

Universal Space Network, Inc.


Approved by OMB
3060-0678

APPLICATION FOR EARTH STATION SPECIAL TEMPORARY AUTHORITY

APPLICANT INFORMATION Enter a description of this application to identify it on the main menu:
Sentinels 1B LEOP

1. Applicant

Name:	Universal Space Network, Inc.	Phone Number:	215-328-9130
DBA Name:		Fax Number:	215-328-9132
Street:	417 Caredean Drive Suite A	E-Mail:	jpgreet@uspacenet.com
City:	Horsham	State:	PA
Country:	USA	Zipcode:	19044
Attention:	Joanne Greet		



GRANTED
International Bureau

File # SES-STA-20160322-00266
 Call Sign 4-21-16 Grant Date 4-27-16
 (or other identifier)
 Term Dates
 From: 4-21-16 To: 5-21-16
 Approved: [Signature]

Universal Space Network, Inc.
File No.: SES-STA-20160322-00266
Call Sign: None
Special Temporary Authority (STA)



File # SES-STA-20160322-00266
Call Sign _____ Grant Date 4-7-16
(or other identifier) _____
Term Dates
From: 4-21-16 To: 5-21-16
Approved: Paul E. Blair

Universal Space Network, Inc. (USN) is granted a Special Temporary Authority for 30 days, beginning April, 21, 2016, to operate its fixed earth station in North Pole, AK, to provide Launch and Early Orbit Support (LEOP) service to the Sentinels-1B spacecraft licensed by the European Space Agency. Communications shall consist of ranging (tone uplink), telecommand, and telemetry of the satellite. Authority is granted under the following conditions.

1. Operations are limited to the following frequencies, emissions and power limits:

Frequency	Emissions	Max. EIRP (dBW)	Max. EIRP Den. (dBW/4KHz)
Transmitting: 2075.650 MHz	400KG1D	68	48
Receiving: 2254.099 MHz	400KG1D		

2. Operations must comply with the satellite operator's coordinated agreements for the Sentinels-1B spacecraft with U.S. satellite operators. If no agreements exist then operations are not permitted.
3. This is not a grant of market access for the Sentinels-1B spacecraft.
4. Operations, shall not cause harmful interference to, and shall not claim protection from, interference caused to it by any other lawfully operating station(s). USN shall cease transmission(s) immediately upon notice of such interference and report the interference to the FCC point of contact Paul.Blaisfcc.gov, 202-418-7274 within 24 hours of occurrence.
5. Grant of this authorization is without prejudice to any determination that the Commission may make regarding pending or future USN applications.
6. Any action taken or expense incurred as a result of operations pursuant to this STA is solely at USN's risk.
7. This action is issued pursuant to Section 0.261 of the Commission's rules on delegated authority, 47 C.F.R. § 0.261, and is effective immediately.

2. Contact

Name: Universal Space Network, Inc. **Phone Number:** 215-394-0127
Company: **Fax Number:** 215-328-9132
Street: 417 Caredean Drive **E-Mail:** jgreet@uspacenet.com
 Suite A
City: Horsham **State:** PA
Country: USA **Zipcode:** 19044 -
Attention: **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

4a. Is a fee submitted with this application?

If Yes, complete and attach FCC Form 159. If No, indicate reason for fee exemption (see 47 C.F.R. Section 1.1114).

Governmental Entity Noncommercial educational licensee

Other (please explain):

4b. Fee Classification CGX - Fixed Satellite Transmit/Receive Earth Station

5. Type Request

Use Prior to Grant Change Station Location Other

6. Requested Use Prior Date
04/21/2016

7. CityNorth Pole 8. Latitude
(dd mm ss.s h) 64 48 15.3 N

9. State AK	10. Longitude (dd mm ss.h) 147 30 0.8 W
11. Please supply any need attachments. Attachment 1: FCC312 Sentinels IB Attachment 2: Waiver & analysis Attachment 3: Coordination report	
12. Description. (If the complete description does not appear in this box, please go to the end of the form to view it in its entirety.) Support the LEOP of the Sentinels-1B spacecraft. Launch scheduled for April 22, 2016 and supported expected for 10 days.	
13. By checking Yes, the undersigned certifies that neither applicant nor any other party to the application is subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Act of 1988, 21 U.S.C. Section 862, because of a conviction for possession or distribution of a controlled substance. See 47 CFR 1.2002(b) for the meaning of "party to the application"; for these purposes. Yes <input checked="" type="radio"/> No <input type="radio"/>	
14. Name of Person Signing Joanne Greet	15. Title of Person Signing Manager, Compliance
WILLFUL FALSE STATEMENTS MADE ON THIS FORM ARE PUNISHABLE BY FINE AND / OR IMPRISONMENT (U.S. Code, Title 18, Section 1001), AND/OR REVOCATION OF ANY STATION AUTHORIZATION (U.S. Code, Title 47, Section 312(a)(1)), AND/OR FORFEITURE (U.S. Code, Title 47, Section 503).	

FCC NOTICE REQUIRED BY THE PAPERWORK REDUCTION ACT

The public reporting for this collection of information is estimated to average 2 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the required data, and completing and reviewing the collection of information. If you have any comments on this burden estimate, or how we can improve the collection and reduce the burden it causes you, please write to the Federal Communications Commission, AMD-PERM, Paperwork Reduction Project (3060-0678), Washington, DC 20554. We will also accept your comments regarding the Paperwork Reduction Act aspects of this collection via the Internet if you send them to PRA@fcc.gov. PLEASE DO NOT SEND COMPLETED FORMS TO THIS ADDRESS.

Remember – You are not required to respond to a collection of information sponsored by the Federal government, and the government may not conduct or sponsor this collection, unless it displays a currently valid OMB control number or if we fail to provide you with this notice. This collection has been assigned an OMB control number of 3060-0678.

THE FOREGOING NOTICE IS REQUIRED BY THE PAPERWORK REDUCTION ACT OF 1995, PUBLIC LAW 104-13, OCTOBER 1, 1995, 44 U.S.C. SECTION 3507.

FCC 312
Main Form

FEDERAL COMMUNICATIONS COMMISSION

APPLICATION FOR SATELLITE SPACE AND EARTH STATION AUTHORIZATIONS

Approved by OMB
3060-0678
Est. Avg. Burden Hours
Per Response: 11 Hrs.

FCC Use Only
File Number:
Call Sign:
Fee Number:

APPLICANT INFORMATION

1. Legal Name of Applicant Universal Space Network, Inc.		2. Voice Telephone Number 215-328-9130
3. Other Name Used for Doing Business (if any)		4. Fax Telephone Number 215-328-9132
5. Mailing Street Address or P.O. Box 417 Caredean Drive, Suite A		6. City Horsham
ATTENTION: Joanne Greet 215-328-9130 phone		7. State / Country (if not U.S.A.) PA
9. Name of Contact Representative (If other than applicant)		8. Zip Code 19044
11. Firm or Company Name		10. Voice Telephone Number
13. Mailing Street Address or P.O. Box		12. Fax Telephone Number
ATTENTION:		14. City
		15. State / Country (if not U.S.A.)
		16. Zip Code

CLASSIFICATION OF FILING

17. Place an "X" in the box next to the classification that applies to this filing for both questions a. and b. Mark only one box for 17a and only one box for 17b.

<input type="checkbox"/> a1. Earth Station	<input type="checkbox"/> b1. Application for License of New Station	<input type="checkbox"/> b6. Transfer of Control of License or Registration
<input type="checkbox"/> a2. Space Station	<input type="checkbox"/> b2. Application for Registration of New Domestic Receive-Only Station	<input type="checkbox"/> b7. Notification of Minor Modification
	<input type="checkbox"/> b3. Amendment to a Pending Application	<input type="checkbox"/> b8. Application for License of New Receive-Only Station Using Non-U.S. Licensed Satellite
	<input type="checkbox"/> b4. Modification of License or Registration	<input type="checkbox"/> b9. Letter of Intent to Use Non-U.S. Licensed Satellite to Provide Service in the United States
	<input type="checkbox"/> b5. Assignment of License or Registration	<input checked="" type="checkbox"/> b10. Other (Please Specify): Application to request Special Temporary Authority

18. If this filing is in reference to an existing station, enter:
Call sign of station: N/A

19. If this filing is an amendment to a pending application enter:
(a) Date pending application was filed:
(b) File number of pending application:

TYPE OF SERVICE

20. NATURE OF SERVICE: This filing is for an authorization to provide or use the following type(s) of service(s): Place an "X" in the box(es) next to all that apply.

- a. Fixed Satellite c. Radiodetermination Satellite e. Direct to Home Fixed Satellite
 b. Mobile Satellite d. Earth Exploration Satellite f. Digital Audio Radio Service g. Other (please specify) **LEOP**

21. STATUS: Place an "X" in the box next to the applicable status. Mark only one box.

- a. Common Carrier b. Non-Common Carrier

22. If earth station applicant, place an "X" in the box(es) next to all that apply.

a. Using U.S. licensed satellites b. Using Non-U.S. licensed satellites

23. If applicant is providing INTERNATIONAL COMMON CARRIER service, see instructions regarding Sec. 214 filings. Mark only one box. Are these facilities:

- a. Connected to the Public Switched Network b. Not connected to the Public Switched Network

24. FREQUENCY BAND(S): Place an "X" in the box(es) next to all applicable frequency band(s).

- a. C-Band (4/6 GHz) b. Ku-Band (12/14 GHz) c. Other (Please specify) **S-band**

TYPE OF STATION

25. CLASS OF STATION: Place an "X" in the box next to the class of station that applies. Mark only one box.

- a. Fixed Earth Station b. Temporary-Fixed Earth Station c. 12/14 GHz VSAT Network d. Mobile Earth Station e. Space Station f. Other (Specify)

If space station applicant, go to Question 27.

26. TYPE OF EARTH STATION FACILITY. Mark only one box.

- a. Transmit/Receive b. Transmit-Only c. Receive-Only

PURPOSE OF MODIFICATION OR AMENDMENT

27. The purpose of this proposed modification or amendment is to: Place an "X" in the box(es) next to all that apply.

- a -- authorization to add new emission designator and related service
 b -- authorization to change emission designator and related service
 c -- authorization to increase EIRP and EIRP density
 d -- authorization to replace antenna
 e -- authorization to add antenna
 f -- authorization to relocate fixed station
 g -- authorization to change assigned frequency(ies)
 h -- authorization to add Points of Communication (satellites & countries)
 i -- authorization to change Points of Communication (satellites & countries)
 j -- authorization for facilities for which environmental assessment and radiation hazard reporting is required
 k -- Other (Please Specify) **N/A**

ENVIRONMENTAL POLICY

28. Would a Commission grant of any proposal in this application or amendment have a significant environmental impact as defined by 47 CFR 1.1307? If YES, submit the statement as required by Sections 1.1308 and 1.1311 of the Commission's rules, 47 C.F.R. §§ 1.1308 and 1.1311, as an exhibit to this application.

A Radiation Hazard Study must accompany all applications as an exhibit for new transmitting facilities, major modifications, or major amendments. Refer to OET Bulletin 65.

- YES NO

ALIEN OWNERSHIP

29. Is the applicant a foreign government or the representative of any foreign government?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
30. Is the applicant an alien or the representative of an alien?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
31. Is the applicant a corporation organized under the laws of any foreign government?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
32. Is the applicant a corporation of which more than one-fifth of the capital stock is owned of record or voted by aliens or their representatives or by a foreign government or representative thereof or by any corporation organized under the laws of a foreign country?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
33. Is the applicant a corporation directly or indirectly controlled by any other corporation of which more than one-fourth of the capital stock is owned of record or voted by aliens, their representatives, or by a foreign government or representative thereof or by any corporation organized under the laws of a foreign country?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
34. If any answer to questions 29, 30, 31, 32 and/or 33 is Yes, attach as an exhibit, the identification of the aliens or foreign entities, their nationality, their relationship to the applicant, and the percentage of stock they own or vote.		

BASIC QUALIFICATIONS

35. Does the applicant request any waivers or exemptions from any of the Commission's Rules? If Yes, attach as an exhibit, copies of the requests for waivers or exceptions with supporting documents.	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
36. Has the applicant or any party to this application had any FCC station authorization or license revoked or had any application for an initial, modification or renewal of FCC station authorization, license, or construction permit denied by the Commission? If Yes, attach as an exhibit, an explanation of the circumstances.	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
37. Has the applicant, or any party to this application, or any party directly or indirectly controlling the applicant ever been convicted of a felony by any state or federal court? If Yes, attach as an exhibit, an explanation of the circumstances.	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
38. Has any court finally adjudged the applicant, or any person directly or indirectly controlling the applicant, guilty of unlawfully monopolizing or attempting unlawfully to monopolize radio communication, directly or indirectly, through control of manufacture or sale of radio apparatus, exclusive traffic arrangement or any other means or unfair methods of competition? If Yes, attach as an exhibit, an explanation of the circumstances.	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
39. Is the applicant, or any person directly or indirectly controlling the applicant, currently a party in any pending matter referred to in the preceding two items? If Yes, attach as an exhibit, an explanation of the circumstances.	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
40. If the applicant is a corporation and is applying for a space station license, attach as an exhibit the names, addresses, and citizenship of those stockholders owning of record and/or voting 10 percent or more of the Filer's voting stock and the percentages so held. In the case of fiduciary control, indicate the beneficiary(ies) or class of beneficiaries. Also list the names and addresses of the officers and directors of the Filer.		
41. By checking Yes, the undersigned certifies, that neither the applicant nor any other party to the application is subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Act of 1988, 21 U.S.C. Section 862, because of a conviction for possession or distribution of a controlled substance. See 47 CFR 1.2002(b) for the meaning of "party to the application" for these purposes.	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
42a. Does the applicant intend to use a non-U.S. licensed satellite to provide service in the United States? If yes, answer 42b and attach an exhibit providing the information specified in 47 C.F.R. § 25.137, as appropriate. If no, proceed to question 43.	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
42b. What administration has licensed or is in the process of licensing the space station? If no license will be issued, what administration has coordinated or is in the process of coordinating the space station? <u>International Telecommunication Union</u>		

43. Description. (Summarize the nature of the application and the services to be provided).

USN ground station shall be used to assist the European Space Agency (ESA) and Swedish Space Corporation (SSC) with the Launch and Early Orbit Support (LEOP) of the Sentinels-1B spacecraft.
Communications shall consist of ranging (tone uplink), telecommand, and telemetry of the satellite.
Sentinels is scheduled to launch on or about April 22nd, 2016
Duration will consist of a maximum of 3 days.

Exhibit No. Identify all exhibits that are attached to this application.

Exhibit No.	Identify all exhibits that are attached to this application.

CERTIFICATION

The Applicant waives any claim to the use of any particular frequency or of the electromagnetic spectrum as against the regulatory power of the United States because of the previous use of the same, whether by license or otherwise, and requests an authorization in accordance with this application. The applicant certifies that grant of this application would not cause the applicant to be in violation of the spectrum aggregation limit in 47 CFR Part 20. All statements made in exhibits are a material part hereof and are incorporated herein as if set out in full in this application. The undersigned, individually and for the applicant, hereby certifies that all statements made in this application and in all attached exhibits are true, complete and correct to the best of his or her knowledge and belief, and are made in good faith.

44. Applicant is a (an): (Place an "X" in the box next to applicable response.)

- a. Individual
- b. Unincorporated Association
- c. Partnership
- d. Corporation
- e. Governmental Entity
- f. Other (Please specify)

45. Typed Name of Person Signing

Joanne Greet

46. Title of Person Signing

Manager, Compliance

47. Signature

48. Date

12 August 2015

WILLFUL FALSE STATEMENTS MADE ON THIS FORM ARE PUNISHABLE BY FINE AND/OR IMPRISONMENT (U.S. Code, Title 18, Section 1001), AND/OR REVOCATION OF ANY STATION AUTHORIZATION (U.S. Code, Title 47, Section 312(a)(1)), AND/OR FORFEITURE (U.S. Code, Title 47, Section 503).

FEDERAL COMMUNICATIONS COMMISSION

FCC 312 - Schedule A

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

CONSENT TO TRANSFER OF CONTROL **CONSENT TO ASSIGNMENT OF LICENSE**
 NOTIFICATION OF TRANSFER OF CONTROL **NOTIFICATION OF ASSIGNMENT**
 OF RECEIVE ONLY REGISTRATION **OF RECEIVE ONLY REGISTRATION**

A1. Name of Licensee or Registrant

A3. Mailing Street Address or P.O. Box

ATTENTION:

A5. City

A6. State / Country (if not U.S.A.)

A7. Zip Code

A8. List Call Sign(s) of station(s) being assigned or transferred

A9. No. of station(s) listed

A10. Name of Transferor/Assignor (if different than licensee or registrant)

A15. Name of Transferee/Assignee

A11. Mailing Street Address or P.O. Box

A16. Mailing Street Address or P.O. Box

A12. City

A13. State/Country

A14. Zip Code

A17. City

A18. State/Country

A19. Zip Code

A20. If these facilities are licensed, is the transferee/assignee directly or indirectly controlled by any other entity?
 If Yes, attach as an exhibit, a statement (including organizational diagrams where appropriate) which fully and completely identifies the nature and extent of control including: (1) the name, address, citizenship, and primary business of the controlling entity and any intermediate subsidiaries or parties; and (2) the names, addresses, citizenship, and the percentages of voting and equity stock of those stockholders holding 10 percent or more of the controlling corporation's voting stock.

YES NO

A21. If these facilities are licensed, attach as an exhibit, a complete statement setting forth the facts which show how the assignment or transfer will serve the public interest.

CERTIFICATION

1. The undersigned, individually and for licensee, certifies that all attached exhibits pertinent to Schedule A and all statements made in Schedule A of this application are true, complete and correct to the best of his/her knowledge and belief. The undersigned also certifies that any contracts or other instruments submitted herewith are complete and constitute the full agreement.

2. The undersigned represents that stock will not be delivered and that control will not be transferred until the Commission's consent has been received, but that transfer of control or assignment of license will be completed within 60 days of Commission consent. The undersigned also acknowledges that the Commission must be notified by letter within 30 days of consummation.

A22. Printed Name of Licensee (Must agree with A1)

A23. Signature

A24. Title (Office Held by Person Signing)

A25. Date

A26. Printed Name of Licensee Transferor/Assignor (if different than licensee. Must agree with A10)

A27. Signature

A28. Title (Office Held by Person Signing)

A29. Date

A30. Printed Name of Licensee Transferee/Assignee (Must agree with A15)

A31. Signature

A32. Title (Office Held by Person Signing)

A33. Date

FCC Use Only

A2. Voice Telephone Number

A4. Fax Telephone Number

FEDERAL COMMUNICATIONS COMMISSION
SATELLITE EARTH STATION AUTHORIZATIONS
(Technical and Operational Description)

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 USAK01	B1b. Site Identifier (HUB, REMOTE1, etc.)	B1c. Telephone Number 907-490-3064	B1j. Geographic Coordinates Deg. - Min. - Sec. - E/W N/S Coordinates are: Lat. 64 48 15.3 N <input type="checkbox"/> NAD-27 Lon. 147 30 00.8 W <input checked="" type="checkbox"/> NAD-83	B1k. Lat./Lon. Coordinates are:
B1d. Street Address of Station or Area of Operation 1465 Broadway Road		B1e. Name of Contact Person Joanne Greet	B1i. Zip Code 99705	B1l. Site Elevation (AMSL) 149.4 meters
B1f. City North Pole	B1g. County North Star Borough-Fairbanks	B1h. State AK		

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
SENTINELS-1B	

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. licensed satellite system. Use additional sheets as needed.

Satellite Name	List of Destination Points
SENTINELS-1B	ESA (Non US spacecraft)

FEDERAL COMMUNICATIONS COMMISSION
SATELLITE 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)
USAK01	AK-13M	1	Datron	1453	13	TX 46.3dBi @ 2090 MHz RX 47.2dBi @ 2270 MHz

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		(c) 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)				
AK-13M	N/A	20	398	N/A+	N/A+	200W	68dBW
				+ Antenna are not	on a building.	Max bidg ht. is 10'	
0-360	0-360		AK-13M	non-GEO	Non-GEO	5 degrees	5 degrees
5 degrees	0-360	0-360	8 dB/W	2075.650 MHz	non-GEO	non-GEO	5 degrees

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
SATELLITE EARTH STATION AUTHORIZATIONS
FCC Form 312 - Schedule B: (Technical and Operational Description)

B6. Frequency Coordination Limits: Use additional pages as needed.

(a) Antenna ID*	(b) Frequency Limits (MHz)	(c) Range of Satellite Arc Eastern Limit**	(d) Range of Satellite Arc Western Limit**	(e) Antenna Elevation Angle Eastern Limit	(f) Antenna Elevation Angle Western Limit	(g) Earth Station Azimuth Angle Eastern Limit	(h) Earth Station Azimuth Angle Western Limit	(i) Maximum EIRP Density toward the Horizon (dBW/4kHz)
AK-13M	2254.099 MHz	non-GEO	Non-GEO	5 degrees	5 degrees	0-360	0-360	
AK-13M	2075.650 MHz	non-GEO	non-GEO	5 degrees	5 degrees	0-360	0-360	8 dBW

Notes: * Provide the ANTENNA-ID from table B4 to identify the antenna to which each frequency band and orbital arc range is associated.
 ** If operating with geostationary satellites, give the orbital arc limits and the associated elevation and azimuth angles. If operating with non-geostationary satellites, give the notation "NON-GEO" for the satellite arc and give the minimum operational elevation angle and the maximum azimuth angle range.

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

B7. Particulars of Operation (Full particulars are required for each r.f. carrier): Use additional pages as needed.

(a) Antenna ID*	(b) Frequency Bands (MHz)	(c) T/R Mode**	(d) Antenna Polarization (H, V, L, R)	(e) Emission Designator	(f) Maximum EIRP per Carrier (dBW)	(g) Maximum EIRP Density per Carrier (dBW/4kHz)	(h) Description of Modulation and Services
AK-13M	2254.099 MHz	R	R,L	400K0G1D			200 KHz range tones with 4Kbit/sec Telemetry on subcarrier
AK-13M	2075.650 MHz	T	R,L	400K0G1D	68	48	200KHz ranging tones plus 2Kbit/sec modulated onto 16KHz subcarrier telecommand

Notes: * Provide the ANTENNA-ID from table B4 to identify the antenna to which each frequency band and emission is associated. For VSAT networks, include frequencies and emissions for all HUB and REMOTE units.
** Indicate whether the earth station transmits or receives in each frequency band.

**FEDERAL COMMUNICATIONS COMMISSION
SATELLITE 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.): N/A -not VSAT network

<p>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.</p>	<input type="checkbox"/> YES <input type="checkbox"/> NO									
<p>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 measurements?</p>	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO									
<p>B10. Is the facility operated by remote control? If YES, provide the location and telephone number of the control point.</p>	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO									
<p>Remote Control Point Location:</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:40%; padding: 2px;">B10a. Street Address 417 Caredean Drive, Suite A</td> <td style="width:20%; padding: 2px;">B10d. State / Country PA</td> <td style="width:40%; padding: 2px;">B10e. Zip Code 19044</td> </tr> <tr> <td style="padding: 2px;">B10b. City Horsham</td> <td style="padding: 2px;">B10c. County Montgomery</td> <td style="padding: 2px;">B10g. Call Sign of Control Station (if appropriate)</td> </tr> <tr> <td style="padding: 2px;">B10f. Telephone Number 215-328-9130</td> <td colspan="2"></td> </tr> </table>		B10a. Street Address 417 Caredean Drive, Suite A	B10d. State / Country PA	B10e. Zip Code 19044	B10b. City Horsham	B10c. County Montgomery	B10g. Call Sign of Control Station (if appropriate)	B10f. Telephone Number 215-328-9130		
B10a. Street Address 417 Caredean Drive, Suite A	B10d. State / Country PA	B10e. Zip Code 19044								
B10b. City Horsham	B10c. County Montgomery	B10g. Call Sign of Control Station (if appropriate)								
B10f. Telephone Number 215-328-9130										
<p>B11. Is frequency coordination required? If YES, attach a frequency coordination report as an exhibit.</p>	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO									
<p>B12. Is coordination with another country required? If YES, attach the name of the country(ies) and plot of coordination contours as an exhibit.</p>	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO									
<p>B13. FAA Notification - (See 47 CFR Part 17 and 47 CFR 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?</p>	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO									
<p>FAILURE TO COMPLY WITH 47 CFR PARTS 17 AND 25 WILL RESULT IN THE RETURN OF THIS APPLICATION.</p>										

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 Sentinels-1B Satellite.¹ 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..."² USN seeks authority to support the Launch and Early Orbit (LEOP) support of Sentinels-1B, 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 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.³ The Commission may grant a waiver for good cause shown.⁴ 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 support for Sentinels-1B. 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 Sentinels-1B satellite, nor is USN in contractual privity with that operator. Rather, USN has contracted with Swedish Space Corporation, Solona Sweden (SSC) to support the LEOP portion in S-Band of the Sentinels-1B satellite.

As evidenced by the Comsearch report attached to this request, USN has coordinated the LEOP of the Sentinels-1B satellite with potentially affected terrestrial operators. Moreover, as with any STA, USN will conduct the test on an unprotected, non-interference basis to government operations.

¹ FCC Form 312 Section B

² 47 C.F.R. § 25.137(a)

³ 47 C.F.R. §§25.137 and 25.114

⁴ 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 low earth 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.⁵ 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 the 7 days of LEOP support of the Sentinels-1B satellite.

It is USN’s understanding that Sentinels-1B is licensed by ESA (European Space Agency). Sentinels-1B is the fourth of the series spacecraft meant to serve the EU. 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 Sentinels-1B satellite using its U.S. earth station for a period of 7 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 7 days would pose undue hardship without serving underlying policy objectives. Given these particular facts, the waiver sought herein is appropriate.

⁵ 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).⁶ 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 support of the Sentinels-1B satellite. 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."⁷ 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.

⁶ 47 C.F.R. §2.106

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

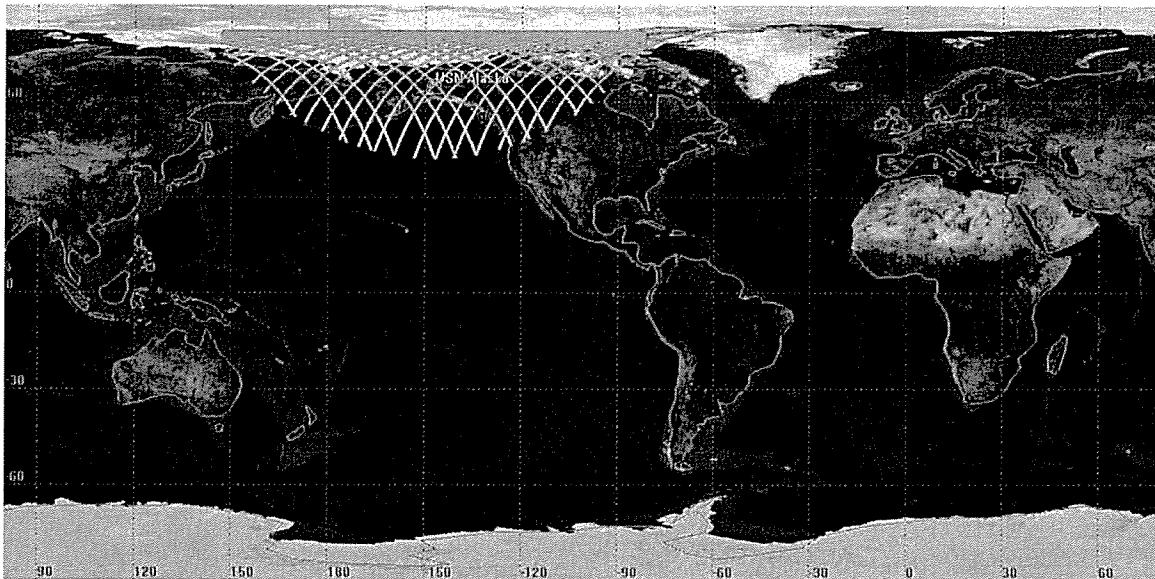
USN LEOP support for Sentinels-1B from Alaska

Sentinels-1B is the fourth in a series of Synthetic Aperture Radar (SAR) earth observation science satellites launched by ESA to serve the European Union. Sentinels-1B will be launched from the CNES space center in Kourou French Guiana on April 22nd, 2016 at a nominal liftoff time of 21:02:23 UTC. The Sentinels-1B spacecraft will be supported by the USN Alaska ground station using a downlink frequency = 2254.099 MHz and uplink = 2075.650 MHz, and has been fully coordinated by Comsearch.

The LEOP support is scheduled to be conducted for 3 days with contingency to extend an additional 4 days for a total of up to 7 days at the USN tracking station in Alaska. All visible passes will not be supported, but for planning purposes it should be assumed that all the passes visible from Alaska could be supported for the first 3 days of the LEOP as shown below.

SENTINELS-1B

```
1 90004U 00000A 16113.89291238 .00000000 00000+0 00000+0 0 00019  
2 90004 98.1834 121.3665 0001409 79.0717 348.8633 14.59174942 08
```



USN Alaska coverage of Sentinels LEOP from 22 April thru 25 April 2016

USN Alaska possible passes for Sentinels-1B 22 April thru 25 April 2016 UTC

Pass	Start Time (UTCG)	Stop Time (UTCG)
1	22 Apr 2016 21:28:54	22 Apr 2016 21:35:49
2	22 Apr 2016 23:04:23	22 Apr 2016 23:12:11
3	23 Apr 2016 00:39:34	23 Apr 2016 00:49:39
4	23 Apr 2016 02:15:58	23 Apr 2016 02:27:27
5	23 Apr 2016 03:54:24	23 Apr 2016 04:05:07
6	23 Apr 2016 05:36:09	23 Apr 2016 05:41:45
7	23 Apr 2016 14:02:53	23 Apr 2016 14:09:01
8	23 Apr 2016 15:39:39	23 Apr 2016 15:50:59
9	23 Apr 2016 17:17:27	23 Apr 2016 17:28:48
10	23 Apr 2016 18:55:08	23 Apr 2016 19:05:06
11	23 Apr 2016 20:32:34	23 Apr 2016 20:40:16
12	23 Apr 2016 22:08:51	23 Apr 2016 22:15:48
13	23 Apr 2016 23:44:00	23 Apr 2016 23:52:44
14	24 Apr 2016 01:19:33	24 Apr 2016 01:30:24
15	24 Apr 2016 02:56:42	24 Apr 2016 03:08:12
16	24 Apr 2016 04:36:16	24 Apr 2016 04:45:40
17	24 Apr 2016 14:42:58	24 Apr 2016 14:51:52
18	24 Apr 2016 16:20:20	24 Apr 2016 16:31:46
19	24 Apr 2016 17:58:08	24 Apr 2016 18:09:09
20	24 Apr 2016 19:35:50	24 Apr 2016 19:44:51
21	24 Apr 2016 21:12:54	24 Apr 2016 21:19:57
22	24 Apr 2016 22:48:35	24 Apr 2016 22:56:04
23	25 Apr 2016 00:23:42	25 Apr 2016 00:33:25
24	25 Apr 2016 01:59:49	25 Apr 2016 02:11:11
25	25 Apr 2016 03:37:52	25 Apr 2016 03:48:55
26	25 Apr 2016 05:18:51	25 Apr 2016 05:25:55
27	25 Apr 2016 13:47:13	25 Apr 2016 13:51:29
28	25 Apr 2016 15:23:27	25 Apr 2016 15:33:54
29	25 Apr 2016 17:01:06	25 Apr 2016 17:12:37
30	25 Apr 2016 18:38:54	25 Apr 2016 18:49:12
31	25 Apr 2016 20:16:26	25 Apr 2016 20:24:28

Flux Density impinging on the ground in Alaska from Sentinels-1B

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 maximum EIRP of Sentinels-1B is -8.83 dBW. The altitude (and thus the closest distance to earth during an overhead pass) is = 692 Km.

Converting -8.83 dBW to scalar watts = 0.130 watts transmitted at 2254.099 MHz

Therefor:

$$\text{Flux density} = 0.13 \div (4 \pi * 692,000 \text{ meters}^2)$$

Flux density = 2.160×10^{-14} Watts/meter²

Or

Flux density = 2.160×10^{-15} mW/cm²

FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for
Universal Space Network, Inc.
NORTH POLE, AK
Satellite Earth Station

Prepared By:
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147
March 16, 2016

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4. EARTH STATION COORDINATION DATA.....	7
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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 02/18/2016.

Company

3G Wireless, LLC
AERIAL VIDEO SYSTEMS
Alascom Inc
Ascent Media Network Services, LLC
Bellsouth Telecommunications, Inc.
Borgeson, Tom R.
Broadcast Sports Inc.
CHENA BROADCASTING, LLC
Carolina Telephone and Telegraph Co
Casper, John
CenturyTel of the Southwest, Inc.
Chicago Comnet Corp
Cincinnati Bell Wireless LLC
Citywide News Network, Inc.
Cohen, Elena
Cowboys Stadium LP
DCI II, INC.
Direct Broadcast Services, Inc.
Fishman Brothers Ent.
GSN News, Inc
Global Telecom & Technology Americas, In
Goodyear Tire & Rubber Company
HF Enterprises, Inc
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.
Interlink Network Corp
Kentucky RSA #3 Cellular General Partner
Kentucky RSA #4 Cellular General Partner
MERCURY COMMUNICATIONS
Metro Networks Communications, Inc.
Michigan Bell Telephone Company
Moreen, Steven K
NEW ENGLAND DIGITAL DISTRIBUTION, INC.
NEW ENGLAND SATELLITE SYSTEMS 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.
Public Television Communications Center
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
Regulus Media Services, Inc.
Remote Broadcasts, Inc.
SBE Coordinator
Southwestern Bell Telephone L.P.
Speedshotz, Inc
Total RF Marketing Inc
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
Vitec Broadcast
Vyvx, LLC
Westar Satellite Services LP
Western Technical Services
Wexler Video, Inc.
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: 03/16/2016
Job Number: 160218COMSGE01

Administrative Information

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

Site Information

NORTH POLE, AK
Venue Name SENTINELS-1B
Latitude (NAD 83) 64° 48' 15.3" N
Longitude (NAD 83) 147° 30' 0.8" W
Climate Zone A
Rain Zone 2
Ground Elevation (AMSL) 140.66 m / 461.5 ft

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

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) 2.1
(dBW/MHz) 26.1

Maximum EIRP (dBW/4 kHz) 48.0
(dBW/MHz) 72.0
(dBW) 68.0

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

Frequency Information

Transmit 2.0 GHz
Emission / Frequency Range (MHz) 400KG1D / 2075.65

Max Great Circle Coordination Distance 293.2 km / 182.2 mi
Precipitation Scatter Contour Radius 188.5 km / 117.1 mi

COMSEARCH

Earth Station Data Sheet

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

Coordination Values		NORTH POLE, AK	
Licensee Name		Universal Space Network, Inc.	
Latitude (NAD 83)		64° 48' 15.3" N	
Longitude (NAD 83)		147° 30' 0.8" W	
Ground Elevation (AMSL)		140.66 m / 461.5 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		2.1 (dBW/4 kHz)	

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Transmit 2.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)
0	0.44	44.41	4.50	293.20
5	0.00	40.65	4.50	293.20
10	0.00	37.42	4.50	293.20
15	0.45	34.90	4.50	293.20
20	0.86	32.87	4.50	293.20
25	0.49	30.73	4.50	293.20
30	0.00	29.09	4.50	293.20
35	0.00	28.67	4.50	293.20
40	0.00	29.04	4.50	293.20
45	0.00	30.18	4.50	293.20
50	0.00	31.99	4.50	293.20
55	0.00	34.38	4.50	293.20
60	0.00	37.23	4.50	293.20
65	0.00	40.45	4.50	293.20
70	0.00	43.94	4.50	293.20
75	0.00	47.65	4.50	293.20
80	0.00	51.53	4.50	293.20
85	0.00	55.55	4.50	293.20
90	0.00	59.66	4.50	293.20
95	0.00	63.85	4.50	293.20
100	0.00	68.11	4.50	293.20
105	0.00	72.41	4.50	293.20
110	0.00	76.74	4.50	293.20
115	0.00	81.10	4.50	293.20
120	0.00	85.48	4.50	293.20
125	0.00	89.87	4.50	293.20
130	0.00	94.25	4.50	293.20
135	0.00	98.63	4.50	293.20
140	0.00	102.99	4.50	293.20
145	0.00	107.33	4.50	293.20
150	0.00	111.64	4.50	293.20
155	0.00	115.89	4.50	293.20
160	0.00	120.09	4.50	293.20
165	0.00	124.21	4.50	293.20
170	0.00	128.23	4.50	293.20
175	0.00	132.12	4.50	293.20
180	0.00	135.84	4.50	293.20
185	0.00	139.35	4.50	293.20

COMSEARCH

Earth Station Data Sheet

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

Coordination Values

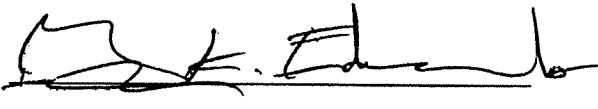
NORTH POLE, AK

Licensee Name Universal Space Network, Inc.
Latitude (NAD 83) 64° 48' 15.3" N
Longitude (NAD 83) 147° 30' 0.8" W
Ground Elevation (AMSL) 140.66 m / 461.5 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 2.1 (dBW/4 kHz)

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Transmit 2.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)
190	0.00	142.58	4.50	293.20
195	0.00	145.46	4.50	293.20
200	0.00	147.88	4.50	293.20
205	0.00	149.73	4.50	293.20
210	0.00	150.91	4.50	293.20
215	0.00	151.33	4.50	293.20
220	0.00	150.96	4.50	293.20
225	0.00	149.82	4.50	293.20
230	0.00	148.01	4.50	293.20
235	0.00	145.62	4.50	293.20
240	0.00	142.77	4.50	293.20
245	0.00	139.55	4.50	293.20
250	0.00	136.06	4.50	293.20
255	0.00	132.35	4.50	293.20
260	0.00	128.47	4.50	293.20
265	0.00	124.45	4.50	293.20
270	0.00	120.34	4.50	293.20
275	0.00	116.15	4.50	293.20
280	0.00	111.89	4.50	293.20
285	0.00	107.59	4.50	293.20
290	0.00	103.26	4.50	293.20
295	0.00	98.90	4.50	293.20
300	0.00	94.52	4.50	293.20
305	0.00	90.13	4.50	293.20
310	0.00	85.75	4.50	293.20
315	0.00	81.37	4.50	293.20
320	0.00	77.01	4.50	293.20
325	0.00	72.67	4.50	293.20
330	0.49	68.47	4.50	293.20
335	0.65	64.28	4.50	293.20
340	0.69	60.13	4.50	293.20
345	0.60	56.02	4.50	293.20
350	0.79	52.11	4.50	293.20
355	0.73	48.25	4.50	293.20

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: March 16, 2016