

## Satellite System Spec Sheet

### Diagram

Earth Station

Satellite Station

\* Link the earth station to the satellite station after dragging them to the diagram.

\* Then link the satellite station to the earth station.

### Classification/Handling/CUI

Field	Value
Special Handling	N/A
CUI Instructions	CRIT - General Critical Infrastructure Information
Limited Dissemination Controls	FEDCON - Federal Employees and Contractors Only
Controlled By:	Your Organization
POC Name, Number, Email	Your Information
Business Identifiable Information (BII)	No

### NTIA General Information

Field	Value
Nomenclature	Satellite System
Type of Nomenclature	Commercial
Target Application Approval Date	11/30/2022
Target Date for System Activation	4/30/2023
Target Date for System Termination	4/30/2033
Number of Units	1
System Description	The sample satellite will provide a platform for scientific data collected by onboard experiments
NSEP Use	Yes
Information Transfer Requirement	Telemetry data GMSK/9.6 kbps ; Experiment data BPSK/38.4 kbps
Estimated Initial Cost (\$)	\$260,000
System Relationship and Essentiality	System is designed to detect and characterize plasma bubbles in the atmosphere.
Replacement Information	Replace existing system
ITU Waiver	No

## EARTH STATION

### Earth Station

Field	Value
Station Name	Earth1
Station Description	Test Earth Station
Equipment Associated with Station*	
Station Transmitters	Earth Transmitter

Station Receivers	Earth Receiver
Station Antenna 1	Earth Antenna Receiving
Station Antenna 2	Earth Antenna Transmitting
* You must add equipment to the station prior to navigating to Link/Selected Mode page	
<b>Location</b>	
State, Country, or Location Name Part 1	Florida
City or Location Name Part 2	Kennedy Space Center**
Location Type	Circle
Geographic Coordinates	283148N 0803722W
Minimum Pointing Angle	5 degrees
** Select Kennedy Space Center, Florida from list of Approved Locations	

Earth Transmitter	
Field	Value
Nomenclature	Earth Transmitter
Type of Nomenclature	Commercial
Manufacturer	Kenwood
Model Name and Number	K-Ground-Tx
Potential Platform	Training Satellite System
Transmitter Type	Communications
Output Device	Transistor
FCC Acceptance No.	12345
<b>Earth Transmitter Frequency Emission Designator</b>	
Necessary Bandwidth	30 kHz
Emission Designator	30K0F2D
<b>Earth Transmitter Frequency</b>	
Lowest Tuned Frequency	2025 MHz
Highest Tuned Frequency	2035 MHz
Tuning Increment (Steps)	2 kHz
Minimum Required Frequency Separation	10 MHz
# of Frequencies Required for Operation	2
Method of Tuning	Synthesizer PLL
<b>Earth Transmitter Frequency Emission Designator Modulation RF Fundamental Curve</b>	
Measured or Calculated	Measured
-3 dB Bandwidth / (Frequency Offset)	7 kHz (3.5 kHz)*
-20 dB Bandwidth / (Frequency Offset)	32 kHz (16 kHz)*
-40 dB Bandwidth / (Frequency Offset)	57 kHz (28.5 kHz)*
-60 dB Bandwidth / (Frequency Offset)	90 kHz (45 kHz)*
* Remember that the curve editor wants frequency offset as an input (freq offset = 1/2 bandwidth)	
Occupied Bandwidth	30 kHz
Measured or Calculated	Measured
<b>Earth Transmitter Power</b>	
Power Type	Mean
Power Upper Limit	100 Watts
<b>Earth Transmitter Frequency Emission Designator Modulation (Modulation Parameters)</b>	
Modulation Type	Digital Modulation

Digital Modulation Type	MSK - Minimum Shift Keying
Digital Maximum Modulation Frequency	9.6 kHz
Number of Digital States	2
Digital Pulse Format	Non-Return to Zero
Transmission Bit Rate	9600 bps
Digital Deviation Ration	0.5
Digital Peak Frequency Deviation	4.8 kHz
Frequency Stability (Tolerance)	3
Frequency Stability (Tolerance) Units	ppm
<b>Earth Transmitter Harmonics</b>	
2nd Harmonic	-70 dB
3rd Harmonic	-70 dB
Other Harmonic	-80 dB
<b>Earth Transmitter Spurious Emission Curve</b>	
Spurious Level Attenuation	-80 dB

Earth Receiver	
Field	Value
Nomenclature	Earth Receiver
Type of Nomenclature	Commercial
Manufacturer	Kenwood
Model Name and Number	K-Ground-Rx
Potential Platform	Training Satellite System
Receiver Type	Other
FCC Type Acceptance No.	123456
Emission Designator	80K0G2D
<b>Earth Receiver Frequency</b>	
Lowest Tuned Frequency	2200 MHz
Highest Tuned Frequency	2290 MHz
Tuning Increment (Steps)	5 kHz
Minimum Seperation	10 MHz
# of Frequencies Required for Operation	2
Tuning Method (Method of Tuning)	Synthesizer
Frequency Stability (Tolerance)	15
Frequency Stability (Tolerance) Units	ppm
<b>Earth Receiver Frequency Emission Sensitivity</b>	
Sensitivity (Level)	-124 dBm
Performance Criteria (Criteria Type)	BER - Bit Error Rate
Performance Value (Criteria Level)	0.0001
Noise Figure	4 dB
Noise Temperature	438.4 K (use the calculator button)
<b>Earth Receiver Frequency Emission Sensitivity IF Selectivity Curve</b>	
Measured or Calculated	Measured
IF Frequency	70 MHz
3 db Bandwidth / (Frequency Offset)	130 kHz / (65 kHz)*
20 db Bandwidth / (Frequency Offset)	210 kHz / (105 kHz)*

60 db Bandwidth / (Frequency Offset)	1380 kHz / (690 kHz)*
* Remember that the curve editor wants frequency offset as an input (frequency offset = 1/2 bandwidth)	
Image Rejection Level	60 dB
Spurious Rejection Level	50 dB

Earth Antenna	
<b>Antenna - Aperture</b>	
Field	Value
Nomenclature	Earth Antenna Receiving
Type of Nomenclature	Commercial
Model Name and Number	DC-Aperture-1
Manufacturer	Direction Corp
Antenna Category	Aperture
Antenna Type	Aperture
Antenna Lower Frequency Limit	2200 MHz
Antenna Upper Frequency Limit	2290 MHz
Antenna Main Beam Gain	26 dBi
Polarization	Lefthand Circular
Antenna Horizontal Beamwidth	4 Degrees
Antenna Vertical Beamwidth	4 Degrees
Vertical Scan Characteristics Type	Electronic Scan Sector
Antenna Vertical Scan Minimum Elevation	0 Degrees
Antenna Vertical Scan Maximum Elevation	90 Degrees
Vertical Scan Rate (scans per..)	1 per minute
Vertical Scan Speed (degrees per..)	2 per second
1st Vertical Sidelobe Attenuation	8 dB
1st Vertical Sidelobe Position	32 degrees
1st Horizontal Sidelobe Attenuation	8 dB
1st Horizontal Sidelobe Position	32 degrees
<b>Antenna - Linear</b>	
Field	Value
Nomenclature	Earth Antenna Transmitting
Type of Nomenclature	Commercial
Model Name and Number	MS-Linear-1
Manufacturer	Mirage System
Antenna Category	Linear
Antenna Type	Linear
Antenna Lower Frequency Limit	2025 MHz
Antenna Upper Frequency Limit	2035 MHz
Antenna Main Beam Gain	3 dBi
Polarization	Linear
Antenna Horizontal Beamwidth	34 Degrees
Antenna Vertical Beamwidth	78 Degrees
1st Vertical Sidelobe Attenuation	6 dB
1st Horizontal Sidelobe Attenuation	6 dB

## SATELLITE STATION

Satellite Station	
Field	Value
Station Name	Satellite1
Station Description	Test Satellite Station
<b>Equipment Associated with Station*</b>	
Station Transmitters	Satellite Transmitter
Station Receivers	Satellite Receiver
Station Antenna 1	Satellite Antenna Transmitting
Station Antenna 2	Satellite Antenna Receiving
* You must add equipment to the station prior to navigating to Link/Selected Mode page	
<b>Location</b>	
Location Type	Satellite Non-Geostationary
Approved Locations	Firefly Space*
Period of Orbit	94.6167 minutes
Altitude at Apogee	500 km
Altitude at Perogee	500 km
Equatorial Inclination	45 Degrees
* Select Firefly Space from list of Approved Locations	

Satellite Transmitter	
Field	Value
Nomenclature	Satellite Transmitter
Type of Nomenclature	Commercial
Model Name and Number	ST-Satellite-1
Manufacturer	SUR-TEC INC
Potential Platform	Training Satellite System
Transmitter Type	Communications
Output Device	Transistor
FCC Type Acceptance Number	12345
<b>Satellite Transmitter Frequency Emission Designator</b>	
Necessary Bandwidth	80 kHz
Emission Designator	80K0G2D
<b>Satellite Transmitter Frequency</b>	
Lowest Tuned Frequency	2200 MHz
Highest Tuned Frequency	2290 MHz
Tuning Increment (Steps)	0 kHz
Minimum Required Frequency Separation	0.5 MHz
# of Frequencies Required for Operation	2
Method of Tuning	Crystal Fixed
<b>Satellite Transmitter Frequency Emission Designator Modulation RF Fundamental Curve</b>	
Measured or Calculated	Measured
-3 dB Bandwidth / (Frequency Offset)	60 kHz (30 kHz)*
-20 dB Bandwidth / (Frequency Offset)	90 kHz (45 kHz)*

-40 dB Bandwidth / (Frequency Offset)	130 kHz (65 kHz)*
-60 dB Bandwidth / (Frequency Offset)	188 kHz (94 kHz)*
* Remember that the curve editor wants frequency offset as an input (freq offset = 1/2 bandwidth)	
Occupied Bandwidth	80 kHz
Measured or Calculated	Measured
<b>Satellite Transmitter Power</b>	
Power Type	Mean
Power Upper Limit	0.5 Watts
<b>Satellite Transmitter Frequency Emission Designator Modulation (Pulse Parameters)</b>	
Modulation Type	Digital
Digital Modulation Type	PSK (Phase Shift Keying)
Max Modulation Frequency	38.400 kHz
Number of Digital States	2
Digital Pulse Format	Non-Return to Zero
Transmission Bit Rate	38400 bps
Deviation Ratio	1.57
Peak Frequency Deviation	60.288 kHz
Frequency Stability (Tolerance)	10
Frequency Stability (Tolerance) Units	ppm
<b>Satellite Transmitter Harmonics</b>	
2nd Harmonic	-60 dB
3rd Harmonic	-60 dB
Other Harmonic	-60 dB
<b>Satellite Transmitter Spurious Emission Curve</b>	
Spurious Level Attenuation	-60 dB

Satellite Receiver	
Field	Value
Nomenclature	Satellite Receiver
Type of Nomenclature	Commercial
Manufacturer	SUR-TEC INC
Model Name and Number	S-Satellite-Rx
Potential Platform	Training Satellite System
Receiver Type	Other
FCC Type Acceptance No.	123456
Emission Designator	30K0F2D
<b>Satellite Receiver Frequency</b>	
Lowest Tuned Frequency	2025 MHz
Highest Tuned Frequency	2035 MHz
Tuning Increment (Steps)	2 kHz
Minimum Separation	10 MHz
# of Frequencies Required for Operation	2
Tuning Method (Method of Tuning)	Crystal Fixed
Frequency Stability (Tolerance)	5
Frequency Stability (Tolerance) Units	ppm
<b>Satellite Receiver Frequency Emission Sensitivity</b>	

Sensitivity (Level)	-130 dBm
Performance Criteria (Criteria Type)	BER - Bit Error Rate
Performance Value (Criteria Level)	0.0001
Noise Figure	2 dB
Noise Temperature	230 K (do not use the calculator button)
<b>Satellite Receiver Frequency Emission Sensitivity IF Selectivity Curve</b>	
Measured or Calculated	Measured
IF Frequency	455 kHz
3 db Bandwidth / (Frequency Offset)	60 kHz / (30 kHz)*
20 db Bandwidth / (Frequency Offset)	80 kHz / (40 kHz)*
60 db Bandwidth / (Frequency Offset)	120 kHz / (60 kHz)*
* Remember that the curve editor wants frequency offset as an input (frequency offset = 1/2 bandwidth)	
Image Rejection Level	60 dB
Spurious Rejection Level	50 dB

Satellite Antenna	
<b>Antenna - Linear</b>	
Field	Value
Nomenclature	Satellite Antenna Transmitting
Type of Nomenclature	Commercial
Model Name and Number	OT-Linear-1
Manufacturer	OMNI Tronix
Antenna Category	Linear
Antenna Type	Linear
Antenna Lower Frequency Limit	2200 MHz
Antenna Upper Frequency Limit	2290 MHz
Antenna Main Beam Gain	28 dBi
Polarization	Lefthand Circular
Antenna Horizontal Beamwidth	8 degrees
Antenna Vertical Beamwidth	8 degrees
1st Vertical Sidelobe Attenuation	6 dB
1st Horizontal Sidelobe Attenuation	6 dB
<b>Antenna - Linear</b>	
Field	Value
Nomenclature	Satellite Antenna Receiving
Type of Nomenclature	Commercial
Model Name and Number	O-Linear-1
Manufacturer	OMERA (FRANCE)
Antenna Category	Linear
Antenna Type	Linear
Antenna Lower Frequency Limit	2025 MHz
Antenna Upper Frequency Limit	2035 MHz
Antenna Main Beam Gain	4 dBi
Polarization	Vertical Linear
Antenna Horizontal Beamwidth	34 Degrees
Antenna Vertical Beamwidth	78 Degrees

1st Vertical Sidelobe Attenuation	6 dB
1st Horizontal Sidelobe Attenuation	6 dB

## LINKS

Link Information: Earth to Satellite	
Field	Value
Transmitter	Earth Transmitter
Transmitter Antenna	Earth Antenna Transmitting (check box)
Coupling Loss	0.0 dB
Receiver	Satellite Receiver
Receiver Antenna	Satellite Antenna Receiving (check box)
Radio Service/Station Class	Space Operation / TT- Earth Space Research / TH - Earth
Identify Frequencies	Select the one In-band frequency range (check box)
Emission/Power	Earth Transmitter (check box)

Link Information: Satellite to Earth	
Field	Value
Transmitter	Satellite Transmitter
Transmitter Antenna	Satellite Antenna Transmitting (check box)
Coupling Loss	0.0 dB
Spectral Power Density	-48.8 dBw/Hz
Receiver	Earth Receiver
Receiver Antenna	Earth Antenna Receiving (check box)
Radio Service/Station Class	Space Operation / ET- Space Space Research / EH - Space
Identify Frequencies	Select the one In-band frequency range (check box)
Emission/Power	Satellite Transmitter (check box)

Link Information: Geographic Location
* Because this is a satellite system leave these fields blank and enter geographic locations on the station page.

## FULL RECORD PRINT

Once completed, send your Full Record Print and Training Survey to [ecohelpdesk@ntia.gov](mailto:ecohelpdesk@ntia.gov)