



312 File Number: **SATAMD2022063000067**

Filing Description

Question	Response
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Description	Applicant seeks authority to launch and operate the remaining 25 SV of an Earth Exploration Satellite Service (EESS) system.
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Satellite
Information

Question	Response
Select Orbit Type	NGSO
Space Station or Satellite Network Name	Landmapper
Estimated Lifetime of Satellite(s) From Date of Launch	15 Years
Will the space station(s) operate on a Common Carrier basis?	No

Operating
Frequency
Bands (3)

Nature of service	Description	Frequency Band(s)	Mode Type
Earth Exploration-Satellite Service		25500.0 MHz -27000.0 MHz	Transmit
Earth Exploration-Satellite Service		2025.0 MHz -2110.0 MHz	Receive
Space Operation Service		400.15 MHz -401.0 MHz	Transmit

**Orbital
Information For
Non-
Geostationary
Satellites**

Question	Response
Total Number of Satellites in the active constellation	25
Orbit Epoch Date	03/21/2022
Celestial Reference Body	Earth

Orbital Plane 1:

Question	Response
Number of Satellites in Plane	5
Inclination Angle	97.5 degrees
Right Ascension of Ascending Node	30.0 degrees
Argument of Perigee	0.0 degrees
Orbital Period	5708.0 seconds
Apogee	525.0 km
Perigee	525.0 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	0.0
2	72.0
3	144.0
4	216.0
5	288.0

Orbital Plane 2:

Question	Response
Number of Satellites in Plane	5
Inclination Angle	97.5 degrees
Right Ascension of Ascending Node	15.0 degrees
Argument of Perigee	0.0 degrees
Orbital Period	5708.0 seconds
Apogee	525.0 km

Perigee	525.0 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	14.4
2	86.4
3	302.4
4	230.4
5	158.4

Orbital Plane 3:

Question	Response
Number of Satellites in Plane	5
Inclination Angle	97.5 degrees
Right Ascension of Ascending Node	0.0 degrees
Argument of Perigee	0.0 degrees
Orbital Period	5708.0 seconds
Apogee	525.0 km
Perigee	525.0 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	316.8

2	244.8
3	172.8
4	100.8
5	28.8

Orbital Plane 4:

Question	Response
Number of Satellites in Plane	5
Inclination Angle	97.5 degrees
Right Ascension of Ascending Node	345.0 degrees
Argument of Perigee	0.0 degrees
Orbital Period	5708.0 seconds
Apogee	525.0 km
Perigee	525.0 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	331.2
2	43.2
3	115.2
4	187.2
5	259.2

Orbital Plane 5:

Question	Response
Number of Satellites in Plane	5

Inclination Angle	97.5 degrees
Right Ascension of Ascending Node	330.0 degrees
Argument of Perigee	0.0 degrees
Orbital Period	5708.0 seconds
Apogee	525.0 km
Perigee	525.0 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	57.6
2	129.6
3	201.6
4	273.6
5	345.6

Receiving Beams 1:

Question	Response
Beam ID	SCNT
Receive Beam Frequency	2045.0 MHz -2050.0 MHz
Beam Type	Steerable
Polarization	RHCP
Peak Gain	5.5 dBi
Antenna Pointing Error	0.01 degrees
Antenna Rotational Error	0.05 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	-22.3 dB/K
Min. Saturation Flux Density	-94.8 dBW/m2
Max. Saturation Flux Density	-93.9 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	NOR, ATA (Svalbard, Norway and Troll, Antarctica)

Receiving Beams 2:

Question	Response
Beam ID	SCMD
Receive Beam Frequency	2054.85 MHz -2056.15 MHz
Beam Type	Steerable
Polarization	RHCP
Peak Gain	5.5 dBi
Antenna Pointing Error	0.01 degrees
Antenna Rotational Error	0.05 degrees

Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	-20.2 dB/K
Min. Saturation Flux Density	-88.0 dBW/m2
Max. Saturation Flux Density	-76.0 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	NOR (Svalbard and Tromso, Norway)

Receiving
Channels (3)

Channel ID	Channel Bandwidth (MHz)	Center Frequency s (MHz)	Feeder Link, Service Link or TT&C
ACNT	5.0	2047.5	Service Link
CMD2	0.3	2056.0	TT&C
CMD1	0.3	2055.0	TT&C

Transmitting
Beams 1:

Question	Response
Beam ID	KaF
Transmit Beam Frequency	26550.0 MHz -27000.0 MHz
Beam Type	Steerable
Polarization	LHCP
Peak Gain	27.4 dBi
Antenna Pointing Error	0.01 degrees
Antenna Rotational Error	0.05 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-52.9 dBW/Hz
Max. Transmit EIRP	33.2 dBW
Co- or Cross Polar Mode	C
Service Area Description	NOR, ATA (Svalbard, Norway and Troll, Antarctica)

Max. Power Flux Density

	* 0° - 5°	* 5° - 10°	* 10° - 15°	* 15° - 20°	* 20° - 25°	* 25° - 90°
* (dBW/m ² /BW):	(dBW/m ² /BW):	(dBW/m ² /BW):	(dBW/m ² /BW):	(dBW/m ² /BW):	(dBW/m ² /BW):	(dBW/m ² /BW):
1.0 MHz	-127.4	-125.2	-123.2	-121.6	-120.1	-113.5

Transmitting
Beams 2:

Question	Response
Beam ID	KaE
Transmit Beam Frequency	26025.0 MHz -26475.0 MHz

Beam Type	Steerable
Polarization	LHCP
Peak Gain	27.4 dBi
Antenna Pointing Error	0.01 degrees
Antenna Rotational Error	0.05 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-52.9 dBW/Hz
Max. Transmit EIRP	33.2 dBW
Co- or Cross Polar Mode	C
Service Area Description	NOR, ATA (Svalbard, Norway and Troll, Antarctica)

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):
1.0 MHz	-127.4	-125.2	-123.2	-121.6	-120.1	-113.5

Transmitting Beams 3:

Question	Response
Beam ID	KaD
Transmit Beam Frequency	25500.0 MHz -25950.0 MHz
Beam Type	Steerable
Polarization	LHCP
Peak Gain	24.7 dBi
Antenna Pointing Error	0.01 degrees

Antenna Rotational Error	0.05 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-52.9 dBW/Hz
Max. Transmit EIRP	33.2 dBW
Co- or Cross Polar Mode	C
Service Area Description	NOR, ATA (Svalbard, Norway and Troll, Antarctica)

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):
1.0 MHz	-127.4	-125.2	-123.2	-121.6	-120.1	-113.5

Transmitting Beams 4:

Question	Response
Beam ID	KaC
Transmit Beam Frequency	26550.0 MHz -27000.0 MHz
Beam Type	Steerable
Polarization	RHCP
Peak Gain	27.4 dBi
Antenna Pointing Error	0.01 degrees
Antenna Rotational Error	0.05 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-52.9 dBW/Hz

Max. Transmit EIRP	33.2 dBW
Co- or Cross Polar Mode	C
Service Area Description	NOR, ATA (Svalbard, Norway and Troll, Antarctica)

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):
1.0 MHz	-127.4	-125.2	-123.2	-121.6	-120.1	-113.5

Transmitting Beams 5:

Question	Response
Beam ID	KaB
Transmit Beam Frequency	26025.0 MHz -26475.0 MHz
Beam Type	Steerable
Polarization	RHCP
Peak Gain	27.4 dBi
Antenna Pointing Error	0.01 degrees
Antenna Rotational Error	0.05 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-52.9 dBW/Hz
Max. Transmit EIRP	33.2 dBW
Co- or Cross Polar Mode	C
Service Area Description	NOR, ATA (Svalbard, Norway and Troll, Antarctica)

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):
1.0 MHz	-127.4	-125.2	-123.2	-121.6	-120.1	-113.5

Transmitting Beams 6:

Question	Response
Beam ID	KaA
Transmit Beam Frequency	25500.0 MHz -25950.0 MHz
Beam Type	Steerable
Polarization	RHCP
Peak Gain	27.4 dBi
Antenna Pointing Error	0.01 degrees
Antenna Rotational Error	0.05 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-52.9 dBW/Hz
Max. Transmit EIRP	33.2 dBW
Co- or Cross Polar Mode	C
Service Area Description	NOR, ATA (Svalbard, Norway and Troll, Antarctica)

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):

1.0 MHz	-127.4	-125.2	-123.2	-121.6	-120.1	-113.5
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**Transmitting
Beams 7:**

Question	Response
Beam ID	UTLM
Transmit Beam Frequency	400.48 MHz -400.52 MHz
Beam Type	Fixed
Polarization	H
Peak Gain	0.19 dBi
Antenna Pointing Error	0.0 degrees
Antenna Rotational Error	0.0 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	0.0 degrees
Max. Transmit EIRP Density	-40.8 dBW/Hz
Max. Transmit EIRP	5.21 dBW
Co- or Cross Polar Mode	C
Service Area Description	CA, NOR (Santa Clara, California and Tromso, Norway)

Max. Power Flux Density

	* 0° - 5°	* 5° - 10°	* 10° - 15°	* 15° - 20°	* 20° - 25°	* 25° - 90°
* BW:	(dBW/m ² /BW):	(dBW/m ² /BW):	(dBW/m ² /BW):	(dBW/m ² /BW):	(dBW/m ² /BW):	(dBW/m ² /BW):
4.0 kHz	-139.3	-137.1	-135.1	-133.4	-132.0	-125.3

Transmitting
Channels (7)

Channel ID	Channel Bandwidth (MHz)	Center Frequency s (MHz)	Feeder Link, Service Link or TT&C
UTLM	0.04	400.5	TT&C
BRH	450.0	26250.0	Service Link
CRH	450.0	26775.0	Service Link
ALH	450.0	25725.0	Service Link
ARH	450.0	25725.0	Service Link
BLH	450.0	26250.0	Service Link
CLH	450.0	26775.0	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?	Yes
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?	N/A
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>SCNT_Troll.gxt</u>	SCNT	NGSO Antenna Gain Data	GXT file (*.gxt)	Beam Projection at Troll GW ES site
<u>SCMD_Tromso.gxt</u>	SCMD	NGSO Antenna Gain Data	GXT file (*.gxt)	Beam Projection at Troll GW ES site
<u>KaF_Troll.gxt</u>	KaF	NGSO Antenna Gain Data	GXT file (*.gxt)	Beam Projection at Troll GW ES site
<u>KaE_Svalbard.gxt</u>	KaE	NGSO Antenna Gain Data	GXT file (*.gxt)	Beam Projection at Svalbard GW ES site
<u>KaD_Troll.gxt</u>	KaD	NGSO Antenna Gain Data	GXT file (*.gxt)	Beam Projection at Troll GW ES site
<u>KaC_Svalbard.gxt</u>	KaC	NGSO Antenna Gain Data	GXT file (*.gxt)	Beam Projection at Svalbard GW ES site
<u>KaB_Troll.gxt</u>	KaB	NGSO Antenna Gain Data	GXT file (*.gxt)	Beam Projection at Troll GW ES site
<u>KaA_KaF_Troll.gxt</u>	KaA	NGSO Antenna Gain Data	GXT file (*.gxt)	Beam Projection at Troll GW ES site
<u>KaA_KaF_Svalbard.gxt</u>	KaA	NGSO Antenna Gain Data	GXT file (*.gxt)	Beam Projection at Svalbard GW ES site