## **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	
168.8 kHz	
Transmit Frequency: 2287.5 MHz	51
1 MHz	51

## Part B: Earth to Space Uplink Data

ransmit Frequency: 2049 MHz68
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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 Orientation (XAZ)

ANTENNA GAIN 0 dBi

XAD = XAD01 00G360B

360

BEAMWIDTH

Transmit Antenna

Dimension (XAD)

NTIA FORMAT (XAD), EXAMPLE, FOR 16 DBI

XAD01 16G030B

ANTENNA GAIN AND 30 DEGREE 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

E000-360, N ABOVE MEAN SEA , GHT ABOVE TERRAIN , 000-360A01339H006 ERN/A, NCYN/A, NUMBER OF TIMES THE SATELLITE WILL COMMUNICATE WITH THE EARTH STATION IN THE SPACE TO EARTH DIRECTION (DOWNLINKS) EACH
OF 6 METERS: 
IN ABOVE MEAN SEA       RAD01 16G030B001-360A00357H006         GHT ABOVE TERRAIN
GHT ABOVE TERRAIN
, D00-360A01339H006 ERN/A, NCYN/A, NUMBER OF TIMES THE SATELLITE WILL COMMUNICATE WITH THE EARTH STATION IN THE SPACE TO EARTH DIRECTION (DOWNLINKS) EACH
000-360A01339H006         ERN/A
ERN/A, NCYN/A, NUMBER OF TIMES THE SATELLITE WILL COMMUNICATE WITH THE EARTH STATION IN THE SPACE TO EARTH DIRECTION (DOWNLINKS) EACH
ERN/A, NCYN/A, NUMBER OF TIMES THE SATELLITE WILL COMMUNICATE WITH THE EARTH STATION IN THE SPACE TO EARTH DIRECTION (DOWNLINKS) EACH
ERN/A, NCYN/A, NUMBER OF TIMES THE SATELLITE WILL COMMUNICATE WITH THE EARTH STATION IN THE SPACE TO EARTH DIRECTION (DOWNLINKS) EACH
NCYN/A,           NUMBER OF TIMES THE SATELLITE WILL           COMMUNICATE WITH THE EARTH STATION IN THE           SPACE TO EARTH DIRECTION (DOWNLINKS) EACH
NUMBER OF TIMES THE SATELLITE WILL COMMUNICATE WITH THE EARTH STATION IN THE SPACE TO EARTH DIRECTION (DOWNLINKS) EACH
COMMUNICATE WITH THE EARTH STATION IN THE SPACE TO EARTH DIRECTION (DOWNLINKS) EACH
COMMUNICATE WITH THE EARTH STATION IN THE SPACE TO EARTH DIRECTION (DOWNLINKS) EACH
COMMUNICATE WITH THE EARTH STATION IN THE SPACE TO EARTH DIRECTION (DOWNLINKS) EACH
COMMUNICATE WITH THE EARTH STATION IN THE SPACE TO EARTH DIRECTION (DOWNLINKS) EACH
SPACE TO EARTH DIRECTION (DOWNLINKS) EACH
AVERAGE DURATION OF EACH CONTACT
d Status Data SATELLITE HEALTH AND STATUS TELEMETRY
ata
h Earth Station Location
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
MINIMUM OPERATING ANGLE OF
ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00
a

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	L 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

BEAMWIDTH40,	RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN
	OF 6 METERS:
	RAD01 16G030B001-360A00357H006
IN WETERS15,	
ANTENNA EFFICIENCYN/A,	
d an at a secondary	NUMBER OF TIMES THE SATELLITE WILL
<1 contact 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	
a (Receiver) at Each Earth Station Locatio	on
RSC = Italy	
RAL = Lomazzo	
Lat = 454150 N	
Lon = 0090205 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
RAZ = RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA
	MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01
	<b>a (Receiver) at Each Earth Station Location</b> RSC = Italy RAL = Lomazzo Lat = 454150 N Lon = 0090205 E RAP = J

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 = pu, 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,	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	
	THE ANTENNA HEIGHT ABOVE TERRAIN		
	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			
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	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

360

Dimension (XAD)

BEAMWIDTH

XAD = XAD01 00G360B

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 = 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 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL
Dimensions (RAD)	BEAMWIDTH22,	RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS:
	AZIMUTHAL RANGE_000-360,	
	THE SITE ELEVATION ABOVE MEAN SEA	RAD01 16G030B001-360A00357H006
	LEVEL IN METERS1339,	
	THE ANTENNA HEIGHT ABOVE TERRAIN	
	IN METERS6,	
	RAD =	
	RAD – RAD01 16.2G022B000-360A01339H006	
Dessive Antonno		
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 AND/OR MISSION PAYLOAD DATA
Operations	Mission Payload Data 🛛	AND/OR MISSION PATLOAD DATA
Earth Station Dat	a (Receiver) at Each Earth Station Locatio	on
	• •	
State (RSC)	RSC = Sweden	
State (RSC)	RSC = Sweden	
State (RSC) City Name (RAL)	RSC = Sweden RAL = Boden	
State (RSC) City Name (RAL) Latitude	RSC = Sweden RAL = Boden	
State (RSC) City Name (RAL) Latitude (DDMMSS)	RSC = Sweden RAL = Boden Lat = 654800 N	
State (RSC) City Name (RAL) Latitude (DDMMSS) Longitude	RSC = Sweden RAL = Boden Lat = 654800 N	POLARIZATIONS INCLUDE:
State (RSC) City Name (RAL) Latitude (DDMMSS) Longitude (DDDMMSS)	RSC = Sweden RAL = Boden Lat = 654800 N Lon = 0214048 E	H = HORIZONTAL,
State (RSC) City Name (RAL) Latitude (DDMMSS) Longitude (DDDMMSS) Receive Antenna	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 Lon = 0214048 E	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	H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR,
State (RSC) City Name (RAL) Latitude (DDMMSS) Longitude (DDDMMSS) Receive Antenna	RSC = Sweden RAL = Boden Lat = 654800 N Lon = 0214048 E	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	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	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

Dessive Antonno		EXAMPLE ASSUMING NONGEOSTATIONARY, 16
Receive Antenna	ANTENNA GAIN14.8,	DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL
Dimensions (RAD)		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	RAD01 16G030B001-360A00357H006
	LEVEL IN METERS177,	
	THE ANTENNA HEIGHT ABOVE TERRAIN	
	IN METERS13,	
	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
Operations	Mission Payload Data	AND/OR MISSION PAYLOAD DATA
Earth Station Dat	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Italy	
City Name (RAL)	RAL = Lomazzo	
Latitude	Lat = 454150 N	
(DDMMSS)		
Longitude	Lon = 0090205 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
Orientation (RAZ)		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	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 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: 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 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

Receive Antenna Dimensions (RAD)	ANTENNA GAIN16.2, BEAMWIDTH22,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 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 METERS1339,	RAD01 16G030B001-360A00357H006
	THE ANTENNA HEIGHT ABOVE TERRAIN	
	IN METERS6,	
	,	
	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
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 Duration of Each	8 minutes	
Contact		SATELLITE HEALTH AND STATUS TELEMETRY
Supported	Satellite Health and Status Data	AND/OR MISSION PAYLOAD DATA
Operations	Mission Payload Data	
Fouth Station Dat	(Reasiver) at Each Fouth Station Leasti	
	a (Receiver) at Each Earth Station Locatio	
State (RSC)	RSC = Sweden	
( ity Nama (RAL)		
City Name (RAL)	RAL = Boden	
Latitude	RAL = Boden Lat = 654800 N	
Latitude (DDMMSS)	Lat = 654800 N	
Latitude (DDMMSS) Longitude		
Latitude (DDMMSS) Longitude (DDDMMSS)	Lat = 654800 N Lon = 0214048 E	
Latitude (DDMMSS) Longitude	Lat = 654800 N	POLARIZATIONS INCLUDE:
Latitude (DDMMSS) Longitude (DDDMMSS)	Lat = 654800 N Lon = 0214048 E	POLARIZATIONS INCLUDE: H = HORIZONTAL, V = VERTICAL,
Latitude (DDMMSS) Longitude (DDDMMSS) Receive Antenna	Lat = 654800 N Lon = 0214048 E	H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL,
Latitude (DDMMSS) Longitude (DDDMMSS) Receive Antenna	Lat = 654800 N Lon = 0214048 E	H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR,
Latitude (DDMMSS) Longitude (DDDMMSS) Receive Antenna	Lat = 654800 N Lon = 0214048 E	H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR,
Latitude (DDMMSS) Longitude (DDDMMSS) Receive Antenna	Lat = 654800 N Lon = 0214048 E	H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR,
Latitude (DDMMSS) Longitude (DDDMMSS) Receive Antenna	Lat = 654800 N Lon = 0214048 E	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
Latitude (DDMMSS) Longitude (DDDMMSS) Receive Antenna Polarization (RAP)	Lat = 654800 N Lon = 0214048 E 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 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)	monsions (PAD) BEAM/WIDTH 40	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 contract 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 Dimensions (RAD)	ANTENNA GAIN14.8, BEAMWIDTH40,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 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 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		
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	8 minutes	AVERAGE DURATION OF EACH CONTACT
Expected Duration of Each	ommutes	
Contact		SATELLITE HEALTH AND STATUS TELEMETRY
Supported	Satellite Health and Status Data 🛛	AND/OR MISSION PAYLOAD DATA
Operations	Mission Payload Data	
Earth Station Dat	(Passiver) at Each Earth Station Lesation	
	a (Receiver) at Each Earth Station Location	
State (RSC)		
City Name (RAL)	RAL = Lomazzo	
Latitude	Lat = 454150 N	
(DDMMSS)		
(DDMMSS) Longitude	Lat = 454150 N Lon = 0090205 E	
(DDMMSS) Longitude (DDDMMSS)	Lon = 0090205 E	
(DDMMSS) Longitude (DDDMMSS) Receive Antenna		POLARIZATIONS INCLUDE:
(DDMMSS) Longitude (DDDMMSS)	Lon = 0090205 E	POLARIZATIONS INCLUDE: H = HORIZONTAL, V = VERTICAL,
(DDMMSS) Longitude (DDDMMSS) Receive Antenna	Lon = 0090205 E	H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL,
(DDMMSS) Longitude (DDDMMSS) Receive Antenna	Lon = 0090205 E	H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR,
(DDMMSS) Longitude (DDDMMSS) Receive Antenna	Lon = 0090205 E	H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL,
(DDMMSS) Longitude (DDDMMSS) Receive Antenna	Lon = 0090205 E	H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR,
(DDMMSS) Longitude (DDDMMSS) Receive Antenna	Lon = 0090205 E	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 = 0090205 E 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, (	S945. Cubesat, (Apex Aries 1)	

Satellite Name: Ape	ex Aries 1	
	Deter Alexandre	
Data Field Transmit Power (PWR)	Data Answer PWR = 2 W PWR02 W2	Description/CommentsTRANSMIT POWER SUPPLIED TO THE ANTENNAINPUT TERMINAL, EXAMPLE, PWR01 W2TRANSMIT 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 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

Receive Antenna	ANTENNA GAIN, BEAMWIDTH22,	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 METERS1339,	RAD01 16G030B001-360A00357H006
	THE ANTENNA HEIGHT ABOVE TERRAIN	
	IN METERS6,	
	IN METERS,	
	RAD =	
	RAD01 16.2G022B000-360A01339H006	
Receive Antenna	ANTENNA DIAMETERN/A,	
Additional	ANTENNA EFFICIENCYN/A,	
Information (For	ANTENNA ETTICIENCIN/A,	
Parabolic		
Antennas) Number of	A contacts par day	NUMBER OF TIMES THE SATELLITE WILL
Satellite Contacts	4 contacts per day	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 Doration 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 🛛	
Farth Station Dat	 a (Receiver) at Each Earth Station Location	 nn
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,
		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
Unentation (RAZ)		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

Receive Antenna Dimensions (RAD)	ANTENNA GAIN14.8, BEAMWIDTH40, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS177, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS13,	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 14.8G040B001-360A00177H013	
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	Satellite Health and Status Data 🖂	SATELLITE HEALTH AND STATUS TELEMETRY
Operations	Mission Payload Data 🛛	AND/OR MISSION PAYLOAD DATA
Forth Station Date	- (Passiver) at Each Forth Station Lassti	
	a (Receiver) at Each Earth Station Locatio	
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 =	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 $oxtimes$	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)	

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.
RF Emissions Data		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 Date	a (Receiver) at Each Earth Station Locatio	
	RSC = South Africa	
State (RSC) 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 Locatio	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	ANTENNA GAIN40,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16
Dimensions (RAD)	BEAMWIDTH0.97,	DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL
	AZIMUTHAL RANGE_000-270,	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 METERS46,	RAD01 16G030B001-360A00357H006
	THE ANTENNA HEIGHT ABOVE TERRAIN	
	IN METERS6,	
	RAD =	
	RAD08 40G.97B000-270A00046H006	
Receive Antenna	ANTENNA DIAMETER6.0,	
Additional	ANTENNA EFFICIENCY0.5,	
Information (For	ANTENNA EFFICIENCI0.5,	
Parabolic		
Antennas) Number of	11 contacts per day	NUMBER OF TIMES THE SATELLITE WILL
Satellite Contacts	II contacts per day	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 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	
Earth Station Dat	a (Receiver) at Each Earth Station Locati	on
State (RSC)	RSC = Australia	
City Name (RAL)	RAL = Currans Hill	
Latitude	Lat = 340224 S	
(DDMMSS)		
Longitude	Lon = 1504612 E	
(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

ANTENNA GAIN16,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16
BEAMWIDTH1.83,	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 95 .	RAD01 16G030B001-360A00357H006
IN METERS 20 ,	
RAD =	
RAD09 16G1.83B000-360A095H020	
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
Mission Payload Data 🛛	AND/OR MISSION PAYLOAD DATA
· · · · ·	
a (Receiver) at Each Earth Station Locatio	on
RSC = Bahrain	
RAL = Zallaq	
Lat = 260300	
Lon = 0503000	
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
DAZ DAZ04 \/00	THE EARTH STATION RECEIVER ANTENNA
RAZ = RAZ01 V00	
RAZ = RAZUI VUU	MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01
	AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS95, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS20, RAD = RAD09 16G1.83B000-360A095H020 ANTENNA DIAMETER5.4, ANTENNA DIAMETER5.4, ANTENNA EFFICIENCY0.5, <1 contact per day <pre></pre>

ANTENNA GAIN16, BEAMWIDTH1.83,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 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 METERS 10 ,	RAD01 16G030B001-360A00357H006
THE ANTENNA HEIGHT ABOVE TERRAIN	
IN METERS20,	
RAD =	
RAD10 16G1.83B000-360A00010H020	
ANTENNA DIAMETER 5.4 ,	
ANTENNA EFFICIENCY0.5,	
<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 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	J = LINEAR POLARIZATION           THE EARTH STATION RECEIVER ANTENNA
RAZ = RAZ01 V00	
	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   <1 contact per day

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 = RAD11 16G1.83B000-360A084H020	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 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 Location	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	Dn
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 Location	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 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	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 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>5</u> , BEAMWIDTH <u>70</u> ,	NTIA FORMAT (XAD), EXAMPLE, FOR 16 DBI ANTENNA GAIN AND 30 DEGREE BEAMWIDTH

XAD01 16G030B

BEAMWIDTH 70

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 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	ANTENNA GAIN40,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16
Dimensions (RAD)	BEAMWIDTH0.97,	DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL
Dimensions (RAD)		RANGE FROM 001-360, SITE ELEVATION OF 357
	AZIMUTHAL RANGE000-270, THE SITE ELEVATION ABOVE MEAN SEA	METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS:
		RAD01 16G030B001-360A00357H006
	LEVEL IN METERS,	
	THE ANTENNA HEIGHT ABOVE TERRAIN	
	IN METERS6,	
	242	
	RAD =	
	RAD07 40G.97B000-270A01339H006	
Receive Antenna	ANTENNA DIAMETER6.0,	
Additional	ANTENNA EFFICIENCY0.5,	
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 = 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,
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 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	1
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 16 , BEAMWIDTH 1.83 , AZIMUTHAL RANGE 000-360 , THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS 95 , THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS 20 , 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	RAD09 16G1.83B000-360A00095H020	
Additional Information (For Parabolic	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	Satellite Health and Status Data 🛛	SATELLITE HEALTH AND STATUS TELEMETRY
Operations	Mission Payload Data	AND/OR MISSION PAYLOAD DATA
Earth Station Date	a (Receiver) at Each Earth Station Locatio	
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	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 METERS10,	RAD01 16G030B001-360A00357H006
	THE ANTENNA HEIGHT ABOVE TERRAIN	
	IN METERS20,	
	242	
	RAD =	
	RAD10 16G1.83B000-360A00010H020	
Receive Antenna	ANTENNA DIAMETER5.4,	
Additional	ANTENNA EFFICIENCY0.5,	
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
Earth Station Data	a (Receiver) at Each Earth Station Locatio	on
State (RSC)	RSC = Ireland	
City Name (RAL)	RAL = Dublin	
Latitude	Lat = 532400 N	
(DDMMSS)		
Longitude	Lon = 0061312 W	
(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 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 = RAD11 16G1.83B000-360A084H020	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 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	ANTENNA DIAMETER3.7, ANTENNA EFFICIENCY4965,	
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 = 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 RANGE 000-360, 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

ANTENNA GAIN,	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 WEILING,	
ANTENNA EFFICIENCY4905,	
<1 contact par day	NUMBER OF TIMES THE SATELLITE WILL
<1 contact per day	COMMUNICATE WITH THE EARTH STATION IN THE
	SPACE TO EARTH DIRECTION (DOWNLINKS) EACH
	DAY
	AVERAGE DURATION OF EACH CONTACT
8 minutes	AVERAGE DURATION OF EACH CONTACT
	SATELLITE HEALTH AND STATUS TELEMETRY AND/OR MISSION PAYLOAD DATA
Mission Payload Data	,
	on
RSC = United Kingdom	
RAL = Unst, Shetland	
Lat = 604452 N	
Lon = 0005128 W	
RAP = R	POLARIZATIONS INCLUDE:
	H = HORIZONTAL, V = VERTICAL,
	S = HORIZONTAL AND VERTICAL,
	L = LEFT HAND CIRCULAR,
	R = RIGHT HAND CIRCULAR,
RAZ = RAZ01 V00	R = RIGHT HAND CIRCULAR, T = RIGHT AND LEFT HAND CIRCULAR, J = LINEAR POLARIZATION THE EARTH STATION RECEIVER ANTENNA
RAZ = RAZ01 V00	R = RIGHT HAND CIRCULAR, T = RIGHT AND LEFT HAND CIRCULAR, J = LINEAR POLARIZATION
	BEAMWIDTH $2.4$ AZIMUTHAL RANGE $000-360$ THE SITE ELEVATION ABOVE MEAN SEALEVEL IN METERS $194$ THE ANTENNA HEIGHT ABOVE TERRAININ METERS $2.2$ RAD =RAD20 34.6G2.4B000-360A00194H2.2ANTENNA DIAMETER $3.7$ ANTENNA EFFICIENCY.4965.4965.4965.4965Satellite Health and Status Data $\square$ Mission Payload Data $\square$ <b>a</b> (Receiver) at Each Earth Station LocationRSC = United KingdomRAL = Unst, ShetlandLat = 604452 NLon = 0005128 W

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 EFFICIENCY .4965 ,	
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		SATELLITE HEALTH AND STATUS TELEMETRY
Supported	Satellite Health and Status Data 🛛	AND/OR MISSION PAYLOAD DATA
Operations	Mission Payload Data	
FCC notes:		
1. Use S-Note		
2. REM AGN, C	Cubesat, (Apex Aries 1)	

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

: 2049 MHz	
XSC = South Africa	
XAL = Pretoria	
Lat = 255136 S	
Lon = 0282700 E	
PWR = 100 W	TRANSMIT POWER SUPPLIED TO THE ANTENNA
PWR01 W100	INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE:
	W = WATT,
	K = KILOWATT,
150 kHz	M = MEGAWATT 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
155 kHz	
160 kHz	
170 kHz	
190 kHz	
GMSK	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
125 kbits/sec	INFORMATION DATA RATE
Is FEC used? Yes 🗌 No 🖂	
FEC Type:,	
FEC 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,
	J = LINEAR POLARIZATION
XAZ = XAZ01 V00	THE EARTH STATION TRANSMITTER ANTENNA MINIMUM OPERATING ANGLE OF
	ELEVATION (XAZ), V00 TO V90, EXAMPLE, XAZ01 V00
	XSC = South Africa         XAL = Pretoria         Lat = 255136 S         Lon = 0282700 E         PWR = 100 W         PWR01 W100         150 kHz         150 kHz         150 kHz         150 kHz         160 kHz         170 kHz         190 kHz         GMSK         125 kbits/sec         Is FEC used? Yes □ No ⊠         FEC Type:

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

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 6	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.
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 $\Box$ 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.

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 Satellites	Type = NONGEOSTATIONARY Longitude =	CHOOSE EITHER: GEOSTATIONARY OR NONGEOSTATIONARY IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE IN DDDMMSS FORMAT
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	(XLG AND/OR RLG). 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)

<b>Transmit Frequency</b>	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)	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.
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 GAIN16, BEAMWIDTH32, AZIMUTHAL RANGE270-270, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS95, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS20, 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 = 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	XAZ XAZ01 X00	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	
Duration of Each		
Contact		
Satellite Receive Sp	pecifications	
	I	
Receive Antenna	RAP = R	POLARIZATIONS INCLUDE: H = HORIZONTAL.
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 = 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 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 = 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		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 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-	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
	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 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 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 <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 = 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</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 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	ommutes	
Contact		
Satellite Receive Sp	Decifications	
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
	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
Satemies		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
(Orbital Data)	PERIGEE IN KILOMETERS 525 km ,	IN KILOMETERS, PERIGEE IN KILOMETERS, 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,
	DECIMAL 0.58 ,	REM04 *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 =	*ORB FOR IT ENDING IN R01, EXAMPLE, REM05
	ORB - ORB, 97.6IN00525AP00525PE001.58H01T01	*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:
<b>( )</b>		W = WATT,
		K = KILOWATT,
N1	450111	M = MEGAWATT THE WIDTH OF FREQUENCY BAND WHICH IS JUST
Necessary	150 kHz	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	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
·		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 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 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 = 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.
		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 $oxtimes$	
<b>Correction Coding</b>	FEC Type:,	
	FEC Rate:,	

Total Symbol Rate	125 ksymbols/sec	DATA RATE COMBINED WITH FEC AND FRAME
TOLAI SYTTDOI 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
	AZIMUTHAL RANGE 000-360 ,	RANGE FROM 001-360, SITE ELEVATION OF 357
		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 METERS2.2,	
	XAD =XAD17 35G002.67B000-	
	360A00210H002.2	
Transmit Antenna	ANTENNA DIAMETERN/A,	
Additional	ANTENNA EFFICIENCY N/A ,	
Information (For		
Parabolic		
Antennas)	1 Countriest Down Down	NUMBER OF TIMES THE EARTH STATION WILL
Number of	<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	ecifications	L
Receive Antenna	RAP = R	POLARIZATIONS INCLUDE:
Polarization (RAP)		H = HORIZONTAL,
r olalization (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)		

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 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: 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	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: 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.
Danawiath		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 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		AVERAGE DURATION OF EACH CONTACT
Expected	8 minutes	AVERAGE DURATION OF EACH CONTACT
Duration of Each		
Contact		
Satellite Receive Sp	pecifications	
Receive Antenna	RAP = R	POLARIZATIONS INCLUDE:
Polarization (RAP)		H = HORIZONTAL,
FOIdTIZATION (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 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	Longrade	ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND
Jatemites		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 <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 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
•		EXPRESSED AS UNIT OF TIME (HH:MM)
Nongeostationary Orbits	14:00	
Orbits	(Nate: Charge V notified was of ITDN and	
	(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	100 KH2	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
		THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK. INFORMATION DATA RATE
Data Rate	155 kHz	
Forward Error	Is FEC used? Yes $\Box$ No $\boxtimes$	
Correction Coding	FEC Type:	,
	FEC Rate:	,
<b>T</b> + 10 + 10 +		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
Transmit Antenna	XAP = R	MAPPER/MODULATOR. POLARIZATIONS INCLUDE:
Polarization (XAP)	AAP - K	H = HORIZONTAL,
FOIdHZation (XAF)		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
		MINIMUM OPERATING ANGLE OF
Orientation (XAZ)		ELEVATION (XAZ), V00 TO V90, EXAMPLE, XAZ01

Transmit Antenna Dimensions (XAD) Transmit Antenna	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 ANTENNA DIAMETERN/A,	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
Additional Information (For Parabolic Antennas)	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 = 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 = 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.
Danamach		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 Pata	125 keymbols/see	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:
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
		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: XAD01 16G030B001-360A00357H006
	LEVEL IN METERS177,	XAD01 1000308001-300A00357H000
	THE ANTENNA HEIGHT ABOVE TERRAIN	
	IN METERS 13 ,	
	XAD =XAD21 34.3G003.2B000-	
	360A00177H013	
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		
Expected	8 minutes	AVERAGE DURATION OF EACH CONTACT
Duration of Each		
Contact		
Satellite Receive Sp	pecifications	
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,
<b>a</b>		J = LINEAR POLARIZATION
Receive Antenna	RAZ = EC	NB= NARROWBEAM EC = EARTH COVERAGE
Orientation (RAZ)		

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 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	v: 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

	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	8 minutes	AVERAGE DURATION OF EACH CONTACT

	242 2	
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)	BEAMWIDTH120,	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	Longitudo -	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT
	Longitude =	ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND
Satellites		REPORT ITS LONGITUDE IN DDDMMSS FORMAT
		(XLG AND/OR RLG).
For	INCLINATION ANGLE97.6 deg,	IF ANY SATELLITES ARE NONGEOSTATIONARY,
Nongeostationary	APOGEE IN KILOMETERS 525 km ,	REPORT ITS INCLINATION ANGLE, APOGEE
(Orbital Data)	PERIGEE IN KILOMETERS 525 km ,	IN KILOMETERS, PERIGEE IN KILOMETERS, ORBITAL PERIOD IN HOURS AND FRACTIONS OF
(Orbital Data)	ORBITAL PERIOD IN HOURS 1 AND	HOURS IN DECIMAL, THE NUMBER OF SATELLITES
		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
	SYSTEM <u>1</u> ,	COMMUNICATIONS WITH ANOTHER NONGEOSTATIONARY SATELLITE ADD AN
	, , , , , , , , , , , , , , , , , , ,	ADDITIONAL
	000	*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 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
	1 WIGI W35.8	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.
		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 kbits/sec	THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK. INFORMATION DATA RATE
Forward Error	Is FEC used? Yes □ No ⊠	
Correction Coding		
correction could	FEC Type:,	
	FEC Rate:,	
Total Symbol Rate	125 ksymbols/sec	DATA RATE COMBINED WITH FEC AND FRAME
Total Symbol Nate	123 K3 y 110013/300	OVERHEAD RESULTING IN THE TOTAL SYMBOL
		RATE AT THE INPUTE TO THE SYMBOL
Turnersit Automa	VAD D	MAPPER/MODULATOR. POLARIZATIONS INCLUDE:
Transmit Antenna	XAP = R	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 Antonna		
Transmit Antenna		FXAMPLE ASSUMING NONGEOSTATIONARY 16
	ANTENNA GAIN35 dBi,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL
Dimensions (XAD)	BEAMWIDTH2.67,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357
		DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN
	BEAMWIDTH2.67,	DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS:
	BEAMWIDTH2.67, AZIMUTHAL RANGE000-360,	DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN
	BEAMWIDTH2.67, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA	DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS:
	BEAMWIDTH2.67, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS16,	DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS:
	BEAMWIDTH2.67, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS16, THE ANTENNA HEIGHT ABOVE TERRAIN	DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS:
	BEAMWIDTH2.67, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS16, THE ANTENNA HEIGHT ABOVE TERRAIN	DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS:
	BEAMWIDTH2.67, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS16, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS2.2,	DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS:
	BEAMWIDTH2.67, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS16, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS2.2, XAD =XAD23 25G002.67B000-	DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS:
Dimensions (XAD)	BEAMWIDTH2.67, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS16, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS2.2, XAD =XAD23 25G002.67B000- 360A00016H002.2	DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS:
Dimensions (XAD)	BEAMWIDTH       2.67         AZIMUTHAL RANGE       000-360         THE SITE ELEVATION ABOVE MEAN SEA         LEVEL IN METERS       16         THE ANTENNA HEIGHT ABOVE TERRAIN         IN METERS       2.2         XAD =XAD23 25G002.67B000-         360A00016H002.2         ANTENNA DIAMETER       N/A	DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS:
Dimensions (XAD) Transmit Antenna Additional	BEAMWIDTH       2.67         AZIMUTHAL RANGE       000-360         THE SITE ELEVATION ABOVE MEAN SEA         LEVEL IN METERS       16         THE ANTENNA HEIGHT ABOVE TERRAIN         IN METERS       2.2         XAD =XAD23 25G002.67B000-         360A00016H002.2         ANTENNA DIAMETER       N/A	DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS:

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	0 minutes	AVERAGE DURATION OF EACH CONTACT
Expected	8 minutes	AVERAGE DONATION OF EACH CONTACT
Duration of Each		
Contact		
Satellite Receive Sp	pecifications	
Receive Antenna	RAP = R	POLARIZATIONS INCLUDE:
Polarization (RAP)		H = HORIZONTAL,
FOIdHZation (RAF)		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	CHOOSE EITHER:
Type of satellite	Type = NONGEOSTATIONARY	GEOSTATIONARY OR NONGEOSTATIONARY
(State = SPCE)		
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 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
	_	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 = 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,
Necessary	150 kHz	M = MEGAWATT THE WIDTH OF FREQUENCY BAND WHICH IS JUST
Bandwidth	150 KHZ	SUFFICIENT TO SUCCESSFULLY TRANSFER DATA.
banawiatin		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 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,
<b>—</b> •• • •		J = LINEAR POLARIZATION
Transmit Antenna	XAZ = XAZ01 V05	THE EARTH STATION TRANSMITTER ANTENNA MINIMUM OPERATING ANGLE OF
Orientation (XAZ)		ELEVATION (XAZ), V00 TO V90, EXAMPLE, XAZ01
		V00

Transmit Antenna Dimensions (XAD) Transmit Antenna	ANTENNA GAIN35 dBi, BEAMWIDTH2.67, AZIMUTHAL RANGE_000-360, 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
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.
Banamath		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 $\Box$ No $igtimes$	
Correction Coding	FEC Type:,	
	FEC Rate:,	

Total Symbol Data	12E koumbols/soc	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:
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 Antenna	XAZ = XAZ01 V05	J = LINEAR POLARIZATION THE EARTH STATION TRANSMITTER ANTENNA
	XAZ = XAZUI VUS	MINIMUM OPERATING ANGLE OF
Orientation (XAZ)		ELEVATION (XAZ), V00 TO V90, EXAMPLE, XAZ01
		V00
Transmit Antenna	ANTENNA GAIN35dBi,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16
		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
	THE SITE ELEVATION ABOVE MEAN SEA	OF 6 METERS: XAD01 16G030B001-360A00357H006
	LEVEL IN METERS19,	XAD01 1000500001-500A0055711000
	THE ANTENNA HEIGHT ABOVE TERRAIN	
	IN METERS,	
	,	
	XAD =XAD25 35G002.67B000-	
	360A019H002.2	
Transmit Antenna	ANTENNA DIAMETER <u>N/A</u> ,	
Additional	ANTENNA EFFICIENCYN/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 EARTH TO SPACE DIRECTION (UPINKS) EACH DAY
Supported Per		EARTH TO SPACE DIRECTION (OPTING) EACH DAT
Day		
Expected	8 minutes	AVERAGE DURATION OF EACH CONTACT
Duration of Each		
Contact Satellite Receive Sp		
Salenne Receive Sp		
Receive Antenna	RAP = R	POLARIZATIONS INCLUDE:
Polarization (RAP)		H = HORIZONTAL,
r olalization (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	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:
(State = SPCE) City = Geo or Nongeo		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.)	