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

Transmit Frequenci	Transmit Frequencies: 174 Channels, range from low end of low		
channel 1618.75 M	channel 1618.75 MHz to high end of high channel 1626 MHz,		
channel spacing 41	channel spacing 41.6667 kHz.		
Satellite Name: Meson			
Data Field	Data Answer	Description/Comments	

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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	Is FEC used? Yes ⊠ No □	
Correction	FEC Type:BCH(32,21),	
Coding	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 INPUTE TO THE SYMBOL MAPPER/MODULATOR.

Does transmitter have a beacon mode?	Yes □ No ⊠	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 □ No □	
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 GAIN3.7 BEAMWIDTH80 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).

For Nongeostationary (Orbital Data)	For Meson: INCLINATION ANGLE97.4, APOGEE IN KILOMETERS500, PERIGEE IN KILOMETERS500, ORBITAL PERIOD IN HOURS1AND FRACTIONS OF HOURS IN DECIMAL594, THE NUMBER OF SATELLITES IN THE SYSTEM1, For Iridium constellation: INCLINATION ANGLE86.4, PERIGEE IN KILOMETERS780, PERIGEE IN KILOMETERS, ORBITAL PERIOD IN HOURS1AND FRACTIONS OF HOURS IN DECIMAL73, THE NUMBER OF SATELLITES IN THE SYSTEM66, 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,72.9IN03209AP00655PE013.46H01NRT01
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)

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

Receiver Data Iridium 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
	· · ·	NID- NADDOWDEAM

 $\overline{Azimuth}$ (RAZ) RAZ = NB

NB= NARROWBEAM EC = EARTH COVERAGE

Receive Antenna Dimension (RAD)	ANTENNA GAIN_20 BEAMWIDTH12 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 ANGLE97.4, APOGEE IN KILOMETERS500, PERIGEE IN KILOMETERS500, ORBITAL PERIOD IN HOURS1AND FRACTIONS OF HOURS IN DECIMAL594, THE NUMBER OF SATELLITES IN THE SYSTEM1, For Iridium constellation: INCLINATION ANGLE86.4, APOGEE IN KILOMETERS, PERIGEE IN KILOMETERS, ORBITAL PERIOD IN HOURS1AND FRACTIONS OF HOURS IN DECIMAL73, THE NUMBER OF SATELLITES IN THE SYSTEM	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	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

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 $oximes$ Mission Payload Data $oximes$	SATELLITE HEALTH AND STATUS TELEMETRY AND/OR MISSION PAYLOAD DATA
ECC notes:		

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

From Meson to the Inmarsat Constellation

Transmit Frequenci	ies: 1626.5 - 1660.5 MHz, centered 1643.5 MHz	
Satellite Name: Me	eson	
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	Is FEC used? Yes ⊠ No □	
Correction	FEC Type:Turbo,	
Coding	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 INPUTE TO THE SYMBOL MAPPER/MODULATOR.
Does transmitter	Yes □	BEACON MODE IS NORMALLY CONSIDERED A
have a beacon mode?	No ⊠	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	Yes □	
a beacon mode,	No □	
can the beacon		
be commanded		

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 GAIN10 BEAMWIDTH53.26 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)	For Meson: INCLINATION ANGLE97.4	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,72.9IN03209AP00655PE013.46H01NRT01
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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)

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

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 FC = FARTH COVERAGE

EC = EARTH COVERAGE

Receive Antenna Dimension (RAD)	ANTENNA GAIN_44 BEAMWIDTH1.07 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 ANGLE97.4, APOGEE IN KILOMETERS500, PERIGEE IN KILOMETERS500, ORBITAL PERIOD IN HOURS1AND FRACTIONS OF HOURS IN DECIMAL594, THE NUMBER OF SATELLITES IN THE SYSTEM1, For Inmarsat constellation: INCLINATION ANGLE0,	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 KILOMETERS35786, PERIGEE IN KILOMETERS35786, ORBITAL PERIOD IN HOURS _24AND FRACTIONS OF HOURS IN DECIMAL_00, THE NUMBER OF SATELLITES IN THE SYSTEM4,	
ORB = ORB,97.4IN00500AP00500PE001.59H01NRR01 ORB,00.0IN35786AP35786PE024.00H4GRT01	

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 ⊠ Mission Payload Data ⊠	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		2-SIDED EMISSION BANDWIDTH VALUES
Data		
-3 dB bandwidth	NA	
-20 dB bandwidth	NA]
-40 dB bandwidth	NA]
-60 dB bandwidth	NA	1
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	Is FEC used? Yes ⊠ No □	
Correction	FEC Type:LDPC,	
Coding	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 INPUTE TO THE SYMBOL MAPPER/MODULATOR.
Does transmitter	Yes □	BEACON MODE IS NORMALLY CONSIDERED A
have a beacon	No ⊠	REGULAR AND PERIODIC SHORT DURATION TRANSMISSION THAT IS OFTEN USED TO ASSIST
mode?		WITH TRACKING, DOPPLER COMPENSATION, OR
		SMALL SATELLITE IDENTIFICATION WHOSE
		TRANSMISSIONS ARE NOT LIMITED TO DURATIONS WHEN SUPPORTING GROUND
		STATIONS ARE VISIBLE.
If transmitter has	Yes □	
a beacon mode,	No 🗆	
can the beacon		
be commanded		
off?		
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	XAZ = XAZ01 NB	NB= NARROWBEAM
Orientation (XAZ)		EC = EARTH COVERAGE
Transmit Antenna	ANTENNA GAIN 5.8	(NTIA format (XAD), EXAMPLE, XAD01 16G030B)
		(*************************************
Dimension (XAD)	BEAMWIDTH360	
	XAD = XAD01 5.8G160B	Channa sikhari
Type of satellite	Type = non	Choose either: Geostationary or
(State = SP)		Nongeostationary
(City = geo or		
non)		
		LE ANN CATELLITES ADE CECCTATION ADV. DEDODT
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 ANGLE97.4, APOGEE IN KILOMETERS500, PERIGEE IN KILOMETERS500, ORBITAL PERIOD IN HOURS1AND FRACTIONS OF HOURS IN DECIMAL594, THE NUMBER OF SATELLITES IN THE SYSTEM1, For Iridium constellation: INCLINATION ANGLE86.4, PERIGEE IN KILOMETERS, PERIGEE IN KILOMETERS, ORBITAL PERIOD IN HOURS1, ORBITAL PERIOD IN HOURS1, THE NUMBER OF SATELLITES IN THE SYSTEM66, 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,72.9IN03209AP00655PE013.46H01NRT01
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)

- 5. Use S-Note S945.
- 6. REM AGN, Cubesat, Meson

Receiver Data Gluon Satellite

Gluon 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

NB= NARROWBEAM EC = EARTH COVERAGE Azimuth (RAZ) RAZ = NB

Receive Antenna Dimension (RAD) Type of satellite (State = SP) City = G/No	ANTENNA GAIN_5.8 BEAMWIDTH360 RAD = RAD01 5.8G012B Type = Non	(NTIA format (RAD), EXAMPLE, RAD01 16G030B) 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 ANGLE97.4, APOGEE IN KILOMETERS500, PERIGEE IN KILOMETERS500, ORBITAL PERIOD IN HOURS1AND FRACTIONS OF HOURS IN DECIMAL594, THE NUMBER OF SATELLITES IN THE SYSTEM1, For Iridium constellation: INCLINATION ANGLE86.4, APOGEE IN KILOMETERS780, PERIGEE IN KILOMETERS, ORBITAL PERIOD IN HOURS1AND FRACTIONS OF HOURS IN DECIMAL73, THE NUMBER OF SATELLITES IN THE SYSTEM	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 $oximes$ Mission Payload Data $oximes$	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

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	ANTENNA GAIN_20	(NTIA format (XAD), EXAMPLE, XAD01 16G030B)
Dimension (XAD)	BEAMWIDTH12	
	XAD = XAD01 20G012B	
Type of satellite	Type = non	Choose either:
(State = SP)	<i>''</i>	Geostationary or
'		Nongeostationary
(City = geo or		
non)		
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 Iridium constellation: INCLINATION ANGLE86.4, APOGEE IN KILOMETERS780, PERIGEE IN KILOMETERS780, ORBITAL PERIOD IN HOURS _1AND FRACTIONS OF HOURS IN DECIMAL73, THE NUMBER OF SATELLITES IN THE SYSTEM66, For Meson: INCLINATION ANGLE97.4, APOGEE IN KILOMETERS500, PERIGEE IN KILOMETERS500, ORBITAL PERIOD IN HOURS1AND FRACTIONS OF HOURS IN DECIMAL594, THE NUMBER OF SATELLITES IN THE SYSTEM1, ORB = ORB,86.4IN00780AP00780PE001.73H66NRT01 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

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

Receiver Data Meson Satellite Iridium Transceiver Receive from Iridium 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 GAIN3.7 BEAMWIDTH80 RAD = RAD01 RAD01 02G160B	(NTIA format (RAD), EXAMPLE, RAD01 16G030B)

Type of satellite (State = SP)	Type = Non	Choose either: Geostationary or Nongeostationary
City = G/No		· ·

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 Iridium constellation: INCLINATION ANGLE 86.4, APOGEE IN KILOMETERS 780, PERIGEE IN KILOMETERS 780, ORBITAL PERIOD IN HOURS _1 AND FRACTIONS OF HOURS IN DECIMAL73, THE NUMBER OF SATELLITES IN THE SYSTEM 66, For Meson: INCLINATION ANGLE 97.4, APOGEE IN KILOMETERS 500, ORBITAL PERIOD IN HOURS AND FRACTIONS OF HOURS IN DECIMAL594, THE NUMBER OF SATELLITES IN THE SYSTEM 1,	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,86.4IN00780AP00780PE001.73H66NRT01 ORB,97.4IN00500AP00500PE001.59H01NRR01	

Inmarsat Constellation to Meson:

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 = XAZO1 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 DECIMAL594, 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 TO1, 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

- 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 GAIN9.7 BEAMWIDTH58 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 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 HOURS1 AND FRACTIONS OF HOURS IN DECIMAL_594, THE NUMBER OF SATELLITES IN THE SYSTEM 1,	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	

Gluon to Meson:

	2444	
Transmit Frequencies: 2400.00 - 2500.00 MHz		
Satellite Name: Glu	on	
Data Field	Data Answer	Description/Comments

Transmit Power	PWR = 1.26 W	TRANSMIT POWER SUPPLIED TO THE ANTENNA INPUT TERMINAL, EXAMPLE, PWR01 W2
(PWR)		TRANSMIT POWER UNITS INCLUDE:
		W = WATT,
		K = KILOWATT,
		M = MEGAWATT
Necessary	20 MHz	THE WIDTH OF FREQUENCY BAND WHICH IS JUST SUFFICIENT TO SUCCESSFULLY TRANSFER
Bandwidth		DATA. FORMULAS CAN BE FOUND IN ANNEX J
		OF THE NTIA MANUAL.
RF Emissions		2-SIDED EMISSION BANDWIDTH VALUES
Data		
-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	Is FEC used? Yes ⊠ No □	
Correction	FEC Type:LDPC,	
Coding	FEC Rate:5/6,	
	, 120 Nate:,	
Total Symbol Rate	50 Msps	DATA RATE COMBINED WITH FEC AND FRAME
'	· ·	OVERHEAD RESULTING IN THE TOTAL SYMBOL
		RATE AT THE INPUTE TO THE SYMBOL MAPPER/MODULATOR.
Does transmitter	Yes □	BEACON MODE IS NORMALLY CONSIDERED A
have a beacon	I	REGULAR AND PERIODIC SHORT DURATION
	No ⊠	TRANSMISSION THAT IS OFTEN USED TO ASSIST
mode?		WITH TRACKING, DOPPLER COMPENSATION, OR
		SMALL SATELLITE IDENTIFICATION WHOSE TRANSMISSIONS ARE NOT LIMITED TO
		DURATIONS WHEN SUPPORTING GROUND
		STATIONS ARE VISIBLE.

If transmitter has	Yes □	
a beacon mode,	No □	
can the beacon		
be commanded		
off?		
	T	
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	XAZ = XAZ01 NB	NB= NARROWBEAM
Orientation (XAZ)		EC = EARTH COVERAGE
Transmit Antenna	ANTENNA GAIN 5.8	(NTIA format (XAD), EXAMPLE, XAD01 16G030B)
	BEAMWIDTH360	(
Dimension (XAD)		
	XAD = XAD01 5.8G160B	Channa sikhan
Type of satellite	Type = non	Choose either: Geostationary or
(State = SP)		Nongeostationary
(City = geo or		
non)		
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	For Gluon:	IF ANY SATELLITES ARE NONGEOSTATIONARY,
Nongeostationary	INCLINATION ANGLE97.4,	REPORT ITS INCLINATION ANGLE, APOGEE IN KILOMETERS, PERIGEE IN KILOMETERS,
(Orbital Data)	APOGEE IN KILOMETERS 500,	ORBITAL PERIOD IN HOURS AND FRACTIONS
	PERIGEE IN KILOMETERS 500,	OF
	ORBITAL PERIOD IN HOURS1AND	HOURS IN DECIMAL, THE NUMBER OF SATELLITES IN THE SYSTEM, THEN TO1,
	FRACTIONS OF HOURS IN DECIMAL .594 ,	EXAMPLE,
	THE NUMBER OF SATELLITES IN THE	REM04
	SYSTEM1,	*ORB,98.0IN00510AP00510PE001.58H01NRT01, AND FOR SPACE-TO-SPACE
		COMMUNICATIONS WITH ANOTHER
	For Iridium constellation:	NONGEOSTATIONARY SATELLITE ADD AN
	INCLINATION ANGLE 86.4 ,	*ORB FOR IT ENDING IN R01, EXAMPLE, REM05
	APOGEE IN KILOMETERS_780,	*ORB,72.9IN03209AP00655PE013.46H01NRT01
	PERIGEE IN KILOMETERS	
	ORBITAL PERIOD IN HOURS 1 AND	
	FRACTIONS OF HOURS IN DECIMAL73,	
	THE NUMBER OF SATELLITES IN THE	
	SYSTEM66,	
	3131LIVI00,	
	ORB =	
	ORB,97.4IN00500AP00500PE001.59H01NRR01	
	·	
	ORB,86.4IN00780AP00780PE001.73H66NRR01	

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)

- 7. Use S-Note S945.
- 8. REM AGN, Cubesat, Meson

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 BEAMWIDTH360 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 ANGLE97.4	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 TO1, 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_780, PERIGEE IN KILOMETERS780, ORBITAL PERIOD IN HOURS _1AND FRACTIONS OF HOURS IN DECIMAL73, THE NUMBER OF SATELLITES IN THE SYSTEM66,	
ORB = ORB,97.4IN00500AP00500PE001.59H01NRR01 ORB,86.4IN00780AP00780PE001.73H66NRR01	

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 $oximes$ Mission Payload Data $oximes$	SATELLITE HEALTH AND STATUS TELEMETRY AND/OR MISSION PAYLOAD DATA
FCC notes:		

- 7. Use S-Note S945.
- 8. REM AGN, Cubesat, Meson