Experimental License Planning
Information Request

The following information request will help us to complete and file an application for an experimental license. The information requested is generally needed both for the application and for coordination requirements that will be part of the application processing. Please provide as much complete information as possible. There will be questions – on your part and on the part of the filing team. To discuss, please contact your spectrum manager at: _____.

Table of Information – FCC application: APPLICATION FOR TERRESTRIAL USE of KA BAND

Name of program: __CORE_____

Administrative Questions:	**Information:**
Formal Name of Applicant:	Raytheon IIS
Address of applicant	
Contact name for application Phone number e-mail	
FRN	
Is there a federal contract? What number?	
Is Confidentiality Needed?	**yes**
Technical Questions:	**Information:**
Address of experiment (including city, state, county)	23010 Ladbrook Drive Dulles VA 20166
Geographic coordinates: (latitude and longitude)	Longitude -73.989308 Latitude 40.741895
Radio manufacturer	Tampa Microwave
Radio(s) model number(s)	Transmitter 1:Tampa Microwave Satellite Emulator System with RF module for KA band model number 220264-ka-1 Overall system part number: 20044-5 Ka-Band Transceiver: 220264-Ka-1
Number of units to be used	1
Outdoor transmitter information: What is the height of the transmitter? What structure will it be installed on?	The test stations will likely be on a tripod so they can be moved. The testing is only temporary. The height probably will not exceed 5 feet high from the rooftop. The installation will be on the roof of the building. The building is 151 feet high.

for more information contact Suzanne Webber. 703-260-3587 or suzanne_v_weber@raytheon.com

What is the overall height of the structure?	
Location of experiment: Indoor? Outdoor? Mobile, fixed? Radius of Operations? If outdoor, what features of the area might attenuate signals?	Outdoor, fixed The test stations will be operating about 50 top 100 feet apart on the rooftop for the terrestrial testing. We have buildings all about the same height close by but they would not be within the link.
Spectrum and transmission characteristics questions:	**Information:**
What spectrum is requested?	**KA Band**
Will the spectrum use be pulsed or CW?	**both**
Will the frequencies be stepped through, swept through, or used constantly?	**both**
How much time will the testing be conducted? (e.g., all day, workdays, or only 2 hours every two weeks?)	**When testing happens it will be for the duration of the workday, but typically transmission is only for a few hours during the day, and can last for up to 3 weeks. Estimate 20 hours per month**
What is the proposed power level: Output power, in watts? ERP, in watts:	**See table below**
Antenna gain (in dBi), if any?	**See table below**
Can the program tolerate any spectrum carve-outs?	**No**
What is the duty cycle?	**For the initial handshake, this could be up to 100% I think, but then after that it's less.**
Does this propose use of a directional antenna? If so, What is the half power beamwidth? What is the orientation in the horizontal plane? What is the orientation in the vertical plane?	**Yes, we will use directional horn type antennas and SATCOM dishes.** **Half power BW for the parabolic dish is 1.1 degrees, the 3dB beam width for the horn is 50 degrees.** **The horizontal and vertical directions have 90 degrees isolation. The transmit for the simulator is on the vertical plane.**
What is the emission designator(s)?	**The VSAT transponders are 36MHz but they will operate at 3MHz or below: 3M00**

	The modulation is PCM, PSK/QAM, I don't know if you should use K or M. **The nature of the signal is two or more channels carrying quantized digital info with a combo of digital or analog : 9** **The type of information is data, video, internet traffic: W** **3M00K9W**
Stop Buzzer POC?	**Suzanne Weber , Chris Gentile**

TEST 1:

Simulator Specs are as below for KA band transmitter for the simulator

Transmitter	KA Emulator
Antenna Type	horn 19.2 to 20.2GHz
Max Gain in dBi	5.00
beamwidth	50 deg
Max Transmit Power that we are limiting testing to:	10.00 dBm
Max EIRP for simulator-to-terminal on KA band:	31.6mW

The following is from the Tampa Microwave Simulator:

A.6 Ka-Band Specifications

Up Link Parameters	Down Link Parameters	Beacon Parameters
Up Link Freq. 29– 30 GHz	Down Link Freq. 19.2 – 20.2 GHz	Freq. 19.2 – 20.2 GHz
Input Level -60 dBm min. to -25dBm max.	Output Level P1dB +20dBm	Beacon Level nom +10dB
Level Adjust 30dB	Level Adjust – CEP mode 40dB Level Adjust – Loop-Back mode 30dB	Level Adjust 10dB
Polarization Horizontal	Polarization Vertical	Polarization Vertical
Antenna Gain 5dBi	Antenna Gain 5dBi	Antenna Gain 5dBi
3dB Beam Width 70°	3dB Beam Width 50°	3dB Beam Width 50°
Spectra Invert Non-	Spectra Invert Non-	
		Resolution 8MHz

Specs are as below for typical terminal transmitter (s) testing with the simulator

Transmitter	VSAT terminal
Antenna Type	The parabolic dishes will be three sizes of 65, 75, and 85cm
Max Range	Max 50.61dBi Min 46.0dBi
beamwidth	1.1 deg
Max Transmit Power in dBm- set by GUI control	-13 max to -17dBm min
Max EIRP for terminal-to-simulator on KA band	1W EIRP

General Purpose of Testing:

The Tampa Microwave VSAT Emulator will be used for two types of test as described below. The band of operation shall be KA, KU, or L band. In each case, the test operator (Doug Knot) will reduce the output power output of the VSAT terminal systems to correspond with the lowest possible output power OTA. We already have a KU band experimental permit that covers the KU testing and we are not using the L band at this time.

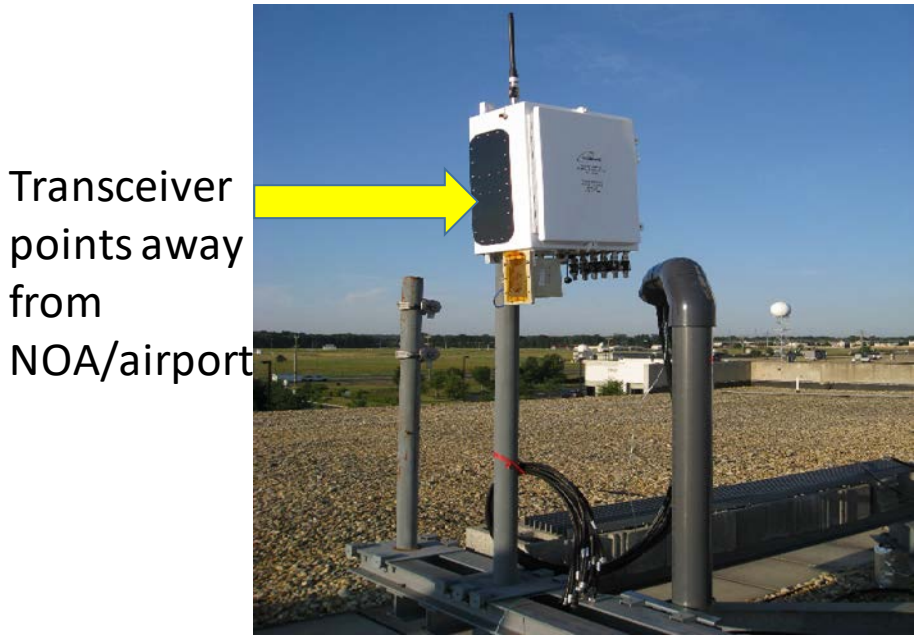
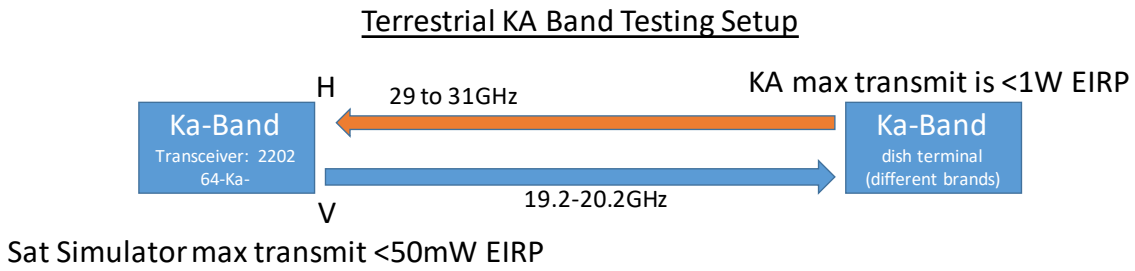


Figure 1 Photo of Tampa Microwave Emulator Installation

A.1.1 TEST 1- TERESTRIAL ROOFTOP, SHORT DISTANCE

In this scenario there is bi-directional communications between the VSAT emulator and a few different **commercial and military** VSAT terminal systems. All are located on the roof. The terminals are to be placed on the terminal platform facing Ladbrook drive, and the emulator will be facing the terminals while installed on a 10 foot pole. The emulator has two integrated horn antennas with low gain. The antennas are dual polarity. The polarity of the transmitter depends on the band used. We will transmit at about 50-100 feet (70 nominal). Dynamic range measurements will be taken using different size VSAT dishes. The dish diameters will be 65, 75, and 85cm. This is being done to verify that operators can reassemble the antennas with accuracy. Careful consideration is taken to make sure the signal power and direction are minimal. The experimental testing permit WJ2XRL was established for military use from 30-31GHz and we need to also test with commercial terminals from 29 to 30GHz. That is the justification for this request to increase the frequency range of this permit down to 29GHz.



The figure below shows the location of the emulator in red, and the terminals in blue. The transmit path is going East/West, parallel to, but not through, the US government and IAD airport airspace The transceiver is mounted 10 feet from the roof surface and pointed slightly down at an angle of 5 degrees.

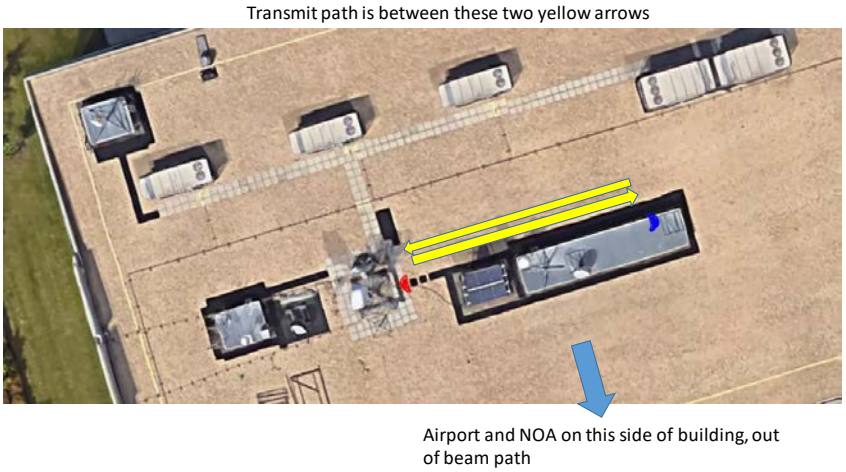
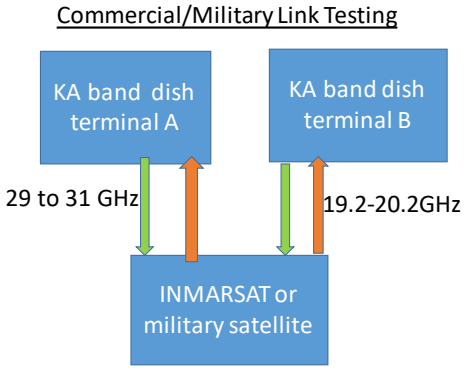


Figure 1 Emulator and Terminal Site Locations

A.1.2 TEST 2- GROUND TO SKY COMMERCIAL AND MILITARY

In this scenario, a set of VSAT terminals will be used to transmit/receive to a live satellite in the KA, KU, or L band using an existing satellite commercial lease (non experimental) or military satellites. This link power density will vary depending on the band, and the SATCOMM carrier. The carrier will determine the transmit power and provide a transmit plan. **This should not need an experimental permit as it is covered by the commercial lease through the SatComm provider or by military co-ordination.** Two terminals will be installed and active at the same time for bi-directional testing.



Point of Communication: INMARSAT 5 F2 55West or Military POC

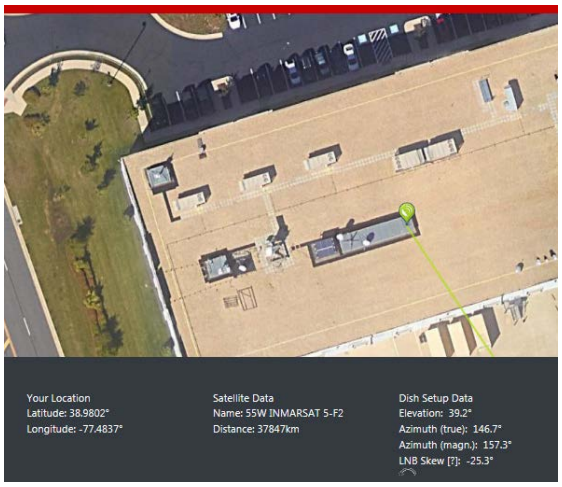
Elevation: 39.2 degrees

Azimuth: 146.7 degrees (true)

Location: Roof on antenna platform

Note: INMARSAT uses the spectrum down to 29GHz for commercial use, that is the justification for the permit change. The simulations that we want to run on the rooftop (terrestrial point to point) need to be at the same frequencies we would be using when connecting to a commercial satellite.

The various dishes will be setup on the platform on the roof, facing 55W for testing with the INMARSAT transponder as shown below in green. THIS IS COVERED VIA COMMERCIAL or MILITARY AGREEMENTS.



FAA Coordination:

In the event that FAA coordination is required, the following additional information is required:

Frequency Bands requiring FAA Coordination	**Antenna Make**	**Antenna Type:** Eg: dipole, panel, etc	**Antenna Gain**	**Pulsed or CW? If pulsed, PRR, & pulse duration**	**Azimuth of operations**	**Site Elevation**	**Height of install**
(sample frequencies)		And, polariza-tion		Are frequencies Stepped, swept, or other			
30 to 31GHz	Any make that fits gain limits	Xpol horn and dual polarity dish	Up to 5dBi for horns and 50.61dBi for dish	both	72 deg East 252 deg West	294 feet above sea level	Roof is 151 ft plus up to 5 feet from roof top

Transmitter	Antenna	Gain	Power	EIRP	Pulse/CW	PRR/PD?	Stepped, Swept, or N/A	Emission Designator(s)
A 19.2 to 20.1 GHz	Horn	5dBi	10dBm	50mW	Pulse/CW		both	**3M00K9W**
B 29-30GHz	Parabolic	Max 50.61dBi Min 46.0dBi	Between -17 to -13dBm	<1W	Pulse/CW		both	**3M00K9W**

Stop Buzzer POC's:

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