



312 File Number: **SATMOD2018091200070**

Filing Description

Question	Response
Description	For MSAT-2 modification filed Sept 12 2018

Satellite Information

Question	Response
Select Orbit Type	GSO
Space Station or Satellite Network Name	MSAT-2
Estimated Lifetime of Satellite(s) From Date of Launch	10 Years
Will the space station(s) operate on a Common Carrier basis?	No

Operating Frequency Bands (8)

Nature of service	Description	Frequency Band(s)	Mode Type
Mobile-Satellite Service		1631.5 MHz -1660.5 MHz	Receive
Mobile-Satellite Service		1530.0 MHz -1559.0 MHz	Transmit
Fixed-Satellite Service		13000.0 MHz -13250.0 MHz	Receive
Fixed-Satellite Service		10750.0 MHz -10950.0 MHz	Transmit
Fixed-Satellite Service		11700.35 MHz -11700.65 MHz	Transmit
Fixed-Satellite Service		11700.85 MHz -11701.15 MHz	Transmit
Fixed-Satellite Service		14000.0 MHz -14001.0 MHz	Receive
Fixed-Satellite Service		14499.0 MHz -14500.0 MHz	Receive

Orbital Information For Geostationary Satellites

Section	Question	Response
Orbital Longitude Information	Orbital Longitude	107.0 degrees
	Hemisphere of Orbital Longitude	W
Longitudinal Tolerance or East /West Station-Keeping	Toward West	0.1 degrees
	Toward East	0.1 degrees
Inclination Excursion or North /South Station-Keeping Tolerance	Inclination Excursion or North /South Station-Keeping Tolerance	13.5 degrees
Antenna Axis Attitude Accuracy	Roll	0.3 degrees
	Pitch	0.3 degrees
	Yaw	0.43 degrees

Receiving Beams 1:

Question	Response
Beam ID	LR1
Receive Beam Frequency	1631.5 MHz -1660.5 MHz
Beam Type	Fixed
Polarization	RHCP
Peak Gain	34.0 dBi
Antenna Pointing Error	0.12 degrees
Antenna Rotational Error	0.2 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	3.2 dB/K
Min. Saturation Flux Density	-104.1 dBW/m ²
Max. Saturation Flux Density	-89.1 dBW/m ²
Co- or Cross Polar Mode	C
Service Area Description	LA1 -- CONUS, Alaska, Canada, and as shown

Receiving Beams 2:

Question	Response
Beam ID	LR2
Receive Beam Frequency	1631.5 MHz -1660.5 MHz
Beam Type	Fixed
Polarization	RHCP
Peak Gain	34.0 dBi
Antenna Pointing Error	0.12 degrees
Antenna Rotational Error	0.2 degrees

Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	3.2 dB/K
Min. Saturation Flux Density	-103.1 dBW/m2
Max. Saturation Flux Density	-88.1 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	LA1 -- CONUS, Alaska, Canada, and as shown

Receiving Beams 3:

Question	Response
Beam ID	LR3
Receive Beam Frequency	1631.5 MHz -1660.5 MHz
Beam Type	Fixed
Polarization	RHCP
Peak Gain	34.0 dBi
Antenna Pointing Error	0.12 degrees
Antenna Rotational Error	0.2 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	3.2 dB/K
Min. Saturation Flux Density	-101.9 dBW/m2
Max. Saturation Flux Density	-86.9 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	LA1 -- CONUS, Alaska, Canada, and as shown

Receiving Beams 4:

Question	Response
Beam ID	LR4
Receive Beam Frequency	1631.5 MHz -1660.5 MHz
Beam Type	Fixed
Polarization	RHCP
Peak Gain	34.0 dBi
Antenna Pointing Error	0.12 degrees
Antenna Rotational Error	0.2 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	3.2 dB/K
Min. Saturation Flux Density	-104.1 dBW/m2
Max. Saturation Flux Density	-89.1 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	LA1 -- CONUS, Alaska, Canada, and as shown

Receiving Beams 5:

Question	Response
Beam ID	LR5
Receive Beam Frequency	1631.5 MHz -1660.5 MHz
Beam Type	Fixed
Polarization	RHCP
Peak Gain	30.0 dBi
Antenna Pointing Error	0.12 degrees
Antenna Rotational Error	0.2 degrees
Polarization Switchable	

Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	-0.8 dB/K
Min. Saturation Flux Density	-100.7 dBW/m2
Max. Saturation Flux Density	-85.7 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	LA1 -- CONUS, Alaska, Canada, and as shown

Receiving Beams 6:

Question	Response
Beam ID	LR6
Receive Beam Frequency	1631.5 MHz -1660.5 MHz
Beam Type	Fixed
Polarization	RHCP
Peak Gain	30.0 dBi
Antenna Pointing Error	0.12 degrees
Antenna Rotational Error	0.2 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	-0.8 dB/K
Min. Saturation Flux Density	-100.7 dBW/m2
Max. Saturation Flux Density	-85.7 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	LA2 -- Hawaii

Receiving Beams 7:

Question	Response
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Beam ID	KU1
Receive Beam Frequency	13000.0 MHz -13250.0 MHz
Beam Type	Fixed
Polarization	H
Peak Gain	29.2 dBi
Antenna Pointing Error	0.12 degrees
Antenna Rotational Error	0.2 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	0.0 degrees
G/T at Max. Gain Point	-3.6 dB/K
Min. Saturation Flux Density	-90.5 dBW/m2
Max. Saturation Flux Density	-75.5 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	KU1 -- CONUS, Alaska, Canada, Hawaii and as shown

Receiving Beams 8:

Question	Response
Beam ID	OMNI
Receive Beam Frequency	14499.0 MHz -14500.0 MHz
Beam Type	Fixed
Polarization	V
Peak Gain	2.0 dBi
Antenna Pointing Error	0.12 degrees
Antenna Rotational Error	0.2 degrees
Polarization Switchable	

Polarization Alignment Relative to the Equatorial Plane	0.0 degrees
G/T at Max. Gain Point	-8.0 dB/K
Min. Saturation Flux Density	-67.5 dBW/m2
Max. Saturation Flux Density	-52.5 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	OMNI -- Global

Receiving Beams 9:

Question	Response
Beam ID	KU1a
Receive Beam Frequency	14000.0 MHz -14001.0 MHz
Beam Type	Fixed
Polarization	H
Peak Gain	29.2 dBi
Antenna Pointing Error	0.12 degrees
Antenna Rotational Error	0.2 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	0.0 degrees
G/T at Max. Gain Point	-3.6 dB/K
Min. Saturation Flux Density	-90.5 dBW/m2
Max. Saturation Flux Density	-75.5 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	KU1 -- CONUS, Alaska, Canada, Hawaii and as shown

Receiving Channels (4)

Channel ID	Channel Bandwidth (MHz)	Center Frequency s (MHz)	Feeder Link, Service Link or TT&C
COMH	0.1	14000.5	TT&C
COMN	0.1	14499.5	TT&C
KUU	200.0	13125.0	Feeder Link
LU	29.0	1646.0	Service Link

Transmitting Beams 1:

Question	Response
Beam ID	LE1
Transmit Beam Frequency	1530.0 MHz -1559.0 MHz
Beam Type	Fixed
Polarization	RHCP
Peak Gain	34.0 dBi
Antenna Pointing Error	0.12 degrees
Antenna Rotational Error	0.2 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	0.0 dBW/Hz
Max. Transmit EIRP	57.3 dBW
Co- or Cross Polar Mode	C
Service Area Description	LA1 -- CONUS, Alaska, Canada, and as shown

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):
Hz	-134.2	-134.0	-133.9	-133.8	-133.7	-133.7

Transmitting Beams 2:

Question	Response
Beam ID	LE2
Transmit Beam Frequency	1530.0 MHz -1559.0 MHz
Beam Type	Fixed

Polarization	RHCP
Peak Gain	34.0 dBi
Antenna Pointing Error	0.12 degrees
Antenna Rotational Error	0.2 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	0.0 dBW/Hz
Max. Transmit EIRP	57.3 dBW
Co- or Cross Polar Mode	C
Service Area Description	LA1 -- CONUS, Alaska, Canada, and as shown

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):
Hz	-134.2	-134.0	-133.9	-133.8	-133.7	-133.7

Transmitting Beams 3:

Question	Response
Beam ID	LE3
Transmit Beam Frequency	1530.0 MHz -1559.0 MHz
Beam Type	Fixed
Polarization	RHCP
Peak Gain	34.0 dBi
Antenna Pointing Error	0.12 degrees
Antenna Rotational Error	0.2 degrees
Polarization Switchable	

Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	0.0 dBW/Hz
Max. Transmit EIRP	57.3 dBW
Co- or Cross Polar Mode	C
Service Area Description	LA1 -- CONUS, Alaska, Canada, and as shown

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):
Hz	-134.2	-134.0	-133.9	-133.8	-133.7	-133.7

Transmitting Beams 4:

Question	Response
Beam ID	LE4
Transmit Beam Frequency	1530.0 MHz -1559.0 MHz
Beam Type	Fixed
Polarization	RHCP
Peak Gain	34.0 dBi
Antenna Pointing Error	0.12 degrees
Antenna Rotational Error	0.2 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	0.0 dBW/Hz
Max. Transmit EIRP	57.3 dBW
Co- or Cross Polar Mode	C

Service Area Description

LA1 -- CONUS, Alaska, Canada,
and as shown

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):
Hz	-134.2	-134.0	-133.9	-133.8	-133.7	-133.7

Transmitting Beams 5:

Question	Response
Beam ID	LE5
Transmit Beam Frequency	1530.0 MHz -1559.0 MHz
Beam Type	Fixed
Polarization	RHCP
Peak Gain	30.0 dBi
Antenna Pointing Error	0.12 degrees
Antenna Rotational Error	0.2 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	0.0 dBW/Hz
Max. Transmit EIRP	57.3 dBW
Co- or Cross Polar Mode	C
Service Area Description	LA1 -- CONUS, Alaska, Canada, and as shown

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):
Hz	-134.2	-134.0	-133.9	-133.8	-133.7	-133.7

Transmitting Beams 6:

Question	Response
Beam ID	LE6
Transmit Beam Frequency	1530.0 MHz -1559.0 MHz
Beam Type	Fixed
Polarization	RHCP
Peak Gain	30.0 dBi
Antenna Pointing Error	0.12 degrees
Antenna Rotational Error	0.2 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	0.0 dBW/Hz
Max. Transmit EIRP	57.3 dBW
Co- or Cross Polar Mode	C
Service Area Description	LA2 -- Hawaii

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):
Hz	-134.2	-134.0	-133.9	-133.8	-133.7	-133.7

Transmitting Beams 7:

Question	Response
Beam ID	KUE
Transmit Beam Frequency	10750.0 MHz -10950.0 MHz
Beam Type	Fixed
Polarization	V
Peak Gain	29.2 dBi
Antenna Pointing Error	0.12 degrees
Antenna Rotational Error	0.2 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	90.0 degrees
Max. Transmit EIRP Density	-35.0 dBW/Hz
Max. Transmit EIRP	36.2 dBW
Co- or Cross Polar Mode	C
Service Area Description	KU1 -- CONUS, Alaska, Canada, Hawaii and as shown

Max. Power Flux Density

	* 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):
Hz	-159.6	-159.4	-159.3	-159.2	-159.1	-159.1

Transmitting Beams 8:

Question	Response
Beam ID	KUaE
Transmit Beam Frequency	11700.35 MHz -11700.65 MHz
Beam Type	Fixed
Polarization	H

Peak Gain	29.2 dBi
Antenna Pointing Error	0.12 degrees
Antenna Rotational Error	0.2 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	90.0 degrees
Max. Transmit EIRP Density	-35.0 dBW/Hz
Max. Transmit EIRP	36.2 dBW
Co- or Cross Polar Mode	C
Service Area Description	KU1 -- CONUS, Alaska, Canada, Hawaii and as shown

Max. Power Flux Density

Information not provided.

Transmitting Beams 9:

Question	Response
Beam ID	KUbE
Transmit Beam Frequency	11700.85 MHz -11701.15 MHz
Beam Type	Fixed
Polarization	H
Peak Gain	29.2 dBi
Antenna Pointing Error	0.12 degrees
Antenna Rotational Error	0.2 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	90.0 degrees
Max. Transmit EIRP Density	-35.0 dBW/Hz
Max. Transmit EIRP	36.2 dBW
Co- or Cross Polar Mode	C

Service Area Description

KU1 -- CONUS, Alaska, Canada,
Hawaii and as shown

Max. Power Flux Density

Information not provided.

Transmitting Beams 10:

Question	Response
Beam ID	OMNE
Transmit Beam Frequency	11700.35 MHz -11700.65 MHz
Beam Type	Fixed
Polarization	V
Peak Gain	2.0 dBi
Antenna Pointing Error	0.12 degrees
Antenna Rotational Error	0.2 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	90.0 degrees
Max. Transmit EIRP Density	-38.5 dBW/Hz
Max. Transmit EIRP	7.4 dBW
Co- or Cross Polar Mode	C
Service Area Description	OMNI -- Global

Max. Power Flux Density

Information not provided.

Transmitting Beams 11:

Question	Response
Beam ID	OMNa
Transmit Beam Frequency	11700.85 MHz -11701.15 MHz

Beam Type	Fixed
Polarization	V
Peak Gain	2.0 dBi
Antenna Pointing Error	0.12 degrees
Antenna Rotational Error	0.2 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	90.0 degrees
Max. Transmit EIRP Density	-38.5 dBW/Hz
Max. Transmit EIRP	7.4 dBW
Co- or Cross Polar Mode	C
Service Area Description	OMNI -- Global

Max. Power Flux Density

Information not provided.

Transmitting Channels (8)

Channel ID	Channel Bandwidth (MHz)	Center Frequency s (MHz)	Feeder Link, Service Link or TT&C
LD	29.0	1544.5	Service Link
THG1	0.3	11701.0	TT&C
THG2	0.3	11700.5	TT&C
TOM1	0.3	11701.0	TT&C
TOM2	0.3	11700.5	TT&C
KUD	200.0	10850.0	Feeder Link
BEA1	0.001	10753.5	TT&C
BEA2	0.001	10751.0	TT&C

Certification Questions

Question	Response
<p>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?</p>	<p>N/A</p>
<p>Are the applicable frequency tolerances of 25.202(e) and out-of-band emission limits of 25.202(f)(1),(2), and (3) met?</p>	<p>Yes</p>
<p>Are the cessation of emissions requirements of 25.207 met?</p>	<p>Yes</p>
<p>Are the applicable power-flux-density limits of 25.208 met, and is the appropriate technical showing provided within the application?</p>	
<p>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?</p>	<p>N/A</p>
<p>Are the applicable full-frequency-reuse requirements of 25.210 met?</p>	<p>Yes</p>
<p>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)?</p>	

Attachments

File Name	Beam	Field	Attachment Type	Description
OMNa.gxt	OMNa	GSO Antenna Gain Contour Data	GXT file (*.gxt)	
OMNE.gxt	OMNE	GSO Antenna Gain Contour Data	GXT file (*.gxt)	
KUbE.gxt	KUbE	GSO Antenna Gain Contour Data	GXT file (*.gxt)	
KUaE.gxt	KUaE	GSO Antenna Gain Contour Data	GXT file (*.gxt)	
KUE.gxt	KUE	GSO Antenna Gain Contour Data	GXT file (*.gxt)	
KU1aR.gxt	KU1a	GSO Antenna Gain Contour Data	GXT file (*.gxt)	
KU1R.gxt	KU1	GSO Antenna Gain Contour Data	GXT file (*.gxt)	
Omni_SA.gxt		Service Area Diagram	GXT file (*.gxt)	For all beams with OMNI service area description
KU_SA.gxt		Service Area Diagram	GXT file (*.gxt)	For all beams with KU1 service area description
LE5.gxt	LE5	GSO Antenna Gain Contour Data	GXT file (*.gxt)	
LE6.gxt	LE6	GSO Antenna Gain Contour Data	GXT file (*.gxt)	
HI_SA.gxt		Service Area Diagram	GXT file (*.gxt)	For all beams with LA2 service description

<u>CONUS_SA.gxt</u>		Service Area Diagram	GXT file (*.gxt)	For all beams with LA1 service area description
<u>LE4.gxt</u>	LE4	GSO Antenna Gain Contour Data	GXT file (*.gxt)	
<u>LE3.gxt</u>	LE3	GSO Antenna Gain Contour Data	GXT file (*.gxt)	
<u>LE2.gxt</u>	LE2	GSO Antenna Gain Contour Data	GXT file (*.gxt)	
<u>LE1.gxt</u>	LE1	GSO Antenna Gain Contour Data	GXT file (*.gxt)	
<u>OMNI-R.gxt</u>	OMNI	GSO Antenna Gain Contour Data	GXT file (*.gxt)	
<u>LR6.gxt</u>	LR6	GSO Antenna Gain Contour Data	GXT file (*.gxt)	
<u>LR5.gxt</u>	LR5	GSO Antenna Gain Contour Data	GXT file (*.gxt)	
<u>LR4.gxt</u>	LR4	GSO Antenna Gain Contour Data	GXT file (*.gxt)	
<u>LR3.gxt</u>	LR3	GSO Antenna Gain Contour Data	GXT file (*.gxt)	
<u>LR2.gxt</u>	LR2	GSO Antenna Gain Contour Data	GXT file (*.gxt)	
<u>LR1.gxt</u>	LR1	GSO Antenna Gain Contour Data	GXT file (*.gxt)	

