NTIA Space record data form

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.

NOTE THAT AEROCUBE-16 HAS TWO INDEPENDENT RADIOS (THE ADV RADIO AND INNOFLIGHT SDR RADIO) ON THE SATELLITE BUT ONLY ONE IS USED AT A TIME. THE SATELLITE HAS A PATCH ANTENNA FOR EACH RADIO AND THAT ONE PATCH ANTENNA HAS SUFFICIENT BANDWIDTH FOR BOTH SEND AND RECEIVE. AT THE GROUND STATION FOR THE 915 MHZ, A SINGLE PARABOLIC ANTENNA IS USED FOR SEND AND RECEIVE. AT THE GROUND STATION FOR THE S-BAND, A SINGLE PARABOLIC ANTENNA IS ALSO USED FOR BOTH SEND AND RECEIVE. THE 915 MHZ AND S-BAND GROUND SITES ARE GEOGRAPHICALLY SEPARATED. ALL OF THE S-BAND GROUND STATIONS ARE OUTSIDE THE UNITED STATES. ALL OF THE 915 MHZ GROUND STATIONS ARE IN THE UNITED STATES AND ITS TERRITORIES.

Part A: Space to Earth Downlink Data

Satellite Transmitter Data (Required for Each Frequency)

AeroCube-16 satellite radio 1 downlink = 915 MHz

Transmit Frequency: 914.7 MHz		
Satellite Name: AeroCube-16		
Data Field	**Data Answer**	**Description/Comments**
Transmit Power (PWR)	PWR = 1.3 W	TRANSMIT POWER SUPPLIED TO THE ANTENNA INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE: W = WATT, K = KILOWATT, M = MEGAWATT
Necessary Bandwidth	1.09 MHz	THE WIDTH OF FREQUENCY BAND WHICH IS JUST SUFFICIENT TO SUCCESSFULLY TRANSFER DATA. FORMULAS CAN BE FOUND IN ANNEX J OF THE NTIA MANUAL.
RF Emissions Data		2-SIDED EMISSION BANDWIDTH VALUES
-3 dB bandwidth	1 MHz	
-20 dB bandwidth	1.1 MHz	
-40 dB bandwidth	1.6 MHz	
-60 dB bandwidth	2.0 MHz	
Modulation Type	2-MSK	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	500 Kbps	INFORMATION DATA RATE
Forward Error Correction Coding	Is FEC used? Yes ☐ No ☒ FEC Type: _____, FEC Rate: _____,	

Total Symbol Rate	500 Kbps	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)	XAP01 R	POLARIZATIONS INCLUDE: H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR, T = RIGHT AND LEFT HAND CIRCULAR, J = LINEAR POLARIZATION
Transmit Antenna Orientation (XAZ)	XAZ01 EC	NB= NARROWBEAM EC = EARTH COVERAGE
Transmit Antenna Dimension (XAD)	ANTENNA GAIN = 0 dBi BEAMWIDTH = OMNI XAD01 00G090B	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 = Nongeo	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 50, APOGEE IN KILOMETERS 525 km, PERIGEE IN KILOMETERS 525km, ORBITAL PERIOD IN HOURS 1 AND FRACTIONS OF HOURS IN DECIMAL 0.58, THE NUMBER OF SATELLITES IN THE SYSTEM 2 ORB,50.0IN00525AP00525PE001.58H02 NRT01	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 (MLTAN) = N/A – not sun sync	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)

Earth Station Data (Receiver) at Each Earth Station Location		
State (RSC)	RSC01 Texas RSC02 Florida RSC03 Hawaii RSC04 California RSC05 Minnesota RSC06 Maine RSC07 Washington RSC08 Puerto Rico	
City Name (RAL)	RAL01 Bryan RAL02 Gainesville RAL03 Kihei RAL04 Vandenberg RAL05 Orr RAL06 Limestone RAL07 Spokane RAL08 Guayama	
Latitude (DDMMSS)	Lat01 303835N Lat02 293737N Lat03 204448N Lat04 343855N Lat05 482245N Lat06 465628N Lat07 473805N Lat08 175755N	
Longitude (DDDMMSS)	Lon01 0962821W Lon02 0822139W Lon03 1562553W Lon04 1203653W Lon05 0924956W Lon06 0675358W Lon07 1173758W Lon08 0660628W	
Receive Antenna Polarization (RAP)	RAP01 R RAP02 R RAP03 R RAP04 R RAP05 R RAP06 R RAP07 R RAP08 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)	RAZ01 V02 RAZ02 V02 RAZ03 V02 RAZ04 V02 RAZ05 V02 RAZ06 V02 RAZ07 V02 RAZ08 V02	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00
Receive Antenna Dimensions (RAD)	RAD01 23G012B000-360A00081H002 RAD02 23G012B000-360A00025H002 RAD03 23G012B000-360A00084H002 RAD04 23G012B000-360A00061H002 RAD05 23G012B000-360A00374H002 RAD06 23G012B000-360A00215H002 RAD07 23G012B000-360A00741H002 RAD08 23G012B000-360A00026H002	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 DIAMETER = 1.8 m, ANTENNA EFFICIENCY = 60%	
Number of Satellite Contacts Supported Per Day	2 per ground station	NUMBER OF TIMES THE SATELLITE WILL COMMUNICATE WITH THE EARTH STATION IN THE SPACE TO EARTH DIRECTION (DOWNLINKS) EACH DAY
Expected Duration of Each Contact	10 minutes per ground station	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 S945. 2. REM AGN, Cubesat, (AeroCube-16)		

AeroCube-16 satellite radio 2 downlink = 2225 MHz

Transmit Frequency: 2225 MHz		
Satellite Name: AeroCube-16		
Data Field	**Data Answer**	**Description/Comments**
Transmit Power (PWR)	PWR = 1.5 W	TRANSMIT POWER SUPPLIED TO THE ANTENNA INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE: W = WATT, K = KILOWATT, M = MEGAWATT
Necessary Bandwidth	1.6 MHz	THE WIDTH OF FREQUENCY BAND WHICH IS JUST SUFFICIENT TO SUCCESSFULLY TRANSFER DATA. FORMULAS CAN BE FOUND IN ANNEX J OF THE NTIA MANUAL.
RF Emissions Data		2-SIDED EMISSION BANDWIDTH VALUES
-3 dB bandwidth	0.67 MHz	
-20 dB bandwidth	1.7 MHz	
-40 dB bandwidth	2.0 MHz	
-60 dB bandwidth	3.4 MHz	
Modulation Type	OQPSK	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	1 Mbps	INFORMATION DATA RATE
Forward Error Correction Coding	Is FEC used? YesM ☒ No ☐ FEC Type: convolutional (R=1/2, K=7) and RS (255,223) FEC Rate = 1/2	
Total Symbol Rate	1 Msps	DATA RATE COMBINED WITH FEC AND FRAME OVERHEAD RESULTING IN THE TOTAL SYMBOL RATE AT THE INPUTE TO THE SYMBOL MAPPER/MODULATOR.
Does transmitter 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)	XAP02 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)	XAZ02 EC	NB= NARROWBEAM EC = EARTH COVERAGE

Transmit Antenna Dimension (XAD)	ANTENNA GAIN = 7 dBi BEAMWIDTH = OMNI XAD02 07G080B	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 = Nongeo	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 50, APOGEE IN KILOMETERS 525 km, PERIGEE IN KILOMETERS 525km, ORBITAL PERIOD IN HOURS 1 AND FRACTIONS OF HOURS IN DECIMAL 0.58, THE NUMBER OF SATELLITES IN THE SYSTEM 2 ORB,50.0IN00525AP00525PE001.58H02 NRT01	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 (MLTAN) = N/A – not sun sync	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)
Earth Station Data (Receiver) at Each Earth Station Location		
State (RSC)	RSC09 South Africa RSC10 Mauritius RSC 11 Spain RSC 12 Greece RSC 13 New Zealand RSC 14 Chile	
City Name (RAL)	RAL09 Hartebeesthoek RAL10 Chemin Grenier RAL11 Puertollano RAL12 Nemea RAL13 Awarua RAL14 Punta Arenas	
Latitude (DDMMSS)	Lat09 255308S Lat10 203003S Lat11 384019N Lat12 375043N Lat13 463144S Lat14 525606S	

Longitude (DDDMMSS)	Lon09 0274220E Lon10 0572702E Lon11 0040943W Lon12 0223724E Lon13 1682247E Lon14 0705214W	
Receive Antenna Polarization (RAP)	RAP09 R RAP10 R RAP11 R RAP12 R RAP13 R RAP14 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)	RAZ09 V02 RAZ10 V02 RAZ11 V02 RAZ12 V02 RAZ13 V02 RAZ14 V02	THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00
Receive Antenna Dimensions (RAD)	RAD09 36G003B000-360A01541H005 RAD10 36G003B000-360A00031H005 RAD11 36G003B000-360A00683H005 RAD12 36G003B000-360A00276H005 RAD13 36G003B000-360A00012H005 RAD14 36G003B000-360A00016H005	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 DIAMETER = 3.7 m, ANTENNA EFFICIENCY = 60%	
Number of Satellite Contacts Supported Per Day	2 per ground station	NUMBER OF TIMES THE SATELLITE WILL COMMUNICATE WITH THE EARTH STATION IN THE SPACE TO EARTH DIRECTION (DOWNLINKS) EACH DAY
Expected Duration of Each Contact	10 minutes per ground station	AVERAGE DURATION OF EACH CONTACT
Supported Operations	Satellite Health and Status Data ☒ Mission Payload Data ☒	SATELLITE HEALTH AND STATUS TELEMETRY AND/OR MISSION PAYLOAD DATA
FCC notes: 3. Use S-Note S945. 4. REM AGN, Cubesat, (AeroCube-16)		

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

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

AeroCube-16 ground station radio 1 = 915 MHz uplink

Transmit Frequency: 915 MHz		
State (XSC)	XSC01 Texas XSC02 Florida XSC03 Hawaii XSC04 California XSC05 Minnesota XSC06 Maine XSC07 Washington XSC08 Puerto Rico	
City Name (XAL)	XAL01 Bryan XAL02 Gainesville XAL03 Kihei XAL04 Vandenberg XAL05 Orr XAL06 Limestone XAL07 Spokane XAL08 Guayama	
Latitude (DDMMSS)	Lat01 303835N Lat02 293737N Lat03 204448N Lat04 343855N Lat05 482245N Lat06 465628N Lat07 473805N Lat08 175755N	
Longitude (DDDMMSS)	Lon01 0962821W Lon02 0822139W Lon03 1562553W Lon04 1203653W Lon05 0924956W Lon06 0675358W Lon07 1173758W Lon08 0660628W	
Transmit Power (PWR)	PWR = 9 W	TRANSMIT POWER SUPPLIED TO THE ANTENNA INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE: W = WATT, K = KILOWATT, M = MEGAWATT
Necessary Bandwidth	1.09 MHz	THE WIDTH OF FREQUENCY BAND WHICH IS JUST SUFFICIENT TO SUCCESSFULLY TRANSFER DATA. FORMULAS CAN BE FOUND IN ANNEX J OF THE NTIA MANUAL.

RF Emissions Data		2-SIDED EMISSION BANDWIDTH VALUES
-3 dB bandwidth	1 MHz	
-20 dB bandwidth	1.1 MHz	
-40 dB bandwidth	1.6 MHz	
-60 dB bandwidth	2.0 MHz	
Modulation Type	2-MSK	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	500 Kbps	INFORMATION DATA RATE
Forward Error Correction Coding	Is FEC used? Yes ☐ No ☒ FEC Type: _____, FEC Rate: _____,	
Total Symbol Rate	500 Kbps	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)	XAP01 R XAP02 R XAP03 R XAP04 R XAP05 R XAP06 R XAP07 R XAP08 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)	XAZ01 V02 XAZ02 V02 XAZ03 V02 XAZ04 V02 XAZ05 V02 XAZ06 V02 XAZ07 V02 XAZ08 V02	THE EARTH STATION TRANSMITTER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (XAZ), V00 TO V90, EXAMPLE, XAZ01 V00
Transmit Antenna Dimensions (XAD)	XAD01 23G012B000-360A00081H002 XAD02 23G012B000-360A00025H002 XAD03 23G012B000-360A00084H002 XAD04 23G012B000-360A00061H002 XAD05 23G012B000-360A00374H002 XAD06 23G012B000-360A00215H002 XAD07 23G012B000-360A00741H002 XAD08 23G012B000-360A00026H002	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 = 1.8 m, ANTENNA EFFICIENCY = 60%	
Number of Satellite Contacts Supported Per Day	2 per ground station	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	10 minutes per ground station	AVERAGE DURATION OF EACH CONTACT
Satellite Receive Specifications		
Receive Antenna Polarization (RAP)	RAP01 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)	RAZ01 = EC	NB= NARROWBEAM EC = EARTH COVERAGE
Receive Antenna Dimension (RAD)	RAD01 00G090B	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 = Nongeo	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 50, APOGEE IN KILOMETERS 525 km, PERIGEE IN KILOMETERS 525km, ORBITAL PERIOD IN HOURS 1 AND FRACTIONS OF HOURS IN DECIMAL 0.58, THE NUMBER OF SATELLITES IN THE SYSTEM 2 ORB,50.0IN00525AP00525PE001.58H02 NRT01	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 (MLTAN) = N/A - not sun sync	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)

AeroCube-16 radio 2 = 2075 MHz uplink

Transmit Frequency: 2075 MHz

State (XSC)	XSC09 South Africa XSC10 Mauritius XSC11 Spain XSC12 Greece XSC13 New Zealand XSC14 Chile	
City Name (XAL)	XAL09 Hartebeesthoek XAL10 Chemin Grenier XAL11 Puertollano XAL12 Nemea XAL13 Awarua XAL14 Punta Arenas	
Latitude (DDMMSS)	Lat09 255308S Lat10 203003S Lat11 384019N Lat12 375043N Lat13 463144S Lat14 525606S	
Longitude (DDDMMSS)	Lon09 0274220E Lon10 0572702E Lon11 0040943W Lon12 0223724E Lon13 1682247E Lon14 0705214W	
Transmit Power (PWR)	20W	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	80 KHz	
-20 dB bandwidth	128 KHz	
-40 dB bandwidth	135 KHz	
-60 dB bandwidth	140 KHz	
Modulation Type	BPSK	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	100 Kbps	INFORMATION DATA RATE
Forward Error Correction Coding	Is FEC used? Yes ☐ No ☒ FEC Type: _____, FEC Rate: _____,	
Total Symbol Rate	100 Kbps	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)	XAP09 R XAP10 R XAP11 R XAP12 R XAP13 R XAP14 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)	XAZ09 V02 XAZ10 V02 XAZ11 V02 XAZ12 V02 XAZ13 V02 XAZ14 V02	THE EARTH STATION TRANSMITTER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (XAZ), V00 TO V90, EXAMPLE, XAZ01 V00
Transmit Antenna Dimensions (XAD)	XAD09 36G003B000-360A01541H005 XAD10 36G003B000-360A00031H005 XAD11 36G003B000-360A00683H005 XAD12 36G003B000-360A00276H005 XAD13 36G003B000-360A00012H005 XAD14 36G003B000-360A00016H005	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 = 3.7 m, ANTENNA EFFICIENCY = 60%	
Number of Satellite Contacts Supported Per Day	2 per ground station	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	10 minutes per ground station	AVERAGE DURATION OF EACH CONTACT
Satellite Receive Specifications		
Receive Antenna Polarization (RAP)	RAP02 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)	RAZ02 = EC	NB= NARROWBEAM EC = EARTH COVERAGE
Receive Antenna Dimension (RAD)	RAD02 07G080B	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 = Nongeo	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 50, APOGEE IN KILOMETERS 525 km, PERIGEE IN KILOMETERS 525km, ORBITAL PERIOD IN HOURS 1 AND FRACTIONS OF HOURS IN DECIMAL 0.58, THE NUMBER OF SATELLITES IN THE SYSTEM 2 ORB,50.0IN00525AP00525PE001.58H02 NRT01	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 (MLTAN) = N/A - not sun sync	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)