### Before the FEDERAL COMMUNICATIONS COMMISSION Washington, DC 20554

In the Matter of

Application of Intelsat License LLC to Modify its Existing Ku-band Earth Stations Aboard Aircraft and Vehicle-Mounted Earth Stations Blanket License to Add New Terminals and New Satellite Points of Communication Call Sign E170121

File No.

# APPLICATION FOR BLANKET LICENSE MODIFICATION

By this application, Intelsat License LLC ("Intelsat") seeks to modify its existing Kuband earth stations aboard aircraft ("ESAA") and vehicle-mounted earth stations ("VMES") blanket license, Call Sign E170121.<sup>1</sup> Specifically, Intelsat seeks to add authority to operate up to 1000 of each of two new terminal types—the SkyTech Model BB30Ku ("BB30") and the SkyTech Model BB45Ku ("BB45")—on private, commercial, and government aircraft in U.S. and international airspace, and on stationary and in-motion vehicles within the United States, pursuant to Section 25.226 and Section 25.227 of the Federal Communication Commission's ("FCC" or "Commission") rules.<sup>2</sup> Intelsat also seeks to add four additional satellites to its *Blanket License* as authorized points of communication for ESAA terminals operating at power above two-degree spacing level but consistent with the coordinated levels of the satellites.

The modifications sought herein will improve Intelsat's operational flexibility and enhance the offerings of the IntelsatOne<sup>®</sup> Flex network, thus facilitating U.S. leadership in satellite-based mobile broadband services. Grant of the requested authority would be consistent

<sup>1</sup> See Intelsat License LLC, File No. SES-MOD-20180220-00148, Call Sign E170121 (granted July 25, 2018) (the "*Blanket License*").

<sup>2</sup> 47 C.F.R. § 25.226 and 47 C.F.R. § 25.227.

with Commission rules and precedent and would serve the public interest by promoting competition in the mobile broadband connectivity market.

Intelsat will operate its terminals with existing and additional satellite points of communication in accordance with the Commission's rules governing Ku-band ESAAs<sup>3</sup> and VMESs,<sup>4</sup> future rules governing such operations,<sup>5</sup> and applicable international requirements. Pursuant to Section 25.117(c) of the Commission's rules,<sup>6</sup> Intelsat provides in the FCC Form 312 Schedule B and Technical Appendix information pertaining to the requested modification.

# I. BACKGROUND

Intelsat is a world leader in providing innovative broadband satellite services and currently holds numerous FCC licenses to operate geostationary satellite orbit ("GSO") fixed-satelitte service ("FSS") satellites and earth station facilities. The IntelsatOne<sup>®</sup> Flex network aggregates Intelsat's global wide beam and Intelsat Epic<sup>NG®</sup> high throughput satellite ("HTS") fleet and the IntelsatOne<sup>®</sup> terrestrial network into a simplified ecosystem that enables Intelsat and its

<sup>4</sup> See 47 C.F.R. § 25.226; see also Amendment of Parts 2 and 25 of the Commission's Rules to Allocate Spectrum and Adopt Service Rules and Procedures to Govern the Use of Vehicle-Mounted Earth Stations in Certain Frequency Bands Allocated to the Fixed-Satellite Service, IB Docket No. 07-101, Order on Reconsideration, FCC 13-1, 28 FCC Rcd 488 (2013).

<sup>5</sup> See Amendment of Parts 2 and 25 of the Commission's Rules to Facilitate the Use of Earth Stations in Motion Communicating with Geostationary Orbit Space Stations in Frequency Bands Allocated to the Fixed Satellite Service, IB Docket No. 17-95, Report and Order and Further Notice of Proposed Rulemaking, FCC 18-138 (rel. Sep. 27, 2018).

<sup>&</sup>lt;sup>3</sup> See 47 C.F.R. § 25.227; see also Revisions to Parts 2 and 25 of the Commission's Rules to Govern the Use of Earth Stations Aboard Aircraft Communicating with Fixed-Satellite Service Geostationary-Orbit Space Stations Operating in the 10.95-11.2 GHz, 11.45-11.7 GHz, 11.7-12.2 GHz and 14.0-14.5 GHz Frequency Bands, IB Docket No. 12-376, Notice of Proposed Rulemaking and Report and Order, FCC 12-161, 27 FCC Rcd 16510 (2012).

<sup>&</sup>lt;sup>6</sup> See 47 C.F.R. § 25.117(c).

distribution partners to easily and cost effectively scale service delivery capability to meet customer demand. Intelsat's ESAA/VMES network is an integral part of its global IntelsatOne<sup>®</sup> Flex offering. Intelsat has fully described the network in its prior submissions and hereby incorporates by reference the technical showing regarding the control functionality and other operational characteristics previously submitted.<sup>7</sup>

Under the original ESAA blanket license,<sup>8</sup> the FCC International Bureau ("Bureau") authorized Intelsat to operate two terminals (Rantec and TECOM terminals) with specific Intelsat satellites and any U.S.-licensed or non-U.S.-licensed satellite on the Commission's Permitted Space Station List ("Permitted List").<sup>9</sup> Subsequently, the Bureau approved Intelsat's modification of its license to include additional antennas (the HR129 and HR6400), as well as VMES operating authority for all the terminals.<sup>10</sup>

Here, Intelsat seeks to add the BB30 and BB45 terminals to its *Blanket License* for regular ESAA and VMES commercial operations.<sup>11</sup> In addition, Intelsat seeks authority for all

<sup>9</sup> See Approved Space Station List (last updated on Nov. 9, 2018, available at: <u>https://www.fcc.gov/approved-space-station-list</u>). Permitted List authority is available in specified frequencies at routine power levels with satellites on the Approved Space Station List.

<sup>10</sup> See supra n.1.

<sup>&</sup>lt;sup>7</sup> See Intelsat License LLC, File Nos. SES-LIC-20170626-00682 and SES-MOD-20180220-00148, Call Sign E170121, at Technical Descriptions.

<sup>&</sup>lt;sup>8</sup> See Intelsat License LLC, File No. SES-LIC-20170626-00682, Call Sign E170121.

<sup>&</sup>lt;sup>11</sup> The BB30 and BB45 terminals have previously operated under experimental authority and the BB45 terminal has also operated under commercial ESAA authority granted by the Commission. *See* UltiSat, Inc., File No. SES-LIC-20180726-02089 (Nov. 21, 2018), Call Sign E181298; UltiSat, Inc., File Nos. SES-STA-20180621-01477, and SES-STA-20180724-

ESAAs in its network to communicate with four additional specific satellite points of communication at higher, coordinated power levels. Below, Intelsat provides an overview of the proposed operations and demonstrates that they will be conducted in accordance with the Commission's ESAA and VMES requirements.

#### II. DISCUSSION

#### A. BB30 & BB45 Terminal Operations

The BB30 and BB45 ESAA terminals are stabilized antenna systems that provide highquality broadband satellite communications for aeronautical and ground-based mobile satellite applications. They are designed to operate in Ku-band frequencies to provide mission-critical delivery of voice, video, and data communications; employ mechanically steerable, circular parabolic antennas; and, with the exception of antenna size, have the same basic design and functional characteristics.

Intelsat seeks authorization to operate the BB30 and BB45 terminals with Permitted List satellites under the provisions of Sections 25.226(a)(1) and 25.227(a)(1) of the Commission's rules,<sup>12</sup> applicable to VMES and ESAA terminals that use transmitters with off-axis EIRP spectral densities ("ESDs") lower than or equal to the levels in paragraph (a)(1)(i) of each section.<sup>13</sup> In the Technical Appendix, Intelsat provides the off-axis ESD plots pursuant to Section 25.115(g)(1) of the Commission's rules, 47 C.F.R. § 25.115(g)(1).

<sup>01969;</sup> see also UltiSat, Inc., File No. 0201-EX-ST-2018; UltiSat, Inc., File No. 1930-EX-ST-2018.

<sup>&</sup>lt;sup>12</sup> 47 C.F.R. §§ 25.226(a)(1) and 25.227(a)(1).

<sup>&</sup>lt;sup>13</sup> The Commission's off-axis ESD masks applicable to ESAAs and VMESs are identical.

The BB30 and BB45 terminals use a circular parabolic antenna with no compliance issues in the plane perpendicular to the geostationary arc (as is the case with many low-profile terminals). The charts show that the ESD remains below permitted limits in all cases, and Intelsat will operate the BB30 and BB45 terminals at off-axis ESD levels that are compliant with the Commission's two-degree spacing policy to prevent adjacent satellite interference and facilitate Ku-band ESAA and VMES operations in a two-degree spacing environment.

For ESAA operations outside the United States with certain satellite points of communication, Intelsat will operate authorized ESAA terminals under Sections 25.226(a)(2) and 25.227(a)(2) of the Commission's rules.<sup>14</sup> The relevant satellites are enumerated in Section II.B, below. Intelsat will operate all ESAA terminals in accordance with the coordinated power levels of the serving satellites.

In addition, the BB30 and BB45 terminals fully meet the pointing accuracy requirements of Section 25.226(a)(1)(ii)(A) and 25.227(a)(1)(ii)(A) with a pointing accuracy of less than or equal to 0.2° between the orbital location of the target satellite and the axis of the main lobe of the ESAA and VMES antennas. Moreover, in accordance with Section 25.226(a)(1)(iii)(A) and 25.227(a)(1)(iii)(A), the BB30 and BB45 terminals' design ensures that all emissions from ESAAs and VMESs automatically cease within 100 milliseconds if the angle between the orbital location of the target satellite and the axis of the main lobe of  $0.5^{\circ}$ , and transmission will not resume until such angle is less than or equal to  $0.2^{\circ}$ .

The Commission has previously examined the technical characteristics of Skytech ESAA terminals in granting STA and long-term operating authority to both the BB30 and BB45

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<sup>47</sup> C.F.R. §§ 25.226(a)(2) and 25.227(a)(2).

terminals.<sup>15</sup> In the Technical Appendix and Form 312 Schedule B, Intelsat provides additional information on the operational characteristics of the BB30 and BB45 terminals, and demonstrates that it will operate in compliance with the Commission's ESAA and VMES rules and policies. The BB30 and BB45 terminals have operated pursuant to Commission authorizations without any reported interference and in compliance with the rules embodied in Sections 25.226 and 25.227. Thus, operation of the BB30 and BB45 terminals as part of the IntelsatOne<sup>®</sup> Flex network will not increase the potential for interference to other lawfully operating spectrum users.

### **B.** Points of Communication

Intelsat seeks authority to add four (4) aditional satellites as points of communication for all ESAA terminals in its *Blanket License*. Uplink from the terminals will occur in portions of the 14.0-14.5 GHz band and downlinks will occur in portions of the 10.95-11.2 GHz and 11.45-12.2 GHz bands, as described in the following table.

Satellite	FCC Call	Orbital	Downlink	ITU Region	Service to
	Sign	Location	Freq. (GHz.)		U.S.
Intelsat 33e	S2939	60° E.L.	10.95-11.2	1, 3	No
			11.45-11.7		
			11.7-12.2		
Galaxy 16	S2687	43.15° W.L.	11.7-12.2	2	Yes
Galaxy 18	S2733	60° E.L.	11.7-12.2	2	Yes
Intelsat 905	S2409	335.5° E.L.	10.95 - 11.20	1, 2	Yes
			11.45-11.7		

Table 1.	New	Satellite	<b>Points</b>	of	Communication
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<sup>&</sup>lt;sup>15</sup> *See supra* n. 11.

Intelsat requests authority to operate the BB30, BB45, and previously authorized ESAA terminals with these satellites at their coordinated power level, as well as with all satellites on the Permitted List. In addition, Intelsat requests authority for the BB30 and BB45 terminals to communicate with certain previously authorized satellites in the 12.2-12.75 GHz band for ESAA receive operations on an unprotected, non-harmful interference basis outside the United States,<sup>16</sup> subject to any necessary authorizations from foreign administrations, and in accordance with existing conditions in the *Blanket License*.<sup>17</sup> Intelsat provides a complete list of satellite points of communication and associated gateways in the Technical Appendix, as well as BB45 and BB30 operating parameters in Form 312 Schedule B.

# C. Permitted List Authority

In addition to the above-mentioned specific satellite points of communication at higher powers, Intelsat is also requesting authority to operate the BB30 and BB45 terminals with all U.S.-licensed and non-U.S. licensed satellites on the Permitted List.<sup>18</sup> Permitted List authority is appropriate because Intelsat will operate the terminals with these satellites in permissible portions of the Ku-band at power levels compliant with the Commission's rules, and otherwise in accordance with operational conditions imposed by the Commission. Permitted List authority for the BB30 and BB45 terminals will provide Intelsat with operational flexibility to provide services throughout the coverage area of its global satellite fleet.

<sup>&</sup>lt;sup>16</sup> The 12.5-12.75 GHz band is allocated for FSS downlinks in ITU Region 1 and the 12.2-12.75 GHz band is allocated for FSS downlinks in ITU Region 3.

<sup>&</sup>lt;sup>17</sup> *See supra* n.1.

<sup>&</sup>lt;sup>18</sup> *See supra* n.11.

### **D.** Ground Segment

The Ground Segment consists of gateway earth stations located at Intelsat and commercial teleport facilities that facilitate network control and connection to the terrestrial telecommunications network. A complete table reflecting all satellites and gateways in the Intelsat network is included in the Technical Appendix. The gateway information for the new satellite points of communication is provided below.

Satellite	Gateway	Gateway Earth	Country	FCC Call Sign
	Operator	Station Location		
IS-33e	Intelsat	Fuchsstadt	Germany	N/A
		Kumsan	Korea	N/A
		Johannesburg	South Africa	N/A
G16	Intelsat	Hagerstown, MD	United States	E030051
C19	Intoloot	Atlanta CA	United States	E000422
018	Intersat	Atlanta, GA	United States	E990433
IS-905	Intelsat	Fuchsstadt	Germany	N/A

**Table 2. Gateway Earth Stations Information** 

Control and monitoring of the Intelsat network will be provided by the information security operations center ("ISOC") in Ellenwood, Georgia, United States, on a 24/7 basis. The primary points of contact at the ISOC facility have been previously provided to the Commission.

# E. Non-Conforming, Non-Interference ESAA Downlink Operations

The FCC's Table of Frequency Allocations ("Table of Allocations"), Section 2.106 of the Commission's rules,<sup>19</sup> permits use of the 10.95-11.2 GHz and 11.45-11.7 GHz (space-to-Earth) bands on an unprotected basis, and the 11.7-12.2 GHz (space-to-Earth) and 14.0-14.5 GHz

<sup>&</sup>lt;sup>19</sup> 47 C.F.R. § 2.106.

(Earth-to-space) bands on a primary basis for ESAA operations.<sup>20</sup> As discussed, in this application Intelsat also seeks authority for the BB30 and BB45 to communicate with certain previously authorized satellites in the 12.2-12.75 GHz downlink band for ESAA operations, as shown in the Technical Appendix accompanying this Application. Intelsat seeks to utilize this additional downlink capacity on an unprotected, non-harmful interference basis outside the United States, under the same conditions that are currently contained in the *Blanket License*.

Intelsat requests that the Commission permit ESAA operations using the BB30 and BB45 in the 12.2-12.75 GHz band under the same conditions that currently apply to the other terminals authorized under the *Blanket License*.<sup>21</sup> Such authority would serve the public interest because use of this downlink (receive) spectrum is essential to Intelsat's broadband mobility offerings in Ku-band spectrum and presents a negligible risk of interference to other spectrum users.

#### III. PUBLIC INTEREST STATEMENT

Grant of the requested modification to add the two new terminal types and the four new satellite points of communication to the *Blanket License* will serve the public interest by

<sup>&</sup>lt;sup>20</sup> See id., n. NG52 and NG55; 47 C.F.R. § 25.227.

<sup>&</sup>lt;sup>21</sup> The *Blanket License* includes the following conditions:

<sup>900414</sup> Reception of downlink transmissions is on a non-interference, non-protected basis from the following geostationary orbit space stations: IS-17 (Call Sign: S2814) at 66° E.L. in the 12.2-12.75 GHz frequency band; IS-18 (Call Sign: S2817) at 180° E.L. in the 12.25-12.75 GHz frequency band; IS-20 (Call Sign: S2847) at 68.5° E.L. in the 12.5-12.75 GHz frequency band; IS-20 (Call Sign: S2847) at 68.5° E.L. in the 12.5-12.75 GHz frequency band; IS-20 (Call Sign: S2847) at 68.5° E.L. in the 12.5-12.75 GHz frequency band; IS-22 (Call Sign: S2846) at 72.1° E.L. in the 12.25-12.75 GHz frequency band; and IS-37 (Call Sign: S2972) at 18° W.L. in the 12.5-12.75 GHz frequency band. When receiving transmissions from these satellites in these frequency bands, the ESAA operations authorized herein must accept interference from any authorized user of the band.

<sup>900415</sup> Reception of downlink transmissions in ITU Region 2 is on a non-interference, non-protected basis from the following geostationary orbit space stations: Horizons 3e (S2947) at 169° E.L. in the 12.2-12.75 GHz frequency band; IS-19 (Call Sign: S2850) at 166° E.L. in the 12.25-12.75 GHz frequency band; IS-33e (Call Sign S2939) at 60.0° E.L. in the 12.5-12.6 GHz frequency band. Operations are not authorized in these bands over the U.S. and its territories.

extending the coverage and increasing the capacity and operational flexibility of Intelsat's global ESAA and VMES network. This will provide a direct benefit to U.S. satellite mobility customers, including the U.S. government, and will further enhance U.S. leadership in mobile broadband services.

Grant of this modification application will also serve the public interest by promoting competition in the market for mobile broadband connectivity services to the benefit of travelers in the United States and internationally. In particular, users of the ESAA and VMES services on Intelsat's network will enjoy increased productivity, operational efficiencies, and other benefits from expanded access to mobile broadband connectivity. This in turn will enhance competition in the air- and ground-transportation market by enabling aircraft and vehicles equipped with Intelsat ESAAs and VMESs to compete with other operators offering terrestrial and satellitebased connectivity to passengers.

Intelsat has provided the technical and operational information necessary for the Commission to grant this modification pursuant to Sections 25.226 and 25.227 of the Commission's rules. Intelsat has established that its terminals can operate with the proposed satellite points of communication consistent with applicable coordination agreements and that its proposed operations are compatible with other co-frequency services. Thus, grant of the requested modification would be consistent with Commission rules, policies and precedent facilitating Ku-band VMES and ESAA operations, and would serve the public interest.

#### **IV. CONCLUSION**

For the foregoing reasons, Intelsat requests that the Commission grant this modification application to add four new satellite points of communication and the BB30 and BB45 terminals to its *Blanket License* for ESAA and VMES operations as described herein.

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