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.

## Part A: Space to Earth Downlink Data

Satellite Transmitter Data (Required for Each Frequency)

| Transmit Frequency:<br>8025-8400 | | |
|---|---|---|
| Satellite Name: RROCI | | |
| **Data Field** | **Data Answer** | **Description/Comments** |
| Transmit Power (PWR) | PWR = 3W<br><br>PWR01 3W | TRANSMIT POWER SUPPLIED TO THE ANTENNA INPUT TERMINAL, EXAMPLE, PWR01 W2<br>TRANSMIT POWER UNITS INCLUDE:<br>W = WATT,<br>K = KILOWATT,<br>M = MEGAWATT |
| Necessary Bandwidth | 200M | 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 | G1D | 2-SIDED EMISSION BANDWIDTH VALUES |
| -3 dB bandwidth | | |
| -20 dB bandwidth | | |
| -40 dB bandwidth | | |
| -60 dB bandwidth | | |
| Modulation Type | OQPSK | THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK. |
| Data Rate | 100 Mbps | INFORMATION DATA RATE |
| Forward Error Correction Coding | Is FEC used? Yes ☒ No ☐<br>FEC Type: __convolutional 7 ½ encoding_____,<br>FEC Rate: _____ _____, | |
| Total Symbol Rate | | 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 ☐<br>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 ☐<br>No ☐ | |
| Transmit Antenna Polarization (XAP) | XAP =R | POLARIZATIONS INCLUDE:<br>H = HORIZONTAL,<br>V = VERTICAL,<br>S = HORIZONTAL AND VERTICAL,<br>L = LEFT HAND CIRCULAR,<br>R = RIGHT HAND CIRCULAR,<br>T = RIGHT AND LEFT HAND CIRCULAR,<br>J = LINEAR POLARIZATION |
| Transmit Antenna Orientation (XAZ) | XAZ = NB | NB= NARROWBEAM<br>EC = EARTH COVERAGE |
| Transmit Antenna Dimension (XAD) | ANTENNA GAIN___10.5_____,<br>BEAMWIDTH _____40_____,<br>XAD =<br>XAD01 10.5G040B | NTIA FORMAT (XAD), EXAMPLE, FOR 16 DBI ANTENNA GAIN AND 30 DEGREE BEAMWIDTH<br>XAD01 16G030B |
| Type of satellite (State = SPCE) (City = Geo or Nongeo) | Type =Nongeo | CHOOSE EITHER:<br>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-<br>_____98_____,<br>APOGEE IN KILOMETERS____642_____,<br>PERIGEE IN KILOMETERS_____642_____,<br>ORBITAL PERIOD IN HOURS<br>_1_____AND FRACTIONS OF HOURS IN DECIMAL__.62____,<br>THE NUMBER OF SATELLITES IN THE SYSTEM___1_____,<br><br>ORB =<br>*ORB,98IN00642AP00642PE01.62H01NT01 | 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,<br>REM04<br>*ORB,98.0IN00510AP00510PE001.58H01NRT01,<br>AND FOR SPACE-TO-SPACE COMMUNICATIONS WITH ANOTHER NONGEOSTATIONARY SATELLITE ADD AN ADDITIONAL<br>*ORB FOR IT ENDING IN R01, EXAMPLE, REM05<br>*ORB,72.9IN03209AP00655PE013.46H01NRR01 |
| For SunSynchronous Nongeostationary Orbits | Mean Local Time of Ascending Node (MLTAN) =_____23:00_____ | 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 – see table below** | | |
| State (RSC) | RSC = | |
| City Name (RAL) | RAL = | |

| | | |
|---|---|---|
| Latitude (DDMMSS) | Lat = | |
| Longitude (DDDMMSS) | Lon = | |
| Receive Antenna Polarization (RAP) | RAP =R | POLARIZATIONS INCLUDE:<br>H = HORIZONTAL,<br>V = VERTICAL,<br>S = HORIZONTAL AND VERTICAL,<br>L = LEFT HAND CIRCULAR,<br>R = RIGHT HAND CIRCULAR,<br>T = RIGHT AND LEFT HAND CIRCULAR,<br>J = LINEAR POLARIZATION |
| Receive Antenna Orientation (RAZ) | RAZ = 5 degrees<br>RAZ01 V05<br>RAZ02 V05<br>RAZ03 V05<br>RAZ04 V05<br>RAZ05 V05 | THE EARTH STATION RECEIVER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00 |
| Receive Antenna Dimensions (RAD) | ANTENNA GAIN_____47.01_____,<br>BEAMWIDTH_____.69_____,<br>AZIMUTHAL RANGE_____,<br>THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS _____,<br>THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS _____,<br><br>RAD =<br>RAD01 47G00.69B001-360A0462.5H003<br>RAD02 47G00.69B001-360A0010.2H003<br>RAD03 47G00.69B001-360A0014.8H003<br>RAD04 47G00.69B001-360A1254.5H003<br>RAD05 47G00.69B001-360A0024.9H003 | 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:<br>RAD01 16G030B001-360A00357H006 |
| Receive Antenna Additional Information (For Parabolic Antennas) | ANTENNA DIAMETER_____3.7 m _____,<br>ANTENNA EFFICIENCY_____, | |
| Number of Satellite Contacts Supported Per Day | Svalbard - 14 per day<br>Awarua – 1 per day<br>Punta Arenas – 1 per day<br>Queen Maud – 2 per day<br>Long Beach – 2 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 | Less than 10 min (expected to be 5 min) | AVERAGE DURATION OF EACH CONTACT |
| Supported Operations | Satellite Health and Status Data ☒<br>Mission Payload Data ☒ | SATELLITE HEALTH AND STATUS TELEMETRY AND/OR MISSION PAYLOAD DATA |

FCC notes:

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

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

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

| Transmit Frequency: 2085 | | |
|---|---|---|
| State (XSC) | XSC = | |
| City Name (XAL) | XAL = | |
| Latitude (DDMMSS) | Lat = | |
| Longitude (DDDMMSS) | Lon = | |
| Transmit Power (PWR) | PWR = 10 W | TRANSMIT POWER SUPPLIED TO THE ANTENNA INPUT TERMINAL, EXAMPLE, PWR01 W2<br>TRANSMIT POWER UNITS INCLUDE:<br>W = WATT,<br>K = KILOWATT,<br>M = MEGAWATT |
| Necessary Bandwidth | 512K | 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 | G1D | 2-SIDED EMISSION BANDWIDTH VALUES |
| -3 dB bandwidth | | |
| -20 dB bandwidth | | |
| -40 dB bandwidth | | |
| -60 dB bandwidth | | |
| Modulation Type | | THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK. |
| Data Rate | 256 kbps | INFORMATION DATA RATE |
| Forward Error Correction Coding | Is FEC used? Yes ☐ No ☐<br>FEC Type: _____,<br>FEC Rate: _____, | |
| Total Symbol Rate | | 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:<br>H = HORIZONTAL,<br>V = VERTICAL,<br>S = HORIZONTAL AND VERTICAL,<br>L = LEFT HAND CIRCULAR,<br>R = RIGHT HAND CIRCULAR,<br>T = RIGHT AND LEFT HAND CIRCULAR,<br>J = LINEAR POLARIZATION |
| Transmit Antenna Orientation (XAZ) | XAZ = 5 degrees<br>XAZ01 V05<br>XAZ02 V05<br>XAZ03 V05<br>XAZ04 V05<br>XAZ05 V05 | THE EARTH STATION TRANSMITTER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (XAZ), V00 TO V90, EXAMPLE, XAZ01 V00 |

| | | |
|---|---|---|
| Transmit Antenna Dimensions (XAD) | ANTENNA GAIN____35.91_____,<br>BEAMWIDTH_____2.73_____,<br>AZIMUTHAL RANGE_____,<br>THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS _____,<br>THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS _____,<br><br>XAD =<br>XAD01 36G2.73B001-360A0462.5H003<br>XAD02 36G2.73B001-360A0010.2H003<br>XAD03 36G2.73B001-360A0014.8H003<br>XAD04 36G2.73B001-360A1254.5H003<br>XAD05 36G2.73B001-360A0024.9H003 | 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:<br>XAD01 16G030B001-360A00357H006 |
| Transmit Antenna Additional Information (For Parabolic Antennas) | ANTENNA DIAMETER__3.7 m_____,<br>ANTENNA EFFICIENCY_____, | |
| Number of Satellite Contacts Supported Per Day | Svalbard – 14<br>Awarua – 1<br>Punta Arenas – 1<br>Queen Maud – 2<br>Long Beach - 2 | 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 | Less than 10 min | AVERAGE DURATION OF EACH CONTACT |
| **Satellite Receive Specifications** | | |
| Receive Antenna Polarization (RAP) | RAP = R | POLARIZATIONS INCLUDE:<br>H = HORIZONTAL,<br>V = VERTICAL,<br>S = HORIZONTAL AND VERTICAL,<br>L = LEFT HAND CIRCULAR,<br>R = RIGHT HAND CIRCULAR,<br>T = RIGHT AND LEFT HAND CIRCULAR,<br>J = LINEAR POLARIZATION |
| Receive Antenna Orientation (RAZ) | RAZ = NB | NB= NARROWBEAM<br>EC = EARTH COVERAGE |
| Receive Antenna Dimension (RAD) | ANTENNA GAIN____4.5_____,<br>BEAMWIDTH _____,<br>RAD =<br>RAD01 4.5G040B | NTIA FORMAT(RAD), EXAMPLE, FOR 16 DBI ANTENNA GAIN AND 30 DEGREE BEAMWIDTH<br>RAD01 16G030B |
| Type of satellite (State = SPCE) City = Geo or Nongeo | Type = nongeo | CHOOSE EITHER:<br>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-<br>_____98_____,<br>APOGEE IN KILOMETERS_____642_____, PERIGEE IN KILOMETERS_____642_____,<br>ORBITAL PERIOD IN HOURS __1_____AND FRACTIONS OF HOURS IN DECIMAL___.62___,<br>THE NUMBER OF SATELLITES IN THE SYSTEM_____1_____,<br>*ORB,98IN00642AP00642PE1.62HT01 | 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<br>*ORB,98.0IN00510AP00510PE001.58H01NRT01, AND FOR SPACE-TO-SPACE COMMUNICATIONS WITH ANOTHER NONGEOSTATIONARY SATELLITE ADD AN ADDITIONAL<br>*ORB FOR IT ENDING IN R01, EXAMPLE, REM05<br>*ORB,72.9IN03209AP00655PE013.46H01NRR01 |
| For SunSynchronous Nongeostationary Orbits | Mean Local Time of Ascending Node (MLTAN) =_____23:00_____ | MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM) |

**Ground Station Information:**

| Name of station, city and country and site elevation | Lat (North) | Long (East) | X band | S band – expected to be in use only once a week for 5 min | # of X band contacts w/satellite per day, time of each |
|---|---|---|---|---|---|
| Svalbard, Norway **1503 Ft** | 78-13-47 N | 15-23-53 E | Beamwidth = 0.69 °<br>Gain: 47.01 dBi | Beamwidth = 2.73 °<br>Gain: 35.91 dBi | Contacts = ~ 14 x / day<br>Duration - ~ 10 min / contact |
| Awarua, New Zealand Venture Southland Ground station, 781 Colyer Road **33 Ft.** | 46-31-45 S | 168-22-52 E | Beamwidth = 0.69 °<br>Gain: 47.01 dBi | Beamwidth = 2.73 °<br>Gain: 35.91 dBi | Contacts = ~ 1 x / day<br>Duration - ~ 10 min / contact |
| Punta Arenas, Chile Sunta Arenas SpA, El Vergel 2850 Providencia, Santiago **48 Ft** | 52-56-17 S | 70-51-28 W | Beamwidth = 0.69 °<br>Gain: 47.01 dBi | Beamwidth = 2.73 °<br>Gain: 35.91 dBi | Contacts = ~ 1 x / day<br>Duration - ~ 10 min / contact |
| TrollSat, Queen Maud Land, Antarctica **4077 Ft.** | 72-00-06 S | 2-31-32 E | Beamwidth = 0.69 °<br>Gain: 47.01 dBi | Beamwidth = 2.73 °<br>Gain: 35.91 dBi | Contacts = ~ 2 x / day<br>Duration - ~ 10 min / contact |
| Long Beach, California USA 4022 E. Conant St., Long Beach **81 Ft.** | 33-49-27 N | 118-08-47 W | Beamwidth = 0.69 °<br>Gain: 47.01 dBi | Beamwidth = 2.73 °<br>Gain: 35.91 dBi | Contacts = ~ 2 x / day<br>Duration - ~ 10 min / contact |