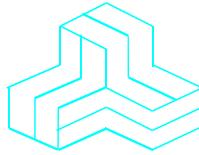


ENGINEERING TEST REPORT



**Wideband Receiver
Model No.: IC-R75**

FCC ID: AFJIC-R75

Applicant:

ICOM Incorporated
1-1-32, Kamiminami, Hirano-ku
Osaka, Japan, 547-0003

Tested in Accordance With

Federal Communications Commission (FCC)
47 CFR, Part 15, Subpart B
Scanning Receivers Operating in the Frequency Band
0.03 - 60 MHz

UltraTech's File No.: ICOM-219F15B121

This Test report is Issued under the Authority of
Tri M. Luu, Professional Engineer,
Vice President of Engineering
UltraTech Group of Labs



Date: July 16, 2009

Report Prepared by: JaeWook Choi

Tested by: Wayne Wu, EMI/RFI Technician

Issued Date: July 16, 2009

Test Dates: June 29, July 7 & 10, 2009

- *The results in this Test Report apply only to the sample(s) tested, and the sample tested is randomly selected.*
- *This report must not be used by the client to claim product endorsement by NVLAP or any agency of the US Government.*

UltraTech Group of Labs

3000 Bristol Circle, Oakville, Ontario, Canada, L6H 6G4

Tel.: (905) 829-1570 Fax.: (905) 829-8050

Website: www.ultratech-labs.com , Email: vic@ultratech-labs.com , Email: tri@ultratech-labs.com



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TABLE OF CONTENTS

EXHIBIT 1. INTRODUCTION	1
1.1. SCOPE.....	1
1.2. RELATED SUBMITTAL(S)/GRANT(S).....	1
1.3. NORMATIVE REFERENCES	1
EXHIBIT 2. PERFORMANCE ASSESSMENT	2
2.1. CLIENT INFORMATION	2
2.2. EQUIPMENT UNDER TEST (EUT) INFORMATION	2
2.3. EUT'S TECHNICAL SPECIFICATIONS	3
2.4. LIST OF EUT'S PORTS.....	3
2.5. ANCILLARY EQUIPMENT	3
2.6. TEST SETUP BLOCK DIAGRAM.....	4
EXHIBIT 3. EUT OPERATING CONDITIONS AND CONFIGURATIONS DURING TESTS	5
3.1. OPERATIONAL TEST CONDITIONS & ARRANGEMENT FOR TEST SIGNALS	5
EXHIBIT 4. SUMMARY OF TEST RESULTS	6
4.1. LOCATION OF TESTS	6
4.2. APPLICABILITY & SUMMARY OF EMC EMISSION TEST RESULTS	6
4.3. MODIFICATIONS REQUIRED FOR COMPLIANCE.....	6
EXHIBIT 5. MEASUREMENTS, EXAMINATIONS & TEST DATA FOR EMC EMISSIONS.....	7
5.1. TEST PROCEDURES	7
5.2. MEASUREMENT UNCERTAINTIES.....	7
5.3. MEASUREMENT EQUIPMENT USED	7
5.4. POWER LINE CONDUCTED EMISSIONS [§ 15.107(A)]	8
5.5. RECEIVER ANTENNA POWER SPURIOUS/HARMONIC CONDUCTED EMISSIONS [§15.111(A)].....	11
5.6. SPURIOUS/HARMONIC RADIATED EMISSIONS FROM RECEIVER AND CLASS B UNINTENTIONAL RADIATORS (DIGITAL DEVICES) [§ 15.109(A)]	19
EXHIBIT 6. TEST EQUIPMENTS LIST	24
EXHIBIT 7. MEASUREMENT UNCERTAINTY.....	26
7.1. LINE CONDUCTED EMISSION MEASUREMENT UNCERTAINTY	26
7.2. RADIATED EMISSION MEASUREMENT UNCERTAINTY	27

EXHIBIT 1. INTRODUCTION

1.1. SCOPE

Reference:	FCC Part 15, Subpart B, Sections 15.107, 15.109, 15.111 & 15.121
Title:	Code of Federal Regulations (CFR), Title 47, Telecommunication, Part 15
Purpose of Test:	To gain FCC Certification Authorization for Scanning Receivers Operating in 0.03 - 60 MHz band.
Test Procedures:	Both conducted and radiated emissions measurements were conducted in accordance with American National Standards Institute ANSI C63.4 - American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
Environmental Classification:	Residential, Commercial, Industrial or Business environment.

1.2. RELATED SUBMITTAL(S)/GRANT(S)

None.

1.3. NORMATIVE REFERENCES

Publication	Year	Title
FCC CFR Parts 0-19, 80-End	2008	Code of Federal Regulations – Telecommunication
ANSI C63.4	2003	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
TIA/EIA 603, Edition C	2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards

ULTRATECH GROUP OF LABS

3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4

Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

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EXHIBIT 2. PERFORMANCE ASSESSMENT

2.1. CLIENT INFORMATION

APPLICANT	
Name:	Icom Incorporated
Address:	1-1-32, Kamiminami, Hirano-ku, Osaka Japan, 547-0003
Contact Person:	Mr. Takayuki Watanabe Phone #: +81-66-793-5302 Fax #: +81-66-793-0013 Email Address: export@icom.co.jp

MANUFACTURER	
Name:	Icom Incorporated
Address:	1-1-32, Kamiminami, Hirano-ku, Osaka Japan, 547-0003
Contact Person:	Mr. Takayuki Watanabe Phone #: +81-66-793-5302 Fax #: +81-66-793-0013 Email Address: export@icom.co.jp

2.2. EQUIPMENT UNDER TEST (EUT) INFORMATION

The following information (with the exception of the Date of Receipt) has been supplied by the applicant.

Brand Name:	ICOM Incorporated
Product Name:	Wideband Receiver
Model Name or Number:	IC-R75
Serial Number:	1201686
Type of Equipment:	Scanning Receiver
Power input source:	13.8 V DC using 120 VAC, 60 Hz Adapter

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July 16, 2009

2.3. EUT'S TECHNICAL SPECIFICATIONS

RECEIVER	
Equipment Type:	Base Station Mobile
Power Supply Requirement:	13.8 V DC using 120 VAC, 60 Hz Adapter
Operating Frequency Range:	0.03 - 60 MHz
RF Input Impedance:	50 Ω

2.4. LIST OF EUT'S PORTS

Port Number	EUT's Port Description	Number of Identical Ports	Connector Type	Cable Type (Shielded/Non-shielded)
1	PHONE	1	Phone Jack	Shielded
2	REC REMOTE	1	Mini Jack	Shielded
3	REC	1	Mini Jack	Non-shielded
4	RS-232C	1	DB-9	N/A
5	REMOTE	1	Mini Jack	Shielded
6	EXT SP	1	Mini Jack	Shielded
7	MUTE	1	RCA Jack	Shielded
8	ANT2	1	2 wire	N/A
9	DC 13.8V	1	DC Power Plug	Non-shielded
10	ANT1	1	J type	N/A

2.5. ANCILLARY EQUIPMENT

N/A

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File #: ICOM-219F15B121

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2.6. TEST SETUP BLOCK DIAGRAM

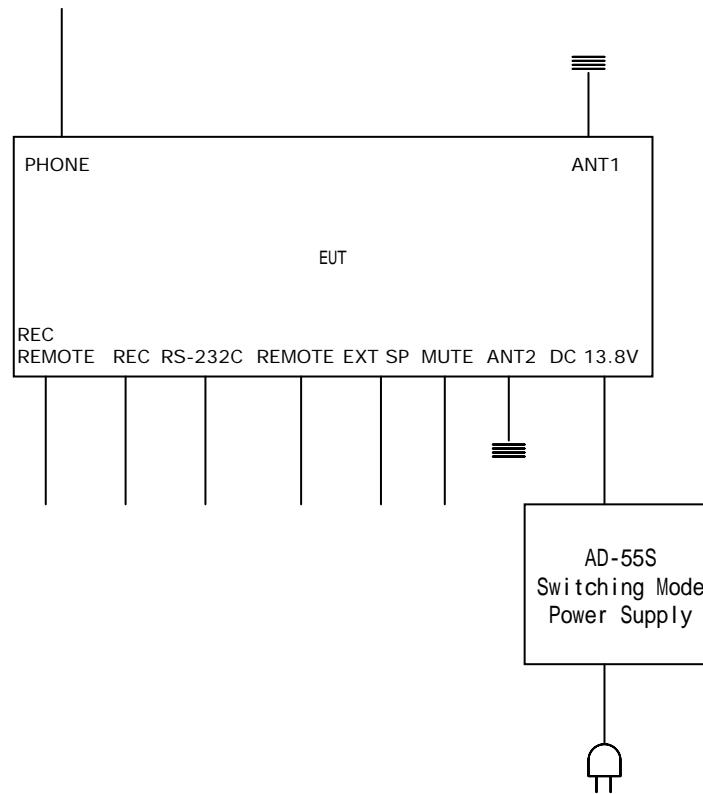


EXHIBIT 3. EUT OPERATING CONDITIONS AND CONFIGURATIONS DURING TESTS

3.1. OPERATIONAL TEST CONDITIONS & ARRANGEMENT FOR TEST SIGNALS

Operating Modes:	The receiver was operated in the normal intended mode during testing
Special Test Software:	None
Special Hardware Used:	None
Receiver Test Antenna:	The EUT was tested with its antenna fitted in normal operation condition

Receiver Test Signals	
Frequency Band(s):	0.03 - 60 MHz
Test Frequency(ies): (Near lowest, near middle & near highest frequencies in the frequency range of operation.)	30 MHz, 45 MHz, 60 MHz

EXHIBIT 4. SUMMARY OF TEST RESULTS

4.1. LOCATION OF TESTS

All of the measurements described in this report were performed at Ultratech Group of Labs located in the city of Oakville, Province of Ontario, Canada.

- Power Line Conducted Emissions were performed in UltraTech's shielded room, 16'(L) by 12'(W) by 12'(H).
- Radiated Emissions were performed at the Ultratech's 3-10 TDK Semi-Anechoic Chamber situated in the Town of Oakville, province of Ontario. This test site been calibrated in accordance with ANSI C63.4, and found to be in compliance with the requirements of Sec. 2.948 of the FCC Rules. The descriptions and site measurement data of the Oakville 3-10 TDK Semi-Anechoic Chamber has been filed with FCC office (FCC File No.: 91038) and Industry Canada office (Industry Canada File No.: 2049A-3). Expiry Date: 2011-05-01.

4.2. APPLICABILITY & SUMMARY OF EMC EMISSION TEST RESULTS

FCC Part 15, Subpart B	Test Requirements	Compliance (Yes/No)
15.107(a), Class B	Power Line Conducted Emissions Measurements	Yes
15.111(a)	Receiver Antenna Power Conducted Emissions for Non-Integral Antenna Port	Yes
15.109(a)	Radiated Emissions from Scanning Receivers & Class B Digital Device	Yes
15.121	Requirements for Scanning Receivers	Yes*

* See the original filing.

4.3. MODIFICATIONS REQUIRED FOR COMPLIANCE

None.

EXHIBIT 5. MEASUREMENTS, EXAMINATIONS & TEST DATA FOR EMC EMISSIONS

5.1. TEST PROCEDURES

Please refer to UltraTech Test Procedures, File# ULTR-P001-2004 and for Test Procedures.

5.2. MEASUREMENT UNCERTAINTIES

The measurement uncertainties stated were calculated in accordance with requirements of UKAS Document LAB 34 with a confidence level of 95%. Please refer to EXHIBIT 7. for Measurement Uncertainties.

5.3. MEASUREMENT EQUIPMENT USED

The measurement equipment used complied with the requirements of the Standards referenced in the Methods & Procedures ANSI C63.4 and CIPSR 16-1-1.

5.4. POWER LINE CONDUCTED EMISSIONS [§ 15.107(a)]

5.4.1. Limits

The equipment shall meet the limits of the following table:

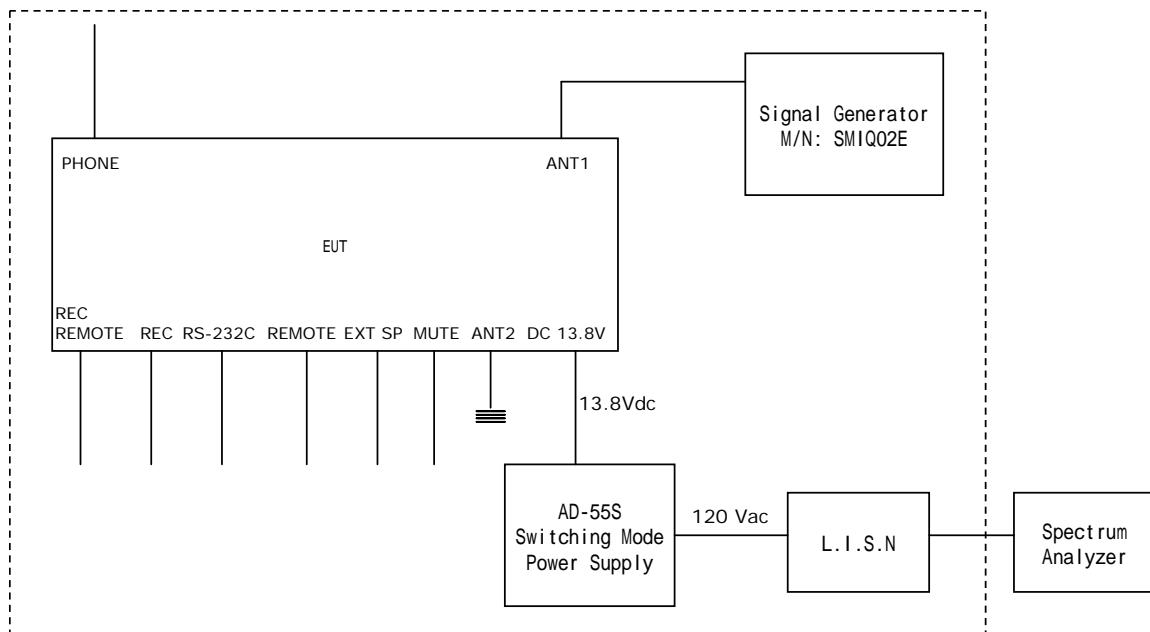
Frequency of Emissions (MHz)	Class B Conducted Limit (dB μ V)	
	Quasi-Peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5	56	46
5 to 30	60	50

* Decreasing linearly with logarithm of frequency

5.4.2. Method of Measurements

Refer to Ultratech Test Procedures ULTR-P001-200 & ANSI C63.4 for method of measurements.

5.4.3. Test Arrangement

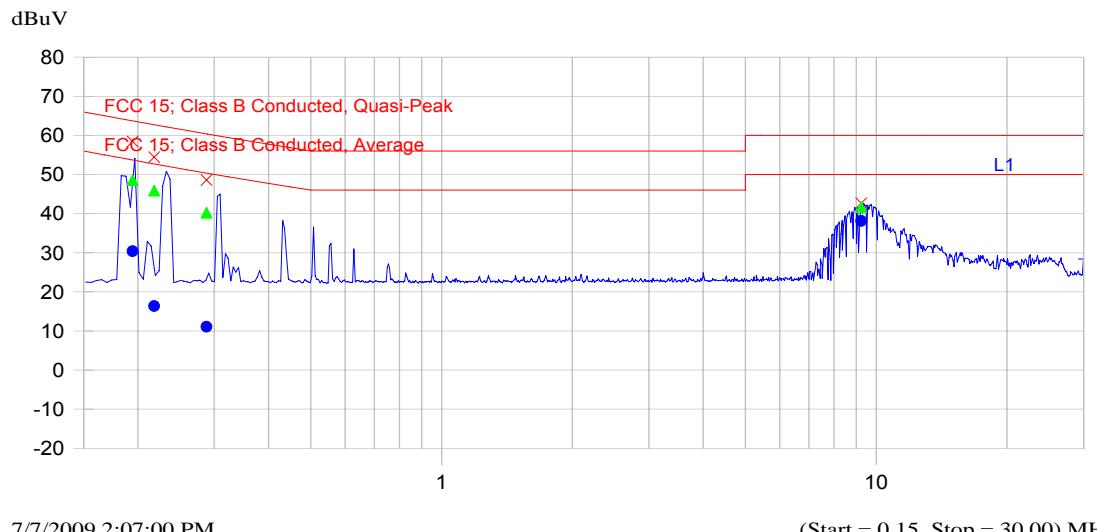


5.4.4. Test Data

Remark: 30 MHz, 60 dBuV CW input signal was fed to antenna port

< 120 VAC, Line Tested: L1 >

Current Graph



Current List

Frequency MHz	Peak dBuV	QP dBuV	Delta Qp-Qp dB	Delta Qp-Qp Limit	Avg dBuV	Delta Avg-Avg dB	Avg-Avg Limit	Trace Name
0.195	58.4	48.6	-15.2		30.4	-23.5		L1
0.218	54.5	45.9	-17.0		16.3	-36.5		L1
0.288	48.6	40.2	-20.3		11.1	-39.5		L1
9.232	42.7	41.6	-18.4		38.1	-11.9		L1

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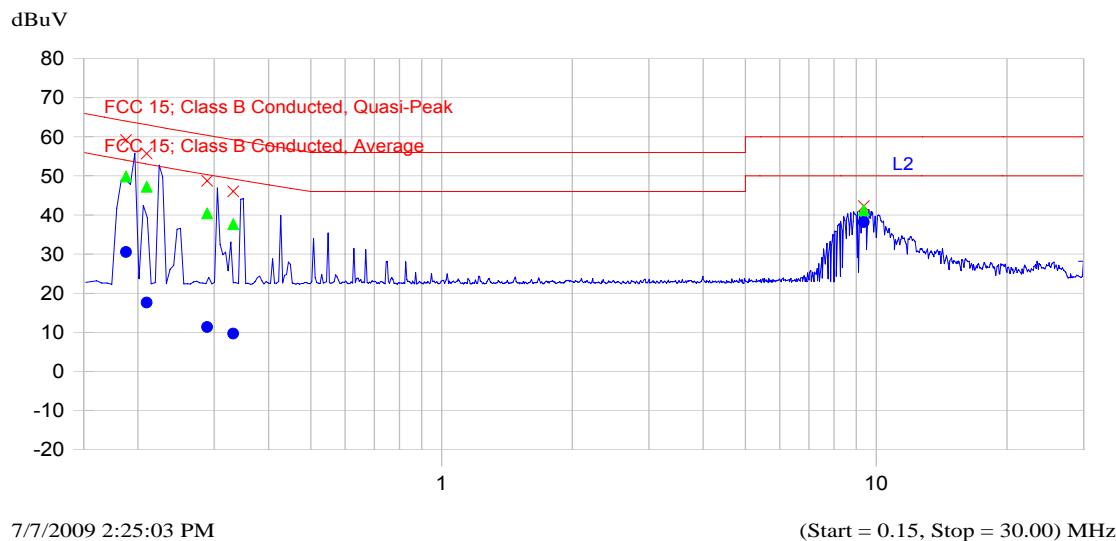
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File #: ICOM-219F15B121

July 16, 2009

< 120 VAC, Line Tested: L2 >

Current Graph



Current List

Frequency MHz	Peak dBuV	QP dBuV	Delta Qp-Qp dB	Avg dBuV	Delta Avg-Avg dB	Trace Name
0.188	59.2	49.8	-14.3	30.5	-23.6	L2
0.210	55.7	47.2	-16.0	17.6	-35.6	L2
0.289	48.7	40.4	-20.1	11.3	-39.2	L2
0.332	46.0	37.6	-21.8	9.7	-39.7	L2
9.357	42.3	41.2	-18.8	38.1	-11.9	L2

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File #: ICOM-219F15B121

July 16, 2009

5.5. RECEIVER ANTENNA POWER SPURIOUS/HARMONIC CONDUCTED EMISSIONS [§ 15.111(a)]

5.5.1. Limits

Receivers that operate (tune) in the frequency range 30 to 960 Mhz and CB receivers that provides terminals for the connection of an external antenna may be tested to demonstrate compliance with the provisions of § 15.109 with the antenna terminals shielded and terminated with a resistive termination equal to the impedance specified for the antenna, provided these receivers also comply with the following:- ***With the receiver antenna terminal connected to a resistive termination equal to the impedance specified or employed for the antenna, the power at the antenna terminal at frequency within the range from 30 MHz to 5th harmonic of the highest frequency shall not exceed 2.0 nanowatts (or -57 dBm @ 50 Ohm).***

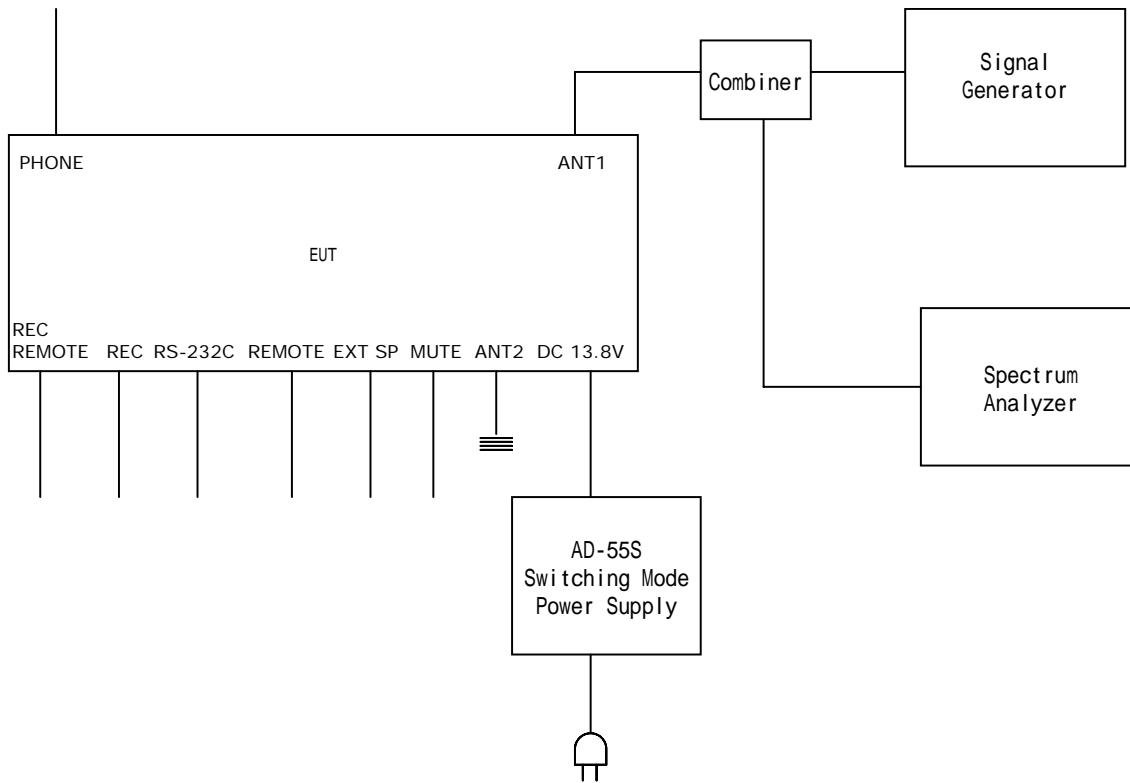
5.5.2. Method of Measurements

Refer to Ultratech Test Procedures ULTR-P001-200 & ANSI C63.4 for method of measurements.

The spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a radiated emission limit is specified, up to the frequency shown in the following table:

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705 - 108	1000
108 – 500	2000
500 -1000	5000
Above 1000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

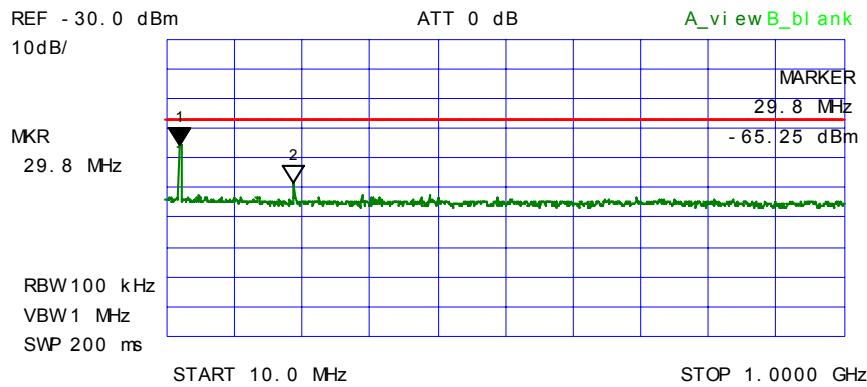
5.5.3. Test Arrangement



5.5.4. Test Data

5.5.4.1. Near Lowest Frequency (30 MHz, 60 dBuV CW input)

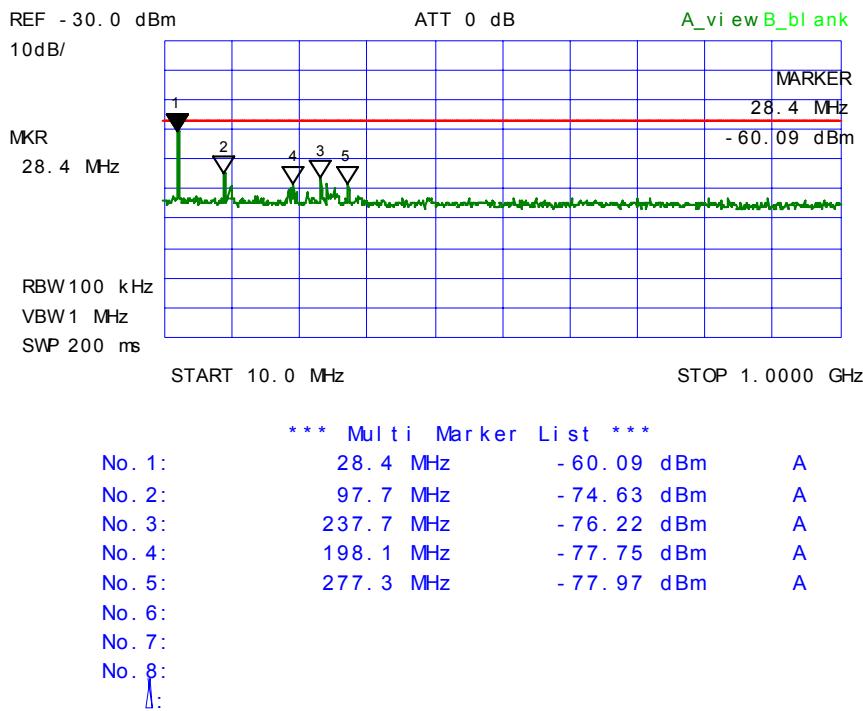
5.5.4.1.1. Antenna 1



*** Multi Marker List ***

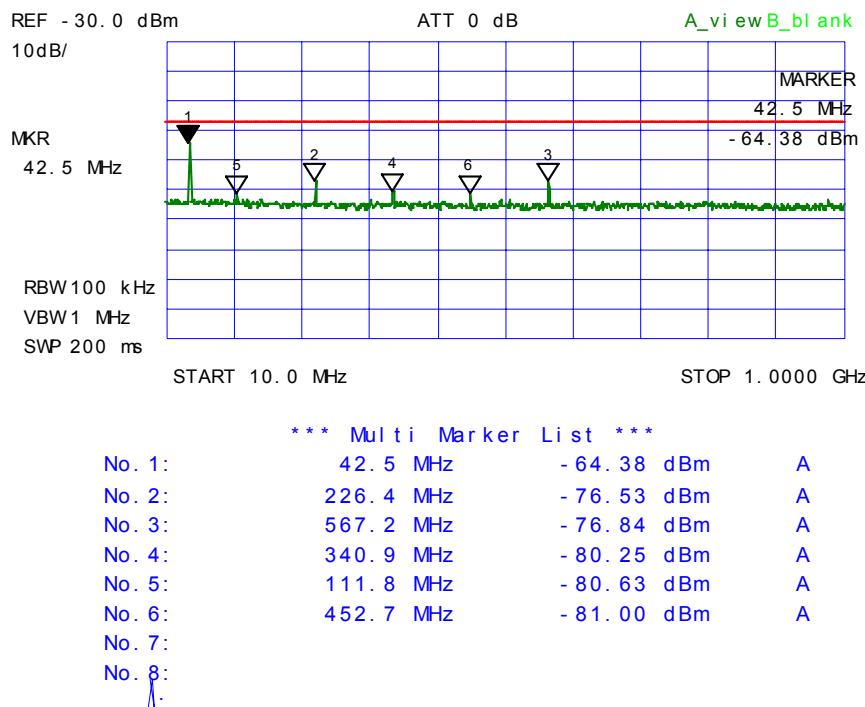
No. 1:	29.8 MHz	-65.25 dBm	A
No. 2:	195.3 MHz	-78.00 dBm	A
No. 3:			
No. 4:			
No. 5:			
No. 6:			
No. 7:			
No. 8:			

5.5.4.1.2. Antenna 2

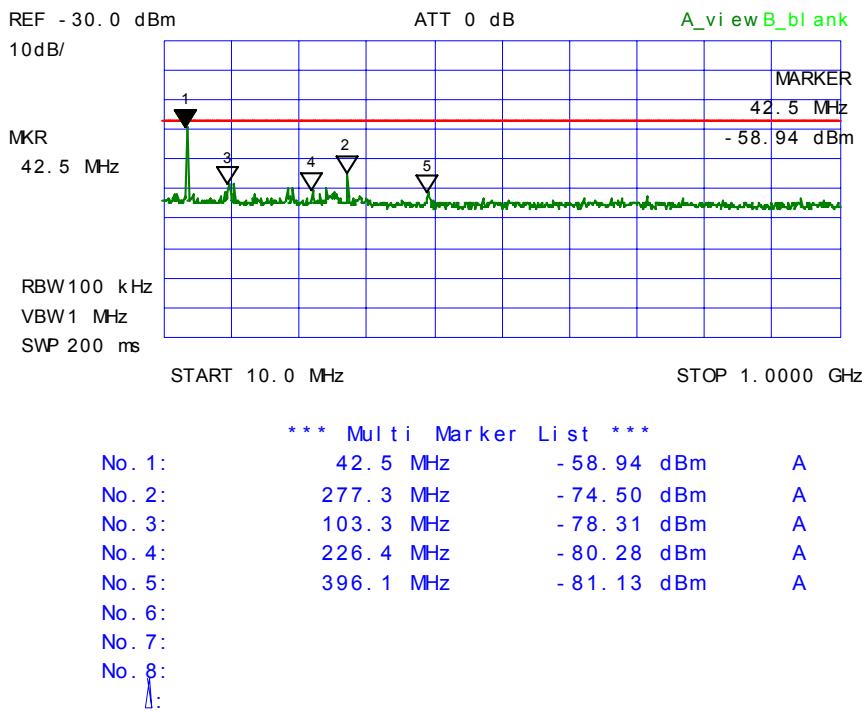


5.5.4.2. Near Middle Frequency (45 MHz, 60 dBuV CW input)

5.5.4.2.1. Antenna 1

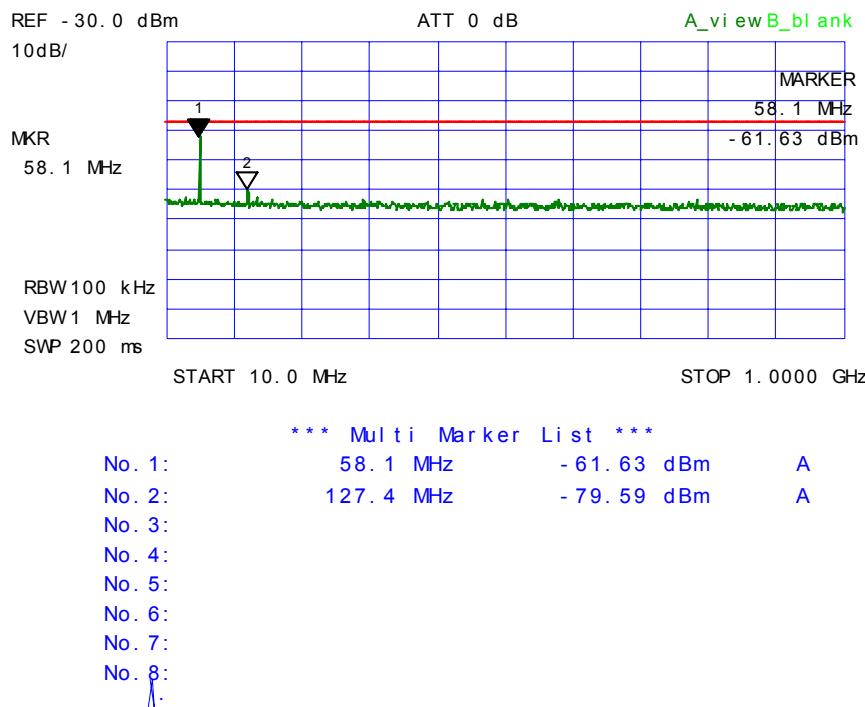


5.5.4.2.2. Antenna 2

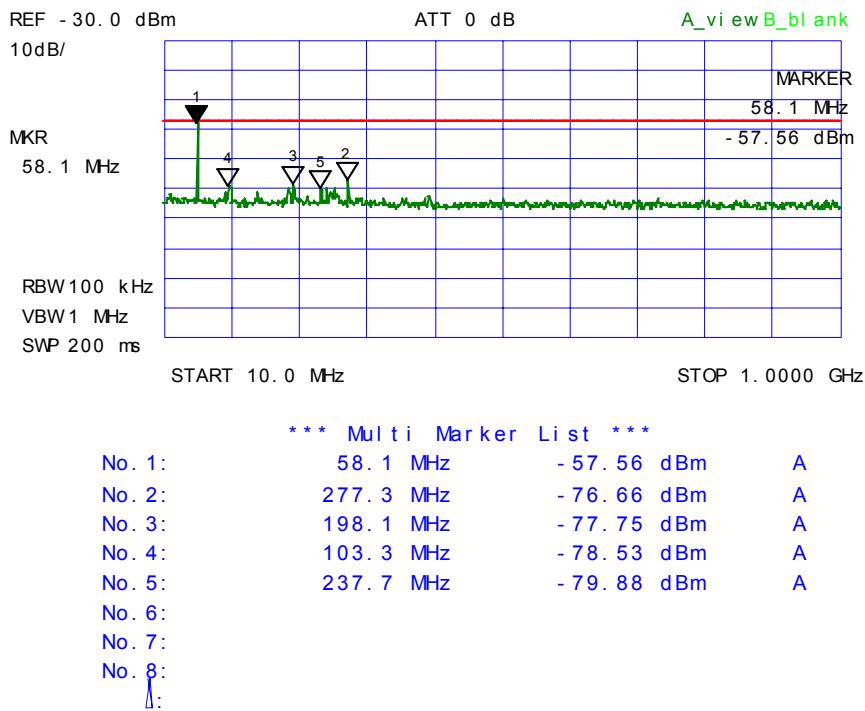


5.5.4.3. Near Highest Frequency (60 MHz, 60 dBuV CW input)

5.5.4.3.1. Antenna 1



5.5.4.3.2. Antenna 2



5.6. SPURIOUS/HARMONIC RADIATED EMISSIONS FROM RECEIVER AND CLASS B UNINTENTIONAL RADIATORS (DIGITAL DEVICES) [§ 15.109(a)]

5.6.1. Limits

The equipment shall meet the limits of the following table:

Test Frequency Range (MHz)	Class B Limits @ 3 m (dB μ V/m)
30 – 88	40.0
88 – 216	43.5
216 – 960	46.0
Above 960	54.0

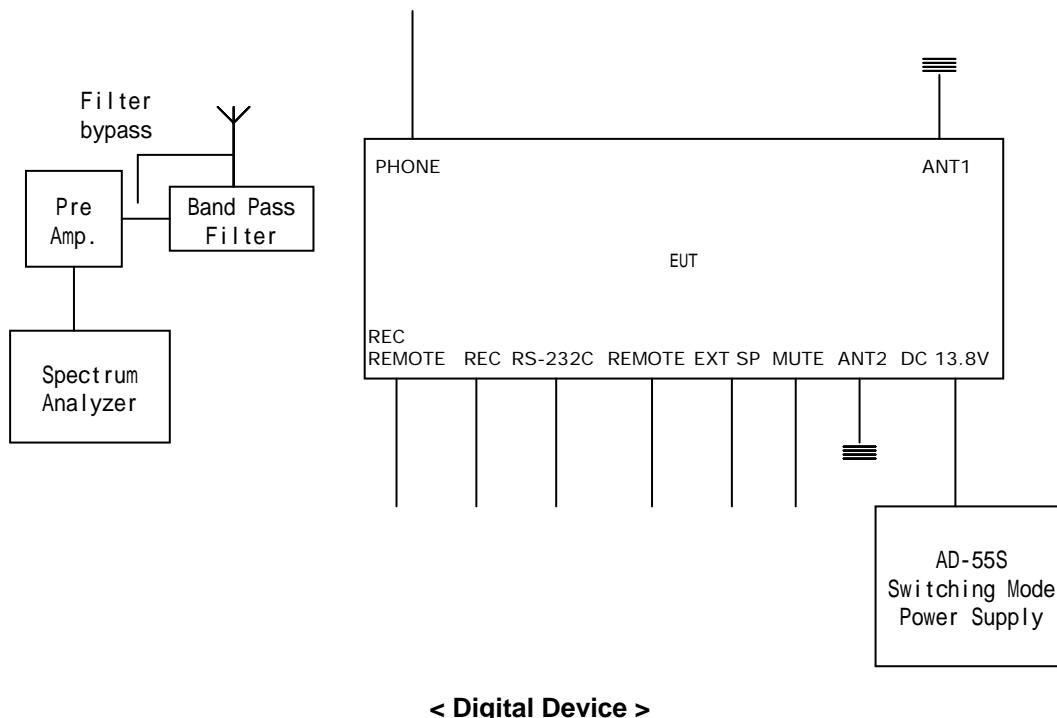
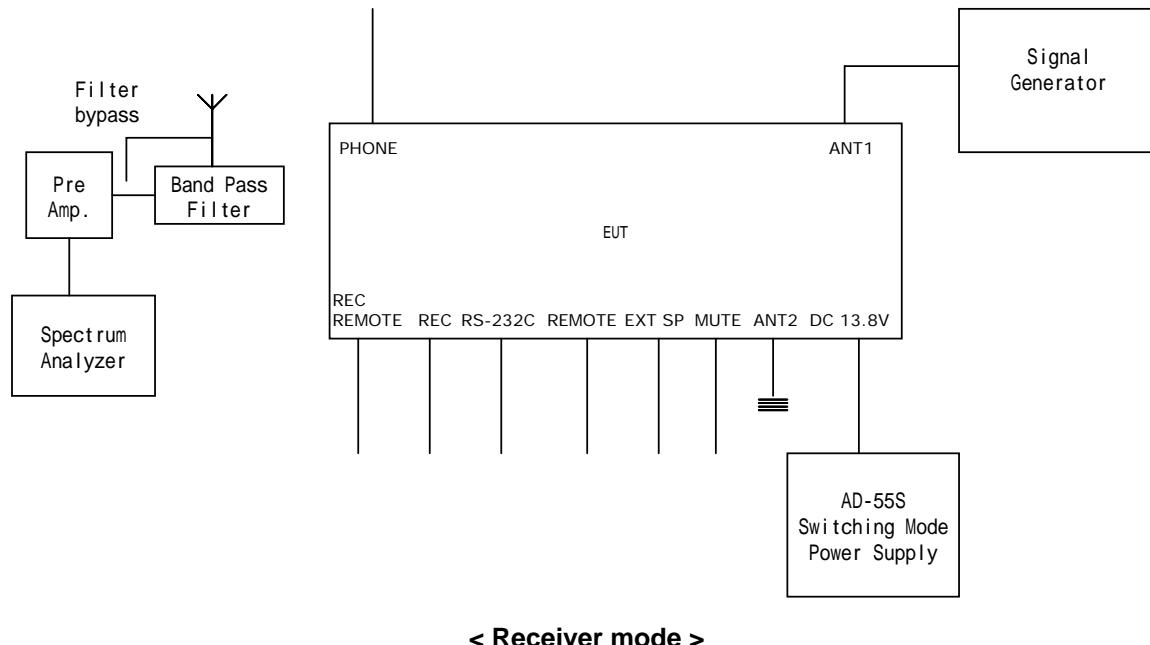
5.6.2. Method of Measurements

Refer to Ultratech Test Procedures ULTR-P001-200 & ANSI C63.4 for method of measurements.

The spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a radiated emission limit is specified, up to the frequency shown in the following table:

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705 - 108	1000
108 – 500	2000
500 -1000	5000
Above 1000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

5.6.3. Test Arrangement



5.6.4. Test Data

5.6.4.1. Near Lowest Frequency (30 MHz, 60dBuV, Lo = Rx + IF = 30 + 69.0115 = 99.0115 MHz)

The emissions were scanned from 30 MHz to 5th harmonic of Lo at 3 Meters distance and all emissions within 20 dB of the specified limits have been reported unless otherwise specified.

FREQUENCY (MHz)	RF LEVEL (dBuV/m)	DETECTOR USED (PEAK/QP)	ANTENNA PLANE (H/V)	LIMIT (dBuV/m)	MARGIN (dB)	PASS/FAIL
99.0115	33.12	PEAK	V	43.5	-10.38	PASS
99.0115	27.23	PEAK	H	43.5	-16.27	PASS
198.0230	27.55	PEAK	V	43.5	-15.95	PASS
198.0230	26.67	PEAK	H	43.5	-16.83	PASS
297.0345	27.35	PEAK	V	46.0	-18.65	PASS
297.0345	26.38	PEAK	H	46.0	-19.62	PASS
396.0460	25.78	PEAK	V	46.0	-20.22	PASS
396.0460	25.52	PEAK	H	46.0	-20.48	PASS
495.0575	23.94	PEAK	V	46.0	-22.06	PASS
495.0575	23.92	PEAK	H	46.0	-22.08	PASS

5.6.4.2. Near Middle Frequency (45 MHz, 60dBuV, Lo = Rx + IF = 45 + 69.0115 = 114.0115 MHz)

The emissions were scanned from 30 MHz to 5th harmonic of Lo at 3 Meters distance and all emissions within 20 dB of the specified limits have been reported unless otherwise specified.

FREQUENCY (MHz)	RF LEVEL (dBuV/m)	DETECTOR USED (PEAK/QP)	ANTENNA PLANE (H/V)	LIMIT (dBuV/m)	MARGIN (dB)	PASS/FAIL
114.0115	27.07	PEAK	V	43.5	-16.43	PASS
114.0115	26.20	PEAK	H	43.5	-17.30	PASS
228.0230	30.85	PEAK	V	46.0	-15.15	PASS
228.0230	33.19	PEAK	H	46.0	-12.81	PASS
342.0345	24.47	PEAK	V	46.0	-21.53	PASS
342.0345	29.76	PEAK	H	46.0	-16.24	PASS
456.0460	30.48	PEAK	V	46.0	-15.52	PASS
456.0460	33.14	PEAK	H	46.0	-12.86	PASS
570.0575	28.18	PEAK	V	46.0	-17.82	PASS
570.0575	27.29	PEAK	H	46.0	-18.71	PASS

5.6.4.3. Near Highest Frequency (60 MHz, 60dBuV, Lo = Rx + IF = 60 + 69.0115 = 129.0115 MHz)

The emissions were scanned from 30 MHz to 5th harmonic of Lo at 3 Meters distance and all emissions within 20 dB of the specified limits have been reported unless otherwise specified.

FREQUENCY (MHz)	RF LEVEL (dBuV/m)	DETECTOR USED (PEAK/QP)	ANTENNA PLANE (H/V)	LIMIT (dBuV/m)	MARGIN (dB)	PASS/ FAIL
129.0115	35.24	PEAK	V	43.5	-8.26	PASS
129.0115	31.88	PEAK	H	43.5	-11.62	PASS
258.0230	30.32	PEAK	V	46.0	-15.68	PASS
258.0230	30.16	PEAK	H	46.0	-15.84	PASS
387.0345	23.58	PEAK	V	46.0	-22.42	PASS
387.0345	25.94	PEAK	H	46.0	-20.06	PASS
645.0575	27.15	PEAK	V	46.0	-18.85	PASS
645.0575	30.76	PEAK	H	46.0	-15.24	PASS

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File #: ICOM-219F15B121

July 16, 2009

5.6.4.4. Class B Digital Devices

The emissions were scanned from 30 MHz to 5 GHz at 3 Meters distance and all emissions within 20 dB of the specified limits have been reported unless otherwise specified.

FREQUENCY (MHz)	RF LEVEL (dBuV/m)	DETECTOR USED (PEAK/QP)	ANTENNA PLANE (H/V)	LIMIT (dBuV/m)	MARGIN (dB)	PASS/FAIL
57.50	27.88	PEAK	V	40.0	-12.12	PASS
57.50	22.54	PEAK	H	40.0	-17.46	PASS
99.50	33.12	PEAK	V	43.5	-10.38	PASS
99.50	27.23	PEAK	H	43.5	-16.27	PASS
198.50	27.65	PEAK	V	43.5	-15.85	PASS
198.50	26.67	PEAK	H	43.5	-16.83	PASS

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File #: ICOM-219F15B121

July 16, 2009

EXHIBIT 6. Test Equipments List

Test Instruments	Manufacturer	Model No.	Serial No.	Operating Range
Attenuator	Weinschel	46-20-34	BM1347	DC – 18 GHz
Attenuator	Weinschel	46-30-34	BM5354	DC – 18 GHz
BiConiLog Antenna	Emco	3142	10005	0.03 – 2 GHz
BiConiLog Antenna	ETS-Lindgren	3142B	1575	26 MHz – 2 GHz
Communication test set	Hewlett Packard	8920B	US39064699	AF SG DC – 20 kHz
Combiner	Weinschel	1515	93459	DC – 10 GHz
Distortion analyzer	Hewlett-Packard	8903E	3514A01460	20-100K Hz
EMC Analyzer	Hewlett Packard	8593EM	...	9kHz – 22 GHz
FFT (audio) EMI Receiver	Advantest	R9211E	82020336	10 mHz – 100 kHz, 1 MHz Input Impedance
High Pass Filter	Mini-Circuits	SHP-300	10427	Cut off 230 MHz
Horn Antenna	Emco	3155	9701-5061	1 – 18 GHz
Horn Antenna	Emco	3155	9911-5955	1 – 18 GHz
Infinium Oscilloscope	Hewlett Packard	54810A	US38380192	500 MHz, 1 GSa/s
L.I.S.N.	EMCO	3810/2	2209	9 kHz – 200 MHz 50 Ohms / 50 μ H
12'x16'x12' RF Shielded Chamber	RF Shielding
Microwave Frequency Counter	EIP	545A	2683	10 Hz – 18 GHz
Modulation Analyzer	Hewlett Packard	8910B	3226A04606	150 kHz – 1300 MHz
Power Divider	Mini-Circuits	15542	105	1 MHz – 1 GHz
Power Meter	Hewlett Packard	437B	3.13E+09	10 kHz – 50 GHz
Power Sensor	Hewlett Packard	8481A	1150A15143	9 kHz – 26.5 GHz
RF Amplifier	Com-Power	PA-103		1 MHz – 1 GHz
RF Amplifier	Hewlett Packard	84498	3008A00769	1 – 26.5 GHz
Signal Generator	Hewlett Packard	83752B	3610A00457	0.01- 20 GHz
Signal Generator	IFR Systems Inc.	2025	20304/137	9 kHz – 2.51 GHz

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3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4

Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: ICOM-219F15B121

July 16, 2009

Signal Generator	Rohde & Schwarz	SMIQ02E	DE2Z858	300 kHz – 2.1 GHz
Spectrum Analyzer	Rohde & Schwarz	FSEK20/B4/B21	834157/005	9 kHz – 40 GHz
Spectrum Analyzer	Rohde & Schwarz	FSEK30	100077	20 Hz – 40 GHz
Spectrum Analyzer	Advantest	R3271	15050203	100 Hz – 26.5 GHz
Spectrum Analyzer / EMI Receiver	Hewlett Packard	8593EM	3710A00223	9 kHz – 6.5 GHz Built-in amplifier 30dB
Temperature & Humidity Chamber	Tenney	T5	9723B	-40 °C – +80 °C range
Transient Limiter	Hewlett Packard	11947A	3107A01998	9 kHz – 200 MHz 10 dB attenuation

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File #: ICOM-219F15B121

July 16, 2009

EXHIBIT 7. MEASUREMENT UNCERTAINTY

The measurement uncertainties stated were calculated in accordance with the requirements of NIST Technical Note 1297 and LAB 34

7.1. LINE CONDUCTED EMISSION MEASUREMENT UNCERTAINTY

CONTRIBUTION (Line Conducted)	PROBABILITY DISTRIBUTION	UNCERTAINTY (dB)	
		9-150 kHz	0.15-30 MHz
EMI Receiver specification	Rectangular	± 1.5	± 1.5
LISN coupling specification	Rectangular	± 1.5	± 1.5
Cable and Input Transient Limiter calibration	Normal (k=2)	± 0.3	± 0.5
Mismatch: Receiver VRC $\Gamma_1 = 0.03$ LISN VRC $\Gamma_R = 0.8(9 \text{ kHz}) 0.2 (30 \text{ MHz})$ Uncertainty limits $20\text{Log}(1+\Gamma_1\Gamma_R)$	U-Shaped	± 0.2	± 0.3
System repeatability	Std. deviation	± 0.2	± 0.05
Repeatability of EUT	--	--	--
Combined standard uncertainty	Normal	± 1.25	± 1.30
Expanded uncertainty U	Normal (k=2)	± 2.50	± 2.60

Sample Calculation for Measurement Accuracy in 150 kHz to 30 MHz Band:

$$u_c(y) = \sqrt{\sum_{i=1}^m u_i^2(y)} = \pm \sqrt{(1.5^2 + 1.5^2)/3 + (0.5/2)^2 + (0.05/2)^2 + 0.35^2} = \pm 1.30 \text{ dB}$$

$$U = 2u_c(y) = \pm 2.6 \text{ dB}$$

7.2. RADIATED EMISSION MEASUREMENT UNCERTAINTY

CONTRIBUTION (Radiated Emissions)	PROBABILITY DISTRIBUTION	UNCERTAINTY (\pm dB)	
		3 m	10 m
Antenna Factor Calibration	Normal (k=2)	± 1.0	± 1.0
Cable Loss Calibration	Normal (k=2)	± 0.3	± 0.5
EMI Receiver specification	Rectangular	± 1.5	± 1.5
Antenna Directivity	Rectangular	± 0.5	± 0.5
Antenna factor variation with height	Rectangular	± 2.0	± 0.5
Antenna phase center variation	Rectangular	0.0	± 0.2
Antenna factor frequency interpolation	Rectangular	± 0.25	± 0.25
Measurement distance variation	Rectangular	± 0.6	± 0.4
Site imperfections	Rectangular	± 2.0	± 2.0
Mismatch: Receiver VRC $\Gamma_1 = 0.2$ Antenna VRC $\Gamma_R = 0.67(B_i) 0.3 (L_p)$ Uncertainty limits $20\log(1+\Gamma_1\Gamma_R)$	U-Shaped	+1.1 -1.25	± 0.5
System repeatability	Std. Deviation	± 0.5	± 0.5
Repeatability of EUT		-	-
Combined standard uncertainty	Normal	+2.19 / -2.21	+1.74 / -1.72
Expanded uncertainty U	Normal (k=2)	+4.38 / -4.42	+3.48 / -3.44

Calculation for maximum uncertainty when 3m biconical antenna including a factor of k = 2 is used:

$$U = 2u_c(y) = 2x(+2.19) = +4.38 \text{ dB} \quad \text{And} \quad U = 2u_c(y) = 2x(-2.21) = -4.42 \text{ dB}$$