



File # SAT-LOA-20210212-00021; SAT-AMD-20210831-00119

Call Sign S3082 Grant Date Dec. 2, 2021

(or other identifier)

Term Dates

Approved by OMB
3060-0678

From See conditions To: See conditions

Approved: Merissa L. Velez
Merissa L. Velez
Chief, Satellite Policy Branch

Date & Time Filed: Feb 12 2021 5:16:38:003PM
File Number: SAT-LOA-20210212-00021
Callsign/Satellite ID: S3082

*with conditions

APPLICATION FOR SATELLITE SPACE STATION AUTHORIZATIONS FCC 312 MAIN FORM FOR OFFICIAL USE ONLY	FCC Use Only
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APPLICANT INFORMATION

Enter a description of this application to identify it on the main menu:


Application for Authority to Launch and Operate a Small Satellite Non-Geostationary Orbit Constellation to Provide Remote Sensing Services in the Earth Exploration Satellite Service Using Synthetic Aperture Radar

1-8. Legal Name of Applicant			
Name:	ICEYE US, Inc.	Phone Number:	949-257-9864
DBA Name:		Fax Number:	
Street:	70 Discovery	E-Mail:	Dee.Grover@ICEYE.com
City:	Irvine	State:	CA
Country:	USA	Zipcode:	92618 -
Attention:	Mr. Dee Grover		

ATTACHMENT TO GRANT

ICEYE US, Inc.

IBFS File Nos. SAT-LOA-20210212-00021; SAT-AMD-20210831-00119

IBFS File No(s):	SAT-LOA-20210212-00021; ¹ SAT-AMD-20210831-00119 ²	<p>GRANTED IN PART/ DEFERRED IN PART -- With Conditions</p>  <p>International Bureau Satellite Division</p>
Licensee/Grantee:	ICEYE US, Inc. (ICEYE)	
Call Sign:	S3082	
Satellite Name:	ICEYE US	
Orbital Location: (required station-keeping tolerance)	Non-geostationary satellite orbit (NGSO), initial deployment to ~550 km altitude (± 50 km), 97.7 degrees (± 1 degree) inclination, Local Time of Descending Node (LTDN) of 9:00 AM	
Administration:	United States of America	
Nature of Service:	Earth Exploration Satellite Service (EESS)	
Scope of Grant:	Authority to construct, deploy, and operate one NGSO satellite ³	
Service Area(s):	Global, subject to limitations in specific frequency bands	
Frequencies:	<p>8025-8400 MHz (center frequency 8212.5 MHz, bandwidth 375 MHz; and center frequency 8300.0 MHz, bandwidth 150 MHz) (space-to-Earth)</p> <p>Synthetic Aperture Radar (SAR): 9300-9900 MHz (center frequency 9600 MHz, bandwidth 600 MHz; 9650.0 MHz, bandwidths 150 MHz, 200 MHz, and 300 MHz) (space-to-Earth)</p> <p>Telemetry, Tracking and Command frequencies: 2200-2290 MHz (center frequency 2277.3 MHz, bandwidth 3 MHz)⁴ (space-to-Earth) (outside U.S. only) 2025-2110 MHz (center frequency 2086.9 MHz, bandwidth 1.2 MHz) (Earth-to-space)</p>	
<p>Operations under this grant must comport with the legal and technical specifications set forth by the applicant or petitioner and with the Federal Communications Commission's rules not waived herein. This grant is also subject to the following conditions:</p> <ol style="list-style-type: none"> 1. ICEYE must timely provide the Commission with the information required for Advance Publication, Coordination, and Notification of the frequency assignment(s) for this constellation, including due diligence information, pursuant to Articles 9 and 11 of the ITU Radio Regulations. This authorization may be modified, without prior notice, consistent with the coordination of the frequency assignment(s) with other Administrations. See 47 CFR § 25.111(b). ICEYE is responsible for all cost-recovery fees associated with the ITU filings. 47 CFR § 25.111(d). 2. ICEYE's request for its application to be processed under the rules for streamlined licensing of small satellites is GRANTED. We find that the operations requested in this application, meet the criteria listed 		

¹ The application was originally placed on public notice on April 16, 2021. *Policy Branch Information Satellite Space Station Applications Accepted for Filing*, Public Notice, Report No. SAT-01544 (Apr. 16, 2021).

² The amendment was placed on public notice on October 1, 2021. *Policy Branch Information Satellite Space Station Applications Accepted for Filing*, Public Notice, Report No. SAT-01582 (Oct. 1, 2021).

³ ICEYE requested authority to deploy, launch, and operate six satellites. We grant-in-part ICEYE's request with respect to the first satellite, and defer a action regarding the remaining five satellites.

⁴ ICEYE clarified this center frequency and bandwidth as a result of coordination with federal operators. See Letter from Robert S. Koppel, Counsel to ICEYE (filed Nov. 29, 2021).

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in section 25.122 of the Commission's rules, 47 CFR § 25.122, for streamlined small satellite applicants.⁵ We conclude that the ICEYE operations are compatible with existing operations in the requested frequency bands and will not materially constrain future space station entrants from using the requested frequency bands.⁶

3. ICEYE is required to successfully coordinate with NTIA prior to submitting any ITU filing involving any ground stations outside of the United States and Possessions (US&P) that operate in the frequency band 2200-2290 MHz. The 2200-2290 MHz band is allocated to Space Operations (space-to-Earth) and EESS (space-to-Earth) in all ITU Regions, but in the United States the band is only allocated for Federal use. Operations in the 2200-2290 MHz frequency band are permitted for use only outside of the US&P. NTIA will consider the request by ICEYE for access to the 2200-2290 MHz for ground stations located outside of US&P on a case-by-case coordinated basis⁷ with appropriate EMC analysis to NTIA (ravery@ntia.gov), AFSMO (jimmy.nguyen@us.af.mil), NASA (john.e.zuzek@nasa.gov) and DOC (david.franc@noaa.gov) to ensure compatibility of operations with the Federal government.
4. Operations pursuant to this authorization must not cause harmful interference to stations operating in the 2025-2110 MHz band in accordance with the U.S. Table of Frequency Allocations. See 47 CFR § 2.106, footnote US347.
5. Transmissions in the 2025-2110, 2200-2290, and 8025-8400 MHz frequency bands may only be made to/from Federal earth stations or earth stations coordinated with the National Aeronautics and Space Administration (NASA), the Air Force Spectrum Management Office (AFSMO), DOC/NOAA, and the Department of the Navy (DON). A list of coordinated non-Federal earth stations is attached in Appendix A. ICEYE shall provide the FCC with an updated list of coordinated non-Federal earth stations within ten business days following any changes to this list.⁸

⁵ See 47 CFR § 25.122; see also ICEYE US, Inc., IBFS File No. SAT-LOA-20210212-00021, Legal Narrative at 5-6 (specifying compliance with the qualifying criteria in 47 CFR § 25.122(c)).

⁶ See 47 CFR § 25.122(c)(9), (d)(3). Operations in the 8025-8400 MHz (space-to-Earth), 2200-2290 (space-to-Earth), and 2025-2110 (Earth-to-space) frequency bands will be limited to those times when the space stations are communicating with one of the planned earth stations, which will be coordinated with Federal operators. ICEYE states that it will share up-to-date orbital characteristics, transmitting windows, and any other information required to ensure ICEYE's successful sharing of spectrum with other services, and that the ICEYE Mission Operations Center will be capable of defining "dark zones" in which the satellites will not transmit. For SAR operations in the 9300-9900 MHz band, the duration of transmissions will be short, with a maximum imaging time for the satellites of 2700 seconds per day. The 3 dB beamwidth of the SAR antenna is 0.4 x 1.0 degree.

⁷ See Appendix A for a list of coordinated ground station locations.

⁸ See Letter from Robert S. Koppel, Counsel to ICEYE, to Marlene H. Dortch, Secretary, FCC (filed June 1, 2021). Maxar Technologies, Inc. (Maxar) commented that ICEYE's application was defective because ICEYE did not provide detail regarding earth station operations. Maxar further commented that ICEYE did not provide sufficient details regarding spectrum sharing in the S-band and X-band and requested that ICEYE provide a good faith showing that it has commenced coordination with incumbent operators. See Letter from Henry Gola, Counsel to Maxar, to Marlene H. Dortch, Secretary, FCC (filed May 17, 2021). ICEYE subsequently provided a list of ground stations with which it will communicate outside of the United States, in addition to the ground station in Irvine, California, reiterated its analysis of the X-band PFD limits, provided technical information regarding uplink transmissions in the S-band, and invited non-federal operators to contact ICEYE to coordinate operations. See Letter from Robert S. Koppel, Counsel to ICEYE, to Marlene H. Dortch, Secretary, FCC (filed June 1, 2021). Maxar confirmed that ICEYE's response satisfactorily addressed its concerns. See Letter from Robert S. Koppel, Counsel to ICEYE US, Attachment (filed Nov. 17, 2021) (ICEYE Nov. 17, 2021 Letter) (attached email from Michael Martinez, VP, Space Engineering, Maxar).

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6. Power flux-density limits from operation in the 8025-8400 MHz band must not exceed the limits in No. 22.5 and Table 21-4 of the ITU Radio Regulations, the limits/protection criteria in Recommendation ITU-R SA.1157-1 must be met, and the guidelines in Recommendation ITU-R SA. 1810 must be followed.
7. For ICEYE's 8025-8400 MHz downlink to Inuvik and Svalbard earth stations, transmissions must cease when any of the ICEYE US, Inc. satellites come within a 2-degree conjunction angle of the Suomi-NPP satellite when it is transmitting to its NOAA earth stations in Fairbanks and Svalbard. The conjunction angle is measured from the boresight of the NOAA earth station antenna.
8. For ICEYE's downlink in the 2200-2290 MHz frequency band, ICEYE must limit the duty cycle for transmissions to the Svalbard ground station to 20%.
9. For ICEYE's downlinks in the 8025-8400 MHz frequency band, ICEYE will limit the duty cycle for transmissions to the Svalbard ground station to 45%.
10. EESS (active) operations in the 9500-9800 MHz (space-to-Earth) frequency band are allocated on a secondary basis in the U.S. Table of Allocations, 47 CFR § 2.106. Accordingly, ICEYE must accept interference from and not cause interference to any services, including Federal operations, operating on a primary basis in the 9500-9800 MHz band. The ICEYE satellites SAR operations will transmit a pulsed signal and will only transmit over specific areas of the Earth and for short bursts. The pulse width and repetition frequency of the ICEYE satellite SAR transmission are variable. Additionally, the antenna gain is variable and can be adjusted as required to further mitigate interference.
11. ICEYE must maintain for any satellite in sun synchronous orbit, the Local Time of Descending Node (LTDN) of 9:00 AM time value to not be in-phase with Federal agencies satellite systems.⁹
12. ICEYE must coordinate physical operations of spacecraft with any operator using similar orbits, for the purpose of eliminating collision risk and minimizing operational impacts. The orbital parameters specified in this grant are subject to change based on such coordination.
13. Upon receipt of a conjunction warning from the 18th Space Control Squadron or other source, ICEYE must review and take all possible steps to assess the collision risk, and mitigate collision risk if necessary. As appropriate, steps to assess and mitigate should include, but are not limited to: contacting the operator of any active spacecraft involved in such warning; sharing ephemeris data and other appropriate operational information with any such operator; and modifying spacecraft attitude and/or operations.
14. Unless extended by the Commission for good cause shown, this authorization will become null and void in the event the ICEYE space station is not constructed and launched in accordance with the schedule set forth in section 25.164 of the Commission's rules, as follows:
 - a. In the event that the ICEYE space station has not been launched, placed into the assigned orbit, and begun operations in accordance with this grant by **December 2, 2022**,¹⁰ ICEYE must post a surety bond in satisfaction of 47 CFR §§ 25.165(a)(1) & (b) no later than **January 1, 2023**, thereafter maintain on file a surety bond requiring payment in the event of a default in an amount, at minimum, determined according to the formula set forth in 47 CFR § 25.165(a)(1); and
 - b. ICEYE must launch the ICEYE space station, place it into the assigned orbit, and operate the space station in accordance with this grant no later than **December 2, 2027**. 47 CFR § 25.164(b).

⁹ See ICEYE Nov. 17, 2021 Letter (providing the LTDN in Appendix 1).

¹⁰ We note that since this application is being processed under the rules for streamlined licensing of small satellites, the requirement for ICEYE to post a surety bond in accordance with 47 CFR § 25.165(a)(1) & (b) is deferred by one year following the date of grant in accordance with the grace period adopted in FCC 19-81. See 47 CFR 25.165(a).

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15. The license term is six years and will begin on 3 a.m. EST on the date that ICEYE certifies to the Commission that the ICEYE space station has been successfully placed into orbit and its operations fully conform to the terms and conditions of this authorization. ICEYE must file such certification within five business days of placing the space station into operation.

Licensee/grantee is afforded thirty (30) days from the date of release of this action to decline the grant as conditioned. Failure to respond within this period will constitute formal acceptance of the grant as conditioned.

This action is taken pursuant to Section 0.261 of the Commission's rules on delegated authority, 47 CFR § 0.261, and is effective upon release.

Station licenses are subject to the conditions specified in Section 309(h) of the Communications Act of 1934, as amended, 47 U.S.C. § 309(h).

Action Date:	December 2, 2021
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Term Dates	From: see conditions	To: see conditions
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Approved:



Merissa L. Velez
Chief, Satellite Policy Branch

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**Appendix A:
Earth Station Locations¹¹
Coordinated with Federal Agencies**

1. Svalbard, Norway
2. TrollSat, Antarctica
3. Hartebeesthoek, South Africa
4. Arwaua, New Zealand
5. Punta Arenas, Chile
6. Puertollano, Spain
7. Mingenew, West Australia
8. Inuvik, Canada

¹¹ See Letter from Robert S. Koppel, Counsel to ICEYE, to Marlene H. Dortch, Secretary, FCC (filed June 1, 2021).

9-16. Name of Contact Representative

Name:	Robert S. Koppel	Phone Number:	703-584-8669
Company:	Lukas, LaFuria, Gutierrez & Sachs, LLP	Fax Number:	
Street:	8300 Greensboro Drive Suite 1200	E-Mail:	bkoppel@fcclaw.com
City:	Tysons	State:	VA
Country:	USA	Zipcode:	22102 -
Attention:		Relationship:	Legal Counsel

CLASSIFICATION OF FILING

17. Choose the button next to the classification that applies to this filing for both questions a. and b. Choose only one for 17a and only one for 17b.

a.

(N/A) a1. Earth Station

a2. Space Station

b.

b1. Application for License of New Station

(N/A) b2. Application for Registration of New Domestic Receive-Only Station

(N/A) b3. Amendment to a Pending Application

(N/A) b4. Modification of License or Registration

(N/A) b5. Assignment of License or Registration

(N/A) b6. Transfer of Control of License or Registration

(N/A) b7. Notification of Minor Modification

(N/A) b8. Application for License of New Receive-Only Station Using Non-U.S. Licensed Satellite

b9. Letter of Intent to Use Non-U.S. Licensed Satellite to Provide Service in the United States

b10. Replacement Satellite Application – no new frequency bands

b11. Replacement Satellite Application – new frequency bands (Not eligible for streamlined processing)

b12. Petition for Declaratory Ruling to be Added to the Permitted List

(N/A) b13. Other (Please specify)

17c. 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):

17c. Fee Classification CLW – Space Station (Non–Geostationary)

18. If this filing is in reference to an existing station, enter:

(a) Call sign of station:

Not Applicable

19. If this filing is an amendment to a pending application enter:

(a) Date pending application was filed:

Not Applicable

(b) File number of pending application:

Not Applicable

TYPE OF SERVICE

<p>20. NATURE OF SERVICE: This filing is for an authorization to provide or use the following type(s) of service(s): Select all that apply:</p> <p><input type="checkbox"/> a. Fixed Satellite</p> <p><input type="checkbox"/> b. Mobile Satellite</p> <p><input type="checkbox"/> c. Radiodetermination Satellite</p> <p><input checked="" type="checkbox"/> d. Earth Exploration Satellite</p> <p><input type="checkbox"/> e. Direct to Home Fixed Satellite</p> <p><input type="checkbox"/> f. Digital Audio Radio Service</p> <p><input type="checkbox"/> g. Other (please specify)</p>	
<p>21. STATUS: Choose the button next to the applicable status. Choose only one.</p> <p><input checked="" type="radio"/> Common Carrier <input checked="" type="radio"/> Non-Common Carrier</p>	<p>22. If earth station applicant, check all that apply.</p> <p>Not Applicable</p>
<p>23. If applicant is providing INTERNATIONAL COMMON CARRIER service, see instructions regarding Sec. 214 filings. Choose one. Are these facilities:</p> <p><input checked="" type="radio"/> Connected to a Public Switched Network <input type="radio"/> Not connected to a Public Switched Network <input checked="" type="radio"/> N/A</p>	
<p>24. FREQUENCY BAND(S): Place an "X" in the box(es) next to all applicable frequency band(s).</p> <p><input type="checkbox"/> a. C-Band (4/6 GHz) <input type="checkbox"/> b. Ku-Band (12/14 GHz)</p> <p><input checked="" type="checkbox"/> c. Other (Please specify upper and lower frequencies in MHz.)</p> <p>Frequency Lower: 8025 Frequency Upper: 8400 (Please specify additional frequencies in an attachment)</p>	

TYPE OF STATION

25. CLASS OF STATION: Choose the button next to the class of station that applies. Choose only one.

(N/A) a. Fixed Earth Station
(N/A) b. Temporary–Fixed Earth Station
(N/A) c. 12/14 GHz VSAT Network
(N/A) d. Mobile Earth Station
 e. Geostationary Space Station.
 f. Non–Geostationary Space Station
 g. Other (please specify)

26. TYPE OF EARTH STATION FACILITY: Not Applicable

PURPOSE OF MODIFICATION

27. The purpose of this proposed modification is to: (Place an "X" in the box(es) next to all that apply.) Not Applicable

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 for new transmitting facilities, major modifications, or major amendments. Yes No

ALIEN OWNERSHIP

Earth station applicants not proposing to provide broadcast, common carrier, aeronautical en route or aeronautical fixed radio station services are not required to respond to Items 30–34.

29. Is the applicant a foreign government or the representative of any foreign government?	<input type="radio"/> Yes <input checked="" type="radio"/> No
30. Is the applicant an alien or the representative of an alien?	<input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> N/A
31. Is the applicant a corporation organized under the laws of any foreign government?	<input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> N/A
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 checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
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 checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
34. If any answer to questions 29, 30, 31, 32 and/or 33 is Yes, attach as an exhibit an identification of the aliens or foreign entities, their nationality, their relationship to the applicant, and the percentage of stock they own or vote.	Ownership Exhibit

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.

Yes No

36. Has the applicant or any party to this application or amendment 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 circumstances.

Yes No

37. Has the applicant, or any party to this application or amendment, 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 circumstances.

Yes 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 circumstances

Yes 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.

Yes No

40. If the applicant is a corporation and is applying for a space station license, attach as an exhibit the names, address, and citizenship of those stockholders owning a 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 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 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. Yes 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? See Narrative Statement

43. Description. (Summarize the nature of the application and the services to be provided). (If the complete description does not appear in this box, please go to the end of the form to view it in its entirety.)

ICEYE seeks authorization to launch and operate a small satellite non-geostationary orbit constellation to provide remote sensing in the Earth Exploration Satellite Service using Synthetic Aperture Radar.

Narrative Statement

43a. Geographic Service Rule Certification

By selecting A, the undersigned certifies that the applicant is not subject to the geographic service or geographic coverage requirements specified in 47 C.F.R. Part 25.

A

By selecting B, the undersigned certifies that the applicant is subject to the geographic service or geographic coverage requirements specified in 47 C.F.R. Part 25 and will comply with such requirements.

B

By selecting C, the undersigned certifies that the applicant is subject to the geographic service or geographic coverage requirements specified in 47 C.F.R. Part 25 and will not comply with such requirements because it is not feasible as a technical matter to do so, or that, while technically feasible, such services would require so many compromises in satellite design and operation as to make it economically unreasonable. A narrative description and technical analysis demonstrating this claim are attached.

C

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): (Choose the button next to applicable response.)

- Individual
- Unincorporated Association
- Partnership
- Corporation
- Governmental Entity
- Other (please specify)

45. Name of Person Signing
Dee Grover

46. Title of Person Signing
Vice President of Operations

47. Please supply any need attachments.

1: Technical Annex

2:

3:

**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).**

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