Engineering and Testing for EMC and Safety Compliance

APPLICATION FOR FCC CLASS B CERTIFICATION
SCANNING RECEIVER

Test Lab:	Applicant Information
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FCC ID:	PH3DR-620T	**GRANTEE FRN NUMBER:**	0005-1920-83
PLAT FORM:	N/A	**RTL WORK ORDER NUMBER:**	2002159
MODEL(S):	DR-620T	**RTL QUOTE NUMBER:**	QRTL02-545
DATE OF TEST REPORT:	August 22, 2002		

American National Standard Institute:	ANSI/TIA/EIA603 and ANSI/TIA/EIA 603-1
FCC Classification:	CSR – Scanning Receiver
FCC Rule Part(s):	Part 15.121: Scanning receivers and frequency converters used with scanning receivers
Industry Canada Standard:	RSS-215; Issue 1 (Provisional): Analogue Scanner Receivers
Digital Interface Information	Digital Interface was found to be compliant
Receiver Information	Receiver was found to be compliant

Frequency Range (MHz)	Output Power (W) EIRP	Frequency Tolerance	Emission Designator
87.500 – 107.995	N/A	N/A	N/A
108.000 – 135.995	N/A	N/A	N/A
136.000 – 173.995	N/A	N/A	N/A
335.000 – 479.995	N/A	N/A	N/A

We, the undersigned, hereby declare that the equipment tested and referenced in this report conforms to the identified standard(s) as described in this test report. No modifications were made to the equipment during testing in order to achieve compliance with these standards.

Furthermore, there was no deviation from, additions to or exclusions from the FCC Part 2, FCC Part 15, Industry Canada RSS-215, ANSI C63.4, ANSI/TIA/EIA603 and ANSI/TIA/EIA 603-1.

Signature: _____ Date: August 22, 2002

Typed/Printed Name: Desmond A. Fraser Position: President

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1 GENERAL INFORMATION

The following Application for FCC Type Certification of a Transceiver (Analog Scanner Receiver portion) is prepared on behalf of Alinco Incorporated, Electronics Division, in accordance with Part 2, and Part 15, Subparts A and B of the Federal Communications Commissions rules and regulations and Industry Canada RSS-215. The Equipment Under Test (EUT) is Model DR620T, FCC ID: PH3DR-620T. 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, 1992. 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. Any equipment used in testing is referenced in this report. 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, Inc. The radiated emissions measurements required by the rules were performed on the three-meter, open field; test range maintained by Rhein Tech Laboratories, Inc., 360 Herndon Parkway, Suite 1400, Herndon, Virginia 20170. The power line conducted emission measurements were not performed for this EUT as it does not include an AC/DC power supply. Complete description and site attenuation measurement data have been placed on file with the Federal Communications Commission. The FCC accepts Rhein Tech Laboratories, Inc. as a facility available to do measurement work for others on a contractual basis.

1.1 MODIFICATIONS

No modifications were made during testing.

1.2 RELATED SUBMITTAL (S)/GRANT (S)

This is an original certification submission.

1.3 TEST METHODOLOGY

Radiated testing was performed according to the procedures in ANSI C63.4 2000. 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 in the parking lot of Rhein Tech Laboratories, Inc. 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 1992).

2 SYSTEM TEST CONFIGURATION

2.1 JUSTIFICATION

To complete the test configuration required by the FCC, the receiver was connected to an external antenna, which receives a signal from a signal generator output. With the antenna installed, the receiver indicator was used to determine optional reception. The EUT's Intermediate frequencies (IF), Local Oscillators (LO), 2nd Local Oscillators (LO), crystal oscillators and harmonics of each were investigated. Conducted emission was not measured because the DR-620T does not come with its own AC/DC power supply. All modes were investigated and tested including standby mode and scanning mode. The final radiated data was taken with the EUT locked to a set frequency.

2.2 EXERCISING THE EUT

The DJ-296T is a receiver designed to function at the following frequency range (87.500 - 107.995 MHz), (108.000 – 135.995 MHz), (136.000 – 173.995MHz),and (335.000 – 479.995MHz). The following frequencies were tested: 87.500 MHz, 97.750 MHz, 107.995 MHz, 108.000 MHz, 129.995 MHz, 135.995MHz, 136.000 MHz, 154.995 MHz, 173.995 MHz, 335.000 MHz, 407.495 MHz, and 479.995MHz. Each receiver frequency was measured independently. In order to activate the receiver circuitry; a signal was transmitted from a signal generator. This allowed the EUT to function in its typical state throughout the course of all testing.

2.3 TEST SYSTEM DETAILS

The FCC Identifiers for all equipment, plus descriptions of all cables used in the tested system are:

TABLE 2-1: EQUIPMENT UNDER TEST (EUT)

PART	MANUFACTURER	MODEL	SERIAL NUMBER	FCC ID	CABLE DESCRIPTION	RTL BAR CODE
VHF/UHF TWIN BAND FM TRANSCEIVER	ALINCO	DR-620T	M000401	PH3DR-620T		14638
BACKLIT DTMF ELECTRET CONDENSER MICROPHONE	ALINCO	EMS-57	M 0008728	N/A		14639

TABLE 2-2: EXTERNAL COMPONENTS IN TEST CONFIGURATION

PART	MANUFACTURER	MODEL	SERIAL NUMBER	FCC ID	CABLE DESCRIPTION	RTL BAR CODE
SIGNAL GENERATOR	HEWLETT PACKARD	8648C	3537A01741	N/A	SHIELDED POWER	900917
WHIP ANTENNA	ALINCO	EA0098	N/A	N/A	N/A	013425

2.4 CONFIGURATION OF TESTED SYSTEM

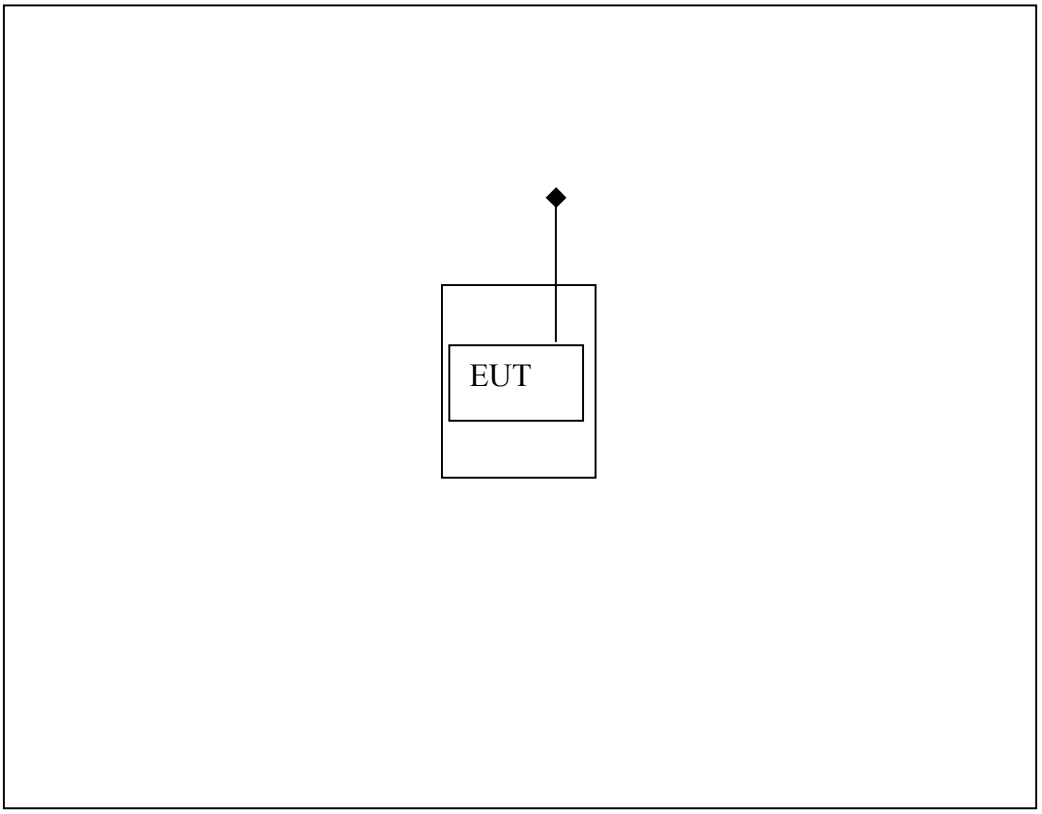


FIGURE 2-1: CONFIGURATION OF TEST SYSTEM

3 CONDUCTED EMISSIONS (NOT APPLICABLE TO THIS EUT)

This testing is not applicable because the DR-620T does not come with its own AC/DC power supply.

3.1 TEST METHODOLOGY FOR CONDUCTED EMISSIONS MEASUREMENTS (NOT APPLICABLE)

3.2 CONDUCTED EMISSION TEST DATA (NOT APPLICABLE)

4 RADIATED EMISSIONS

4.1 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 insure 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 SCHAFFNER-EMC Ltd. Bilog 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 CISPR 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.

4.2 RADIATED EMISSION TEST DATA

TABLE 4-1: RADIATED EMISSIONS: (INPUT FREQUENCY: 87.500 MHZ)

Temperature: 79°F Humidity: 69%									
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)**
109.200	Qp	V	0	1.0	37.7	-11.0	26.7	43.5	-16.8
132.600	Qp	V	0	1.0	38.8	-10.8	28.0	43.5	-15.5
218.400	Qp	V	180	1.0	38.0	-10.2	27.8	46.0	-18.2
265.200	Qp	V	145	1.0	36.1	-9.9	26.2	46.0	-19.8
327.600	Qp	V	45	1.0	37.6	-9.4	28.2	46.0	-17.8
436.800	Qp	V	135	1.0	37.4	-8.6	28.8	46.0	-17.2
530.400	Qp	V	190	1.0	36.5	-7.9	28.6	46.0	-17.4
546.000	Qp	V	145	1.0	37.3	-7.8	29.5	46.0	-16.5
655.200	Qp	V	145	1.0	35.1	-7.0	28.1	46.0	-17.9
764.400	Qp	V	90	1.0	37.3	-6.2	31.1	46.0	-14.9
795.600	Qp	V	45	1.0	36.9	-5.9	31.0	46.0	-15.0
873.600	Qp	V	45	1.0	38.4	-5.3	33.1	46.0	-12.9
982.800	Qp	V	45	1.0	35.3	-4.5	30.8	54.0	-23.2
1060.800	Av	V	145	1.0	35.5	-2.6	32.9	54.0	-21.1
1092.000	Av	V	45	1.0	35.7	-2.3	33.4	54.0	-20.6
1326.000	Av	V	45	1.0	36.8	0.7	37.5	54.0	-16.5

VHF: 1st IF = 21.7 MHz, 2nd IF = 450 kHz
UHF: 1st IF = 45.1 MHz, 2nd IF = 455 kHz
1st LO = 109.200 MHz, 2nd Harmonic of 1st LO = 218.400 MHz
**All readings are quasi-peak, unless stated otherwise.*

TEST PERSONNEL:

Franck Schuppius 08/19/02

EMC Test Engineer Signature: Date of Test

TABLE 4-2: RADIATED EMISSIONS: (INPUT FREQUENCY: 97.750 MHZ)

Temperature: 79°F Humidity: 69%								
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)**
119.448	Qp	V	145	1.0	37.6	-10.9	26.7	43.5
142.848	Qp	V	180	1.0	37.1	-10.8	26.3	43.5
238.895	Qp	V	145	1.0	38.1	-10.1	28.0	46.0
285.695	Qp	V	45	1.0	37.0	-9.7	27.3	46.0
358.342	Qp	V	180	1.0	34.3	-9.2	25.1	46.0
428.543	Qp	V	90	1.0	36.2	-8.6	27.6	46.0
477.790	Qp	V	180	1.0	36.8	-8.3	28.5	46.0
571.390	Qp	V	55	1.0	36.3	-7.6	28.7	46.0
597.237	Qp	V	0	1.0	37.3	-7.4	29.9	46.0
716.685	Qp	V	45	1.0	36.5	-6.5	30.0	46.0
836.133	Qp	V	45	1.0	37.2	-5.6	31.6	46.0
955.580	Qp	V	345	1.0	37.0	-4.7	32.3	46.0
1075.027	Av	V	78	1.0	35.6	-2.5	33.1	54.0
1142.780	Av	V	45	1.0	34.6	-1.7	32.9	54.0
1194.475	Av	V	180	1.0	35.2	-0.7	34.5	54.0
1428.475	Av	V	145	1.0	36.4	2.1	38.5	54.0

VHF: 1st IF = 21.7 MHz, 2nd IF = 450 kHz
UHF: 1st IF = 45.1 MHz, 2nd IF = 455 kHz
1st LO = 119.448 MHz, 2nd Harmonic of 1st LO = 238.895 MHz
**All readings are quasi-peak, unless stated otherwise.*

TEST PERSONNEL:

Franck Schuppius 08/19/02

EMC Test Engineer Signature: Date of Test

TABLE 4-3: RADIATED EMISSIONS: (INPUT FREQUENCY: 107.995 MHZ)

Temperature: 79°F Humidity: 69%									
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)**
129.695	Qp	V	145	1.0	39.6	-10.9	28.7	43.5	-14.8
153.095	Qp	V	45	1.0	41.3	-10.7	30.6	43.5	-12.9
259.390	Qp	V	45	1.0	37.7	-9.9	27.8	46.0	-18.2
306.190	Qp	V	0	1.0	41.6	-9.6	32.0	46.0	-14.0
389.085	Qp	V	90	1.0	37.0	-8.9	28.1	46.0	-17.9
518.780	Qp	V	45	1.0	36.5	-8.0	28.5	46.0	-17.5
648.475	Qp	V	45	1.0	38.6	-7.0	31.6	46.0	-14.4
765.475	Qp	V	45	1.0	37.6	-6.1	31.5	46.0	-14.5
778.170	Qp	V	45	1.0	36.8	-6.1	30.7	46.0	-15.3
907.865	Qp	V	45	1.0	36.4	-5.1	31.3	46.0	-14.7
1167.255	Av	V	45	1.0	34.8	-1.3	33.5	54.0	-20.5
1224.760	Av	V	45	1.0	35.9	-0.3	35.6	54.0	-18.4
1296.950	Av	V	45	1.0	35.3	0.3	35.6	54.0	-18.4
1530.950	Av	V	45	1.0	35.8	3.1	38.9	54.0	-15.1

VHF: 1st IF = 21.7 MHz, 2nd IF = 450 kHz
UHF: 1st IF = 45.1 MHz, 2nd IF = 455 kHz
1st LO = 129.695 MHz, 2nd Harmonic of 1st LO = 259.390 MHz
**All readings are quasi-peak, unless stated otherwise.*

TEST PERSONNEL:

Franck Schuppius 08/19/02

EMC Test Engineer Signature: Date of Test

TABLE 4-4: RADIATED EMISSIONS: (INPUT FREQUENCY: 108.000 MHZ)

Temperature: 79°F Humidity: 69%									
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)**
129.700	Qp	V	90	1.0	40.8	-10.9	29.9	43.5	-13.6
153.100	Qp	V	145	1.0	39.9	-10.7	29.2	43.5	-14.3
259.400	Qp	V	45	1.0	42.6	-9.9	32.7	46.0	-13.3
306.200	Qp	V	145	1.0	38.7	-9.6	29.1	46.0	-16.9
389.100	Qp	V	45	1.0	37.5	-8.9	28.6	46.0	-17.4
459.300	Qp	V	145	1.0	37.6	-8.4	29.2	46.0	-16.8
518.800	Qp	V	45	1.0	37.2	-8.0	29.2	46.0	-16.8
612.400	Qp	V	90	1.0	37.1	-7.3	29.8	46.0	-16.2
778.200	Qp	V	90	1.0	36.2	-6.1	30.1	46.0	-15.9
907.900	Qp	V	0	1.0	37.8	-5.1	32.7	46.0	-13.3
1037.600	Av	V	90	1.0	34.5	-3.1	31.4	54.0	-22.6
1167.300	Av	V	180	1.0	35.5	-1.3	34.2	54.0	-19.8
1297.000	Av	V	145	1.0	35.2	0.3	35.5	54.0	-18.5
1531.000	Av	V	45	1.0	35.5	3.1	38.6	54.0	-15.4

VHF: 1st IF = 21.7 MHz, 2nd IF = 450 kHz
UHF: 1st IF = 45.1 MHz, 2nd IF = 455 kHz
1st LO = 129.700 MHz, 2nd Harmonic of 1st LO = 259.400 MHz
**All readings are quasi-peak, unless stated otherwise.*

TEST PERSONNEL:

Franck Schuppius 08/19/02

EMC Test Engineer Signature: Date of Test

TABLE 4-5: RADIATED EMISSIONS: (INPUT FREQUENCY: 129.995 MHZ)

Temperature: 79°F Humidity: 69%									
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)**
143.698	Qp	V	145	1.0	41.1	-10.8	30.3	43.5	-13.2
167.098	Qp	V	145	1.0	43.7	-10.6	33.1	43.5	-10.4
287.395	Qp	V	45	1.0	40.1	-9.7	30.4	46.0	-15.6
334.195	Qp	V	145	1.0	38.3	-9.3	29.0	46.0	-17.0
431.092	Qp	V	145	1.0	36.3	-8.6	27.7	46.0	-18.3
574.790	Qp	V	45	1.0	35.5	-7.6	27.9	46.0	-18.1
668.390	Qp	V	145	1.0	35.9	-6.9	29.0	46.0	-17.0
718.487	Qp	V	145	1.0	35.4	-6.5	28.9	46.0	-17.1
1002.585	Av	V	145	1.0	35.6	-4.3	31.3	54.0	-22.7
1005.883	Av	V	145	1.0	35.2	-4.2	31.0	54.0	-23.0
1293.277	Av	V	90	1.0	35.9	0.3	36.2	54.0	-17.8
1436.975	Av	V	45	1.0	35.1	2.2	37.3	54.0	-16.7
1503.878	Av	V	45	1.0	34.9	2.6	37.5	54.0	-16.5
1670.975	Av	V	45	1.0	36.2	3.5	39.7	54.0	-14.3

VHF: 1st IF = 21.7 MHz, 2nd IF = 450 kHz
UHF: 1st IF = 45.1 MHz, 2nd IF = 455 kHz
1st LO = 143.698 MHz, 2nd Harmonic of 1st LO = 287.395 MHz
**All readings are quasi-peak, unless stated otherwise.*

TEST PERSONNEL:

Franck Schuppius 08/19/02

EMC Test Engineer Signature: Date of Test

TABLE 4-6: RADIATED EMISSIONS: (INPUT FREQUENCY: 135.995 MHZ)

Temperature: 79°F Humidity: 69%									
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)**
157.695	Qp	V	145	1.0	43.2	-10.6	32.6	43.5	-10.9
181.095	Qp	V	45	1.0	42.2	-10.5	31.7	43.5	-11.8
315.390	Qp	V	245	1.0	39.6	-9.5	30.1	46.0	-15.9
473.085	Qp	V	45	1.0	38.0	-8.3	29.7	46.0	-16.3
630.780	Qp	V	45	1.0	36.6	-7.1	29.5	46.0	-16.5
724.380	Qp	V	45	1.0	35.0	-6.4	28.6	46.0	-17.4
788.475	Qp	V	45	1.0	33.5	-6.0	27.5	46.0	-18.5
905.475	Qp	V	90	1.0	37.1	-5.1	32.0	46.0	-14.0
946.170	Qp	V	90	1.0	34.4	-4.8	29.6	46.0	-16.4
1103.865	Av	V	90	1.0	34.2	-2.2	32.0	54.0	-22.0
1261.560	Av	V	45	1.0	35.7	0.1	35.8	54.0	-18.2
1419.255	Av	V	180	1.0	35.1	2.0	37.1	54.0	-16.9
1448.760	Av	V	45	1.0	33.6	2.4	36.0	54.0	-18.0
1576.950	Av	V	45	1.0	36.3	3.3	39.6	54.0	-14.4
1810.950	Av	V	45	1.0	34.1	4.9	39.0	54.0	-15.0

VHF: 1st IF = 21.7 MHz, 2nd IF = 450 kHz
UHF: 1st IF = 45.1 MHz, 2nd IF = 455 kHz
1st LO = 157.695 MHz, 2nd Harmonic of 1st LO = 315.390 MHz
**All readings are quasi-peak, unless stated otherwise.*

TEST PERSONNEL:

Franck Schuppius 08/19/02

EMC Test Engineer Signature: Date of Test

TABLE 4-7: RADIATED EMISSIONS: (INPUT FREQUENCY: 136.000 MHZ)

Temperature: 88°F Humidity: 40%									
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)**
157.700	Qp	V	180	1.0	35.8	-10.6	25.2	43.5	-18.3
181.000	Qp	V	225	1.0	38.9	-10.5	28.4	43.5	-15.1
315.400	Qp	V	145	1.0	37.0	-9.5	27.5	46.0	-18.5
362.000	Qp	V	245	1.0	35.5	-9.1	26.4	46.0	-19.6
473.100	Qp	V	45	1.0	36.7	-8.3	28.4	46.0	-17.6
630.800	Qp	V	90	1.0	36.1	-7.1	29.0	46.0	-17.0
788.500	Qp	V	180	1.0	35.1	-6.0	29.1	46.0	-16.9
946.200	Qp	V	75	1.0	36.2	-4.8	31.4	46.0	-14.6
1086.000	Av	V	180	1.0	33.9	-2.3	31.6	54.0	-22.4
1103.900	Av	V	45	1.0	35.8	-2.2	33.6	54.0	-20.4
1419.300	Av	V	55	1.0	34.9	2.0	36.9	54.0	-17.1
1577.000	Av	V	45	1.0	35.5	3.3	38.8	54.0	-15.2
1629.000	Av	V	45	1.0	33.5	3.0	36.5	54.0	-17.5
1810.000	Av	V	45	1.0	38.6	4.9	43.5	54.0	-10.5

VHF: 1st IF = 21.7 MHz, 2nd IF = 450 kHz
UHF: 1st IF = 45.1 MHz, 2nd IF = 455 kHz
1st LO = 157.700 MHz, 2nd Harmonic of 1st LO = 315.400 MHz
**All readings are quasi-peak, unless stated otherwise.*

TEST PERSONNEL:

Franck Schuppius 08/19/02

EMC Test Engineer Signature: Date of Test

TABLE 4-8: RADIATED EMISSIONS: (INPUT FREQUENCY: 154.995 MHZ)

Temperature: 88°F Humidity: 40%									
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)**
176.695	Qp	V	45	1.0	36.7	-10.5	26.2	43.5	-17.3
200.095	Qp	V	145	1.0	43.2	-10.3	32.9	43.5	-10.6
353.390	Qp	V	45	1.0	37.1	-9.2	27.9	46.0	-18.1
530.085	Qp	V	90	1.0	37.1	-7.9	29.2	46.0	-16.8
600.285	Qp	V	45	1.0	36.1	-7.4	28.7	46.0	-17.3
706.780	Qp	V	45	1.0	38.9	-6.6	32.3	46.0	-13.7
883.475	Qp	V	45	1.0	38.6	-5.3	33.3	46.0	-12.7
1000.475	Av	V	45	1.0	40.0	-4.4	35.6	54.0	-18.4
1060.170	Av	V	90	1.0	35.7	-2.6	33.1	54.0	-20.9
1236.865	Av	V	225	1.0	36.7	-0.2	36.5	54.0	-17.5
1236.865	Av	V	180	1.0	34.2	-0.2	34.0	54.0	-20.0
1413.560	Av	V	45	1.0	34.2	2.0	36.2	54.0	-17.8
1590.255	Av	V	0	1.0	34.6	3.2	37.8	54.0	-16.2
1766.950	Av	V	75	1.0	33.2	4.5	37.7	54.0	-16.3

VHF: 1st IF = 21.7 MHz, 2nd IF = 450 kHz
UHF: 1st IF = 45.1 MHz, 2nd IF = 455 kHz
1st LO = 176.695 MHz, 2nd Harmonic of 1st LO = 353.390 MHz
**All readings are quasi-peak, unless stated otherwise.*

TEST PERSONNEL:

Franck Schuppius 08/19/02

EMC Test Engineer Signature: Date of Test

TABLE 4-9: RADIATED EMISSIONS: (INPUT FREQUENCY: 173.995 MHZ)

Temperature: 88°F Humidity: 40%									
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)**
195.695	Qp	V	145	1.0	35.2	-10.4	24.8	43.5	-18.7
219.095	Qp	V	145	1.0	36.9	-10.2	26.7	46.0	-19.3
391.390	Qp	V	45	1.0	35.1	-8.9	26.2	46.0	-19.8
438.190	Qp	V	45	1.0	39.5	-8.6	30.9	46.0	-15.1
587.085	Qp	V	225	1.0	36.5	-7.5	29.0	46.0	-17.0
782.780	Qp	V	180	1.0	36.0	-6.0	30.0	46.0	-16.0
978.475	Qp	V	450	1.0	33.6	-4.6	29.0	54.0	-25.0
1174.170	Av	V	45	1.0	34.8	-1.1	33.7	54.0	-20.3
1314.570	Av	V	45	1.0	37.4	0.5	37.9	54.0	-16.1
1369.865	Av	V	0	1.0	34.4	1.3	35.7	54.0	-18.3
1565.560	Av	V	45	1.0	33.0	3.3	36.3	54.0	-17.7
1761.255	Av	V	45	1.0	33.5	4.4	37.9	54.0	-16.1
1956.950	Av	V	45	1.0	31.6	9.4	41.0	54.0	-13.0
2190.950	Av	V	45	1.0	26.1	19.9	46.0	54.0	-8.0

VHF: 1st IF = 21.7 MHz, 2nd IF = 450 kHz
UHF: 1st IF = 45.1 MHz, 2nd IF = 455 kHz
1st LO = 195.695 MHz, 2nd Harmonic of 1st LO = 391.390 MHz
**All readings are quasi-peak, unless stated otherwise.*

TEST PERSONNEL:

Franck Schuppius 08/19/02

EMC Test Engineer Signature: Date of Test

TABLE 4-10: RADIATED EMISSIONS: (INPUT FREQUENCY: 335.000 MHZ)

Temperature: 88°F Humidity: 40%									
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)**
289.900	Qp	V	145	1.0	34.1	-9.7	24.4	46.0	-21.6
313.300	Qp	V	45	1.0	34.7	-9.5	25.2	46.0	-20.8
626.600	Qp	V	45	1.0	34.6	-7.2	27.4	46.0	-18.6
939.900	Qp	V	90	1.0	35.0	-4.8	30.2	46.0	-15.8
1159.600	Av	V	45	1.0	33.1	-1.4	31.7	54.0	-22.3
1253.200	Av	V	45	1.0	35.5	0.0	35.5	54.0	-18.5
1566.500	Av	V	90	1.0	35.2	3.3	38.5	54.0	-15.5
1739.400	Av	V	90	1.0	32.8	4.4	37.2	54.0	-16.8
2319.200	Av	V	0	1.0	22.9	19.2	42.1	54.0	-11.9
2506.400	Av	V	180	1.0	20.8	19.8	40.6	54.0	-13.4
2819.700	Av	V	225	1.0	20.5	22.1	42.6	54.0	-11.4
2899.000	Av	V	45	1.0	20.4	20.9	41.3	54.0	-12.7
3133.000	Av	V	45	1.0	20.3	21.0	41.3	54.0	-12.7

VHF: 1st IF = 21.7 MHz, 2nd IF = 450 kHz
UHF: 1st IF = 45.1 MHz, 2nd IF = 455 kHz
1st LO = 313.300 MHz, 2nd Harmonic of 1st LO = 626.600 MHz
**All readings are quasi-peak, unless stated otherwise.*

TEST PERSONNEL:

Franck Schuppius 08/19/02

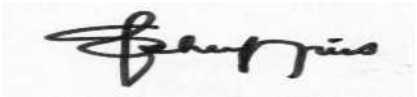
EMC Test Engineer Signature: Date of Test

TABLE 4-11: RADIATED EMISSIONS: (INPUT FREQUENCY: 407.495 MHZ)

Temperature: 88°F Humidity: 40%									
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)**
362.395	Qp	V	145	1.0	35.2	-9.1	26.1	46.0	-19.9
385.795	Qp	V	45	1.0	32.8	-9.0	23.8	46.0	-22.2
724.790	Qp	V	0	1.0	35.8	-6.4	29.4	46.0	-16.6
820.690	Qp	V	45	1.0	30.6	-5.7	24.9	46.0	-21.1
1255.585	Av	V	145	1.0	31.0	0.0	31.0	54.0	-23.0
2125.375	Av	V	45	1.0	25.4	20.4	45.8	54.0	-8.2
2536.765	Av	V	45	1.0	20.7	20.1	40.8	54.0	-13.2
2560.270	Av	V	145	1.0	20.6	20.4	41.0	54.0	-13.0
2995.165	Av	V	180	1.0	20.5	21.6	42.1	54.0	-11.9
3430.060	Av	V	145	1.0	20.3	24.3	44.6	54.0	-9.4
3623.950	Av	V	45	1.0	20.3	24.5	44.8	54.0	-9.2
3864.955	Av	V	180	1.0	20.3	23.6	43.9	54.0	-10.1

VHF: 1st IF = 21.7 MHz, 2nd IF = 450 kHz
UHF: 1st IF = 45.1 MHz, 2nd IF = 455 kHz
1st LO = 362.395 MHz, 2nd Harmonic of 1st LO = 724.790 MHz
**All readings are quasi-peak, unless stated otherwise.*

TEST PERSONNEL:



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EMC Test Engineer Signature: Date of Test

TABLE 4-12: RADIATED EMISSIONS: (INPUT FREQUENCY: 479.995 MHZ)

Temperature: 88°F Humidity: 40%									
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)**
434.895	Qp	V	90	1.0	45.7	-8.6	37.1	46.0	-8.9
458.295	Qp	V	145	1.0	35.9	-8.4	27.5	46.0	-18.5
869.790	Qp	V	180	1.0	41.6	-5.4	36.2	46.0	-9.8
916.590	Qp	V	145	1.0	34.5	-5.0	29.5	46.0	-16.5
1304.685	Av	V	45	1.0	33.8	0.4	34.2	54.0	-19.8
1374.885	Av	V	45	1.0	32.7	1.4	34.1	54.0	-19.9
1833.180	Av	V	45	1.0	37.0	5.6	42.6	54.0	-11.4
2291.475	Av	V	145	1.0	23.2	19.3	42.5	54.0	-11.5
2749.770	Av	V	45	1.0	20.4	23.2	43.6	54.0	-10.4
3208.065	Av	V	45	1.0	20.4	20.4	40.8	54.0	-13.2
3666.360	Av	V	180	1.0	20.4	24.3	44.7	54.0	-9.3

VHF: 1st IF = 21.7 MHz, 2nd IF = 450 kHz
UHF: 1st IF = 45.1 MHz, 2nd IF = 455 kHz
1st LO = 434.895 MHz, 2nd Harmonic of 1st LO = 869.790 MHz
**All readings are quasi-peak, unless stated otherwise.*

TEST PERSONNEL:

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EMC Test Engineer Signature: Date of Test

4.3 EQUIPMENT USED FOR TESTING

RADIATED EMISSION TEST EQUIPMENTS					
RTL ASSET #	MANUFACTURER	MODEL	PART TYPE	SERIAL NUMBER	CALIBRATION DUE DATE
900897	HP	8565A	Spectrum Analyzer (10kHz – 1.5 GHz)	N/A	03/27/03
901053	Schaffner &Chase	CBL6112B	Bilog antenna (20 MHz - 2 GHz)	2648	05/24/03
900905*	Rhein Tech Laboratories, Inc.	PR-1040	Pre Amplifier 40dB (10MHz – 2 GHz)	1006	N/A

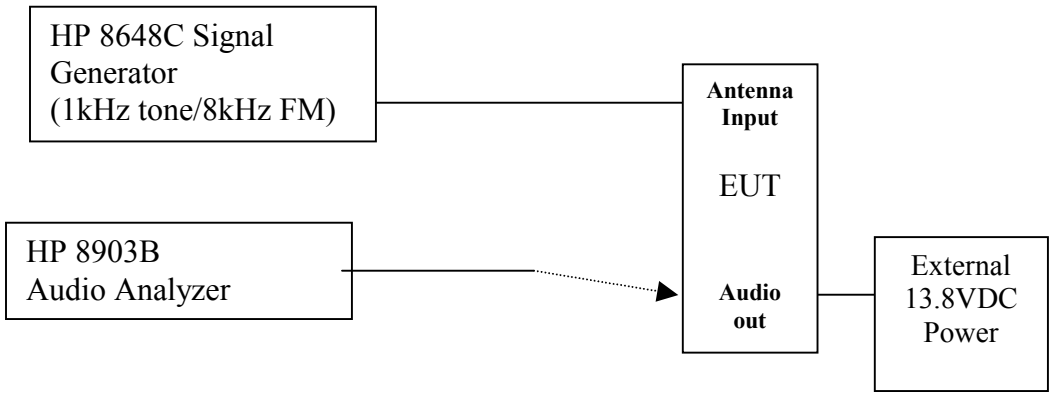
* Note: The preamplifier's gain is included in the site correction factor.

5 38DB REJECTION TEST

A signal generator was connected to the receiver under test, and the output of the receiver was connected to an audio analyzer.

An FM signal was applied to the receiver antenna input with a 1 kHz tone modulated at 8 kHz deviation, and adjusted with the audio analyzer to produce a 12 dB SINAD. This was done across the receiver bands to determine a reference level. The reference level used was that with the highest sensitivity in all of the bands.

The output of the signal generator was then adjusted to a level 40 dB above the reference level established and set to a low, medium and high frequency in both the mobile and base cellular bands (mobile = 824.04 MHz through 848.97 MHz, Base = 881.50 MHz through 893. 97 MHz). The squelch of the receiver was then set to a minimum threshold level and scanning began from the lowest to the highest channel. Whenever the receiver stopped and "un-squelched", that frequency was noted as a response. After all the response frequencies were noted, the signal generator was set to measure the sensitivity at each of these response frequencies. This measurement was the reference sensitivity for the particular received frequency measured. The audio analyzer measurement was used to measure the 12 dB SINAD and that is the spurious value. The difference between the reference sensitivity and the spurious value is the rejection ratio and must be at least 38 dB.



Frequencies used on the Signal Generator were 824.04, 836.50, and 848.97 MHz for the Mobile, and 869.04, 881.50, and 893.97 MHz for the Base.

The DR-620T unit reference level used was –75.7 dBm from the signal generator. The DR-620T unit was scanned from 30 - 960 MHz for all channels (manufacturers spec.). Signals that were noted as responses were checked with the signal generator off. If they were still present they were determined as ambient signals and removed from the response list. There was no signal available for the 38 dB rejection test requirements.

5.1 38DB REJECTION TEST DATA FOR BASE BAND (869.040-893.970 MHZ)

TABLE 5-1: 38DB REJECTION {FREQUENCY INJECTED: 869.040 MHZ} (CELLULAR BAND)

Frequency Injected: 869.040 MHz		Temperature: 74°F; Humidity: 45%		
Frequency Detected (MHz)	**Level 12dB SINAD at 869.040 MHz**	**Level 12dB at frequency detected**	**Rejection**	**Margin**
No Frequencies Detected	N/A	N/A	N/A	N/A

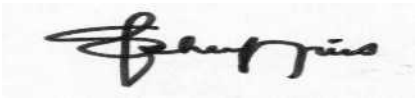
TABLE 5-2: 38DB REJECTION {FREQUENCY INJECTED: 881.505 MHZ} (CELLULAR BAND)

Frequency Injected: 881.500 MHz		Temperature: 74°F; Humidity: 45%		
Frequency Detected (MHz)	**Level 12dB SINAD at 881.50MHz**	**Level 12dB at frequency detected**	**Rejection**	**Margin**
No Frequencies Detected	N/A	N/A	N/A	N/A

TABLE 5-3: 38DB REJECTION {FREQUENCY INJECTED: 893.970 MHZ} (CELLULAR BAND)

Frequency Injected: 893.970 MHz		Temperature: 74°F; Humidity: 45%		
Frequency Detected (MHz)	**Level 12dB SINAD at 893.970MHz**	**Level 12dB at frequency detected**	**Rejection**	**Margin**
No Frequencies Detected	N/A	N/A	N/A	N/A

TEST PERSONNEL:



Franck Schuppius — 08/22/02

EMC Test Engineer — Signature: — Date of Test

5.2 38DB REJECTION TEST DATA FOR MOBILE BAND (824.040-848.970 MHZ)

TABLE 5-4: 38DB REJECTION {FREQUENCY INJECTED: 824.040 MHZ} (MOBILE BAND)

Frequency Injected: 824.040 MHz		Temperature: 74°F; Humidity: 45%		
Frequency Detected (MHz)	**Level 12dB SINAD at 824.040MHz**	**Level 12dB at frequency detected**	**Rejection**	**Margin**
No Frequencies Detected	N/A	N/A	N/A	N/A

TABLE 5-5: 38DB REJECTION {FREQUENCY INJECTED: 836.505 MHZ} (MOBILE BAND)

Frequency Injected: 836.505 MHz		Temperature: 74°F; Humidity: 45%		
Frequency Detected (MHz)	**Level 12dB SINAD at 836.500MHz**	**Level 12dB at frequency detected**	**Rejection**	**Margin**
No Frequencies Detected	N/A	N/A	N/A	N/A

TABLE 5-6: 38DB REJECTION {FREQUENCY INJECTED: 848.970 MHZ} (MOBILE BAND)

Frequency Injected: 848.970 MHz		Temperature: 74°F; Humidity: 45%		
Frequency Detected (MHz)	**Level 12dB SINAD at 848.970MHz**	**Level 12dB at frequency detected**	**Rejection**	**Margin**
No Frequencies Detected	N/A	N/A	N/A	N/A

TEST PERSONNEL:

Franck Schuppius 08/22/02

EMC Test Engineer Signature: Date of Test