

Teralink's Project Mayhem NTIA Space Record Data

communications links in the Bishop Air Lock on the International Space Station

File Number: 0758 -EX-CN-2026

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.

Part A: Space to Space – all communications are intra-Bishop airlock on the ISS

Part A: Space to Space Transmitter Data

Operations on the ISS in Bishop Airlock		
Transmit (Beam 1)		
Transmit Frequency: 123-143 GHz space to space link, no associated ground operations		
Data Field	Data Answer	Description/Comments
Transmit Power (PWR)	PWR01 _.001 W ____	TRANSMIT POWER SUPPLIED TO THE ANTENNA INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE: W = WATT, K = KILOWATT, M = MEGAWATT
Necessary Bandwidth	20 GHz	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	12 GHz	
-20 dB bandwidth		
-40 dB bandwidth		
-60 dB bandwidth		
Modulation Type	OFDM	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	100 Gbps	INFORMATION DATA RATE

Forward Error Correction Coding	Is FEC used? Yes ☐ NO XX	
Total Symbol Rate	20 Gsym/s	DATA RATE COMBINED WITH FEC AND FRAME OVERHEAD RESULTING IN THE TOTAL SYMBOL RATE AT THE INPUT TO THE SYMBOL MAPPER/MODULATOR.
Does transmitter have a beacon mode?	No ☐ XX	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 X	
Transmit Antenna Polarization (XAP)	XAP = XAP01 J	POLARIZATIONS INCLUDE: H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR, T = RIGHT AND LEFT HAND CIRCULAR, J = LINEAR POLARIZATION
Transmit Antenna Orientation (XAZ)	XAZ = XAZ01 NB	NB= NARROWBEAM EC = EARTH COVERAGE
Transmit Antenna Dimension (XAD)	ANTENNA GAIN__24 dBi_____, BEAMWIDTH __12 deg_____, XAD = XAD01 24G012B Aperture diameter is 5.6 millimeters	NTIA FORMAT (XAD), EXAMPLE, FOR 16 DBI ANTENNA GAIN AND 30 DEGREE BEAMWIDTH XAD01 16G030B

Type of satellite (State = SPCE) (City = Geo or Nongeoe)	Radio will be installed on ISS. It is in non-geostationary orbit.	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____51.6____, APOGEE IN KILOMETERS____400____, PERIGEE IN KILOMETERS____400____, ORBITAL PERIOD IN HOURS ____1____AND FRACTIONS OF HOURS IN DECIMAL____.55____, THE NUMBER OF SATELLITES IN THE SYSTEM____0____, ORB = ORB,51.6IN00400AP00400PE001.55H01N RT00 Radio is in Bishop Airlock on ISS, it does not have its own orbit, and it is not on a satellite	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) =	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)

Operations on the ISS in Bishop airlock**Transmit (beam 2)****Transmit Frequency: 205-225 GHz - space to space link, no associated ground operations**

Data Field	Data Answer	Description/Comments
Transmit Power (PWR)	PWR01 0.001 W	TRANSMIT POWER SUPPLIED TO THE ANTENNA INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE: W = WATT, K = KILOWATT, M = MEGAWATT
Necessary Bandwidth	20 GHz	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	12 GHz	
-20 dB bandwidth		
-40 dB bandwidth		
-60 dB bandwidth		
Modulation Type	OFDM	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	100 Gbps	INFORMATION DATA RATE
Forward Error Correction Coding	Is FEC used? NO	
Total Symbol Rate	20 Gsym/s	DATA RATE COMBINED WITH FEC AND FRAME OVERHEAD RESULTING IN THE TOTAL SYMBOL RATE AT THE INPUT TO THE SYMBOL MAPPER/MODULATOR.

Does transmitter have a beacon mode?	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 = XAP01 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 = XAZ101 NB Pointed anti-Nadir (Zenith)	NB= NARROWBEAM EC = EARTH COVERAGE
Transmit Antenna Dimension (XAD)	ANTENNA GAIN ____ 24 dBi____, BEAMWIDTH ____ 12deg____, XAD = XAD01 24G012B Aperture diameter is 5.6 millimeters	NTIA FORMAT (XAD), EXAMPLE, FOR 16 DBI ANTENNA GAIN AND 30 DEGREE BEAMWIDTH XAD01 16G030B
Type of satellite (State = SPCE) (City = Geo or Nongeo)	Radio will be installed on ISS. It is in non-geostationary orbit.	CHOOSE EITHER: GEOSTATIONARY OR NONGEOSTATIONARY

Commented [1]: same comment as previous

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____51.6____, APOGEE IN KILOMETERS____400____, PERIGEE IN KILOMETERS____400____, ORBITAL PERIOD IN HOURS ____1____AND FRACTIONS OF HOURS IN DECIMAL____.55____, THE NUMBER OF SATELLITES IN THE SYSTEM____0____, ORB = ORB,51.6IN00400AP00400PE001.55H01N RT00 Radio is in Bishop Airlock on ISS, it does not have its own orbit, and it is not on a satellite	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) =	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)
Operations on ISS in the Bishop Airlock Transmit (beam 3) 252-272 GHz – space to space link, no associated ground operations		
Data Field	Data Answer	Description/Comments

Transmit Power (PWR)	PWR01 0.001 W	TRANSMIT POWER SUPPLIED TO THE ANTENNA INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE: W = WATT, K = KILOWATT, M = MEGAWATT
Necessary Bandwidth	200 GHz	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	12 GHz	
-20 dB bandwidth		
-40 dB bandwidth		
-60 dB bandwidth		
Modulation Type	OFDM	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	100 GBits/sec	INFORMATION DATA RATE
Forward Error Correction Coding	Is FEC used? ☐ No	
Total Symbol Rate	100 Gsymbols/sec	DATA RATE COMBINED WITH FEC AND FRAME OVERHEAD RESULTING IN THE TOTAL SYMBOL RATE AT THE INPUT 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 ☐	

Commented [2]: 275-252 = 23 GHz?

Commented [3]: Where does this come from? Not sure if that's correct.

Commented [4]: Hoping they don't need this info right away... we will not have this for at least another 4-6wks.

Transmit Antenna Polarization (XAP)	XAP =XAP01 J	POLARIZATIONS INCLUDE: H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR, T = RIGHT AND LEFT HAND CIRCULAR, J = LINEAR POLARIZATION
Transmit Antenna Orientation (XAZ)	XAZ = XAZ01 NB, Pointed anti-Nadir (Zenith)	NB= NARROWBEAM EC = EARTH COVERAGE
Transmit Antenna Dimension (XAD)	ANTENNA GAIN ____24 dBi____, BEAMWIDTH ____12____, XAD = XAD01 24G012B Aperture diameter is 5.6 millimeters	NTIA FORMAT (XAD), EXAMPLE, FOR 16 DBI ANTENNA GAIN AND 30 DEGREE BEAMWIDTH XAD01 16G030B
Type of satellite (State = SPCE) (City = Geo or Nongeo)	Radio will be installed on ISS. It is in non-geostationary orbit.	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).

Commented [5]: same comment as previous

For Nongeostationary (Orbital Data)	INCLINATION ANGLE____51.6____, APOGEE IN KILOMETERS____400____, PERIGEE IN KILOMETERS____400____, ORBITAL PERIOD IN HOURS ____1____AND FRACTIONS OF HOURS IN DECIMAL____.55____, THE NUMBER OF SATELLITES IN THE SYSTEM____0____, ORB = ORB,56.1IN00400AP00400PE001.55H01N RT00 Radio is in Bishop Airlock on ISS, it does not have its own orbit, and it is not on a satellite	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) =	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)
Ground Station Receiver information:	The section is not applicable as this is a space-to-space link.	

Section IIIB: Space to Space

Part B: Receiver Data on Space to Space radio link:

Transmitter Data – for signal to be received within the Bishop Airlock <u>Transmit Frequencies:</u> 123-143 GHz, 205-225 GHz, and 252-272 GHz		
Satellite Name: N/A, this radio will be riding on the ISS in the Bishop Airlock		
Data Field	Data Answer	Description/Comments
Polarization (XAP)	XAP = XAP01 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
Orientation (XAZ)	XAZ = XAZ01 NB	NB= NARROWBEAM EC = EARTH COVERAGE

Antenna Dimension (XAD)	ANTENNA GAIN_24____ BEAMWIDTH ____12____ XAD = XAD01 24G012B Aperture diameter is 5.6 millimeters	(NTIA format (XAD), EXAMPLE, XAD01 16G030B)
Type of satellite (State = SP) (City = geo or non)	Type = non N/A, the radio will be inside the Bishop Airlock attached to the International Space Station	Choose either: Geostationary or Nongeostationary
For Geostationary	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE (XLG AND/OR RLG).

For	INCLINATION ANGLE___51.6_____,	IF ANY SATELLITES ARE NONGEOSTATIONARY,
Nongeostationary	APOGEE IN KILOMETERS_400_____,	REPORT ITS INCLINATION ANGLE, APOGEE
(Orbital Data)	PERIGEE IN KILOMETERS___400_____,	IN KILOMETERS, PERIGEE IN KILOMETERS,
	ORBITAL PERIOD IN HOURS _1_ AND	ORBITAL PERIOD IN HOURS AND
	FRACTIONS OF HOURS IN DECIMAL_.55____,	FRACTIONS OF
	THE NUMBER OF SATELLITES IN THE	HOURS IN DECIMAL, THE NUMBER OF
	SYSTEM___0____,	SATELLITES IN THE SYSTEM, THEN T01,
	n/a, radio will be riding on the ISS inside the	EXAMPLE,
	Bishop airlock.	REM04
		*ORB,98.0IN00510AP00510PE001.58H01NRTO
		1,
		AND FOR SPACE-TO-SPACE
		COMMUNICATIONS WITH ANOTHER
		NONGEOSTATIONARY SATELLITE ADD AN
		ADDITIONAL
		*ORB FOR IT ENDING IN R01, EXAMPLE,
		REM05
		*ORB,72.9IN03209AP00655PE013.46H01NRTO
		1

Receiver Data – Same as transmitter data, all inside the Bishop Airlock on the ISS

Frequency bands: 123-143 GHz, 205-225 GHz, and 252-272 GHz

Receive Antenna RAP = RAP01 J
Polarization (RAP)

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 NB	NB= NARROWBEAM EC = EARTH COVERAGE
Receive Antenna Dimension (RAD)	ANTENNA GAIN_24 dBi__, BEAMWIDTH __12 deg__, RAD01 24G012B Aperture diameter is 5.6 millimeters	NTIA FORMAT(RAD), EXAMPLE, FOR 16 DBI ANTENNA GAIN AND 30 DEGREE BEAMWIDTH RAD01 16G030B
Type of satellite (State = SPCE) City = Geo or Nongeo	n/a radio is riding on the ISS, installed inside the Bishop airlock	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_____ APOGEE IN KILOMETERS_____, PERIGEE IN KILOMETERS_____ ORBITAL PERIOD IN HOURS _____AND FRACTIONS OF HOURS IN DECIMAL_____ THE NUMBER OF SATELLITES IN THE SYSTEM_____ *ORB ORB,51.6IN00400AP00400PE001.55H0 1NRR00	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) =	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)