



312 File Number: **SATSTA2021020800018**

---

## Filing Description

Question	Response
Description	The information included in this form is related to Peregrine's lunar lander communications system. Peregrine is Astrobotic's lunar lander that will deliver commercial and science payloads to the surface of the Moon.

---

## Satellite Information

Question	Response
Select Orbit Type	NGSO
Space Station or Satellite Network Name	Peregrine Mission One
Estimated Lifetime of Satellite(s) From Date of Launch	1 Years
Will the space station(s) operate on a Common Carrier basis?	Yes

## Operating Frequency Bands (2)

Nature of service	Description	Frequency Band(s)	Mode Type
Space Operation Service		7223.117 MHz -7233.119 MHz	Receive
Space Operation Service		8487.314 MHz -8497.315 MHz	Transmit

**Orbital  
Information For  
Non-  
Geostationary  
Satellites**

Question	Response
Total Number of Satellites in the active constellation	1
Orbit Epoch Date	12/15/2021
Celestial Reference Body	Earth

## Orbital Plane 1:

Question	Response
Number of Satellites in Plane	1
Inclination Angle	30.0 degrees
Right Ascension of Ascending Node	254.6 degrees
Argument of Perigee	145.0 degrees
Orbital Period	219.2 seconds
Apogee	99999.0 km
Perigee	501.0 km
Active Service Arc Begin Angle with respect to Ascending Node	-99.5 degrees
Active Service Arc End Angle with respect to Ascending Node	-15.0 degrees

### Mean Anomaly For Each Satellite

Satellite Number	Mean Anomaly (degrees) at the Orbit Epoch Date
1	1.6

## Receiving Beams 1:

Question	Response
Beam ID	CNE
Receive Beam Frequency	7223.117 MHz -7233.119 MHz
Beam Type	Fixed
Polarization	LHCP
Peak Gain	5.0 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	-18.4 dB/K
Min. Saturation Flux Density	-100.5 dBW/m <sup>2</sup>
Max. Saturation Flux Density	-30.5 dBW/m <sup>2</sup>
Co- or Cross Polar Mode	X
Service Area Description	The S/C will take several days to reach the Moon. Three earth stations from DSN will provide coverage regardless of the S/C location, Canberra in Australia, Madrid in Spain and Goldstone, California.

**Receiving  
Channels (1)**

<b>Channel ID</b>	<b>Channel Bandwidth (MHz)</b>	<b>Center Frequency s (MHz)</b>	<b>Feeder Link, Service Link or TT&amp;C</b>
UL	10.0	7228.118	TT&C

## Transmitting Beams 1:

Question	Response
Beam ID	CTX2
Transmit Beam Frequency	8487.314 MHz -8497.315 MHz
Beam Type	Fixed
Polarization	RHCP
Peak Gain	5.0 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	-65.02 dBW/Hz
Max. Transmit EIRP	7.78 dBW
Co- or Cross Polar Mode	X
Service Area Description	The S/C will take several days to reach the Moon. Three earth stations from DSN will provide coverage regardless of the S/C location, Canberra in Australia, Madrid in Spain and Goldstone, California. This beam is at moon orbit max power 6 W on LGAs



## Max. Power Flux Density

	* 0° - 5°	* 5° - 10°	* 10° - 15°	* 15° - 20°	* 20° - 25°	* 25° - 90°
*	(dBW/m <sup>2</sup> )	(dBW/m <sup>2</sup> )	(dBW/m <sup>2</sup> )	(dBW/m <sup>2</sup> )	(dBW/m <sup>2</sup> )	(dBW/m <sup>2</sup> )
BW:	/BW):	/BW):	/BW):	/BW):	/BW):	/BW):
4.0 kHz	-200.0	-200.0	-200.0	-200.0	-200.0	-200.0

## Transmitting Beams 2:

Question	Response
Beam ID	CTX3
Transmit Beam Frequency	8487.314 MHz -8497.315 MHz
Beam Type	Steerable
Polarization	RHCP
Peak Gain	26.0 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	-44.81 dBW/Hz
Max. Transmit EIRP	25.19 dBW
Co- or Cross Polar Mode	X

Service Area Description	At moon surface the S/C will deploy gimbaled Medium Gain antenna (MGA. Power is reduced due to higher gain than LGAs. Same 3 DSn earth stations provide coverage/service at earths surface.
--------------------------	---

### Max. Power Flux Density

	* 0° - 5°	* 5° - 10°	* 10° - 15°	* 15° - 20°	* 20° - 25°	* 25° - 90°
*	(dbW/m <sup>2</sup>	(dbW/m <sup>2</sup>	(dbW/m <sup>2</sup>	(dbW/m <sup>2</sup>	(dbW/m <sup>2</sup>	(dbW/m <sup>2</sup>
BW:	/BW):	/BW):	/BW):	/BW):	/BW):	/BW):
4.0 kHz	-191.9	-194.9	-200.0	-200.0	-200.0	-200.0

### Transmitting Beams 3:

Question	Response
Beam ID	CTX1
Transmit Beam Frequency	8487.314 MHz -8497.315 MHz
Beam Type	Fixed
Polarization	RHCP
Peak Gain	5.0 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 -85.0 dBW/Hz

---

Max. Transmit EIRP 0.0 dBW

---

Co- or Cross Polar Mode X

---

Service Area Description Attached is the Downlink (Telemetry) antenna pattern. The S/C will take several days to reach the Moon. Three earth stations from DSN will provide coverage regardless of the S/C location, Canberra in Australia, Madrid in Spain and Goldstone, California.

---

### Max. Power Flux Density

	* 0° - 5°	* 5° - 10°	* 10° - 15°	* 15° - 20°	* 20° - 25°	* 25° - 90°
*	(dBW/m <sup>2</sup> )	(dBW/m <sup>2</sup> )	(dBW/m <sup>2</sup> )	(dBW/m <sup>2</sup> )	(dBW/m <sup>2</sup> )	(dBW/m <sup>2</sup> )
BW:	/BW):	/BW):	/BW):	/BW):	/BW):	/BW):
<b>4.0 kHz</b>	-174.0	-173.0	-172.0	-171.0	-170.0	-169.0

---

**Transmitting Channels (3)**

<b>Channel ID</b>	<b>Channel Bandwidth (MHz)</b>	<b>Center Frequency s (MHz)</b>	<b>Feeder Link, Service Link or TT&amp;C</b>
<b>CTX1</b>	10.0	8492.3149	TT&C
<b>CTX2</b>	10.0	8492.3149	TT&C
<b>CTX3</b>	10.0	8492.3149	Service Link

## 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>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
<a href="#"><u>19410_SN6_FULL_PATTERNS_AB.pdf</u></a>	CNE	NGSO Antenna Gain Data	PDF file (*.pdf)	LGA antenna pattern per vendor specs.
<a href="#"><u>19410_SN6_FULL_PATTERNS_AB.pdf</u></a>	CTX1	NGSO Antenna Gain Data	PDF file (*.pdf)	LGA antenna pattern per vendor specs.
<a href="#"><u>19410_SN6_FULL_PATTERNS_AB.pdf</u></a>	CTX2	NGSO Antenna Gain Data	PDF file (*.pdf)	LGA antenna pattern per vendor specs.
<a href="#"><u>27010_SN1_PATTERNS.pdf</u></a>	CTX3	NGSO Antenna Gain Data	PDF file (*.pdf)	Medium Gain antenna sample pattern. The actual antenna will have a 26 dBi gain