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
	)	
Amendment of the Commission's Rules Regarding the 37.0-38.6 GHz and 38.6-40.0 GHz Bands	)	ET Docket No. 95-183 (Terminated)
	)	
Implementation of Section 309(j) of the Communications Act – Competitive Bidding, 37.0-38.6 Ghz and 38.6-40.0 GHz Bands	)	PP Docket No. 93-253 (Terminated)
	)	
Petition for Rulemaking of the Fixed Wireless Communications Coalition to Create Service Rules for the 42-43.5 GHz Band	)	RM-11664

COMMENTS OF VERIZON[1]

There are a number of opportunities, and challenges, that the Commission should keep in mind as it explores important questions about potential future uses of frequencies above 24 GHz. In the Notice of Inquiry,[2] the Commission appropriately commits to remain faithful to the principle of flexible use and to keep an open mind about its regulatory approach as high-frequency spectrum technology develops. The Commission also appropriately emphasizes that the possibility of future mobile operations in the higher frequencies should not displace the crucial work of identifying and making available more lower-frequency spectrum for commercial operations.

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[1] In addition to Verizon Wireless, the Verizon companies participating in this filing are the regulated, wholly owned subsidiaries of Verizon Communications Inc.

[2] *Use of Spectrum Bands Above 24 GHz For Mobile Radio* Services, Notice of Inquiry, GN Docket No. 14-177 (rel. Oct. 17, 2014) ("NOI").

DISCUSSION

I. IT IS IMPORTANT TO AVOID PREMATURE ASSUMPTIONS ABOUT ABOVE-24 GHz TECHNOLOGY.

While a substantial amount of work is being done that may eventually lead to commercial uses of one or more above-24 GHz spectrum bands, it is currently unclear what technologies and business models may eventually emerge for those frequencies. The Commission should thus avoid making determinations at this time – even preliminary ones – about the appropriate regulatory framework or frameworks.

The Commission should also avoid making prescriptive assumptions about what "5G" means today. Instead, the Commission should continue to be cautious in using "5G" merely as shorthand for the unbounded technologies that may emerge in the proceeding.[3] While 5G is often discussed in the context of the higher frequencies, existing "traditional" mobile frequencies may also be candidates for employing a next generation of technology. Moreover, the term "5G" sometimes appears to be used to describe an evolution from the existing technology (4G) to a more advanced version – but in reality the technologies for above-24 GHz spectrum may involve radical departures from existing ones.

While it is important to explore the potential for use of the above-24 GHz bands, the Commission and industry will need to overcome substantial hurdles before the spectrum can potentially be used for mobile commercial use. Technological breakthroughs and major investments will be necessary before these frequencies are commercially viable. By contrast, the know-how to deploy mobile operations using more traditional mobile frequencies already exists, and consumers' exploding need for bandwidth means that making available more "traditional" mobile spectrum needs to be the Commission's top priority. As the Commission correctly notes,

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[3] *Id.*, ¶ 3.

this proceeding cannot be a substitute for making more of the proven (lower) frequencies available for mobile uses.[4]

II. FUTURE TECHNOLOGAL DEVELOPMENTS MAY NECESSITATE NEW REGULATORY APPROACHES.

New technologies will give the Commission the opportunity to develop new regulatory frameworks that also may make sense for above-24 GHz spectrum. As the Commission has recognized, including in the 3.5 GHz proceeding, it is a false choice to assume that all spectrum must either be "licensed" or "unlicensed." While the Commission should continue to pursue where feasible the proven clearing-and-auctioning model for lower frequencies, it should be open to other frameworks for the upper frequencies.

Exploring new licensing frameworks for spectrum management should not mean jettisoning economic principles that are fundamental to robust competition and to the consumer benefits competition brings. To the contrary, any new framework needs to be cognizant of the incentives that economic actors need to innovate and to invest. Investment and innovation by private sector firms will flourish only if the Commission stays faithful to its stated goal of flexible use and provides a means for operators to benefit from their investments. For example, even in a sharing framework, part of the benefit comes from the right of users to exclude other uses of particular frequencies at particular points in time and/or in particular places. In addition, major capital investment will only take place if there is sufficient regulatory certainty about operators' ability to recoup their investments. That is a crucial point because the emerging technologies for the upper frequencies will likely require large investments.

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[4] *Id.*, ¶ 2. While not the subject of this proceeding, the Commission should be exploring all possible avenues to make more spectrum available, including the Technological Advisory Council's recommendation that it examine frequencies between 6 and 10 GHz.

The Notice asks how – if a "traditional" licensing approach is employed – the Commission can ensure that spectrum does not remain fallow in areas where the licensee does not build out.[5] It suggests that tweaks to the traditional approach, such as adjusting geographic license sizes or focusing on build-out requirements, might be part of the answer.[6] Instead of making adjustments to the usual approach, however, the better answer may lie in changing it. Spectrum is unlikely to remain fallow under a truly flexible licensing regime. The Commission should take care to ensure that its rules allow secondary market transactions to take place efficiently and permit parties to enter into leasing and partitioning arrangements without cumbersome regulatory approvals. Another approach may be for the Commission to import aspects of a "use it or share it" licensing framework, such as what is being explored in the 3.5 GHz proceeding.

The Notice also seeks comment on whether, and if so how, existing incumbents in these bands should be authorized to begin mobile operations. There are two basic approaches to repurposing spectrum that is currently not being used efficiently by existing incumbents. As a general matter, if there are relatively few incumbents, granting them flexible use rights, along with flexibility to transfer the spectrum, is likely to be the best way to ensure that the spectrum is efficiently repurposed to a higher and better use. On the other hand, to the extent the incumbents are of greater number and/or more diverse, it is more likely that collective action problems would impede incumbents' ability to repurpose the spectrum on their own. Where such collective action problems are likely to prevent incumbents from efficiently repurposing their spectrum themselves, a government-managed auction (either an incentive auction or overlay auction) may

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[5] *Id.*, ¶ 93.
[6] *Id.*, ¶¶ 94-96.

be the preferred repurposing mechanism. The right approach may depend on which band is allocated for new mobile services and the extent to which that band is being utilized.

III. THE BAND PLAN AND TECHNICAL RULES MAY DIFFER FROM THOSE USED IN OTHER FREQUENCIES.

A. TDD Likely Provides More Flexibility than FDD for Higher-Frequency Operations.

While it is far too early to begin setting technical rules for above-24 GHz spectrum, it is appropriate to consider the advantages of Time Division Duplexing (TDD) at higher frequencies. For example, since transmit and receive frequencies are identical, TDD allows for less complicated and more accurate beamsteering techniques needed for active beam-forming (that do not require direction-finding). Moreover, the use of directional, high-gain antennas can help overcome the higher frequencies' higher propagation losses and also reduce the interference energy radiated in unintended directions. These techniques are more practical at higher frequencies using TDD.

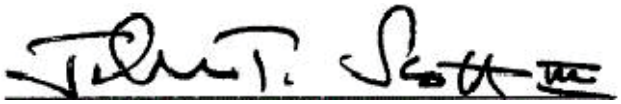
B. The Commission Should Preserve the Technical and Economic Benefits of Wide Bandwidths.

The Commission correctly observes that the economic benefits of this spectrum flow in part from the wide bandwidths available at these higher frequencies.[7] The investments needed to develop and deploy these next-generation technologies will probably be large, and it will not make sense for industry to develop or deploy these technologies absent regulatory assurances that substantial amounts of high-band spectrum will be available on a long-term basis for firms that take the risk of investing in those technologies. Accordingly, to support efforts to develop

[7] *Id.*, ¶ 30.

and commercialize higher-frequency spectrum, the Commission should make clear from the outset that substantial amounts of contiguous spectrum will be available for firms willing to invest in these emerging technologies.

Respectfully submitted,



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January 15, 2015