

# FCC Part 15C

## Measurement and Test Report

For

### ATI Electronics (ShenZhen) Co., LTD

2/F, A Tower, Tangyanshan Industrial Park Tangkeng Village, Shiyan Town

Shenzhen, China

**FCC ID: SF4-BTDF111**

<b>Report Concerns:</b> Original Report	<b>Equipment Type:</b> BT Drive Free 111
<b>Model:</b>	<u>7607545530-001</u>
<b>Report No.:</b>	<u>STR10088199I</u>
<b>Test Date:</b>	<u>2010-09-01 to 2010-09-11</u>
<b>Issue Date:</b>	<u>2010-09-16</u>
<b>Tested By:</b>	<u>Seven Song / Engineer</u> <span style="float: right;"><i>Seven Song</i></span>
<b>Reviewed By:</b>	<u>Lahm Peng / EMC Manager</u> <span style="float: right;"><i>Lahm peng</i></span>
<b>Approved &amp; Authorized By:</b>	<u>Jandy so / PSQ Manager</u> <span style="float: right;"><i>Jandyso</i></span>
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Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by SEM.Test Compliance Service Co., Ltd.

**TABLE OF CONTENTS**

**1. GENERAL INFORMATION.....4**

1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT).....4

1.2 TEST STANDARDS.....4

1.3 RELATED SUBMITTAL(S)/GRANT(S) .....4

1.4 TEST METHODOLOGY .....5

1.5 TEST FACILITY .....5

1.6 EUT EXERCISE SOFTWARE .....5

1.7 ACCESSORIES EQUIPMENT LIST AND DETAILS .....5

1.8 EUT CABLE LIST AND DETAILS .....5

**2. SUMMARY OF TEST RESULTS .....6**

**3. CONDUCTED EMISSIONS .....7**

3.1 MEASUREMENT UNCERTAINTY .....7

3.2 TEST EQUIPMENT LIST AND DETAILS .....7

3.3 TEST PROCEDURE.....7

3.4 BASIC TEST SETUP BLOCK DIAGRAM.....7

3.5 ENVIRONMENTAL CONDITIONS .....8

3.6 SUMMARY OF TEST RESULTS/PLOTS .....8

3.7 CONDUCTED EMISSIONS TEST DATA.....8

**4. §15.203 - ANTENNA REQUIREMENT.....11**

4.1 STANDARD APPLICABLE.....11

4.2 TEST RESULT.....11

**5. NUMBER OF HOPPING CHANNELS AND CHANNEL SPACING .....12**

5.1 STANDARD APPLICABLE.....12

5.2 TEST EQUIPMENT LIST AND DETAILS .....12

5.3 TEST PROCEDURE.....12

5.4 ENVIRONMENTAL CONDITIONS .....12

5.5 SUMMARY OF TEST RESULTS/PLOTS .....13

**6. DWELL TIME OF A HOPPING CHANNEL.....15**

6.1 STANDARD APPLICABLE.....15

6.2 TEST EQUIPMENT LIST AND DETAILS .....15

6.3 TEST PROCEDURE.....15

6.4 ENVIRONMENTAL CONDITIONS .....15

6.5 SUMMARY OF TEST RESULTS/PLOTS .....16

**7. 20-DB BANDWIDTH.....18**

7.1 STANDARD APPLICABLE.....18

7.2 TEST EQUIPMENT LIST AND DETAILS .....18

7.3 TEST PROCEDURE.....18

7.4 ENVIRONMENTAL CONDITIONS .....18

7.5 SUMMARY OF TEST RESULTS/PLOTS .....18

**8. POWER OUTPUT.....21**

8.1 STANDARD APPLICABLE.....21

8.2 TEST EQUIPMENT LIST AND DETAILS .....21

8.3 TEST PROCEDURE.....21

8.4 ENVIRONMENTAL CONDITIONS .....21

8.5 SUMMARY OF TEST RESULTS/PLOTS .....21

**9. FIELD STRENGTH OF SPURIOUS EMISSIONS .....22**

9.1 MEASUREMENT UNCERTAINTY .....22

9.2 STANDARD APPLICABLE.....22

9.3 TEST EQUIPMENT LIST AND DETAILS .....22

9.4 TEST PROCEDURE.....23

9.5 TEST RECEIVER SETUP .....23

9.6 CORRECTED AMPLITUDE & MARGIN CALCULATION.....23

9.7 ENVIRONMENTAL CONDITIONS .....24

9.8 SUMMARY OF TEST RESULTS/PLOTS .....24

**10. OUT OF BAND EMISSIONS.....39**  
10.1 STANDARD APPLICABLE.....39  
10.2 TEST EQUIPMENT LIST AND DETAILS .....39  
10.3 TEST PROCEDURE.....39  
10.4 ENVIRONMENTAL CONDITIONS .....40  
10.5 SUMMARY OF TEST RESULTS/PLOTS .....40

## 1. GENERAL INFORMATION

### 1.1 Product Description for Equipment Under Test (EUT)

#### Client Information

Applicant: ATI Electronics (ShenZhen) Co., LTD  
 Address of applicant: 2/F, A Tower, Tangyanshan Industrial Park Tangkeng Village, Shiyan Town Shenzhen, China

Manufacturer: ATI Electronics (ShenZhen) Co., LTD  
 Address of manufacturer: 2/F, A Tower, Tangyanshan Industrial Park Tangkeng Village, Shiyan Town Shenzhen, China

#### General Description of E.U.T

Items	Description
EUT Description:	BT Drive Free 111
Trade Name:	Blaupunkt
Model Tested:	7607545530-001
Rated Voltage:	Battery DC 3V
RF Output Power:	-6~4dBm
Frequency range:	2402-2480MHz
Number of channels:	79
Channel Separation:	1MHz
Type of Antenna:	Integral Antenna
Size:	11.7X4.6X1.8 cm

*Note: The test data is gathered from a production sample, provided by the manufacture.*

### 1.2 Test Standards

The following report is prepared on behalf of the ATI Electronics (ShenZhen) Co., LTD in accordance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 of the Federal Communication Commissions rules.

**Maintenance of compliance** is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

### 1.3 Related Submittal(s)/Grant(s)

No Related Submittal(s).

## 1.4 Test Methodology

All measurements contained in this report were conducted with 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.

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted with Low Channel, Middle Channel and High Channel, accordingly in reference to the Operating Instructions.

## 1.5 Test Facility

- **FCC – Registration No.: 994117**

SEM.Test Compliance Services Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the Registration is 994117.

- **Industry Canada (IC) Registration No.: 7673A**

The 3m Semi-anechoic chamber of SEM.Test Compliance Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 7673A.

## 1.6 EUT Exercise Software

The EUT exercise program used during the testing was designed to exercise the system components.

## 1.7 Accessories Equipment List and Details

Description	Manufacturer	Model	Serial Number
Adapter	Rosen	YHSW-0521000C	/
/	/	/	/

## 1.8 EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
USB Cable	0.75	Unshielded	Without Core
/	/	/	/

## 2. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§ 15.203; § 15.247(b)(4)(i)	Antenna Requirement	Compliant
§ 15.247(a)(1)(iii)	Quantity of Hopping Channel	Compliant
§ 15.247(a)(1)	Channel Separation	Compliant
§ 15.247(a)(1)(iii)	Time of Occupancy (Dwell time)	Compliant
§ 15.247(a)	20dB Bandwidth	Compliant
§ 15.247(b)(1)	Power Output	Compliant
§ 15.209(a)(f)	Radiated Emission	Compliant
§ 15.247(c)	Band edge	Compliant

### 3. CONDUCTED EMISSIONS

#### 3.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is  $\pm 2.88$  dB.

#### 3.2 Test Equipment List and Details

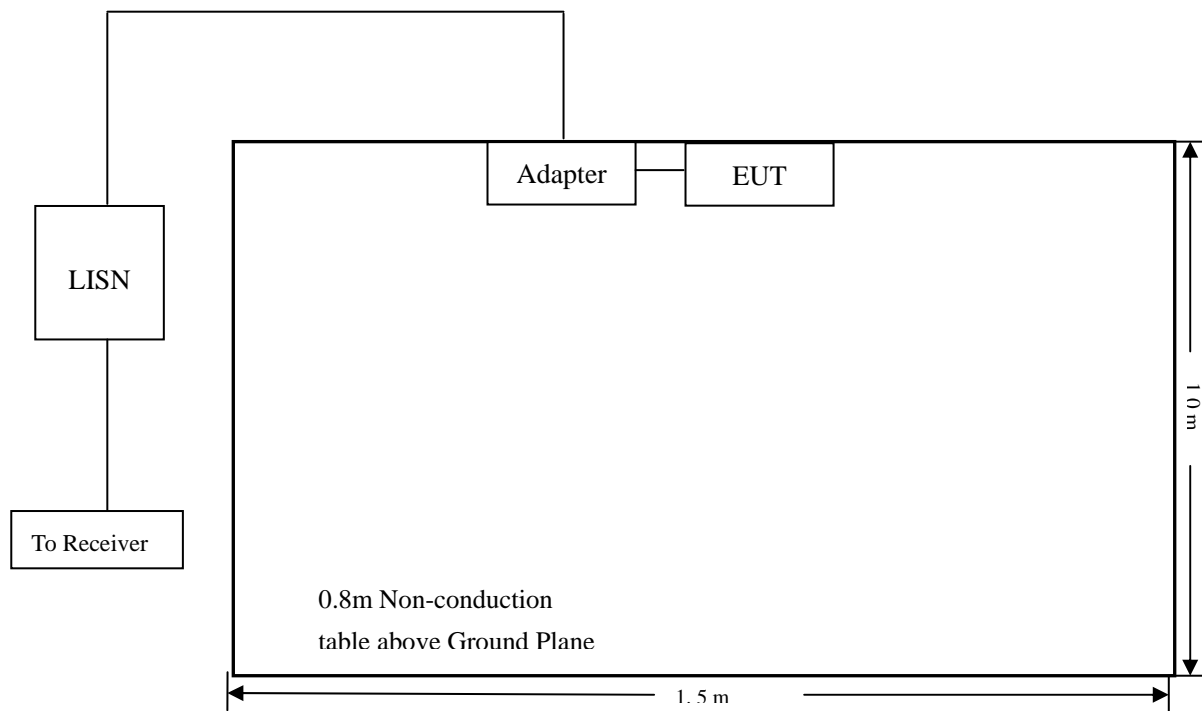
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2010-08-12	2011-08-11
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2010-08-12	2011-08-11
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2010-08-12	2011-08-11

**Statement of Traceability:** All calibrations have been performed per the NVLAP requirements traceable to the NIST.

#### 3.3 Test Procedure

Test is conducting under the description of 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.

#### 3.4 Basic Test Setup Block Diagram



### 3.5 Environmental Conditions

Temperature:	20° C
Relative Humidity:	52%
ATM Pressure:	1011 mbar

### 3.6 Summary of Test Results/Plots

According to the data in section 3.7, the EUT complied with the FCC 15.207 Conducted margin for a Class B device, with the *worst* margin reading of:

**-7.7 dBμV at 23.986 MHz in the Neutral Ave Detector, 0.15-30MHz**

### 3.7 Conducted Emissions Test Data

LINE CONDUCTED EMISSIONS				FCC 15.207	
Frequency	Amplitude	Detector	Phase	Limit	Margin
MHz	dBμV	QP/Ave/Pk	Line/Neutral	dBμV	dB
23.986	42.29	Ave	Neutral	50.00	-7.7
23.986	41.66	Ave	Line	50.00	-8.3
5.470	49.16	Pk	Line	60.00	-10.8
5.662	47.94	Pk	Line	60.00	-12.1
24.090	36.34	Ave	Neutral	50.00	-13.7
5.418	45.55	Pk	Neutral	60.00	-14.5
0.206	48.31	Pk	Line	63.37	-15.1
5.358	44.62	Pk	Neutral	60.00	-15.4
25.002	34.59	Ave	Neutral	50.00	-15.4
25.002	34.22	Ave	Line	50.00	-15.8
0.198	36.00	Ave	Line	53.69	-17.7
0.202	45.71	Pk	Neutral	63.53	-17.8



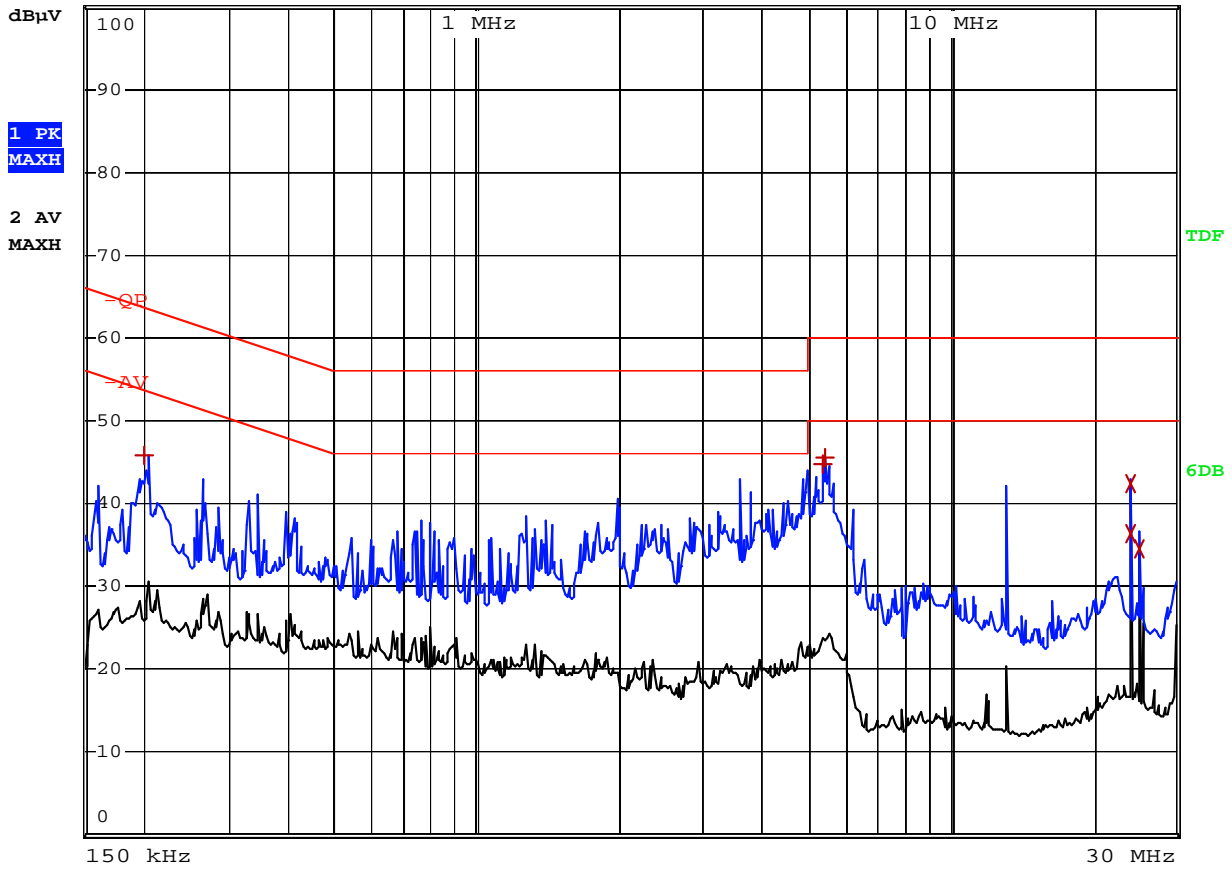
**Plot of Conducted Emissions Test Data**

Conducted Disturbance  
EUT: BT Drive Free 111  
M/N: 7607545530-001  
Operating Condition: Charging Mode  
Test Specification: N  
Comment: AC120V/60Hz; Adapter USB 5V



RBW 9 kHz  
MT 5 ms

Att 10 dB AUTO



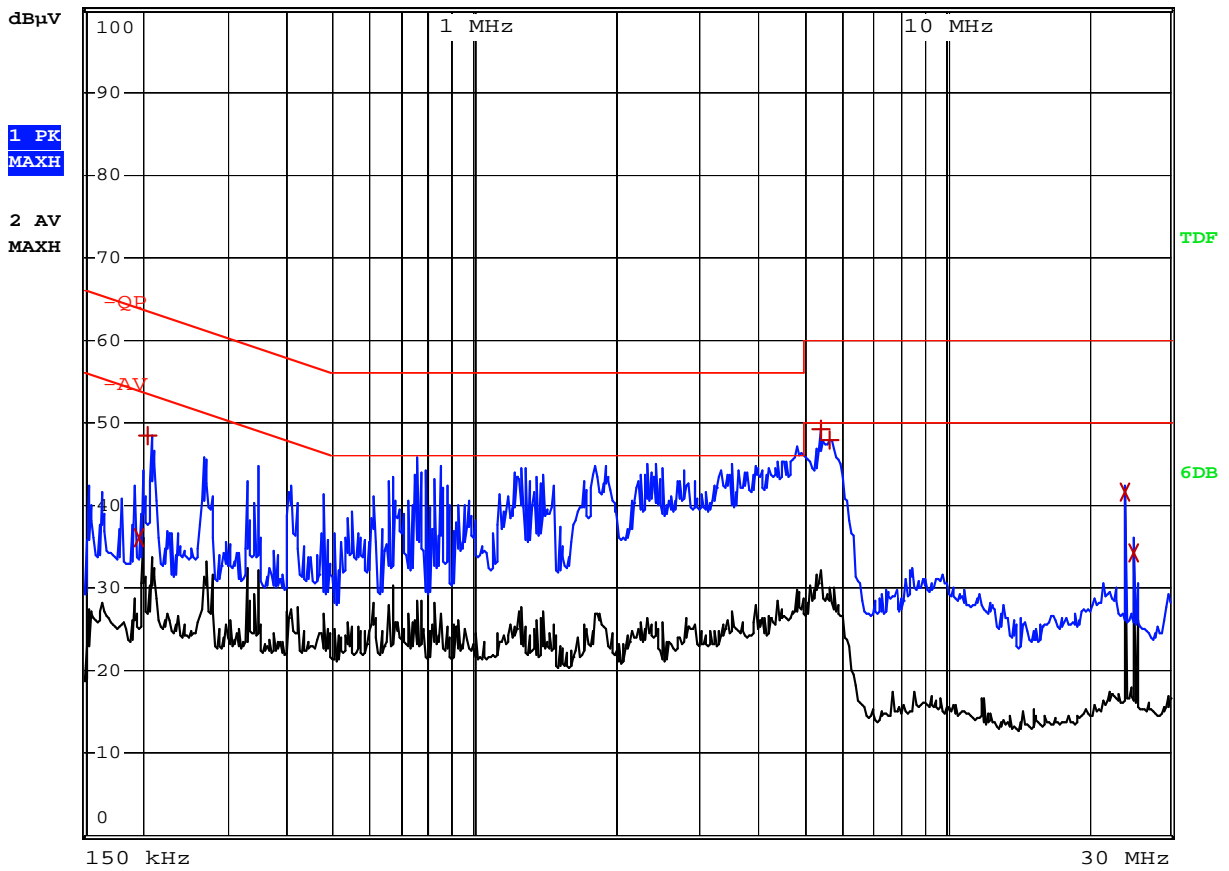
**Plot of Conducted Emissions Test Data**

Conducted Disturbance  
EUT: BT Drive Free 111  
M/N: 7607545530-001  
Operating Condition: Charging Mode  
Test Specification: L  
Comment: AC120V/60Hz; Adapter USB 5V



RBW 9 kHz  
MT 5 ms

Att 10 dB AUTO



## **4. §15.203 - ANTENNA REQUIREMENT**

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### **4.1 Standard Applicable**

According to FCC 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

### **4.2 Test Result**

This product has an Integral antenna, fulfill the requirement of this section.

## 5. NUMBER OF HOPPING CHANNELS AND CHANNEL SPACING

### 5.1 Standard Applicable

According to FCC 15.247(a)(1), frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, and frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

### 5.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4402B	US41192821	2010-08-12	2011-08-11
Attenuator	ATTEN	DC-4GHz	ATS100-4-20	2010-08-12	2011-08-11

**Statement of Traceability:** All calibrations have been performed per the NVLAP requirements traceable to the NIST.

### 5.3 Test Procedure

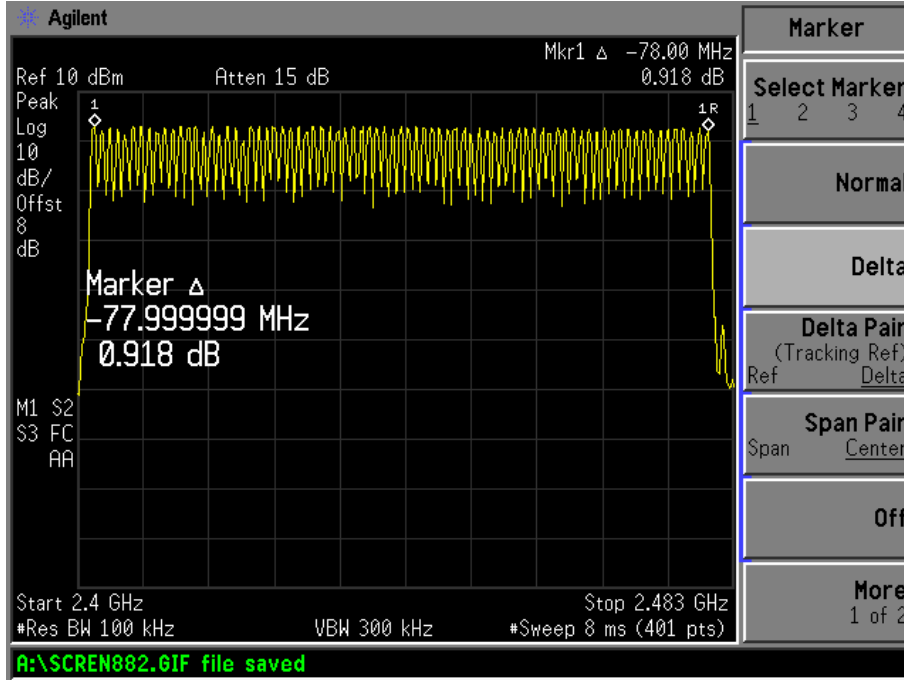
Set the Lowest channel to the Highest Channel, observed the band of 2400MHz to 2438.5MHz, than count it out the number of channels for comparing with the FCC rules. Adjust channel spacing can be read by adjusting the Analyzer SPAN.

### 5.4 Environmental Conditions

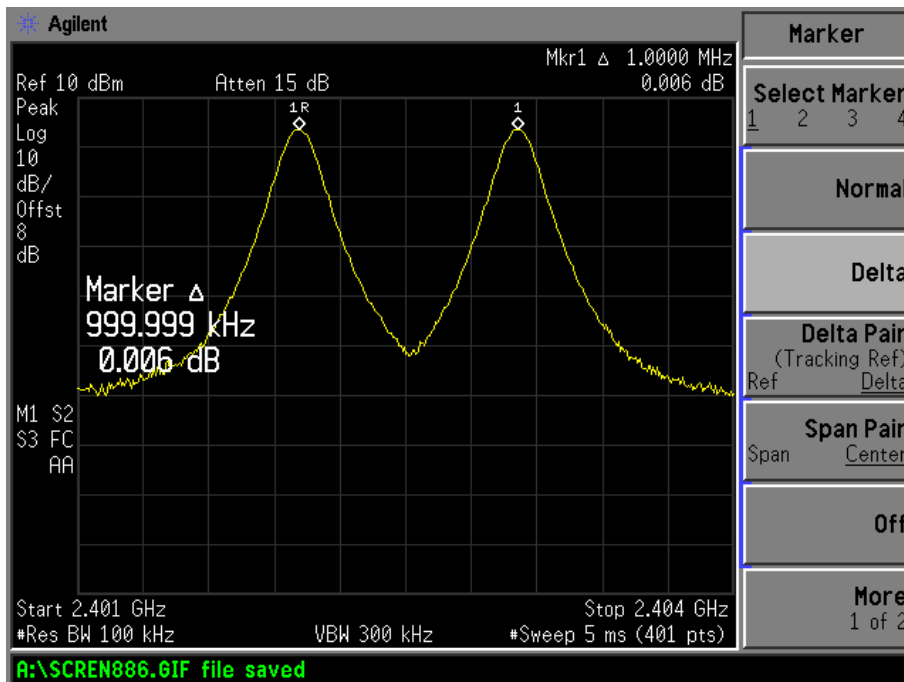
Temperature:	24 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

### 5.5 Summary of Test Results/Plots

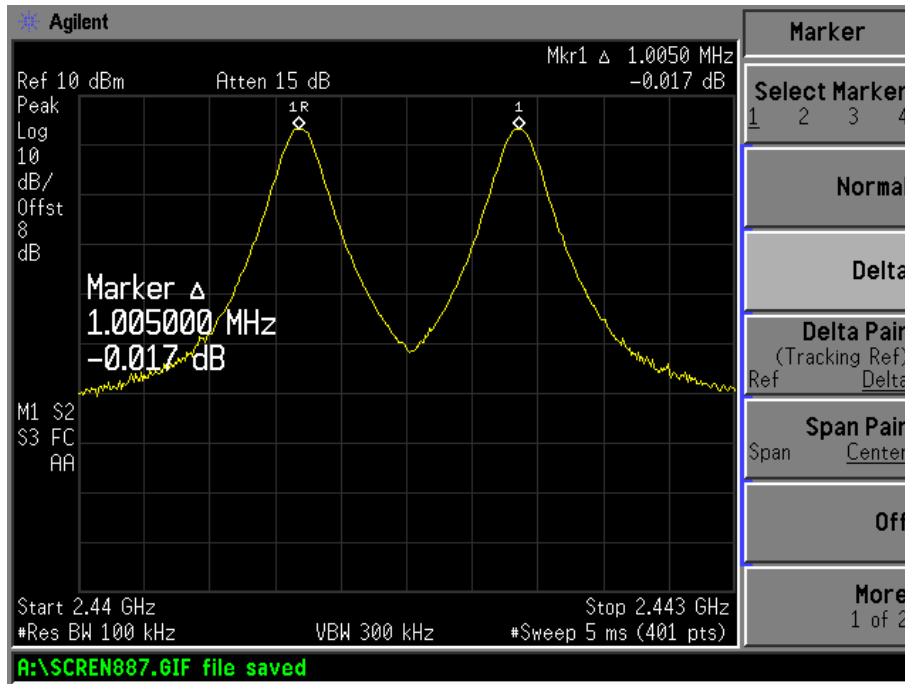
No. of Channel=79



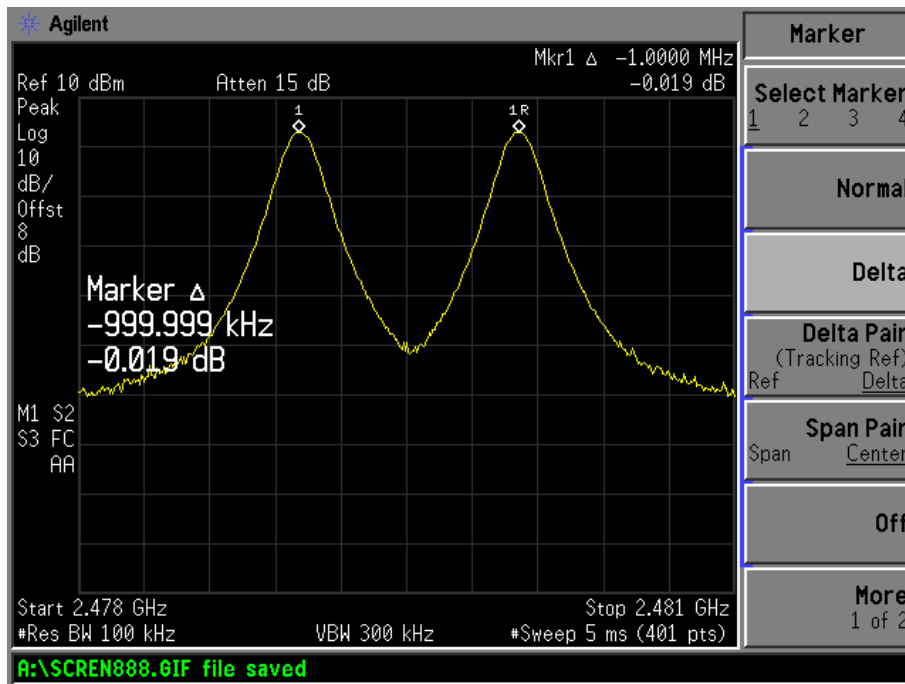
Channel Spacing (Low CH=1MHz)



Channel Spacing (Middle CH=1MHz)



Channel Spacing (High CH=1MHz)



## 6. DWELL TIME OF A HOPPING CHANNEL

### 6.1 Standard Applicable

According to 15.247(a)(1)(iii), Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

### 6.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4402B	US41192821	2010-08-12	2011-08-11
Attenuator	ATTEN	DC-4GHz	ATS100-4-20	2010-08-12	2011-08-11

**Statement of Traceability:** All calibrations have been performed per the NVLAP requirements traceable to the NIST.

### 6.3 Test Procedure

1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set center frequency of spectrum analyzer = operating frequency.
3. Set the spectrum analyzer as RBW=1000 KHz, VBW=3000 KHz, Span = 0Hz.
4. Repeat above procedures until all frequency measured was complete.

### 6.4 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

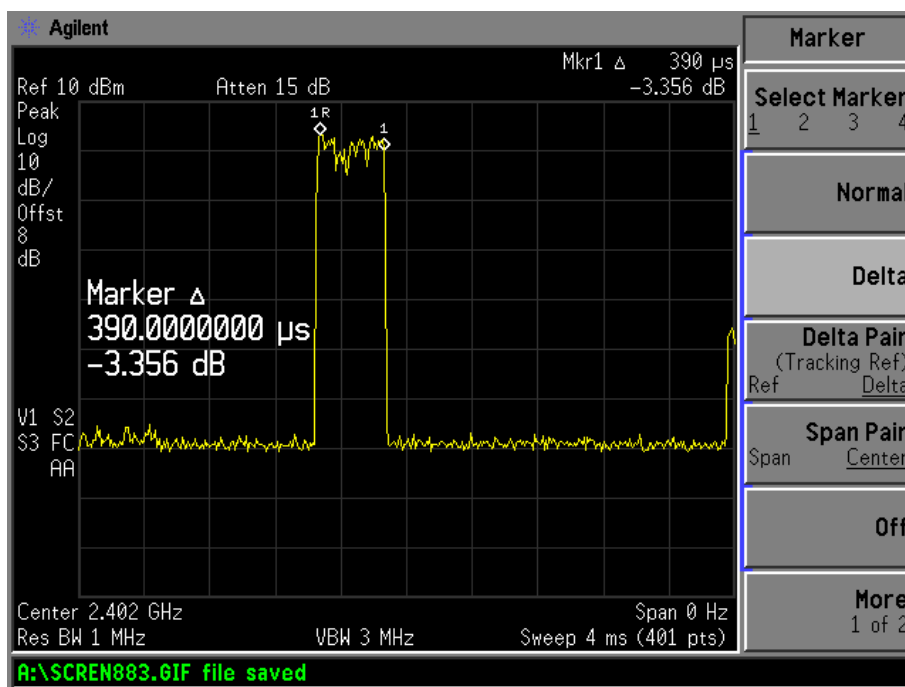
### 6.5 Summary of Test Results/Plots

The dwell time within a 31.6 second period in data mode is independent from the packet type (packet length). The calculation for a 31.6 second period is as follows:

$$\text{Dwell time} = \text{time slot length} * \text{hop rate} / \text{number of hopping channels} * 31.6\text{s}$$

Test data is corrected with the worse case, which the packet length is DH1.

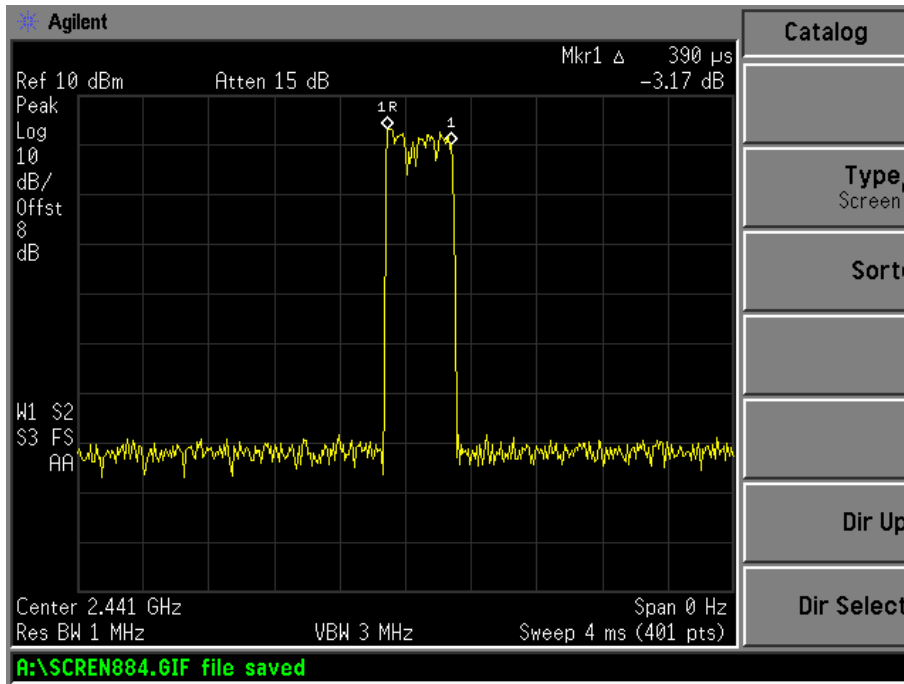
CH Low:



$$\text{DH1 time slot} = 0.39 \text{ (ms)} * (1600/(79)) * 31.6 = 249.6 \text{ (ms)} < 400 \text{ (ms)}$$

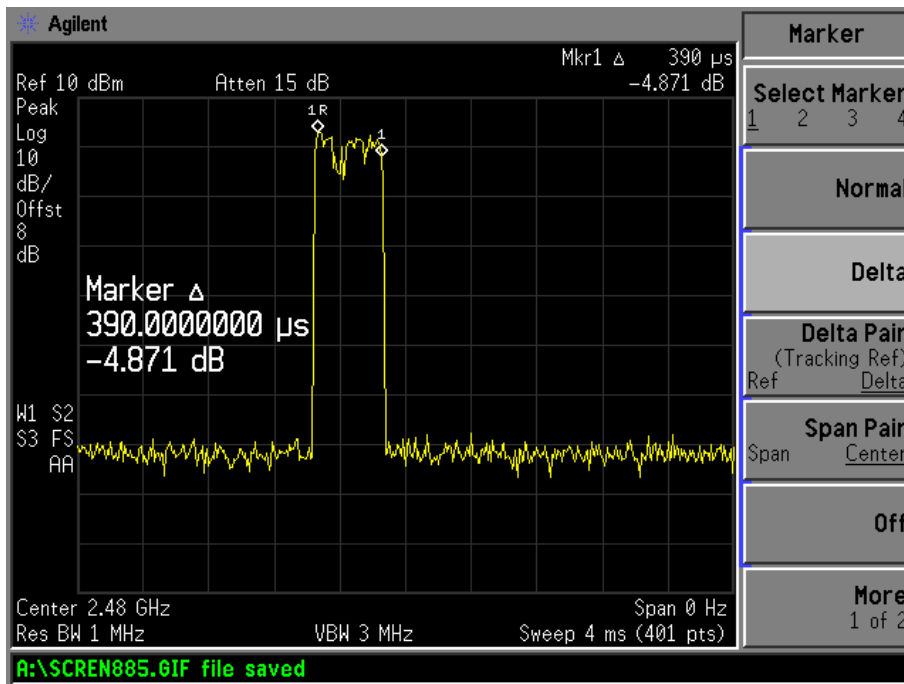


CH Mid:



$$DH1 \text{ time slot} = 0.39 \text{ (ms)} * (1600 / (79)) * 31.6 = 249.6 \text{ (ms)} < 400 \text{ (ms)}$$

CH High:



$$DH1 \text{ time slot} = 0.39 \text{ (ms)} * (1600 / (79)) * 31.6 = 249.6 \text{ (ms)} < 400 \text{ (ms)}$$

## 7. 20-dB BANDWIDTH

### 7.1 Standard Applicable

According to 15.247(a)(1)(iii). For frequency hopping systems operating in the 2400MHz-2483.5 MHz no limit for 20dB bandwidth.

### 7.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4402B	US41192821	2010-08-12	2011-08-11
Attenuator	ATTEN	DC-4GHz	ATS100-4-20	2010-08-12	2011-08-11

**Statement of Traceability:** All calibrations have been performed per the NVLAP requirements traceable to the NIST.

### 7.3 Test Procedure

1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set center frequency of spectrum analyzer = operating frequency.
3. The spectrum analyzer as RBW=30 KHz (>1 % of Bandwidth.), Sweep=auto
4. Mark the peak frequency and -20dB (upper and lower) frequency.

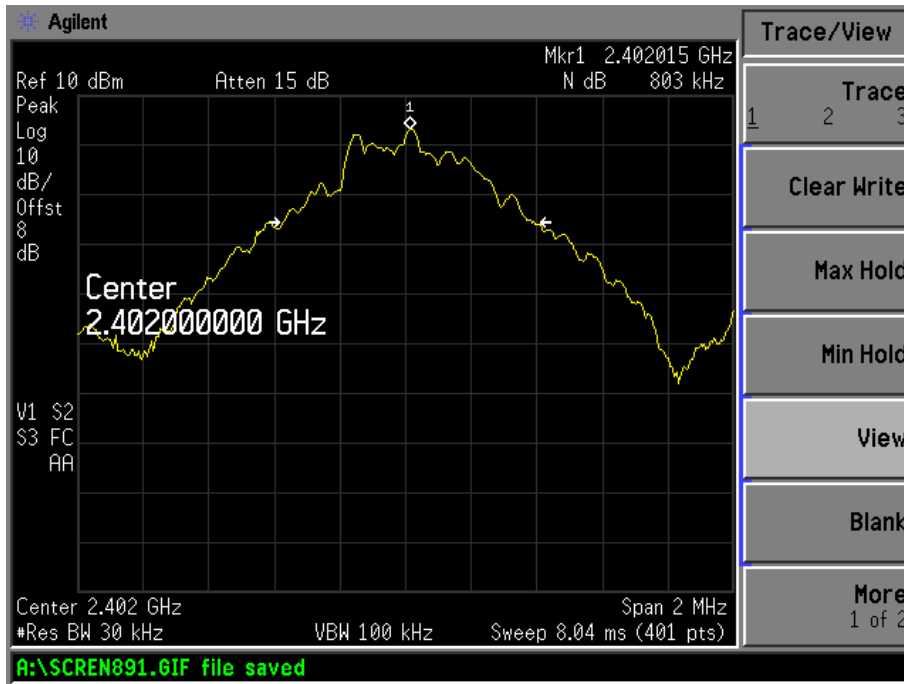
### 7.4 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

### 7.5 Summary of Test Results/Plots

Frequency MHz	20 dB Bandwidth kHz	Limit dB
2402	803	/
2441	803	/
2480	813	/

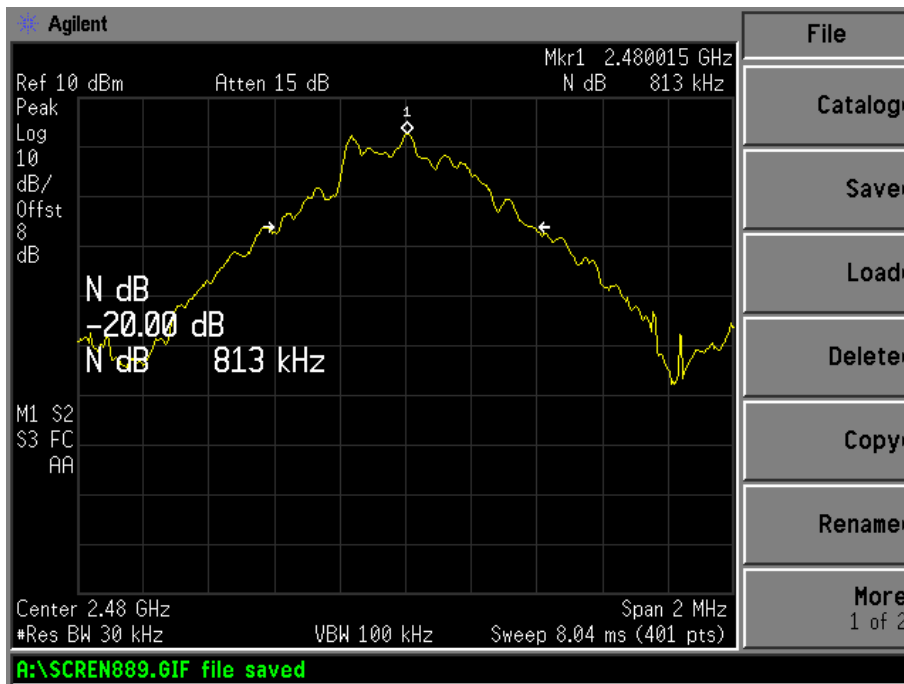
CH Low:



CH Mid:



CH High:



## 8. POWER OUTPUT

### 8.1 Standard Applicable

According to 15.247(b)(1). For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

### 8.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2010-04-16	2011-04-15
EMI Test Receiver	R&S	ESVB	825471/005	2010-08-12	2011-08-11
Positioning Controller	C&C	CC-C-1F	N/A	2010-08-12	2011-08-11
RF Switch	EM	EMSW18	SW060023	2010-08-12	2011-08-11
Pre-amplifier	Agilent	8447F	3113A06717	2010-08-12	2011-08-11
Pre-amplifier	Compliance Direction	PAP-0118	24002	2010-08-12	2011-08-11
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2010-07-21	2011-07-20
Horn Antenna	ETS	3117	00086197	2010-07-21	2011-07-20

**Statement of Traceability:** All calibrations have been performed per the NVLAP requirements traceable to the NIST.

### 8.3 Test Procedure

The device under test has an integral antenna and the power was measured on a radiated basis.

### 8.4 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	55%
ATM Pressure:	1011 mbar

### 7.5 Summary of Test Results/Plots

2402 MHz 2.2218 mW EIRP

2441 MHz 2.1135 mW EIRP

2480 MHz 2.0370 mW EIRP

Note: The Antenna Gain is under considering.

## 9. FIELD STRENGTH OF SPURIOUS EMISSIONS

### 9.1 Measurement Uncertainty

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is  $\pm 5.10$  dB.

### 9.2 Standard Applicable

According to §15.247(c), 15.205 15.209(b) & 15.35 (b), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Section 15.209:

30 - 88 MHz 40 dBuV/m @3M

88 -216 MHz 43.5 dBuV/m @3M

216 -960 MHz 46 dBuV/m @3M

Above 960 MHz 54dBuV/m @3M

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply.

EMISSIONS RADIATED OUTSIDE OF THE SPECIFIED FREQUENCY BANDS, EXCEPT FOR HARMONICS, SHALL BE ATTENUATED BY AT LEAST 20 dB BELOW THE LEVEL OF THE FUNDAMENTAL OR TO THE GENERAL RADIATED EMISSION LIMITS IN 15.209,WHICHEVER IS THE LESSER ATTENUATION.

Emissions that fall in the restricted bands (15.205) must be less than 54dBuV/m otherwise the spurious and harmonics must be attenuated by at least 20dB.

### 9.3 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2010-04-16	2011-04-15
EMI Test Receiver	R&S	ESVB	825471/005	2010-08-12	2011-08-11
Positioning Controller	C&C	CC-C-1F	N/A	2010-08-12	2011-08-11
RF Switch	EM	EMSW18	SW060023	2010-08-12	2011-08-11
Pre-amplifier	Agilent	8447F	3113A06717	2010-08-12	2011-08-11
Pre-amplifier	Compliance Direction	PAP-0118	24002	2010-08-12	2011-08-11
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2010-07-21	2011-07-20
Horn Antenna	ETS	3117	00086197	2010-07-21	2011-07-20

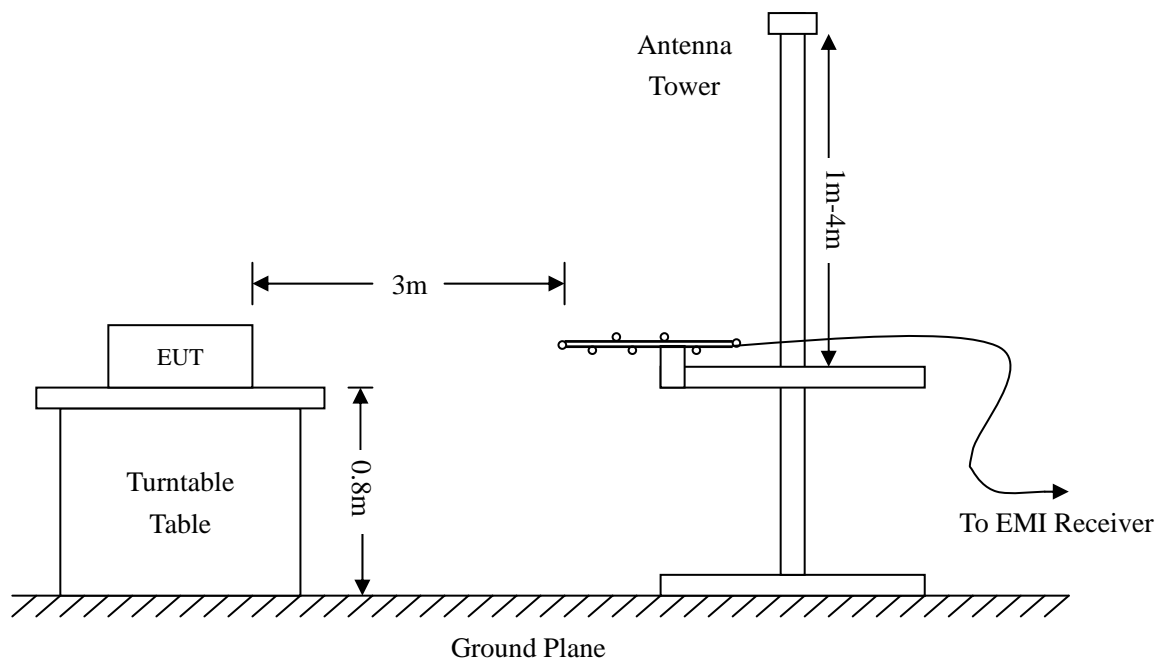
**Statement of Traceability:** All calibrations have been performed per the NVLAP requirements traceable to the NIST.

## 9.4 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.205 15.247(a) and FCC Part 15.209 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.



## 9.5 Test Receiver Setup

During the radiated emission test for above 1GHz, the test receiver was set with the following configurations:

For peak detector:

RBW = 1000kHz, VBW = 3000kHz, Sweep Time = Auto

For average detector:

RBW = 1000kHz, VBW = 10Hz, Sweep Time = Auto

## 9.6 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Ant. Factor} + \text{Cable Loss} - \text{Ampl. Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dB $\mu$ V means the emission is 6dB $\mu$ V below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15 Limit}$$

## 9.7 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

## 9.8 Summary of Test Results/Plots

According to the data below, the FCC Part 15.205, 15.209 and 15.247 standards, and had the worst margin of:

**-2.39 dB $\mu$ V at 4882.000 MHz in the Vertical polarization for Middle Channel, 30 MHz to 25 GHz, 3 Meters**

*Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.*



*Radiated Disturbance*

*EUT: BT Drive Free 111*

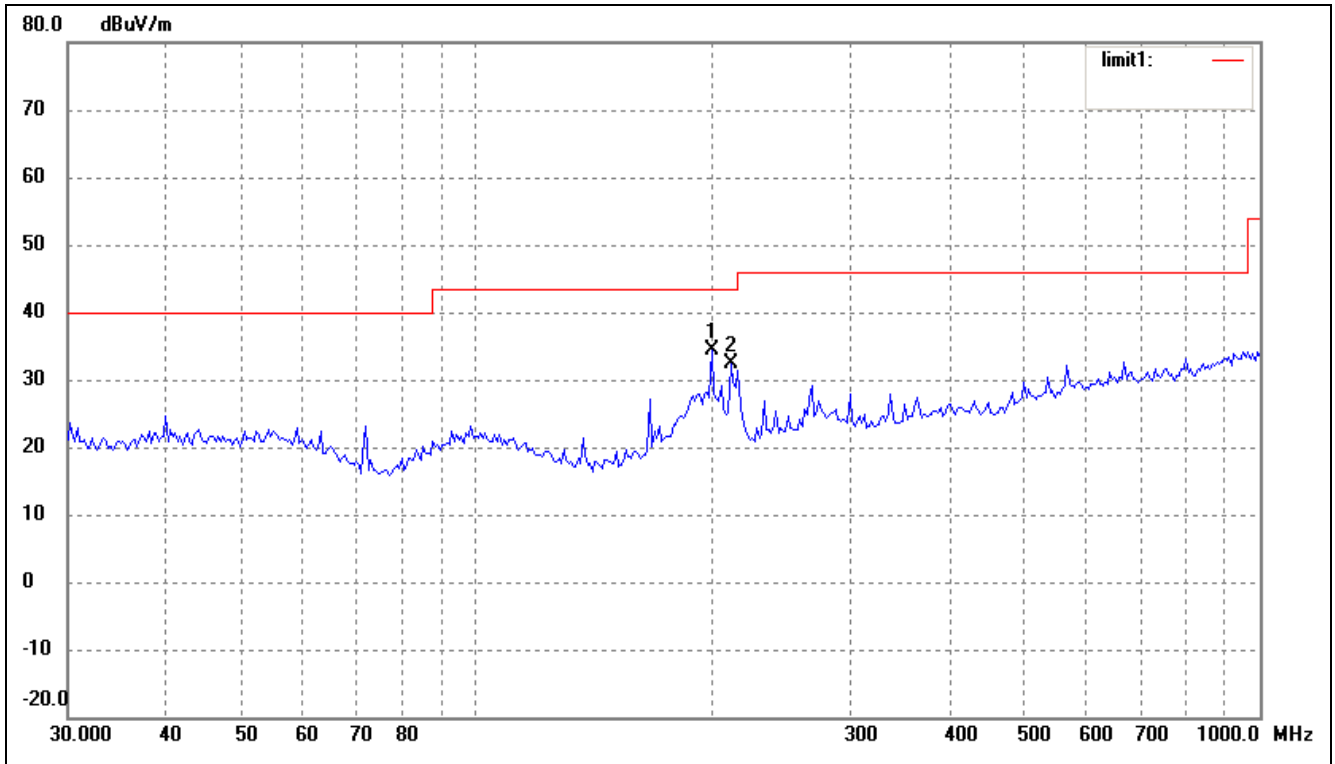
*M/N: 7607545530-001*

*Operating Condition: Charging Mode*

*Test Specification: Horizontal & Vertical*

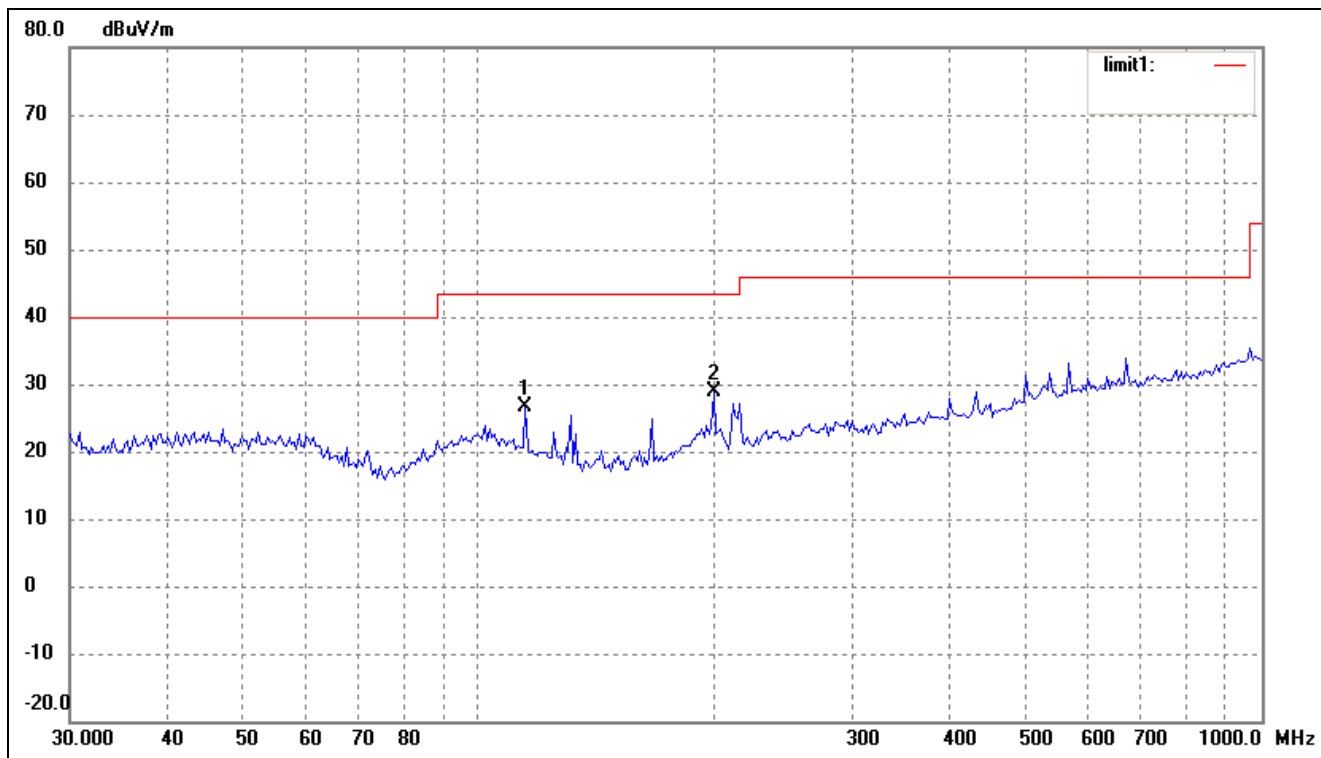
*Comment: AC120V/60Hz; Adapter USB 5V*

*Horizontal*



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	199.2855	28.60	5.68	34.28	43.50	-9.22	164	100	peak
2	210.7860	26.43	6.04	32.47	43.50	-11.03	224	100	peak

Vertical



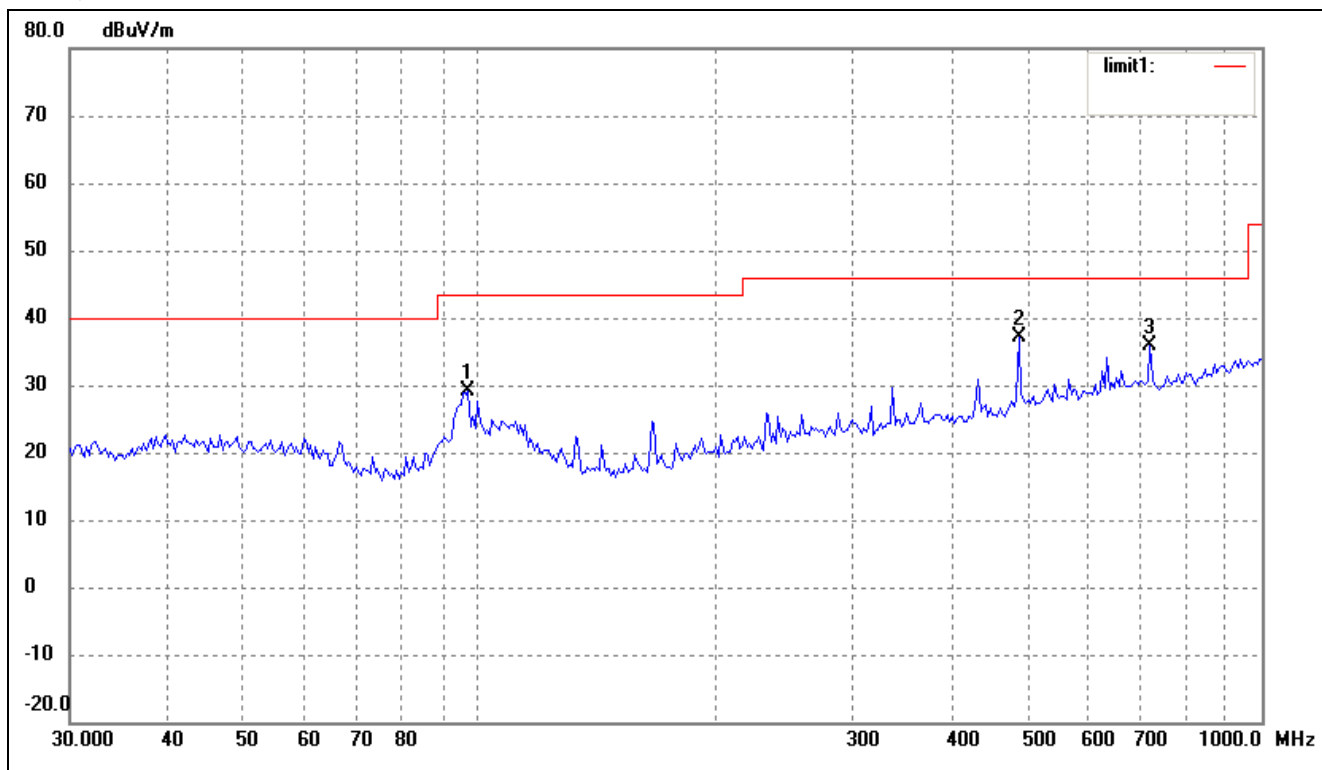
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	114.5146	20.42	6.19	26.61	43.50	-16.89	169	100	peak
2	199.2855	23.12	5.68	28.80	43.50	-14.70	60	100	peak

The emission above 1G is closing to the base, so it is not declare

From 30 MHz to 1 GHz

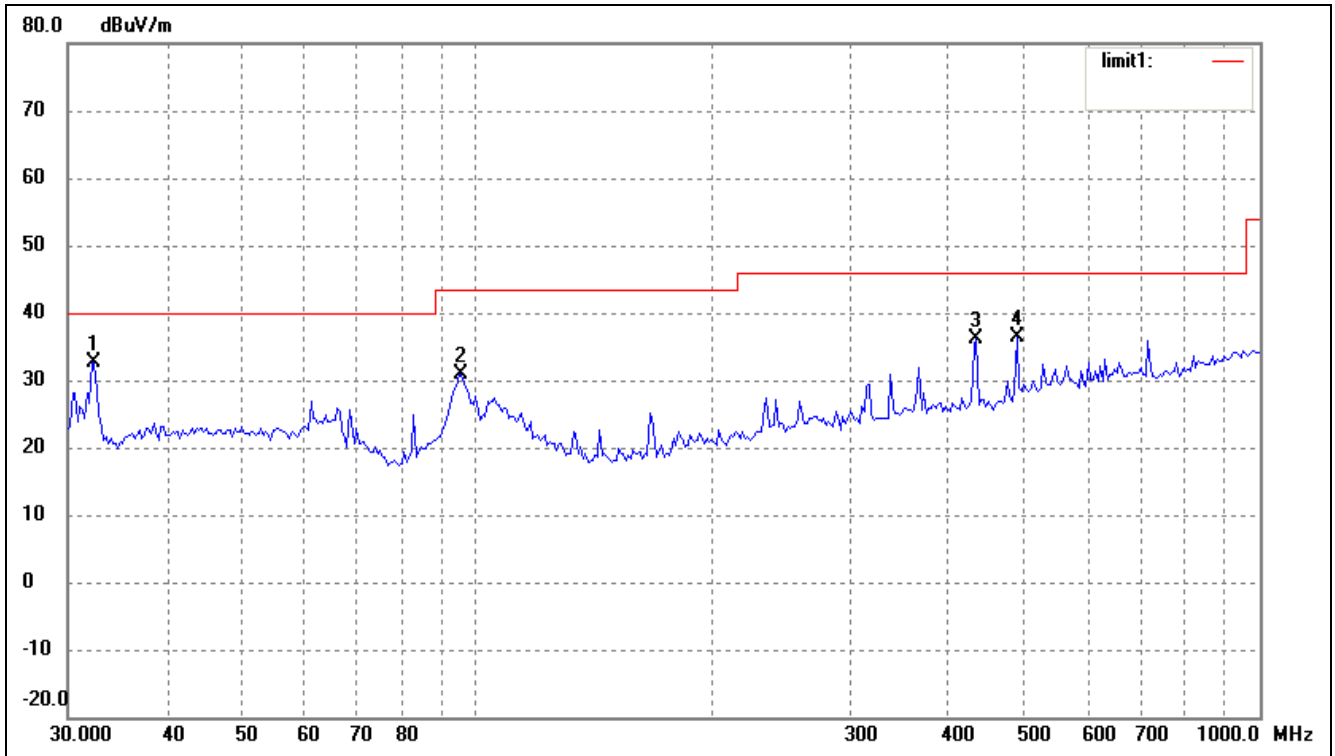
Test Mode: Transmitting-Low channel

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	96.7749	21.50	7.59	29.09	43.50	-14.41	320	100	peak
2	489.0269	25.47	11.65	37.12	46.00	-8.88	187	200	peak
3	719.1995	21.27	14.69	35.96	46.00	-10.04	46	100	peak

Vertical

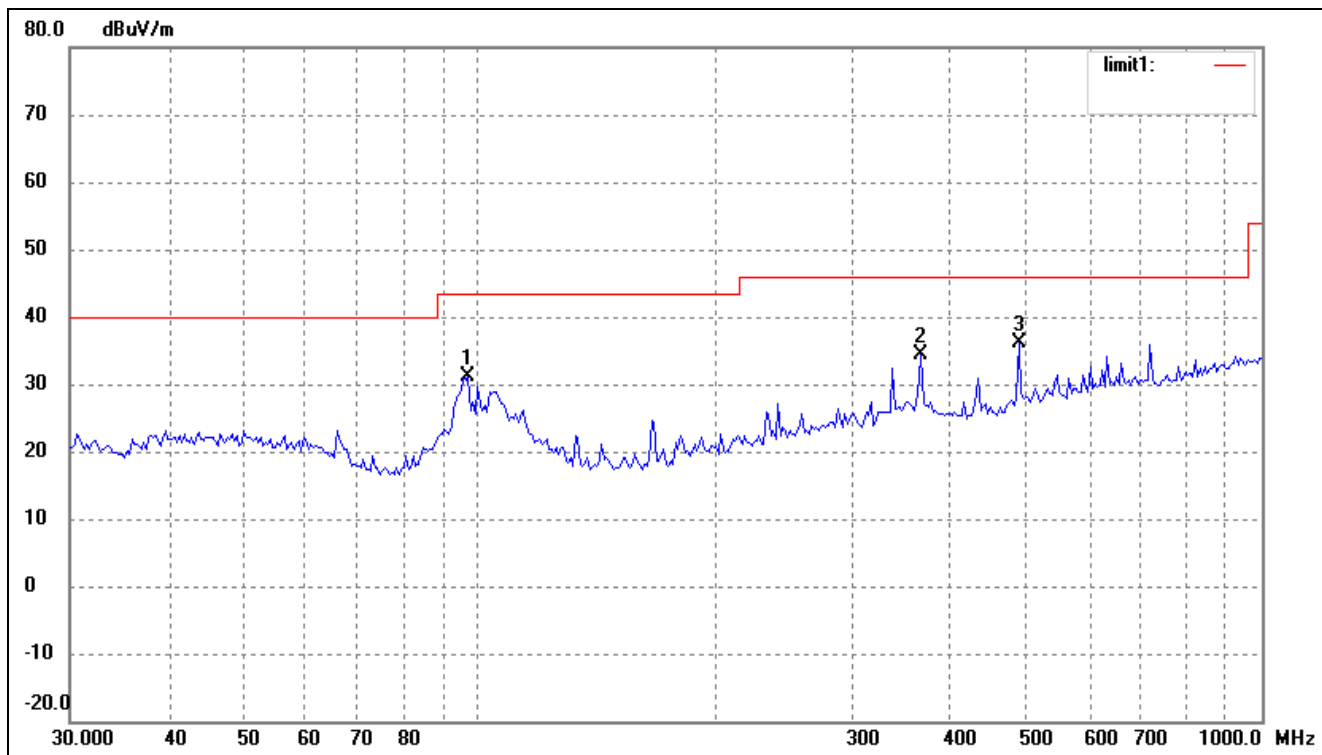


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	32.4059	26.03	6.62	32.65	40.00	-7.35	171	100	peak
2	95.4270	23.41	7.50	30.91	43.50	-12.59	249	100	peak
3	434.0651	25.63	10.56	36.19	46.00	-9.81	110	100	peak
4	489.0269	24.46	11.88	36.34	46.00	-9.66	300	200	peak

From 30 MHz to 1 GHz

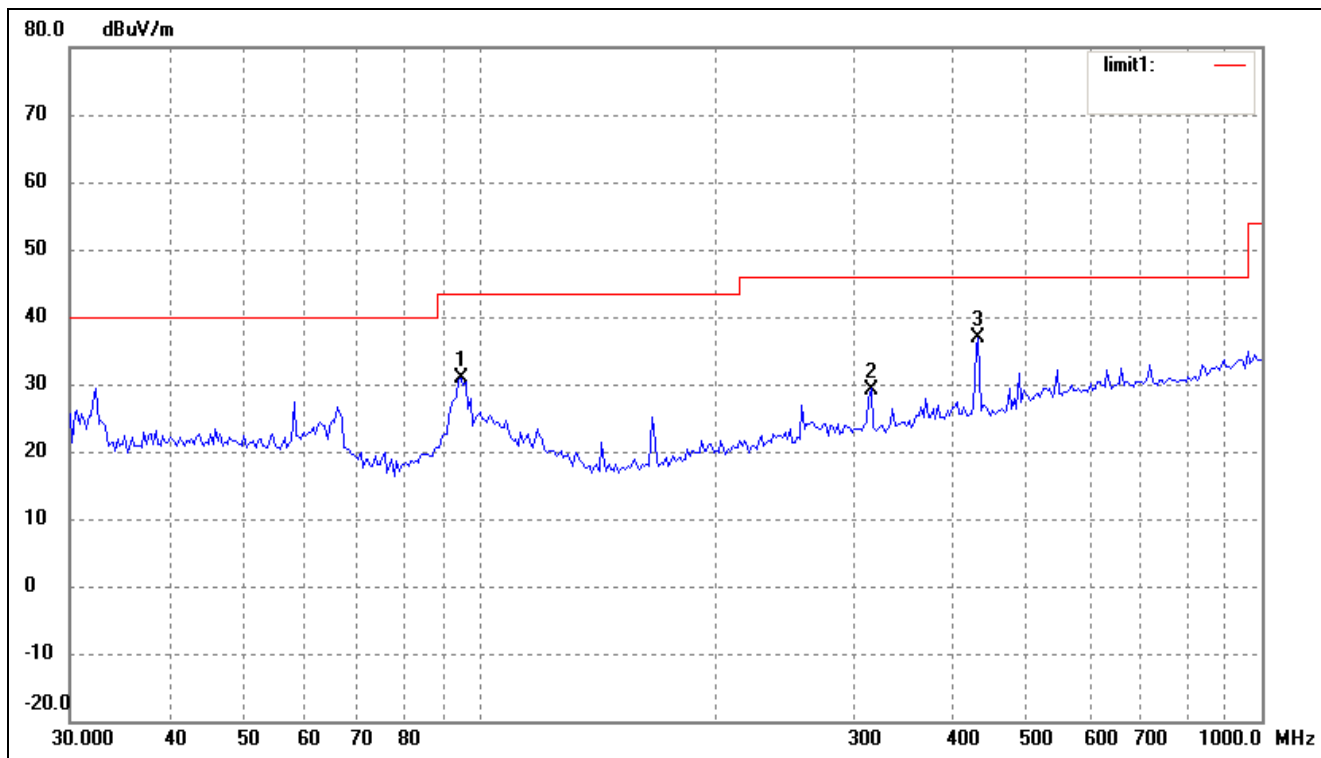
Test Mode: Transmitting-Middle channel

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	96.7749	23.50	7.59	31.09	43.50	-12.41	136	100	peak
2	366.8231	24.55	9.74	34.29	46.00	-11.71	210	200	peak
3	489.0269	24.47	11.65	36.12	46.00	-9.88	94	100	peak

Vertical

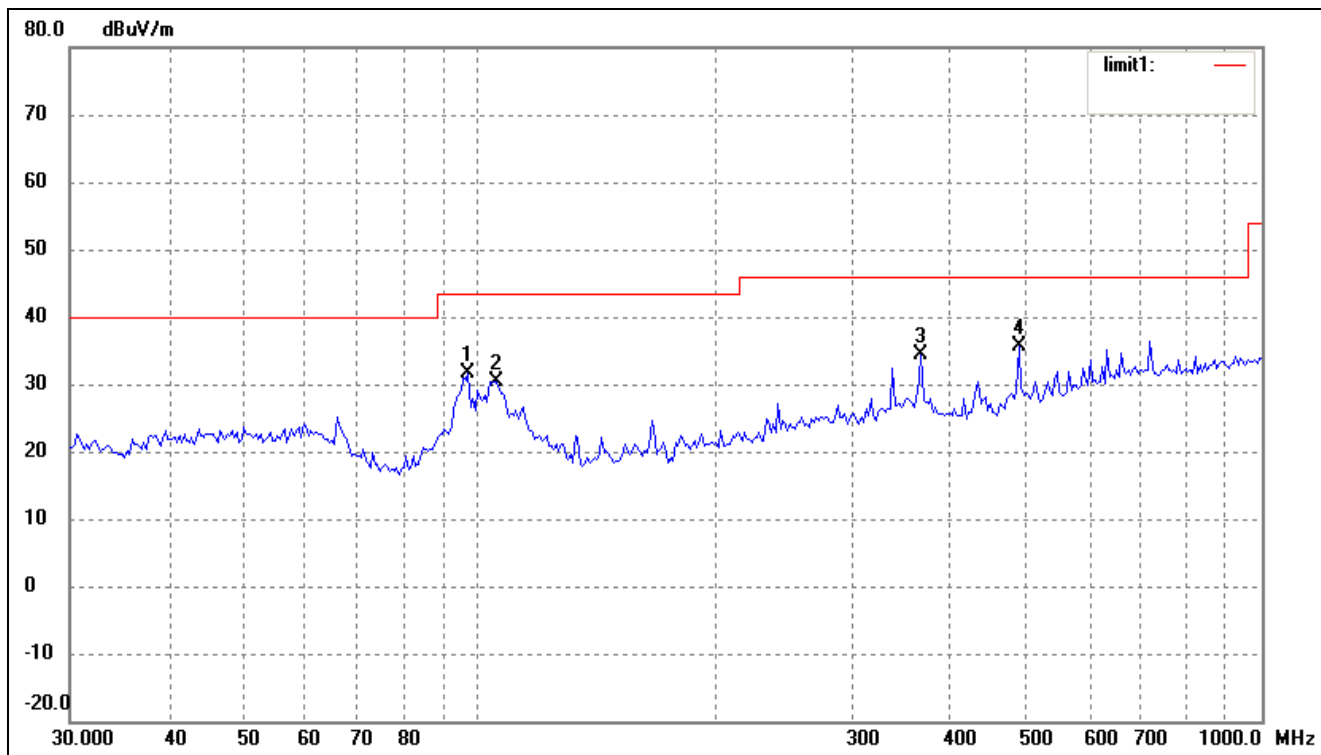


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	94.7601	23.35	7.42	30.77	43.50	-12.73	137	100	peak
2	316.5890	20.45	8.80	29.25	46.00	-16.75	224	100	peak
3	434.0651	26.25	10.56	36.81	46.00	-9.19	100	100	peak

From 30 MHz to 1 GHz

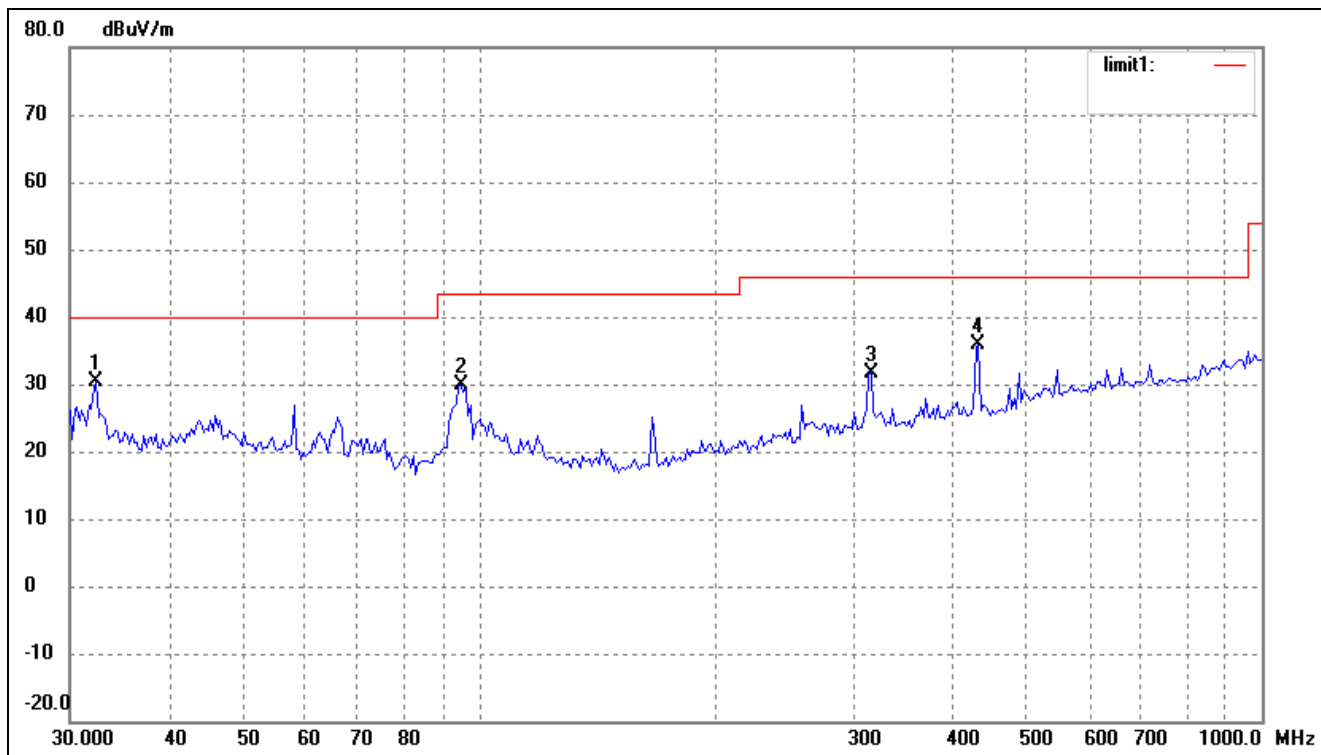
Test Mode: Transmitting-High channel

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	96.7749	24.00	7.59	31.59	43.50	-11.91	212	100	peak
2	105.2718	23.14	7.35	30.49	43.50	-13.01	110	100	peak
3	366.8231	24.55	9.74	34.29	46.00	-11.71	167	200	peak
4	489.0269	23.97	11.65	35.62	46.00	-10.38	52	200	peak

Vertical



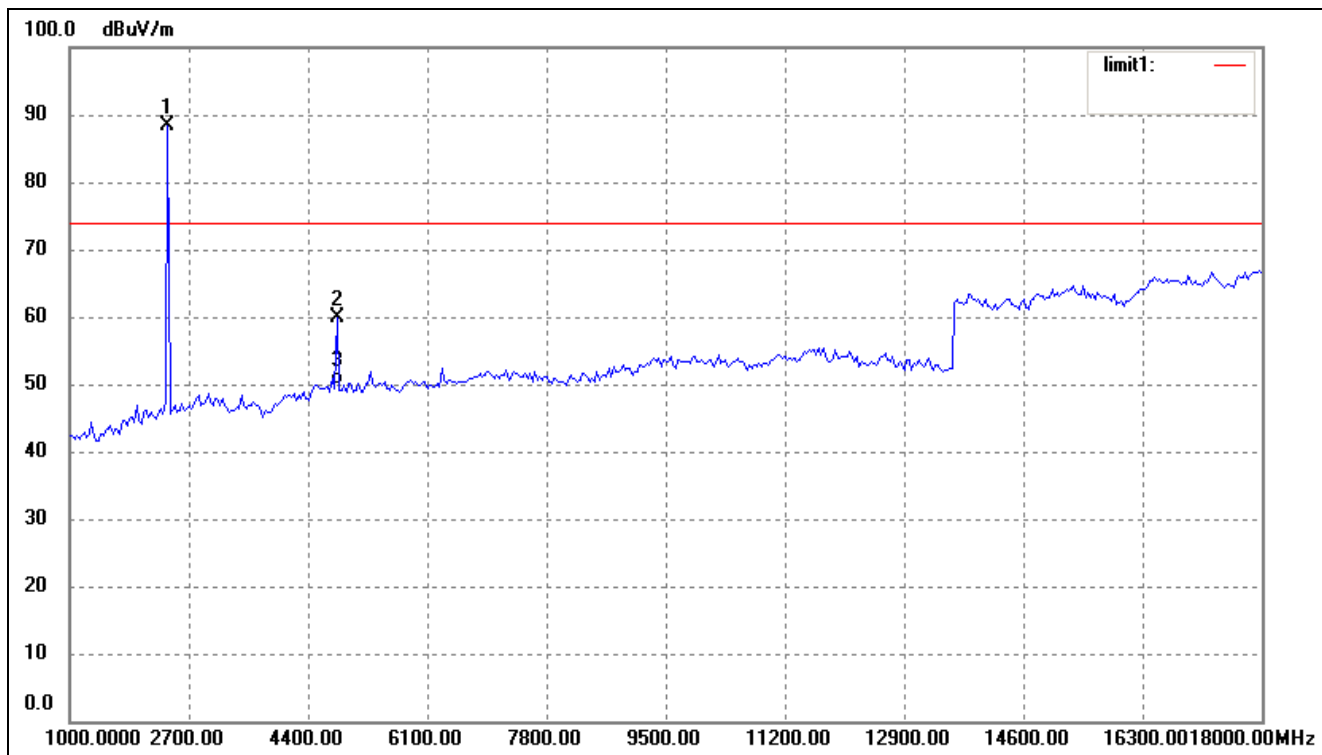
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	32.4059	23.84	6.62	30.46	40.00	-9.54	264	100	peak
2	94.7601	22.35	7.42	29.77	43.50	-13.73	109	200	peak
3	316.5890	22.95	8.80	31.75	46.00	-14.25	107	200	peak
4	434.0651	25.25	10.56	35.81	46.00	-10.19	227	100	peak



Above 1 GHz

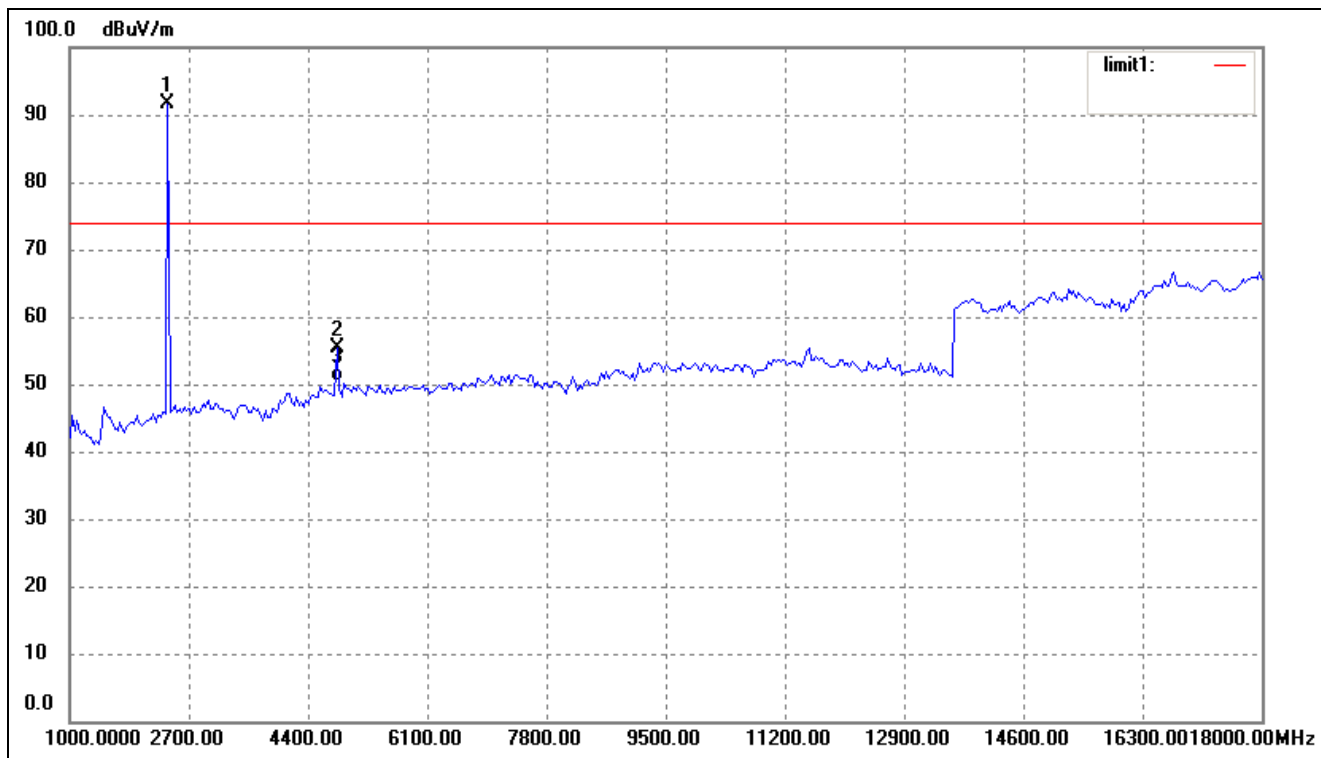
Test Mode: Transmitting-Low channel

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	2402.000	92.92	-4.53	88.39	/	/	176	100	peak
2	4804.000	60.70	-0.81	59.89	74.00	-14.11	230	200	peak
3	4804.000	50.79	-0.81	49.98	54.00	-4.02	230	200	AVG

Vertical

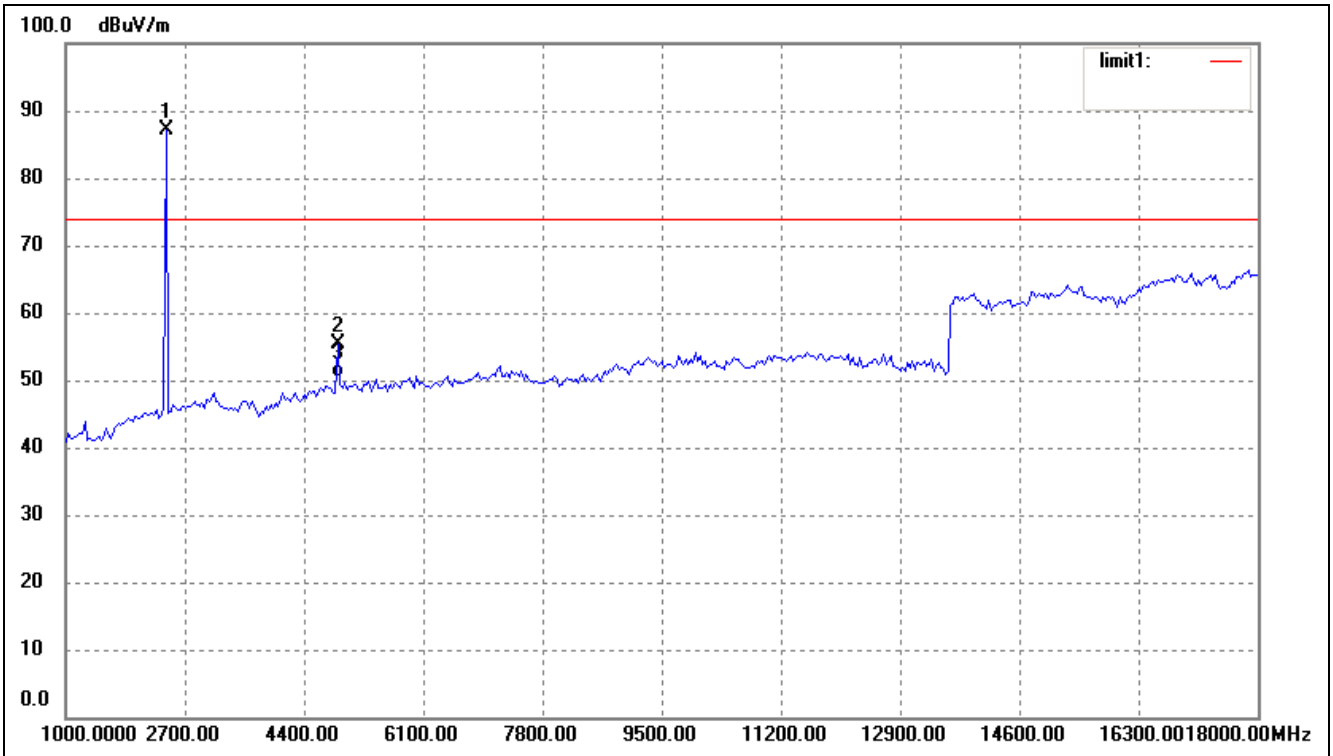


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	2402.000	96.21	-4.53	91.68	/	/	167	100	peak
2	4804.000	56.29	-0.81	55.48	74.00	-18.52	222	200	peak
3	4804.000	51.23	-0.81	50.42	54.00	-3.58	222	200	AVG

Above 1 GHz

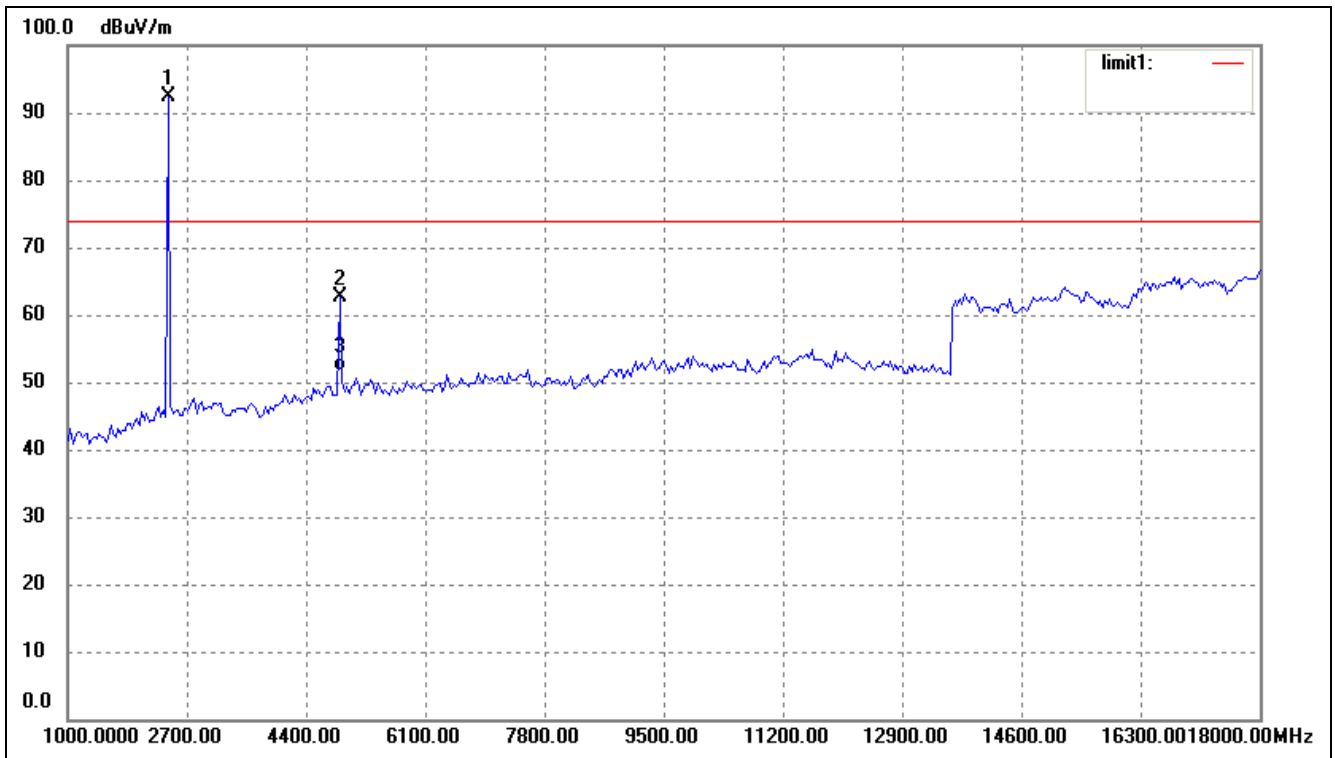
Test Mode: Transmitting-Middle channel

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	2441.000	91.69	-4.47	87.22	/	/	139	100	peak
2	4882.000	56.12	-0.69	55.43	74.00	-18.57	246	200	peak
3	4882.000	51.01	-0.69	50.32	54.00	-3.68	246	200	AVG

Vertical

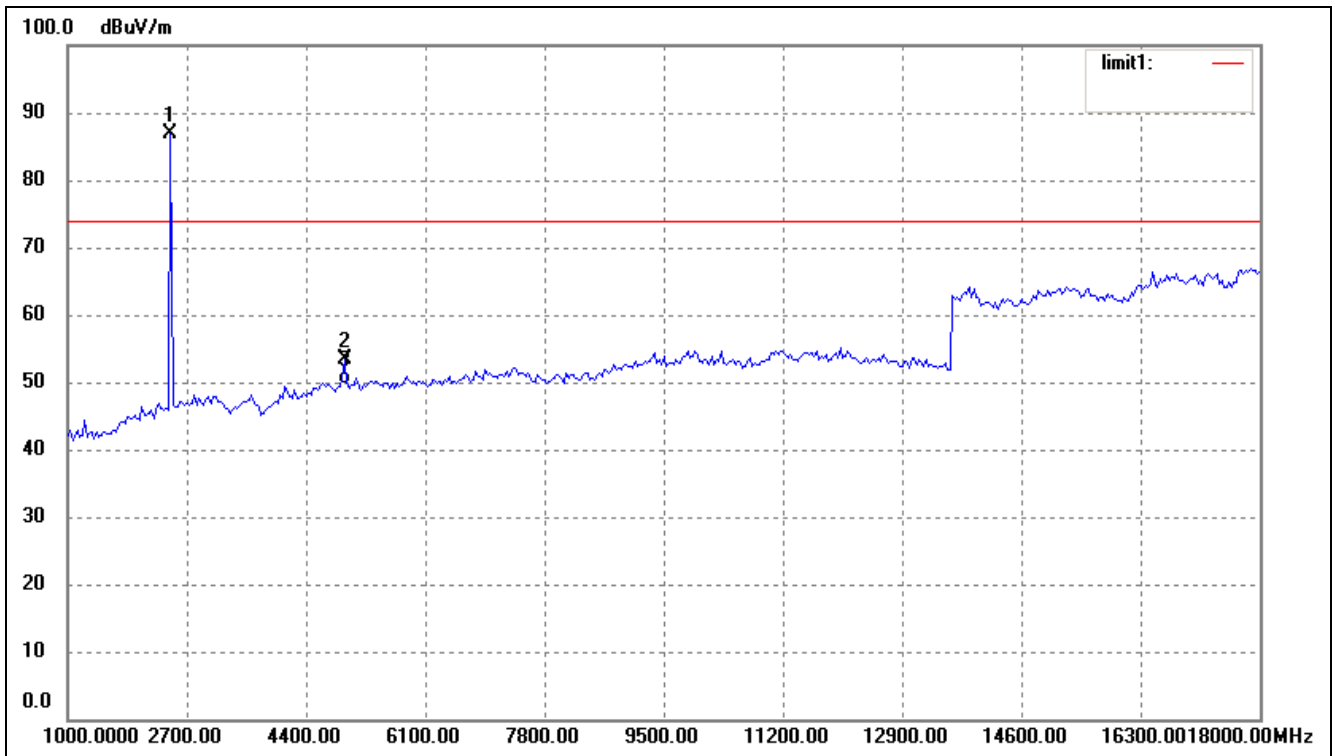


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	2441.000	96.86	-4.47	92.39	74.00	18.39	155	100	peak
2	4882.000	63.27	-0.69	62.58	74.00	-11.42	261	200	peak
3	4882.000	52.30	-0.69	51.61	54.00	-2.39	261	200	AVG

Above 1 GHz

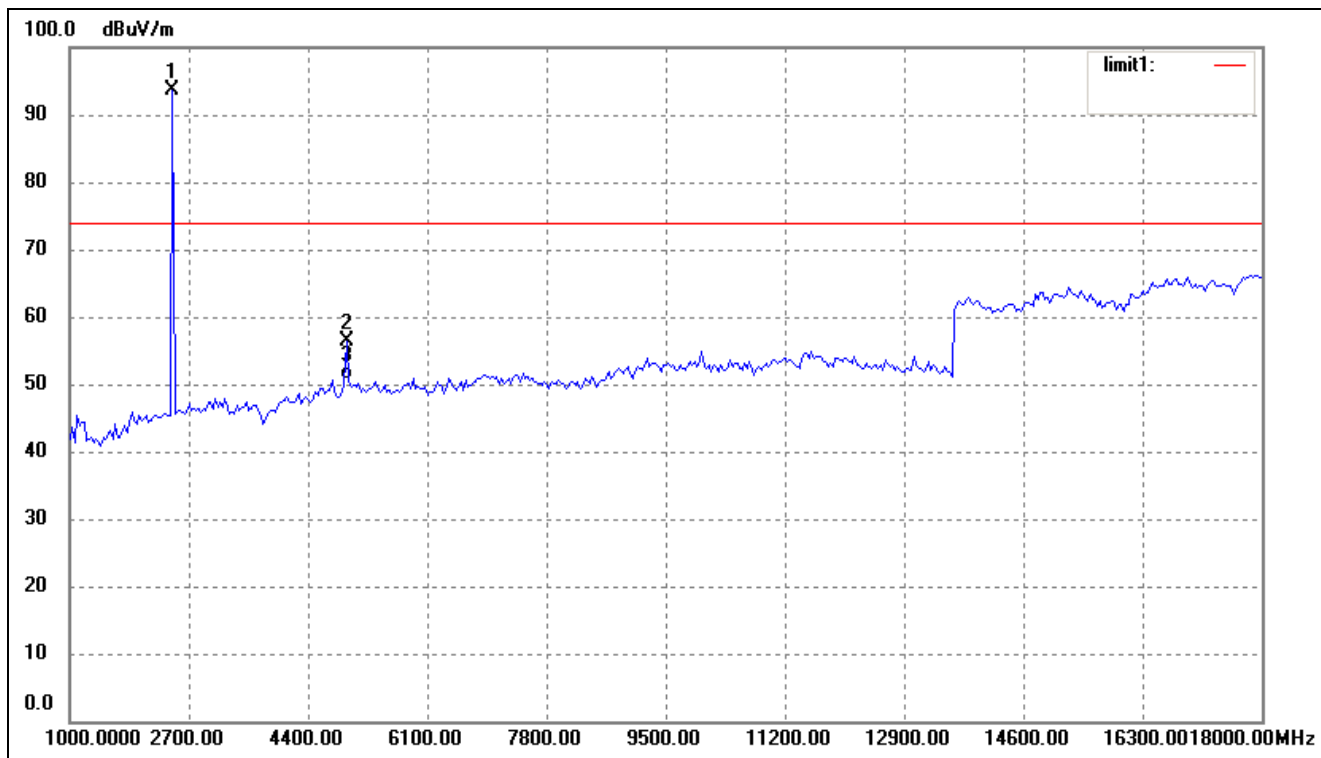
Test Mode: Transmitting-High channel

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	2480.000	91.29	-4.39	86.90	74.00	12.90	112	100	peak
2	4960.000	53.99	-0.58	53.41	74.00	-20.59	130	200	peak
3	4960.000	50.14	-0.58	49.56	54.00	-4.44	130	200	AVG

Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	2480.000	97.93	-4.39	93.54	74.00	19.54	132	200	peak
2	4960.000	56.86	-0.58	56.28	74.00	-17.72	253	200	peak
3	4960.000	51.32	-0.58	50.74	54.00	-3.26	253	200	AVG

## 10. OUT OF BAND EMISSIONS

### 10.1 Standard Applicable

According to §15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

### 10.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2010-04-16	2011-04-15
EMI Test Receiver	R&S	ESVB	825471/005	2010-08-12	2011-08-11
Positioning Controller	C&C	CC-C-1F	N/A	2010-08-12	2011-08-11
RF Switch	EM	EMSW18	SW060023	2010-08-12	2011-08-11
Pre-amplifier	Agilent	8447F	3113A06717	2010-08-12	2011-08-11
Pre-amplifier	Compliance Direction	PAP-0118	24002	2010-08-12	2011-08-11
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2010-07-21	2011-07-20
Horn Antenna	ETS	3117	00086197	2010-07-21	2011-07-20

**Statement of Traceability:** All calibrations have been performed per the NVLAP requirements traceable to the NIST.

### 10.3 Test Procedure

As the radiation test, set the Lowest and Highest Transmitting Channel, observed the outside band of 2400MHz to 2438.5MHz, than mark the higher-level emission for comparing with the FCC rules.

The test receiver was set with the following configurations:

For peak detector:

RBW = 1000kHz, VBW = 3000kHz, Sweep Time = Auto

For average detector:

RBW = 1000kHz, VBW = 10Hz, Sweep Time = Auto

## 10.4 Environmental Conditions

Temperature:	23°C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

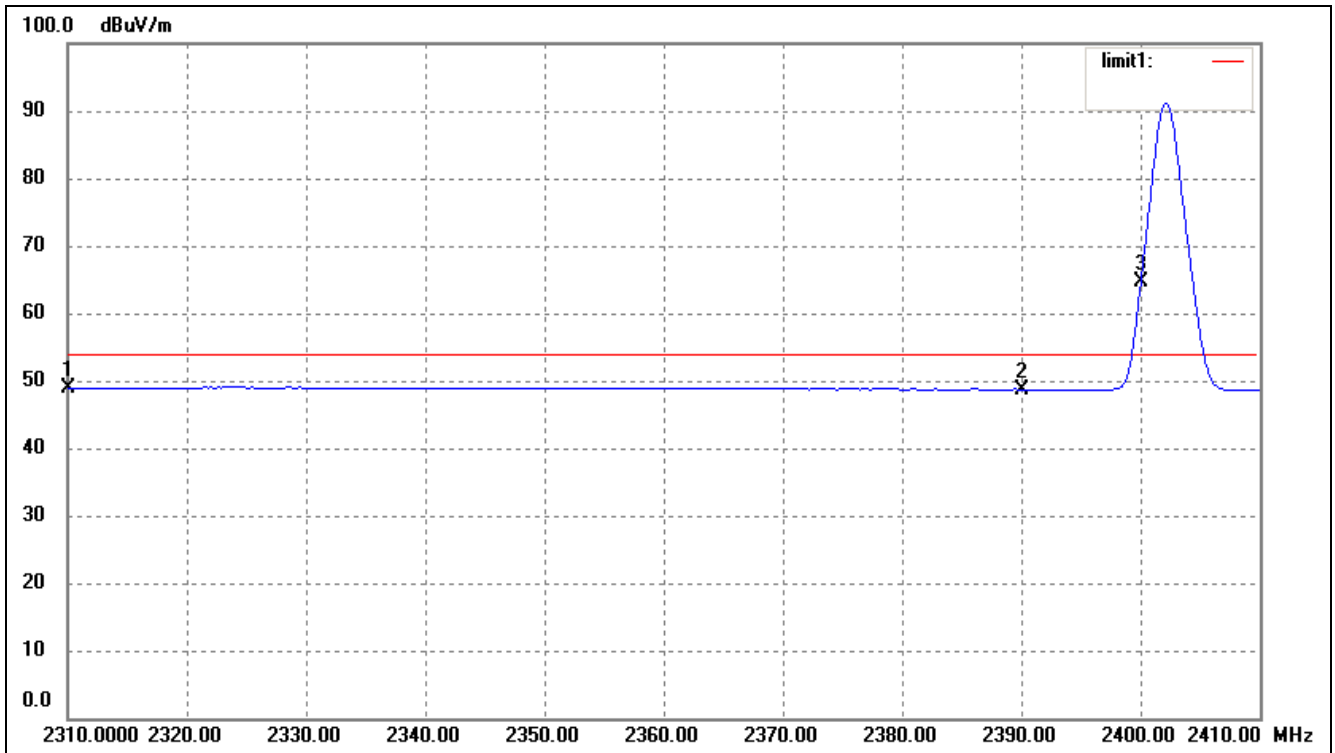
## 10.5 Summary of Test Results/Plots

Test mode	Frequency	Limit	Result
	MHz	dBuV /dB	
Lowest	2390.00	<54dBuv	Pass
	2400.00	>20dB ATT	Pass
Highest	2483.50	<54dBuv	Pass

The edge emissions are below the FCC 15.209 Limits. Please refer to the test plots below.

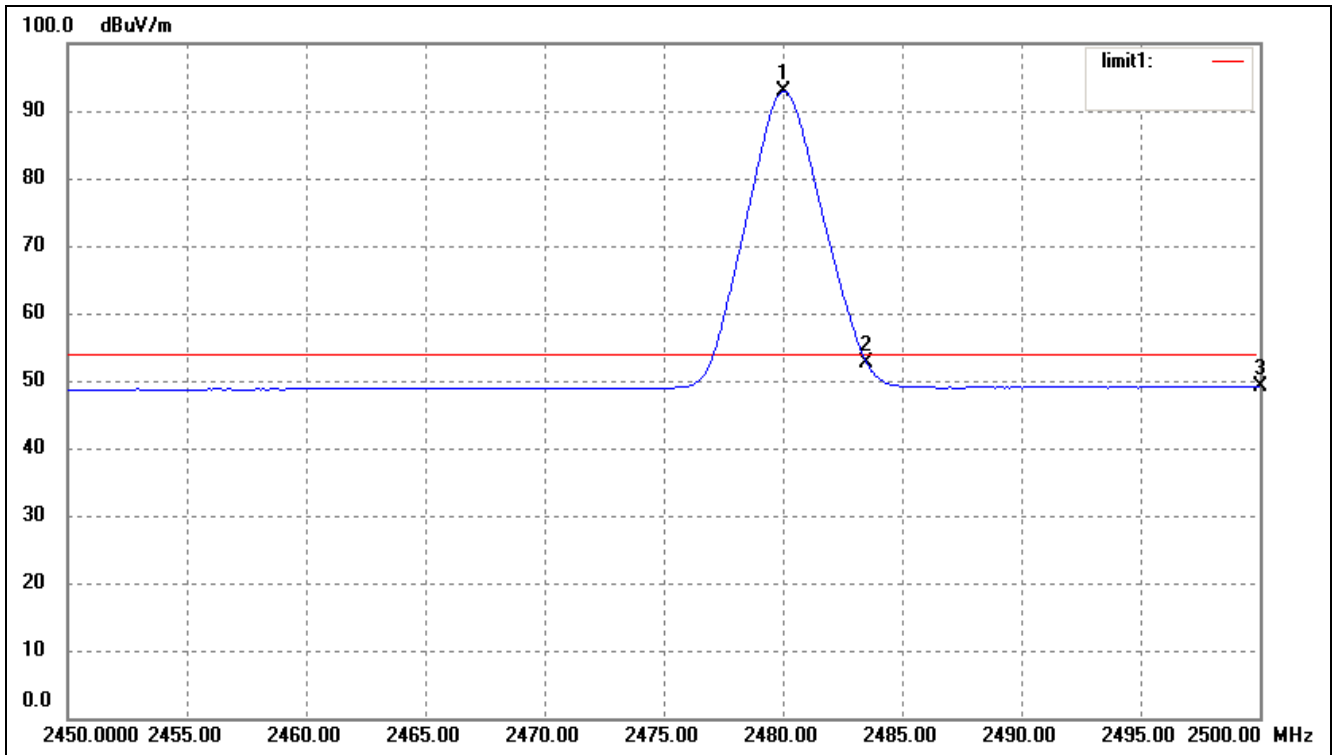


Lowest Bandedge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	12.43	36.49	48.92	54.00	-5.08	Average Detector
	2310.000	21.38	36.49	57.87	74.00	-16.13	Peak Detector
2	2390.000	12.03	36.67	48.70	54.00	-5.30	Average Detector
	2390.000	20.95	36.67	57.62	74.00	-16.38	Peak Detector
3	2400.000	27.98	36.69	64.67	54.00	10.67	Average Detector
4	2402.000	54.33	36.69	91.02	54.00	37.02	Average Detector

Highest Bandedge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2480.000	55.94	36.88	92.82	54.00	38.82	Average Detector
2	2483.500	15.75	36.88	52.63	54.00	-1.37	Average Detector
	2483.500	25.44	36.88	62.32	74.00	-11.68	Peak Detector
3	2500.000	12.12	36.93	49.05	54.00	-4.95	Average Detector
	2500.000	24.17	36.93	61.10	74.00	-12.90	Peak Detector

\*\*\*\*\* END OF REPORT \*\*\*\*\*