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**Radio Intentional EMC Test Report: EDCS - 1028768**

**For**

**CP-7926G-W-K9 Bluetooth Module**

**Against the following Specifications :**

**47 CFR 15.247**

**RSS-210**

**RSS-102**

**Cisco Systems**

EMC Laboratory

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San Jose, CA 95134

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**Approved By:** Tim Lawler

**Title:** Regulatory Compliance

This report replaces any previously entered test report under EDCS -1028768



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

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## 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.

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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

26-May-2011

## 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**

<b>Cisco System Site</b>	<b>Site Identifier</b>
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-7926G-W-K9

## 2.6 EUT Description

. The CP-7926G-W-K9 is the next generation Wireless IP Phone with IR Scanner 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-7926G-W-K9 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 demined "Worst Case".

##### 4.1 Sample Details

Sample Number	Equipment Details	Serial Number	Part Number
S01	CP-7926G-W-K9	IAC1444E03U	74-7643-01

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 = 1.67dBi ( 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.





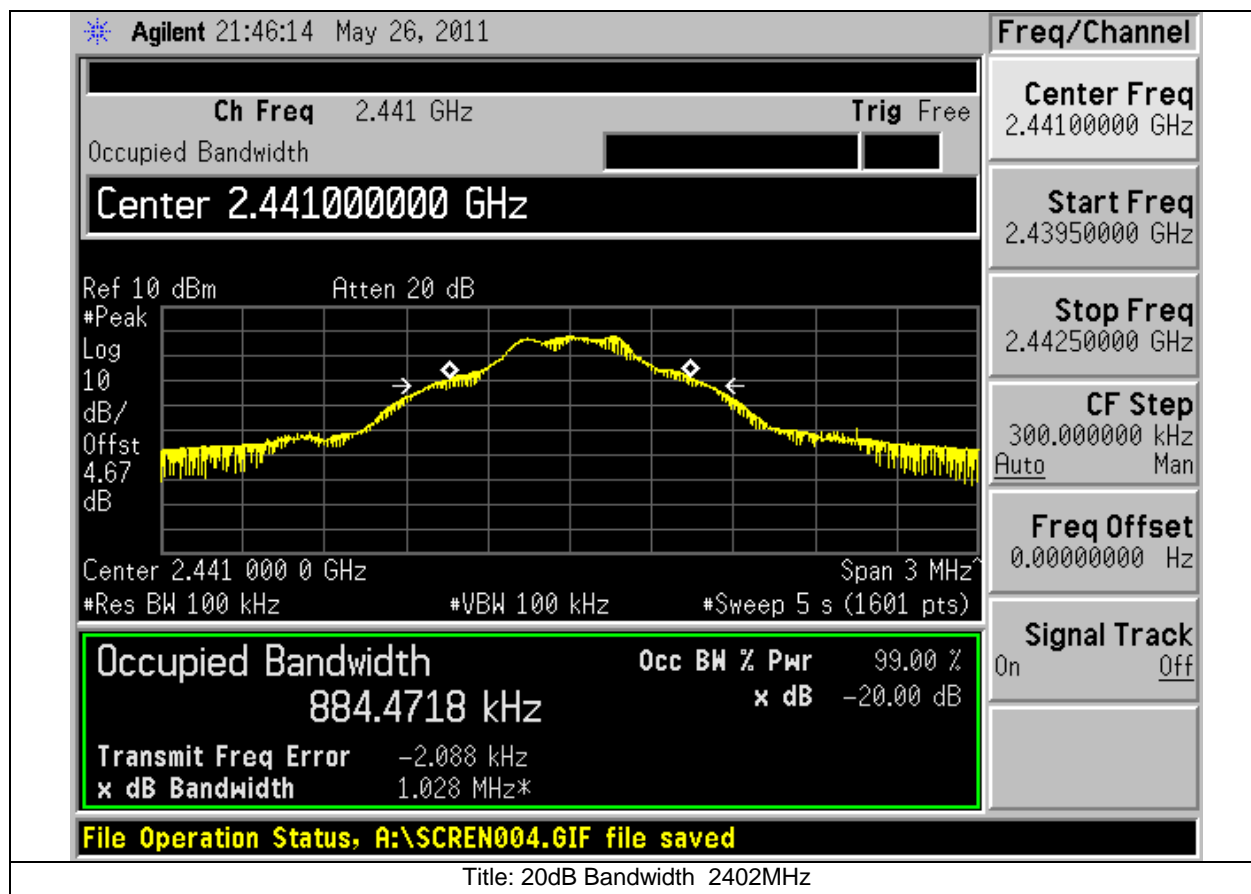
**Appendix A: Formal Test Results**

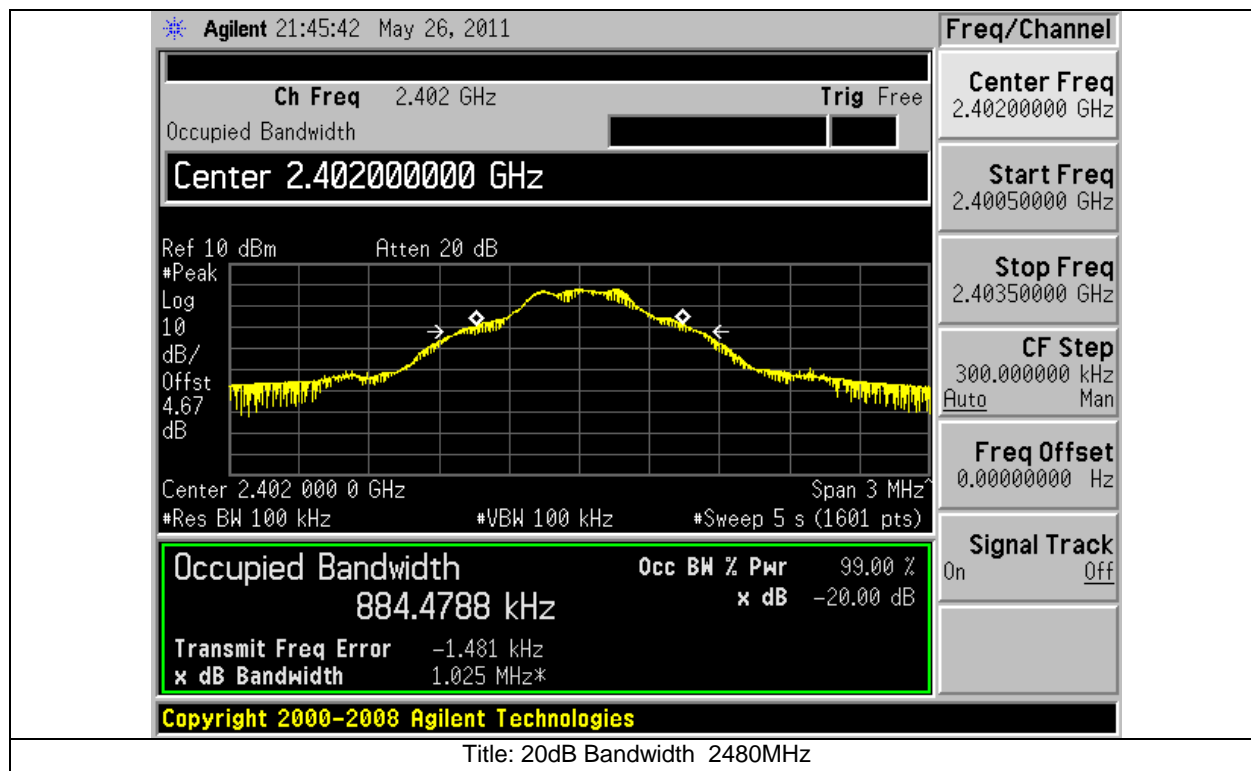
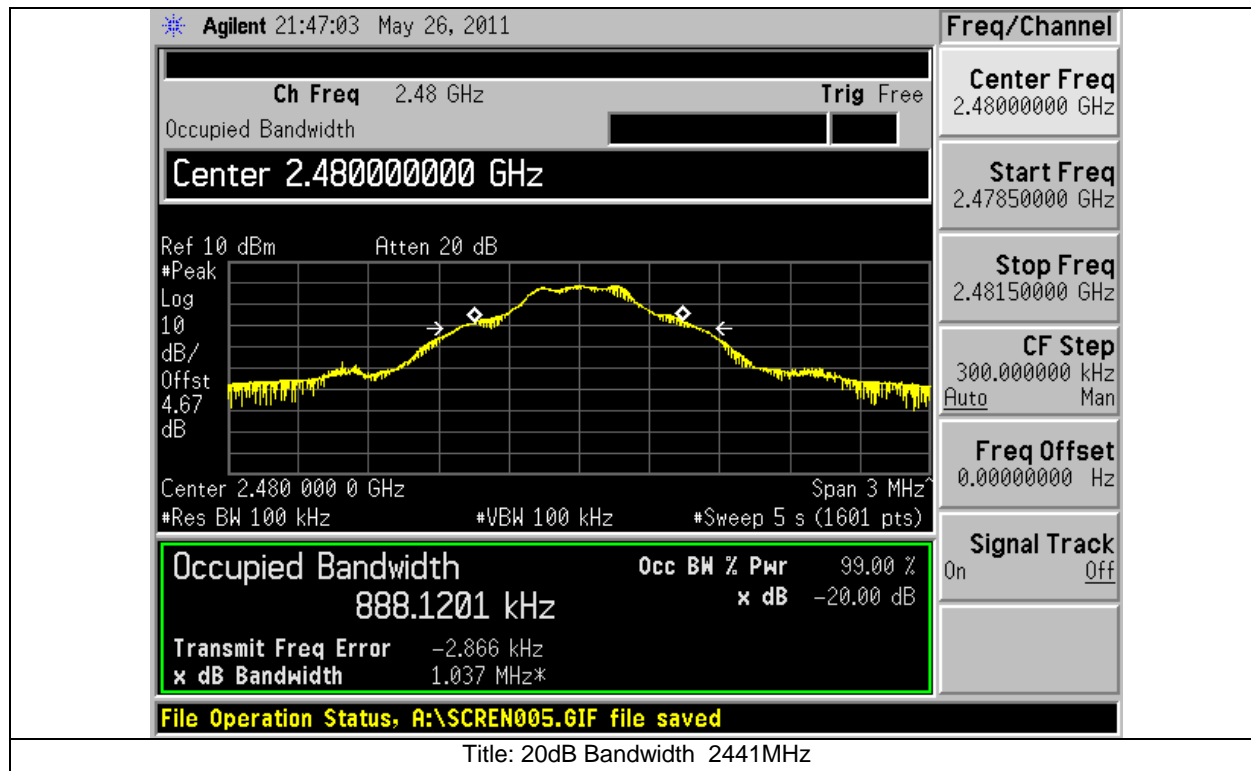
**20dB Bandwidth**

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

Frequency (MHz)	20dB Bandwidth (kHz)
2402	1025
2441	1028
2480	1037

**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	-1.88	30	-31.88
2441	-0.88	30	-30.88
2480	-0.66	30	-30.66

## Anritsu BlueTest2 Test Report

Test Set Serial Number: 000830002  
EUT Bluetooth Address: D8543AFB8436

Date: 5/31/2011  
Time: 2:22:35 PM

### Overall Result: PASS

Model: CP-7926G-W-K9  
Serial: IAC1444E019

TRM/CA/01/C (Output Power)

Packet Length Tested: DH5

<b>Hopping OFF</b>	<u>Low</u>	<u>Med</u>	<u>High</u>	<u>Limits</u>
Average Power	-1.95 dBm	-0.99 dBm	-0.74 dBm	
Max Power	-1.94 dBm	-0.97 dBm	-0.73 dBm	< 20.00 dBm
Min Power	-1.95 dBm	-1.00 dBm	-0.74 dBm	> -6.00 dBm
Peak Power	-1.88 dBm	-0.88 dBm	-0.66 dBm	< 4.00 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**

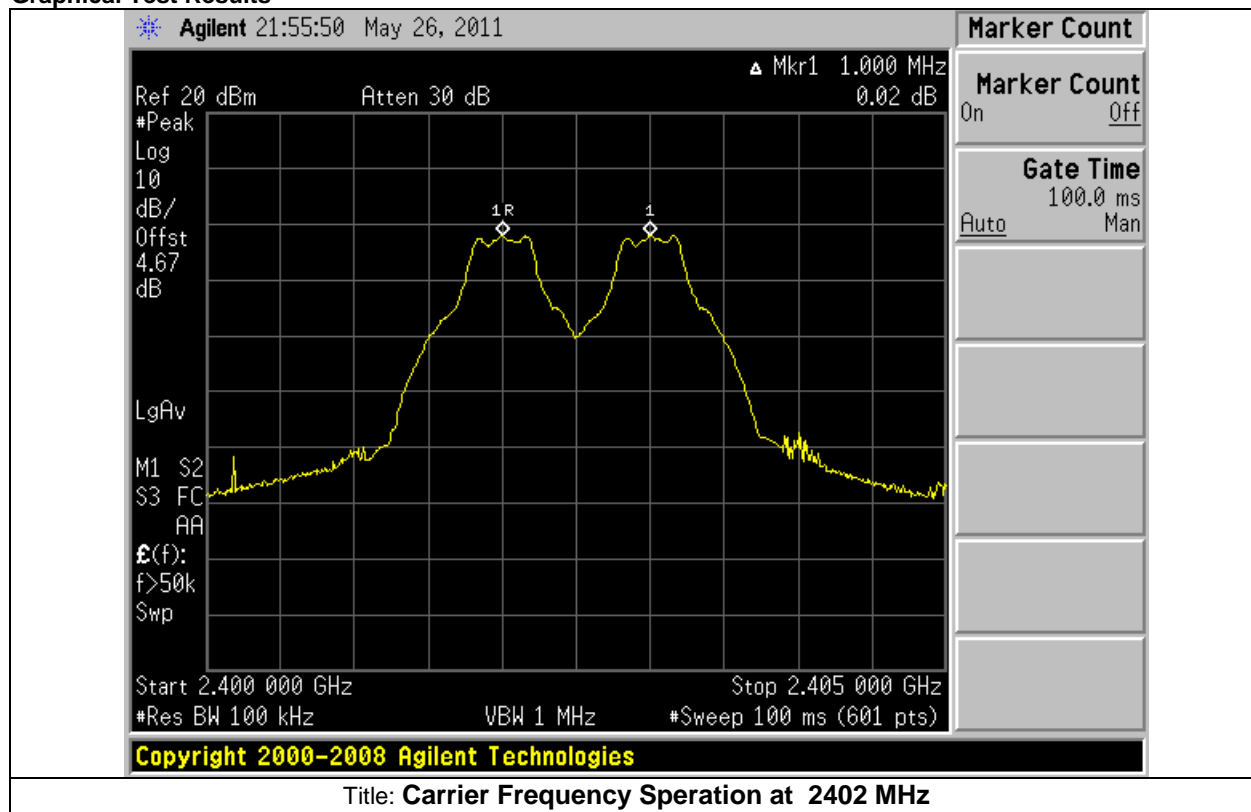
15.247 & RSS-210 A8.1:

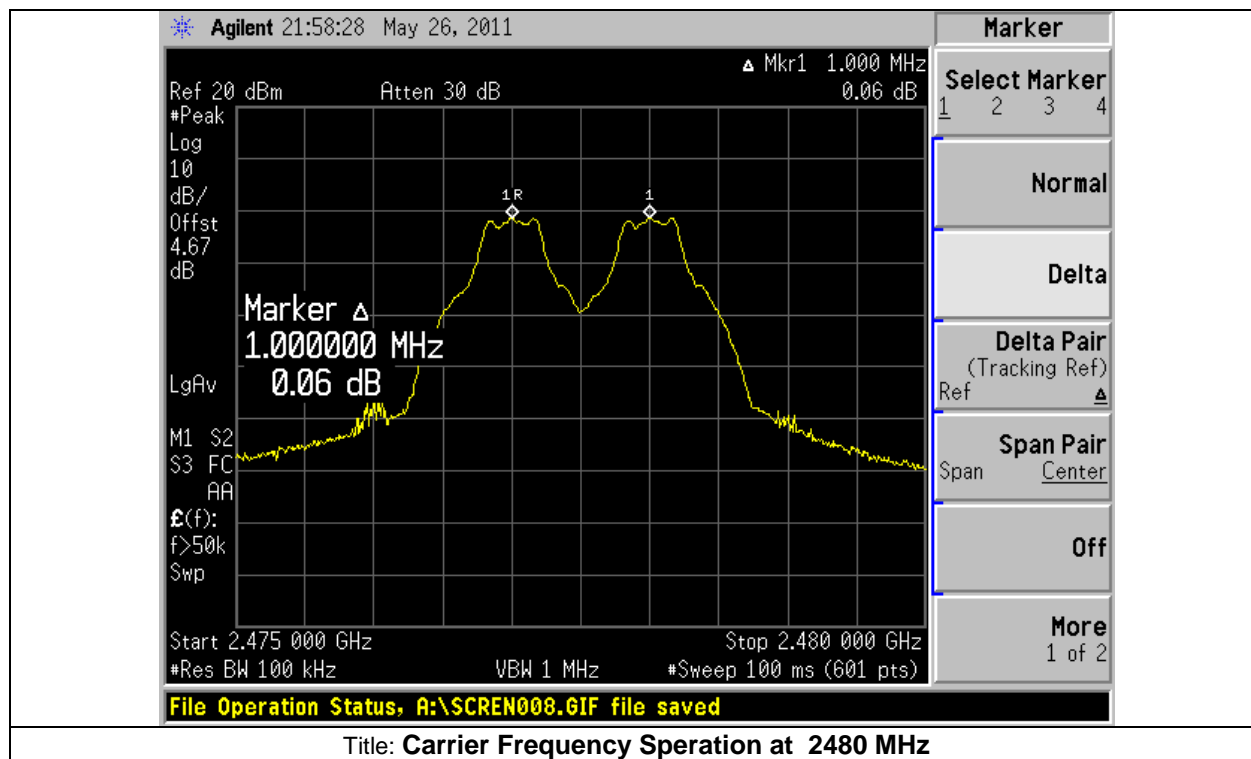
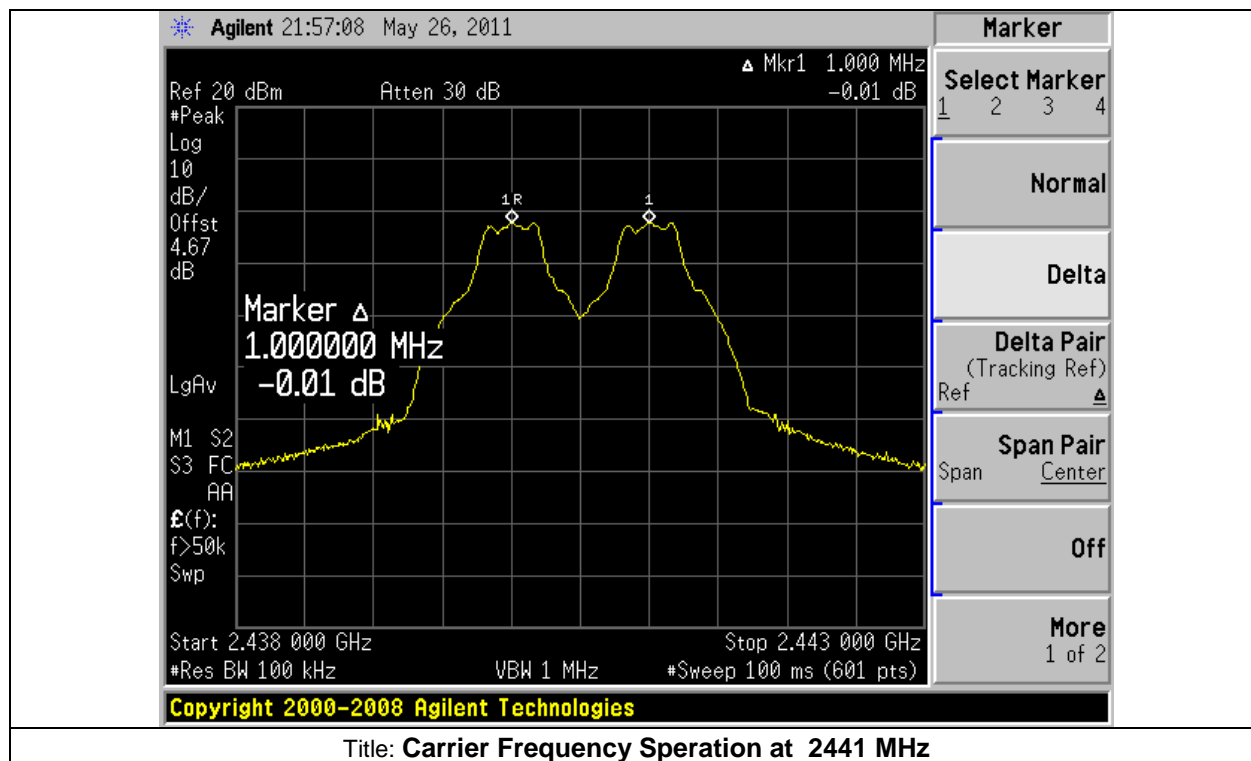
For frequency hopping systems operating in the 2400-2483.5MHz band may have hopping channel frequencies that are separated by 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater, provided the system operates with an output power no greater than 0.125W.

The smallest 20dB bandwidth for all channels is 1.025MHz. The minimum channel carrier frequencies separation is calculated as  $2/3(1025) = 683.3\text{kHz}$

Frequency (MHz)	Carrier Frequency Separation (kHz)	Limit (kHz)	Margin (kHz)
2402	1000.00	683.3	-316.70
2441	1000.00	683.3	-316.70
2480	1000.00	683.3	-316.70

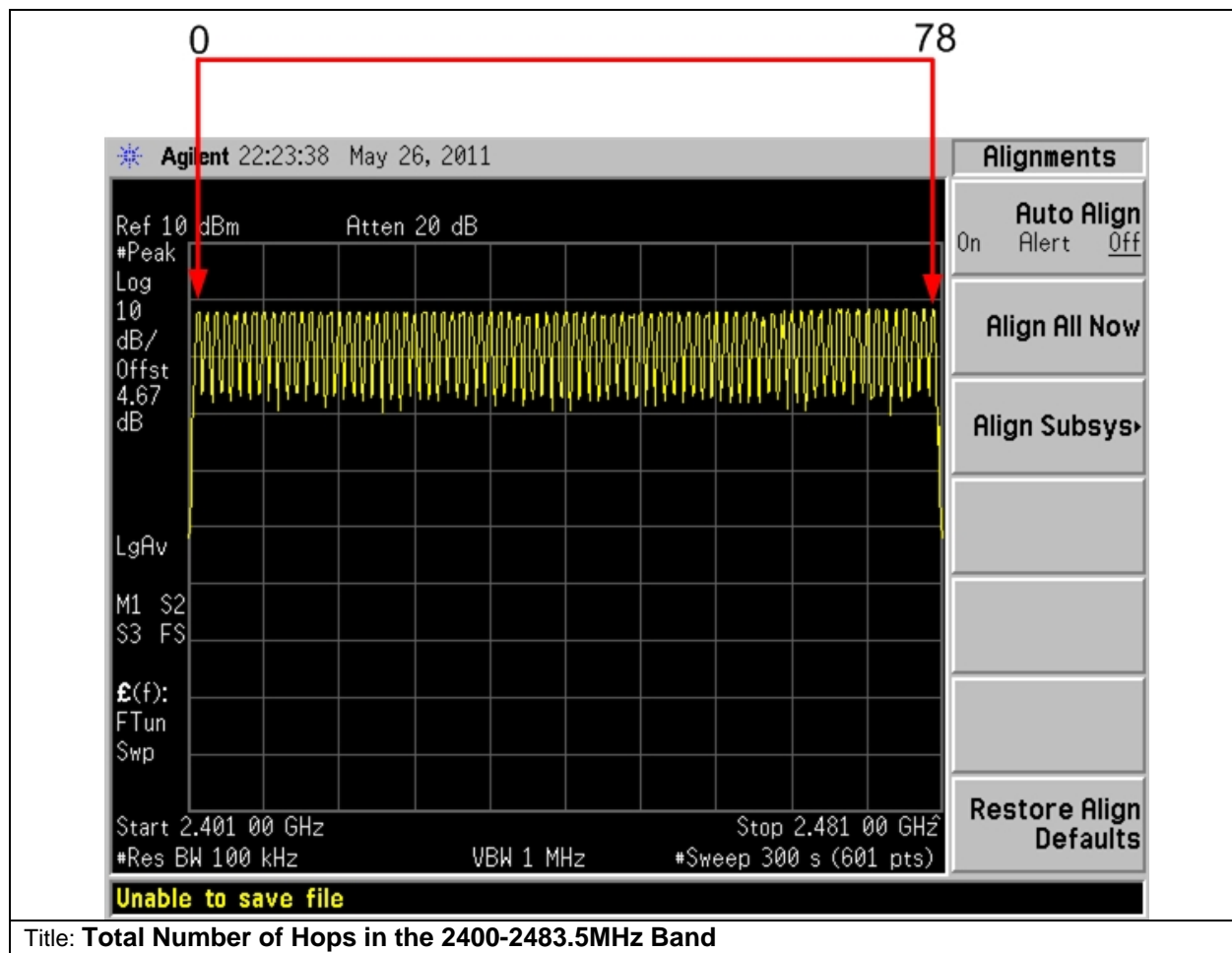
**Graphical Test Results**





### 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.

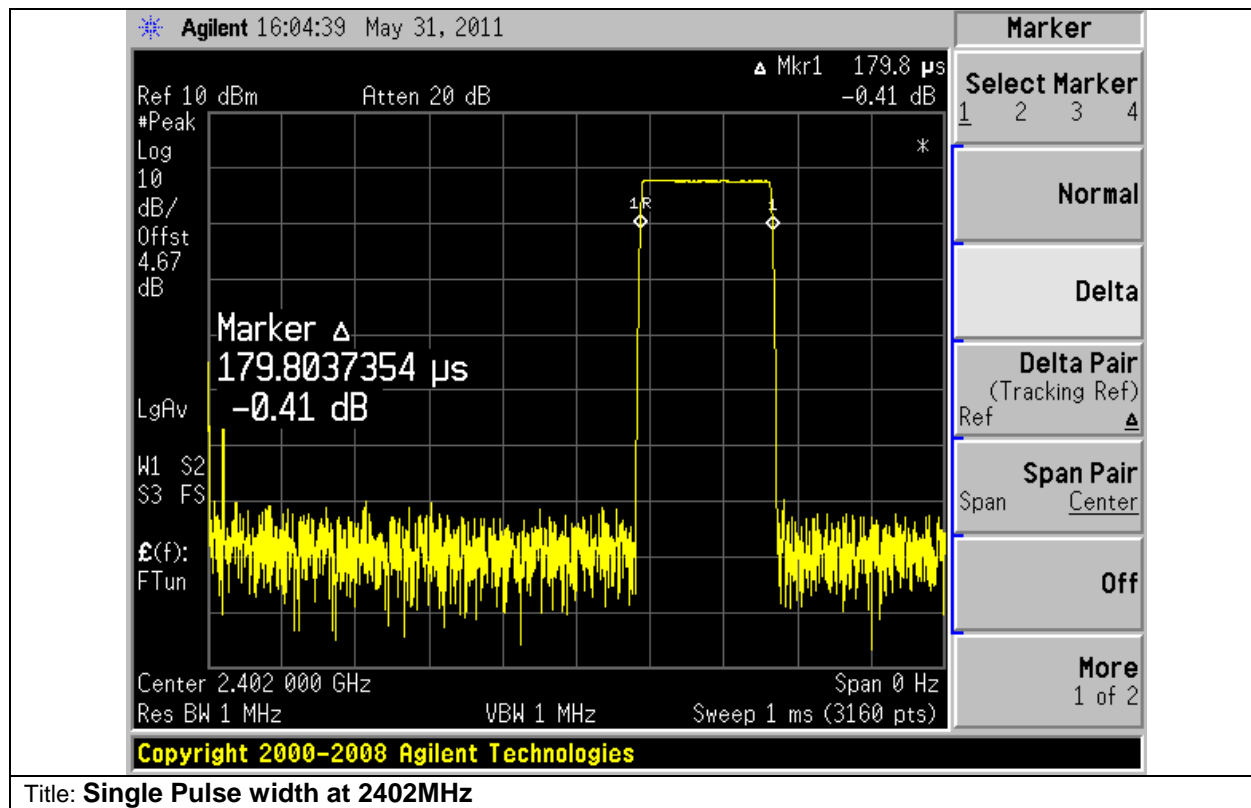
The total sweep time is  $0.4(79) = 31.6$  seconds.

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.

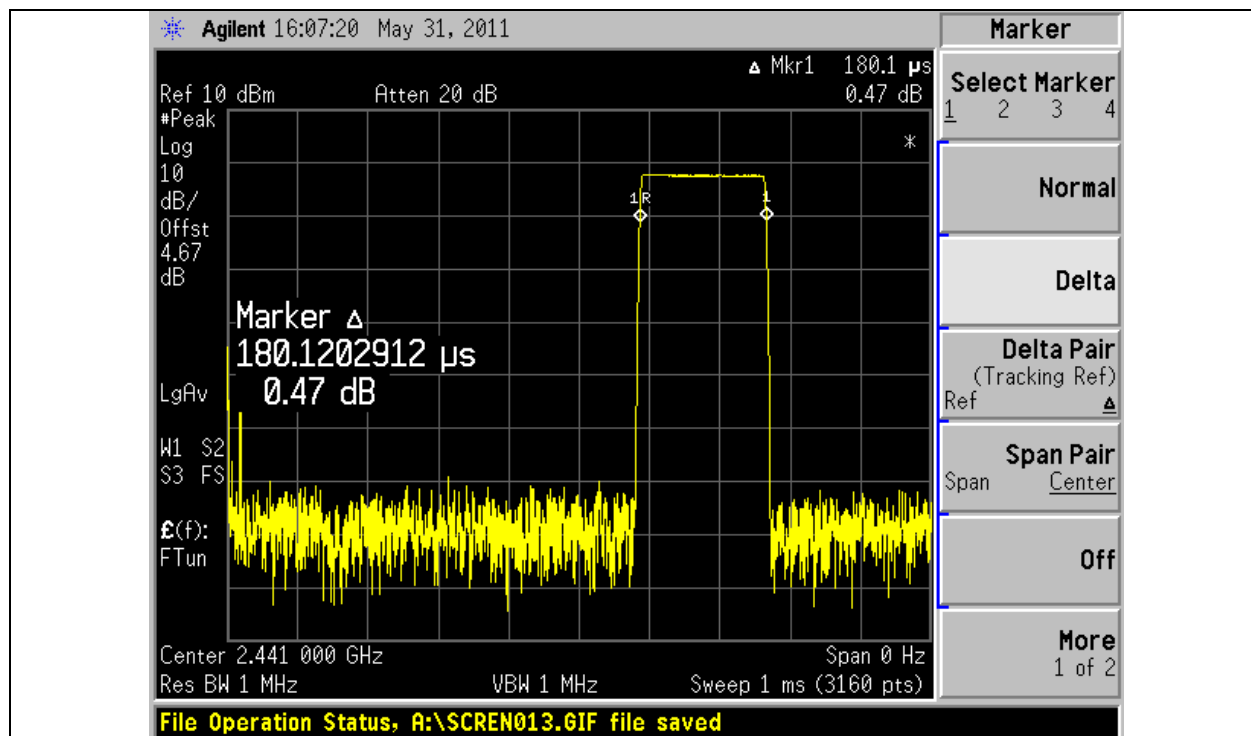
Example: Number of Hops in 3.16s = 31. Total Number of Hops in 31.6s =  $40(10) = 400$

Single Pulse Width = 0.00018012s. Time of Occupancy =  $400(0.00018012) = 0.072$ s

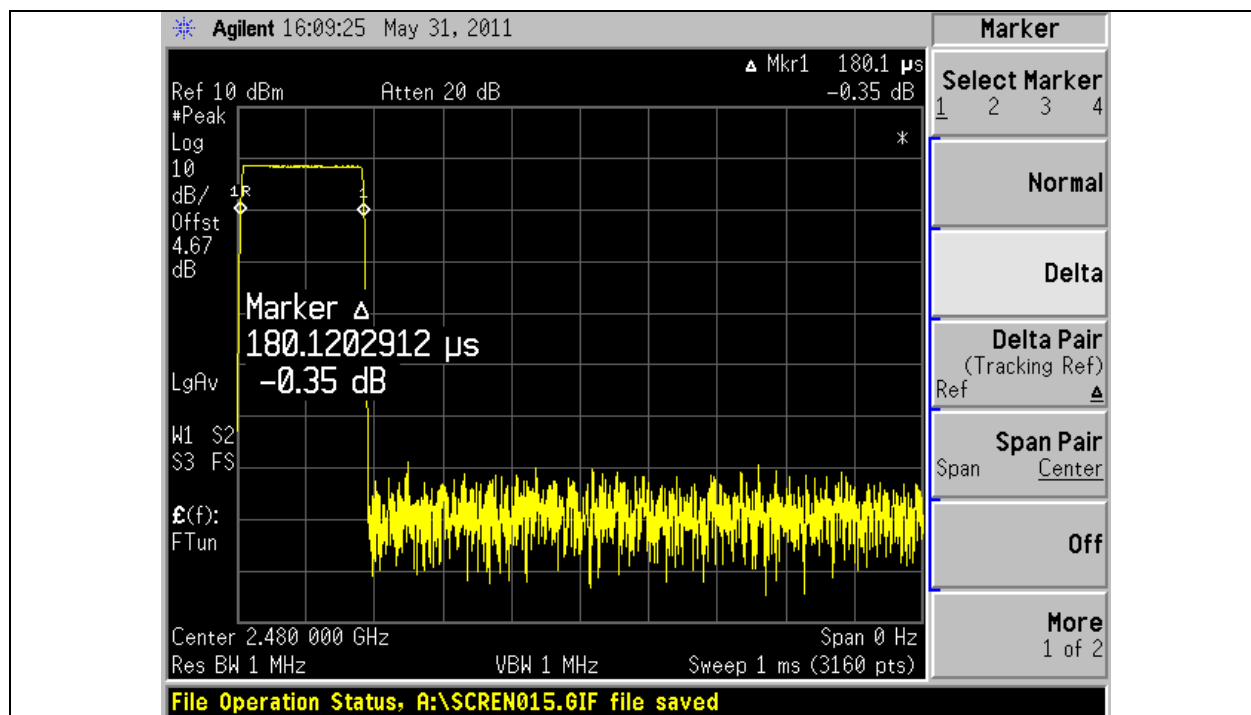
Frequency (MHz)	Time of Occupancy (sec)	Limit (sec)	Margin (sec)
2402	0.07	0.4	-0.33
2441	0.07	0.4	-0.33
2480	0.07	0.4	-0.33



Title: **Single Pulse width at 2402MHz**

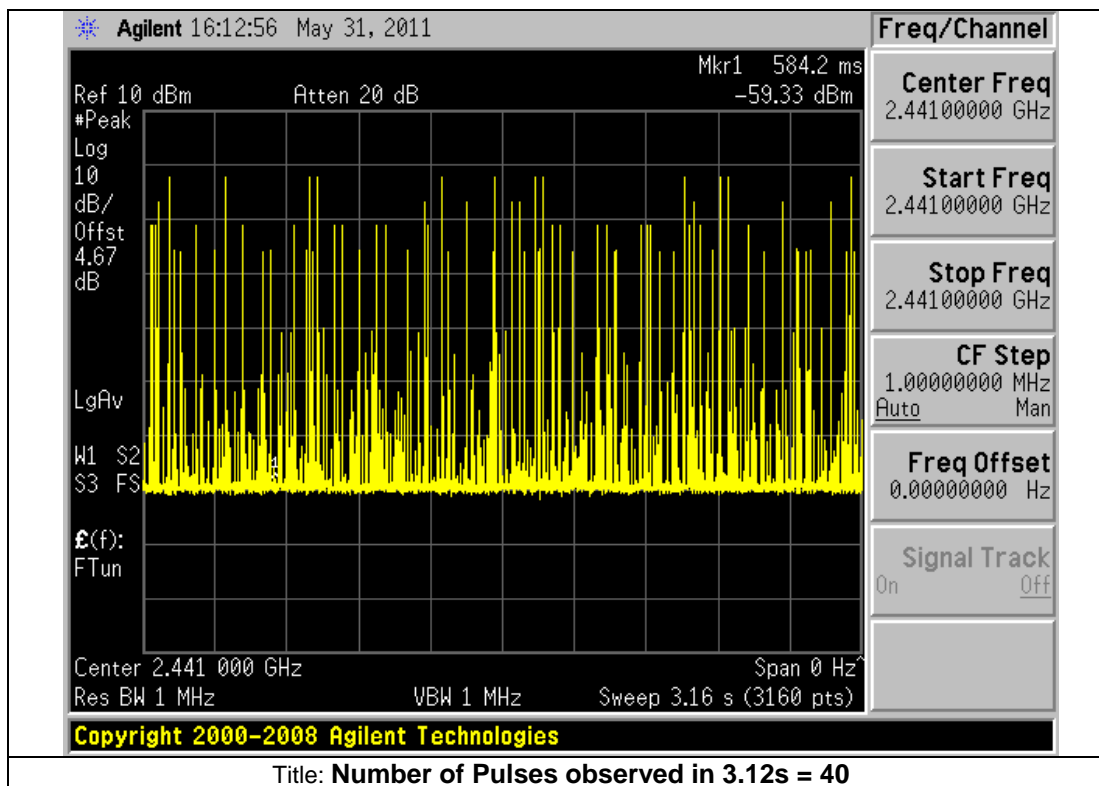
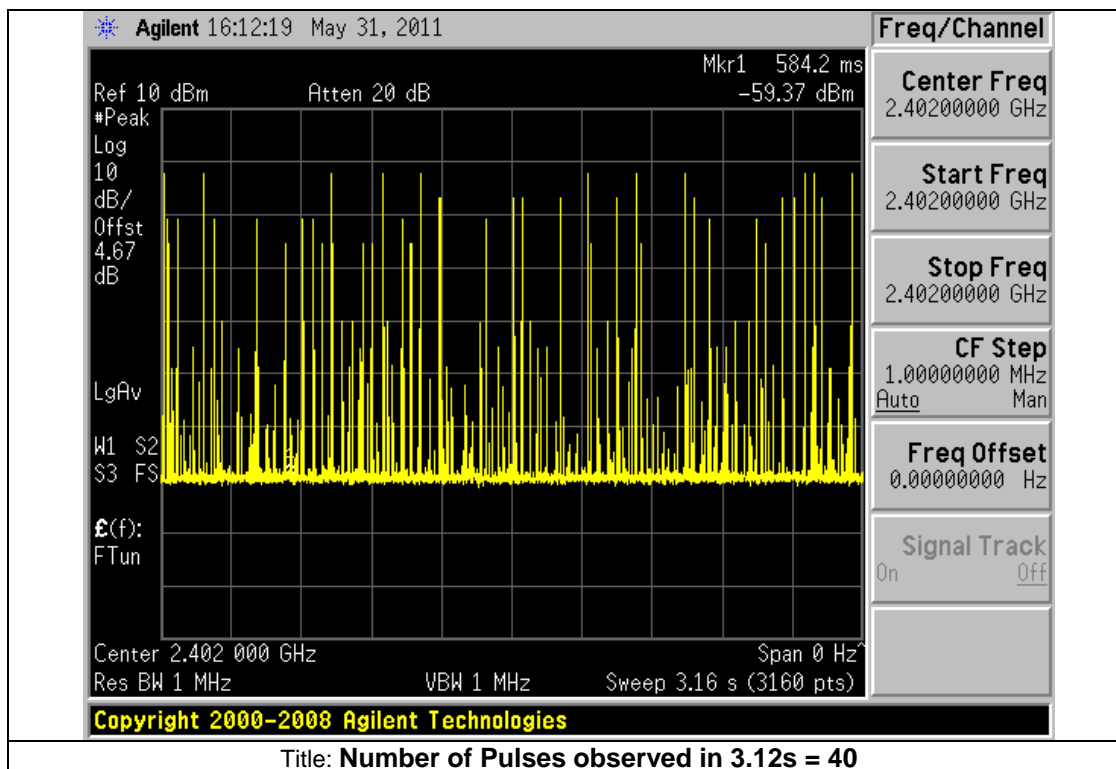


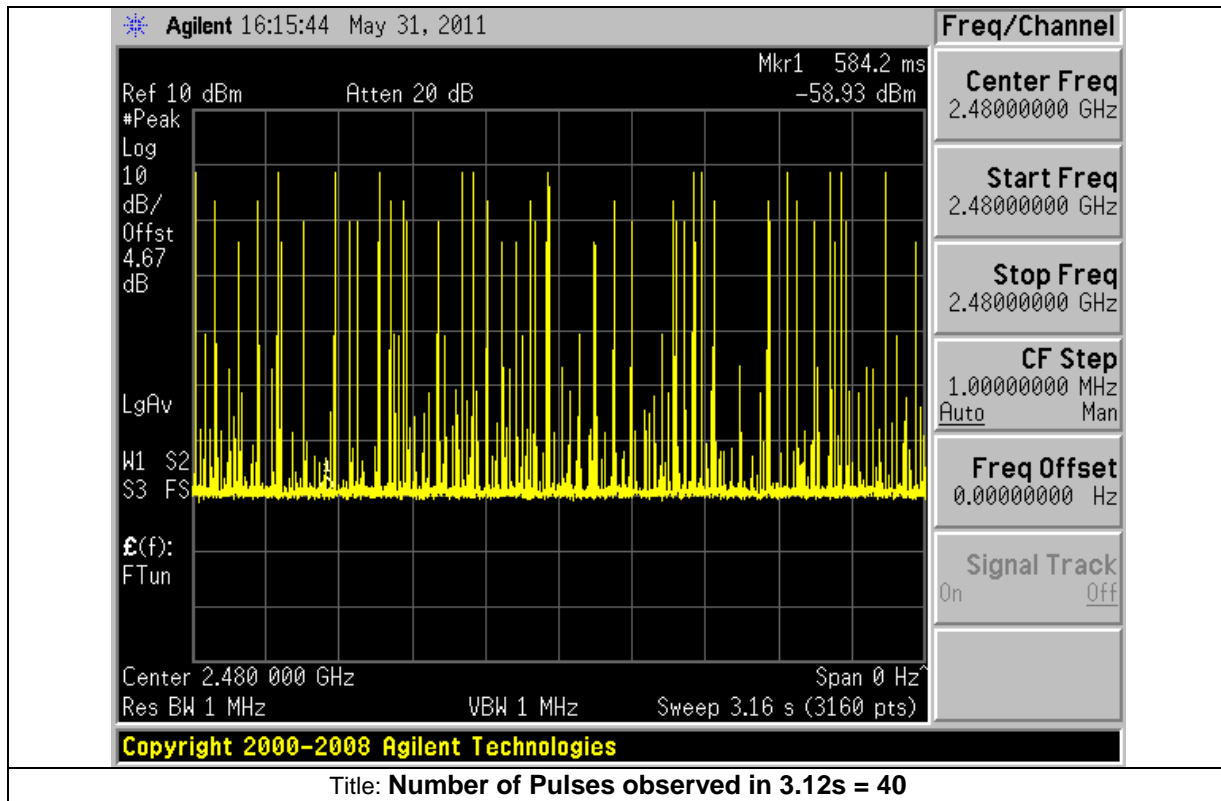
Title: Single Pulse width at 2441MHz



Title: Single Pulse width at 2480MHz









**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> 63691		<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"/>

<b>Subtest Number:</b> 63691 - 1		<b>Subtest Date:</b> 01-Jun-2011	
<b>Engineer</b>	Phillip Carranco		
<b>Lab Information</b>	Building B, Shield Room		
<b>Subtest Results</b>			
<b>Line Under Test</b>	[A] Antenna Port		
<b>Transducer</b>	Direct		
<b>Subtest Result</b>	Pass		
<b>Highest Frequency</b>	26499.999		
<b>Lowest Frequency</b>	30.0		
<b>Comments on the above Test Results</b>	No further comments		
<b>Environmental Conditions:</b>			
Temperature: within range of 54 to 95 F:	Yes		
Humidity: between 10 and 75%:	Yes		
<b>Comments:</b>			
<b>Equipment used:</b>			



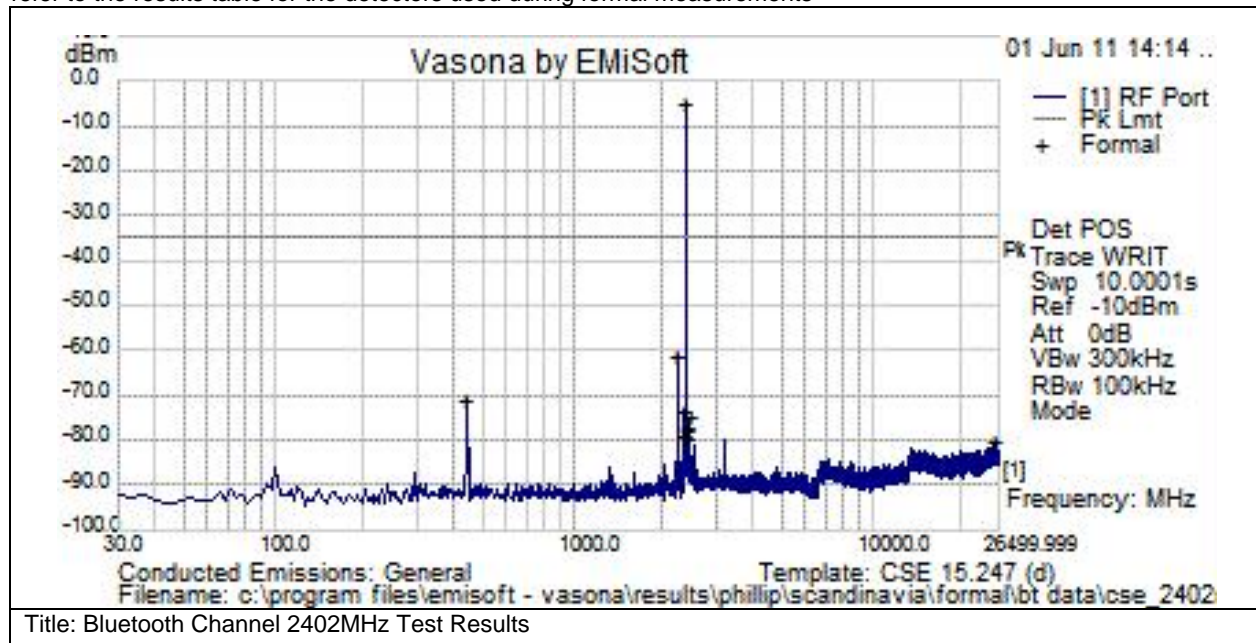
Equipment No	Manufacturer	Model	Description
CIS035095	Micro-Coax	UFA147A-0-0180-110200	RF Coaxial Cable, to 40 GHz, 18 in
CIS040514	Agilent	E4440A	Precision Spectrum Analyzer
CIS041985	Murata Electronics	MXGS83RK3000	Special Radio Test Adaptor Cable
CIS043023	Anritsu	MT8852B-042	EDR Bluetooth Test Set
CIS044583	Mini-Circuits	ZFSC-2-10G	Splitter

**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**

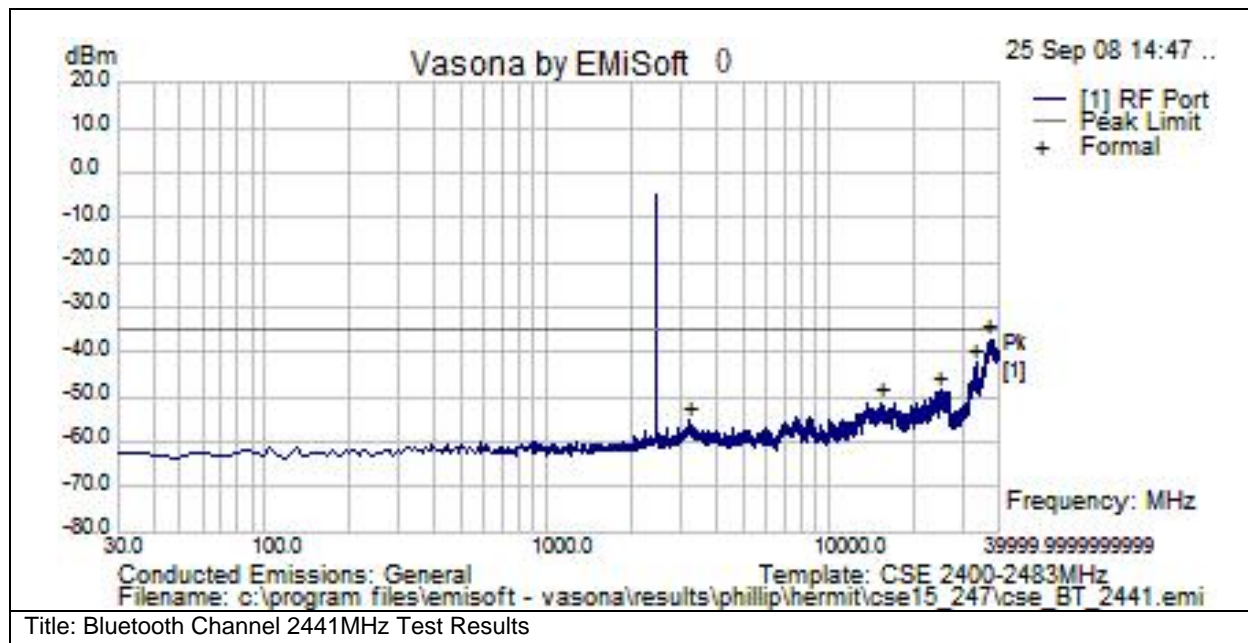
Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
2401.991	-9.6	4.7	0	-5	NA	RF	-35	30	N/A	Tx Signal
2243.643	-65.6	4.5	0	-61.1	Peak(Scan)	RF	-35	-26.2	Pass	
443.644	-74.8	3.8	0	-71	Peak(Scan)	RF	-35	-36	Pass	
2366.444	-78	4.5	0	-73.4	Peak(Scan)	RF	-35	-38.5	Pass	
2466.623	-79.5	4.6	0	-74.9	Peak(Scan)	RF	-35	-40	Pass	
2418.149	-81.8	4.7	0	-77	Peak(Scan)	RF	-35	-42.1	Pass	
2427.844	-82.8	4.7	0	-78.1	Peak(Scan)	RF	-35	-43.1	Pass	
2376.138	-83.8	4.5	0	-79.3	Peak(Scan)	RF	-35	-44.3	Pass	
2453.697	-84.5	4.5	0	-80	Peak(Scan)	RF	-35	-45	Pass	
26102.513	-84.8	4.6	0	-80.2	Peak(Scan)	RF	-35	-45.2	Pass	



<b>Subtest Number:</b> 63691 - 2		<b>Subtest Date:</b> 01-Jun-2011	
<b>Engineer</b>	Phillip Carranco		
<b>Lab Information</b>	Building B, Shield Room		
<b>Subtest Results</b>			
<b>Line Under Test</b>	[A] Antenna Port		
<b>Transducer</b>	Direct		
<b>Subtest Result</b>	Pass		
<b>Highest Frequency</b>	26499.999		
<b>Lowest Frequency</b>	30.0		
<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**

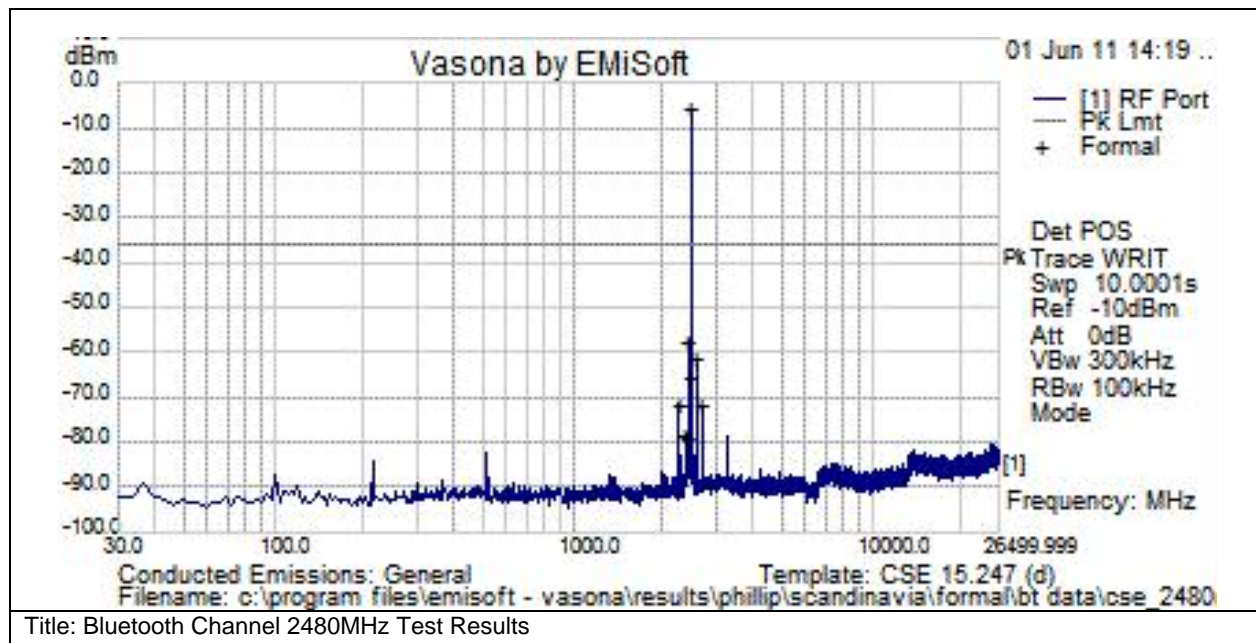
Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
2440.77	-8.1	4.6	0	-3.5	NA	RF	-33.5	30	N/A	Tx Signal
1991.578	-75.1	4.5	0	-70.6	Peak(Scan)	RF	-33.5	-37.2	Pass	
479.192	-78.7	3.9	0	-74.9	Peak(Scan)	RF	-33.5	-41.4	Pass	
2505.402	-79.8	4.6	0	-75.1	Peak(Scan)	RF	-33.5	-41.7	Pass	
2637.898	-80.9	4.6	0	-76.4	Peak(Scan)	RF	-33.5	-42.9	Pass	
2376.138	-81.8	4.5	0	-77.3	Peak(Scan)	RF	-33.5	-43.8	Pass	
2469.855	-83	4.6	0	-78.4	Peak(Scan)	RF	-33.5	-45	Pass	
2492.476	-84	4.7	0	-79.4	Peak(Scan)	RF	-33.5	-45.9	Pass	



<b>Subtest Number:</b> 63691 - 3		<b>Subtest Date:</b> 01-Jun-2011	
<b>Engineer</b>	Phillip Carranco		
<b>Lab Information</b>	Building B, Shield Room		
<b>Subtest Results</b>			
<b>Line Under Test</b>	[A] Antenna Port		
<b>Transducer</b>	Direct		
<b>Subtest Result</b>	Pass		
<b>Highest Frequency</b>	26499.999		
<b>Lowest Frequency</b>	30.0		
<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 dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
2479.549	-10.4	4.6	0	-5.8	NA	RF	-35.8	30	N/A	Tx Signal
2427.844	-62.3	4.7	0	-57.6	Peak(Scan)	RF	-35.8	-21.8	Pass	
2586.192	-66.3	4.8	0	-61.5	Peak(Scan)	RF	-35.8	-25.7	Pass	
2505.402	-70.1	4.6	0	-65.4	Peak(Scan)	RF	-35.8	-29.6	Pass	
2269.496	-76	4.5	0	-71.5	Peak(Scan)	RF	-35.8	-35.6	Pass	
2715.456	-76.6	4.6	0	-72	Peak(Scan)	RF	-35.8	-36.1	Pass	
2376.138	-82.8	4.5	0	-78.2	Peak(Scan)	RF	-35.8	-42.4	Pass	

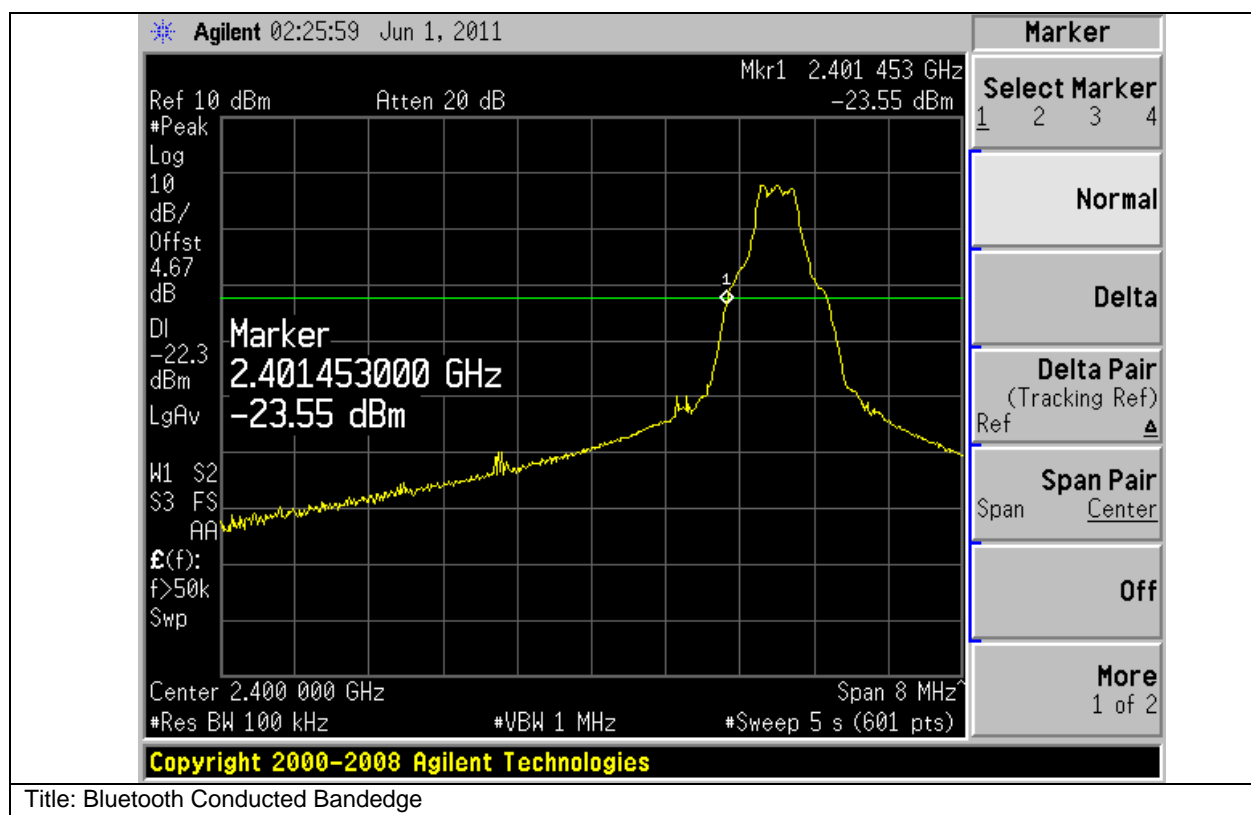
**Conducted Band Edge Measurements**

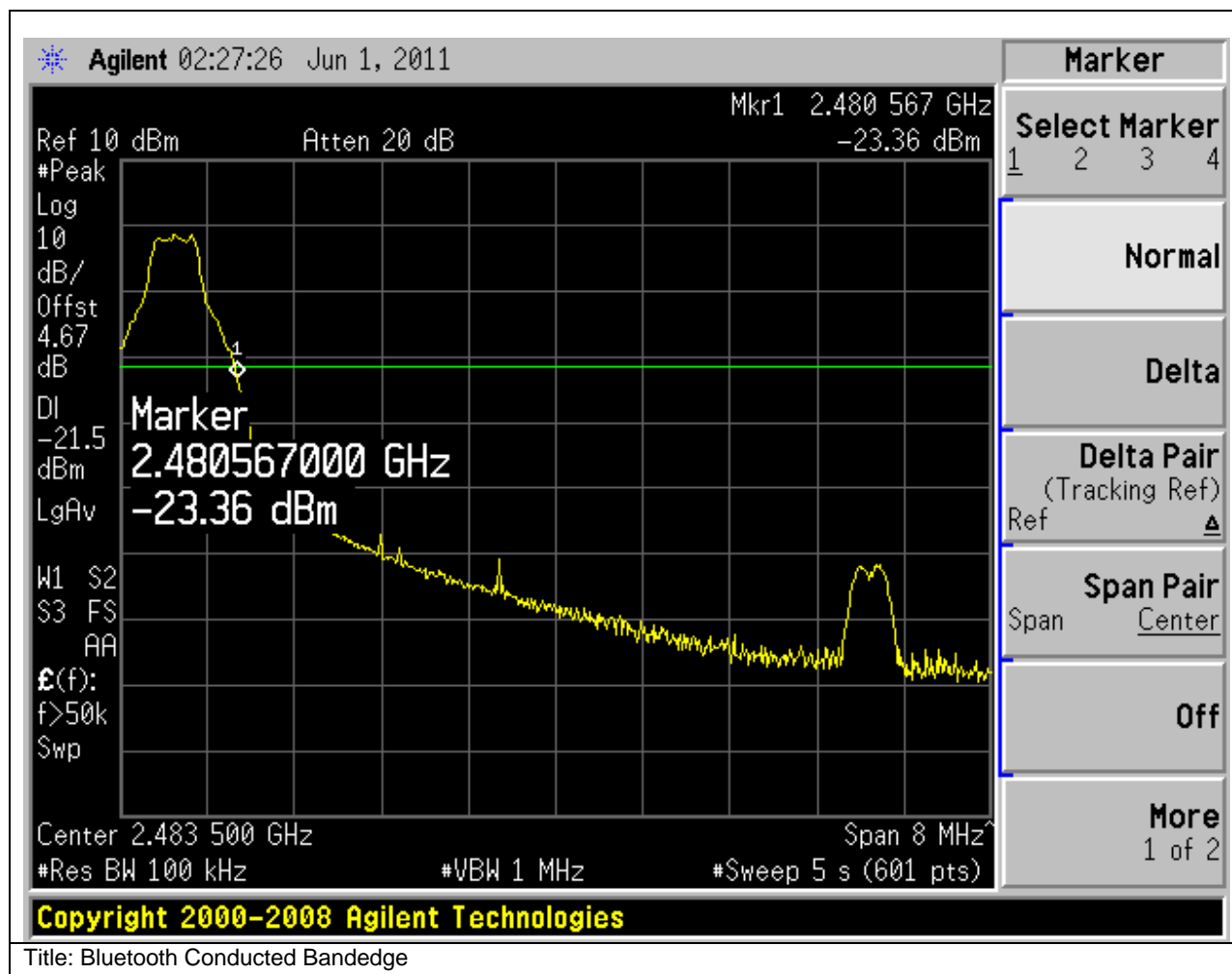
15.205 & RSS-210 sec2.7:

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**

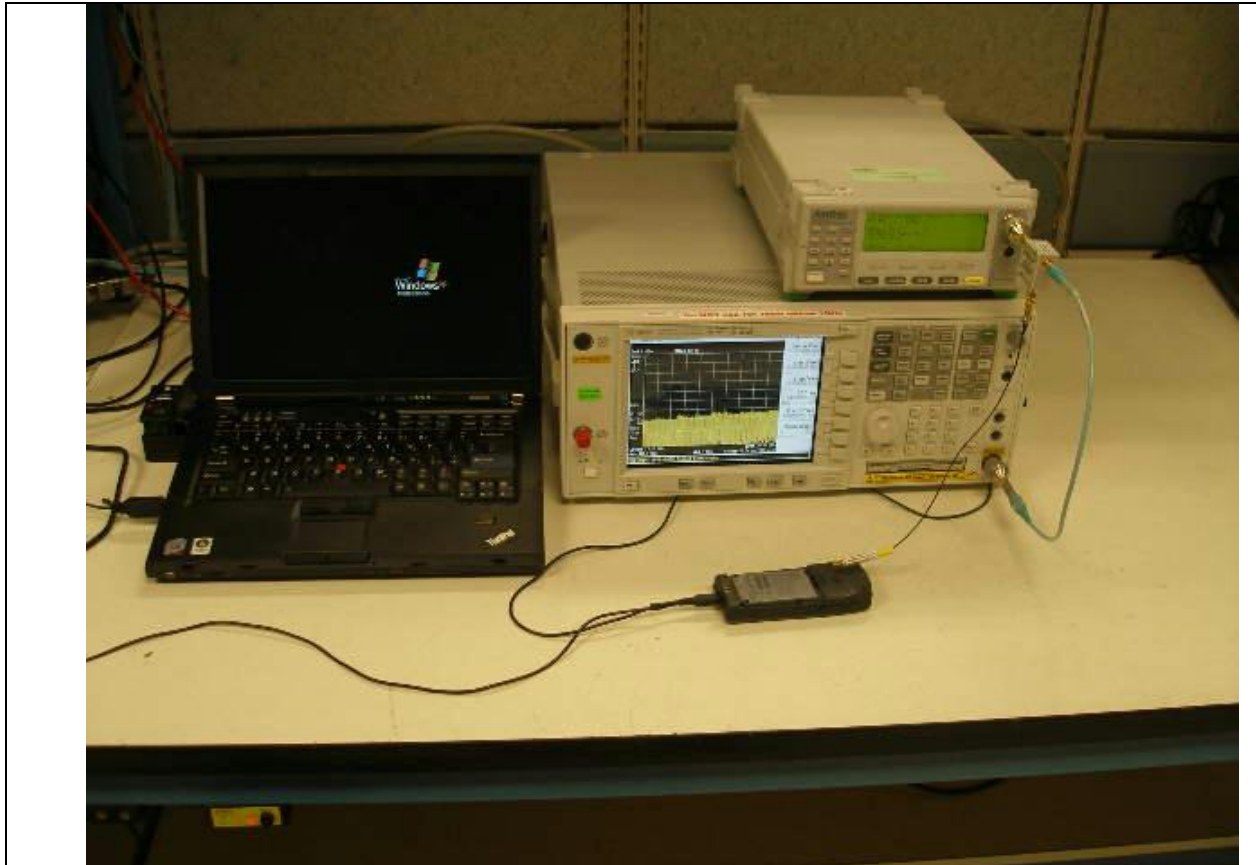
Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements







**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> 63826		<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"/>

<b>Subtest Number:</b> 63826 - 1		<b>Subtest Date:</b> 03-Jun-2011	
<b>Engineer</b>	Phillip Carranco		
<b>Lab Information</b>	Building I, 5m Anechoic		
<b>Subtest Results</b>			
<b>Subtest Title</b>	Radiated Spurious Emissions Test Results from 30 - 1000MHz		
<b>Subtest Result</b>	Pass		
<b>Highest Frequency</b>	1000.0		
<b>Lowest Frequency</b>	30.0		
<b>Comments on the above Test Results</b>	No further comments		
<b>Environmental Conditions:</b>			
Temperature: within range of 54 to 95 F:	75F		
Humidity: between 10 and 75%:	36%		
Comments:			
<b>Equipment used:</b>			
Equipment No	Manufacturer	Model	Description
CIS002119	EMC Test Systems	3115	Double Ridged Guide Horn Antenna
CIS008022	Huber + Suhner	SF106A	1 meter Sucoflex cable
CIS008024	Huber + Suhner	SF106A	3 meter Sucoflex cable
CIS005691	Miteq	NSP1800-25-S1	Broadband Preamplifier (1-18GHz)

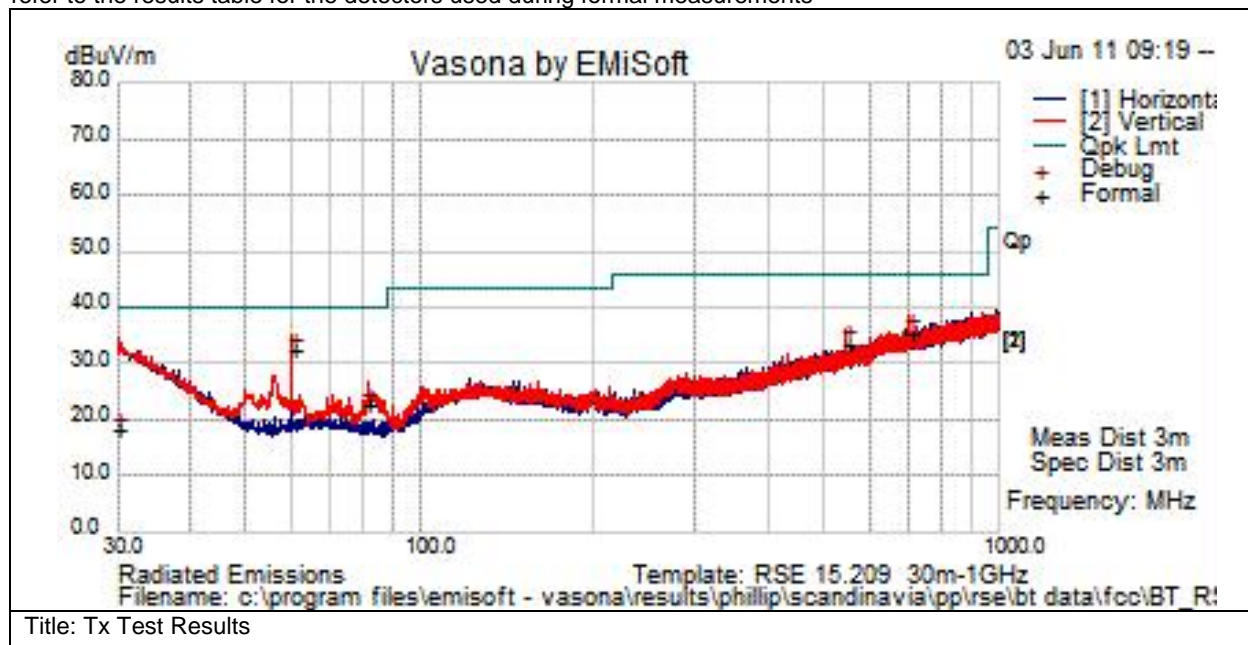


CIS024201	Rohde & Schwarz	FSEK30	Spectrum Analyzer 20Hz - 40GHz
CIS028072	Cisco	1840	18-40GHz EMI Test Head/Verification Fixture
CIS030443	Micro-Coax	UFB311A-0-1560-520520	RF Coaxial Cable, to 18GHz, 156 In.
CIS033602	Midwest Microwave	CSY-NMNM-80-273001	RF Coaxial Cable, 27ft. to 18GHz
CIS042000	Agilent	E4440A	Spectrum Analyzer
CIS045588	Sunol Sciences	JB1	Combination Antenna, 30MHz-2GHz
CIS045051	Rohde & Schwarz	ESCI	EMI Test Receiver

<b>Confidence Check Details:</b>	
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**

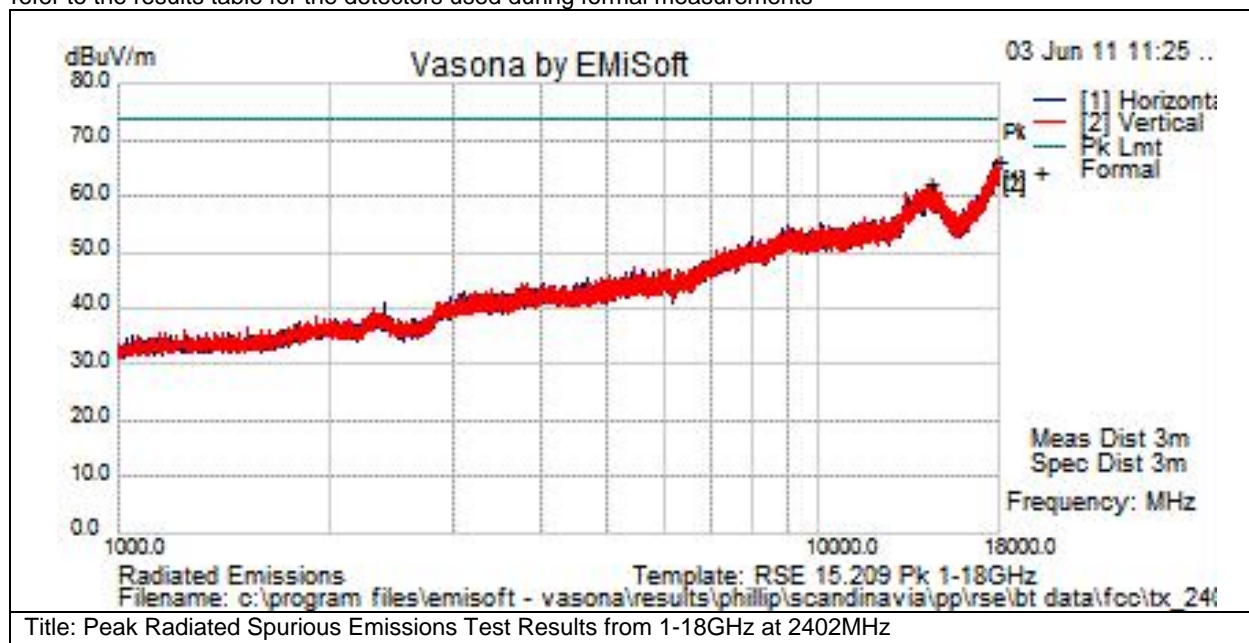
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
60.01	24.3	0.6	7.2	32.2	Qp	V	100	15	40	-7.8	Pass	
701.996	13	2.2	20.1	35.3	Qp	V	103	114	46	-10.7	Pass	
545.998	13.5	1.9	18.1	33.5	Qp	V	100	118	46	-12.5	Pass	
81.341	14.2	0.7	7.5	22.4	Qp	V	111	11	40	-17.6	Pass	
30.001	-3.9	0.4	21.4	18	Qp	V	100	0	40	-22	Pass	



<b>Subtest Number:</b> 63826 - 2		<b>Subtest Date:</b> 03-Jun-2011	
<b>Engineer</b>	Phillip Carranco		
<b>Lab Information</b>	Building I, 5m Anechoic		
<b>Subtest Results</b>			
<b>Subtest Title</b>	Peak Radiated Spurious Emissions Test Results from 1-18GHz at 2402MHz		
<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**

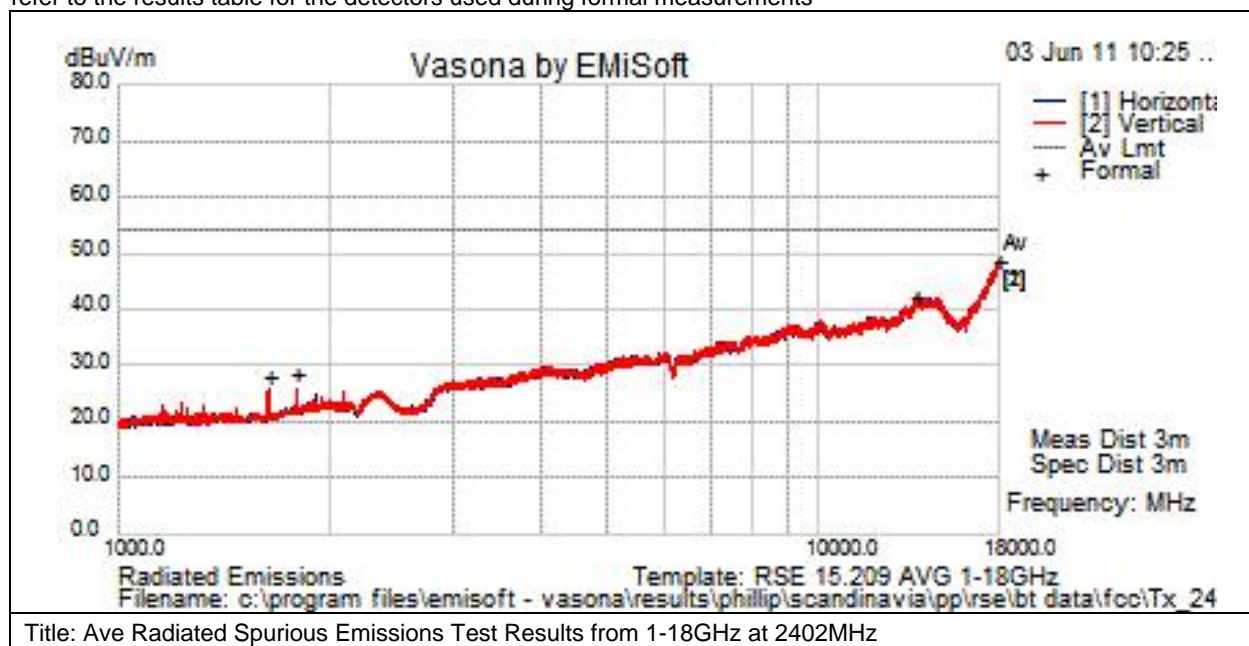
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
17939.812	40.9	13.7	11.7	66.2	Peak	H	100	0	74	-7.8	Pass	Noise Floor
14351.361	43.4	11.7	7.1	62.1	Peak	H	100	0	74	-11.9	Pass	Noise Floor



<b>Subtest Number:</b> 63826 - 3		<b>Subtest Date:</b> 03-Jun-2011	
<b>Engineer</b>	Phillip Carranco		
<b>Lab Information</b>	Building I, 5m Anechoic		
<b>Subtest Results</b>			
<b>Subtest Title</b>	Ave Radiated Spurious Emissions Test Results from 1-18GHz at 2402MHz		
<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**

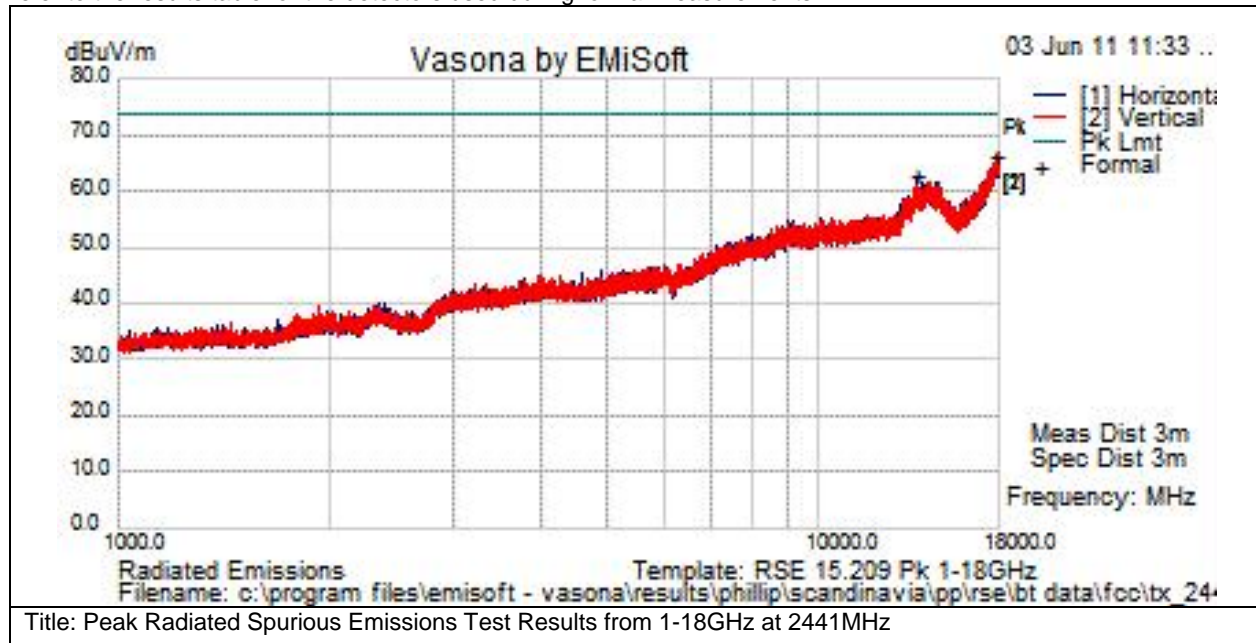
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
17990.66	23.4	13.6	11.6	48.6	Peak(Scan)	V	100	0	54	-5.4	Pass	Noise Floor
13727.689	23.9	11.8	6.7	42.4	Peak(Scan)	V	100	0	54	-11.6	Pass	Noise Floor
1794.03	31.1	3.8	-6.5	28.4	Av	V	100	213	54	-25.6	Pass	
1638.018	31.8	3.6	-7.5	27.9	Av	V	100	214	54	-26.1	Pass	



<b>Subtest Number:</b> 63826 - 4		<b>Subtest Date:</b> 03-Jun-2011	
<b>Engineer</b>	Phillip Carranco		
<b>Lab Information</b>	Building I, 5m Anechoic		
<b>Subtest Results</b>			
<b>Subtest Title</b>	Peak Radiated Spurious Emissions Test Results from 1-18GHz at 2441MHz		
<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**

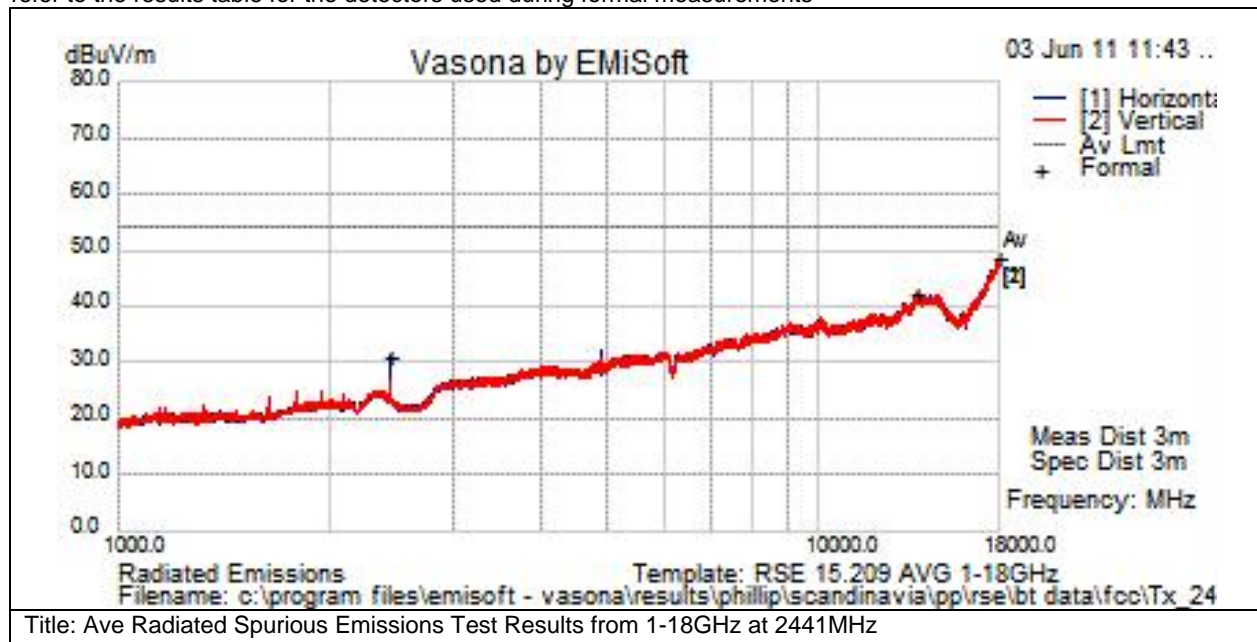
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
17877.549	41.3	13.6	11.3	66.2	Peak(Scan)	V	100	0	74	-7.8	Pass	Noise Floor
13738.066	44.1	11.9	6.6	62.5	Peak(Scan)	H	100	0	74	-11.5	Pass	Noise Floor



<b>Subtest Number:</b> 63826 - 5		<b>Subtest Date:</b> 03-Jun-2011
<b>Engineer</b>	Phillip Carranco	
<b>Lab Information</b>	Building I, 5m Anechoic	
<b>Subtest Results</b>		
<b>Subtest Title</b>	Ave Radiated Spurious Emissions Test Results from 1-18GHz at 2441MHz	
<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**

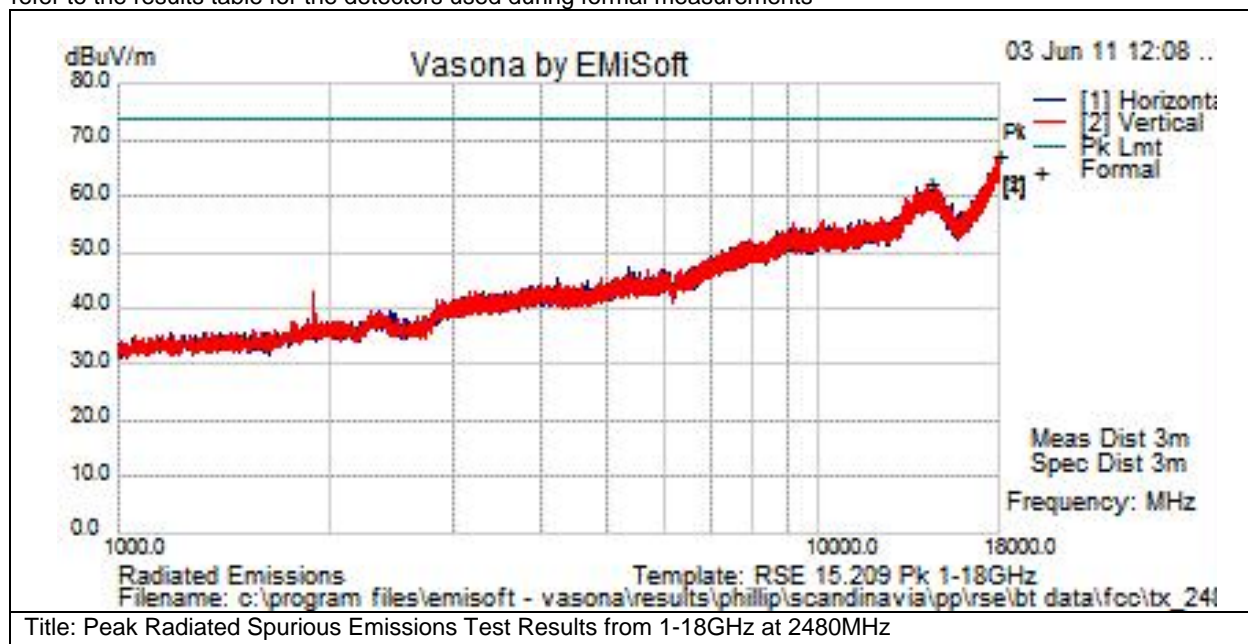
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
17997.406	23	13.8	11.6	48.4	Peak(Scan)	V	100	0	54	-5.6	Pass	Noise Floor
13713.68	23.8	11.8	6.7	42.3	Peak(Scan)	H	100	0	54	-11.7	Pass	Noise Floor
2440.886	32.2	4.5	-5.6	31	Peak(Scan)	H	100	0	54	-23	Pass	Tx Signal



<b>Subtest Number:</b> 63826 - 6		<b>Subtest Date:</b> 03-Jun-2011	
<b>Engineer</b>	Phillip Carranco		
<b>Lab Information</b>	Building I, 5m Anechoic		
<b>Subtest Results</b>			
<b>Subtest Title</b>	Peak Radiated Spurious Emissions Test Results from 1-18GHz at 2480MHz		
<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
17996.887	41.6	13.8	11.6	67	Peak(Scan)	V	100	0	74	-7	Pass	Noise Floor
14339.946	43.3	11.6	7.1	62	Peak(Scan)	V	100	0	74	-12	Pass	Noise Floor

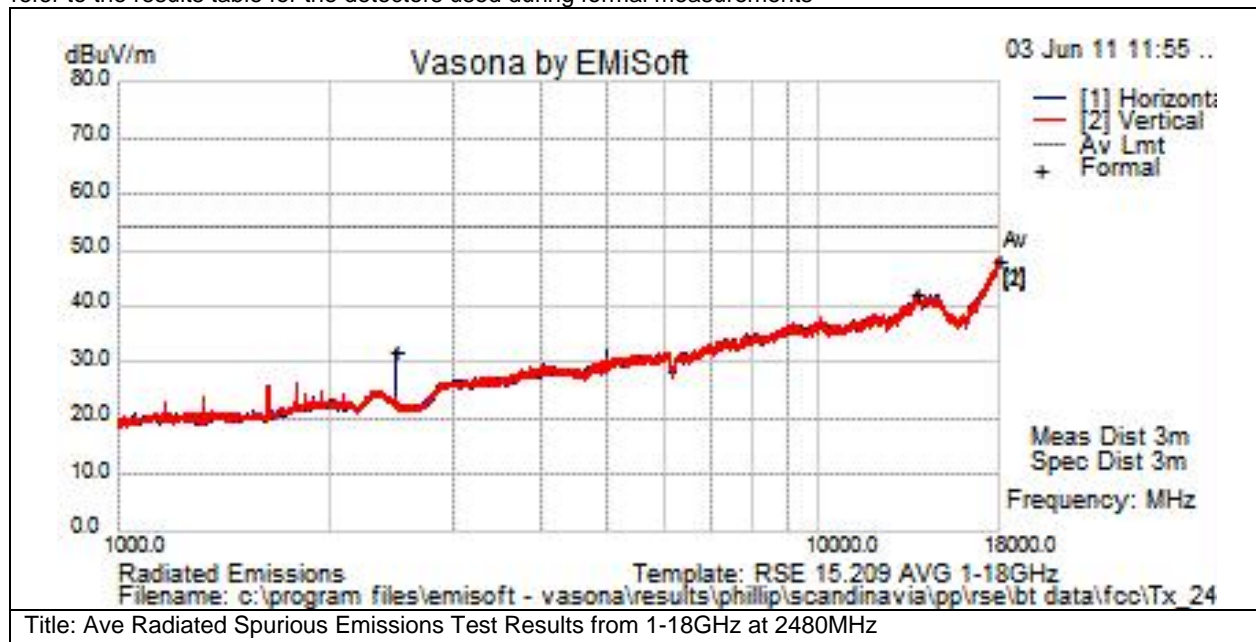




<b>Subtest Number:</b> 63826 - 7		<b>Subtest Date:</b> 03-Jun-2011	
<b>Engineer</b>	Phillip Carranco		
<b>Lab Information</b>	Building I, 5m Anechoic		
<b>Subtest Results</b>			
<b>Subtest Title</b>	Ave Radiated Spurious Emissions Test Results from 1-18GHz at 2480MHz		
<b>Subtest Result</b>	Pass		
<b>Highest 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**

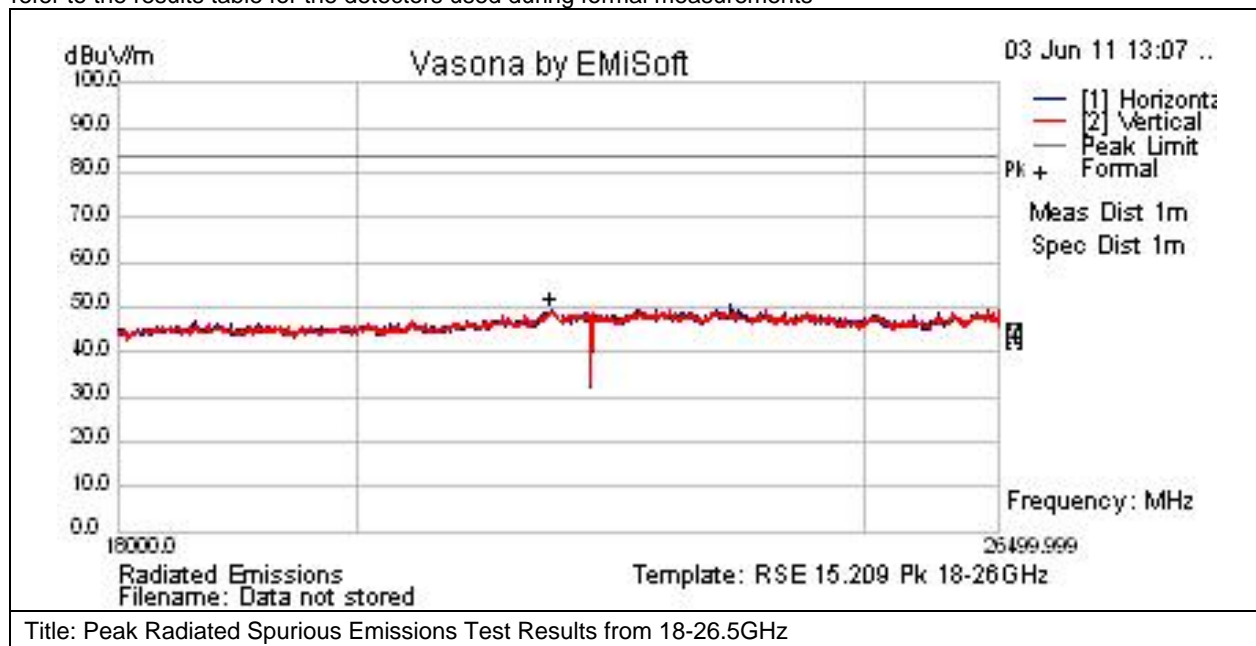
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
17936.18	23	13.7	11.7	48.3	Peak(Scan)	V	100	0	54	-5.7	Pass	Noise Floor
13725.613	23.8	11.8	6.7	42.3	Peak(Scan)	H	100	0	54	-11.7	Pass	Noise Floor
2479.933	33	4.5	-5.6	31.9	Peak(Scan)	H	100	-1	54	-22.1	Pass	Tx Signal



<b>Subtest Number:</b> 63826 - 8		<b>Subtest Date:</b> 03-Jun-2011	
<b>Engineer</b>	Phillip Carranco		
<b>Lab Information</b>	Building I, 5m Anechoic		
<b>Subtest Results</b>			
<b>Subtest Title</b>	Peak Radiated Spurious Emissions Test Results from 18-26.5GHz		
<b>Subtest Result</b>	Pass		
<b>Highest Frequency</b>	26499.999		
<b>Lowest Frequency</b>	18000.0		
<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**

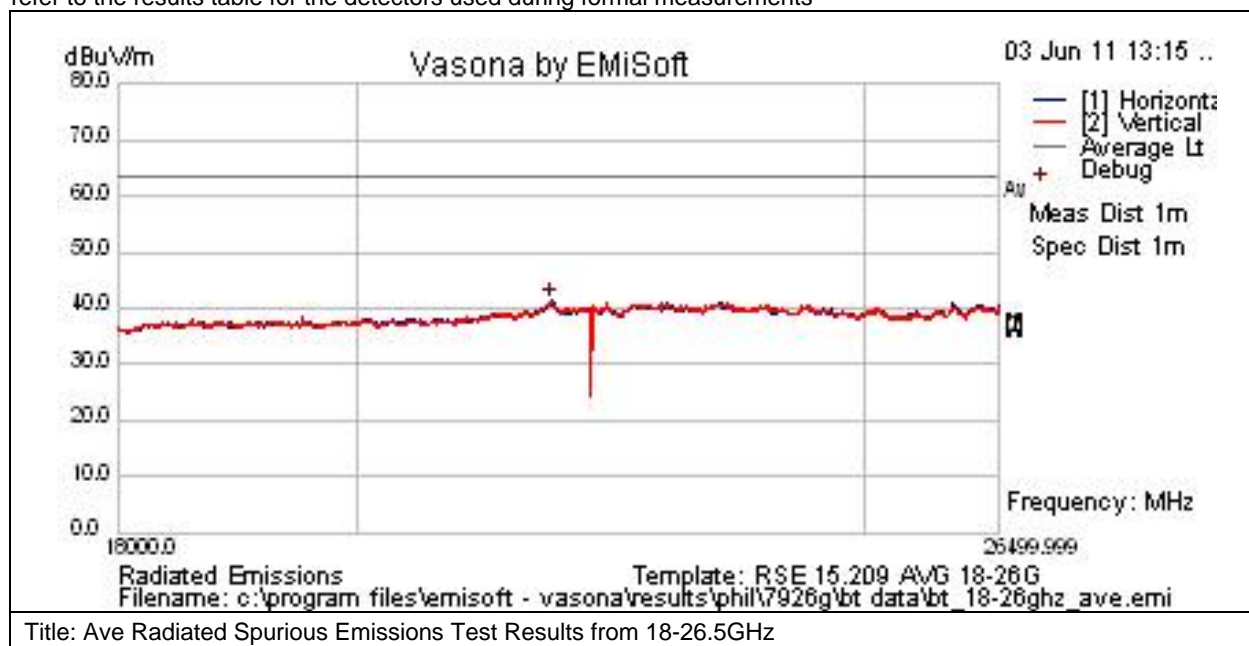
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
21775.884	34.1	0	15	49.1	Peak(Scan)	H	100	0	83.5	-34.4	Pass	Noise Floor



<b>Subtest Number:</b> 63826 - 9		<b>Subtest Date:</b> 03-Jun-2011	
<b>Engineer</b>	Phillip Carranco		
<b>Lab Information</b>	Building I, 5m Anechoic		
<b>Subtest Results</b>			
<b>Subtest Title</b>	Ave Radiated Spurious Emissions Test Results from 18-26.5GHz		
<b>Subtest Result</b>	Pass		
<b>Highest Frequency</b>	26499.999		
<b>Lowest Frequency</b>	18000.0		
<b>Comments on the above Test Results</b>	No further comments		

**Graphical Test Results**

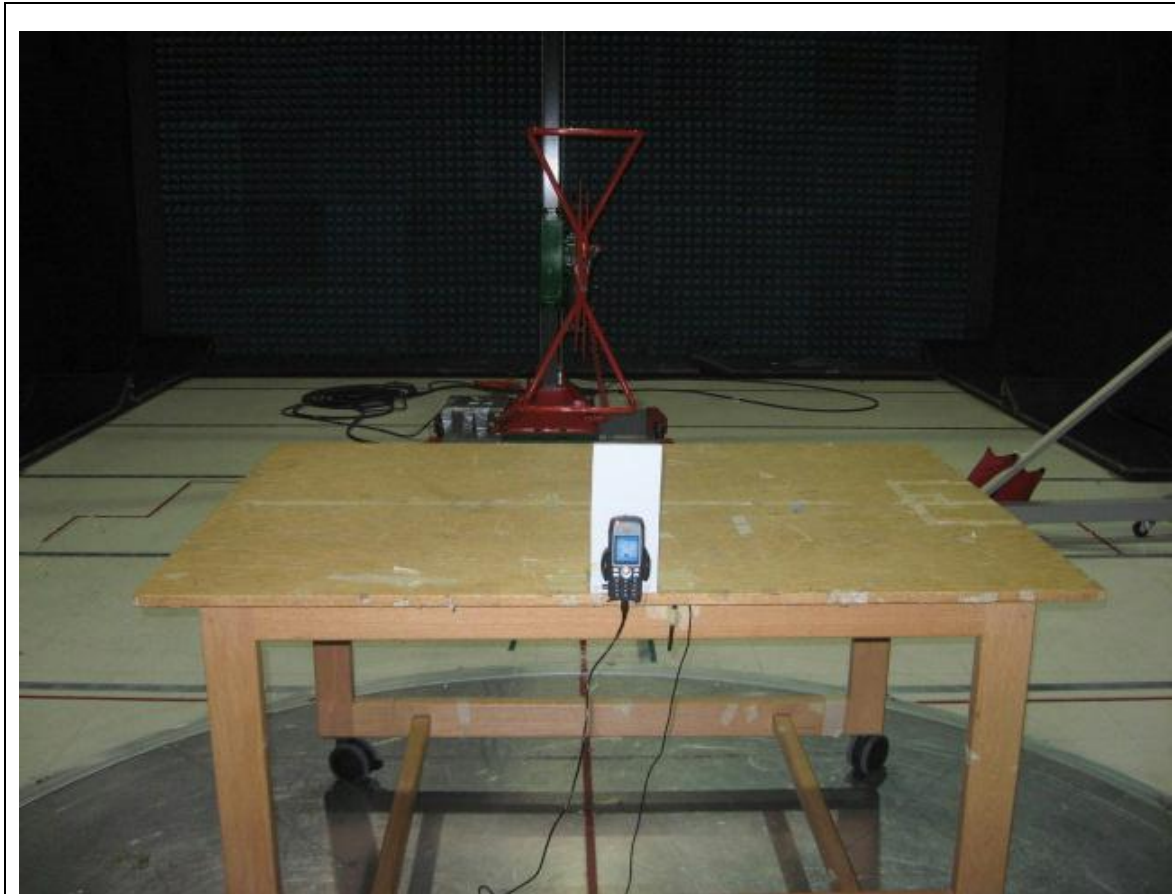
Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



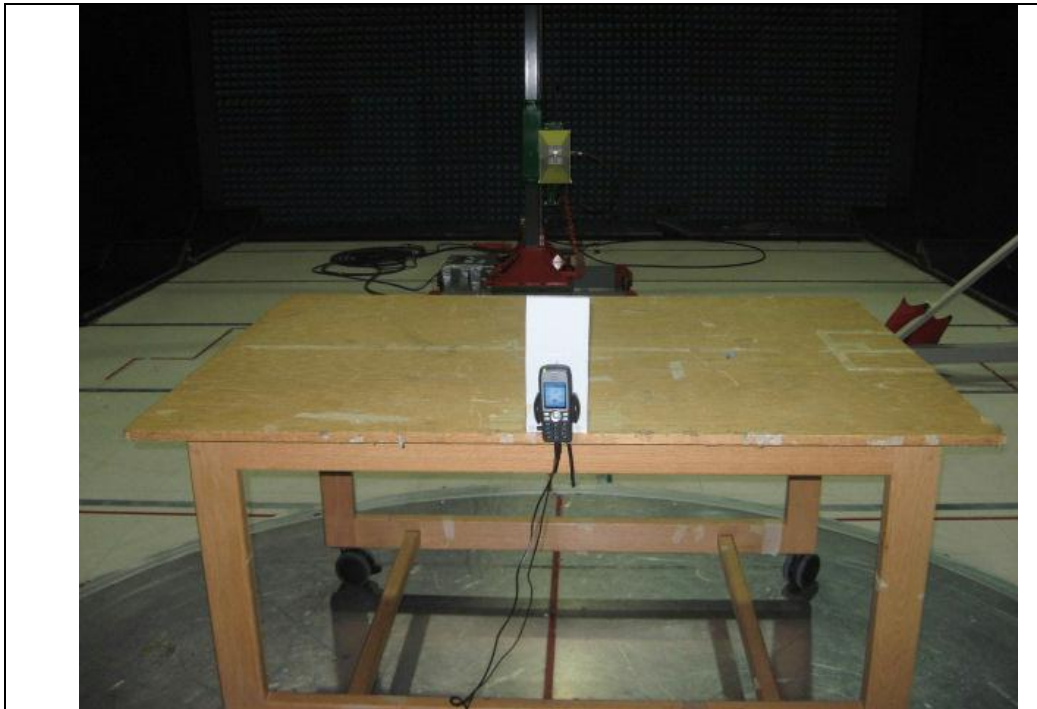
**Test Results Table**

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
21778.179	26.2	0	15	41.2	Peak(Scan)	H	100	-3	63.5	-22.4	Pass	Noise Floor

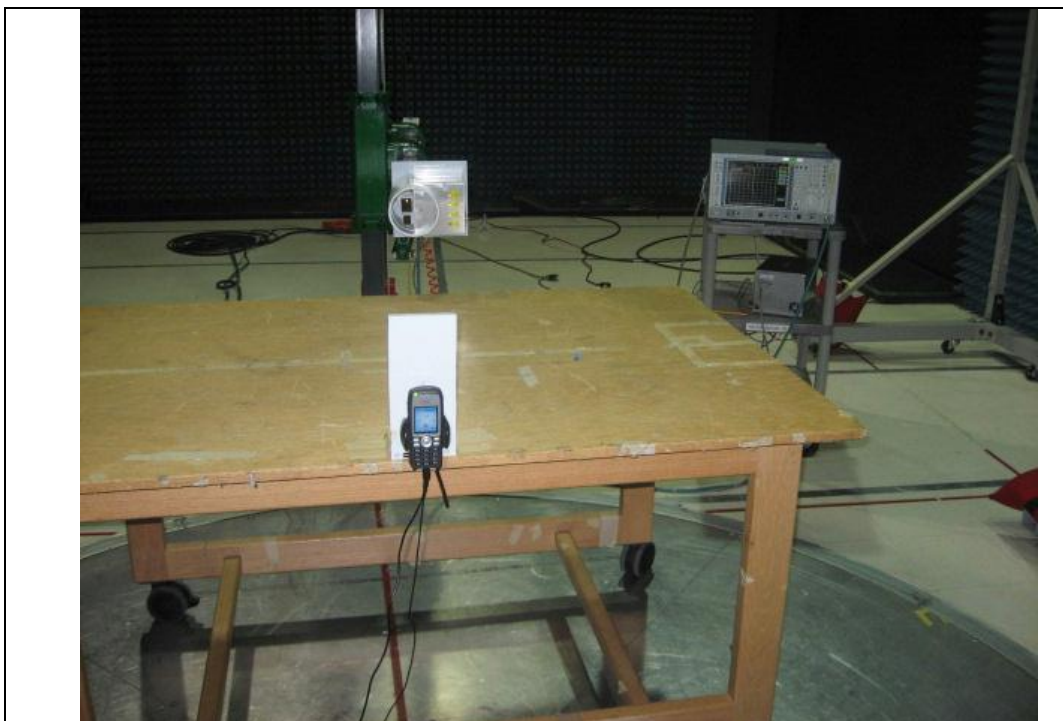
**Physical Test arrangement Photos:**



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



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



**Title:** Radiated Spurious Emissions 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 (1x10 <sup>3</sup> )
EN	European Norm	MHz	MegaHertz (1x10 <sup>6</sup> )
IEC	International Electro technical Commission	GHz	Gigahertz (1x10 <sup>9</sup> )
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 (1x10 <sup>3</sup> )
L1	Line 1	µV	Microvolt (1x10 <sup>-6</sup> )
L2	Line2	A	Amp
L3	Line 3	µA	Micro Amp (1x10 <sup>-6</sup> )
DC	Direct Current	mS	Milli Second (1x10 <sup>-3</sup> )
RAW	Uncorrected measurement value, as indicated by the measuring device	µS	Micro Second (1x10 <sup>-6</sup> )
RF	Radio Frequency	µS	Micro Second (1x10 <sup>-6</sup> )
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
035095	Micro-Coax/ UFA147A-0-0180-110200	RF Coaxial Cable, to 40 GHz, 18 in	13-OCT-10	13-OCT-11
040514	Agilent (E4440A)	Precision Spectrum Analyzer	09-NOV-10	09-NOV-11
041985	Murata Electronics/ MXGS83RK3000	Special Radio Test Adaptor Cable	12-MAY-11	12-MAY-12
041986	Murata Electronics/ MXGS83RK3000	Special Radio Test Adaptor Cable	12-MAY-11	12-MAY-12
043023	Anritsu (MT8852B-042)	EDR Bluetooth Test Set	27-AUG-10	27-AUG-11
044583	Mini-Circuits (ZFSC-2-10G)	Splitter	07-JUL-10	07-JUL-11
002119	EMC Test Systems/ 3115	Double Ridged Guide Horn Antenna	30-JUN-10	30-JUN-11
005691	Mitec/ NSP1800-25-S1	Broadband Preamplifier (1-18GHz)	02-FEB-11	02-FEB-12
008022	Huber + Suhner/ SF106A	1 meter Sucoflex cable	16-DEC-10	16-DEC-11
008024	Huber + Suhner/ SF106A	3 meter Sucoflex cable	10-NOV-10	10-NOV-11
024201	Rohde & Schwarz/ FSEK30	Spectrum Analyzer 20Hz - 40GHz	22-NOV-10	22-NOV-11
028072	Cisco/ 1840	18-40GHz EMI Test Head/Verification Fixture	17-FEB-11	17-FEB-12
030443	Micro-Coax/ UFB311A-0-1560-520520	RF Coaxial Cable, to 18GHz, 156 In.	10-NOV-10	10-NOV-11
033602	Midwest Microwave/ CSY-NMNM-80-273001	RF Coaxial Cable, 27ft. to 18GHz	10-NOV-10	10-NOV-11
042000	Agilent/ E4440A	Spectrum Analyzer	14-JUN-10	14-JUN-11
045051	Rohde & Schwarz/ ESCI	EMI Test Receiver	03-NOV-10	03-NOV-11
045588	Sunol Sciences/ JB1	Combination Antenna, 30MHz-2GHz	03-DEC-10	03-DEC-11
030666	Micro-Tronics BRM50702-02	Band Reject Filter, Stop Band=2.4-2.5GHz	04-JUN- 2010	04-JUN- 2011

**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