



312 File Number: **SATLOI2017072600111**

Filing Description

Question	Response
Description	A GLOBAL NONGEOSTATIONARY SATELLITE SYSTEM IN SUB-GEOSYNCHRONOUS ELLIPTICAL ORBITS THAT EMULATES THE GEOSTATIONARY ARC

**Satellite
Information**

Question	Response
Select Orbit Type	NGSO
Space Station or Satellite Network Name	Virtual Geo
Estimated Lifetime of Satellite(s) From Date of Launch	12 Years
Will the space station(s) operate on a Common Carrier basis?	No

Operating Frequency Bands (6)

Nature of service	Description	Frequency Band(s)	Mode Type
Fixed-Satellite Service		12750.0 MHz -13250.0 MHz	Receive
Fixed-Satellite Service		17800.0 MHz -18300.0 MHz	Receive
Fixed-Satellite Service		13800.0 MHz -14500.0 MHz	Receive
Fixed-Satellite Service		10700.0 MHz -12700.0 MHz	Transmit
Fixed-Satellite Service		5925.0 MHz -6725.0 MHz	Receive
Fixed-Satellite Service		3700.0 MHz -4200.0 MHz	Transmit

**Orbital
Information For
Non-
Geostationary
Satellites**

Question	Response
Total Number of Satellites in the active constellation	15
Orbit Epoch Date	01/01/2020
Celestial Reference Body	Earth

Orbital Plane 1:

Question	Response
Number of Satellites in Plane	1
Inclination Angle	63.435 degrees
Right Ascension of Ascending Node	306.5 degrees
Argument of Perigee	270.0 degrees
Orbital Period	28743.8 seconds
Apogee	26190.0 km
Perigee	1650.0 km
Active Service Arc Begin Angle with respect to Ascending Node	42.195 degrees
Active Service Arc End Angle with respect to Ascending Node	42.195 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	63.435 degrees
Right Ascension of Ascending Node	18.5 degrees
Argument of Perigee	270.0 degrees
Orbital Period	28743.8 seconds
Apogee	26190.0 km
Perigee	1650.0 km
Active Service Arc Begin Angle with respect to Ascending Node	42.195 degrees

Active Service Arc End Angle with respect to Ascending Node 42.195 degrees

Mean Anomaly For Each Satellite

Satellite Number	Mean Anomaly (degrees) at the Orbit Epoch Date
1	144.0

Orbital Plane 3:

Question	Response
Number of Satellites in Plane	1
Inclination Angle	63.435 degrees
Right Ascension of Ascending Node	90.5 degrees
Argument of Perigee	270.0 degrees
Orbital Period	28743.8 seconds
Apogee	26190.0 km
Perigee	1650.0 km
Active Service Arc Begin Angle with respect to Ascending Node	42.195 degrees
Active Service Arc End Angle with respect to Ascending Node	42.195 degrees

Mean Anomaly For Each Satellite

Satellite Number	Mean Anomaly (degrees) at the Orbit Epoch Date
1	288.0

Orbital Plane 4:

Question	Response
Number of Satellites in Plane	1
Inclination Angle	63.435 degrees
Right Ascension of Ascending Node	162.5 degrees

Argument of Perigee	270.0 degrees
Orbital Period	28843.8 seconds
Apogee	26190.0 km
Perigee	1650.0 km
Active Service Arc Begin Angle with respect to Ascending Node	42.195 degrees
Active Service Arc End Angle with respect to Ascending Node	42.195 degrees

Mean Anomaly For Each Satellite

Satellite Number	Mean Anomaly (degrees) at the Orbit Epoch Date
1	72.0

Orbital Plane 5:

Question	Response
Number of Satellites in Plane	1
Inclination Angle	63.435 degrees
Right Ascension of Ascending Node	234.5 degrees
Argument of Perigee	270.0 degrees
Orbital Period	28743.8 seconds
Apogee	26190.0 km
Perigee	1650.0 km
Active Service Arc Begin Angle with respect to Ascending Node	42.195 degrees
Active Service Arc End Angle with respect to Ascending Node	42.195 degrees

Mean Anomaly For Each Satellite

Satellite Number	Mean Anomaly (degrees) at the Orbit Epoch Date
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1	216.0
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Orbital Plane 6:

Question	Response
Number of Satellites in Plane	1
Inclination Angle	63.435 degrees
Right Ascension of Ascending Node	6.5 degrees
Argument of Perigee	270.0 degrees
Orbital Period	28743.8 seconds
Apogee	26190.0 km
Perigee	1650.0 km
Active Service Arc Begin Angle with respect to Ascending Node	42.195 degrees
Active Service Arc End Angle with respect to Ascending Node	42.195 degrees

Mean Anomaly For Each Satellite

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

Orbital Plane 7:

Question	Response
Number of Satellites in Plane	1
Inclination Angle	63.435 degrees
Right Ascension of Ascending Node	78.5 degrees
Argument of Perigee	270.0 degrees
Orbital Period	28743.8 seconds
Apogee	26190.0 km

Perigee	1650.0 km
Active Service Arc Begin Angle with respect to Ascending Node	42.195 degrees
Active Service Arc End Angle with respect to Ascending Node	42.195 degrees

Mean Anomaly For Each Satellite

Satellite Number	Mean Anomaly (degrees) at the Orbit Epoch Date
1	144.0

Orbital Plane 8:

Question	Response
Number of Satellites in Plane	1
Inclination Angle	63.435 degrees
Right Ascension of Ascending Node	150.5 degrees
Argument of Perigee	270.0 degrees
Orbital Period	28743.8 seconds
Apogee	26190.0 km
Perigee	1650.0 km
Active Service Arc Begin Angle with respect to Ascending Node	42.195 degrees
Active Service Arc End Angle with respect to Ascending Node	42.195 degrees

Mean Anomaly For Each Satellite

Satellite Number	Mean Anomaly (degrees) at the Orbit Epoch Date
1	288.0

Orbital Plane 9:

Question	Response
Number of Satellites in Plane	1

Inclination Angle	63.435 degrees
Right Ascension of Ascending Node	222.5 degrees
Argument of Perigee	270.0 degrees
Orbital Period	28743.8 seconds
Apogee	26190.0 km
Perigee	1650.0 km
Active Service Arc Begin Angle with respect to Ascending Node	42.195 degrees
Active Service Arc End Angle with respect to Ascending Node	42.195 degrees

Mean Anomaly For Each Satellite

Satellite Number	Mean Anomaly (degrees) at the Orbit Epoch Date
1	72.0

Orbital Plane 10:

Question	Response
Number of Satellites in Plane	1
Inclination Angle	63.435 degrees
Right Ascension of Ascending Node	294.5 degrees
Argument of Perigee	270.0 degrees
Orbital Period	28743.8 seconds
Apogee	26190.0 km
Perigee	1650.0 km
Active Service Arc Begin Angle with respect to Ascending Node	42.195 degrees
Active Service Arc End Angle with respect to Ascending Node	42.195 degrees

Mean Anomaly For Each Satellite

Satellite Number	Mean Anomaly (degrees) at the Orbit Epoch Date
1	216.0

Orbital Plane 11:

Question	Response
Number of Satellites in Plane	1
Inclination Angle	63.435 degrees
Right Ascension of Ascending Node	286.5 degrees
Argument of Perigee	90.0 degrees
Orbital Period	28743.8 seconds
Apogee	26190.0 km
Perigee	1650.0 km
Active Service Arc Begin Angle with respect to Ascending Node	42.195 degrees
Active Service Arc End Angle with respect to Ascending Node	42.195 degrees

Mean Anomaly For Each Satellite

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

Orbital Plane 12:

Question	Response
Number of Satellites in Plane	1
Inclination Angle	63.435 degrees
Right Ascension of Ascending Node	358.5 degrees
Argument of Perigee	90.0 degrees
Orbital Period	28743.8 seconds

Apogee	26190.0 km
Perigee	1650.0 km
Active Service Arc Begin Angle with respect to Ascending Node	42.195 degrees
Active Service Arc End Angle with respect to Ascending Node	42.195 degrees

Mean Anomaly For Each Satellite

Satellite Number	Mean Anomaly (degrees) at the Orbit Epoch Date
1	144.0

Orbital Plane 13:

Question	Response
Number of Satellites in Plane	1
Inclination Angle	63.435 degrees
Right Ascension of Ascending Node	70.5 degrees
Argument of Perigee	90.0 degrees
Orbital Period	28743.8 seconds
Apogee	26190.0 km
Perigee	1650.0 km
Active Service Arc Begin Angle with respect to Ascending Node	42.195 degrees
Active Service Arc End Angle with respect to Ascending Node	42.195 degrees

Mean Anomaly For Each Satellite

Satellite Number	Mean Anomaly (degrees) at the Orbit Epoch Date
1	288.0

Orbital Plane 14:

Question	Response
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Number of Satellites in Plane	1
Inclination Angle	63.435 degrees
Right Ascension of Ascending Node	142.5 degrees
Argument of Perigee	90.0 degrees
Orbital Period	28743.8 seconds
Apogee	26190.0 km
Perigee	1650.0 km
Active Service Arc Begin Angle with respect to Ascending Node	42.195 degrees
Active Service Arc End Angle with respect to Ascending Node	42.195 degrees

Mean Anomaly For Each Satellite

Satellite Number	Mean Anomaly (degrees) at the Orbit Epoch Date
1	72.0

Orbital Plane 15:

Question	Response
Number of Satellites in Plane	1
Inclination Angle	63.435 degrees
Right Ascension of Ascending Node	214.5 degrees
Argument of Perigee	90.0 degrees
Orbital Period	28743.0 seconds
Apogee	26190.0 km
Perigee	1650.0 km
Active Service Arc Begin Angle with respect to Ascending Node	42.195 degrees
Active Service Arc End Angle with respect to Ascending Node	42.195 degrees

Mean Anomaly For Each Satellite

Satellite Number	Mean Anomaly (degrees) at the Orbit Epoch Date
1	216.0

Receiving Beams 1:

Question	Response
Beam ID	001R
Receive Beam Frequency	14000.0 MHz -14500.0 MHz
Beam Type	Fixed
Polarization	RHCP
Peak Gain	42.5 dBi
Antenna Pointing Error	0.2 degrees
Antenna Rotational Error	0.25 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	14.7 dB/K
Min. Saturation Flux Density	-125.0 dBW/m ²
Max. Saturation Flux Density	-105.0 dBW/m ²
Co- or Cross Polar Mode	C
Service Area Description	A circular beam, the center RHC beam of user beam hexpack array

Receiving Beams 2:

Question	Response
Beam ID	001L
Receive Beam Frequency	14000.0 MHz -14500.0 MHz
Beam Type	Spot
Polarization	LHCP
Peak Gain	42.5 dBi
Antenna Pointing Error	0.2 degrees
Antenna Rotational Error	0.25 degrees

Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	14.7 dB/K
Min. Saturation Flux Density	-125.0 dBW/m2
Max. Saturation Flux Density	-105.0 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	A circular beam, the center beam of the user beam hex pack array

Receiving Beams 3:

Question	Response
Beam ID	002R
Receive Beam Frequency	14000.0 MHz -14500.0 MHz
Beam Type	Spot
Polarization	RHCP
Peak Gain	42.5 dBi
Antenna Pointing Error	0.2 degrees
Antenna Rotational Error	0.25 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	14.7 dB/K
Min. Saturation Flux Density	-125.0 dBW/m2

Max. Saturation Flux Density	-105.0 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	Circular beam representative of the first ring RHC beams in the receive earth pointing user beam hexpack array. All 6 RHC beams in this ring, numbers 002R to 007R, are identical to this one.

Receiving Beams 4:

Question	Response
Beam ID	002L
Receive Beam Frequency	14000.0 MHz -14500.0 MHz
Beam Type	Fixed
Polarization	LHCP
Peak Gain	42.5 dBi
Antenna Pointing Error	0.2 degrees
Antenna Rotational Error	0.25 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	14.7 dB/K
Min. Saturation Flux Density	-125.0 dBW/m2
Max. Saturation Flux Density	-105.0 dBW/m2
Co- or Cross Polar Mode	C

Receiving Beams 5:

Service Area Description	Circular beam representative of the first ring LHC beams in the receive earth pointing user beam hexpack array. All 6 LHC beams in this ring, numbers 002L to 007L, are identical to this one.
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Question	Response
Beam ID	008R
Receive Beam Frequency	14000.0 MHz -14500.0 MHz
Beam Type	Fixed
Polarization	RHCP
Peak Gain	42.4 dBi
Antenna Pointing Error	0.2 degrees
Antenna Rotational Error	0.25 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	14.7 dB/K
Min. Saturation Flux Density	-125.0 dBW/m ²
Max. Saturation Flux Density	-105.0 dBW/m ²
Co- or Cross Polar Mode	C
Service Area Description	Circular beam representative of the second ring RHC beams in the receive earth pointing user beam hexpack array. All 12 RHC beams in this ring, numbers 008R - 019R, are identical to this one.

Receiving Beams 6:

Question	Response
Beam ID	008L
Receive Beam Frequency	14000.0 MHz -14500.0 MHz
Beam Type	Fixed
Polarization	LHCP
Peak Gain	42.4 dBi
Antenna Pointing Error	0.2 degrees
Antenna Rotational Error	0.25 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	14.7 dB/K
Min. Saturation Flux Density	-125.0 dBW/m ²
Max. Saturation Flux Density	-105.0 dBW/m ²
Co- or Cross Polar Mode	C
Service Area Description	Circular beam representative of the second ring LHC beams in the receive earth pointing user beam hexpack array. All 12 LHC beams in this ring, numbers 008L to 019L, are identical to this one.

Receiving Beams 7:

Question	Response
Beam ID	020R

Receive Beam Frequency	14000.0 MHz -14500.0 MHz
Beam Type	Fixed
Polarization	RHCP
Peak Gain	42.4 dBi
Antenna Pointing Error	0.2 degrees
Antenna Rotational Error	0.25 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	14.7 dB/K
Min. Saturation Flux Density	-125.0 dBW/m ²
Max. Saturation Flux Density	-105.0 dBW/m ²
Co- or Cross Polar Mode	C
Service Area Description	Circular beam representative of the third ring RHC beams in the receive earth pointing user beam hexpack array. All 18 RHC beams in this ring, numbers 020R - 037R, are identical to this one.

Receiving Beams 8:

Question	Response
Beam ID	020L
Receive Beam Frequency	14000.0 MHz -14500.0 MHz
Beam Type	Fixed

Polarization	LHCP
Peak Gain	42.4 dBi
Antenna Pointing Error	0.2 degrees
Antenna Rotational Error	0.25 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	14.7 dB/K
Min. Saturation Flux Density	-125.0 dBW/m ²
Max. Saturation Flux Density	-105.0 dBW/m ²
Co- or Cross Polar Mode	C
Service Area Description	Circular beam representative of the third ring LHC beams in the receive earth pointing user beam hexpack array. All 18 LHC beams in this ring, numbers 020L to 037L, are identical to this one.

Receiving Beams 9:

Question	Response
Beam ID	038R
Receive Beam Frequency	14000.0 MHz -14500.0 MHz
Beam Type	Fixed
Polarization	RHCP
Peak Gain	42.3 dBi

Antenna Pointing Error	0.2 degrees
Antenna Rotational Error	0.25 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	14.6 dB/K
Min. Saturation Flux Density	-125.0 dBW/m ²
Max. Saturation Flux Density	-105.0 dBW/m ²
Co- or Cross Polar Mode	C
Service Area Description	Circular beam representative of the fourth ring RHC beams in the receive earth pointing user beam hexpack array. All 24 RHC beams, beam numbers 039R - 061R, in this ring are identical to this one.

Receiving Beams 10:

Question	Response
Beam ID	038L
Receive Beam Frequency	14000.0 MHz -14500.0 MHz
Beam Type	Fixed
Polarization	LHCP
Peak Gain	42.3 dBi
Antenna Pointing Error	0.2 degrees

Antenna Rotational Error	0.25 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	14.6 dB/K
Min. Saturation Flux Density	-125.0 dBW/m ²
Max. Saturation Flux Density	-105.0 dBW/m ²
Co- or Cross Polar Mode	C
Service Area Description	Circular beam representative of the fourth ring LHC beams in the receive earth pointing user beam hexpack array. All 24 LHC beams in this ring, numbers 038L to 061L, are identical to this one.

Receiving Beams 11:

Question	Response
Beam ID	062R
Receive Beam Frequency	14000.0 MHz -14500.0 MHz
Beam Type	Fixed
Polarization	RHCP
Peak Gain	42.1 dBi
Antenna Pointing Error	0.2 degrees
Antenna Rotational Error	0.25 degrees
Polarization Switchable	

Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	14.6 dB/K
Min. Saturation Flux Density	-125.0 dBW/m ²
Max. Saturation Flux Density	-105.0 dBW/m ²
Co- or Cross Polar Mode	C
Service Area Description	Circular beam representative of the fifth ring RHC beams in the receive earth pointing user beam hexpack array. All 30 RHC beams in this ring, numbers 062R to 091R, are identical to this one.

Receiving Beams 12:

Question	Response
Beam ID	062L
Receive Beam Frequency	14000.0 MHz -14500.0 MHz
Beam Type	Fixed
Polarization	LHCP
Peak Gain	42.1 dBi
Antenna Pointing Error	0.2 degrees
Antenna Rotational Error	0.25 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees

G/T at Max. Gain Point	14.6 dB/K
Min. Saturation Flux Density	-125.0 dBW/m ²
Max. Saturation Flux Density	-105.0 dBW/m ²
Co- or Cross Polar Mode	C
Service Area Description	Circular beam representative of the fifth ring LHC beams in the receive earth pointing user beam hexpack array. All 30 LHC beams in this ring, numbers 062L to 091L, are identical to this one.

Receiving Beams 13:

Question	Response
Beam ID	092L
Receive Beam Frequency	14000.0 MHz -14500.0 MHz
Beam Type	Fixed
Polarization	LHCP
Peak Gain	42.0 dBi
Antenna Pointing Error	0.2 degrees
Antenna Rotational Error	0.25 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	14.5 dB/K
Min. Saturation Flux Density	-125.0 dBW/m ²

Max. Saturation Flux Density	-105.0 dBW/m ²
Co- or Cross Polar Mode	C
Service Area Description	Circular beam representative of the sixth ring LHC beams in the receive earth pointing user beam hexpack array. All 36 LHC beams in this ring, numbers 092L to 127L, are identical to this one.

Receiving Beams 14:

Question	Response
Beam ID	092R
Receive Beam Frequency	14000.0 MHz -14500.0 MHz
Beam Type	Fixed
Polarization	RHCP
Peak Gain	42.0 dBi
Antenna Pointing Error	0.2 degrees
Antenna Rotational Error	0.25 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	14.5 dB/K
Min. Saturation Flux Density	-125.0 dBW/m ²
Max. Saturation Flux Density	-105.0 dBW/m ²
Co- or Cross Polar Mode	C

Service Area Description	Circular beam representative of the sixth ring RHC beams in the receive earth pointing user beam hexpack array. All 36 RHC beams in this ring, numbers 092R to 127R, are identical to this one.
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Receiving Beams 15:

Question	Response
Beam ID	F01L
Receive Beam Frequency	12750.0 MHz -13250.0 MHz
Beam Type	Steerable
Polarization	LHCP
Peak Gain	41.7 dBi
Antenna Pointing Error	0.2 degrees
Antenna Rotational Error	0.25 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	13.9 dB/K
Min. Saturation Flux Density	-110.0 dBW/m2
Max. Saturation Flux Density	-90.0 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	Representative of Beams F01L to F08L, which are identical circular LHC steering beams serving differing gateways.

Receiving Beams 16:

Question	Response
Beam ID	F01R

Receive Beam Frequency	12750.0 MHz -13250.0 MHz
Beam Type	Steerable
Polarization	RHCP
Peak Gain	41.7 dBi
Antenna Pointing Error	0.2 degrees
Antenna Rotational Error	0.25 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	13.9 dB/K
Min. Saturation Flux Density	-110.0 dBW/m2
Max. Saturation Flux Density	-90.0 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	Representative of Beams F01R to F08R, which are identical circular RHC steering beams serving differing gateways.

Receiving Beams 17:

Question	Response
Beam ID	F09L
Receive Beam Frequency	13800.0 MHz -14000.0 MHz
Beam Type	Steerable
Polarization	LHCP
Peak Gain	42.3 dBi
Antenna Pointing Error	0.2 degrees
Antenna Rotational Error	0.25 degrees

Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	14.5 dB/K
Min. Saturation Flux Density	-110.0 dBW/m2
Max. Saturation Flux Density	-90.0 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	Representative of Beams F09L to F16L, which are identical circular LHC steering beams serving differing gateways.

Receiving Beams 18:

Question	Response
Beam ID	F09R
Receive Beam Frequency	13800.0 MHz -14000.0 MHz
Beam Type	Steerable
Polarization	RHCP
Peak Gain	42.3 dBi
Antenna Pointing Error	0.2 degrees
Antenna Rotational Error	0.25 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	14.5 dB/K
Min. Saturation Flux Density	-110.0 dBW/m2

Max. Saturation Flux Density	-90.0 dBW/m ²
Co- or Cross Polar Mode	C
Service Area Description	Representative of Beams F09R to F16R, which are identical circular RHC steering beams serving differing gateways.

Receiving Beams 19:

Question	Response
Beam ID	F17L
Receive Beam Frequency	17800.0 MHz -18300.0 MHz
Beam Type	Steerable
Polarization	LHCP
Peak Gain	42.6 dBi
Antenna Pointing Error	0.2 degrees
Antenna Rotational Error	0.25 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	12.2 dB/K
Min. Saturation Flux Density	-110.0 dBW/m ²
Max. Saturation Flux Density	-90.0 dBW/m ²
Co- or Cross Polar Mode	C
Service Area Description	Representative of Beams F17L to F24L, which are identical circular LHC steering beams serving differing gateways.

Receiving Beams 20:

Question	Response
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Beam ID	F17R
Receive Beam Frequency	17800.0 MHz -18300.0 MHz
Beam Type	Steerable
Polarization	RHCP
Peak Gain	42.6 dBi
Antenna Pointing Error	0.2 degrees
Antenna Rotational Error	0.25 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	12.2 dB/K
Min. Saturation Flux Density	-110.0 dBW/m ²
Max. Saturation Flux Density	-90.0 dBW/m ²
Co- or Cross Polar Mode	C
Service Area Description	Representative of Beams F17R to F24R, which are identical circular RHC steering beams serving differing gateways.

Receiving Beams 21:

Question	Response
Beam ID	F25L
Receive Beam Frequency	5925.0 MHz -6725.0 MHz
Beam Type	Steerable
Polarization	LHCP
Peak Gain	35.4 dBi
Antenna Pointing Error	0.2 degrees

Antenna Rotational Error	0.25 degrees
Polarization Switchable	No
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	8.2 dB/K
Min. Saturation Flux Density	-110.0 dBW/m2
Max. Saturation Flux Density	-90.0 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	Representative of circular Beams F25L to F32L, which are identical LHC steering beams serving differing gateways.

Receiving Beams 22:

Question	Response
Beam ID	F25R
Receive Beam Frequency	5925.0 MHz -6725.0 MHz
Beam Type	Steerable
Polarization	RHCP
Peak Gain	35.4 dBi
Antenna Pointing Error	0.2 degrees
Antenna Rotational Error	0.25 degrees
Polarization Switchable	No
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	8.2 dB/K
Min. Saturation Flux Density	-110.0 dBW/m2

Max. Saturation Flux Density	-90.0 dBW/m ²
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Co- or Cross Polar Mode	C
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Service Area Description	Representative of circular Beams F25R to F32R, which are identical RHC steering beams serving differing gateways.
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Receiving Channels (16)

Channel ID	Channel Bandwidth (MHz)	Center Frequency s (MHz)	Feeder Link, Service Link or TT&C
9	250.0	14125.0	Service Link
23	500.0	13000.0	Feeder Link
22	500.0	13000.0	Feeder Link
21	500.0	13000.0	Feeder Link
20	500.0	18050.0	Feeder Link
19	500.0	18050.0	Feeder Link
18	200.0	13900.0	Feeder Link
17	200.0	13900.0	Feeder Link
16	300.0	6575.0	Service Link
15	300.0	6575.0	Feeder Link
14	500.0	6175.0	Feeder Link
13	500.0	6175.0	Feeder Link
12	250.0	14375.0	Service Link
11	250.0	14125.0	Service Link
10	250.0	14375.0	Service Link
24	500.0	13000.0	Feeder Link

Transmitting Beams 1:

Question	Response
Beam ID	201L
Transmit Beam Frequency	11200.0 MHz -12700.0 MHz
Beam Type	Fixed
Polarization	LHCP
Peak Gain	41.0 dBi
Antenna Pointing Error	0.2 degrees
Antenna Rotational Error	0.25 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-21.6 dBW/Hz
Max. Transmit EIRP	52.7 dBW
Co- or Cross Polar Mode	C
Service Area Description	The circular center LHC beam of the hexpack array of user beams.

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	-158.0	-157.0	-156.0	-154.0	-151.0	-133.0

Transmitting Beams 2:

Question	Response
Beam ID	201R
Transmit Beam Frequency	11200.0 MHz -12700.0 MHz

Beam Type	Fixed
Polarization	RHCP
Peak Gain	41.0 dBi
Antenna Pointing Error	0.2 degrees
Antenna Rotational Error	0.25 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-21.6 dBW/Hz
Max. Transmit EIRP	65.3 dBW
Co- or Cross Polar Mode	C
Service Area Description	The circular center RHC beam of the hexpack array of user beams.

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):
1.0 MHz	-157.0	-157.0	-156.0	-154.0	-151.0	-133.0

Transmitting Beams 3:

Question	Response
Beam ID	202L
Transmit Beam Frequency	11200.0 MHz -12700.0 MHz
Beam Type	Fixed
Polarization	LHCP
Peak Gain	41.0 dBi

Antenna Pointing Error	0.2 degrees
Antenna Rotational Error	0.25 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-21.6 dBW/Hz
Max. Transmit EIRP	65.3 dBW
Co- or Cross Polar Mode	C
Service Area Description	Circular beam representative of the first ring LHC beams in the transmit earth pointing user beam hexpack array. All 6 LHC beams in this ring, numbers 202L to 207L, are identical to this one. Also all 6 RHC beams in this ring, numbers 202R to 207R, are

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):
1.0 MHz	-142.0	-142.0	-141.0	-140.0	-139.0	-133.0

Transmitting Beams 4:

Question	Response
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Beam ID	208L
Transmit Beam Frequency	11200.0 MHz -12700.0 MHz
Beam Type	Fixed
Polarization	LHCP
Peak Gain	40.9 dBi
Antenna Pointing Error	0.2 degrees
Antenna Rotational Error	0.25 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-21.6 dBW/Hz
Max. Transmit EIRP	65.3 dBW
Co- or Cross Polar Mode	C
Service Area Description	Circular beam in 2nd ring in the transmit earth pointing user beam hexpack array. All 12 LHC beams in this ring, nos 208L to 219L, are identical to this one. Also all 12 RHC beams in this ring, nos 208R to 219R, are identical except for RHCP.

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	-140.0	-139.0	-133.0	-133.0	-133.0	-133.0

Transmitting Beams 5:

Question	Response
Beam ID	220L
Transmit Beam Frequency	11200.0 MHz -12700.0 MHz
Beam Type	Fixed
Polarization	LHCP
Peak Gain	40.9 dBi
Antenna Pointing Error	0.2 degrees
Antenna Rotational Error	0.25 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-21.6 dBW/Hz
Max. Transmit EIRP	65.3 dBW

Co- or Cross Polar Mode C

Service Area Description Circular beam in 3rd ring in the transmit earth pointing user beam hexpack array. All 18 LHC beams in this ring, nos 220L to 237L, are identical to this one. Also all 18 RHC beams in this ring, nos 220R to 237R, are identical except for RHCP.

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	-139.0	-136.0	-133.0	-133.0	-133.0	-133.0

Transmitting Beams 6:

Question	Response
Beam ID	238L
Transmit Beam Frequency	11200.0 MHz -12700.0 MHz
Beam Type	Fixed
Polarization	LHCP
Peak Gain	40.8 dBi
Antenna Pointing Error	0.2 degrees
Antenna Rotational Error	0.25 degrees
Polarization Switchable	

Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-21.6 dBW/Hz
Max. Transmit EIRP	65.3 dBW
Co- or Cross Polar Mode	C
Service Area Description	Circular beam in 4th ring in the transmit earth pointing user beam hexpack array. All 24 LHC beams in this ring, nos 238L to 261L, are identical to this one. Also all 24 RHC beams in this ring, nos 238R to 261R, are identical except for RHCP.

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	-135.0	-134.0	-133.0	-133.0	-133.0	-133.0

Transmitting Beams 7:

Question	Response
Beam ID	262L
Transmit Beam Frequency	11200.0 MHz -12700.0 MHz
Beam Type	Fixed
Polarization	LHCP
Peak Gain	40.6 dBi

Antenna Pointing Error	0.2 degrees
Antenna Rotational Error	0.25 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-21.6 dBW/Hz
Max. Transmit EIRP	65.3 dBW
Co- or Cross Polar Mode	C
Service Area Description	Circular beam in 5th ring in the transmit earth pointing user beam hexpack array. All 30 LHC beams in this ring, nos 262L to 291L, are identical to this one. Also all 30 RHC beams in this ring, nos 262R to 291R, are identical except for RHCP.

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	-134.0	-133.0	-132.0	-132.0	-132.0	-132.0

Transmitting Beams 8:

Question	Response
Beam ID	292L

1.0	-132.0	-131.0	-131.0	-131.0	-131.0	-131.0
MHz						

Transmitting Beams 9:

Question	Response
Beam ID	D01L
Transmit Beam Frequency	3700.0 MHz -4200.0 MHz
Beam Type	Steerable
Polarization	LHCP
Peak Gain	31.3 dBi
Antenna Pointing Error	0.2 degrees
Antenna Rotational Error	0.25 degrees
Polarization Switchable	No
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-35.3 dBW/Hz
Max. Transmit EIRP	51.3 dBW
Co- or Cross Polar Mode	C
Service Area Description	Circular spot beam kept pointed to gateway earth station. Beams D01L - D08L are identical. Beams D01R - D08R are identical except for RHCP.

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	-173.0	-173.0	-173.0	-170.0	-167.0	-133.0

Transmitting Beams 10:

Question	Response
Beam ID	D09L
Transmit Beam Frequency	10700.0 MHz -11200.0 MHz
Beam Type	Steerable
Polarization	LHCP
Peak Gain	40.2 dBi
Antenna Pointing Error	0.2 degrees
Antenna Rotational Error	0.25 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-37.4 dBW/Hz
Max. Transmit EIRP	49.6 dBW
Co- or Cross Polar Mode	C
Service Area Description	Circular spot beam kept pointed to gateway earth station. Beams D09L - D16L are identical. Beams D09R - D16R are identical except for RHCP.

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	-175.0	-175.0	-175.0	-172.0	-169.0	-135.0

Transmitting Channels (16)

Channel ID	Channel Bandwidth (MHz)	Center Frequency s (MHz)	Feeder Link, Service Link or TT&C
8	250.0	12575.0	Service Link
7	500.0	12200.0	Service Link
6	250.0	11825.0	Service Link
5	500.0	11450.0	Service Link
4	250.0	12575.0	Service Link
3	500.0	12200.0	Service Link
29	250.0	3825.0	Feeder Link
28	250.0	4075.0	Feeder Link
27	250.0	3825.0	Feeder Link
26	250.0	11075.0	Feeder Link
25	250.0	11075.0	Feeder Link
24	250.0	10825.0	Service Link
23	250.0	10825.0	Feeder Link
2	250.0	11825.0	Service Link
1	500.0	11450.0	Service Link
30	250.0	4075.0	Feeder 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?	Yes
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?	Yes
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>Beam footprint explanatory text.pdf</u>	001L	NGSO Antenna Gain Data	PDF file (*.pdf)	
<u>VGEO-1 at 100W-1.pdf</u>	001L	NGSO Antenna Gain Data	PDF file (*.pdf)	
<u>beam1 100W.gxt</u>	001L	NGSO Antenna Gain Data	GXT file (*.gxt)	