

True Anomaly NTIA Space record data form for Meson Experiment

NTIA requires the following data for space related experiments using government shared spectrum. For each transmit frequency, please provide the data for both ends of the transmit-receive link.

**Part A: Space to Space Downlink Data**

**From Meson to the Iridium Constellation**

**Satellite Transmitter Data**

Transmit Frequencies: 174 Channels, range from low end of low channel 1618.75 MHz to high end of high channel 1626 MHz, channel spacing 41.6667 kHz.		
Satellite Name: Meson		
Data Field	Data Answer	Description/Comments
Transmit Power (PWR)	PWR = 1.25 W	TRANSMIT POWER SUPPLIED TO THE ANTENNA INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE: W = WATT, K = KILOWATT, M = MEGAWATT
Necessary Bandwidth	35 kHz	THE WIDTH OF FREQUENCY BAND WHICH IS JUST SUFFICIENT TO SUCCESSFULLY TRANSFER DATA. FORMULAS CAN BE FOUND IN ANNEX J OF THE NTIA MANUAL.
RF Emissions Data		2-SIDED EMISSION BANDWIDTH VALUES
-3 dB bandwidth	NA	
-20 dB bandwidth	NA	
-40 dB bandwidth	NA	
-60 dB bandwidth	NA	
Modulation Type	DQPSK	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	50 kbps	INFORMATION DATA RATE
Forward Error Correction Coding	Is FEC used? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> FEC Type: __BCH(32,21)_____, FEC Rate: _____50 kbps_____	
Total Symbol Rate	25 ksps	DATA RATE COMBINED WITH FEC AND FRAME OVERHEAD RESULTING IN THE TOTAL SYMBOL RATE AT THE INPUT TO THE SYMBOL MAPPER/MODULATOR.

Does transmitter have a beacon mode?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	BEACON MODE IS NORMALLY CONSIDERED A REGULAR AND PERIODIC SHORT DURATION TRANSMISSION THAT IS OFTEN USED TO ASSIST WITH TRACKING, DOPPLER COMPENSATION, OR SMALL SATELLITE IDENTIFICATION WHOSE TRANSMISSIONS ARE NOT LIMITED TO DURATIONS WHEN SUPPORTING GROUND STATIONS ARE VISIBLE.
If transmitter has a beacon mode, can the beacon be commanded off?	Yes <input type="checkbox"/> No <input type="checkbox"/>	

Polarization (XAP)	XAP = XAP01 R	POLARIZATIONS INCLUDE : H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR, T = RIGHT AND LEFT HAND CIRCULAR, J = LINEAR POLARIZATION
Transmit Antenna Orientation (XAZ)	XAZ = XAZ01 NB	NB= NARROWBEAM EC = EARTH COVERAGE
Transmit Antenna Dimension (XAD)	ANTENNA GAIN <u>3.7</u> BEAMWIDTH <u>80</u> XAD = XAD01 3.7G160B	(NTIA format (XAD), EXAMPLE, XAD01 16G030B)
Type of satellite (State = SP) (City = geo or non)	Type = non	Choose either: Geostationary or Nongeostationary
For Geostationary	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE (XLG AND/OR RLG).

<p>For Nongeostationary (Orbital Data)</p>	<p>For Meson:  INCLINATION ANGLE <u>97.4</u>,  APOGEE IN KILOMETERS <u>500</u>,  PERIGEE IN KILOMETERS <u>500</u>,  ORBITAL PERIOD IN HOURS <u>1</u> AND FRACTIONS OF HOURS IN DECIMAL <u>.594</u>,  THE NUMBER OF SATELLITES IN THE SYSTEM <u>1</u>,</p> <p>For Iridium constellation:  INCLINATION ANGLE <u>86.4</u>,  APOGEE IN KILOMETERS <u>780</u>,  PERIGEE IN KILOMETERS <u>780</u>,  ORBITAL PERIOD IN HOURS <u>1</u> AND FRACTIONS OF HOURS IN DECIMAL <u>.73</u>,  THE NUMBER OF SATELLITES IN THE SYSTEM <u>66</u>,</p> <p>ORB =  ORB,97.4IN00500AP00500PE001.59H01NRT01  ORB,86.4IN00780AP00780PE001.73H66NRR01</p>	<p>IF ANY SATELLITES ARE NONGEOSTATIONARY, REPORT ITS INCLINATION ANGLE, APOGEE IN KILOMETERS, PERIGEE IN KILOMETERS, ORBITAL PERIOD IN HOURS AND FRACTIONS OF HOURS IN DECIMAL, THE NUMBER OF SATELLITES IN THE SYSTEM, THEN T01, EXAMPLE, REM04  *ORB,98.0IN00510AP00510PE001.58H01NRT01,  AND FOR SPACE-TO-SPACE COMMUNICATIONS WITH ANOTHER NONGEOSTATIONARY SATELLITE ADD AN ADDITIONAL  *ORB FOR IT ENDING IN R01, EXAMPLE, REM05  *ORB,72.9IN03209AP00655PE013.46H01NRT01</p>
<p>For SunSynchronous Nongeostationary Orbits</p>	<p>Mean Local Time of Ascending Node (MLTAN) = 22:00 For Meson</p>	<p>MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)</p>

FCC notes:  
1. Use S-Note S945.  
2. REM AGN, Cubesat, Meson

**Receiver Data Iridium Satellite**

<b>Iridium Satellite Receive Specifications</b>		
<p>Receive Antenna Polarization (RAP)</p>	<p>RAP = RAP 01 R</p>	<p>POLARIZATIONS INCLUDE :  H = HORIZONTAL,  V = VERTICAL,  S = HORIZONTAL AND VERTICAL,  L = LEFT HAND CIRCULAR,  R = RIGHT HAND CIRCULAR,  T = RIGHT AND LEFT HAND CIRCULAR, J = LINEAR POLARIZATION</p>
<p>Azimuth (RAZ)</p>	<p>RAZ = NB</p>	<p>NB= NARROWBEAM  EC = EARTH COVERAGE</p>

Receive Antenna Dimension (RAD)	ANTENNA GAIN_20____ BEAMWIDTH ___12____ RAD = RAD01 20G012B	(NTIA format (RAD), EXAMPLE, RAD01 16G030B)
Type of satellite (State = SP) City = G/No	Type = Non	Choose either: Geostationary or Nongeostationary
For Geostationary	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE (XLG AND/OR RLG).
For Nongeostationary (Orbital Data)	For Meson: INCLINATION ANGLE___97.4_____, APOGEE IN KILOMETERS___500_____, PERIGEE IN KILOMETERS___500_____, ORBITAL PERIOD IN HOURS __1__AND FRACTIONS OF HOURS IN DECIMAL_.594 __, THE NUMBER OF SATELLITES IN THE SYSTEM___1_____,  For Iridium constellation: INCLINATION ANGLE___86.4_____, APOGEE IN KILOMETERS___780_____, PERIGEE IN KILOMETERS___780_____, ORBITAL PERIOD IN HOURS __1__AND FRACTIONS OF HOURS IN DECIMAL_.73__, THE NUMBER OF SATELLITES IN THE SYSTEM___66_____,  ORB = ORB,97.4IN00500AP00500PE001.59H01NRR01 ORB,86.4IN00780AP00780PE001.73H66NRR01	IF ANY SATELLITES ARE NONGEOSTATIONARY, REPORT ITS INCLINATION ANGLE, APOGEE IN KILOMETERS, PERIGEE IN KILOMETERS, ORBITAL PERIOD IN HOURS AND FRACTIONS OF HOURS IN DECIMAL, THE NUMBER OF SATELLITES IN THE SYSTEM, THEN T01, EXAMPLE, REM04 *ORB,98.0IN00510AP00510PE001.58H01NRT01, AND FOR SPACE-TO-SPACE COMMUNICATIONS WITH ANOTHER NONGEOSTATIONARY SATELLITE ADD AN ADDITIONAL *ORB FOR IT ENDING IN R01, EXAMPLE, REM05 *ORB,72.9IN03209AP00655PE013.46H01NRR01

Number of Satellite Contacts Supported Per Day	N/A due to ISL	NUMBER OF TIMES THE SATELLITE WILL COMMUNICATE WITH THE EARTH STATION IN THE SPACE TO EARTH DIRECTION (DOWNLINKS) EACH DAY
Expected Duration of Each Contact	10 Seconds Max	AVERAGE DURATION OF EACH CONTACT
Supported Operations	Satellite Health and Status Data <input checked="" type="checkbox"/> Mission Payload Data <input checked="" type="checkbox"/>	SATELLITE HEALTH AND STATUS TELEMETRY AND/OR MISSION PAYLOAD DATA
FCC notes: 1. Use S-Note S945. 2. REM AGN, Cubesat, Meson		

## From Meson to the Inmarsat Constellation

### Satellite Transmitter Data

Transmit Frequencies: 1626.5 - 1660.5 MHz, centered 1643.5 MHz		
Satellite Name: Meson		
Data Field	Data Answer	Description/Comments
Transmit Power (PWR)	PWR = 1.26 W	TRANSMIT POWER SUPPLIED TO THE ANTENNA INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE: W = WATT, K = KILOWATT, M = MEGAWATT
Necessary Bandwidth	200 kHz	THE WIDTH OF FREQUENCY BAND WHICH IS JUST SUFFICIENT TO SUCCESSFULLY TRANSFER DATA. FORMULAS CAN BE FOUND IN ANNEX J OF THE NTIA MANUAL.
RF Emissions Data		2-SIDED EMISSION BANDWIDTH VALUES
-3 dB bandwidth	NA	
-20 dB bandwidth	NA	
-40 dB bandwidth	NA	
-60 dB bandwidth	NA	
Modulation Type	QPSK	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	200 kbps	INFORMATION DATA RATE
Forward Error Correction Coding	Is FEC used? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> FEC Type: ___ Turbo_____, FEC Rate: ___ 1/3 - 1 _____,	
Total Symbol Rate	151.2 ksps	DATA RATE COMBINED WITH FEC AND FRAME OVERHEAD RESULTING IN THE TOTAL SYMBOL RATE AT THE INPUT TO THE SYMBOL MAPPER/MODULATOR.
Does transmitter have a beacon mode?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	BEACON MODE IS NORMALLY CONSIDERED A REGULAR AND PERIODIC SHORT DURATION TRANSMISSION THAT IS OFTEN USED TO ASSIST WITH TRACKING, DOPPLER COMPENSATION, OR SMALL SATELLITE IDENTIFICATION WHOSE TRANSMISSIONS ARE NOT LIMITED TO DURATIONS WHEN SUPPORTING GROUND STATIONS ARE VISIBLE.
If transmitter has a beacon mode, can the beacon be commanded off?	Yes <input type="checkbox"/> No <input type="checkbox"/>	

Polarization (XAP)	XAP = R	POLARIZATIONS INCLUDE : H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR, T = RIGHT AND LEFT HAND CIRCULAR, J = LINEAR POLARIZATION
Transmit Antenna Orientation (XAZ)	XAZ = NB	NB= NARROWBEAM EC = EARTH COVERAGE
Transmit Antenna Dimension (XAD)	ANTENNA GAIN ___10___ BEAMWIDTH ___53.26___ XAD = XAD01 10G053B	(NTIA format (XAD), EXAMPLE, XAD01 16G030B)
Type of satellite (State = SP) (City = geo or non)	Type = non	Choose either: Geostationary or Nongeostationary
For Geostationary	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE (XLG AND/OR RLG).

For Nongeostationary (Orbital Data)	<p>For Meson: INCLINATION ANGLE ___97.4___, APOGEE IN KILOMETERS ___500___, PERIGEE IN KILOMETERS ___500___, ORBITAL PERIOD IN HOURS ___1___ AND FRACTIONS OF HOURS IN DECIMAL ___594___, THE NUMBER OF SATELLITES IN THE SYSTEM ___1___,</p> <p>For Inmarsat constellation: INCLINATION ANGLE ___0___, APOGEE IN KILOMETERS ___35786___, PERIGEE IN KILOMETERS ___35786___, ORBITAL PERIOD IN HOURS ___24___ AND FRACTIONS OF HOURS IN DECIMAL ___00___, THE NUMBER OF SATELLITES IN THE SYSTEM ___4___,</p> <p>ORB = ORB,97.4IN00500AP00500PE001.59H01NRT01 ORB,00.0IN35786AP35786PE024.00H04GRR01</p>	<p>IF ANY SATELLITES ARE NONGEOSTATIONARY, REPORT ITS INCLINATION ANGLE, APOGEE IN KILOMETERS, PERIGEE IN KILOMETERS, ORBITAL PERIOD IN HOURS AND FRACTIONS OF HOURS IN DECIMAL, THE NUMBER OF SATELLITES IN THE SYSTEM, THEN T01, EXAMPLE, REM04 *ORB,98.0IN00510AP00510PE001.58H01NRT01, AND FOR SPACE-TO-SPACE COMMUNICATIONS WITH ANOTHER NONGEOSTATIONARY SATELLITE ADD AN ADDITIONAL *ORB FOR IT ENDING IN R01, EXAMPLE, REM05 *ORB,72.9IN03209AP00655PE013.46H01NRT01</p>
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For SunSynchronous Nongeostationary Orbits	Mean Local Time of Ascending Node (MLTAN) = 22:00 For Meson	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)
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FCC notes: 3. Use S-Note S945. 4. REM AGN, Cubesat, Meson
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### Receiver Data Inmarsat Satellite

Iridium Satellite Receive Specifications		
Receive Antenna Polarization (RAP)	RAP = RAP 01 R	POLARIZATIONS INCLUDE : H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR, T = RIGHT AND LEFT HAND CIRCULAR, J = LINEAR POLARIZATION
Azimuth (RAZ)	RAZ = NB	NB= NARROWBEAM EC = EARTH COVERAGE

Receive Antenna Dimension (RAD)	ANTENNA GAIN_44 _____ BEAMWIDTH ____1.07_____ RAD = RAD01 44G001B	(NTIA format (RAD), EXAMPLE, RAD01 16G030B)
Type of satellite (State = SP) City = G/No	Type = Geo	Choose either: Geostationary or Nongeostationary
For Geostationary	Longitude = 143.5E, 63.9E, 98W, 24.9E	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE (XLG AND/OR RLG).
For Nongeostationary (Orbital Data)	For Meson: INCLINATION ANGLE____97.4_____, APOGEE IN KILOMETERS____ 500 _____, PERIGEE IN KILOMETERS____ 500 _____, ORBITAL PERIOD IN HOURS __1____AND FRACTIONS OF HOURS IN DECIMAL_ .594 __, THE NUMBER OF SATELLITES IN THE SYSTEM ____1 _____,  For Inmarsat constellation: INCLINATION ANGLE ____ 0 _____,	IF ANY SATELLITES ARE NONGEOSTATIONARY, REPORT ITS INCLINATION ANGLE, APOGEE IN KILOMETERS, PERIGEE IN KILOMETERS, ORBITAL PERIOD IN HOURS AND FRACTIONS OF HOURS IN DECIMAL, THE NUMBER OF SATELLITES IN THE SYSTEM, THEN T01, EXAMPLE, REM04 *ORB,98.0IN00510AP00510PE001.58H01NRT01, AND FOR SPACE-TO-SPACE COMMUNICATIONS WITH ANOTHER NONGEOSTATIONARY SATELLITE ADD AN ADDITIONAL *ORB FOR IT ENDING IN R01, EXAMPLE, REM05 *ORB,72.9IN03209AP00655PE013.46H01NRR01

	<p>APOGEE IN KILOMETERS__35786_____,  PERIGEE IN KILOMETERS__35786_____,  ORBITAL PERIOD IN HOURS _24_ AND  FRACTIONS OF HOURS IN DECIMAL_00_,  THE NUMBER OF SATELLITES IN THE  SYSTEM__4_____,</p> <p>ORB =  ORB,97.4IN00500AP00500PE001.59H01NRT01  ORB,00.0IN35786AP35786PE024.00H4GRR01</p>	
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Number of Satellite Contacts Supported Per Day	N/A due to ISL	NUMBER OF TIMES THE SATELLITE WILL COMMUNICATE WITH THE EARTH STATION IN THE SPACE TO EARTH DIRECTION (DOWNLINKS) EACH DAY
Expected Duration of Each Contact	10 Seconds Max	AVERAGE DURATION OF EACH CONTACT
Supported Operations	Satellite Health and Status Data <input checked="" type="checkbox"/> Mission Payload Data <input checked="" type="checkbox"/>	SATELLITE HEALTH AND STATUS TELEMETRY AND/OR MISSION PAYLOAD DATA
FCC notes: 3. Use S-Note S945. 4. REM AGN, Cubesat, Meson		

## From Meson to Gluon

### Satellite Transmitter Data

Transmit Frequencies: 2400.00 - 2500.00 MHz		
Satellite Name: Meson		
Data Field	Data Answer	Description/Comments

Transmit Power (PWR)	PWR = 1.26 W	TRANSMIT POWER SUPPLIED TO THE ANTENNA INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE: W = WATT, K = KILOWATT, M = MEGAWATT
Necessary Bandwidth	20 MHz	THE WIDTH OF FREQUENCY BAND WHICH IS JUST SUFFICIENT TO SUCCESSFULLY TRANSFER DATA. FORMULAS CAN BE FOUND IN ANNEX J OF THE NTIA MANUAL.



RF Emissions Data		2-SIDED EMISSION BANDWIDTH VALUES
-3 dB bandwidth	NA	
-20 dB bandwidth	NA	
-40 dB bandwidth	NA	
-60 dB bandwidth	NA	
Modulation Type	WiFi (802.11)	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	50 Mbps	INFORMATION DATA RATE
Forward Error Correction Coding	Is FEC used? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> FEC Type: __LDPC_____, FEC Rate: _____5/6_____	
Total Symbol Rate	50 Msps	DATA RATE COMBINED WITH FEC AND FRAME OVERHEAD RESULTING IN THE TOTAL SYMBOL RATE AT THE INPUT TO THE SYMBOL MAPPER/MODULATOR.
Does transmitter have a beacon mode?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	BEACON MODE IS NORMALLY CONSIDERED A REGULAR AND PERIODIC SHORT DURATION TRANSMISSION THAT IS OFTEN USED TO ASSIST WITH TRACKING, DOPPLER COMPENSATION, OR SMALL SATELLITE IDENTIFICATION WHOSE TRANSMISSIONS ARE NOT LIMITED TO DURATIONS WHEN SUPPORTING GROUND STATIONS ARE VISIBLE.
If transmitter has a beacon mode, can the beacon be commanded off?	Yes <input type="checkbox"/> No <input type="checkbox"/>	

Polarization (XAP)	XAP = XAP01 J	POLARIZATIONS INCLUDE : H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR, T = RIGHT AND LEFT HAND CIRCULAR, J = LINEAR POLARIZATION
Transmit Antenna Orientation (XAZ)	XAZ = XAZ01 NB	NB= NARROWBEAM EC = EARTH COVERAGE
Transmit Antenna Dimension (XAD)	ANTENNA GAIN _____ 5.8 _____ BEAMWIDTH _____ 360 _____ XAD = XAD01 5.8G160B	(NTIA format (XAD), EXAMPLE, XAD01 16G030B)
Type of satellite (State = SP) (City = geo or non)	Type = non	Choose either: Geostationary or Nongeostationary
For Geostationary	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND

		REPORT ITS LONGITUDE (XLG AND/OR RLG).
For Nongeostationary (Orbital Data)	<p>For Meson:  INCLINATION ANGLE <u>97.4</u>,  APOGEE IN KILOMETERS <u>500</u>,  PERIGEE IN KILOMETERS <u>500</u>,  ORBITAL PERIOD IN HOURS <u>1</u> AND FRACTIONS OF HOURS IN DECIMAL <u>.594</u>,  THE NUMBER OF SATELLITES IN THE SYSTEM <u>1</u>,</p> <p>For Gluon:  INCLINATION ANGLE <u>97.4</u>,  APOGEE IN KILOMETERS <u>500</u>,  PERIGEE IN KILOMETERS <u>500</u>,  ORBITAL PERIOD IN HOURS <u>1</u> AND FRACTIONS OF HOURS IN DECIMAL <u>.594</u>,  THE NUMBER OF SATELLITES IN THE SYSTEM <u>1</u>,</p> <p>ORB =  ORB,97.4IN00500AP00500PE001.59H01NRT01  ORB,97.4IN00500AP00500PE001.59H01NRR01</p>	<p>IF ANY SATELLITES ARE NONGEOSTATIONARY, REPORT ITS INCLINATION ANGLE, APOGEE IN KILOMETERS, PERIGEE IN KILOMETERS, ORBITAL PERIOD IN HOURS AND FRACTIONS OF HOURS IN DECIMAL, THE NUMBER OF SATELLITES IN THE SYSTEM, THEN T01, EXAMPLE, REM04  *ORB,98.0IN00510AP00510PE001.58H01NRT01, AND FOR SPACE-TO-SPACE COMMUNICATIONS WITH ANOTHER NONGEOSTATIONARY SATELLITE ADD AN ADDITIONAL  *ORB FOR IT ENDING IN R01, EXAMPLE, REM05  *ORB,72.9IN03209AP00655PE013.46H01NRT01</p>
For SunSynchronous Nongeostationary Orbits	Mean Local Time of Ascending Node (MLTAN) = 22:00 For Meson	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)

FCC notes: 5. Use S-Note S945. 6. REM AGN, Cubesat, Meson
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**Receiver Data Gluon Satellite**

<b>Gluon Satellite Receive Specifications</b>		
Receive Antenna Polarization (RAP)	RAP = RAP 01 J	<p>POLARIZATIONS INCLUDE :</p> <p>H = HORIZONTAL,  V = VERTICAL,  S = HORIZONTAL AND VERTICAL,  L = LEFT HAND CIRCULAR,  R = RIGHT HAND CIRCULAR,  T = RIGHT AND LEFT HAND CIRCULAR, J = LINEAR POLARIZATION</p>

Azimuth (RAZ)

RAZ = NB

NB= NARROWBEAM

EC = EARTH COVERAGE

Receive Antenna Dimension (RAD)	ANTENNA GAIN_5.8_____ BEAMWIDTH ___360_____ RAD = RAD01 5.8G012B	(NTIA format (RAD), EXAMPLE, RAD01 16G030B)
Type of satellite (State = SP) City = G/No	Type = Non	Choose either: Geostationary or Nongeostationary
For Geostationary	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE (XLG AND/OR RLG).
For Nongeostationary (Orbital Data)	For Gluon: INCLINATION ANGLE___97.4_____, APOGEE IN KILOMETERS___500_____, PERIGEE IN KILOMETERS___500_____, ORBITAL PERIOD IN HOURS __1__ AND FRACTIONS OF HOURS IN DECIMAL_ .594 __, THE NUMBER OF SATELLITES IN THE SYSTEM___1_____,  For Meson constellation: INCLINATION ANGLE___97.4_____, APOGEE IN KILOMETERS_500_____, PERIGEE IN KILOMETERS___500_____, ORBITAL PERIOD IN HOURS _1_ AND FRACTIONS OF HOURS IN DECIMAL_ .594 __, THE NUMBER OF SATELLITES IN THE SYSTEM___1_____,  ORB = ORB,97.4IN00500AP00500PE001.59H01NRR01 ORB,97.4IN00500AP00500PE001.59H01NRT01	IF ANY SATELLITES ARE NONGEOSTATIONARY, REPORT ITS INCLINATION ANGLE, APOGEE IN KILOMETERS, PERIGEE IN KILOMETERS, ORBITAL PERIOD IN HOURS AND FRACTIONS OF HOURS IN DECIMAL, THE NUMBER OF SATELLITES IN THE SYSTEM, THEN T01, EXAMPLE, REM04 *ORB,98.0IN00510AP00510PE001.58H01NRT01, AND FOR SPACE-TO-SPACE COMMUNICATIONS WITH ANOTHER NONGEOSTATIONARY SATELLITE ADD AN ADDITIONAL *ORB FOR IT ENDING IN R01, EXAMPLE, REM05 *ORB,72.9IN03209AP00655PE013.46H01NRR01

Number of Satellite Contacts Supported Per Day	N/A due to ISL	NUMBER OF TIMES THE SATELLITE WILL COMMUNICATE WITH THE EARTH STATION IN THE SPACE TO EARTH DIRECTION (DOWNLINKS) EACH DAY
Supported Operations	Satellite Health and Status Data <input checked="" type="checkbox"/> Mission Payload Data <input checked="" type="checkbox"/>	SATELLITE HEALTH AND STATUS TELEMETRY AND/OR MISSION PAYLOAD DATA
FCC notes: 5. Use S-Note S945. 6. REM AGN, Cubesat, Meson		

**Part B:**

**Iridium Constellation to Meson:**

**Satellite Transmitter Data**

Transmit Frequencies: 174 Channels spaced 41.6667 kHz apart, plus ring tone. Low end of low channel 1618.75 MHz, High end of High channel 1626.2912 MHz.		
Satellite Name: IRIDIUM CONSTELLATION		
<b>Data Field</b>	<b>Data Answer</b>	<b>Description/Comments</b>
Polarization (XAP)	XAP = XAP01 R	POLARIZATIONS INCLUDE : H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR, T = RIGHT AND LEFT HAND CIRCULAR, J = LINEAR POLARIZATION
Orientation (XAZ)	XAZ = XAZ01 NB	NB= NARROWBEAM EC = EARTH COVERAGE
Antenna Dimension (XAD)	ANTENNA GAIN_20_____ BEAMWIDTH ____12_____ XAD = XAD01 20G012B	(NTIA format (XAD), EXAMPLE, XAD01 16G030B)
Type of satellite (State = SP) (City = geo or non)	Type = non	Choose either: Geostationary or Nongeostationary
For Geostationary	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE (XLG AND/OR RLG).

<p>For Nongeostationary (Orbital Data)</p>	<p>For Iridium constellation:  INCLINATION ANGLE__86.4_____,  APOGEE IN KILOMETERS_780_____,  PERIGEE IN KILOMETERS__780_____,  ORBITAL PERIOD IN HOURS _1_ AND  FRACTIONS OF HOURS IN DECIMAL_.73_____,  THE NUMBER OF SATELLITES IN THE  SYSTEM__66_____,</p> <p>For Meson:  INCLINATION ANGLE_____97.4_____,  APOGEE IN KILOMETERS_____500_____,  PERIGEE IN KILOMETERS_____500_____,  ORBITAL PERIOD IN HOURS _1_ AND  FRACTIONS OF HOURS IN DECIMAL_.594_____,  THE NUMBER OF SATELLITES IN THE  SYSTEM__1_____,</p> <p>ORB =  ORB,86.4IN00780AP00780PE001.73H66NRT01  ORB,97.4IN00500AP00500PE001.59H01NRR01</p>	<p>IF ANY SATELLITES ARE NONGEOSTATIONARY, REPORT ITS INCLINATION ANGLE, APOGEE IN KILOMETERS, PERIGEE IN KILOMETERS, ORBITAL PERIOD IN HOURS AND FRACTIONS OF HOURS IN DECIMAL, THE NUMBER OF SATELLITES IN THE SYSTEM, THEN T01, EXAMPLE, REM04  *ORB,98.0IN00510AP00510PE001.58H01NRT01,  AND FOR SPACE-TO-SPACE COMMUNICATIONS WITH ANOTHER NONGEOSTATIONARY SATELLITE ADD AN ADDITIONAL  *ORB FOR IT ENDING IN R01, EXAMPLE, REM05  *ORB,72.9IN03209AP00655PE013.46H01NRT01</p>
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<p>FCC notes:</p> <ol style="list-style-type: none"> <li>1. Use S-Note S945.</li> <li>2. REM AGN, Cubesat, Meson</li> </ol>
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Receiver Data Meson Satellite Iridium Transceiver Receive from Iridium Constellation

<b>Satellite Receive Specifications</b>		
Polarization (RAP)	RAP = RAP 01 R	POLARIZATIONS INCLUDE : H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR, T = RIGHT AND LEFT HAND CIRCULAR, J = LINEAR POLARIZATION
Azimuth (RAZ)	RAZ = NB	NB= NARROWBEAM EC = EARTH COVERAGE
Dimension (RAD)	ANTENNA GAIN__3.7_____ BEAMWIDTH__80_____ RAD = RAD01 RAD01 02G160B	(NTIA format (RAD), EXAMPLE, RAD01 16G030B)

Type of satellite (State = SP) City = G/No	Type = Non	Choose either: Geostationary or Nongeostationary
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For Geostationary	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE (XLG AND/OR RLG).
For Nongeostationary (Orbital Data)	<p>For Iridium constellation: INCLINATION ANGLE <u>86.4</u>, APOGEE IN KILOMETERS <u>780</u>, PERIGEE IN KILOMETERS <u>780</u>, ORBITAL PERIOD IN HOURS <u>1</u> AND FRACTIONS OF HOURS IN DECIMAL <u>.73</u>, THE NUMBER OF SATELLITES IN THE SYSTEM <u>66</u>,</p> <p>For Meson: INCLINATION ANGLE <u>97.4</u>, APOGEE IN KILOMETERS <u>500</u>, PERIGEE IN KILOMETERS <u>500</u>, ORBITAL PERIOD IN HOURS <u>1</u> AND FRACTIONS OF HOURS IN DECIMAL <u>.594</u>, THE NUMBER OF SATELLITES IN THE SYSTEM <u>1</u>,</p> <p>ORB = ORB,86.4IN00780AP00780PE001.73H66NRT01 ORB,97.4IN00500AP00500PE001.59H01NRR01</p>	<p>IF ANY SATELLITES ARE NONGEOSTATIONARY, REPORT ITS INCLINATION ANGLE, APOGEE IN KILOMETERS, PERIGEE IN KILOMETERS, ORBITAL PERIOD IN HOURS AND FRACTIONS OF HOURS IN DECIMAL, THE NUMBER OF SATELLITES IN THE SYSTEM, THEN T01, EXAMPLE, REM04 *ORB,98.0IN00510AP00510PE001.58H01NRT01, AND FOR SPACE-TO-SPACE COMMUNICATIONS WITH ANOTHER NONGEOSTATIONARY SATELLITE ADD AN ADDITIONAL *ORB FOR IT ENDING IN R01, EXAMPLE, REM05 *ORB,72.9IN03209AP00655PE013.46H01NRR01</p>

### Inmarsat Constellation to Meson:

#### Satellite Transmitter Data

Transmit Frequencies: 1525 MHz - 1559 MHz, centered at 1542 MHz		
Satellite Name: INMARSAT CONSTELLATION		
Data Field	Data Answer	Description/Comments

Polarization (XAP)	XAP = XAP01 R	POLARIZATIONS INCLUDE : H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR, T = RIGHT AND LEFT HAND CIRCULAR, J = LINEAR POLARIZATION
Orientation (XAZ)	XAZ = XAZ01 NB	NB= NARROWBEAM EC = EARTH COVERAGE
Antenna Dimension (XAD)	ANTENNA GAIN_44_____ BEAMWIDTH ___1.07_____ XAD = XAD01 44G001B	(NTIA format (XAD), EXAMPLE, XAD01 16G030B)
Type of satellite (State = SP) (City = geo or non)	Type = GEO	Choose either: Geostationary or Nongeostationary
For Geostationary	Longitude = 143.5E, 63.9E, 98W, 24.9E	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE (XLG AND/OR RLG).
For Nongeostationary (Orbital Data)	For Inmarsat constellation: INCLINATION ANGLE___0_____, APOGEE IN KILOMETERS___35786_____, PERIGEE IN KILOMETERS___35786_____, ORBITAL PERIOD IN HOURS _24_ AND FRACTIONS OF HOURS IN DECIMAL_00____, THE NUMBER OF SATELLITES IN THE SYSTEM___4_____,  For Meson: INCLINATION ANGLE___97.4_____, APOGEE IN KILOMETERS___500_____, PERIGEE IN KILOMETERS___500_____, ORBITAL PERIOD IN HOURS _1_ AND FRACTIONS OF HOURS IN DECIMAL_.594____, THE NUMBER OF SATELLITES IN THE SYSTEM___1_____,  ORB = ORB,00.0IN35786AP35786PE024.00H4GRT01 ORB,97.4IN00500AP00500PE001.59H01NRR01	IF ANY SATELLITES ARE NONGEOSTATIONARY, REPORT ITS INCLINATION ANGLE, APOGEE IN KILOMETERS, PERIGEE IN KILOMETERS, ORBITAL PERIOD IN HOURS AND FRACTIONS OF HOURS IN DECIMAL, THE NUMBER OF SATELLITES IN THE SYSTEM, THEN T01, EXAMPLE, REM04 *ORB,98.0IN00510AP00510PE001.58H01NRT01, AND FOR SPACE-TO-SPACE COMMUNICATIONS WITH ANOTHER NONGEOSTATIONARY SATELLITE ADD AN ADDITIONAL *ORB FOR IT ENDING IN R01, EXAMPLE, REM05 *ORB,72.9IN03209AP00655PE013.46H01NRT01

FCC notes:

3. Use S-Note S945.
4. REM AGN, Cubesat, Meson

### Receiver Data Meson Satellite Iridium Transceiver Receive from Inmarsat Constellation

Satellite Receive Specifications		
Polarization (RAP)	RAP = RAP 01 R	POLARIZATIONS INCLUDE : H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR, T = RIGHT AND LEFT HAND CIRCULAR, J = LINEAR POLARIZATION
Azimuth (RAZ)	RAZ = NB	NB= NARROWBEAM EC = EARTH COVERAGE
Dimension (RAD)	ANTENNA GAIN <u>9.7</u> BEAMWIDTH <u>58</u> RAD = RAD01 RAD01 9.7G058B	(NTIA format (RAD), EXAMPLE, RAD01 16G030B)
Type of satellite (State = SP) City = G/No	Type = Non	Choose either: Geostationary or Nongeostationary

For Geostationary	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE (XLG AND/OR RLG).
For Nongeostationary (Orbital Data)	For Inmarsat constellation: INCLINATION ANGLE <u>0</u> , APOGEE IN KILOMETERS <u>35786</u> , PERIGEE IN KILOMETERS <u>35786</u> , ORBITAL PERIOD IN HOURS <u>24</u> AND FRACTIONS OF HOURS IN DECIMAL <u>00</u> , THE NUMBER OF SATELLITES IN THE SYSTEM <u>4</u> ,  For Meson: INCLINATION ANGLE <u>97.4</u> , APOGEE IN KILOMETERS <u>500</u> , PERIGEE IN KILOMETERS <u>500</u> , ORBITAL PERIOD IN HOURS <u>1</u> AND FRACTIONS OF HOURS IN DECIMAL <u>.594</u> , THE NUMBER OF SATELLITES IN THE SYSTEM <u>1</u> ,	IF ANY SATELLITES ARE NONGEOSTATIONARY, REPORT ITS INCLINATION ANGLE, APOGEE IN KILOMETERS, PERIGEE IN KILOMETERS, ORBITAL PERIOD IN HOURS AND FRACTIONS OF HOURS IN DECIMAL, THE NUMBER OF SATELLITES IN THE SYSTEM, THEN T01, EXAMPLE, REM04 *ORB,98.0IN00510AP00510PE001.58H01NRT01, AND FOR SPACE-TO-SPACE COMMUNICATIONS WITH ANOTHER NONGEOSTATIONARY SATELLITE ADD AN ADDITIONAL *ORB FOR IT ENDING IN R01, EXAMPLE, REM05 *ORB,72.9IN03209AP00655PE013.46H01NRR01



	ORB = ORB,00.0IN35786AP35786PE024.00H4GRT01 ORB,97.4IN00500AP00500PE001.59H01NRR01	
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## Gluon to Meson:

### Satellite Transmitter Data

Transmit Frequencies: 2400.00 - 2500.00 MHz		
Satellite Name: Gluon		
Data Field	Data Answer	Description/Comments
Transmit Power (PWR)	PWR = 1.26 W	TRANSMIT POWER SUPPLIED TO THE ANTENNA INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE: W = WATT, K = KILOWATT, M = MEGAWATT
Necessary Bandwidth	20 MHz	THE WIDTH OF FREQUENCY BAND WHICH IS JUST SUFFICIENT TO SUCCESSFULLY TRANSFER DATA. FORMULAS CAN BE FOUND IN ANNEX J OF THE NTIA MANUAL.
RF Emissions Data		2-SIDED EMISSION BANDWIDTH VALUES
-3 dB bandwidth	NA	
-20 dB bandwidth	NA	
-40 dB bandwidth	NA	
-60 dB bandwidth	NA	
Modulation Type	WiFi (802.11)	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	50 Mbps	INFORMATION DATA RATE
Forward Error Correction Coding	Is FEC used? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> FEC Type: __LDPC_____, FEC Rate: ____5/6_____,	
Total Symbol Rate	50 Msps	DATA RATE COMBINED WITH FEC AND FRAME OVERHEAD RESULTING IN THE TOTAL SYMBOL RATE AT THE INPUT TO THE SYMBOL MAPPER/MODULATOR.
Does transmitter have a beacon mode?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	BEACON MODE IS NORMALLY CONSIDERED A REGULAR AND PERIODIC SHORT DURATION TRANSMISSION THAT IS OFTEN USED TO ASSIST WITH TRACKING, DOPPLER COMPENSATION, OR SMALL SATELLITE IDENTIFICATION WHOSE TRANSMISSIONS ARE NOT LIMITED TO DURATIONS WHEN SUPPORTING GROUND STATIONS ARE VISIBLE.

If transmitter has a beacon mode, can the beacon be commanded off?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
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Polarization (XAP)	XAP = XAP01 J	POLARIZATIONS INCLUDE : H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR, T = RIGHT AND LEFT HAND CIRCULAR, J = LINEAR POLARIZATION
Transmit Antenna Orientation (XAZ)	XAZ = XAZ01 NB	NB= NARROWBEAM EC = EARTH COVERAGE
Transmit Antenna Dimension (XAD)	ANTENNA GAIN <u>5.8</u> BEAMWIDTH <u>360</u> XAD = XAD01 5.8G160B	(NTIA format (XAD), EXAMPLE, XAD01 16G030B)
Type of satellite (State = SP) (City = geo or non)	Type = non	Choose either: Geostationary or Nongeostationary
For Geostationary	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE (XLG AND/OR RLG).
For Nongeostationary (Orbital Data)	For Gluon: INCLINATION ANGLE <u>97.4</u> , APOGEE IN KILOMETERS <u>500</u> , PERIGEE IN KILOMETERS <u>500</u> , ORBITAL PERIOD IN HOURS <u>1</u> AND FRACTIONS OF HOURS IN DECIMAL <u>.594</u> , THE NUMBER OF SATELLITES IN THE SYSTEM <u>1</u> ,  For Meson constellation: INCLINATION ANGLE <u>97.4</u> , APOGEE IN KILOMETERS <u>500</u> , PERIGEE IN KILOMETERS <u>500</u> , ORBITAL PERIOD IN HOURS <u>1</u> AND FRACTIONS OF HOURS IN DECIMAL <u>.594</u> , THE NUMBER OF SATELLITES IN THE SYSTEM <u>1</u> ,  ORB = ORB,97.4IN00500AP00500PE001.59H01NRT01 ORB,97.4IN00500AP00500PE001.59H01NRR01	IF ANY SATELLITES ARE NONGEOSTATIONARY, REPORT ITS INCLINATION ANGLE, APOGEE IN KILOMETERS, PERIGEE IN KILOMETERS, ORBITAL PERIOD IN HOURS AND FRACTIONS OF HOURS IN DECIMAL, THE NUMBER OF SATELLITES IN THE SYSTEM, THEN T01, EXAMPLE, REM04 *ORB,98.0IN00510AP00510PE001.58H01NRT01, AND FOR SPACE-TO-SPACE COMMUNICATIONS WITH ANOTHER NONGEOSTATIONARY SATELLITE ADD AN ADDITIONAL *ORB FOR IT ENDING IN R01, EXAMPLE, REM05 *ORB,72.9IN03209AP00655PE013.46H01NRT01

For SunSynchronous Nongeostationary Orbits	Mean Local Time of Ascending Node (MLTAN) = 22:00 For Meson	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)
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FCC notes: 7. Use S-Note S945. 8. REM AGN, Cubesat, Meson
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### Receiver Data Meson Satellite

Meson Satellite Receive Specifications		
Receive Antenna Polarization (RAP)	RAP = RAP 01 J	POLARIZATIONS INCLUDE : H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR, T = RIGHT AND LEFT HAND CIRCULAR, J = LINEAR POLARIZATION
Azimuth (RAZ)	RAZ = NB	NB= NARROWBEAM EC = EARTH COVERAGE

Receive Antenna Dimension (RAD)	ANTENNA GAIN_5.8_____ BEAMWIDTH ____360_____ RAD = RAD01 5.8G012B	(NTIA format (RAD), EXAMPLE, RAD01 16G030B)
Type of satellite (State = SP) City = G/No	Type = Non	Choose either: Geostationary or Nongeostationary
For Geostationary	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE (XLG AND/OR RLG).
For Nongeostationary (Orbital Data)	For Meson: INCLINATION ANGLE ____97.4_____, APOGEE IN KILOMETERS ____500_____, PERIGEE IN KILOMETERS ____500_____, ORBITAL PERIOD IN HOURS __1__ AND FRACTIONS OF HOURS IN DECIMAL __.594 __, THE NUMBER OF SATELLITES IN THE SYSTEM ____1_____,  For Gluon constellation: INCLINATION ANGLE ____97.4_____,	IF ANY SATELLITES ARE NONGEOSTATIONARY, REPORT ITS INCLINATION ANGLE, APOGEE IN KILOMETERS, PERIGEE IN KILOMETERS, ORBITAL PERIOD IN HOURS AND FRACTIONS OF HOURS IN DECIMAL, THE NUMBER OF SATELLITES IN THE SYSTEM, THEN T01, EXAMPLE, REM04 *ORB,98.0IN00510AP00510PE001.58H01NRT01, AND FOR SPACE-TO-SPACE COMMUNICATIONS WITH ANOTHER NONGEOSTATIONARY SATELLITE ADD AN ADDITIONAL *ORB FOR IT ENDING IN R01, EXAMPLE, REM05 *ORB,72.9IN03209AP00655PE013.46H01NRR01

	APOGEE IN KILOMETERS_500_____, PERIGEE IN KILOMETERS___500_____, ORBITAL PERIOD IN HOURS _1_ AND FRACTIONS OF HOURS IN DECIMAL_.594___, THE NUMBER OF SATELLITES IN THE SYSTEM___1_____,  ORB = ORB,97.4IN00500AP00500PE001.59H01NRR01 ORB,97.4IN00500AP00500PE001.59H01NRT01	
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Number of Satellite Contacts Supported Per Day	N/A due to ISL	NUMBER OF TIMES THE SATELLITE WILL COMMUNICATE WITH THE EARTH STATION IN THE SPACE TO EARTH DIRECTION (DOWNLINKS) EACH DAY
Supported Operations	Satellite Health and Status Data <input checked="" type="checkbox"/> Mission Payload Data <input checked="" type="checkbox"/>	SATELLITE HEALTH AND STATUS TELEMETRY AND/OR MISSION PAYLOAD DATA
FCC notes: 7. Use S-Note S945. 8. REM AGN, Cubesat, Meson		