

INTELSAT LICENSE LLC
REQUEST FOR SPECIAL TEMPORARY AUTHORITY
EARTH STATION CALL SIGN KA258
HAGERSTOWN, MARYLAND

EXHIBITS A – C

DECEMBER 7, 2015

Exhibit A

Hagerstown, Maryland TIF 14.2 Meter Earth Station Call Sign: KA258

COMPLAINT WITH FCC REPORT & ORDER (FCC 96-377) FOR THE 13.75 GHz - 14.0 GHz BAND ANALYSIS AND CALCULATIONS

1. Background

This Exhibit is presented to demonstrate the extent to which the Intelsat License LLC satellite earth station in Hagerstown, Maryland is in compliance with FCC REPORT & ORDER 96-377. The potential interference from the earth station to US Navy shipboard radiolocation operations (RADAR) and the NASA space research activities in the 13.75 - 14.0 GHz Band is addressed in this exhibit. The parameters for the earth station are:

Table 1. Earth Station Characteristics

- Coordinates (NAD83): 39° 35' 54.0" N, 77° 45' 33.0" W
- Satellite Location for Earth Station: SES-9 at 6° W to 149° W
- Frequency Band: 13.75-14.5 GHz for uplink
- Polarizations: Circular
- Emissions:
 - Modulation: FM/PCM/PSK
- Maximum Aggregate Uplink EIRP: 88dBW for all Carriers
- Transmit Antenna Characteristics
 - Antenna Size: **14.2** meters in Diameter
 - Antenna Type/Model:
 - Gain: 62.5dBi
- RF power into Antenna Flange: 25.5 dBW or -0.2 dBW/ MHz (Maximum)
- Minimum Elevation Angle:
 - Hagerstown, Md. 5.5° @ 101.9Az.
 - 5.7° @ 257.8° Az.
- Side Lobe Antenna Gain: 32 - 25*log(θ)

Because the above uplink spectrum is shared with the Federal Government, coordination in this band require resolution data pertaining to potential interference between the earth stations and both Navy Department and NASA systems. Potential interference from the earth station could impact with the Navy and/or NASA systems in two areas. These areas are noted in FCC Report and Order 96-377 dated September 1996, and consist of (1) Radiolocation and radio navigation, (2) Data Relay Satellites.

Summary of Coordination Issues:

- 1) Potential Impact to Government Radiolocation (Shipboard Radar)
- 2) Potential Impact to NASA Data Relay Satellite Systems (TDRSS)

2. Potential Impact to Government Radiolocation (Shipboard Radar)

Radiolocation operations (RADAR) may occur anywhere in the 13.4 - 14 GHz frequency band aboard ocean going United States Navy ships. The Federal Communication Commission (FCC) order 96-377 allocates the top 250 MHz of this 600 MHz band to the Fixed Satellite Service (FSS) on a co-primary basis with the radiolocation operations and provides for an interference protection level of $-167 \text{ dBW/m}^2/4 \text{ kHz}$.

The closest distance to the shoreline from the Hagerstown earth station is approximately 131km south-east toward the Atlantic Ocean. The calculation of the power spectral density at this distance is given by:

- | | |
|------------------------------|-----------------------|
| 1. Clear Sky EIRP: | 88 dBW |
| 2. Carrier Bandwidth: | 1300 kHz |
| 3. PD at antenna input: | 0.4dBW/4kHz |
| 4. Transmit Antenna Gain: | 62.5dBi |
| 5. Antenna Gain Horizon: | FCC Reference Pattern |
| 6. Antenna Elevation Angles: | 5° |

The earth station will radiate interference toward the ocean according to its off-axis side-lobe performance. A conservative analysis, using FCC standard reference pattern, results in off-axis antenna gain of 13.5 dBi towards the Atlantic Ocean.

The signal density at the shoreline, through free space is:

$$\begin{aligned} \text{PFD} &= \text{Antenna Feed Power density (dBW/4kHz)} + \text{Antenna Off-Axis Gain (dBi)} - \text{Spread Loss (dB-m}^2\text{)} \\ &= \text{dBW/4kHz} + 13.5 \text{ dBi} - 10 \cdot \log[4\pi \cdot (131000\text{m})^2] \\ &= -99.5 \text{ dBW/ m}^2/4 \text{ kHz} + \text{Additional Path Losses (~69 dB)} \end{aligned}$$

Our calculations indicate additional path loss of approximately 69.0 dB including absorption loss and earth diffraction loss for the actual path profiles from the earth station to the nearest shoreline.

The calculated PFD, including additional path losses to the closest shoreline, is -168.5 dBW/m²/4 kHz. This is 1.5 dB below the -167 dBW/m²/4 kHz interference criteria of the R&O 96-377. Therefore, there should be no interference to the US Navy RADAR from the Hagerstown earth station due to the distance and the terrain blockage between the site and the shore.

3. Potential Impact to NASA's Tracking and Data Relay Satellite System (TDRSS)

The geographic location of the Intelsat License LLC earth station in Hagerstown, Maryland is outside the 390 km radius coordination contour surrounding NASA's White Sands, New Mexico ground station complex. Therefore, the TDRSS space-to-earth link will not be impacted by the Intelsat License LLC earth station in Hagerstown, Maryland.

The TDRSS space-to-space link in the 13.772 to 13.778 GHz band is assumed to be protected if an earth station produces an EIRP less than 71 dBW/6 MHz in this band. The 14.2 meter earth station antenna will not be operating in 13.772 to 13.778 GHz band and consequently the TDRSS space-to-space link will be protected.

4. Coordination Result Summary and Conclusions

The results of the analysis and calculations performed in this exhibit indicate that compatible operation between the earth station at the Hagerstown, Maryland facility and the US Navy and NASA systems space-to-earth link are possible. These analyses have been based on the assumption of 1300 kHz bandwidth carriers. No interference to US Navy RADAR operations, TDRSS space-to-earth link, or TDRSS space-to-space link will occur from the Hagerstown, Maryland site earth station.

Exhibit B

PETITION FOR WAIVER OF SECTIONS 25.137 AND 25.114

Pursuant to Section 25.137 of the Federal Communications Commission's ("Commission" or "FCC") rules, earth station applicants "requesting authority to operate with a non-U.S. licensed space station *to serve the United States*" must demonstrate that effective competitive opportunities exist and must provide the same technical information required by Section 25.114 for U.S.-licensed space stations.¹ Intelsat License LLC ("Intelsat") herein seeks authority to provide launch and early orbit phase ("LEOP") services—not commercial services—to the United States, and thus believes that Section 25.137 does not apply.²

To the extent the Commission determines, however, that Intelsat's request for authority to provide LEOP services on a special temporary basis is a request to serve the United States with a non U.S.-licensed satellite, Intelsat respectfully requests a waiver of Sections 25.137 and 25.114 of the Commission's rules.³ The Commission may grant a waiver for good cause shown.⁴ The Commission typically grants a waiver where the particular facts make strict compliance inconsistent with the public interest.⁵ In granting a waiver, the Commission may take into account considerations of hardship, equity, or more effective implementation of overall policy on an individual basis.⁶ Waiver is therefore appropriate if special circumstances warrant a deviation from the general rule, and such a deviation will serve the public interest.

In this case, good cause exists for a waiver of both Section 25.137 and Section 25.114. With respect to Section 25.114, Intelsat seeks authority only to provide LEOP services for the SES-9 satellite. The information sought by Section 25.114 is not relevant to LEOP services. Moreover, Intelsat does not have—and would not easily be able to obtain—such information because Intelsat is not the operator of the SES-9 satellite, nor is Intelsat in contractual privity with that operator. Rather, an affiliate of Intelsat has a contract with Boeing, the manufacturer of the SES-9 satellite, to conduct LEOP services for the satellite.

¹ 47 C.F.R. § 25.137 (emphasis added).

² See *EchoStar Satellite Operating Company Application for Special Temporary Authority Related to Moving the EchoStar 6 Satellite from the 77° W.L. Orbital Location to the 96.2° W.L. Orbital Location, and to Operate at the 96.2° W.L. Orbital Location*, DA 13-593, File No. SAT-STA-20130220-00023 (released Apr. 1, 2013) (noting that operating TT&C earth stations in the United States with a foreign-licensed satellite does not constitute "DBS service").

³ 47 C.F.R. §§ 25.137 and 25.114.

⁴ 47 C.F.R. § 1.3.

⁵ *N.E. Cellular Tel. Co. v. FCC*, 897 F.2d 1164, 1166 (D.C. Cir. 1990) ("*Northeast Cellular*").

⁶ *WAIT Radio v. FCC*, 418 F.2d 1153, 1159 (D.C. Cir. 1969); *Northeast Cellular*, 897 F.2d at 1166.

The information that Intelsat is not including is not required to determine potential harmful interference. The Schedule S information for this satellite would pertain to the operation of the SES-9 satellite at its final orbital location. However, the present application for LEOP services involves communications *prior* to the satellite attaining its final location in the geostationary orbit. In other words, during the LEOP mission, the earth station will not be communicating with a satellite located in the geostationary orbit. Rather, it will be transmitting to a satellite traveling on its “transfer orbit” or “LEOP path,” which starts immediately following its separation from a launch vehicle, and ends when the satellite reaches its geostationary orbital location. Moreover, as with any STA, Intelsat will perform the LEOP services on a non-interference basis.

Because it is not relevant to the service for which Intelsat seeks authorization, and because obtaining the information would be a hardship, Intelsat seeks a waiver of all the information required by Section 25.114. Intelsat has provided in this STA request the required technical information that is relevant to the LEOP services for which Intelsat seeks authorization.

Good cause also exists to waive Section 25.137. Section 25.137 is designed to ensure that “U.S.-licensed satellite systems have effective competitive opportunities to provide analogous services” in other countries. Here, there is no service being provided by the satellite; it is simply being placed in its orbital location after separating from the launch vehicle. Thus, the purpose of the information required by Section 25.137 is not implicated here. For example, Section 25.137(d) requires earth station applicants requesting authority to operate with a non-U.S.-licensed space station that is not in orbit and operating to post a bond.⁷ The underlying purpose in having to post a bond—*i.e.*, to prevent warehousing of orbital locations by operators seeking to serve the United States—would not be served by requiring Intelsat to post a bond in order to provide approximately ten days of LEOP services to the SES-9 satellite.

It is Intelsat’s understanding that SES-9 is licensed by Gibraltar, which is an Overseas Territory of the United Kingdom, a WTO-member country. Thus, the purposes of Section 25.137—to ensure that U.S. satellite operators enjoy “effective competitive opportunities” to serve foreign markets and to prevent warehousing of orbital locations serving the United States—will not be undermined by grant of this waiver request.

⁷ See 47 C.F.R. §25.137(d)(4).

Exhibit C

REQUEST FOR WAIVER OF FOOTNOTE 2 OF SECTION 25.202(a)(1) AND FOOTNOTE NG 104 OF THE U.S. TABLE OF ALLOCATIONS

To the extent necessary, Intelsat requests waiver of 1) Section 25.202(a)(1), which restricts the use of the 12200-12700 MHz band to the Fixed and Broadcast Satellite services, and 2) Section 25.202(a)(1), footnote 2 and footnote NG104 of the U.S. Table of Allocations,¹ which restrict the use of the 10700-11700 MHz band by the non-federal fixed satellite service in the geostationary orbit to international systems only.²

Good cause exists to waive the allocation of the 12200-12700 MHz frequency band to the Fixed and Broadcast Satellite services to allow use of the telemetry link for the SES-9 satellite. The power level of the SES-9 telemetry signal will be very low in comparison to the emissions from a BSS satellite and should not cause harmful interference. Intelsat is coordinating with potentially affected BSS operators to ensure their protection.

Good cause also exists to waive the international systems only requirements for the 10700-11700 MHz. The purposes of Section 25.202(a)(1) and NG104 and footnote 2 of Section 25.202(a)(1) are to harmonize the use of spectrum and thereby reduce harmful interference to allocated services and to limit the number of fixed satellite service earth stations with which the co-primary fixed service would need to coordinate.³ Intelsat will provide launch and early orbit phase (“LEOP”) service in these frequency bands only on a non-interference/non-protected basis and, therefore, will not need to coordinate with fixed service stations or broadcast satellite.

Moreover, grant of this waiver is consistent with the Commission’s precedent. A waiver of the U.S. Table of Allocations is generally granted “when there is little potential interference into any service authorized under the Table of Frequency allocations and when the nonconforming operator accepts any interference from authorized services.”⁴ The International Bureau has found that waiving NG104 and footnote 2 of Section 25.202(a)(1) would not undermine the purpose of the rules if the party seeking a waiver: (2) will be utilizing earth stations that are receive-only in these bands and thus “not capable of causing interference into FS stations”

¹ 47 C.F.R. §§ 25.202(a)(1).

² See 47 C.F.R. §§ 25.202(a)(1), fn. 2 and 2.106, fn. NG 104.

³ See *Satellite Services*, 26 RR 2d at 1263-65 (1973). See also *EchoStar KuX Corporation Application for Authority to Construct, Launch and Operate a Geostationary Satellite Using the Extended Ku-band Frequencies in the Fixed-Satellite Service at the 83° W.L. Orbital Location*, Order and Authorization, DA 04-3162, 9 (Int’l Bur., Sept. 30, 2004) (“EchoStar 83° Waiver”).

⁴ See *The Boeing Company*, Order and Authorization, 16 FCC Rcd 22645, 22651 (Int’l Bur. & OET 2001); *Application of Fugro-Chance, Inc. for Blanket Authority to Construct and Operate a Private Network of Receive-Only Mobile Earth Stations*, Order and Authorization, 10 FCC Rcd 2860 (Int’l Bur. 1995) (authorizing MSS in the C-band); see also *Application of Motorola Satellite Communications, Inc. for Modification of License*, Order and Authorization, 11 FCC Rcd 13952-13956 (Int’l Bur. 1996) (authorizing service to fixed terminals in bands allocated the mobile satellite service).

operating in the bands and (2) agrees “to accept any level of interference from FS stations” into its receiving earth stations.”⁵ Intelsat satisfies these criteria. The earth stations operating in the 10700-11700 MHz band purposes of the SES-9 LEOP mission will not transmit in these bands and Intelsat agrees to accept any level of interference into these earth stations from fixed service stations in the band. Accordingly, the earth stations operating in these bands pose no interference concerns with respect to co-frequency fixed service stations.

Finally, Intelsat notes that it expects to operate with the SES-9 satellite using its U.S. earth stations only for a period of approximately ten days. Given these particular facts, the waiver sought herein is plainly appropriate.

⁵ EchoStar 83° Waiver, ¶ 13.