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

In the Matter of	)	
	)	WT Docket No. 19-348
Facilitating Shared Use in the 3100-3550 MHz Band	)	

COMMENTS OF MICROSOFT CORPORATION

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Microsoft Corporation ("Microsoft") respectfully submits the following comments in response to the Federal Communications Commission's ("Commission") Report and Order and Further Notice of Proposed Rulemaking on "Facilitating Shared Use in the 3100-3550 MHz Band" ("Order and Further Notice").[1] Microsoft applauds the Commission for its actions taken in the Order and Further Notice to lay the groundwork necessary to make additional mid-band spectrum available for 5G services in the 3.10-3.55 GHz band, and more specifically, the 3.45-3.55 GHz band.

Mobile network operators and other 5G providers require access to ample low-, mid-, and high band spectrum to increase the number of consumers and businesses that will experience the benefits of 5G services. Ultra-high density 5G deployment using high-band spectrum will be economical to deploy within enterprises, in urban cores, and generally in more densely populated areas. The need to locate high-band 5G base stations every 100 to 200 meters on suitable local infrastructure presents a practical challenge to broader outdoor (true) 5G deployments even in urban areas outside the core. Mid-band spectrum is viewed as the sweet spot between balancing network coverage and capacity. Access to sufficient mid-band spectrum is critical to 5G's broader success in serving larger segments of consumers and communities.

In concert with its efforts to make high-band spectrum available through a series of "Spectrum Frontiers" Report and Orders[2], the Commission has taken steps to increase the

[1] *Facilitating Share Use in the 3100-3550 MHz Band*, WT Docket No. 19-348, Report and Order and Further Notice of Proposed Rulemaking (adopted September 30, 2020).

[2] Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, et al., Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd 8014 (2016); Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, et al., Second Report and Order, Second Further Notice of Proposed Rulemaking, Order on Reconsideration, and Memorandum Opinion and Order, 32 FCC Rcd 10988 (2017); Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, et al., GN Docket No. 14-177, WT Docket No. 10-112, Third Report and Order, Memorandum Opinion and Order, Third Further Notice of Proposed Rulemaking, 33 FCC Rcd 5576 (2018); Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, et al., GN Docket No. 14-177, Fourth

availability of mid-band spectrum.[3] Only focusing on the 3 GHz bands, the Commission adopted rules for commercial use of 150 megahertz in the 3.55-3.70 GHz band ("3.5 GHz Band") in April 2015.[4] The technical rules for the Citizens Broadband Radio Service ("CBRS") create a three-tier-of-access dynamic spectrum sharing framework among federal and non-federal users, with each tier conferring a different level of rights to access the spectrum. Commercial cloud-based Spectrum Access Systems ("SAS") manage access to the spectrum to ensure incumbents are protected from receiving harmful interference. Electronic Sensing Capability ("ESC") detects signals from federal shipborne radars when they are operating nearby and communicates this information to the SAS, which in turn causes the cessation of commercial CBRS operations in the area on the occupied frequencies. Commercial CBRS deployments using General Authorized Access (GAA) spectrum began earlier this year. This summer, the Commission auctioned a total of 70 MHz of spectrum (7, 10 MHz channel blocks) within the CBRS band for Priority Access Licenses ("PAL") in each county across the country.[5]

In February 2020, the Commission made an additional 280 MHz of commercial mid-band spectrum available in the 3.70 – 3.98 GHz frequency band ("C-Band").[6] The technical and service rules for the C-band differ from those established for CBRS and are generally consistent

Report and Order, 33 FCC Rcd 12,168 (2018); Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, et al., GN Docket No. 14-177, Fifth Report and Order, 34 FCC Rcd 2556 (2019).

[3] Today 'mid-band' spectrum is commonly considered to be between 1 and 6 GHz.

[4] Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band, GN Docket No. 12-354, Report and Order and Second Further Notice of Proposed Rulemaking, 30 FCC Rcd 3959 (2015).

[5] *Auction of Priority Access Licenses in the 3550-3650 MHz Band Closes; Winning Bidders Announced for Auction 105,* AU Docket No. 19-244, Public Notice, DA 20-1009 (WTB Sept. 2, 2020).

[6] *Expanding Flexible Use of the 3.7 to 4.2 GHz Band*, GN Docket No. 18-122, Report and Order and Order of Proposed Modification, 35 FCC Rcd 2343 (2020).

with the Commission's Part 27 rules. Most noticeably, C-band licensees will be able to operate at a considerably higher EIRP level than CBRS licensees and there is a different out-of-band emissions limit. The Commission's auction of C-Band licenses is scheduled to begin on December 8th. The coverage area for each of these 'flexible-use' licenses is based on a Partial Economic Area[7], which with very limited exception, consists of multiple county areas.

In parallel, as a result of Executive and Legislative Branch actions over the past decade, NTIA identified the 3.10 – 3.55 GHz spectrum range as a potential band for spectrum sharing between federal incumbents and commercial users. In July 2020, to comply with the requirements in Section 605 of the MOBILE NOW Act[8], the U.S. Department of Commerce released *Feasibility of Commercial Wireless Services Sharing with Federal Operations in the 3100-3550 MHz Band*.[9] Under the assumption that there are no changes in incumbent operations and ground rules requiring spectrum sharing, the report concluded that:

- …the 3450-3550 MHz portion of this band is a good candidate for potential spectrum sharing, including at the commercial system power levels sought by the wireless industry."
- "…although ultimately some sharing of spectrum below 3450 MHz may be possible as well, additional analysis of the entire band should be conducted to assess the various sharing

[7] The Partial Economic Areas, which were established in the Incentive Auction Report and Order, divide larger Economic Areas into 416 service areas. *Wireless Telecommunications Bureau Provides Details About Partial Economic Areas*, GN Docket No. 12-268, Public Notice 29 FCC Rcd 6491(2014). List of Counties with Corresponding Partial Economic Area: Acrobat.

[8] Making Opportunities for Broadband Investment and Limiting Excessive and Needless Obstacles to Wireless ('MOBILE NOW Act'), Division P, Title VI of the Consolidated Appropriations Act of 2018, Pub. L. No. 115-141, 132 Stat. 348, 1100 (Mar. 23, 2018).

[9] *Feasibility of Commercial Wireless Services Sharing with Federal Operations in the 3100-3550 MHz Band*, U.S. Department of Commerce National Telecommunication and Information Administration, 3100-3550 MHz MOBILE NOW Act Report to Congress, July 2020.

mechanisms and the potential for relocating incumbents from some portion of the remainder of the band for commercial use."[10]

In September, NTIA communicated to the Commission that America's Mid-Band Initiative Team (AMBIT) devised a sharing framework that, "…establishes a spectrum-sharing solution that allows 5G development to progress in the private sector, while at the same time, allowing the U.S. military to continue to use that spectrum to meet national security requirements". [11] Additionally, the NTIA Office of Spectrum Management suggested "that the FNPRM seek comment on non-federal technical parameters that would inform effective federal and non-federal coordination and coexistence in the band".[12] The letter was silent on making some or all of the spectrum between 3.10 and 3.45 GHz available for sharing between federal and commercial users.

Microsoft is a Sector Member of the International Telecommunication Union ("ITU") and is familiar with the efforts underway in the appropriate ITU-Radiocommunication Sector Study Groups to harmonize primary mobile spectrum allocations and IMT-2020 ("5G") identifications globally to the greatest extent feasible above 3.3 GHz to create economies of scale.[13] We note that in each of the three ITU Regions, there is currently no mobile allocation

[10] Id. at Executive Summary.

[11] *See* Letter from Charles Cooper, Associate Administrator, NTIA, to Ronald T. Repasi, Acting Chief, Office of Engineering and Technology, FCC, and Donald K. Stockdale, Jr., Chief, Wireless Telecommunications Bureau, FCC, WT Docket No. 19-348 at 1 (filed Sept. 8, 2020) at 2.

[12] *Id* at 3.

[13] *See* ITU WRC Agenda Items AI 1.2 (Resolution 245 (WRC-19) https://www.itu.int/dms_pub/itu-r/oth/0c/0a/R0C0A00000D0002PDFE.pdf) and AI 1.3 (Resolution 246 (WRC-19) https://www.itu.int/dms_pub/itu-r/oth/0c/0a/R0C0A00000D0003PDFE.pdf).

between 3.1 and 3.3 GHz.[14] Consequently, we suggest that the Commission might want to consider 3.3 GHz as a reasonable lower bound for frequency sharing between federal incumbents and commercial users in the 3 GHz band.

Microsoft participated in the development of the 2012 PCAST report[15] that included policy recommendations on creating a mid-band spectrum superhighway, which led ultimately to the Commission launching its CBRS proceeding in 2014. We have been active in subsequent CBRS proceedings. The CBRS approach was groundbreaking in unlocking commercial access to 3.5 GHz band spectrum. Microsoft understands why many consider a SAS-like/lite approach to be an appropriate framework for the adjacent 3.45-3.55 GHz band where there is also U.S. Department of Defense ("DoD") incumbents that require protection from receiving harmful interference. More recently, with the launch of Azure for Operators[16], where we are engaged in bringing Microsoft technologies to the edge of operators' networks, we have gained an understanding of the benefit of having the Commission's C-Band rules applied to the 3.45-3.55 GHz band.

For Microsoft, the key is whether, and if so, to what extent the 3.30-3.45 GHz band can be shared between federal incumbents and commercial users. If the 3.30-3.45 GHz band can be shared by only using a SAS / ESC like mechanism, then it makes sense for the Commission to consider more CBRS-like rules for the 3.45-3.55 GHz band, which would be located between

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[14] *See* FCC ONLINE TABLE OF FREQUENCY ALLOCATIONS, 47 C.F.R. § 2.106, Revised on October 9, 2020, pages 40-41, https://transition.fcc.gov/oet/spectrum/table/fcctable.pdf.

[15] *See* President's Council of Advisors on Science and Technology, Report to the President: Realizing the Full Potential of Government-Held Spectrum to Spur Economic Growth (rel. July 20, 2012)("PCAST Report")

[16] *See* https://www.usnews.com/news/top-news/articles/2020-09-28/microsoft-gets-into-5g-race-with-azure-cloud-for-telecom-operators.

CBRS / CBRS like bands. Alternatively, if it turns out that after further review by DoD the 3.30-3.45 GHz band cannot be shared between federal incumbents and commercial interests, then the Commission should: (1) consider moving forward with a more C-band like approach, (2) consider increasing the EIRP limits for CBRS operations (while protecting federal and non-federal incumbents) and (3) address concerns about potential adjacent band interference to ESC, coordination and/or TDD synchronization between the CBRS band and mobile bands above and below, where appropriate.

Microsoft is not supportive of any scheme in which a primary user can turn off all the spectrum afforded to a commercial operator at a given time. A system that would force commercial users to vacate their channels at a moment's notice in a fashion similar to Dynamic Frequency Selection in the U-NII-2A and U-NII-2C bands in the 5 GHz frequency range, is unlikely to allow for the certainty needed for 5G services.

Respectfully submitted,

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