EMC COMPLIANCE ENGINEERING AND TESTING

NVLAP Accredited

APPLICATION FOR FCC CLASS B CERTIFICATION

SCANNING RECEIVER

Alinco, Inc.
438 Amapola Ave.
Suite 130
Torrance, CA 90501

MODEL: DR-605T
FCC ID: EUGDR-605T

March 1, 2000

This report concerns (check one): Original Grant: X **Class II Change:** **Equipment Type: Scanning Receiver**
Deferred grant requested per 47 CFR 0.457 (d) (1) (ii)? Yes: No: X **If yes, defer until:** _____ ***Date*** **Company name agrees to notify the Commission by: _____(date) of the intended date of announcement of the product so that the grant can be issued on that date.**
Transition Rules Request per 15.37? Yes: No: X **If no, assumed Part 15, subpart B for unintentional radiators - the new 47 CFR [10-1-90 Edition] provision..**

REPORT PREPARED BY:

EMI Technician: Daniel Baltzell
Administrative Writer: Melissa Fleming

Rhein Tech Laboratories, Inc.

Document Number: 990529

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Herndon,VA 20170
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1.0 GENERAL INFORMATION

The following Application for FCC Type Certification of a Scanning Receiver is prepared on behalf of Alinco, Inc. in accordance with Part 2, and Part 15, Subparts A and B of the Federal Communications Commissions rules and regulations. The Equipment Under Test (EUT) was the DR-605T, FCC ID: EUGDR-605T. 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. These are explained in the appendix of this report. Calibration checks are performed regularly on the instruments, and all accessories including the high pass filter, preamplifier and cables.

All radiated emissions measurement were performed manually at Rhein Tech, Incorporated. 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. Complete description and site attenuation measurement data have been placed on file with the Federal Communications Commission. The power line conducted emission 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:

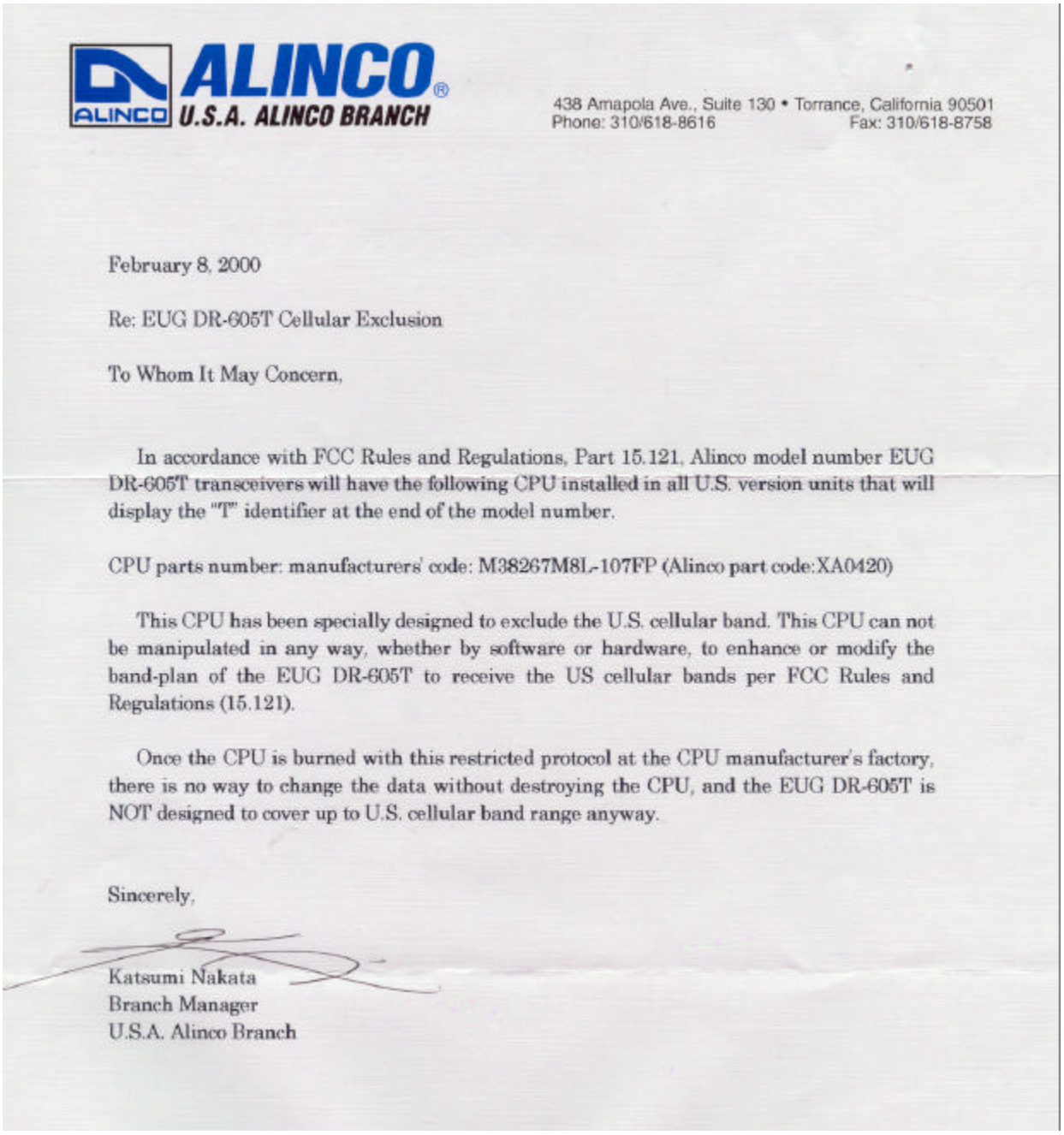
A copper metal box was created to house 4 in-line capacitors (1500pF each) at the power input, also the diode (D214) was moved to the large capacitor (C350) leads to make room for the box. A strip of gasket material was used at the top UHF section between the chassis and cover, and squares of gasket material at both sides between the chassis and cover.

Small pieces of copper tape were used to ground the cover at the front top mounting screws to the sides, as well as a single piece of copper tape to replace the copper tape shield between the UHF and front assembly. It has an overlapping edge at the top for continuity with a gasket placed along the top front edge to the two small copper side pieces added.

TFront Unit PCB Side B capacitor at C401 (.001uF) was changed to a location on the trace leading from R401/R402 to ground. This is the line, which leads to the UP/DOWN lines at the CN401 connector. C401 is the 5V to ground from the CN401, which was removed and left unfilled.

A 1000pF capacitor was added at location D412 The Front Unit Side A, which previously was not filled and is the PTT line above the CN401 connector.
C375, C376 changed from 0.001uF to 220pF. At the front connector on the UHF Main Unit Side B

1.2 STATEMENT FROM THE MANUFACTURER



ALINCO U.S.A. ALINCO BRANCH

438 Amapola Ave., Suite 130 • Torrance, California 90501
Phone: 310/618-8616 Fax: 310/618-8758

February 8, 2000

Re: EUG DR-605T Cellular Exclusion

To Whom It May Concern,

In accordance with FCC Rules and Regulations, Part 15.121, Alinco model number EUG DR-605T transceivers will have the following CPU installed in all U.S. version units that will display the "T" identifier at the end of the model number.

CPU parts number: manufacturers' code: M38267M8L-107FP (Alinco part code:XA0420)

This CPU has been specially designed to exclude the U.S. cellular band. This CPU can not be manipulated in any way, whether by software or hardware, to enhance or modify the band-plan of the EUG DR-605T to receive the US cellular bands per FCC Rules and Regulations (15.121).

Once the CPU is burned with this restricted protocol at the CPU manufacturer's factory, there is no way to change the data without destroying the CPU, and the EUG DR-605T is NOT designed to cover up to U.S. cellular band range anyway.

Sincerely,

Katsumi Nakata
Branch Manager
U.S.A. Alinco Branch

1.3 RELATED SUBMITTAL(S)/GRANT(S)

This is an original certification submission.

1.4 TEST METHODOLOGY

Radiated testing was performed according to the procedures in ANSI C63.4 1992. Radiated testing was performed at an antenna to EUT distance of 3 meters.

1.5 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, Inc. 360 Herndon Parkway, Suite 1400, Herndon, Virginia 20170. This site has been fully described in a report dated June 24, 1996, submitted to and approved by the Federal Communication Commission to perform AC line conducted and radiated emissions testing (ANSI C63.4 1992).

2.0 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 and a DC power supply connected, the receiver indicator was used to determine optional reception. The EUT's IF, local oscillators, and crystal oscillators and harmonics of each were investigated.

2.2 EXERCISING THE EUT

The EUT was exercised using a Hewlett Packard Signal Generator to generate a continuous wave frequency which was received by and activated the EUT receiver portion under test.

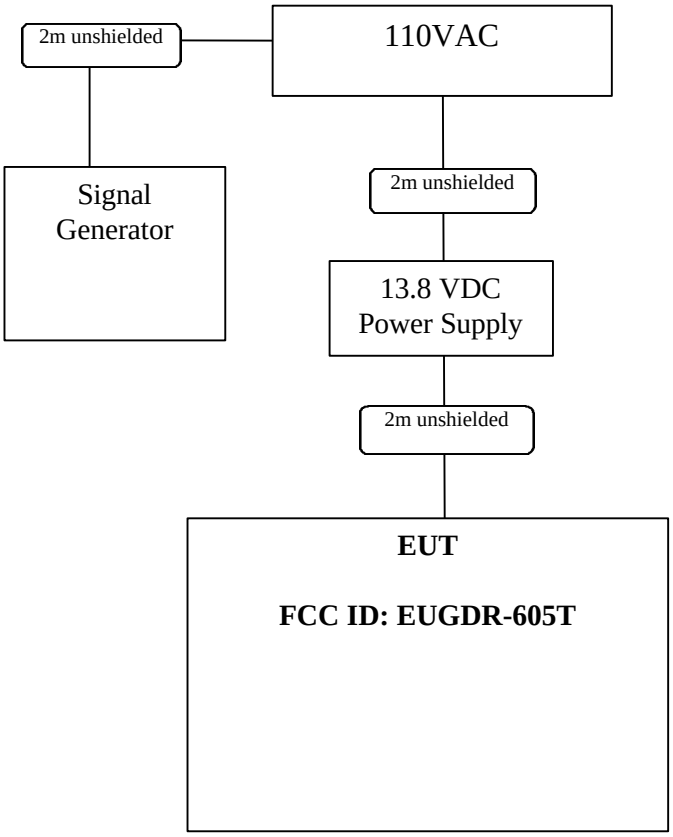
2.3 TEST SYSTEM DETAILS

The FCC Identifiers for all equipment, plus descriptions of all cables used in the tested system (including inserted cards, which have grants) are:

EXTERNAL PERIPHERALS

PART	MANUFACTURER	MODEL	SERIAL NUMBER	FCC ID	CABLE DESCRIPTION	RTL BAR CODE
TWIN FM MOBILE TRX W/TSQ (EUT)	**ALINCO**	**DR-605TQ**	**T001387Q**	**EUG5U5-DR-605T**	**UNSHIELDED POWER; UNSHIELDED I/O**	**011111**
HANDSET	ALINCO	EMS-45	T001387	N/A	UNSHIELDED I/O	011112
SIGNAL GENERATOR	HEWLETT PACKARD	8660C	1947A02956	N/A	UNSHIELDED POWER; UNSHIELDED I/O	900059
POWER SUPPLY	HEWLETT PACKARD	6291	1928A05385	N/A	UNSHIELDED POWER	900773

2.4 TEST SYSTEM CONFIGURATION



2.5 EMISSIONS EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. LAB
AMPLIFIER	HEWLETT PACKARD	11975A	2304A00348	TEST EQUITY
AMPLIFIER (S/A 1)	RHEIN TECH	PR-1040	00001	RTL
AMPLIFIER (S/A 2)	RHEIN TECH	RTL2	900723	RTL
AMPLIFIER (S/A 3)	RHEIN TECH	8447F	2944A03783	RTL
AMPLIFIER (S/A 4)	RHEIN TECH	8447D	2727A05397	RTL
BICONICAL/LOG ANTENNA 1	ANTENNA RESEARCH	LPB-2520	1037	LIBERTY LABS
BICONICAL/LOG ANTENNA 2	ANTENNA RESEARCH	LPB-2520	1036	LIBERTY LABS
FIELD SITE SOURCE	EMCO	4610	9604-1313	RTL
FILTER (ROOM 1)	SOLAR	8130	947305	RTL
FILTER (ROOM 2)	SOLAR	8130	947306	RTL
HARMONIC MIXER 1	HEWLETT PACKARD	11970K	2332A00563	TELOGY
HARMONIC MIXER 2	HEWLETT PACKARD	11970A	2332A01199	TELOGY
HORN ANTENNA 1	EMCO	3160-10	9606-1033	EMCO
HORN ANTENNA 2	EMCO	3160-9	9605-1051	EMCO
HORN ANTENNA 3	EMCO	3160-7	9605-1054	EMCO
HORN ANTENNA 4	EMCO	3160-8	9605-1044	EMCO
HORN ANTENNA 5	EMCO	3160-03	9508-1024	EMCO
LISN (ROOM 1/L1)	SOLAR	7225-1	900727	ACUCAL
LISN (ROOM 1/L2)	SOLAR	7225-1	900726	ACUCAL
LISN (ROOM 2/L1)	SOLAR	7225-1	900078	ACUCAL
LISN (ROOM 2/L2)	SOLAR	7225-1	900077	ACUCAL
PRE-AMPLIFIER	HEWLETT PACKARD	8449B OPT	3008A00505	TELOGY
QUASI-PEAK ADAPTER (S/A 1)	HEWLETT PACKARD	85650A	3145A01599	ACUCAL
QUASI-PEAK ADAPTER (S/A 2)	HEWLETT PACKARD	85650A	2811A01276	ACUCAL
QUASI-PEAK ADAPTER (S/A 3)	HEWLETT PACKARD	85650A	2521A00473	ACUCAL
QUASI-PEAK ADAPTER (S/A 4)	HEWLETT PACKARD	85650A	2521A01032	ACUCAL
RF PRESELECTOR (S/A 1)	HEWLETT PACKARD	85685A	3146A01309	ACUCAL
SIGNAL GENERATOR (HP)	HEWLETT PACKARD	8660C	1947A02956	ACUCAL
SIGNAL GENERATOR (WAVETEK)	WAVETEK	3510B	4952044	ACUCAL
SPECTRUM ANALYZER 1	HEWLETT PACKARD	8566B	3138A07771	ACUCAL
SPECTRUM ANALYZER 2	HEWLETT PACKARD	8567A	2841A00614	ACUCAL
SPECTRUM ANALYZER 4	HEWLETT PACKARD	8567A	2727A00535	ACUCAL
TUNABLE DIPOLE	EMCO	3121	274	LIBERTY LABS
ANTENNA	ATM	WR08	08443-6	ATM
MIXER	OLESON	M08HW	F80814-1	OLESON
MIXER	OLESON	M05HW	G80814-1	OLESON
DIPLEXER	OLESON	M05HW	G80814-1	OLESON
MIXER	HEWLETT PACKARD	11970U	2332A01110	ACUCAL
MIXER	HEWLETT PACKARD	11970V	2521A00512	TELOGY
MIXER	HEWLETT PACKARD	11970W	2521A00710	TELOGY
ANTENNA	ATM	WR15	15-443-6	ATM
ANTENNA	ATM	WR10	10-443-6	ATM
ANTENNA	ATM	WR05	05-443-6	ATM
SWEEP GENERATOR	HEWLETT PACKARD	83752A	3610A00866	HEWLETT PACKARD

2.6 TEST METHODOLOGY

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 Hewlett Packard 8566B spectrum analyzer, a Hewlett Packard 85650A quasi-peak adapter, and EMCO log periodic and biconical antenna. In order to gain sensitivity, a New Circuits ZHL-4240W preamplifier was connected in series between the antenna and the input of the spectrum analyzer.

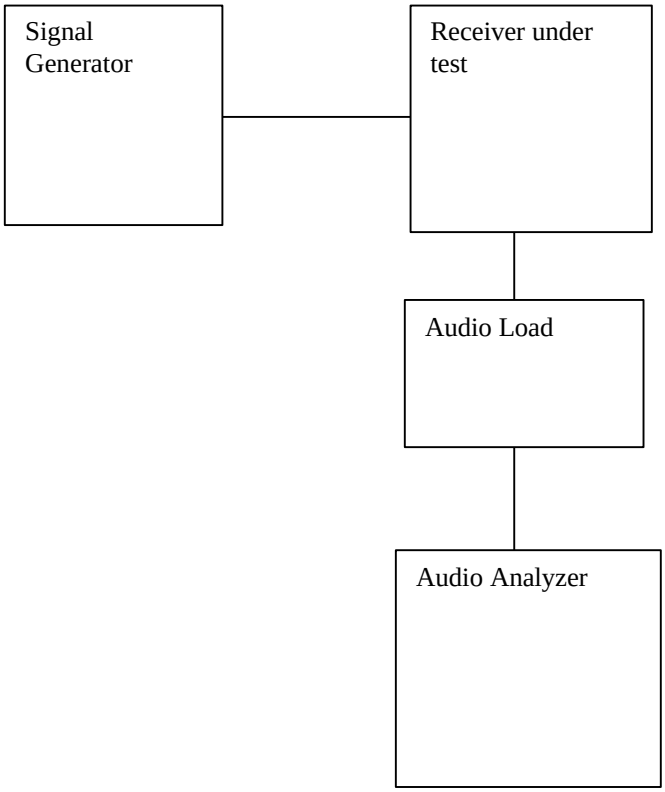
At each frequency, the EUT was rotated 360 degrees, and the antenna was raised and lowered from one to four meters in order to determine the maximum emission levels. Measurements were taken using both horizontal and vertical antenna polarizations. The spectrum analyzer's 6 dB bandwidth was set to 120 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. When any clock exceeds 108 MHz, the EUT was tested between 1 to 2 Gigahertz in peak mode with the resolution bandwidth set at 1 MHz as stated in ANSI C63.4. 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.

38dB REJECTION TEST MEASUREMENTS

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

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


Signal Generator
Receiver under test
Audio Load
Audio Analyzer

3.0 TEST RESULTS

3.1 RADIATED EMISSION DATA

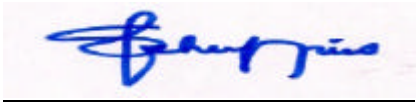
TABLE 1: RADIATED EMISSIONS: (VHF 136MHz)

(Temperature: 58° F Degree, Humidity: 29%)

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV/m)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
114.310	Qp	H	180	1.4	43.0	-16.3	26.7	43.5	-16.8
228.595	Qp	H	90	1.4	51.3	-16.9	34.4	46.0	-11.6
272.000	Qp	H	0	1.0	55.7	-14.1	41.6	46.0	-4.4
342.920	Qp	H	90	1.0	46.4	-12.0	34.4	46.0	-11.6
408.000	Qp	H	0	1.0	47.4	-9.4	38.0	46.0	-8.0
457.220	Qp	H	145	1.0	45.2	-9.2	36.0	46.0	-10.0
571.530	Qp	H	145	1.0	37.7	-6.1	31.6	46.0	-14.4
685.828	Qp	H	90	1.0	42.2	-5.5	36.7	46.0	-9.3
914.440	Qp	H	175	1.0	44.2	-2.7	41.5	46.0	-4.5

All readings are quasi-peak, unless stated otherwise.

TEST PERSONNEL:

Signature: 

Date: November 1, 1999

Typed/Printed Name: K. Franck Schuppius

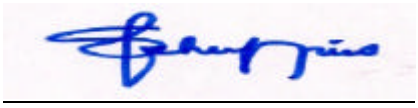
TABLE 2: RADIATED EMISSIONS: (VHF 155 MHz)

(Temperature: 64° F Degree, Humidity: 18%)

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV/m)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
133.303	Qp	H	145	1.0	44.6	-16.4	28.2	43.5	-15.3
266.600	Qp	H	145	1.6	41.4	-13.5	27.9	46.0	-18.1
399.900	Qp	H	0	1.4	36.3	-10.4	25.9	46.0	-20.1
533.200	Qp	H	180	1.3	42.1	-8.0	34.1	46.0	-11.9
799.800	Qp	H	90	1.0	30.7	-3.3	27.4	46.0	-18.6
933.096	Qp	V	0	1.0	45.3	-3.3	42.0	46.0	-4.0

All readings are quasi-peak, unless stated otherwise.

TEST PERSONNEL:

Signature: 

Date: November 2, 1999

Typed/Printed Name: K. Franck Schuppius

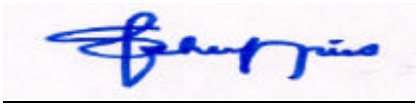
TABLE 3: RADIATED EMISSIONS: (VHF 173.995MHz)

(Temperature: 64° F Degree, Humidity: 18%)

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV/m)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
152.290	Qp	H	180	1.8	50.5	-18.3	32.2	43.5	-11.3
304.580	Qp	H	0	1.0	45.4	-14.1	31.3	46.0	-14.7
456.870	Qp	H	270	1.0	44.2	-10.0	34.2	46.0	-11.8
609.159	Qp	H	0	1.0	44.1	-6.6	37.5	46.0	-8.5
761.450	Qp	H	0	1.0	32.3	-4.2	28.1	46.0	-17.9
913.740	Qp	H	90	1.0	38.0	-4.1	33.9	46.0	-12.1

All readings are quasi-peak, unless stated otherwise.

TEST PERSONNEL:

Signature: 

Date: November 2, 1999

Typed/Printed Name: K. Franck Schuppius

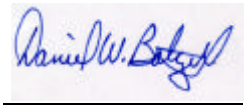
TABLE 4: RADIATED EMISSIONS: (UHF 420 MHz)

(Temperature: 31° F Degree, Humidity: 4%)

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV/m)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
111.800	Qp	V	90	1.0	36.2	-16.1	20.1	43.5	-23.4
224.900	Qp	V	0	1.0	37.1	-17.2	19.9	46.0	-26.1
389.150	Qp	H	185	1.0	56.0	-11.0	45.0	46.0	-1.0
400.000	Qp	V	180	1.0	40.7	-10.9	29.8	46.0	-16.2
428.065	Qp	V	90	1.0	34.3	-9.2	25.1	46.0	-20.9
448.434	Qp	H	145	1.0	31.3	-9.3	22.0	46.0	-24.0
778.300	Qp	H	30	1.1	40.9	-4.0	36.9	46.0	-9.1

All readings are quasi-peak, unless stated otherwise.

TEST PERSONNEL:

Signature: 

Date: January 23, 2000

Typed/Printed Name: Daniel Baltzell

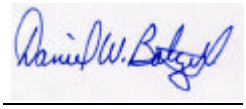
TABLE 5: RADIATED EMISSIONS: (UHF 445 MHz)

(Temperature: 31° F Degree, Humidity: 4%)

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV/m)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
121.580	Qp	H	145	1.0	35.7	-16.5	19.2	43.5	-24.3
182.370	Qp	H	135	1.0	33.9	-18.8	15.1	43.5	-28.4
185.100	Qp	V	124	1.0	35.7	-18.6	17.1	43.5	-26.4
246.800	Qp	H	220	1.0	34.3	-15.6	18.7	46.0	-27.3
336.070	Qp	H	270	1.0	35.6	-13.3	22.3	46.0	-23.7
414.150	Qp	H	30	1.0	48.0	-8.8	39.2	46.0	-6.8
828.300	Qp	H	30	1.2	40.2	-3.1	37.1	46.0	-8.9

All readings are quasi-peak, unless stated otherwise.

TEST PERSONNEL:

Signature: 

Date: January 23, 2000

Typed/Printed Name: Daniel Baltzell

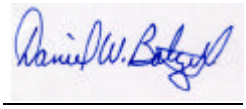
TABLE 6: RADIATED EMISSIONS: (UHF 470 MHz)

(Temperature: 31° F Degree, Humidity: 4%)

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV/m)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
91.185	Qp	H	220	1.0	37.0	-19.7	17.3	43.5	-26.2
121.580	Qp	H	135	1.0	35.8	-16.5	19.3	43.5	-24.2
243.160	Qp	H	225	1.0	36.3	-16.2	20.1	46.0	-25.9
303.950	Qp	V	180	1.0	35.0	-14.2	20.8	46.0	-25.2
439.150	Qp	H	125	1.0	48.6	-9.4	39.2	46.0	-6.8
878.300	Qp	H	50	1.2	41.1	-2.5	38.6	46.0	-7.4

All readings are quasi-peak, unless stated otherwise.

TEST PERSONNEL:

Signature: 

Date: January 23, 2000

Typed/Printed Name: Daniel Baltzell

3.2 38dB REJECTION TEST

The UHF (400 MHz – 489 MHz) and VHF (130 MHz – 173 MHz) bands of the receiver under test were checked to determine the highest 12 dB SINAD level on the signal generator which would be used to determine a level at which to scan for the 38 dB rejection test. A high, middle, and low channel were used for each band and a –23 dBm at 487.14 MHz was determined to be worst case of both UHF and VHF bands. 40 dB was added to –23 dBm and the signal generator was set at 17 dBm as the level used in both bands. A high, middle, and low channel from the mobile and base bands was selected to scan and the receiver set into scanning mode; however, it did not stop on any channels so no comparison signal could be used to determine the 38 dB rejection. Channels selected from each band were:

MOBILE BAND

824.04 MHz - low frequency
836.00 MHz - medium frequency
848.97 MHz - high frequency

BASE BAND

869.04 MHz – low frequency
881.00 MHz – medium frequency
893.97 MHz – high frequency

3.3 CONFORMANCE STATEMENT

I, the undersigned, hereby declare that the equipment tested and referenced in this report conforms to the identified standard(s) as described in this attached test record. The modifications mentioned in this report were made during testing 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 1, 2000

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.