

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

In the Matter of)	
)	
Use of Spectrum Bands 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
)	
Petition for Rulemaking of the Fixed Wireless Communications Coalition to Create Service Rules for the 42-43.5 GHz Band)	RM-11664
)	
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)	RM-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

VERIZON'S COMMENTS ON FURTHER NOTICE

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INTRODUCTION AND SUMMARY

The *Further Notice*¹ continues to lay the groundwork to maintain U.S. leadership in advanced wireless communications. Simultaneously with its important decisions in the *Report and Order* to repurpose a substantial amount of new spectrum for 5G operations, the *Further Notice* identifies 17.7 GHz of additional spectrum to put into the 5G pipeline. By doing so, the Commission is taking important steps toward ensuring that the United States retains its global leadership position in wireless communications. Closing out this exciting process with rules that promote investment and innovation can help usher in a new era of consumer benefits.

The Commission should move forward quickly to build on its decision making the 28 GHz and 37-40 GHz bands available for licensed use under a framework that promotes investment and innovation. The Commission should proceed with all of the bands identified in the *Further Notice*, and should pay particular attention to the spectrum close to the 28 GHz and 37-40 GHz bands—specifically, the 24GHz, 32 GHz, and 42 GHz bands. To repurpose those bands quickly and to facilitate synergies with nearby spectrum, the Commission should adopt licensing regimes that mirror those in place for 28 GHz and 37-40 GHz. That would maximize investment and innovation through proven licensing frameworks for the new millimeter wave bands, including reasonably sized license sizes, reasonably long license terms, and traditional performance requirements.

The Commission also can promote 5G by slating the entire 28 GHz band (the A1, A2, A3, B1 and B2 blocks) for flexible use. Doing so will support synergies with the spectrum

¹ *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services*, GN Docket No. 14-177, Report and Order and Further Notice of Proposed Rulemaking, FCC 16-89, (July 14, 2016) (“*Further Notice*” or “*Report & Order*”).

already repurposed at 27.50-28.35 GHz, and will avoid stranding the remaining 28 GHz spectrum, whose attractiveness and value would be impaired if it cannot be used for mobility.

Verizon and others have described the risks of heavy reliance on untested sharing proposals, such as the “use it or share it” approach discussed in the *Report and Order* and again raised in the *Further Notice*. That is why the Commission should not undertake such experiments in the 24GHz, 32 GHz, and 42 GHz bands. To the extent the Commission moves forward with these experiments, it should stay faithful to its stated goal of flexible use and should provide licensed operators with certainty about their ability to exclude others when and where they deploy service. Sharing frameworks are most likely to succeed if operators are confident about their ability to recoup large capital investments based on having access to the spectrum.

Appropriately tailored spectrum aggregation rules will also promote deployments by companies interested in making major investments in 5G technologies. The Commission should establish, as it has elsewhere, a reasonable methodology for calculating spectrum holdings based on a company’s population-weighted holdings in the license’s service area. It should also establish a holding period of 3 years for licenses acquired by “Designated Entities” at auction, and should avoid unnecessary future constraints on companies’ ability to acquire the spectrum they need to provide advanced wireless services to their customers.

Finally, certain clarifications and adjustments to the technical rules will increase the attractiveness of the repurposed spectrum. The Commission should clarify that its interoperability rules will not delay prompt device development in the 37-40 GHz band by requiring device manufacturers to wait for the Commission to fully establish the sharing regime

for the lower portion of 37 GHz. It should also carefully evaluate any digital identification requirements to ensure that their policy benefit is not outweighed by their costs.

I. THE COMMISSION SHOULD PROMPTLY MOVE TO REPURPOSE ADDITIONAL mmW SPECTRUM.

A. The Commission Should Embrace Known, Proven Licensing Models, Especially for the Bands Close to 28 GHz and 37-40 GHz.

The Commission should move forward with all of the bands identified for repurposing in the *Further Notice*. In particular, it should open up the 24 GHz, 32 GHz, and 42 GHz bands to mobile use under traditional licensing models known to promote investment and innovation. These bands are attractive for prompt deployment of 5G services because their proximity to the 28 GHz and 37-40 GHz bands presents possible opportunities for synergies and economies of scale. The licensing in these bands should mirror licensing regimes proven to promote investment and innovation; that means exclusive-use licenses with reasonably long terms (10 years or more), renewal expectancies, and relatively large service areas. Experience has shown that these features provide the certainty that supports and encourages large investments by operators.

To the extent the Commission decides to experiment with a novel “use it or share it” model in mmW bands, it should not permit such sharing in the 28 GHz and 37-40 GHz licensed bands or the nearby 24 GHz, 32 GHz, and 42 GHz bands. “Use it or share it” experiments will take time to put in place and will subject licensees to substantial uncertainty.

If, however, the Commission moves forward with “use it or share it” or other sharing frameworks in other bands, it should stay faithful to the principles that—based on both theoretical and empirical learning—are known to support investment and innovation. One important principle is that licensees, even in a sharing framework, need clarity about their ability

to exclude other uses of particular frequencies at points in time and/or in particular places. Any sharing arrangement thus needs clear procedures and mechanisms for promptly clearing opportunistic users from licensed spectrum once the licensee invokes its right to begin using the spectrum.

Additionally, the Commission must make clear to potential opportunistic users that they will not have grounds to stay on licensed spectrum by arguing that they did not “expect” the licensee to invoke its right to clear them. It should advise or require all opportunistic users to deploy equipment capable of moving to other frequencies, if and to the extent the licensee invokes its right to require them to immediately shut down operations in its spectrum.

Another key principle is that major capital investment will only take place with regulatory certainty about operators’ ability to recoup their investments. A licensee should know precisely the portions of a service area where opportunistic users may and may not operate. An operator using its license to deploy a network with particular quality of service requirements also must know that it will be able to avoid potential interference from opportunistic users. Uncertainty in spectrum availability and licensing models would reduce the value of the spectrum and inhibit robust investment in developing technologies for efficient use of the spectrum.

B. The Commission Should Supplement the Already-Repurposed 28 GHz Spectrum with the Adjacent LMDS Frequencies.

The Commission correctly decided to repurpose sub-block A1 of the A block of LMDS spectrum, which is the 850 MHz swath of spectrum at 27.50-28.35 GHz.² It did not repurpose

² *Report & Order*, ¶¶ 19-21, 30.

the A2 and A3 portions of that band (29.10-29.25 GHz and 31.075-31.225 GHz respectively), or the B band licenses (comprised of 31.00-31.075 GHz for B1, and 31.225-31.30 GHz for B2).³ The Commission should now repurpose all of that LMDS spectrum to promote synergies with 5G operations using the A1 sub-block. Equipment that is developed and manufactured for 5G use in the A1 frequencies could readily be designed to also take advantage of the additional capacity by using the A2, A3, B1, and B2 frequencies, but only if the Commission adds those frequencies to the spectrum that is repurposed in this proceeding for 5G use.

At a minimum, the Commission should repurpose sub-blocks A2 and A3: they are part of the same licenses as A1 and could be stranded once incumbent licensees replace their existing operations with the new 5G operations under Part 30. Impairing licensees' ability to use their A2 and A3 sub-blocks in conjunction with their larger swath of A1 spectrum would reduce the usefulness and value of those smaller sub-blocks. It would preclude A block licensees from procuring the deploying equipment for 5G uses that takes advantage of their entire spectrum holdings, and instead would force them to inefficiently bifurcate their operations—under a single license—into 5G and non-5G.

II. FLEXIBILITY AND CERTAINTY ABOUT CARRIERS' ABILITY TO ACQUIRE AND DEPLOY mmW SPECTRUM WILL PROMOTE 5G DEPLOYMENT.

A. The Commission Should Structure Spectrum Aggregation Rules to Encourage Investment or Innovation.

A dynamic, efficient secondary market for mmW licenses will spur innovation and investment by ensuring that operators can obtain licenses when needed, and divest them if not

³ *Id.*

needed. Flexible spectrum aggregation policies will promote those outcomes by ensuring that companies possess the ability to acquire the spectrum needed for future operations. Nascent mmW bands warrant flexibility because it is difficult to predict what will emerge in them or how much spectrum will be needed.

1. The Only Reasonable Way to Calculate Spectrum Holdings Is Using the Population-Weighted Average in a License Area.

The *Further Notice* asks about the right methodology for calculating spectrum holdings for the purpose of determining bidding eligibility in 28 GHz, 37 GHz, and 39 GHz auctions.⁴ Of the options presented, the only reasonable one is to calculate a bidder's spectrum holdings in a PEA based on the bidder's weighted average holdings of spectrum in that PEA subject to the screen.⁵ That would be consistent with past Commission policy,⁶ and would be a balanced way to make sure a licensee cannot become a dominant holder of spectrum in the PEA.

The other "option" mentioned in the *Further Notice* would unfairly penalize incumbent 28 GHz licensees because of the mismatch in license sizes between 28 GHz (now BTAs, becoming counties) and the PEA-based licenses for other mmW bands that will be made available in future auctions. It would impose a "least common denominator" rule under which the incumbent licensee's eligibility for the entire license is determined by the *single* county in which it has the largest amount of mmW spectrum, even if its holdings in the rest of the PEA are low.⁷ That approach would unnecessarily prevent the operator from acquiring spectrum needed

⁴ *Id.*, ¶ 484-87.

⁵ *See Further Notice*, ¶ 487.

⁶ *See, e.g., Policies Regarding Mobile Spectrum Holdings*, WT Docket No. 12-269, Report and Order, FCC 14-63, ¶ 175 & n.496 (2014).

⁷ *See Further Notice*, ¶ 486.

to serve customers throughout the entire PEA, and in many cases would dramatically reduce the attractiveness and value of the to-be-auctioned spectrum.

2. The Proposed Holding Period of Three Years for Designated Entities' Acquisitions of mmW Spectrum at Auction Is Reasonable in the Unique Context of mmW Spectrum.

Given the nascent nature of mmW spectrum and the attendant need for flexibility, the *Further Notice's* proposal to require designated entities to hold spectrum acquired under the Designated Entity program for three years is reasonable.⁸ The Commission has most often set longer holding periods for spectrum typically used for more mature technologies, but the uncertainties present with use cases for mmW spectrum dictate a shorter holding period. A three-year holding period would be reasonable because flexibility is particularly important in these mmW bands. For example, because of the uncertainty associated with what technologies and devices will emerge and take root in the mmW bands, entities may acquire mmW spectrum with specific business plans in mind that do not pan out. Those entities should be able quickly to put their spectrum into the hands of others who may be able to use it more efficiently. The Commission should monitor the emerging market for mmW spectrum and could revisit the holding period for future auctions as the market develops and matures.

3. The Commission Should Not Impose Spectrum Aggregation Limits for Future mmW Spectrum.

There is no demonstrated need for an aggregation limit. A large amount of new mmW spectrum—both licensed and unlicensed—is in the 5G pipeline and will become available to the market incrementally for many years. It would be impossible for any firm to exclude a

⁸ See *Further Notice*, ¶¶ 488-90.

competitor by purchasing “too much” of the spectrum released early on because that competitor will continuously have new opportunities to correct its lack of spectrum by bidding on the additional spectrum coming through the pipeline. The Commission should thus monitor the evolution of 5G and the structure of spectrum holdings, and should be poised to implement aggregation rules in the future if and to the extent there is a need for them.

B. The Commission Should Flesh Out Additional Performance Requirements as 5G Technologies Develop.

Although the record shows strong support for the Commission’s decision to promote productive use of spectrum by conditioning renewal on meeting performance requirements, commenters have struggled to describe the specific metrics the Commission should use to determine that licensees have met their build-out obligations. That is because it is still too early in the product cycles of 5G technologies to identify metrics tailored to 5G deployments. The *Report and Order* thus appropriately decided to apply traditional build-out metrics, imported from other bands, while recognizing that they are “non-exhaustive” and “not ... designed to accommodate new and innovative services that may develop in the millimeter wave bands.”⁹ That is the right approach, and the Commission should consciously contemplate returning to this question as 5G technologies and Internet of Things services continue to evolve.

⁹ *Report & Order*, ¶ 465.

III. MOST OF THE PROPOSED TECHNICAL RULES WILL BE WORKABLE WITH CERTAIN MODIFICATIONS OR CLARIFICATIONS.

Verizon generally agrees with most of the technical proposals, including the proposed 305-meter antenna height limit,¹⁰ and looks forward to the input from device manufacturers and other stakeholders. Our areas of concern are relatively narrow.

A. The Sharing Regime for the Lower Portion of the 37 GHz Band Should Avoid Unnecessary Complications and Should Not Impair Device Development.

The Commission should ensure that the interoperability requirements imposed in the *Report and Order*, combined with whatever sharing regime it establishes for the lower portion of the 37 GHz band (i.e., 37-37.6 GHz), do not hinder robust device development. It should clarify that its interoperability rule only requires that devices designed and deployed for the upper portion of the band (i.e., 37.6-38.6 GHz) be capable of tuning (i.e., the receiver has the ability to “hear” frequencies) across the entire band (including the lower portion). If the rule were interpreted to require all devices used in the upper portion of the band to be capable of complying with the sharing arrangement established for the lower portion, it would be risky and costly for device manufacturers to go to market promptly with devices designed for service providers with upper band spectrum.

And the Commission should take care to not impose an overly complex sharing regime for the lower portion of the 37 GHz band. The Commission correctly notes that there are “limited incumbent uses” that require protection in these frequencies, which makes this sharing

¹⁰ *Further Notice*, ¶ 505.

environment “relatively straight forward.”¹¹ There is thus no need to reinvent the wheel by experimenting with a dynamic Spectrum Access System regime such as that planned for the 3.5 GHz context. Instead, static geographic coordination through a manual site-registration is the fastest and surest way to make sure that this spectrum can be put to use promptly.

B. The Commission Should Proceed Cautiously on Any Digital Station Identification Requirements and Should Not Impose Them on Any Licensed Operations.

The concept of digital station identification requirements for mmW bands creates substantial complications and potential burdens. The identification examples cited in the *Further Notice* relate to broadcasts by FM, AM, or TV stations, where operators simply announce, in the course of their ordinary operations, their call signs. That simple identification technique is very different than attempting to build a special identification protocol that can be readily implemented in each of the myriad technologies that may eventually be developed for 5G operations. The costs, burdens, and potential delays of developing, testing, and implementing such protocols would outweigh any benefit they might have in the context of licensees deploying operations in their licensed spectrum.

On the other hand, there are potential policy reasons to require unlicensed users, and opportunistic users in sharing regimes, to transmit digital identification requirements so that such users can be efficiently identified if they cause interference to licensed users. But to the extent commenters propose specific identification requirements, the Commission should evaluate whether their implementation costs outweigh the policy benefits.

¹¹ *Further Notice*, ¶ 449.

Respectfully submitted,

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