Engineering and Testing for EMC and Safety Compliance

APPLICATION FOR FCC CLASS B CERTIFICATION

COMMUNICATION RECEIVER

Icom America, Inc.
12380 116th Avenue N.E
Bellevue, WA 98004

MODEL: IC-R3

FCC ID: AFJIC-R3

September 25, 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:** _____ ***September 19. 2000*** **Company name agrees to notify the Commission by: _____(date) of the intended September 19. 2000of 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:

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Rhein Tech Laboratories, Inc.

Document Number: 2000381 / QRTL00-356

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1 GENERAL INFORMATION

The following Application for FCC Type Certification of a Scanning Receiver is prepared on behalf of ***Icom America, 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 ***IC-R3, FCC ID: AFJIC-R3.*** 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 STANDARDS REFERENCED

STANDARDS REFERENCED FOR THIS REPORT	
FCC RULES AND REGULATION	PART 2 SUBPART J
FCC RULES AND REGULATION	PART 15 §15.109
FCC RULES AND REGULATION	PART 15 §15.111
FCC RULES AND REGULATION	PART 15 § 15.121
ANSI	C63.4:1992

1.2 BASIC INFORMATION ON THE EUT

FREQUENCY RANGE MHz	OUTPUT POWER (W)	FREQUENCY TOLERANCE	EMISSION DESIGNATOR
AM 0.495-4.995 MHz	N/A	MORE 12KHZ/-6 DB LESS THAN 30 KHZ/-50 DB	N/A
5.0-29.995	N/A		N/A
118-136	N/A		N/A
222-329.995	N/A		N/A
FM 1.625-4.995	N/A		N/A
5-469.995	N/A		N/A
470-799.995	N/A		N/A
800-1999.995	N/A		N/A
2000-2299.995	N/A		N/A
2300-2450.095	N/A		N/A
WFM 76-107.995	N/A	MORE 150KHZ/-6 DB	N/A
175-221.995	N/A		N/A
470-769.995	N/A		N/A

1.3 MODIFICATIONS

Modifications were not made to the EUT during testing.

1.4 RELATED SUBMITTAL(S)/GRANT(S)

This is an original certification submission.

1.5 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.

1.6 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 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 and a TV Pattern generator to generate a continuous wave frequency, which was received by and activated the EUT receiver portion under test.

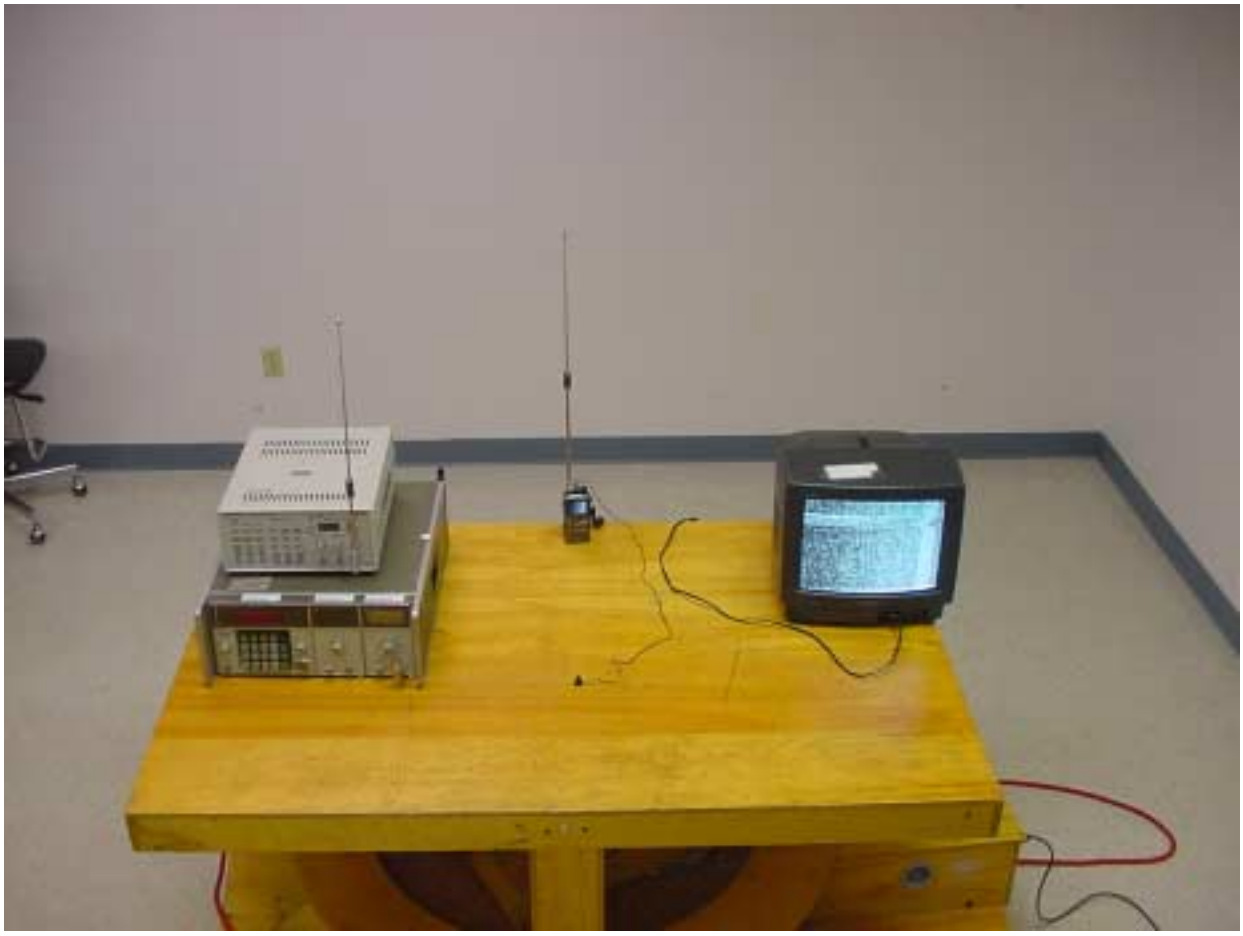
2.3 TEST SYSTEM DETAILS

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

2.3.1 External Peripherals

PART	MANUFACTURER	MODEL	SERIAL NUMBER	FCC ID	CABLE DESCRIPTION	RTL BAR CODE
EARPHONE	ICOM	SP-13	N/A	N/A	S I/O	N/A
ANTENNA	RADIOSHACK	6-1/4"	N/A	N/A		N/A
TRANSCEIVER	ICOM	IC-R3	20602	AFJ IC-R3		011867
SIGNAL GENERATOR	HEWLETT PACKARD	8660C SYNTHESIZED SIGNAL GENERATOR	1947A02956	N/A	SHIELDED POWER	900059
POWER SUPPLY	ICOM	BC-136A	N/A	N/A	UNSHIELDED POWER	12501
CAR POWER ADAPTER	ICOM			N/A	UNSHIELDED POWER	

2.3.2 Configuration Photograph



3 EMISSIONS EQUIPMENT LIST

RTL equipment for emission testing					
RTL Asset Number	**Manufacturer**	**Model**	**Part Type**	**Serial Number**	**Calibration due date**
900969	Hewlett Packard	85650A	Quasi-Peak Adapter (30 Hz – 40 GHz)	2412A00414	03/23/01
900929	Hewlett Packard	85650A	Quasi-Peak Adapter (30 Hz – 40 GHz)	2811A01276	03/28/01
900901	Hewlett Packard	85650A	Quasi-Peak Adapter (30 Hz – 40 GHz)	3145A01599	11/09/00
900339	Hewlett Packard	85650A	Quasi-Peak Adapter (30 Hz – 40 GHz)	2521A00743	03/27/01
900042	Hewlett Packard	85650A	Quasi-Peak Adapter (30 Hz – 40 GHz)	2521A01032	11/09/00
900933	Hewlett Packard	11975A	Power Amplifier (2 - 8 GHz)	2304A00348	11/10/00
901067	Hewlett Packard	8903B	Audio Analyzer	2303A00307	06/28/01
900968	Hewlett Packard	8567A	Spectrum Analyzer (10 kHz - 1.5 GHz)	2602A00160	03/23/01
900903	Hewlett Packard	8567A	Spectrum Analyzer (10 kHz - 1.5 GHz)	2841A00614	11/09/00
900897	Hewlett Packard	8567A	Spectrum Analyzer (10 kHz - 1.5 GHz)	2727A00535	11/09/00
901089	Hewlett Packard	HP875ET	Transmission/Reflection Network Analyzer	US39170052	N/A
901055	Hewlett Packard	8901A Opt. 002-003	Modulation Analyzer	2545A04102	06/08/01
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719	03/06/01
901016	Hewlett Packard	8565E	Portable Spectrum Analyzer (30 Hz-50 GHz)	3846A01069	02/28/01
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771	03/27/01
900926	Hewlett Packard	8753D	RF Vector Network Analyzer	3410A09659	03/28/01
900912	Hewlett Packard	8568A	RF Spectrum Analyzer (100 Hz - 1.5 GHz)	2634A02704	08/02/01
900824	Hewlett Packard	8591E	RF Spectrum Analyzer (9 KHz - 1.8 GHz)	3710A06135	11/10/00
901088	Hewlett Packard	HP8954A	Transceiver Interface	2146A00139	07/28/01
901057	Hewlett Packard	3336B	Synthesizer/Level Generator	2514A02585	06/21/01
900151	Rohde@Schwarz	HFH2-Z2	Loop Antenna (9 kHz - 30 MHz)	827525/019	05/26/01
900800	EMCO	3301B	Active Monopole	9809-4071	05/02/01
900154	Compliance Design Inc,	Roberts Dipole	Adjustable Elements Dipole Antenna (30-1000MHz)	-	07/266/01
900725	Antenna Research Associates, Inc.	LPB-2520	LOG Periodic /Biconical Antenna (25-1000MHz)	1036	07/12/01
900724	Antenna Research Associates, Inc.	LPB-2520	LOG Periodic /Biconical Antenna (25-1000MHz)	1037	02/01/01
901053	Schaffner	CBL6112B	Bi-Log Chase Antenna (200 MHz – 2 GHz)	2648	07/24/01
900713	ATM	WR05	Horn Antennas (140-220 GHz)	05-443-6	N/A
900826	ATM	WR08,	Horn Antennas (50-220 GHz)	8041904-1	N/A
900711	ATM	WR10	Horn Antennas (75-110 GHz)	8051905-1	N/A
900712	ATM	WR15	Horn Antennas (50-75 GHz)	8051805-1	N/A
900814	Electro-Metrics	RGA-60	Double Ridges Guide Antenna (1-18 GHz)	2310	02/26/01
900791	Schaffner - Chase	CBL6112	Antenna (25 MHz - 2 GHz)	2099	02/22/01
900321	EMCO	3161-03	Horn Antennas (4-8,2GHz)	9508-1020	N/A
900323	EMCO	3160-7	Horn Antennas (8,2-12,4 GHz)	9605-1054	N/A
900325	EMCO	3160-9	Horn Antennas (18 - 26.5 GHz)	9605-1051	N/A
900338	EMCO	3160-10	Horn Antennas (26.5 - 40 GHz)	9606-1033	N/A
900970	Hewlett Packard	85662A	Spectrum Analyzer Display	254211239	03/23/01
900930	Hewlett Packard	85662A	Spectrum Analyzer Display	3144A20839	03/28/01
900911	Hewlett Packard	85662A	Spectrum Analyzer Display	2542A12739	08/02/01
900902	Hewlett Packard	85662A	Spectrum Analyzer Display	2848A17585	11/09/00

RTL equipment for emission testing

RTL Asset Number	Manufacturer	Model	Part Type	Serial Number	Calibration due date
900896	Hewlett Packard	85662A	Spectrum Analyzer Display	2816A16471	11/09/00
900914	Hewlett Packard	8546OA	RF Filter Section, (100 KHz to 6.5 GHz)	3330A00107	05/10/00
900059	Hewlett Packard	8660C	Synthesized Signal Generator (9KHz to 3200 MHz)	1947A02956	11/09/00
900960	Hewlett Packard	8444A	Tracking Generator (0.5 -1500MHz)	2325A07827	03/08/01
900917	Hewlett Packard	8648C	Synthesized. Signal Generator (9 KHz to 3200 MHz)	3537A01741	03/28/00
900660	Philips	PM-5418TDS	TV Generator	LO 604891	11/10/00
901083	AFJ International	LS16/110VAC	LISN, 16A	16010020080	06/16/01
901082	AFJ International	LS16/110VAC	LISN, 16A	16010020081	06/16/01
901084	AFJ International	LS16/110VAC	LISN, 16A	16010020082	06/16/01
900726	Solar	7225-1	LISN	-	03/29/01
900727	Solar	7225-1	LISN	-	03/29/01
901090	Bajog electronic GmbH	4V-100/200	LISN (150 kHz – 30 MHz)	00-44-007	08/03/00
901054	Hewlett Packard	HP 3586B	Selective Level Meter	1928A01892	06/08/01
900126	Hewlett Packard	11970A	Harmonic Mixer (26-40 GHz)	2332A01199	11/10/02
900396	Hewlett Packard	11970K	Harmonic Mixer (18-26 GHz)	2332A00563	11/00/02
900717	Hewlett Packard	11970U	Harmonic Mixer (40-60 GHz)	2332A01110	06/18/01
900715	Hewlett Packard	11970V	Harmonic Mixer (50-75 GHz)	2521A00512	06/18/01
900716	Hewlett Packard	11970W	Harmonic Mixer (75-110 GHz)	2521A00710	06/12/01
900752	Oleson Microwave Lab.	M05HW	Mixer (140-700 GHz)	G80814-1	08/14/01
900751	Oleson Microwave Lab.	M08HW	Mixer (90-140 GHz)	F80814-1	08/14/01
900770	Hewlett Packard	437B	Power Meter	2949A02966	11/09/00
900769	Hewlett Packard	8481B	Power Sensor	2702A05059	11/09/00
900061	Hewlett Packard	86603A	RF Plug-in (1 to 2600 MHz)	2221A02967	11/09/00
900932	Hewlett Packard	8449B OPT H02	Preamplifier (1-26.5 GHz)	3008A00505	11/10/00
900889	Hewlett Packard	85685A	RF Preselector for HP 8566B or 8568B (20Hz-2GHz)	3146A01309	11/10/00
900913	Hewlett Packard	85462A	EMI Receiver RF Section (9 KHz – 6.5 GHz)	3325A00159	03/29/01
900937	Hewlett Packard	8482H	3-watt Power Sensor (100 KHz to 4.2 GHz)	3318A08961	07/18/00
900928	Hewlett Packard	83752A	Synthesized Sweeper, 0.01 to 20 GHz	3610A00866	03/28/01
900946	Tenney Engineering, Inc.	TH65	Temperature Chamber with Humidity	11380	09/22/00

4 TEST METHODOLOGY

4.1 CONDUCTED 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 400 kHz high-pass filter. The filter is used to prevent overload of the spectrum analyzer from noise below 400 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 (150/450) kHz to 30 MHz. The highest emission amplitudes relative to the appropriate limit were measured and have been recorded in this report.

4.2 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.

5 CONDUCTED EMISSION DATA

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. If the conducted emissions exceed the limit with the instrument set to the quasi-peak mode, then measurements are made in the average mode. If the quasi-peak measurement is at least 6dB higher than the amplitude in the average mode, the level measured in the quasi-peak mode may be reduced by 13dB before comparing it to the limit.

The conducted test was performed with the EUT exercise program loaded, and the emissions were scanned between 450 kHz to 30 MHz on the NEUTRAL SIDE and HOT SIDE, herein referred to as L1 and L2, respectively.

Pk = Peak; QP = Quasi-Peak; Av = Average

5.1.1 Conducted Emissions: TV channel 2 (1) and channel 69 (2)

5.1.1.1 Neutral Side (L1)

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
4.2	Pk	23.9	1.7	25.6	48	-22.4	48	-22.4	Pass	1
14.93	Pk	21.1	2.9	24	48	-24	48	-24	Pass	1
27.107	Pk	22.3	3.5	25.8	48	-22.2	48	-22.2	Pass	1
0.498	Pk	26.6	0.9	27.5	48	-20.5	48	-20.5	Pass	2
4.083	Pk	24.6	1.6	26.2	48	-21.8	48	-21.8	Pass	2
26.298	Pk	21.3	3.5	24.8	48	-23.2	48	-23.2	Pass	2

5.1.1.2 Hot Side (L2)

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
9.415	Pk	24.5	2.3	26.8	48	-21.2	48	-21.2	Pass	1
0.519	Pk	27.7	0.7	28.4	48	-19.6	48	-19.6	Pass	1
0.518	Pk	27.5	0.7	28.2	48	-19.8	48	-19.8	Pass	1
10.22	Pk	23.7	2.4	26.1	48	-21.9	48	-21.9	Pass	2
29.732	Pk	23.1	3.5	26.6	48	-21.4	48	-21.4	Pass	2
0.45	Pk	25.3	0.7	26	48	-22	48	-22	Pass	2

TEST PERSONNEL:

Signature: _____ DATE : September 19. 2000

Typed/Printed Name: Rachid SEHB

5.1.2 Conducted Emissions: Channel @ 30 MHz (1) and 224.995 MHz (2)

5.1.2.1 Neutral Side (L1)

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
0.45	Pk	31.7	0.8	32.5	48	-15.5	48	-15.5	Pass	1
4.41	Pk	22.3	1.8	24.1	48	-23.9	48	-23.9	Pass	1
28.059	Pk	21.4	3.4	24.8	48	-23.2	48	-23.2	Pass	1
0.485	Pk	33.4	0.7	34.1	48	-13.9	48	-13.9	Pass	2
0.578	Pk	29.1	0.7	29.8	48	-18.2	48	-18.2	Pass	2
4.099	Pk	23.5	1.6	25.1	48	-22.9	48	-22.9	Pass	2

5.1.2.2 Hot Side (L2)

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
0.45	Pk	29.8	0.7	30.5	48	-17.5	48	-17.5	Pass	1
0.45	Pk	30.1	0.8	30.9	48	-17.1	48	-17.1	Pass	1
29.533	Pk	23.4	3.5	26.9	48	-21.1	48	-21.1	Pass	1
0.45	Pk	30.1	0.8	30.9	48	-17.1	48	-17.1	Pass	2
7.948	Pk	21.2	2.2	23.4	48	-24.6	48	-24.6	Pass	2
29.533	Pk	23.4	3.5	26.9	48	-21.1	48	-21.1	Pass	2

TEST PERSONNEL:

Signature: _____ DATE : September 19. 2000

Typed/Printed Name: Rachid SEHB

5.1.3 Conducted Emissions: channel @ frequency 330 MHz (1) and 469.995 MHz (2)

5.1.3.1 Neutral Side (L1)

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
0.482	Pk	32.7	0.8	33.5	48	-14.5	48	-14.5	Pass	1
4.164	Pk	23.6	1.7	25.3	48	-22.7	48	-22.7	Pass	1
28.871	Pk	21	3.4	24.4	48	-23.6	48	-23.6	Pass	1
0.482	Pk	32.3	0.8	33.1	48	-14.9	48	-14.9	Pass	2
0.48	Pk	32.2	0.8	33	48	-15	48	-15	Pass	2
0.582	Pk	29.1	0.9	30	48	-18	48	-18	Pass	2

5.1.3.2 Hot Side (L2)

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
0.487	Pk	32.3	0.7	33	48	-15	48	-15	Pass	1
9.438	Pk	22.3	2.3	24.6	48	-23.4	48	-23.4	Pass	1
29.255	Pk	23.9	3.5	27.4	48	-20.6	48	-20.6	Pass	1
0.489	Pk	31.9	0.7	32.6	48	-15.4	48	-15.4	Pass	2
27.951	Pk	23.5	3.5	27	48	-21	48	-21	Pass	2
4.414	Pk	23.6	1.7	25.3	48	-22.7	48	-22.7	Pass	2

TEST PERSONNEL:

Signature: _____ DATE : September 19. 2000

Typed/Printed Name: Rachid SEHB

5.1.4 Conducted Emissions: channel @ frequency 470 MHz (1) and 799.995 MHz (2)

5.1.4.1 Neutral Side (L1)

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
0.487	Pk	32.3	0.8	33.1	48	-14.9	48	-14.9	Pass	1
0.578	Pk	28.8	0.9	29.7	48	-18.3	48	-18.3	Pass	1
4.1	Pk	22.9	1.6	24.5	48	-23.5	48	-23.5	Pass	1
0.488	Pk	32.7	0.8	33.5	48	-14.5	48	-14.5	Pass	2
4.045	Pk	24.8	1.6	26.4	48	-21.6	48	-21.6	Pass	2
27.612	Pk	22.6	3.4	26	48	-22	48	-22	Pass	2

5.1.4.2 Hot Side (L2)

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
0.54	Pk	24.6	0.7	25.3	48	-22.7	48	-22.7	Pass	1
0.498	Pk	30.3	0.7	31	48	-17	48	-17	Pass	1
27.772	Pk	23.2	3.5	26.7	48	-21.3	48	-21.3	Pass	1
0.481	Pk	32	0.7	32.7	48	-15.3	48	-15.3	Pass	2
29.576	Pk	24.3	3.5	27.8	48	-20.2	48	-20.2	Pass	2
9.061	Pk	23.2	2.3	25.5	48	-22.5	48	-22.5	Pass	2

TEST PERSONNEL:

Signature: _____ DATE : September 19. 2000

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5.1.5 Conducted Emissions: channel @ frequency 225 MHz (1) and 329.995MHz (2

5.1.5.1 Neutral Side (L1)

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
0.591	Pk	29.7	0.9	30.6	48	-17.4	48	-17.4	Pass	1
0.687	Pk	27.8	0.8	28.6	48	-19.4	48	-19.4	Pass	1
4.451	Pk	24.9	1.8	26.7	48	-21.3	48	-21.3	Pass	1
0.481	Pk	32.2	0.8	33	48	-15	48	-15	Pass	2
0.573	Pk	26.9	0.9	27.8	48	-20.2	48	-20.2	Pass	2
4.411	Pk	24.6	1.8	26.4	48	-21.6	48	-21.6	Pass	2

5.1.5.2 Hot Side (L2)

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
0.486	Pk	31.3	0.7	32	48	-16	48	-16	Pass	1
9.811	Pk	22.4	2.4	24.8	48	-23.2	48	-23.2	Pass	1
28.539	Pk	24.4	3.5	27.9	48	-20.1	48	-20.1	Pass	1
0.478	Pk	30.7	0.7	31.4	48	-16.6	48	-16.6	Pass	2
0.58	Pk	27.4	0.7	28.1	48	-19.9	48	-19.9	Pass	2
28.997	Pk	24.1	3.4	27.5	48	-20.5	48	-20.5	Pass	2

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5.1.6 Conducted Emissions: channel @ frequency 800 MHz (1) and 960.MHz (2)

5.1.6.1 Neutral Side (L1)

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
0.485	Pk	33.3	0.8	34.1	48	-13.9	48	-13.9	Pass	1
4.391	Pk	23.9	1.8	25.7	48	-22.3	48	-22.3	Pass	1
26.025	Pk	22.3	3.5	25.8	48	-22.2	48	-22.2	Pass	1
0.488	Pk	32.9	0.7	33.6	48	-14.4	48	-14.4	Pass	2
4.365	Pk	24.8	1.7	26.5	48	-21.5	48	-21.5	Pass	2
25.285	Pk	22	3.6	25.6	48	-22.4	48	-22.4	Pass	2

5.1.6.2 Hot Side (L2)

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
0.486	Pk	31.9	0.7	32.6	48	-15.4	48	-15.4	Pass	1
27.519	Pk	23.8	3.5	27.3	48	-20.7	48	-20.7	Pass	1
9.661	Pk	22.3	2.4	24.7	48	-23.3	48	-23.3	Pass	1
27.91	Pk	23.2	3.4	26.6	48	-21.4	48	-21.4	Pass	2
0.487	Pk	32.6	0.8	33.4	48	-14.6	48	-14.6	Pass	2
9.596	Pk	22.3	2.4	24.7	48	-23.3	48	-23.3	Pass	2

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6 RADIATED EMISSION TEST DATA

6.1 RADIATED EMISSIONS: TV CHANNEL 2 (1) AND CHANNEL 69 (2)

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)	Comments
49.850	Qp	H	0	1.0	30.3	-19.8	10.5	40.0	-29.5	1
276.500	Qp	H	180	1.0	35.8	-13.6	22.2	46.0	-23.8	1
297.101	Qp	H	90	1.0	41.4	-13.4	28.0	46.0	-18.0	1
280.447	Qp	H	90	1.0	40.3	-13.5	26.8	46.0	-19.2	2
286.070	Qp	H	90	1.0	37.1	-13.5	23.6	46.0	-22.4	2
233.288	Qp	H	180	1.0	34.9	-16.3	18.6	46.0	-27.4	2
85.905	Qp	H	270	1.0	36.1	-20.3	15.8	40.0	-24.2	2

All readings are quasi-peak, unless stated otherwise.

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6.2 RADIATED EMISSIONS: CHANNEL @ FREQUENCY 330 MHZ (1) AND 469.995 MHZ (2)

(Temperature: 76°F Degree, Humidity: 25%)

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)	Comments
270.100	Qp	H	90	1.0	35.7	-13.6	22.1	46.0	-23.9	1
419.996	Qp	V	0	1.0	32.1	-8.8	23.3	46.0	-22.7	1
810.300	Qp	H	270	1.0	30.9	-2.8	28.1	46.0	-17.9	1
899.984	Qp	H	100	1.0	30.5	-2.1	28.4	46.0	-17.6	1
214.783	Qp	H	180	1.0	33.4	-16.9	16.5	43.5	-27.0	2
600.000	Qp	H	180	1.0	31.1	-6.3	24.8	46.0	-21.2	2
930.190	Qp	V	180	1.0	32.5	-3.0	29.5	46.0	-16.5	2

All readings are quasi-peak, unless stated otherwise.

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6.3 RADIATED EMISSIONS: CHANNEL @ 30 MHZ (1) AND 224.995 MHZ (2)

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV/m) (dB/m)	Site Correction Factor	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Comments
214.048	Qp	H	90	1.0	37.9	-17.0	20.9	43.5	-22.6	1
229.081	Qp	H	180	1.0	33.1	-16.4	16.7	46.0	-29.3	1
343.266	Qp	H	10	1.0	27.1	-12.1	15.0	46.0	-31.0	1
428.102	Qp	H	10	1.0	30.6	-9.9	20.7	46.0	-25.3	1
570.100	Qp	V	80	1.0	36.3	-7.9	28.4	46.0	-17.6	1
855.158	Qp	H	90	1.0	38.0	-2.7	35.3	46.0	-10.7	1
285.044	Qp	H	90	1.0	44.6	-14.7	29.9	46.0	-16.1	1
229.066	Qp	H	10	1.0	36.1	-16.4	19.7	46.0	-26.3	2
229.819	Qp	V	0	1.0	24.9	-16.6	8.3	46.0	-37.7	2
355.018	Qp	H	90	1.0	39.4	-12.3	27.1	46.0	-18.9	2
465.095	Qp	V	270	1.0	34.6	-8.4	26.2	46.0	-19.8	2

All readings are quasi-peak, unless stated otherwise.

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6.4 RADIATED EMISSIONS: CHANNEL @ FREQUENCY 470 MHZ (1) AND 799.995 MHZ (2)

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)	Comments
343.632	Qp	V	10	1.0	27.8	-12.0	15.8	46.0	-30.2	1
710.100	Qp	V	180	1.0	30.7	-4.8	25.9	46.0	-20.1	1
355.052	Qp	V	95	1.0	41.8	-11.2	30.6	46.0	-15.4	1
229.088	Qp	V	90	1.0	38.0	-16.6	21.4	46.0	-24.6	1
343.572	Qp	H	180	1.0	23.4	-11.7	11.7	46.0	-34.3	2
520.023	Qp	V	90	1.0	43.1	-7.8	35.3	46.0	-10.7	2

All readings are quasi-peak, unless stated otherwise.

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6.5 RADIATED EMISSIONS: CHANNEL @ FREQUENCY 225 MHZ (1) AND 329.995MHZ (2)

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)	Comments
465.100	Qp	V	180	1.0	37.9	-8.4	29.5	46.0	-16.5	1
229.070	Qp	V	90	1.0	37.4	-16.6	20.8	46.0	-25.2	1
229.082	Qp	V	270	1.0	37.7	-16.6	21.1	46.0	-24.9	2
428.060	Qp	H	100	14.0	21.7	-8.8	12.9	46.0	-33.1	2

All readings are quasi-peak, unless stated otherwise.

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6.6 RADIATED EMISSIONS: CHANNEL @ FREQUENCY 800 MHZ (1) AND 960.MHZ (2)

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)	Comments
559.900	Qp	H	180	1.0	32.3	-6.2	26.1	46.0	-19.9	1
343.861	Qp	H	180	1.0	23.7	-11.6	12.1	46.0	-33.9	1
839.851	Qp	H	100	1.0	31.4	-3.6	27.8	46.0	-18.2	1
359.951	Qp	V	100	1.0	40.8	-11.1	29.7	46.0	-16.3	2
229.066	Qp	V	90	1.0	35.8	-16.6	19.2	46.0	-26.8	2
279.950	Qp	V	240	1.0	37.8	-14.3	23.5	46.0	-22.5	2
719.892	Qp	V	180	1.0	37.7	-4.3	33.4	46.0	-12.6	2

All readings are quasi-peak, unless stated otherwise.

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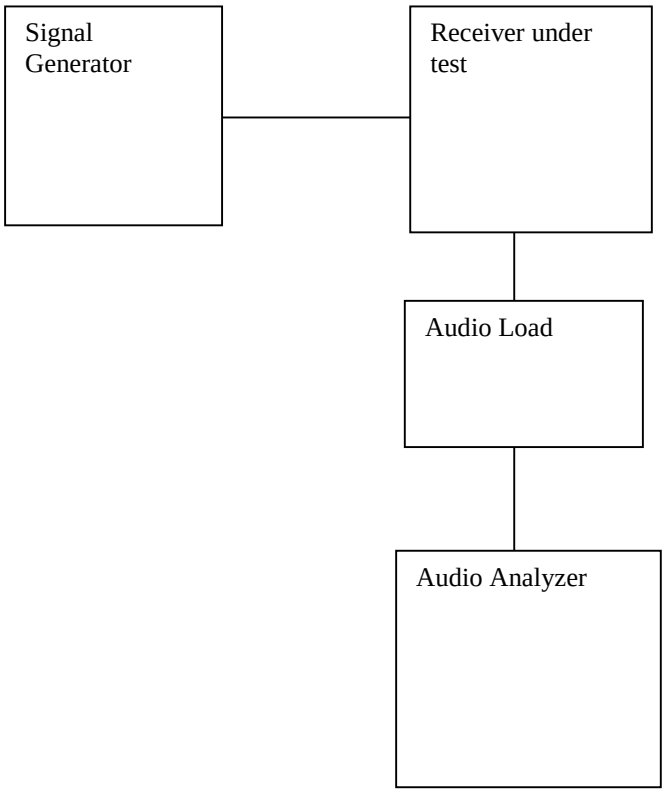
4.1 38dB REJECTION TEST

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.



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 = 869.04 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 frequencies of responses 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, 836.505, 848.97 MHz for the Mobile and 869.04, 881.505, 893.97 MHz for the Base.

The IC-R3 unit reference level used was –52. dBm from the signal generator, this was determined from the highest sensitivity from 2450 MHz at –92dBm measurement of 12dB SINAD. The IC-R3 unit was scanned from 0.495MHz to 815.995 MHz and from 902 MHz to 2450.095 MHz for all six channels (manufacturers spec.).

6.7 38 dB REJECTION MOBILE BAND TEST DATA

Table 1

FREQUENCY INJECTED 824,04 MHZ				
FREQUENCY DETECTED MHZ	**12DB SINAD LEVEL @ 824.04 MHz (DB)**	**12 DB SINAD LEVEL @ DETECTED FREQUENCY (dB)**	**REJECTION (dB)**	**MARGIN (dB)**
949.68	-62.1	-106.6	44.5	6.5
343.84	-60.0	-111.7	51.7	13.7

FREQUENCY INJECTED 836,5 MHZ				
FREQUENCY DETECTED MHZ	**12DB SINAD LEVEL @ 836,5 MHz (dB)**	**12 DB SINAD LEVEL @ DETECTED FREQUENCY (DB)**	**REJECTION (DB)**	**MARGIN (DB)**
NO POINT DETECTED	N/A	N/A	N/A	N/A

FREQUENCY INJECTED 848,97 MHZ				
FREQUENCY DETECTED MHZ	**12DB SINAD LEVEL @ 848,97MHz (dB)**	**12 DB SINAD LEVEL @ DETECTED FREQUENCY (dB)**	**REJECTION (dB)**	**MARGIN (dB)**
703.66	-59.4	-113.3	53.9	15.9
634.92	-65.7	-113.6	47.9	9.9
485.95	-63.2	-111.9	48.7	10.7
368.78	-65.0	-115.0	50.0	12.0

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6.8 38 dB REJECTION FOR CELLULAR BAND TEST DATA

Table 2

FREQUENCY INJECTED	869,04 MHZ			
FREQUENCY DETECTED MHZ	**12DB SINAD LEVEL @ 869,04 MHz (dB)**	**12 DB SINAD LEVEL @ DETECTED FREQUENCY (dB)**	**REJECTION (dB)**	**MARGIN (dB)**
NO POINT DETECTED	N/A	N/A	N/A	N/A

FREQUENCY INJECTED	881,5 MHZ			
FREQUENCY DETECTED MHZ	**12DB SINAD LEVEL @ 881 5 MHz (dB)**	**12 DB SINAD LEVEL @ DETECTED FREQUENCY (dB)**	**REJECTION (dB)**	**MARGIN (dB)**
800.90	-74.0	-114.0	40.0	2.0
719.79	-62.0	-111.5	49.5	11.5
685.06	-60.7	-113.3	52.6	14.6
401.30	-64.2	-116.0	51.8	13.8

FREQUENCY INJECTED	893,97 MHZ			
FREQUENCY DETECTED MHZ	**12DB SINAD LEVEL@ 893.97 MHz (dB)**	**12 DB SINAD LEVEL @ DETECTED FREQUENCY (dB)**	**REJECTION (dB)**	**MARGIN (dB)**
807.15	-73,4	-113.9	40.5	2.5
693.38	-60.0	-112.9	52.9	14.9
679.92	-69.0	-112.7	43.7	5.7

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EUT 38 DB REJECTION TEST CONFIGURATION

7 CONFORMANCE STATEMENT

STANDARDS REFERENCED FOR THIS REPORT	
FCC RULES AND REGULATION	PART 2 SUBPART J
FCC RULES AND REGULATION	PART 15 §15.109
FCC RULES AND REGULATION	PART 15 §15.111
FCC RULES AND REGULATION	PART 15 § 15.121
ANSI	C63.4:1992

I, the undersigned, hereby declare that the equipment tested and referenced in this report conforms to the identified standard(s) as described above. Modifications were not 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 : September 19. 2000
Typed/Printed Name: Desmond A. Fraser Position: President
(NVLAP Signatory)

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

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