



312 File Number: **SATAMD2021083100119**

Filing Description

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

**Satellite
Information**

Question	Response
Select Orbit Type	NGSO
Space Station or Satellite Network Name	ICEYE
Estimated Lifetime of Satellite(s) From Date of Launch	6 Years
Will the space station(s) operate on a Common Carrier basis?	No

Operating Frequency Bands (4)

Nature of service	Description	Frequency Band(s)	Mode Type
Earth Exploration-Satellite Service		9300.0 MHz -9900.0 MHz	Transmit
Earth Exploration-Satellite Service		2025.0 MHz -2110.0 MHz	Receive
Earth Exploration-Satellite Service		2200.0 MHz -2290.0 MHz	Transmit
Earth Exploration-Satellite Service		8025.0 MHz -8400.0 MHz	Transmit

**Orbital
Information For
Non-
Geostationary
Satellites**

Question	Response
Total Number of Satellites in the active constellation	6
Orbit Epoch Date	12/04/2021
Celestial Reference Body	Earth

Orbital Plane 1:

Question	Response
Number of Satellites in Plane	2
Inclination Angle	97.7 degrees
Right Ascension of Ascending Node	0.0 degrees
Argument of Perigee	0.0 degrees
Orbital Period	5400.0 seconds
Apogee	550.0 km
Perigee	550.0 km
Active Service Arc Begin Angle with respect to Ascending Node	0.0 degrees
Active Service Arc End Angle with respect to Ascending Node	90.0 degrees

Mean Anomaly For Each Satellite

Satellite Number	Mean Anomaly (degrees) at the Orbit Epoch Date
1	180.0
2	0.0

Orbital Plane 2:

Question	Response
Number of Satellites in Plane	2
Inclination Angle	97.7 degrees
Right Ascension of Ascending Node	120.0 degrees
Argument of Perigee	0.0 degrees
Orbital Period	5400.0 seconds
Apogee	550.0 km
Perigee	550.0 km
Active Service Arc Begin Angle with respect to Ascending Node	90.0 degrees
Active Service Arc End Angle with respect to Ascending Node	90.0 degrees

Mean Anomaly For Each Satellite

Satellite Number	Mean Anomaly (degrees) at the Orbit Epoch Date
1	180.0
2	0.0

Orbital Plane 3:

Question	Response
Number of Satellites in Plane	2
Inclination Angle	97.7 degrees
Right Ascension of Ascending Node	240.0 degrees
Argument of Perigee	0.0 degrees
Orbital Period	5400.0 seconds
Apogee	550.0 km
Perigee	550.0 km
Active Service Arc Begin Angle with respect to Ascending Node	180.0 degrees
Active Service Arc End Angle with respect to Ascending Node	180.0 degrees

Mean Anomaly For Each Satellite

Satellite Number	Mean Anomaly (degrees) at the Orbit Epoch Date
1	180.0
2	0.0

Receiving Beams 1:

Question	Response
Beam ID	Sup
Receive Beam Frequency	2025.0 MHz -2110.0 MHz
Beam Type	Fixed
Polarization	RHCP
Peak Gain	3.3 dBi
Antenna Pointing Error	0.0 degrees
Antenna Rotational Error	0.0 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	0.01 dB/K
Min. Saturation Flux Density	-200.0 dBW/m ²
Max. Saturation Flux Density	-197.0 dBW/m ²
Co- or Cross Polar Mode	C
Service Area Description	XAA

**Receiving
Channels (1)**

Channel ID	Channel Bandwidth (MHz)	Center Frequency s (MHz)	Feeder Link, Service Link or TT&C
Sup1	1.2	2086.9	TT&C

Transmitting Beams 1:

Question	Response
Beam ID	SAR
Transmit Beam Frequency	9300.0 MHz -9900.0 MHz
Beam Type	Both Steerable and Shapeable
Polarization	V
Peak Gain	41.6 dBi
Antenna Pointing Error	0.01 degrees
Antenna Rotational Error	0.0 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	0.0 degrees
Max. Transmit EIRP Density	-7.101 dBW/Hz
Max. Transmit EIRP	77.67 dBW
Co- or Cross Polar Mode	C
Service Area Description	N/A

Max. Power Flux Density

	* 0° - 5°	* 5° - 10°	* 10° - 15°	* 15° - 20°	* 20° - 25°	* 25° - 90°
*	(dBW/m ²	(dBW/m ²	(dBW/m ²	(dBW/m ²	(dBW/m ²	(dBW/m ²
BW:	/BW):	/BW):	/BW):	/BW):	/BW):	/BW):
4.0 kHz	-96.8	-97.0	-97.2	-97.2	-97.6	-108.0

Transmitting Beams 2:

Question	Response
Beam ID	Xdown
Transmit Beam Frequency	8025.0 MHz -8400.0 MHz

Beam Type	Steerable
Polarization	RHCP
Peak Gain	17.0 dBi
Antenna Pointing Error	0.01 degrees
Antenna Rotational Error	0.01 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-72.3 dBW/Hz
Max. Transmit EIRP	13.4 dBW
Co- or Cross Polar Mode	C
Service Area Description	XAA

Max. Power Flux Density

	* 0° - 5°	* 5° - 10°	* 10° - 15°	* 15° - 20°	* 20° - 25°	* 25° - 90°
*	(dBW/m ²	(dBW/m ²	(dBW/m ²	(dBW/m ²	(dBW/m ²	(dBW/m ²
BW:	/BW):	/BW):	/BW):	/BW):	/BW):	/BW):
4.0 kHz	-163.9	-162.2	-160.6	-159.3	-158.0	-151.8

Transmitting Beams 3:

Question	Response
Beam ID	Sttc
Transmit Beam Frequency	2200.0 MHz -2290.0 MHz
Beam Type	Fixed
Polarization	RHCP
Peak Gain	1.5 dBi
Antenna Pointing Error	0.0 degrees

Antenna Rotational Error	0.0 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-56.5 dBW/Hz
Max. Transmit EIRP	11.3 dBW
Co- or Cross Polar Mode	C
Service Area Description	XAA

Max. Power Flux Density

	* 0° - 5°	* 5° - 10°	* 10° - 15°	* 15° - 20°	* 20° - 25°	* 25° - 90°
*	(dBW/m ²	(dBW/m ²	(dBW/m ²	(dBW/m ²	(dBW/m ²	(dBW/m ²
BW:	/BW):	/BW):	/BW):	/BW):	/BW):	/BW):
4.0	-159.0	-148.7	-148.3	-148.1	-148.0	-147.0
kHz						

Transmitting Channels (7)

Channel ID	Channel Bandwidth (MHz)	Center Frequency s (MHz)	Feeder Link, Service Link or TT&C
Xdwn	375.0	8212.5	Service Link
Xdw2	150.0	8300.0	Service Link
Sdwn	6.0	2266.75	TT&C
SAR3	300.0	9650.0	Service Link
SAR2	200.0	9650.0	Service Link
SAR4	600.0	9600.0	Service Link
SAR1	150.0	9650.0	Service Link

Certification Questions

Question	Response
Are the applicable service area coverage requirements of 25.143(b)(2) (ii) and (iii), or 25.144(a)(3)(i), or 25.145 (c)(1) and (2), or 25.146(i)(1) and (2), or 25.148(c), or 25.225 met?	N/A
Are the applicable frequency tolerances of 25.202(e) and out-of-band emission limits of 25.202(f)(1),(2), and (3) met?	Yes
Are the cessation of emissions requirements of 25.207 met?	Yes
Are the applicable power-flux-density limits of 25.208 met, and is the appropriate technical showing provided within the application?	
For NGSO applications, are the applicable equivalent-power-flux-density limits of 25.208 met, and is the appropriate technical showing provided within the application?	Yes
Are the applicable full-frequency-reuse requirements of 25.210 met?	
If the application is for a 17/24 GHz BSS space station, will it be operated at an offset location with full power and interference protection in accordance with 25.262(b)?	

Attachments

File Name	Beam	Field	Attachment Type	Description
<u>ICEYE Application -- Exhibit B -- Technical Annex (Revised) -- FINAL -- 08.30.21.pdf</u>		NGSO Antenna Gain Data	PDF file (*.pdf)	Technical Annex
<u>ICEYE -- Schedule S with Highlighting to Show Changes -- FINAL -- 08.30.21.pdf</u>		NGSO Antenna Gain Data	PDF file (*.pdf)	Schedule S with highlighting to show changes from original, and margin comments to indicate where the correct response is "Not Applicable."