



312 File Number: **SATAMD2023020700021**

Filing Description

Question	Response
Description	Space Exploration Holdings, LLC Direct-to-Cell System (Gen2)

**Satellite
Information**

Question	Response
Select Orbit Type	NGSO
Space Station or Satellite Network Name	Direct-to-Cell
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		1990.0 MHz -1995.0 MHz	Transmit
Mobile-Satellite Service		1910.0 MHz -1915.0 MHz	Receive

**Orbital
Information For
Non-
Geostationary
Satellites**

Question	Response
Total Number of Satellites in the active constellation	3
Orbit Epoch Date	01/01/2023
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	-53.0 degrees
Active Service Arc End Angle with respect to Ascending Node	53.0 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	RX02
Receive Beam Frequency	1910.0 MHz -1915.0 MHz
Beam Type	Both Steerable and Shapeable
Polarization	V
Peak Gain	32.0 dBi
Antenna Pointing Error	0.1 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	6.5 dB/K
Min. Saturation Flux Density	-0.1 dBW/m2
Max. Saturation Flux Density	0.0 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	CONUS, AK, HI, PR

Receiving Beams 2:

Question	Response
Beam ID	RX06
Receive Beam Frequency	1910.0 MHz -1915.0 MHz
Beam Type	Both Steerable and Shapeable
Polarization	H
Peak Gain	32.0 dBi
Antenna Pointing Error	0.1 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	6.5 dB/K
Min. Saturation Flux Density	-0.1 dBW/m2
Max. Saturation Flux Density	0.0 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	CONUS, AK, HI, PR, and VI

Receiving Beams 3:

Question	Response
Beam ID	RX01
Receive Beam Frequency	1910.0 MHz -1915.0 MHz
Beam Type	Both Steerable and Shapeable
Polarization	V
Peak Gain	29.0 dBi
Antenna Pointing Error	0.1 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	3.5 dB/K
Min. Saturation Flux Density	-0.1 dBW/m2
Max. Saturation Flux Density	0.0 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	CONUS, AK, HI, PR

Receiving

Beams 4:

Question	Response
Beam ID	RX03
Receive Beam Frequency	1910.0 MHz -1915.0 MHz
Beam Type	Both Steerable and Shapeable
Polarization	V
Peak Gain	35.0 dBi
Antenna Pointing Error	0.1 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	9.5 dB/K
Min. Saturation Flux Density	-0.1 dBW/m2
Max. Saturation Flux Density	0.0 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	CONUS, AK, HI, PR

**Receiving
Beams 5:**

Question	Response
Beam ID	RX04
Receive Beam Frequency	1910.0 MHz -1915.0 MHz
Beam Type	Both Steerable and Shapeable
Polarization	V
Peak Gain	38.0 dBi
Antenna Pointing Error	0.1 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	-0.1 dBW/m2
Max. Saturation Flux Density	0.0 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	CONUS, AK, HI, PR

Receiving Beams 6:

Question	Response
Beam ID	RX05
Receive Beam Frequency	1910.0 MHz -1915.0 MHz
Beam Type	Both Steerable and Shapeable
Polarization	H
Peak Gain	29.0 dBi
Antenna Pointing Error	0.1 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	3.5 dB/K
Min. Saturation Flux Density	-0.1 dBW/m2
Max. Saturation Flux Density	0.0 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	CONUS, AK, HI, PR, and VI

Receiving Beams 7:

Question	Response
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Beam ID	RX07
Receive Beam Frequency	1910.0 MHz -1915.0 MHz
Beam Type	Both Steerable and Shapeable
Polarization	H
Peak Gain	35.0 dBi
Antenna Pointing Error	0.1 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	9.5 dB/K
Min. Saturation Flux Density	-0.1 dBW/m2
Max. Saturation Flux Density	0.0 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	CONUS, AK, HI, PR, and VI

Receiving Beams 8:

Question	Response
Beam ID	RX08
Receive Beam Frequency	1910.0 MHz -1915.0 MHz
Beam Type	Both Steerable and Shapeable
Polarization	H
Peak Gain	38.0 dBi
Antenna Pointing Error	0.1 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	-0.1 dBW/m2
Max. Saturation Flux Density	0.0 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	CONUS, AK, HI, PR, and VI

Receiving
Channels (8)

Channel ID	Channel Bandwidth (MHz)	Center Frequency s (MHz)	Feeder Link, Service Link or TT&C
C1	5.0	1912.5	Service Link
B4	1.4	1914.3	Service Link
B3	1.4	1913.1	Service Link
B2	1.4	1911.9	Service Link
A2	1.4	1912.5	Service Link
A1	1.4	1911.1	Service Link
A3	1.4	1913.9	Service Link
B1	1.4	1910.7	Service Link

Transmitting
Beams 1:

Question	Response
Beam ID	TX02
Transmit Beam Frequency	1990.0 MHz -1995.0 MHz
Beam Type	Both Steerable and Shapeable
Polarization	RHCP
Peak Gain	32.0 dBi
Antenna Pointing Error	0.1 degrees
Antenna Rotational Error	0.1 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-8.26 dBW/Hz
Max. Transmit EIRP	52.0 dBW
Co- or Cross Polar Mode	C
Service Area Description	CONUS, AK, HI, and PR

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	-85.9	-84.2	-82.6	-81.2	-80.0	-80.0

Transmitting
Beams 2:

Question	Response
Beam ID	TX06
Transmit Beam Frequency	1990.0 MHz -1995.0 MHz

Beam Type	Both Steerable and Shapeable
Polarization	LHCP
Peak Gain	32.0 dBi
Antenna Pointing Error	0.1 degrees
Antenna Rotational Error	0.1 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-8.26 dBW/Hz
Max. Transmit EIRP	52.0 dBW
Co- or Cross Polar Mode	C
Service Area Description	CONUS, AK, HI, and PR

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	-85.9	-84.2	-82.6	-81.2	-80.0	-80.0

Transmitting Beams 3:

Question	Response
Beam ID	TX01
Transmit Beam Frequency	1990.0 MHz -1995.0 MHz
Beam Type	Both Steerable and Shapeable
Polarization	RHCP
Peak Gain	29.0 dBi
Antenna Pointing Error	0.1 degrees

Antenna Rotational Error	0.1 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-11.33 dBW/Hz
Max. Transmit EIRP	49.0 dBW
Co- or Cross Polar Mode	C
Service Area Description	CONUS, AK, HI, and PR

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):
1.0 MHz	-88.9	-87.2	-85.6	-84.2	-83.0	-80.0

Transmitting Beams 4:

Question	Response
Beam ID	TX03
Transmit Beam Frequency	1990.0 MHz -1995.0 MHz
Beam Type	Both Steerable and Shapeable
Polarization	RHCP
Peak Gain	35.0 dBi
Antenna Pointing Error	0.1 degrees
Antenna Rotational Error	0.1 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-5.33 dBW/Hz

Max. Transmit EIRP	55.0 dBW
Co- or Cross Polar Mode	C
Service Area Description	CONUS, AK, HI, and PR

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):
1.0 MHz	-82.9	-81.2	-80.0	-80.0	-80.0	-80.0

Transmitting Beams 5:

Question	Response
Beam ID	TX04
Transmit Beam Frequency	1990.0 MHz -1995.0 MHz
Beam Type	Both Steerable and Shapeable
Polarization	RHCP
Peak Gain	38.0 dBi
Antenna Pointing Error	0.1 degrees
Antenna Rotational Error	0.1 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-2.33 dBW/Hz
Max. Transmit EIRP	58.0 dBW
Co- or Cross Polar Mode	C
Service Area Description	CONUS, AK, HI, and PR

Max. Power Flux Density

Transmitting Beams 6:

	* 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	-80.0	-80.0	-80.0	-80.0	-80.0	-80.0

Question	Response
Beam ID	TX05
Transmit Beam Frequency	1990.0 MHz -1995.0 MHz
Beam Type	Both Steerable and Shapeable
Polarization	LHCP
Peak Gain	29.0 dBi
Antenna Pointing Error	0.1 degrees
Antenna Rotational Error	0.1 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-11.33 dBW/Hz
Max. Transmit EIRP	49.0 dBW
Co- or Cross Polar Mode	C
Service Area Description	CONUS, AK, HI, and PR

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):
1.0 MHz	-88.9	-87.2	-85.6	-84.2	-83.0	-80.0

Transmitting
Beams 7:

Question	Response
Beam ID	TX07
Transmit Beam Frequency	1990.0 MHz -1995.0 MHz
Beam Type	Both Steerable and Shapeable
Polarization	LHCP
Peak Gain	35.0 dBi
Antenna Pointing Error	0.1 degrees
Antenna Rotational Error	0.1 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-5.33 dBW/Hz
Max. Transmit EIRP	55.0 dBW
Co- or Cross Polar Mode	C
Service Area Description	CONUS, AK, HI, and PR

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	-82.9	-81.2	-80.0	-80.0	-80.0	-80.0

Transmitting
Beams 8:

Question	Response
Beam ID	TX08
Transmit Beam Frequency	1990.0 MHz -1995.0 MHz

Beam Type	Both Steerable and Shapeable
Polarization	LHCP
Peak Gain	38.0 dBi
Antenna Pointing Error	0.1 degrees
Antenna Rotational Error	0.1 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-2.33 dBW/Hz
Max. Transmit EIRP	58.0 dBW
Co- or Cross Polar Mode	C
Service Area Description	CONUS, AK, HI, and PR

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):
1.0 MHz	-80.0	-80.0	-80.0	-80.0	-80.0	-80.0

**Transmitting
Channels (8)**

Channel ID	Channel Bandwidth (MHz)	Center Frequency s (MHz)	Feeder Link, Service Link or TT&C
A2	1.4	1992.5	Service Link
A3	1.4	1993.9	Service Link
A1	1.4	1991.1	Service Link
B4	1.4	1994.3	Service Link
B3	1.4	1993.1	Service Link
B2	1.4	1991.9	Service Link
C1	5.0	1992.5	Service Link
B1	1.4	1990.7	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
<u>SpaceX DTC 29dBi DL TX01 TX05 0deg. gxt</u>		NGSO Antenna Gain Data	GXT file (*.gxt)
<u>SpaceX DTC 29dBi DL TX01 TX05 35deg. gxt</u>		NGSO Antenna Gain Data	GXT file (*.gxt)
<u>SpaceX DTC 29dBi UL RX01 RX05 0deg. gxt</u>		NGSO Antenna Gain Data	GXT file (*.gxt)
<u>SpaceX DTC 29dBi UL RX01 RX05 35deg. gxt</u>		NGSO Antenna Gain Data	GXT file (*.gxt)
<u>SpaceX DTC 32dBi DL TX02 TX06 0deg. gxt</u>		NGSO Antenna Gain Data	GXT file (*.gxt)
<u>SpaceX DTC 32dBi DL TX02 TX06 35deg. gxt</u>		NGSO Antenna Gain Data	GXT file (*.gxt)
<u>SpaceX DTC 32dBi UL RX02 RX06 0deg. gxt</u>		NGSO Antenna Gain Data	GXT file (*.gxt)
<u>SpaceX DTC 32dBi UL RX02 RX06 35deg. gxt</u>		NGSO Antenna Gain Data	GXT file (*.gxt)
<u>SpaceX DTC 35dBi DL TX03 TX07 0deg. gxt</u>		NGSO Antenna Gain Data	GXT file (*.gxt)

<u>SpaceX DTC 35dBi DL TX03 TX07 35deg. gxt</u>	NGSO Antenna Gain Data	GXT file (*. gxt)
<u>SpaceX DTC 35dBi UL RX03 RX07 0deg. gxt</u>	NGSO Antenna Gain Data	GXT file (*. gxt)
<u>SpaceX DTC 35dBi UL RX03 RX07 35deg. gxt</u>	NGSO Antenna Gain Data	GXT file (*. gxt)
<u>SpaceX DTC 38dBi DL TX04 TX08 0deg. gxt</u>	NGSO Antenna Gain Data	GXT file (*. gxt)
<u>SpaceX DTC 38dBi DL TX04 TX08 35deg. gxt</u>	NGSO Antenna Gain Data	GXT file (*. gxt)
<u>SpaceX DTC 38dBi UL RX04 RX08 0deg. gxt</u>	NGSO Antenna Gain Data	GXT file (*. gxt)
<u>SpaceX DTC 38dBi UL RX04 RX08 35deg. gxt</u>	NGSO Antenna Gain Data	GXT file (*. gxt)
<u>Direct-to-Cell MSS Technical DB 20230202. mdb</u>	NGSO Antenna Gain Data	GIMS file (*. mdb)