



312 File Number: **SATLOI2017030100023**

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## Filing Description

Question	Response
Description	V-band LEO Satellite Constellation

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## Satellite Information

Question	Response
Select Orbit Type	NGSO
Space Station or Satellite Network Name	V-band LEO Constellation
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 (3)

Nature of service	Description	Frequency Band(s)	Mode Type
<b>Fixed-Satellite Service</b>		37500.0 MHz -42000.0 MHz	Transmit
<b>Fixed-Satellite Service</b>		47200.0 MHz -50200.0 MHz	Receive
<b>Fixed-Satellite Service</b>		50400.0 MHz -51400.0 MHz	Receive

**Orbital  
Information For  
Non-  
Geostationary  
Satellites**

Question	Response
Total Number of Satellites in the active constellation	117
Orbit Epoch Date	09/23/2019
Celestial Reference Body	Earth

## Orbital Plane 1:

Question	Response
Number of Satellites in Plane	12
Inclination Angle	99.5 degrees
Right Ascension of Ascending Node	0.0 degrees
Argument of Perigee	0.0 degrees
Orbital Period	6306.9 seconds
Apogee	1000.0 km
Perigee	1000.0 km
Active Service Arc Begin Angle with respect to Ascending Node	0.0 degrees
Active Service Arc End Angle with respect to Ascending Node	360.0 degrees

### Mean Anomaly For Each Satellite

Satellite Number	Mean Anomaly (degrees) at the Orbit Epoch Date
1	0.0
2	30.0
3	60.0
4	90.0
5	120.0
6	150.0
7	180.0
8	210.0
9	240.0
10	270.0
11	300.0
12	330.0

## Orbital Plane 2:

Question	Response
Number of Satellites in Plane	12
Inclination Angle	99.5 degrees
Right Ascension of Ascending Node	63.2 degrees
Argument of Perigee	0.0 degrees
Orbital Period	6306.9 seconds
Apogee	1000.0 km
Perigee	1000.0 km
Active Service Arc Begin Angle with respect to Ascending Node	0.0 degrees
Active Service Arc End Angle with respect to Ascending Node	360.0 degrees

### Mean Anomaly For Each Satellite

Satellite Number	Mean Anomaly (degrees) at the Orbit Epoch Date
1	330.0
2	0.0
3	30.0
4	60.0
5	90.0
6	120.0
7	150.0
8	180.0
9	210.0
10	240.0
11	270.0
12	300.0

## Orbital Plane 3:

Question	Response
Number of Satellites in Plane	12
Inclination Angle	99.5 degrees
Right Ascension of Ascending Node	94.8 degrees
Argument of Perigee	0.0 degrees
Orbital Period	6306.9 seconds
Apogee	1000.0 km
Perigee	1000.0 km
Active Service Arc Begin Angle with respect to Ascending Node	0.0 degrees
Active Service Arc End Angle with respect to Ascending Node	360.0 degrees

### Mean Anomaly For Each Satellite

Satellite Number	Mean Anomaly (degrees) at the Orbit Epoch Date
1	15.0
2	45.0
3	75.0
4	105.0
5	135.0
6	165.0
7	195.0
8	225.0
9	255.0
10	285.0
11	315.0
12	345.0

Orbital Plane 4:

Question	Response
Number of Satellites in Plane	12
Inclination Angle	99.5 degrees
Right Ascension of Ascending Node	126.4 degrees
Argument of Perigee	0.0 degrees
Orbital Period	6306.9 seconds
Apogee	1000.0 km
Perigee	1000.0 km
Active Service Arc Begin Angle with respect to Ascending Node	0.0 degrees
Active Service Arc End Angle with respect to Ascending Node	360.0 degrees

### Mean Anomaly For Each Satellite

Satellite Number	Mean Anomaly (degrees) at the Orbit Epoch Date
1	0.0
2	30.0
3	60.0
4	90.0
5	120.0
6	150.0
7	180.0
8	210.0
9	240.0
10	270.0
11	300.0
12	330.0

**Orbital Plane 5:**



Question	Response
Number of Satellites in Plane	12
Inclination Angle	99.5 degrees
Right Ascension of Ascending Node	158.0 degrees
Argument of Perigee	0.0 degrees
Orbital Period	6306.9 seconds
Apogee	1000.0 km
Perigee	1000.0 km
Active Service Arc Begin Angle with respect to Ascending Node	0.0 degrees
Active Service Arc End Angle with respect to Ascending Node	360.0 degrees

### Mean Anomaly For Each Satellite

Satellite Number	Mean Anomaly (degrees) at the Orbit Epoch Date
1	15.0
2	45.0
3	75.0
4	105.0
5	135.0
6	165.0
7	195.0
8	225.0
9	255.0
10	285.0
11	315.0
12	345.0

**Orbital Plane 6:**

Question	Response
Number of Satellites in Plane	12
Inclination Angle	99.5 degrees
Right Ascension of Ascending Node	31.6 degrees
Argument of Perigee	0.0 degrees
Orbital Period	6306.9 seconds
Apogee	1000.0 km
Perigee	1000.0 km
Active Service Arc Begin Angle with respect to Ascending Node	0.0 degrees
Active Service Arc End Angle with respect to Ascending Node	360.0 degrees

### Mean Anomaly For Each Satellite

Satellite Number	Mean Anomaly (degrees) at the Orbit Epoch Date
1	15.0
2	45.0
3	75.0
4	105.0
5	135.0
6	165.0
7	195.0
8	225.0
9	255.0
10	285.0
11	315.0
12	345.0

**Orbital Plane 7:**

Question	Response
Number of Satellites in Plane	9
Inclination Angle	37.4 degrees
Right Ascension of Ascending Node	0.0 degrees
Argument of Perigee	0.0 degrees
Orbital Period	6627.6 seconds
Apogee	1248.0 km
Perigee	1248.0 km
Active Service Arc Begin Angle with respect to Ascending Node	0.0 degrees
Active Service Arc End Angle with respect to Ascending Node	360.0 degrees

### Mean Anomaly For Each Satellite

Satellite Number	Mean Anomaly (degrees) at the Orbit Epoch Date
1	0.0
2	40.0
3	80.0
4	120.0
5	160.0
6	200.0
7	240.0
8	280.0
9	320.0

### Orbital Plane 8:

Question	Response
Number of Satellites in Plane	9
Inclination Angle	37.4 degrees

Right Ascension of Ascending Node	36.0 degrees
Argument of Perigee	0.0 degrees
Orbital Period	6627.6 seconds
Apogee	1248.0 km
Perigee	1248.0 km
Active Service Arc Begin Angle with respect to Ascending Node	0.0 degrees
Active Service Arc End Angle with respect to Ascending Node	360.0 degrees

### Mean Anomaly For Each Satellite

Satellite Number	Mean Anomaly (degrees) at the Orbit Epoch Date
1	0.0
2	40.0
3	80.0
4	120.0
5	160.0
6	200.0
7	240.0
8	280.0
9	320.0

### Orbital Plane 9:

Question	Response
Number of Satellites in Plane	9
Inclination Angle	37.4 degrees
Right Ascension of Ascending Node	72.0 degrees
Argument of Perigee	0.0 degrees
Orbital Period	6627.6 seconds

Apogee	1248.0 km
Perigee	1248.0 km
Active Service Arc Begin Angle with respect to Ascending Node	0.0 degrees
Active Service Arc End Angle with respect to Ascending Node	360.0 degrees

### Mean Anomaly For Each Satellite

Satellite Number	Mean Anomaly (degrees) at the Orbit Epoch Date
1	0.0
2	40.0
3	80.0
4	120.0
5	160.0
6	200.0
7	240.0
8	280.0
9	320.0

### Orbital Plane 10:

Question	Response
Number of Satellites in Plane	9
Inclination Angle	37.4 degrees
Right Ascension of Ascending Node	108.0 degrees
Argument of Perigee	0.0 degrees
Orbital Period	6627.6 seconds
Apogee	1248.0 km
Perigee	1248.0 km
Active Service Arc Begin Angle with respect to Ascending Node	0.0 degrees

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Active Service Arc End Angle with respect to Ascending Node 360.0 degrees

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### Mean Anomaly For Each Satellite

Satellite Number	Mean Anomaly (degrees) at the Orbit Epoch Date
1	0.0
2	40.0
3	80.0
4	120.0
5	160.0
6	200.0
7	240.0
8	280.0
9	320.0

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### Orbital Plane 11:

Question	Response
Number of Satellites in Plane	9
Inclination Angle	37.4 degrees
Right Ascension of Ascending Node	144.0 degrees
Argument of Perigee	0.0 degrees
Orbital Period	6627.6 seconds
Apogee	1248.0 km
Perigee	1248.0 km
Active Service Arc Begin Angle with respect to Ascending Node	0.0 degrees
Active Service Arc End Angle with respect to Ascending Node	360.0 degrees

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### Mean Anomaly For Each Satellite

Satellite Number	Mean Anomaly (degrees) at the Orbit Epoch Date
1	0.0
2	40.0
3	80.0
4	120.0
5	160.0
6	200.0
7	240.0
8	280.0
9	320.0

## Receiving Beams 1:

Question	Response
Beam ID	F1P1
Receive Beam Frequency	47200.0 MHz -50200.0 MHz
Beam Type	Both Steerable and Shapeable
Polarization	RHCP
Peak Gain	46.2 dBi
Antenna Pointing Error	0.1 degrees
Antenna Rotational Error	0.0 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	15.4 dB/K
Min. Saturation Flux Density	-110.0 dBW/m <sup>2</sup>
Max. Saturation Flux Density	-70.0 dBW/m <sup>2</sup>
Co- or Cross Polar Mode	C
Service Area Description	Visible Earth

## Receiving Beams 2:

Question	Response
Beam ID	F1P2
Receive Beam Frequency	47200.0 MHz -50200.0 MHz
Beam Type	Both Steerable and Shapeable
Polarization	LHCP
Peak Gain	46.2 dBi
Antenna Pointing Error	0.1 degrees
Antenna Rotational Error	0.0 degrees



Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	15.4 dB/K
Min. Saturation Flux Density	-110.0 dBW/m2
Max. Saturation Flux Density	-70.0 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	Visible Earth

### Receiving Beams 3:

Question	Response
Beam ID	F2P1
Receive Beam Frequency	50400.0 MHz -51400.0 MHz
Beam Type	Both Steerable and Shapeable
Polarization	RHCP
Peak Gain	46.2 dBi
Antenna Pointing Error	0.1 degrees
Antenna Rotational Error	0.0 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	15.4 dB/K
Min. Saturation Flux Density	-110.0 dBW/m2
Max. Saturation Flux Density	-70.0 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	Visible Earth

### Receiving

## Beams 4:

Question	Response
Beam ID	F2P2
Receive Beam Frequency	50400.0 MHz -51400.0 MHz
Beam Type	Both Steerable and Shapeable
Polarization	LHCP
Peak Gain	46.2 dBi
Antenna Pointing Error	0.1 degrees
Antenna Rotational Error	0.0 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	15.4 dB/K
Min. Saturation Flux Density	-110.0 dBW/m2
Max. Saturation Flux Density	-70.0 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	Visible Earth

## Receiving Beams 5:

Question	Response
Beam ID	J1P1
Receive Beam Frequency	47200.0 MHz -50200.0 MHz
Beam Type	Fixed
Polarization	RHCP
Peak Gain	12.3 dBi
Antenna Pointing Error	0.1 degrees
Antenna Rotational Error	0.0 degrees
Polarization Switchable	

Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	-18.5 dB/K
Min. Saturation Flux Density	-96.1 dBW/m2
Max. Saturation Flux Density	-56.1 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	Visible Earth

**Receiving Beams 6:**

Question	Response
Beam ID	J1P2
Receive Beam Frequency	47200.0 MHz -50200.0 MHz
Beam Type	Fixed
Polarization	LHCP
Peak Gain	12.3 dBi
Antenna Pointing Error	0.1 degrees
Antenna Rotational Error	0.0 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	-18.5 dB/K
Min. Saturation Flux Density	-96.1 dBW/m2
Max. Saturation Flux Density	-56.1 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	Visible Earth

**Receiving Beams 7:**

Question	Response
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Beam ID	J2P1
Receive Beam Frequency	50400.0 MHz -51400.0 MHz
Beam Type	Fixed
Polarization	RHCP
Peak Gain	12.3 dBi
Antenna Pointing Error	0.1 degrees
Antenna Rotational Error	0.0 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	-18.5 dB/K
Min. Saturation Flux Density	-96.1 dBW/m2
Max. Saturation Flux Density	-56.1 dBW/m2
Co- or Cross Polar Mode	C
Service Area Description	Visible Earth

**Receiving Beams 8:**

Question	Response
Beam ID	J2P2
Receive Beam Frequency	50400.0 MHz -51400.0 MHz
Beam Type	Fixed
Polarization	LHCP
Peak Gain	12.3 dBi
Antenna Pointing Error	0.1 degrees
Antenna Rotational Error	0.0 degrees
Polarization Switchable	

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Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
G/T at Max. Gain Point	-18.5 dB/K
Min. Saturation Flux Density	-96.1 dBW/m <sup>2</sup>
Max. Saturation Flux Density	-56.1 dBW/m <sup>2</sup>
Co- or Cross Polar Mode	C
Service Area Description	Visible Earth

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## Receiving Channels (17)

Channel ID	Channel Bandwidth (MHz)	Center Frequency s (MHz)	Feeder Link, Service Link or TT&C
TC9	1.0	47209.0	TT&C
TC8	1.0	47208.0	TT&C
TC7	1.0	47207.0	TT&C
TC6	1.0	47206.0	TT&C
TC5	1.0	47205.0	TT&C
TC4	1.0	47204.0	TT&C
TC3	1.0	47203.0	TT&C
TC14	1.0	49698.0	TT&C
TC13	1.0	49697.0	TT&C
TC12	1.0	49696.0	TT&C
TC11	1.0	49695.0	TT&C
TC10	1.0	47210.0	TT&C
TC15	1.0	49699.0	TT&C
TC2	1.0	47202.0	TT&C
TC1	1.0	47201.0	TT&C
U1	3000.0	48700.0	Service Link
U2	1000.0	50900.0	Service Link

## Transmitting Beams 1:

Question	Response
Beam ID	M1P1
Transmit Beam Frequency	37500.0 MHz -42000.0 MHz
Beam Type	Both Steerable and Shapeable
Polarization	RHCP
Peak Gain	44.7 dBi
Antenna Pointing Error	0.1 degrees
Antenna Rotational Error	0.0 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-42.0 dBW/Hz
Max. Transmit EIRP	53.1 dBW
Co- or Cross Polar Mode	C
Service Area Description	Visible Earth

### 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>1.0 MHz</b>	-123.0	-116.9	-113.0	-113.0	-113.0	-113.0

## Transmitting Beams 2:

Question	Response
Beam ID	M1P2
Transmit Beam Frequency	37500.0 MHz -42000.0 MHz

Beam Type	Both Steerable and Shapeable
Polarization	LHCP
Peak Gain	44.7 dBi
Antenna Pointing Error	0.1 degrees
Antenna Rotational Error	0.0 degrees
Polarization Switchable	
Polarization Alignment Relative to the Equatorial Plane	45.0 degrees
Max. Transmit EIRP Density	-42.0 dBW/Hz
Max. Transmit EIRP	53.1 dBW
Co- or Cross Polar Mode	C
Service Area Description	Visible Earth

### 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>1.0 MHz</b>	-123.0	-116.9	-113.0	-113.0	-113.0	-113.0



## Transmitting Channels (16)

Channel ID	Channel Bandwidth (MHz)	Center Frequency s (MHz)	Feeder Link, Service Link or TT&C
TM15	1.0	41999.0	TT&C
D1	4500.0	39750.0	Service Link
TM1	0.5	40001.0	TT&C
TM10	0.5	41994.0	TT&C
TM11	1.0	41995.0	TT&C
TM12	1.0	41996.0	TT&C
TM13	1.0	41997.0	TT&C
TM14	1.0	41998.0	TT&C
TM2	0.5	40002.0	TT&C
TM3	0.5	40003.0	TT&C
TM4	0.5	40004.0	TT&C
TM5	0.5	40005.0	TT&C
TM6	0.5	41990.0	TT&C
TM7	0.5	41991.0	TT&C
TM8	0.5	41992.0	TT&C
TM9	0.5	41993.0	TT&C

## 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?	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?	N/A
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>GIMS_V_LEO.mdb</u>		NGSO Antenna Gain Data	GIMS file (*.mdb)	
<u>GIMS_V_LEO.mdb</u>		NGSO Antenna Gain Data	GIMS file (*.mdb)	