

**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 FURTHER NOTICE REPLY**

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## INTRODUCTION

The comments on the *Further Notice*<sup>1</sup> confirm that the Commission is on the right track with its plans to repurpose additional bands that hold promise for 5G. Parties agree the Commission should repurpose the additional mmW bands identified in the *Notice* and others, particularly the LMDS spectrum adjacent to the 28 GHz band that it has already repurposed. It should employ known, proven licensing regimes for new mmW bands to promote investment and innovation, and should facilitate operators' ability to assemble the spectrum portfolios needed for future 5G operations.

### **I. REPURPOSING ADDITIONAL SPECTRUM UNDER SOUND LICENSING MODELS WILL BENEFIT CONSUMERS AND COMPETITION.**

#### **A. Known, Proven Licensing Models, Especially for the Bands Close to 28 GHz and 37-40 GHz, Will Promote Investment, Innovation and Sustainable Global 5G Leadership.**

As Verizon explained in its initial comments, the Commission should repurpose the additional bands identified in the *Further Notice*, prioritizing the 24 GHz, 32 GHz, and 42 GHz bands for repurposing under traditional licensing models known to promote investment and innovation.<sup>2</sup> The record confirms that focusing on these three bands can promote potential synergies with the bands at 28 GHz and 37-40 GHz that the FCC already has repurposed.<sup>3</sup>

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<sup>1</sup> *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, 31 FCC Rcd. 8014 (July 14, 2016) ("*Further Notice*" or "*Report & Order*").

<sup>2</sup> Verizon FNPRM Comments at 3-4.

<sup>3</sup> See, e.g., Samsung FNPRM Comments at 4-5 (stating that these bands' proximity to the 28 GHz and 37-40 GHz bands "will accelerate technology development"); Verizon FNPRM Comments at 3.

With only a relatively small portion (3.85 GHz out of 17.85 GHz) of the repurposed mmW spectrum available for licensed operations,<sup>4</sup> the Commission should emphasize licensing models for additional mmW bands that promote investment and innovation. That means establishing traditional licenses with reasonable terms, renewal expectancies, and relatively large service areas.<sup>5</sup> Any sharing experiments should be limited (avoiding, in particular, the priority 24 GHz, 32 GHz, and 42 GHz bands), and should provide the certainty needed by operators deploying networks with high reliability requirements.<sup>6</sup>

Some parties simplistically assert that the 3.5 GHz band's complex Spectrum Access System ("SAS") can be readily imported and successfully implemented in mmW bands—both in the new bands proposed in the FNPRM and in the lower portion of the 37 GHz band.<sup>7</sup> Not so. Verizon supported the Commission adopting a SAS in the 3.5 GHz context to address government incumbents' protection requirements, but only time and experience will tell if it will prove capable of supporting the same level of investment and innovation encouraged by more traditional licensing frameworks. As Intel explained, "unless and until the sharing (SAS) concept proposed in the 3.5 GHz band is proven technically and operationally under a broad range of user and usage conditions, and also proven for scalability to other bands, it should be considered an unproven experimental concept."<sup>8</sup> In the face of those risks, any sharing model should focus on more tested approaches, such as site-based coordination.

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<sup>4</sup> See Report & Order, ¶ 376.

<sup>5</sup> Verizon FNPRM Comments at 3.

<sup>6</sup> *Id.* at 3-4.

<sup>7</sup> See, e.g., Google FNPRM Comments at 6-11; Federated Wireless Comments at 7-9;

<sup>8</sup> Intel FNPRM Comments at 5.

**B. The Commission Should Repurpose Additional Bands and Prioritize Repurposing the Balance of LMDS Spectrum.**

The record supports identifying additional spectrum bands (including below 24 GHz) to repurpose for mobile broadband use.<sup>9</sup> The Commission should pursue an “all of the above” policy with respect to exploring potential options for the spectrum pipeline. In the mmW context, its top priority should be to complete the work it started with sub-block A1 block of the 28 GHz band: to repurpose the rest of the LMDS frequencies (i.e., the A2, A3, B1, and B2 sub-blocks).<sup>10</sup> As NextLink explained, failure to pursue such a “dig once” policy for LMDS spectrum would be particularly problematic for the A2 and A3 sub-blocks of that spectrum.<sup>11</sup> It would create a “chilling effect” by imposing diseconomies on equipment manufacturers and operators and would risk creating regulatory confusion by imposing different rules on different frequencies within the same licenses.<sup>12</sup>

**C. Google’s Proposal for the 70-80 GHz Band Merits Consideration.**

A successful 5G ecosystem will require robust backhaul operations, and the 70-80 GHz band’s existing rules support that use case. Google correctly argues that the Commission should not compromise the 70-80 GHz band’s attractiveness by imposing a new three-tiered sharing framework.<sup>13</sup> And Google’s proposal for generally continuing a “light-licensing” approach for

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<sup>9</sup> See, e.g., Nokia FNPRM Comments at 5-6; NextLink Wireless Comments at 10.

<sup>10</sup> Verizon FNPRM Comments at 4-5.

<sup>11</sup> NextLink Wireless FNPRM Comments at 10.

<sup>12</sup> *Id.*

<sup>13</sup> Google FNPRM Comments at 1-4.

the 70-80 GHz band would be preferable to a complex experimental SAS regime that could risk harming existing backhaul operations and deterring future ones.<sup>14</sup>

The Commission should consider Google's proposal to modify the 70-80 GHz band's existing regime to add point-to-multipoint operations.<sup>15</sup> Verizon looks forward to details about how that proposal would work, including the proposed coordination and registration regime for clusters of links, and the respective interference rights and obligations of operators registering different types of operations in the band.

## **II. FLEXIBLE SPECTRUM AGGREGATION POLICIES PROMOTE COMPETITION AND INNOVATION.**

### **A. Spectrum Aggregation Limits Lack Record Support and Would Be Bad Policy.**

It is too early in the 5G innovation cycle to know how much bandwidth operators will need to provide customers with innovative services envisioned in a 5G environment; the Commission should thus not artificially limit bandwidth, performance, and innovation through arbitrary aggregation policies. Arbitrary spectrum aggregation limits would quash innovation and investment in these incipient technologies by preventing operators from acquiring the spectrum needed to support their operations.<sup>16</sup> Instead of imposing *ex ante* restrictions based on speculative future harms nowhere in sight, the Commission should monitor the evolution of 5G

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<sup>14</sup> While Google correctly opposes imposing an untested three-tiered SAS for the 70-80 GHz band, it proposes directly importing the unproven 3.5 GHz band framework for what it says will be small cell uses in the 24 GHz band. *Id.* at 8. But, as discussed above, the record confirms that the SAS model remains untested commercially, and would not support robust investments in new technologies.

<sup>15</sup> *Id.* at 4-5.

<sup>16</sup> Verizon FNPRM Comments at 7-8; Verizon Initial Comments (filed Jan. 28, 2016) at 15; *see also* Ericsson Initial Comments at 6; HTSC Initial Comments at 5; Mobile Future Initial Comments at 15; TIA Initial Comments at 28; XO Initial Comments at 18-20.

and the structure of spectrum holdings—and could implement aggregation rules if and to the extent it identifies a need for them as 5G services develop and evolve.<sup>17</sup>

The economic evidence shows that such a flexible policy will pose no risk to competition. It would be impossible for any firm to exclude a competitor by purchasing “too much” mmW spectrum because a large amount of mmW spectrum in the 5G pipeline will be released continuously for many years. So any competitor that fails to acquire spectrum necessary for its operations will have numerous future opportunities to correct its lack of spectrum.<sup>18</sup>

The Competitive Carriers Association (CCA) does not marshal any sound economic or technical argument to support its request for band-specific aggregation limits.<sup>19</sup> CCA asserts that the Commission could somehow determine the “best use case” for each band, but does not even attempt to explain what those use cases should be in this nascent spectrum.<sup>20</sup> The Commission found in the *Report and Order*, however, that mmW spectrum bands share similar technical characteristics and potential uses.<sup>21</sup> And it would be impossible for the Commission to predict accurately the business cases and technical approaches that will take root in these bands.

The Commission should adhere to its longstanding policy to permit flexible use of particular bands of spectrum and let the use cases emerge. But if the Commission still perceives a need for an *ex ante* prophylactic measure, any limit should permit as much flexibility as possible and should apply across all mmW bands.

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<sup>17</sup> Verizon FNPRM Comments at 7-8.

<sup>18</sup> *Id.*

<sup>19</sup> Competitive Carrier Association FNPRM Comments at 3.

<sup>20</sup> CCA FNPRM Comments at 3.

<sup>21</sup> Report & Order, ¶ 186.

**B. The Record Confirms that the Commission Should Calculate Spectrum Holdings Based on the Population-Weighted Average in a License Area.**

Commenters agree that the Commission should use the population-weighted average methodology it explained in the *Notice* to calculate spectrum holdings to determine bidding eligibility in the 28 GHz, 37 GHz, and 39 GHz auctions.<sup>22</sup> That methodology, which the Commission has used in the past,<sup>23</sup> reflects a balanced approach to implementing spectrum aggregation policies. No party supported the alternative mentioned in the *Notice*; that approach would attribute to the entire license area an operator's spectrum holdings from the single county in which it has the largest amount of spectrum. Because of a mismatch in license areas, that method would thwart an operator's ability to bid on an entire license if it holds substantial spectrum in an adjacent market that happens to slightly overlap with the auctioned license area.<sup>24</sup>

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<sup>22</sup> T-Mobile FNPRM Comments at 27; Verizon FNPRM Comments at 6-7.

<sup>23</sup> *See, e.g., Policies Regarding Mobile Spectrum Holdings*, WT Docket No. 12-269, Report and Order, FCC 14-63, ¶ 175 & n.496 (2014).

<sup>24</sup> Verizon FNPRM Comments at 6-7.

