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 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 | | |
|--|---|---|
| | | |
| 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 | XAZ01 EC | NB= NARROWBEAM EC = EARTH COVERAGE |
| Orientation (XAZ) | ANTENNIA CAINI – O dp: | NTIA FORMAT (XAD), EXAMPLE, FOR 16 DBI |
| Transmit Antenna Dimension (XAD) | ANTENNA GAIN = 0 dBi BEAMWIDTH = OMNI XAD01 00G090B | 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 Dat | a (Receiver) at Each Earth Station Locatio | on |
|--------------------|--|---|
| 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 | Lat01 303835N | |
| (DDMMSS) | Lat02 293737N | |
| | Lat03 204448N | |
| | Lat04 343855N | |
| | Lat05 482245N | |
| | Lat06 465628N | |
| | Lat07 473805N | |
| | Lat08 175755N | |
| Longitude | Lon01 0962821W | |
| (DDDMMSS) | Lon02 0822139W | |
| | Lon03 1562553W | |
| | Lon04 1203653W | |
| | Lon05 0924956W | |
| | Lon06 0675358W | |
| | Lon07 1173758W | |
| | Lon08 0660628W | |
| Receive Antenna | RAP01 R | POLARIZATIONS INCLUDE: |
| Polarization (RAP) | RAP02 R | H = HORIZONTAL, V = VERTICAL, |
| | RAP03 R | S = HORIZONTAL AND VERTICAL, |
| | RAP04 R | L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR, |
| | RAP05 R | T = RIGHT HAND CIRCULAR, T = RIGHT AND LEFT HAND CIRCULAR, |
| | RAP06 R | J = LINEAR POLARIZATION |
| | RAP07 R | |
| | RAP08 R | |

| Receive Antenna | RAZ01 V02 | THE EARTH STATION RECEIVER ANTENNA |
|--------------------|------------------------------------|---|
| Orientation (RAZ) | RAZ02 V02 | MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), VOO TO V90, EXAMPLE, RAZ01 |
| | RAZ03 V02 | V00 |
| | RAZ04 V02 | |
| | RAZ05 V02 | |
| | RAZ06 V02 | |
| | RAZ07 V02 | |
| | RAZ08 V02 | |
| Receive Antenna | RAD01 23G012B000-360A00081H002 | EXAMPLE ASSUMING NONGEOSTATIONARY, 16 |
| Dimensions (RAD) | RAD02 23G012B000-360A00025H002 | DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 |
| | RAD03 23G012B000-360A00084H002 | METERS, AND ANTENNA HEIGHT ABOVE TERRAIN |
| | RAD04 23G012B000-360A00061H002 | OF 6 METERS: RAD01 16G030B001-360A00357H006 |
| | RAD05 23G012B000-360A00374H002 | KADUI 1000308001-300A00337H000 |
| | RAD06 23G012B000-360A00215H002 | |
| | RAD07 23G012B000-360A00741H002 | |
| | RAD08 23G012B000-360A00026H002 | |
| Receive Antenna | | |
| Additional | ANTENNA DIAMETER = 1.8 m, ANTENNA | |
| Information (For | EFFICIENCY = 60% | |
| Parabolic | | |
| Antennas) | | |
| Number of | 2 per ground station | 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 | | |
| Expected | 10 minutes per ground station | 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 |
| CCC notos: | | • |

FCC notes:

- 1. Use S-Note S945.
- 2. REM AGN, Cubesat, (AeroCube-16)

AeroCube-16 satellite radio 2 downlink = 2225 MHz

| Transmit Frequency | v: 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 | Yes □ | BEACON MODE IS NORMALLY CONSIDERED A REGULAR AND PERIODIC SHORT DURATION |
| have a beacon mode? | No ⊠ | 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) | 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 | ANTENNA GAIN = 7 dBi | NTIA FORMAT (XAD), EXAMPLE, FOR 16 DBI |
|--------------------|---|---|
| | BEAMWIDTH = OMNI | ANTENNA GAIN AND 30 DEGREE BEAMWIDTH |
| Dimension (XAD) | | XAD01 16G030B |
| T (| XAD02 07G080B | CHOOSE EITHER: |
| Type of satellite | Type = Nongeo | GEOSTATIONARY OR NONGEOSTATIONARY |
| (State = SPCE) | | |
| (City = Geo or | | |
| Nongeo) | | |
| For Geostationary | Longitude = | IF ANY SATELLITES ARE GEOSTATIONARY, REPORT |
| Satellites | Longitude – | ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND |
| Saternites | | REPORT ITS LONGITUDE IN DDDMMSS FORMAT |
| For | INCLINATION ANGLE 50, | (XLG AND/OR RLG). IF ANY SATELLITES ARE NONGEOSTATIONARY, |
| Nongeostationary | APOGEE IN KILOMETERS 525 km, PERIGEE | REPORT ITS INCLINATION ANGLE, APOGEE |
| (Orbital Data) | IN KILOMETERS 525km, | IN KILOMETERS, PERIGEE IN KILOMETERS, |
| (Orbital Data) | ORBITAL PERIOD IN HOURS 1 AND | ORBITAL PERIOD IN HOURS AND FRACTIONS OF HOURS IN DECIMAL, THE NUMBER OF SATELLITES |
| | | IN THE SYSTEM, THEN TO1, EXAMPLE, |
| | FRACTIONS OF HOURS IN DECIMAL 0.58, | REM04 |
| | THE NUMBER OF SATELLITES IN THE | *ORB,98.0IN00510AP00510PE001.58H01NRT01, AND FOR SPACE-TO-SPACE |
| | SYSTEM 2 | COMMUNICATIONS WITH ANOTHER |
| | | NONGEOSTATIONARY SATELLITE ADD AN |
| | ORB,50.0IN00525AP00525PE001.58H02 | *ORB FOR IT ENDING IN R01, EXAMPLE, REM05 |
| | NRT01 | *ORB,72.9IN03209AP00655PE013.46H01NRR01 |
| For | Mean Local Time of Ascending Node | MLTAN IS THE ANGLE BETWEEN AN ORBIT'S |
| SunSynchronous | (MLTAN) = N/A - not sun sync | ASCENDING NODE AND THE MEAN SUN, OFTEN |
| Nongeostationary | (WEITHY) NYTY HOUSAN SYNC | EXPRESSED AS UNIT OF TIME (HH:MM) |
| Orbits | | |
| OTBICS | | |
| Earth Station Data | a (Receiver) at Each Earth Station Location | on |
| 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 | Lat09 255308S | |
| (DDMMSS) | Lat10 203003S | |
| | Lat11 384019N | |
| | Lat12 375043N | |
| | Lat13 463144S | |
| 1 | Lat14 525606S | İ |

| Longitude | Lon09 0274220E | |
|--------------------|------------------------------------|--|
| (DDDMMSS) | Lon10 0572702E | |
| (DDDIVIIVISS) | Lon11 0040943W | |
| | Lon12 0223724E | |
| | Lon13 1682247E | |
| | Lon14 0705214W | |
| Doggive Antonna | | POLARIZATIONS INCLUDE: |
| Receive Antenna | RAP09 R | H = HORIZONTAL, |
| Polarization (RAP) | RAP10 R | V = VERTICAL, |
| | RAP11 R | S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, |
| | RAP12 R | R = RIGHT HAND CIRCULAR, |
| | RAP13 R | T = RIGHT AND LEFT HAND CIRCULAR, |
| | RAP14 R | J = LINEAR POLARIZATION |
| Receive Antenna | RAZ09 V02 | THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF |
| Orientation (RAZ) | RAZ10 V02 | ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 |
| | RAZ11 V02 | V00 |
| | RAZ12 V02 | |
| | RAZ13 V02 | |
| | RAZ14 V02 | |
| Receive Antenna | RAD09 36G003B000-360A01541H005 | EXAMPLE ASSUMING NONGEOSTATIONARY, 16 |
| Dimensions (RAD) | RAD10 36G003B000-360A00031H005 | DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL RANGE FROM 001-360, SITE ELEVATION OF 357 |
| | RAD11 36G003B000-360A00683H005 | METERS, AND ANTENNA HEIGHT ABOVE TERRAIN |
| | RAD12 36G003B000-360A00276H005 | OF 6 METERS: |
| | RAD13 36G003B000-360A00012H005 | RAD01 16G030B001-360A00357H006 |
| | RAD14 36G003B000-360A00016H005 | |
| Receive Antenna | | |
| Additional | ANTENNA DIAMETER = 3.7 m, ANTENNA | |
| Information (For | EFFICIENCY = 60% | |
| Parabolic | | |
| Antennas) | | |
| Number of | 2 per ground station | NUMBER OF TIMES THE SATELLITE WILL |
| Satellite Contacts | _ p = 8. c = 1 | COMMUNICATE WITH THE EARTH STATION IN THE |
| Supported Per | | SPACE TO EARTH DIRECTION (DOWNLINKS) EACH DAY |
| Day | | |
| Expected | 10 minutes per ground station | AVERAGE DURATION OF EACH CONTACT |
| Duration of Each | 20 milates per ground station | |
| Contact | | |
| Supported | Satellite Health and Status Data ⊠ | SATELLITE HEALTH AND STATUS TELEMETRY |
| Operations | | AND/OR MISSION PAYLOAD DATA |
| ECC notos: | 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 Frequenc | cy: 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 | Lat01 303835N | |
| (DDMMSS) | Lat02 293737N | |
| | Lat03 204448N | |
| | Lat04 343855N | |
| | Lat05 482245N | |
| | Lat06 465628N | |
| | Lat07 473805N | |
| | Lat08 175755N | |
| Longitude | Lon01 0962821W | |
| (DDDMMSS) | Lon02 0822139W | |
| | Lon03 1562553W | |
| | Lon04 1203653W | |
| | Lon05 0924956W | |
| | Lon06 0675358W | |
| | Lon07 1173758W | |
| | Lon08 0660628W | |
| Transmit Power | PWR = 9 W | TRANSMIT POWER SUPPLIED TO THE ANTENNA |
| (PWR) | | INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE: |
| | | W = WATT, |
| | | K = KILOWATT, |
| Necessary | 1.09 MHz | M = MEGAWATT THE WIDTH OF FREQUENCY BAND WHICH IS JUST |
| Bandwidth | 1.05 141115 | SUFFICIENT TO SUCCESSFULLY TRANSFER DATA. |
| Danawiatii | | 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 | THE METHOD USED TO SUPERIMPOSE DATA ON |
| Modulation Type | 2-MSK | THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK. |
| Data Rate | 500 Kbps | INFORMATION DATA RATE |
| Forward Error | Is FEC used? Yes □ No ⊠ | |
| Correction Coding | 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 |
| Turnerit Automo | VA DO4 D | MAPPER/MODULATOR. POLARIZATIONS INCLUDE: |
| Transmit Antenna | XAPO1 R | H = HORIZONTAL, |
| Polarization (XAP) | XAP02 R | V = VERTICAL, |
| | XAP03 R | S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, |
| | XAP04 R | R = RIGHT HAND CIRCULAR, |
| | XAP05 R | T = RIGHT AND LEFT HAND CIRCULAR, |
| | XAP06 R | J = LINEAR POLARIZATION |
| | XAPO7 R | |
| | XAP08 R | |
| Transmit Antenna | XAZ01 V02 | THE EARTH STATION TRANSMITTER ANTENNA MINIMUM OPERATING ANGLE OF |
| Orientation (XAZ) | XAZ02 V02 | ELEVATION (XAZ), V00 TO V90, EXAMPLE, XAZ01 |
| | XAZ03 V02 | V00 |
| | XAZ04 V02 | |
| | XAZ05 V02 | |
| | XAZ06 V02 | |
| | XAZ07 V02 | |
| | XAZ08 V02 | |
| Transmit Antenna | XAD01 23G012B000-360A00081H002 | EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL |
| Dimensions (XAD) | XAD02 23G012B000-360A00025H002 | RANGE FROM 001-360, SITE ELEVATION OF 357 |
| | XAD03 23G012B000-360A00084H002 | METERS, AND ANTENNA HEIGHT ABOVE TERRAIN |
| | XAD04 23G012B000-360A00061H002 | OF 6 METERS: XAD01 16G030B001-360A00357H006 |
| | XAD05 23G012B000-360A00374H002 | 74 B31 13333B301 335/1033711333 |
| | XAD06 23G012B000-360A00215H002 | |
| | XAD07 23G012B000-360A00741H002 | |
| | XAD08 23G012B000-360A00026H002 | |
| Transmit Antenna | | |
| Additional | ANTENNA DIAMETER = 1.8 m, ANTENNA | |
| Information (For | EFFICIENCY = 60% | |
| Parabolic | | |
| Antennas) | | |
| Number of | 2 per ground station | 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 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 | |
| 0.07 | XAL10 Chemin Grenier | |
| | XAL11 Puertollano | |
| | XAL12 Nemea | |
| | XAL13 Awarua | |
| | XAL14 Punta Arenas | |
| Latitude | Lat09 255308S | |
| (DDMMSS) | Lat10 203003S | |
| (DDIVIIVISS) | Lat11 384019N | |
| | Lat12 375043N | |
| | | |
| | Lat13 463144S | |
| Lauraitu da | Lat14 525606S | |
| Longitude | Lon09 0274220E | |
| (DDDMMSS) | Lon10 0572702E | |
| | Lon11 0040943W | |
| | Lon12 0223724E | |
| | Lon13 1682247E | |
| | Lon14 0705214W | |
| Transmit Power | 20W | TRANSMIT POWER SUPPLIED TO THE ANTENNA INPUT TERMINAL, EXAMPLE, PWR01 W2 |
| (PWR) | | 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 | 80 KHz | |
| -20 dB bandwidth | 128 KHz | |
| -40 dB bandwidth | 135 KHz | |
| -60 dB bandwidth | 140 KHz | |
| | BPSK | THE METHOD USED TO SUPERIMPOSE DATA ON |
| Modulation Type | | THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK. |
| Data Rate | 100 Kbps | INFORMATION DATA RATE |
| Forward Error | Is FEC used? Yes \square No \boxtimes | |
| Correction Coding | 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. |
| | | |

| | 1 | DOLADIZATIONS INCLUDE | |
|----------------------------------|-----------------------------------|---|--|
| Transmit Antenna | XAP09 R | POLARIZATIONS INCLUDE: H = HORIZONTAL, | |
| Polarization (XAP) | XAP10 R | V = VERTICAL, | |
| | XAP11 R | S = HORIZONTAL AND VERTICAL, | |
| | XAP12 R | L = LEFT HAND CIRCULAR, | |
| | XAP13 R | R = RIGHT HAND CIRCULAR, T = RIGHT AND LEFT HAND CIRCULAR, | |
| | XAP14 R | J = LINEAR POLARIZATION | |
| Transmit Antenna | XAZ09 V02 | THE EARTH STATION TRANSMITTER ANTENNA | |
| Orientation (XAZ) | XAZ10 V02 | MINIMUM OPERATING ANGLE OF | |
| , | XAZ11 V02 | ELEVATION (XAZ), V00 TO V90, EXAMPLE, XAZ01 | |
| | XAZ12 V02 | | |
| | XAZ13 V02 | | |
| | XAZ14 V02 | | |
| Transmit Antenna | XAD09 36G003B000-360A01541H005 | EXAMPLE ASSUMING NONGEOSTATIONARY, 16 | |
| | | DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL | |
| Dimensions (XAD) | XAD10 36G003B000-360A00031H005 | RANGE FROM 001-360, SITE ELEVATION OF 357 | |
| | XAD11 36G003B000-360A00683H005 | METERS, AND ANTENNA HEIGHT ABOVE TERRAIN OF 6 METERS: | |
| | XAD12 36G003B000-360A00276H005 | XAD01 16G030B001-360A00357H006 | |
| | XAD13 36G003B000-360A00012H005 | | |
| | XAD14 36G003B000-360A00016H005 | | |
| Transmit Antenna | | | |
| Additional | ANTENNA DIAMETER = 3.7 m, ANTENNA | | |
| Information (For | EFFICIENCY = 60% | | |
| Parabolic | | | |
| Antennas) | | | |
| Number of | 2 per ground station | 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 | 10 minutes per ground station | AVERAGE DURATION OF EACH CONTACT | |
| Duration of Each | | | |
| Contact | | | |
| Satellite Receive Specifications | | | |
| Receive Antenna | RAP02 R | POLARIZATIONS INCLUDE: | |
| Polarization (RAP) | INALOZ IV | H = HORIZONTAL, | |
| Folarization (NAF) | | V = VERTICAL, | |
| | | S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, | |
| | | R = RIGHT HAND CIRCULAR, | |
| | | T = RIGHT AND LEFT HAND CIRCULAR, | |
| Posoivo Antonno | RAZ02 = EC | J = LINEAR POLARIZATION NB= NARROWBEAM | |
| Receive Antenna | NAZUZ – EC | EC = EARTH COVERAGE | |
| Orientation (RAZ) | | NITIA FORMAT(RAD) EVANADI E FOR 16 DRI | |
| Receive Antenna | RAD02 07G080B | NTIA FORMAT(RAD), EXAMPLE, FOR 16 DBI ANTENNA GAIN AND 30 DEGREE BEAMWIDTH | |
| Dimension (RAD) | | RAD01 16G030B | |
| - | | CHOOSE EITHER: | |
| Type of satellite | Type = Nongeo | CHOOSE EITHER: GEOSTATIONARY OR NONGEOSTATIONARY | |
| (State = SPCE) | | | |
| City = Geo or | | | |
| Nongeo | | | |

| 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 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 (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) |