

**Before the  
Federal Communications Commission  
Washington, D.C. 20554**

In the Matter of	)	
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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	)	WT Docket No. 10-112
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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
	)	

**REPLY COMMENTS OF SES AMERICOM, INC.**

SES Americom, Inc. (“SES”) hereby submits its reply comments in response to the Notice of Proposed Rulemaking in the above-captioned proceeding, FCC 15-138, 30 FCC Rcd 11878 (2015) (“NPRM”).

Numerous satellite operators<sup>1</sup> and the Satellite Industry Association (“SIA”)<sup>2</sup> have described the important role satellites play in the daily lives of Americans. To ensure continued

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<sup>1</sup> Comments of EchoStar Satellite Operating Corporation, Hughes Network Systems, LLC, and Alta Wireless, Inc., GN Docket No. 14-177, at 4-5 (filed Jan. 27, 2016); Comments of Inmarsat Mobile Networks, Inc., GN Docket No. 14-177, at 2-4 (filed Jan. 28, 2016); Comments of O3b Limited, GN Docket No. 14-177, at 2-7 (filed Jan. 28, 2016); Comments of ViaSat Inc., GN Docket No. 14-177, at 2-7 (filed Jan. 28, 2016).

<sup>2</sup> Comments of the Satellite Industry Association, submitted in GN Docket No. 14-177, at 2-7 (Jan. 28, 2016).

availability of existing services and the development of future services, satellite operators, like all wireless operators, must have regulatory certainty and access to spectrum. In its comments, SES outlined several approaches that the Commission could use to license Fixed Satellite Service (“FSS”) gateway earth stations on a co-primary basis in the 27.5-28.35 GHz frequency band (“28 GHz band”) without unduly restricting current Local Multipoint Distribution Service (“LMDS”) operators or future Upper Microwave Flexible Use Service (“Flexible Use”) operators.<sup>3</sup>

As discussed below, the record supports SES’s contention that gateway earth station operations can co-exist with terrestrial operators. Therefore, the Commission should elevate to co-primary status earth stations that are licensed or have applications pending prior to a Flexible Use auction. Furthermore, future gateway earth stations should be licensed on a co-primary, first-come, first-served basis. Alternatively, the Commission should adopt a modified version of its proposal to allow gateway earth stations operating prior to a Flexible Use auction to obtain co-primary access to the 28 GHz band for future growth.

No matter how the Commission decides to proceed, it must ensure that all licensees are held to a rigorous performance standard to protect against spectrum warehousing. Such standards need to be clear and objective, and the Commission should make every effort to avoid standards that can be gamed by a licensee.

**I. Satellite Gateway Earth Stations Can Operate on a Co-Primary Basis under Defined Conditions without Participating in an Auction**

The record demonstrates that gateway earth stations can successfully operate within the 5G environment that the Commission contemplates in the NPRM without the need for dual licensing, cost-prohibitive auctions, or fickle secondary markets, all while imposing limited restrictions on the deployment of future mobile terrestrial 5G systems.

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<sup>3</sup> Comments of SES Americom, Inc., GN Docket No. 14-177 (filed Jan. 28, 2016).

As SES pointed out in its initial comments, the satellite industry will be an integral part of the 5G environment,<sup>4</sup> providing direct service to customers operating on the sea, in the air and in remote land areas and offering additional services, such as backhaul, to other 5G operators.<sup>5</sup> While SES looks forward to a thriving 5G broadband market in the United States, it must also ensure protection of its planned broadband services, including those to be provided by the SES-15 satellite to be launched in 2017. SES has requested authority to operate six gateway earth stations in the 28 GHz band to support the high-throughput (“HTS”) spot beam service of SES-15.<sup>6</sup> Those gateways can and must be granted co-primary status to ensure SES can continue to provide its broadband service within the new interference environment created by the introduction of mobile terrestrial operations in this spectrum. Therefore, SES urges the Commission to elevate these and all other gateways that are either licensed or described in applications filed prior to a Flexible Use auction.

For all future gateway earth stations, the Commission should establish siting criteria and operating requirements to determine an earth station’s eligibility for co-primary status and require future mobile terrestrial 5G operators to accept the limited interference that such gateway earth stations will create. Thoughtful development of the rules will allow satellite operators to both continue and expand their broadband offerings without significantly hindering future mobile terrestrial operations.

Numerous commenters who plan to implement mobile terrestrial 5G operations note how targeted those operations will be in both cell size and population density. For example, Qualcomm notes that “Millimeter wave deployments will focus, at least initially, on locations with a high density of users and devices where more capacity is needed, such as event venues

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<sup>4</sup> See SES Comments at 5.

<sup>5</sup> See “SES Strongly Advocates and Supports Future 5G Deployment in Europe”, available at <http://www.ses.com/4233325/news/2016/22011760> (“In order to cope with the tremendous growth of data demand, including 5G requirements, a combination of terrestrial and satellite wireless technologies is needed. Satellites play a key role in allowing the seamless extension of 5G services, by providing connectivity on the sea, in the air and to remote land areas.”).

<sup>6</sup> See File Nos. SES-LIC-20160209-00122 (call sign E160020), SES-LIC-20160209-00123 (call sign E10021), SES-LIC-20160209-00124 (call sign E160022), SES-AMD-20160209-00125 (E160017), SES-AMD-20160209-00126 (E160016), and SES-AMD-20160209-00127 (call sign E160015).

and transportation hubs.”<sup>7</sup> The Telecommunications Industry Association (“TIA”) explains that “[u]sing UMFUS bands in rural areas will be a challenge, as the propagation characteristics are less than ideal for serving widely-dispersed demand.”<sup>8</sup>

Gateway earth stations require large antennas with a significant footprint and therefore are typically constructed in rural or suburban areas. As a result, such earth stations are unlikely to be located in or near an area where mobile Flexible Use operations may be deployed.

In any event, the record shows that future mobile terrestrial networks will be able to operate very close to a gateway earth station without experiencing interference. Using 5G parameters provided by Samsung, one of the leading proponents of mobile terrestrial 5G service, together with a conservative path loss model, EchoStar demonstrated that a mobile base station could operate as close as 170 meters away from a 28 GHz gateway earth station without experiencing interference.<sup>9</sup> An area with a 200 meter radius represents a minuscule portion of a county, and an even smaller segment of a Basic Trading Area (“BTA”), the licensing area favored by most terrestrial operators for the 28 GHz band.<sup>10</sup> Flexible Use licensees can easily work around such limited zones. Indeed, TIA observes that “there are a wide range of tools available to engineers in the design, location and operation of facilities (both FSS gateways and terrestrial networks) to avoid interference.”<sup>11</sup>

SES recognizes that a gateway earth station operating within or very near a densely populated area, such as New York City, could affect the local licensee’s plans to implement

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<sup>7</sup> Comments of Qualcomm Incorporated, GN Docket No. 14-177, at 13 (filed Jan. 27, 2016). *But see* Comments of Straight Path Communications, Inc., GN Docket No. 14-177, at 8-9 (filed Jan. 27, 2016) (arguing that the Commission incorrectly presumes millimeter wave spectrum will be used exclusively for small cell coverage).

<sup>8</sup> Comments of Telecommunications Industry Association, GN Docket No. 14-177, at 23 (filed Jan. 27, 2016); *see also* CTIA *ex parte*, GN Docket No. 14-177, at 1 (filed Oct. 19, 2015) (“Spectrum bands above 24 GHz may yield extensive amounts of contiguous spectrum blocks (gigahertz rather than megahertz available in lower spectrum bands), potentially allowing the provision of extensive throughput and capacity improvements as compared to other spectrum bands available for mobile services. However, CTIA noted that such capabilities may be limited to portions of densely populated areas of the country due to the inherent propagation limits associated with spectrum above 24 GHz.”); Reed Hundt *ex parte*, GN Docket No. 14-177, at 26 (filed Jan. 13, 2016) (“High frequency is appropriate for densification but not wide area deployment.”).

<sup>9</sup> EchoStar Comments at 16; *see also* ViaSat Comments at 13-14, Exhibit 1.

<sup>10</sup> TIA Comments at 22-24; *see also* Comments of Cisco Systems, Inc., GN Docket No. 14-177, at 11 (filed Jan. 28, 2016); Comments of Ericsson, GN Docket No. 14-177, at 9-10 (filed Jan. 26, 2016); Comments of Verizon, GN Docket No. 14-177, at 10-11 (filed Jan. 28, 2016).

<sup>11</sup> TIA Comments at 9.

mobile terrestrial services. But this can be addressed by specifying criteria for co-primary status of future gateways based on population density. Given the mobile terrestrial operators' service descriptions, a gateway location should be ineligible for primary status only in the most densely populated areas. In all other areas, including current LMDS licensed areas, gateway earth station licenses should be issued under Part 25 of the Commission's rules on a co-primary, first-come, first-served basis. Gateway earth station operations could be further defined to ensure that future mobile terrestrial services are not unnecessarily restricted. Those operational constraints can be derived from the characteristics of existing earth stations and the description of earth stations proposed in applications currently pending before the Commission. Furthermore, licensed gateway operators should be able to add antennas to their licensed facilities in the future as long as they do not cause a significant increase in the potential interference to nearby mobile terrestrial operations.

For their part, future mobile operations should be required to take existing and pending earth station operations into account when developing their deployment plans. The operational characteristics of such earth stations are publicly available in the Commission's IBFS database and can be reviewed by potential bidders in a Flexible Use auction, who can develop appropriate bids for each area in light of these prior earth station licenses and applications.

In developing the operational characteristics for mobile terrestrial operations, the Commission must also ensure they do not cause unnecessary harm to satellites. As mobile terrestrial 5G services are introduced and grow under the Commission's proposed rules, satellite operators face the very real concern that the aggregate transmissions from numerous terrestrial base and mobile stations will cause interference into their in-orbit satellite receive antennas. Therefore, the Commission should consider methods for ensuring mobile terrestrial services in the 28 GHz band do not cause harmful interference to satellites. In particular, the Commission should carefully consider the maximum power of terrestrial base and mobile stations as it is a critical element in this interference scenario.

This licensing approach will ensure satellite operators are able to plan for future satellites, including the 5G service they will provide, without fear that the spectrum will become unavailable after the satellite is under construction or already providing service.

## **II. Co-Primary Status for Gateway Earth Stations Strikes a Balance in Favor of Technology Neutrality**

Allowing FSS gateway earth stations co-primary access to the 28 GHz band within defined operational parameters will support the Commission’s goal “to develop rules that will accommodate the widest possible variety of services,” in a technology neutral way.<sup>12</sup> This is particularly true in areas currently subject to an LMDS license.

As SES noted in its comments,<sup>13</sup> the Commission is proposing to grant LMDS licensees mobile rights, a windfall to the licensees that also changes the interference environment gateway operators have come to expect when planning their 28 GHz operations.<sup>14</sup> The Commission can balance the benefits existing licensees will receive with the potential harm gateway operators could experience by making gateway earth stations eligible for co-primary status, including in undeveloped portions of LMDS license areas, thereby creating a more neutral approach to accessing the 28 GHz spectrum.

Several commenters incorrectly state that FSS gateway operators understood they would be required to operate on a secondary basis to both fixed and mobile terrestrial operations in the 28 GHz band.<sup>15</sup> As SIA and ViaSat pointed out in their comments,<sup>16</sup> FSS is co-primary with both the Fixed Service and Mobile networks under the Table of Allocations.<sup>17</sup> By rule FSS is required to operate on a secondary basis but only with respect to LMDS.<sup>18</sup> The underlying

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<sup>12</sup> NPRM at ¶ 24; *see also* ¶ 33.

<sup>13</sup> SES Comments at 11.

<sup>14</sup> *See* EchoStar Comments at 18-19 (“the Commission proposes to upgrade LMDS licensees from a strictly fixed authorization to one that allows them to provide both fixed and mobile services. ... Authorizing the addition of mobile services threatens to expand the territory used for terrestrial operations, which also expands the areas in which an FSS earth station could cause interference.”).

<sup>15</sup> *See* CTIA Comments at 32 (“Existing FSS licensees were aware when they acquired their licenses that they were authorized only on a secondary basis, and that primary licensees in the band had the option of deploying mobile services.”); *see also* Comments of Skyriver Communications, Inc., submitted in GN Docket No. 14-177, at 5-6 (Jan. 27, 2016).

<sup>16</sup> SIA Comments at 11-12; ViaSat Comments at 11-13.

<sup>17</sup> 47 C.F.R. §2.106.

<sup>18</sup> 47 C.F.R. §25.202(a)(1), n.2.

Commission order makes this clear, explicitly stating that under the band plan, a service designated as secondary maintains its “licensing priority vis-à-vis any third service allocated domestically or internationally in the band.”<sup>19</sup> Thus, contrary to arguments made by some commenters,<sup>20</sup> LMDS licensees do not have a reasonable expectation that FSS will be required to operate on a secondary basis to future mobile operations.

### **III. Alternatively, the Commission Should Adopt a Modified Version of its Proposed Closed Filing Window Approach for Gateway Earth Stations**

If the Commission does not adopt the first-come, first-served licensing approach described above, it should at a minimum implement the closed filing window it has proposed in the NPRM<sup>21</sup> with the revisions SES proposed in its comments.<sup>22</sup> Neither auctions nor the secondary market will meet satellite industry needs for protected access to the 28 GHz band.

As SES noted in its comments, auctions are not a viable option for gateway earth stations to obtain co-primary access to the 28 GHz band.<sup>23</sup> An earth station operator would be required to bid for an entire county when it only requires access to a small portion of the licensed area. The economics that drive such auctions simply do not apply in the context of a gateway earth station. Those commenters who argue earth station operators should be required to participate in an auction are also the parties advocating for licensing areas significantly larger than a county, demonstrating either a complete lack of understanding of how satellite gateways work or an unspoken attempt to exclude gateway earth station operations altogether.<sup>24</sup>

The secondary market is fraught with even greater uncertainty. There is no way for SES to know whether future Flexible Use licensees in the 28 GHz band will entertain the possibility of a spectrum lease or partition agreement. Licensees may view SES as a competitor and decline

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<sup>19</sup> *Rulemaking to Amend Part 1, 2, 21, and 25 of the Commission’s Rules to Redesignate the 27.5-29.5 GHz Frequency Band, to Reallocate the 29.5-30 GHz Frequency Band, to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services*, First Report and Order, 11 FCC Rcd 19005, 19024, ¶ 44 (1996).

<sup>20</sup> *Supra* n.15.

<sup>21</sup> NPRM at ¶ 140.

<sup>22</sup> SES Comments at 8-11.

<sup>23</sup> SES Comments at 7; *see also* SIA Comments at 15-16.

<sup>24</sup> *See* Ericsson Comments at 9-10, 20-22; Verizon Comments at 10-11, 22-24.

even to discuss an agreement. Moreover, licensees may not complete their planning or roll-out service for up to ten years, and hence be reluctant to enter into any secondary market transactions. Such uncertainty would undermine SES's ability to plan for future satellite operations.

#### **IV. Performance Criteria Must be Clear, Objective and Enforceable**

Terrestrial 5G advocates argue for a variety of performance standards ranging from network usage<sup>25</sup> to “substantial service.”<sup>26</sup> TIA has even proposed developing a number of benchmark options depending on the nature of the Flexible Use service.<sup>27</sup> SES cannot recommend a specific performance standard without understanding the likely deployment characteristics of future terrestrial 5G services, but the standards must be clear, objective and enforceable.

SES notes that many parties advocate for a “substantial service” standard, which is defined as “a service that is sound, favorable, and substantially above a level of mediocre service which might minimally warrant renewal.”<sup>28</sup> This standard may be particularly difficult to enforce in an environment that is so undefined. As many commenters point out, 5G services have not been fully defined, making it unclear how the Commission would determine if the service provided at the end of a ten-year license term is “substantially above a level of mediocre service.” SES urges the Commission to evaluate whether the standards proposed by the terrestrial 5G proponents will ensure licensees are not able to game the standard and warehouse the very valuable spectrum at issue here.

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<sup>25</sup> Cisco Comments at 14 (suggesting using metrics such as number of connected devices, carried traffic, or session count).

<sup>26</sup> TIA Comments at 27-28.

<sup>27</sup> *Id* at 27.

<sup>28</sup> 47 C.F.R. § 101.1413(b).

## V. Additional Proposals

At least two parties have suggested carving up the 850 MHz of spectrum available in the 28 GHz band into smaller blocks.<sup>29</sup> If the Commission considers such band segmentation, SES requests that it not be applied to FSS gateway operations. Such earth stations require a contiguous block of spectrum to provide efficient uplink services in the 28 GHz band, and band segmentation would jeopardize a gateway operator's ability to take full advantage of the available spectrum. Also, if less spectrum is available for gateways, more gateways will be required to provide the same service, which will increase the complexity and cost of future HTS systems.

Other commenters have proposed alternative licensing regimes in the 28 GHz band that could create an even more complex interference environment. For example, the National Cable & Telecommunications Association advocates for opportunistic use of the 28 GHz band, in addition to other bands, when licensed users are not operating and subject to use of a database to protect licensees.<sup>30</sup> While SES believes that licensed gateway earth station operations can co-exist with licensed terrestrial operations in the 28 GHz, opportunistic and unlicensed operations must be carefully evaluated to ensure protection of licensed services.

## VI. Conclusion

For the foregoing reasons, SES respectfully requests that the Commission elevate to co-primary status all FSS gateway operations that are licensed or are subject to a pending application prior to a Flexible Use auction. Additionally, SES requests that the Commission authorize future FSS gateway operations on a co-primary basis in the 28 GHz band under a first-come, first-served licensing regime and develop operating requirements that will allow both satellite and terrestrial operators in the band to thrive.

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<sup>29</sup> See Comments of Microsoft Corporation, GN Docket No. 14-177, at 14-17 (filed Jan. 27, 2016); *see also* Comments of T-Mobile USA, Inc., GN Docket No. 14-177, at 11 (filed Jan. 27, 2016).

<sup>30</sup> Comments of National Cable & Telecommunications Association, GN Docket No. 14-177, at 11-13 (filed Jan. 28, 2016); *see also* Comments of Open Technology Institute at New America and Public Knowledge, GN Docket No. 14-177, at 7-12 (filed Jan. 28, 2016) (urging the Commission to extend the three-tier spectrum access framework adopted for 3.5 GHz to the 28 GHz band, among others, to allow a mix of licensed, unlicensed and dynamic shared access).

Respectfully submitted,  
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