

Raytheon Company (Missiles and Defense – M)  
Experimental STA Application  
File Number: 0079-EX-ST-2022

### **Exhibit 1 – Overview and Explanation**

**Overview:** Raytheon Company (Missiles and Defense – M) (Raytheon) is filing this application for a signal generator system used for simulating FTS signal at Vandenburg Space Force Base (VSFB), building 980 (34°40'38.24"N 120°35'59.05") as directed by the government spectrum office supporting the Air Force Test Group which will be conducting testing at VSFB. The testing will be preliminary testing done prior to actual CFT.

Technical details:

Frequency: 425.4MHz (FTS simulator)

OB: 180 KHz

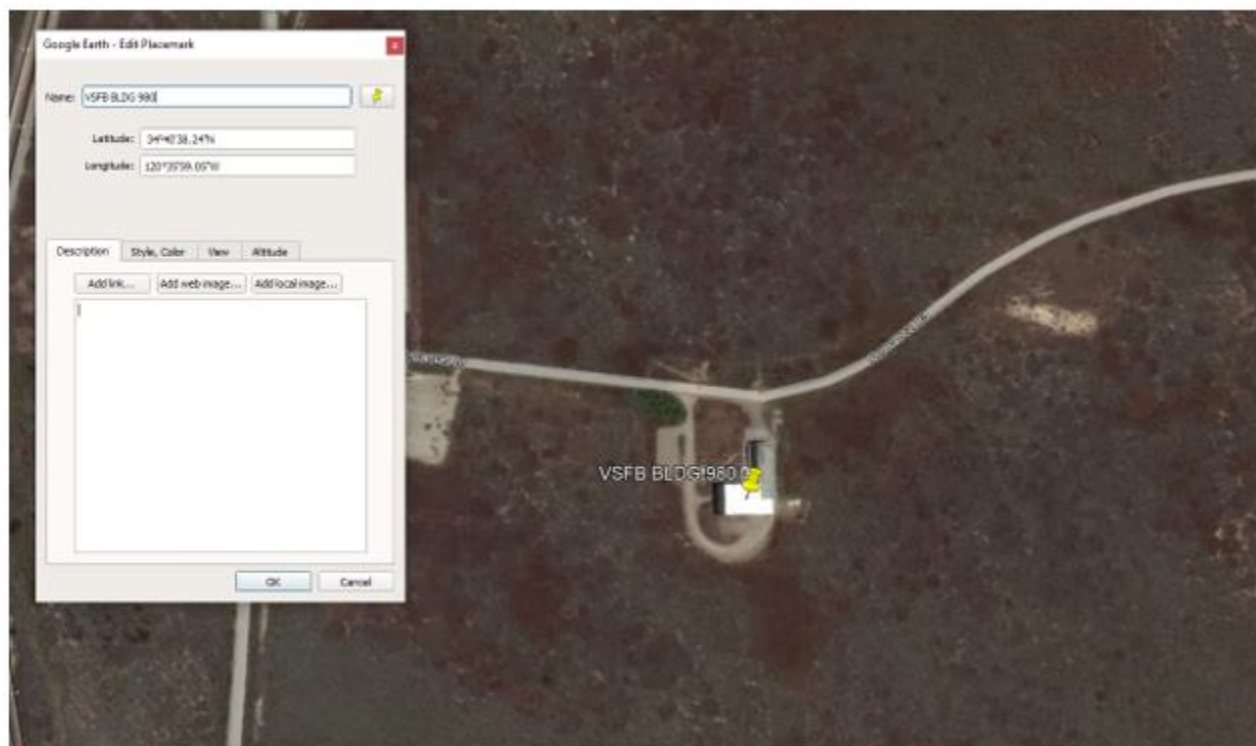
Power: 19 mW (ERP)

System: WV Communications Model EX1004-002

The government test officer is Ms. Reja Klug of the USAF 780<sup>th</sup> TS at [reja.klug@uslaf.mil](mailto:reja.klug@uslaf.mil). The supporting government spectrum office for the 780<sup>th</sup> TS is the DOD Gulf Area Frequency Coordinator (GAFC). The spectrum manager directing the action from the GAFC is Mr. Larry Parsons at [larry.parsons.1@us.af.mil](mailto:larry.parsons.1@us.af.mil). Mr. Parson will make the direct coordination with the Vandenburg ISM and WAFC personnel.

For any questions about this application, please contact Jim Ortega, Raytheon Spectrum Manager, 520-794-0227, [james.e.ortega@raytheon.com](mailto:james.e.ortega@raytheon.com) .

Location in building: The signal generator will be used inside the structure.



**A “Stop Buzzer” point of contact for the authorized device must be identified and available at all times during GPS re-radiation operation of the device under any condition.**

The Stop Buzzer point of contact for this re-radiation system is:

Jim Ortega 520-262-1757

[James.e.ortega@raytheon.com](mailto:James.e.ortega@raytheon.com)

**Location: Vandenburg SFB BLDG 980 34°40'38.24"N 120°35'59.05"**

Use: Re-radiation system used 100% for testing installed antennas installed: indoors Manufacturer: all components are part of GPS Source Re-radiation kit

**GPS Signal Analysis - L1 Link Budget**

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6.3E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1.3E-10	125.89
GPS RF Attenuator	-22	dB	-91	7.9E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	1.7E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3.4E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	7.8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	4.8E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8.4E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5.1E-20	5.12E-08

### GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6.3E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1.3E-10	125.89
GPS RF Attenuator	-22	dB	-91	7.9E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	1.7E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3.4E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1.3E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	7.8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1.4E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8.4E-20	8.43E-08