

# Exhibit A

Prepared By

## COMSEARCH

19700 Janelia Farm Boulevard, Ashburn, VA 20147  
(703)726-5500 <http://www.comsearch.com>

Prepared For

### Intelsat License LLC Hagerstown, Maryland

Temporary Transmit-Only Earth Station  
Operation Dates: 02/14/2017 - 03/16/2017

Pursuant to Part 25.203(c) of the FCC Rules and Regulations, the satellite earth station proposed in this application was coordinated by Comsearch using computer techniques and in accordance with Part 25 of the FCC Rules and Regulations. Verbal and written coordination was conducted with the below listed carriers on December 21, 2016.

#### Company

3G Wireless, LLC  
ACC License, LLC  
AERIAL VIDEO SYSTEMS  
Alascom Inc  
American Broadcasting Companies, Inc.  
Antietam Cable Television  
Ascent Media Network Services, LLC  
Bellsouth Telecommunications, Inc.  
Borgeson, Tom R.  
Broadcast Sports Inc.  
C-SPAN  
CBS TELEVISION LICENSES LLC  
CNN America, Inc.  
CTVN HARRISBURG, LLC  
Carolina Telephone and Telegraph Co  
Casper, John  
CenturyTel of the Southwest, Inc.  
Channel Communications, LLC (WHVL)  
Chicago Comnet Corp  
Cincinnati Bell Wireless LLC  
Citywide News Network, Inc.  
Cohen, Elena  
Cowboys Stadium LP  
DCI II, INC.  
Direct Broadcast Services, Inc.  
F Corporation  
Federal Communication Commission  
GEORGE MASON UNIVERSITY INSTR FNDTION  
Global Telecom & Technology Americas, In  
Goodyear Tire & Rubber Company  
HF Enterprises, Inc  
HOWARD UNIVERSITY TELEVISION - (WHUT-TV)  
Hallco Unlimited, Inc.  
Hawaiian Telcom, Inc.  
Heiden, William  
Illinois Bell Telephone Company

Indiana Bell Telephone Company  
Information & Display Systems, Inc.  
Information Super Station, LLC  
International Communications Group, Inc.  
Kentucky RSA #3 Cellular General Partner  
Kentucky RSA #4 Cellular General Partner  
MERCURY COMMUNICATIONS  
Maryland Public Broadcasting Commission  
Media General Communications Holdings, L  
Michigan Bell Telephone Company  
Moreen, Steven K  
Multimedia Holdings Corporation  
NBC Telemundo License LLC  
NEW ENGLAND DIGITAL DISTRIBUTION, INC.  
NEW ENGLAND SATELLITE SYSTEMS INC  
NSM Surveillance  
National Cable Satellite Corporation  
Navajo Communications Company  
NorthWest Suburbs Community Access Corp  
OHIO BELL TELEPHONE COMPANY  
Onboard Images  
Pacific Bell Tel Com dba AT&T California  
Pacific and Southern Company, Inc.  
Penn Service Microwave Co., Inc.  
Pennsylvania Educational Comm Systems  
Plateau Telecommunications, Inc.  
Plum TV, LLC  
Production & Satellite Services, Inc.  
QUICK LINK CONNECTIONS INC  
Qwest Corporation  
RCC Minnesota Inc. - MN NE ND SD  
REMOTE FACILITIES CONSULTING SERVICES  
RF Central, LLC  
RF Film, Inc  
Radiofone, Inc.  
Randy Hermes Production  
Remote Broadcasts, Inc.  
SBE Coordinator  
Southwestern Bell Telephone L.P.  
Speedshotz, Inc  
TTWN Networks, LLC  
Unisat, Inc.  
United Telephone - Southeast  
VERIZON SOUTH INC.  
Verizon California Inc.  
Verizon Maryland, Inc.  
Verizon New England Inc.  
Verizon New Jersey, Inc.  
Verizon New York, Inc.  
Verizon North Inc.  
Verizon Northwest Inc.  
Verizon Pennsylvania, Inc.  
Verizon Virginia, Inc.  
Verizon Washington DC, Inc.  
Village Video Productions Inc  
Vyvx, LLC

WBAL HEARST-ARGYLE TV, INC. (CA CORP.)  
WDCW, LLC  
WGAL Hearst Television, Inc  
WHP Licensee, LLC  
WHYY, Inc.  
WITF Inc.  
WJAC Licensee, LLC  
WPXI, LLC  
WUSA-TV, Inc  
West Virginia Educational Broadcasting  
West Virginia Media Holdings, LLC  
Westar Satellite Services LP  
Western Technical Services  
Wexler Video, Inc.  
Winged Vision Inc  
Wisconsin Bell Telephone Company  
Wolfe Air Aviation

There are no unresolved interference objections with the station contained in these applications.

The following section presents the data pertinent to frequency coordination of the earth station that was circulated to all carriers within its coordination contours.

# COMSEARCH

## Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147  
(703)726-5500 <http://www.comsearch.com>

Date: 12/21/2016  
Job Number: 161221COMSGE02

---

### Administrative Information

Status TEMPORARY (Operation from 02/14/2017 to 03/16/2017)  
Call Sign TEMP03  
Licensee Code INTELS  
Licensee Name Intelsat License LLC

---

### Site Information HAGERSTOWN, MD

Venue Name  
Latitude (NAD 83) 39° 35' 54.6" N  
Longitude (NAD 83) 77° 45' 33.0" W  
Climate Zone A  
Rain Zone 2  
Ground Elevation (AMSL) 174.65 m / 573.0 ft

---

### Link Information

Satellite Type Geostationary  
Mode TO - Transmit-Only  
Modulation Digital  
Satellite Arc 6° W to 149° West Longitude  
Azimuth Range 101.9° to 257.8°  
Corresponding Elevation Angles 5.3° / 5.7°  
Antenna Centerline (AGL) 9.45 m / 31.0 ft

---

### Antenna Information Transmit - FCC32

Manufacturer TIW  
Model 14.2 Meter  
Gain / Diameter 65.1 dBi / 14.2 m  
3-dB / 15-dB Beamwidth 0.10° / 0.20°

Max Available RF Power (dBW/4 kHz) -0.8  
(dBW/MHz) 23.2

Maximum EIRP (dBW/4 kHz) 64.3  
(dBW/MHz) 88.3

Interference Objectives: Long Term -154.0 dBW/4 kHz 20%  
Short Term -131.0 dBW/4 kHz 0.0025%

---

### Frequency Information Transmit 13.0 GHz

Emission / Frequency Range (MHz) 950KFXD / 13249.5, 14498.0

Max Great Circle Coordination Distance 504.2 km / 313.2 mi  
Precipitation Scatter Contour Radius 224.4 km / 139.4 mi

<b>Coordination Values</b>	<b>HAGERSTOWN, MD</b>
Licensee Name	Intelsat License LLC
Latitude (NAD 83)	39° 35' 54.6" N
Longitude (NAD 83)	77° 45' 33.0" W
Ground Elevation (AMSL)	174.65 m / 573.0 ft
Antenna Centerline (AGL)	9.45 m / 31.0 ft
Antenna Model	TIW 14.2 Meter
Antenna Mode	Transmit 13.0 GHz
Interference Objectives: Long Term	-154.0 dBW/4 kHz 20%
Short Term	-131.0 dBW/4 kHz 0.0025%
Max Available RF Power	-0.8 (dBW/4 kHz)

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Transmit 13.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)
0	0.00	101.81	-10.00	168.61
5	0.00	96.84	-10.00	168.61
10	0.00	91.86	-10.00	168.61
15	0.00	86.88	-10.00	168.61
20	0.00	81.90	-10.00	168.61
25	0.00	76.92	-10.00	168.61
30	0.00	71.95	-10.00	168.61
35	0.00	66.97	-10.00	168.61
40	0.00	62.00	-10.00	168.61
45	0.00	57.03	-10.00	168.61
50	0.00	52.06	-10.00	168.61
55	0.00	47.09	-9.82	169.29
60	0.00	42.14	-8.62	173.94
65	0.00	37.19	-7.26	179.11
70	0.00	32.26	-5.72	184.92
75	0.00	27.34	-3.92	191.59
80	0.00	22.47	-1.79	199.39
85	0.00	17.65	0.83	207.25
90	0.00	12.98	4.17	220.55
95	0.00	8.66	8.56	239.88
100	0.00	5.61	13.27	504.16
105	0.00	6.15	12.28	334.85
110	0.00	9.60	7.45	234.79
115	0.00	13.27	3.93	219.54
120	0.00	16.89	1.31	209.08
125	0.00	20.41	-0.75	201.40
130	0.00	23.83	-2.43	197.07
135	0.00	27.11	-3.83	191.93
140	0.00	30.23	-5.01	187.56
145	0.00	33.14	-6.01	183.82
150	0.00	35.82	-6.85	180.65
155	0.00	38.20	-7.55	178.00
160	0.00	40.26	-8.12	175.83
165	0.00	41.93	-8.56	174.15
170	0.00	43.16	-8.88	172.94
175	0.00	43.92	-9.07	172.22
180	0.00	44.18	-9.13	171.97
185	0.00	43.92	-9.07	172.21

<b>Coordination Values</b>	<b>HAGERSTOWN, MD</b>
Licensee Name	Intelsat License LLC
Latitude (NAD 83)	39° 35' 54.6" N
Longitude (NAD 83)	77° 45' 33.0" W
Ground Elevation (AMSL)	174.65 m / 573.0 ft
Antenna Centerline (AGL)	9.45 m / 31.0 ft
Antenna Model	TIW 14.2 Meter
Antenna Mode	Transmit 13.0 GHz
Interference Objectives: Long Term	-154.0 dBW/4 kHz 20%
Short Term	-131.0 dBW/4 kHz 0.0025%
Max Available RF Power	-0.8 (dBW/4 kHz)

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Transmit 13.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)
190	0.00	43.16	-8.88	172.94
195	0.00	41.93	-8.56	174.15
200	0.00	40.26	-8.12	175.84
205	0.00	38.20	-7.55	178.00
210	0.00	35.81	-6.85	180.65
215	0.00	33.14	-6.01	183.83
220	0.00	30.22	-5.01	187.56
225	0.00	27.11	-3.83	191.93
230	0.00	23.83	-2.43	197.06
235	0.00	20.42	-0.75	201.39
240	0.00	16.89	1.31	209.10
245	0.00	13.28	3.92	219.53
250	0.00	9.59	7.46	234.84
255	0.00	6.33	11.96	346.58
260	0.00	6.11	12.35	482.94
265	0.00	9.18	7.93	236.97
270	0.00	13.46	3.77	218.91
275	0.00	18.11	0.55	206.21
280	0.00	22.90	-2.00	198.64
285	0.00	27.76	-4.09	190.98
290	0.00	32.66	-5.85	184.42
295	0.00	37.59	-7.38	178.67
300	0.00	42.53	-8.72	173.56
305	0.00	47.48	-9.91	168.95
310	0.00	52.44	-10.00	168.61
315	0.00	57.40	-10.00	168.61
320	0.00	62.37	-10.00	168.61
325	0.00	67.34	-10.00	168.61
330	0.00	72.31	-10.00	168.61
335	0.00	77.28	-10.00	168.61
340	0.00	82.26	-10.00	168.61
345	0.00	87.23	-10.00	168.61
350	0.00	92.21	-10.00	168.61
355	0.00	97.18	-10.00	168.61



## Exhibit B

### Request for Waiver of Footnote NG52 of Section 25.202(a)(1) of the U.S. Table of Allocations

To the extent necessary, Intelsat requests a waiver of the footnote NG52 to the U.S. Table of Frequency Allocations, which limits the use of the SKY-B1 MHz frequency band to “international systems.”<sup>1</sup> Intelsat seeks waiver to permit the Hagerstown, Maryland earth station KA258 to communicate with the 10700-11700 MHz satellite during launch and early orbit phase (“LEOP”) and in-orbit testing (“IOT”).

The Commission may grant a waiver for good cause shown.<sup>2</sup> The Commission typically grants a waiver where the particular facts make strict compliance inconsistent with the public interest.<sup>3</sup> 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.<sup>4</sup> Waiver is therefore appropriate if special circumstances warrant a deviation from the general rule, and such a deviation will serve the public interest. As shown below, good cause exists here to grant a waiver allowing KA258 to provide telemetry, tracking, and control (“TT&C”) and IOT services to the SKY-B1 satellite using frequencies in the 10700-11700 MHz band.

Good cause exists to waive the international only requirements for the 10700-11700 MHz frequency band. The purpose of NG52 is to limit the number of the FSS service earth stations with which the co-primary fixed service would need to coordinate.<sup>5</sup> The requested frequencies in the 10700-11700 MHz band is used only for downlink and therefore will not cause harmful interference to fixed service stations and will not need to coordinate with fixed service stations. Moreover, no service being provided by the satellite; it is simply being placed in its orbital location after separating from the launch vehicle and being tested in-orbit.

Grant of this waiver is consistent with the Commission’s precedent. A waiver of the 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.”<sup>6</sup> The International Bureau has found that

---

<sup>1</sup> See 47 C.F.R. § 2.106 fn. NG52.

<sup>2</sup> 47 C.F.R. §1.3.

<sup>3</sup> *N.E. Cellular Tel. Co. v. FCC*, 897 F.2d 1164, 1166 (D.C. Cir. 1990) (“*Northeast Cellular*”).

<sup>4</sup> *WAIT Radio v. FCC*, 418 F.2d 1153, 1159 (D.C. Cir. 1969); *Northeast Cellular*, 897 F.2d at 1166.

<sup>5</sup> See *Satellite Services*, 26 RR 2d 1257, 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*”).

<sup>6</sup> 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.*



waiving the international only requirement would not undermine the purpose of the rules if the party seeking a waiver will be utilizing earth stations that are receive-only in these bands and thus “not capable of causing interference into FS stations” operating in the bands.<sup>7</sup> KA258 will not transmit in the 10700-11700 MHz frequency band and Intelsat agrees to accept any level of interference into those earth stations from fixed service stations in the band. Accordingly, the antenna providing LEOP and IOT services in the 10700-11700 MHz band poses no interference concerns with respect to co-frequency fixed service stations.

Given these particular facts, the waiver sought herein is plainly appropriate.

---

*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).

<sup>7</sup> EchoStar 83° Waiver, ¶ 13.

# Exhibit C

Intelsat Licence LLC  
Hagerstown, Maryland

## TIW/14.2 KFA 14.2m Meter Earth Station

### 1. Background

This Exhibit is presented to demonstrate the extent to which the Intelsat License LLC ("Intelsat") satellite earth station in Hagerstown, Maryland is in compliance with the Federal Communications Commission ("FCC") Report and Order 96-377. The potential interference from the earth station to U.S. Navy shipboard radiolocation operations ("RADAR") and the National Aeronautics and Space Administration ("NASA") space research activities in the 13.75-14.0 GHz band is addressed in this exhibit. The parameters for the earth station are:

Coordinates (NAD83):	39° 35' 54.6" N, 77° 45' 33" W
Satellite Location for Earth Station:	IS-32e at 149°W to 6°W
Frequency Band:	13.75-14.00 GHz
Polarizations:	Linear
Emissions:	800KF2D
Modulation:	FM/PCM/PSK
Maximum Aggregate Uplink EIRP:	88dBW for all Carriers
<b>Transmit Antenna Characteristics</b>	
Antenna Size:	14.2m Meters in Diameter
Antenna Type/Model:	TIW/14.2 KFA
Gain:	65.1 dBi
RF Power into Antenna Flange:	22.9 dBW or -0.1 dBW/4kHz
Minimum Elevation Angle:	5.69° @ 257.78° Azimuth 5.29° @ 86° Azimuth
Side Lobe Antenna Gain	FCC Reference Pattern

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

### Summary of Coordination Issues:

- a.) Potential Impact to Government Radiolocation (Shipboard Radar)
- b.) Potential Impact to NASA Tracking and Data Relay Satellite Systems ("TDRSS")

## 2. Potential Impact to Government Radiolocation (Shipboard Radar)

Radiolocation operations ("RADAR") may occur anywhere in the 13.4-14.0 GHz frequency band aboard ocean-going U.S. Navy ships. FCC order 96-377 allocates the top 250MHz 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 Hagerstown, Maryland earth station is approximately 131 km. The calculation of the power spectral density at this distance is given by:

1. Clear Sky EIRP:	88 dBW
2. Carrier Bandwidth:	800 kHz
3. PD at antenna input:	-0.1 dBW/4kHz
4. Transmit Antenna Gain:	65.1 dBi
5. Antenna Gain to Horizon:	10.1 dBi
6. Antenna Elevation Angles:	5.7° @ 257.8° azimuth 5.3° @ 86° azimuth

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 an off-axis antenna gain of 10.1 towards the nearest shoreline.

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

$$\begin{aligned} \text{PFD} &= \text{Antenna Feed Power density (dBW/4kHz)} + \text{Antenna Off-Axis Gain (dBi)} - \text{Spread Loss (dBW/m}^2\text{)} \\ &= -0.1\text{dBW/4kHz} + 10.1\text{dBi} - (10*\log[4*\text{PI}*[131\text{km}]^2]) \\ &= -103.3 \text{ dBW/m/4kHz} - \text{Additional Path Losses (69 dB)} \end{aligned}$$

Our calculation indicate additional path loss of approximately 69 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  $-172.3 \text{ dBW/m}^2/4 \text{ kHz}$ . This is 5.3dB below the  $-167.0 \text{ dBW/m}^2/4 \text{ kHz}$  interference criteria of the R&O 96-377. Therefore, there should be no interference to the U.S. Navy RADAR from the Hagerstown, Maryland 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

The geographic location of the Intelsat 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 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 of less than 71 dBW/6MHz in this band. The 14.2m meter earth station antenna will not transmit in this band. Therefore, there will be no potential interference to the TDRSS space-to-space link.

#### **4. Coordination Result Summary and Conclusions**

The results of the analysis and calculation performed in this exhibit indicate that compatible operation between the earth station at the Hagerstown, Maryland facility and U.S. Navy and NASA TDRSS space-to-earth and space-to-space links are possible. No interference to U.S. Navy RADAR or NASA TDRSS operations from the Hagerstown, Maryland site earth station should occur.