



**Radio Intentional EMC Test Report: EDCS - 705498**

**For**  
**CP-7925G-A-K9 2.4GHz Bluetooth Module**  
**Against the following Specifications :**  
**47 CFR 15.247**  
**RSS-210**  
**RSS-102**

**Cisco Systems**  
EMC Laboratory  
170 West Tasman Drive  
San Jose, CA 95134

**Author:** Phillip Carranco  
**Approved By:** Craig Mullis  
**Title:** Regulatory Compliance Manager

This report replaces any previously entered test report under EDCS -705498



This test report has been electronically authorized and archived using the CISCO Engineering Document Control system.

<b>SECTION 1: OVERVIEW .....</b>	<b>3</b>
TEST SUMMARY.....	3
2.3 REPORT ISSUE DATE .....	5
2.4 TESTING FACILITIES .....	5
2.6 EUT DESCRIPTION.....	6
2.7 SCOPE OF ASSESSMENT.....	6
2.8 UNITS OF MEASUREMENT .....	6
2.9 REPORT TEMPLATE CONTROL NO.....	6
EDCS#: 703456 .....	6
<b>SECTION 3: RESULT SUMMARY.....</b>	<b>7</b>
3.1 RESULTS SUMMARY TABLE .....	7
<b>SECTION 4: SAMPLE DETAILS.....</b>	<b>8</b>
4.1 SAMPLE DETAILS .....	8
4.2 SYSTEM DETAILS .....	8
4.3 MODE OF OPERATION DETAILS.....	8
<b>SECTION 5: MODIFICATIONS .....</b>	<b>8</b>
5.1 SAMPLE MODIFICATIONS PERFORMED DURING ASSESSMENT .....	8
<b>APPENDIX A: FORMAL TEST RESULTS.....</b>	<b>9</b>
20dB BANDWIDTH .....	9
PEAK OUTPUT POWER .....	11
CARRIER FREQUENCY SEPERATION .....	12
NUMBER OF HOPPING FREQUENCIES .....	14
AVERAGE TIME OF OCCUPANCY.....	15
CONDUCTED SPURIOUS EMISSIONS .....	19
CONDUCTED BAND EDGE MEASUREMENTS .....	23
RADIATED SPURIOUS AND HARMONICS EMISSIONS .....	26
PHYSICAL TEST ARRANGEMENT PHOTOS:.....	36
<b>APPENDIX B: ABBREVIATION KEY AND DEFINITIONS.....</b>	<b>38</b>
<b>APPENDIX C: TEST EQUIPMENT USED TO PERFORM THE TEST .....</b>	<b>39</b>
<b>APPENDIX D: TEST PROCEDURES .....</b>	<b>39</b>

---

## **Section 1: Overview**

### **Test Summary**

**The samples were assessed against the tests detailed in section 3 under the requirements of the following standards:**

#### **Emissions:**

CFR47 Part 15.247

RSS-210

RSS102

#### **Notes:**

- 1) Measurements were made in accordance with FCC docket #:DA 02-2138, ET docket 96-8, KDB Publication No. 558074& measurement method of spurious emission tolerance to the International Telecommunication Union (ITU) Recommendation SM329.

---

Section 2: Assessment Information

2.1 General

**This report must not be used to claim product certification, approval, or endorsement by A2LA, NIST, or any agency of the federal Government.**

With regard to this assessment, the following points should be noted:

- a) The results contained in this report relate only to the items tested and were obtained in the period between the date of the initial assessment and the date of issue of the report. Manufactured products will not necessarily give identical results, due to production tolerances and measurement uncertainties.
- b) The apparatus was set up and exercised using the configuration and modes of operation defined in this report only.
- c) Where relevant, the apparatus was only assessed using the susceptibility criteria defined in this report and the Test Assessment Plan (TAP).
- d) All testing was performed under the following environmental conditions:
  - Temperature 15°C to 35°C (54°F to 95°F)
  - Atmospheric Pressure 860mbar to 1060mbar (25.4" to 31.3")
  - Humidity 10% to 75\*%
- e) All AC testing was performed at one or more of the following supply voltages:
  - 110V (+/-10%) 60Hz
  - 220V (+/-10%) 50 or 60Hz
- f) Cisco Systems, Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). The scope of accreditation, certificate number 1178-01 is referenced in appendix C, along with further details.

**This report must not be reproduced except in full, without written approval of Cisco Systems, Inc.**

## 2.2 Start Date of Testing

10-Sep-2008

## 2.3 Report Issue Date

Cisco Systems, Inc. uses an electronic system to issue, store and control the revision of test reports. This system is called the Engineering Document Control System (EDCS). The actual report issue date is embedded into the original file on EDCS. Any copies of this report, either electronic or paper, that are not on EDCS must be considered uncontrolled

## 2.4 Testing facilities

This assessment was performed by:

### Testing Laboratory

Cisco Systems, Inc.,  
170 West Tasman Drive  
San Jose, CA 95134,  
USA

#### Registration Numbers for Industry Canada

Cisco System Site	Site Identifier
Building P, 10m Chamber	Company #: 4624-2
Building P, 5m Chamber	Company #: 4624-1
Building N, 5m Chamber	Company #: 6111
Building I, 5m Chamber	Company #: 6112

### Test Engineers

Phillip Carranco

## 2.5 Equipment Assessed (EUT)

CP-7925G-A-K9

## 2.6 EUT Description

. The CP-7925G- is the next generation Wireless IP Phone that will be more rugged and more resistant to dust, alcohol-based wipes, and liquid splashes, repeated drops and shocks therefore targeting the following markets: Retail, Warehouse, Distribution Centers, Manufacturing, Healthcare. It will also support Bluetooth as an optional interface for wireless headset.

The CP-7925G- will comprise of the MuRata LBEE1W9GVC module with support for TNET1253 for wlan and BRF6300 for Bluetooth support. The MuRata module will interface to the TNETV1700 host processor via SDIO interface, and it has 2 antenna interfaces, one for 2.4 GHz for both Bluetooth and 802.11b/g support, and an additional antenna for 5 GHz for 802.11a support.

## 2.7 Scope of Assessment

Tests have been performed in accordance with the relevant Test and Assessment Plan (TAP), a copy of which is contained in Appendix F of this report, and the relevant Cisco Systems, Inc. radio test procedures (EDCS-420238 ). This test report may not cover all of the tests highlighted in the test plan.

## 2.8 Units of Measurement

The units of measurements defined in the appendices are reported in specific terms, which are test dependent. Where radiated measurements are concerned these are defined at a particular distance. Basic voltage measurements are defined in units of [dBuV]

As an example, the basic calculation for all measurements is as follows:

$$\text{Emission level [dBuV]} = \text{Indicated voltage level [dBuV]} + \text{Cable Loss [dB]} + \text{Other correction factors [dB]}$$

The combinations of correction factors are dependent upon the exact test configurations [see test equipment lists for further details] and may include:-

Antenna Factors, Pre Amplifier Gain, LISN Loss, Pulse Limiter Loss and Filter Insertion Loss..

Note: to convert the results from dBuV/m to uV/m use the following formula:-

$$\text{Level in uV/m} = \text{Common Antilogarithm } [(X \text{ dBuV/m})/20] = Y \text{ uV/m}$$

## 2.9 Report Template Control No.

EDCS#: 703456

## Section 3: Result Summary

### 3.1 Results Summary Table

#### Conducted emissions

Basic Standard	Test Details / Comments	Result
Peak Output Power	15.247: The maximum conducted output power of the intentional radiator for systems using digital modulation in the 2400-2483.5MHz band shall not exceed 1 Watt (30dBm). If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. (RSS-210 A8.4)	Pass
20dB Bandwidth	15.247: Systems using digital modulation techniques may operate in the 5725-5850MHz band. The minimum 6 dB bandwidth shall be at least 500 kHz. (RSS-210 A8.2)	Pass
Conducted Spurious Emissions	15.247: In any 100 kHz bandwidth outside the frequency band in which the digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.( RSS-210 A8.5)	Pass
Restricted Bandedge Measurements	Conducted emissions which fall in the restricted bands, as defined in Sec. 15.205(a), must also comply with the radiated emission limits specified in Sec. 15.209(a). (RSS-210 Sec2.7)	Pass

#### Radiated emissions

Basic Standard	Test Details / Comments	Result
Radiated Spurious and Harmonic Emissions	Radiated emissions which fall in the restricted bands, as defined in Sec. 15.205(a), must also comply with the radiated emission limits specified in Sec. 15.209(a). (RSS-210 Sec2.7)	Pass

\* SAR measurements to reported in separate report

## Section 4: Sample Details

Note: Each sample was evaluated to ensure that its condition was suitable to be used as a test sample prior to the commencement of testing. During preliminary testing all three planes (X,Y & Z) were evaluated to determine "Worst Case". The data collected determine that the orientation used for this report was deemed "Worst Case".

### 4.1 Sample Details

Sample Number	Equipment Details	Serial Number	Part Number
S01	CP-7925G-A-K9	IAC1232A00M	74-5464-01

The following antennas were evaluated as part of this testing process. The antennas listed reflect the maximum gain allowed for each family type of antenna:

Fixed internal Antenna, Gain = 1.97dBi ( no external antenna can be used. )

### 4.2 System Details

System #	Description	Samples
1	Bluetooth Radio Test Sample	S01

### 4.3 Mode of Operation Details

Mode#	Description	Comments
1	Bluetooth Test Mode	System is connected to the MT8852B Bluetooth Tester and placed in a continuous Tx Mode with Hopping Turned ON or OFF per test requirements.

## Section 5: Modifications

### 5.1 Sample Modifications Performed During Assessment

No modifications were performed during assessment.



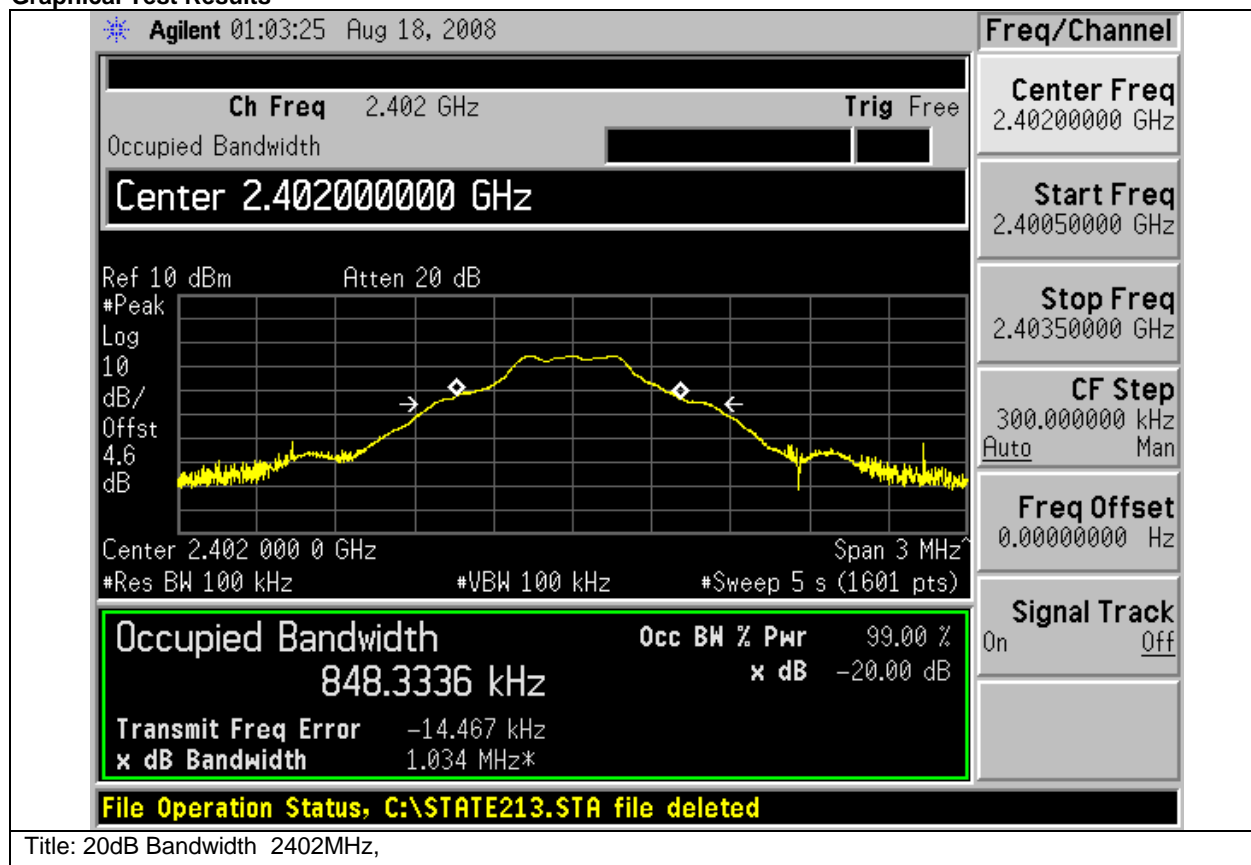
## Appendix A: Formal Test Results

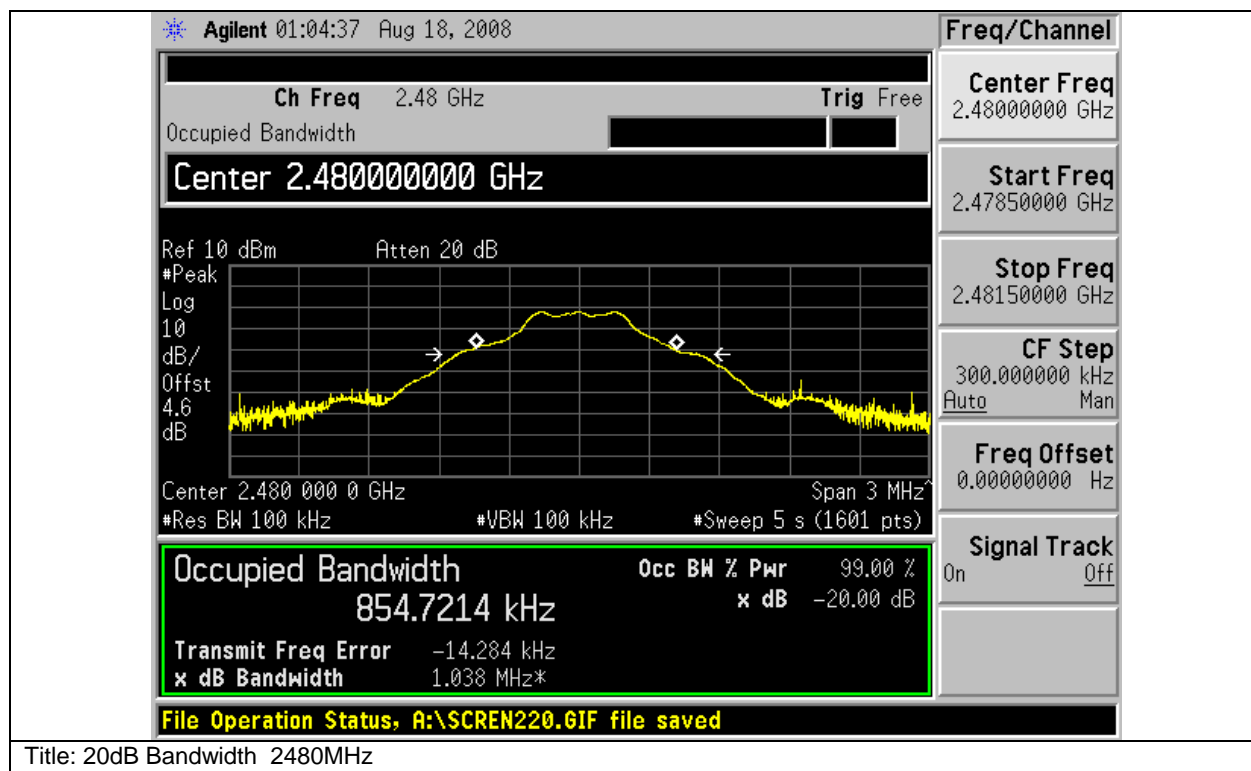
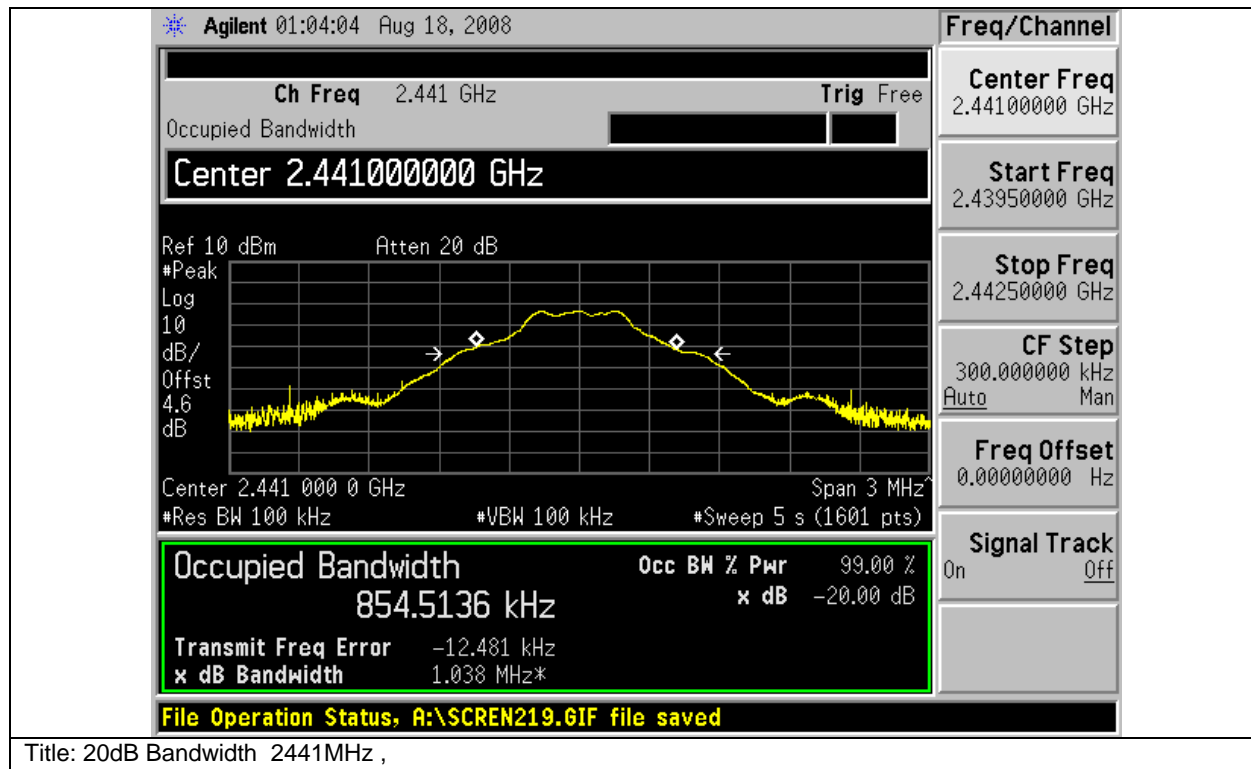
### 20dB Bandwidth

20dB bandwidth of a frequency hopping channel is the 2400-2483.5MHz with hopping stopped.

Frequency (MHz)	20dB Bandwidth (kHz)
2402	1034
2441	1038
2480	1038

### Graphical Test Results





## Peak Output Power

15.247 & RSS-210 A8.4:

The maximum conducted output power of the intentional radiator for systems using frequency hopping systems in the 2400-2483.5MHz band shall not exceed 1 Watt (30dBm). If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Frequency (MHz)	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
2402	0.62	30	-29.38
2441	0.54	30	-29.46
2480	-0.26	30	-30.26

## Anritsu BlueTest2 Test Report

Test Set Serial Number: 000830002  
EUT Bluetooth Address: 0017836221F6

Date: 9/9/2008  
Time: 9:07:24 AM

## Overall Result: PASS

*CP-7925G Serial Number: IAC123A00M*

### TRM/CA/01/C (Output Power)

Packet Length Tested: DH1

Hopping OFF	<u>Low</u>	<u>Med</u>	<u>High</u>	<u>Limits</u>
Average Power	0.54 dBm	0.48 dBm	-0.32 dBm	
Max Power	0.54 dBm	0.49 dBm	-0.32 dBm	< 21.00 dBm
Min Power	0.53 dBm	0.47 dBm	-0.33 dBm	> -6.00 dBm
Peak Power	0.62 dBm	0.54 dBm	-0.26 dBm	< 1.00 dBm
Total Packets Failed	0	0	0	
Total Packets Tested	100	100	100	
Result	Pass	Pass	Pass	

Measurement procedure as per KDB Publication No. 558074 power output option 1, peak power meter.

### Carrier Frequency Separation

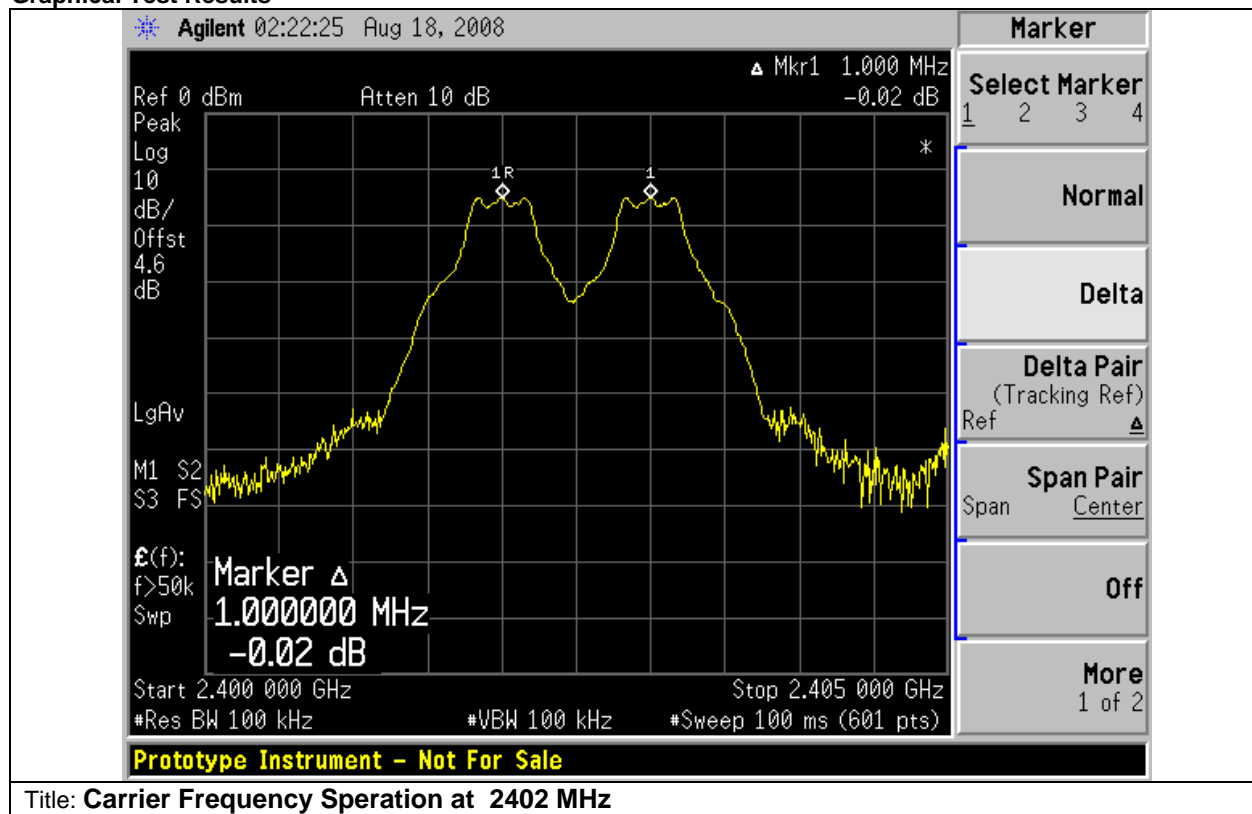
15.247 & RSS-210 A8.1:

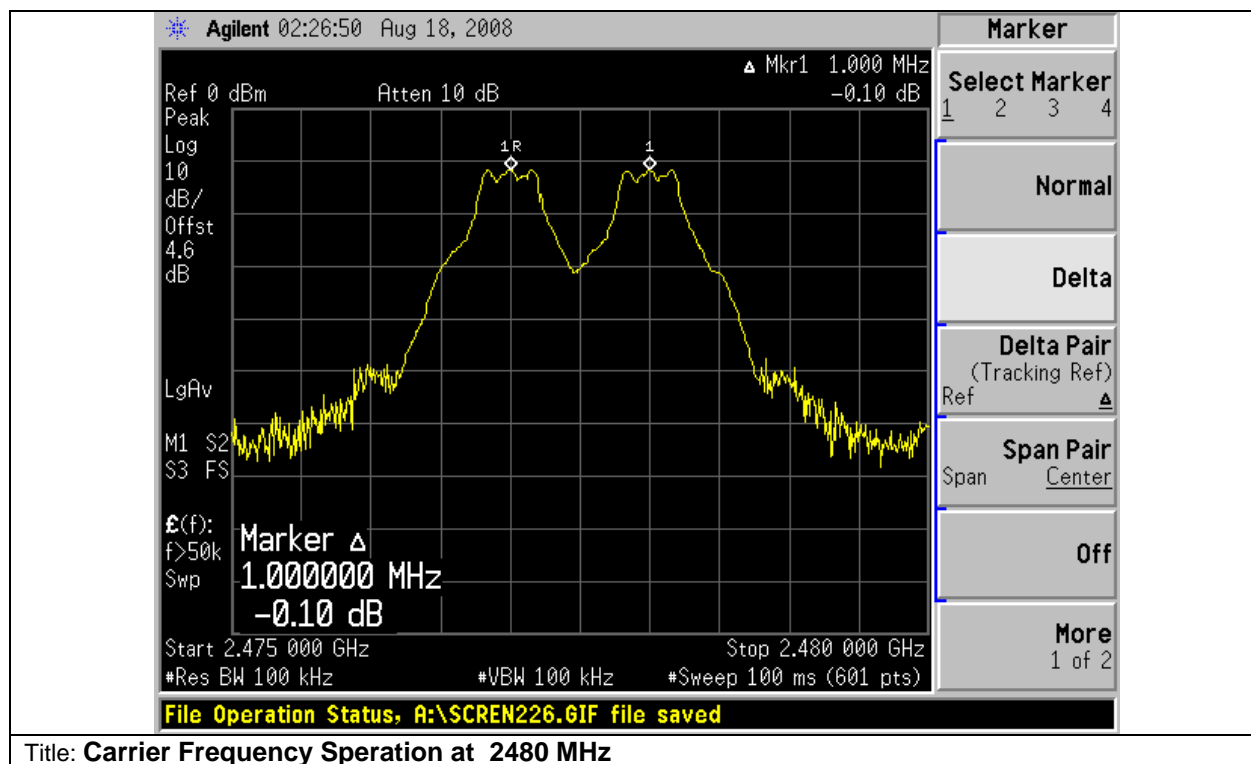
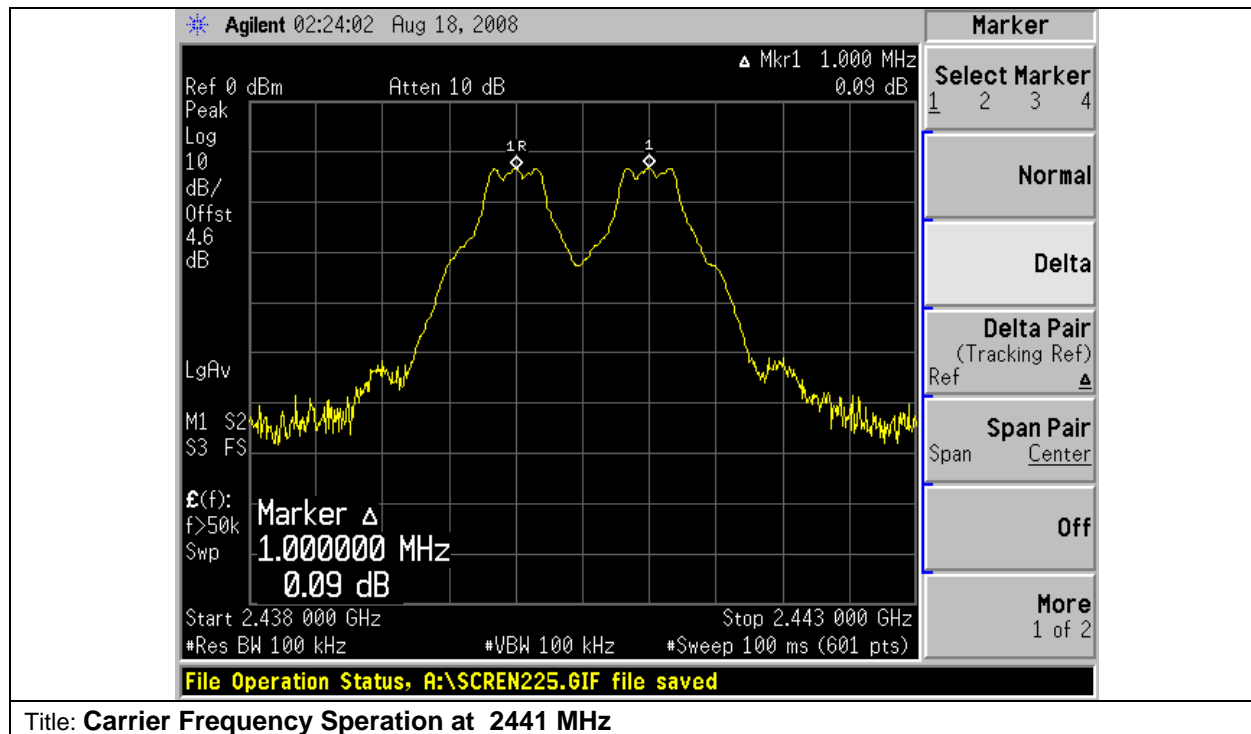
For frequency hopping systems operating in the 2400-2483.5MHz band may have hopping channel frequencies that are separated by 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater, provided the system operates with an output power no greater than 0.125W.

The smallest 20dB bandwidth for all channels is 1.034MHz. The minimum channel carrier frequencies separation is calculated as  $2/3(1034) = 689.3\text{kHz}$

Frequency (MHz)	Carrier Frequency Separation (kHz)	Limit (kHz)	Margin (kHz)
2402	1000.00	689.3	-310.70
2441	1000.00	689.3	-310.70
2480	1000.00	689.3	-310.70

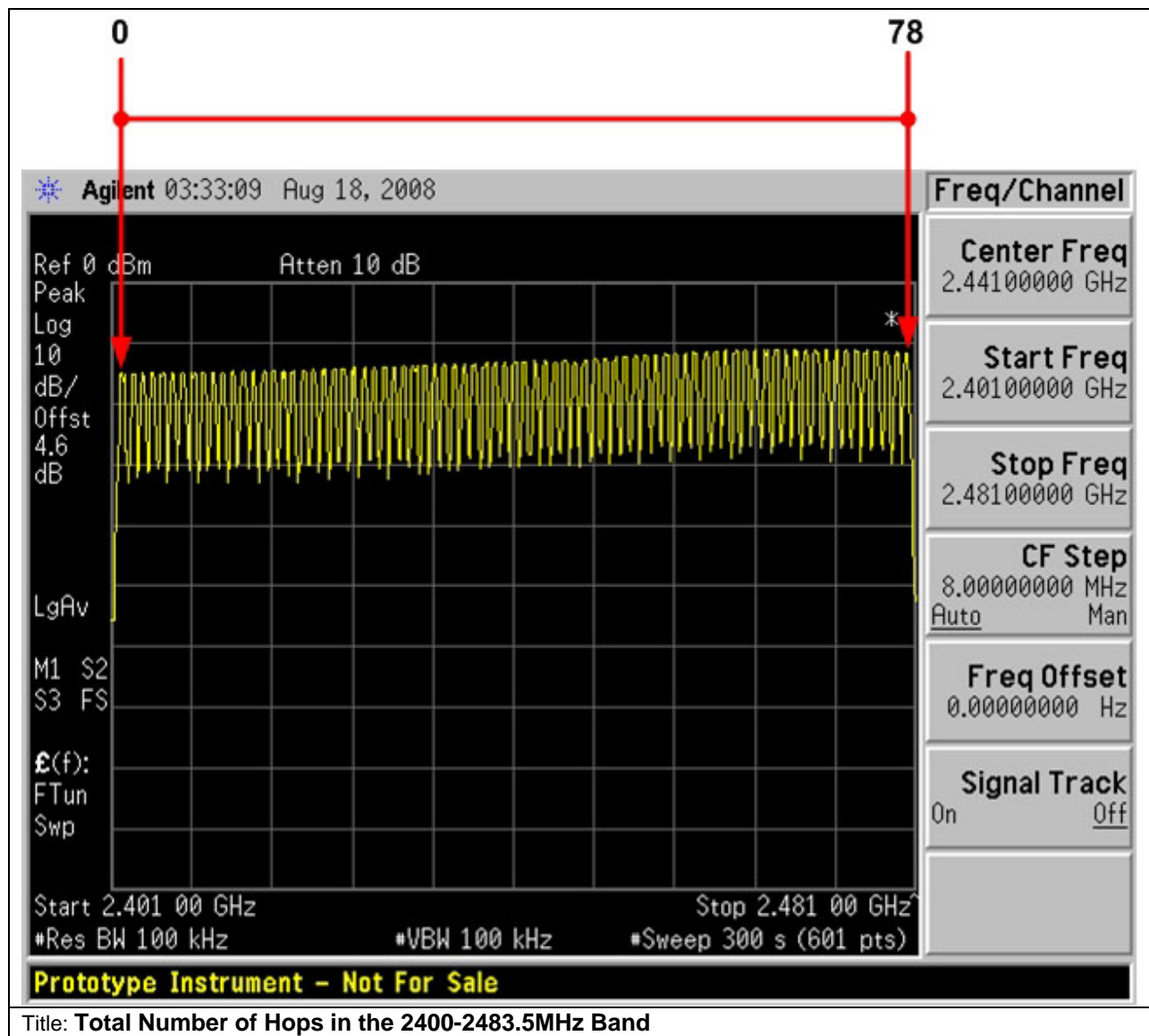
### Graphical Test Results





### Number of Hopping Frequencies

Total number of hopping frequencies is the 2400-2483.5MHz Band = 79 Channels



### Average Time of Occupancy

15.247 & RSS-210 A8.1:

Frequency hopping systems operating in the band 2400-2483.5MHz shall use at least 15 hopping 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.

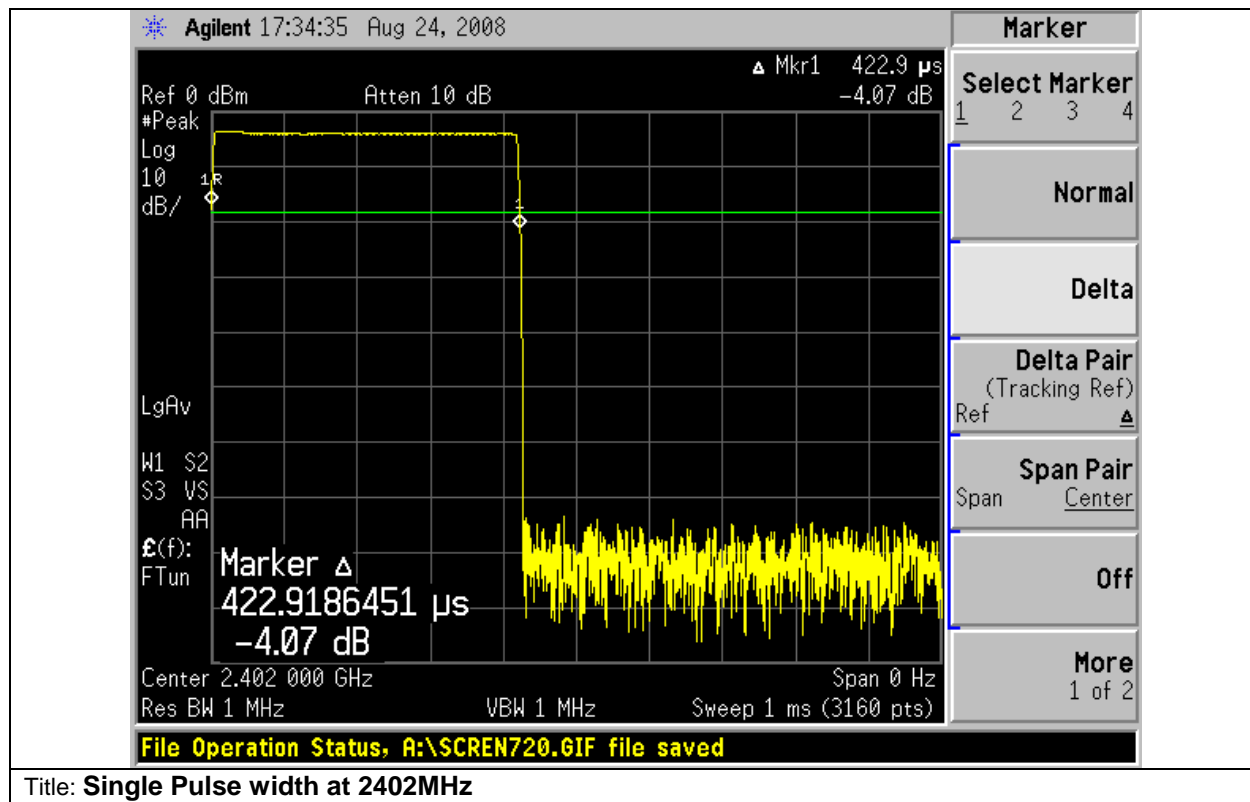
The total sweep time is  $0.4(79) = 31.6$  seconds.

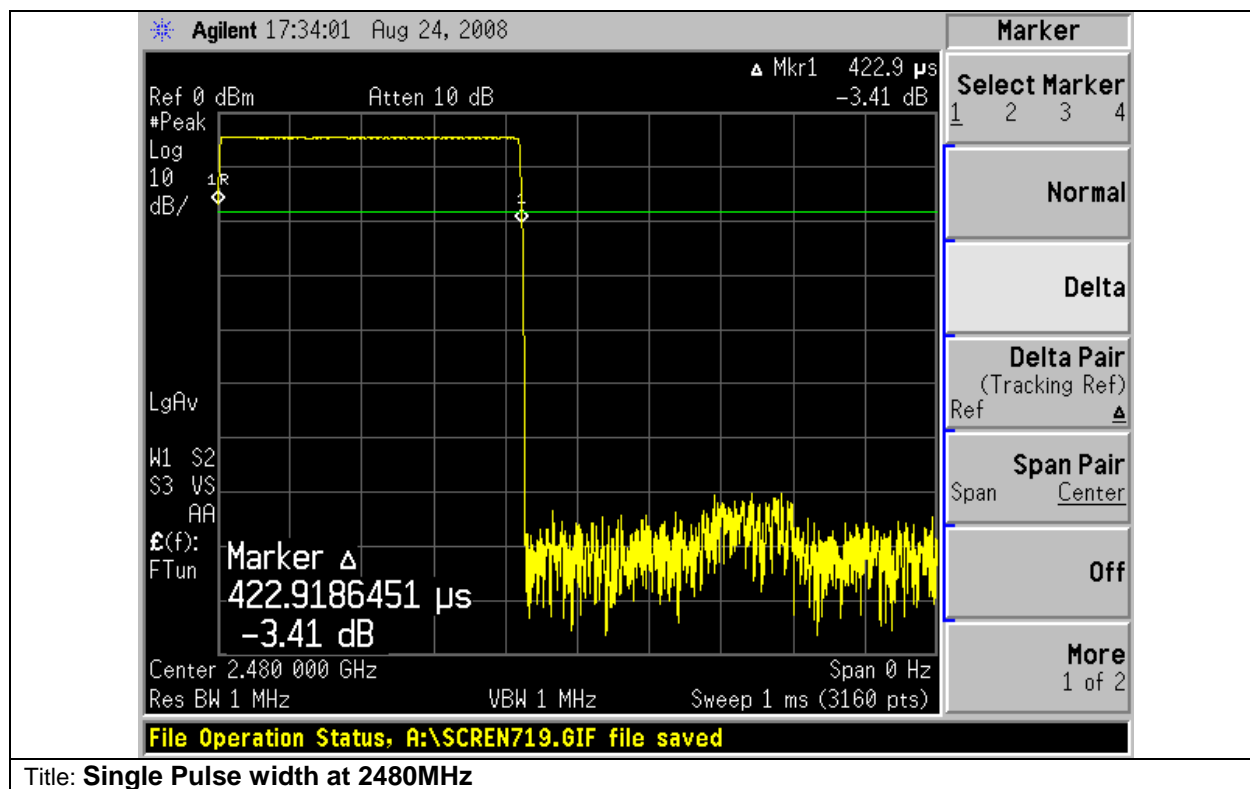
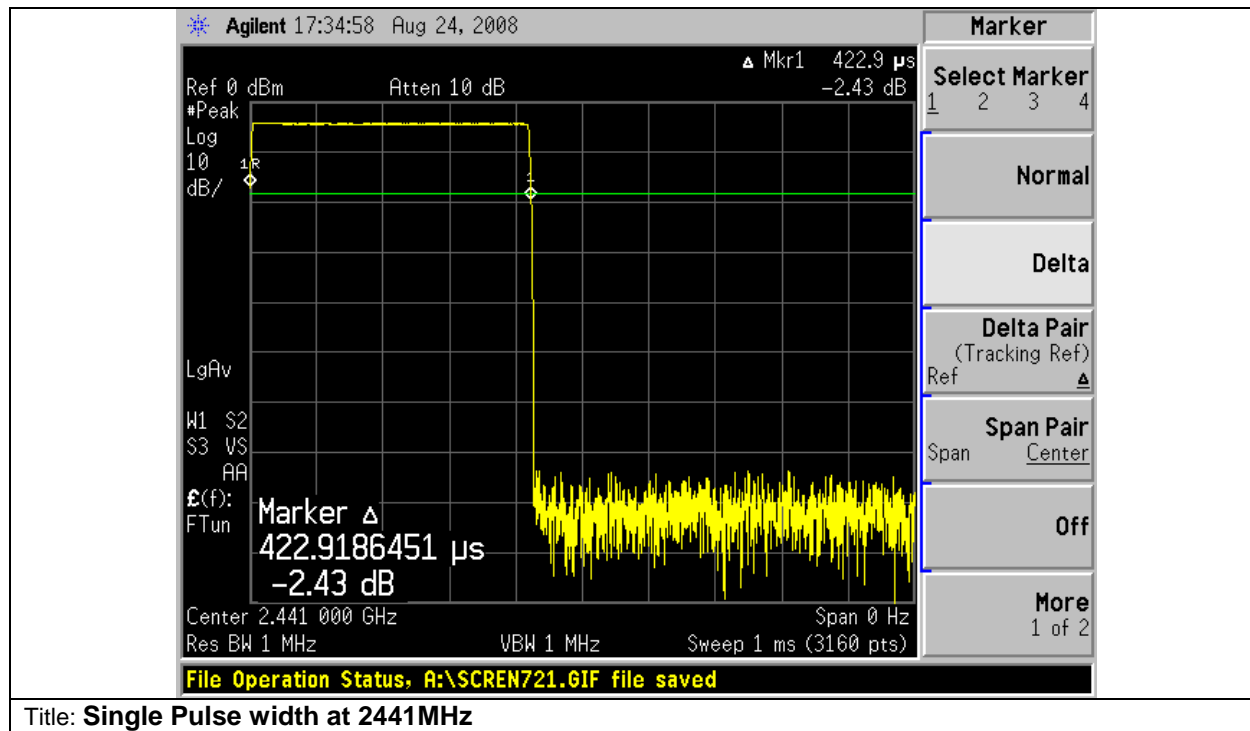
Due to the number of hops in the 31.6s sweep we determined to reduce the sweep time to 3.16s, count the number of hops and multiply by 10. The total number of hops will be multiplied by the measured time of one pulse.

Example: Number of Hops in 3.16s = 31. Total Number of Hops in 31.6s =  $31(10) = 310$

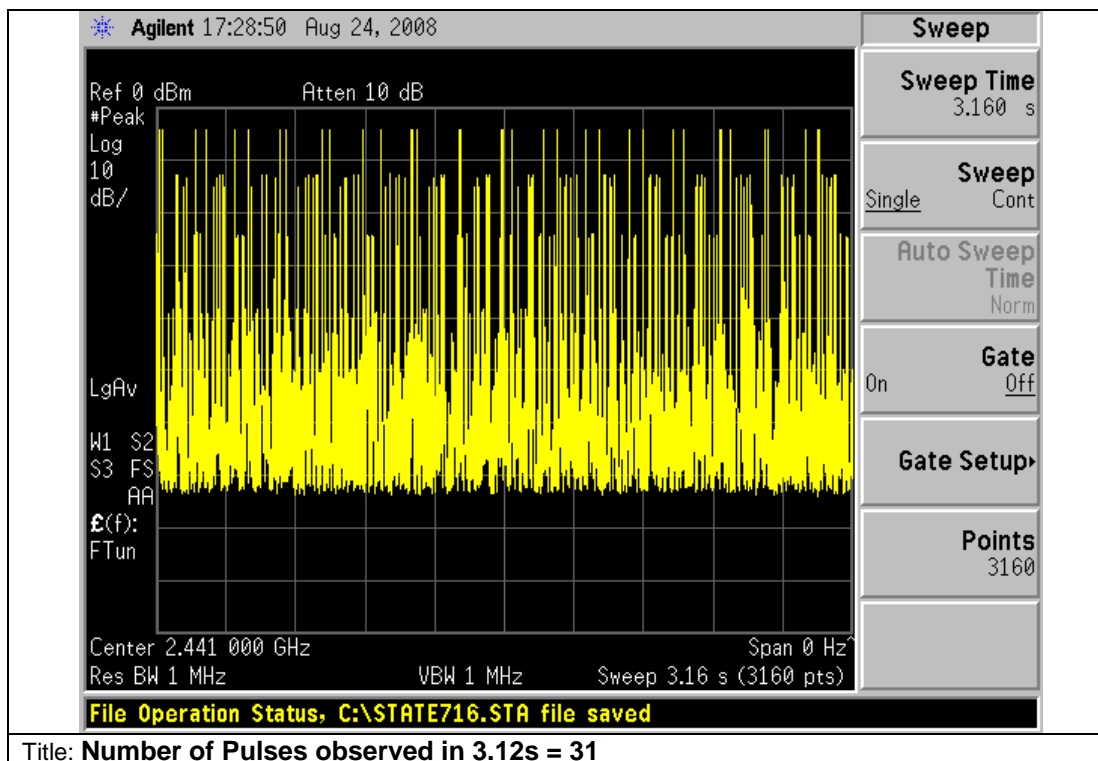
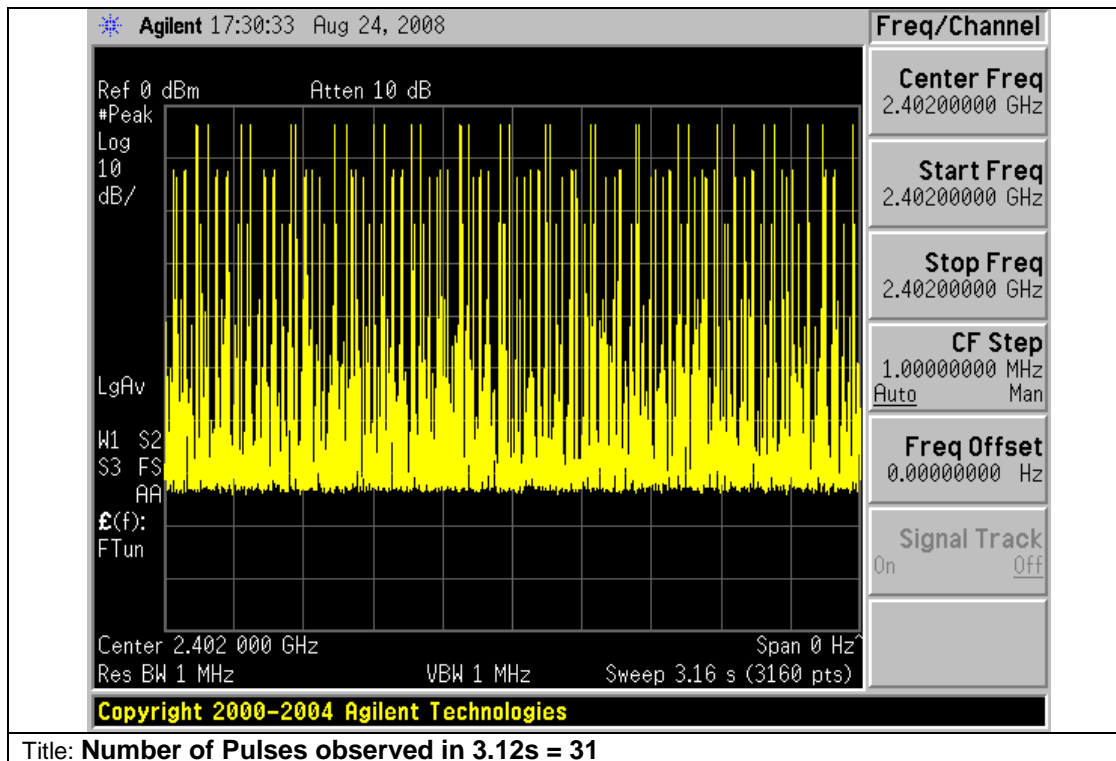
Single Pulse Width = 0.00042292s. Time of Occupancy =  $310(0.00042292) = 0.13$ s

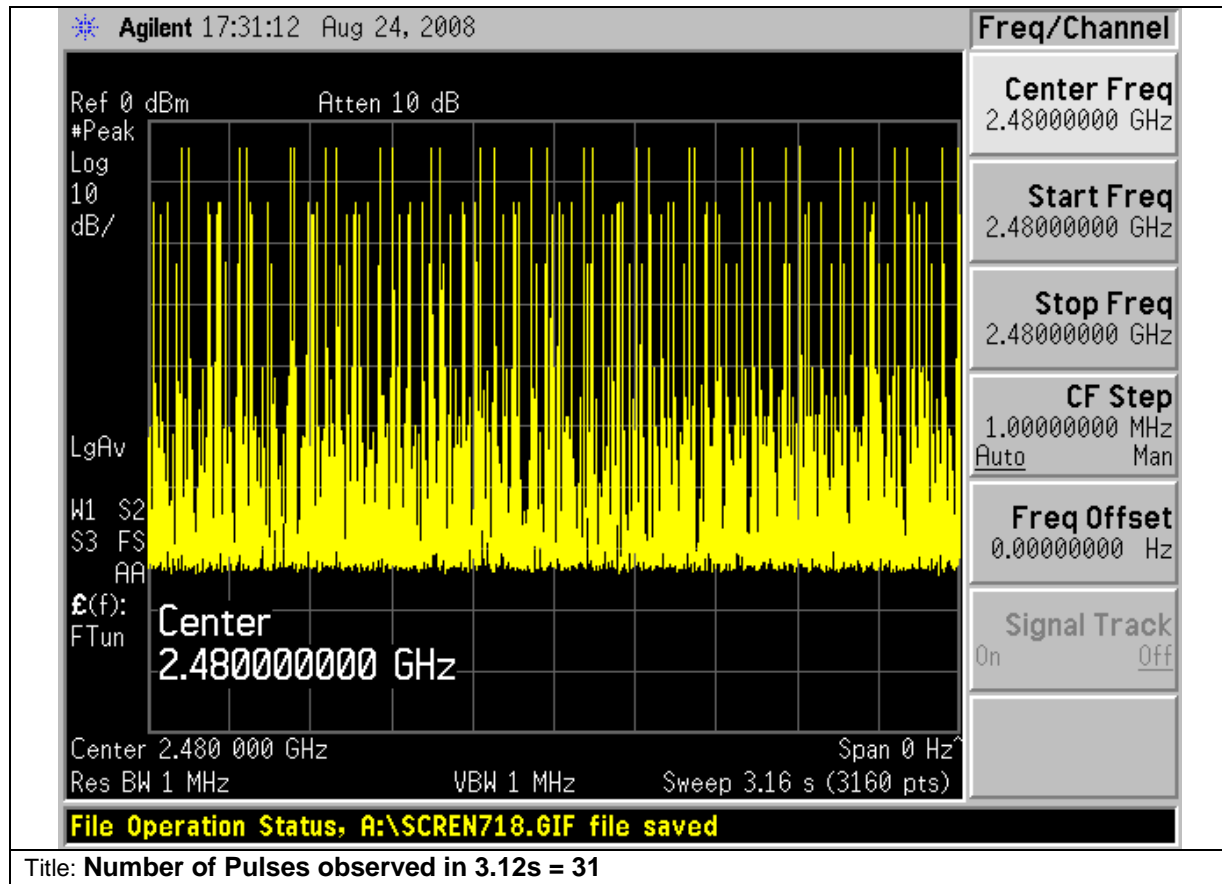
Frequency (MHz)	Time of Occupancy (sec)	Limit (sec)	Margin (sec)
2402	0.13	0.4	-0.27
2441	0.13	0.4	-0.27
2480	0.13	0.4	-0.27













## Conducted Spurious emissions

15.247 & RSS-210 A8.5:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum modulated device is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

## Test Results

<b>Test Number:</b> 33543 <b>Spec ID:</b> 652				
Basic Standard	Applied to	Class	Freq Range	Test Details / Comments
Conducted Spurious Emissions	RF Ports	N/A	30MHz - xGHz	Also complies with RSS 210, LP0002, HKTA1039
<b>Operating Mode</b>	<b>Mode :</b> 1, Bluetooth Test Mode			
<b>Power Input</b>	110, 60Hz (+/-20%)			
<b>Overall Result</b>	Pass			
<b>Comments</b>	No further comments			
<b>Deviation</b>	There were no deviations from the specification			

System Number	Description	Samples	System under test	Support equipment
1	Bluetooth Module Sample Tested	S01	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Subtest Number: 33543 - 1		Subtest Date: 30-Sep-2008	
Engineer	Phillip Carranco		
Lab Information	Building B, Shield Room		
Subtest Results			
Line Under Test	[A] Antenna Port		
Transducer	Direct		
Subtest Result	Pass		
Highest Frequency	40000.0		
Lowest Frequency	30.0		
Comments on the above Test Results	No further comments		
Environmental Conditions:			
Temperature: within range of 54 to 95 F:		Yes	
Humidity: between 10 and 75%:		Yes	
Comments:			
Equipment used:			



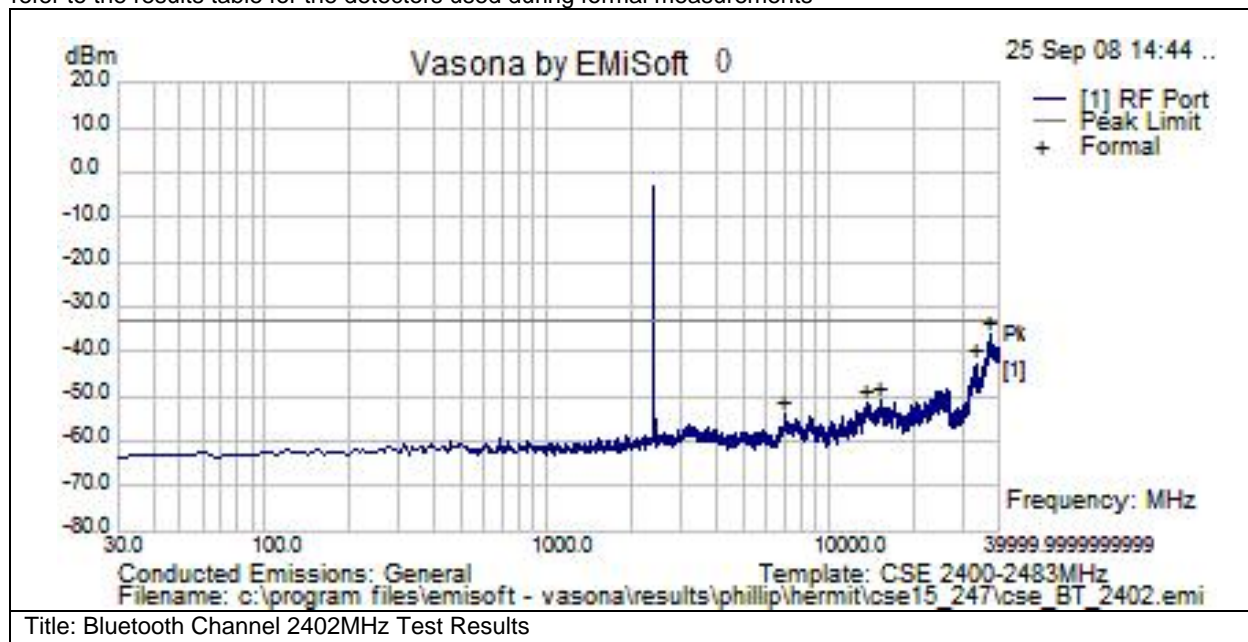
Equipment No	Manufacturer	Model	Description
CIS025716	HP	11500E	Radio testing cable 3.5mm
CIS025717	HP	11500E	Radio testing cable 3.5mm
CIS033988	Agilent	E4446A	PSA Spectrum Analyzer
CIS034974	Midwest Microwave	ATT-0640-20-29M-02	Attenuator, 20dB, DC-40GHz
CIS041986	Murata Electronics	MXGS83RK3000	Special Radio Test Adaptor Cable

**Confidence Check Details:**

Transducer	Direct
Confidence Check	Pass
Confidence Check Comments	No further Comments

**Graphical Test Results**

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



**Test Results Table**

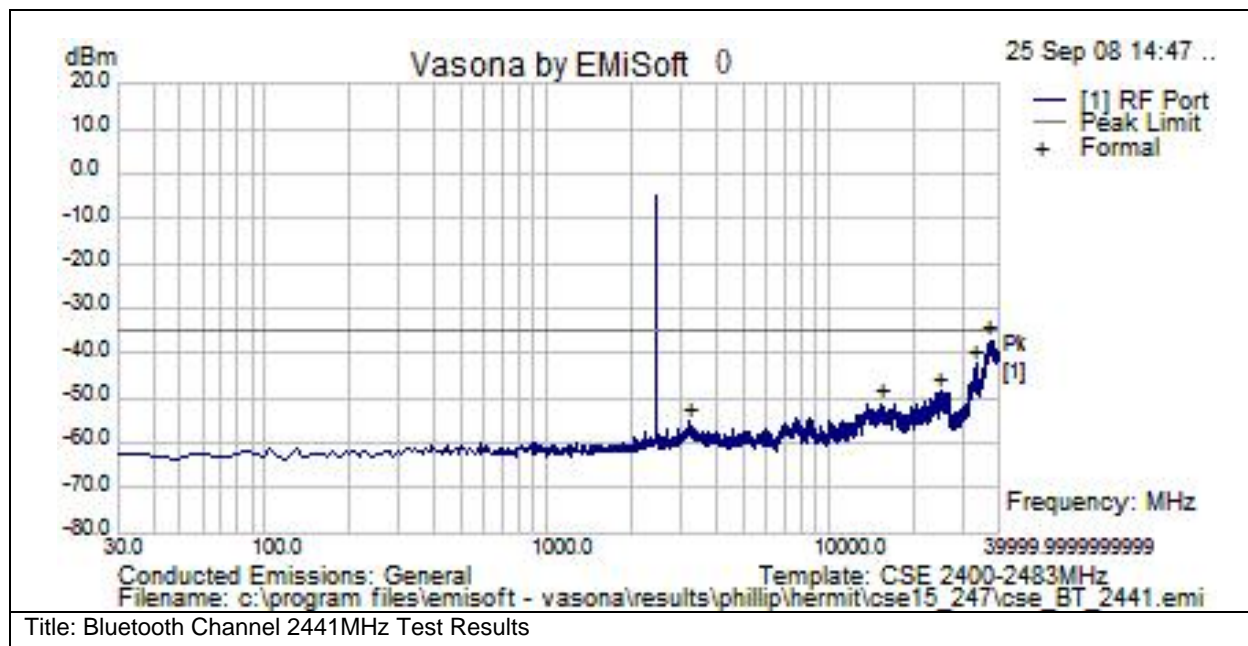
Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
37388.111	-56.8	0	20.5	-36.4	Peak(Scan)	RF	-33	-3.3	Pass	Noise Floor
33317.555	-63.2	0	20.5	-42.7	Peak(Scan)	RF	-33	-9.6	Pass	Noise Floor
15426.446	-72.1	0.9	20	-51.1	Peak(Scan)	RF	-33	-18.1	Pass	
13748.231	-73.2	1.4	20	-51.9	Peak(Scan)	RF	-33	-18.8	Pass	
7024.846	-74.6	0.6	19.8	-54.2	Peak(Scan)	RF	-33	-21.2	Pass	



Subtest Number: 33543 - 2		Subtest Date: 30-Sep-2008
Engineer	Phillip Carranco	
Lab Information	Building B, Shield Room	
Subtest Results		
Line Under Test	[A] Antenna Port	
Transducer	Direct	
Subtest Result	Pass	
Highest Frequency	40000.0	
Lowest Frequency	30.0	
Comments on the above Test Results	No further comments	

### Graphical Test Results

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



**Test Results Table**

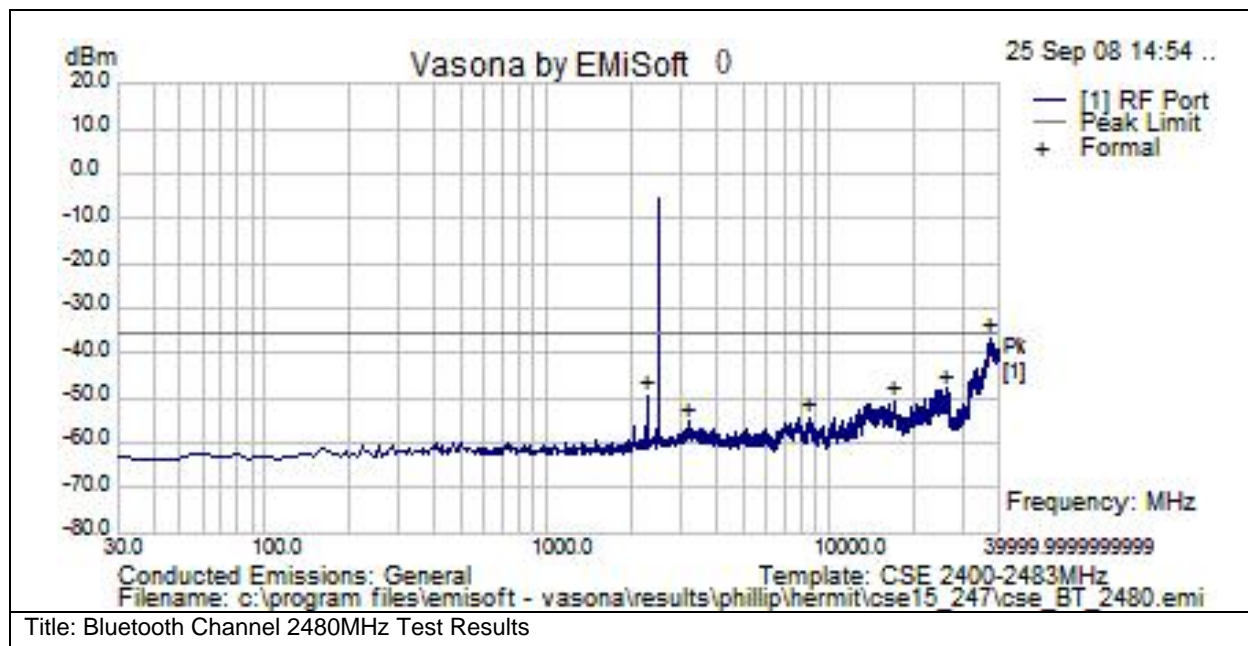
Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
37612.522	-57.7	0	20.5	-37.2	Peak(Scan)	RF	-35	-2.2	Pass	Noise Floor
33317.555	-62.9	0	20.5	-42.4	Peak(Scan)	RF	-35	-7.4	Pass	Noise Floor
24870.993	-70	1.1	20.3	-48.6	Peak(Scan)	RF	-35	-13.6	Pass	
15495.622	-72.3	1	20	-51.3	Peak(Scan)	RF	-35	-16.3	Pass	
3221.884	-76.2	1.2	19.8	-55.2	Peak(Scan)	RF	-35	-20.2	Pass	



Subtest Number: 33543 - 3		Subtest Date: 30-Sep-2008
Engineer	Phillip Carranco	
Lab Information	Building B, Shield Room	
Subtest Results		
Line Under Test	[A] Antenna Port	
Transducer	Direct	
Subtest Result	Pass	
Highest Frequency	40000.0	
Lowest Frequency	30.0	
Comments on the above Test Results	No further comments	

### Graphical Test Results

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



**Test Results Table**

Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
37469.148	-57	0	20.5	-36.6	Peak(Scan)	RF	-35.5	-1	Pass	Noise Floor
26286.026	-69.6	1.1	20.3	-48.1	Peak(Scan)	RF	-35.5	-12.6	Pass	
2267.871	-70.2	1.1	19.8	-49.4	Peak(Scan)	RF	-35.5	-13.9	Pass	
17166.234	-71.7	0.9	20.1	-50.7	Peak(Scan)	RF	-35.5	-15.2	Pass	
8613.701	-74.8	0.6	19.9	-54.3	Peak(Scan)	RF	-35.5	-18.8	Pass	
3177.027	-76.7	1.2	19.8	-55.7	Peak(Scan)	RF	-35.5	-20.1	Pass	

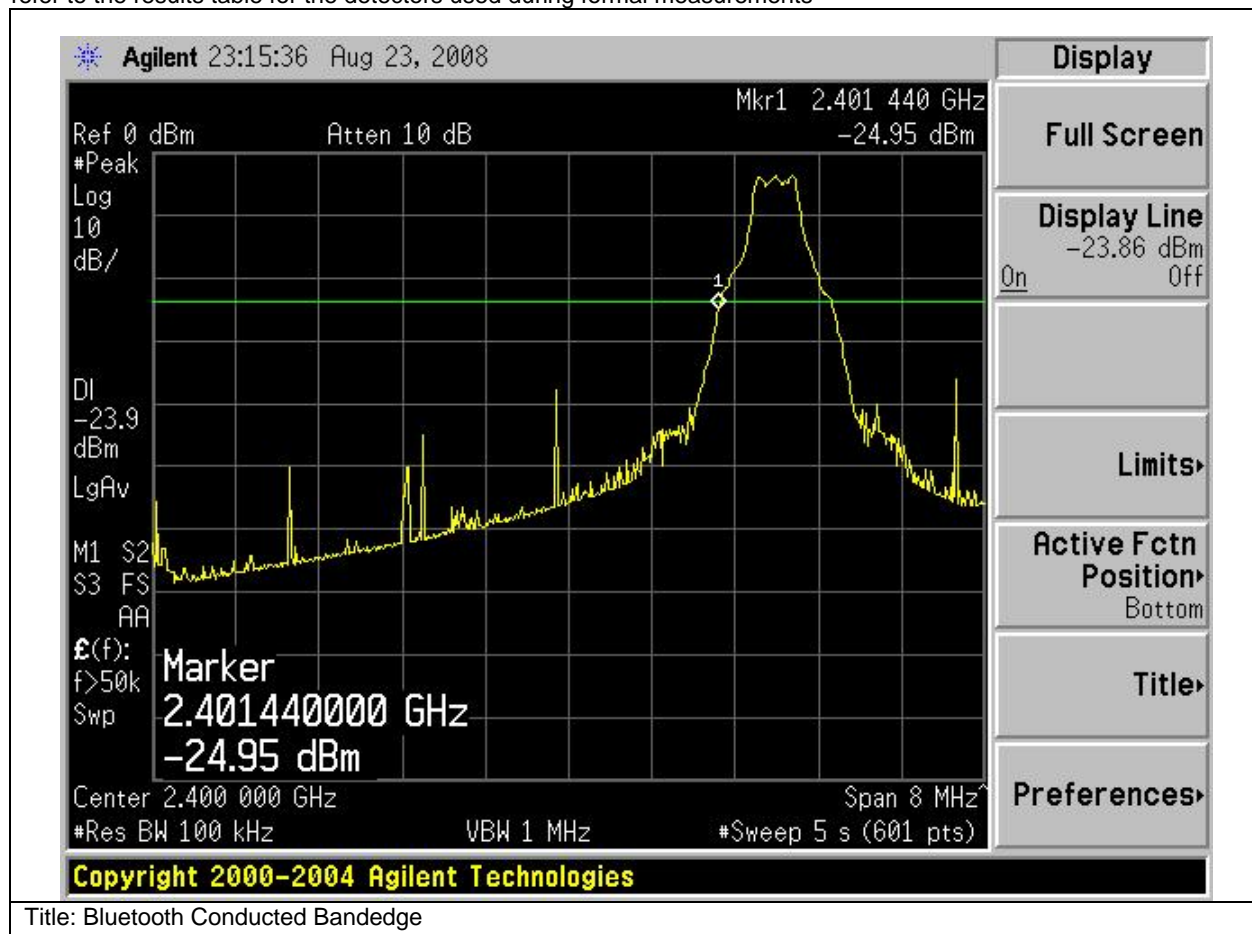
## Conducted Band Edge Measurements

15.205 & RSS-210 sec2.7:

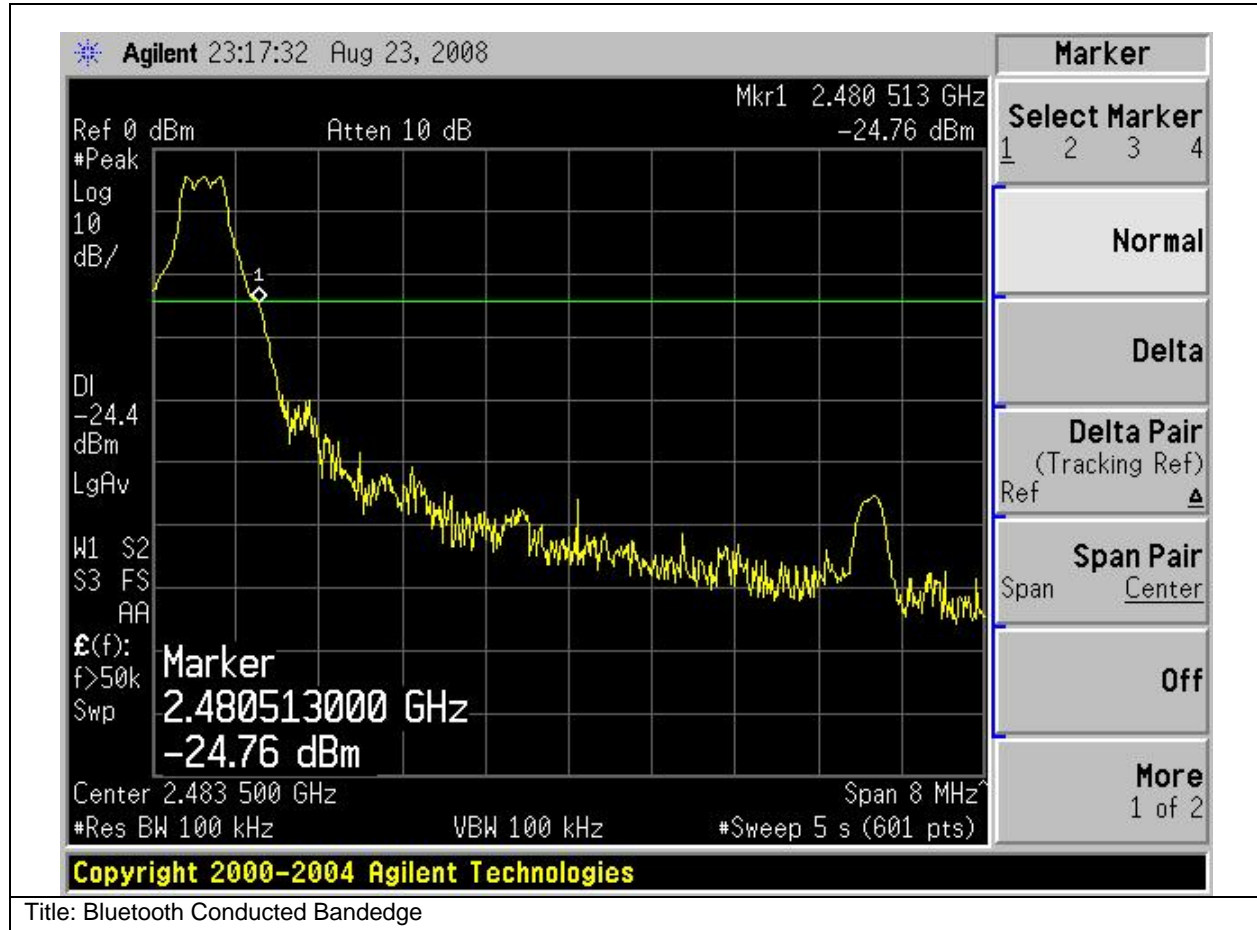
Conducted emissions which fall in the restricted bands, as defined in Sec. 15.205(a), must also comply with the radiated emission limits specified in Sec. 15.209(a).

## Graphical Test Results

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements

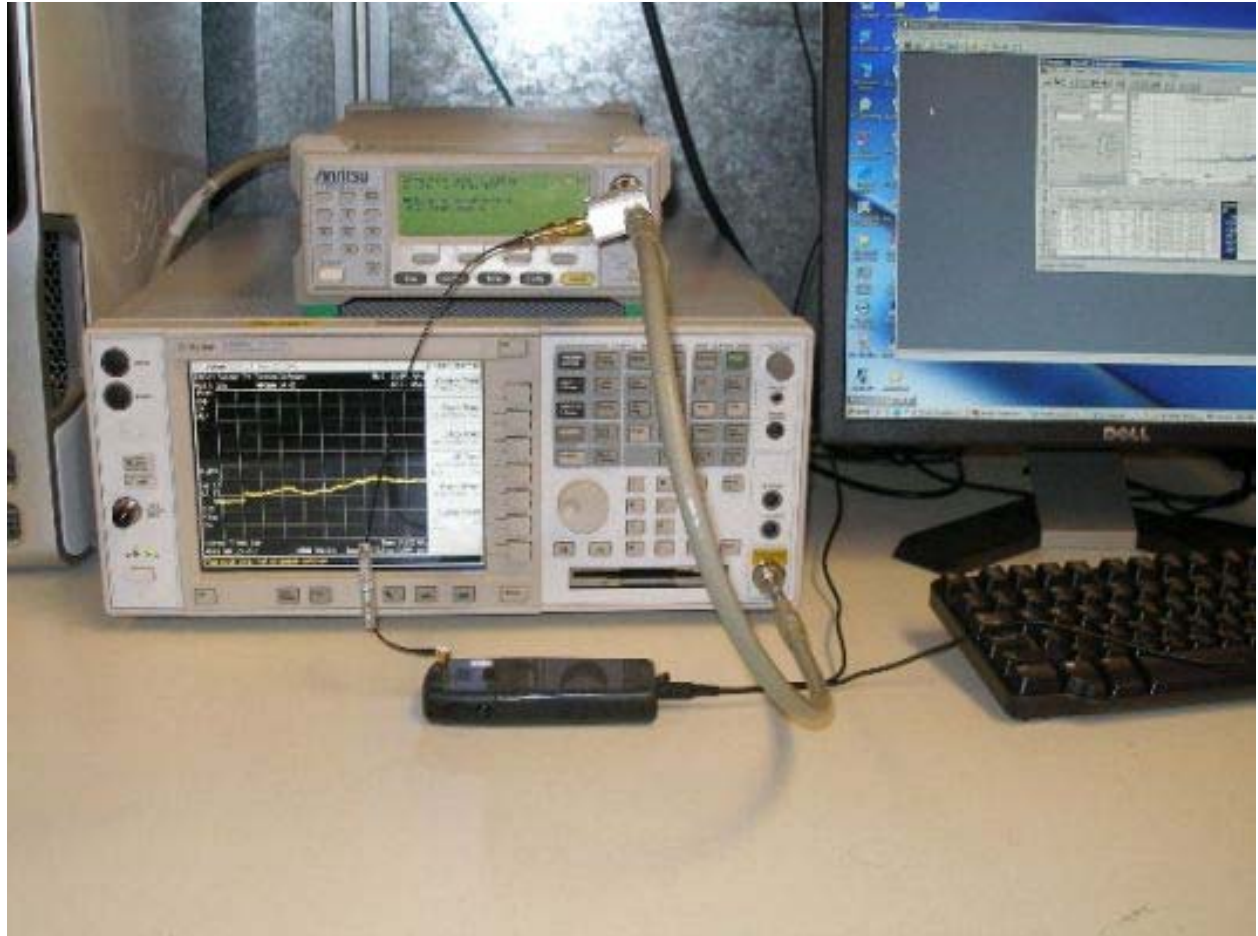








**Physical Test arrangement Photograph:**



**Title:** Bluetooth Bench Setup

**Comments on the above Photograph:**

No further comments



## Radiated Spurious and Harmonics Emissions

15.205 & RSS-210 sec2.7:

Radiated emissions which fall in the restricted bands, as defined in Sec. 15.205(a), must also comply with the radiated emission limits specified in Sec. 15.209(a).

<b>Test Number:</b> 33545		<b>Spec ID:</b> 647		
Basic Standard	Applied to	Class	Freq Range	Test Details / Comments
Radiated Spurious Emissions	Enclosure	B	30MHz - 26.5GHz	CFR47 Part 15.109CFR47 Part 15.247, RSS-210, LP0002 HKTA1039
<b>Operating Mode</b>	<b>Mode :</b> 1, Bluetooth Test Mode			
<b>Power Input</b>	110, 60Hz (+/-20%)			
<b>Overall Result</b>	Pass			
<b>Comments</b>	No further comments			
<b>Deviation</b>	There were no deviations from the specification			

System Number	Description	Samples	System under test	Support equipment
1	Bluetooth Module Sample Tested	S01	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Subtest Number: 33545 - 1		Subtest Date: 30-Sep-2008	
Engineer	Phillip Carranco		
Lab Information	Building I, 5m Anechoic		
Subtest Results			
Subtest Title	Radiated Spurious Emissions from 30M - 1000MHz		
Subtest Result	Pass		
Highest Frequency	1000.0		
Lowest Frequency	30.0		
Comments on the above Test Results	No further comments		
Environmental Conditions:			
Temperature: within range of 54 to 95 F:		Yes	
Humidity: between 10 and 75%:		Yes	
Comments:			
Equipment used:			
Equipment No	Manufacturer	Model	Description
CIS002119	EMC Test Systems	3115	Double Ridged Guide Horn Antenna
CIS008024	Huber + Suhner	SF106A	3 meter Sucoflex cable
CIS008081	Huber + Suhner	SF106A	1m Sucoflex cable



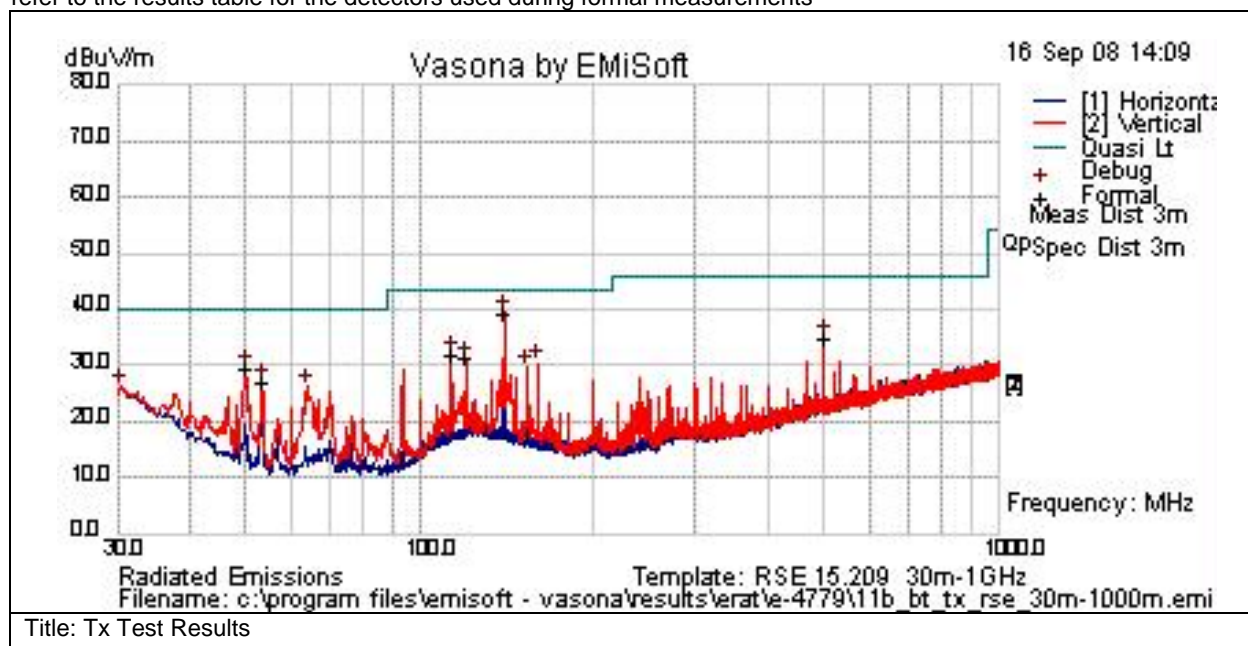
CIS005691	Miteq	NSP1800-25-S1	Broadband Preamplifier (1-18GHz)
CIS024201	Rohde & Schwarz	FSEK30	Spectrum Analyzer 20Hz - 40GHz
CIS028072	Cisco	1840	18-40GHz EMI Test Head/Verification Fixture
CIS030443	Micro-Coax	UFB311A-0-1560-520520	RF Coaxial Cable, to 18GHz, 156 In.
CIS033602	Midwest Microwave	CSY-NMNM-80-273001	RF Coaxial Cable, 27ft. to 18GHz
CIS039114	Sunol Sciences	JB1	Combination Antenna
CIS040523	Rohde & Schwarz	ESCI	EMI Test Receiver
CIS042000	Agilent	E4440A	Spectrum Analyzer

**Confidence Check Details:**

Confidence Check	Pass
Confidence Check Comments	No further Comments

**Graphical Test Results**

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



**Test Results Table**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
139.852	25.6	1	12.9	39.5	NA	V	100	0	43.5	-4	Pass	Support Equip
49.885	21	0.6	7.8	29.4	NA	V	125	0	40	-10.6	Pass	Support Equip
499.965	15	1.9	17.8	34.7	NA	V	100	0	46	-11.3	Pass	Support Equip
113.42	17.8	0.9	13	31.7	NA	V	125	0	43.5	-11.8	Pass	Support Equip
119.968	16.4	0.9	13.9	31.2	NA	V	125	0	43.5	-12.3	Pass	Support Equip

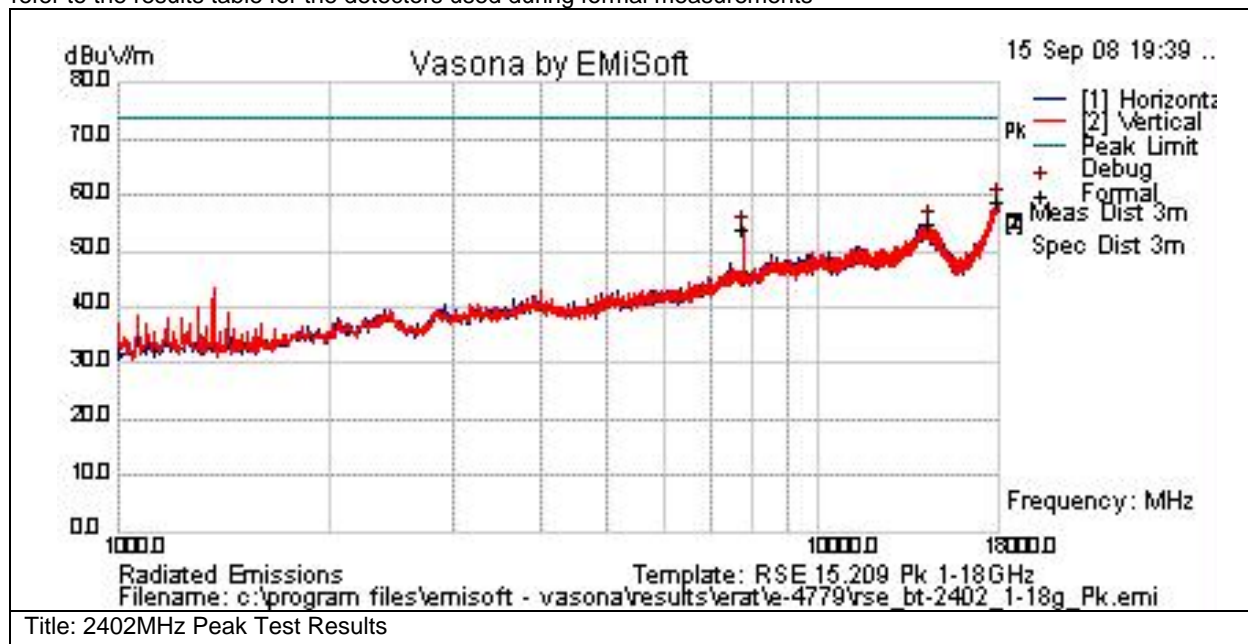


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
53.28	19.1	0.6	7.3	27	NA	V	100	0	40	-13	Pass	Support Equip

<b>Subtest Number:</b> 33545 - 2		<b>Subtest Date:</b> 30-Sep-2008
<b>Engineer</b>	Phillip Carranco	
<b>Lab Information</b>	Building I, 5m Anechoic	
<b>Subtest Results</b>		
<b>Subtest Title</b>	Radiated Spurious Emissions from 1 - 18GHz	
<b>Subtest Result</b>	Pass	
<b>Highest Frequency</b>	18000.0	
<b>Lowest Frequency</b>	1000.0	
<b>Comments on the above Test Results</b>	No further comments	

#### Graphical Test Results

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



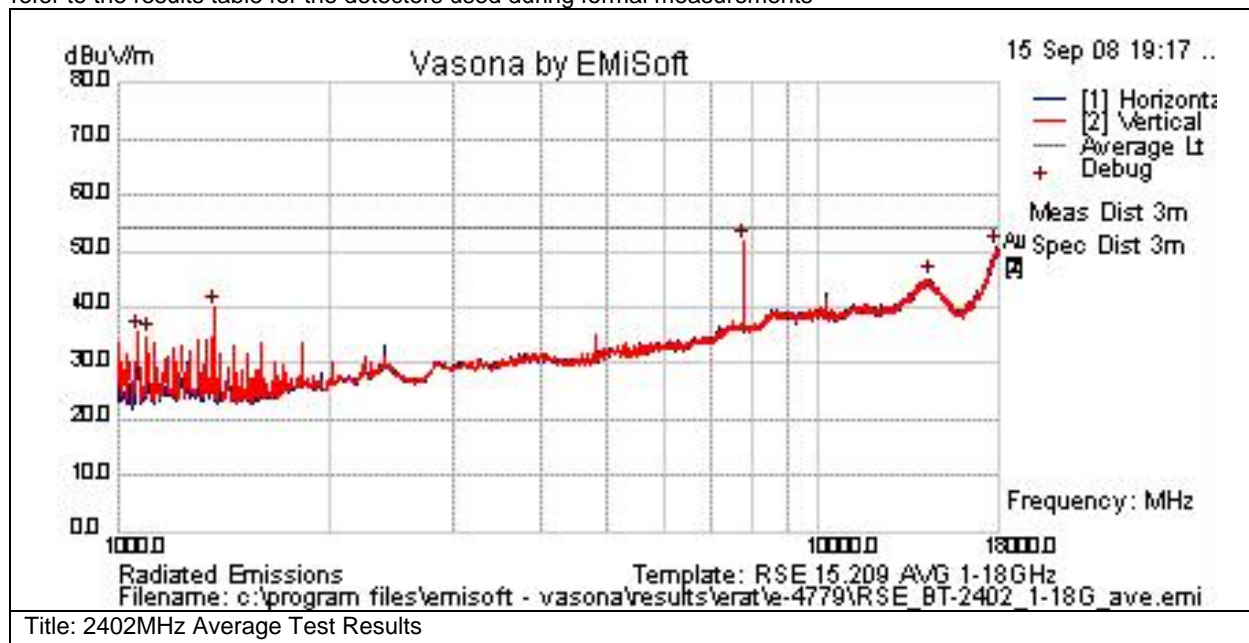
#### Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
17931.067	32.4	15.2	11.4	59	Peak(Scan)	V	100	0	74	-15	Pass	
14309.42	35.5	12.7	7	55.1	Peak(Scan)	H	125	0	74	-18.9	Pass	
7813.793	42.7	9.4	1.9	54	Peak(Scan)	V	100	0	74	-20	Pass	

Subtest Number: 33545 - 3		Subtest Date: 30-Sep-2008
Engineer	Phillip Carranco	
Lab Information	Building I, 5m Anechoic	
Subtest Results		
Subtest Title	Radiated Spurious Emissions from 1 - 18GHz	
Subtest Result	Pass	
Highest Frequency	18000.0	
Lowest Frequency	1000.0	
Comments on the above Test Results	No further comments	

#### Graphical Test Results

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



**Test Results Table**

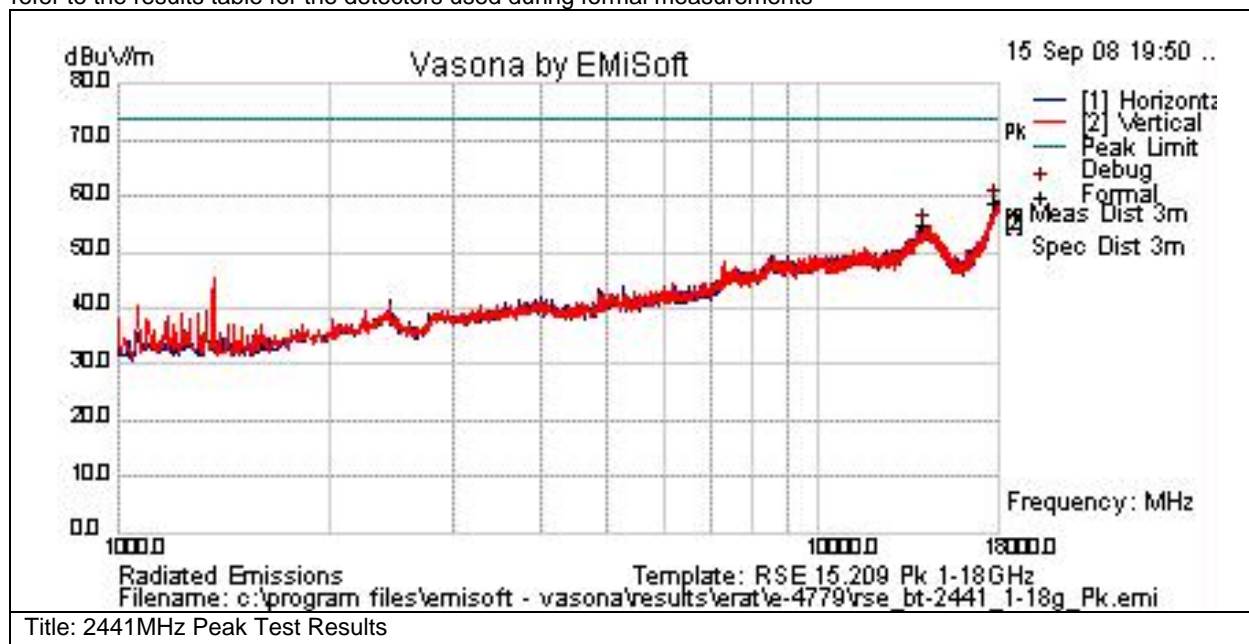
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
7812.025	39.4	9.4	1.9	50.7	Av	V	100	145	54	-3.3	Pass	
17909.857	24.1	15.1	11.4	50.6	Peak(Scan)	H	125	0	54	-3.4	Pass	Noise Floor
14357.143	25.4	12.7	6.9	45	Peak(Scan)	H	125	0	54	-9	Pass	Noise Floor



Subtest Number: 33545 - 4		Subtest Date: 30-Sep-2008
Engineer	Phillip Carranco	
Lab Information	Building I, 5m Anechoic	
Subtest Results		
Subtest Title	Radiated Spurious Emissions from 1 - 18GHz	
Subtest Result	Pass	
Highest Frequency	18000.0	
Lowest Frequency	1000.0	
Comments on the above Test Results	No further comments	

#### Graphical Test Results

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



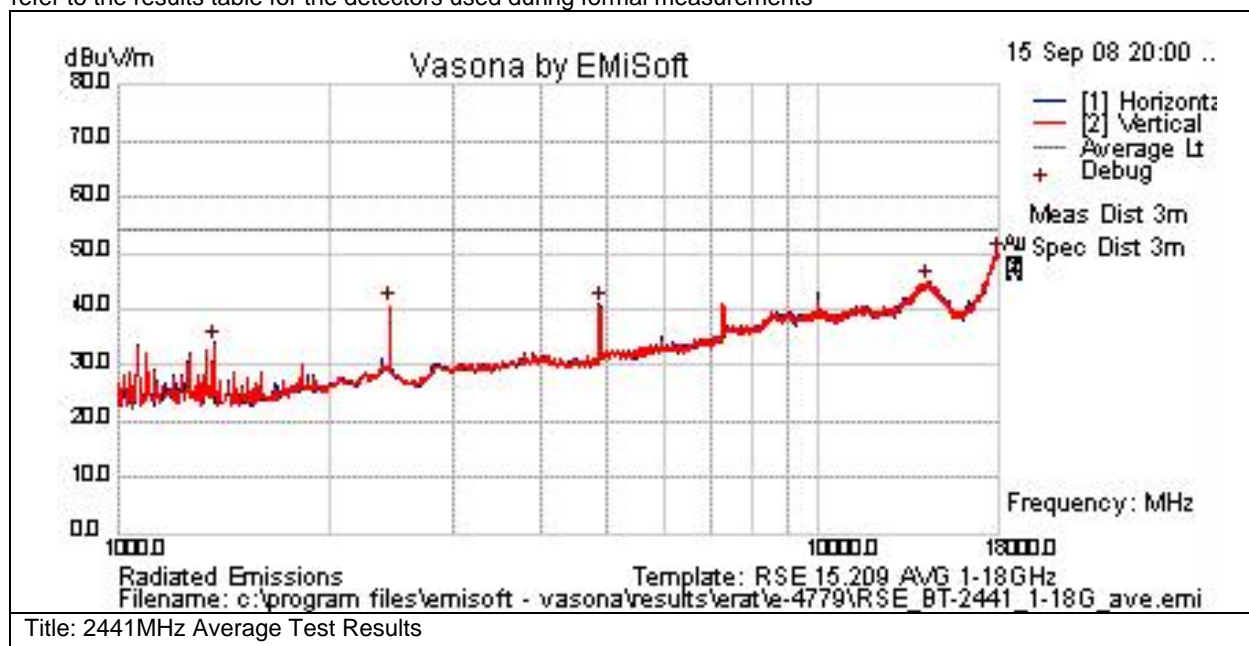
**Test Results Table**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
17899.251	32.3	15.1	11.6	59	Peak(Scan)	H	125	0	74	-15	Pass	Noise Floor
14145.041	35.1	12.5	7.1	54.7	Peak(Scan)	V	100	0	74	-19.3	Pass	Noise Floor

Subtest Number: 33545 - 5		Subtest Date: 30-Sep-2008
Engineer	Phillip Carranco	
Lab Information	Building I, 5m Anechoic	
Subtest Results		
Subtest Title	Radiated Spurious Emissions from 1 - 18GHz	
Subtest Result	Pass	
Highest Frequency	18000.0	
Lowest Frequency	1000.0	
Comments on the above Test Results	No further comments	

### Graphical Test Results

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



**Test Results Table**

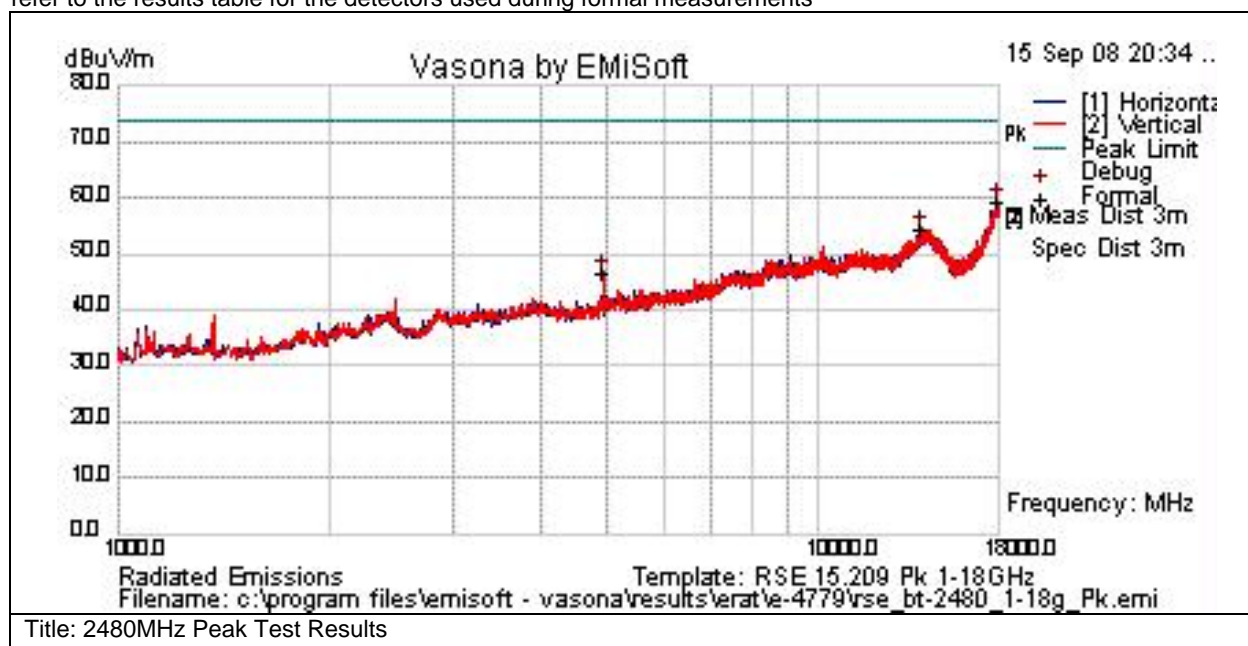
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
17937.291	23.2	15.2	11.5	49.8	Peak(Scan)	H	99	-1	54	-4.2	Pass	Noise Floor
14266.999	25.3	12.7	7	44.9	Peak(Scan)	H	125	0	54	-9.1	Pass	Noise Floor
4867.869	36.2	7.2	-3.9	39.5	Av	V	106	238	54	-14.5	Pass	
2442.296	38.8	7.2	-5.4	40.7	Peak(Scan)	H	100	0	54	-13.3	Pass	Tx Signal – EUT
1371.179	37.9	3.9	-7.7	34.1	Peak(Scan)	H	100	0	54	-19.9	Pass	
4867.991	38.1	7.2	-3.9	41.3	Av	H	100	140	54	-12.7	Pass	



<b>Subtest Number:</b> 33545 - 6		<b>Subtest Date:</b> 30-Sep-2008
<b>Engineer</b>	Phillip Carranco	
<b>Lab Information</b>	Building I, 5m Anechoic	
<b>Subtest Results</b>		
<b>Subtest Title</b>	Radiated Spurious Emissions from 1 - 18GHz	
<b>Subtest Result</b>	Pass	
<b>Highest Frequency</b>	18000.0	
<b>Lowest Frequency</b>	1000.0	
<b>Comments on the above Test Results</b>	No further comments	

### Graphical Test Results

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



**Test Results Table**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
18000	32.2	15.2	11.8	59.1	Peak(Scan)	H	125	0	74	-14.9	Pass	Noise Floor
14049.595	35	12.4	7.1	54.5	Peak(Scan)	V	125	0	74	-19.5	Pass	Noise Floor
4945.219	43.6	7.2	-4.2	46.7	Peak(Scan)	V	100	361	74	-27.3	Pass	

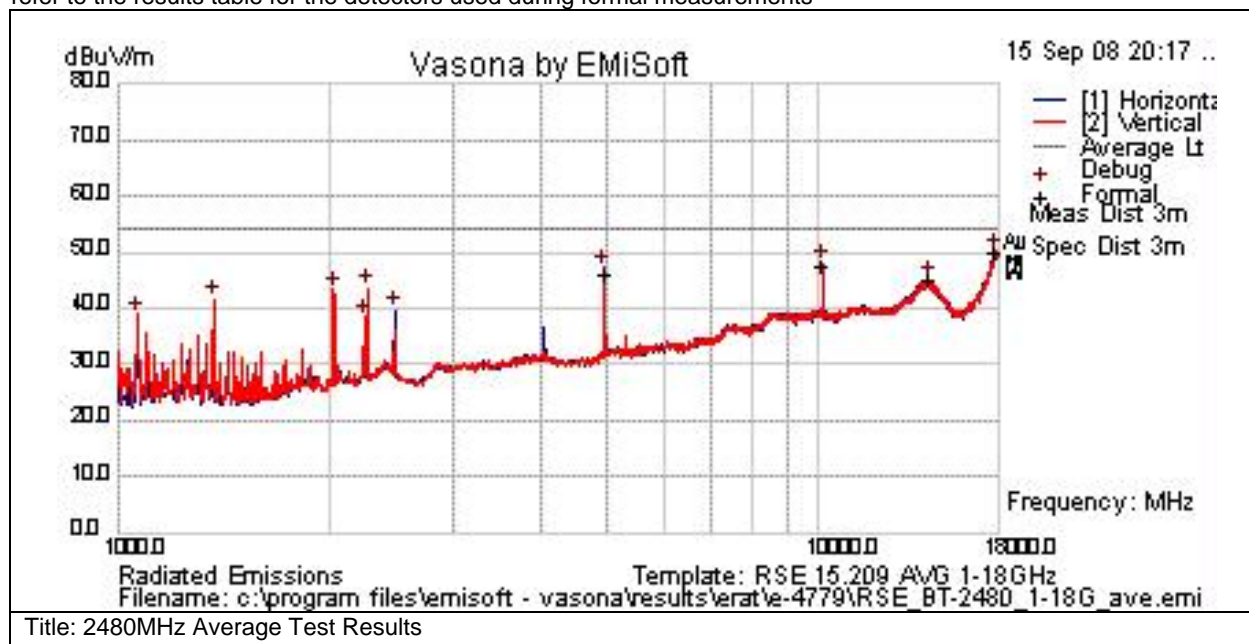




Subtest Number: 33545 - 7		Subtest Date: 30-Sep-2008
Engineer	Phillip Carranco	
Lab Information	Building I, 5m Anechoic	
Subtest Results		
Subtest Title	Radiated Spurious Emissions from 1 - 18GHz	
Subtest Result	Pass	
Highest Frequency	18000.0	
Lowest Frequency	1000.0	
Comments on the above Test Results	No further comments	

### Graphical Test Results

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



**Test Results Table**

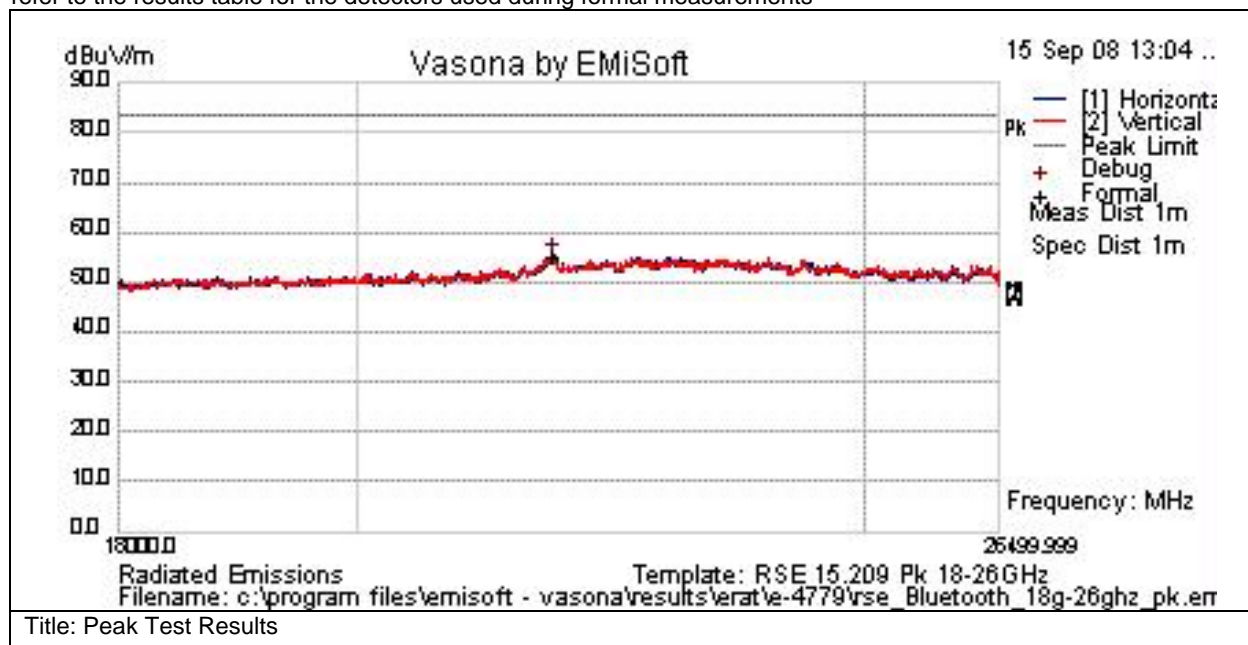
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
17899.251	23.6	15.1	11.6	50.2	NA	V	125	0	54	-3.8	Pass	Noise Floor
10154.883	32.2	10.2	5.4	47.8	Av	V	114	152	54	-6.2	Pass	
4946.039	43.2	7.2	-4.2	46.3	Av	V	110	196	54	-7.7	Pass	
14341.235	25.5	12.6	7	45.1	NA	H	100	0	54	-8.9	Pass	Noise Floor



Subtest Number: 33545 - 8		Subtest Date: 30-Sep-2008
Engineer	Phillip Carranco	
Lab Information	Building I, 5m Anechoic	
Subtest Results		
Subtest Title	Radiated Spurious Emissions from 18 - 26.5GHz	
Subtest Result	Pass	
Highest Frequency	26499.999	
Lowest Frequency	18000.0	
Comments on the above Test Results	No further comments	

### Graphical Test Results

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



### Test Results Table

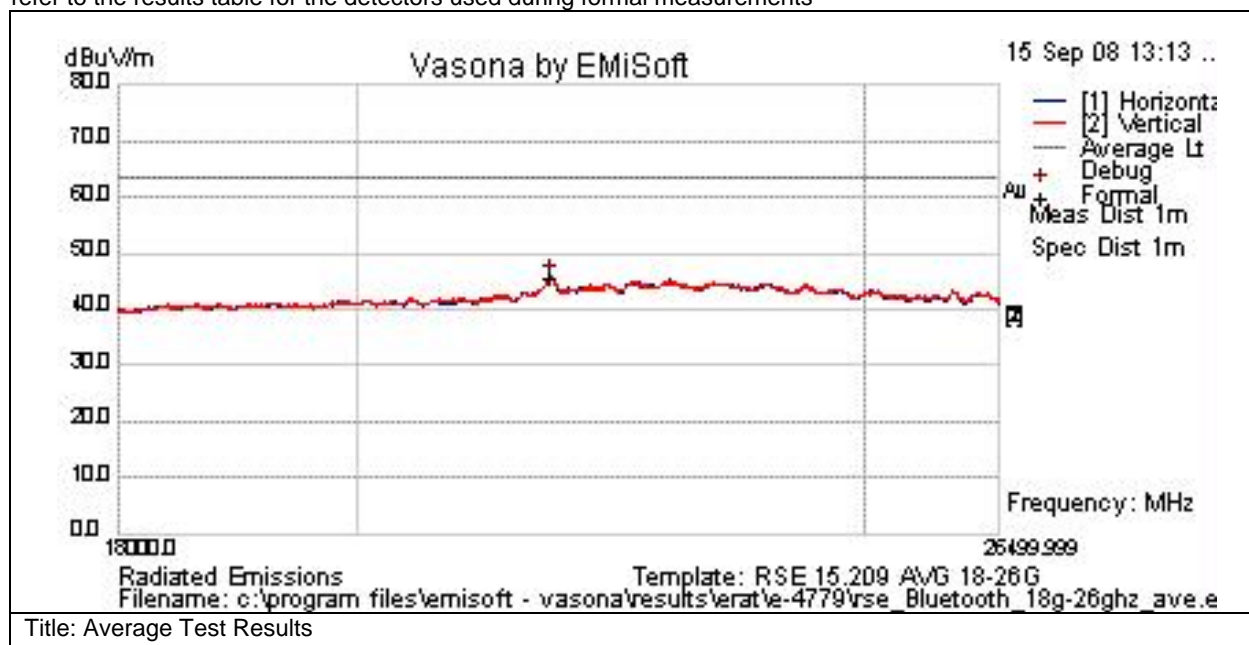
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
21807.222	37.8	0	17.6	55.4	Peak(Scan)	H	100	361	83.5	-28.1	Pass	Noise Floor



Subtest Number: 33545 - 9		Subtest Date: 30-Sep-2008
Engineer	Phillip Carranco	
Lab Information	Building I, 5m Anechoic	
Subtest Results		
Subtest Title	Radiated Spurious Emissions from 18 - 26.5GHz	
Subtest Result	Pass	
Highest Frequency	26499.999	
Lowest Frequency	18000.0	
Comments on the above Test Results	No further comments	

#### Graphical Test Results

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



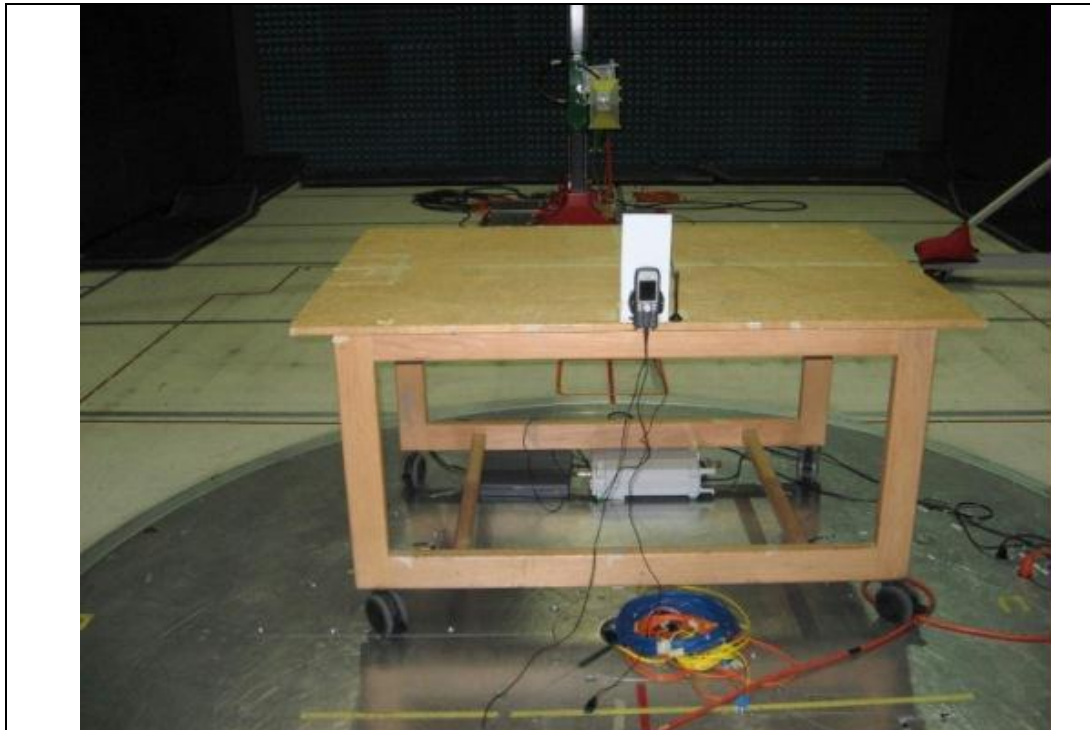
#### Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
21781.563	28.2	0	17.5	45.8	NA	V	100	0	63.5	-17.8	Pass	Noise Floor

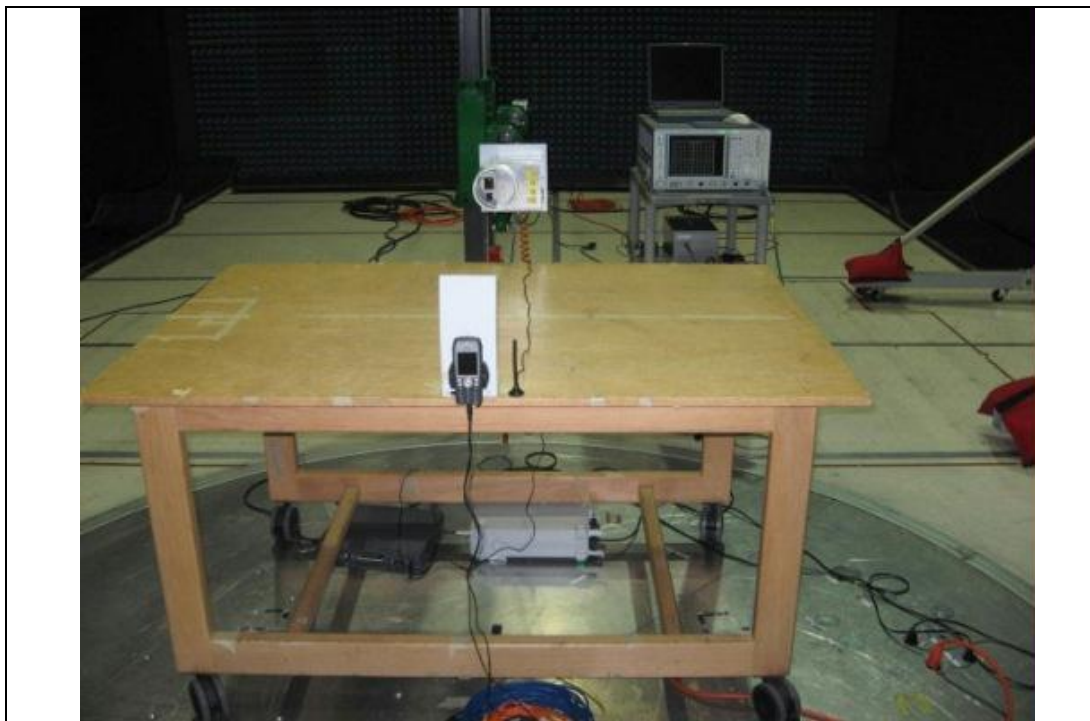
**Physical Test arrangement Photos:**



**Title:** Radiated Test Configuration from 30M - 1000MHz



**Title:** Radiated Test Configuration from 1 - 18GHz



**Title:** Radiated Test Configuration from 18 - 26.5GHz

## Appendix B: Abbreviation Key and Definitions

The following table defines abbreviations used within this test report.

Abbreviation	Description	Abbreviation	Description
EMC	Electro Magnetic Compatibility	°F	Degrees Fahrenheit
EMI	Electro Magnetic Interference	°C	Degrees Celsius
EUT	Equipment Under Test	Temp	Temperature
ITE	Information Technology Equipment	S/N	Serial Number
TAP	Test Assessment Schedule	Qty	Quantity
ESD	Electro Static Discharge	emf	Electromotive force
EFT	Electric Fast Transient	RMS	Root mean square
EDCS	Engineering Document Control System	Qp	Quasi Peak
Config	Configuration	Av	Average
CIS#	Cisco Number (unique identification number for Cisco test equipment)	Pk	Peak
Cal	Calibration	kHz	Kilohertz ( $1 \times 10^3$ )
EN	European Norm	MHz	MegaHertz ( $1 \times 10^6$ )
IEC	International Electro technical Commission	GHz	Gigahertz ( $1 \times 10^9$ )
CISPR	International Special Committee on Radio Interference	H	Horizontal
CDN	Coupling/Decoupling Network	V	Vertical
LISN	Line Impedance Stabilization Network	dB	decibel
PE	Protective Earth	V	Volt
GND	Ground	kV	Kilovolt ( $1 \times 10^3$ )
L1	Line 1	$\mu$ V	Microvolt ( $1 \times 10^{-6}$ )
L2	Line2	A	Amp
L3	Line 3	$\mu$ A	Micro Amp ( $1 \times 10^{-6}$ )
DC	Direct Current	mS	Milli Second ( $1 \times 10^{-3}$ )
RAW	Uncorrected measurement value, as indicated by the measuring device	$\mu$ S	Micro Second ( $1 \times 10^{-6}$ )
RF	Radio Frequency	$\mu$ S	Micro Second ( $1 \times 10^{-6}$ )
SLCE	Signal Line Conducted Emissions	m	Meter
Meas dist	Measurement distance	Spec dist	Specification distance
N/A or NA	Not Applicable	SL	Signal Line (or Telecom Line)
P	Power Line	L	Live Line
N	Neutral Line	R	Return
S	Supply	AC	Alternating Current



## Appendix C: Test Equipment Used to perform the test

Equip#	Manufacturer/ Model	Description	Last Cal	Next Due
041987	Murata Electronics MXGS83RK3000	Special Radio Test Adaptor Cable	10-MAY-08	10-MAY-09
034974	Midwest Microwave ATT-0640-20-29M-02	Attenuator, 20dB, DC-40GHz	15-MAY-08	15-MAY-09
036716	Cisco RF Coaxial Cable-SMA	Radio Test Cable, SMA-SMA	14-Dec-08	14-Dec-09
033988	Agilent E4446A	Precision Spectrum Analyzer	07-Nov-08	07-Nov-09
008024	Huber + Suhner SF106A	3 meter Sucoflex cable	13-Nov-08	13-Nov-09
030443	Micro-Coax UFB311A-0-1560-520520	RF Coaxial Cable, to 18GHz, 156 In.	13-Nov-08	13-Nov-09
033602	Midwest Microwave CSY-NMNM-80-273001	RF Coaxial Cable, 27ft. to 18GHz	13-Nov-08	13-Nov-09
039114	Sunol Sciences JB1	Combination Antenna	19-Dec-08	19-Dec-09
040523	Rohde & Schwarz ESCI	EMI Test Receiver	26-Jun-08	26-Jun-09
002119	EMC Test Systems 3115	Double Ridged Guide Horn Antenna	03-Jun-08	03-Jun-09
008081	Huber + Suhner SF106A	1m Sucoflex cable	13-Nov-08	13-Nov-09
005691	Miteq NSP1800-25-S1	Broadband Preamplifier (1-18GHz)	09-Oct-08	09-Oct-09
035613	Micro-Tronics BRM50702-02	Notch Filter, SB:2.4-2.5GHz, to 18GHz	12-Jun-08	12-Jun-09
042000	Agilent E4440A	Spectrum Analyzer	04-Jun-08	04-Jun-09
024201	Rohde & Schwarz FSEK30	EMI Test Receiver	20-Nov-07	20-Nov-08
028072	CISCO 1840	18-40GHz EMI Test Fixture	03-Oct-07	03-Oct-08
021608	Micro-Coax UFB142A-1-1572-200-200	RF Coax Cable to 40GHz, 157.2in	03-Oct-07	03-Oct-08
041993	Mini-Circuit ZFSC-2-9G+	Splitter	29-May-08	29-May-09
043023	Anritsu MT8852B	Bluetooth Test Set	04-Aug-08	04-Aug-09

## Appendix D: Test Procedures

Measurements were made in accordance with

- FCC docket #:DA 00-0705,
- ET docket 96-8, KDB Publication No. 558074
- measurement method of spurious emission tolerance to the International Telecommunication Union (ITU) Recommendation SM329.
- ANSI PC63.10
- ANSI C63.4