Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Use of Spectrum Above 24 GHz for Mobile Radio Services	)	GN Docket No. 14-177
	)	
Establishing a More Flexible Framework to Facilitate Satellite Operations in the 27.5-28.35 GHz and 37.5-40 GHz Bands	)	IB Docket No. 15-256
	)	
Amendment of Parts 1, 22, 24, 27, 74, 80, 90, 95, and 101 to Establish Uniform License Renewal, Discontinuance of Operation, and Geographic Partitioning and Spectrum Disaggregation Rules And Policies for Certain Wireless Radio Services	)	WT Docket No. 10-112
	)	
Allocation and Designation of Spectrum for Fixed-Satellite Services in the 37.5-38.5 GHz, 40.5-41.5 GHz and 48.2-50.2 GHz Frequency Bands; Allocation of Spectrum to Upgrade Fixed and Mobile Allocations in the 40.5-42.5 GHz Frequency Band; Allocation of Spectrum in the 46.9-47.0 GHz Frequency Band for Wireless Services; and Allocation of Spectrum in the 37.0-38.0 GHz and 40.0-40.5 GHz for Government Operations	)	IB Docket No. 97-95

COMMENTS OF UNITED STATES CELLULAR CORPORATION

United States Cellular Corporation ("USCC") submits these comments in response to the Second Further Notice of Proposed Rulemaking released November 22, 2017 in the above-captioned proceedings.[1] As the Commission previously recognized in this proceeding, spectrum is an "essential input for the provision of mobile wireless services, and ensuring access to and the availability of sufficient spectrum is crucial to promoting competition, innovation, and

[1] *See Use of Spectrum Bands Above 24 GHz for Mobile Radio Services*, Second Report and Order, Second Further Notice of Proposed Rulemaking, Order on Reconsideration, and Memorandum Opinion and Order, GN Docket No. 14-177, FCC 17-152 (rel. Nov. 22, 2017) ("*Notice*"). All comments and reply comments cited herein were filed in the above-referenced dockets.

investment."[2] USCC commends the Commission for its work to make multiple millimeter wave ("mmW") bands available for future Upper Microwave Flexible Use Service ("UMFUS") operations, including next-generation 5G services. Making additional spectrum available, however, is only part of the equation. The Commission also must "ensur[e] access" to this spectrum by a variety of wireless service providers, both large and small, in order to adequately promote competition, innovation, and investment. In this respect, USCC focuses herein on two actions it believes will be particularly important for ensuring that carriers of all sizes can acquire UMFUS licenses and deploy 5G mobile broadband networks, including in rural and other underserved areas. First, USCC urges the Commission to adopt its proposed operability requirement for the 24 GHz band. Second, USCC opposes the Commission's proposal to eliminate the existing pre-auction spectrum aggregation limit for the 28 GHz, 37 GHz, and 39 GHz bands.

I. THE COMMISSION SHOULD REQUIRE DEVICE OPERABILITY ACROSS BOTH SEGMENTS OF THE 24 GHz BAND

USCC strongly urges the Commission to adopt its proposed operability requirement for the 24 GHz band. Specifically, "to require that any equipment capable of operating anywhere within the 24 GHz band must be capable of operating across the entire 24 GHz band, on all frequencies in both band segments."[3] As the Commission has recognized on numerous occasions with respect to other spectrum bands, ensuring operability in the 24 GHz band will be essential to achieving the potential of this spectrum to promote competition and the deployment of 5G networks, particularly in rural and other underserved areas.[4] USCC stresses that an

[2] *Use of Spectrum Bands Above 24 GHz for Mobile Radio Services*, Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd 8014, 8078 (2016) ("*mmW R&O*").

[3] *Notice* at ¶ 108.

[4] *See, e.g.*, *Promoting Interoperability in the 700 MHz Commercial Spectrum*, Report and Order and Order of Proposed Modification, 28 FCC Rcd 15122, 15145 (2013) ("*Lower 700 MHz Interoperability Order*") (explaining that the interoperability rule adopted there would "promote the efficient use of spectrum, the availability of higher

operability requirement is particularly important for the 24 GHz band given the fragmented nature of this band. Absent an operability requirement, the lower segment of the band (*i.e.*, 24.25-24.45 GHz), which is not immediately adjacent to the larger, upper segment of the band (*i.e.*, 24.75-25.25 GHz), could become "orphaned" and, as a result, "suffer from a lack of available equipment."[5]

On the other hand, the Commission's proposed operability requirement would "increase the market for equipment" designed for the 24 GHz band and, as a result, "allow both smaller and larger service providers to benefit from economies of scale and increased equipment availability."[6] This consequence of broad device operability is particularly important for small and regional carriers, which lack the considerable leverage *vis-à-vis* equipment manufacturers enjoyed by the nationwide carriers as a result of their volume purchases.[7] Due to this leverage, if "boutique" band classes develop for the mmW bands, manufacturers would initially, and perhaps exclusively, focus on the needs of the largest carriers.[8] As a result, at a minimum, smaller carriers would experience significant delays in gaining initial access to equipment for the 24

quality and lower priced offerings and enhanced choices for customers of all wireless broadband providers, overall timely deployment of nationwide wireless broadband coverage, and the delivery of such service to rural and underserved areas"); *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Notice of Proposed Rulemaking, 27 FCC Rcd 12357, 12415 (2012) ("Interoperability has often been important in ensuring rapid and widespread deployment of mobile devices in a new spectrum band.").

[5] *Notice* at ¶ 108.

[6] *mmW R&O*, 31 FCC Rcd at 8125.

[7] *See* Reply Comments of Competitive Carriers Association, p. 12 (Feb. 26, 2016) ("CCA NPRM Reply Comments") ("Interoperability is important for competitive carriers that face significant challenges in obtaining the latest, most-advanced and feature-rich devices.").

[8] *See* Opposition to Petitions for Reconsideration, New America's Open Technology Institute and Public Knowledge, p. 12 (Jan. 31, 2017) ("An operability requirement … encourages a mass-market deice ecosystem for small providers and promotes competition by lowering the risk that chips, devices or standards will be tailored only to the post-auction holdings of the very largest 5G ISPs."); Opposition of Starry, Inc. to Petition for Reconsideration, p. 6 (Jan. 31, 2017) (stressing that operability requirements "open up a wider marketplace of available network devices and equipment available to a wide range of telecommunications companies").

GHz band, and thereafter likely would continue to face higher equipment costs and delayed access to the latest consumer devices.[9]

USCC also stresses the need for the Commission to adopt an operability requirement for the 24 GHz band at this time, rather than assume that the industry's standards-setting process will give rise to a fully operable device ecosystem. As the Commission noted in adopting an interoperability requirement for the 600 MHz band, the experience of both the industry and the Commission with regard to "deployment in the Lower 700 MHz Band highlights the need for clear *ex ante* interoperability rules to promote rapid deployment…, *particularly in rural areas*."[10] If small and regional carriers lack any assurance that they will be able to timely acquire the equipment necessary for 24 GHz band operations, it will be difficult for these carriers to justify expending the substantial sums needed to acquire UMFUS licenses for this band.[11] In addition to lower auction revenue and even greater concentration in the wireless industry, the reduced demand by small and regional carriers for these licenses would make it less likely that this spectrum will be used to provide innovative 5G services to rural and other underserved areas, where these carriers typically focus their deployment efforts. Thus, absent an interoperability requirement, ultimately it will be consumers in these areas who will suffer. In contrast, the Commission has explained how a fully operable device ecosystem "serve[s] the public interest by enabling consumers, *especially in rural areas*, to enjoy the benefits of greater competition and

[9] *See* CCA NPRM Reply Comments at 12-13 ("Without an interoperability requirement for each mmW band, CCA's members may be at a significant competitive disadvantage if they are unable to acquire the newest, compatible device for 5G services.").

[10] *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Report and Order, 29 FCC Rcd 6567, 6868-69 (2014) (emphasis added).

[11] *See Amendment of the Commission's Rules with Regard to Commercial Operations in the 1695-1710 MHz, 1755-1780 MHz, and 2155-2180 MHz Bands*, Report and Order, 29 FCC Rcd 4610, 4698-99 (2014) (finding that adopting an interoperability requirement "prior to licensing best serves the public interest" because "potential licensees, particularly smaller ones, will face less uncertainty over the development of a healthy device ecosystem").

more choices, and by encouraging efficient use of spectrum, investment, job creation, and the development of innovative mobile broadband services and equipment."[12]

Finally, USCC notes the importance of making the 24 GHz band a viable option for small and regional carriers to deploy 5G networks by adopting the proposed operability requirement. Services operating on spectrum below 30 GHz are far more efficient than those using higher frequency spectrum due to the superior propagation characteristics of lower frequency spectrum. This favorable characteristic of below-30 GHz spectrum is particularly important for service providers, like USCC, that focus their deployment efforts in rural and other less densely populated areas. As a result, acquiring mmW band spectrum below 30 GHz will be critical to USCC and other small and regional carriers.

Currently, only two mmW bands below 30 GHz are in the Commission's flexible use spectrum pipeline – the 24 GHz band and the 28 GHz band. Smaller bidders, however, likely will not have a reasonable opportunity to acquire UMFUS licenses for the 28 GHz band given that the license areas of incumbent Local Multipoint Distribution Service licensees, who the Commission granted flexible use spectrum rights, cover about 75% of the U.S. population.[13] Moreover, even in license areas where UMFUS licenses for the 28 GHz band are made available at auction, the large size of these blocks – 425 megahertz each – will cause the price of such licenses to exceed the financial means of most smaller bidders. As a result, the less encumbered 24 GHz band, with its 100 megahertz blocks, likely will provide the only realistic option for smaller bidders to acquire rights to the below-30 GHz spectrum they will need to deploy 5G networks in rural and other underserved areas.

[12] *Lower 700 MHz Interoperability Order*, 28 FCC Rcd at 15123 (emphasis added).

[13] *See mmW R&O*, 31 FCC Rcd at 8024.

II. THE COMMISSION SHOULD STRENGTHEN, NOT WEAKEN, THE MOBILE SPECTRUM HOLDINGS POLICIES FOR THE MMW BANDS

USCC strongly opposes the Commission's proposal to eliminate the existing pre-auction spectrum aggregation limit of 1250 megahertz for the 28 GHz, 37 GHz, and 39 GHz bands.[14] Absent adequate spectrum aggregation policies, the largest carriers will have both the means and motivation to prevent small and regional carriers from acquiring the mmW band spectrum they need to serve as a competitive balance and to ensure that those living in rural and other underserved areas also have an opportunity to benefit from innovative 5G-based services.[15] It was for this reason that the Commission found it "essential" to adopt a pre-auction spectrum aggregation limit for these bands.[16]

Since the Commission came to that conclusion, the only changed circumstance is its recent decision to also license the 24 GHz and 47 GHz bands on a geographic area basis. Notably, if the Commission had added these bands to the existing pre-auction aggregation limit, as USCC and others urged, the largest carriers could have acquired an additional 600 megahertz of licensed mmW band spectrum at auction (*i.e.*, up to 1850 total megahertz of spectrum). Given that no carrier has demonstrated a need for this much mmW band spectrum in the near-term, and the fact that additional spectrum controlled by the largest carriers necessarily means reduced availability for everyone else, USCC questions the Commission's decision not to add the 24 GHz and 47 GHz bands to the existing pre-auction spectrum aggregation limit.

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[14] *See Notice* at ¶ 105.

[15] *See Policies Regarding Mobile Spectrum Holdings Expanding the Econ. & Innovation Opportunities of Spectrum Through Incentive Auctions*, Report and Order, 29 FCC Rcd 6133, 6135 (2014) ("*Mobile Spectrum Holdings Order*") ("Today's mobile wireless marketplace is characterized by factors that, according to DOJ, increase the potential for anticompetitive conduct, including high market concentration, highly concentrated holdings of low-band spectrum, high margins, and high barriers to entry.").

[16] *mmW R&O*, 31 FCC Rcd at 8081 ("We find it essential today to establish clear and transparent mobile spectrum holdings policies that will promote competition in the future, including competition in the development of 5G services, as well as promote the efficient use of mmW spectrum, and avoid an excessive concentration of licenses.").

Far from being draconian, such action, by itself, would not have even ensured compliance with the Communications Act's mandates to avoid excessive concentration of licenses and to disseminate licenses among a wide variety of applicants.[17] USCC and others, therefore, urged the Commission to also adopt band-specific aggregation limits, explaining that a limit only on the total amount of mmW spectrum that a bidder can acquire at auction would not prevent a single entity from acquiring the rights to an entire band. Given that the technical and regulatory differences between the mmW bands will affect the utility, and thus value, of the bands in relation to each other, the largest carriers will have an incentive to use all of their bidding eligibility to acquire spectrum in only a subset of the mmW bands, which would relegate smaller bidders to those bands that are the most encumbered, or that require additional base stations and bandwidth simply to provide the same coverage and performance as services operating in lower spectrum bands.

USCC also questions the Commission's suggestion that pre-auction spectrum aggregation limits may be unnecessary for the mmW bands. For instance, the Commission notes the "nascent stage of technological development in these mmW bands…"[18] The Commission, however, already considered and rejected this argument, finding that, despite the uncertainty regarding exactly how mmW spectrum will be used, its "anticipated value to the future of 5G makes it critical that multiple providers have access to it."[19] The Commission also states that a pre-auction aggregation limit may be unnecessary because the Commission continues to make additional mmW spectrum available.[20] As Commissioner Clyburn stressed, however, the amount of spectrum being made available cannot ensure an equitable distribution of UMFUS licenses

[17] *See* 47 U.S.C. §309(j)(3).

[18] *Notice* at ¶ 105.

[19] *mmW R&O*, 31 FCC Rcd at 8084.

[20] *Notice* at ¶ 105.

because, "[g]iven the importance of these spectrum bands to the future of the commercial wireless industry, the large wireless companies have the same incentives to acquire dominant holdings here as they did with low-band spectrum."[21]

Commissioner Clyburn's apprehensions are not theoretical. They are being borne out. Within the last two months, the FCC has approved Verizon's acquisition of large amounts of 28 GHz, 29 GHz, 31 GHz, and 39 GHz spectrum from XO Holdings and Straight Path Communications, Inc.[22] As a result of these acquisitions, Verizon's mmW spectrum holdings already exceed, prior to any auction of UMFUS licenses, the former mmW spectrum threshold of 1250 megahertz for proposed secondary market transactions involving spectrum rights in the 28 GHz, 37 GHz, and 39 GHz bands. The more recent grant of Verizon's application to acquire the Straight Path licenses did not cause Verizon to exceed the spectrum threshold now in effect, but only because the threshold had been increased to 1850 megahertz as a result of the addition of the 24 GHz and 47 GHz bands. These transactions, however, certainly are evidence that the largest carriers are likely to pursue mmW spectrum acquisition relentlessly, shutting out smaller carriers, unless they are subject to reasonable spectrum acquisition restraints both pre- and post-auction.[23]

Finally, the Commission states that it would be "inconsistent to retain the pre-auction limit for the 28 GHz, 37 GHz, and 39 GHz bands," but not have a pre-auction limit for the 24

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[21] *Id.* (Statement of Commissioner Mignon L. Clyburn Concurring in Part; Dissenting in Part).

[22] *See Application of Cellco Partnership d/b/a Verizon Wireless and XO Holdings For Consent to Transfer Control of Local Multipoint Distribution Service and 39 GHz Licenses*, Memorandum Opinion and Order, 32 FCC Rcd 10125 (WTB 2017); *Application of Verizon Communications Inc. and Straight Path Communications, Inc. For Consent to Transfer Control of Local Multipoint Distribution Service, 39 GHz, Common Carrier Point-to-Point Microwave, and 3650-3700 MHz Service Licenses*, Memorandum Opinion and Order, DA 18-52 (WTB, rel. Jan. 18, 2018) ("*Verizon/Straight Path Order*")

[23] USCC further notes that, if the Commission also grants AT&T's application to acquire FiberTower's mmW band licenses, the two largest wireless carriers collectively would hold more than half of all available 28 GHz spectrum and about two-thirds of the 39 GHz spectrum even before a UMFUS auction ever takes place. *See Verizon/Straight Path Order*, p. 6, n. 39.

GHz and 47 GHz bands.[24] Any such inconsistency, however, would arise solely from the Commission's decision not to adopt a pre-auction limit for the 24 GHz and 47 GHz bands *in the same item* in which the Commission proposes to eliminate the pre-auction limit for the 28 GHz, 37 GHz, and 39 GHz bands.

Although the far better course would be to not only retain the pre-auction spectrum aggregation limit for the 28 GHz, 37 GHz, and 39 GHz bands, but also to include the 24 GHz and 47 GHz bands in an expanded pre-auction aggregation limit,[25] if the Commission nevertheless eliminates the existing pre-auction aggregation limit, USCC supports the Commission's proposal to review mmW band holdings on a case-by-case basis when applications for initial licenses are filed.[26] If the Commission takes this approach, USCC proposes a two-tiered framework for determining when the public interest requires the divestiture of licenses in order to address any competitive harms identified in the Commission's review. Specifically, USCC urges the Commission to adopt a rebuttable presumption that total mmW band holdings in excess of 1850 megahertz (*i.e.*, approximately one-third of the licensed spectrum in these five bands) *or* holdings in excess of one-half of the spectrum in a particular band are not in the public interest, and thus, require divestiture. USCC notes that both of these proposed thresholds are based on factors that the Commission already takes into account in its case-by-case review of proposed secondary market transactions.[27] Accordingly, USCC's proposed approach would advance the Commission's goal of ensuring that "the public interest

[24] *Notice* at ¶ 105.

[25] *See Mobile Spectrum Holdings Order*, 29 FCC Rcd at 6192 ("[A]pplying the limit *ex ante* would provide greater certainty and efficiency in the process of licensing through competitive bidding…").

[26] *See Notice* at ¶ 106.

[27] *See Mobile Spectrum Holdings Order*, 29 FCC Rcd at 6239 (noting that, among other factors, the Commission considers both the total amount of spectrum controlled by the entity and the concentration of spectrum held by the entity in a particular spectrum band).

benefits of having a threshold on mmW spectrum applicable to secondary market transactions are not rendered ineffective" if the Commission decides to eliminate the existing pre-auction aggregation limit for the 28 GHz, 37 GHz, and 39 GHz bands.[28]

III. CONCLUSION

USCC strongly urges the Commission to adopt its proposed operability requirement for the 24 GHz band in order to promote competition and the deployment of 5G networks, particularly in rural and other underserved areas. In addition, USCC strongly opposes any further weakening of the spectrum holdings policies previously established by the Commission for the mmW bands because such action would allow the largest carriers to monopolize most or all of the mmW bands to the exclusion of small and regional carriers, and to the detriment of those consumers served by small and regional carriers.

Respectfully submitted,

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[28] *Notice* at ¶ 70.