Approved by OMB 3060-0678
Estimated Burden: up to 80 hours
April 2016

Federal Communications Commission

312 File Number: **SATMOD2021031900036**

Filing Description

Question	Response
Description	This update (dated February 2021) corrects the Schedule S to include the frequency information provided to the FCC. See Letter from Chris Biddy, CEO, Astro Digital, to Marlene Dortch, Secretary, FCC, SAT-AMD-20200528-00064 et al. (filed Aug. 14, 2020).

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 (7)

Nature of service	Description	Frequency Band (s)	Mode Type
Earth Exploration-Satellite Service		29900.0 MHz -30000.0 MHz	Receive
Earth Exploration-Satellite Service		402.0 MHz -403.0 MHz	Receive
Other Satellite Service (please specify)	Inter-Satellite Service	1615.0 MHz -1617.775 MHz	Transmit
Other Satellite Service (please specify)	Inter-Satellite Service	2483.5 MHz -2500.0 MHz	Receive
Space Operation Service		2025.0 MHz -2110.0 MHz	Receive
Space Operation Service		400.15 MHz -401.0 MHz	Transmit
Earth Exploration-Satellite Service		25500.0 MHz -27000.0 MHz	Transmit

Orbital Information For Non-Geostationary Satellites

Question	Response
Total Number of Satellites in the active constellation	30
Orbit Epoch Date	03/21/2017
Celestrial Reference Body	Earth

Orbital Plane 1:

Question	Response
Number of Satellites in Plane	5
Inclination Angle	97.73 degrees
Right Ascension of Ascending Node	30.0 degrees
Argument of Perigee	0.0 degrees
Orbital Period	5782.5 seconds
Apogee	608.0 km
Perigee	562.0 km
Active Service Arc Begin Angle with respect to Ascending Node	45.0 degrees
Active Service Arc End Angle with respect to Ascending Node	135.0 degrees

Mean Anomaly For Each Satellite

Satellite Number	Mean Anomaly (degrees) at the Orbit Epoch Date
1	288.0
2	216.0
3	144.0
4	72.0
5	0.0

Orbital Plane 2:

Question	Response
Number of Satellites in Plane	5
Inclination Angle	97.73 degrees
Right Ascension of Ascending Node	330.0 degrees
Argument of Perigee	0.0 degrees
Orbital Period	5782.5 seconds
Apogee	608.0 km

Perigee	562.0 km
Active Service Arc Begin Angle with respect to Ascending Node	45.0 degrees
Active Service Arc End Angle with respect to Ascending Node	135.0 degrees

Mean Anomaly For Each Satellite

Satellite Number	Mean Anomaly (degrees) at the Orbit Epoch Date
1	0.0
2	72.0
3	288.0
4	216.0
5	144.0

Orbital Plane 3:

Question	Response
Number of Satellites in Plane	10
Inclination Angle	97.73 degrees
Right Ascension of Ascending Node	30.0 degrees
Argument of Perigee	0.0 degrees
Orbital Period	5782.5 seconds
Apogee	608.0 km
Perigee	562.0 km
Active Service Arc Begin Angle with respect to Ascending Node	45.0 degrees
Active Service Arc End Angle with respect to Ascending Node	135.0 degrees

Mean Anomaly For Each Satellite

Satellite Number	Mean Anomaly (degrees) at the Orbit Epoch Date
1	324.0

2	288.0
3	252.0
4	216.0
5	180.0
6	144.0
7	108.0
8	72.0
9	36.0
10	0.0

Orbital Plane 4:

Question	Response
Number of Satellites in Plane	10
Inclination Angle	97.73 degrees
Right Ascension of Ascending Node	330.0 degrees
Argument of Perigee	0.0 degrees
Orbital Period	5782.5 seconds
Apogee	608.0 km
Perigee	562.0 km
Active Service Arc Begin Angle with respect to Ascending Node	45.0 degrees
Active Service Arc End Angle with respect to Ascending Node	135.0 degrees

Mean Anomaly For Each Satellite

Satellite Number	Mean Anomaly (degrees) at the Orbit Epoch Date
1	324.0
2	288.0
3	252.0

4	216.0
5	180.0
6	144.0
7	108.0
8	72.0
9	36.0
10	0.0

Receiving Beams 1:

Question	Response
Beam ID	KaRX
Receive Beam Frequency	29900.0 MHz -30000.0 MHz
Beam Type	Fixed
Polarization	LHCP
Peak Gain	15.0 dBi
Antenna Pointing Error	0.05 degrees
Antenna Rotational Error	0.1 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	-12.5 dB/K
Min. Saturation Flux Density	-75.0 dBW/m2
Max. Saturation Flux Density	-56.7 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	This is a high-speed directional Ka-band link for adjusting the properties of the high-speed Ka-band downlink beam KaTX. For Antenna Pattern and Beam Contour, see Exhibit 43, Attachments B and C.

Receiving Beams 2:

Question	Response

Beam ID	URX1
Receive Beam Frequency	402.0 MHz -403.0 MHz
Beam Type	Fixed
Polarization	H
Peak Gain	2.15 dBi
Antenna Pointing Error	0.05 degrees
Antenna Rotational Error	0.1 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	0.0 degrees
G/T at Max. Gain Point	-28.3 dB/K
Min. Saturation Flux Density	-98.2 dBW/m2
Max. Saturation Flux Density	-79.5 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	This is an omni-directonal dipole-like antenna intended for T & C purposes. For this UHF Antenna Pattern and Beam Contour, please See Exhibit 43, Attachments C and D.

Receiving Beams 3:

Question	Response
Beam ID	SRX1
Receive Beam Frequency	2025.0 MHz -2110.0 MHz
Beam Type	Fixed

Polarization	RHCP
Peak Gain	6.0 dBi
Antenna Pointing Error	0.05 degrees
Antenna Rotational Error	0.1 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	-19.3 dB/K
Min. Saturation Flux Density	-93.5 dBW/m2
Max. Saturation Flux Density	-75.3 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	This is a single patch antenna for Command reception. For Antenna Pattern and Beam Contour Information, see Exhibit 43, Attachments B and C.

Receiving Beams 4:

Question	Response
Beam ID	GSRX
Receive Beam Frequency	2483.5 MHz -2500.0 MHz
Beam Type	Fixed
Polarization	LHCP
Peak Gain	4.5 dBi
Antenna Pointing Error	0.05 degrees

Antenna Rotational Error	0.1 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	-17.8 dB/K
Min. Saturation Flux Density	-126.4 dBW/m2
Max. Saturation Flux Density	-120.4 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	This is the RX Antenna to receive signals from the Globalstar constellation satellites. For Antenna Pattern and Gain Contour information about this beam please see Exhibit 43, Attachments B and C.

Receiving Channels (4)

Channel ID	Channel Bandwidth (MHz)	Center Frequency s (MHz)	Feeder Link, Service Link or TT&C
GSRX	1.23	2491.75	TT&C
KaRX	30.0	29950.0	Service Link
URX1	0.04	402.6	TT&C
SRX1	0.3	2048.0	TT&C

Transmitting Beams 1:

Question	Response
Beam ID	KaTX
Transmit Beam Frequency	25500.0 MHz -27000.0 MHz
Beam Type	Fixed
Polarization	LHCP
Peak Gain	23.5 dBi
Antenna Pointing Error	0.05 degrees
Antenna Rotational Error	0.1 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-58.97 dBW/Hz
Max. Transmit EIRP	28.81 dBW
Co- or Cross Polar Mode	C
Service Area Description	This antenna is the primary high speed downlink for EESS imagery during Phase 3 of the Landmapper program. For more detail regarding the Antenna Pattern and the Beam Contour of this beam, please see Exhibit 43, Attachments C and D.

Max. Power Flux Density

* BW:	* 0° - 5° (dbW/m^2 /BW):	* 5° - 10° (dbW/m^2 /BW):	* 10° - 15° (dbW/m^2 /BW):	* 15° - 20° (dbW/m^2 /BW):	* 20° - 25° (dbW/m^2 /BW):	* 25° - 90° (dbW/m^2 /BW):
1.0 MHz	-132.7	-130.5	-128.5	-126.8	-125.4	-118.7

Transmitting Beams 2:

Question	Response
Beam ID	GSTX
Transmit Beam Frequency	1615.0 MHz -1617.775 MHz
Beam Type	Fixed
Polarization	LHCP
Peak Gain	4.5 dBi
Antenna Pointing Error	0.05 degrees
Antenna Rotational Error	0.1 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-58.04 dBW/Hz
Max. Transmit EIRP	2.86 dBW
Co- or Cross Polar Mode	C

Service Area Description	This is the Telemetry crosslink from Landmapper satellites to the Globalstar Constellation. For more information regarding the Antenna Patterns and the Beam Contours for this beam, please see Exhibit 43, Attachments C and D.

Max. Power Flux Density

* BW:	* 0° - 5° (dbW/m^2 /BW):	* 5° - 10° (dbW/m^2 /BW):	* 10° - 15° (dbW/m^2 /BW):	* 15° - 20° (dbW/m^2 /BW):	* 20° - 25° (dbW/m^2 /BW):	* 25° - 90° (dbW/m^2 /BW):
1.0 MHz	-146.5	-144.1	-141.9	-139.8	-137.9	-127.0

Transmitting Beams 3:

Question	Response
Beam ID	UTX4
Transmit Beam Frequency	400.15 MHz -401.0 MHz
Beam Type	Fixed
Polarization	H
Peak Gain	2.15 dBi
Antenna Pointing Error	0.05 degrees
Antenna Rotational Error	0.1 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees

Max. Transmit EIRP Density	-40.6 dBW/Hz
Max. Transmit EIRP	5.6 dBW
Co- or Cross Polar Mode	C
Service Area Description	This is the UHF Telemetry Link in Phase 2 of the program at the highest power setting. For information regarding the UHF Antenna Patterns for the CORVUS-BC and CORVUS-HD variant satellites, please see Exhibit 43, Attachments C & D.

Max. Power Flux Density

* BW:	* 0° - 5° (dbW/m^2 /BW):	* 5° - 10° (dbW/m^2 /BW):	* 10° - 15° (dbW/m^2 /BW):	* 15° - 20° (dbW/m^2 /BW):	* 20° - 25° (dbW/m^2 /BW):	* 25° - 90° (dbW/m^2 /BW):
4.0 kHz	-136.8	-124.6	-122.7	-121.0	-119.6	-112.6

Transmitting Channels (3)

Channel ID	Channel Bandwidth (MHz)	Center Frequency s (MHz)	Feeder Link, Service Link or TT&C
GSTX	1.23	1616.8625	TT&C
UTX4	0.04	400.175	TT&C
KaTX	600.0	26700.0	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?	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

Information not provided.