



Engineering and Testing for EMC and Safety Compliance

FCC CERTIFICATION APPLICATION

FOR

UNLICENSED TRANSMITTER

**MODEL: i-Card III/NA
FCC ID: O2E-ILR-ICARDIII**

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March 15, 2004

STANDARDS REFERENCED FOR THIS REPORT	
PART 2: 2003	FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS
PART 15: 2003	RADIO FREQUENCY DEVICES
ANSI C63.4-2001	STANDARD FORMAT MEASUREMENT/TECHNICAL REPORT PERSONAL COMPUTER AND PERIPHERALS
RSS-210; 2001	LOW POWER LICENSE-EXEMPT RADIO COMMUNICATION DEVICES (ALL FREQUENCY BANDS)

FCC Rule	Frequency Range (MHz)	Output Power (W)	Frequency Tolerance	Emission Designator
15.245	905-918	0.070	N/A	356KG1D

REPORT PREPARED BY:

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Document Number: 2004032

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1 GENERAL INFORMATION

The following application for FCC certification of a transceiver is prepared on behalf of Identec Solutions, Inc. in accordance with Part 2, and Part 15, Subparts A and C of the Federal Communications Commission's rules and regulations, and Industry Canada RSS-210. The Equipment Under Test (EUT) was Model i-CARD III/NA, FCC ID: O2E-ILR-ICARDIII. The test results reported in this document relate only to the item that was tested.

All measurements contained in this application were conducted in accordance with ANSI C63.4 Methods of Measurement of Radio Noise Emissions, 2001. The instrumentation utilized for the measurements conforms to the ANSI C63.4 standard for EMI and Field Strength Instrumentation. Some accessories are used to increase sensitivity and prevent overloading of the measuring instrument. Calibration checks are performed regularly on the instruments, and all accessories including the high pass filter, preamplifier, and cables.

All radiated emissions measurements were performed manually at Rhein Tech Laboratories. The radiated emissions measurements required by the rules were performed on the three meter, open-field test range maintained by Rhein Tech Laboratories, 360 Herndon Parkway, Suite 1400, Herndon, Virginia 20170. A complete description and site attenuation measurement data have been placed on file with the Federal Communications Commission. The power line conducted emissions measurements were performed in a shielded enclosure also located at the Herndon, Virginia facility. The FCC accepts Rhein Tech Laboratories, Inc. as a facility available to do measurement work for others on a contractual basis.

1.1 MODIFICATIONS

Modifications were made to the power setting when using the YAGI antenna to meet fundamental power limits; a setting of 21 was used with the provided software, which coincided with a highest conducted power level of 25.2 dBm at 918 MHz.

1.2 RELATED SUBMITTAL(S)/GRANT(S)

This is an original certification submission for **FULL MODULAR APPROVAL**.

1.3 TEST METHODOLOGY

Radiated testing was performed according to the procedures in ANSI C63.4 2001. Radiated testing was performed at an antenna-to-EUT distance of 3 meters.

1.4 TEST FACILITY

The open area test site and conducted measurement facility used to collect the radiated data is located on the parking lot of Rhein Tech Laboratories, 360 Herndon Parkway, Suite 1400, Herndon, Virginia 20170. This site has been fully described in a report, submitted to and approved by the Federal Communications Commission, to perform AC line conducted and radiated emissions testing (ANSI C63.4 2001).

2 CONFORMANCE STATEMENT

STANDARDS REFERENCED FOR THIS REPORT	
PART 2: 2003	FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS
PART 15: 2003	RADIO FREQUENCY DEVICES
ANSI C63.4-2001	STANDARD FORMAT MEASUREMENT/TECHNICAL REPORT PERSONAL COMPUTER AND PERIPHERALS
RSS-210; 2001	LOW POWER LICENSE-EXEMPT RADIO COMMUNICATION DEVICES (ALL FREQUENCY BANDS)

FCC Rule	Frequency Range (MHz)	Output Power (W)	Frequency Tolerance	Emission Designator
15.245	905-918 MHz	0.070	N/A	356KG1D

I, the undersigned, hereby declare that the equipment tested and referenced in this report conforms to the identified standard(s) as described above. See Section 1.1 for modifications which were made to the equipment in order to achieve compliance with these standards.

Furthermore, there was no deviation from, additions to or exclusions from the ANSI C63.4 test methodology.

Signature: 

Date: March 15, 2004

Typed/Printed Name: Desmond A. Fraser

Position: President
(NVLAP Signatory)

 Accredited by the National Voluntary Accreditation Program for the specific scope of accreditation under Lab Code 20061-0.

Note: This report may not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

3 SYSTEM TEST CONFIGURATION

3.1 JUSTIFICATION

To complete the test configuration required by the FCC, the transmitter was initiated by client-supplied software to control channel selection, modulation type, and power settings. The EUT's crystal oscillators and harmonics of each were investigated. Furthermore, the EUT was tested and investigated in three orthogonal planes.

3.2 EXERCISING THE EUT

The i-CARD III/NA is a transmitter designed to function between 905 MHz to 918 MHz. Software selection provided a high (918 MHz), mid (912 MHz), and lower (905 MHz) channel in this range for testing. There were no deviations from the test standard(s) and/or method(s).

3.3 TEST SYSTEM DETAILS

The test sample was received on March 8, 2004. The test results relate only to the item that was tested. The FCC Identifiers for all equipment, plus descriptions of all cables used in the tested system are shown in the table below:

TABLE 3-1: EQUIPMENT UNDER TEST (EUT)

PART	MANUFACTURER	MODEL	SERIAL NUMBER	FCC ID	CABLE DESCRIPTION	RTL BAR CODE
i-CARD III/NA Type II PCMCIA Mobile RFID Reader	Identec Solutions, Inc.	i-CARD III/NA	254870	O2E-ILR- ICARDIII	N/A	015748
1/2 wave Antenna w/SMA connector	Identec Solutions, Inc.	N/A	210273-001	N/A	N/A	015752
1/4 wave Antenna	Identec Solutions, Inc.	N/A	210265-001	N/A	N/A	015751
Patch Antenna (8 dBic Gain)	Cushcraft	S9028PC	210270-001	N/A	0.3 m shielded	015750
YAGI Antenna (7 dB gain)	Wireless Technologies, Inc.	Astron	210266-05	N/A	0.25 m shielded	015749
Antenna extension cable 10' RG58	Identec Solutions, Inc.	N/A	210278-010	N/A	2.54 m shielded I/O	015754
4" coax cable ass'y MMCX to SMA	Identec Solutions, Inc.	N/A	NA	N/A	0.1 m shielded I/O	015753
ISDN Modem (Termination)	Ascend Communications, Inc.	P25-1UBRI	5385341	N/A	2m unshielded I/O	900203
Laptop Computer	Panasonic	CF-28 (Toughbook)	1KKSB13546	DOC	0.2 m unshielded I/O	013954
110VAC/12VDC power adaptor	Jameco	DC1210F5	N/A	N/A	1.9 m Unshielded Power	015757

3.4 CONFIGURATION OF TESTED SYSTEM

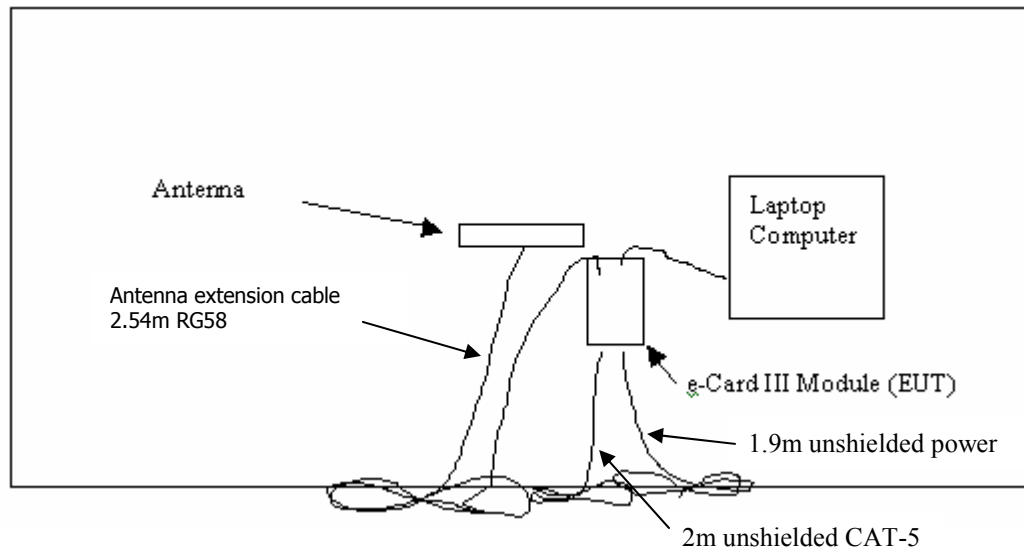


FIGURE 3-1: TEST SYSTEM CONFIGURATION

4 OCCUPIED BANDWIDTH - §2.1049; NECESSARY BANDWIDTH §2.202 (OCCUPIED BANDWIDTH) –IC RSS-210 §5.9.1

4.1 MODULATED BANDWIDTH TEST PROCEDURE

The 20 dB bandwidth per IC RSS-210 was measured using a 50 ohm spectrum analyzer with the resolution bandwidth set at 30 kHz, and the video bandwidth set $\geq$ RBW.

4.2 TEST EQUIPMENT USED FOR TESTING

TABLE 4-1: TEST EQUIPMENT USED FOR TESTING MODULATED BANDWIDTH

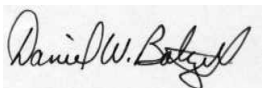
RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Date
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771	5/12/04
900930	Hewlett Packard	85662A	Spectrum Analyzer Display Section	3144A20839	5/12/04

4.3 MODULATED BANDWIDTH TEST DATA

TABLE 4-2: MODULATED 20 DB BANDWIDTH

Frequency (MHz)	20 dB BANDWIDTH (kHz)
905	331.8
912	356.0
918	343.5

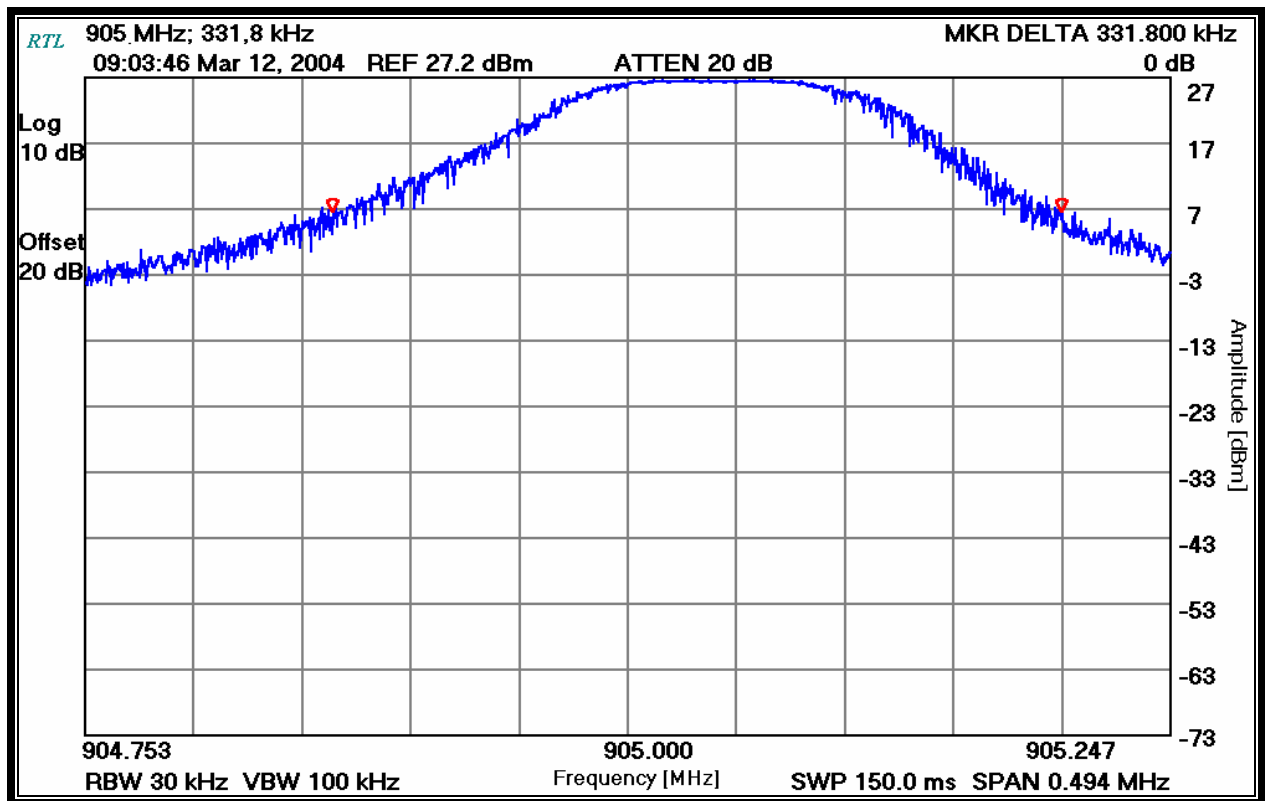
TEST PERSONNEL:

Daniel W. Baltzell		March 12, 2004
Test Engineer	Signature	Date Of Test

4.4 MODULATED BANDWIDTH PLOTS

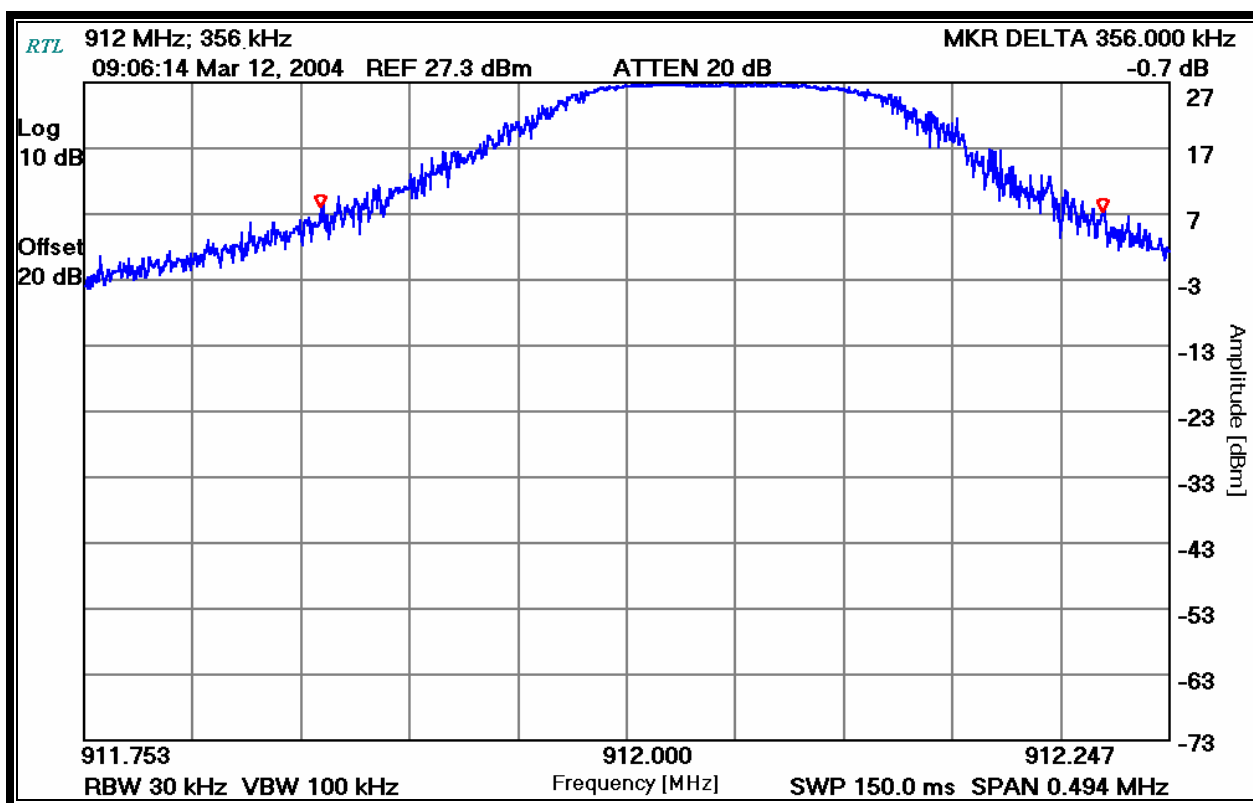
Bandwidth Channel Frequency (MHz): 905
Bandwidth Resolution (kHz): 30
Bandwidth Video (kHz): 100
Sweep Time (ms): 150

PLOT 4-1: EMISSION BANDWIDTH (20 DB); 905 MHZ



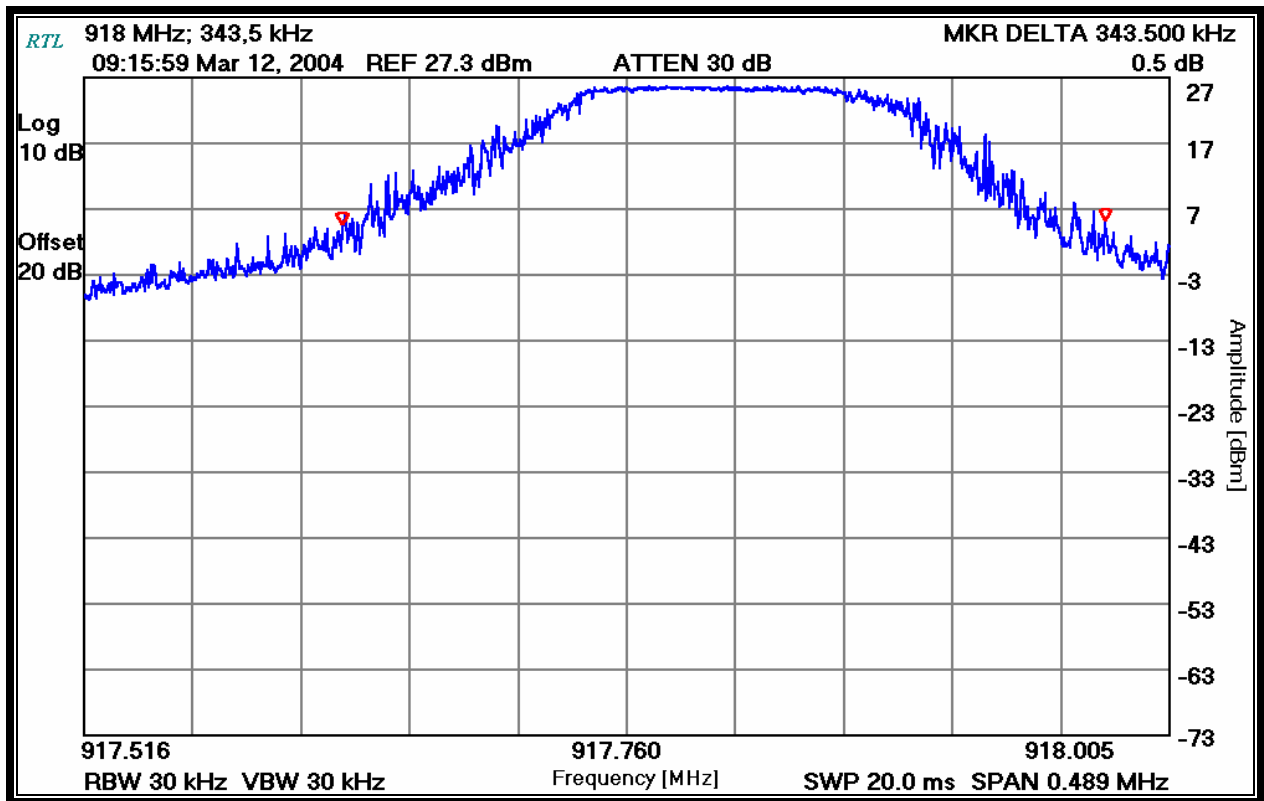
Bandwidth Channel Frequency (MHz): 912
Bandwidth Resolution (kHz): 30
Bandwidth Video (kHz): 100
Sweep Time (ms): 150

PLOT 4-2: EMISSION BANDWIDTH (20 DB); 912 KHZ



Bandwidth Channel Frequency (MHz): 918
Bandwidth Resolution (kHz): 30
Bandwidth Video (kHz): 30
Sweep Time (ms): 20

PLOT 4-3: EMISSION BANDWIDTH (20 DB); 918 MHZ



TEST PERSONNEL:

Daniel W. Baltzell
Test Engineer

Signature

March 12, 2004
Date Of Test

5 RADIATED EMISSIONS

5.1 TEST METHODOLOGY FOR RADIATED EMISSIONS MEASUREMENTS

Before final measurements of radiated emissions were made on the open-field three/ten meter range, the EUT was scanned indoors at one meter and three meter distances, in order to determine its emissions spectrum signature. The physical arrangement of the test system and associated cabling was varied in order to determine the effect on the EUT's emissions in amplitude, direction and frequency. This process was repeated during final radiated emissions measurements on the open-field range, at each frequency, in order to ensure that maximum emission amplitudes were attained.

Final radiated emissions measurements were made on the three meter, open-field test site. The EUT was placed on a nonconductive turntable approximately 0.8 meters above the ground plane. The spectrum was examined from 30 MHz to 1000 MHz using a spectrum analyzer, a quasi-peak adapter, and EMCO log periodic and biconical antenna. In order to gain sensitivity, a preamplifier was connected in series between the antenna and the input of the spectrum analyzer.

At each frequency, the EUT was rotated 360 degrees, and the antenna was raised and lowered from one to four meters in order to determine the maximum emission levels. Measurements were taken using both horizontal and vertical antenna polarizations. The spectrum analyzer's 6 dB bandwidth was set to 120 kHz, and the analyzer was operated in the FCC quasi-peak detection mode. No video filter less than 10 times the resolution bandwidth was used. The second harmonic of the highest LO was tested. The highest emission amplitudes relative to the appropriate limit were measured and recorded in this report.

Note: Rhein Tech Laboratories, Inc. has implemented procedures to minimize errors that occur from test instruments, calibration, procedures, and test setups. Test instrument and calibration errors are documented from the manufacturer or calibration lab. Other errors have been defined and calculated within the Rhein Tech Quality Manual, section 6.1. Rhein Tech implements the following procedures to minimize errors that may occur: yearly as well as daily calibration methods, technician training, and emphasis to employees on avoiding error.

5.2 RADIATED EMISSIONS DATA

Radiated Power IC RSS-210 §11

The following formula is used to convert field strength (FS) in volts/m to transmitter output power (TP) in watts:

$$TP = \frac{(FS \times d)^2}{30 \times G}$$

where d is the distance in meters between the two antennas and G is the antenna numerical gain referenced to isotropic gain.

5.3 FUNDAMENTAL RADIATED EMISSIONS: FCC §15.245; IC RSS-210 §6.2.2 (N)

TABLE 5-1: PATCH ANTENNA (0.012 W)

Temperature: 40°F					Humidity: 35%				
Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
904.991	Pk	H	0	1.5	88.8	36.2	125	134	-9
904.991	Av	H	0	1.5	69.9	36.2	106.1	114	-7.9
912.037	Pk	H	0	1.5	87.9	36.2	124.1	134	-9.9
912.037	Av	H	0	1.5	68.2	36.2	104.4	114	-9.6
917.761	Pk	H	0	1.5	88	36.3	124.3	134	-9.7
917.761	Av	H	0	1.5	68.2	36.3	104.5	114	-9.5

TABLE 5-2: ½ WAVE WHIP ANTENNA (0.006 W)

Temperature: 40°F					Humidity: 35%				
Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
905.000	Pk	H	180	1.0	90.0	36.2	126.2	134.0	-7.8
905.000	Av	H	270	1.0	66.5	36.2	102.7	114.0	-11.3
912.000	Pk	H	280	2.2	84.4	36.2	120.6	134.0	-13.4
912.000	Av	H	280	2.2	66.2	36.2	102.4	114.0	-11.6
917.709	Pk	V	40	1.0	84.1	35.4	119.5	134.0	-14.5
917.709	Av	V	40	1.0	62.3	35.4	97.7	114.0	-16.3

TABLE 5-3: ¼ WAVE ANTENNA (0.010 W)

Temperature: 40°F Humidity: 35%									
Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
905.005	Pk	V	100	1.0	93.5	35.4	128.9	134.0	-5.1
905.005	Av	V	100	1.0	70.0	35.4	105.4	114.0	-8.6
912.069	Pk	H	275	2.4	95.4	36.2	131.6	134.0	-2.4
912.069	Av	H	275	2.4	65.3	36.2	101.5	114.0	-12.5
917.900	Pk	H	230	2.5	95.0	36.3	131.3	134.0	-2.7
917.900	Av	H	230	2.5	57.8	36.3	94.1	114.0	-19.9

TABLE 5-4: YAGI ANTENNA (0.070 W)

Temperature: 40°F Humidity: 35%									
Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
905.000	Pk	V	0	1.0	97.5	35.4	132.9	134.0	-1.1
905.000	Av	V	0	1.0	78.3	35.4	113.7	114.0	-0.3
912.000	Pk	V	0	1.0	97.6	35.3	132.9	134.0	-1.1
912.000	Av	V	0	1.0	77.9	35.3	113.2	114.0	-0.8
917.708	Pk	H	0	1.5	96.7	36.3	133.0	134.0	-1.0
917.708	Av	H	0	1.5	77.0	36.3	113.3	114.0	-0.7

6 RADIATED SPURIOUS AND HARMONIC EMISSIONS - §2.1053

Radiated Spurious and Harmonic Emissions - §2.1053

6.1 HARMONIC RADIATED EMISSIONS: FCC §15.245

TABLE 6-1: ½ WAVE WHIP ANTENNA; LOW CHANNEL; 905 MHZ

Temperature: 40°F Humidity: 35%									
Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1810.040	Pk	H	300	1.0	63.1	5.8	68.9	84.1	-15.2
1810.040	Av	H	300	1.0	48.8	5.8	54.6	64.1	-9.5
2715.000	Pk	H	180	1.0	53.3	10.6	63.9	74.0	-10.1
2715.000	Av	H	180	1.0	36.2	10.6	46.8	54.0	-7.2
3620.000	Pk	V	30	1.0	51.8	9.3	61.1	74.0	-12.9
3620.000	Av	V	30	1.0	32.0	9.3	41.3	54.0	-12.7
4524.750	Pk	V	320	1.1	47.3	13.3	60.6	74.0	-13.4
4524.750	Av	V	320	1.1	32.2	13.3	45.5	54.0	-8.5
5429.017	Pk	V	180	1.5	44.5	14.2	58.7	74.0	-15.3
5429.017	Av	V	180	1.5	29.2	14.2	43.4	54.0	-10.6
6334.092	Pk	H	100	1.5	41.2	12.7	53.9	84.1	-30.2
6334.092	Av	H	100	1.5	28.2	12.7	40.9	64.1	-23.2

TABLE 6-2: ½ WAVE WHIP ANTENNA; MID CHANNEL; 912 MHZ

Temperature: 40°F Humidity: 35%									
Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1824.660	Pk	V	40	1.0	63.2	5.3	68.5	84.1	-15.6
1824.660	Av	V	40	1.0	47.6	5.3	52.9	64.1	-11.2
2736.162	Pk	V	350	1.0	55.2	10.9	66.1	74.0	-7.9
2736.162	Av	V	350	1.0	37.0	10.9	47.9	54.0	-6.1
3645.660	Pk	V	180	1.0	50.3	9.0	59.3	74.0	-14.7
3645.660	Av	V	180	1.0	31.7	9.0	40.7	54.0	-13.3
4560.030	Pk	V	240	1.2	51.8	13.5	65.3	74.0	-8.7
4560.030	Av	V	240	1.2	38.2	13.5	51.7	54.0	-2.3
5472.340	Pk	V	175	1.3	44.2	13.5	57.7	74.0	-16.3
5472.340	Av	V	175	1.3	30.8	13.5	44.3	54.0	-9.7
6384.380	Pk	V	0	1.2	40.5	12.5	53.0	84.1	-31.1
6384.380	Av	V	0	1.2	27.8	12.5	40.3	64.1	-23.8

TABLE 6-3: ½ WAVE WHIP ANTENNA; HIGH CHANNEL; 918 MHZ

Temperature: 40°F Humidity: 35%									
Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1836.030	Pk	V	80	1.4	63.3	5.7	69.0	84.1	-15.1
1836.030	Av	V	80	1.4	48.3	5.7	54.0	64.1	-10.1
2753.400	Pk	V	350	1.0	55.0	10.8	65.8	74.0	-8.2
2753.400	Av	V	350	1.0	35.7	10.8	46.5	54.0	-7.5
3671.200	Pk	V	355	1.0	48.5	9.2	57.7	74.0	-16.3
3671.200	Av	V	355	1.0	29.2	9.2	38.4	54.0	-15.6
4589.000	Pk	H	240	1.1	52.0	13.9	65.9	74.0	-8.1
4589.000	Av	H	240	1.1	32.5	13.9	46.4	54.0	-7.6
5506.800	Pk	V	175	1.2	43.2	14.1	57.3	74.0	-16.7
5506.800	Av	V	175	1.2	27.8	14.1	41.9	54.0	-12.1
6424.600	Pk	V	200	1.0	41.5	12.4	53.9	84.1	-30.2
6424.600	Av	V	200	1.0	27.2	12.4	39.6	64.1	-24.5

TABLE 6-4: 1/4 WAVE WHIP ANTENNA; LOW CHANNEL; 905 MHZ

Temperature: 40°F Humidity: 35%									
Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1810.252	Pk	H	180	1.2	68.7	5.8	74.5	84.1	-9.6
1810.252	Av	H	180	1.2	52.9	5.8	58.7	64.1	-5.4
2714.805	Av	H	170	1.2	55.0	10.6	65.6	74.0	-8.4
2714.805	Av	H	170	1.2	35.0	10.6	45.6	54.0	-8.4
3619.740	Av	H	160	1.0	50.2	9.3	59.5	74.0	-14.5
3619.740	Av	H	160	1.0	31.7	9.3	41.0	54.0	-13.0
4525.183	Pk	H	190	1.6	45.2	13.3	58.5	74.0	-15.5
4525.183	Av	H	190	1.6	29.5	13.3	42.8	54.0	-11.2
5429.842	Pk	V	200	1.6	43.7	14.2	57.9	74.0	-16.1
5429.842	Av	V	200	1.6	28.3	14.2	42.5	54.0	-11.5
6335.267	Pk	H	190	1.1	46.8	12.7	59.5	84.1	-24.6
6335.267	Av	H	190	1.1	28.8	12.7	41.5	64.1	-22.6
7240.125	Pk	H	175	1.1	39.8	11.9	51.7	84.1	-32.4
7240.125	Av	H	175	1.1	28.0	11.9	39.9	64.1	-24.2

TABLE 6-5: 1/4 WAVE WHIP ANTENNA; MID CHANNEL; 912 MHZ

Temperature: 40°F Humidity: 35%									
Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1824.138	Av	H	180	1.5	71.5	6.3	77.8	84.1	-6.3
1824.138	Av	H	180	1.5	54.4	6.3	60.7	64.1	-3.4
2736.700	Av	H	180	1.6	55.0	10.9	65.9	74.0	-8.1
2736.700	Av	H	180	1.6	36.5	10.9	47.4	54.0	-6.6
3649.050	Av	H	165	1.0	52.2	9.0	61.2	74.0	-12.8
3649.050	Av	H	165	1.0	32.0	9.0	41.0	54.0	-13.0
4560.030	Pk	H	200	1.3	42.8	13.5	56.3	74.0	-17.7
4560.030	Av	H	200	1.3	29.5	13.5	43.0	54.0	-11.0
5472.340	Pk	H	170	1.4	43.8	13.5	57.3	84.1	-26.8
5472.340	Av	H	170	1.4	26.7	13.5	40.2	64.1	-23.9
6384.380	Pk	H	190	1.2	46.8	12.5	59.3	84.1	-24.8
6384.380	Av	H	190	1.2	27.2	12.5	39.7	64.1	-24.4
7296.480	Pk	V	100	1.0	40.0	11.8	51.8	74.0	-22.2
7296.480	Av	V	100	1.0	28.0	11.8	39.8	54.0	-14.2

TABLE 6-6: 1/4 WAVE WHIP ANTENNA; HIGH CHANNEL; 918 MHZ

Temperature: 40°F Humidity: 35%									
Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1835.800	Av	H	180	1.5	69.2	6.7	75.9	84.1	-8.2
1835.800	Av	H	180	1.5	46.6	6.7	53.3	64.1	-10.8
2753.700	Av	H	180	1.6	56.8	10.8	67.6	74.0	-6.4
2753.700	Av	H	180	1.6	32.8	10.8	43.6	54.0	-10.4
3671.600	Av	H	200	1.2	41.0	9.2	50.2	74.0	-23.8
3671.600	Av	H	200	1.2	28.0	9.2	37.2	54.0	-16.8
4589.000	Pk	H	90	1.6	41.0	13.9	54.9	74.0	-19.1
4589.000	Av	H	90	1.6	30.7	13.9	44.6	54.0	-9.4
5506.800	Pk	V	180	1.2	43.8	14.1	57.9	84.1	-26.2
5506.800	Av	V	180	1.2	32.0	14.1	46.1	64.1	-18.0
6424.600	Pk	V	350	1.1	47.0	12.4	59.4	84.1	-24.7
6424.600	Av	V	350	1.1	31.5	12.4	43.9	64.1	-20.2
7342.400	Pk	V	90	1.0	41.2	11.7	52.9	74.0	-21.1
7342.400	Av	V	90	1.0	28.8	11.7	40.5	54.0	-13.5

TABLE 6-7: YAGI ANTENNA; LOW CHANNEL; 905 MHZ

Temperature: 40°F					Humidity: 35%				
Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1810.008	Av	V	100	1.0	63.2	4.8	68.0	84.1	-16.1
1810.008	Av	V	100	1.0	47.3	4.8	52.1	64.1	-12.0
2715.081	Av	V	355	1.0	49.0	10.6	59.6	74.0	-14.4
2715.081	Av	V	355	1.0	37.5	10.6	48.1	54.0	-5.9
3620.081	Av	V	180	1.0	47.8	9.3	57.1	74.0	-16.9
3620.081	Av	V	180	1.0	31.3	9.3	40.6	54.0	-13.4
4525.183	Pk	V	180	1.1	44.7	13.3	58.0	74.0	-16.0
4525.183	Av	V	180	1.1	32.7	13.3	46.0	54.0	-8.0
5429.842	Pk	H	180	1.1	43.5	14.2	57.7	74.0	-16.3
5429.842	Av	H	180	1.1	31.8	14.2	46.0	54.0	-8.0

TABLE 6-8: YAGI ANTENNA; MID CHANNEL; 912 MHZ

Temperature: 40°F					Humidity: 35%				
Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1823.933	Av	H	140	1.0	63.7	6.3	70.0	84.1	-14.1
1823.933	Av	H	140	1.0	50.5	6.3	56.8	64.1	-7.3
2736.063	Av	V	185	1.0	48.2	10.9	59.1	74.0	-14.9
2736.063	Av	V	185	1.0	37.0	10.9	47.9	54.0	-6.1
3648.084	Av	V	180	1.0	47.3	9.0	56.3	74.0	-17.7
3648.084	Av	V	180	1.0	31.7	9.0	40.7	54.0	-13.3
4560.030	Pk	H	180	1.2	43.3	13.5	56.8	74.0	-17.2
4560.030	Av	H	180	1.2	38.3	13.5	51.8	54.0	-2.2
5472.340	Pk	H	180	1.2	43.7	13.5	57.2	84.1	-26.9
5472.340	Av	H	180	1.2	32.8	13.5	46.3	64.1	-17.8

TABLE 6-9: YAGI ANTENNA; HIGH CHANNEL; 918 MHZ

Temperature: 40°F Humidity: 35%									
Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1835.591	Av	H	250	1.0	67.3	6.7	74.0	84.1	-10.1
1835.591	Av	H	250	1.0	51.2	6.7	57.9	64.1	-6.2
2753.348	Av	V	30	1.0	49.5	10.8	60.3	74.0	-13.7
2753.348	Av	V	30	1.0	34.3	10.8	45.1	54.0	-8.9
3671.141	Av	V	270	1.0	43.7	9.2	52.9	74.0	-21.1
3671.141	Av	V	270	1.0	29.5	9.2	38.7	54.0	-15.3
4589.000	Pk	H	10	1.0	40.8	13.9	54.7	74.0	-19.3
4589.000	Av	H	10	1.0	31.0	13.9	44.9	54.0	-9.1
5506.800	Pk	V	30	1.2	40.5	14.1	54.6	84.1	-29.5
5506.800	Av	V	30	1.2	27.7	14.1	41.8	64.1	-22.3
6424.600	Pk	V	95	1.1	39.8	12.4	52.2	84.1	-31.9
6424.600	Av	V	95	1.1	28.0	12.4	40.4	64.1	-23.7

TABLE 6-10: PATCH ANTENNA; LOW CHANNEL; 905 MHZ

Temperature: 40°F Humidity: 35%									
Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1809.983	Pk	V	225	1.0	57.8	4.8	62.6	84.1	-21.5
1809.983	Av	V	225	1.0	52.9	4.8	57.7	64.1	-6.4
2715.000	Pk	V	225	1.0	51.8	10.6	62.4	74.0	-11.6
2715.000	Av	V	225	1.0	34.7	10.6	45.3	54.0	-8.7
3620.000	Pk	V	100	1.0	47.7	9.3	57.0	74.0	-17.0
3620.000	Av	V	100	1.0	31.5	9.3	40.8	54.0	-13.2
4525.183	Pk	V	260	1.4	45.5	13.3	58.8	74.0	-15.2
4525.183	Av	V	260	1.4	31.8	13.3	45.1	54.0	-8.9
5429.842	Pk	H	90	1.5	39.5	14.2	53.7	74.0	-20.3
5429.842	Av	H	90	1.5	28.2	14.2	42.4	54.0	-11.6
6335.267	Pk	H	225	1.5	40.3	12.7	53.0	84.1	-31.1
6335.267	Av	H	225	1.5	28.3	12.7	41.0	64.1	-23.1

TABLE 6-11: PATCH ANTENNA; MID CHANNEL; 912 MHZ

Temperature: 40°F Humidity: 35%									
Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1824.164	Pk	H	270	1.0	64.7	6.3	71.0	84.1	-13.1
1824.164	Av	H	270	1.0	46.9	6.3	53.2	64.1	-10.9
2736.162	Pk	H	225	1.0	46.0	10.9	56.9	74.0	-17.1
2736.162	Av	H	225	1.0	30.3	10.9	41.2	54.0	-12.8
3645.660	Pk	V	100	1.0	48.3	9.0	57.3	74.0	-16.7
3645.660	Av	V	100	1.0	31.7	9.0	40.7	54.0	-13.3
4560.030	Pk	H	225	1.0	46.5	13.5	60.0	74.0	-14.0
4560.030	Av	H	225	1.0	37.2	13.5	50.7	54.0	-3.3
5472.340	Pk	H	80	1.0	38.7	13.5	52.2	84.1	-31.9
5472.340	Av	H	80	1.0	28.0	13.5	41.5	64.1	-22.6
6384.380	Pk	H	225	1.8	42.3	12.5	54.8	74.0	-19.2
6384.380	Av	H	225	1.8	29.0	12.5	41.5	54.0	-12.5
7296.480	Pk	V	225	1.5	42.2	11.8	54.0	74.0	-20.0
7296.480	Av	V	225	1.5	30.2	11.8	42.0	54.0	-12.0

TABLE 6-12: PATCH ANTENNA; HIGH CHANNEL; 918 MHZ

Temperature: 40°F Humidity: 35%									
Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1835.672	Pk	H	260	1.0	66.6	6.7	73.3	84.1	-10.8
1835.672	Av	H	260	1.0	47.3	6.7	54.0	64.1	-10.1
2753.400	Pk	V	225	1.0	53.1	10.8	63.9	74.0	-10.1
2753.400	Av	V	225	1.0	36.3	10.8	47.1	54.0	-6.9
3671.200	Pk	V	100	1.0	47.3	9.2	56.5	74.0	-17.5
3671.200	Av	V	100	1.0	30.7	9.2	39.9	54.0	-14.1
4589.000	Pk	H	190	1.0	43.2	13.9	57.1	74.0	-16.9
4589.000	Av	H	190	1.0	30.7	13.9	44.6	54.0	-9.4
5506.800	Pk	V	80	1.0	40.2	14.1	54.3	84.1	-29.8
5506.800	Av	V	80	1.0	27.2	14.1	41.3	64.1	-22.8
6424.600	Pk	V	90	1.5	39.8	12.4	52.2	84.1	-31.9
6424.600	Av	V	90	1.5	28.5	12.4	40.9	64.1	-23.2
7342.400	Pk	V	90	1.2	41.5	11.7	53.2	74.0	-20.8
7342.400	Av	V	90	1.2	29.5	11.7	41.2	54.0	-12.8

TABLE 6-13: DIGITAL/RECEIVER RADIATED EMISSIONS; FCC §15.209; IC RSS-210 §7.3

Temperature: 40°F Humidity: 35%									
Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
120.064	Qp	H	0	1.5	46.4	-17.3	29.1	43.5	-14.4
140.069	Qp	H	190	2.0	43.6	-18.3	25.3	43.5	-18.2
160.07	Qp	H	180	1.5	25.0	-19.4	5.6	43.5	-37.9
180.071	Qp	H	280	1.5	51.5	-19.9	31.6	43.5	-11.9
200.072	Qp	H	90	1.9	54.6	-19.9	34.7	43.5	-8.8
220.073	Qp	H	90	1.0	54.1	-20.2	33.9	46.4	-12.5

*All readings are quasi-peak, unless stated otherwise.

TEST PERSONNEL:

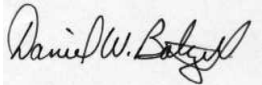
Daniel W. Baltzell Test Engineer	 Signature	March 12, 2004 Date Of Test
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TABLE 6-14: TEST EQUIPMENT USED FOR TESTING RADIATED EMISSIONS

RTL Asset	Manufacturer	Model	Part Type	Serial Number	Calibration Date
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771	5/12/04
900930	Hewlett Packard	85662A	Spectrum Analyzer Display Section	3144A20839	5/12/04
900905	Rhein Tech Labs	PR-1040	Pre Amplifier 40 dB (10 MHz – 2 GHz)	1006	9/10/04
900969	Hewlett Packard	85650A	Quasi-Peak Adapter	2412A00414	5/12/04
901053	Schaffner-Chase	CBL6112	Antenna (25 MHz – 2 GHz)	2648	07/03/04
900151	Rohde and Schwarz	HFH2-Z2	Antenna (Loop, 9 kHz - 30 MHz)	827525/019	8/25/06
900932	Hewlett Packard	8449B OPT H02	Preamplifier (1 - 26.5 GHz)	3008A00505	4/22/04
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719	07/15/04
900811	Rhein Tech Labs	PR-1040	Amplifier	1003	2/13/05
900878	Rhein Tech Labs	AM3-1197-0005	3 meter antenna mast, polarizing	Outdoor Range 1	Not Required
901231	IW Microwave Products	KPS-1503-2400-KPS	High frequency RF cables	240"	1/30/05
901232	IW Microwave Products	KPS-1503-2400-KPS	High frequency RF cables	240"	1/30/05
901235	IW Microwave Products	KPS-1503-360-KPS	High frequency RF cables	36"	1/30/05
901242	Rhein Tech Labs	WRT-000-0003	Wood rotating table	N/A	Not Required
900772	EMCO	3161-02	Horn Antenna (2 - 4 GHz)	9804-1044	3/15/04
900321	EMCO	3161-03	Horn Antennas (4 - 8,2 GHz)	9508-1020	4/10/04
900323	EMCO	3160-7	Horn Antennas (8,2 - 12,4 GHz)	9605-1054	6/10/04

* Note: The preamplifier's gain is included in the site correction factor.

7 CONDUCTED LIMITS - §15.207; IC RSS-210 §9

7.1 TEST METHODOLOGY FOR CONDUCTED LINE EMISSIONS MEASUREMENTS

The power line conducted emission measurements were performed in a Series 81 type shielded enclosure manufactured by Rayproof. The EUT was assembled on a wooden table 80 centimeters high. Power was fed to the EUT through a 50 ohm / 50 microhenry Line Impedance Stabilization Network (EUT LISN). The EUT LISN was fed power through an A.C. filter box on the outside of the shielded enclosure. The filter box and EUT LISN housing are bonded to the ground plane of the shielded enclosure. A second LISN, the peripheral LISN, provides isolation for the EUT test peripherals. This peripheral LISN was also fed A.C. power. A metal power outlet box, which is bonded to the ground plane and electrically connected to the peripheral LISN, powers the EUT host peripherals.

The spectrum analyzer was connected to the A.C. line through an isolation transformer. The 50-ohm output of the EUT LISN was connected to the spectrum analyzer input through a Solar high-pass filter. The filter is used to prevent overload of the spectrum analyzer from noise below 100 kHz. Conducted emission levels were measured on each current-carrying line with the spectrum analyzer operating in the CISPR quasi-peak mode (or peak mode if applicable). The analyzer's 6 dB bandwidth was set to 9 kHz. No video filter less than 10 times the resolution bandwidth was used. Average measurements are performed in linear mode using a 10 kHz resolution bandwidth, a 1 Hz video bandwidth, and by increasing the sweep time in order to obtain a calibrated measurement. The emission spectrum was scanned from 150 kHz to 30 MHz. The highest emission amplitudes relative to the appropriate limit were measured and have been recorded in this report.

Note: Rhein Tech Laboratories, Inc. has implemented procedures to minimize errors that occur from test instruments, calibration, procedures, and test setups. Test instrument and calibration errors are documented from the manufacturer or calibration lab. Other errors have been defined and calculated within the Rhein Tech Quality Manual, section 6.1. Rhein Tech implements the following procedures to minimize errors that may occur: yearly as well as daily calibration methods, technician training, and emphasis to employees on avoiding error.

7.2 CONDUCTED LINE EMISSION TEST

The conducted test was performed with the EUT exercise program loaded, and the emissions were scanned between 150 kHz to 30 MHz on the NEUTRAL SIDE and PHASE SIDE.

7.3 CONDUCTED LINE EMISSIONS TEST EQUIPMENT

TABLE 7-1: TEST EQUIPMENT USED FOR TESTING CONDUCTED LINE EMISSIONS

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Date
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771	5/12/04
901082	AFJ International	LS16	16A LISN	16010020081	11/5/04

7.4 CONDUCTED LINE EMISSIONS TEST DATA

TABLE 7-2: 1/2 WAVE ANTENNA; LOW CHANNEL (905 MHZ), NEUTRAL SIDE (LINE 1)

Temperature: 74°F					Humidity: 43%					
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)	Pass/Fail	Comments
0.153	Pk	41.3	2.0	43.3	65.8	-22.5	55.8	-12.5	Pass	
0.263	Pk	48.7	1.2	49.9	61.3	-11.4	51.3	-1.4	Pass	
0.560	Pk	32.6	0.7	33.3	56.0	-22.7	46.0	-12.7	Pass	
4.450	Pk	28.9	1.5	30.4	56.0	-25.6	46.0	-15.6	Pass	
16.610	Pk	26.6	2.8	29.4	60.0	-30.6	50.0	-20.6	Pass	
21.620	Pk	25.9	3.2	29.1	60.0	-30.9	50.0	-20.9	Pass	

TABLE 7-3: 1/2 WAVE ANTENNA; LOW CHANNEL (905 MHZ), HOT SIDE (LINE 2)

Temperature: 74°F					Humidity: 43%					
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)	Pass/Fail	Comments
0.158	Pk	42.4	1.9	44.3	65.6	-21.3	55.6	-11.3	Pass	
0.263	Pk	48.7	1.2	49.9	61.3	-11.4	51.3	-1.4	Pass	
0.560	Pk	33.8	0.7	34.5	56.0	-21.5	46.0	-11.5	Pass	
5.220	Pk	30.4	1.7	32.1	60.0	-27.9	50.0	-17.9	Pass	
16.900	Pk	26.2	2.8	29.0	60.0	-31.0	50.0	-21.0	Pass	
21.090	Pk	32.3	3.2	35.5	60.0	-24.5	50.0	-14.5	Pass	

TABLE 7-4: 1/2 WAVE ANTENNA; MID CHANNEL (912 MHZ), NEUTRAL SIDE (LINE 1)

Temperature: 74°F Humidity: 43%										
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)	Pass/Fail	Comments
0.151	Pk	50.6	2.0	52.6	65.9	-13.3	55.9	-3.3	Pass	
0.262	Pk	48.8	1.2	50.0	61.4	-11.4	51.4	-1.4	Pass	
0.560	Pk	36.9	0.7	37.6	56.0	-18.4	46.0	-8.4	Pass	
3.390	Pk	27.9	1.3	29.2	56.0	-26.8	46.0	-16.8	Pass	
15.840	Pk	25.7	2.8	28.5	60.0	-31.5	50.0	-21.5	Pass	
21.620	Pk	28.4	3.2	31.6	60.0	-28.4	50.0	-18.4	Pass	

TABLE 7-5: 1/2 WAVE ANTENNA; MID CHANNEL (912 MHZ), HOT SIDE (LINE 2)

Temperature: 74°F Humidity: 43%										
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)	Pass/Fail	Comments
0.172	Pk	48.9	1.8	50.7	64.9	-14.2	54.9	-4.2	Pass	
0.262	Pk	47.0	1.2	48.2	61.4	-13.2	51.4	-3.2	Pass	
0.560	Pk	36.0	0.7	36.7	56.0	-19.3	46.0	-9.3	Pass	
5.280	Pk	30.1	1.7	31.8	60.0	-28.2	50.0	-18.2	Pass	
15.810	Pk	26.3	2.8	29.1	60.0	-30.9	50.0	-20.9	Pass	
21.390	Pk	32.7	3.2	35.9	60.0	-24.1	50.0	-14.1	Pass	

TABLE 7-6: 1/2 WAVE ANTENNA; HIGH CHANNEL (918 MHZ), NEUTRAL SIDE (LINE 1)

Temperature: 74°F Humidity: 43%										
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)	Pass/Fail	Comments
0.151	Pk	41.4	2.0	43.4	65.9	-22.5	55.9	-12.5	Pass	
0.263	Pk	48.4	1.2	49.6	61.3	-11.7	51.3	-1.7	Pass	
0.560	Pk	33.4	0.7	34.1	56.0	-21.9	46.0	-11.9	Pass	
4.450	Pk	29.2	1.5	30.7	56.0	-25.3	46.0	-15.3	Pass	
16.080	Pk	24.6	2.8	27.4	60.0	-32.6	50.0	-22.6	Pass	
21.060	Pk	27.9	3.2	31.1	60.0	-28.9	50.0	-18.9	Pass	

TABLE 7-7: 1/2 WAVE ANTENNA; HIGH CHANNEL (918 MHZ), HOT SIDE (LINE 2)

Temperature: 74°F Humidity: 43%										
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)	Pass/Fail	Comments
0.154	Pk	40.8	2.0	42.8	65.8	-23.0	55.8	-13.0	Pass	
0.264	Pk	49.0	1.2	50.2	61.3	-11.1	51.3	-1.1	Pass	
0.560	Pk	36.2	0.7	36.9	56.0	-19.1	46.0	-9.1	Pass	
4.950	Pk	31.2	1.7	32.9	56.0	-23.1	46.0	-13.1	Pass	
16.080	Pk	26.3	2.8	29.1	60.0	-30.9	50.0	-20.9	Pass	
20.830	Pk	31.5	3.2	34.7	60.0	-25.3	50.0	-15.3	Pass	

TABLE 7-8: 1/4 WAVE ANTENNA; LOW CHANNEL (905 MHZ), NEUTRAL SIDE (LINE 1)

Temperature: 74°F Humidity: 43%										
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)	Pass/Fail	Comments
0.155	Pk	42.2	2.0	44.2	65.7	-21.5	55.7	-11.5	Pass	
0.262	Pk	47.1	1.2	48.3	61.4	-13.1	51.4	-3.1	Pass	
0.560	Pk	32.8	0.7	33.5	56.0	-22.5	46.0	-12.5	Pass	
5.490	Pk	29.2	1.6	30.8	60.0	-29.2	50.0	-19.2	Pass	
16.840	Pk	25.0	2.8	27.8	60.0	-32.2	50.0	-22.2	Pass	
21.090	Pk	25.3	3.2	28.5	60.0	-31.5	50.0	-21.5	Pass	

TABLE 7-9: 1/4 WAVE ANTENNA; LOW CHANNEL (905 MHZ), HOT SIDE (LINE 2)

Temperature: 74°F Humidity: 43%										
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)	Pass/Fail	Comments
0.157	Pk	39.3	1.9	41.2	65.6	-24.4	55.6	-14.4	Pass	
0.264	Pk	47.2	1.2	48.4	61.3	-12.9	51.3	-2.9	Pass	
0.560	Pk	35.6	0.7	36.3	56.0	-19.7	46.0	-9.7	Pass	
5.780	Pk	29.9	1.8	31.7	60.0	-28.3	50.0	-18.3	Pass	
16.080	Pk	26.0	2.8	28.8	60.0	-31.2	50.0	-21.2	Pass	
20.860	Pk	32.2	3.2	35.4	60.0	-24.6	50.0	-14.6	Pass	

TABLE 7-10: 1/4 WAVE ANTENNA; MID CHANNEL (912 MHZ), NEUTRAL SIDE (LINE 1)

Temperature: 74°F Humidity: 43%										
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)	Pass/Fail	Comments
0.152	Pk	41.7	2.0	43.7	65.9	-22.2	55.9	-12.2	Pass	
0.264	Pk	48.7	1.2	49.9	61.3	-11.4	51.3	-1.4	Pass	
0.500	Pk	28.9	0.7	29.6	56.0	-26.4	46.0	-16.4	Pass	
4.450	Pk	29.8	1.5	31.3	56.0	-24.7	46.0	-14.7	Pass	
16.610	Pk	25.5	2.8	28.3	60.0	-31.7	50.0	-21.7	Pass	
21.360	Pk	28.3	3.2	31.5	60.0	-28.5	50.0	-18.5	Pass	

TABLE 7-11: 1/4 WAVE ANTENNA; MID CHANNEL (912 MHZ), HOT SIDE (LINE 2)

Temperature: 74°F Humidity: 43%										
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)	Pass/Fail	Comments
0.157	Pk	41.5	1.9	43.4	65.6	-22.2	55.6	-12.2	Pass	
0.261	Pk	48.5	1.2	49.7	61.4	-11.7	51.4	-1.7	Pass	
0.560	Pk	35.4	0.7	36.1	56.0	-19.9	46.0	-9.9	Pass	
5.810	Pk	29.6	1.8	31.4	60.0	-28.6	50.0	-18.6	Pass	
16.080	Pk	26.4	2.8	29.2	60.0	-30.8	50.0	-20.8	Pass	
21.390	Pk	33.5	3.2	36.7	60.0	-23.3	50.0	-13.3	Pass	

TABLE 7-12: 1/4 WAVE ANTENNA; HIGH CHANNEL (918 MHZ), NEUTRAL SIDE (LINE 1)

Temperature: 74°F Humidity: 43%										
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)	Pass/Fail	Comments
0.156	Pk	41.5	2.0	43.5	65.7	-22.2	55.7	-12.2	Pass	
0.264	Pk	48.3	1.2	49.5	61.3	-11.8	51.3	-1.8	Pass	
0.560	Pk	35.6	0.7	36.3	56.0	-19.7	46.0	-9.7	Pass	
4.160	Pk	28.9	1.4	30.3	56.0	-25.7	46.0	-15.7	Pass	
16.340	Pk	25.4	2.8	28.2	60.0	-31.8	50.0	-21.8	Pass	
21.390	Pk	25.8	3.2	29.0	60.0	-31.0	50.0	-21.0	Pass	

TABLE 7-13: 1/4 WAVE ANTENNA; HIGH CHANNEL (918 MHZ), HOT SIDE (LINE 2)

Temperature: 74°F Humidity: 43%										
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)	Pass/Fail	Comments
0.157	Pk	39.6	1.9	41.5	65.6	-24.1	55.6	-14.1	Pass	
0.264	Pk	48.4	1.2	49.6	61.3	-11.7	51.3	-1.7	Pass	
0.560	Pk	36.4	0.7	37.1	56.0	-18.9	46.0	-8.9	Pass	
5.220	Pk	30.4	1.7	32.1	60.0	-27.9	50.0	-17.9	Pass	
5.750	Pk	29.9	1.8	31.7	60.0	-28.3	50.0	-18.3	Pass	
21.360	Pk	35.0	3.2	38.2	60.0	-21.8	50.0	-11.8	Pass	

TABLE 7-14: PATCH ANTENNA; LOW CHANNEL (905 MHZ), NEUTRAL SIDE (LINE 1)

Temperature: 74°F Humidity: 43%										
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)	Pass/Fail	Comments
0.163	Pk	40.8	1.9	42.7	65.3	-22.6	55.3	-12.6	Pass	
0.262	Pk	45.7	1.2	46.9	61.4	-14.5	51.4	-4.5	Pass	
0.500	Pk	33.2	0.7	33.9	56.0	-22.1	46.0	-12.1	Pass	
5.520	Pk	26.1	1.6	27.7	60.0	-32.3	50.0	-22.3	Pass	
19.500	Pk	42.0	3.1	45.1	60.0	-14.9	50.0	-4.9	Pass	
20.090	Pk	38.9	3.1	42.0	60.0	-18.0	50.0	-8.0	Pass	

TABLE 7-15: PATCH ANTENNA; LOW CHANNEL (905 MHZ), HOT SIDE (LINE 2)

Temperature: 74°F Humidity: 43%										
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)	Pass/Fail	Comments
0.153	Pk	39.5	2.0	41.5	65.8	-24.3	55.8	-14.3	Pass	
0.265	Pk	47.0	1.2	48.2	61.3	-13.1	51.3	-3.1	Pass	
0.500	Pk	34.5	0.7	35.2	56.0	-20.8	46.0	-10.8	Pass	
4.950	Pk	30.3	1.7	32.0	56.0	-24.0	46.0	-14.0	Pass	
19.500	Pk	40.9	3.1	44.0	60.0	-16.0	50.0	-6.0	Pass	
20.060	Pk	39.5	3.1	42.6	60.0	-17.4	50.0	-7.4	Pass	

TABLE 7-16: PATCH ANTENNA; MID CHANNEL (912 MHZ), NEUTRAL SIDE (LINE 1)

Temperature: 74°F Humidity: 43%										
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)	Pass/Fail	Comments
0.177	Pk	39.8	1.8	41.6	64.6	-23.0	54.6	-13.0	Pass	
0.263	Pk	47.9	1.2	49.1	61.3	-12.2	51.3	-2.2	Pass	
0.560	Pk	35.2	0.7	35.9	56.0	-20.1	46.0	-10.1	Pass	
4.450	Pk	29.3	1.5	30.8	56.0	-25.2	46.0	-15.2	Pass	
19.500	Pk	36.5	3.1	39.6	60.0	-20.4	50.0	-10.4	Pass	
20.060	Pk	33.3	3.1	36.4	60.0	-23.6	50.0	-13.6	Pass	

TABLE 7-17: PATCH ANTENNA; MID CHANNEL (912 MHZ), HOT SIDE (LINE 2)

Temperature: 74°F Humidity: 43%										
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)	Pass/Fail	Comments
0.165	Pk	40.0	1.9	41.9	65.2	-23.3	55.2	-13.3	Pass	
0.261	Pk	47.0	1.2	48.2	61.4	-13.2	51.4	-3.2	Pass	
0.500	Pk	31.7	0.7	32.4	56.0	-23.6	46.0	-13.6	Pass	
4.950	Pk	29.6	1.7	31.3	56.0	-24.7	46.0	-14.7	Pass	
19.230	Pk	39.3	3.1	42.4	60.0	-17.6	50.0	-7.6	Pass	
20.060	Pk	38.6	3.1	41.7	60.0	-18.3	50.0	-8.3	Pass	

TABLE 7-18: PATCH ANTENNA; HIGH CHANNEL (918 MHZ), NEUTRAL SIDE (LINE 1)

Temperature: 74°F Humidity: 43%										
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)	Pass/Fail	Comments
0.158	Pk	41.1	1.9	43.0	65.6	-22.6	55.6	-12.6	Pass	
0.263	Pk	48.1	1.2	49.3	61.3	-12.0	51.3	-2.0	Pass	
0.560	Pk	33.9	0.7	34.6	56.0	-21.4	46.0	-11.4	Pass	
5.750	Pk	29.2	1.7	30.9	60.0	-29.1	50.0	-19.1	Pass	
19.470	Pk	35.5	3.1	38.6	60.0	-21.4	50.0	-11.4	Pass	
20.090	Pk	32.9	3.1	36.0	60.0	-24.0	50.0	-14.0	Pass	

TABLE 7-19: PATCH ANTENNA; HIGH CHANNEL (918 MHZ), HOT SIDE (LINE 2)

Temperature: 74°F Humidity: 43%										
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)	Pass/Fail	Comments
0.162	Pk	41.1	1.9	43.0	65.4	-22.4	55.4	-12.4	Pass	
0.264	Pk	47.5	1.2	48.7	61.3	-12.6	51.3	-2.6	Pass	
0.500	Pk	35.5	0.7	36.2	56.0	-19.8	46.0	-9.8	Pass	
5.250	Pk	30.4	1.7	32.1	60.0	-27.9	50.0	-17.9	Pass	
19.470	Pk	42.1	3.1	45.2	60.0	-14.8	50.0	-4.8	Pass	
20.060	Pk	39.1	3.1	42.2	60.0	-17.8	50.0	-7.8	Pass	

TABLE 7-20: YAGI ANTENNA; LOW CHANNEL (905 MHZ), NEUTRAL SIDE (LINE 1)

Temperature: 74°F Humidity: 43%										
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)	Pass/Fail	Comments
0.161	Pk	40.5	1.9	42.4	65.4	-23.0	55.4	-13.0	Pass	
0.261	Pk	46.4	1.2	47.6	61.4	-13.8	51.4	-3.8	Pass	
0.560	Pk	34.7	0.7	35.4	56.0	-20.6	46.0	-10.6	Pass	
5.220	Pk	27.0	1.6	28.6	60.0	-31.4	50.0	-21.4	Pass	
15.810	Pk	25.9	2.8	28.7	60.0	-31.3	50.0	-21.3	Pass	
22.650	Pk	28.9	3.2	32.1	60.0	-27.9	50.0	-17.9	Pass	

TABLE 7-21: YAGI ANTENNA; LOW CHANNEL (905 MHZ), HOT SIDE (LINE 2)

Temperature: 74°F Humidity: 43%										
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)	Pass/Fail	Comments
0.153	Pk	41.1	2.0	43.1	65.8	-22.7	55.8	-12.7	Pass	
0.263	Pk	47.7	1.2	48.9	61.3	-12.4	51.3	-2.4	Pass	
0.500	Pk	35.4	0.7	36.1	56.0	-19.9	46.0	-9.9	Pass	
5.750	Pk	28.8	1.8	30.6	60.0	-29.4	50.0	-19.4	Pass	
20.060	Pk	33.5	3.1	36.6	60.0	-23.4	50.0	-13.4	Pass	
22.150	Pk	35.6	3.2	38.8	60.0	-21.2	50.0	-11.2	Pass	

TABLE 7-22: YAGI ANTENNA; MID CHANNEL (912 MHZ), NEUTRAL SIDE (LINE 1)

Temperature: 74°F Humidity: 43%										
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)	Pass/Fail	Comments
0.156	Pk	39.9	2.0	41.9	65.7	-23.8	55.7	-13.8	Pass	
0.264	Pk	47.1	1.2	48.3	61.3	-13.0	51.3	-3.0	Pass	
0.560	Pk	30.9	0.7	31.6	56.0	-24.4	46.0	-14.4	Pass	
4.450	Pk	27.4	1.5	28.9	56.0	-27.1	46.0	-17.1	Pass	
17.670	Pk	26.9	2.9	29.8	60.0	-30.2	50.0	-20.2	Pass	
21.620	Pk	31.7	3.2	34.9	60.0	-25.1	50.0	-15.1	Pass	

TABLE 7-23: YAGI ANTENNA; MID CHANNEL (912 MHZ), HOT SIDE (LINE 2)

Temperature: 74°F Humidity: 43%										
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)	Pass/Fail	Comments
0.163	Pk	39.8	1.9	41.7	65.3	-23.6	55.3	-13.6	Pass	
0.264	Pk	47.4	1.2	48.6	61.3	-12.7	51.3	-2.7	Pass	
0.500	Pk	31.7	0.7	32.4	56.0	-23.6	46.0	-13.6	Pass	
5.750	Pk	29.7	1.8	31.5	60.0	-28.5	50.0	-18.5	Pass	
18.700	Pk	31.4	3.0	34.4	60.0	-25.6	50.0	-15.6	Pass	
21.590	Pk	37.0	3.2	40.2	60.0	-19.8	50.0	-9.8	Pass	

TABLE 7-24: YAGI ANTENNA; HIGH CHANNEL (918 MHZ), NEUTRAL SIDE (LINE 1)

Temperature: 74°F Humidity: 43%										
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)	Pass/Fail	Comments
0.161	Pk	40.5	1.9	42.4	65.4	-23.0	55.4	-13.0	Pass	
0.263	Pk	47.3	1.2	48.5	61.3	-12.8	51.3	-2.8	Pass	
0.560	Pk	32.3	0.7	33.0	56.0	-23.0	46.0	-13.0	Pass	
5.750	Pk	28.5	1.7	30.2	60.0	-29.8	50.0	-19.8	Pass	
20.060	Pk	28.0	3.1	31.1	60.0	-28.9	50.0	-18.9	Pass	
22.120	Pk	31.1	3.2	34.3	60.0	-25.7	50.0	-15.7	Pass	

TABLE 7-25: YAGI ANTENNA; HIGH CHANNEL (918 MHZ), HOT SIDE (LINE 2)

Temperature: 74°F Humidity: 43%										
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)	Pass/Fail	Comments
0.186	Pk	40.7	1.7	42.4	64.2	-21.8	54.2	-11.8	Pass	
0.266	Pk	47.0	1.2	48.2	61.2	-13.0	51.2	-3.0	Pass	
0.560	Pk	34.3	0.7	35.0	56.0	-21.0	46.0	-11.0	Pass	
4.420	Pk	30.1	1.5	31.6	56.0	-24.4	46.0	-14.4	Pass	
20.090	Pk	32.5	3.1	35.6	60.0	-24.4	50.0	-14.4	Pass	
21.330	Pk	35.4	3.2	38.6	60.0	-21.4	50.0	-11.4	Pass	

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Client: Identec Solutions, Inc.
Model: i-CARD III/NA
FCC ID: O2E-ILR-ICARDIII
Standards: FCC 15.245/IC RSS-210
Date: March 15, 2004

8 CONCLUSION

The data in this measurement report shows that the Identec Solutions, Inc. Model i-CARD III/NA, FCC ID: O2E-ILR-ICARDIII/NA, complies with all the requirements of Parts 2 and 15.245 of the FCC Rules, and Industry Canada RSS-210.