

Request for Experimental Authority

Iridium Satellite LLC (“Iridium”) seeks experimental authority to transmit from its space stations to the Air Force Institute of Technology’s (“AFIT”) Grissom-1 cubesat as a point of communication, since Iridium’s Part 25 space station license does not cover space-to-space communications.

Iridium requests an experimental license for 18 months, from February 1, 2021, to August 1, 2023. So that it can accommodate launch integrator requirements, Iridium requests that grant of the license be made on or before December 10, 2021. The 18 month time period reflects the 12-month scheduled duration of the mission plus six months to account for any possible launch or other technical delays common to spacecraft missions.

A single Iridium modem model 9603 will be installed on Grissom-1, which is scheduled to launch as a payload in February 2022. Grissom-1 is the inaugural flight of the Grissom 6U cubesat satellite bus. This maiden flight will validate the bus designed by AFIT and give the full suite of integrated systems onboard. Grissom-1 will carry two payloads: a passive retro-reflector to assist with cubesat identification via a “license plate” uniquely designed into the retroreflector; and a second payload consisting of a diffuse laser that flashes a unique sequence that can be detected optically on the ground to assist with cubesat identification. Additionally, Grissom-1 uses an Iridium 9603 modem as a backup transceiver to report errors and critical state of health information to AFIT when they occur. This is accomplished by cross-linking with an Iridium satellite for relay to the ground.

The 9603 modem will transmit from the Grissom-1 cubesat to space stations in Iridium’s “Big LEO” constellation, under authority to be obtained from the National Telecommunications and Information Administration.¹ Iridium hereby requests an experimental license to transmit in the reverse direction, from its Big LEO constellation to the modem on the Grissom-1 cubesat, in the 1618.725–1626.5 MHz band.

The technical characteristics of these transmissions will be identical to the technical characteristics of Iridium’s already-licensed space station transmissions.² Iridium’s space station constellation is licensed under Call Sign S2110. Because Iridium will be operating under the parameters of its license, no operating parameters, other than effective radiated power and emission designator, were used in the form that this exhibit accompanies. The only change from Iridium’s licensed operations is that

¹ See SPS 22290/3 and attached “Certification of Spectrum Support, Stage 4.”

² Iridium’s constellation is licensed under call sign S2110 and is comprised of 66 satellites, any one of which may be used as part of the experiment at any point in time.

Iridium will be adding the AFIT Grissom-1 modem as a point of communication. Iridium's space station license does not cover intersatellite communications in the 1618.725-1626.5 MHz band.



UNITED STATES DEPARTMENT OF COMMERCE
National Telecommunications and
Information Administration
INTERDEPARTMENT RADIO ADVISORY COMMITTEE
Washington, D.C. 20230

SPS 22290/3

Document Date: 9/24/2021

Agency: NTIA

Document Type: Certification of Spectrum Support, Stage 4

Air Force Cadet & SHFT & RSat & NPSAT1 S/U Cubesat Transceiver

Referenced Documents:

Doc. 43216/1

REQ: 21961/5 PA: 22261/1, 23205/1

Current Status:

Signed on 9/24/2021 to Certifications for September 2021

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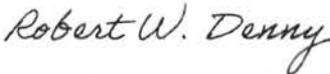
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FORM NTIA-44		U.S. DEPARTMENT OF COMMERCE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION		Classification UNCLASSIFIED		Control Number Doc. 43216/3 SPS-22290/3	
CERTIFICATION OF SPECTRUM SUPPORT							
Recipient Agency Air Force		System Cadet & SHFT & RSat & NPSAT1 & Grissom-1 S/U Cubesat Transceiver				Stage of Review 4 – Operational	
Section 1: OPERATING CHARACTERISTICS FOR WHICH SUPPORT IS CERTIFIED							
Frequency (MHz)	Emission	Mean Power (W)	Station Class	Transmit Location	Receive Location		
1616-1626.5	41K7Q7W	7	XT	Space (Grissom-1)	Space (Iridium)		
2278.7 2279.1	138KF1D 200KG1D 1M40G1D 2M45G1D	2	ET	Space (Cadet & SHFT & RSat & NPSAT1 & Grissom-1)	Huntsville, AL Fairbanks, AK Huntington Beach, CA Monterey, CA New London, CT Palm Bay, FL Honolulu, HI Blossom Point, MD Annapolis, MD Albuquerque, NM Wright Patterson AFB, OH Bryan, TX College Station, TX Logan, UT		
449.75 - 450.25 (receive)	12K5F1D 43K0F1D	N/A	TD	Huntsville, AL Fairbanks, AK Huntington Beach, CA Monterey, CA New London, CT Palm Bay, FL Honolulu, HI Blossom Point, MD Annapolis, MD Albuquerque, NM Wright Patterson AFB, OH Bryan, TX College Station, TX Logan, UT	Space (Cadet & SHFT & RSat & NPSAT1 & Grissom-1)		
Section 2: SOURCE DOCUMENTS							
Docket Number	Description of Document					Dated	
SPS-21961/7 SPS-24057/1	Air Force Replacement Request for Stage 4 System Review NTIA Preliminary Assessment					August 19, 2021 January 2, 2020	
Section 3: SPECTRUM PLANNING SUBCOMMITTEE (SPS) RECOMMENDATIONS							
<p>The SPS reviewed this system under the provisions of Chapter 10 of the NTIA Manual, noting that this system is supported by the MC3 ground stations certified on October 3, 2018 (SPS-21677/3), and each satellite will last less than a year, and recommends that:</p> <ol style="list-style-type: none"> 1. NTIA certify Stage 4 spectrum support for the Cadet & SHFT & RSat & NPSAT1 & Grissom-1 S/U Cubesat Transceiver as specified in Section 1. 							
Downgrading Instructions		Classification UNCLASSIFIED				Page Number 1 of 2	

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(continued from page 1)

2. Air Force be aware that, due to nonconformance of this system with the unwanted emission standards of Section 5.6.2 of the NTIA Manual for the use of the emission 200KG1D, the responsibility for eliminating any harmful interference caused by the nonconformance shall rest with the Air Force, in accordance with Section 5.1.2 of the NTIA Manual.
3. NTIA waive conformance with the power flux-density limits specified in Section 8.2.36 of the NTIA Manual for the downlink signal (space-to-Earth transmissions on the frequency 2278.7 MHz and 2279.1 MHz) which exceeds the recommended limits by as much as 10 dB for the Cadet & SHFT & RSat & Grissom-1 S/U Cubesat Transceiver, and by as much as 6.5 dB for the NPSAT1 S/U Cubesat Transceiver, but complies with the alternate limits stipulated in the guidance provided in SPS-12038/1. Air Force should be aware that conformance with the alternate pfd limits does not necessarily ensure complete electromagnetic compatibility with terrestrial telemetry equipment receiving in the band 2200-2290 MHz.
4. Air Force operate no more than 3 of the Cadet & SHFT & RSat & NPSAT1 & Grissom-1 S/U Cubesat satellites simultaneously in orbit.
5. Air Force, at least 90 days prior to each Cadet & SHFT & RSat & NPSAT1 & Grissom-1 S/U Cubesat launch, provide NASA the orbital parameters and ground station locations that will be used for the satellite.
6. Air Force coordinate frequency selection of uplinks in the 449.75 - 450.25 MHz band with NASA prior to each launch.
7. Air Force be aware that coordination with Iridium is required for use of the frequency band 1616-1626.5 MHz and that operation of this system is contingent upon Iridium successfully obtaining authorization from the FCC.
8. Air Force protect personnel from non-ionizing radiation levels that exceed generally accepted exposure criteria.

Name/Title of Certifying Official Robert W. Denny SPS Chairperson	Signature 	Date SEP 24 2021
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Section 4: NTIA CERTIFICATION

The Office of Spectrum Management concurs with the SPS recommendations in Section 3. This office certifies Stage 4 spectrum support for this system. This certification supersedes IRAC Doc. 43216/2 (SPS-22290/2) dated February 6, 2020.

Name/Title of Certifying Official Steven A. Molina Deputy Associate Administrator	Signature 	Date SEP 24 2021
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