



Nemko Test Report: 55429RUS1

Applicant: The Charles Machine Works, Inc
1959 W. Fir Ave
Perry, OK 73077
USA

Equipment Under Test: 2450GR
(E.U.T.)

In Accordance With: **FCC Part 15, Subpart F, Paragraph 15.509**
and Industry Canada, RSS-220, Issue 1
Ultra Wide Band Operation
Ground Penetrating Radar

Tested By: Nemko USA Inc.
802 N. Kealy
Lewisville, TX 75057

TESTED BY:



David Light, Senior Wireless Engineer

DATE: 17 November 2010

APPROVED BY:



Tom Tidwell, Director Nemko Direct for Telecom

DATE: 29 November 2010

Total Number of Pages: 23

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Section 1. Summary Of Test Results

Manufacturer: The Charles Machine Works, Inc.

Model No.: 2450GR

Serial No.: None

General: **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 15, Subpart C, Paragraph 15.509 and Industry Canada, RSS-220, Issue 1 for ultra wide band operation. All tests were conducted using measurement procedure ANSI C63.4-2003. Radiated Emissions were made on an open area test site with a 4' x 4' x 4' (*length x width x depth*) dry sand pit.



New Submission



Production Unit



Class II Permissive Change



Pre-Production Unit

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE. NONE
See " Summary of Test Data".



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Summary Of Test Data

NAME OF TEST	PARA. NO.	RESULT
Conducted Emissions	15.207/RSS-Gen	NA ¹
Definition of UWB	15.203(d)/2.0	Complies
Radiated Emissions	15.509(d)/3.4	Complies
Radiated Emissions	15.509(e)/6.2.1(d) & (e)	Complies
Peak Emission at f_M	15.509(f)/6.2.1(g)	NA ²

Footnotes For N/A's:

- 1) The device is battery powered.
- 2) The f_M is located below 960 MHz.

Section 2. General Equipment Specification

Frequency f_M :	192.9 MHz	
Operating Frequency(ies) of Sample:	31.9 MHz to 345.5 MHz (10 dB BW)	
Tunable Bands:	Single	
10 dB Occupied Bandwidth:	313.6 MHz	
Fractional Bandwidth:	1.66	
User Frequency Adjustment:	None	
Integral Antenna	Yes ☒	No ☐

Description of Device Tested

Ground Penetrating Radar Bipolar Antenna System

System Diagram

Refer to separate exhibit.

Section 3. Radiated Emissions

NAME OF TEST: Radiated Emissions	PARA. NO.: 15.509(d)&(e)
TESTED BY: David Light	RSS-220 3.4 & 6.2.1(d) & (e)
	DATE: 09 November 2010

Minimum Standard:**Limits below 960 MHz**

Frequency (MHz)	Field Strength Limits (microvolts/m)	Measuring RBW	Distance (Meters)
0.009-0.490	2400/F(kHz)	1 kHz	300
0.490-1.705	24000/F(kHz)	10 kHz	30
1.705-30.0	30	10 kHz	30
30-88	100	100 kHz	3
88-216	150	100 kHz	3
216-960	200	100 kHz	3

Limits above 960 MHz

Frequency (MHz)	E.I.R.P. Limit (dBm)	Field Strength Limit dBμV/m	Measuring RBW	Distance (Meters)
960-1610	-65.3	29.9	1 MHz	3
1610-1990	-53.3	41.9	1 MHz	3
1990-3100	-51.3	43.9	1 MHz	3
3100-10600	-41.3	53.9	1 MHz	3
Above 10600	-51.3	43.9	1 MHz	3
1164-1240	-75.3	19.9	1 kHz	3
1559-1610	-75.3	19.9	1 kHz	3

E.I.R.P limits converted to field strength during measurements per 15.521(g)

Maximizing Emission Levels:

The spectrum was scanned from 30 MHz to 5000 MHz. All emissions detected above 960 MHz were determined to be digital emissions and were below the noise floor which was 20 dB below the limits specified in 15.209.

For measurements below 960 MHz the emissions were made using a PEAK detector
RBW=VBW=100 kHz

For Frequency above 960 MHz and outside the below frequency bands, the emissions were measured using RMS detector, RBW=1MHz, VBW=3MHz

For frequencies fall inside 1164-1240 and 1559-1610 MHz, the emissions were measured using EMI RMS Detector, RBW = 1 KHz, VBW = 1 MHz

Measurements were made using a fresh fully charged battery.

Note: The above tests were performed with the EUT in contact with the ground as its intended use. The EUT was tested in 8 positions (every 45°)

Test Results: Complies. The worse case emission was 43.4 dB μ V/m at 186.8 MHz in the vertical polarity. This is 0.1 dB below the specification limit.

Measurement Data: See attached table(s).

Test Equipment: 1036-1629-1628-791-1016-993-1016

Measurement Uncertainty: +/-3.6 dB

Temperature: 23 °C

Relative Humidity: 47 %

Test Data – Radiated Emissions

Meas. Freq. (MHz)	Ant. Pol. (H/V)	Det. Atten. (dB)	Meter Reading (dBuV)	Antenna Factor (dB)	Path Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec. limit (dBuV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
											Right Side
40	H	10	26	13	2.2	26.1	25.1	40.0	-14.9	Pass	
56	H	10	30	5.3	2.6	26.1	21.8	40.0	-18.2	Pass	
80	H	10	36.3	7	3.2	26.0	30.5	40.0	-9.5	Pass	
83	H	10	39.3	7	3.2	26.0	33.5	40.0	-6.5	Pass	
86	H	10	34.7	7.8	3.2	26.0	29.7	40.0	-10.3	Pass	
117.8	H	10	32.6	10.7	3.7	25.9	31.1	43.5	-12.4	Pass	
124.6	H	10	34	10.9	3.7	25.9	32.7	43.5	-10.8	Pass	
152.4	H	10	35.3	10.6	4.6	25.9	34.6	43.5	-8.9	Pass	
175.6	H	10	36.7	8.4	5.1	25.7	34.5	43.5	-9.0	Pass	
204.6	H	10	32.4	8.4	5.4	25.6	30.6	43.5	-12.9	Pass	
280	H	10	34.3	12.6	6.4	25.5	37.8	46.0	-8.2	Pass	
332	H	10	34.8	13.9	6.9	25.6	40.0	46.0	-6.0	Pass	
45	V	10	32.4	10.7	2.2	26.1	29.2	40.0	-10.8	Pass	
51	V	10	37	7.6	2.6	26.1	31.1	40.0	-8.9	Pass	
58.8	V	10	43	4.9	2.6	26.1	34.4	40.0	-5.6	Pass	
76.6	V	10	41.7	6.3	3.1	26.0	35.1	40.0	-4.9	Pass	
83.2	V	10	44.4	7	3.2	26.0	38.6	40.0	-1.4	Pass	
86	V	10	41.3	7.8	3.2	26.0	36.3	40.0	-3.7	Pass	
116	V	10	38.5	10.7	3.7	25.9	37.0	43.5	-6.5	Pass	
121.2	V	10	38.3	10.9	3.7	25.9	37.0	43.5	-6.5	Pass	
149.6	V	10	39.8	10.9	4.2	25.7	39.2	43.5	-4.3	Pass	
160	V	10	39.4	9.9	4.6	25.9	38.0	43.5	-5.5	Pass	
172.2	V	10	41.8	9.1	4.6	25.9	39.6	43.5	-3.9	Pass	
177.4	V	10	42.7	8.4	5.1	25.7	40.5	43.5	-3.0	Pass	
194.6	V	10	40.2	8.2	5.1	25.7	37.8	43.5	-5.7	Pass	
215.9	V	10	36	8.1	5.4	25.6	33.9	43.5	-9.6	Pass	
504	V	10	27.5	17.7	9.0	25.4	38.8	46.0	-7.2	Pass	

Test Data – Radiated Emissions

Meas. Freq. (MHz)	Ant. Pol. (H/V)	Det. Atten. (dB)	Meter Reading (dBuV)	Antenna Factor (dB)	Path Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec. limit (dBuV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
70.0	V	10.0	42.6	5.4	3.1	26.0	35.1	40.0	-4.9	Pass	Left side
75.0	V	10.0	45.3	6.3	3.1	26.0	38.7	40.0	-1.3	Pass	
80.0	V	10.0	44.4	7.0	3.2	26.0	38.6	40.0	-1.4	Pass	
83.2	V	10.0	42.2	7.0	3.2	26.0	36.4	40.0	-3.6	Pass	
86.8	V	10.0	41.4	7.8	3.2	26.0	36.4	40.0	-3.6	Pass	
109.0	V	10.0	36.9	10.1	3.7	25.9	34.8	43.5	-8.7	Pass	
136.0	V	10.0	37.3	11.2	4.2	25.7	37.0	43.5	-6.5	Pass	
190.0	V	10.0	37.8	8.2	5.1	25.7	35.4	43.5	-8.1	Pass	
192.0	V	10.0	36.8	8.2	5.1	25.7	34.4	43.5	-9.1	Pass	
216.0	V	10.0	33.0	8.1	5.4	25.6	30.9	43.5	-12.6	Pass	
290.0	V	10.0	26.6	12.8	6.4	25.5	30.3	46.0	-15.7	Pass	
312.0	V	10.0	33.7	13.3	6.9	25.6	38.3	46.0	-7.7	Pass	
360.0	V	10.0	30.7	14.7	7.4	25.5	37.3	46.0	-8.7	Pass	
443.0	V	10.0	28.0	16.8	8.0	25.4	37.4	46.0	-8.6	Pass	
52.0	H	10.0	29.7	6.7	2.6	26.1	22.9	40.0	-17.1	Pass	
55.0	H	10.0	33.1	5.9	2.6	26.1	25.5	40.0	-14.5	Pass	
83.2	H	10.0	36.0	7.0	3.2	26.0	30.2	40.0	-9.8	Pass	
87.7	H	10.0	33.0	7.8	3.2	26.0	28.0	40.0	-12.0	Pass	
117.6	H	10.0	33.2	10.7	3.7	25.9	31.7	43.5	-11.8	Pass	
178.8	H	10.0	40.5	8.4	5.1	25.7	38.3	43.5	-5.2	Pass	
192.9	H	10.0	38.4	8.2	5.1	25.7	36.0	43.5	-7.5	Pass	
228.0	H	10.0	38.3	9.2	5.7	25.5	37.7	46.0	-8.3	Pass	
317.0	H	10.0	34.0	13.3	6.9	25.6	38.6	46.0	-7.4	Pass	

Test Data – Radiated Emissions

Meas. Freq. (MHz)	Ant. Pol. (H/V)	Det. Atten. (dB)	Meter Reading (dBuV)	Antenna Factor (dB)	Path Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec. limit (dBuV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
											Rear
51.4	V	10.0	34.6	7.6	2.6	26.1	28.7	40.0	-11.3	Pass	
53.8	V	10.0	39.0	6.7	2.6	26.1	32.2	40.0	-7.8	Pass	
57.4	V	10.0	42.9	5.3	2.6	26.1	34.7	40.0	-5.3	Pass	
63.0	V	10.0	39.6	4.7	2.8	26.0	31.1	40.0	-8.9	Pass	
67.2	V	10.0	38.2	4.9	2.8	26.0	29.9	40.0	-10.1	Pass	
70.8	V	10.0	38.4	5.4	3.1	26.0	30.9	40.0	-9.1	Pass	
75.0	V	10.0	39.8	6.3	3.1	26.0	33.2	40.0	-6.8	Pass	
80.0	V	10.0	42.0	7.0	3.2	26.0	36.2	40.0	-3.8	Pass	
83.2	V	10.0	42.8	7.0	3.2	26.0	37.0	40.0	-3.0	Pass	
87.8	V	10.0	41.5	7.8	3.2	26.0	36.5	40.0	-3.5	Pass	
108.4	V	10.0	37.3	10.1	3.7	25.9	35.2	43.5	-8.3	Pass	
114.6	V	10.0	37.6	10.5	3.7	25.9	35.9	43.5	-7.6	Pass	
153.0	V	10.0	41.6	10.6	4.6	25.9	40.9	43.5	-2.6	Pass	
170.0	V	10.0	43.0	9.1	4.6	25.9	40.8	43.5	-2.7	Pass	
176.6	V	10.0	45.3	8.4	5.1	25.7	43.1	43.5	-0.4	Pass	
188.6	V	10.0	45.7	8.1	5.1	25.7	43.2	43.5	-0.3	Pass	
205.0	V	10.0	35.0	8.4	5.4	25.6	33.2	43.5	-10.3	Pass	
305.0	V	10.0	34.9	13.1	6.9	25.6	39.3	46.0	-6.7	Pass	
87.8	H	10.0	24.6	7.8	3.2	26.0	19.6	40.0	-20.4	Pass	
166.8	H	10.0	26.2	9.4	4.6	25.9	24.3	43.5	-19.2	Pass	
192.0	H	10.0	30.7	8.2	5.1	25.7	28.3	43.5	-15.2	Pass	
204.0	H	10.0	30.7	8.4	5.4	25.6	28.9	43.5	-14.6	Pass	
300	H	10.0	28.7	13.1	6.9	25.5	33.2	46.0	-12.8	Pass	

Test Data – Radiated Emissions

Meas. Freq. (MHz)	Ant. Pol. (H/V)	Det. Atten. (dB)	Meter Reading (dBuV)	Antenna Factor (dB)	Path Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec. limit (dBuV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
											Front
55.8	V	10.0	42.6	5.9	2.6	26.1	35.0	40.0	-5.0	Pass	
60.0	V	10.0	42.8	4.7	2.8	26.0	34.3	40.0	-5.7	Pass	
70.0	V	10.0	40.7	5.4	3.1	26.0	33.2	40.0	-6.8	Pass	
85.0	V	10.0	43.9	7.8	3.2	26.0	38.9	40.0	-1.1	Pass	
87.6	V	10.0	40.3	7.8	3.2	26.0	35.3	40.0	-4.7	Pass	
108.6	V	10.0	34.2	10.1	3.7	25.9	32.1	43.5	-11.4	Pass	
113.6	V	10.0	37.0	10.5	3.7	25.9	35.3	43.5	-8.2	Pass	
135.2	V	10.0	35.4	11.2	4.2	25.7	35.1	43.5	-8.4	Pass	
155.4	V	10.0	34.6	10.1	4.6	25.9	33.4	43.5	-10.1	Pass	
178.8	V	10.0	35.5	8.4	5.1	25.7	33.3	43.5	-10.2	Pass	
179.8	V	10.0	33.9	8.4	5.1	25.7	31.7	43.5	-11.8	Pass	
186.3	V	10.0	42.4	8.1	5.1	25.7	39.9	43.5	-3.6	Pass	
189.0	V	10.0	40.1	8.1	5.1	25.7	37.6	43.5	-5.9	Pass	
195.0	V	10.0	38.8	8.3	5.1	25.7	36.5	43.5	-7.0	Pass	
201.0	V	10.0	42.6	8.4	5.4	25.6	40.8	43.5	-2.7	Pass	
200.0	V	10.0	41.5	8.4	5.4	25.6	39.7	43.5	-3.8	Pass	
231.0	V	10.0	36.3	9.6	5.7	25.5	36.1	46.0	-9.9	Pass	
83.2	H	10.0	30.9	7.0	3.2	26.0	25.1	40.0	-14.9	Pass	
86.8	H	10.0	22.2	7.8	3.2	26.0	17.2	40.0	-22.8	Pass	
120.0	H	10.0	27.6	10.9	3.7	25.9	26.3	43.5	-17.2	Pass	
133.0	H	10.0	28.6	11.2	4.2	25.7	28.3	43.5	-15.2	Pass	
145.2	H	10.0	29.0	10.9	4.2	25.7	28.4	43.5	-15.1	Pass	
172.4	H	10.0	31.7	9.1	4.6	25.9	29.5	43.5	-14.0	Pass	
178.4	H	10.0	34.3	8.4	5.1	25.7	32.1	43.5	-11.4	Pass	
196.2	H	10.0	35.6	8.3	5.1	25.7	33.3	43.5	-10.2	Pass	
240.0	H	10.0	33.0	11.0	5.7	25.5	34.2	46.0	-11.8	Pass	
311.0	H	10.0	36.2	13.3	6.9	25.6	40.8	46.0	-5.2	Pass	
340.0	H	10.0	34.8	14.1	6.9	25.6	40.2	46.0	-5.8	Pass	
	H	10.0									
	H	10.0									

Test Data – Radiated Emissions

Meas. Freq. (MHz)	Ant. Pol. (H/V)	Atten. (dB)	Meter Reading (dBuV)	Antenna Factor (dB)	Path Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec. limit (dBuV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
											Right rear corner
50	V	10	43.5	7.6	2.6	26.1	37.6	40.0	-2.4	Pass	
58.6	V	10	40.5	4.9	2.6	26.1	31.9	40.0	-8.1	Pass	
72.2	V	10	42.8	5.4	3.1	26.0	35.3	40.0	-4.7	Pass	
83.2	V	10	42.7	7	3.2	26.0	36.9	40.0	-3.1	Pass	
115.6	V	10	38.3	10.7	3.7	25.9	36.8	43.5	-6.7	Pass	
127.2	V	10	39.2	11.2	4.2	25.7	38.9	43.5	-4.6	Pass	
151.6	V	10	40.4	10.6	4.6	25.9	39.7	43.5	-3.8	Pass	
178.4	V	10	43.2	8.4	5.1	25.7	41.0	43.5	-2.5	Pass	
186.8	V	10	44.1	8.1	5.1	25.7	41.6	43.5	-1.9	Pass	
201.8	V	10	44.4	8.4	5.4	25.6	42.6	43.5	-0.9	Pass	
234	V	10	38.3	9.6	5.7	25.5	38.1	46.0	-7.9	Pass	
303	V	10	33.2	13.1	6.9	25.6	37.6	46.0	-8.4	Pass	
552	V	10	30.5	20	9.7	25.3	44.9	46.0	-1.1	Pass	
61.4	H	10	28.6	4.7	2.8	26.0	20.1	40.0	-19.9	Pass	
85.6	H	10	30	7.8	3.2	26.0	25.0	40.0	-15.0	Pass	
117.6	H	10	29.3	10.7	3.7	25.9	27.8	43.5	-15.7	Pass	
179.6	H	10	33.9	8.4	5.1	25.7	31.7	43.5	-11.8	Pass	
307.2	H	10	30.9	13.1	6.9	25.6	35.3	46.0	-10.7	Pass	
469	H	10	25	17.1	8.6	25.5	35.2	46.0	-10.8	Pass	
670	H	10	22	20.4	10.6	25.1	37.9	46.0	-8.1	Pass	

Test Data – Radiated Emissions

Meas. Freq. (MHz)	Ant. Pol. (H/V)	Det. Atten. (dB)	Meter Reading (dBuV)	Antenna Factor (dB)	Path Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec. limit (dBuV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
											Left rear corner
54.6	V	10.0	45.7	5.9	2.6	26.1	38.1	40.0	-1.9	Pass	
64.2	V	10.0	42.3	4.7	2.8	26.0	33.8	40.0	-6.2	Pass	
80.0	V	10.0	42.5	7.0	3.2	26.0	36.7	40.0	-3.3	Pass	
85.0	V	10.0	39.0	7.8	3.2	26.0	34.0	40.0	-6.0	Pass	
88.4	V	10.0	38.2	7.8	3.2	26.0	33.2	43.5	-10.3	Pass	
151.6	V	10.0	42.2	10.6	4.6	25.9	41.5	43.5	-2.0	Pass	
160.0	V	10.0	40.1	9.9	4.6	25.9	38.7	43.5	-4.8	Pass	
170.0	V	10.0	41.1	9.1	4.6	25.9	38.9	43.5	-4.6	Pass	
176.2	V	10.0	42.3	8.4	5.1	25.7	40.1	43.5	-3.4	Pass	
179.8	V	10.0	39.7	8.4	5.1	25.7	37.5	43.5	-6.0	Pass	
186.8	V	10.0	45.9	8.1	5.1	25.7	43.4	43.5	-0.1	Pass	
199.0	V	10.0	40.9	8.3	5.1	25.7	38.6	43.5	-4.9	Pass	
202.4	V	10.0	38.3	8.4	5.4	25.6	36.5	43.5	-7.0	Pass	
277.2	V	10.0	30.4	12.5	6.4	25.5	33.8	46.0	-12.2	Pass	
306.0	V	10.0	35.1	13.1	6.9	25.6	39.5	46.0	-6.5	Pass	
403.0	V	10.0	26.1	15.7	8.0	25.4	34.4	46.0	-11.6	Pass	
55.0	H	10.0	31.1	5.9	2.6	26.1	23.5	40.0	-16.5	Pass	
83.2	H	10.0	32.5	7.0	3.2	26.0	26.7	40.0	-13.3	Pass	
178.0	H	10.0	34.2	8.4	5.1	25.7	32.0	43.5	-11.5	Pass	
197.6	H	10.0	33.1	8.3	5.1	25.7	30.8	43.5	-12.7	Pass	
253.6	H	10.0	32.1	12.0	6.2	25.4	34.9	46.0	-11.1	Pass	
618.0	H	10.0	25.9	19.8	10.1	25.4	40.4	46.0	-5.6	Pass	

Test Data – Radiated Emissions

Meas. Freq. (MHz)	Ant. Pol. (H/V)	Det. Atten. (dB)	Meter Reading (dBuV)	Antenna Factor (dB)	Path Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec. limit (dBuV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
											Left front corner
54.4	V	10.0	46.2	5.9	2.6	26.1	38.6	40.0	-1.4	Pass	
69.0	V	10.0	41.8	4.9	2.8	26.0	33.5	40.0	-6.5	Pass	
74.6	V	10.0	42.8	5.4	3.1	26.0	35.3	40.0	-4.7	Pass	
83.2	V	10.0	42.7	7.0	3.2	26.0	36.9	40.0	-3.1	Pass	
108.8	V	10.0	34.7	10.1	3.7	25.9	32.6	43.5	-10.9	Pass	
131.2	V	10.0	35.2	11.2	4.2	25.7	34.9	43.5	-8.6	Pass	
160.4	V	10.0	38.3	9.9	4.6	25.9	36.9	43.5	-6.6	Pass	
180.0	V	10.0	38.4	8.2	5.1	25.7	36.0	43.5	-7.5	Pass	
186.8	V	10.0	42.6	8.1	5.1	25.7	40.1	43.5	-3.4	Pass	
214.6	V	10.0	34.7	8.2	5.4	25.6	32.7	43.5	-10.8	Pass	
469.4	V	10.0	28.6	17.1	8.6	25.5	38.8	46.0	-7.2	Pass	
55.8	H	10.0	34.3	5.9	2.6	26.1	26.7	40.0	-13.3	Pass	
78.0	H	10.0	29.7	6.3	3.1	26.0	23.1	40.0	-16.9	Pass	
83.2	H	10.0	31.8	7.0	3.2	26.0	26.0	40.0	-14.0	Pass	
151.8	H	10.0	32.8	10.6	4.6	25.9	32.1	43.5	-11.4	Pass	
178.0	H	10.0	37.2	8.4	5.1	25.7	35.0	43.5	-8.5	Pass	
194.4	H	10.0	36.7	8.2	5.1	25.7	34.3	43.5	-9.2	Pass	
309.6	H	10.0	35.8	13.1	6.9	25.6	40.2	46.0	-5.8	Pass	
591.0	H	10.0	25.5	19.3	9.7	25.3	39.2	46.0	-6.8	Pass	

Test Data – Radiated Emissions

Meas. Freq. (MHz)	Ant. Pol. (H/V)	Det. Atten. (dB)	Meter Reading (dBuV)	Antenna Factor (dB)	Path Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec. limit (dBuV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
											Right front corner
54.8	V	10.0	43.7	5.9	2.6	26.1	36.1	40.0	-3.9	Pass	
58.8	V	10.0	41.9	4.9	2.6	26.1	33.3	40.0	-6.7	Pass	
72.2	V	10.0	43.8	5.4	3.1	26.0	36.3	40.0	-3.7	Pass	
83.2	V	10.0	43.7	7.0	3.2	26.0	37.9	40.0	-2.1	Pass	
113.4	V	10.0	36.1	10.5	3.7	25.9	34.4	43.5	-9.1	Pass	
133.6	V	10.0	38.6	11.2	4.2	25.7	38.3	43.5	-5.2	Pass	
177.2	V	10.0	37.8	8.4	5.1	25.7	35.6	43.5	-7.9	Pass	
180.0	V	10.0	38.6	8.2	5.1	25.7	36.2	43.5	-7.3	Pass	
186.8	V	10.0	42.5	8.1	5.1	25.7	40.0	43.5	-3.5	Pass	
203.6	V	10.0	35.9	8.4	5.4	25.6	34.1	43.5	-9.4	Pass	
231.0	V	10.0	33.9	9.6	5.7	25.5	33.7	46.0	-12.3	Pass	
302.4	V	10.0	31.2	13.1	6.9	25.6	35.6	46.0	-10.4	Pass	
552.0	V	10.0	27.5	20.0	9.7	25.3	41.9	46.0	-4.1	Pass	
63.2	H	10.0	30.9	4.7	2.8	26.0	22.4	40.0	-17.6	Pass	
83.2	H	10.0	31.4	7.0	3.2	26.0	25.6	40.0	-14.4	Pass	
120.0	H	10.0	30.5	10.9	3.7	25.9	29.2	43.5	-14.3	Pass	
142.0	H	10.0	31.4	11.1	4.2	25.7	31.0	43.5	-12.5	Pass	
152.4	H	10.0	34.3	10.6	4.6	25.9	33.6	43.5	-9.9	Pass	
180.0	H	10.0	35.9	8.2	5.1	25.7	33.5	43.5	-10.0	Pass	
212.6	H	10.0	32.5	8.2	5.4	25.6	30.5	43.5	-13.0	Pass	
340.0	H	10.0	31.0	14.1	6.9	25.6	36.4	46.0	-9.6	Pass	

Section 4. Ultra-wideband Requirements

NAME OF TEST: Ultra-wideband Requirements	PARA. NO.: 15.503(d)
	RSS-220 Paragraph 2
TESTED BY: David Light	DATE: 12 November 2010

Minimum Standard:

Ultra-wideband (UWB) transmitter. An intentional radiator that, at any point in time, has a fractional bandwidth equal to or greater than 0.20 or has a UWB bandwidth equal to or greater than 500 MHz, regardless of the fractional bandwidth.

Test Results: Complies

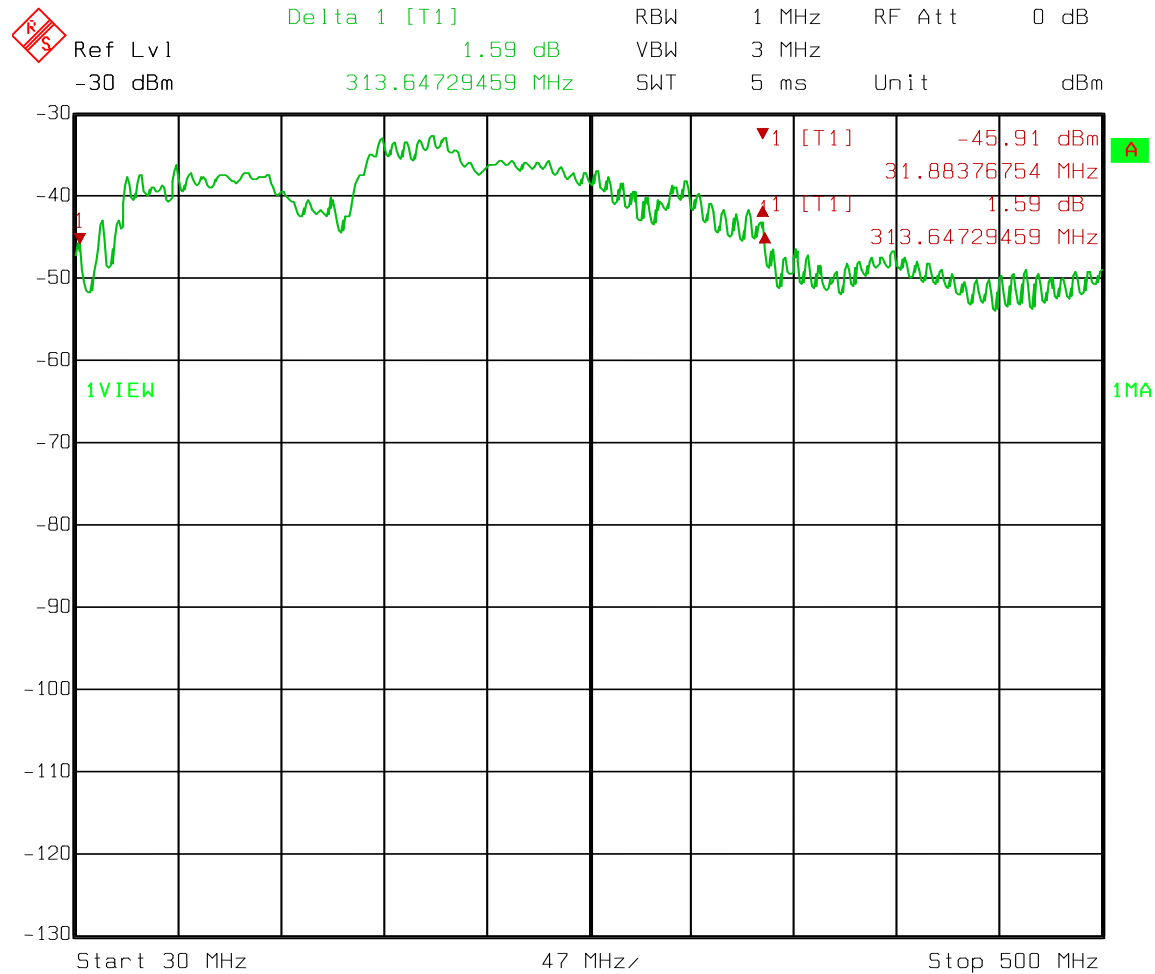
Measurement Data: See attached graphs

Test Equipment: 1036-1480-1484-1485-791

Measurement Uncertainty: +/-3.6 dB

Temperature: 21 °C

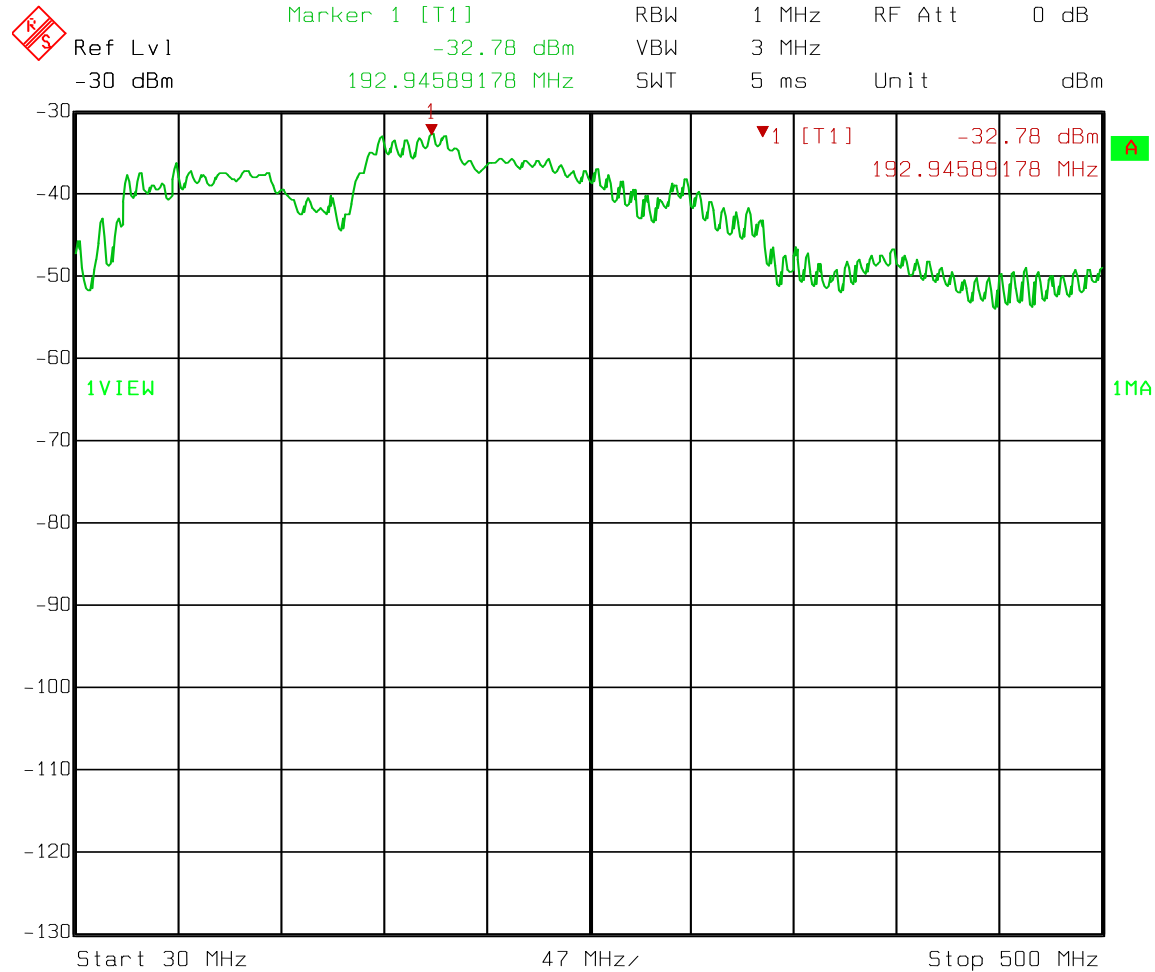
Relative Humidity: 52 %

Test Data – UWB Requirements**Fractional Bandwidth** $f_L = 31.9 \text{ MHz}$ $f_H = 345.4 \text{ MHz}$ Fractional Bandwidth = $2(313.6)/377.4 = 1.66$ 

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Test Data – UWB Requirements

$f_M = 192.9$ MHz



Date: 11.NOV.2010 11:46:51

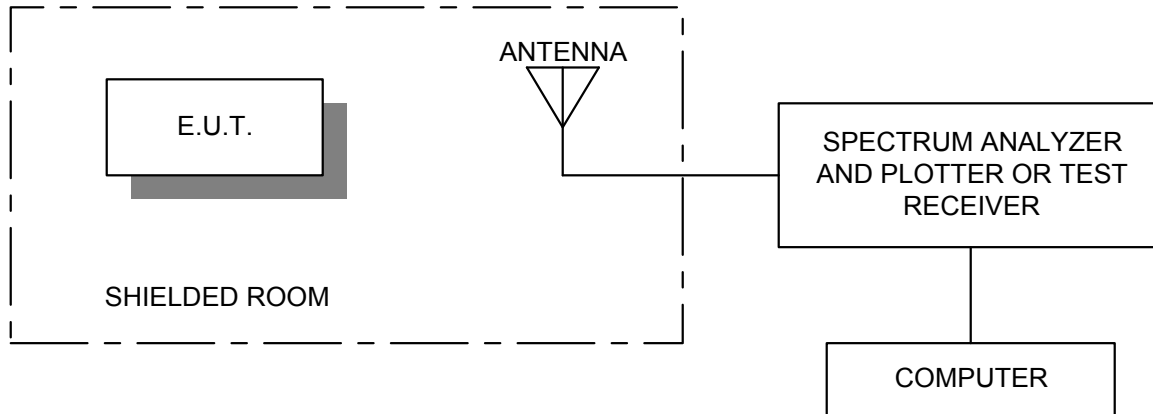
Section 5. Test Equipment List

Asset Tag	Description	Manufacturer	Model	Serial #	Last Cal	Next Cal
993	Antenna, Horn	A.H. Systems	SAS-200/571	162	09-Sep-2009	09-Sep-2011
1016	Preamplifier	Hewlett Packard	8449A	2749A00159	19-Jun-2010	19-Jun-2011
1036	Spectrum Analyzer	Rohde & Schwartz	FSEK30	830844/006	19-Jan-2009	19-Jan-2011
1067	Cable	Storm	PR90-010-144		12-Apr-2010	12-Apr-2011
1480	Antenna, Bilog	Schaffner- Chase	CBL6111C	2572	18-Jan-2010	18-Jan-2011
1484	Cable	Storm	PR90-010-072		19-Jun-2010	19-Jun-2011
1485	Cable	Storm	PR90-010-216		19-Jun-2010	19-Jun-2011
1528	Cable	Storm	PR90-010-144	00-07-001	12-Apr-2010	12-Apr-2011
791	PreAmp	Nemko, USA			08-Mar-2010	08-Mar-2011

ANNEX A

TEST DIAGRAMS

Radiated Prescan



Test Site For Radiated Emissions

