## **NTIA Space Record Data Form**

(Note: Apex recognizes its frequency plan's complexity and, therefore, has summarized all inputs in its application's technical annex (table 1 and table 2) for convenience. Apex also notes no U.S.-based earth stations will communicate with the Apex Aries 1 satellite. In other words, no space-to-Earth or Earth-to-space transmissions will occur inside the United States.)

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. Use Part A to describe the satellite to ground information. Part B is for all ground to space transmit links.

## Part A: Space to Earth Downlink Data

Transmit Frequency: 400.5 MHz	2
2.64 kHz	2
Transmit Frequency: 401.5 MHz	10
2.64 kHz	10
Transmit Frequency:400.5 MHz	
65.28 kHz	
Transmit Frequency: 401.5 MHz	26
65.28 kHz	26
Transmit Frequency: 2287.5 MHz	34
168.8 kHz	34
Transmit Frequency: 2287.5 MHz	51
1 MHz	51
Transmit Frequency: 8212.5 MHz	68
13.5 MHz	68
Transmit Frequency: 8212.5 MHz	72
100 MHz	72
Transmit Frequency: 8212.5 MHz	76
13.5 MHz	76
Transmit Frequency: 8212.5 MHz	90
100 MHz	90

## Part B: Earth to Space Uplink Data

Transmit Frequency: 402.7 MHz104
Transmit Frequency: 2049 MHz

Transmit Frequency: 400.5 MHz Satellite Name: Apex Aries 1 Data Field Data Answer **Description/Comments** TRANSMIT POWER SUPPLIED TO THE ANTENNA PWR = 1.2 W Transmit Power INPUT TERMINAL, EXAMPLE, PWR01 W2 (PWR) PWR01 W1.2 TRANSMIT POWER UNITS INCLUDE: W = WATT. K = KILOWATT, M = MEGAWATT THE WIDTH OF FREQUENCY BAND WHICH IS JUST 2.64 kHz Necessary SUFFICIENT TO SUCCESSFULLY TRANSFER DATA. Bandwidth FORMULAS CAN BE FOUND IN ANNEX J OF THE NTIA MANUAL. 2-SIDED EMISSION BANDWIDTH VALUES **RF** Emissions Data -3 dB bandwidth 3 kHz -20 dB bandwidth 17.5 kHz -40 dB bandwidth 25 kHz -60 dB bandwidth 40 kHz THE METHOD USED TO SUPERIMPOSE DATA ON Modulation Type 2GFSK THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK. INFORMATION DATA RATE Data Rate 1.2 kbits/sec Is FEC used? Yes  $\Box$  No  $\boxtimes$ Forward Error **Correction Coding** FEC Type: \_\_\_\_\_ FEC Rate: \_\_\_\_\_ DATA RATE COMBINED WITH FEC AND FRAME Total Symbol Rate 1.2 ksymbols/sec OVERHEAD RESULTING IN THE TOTAL SYMBOL RATE AT THE INPUTE TO THE SYMBOL MAPPER/MODULATOR. BEACON MODE IS NORMALLY CONSIDERED A Does transmitter Yes 🖂 REGULAR AND PERIODIC SHORT DURATION have a beacon 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? POLARIZATIONS INCLUDE: Transmit Antenna XAP = JH = HORIZONTAL,Polarization (XAP) 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 Transmit Antenna XAZ = ECEC = EARTH COVERAGE

2

NTIA FORMAT (XAD), EXAMPLE, FOR 16 DBI

XAD01 16G030B

ANTENNA GAIN AND 30 DEGREE BEAMWIDTH

Orientation (XAZ)

Transmit Antenna

Dimension (XAD)

ANTENNA GAIN 0 dBi

XAD = XAD01 00G360B

360

BEAMWIDTH

Type of satellite (State = SPCE) (City = Geo or Nongeo)	Type = NONGEOSTATIONARY	CHOOSE EITHER: GEOSTATIONARY OR NONGEOSTATIONARY
For Geostationary Satellites	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE IN DDDMMSS FORMAT (XLG AND/OR RLG).
For Nongeostationary (Orbital Data)	INCLINATION ANGLE 97.6, APOGEE IN KILOMETERS 525, PERIGEE IN KILOMETERS 525, ORBITAL PERIOD IN HOURS 1_AND FRACTIONS OF HOURS IN DECIMAL 0.58, THE NUMBER OF SATELLITES IN THE SYSTEM 1, ORB = *ORB,97.6IN00525AP00525PE001.58H01NRT01	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
For SunSynchronous Nongeostationary	Mean Local Time of Ascending Node MLTDN = 13:00 + 60 mins or 13:00-14:00	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)
Orbits	(Note: SpaceX notified use of LTDN, not LTAN.)	
	a (Receiver) at Each Earth Station Location	on
State (RSC)	RSC = South Africa	
City Name (RAL)	RAL = Pretoria	
Latitude (DDMMSS)	Lat = 255136 S	
Longitude (DDDMMSS)	Lon = 0282700 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Deceive Antonna	ANTENNA GAIN16.2,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16
Receive Antenna Dimensions (RAD)	ANTENNA GAIN10.2,	DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL
Dimensions (RAD)	BEAMWIDTH22,	RANGE FROM 001-360, SITE ELEVATION OF 357
	AZIMUTHAL RANGE_000-360,	METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS:
	THE SITE ELEVATION ABOVE MEAN SEA	RAD01 16G030B001-360A00357H006
	LEVEL IN METERS1339,	
	THE ANTENNA HEIGHT ABOVE TERRAIN	
	IN METERS6,	
	RAD =	
	RAD01 16.2G022B000-360A01339H006	
Receive Antenna	ANTENNA DIAMETERN/A,	
Additional	ANTENNA EFFICIENCY N/A,	
Information (For		
Parabolic		
Antennas)		
Number of	4 contacts per day	NUMBER OF TIMES THE SATELLITE WILL
Satellite Contacts		COMMUNICATE WITH THE EARTH STATION IN THE
Supported Per		SPACE TO EARTH DIRECTION (DOWNLINKS) EACH DAY
Day		
Expected	8 minutes	AVERAGE DURATION OF EACH CONTACT
Duration of Each	5 minutes	
Contact		
Supported	Satellite Health and Status Data 🖂	SATELLITE HEALTH AND STATUS TELEMETRY
Operations		AND/OR MISSION PAYLOAD DATA
Operations	Mission Payload Data	
Earth Station Data	A (Receiver) at Each Earth Station Location	on
	a (Receiver) at Each Earth Station Location	on
State (RSC)	RSC = Sweden	on 
State (RSC) City Name (RAL)	RSC = Sweden RAL = Boden	on 
State (RSC) City Name (RAL) Latitude	RSC = Sweden	on 
State (RSC) City Name (RAL) Latitude (DDMMSS)	RSC = Sweden RAL = Boden Lat = 654800 N	on
State (RSC) City Name (RAL) Latitude (DDMMSS) Longitude	RSC = Sweden RAL = Boden	on 
State (RSC) City Name (RAL) Latitude (DDMMSS) Longitude (DDDMMSS)	RSC = Sweden RAL = Boden Lat = 654800 N Lon = 0214048 E	
State (RSC) City Name (RAL) Latitude (DDMMSS) Longitude (DDDMMSS) Receive Antenna	RSC = Sweden RAL = Boden Lat = 654800 N	POLARIZATIONS INCLUDE: H = HORIZONTAL,
State (RSC) City Name (RAL) Latitude (DDMMSS) Longitude (DDDMMSS)	RSC = Sweden RAL = Boden Lat = 654800 N Lon = 0214048 E	POLARIZATIONS INCLUDE: H = HORIZONTAL, V = VERTICAL,
State (RSC) City Name (RAL) Latitude (DDMMSS) Longitude (DDDMMSS) Receive Antenna	RSC = Sweden RAL = Boden Lat = 654800 N Lon = 0214048 E	POLARIZATIONS INCLUDE: H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL,
State (RSC) City Name (RAL) Latitude (DDMMSS) Longitude (DDDMMSS) Receive Antenna	RSC = Sweden RAL = Boden Lat = 654800 N Lon = 0214048 E	POLARIZATIONS INCLUDE: H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR,
State (RSC) City Name (RAL) Latitude (DDMMSS) Longitude (DDDMMSS) Receive Antenna	RSC = Sweden RAL = Boden Lat = 654800 N Lon = 0214048 E	POLARIZATIONS INCLUDE: H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL,
State (RSC) City Name (RAL) Latitude (DDMMSS) Longitude (DDDMMSS) Receive Antenna Polarization (RAP)	RSC = Sweden         RAL = Boden         Lat = 654800 N         Lon = 0214048 E         RAP = 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
State (RSC) City Name (RAL) Latitude (DDMMSS) Longitude (DDDMMSS) Receive Antenna	RSC = Sweden RAL = Boden Lat = 654800 N Lon = 0214048 E	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 THE EARTH STATION RECEIVER ANTENNA
State (RSC) City Name (RAL) Latitude (DDMMSS) Longitude (DDDMMSS) Receive Antenna Polarization (RAP)	RSC = Sweden         RAL = Boden         Lat = 654800 N         Lon = 0214048 E         RAP = 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

Receive Antenna Dimensions (RAD)	ANTENNA GAIN16.2, BEAMWIDTH22, AZIMUTHAL RANGE360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS46, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS6, RAD = RAD02 16.2G022B000-360A00046H006	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETERN/A, ANTENNA EFFICIENCYN/A,	
Number of Satellite Contacts Supported Per Day	11 contacts per day	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	8 minutes	AVERAGE DURATION OF EACH CONTACT
Earth Station Data	A (Receiver) at Each Earth Station Location	on
State (RSC)	RSC = Spain	
City Name (RAL)	RAL = Puertollano	
Latitude (DDMMSS)	Lat = 384026 N	
Longitude (DDDMMSS)	Lon = 0040943 W	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN14.8, BEAMWIDTH40, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS690, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS14, RAD = RAD03 14.8G040B000-360A00690H014	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETERN/A, ANTENNA EFFICIENCYN/A,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Italy	
City Name (RAL)	RAL = Vimercate	
Latitude (DDMMSS)	Lat = 453536 N	
Longitude (DDDMMSS)	Lon = 0092144 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN 14.8 , BEAMWIDTH 40 , AZIMUTHAL RANGE 000-360 , THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS 177 , THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS 13 ,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
	RAD = RAD04 14.8G040B000-360A00177H013	
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETERN/A, ANTENNA EFFICIENCYN/A,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Location	on
State (RSC)	RSC = Italy	
City Name (RAL)	RAL = Lomazzo	
Latitude (DDMMSS)	Lat = 454150 N	
Longitude (DDDMMSS)	Lon = 0090205 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN14.8, BEAMWIDTH40, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS296, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS25, RAD = RAD05 14.8G040B000-360A00296H025	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETERN/A, ANTENNA EFFICIENCYN/A,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = United Kingdom	
City Name (RAL)	RAL = Unst, Shetland	
Latitude (DDMMSS)	Lat = 604452 N	
Longitude (DDDMMSS)	Lon = 0005128 W	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN14.8, BEAMWIDTH40, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS19, THE ANTENNA HEIGHT ABOVE TERRAIN	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
	IN METERS4,	
	RAD = RAD06 14.8G040B000-360A00019H004	
Receive Antenna	ANTENNA DIAMETERN/A,	
Additional	ANTENNA EFFICIENCYN/A,	
Information (For		
Parabolic		
Antennas)		
Number of	<1 contact per day	NUMBER OF TIMES THE SATELLITE WILL COMMUNICATE WITH THE EARTH STATION IN THE
Satellite Contacts		SPACE TO EARTH DIRECTION (DOWNLINKS) EACH
Supported Per		DAY
Day		AVERAGE DURATION OF EACH CONTACT
Expected	8 minutes	AVERAGE DURATION OF EACH CONTACT
Duration of Each		
Contact		
Supported	Satellite Health and Status Data 🛛	SATELLITE HEALTH AND STATUS TELEMETRY AND/OR MISSION PAYLOAD DATA
Operations	Mission Payload Data 🛛	
FCC notes:		
1. Use S-Note	S945.	
2. REM AGN, 0	Cubesat, (Apex Aries 1)	

Transmit Frequency: 401.5 MHz Satellite Name: Apex Aries 1 Data Field Data Answer **Description/Comments** TRANSMIT POWER SUPPLIED TO THE ANTENNA PWR = 1.2 W Transmit Power INPUT TERMINAL, EXAMPLE, PWR01 W2 (PWR) PWR01 W1.2 TRANSMIT POWER UNITS INCLUDE: W = WATTK = KILOWATT, M = MEGAWATT THE WIDTH OF FREQUENCY BAND WHICH IS JUST 2.64 kHz Necessary SUFFICIENT TO SUCCESSFULLY TRANSFER DATA. Bandwidth FORMULAS CAN BE FOUND IN ANNEX J OF THE NTIA MANUAL. 2-SIDED EMISSION BANDWIDTH VALUES **RF** Emissions Data -3 dB bandwidth 3 kHz -20 dB bandwidth 17.5 kHz -40 dB bandwidth 25 kHz -60 dB bandwidth 40 kHz THE METHOD USED TO SUPERIMPOSE DATA ON Modulation Type 2GFSK THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK. INFORMATION DATA RATE Data Rate 1.2 kbits/sec Is FEC used? Yes  $\Box$  No  $\boxtimes$ Forward Error **Correction Coding** FEC Type: \_\_\_\_\_ FEC Rate: \_\_\_\_\_ DATA RATE COMBINED WITH FEC AND FRAME Total Symbol Rate 1.2 ksymbols/sec OVERHEAD RESULTING IN THE TOTAL SYMBOL RATE AT THE INPUTE TO THE SYMBOL MAPPER/MODULATOR. BEACON MODE IS NORMALLY CONSIDERED A Does transmitter Yes 🖂 REGULAR AND PERIODIC SHORT DURATION have a beacon 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? POLARIZATIONS INCLUDE: Transmit Antenna XAP = JH = HORIZONTAL,Polarization (XAP) 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 Transmit Antenna XAZ = ECEC = EARTH COVERAGE Orientation (XAZ) NTIA FORMAT (XAD), EXAMPLE, FOR 16 DBI Transmit Antenna ANTENNA GAIN 0 dBi ANTENNA GAIN AND 30 DEGREE BEAMWIDTH

XAD01 16G030B

360

Dimension (XAD)

BEAMWIDTH

XAD = XAD01 00G360B

Type of satellite (State = SPCE) (City = Geo or Nongeo)	Type = NONGEOSTATIONARY	CHOOSE EITHER: GEOSTATIONARY OR NONGEOSTATIONARY
For Geostationary Satellites	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE IN DDDMMSS FORMAT (XLG AND/OR RLG).
For Nongeostationary (Orbital Data)	INCLINATION ANGLE 97.6 APOGEE IN KILOMETERS 525, PERIGEE IN KILOMETERS 525, ORBITAL PERIOD IN HOURS 1_AND FRACTIONS OF HOURS IN DECIMAL 0.58, THE NUMBER OF SATELLITES IN THE SYSTEM 1, ORB = *ORB,97.6IN00525AP00525PE001.58H01NRT01	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
For SunSynchronous Nongeostationary	Mean Local Time of Ascending Node MLTDN = 13:00 + 60 mins or 13:00-14:00	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)
Orbits	(Note: SpaceX notified use of LTDN, not LTAN.)	
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = South Africa	
City Name (RAL)	RAL = Pretoria	
Latitude (DDMMSS)	Lat = 255136 S	
Longitude (DDDMMSS)	Lon = 0282700 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

ANTENNA GAIN 16.2	EXAMPLE ASSUMING NONGEOSTATIONARY, 16
	DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN
	OF 6 METERS:
	RAD01 16G030B001-360A00357H006
ANTENNA EFFICIENCYN/A,	
	NUMBER OF TIMES THE SATELLITE WILL
4 contacts per day	COMMUNICATE WITH THE EARTH STATION IN THE
	SPACE TO EARTH DIRECTION (DOWNLINKS) EACH
	DAY
8 minutes	AVERAGE DURATION OF EACH CONTACT
Satellite Health and Status Data 🛛	SATELLITE HEALTH AND STATUS TELEMETRY AND/OR MISSION PAYLOAD DATA
Mission Payload Data 🛛	AND/OK MISSION PATEOAD DATA
a (Receiver) at Each Earth Station Locatio	on
RSC = Sweden	
RAL = Boden	
Lat = 654800 N	
Lon = 0214048 E	
RAP = J	POLARIZATIONS INCLUDE:
	H = HORIZONTAL,
	V = VERTICAL,
	V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR,
	V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR, T = RIGHT AND LEFT HAND CIRCULAR,
RAZ = RAZ01 V00	V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR,
RAZ = RAZ01 V00	V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR, T = RIGHT AND LEFT HAND CIRCULAR, J = LINEAR POLARIZATION
	a (Receiver) at Each Earth Station Location RSC = Sweden RAL = Boden Lat = 654800 N Lon = 0214048 E

Receive Antenna Dimensions (RAD)	ANTENNA GAIN16.2, BEAMWIDTH22, AZIMUTHAL RANGE360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS46, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS6, RAD = RAD02 16.2G022B000-360A00046H006	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETERN/A, ANTENNA EFFICIENCYN/A,	
Number of Satellite Contacts Supported Per Day	11 contacts per day	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	8 minutes	AVERAGE DURATION OF EACH CONTACT
Earth Station Data	□ a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Spain	
City Name (RAL)	RAL = Puertollano	
Latitude (DDMMSS)	Lat = 384026 N	
Longitude (DDDMMSS)	Lon = 0040943 W	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN14.8, BEAMWIDTH40, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS690, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS14, RAD = RAD03 14.8G040B000-360A00690H014	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETERN/A, ANTENNA EFFICIENCYN/A,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Italy	
City Name (RAL)	RAL = Vimercate	
Latitude (DDMMSS)	Lat = 453536 N	
Longitude (DDDMMSS)	Lon = 0092144 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN14.8, BEAMWIDTH40, AZIMUTHAL RANGE000-360,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN
	THE SITE ELEVATION ABOVE MEAN SEA	OF 6 METERS: RAD01 16G030B001-360A00357H006
	LEVEL IN METERS177,	
	THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS13,	
	IN METERS15,	
	RAD =	
	RAD04 14.8G040B000-360A00177H013	
Receive Antenna	ANTENNA DIAMETERN/A,	
Additional	ANTENNA EFFICIENCYN/A,	
Information (For		
Parabolic		
Antennas)		
Number of	<1 contact per day	NUMBER OF TIMES THE SATELLITE WILL COMMUNICATE WITH THE EARTH STATION IN THE
Satellite Contacts		SPACE TO EARTH DIRECTION (DOWNLINKS) EACH
Supported Per		DAY
Day		
Expected	8 minutes	AVERAGE DURATION OF EACH CONTACT
Duration of Each		
Contact		
Supported	Satellite Health and Status Data 🛛	SATELLITE HEALTH AND STATUS TELEMETRY AND/OR MISSION PAYLOAD DATA
Operations	Mission Payload Data	
	a (Receiver) at Each Earth Station Locatio	
State (RSC)	RSC = Italy	
City Name (RAL)	RAL = Lomazzo	
Latitude	Lat = 454150 N	
(DDMMSS)	1	
Longitude	Lon = 0090205 E	
Longitude (DDDMMSS)		
Longitude (DDDMMSS) Receive Antenna	Lon = 0090205 E RAP = J	POLARIZATIONS INCLUDE: H = HORIZONTAL,
Longitude (DDDMMSS)		H = HORIZONTAL, V = VERTICAL,
Longitude (DDDMMSS) Receive Antenna		H = HORIZONTAL,
Longitude (DDDMMSS) Receive Antenna		H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR,
Longitude (DDDMMSS) Receive Antenna		H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR, T = RIGHT AND LEFT HAND CIRCULAR,
Longitude (DDDMMSS) Receive Antenna		H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR,
Longitude (DDDMMSS) Receive Antenna Polarization (RAP)	RAP = J	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

Receive Antenna Dimensions (RAD)	ANTENNA GAIN14.8, BEAMWIDTH40, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS296, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS25, RAD = RAD05 14.8G040B000-360A00296H025	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETERN/A, ANTENNA EFFICIENCYN/A,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	Dn
State (RSC)	RSC = United Kingdom	
City Name (RAL)	RAL = Unst, Shetland	
Latitude (DDMMSS)	Lat = 604452 N	
Longitude (DDDMMSS)	Lon = 0005128 W	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN14.8, BEAMWIDTH40, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS19, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS4,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
	RAD = RAD06 14.8G040B000-360A00019H004	
Receive Antenna Additional Information (For Parabolic	ANTENNA DIAMETERN/A, ANTENNA EFFICIENCYN/A,	
Antennas) Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	AVERAGE DURATION OF EACH CONTACT
Supported Operations	Satellite Health and Status Data $oxtimes$ Mission Payload Data $\Box$	SATELLITE HEALTH AND STATUS TELEMETRY AND/OR MISSION PAYLOAD DATA
<ul><li>FCC notes:</li><li>1. Use S-Note S945.</li><li>2. REM AGN, Cubesat, (Apex Aries 1)</li></ul>		

Satellite Name: Apex Aries 1		
Data Field	Data Answer	Description/Comments
Transmit Power (PWR)	PWR = 2 W PWR02 W2	TRANSMIT POWER SUPPLIED TO THE ANTENNA INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE: W = WATT, K = KILOWATT, M = MEGAWATT
Necessary Bandwidth	65.28 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	68.28 kHz	
-20 dB bandwidth	82.3 kHz	
-40 dB bandwidth	92 kHz	
-60 dB bandwidth	105 kHz	
Modulation Type	2GFSK	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	29.6 kbits/sec	INFORMATION DATA RATE
Forward Error	Is FEC used? Yes $\Box$ No $oxtimes$	
Correction Coding	FEC Type:,	
	FEC Rate:,	
Total Symbol Rate	29.6 ksymbols/sec	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 □	
Transmit Antenna Polarization (XAP)	XAP = 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 = EC	NB= NARROWBEAM EC = EARTH COVERAGE
Transmit Antenna Dimension (XAD)	ANTENNA GAIN <u>0 dBi</u> , BEAMWIDTH <u>360</u> ,	NTIA FORMAT (XAD), EXAMPLE, FOR 16 DBI ANTENNA GAIN AND 30 DEGREE BEAMWIDTH XAD01 16G030B

Type of satellite (State = SPCE) (City = Geo or Nongeo)	Type = NONGEOSTATIONARY	CHOOSE EITHER: GEOSTATIONARY OR NONGEOSTATIONARY
For Geostationary Satellites	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE IN DDDMMSS FORMAT (XLG AND/OR RLG).
For Nongeostationary (Orbital Data)	INCLINATION ANGLE <u>97.6</u> , APOGEE IN KILOMETERS <u>525</u> , PERIGEE IN KILOMETERS <u>525</u> , ORBITAL PERIOD IN HOURS <u>1</u> AND FRACTIONS OF HOURS IN DECIMAL <u>0</u> . <u>58</u> , THE NUMBER OF SATELLITES IN THE SYSTEM <u>1</u> , ORB = *ORB,97.6IN00525AP00525PE001.58H01NRT01	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
For SunSynchronous Nongeostationary	Mean Local Time of Ascending Node MLTDN = 13:00 + 60 mins or 13:00-14:00	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)
Orbits	(Note: SpaceX notified use of LTDN, not LTAN.)	
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = South Africa	
City Name (RAL)	RAL = Pretoria	
Latitude (DDMMSS)	Lat = 255136 S	
Longitude (DDDMMSS)	Lon = 0282700 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

ANTENNA GAIN16.2,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL
BEAMWIDTH22,	RANGE FROM 001-360, SITE ELEVATION OF 357
	METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS:
	RAD01 16G030B001-360A00357H006
IN METERS6,	
ANTENNA EFFICIENCY N/A,	
4 contacts per day	NUMBER OF TIMES THE SATELLITE WILL
	COMMUNICATE WITH THE EARTH STATION IN THE SPACE TO EARTH DIRECTION (DOWNLINKS) EACH
	DAY
8 minutes	AVERAGE DURATION OF EACH CONTACT
Satellite Health and Status Data 🛛	SATELLITE HEALTH AND STATUS TELEMETRY
Mission Pavload Data	AND/OR MISSION PAYLOAD DATA
a (Receiver) at Each Earth Station Locatio	on
RSC = Sweden	
RAL = Boden	
Lat = 654800 N	
Lon = 0214048 E	
RAP = J	POLARIZATIONS INCLUDE:
RAP = J	H = HORIZONTAL,
RAP = J	H = HORIZONTAL, V = VERTICAL,
RAP = J	H = HORIZONTAL,
RAP = J	H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR,
RAP = J	H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR, T = RIGHT AND LEFT HAND CIRCULAR,
	H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR,
RAP = J RAZ = RAZ01 V00	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
	BEAMWIDTH 22   AZIMUTHAL RANGE 000-360   THE SITE ELEVATION ABOVE MEAN SEA   LEVEL IN METERS 1339   THE ANTENNA HEIGHT ABOVE TERRAIN   IN METERS

Receive Antenna Dimensions (RAD)	ANTENNA GAIN16.2, BEAMWIDTH22, AZIMUTHAL RANGE360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS46, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS6,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
	RAD = RAD02 16.2G022B000-360A00046H006	
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETERN/A, ANTENNA EFFICIENCYN/A,	
Number of Satellite Contacts Supported Per Day	11 contacts per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Spain	
City Name (RAL)	RAL = Puertollano	
Latitude (DDMMSS)	Lat = 384026 N	
Longitude (DDDMMSS)	Lon = 0040943 W	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna	ANTENNA GAIN 14.8 ,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16
Dimensions (RAD)	DBI GAIN, 30 DEGREE BEAMWID	DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL
	AZIMUTHAL RANGE 000-360 ,	RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN
	THE SITE ELEVATION ABOVE MEAN SEA	OF 6 METERS:
	LEVEL IN METERS690,	RAD01 16G030B001-360A00357H006
	THE ANTENNA HEIGHT ABOVE TERRAIN	
	IN METERS14,	
	RAD =	
	RAD03 14.8G040B000-360A00690H014	
Receive Antenna	ANTENNA DIAMETERN/A,	
Additional	ANTENNA EFFICIENCYN/A,	
	ANTENNA EFFICIENCEN/A,	
Information (For Parabolic		
Antennas)	(1 contact non day	NUMBER OF TIMES THE SATELLITE WILL
Number of	<1 contact per day	COMMUNICATE WITH THE EARTH STATION IN THE
Satellite Contacts		SPACE TO EARTH DIRECTION (DOWNLINKS) EACH
Supported Per		DAY
Day		
Expected	8 minutes	AVERAGE DURATION OF EACH CONTACT
Duration of Each		
Contact		
Supported	Satellite Health and Status Data 🛛	SATELLITE HEALTH AND STATUS TELEMETRY AND/OR MISSION PAYLOAD DATA
Operations	Mission Payload Data 🛛	AND/OR MISSION FATLOAD DATA
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Italy	
City Name (RAL)	RAL = Vimercate	
Latitude	Lat = 453536 N	
(DDMMSS)		
Longitude	Lon = 0092144 E	
(DDDMMSS)		
Receive Antenna	RAP = J	POLARIZATIONS INCLUDE:
Polarization (RAP)		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
Receive Antenna	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA
		MINIMUM OPERATING ANGLE OF
		ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	MINIMUM OPERATING ANGLE OF

Receive Antenna	ANTENNA GAIN14.8, BEAMWIDTH40,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL
Dimensions (RAD)	AZIMUTHAL RANGE 000-360 ,	RANGE FROM 001-360, SITE ELEVATION OF 357
	THE SITE ELEVATION ABOVE MEAN SEA	METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS:
	LEVEL IN METERS 177 ,	RAD01 16G030B001-360A00357H006
	THE ANTENNA HEIGHT ABOVE TERRAIN	
	IN METERS13,	
	RAD =	
	RAD04 14.8G040B001-360A00177H013	
Receive Antenna	ANTENNA DIAMETERN/A,	
Additional	ANTENNA EFFICIENCYN/A,	
Information (For	ANTENNA EFFICIENCI N/A,	
Parabolic		
Antennas) Number of	<1 contact per day	NUMBER OF TIMES THE SATELLITE WILL
Satellite Contacts		COMMUNICATE WITH THE EARTH STATION IN THE
		SPACE TO EARTH DIRECTION (DOWNLINKS) EACH
Supported Per		DAY
Day		AVERAGE DURATION OF EACH CONTACT
Expected	8 minutes	AVERAGE DONATION OF EACH CONTACT
Duration of Each		
Contact		SATELLITE HEALTH AND STATUS TELEMETRY
Supported	Satellite Health and Status Data 🛛	AND/OR MISSION PAYLOAD DATA
Operations	Mission Payload Data	
Earth Station Data	 a (Receiver) at Each Earth Station Locatio	Dn
State (RSC)	RSC = Italy	
City Name (RAL)	RAL = Lomazzo	
Latitude	Lat = 454150 N	
(DDMMSS)		
Longitude	Lon = 0090205 E	
Longitude	LON = 0090203 L	
(DDDMMSS)		
-	RAP = J	POLARIZATIONS INCLUDE:
(DDDMMSS)		H = HORIZONTAL,
(DDDMMSS) Receive Antenna		
(DDDMMSS) Receive Antenna		H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR,
(DDDMMSS) Receive Antenna		H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR,
(DDDMMSS) Receive Antenna		H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR,
(DDDMMSS) Receive Antenna		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 THE EARTH STATION RECEIVER ANTENNA
(DDDMMSS) Receive Antenna Polarization (RAP)	RAP = J	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

Receive Antenna Dimensions (RAD)	ANTENNA GAIN14.8, BEAMWIDTH40, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS296, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS25, RAD = RAD05 14.8G040B000-360A00296H025	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETERN/A, ANTENNA EFFICIENCYN/A,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	Dn
State (RSC)	RSC = United Kingdom	
City Name (RAL)	RAL = Unst, Shetland	
Latitude (DDMMSS)	Lat = 604452 N	
Longitude (DDDMMSS)	Lon = 0005128 W	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN14.8, BEAMWIDTH40, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS19, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS4, RAD = RAD06 14.8G040B000-360A00019H004	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETERN/A, ANTENNA EFFICIENCYN/A,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	AVERAGE DURATION OF EACH CONTACT
Supported Operations	Satellite Health and Status Data $oxtimes$ Mission Payload Data $\Box$	SATELLITE HEALTH AND STATUS TELEMETRY AND/OR MISSION PAYLOAD DATA
FCC notes: 1. Use S-Note 2. REM AGN, 0	S945. Cubesat, (Apex Aries 1)	

Satellite Name: Ape	ex Aries 1	
Data Field	Data Answer	Description/Comments
Transmit Power (PWR)	PWR = 2 W PWR02 W2	TRANSMIT POWER SUPPLIED TO THE ANTENNA INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE: W = WATT, K = KILOWATT, M = MEGAWATT
Necessary Bandwidth	65.28 kHz	THE WIDTH OF FREQUENCY BAND WHICH IS JUS 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	68.28 kHz	
-20 dB bandwidth	82.3 kHz	
-40 dB bandwidth	92 kHz	
-60 dB bandwidth	105 kHz	
Modulation Type	2GFSK	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	29.6 kbits/sec	INFORMATION DATA RATE
Forward Error Correction Coding	Is FEC used? Yes □ No ⊠ FEC Type:, FEC Rate:,	
Total Symbol Rate	29.6 ksymbols/s	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	Yes 🖂	
a beacon mode, can the beacon be commanded off?	No 🗆	
Transmit Antenna Polarization (XAP)	XAP = 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 = EC	NB= NARROWBEAM EC = EARTH COVERAGE

Transmit Antenna Dimension (XAD)	ANTENNA GAIN <u>0</u> , BEAMWIDTH <u>360</u> , XAD = XAD01 00G360B	NTIA FORMAT (XAD), EXAMPLE, FOR 16 DBI ANTENNA GAIN AND 30 DEGREE BEAMWIDTH XAD01 16G030B
Type of satellite (State = SPCE) (City = Geo or Nongeo)	Type = NONGEOSTATIONARY	CHOOSE EITHER: GEOSTATIONARY OR NONGEOSTATIONARY
For Geostationary Satellites	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE IN DDDMMSS FORMAT (XLG AND/OR RLG).
For Nongeostationary (Orbital Data)	INCLINATION ANGLE 97.6 APOGEE IN KILOMETERS 525, PERIGEE IN KILOMETERS 525, ORBITAL PERIOD IN HOURS 1 AND FRACTIONS OF HOURS IN DECIMAL 0. 58, THE NUMBER OF SATELLITES IN THE SYSTEM 1, ORB = *ORB,97.6IN00525AP00525PE001.58H01NRT01	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
For SunSynchronous Nongeostationary Orbits	Mean Local Time of Ascending Node MLTDN = 13:00 + 60 mins or 13:00-14:00 (Note: SpaceX notified use of LTDN, not	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)
	LTAN.)	
Earth Station Data	a (Receiver) at Each Earth Station Location	on
State (RSC)	RSC = South Africa	
City Name (RAL)	RAL = Pretoria	
Latitude (DDMMSS)	Lat = 255136 S	
Longitude (DDDMMSS)	Lon = 0282700 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna	ANTENNA GAIN16.2,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16
Dimensions (RAD)	BEAMWIDTH,	DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL
		RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
	AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA	
	LEVEL IN METERS1339,	
	THE ANTENNA HEIGHT ABOVE TERRAIN	
	IN METERS6,	
	242	
	RAD =	
	RAD01 16.2G022B000-360A01339H006	
Receive Antenna	ANTENNA DIAMETERN/A,	
Additional	ANTENNA EFFICIENCYN/A,	
Information (For		
Parabolic		
Antennas)		
Number of	4 contacts per day	NUMBER OF TIMES THE SATELLITE WILL COMMUNICATE WITH THE EARTH STATION IN THE
Satellite Contacts		SPACE TO EARTH DIRECTION (DOWNLINKS) EACH
Supported Per		DAY
Day		
Expected	8 minutes	AVERAGE DURATION OF EACH CONTACT
Duration of Each		
Contact		
Supported	Satellite Health and Status Data 🛛	SATELLITE HEALTH AND STATUS TELEMETRY
Operations	Mission Payload Data	AND/OR MISSION PAYLOAD DATA
	,	
Earth Station Dat	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Sweden	
City Name (RAL)	RAL = Boden	
Latitude	Lat = 654800 N	
(DDMMSS)		
Longitude	Lon = 0214048 E	
(DDDMMSS)		
Receive Antenna	RAP = J	POLARIZATIONS INCLUDE:
Polarization (RAP)		H = HORIZONTAL,
		V = VERTICAL, S = HORIZONTAL AND VERTICAL,
		L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR,
		T = RIGHT AND LEFT HAND CIRCULAR,
Receive Antenna	RAZ = RAZ01 V00	J = LINEAR POLARIZATION THE EARTH STATION RECEIVER ANTENNA
Orientation (RAZ)		MINIMUM OPERATING ANGLE OF
		ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01
		V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN16.2, BEAMWIDTH22, AZIMUTHAL RANGE360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS46, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS6,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
	RAD = RAD02 16.2G022B000-360A00046H006	
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETERN/A, ANTENNA EFFICIENCYN/A,	
Number of Satellite Contacts Supported Per Day	11 contacts per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Spain	
City Name (RAL)	RAL = Puertollano	
Latitude (DDMMSS)	Lat = 384026 N	
Longitude (DDDMMSS)	Lon = 0040943 W	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN14.8, BEAMWIDTH40, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS690, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS14, RAD = RAD03 14.8G040B000-360A00690H014	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETERN/A, ANTENNA EFFICIENCYN/A,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Italy	
City Name (RAL)	RAL = Vimercate	
Latitude (DDMMSS)	Lat = 453536 N	
Longitude (DDDMMSS)	Lon = 0092144 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

ANTENNA GAIN14.8, BEAMWIDTH 40	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL
	RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN
THE SITE ELEVATION ABOVE MEAN SEA	OF 6 METERS:
	RAD01 16G030B001-360A00357H006
THE ANTENNA HEIGHT ABOVE TERRAIN	
IN METERS13,	
RAD =	
RAD04 14.8G040B001-360A00177H013	
ANTENNA DIAMETERN/A,	
ANTENNA EFFICIENCYN/A,	
<1 contact per day	NUMBER OF TIMES THE SATELLITE WILL
	COMMUNICATE WITH THE EARTH STATION IN THE SPACE TO EARTH DIRECTION (DOWNLINKS) EACH
	DAY
8 minutes	AVERAGE DURATION OF EACH CONTACT
Satellite Health and Status Data 🖂	SATELLITE HEALTH AND STATUS TELEMETRY
Mission Payload Data 🛛	AND/OR MISSION PAYLOAD DATA
a (Receiver) at Each Earth Station Locatio	on
RSC = Italy	
RAL = Lomazzo	
Lat = 454150 N	
Lon = 0090205 E	
1	
RAP = J	POLARIZATIONS INCLUDE:
RAP = J	H = HORIZONTAL,
RAP = J	
RAP = J	H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR,
RAP = J	H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR,
RAP = J	H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR,
RAP = J RAZ = RAZ01 V00	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 THE EARTH STATION RECEIVER ANTENNA
	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
	BEAMWIDTH40

Receive Antenna Dimensions (RAD)	ANTENNA GAIN14.8, BEAMWIDTH40, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS296, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS25, RAD =	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	RAD05 14.8G040B000-360A00296H025         ANTENNA DIAMETERN/A,         ANTENNA EFFICIENCYN/A,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = United Kingdom	-
City Name (RAL)	RAL = Unst, Shetland	
Latitude (DDMMSS)	Lat = 604452 N	
Longitude (DDDMMSS)	Lon = 0005128 W	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN14.8, BEAMWIDTH40, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS19, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS4,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006	
	RAD = RAD06 14.8G040B000-360A00019H004		
Receive Antenna	ANTENNA DIAMETERN/A,		
Additional	ANTENNA EFFICIENCYN/A,		
Information (For			
Parabolic			
Antennas)			
Number of	<1 contact per day	NUMBER OF TIMES THE SATELLITE WILL COMMUNICATE WITH THE EARTH STATION IN THE	
Satellite Contacts		SPACE TO EARTH DIRECTION (DOWNLINKS) EACH	
Supported Per		DAY	
Day			
Expected	8 minutes	AVERAGE DURATION OF EACH CONTACT	
Duration of Each			
Contact			
Supported	Satellite Health and Status Data 🖂	SATELLITE HEALTH AND STATUS TELEMETRY AND/OR MISSION PAYLOAD DATA	
Operations	Mission Payload Data		
FCC notes:			
1. Use S-Note	S945.		
2. REM AGN, O	2. REM AGN, Cubesat, (Apex Aries 1)		

Satellite Name: Apex Aries	1
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Data Field	Data Answer	Description/Comments
Transmit Power (PWR)	PWR = 0.143 W PWR01 W0.143	TRANSMIT POWER SUPPLIED TO THE ANTENNA INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE: W = WATT, K = KILOWATT, M = MEGAWATT
Necessary Bandwidth	168.8 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.
<b>RF Emissions Data</b>		2-SIDED EMISSION BANDWIDTH VALUES
-3 dB bandwidth	170 kHz	
-20 dB bandwidth	200 kHz	
-40 dB bandwidth	240 kHz	
-60 dB bandwidth	400 kHz	
Modulation Type	GMSK	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	54.7 kbits/sec	INFORMATION DATA RATE
Forward Error Correction Coding	Is FEC used? Yes ⊠ No □ FEC Type: <u>Reed-Solomon and ½ CC</u> , FEC Rate: <u>0.563</u> ,	
Total Symbol Rate	125 ksymbols/sec	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 🗆	
Transmit Antenna 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 = EC	NB= NARROWBEAM EC = EARTH COVERAGE
Transmit Antenna Dimension (XAD)	ANTENNA GAIN <u>6</u> , BEAMWIDTH <u>70</u> , XAD = XAD02 06G070B	NTIA FORMAT (XAD), EXAMPLE, FOR 16 DBI ANTENNA GAIN AND 30 DEGREE BEAMWIDTH XAD01 16G030B

Type of satellite (State = SPCE) (City = Geo or Nongeo)	Type = NONGEOSTATIONARY	CHOOSE EITHER: GEOSTATIONARY OR NONGEOSTATIONARY
For Geostationary Satellites	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE IN DDDMMSS FORMAT (XLG AND/OR RLG).
For Nongeostationary (Orbital Data)	INCLINATION ANGLE 97.6, APOGEE IN KILOMETERS 525, PERIGEE IN KILOMETERS 525, ORBITAL PERIOD IN HOURS 1_AND FRACTIONS OF HOURS IN DECIMAL 0.58, THE NUMBER OF SATELLITES IN THE SYSTEM 1, ORB = *ORB,97.6IN00525AP00525PE001.58H01NRT01	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
For SunSynchronous Nongeostationary	Mean Local Time of Ascending Node MLTDN = 13:00 + 60 mins or 13:00-14:00	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)
Orbits	(Note: SpaceX notified use of LTDN, not LTAN.)	
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = South Africa	
City Name (RAL)	RAL = Pretoria	
Latitude (DDMMSS)	Lat = 255136 S	
Longitude (DDDMMSS)	Lon = 0282700 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN, BEAMWIDTH0.97, AZIMUTHAL RANGE000-270, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS1339, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS6, RAD = RAD07 40G.97B000-270A01339H006	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER6.0, ANTENNA EFFICIENCY0.5,	
Number of Satellite Contacts Supported Per Day	4 contacts per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Location	on
State (RSC)	RSC = Sweden	
City Name (RAL)	RAL = Boden	
Latitude (DDMMSS)	Lat = 654800 N	
Longitude (DDDMMSS)	Lon = 0214048 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN, BEAMWIDTH0.97, AZIMUTHAL RANGE000-270, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS46, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS6, RAD = RAD08 40G.97B000-270A00046H006	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER6.0, ANTENNA EFFICIENCY0.5,	
Number of Satellite Contacts Supported Per Day	11 contacts per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Location	on
State (RSC)	RSC = Australia	
City Name (RAL)	RAL = Currans Hill	
Latitude (DDMMSS)	Lat = 340224 S	
Longitude (DDDMMSS)	Lon = 1504612 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna	ANTENNA GAIN16,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16
Dimensions (RAD)	BEAMWIDTH1.83,	DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357
	AZIMUTHAL RANGE000-360,	METERS, AND ANTENNA HEIGHT ABOVE TERRAIN
	THE SITE ELEVATION ABOVE MEAN SEA	OF 6 METERS:
	LEVEL IN METERS95,	RAD01 16G030B001-360A00357H006
	THE ANTENNA HEIGHT ABOVE TERRAIN	
	IN METERS20,	
	RAD =	
	RAD09 16G1.83B000-360A095H020	
Receive Antenna		
Additional	ANTENNA DIAMETER5.4, ANTENNA EFFICIENCY 0.5 ,	
	ANTENNA EFFICIENCE0.5,	
Information (For		
Parabolic		
Antennas)		NUMBER OF TIMES THE SATELLITE WILL
Number of	<1 contact per day	COMMUNICATE WITH THE EARTH STATION IN THE
Satellite Contacts		SPACE TO EARTH DIRECTION (DOWNLINKS) EACH
Supported Per		DAY
Day		
Expected	8 minutes	AVERAGE DURATION OF EACH CONTACT
Duration of Each		
Contact		
Supported	Satellite Health and Status Data $oxtimes$	SATELLITE HEALTH AND STATUS TELEMETRY
Operations	Mission Payload Data $\ \Box$	AND/OR MISSION PAYLOAD DATA
Earth Station Dat	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Bahrain	
City Name (RAL)	RAL = Zallaq	
Latitude	Lat = 260300	
(DDMMSS)		
Longitude	Lon = 0503000	
(DDDMMSS)		
Receive Antenna	RAP = R	POLARIZATIONS INCLUDE:
Polarization (RAP)		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
Receive Antenna	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA
Orientation (RAZ)		MINIMUM OPERATING ANGLE OF
		ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna	ANTENNA GAIN,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL
Dimensions (RAD)	BEAMWIDTH1.83, AZIMUTHAL RANGE000-360,	RANGE FROM 001-360, SITE ELEVATION OF 357
	THE SITE ELEVATION ABOVE MEAN SEA	METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS:
	LEVEL IN METERS	RAD01 16G030B001-360A00357H006
	THE ANTENNA HEIGHT ABOVE TERRAIN	
	IN METERS20,	
	RAD =	
	RAD10 16G1.83B000-360A00010H020	
Receive Antenna	ANTENNA DIAMETER5.4,	
Additional	ANTENNA EFFICIENCY 0.5 ,	
Information (For		
Parabolic		
Antennas)		
Number of	<1 contact per day	NUMBER OF TIMES THE SATELLITE WILL
Satellite Contacts		COMMUNICATE WITH THE EARTH STATION IN THE
		SPACE TO EARTH DIRECTION (DOWNLINKS) EACH
Supported Per		DAY
Day	0 minutos	AVERAGE DURATION OF EACH CONTACT
Expected	8 minutes	Avenade bonarion of Each contact
Duration of Each		
Contact		SATELLITE HEALTH AND STATUS TELEMETRY
Supported	Satellite Health and Status Data	AND/OR MISSION PAYLOAD DATA
Operations	Mission Payload Data 🗌	
	a (Receiver) at Each Earth Station Location	on I
State (RSC)	RSC = Ireland	
City Name (RAL)	RAL = Dublin	
Latitude		
	Lat = 532400 N	
(DDMMSS)		
(DDMMSS) Longitude	Lat = 532400 N Lon = 0061312 W	
(DDMMSS)	Lon = 0061312 W	
(DDMMSS) Longitude		POLARIZATIONS INCLUDE:
(DDMMSS) Longitude (DDDMMSS)	Lon = 0061312 W	POLARIZATIONS INCLUDE: H = HORIZONTAL, V = VERTICAL,
(DDMMSS) Longitude (DDDMMSS) Receive Antenna	Lon = 0061312 W	H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL,
(DDMMSS) Longitude (DDDMMSS) Receive Antenna	Lon = 0061312 W	H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR,
(DDMMSS) Longitude (DDDMMSS) Receive Antenna	Lon = 0061312 W	H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL,
(DDMMSS) Longitude (DDDMMSS) Receive Antenna	Lon = 0061312 W	H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR,
(DDMMSS) Longitude (DDDMMSS) Receive Antenna	Lon = 0061312 W	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 THE EARTH STATION RECEIVER ANTENNA
(DDMMSS) Longitude (DDDMMSS) Receive Antenna Polarization (RAP)	Lon = 0061312 W RAP = R	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

Receive Antenna Dimensions (RAD)	ANTENNA GAIN16, BEAMWIDTH1.83, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS84, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS20, RAD =	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic	RAD11 16G1.83B000-360A084H020         ANTENNA DIAMETER5.4,         ANTENNA EFFICIENCY0.5,	
Antennas) Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Location	on
State (RSC)	RSC = Southern Australia	
City Name (RAL)	RAL = Peterborough	
Latitude (DDMMSS)	Lat = 325743 S	
Longitude (DDDMMSS)	Lon = 1385058 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN34.6, BEAMWIDTH2.4, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS540, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS2.2,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
	RAD =	
	RAD12 34.6G2.4B000-360A00540H2.2	
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER3.7, ANTENNA EFFICIENCY4965,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	AVERAGE DURATION OF EACH CONTACT
Supported	Satellite Health and Status Data 🖂	SATELLITE HEALTH AND STATUS TELEMETRY
Operations	Mission Payload Data 🛛	AND/OR MISSION PAYLOAD DATA
Fauth Ctation Dat	- (Dessiver) at Each Forth Station Lessti	
	a (Receiver) at Each Earth Station Locatio	
State (RSC)	RSC = Western Australia	
City Name (RAL)	RAL = Nangetty	
Latitude (DDMMSS)	Lat = 290037 S	
Longitude (DDDMMSS)	Lon = 1152030 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN34.6, BEAMWIDTH2.4, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS270, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS2.2, RAD = RAD13 34.6G2.4B000-360A00270H2.2	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER3.7, ANTENNA EFFICIENCY4965,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Azerbaijan	
City Name (RAL)	RAL = Absheron	
Latitude (DDMMSS)	Lat = 402758 N	
Longitude (DDDMMSS)	Lon = 492908 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN34.6, BEAMWIDTH2.4, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS210, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS2.2, RAD = RAD14 34.6G2.4B000-360A00210H2.2	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER3.7, ANTENNA EFFICIENCY4965,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Bulgaria	
City Name (RAL)	RAL = Plana	
Latitude (DDMMSS)	Lat = 422858 N	
Longitude (DDDMMSS)	Lon = 0232643 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN35.8, BEAMWIDTH2.2, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS1106, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS4, RAD = RAD15 35.8G2.2B000-360A01106H004	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER4.5, ANTENNA EFFICIENCY3356,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Iceland	
City Name (RAL)	RAL = Blönduós	
Latitude (DDMMSS)	Lat = 653850 N	
Longitude (DDDMMSS)	Lon = 0201445 W	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN34.6, BEAMWIDTH2.4, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS53, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS2.2, RAD = RAD16 34.6G2.4B000-360A00053H2.2	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER3.7, ANTENNA EFFICIENCY4965,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Italy	-
City Name (RAL)	RAL = Vimercate	
Latitude (DDMMSS)	Lat = 453536 N	
Longitude (DDDMMSS)	Lon = 0092144 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN35, BEAMWIDTH3.1, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS177, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS13, RAD = RAD17 35G3.1B000-360A00177H013	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER3.7, ANTENNA EFFICIENCY4965,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Sri Lanka	-
City Name (RAL)	RAL = Kandy	
Latitude (DDMMSS)	Lat = 071627 N	
Longitude (DDDMMSS)	Lon = 0804329 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN34.6, BEAMWIDTH2.4, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS462, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS2.2, RAD = RAD18 34.6G2.4B000-360A00462H2.2	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER3.7, ANTENNA EFFICIENCY4965,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = New Zealand	
City Name (RAL)	RAL = Awarua	
Latitude (DDMMSS)	Lat = 463141 S	
Longitude (DDDMMSS)	Lon = 1682245 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN34.6, BEAMWIDTH2.4, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS16, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS2.2, RAD = RAD19 34.6G2.4B000-360A00016H2.2	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER3.7, ANTENNA EFFICIENCY4965,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Azores, Portugal	-
City Name (RAL)	RAL = Santa Maria	
Latitude (DDMMSS)	Lat = 365951 N	
Longitude (DDDMMSS)	Lon = 0250814 W	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN34.6, BEAMWIDTH2.4, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS194, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS2.2, RAD = RAD20 34.6G2.4B000-360A00194H2.2	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER3.7, ANTENNA EFFICIENCY4965,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	A (Receiver) at Each Earth Station Location	on
State (RSC)	RSC = United Kingdom	-
City Name (RAL)	RAL = Unst, Shetland	
Latitude (DDMMSS)	Lat = 604452 N	
Longitude (DDDMMSS)	Lon = 0005128 W	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN34.6, BEAMWIDTH2.4, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS19, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS2.2, RAD = RAD21 34.6G2.4B000-360A00019H2.2	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER3.7, ANTENNA EFFICIENCY4965,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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: 1. Use S-Note 2. REM AGN, (	S945. Cubesat, (Apex Aries 1)	

Satellite Name: Ape	ex Aries 1	
Data Field	Data Answer	Description/Comments
Transmit Power (PWR)	PWR = 0.85 W PWR01 W0.85	TRANSMIT POWER SUPPLIED TO THE ANTENNA INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE: W = WATT, K = KILOWATT, M = MEGAWATT
Necessary Bandwidth	1 MHz	THE WIDTH OF FREQUENCY BAND WHICH IS JUS SUFFICIENT TO SUCCESSFULLY TRANSFER DATA. FORMULAS CAN BE FOUND IN ANNEX J OF THE NTIA MANUAL.
<b>RF Emissions Data</b>		2-SIDED EMISSION BANDWIDTH VALUES
-3 dB bandwidth	1.02 MHz	
-20 dB bandwidth	1.08 MHz	
-40 dB bandwidth	1.14 MHz	
-60 dB bandwidth	1.20 MHz	
Modulation Type	GMSK	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	54.7 kbits/sec	INFORMATION DATA RATE
Forward Error	Is FEC used? Yes $oxtimes$ No $\Box$	
Correction Coding	FEC Type: <u>Reed-Solomon and ½ CC</u> , FEC Rate: <u>0.563</u> ,	
Total Symbol Rate	125 ksymbols/sec	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 🗆	
Transmit Antenna 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 = EC	NB= NARROWBEAM EC = EARTH COVERAGE
Transmit Antenna Dimension (XAD)	ANTENNA GAIN <u>5</u> , BEAMWIDTH <u>70</u> ,	NTIA FORMAT (XAD), EXAMPLE, FOR 16 DBI ANTENNA GAIN AND 30 DEGREE BEAMWIDTH

XAD01 16G030B

BEAMWIDTH <u>70</u>

XAD = XAD02 05G070B

Dimension (XAD)

Type of satellite (State = SPCE) (City = Geo or Nongeo)	Type = NONGEOSTATIONARY	CHOOSE EITHER: GEOSTATIONARY OR NONGEOSTATIONARY
For Geostationary Satellites	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE IN DDDMMSS FORMAT (XLG AND/OR RLG).
For Nongeostationary (Orbital Data)	INCLINATION ANGLE 97.6 APOGEE IN KILOMETERS 525, PERIGEE IN KILOMETERS 525, ORBITAL PERIOD IN HOURS 1_AND FRACTIONS OF HOURS IN DECIMAL 0.58, THE NUMBER OF SATELLITES IN THE SYSTEM 1, ORB = *ORB,97.6IN00525AP00525PE001.58H01NRT01	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
For SunSynchronous	Mean Local Time of Ascending Node MLTDN = 13:00 + 60 mins or 13:00-14:00	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)
, Nongeostationary		
Orbits	(Note: SpaceX notified use of LTDN, not LTAN.)	
Earth Station Data	A (Receiver) at Each Earth Station Location	on
State (RSC)	RSC = South Africa	
City Name (RAL)	RAL = Pretoria	
Latitude (DDMMSS)	Lat = 255136 S	
Longitude (DDDMMSS)	Lon = 0282700 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN40, BEAMWIDTH0.97, AZIMUTHAL RANGE000-270, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS1339, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS6, RAD = RAD07 40G.97B000-270A01339H006	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER6.0,           ANTENNA EFFICIENCY0.5,	
Number of Satellite Contacts Supported Per Day	4 contacts per day	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	8 minutes	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
Earth Station Data	A (Receiver) at Each Earth Station Location	on
State (RSC)	RSC = Sweden	
City Name (RAL)	RAL = Boden	
Latitude (DDMMSS)	Lat = 654800 N	
Longitude (DDDMMSS)	Lon = 0214048 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN, BEAMWIDTH0.97, AZIMUTHAL RANGE000-270, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS46, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS6, RAD = RAD08 40G.97B000-270A00046H006	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER6.0, ANTENNA EFFICIENCY0.5,	
Number of Satellite Contacts Supported Per Day	11 contacts per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Location	on
State (RSC)	RSC = Australia	
City Name (RAL)	RAL = Currans Hill	
Latitude (DDMMSS)	Lat = 340224 S	
Longitude (DDDMMSS)	Lon = 1504612 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN, BEAMWIDTH1.83, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS95, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS20, RAD =	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic	RAD09 16G1.83B000-360A00095H020         ANTENNA DIAMETER5.4,         ANTENNA EFFICIENCY0.5,	
Antennas)		
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Farth Station Data	a (Receiver) at Each Earth Station Location	on series and ser
State (RSC)	RSC = Bahrain	
City Name (RAL)	RAL = Zallaq	
Latitude (DDMMSS)	Lat = 260300 N	
Longitude (DDDMMSS)	Lon = 0503000 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

ANTENNA GAIN16,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16
	DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357
	METERS, AND ANTENNA HEIGHT ABOVE TERRAIN
THE SITE ELEVATION ABOVE MEAN SEA	OF 6 METERS:
LEVEL IN METERS 10 ,	RAD01 16G030B001-360A00357H006
THE ANTENNA HEIGHT ABOVE TERRAIN	
IN METERS 20 ,	
RAD =	
RAD10 16G1.83B000-360A00010H020	
ANTENNA EFFICIENCY 0.5	
<1 contact per day	NUMBER OF TIMES THE SATELLITE WILL
	COMMUNICATE WITH THE EARTH STATION IN THE
	SPACE TO EARTH DIRECTION (DOWNLINKS) EACH DAY
8 minutes	AVERAGE DURATION OF EACH CONTACT
Satellite Health and Status Data 🖂	SATELLITE HEALTH AND STATUS TELEMETRY
Mission Payload Data	AND/OR MISSION PAYLOAD DATA
a (Receiver) at Each Earth Station Locatio	on
RSC = Ireland	
RAL = Dublin	
Lat = 532400 N	
Lon = 0061312 W	
RAP = 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
RAZ = RAZ01 V00	T = RIGHT AND LEFT HAND CIRCULAR, J = LINEAR POLARIZATION THE EARTH STATION RECEIVER ANTENNA
RAZ = RAZ01 V00	T = RIGHT AND LEFT HAND CIRCULAR, J = LINEAR POLARIZATION
	BEAMWIDTH 1.83   AZIMUTHAL RANGE 000-360   THE SITE ELEVATION ABOVE MEAN SEA   LEVEL IN METERS 10   THE ANTENNA HEIGHT ABOVE TERRAIN   IN METERS 20   RAD =   RAD10 16G1.83B000-360A00010H020   ANTENNA DIAMETER 5.4   ANTENNA EFFICIENCY 0.5   Output   8 minutes   Satellite Health and Status Data    Mission Payload Data   a (Receiver) at Each Earth Station Location   RSC = Ireland   RAL = Dublin   Lat = 532400 N   Lon = 0061312 W

Receive Antenna Dimensions (RAD)	ANTENNA GAIN, BEAMWIDTH1.83, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS84, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS20, RAD =	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	RAD11 16G1.83B000-360A084H020         ANTENNA DIAMETER5.4,         ANTENNA EFFICIENCY0.5,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locati	on
State (RSC)	RSC = Southern Australia	
City Name (RAL)	RAL = Peterborough	
Latitude (DDMMSS)	Lat = 325743 S	
Longitude (DDDMMSS)	Lon = 1385058 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN34.6, BEAMWIDTH2.4, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS540, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS2.2, RAD = RAD12 34.6G2.4B000-360A00540H2.2	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER3.7, ANTENNA EFFICIENCY4965,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Western Australia	
City Name (RAL)	RAL = Nangetty	
Latitude (DDMMSS)	Lat = 290037 S	
Longitude (DDDMMSS)	Lon = 1152030 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN34.6, BEAMWIDTH2.4, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS270, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS2.2, RAD = RAD13 34.6G2.4B000-360A00270H2.2	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER3.7, ANTENNA EFFICIENCY4965,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Location	on
State (RSC)	RSC = Azerbaijan	
City Name (RAL)	RAL = Absheron	
Latitude (DDMMSS)	Lat = 402758 N	
Longitude (DDDMMSS)	Lon = 492908 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN34.6, BEAMWIDTH2.4, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS210, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS2.2, RAD = RAD14 34.6G2.4B000-360A00210H2.2	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER3.7, ANTENNA EFFICIENCY4965,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Bulgaria	
City Name (RAL)	RAL = Plana	
Latitude (DDMMSS)	Lat = 422858 N	
Longitude (DDDMMSS)	Lon = 0232643 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN35.8, BEAMWIDTH2.2, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS1106, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS4, RAD = RAD15 35.8G2.2B000-360A01106H004	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER4.5, ANTENNA EFFICIENCY3356,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Iceland	
City Name (RAL)	RAL = Blönduós	
Latitude (DDMMSS)	Lat = 653850 N	
Longitude (DDDMMSS)	Lon = 0201445 W	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN34.6, BEAMWIDTH2.4, AZIMUTHAL RANGE000-360_, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS53, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS2.2, RAD =	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Dessitive Automate	RAD16 34.6G2.4B000-360A00053H2.2	
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER3.7, ANTENNA EFFICIENCY4965,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	AVERAGE DURATION OF EACH CONTACT
Supported	Satellite Health and Status Data 🖂	SATELLITE HEALTH AND STATUS TELEMETRY
Operations	Mission Payload Data	AND/OR MISSION PAYLOAD DATA
	a (Receiver) at Each Earth Station Locatio	on I
State (RSC)	RSC = Italy	
City Name (RAL)	RAL = Vimercate	
Latitude (DDMMSS)	Lat = 453536 N	
Longitude (DDDMMSS)	Lon = 0092144 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN 35, BEAMWIDTH 3.1, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS 177, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS 13, RAD = RAD17 35G3.1B000-360A00177H013	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER3.0, ANTENNA EFFICIENCY4965,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Sri Lanka	
City Name (RAL)	RAL = Kandy	
Latitude (DDMMSS)	Lat = 071627 N	
Longitude (DDDMMSS)	Lon = 0804329 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN34.6, BEAMWIDTH2.4, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS _462, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS2.2, RAD = RAD18 34.6G2.4B000-360A00462H2.2	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER3.7, ANTENNA EFFICIENCY4965,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = New Zealand	
City Name (RAL)	RAL = Awarua	
Latitude (DDMMSS)	Lat = 463141 S	
Longitude (DDDMMSS)	Lon = 1682245 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN34.6, BEAMWIDTH2.4, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS16, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS2.2, RAD = RAD19 34.6G2.4B000-360A00016H2.2	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER3.7, ANTENNA EFFICIENCY4965,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Azores, Portugal	
City Name (RAL)	RAL = Santa Maria	
Latitude (DDMMSS)	Lat = 365951 N	
Longitude (DDDMMSS)	Lon = 0250814 W	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN34.6, BEAMWIDTH2.4, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS194, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS2.2, RAD = RAD20 34.6G2.4B000-360A00194H2.2	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER3.7, ANTENNA EFFICIENCY4965,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = United Kingdom	
City Name (RAL)	RAL = Unst, Shetland	
Latitude (DDMMSS)	Lat = 604452 N	
Longitude (DDDMMSS)	Lon = 0005128 W	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN34.6, BEAMWIDTH2.4, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS19, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS2.2,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
	RAD =	
	RAD21 34.6G2.4B000-360A00019H2.2	
Receive Antenna	ANTENNA DIAMETER3.7,	
Additional	ANTENNA EFFICIENCY4965,	
Information (For		
Parabolic		
Antennas)		
Number of	<1 contact per day	NUMBER OF TIMES THE SATELLITE WILL COMMUNICATE WITH THE EARTH STATION IN THE
Satellite Contacts		SPACE TO EARTH DIRECTION (DOWNLINKS) EACH
Supported Per		DAY
Day		
Expected	8 minutes	AVERAGE DURATION OF EACH CONTACT
Duration of Each		
Contact		
Supported	Satellite Health and Status Data 🖂	SATELLITE HEALTH AND STATUS TELEMETRY
Operations	Mission Payload Data 🛛	AND/OR MISSION PAYLOAD DATA
FCC notes:		
1. Use S-Note	\$945.	
2. REM AGN, O	Cubesat, (Apex Aries 1)	

Satellite Name: Apex Aries 1		
Data Field	Data Anour	Description (Comments
	Data Answer	Description/Comments TRANSMIT POWER SUPPLIED TO THE ANTENNA
Transmit Power (PWR)	PWR = 1 W PWR01 W1	INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE: W = WATT, K = KILOWATT, M = MEGAWATT
Necessary Bandwidth	13.5 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.
<b>RF</b> Emissions Data		2-SIDED EMISSION BANDWIDTH VALUES
-3 dB bandwidth	65 MHz	
-20 dB bandwidth	75 MHz	
-40 dB bandwidth	85 MHz	
-60 dB bandwidth	100 MHz	
Modulation Type	16APSK	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	103 mbits/sec	INFORMATION DATA RATE
Forward Error Correction Coding	Is FEC used? Yes ⊠ No □ FEC Type: <u>LDPC 2/3</u> , FEC Rate: <u>0.67</u> ,	
Total Symbol Rate	69.01 msymbol/s	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 🗆	
Transmit Antenna 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 = EC	NB= NARROWBEAM EC = EARTH COVERAGE
Transmit Antenna Dimension (XAD)	ANTENNA GAIN <u>17 dBi</u> , BEAMWIDTH <u>18</u> , XAD = XAD03 17G018B	NTIA FORMAT (XAD), EXAMPLE, FOR 16 DBI ANTENNA GAIN AND 30 DEGREE BEAMWIDTH XAD01 16G030B

Type of satellite (State = SPCE) (City = Geo or Nongeo)	Type = NONGEOSTATIONARY	CHOOSE EITHER: GEOSTATIONARY OR NONGEOSTATIONARY
For Geostationary Satellites	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE IN DDDMMSS FORMAT (XLG AND/OR RLG).
For Nongeostationary (Orbital Data)	INCLINATION ANGLE <u>97.6deg</u> , APOGEE IN KILOMETERS <u>525 km</u> , PERIGEE IN KILOMETERS <u>525 km</u> , ORBITAL PERIOD IN HOURS <u>1</u> AND FRACTIONS OF HOURS IN DECIMAL <u>0.58</u> , THE NUMBER OF SATELLITES IN THE SYSTEM <u>1</u> , ORB = *ORB,97.6IN00525AP00525PE001.58H01NRT01	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
For SunSynchronous Nongeostationary	Mean Local Time of Ascending Node MLTDN = 13:00 + 60 mins or 13:00-14:00	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)
Orbits	(Note: SpaceX notified use of LTDN, not LTAN.)	
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = South Africa	
City Name (RAL)	RAL = Pretoria	
Latitude (DDMMSS)	Lat = 255136 S	
Longitude (DDDMMSS)	Lon = 0282700 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN52, BEAMWIDTH0.2, AZIMUTHAL RANGE_000-270, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS39, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS6, RAD = RAD22 52G0.2B000-270A01339H006	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER6.0, ANTENNA EFFICIENCY0.5,	
Number of Satellite Contacts Supported Per Day	4 contacts per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Location	on
State (RSC)	RSC = Sweden	
City Name (RAL)	RAL = Boden	
Latitude (DDMMSS)	Lat = 654800 N	
Longitude (DDDMMSS)	Lon = 0214048 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN52, BEAMWIDTH0.2, AZIMUTHAL RANGE_000-270, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS46, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS6,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
	RAD =	
	RAD23 52G0.2B000-270A00046H006	
Receive Antenna	ANTENNA DIAMETER6.0,	
Additional	ANTENNA EFFICIENCY0.5,	
Information (For		
Parabolic		
Antennas)		
Number of	11 contacts per day	NUMBER OF TIMES THE SATELLITE WILL COMMUNICATE WITH THE EARTH STATION IN THE
Satellite Contacts		SPACE TO EARTH DIRECTION (DOWNLINKS) EACH
Supported Per		DAY
Day		
Expected	8 minutes	AVERAGE DURATION OF EACH CONTACT
Duration of Each		
Contact		
Supported	Satellite Health and Status Data $\Box$	SATELLITE HEALTH AND STATUS TELEMETRY
Operations	Mission Payload Data 🛛	AND/OR MISSION PAYLOAD DATA
FCC notes:	· · · ·	
1. Use S-Note	S945.	
2. REM AGN, (	Cubesat, (Apex Aries 1)	

Transmit Frequency	y: 8212.5 MHz	
Satellite Name: Apex Aries 1		
Data Field	Data Answer	Description/Comments
Transmit Power (PWR)	PWR = 2 W PWR01 W2	TRANSMIT POWER SUPPLIED TO THE ANTENNA INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE: W = WATT, K = KILOWATT, M = MEGAWATT
Necessary Bandwidth	100 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.
<b>RF</b> Emissions Data		2-SIDED EMISSION BANDWIDTH VALUES
-3 dB bandwidth	65 MHz	
-20 dB bandwidth	75 MHz	
-40 dB bandwidth	85 MHz	
-60 dB bandwidth	100 MHz	
Modulation Type	16APSK	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	103 mbits/sec	INFORMATION DATA RATE
Forward Error Correction Coding	Is FEC used? Yes ⊠ No □ FEC Type: <u>LDPC 2/3</u> , FEC Rate: <u>0.67</u> ,	
Total Symbol Rate	69.01 msymbols/sec	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 🗆	
Transmit Antenna 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 = EC	NB= NARROWBEAM EC = EARTH COVERAGE
Transmit Antenna Dimension (XAD)	ANTENNA GAIN <u>17 dBi</u> , BEAMWIDTH <u>18</u> , XAD = XAD03 17G018B	NTIA FORMAT (XAD), EXAMPLE, FOR 16 DBI ANTENNA GAIN AND 30 DEGREE BEAMWIDTH XAD01 16G030B

Type of satellite (State = SPCE) (City = Geo or Nongeo)	Type = NONGEOSTATIONARY	CHOOSE EITHER: GEOSTATIONARY OR NONGEOSTATIONARY
For Geostationary Satellites	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE IN DDDMMSS FORMAT (XLG AND/OR RLG).
For Nongeostationary (Orbital Data)	INCLINATION ANGLE <u>97.6deg</u> , APOGEE IN KILOMETERS <u>525 km</u> , PERIGEE IN KILOMETERS <u>525 km</u> , ORBITAL PERIOD IN HOURS <u>1</u> AND FRACTIONS OF HOURS IN DECIMAL <u>0.58</u> , THE NUMBER OF SATELLITES IN THE SYSTEM <u>1</u> , ORB = *ORB,97.6IN00525AP00525PE001.58H01NRT01	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
For SunSynchronous Nongeostationary Orbits	Mean Local Time of Ascending Node MLTDN = 13:00 + 60 mins or 13:00-14:00 (Note: SpaceX notified use of LTDN, not LTAN.)	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)
Earth Station Data	a (Receiver) at Each Earth Station Location	on
State (RSC)	RSC = South Africa	
City Name (RAL)	RAL = Pretoria	
Latitude (DDMMSS)	Lat = 255136 S	
Longitude (DDDMMSS)	Lon = 0282700 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN52, BEAMWIDTH0.2, AZIMUTHAL RANGE_000-270, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS1339, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS6, RAD = RAD22 52G0.2B000-270A01339H006	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER6.0, ANTENNA EFFICIENCY0.5,	
Number of Satellite Contacts Supported Per Day	4 contacts per day	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	8 minutes	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
Earth Station Data	A (Receiver) at Each Earth Station Location	on
State (RSC)	RSC = Sweden	
City Name (RAL)	RAL = Boden	
Latitude (DDMMSS)	Lat = 654800 N	
Longitude (DDDMMSS)	Lon = 0214048 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN52, BEAMWIDTH0.2, AZIMUTHAL RANGE_000-270, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS46, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS6,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
	RAD =	
	RAD23 52G0.2B000-270A00046H006	
Receive Antenna	ANTENNA DIAMETER6.0,	
Additional	ANTENNA EFFICIENCY0.5,	
Information (For		
Parabolic		
Antennas)		
Number of	11 contacts per day	NUMBER OF TIMES THE SATELLITE WILL COMMUNICATE WITH THE EARTH STATION IN THE
Satellite Contacts		SPACE TO EARTH DIRECTION (DOWNLINKS) EACH
Supported Per		DAY
Day		
Expected	8 minutes	AVERAGE DURATION OF EACH CONTACT
Duration of Each		
Contact		
Supported	Satellite Health and Status Data $\Box$	SATELLITE HEALTH AND STATUS TELEMETRY AND/OR MISSION PAYLOAD DATA
Operations	Mission Payload Data 🛛	
FCC notes:		
1. Use S-Note	S945.	
2. REM AGN, (	Cubesat, (Apex Aries 1)	

Satellite Name: Ape	ex Aries 1	
Data Field	Data Annuar	Description/Comments
Data Field	Data Answer	Description/Comments TRANSMIT POWER SUPPLIED TO THE ANTENNA
Transmit Power (PWR)	PWR = 1 W PWR02 W1	INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE: W = WATT, K = KILOWATT, M = MEGAWATT
Necessary Bandwidth	13.5 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	65 MHz	
-20 dB bandwidth	75 MHz	
-40 dB bandwidth	85 MHz	
-60 dB bandwidth	100 MHz	
Modulation Type	16APSK	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	103 mbits/sec	INFORMATION DATA RATE
Forward Error Correction Coding	Is FEC used? Yes $\square$ No $\square$ FEC Type: <u>LDPC 2/3</u> , FEC Rate: <u>0.67</u> ,	
Total Symbol Rate	69.01 msymbols/s	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 🗆	
Transmit Antenna 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 = EC	NB= NARROWBEAM EC = EARTH COVERAGE
Transmit Antenna Dimension (XAD)	ANTENNA GAIN <u>17 dBi</u> , BEAMWIDTH <u>18</u> , XAD = XAD03 17G018B	NTIA FORMAT (XAD), EXAMPLE, FOR 16 DBI ANTENNA GAIN AND 30 DEGREE BEAMWIDTH XAD01 16G030B

Type of satellite (State = SPCE) (City = Geo or Nongeo)	Type = NONGEOSTATIONARY	CHOOSE EITHER: GEOSTATIONARY OR NONGEOSTATIONARY
For Geostationary Satellites	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE IN DDDMMSS FORMAT (XLG AND/OR RLG).
For Nongeostationary (Orbital Data)	INCLINATION ANGLE <u>97.6deg</u> , APOGEE IN KILOMETERS <u>525 km</u> , PERIGEE IN KILOMETERS <u>525 km</u> , ORBITAL PERIOD IN HOURS <u>1</u> AND FRACTIONS OF HOURS IN DECIMAL <u>0.58</u> , THE NUMBER OF SATELLITES IN THE SYSTEM <u>1</u> , ORB = *ORB,97.6IN00525AP00525PE001.58H01NRT01	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
For SunSynchronous Nongeostationary	Mean Local Time of Ascending Node MLTDN = 13:00 + 60 mins or 13:00-14:00	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)
Orbits	(Note: SpaceX notified use of LTDN, not LTAN.)	
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Australia	
City Name (RAL)	RAL = Currans Hill	
Latitude (DDMMSS)	Lat = 340224 S	
Longitude (DDDMMSS)	Lon = 1504612 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN30.5, BEAMWIDTH0.46, AZIMUTHAL RANGE_000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS95, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS20,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
	RAD =	
	RAD24 30G.46B000-360A00095H020	
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER5.4, ANTENNA EFFICIENCY0.5,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	AVERAGE DURATION OF EACH CONTACT
Supported	Satellite Health and Status Data 🗆	SATELLITE HEALTH AND STATUS TELEMETRY
Operations	Mission Payload Data $\boxtimes$	AND/OR MISSION PAYLOAD DATA
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Bahrain	
City Name (RAL)	RAL = Zallag	
Latitude	Lat = 260300 N	
(DDMMSS)		
Longitude (DDDMMSS)	Lon = 0503000 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

ANTENNA GAIN30.5, BEAMWIDTH0.46,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357
AZIMUTHAL RANGE_000-360,	METERS, AND ANTENNA HEIGHT ABOVE TERRAIN
THE SITE ELEVATION ABOVE MEAN SEA	OF 6 METERS: RAD01 16G030B001-360A00357H006
LEVEL IN METERS10,	KAD01 1000308001-300A0033711000
THE ANTENNA HEIGHT ABOVE TERRAIN	
IN METERS20,	
RAD =	
RAD25 30G.46B000-360A00010H020	
ANTENNA DIAMETER 5.4 ,	
ANTENNA EFFICIENCY 0.5 ,	
<1 contact per day	NUMBER OF TIMES THE SATELLITE WILL
	COMMUNICATE WITH THE EARTH STATION IN THE
	SPACE TO EARTH DIRECTION (DOWNLINKS) EACH DAY
8 minutes	AVERAGE DURATION OF EACH CONTACT
Satellite Health and Status Data 🗆	SATELLITE HEALTH AND STATUS TELEMETRY
	AND/OR MISSION PAYLOAD DATA
a (Receiver) at Each Earth Station Location	on
RSC = Ireland	
RAL = Dublin	
Lat = 532400 N	
Lon = 0061312 W	
RAP = 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
RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA
RAZ = RAZ01 V00	
	BEAMWIDTH $0.46$ AZIMUTHAL RANGE_000-360THE SITE ELEVATION ABOVE MEAN SEALEVEL IN METERS10THE ANTENNA HEIGHT ABOVE TERRAININ METERS20RAD =RAD25 30G.46B000-360A00010H020ANTENNA DIAMETER5.4ANTENNA EFFICIENCY0.5<1 contact per day

Receive Antenna Dimensions (RAD)	ANTENNA GAIN30.5, BEAMWIDTH0.46, AZIMUTHAL RANGE_000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS84, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS20, RAD =	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
	RAD26 30G.46B000-360A084H020	
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER5.4, ANTENNA EFFICIENCY0.5,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Farth Station Data	a (Receiver) at Each Earth Station Location	n n
State (RSC)	RSC = Southern Australia	
City Name (RAL)	RAL = Peterborough	
Latitude (DDMMSS)	Lat = 325743 S	
Longitude (DDDMMSS)	Lon = 1385058 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN47, BEAMWIDTH0.6, AZIMUTHAL RANGE_000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS540, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS2.2, RAD = RAD27 47G.60B000-360A00540H002.2	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER3.7, ANTENNA EFFICIENCY0.4965,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Western Australia	
City Name (RAL)	RAL = Nangetty	
Latitude (DDMMSS)	Lat = 290037 S	
Longitude (DDDMMSS)	Lon = 1152030 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

BEAMWIDTH0.60, AZIMUTHAL RANGE_000-360,	DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357
AZIMUTHAL RANGE_000-360,	
	METERS, AND ANTENNA HEIGHT ABOVE TERRAIN
THE SITE ELEVATION ABOVE MEAN SEA	OF 6 METERS:
LEVEL IN METERS,	RAD01 16G030B001-360A00357H006
THE ANTENNA HEIGHT ABOVE TERRAIN	
IN METERS4.0,	
RAD =	
RAD28 47G.60B000-360A00270H004	
ANTENNA DIAMETER3.7,	
ANTENNA EFFICIENCY0.4965,	
<1 contact per day	NUMBER OF TIMES THE SATELLITE WILL
, ,	COMMUNICATE WITH THE EARTH STATION IN THE
	SPACE TO EARTH DIRECTION (DOWNLINKS) EACH DAY
8 minutes	AVERAGE DURATION OF EACH CONTACT
Satellite Health and Status Data $\Box$	SATELLITE HEALTH AND STATUS TELEMETRY
Mission Pavload Data	AND/OR MISSION PAYLOAD DATA
,	
(Receiver) at Each Earth Station Locatio	on
RSC = Azerbaijan	
RAL = Absheron	
Lat = 402758 N	
Lon = 492908 E	
RAP = 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
RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA
	MINIMUM OPERATING ANGLE OF
	ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00
	IN METERS4.0, RAD = RAD28 47G.60B000-360A00270H004 ANTENNA DIAMETER3.7, ANTENNA EFFICIENCY0.4965, <1 contact per day <1 contact per day <1 contact per day

Receive Antenna Dimensions (RAD)	ANTENNA GAIN 47, , BEAMWIDTH 0.6, , AZIMUTHAL RANGE 000-360, , THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS 210, , THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS 2.2, , RAD = RAD29 47G.60B000-360A00210H002.2	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER3.7, ANTENNA EFFICIENCY0.4965,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Bulgaria	
City Name (RAL)	RAL = Plana	
Latitude (DDMMSS)	Lat = 422858 N	
Longitude (DDDMMSS)	Lon = 0232643 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna	ANTENNA GAIN47,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL
Dimensions (RAD)	BEAMWIDTH0.63,	RANGE FROM 001-360, SITE ELEVATION OF 357
	AZIMUTHAL RANGE000-360,	METERS, AND ANTENNA HEIGHT ABOVE TERRAIN
	THE SITE ELEVATION ABOVE MEAN SEA	OF 6 METERS: RAD01 16G030B001-360A00357H006
	LEVEL IN METERS1106,	
	THE ANTENNA HEIGHT ABOVE TERRAIN	
	IN METERS4,	
	RAD =	
	RAD30 47G.63B000-360A01106H004	
Receive Antenna	ANTENNA DIAMETER4.5,	
Additional	ANTENNA EFFICIENCY3356,	
Information (For		
Parabolic		
Antennas)		
Number of	<1 contact per day	NUMBER OF TIMES THE SATELLITE WILL
Satellite Contacts		COMMUNICATE WITH THE EARTH STATION IN THE
Supported Per		SPACE TO EARTH DIRECTION (DOWNLINKS) EACH DAY
••		DAT
Day Expected	8 minutes	AVERAGE DURATION OF EACH CONTACT
Duration of Each	o minutes	
Contact		
Supported	Satellite Health and Status Data 🗌	SATELLITE HEALTH AND STATUS TELEMETRY
Operations		AND/OR MISSION PAYLOAD DATA
Operations	Mission Payload Data	
Earth Station Dat	a (Receiver) at Each Earth Station Location	on
State (RSC)	RSC = Iceland	
City Name (RAL)	RAL = Blönduós	
Latitude	Lat = 653850 N	
(DDMMSS)		
Longitude	Lon = 0201445 W	
(DDDMMSS)		
Receive Antenna	RAP = R	POLARIZATIONS INCLUDE:
Polarization (RAP)		H = HORIZONTAL,
POIdTIZACION (RAP)		V = VERTICAL,
		S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR,
		R = RIGHT HAND CIRCULAR,
		T = RIGHT AND LEFT HAND CIRCULAR,
Receive Antenna		J = LINEAR POLARIZATION THE EARTH STATION RECEIVER ANTENNA
	RAZ = RAZ01 V00	MINIMUM OPERATING ANGLE OF
Orientation (RAZ)		ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01
		V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN 47, , BEAMWIDTH 0.60, , AZIMUTHAL RANGE 000-360, , THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS 53, , THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS 2.2, , RAD = RAD31 47G.60B000-360A00053H002.2	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER3.7, ANTENNA EFFICIENCY0.4965,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	e (Receiver) at Each Earth Station Location	on
State (RSC)	RSC = Sri Lanka	
City Name (RAL)	RAL = Kandy	
Latitude (DDMMSS)	Lat = 071627 N	
Longitude (DDDMMSS)	Lon = 0804329 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN 47, , BEAMWIDTH 0.60, , AZIMUTHAL RANGE 000-360, , THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS 462, , THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS 2.2, , RAD = RAD32 47G.60B000-360A00462H002.2	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER3.7, ANTENNA EFFICIENCY0.4965,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = New Zealand	
City Name (RAL)	RAL = Awarua	
Latitude (DDMMSS)	Lat = 463141 S	
Longitude (DDDMMSS)	Lon = 1682245 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN47, BEAMWIDTH0.60, AZIMUTHAL RANGE_000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS16, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS2.2, RAD = RAD33 47G.60B000-360A00016H002.2	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER3.7, ANTENNA EFFICIENCY0.4965,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Azores, Portugal	
City Name (RAL)	RAL = Santa Maria	
Latitude (DDMMSS)	Lat = 365951 N	
Longitude (DDDMMSS)	Lon = 0250814 W	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN 47, , BEAMWIDTH 0.60, , AZIMUTHAL RANGE 000-360, , THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS 194, , THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS 2.2, , RAD = RAD34 47G.60B000-360A00194H002.2	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER3.7, ANTENNA EFFICIENCY0.4965,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = United Kingdom	
City Name (RAL)	RAL = Unst, Shetland	
Latitude (DDMMSS)	Lat = 604452 N	
Longitude (DDDMMSS)	Lon = 0005128 W	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN, BEAMWIDTH0.6, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS19, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS2.2, RAD = RAD35 47G.60B000-360A00019H002	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER3.7, ANTENNA EFFICIENCY0.4965,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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: 1. Use S-Note 2. REM AGN, 0	S945. Cubesat, (Apex Aries 1)	

Satellite Name: Apex Aries 1		
Data Field	Data Answer	Description/Comments
Transmit Power (PWR)	PWR = 2 W PWR02 W2	TRANSMIT POWER SUPPLIED TO THE ANTENNA INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE: W = WATT, K = KILOWATT, M = MEGAWATT
Necessary Bandwidth	100 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	65 MHz	
-20 dB bandwidth	75 MHz	
-40 dB bandwidth	85 MHz	
-60 dB bandwidth	100 MHz	
Modulation Type	16APSK	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	103 mbits/sec	INFORMATION DATA RATE
Forward Error Correction Coding	IS FEC used? Yes $\square$ No $\square$ FEC Type: <u>LDPC 2/3</u> , FEC Rate: <u>0.67</u> ,	
Total Symbol Rate	69.01 Msymbols/sec	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 🗆	
Transmit Antenna 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 = EC	NB= NARROWBEAM EC = EARTH COVERAGE
Transmit Antenna Dimension (XAD)	ANTENNA GAIN <u>17 dBi</u> , BEAMWIDTH <u>18</u> ,	NTIA FORMAT (XAD), EXAMPLE, FOR 16 DBI ANTENNA GAIN AND 30 DEGREE BEAMWIDTH XAD01 16G030B

Type of satellite (State = SPCE) (City = Geo or Nongeo)	Type = NONGEOSTATIONARY	CHOOSE EITHER: GEOSTATIONARY OR NONGEOSTATIONARY
For Geostationary Satellites	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE IN DDDMMSS FORMAT (XLG AND/OR RLG).
For Nongeostationary (Orbital Data)	INCLINATION ANGLE <u>97.6deg</u> , APOGEE IN KILOMETERS <u>525 km</u> , PERIGEE IN KILOMETERS <u>525 km</u> , ORBITAL PERIOD IN HOURS <u>1</u> AND FRACTIONS OF HOURS IN DECIMAL <u>0.58</u> , THE NUMBER OF SATELLITES IN THE SYSTEM <u>1</u> , ORB = *ORB,97.6IN00525AP00525PE001.58H01NRT01	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
For SunSynchronous Nongeostationary	Mean Local Time of Ascending Node MLTDN = 13:00 + 60 mins or 13:00-14:00	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)
Orbits	(Note: SpaceX notified use of LTDN, not LTAN.)	
Earth Station Data	a (Receiver) at Each Earth Station Location	on
State (RSC)	RSC = Australia	
City Name (RAL)	RAL = Currans Hill	
Latitude (DDMMSS)	Lat = 340224 S	
Longitude (DDDMMSS)	Lon = 1504612 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN30.5, BEAMWIDTH0.46, AZIMUTHAL RANGE_000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS95, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS20, RAD = RAD24 30.5G.46B000-360A00095H020	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER5.4, ANTENNA EFFICIENCY0.5,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Location	on
State (RSC)	RSC = Bahrain	
City Name (RAL)	RAL = Zallag	
Latitude (DDMMSS)	Lat = 260300 N	
Longitude (DDDMMSS)	Lon = 0503000 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN30.5, BEAMWIDTH0.46, AZIMUTHAL RANGE_000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS10, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS20, RAD =	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
	RAD25 30.5G.46B000-360A00010H020	
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER5.4, ANTENNA EFFICIENCY0.5,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	AVERAGE DURATION OF EACH CONTACT
Supported	Satellite Health and Status Data 🗌	SATELLITE HEALTH AND STATUS TELEMETRY
Operations	Mission Payload Data	AND/OR MISSION PAYLOAD DATA
	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Ireland	
City Name (RAL)	RAL = Dublin	
Latitude (DDMMSS)	Lat = 532400 N	
Longitude (DDDMMSS)	Lon = 0061312 W	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN30.5, BEAMWIDTH0.46, AZIMUTHAL RANGE_000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS84, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS20, RAD = RAD26 30.5G.46B000-360A00084H020	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER5.4, ANTENNA EFFICIENCY0.5,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	A (Receiver) at Each Earth Station Location	on
State (RSC)	RSC = Southern Australia	
City Name (RAL)	RAL = Peterborough	
Latitude (DDMMSS)	Lat = 325743 S	
Longitude (DDDMMSS)	Lon = 1385058 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN47, BEAMWIDTH0.6, AZIMUTHAL RANGE_000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS540, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS2.2, RAD = RAD27 47G.60B000-360A00540H002.2	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER3.7, ANTENNA EFFICIENCY0.4965,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Western Australia	
City Name (RAL)	RAL = Nangetty	
Latitude (DDMMSS)	Lat = 290037 S	
Longitude (DDDMMSS)	Lon = 1152030 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN 47, , BEAMWIDTH 0.60, , AZIMUTHAL RANGE 000-360, , THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS 270, , THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS 2.22, ,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
	RAD28 47G.60B000-360A00270H002.2	
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER3.7, ANTENNA EFFICIENCY0.4965,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	AVERAGE DURATION OF EACH CONTACT
Supported	Satellite Health and Status Data 🗆	SATELLITE HEALTH AND STATUS TELEMETRY
Operations	Mission Payload Data $\boxtimes$	AND/OR MISSION PAYLOAD DATA
Earth Station Dat	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Azerbaijan	-
City Name (RAL)	RAL = Absheron	
Latitude	Lat = 402758 N	
(DDMMSS)		
Longitude (DDDMMSS)	Lon = 492908 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN 47 , BEAMWIDTH 0.60 , AZIMUTHAL RANGE 000-360 , THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS 210 , THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS 2.2 ,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
	RAD =	
<b>-</b>	RAD29 47G.60B000-360A00210H002.2	
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER3.7, ANTENNA EFFICIENCY0.4965,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	AVERAGE DURATION OF EACH CONTACT
Supported	Satellite Health and Status Data 🗆	SATELLITE HEALTH AND STATUS TELEMETRY
Operations	Mission Payload Data	AND/OR MISSION PAYLOAD DATA
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Bulgaria	
City Name (RAL)	RAL = Plana	
Latitude (DDMMSS)	Lat = 422858 N	
Longitude (DDDMMSS)	Lon = 0232643 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN, BEAMWIDTH0.63, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS1106, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS4, RAD = RAD30 47G.63B000-360A01106H004	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER4.5, ANTENNA EFFICIENCY0.3356,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Iceland	
City Name (RAL)	RAL = Blönduós	
Latitude (DDMMSS)	Lat = 653850 N	
Longitude (DDDMMSS)	Lon = 0201445 W	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN, BEAMWIDTH0.60, AZIMUTHAL RANGE_000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS53, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS2.2, RAD = RAD31 47G.60B000-360A00053H002.2	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER3.7, ANTENNA EFFICIENCY0.4965,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Sri Lanka	
City Name (RAL)	RAL = Kandy	
Latitude (DDMMSS)	Lat = 071627 N	
Longitude (DDDMMSS)	Lon = 0804329 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN47, BEAMWIDTH0.60, AZIMUTHAL RANGE_000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS462, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS2.2, RAD = RAD32 47G.60B000-360A00462H002.2	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER3.7, ANTENNA EFFICIENCY0.4965,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Location	on
State (RSC)	RSC = New Zealand	
City Name (RAL)	RAL = Awarua	
Latitude (DDMMSS)	Lat = 463141 S	
Longitude (DDDMMSS)	Lon = 1682245 E	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN 47, BEAMWIDTH 0.60, AZIMUTHAL RANGE 000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS 16, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS 2.2, RAD = RAD33 47G.60B000-360A00016H002.2	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic	ANTENNA DIAMETER3.7, ANTENNA EFFICIENCY0.4965,	
Antennas) Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Azores, Portugal	
City Name (RAL)	RAL = Santa Maria	
Latitude (DDMMSS)	Lat = 365951 N	
Longitude (DDDMMSS)	Lon = 0250814 W	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN47, BEAMWIDTH0.60, AZIMUTHAL RANGE_000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS194, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS2.2, RAD = RAD34 47G.60B000-360A00194H002.2	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER3.7, ANTENNA EFFICIENCY0.4965,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = United Kingdom	
City Name (RAL)	RAL = Unst, Shetland	
Latitude (DDMMSS)	Lat = 604452 N	
Longitude (DDDMMSS)	Lon = 0005128 W	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00

Receive Antenna Dimensions (RAD)	ANTENNA GAIN47, BEAMWIDTH0.6, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS19, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS2.2, RAD = RAD35 47G.60B000-360A00019H2.2	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: RAD01 16G030B001-360A00357H006
Receive Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER3.7, ANTENNA EFFICIENCY0.4965,	
Number of Satellite Contacts Supported Per Day	<1 contact per day	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	8 minutes	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: 1. Use S-Note 2. REM AGN, (	S945. Cubesat, (Apex Aries 1)	

## Part B: Ground Stations, Earth to Space link data:

Transmit Frequency	/: 402.7 MHz	
State (XSC)	XSC = South Africa	
City Name (XAL)	XAL = Pretoria	
Latitude	Lat = 255136 S	
(DDMMSS)		
Longitude	Lon = 0282700 E	
(DDDMMSS)		
Transmit Power	PWR = 0.12	TRANSMIT POWER SUPPLIED TO THE ANTENNA
(PWR)	PWR01 W0.12	INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE:
		W = WATT,
		K = KILOWATT, M = MEGAWATT
Necessary	5.76 kHz	THE WIDTH OF FREQUENCY BAND WHICH IS JUST
Bandwidth		SUFFICIENT TO SUCCESSFULLY TRANSFER DATA.
		FORMULAS CAN BE FOUND IN ANNEX J OF THE NTIA MANUAL.
<b>RF Emissions Data</b>		2-SIDED EMISSION BANDWIDTH VALUES
-3 dB bandwidth	6 kHz	
-20 dB bandwidth	8 kHz	
-40 dB bandwidth	20 kHz	
-60 dB bandwidth	50 kHz	
Modulation Type	GFSK	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	2.6 kbits/sec	INFORMATION DATA RATE
Forward Error	Is FEC used? Yes $\Box$ No $\boxtimes$	
<b>Correction Coding</b>	FEC Type:,	
0	FEC Rate:,	
	,	
Total Symbol Rate	2.6 ksymbols/sec	DATA RATE COMBINED WITH FEC AND FRAME
		OVERHEAD RESULTING IN THE TOTAL SYMBOL RATE AT THE INPUTE TO THE SYMBOL
		MAPPER/MODULATOR.
Transmit Antenna	XAP = R	POLARIZATIONS INCLUDE:
Polarization (XAP)		H = HORIZONTAL, V = VERTICAL,
		S = HORIZONTAL AND VERTICAL,
		L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR,
		T = RIGHT AND LEFT HAND CIRCULAR,
Transmit Antonna	XAZ = XAZ01 V05	THE EARTH STATION TRANSMITTER ANTENNA
Transmit Antenna		MINIMUM OPERATING ANGLE OF
Orientation (XAZ)		MINIMUM OPERATING ANGLE OF ELEVATION (XAZ), V00 TO V90, EXAMPLE, XAZ01 V00

Earth Station Transmitter Data (Required for Each Frequency at Each Earth Station Location)

Transmit Antenna Dimensions (XAD)	ANTENNA GAIN16.2 dBi, BEAMWIDTH28, AZIMUTHAL RANGE270-270, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS1339, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS6, XAD = XAD04 16.2G28B-270- 270A11339H006	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: XAD01 16G030B001-360A00357H006
Transmit Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER <u>N/A</u> , ANTENNA EFFICIENCY <u>N/A</u> ,	
Number of Satellite Contacts Supported Per Day	4 Contacts Per Day	NUMBER OF TIMES THE EARTH STATION WILL COMMUNICATE WITH THE STATELLITE IN THE EARTH TO SPACE DIRECTION (UPINKS) EACH DAY
Expected Duration of Each Contact	8 minutes	AVERAGE DURATION OF EACH CONTACT
Satellite Receive Sp	pecifications	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = EC	NB= NARROWBEAM EC = EARTH COVERAGE
Receive Antenna Dimension (RAD)	ANTENNA GAIN0, BEAMWIDTH360, RAD = RAD36 0G360B	NTIA FORMAT(RAD), EXAMPLE, FOR 16 DBI ANTENNA GAIN AND 30 DEGREE BEAMWIDTH RAD01 16G030B
Type of satellite (State = SPCE) City = Geo or Nongeo	Type = NONGEOSTATIONARY	CHOOSE EITHER: GEOSTATIONARY OR NONGEOSTATIONARY
For Geostationary Satellites	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE IN DDDMMSS FORMAT (XLG AND/OR RLG).

For Nongeostationary (Orbital Data)	INCLINATION ANGLE <u>97.6 deg</u> , APOGEE IN KILOMETERS <u>525 km</u> , PERIGEE IN KILOMETERS <u>525 km</u> , ORBITAL PERIOD IN HOURS <u>1</u> AND FRACTIONS OF HOURS IN DECIMAL <u>0.58</u> , THE NUMBER OF SATELLITES IN THE SYSTEM <u>1</u> , ORB = ORB, 97.6IN00525AP00525PE001.58H01T01	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, REMO4 *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
For SunSynchronous Nongeostationary Orbits	Mean Local Time of Ascending Node (MLTDN) = 13:00 + 60 mins or 13:00- 14:00 (Note: SpaceX notified use of LTDN, not LTAN.)	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)

Transmit Frequency	/: 402.7 MHz	
State (XSC)	XSC = Sweden	
City Name (XAL)	XAL = Boden	
Latitude	Lat = 654800 N	
(DDMMSS)		
Longitude	Lon = 0214048 E	
(DDDMMSS)		
Transmit Power	PWR = 0.12W	TRANSMIT POWER SUPPLIED TO THE ANTENNA
(PWR)	PWR01 W0.12	INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE:
		W = WATT,
		K = KILOWATT, M = MEGAWATT
Necessary	5.76 kHz	THE WIDTH OF FREQUENCY BAND WHICH IS JUST
Bandwidth		SUFFICIENT TO SUCCESSFULLY TRANSFER DATA.
		FORMULAS CAN BE FOUND IN ANNEX J OF THE NTIA MANUAL.
<b>RF</b> Emissions Data		2-SIDED EMISSION BANDWIDTH VALUES
-3 dB bandwidth	6 kHz	
-20 dB bandwidth	8 kHz	
-40 dB bandwidth	20 kHz	
-60 dB bandwidth	50 kHz	
Modulation Type	GFSK	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	2.6kbits/sec	INFORMATION DATA RATE
Forward Error	Is FEC used? Yes 🗌 No 🖂	
Correction Coding	FEC Type:,	
	FEC Rate:,	

Total Symbol Data	2.6 koumbols/soc	DATA RATE COMBINED WITH FEC AND FRAME
Total Symbol Rate	2.6 ksymbols/sec	OVERHEAD RESULTING IN THE TOTAL SYMBOL
		RATE AT THE INPUTE TO THE SYMBOL
		MAPPER/MODULATOR.
Transmit Antenna	XAP = R	POLARIZATIONS INCLUDE: H = HORIZONTAL,
Polarization (XAP)		V = VERTICAL,
		S = HORIZONTAL AND VERTICAL,
		L = LEFT HAND CIRCULAR,
		R = RIGHT HAND CIRCULAR,
		T = RIGHT AND LEFT HAND CIRCULAR,
T		J = LINEAR POLARIZATION THE EARTH STATION TRANSMITTER ANTENNA
Transmit Antenna	XAZ = XAZ01 V05	MINIMUM OPERATING ANGLE OF
Orientation (XAZ)		ELEVATION (XAZ), V00 TO V90, EXAMPLE, XAZ01
		V00
Transmit Antenna	ANTENNA GAIN16.2,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16
		DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL
Dimensions (XAD)	BEAMWIDTH28,	RANGE FROM 001-360, SITE ELEVATION OF 357
	AZIMUTHAL RANGE270-270,	METERS, AND ANTENNA HEIGHT ABOVE TERRAIN
	THE SITE ELEVATION ABOVE MEAN SEA	OF 6 METERS: XAD01 16G030B001-360A00357H006
	LEVEL IN METERS46,	XAD01 1000308001-300A0033711000
	THE ANTENNA HEIGHT ABOVE TERRAIN	
	IN METERS 6 ,	
	XAD = XAD05 16.2G28B-270-	
Turners it Automas	270A00046H006	
Transmit Antenna	ANTENNA DIAMETER <u>N/A</u> ,	
Additional	ANTENNA EFFICIENCY_ <u>N/A</u> ,	
Information (For		
Parabolic		
Antennas)		
Number of	11 Contacts Per Day	NUMBER OF TIMES THE EARTH STATION WILL
Satellite Contacts	,	COMMUNICATE WITH THE STATELLITE IN THE
Supported Per		EARTH TO SPACE DIRECTION (UPINKS) EACH DAY
••		
Day		AVERAGE DURATION OF EACH CONTACT
Expected	8 minutes	AVENAGE DONATION OF EACH CONTACT
Duration of Each		
Contact		
Satellite Receive Sp	pecifications	
Receive Antenna	RAP = J	POLARIZATIONS INCLUDE: H = HORIZONTAL.
Polarization (RAP)		V = VERTICAL,
		S = HORIZONTAL AND VERTICAL,
		L = LEFT HAND CIRCULAR,
		R = RIGHT HAND CIRCULAR,
		T = RIGHT AND LEFT HAND CIRCULAR,
Receive Antenna	RAZ = EC	J = LINEAR POLARIZATION NB= NARROWBEAM
		EC = EARTH COVERAGE
Orientation (RAZ)		

Receive Antenna Dimension (RAD)	ANTENNA GAIN0, BEAMWIDTH360, RAD = RAD36 0G360B	NTIA FORMAT(RAD), EXAMPLE, FOR 16 DBI ANTENNA GAIN AND 30 DEGREE BEAMWIDTH RAD01 16G030B CHOOSE EITHER:
Type of satellite (State = SPCE) City = Geo or Nongeo	Type = NONGEOSTATIONARY	GEOSTATIONARY OR NONGEOSTATIONARY
For Geostationary Satellites	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE IN DDDMMSS FORMAT (XLG AND/OR RLG).
For Nongeostationary (Orbital Data)	INCLINATION ANGLE <u>97.6 deg</u> , APOGEE IN KILOMETERS <u>525 km</u> , PERIGEE IN KILOMETERS <u>525 km</u> , ORBITAL PERIOD IN HOURS <u>1</u> AND FRACTIONS OF HOURS IN DECIMAL <u>0.58</u> , THE NUMBER OF SATELLITES IN THE SYSTEM <u>1</u> , ORB = ORB, 97.6IN00525AP00525PE001.58H01T01	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
For SunSynchronous Nongeostationary Orbits	Mean Local Time of Ascending Node (MLTDN) = 13:00 + 60 mins or 13:00- 14:00	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)
	(Note: SpaceX notified use of LTDN, not LTAN.)	

Transmit Frequency: 402.7 MHz		
State (XSC)	XSC = Spain	
City Name (XAL)	XAL = Puertollano	
Latitude	Lat = 384026 N	
(DDMMSS)		
Longitude	Lon = 0040943 W	
(DDDMMSS)		
Transmit Power (PWR)	PWR = 0.12 W PWR01 W0.12	TRANSMIT POWER SUPPLIED TO THE ANTENNA INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE: W = WATT, K = KILOWATT, M = MEGAWATT
Necessary Bandwidth	5.76 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.
<b>RF</b> Emissions Data		2-SIDED EMISSION BANDWIDTH VALUES

-3 dB bandwidth	6 kHz	
-20 dB bandwidth	8 kHz	
-40 dB bandwidth	20 kHz	1
-60 dB bandwidth	50 kHz	
Modulation Type	GFSK	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	2.6 kbits/sec	INFORMATION DATA RATE
Forward Error	Is FEC used? Yes $\Box$ No $igtimes$	
Correction Coding	FEC Type:,	
	FEC Rate:,	
Total Symbol Rate	1.2ksymbols/sec	DATA RATE COMBINED WITH FEC AND FRAME OVERHEAD RESULTING IN THE TOTAL SYMBOL RATE AT THE INPUTE TO THE SYMBOL MAPPER/MODULATOR.
Transmit Antenna Polarization (XAP)	XAP = 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 V05	THE EARTH STATION TRANSMITTER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (XAZ), V00 TO V90, EXAMPLE, XAZ01 V00
Transmit Antenna Dimensions (XAD)	ANTENNA GAIN <u>14.8 dBi</u> , BEAMWIDTH <u>40</u> , AZIMUTHAL RANGE <u>000-360</u> , THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS <u>690</u> , THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS <u>14</u> , XAD = XAD06 14.8G040B000- 360A00690H014	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: XAD01 16G030B001-360A00357H006
Transmit Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER <u>N/A</u> , ANTENNA EFFICIENCY <u>N/A</u> ,	
Number of Satellite Contacts Supported Per Day	<1 Contact Per Day	NUMBER OF TIMES THE EARTH STATION WILL COMMUNICATE WITH THE STATELLITE IN THE EARTH TO SPACE DIRECTION (UPINKS) EACH DAY
Expected Duration of Each Contact	8 minutes	AVERAGE DURATION OF EACH CONTACT
Satellite Receive Sp	pecifications	

		POLARIZATIONS INCLUDE:
Receive Antenna	RAP = J	H = HORIZONTAL,
Polarization (RAP)		V = VERTICAL,
		S = HORIZONTAL AND VERTICAL,
		L = LEFT HAND CIRCULAR,
		R = RIGHT HAND CIRCULAR,
		T = RIGHT AND LEFT HAND CIRCULAR,
		J = LINEAR POLARIZATION
Receive Antenna	RAZ = EC	NB= NARROWBEAM
Orientation (RAZ)		EC = EARTH COVERAGE
Receive Antenna	ANTENNA GAIN 0 ,	NTIA FORMAT(RAD), EXAMPLE, FOR 16 DBI
		ANTENNA GAIN AND 30 DEGREE BEAMWIDTH
Dimension (RAD)	BEAMWIDTH360,	RAD01 16G030B
	RAD =	
	RAD36 0G360B	
Type of satellite	Type = NONGEOSTATIONARY	CHOOSE EITHER:
(State = SPCE)		GEOSTATIONARY OR NONGEOSTATIONARY
City = Geo or		
Nongeo		
For Geostationary	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT
Satellites	5	ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND
Jatemies		REPORT ITS LONGITUDE IN DDDMMSS FORMAT
-		(XLG AND/OR RLG). IF ANY SATELLITES ARE NONGEOSTATIONARY,
For	INCLINATION ANGLE <u>97.6 deg</u> ,	REPORT ITS INCLINATION ANGLE, APOGEE
Nongeostationary	APOGEE IN KILOMETERS <u>525 km</u> ,	IN KILOMETERS, PERIGEE IN KILOMETERS,
(Orbital Data)	PERIGEE IN KILOMETERS 525 km ,	ORBITAL PERIOD IN HOURS AND FRACTIONS OF
()	ORBITAL PERIOD IN HOURS 1 AND	HOURS IN DECIMAL, THE NUMBER OF SATELLITES
		IN THE SYSTEM, THEN T01, EXAMPLE,
	FRACTIONS OF HOURS IN	REM04
	DECIMAL <u>0.58</u> ,	*ORB,98.0IN00510AP00510PE001.58H01NRT01,
	THE NUMBER OF SATELLITES IN THE	AND FOR SPACE-TO-SPACE
	SYSTEM 1 ,	COMMUNICATIONS WITH ANOTHER NONGEOSTATIONARY SATELLITE ADD AN
	, , , , , , , , , , , , , , , , , , ,	ADDITIONAL
		*ORB FOR IT ENDING IN R01, EXAMPLE, REM05
	ORB =	*ORB,72.9IN03209AP00655PE013.46H01NRR01
	ORB, 97.6IN00525AP00525PE001.58H01T01	
For	Mean Local Time of Ascending Node	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S
SunSynchronous	(MLTDN) = 13:00 + 60 mins or 13:00-	ASCENDING NODE AND THE MEAN SUN, OFTEN
Nongeostationary	14:00	EXPRESSED AS UNIT OF TIME (HH:MM)
• ,	14.00	
Orbits		
	(Note: SpaceX notified use of LTDN, not	
	LTAN.)	
	(Note: SpaceX notified use of LTDN, not LTAN.)	

Transmit Frequency: 402.7 MHz		
State (XSC)	XSC = Italy	
City Name (XAL)	XAL = Vimercate	
Latitude	Lat = 453536 N	
(DDMMSS)		
Longitude	Lon = 0092144 E	
(DDDMMSS)		

Transmit Power	PWR = 0.12 W	TRANSMIT POWER SUPPLIED TO THE ANTENNA
(PWR)	PWR01 W0.12	INPUT TERMINAL, EXAMPLE, PWR01 W2
		TRANSMIT POWER UNITS INCLUDE:
		W = WATT, K = KILOWATT,
		M = MEGAWATT
Necessary	5.76 kHz	THE WIDTH OF FREQUENCY BAND WHICH IS JUST
, Bandwidth		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	6 kHz	
-20 dB bandwidth	8 kHz	
-40 dB bandwidth	20 kHz	7
-60 dB bandwidth	50 kHz	7
Modulation Type	GFSK	THE METHOD USED TO SUPERIMPOSE DATA ON
Data Rate	2.6 kbits/sec	THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK. INFORMATION DATA RATE
Forward Error	-	
	Is FEC used? Yes □ No ⊠	
Correction Coding	FEC Type:,	
	FEC Rate:,	
Total Symbol Rate	2.6 ksymbols/sec	DATA BATE COMBINED WITH FEC AND FRAME
TOTAL SYTTEOL RALE	2.0 KSyTTDOIS/SEC	OVERHEAD RESULTING IN THE TOTAL SYMBOL
		RATE AT THE INPUTE TO THE SYMBOL
		MAPPER/MODULATOR.
Transmit Antenna	XAP = J	POLARIZATIONS INCLUDE: H = HORIZONTAL,
Polarization (XAP)		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 V05	THE EARTH STATION TRANSMITTER ANTENNA
Orientation (XAZ)		MINIMUM OPERATING ANGLE OF ELEVATION (XAZ), V00 TO V90, EXAMPLE, XAZ01
Υ Υ		V00
Transmit Antenna	ANTENNA GAIN <u>14.8 dBi</u> ,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL
Dimensions (XAD)	BEAMWIDTH <u>40 deg</u> ,	RANGE FROM 001-360, SITE ELEVATION OF 357
	AZIMUTHAL RANGE <u>000-360</u> ,	METERS, AND ANTENNA HEIGHT ABOVE TERRAIN
	THE SITE ELEVATION ABOVE MEAN SEA	OF 6 METERS:
	LEVEL IN METERS177,	XAD01 16G030B001-360A00357H006
	THE ANTENNA HEIGHT ABOVE TERRAIN	
	IN METERS <u>13</u> ,	
	XAD = XAD07 14.8G040B000-	
	360A00177H013	
Transmit Antenna	ANTENNA DIAMETERN/A,	
Additional	ANTENNA EFFICIENCY N/A ,	
Information (For		
Parabolic		
Antennas)		
,		

Number of Satellite Contacts Supported Per Day	<1 Contact Per Day	NUMBER OF TIMES THE EARTH STATION WILL COMMUNICATE WITH THE STATELLITE IN THE EARTH TO SPACE DIRECTION (UPINKS) EACH DAY
Expected Duration of Each Contact	8 minutes	AVERAGE DURATION OF EACH CONTACT
Satellite Receive Sp	ecifications	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = EC	NB= NARROWBEAM EC = EARTH COVERAGE
Receive Antenna Dimension (RAD)	ANTENNA GAIN0, BEAMWIDTH360, RAD = RAD36 0G360B	NTIA FORMAT(RAD), EXAMPLE, FOR 16 DBI ANTENNA GAIN AND 30 DEGREE BEAMWIDTH RAD01 16G030B
Type of satellite (State = SPCE) City = Geo or Nongeo	Type = NONGEOSTATIONARY	CHOOSE EITHER: GEOSTATIONARY OR NONGEOSTATIONARY
For Geostationary Satellites	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE IN DDDMMSS FORMAT (XLG AND/OR RLG).
For Nongeostationary (Orbital Data)	INCLINATION ANGLE <u>97.6 deg</u> , APOGEE IN KILOMETERS <u>525 km</u> , PERIGEE IN KILOMETERS <u>525 km</u> , ORBITAL PERIOD IN HOURS <u>1</u> AND FRACTIONS OF HOURS IN DECIMAL <u>0.58</u> , THE NUMBER OF SATELLITES IN THE SYSTEM <u>1</u> , ORB = ORB, 97.6IN00525AP00525PE001.58H01T01	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
For SunSynchronous Nongeostationary Orbits	Mean Local Time of Ascending Node (MLTDN) = 13:00 + 60 mins or 13:00- 14:00	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)
	(Note: SpaceX notified use of LTDN, not LTAN.)	

Transmit Frequency: 402.7 MHz

State (XSC)	XSC = Italy	
City Name (XAL)	XAL = Lomazzo	
Latitude	Lat = 454150 N	
(DDMMSS)		
Longitude	Lon = 0090205 E	
(DDDMMSS)		
Transmit Power	PWR = 0.12 W	TRANSMIT POWER SUPPLIED TO THE ANTENNA
(PWR)	PWR01 W0.12	INPUT TERMINAL, EXAMPLE, PWR01 W2
		TRANSMIT POWER UNITS INCLUDE: W = WATT,
		K = KILOWATT,
		M = MEGAWATT
Necessary	5.76 kHz	THE WIDTH OF FREQUENCY BAND WHICH IS JUST SUFFICIENT TO SUCCESSFULLY TRANSFER DATA.
Bandwidth		FORMULAS CAN BE FOUND IN ANNEX J OF THE
		NTIA MANUAL.
RF Emissions Data		2-SIDED EMISSION BANDWIDTH VALUES
-3 dB bandwidth	6 kHz	4
-20 dB bandwidth	8 kHz	1
-40 dB bandwidth	20 kHz	
-60 dB bandwidth	50 kHz	
Modulation Type	GFSK	THE METHOD USED TO SUPERIMPOSE DATA ON
Data Rate	2.6 kbits/sec	THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK. INFORMATION DATA RATE
Forward Error	Is FEC used? Yes $\Box$ No $\boxtimes$	
Correction Coding		
concetion counig	FEC Type:,	
	FEC Rate:,	
Total Symbol Rate	2.6 ksymbols/sec	DATA RATE COMBINED WITH FEC AND FRAME
TOTAL SYMDOL NATE		OVERHEAD RESULTING IN THE TOTAL SYMBOL
		RATE AT THE INPUTE TO THE SYMBOL
Transmit Antenna	XAP = J	MAPPER/MODULATOR. POLARIZATIONS INCLUDE:
Polarization (XAP)		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 V05	THE EARTH STATION TRANSMITTER ANTENNA
Orientation (XAZ)		MINIMUM OPERATING ANGLE OF
		ELEVATION (XAZ), V00 TO V90, EXAMPLE, XAZ01 V00
Transmit Antenna	ANTENNA GAIN,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16
Dimensions (XAD)	BEAMWIDTH <u>40 deg</u> ,	DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357
	AZIMUTHAL RANGE <u>000-360</u> ,	METERS, AND ANTENNA HEIGHT ABOVE TERRAIN
	THE SITE ELEVATION ABOVE MEAN SEA	OF 6 METERS: XAD01 16G030B001-360A00357H006
	LEVEL IN METERS <u>296</u> ,	20001 100030001-300M0033/10000
	THE ANTENNA HEIGHT ABOVE TERRAIN	
	IN METERS,	
	XAD =XAD08 14.8G040B000-	
	360A00296H025	

Transmit Antenna	ANTENNA DIAMETER N/A ,	
Additional	ANTENNA EFFICIENCY N/A ,	
Information (For	,, ,	
Parabolic		
Antennas)		
Number of	<1 Contact Por Day	NUMBER OF TIMES THE EARTH STATION WILL
	<1 Contact Per Day	COMMUNICATE WITH THE STATELLITE IN THE
Satellite Contacts		EARTH TO SPACE DIRECTION (UPINKS) EACH DAY
Supported Per		
Day		
Expected	8 minutes	AVERAGE DURATION OF EACH CONTACT
Duration of Each		
Contact		
Satellite Receive Sp	pecifications	
Receive Antenna	RAP = J	POLARIZATIONS INCLUDE:
Polarization (RAP)		H = HORIZONTAL,
F Old 12 at OTT (INAF)		V = VERTICAL,
		S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR,
		R = RIGHT HAND CIRCULAR,
		T = RIGHT AND LEFT HAND CIRCULAR,
Dessive Antonno		J = LINEAR POLARIZATION NB= NARROWBEAM
Receive Antenna	RAZ = EC	EC = EARTH COVERAGE
Orientation (RAZ)		NTIA FORMAT(RAD), EXAMPLE, FOR 16 DBI
Receive Antenna	ANTENNA GAIN0,	ANTENNA GAIN AND 30 DEGREE BEAMWIDTH
Dimension (RAD)	BEAMWIDTH360,	RAD01 16G030B
	RAD =	
	RAD36 0G360B	
Type of satellite	Type = NONGEOSTATIONARY	CHOOSE EITHER: GEOSTATIONARY OR NONGEOSTATIONARY
(State = SPCE)		
City = Geo or		
Nongeo		
For Geostationary	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND
Satellites		REPORT ITS LONGITUDE IN DDDMMSS FORMAT
		(XLG AND/OR RLG).
For	INCLINATION ANGLE <u>97.6 deg</u> ,	IF ANY SATELLITES ARE NONGEOSTATIONARY,
Nongeostationary	APOGEE IN KILOMETERS <u>525 km</u> ,	REPORT ITS INCLINATION ANGLE, APOGEE IN KILOMETERS, PERIGEE IN KILOMETERS,
(Orbital Data)	PERIGEE IN KILOMETERS <u>525 km</u> ,	ORBITAL PERIOD IN HOURS AND FRACTIONS OF
	ORBITAL PERIOD IN HOURS <u>1</u> AND	HOURS IN DECIMAL, THE NUMBER OF SATELLITES
	FRACTIONS OF HOURS IN	IN THE SYSTEM, THEN T01, EXAMPLE, REM04
	DECIMAL <u>0.58</u> ,	*ORB,98.0IN00510AP00510PE001.58H01NRT01,
	THE NUMBER OF SATELLITES IN THE	AND FOR SPACE-TO-SPACE
	SYSTEM,	COMMUNICATIONS WITH ANOTHER NONGEOSTATIONARY SATELLITE ADD AN
		ADDITIONAL
	ORB =	*ORB FOR IT ENDING IN R01, EXAMPLE, REM05 *ORB,72.9IN03209AP00655PE013.46H01NRR01
	ORB, 97.6IN00525AP00525PE001.58H01T01	

For SunSynchronous Nongeostationary Orbits	Mean Local Time of Ascending Node (MLTDN) = 13:00 + 60 mins or 13:00- 14:00	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)
	(Note: SpaceX notified use of LTDN, not LTAN.)	

Transmit Frequency	/: 402.7 MHz	
State (XSC)	XSC = United Kingdom	
City Name (XAL)	XAL = Unst, Shetland	
Latitude	Lat = 604452 N	
(DDMMSS)		
Longitude	Lon = 0005128 W	
(DDDMMSS)		
Transmit Power	PWR = 0.12 W	TRANSMIT POWER SUPPLIED TO THE ANTENNA
(PWR)	PWR01 W0.12	INPUT TERMINAL, EXAMPLE, PWR01 W2
(,		TRANSMIT POWER UNITS INCLUDE: W = WATT,
		K = KILOWATT,
		M = MEGAWATT
Necessary	5.76 kHz	THE WIDTH OF FREQUENCY BAND WHICH IS JUST SUFFICIENT TO SUCCESSFULLY TRANSFER DATA.
Bandwidth		FORMULAS CAN BE FOUND IN ANNEX J OF THE
		NTIA MANUAL.
RF Emissions Data		2-SIDED EMISSION BANDWIDTH VALUES
-3 dB bandwidth	6 kHz	
-20 dB bandwidth	8 kHz	
-40 dB bandwidth	20 kHz	
-60 dB bandwidth	50 kHz	
Modulation Type	GFSK	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	2.6 kbits/sec	INFORMATION DATA RATE
Forward Error	Is FEC used? Yes 🗆 No 🗵	
Correction Coding	FEC Type:,	
	FEC Rate:,	
Total Cumbal Data	2.C. kovreholo (coo	DATA RATE COMBINED WITH FEC AND FRAME
Total Symbol Rate	2.6 ksymbols/sec	OVERHEAD RESULTING IN THE TOTAL SYMBOL
		RATE AT THE INPUTE TO THE SYMBOL
<b>—</b> ·· • ·		MAPPER/MODULATOR. POLARIZATIONS INCLUDE:
Transmit Antenna	XAP = J	H = HORIZONTAL,
Polarization (XAP)		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 V05	THE EARTH STATION TRANSMITTER ANTENNA
Orientation (XAZ)		MINIMUM OPERATING ANGLE OF ELEVATION (XAZ), V00 TO V90, EXAMPLE, XAZ01
		V00

Transmit Antenna Dimensions (XAD)	ANTENNA GAIN14.8 dBi, BEAMWIDTH40 deg, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS19, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS4, XAD =XAD09 14.8G040B000- 360A00019H004	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: XAD01 16G030B001-360A00357H006
Transmit Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER <u>N/A</u> , ANTENNA EFFICIENCY <u>N/A</u> ,	
Number of Satellite Contacts Supported Per Day	<1 Contact Per Day	NUMBER OF TIMES THE EARTH STATION WILL COMMUNICATE WITH THE STATELLITE IN THE EARTH TO SPACE DIRECTION (UPINKS) EACH DAY
Expected Duration of Each Contact	8 minutes	AVERAGE DURATION OF EACH CONTACT
Satellite Receive Sp	pecifications	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = EC	NB= NARROWBEAM EC = EARTH COVERAGE
Receive Antenna Dimension (RAD)	ANTENNA GAIN0, BEAMWIDTH360, RAD = RAD36 0G360B	NTIA FORMAT(RAD), EXAMPLE, FOR 16 DBI ANTENNA GAIN AND 30 DEGREE BEAMWIDTH RAD01 16G030B
Type of satellite (State = SPCE) City = Geo or Nongeo	Type = NONGEOSTATIONARY	CHOOSE EITHER: GEOSTATIONARY OR NONGEOSTATIONARY
For Geostationary Satellites	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE IN DDDMMSS FORMAT (XLG AND/OR RLG).

For Nongeostationary (Orbital Data)	INCLINATION ANGLE <u>97.6 deg</u> , APOGEE IN KILOMETERS <u>525 km</u> , PERIGEE IN KILOMETERS <u>525 km</u> , ORBITAL PERIOD IN HOURS <u>1</u> AND FRACTIONS OF HOURS IN DECIMAL <u>0.58</u> , THE NUMBER OF SATELLITES IN THE SYSTEM <u>1</u> , ORB = ORB, 97.6IN00525AP00525PE001.58H01T01	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
For SunSynchronous Nongeostationary Orbits	Mean Local Time of Ascending Node (MLTDN) = 13:00 + 60 mins or 13:00- 14:00 (Note: SpaceX notified use of LTDN, not LTAN.)	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)

Transmit Frequency	/: 2049 MHz	
State (XSC)	XSC = South Africa	
City Name (XAL)	XAL = Pretoria	
Latitude	Lat = 255136 S	
(DDMMSS)		
Longitude	Lon = 0282700 E	
(DDDMMSS)		
Transmit Power (PWR)	PWR = 100 W PWR01 W100	TRANSMIT POWER SUPPLIED TO THE ANTENNA INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE:
		W = WATT, K = KILOWATT, M = MEGAWATT
Necessary Bandwidth	150 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	155 kHz	
-20 dB bandwidth	160 kHz	
-40 dB bandwidth	170 kHz	
-60 dB bandwidth	190 kHz	
Modulation Type	GMSK	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	125 kbits/sec	INFORMATION DATA RATE
Forward Error Correction Coding	Is FEC used? Yes □ No ⊠ FEC Type: FEC Rate:	
Total Symbol Rate	125 ksymbols/sec	DATA RATE COMBINED WITH FEC AND FRAME OVERHEAD RESULTING IN THE TOTAL SYMBOL RATE AT THE INPUTE TO THE SYMBOL MAPPER/MODULATOR.
Transmit Antenna 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 = XAZ01 V00	THE EARTH STATION TRANSMITTER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (XAZ), V00 TO V90, EXAMPLE, XAZ01 V00

Transmit Antenna Dimensions (XAD)	ANTENNA GAIN 39 BEAMWIDTH 1.5 AZIMUTHAL RANGE -270-270, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS 1339, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS 66	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: XAD01 16G030B001-360A00357H006
	XAD =XAD10 39G001.5B-270- 270A01339H006	
Transmit Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER <u>N/A</u> , ANTENNA EFFICIENCY <u>N/A</u> ,	
Number of Satellite Contacts Supported Per Day	4 Contact Per Day	NUMBER OF TIMES THE EARTH STATION WILL COMMUNICATE WITH THE STATELLITE IN THE EARTH TO SPACE DIRECTION (UPINKS) EACH DAY
Expected Duration of Each Contact	8 minutes	AVERAGE DURATION OF EACH CONTACT
Satellite Receive Sp	pecifications	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = EC	NB= NARROWBEAM EC = EARTH COVERAGE
Receive Antenna Dimension (RAD)	ANTENNA GAIN5, BEAMWIDTH120, RAD = RAD37 5G120B	NTIA FORMAT(RAD), EXAMPLE, FOR 16 DBI ANTENNA GAIN AND 30 DEGREE BEAMWIDTH RAD01 16G030B
Type of satellite (State = SPCE) City = Geo or Nongeo	Type = NONGEOSTATIONARY	CHOOSE EITHER: GEOSTATIONARY OR NONGEOSTATIONARY
For Geostationary Satellites	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE IN DDDMMSS FORMAT (XLG AND/OR RLG).

For Nongeostationary (Orbital Data)	INCLINATION ANGLE <u>97.6 deg</u> , APOGEE IN KILOMETERS <u>525 km</u> , PERIGEE IN KILOMETERS <u>525 km</u> , ORBITAL PERIOD IN HOURS <u>1</u> AND FRACTIONS OF HOURS IN DECIMAL <u>0.58</u> , THE NUMBER OF SATELLITES IN THE SYSTEM <u>1</u> , ORB = ORB, 97.6IN00525AP00525PE001.58H01T01	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
For SunSynchronous Nongeostationary Orbits	Mean Local Time of Ascending Node (MLTDN) = 13:00 + 60 mins or 13:00- 14:00 (Note: SpaceX notified use of LTDN, not LTAN.)	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)

Transmit Frequency	/: 2049 MHz	
State (XSC)	XSC = Sweden	
City Name (XAL)	XAL = Boden	
Latitude	Lat = 654800 N	
(DDMMSS)		
Longitude	Lon = 0214048 E	
(DDDMMSS)		
Transmit Power	PWR = 100 W	TRANSMIT POWER SUPPLIED TO THE ANTENNA INPUT TERMINAL, EXAMPLE, PWR01 W2
(PWR)	PWR01 W100	TRANSMIT POWER UNITS INCLUDE:
		W = WATT,
		K = KILOWATT, M = MEGAWATT
Necessary	150 kHz	THE WIDTH OF FREQUENCY BAND WHICH IS JUST
Bandwidth		SUFFICIENT TO SUCCESSFULLY TRANSFER DATA. FORMULAS CAN BE FOUND IN ANNEX J OF THE
		NTIA MANUAL.
<b>RF Emissions Data</b>		2-SIDED EMISSION BANDWIDTH VALUES
-3 dB bandwidth	155 kHz	
-20 dB bandwidth	160 kHz	
-40 dB bandwidth	170 kHz	
-60 dB bandwidth	190 kHz	
Modulation Type	GMSK	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	125 kbits/sec	INFORMATION DATA RATE
Forward Error	Is FEC used? Yes 🗆 No 🖂	
Correction Coding	FEC Type:,	
	FEC Rate:,	
Total Symbol Rate	125 ksymbols/sec	DATA RATE COMBINED WITH FEC AND FRAME OVERHEAD RESULTING IN THE TOTAL SYMBOL RATE AT THE INPUTE TO THE SYMBOL MAPPER/MODULATOR.

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,
XAZ = XAZ01 V00	THE EARTH STATION TRANSMITTER ANTENNA MINIMUM OPERATING ANGLE OF
	ELEVATION (XAZ), V00 TO V90, EXAMPLE, XAZ01
	V00
ANTENNA GAIN 39 ,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16
	DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL
	RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN
	OF 6 METERS:
	XAD01 16G030B001-360A00357H006
IN IVIETERS6,	
XAD = XAD11 39G001 5B-270-	
ANTENNA EFFICIENCI <u>N/A</u> ,	
44.0 + + D - D	
11 Contact Per Day	NUMBER OF TIMES THE EARTH STATION WILL COMMUNICATE WITH THE STATELLITE IN THE
	EARTH TO SPACE DIRECTION (UPINKS) EACH DAY
8 minutes	AVERAGE DURATION OF EACH CONTACT
ecifications	
	POLARIZATIONS INCLUDE:
кар = к	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
RAZ = EC	NB= NARROWBEAM
RAZ = EC	
RAZ = EC ANTENNA GAIN5,	NB= NARROWBEAM EC = EARTH COVERAGE NTIA FORMAT(RAD), EXAMPLE, FOR 16 DBI
	NB= NARROWBEAM EC = EARTH COVERAGE NTIA FORMAT(RAD), EXAMPLE, FOR 16 DBI ANTENNA GAIN AND 30 DEGREE BEAMWIDTH
ANTENNA GAIN5,	NB= NARROWBEAM EC = EARTH COVERAGE NTIA FORMAT(RAD), EXAMPLE, FOR 16 DBI
	XAZ = XAZO1 V00 ANTENNA GAIN39, BEAMWIDTH1.5, AZIMUTHAL RANGE270-270, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS46, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS6, XAD =XAD11 39G001.5B-270- 270A00046H006 ANTENNA DIAMETERN/A, ANTENNA EFFICIENCYN/A, 11 Contact Per Day 8 minutes

Type of satellite (State = SPCE) City = Geo or Nongeo For Geostationary	Type = NONGEOSTATIONARY Longitude =	CHOOSE EITHER: GEOSTATIONARY OR NONGEOSTATIONARY IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND
Satellites		REPORT ITS LONGITUDE IN DDDMMSS FORMAT (XLG AND/OR RLG).
For Nongeostationary (Orbital Data)	INCLINATION ANGLE 97.6 deg , APOGEE IN KILOMETERS 525 km , PERIGEE IN KILOMETERS 525 km , ORBITAL PERIOD IN HOURS 1 AND FRACTIONS OF HOURS IN DECIMAL 0.58 , THE NUMBER OF SATELLITES IN THE SYSTEM 1 , ORB = ORB = ORB, 97.6IN00525AP00525PE001.58H01T01	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
For SunSynchronous Nongeostationary Orbits	Mean Local Time of Ascending Node (MLTDN) = 13:00 + 60 mins or 13:00- 14:00	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)
	(Note: SpaceX notified use of LTDN, not LTAN.)	

Transmit Frequency	r: 2049 MHz	
State (XSC)	XSC = Australia	
City Name (XAL)	XAL = Currans Hill	
Latitude	Lat = 340224 S	
(DDMMSS)		
Longitude	Lon = 1504612 E	
(DDDMMSS)		
Transmit Power	PWR = 39.8 W	TRANSMIT POWER SUPPLIED TO THE ANTENNA
(PWR)	PWR01 W39.8	INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE:
		W = WATT,
		K = KILOWATT, M = MEGAWATT
Necessary	150 kHz	THE WIDTH OF FREQUENCY BAND WHICH IS JUST
Bandwidth		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	155 kHz	
-20 dB bandwidth	160 kHz	
-40 dB bandwidth	170 kHz	
-60 dB bandwidth	190 kHz	
Modulation Type	GMSK	THE METHOD USED TO SUPERIMPOSE DATA ON
Data Rate	125 khite/see	THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK. INFORMATION DATA RATE
Forward Error	125 kbits/sec	
	Is FEC used? Yes $\Box$ No $\boxtimes$	
Correction Coding	FEC Type:	
	FEC Rate:	
Total Symbol Rate	125 ksymbols/sec	DATA RATE COMBINED WITH FEC AND FRAME
Total Symbol Nate	125 KSymbols/ sec	OVERHEAD RESULTING IN THE TOTAL SYMBOL
		RATE AT THE INPUTE TO THE SYMBOL MAPPER/MODULATOR.
Transmit Antenna	XAP = R	POLARIZATIONS INCLUDE:
Polarization (XAP)		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 V00	THE EARTH STATION TRANSMITTER ANTENNA
		MINIMUM OPERATING ANGLE OF
Orientation (XAZ)		ELEVATION (XAZ), V00 TO V90, EXAMPLE, XAZ01

Transmit Antenna Dimensions (XAD)	ANTENNA GAIN 16 , BEAMWIDTH 32 , AZIMUTHAL RANGE270-270 , THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS 95 , THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS 20 , XAD = XAD12 16G032B-270- 270A00095H020	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: XAD01 16G030B001-360A00357H006
Transmit Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER <u>N/A</u> , ANTENNA EFFICIENCY <u>N/A</u> ,	
Number of Satellite Contacts Supported Per Day	<1 Contact Per Day	NUMBER OF TIMES THE EARTH STATION WILL COMMUNICATE WITH THE STATELLITE IN THE EARTH TO SPACE DIRECTION (UPINKS) EACH DAY
Expected Duration of Each Contact	8 minutes	AVERAGE DURATION OF EACH CONTACT
Satellite Receive Sp	pecifications	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = EC	NB= NARROWBEAM EC = EARTH COVERAGE
Receive Antenna Dimension (RAD)	ANTENNA GAIN5, BEAMWIDTH120, RAD = RAD37 5G120B	NTIA FORMAT(RAD), EXAMPLE, FOR 16 DBI ANTENNA GAIN AND 30 DEGREE BEAMWIDTH RAD01 16G030B
Type of satellite (State = SPCE) City = Geo or Nongeo	Type = NONGEOSTATIONARY	CHOOSE EITHER: GEOSTATIONARY OR NONGEOSTATIONARY
For Geostationary Satellites	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE IN DDDMMSS FORMAT (XLG AND/OR RLG).

For Nongeostationary (Orbital Data)	INCLINATION ANGLE <u>97.6 deg</u> , APOGEE IN KILOMETERS <u>525 km</u> , PERIGEE IN KILOMETERS <u>525 km</u> , ORBITAL PERIOD IN HOURS <u>1</u> AND FRACTIONS OF HOURS IN DECIMAL <u>0.58</u> , THE NUMBER OF SATELLITES IN THE SYSTEM <u>1</u> , ORB = ORB, 97.6IN00525AP00525PE001.58H01T01	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
For SunSynchronous Nongeostationary Orbits	Mean Local Time of Ascending Node (MLTDN) = 13:00 + 60 mins or 13:00- 14:00 (Note: SpaceX notified use of LTDN, not LTAN.)	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)

Transmit Frequency	v: 2049 MHz	
State (XSC)	XSC = Bahrain	
City Name (XAL)	XAL = Zallaq	
Latitude	Lat = 260300 N	
(DDMMSS)		
Longitude	Lon = 0503000 E	
(DDDMMSS)		
Transmit Power	PWR = 39.8 W	TRANSMIT POWER SUPPLIED TO THE ANTENNA
(PWR)	PWR01 W39.8	INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE:
		W = WATT,
		K = KILOWATT, M = MEGAWATT
Necessary	150 kHz	THE WIDTH OF FREQUENCY BAND WHICH IS JUST
Bandwidth		SUFFICIENT TO SUCCESSFULLY TRANSFER DATA.
		FORMULAS CAN BE FOUND IN ANNEX J OF THE NTIA MANUAL.
<b>RF</b> Emissions Data		2-SIDED EMISSION BANDWIDTH VALUES
-3 dB bandwidth	155 kHz	
-20 dB bandwidth	160 kHz	
-40 dB bandwidth	170 kHz	
-60 dB bandwidth	190 kHz	
Modulation Type	GMSK	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	125 kbits/sec	INFORMATION DATA RATE
Forward Error	Is FEC used? Yes $\Box$ No $igtriangleup$	
<b>Correction Coding</b>	FEC Type:,	
	FEC Rate:,	

Total Symbol Bata	125 ksymbols/sec	DATA RATE COMBINED WITH FEC AND FRAME
Total Symbol Rate	125 KSymbols/Sec	OVERHEAD RESULTING IN THE TOTAL SYMBOL
		RATE AT THE INPUTE TO THE SYMBOL
		MAPPER/MODULATOR.
Transmit Antenna	XAP = R	POLARIZATIONS INCLUDE: H = HORIZONTAL,
Polarization (XAP)		V = VERTICAL,
		S = HORIZONTAL AND VERTICAL,
		L = LEFT HAND CIRCULAR,
		R = RIGHT HAND CIRCULAR,
		T = RIGHT AND LEFT HAND CIRCULAR,
T		J = LINEAR POLARIZATION THE EARTH STATION TRANSMITTER ANTENNA
Transmit Antenna	XAZ = XAZ01 V00	MINIMUM OPERATING ANGLE OF
Orientation (XAZ)		ELEVATION (XAZ), V00 TO V90, EXAMPLE, XAZ01
		V00
Transmit Antenna	ANTENNA GAIN16,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16
		DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL
Dimensions (XAD)	BEAMWIDTH32,	RANGE FROM 001-360, SITE ELEVATION OF 357
	AZIMUTHAL RANGE270-270,	METERS, AND ANTENNA HEIGHT ABOVE TERRAIN
	THE SITE ELEVATION ABOVE MEAN SEA	OF 6 METERS:
	LEVEL IN METERS 10 ,	XAD01 16G030B001-360A00357H006
	THE ANTENNA HEIGHT ABOVE TERRAIN	
	IN METERS 20,	
	IN METERS20,	
	XAD =XAD13 16G032B-270-	
	270A00010H020	
Transmit Antenna	ANTENNA DIAMETER <u>N/A</u> ,	
Additional	ANTENNA EFFICIENCY_ <u>N/A</u> ,	
Information (For		
Parabolic		
Antennas)		
Number of	<1 Contact Per Day	NUMBER OF TIMES THE EARTH STATION WILL
Satellite Contacts	,	COMMUNICATE WITH THE STATELLITE IN THE
		EARTH TO SPACE DIRECTION (UPINKS) EACH DAY
Supported Per		
Day	0 minutes	AVERAGE DURATION OF EACH CONTACT
Expected	8 minutes	AVENAGE DURATION OF EACH CONTACT
Duration of Each		
Contact		
Satellite Receive Sp	pecifications	
Receive Antenna	RAP = R	POLARIZATIONS INCLUDE: H = HORIZONTAL.
Polarization (RAP)		V = VERTICAL,
		S = HORIZONTAL AND VERTICAL,
		L = LEFT HAND CIRCULAR,
		R = RIGHT HAND CIRCULAR,
		T = RIGHT AND LEFT HAND CIRCULAR,
Receive Antenna	RAZ = EC	J = LINEAR POLARIZATION NB= NARROWBEAM
		EC = EARTH COVERAGE
Orientation (RAZ)		

Receive Antenna Dimension (RAD) Type of satellite (State = SPCE) City = Geo or Nongeo	ANTENNA GAIN5, BEAMWIDTH120, RAD = RAD37 5G120B Type = NONGEOSTATIONARY	NTIA FORMAT(RAD), EXAMPLE, FOR 16 DBI ANTENNA GAIN AND 30 DEGREE BEAMWIDTH RAD01 16G030B CHOOSE EITHER: GEOSTATIONARY OR NONGEOSTATIONARY
For Geostationary Satellites	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE IN DDDMMSS FORMAT (XLG AND/OR RLG).
For Nongeostationary (Orbital Data)	INCLINATION ANGLE <u>97.6 deg</u> , APOGEE IN KILOMETERS <u>525 km</u> , PERIGEE IN KILOMETERS <u>525 km</u> , ORBITAL PERIOD IN HOURS <u>1</u> AND FRACTIONS OF HOURS IN DECIMAL <u>0.58</u> , THE NUMBER OF SATELLITES IN THE SYSTEM <u>1</u> , ORB = ORB, 97.6IN00525AP00525PE001.58H01T01	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
For SunSynchronous Nongeostationary Orbits	Mean Local Time of Ascending Node (MLTDN) = 13:00 + 60 mins or 13:00- 14:00 (Note: SpaceX notified use of LTDN, not	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)

Transmit Frequency: 2049 MHz		
State (XSC)	XSC = Ireland	
City Name (XAL)	XAL = Dublin	
Latitude (DDMMSS)	Lat = 532400 N	
Longitude (DDDMMSS)	Lon = 0061312 W	
Transmit Power (PWR)	PWR = 39.8 W PWR01 W39.8	TRANSMIT POWER SUPPLIED TO THE ANTENNA INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE: W = WATT, K = KILOWATT, M = MEGAWATT
Necessary Bandwidth	150 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.

		2-SIDED EMISSION BANDWIDTH VALUES
RF Emissions Data		
-3 dB bandwidth	155 kHz	-
-20 dB bandwidth	160 kHz	_
-40 dB bandwidth	170 kHz	
-60 dB bandwidth	190 kHz	
Modulation Type	GMSK	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	125 kbits/sec	INFORMATION DATA RATE
Forward Error	Is FEC used? Yes $\Box$ No $oxtimes$	
Correction Coding	FEC Type:,	
	FEC Rate:,	
Total Symbol Rate	125 ksymbols/sec	DATA RATE COMBINED WITH FEC AND FRAME OVERHEAD RESULTING IN THE TOTAL SYMBOL RATE AT THE INPUTE TO THE SYMBOL MAPPER/MODULATOR.
Transmit Antenna 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 = XAZ01 V00	THE EARTH STATION TRANSMITTER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (XAZ), V00 TO V90, EXAMPLE, XAZ01 V00
Transmit Antenna Dimensions (XAD)	ANTENNA GAIN16, BEAMWIDTH32, AZIMUTHAL RANGE270-270, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS84, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS20, XAD =XAD14 16G032B-270- 270A00084H020	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: XAD01 16G030B001-360A00357H006
Turners it Andrew	270A00084H020	
Transmit Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER <u>N/A</u> , ANTENNA EFFICIENCY <u>N/A</u> ,	
Number of Satellite Contacts Supported Per Day	<1 Contact Per Day	NUMBER OF TIMES THE EARTH STATION WILL COMMUNICATE WITH THE STATELLITE IN THE EARTH TO SPACE DIRECTION (UPINKS) EACH DAY
Expected Duration of Each Contact	8 minutes	AVERAGE DURATION OF EACH CONTACT

Satellite Receive Specifications		
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = EC	NB= NARROWBEAM EC = EARTH COVERAGE NTIA FORMAT(RAD), EXAMPLE, FOR 16 DBI
Receive Antenna Dimension (RAD)	ANTENNA GAIN5, BEAMWIDTH120, RAD = RAD37 5G120B	ANTENNA GAIN AND 30 DEGREE BEAMWIDTH RAD01 16G030B
Type of satellite (State = SPCE) City = Geo or Nongeo	Type = NONGEOSTATIONARY	CHOOSE EITHER: GEOSTATIONARY OR NONGEOSTATIONARY
For Geostationary Satellites	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE IN DDDMMSS FORMAT (XLG AND/OR RLG).
For Nongeostationary (Orbital Data)	INCLINATION ANGLE 97.6 deg APOGEE IN KILOMETERS 525 km PERIGEE IN KILOMETERS 525 km ORBITAL PERIOD IN HOURS 1_AND FRACTIONS OF HOURS IN DECIMAL 0.58 THE NUMBER OF SATELLITES IN THE SYSTEM 1_ ORB = ORB, 97.6IN00525AP00525PE001.58H01T01	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
For SunSynchronous Nongeostationary Orbits	Mean Local Time of Ascending Node (MLTDN) = 13:00 + 60 mins or 13:00- 14:00 (Note: SpaceX notified use of LTDN, not LTAN.)	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)

Transmit Frequency: 2049 MHz		
State (XSC)	XSC = Southern	
	Australia	
City Name (XAL)	XAL = Peterborough	
Latitude	Lat = 325743 S	
(DDMMSS)		

Longitude	Lon = 1385058 E	
(DDDMMSS)		
Transmit Power (PWR)	PWR = 39.8 W PWR01 W39.8	TRANSMIT POWER SUPPLIED TO THE ANTENNA INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE: W = WATT, K = KILOWATT, M = MEGAWATT
Necessary Bandwidth	150 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.
<b>RF Emissions Data</b>		2-SIDED EMISSION BANDWIDTH VALUES
-3 dB bandwidth	155 kHz	
-20 dB bandwidth	160 kHz	
-40 dB bandwidth	170 kHz	
-60 dB bandwidth	190 kHz	
Modulation Type	GMSK	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	125 kbits/sec	INFORMATION DATA RATE
Forward Error	Is FEC used? Yes 🗌 No 🖂	
Correction Coding	FEC Type:,	
	FEC Rate:,	
Total Symbol Rate	125 ksymbols/sec	DATA RATE COMBINED WITH FEC AND FRAME OVERHEAD RESULTING IN THE TOTAL SYMBOL RATE AT THE INPUTE TO THE SYMBOL MAPPER/MODULATOR.
Transmit Antenna 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 = XAZ01 V05	THE EARTH STATION TRANSMITTER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (XAZ), V00 TO V90, EXAMPLE, XAZ01 V00
Transmit Antenna Dimensions (XAD)	ANTENNA GAIN35 dBi, BEAMWIDTH2.67, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS540, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS2.2, XAD =XAD15 35G002.67B000-	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: XAD01 16G030B001-360A00357H006
	360A00540H002.2	

Transmit Antenna	ANTENNA DIAMETER N/A ,	
Additional	ANTENNA EFFICIENCY N/A ,	
Information (For	,	
Parabolic		
Antennas)		
Number of	<1 Contact Per Day	NUMBER OF TIMES THE EARTH STATION WILL
Satellite Contacts		COMMUNICATE WITH THE STATELLITE IN THE
Supported Per		EARTH TO SPACE DIRECTION (UPINKS) EACH DAY
Day		
Expected	8 minutes	AVERAGE DURATION OF EACH CONTACT
Duration of Each	o minutes	
Contact		
Satellite Receive Sp	becincations	
Receive Antenna	RAP = R	POLARIZATIONS INCLUDE:
Polarization (RAP)		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
Receive Antenna	RAZ = EC	NB= NARROWBEAM
Orientation (RAZ)		EC = EARTH COVERAGE
Receive Antenna	ANTENNA GAIN5,	NTIA FORMAT(RAD), EXAMPLE, FOR 16 DBI
Dimension (RAD)	BEAMWIDTH 120 ,	ANTENNA GAIN AND 30 DEGREE BEAMWIDTH RAD01 16G030B
, , , , , , , , , , , , , , , , , , ,	RAD =	KADUI 100030B
	RAD37 5G120B	
Type of satellite	Type = NONGEOSTATIONARY	CHOOSE EITHER:
(State = SPCE)		GEOSTATIONARY OR NONGEOSTATIONARY
City = Geo or		
Nongeo		
For Geostationary	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT
, Satellites		ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND
		REPORT ITS LONGITUDE IN DDDMMSS FORMAT (XLG AND/OR RLG).
For	INCLINATION ANGLE <u>97.6 deg</u> ,	IF ANY SATELLITES ARE NONGEOSTATIONARY,
Nongeostationary	APOGEE IN KILOMETERS 525 km ,	REPORT ITS INCLINATION ANGLE, APOGEE IN KILOMETERS, PERIGEE IN KILOMETERS,
(Orbital Data)	PERIGEE IN KILOMETERS 525 km ,	ORBITAL PERIOD IN HOURS AND FRACTIONS OF
	ORBITAL PERIOD IN HOURS 1 AND	HOURS IN DECIMAL, THE NUMBER OF SATELLITES
	FRACTIONS OF HOURS IN	IN THE SYSTEM, THEN T01, EXAMPLE, REM04
	DECIMAL 0.58 ,	*ORB,98.0IN00510AP00510PE001.58H01NRT01,
	THE NUMBER OF SATELLITES IN THE	AND FOR SPACE-TO-SPACE
	SYSTEM <u>1</u> ,	COMMUNICATIONS WITH ANOTHER NONGEOSTATIONARY SATELLITE ADD AN
		ADDITIONAL
	ORB =	*ORB FOR IT ENDING IN R01, EXAMPLE, REM05
		*ORB,72.9IN03209AP00655PE013.46H01NRR01

For SunSynchronous Nongeostationary Orbits	Mean Local Time of Ascending Node (MLTDN) = 13:00 + 60 mins or 13:00- 14:00	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)
	(Note: SpaceX notified use of LTDN, not LTAN.)	

Transmit Frequency	/: 2049 MHz	
State (XSC)	XSC = Western Australia	
City Name (XAL)	XAL = Nangetty	
Latitude	Lat = 290037 S	
(DDMMSS)		
Longitude	Lon = 1152030 E	
(DDDMMSS)		
Transmit Power	PWR = 39.8 W	TRANSMIT POWER SUPPLIED TO THE ANTENNA
(PWR)	PWR01 W39.8	INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE:
		W = WATT,
		K = KILOWATT,
	450.111	
Necessary	150 kHz	THE WIDTH OF FREQUENCY BAND WHICH IS JUST SUFFICIENT TO SUCCESSFULLY TRANSFER DATA.
Bandwidth		FORMULAS CAN BE FOUND IN ANNEX J OF THE
RF Emissions Data		2-SIDED EMISSION BANDWIDTH VALUES
-3 dB bandwidth	155 kHz	
-20 dB bandwidth	160 kHz	
-40 dB bandwidth	170 kHz	
-60 dB bandwidth	190 kHz	
Modulation Type	GMSK	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	125 kbits/sec	INFORMATION DATA RATE
Forward Error	Is FEC used? Yes □ No ⊠	
Correction Coding	FEC Type:,	
	FEC Rate:,	
Total Symbol Rate	125 ksymbols/sec	DATA RATE COMBINED WITH FEC AND FRAME
		OVERHEAD RESULTING IN THE TOTAL SYMBOL RATE AT THE INPUTE TO THE SYMBOL
		MAPPER/MODULATOR.
Transmit Antenna	XAP = R	POLARIZATIONS INCLUDE:
Polarization (XAP)		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 V05	J = LINEAR POLARIZATION THE EARTH STATION TRANSMITTER ANTENNA
		MINIMUM OPERATING ANGLE OF
Orientation (XAZ)		ELEVATION (XAZ), V00 TO V90, EXAMPLE, XAZ01
1		V00

Transmit Antenna Dimensions (XAD)	ANTENNA GAIN35 dBi, BEAMWIDTH2.67, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS270, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS2.2, XAD =XAD16 35G002.67B000- 360A00270H002.2	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: XAD01 16G030B001-360A00357H006
Transmit Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER <u>N/A</u> , ANTENNA EFFICIENCY <u>N/A</u> ,	
Number of Satellite Contacts Supported Per Day	<1 Contact Per Day	NUMBER OF TIMES THE EARTH STATION WILL COMMUNICATE WITH THE STATELLITE IN THE EARTH TO SPACE DIRECTION (UPINKS) EACH DAY
Expected Duration of Each Contact	8 minutes	AVERAGE DURATION OF EACH CONTACT
Satellite Receive Sp	pecifications	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = EC	NB= NARROWBEAM EC = EARTH COVERAGE
Receive Antenna Dimension (RAD)	ANTENNA GAIN5, BEAMWIDTH120, RAD = RAD37 5G120B	NTIA FORMAT(RAD), EXAMPLE, FOR 16 DBI ANTENNA GAIN AND 30 DEGREE BEAMWIDTH RAD01 16G030B
Type of satellite (State = SPCE) City = Geo or Nongeo	Type = NONGEOSTATIONARY	CHOOSE EITHER: GEOSTATIONARY OR NONGEOSTATIONARY
For Geostationary Satellites	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE IN DDDMMSS FORMAT (XLG AND/OR RLG).

For	INCLINATION ANGLE 97.6 deg ,	IF ANY SATELLITES ARE NONGEOSTATIONARY,
Nongeostationary	APOGEE IN KILOMETERS 525 km ,	REPORT ITS INCLINATION ANGLE, APOGEE IN KILOMETERS, PERIGEE IN KILOMETERS,
(Orbital Data)	PERIGEE IN KILOMETERS <u>525 km</u> ,	ORBITAL PERIOD IN HOURS AND FRACTIONS OF
	ORBITAL PERIOD IN HOURS <u>1</u> AND	HOURS IN DECIMAL, THE NUMBER OF SATELLITES
	FRACTIONS OF HOURS IN	IN THE SYSTEM, THEN T01, EXAMPLE, REM04
	DECIMAL <u>0.58</u> ,	*ORB,98.0IN00510AP00510PE001.58H01NRT01,
	THE NUMBER OF SATELLITES IN THE	AND FOR SPACE-TO-SPACE
	SYSTEM,	NONGEOSTATIONARY SATELLITE ADD AN
		ADDITIONAL
	ORB =	*ORB FOR IT ENDING IN R01, EXAMPLE, REM05 *ORB,72.9IN03209AP00655PE013.46H01NRR01
	ORB, 97.6IN00525AP00525PE001.58H01T01	
For	Mean Local Time of Ascending Node	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S
SunSynchronous	(MLTDN) = 13:00 + 60 mins or 13:00-	ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)
Nongeostationary	14:00	
Orbits		
	(Note: SpaceX notified use of LTDN, not	
	LTAN.)	

Transmit Frequency	r: 2049 MHz	
State (XSC)	XSC = Absheron	
City Name (XAL)	XAL = Azerbaijan	
Latitude	Lat = 402758 N	
(DDMMSS)		
Longitude	Lon = 492908 E	
(DDDMMSS)		
Transmit Power	PWR = 39.8 W	TRANSMIT POWER SUPPLIED TO THE ANTENNA
(PWR)	PWR01 W39.8	INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE:
		W = WATT,
		K = KILOWATT, M = MEGAWATT
Necessary	150 kHz	THE WIDTH OF FREQUENCY BAND WHICH IS JUST
Bandwidth		SUFFICIENT TO SUCCESSFULLY TRANSFER DATA.
Banamath		FORMULAS CAN BE FOUND IN ANNEX J OF THE NTIA MANUAL.
RF Emissions Data		2-SIDED EMISSION BANDWIDTH VALUES
-3 dB bandwidth	155 kHz	
-20 dB bandwidth	160 kHz	
-40 dB bandwidth	170 kHz	
-60 dB bandwidth	190 kHz	
Modulation Type	GMSK	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	125 kbits/sec	INFORMATION DATA RATE
Forward Error	Is FEC used? Yes □ No ⊠	
Correction Coding	FEC Type:,	
	FEC Rate:,	

Total Symbol Rate	125 ksymbols/sec	DATA RATE COMBINED WITH FEC AND FRAME
TOTAL SYMDOL RALE	125 KSymbols/sec	OVERHEAD RESULTING IN THE TOTAL SYMBOL
		RATE AT THE INPUTE TO THE SYMBOL
		MAPPER/MODULATOR.
Transmit Antenna	XAP = R	POLARIZATIONS INCLUDE: H = HORIZONTAL,
Polarization (XAP)		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 V05	THE EARTH STATION TRANSMITTER ANTENNA
Orientation (XAZ)		MINIMUM OPERATING ANGLE OF
		ELEVATION (XAZ), V00 TO V90, EXAMPLE, XAZ01
		V00
Transmit Antenna	ANTENNA GAIN35 dBi,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16
Dimensions (XAD)	BEAMWIDTH2.67,	DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL
		RANGE FROM 001-360, SITE ELEVATION OF 357
	AZIMUTHAL RANGE000-360,	METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS:
	THE SITE ELEVATION ABOVE MEAN SEA	XAD01 16G030B001-360A00357H006
	LEVEL IN METERS210,	
	THE ANTENNA HEIGHT ABOVE TERRAIN	
	IN METERS 2.2 ,	
	XAD =XAD17 35G002.67B000-	
	360A00210H002.2	
Transmit Antenna	ANTENNA DIAMETERN/A,	
Additional	ANTENNA EFFICIENCY <u>N/A</u> ,	
Information (For		
Parabolic		
Antennas)		
Number of	<1 Contact Per Day	NUMBER OF TIMES THE EARTH STATION WILL
Satellite Contacts		COMMUNICATE WITH THE STATELLITE IN THE EARTH TO SPACE DIRECTION (UPINKS) EACH DAY
Supported Per		EARTH TO SPACE DIRECTION (OPTINKS) EACH DAT
Day		
Expected	8 minutes	AVERAGE DURATION OF EACH CONTACT
Duration of Each		
Contact		
Satellite Receive Sp	Decifications	
Deceive Antonio		POLARIZATIONS INCLUDE:
Receive Antenna	RAP = R	H = HORIZONTAL,
Polarization (RAP)		V = VERTICAL,
		S = HORIZONTAL AND VERTICAL,
		L = LEFT HAND CIRCULAR,
		R = RIGHT HAND CIRCULAR,
		T = RIGHT AND LEFT HAND CIRCULAR, J = LINEAR POLARIZATION
Receive Antenna	RAZ = EC	NB= NARROWBEAM
Orientation (RAZ)		EC = EARTH COVERAGE
Unentation (RAZ)		

Receive Antenna Dimension (RAD) Type of satellite (State = SPCE) City = Geo or Nongeo	ANTENNA GAIN5, BEAMWIDTH120, RAD = RAD37 5G120B Type = NONGEOSTATIONARY	NTIA FORMAT(RAD), EXAMPLE, FOR 16 DBI ANTENNA GAIN AND 30 DEGREE BEAMWIDTH RAD01 16G030B CHOOSE EITHER: GEOSTATIONARY OR NONGEOSTATIONARY
For Geostationary Satellites	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE IN DDDMMSS FORMAT (XLG AND/OR RLG).
For Nongeostationary (Orbital Data)	INCLINATION ANGLE <u>97.6 deg</u> , APOGEE IN KILOMETERS <u>525 km</u> , PERIGEE IN KILOMETERS <u>525 km</u> , ORBITAL PERIOD IN HOURS <u>1</u> AND FRACTIONS OF HOURS IN DECIMAL <u>0.58</u> , THE NUMBER OF SATELLITES IN THE SYSTEM <u>1</u> , ORB = ORB, 97.6IN00525AP00525PE001.58H01T01	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
For SunSynchronous Nongeostationary Orbits	Mean Local Time of Ascending Node (MLTDN) = 13:00 + 60 mins or 13:00- 14:00 (Note: SpaceX notified use of LTDN, not	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)

Transmit Frequency: 2049 MHz		
State (XSC)	XSC = Plana	
City Name (XAL)	XAL = Bulgaria	
Latitude	Lat = 422858 N	
(DDMMSS)		
Longitude	Lon = 0232643 E	
(DDDMMSS)		
Transmit Power (PWR)	PWR = 39.8 W PWR01 W39.8	TRANSMIT POWER SUPPLIED TO THE ANTENNA INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE: W = WATT, K = KILOWATT, M = MEGAWATT
Necessary Bandwidth	150 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.
<b>RF</b> Emissions Data		2-SIDED EMISSION BANDWIDTH VALUES

-3 dB bandwidth	155 kHz	
-20 dB bandwidth	160 kHz	-
-40 dB bandwidth	170 kHz	-
-60 dB bandwidth	190 kHz	-
Modulation Type	GMSK	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	125 kbits/sec	INFORMATION DATA RATE
Forward Error	Is FEC used? Yes 🗌 No 🖂	
Correction Coding	FEC Type:,	
	FEC Rate:,	
Total Symbol Rate	125 ksymbols/sec	DATA RATE COMBINED WITH FEC AND FRAME OVERHEAD RESULTING IN THE TOTAL SYMBOL RATE AT THE INPUTE TO THE SYMBOL MAPPER/MODULATOR.
Transmit Antenna 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 = XAZ01 V05	THE EARTH STATION TRANSMITTER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (XAZ), V00 TO V90, EXAMPLE, XAZ01 V00
Transmit Antenna Dimensions (XAD)	ANTENNA GAIN35.8 dBi, BEAMWIDTH2.2, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS1106, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS4, XAD =XAD18 35.8G002.2B000- 360A01106H004	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: XAD01 16G030B001-360A00357H006
Transmit Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER <u>N/A</u> , ANTENNA EFFICIENCY <u>N/A</u> ,	
Number of Satellite Contacts Supported Per Day	<1 Contact Per Day	NUMBER OF TIMES THE EARTH STATION WILL COMMUNICATE WITH THE STATELLITE IN THE EARTH TO SPACE DIRECTION (UPINKS) EACH DAY
Expected Duration of Each Contact	8 minutes	AVERAGE DURATION OF EACH CONTACT
Satellite Receive Sp	pecifications	

		POLARIZATIONS INCLUDE:
Receive Antenna	RAP = R	POLARIZATIONS INCLUDE: H = HORIZONTAL,
Polarization (RAP)		V = VERTICAL,
		S = HORIZONTAL AND VERTICAL,
		L = LEFT HAND CIRCULAR,
		R = RIGHT HAND CIRCULAR,
		T = RIGHT AND LEFT HAND CIRCULAR,
		J = LINEAR POLARIZATION
Receive Antenna	RAZ = EC	NB= NARROWBEAM
Orientation (RAZ)		EC = EARTH COVERAGE
Receive Antenna	ANTENNA GAIN 5 ,	NTIA FORMAT(RAD), EXAMPLE, FOR 16 DBI
Dimension (RAD)	BEAMWIDTH 120 ,	ANTENNA GAIN AND 30 DEGREE BEAMWIDTH
Dimension (RAD)		RAD01 16G030B
	RAD =	
	RAD37 5G120B	
Type of satellite	Type = NONGEOSTATIONARY	CHOOSE EITHER:
(State = SPCE)		GEOSTATIONARY OR NONGEOSTATIONARY
City = Geo or		
Nongeo		
For Geostationary	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT
Satellites		ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE IN DDDMMSS FORMAT
		(XLG AND/OR RLG).
For	INCLINATION ANGLE 97.6 deg ,	IF ANY SATELLITES ARE NONGEOSTATIONARY,
Nongeostationary	APOGEE IN KILOMETERS 525 km ,	REPORT ITS INCLINATION ANGLE, APOGEE
• •		IN KILOMETERS, PERIGEE IN KILOMETERS,
(Orbital Data)	PERIGEE IN KILOMETERS <u>525 km</u> ,	ORBITAL PERIOD IN HOURS AND FRACTIONS OF
	ORBITAL PERIOD IN HOURS <u>1</u> AND	HOURS IN DECIMAL, THE NUMBER OF SATELLITES
	FRACTIONS OF HOURS IN	IN THE SYSTEM, THEN T01, EXAMPLE, REM04
	DECIMAL 0.58 ,	*ORB,98.0IN00510AP00510PE001.58H01NRT01,
	THE NUMBER OF SATELLITES IN THE	AND FOR SPACE-TO-SPACE
		COMMUNICATIONS WITH ANOTHER
	SYSTEM,	NONGEOSTATIONARY SATELLITE ADD AN
		ADDITIONAL
	ORB =	*ORB FOR IT ENDING IN R01, EXAMPLE, REM05 *ORB,72.9IN03209AP00655PE013.46H01NRR01
	ORB, 97.6IN00525AP00525PE001.58H01T01	ORB,72.9IN03209AP00655PE013.40H01NRR01
For	Mean Local Time of Ascending Node	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S
	5	ASCENDING NODE AND THE MEAN SUN, OFTEN
SunSynchronous	(MLTDN) = 13:00 + 60 mins or 13:00-	EXPRESSED AS UNIT OF TIME (HH:MM)
Nongeostationary	14:00	
Orbits		
	(Note: SpaceX notified use of LTDN, not	
	LTAN.)	

Transmit Frequency: 2049 MHz		
State (XSC)	XSC = Puertollano	
City Name (XAL)	XAL = Spain	
Latitude	Lat = 384026 N	
(DDMMSS)		
Longitude	Lon = 0040943 W	
(DDDMMSS)		

Transmit Power	PWR = 39.8 W	TRANSMIT POWER SUPPLIED TO THE ANTENNA
(PWR)	PWR01 W39.8	INPUT TERMINAL, EXAMPLE, PWR01 W2
	FWR01 W39.8	TRANSMIT POWER UNITS INCLUDE:
		W = WATT, K = KILOWATT,
		M = MEGAWATT
Necessary	150 kHz	THE WIDTH OF FREQUENCY BAND WHICH IS JUST
Bandwidth		SUFFICIENT TO SUCCESSFULLY TRANSFER DATA.
Banawiath		FORMULAS CAN BE FOUND IN ANNEX J OF THE NTIA MANUAL.
RF Emissions Data		2-SIDED EMISSION BANDWIDTH VALUES
-3 dB bandwidth	155 kHz	
-20 dB bandwidth	160 kHz	
-40 dB bandwidth	170 kHz	
-60 dB bandwidth	190 kHz	1
Modulation Type	GMSK	THE METHOD USED TO SUPERIMPOSE DATA ON
Data Data	125 khita/aaa	THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK. INFORMATION DATA RATE
Data Rate	125 kbits/sec	
Forward Error	Is FEC used? Yes □ No ⊠	
Correction Coding	FEC Type:,	
	FEC Rate:,	
Tatal Cumbal Data		DATA RATE COMBINED WITH FEC AND FRAME
Total Symbol Rate	125 ksymbols/sec	OVERHEAD RESULTING IN THE TOTAL SYMBOL
		RATE AT THE INPUTE TO THE SYMBOL
		MAPPER/MODULATOR.
Transmit Antenna	XAP = R	POLARIZATIONS INCLUDE: H = HORIZONTAL,
Polarization (XAP)		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 V05	THE EARTH STATION TRANSMITTER ANTENNA
Orientation (XAZ)		MINIMUM OPERATING ANGLE OF ELEVATION (XAZ), V00 TO V90, EXAMPLE, XAZ01
( )		V00
Transmit Antenna	ANTENNA GAIN34.3 dBi,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL
Dimensions (XAD)	BEAMWIDTH3.2,	RANGE FROM 001-360, SITE ELEVATION OF 357
	AZIMUTHAL RANGE000-360,	METERS, AND ANTENNA HEIGHT ABOVE TERRAIN
	THE SITE ELEVATION ABOVE MEAN SEA	OF 6 METERS:
	LEVEL IN METERS690,	XAD01 16G030B001-360A00357H006
	THE ANTENNA HEIGHT ABOVE TERRAIN	
	IN METERS 14,	
	······································	
	XAD =XAD19 34.3G003.2B000-	
	360A00690H014	
Transmit Antenna	ANTENNA DIAMETER N/A ,	
Additional	ANTENNA EFFICIENCYN/A,	
Information (For		
Parabolic		
Antennas)		
,		

Number of	<1 Contact Bor Day	NUMBER OF TIMES THE EARTH STATION WILL
Satellite Contacts	<1 Contact Per Day	COMMUNICATE WITH THE STATELLITE IN THE
		EARTH TO SPACE DIRECTION (UPINKS) EACH DAY
Supported Per		
Day		AVERAGE DURATION OF EACH CONTACT
Expected	8 minutes	AVERAGE DURATION OF EACH CONTACT
Duration of Each		
Contact		
Satellite Receive Sp	ecifications	
Receive Antenna	RAP = R	POLARIZATIONS INCLUDE:
Polarization (RAP)	NAF - N	H = HORIZONTAL,
FOIDI IZALION (NAF)		V = VERTICAL,
		S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR,
		R = RIGHT HAND CIRCULAR,
		T = RIGHT AND LEFT HAND CIRCULAR,
		J = LINEAR POLARIZATION
Receive Antenna	RAZ = EC	NB= NARROWBEAM
Orientation (RAZ)		EC = EARTH COVERAGE
Receive Antenna	ANTENNA GAIN 5_,	NTIA FORMAT(RAD), EXAMPLE, FOR 16 DBI
Dimension (RAD)	BEAMWIDTH 120 ,	ANTENNA GAIN AND 30 DEGREE BEAMWIDTH
	RAD =	RAD01 16G030B
	RAD37 5G120B	
Type of satellite	Type = NONGEOSTATIONARY	CHOOSE EITHER:
(State = SPCE)		GEOSTATIONARY OR NONGEOSTATIONARY
City = Geo or		
•		
Nongeo	Longitudo -	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT
For Geostationary	Longitude =	ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND
Satellites		REPORT ITS LONGITUDE IN DDDMMSS FORMAT
_		(XLG AND/OR RLG).
For	INCLINATION ANGLE <u>97.6 deg</u> ,	IF ANY SATELLITES ARE NONGEOSTATIONARY, REPORT ITS INCLINATION ANGLE, APOGEE
Nongeostationary	APOGEE IN KILOMETERS <u>525 km</u> ,	IN KILOMETERS, PERIGEE IN KILOMETERS,
(Orbital Data)	PERIGEE IN KILOMETERS <u>525 km</u> ,	ORBITAL PERIOD IN HOURS AND FRACTIONS OF
	ORBITAL PERIOD IN HOURS1_AND	HOURS IN DECIMAL, THE NUMBER OF SATELLITES
	FRACTIONS OF HOURS IN	IN THE SYSTEM, THEN T01, EXAMPLE, REM04
	DECIMAL 0.58 ,	*ORB,98.0IN00510AP00510PE001.58H01NRT01,
	THE NUMBER OF SATELLITES IN THE	AND FOR SPACE-TO-SPACE
	SYSTEM 1 ,	COMMUNICATIONS WITH ANOTHER
	JIJILIVI,	NONGEOSTATIONARY SATELLITE ADD AN ADDITIONAL
		*ORB FOR IT ENDING IN R01, EXAMPLE, REM05
	ORB =	*ORB,72.9IN03209AP00655PE013.46H01NRR01
<b>F</b>	ORB, 97.6IN00525AP00525PE001.58H01T01	
For	Mean Local Time of Ascending Node	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN
SunSynchronous	(MLTDN) = 13:00 + 60 mins or 13:00-	EXPRESSED AS UNIT OF TIME (HH:MM)
Nongeostationary	14:00	
Orbits		
	(Note: SpaceX notified use of LTDN, not	
	LTAN.)	

Transmit Frequency	/: 2049 MHz	
State (XSC)	XSC = Blönduós	
City Name (XAL)	XAL = Iceland	
Latitude	Lat = 653850 N	
(DDMMSS)		
Longitude	Lon = 0201445 W	
(DDDMMSS)		
Transmit Power	PWR = 39.8 W	TRANSMIT POWER SUPPLIED TO THE ANTENNA
(PWR)	PWR01 W39.8	INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE:
		W = WATT,
		K = KILOWATT, M = MEGAWATT
Necessary	150 kHz	THE WIDTH OF FREQUENCY BAND WHICH IS JUST
Bandwidth		SUFFICIENT TO SUCCESSFULLY TRANSFER DATA.
		FORMULAS CAN BE FOUND IN ANNEX J OF THE NTIA MANUAL.
RF Emissions Data	155 kHz	2-SIDED EMISSION BANDWIDTH VALUES
-3 dB bandwidth	160 kHz	
-20 dB bandwidth	170 kHz	
-40 dB bandwidth	190 kHz	
-60 dB bandwidth	GMSK	
Modulation Type	125 kbits/sec	THE METHOD USED TO SUPERIMPOSE DATA ON
Data Pata	155 kHz	THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK. INFORMATION DATA RATE
Data Rate Forward Error		
	Is FEC used? Yes □ No ⊠	
Correction Coding	FEC Type:	
	FEC Rate:	
Total Symbol Rate	1.2 ksymbols/sec	DATA RATE COMBINED WITH FEC AND FRAME
Total Symbol Nate	1.2 KSymbols/ sec	OVERHEAD RESULTING IN THE TOTAL SYMBOL
		RATE AT THE INPUTE TO THE SYMBOL MAPPER/MODULATOR.
Transmit Antenna	XAP = R	POLARIZATIONS INCLUDE:
Polarization (XAP)		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 V05	THE EARTH STATION TRANSMITTER ANTENNA
Orientation (XAZ)		MINIMUM OPERATING ANGLE OF ELEVATION (XAZ), V00 TO V90, EXAMPLE, XAZ01
. ,		V00

Transmit Antenna Dimensions (XAD)	ANTENNA GAIN35 dBi, BEAMWIDTH2.67, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS53, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS2.2, XAD =XAD20 35G002.67B000- 360A00053H002.2	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: XAD01 16G030B001-360A00357H006
Transmit Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER <u>N/A</u> , ANTENNA EFFICIENCY <u>N/A</u> ,	
Number of Satellite Contacts Supported Per Day	<1 Contacts per Day	NUMBER OF TIMES THE EARTH STATION WILL COMMUNICATE WITH THE STATELLITE IN THE EARTH TO SPACE DIRECTION (UPINKS) EACH DAY
Expected Duration of Each Contact	8 minutes	AVERAGE DURATION OF EACH CONTACT
Satellite Receive Sp	pecifications	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = EC	NB= NARROWBEAM EC = EARTH COVERAGE
Receive Antenna Dimension (RAD)	ANTENNA GAIN5, BEAMWIDTH120, RAD = RAD37 5G120B	NTIA FORMAT(RAD), EXAMPLE, FOR 16 DBI ANTENNA GAIN AND 30 DEGREE BEAMWIDTH RAD01 16G030B
Type of satellite (State = SPCE) City = Geo or Nongeo	Type = NONGEOSTATIONARY	CHOOSE EITHER: GEOSTATIONARY OR NONGEOSTATIONARY
For Geostationary Satellites	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE IN DDDMMSS FORMAT (XLG AND/OR RLG).

For Nongeostationary (Orbital Data)	INCLINATION ANGLE <u>97.6 deg</u> , APOGEE IN KILOMETERS <u>525 km</u> , PERIGEE IN KILOMETERS <u>525 km</u> , ORBITAL PERIOD IN HOURS <u>1</u> AND FRACTIONS OF HOURS IN DECIMAL <u>0.58</u> , THE NUMBER OF SATELLITES IN THE SYSTEM <u>1</u> , ORB = ORB, 97.6IN00525AP00525PE001.58H01T01	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, REMO4 *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
For SunSynchronous Nongeostationary Orbits	Mean Local Time of Ascending Node (MLTDN) = 13:00 + 60 mins or 13:00- 14:00 (Note: SpaceX notified use of LTDN, not LTAN.)	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)

Transmit Frequency	v: 2049 MHz	
State (XSC)	XSC = Italy	
City Name (XAL)	XAL = Vimercate	
Latitude	Lat = 453536 N	
(DDMMSS)		
Longitude	Lon = 0092144 E	
(DDDMMSS)		
Transmit Power	PWR = 39.8 W	TRANSMIT POWER SUPPLIED TO THE ANTENNA
(PWR)	PWR01 W39.8	INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE:
		W = WATT,
		K = KILOWATT, M = MEGAWATT
Necessary	150 kHz	THE WIDTH OF FREQUENCY BAND WHICH IS JUST
Bandwidth		SUFFICIENT TO SUCCESSFULLY TRANSFER DATA.
Danamath		FORMULAS CAN BE FOUND IN ANNEX J OF THE NTIA MANUAL
<b>RF</b> Emissions Data		2-SIDED EMISSION BANDWIDTH VALUES
-3 dB bandwidth	155 kHz	
-20 dB bandwidth	160 kHz	
-40 dB bandwidth	170 kHz	
-60 dB bandwidth	190 kHz	
Modulation Type	GMSK	THE METHOD USED TO SUPERIMPOSE DATA ON
Data Rate	125 kbits/sec	THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK. INFORMATION DATA RATE
Forward Error	Is FEC used? Yes $\Box$ No $\boxtimes$	
Correction Coding	FEC Type: ,	
	FEC Rate:,	
	,,	

Total Symbol Rate	125 ksymbols/sec	DATA RATE COMBINED WITH FEC AND FRAME OVERHEAD RESULTING IN THE TOTAL SYMBOL
		RATE AT THE INPUTE TO THE SYMBOL
		MAPPER/MODULATOR.
Transmit Antenna	XAP = R	POLARIZATIONS INCLUDE:
Polarization (XAP)		H = HORIZONTAL,
		V = VERTICAL, S = HORIZONTAL AND VERTICAL,
		L = LEFT HAND CIRCULAR,
		R = RIGHT HAND CIRCULAR,
		T = RIGHT AND LEFT HAND CIRCULAR,
T		J = LINEAR POLARIZATION THE EARTH STATION TRANSMITTER ANTENNA
Transmit Antenna	XAZ = XAZ01 V05	MINIMUM OPERATING ANGLE OF
Orientation (XAZ)		ELEVATION (XAZ), V00 TO V90, EXAMPLE, XAZ01
		V00
Transmit Antenna	ANTENNA GAIN34.3 dBi,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16
Dimensions (XAD)	BEAMWIDTH3.2,	DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL
	AZIMUTHAL RANGE 000-360 ,	RANGE FROM 001-360, SITE ELEVATION OF 357
	THE SITE ELEVATION ABOVE MEAN SEA	METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS:
		XAD01 16G030B001-360A00357H006
	LEVEL IN METERS177,	
	THE ANTENNA HEIGHT ABOVE TERRAIN	
	IN METERS13,	
	XAD =XAD21 34.3G003.2B000-	
	360A00177H013	
Transmit Antenna	ANTENNA DIAMETERN/A,	
Additional	ANTENNA EFFICIENCY <u>N/A</u> ,	
Information (For		
Parabolic		
Antennas)		
Number of	<1 Contact Per Day	NUMBER OF TIMES THE EARTH STATION WILL
Satellite Contacts		COMMUNICATE WITH THE STATELLITE IN THE
		EARTH TO SPACE DIRECTION (UPINKS) EACH DAY
Supported Per		
Day		AVERAGE DURATION OF EACH CONTACT
Expected	8 minutes	
Duration of Each		
Contact		
Satellite Receive Sp	pecifications	
Receive Antenna	RAP = R	POLARIZATIONS INCLUDE:
		H = HORIZONTAL,
Polarization (RAP)		V = VERTICAL,
		S = HORIZONTAL AND VERTICAL,
		L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR,
		T = RIGHT AND LEFT HAND CIRCULAR,
		J = LINEAR POLARIZATION
Receive Antenna	RAZ = EC	
Orientation (RAZ)		EC = EARTH COVERAGE

Receive Antenna Dimension (RAD) Type of satellite (State = SPCE) City = Geo or Nongeo	ANTENNA GAIN5, BEAMWIDTH120, RAD = RAD37 5G120B Type = NONGEOSTATIONARY	NTIA FORMAT(RAD), EXAMPLE, FOR 16 DBI ANTENNA GAIN AND 30 DEGREE BEAMWIDTH RAD01 16G030B CHOOSE EITHER: GEOSTATIONARY OR NONGEOSTATIONARY
For Geostationary Satellites	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE IN DDDMMSS FORMAT (XLG AND/OR RLG).
For Nongeostationary (Orbital Data)	INCLINATION ANGLE <u>97.6 deg</u> , APOGEE IN KILOMETERS <u>525 km</u> , PERIGEE IN KILOMETERS <u>525 km</u> , ORBITAL PERIOD IN HOURS <u>1</u> AND FRACTIONS OF HOURS IN DECIMAL <u>0.58</u> , THE NUMBER OF SATELLITES IN THE SYSTEM <u>1</u> , ORB = ORB, 97.6IN00525AP00525PE001.58H01T01	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
For SunSynchronous Nongeostationary Orbits	Mean Local Time of Ascending Node (MLTDN) = 13:00 + 60 mins or 13:00- 14:00 (Note: SpaceX notified use of LTDN, not	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)

Transmit Frequency	/: 2049 MHz	
State (XSC)	XSC = Kandy	
City Name (XAL)	XAL = Sri Lanka	
Latitude	Lat = 071627 N	
(DDMMSS)		
Longitude	Lon = 0804329 E	
(DDDMMSS)		
Transmit Power (PWR)	PWR = 39.8 W PWR01 W39.8	TRANSMIT POWER SUPPLIED TO THE ANTENNA INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE: W = WATT, K = KILOWATT, M = MEGAWATT
Necessary Bandwidth	150 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.
<b>RF</b> Emissions Data		2-SIDED EMISSION BANDWIDTH VALUES

-3 dB bandwidth	155 kHz	
-20 dB bandwidth	160 kHz	-
-40 dB bandwidth	170 kHz	-
-60 dB bandwidth	190 kHz	_
Modulation Type	GMSK	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	125 kbits/sec	INFORMATION DATA RATE
Forward Error	Is FEC used? Yes 🗌 No 🖂	
Correction Coding	FEC Type:,	
	FEC Rate:,	
Total Symbol Rate	125 ksymbols/sec	DATA RATE COMBINED WITH FEC AND FRAME OVERHEAD RESULTING IN THE TOTAL SYMBOL RATE AT THE INPUTE TO THE SYMBOL MAPPER/MODULATOR.
Transmit Antenna 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 = XAZ01 V05	THE EARTH STATION TRANSMITTER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (XAZ), V00 TO V90, EXAMPLE, XAZ01 V00
Transmit Antenna Dimensions (XAD)	ANTENNA GAIN35 dBi, BEAMWIDTH2.67, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS462, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS2.2, XAD =XAD22 35H002.67B000- 360A00462H002.2	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: XAD01 16G030B001-360A00357H006
Transmit Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER <u>N/A</u> , ANTENNA EFFICIENCY <u>N/A</u> ,	
Number of Satellite Contacts Supported Per Day	<1 Contact Per Day	NUMBER OF TIMES THE EARTH STATION WILL COMMUNICATE WITH THE STATELLITE IN THE EARTH TO SPACE DIRECTION (UPINKS) EACH DAY
Expected Duration of Each Contact	8 minutes	AVERAGE DURATION OF EACH CONTACT
Satellite Receive Sp	pecifications	

		POLARIZATIONS INCLUDE:
Receive Antenna	RAP = R	H = HORIZONTAL,
Polarization (RAP)		V = VERTICAL,
		S = HORIZONTAL AND VERTICAL,
		L = LEFT HAND CIRCULAR,
		R = RIGHT HAND CIRCULAR,
		T = RIGHT AND LEFT HAND CIRCULAR,
		J = LINEAR POLARIZATION
Receive Antenna	RAZ = EC	NB= NARROWBEAM
Orientation (RAZ)		EC = EARTH COVERAGE
Receive Antenna	ANTENNA GAIN 5 ,	NTIA FORMAT(RAD), EXAMPLE, FOR 16 DBI
Dimension (RAD)	BEAMWIDTH 120 ,	ANTENNA GAIN AND 30 DEGREE BEAMWIDTH
Dimension (RAD)		RAD01 16G030B
	RAD =	
	RAD37 5G120B	
Type of satellite	Type = NONGEOSTATIONARY	CHOOSE EITHER:
(State = SPCE)		GEOSTATIONARY OR NONGEOSTATIONARY
-		
City = Geo or		
Nongeo		
For Geostationary	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT
Satellites		ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE IN DDDMMSS FORMAT
		(XLG AND/OR RLG).
For	INCLINATION ANGLE 97.6 deg ,	IF ANY SATELLITES ARE NONGEOSTATIONARY,
	APOGEE IN KILOMETERS 525 km ,	REPORT ITS INCLINATION ANGLE, APOGEE
Nongeostationary		IN KILOMETERS, PERIGEE IN KILOMETERS,
(Orbital Data)	PERIGEE IN KILOMETERS <u>525 km</u> ,	ORBITAL PERIOD IN HOURS AND FRACTIONS OF
	ORBITAL PERIOD IN HOURS <u>1</u> AND	HOURS IN DECIMAL, THE NUMBER OF SATELLITES
	FRACTIONS OF HOURS IN	IN THE SYSTEM, THEN T01, EXAMPLE, REM04
	DECIMAL <u>0.58</u> ,	*ORB,98.0IN00510AP00510PE001.58H01NRT01,
	THE NUMBER OF SATELLITES IN THE	AND FOR SPACE-TO-SPACE
		COMMUNICATIONS WITH ANOTHER
	SYSTEM,	NONGEOSTATIONARY SATELLITE ADD AN
		ADDITIONAL
	ORB =	*ORB FOR IT ENDING IN R01, EXAMPLE, REM05
	ORB, 97.6IN00525AP00525PE001.58H01T01	*ORB,72.9IN03209AP00655PE013.46H01NRR01
For	Mean Local Time of Ascending Node	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S
	5	ASCENDING NODE AND THE MEAN SUN, OFTEN
SunSynchronous	(MLTDN) = 13:00 + 60 mins or 13:00-	EXPRESSED AS UNIT OF TIME (HH:MM)
Nongeostationary	14:00	
Orbits		
	(Note: SpaceX notified use of LTDN, not	
	LTAN.)	

Transmit Frequency	y: 2049 MHz	
State (XSC)	XSC = Awarua	
City Name (XAL)	XAL = New Zealand	
Latitude	Lat = 463141 S	
(DDMMSS)		
Longitude	Lon = 1682245 E	
(DDDMMSS)		

Transmit Power	PWR = 39.8 W	TRANSMIT POWER SUPPLIED TO THE ANTENNA
(PWR)	PWR01 W39.8	INPUT TERMINAL, EXAMPLE, PWR01 W2
		TRANSMIT POWER UNITS INCLUDE:
		W = WATT, K = KILOWATT,
		M = MEGAWATT
Necessary	150 kHz	THE WIDTH OF FREQUENCY BAND WHICH IS JUST
Bandwidth		SUFFICIENT TO SUCCESSFULLY TRANSFER DATA.
Banawaan		FORMULAS CAN BE FOUND IN ANNEX J OF THE NTIA MANUAL.
RF Emissions Data		2-SIDED EMISSION BANDWIDTH VALUES
-3 dB bandwidth	155 kHz	
-20 dB bandwidth	160 kHz	
-40 dB bandwidth	170 kHz	
-60 dB bandwidth	190 kHz	
Modulation Type	GMSK	THE METHOD USED TO SUPERIMPOSE DATA ON
Data Data	125 khita/aaa	THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK. INFORMATION DATA RATE
Data Rate	125 kbits/sec	
Forward Error	Is FEC used? Yes □ No ⊠	
Correction Coding	FEC Type:,	
	FEC Rate:,	
Tatal Cumbal Data		DATA RATE COMBINED WITH FEC AND FRAME
Total Symbol Rate	125 ksymbols/sec	OVERHEAD RESULTING IN THE TOTAL SYMBOL
		RATE AT THE INPUTE TO THE SYMBOL
		MAPPER/MODULATOR.
Transmit Antenna	XAP = R	POLARIZATIONS INCLUDE: H = HORIZONTAL,
Polarization (XAP)		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 V05	THE EARTH STATION TRANSMITTER ANTENNA
Orientation (XAZ)		MINIMUM OPERATING ANGLE OF
		ELEVATION (XAZ), V00 TO V90, EXAMPLE, XAZ01 V00
Transmit Antenna	ANTENNA GAIN35 dBi,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16
Dimensions (XAD)	BEAMWIDTH2.67,	DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357
	AZIMUTHAL RANGE000-360,	METERS, AND ANTENNA HEIGHT ABOVE TERRAIN
	THE SITE ELEVATION ABOVE MEAN SEA	OF 6 METERS:
	LEVEL IN METERS16,	XAD01 16G030B001-360A00357H006
	THE ANTENNA HEIGHT ABOVE TERRAIN	
	IN METERS 2.2,	
	11N IVIETERS2.2,	
	XAD =XAD23 25G002.67B000-	
	360A00016H002.2	
Transmit Antenna	ANTENNA DIAMETER N/A ,	
Additional	ANTENNA EFFICIENCY N/A ,	
Information (For	,	
Parabolic		
Antennas)		
, arternasj		

Number of	<1 Contact Por Day	NUMBER OF TIMES THE EARTH STATION WILL
Satellite Contacts	<1 Contact Per Day	COMMUNICATE WITH THE STATELLITE IN THE
		EARTH TO SPACE DIRECTION (UPINKS) EACH DAY
Supported Per		
Day		
Expected	8 minutes	AVERAGE DURATION OF EACH CONTACT
Duration of Each		
Contact		
Satellite Receive Sp	pecifications	
Receive Antenna	RAP = R	POLARIZATIONS INCLUDE:
		H = HORIZONTAL,
Polarization (RAP)		V = VERTICAL,
		S = HORIZONTAL AND VERTICAL,
		L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR,
		T = RIGHT AND LEFT HAND CIRCULAR,
		J = LINEAR POLARIZATION
Receive Antenna	RAZ = EC	NB= NARROWBEAM EC = EARTH COVERAGE
Orientation (RAZ)		EC = EARTH COVERAGE
Receive Antenna	ANTENNA GAIN5,	NTIA FORMAT(RAD), EXAMPLE, FOR 16 DBI
Dimension (RAD)	BEAMWIDTH 120 ,	ANTENNA GAIN AND 30 DEGREE BEAMWIDTH
( )	RAD =	RAD01 16G030B
	RAD37 5G120B	
Type of satellite	Type = NONGEOSTATIONARY	CHOOSE EITHER:
(State = SPCE)		GEOSTATIONARY OR NONGEOSTATIONARY
City = Geo or		
Nongeo		
For Geostationary	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT
Satellites		ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND
Jatemies		REPORT ITS LONGITUDE IN DDDMMSS FORMAT
For	INCLINATION ANGLE 97.6 deg ,	(XLG AND/OR RLG). IF ANY SATELLITES ARE NONGEOSTATIONARY,
		REPORT ITS INCLINATION ANGLE, APOGEE
Nongeostationary	APOGEE IN KILOMETERS 525 km,	IN KILOMETERS, PERIGEE IN KILOMETERS,
(Orbital Data)	PERIGEE IN KILOMETERS <u>525 km</u> ,	ORBITAL PERIOD IN HOURS AND FRACTIONS OF HOURS IN DECIMAL, THE NUMBER OF SATELLITES
	ORBITAL PERIOD IN HOURS <u>1</u> AND	IN THE SYSTEM, THEN TO1, EXAMPLE,
	FRACTIONS OF HOURS IN	REM04
	DECIMAL <u>0.58</u> ,	*ORB,98.0IN00510AP00510PE001.58H01NRT01,
	THE NUMBER OF SATELLITES IN THE	AND FOR SPACE-TO-SPACE COMMUNICATIONS WITH ANOTHER
	SYSTEM,	NONGEOSTATIONARY SATELLITE ADD AN
		ADDITIONAL
	ORB =	*ORB FOR IT ENDING IN R01, EXAMPLE, REM05
	ORB, 97.6IN00525AP00525PE001.58H01T01	*ORB,72.9IN03209AP00655PE013.46H01NRR01
For	Mean Local Time of Ascending Node	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S
SunSynchronous	(MLTDN) = 13:00 + 60 mins or 13:00-	ASCENDING NODE AND THE MEAN SUN, OFTEN
Nongeostationary	14:00	EXPRESSED AS UNIT OF TIME (HH:MM)
Orbits	17.00	
OT DILS	(Note: SpaceX notified use of LTDN, not	
	LTAN.)	

Transmit Frequency	/: 2049 MHz	
State (XSC)	XSC = Santa Maria, Azores	
City Name (XAL)	XAL = Portugal	
Latitude	Lat = 365951 N	
(DDMMSS)		
Longitude	Lon = 0250814 W	
(DDDMMSS)		
Transmit Power	PWR = 39.8 W	TRANSMIT POWER SUPPLIED TO THE ANTENNA
(PWR)	PWR01 W39.8	INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE:
		W = WATT,
		K = KILOWATT, M = MEGAWATT
Necessary	150 kHz	THE WIDTH OF FREQUENCY BAND WHICH IS JUST
Bandwidth		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	155 kHz	
-20 dB bandwidth	160 kHz	
-40 dB bandwidth	170 kHz	
-60 dB bandwidth	190 kHz	
Modulation Type	GMSK	THE METHOD USED TO SUPERIMPOSE DATA ON
Data Data		THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK. INFORMATION DATA RATE
Data Rate	125 kbits/sec	
Forward Error	Is FEC used? Yes □ No ⊠	
Correction Coding	FEC Type:	
	FEC Rate:	
<b>T</b> + 10 + 10 +		DATA RATE COMBINED WITH FEC AND FRAME
Total Symbol Rate	125 ksymbols/sec	OVERHEAD RESULTING IN THE TOTAL SYMBOL
		RATE AT THE INPUTE TO THE SYMBOL
Transmit Antenna	XAP = R	MAPPER/MODULATOR. POLARIZATIONS INCLUDE:
Polarization (XAP)		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 V05	THE EARTH STATION TRANSMITTER ANTENNA
Orientation (XAZ)		MINIMUM OPERATING ANGLE OF
		ELEVATION (XAZ), V00 TO V90, EXAMPLE, XAZ01

Transmit Antenna Dimensions (XAD)	ANTENNA GAIN35 dBi, BEAMWIDTH2.67, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS194, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS2.2, XAD =XAD24 35G002.67B000- 360A00194H002.2	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: XAD01 16G030B001-360A00357H006
Transmit Antenna Additional Information (For Parabolic Antennas)	ANTENNA DIAMETER <u>N/A</u> , ANTENNA EFFICIENCY <u>N/A</u> ,	
Number of Satellite Contacts Supported Per Day	<1 Contact Per Day	NUMBER OF TIMES THE EARTH STATION WILL COMMUNICATE WITH THE STATELLITE IN THE EARTH TO SPACE DIRECTION (UPINKS) EACH DAY
Expected Duration of Each Contact	8 minutes	AVERAGE DURATION OF EACH CONTACT
Satellite Receive Sp	pecifications	
Receive Antenna Polarization (RAP)	RAP = 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
Receive Antenna Orientation (RAZ)	RAZ = EC	NB= NARROWBEAM EC = EARTH COVERAGE
Receive Antenna Dimension (RAD)	ANTENNA GAIN5, BEAMWIDTH120, RAD = RAD37 5G120B	NTIA FORMAT(RAD), EXAMPLE, FOR 16 DBI ANTENNA GAIN AND 30 DEGREE BEAMWIDTH RAD01 16G030B
Type of satellite (State = SPCE) City = Geo or Nongeo	Type = NONGEOSTATIONARY	CHOOSE EITHER: GEOSTATIONARY OR NONGEOSTATIONARY
For Geostationary Satellites	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE IN DDDMMSS FORMAT (XLG AND/OR RLG).

For Nongeostationary (Orbital Data)	INCLINATION ANGLE <u>97.6 deg</u> , APOGEE IN KILOMETERS <u>525 km</u> , PERIGEE IN KILOMETERS <u>525 km</u> , ORBITAL PERIOD IN HOURS <u>1</u> AND FRACTIONS OF HOURS IN DECIMAL <u>0.58</u> , THE NUMBER OF SATELLITES IN THE SYSTEM <u>1</u> , ORB = ORB, 97.6IN00525AP00525PE001.58H01T01	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, REMO4 *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
For SunSynchronous Nongeostationary Orbits	Mean Local Time of Ascending Node (MLTDN) = 13:00 + 60 mins or 13:00- 14:00 (Note: SpaceX notified use of LTDN, not LTAN.)	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)

Transmit Frequency	v: 2049 MHz	
State (XSC)	XSC = United Kingdom	
City Name (XAL)	XAL = Unst, Shetland	
Latitude	Lat = 604452 N	
(DDMMSS)		
Longitude	Lon = 0005128 W	
(DDDMMSS)		
Transmit Power	PWR = 39.8 W	TRANSMIT POWER SUPPLIED TO THE ANTENNA
(PWR)	PWR01 W39.8	INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE:
		W = WATT,
		K = KILOWATT, M = MEGAWATT
Necessary	150 kHz	THE WIDTH OF FREQUENCY BAND WHICH IS JUST
Bandwidth		SUFFICIENT TO SUCCESSFULLY TRANSFER DATA.
		FORMULAS CAN BE FOUND IN ANNEX J OF THE NTIA MANUAL.
<b>RF</b> Emissions Data		2-SIDED EMISSION BANDWIDTH VALUES
-3 dB bandwidth	155 kHz	
-20 dB bandwidth	160 kHz	
-40 dB bandwidth	170 kHz	
-60 dB bandwidth	190 kHz	
Modulation Type	GMSK	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	125 kbits/sec	INFORMATION DATA RATE
Forward Error	Is FEC used? Yes □ No ⊠	
<b>Correction Coding</b>	FEC Type:,	
	FEC Rate:,	

Total Symbol Rate	125 ksymbols/sec	DATA RATE COMBINED WITH FEC AND FRAME
TOTAL SYTTEOL RALE	125 KSymbols/sec	OVERHEAD RESULTING IN THE TOTAL SYMBOL
		RATE AT THE INPUTE TO THE SYMBOL
		MAPPER/MODULATOR.
Transmit Antenna	XAP = R	POLARIZATIONS INCLUDE: H = HORIZONTAL,
Polarization (XAP)		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 V05	THE EARTH STATION TRANSMITTER ANTENNA
Orientation (XAZ)		MINIMUM OPERATING ANGLE OF
		ELEVATION (XAZ), V00 TO V90, EXAMPLE, XAZ01
		V00
Transmit Antenna	ANTENNA GAIN35dBi,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16
Dimensions (XAD)		DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL
Dimensions (XAD)	BEAMWIDTH2.67,	RANGE FROM 001-360, SITE ELEVATION OF 357
	AZIMUTHAL RANGE000-360,	METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS:
	THE SITE ELEVATION ABOVE MEAN SEA	XAD01 16G030B001-360A00357H006
	LEVEL IN METERS19,	
	THE ANTENNA HEIGHT ABOVE TERRAIN	
	IN METERS,	
	XAD =XAD25 35G002.67B000-	
	360A019H002.2	
Transmit Antenna	ANTENNA DIAMETER <u>N/A</u> ,	
Additional	ANTENNA EFFICIENCY N/A ,	
	ANTENNA EFFICIENCI_ <u>N/A</u> ,	
Information (For		
Parabolic		
Antennas)		
Number of	<1 Contact Per Day	NUMBER OF TIMES THE EARTH STATION WILL
Satellite Contacts		COMMUNICATE WITH THE STATELLITE IN THE EARTH TO SPACE DIRECTION (UPINKS) EACH DAY
Supported Per		
Day		
Expected	8 minutes	AVERAGE DURATION OF EACH CONTACT
Duration of Each		
Contact		
Satellite Receive Sp	Decifications	
Dopping Antonna	RAP = R	POLARIZATIONS INCLUDE:
Receive Antenna	KAP = K	H = HORIZONTAL,
Polarization (RAP)		V = VERTICAL,
		S = HORIZONTAL AND VERTICAL,
		L = LEFT HAND CIRCULAR,
		R = RIGHT HAND CIRCULAR, T = RIGHT AND LEFT HAND CIRCULAR,
		J = LINEAR POLARIZATION
Receive Antenna	RAZ = EC	NB= NARROWBEAM
Orientation (RAZ)	-	EC = EARTH COVERAGE

Receive Antenna Dimension (RAD) Type of satellite (State = SPCE) City = Geo or Nongeo	ANTENNA GAIN5, BEAMWIDTH120, RAD = RAD37 5G120B Type = NONGEOSTATIONARY	NTIA FORMAT(RAD), EXAMPLE, FOR 16 DBI ANTENNA GAIN AND 30 DEGREE BEAMWIDTH RAD01 16G030B CHOOSE EITHER: GEOSTATIONARY OR NONGEOSTATIONARY
For Geostationary Satellites	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE IN DDDMMSS FORMAT (XLG AND/OR RLG).
For Nongeostationary (Orbital Data)	INCLINATION ANGLE <u>97.6 deg</u> , APOGEE IN KILOMETERS <u>525 km</u> , PERIGEE IN KILOMETERS <u>525 km</u> , ORBITAL PERIOD IN HOURS <u>1</u> AND FRACTIONS OF HOURS IN DECIMAL <u>0.58</u> , THE NUMBER OF SATELLITES IN THE SYSTEM <u>1</u> , ORB = ORB, 97.6IN00525AP00525PE001.58H01T01	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
For SunSynchronous Nongeostationary Orbits	Mean Local Time of Ascending Node (MLTDN) = 13:00 + 60 mins or 13:00- 14:00 (Note: SpaceX notified use of LTDN, not	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)