



Nemko Test Report: 5891RUS1

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

Equipment Under Test: 2150GR
(E.U.T.)

In Accordance With: **FCC Part 15, Subpart F, Paragraph 15.509**
Ultra Wide Band Operation
Ground Penetrating Radar

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

TESTED BY:

A handwritten signature in black ink, appearing to read 'David Light', written over a horizontal line.

David Light, Senior Wireless Engineer

DATE

:

02 July 2007

APPROVED BY:

A handwritten signature in black ink, appearing to read 'Harry Ward', written over a horizontal line.

Harry Ward, Verifier

DATE

:

2nd July 2007

Total Number of Pages: 15

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Section 1. Summary Of Test Results

Manufacturer: The Charles Machine Works, Inc.

Model No.: 2150GR

Serial No.: Preproduction

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 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 foot by 4foot by 4foot 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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This report applies only to the items tested.

Summary Of Test Data

NAME OF TEST	PARA. NO.	RESULT
Conducted Emissions	15.207	NA
Pulse Repetition Frequency	15.509	Complies
Definition of UWB	15.203(a)/15.209(a)	Complies
Radiated Emissions	15.509(d)	Complies
Radiated Emissions	15.509(e)	Complies
Peak Emission at f_M	15.509(f)	Complies

Footnotes For N/A's:

The device is battery powered.

Section 2. General Equipment Specification

Frequency Range:	Single	
Operating Frequency(ies) of Sample:	57 MHz to 415 MHz (20 dB BW)	
Tunable Bands:	Single	
20 dB Occupied Bandwidth:	358 MHz	
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	DATE: 06 March 07

Minimum Standard: Para no. 15.509

Limits below 960 MHz (15.209 and 15.509):

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 (15.509)

Frequency (MHz)	E.I.R.P. (dBm)	Measuring RBW	Distance (Meters)
960-1610	-65.3	1 MHz	3
1610-1990	-53.3	1 MHz	3
1990-3100	-51.3	1 MHz	3
3100-10600	-41.3	1 MHz	3
Above 10600	-51.3	1 MHz	3
1164-1240	-75.3	1 kHz	3
1559-1610	-75.3	1 kHz	3

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

Maximizing Emission Levels:

The emissions were scanned from 30 MHz to 15000 MHz.

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

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

Measurement Data: See attached table(s).

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 Unc.	Comment
42.6	V	0	30	12.2	2.3	24.8	19.7	40.0	-20.3	Pass	0°
65	V	0	42.9	8.4	3.0	24.7	29.6	40.0	-10.4	Pass	
69.8	V	0	50.9	8	3.0	24.7	37.2	40.0	-2.8	Pass	PEAK
69.8	V	0	48.4	8	3.0	24.7	34.7	40.0	-5.3	Pass	QP
74.4	V	0	51.4	8.1	3.1	24.7	37.9	40.0	-2.1	Pass	PEAK
74.4	V	0	50.1	8.1	3.1	24.7	36.6	40.0	-3.4	Pass	QP
84.4	V	0	46.2	9.3	3.5	24.6	34.4	40.0	-5.6	Pass	
114.6	V	0	44.4	11.8	3.8	24.7	35.3	43.5	-8.2	Pass	
121	V	0	41.6	11.6	3.8	24.7	32.3	43.5	-11.2	Pass	
132	V	0	34.4	13	4.2	24.6	27.0	43.5	-16.5	Pass	
143	V	0	40.4	13.7	4.2	24.6	33.7	43.5	-9.8	Pass	
148.4	V	0	43.1	14.1	4.2	24.6	36.8	43.5	-6.7	Pass	
159.2	V	0	44.7	14	4.7	24.6	38.8	43.5	-4.7	Pass	
165.2	V	0	41.3	14	4.7	24.6	35.4	43.5	-8.1	Pass	
170.2	V	0	40.1	13.9	4.7	24.6	34.1	43.5	-9.4	Pass	
191	V	0	40.9	14.5	5.1	24.5	36.0	43.5	-7.5	Pass	
207.4	V	0	38.9	15.5	5.5	24.5	35.4	43.5	-8.1	Pass	
218.2	V	0	37.2	15.4	5.5	24.5	33.6	46.0	-12.4	Pass	
229.2	V	0	36.2	15.9	5.9	24.5	33.5	46.0	-12.5	Pass	
240.2	V	0	40.5	16.7	5.9	24.5	38.6	46.0	-7.4	Pass	
263	V	0	39.3	17.8	6.2	24.4	38.9	46.0	-7.1	Pass	
273.8	V	0	35.8	18.9	6.2	24.4	36.5	46.0	-9.5	Pass	

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 Unc.	Comment
54.8	V	0	43	10.6	2.7	24.8	31.5	40.0	-8.5	Pass	45°
73.2	V	0	51	8	3.1	24.7	37.4	40.0	-2.6	Pass	PEAK
73.2	V	0	50.5	8	3.1	24.7	36.9	40.0	-3.1	Pass	QP
75.4	V	0	49.7	8.2	3.1	24.7	36.3	40.0	-3.7	Pass	PEAK
75.4	V	0	49.5	8.2	3.1	24.7	36.1	40.0	-3.9	Pass	QP
119.6	V	0	42.2	11.6	3.8	24.7	32.9	43.5	-10.6	Pass	
151.4	V	0	45.6	14.2	4.7	24.6	39.9	43.5	-3.6	Pass	
154	V	0	46.3	14.2	4.7	24.6	40.6	43.5	-2.9	Pass	
154	V	0	45.3	14.2	4.7	24.6	39.6	43.5	-3.9	Pass	
209.6	V	0	41.2	15.4	5.5	24.5	37.6	43.5	-5.9	Pass	
269	V	0	37.9	18.1	6.2	24.4	37.8	46.0	-8.2	Pass	
50	V	0	42.7	11.6	2.7	24.8	32.2	40.0	-7.8	Pass	90°
70	V	0	50.3	7.9	3.1	24.7	36.6	40.0	-3.4	Pass	Peak
70	V	0	50	7.9	3.1	24.7	36.3	40.0	-3.7	Pass	QP
110.8	V	0	48	11.6	3.8	24.7	38.7	43.5	-4.8	Pass	
151.8	V	0	43.1	14.2	4.7	24.6	37.4	43.5	-6.1	Pass	
155.8	V	0	45	14.2	4.7	24.6	39.3	43.5	-4.2	Pass	
189.2	V	0	40.5	14.6	5.1	24.5	35.7	43.5	-7.8	Pass	
211	V	0	45.1	15.3	5.5	24.5	41.4	43.5	-2.1	Pass	Peak
211	V	0	41	15.3	5.5	24.5	37.3	43.5	-6.2	Pass	QP
232.2	V	0	38.4	15.9	5.9	24.5	35.7	46.0	-10.3	Pass	
262.6	V	0	36.7	17.7	6.2	24.4	36.2	46.0	-9.8	Pass	
272.4	V	0	33.6	18.7	6.2	24.4	34.1	46.0	-11.9	Pass	
50	V	0	40.2	11.6	2.7	24.8	29.7	40.0	-10.3	Pass	135°
70	V	0	50.1	7.9	3.1	24.7	36.4	40.0	-3.6	Pass	
83	V	0	49.7	9.1	3.5	24.6	37.7	40.0	-2.3	Pass	
83	V	0	49.4	9.1	3.5	24.6	37.4	40.0	-2.6	Pass	
150	V	0	45.6	14.2	4.7	24.6	39.9	43.5	-3.6	Pass	
154.2	V	0	43	14.3	4.7	24.6	37.4	43.5	-6.1	Pass	
177.8	V	0	36.2	17.9	5.1	24.5	30.8	43.5	-12.7	Pass	
266.6	V	0	35.6	14	6.2	24.4	35.3	46.0	-10.7	Pass	
299.8	V	0	35.3	20.6	6.4	24.4	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 Unc.	Comment
50	V	0	37.5	11.6	2.7	24.8	27.0	40.0	-13.0	Pass	180°
70	V	0	48.1	7.9	3.1	24.7	34.4	40.0	-5.6	Pass	
82.8	V	0	47.8	9.1	3.5	24.6	35.8	40.0	-4.2	Pass	
116.2	V	0	43.1	11.8	3.8	24.7	34.0	43.5	-9.5	Pass	
150	V	0	43.7	14.2	4.7	24.6	38.0	43.5	-5.5	Pass	
154	V	0	42.7	14.2	4.7	24.6	37.0	43.5	-6.5	Pass	
177.8	V	0	36.7	14	5.1	24.5	31.3	43.5	-12.2	Pass	
206.4	V	0	34.5	15.6	5.5	24.5	31.1	43.5	-12.4	Pass	
233.2	V	0	36.5	15.9	5.9	24.5	33.8	46.0	-12.2	Pass	
273.2	V	0	34.8	18.9	6.2	24.4	35.5	46.0	-10.5	Pass	
50	V	0	37	11.6	2.7	24.8	26.5	40.0	-13.5	Pass	225°
70	V	0	46.8	7.9	3.1	24.7	33.1	40.0	-6.9	Pass	
83.4	V	0	47.6	9.1	3.5	24.6	35.6	40.0	-4.4	Pass	
116.4	V	0	44.8	11.8	3.8	24.7	35.7	43.5	-7.8	Pass	
150	V	0	43.2	14.2	4.7	24.6	37.5	43.5	-6.0	Pass	
154.4	V	0	43.6	14.3	4.7	24.6	38.0	43.5	-5.5	Pass	
177.8	V	0	38	14	5.1	24.5	32.6	43.5	-10.9	Pass	
204.4	V	0	35.7	15.7	5.5	24.5	32.4	43.5	-11.1	Pass	
232.2	V	0	35.6	15.9	5.9	24.5	32.9	46.0	-13.1	Pass	
266.6	V	0	34.3	17.9	6.2	24.4	34.0	46.0	-12.0	Pass	
52.4	V	0	38.3	11.1	2.7	24.8	27.3	40.0	-12.7	Pass	270°
70	V	0	48	7.9	3.1	24.7	34.3	40.0	-5.7	Pass	
78.6	V	0	49.3	8.4	3.1	24.7	36.1	40.0	-3.9	Pass	
115	V	0	44.4	11.8	3.8	24.7	35.3	43.5	-8.2	Pass	
150	V	0	39.6	14.2	4.7	24.6	33.9	43.5	-9.6	Pass	
154.2	V	0	40.3	14.3	4.7	24.6	34.7	43.5	-8.8	Pass	
176	V	0	39.4	14.2	5.1	24.5	34.2	43.5	-9.3	Pass	
208.8	V	0	41.2	15.4	5.5	24.5	37.6	43.5	-5.9	Pass	
225.4	V	0	36	16.1	5.9	24.5	33.5	46.0	-12.5	Pass	
264.6	V	0	34.3	17.8	6.2	24.4	33.9	46.0	-12.1	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 Unc.	Comment
55	V	0	39.8	10.6	2.7	24.8	28.3	40.0	-11.7	Pass	315°
70.4	V	0	50	7.9	3.1	24.7	36.3	40.0	-3.7	Pass	
83	V	0	46.3	9.1	3.5	24.6	34.3	40.0	-5.7	Pass	
113.8	V	0	43.3	11.9	3.8	24.7	34.3	43.5	-9.2	Pass	
150	V	0	39.9	14.2	4.7	24.6	34.2	43.5	-9.3	Pass	
153.8	V	0	42.2	14.2	4.7	24.6	36.5	43.5	-7.0	Pass	
175	V	0	39.1	14	5.1	24.5	33.7	43.5	-9.8	Pass	
208.4	V	0	42.3	15.5	5.5	24.5	38.8	43.5	-4.7	Pass	
229.4	V	0	35.7	15.9	5.9	24.5	33.0	46.0	-13.0	Pass	
261.2	V	0	33.8	17.5	6.2	24.4	33.1	46.0	-12.9	Pass	
117	H	0	38.7	11.8	3.8	24.7	29.6	43.5	-13.9	Pass	0°
173.3	H	0	39.5	14	4.7	24.6	33.6	43.5	-9.9	Pass	
194.4	H	0	37.6	14.5	5.1	24.5	32.7	43.5	-10.8	Pass	
207.2	H	0	40.7	15.6	5.5	24.5	37.3	43.5	-6.2	Pass	
218.2	H	0	37.6	15.4	5.5	24.5	34.0	46.0	-12.0	Pass	
234.2	H	0	39	16	5.9	24.5	36.4	46.0	-9.6	Pass	
234	H	0	39	16	5.9	24.5	36.4	46.0	-9.6	Pass	
240	H	0	40	16.7	5.9	24.5	38.1	46.0	-7.9	Pass	
245	H	0	38	17.2	5.9	24.5	36.6	46.0	-9.4	Pass	
266.8	H	0	39.9	18.1	6.2	24.4	39.8	46.0	-6.2	Pass	
66.4	H	0	43.2	8.3	3.0	24.7	29.8	40.0	-10.2	Pass	45°
67.8	H	0	42.4	8	3.0	24.7	28.7	40.0	-11.3	Pass	
74.2	H	0	41.4	8.1	3.1	24.7	27.9	40.0	-12.1	Pass	
82.8	H	0	41.6	9.1	3.5	24.6	29.6	40.0	-10.4	Pass	
115.6	H	0	40.5	11.8	3.8	24.7	31.4	43.5	-12.1	Pass	
121.4	H	0	38.7	11.6	3.8	24.7	29.4	43.5	-14.1	Pass	
148.4	H	0	37.2	14.1	4.2	24.6	30.9	43.5	-12.6	Pass	
175.6	H	0	36.4	14.2	5.1	24.5	31.2	43.5	-12.3	Pass	
208.2	H	0	38.2	15.5	5.5	24.5	34.7	43.5	-8.8	Pass	
235	H	0	33.5	16.1	5.9	24.5	31.0	46.0	-15.0	Pass	
269.6	H	0	32.2	18.1	6.2	24.4	32.1	46.0	-13.9	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 Unc.	Comment
62.4	H	0	40.9	8.9	3.0	24.7	28.1	40.0	-11.9	Pass	90°
70.4	H	0	44.3	7.9	3.1	24.7	30.6	40.0	-9.4	Pass	
82.2	H	0	43.1	8.9	3.5	24.6	30.9	40.0	-9.1	Pass	
115	H	0	41.2	11.8	3.8	24.7	32.1	43.5	-11.4	Pass	
150	H	0	38.6	14.2	4.7	24.6	32.9	43.5	-10.6	Pass	
155.6	H	0	39.2	14.2	4.7	24.6	33.5	43.5	-10.0	Pass	
162	H	0	37.5	14	4.7	24.6	31.6	43.5	-11.9	Pass	
195	H	0	29.6	14.4	5.1	24.5	24.6	43.5	-18.9	Pass	
223.2	H	0	33.6	15.9	5.5	24.5	30.5	46.0	-15.5	Pass	
261.8	H	0	36.9	17.7	6.2	24.4	36.4	46.0	-9.6	Pass	
296	H	0	32.4	19.9	6.4	24.4	34.3	46.0	-11.7	Pass	
54.2	H	0	34.4	10.9	2.7	24.8	23.2	40.0	-16.8	Pass	135°
70.6	H	0	44	7.9	3.1	24.7	30.3	40.0	-9.7	Pass	
82.2	H	0	43.2	8.9	3.5	24.6	31.0	40.0	-9.0	Pass	
112	H	0	40.8	11.7	3.8	24.7	31.6	43.5	-11.9	Pass	
150	H	0	40.6	14.2	4.7	24.6	34.9	43.5	-8.6	Pass	
156.6	H	0	40.1	14.2	4.7	24.6	34.4	43.5	-9.1	Pass	
173.4	H	0	39.5	14	4.7	24.6	33.6	43.5	-9.9	Pass	
206.2	H	0	40.4	15.6	5.5	24.5	37.0	43.5	-6.5	Pass	
233.2	H	0	38.2	15.9	5.9	24.5	35.5	46.0	-10.5	Pass	
266.8	H	0	39.2	18.1	6.2	24.4	39.1	46.0	-6.9	Pass	
61.6	H	0	34.3	9	3.0	24.7	21.6	40.0	-18.4	Pass	180°
70	H	0	34.7	7.9	3.1	24.7	21.0	40.0	-19.0	Pass	
82	H	0	37.1	8.9	3.5	24.6	24.9	40.0	-15.1	Pass	
119.6	H	0	36.4	11.6	3.8	24.7	27.1	43.5	-16.4	Pass	
147.4	H	0	38	13.9	4.2	24.6	31.5	43.5	-12.0	Pass	
153.8	H	0	37.9	14.2	4.7	24.6	32.2	43.5	-11.3	Pass	
171	H	0	37.2	13.9	4.7	24.6	31.2	43.5	-12.3	Pass	
197.3	H	0	35.6	14.5	5.1	24.5	30.7	43.5	-12.8	Pass	
219.8	H	0	35.1	15.5	5.5	24.5	31.6	46.0	-14.4	Pass	
270	H	0	35	18.1	6.2	24.4	34.9	46.0	-11.1	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 Unc.	Comment
51.4	H	0	30.8	11.3	2.7	24.8	20.0	40.0	-20.0	Pass	225°
64	H	0	42.3	8.5	3.0	24.7	29.1	40.0	-10.9	Pass	
69.4	H	0	42.7	8	3.0	24.7	29.0	40.0	-11.0	Pass	
82.2	H	0	38.2	8.9	3.5	24.6	26.0	40.0	-14.0	Pass	
108.8	H	0	39.7	11.5	3.8	24.7	30.3	43.5	-13.2	Pass	
153.6	H	0	42.8	14.2	4.7	24.6	37.1	43.5	-6.4	Pass	
166.2	H	0	42.1	14.1	4.7	24.6	36.3	43.5	-7.2	Pass	
179.6	H	0	38.9	14	5.1	24.5	33.5	43.5	-10.0	Pass	
213.6	H	0	42.4	15.4	5.5	24.5	38.8	43.5	-4.7	Pass	
246.4	H	0	39.3	17.2	5.9	24.5	37.9	46.0	-8.1	Pass	
263	H	0	39.5	17.8	6.2	24.4	39.1	46.0	-6.9	Pass	
52.6	H	0	32.4	11.1	2.7	24.8	21.4	40.0	-18.6	Pass	270°
69.2	H	0	43.7	8	3.0	24.7	30.0	40.0	-10.0	Pass	
73.4	H	0	44.1	8	3.1	24.7	30.5	40.0	-9.5	Pass	
82.2	H	0	40.1	8.9	3.5	24.6	27.9	40.0	-12.1	Pass	
119.2	H	0	39.2	11.6	3.8	24.7	29.9	43.5	-13.6	Pass	
150	H	0	37.1	14.2	4.7	24.6	31.4	43.5	-12.1	Pass	
154.4	H	0	38.1	14.3	4.7	24.6	32.5	43.5	-11.0	Pass	
173.3	H	0	37	14	4.7	24.6	31.1	43.5	-12.4	Pass	
193.4	H	0	33.3	14.6	5.1	24.5	28.5	43.5	-15.0	Pass	
220.8	H	0	33.8	15.5	5.5	24.5	30.3	46.0	-15.7	Pass	
271	H	0	36.1	18.4	6.2	24.4	36.3	46.0	-9.7	Pass	
66.2	H	0	37.8	8.3	3.0	24.7	24.4	40.0	-15.6	Pass	315°
71	H	0	41.9	7.9	3.1	24.7	28.2	40.0	-11.8	Pass	
82.6	H	0	38.7	9.1	3.5	24.6	26.7	40.0	-13.3	Pass	
119.4	H	0	36.5	11.6	3.8	24.7	27.2	43.5	-16.3	Pass	
150	H	0	37.4	14.2	4.7	24.6	31.7	43.5	-11.8	Pass	
154	H	0	38.7	14.2	4.7	24.6	33.0	43.5	-10.5	Pass	
171.2	H	0	35.5	13.9	4.7	24.6	29.5	43.5	-14.0	Pass	
207.8	H	0	36.4	15.5	5.5	24.5	32.9	43.5	-10.6	Pass	
240	H	0	36.9	16.7	5.9	24.5	35.0	46.0	-11.0	Pass	
261.8	H	0	37.9	17.7	6.2	24.4	37.4	46.0	-8.6	Pass	

Test Data – Radiated Emissions

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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 Unc.	Comment
309.2	V	0	28	19.5	6.8	24.4	29.9	46.0	-16.1	Pass	225 °
412.2	V	0	26.8	15.9	8.0	24.4	26.3	46.0	-19.7	Pass	
442	V	0	25.6	17.7	8.0	24.4	26.9	46.0	-19.1	Pass	
539.8	V	0	27.7	19	8.9	24.5	31.1	46.0	-14.9	Pass	
609.6	V	0	26.4	17.7	9.7	24.6	29.2	46.0	-16.8	Pass	
654.8	V	0	27.4	17.7	10.4	24.7	30.8	46.0	-15.2	Pass	
731.8	V	0	27.4	17.7	10.7	24.5	31.3	46.0	-14.7	Pass	
805	V	0	25.5	17.7	11.8	24.6	30.4	46.0	-15.6	Pass	
315	V	0	30.8	18.9	6.8	24.4	32.1	46.0	-13.9	Pass	270 °
384	V	0	28.4	16	7.4	24.4	27.4	46.0	-18.6	Pass	
491	V	0	26.3	18.2	8.5	24.5	28.5	46.0	-17.5	Pass	
523.4	V	0	30.8	17.1	8.9	24.5	32.3	46.0	-13.7	Pass	
540.4	V	0	29.7	19	8.9	24.5	33.1	46.0	-12.9	Pass	
613.8	V	0	29.3	17.7	9.7	24.6	32.1	46.0	-13.9	Pass	
653.2	V	0	27.4	17.7	10.4	24.7	30.8	46.0	-15.2	Pass	
690.2	V	0	28.5	17.7	10.4	24.7	31.9	46.0	-14.1	Pass	
780.8	V	0	25.6	17.7	11.1	24.8	29.6	46.0	-16.4	Pass	
803	V	0	25.7	17.7	11.8	24.6	30.6	46.0	-15.4	Pass	
314.8	V	0	31.5	18.9	6.8	24.4	32.8	46.0	-13.2	Pass	315 °
366.6	V	0	31.2	15.5	7.4	24.4	29.7	46.0	-16.3	Pass	
417.8	V	0	28.3	16	8.0	24.4	27.9	46.0	-18.1	Pass	
488.6	V	0	26	17.9	8.5	24.5	27.9	46.0	-18.1	Pass	
522	V	0	30.3	17.1	8.9	24.5	31.8	46.0	-14.2	Pass	
554.2	V	0	26.7	19.2	9.5	24.6	30.8	46.0	-15.2	Pass	
618.8	V	0	30.4	17.7	9.7	24.6	33.2	46.0	-12.8	Pass	
708.4	V	0	26.4	17.7	10.7	24.5	30.3	46.0	-15.7	Pass	
786.6	V	0	25.8	17.7	11.1	24.8	29.8	46.0	-16.2	Pass	
815	V	0	25	17.7	11.8	24.6	29.9	46.0	-16.1	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 Unc.	Comment
316.2	H	0	38.7	18.9	6.8	24.4	40.0	46.0	-6.0	Pass	0°
326.4	H	0	39.4	17.1	6.8	24.4	38.9	46.0	-7.1	Pass	
337.6	H	0	41	16.4	6.8	24.4	39.8	46.0	-6.2	Pass	
350	H	0	39.8	15.4	7.4	24.4	38.2	46.0	-7.8	Pass	
380	H	0	39.9	15.7	7.4	24.4	38.6	46.0	-7.4	Pass	
401.6	H	0	35.3	16.6	8.0	24.4	35.5	46.0	-10.5	Pass	
429.6	H	0	37.5	17.5	8.0	24.4	38.6	46.0	-7.4	Pass	
440	H	0	38.3	17.4	8.0	24.4	39.3	46.0	-6.7	Pass	
460.4	H	0	37.5	16.9	8.5	24.5	38.4	46.0	-7.6	Pass	
541	H	0	34.4	19	8.9	24.5	37.8	46.0	-8.2	Pass	
575.6	H	0	31.6	17.8	9.5	24.6	34.3	46.0	-11.7	Pass	
614.6	H	0	32.6	17.7	9.7	24.6	35.4	46.0	-10.6	Pass	
730.4	H	0	31.3	17.7	10.7	24.5	35.2	46.0	-10.8	Pass	
310.6	H	0	34.9	19.5	6.8	24.4	36.8	46.0	-9.2	Pass	45°
337.8	H	0	37.5	16.4	6.8	24.4	36.3	46.0	-9.7	Pass	
404.8	H	0	29.8	16.6	8.0	24.4	30.0	46.0	-16.0	Pass	
431.4	H	0	31.7	17.5	8.0	24.4	32.8	46.0	-13.2	Pass	
490.6	H	0	25.8	18.2	8.5	24.5	28.0	46.0	-18.0	Pass	
545.4	H	0	27.2	19.9	8.9	24.5	31.5	46.0	-14.5	Pass	
652.4	H	0	28.9	17.7	10.4	24.7	32.3	46.0	-13.7	Pass	
669.8	H	0	28.1	17.7	10.4	24.7	31.5	46.0	-14.5	Pass	
705.6	H	0	27.1	17.7	10.7	24.5	31.0	46.0	-15.0	Pass	
809	H	0	21.9	17.7	11.8	24.6	26.8	46.0	-19.2	Pass	
318.2	H	0	36.4	18.2	6.8	24.4	37.0	46.0	-9.0	Pass	90°
339.6	H	0	39	16.4	6.8	24.4	37.8	46.0	-8.2	Pass	
366.8	H	0	35.2	15.5	7.4	24.4	33.7	46.0	-12.3	Pass	
425	H	0	34.2	16.3	8.0	24.4	34.1	46.0	-11.9	Pass	
488.8	H	0	29.2	17.9	8.5	24.5	31.1	46.0	-14.9	Pass	
538.6	H	0	31.5	19	8.9	24.5	34.9	46.0	-11.1	Pass	
653.8	H	0	21.7	17.7	10.4	24.7	25.1	46.0	-20.9	Pass	
704.2	H	0	25.1	17.7	10.7	24.5	29.0	46.0	-17.0	Pass	

Test Data – Radiated Emissions

[illegible]

Test Data – Radiated Emissions

[illegible]

Test Data – Radiated Emissions

Frequency (MHz)	Meter Reading (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Pre-Amp Gain (dB)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Comments
								Vertical
1082.0	33.7	22.7	1.1	29.5	28.0	35.9	-7.9	
1202.0	6.4	22.7	1.1	29.5	0.7	25.9	-25.2	GPS Band
1399.5	39.9	24.3	1.2	32.2	33.2	35.9	-2.7	
1584.5	3.5	24.3	1.2	32.2	-3.2	25.9	-29.1	GPS Band
1800.0	35.2	28.5	1.3	32.0	33.0	47.9	-14.9	
2544.5	35.9	29.0	1.5	32.8	33.6	59.9	-26.3	
6550.0	32.0	35.2	2.6	34.3	35.5	59.9	-24.4	
								Horizontal
1082.0	39.0	22.7	1.1	29.5	33.3	35.9	-2.6	
1202.0	10.3	22.7	1.1	29.5	4.6	25.9	-21.3	GPS Band
1399.5	38.7	24.3	1.2	32.2	32.0	35.9	-3.9	
1584.5	6.0	24.3	1.2	32.2	-0.7	25.9	-26.6	GPS Band
1800.0	36.5	28.5	1.3	32.0	34.3	47.9	-13.6	
2544.5	36.2	29.0	1.5	32.8	33.9	59.9	-26.0	
6550.0	32.3	35.2	2.6	34.3	35.8	59.9	-24.1	
The spectrum was searched from 1 to 10 Ghz. The EUT was measured every 45° on a 360° rotational axis. Worst case emissions are reported.								

Spectrum Analyzer Settings:

Below 1000 MHz: RBW=VBW=100 kHz Peak detector
Below 1000 MHz: IF bandwidth = 120 kHz Quasi peak detector
Above 1000 MHz: RBW=VBW=1 MHz
GPS Bands: RBW=VBW=1 kHz

All measurements are PEAK unless otherwise stated.

Equipment Used: 993-1016-1036-1629-760-1034-1522-791-1659

Measurement Uncertainty: +/-3.6 dB

Temperature: 21 °C

Relative Humidity: 33 %

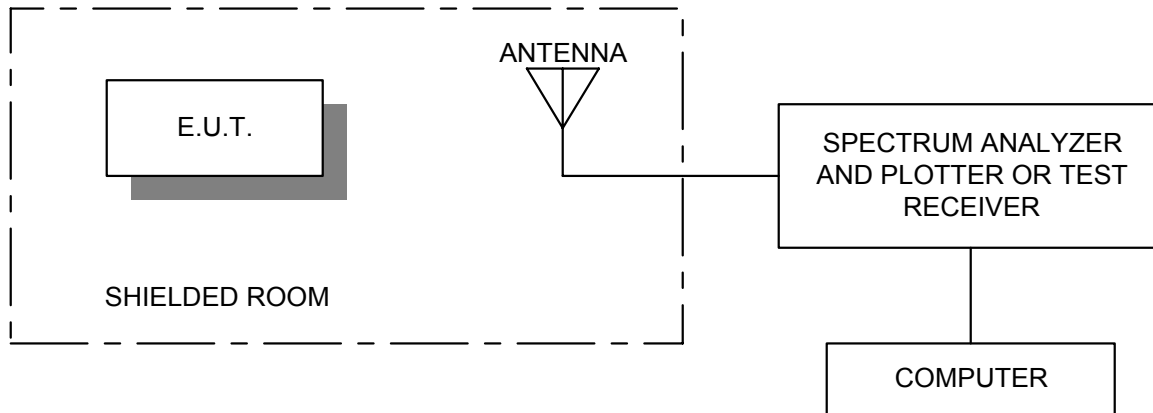
Section 4. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
993	Horn antenna	A.H. Systems SAS-200/571	XXX	08/01/05	08/02/07
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	05/01/07	04/30/08
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	05/26/06	05/26/08
1629	CABLE, 6 ft	MEGAPHASE 10311 1GVT4	N/A	CBU	N/A
760	Antenna biconical	Electro Metrics MFC-25	477	01/19/07	01/19/08
1034	ANTENNA,LP	A.H. SYSTEMS SAS-200/510	121	03/30/07	03/29/08
1522	Cable Assy, LAB 5 - D OATS	Nemko USA, Inc. Site D OATS	N/A	05/09/06	05/09/07
791	PREAMP, 25dB	Nemko USA, Inc. LNA25	398	05/01/07	04/30/08
1659	Spectrum Analyzer	Rhode & Schwarz FSP	973353	01/24/07	01/24/09

ANNEX A

TEST DIAGRAMS

Radiated Prescan



Test Site For Radiated Emissions

