## 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.

Data below for HF Varisat-2A through HF Varisat-2F, six identical satellites deployed in a cluster.

## Part A: Space to Earth Downlink Data

Forward Error

**Correction Coding** 

**Total Symbol Rate** 

Satellite Transmitter Data (Required for Each Frequency)

Is FEC used? Yes oxtimes No oxtimes

1000 Symbols/second, max

length)=7\_,

FEC Type: \_Reed-Solomon, with Viterbi type decoder, both coder outputs being sent successively, 2x2x160 interleave

FEC Rate: R(Rate)=1/2, K (Constraint

Transmit Frequency	<i>y</i> .	•
24.585 MHz	,.	
24.5864 MHz		
24.687 MHz		
24.6884 MHz		
All data same for al	I fraguencies	
	· ·	
Satellite Name: var	isat-1A and Varisat-1B	
Data Field	Data Answer	Description/Comments
Transmit Power	PWR =	TRANSMIT POWER SUPPLIED TO THE ANTENNA
(PWR)	PWR01 1.91 W	INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE:
		W = WATT,
		K = KILOWATT,
		M = MEGAWATT
Necessary	2.4 kHz	THE WIDTH OF FREQUENCY BAND WHICH IS JUST SUFFICIENT TO SUCCESSFULLY TRANSFER DATA.
Bandwidth		FORMULAS CAN BE FOUND IN ANNEX J OF THE
		NTIA MANUAL.
RF Emissions Data	N/A	2-SIDED EMISSION BANDWIDTH VALUES
-3 dB bandwidth		
-20 dB bandwidth		
-40 dB bandwidth		
-60 dB bandwidth		
Modulation Type	PSK or CW	THE METHOD USED TO SUPERIMPOSE DATA ON THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	1000 baud, max	INFORMATION DATA 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	Yes □	BEACON MODE IS NORMALLY CONSIDERED A REGULAR AND PERIODIC SHORT DURATION	
have a beacon	No ⊠	TRANSMISSION THAT IS OFTEN USED TO ASSIST	
mode?		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 □	STATISTICS THE VISIBLE	
a beacon mode,	No □		
can the beacon be			
commanded off?			
Transmit Antenna	XAP = V	POLARIZATIONS INCLUDE: H = HORIZONTAL,	
Polarization (XAP)		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	XAZ = EC	NB= NARROWBEAM	
Orientation (XAZ)	70.12 20	EC = EARTH COVERAGE	
Transmit Antenna	ANTENNA GAIN3,	NTIA FORMAT (XAD), EXAMPLE, FOR 16 DBI	
Dimension (XAD)	BEAMWIDTH60,	ANTENNA GAIN AND 30 DEGREE BEAMWIDTH XAD01 16G030B	
	XAD = XAD01 03G060B		
Type of satellite	Type = Nongeo	CHOOSE EITHER: GEOSTATIONARY OR NONGEOSTATIONARY	
(State = SPCE)		GEOSTATIONARY OR NONGEOSTATIONARY	
(City = Geo or			
Nongeo)			
For Geostationary	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT	
Satellites		ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE IN DDDMMSS FORMAT	
		(XLG AND/OR RLG).	
For	INCLINATION ANGLE51.6,	IF ANY SATELLITES ARE NONGEOSTATIONARY,	
Nongeostationary	APOGEE IN KILOMETERS475,	REPORT ITS INCLINATION ANGLE, APOGEE IN KILOMETERS, PERIGEE IN KILOMETERS,	
(Orbital Data)	PERIGEE IN KILOMETERS475,	ORBITAL PERIOD IN HOURS AND FRACTIONS OF	
	ORBITAL PERIOD IN HOURS1AND	HOURS IN DECIMAL, THE NUMBER OF SATELLITES IN THE SYSTEM, THEN TO1, EXAMPLE,	
	FRACTIONS OF HOURS IN	REM04	
	DECIMAL57,	*ORB,98.0IN00510AP00510PE001.58H01NRT01, AND FOR SPACE-TO-SPACE	
	THE NUMBER OF SATELLITES IN THE	COMMUNICATIONS WITH ANOTHER	
	SYSTEM_6,	NONGEOSTATIONARY SATELLITE ADD AN	
	ORB =	ADDITIONAL *ORB FOR IT ENDING IN R01, EXAMPLE, REM05	
	ORB,51.6IN00475AP00475PE001.57H06NRT0	*ORB,72.9IN03209AP00655PE013.46H01NRR01	
	1		
For	Mean Local Time of Ascending Node	MLTAN IS THE ANGLE BETWEEN AN ORBIT'S	
SunSynchronous	(MLTAN) =	ASCENDING NODE AND THE MEAN SUN, OFTEN EXPRESSED AS UNIT OF TIME (HH:MM)	
Nongeostationary			
Orbits			
Earth Station Dat	Earth Station Data (Possiver) at Each Earth Station Location		
Earth Station Data (Receiver) at Each Earth Station Location			

Ctata (DCC)	DCC - M/V	1
State (RSC)	RSC = WV	
City Name (RAL)	RAL = HILLSBORO	
Latitude	Lat = 380645 NORTH	
(DDMMSS)		
Longitude	Lon = 0801558 WEST	
(DDDMMSS)		DOLARIZATIONS INICILIDE.
Receive Antenna	RAP = L	POLARIZATIONS INCLUDE: H = HORIZONTAL,
Polarization (RAP)		V = VERTICAL,
		S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR,
		R = RIGHT HAND CIRCULAR,
		T = RIGHT AND LEFT HAND CIRCULAR,
Receive Antenna	RAZ =	J = LINEAR POLARIZATION  THE EARTH STATION RECEIVER ANTENNA
Orientation (RAZ)	RAZ01 V05	MINIMUM OPERATING ANGLE OF
0110110011011 (	10.1201 100	ELEVATION (RAZ), V00 TO V90, EXAMPLE, RAZ01 V00
Receive Antenna	ANTENNA GAIN2.5,	EXAMPLE ASSUMING NONGEOSTATIONARY, 16 DBI GAIN, 30 DEGREE BEAMWIDTH, AZIMUTHAL
Dimensions (RAD)	BEAMWIDTH60,	RANGE FROM 001-360, SITE ELEVATION OF 357
	AZIMUTHAL RANGE000-360,	METERS, AND ANTENNA HEIGHT ABOVE TERRAIN
	THE SITE ELEVATION ABOVE MEAN SEA	OF 6 METERS: RAD01 16G030B001-360A00357H006
	LEVEL IN METERS975	10.002 200000000000000000000000000000000
	THE ANTENNA HEIGHT ABOVE TERRAIN	
	IN METERS12	
	242	
	RAD =	
	RAD01 02G060B000-360A00975H012	
Receive Antenna	ANTENNA DIAMETER,	
Additional	ANTENNA EFFICIENCY,	
Information (For		
Parabolic	Not parabolic	
Antennas)	_	AND THE CATELLITE WILL
Number of	5	NUMBER OF TIMES THE SATELLITE WILL COMMUNICATE WITH THE EARTH STATION IN THE
Satellite Contacts		SPACE TO EARTH DIRECTION (DOWNLINKS) EACH
Supported Per		DAY
Day		WEST OF BURNTION OF FACIL CONTACT
Expected	17 Minutes	AVERAGE DURATION OF EACH CONTACT
Duration of Each		
Contact	_	
Supported	Satellite Health and Status Data ⊠	SATELLITE HEALTH AND STATUS TELEMETRY AND/OR MISSION PAYLOAD DATA
Operations	Mission Payload Data 🗵	AND/ON MISSION FATEOAD DATA
FCC notes:		

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

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

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

Transmit Frequency	<i>/</i> :	
24.585 MHz		
24.5864 MHz		
24.687 MHz		
24.6884 MHz		
All data same for all	l frequencies	
State (XSC)	XSC = WV	
City Name (XAL)	XAL = Hillsboro	
Latitude	Lat = 380645 NORTH	
(DDMMSS)		
Longitude	Lon = 0801558 WEST	
(DDDMMSS)		
Transmit Power	PWR at Ant Term = 178 W	TRANSMIT POWER SUPPLIED TO THE ANTENNA
(PWR)		INPUT TERMINAL, EXAMPLE, PWR01 W2 TRANSMIT POWER UNITS INCLUDE:
		W = WATT,
		K = KILOWATT,
Nococcany	2.4 kHz	M = MEGAWATT  THE WIDTH OF FREQUENCY BAND WHICH IS JUST
Necessary Bandwidth	2.4 KHZ	SUFFICIENT TO SUCCESSFULLY TRANSFER DATA.
Dalluwiutii		FORMULAS CAN BE FOUND IN ANNEX J OF THE
RF Emissions Data	N/A	NTIA MANUAL.  2-SIDED EMISSION BANDWIDTH VALUES
-3 dB bandwidth	14/4	1
-20 dB bandwidth		-
-40 dB bandwidth		-
		-
-60 dB bandwidth	DCK	THE METHOD USED TO SUPERIMPOSE DATA ON
Modulation Type	PSK	THE CARRIER, EXAMPLE, BPSK, QPSK, GMSK.
Data Rate	1000 baud	INFORMATION DATA RATE
Forward Error	Is FEC used? Yes $oxtimes$ No $oxtimes$	
Correction Coding	FEC Type: _Reed-Solomon, with Viterbi	
	type decoder, both coder outputs being	
	sent successively, 2x2x160 interleave	
	FEC Rate: R(Rate)=1/2, K (Constraint	
	length)=7_,	
Total Symbol Rate	1000 Symbols/second	DATA RATE COMBINED WITH FEC AND FRAME
		OVERHEAD RESULTING IN THE TOTAL SYMBOL RATE AT THE INPUTE TO THE SYMBOL
		MAPPER/MODULATOR.
Transmit Antenna	XAP = L	POLARIZATIONS INCLUDE:
Polarization (XAP)		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 V05	THE EARTH STATION TRANSMITTER ANTENNA MINIMUM OPERATING ANGLE OF ELEVATION (XAZ), V00 TO V90, EXAMPLE, XAZ01 V00
Transmit Antenna Dimensions (XAD)	ANTENNA GAIN2.5, BEAMWIDTH60, AZIMUTHAL RANGE000-360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS975 THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS12  XAD = XAD01 02G060B000-360A00975H012	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, ANTENNA EFFICIENCY, Not Parabolic	
Number of Satellite Contacts Supported Per Day	5	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	17 minutes	AVERAGE DURATION OF EACH CONTACT
Satellite Receive Sp	Decifications	
Receive Antenna Polarization (RAP)	RAP = V	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 = EC	NB= NARROWBEAM EC = EARTH COVERAGE
Receive Antenna Dimension (RAD)	ANTENNA GAIN3 BEAMWIDTH60 RAD = RAD01 03G060B	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 ANGLE51.6, APOGEE IN KILOMETERS 475, PERIGEE IN KILOMETERS 475, ORBITAL PERIOD IN HOURS 1 AND FRACTIONS OF HOURS IN DECIMAL57, THE NUMBER OF SATELLITES IN THE SYSTEM 6,  ORB = ORB,51.6IN00475AP00475PE001.57H06NRR01	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) =  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)