June 1, 2005

Florence Harwood
Engineering Logistics Center
United States Coast Guard
Receiving Room
2401 Hawkins Point Road Bldg. 86
Baltimore, MD 21226

Dear Florence:

Thank you for the opportunity to perform environmental and electromagnetic interference qualification testing on the Tideland Signal, RACON. Enclosed is a copy of the Environmental and Electromagnetic Interference Test Report.

We look forward to continuing to support the United States Coast Guard in its product development efforts.

If you have any questions or comments about the report or the testing performed, please contact us.

Sincerely,

Jeffrey Lenk
President

Enclosure

Project Number:

05480-10

Prepared for:

ENGINEERING LOGISTICS CENTER

UNITED STATES COAST GUARD
2401 Hawkins Point Road, Bldg. 86
Baltimore, MD 21226

By

Professional Testing (EMI), Inc.
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Round Rock, Texas 78664

June 1, 2005

TIDELAND SIGNAL RACON TEST REPORT

UNITED STATES COAST GUARD RACON

Test Report reviewed by:	Test Report written by:	Tests Performed by:
Dave Rahe	Bert Furr	Bert Furr

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1.0 Introduction

1.1 Objective

The objective of the tests specified in this document is to provide performance verification data of the Tideland Signal, RACON unit as prescribed in the governing document.

1.2 EUT Description

The product tested was the Tideland Signal, RACON. The RACON is a combination weatherproof S + X-band frequency agile radar transponder beacon (RACON). It is used as a maritime aid to navigation device that responds to interrogation signals from commercial marine radars. The RACON is a multipurpose system incorporating state-of-the-art modular construction techniques that include the capability for sleep mode, suppress side lobe, and other interface options for nearby radars. The sample provided is listed in Table 1.2.

Table 1.2 Product Identifiers

Product	Part Number	Serial Number	Date Received
RACON	SeaBeacon 2	6293	04/15/05

2.0 Overview

This document describes the results of testing of the RACON units in accordance with the U. S. Coast Guard Statement of Work as detailed in contract number HSCG4-05-P-29109, attachment A-3 RACON Test Plan. The U. S. Coast Guard specified this document and equipment to be tested by Professional Testing (EMI), Inc. prior to the start of testing. Details of the exact equipment used for each test is provided in the test report. Pass/Fail criteria for each test was based on normal operating performance of the RACON and performance guidelines set forth for each of the RACON tests.

2.1 Test Facilities

Testing was performed at Professional Testing (EMI), Inc. located in Round Rock, Texas. For all tests, the basic test configuration information documented by attachment A-3 RACON Test Plan was followed. This document was used for guidance in placement of the devices in the test environment, configuration of test and support cables, equipment, and for proper test performance.

2.2 Applicable Documents

The documents listed in Table 2.2 are referenced in this test report. The procedures and specifications listed for the referenced portion of each document shall be considered part of this test plan. Variation from the revision of the documents listed below is not permitted.

Table 2.2 Applicable Documents

Document Number	Revision Date	Document Title
US Coast Guard Contract Number HSCG4-05-P-29109		Independent Contractor Testing of Radar Transponder Beacon (RACON)
Military Specifications		
MIL-HDBK-454A	11-03-00	Standard General Requirements for Electronic Equipment.
MIL-E-17555H	11-15-84	Electronic and Electrical Equipment, Accessories, and Repair Parts
IPC 2221, IPC D-275	02-01-98	Printed Board Design
ISO 10012-2003		Calibration System Requirements
Military Standards		
MIL-STD-129P	12-15-02	Marking for Shipment and Storage
MIL-STD-461E	08-20-99	Electromagnetic Emission and Susceptibility Requirements for the Control of Electromagnetic Interference
MIL-STD-810F	08-30-02	Test Method Standard for Environmental Engineering Consideration and Laboratory Tests
MIL-STD-202F	04-01-80	Test Method for Electronic and Electrical Component Parts
MIL-STD-2073-1D	05-10-02	Standard Practice for Military Packaging
Joint Industry Standards		
IPC J-STD-001C	03-01-00	Requirements for Soldering Electrical and Electronic Assemblies
IPC J-STD-002B	02-01-03	Solderability Tests for Component Leads, Terminations, Lugs, Terminals and Wires
FED-STD-368A	12-10-79	Quality Control System Requirements

2.3 Summary of Test Criteria and Results

The RACON was tested in accordance with the U.S. Coast Guard Statement of Work as detailed in their contract number HSCG4-05-P-29109 attachment A-3 RACON Test Plan listed in Table 2.3. The Pass/Fail results are also listed in Table 2.3. The RACON Test Plan Attachment A-3 is located in Appendix A.

Table 2.3 Performance Requirements

Test Standard	Test Description	Performance	Date Completed
Sect. 1	Preparation for Testing	Pass	04/18/05
Sect. 2	Power Supply Range	Pass	04/18/05
Sect. 3	Transmitter Output Power	Pass	04/18/05
Sect. 4	Power Consumption	Pass	04/27/05
Sect. 5	Band Pass Test	Pass	04/18/05
Sect. 6	Frequency Tracking Accuracy	Pass	04/27/05
Sect. 7	Side Lobe Suppression	Pass	04/27/05
Sect. 8	Receiver Threshold Test	Pass	04/27/05
Sect. 9	Morse Code Response	Pass	04/27/05
Sect. 10	Response Code Length	Pass	04/28/05
Sect. 11	Response Delay	Pass	04/28/05
Sect. 12	Rise Time	Pass	06/07/05
Sect. 13	Mode of Operation	Pass	04/28/05
Sect. 14	Min and Max Response Rate	Pass	04/28/05
Sect. 15	Instantaneous Emissions Bandwidth	Pass	04/28/05
Sect. 16	Vibration Test	Pass	05/03/05
Sect. 17	Shock (Specified Pulse) Test	Pass	05/03/05
Sect. 18	Leak Test	Pass	05/09/05
Sect. 19	Immersion Test	Pass	05/09/05
Sect. 20	EMI/RFI Test	Fail	05/25/05
Sect. 21	Environmental Test	Pass	05/24/05
Sect. 22	Physical Characteristics	Fail[1]	05/27/05
Sect. 23	Post Testing Test	Pass	05/28/05

Notes: 1 Details articulated in Section 3.23.

3.0 Test Results

3.1 Preparation for Testing

The unit was connected to the supplied hand terminal and powered with an external 12Vdc power supply. The results are listed in Table 3.1. The unit was allowed a 10-minute stabilization warm-up period before the unit was forced to perform a self-test.

Table 3.1 Initial Functional Test Results

Test	Test Results
Self Test	Pass

3.2 Power Supply Range Test

Unit was powered up at 12 VDC to verify operation after visual inspections. Unit passed its normal self-test routine. The results are listed in Table 3.2. The list of equipment used to perform the test, and photographs of the test are in Section 4.2.

Table 3.2 Power Supply Range Test Results

Voltage Applied (VDC)	Polarity	Results
+12	Normal	Self Test Passed
-30	Reverse	Did not Operate - Passed
+30	Reverse	Powered up
+36	Normal	Self Test Passed
+10	Normal	Self Test Passed
+18	Normal	Self Test Passed

3.3 Transmitter Output Power

The unit was powered up and allowed to complete its self-test and calibration routines. When the unit was ready for testing the RACON was set to response code “T” with a code length of 45 μs when interrogated by a 1.7 μs pulse. The Signal generator was set up for S-Band frequency and a PRF of 3 kHz. The RACON was interrogated and monitored at the antenna terminal. The interrogation signal was swept from 2900 MHz to 3100 MHz while the analyzer was set to max-hold to capture the resultant RACON response. This procedure was repeated for the X-Band frequencies from 9300 MHz to 9500 MHz. The results are listed in Table 3.3. The list of equipment used to perform the test, photographs and test data are in Section 4.3.

Table 3.3 Transmitter Output Power Test Results

Frequency Band	Requirement (dBm)	Measurement (dBm)	Results
S	+27	31.5	Pass
X	+27	30.2	Pass

3.4 Power Consumption

The unit was powered up and allowed to complete its self-test and calibration routines. When the unit was ready for testing the RACON was set to response code "T" with a code length of 15 µs. The power supply was set to 12.08 VDC. The signal generator was set to S-Band frequency of 3000 MHz with a 1 kHz PRF and then set to X-Band frequency of 9400 MHz with a 1 kHz PRF. Test results are listed in Table 3.4. The list of equipment used to perform the test is in Section 4.1.

Table 3.4 Power Consumption Test Results

Mode	Specification (mA)	Current (mA)	Results
Standby	< 41	16.4	Pass
Listen	< 333	140.4	Pass
Transmit S-Band	< 500	150.4	Pass
Transmit X-Band	< 500	155.4	Pass

3.5 Bandpass Test

The unit was powered up and allowed to complete its self-test and calibration routines. When the unit was ready for testing the RACON was set to response code "T" with a code length of 15 µs. The signal generator was set to the S-Band with a 1 kHz PRF and a 1 µs pulse width with an amplitude to give the RACON a –20dBm signal at the antenna port. The test was repeated in the X-Band at the same PRF, pulse width and power. Test results are listed in Table 3.5. The list of equipment used to perform the test is in Section 4.1. The test data is in Section 4.5.

Table 3.5 Bandpass Test Results

Band	Interrogation Frequency (MHz)	Response Frequency (MHz)	Specification (MHz)	Results
S	2905	2903.98	+/- 5	Pass
S	3095	3093.98	+/- 5	Pass
X	9305	9306.7	+/- 5	Pass
X	9495	9492.7	+/- 5	Pass

3.6 Frequency Tracking Accuracy

The unit was powered up and allowed to complete its self-test and calibration routines. When the unit was ready for testing the RACON was set to response code "T" with a code length of 15 μs. The signal generator was set for S-Band with a 1 kHz PRF and a power level (at the antenna port) of –20dBm. This was repeated for the X-Band. The maximum tracking error allowed is +/-10MHz for PW < 200 ns and +/-2 MHz for PW > 200 ns. Test results are listed in Table 3.6. The list of equipment used to perform the test is in Section 4.1. Test data is in Section 4.6.

Table 3.6 Frequency Tracking Accuracy Test Results

Frequency (MHz)	Pulse Width (μs)	Response Frequency (MHz)	Results
2925	1.7	2924.74	Pass
2925	.150	2924.74	Pass
3000	1.7	3000.0	Pass
3000	.150	3000.0	Pass
3075	1.7	3073.46	Pass
3075	.150	3074.02	Pass
9325	1.7	9326.06	Pass
9325	.150	9326.06	Pass
9400	1.7	9399.74	Pass
9400	.150	9399.66	Pass
9475	1.7	9474.16	Pass
9475	.150	9474.82	Pass

3.7 Side Lobe Suppression

The unit was powered and allowed to complete its self-test and calibration routines. When the unit was ready for testing the RACON was set to response code "T" with a code length of 15 µs. Using HyperTerminal, the unit was verified or set to the following conditions: Duty Cycle to 30 sec on and 5 sec off, and verified sidelobes were set to 15dB. For the S-Band test, the signal generator was set to 2925 MHz at a 1 kHz PRF with a 500 ns PW at an amplitude of –5 dBm at the antenna connector. For the X-Band test, the signal generator was set to 9475 MHz at a 1 kHz PRF with a 500 ns PW at an amplitude of –5 dBm at the antenna connector. The results of the test are listed in Table 3.7. The list of equipment used to perform this test is in Section 4.1.

Table 3.7 Side Lobe Suppression Test Results

Band	Test Factor	Unit Response	Results
S	Decreased signal by 20 dBm	Not responding	Pass
S	Changed PW until unit responded	Responding	Pass
S	Changed PW to original setting	Not responding	Pass
S	Changed PRF until unit responded	Responding	Pass
S	Changed PRF to original setting	Not responding	Pass
S	Increase signal by 20 dBm	Responding	Pass
X	Decreased signal by 20 dBm	Not responding	Pass
X	Changed PW until unit responded	Responding	Pass
X	Changed PW to original setting	Not responding	Pass
X	Changed PRF until unit responded	Responding	Pass
X	Changed PRF to original setting	Not responding	Pass
X	Increase signal by 20 dBm	Responding	Pass

3.8 Receiver Threshold Test

The unit was powered and allowed to complete its self-test and calibration routines. When the unit was ready for testing the RACON was set to response code "T" with a code length of 15 µs. The signal generator was setup for S-Band at 3000 MHz, 1 kHz PRF, 50 ns PW, and amplitude of –70 dBm at the antenna connector. The amplitude of the signal generator was slowly increased until the RACON began to respond continuously. Test results are listed in Table 3.8. The list of equipment used to perform the test is in Section 4.1.

Table 3.8 Receiver Threshold Test Results

Frequency (MHz)	Pulse Width (ns)	Specification (dBm)	Minimum Response Level (dBm)	Results
3000	300	<-33	-37	Pass
3000	50	<-33	-36	Pass
9400	50	<-35	-46	Pass
9400	300	<-40	-44	Pass

3.9 Morse Code Response

The unit was powered and allowed to complete its self-test and calibration routines. When the unit was ready for testing, the signal generator was set up for S-Band at 3000 MHz, 1 kHz PRF, 1.5 µs PW, and amplitude of –20 dBm. While monitoring the output with an oscilloscope, the Morse code responses were set and verified. Test results are listed in Table 3.9. The list of equipment used to perform the test is in Section 4.1.

Table 3.9 Morse Code Response Test Results

Unit Code Response Setting	RACON Response	Results
B -…	B -…	Pass
C -.-.	C -.-.	Pass
D -..	D -..	Pass
G --.	G --.	Pass
K -.-	K -.-	Pass
M --	M --	Pass
N -.	N -.	Pass
O ---	O ---	Pass
Q --.-	Q --.-	Pass
T -	T -	Pass
X -..-	X -..-	Pass
Y -.--	Y -.--	Pass
Z --..	Z --..	Pass

3.10 Response Code Length

The unit was powered and allowed to complete its self-test and calibration routines. When the unit was ready for testing the signal generator was set up for S-Band at 3000 MHz, 1 kHz PRF, 1.7 μs PW, and amplitude of –20 dBm. While monitoring the output with an oscilloscope, the response code length was measured and recorded. The test was repeated at 9400MHz. Test results are listed in Table 3.10. The list of equipment used to perform the test is in Section 4.1. Test data is in Section 4.10.

Table 3.10 Response Code Length Results

Frequency (MHz)	Pulse Width (μs)	Specification (μs)	Measured Pulse Width (μs)	Results
3000	5	+/-0.5	5.14	Pass
3000	45	+/-1.0	45.0	Pass
9400	5	+/-0.5	5.16	Pass
9400	45	+/-1.0	45.6	Pass

3.11 Response Delay

The unit was powered and allowed to complete its self-test and calibration routines. When the unit was ready for testing the RACON was set to Morse code Q and a response code length of 45 μs. The signal generator was set up for S-Band at 3000 MHz, 1 kHz PRF, 1 μs PW, and amplitude of –20 dBm. While monitoring the output with an oscilloscope, the response delay was monitored. Test results are listed in Table 3.11. Test data is in Section 4.13. The list of equipment used to perform the test is in Section 4.1.

Table 3.11 Response Delay Test Results

Band	Specification (ns)	Measured (ns)	Results
S-Band	< 667	620	Pass
X-Band	< 667	620	Pass

3.12 Rise Time

The unit was powered and allowed to complete its self-test and calibration routines. When the unit was ready for testing the RACON was set to Morse code Q and a response code length of 45 μs. The signal generator was set up for S-Band at 3000 MHz, 1 kHz PRF, 1 μs PW, and amplitude of –20 dBm. While monitoring the output with an oscilloscope, the rise and fall times were measured. Test results are listed in Table 3.12. Test data is in Section 4.13. The list of equipment used to perform the test is in Section 4.1.

Table 3.12 Rise Time Results

Band	Specification (ns)	Rise Time (ns)	Fall Time (ns)	Results
S	< 100	51.2	54	Pass
X	< 100	48.0	48.8	Pass

3.13 Mode of Operation

The unit was powered and allowed to complete its self-test and calibration routines. The mode of operation was set, and monitored with a digital stopwatch. Test results are listed in Table 3.13. The list of equipment used to perform the test is in Section 4.1.

Table 3.13 Mode of Operation Test Results

Set Time ON/OFF (sec)	Measured Time ON/OFF (sec)	Results
10/10	10/10	Pass
60/30	60/30	Pass
10/30	10/30	Pass
30/0	30/0	Pass

3.14 Min and Max Response Rate

The unit was powered and allowed to complete its self-test and calibration routines. When the unit was ready for testing the RACON was set to Morse code Q and a response code length of 45 μs. The signal generator was set up for S-Band at 3000 MHz, 10 kHz PRF, 1.7 μs PW, and amplitude of –20 dBm. The test was repeated in the X-Band at 9400 MHz. Test results are listed in Table 3.14. The list of equipment used to perform the test is in Section 4.1.

Table 3.14 Min and Max Response Rate Test Results

Frequency (MHz)	PRF (kHz)	Responds YES/NO	Results
3000	10	YES	Pass
3000	250	YES	Pass
9400	10	YES	Pass
9400	250	YES	Pass

3.15 Instantaneous Emissions Bandwidth

The unit was powered and allowed to complete its self-test and calibration routines. When the unit was ready for testing the RACON was set to Morse code T and a response code length of 45μs. The signal generator was set up for S-Band at 3025 MHz, 1 kHz PRF, 1.7 μs PW, and amplitude of –20dBm. The test was repeated at 9425 MHz. Test results are listed in Table 3.15. The list of equipment used to perform the test is in Section 4.1.

Table 3.15 Instantaneous Emissions Bandwidth Test Results

Frequency (MHz)	Level (dBc)	Specification (MHz)	Pass/Fail
3025	-5	< 2	Pass
3025	-20	< 4	Pass
9425	-5	< 2	Pass
9425	-20	< 4	Pass

3.16 Vibration Test

The unit was subjected to vibration testing per MIL-STD-810F, Method 514.5, Category 10 for ships and amphibious equipments. The random vibration test levels were 0.001 g^2/Hz from 1 to 100 Hz for a 2-hour duration in each of the three mutually perpendicular axes. After the Vibration stress was completed, the unit was tested for functionality including: Transmitter Output Power, Morse Code Response, and Frequency Tracking Accuracy for both S and X band. Test results are listed in Table 3.16. The list of equipment used to perform the test, test data and photographs of the test are in Section 4.16.

Table 3.16 Post Vibration Test Results

Test Conducted	Results
Transmitter Output Power	Pass
Morse Code Response	Pass
Frequency Tracking Accuracy	Pass

3.17 Shock (Specified Pulse) Test

The unit was subjected to shock testing per MIL-STD-202G, Method 213B, Condition K. The shock pulses applied to the unit were 30G 11mS terminal peak sawtooth pulses with three shocks in each direction along the three mutually perpendicular axes (18 shocks total). After the Shock stress was completed, the unit was tested for functionality including: Transmitter Output Power, Morse Code Response, and Frequency Tracking Accuracy. Test results are listed in Table 3.17. The equipment used to perform the test and photographs of the test are in Section 4.16. Test data is in Section 4.17.

Table 3.17 Post Shock Test Results

Test Conducted	Results
Transmitter Output Power	Pass
Morse Code Response	Pass
Frequency Tracking Accuracy	Pass

3.18 Leak Test

The unit was pressurized to 5 psi with dry nitrogen and monitored for pressure loss for a period of 5 days. The results are listed in Table 3.19. The list of equipment used to perform the test, test data, and photographs of the test are in Section 4.18.

Table 3.18 Leak Test Results

Standard	Measured	Day	Results
5 psi	5 psi	1	Pass
5 psi	5 psi	5	Pass

3.19 Immersion Test

The unit was pressurized to 5 psi with dry nitrogen then immersed into a body of water to a depth of 6.5ft (2 meters). The unit was visually monitored for a period of 2 hours for bubbles leaking from the unit. The results are listed in Table 3.19. The list of equipment used to perform the test, test data, and photographs of the test are in Section 4.19.

Table 3.19 Immersion Test Results

Environment	Inspection Results	Results
Immersion to 6.5ft (2M)	No bubbles observed	Pass
Post-Test Inspection	No moisture in unit	Pass

3.20 EMI/RFI Test

RE102 - This test method was used to verify that electric field emissions from the unit and its associated cabling do not exceed the specified requirements. CS103 – The intent of this requirement is to control the response of antenna-products of two signals outside of the intentional passband of the subsystem produced by non-linearities in the subsystem.

3.20.1 Test Criterion

Table 3.20.1 RE102 Radiated Emissions test limits

Frequency	Maximum RF Emissions (dBμV/m)
10kHz to 100MHz	70 to 36
100MHz to 18GHz	36 to 82
The limit decreases linearly with the logarithm of the frequency in the range of 10 kHz to 100 MHz, increases from 100 MHz to 18 GHz.	

3.20.2 RE102 Test Procedure

The EUT was setup according to the test setup procedure given for RE102 testing in MIL-STD-461E. The frequency range, Spectrum Analyzer parameters, limit, and correction factors were entered into the test software profile which controlled the spectrum analyzer. The frequency range was automatically scanned utilizing test software. The test software collected the raw data, added in the antenna factor and cable loss, and subtracted the pre-amplifier gain. Measurements were made with the unit operating in the S-band and again with the unit operating in the X-band. The measured radiated emission test data is included in Section 4.20.

3.20.3 Test Results

The EUT was subjected to MIL-STD-461E, RE102 Radiated Electric Field Emissions testing on May 11, 2005. The radiated electric field emissions generated by the EUT as measured on the EUT and its associated cabling exceeded the RE102 limit. The results are in Table 3.22. The list of equipment used to perform the test, and photographs of the test are in Section 4.20.

Table 3.20.3 RE102 Radiated Emissions Test Results

Test	Observation	Results
S-band Horizontal Polarity	Exceeds Limits	Fail
S-band Vertical Polarity	Exceeds Limits	Fail
X-band Horizontal Polarity	Exceeds Limits	Fail
X-band Vertical Polarity	Exceeds Limits	Fail

3.20.4 CS103 Test Procedure

No test procedures are provided in the main body of the standard for this requirement. Because of the large variety of receiver designs being developed, the requirements for the specific operational characteristics of a receiver were established before meaningful test procedures could be developed. Intermodulation testing can be applied to a variety of receiving subsystems such as receivers, RF amplifiers, transceivers and transponders. Several receiver front-end characteristics must be known for proper testing for intermodulation responses. These characteristics were determined by test. The sensitivity of the receiver was evaluated. This determined at what input amplitude level the unit would respond to with a transmit signal. The input amplitude of the out of band signals was limited to 20dB above the input sensitivity. Next, the bandpass characteristics of the unit were determined, in order to determine frequencies near the receiver fundamental f0 that were excluded from the test. The basic concept with this test is to combine two out of band signals and apply them to the antenna port of the unit while monitoring it for an undesired response. One of the out of band signals (f1) was modulated with the modulation used by the unit. The second signal (f2) was continuous wave (CW). The frequency of the two out of band signals was set such that $f0 = 2f1-f2$ where f0 is the tuned frequency of the unit and f1 and f2 are the two out of band signal sources. This equation represents a third order intermodulation product, which is the most common response observed in receivers. The output of the unit was observed for adverse responses while f1 and f2 were stepped over the desired frequency range while maintaining the relationship in the equation.

3.20.5 Test Results

The EUT was subjected to MIL-STD-461E, CS103 conducted susceptibility, antenna port, intermodulation testing on May 25, 2005. Testing produced intermodulation products which caused the EUT to transmit falsely. The results are in Tables 3.20.5.1 through 3.20.5.2. The list of equipment used to perform the test, and photographs of the test are in Section 4.20.

Table 3.20.5.1CS103 S-band Test Results

Project #:	05480-10	Customer:	USCG
EUT:	RACON, Tideland Signal	Test Date:	5/25/2005
Technician:	Jason Haley		
Sensitivity:	-33.3 dBm To initiate the EUT to Transmit	Band Being Evaluated:	S
USCG Operational Frequency Range:			
Lower Frequency:	2905 +/-5 MHz	Upper Frequency:	3095 +/-5 MHz
F1 signal source is 30dB above EUT sensitivity at 3 GHz		F2 signal source is 20dB above EUT sensitivity at 3 GHz	
F1 is modulated using 1kHz, 1.7uS pulse width, 0nS delay		F2 is CW	

F0 (MHz)	F1 (MHz)	S/G Amplitude F1 (dBm)	Correction Factor (dB)	Corrected Amplitude F1 (dBm)	F2 (MHz)	S/G Amplitude F2 (dBm)	Correction Factor (dB)	Corrected Amplitude F2 (dBm)	Observations
2905	1702.5	16.9	19.2	-2.3	500	6.9	26.3	-19.4	1
2905	1952.5	16.9	18.5	-1.6	1000	6.9	29.5	-22.6	1
2905	2202.5	16.9	19	-2.1	1500	6.9	16.3	-9.4	1
2905	2452.5	16.9	18.7	-1.8	2000	6.9	17.9	-11	1
2905	2702.5	16.9	18.8	-1.9	2500	6.9	20.5	-13.6	1
2905	2752.5	16.9	18.7	-1.8	2600	6.9	21.2	-14.3	1
2905	3152.5	16.9	19.8	-2.9	3400	6.9	21.6	-14.7	1
2905	3452.5	16.9	20.3	-3.4	4000	6.9	22.7	-15.8	1
2905	3702.5	16.9	19.9	-3	4500	6.9	27.4	-20.5	1
2905	3952.5	16.9	20	-3.1	5000	6.9	22.1	-15.2	1
2905	4202.5	16.9	20.2	-3.3	5500	6.9	26	-19.1	1
2905	4452.5	16.9	23.5	-6.6	6000	6.9	31.5	-24.6	1
2905	4702.5	16.9	23.7	-6.8	6500	6.9	24.1	-17.2	1
2905	4952.5	16.9	24.4	-7.5	7000	6.9	25.5	-18.6	1
2905	5202.5	16.9	24.2	-7.3	7500	6.9	26.6	-19.7	1
2905	5452.5	16.9	26.1	-9.2	8000	6.9	25.2	-18.3	1
2905	5702.5	16.9	27.8	-10.9	8500	6.9	33	-26.1	1
2905	5952.5	16.9	40.8	-23.9	9000	6.9	28.9	-22	1
2905	6202.5	16.9	26.7	-9.8	9500	6.9	33.1	-26.2	1
2905	6452.5	16.9	26.7	-9.8	10000	6.9	30.4	-23.5	1
3000	1750	16.9	18.6	-1.7	500	6.9	26.3	-19.4	1
3000	2000	16.9	18.8	-1.9	1000	6.9	29.5	-22.6	1
3000	2250	16.9	18.8	-1.9	1500	6.9	16.3	-9.4	1
3000	2500	16.9	18.6	-1.7	2000	6.9	17.9	-11	1
3000	2750	16.9	18.6	-1.7	2500	6.9	20.5	-13.6	1
3000	2800	16.9	18.5	-1.6	2600	6.9	21.2	-14.3	1
3000	3200	16.9	19.3	-2.4	3400	6.9	21.6	-14.7	2
3000	3500	16.9	20.5	-3.6	4000	6.9	22.7	-15.8	1
3000	3750	16.9	19.9	-3	4500	6.9	27.4	-20.5	1
3000	4000	16.9	19.8	-2.9	5000	6.9	22.1	-15.2	1
3000	4250	16.9	19.7	-2.8	5500	6.9	26	-19.1	1
3000	4500	16.9	29	-12.1	6000	6.9	31.5	-24.6	1
3000	4750	16.9	24.7	-7.8	6500	6.9	24.1	-17.2	1
3000	5000	16.9	24.6	-7.7	7000	6.9	25.5	-18.6	1
3000	5250	16.9	25.2	-8.3	7500	6.9	26.6	-19.7	1
3000	5500	16.9	25.6	-8.7	8000	6.9	25.2	-18.3	1

3000	5750	16.9	27.9	-11	8500	6.9	33	-26.1	1
3000	6000	16.9	34.4	-17.5	9000	6.9	28.9	-22	1
3000	6250	16.9	27.8	-10.9	9500	6.9	33.1	-26.2	1
3000	6500	16.9	26.6	-9.7	10000	6.9	30.4	-23.5	1
3095	1797.5	16.9	18.6	-1.7	500	6.9	26.3	-19.4	1
3095	2047.5	16.9	18.7	-1.8	1000	6.9	29.5	-22.6	1
3095	2297.5	16.9	18.7	-1.8	1500	6.9	16.3	-9.4	1
3095	2547.5	16.9	18.5	-1.6	2000	6.9	17.9	-11	1
3095	2797.5	16.9	18.4	-1.5	2500	6.9	20.5	-13.6	1
3095	2847.5	16.9	18.7	-1.8	2600	6.9	21.2	-14.3	1
3095	3247.5	16.9	19.8	-2.9	3400	6.9	21.6	-14.7	1
3095	3547.5	16.9	21.1	-4.2	4000	6.9	22.7	-15.8	1
3095	3797.5	16.9	20.5	-3.6	4500	6.9	27.4	-20.5	1
3095	4047.5	16.9	20.4	-3.5	5000	6.9	22.1	-15.2	1
3095	4297.5	16.9	20.8	-3.9	5500	6.9	26	-19.1	1
3095	4547.5	16.9	30.6	-13.7	6000	6.9	31.5	-24.6	1
3095	4797.5	16.9	25.4	-8.5	6500	6.9	24.1	-17.2	1
3095	5047.5	16.9	25	-8.1	7000	6.9	25.5	-18.6	1
3095	5297.5	16.9	25.2	-8.3	7500	6.9	26.6	-19.7	1
3095	5547.5	16.9	27.1	-10.2	8000	6.9	25.2	-18.3	1
3095	5797.5	16.9	29.2	-12.3	8500	6.9	33	-26.1	1
3095	6047.5	16.9	32.3	-15.4	9000	6.9	28.9	-22	1
3095	6297.5	16.9	28.5	-11.6	9500	6.9	33.1	-26.2	1
3095	6547.5	16.9	28.2	-11.3	10000	6.9	30.4	-23.5	1

Note	Explanation
1	Normal, EUT does not transmit
2	EUT transmits at several frequencies within the band. Reduced F2 80dB and EUT continued transmitting. Fail
Test Result:	Fail, the EUT is susceptible to intermodulation products.

Table 3.20.5.2 CS103 X-band Test Results

Project #:	05480-10	Customer:	USCG
EUT:	RACON, Tideland Signal	Test Date:	5/25/2005
Technician:	Jason Haley		
Sensitivity:	-37.7 dBm To initiate the EUT to Transmit	Band Being Evaluated:	X
USCG Operational Frequency Range:			
Lower Frequency:	2905 +/-5 MHz	Upper Frequency:	3095 +/-5 MHz
F1 signal source is 20dB above EUT sensitivity at 9.4 GHz		F2 signal source is 10dB above EUT sensitivity at 9.4 GHz	
F1 is modulated using 1kHz, 1.7uS pulse width, 0nS delay		F2 is CW	

F0 (MHz)	F1 (MHz)	S/G Amplitude F1 (dBm)	Correction Factor (dB)	Corrected Amplitude F1 (dBm)	F2 (MHz)	S/G Amplitude F2 (dBm)	Correction Factor (dB)	Corrected Amplitude F2 (dBm)	Observations
9305	5152.5	4.2	32.8	-28.6	1000	-5.8	30.5	-36.3	1
9305	5402.5	4.2	30.8	-26.6	1500	-5.8	18.9	-24.7	1
9305	5652.5	4.2	30.1	-25.9	2000	-5.8	37.1	-42.9	1
9305	5902.5	4.2	28.5	-24.3	2500	-5.8	37.8	-43.6	1
9305	6152.5	4.2	27.9	-23.7	3000	-5.8	32.4	-38.2	1
9305	6402.5	4.2	28.9	-24.7	3500	-5.8	34.5	-40.3	1
9305	6652.5	4.2	28.1	-23.9	4000	-5.8	37.9	-43.7	1

9305	6902.5	4.2	27.7	-23.5	4500	-5.8	32	-37.8	1
9305	7152.5	4.2	28.3	-24.1	5000	-5.8	31.4	-37.2	1
9305	7402.5	4.2	27.6	-23.4	5500	-5.8	30.5	-36.3	1
9305	7652.5	4.2	27.9	-23.7	6000	-5.8	26.3	-32.1	1
9305	7902.5	4.2	28.7	-24.5	6500	-5.8	26.5	-32.3	1
9305	8152.5	4.2	28.9	-24.7	7000	-5.8	29.6	-35.4	1
9305	8402.5	4.2	28.9	-24.7	7500	-5.8	28.8	-34.6	1
9305	8652.5	4.2	29.4	-25.2	8000	-5.8	31.6	-37.4	1
9305	8902.5	4.2	29.4	-25.2	8500	-5.8	32.9	-38.7	1
9305	9152.5	4.2	29.3	-25.1	9000	-5.8	30.6	-36.4	1
9305	9202.5	4.2	29.9	-25.7	9100	-5.8	30.6	-36.4	2
9305	9552.5	4.2	29.7	-25.5	9800	-5.8	29	-34.8	1
9305	9652.5	4.2	29.9	-25.7	10000	-5.8	29	-34.8	1
9400	5200	4.2	32.9	-28.7	1000	-5.8	30.5	-36.3	1
9400	5450	4.2	31.2	-27	1500	-5.8	18.9	-24.7	1
9400	5700	4.2	31.1	-26.9	2000	-5.8	37.1	-42.9	1
9400	5950	4.2	28.4	-24.2	2500	-5.8	37.8	-43.6	1
9400	6200	4.2	27.4	-23.2	3000	-5.8	32.4	-38.2	1
9400	6450	4.2	31.2	-27	3500	-5.8	34.5	-40.3	1
9400	6700	4.2	27.3	-23.1	4000	-5.8	37.9	-43.7	1
9400	6950	4.2	28.5	-24.3	4500	-5.8	32	-37.8	1
9400	7200	4.2	29.3	-25.1	5000	-5.8	31.4	-37.2	1
9400	7450	4.2	29.7	-25.5	5500	-5.8	30.5	-36.3	1
9400	7700	4.2	30.7	-26.5	6000	-5.8	26.3	-32.1	1
9400	7950	4.2	31.5	-27.3	6500	-5.8	26.5	-32.3	1
9400	8200	4.2	32.6	-28.4	7000	-5.8	29.6	-35.4	1
9400	8450	4.2	33.4	-29.2	7500	-5.8	28.8	-34.6	1
9400	8700	4.2	33.4	-29.2	8000	-5.8	31.6	-37.4	1
9400	8950	4.2	32.9	-28.7	8500	-5.8	32.9	-38.7	1
9400	9200	4.2	31.9	-27.7	9000	-5.8	30.6	-36.4	1
9400	9250	4.2	30.7	-26.5	9100	-5.8	30.6	-36.4	1
9400	9600	4.2	30.8	-26.6	9800	-5.8	29	-34.8	1
9400	9700	4.2	30.2	-26	10000	-5.8	29	-34.8	1
9495	5247.5	4.2	33.4	-29.2	1000	-5.8	30.5	-36.3	1
9495	5497.5	4.2	29.4	-25.2	1500	-5.8	18.9	-24.7	1
9495	5747.5	4.2	29	-24.8	2000	-5.8	37.1	-42.9	1
9495	5997.5	4.2	29.3	-25.1	2500	-5.8	37.8	-43.6	1
9495	6247.5	4.2	27.6	-23.4	3000	-5.8	32.4	-38.2	1
9495	6497.5	4.2	29.4	-25.2	3500	-5.8	34.5	-40.3	1
9495	6747.5	4.2	28.8	-24.6	4000	-5.8	37.9	-43.7	1
9495	6997.5	4.2	29.3	-25.1	4500	-5.8	32	-37.8	1
9495	7247.5	4.2	30.5	-26.3	5000	-5.8	31.4	-37.2	1
9495	7497.5	4.2	31	-26.8	5500	-5.8	30.5	-36.3	1
9495	7747.5	4.2	31	-26.8	6000	-5.8	26.3	-32.1	1
9495	7997.5	4.2	33.5	-29.3	6500	-5.8	26.5	-32.3	1
9495	8247.5	4.2	33.1	-28.9	7000	-5.8	29.6	-35.4	1
9495	8497.5	4.2	32.6	-28.4	7500	-5.8	28.8	-34.6	1
9495	8747.5	4.2	33.9	-29.7	8000	-5.8	31.6	-37.4	1
9495	8997.5	4.2	32.7	-28.5	8500	-5.8	32.9	-38.7	1

9495	9247.5	4.2	30.5	-26.3	9000	-5.8	30.6	-36.4	1
9495	9297.5	4.2	30.3	-26.1	9100	-5.8	30.6	-36.4	3
9495	9647.5	4.2	30.1	-25.9	9800	-5.8	29	-34.8	1
9495	9747.5	4.2	30.2	-26	10000	-5.8	29	-34.8	1

Note	Explanation
1	Normal, EUT does not transmit
2	EUT transmits 9321 MHz, reduced F2 68dB and EUT still transmits. Fail
3	F1 in the passband, EUT transmits, invalid data point
Test Result:	Fail, the EUT is susceptible to intermodulation products.

3.21 Environmental Test

The unit was placed into an environmental chamber capable of meeting the requirements of the test. Temperature was cycled from +70° to -40° at 12-hour intervals per temperature. After temperature was stabilized and allowed to thoroughly soak the unit, test were performed to verify operation, these included Output Power, Morse Code Response, and Frequency Tracking. The test results are in Table 3.21.

Table 3.21 Environmental Test Results

Cycle	Temperature (In °C)	Output Power	Morse Code	Frequency Response
1	+70	Pass	Pass	Pass
	-40	Pass	Pass	Pass
2	+70	Pass	Pass	Pass
	-40	Pass	Pass	Pass
3	+70	Pass	Pass	Pass
	-40	Pass	Pass	Pass
4	+70	Pass	Pass	Pass
	-40	Pass	Pass	Pass
5	+70	Pass	Pass	Pass
	-40	Pass	Pass	Pass
6	+70	Pass	Pass	Pass
	-40	Pass	Pass	Pass
7	+70	Pass	Pass	Pass
	-40	Pass	Pass	Pass

3.22 Post Test Testing

The unit was powered and allowed to operate for ten minutes then a self test was performed.

Table 3.22 Post Testing Result

Post test self test	Result
Unit self test	Pass

3.23 Physical Characteristics

The unit was opened for internal inspection as per customer test plan. The electronics module consists of a gold anodized metal housing with six internal PWA's and a back plane. PWA interconnectivity is accomplished via one common back plane PWA with the exception of the RF connections that are accomplished with push on coaxial cables. Test results are listed in Table 3.23.1, Table 3.23.2, and Table 3.23.3. The list of equipment used to perform the test, and photographs of the test are in Section 4.1.

Table 3.23.1 Findings as inspected to IPC/EIA J-STD-001C Class 3

PWA	S/N	Results
PSU	AC100203124	No Anomalies
DSP	AC070704892	No Anomalies
VCO	AC120204020	No Anomalies
PWA	AC071984863	No Anomalies
XRF	AC121404115	No Anomalies
SRF	AC031004118	Non-Conformance [1&2]
Back plane	AC120503081	No Anomalies

Notes:

1. White residue on the PWA destination side of the multipin connector Per IPC/EIA J-STD-001C Section 8.1 Paragraph 8.3.2.2 Visual Requirements "Surfaces cleaned should be inspected without magnification and shall be free of visual evidence of residue or contaminants. Surfaces not cleaned may have evidence of flux residues." Note: This requirement may be eliminated when visible residue has been identified as benign through laboratory analysis or other means. The contaminant is UNKNOWN and may or may not be a failure.
2. Cold solder joints on trace between U4 and Q17

Table 3.23.2 Observations for MIL-HDBK-454 Guideline 9

Section	Title	Results
4.1	Cleaning	Meets requirements
4.2	Threaded parts or devices	Meets requirements
4.3	Bearing Assemblies	Not Applicable
4.4	Wiring	Meets requirements
4.5	Shielding	Meets requirements
5.1	Containment	Meets requirements
5.2	Insulation	Meets requirements
5.3	Clearance	Meets requirements

Table 3.23.3 Observations for MIL-HDBK-454 Guideline 69

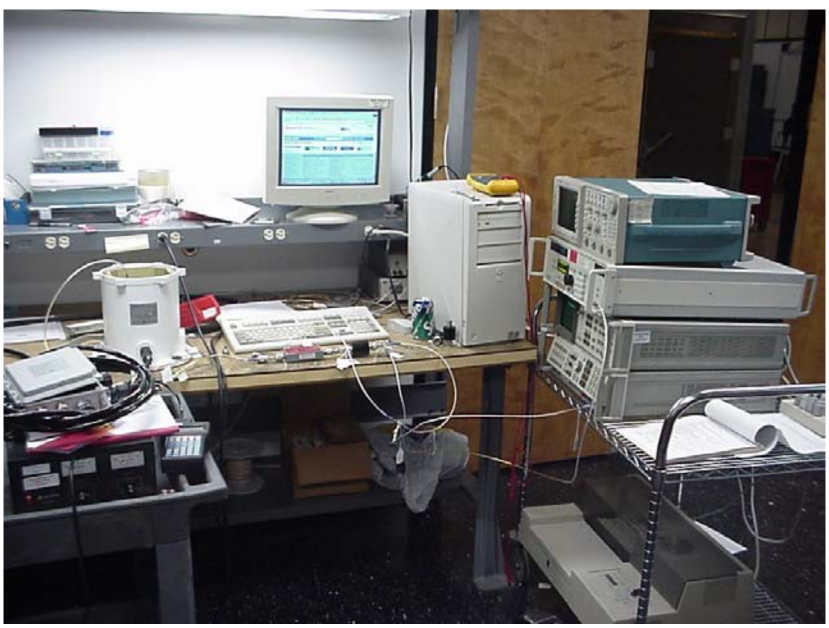
Section	Title	Results
4.1	Clearance and Leakage (creepage) distances	Meets requirements
4.2	Through hole protection	Meets requirements
4.3	Wiring Arrangement	Meets requirements
4.4	Solderless wrapped wire connections	Meets requirements
4.5	Clamped connections	Not Applicable
4.6	Connectors, insulation sleeving	Not Applicable
5.1	Wiring arrangement	Meets requirements
5.2	Internal wiring	Meets requirements
5.3	Wiring Protection	Meets requirements
5.4	Cable ducts	Not Applicable
5.5	Bend radius	Not Applicable
5.6	Sleeving	Not Applicable
5.7	Panel Door cables	Not Applicable
5.8a	Slack	Meets requirements
5.8b	Slack	Meets requirements
5.8c	Slack	Meets requirements
5.8d	Slack	Not Applicable
5.8e	Slack	Meets requirements
5.8f	Slack	Not Applicable
5.9	Support	Meets requirements
5.10	Cable and harness design	Meets requirements
5.11	Solderless crimp connections	Meets requirements
5.12	Fungus protection	Meets requirements

4.0 Test Data and Photographs

4.1 Functional Testing Test Equipment

Table 4.1 Functional Testing Test Equipment

Description	Serial Number / Asset Number	Calibration Due
Hewlett Packard, HP8566B Network Analyzer	2950A06265	06/02/05
Gigatronics GT9000 Signal Generator	9824003/0547	07/13/05
Tektronics TDS680B O Scope	0677	12/20/05
Fluke 87 Digital Multimeter	C001338	06/15/05
HP8496A Attenuator 0-110dB	1509A00118	User cal
Pasternack Circulator PE8303	N/A	N/A
Pasternack Circulator PE8301	N/A	N/A
Pasternack Splitter/Combiner (3)	N/A	N/A
NARDA Directional Coupler 3293-1 1.0 – 12.4GHz	N/A	N/A
30dB 20W Attenuator	0932	N/A
Astron VS-35M 0-15VDC PS	0401	User

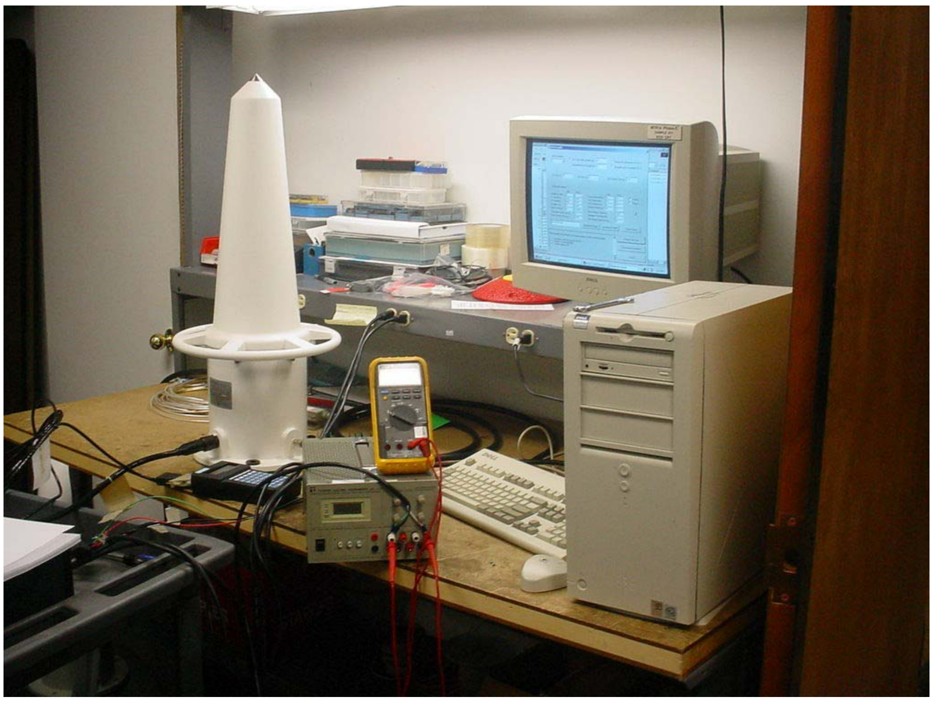


Photograph 4.1 Section 3.3 through Section 3.21 Test Setup for all Functional Testing

4.2 Power Supply Range

Table 4.2 Power Supply Range Test Equipment List

Description	Serial Number / Asset Number	Calibration Due
TPS-4000D, DC power supply	914237	At Use
Fluke 87 Digital Multimeter	C001338	06/15/05



Photograph 4.2 Power Supply Range Test Setup

4.3 Transmitter Output Power

Refer to Section 4.2 for the list of equipment used to perform this test.

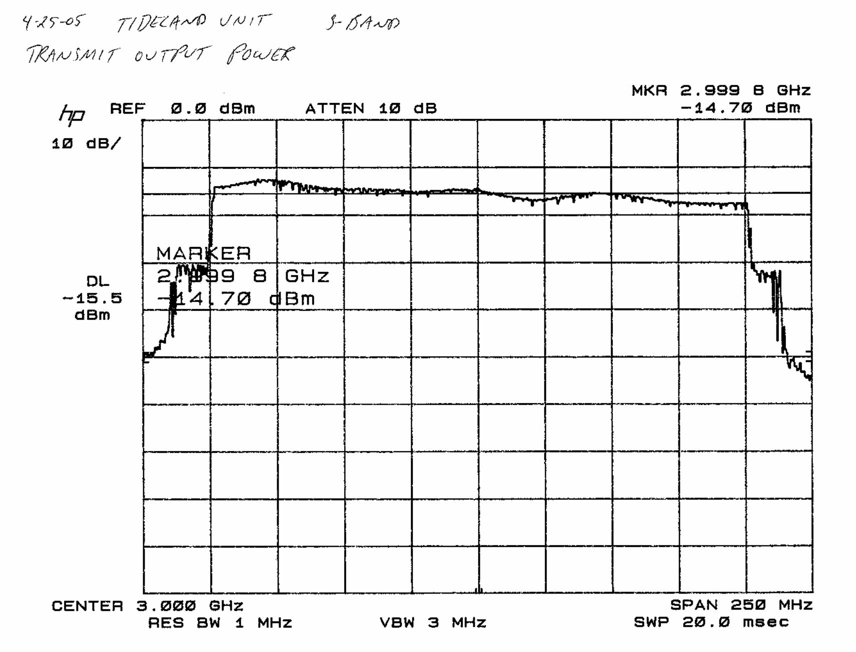


Figure 4.3.1 S-Band Output Power

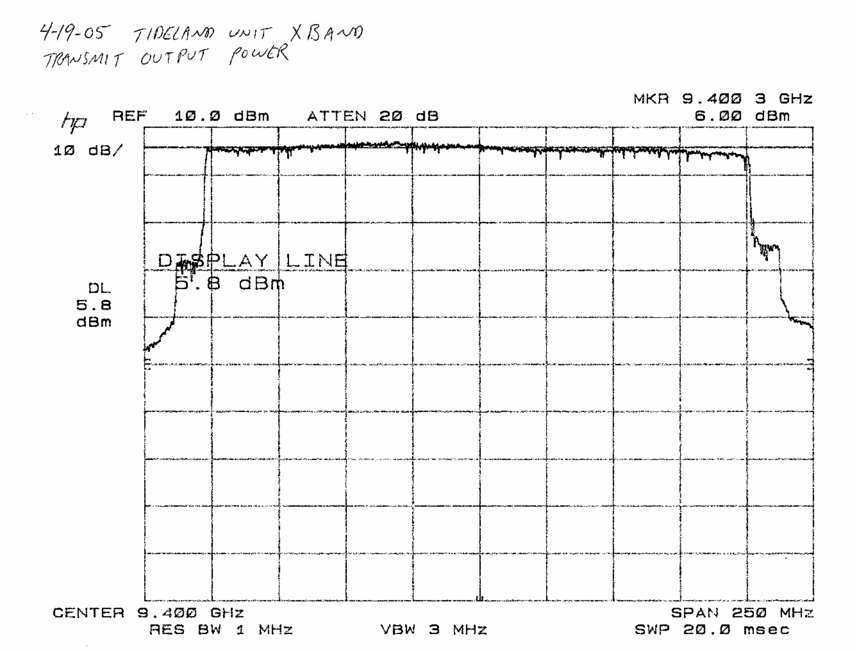


Figure 4.3.2 X-Band Output Power

4.4 Power Consumption

Refer to Section 4.2 for the list of equipment used to perform this test.

4.5 Bandpass Test

Refer to Section 4.2 for the list of equipment used to perform this test.

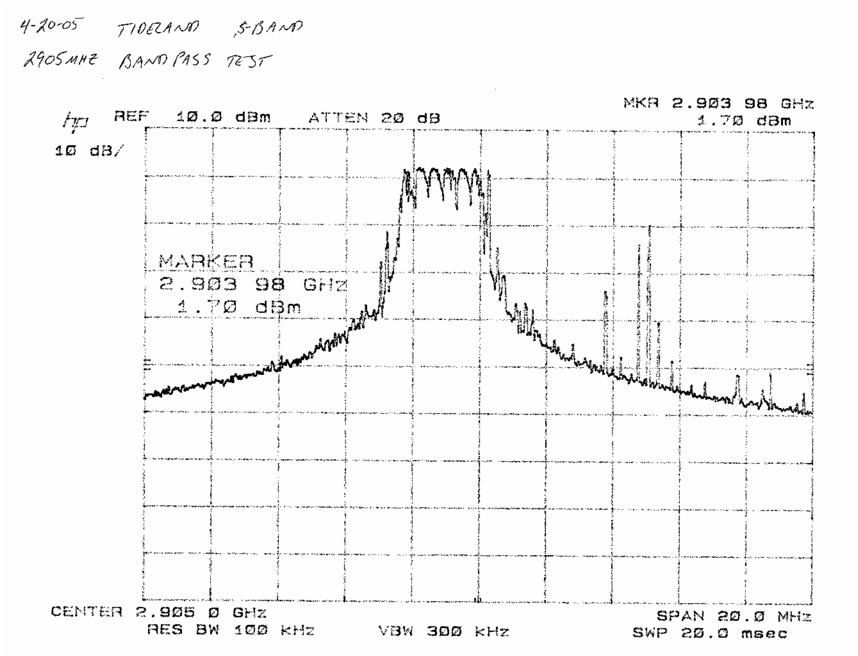


Figure 4.5.1 S-Band Band Pass Test 2905MHZ

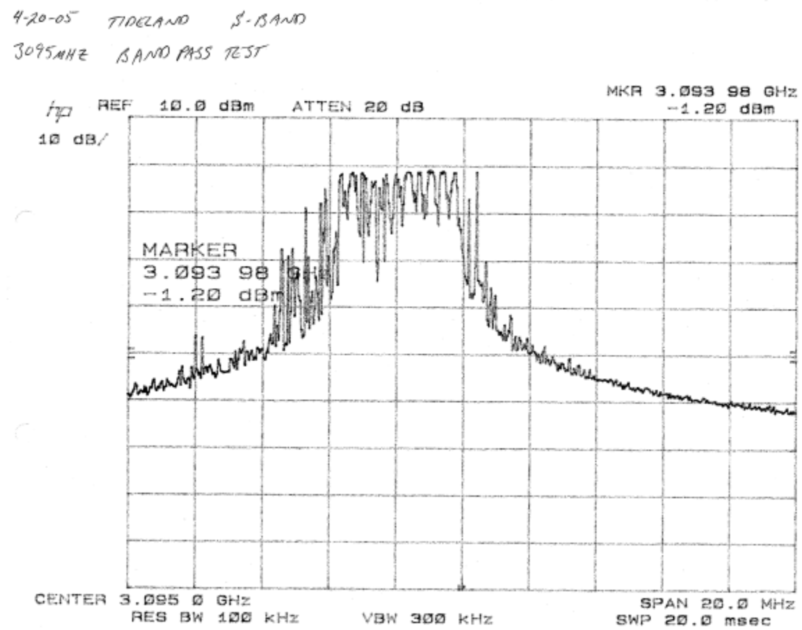


Figure 4.5.2 S-Band Band Pass Test 3095MHZ

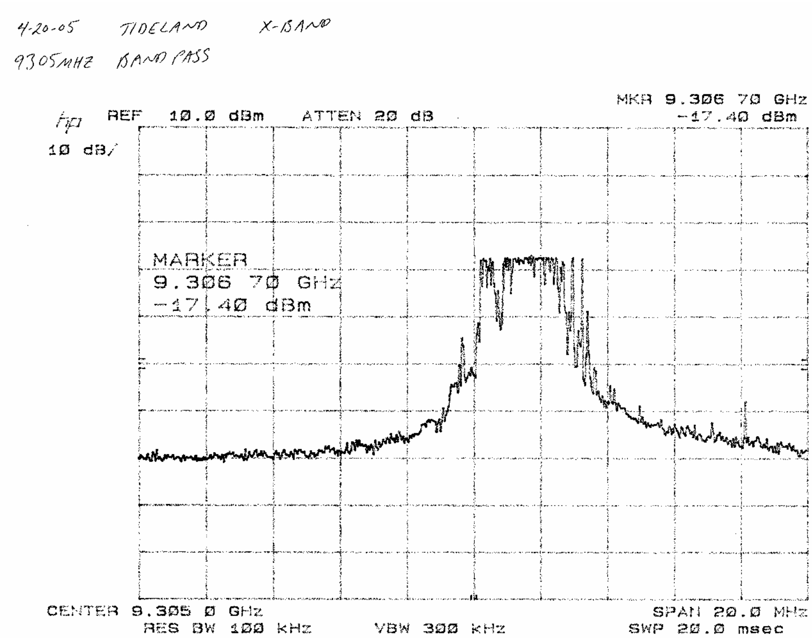


Figure 4.5.3 X-Band Band Pass Test 9305MHZ

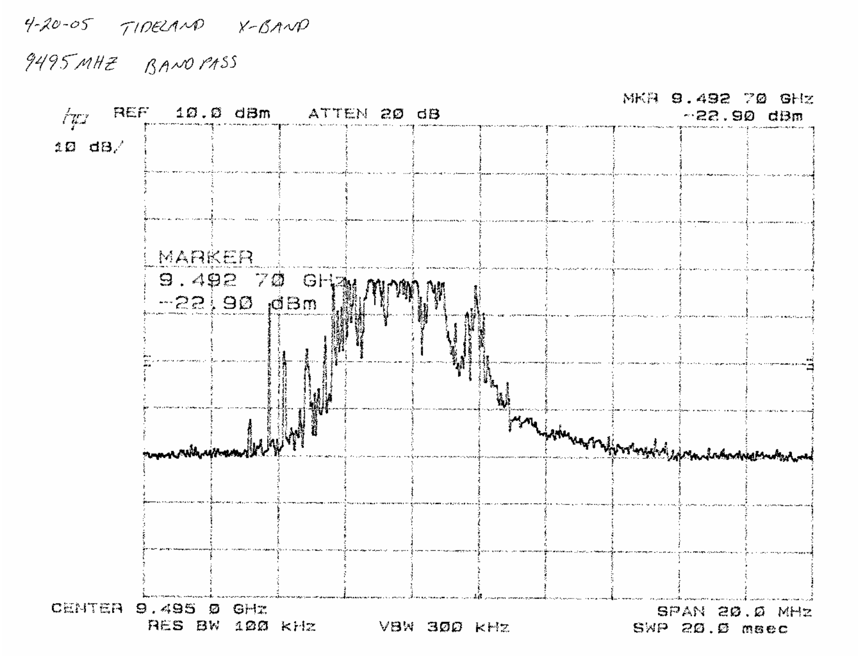


Figure 4.5.4 X-Band Band Pass Test 9495MHZ

4.6 Frequency Tracking Accuracy

Refer to Section 4.2 for the list of equipment used to perform this test.

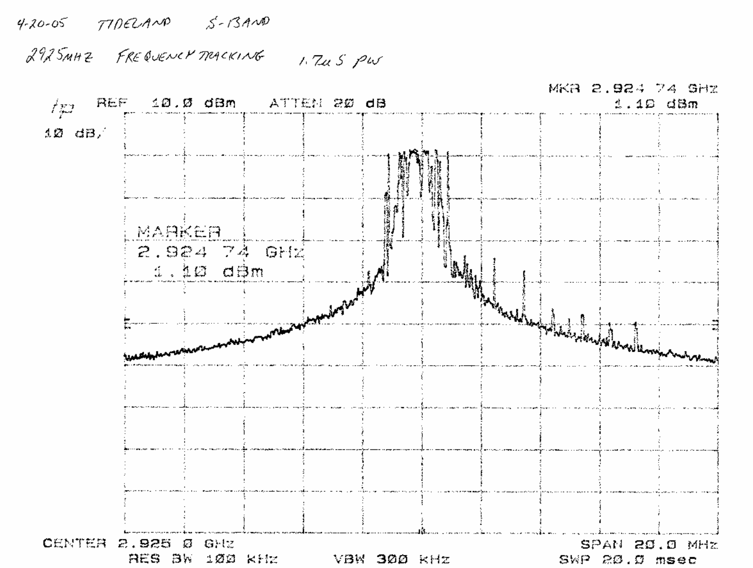


Figure 4.6.1 S Band Frequency Tracking Accuracy 2925MHZ 1.7uS

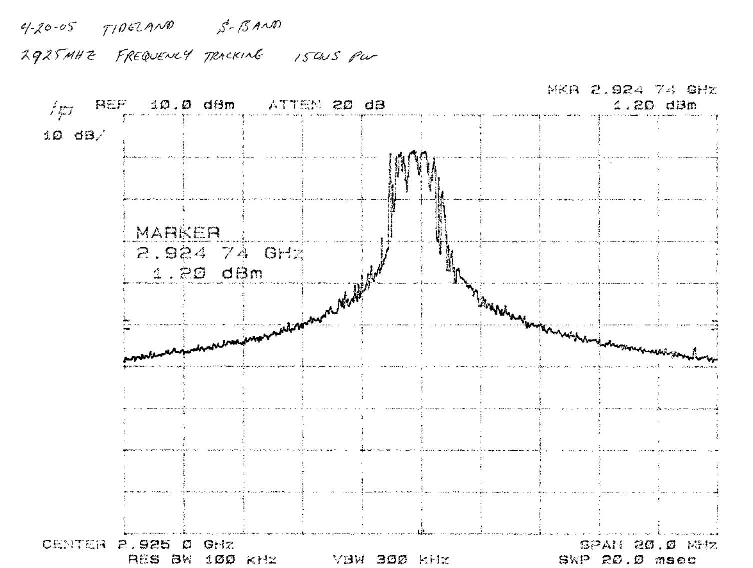


Figure 4.6.2 S Band Frequency tracking Accuracy 2925MHZ 150nS

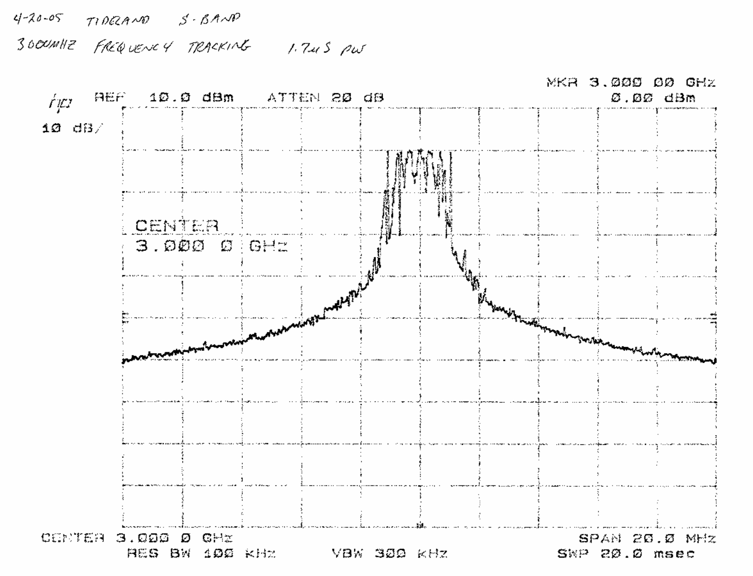


Figure 4.6.3 S Band Frequency Tracking Accuracy 3000MHZ 1.7uS

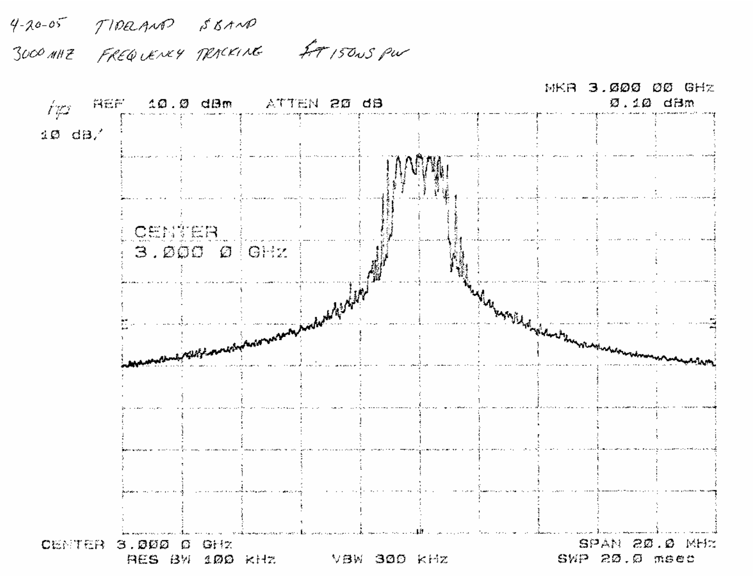


Figure 4.6.4 Frequency Tracking Accuracy 3000MHZ 150nS

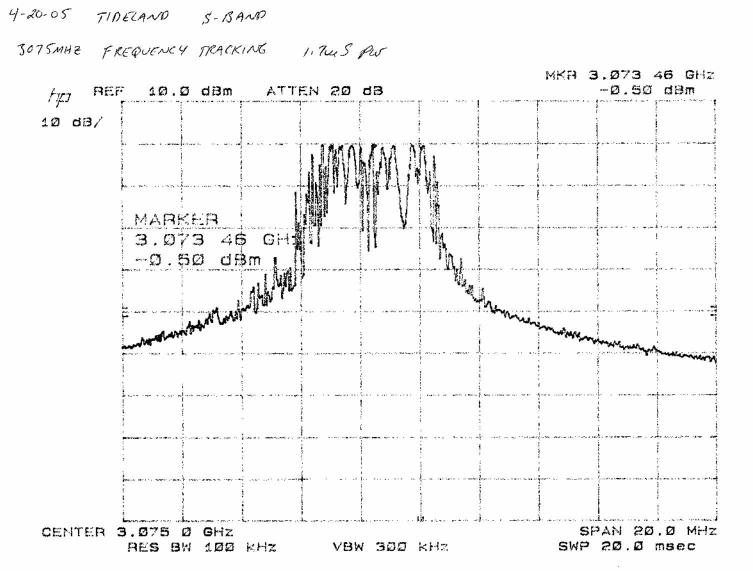


Figure 4.6.5 Frequency Tracking Accuracy 3075MHZ 1.7uS

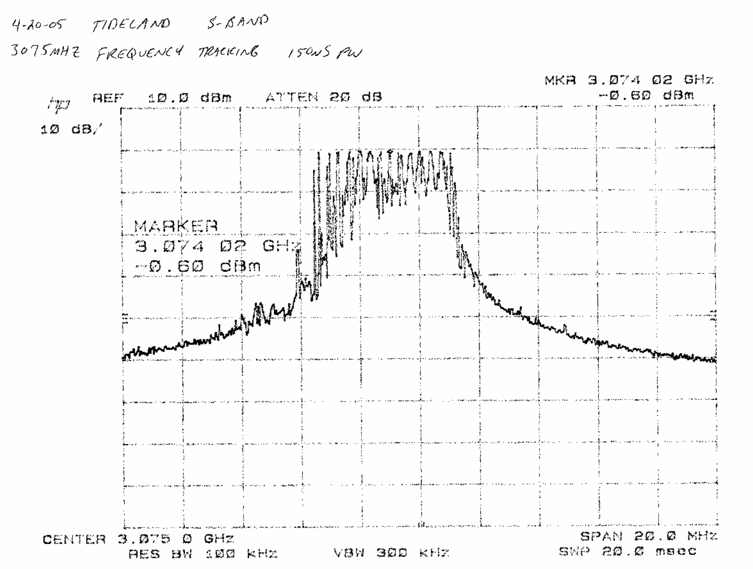


Figure 4.6.6 Frequency Tracking Accuracy 3075MHZ 150nS

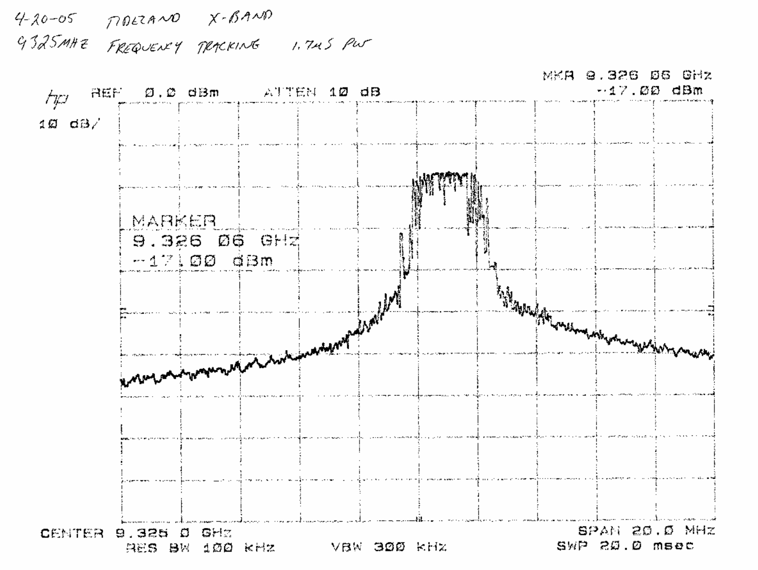


Figure 4.6.7 Frequency Tracking Accuracy 9325MHZ 1.7uS

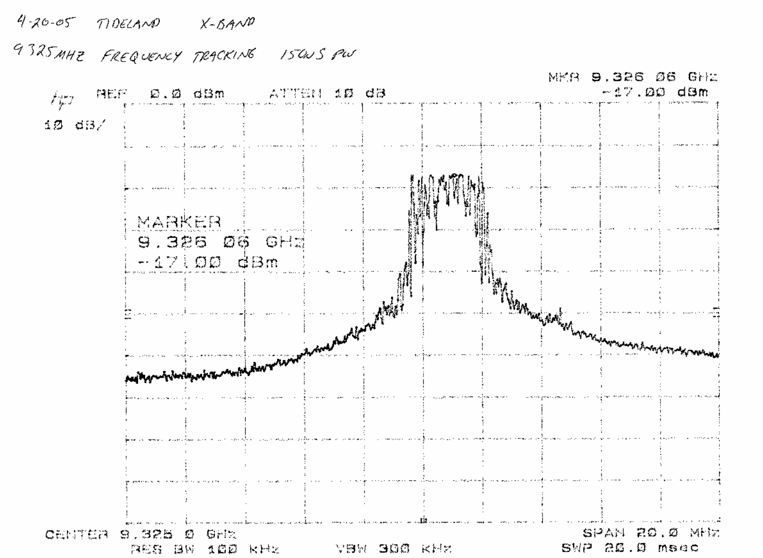


Figure 4.6.8 Frequency Tracking Accuracy 9325MHZ 150ns

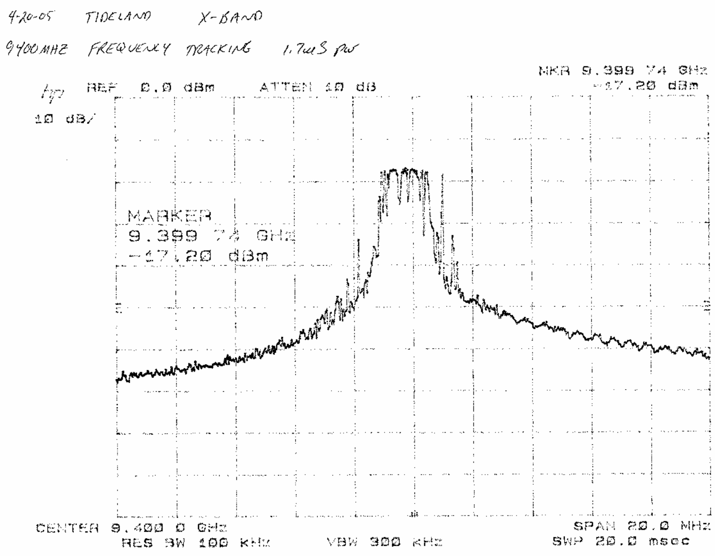


Figure 4.6.9 Frequency Tracking Accuracy 9400MHZ 1.7uS

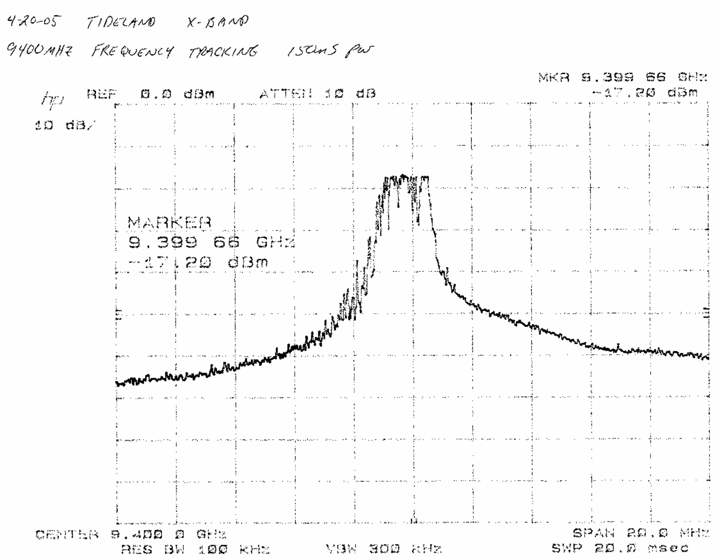


Figure 4.6.10 Frequency Tracking Accuracy 9400MHZ 150nS

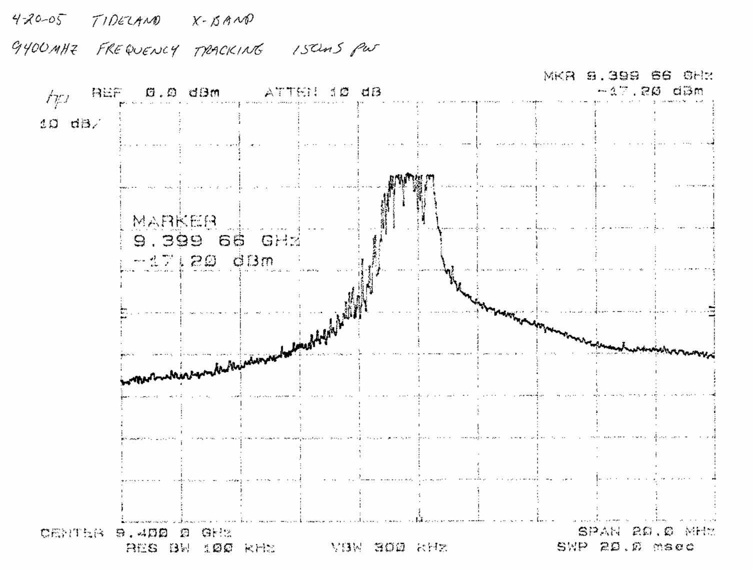


Figure 4.6.11 Frequency Tracking Accuracy 9475MHZ 1.7uS

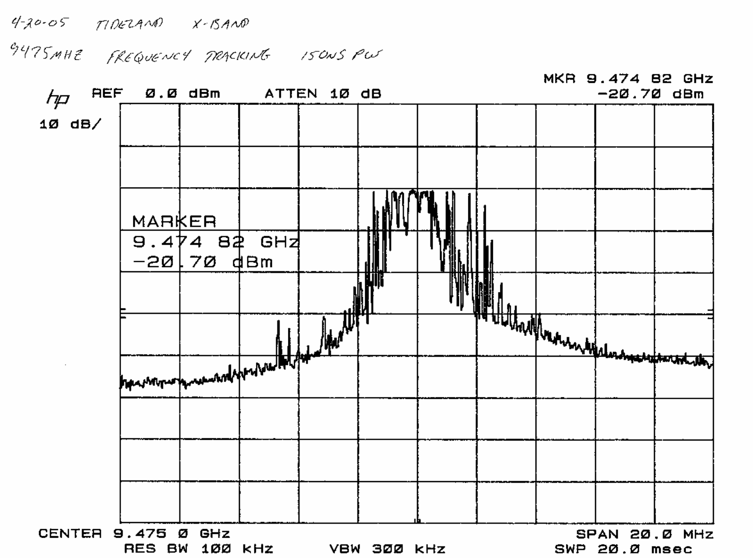


Figure 4.6.12 Frequency Tracking Accuracy 9475MHZ 150nS

4.7 Side Lobe Suppression

Refer to Section 4.2 for the list of equipment used to perform this test.

4.8 Receiver Threshold Test

Refer to Section 4.2 for the list of equipment used to perform this test.

4.9 Morse Code Response

Refer to Section 4.2 for the list of equipment used to perform this test.

4.10 Response Code Length

Refer to Section 4.2 for the list of equipment used to perform this test.

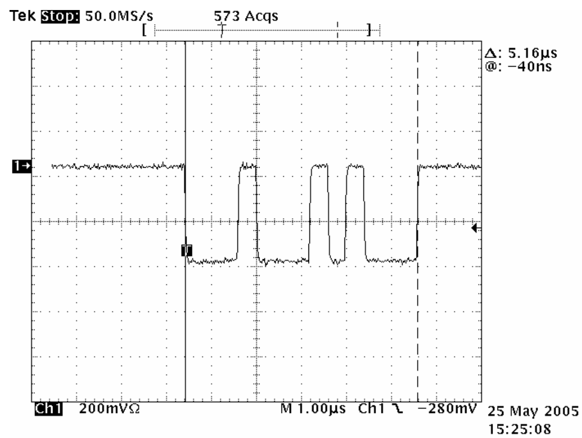


Figure 4.10.1 S Band Response Code Length 5uS

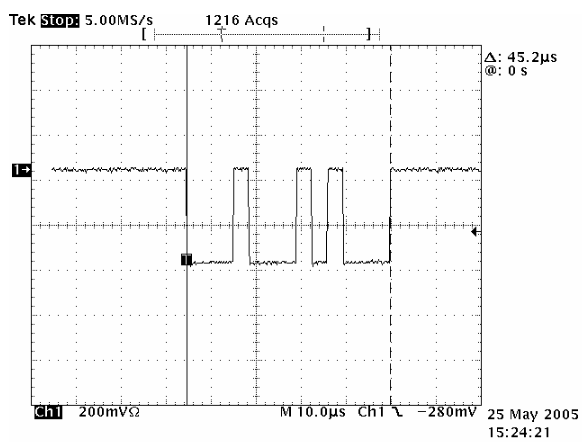


Figure 4.10.2 S Band Response Code Length 45uS

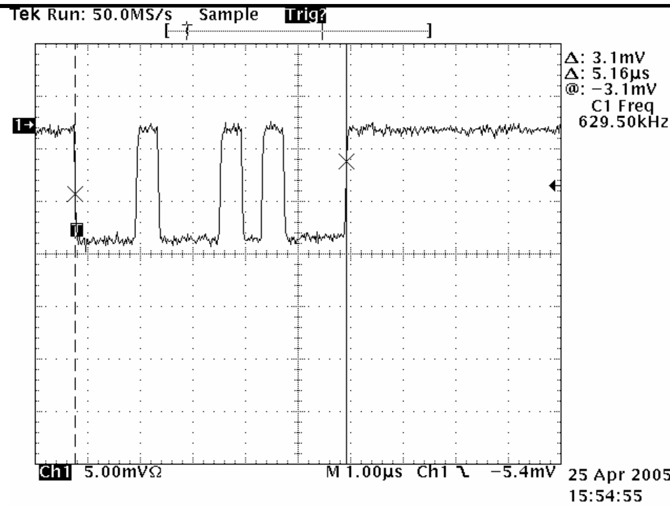


Figure 4.10.3 X Band Response Code Length 5uS

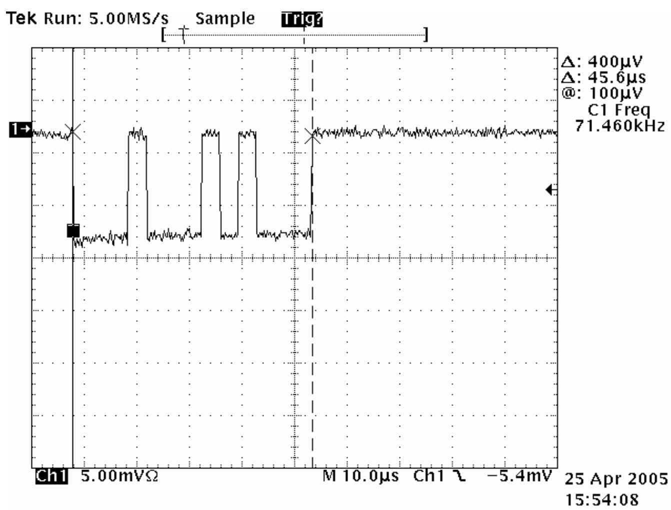


Figure 4.10.4 X Band Response Code Length 45uS

4.11 Response Delay

Refer to Section 4.2 for the list of equipment used to perform this test.

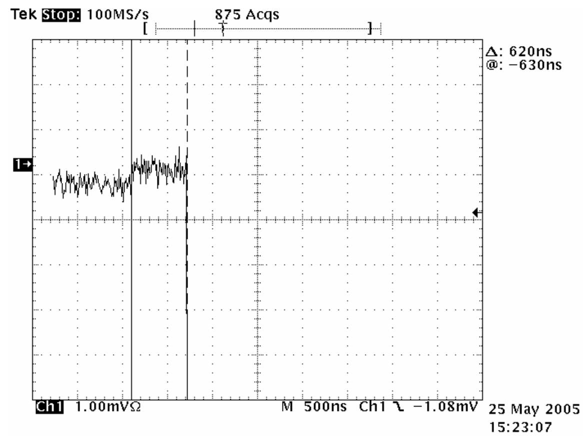


Figure 4.11.1 S Band Response Delay

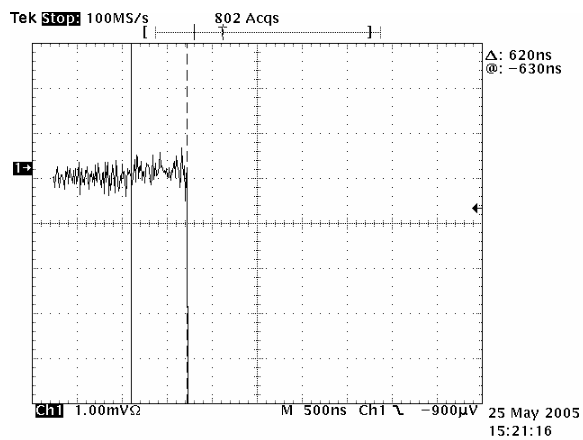


Figure 4.11.2 X Band Response Delay

4.12 Rise Time

Refer to Section 4.2 for the list of equipment used to perform this test.

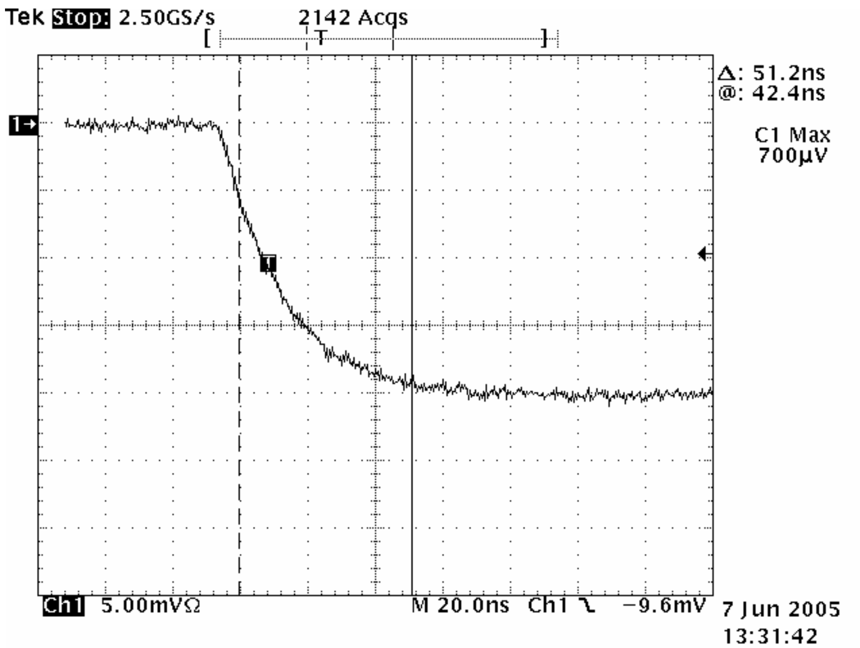


Figure 4.12.1 S Band Rise Time

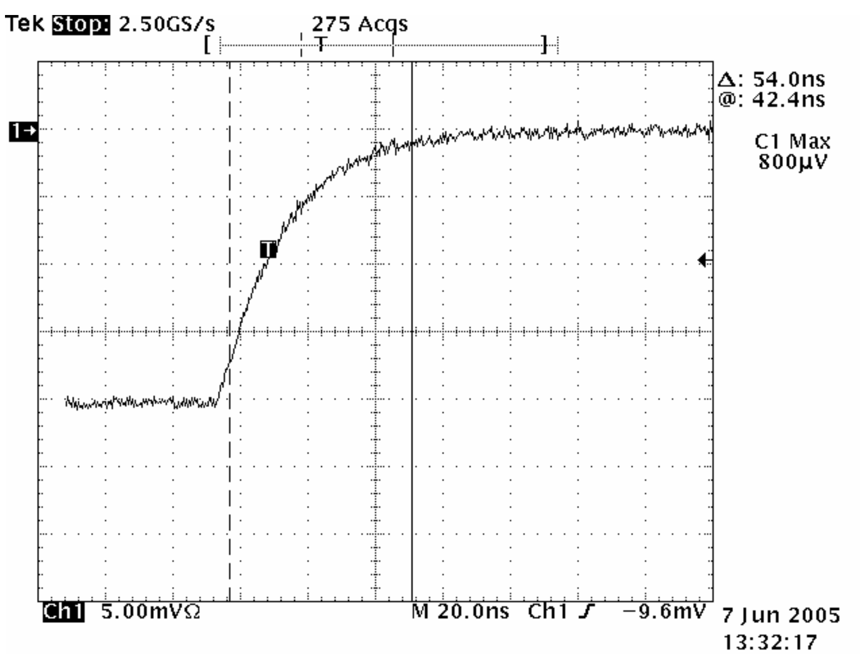


Figure 4.12.2 S Band Fall Time

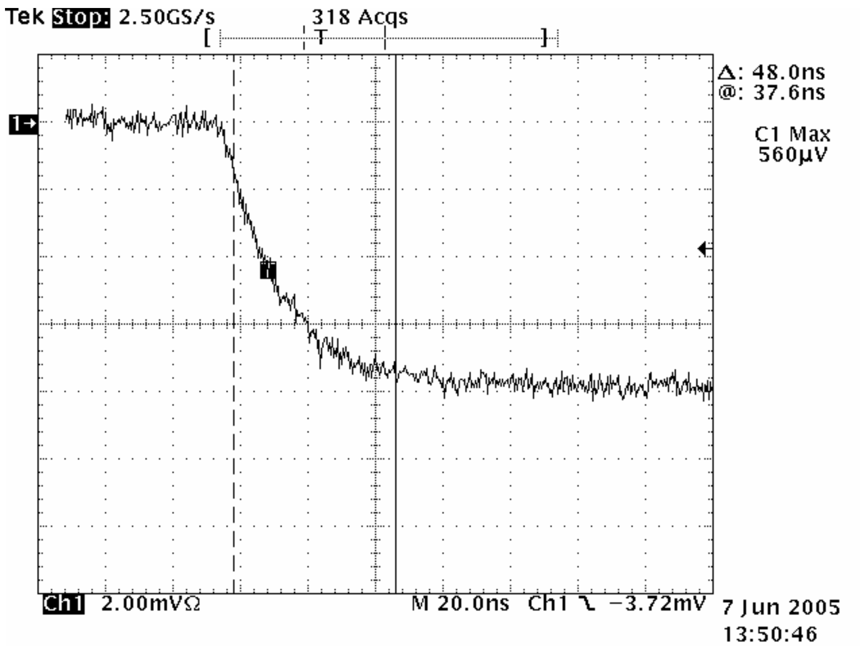


Figure 4.12.3 X Band Rise Time

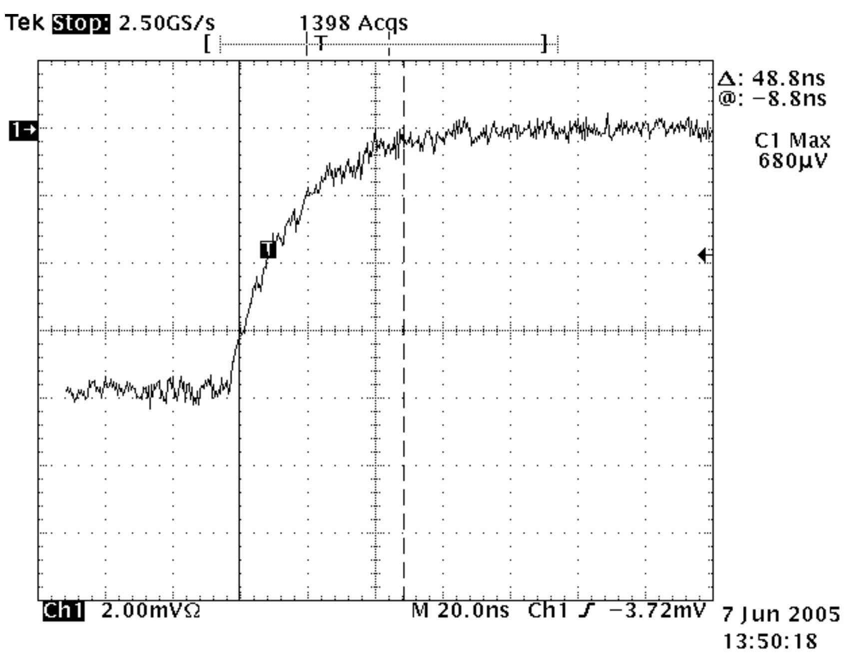


Figure 4.12.4 X Band Fall Time

4.13 Mode of Operation

Refer to Section 4.2 for the list of equipment used to perform this test.

4.14 Min and Max Response Rate

Refer to Section 4.2 for the list of equipment used to perform this test.

4.15 Instantaneous Emission Bandwidth

Refer to Section 4.2 for the list of equipment used to perform this test.

4.16 Vibration Test

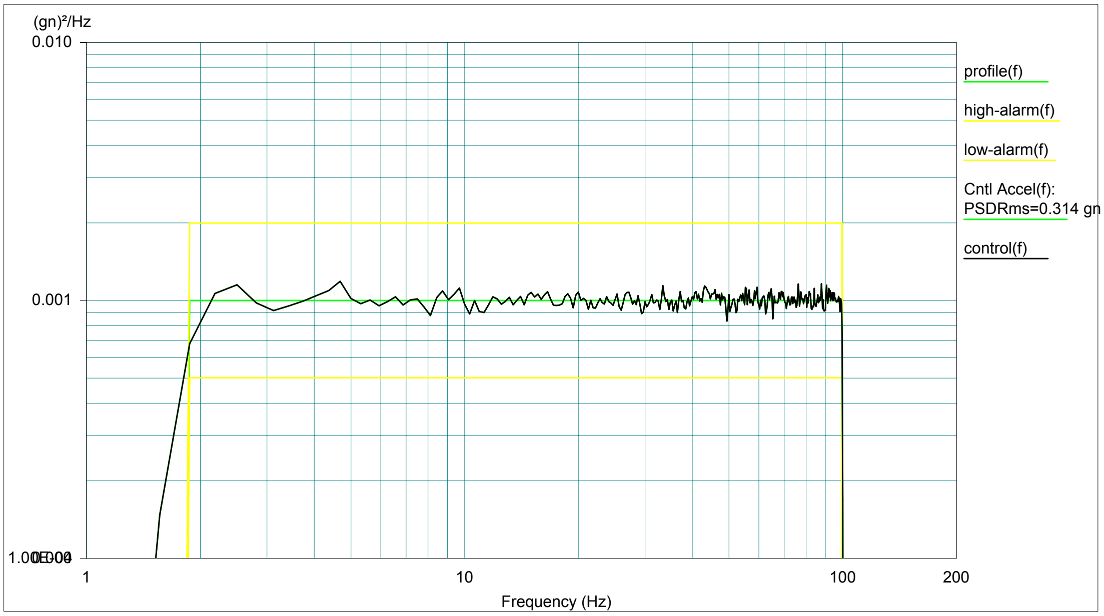
Table 4.16 PTI Vibration and Shock Test Equipment

Equipment	Manufacturer	Model	Serial Number	Calibration Due
Shaker Controller	Dactron	V2.10	7221624	03/05/06
PCI DSP Card	Dactron	V2.0	3410179	N/A
Power Amp	Ling	DMA4016E	035	N/A
Shaker Table	Ling	335VH	154	N/A
Accelerometer	Dytran	3136A	1878	10/26/05
Signal Conditioner	Endevco	133	AY35	10/11/05

Photograph 4.16.1 Y Axis Vibration Test Setup

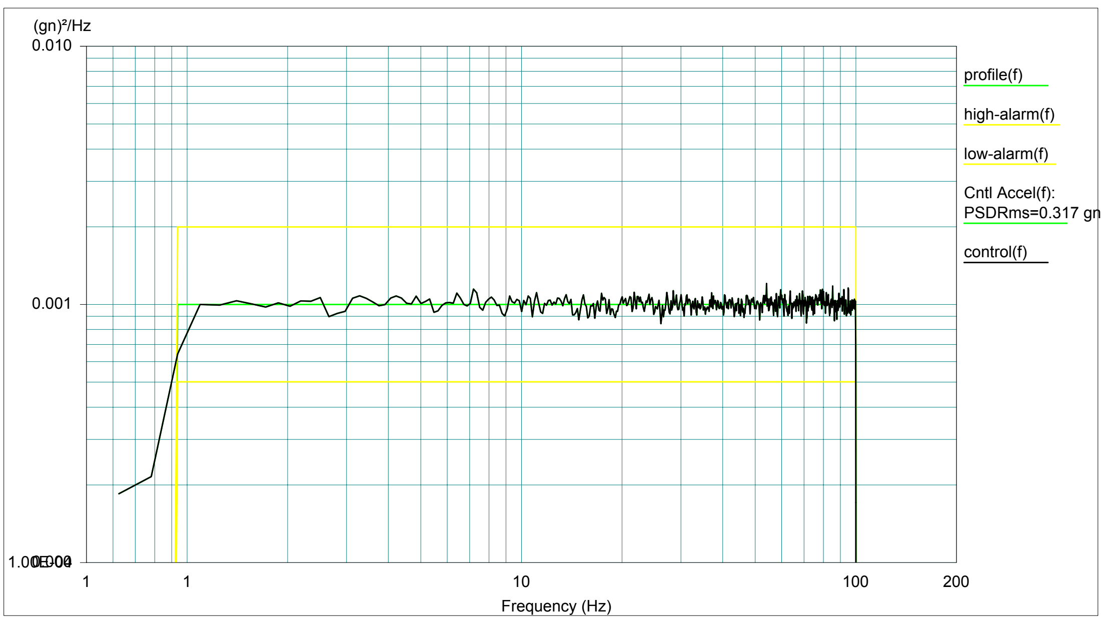
Photograph 4.16.2 X Axis Vibration Test Setup

Photograph 4.16.3 Z Axis Vibration Test Setup



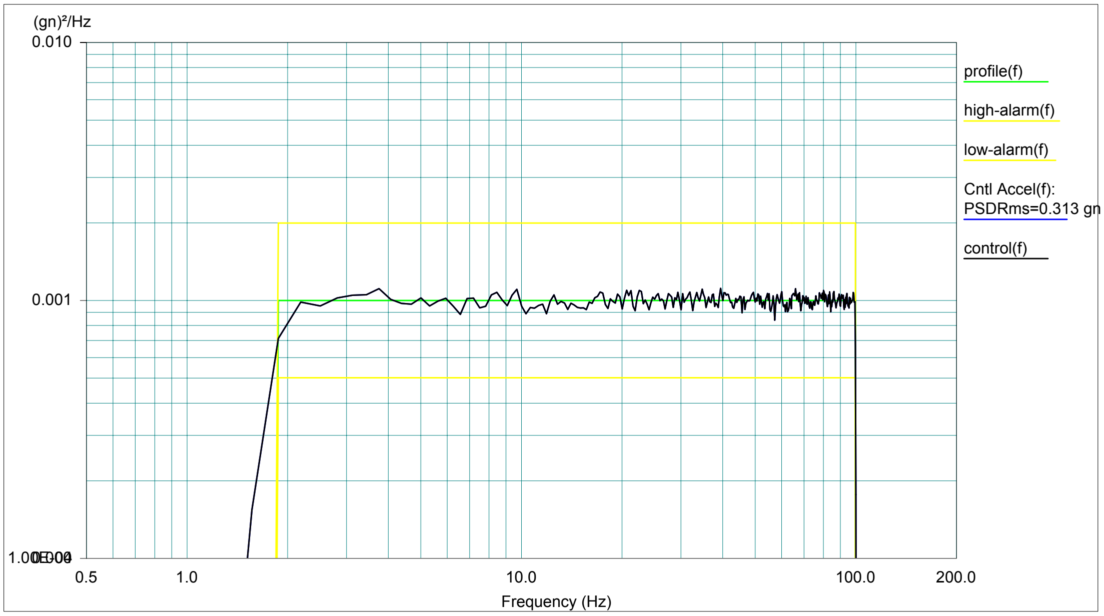
Level: 100 % Control RMS: 0.314109 gn Full Level Elapsed Time: 00:13:55 Lines: 400 Frame Time: 3.200000 Seconds
Demand RMS: 0.313069 gn Remaining Time: 00:00:00 DOF: 300 dF: 0.312500 Hz
Data saved at 05:37:17 PM, Friday, April 29, 2005 Report created at 05:37:22 PM, Friday, April 29, 2005

Figure 4.16.1 X Axis Vibration Final Run



Level: 100 % Control RMS: 0.316871 gn Full Level Elapsed Time: 00:29:00 Lines: 800 Frame Time: 6.400000 Seconds
Demand RMS: 0.314612 gn Remaining Time: 00:00:00 DOF: 300 dF: 0.156250 Hz
Data saved at 10:50:03 AM, Friday, April 29, 2005 Report created at 10:50:05 AM, Friday, April 29, 2005

Figure 4.16.2 Y Axis Vibration Final Run



Level: 100 % Control RMS: 0.313284 gn Full Level Elapsed Time: 01:59:57 Lines: 400 Frame Time: 3.200000 Seconds
Demand RMS: 0.313069 gn Remaining Time: 00:00:00 DOF: 300 dF: 0.312500 Hz
Data saved at 09:52:16 AM, Tuesday, May 03, 2005 Report created at 09:52:19 AM, Tuesday, May 3, 2005

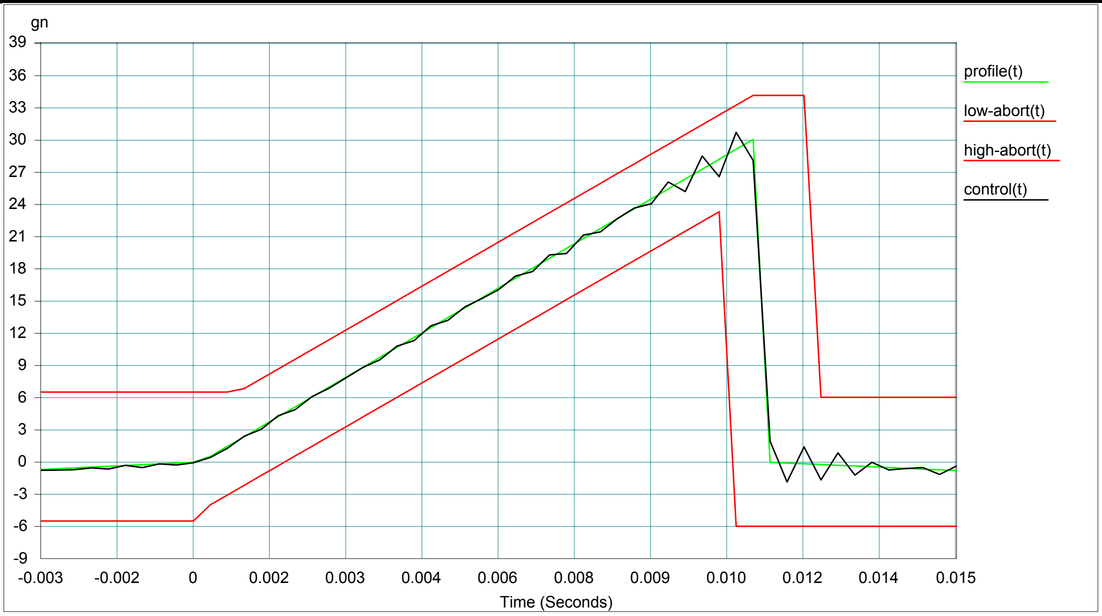
Figure 4.16.3 Z Axis Vibration Final Run

4.17 Shock (Specified Pulse) Test

Refer to Section 4.16 for the list of equipment used to perform this test.

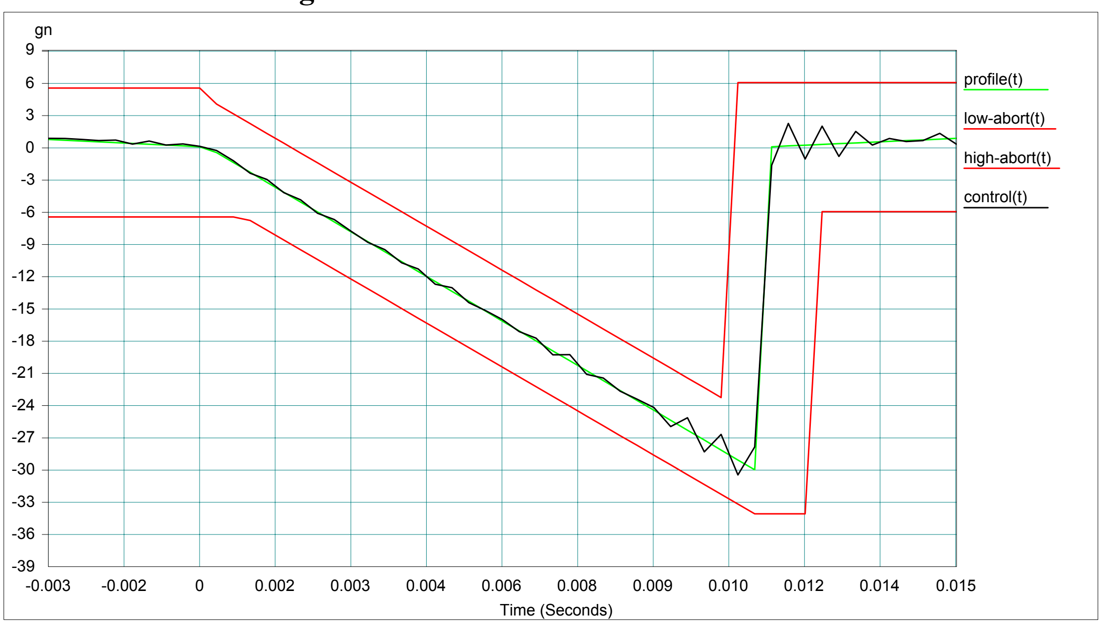
Photograph 4.17.1 Y Axis Shock Test Setup

Photograph 4.17.2 X & Z Axis Shock Test Setup



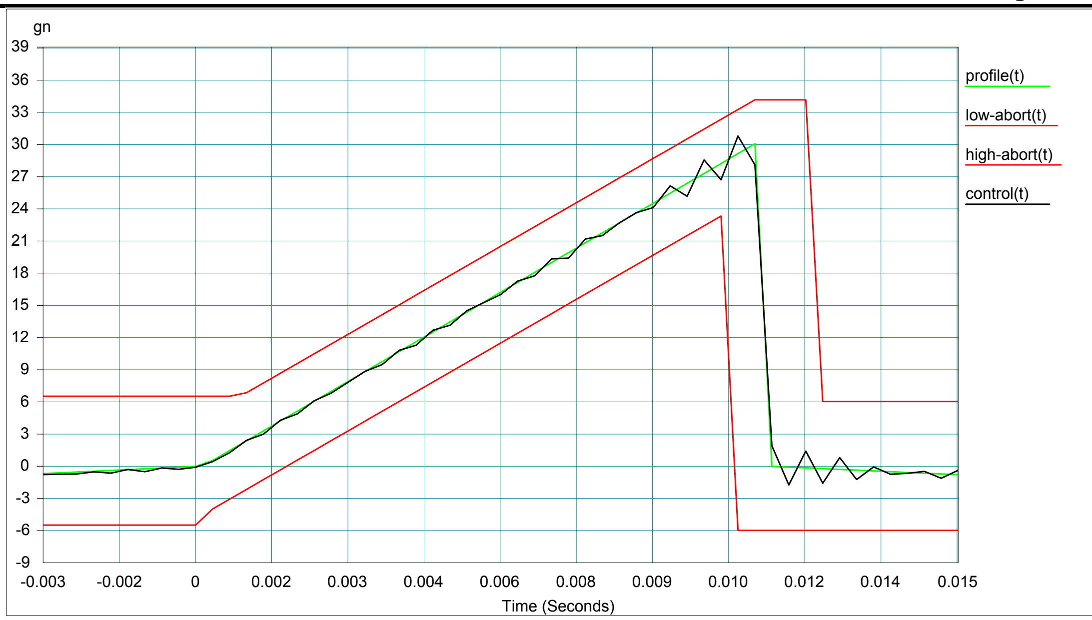
Level: 100 % Block Size: 1024 Elapsed Pulses: 8 Frame Time: 0.341333 Seconds Control Peak: 30.650499 gn
Control RMS: 3.345675 gn Full Level Elapsed Pulses: 3 dT: 0.000333 Seconds Demand Peak: 29.999998 gn
Demand RMS: 3.338302 gn Remaining Pulses: 0 Pulse Type: Forward Sawtooth Amplitude: 29.999998 gn
Data saved at 05:39:26 PM, Friday, April 29, 2005 Report created at 05:39:30 PM, Friday, April 29, 2005

Figure 4.17.1 X Axis Positive Shock Pulse



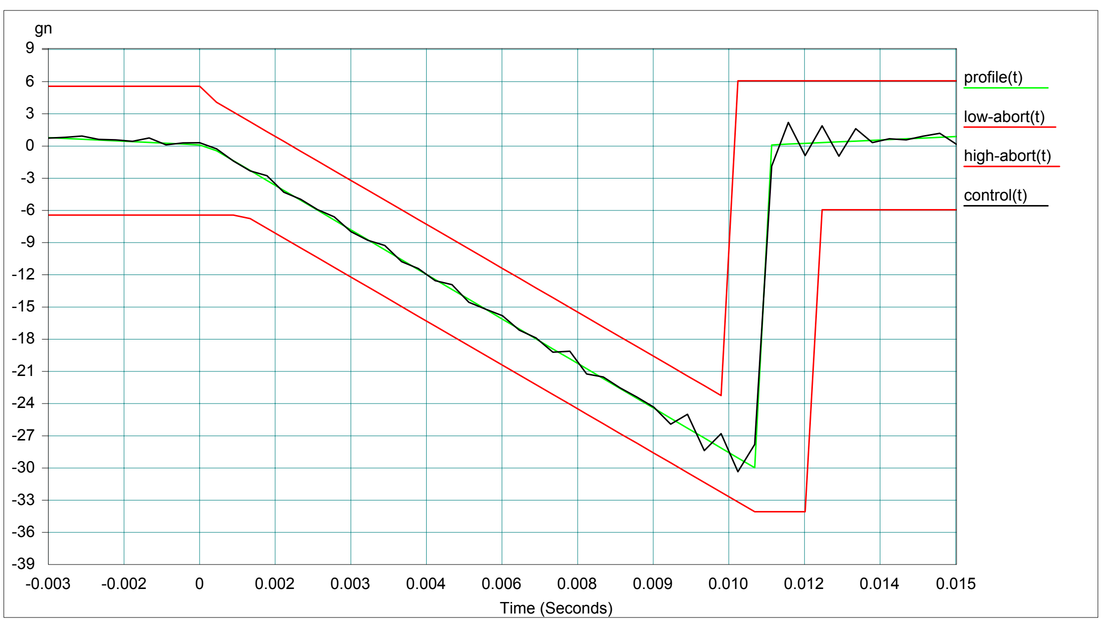
Level: 100 % Block Size: 1024 Elapsed Pulses: 8 Frame Time: 0.341333 Seconds Control Peak: 30.480839 gn
Control RMS: 3.340284 gn Full Level Elapsed Pulses: 3 dT: 0.000333 Seconds Demand Peak: 29.999998 gn
Demand RMS: 3.338302 gn Remaining Pulses: 0 Pulse Type: Forward Sawtooth Amplitude: 29.999998 gn
Data saved at 05:40:26 PM, Friday, April 29, 2005 Report created at 05:40:28 PM, Friday, April 29, 2005

Figure 4.17.2 -X Axis Positive Shock Pulse



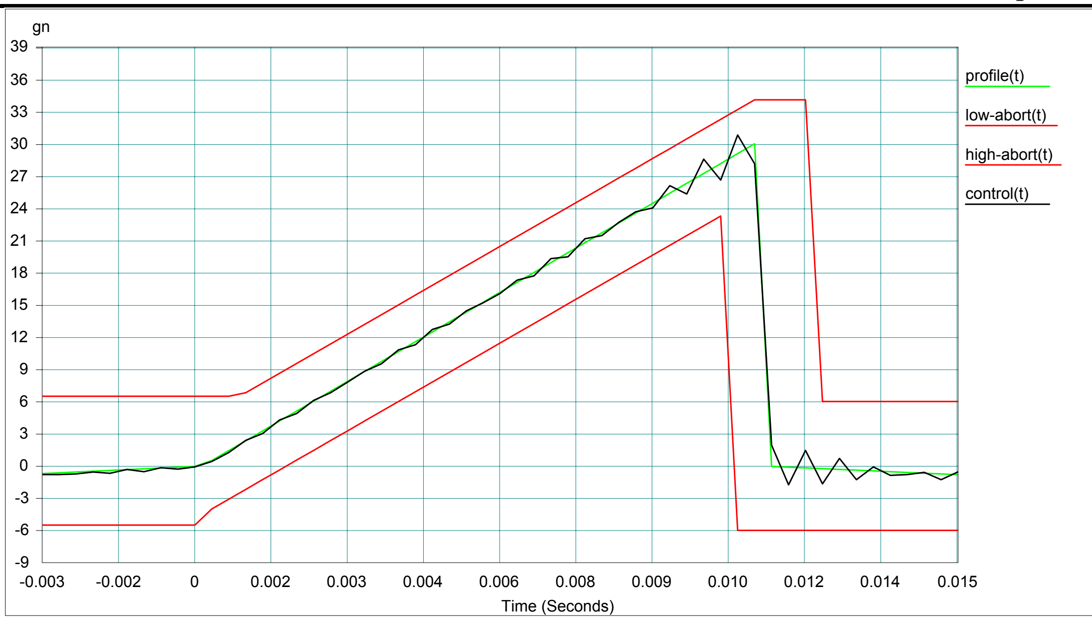
Level: 100 % Block Size: 1024 Elapsed Pulses: 8 Frame Time: 0.341333 Seconds Control Peak: 30.734970 gn
Control RMS: 3.345797 gn Full Level Elapsed Pulses: 3 dT: 0.000333 Seconds Demand Peak:29.999998 gn
Demand RMS: 3.338302 gn Remaining Pulses: 0 Pulse Type: Forward Sawtooth Amplitude: 29.999998 gn
Data saved at 09:57:35 AM, Tuesday, May 03, 2005 Report created at 09:57:39 AM, Tuesday, May 3, 2005

Figure 4.17.3 Z Axis Positive Shock Pulse



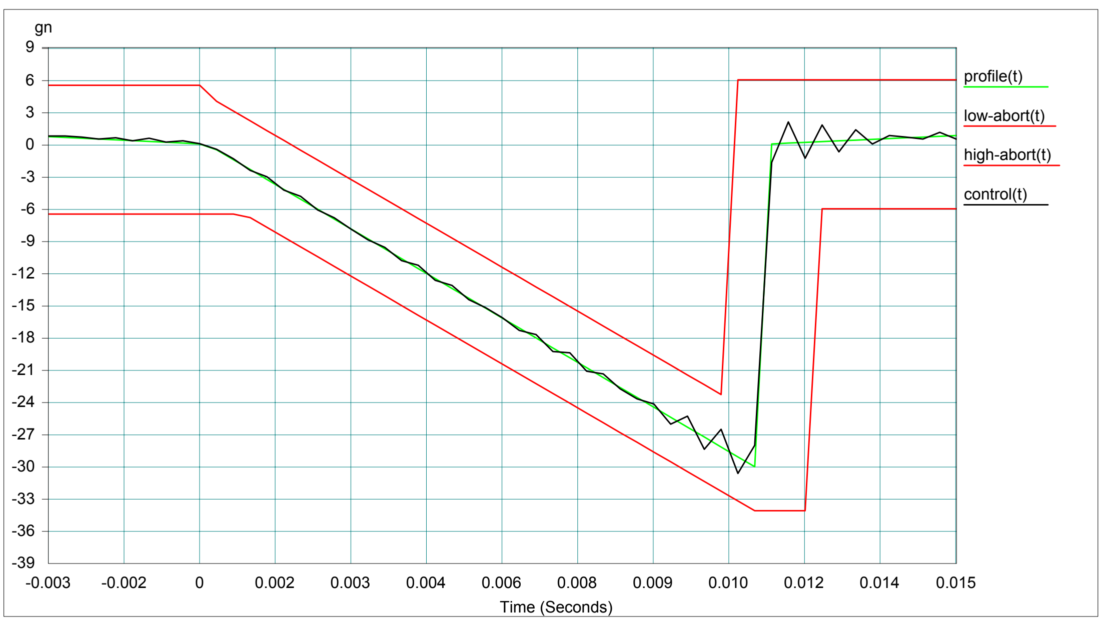
Level: 100 % Block Size: 1024 Elapsed Pulses: 8 Frame Time: 0.341333 Seconds Control Peak: 30.358866 gn
Control RMS: 3.340503 gn Full Level Elapsed Pulses: 3 dT: 0.000333 Seconds Demand Peak: 29.999998 gn
Demand RMS: 3.338302 gn Remaining Pulses: 0 Pulse Type: Forward Sawtooth Amplitude: 29.999998 gn
Data saved at 09:58:41 AM, Tuesday, May 03, 2005 Report created at 09:58:43 AM, Tuesday, May 3, 2005

Figure 4.17.4 -Z Axis Positive Shock Pulse



Level: 100 % Block Size: 1024 Elapsed Pulses: 8 Frame Time: 0.341333 Seconds Control Peak: 30.807590 gn
Control RMS: 3.354164 gn Full Level Elapsed Pulses: 3 dT: 0.000333 Seconds Demand Peak: 29.999998 gn
Demand RMS: 3.338302 gn Remaining Pulses: 0 Pulse Type: Forward Sawtooth Amplitude: 29.999998 gn
Data saved at 02:12:33 PM, Friday, April 29, 2005 Report created at 02:12:35 PM, Friday, April 29, 2005

Figure 4.17.5 Y Axis Negative Shock Pulse



Level: 100 % Block Size: 1024 Elapsed Pulses: 8 Frame Time: 0.341333 Seconds Control Peak: 30.610945 gn
Control RMS: 3.347642 gn Full Level Elapsed Pulses: 3 dT: 0.000333 Seconds Demand Peak: 29.999998 gn
Demand RMS: 3.338302 gn Remaining Pulses: 0 Pulse Type: Forward Sawtooth Amplitude 29.999998 gn
Data saved at 02:14:37 PM, Friday, April 29, 2005 Report created at 02:14:39 PM, Friday, April 29, 2005

Figure 4.17.6 -Y Axis Negative Shock Pulse

4.18 Leak Test

Table 4.18Leak Test Equipment

Description	Serial Number / Asset Number	Calibration Due
Ashcroft Test Gauge 0.2psi	0972	07/23/05

Photograph 4.18 Leak Test Setup

4.19 Immersion Test

Table 4.19 Immersion Test Equipment

Description	Serial Number / Asset Number	Calibration Due
Body of Water 12ft deep	N/A	N/A
Various weight and floats	N/A	N/A

4.20 EMI/ RFI Test

Table 4.20.1 CS103 Test Equipment List

A/N	Manufacturer	Model	Equipment Type	Serial #	Calibration Due Date
0715	Gigatronics	900	Signal Generator	321F03	07/30/2005
0547	Gigatronics	GT9000	Signal Generator	9824003	07/13/2005
0957	Pasternack	PE2068	Combiner	None	Calibrate before use
0084	HP	8566B	Spectrum Analyzer	2950A06265	02/03/2006
0835	Narda	3293-1	Directional Coupler	4759	Calibrate before use
0968	Pasternack	PE8301	2-4 GHz Isolator	None	Calibrate before use
0969	Pasternack	PE8303	7-12.4 GHz Isolator	None	Calibrate before use
None	Inmet	10dB	2Watt Attenuator	None	Not Required

Table 4.20.2 RE102 Test Equipment List

A/N	Manufacturer	Model	Equipment Type	Serial #	Calibration Due Date
0007	EMCO	3401	Biconical Antenna	3240	06/02/2005
0008	EMCO	3146	Log Periodic Antenna	1639	07/23/2005
0077	EMCO	3115	Horn Antenna	9010-3578	07/16/2005
0084	HP	8566B	Spectrum Analyzer	2950A06265	02/03/2006
0005	EMCO	3825/2	LISN	1356	07/12/2005
0078	EMCO	3301B	Active Rod Antenna	8912-2910	05/03/2005*
0897	Miteq	None	Microwave Preamplifier	5124B	05/13/2005
0086	HP	8447F	Preamplifier	2944A04163	05/13/2005
0586	HP	8447D	Preamplifier	1726A01364	11/18/2005
C007	None	None	Armored RF Cable	None	08/30/2005

*Calibration extended through 5/30/2005.

Photograph 4.20.1 RE102 Test Setup Front View

Photograph 4.20.2 RE102 Test Setup Side View

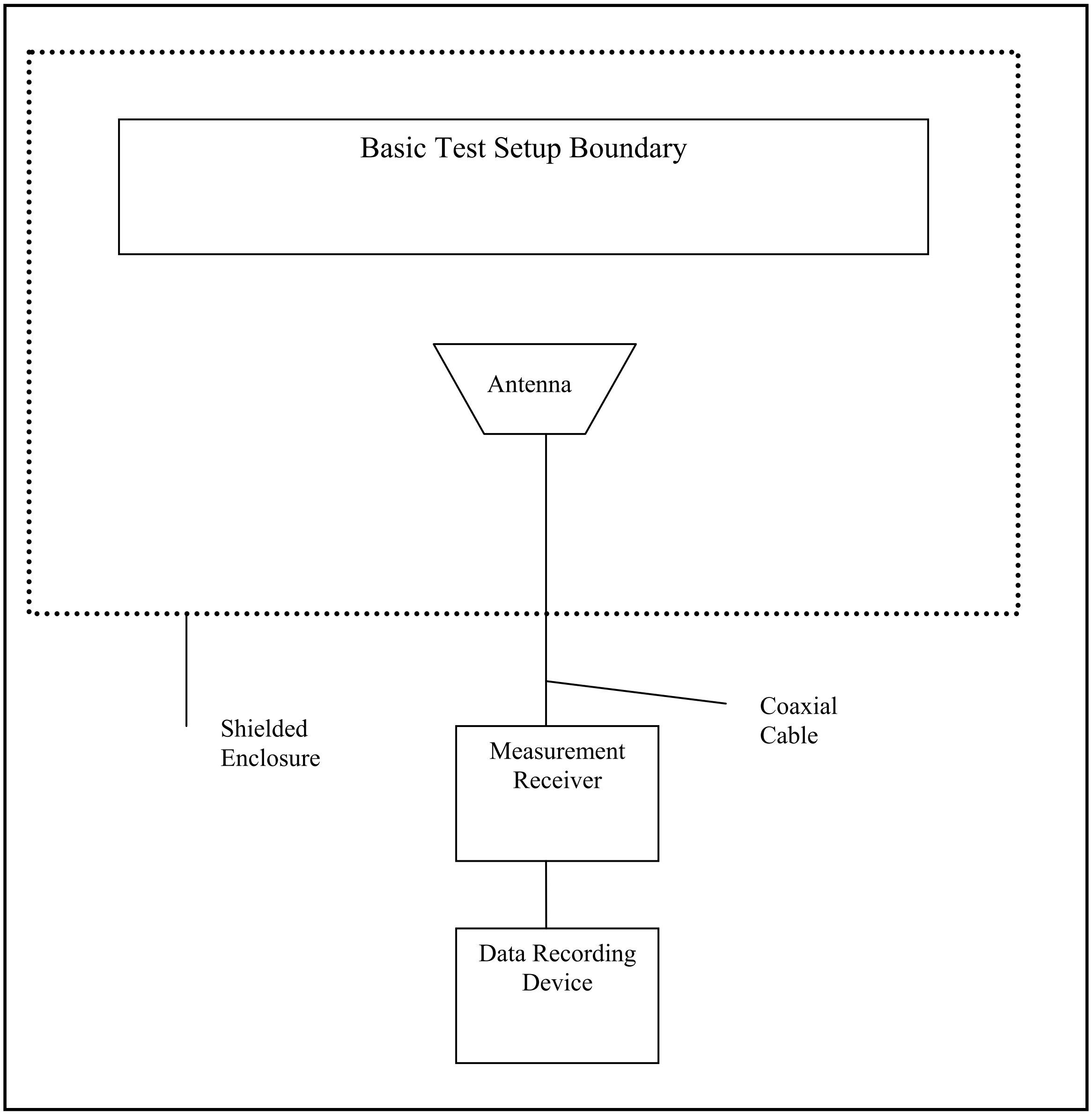
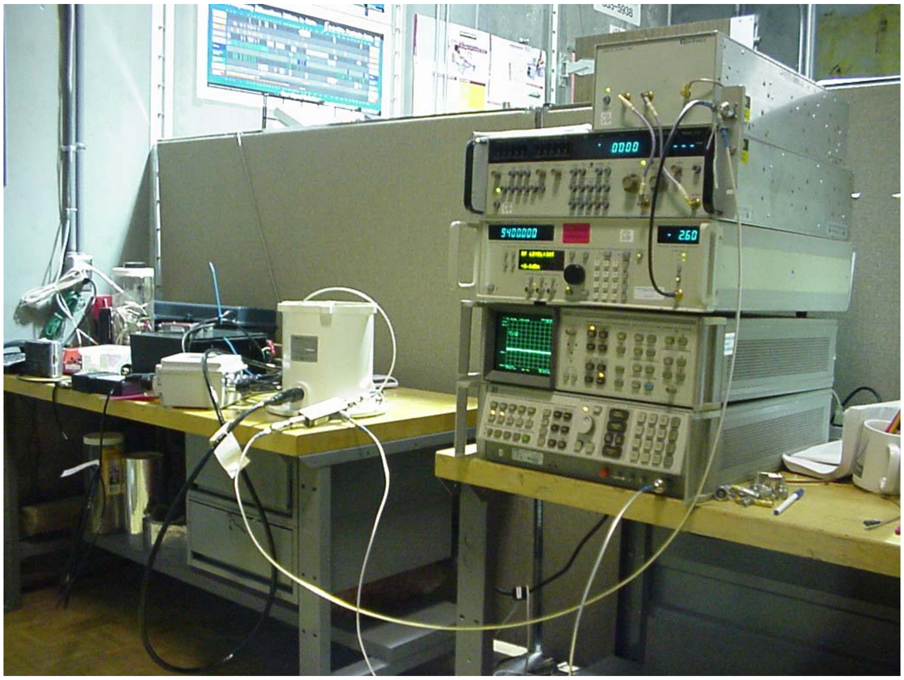


Diagram 4.20.1 RE102 Test Setup



Photograph 4.20.3 CS103 Test Setup

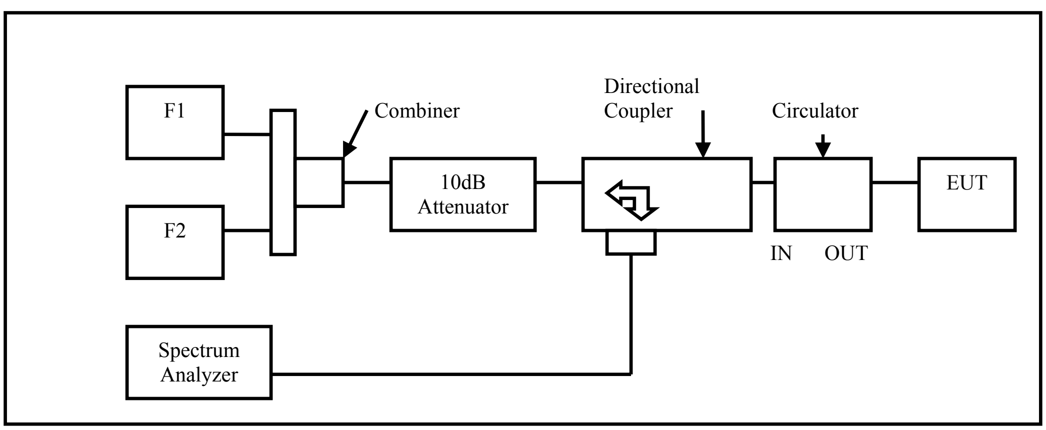


Diagram 4.20.2 CS103 Test Setup

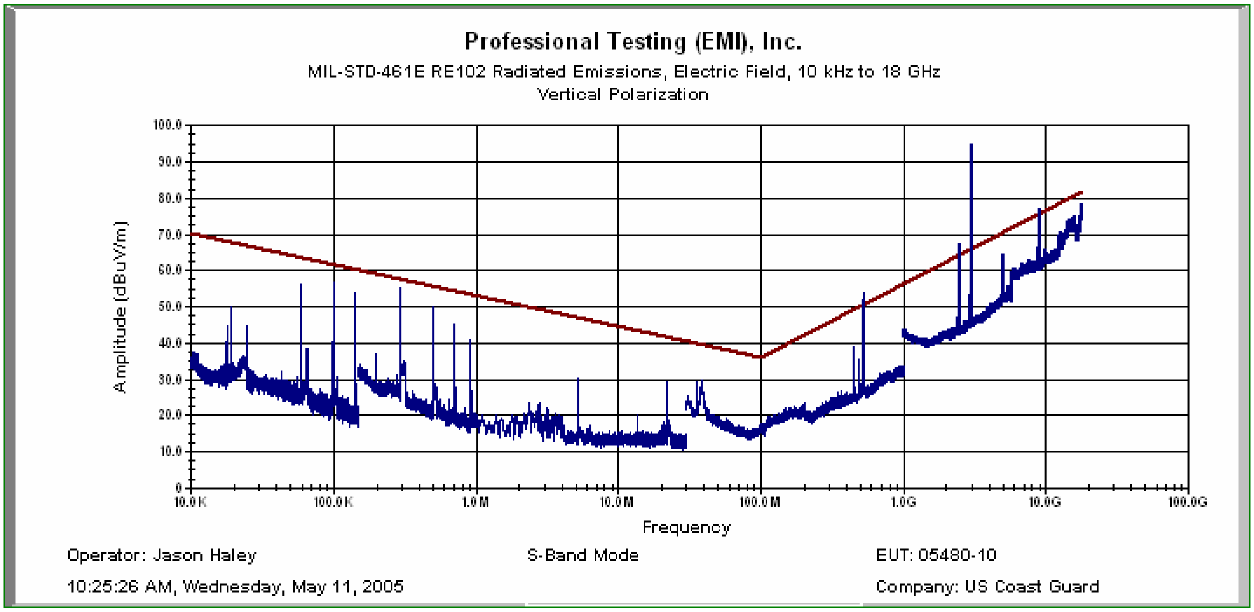


Figure 4.20.1 RE102 S-band Vertical Polarization

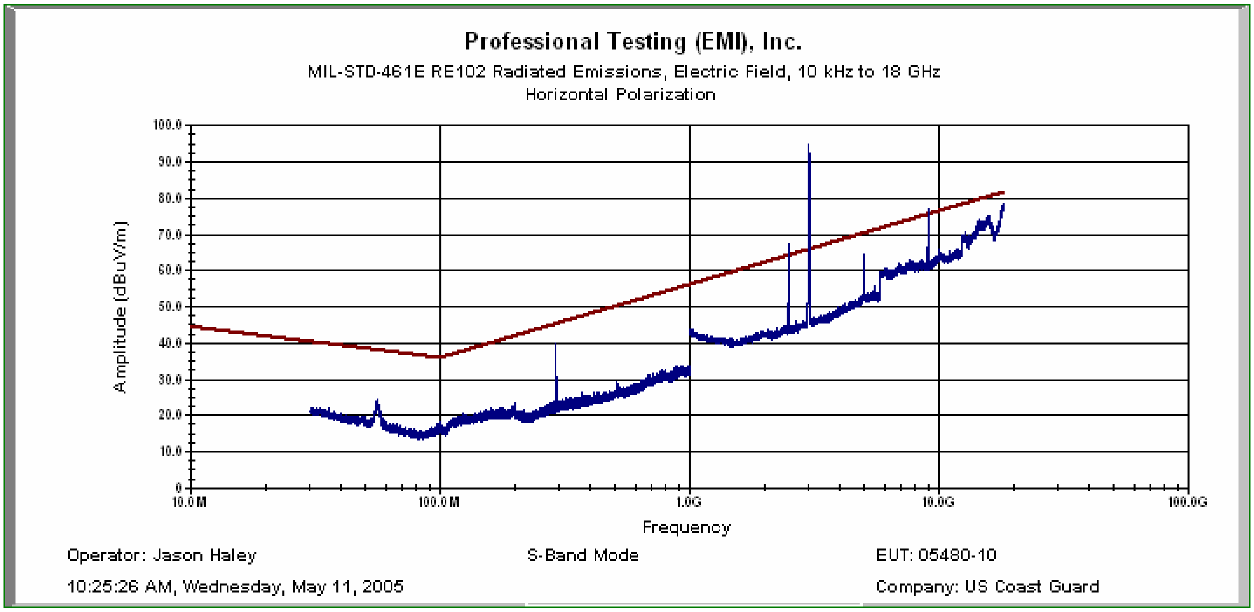


Figure 4.20.2 RE102 S-band Horizontal Polarization

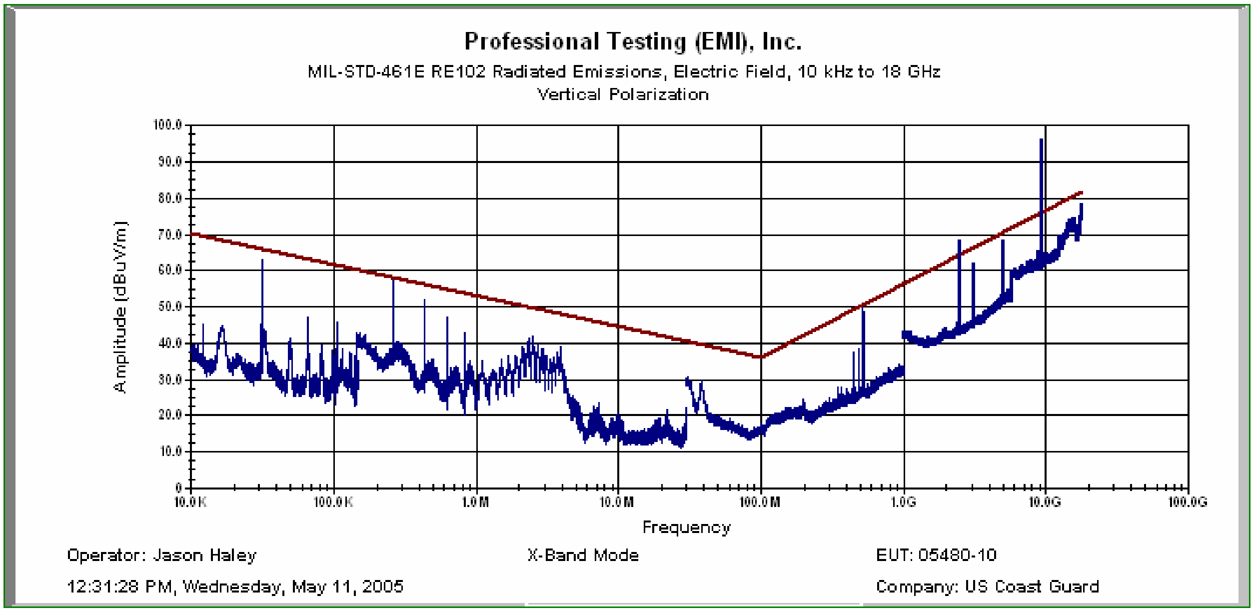


Figure 4.20.3 RE102 X-band Vertical Polarization

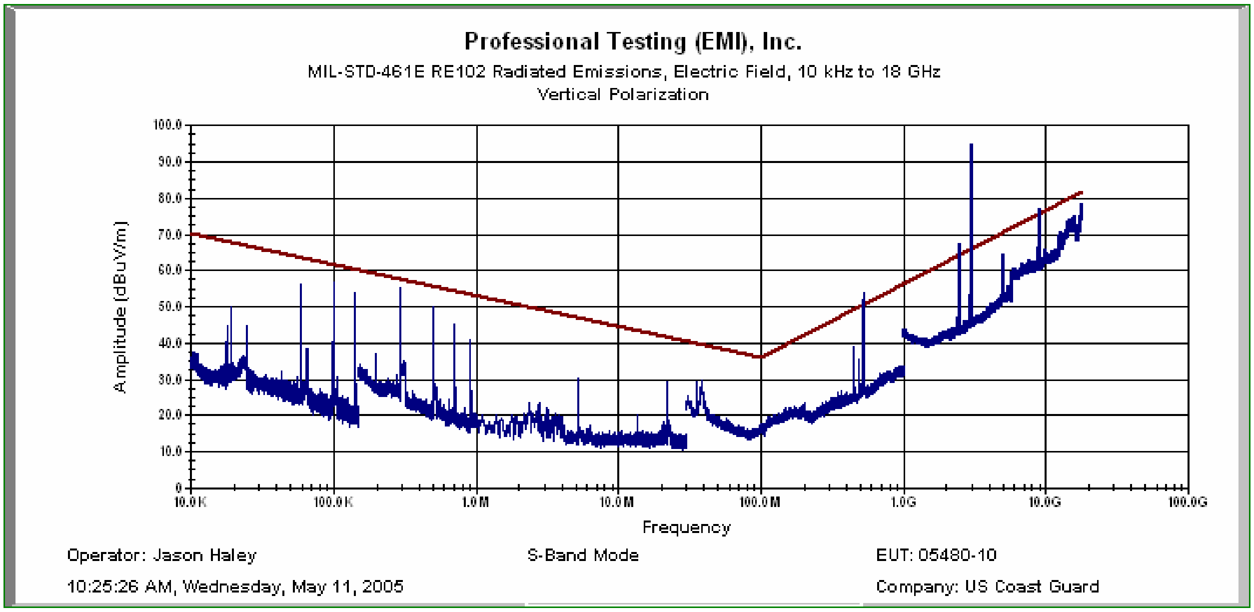


Figure 4.20.4 X-band Horizontal Polarization

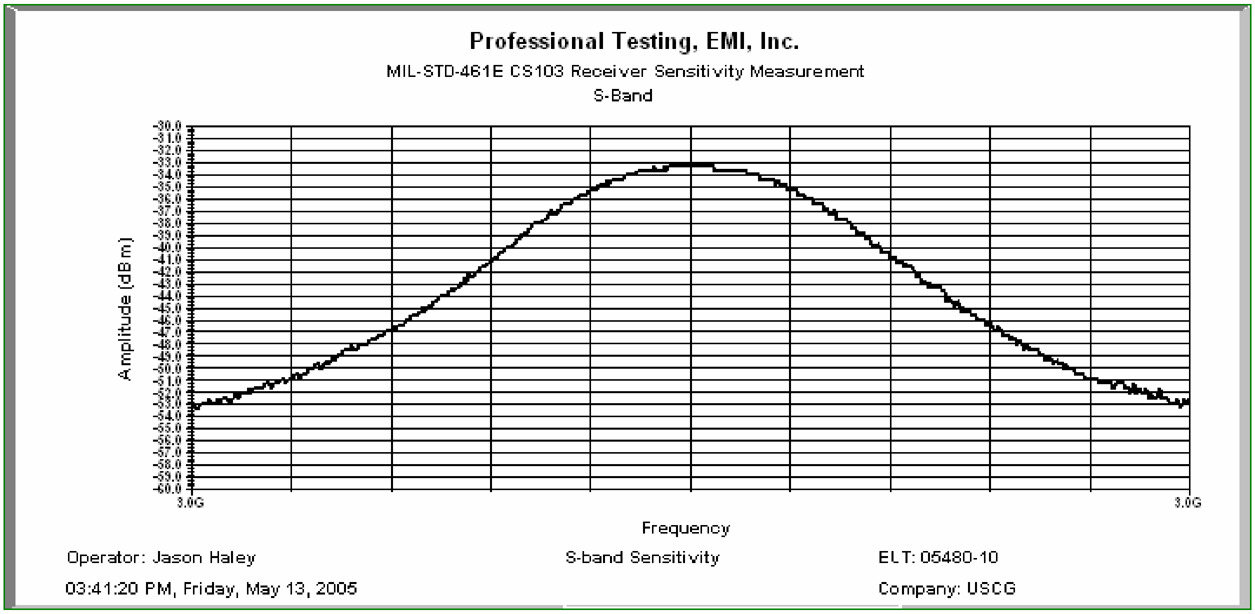


Figure 4.20.5 S-band Sensitivity Measurement

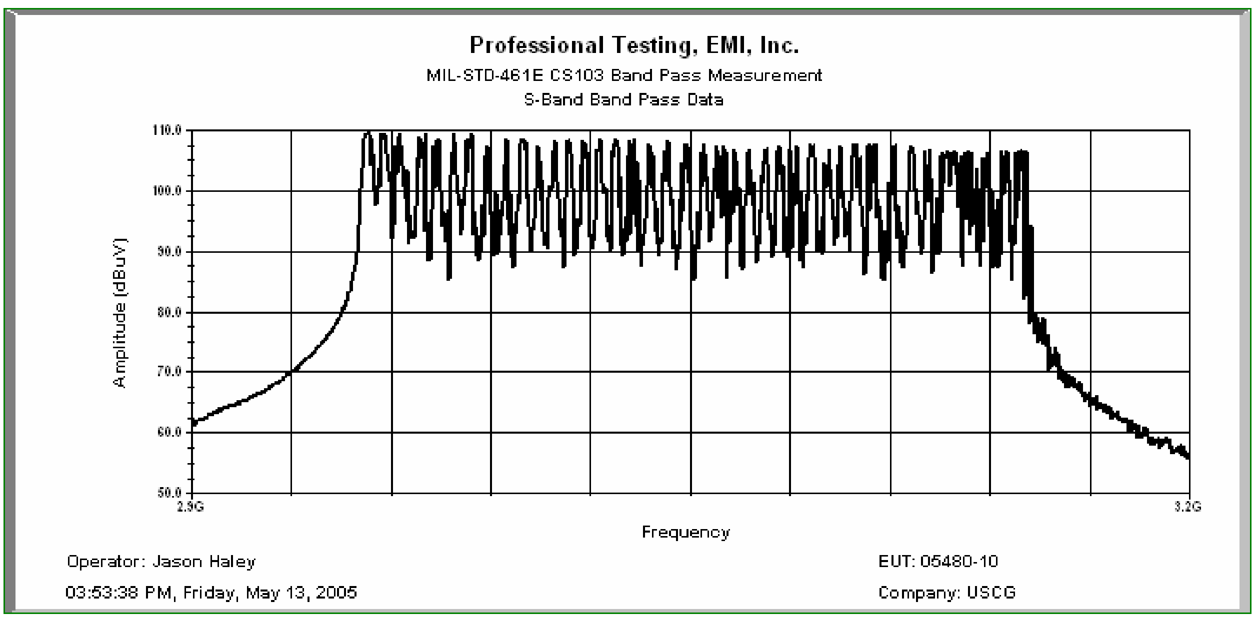


Figure 4.20.6 S-band Bandpass Measurement

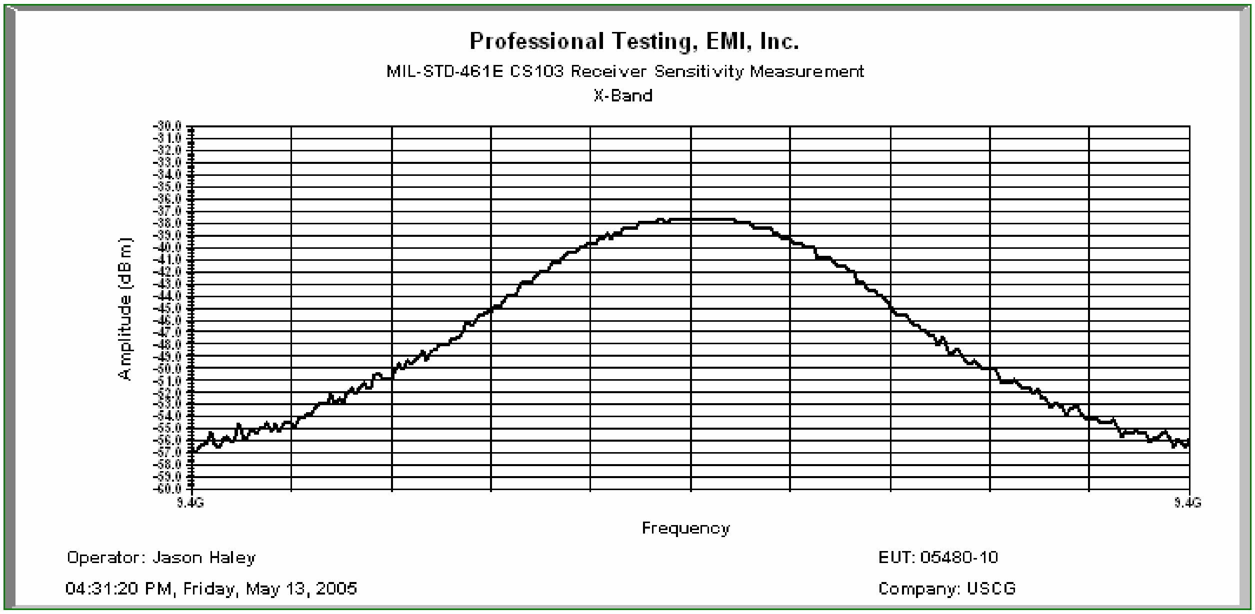


Figure 4.20.7 X-band Sensitivity Measurement

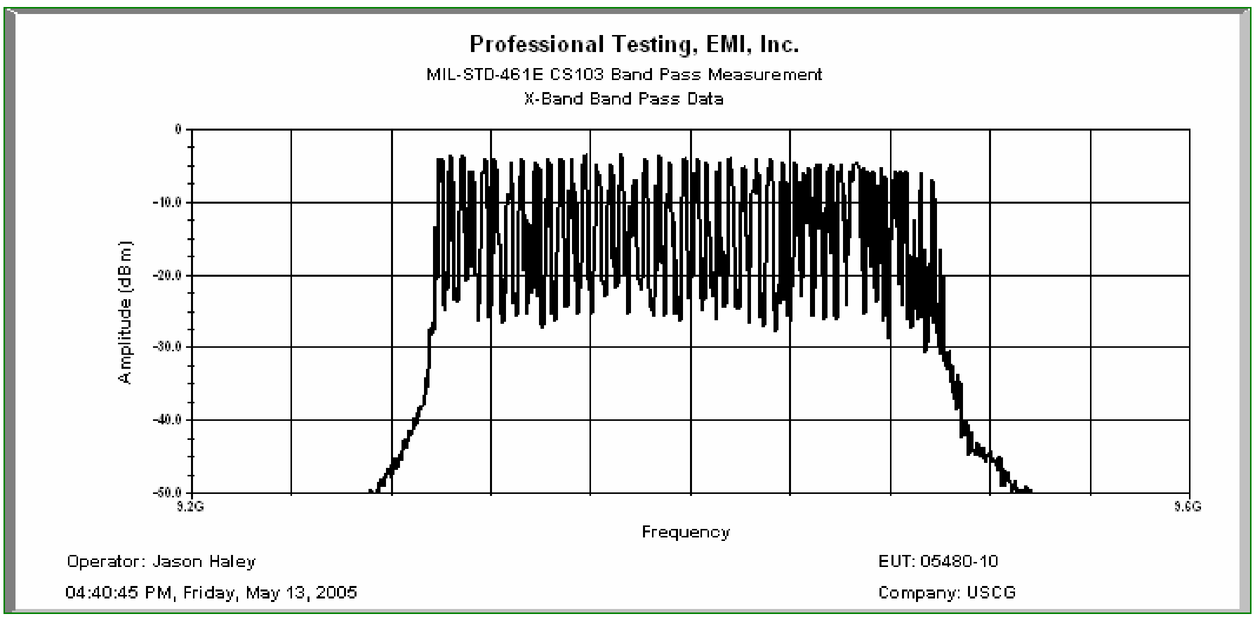


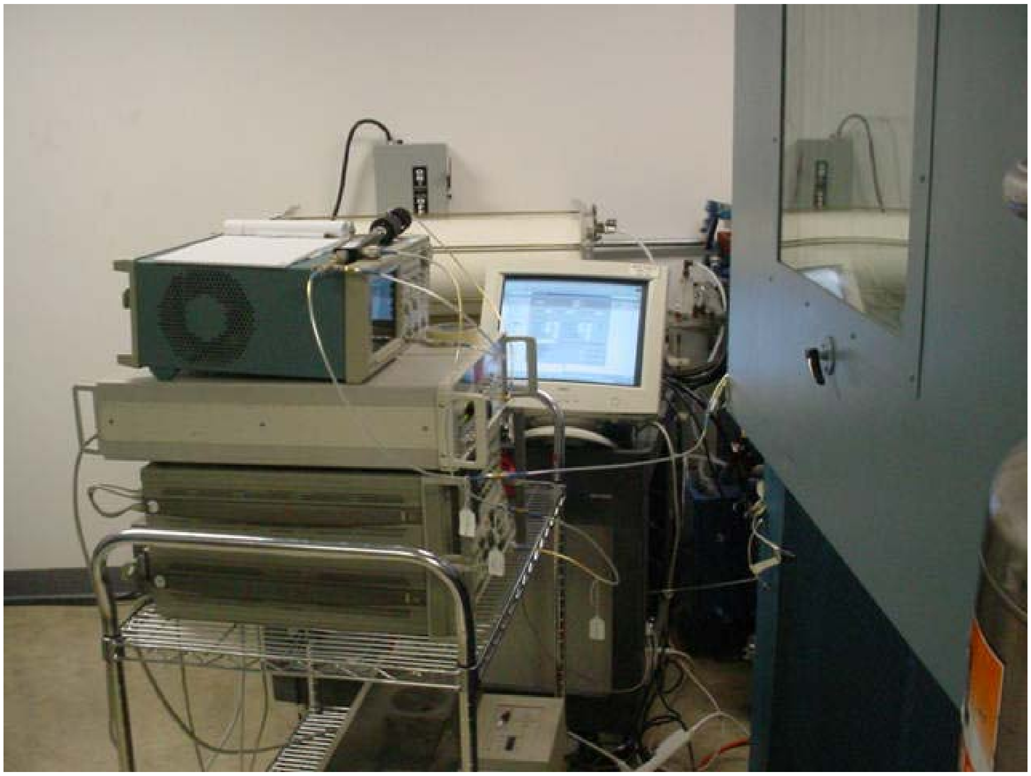
Figure 4.20.8 X-band Bandpass Measurement

4.21 Environmental Test

Table 4.21 Environmental Test Equipment List

Description	Serial Number / Asset Number	Calibration Due
Fluke Hydra Data Logger	0360	07/22/05
Tenney Environmental Chamber	0525	10/13/05

Photograph 4.21.1 Environmental Test Setup



Photograph 4.21.2 Environmental Test Setup

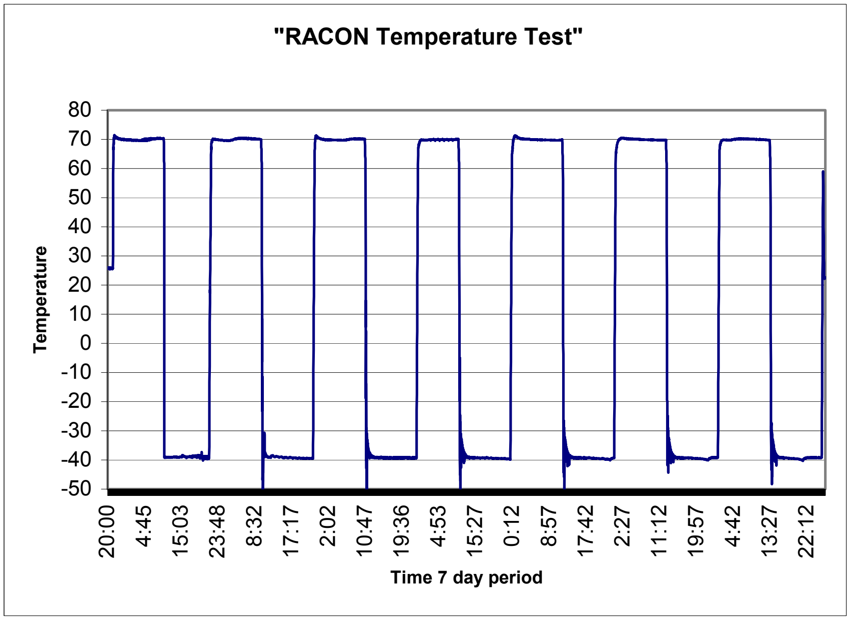
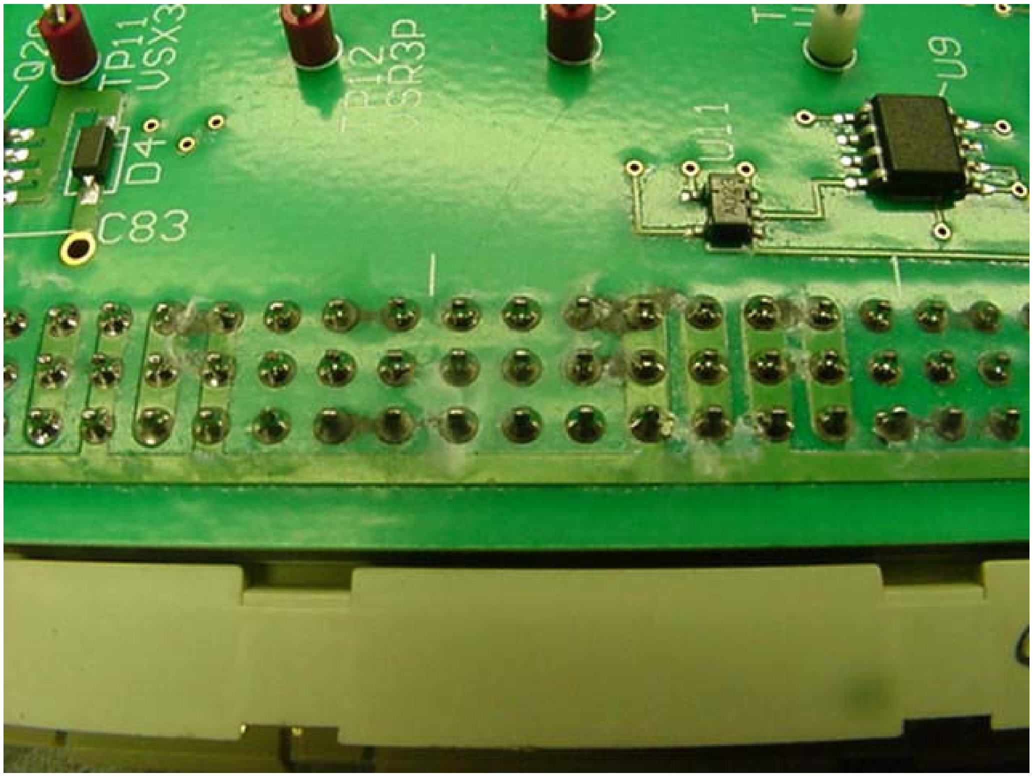


Figure 4.21.2 Environmental Test Temperature Profile

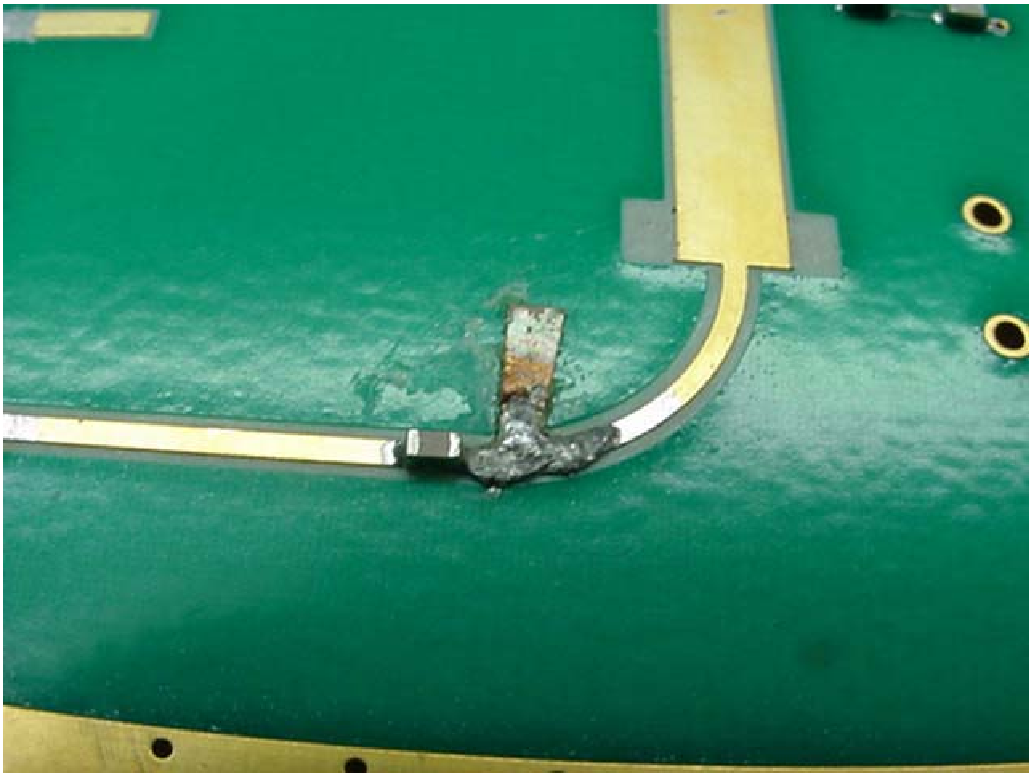
4.22 Physical Characteristics

Table 4.22 Equipment used in Visual Inspection

Description	Serial Number / Asset Number	Calibration Due
Microscope	000	CNR



Photograph 4.22.1 SRF White Residue



Photograph 4.22.2 SRF Cold Solder Joint

APPENDIX A: RACON TEST PLAN ATTACHMENT A-3

ATTACHMENT A-3

RACON TEST PLAN

Tested By D. FURR Date Passed Test ____________

RACON S/N 6293

Number of attempts to complete test: 1

Test Equipment (including calibrated interconnecting cable):

Item	S/N	Calibration Date
SEE TABLES IN REPORT		

1. INTRODUCTION

This test procedure is designed to produce confirmation that all RACONs meet the requirements of the United States Coast Guard. This test shall be performed on units selected by the U.S.C.G.

a. The equipment manufacturer may propose alternate test methods. The Coast Guard, however, reserves the right to reject any portion of the proposal prior testing.

b. The equipment manufacturer shall submit EMI/RFI test procedures specific to each RACON design with the first article unit.

c. The equipment manufacturer shall indicate the appropriate side lobe suppression test method in paragraph 2.7.

<u>The following equipment will be required for testing:</u>

a. 1035.5005.02, 2Ghz–20Ghz Rhode and Schwarz Signal Generator or equivalent
b. 1166.1660.26, 20Hz-26.5Ghz Rhode and Schwarz Spectrum Analyzer or equivalent

c. E4418B, Agilent Power Meter or equivalent
d. QHMT-2-10G, Merrimac Four-way Hybrid Splitter or equivalent
e. 2465A, Tektronix 350Mhz oscilloscope or equivalent
f. RS232C Data Terminal with keyboard
g. Variable Power Supply, 0-40 Volts DC, 0-5 Amps
h. Environmental Test Chamber: -40°C to +70°C

2. TESTING

a. The following tests shall be performed in the order indicated.
b. The RACON shall remain assembled at the highest level possible throughout each test.

2.1. SELF TEST

a. Connect power to the RACON using 12 volts DC. Allow the RACON to operate for 10 minute before testing.
b. Cause the system to do a self-test. The system should pass its own internal testing.

PASS [signature] **FAIL** ____ 4-18-05

2.2. POWER SUPPLY RANGE

a. Reverse Polarity and adjust voltage from 0 to -30 volts.
b. Reverse Polarity and adjust voltage from 0 to +30 volts.
c. Adjust voltage to +36 volts DC. Cause the system to do a self-test. The system should pass its own internal testing.
d. Adjust voltage to +10 volts DC. Cause the system to do a self-test. The system should pass its own internal testing.
e. Adjust voltage to +18 volts DC. Cause the system to do a self-test. The system should pass its own internal testing.

PASS [signature] **FAIL** ____ 4-18-05

2.3. TRANSMITTER POWER OUTPUT

a. Set the RACON response code to "T". Set the code length for 60 μs when interrogated by a 1.7 μs pulse.
b. Set the spectrum analyzer for 1 dBm per vertical division and the span for 250 MHz. Turn the "Max Hold" on. The spectrum analyzer must have been pre-calibrated by the technician for this test.
c. Slowly sweep the signal generator frequency across for S- band using a PRF of 3KHz.
d. Photograph the resultant power band pass and attach to the data sheets.
e. Write all pertinent information of the pictures on the data sheet.
f. Repeat steps (c), (d) and (e) for the X-band frequencies.
g. Measure and record the minimum power output from 2.9 to 3.1 GHz and again from 9.3 to 9.5 GHz.

METER 31.5 **dBm S >27.0 dBm Min.** **PASS** [signature] **FAIL** ____
METER 30.2 **dBm X >27.0 dBm Min.** **PASS** [signature] **FAIL** ____

2.4. POWER CONSUMPTION

a. Set the signal generator to S-band frequency to 1 KHz pulse repetition rate. Program the code length to 15 μs response length and the code to a "T".
b. The power supply should be set at 12 volts ± 0.25 volts.
c. Measure the supply current during the 3 states of the RACON.
d. Repeat steps transmit measurement for the X-band frequency.
e. Not to exceed 0.8 W in standby or quiescent and not to exceed 9.0 W when transmitting in dual band with 1% duty cycle pulses in the normal mode with enhanced SLS.

DISTRIBUTION BOX PULLS 44.6mA

Standby ≤ 41 ma METER 16.4 **ma** **PASS** [initials] **FAIL** ____

Listen ≤ 333 ma METER 140.4 **ma** **PASS** [initials] **FAIL** ____

1 KHz Transmit ≤ 500 ma S-Band METER 150.4 **ma**

1 KHz Transmit ≤ 500 ma X-Band METER 155.4 **ma**

PASS [initials] **FAIL** ____

2.5. BANDPASS TEST

a. Set the signal generator to the S-band frequency for -20 dBm. Set the pulsewidth to 1 μs ± 50 ns and the pulse repetition frequency (PRF) to 1 KHz ± 0.05 KHz.
b. Measure and record the RACON frequency response band on the spectrum analyzer.
c. Repeat steps (a) and (b) for the X-band frequency.

S-Band ± 5MHz 2905 MHz	**METER** 2903.98 **MHz**	**PASS** [initials]	**FAIL** ____
S-Band ± 5MHz 3095 MHz	**METER** 3093.98 **MHz**	**PASS** [initials]	**FAIL** ____
X-Band ± 5MHz 9305 MHz	**METER** 9306.7 **MHz**	**PASS** [initials]	**FAIL** ____
X-Band ± 5MHz 9495 MHz	**METER** 9492.7 **MHz**	**PASS** [initials]	**FAIL** ____

2.6. FREQUENCY TRACKING ACCURACY

a. Set the signal generator to the indicated frequency ± 0.1MHz, the PRF to 1 KHz ± 50 Hz, the amplitude to -20 dBm and the indicated pulsewidth at the antenna connector.
b. Measure and record response. The maximum tracking error is ± 10 MHz for PW < 200 ns and ± 2 MHz for > 200 ns.

2925MHz	**1.7 μs**	**METER** 2924.74 **MHz**	**PASS** [initials]	**FAIL** ____
2925MHz	**150 ns**	**METER** 2924.74 **MHz**	**PASS** [initials]	**FAIL** ____
3000MHz	**1.7 μs**	**METER** 3000.0 **MHz**	**PASS** [initials]	**FAIL** ____
3000MHz	**150 ns**	**METER** 3000.0 **MHz**	**PASS** [initials]	**FAIL** ____
3075MHz	**1.7 μs**	**METER** 3073.46 **MHz**	**PASS** [initials]	**FAIL** ____
3075MHz	**150 ns**	**METER** 3074.02 **MHz**	**PASS** [initials]	**FAIL** ____

9325MHz	1.7 µs	METER 9326.06 MHz	PASS [signature]	FAIL ____
9325MHz	150 ns	METER 9326.06 MHz	PASS [signature]	FAIL ____
9400MHz	1.7 µs	METER 9399.74 MHz	PASS [signature]	FAIL ____
9400MHz	150 ns	METER 9399.66 MHz	PASS [signature]	FAIL ____
9475MHz	1.7 µs	METER 9474.16 MHz	PASS [signature]	FAIL ____
9475MHz	150 ns	METER 9474.82 MHz	PASS [signature]	FAIL ____

2.7. SIDE LOBE SUPPRESSION

This test shall be performed in the order listed in paragraph 2.7.1 (a) through (i) below unless otherwise noted in paragraph 1.c. The alternate test, paragraph 2.7.2, allows the RF signal to be turned off prior to adjusting the pulse width and frequency in steps (d) and (e).

2.7.1 SIDE LOBE SUPPRESSION TEST

a. Set the signal generator to a 2925 MHz ± 1 MHz, the PRF to 1 KHz ± 50 Hz, the amplitude to - 5 dBm ± 3 dBm and the pulsewidth to 500 ns ± 100 ns at the antenna connector. Monitor the output with a spectrum analyzer.
b. Watch the spectrum analyzer. At the beginning of the active period reduce the amplitude of the signal generator by 20dBm
c. The transmitter response on the spectrum analyzer and the scope should cease.
d. Rock the pulsewidth back and forth. The transmitter should come back on when the pulsewidth is not the same as the original setting.
e. Rock the frequency back and forth. The transmitter should come back on when the frequency is not the same as the original setting.
f. When both the frequency and pulsewidth are the same as the original setting the transmitter should again turn off.
g. Increase the amplitude of the interrogating signal generator to its original setting. The transmitter should turn back on.
h. Repeat the above test on the X-band frequency of 9475 MHz.
i. Record the result below.

S-Band ± 1 MHz 2925MHz	PASS [signature]	FAIL ____
X-Band ± 1 MHz 9475MHz	PASS [signature]	FAIL ____

2.7.2 ALTERNATE SIDE LOBE SUPPRESSION TEST

a. Set the signal generator to a 2925 MHz ± 1 MHz, the PRF to 1 KHz ± 50 Hz, the amplitude to - 5 dBm ± 3 dBm and the pulse width to 500 ns ± 100 ns at the antenna connector. Monitor the output with a spectrum analyzer.
b. Watch the spectrum analyzer. At the beginning of the active period reduce the amplitude of the signal generator by 20dBm
c. The transmitter response on the spectrum analyzer and the scope should cease.

d. Switch the RF Signal OFF. Change the Pulse Width and turn RF Signal back ON. The transmitter should come back on when the pulse width is not the same as the original setting. The pulse width should now be returned to the original setting with RF ON.
e. Switch the RF Signal OFF. Change the Pulse Frequency and turn RF Signal back ON. The transmitter should come back on when the frequency is not the same as the original setting. The frequency should now be returned to the original setting with RF ON.
f. When both the frequency and pulse width are the same, as the original setting the transmitter should again turn off.
g. Increase the amplitude of the interrogating signal generator to its original setting. The transmitter should turn back on.
h. If it is necessary to repeat this test, wait 10 duty cycles for the RACON to clear its SLS memory or switch off the RF and move to a new frequency.
i. Repeat the above test on the X-band frequency of 9475 MHz.

S-Band ± 1 MHz 2925MHz **PASS ____ FAIL ____**

X-Band ± 1 MHz 9475MHz **PASS ____ FAIL ____**

2.8. RECEIVER THRESHOLD TEST

a. Set the signal generator to 3000 MHz ± 1 MHz, the PRF to 1 KHz ± 50 Hz, the amplitude to - 70 dBm ± 2 dBm and the pulse width to 50 ns at the antenna connector. Monitor the output with a spectrum analyzer.
b. Increase the amplitude of the signal generator pulse output until the RACON just starts to respond.
c. Record the minimum signal level needed to cause the RACON to continuously respond.
d. Set the signal generator to 3000 MHz ± 1 MHz, the PRF to 1 KHz ± 50 Hz, the amplitude to - 70 dBm ± 2 dBm and the pulsewidth to 300 ns ± 10 ns at the antenna connector. Monitor the output with a spectrum analyzer.
e. Record the minimum signal level needed to cause the RACON to continuously respond.
f. Set the signal generator to a frequency of 9400 MHz ± 1 MHz, the PRF to 1 KHz ± 50 Hz, the amplitude to - 70 dBm ± 2 dBm and the pulse width to 50 ns at the antenna connector. Monitor the output with a spectrum analyzer.
g. Increase the amplitude of the signal generator pulse output until the RACON just starts to respond.
h. Record the minimum signal level needed to cause the RACON to continuously respond.
i. Set the signal generator to a frequency of 9400 MHz ± 1 MHz, the PRF to 1 KHz ± 50 Hz, the amplitude to - 70 dBm ± 2 dBm and the pulsewidth to 300 ns ± 10 ns at the antenna connector. Monitor the output with a spectrum analyzer.
j. Record the minimum signal level needed to cause the RACON to continuously respond.

3000MHz ≤ -33 dBm at 300 ns **METER** ~~-36~~ -37 **dBm** **PASS ____ FAIL ____**

3000MHz ≤ -33 dBm at 50 ns **METER** ~~-36~~ -36 **dBm** **PASS ____ FAIL ____**

9400MHz ≤ -35 dBm at 50 ns **METER** ~~-36~~ -46 **dBm** **PASS ____ FAIL ____**

9400MHz ≤ -40 dBm at 300 ns **METER** ~~-35~~ -44 **dBm** **PASS ____ FAIL ____**

2.9. MORSE CODE RESPONSE

a. Set the signal generator to 3000 MHz ± 50 MHz, the PRF to 1 KHz, the amplitude to -20 dBm ± 2 dBm and the pulsewidth to 1.5 μs ± 50 ns at the antenna connector.
b. Monitor the output with a scope and a crystal detector.
c. Use the keypad to make the Morse code responses as per the following table:

B -... ✓ C -.-. ✓ D -.. ✓ G --. ✓ K -.- ✓ M -- ✓

N -. ✓ O --- ✓ Q --.- ✓ T - ✓ X -..- ✓ Y -.-- ✓

Z --.. ✓

PASS ✓ **FAIL** ___

2.10. RESPONSE CODE LENGTH

a. Set the RACON response code length to 5 μs using. Set the Morse code to a "Q".
b. Set the signal generator to 3000 MHz ± 50 MHz, the PRF to 1 KHz, the amplitude to -20 dBm ± 2 dBm and the pulsewidth to 1.7 μs ± 100 ns at the antenna connector. Monitor the output with a scope and a crystal detector. Repeat the same test at 9400 MHz.
c. Measure the response code length on the oscilloscope and record on the data sheet.
d. Repeat (a), (b) and (c) setting the response code length to 45 μs.

METER X ~~5.1867~~ 5.16 **μs 5 ± 0.5 μs**	**PASS** ✓	**FAIL** ___
METER S 5.146 **μs 5 ± 0.5 μs**	**PASS** ✓	**FAIL** ___
METER X 45.6 **μs 45 ± 1 μs**	**PASS** ✓	**FAIL** ___
METER S 45.2 **μs 45 ± 1 μs**	**PASS** ✓	**FAIL** ___

2.11. RESPONSE DELAY

a. Set the signal generator to S-band frequency and the pulsewidth to 1.0 μs. Set the RACON response code length to 45 μs. Set the Morse code to a "Q".
b. Measure the time between the falling edge of the interrogation pulse and the leading edge of the response code on the oscilloscope. Take your measurements at the 50% fall of the interrogation pulse to the 50% rise of the code response.
c. Repeat the (a) and (b) using X-band frequency.

Measured at 50% to 50%. <667 ns **PASS** ✓ **FAIL** ___

2.12. RISE TIME

a. Set the signal generator S-band frequency pulsewidth to 100 ns. Set the RACON response code length to 45 μs. Set the Morse code to a "Q".
b. Measure the rise time and the fall time of the detector transmitter output and record on the data sheet. Measurements should be from the 10% to 90% of the rise/fall amplitude.
c. Repeat the (a) and (b) using X-band frequency.

RETEST FOR DATA FOR PLOT CAPTURE 6-7-05

S BAND RISE ~~23.7~~ 51.2 < 100 ns FALL ~~42.7~~ 54.0 < 100 ns PASS ✓ FAIL ____

X BAND RISE ~~44.1~~ 48.0 < 100 ns FALL ~~41.6~~ 48.8 < 100 ns PASS ✓ FAIL ____

2.13. MODE OF OPERATION

Check the ON and OFF time program. Accuracy ± 1 second.

Time On: 10 secs	Time Off: 10	PASS ✓ FAIL ____
Time On: 60 secs	Time Off: 30	PASS ✓ FAIL ____
Time On: 10 secs	Time Off: 30	PASS ✓ FAIL ____
Time On: 30 secs	Time Off: 0	PASS ✓ FAIL ____

2.14. Min and Max RESPONSE RATE

a. Set the signal generator to S-band and the pulsewidth to 1.7 μs. Set the RACON response code length to 45 μs. Set PRT/PRF to 0.1 ms or 10 KHz.
b. Repeat (a) and (b) using X-band frequency.

The RACON should reliably respond. PASS ✓ FAIL ____

c. Set PRT/PRF to 4 ms or 250 Hz.
d. Repeat (c) using X-band frequency.

The RACON should reliably respond. PASS ✓ FAIL ____

2.15. INSTANTANEOUS EMISSION BANDWIDTH

a. Set the signal generator to 3025 MHz ± 5 MHz, the PRF to 1 KHz ± 50 Hz, the amplitude to - 20 dBm and the pulsewidth to 1.7 μs at the antenna connector. Set the Morse code response to "T" (tango) and the length to 45 μs.
b. Measure the instantaneous bandwidth. Repeat the same test at 9425 MHz.

S @ -5 dBc	**≤ 2 MHz**	PASS ✓ FAIL ____
S @ -20 dBc	**≤ 4 MHz**	PASS ✓ FAIL ____
X @ -5 dBc	**≤ 2 MHz**	PASS ✓ FAIL ____
X @ -20 dBc	**≤ 4 MHz**	PASS ✓ FAIL ____

The period of cycling shall be 24 hours, with 12 hours at high temperature and 12 hours at low temperature. These times include the time required to accomplish the temperature changes. Checkout of RACON operation shall be performed at least once each hot cycle and once each cold cycle. The RACON operation during this test pertains to TRANSMITTER POWER OUT, MORSE CODE RESPONSE and FREQUENCY TRACKING ACCURACY.

PASS ____ **FAIL** ____

2.22. PHYSICAL CHARACTERISTICS

a. Workmanship in accordance with MIL-HDBK-454A, Guideline 9 and 69.

PASS ____ **FAIL** ____

b. Soldering conforms to MIL-HDBK-454A, Guideline 5 and IPC J-STD-001C.

PASS ____ **FAIL** ____

c. Terminations conform to MIL-HDBK-454A, Guideline 19 and IPC-J-STD-002B.

PASS ____ **FAIL** ____

d. Weight not to exceed 66Lbs (30Kg.) **PASS** ____ **FAIL** ____

e. Handle equipped. **YES** ____ **NO** ____

f. Cylindrical diameter not to exceed 23.6 inches (600mm). **PASS** ____ **FAIL** ____

g. Height not to exceed 35.5 inches (900mm) **PASS** ____ **FAIL** ____

h. RACON shall mate with the standard USCG RACON platform Refer to Attachment A-4 for reference.

YES ____ **NO** ____

2.23. POST TESTING

a. Reassemble in accordance with manufactures provided specification.
b. Connect power to the RACON using 12 volts DC. Allow the RACON to operate for 10 minute before testing.
c. Cause the system to do a self-test. The system should pass its own internal testing.

YES ____ **NO** ____