

Test of SpectraLink 703X Wireless  
Telephone

To: FCC 47 CFR Part 15.407 & IC RSS-210

Test Report Serial No.: TUVR89-A5 Rev A



# TEST REPORT

FROM



Test of SpectraLink 703X Wireless Telephone

To: FCC 47 CFR Part 15.407 & IC RSS-210

Test Report Serial No.: TUVR89-A5 Rev A

Note: this report only contains data with regard to the 5,150 to 5,350 MHz operational modes of the SpectraLink 703X Wireless Telephone. 2.4 and 5.8 GHz test data is reported in MiCOM Labs test report TUVR89-A1

This report supersedes None

**Manufacturer:** SpectraLink Corporation  
5755 Central Avenue  
Boulder, Colorado 80301, USA

**Product Function:** 802.11a/b/g Wireless Telephone

**Copy No:** pdf **Issue Date:** 13th June '06

**This Test Report is Issued Under the Authority of:**

**MiCOM Labs, Inc.**  
3922 Valley Avenue, Suite B  
Pleasanton, CA 94566 USA  
Phone: +1 (925) 462-0304  
Fax: +1 (925) 462-0306  
[www.micomlabs.com](http://www.micomlabs.com)



CERTIFICATE #2381.01

**MiCOM Labs is an ISO 17025 Accredited Testing Laboratory**



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**To:** FCC 47 CFR Part 15.407 & IC RSS-210  
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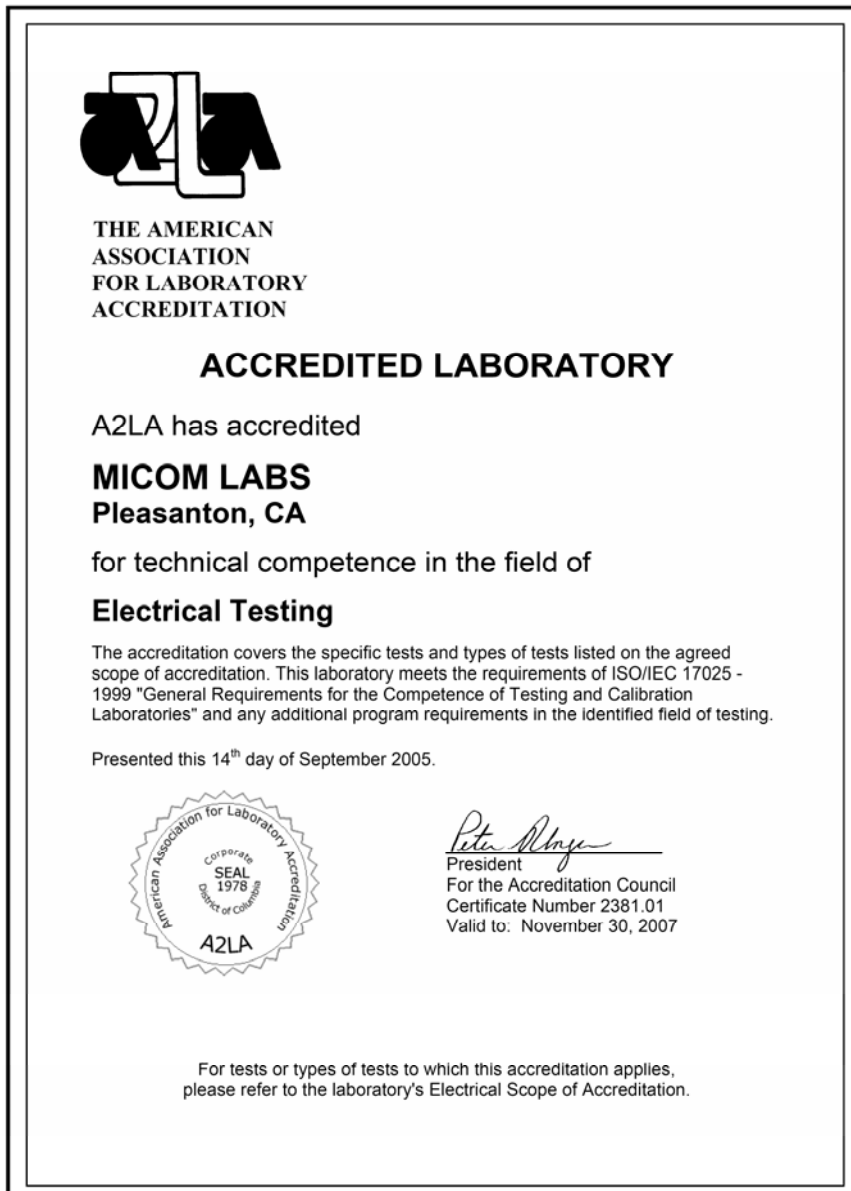
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## **ACCREDITATION & LISTINGS**

MiCOM Labs, Inc. an accredited laboratory complies with the international standard BS EN ISO/IEC 17025. The company is accredited by the American Association for Laboratory Accreditation (A2LA) [www.a2la.org](http://www.a2la.org) test laboratory number 2381.01. MiCOM Labs test schedule is available at the following URL; <http://www.a2la.org/scopepdf/2381-01.pdf>



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## **LISTINGS**

MiCOM Labs test facilities are listed by the following organizations;

### **North America**

#### **United States of America**

Federal Communications Commission (FCC) Listing #: 102167

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## DOCUMENT HISTORY

Document History		
Revision	Date	Comments
Draft		
Rev A	13 <sup>th</sup> June '06	Initial Release

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## 1. TEST RESULT CERTIFICATE

<b>Manufacturer:</b>	SpectraLink Corporation 5755 Central Avenue Boulder, Colorado 80301, USA	<b>Tested By:</b>	MiCOM Labs, Inc. 3922 Valley Avenue 'B' Pleasanton California, 94566, USA
<b>EUT:</b>	Product Description	<b>Telephone:</b>	+1 925 462 0304
<b>Model:</b>	703X	<b>Fax:</b>	+1 925 462 0306
<b>S/N:</b>	660324736 660324699		
<b>Test Date(s):</b>	8th April to 23rd May '06	<b>Website:</b>	www.micomlabs.com

STANDARD(S)	TEST RESULTS
FCC 47 CFR Part 15.407 & IC RSS-210	EQUIPMENT COMPLIES

MiCOM Labs, Inc. tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report.

### Notes:

1. This document reports conditions under which testing was conducted and the results of testing performed.
2. Details of test methods used have been recorded and kept on file by the laboratory.
3. Test results apply only to the item(s) tested.

Approved & Released for MiCOM Labs, Inc. by:



CERTIFICATE #2381.01

Graeme Grieve  
Quality Manager MiCOM Labs,

Gordon Hurst  
President & CEO MiCOM Labs, Inc.

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## 2. REFERENCES AND MEASUREMENT UNCERTAINTY

### 2.1. Normative References

Ref.	Publication	Year	Title
(i)	FCC 47 CFR Part 15.407	Feb 2006	Code of Federal Regulations
(ii)	Industry Canada RSS-210	Issue 6 Sept. 2005	Low Power License-Exempt Radiocommunication Devices (All Frequency Bands): Category 1 Equipment
(iii)	Industry Canada RSS-Gen	Issue 1 Sept. 2005	General Requirements and Information for the Certification of Radiocommunication Equipment
(iv)	ANSI C63.4	2003	American National Standards for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
(v)	CISPR 22/ EN 55022	1997 1998	Limits and Methods of Measurements of Radio Disturbance Characteristics of Information Technology Equipment
(vi)	M 3003	Edition 1 Dec. 1997	Expression of Uncertainty and Confidence in Measurements
(vii)	LAB34	Edition 1 Aug 2002	The expression of uncertainty in EMC Testing
(viii)	ETSI TR 100 028	2001	Parts 1 and 2 Electromagnetic compatibility and Radio Spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics
(ix)	A2LA	14 <sup>th</sup> September 2005	Reference to A2LA Accreditation Status – A2LA Advertising Policy
(x)	FCC Public Notice – DA 02-2138	2002	Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices

### 2.2. Test and Uncertainty Procedures

Conducted and radiated emission measurements were conducted in accordance with American National Standards Institute ANSI C63.4, listed in the Normative References section of this report.

Measurement uncertainty figures are calculated in accordance with ETSI TR 100 028 Parts 1 and 2.

Measurement uncertainties stated are based on a standard uncertainty multiplied by a coverage factor  $k = 2$ , providing a level of confidence of approximately 95 % in accordance with UKAS document M 3003 listed in the Normative References section of this report.

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### 3. PRODUCT DETAILS AND TEST CONFIGURATIONS

#### 3.1. Technical Details

Details	Description
Purpose:	Test of the SpectraLink 703X Wireless Telephone in the frequency ranges 5150 to 5350 MHz to FCC Part 15.407 and Industry Canada RSS-210 regulations.
Applicant:	As Manufacturer
Manufacturer:	SpectraLink Corporation 5755 Central Avenue Boulder, Colorado 80301, USA
Laboratory performing the tests:	MiCOM Labs, Inc. 3922 Valley Avenue, Suite "B" Pleasanton, California 94566 USA
Test report reference number:	TUV89-A5 Rev A
Date EUT received:	7 <sup>TH</sup> April 2006
Standard(s) applied:	FCC 47 CFR Part 15.407 & IC RSS-210
Dates of test (from - to):	8th April to 23rd May '06
No of Units Tested:	2
Type of Equipment:	802.11a/b/g Wireless Telephone
Manufacturers Trade Name:	NetLink Wireless Telephone
Model:	703X
Location for use:	Indoor
Declared Frequency Range(s):	5,150 – 5,350 MHz
Type of Modulation:	Per 802.11a – OFDM
Declared Nominal Output Power:	802.11a: +20dBm
EUT Modes of Operation:	802.11a/b/g
Transmit/Receive Operation:	Time Division Duplex
Rated Input Voltage and Current:	3.7 Vdc, current (depending on mode) 200mA Avg/ 800 mA peak
Operating Temperature Range:	Declared range -10 to +50°C
ITU Emission Designator:	802.11a – 17M8W7D
Microprocessor(s) Model:	TI TMS320VC5507
Clock/Oscillator(s):	32.768 KHz, 40 MHz, 48 MHz
Frequency Stability:	±20 ppm max
Equipment Dimensions:	145mm x 51mm x 22mm
Weight:	With Ultra battery 0.3 lbs (137 grams)
Primary function of equipment:	Wireless Telephone Handset

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### **3.2. Scope of Test Program**

The scope of the test program was to test the SpectraLink 703X wireless telephone handset in the frequency ranges 5150 - 5350 MHz for compliance against FCC 47 CFR Part 15.407 and Industry Canada RSS-210 specifications

#### **Models 702X & 703X**

The 702X and 703X phones use common RF components and printed circuit boards. The 703X version of the 802.11abg telephone is a mechanical variation of the 702X telephone.

#### **703X V's 702X Variations**

- Dimensions 145mm x 51mm x 22mm (137x52x22 on the 702X telephone)
- Battery contacts are 7mm longer
- The phone side keys are molded into the plastic
- Headset jack cover
- Speaker is 30mm (16mm on the 702X)
- "push to talk" available

As a result of the commonality between the 702X and 703X telephones and to prove compliance with the R&TTE Directive all conducted test results performed on the 702X telephone were used in the generation of this test report.

Testing on the 703X telephone was limited to radiated and conducted emissions.

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**SpectraLink Corporation  
703X Wireless Telephone Handset**



Photos of the headsets that were tested in combination with the 703X phone.

**PTH200 Headset**



**H251/N Headset**



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### 3.3. Equipment Model(s) and Serial Number(s)

Type (EUT/Support)	Equipment Description (Including Brand Name)	Mfr	Model No.	Serial No.
EUT	Wireless phone (integral antenna)	SpectraLink	703X	660324736
EUT	Wireless phone (RF connector)	SpectraLink	703X	660324699
EUT	Phone stand and single battery charger	SpectraLink	PCS1850	None
EUT	Phone stand and dual battery charger	SpectraLink	PCD1850	None
EUT	Earpiece	Plantronics	PTH200	None
EUT	Headset	Plantronics	H251/N	None

### 3.4. Antenna Details

1. 0 dBi integral antenna

### 3.5. Cabling and I/O Ports

Number and type of I/O ports

1. 2.4mm socket for headset or earpiece.

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### 3.6. Test Configurations

Matrix of test configurations

Operational Mode (802.11)	Frequencies (MHz)	Maximum Data Rates (MBit/s)	Data Rate(s ) Selected for Test Purposes (Mbit/s)	
			Conducted	Radiated
a	5,180 5,260 5,320	54	12 <sup>1</sup>	12 <sup>1</sup>

<sup>1</sup> - Used to test and exercise 802.11a operational mode at all times

Matrix of Equipment test configurations

Telephone Model #	Headsets		Desktop Phone stand & Battery Charger	
	PTH200	H251/N	Single	Dual
703X	√	√	√	√

Worst case plots are provided for each test parameter within this report. Plots not included are held on file by the test laboratory and available upon request with client permission.

### 3.7. Equipment Modifications

The following modifications were required to bring the equipment into compliance:

1. None

### 3.8. Deviations from the Test Standard

The following deviations from the test standard were required in order to complete the test program:

1. NONE



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### **3.9. Subcontracted Testing or Third Party Data**

Radiated emissions are tested below and verified above 1 GHz at TUV Rheinland of North America's 10m chamber located at the following address;-

2305 Mission College Blvd.  
Santa Clara  
California 95054  
USA

TUV Rheinland of North America IC Registration Number: IC 4453-1

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## 4. TEST SUMMARY

### List of Measurements

The following table represents the list of measurements required under the **FCC CFR47 Part 15.407** and **Industry Canada RSS-210** and **Industry Canada RSS-Gen**.

Section(s)	Test Items	Description	Condition	Result	Test Report Section
15.407(a) A9.2(2) 4.4	26dB and 99% Emission BW	Emission bandwidth measurement	Conducted	Complies	5.1.1
15.407(a) A9.2(2) 4.6	Transmit Output Power	Power Measurement	Conducted	Complies	5.1.2
15.407(a) A9.2(2)	Peak Power Spectral Density	PPSD	Conducted	Complies	5.1.3
15.407(a)(6)	Peak Excursion Ratio	<13dB in any 1MHz bandwidth	Conducted	Complies	5.1.4
15.407(g) 15.31 2.1 4.5	Frequency Stability	Limits: contained within band of operation at all times.	Manufacturer declaration	Complies	5.1.5
15.407(f) 5.5	Radio Frequency Radiation Exposure	Exposure to radio frequency energy levels, Maximum Permissible Exposure (MPE)	SAR testing performed	Complies	5.1.6
15.407(b)(2) 2.2 2.6 A9.3(2) 4.7	Conducted Spurious Emissions	Spurious emissions above 1GHz (1-40GHz) including band edge	Conducted	Complies	5.1.7

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**List of Measurements (continued)**

The following table represents the list of measurements required under the **FCC CFR47 Part 15.407** and **Industry Canada RSS-210** and **Industry Canada RSS-Gen**.

Section(s)	Test Items	Description	Condition	Result	Test Report Section
<b>15.407(b)(2)</b> <b>15.205(a)</b> <b>15.209(a)</b> <b>2.2</b> <b>2.6</b> <b>A9.3(2)</b> <b>4.7</b>	Radiated Emissions		Radiated		5.1.8
	Transmitter Radiated Spurious Emissions	Emissions above 1 GHz		Complies	5.1.8.1
	Radiated Band Edge	Band edge results		Complies	5.1.8.2
<b>RSS-GEN</b> <b>6</b>	Receiver Radiated Spurious Emissions	Emissions above 1 GHz		Complies	5.1.8.3
<b>15.407(b)(6)</b> <b>15.205(a)</b> <b>15.209(a)</b> <b>2.2</b>	Radiated Emissions	Emissions <1 GHz (30M-1 GHz)		Complies	5.1.8.4
<b>15.407(b)(6)</b> <b>15.207</b> <b>7.2.2</b>	AC Wireline Conducted Emissions 150 kHz–30 MHz	Conducted Emissions	Conducted	Complies	5.1.9

**Note 1:** Test results reported in this document relate only to the items tested

**Note 2:** The required tests demonstrated compliance as per client declaration of test configuration, monitoring methodology and associated pass/fail criteria

## 5. TEST RESULTS

### 5.1. Device Characteristics

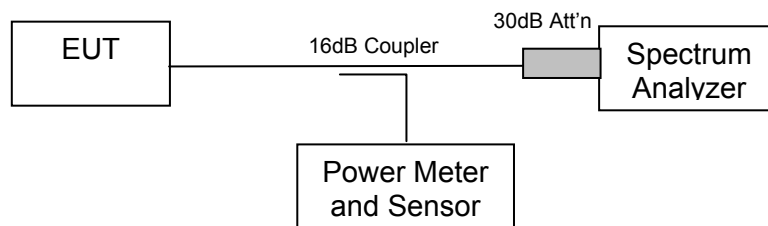
#### 5.1.1. 26 dB and 99 % Bandwidth

**FCC, Part 15 Subpart C §15.407(a)**  
**Industry Canada RSS-210 § A9.2(2)**  
**Industry Canada RSS-Gen 4.4**

#### Test Procedure

The bandwidth at 26 dB and 99 % is measured with a spectrum analyser connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency. The spectrum analyzer utilized the 6 dB resolution bandwidth filter for all measurements.

#### Test Measurement Set up



Measurement set up for 6 dB and 99 % bandwidth test

EUT parameters.  
Data Rate(s): 802.11a 12 MBit/s,  
Power Level: Maximum  
Duty Cycle: 100%



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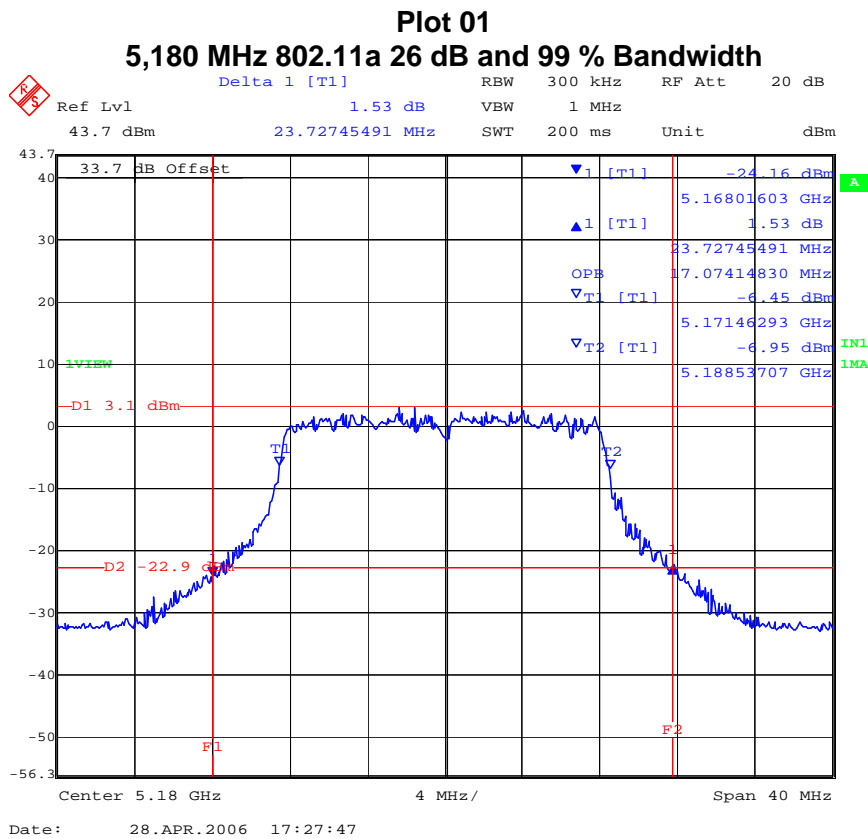
**Measurement Results for 26 dB and 99 % Operational Bandwidth(s)**

Ambient conditions.

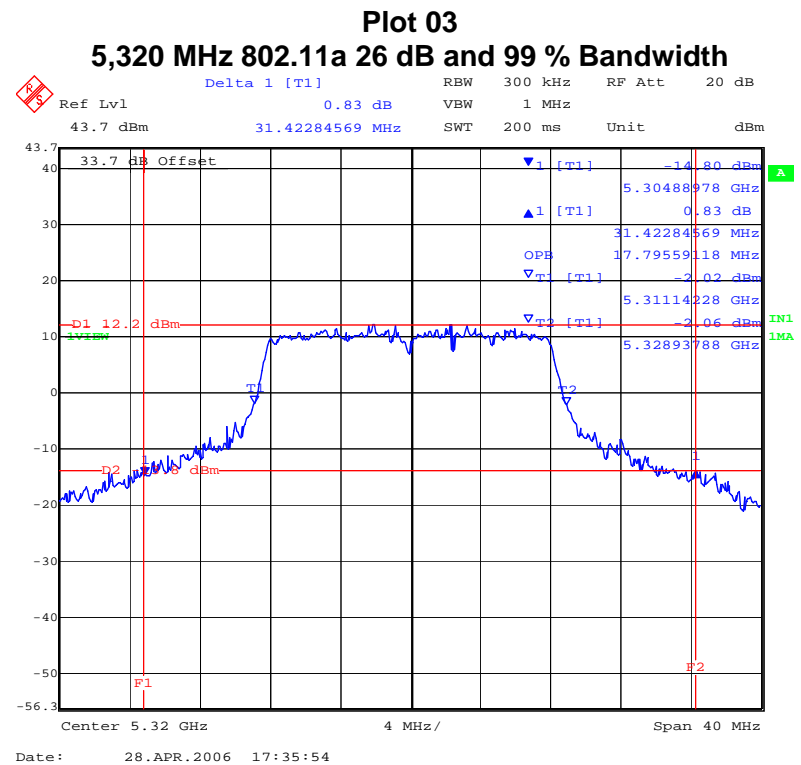
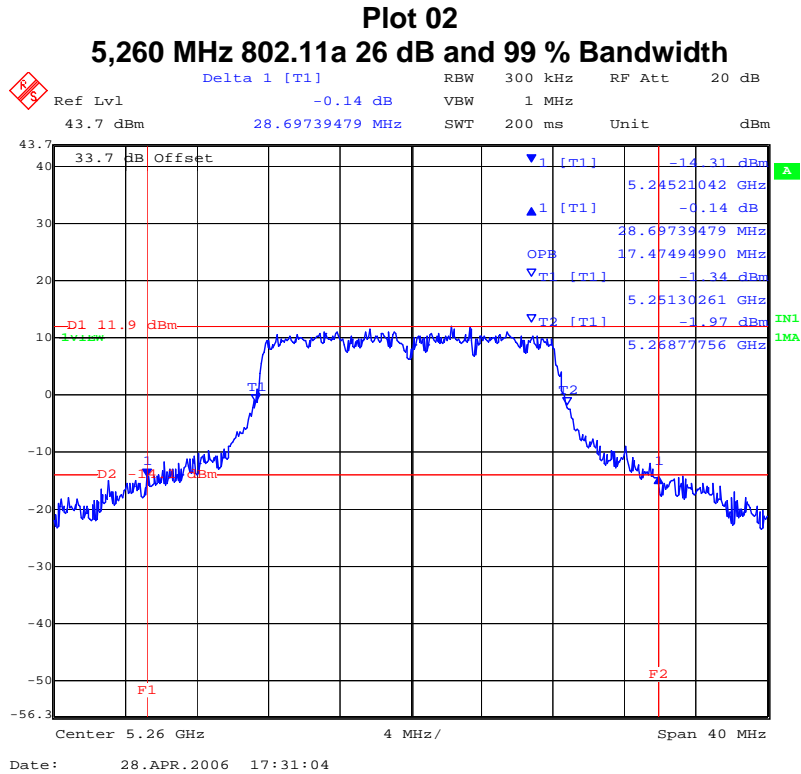
Temperature: 17 to 23 °C    Relative humidity: 31 to 57 %    Pressure: 999 to 1012 mbar

**TABLE OF RESULTS – 802.11a**

Center Frequency (MHz)	26 dB Bandwidth (MHz)	99 % BW (MHz)	26 dB and 99 % BW Plots
5,180	23.7275	17.0741	01
5,260	28.6973	17.4749	02
5,320	31.4228	17.7956	03



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## Specification

### Limits

#### FCC, Part 15 §15.407 (a)(1), (a)(2) and Industry Canada RSS-210 § A9.2(2)

**(a)(1)** For the band 5.15-5.25 GHz the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or  $+4 \text{ dBm} + 10 \log B$ , where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed +4 dBm in any 1 megahertz band.

**(a)(2)** For the 5.25-5.35 GHz band the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or  $+11 \text{ dBm} + 10 \log B$ , where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed +11 dBm in any 1 megahertz band.

#### Industry Canada RSS-Gen 4.4

When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured.

## Laboratory Measurement Uncertainty for Spectrum Measurement

Measurement uncertainty	$\pm 2.81 \text{ dB}$
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## Traceability

Method	Test Equipment Used
Measurements were made per work instruction WI-03 'Measurement of RF Spectrum Mask'	0158, 0193, 0252, 0313, 0314, 0070, 0116, 0117

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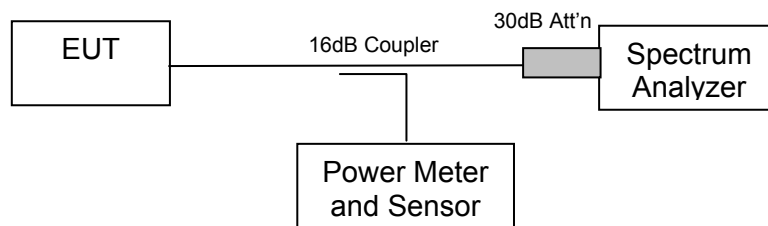
### 5.1.2. Transmit Output Power

**FCC, Part 15 Subpart C §15.407(a)**  
**Industry Canada RSS-210 §9.9(2)**  
**Industry Canada RSS-Gen 4.6**

#### Test Procedure

The transmitter terminal of EUT was connected to the input of the average power meter. The measurement results included any offsets.

#### Test Measurement Set up



Measurement set up for Transmitter Output Power

#### Maximum Transmit Power

Limit 5150 – 5250: Lesser of 50 mW (+17dBm) or  $4 + 10 \text{ Log (B)}$  dBm

Frequency Range (MHz)	Maximum 26 dB Bandwidth (MHz)	$4 + 10 \text{ Log (B)}$	Limit (dBm)
5150 – 5250	17.0741	+16.32 dBm	+16.32

Limit 5250 – 5350: Lesser of 250 mW (+24dBm) or  $11 + 10 \text{ Log (B)}$  dBm

Frequency Range (MHz)	Maximum 26 dB Bandwidth (MHz)	$11 + 10 \text{ Log (B)}$	Limit (dBm)
5250 - 5350	17.7956	+23.50 dBm	+23.50



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### Measurement Results for Transmit Output Power

Ambient conditions.

Temperature: 17 to 23 °C      Relative humidity: 31 to 57 %      Pressure: 999 to 1012 mbar

EUT parameters.

Data Rate(s): 802.11a 12 MBit/s,

Power Level: Maximum

Duty Cycle: 100%

### TABLE OF RESULTS – 802.11a

Center Frequency (MHz)	Average Power (dBm)
5,180	+9.75
5,260	+13.46
5,320	+13.36

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**Specification**

**Limits**

**FCC, Part 15 §15.407 (a)(1), (a)(2) and Industry Canada RSS-210 § A9.2(2)**

**(a)(1)** For the band 5.15-5.25 GHz the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or +4 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed +4 dBm in any 1 megahertz band.

**(a)(2)** For the 5.25-5.35 GHz band the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or +11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed +11 dBm in any 1 megahertz band.

**Industry Canada RSS-Gen 4.4**

When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured.

**Laboratory Measurement Uncertainty for Power Measurements**

Measurement uncertainty	±1.33 dB
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**Traceability**

Method	Test Equipment Used
Measurements were made per work instruction WI-01 'Measuring RF Output Power'	0158, 0193, 0252, 0313, 0314, 0070, 0116, 0117

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### 5.1.3. Peak Power Spectral Density

**FCC, Part 15 Subpart C §15.407(a)**  
**Industry Canada RSS-210 § A9.2(2)**

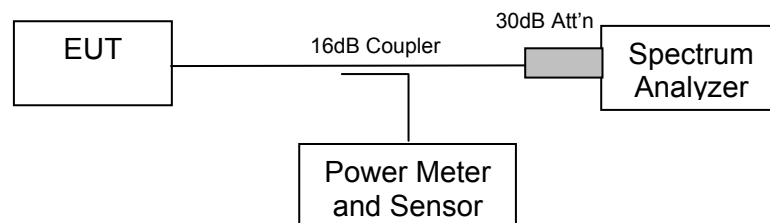
#### **Test Procedure**

The transmitter output was connected to a spectrum analyzer and the peak power spectral density measured. Method 2 Sample Detection and power averaging, specified in FCC document DA 02-2138 (Normative Reference (x) in Section 2.1 'References and Measurement Uncertainty');

“Measurement Procedure Updated for Peak Transmit Power in the Unlicensed National Information Infrastructure (U-NII) Bands.”

was used to determine the peak power spectral density of the emission. The Peak Power Spectral Density is the highest level found across the emission in a 1 MHz resolution bandwidth.

#### **Test Measurement Set up**



Measurement set up for Peak Power Spectral Density

#### **Measurement Results for Peak Power Spectral Density**

Ambient conditions.

Temperature: 17 to 23 °C      Relative humidity: 31 to 57 %      Pressure: 999 to 1012 mbar

EUT parameters.

Data Rate(s): 802.11a 12 MBit/s,

Power Level: Maximum

Duty Cycle: 100%




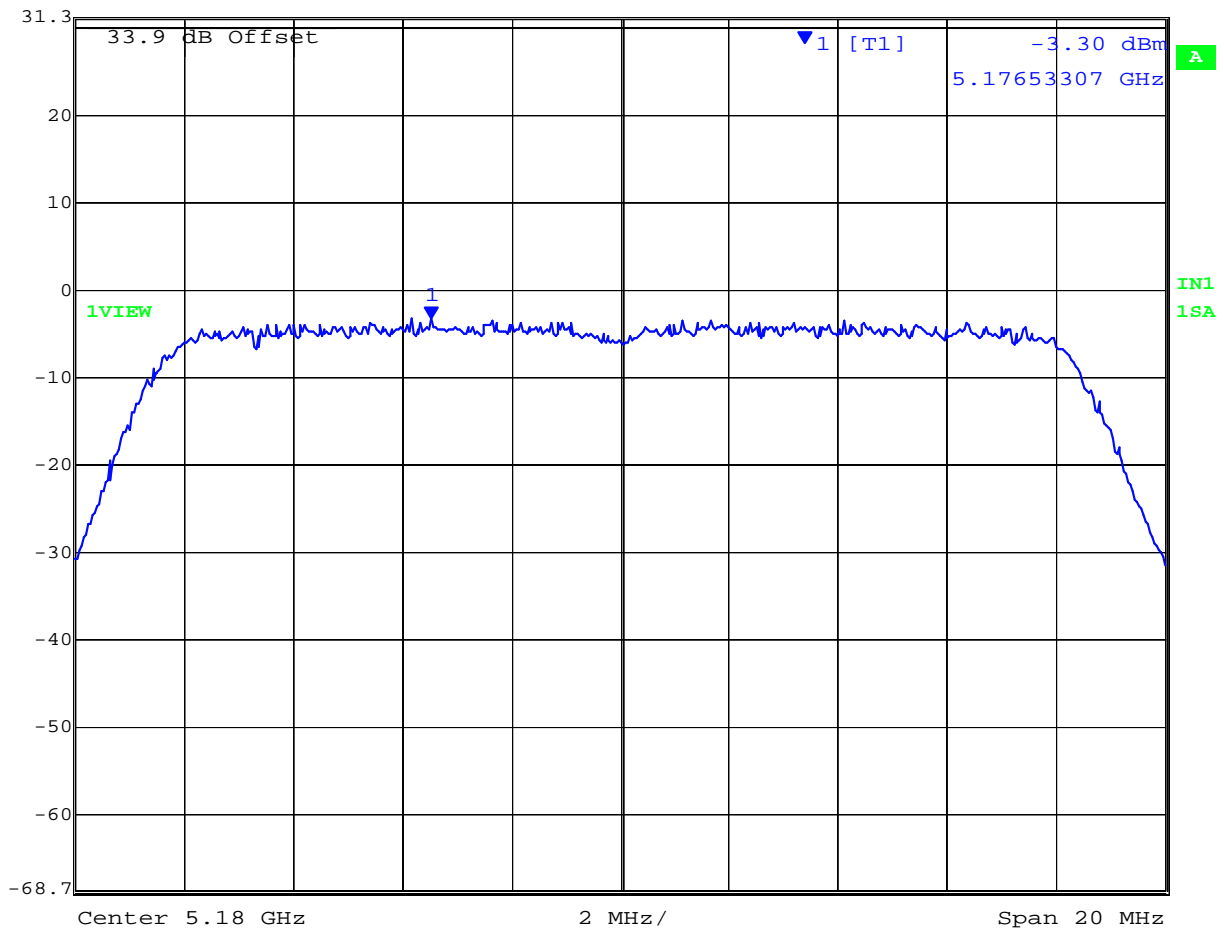
TABLE OF RESULTS – 802.11a

Center Frequency (MHz)	Peak Frequency (MHz)	PPSD (dBm)	Plot #
5,180	5176.53307	-3.30	04
5,260	5258.65731	+0.72	05
5,320	5316.01202	+0.50	06

Plot 04

5,180 MHz 802.11a Peak Power Spectral Density


 Marker 1 [T1]      RBW    1 MHz    RF Att    10 dB  
 Ref Lvl                      -3.30 dBm    VBW    1 MHz  
 31.3 dBm                      5.17653307 GHz    SWT    5 ms    Unit            dBm



Date: 26.MAY.2006 15:31:47

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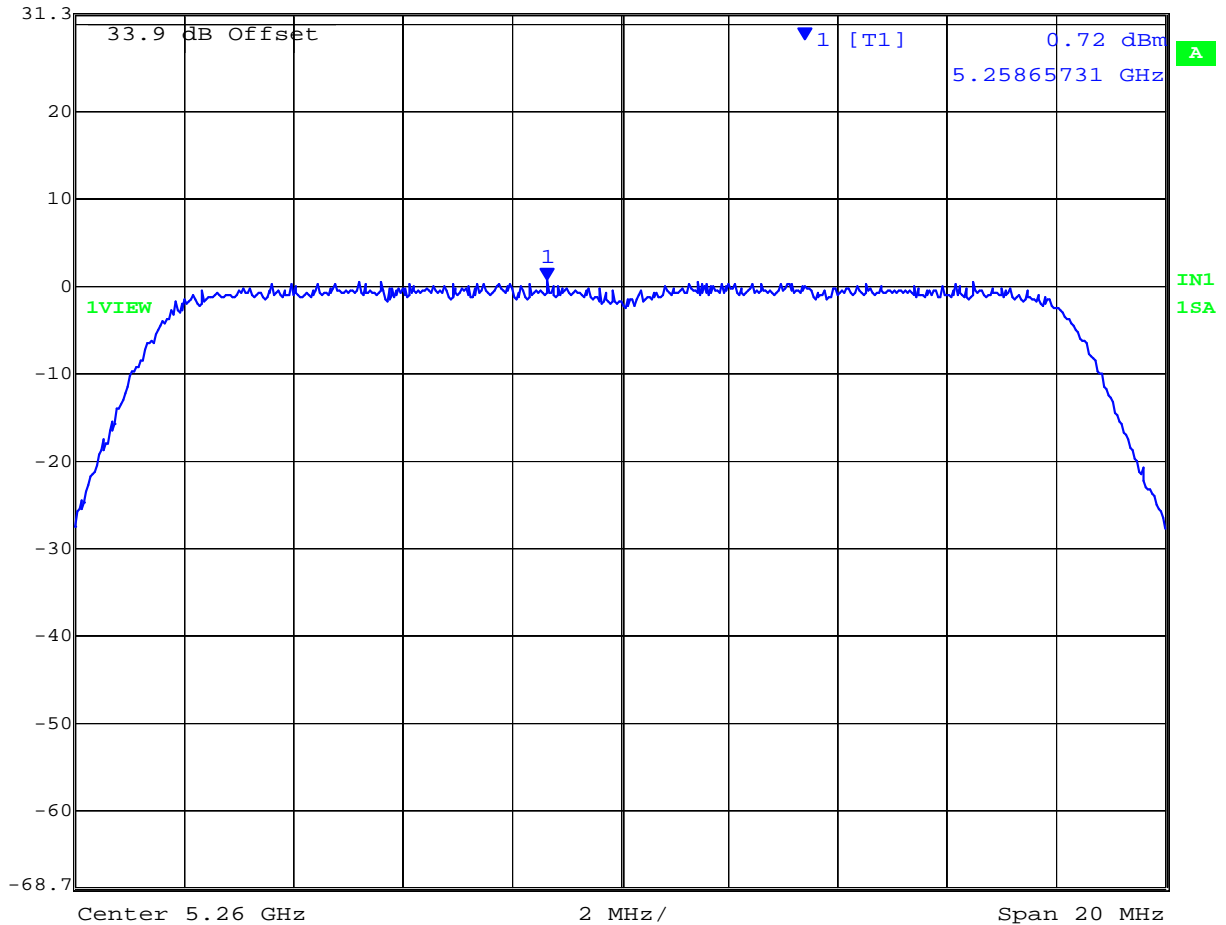


Title: SpectraLink 703X Wireless Telephone  
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Plot 05  
5,260 MHz 802.11a Peak Power Spectral Density



Ref Lvl 31.3 dBm  
Marker 1 [T1] 0.72 dBm  
RBW 1 MHz RF Att 10 dB  
VBW 1 MHz  
SWT 5 ms Unit dBm



Date: 26.MAY.2006 15:31:01

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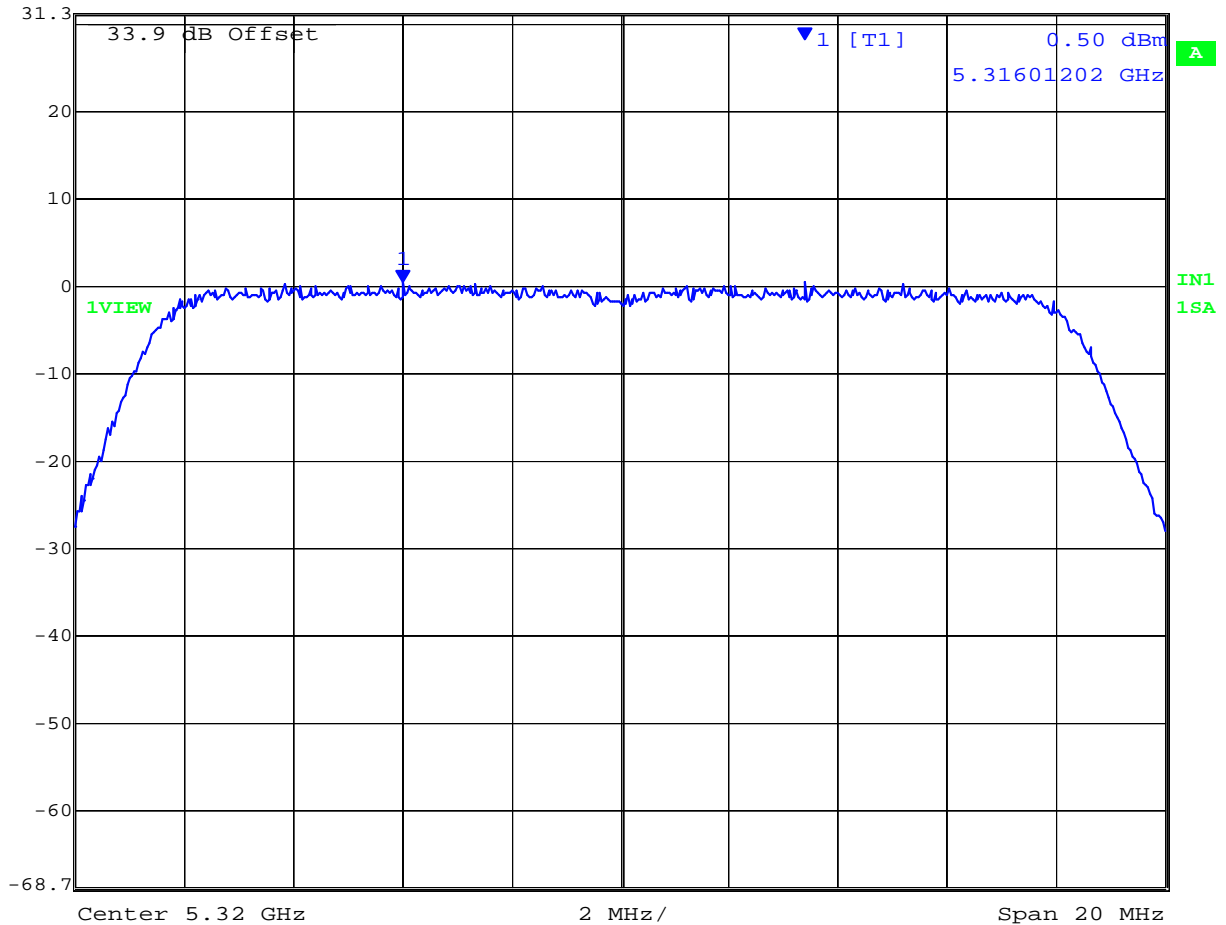


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Plot 06  
5,320 MHz 802.11a Peak Power Spectral Density



Ref Lvl 31.3 dBm  
Marker 1 [T1] 0.50 dBm  
RBW 1 MHz RF Att 10 dB  
VBW 1 MHz  
SWT 5 ms Unit dBm



Date: 26.MAY.2006 15:30:03

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## Specification

### **FCC, Part 15 §15.407 (a)(1), (a)(2)**

**(a)(1)** The peak power spectral density shall not exceed +4 dBm in any 1 megahertz band.

**(a)(2)** The peak power spectral density shall not exceed +11 dBm in any 1 megahertz band.

### **Industry Canada RSS-210 § A9.2(1), A9.2(2)**

§ **A9.2(1)** The eirp spectral density shall not exceed +10 dBm in any 1 MHz band

§ **A9.2(2)** The power spectral density shall not exceed +11 dBm in any 1 MHz band

## Laboratory Measurement Uncertainty for Spectral Density

Measurement uncertainty	±1.33 dB
-------------------------	----------

## Traceability

Method	Test Equipment Used
Measurements were made per work instruction WI-01 'Measuring RF Output Power'	0158, 0193, 0252, 0313, 0314, 0070, 0116, 0117

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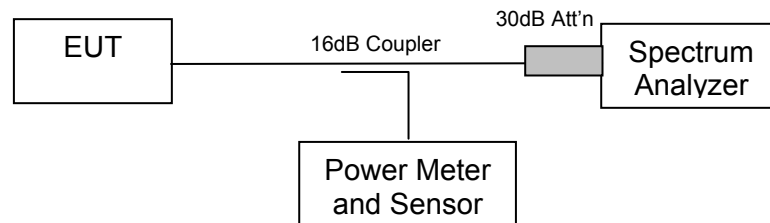
#### 5.1.4. Peak Excursion Ratio

#### FCC, Part 15 Subpart C §15.407(a)(6)

##### Test Procedure

This is an antenna conducted measurement using a spectrum analyzer. Method 1 in Normative Reference (x) Section 2.1 was implemented to determine module Peak Excursion Ratio. The Peak Excursion Ratio is the difference in amplitude (dB) between the two traces.

##### Test Measurement Set up



Measurement set up for Peak Excursion Ratio

##### Measurement Results for Peak Excursion Ratio

Ambient conditions.

Temperature: 17 to 23 °C Relative humidity: 31 to 57% Pressure: 999 to 1012 mbar

EUT parameters.

Data Rate(s): 802.11a 12 MBit/s,

Power Level: Maximum

Duty Cycle: 100%

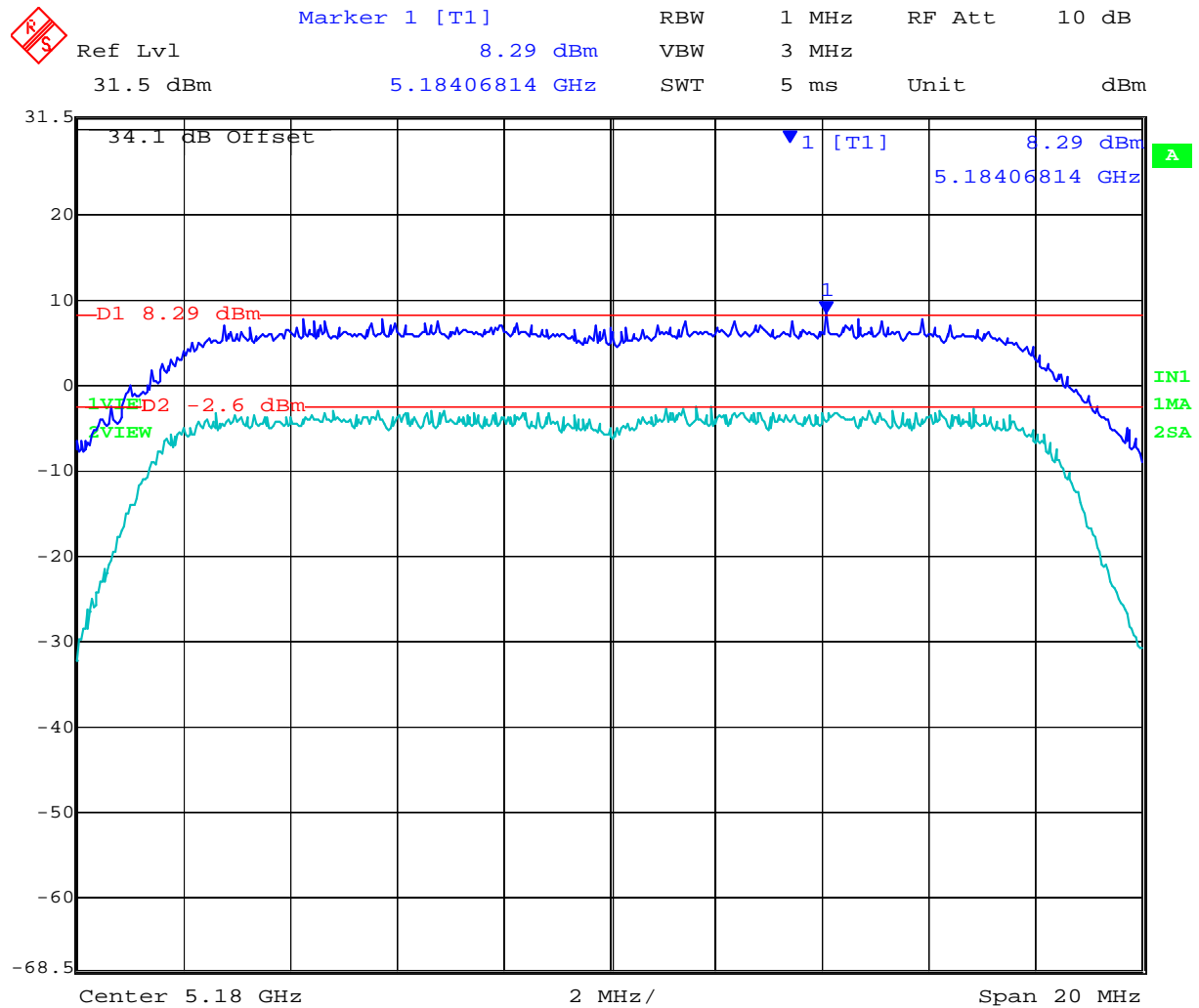


TABLE OF RESULTS – 802.11a

Centre Frequency (MHz)	Peak Excursion Ratio (dB)	Plot #
5,180	10.89	07
5,260	11.83	08
5,320	10.68	09

Plot 07

5,180 MHz 802.11a - Peak Excursion Ratio



Date: 26.MAY.2006 16:33:43

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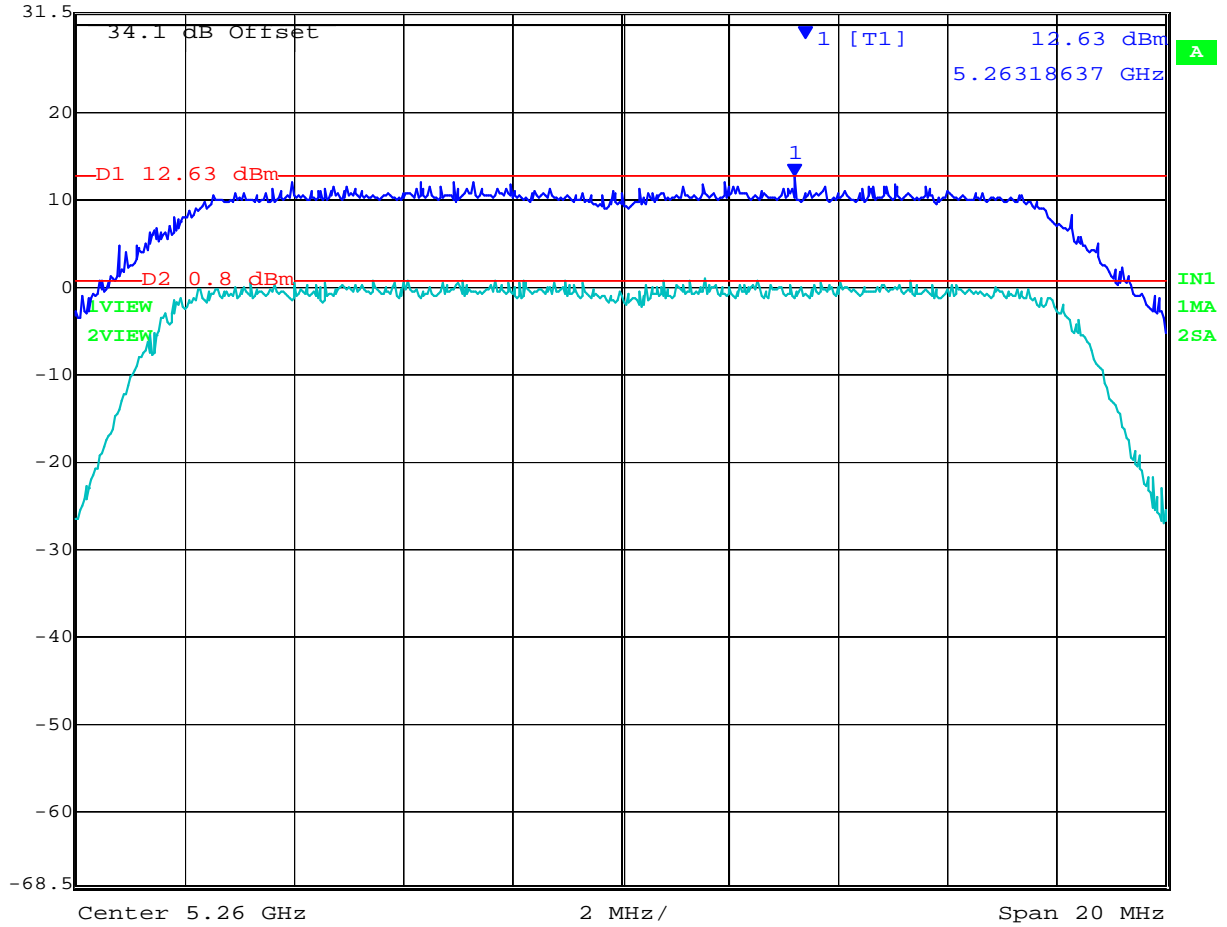


Plot 08

5,260 MHz 802.11a - Peak Excursion Ratio



Marker 1 [T1] RBW 1 MHz RF Att 10 dB  
Ref Lvl 12.63 dBm VBW 3 MHz  
31.5 dBm 5.26318637 GHz SWT 5 ms Unit dBm



Date: 26.MAY.2006 16:32:08

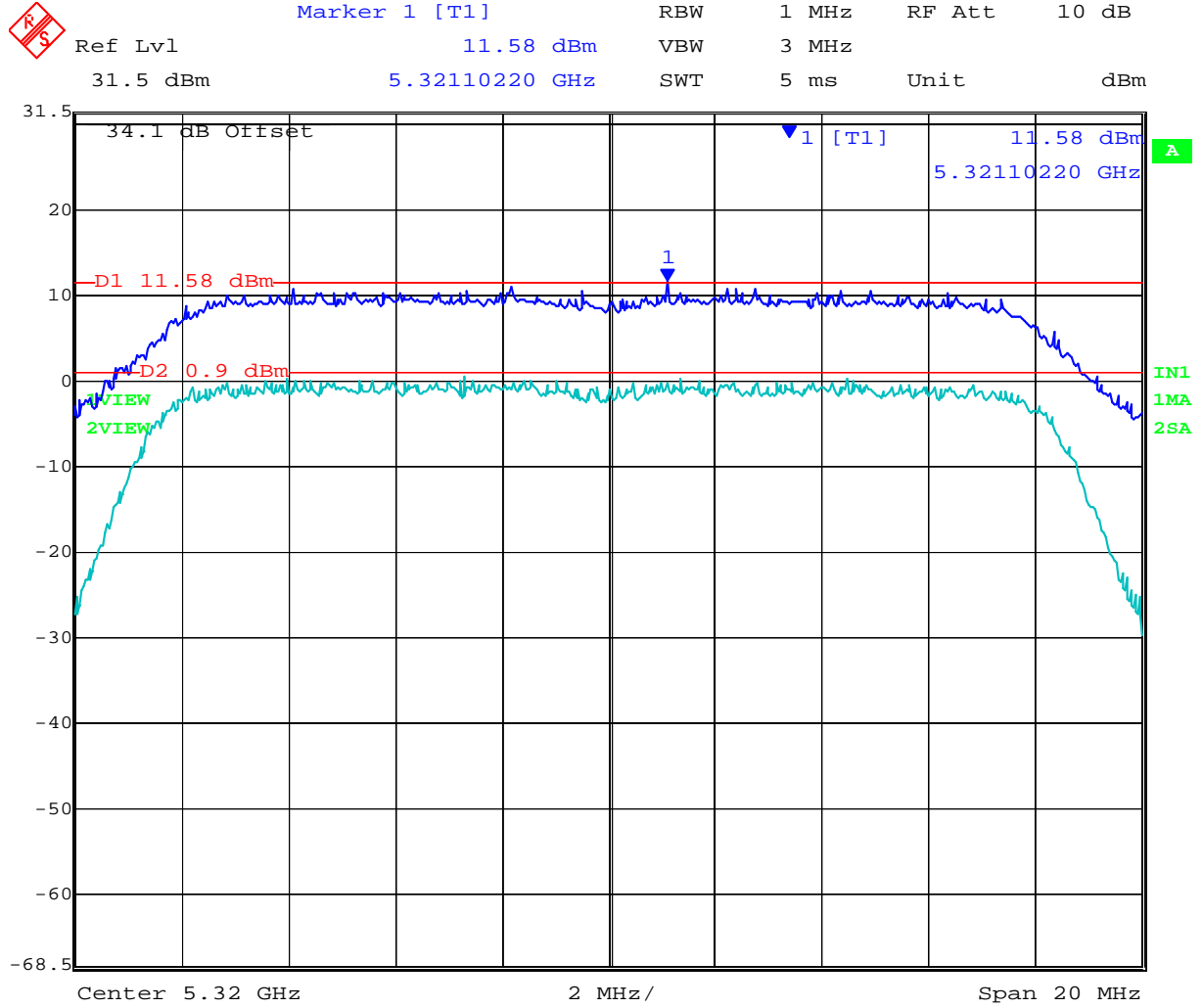
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Plot 09

5,320 MHz 802.11a - Peak Excursion Ratio



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## Specification

### Limits

**§15.407 (a)(6)** The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified in this paragraph) shall not exceed 13dB across any 1MHz bandwidth or the emission bandwidth whichever is less

## Laboratory Measurement Uncertainty for Spectrum Measurement

Measurement uncertainty	$\pm 2.81\text{dB}$
-------------------------	---------------------

## Traceability

Method	Test Equipment Used
Measurements were made per work instruction WI-03 'Measurement of RF Spectrum Mask'	0158, 0193, 0252, 0313, 0314, 0070, 0116, 0117

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### 5.1.5. Frequency Stability

**FCC, Part 15 Subpart C §15.407(g)**  
**Industry Canada RSS-210 §2.1**

#### **Test Procedure**

The manufacturer of the equipment is responsible for ensuring that the frequency stability is such that emissions are always maintained within the band of operation under all conditions.

#### **Manufacturer Declaration**

The frequency stability of the reference oscillator sets the frequency stability of the RF transceiver signals. Therefore all of the RF signals should have  $\pm 20$ ppm stability.

This stability accounts for room temp tolerance of the crystal oscillator circuit, frequency variation across temperature, and crystal ageing.

$\pm 20$ ppm at 5.250 GHz translates to a maximum frequency shift of  $\pm 105$  KHz. As the edge of the channels is at least one MHz from either of the band edges,  $\pm 105$  KHz is more than sufficient to guarantee that the intentional emission will remain in the band over the entire operating range of the EUT.

#### **Specification**

#### **Limits**

**§15.407 (g)** Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

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#### **5.1.6. Maximum Permissible Exposure**

**FCC, Part 15 Subpart C §15.407(f)**  
**Industry Canada RSS-Gen §5.5**

A Specific Absorption Rate (SAR) test report is available for this 802.11a telephone device.

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### 5.1.7. Conducted Spurious Emissions

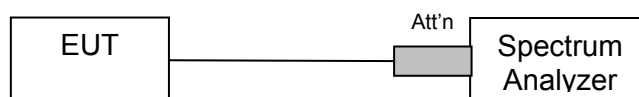
**FCC, Part 15 Subpart C §15.407(b)(2)**  
**Industry Canada RSS-210 §A9.3(2); §2.2; §2.6; RSS-Gen §4.7**

#### **Test Procedure**

Conducted emissions were measured at a EIRP limit of -27 dBm/MHz with a spectrum analyzer connected to the antenna terminal. Emissions at the band edge were measured and recorded. Measurements were made while EUT was operating in transmit mode of operation at the appropriate center frequency.

**Note:** The data in this section along with the data in sections 5.1.8.1 (Transmitter Radiated Spurious emissions) and section 5.1.8.2 ( Radiated Band Edge - Restricted Bands) identifies that the EUT is in compliance with the -27dBm/MHz EIRP limit for out of band emissions.

#### **Test Measurement Set up**



Band-edge measurement test configuration

#### **Measurement Results of Conducted Spurious Emissions**

Ambient conditions.

Temperature: 17 to 23 °C    Relative humidity: 31 to 57 %    Pressure: 999 to 1012 mbar

EUT parameters.

Data Rate(s): 802.11a 12 MBit/s,

Power Level: Maximum

Duty Cycle: 1.45%

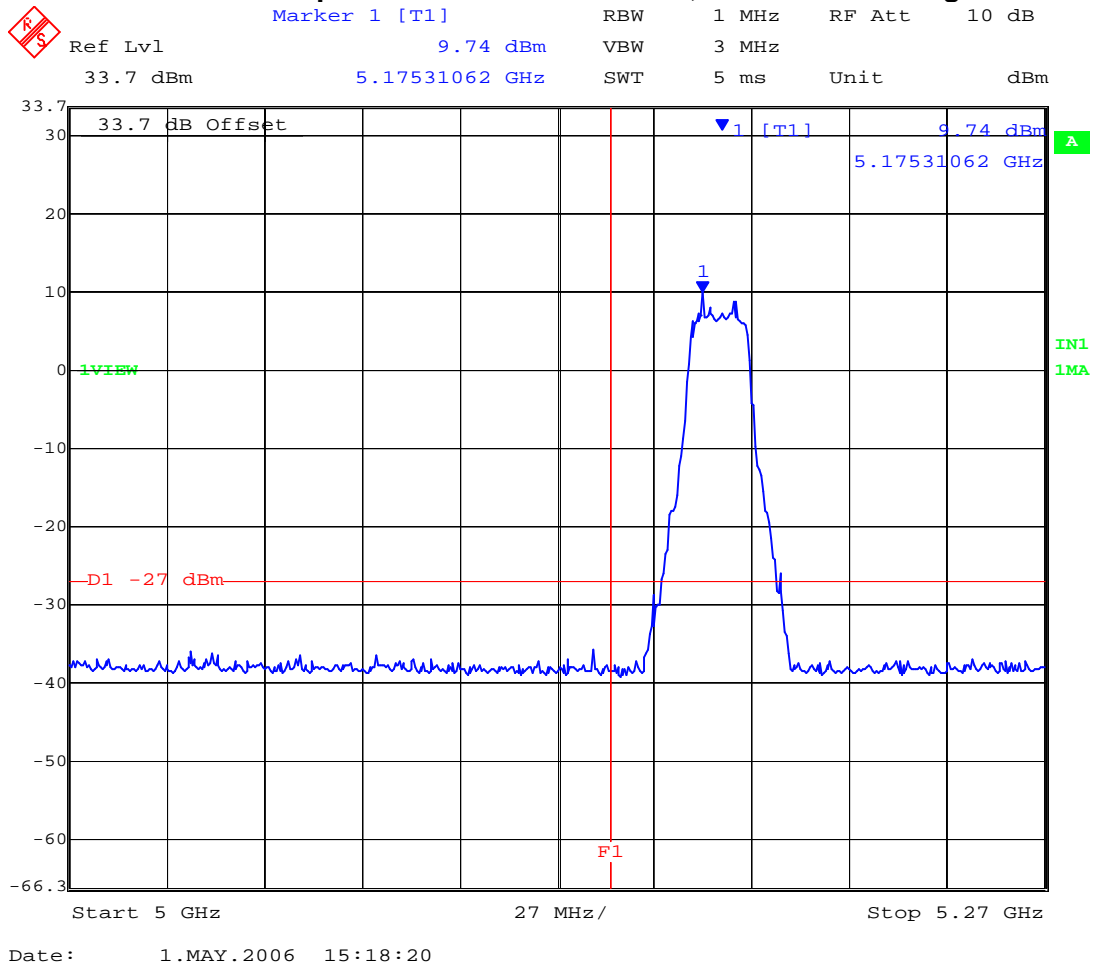


**Conducted Band-Edge Results**

TABLE OF RESULTS – 802.11a

Center Frequency (MHz)	Band edge Frequency (MHz)	Limit (dBm/MHz)	Amplitude @ Band edge (dBm/MHz)	Plot #	Margin (dB)
5,180	5,150	-27.00	-37.0	10	-10.0
5,320	5,350	-27.00	-30.0	11	-3.0

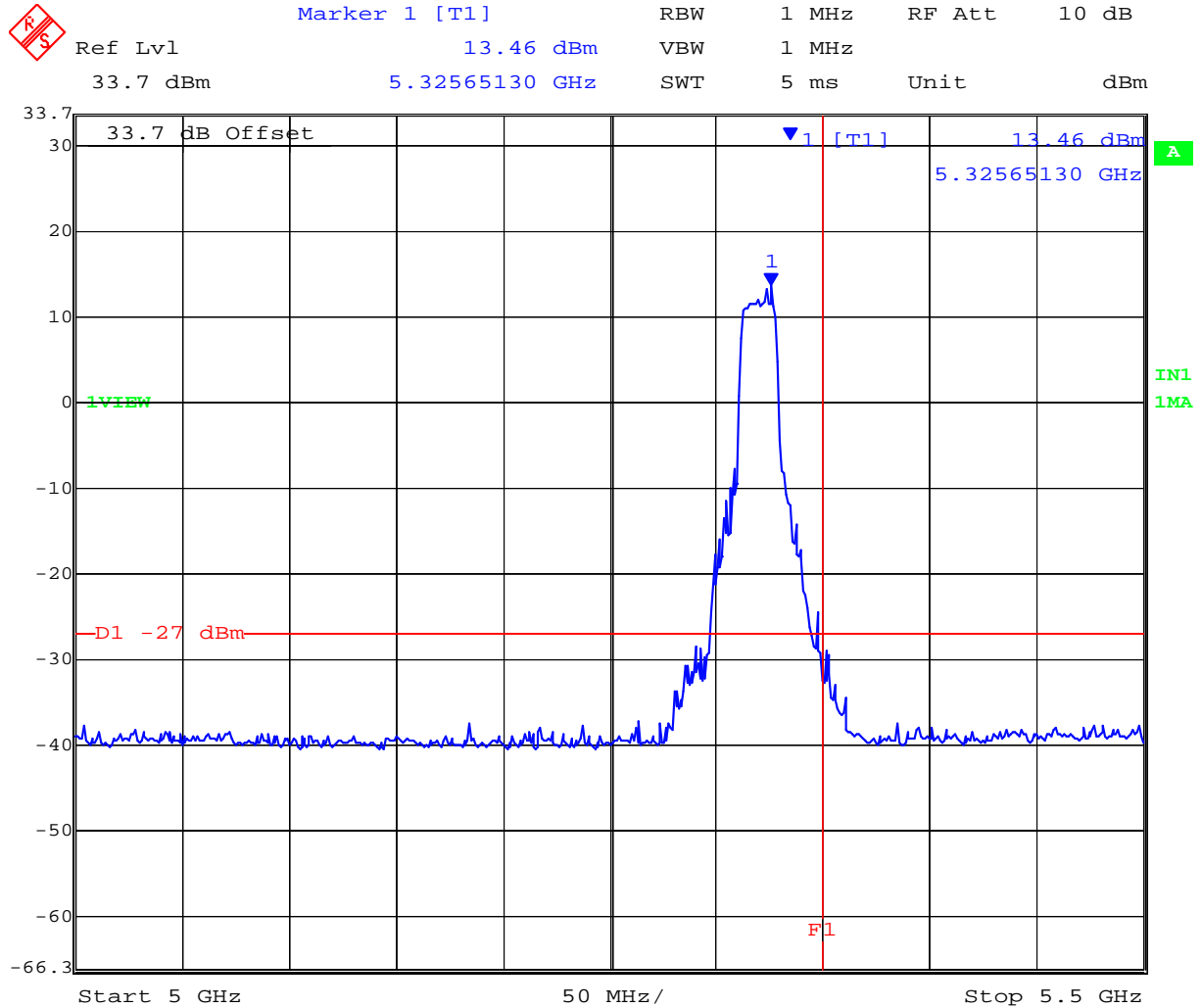
**Plot 10**  
**Conducted Spurious Emissions at the 5,150 MHz Band Edge**



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Plot 11  
Conducted Spurious Emissions at the 5,350 MHz Band Edge



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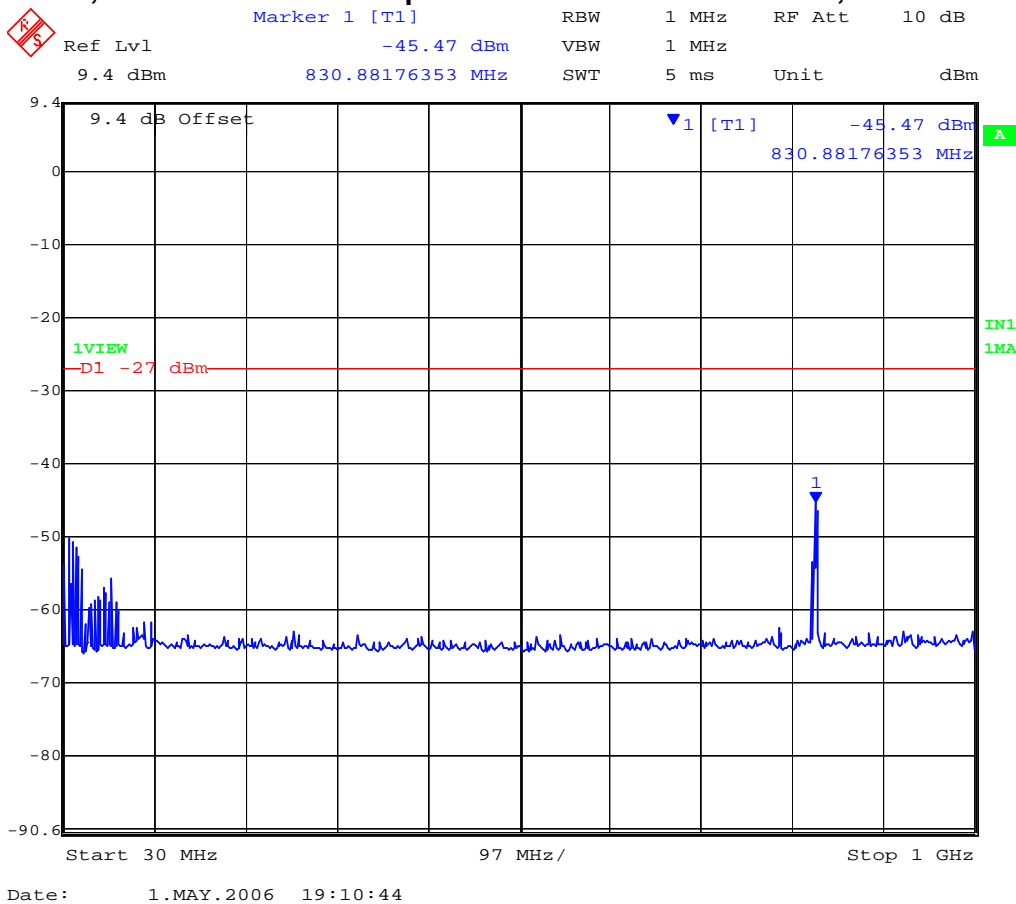
**Spurious Emissions (1-40 GHz)**

Conducted spurious emissions (1-40 GHz) are provided indicated by the following matrix. Measurements were performed with the transmitter tuned to the channel closest to the band-edge being measured. All emissions were maximized during measurement. Limit @ -27 dBm are drawn on each plot.

TABLE OF RESULTS – 802.11a

Channel Centre Frequency (MHz)	Start Frequency (MHz)	Stop Frequency (MHz)	Maximum Emission Observed (dBm/MHz)	Limit (dBm/MHz)	Plot #	Margin (dB)
5,180	30	1,000	-45.47	-27.00	12	-18.47
5,180	1,000	7,000	-29.08	-27.00	13	-2.08
5,180	7,000	40,000	-42.80	-27.00	14	-15.80

**Plot 12 802.11a**  
**5,180 MHz Conducted Spurious Emissions 30 MHz to 1,000 MHz**

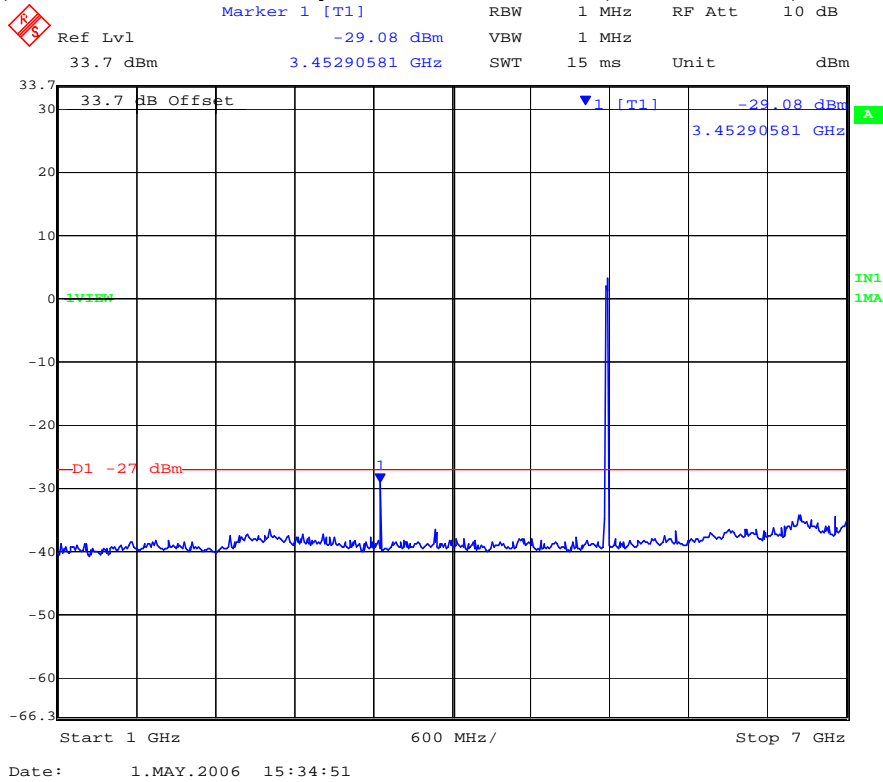


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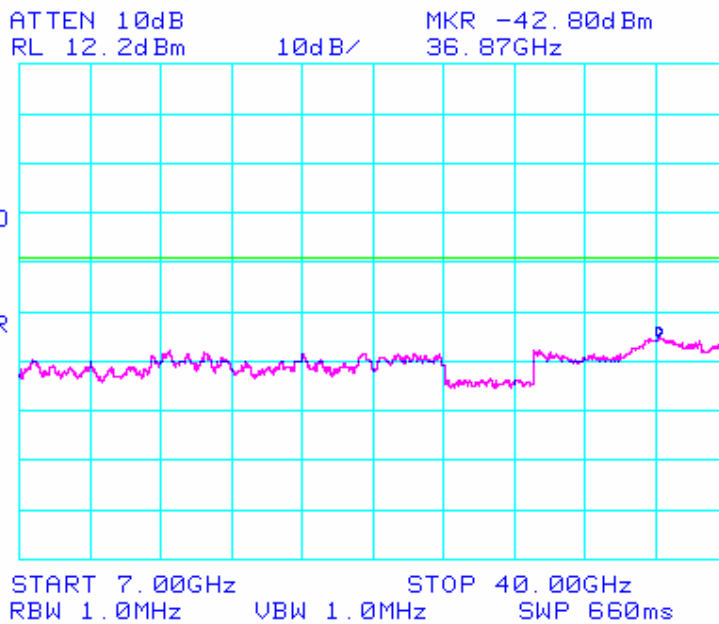




**Plot 13 802.11a**  
**5,180 MHz Conducted Spurious Emissions 1,000 MHz to 7,000 MHz**



**Plot 14 802.11a**  
**5,180 MHz Conducted Spurious Emissions 7,000 MHz to 40,000 MHz**



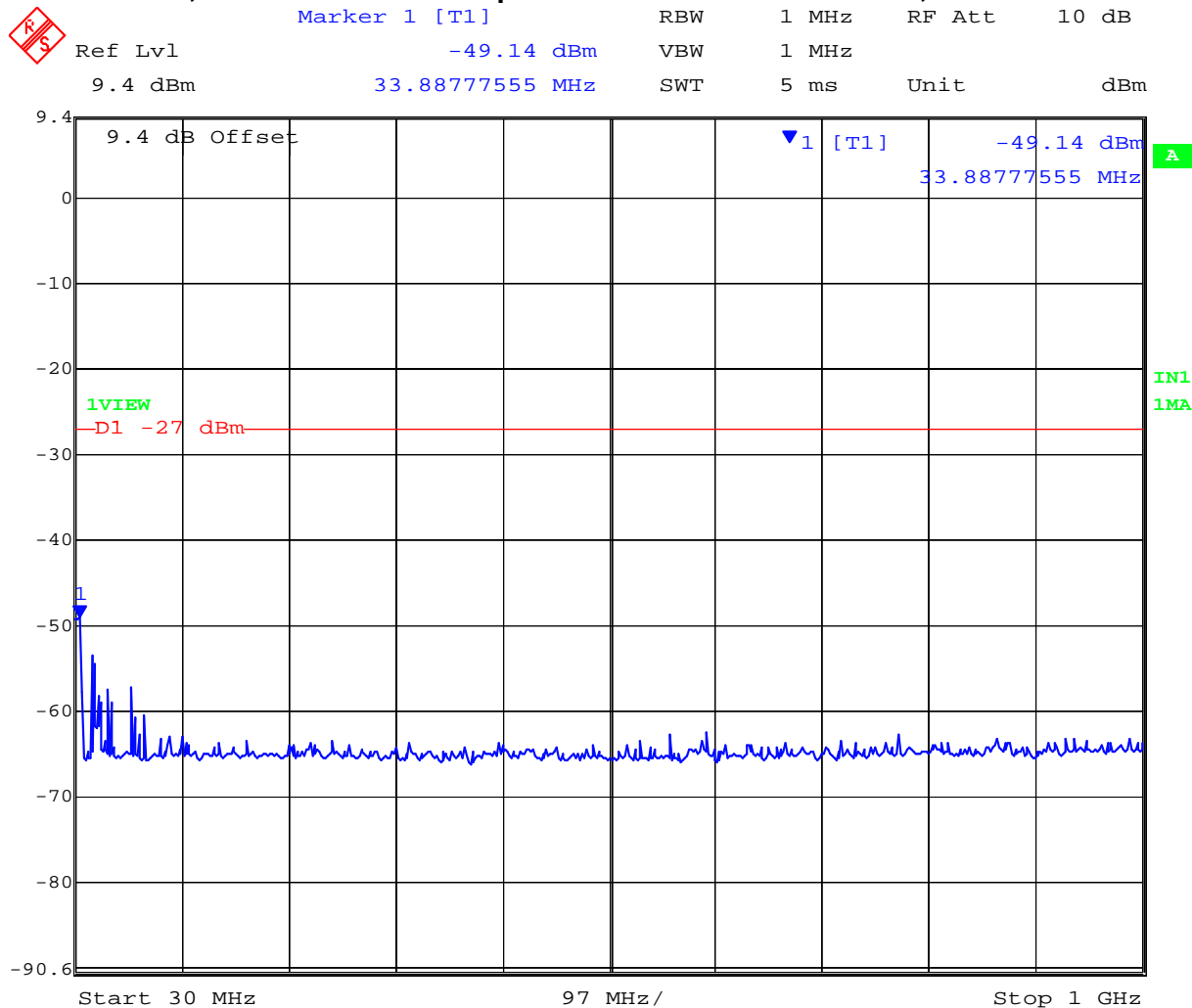
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TABLE OF RESULTS – 802.11a

Channel Centre Frequency (MHz)	Start Frequency (MHz)	Stop Frequency (MHz)	Maximum Emission Observed (dBm/MHz)	Limit (dBm/MHz)	Plot #	Margin (dB)
5,260	30	1,000	-49.14	-27.00	15	-22.14
5,260	1,000	7,000	-28.05	-27.00	16	-1.05
5,260	7,000	40,000	-40.13	-27.00	17	-13.13

**Plot 15 802.11a**  
**5,260 MHz Conducted Spurious Emissions 30 MHz to 1,000 MHz**



Date: 1.MAY.2006 19:15:51

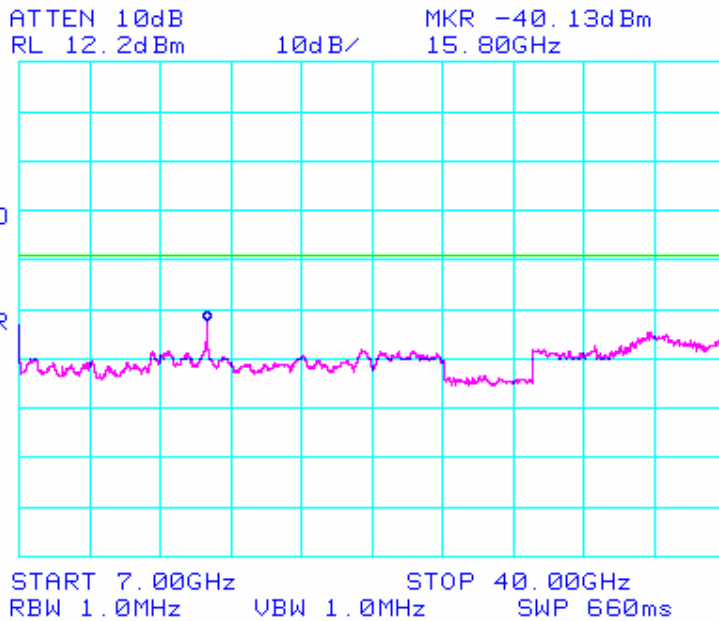
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**Plot 16 802.11a**  
**5,260 MHz Conducted Spurious Emissions 1,000 MHz to 7,000 MHz**



**Plot 17 802.11a**  
**5,260 MHz Conducted Spurious Emissions 7,000 MHz to 40,000 MHz**



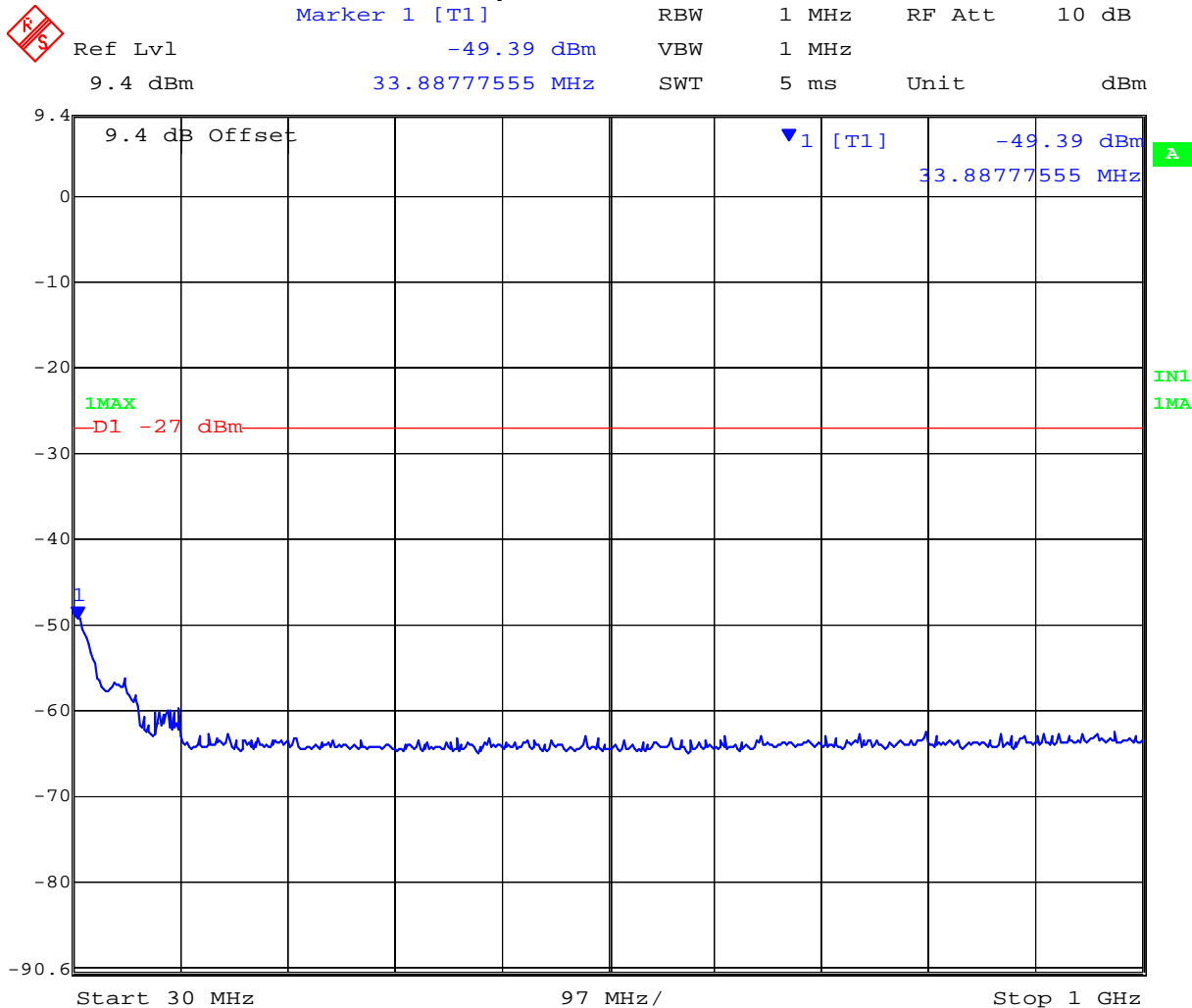
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TABLE OF RESULTS – 802.11a

Channel Centre Frequency (MHz)	Start Frequency (MHz)	Stop Frequency (MHz)	Maximum Emission Observed (dBm/MHz)	Limit (dBm/MHz)	Plot #	Margin (dB)
5,320	30	1,000	-49.39	-27.00	18	-22.39
5,320	1,000	7,000	-27.14	-27.00	19	-0.14
5,320	7,000	40,000	-35.80	-27.00	20	-8.80

**Plot 18 802.11a**  
**5,320 MHz Conducted Spurious Emissions 30 MHz to 1,000 MHz**

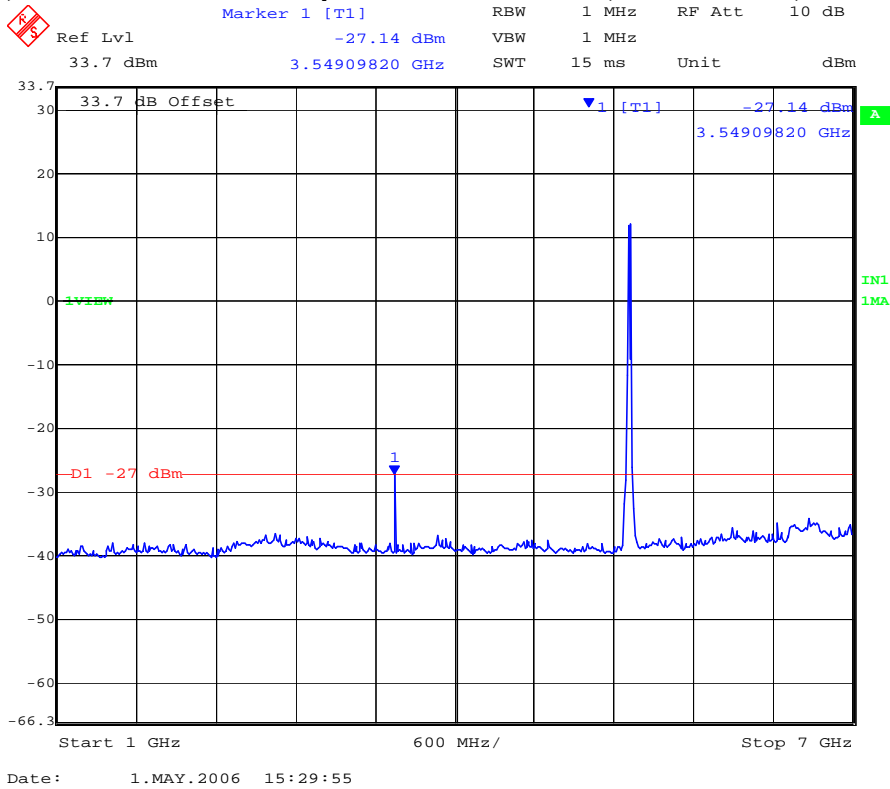


Date: 1.MAY.2006 19:24:45

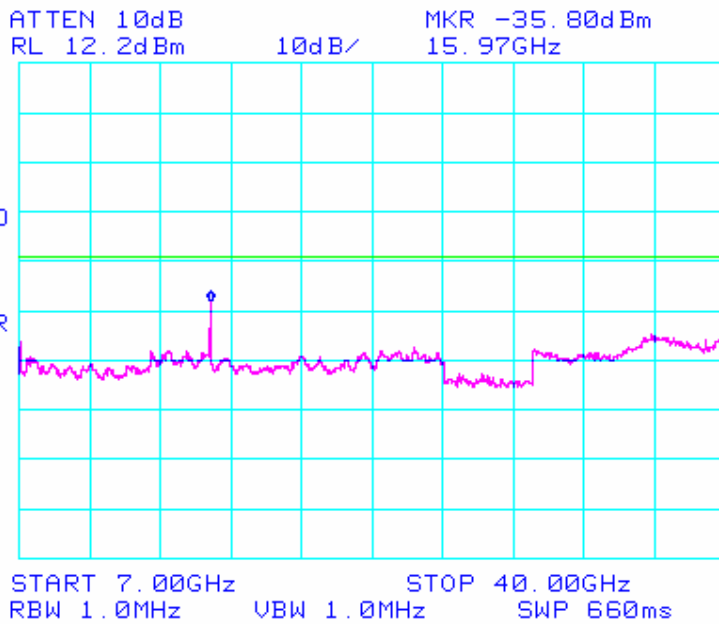
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**Plot 19 802.11a**  
**5,320 MHz Conducted Spurious Emissions 1,000 MHz to 7,000 MHz**



**Plot 20 802.11a**  
**5,320 MHz Conducted Spurious Emissions 7,000 MHz to 40,000 MHz**



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**Specification**

**Limits**

**15.407 (b)(2).** All emissions outside of the 5,150-5,350MHz band shall not exceed an EIRP of -27dBm/MHz.

**RSS-210 §A9.3(2)** For transmitters operating in the 5250-5350 MHz band, all emissions outside the 5150-5350 MHz band shall not exceed -27 dBm/MHz e.i.r.p.

Devices operating in the 5250-5350 MHz band that generate emissions in the 5150-5250 MHz band shall not exceed out of band emission limit of -27 dBm/MHz e.i.r.p. in the 5150-5250 MHz band in order to operate indoor/outdoor, or alternatively shall comply with the spectral power density for operation within the 5150-5250 MHz band and shall be labeled “for indoor use only”.

**RSS-Gen §4.7**

The search for unwanted emissions shall be from the lowest frequency internally generated or used in the device (local oscillator, intermediate of carrier frequency), or from 30 MHz , whichever is the lowest frequency, to the 5<sup>th</sup> harmonic of the highest frequency generated without exceeding 40 GHz.

**Laboratory Measurement Uncertainty for Conducted Spurious Emissions**

Measurement uncertainty	±2.37 dB
-------------------------	----------

**Traceability**

Method	Test Equipment Used
Measurements were made per work instruction WI-05 'Measurement of Spurious Emissions'	0088, 0158, 0193, 0252, 0313, 0314, 0070, 0116, 0117.

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## 5.1.8. Radiated Emissions

### 5.1.8.1. Transmitter Radiated Spurious Emissions (above 1 GHz)

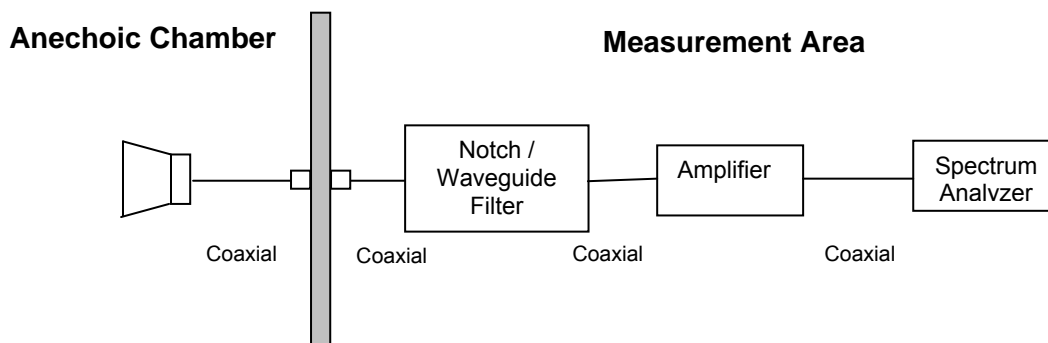
**FCC, Part 15 Subpart C §15.407(b)(2), §15.205(a)/15.209(a)**  
**Industry Canada RSS-210 §A9.3(2); §2.2; §2.6; RSS-Gen §4.7**

#### Test Procedure

Radiated emissions above 1 GHz are measured in the anechoic chamber at a 3-meter distance on every azimuth in both horizontal and vertical polarities. The emissions are recorded and maximized as a function of azimuth by rotation through 360° with a spectrum analyzer in peak hold mode. Depending on the frequency band spanned a notch filter and waveguide filter was used to remove the fundamental frequency. The highest emissions relative to the limit are listed for each frequency spanned.

All measurements on any frequency or frequencies over 1 MHz are based on the use of measurement instrumentation employing an average detector function. All measurements above 1 GHz were performed using a minimum resolution bandwidth of 1 MHz.

#### Test Measurement Set up



Measurement set up for Radiated Emission Test

#### Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. All factors are included in the reported data.

$$FS = R + AF + CORR - FO$$

where: FS = Field Strength

R = Measured Spectrum analyzer Input Amplitude

AF = Antenna Factor

CORR = Correction Factor = CL – AG + NFL

CL = Cable Loss

AG = Amplifier Gain

FO = Distance Falloff Factor

NFL = Notch Filter Loss or Waveguide Loss



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For example:

Given receiver input reading of 51.5 dB $\mu$ V; Antenna Factor of 8.5 dB; Cable Loss of 1.3 dB; Falloff Factor of 0 dB, an Amplifier Gain of 26 dB and Notch Filter Loss of 1 dB. The Field Strength of the measured emission is:

$$FS = 51.5 + 8.5 + 1.3 - 26.0 + 1 = 36.3 \text{ dB}\mu\text{V/m}$$

Conversion between dB $\mu$ V/m (or dB $\mu$ V) and  $\mu$ V/m (or  $\mu$ V) are done as:

$$\text{Level (dB}\mu\text{V/m)} = 20 * \text{Log (level (\mu\text{V/m}))}$$

$$40 \text{ dB}\mu\text{V/m} = 100 \mu\text{V/m}$$

$$48 \text{ dB}\mu\text{V/m} = 250 \mu\text{V/m}$$

The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength;

$$E = 1000000 \times \sqrt{30P} / 3 \mu\text{V/m, where P is the EIRP in Watts}$$

$$\text{Therefore: } -27 \text{ dBm/MHz} = 68.23 \text{ dB}\mu\text{V/m}$$

**Note:** The data in this Section along with the data in sections 5.1.7 (Conducted Spurious Emissions) and Section 5.1.8.2 (Radiated Band Edge - Restricted Bands) identifies that the EUT is in compliance with the -27dBm/MHz EIRP limit for out of band emissions.

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**Measurement Results Transmitter Radiated Spurious Emissions above 1 GHz**

Ambient conditions.

Temperature: 17 to 23°C      Relative humidity: 31 to 57 %      Pressure: 999 to 1012 mbar

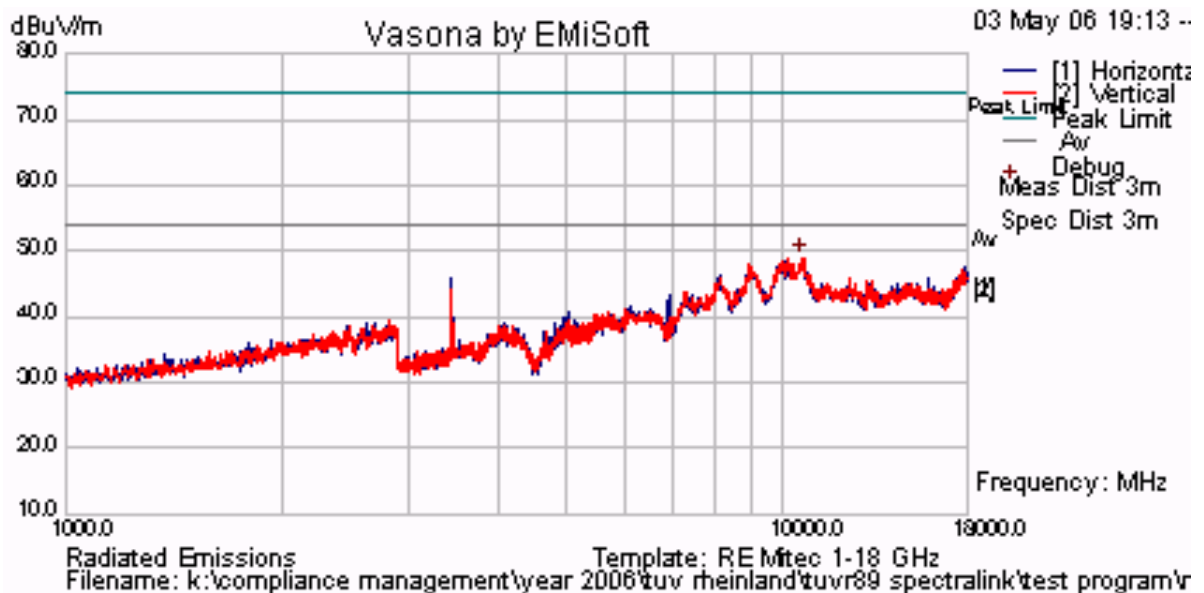
**TABLE OF RESULTS – 802.11a 5,180 MHz Radiated Emissions above 1 GHz**

Freq. (MHz)	Pol. (H/V)	Raw Reading (dB $\mu$ V/m)	Correction Factor (dB)	Corrected Peak Field Strength (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Margin (dB)
					74	

Freq. (MHz)	Pol. (H/V)	Raw Reading (dB $\mu$ V/m)	Correction Factor (dB)	Corrected Field Strength (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/m)	Margin (dB)
					54	

No emissions observed within 6 dB of the limit

**Plot 21  
Radiated Emissions for 5,180 MHz**



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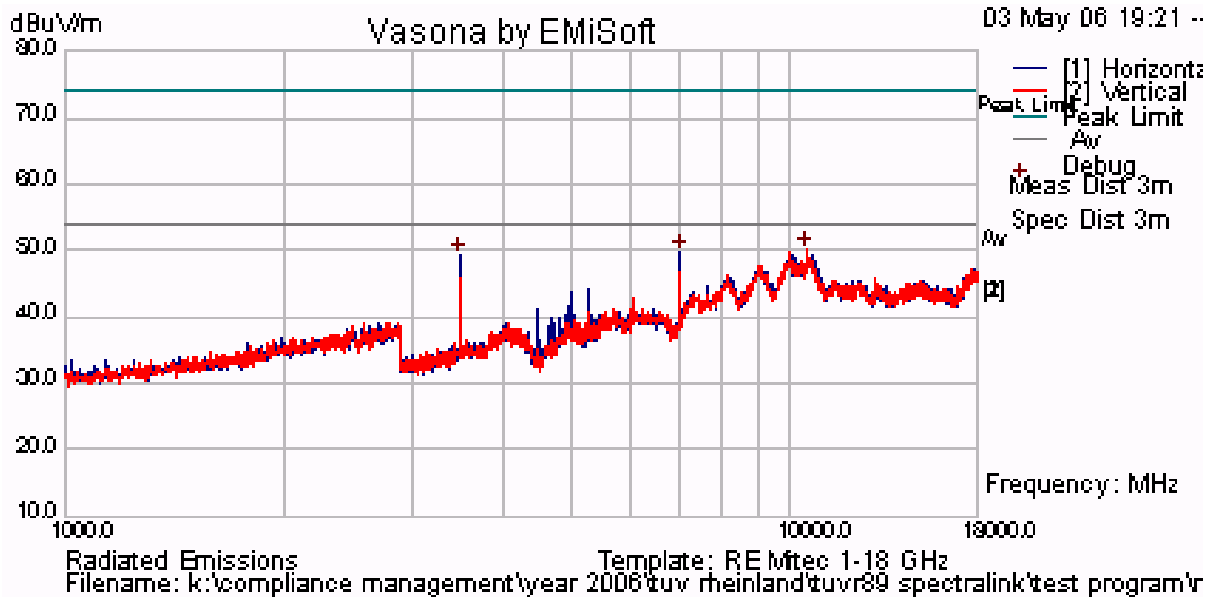


**TABLE OF RESULTS – 802.11a 5,260 MHz Radiated Emissions above 1 GHz**

Freq. (MHz)	Pol. (H/V)	Raw Reading (dB $\mu$ V/m)	Correction Factor (dB)	Corrected Average Field Strength (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/m)	Margin (dB)
3509.667	H	57	-7.82	49.18	54	-4.82
7026.667	H	49.17	+0.52	49.69	54	-4.31
10526.670	V	40.67	+9.33	50.00	54	-4.00

As no peak emission were greater that the Average Limit (54 dB $\mu$ V/m) peak emissions are reported in the above matrix

**Plot 22  
Radiated Emissions for 5,260 MHz**



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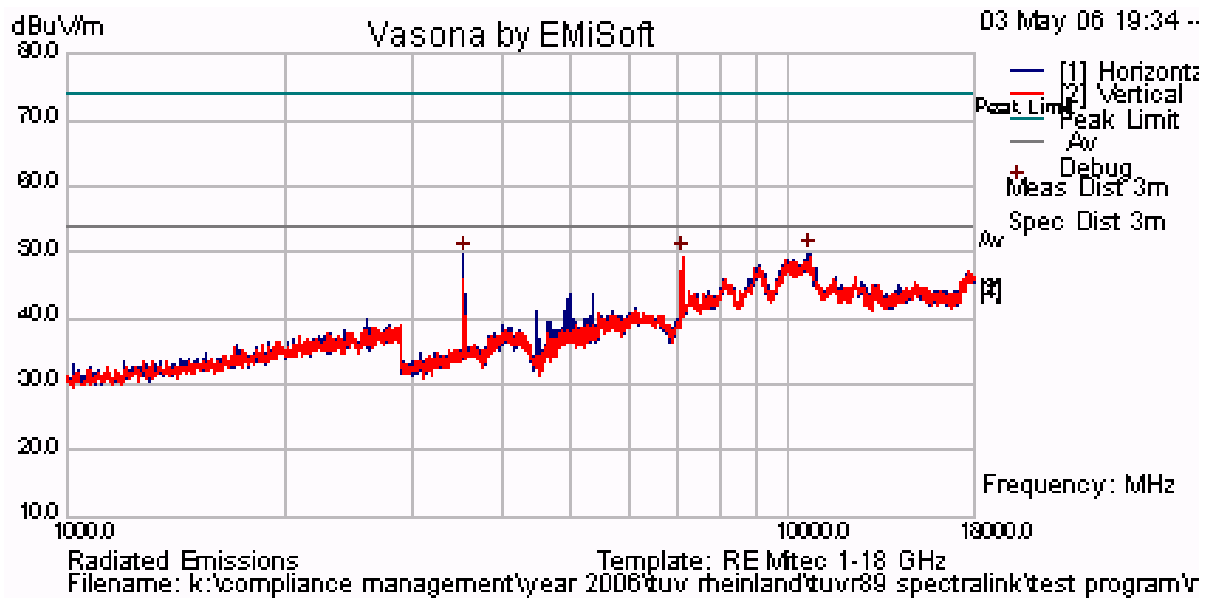


**TABLE OF RESULTS – 802.11a 5,320 MHz Radiated Emissions 1 GHz to 18 GHz**

Freq. (MHz)	Pol. (H/V)	Raw Reading (dB $\mu$ V/m)	Correction Factor (dB)	Corrected Field Strength (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)
3551.000	H	57.17	-7.61	49.56	54	-4.44
7108.333	V	48.50	+0.96	49.46	54	-4.54
10666.670	H	41.00	+8.90	49.90	54	-4.10

As no peak emission were greater that the Average Limit (54 dB $\mu$ V/m) peak emissions are reported in the above matrix

**Plot 23  
Radiated Emissions for 5,320 MHz**



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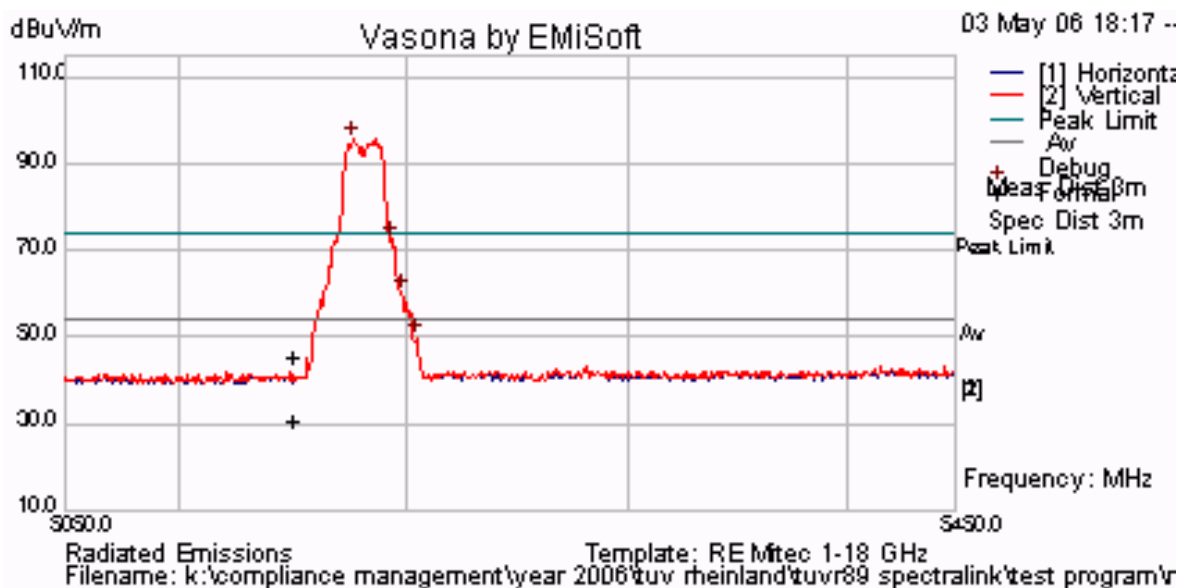
**5.1.8.2. Radiated Band-Edge – Restricted Bands**

Lower sub-band 5,150 MHz to 5,350 MHz

**TABLE OF RESULTS - 802.11a**

Tx Freq. (MHz)	Restricted Band Frequency (MHz)	Measured (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Plot #
5,180 <sub>PEAK</sub>	5,150	42.03	74.00	-31.97	24
5,180 <sub>Ave</sub>	5,150	37.78	54.00	-16.22	24

**Plot 24 802.11a – 5,180 MHz**  
 Lower Band Edge Peak Emission = 100.34 dBuV/m



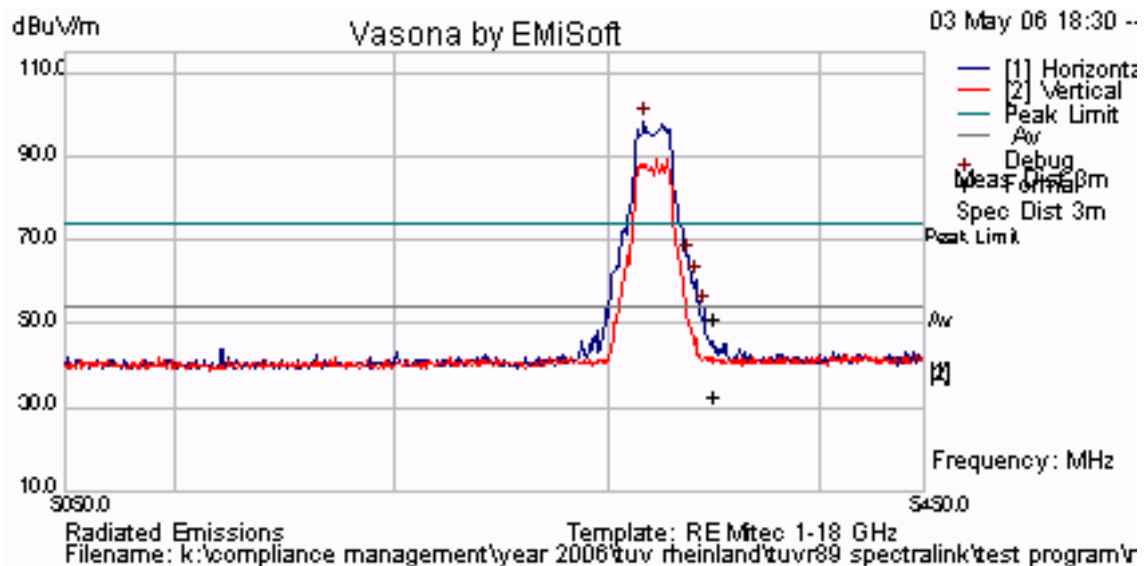
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**TABLE OF RESULTS - 802.11a**

Tx Freq. (MHz)	Restricted Band Frequency (MHz)	Measured (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Plot #
5,320 <sub>PEAK</sub>	5,350	48.05	74.00	-25.95	25
5,320 <sub>AVE</sub>	5,350	39.43	54.00	-14.57	25

**Plot 25 802.11a – 5,320 MHz**  
**Upper Band Edge Peak Emission = 102.50 dBuV/m**



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### 5.1.8.3. Receiver Spurious Emissions above 1 GHz

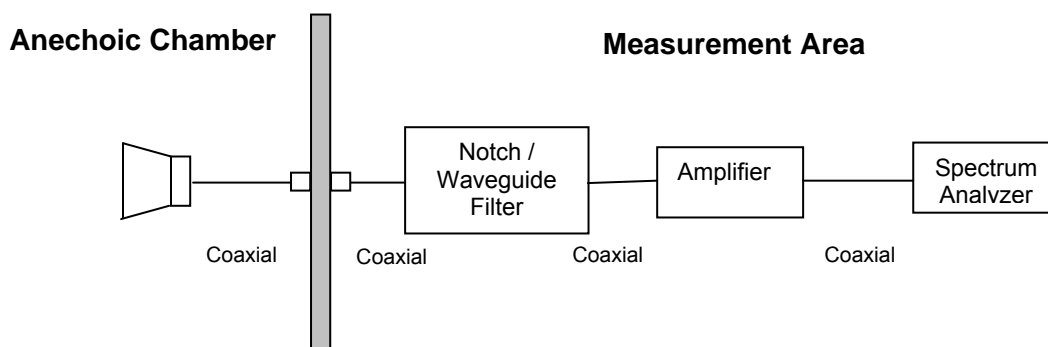
#### Industry Canada RSS-Gen §4.8, §6

#### Test Procedure

Radiated emissions above 1 GHz are measured in the anechoic chamber at a 3-meter distance on every azimuth in both horizontal and vertical polarities. The emissions are recorded and maximized as a function of azimuth by rotation through 360° with a spectrum analyzer in peak hold mode. Depending on the frequency band spanned a notch filter and waveguide filter was used to remove the fundamental frequency. The highest emissions relative to the limit are listed for each frequency spanned.

All measurements on any frequency or frequencies over 1 MHz are based on the use of measurement instrumentation employing an average detector function. All measurements above 1 GHz were performed using a minimum resolution bandwidth of 1 MHz.

#### Test Measurement Set up



Measurement set up for Radiated Emission Test

#### Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. All factors are included in the reported data.

$$FS = R + AF + CORR - FO$$

where: FS = Field Strength

R = Measured Spectrum analyzer Input Amplitude

AF = Antenna Factor

CORR = Correction Factor = CL – AG + NFL

CL = Cable Loss

AG = Amplifier Gain

FO = Distance Falloff Factor

NFL = Notch Filter Loss or Waveguide Loss



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For example:

Given receiver input reading of 51.5 dB $\mu$ V; Antenna Factor of 8.5 dB; Cable Loss of 1.3 dB; Falloff Factor of 0 dB, an Amplifier Gain of 26 dB and Notch Filter Loss of 1 dB. The Field Strength of the measured emission is:

$$FS = 51.5 + 8.5 + 1.3 - 26.0 + 1 = 36.3 \text{ dB}\mu\text{V/m}$$

Conversion between dB $\mu$ V/m (or dB $\mu$ V) and  $\mu$ V/m (or  $\mu$ V) are done as:

$$\text{Level (dB}\mu\text{V/m)} = 20 * \text{Log (level (\mu\text{V/m}))}$$

$$40 \text{ dB}\mu\text{V/m} = 100 \mu\text{V/m}$$

$$48 \text{ dB}\mu\text{V/m} = 250 \mu\text{V/m}$$

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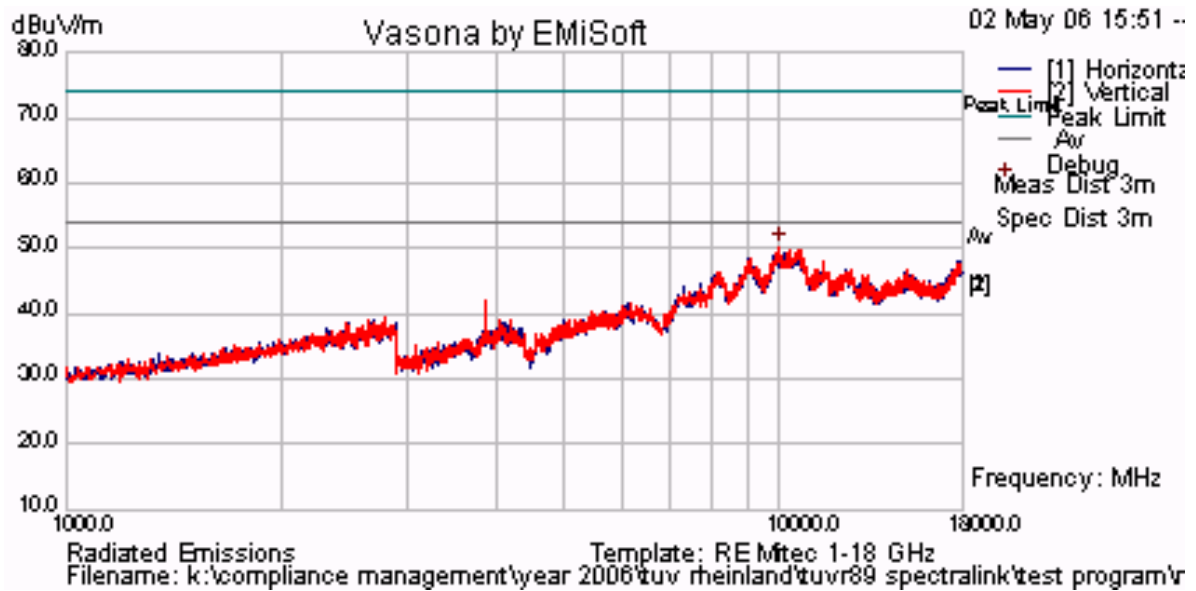
**Receiver Radiated Spurious Emissions above 1 GHz**

**Test Setup - 802.11a**  
**Channel 5,260 MHz**

TABLE OF RESULTS –802.11a

Freq. (MHz)	Pol. (H/V)	Raw Reading (dB $\mu$ V/m)	Correction Factor (dB)	Corrected Field Strength (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)
10001.67	V	39.17	11.03	50.2	54	-3.8

**Plot 26  
Radiated Emissions**



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## Specification

### Limits

**15.407 (b)(2).** All emissions outside of the 5,150-5,350MHz band shall not exceed an EIRP of -27dBm/MHz.

**§15.205 (a)** Except as shown in paragraph (d) of 15.205 (a), only spurious emissions are permitted in any of the frequency bands listed.

**§15.205 (a)** Except as shown in paragraphs (d) and (e) of this section, the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

**§15.209 (a)** Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table.

**RSS-210 §A9.3(2)** For transmitters operating in the 5250-5350 MHz band, all emissions outside the 5150-5350 MHz band shall not exceed -27 dBm/MHz e.i.r.p. Devices operating in the 5250-5350 MHz band that generate emissions in the 5150-5250 MHz band shall not exceed out of band emission limit of 27 dBm/MHz e.i.r.p. in the 5150-5250 MHz band in order to operate indoor/outdoor, or alternatively shall comply with the spectral power density for operation within the 5150-5250 MHz band and shall be labeled "for indoor use only".

**RSS-Gen §4.7** The search for unwanted emissions shall be from the lowest frequency internally generated or used in the device (local oscillator, intermediate of carrier frequency), or from 30 MHz, whichever is the lowest frequency, to the 5<sup>th</sup> harmonic of the highest frequency generated without exceeding 40 GHz.

#### **RSS-Gen §6** Receiver Spurious Emission Standard

If a radiated measurement is made, all spurious emissions shall comply with the limits of the following Table. The resolution bandwidth of the spectrum analyzer shall be 100 kHz for spurious emission measurements below 1.0 GHz and 1.0 MHz for measurements above 1.0 GHz

Frequency (MHz)	Field Strength (µV/m)	Field Strength (dBµV/m)	Measurement Distance (meters)
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

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### Laboratory Measurement Uncertainty for Radiated Emissions

Measurement uncertainty	+5.6/ -4.5 dB
-------------------------	---------------

### Traceability

Method	Test Equipment Used
Measurements were made per work instruction WI-03 'Measurement of Radiated Emissions'	0088, 0158, 0134, 0304, 0311, 0315, 0310, 0312

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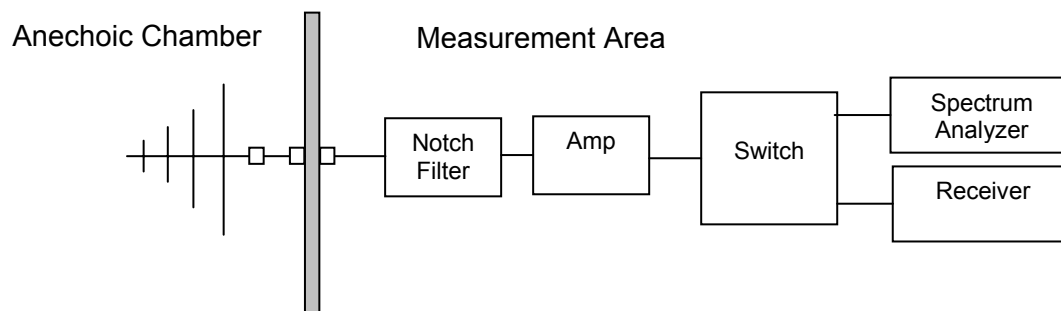
#### 5.1.8.4. Radiated Spurious Emissions (30M-1 GHz)

**FCC, Part 15 Subpart C §15.407(b)(6); §15.205(a); §15.209(a)**  
**Industry Canada RSS-210 §2.2**

##### Test Procedure

Preliminary radiated emissions are measured in the anechoic chamber at a 10-meter distance on every azimuth in both horizontal and vertical polarity. The emissions are recorded with a spectrum analyzer in peak hold mode. Emissions closest to the limits are measured in the quasi-peak mode with the tuned receiver using a bandwidth of 120 kHz. Only the highest emissions relative to the limit are listed. The anechoic chamber test set-up is identified in Section 6 Test Set-Up Photographs.

##### Test Measurement Set up



##### Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. In this test facility, the Antenna Factor, Cable Loss, and Amplifier Gains are loaded into the Rohde & Schwarz Receiver and the corrected field strength can be read directly on the receiver.

$$FS = R + AF + CORR$$

where:

FS = Field Strength

R = Measured Receiver Input Amplitude

AF = Antenna Factor

CORR = Correction Factor = CL – AG + NFL

CL = Cable Loss

AG = Amplifier Gain



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For example:

Given a Receiver input reading of 51.5dB $\mu$ V; Antenna Factor of 8.5dB; Cable Loss of 1.3dB; Falloff Factor of 0dB, an Amplifier Gain of 26dB and Notch Filter Loss of 1dB. The Field Strength of the measured emission is:

$$FS = 51.5 + 8.5 + 1.3 - 26.0 + 1 = 36.3\text{dB}\mu\text{V/m}$$

Conversion between dB $\mu$ V/m (or dB $\mu$ V) and  $\mu$ V/m (or  $\mu$ V) are done as:

$$\text{Level (dB}\mu\text{V/m)} = 20 * \text{Log (level (\mu\text{V/m}))}$$

$$40 \text{ dB}\mu\text{V/m} = 100\mu\text{V/m}$$

$$48 \text{ dB}\mu\text{V/m} = 250\mu\text{V/m}$$

### **Measurement Results for Spurious Emissions (30 MHz – 1 GHz)**

Ambient conditions.

Temperature: 17 to 23 °C    Relative humidity: 31 to 57 %    Pressure: 999 to 1012 mbar

EUT parameters.

Data Rate(s): 802.11a 12 MBit/s,

Power Level: Maximum

Duty Cycle: 1.45%

Channel: 5180 MHz

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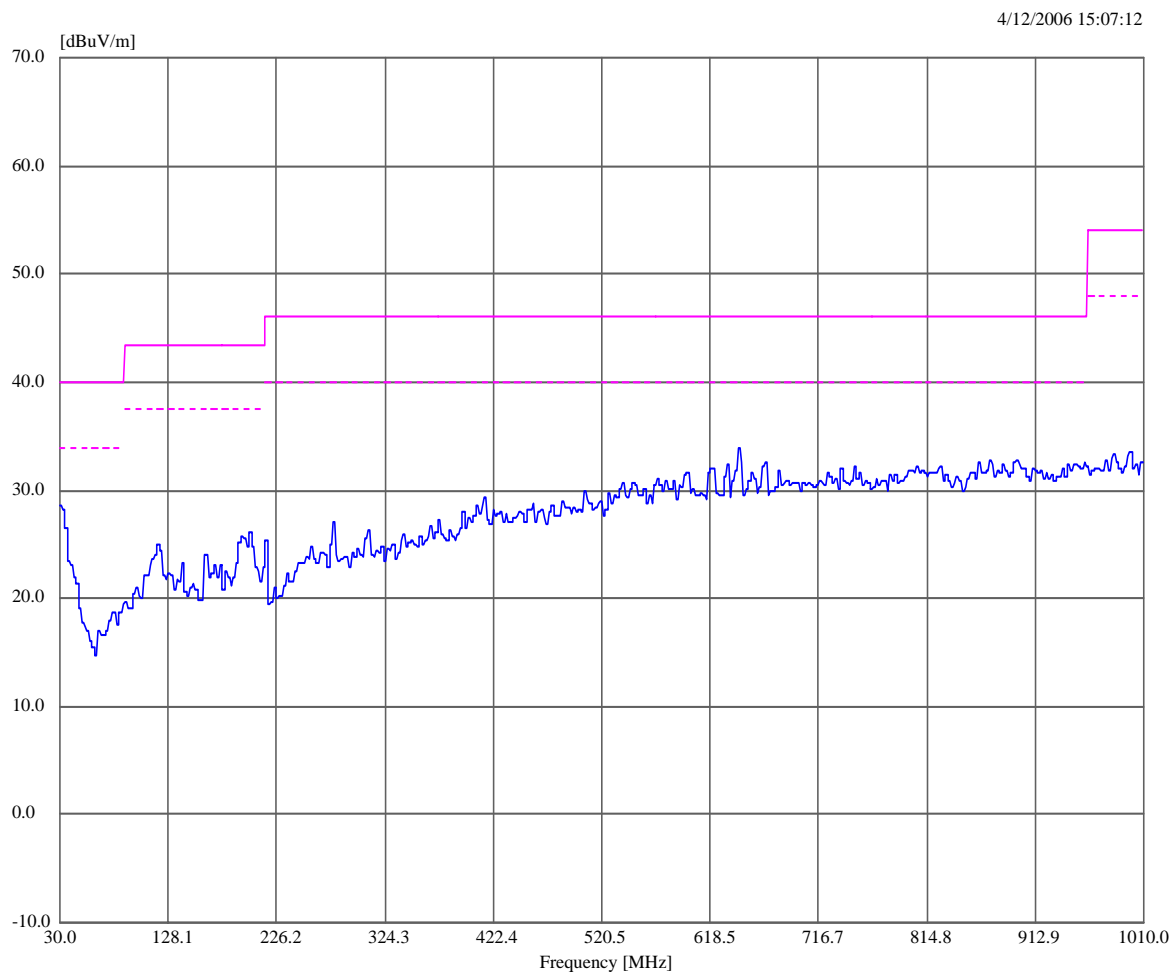
Product: 703X Phone with H251N headset  
 Operation mode: 5.180 GHz 12 MBit/s max power  
 Model: Serial # Phone: 660324736 with Dual Charger

**TABLE OF RESULTS**

Freq. (MHz)	Peak (dBuV/m)	QP (dBuV/m)	QP Lmt (dBuV/m)	QP Margin (dB)	Angle (deg)	Height (cm)	Polarity

There were no emissions observed within 6 dB of the limit.

**Plot 27**  
**Radiated Spurious Emissions 30 MHz to 1 GHz**



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## Specification

### Limits

**§15.407(b)(6)** Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in Section 15.209.

**§15.205 (a)** Except as shown in paragraph (d) of 15.205 (a), only spurious emissions are permitted in any of the frequency bands listed.

**§15.205 (a)** Except as shown in paragraphs (d) and (e) of this section, the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

**§15.209 (a)** Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table.

**RSS-210 §2.2** refers to Section 2.7 Table 2 below;-

Frequency(MHz)	Field Strength ( $\mu\text{V}/\text{m}$ )	Field Strength ( $\text{dB}\mu\text{V}/\text{m}$ )	Measurement Distance (meters)
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

### Laboratory Measurement Uncertainty for Radiated Emissions

Measurement uncertainty	+5.6/ -4.5 dB
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### Traceability

Method	Test Equipment Used
Measurements were made per Sanmina work instruction	8546A HP Receiver and RF Filter, HP Pre-amp, Antenna EMCO Biconilog

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### 5.1.9. AC Wireline Conducted Emissions (150 kHz – 30 MHz)

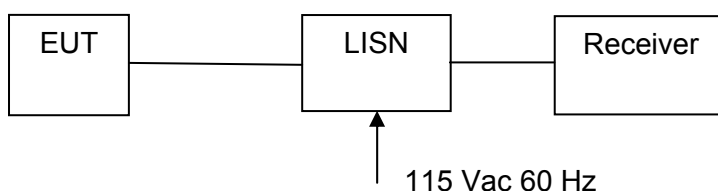
**FCC, Part 15 Subpart C §15.407(b)(6)/15.207**

**Industry Canada RSS-Gen §7.2.2**

#### Test Procedure

The EUT is configured in accordance with ANSI C63.4. The conducted emissions are measured in a shielded room with a spectrum analyzer in peak hold in the first instance. Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation. The highest emissions relative to the limit are listed.

#### Test Measurement Set up



Measurement set up for AC Wireline Conducted Emissions Test

### Measurement Results for AC Wireline Conducted Emissions (150 kHz – 30 MHz)

Ambient conditions.

Temperature: 17 to 23 °C    Relative humidity: 31 to 57 %    Pressure: 999 to 1012 mbar

Product: 703X with H251N headset connected

Operation mode: 5.180 GHz 12 MBit/s max power

Model: Serial # Phone: 660324736 with Single Charger

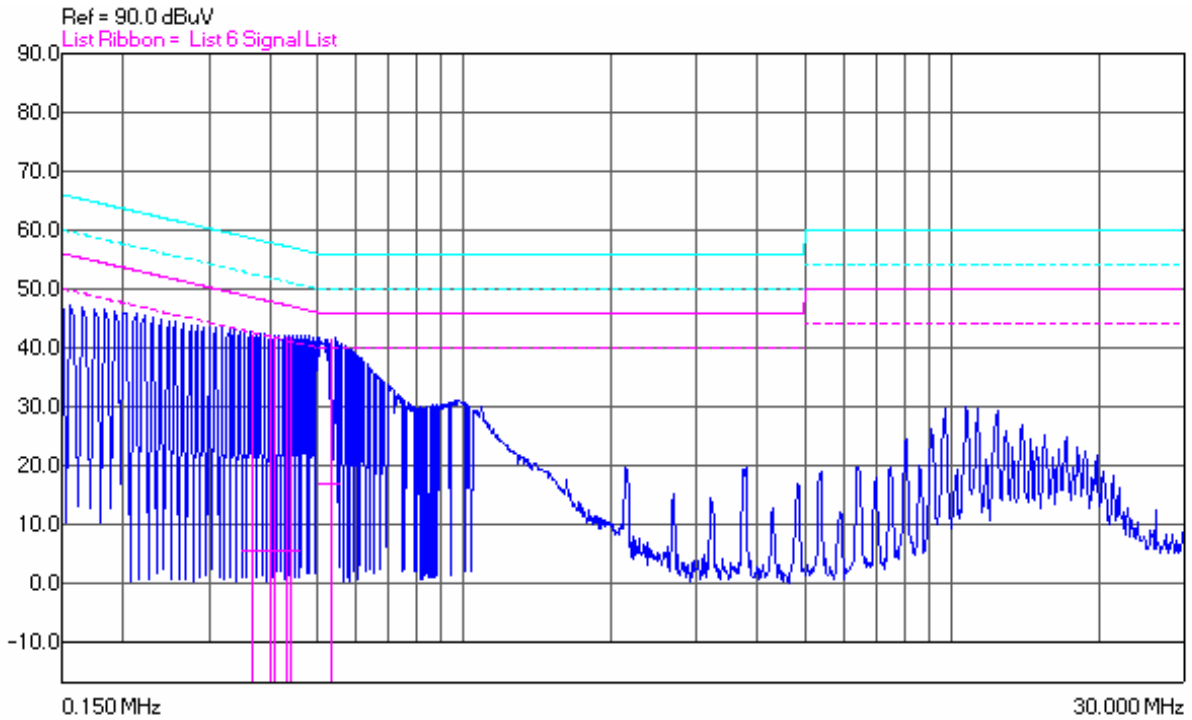
#### TABLE OF RESULTS – Live Line

Freq (MHz)	Peak (dB $\mu$ V)	QP (dB $\mu$ V)	QP Limit (dB $\mu$ V)	QP Margin (dB)	Ave. (dB $\mu$ V)	Ave. Limit (dB $\mu$ V)	Ave. Margin (dB)
0.369326	42.44	--.--	58.56	--.--	5.51	48.56	-43.06
0.402766	42.17	--.--	57.82	--.--	5.37	47.82	-42.45
0.410382	42.17	--.--	57.68	--.--	5.31	47.68	-42.36
0.433516	42.12	--.--	57.24	--.--	5.32	47.24	-41.92
0.440922	42.04	--.--	57.10	--.--	5.36	47.10	-41.75
0.533576	41.78	--.--	56.00	--.--	16.96	46.00	-29.04

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**Plot 28**  
**AC Wireline Conducted Emissions – LIVE LINE 150 kHz – 30 MHz)**



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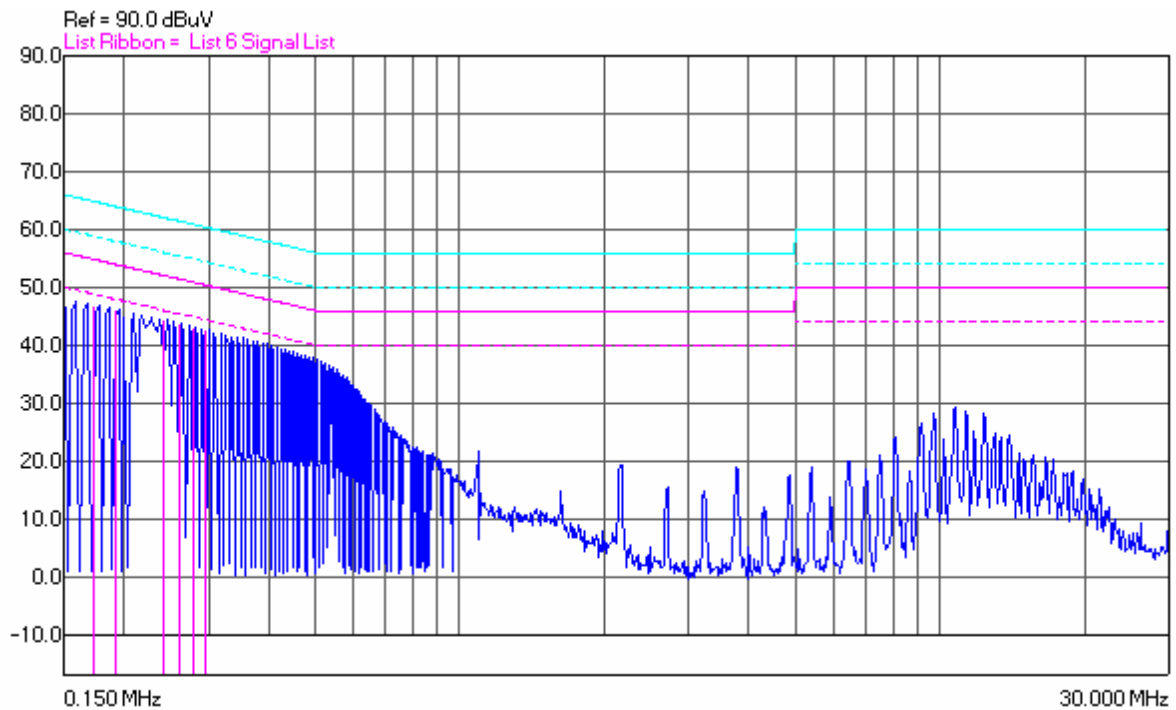




**TABLE OF RESULTS – Neutral Line**

Freq (MHz)	Peak (dB $\mu$ V)	QP (dB $\mu$ V)	QP Limit (dB $\mu$ V)	QP Margin (dB)	Ave. (dB $\mu$ V)	Ave. Limit (dB $\mu$ V)	Ave. Margin (dB)
0.173880	46.86	--.--	64.84	--.--	--.--	54.84	--.--
0.191790	46.13	--.--	63.97	--.--	--.--	53.97	--.--
0.242535	44.36	--.--	62.02	--.--	--.--	52.02	--.--
0.260445	43.72	--.--	61.47	--.--	--.--	51.47	--.--
0.278355	43.10	--.--	60.93	--.--	--.--	50.93	--.--
0.296265	42.61	--.--	60.39	--.--	--.--	50.39	--.--

**Plot 29**  
**AC Wireline Conducted Emissions – NEUTRAL LINE 150 kHz – 30 MHz)**



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**Specification**

**Limit**

**§15.407 (b)(6);** Any U-NII devices using an AC power line are required to comply also with the limits set forth in Section 15.207.

**§15.207 (a)** Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50  $\mu\Omega$  line impedance stabilization network (LISN), see §15.207 (a) matrix below. Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

**RSS-Gen §7.2.2**

The radio frequency voltage that is conducted back into the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown in the table below. The tighter limit applies at the frequency range boundaries.

**§15.207 (a)** and **RSS-Gen §7.2.2** Limit Matrix

The lower limit applies at the boundary between frequency ranges

Frequency of Emission (MHz)	Conducted Limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\* Decreases with the logarithm of the frequency

**Laboratory Measurement Uncertainty for Conducted Emissions**

Measurement uncertainty	$\pm 2.64$ dB
-------------------------	---------------

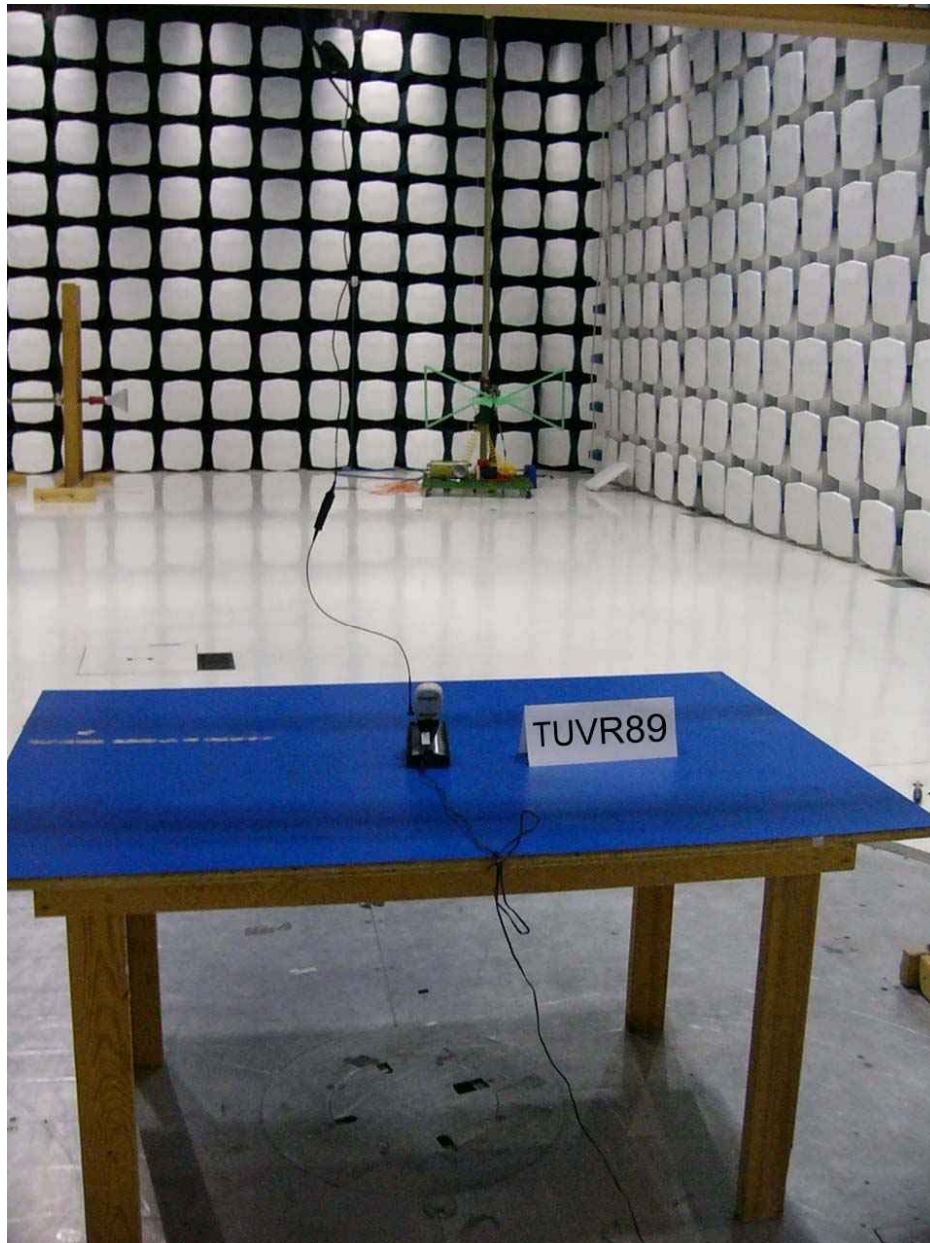
**Traceability**

Method	Test Equipment Used
Measurements were made per work instruction WI-EMC-01 'Measurement of Conducted Emissions'	0158, 0184, 0193, 0190, 0293, 0307

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## 6. PHOTOGRAPHS

### 6.1. Radiated Emissions (30 MHz-1 GHz)



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## 6.2. Spurious Emissions >1 GHz



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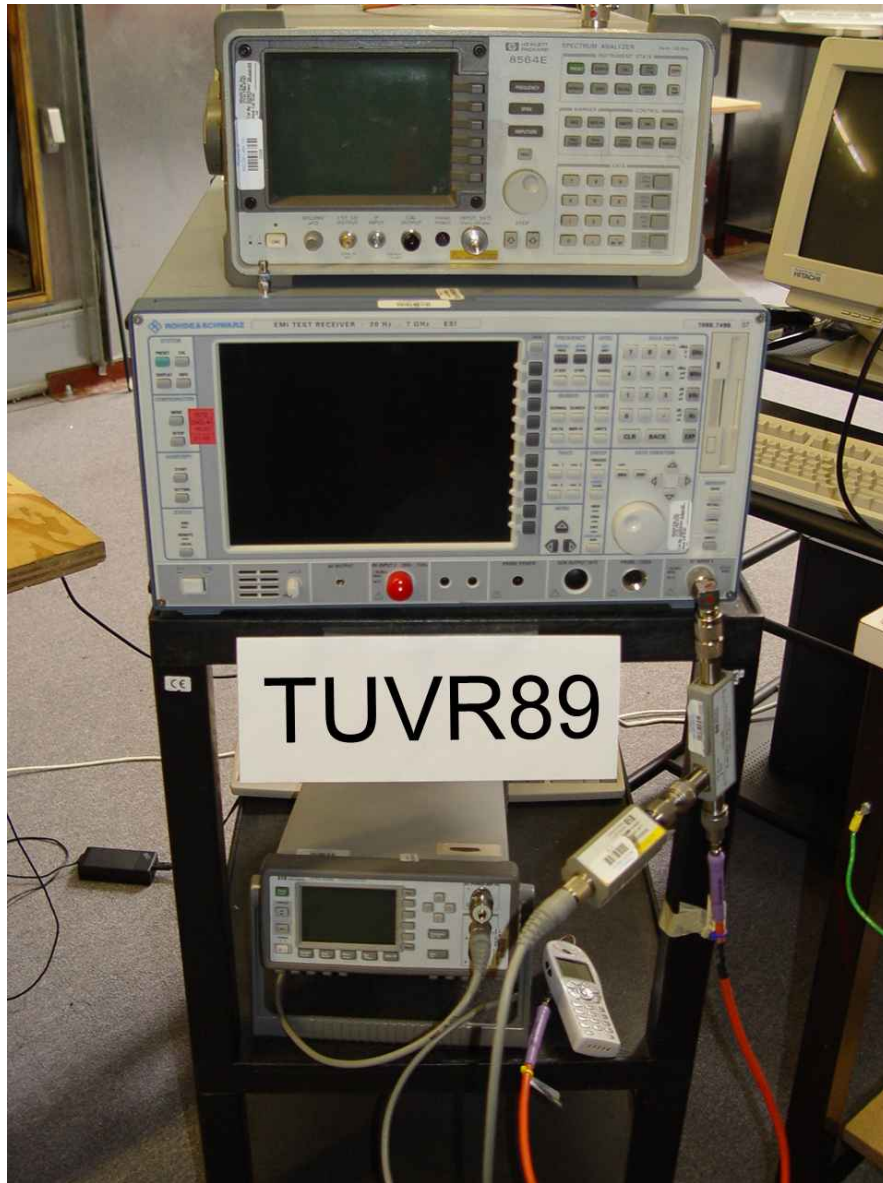
### 6.3. Conducted Emissions (150 kHz - 30 MHz)



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#### 6.4. General Measurement Test Set-Up



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## 7. TEST EQUIPMENT DETAILS

Asset #	Instrument	Manufacturer	Part #	Serial #
0088	Spectrum Analyzer	Hewlett Packard	8564E	3410A00141
0104	1-18GHz Horn Antenna	The Electro-Mechanics Company	3115	9205-3882
0134	Amplifier	Com Power	PA 122	181910
0158	Barometer /Thermometer	Control Co.	4196	E2846
0193	EMI Receiver	Rhode & Schwartz	ESI 7	838496/007
0252	SMA Cable	Megaphase	Sucoflex 104	None
0310	2m SMA Cable	Micro-Coax	UFA210A-0-0787-3G03G0	209089-001
0312	3m SMA Cable	Micro-Coax	UFA210A-1-1181-3G0300	209092-001
0313	Coupler	Hewlett Packard	86205A	3140A01285
0314	30dB N-Type Attenuator	ARRA	N9444-30	1623
0070	Power Meter	Hewlett Packard	437B	3125U11552
0116	Power Sensor	Hewlett Packard	8485A	3318A19694
0117	Power Sensor	Hewlett Packard	8487D	3318A00371
0184	Pulse Limiter	Rhode & Schwartz	ESH3Z2	357.8810.52
0190	LISN	Rhode & Schwartz	ESH3Z5	836679/006
0293	BNC Cable	Megaphase	1689 1GVT4	15F50B001
0307	BNC Cable	Megaphase	1689 1GVT4	15F50B002

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3922 Valley Avenue, Suite "B"  
Pleasanton, CA 94566, USA  
Tel: 1.925.462.0304  
Fax: 1.925.462.0306  
[www.micomlabs.com](http://www.micomlabs.com)