



312 File Number: **SATAMD2022121600175**

Filing Description

Question	Response
Description	Very-High Frequency TT&C Beacons on SpaceX Gen2 Satellite Constellation

Satellite
Information

Question	Response
Select Orbit Type	NGSO
Space Station or Satellite Network Name	SpaceX Gen2
Estimated Lifetime of Satellite(s) From Date of Launch	5 Years
Will the space station(s) operate on a Common Carrier basis?	No

Operating
Frequency
Bands (2)

Nature of service	Description	Frequency Band(s)	Mode Type
Mobile-Satellite Service		137.0 MHz -138.0 MHz	Transmit
Mobile-Satellite Service		148.0 MHz -150.0 MHz	Receive

**Orbital
Information For
Non-
Geostationary
Satellites**

Question	Response
Total Number of Satellites in the active constellation	3
Orbit Epoch Date	01/01/2015
Celestial Reference Body	Earth

Orbital Plane 1:

Question	Response
Number of Satellites in Plane	1
Inclination Angle	53.0 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	0.0 degrees
Active Service Arc End Angle with respect to Ascending Node	0.0 degrees

Mean Anomaly For Each Satellite

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

Orbital Plane 2:

Question	Response
Number of Satellites in Plane	1
Inclination Angle	43.0 degrees
Right Ascension of Ascending Node	0.0 degrees
Argument of Perigee	0.0 degrees
Orbital Period	5714.0 seconds
Apogee	530.0 km
Perigee	530.0 km
Active Service Arc Begin Angle with respect to Ascending Node	-43.0 degrees
Active Service Arc End Angle with respect to Ascending Node	43.0 degrees

Mean Anomaly For Each Satellite

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

Orbital Plane 3:

Question	Response
Number of Satellites in Plane	1
Inclination Angle	33.0 degrees
Right Ascension of Ascending Node	0.0 degrees
Argument of Perigee	0.0 degrees
Orbital Period	5720.0 seconds
Apogee	535.0 km
Perigee	535.0 km
Active Service Arc Begin Angle with respect to Ascending Node	-33.0 degrees
Active Service Arc End Angle with respect to Ascending Node	33.0 degrees

Mean Anomaly For Each Satellite

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

Receiving Beams 1:

Question	Response
Beam ID	RB02
Receive Beam Frequency	148.635 MHz -148.75 MHz
Beam Type	Fixed
Polarization	RHCP
Peak Gain	0.0 dBi
Antenna Pointing Error	2.0 degrees
Antenna Rotational Error	2.0 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	-24.8 dB/K
Min. Saturation Flux Density	-154.2 dBW/m2
Max. Saturation Flux Density	-125.2 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	Global

Receiving Beams 2:

Question	Response
Beam ID	RB03
Receive Beam Frequency	149.9 MHz -149.95 MHz
Beam Type	Fixed
Polarization	RHCP
Peak Gain	0.0 dBi
Antenna Pointing Error	2.0 degrees
Antenna Rotational Error	2.0 degrees

Receiving Beams 3:

Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	-24.8 dB/K
Min. Saturation Flux Density	-154.2 dBW/m2
Max. Saturation Flux Density	-125.2 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	Global

Question	Response
Beam ID	RB01
Receive Beam Frequency	148.25 MHz -148.585 MHz
Beam Type	Fixed
Polarization	RHCP
Peak Gain	0.0 dBi
Antenna Pointing Error	2.0 degrees
Antenna Rotational Error	2.0 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	-24.8 dB/K
Min. Saturation Flux Density	-154.2 dBW/m2
Max. Saturation Flux Density	-125.2 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	Global

**Receiving
Channels (14)**

Channel ID	Channel Bandwidth (MHz)	Center Frequency s (MHz)	Feeder Link, Service Link or TT&C
R007	0.03	148.4625	Service Link
R008	0.03	148.4925	Service Link
R009	0.03	148.5225	Service Link
R010	0.03	148.5525	Service Link
R011	0.03	148.6625	Service Link
R012	0.03	148.6925	Service Link
R013	0.03	148.7225	Service Link
R014	0.03	149.925	Service Link
R001	0.03	148.2825	Service Link
R002	0.03	148.3125	Service Link
R003	0.03	148.3425	Service Link
R004	0.03	148.3725	Service Link
R005	0.03	148.4025	Service Link
R006	0.03	148.4325	Service Link

Transmitting
Beams 1:

Question	Response
Beam ID	TB05
Transmit Beam Frequency	137.813 MHz -138.0 MHz
Beam Type	Fixed
Polarization	RHCP
Peak Gain	0.0 dBi
Antenna Pointing Error	2.0 degrees
Antenna Rotational Error	2.0 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-41.4 dBW/Hz
Max. Transmit EIRP	1.76 dBW
Co- or Cross Polar Mode	C
Service Area Description	Global

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):
4.0 kHz	-129.4	-129.3	-129.2	-129.0	-128.8	-125.9

Transmitting
Beams 2:

Question	Response
Beam ID	TB04
Transmit Beam Frequency	137.585 MHz -137.65 MHz

Beam Type	Fixed
Polarization	RHCP
Peak Gain	0.0 dBi
Antenna Pointing Error	2.0 degrees
Antenna Rotational Error	2.0 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-41.4 dBW/Hz
Max. Transmit EIRP	1.76 dBW
Co- or Cross Polar Mode	C
Service Area Description	Global

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):
4.0 kHz	-129.4	-129.3	-129.2	-129.0	-128.8	-125.9

Transmitting Beams 3:

Question	Response
Beam ID	TB03
Transmit Beam Frequency	137.473 MHz -137.535 MHz
Beam Type	Fixed
Polarization	RHCP
Peak Gain	0.0 dBi
Antenna Pointing Error	2.0 degrees

Antenna Rotational Error	2.0 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-41.4 dBW/Hz
Max. Transmit EIRP	1.76 dBW
Co- or Cross Polar Mode	C
Service Area Description	Global

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):
* BW: kHz						
4.0	-129.4	-129.3	-129.2	-129.0	-128.8	-125.9

Transmitting Beams 4:

Question	Response
Beam ID	TB02
Transmit Beam Frequency	137.328 MHz -137.375 MHz
Beam Type	Fixed
Polarization	RHCP
Peak Gain	0.0 dBi
Antenna Pointing Error	2.0 degrees
Antenna Rotational Error	2.0 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-41.4 dBW/Hz

Max. Transmit EIRP	1.76 dBW
Co- or Cross Polar Mode	C
Service Area Description	Global

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	-129.4	-129.3	-129.2	-129.0	-128.8	-125.9

Transmitting Beams 5:

Question	Response
Beam ID	TB01
Transmit Beam Frequency	137.025 MHz -137.175 MHz
Beam Type	Fixed
Polarization	RHCP
Peak Gain	0.0 dBi
Antenna Pointing Error	2.0 degrees
Antenna Rotational Error	2.0 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-41.4 dBW/Hz
Max. Transmit EIRP	1.76 dBW
Co- or Cross Polar Mode	C
Service Area Description	Global

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	-129.4	-129.3	-129.2	-129.0	-128.8	-125.9

**Transmitting
Channels (12)**

Channel ID	Channel Bandwidth (MHz)	Center Frequency s (MHz)	Feeder Link, Service Link or TT&C
T012	0.03	137.9663	Service Link
T001	0.03	137.055	Service Link
T002	0.03	137.085	Service Link
T011	0.03	137.9363	Service Link
T010	0.03	137.9063	Service Link
T009	0.03	137.8763	Service Link
T008	0.03	137.8463	Service Link
T007	0.03	137.6175	Service Link
T006	0.03	137.5038	Service Link
T005	0.03	137.3513	Service Link
T004	0.03	137.145	Service Link
T003	0.03	137.115	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?	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>Transmit Antenna Pattern.pdf</u>	TB02	NGSO Antenna Gain Data	PDF file (*.pdf)	Antenna pattern for satellite transmit beam
<u>Transmit Antenna Pattern.pdf</u>	TB01	NGSO Antenna Gain Data	PDF file (*.pdf)	Antenna pattern for satellite transmit beam
<u>Receive Antenna Pattern.pdf</u>	RB02	NGSO Antenna Gain Data	PDF file (*.pdf)	Antenna pattern for satellite receive beam
<u>Receive Antenna Pattern.pdf</u>	RB01	NGSO Antenna Gain Data	PDF file (*.pdf)	Antenna pattern for satellite receive beam
<u>Receive Antenna Pattern.pdf</u>	RB03	NGSO Antenna Gain Data	PDF file (*.pdf)	Antenna pattern for satellite receive beam
<u>Transmit Antenna Pattern.pdf</u>	TB05	NGSO Antenna Gain Data	PDF file (*.pdf)	Antenna pattern for satellite transmit beam
<u>Transmit Antenna Pattern.pdf</u>	TB04	NGSO Antenna Gain Data	PDF file (*.pdf)	Antenna pattern for satellite transmit beam
<u>Transmit Antenna Pattern.pdf</u>	TB03	NGSO Antenna Gain Data	PDF file (*.pdf)	Antenna pattern for satellite transmit beam