum auctions in order to promote greater competition, innovation, and investment. To attract a large and diverse group of applicants and licensees, the Commission should adopt county-level licenses and a spectrum aggregation limit, while also taking affirmative steps to protect investment in the CBRS band through lower power levels and a TDD synchronization requirement. Such a tailored and balanced approach is the best way to make the band’s reallocation a success.

Please direct any questions to the undersigned.

Respectfully Submitted,

/s/ Brian M. Josef

Comcast Corporation

cc: Erin Boone

³⁴ *Further Notice* ¶ 109.

³⁵ *See* Letter from Louis Peraertz, Vice President of Policy, WISPA, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 19-348, at 2 (Feb. 2, 2021) (noting that the NTIA estimate “does not allocate costs between relocation and sharing”); Letter from Danielle Piñeres, Vice President & Associate General Counsel, NCTA – The Internet & Television Association, WT Docket No. 19-348, GN Docket No. 17-258, at 2 (Jan. 25, 2021) (expressing interest “in understanding the inputs and assumptions that led to [NTIA’s] estimate”).

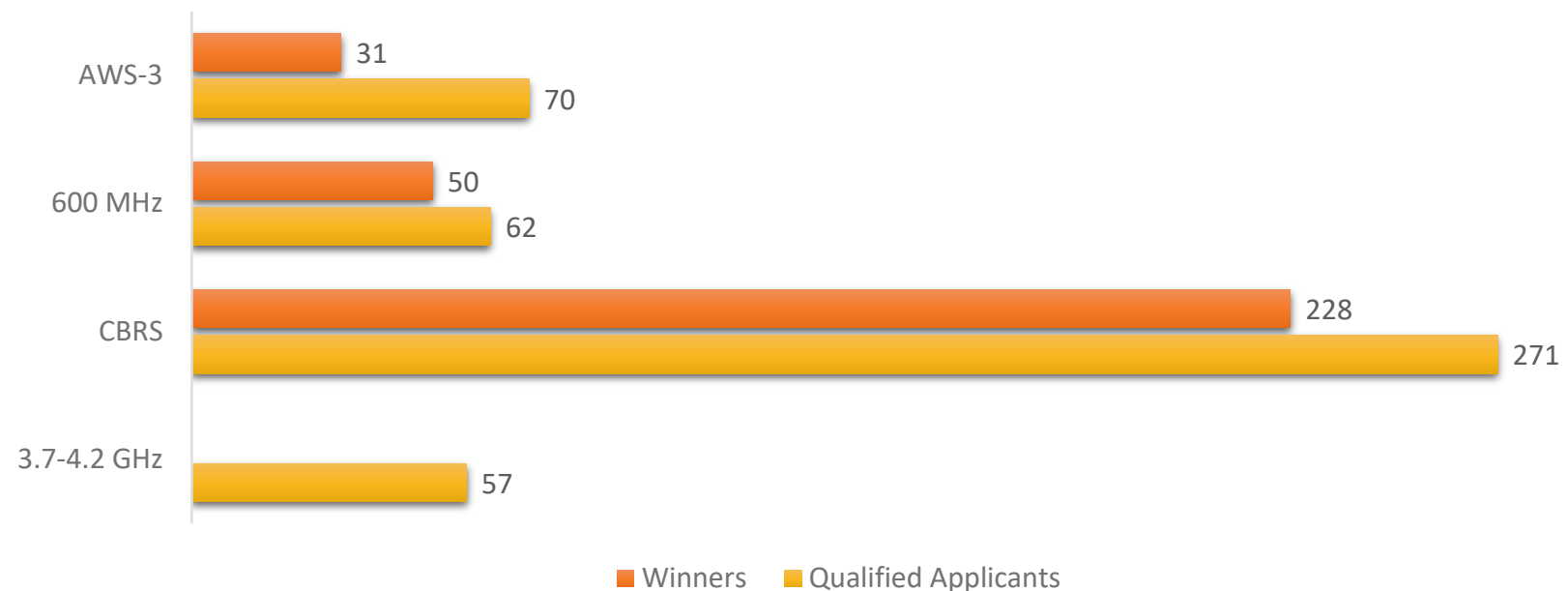
Appendix A

A Balanced Framework for the 3.45 GHz Band

February 16, 2021

A Licensing Framework to Support a Successful Auction

- The FCC should renew its focus on **innovation and competition** by ensuring the 3.45 GHz auction attracts a broad diversity of applicants, leading to a broad diversity of licensees and a robust mix of varying 5G use cases.
- The CBRS auction awarded **20,625 licenses** – *more than any other single FCC auction in history*.
 - CBRS was an “**innovation band**,” attracting non-traditional participants pursuing non-traditional, innovative use cases . . . *and it worked*.
 - Nationwide and regional carriers, WISPs, cable companies, manufacturers of agricultural equipment, universities, real estate firms, energy companies, electric utilities, and others became licensees – many for the first time
- The most recent below-6 GHz auctions with more traditional licensing rules have paled in comparison.



Key Licensing Rules

County-Size License Areas

- “Right-sized” between census tracts and PEAs
- Encourages competition, investment, and deployment in urban and rural communities
- Accommodates applicants of all sizes by lowering barriers to entry
- Easy to aggregate to create PEA-size license areas, as occurred in the CBRS auction
- Attracts robust investment to cover relocation costs

Spectrum Aggregation Limit

- Broad stakeholder support in the record
- Consensus forming at 40-megahertz limit
- Ensures competition – 100 megahertz auctioned would mean at least three licensees in each area
- Made a meaningful, pro-competitive difference in the CBRS auction, reaching limit in approximately two-thirds of all counties (2,099 counties)

Interference Protection for CBRS

- The Commission should ensure new 3.45 GHz services do not cause harmful interference to adjacent CBRS operations:

Lower Power Limits and TDD Synchronization

- Record shows that proposed limits risk harming CBRS - shouldn't undermine billions in CBRS investment
- Lower levels would simplify deployment, particularly for operators deploying in both 3.45 GHz and 3.5 GHz
- TDD operators should be required to sync – CBRS severely degraded without it
- As C-Band TWG4 report explains, this is not a new or novel approach
 - ✓ GSMA guidance recommends regulatory role
 - ✓ Japan recommends consensus TDD parameters
 - ✓ Operators in Europe have selected preferred TDD pattern with encouragement from regulators