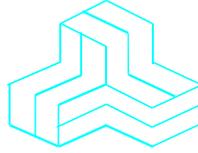


ENGINEERING TEST REPORT



HF/VHF/UHF Transceiver
Model No.: IC-9100

FCC ID: AFJ318300

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

UltraTech's File No.: ICOM-266F15B121

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

Date: January 24, 2011

Report Prepared by: Dan Huynh

Tested by: Wei Wu, Phuong Ngo and
Satish Patel

Issued Date: January 24, 2011

Test Dates: January 14, 19 & 21, 2011

- *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

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

FCC

91038



1309



Approved Test Facility

46390-2049



NvLap Lab Code 200093-0



SL2-IN-E-1119R



Korea KCC-RRL
CA2049

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 4

2.6. TEST SETUP BLOCK DIAGRAM 5

EXHIBIT 3. EUT OPERATING CONDITIONS AND CONFIGURATIONS DURING TESTS..... 6

3.1. OPERATIONAL TEST CONDITIONS & ARRANGEMENT FOR TEST SIGNALS 6

EXHIBIT 4. SUMMARY OF TEST RESULTS..... 7

4.1. LOCATION OF TESTS 7

4.2. APPLICABILITY & SUMMARY OF EMC EMISSION TEST RESULTS 7

4.3. MODIFICATIONS REQUIRED FOR COMPLIANCE 7

EXHIBIT 5. MEASUREMENTS, EXAMINATIONS & TEST DATA FOR EMC EMISSIONS 8

5.1. TEST PROCEDURES 8

5.2. MEASUREMENT UNCERTAINTIES 8

5.3. MEASUREMENT EQUIPMENT USED 8

5.4. POWER LINE CONDUCTED EMISSIONS [§ 15.107(a)] 9

5.5. RECEIVER ANTENNA POWER SPURIOUS/HARMONIC CONDUCTED EMISSIONS [§ 15.111(a)] 12

5.6. SPURIOUS/HARMONIC RADIATED EMISSIONS FROM RECEIVER AND CLASS B UNINTENTIONAL RADIATORS (DIGITAL DEVICES) [§ 15.109(a)] 28

5.7. REQUIREMENTS FOR SCANNING RECEIVERS [§ 15.121] 36

5.8. SCANNING RECEIVERS CELLULAR BAND REJECTION [§ 15.121(b)] 39

EXHIBIT 6. TEST EQUIPMENTS LIST 42

EXHIBIT 7. MEASUREMENT UNCERTAINTY..... 43

7.1. LINE CONDUCTED EMISSION MEASUREMENT UNCERTAINTY 43

7.2. RADIATED EMISSION MEASUREMENT UNCERTAINTY 43

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.
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	2009	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
ANSI C63.10	2009	American National Standard for Testing Unlicensed Wireless Devices
TIA/EIA 603, Edition C	2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards

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:	HF/VHF/UHF Transceiver
Model Name or Number:	IC-9100
Serial Number:	Test sample
Type of Equipment:	HF/VHF/UHF Transceiver
Power Input Source:	13.8 VDC power supply

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>

File #: ICOM-266F15B121

January 24, 2011

All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

2.3. EUT'S TECHNICAL SPECIFICATIONS

RECEIVER	
Equipment Type:	Mobile
Power Supply Requirement:	13.8 VDC \pm 15% (negative ground)
Operating Frequency Range:	0.030 - 60.000 MHz, 136.000 - 174.000 MHz, 420.000 - 480.000 MHz, 1240.000 - 1320.000 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	Antenna Connector 1 [ANT1]	1	PL-259	N/A
2	Antenna Connector 1 [ANT2]	1	PL-259	N/A
3	1200 MHz Band antenna Connector [1200MHz ANT]	1	Type-N	N/A
4	Main Band External Speaker Jack [EXT-SP (MAIN)]	1	Mini Jack	Shielded
5	Sub Band External Speaker Jack [EXT-SP (SUB)]	1	Mini Jack	Shielded
6	430 MHz Antenna Connector [430MHz ANT]	1	Type-N	N/A
7	144 MHz Antenna Connector [144MHz ANT]	1	PL-259	Shielded
8	DC Power Socket [DC 13.8V]	1	4 pin connector	Non-Shielded
9	Tuner Control Socket [TUNER]	1	4 Wires	Non-Shielded
10	Data1 Jack [DATA1]	1	2.5 mm Mini Jack	Shielded
11	Data2 Socket [DATA2]	1	6-pin DIN	Shielded
12	Straight Key Jack [KEY]	1	Mini Jack	Shielded
13	ALC Input Jack [ALC]	1	RCA	Shielded
14	Send Control Jack [SEND]	1	RCA	Shielded
15	Accessory Socket [ACC]	1	13-pin DIN	Shielded
16	CI-V remote Control Jack [REMOTE]	1	Mini Jack	Shielded
17	USB Port [USB]	1	USB Type B	Shielded
18	Headphone Jack [PHONES]	1	Phone Jack	Shielded
19	Electronic Keyer Jack [ELEC-KEY]	1	Phone Jack	Shielded
20	Microphone Connector [MIC]	1	8-pin DIN	Shielded

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>

File #: ICOM-266F15B121

January 24, 2011

All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

2.5. ANCILLARY EQUIPMENT

The EUT was tested while connected to the following representative configuration of ancillary equipment necessary to exercise the ports during tests:

Ancillary Equipment # 1	
Description:	External Speaker
Brand name:	ICOM
Model Name or Number:	SP-21
Cable Type:	Shielded

Ancillary Equipment # 2	
Description:	Desktop Microphone
Brand name:	ICOM
Model Name or Number:	SM-20
Cable Type:	Shielded

Ancillary Equipment # 3	
Description:	Electronic Keyer
Brand name:	ICOM
Model Name or Number:	N/A
Cable Type:	Non-Shielded

Ancillary Equipment # 4	
Description:	Headphone
Brand name:	Sony
Model Name or Number:	MDR-Z500
Cable Type:	Shielded

2.6. TEST SETUP BLOCK DIAGRAM

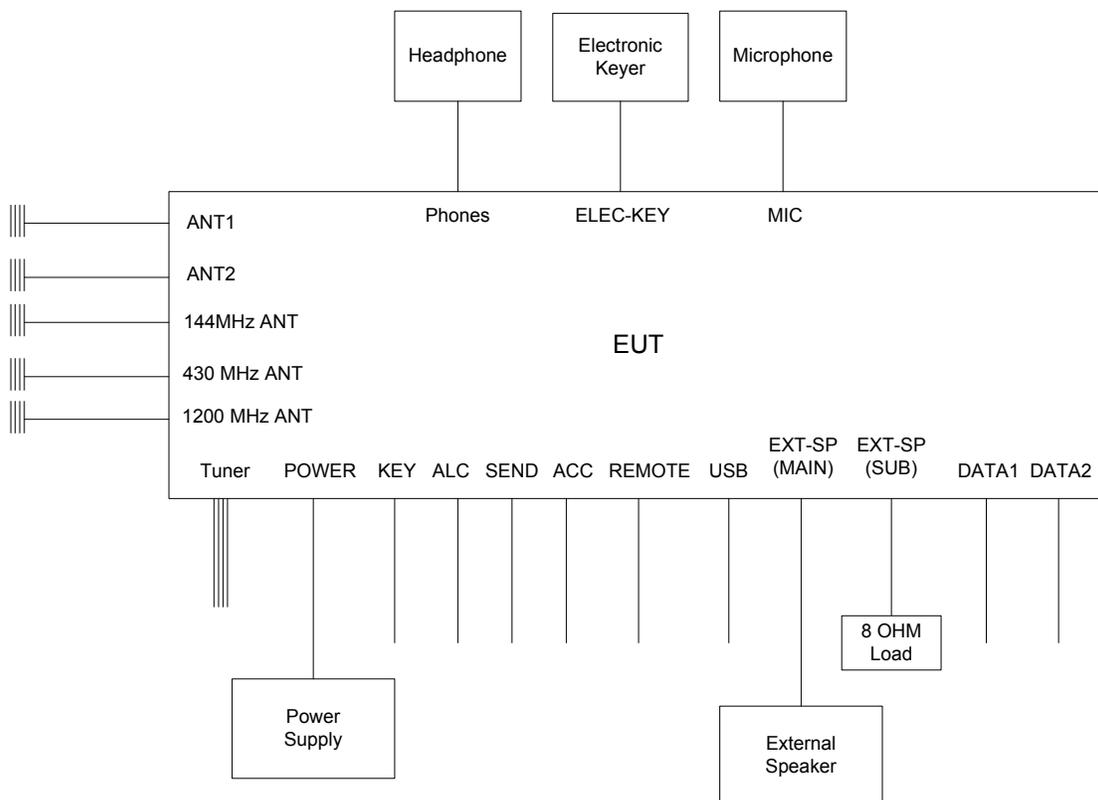


EXHIBIT 3. EUT OPERATING CONDITIONS AND CONFIGURATIONS DURING TESTS

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 port terminated to 50Ω

Receiver Test Signals	
Frequency Band(s):	0.030 - 60.000 MHz 136.000 - 174.000 MHz 420.000 - 480.000 MHz 1240.000 - 1320.000 MHz
Test Frequency(ies): (Near lowest, near middle & near highest frequencies in the frequency range of operation.)	30 MHz, 45 MHz, 60 MHz 136 MHz, 155 MHz, 174 MHz 420 MHz, 450 MHz, 480 MHz 1240 MHz, 1280 MHz, 1320 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.

- AC Power Line Conducted Emissions were performed in UltraTech's shielded room, 24'(L) by 16'(W) by 8'(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

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 the requirements of CISPR 16-4-2 @ IEC:2003 and JCGM 100:2008 (GUM 1995) – Guide to the Expression of Uncertainty in Measurement. Please refer to Exhibit 7 for Measurement Uncertainties.

5.3. MEASUREMENT EQUIPMENT USED

The measurement equipment used complied with the requirements contained in ANSI C63.10 and CISPR 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:

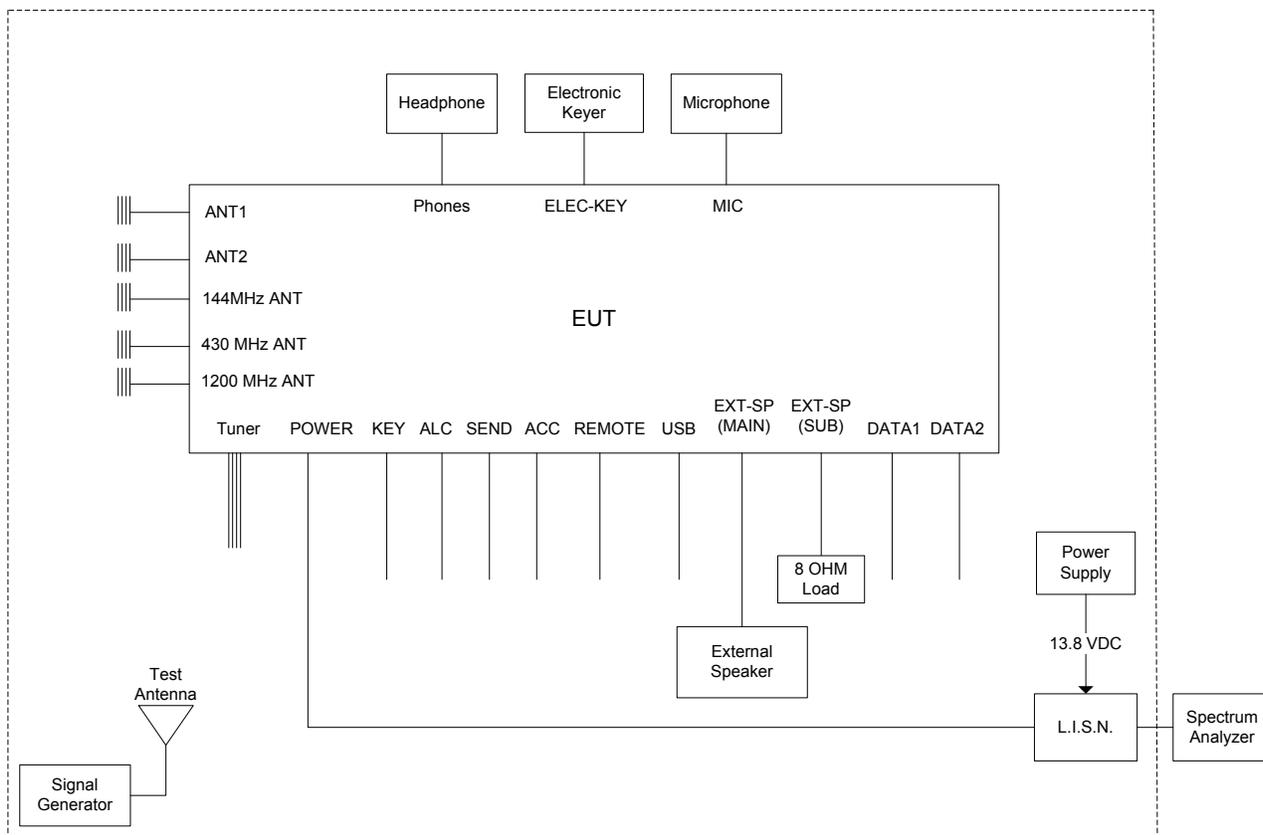
Frequency of Emissions (MHz)	Class B Conducted Limit (dBµV)	
	Quasi-Peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5	56	46
5 to 30	60	50

* Decreasing linearly with logarithm of frequency

5.4.2. Method of Measurements

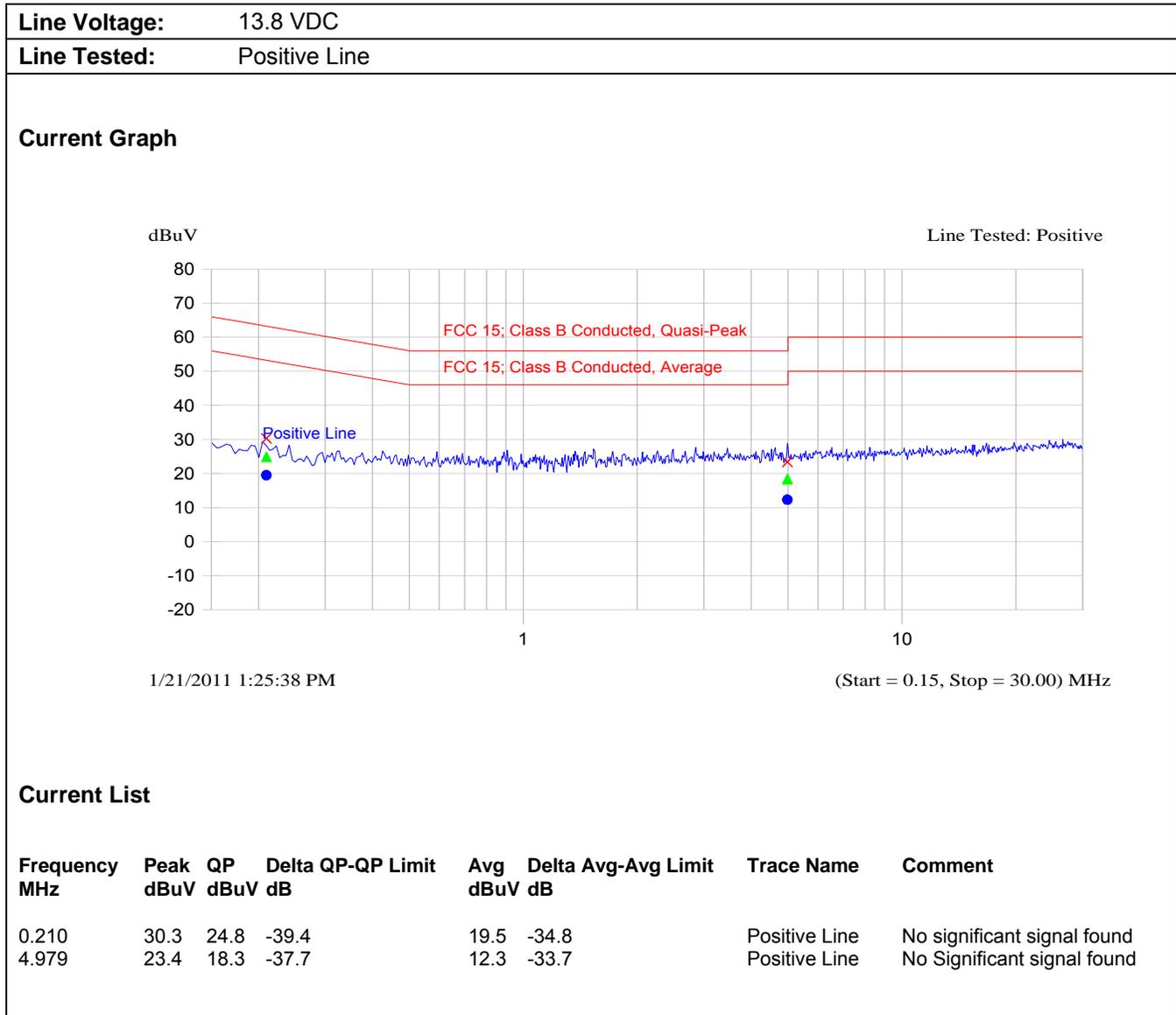
Refer to Ultratech Test Procedures ULTR-P001-200 & ANSI C63.4 for method of measurements.

5.4.3. Test Arrangement

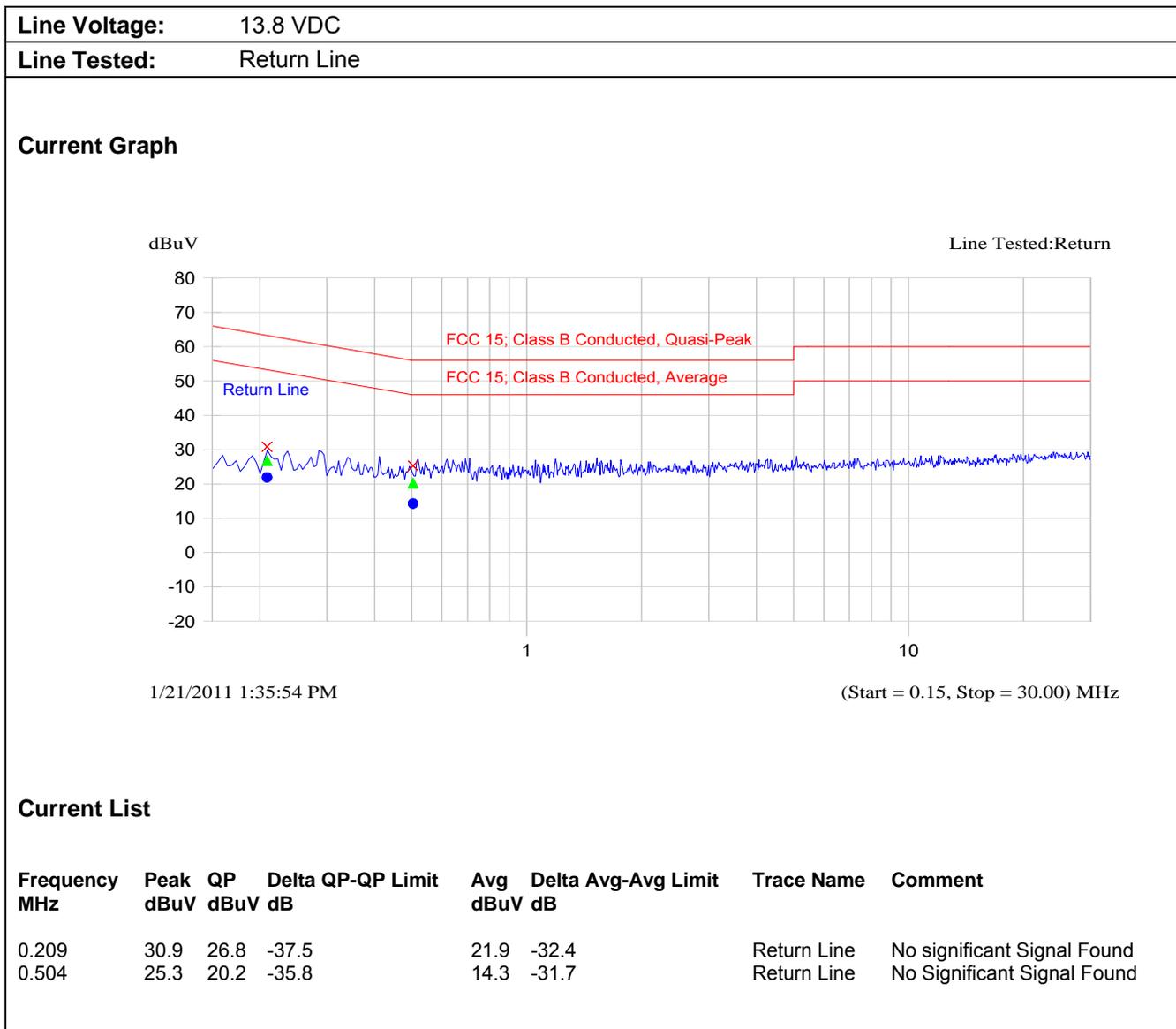


5.4.4. Test Data

Plot 5.4.4.1. Power Line Conducted Emissions, Positive Line



Plot 5.4.4.2. Power Line Conducted Emissions, Return Line



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

5.5.1. Limits

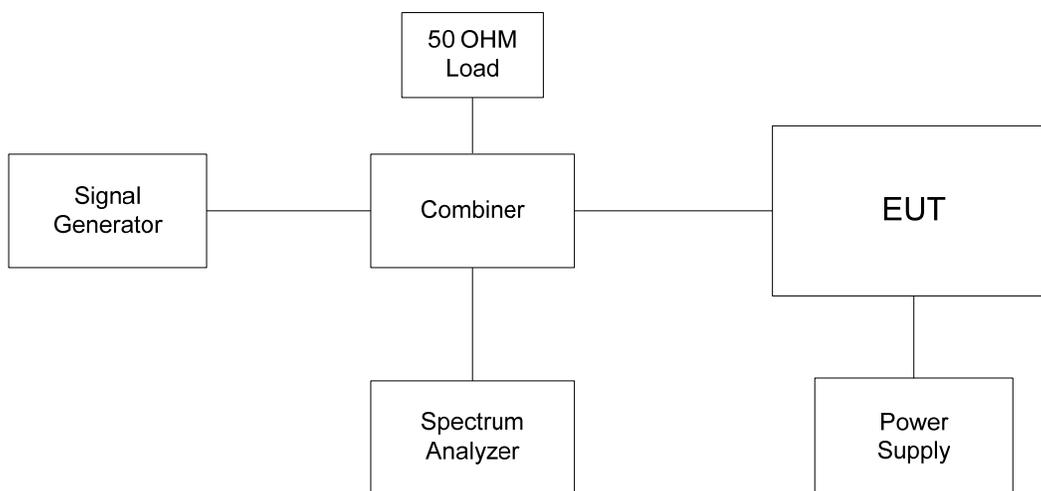
Receivers that operate (tune) in the frequency range 30 to 960 MHz and CB receivers that provides terminals for the connection of an external antenna may be tested to demonstrate compliance with the provisions of @ 15.109 with the antenna terminals shielded and terminated with a resistive termination 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 the emission limit is specified, up to 5th harmonic of the highest frequency

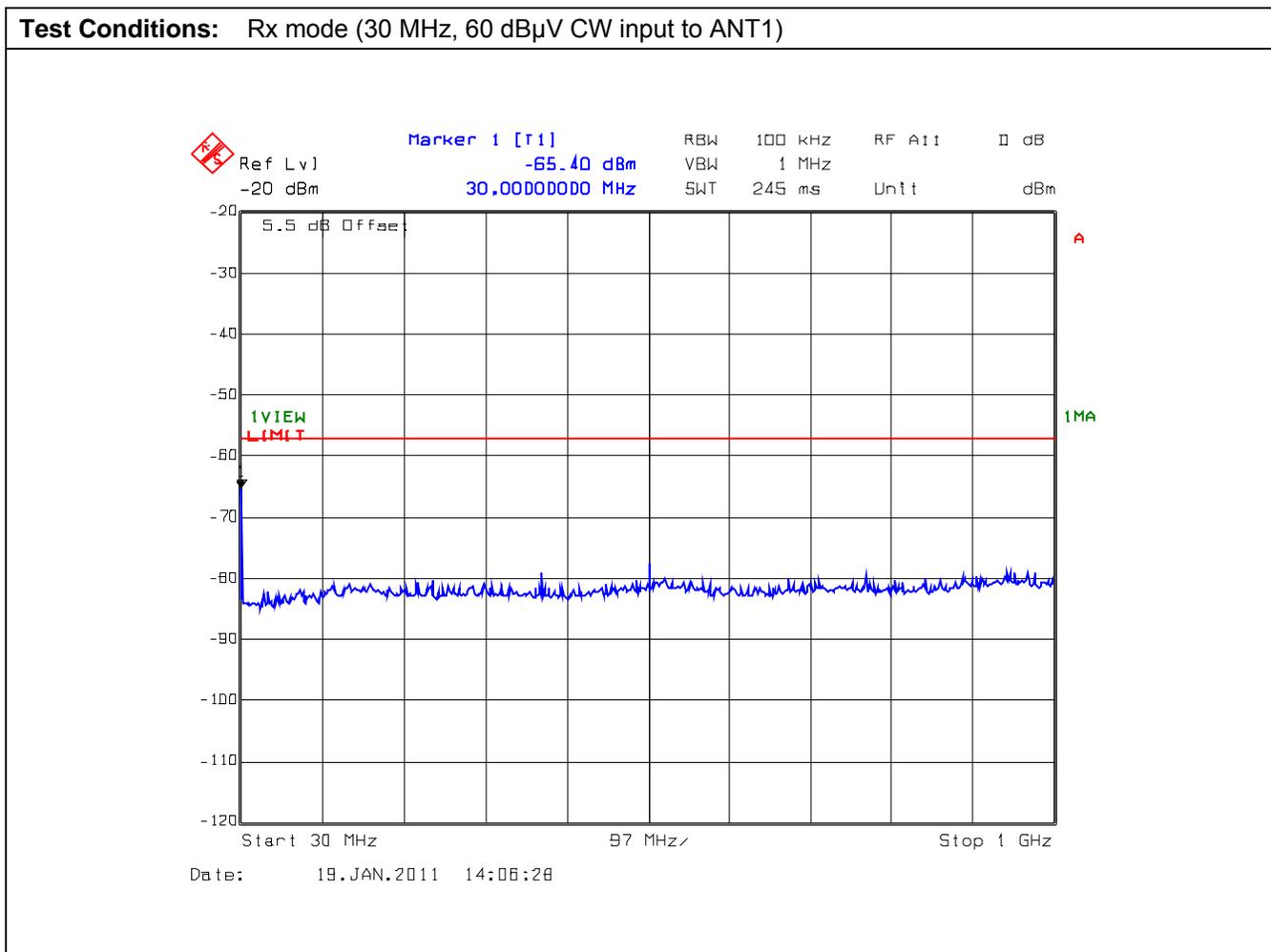
5.5.3. Test Arrangement



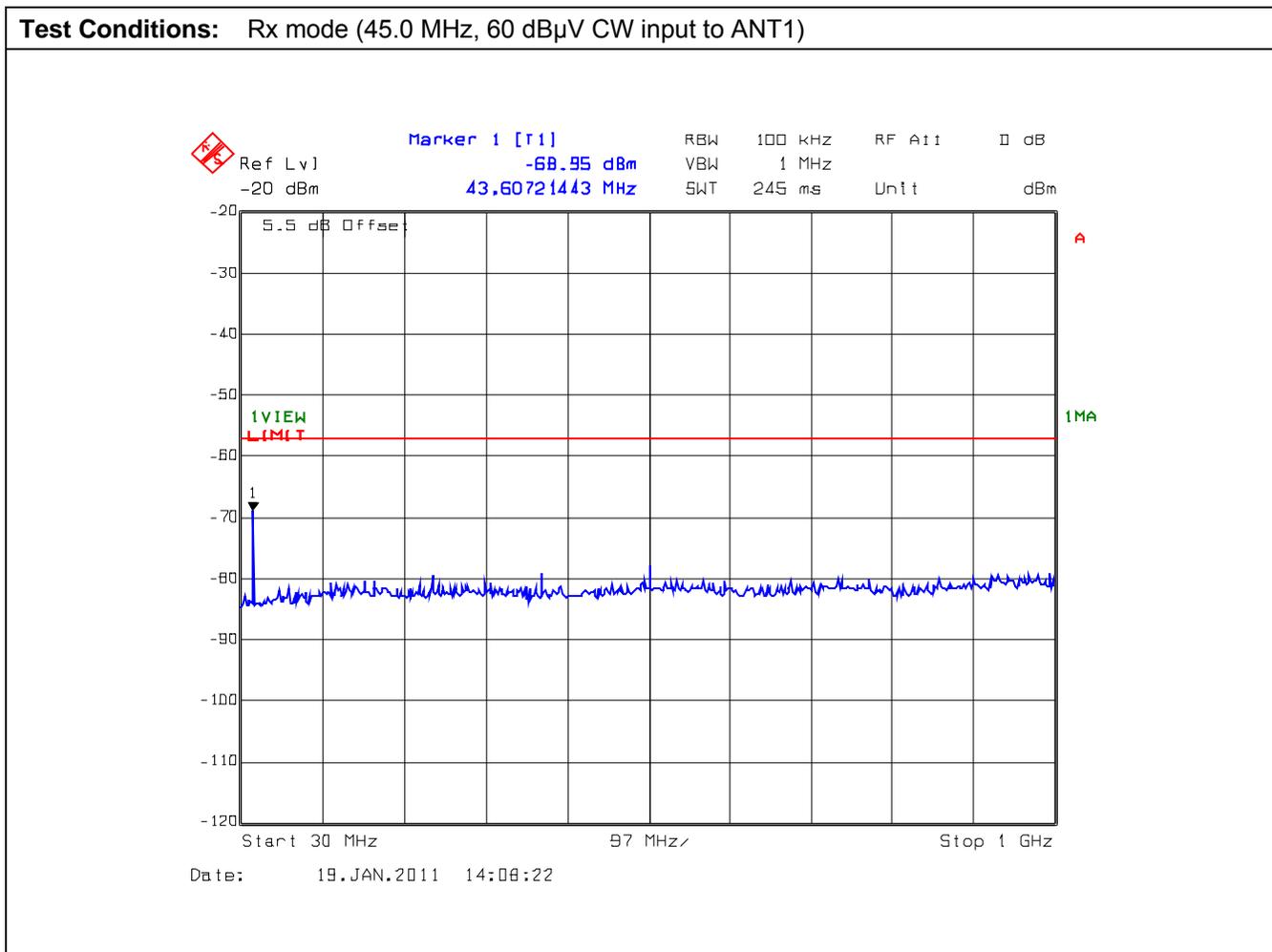
5.5.4. Test Data

5.5.4.1. 0.03 – 60 MHz Band

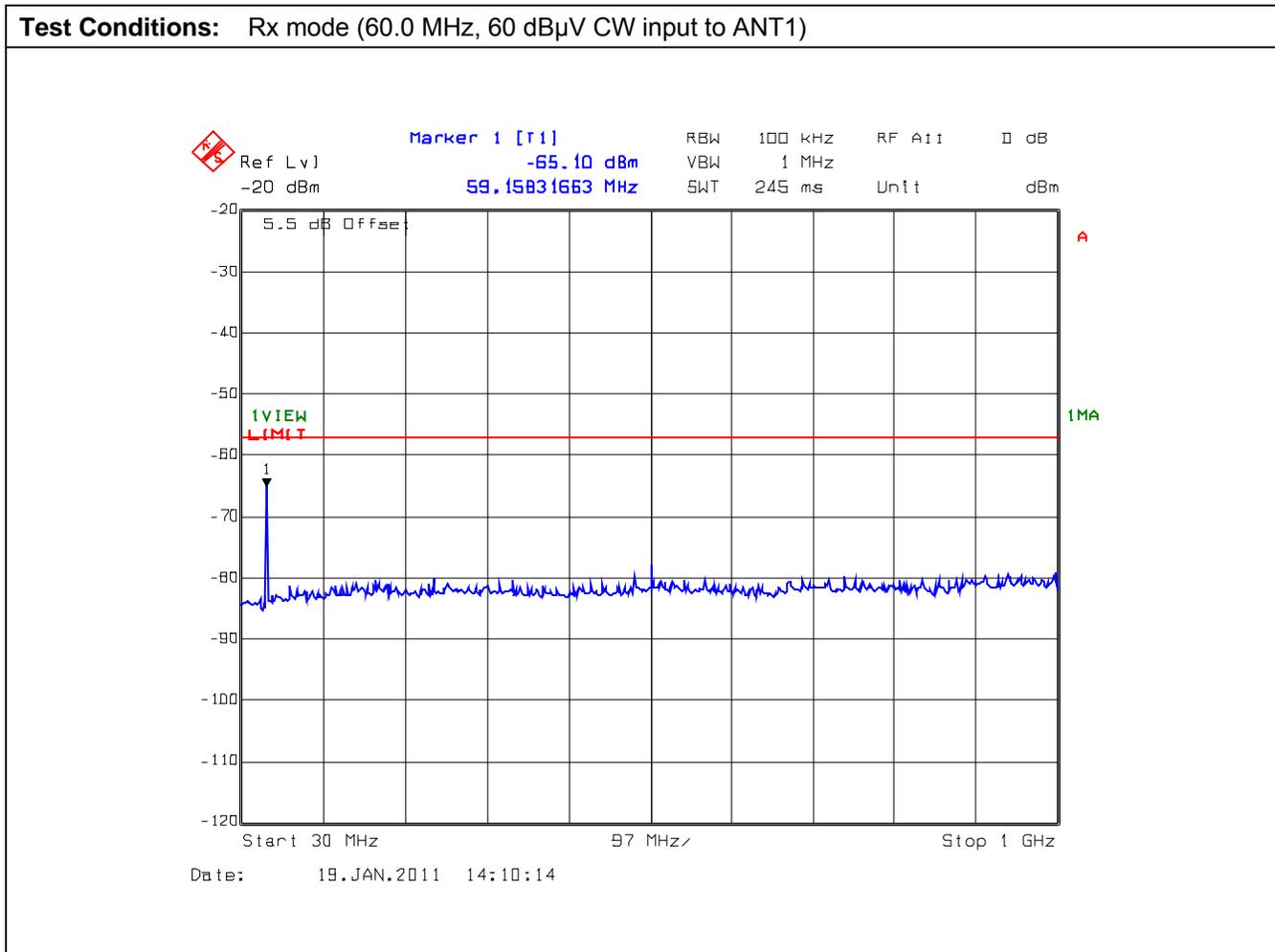
Plot 5.5.4.1.1. Conducted Receiver Spurious Emissions, ANT1, 30 MHz - 1 GHz



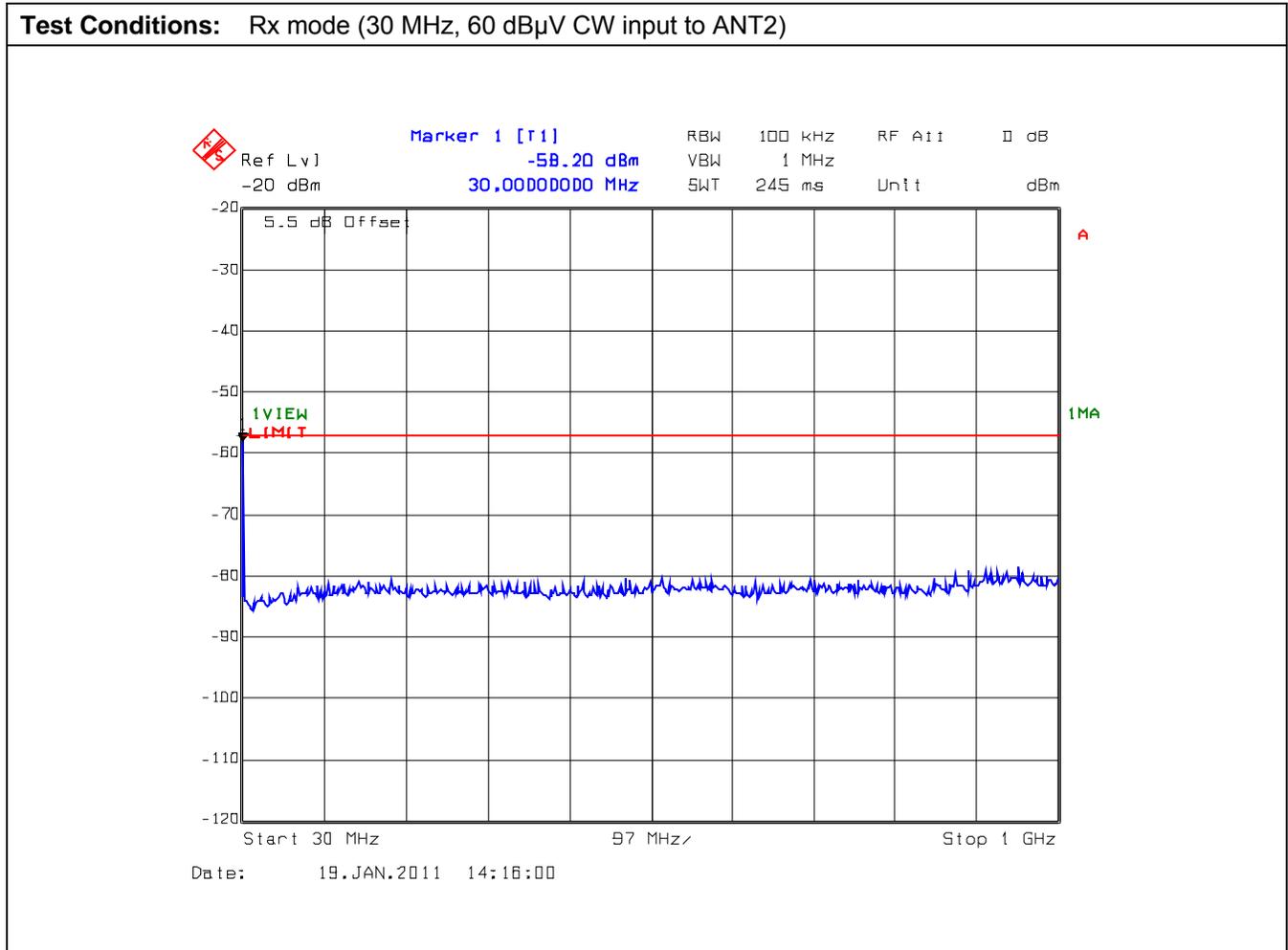
Plot 5.5.4.1.2. Conducted Receiver Spurious Emissions, ANT1, 30 MHz - 1 GHz



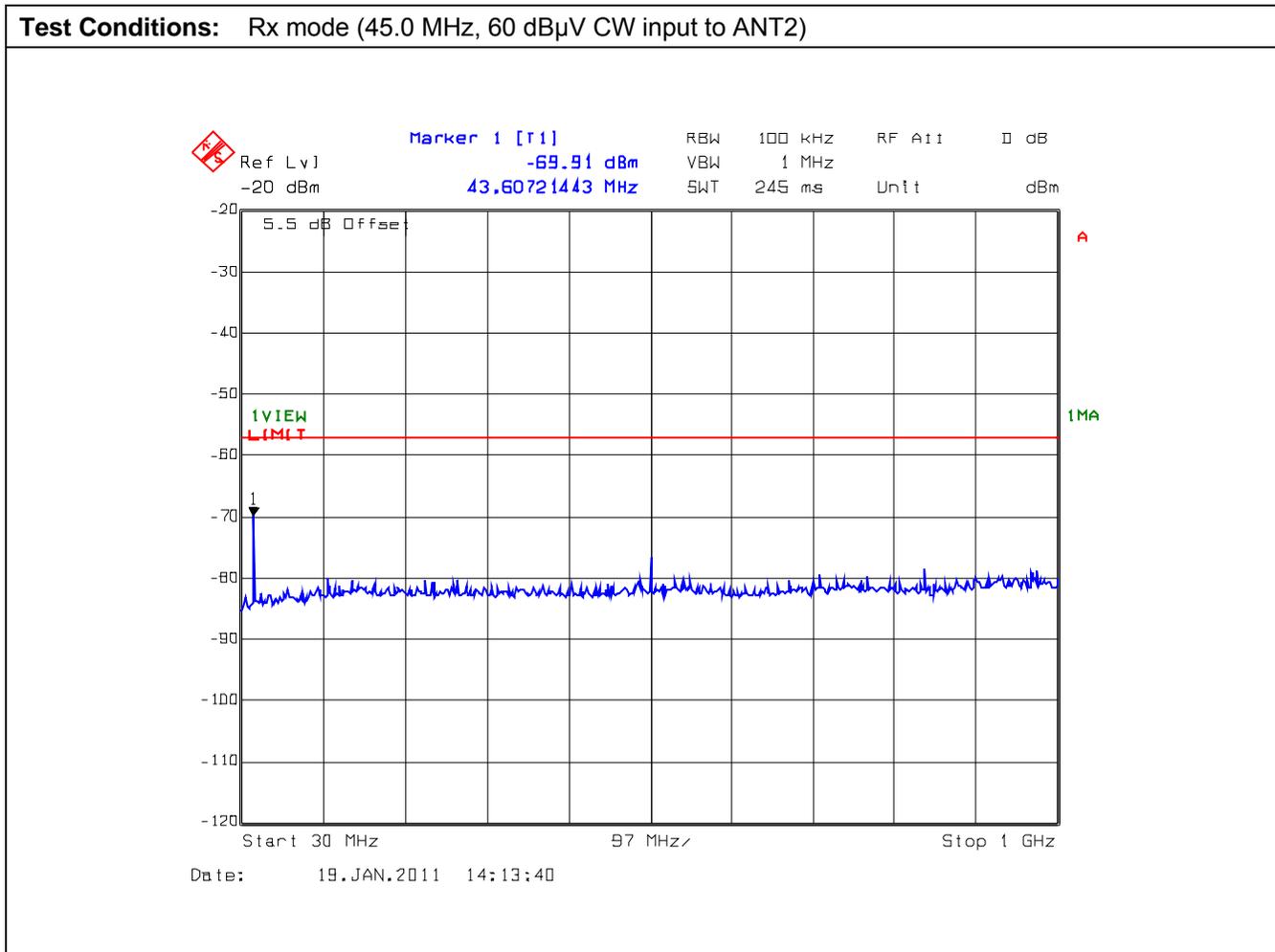
Plot 5.5.4.1.3. Conducted Receiver Spurious Emissions, ANT1, 30 MHz - 1 GHz



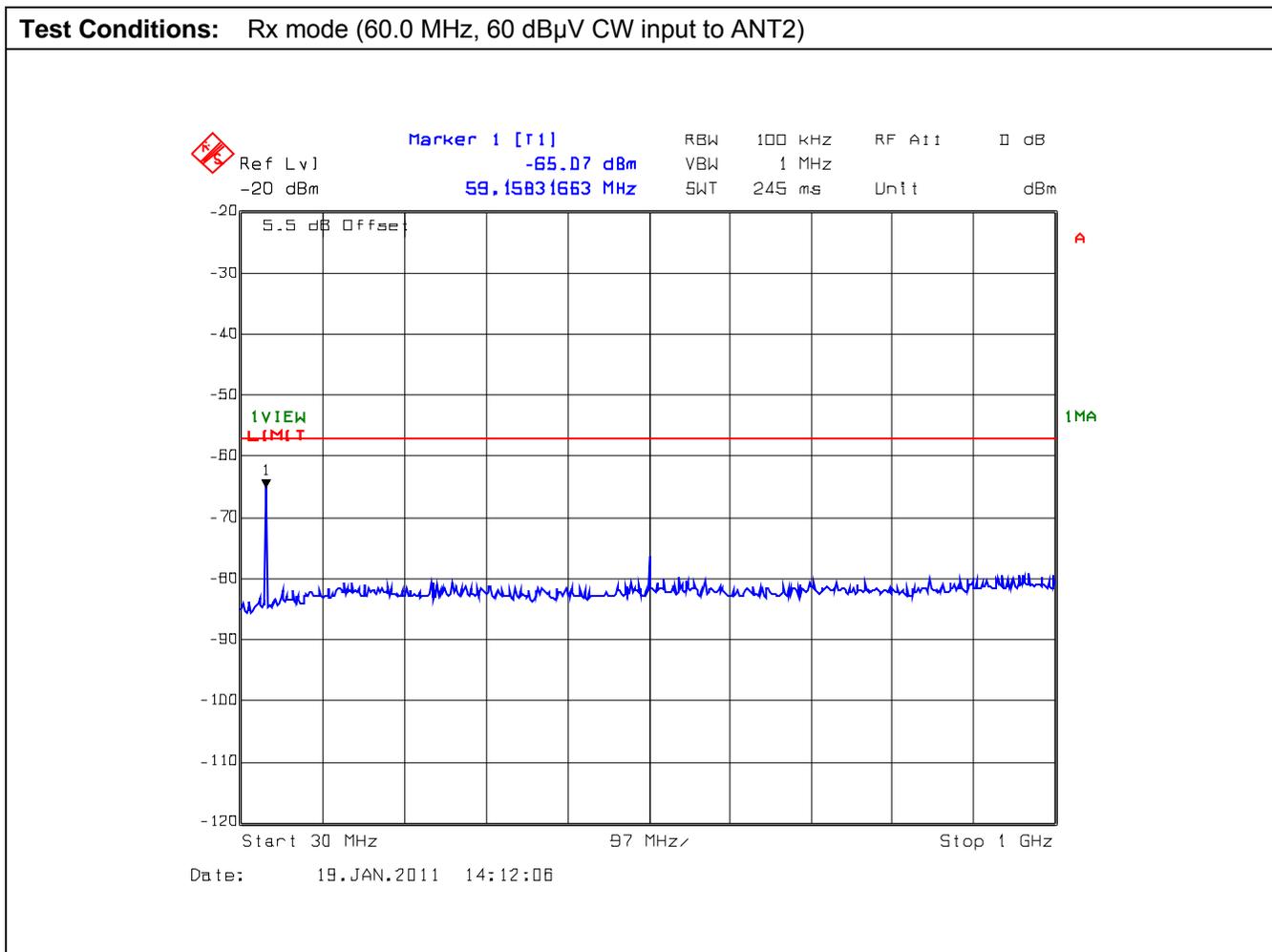
Plot 5.5.4.1.4. Conducted Receiver Spurious Emissions, ANT2, 30 MHz - 1 GHz



Plot 5.5.4.1.5. Conducted Receiver Spurious Emissions, ANT2, 30 MHz - 1 GHz

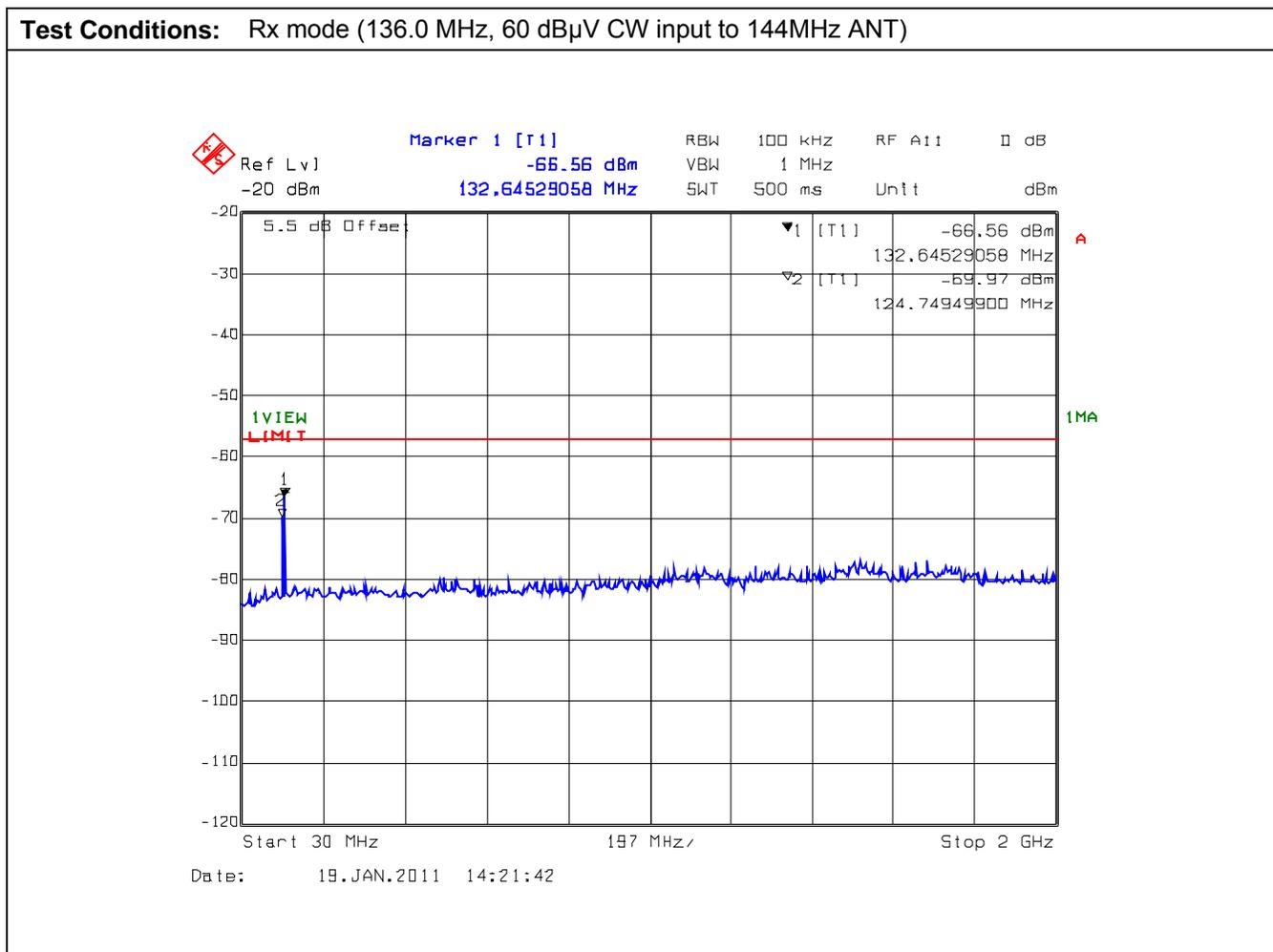


Plot 5.5.4.1.6. Conducted Receiver Spurious Emissions, ANT2, 30 MHz - 1 GHz

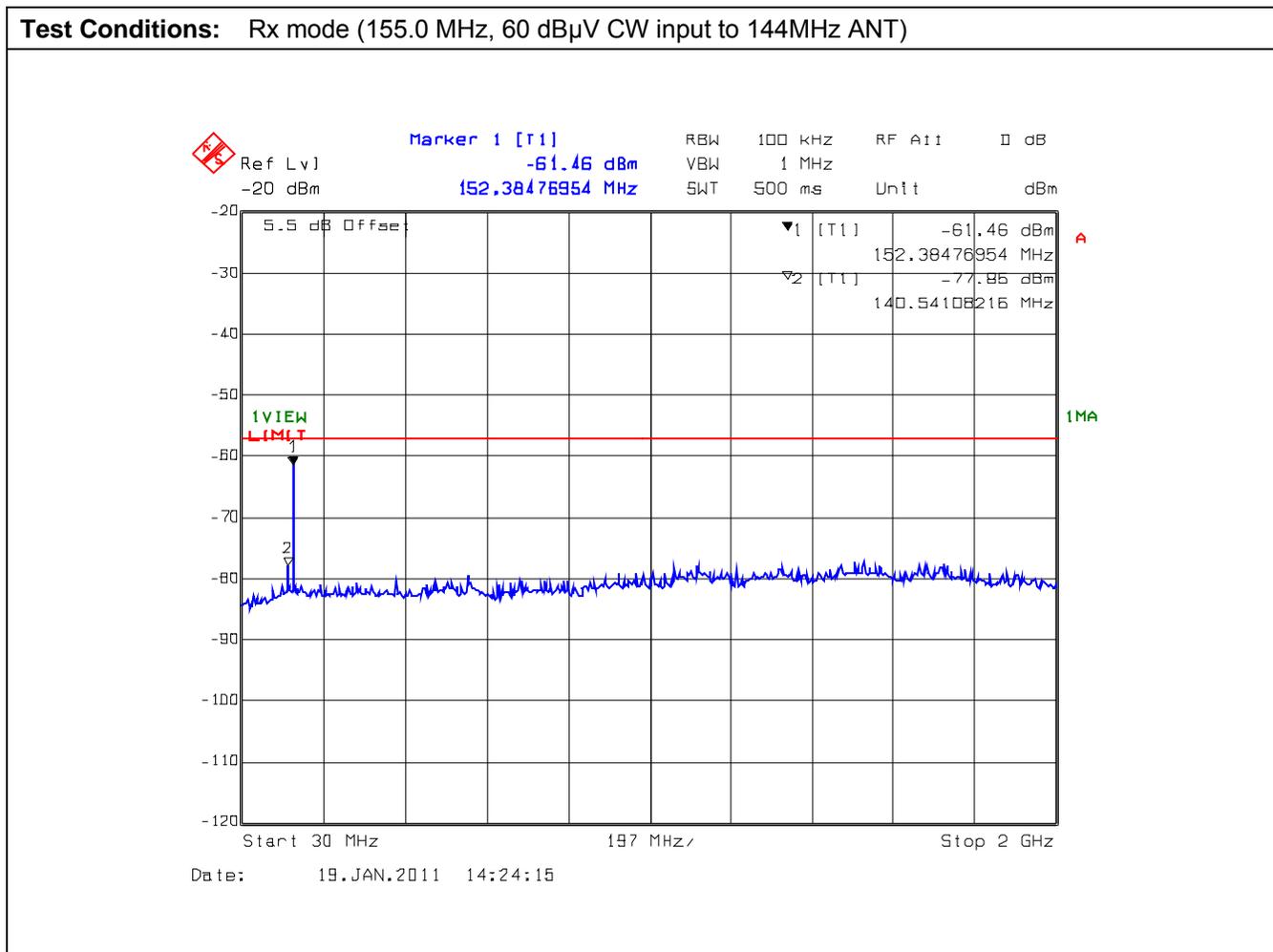


5.5.4.2. 136 – 174 MHz Band

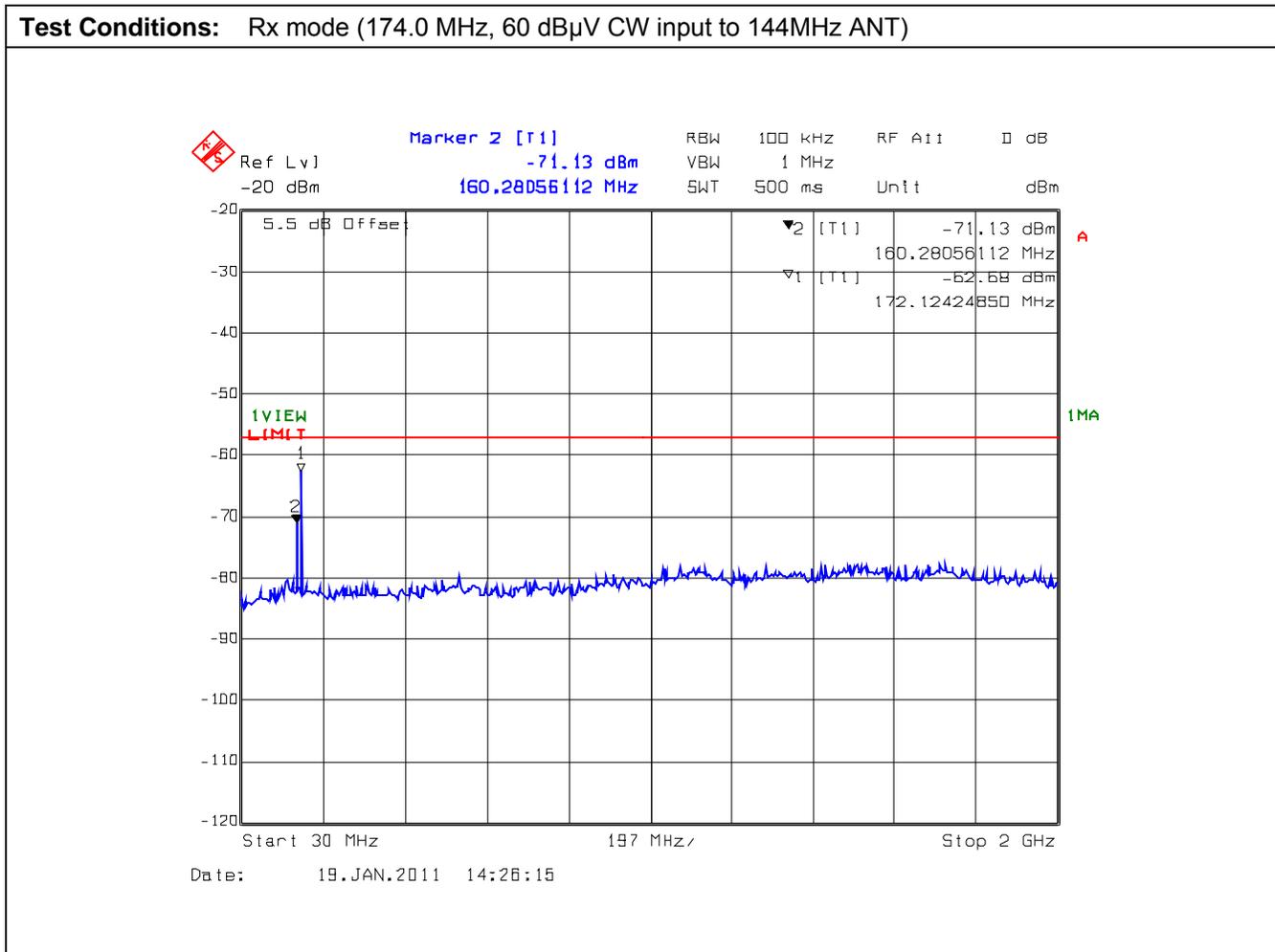
Plot 5.5.4.2.1. Conducted Receiver Spurious Emissions, 144MHz ANT, 30 MHz - 2 GHz



Plot 5.5.4.2.2. Conducted Receiver Spurious Emissions, 144MHz ANT, 30 MHz - 2 GHz

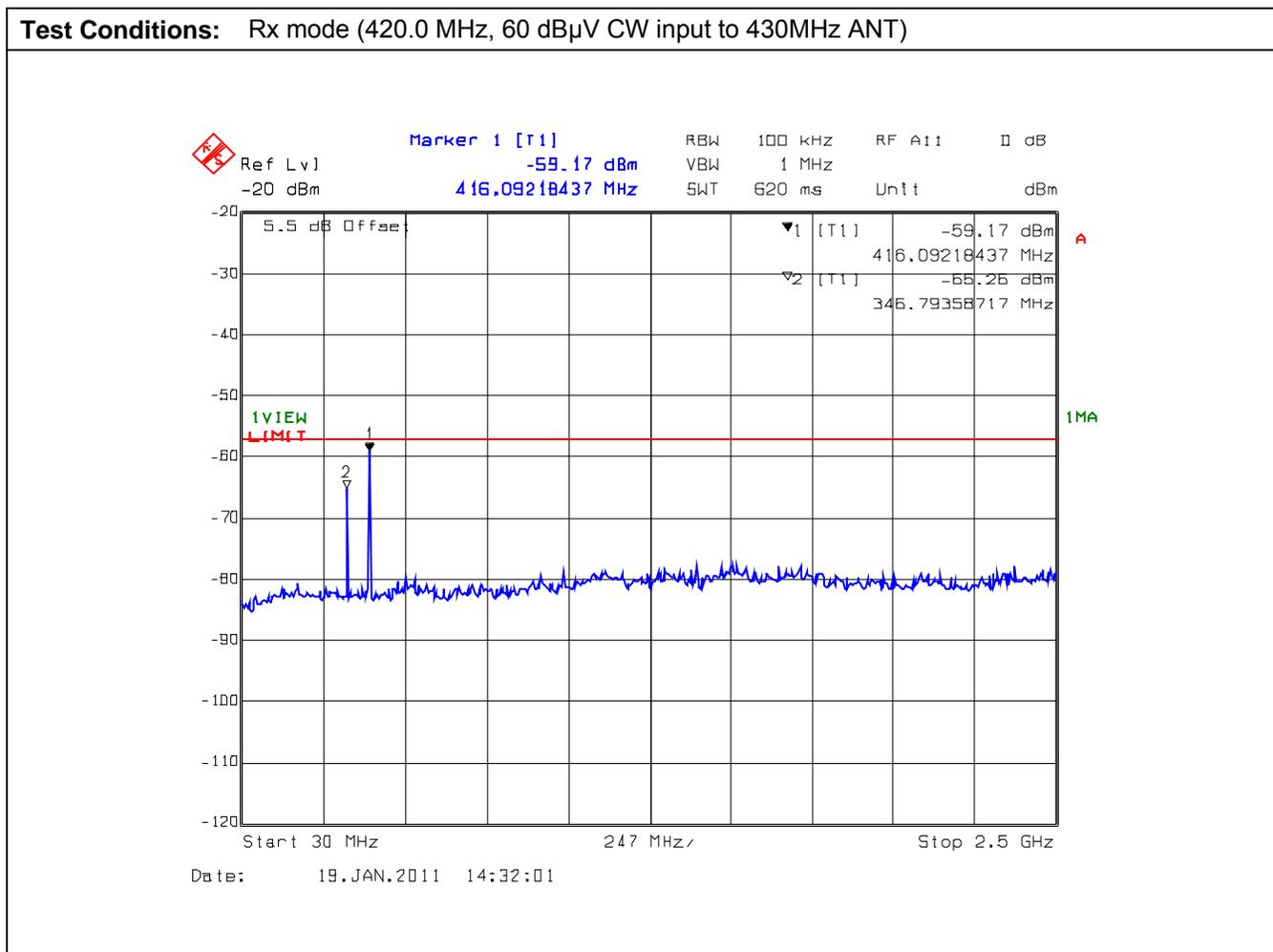


Plot 5.5.4.2.3. Conducted Receiver Spurious Emissions, 144MHz ANT, 30 MHz - 2 GHz

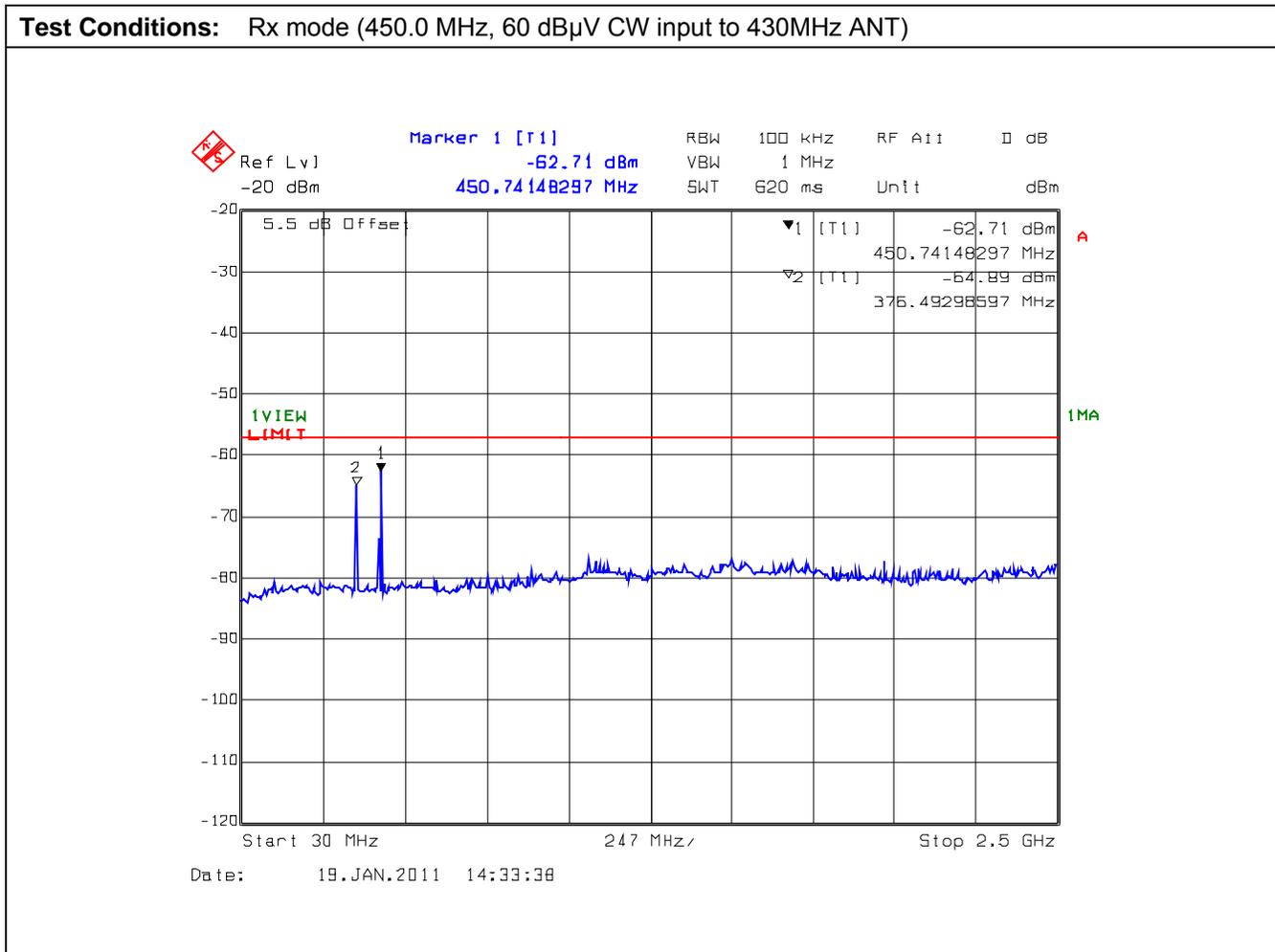


5.5.4.3. 420 – 480 MHz Band

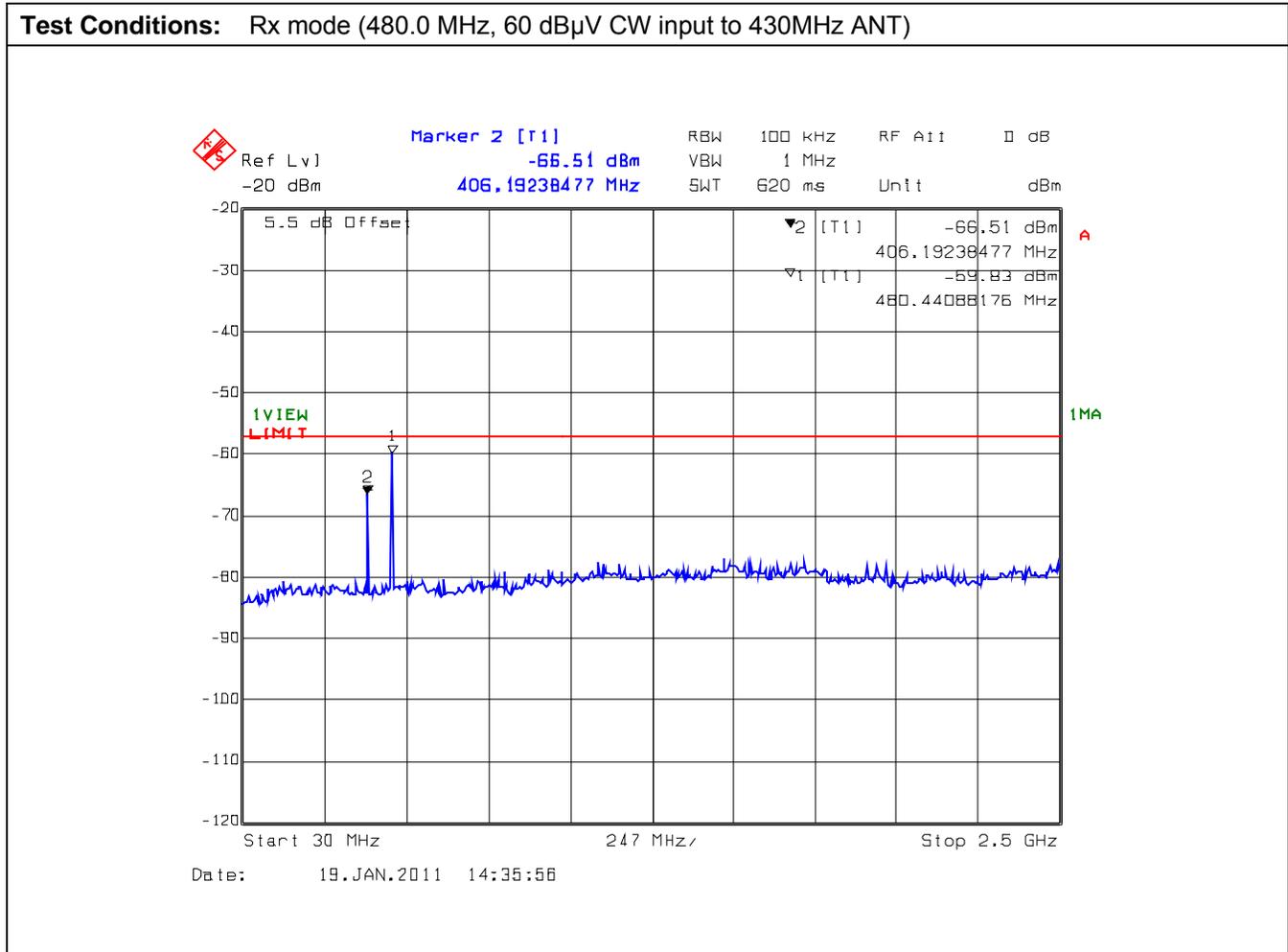
Plot 5.5.4.3.1. Conducted Receiver Spurious Emissions, 430MHz ANT, 30 MHz – 2.5 GHz



Plot 5.5.4.3.2. Conducted Receiver Spurious Emissions, 430MHz ANT, 30 MHz - 2.5 GHz

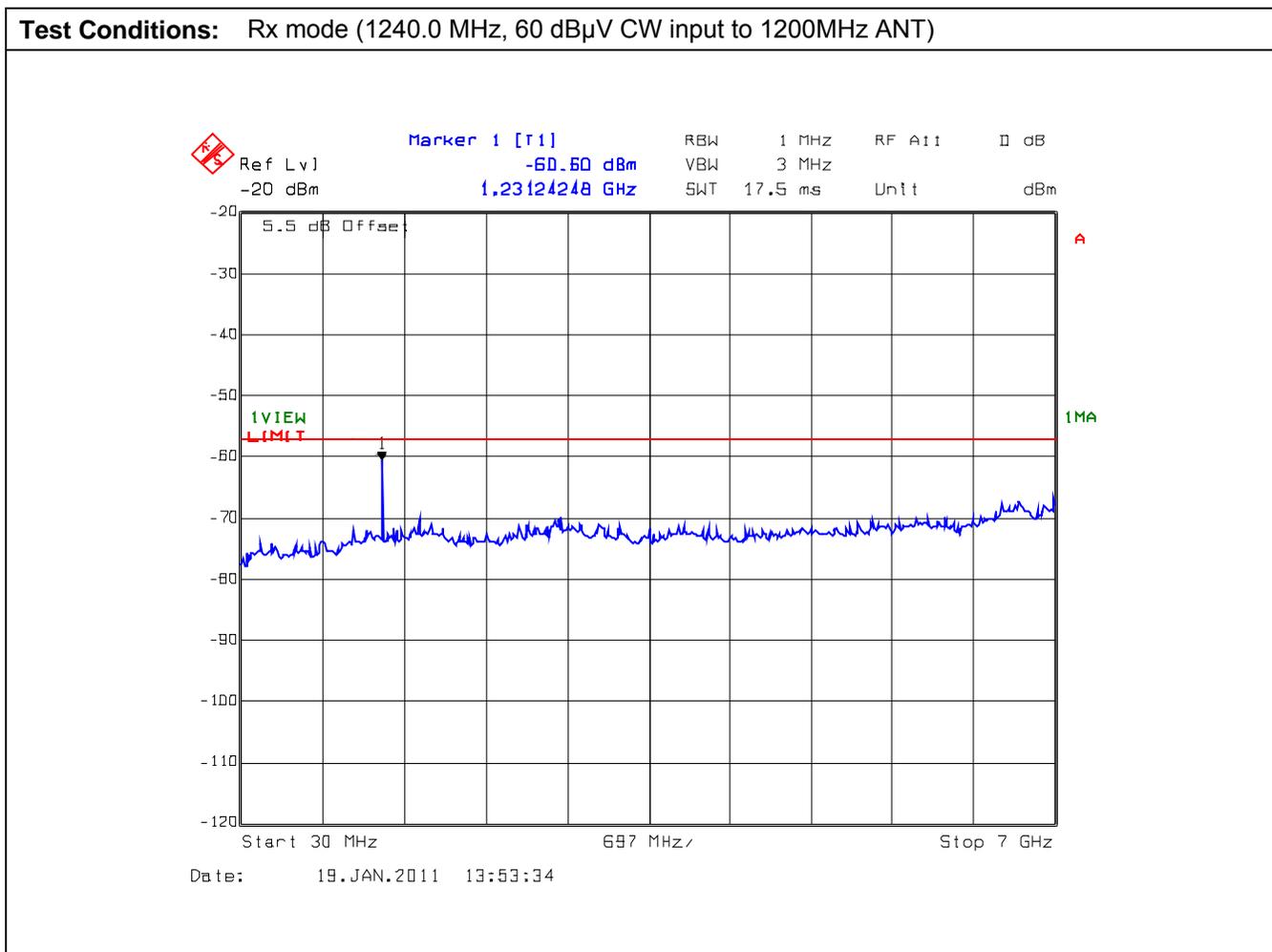


Plot 5.5.4.3.3. Conducted Receiver Spurious Emissions, 430MHz ANT, 30 MHz - 2.5 GHz

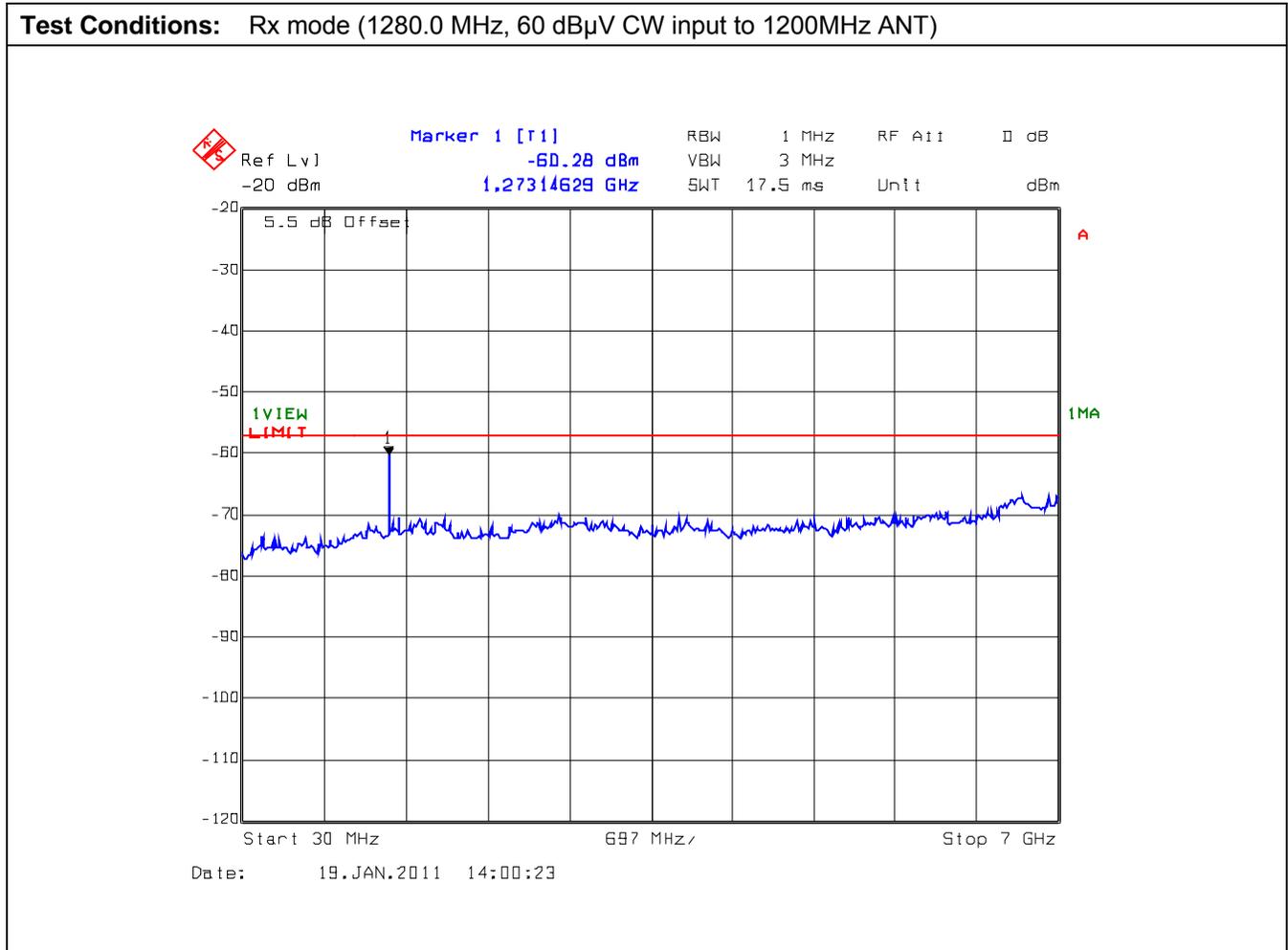


5.5.4.4. 1240 – 1320 MHz Band

Plot 5.5.4.4.1. Conducted Receiver Spurious Emissions, 1200MHz ANT, 30 MHz - 7 GHz



Plot 5.5.4.4.2. Conducted Receiver Spurious Emissions, 1200MHz ANT, 30 MHz - 7 GHz



ULTRATECH GROUP OF LABS

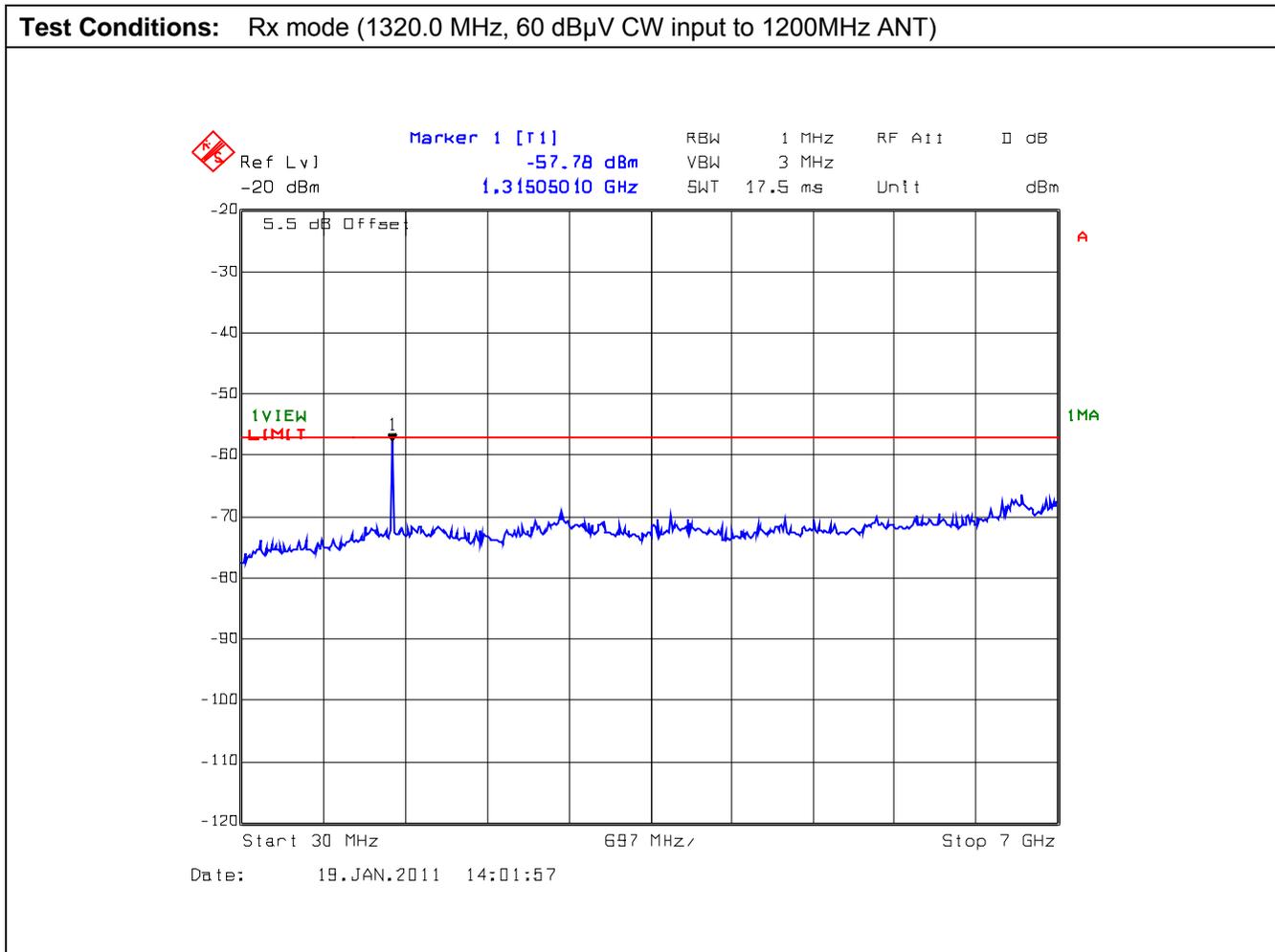
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: ICOM-266F15B121

January 24, 2011

All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

Plot 5.5.4.4.3. Conducted Receiver Spurious Emissions, 1200MHz ANT, 30 MHz - 7 GHz



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

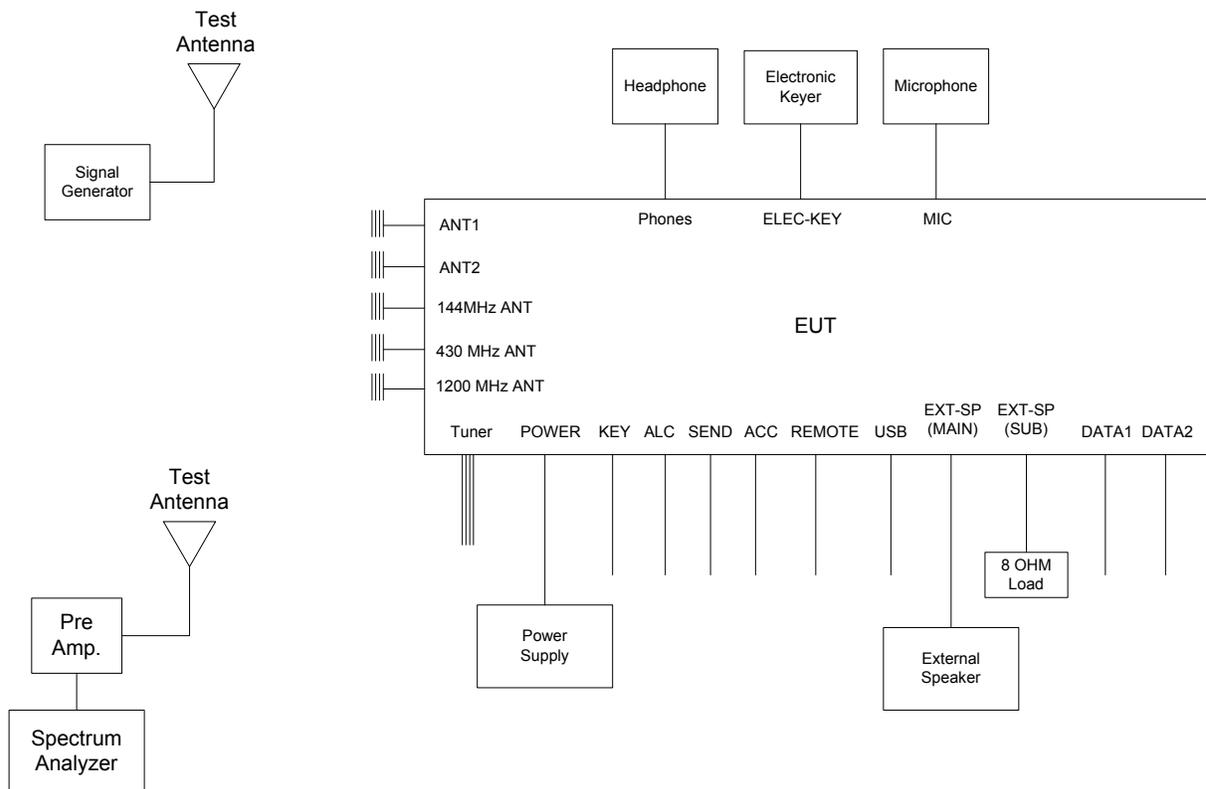
Refer to Ultratech Test Procedures ULTR-P001-200 & ANSI C63.4 for method of measurements.

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:

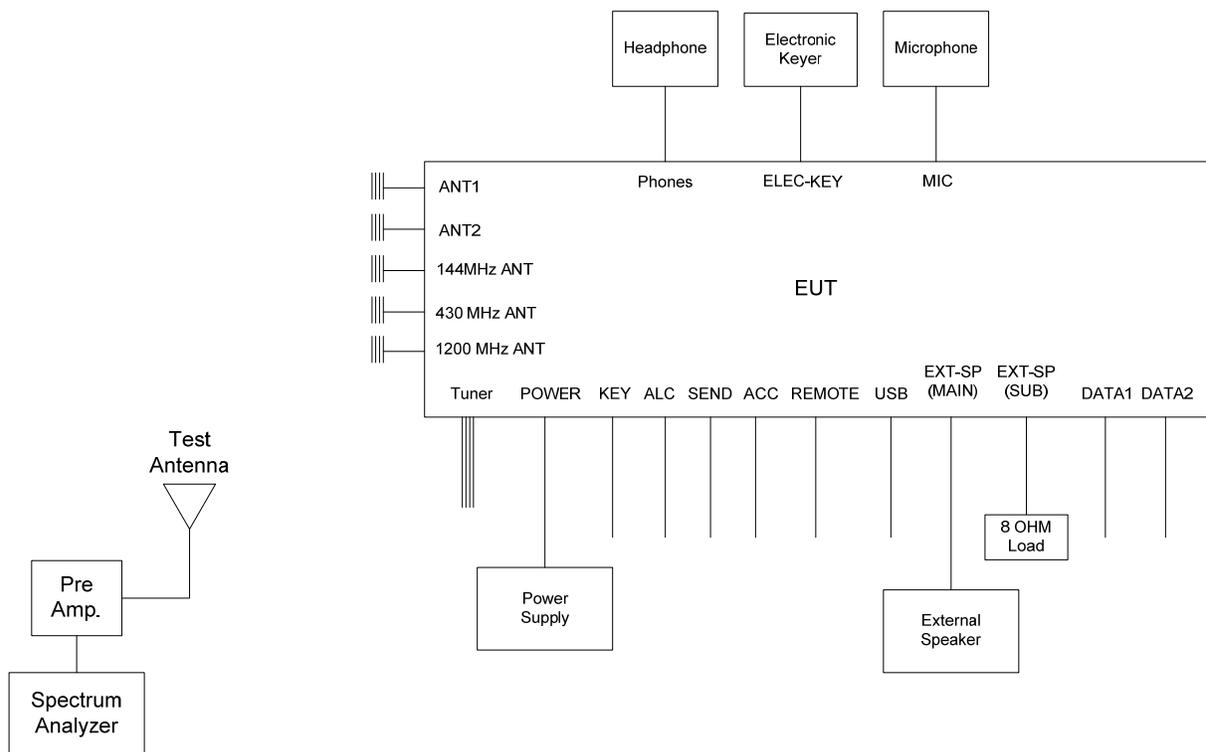
Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705 - 108	1000
108 – 500	2000
500 -1000	5000
Above 1000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

5.6.3. Test Arrangement

Receiver Mode



Digital Device



5.6.4. Test Data

Remarks:

- The measuring receiver shall be tuned over the frequency range 30 MHz to 5th harmonic of the highest frequency.
- All spurious emissions that are in excess of 20 dB below the specified limit shall be recorded.

5.6.4.1. 0.03 – 60 MHz Band

5.6.4.1.1. Radiated Receiver Spurious Emissions Near Lowest Frequency (30 MHz)

Frequency (MHz)	RF Level (dBµV/m)	Detector Used (Peak/QP)	Antenna Plane (H/V)	Limit (dBµV/m)	Margin (dB)
188.91	35.08	Peak	H	43.5	-8.4

5.6.4.1.2. Radiated Receiver Spurious Emissions Near Middle Frequency (45 MHz)

Frequency (MHz)	RF Level (dBµV/m)	Detector Used (Peak/QP)	Antenna Plane (H/V)	Limit (dBµV/m)	Margin (dB)
All spurious emissions are more than 20 dB below the specified limit.					

5.6.4.1.3. Radiated Receiver Spurious Emissions Near Highest Frequency (60 MHz)

Frequency (MHz)	RF Level (dBµV/m)	Detector Used (Peak/QP)	Antenna Plane (H/V)	Limit (dBµV/m)	Margin (dB)
All spurious emissions are more than 20 dB below the specified limit.					

5.6.4.2. 136 – 174 MHz Band

5.6.4.2.1. Radiated Receiver Spurious Emissions Near Lowest Frequency (136 MHz)

Frequency (MHz)	RF Level (dB μ V/m)	Detector Used (Peak/QP)	Antenna Plane (H/V)	Limit (dB μ V/m)	Margin (dB)
All spurious emissions are more than 20 dB below the specified limit.					

5.6.4.2.2. Radiated Receiver Spurious Emissions Near Middle Frequency (155 MHz)

Frequency (MHz)	RF Level (dB μ V/m)	Detector Used (Peak/QP)	Antenna Plane (H/V)	Limit (dB μ V/m)	Margin (dB)
All spurious emissions are more than 20 dB below the specified limit.					

5.6.4.2.3. Radiated Receiver Spurious Emissions Near Highest Frequency (174 MHz)

Frequency (MHz)	RF Level (dB μ V/m)	Detector Used (Peak/QP)	Antenna Plane (H/V)	Limit (dB μ V/m)	Margin (dB)
All spurious emissions are more than 20 dB below the specified limit.					

5.6.4.3. 420 – 480 MHz Band

5.6.4.3.1. Radiated Receiver Spurious Emissions Near Lowest Frequency (420 MHz)

Frequency (MHz)	RF Level (dBµV/m)	Detector Used (Peak/QP)	Antenna Plane (H/V)	Limit (dBµV/m)	Margin (dB)
697.50	28.18	Peak	V	46.0	-17.8
697.50	26.71	Peak	H	46.0	-19.3

5.6.4.3.2. Radiated Receiver Spurious Emissions Near Middle Frequency (450 MHz)

Frequency (MHz)	RF Level (dBµV/m)	Detector Used (Peak/QP)	Antenna Plane (H/V)	Limit (dBµV/m)	Margin (dB)
757.50	31.35	Peak	V	46.0	-14.7
757.50	29.75	Peak	H	46.0	-16.3

5.6.4.3.3. Radiated Receiver Spurious Emissions Near Highest Frequency (480 MHz)

Frequency (MHz)	RF Level (dBµV/m)	Detector Used (Peak/QP)	Antenna Plane (H/V)	Limit (dBµV/m)	Margin (dB)
408.75	30.06	Peak	V	46.0	-15.9
408.75	30.47	Peak	H	46.0	-15.5
817.50	31.89	Peak	V	46.0	-14.1
817.50	30.10	Peak	H	46.0	-15.9

5.6.4.4. 1240 – 1320 MHz Band

5.6.4.4.1. Radiated Receiver Spurious Emissions Near Lowest Frequency (30 MHz)

Frequency (MHz)	RF Level (dB μ V/m)	Detector Used (Peak/QP)	Antenna Plane (H/V)	Limit (dB μ V/m)	Margin (dB)
All spurious emissions are more than 20 dB below the specified limit.					

5.6.4.4.2. Radiated Receiver Spurious Emissions Near Middle Frequency (30 MHz)

Frequency (MHz)	RF Level (dB μ V/m)	Detector Used (Peak/QP)	Antenna Plane (H/V)	Limit (dB μ V/m)	Margin (dB)
1036.05	42.71	Peak	V	54.0	-11.3
1036.05	44.95	Peak	H	54.0	-9.1

5.6.4.4.3. Radiated Receiver Spurious Emissions Near Highest Frequency (60 MHz)

Frequency (MHz)	RF Level (dB μ V/m)	Detector Used (Peak/QP)	Antenna Plane (H/V)	Limit (dB μ V/m)	Margin (dB)
1076.05	41.42	Peak	V	54.0	-12.6

5.6.4.5. Radiated Emissions From Class B Digital Devices

Remark: The emissions were scanned from 30 MHz to 6 GHz at 3 m distance.						
Frequency (MHz)	RF Level (dBµV/m)	Detector Used (Peak/QP)	Antenna Plane (H/V)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)
129.0	25.55	Peak	H	43.5	-18.0	Pass
133.8	25.01	Peak	H	43.5	-18.5	Pass
137.8	27.60	Peak	H	43.5	-15.9	Pass
188.9	26.19	Peak	V	43.5	-17.3	Pass
188.9	33.23	Peak	H	43.5	-10.3	Pass
199.6	32.08	Peak	H	43.5	-11.4	Pass
201.6	31.92	Peak	H	43.5	-11.6	Pass
203.6	23.73	Peak	V	43.5	-19.8	Pass
203.6	32.12	Peak	H	43.5	-11.4	Pass
207.5	32.42	Peak	H	43.5	-11.1	Pass
211.8	31.98	Peak	H	43.5	-11.5	Pass
258.2	34.79	Peak	H	46.0	-11.2	Pass
1290.0	41.53	Peak	V	54.0	-12.5	Pass
1290.0	40.94	Peak	H	54.0	-13.1	Pass
1304.0	42.00	Peak	V	54.0	-12.0	Pass
1304.0	39.91	Peak	H	54.0	-14.1	Pass
1318.0	44.51	Peak	V	54.0	-9.5	Pass
1318.0	42.88	Peak	H	54.0	-11.1	Pass
1333.0	46.39	Peak	V	54.0	-7.6	Pass
1333.0	43.49	Peak	H	54.0	-10.5	Pass
1347.0	43.76	Peak	V	54.0	-10.2	Pass
1347.0	40.76	Peak	H	54.0	-13.2	Pass
1419.0	40.95	Peak	V	54.0	-13.1	Pass
1419.0	40.52	Peak	H	54.0	-13.5	Pass
1554.0	45.83	Peak	V	54.0	-8.2	Pass
1554.0	43.13	Peak	H	54.0	-10.9	Pass

5.7. REQUIREMENTS FOR SCANNING RECEIVERS [§ 15.121]

5.7.1. FCC Rules

- a. Except as provided in paragraph (c) of this section, scanning receivers and frequency converters designed or marketed for use with scanning receivers, shall:
 - (1) Be incapable of operating (tuning), or readily being altered by the user to operate, within the frequency bands allocated to the Cellular Radiotelephone Service in part 22 of this chapter (cellular telephone bands). Scanning receivers capable of "readily being altered by the user" include, but are not limited to, those for which the ability to receive transmissions in the cellular telephone bands can be added by clipping the leads of, or installing, a simple component such as a diode, resistor or jumper wire; replacing a plug-in semiconductor chip; or programming a semiconductor chip using special access codes or an external device, such as a personal computer. Scanning receivers, and frequency converters designed for use with scanning receivers, also shall be incapable of converting digital cellular communication transmissions to analog voice audio.
 - (2) Be designed so that the tuning, control and filtering circuitry is inaccessible. The design must be such that any attempts to modify the equipment to receive transmissions from the Cellular Radiotelephone Service likely will render the receiver inoperable.
- b. Except as provided in paragraph (c) of this section, scanning receivers shall reject any signals from the Cellular Radiotelephone Service frequency bands that are 38 dB or lower based upon a 12 dB SINAD measurement, which is considered the threshold where a signal can be clearly discerned from any interference that may be present.
- c. Scanning receivers and frequency converters designed or marketed for use with scanning receivers, are not subject to the requirements of paragraphs (a) and (b) of this section provided that they are manufactured exclusively for, and marketed exclusively to, entities described in 18 U.S.C. 2512(2), or are marketed exclusively as test equipment pursuant to Sec. 15.3(dd)
- d. Modification of a scanning receiver to receive transmissions from Cellular Radiotelephone Service frequency bands will be considered to constitute manufacture of such equipment. This includes any individual, individuals, entity or organization that modifies one or more scanners. Any modification to a scanning receiver to receive transmissions from the Cellular Radiotelephone Service frequency bands voids the certification of the scanning receiver, regardless of the date of manufacture of the original unit. In addition, the provisions of Sec. 15.23 shall not be interpreted as permitting modification of a scanning receiver to receiver cellular radiotelephone service transmissions.
- e. Scanning receivers and frequency converters designed for use with scanning receivers shall not be assembled from kits or marketed in kit form unless they comply with the requirements in paragraph (a) through (c) of this section.

- f. Scanning receivers shall have a label permanently affixed to the product, and this label shall be readily visible to the purchaser at the time of purchase. The label shall read as follows: WARNING: MODIFICATION OF THIS DEVICE TO RECEIVE CELLULAR RADIOTELEPHONE SERVICE SIGNALS IS PROHIBITED UNDER FCC RULES AND FEDERAL LAW.
- (1) ``Permanently affixed'' means that the label is etched, engraved, stamped, silkscreened, indelible printed or otherwise permanently marked on a permanently attached part of the equipment or on a nameplate of metal, plastic or other material fastened to the equipment by welding, riveting, or permanent adhesive. The label shall be designed to last the expected lifetime of the equipment in the environment in which the equipment may be operated and must not be readily detachable. The label shall not be a stick-on, paper label.
 - (2) When the device is so small that it is not practicable to place the warning label on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user and shall also be placed on the container in which the device is marketed. However, the FCC identifier must be displayed on the device.

5.7.2. Declaration for Compliance with FCC §15.121

- Comply with FCC 121(a)(1) – This Scanning Receiver is incapable of operating (tuning), or readily being altered by the user to operate, within the frequency bands allocated to the Cellular Radiotelephone Service in part 22 of this chapter (cellular telephone bands).

Please refer to ICOM attestation letter conforming compliance with this requirement.

- Comply with FCC 121(a)(2) – This Scanning Receiver is designed so that the tuning, control and filtering circuitry is inaccessible. The design is such that any attempts to modify the equipment to receive transmissions from the Cellular Radiotelephone Service likely will render the receiver inoperable.

Please refer to ICOM attestation letter conforming compliance with this requirement.

- Comply with FCC 121(b) – Please refer to the following Section of this Test Report for Scanning Receivers Cellular Band Rejection test.
- Comply with FCC 121(c) – Not applicable.
- Comply with FCC 121(d) – The Users Manual of this Scanning Receiver is provided with the Warning statement as below.

CAUTION: Changes or modifications to this device, not expressly approved by ICOM Inc., could void your authority to operate this device under FCC regulations.

- Comply with FCC 121(e) – This Scanning Receiver is not assembled from kits or marketed in kit form.
- Comply with FCC 121(f) – Scanning receivers shall have a label permanently affixed to the product, and this label shall be readily visible to the purchaser at the time of purchase. The label reads as follows: **WARNING: MODIFICATION OF THIS DEVICE TO RECEIVE CELLULAR RADIOTELEPHONE SERVICE SIGNALS IS PROHIBITED UNDER FCC RULES AND FEDERAL LAW.**

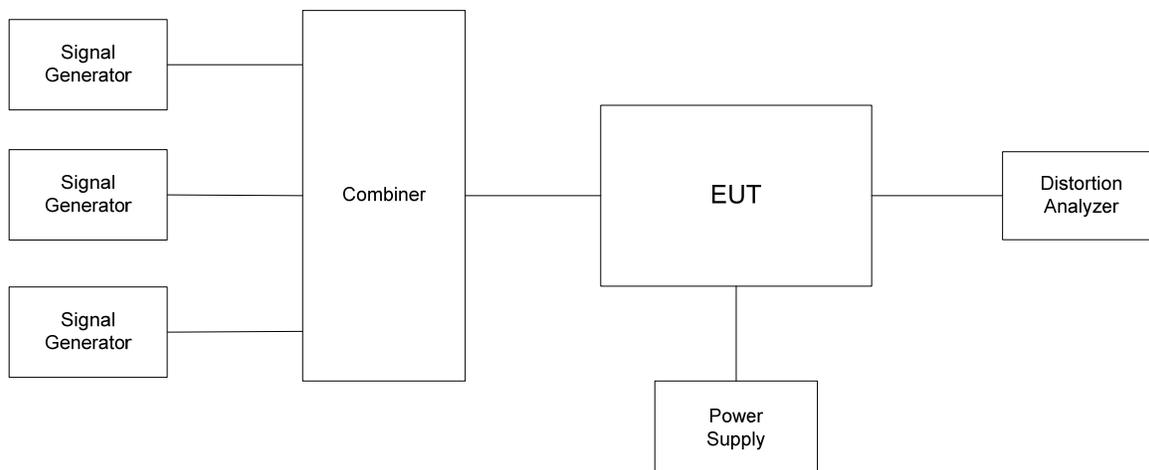
5.8. SCANNING RECEIVERS CELLULAR BAND REJECTION [§ 15.121(b)]

5.8.1. Limits

Except as provided in paragraph (c) of this section, scanning receivers shall reject any signals from the Cellular Radiotelephone Service frequency bands that are 38dB or lower based upon a 12dB SINAD measurement, which is considered the threshold where a signal can be clearly discerned from any interference that may be present.

5.8.2. Method of Measurements

- (1) Connected the EUT as shown in the following block diagram
- (2) Apply a standard RF signal to the receiver input port
- (3) Adjust the audio output signal of the receiver to it's rated value with the distortion less than 10%
- (4) Adjust the RF Signal Generator Output Power to produce 12 dB SINAD without the audio output power dropping by more than 3 dB
- (5) Repeat step (4) at lowest, middle and highest channel frequencies across all cellular base station band to establish a reference sensitivity level. The reference sensitivity taken was the lowest or worse-case sensitivity for all of the bands.
- (6) Adjust the RF Signal Generator output to a level of +60 dB above the reference sensitivity obtained in step (5)
- (7) Set the Receiver squelch threshold (the signal required to open the squelch) no greater than +20 dB above the reference sensitivity level.
- (8) Put the receiver in a scanning mode and allow it to scan across it's complete receive range
- (9) If the receiver un-squelched or stopped on any frequency, the display frequency is recorded. The signal generator output level was then adjusted until 12 dB SINAD from the receiver was produced. The signal generator level associated with this response was also noted.
- (10) Repeat this procedure for 3 frequencies in the cellular base station transmit band.
- (11) The difference between the signal generator output for any response recorded and reference sensitivity is the rejection ratio



5.8.3. Test Data

Remark: Cellular Transmitter Test frequencies are 824.04, 836.40, 848.97, 869.04, 880.62 and 893.97 MHz.

5.8.3.1. AM Mode [HF (ANT1 and ANT2), VHF (144MHz ANT), UHF (430MHz ANT)]

EUT's Scanning Frequency Band (MHz)	Cellular Transmitter Test Frequencies (MHz)	RF Input Signal Level @ Cellular Frequencies for 12 dB SINAD (dBm)	Reference Sensitivity (dBm)	Rejection Ratio (dB)	Maximum Rejection Ratio Limit (dB)
No signal found in scanning across complete receiver range [HF (ANT1 and ANT2), VHF (144MHz ANT), UHF (430MHz ANT)], -35 dBm input.					

5.8.3.2. FM Mode [HF (ANT1 and ANT2), VHF (144MHz ANT), UHF (430MHz ANT), UHF (1200MHz ANT)]

EUT's Scanning Frequency Band (MHz)	Cellular Transmitter Test Frequencies (MHz)	RF Input Signal Level @ Cellular Frequencies for 12 dB SINAD (dBm)	Reference Sensitivity (dBm)	Rejection Ratio (dB)	Maximum Rejection Ratio Limit (dB)
No signal found in scanning across complete receiver range [HF (ANT1 and ANT2), VHF (144MHz ANT), UHF (430MHz ANT), UHF (1200MHz ANT)], -35 dBm input.					

5.8.3.3. DV Mode [HF (ANT1 and ANT2), VHF (144MHz ANT), UHF (430MHz ANT), UHF (1200MHz ANT)]

EUT's Scanning Frequency Band (MHz)	Cellular Transmitter Test Frequencies (MHz)	RF Input Signal Level @ Cellular Frequencies for 12 dB SINAD (dBm)	Reference Sensitivity (dBm)	Rejection Ratio (dB)	Maximum Rejection Ratio Limit (dB)
No signal found in scanning across complete receiver range [HF (ANT1 and ANT2), VHF (144MHz ANT), UHF (430MHz ANT), UHF (1200MHz ANT)], -35 dBm input.					

5.8.3.4. CW Mode [HF (ANT1 and ANT2), VHF (144MHz ANT), UHF (430MHz ANT)]

EUT's Scanning Frequency Band (MHz)	Cellular Transmitter Test Frequencies (MHz)	RF Input Signal Level @ Cellular Frequencies for 12 dB SINAD (dBm)	Reference Sensitivity (dBm)	Rejection Ratio (dB)	Maximum Rejection Ratio Limit (dB)
No signal found in scanning across complete receiver range [HF (ANT1 and ANT2), VHF (144MHz ANT), UHF (430MHz ANT)], -35 dBm input.					

5.8.3.5. SSB Mode [HF (ANT1 and ANT2), VHF (144MHz ANT), UHF (430MHz ANT)]

EUT's Scanning Frequency Band (MHz)	Cellular Transmitter Test Frequencies (MHz)	RF Input Signal Level @ Cellular Frequencies for 12 dB SINAD (dBm)	Reference Sensitivity (dBm)	Rejection Ratio (dB)	Maximum Rejection Ratio Limit (dB)
No signal found in scanning across complete receiver range [HF (ANT1 and ANT2), VHF (144MHz ANT), UHF (430MHz ANT)], -35 dBm input.					

5.8.3.6. RTTY Mode [HF (ANT1 and ANT2), VHF (144MHz ANT), UHF (430MHz ANT)]

EUT's Scanning Frequency Band (MHz)	Cellular Transmitter Test Frequencies (MHz)	RF Input Signal Level @ Cellular Frequencies for 12 dB SINAD (dBm)	Reference Sensitivity (dBm)	Rejection Ratio (dB)	Maximum Rejection Ratio Limit (dB)
No signal found in scanning across complete receiver range [HF (ANT1 and ANT2), VHF (144MHz ANT), UHF (430MHz ANT)], -35 dBm input.					

EXHIBIT 6. TEST EQUIPMENTS LIST

Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range	Cal. Due Date
Semi-Anechoic Chamber	TDK	FCC: 91038 IC: 2049A-3	--	--	01 May 2011
Spectrum Analyzer	Agilent	E7401A	US40240432	9 kHz – 1.5 GHz	10 Jan 2012
Attenuator	Pasternack	PE7010-20	---	DC - 2 GHz 20dB attenuation	18 Jan 2012
L.I.S.N.	EMCO	3825/2	8907-1531	10 kHz – 100 MHz	30 May 2011
L.I.S.N.	EMCO	3810/2	2209	9 kHz – 30 MHz	25 Aug 2011
EMI Receiver	Rohde & Schwarz	ESU40	100037	20 Hz - 40 GHz	09 Mar 2011
Pre Amplifier	AH System	PAM-0118	225	20 MHz - 18 GHz	08 Mar 2011
Biconilog Antenna	EMCO	3142C	00026873	26 - 3000 MHz	18 Apr 2011
Horn Antenna	EMCO	3115	9701-5061	1GHz - 18 GHz	28 Nov 2011
Semi-Anechoic Chamber	TDK	FCC: 91038 IC: 2049A-3	--	--	01 May 2011
Spectrum Analyzer	Rohde & Schwarz	FSEK	834157/005	9 kHz - 40 GHz	26 Jul 2011
Combiner	Mini Circuit	ZFSC-3-4	15542	1 MHz - 1 GHz	
RF Synthesized Signal Generator	HP	8648C	3343U00391	100 kHz - 3200 MHz AM/ FM/ PM	16 Dec 2011
Power supply	Tenma	72-7295	490300297	1-40V DC 5A	Cal. on use
RF Communication Test Set	Hewlett Packard	8920B	US39064699	30 MHz - 1 GHz	27 Oct 2012
Log Periodic dipole Array antenna	ETS	3148	23845	200-2000 MHz	15 Nov 2011
Horn antenna	ETS-LINDGREN	3117	119425	1-18 GHz	18 Jan 2011
Preamplifier	Com Power	PA-103A	161243	10-1000 MHz	22 Jun 2011
Preamplifier	Hewlett Packard	8449B	3008A00769	1-18 GHz	18 Jan 2011
RF Signal Generator	Marconi Instruments	2024	112255/164	9 kHz – 2.4 GHz	23 Jul 2011
Radiocommunication Test Set	Rohde & Schwarz	CMS54	839096/007	0.4-1000 MHz	25 Nov 2011

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>

File #: ICOM-266F15B121

January 24, 2011

All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

EXHIBIT 7. MEASUREMENT UNCERTAINTY

The measurement uncertainties stated were calculated in accordance with the requirements of CISPR 16-4-2 @ IEC:2003 and JCGM 100:2008 (GUM 1995) – Guide to the Expression of Uncertainty in Measurement.

7.1. LINE CONDUCTED EMISSION MEASUREMENT UNCERTAINTY

	Line Conducted Emission Measurement Uncertainty (150 kHz – 30 MHz):	Measured	Limit
u_c	Combined <u>standard</u> uncertainty: $u_c(y) = \sqrt{\sum_{i=1}^m u_i^2(y)}$	± 1.57	± 1.8
U	Expanded uncertainty U : $U = 2u_c(y)$	± 3.14	± 3.6

7.2. RADIATED EMISSION MEASUREMENT UNCERTAINTY

	Radiated Emission Measurement Uncertainty @ 3m, Horizontal (30-1000 MHz):	Measured	Limit
u_c	Combined <u>standard</u> uncertainty: $u_c(y) = \sqrt{\sum_{i=1}^m u_i^2(y)}$	± 2.15	± 2.6
U	Expanded uncertainty U : $U = 2u_c(y)$	± 4.30	± 5.2

	Radiated Emission Measurement Uncertainty @ 3m, Vertical (30-1000 MHz):	Measured	Limit
u_c	Combined <u>standard</u> uncertainty: $u_c(y) = \sqrt{\sum_{i=1}^m u_i^2(y)}$	± 2.39	± 2.6
U	Expanded uncertainty U : $U = 2u_c(y)$	± 4.78	± 5.2

	Radiated Emission Measurement Uncertainty @ 3 m, Horizontal & Vertical (1 – 18 GHz):	Measured	Limit
u_c	Combined <u>standard</u> uncertainty: $u_c(y) = \sqrt{\sum_{i=1}^m u_i^2(y)}$	± 1.87	Under consideration
U	Expanded uncertainty U : $U = 2u_c(y)$	± 3.75	Under consideration