

NTIA Space record data form – DOGE-1 Revision B

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 (S-Band)**

Satellite Transmitter Data

Transmit Frequency: 2289.5 MHz (nominal centerpoint)		
Satellite Name: DOGE-1 (Lunar CubeSat)		
Data Field	Data Answer	Description/Comments
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
Orientation (XAZ)	XAZ = NB	NB= NARROWBEAM EC = EARTH COVERAGE
Antenna Dimension (XAD)	ANTENNA GAIN = <u>0.0 dBi</u> BEAMWIDTH = <u>72 degrees</u>  XAD = XAD01 00G072B	(NTIA format (XAD), EXAMPLE, XAD01 16G030B) Antenna Gain from link budget (0 dBi) Beamwidth from manufacturers specification (20% = 72 degrees) XAD01 00G072B
Type of satellite (State = SP) (City = geo or non)	Type = Nongeostationary	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 Nongeostationary (Orbital Data)	INCLINATION ANGLE <u>28.5 degrees</u> , APOGEE IN KILOMETERS <u>420000 km</u> , PERIGEE IN KILOMETERS <u>400.4 km</u> , ORBITAL PERIOD IN HOURS <u>(0)</u> AND FRACTIONS OF HOURS IN DECIMAL <u>(0)</u> , THE NUMBER OF SATELLITES IN THE SYSTEM <u>one (1)</u> ,  ORB = 28.5IN420000AP00400PE000H00NRT01	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,  Inclination assumes launch from Cape Canaveral Spacecraft is deployed on a Trans Lunar Injection (TLI) trajectory. Apogee and Perigee are estimated from the point of deployment projecting an imaginary elliptical orbit. Per ODAR spacecraft target orbit is the most stable achievable lunar orbit.

Earth Station Data (Receiver)		
State (RSC)	RSC = <u>Helston, Cornwall</u>	Goonhilly Earth Station Ltd. Goonhilly Downs Helston Cornwall TR12 6LQ U.K.
City Name (RAL)	RAL = <u>Goonhilly Downs</u>	Goonhilly Earth Station Ltd. Goonhilly Downs Helston Cornwall TR12 6LQ U.K.
Latitude (DDMMSS)	Lat = 500302N	Specification is GHY-6-TN-GES-0019, V2 50° 3' 01.609500" N
Longitude (DDDMMSS)	Lon = 051101W	Specification is GHY-6-TN-GES-0019, V2 5° 11' 01.112883" W
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
Antenna Azimuth (RAZ)	RAZ = V00  RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA AZIMUTH (RAZ), THE MINIMUM ANGLE OF ELEVATION, V00 TO V90, EXAMPLE, RAZ01 V00
Antenna Dimensions (RAD)	ANTENNA GAIN = <u>55.5 dBi</u> , BEAMWIDTH = <u>0.264 degree</u> , AZIMUTHAL RANGE <u>000-360</u> , THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS = <u>122 m</u> , THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS = <u>44.7 m</u> ,  RAD = RAD01 55.5G0.264B000-360A00122H44.7	EXAMPLE ASSUMING NONGEOSTATIONARY, RAD01 16G030B000-360A00357H006 Specification is GHY-6-TN-GES-0019, V2 The antenna gain is from specification average The Beamwidth from specification (Half Power Beam Width)( 0.264 degrees) The azimuthal range is from derived from specification (0 to 540, centred on 270) The elevation is from GPS GNSS The antenna height is maximum is from specification (44.7 m).
FCC notes: <ol style="list-style-type: none"> <li>1. Use S-Note S945.</li> <li>2. REM AGN, 12U Lunar CubeSat, (DOGE-1)</li> </ol>		

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

Earth Station Transmitter Data (S-Band)

Transmit Frequency: 2109.5 MHz (Nominal Centerpoint)		
State (XSC)	XSC = <u>Helston, Cornwall</u>	Goonhilly Earth Station Ltd. Goonhilly Downs Helston Cornwall TR12 6LQ U.K.
City Name (XAL)	XAL = <u>Goonhilly Downs</u>	Goonhilly Earth Station Ltd. Goonhilly Downs Helston Cornwall TR12 6LQ U.K.
Latitude (DDMMSS)	Lat = 500302N	Specification is GHY-6-TN-GES-0019, V2 50° 3' 01.609500" N
Longitude (DDDMMSS)	Lon = 051101W	Specification is GHY-6-TN-GES-0019, V2 5° 11' 01.112883" W
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
Antenna Azimuth (XAZ)	XAZ =  XAZ01 V05	THE EARTH STATION Transmitter ANTENNA AZIMUTH (XAZ), THE MINIMUM ANGLE OF ELEVATION, V00 TO V90, EXAMPLE, XAZ01 V00 Specification is GHY-6-TN-GES-0019, V2 XAZ from specification
Antenna Dimensions (XAD)	ANTENNA GAIN = <u>55.5 dBi</u> , BEAMWIDTH = <u>0.264 degree</u> , AZIMUTHAL RANGE = <u>000-360</u> , THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS = <u>122 m</u> , THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS = <u>44.7 m</u> ,  XAD = XAD01 55.5G0.264B000-360A00122H44.7	EXAMPLE ASSUMING NONGEOSTATIONARY, XAD01 16G030B000-360A00357H006 Specification is GHY-6-TN-GES-0019, V2 The antenna gain is from specification average The Beamwidth from specification (Half Power Beam Width)(0.264 degrees) The azimuthal range is from derived from specification (0 to 360, centred on 270) The elevation is from GPS GNSS The antenna height is maximum is from specification (44.7 m).
<b>Satellite Receive Specifications</b>		
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

Azimuth (RAZ)	RAZ = NB	NB= NARROWBEAM EC = EARTH COVERAGE
Dimension (RAD)	ANTENNA GAIN = <u>0.0 dBi</u> BEAMWIDTH = <u>72 degrees</u>  RAD = RAD01 00G072B  RAD =	(NTIA format (RAD), EXAMPLE, RAD01 16G030B)
Type of satellite (State = SP) City = G/No	Type = Nongeostationary	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 Nongeostationary (Orbital Data)	INCLINATION ANGLE <u>28.5 degrees</u> , APOGEE IN KILOMETERS <u>420000 km</u> , PERIGEE IN KILOMETERS <u>400.4 km</u> , ORBITAL PERIOD IN HOURS ( <u>0</u> ) AND FRACTIONS OF HOURS IN DECIMAL ( <u>0</u> ), THE NUMBER OF SATELLITES IN THE SYSTEM <u>one (1)</u> ,  ORB = 28.5IN420000AP00400PE000H00NRT01	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,  Inclination assumes launch from Cape Canaveral Spacecraft is deployed on a Trans Lunar Injection (TLI) trajectory. Apogee and Perigee are estimated from the point of deployment projecting an imaginary elliptical orbit. Per ODAR spacecraft target orbit is the most stable achievable lunar orbit.

## Part A: Space to Earth Downlink Data

### Satellite Transmitter Data (X-Band)

Transmit Frequency: 8262.5 MHz (nominal centerpoint)		
Satellite Name: Geometric-1 (train constellation GENMAT-1, NOCLIP-1, and MOXY-1)		
Data Field	Data Answer	Description/Comments
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
Orientation (XAZ)	XAZ = EC	NB= NARROWBEAM EC = EARTH COVERAGE
Antenna Dimension (XAD)	ANTENNA GAIN <u>12 dBi</u> BEAMWIDTH <u>40 degrees</u> XAD = XAD01 12G040B XAD02 06G074B	(NTIA format (XAD), EXAMPLE, XAD01 16G030B) Antenna gain is from manufacturer specifications for 2X2 Patch (GENMAP & NOCLIP) Single Patch (6dBi MOXY) Beamwidth is from manufacturer specifications
Type of satellite (State = SP) (City = geo or non)	Type = Nongeostationary	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 Nongeostationary (Orbital Data)	INCLINATION ANGLE <u>28.5 degrees</u> , APOGEE IN KILOMETERS <u>420000 km</u> , PERIGEE IN KILOMETERS <u>400.4 km</u> , ORBITAL PERIOD IN HOURS ( <u>0</u> ) AND FRACTIONS OF HOURS IN DECIMAL ( <u>0</u> ), THE NUMBER OF SATELLITES IN THE SYSTEM <u>one (1)</u> ,  ORB = 28.5IN420000AP00400PE000H00NRT01	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,  Inclination assumes launch from Cape Canaveral Spacecraft is deployed on a Trans Lunar Injection (TLI) trajectory. Apogee and Perigee are estimated from the point of deployment projecting an imaginary elliptical orbit. Per ODAR spacecraft target orbit is the most stable achievable lunar orbit.

<b>Earth Station Data (Receiver)</b>		
State (RSC)	RSC = Ohio	
City Name (RAL)	RAL = Dublin	
Latitude (DDMMSS)	Lat = 400615N	40°6'15"N
Longitude (DDDMMSS)	Lon = 831158W	83°11'58"W
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
Antenna Azimuth (RAZ)	RAZ = 0 RAZ01 V00	THE EARTH STATION RECEIVER ANTENNA AZIMUTH (RAZ), THE MINIMUM ANGLE OF ELEVATION, V00 TO V90, EXAMPLE, RAZ01 V00
Antenna Dimensions (RAD)	ANTENNA GAIN <u>0.5 dB</u> , BEAMWIDTH <u>0.45 degrees</u> AZIMUTHAL RANGE <u>000-360</u> , THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS <u>258.7</u> THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS <u>5.4</u>  RAD = RAD01 1G001B000-360A00259H006	EXAMPLE ASSUMING NONGEOSTATIONARY, RAD01 16G030B000-360A00357H006  The antenna gain is derived from AWS Specifications. The beamwidth the specified Half-power Beamwidth = 0.45 degrees (Typical) is derived from AWS Specifications.  The azimuthal range is derived from AWS Specifications.  The elevation for these coordinates is 258.7 meters based on GPS elevation data.  The antenna height above terrain is derived from AWS Specifications.  All numbers rounded up to the next integer
FCC notes: 1. Use S-Note S945. 2. REM AGN, 12U Lunar CubeSat, (DOGE-1)		

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

Earth Station Transmitter Data (X-Band) – Not Applicable

**Table 3**

**Space Station Class of Station**

Symbol	Space Station Class of Station	DOGE-1		
		UPLINK	DOWNLNKS	DOWNLNKX
ED	Space telecommand space station (Spacecraft Operations)	<input checked="" type="checkbox"/> Spacecraft Commands		
EH	Space research space station (Payload Operations + Technology Development)	<input checked="" type="checkbox"/> INCA + DLT Commands	<input checked="" type="checkbox"/> INCA + DLT Telemetry	<input checked="" type="checkbox"/> INCA + DLT Data
ER	Space telemetering space station (Spacecraft Operations)		<input checked="" type="checkbox"/> Spacecraft Telemetry	
ET	<i>Space station in the space operation service (Potential Products)</i>			<input checked="" type="checkbox"/> <b>DLT + NFT Imagery</b>
Symbol	Earth Station Class of Station			
TD	Space telecommand earth station (Spacecraft Operations)	<input checked="" type="checkbox"/> Spacecraft Commands		
TH	Earth station in the space research service (Payload Operations)	<input checked="" type="checkbox"/> INCA + DLT Commands	<input checked="" type="checkbox"/> INCA + DLT Telemetry	<input checked="" type="checkbox"/> INCA + DLT Data
TK	Space tracking earth station (Spacecraft + Payload Operations)	<input checked="" type="checkbox"/> Spacecraft Tracking	<input checked="" type="checkbox"/> Spacecraft Tracking	
TR	Space telemetering earth station (Spacecraft Operations)	<input checked="" type="checkbox"/> Spacecraft Commands		
TT	<i>Earth station in the space operation service (Potential Products)</i>			<input checked="" type="checkbox"/> <b>DLT + NFT Imagery</b>
Symbol	Nature of the service			
CR	Station open to limited public correspondence			<input checked="" type="checkbox"/> DLT + NFT Imagery
<b>Key:</b>				
	Experiments			
	Potential Products (resulting from experiments)			