

File # SES-57A-20181008-03145

Call Sign N1A Grant Date 12/4/2018

(or other identifier)

Term Dates

To: 1/2/2019



APPROVED BY THOMAS J. HARRIS To: 1/2/2019

Approved: Thomas J. Harris

APPLICATION FOR EARTH STATION SPECIAL

APPLICANT INFORMATION

Approved by OMB  
3060-0678

Enter a description of this application to identify it on the main menu:  
Geo-Kompsat-2A

1. Applicant

Name: Universal Space Network, Inc.  
DBA Name:  
Street: 417 Caredean Drive  
Suite A  
City: Horsham  
Country: USA  
Attention: Joanne Greet

Phone Number: 215-328-9130  
Fax Number: 215-328-9132  
E-Mail: jgreet@uspacenet.com  
State: PA  
Zipcode: 19044 -

2. Contact

Name: Universal Space Network  
Company:  
Street: 417 Caredean Drive  
Suite A  
City: Horsham  
Country: USA  
Attention:

Phone Number: 215-328-9130  
Fax Number: 215-328-9132  
E-Mail: jgreet@uspacenet.com  
State: PA  
Zipcode: 16044 -  
Relationship: Same

(If your application is related to an application filed with the Commission, enter either the file number or the IB Submission ID of the related application. Please enter only one.)

3. Reference File Number or Submission ID

provide telemetry, tracking, and command (TT&C) launch and early orbit phase services for the KARI Geo-Kompsat-2A (GK-2A) satellite during its drift to the 128.2° E.L. orbital location.

START DATE: 12/4/2018

END DATE: 1/3/2019

Summary of the Technical Information

File # SES-STA-20181008-03145

Applicant: Universal Space Network  
File No: SES-STA-20181008-03145  
Call Sign: None  
Special Temporary Authority (STA)



Call Sign N/A Grant Date 12/4/2018  
(or other identifier)

Term Dates  
From 12/4/2018 To: 1/3/2018

**Purpose of Operation:**

Universal Space Network requests special temporary beginning December 4, 2018 for 50 days to operate its Naalehu, HI earth station to provide launch and early orbit phase (LEOP) services to the KARI Geo-Kompsat-2A (GK-2A) satellite on the following center frequencies: 2102.458MHz (Earth-to-space) and 2283.212 MHz, (space-to-earth). KARI Geo-Kompsat-2A is licensed by the Korean Aerospace Research Institute (KARI (Korean) and will operate at the 128.2° E.L. orbital location. This support will be conducted for a period of 5 days.

The 24x7 contact information is as follows: Ph.: (808) 929-8069 Naalehu, HI site, and 215-328-9130 remote control in Horsham, PA

Station Location: Naalehu, HI

Lat. and Long: 19° 00' 50.3" N , 155° 39' 46.6" W

46.9 dBi at 2.245 GHz

45.9 dBi at 2.067 GHz

Antenna:	
Antenna size (meters):	13 m
Antenna Gain (dBi):	45.9 dBi at 2.067 GHz
Satellite Arc Range for Earth Station	Per LEOP plan
Input power (watts):	4.1w (6 dBW)
Transmit Frequency (MHz):	2102.458
Receive Frequency (MHz)	2283.212
Emission	200KG2D
EIRP (dBW/ Carrier)	68 dBW/200 KHz
EIRP (dBW/4 KHz )	51.0 dBW/4 KHz

Point of Communications Satellite: KARI Geo-Kompsat-2A

**Attached Documentation**

1. Form 312: Application for Special Temporary Authority
2. Narrative describing their operation
3. Comsearch Coordination Report

**Conditions**

1. Operations shall be on an unprotected, non-interference basis with respect to other authorized stations, including federal stations.
2. Any future requests or extensions will need to submit applications to the FCC to be re-coordinated with NTIA.
3. Any action taken or expense incurred as a result of operations pursuant to this STA is solely at Universal Space Network's risk.

This grant is issued pursuant to Section 0.261 of the Commission's rules on delegated authority, 47 C.F.R. § 0.261, and is effective upon release.

**FCC 312**  
Schedule B

Page 1: Location

**FEDERAL COMMUNICATIONS COMMISSION**  
**APPLICATION FOR SATELLITE SPACE AND EARTH STATION AUTHORIZATIONS**  
**Technical and Operational Description)**

(Place an "X" in one of the blocks below)

License of New Station     Registration of new Domestic Receive-Only Station     Amendment to a Pending Application     Modification of License/Registration     Notification of Minor Modification

**B1. Location of Earth Station Site.** If temporary-fixed, mobile, or VSAT remote facility, specify area of operation and point of contact. If VSAT hub station, give its location. For VSAT networks attach individual Schedule B, Page 1 sheets for each hub station and each remote station. Individually provide the Location, Points of Communications, and Destination Points for each hub and remote station.

B1a. Station Call Sign		B1b. Site identifier (HUB, REMOTE1, etc.)		B1c. Telephone Number		B1j. Geographic Coordinates N/S, Deg - Min - Sec - E/W		B1k. Lat./Lon. Coordinates are:	
		USHI01		(808) 929-8069		Lat. 19° 00' 50.3" N Lon. 155° 39' 46.6" W		<input type="checkbox"/> NAD-27 <input checked="" type="checkbox"/> NAD-83	
B1d. Mailing Street Address of Station or Area of Operation				B1e. Name of Contact Person					
93-1704 South Point Road				Joanne Greet					
B1f. City		B1g. County		B1h. State	B1i. Zip Code		B1l. Site Elevation (AMSL)		
Naalehu		Ka'u		HI	96772-0842		378.0 meters		

**B2. Points of Communications:** List the names and orbit locations of all satellites with which this earth station will communicate. The entry "ALSAT" is sufficient to identify the names and locations of all satellite facilities licensed by the U.S. All non-U.S. licensed satellites must be listed individually.

Satellite Name and Orbit Location	Satellite Name and Orbit Location	Satellite Name and Orbit Location
KARI GK-2A 128.2 degrees east		

**B3. Destination points for communications using non-U.S. licensed satellites.** For each non-U.S. licensed satellite facility identified in section B2 above, specify the destination point(s) (countries) where the services will be provided by this earth station via each non-U.S. license satellite system. Use additional sheets as needed.

Satellite Name	List of Destination Points
GK-2A (GK2-128.2E)	KARI - South Korean Aerospace Research Institute

**FEDERAL COMMUNICATIONS COMMISSION  
APPLICATION FOR SATELLITE SPACE AND EARTH STATION AUTHORIZATIONS  
FCC Form 312 - Schedule B: (Technical and Operational Description)**

**B4. Earth Station Antenna Facilities: Use additional pages as needed.**

(a) Site ID*	(b) Antenna ID**	(c) Quantity	(d) Manufacturer	(e) Model	(f) Antenna Size (meters)	(g) Antenna Gain Transmit and/or Receive (____dBi at ____GHz)
USHI01	HI-13M	1	Datron	1453	13.0	46.9 dBi at 2.245 GHz 45.9 dBi at 2.067 GHz

**B5. Antenna Heights and Maximum Power Limits: (The corresponding Antenna ID in tables B4 and B5 applies to the same antenna)**

(a) Antenna ID**	(b) Antenna Structure Registration No.	Maximum Antenna Height		(e) Building Height Above Ground Level (meters)***	(f) Maximum Antenna Height Above Rooftop (meters)***	(g) Total Input Power at antenna flange (Watts)	(h) Total EIRP for all carriers (dBW)
		(c) Above Ground Level (meters)	(d) Above Mean Sea Level (meters)				
HI-13M		20.0	398.0			200.0	68.9

Notes: \* If this is an application for a VSAT network, identify the site (Item B1b, Schedule B, Page 1) where each antenna is located. Also include this Site-ID on Schedule B, Page 5.  
 \*\* Identify each antenna in VSAT network or multi-antenna station with a unique identifier, such as HUB, REMOTE1, A1, A2, 10M, 12M, 7M, etc. Use this same antenna ID throughout tables B4, B5, B6, and B7 when referring to the same antenna.  
 \*\*\* Attach sketch of site or exemption, See 47 CFR Part 17.





**FEDERAL COMMUNICATIONS COMMISSION  
APPLICATION FOR SATELLITE SPACE AND EARTH STATION AUTHORIZATIONS  
FCC Form 312 - Schedule B: (Technical and Operational Description)**

If VSAT Network, provide the SITE-ID (Item B1b) of the station that B8-B13 are in response to (HUB, REMOTE1, etc.): \_\_\_\_\_

<b>B8. If the proposed antenna(s) operate in the Fixed Satellite Service (FSS) with geostationary satellites, do(es) the proposed antenna(s) comply with the antenna gain patterns specified in Section 25.209(a) and (b) as demonstrated by the manufacturer's qualification measurements? If NO, provide as an exhibit, a technical analysis showing compliance with two-degree spacing policy.</b>	<input type="checkbox"/> YES	<input type="checkbox"/> NO	N/A												
<b>B9. If the proposed antenna(s) do not operate in the Fixed Satellite Service (FSS), or if they operate in the Fixed Satellite Service (FSS) with non-geostationary satellites, do(es) the proposed antenna(s) comply with the antenna gain patterns specified in Section 25.209(a2) and (b) as demonstrated by the manufacturer's qualification measurement?</b>	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO													
<b>B10. Is the facility operated by remote control? If YES, provide the location and telephone number of the control point.</b>	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO													
<b>Remote Control Point Location:</b> <table border="1" style="width:100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td colspan="4" style="padding: 2px;">                     B10a. Street Address                      417 Caredean Drive Suite A                 </td> </tr> <tr> <td style="width:33%; padding: 2px;">                     B10b. City                      Horsham                 </td> <td style="width:20%; padding: 2px;">                     B10c. County                      Montgomery                 </td> <td style="width:20%; padding: 2px;">                     B10 d. State/Country                      PA                 </td> <td style="width:27%; padding: 2px;">                     B10e. Zip Code                      19044                 </td> </tr> <tr> <td style="padding: 2px;">                     B10f. Telephone Number                      215-328-9130                 </td> <td colspan="3" style="padding: 2px;">                     B10g. Call Sign of Control Station (if appropriate)                 </td> </tr> </table>				B10a. Street Address 417 Caredean Drive Suite A				B10b. City Horsham	B10c. County Montgomery	B10 d. State/Country PA	B10e. Zip Code 19044	B10f. Telephone Number 215-328-9130	B10g. Call Sign of Control Station (if appropriate)		
B10a. Street Address 417 Caredean Drive Suite A															
B10b. City Horsham	B10c. County Montgomery	B10 d. State/Country PA	B10e. Zip Code 19044												
B10f. Telephone Number 215-328-9130	B10g. Call Sign of Control Station (if appropriate)														
<b>B11. Is frequency coordination required? If YES, attach a frequency coordination report as an exhibit.</b>	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO													
<b>B12. Is coordination with another country required? If YES, attach the name of the country(ies) and plot of coordination contours as an exhibit.</b>	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO													
<b>B13. FAA Notification - (See 47 CFT Part 17 and 47 CFT Part 25.113(c)) Where FAA notification is required, have you attached a copy of a completed FCC Form 854 and/or the FAA's study regarding the potential hazard of the structure to aviation? FAILURE TO COMPLY WITH 47 CFT PARTS 17 AND 25 WILL RESULT IN THE RETURN OF THIS APPLICATION</b>	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO													

# FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for  
**Universal Space Network, Inc.**  
NAALEHU, HI  
Satellite Earth Station

Prepared By:  
COMSEARCH  
19700 Janelia Farm Boulevard  
Ashburn, VA 20147  
May 29, 2018



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3. SUPPLEMENTAL SHOWING.....	5
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## **1. CONCLUSIONS**

An interference study considering all existing, proposed and prior coordinated microwave facilities within the coordination contours of the proposed earth station demonstrates that this site will operate satisfactorily with the common carrier microwave environment. Further, there will be no restrictions of its operation due to interference considerations.

## **2. SUMMARY OF RESULTS**

A number of great circle interference cases were identified during the interference study of the proposed earth station. Each of the cases, which exceeded the interference objective on a line-of-sight basis, was profiled and the propagation losses estimated using NBS TN101 (Revised) techniques. The losses were found to be sufficient to reduce the signal levels to acceptable magnitudes in every case.

### 3. SUPPLEMENTAL SHOWING

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.

Coordination data for this earth station was sent to the below listed carriers with a letter dated 04/23/2018.

Company

3G Wireless, LLC  
AERIAL VIDEO SYSTEMS  
Alascom Inc  
Ascent Media Network Services, LLC  
Bellsouth Telecommunications, Inc.  
Borgeson, Tom R.  
Broadcast Sports Inc.  
Carolina Telephone and Telegraph Co  
Casper, John  
CenturyTel of the Southwest, Inc.  
Chicago Comnet Corp  
Cincinnati Bell Wireless LLC  
Citywide News Network, Inc.  
Cowboys Stadium LP  
DCI II, INC.  
Direct Broadcast Services, Inc.  
Frontier California Inc.  
Global Telecom & Technology Americas, In  
HF Enterprises, Inc  
Hallco Unlimited, Inc.  
Hawaii Public Television Foundation  
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.  
KHNL/KGMB License Subsidiary, LLC  
KITV, Inc  
Kentucky RSA #3 Cellular General Partner  
Kentucky RSA #4 Cellular General Partner  
MERCURY COMMUNICATIONS  
Michigan Bell Telephone Company  
Moreen, Steven K  
NEW ENGLAND DIGITAL DISTRIBUTION, INC.  
NSM Surveillance  
Navajo Communications Company  
NorthWest Suburbs Community Access Corp  
Ohio Bell Telephone Company  
Onboard Images

Pacific Bell Tel Com dba AT&T California  
Penn Service Microwave Co., Inc.  
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.  
Southwestern Bell Telephone L.P.  
Speedshotz, Inc  
TTWN Networks, LLC  
Unisat, Inc.  
United Telephone - Southeast  
VERIZON SOUTH 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.  
Vyvx, LLC  
Westar Satellite Services LP  
Winged Vision Inc  
Wisconsin Bell Telephone Company  
Wolfe Air Aviation

## **4. EARTH STATION COORDINATION DATA**

This section presents the data pertinent to frequency coordination of the proposed 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: 05/29/2018  
Job Number: 180423COMSGE03

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### Administrative Information

Status ENGINEER PROPOSAL  
Call Sign NAALEHU  
Licensee Code UNSPNE  
Licensee Name Universal Space Network, Inc.

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### Site Information

**NAALEHU, HI**  
Venue Name  
Latitude (NAD 83) 19° 0' 50.3" N  
Longitude (NAD 83) 155° 39' 46.6" W  
Climate Zone C  
Rain Zone 4  
Ground Elevation (AMSL) 355.09 m / 1165.0 ft

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### Link Information

Satellite Type Low Earth Orbit  
Mode TO - Transmit-Only  
Modulation Digital  
Minimum Elevation Angle 5.0°  
Azimuth Range 0.0° to 360°  
Antenna Centerline (AGL) 8.54 m / 28.0 ft

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### Antenna Information

**Transmit - FCC32**  
Manufacturer Datron  
Model 1453  
Gain / Diameter 45.9 dBi / 13.0 m  
3-dB / 15-dB Beamwidth 0.76° / 1.46°

Max Available RF Power (dBW/4 kHz) 5.1  
(dBW/MHz) 29.1

Maximum EIRP (dBW/4 kHz) 51.0  
(dBW/MHz) 75.0  
(dBW) 68.0

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

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### Frequency Information

**Transmit 2.0 GHz**  
Emission / Frequency Range (MHz) 200KG2D / 2102.458

Max Great Circle Coordination Distance 293.2 km / 182.2 mi  
Precipitation Scatter Contour Radius 176.0 km / 109.3 mi

# COMSEARCH

## Earth Station Data Sheet

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

<b>Coordination Values</b>	<b>NAALEHU, HI</b>
Licensee Name	Universal Space Network, Inc.
Latitude (NAD 83)	19° 0' 50.3" N
Longitude (NAD 83)	155° 39' 46.6" W
Ground Elevation (AMSL)	355.09 m / 1165.0 ft
Antenna Centerline (AGL)	8.54 m / 28.0 ft
Antenna Model	Datron 13 meter
Antenna Mode	Transmit 2.0 GHz
Interference Objectives: Long Term	-154.0 dBW/4 kHz 20%
Short Term	-131.0 dBW/4 kHz 0.0025%
Max Available RF Power	5.1 (dBW/4 kHz)

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Transmit 2.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)
0	2.94	76.42	4.50	293.25
5	2.79	74.70	4.50	293.25
10	2.59	73.03	4.50	293.25
15	2.48	71.52	4.50	293.25
20	2.30	70.08	4.50	293.25
25	2.09	68.75	4.50	293.25
30	1.85	67.52	4.50	293.25
35	1.08	65.97	4.50	293.25
40	0.70	64.92	4.50	293.25
45	0.44	64.17	4.50	293.25
50	0.00	63.44	4.50	293.25
55	0.00	63.37	4.50	293.25
60	0.00	63.51	4.50	293.25
65	0.00	63.87	4.50	293.25
70	0.00	64.44	4.50	293.25
75	0.00	65.22	4.50	293.25
80	0.00	66.19	4.50	293.25
85	0.00	67.34	4.50	293.25
90	0.00	68.67	4.50	293.25
95	0.00	70.15	4.50	293.25
100	0.00	71.77	4.50	293.25
105	0.00	73.53	4.50	293.25
110	0.00	75.39	4.50	293.25
115	0.00	77.35	4.50	293.25
120	0.00	79.39	4.50	293.25
125	0.00	81.51	4.50	293.25
130	0.00	83.67	4.50	293.25
135	0.00	85.87	4.50	293.25
140	0.00	88.10	4.50	293.25
145	0.00	90.34	4.50	293.25
150	0.00	92.58	4.50	293.25
155	0.00	94.80	4.50	293.25
160	0.00	96.99	4.50	293.25
165	0.00	99.14	4.50	293.25
170	0.00	101.24	4.50	293.25
175	0.00	103.26	4.50	293.25
180	0.00	105.19	4.50	293.25
185	0.00	107.02	4.50	293.25



# COMSEARCH

## Earth Station Data Sheet

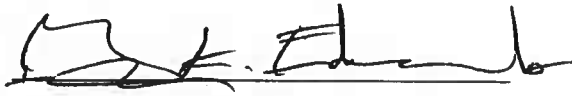
19700 Janelia Farm Boulevard, Ashburn, VA 20147  
(703)726-5500 <http://www.comsearch.com>

<b>Coordination Values</b>	<b>NAALEHU, HI</b>
Licensee Name	Universal Space Network, Inc.
Latitude (NAD 83)	19° 0' 50.3" N
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Antenna Centerline (AGL)	8.54 m / 28.0 ft
Antenna Model	Datron 13 meter
Antenna Mode	Transmit 2.0 GHz
Interference Objectives: Long Term	-154.0 dBW/4 kHz 20%
Short Term	-131.0 dBW/4 kHz 0.0025%
Max Available RF Power	5.1 (dBW/4 kHz)

			Transmit 2.0 GHz	
Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
190	0.00	108.73	4.50	293.25
195	0.00	110.32	4.50	293.25
200	0.00	111.75	4.50	293.25
205	0.00	113.03	4.50	293.25
210	0.00	114.13	4.50	293.25
215	0.21	114.85	4.50	293.25
220	0.32	115.45	4.50	293.25
225	0.47	115.80	4.50	293.25
230	0.68	115.88	4.50	293.25
235	0.87	115.76	4.50	293.25
240	1.06	115.43	4.50	293.25
245	1.28	114.88	4.50	293.25
250	1.44	114.18	4.50	293.25
255	1.62	113.29	4.50	293.25
260	1.74	112.28	4.50	293.25
265	1.92	111.06	4.50	293.25
270	2.05	109.73	4.50	293.25
275	2.21	108.25	4.50	293.25
280	2.34	106.68	4.50	293.25
285	2.40	105.05	4.50	293.25
290	2.42	103.34	4.50	293.25
295	2.42	101.56	4.50	293.25
300	2.41	99.70	4.50	293.25
305	2.41	97.77	4.50	293.25
310	2.36	95.80	4.50	293.25
315	2.52	93.76	4.50	293.25
320	2.62	91.72	4.50	293.25
325	2.69	89.69	4.50	293.25
330	2.80	87.68	4.50	293.25
335	2.86	85.68	4.50	293.25
340	2.90	83.72	4.50	293.25
345	2.95	81.81	4.50	293.25
350	3.34	80.10	4.50	293.25
355	3.11	78.22	4.50	293.25

## 5. CERTIFICATION

I HEREBY CERTIFY THAT I AM THE TECHNICALLY QUALIFIED PERSON RESPONSIBLE FOR THE PREPARATION OF THE FREQUENCY COORDINATION DATA CONTAINED IN THIS APPLICATION, THAT I AM FAMILIAR WITH PARTS 101 AND 25 OF THE FCC RULES AND REGULATIONS, THAT I HAVE EITHER PREPARED OR REVIEWED THE FREQUENCY COORDINATION DATA SUBMITTED WITH THIS APPLICATION, AND THAT IT IS COMPLETE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

BY: 

Gary K. Edwards  
Senior Manager  
COMSEARCH  
19700 Janelia Farm Boulevard  
Ashburn, VA 20147

DATED: May 29, 2018

**Exhibit C**  
**PETITION FOR WAIVER OF SECTION 25.137 AND 25.114 AND OF**  
**THE U.S. TABLE OF FREQUENCY ALLOCATIONS**

**I. TO THE EXTENT THEY APPLY, GOOD CAUSE EXISTS FOR A WAIVER OF CERTAIN PORTIONS OF SECTIONS 25.137 AND 25.114**

Universal Space Network, Inc. (USN) is provided limited legal and technical information for the Geo-Kompsat-2A (GK-2A), meteorological and communications Satellite.<sup>1</sup> Pursuant to Section 25.137 of the Federal Communications Commission's ("Commission" or "FCC") rules, the same technical information required by Section 25.114 for U.S.-licensed space station, and certain legal information, must be submitted by earth station applicants "requesting authority to operate with a non-U.S. licensed space station to serve the United States..."<sup>2</sup> USN seeks authority to support the needed Telemetry, Tracking, and Control ("TT&C") during the LEOP orbit raising support of the Geo-Kompsat-2A (GK-2A) spacecraft from launch to geosynchronous parking orbit, not commercial service to the United States, and thus believes that Section 25.137 does not apply.

To the extent the Commission determines, however, that USN's request for authority to provide LEOP orbit raising on a special temporary basis is a request to serve the United States with a non-U.S.-licensed satellite, USN respectfully requests a waiver of Sections 25.137 and 25.114 of the Commission's rules, to the extent that USN has not herein provided the information required by these rules.<sup>3</sup> The Commission may grant a waiver for good cause shown.<sup>4</sup> A 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 for a waiver of portions of Section 25.114 exists. USN seeks authority only to conduct LEOP orbit raising support for Geo-Kompsat-2A (GK-2A). Thus, any information sought by Section 25.114 that is not relevant to the LEOP – e.g., antenna patterns, energy and propulsion and orbital debris - USN does not have. In addition, USN would not easily be able to obtain such information because USN is not the operator of the Geo-Kompsat-2A (GK-2A) satellites, nor is USN in contractual privity with that operator. Rather, USN has contracted with Swedish Space Corporation, Solona Sweden (SSC) to support the orbit raising LEOP portion in S-Band of the satellite prior to its operation.

As evidenced by the Comsearch report attached to this request, USN has coordinated the LEOP of the Geo-Kompsat-2A (GK-2A) satellites with potentially affected terrestrial operators. Moreover, as with any STA, USN will conduct the LEOP on an unprotected, non-interference basis to government operations.

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<sup>1</sup> FCC Form 312 Section B

<sup>2</sup> 47 C.F.R. § 25.137(a)

<sup>3</sup> 47 C.F.R. §§25.137 and 25.114

<sup>4</sup> 47 C.F.R. §1.3

Because it is not relevant to the service for which USN seeks authorization, and because obtaining the information would be a hardship, USN seeks a waiver of all the technical and legal information required by Section 25.114, to the extent it is not provided herein. As noted above, USN has provided the required information to the extent that it is relevant to the LEOP service for which USN seeks authorization.

Good cause also exists to waive portions of Section 25.137, to the extent the information required is not herein provided. 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; USN is providing TT&C while the satellite is on the way to its operational orbit. 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.<sup>5</sup> 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 USN to post a bond in order to conduct 5 days of LEOP support of the Geo-Kompsat-2A (GK-2A) satellites.

It is USN’s understanding that Geo-Kompsat-2A (GK-2A) is licensed by KARI (Korean Aerospace Research Institute). Geo-Kompsat-2A (GK-2A) is the first of two meteorological and communications spacecraft series to support South Korea. Thus, the purpose 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 service the United States – will not be undermined by grant of this waiver request.

Finally, USN notes that it expects to communicate with the Geo-Kompsat-2A (GK-2A) satellite using its U.S. earth station for a period of 5 days. Requiring USN to obtain technical and legal information from an unrelated party, where there is no risk of interference and the operation will cease within 5 days would pose undue hardship without serving underlying policy objectives. Given these particular facts, the waiver sought herein is appropriate.

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<sup>5</sup> 47 C.F.R. §25.137(d)(4)

## II. GOOD CAUSE EXISTS FOR A WAIVER OF THE UNITED STATES TABLE OF FREQUENCY ALLOCATIONS

USN further requests a waiver of the United States Table of Frequency Allocations ("U.S. Table") as described in section 2.106 of the rules for the frequency bands 2025 – 2110 MHz (Earth-to-Space) and 2200 – 2290 MHz (Space-to-Earth).<sup>6</sup> Section footnotes allow for non-federal Government use of these bands in the United States on a case-by-case non-interference basis. Such use by USN necessitates a waiver of the U.S. Table.

Good cause exists to grant USN a limited waiver of the U.S. Table to allow LEOP of the Geo-Kompsat-2A (GK-2A) satellites. In considering request for case-by-case spectrum uses, the Commission has indicated that it would generally grant such waivers "where there is little potential for interference into any service authorized under the Table of Frequency Allocations and when the case-by-case operator accepts any interference from authorized services."<sup>7</sup> USN will coordinate with other parties operating communication systems in compliance with the Table of Frequency Allocations to ensure that no harmful interference is caused. USN seeks to operate only pursuant to special temporary authorization and thus agrees to accept any interference from authorized services. In summary, USN's operation on a non-interference, non-protected basis support waiver of the U.S. Table.

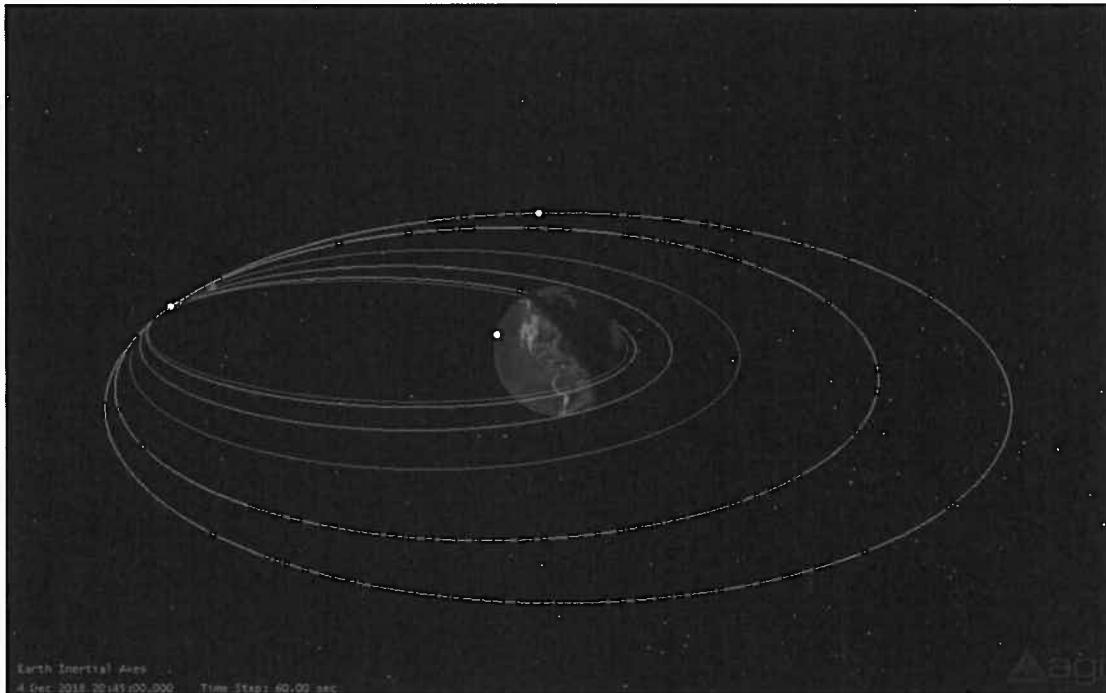
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<sup>6</sup> 47 C.F.R. §2.106

<sup>7</sup> Previously approved STA's for Universal Space Network SES-STA-20020725-01174; SES-STA-20021112-02008; SES-STA-20040315-00475

## Launch and Early Orbit (LEOP) support for the KARI Geo-Kompsat-2A spacecraft from USN's Hawaiian ground station

KARI (Korean Aerospace Research Institute) in South Korea will launch 2 geosynchronous spacecraft Geo-Kompsat 2A and 2B (aka GK-2A and GK-2B) in late 2018 and early 2019 for communications and meteorology support. USN will support both launches in the LEOP phase to final orbit parking. GK-2A is scheduled to launch on December 4<sup>th</sup> at 20:45:00 GMT on an Ariane launch vehicle from Kourou in French Guiana. The LEOP support from Hawaii will be conducted for a maximum period of 5 days.



### GK-2A showing 5 orbital maneuver burns

The spacecraft is directly injected into a highly elliptical orbit with apogee near GEO altitude with visible passes from 45 minutes to 8 hours long. In the following 5 days five orbital maneuvers are conducted to circularize the orbit and park the spacecraft over South Korea. Maneuver #5 and post burn satellite position are no longer visible from Hawaii. All possible visibilities are shown for each maneuver below, but note that all visibilities will not be supported.

### Initial direct injection orbit

GK2A-Inj

1 99918U 18777A 18338.89027777 .00000000 00000-0 10000-3 0 182

2 99918 3.4992 208.8194 7280328 178.0950 13.0669 2.27879284 326

Access	Start Time (UTCG)	Stop Time (UTCG)
1	5 Dec 2018 18:49:13	5 Dec 2018 23:15:00*

\*Note that the spacecraft is visible from Hawaii during the maneuver #1 burn and continues into pass #2

### Post Maneuver #1 orbit

GK2A-B1

1 99918U 18777A 18339.98472221 .00000000 00000-0 10000-3 0 181

2 99918 3.1475 208.3296 7005182 178.8938 191.3876 2.22698845 321

Access	Start Time (UTCG)	Stop Time (UTCG)
2	5 Dec 2018 23:15:00	6 Dec 2018 01:28:44
3	6 Dec 2018 03:48:44	6 Dec 2018 04:37:19
4	6 Dec 2018 15:54:03	6 Dec 2018 21:20:00*

\*Note that the spacecraft is visible from Hawaii during the maneuver #2 burn and continues into pass #5

### Post Maneuver #2 orbit

GK2A-B2

1 99918U 18777A 18340.88888888 .00000000 00000-0 10000-3 0 182

2 99918 2.1080 207.4895 5882413 179.8821 194.4875 2.01107573 320

Access	Start Time (UTCG)	Stop Time (UTCG)
5	6 Dec 2018 21:20:00	7 Dec 2018 02:41:34
6	7 Dec 2018 15:19:41	7 Dec 2018 21:13:00*

\*Note that the spacecraft is visible from Hawaii during the maneuver #3 burn and continues into pass #7

### Post Maneuver #3 orbit

GK2A-B3

1 99918U 18777A 18341.88402777 .00000000 00000-0 10000-3 0 182  
2 99918 1.1393 205.9126 4143069 181.4874 192.3834 1.69064626 325

Access	Start Time (UTCG)	Stop Time (UTCG)
7	7 Dec 2018 21:13:00	8 Dec 2018 04:05:45
8	9 Dec 2018 07:08:15	9 Dec 2018 15:47:00*

\*Note that the spacecraft is visible from Hawaii during the maneuver #4 burn and continues into pass #9

### Post Maneuver #4 orbit

GK2A-B4

1 99918U 18777A 18343.65763888 .00000000 00000-0 10000-3 0 182  
2 99918 0.3204 197.7601 1615021 189.6963 188.6905 1.25870645 326

Access	Start Time (UTCG)	Stop Time (UTCG)
9	9 Dec 2018 15:47:00	9 Dec 2018 23:06:02

End of mission and visibility from Hawaii



## Flux Density impinging on the ground in Hawaii from Geo-KOMPSAT-2A

The Flux density is calculated as:

$$\text{Flux density} = \text{EIRP} \div (4 \pi Rse^2)$$

Where *Rse* is the distance from spacecraft to the ground?

Where *EIRP* is the Effective Isotropic Radiated Power of the spacecraft?

Data from the spacecraft vendor indicates that the nominal EIRP of GK-2A spacecraft is -4.0 dBW. Due to the highly elliptical orbit the spacecraft will pass near Hawaii at an altitude of 400 Km during the perigee of pass #3 shown above and thus the maximum flux density will be received during that pass. The smallest slant range to USN Hawaii is = 450 Km.

Converting -4.0 dBW to scalar watts = 0.398 watts transmitted at 2283.2 MHz

Therefore:

$$\text{Flux density} = 0.398 \div (4 \pi * 450,000 \text{ meters}^2)$$

$$\text{Flux density} = 1.564 \times 10^{-13} \text{ Watts/meter}^2$$

Or

$$\text{Flux density} = 1.564 \times 10^{-14} \text{ mW/cm}^2$$