



**Spectrum Research &  
Testing Lab., Inc.**  
No. 101-10, Ling 8,  
Shan-Tong Li, Chung-Li  
City, Taoyuan, Taiwan

## TEST REPORT

Reference No.: A09093003  
Report No.: FCCA09093003  
FCC ID: XTA0800V2B27012  
Page: 1 of 63  
Date : Nov. 03, 2009

Product Name: Wireless VoIP Gateway  
Model Number: GP-712  
Applicant: Gempro Technology Inc.  
6F., No.314, Sec. 3, Fusing Rd., South District,  
Taichung City 402, Taiwan (R.O.C.)  
Date of Receipt: Sep. 09, 2009  
Finished date of Test: Oct. 09, 2009  
Applicable Standards: 47 CFR Part 15, Subpart C, Class B  
ANSI C63.4:2003

We, **Spectrum Research & Testing Laboratory Inc.**, hereby certify that one sample of the above was tested in our laboratory with positive results according to the above-mentioned standards. The records in the report are an accurate account of the results. Details of the results are given in the subsequent pages of this report.

Tested By :

Shun Wang  
(Shunm Wang)

Date: Nov. 03, 2009

Approved By :

J. H.  
(Johnson Ho, Director)

Date: 11/03/2009

**NVLAQ**

Lab Code: 200099-0



## TEST REPORT

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## 1. DOCUMENT POLICY AND TEST STATEMENT

### 1.1 DOCUMENT POLICY

- The report shall not be reproduced except in full, without the written approval of SRT Lab, Inc.
- The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

### 1.2 TEST STATEMENT

- The test results in the report apply only to the unit tested by SRT Lab.
- There was no deviation from the requirements of test standards during the test.
- AC power source, 120 VAC/60 Hz, was used during the test.

### 1.3 EUT MODIFICATION

Radiation :

- 1.The top cover of inside and bottom outside must connect to ground more closed.
- 2.Enthernet LAN port will use shield cable
- 3.RJ-45 jack will connect to ground.



## TEST REPORT

## 2. DESCRIPTION OF EUT AND TEST MODE

### 2.1 GENERAL DESCRIPTION OF EUT

Product	Wireless VoIP Gateway
Model No.	GP-712
Power Supply	DC 12 V , 1000mA
Frequency Band	2400-2483.5 MHz
Carrier Frequency	2402-2480 MHz
Number of Channel	79
Channel Spacing	1 MHz
Rated RF Output Power	0 dBm
Modulation Type	GFSK
Bit Rate of Transmission	1Mbps
Mode of Operation	Duplex
Antenna Gain	2 dBi
Operating Temperature Range	-10 ~ 70 °C
Channel Bandwidth	1 MHz
Antenna Type	Dipole

#### NOTE :

1. For more detailed information, please refer to the EUT's specification or user's manual provided by manufacturer.

### 2.2 DESCRIPTION OF SUPPORT UNIT

The transmitter part of EUT was tested with a NB system and configured by the requirement of ANSI C63.4. All interface ports were connected to the appropriate support units via specific cables. The support units and cables are listed below.

No	Device	Brand	Model #	FCC ID/DoC	Cable
1	Note Book	Dell	PP21L	DOC	1.8m unshielded power cord with DC adapter

**NOTE :** For the actual test configuration, please refer to the photos of testing.



## 2.3 DESCRIPTION OF TEST MODE

This product has two bluetooth modules and test mode as below:

The test mode of two bluetooth are the same.

79 channels are provided by EUT. Three channels of lower, medium and higher were chosen for test.

Mode	Channel	Frequency (MHz)
TX	0	2402
TX	39	2441
TX	78	2480
RX	N/A	N/A

### NOTE :

1. Below 1 GHz, the channel 0, 39 and 78 were pre-tested in chamber. The channel 39, worst case one, was chosen for radiated emission test and conduction.
2. Above 1 GHz, the channel 0, 39 and 78 were tested individually.

## 3. DESCRIPTION OF APPLIED STANDARDS

The EUT is Wireless VoIP Gateway and to be connected with a NB system for normal use. According to the specifications provided by the applicant, it must comply with the requirements of the following standards:

47 CFR Part 15, Subpart C  
ANSI C63.4: 2003

All tests have been performed and recorded as the above standards.

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## 4. TECHNICAL CHARACTERISTICS TEST

### 4.1 CHANNEL SEPARATION TEST

#### 4.1.1 LIMIT

FCC Part15, Subpart C Section 15.247(a)(1). Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

Frequency Range (MHz)	Limit(kHz)
902-928	>25kHz
2400-2483.5	>25kHz
5725-5850	>25kHz

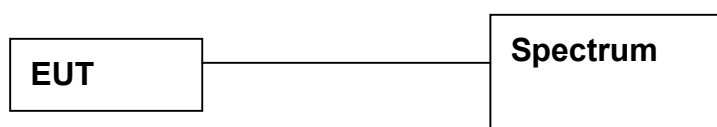
#### 4.1.2 TEST EQUIPMENT

The following test equipment was used during the radiated emission test :

Equipment/ Facilities	Specifications	Manufacturer	Model#/ Serial#	Due Date of Cal. & Cal. Center
SPECTRUM	9kHz-7GHz	ROHDE & SCHWARZ	FSP7/ 100289	APR. 2010 ETC

**NOTE:** The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

#### 4.1.3 TEST SET-UP



The EUT was connected to a spectrum through a 50Ω RF cable.

#### 4.1.4 TEST PROCEDURE

The EUT was operating in hopping mode or could be controlled its channel.  
 Printed out the test result from the spectrum by hard copy function.





## 4.1.5 EUT OPERATING CONDITION

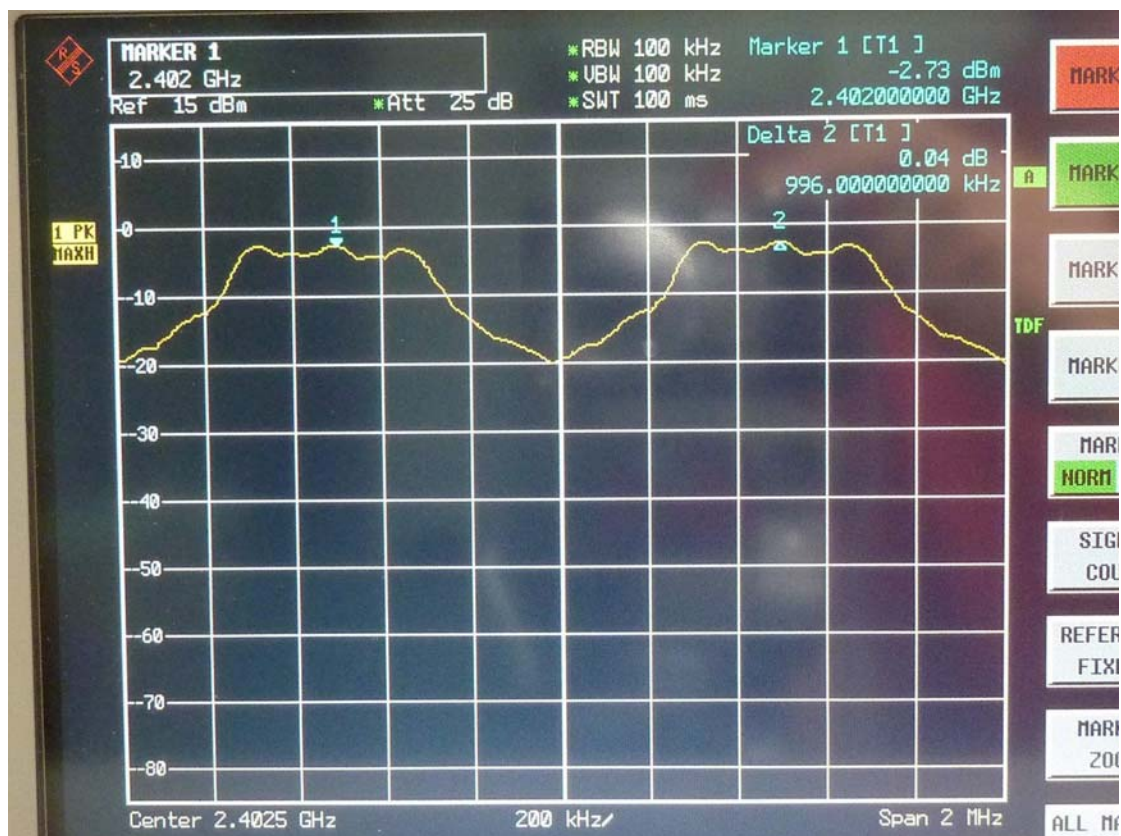
1. Set the EUT under transmission condition continuously at a specific channel frequency.
2. The EUT was set to the highest available power level.

## 4.1.6 TEST RESULT

Bluetooth Module:	1	Temperature:	24°C
Spectrum Detector:	PK	Humidity:	67%RH
		Tested Date:	Oct. 06, 2009
Test Result:	PASS	Tested by:	Shunm Wang

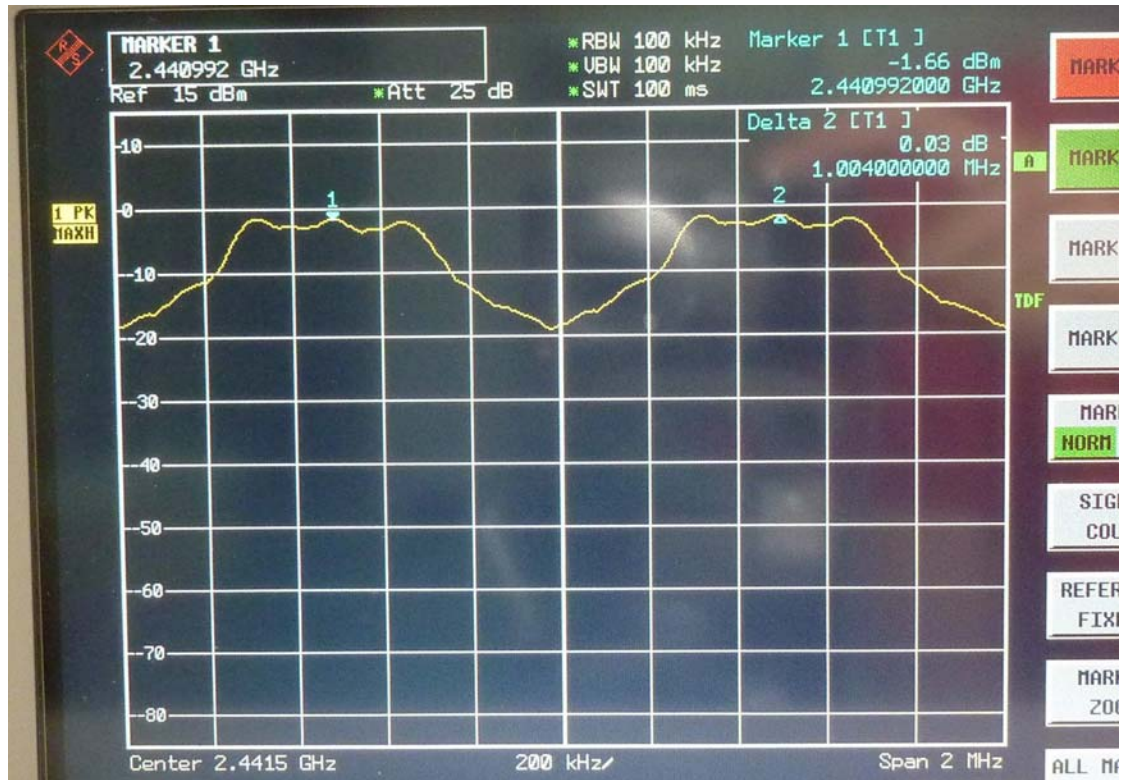
Channel Number	Channel Frequency (MHz)	Separation Read Value (kHz)	Minimum Limit(20dB Bandwidth) (kHz)
0	2402	996	25
39	2441	1004	25
78	2480	1004	25

CH0:

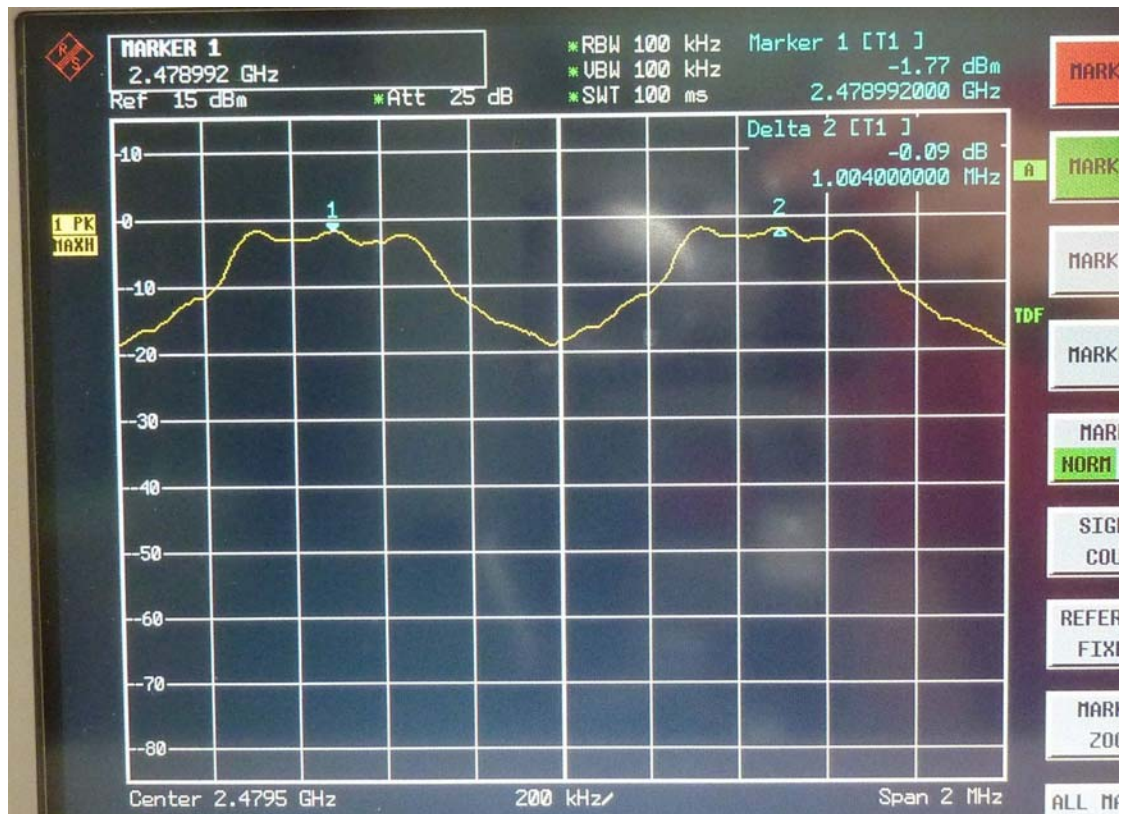




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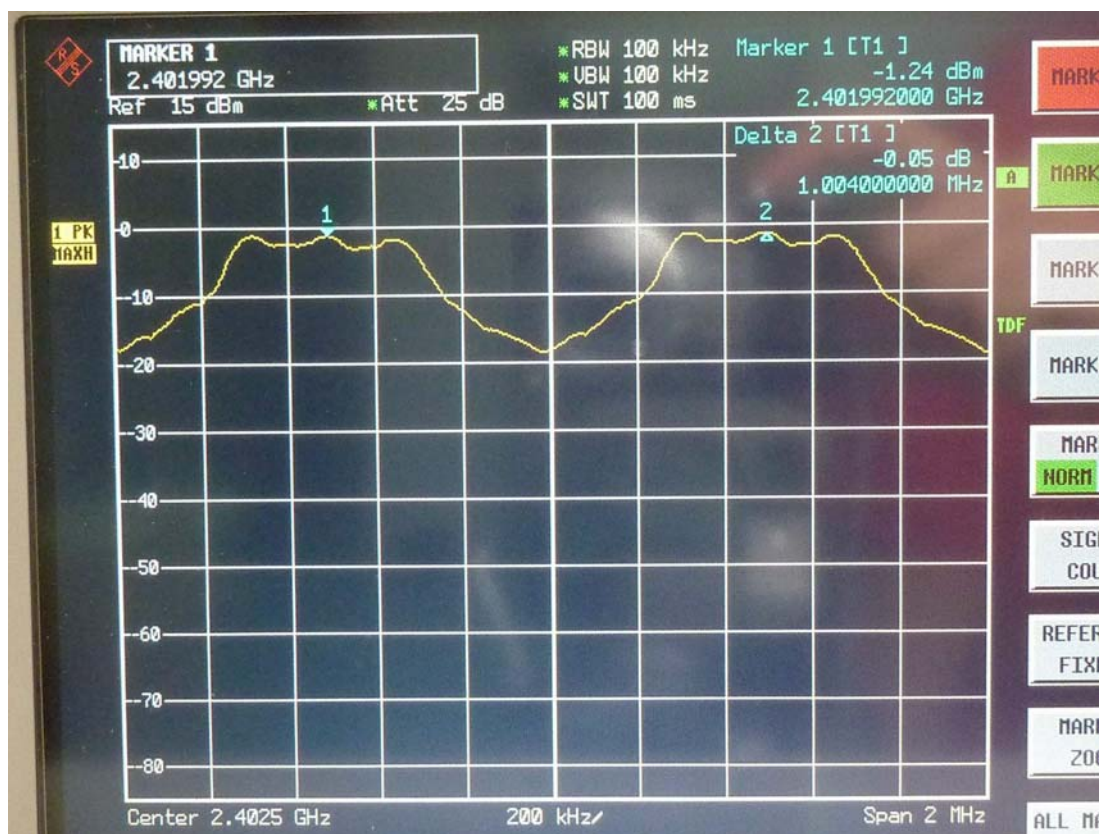
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Bluetooth Module:	2	Temperature:	24°C
Spectrum Detector:	PK	Humidity:	67%RH
		Tested Date:	Oct. 06, 2009
Test Result:	PASS	Tested by:	Shunm Wang

Channel Number	Channel Frequency (MHz)	Separation Read Value (kHz)	Minimum Limit(20dB Bandwidth) (kHz)
0	2402	1004	25
39	2441	1004	25
78	2480	1004	25

CH0:

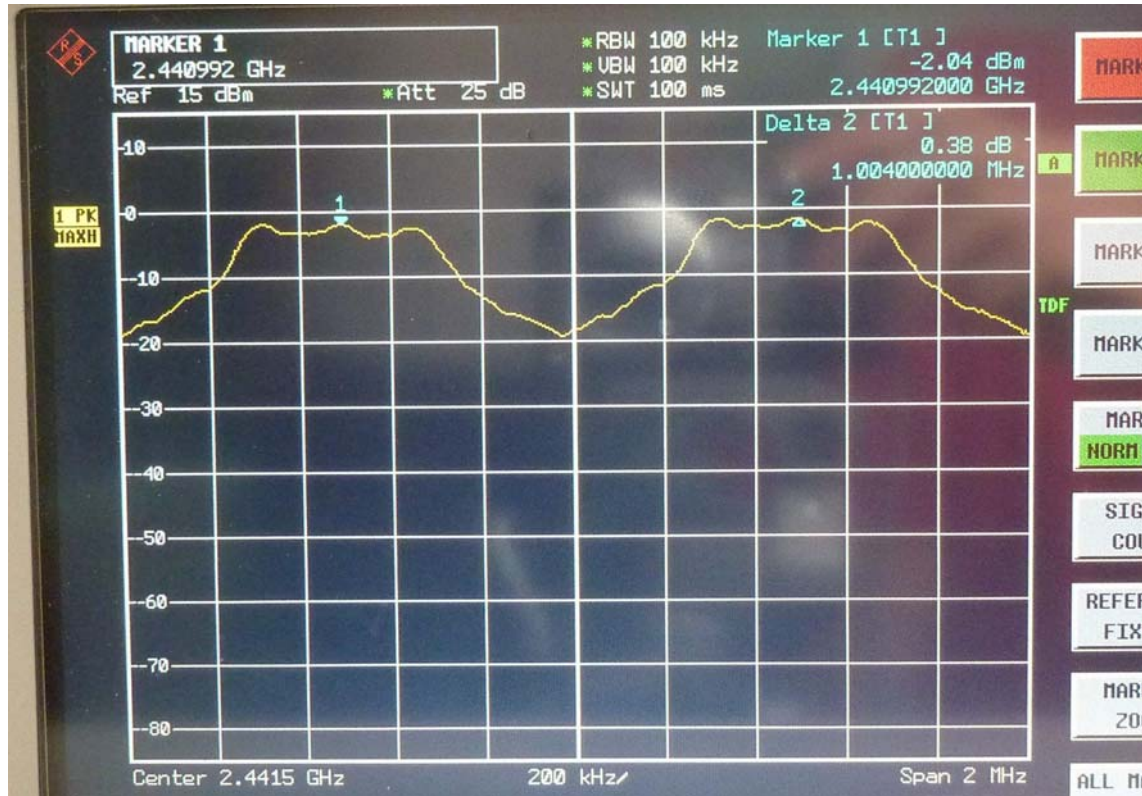




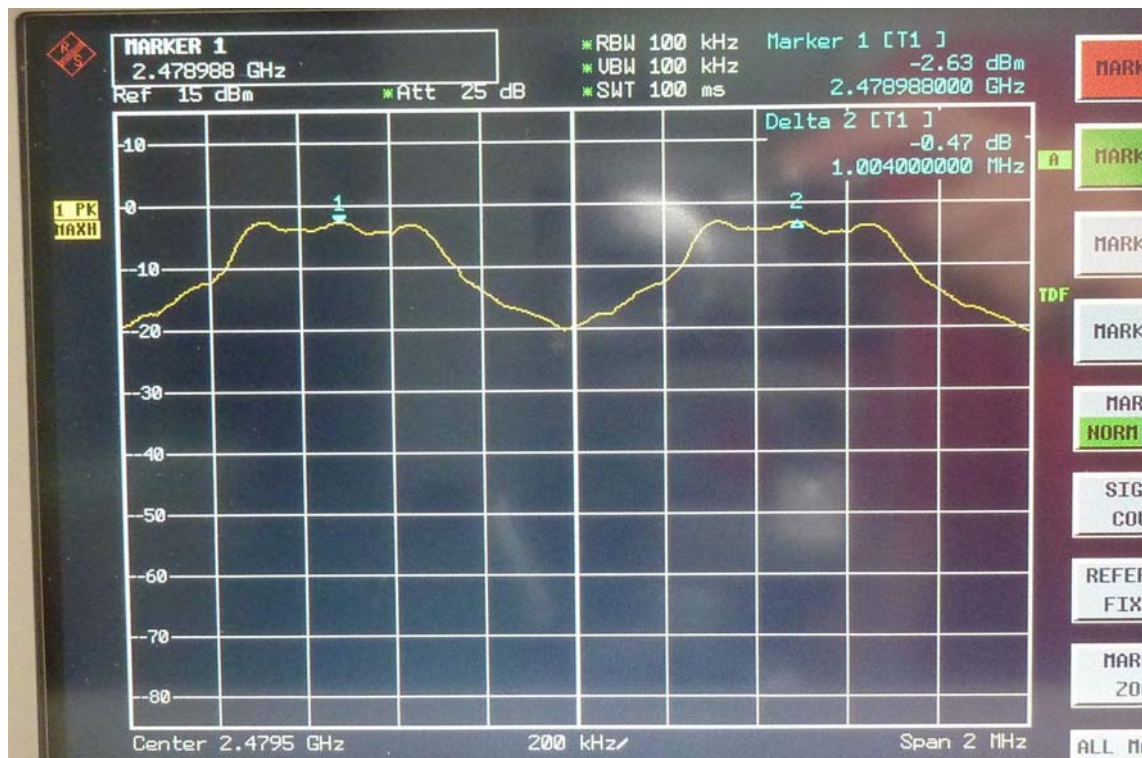


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## 4.2 20dB Bandwidth

### 4.2.1 LIMIT

Frequency Range (MHz)	Limit(kHz)				
	Quantity of Hopping Channel	50	25	15	75
902-928		<250	>250	NA	NA
2400-2483.5		NA	NA	>1000	<1000

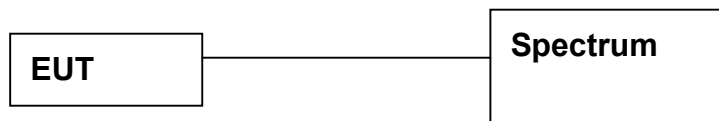
### 4.2.2 TEST EQUIPMENT

The following test equipment was used during the test:

Equipment/ Facilities	Specifications	Manufacturer	Model#/ Serial#	Due Date of Cal. & Cal. center
SPECTRUM	9kHz-7GHz	ROHDE & SCHWARZ	FSP7/ 100289	APR. 2010 ETC

**NOTE:** The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

### 4.2.3 TEST SET-UP



The EUT was connected to a spectrum through a 50Ω RF cable.

### 4.2.4 TEST PROCEDURE

The EUT was operated in hopping mode or any specific channel.  
 Printed out the test result from the spectrum by hard copy function.

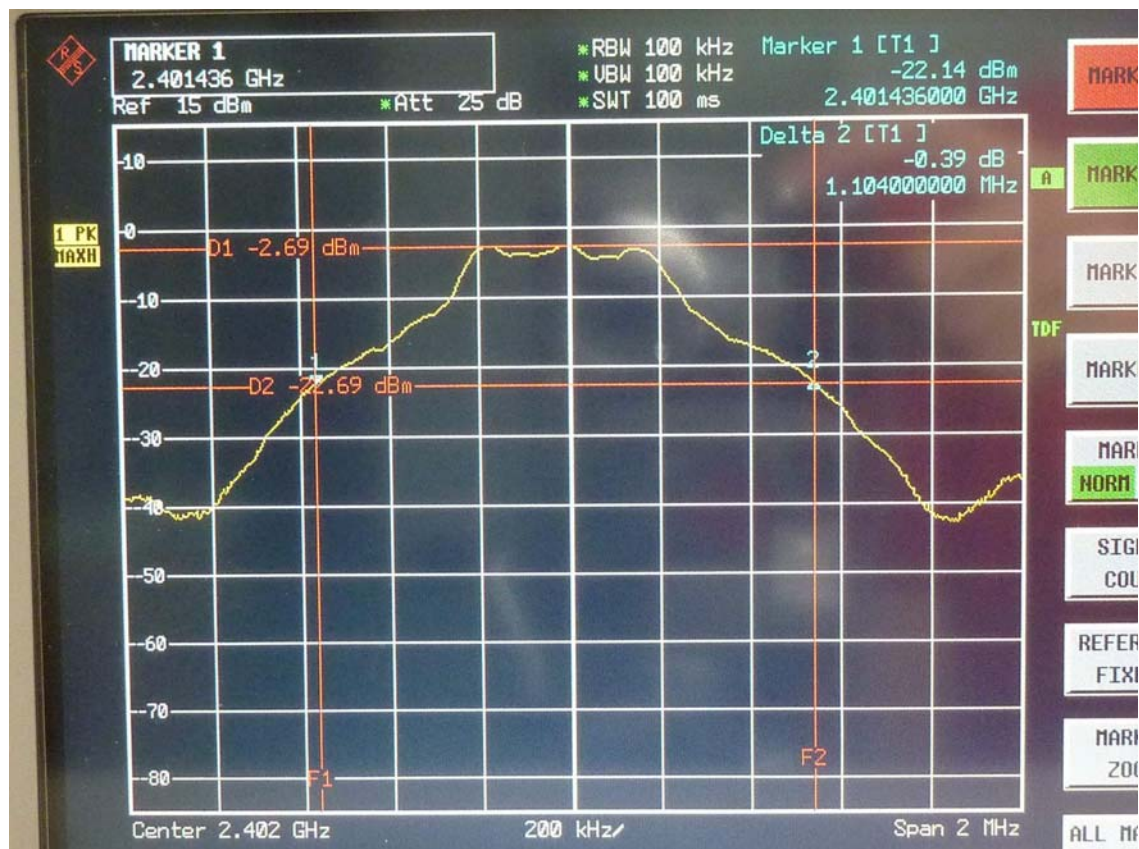


## 4.2.5 TEST RESULT

Bluetooth Module:	1	Temperature:	24°C
Spectrum Detector:	PK	Humidity:	67%RH
		Tested Date:	Oct. 06, 2009
Test Result:	PASS	Tested by:	Shunm Wang

Channel Number	Channel Frequency (MHz)	20dB Down Bandwidth (KHz)
0	2402	1104
39	2441	1108
78	2480	1108

CH0:

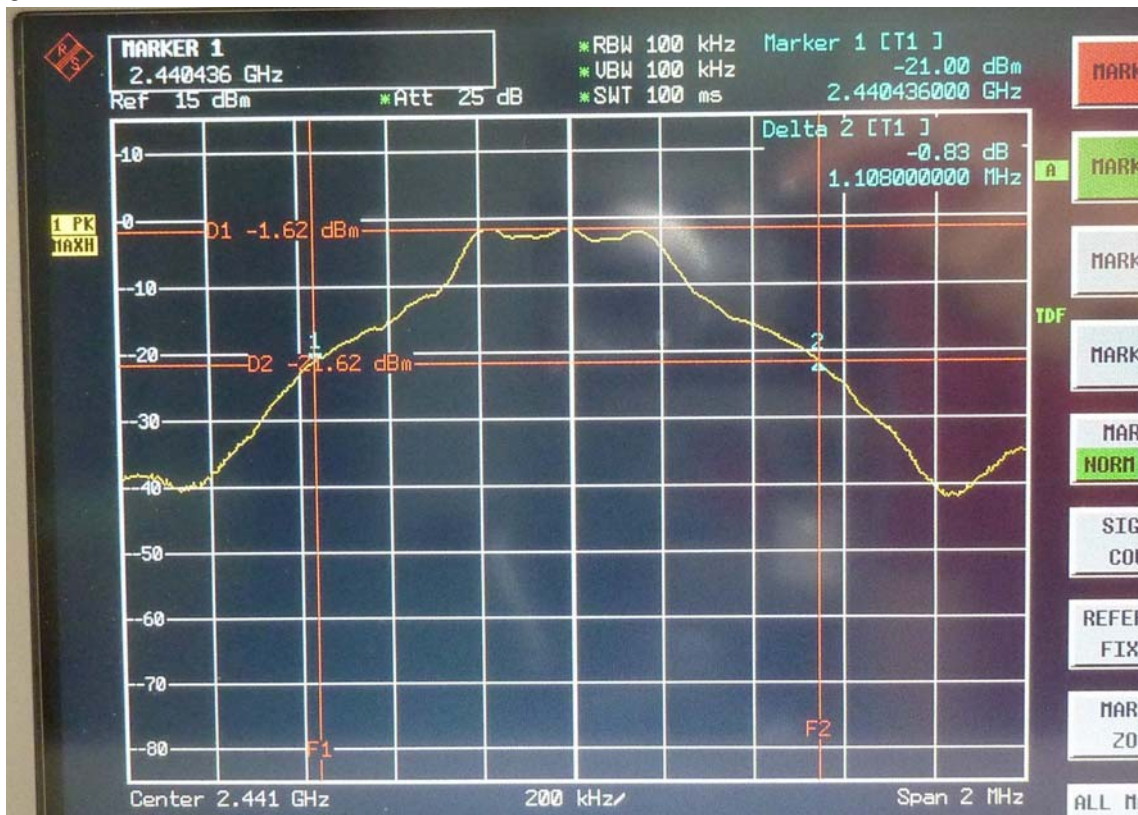






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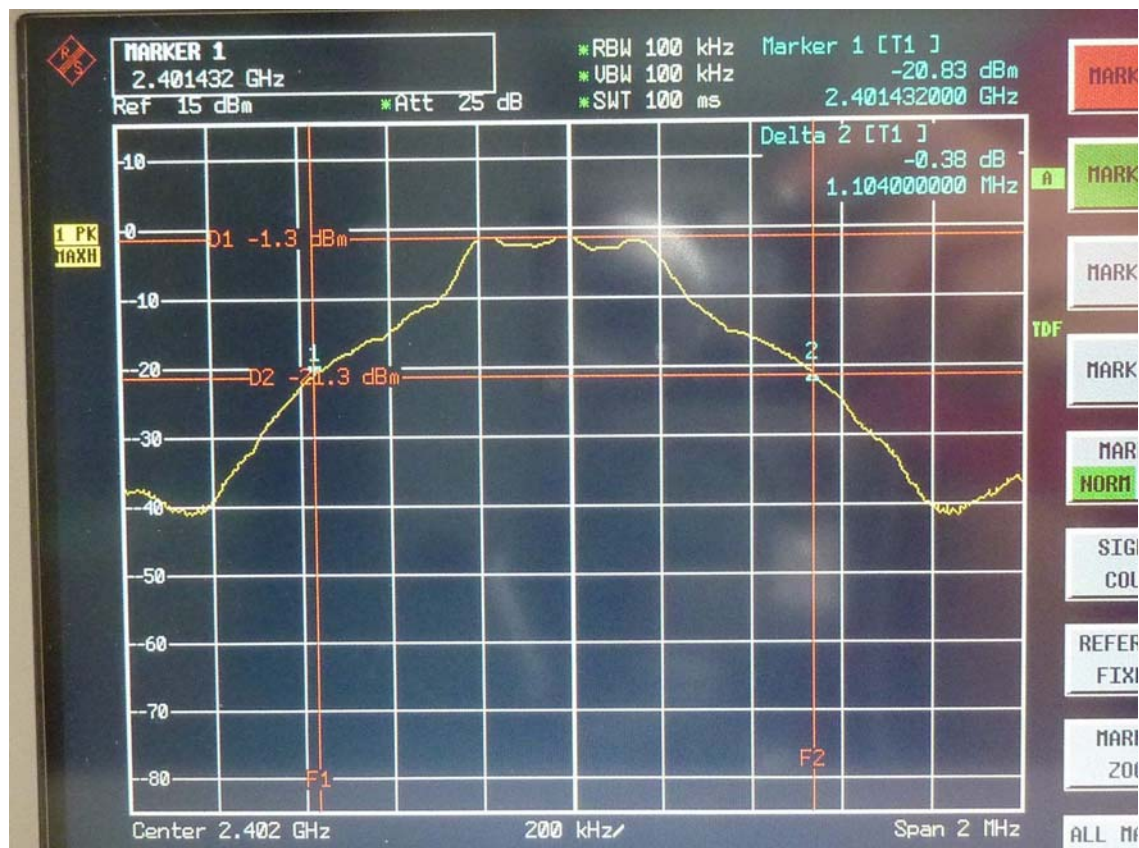


## TEST REPORT

Bluetooth Module:	2	Temperature:	24°C
Spectrum Detector:	PK	Humidity:	67%RH
		Tested Date:	Oct. 06, 2009
Test Result:	PASS	Tested by:	Shunm Wang

Channel Number	Channel Frequency (MHz)	20dB Down Bandwidth (KHz)
0	2402	1104
39	2441	1104
78	2480	1104

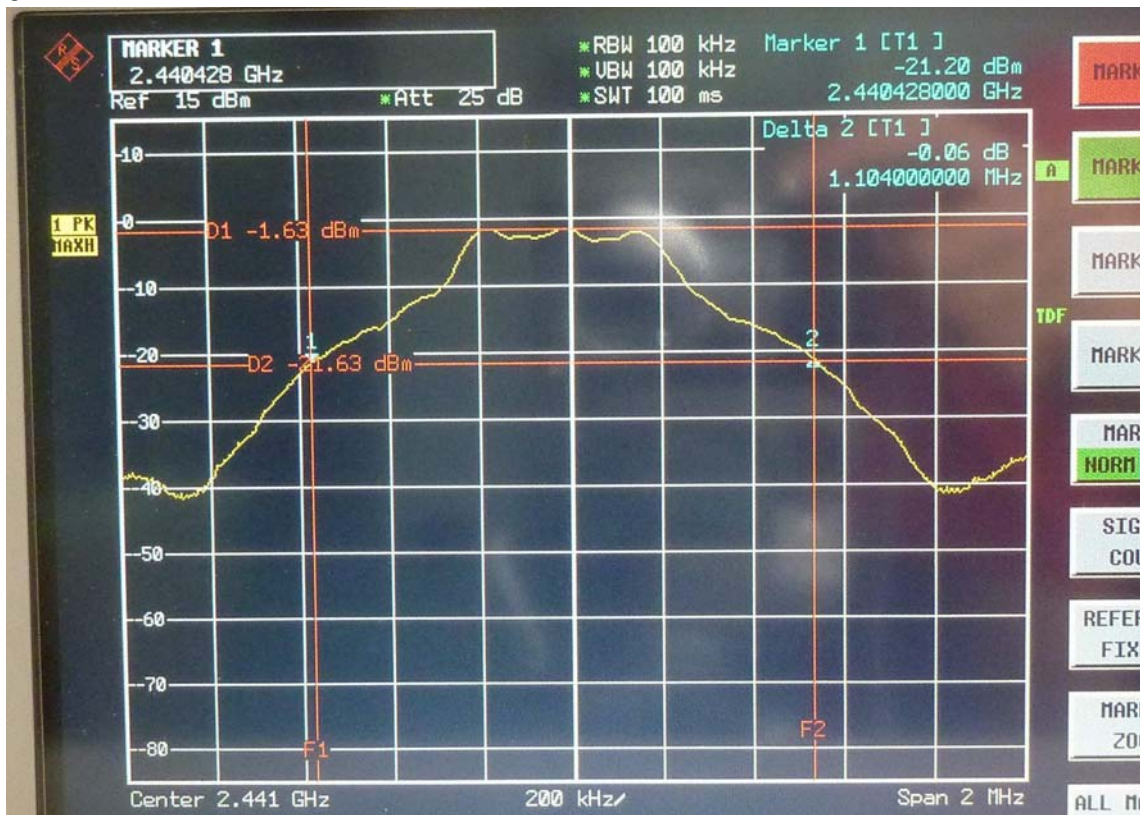
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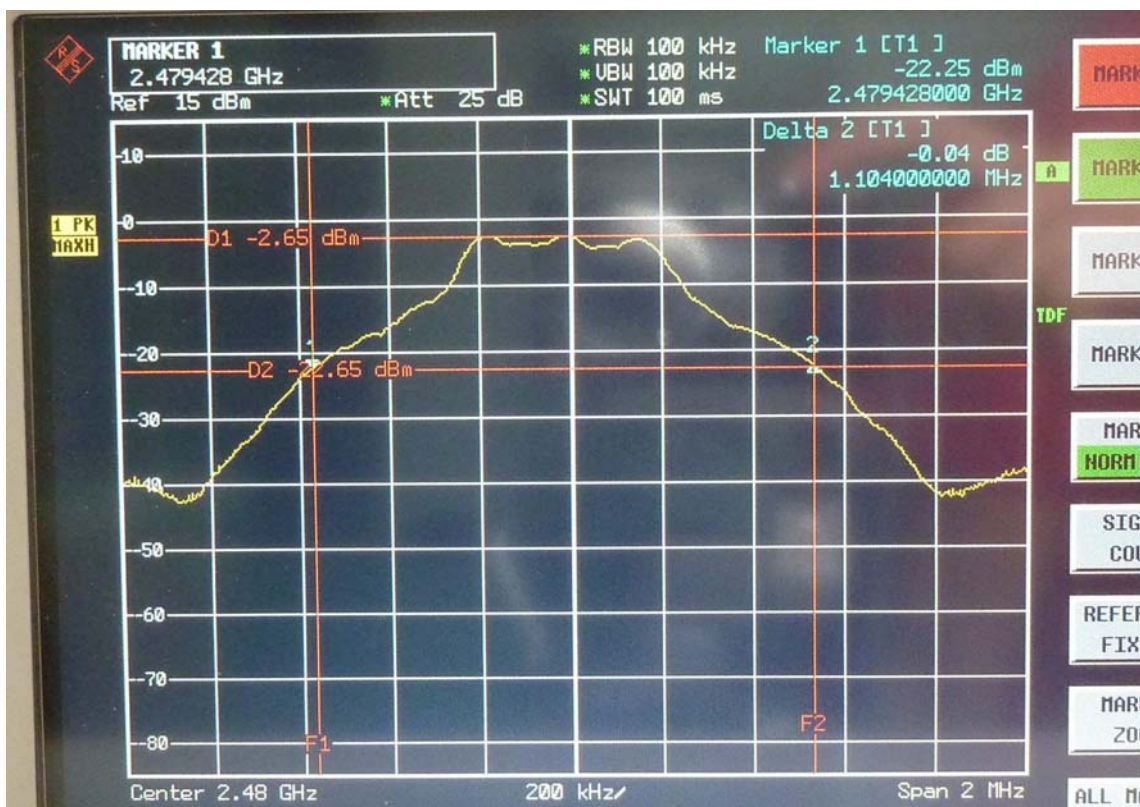


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## 4.3 QUANTITY OF HOPPING CHANNEL TEST

### 4.3.1 LIMIT

FCC Part15, Subpart C Section 15.247.

Frequency Range (MHz)	Limit (Quantity of Hopping Channel)			
	20dB Bandwidth <250kHz	20dB Bandwidth >250kHz	20dB Bandwidth <1MHz	20dB Bandwidth >1MHz
902-928	50	25	N/A	N/A
2400-2483.5	N/A	N/A	75	15
5725-5850	N/A	N/A	75	N/A

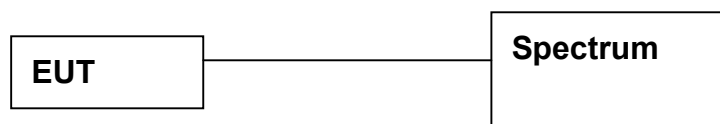
### 4.3.2 TEST EQUIPMENT

The following test equipment was used during the test:

Equipment/Facilities	Specifications	Manufacturer	Model#/Serial#	Due Date of Cal. & Cal. Center
SPECTRUM	9kHz-7GHz	ROHDE & SCHWARZ	FSP7/100289	APR. 2010 ETC

**NOTE:** The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

### 4.3.3 TEST SET-UP



The EUT was connected to a spectrum through a 50Ω RF cable.

### 4.3.4 TEST PROCEDURE

The EUT was operating in hopping mode or could be controlled its channel.  
 Printed out the test result from the spectrum by hard copy function.

### 4.3.5 EUT OPERATING CONDITION

1. Set the EUT under frequency hopping transmission condition.
2. The EUT was set to the highest available power level.



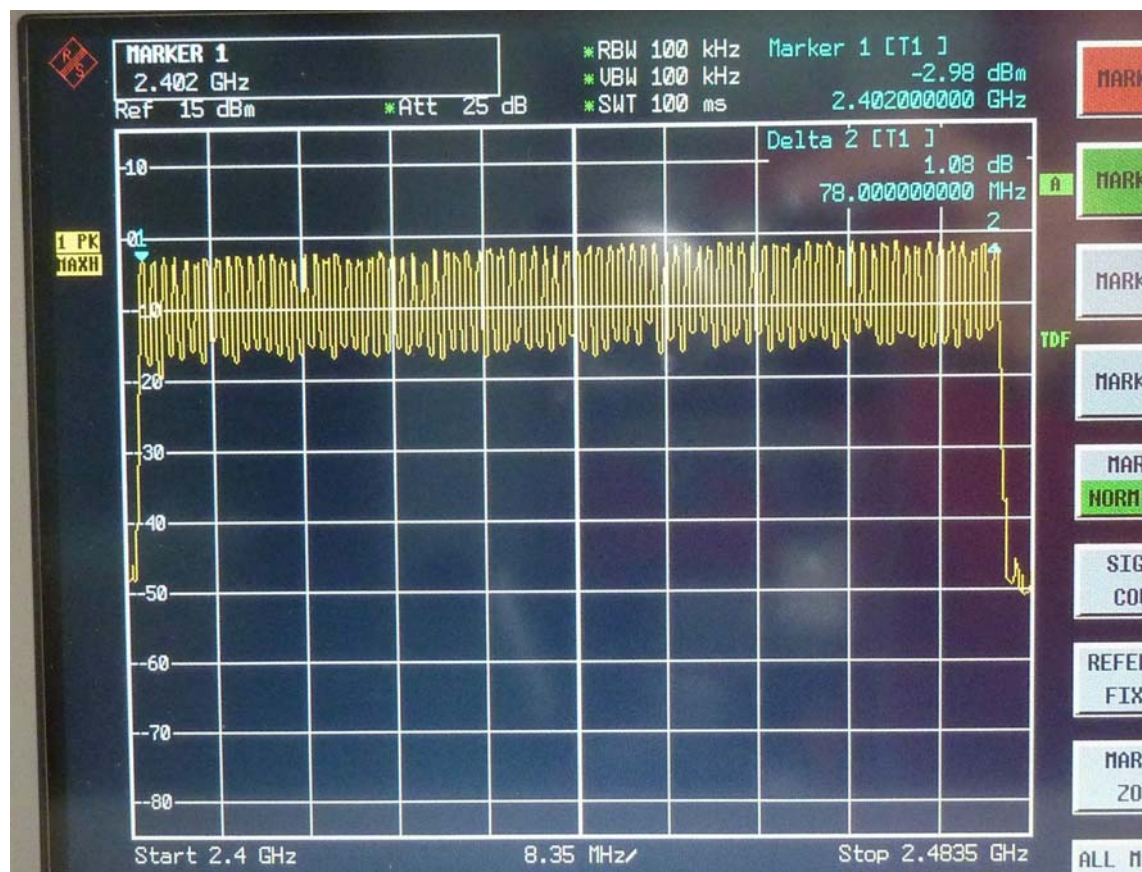
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#### 4.3.6 TEST RESULT

Bluetooth Module:	1	Temperature:	24°C
Spectrum Detector:	PK	Humidity:	67%RH
		Tested Date:	Oct. 06, 2009
Test Result:	PASS	Tested by:	Shunm Wang

Hopping Channel Frequency Range(MHz)	Quantity of Hopping Channel Read Value	Quantity of Hopping Channel Limit
2402~2480	79	75

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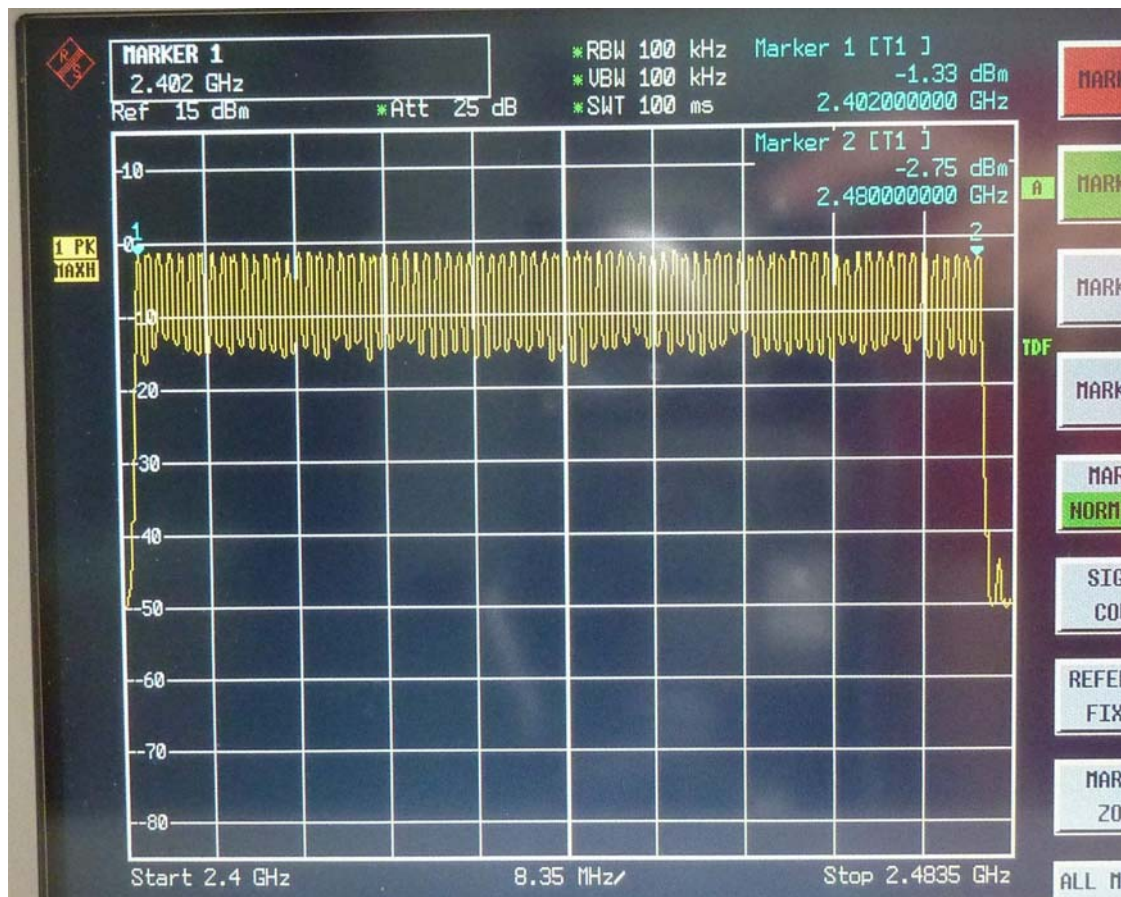
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Bluetooth Module:	2	Temperature:	24°C
Spectrum Detector:	PK	Humidity:	67%RH
		Tested Date:	Oct. 06, 2009
Test Result:	PASS	Tested by:	Shunm Wang

Hopping Channel Frequency Range(MHz)	Quantity of Hopping Channel Read Value	Quantity of Hopping Channel Limit
2402~2480	79	75

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## 4.4 TIME OF OCCUPANCY (Dwell Time)

### 4.4.1 LIMIT

FCC Part15, Subpart C Section 15.247.

Frequency Range (MHz)	Limit (ms)		
	20dB Bandwidth <250kHz(50Channel)	20dB Bandwidth >250kHz(25Channel)	20dB Bandwidth <1MHz(75Channel)
902-928	400(20s)	400(10s)	NA
2400-2483.5	NA	NA	400(30s)
5725-5850	NA	NA	400(30s)

**NOTE:** The “()” is all channel's average time of occupancy.

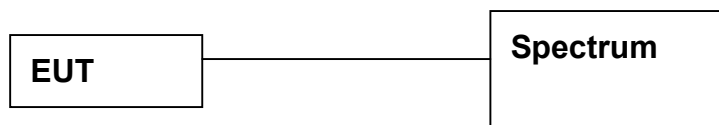
### 4.4.2 TEST EQUIPMENT

The following test equipment was used during the test:

Equipment/Facilities	Specifications	Manufacturer	Model#/Serial#	Due Date of Cal. & Cal. Center
SPECTRUM	9kHz-7GHz	ROHDE & SCHWARZ	FSP7/100289	APR. 2010 ETC

**NOTE:** The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

### 4.4.3 TEST SET-UP



The EUT was connected to a spectrum through a 50Ω RF cable.

### 4.4.4 TEST PROCEDURE

The EUT was operating in hopping mode or could be controlled its channel.  
 Printed out the test result from the spectrum by hard copy function.

### 4.4.5 EUT OPERATING CONDITION

Same as section 4.1.5 of this report.





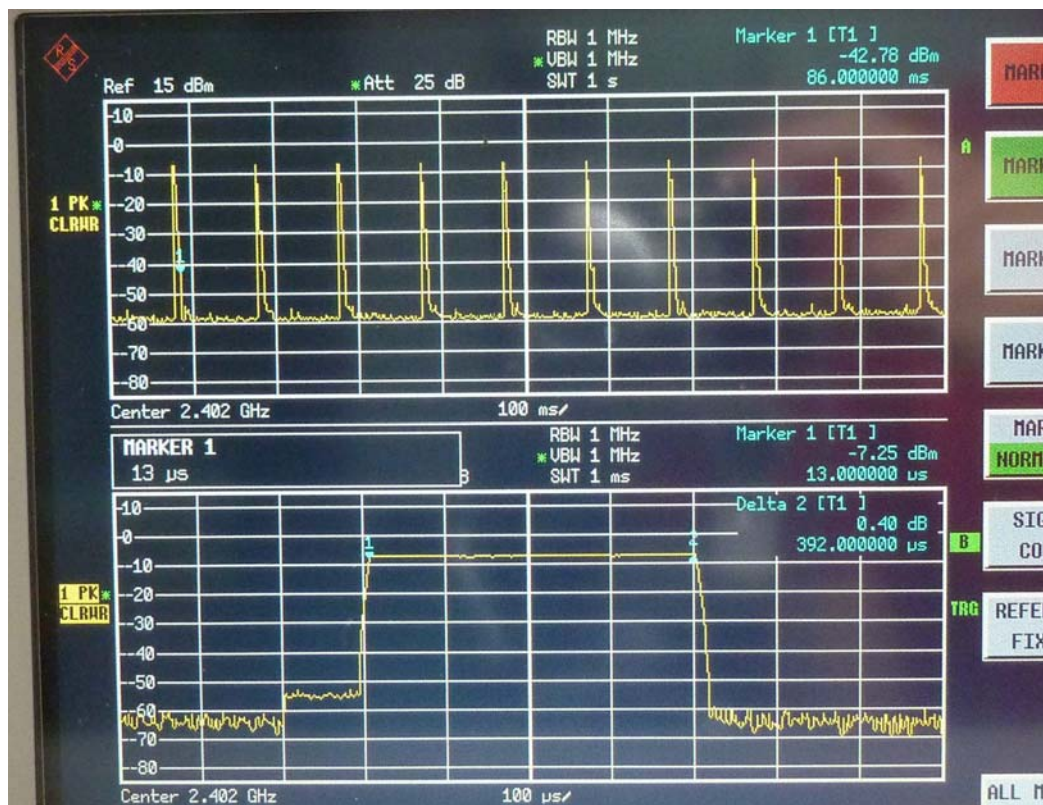
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### 4.4.6 TEST RESULT

Bluetooth Module:	1	Temperature:	24°C
Spectrum Detector:	PK	Humidity:	67%RH
		Tested Date:	Oct. 06, 2009
Test Result:	PASS	Tested by:	Shunm Wang

Channel Number	Channel Frequency (MHz)	Pulse Time (μs)	Time of Occupancy (Dwell Time) (ms)	Average Time of Occupancy Limit (ms)
0	2402.00	392	123.872	400
39	2441.00	386	121.976	400
78	2480.00	392	123.872	400

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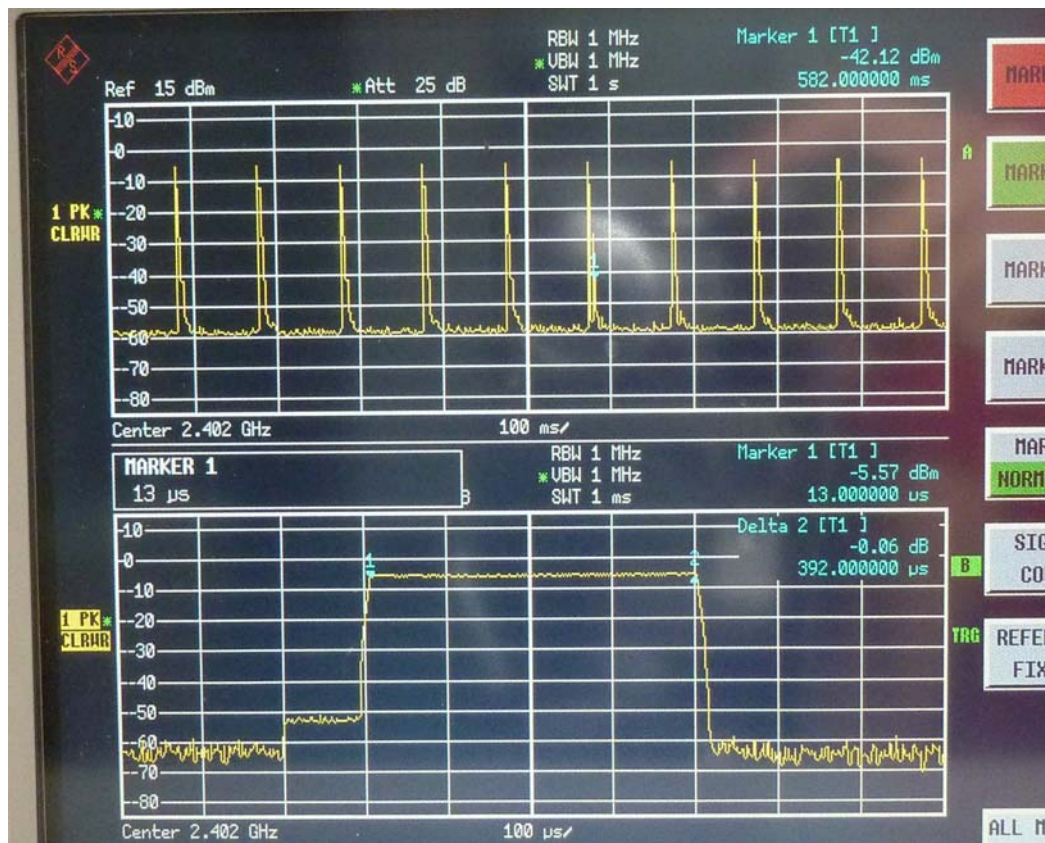
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Bluetooth Module:	2	Temperature:	24°C
Spectrum Detector:	PK	Humidity:	67%RH
		Tested Date:	Oct. 06, 2009
Test Result:	PASS	Tested by:	Shunm Wang

Channel Number	Channel Frequency (MHz)	Pulse Time (μs)	Time of Occupancy (Dwell Time) (ms)	Average Time of Occupancy Limit (ms)
0	2402.00	392	123.872	400
39	2441.00	392	123.872	400
78	2480.00	390	123.240	400

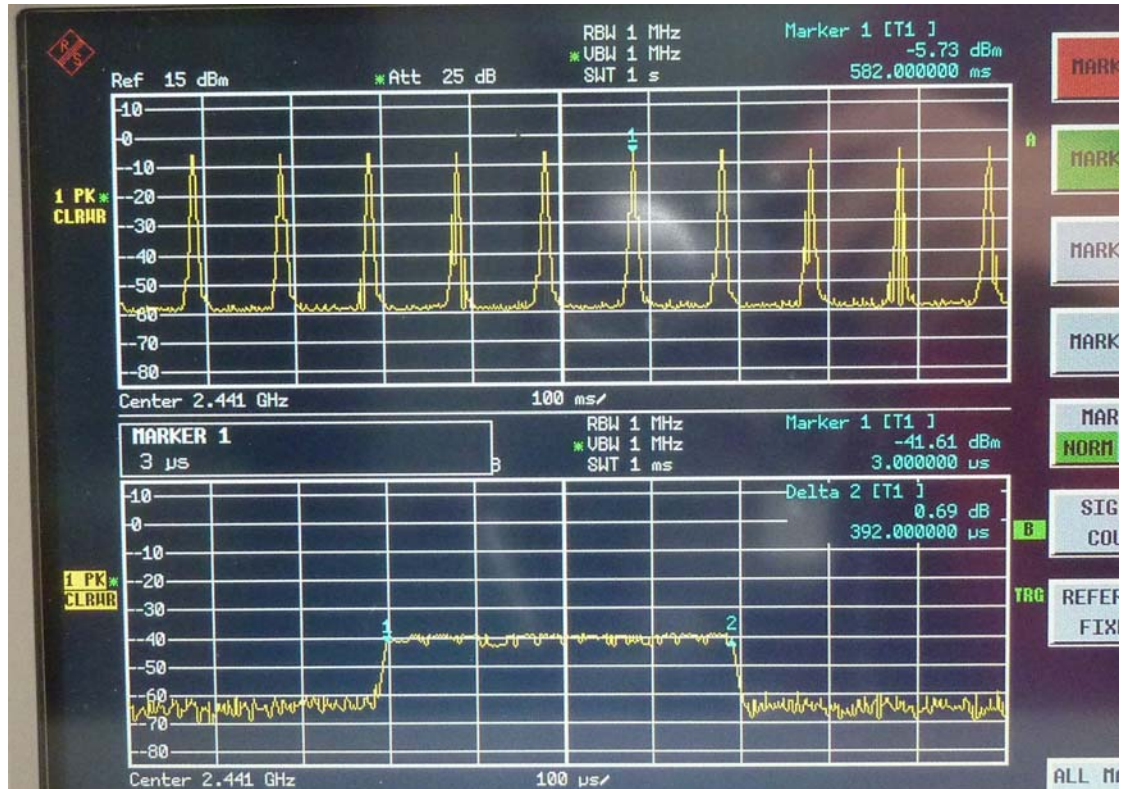
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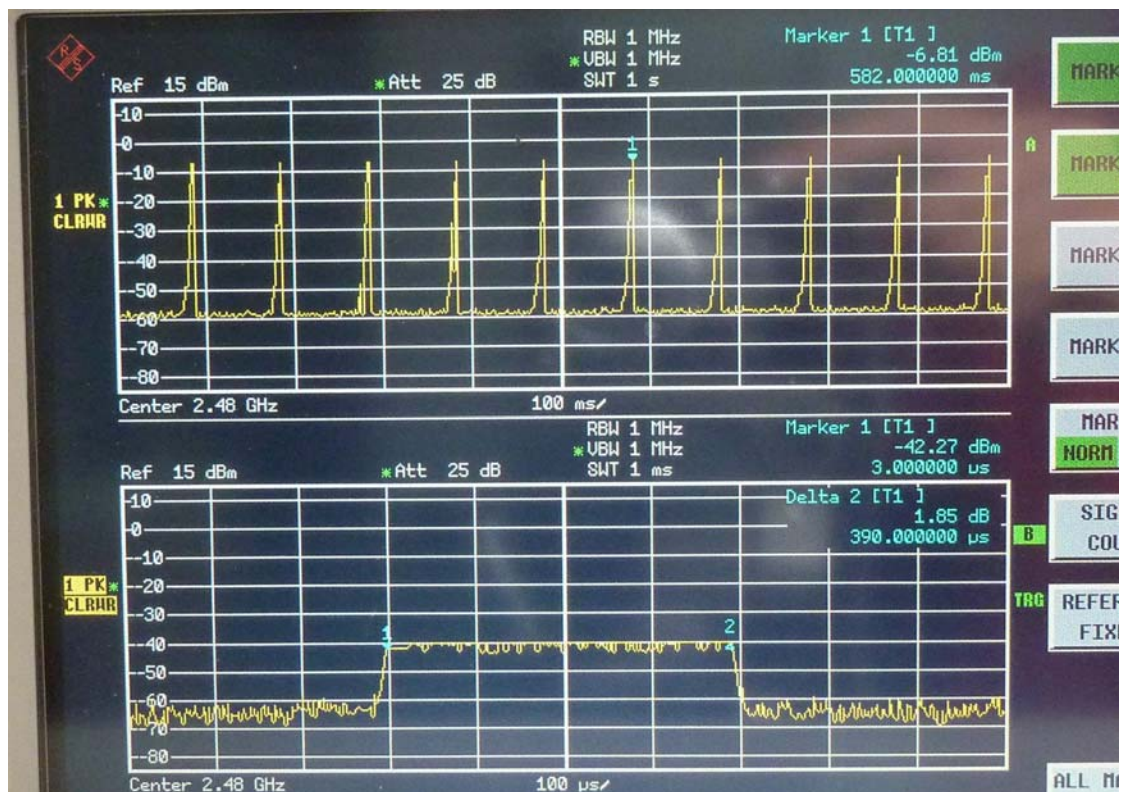


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## 4.5 PEAK POWER TEST

### 4.5.1 LIMIT

FCC Part15, Subpart C Section 15.247.

Frequency Range (MHz)	Limit(w)				
	Quantity of Hopping Channel	50	25	15	75
902-928		1(30dBm)	0.125(21dBm)	NA	NA
2400-2483.5		NA	NA	0.125(21dBm)	1(30dBm)
5725-5850		NA	NA	NA	1(30dBm)

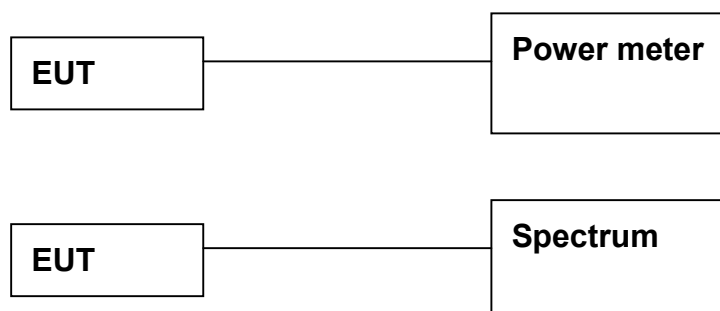
### 4.5.2 TEST EQUIPMENT

The following test equipment was used during the test :

Equipment/Facilities	Specifications	Manufacturer	Model#/Serial#	Due Date of Cal. & Cal. Center
SPECTRUM	9kHz-7GHz	ROHDE & SCHWARZ	FSP7/100289	APR. 2010 ETC
POWER METER	N/A	BOONTON	4532 / 77601	NOV. 2009 ETC
POWER SENSOR	DC-18GHz 0.3 $\mu$ W-100mW 50 $\Omega$	BOONTON	51011-EMC/31184	NOV. 2009 ETC

**NOTE:** The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

### 4.5.3 TEST SET-UP



The EUT was connected to a spectrum through a 50  $\Omega$  RF cable.





#### 4.5.4 TEST PROCEDURE

The EUT was operating in hopping mode or could control its channel.  
Printed out the test result from the spectrum by hard copy function.  
Recorded the read value of the power meter.

#### 4.5.5 EUT OPERATING CONDITION

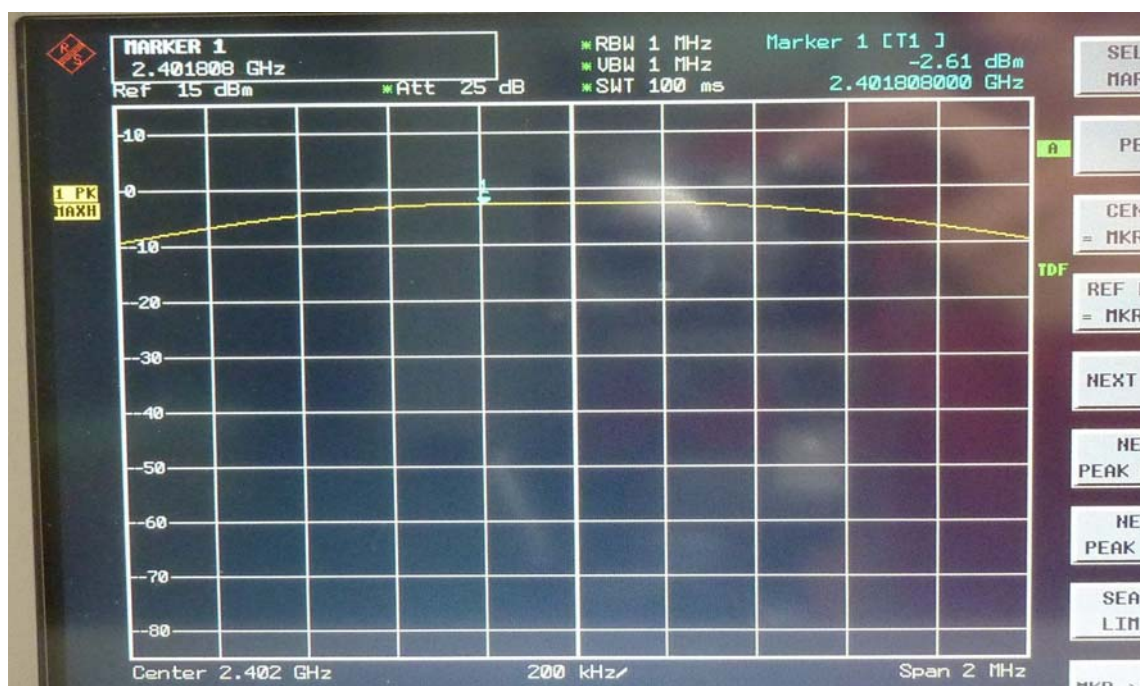
Same as section 4.1.5 of this report.

#### 4.5.6 TEST RESULT

Bluetooth Module:	1	Temperature:	24°C
Spectrum Detector:	PK	Humidity:	67%RH
		Tested Date:	Oct. 06, 2009
Test Result:	PASS	Tested by:	Shunm Wang

Channel Number	Channel Frequency (MHz)	Peak Output Power (dBm)	Peak Power Limit (dBm)
0	2402.00	-2.16	30
39	2441.00	-1.57	30
78	2480.00	-1.70	30

CH0:

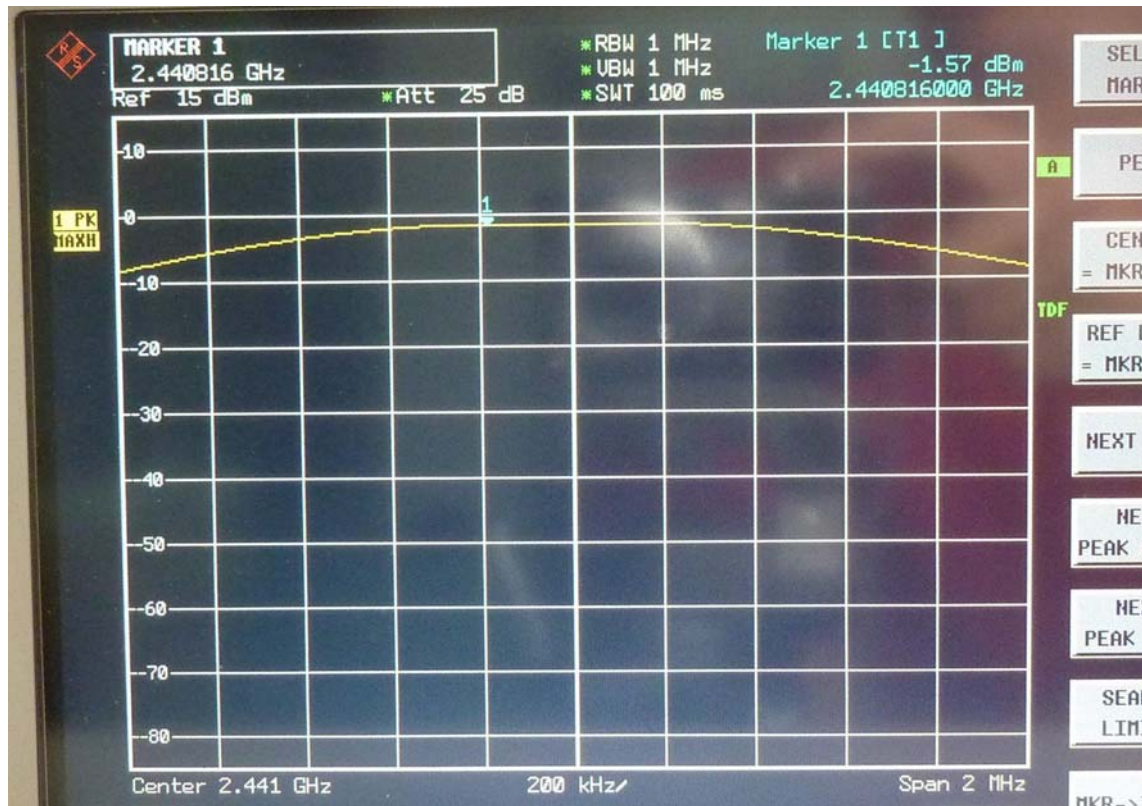




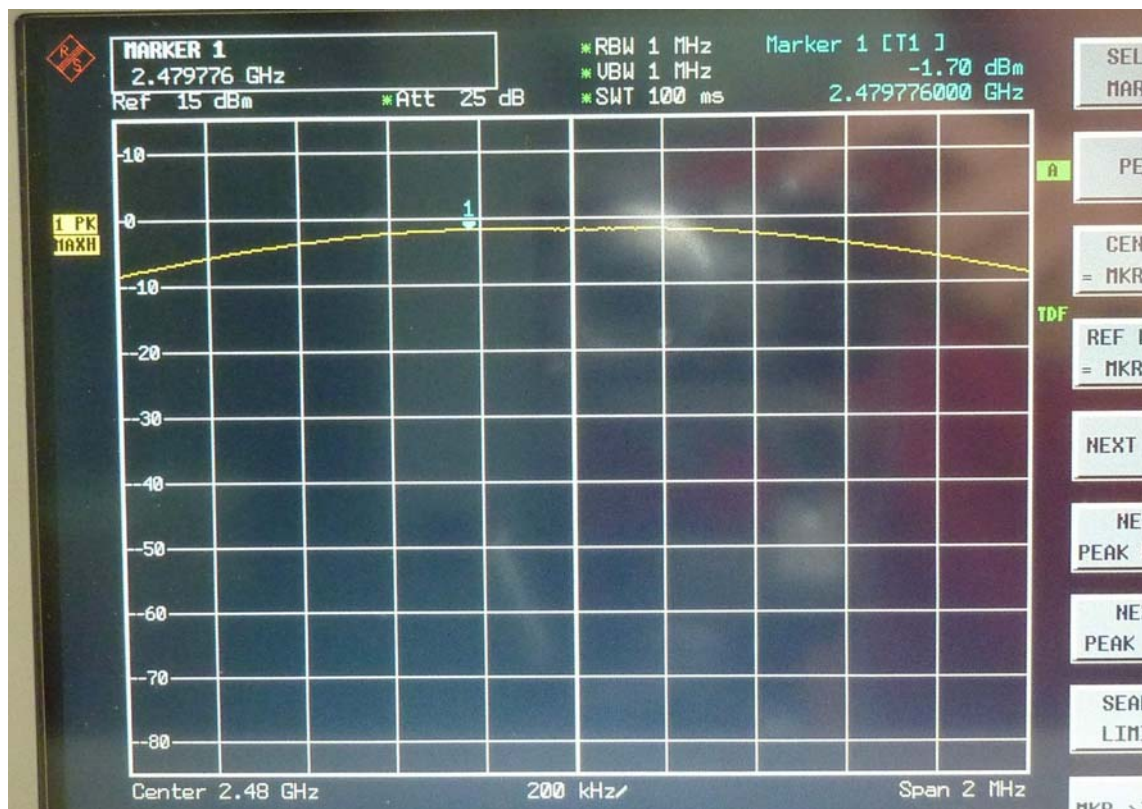


# TEST REPORT

CH39:



CH78:



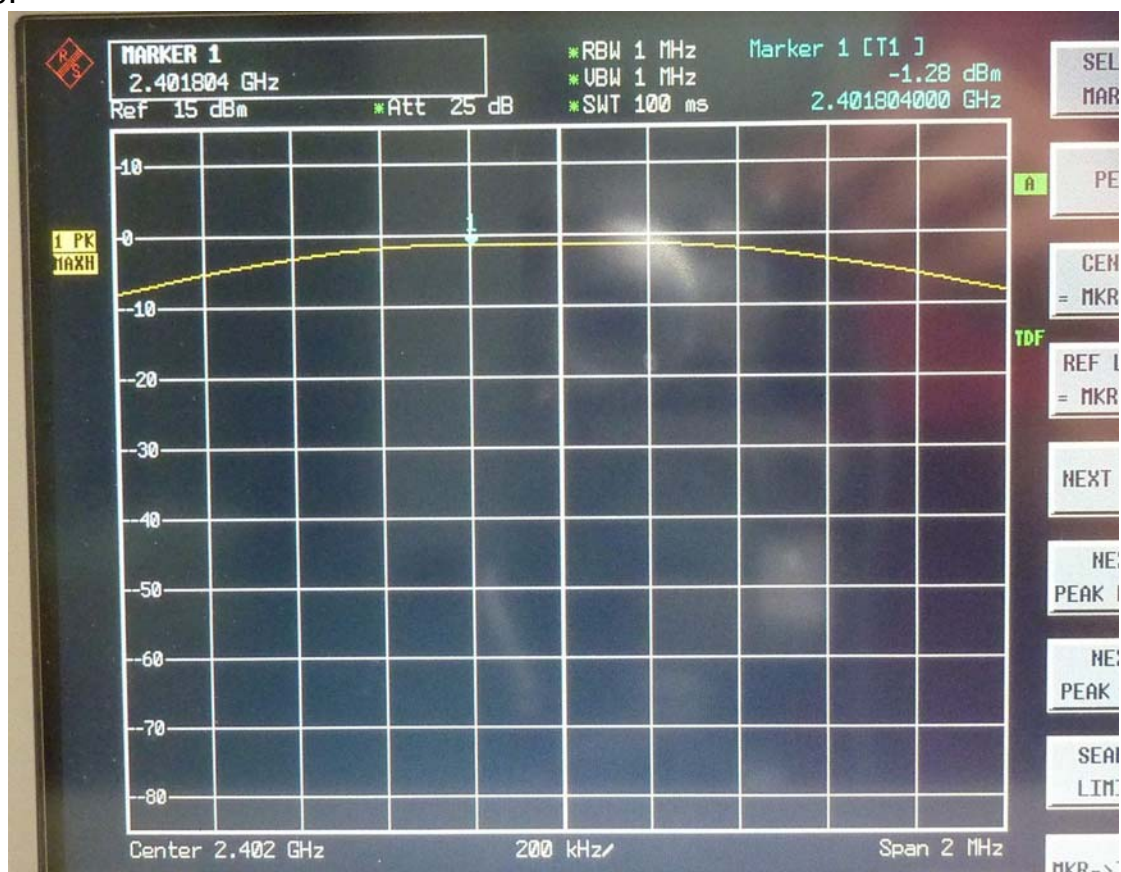


## TEST REPORT

Bluetooth Module:	2	Temperature:	24°C
Spectrum Detector:	PK	Humidity:	67%RH
		Tested Date:	Oct. 06, 2009
Test Result:	PASS	Tested by:	Shunm Wang

Channel Number	Channel Frequency (MHz)	Peak Output Power (dBm)	Peak Power Limit (dBm)
0	2402.00	-1.28	30
39	2441.00	-1.98	30
78	2480.00	-2.62	30

CH0:

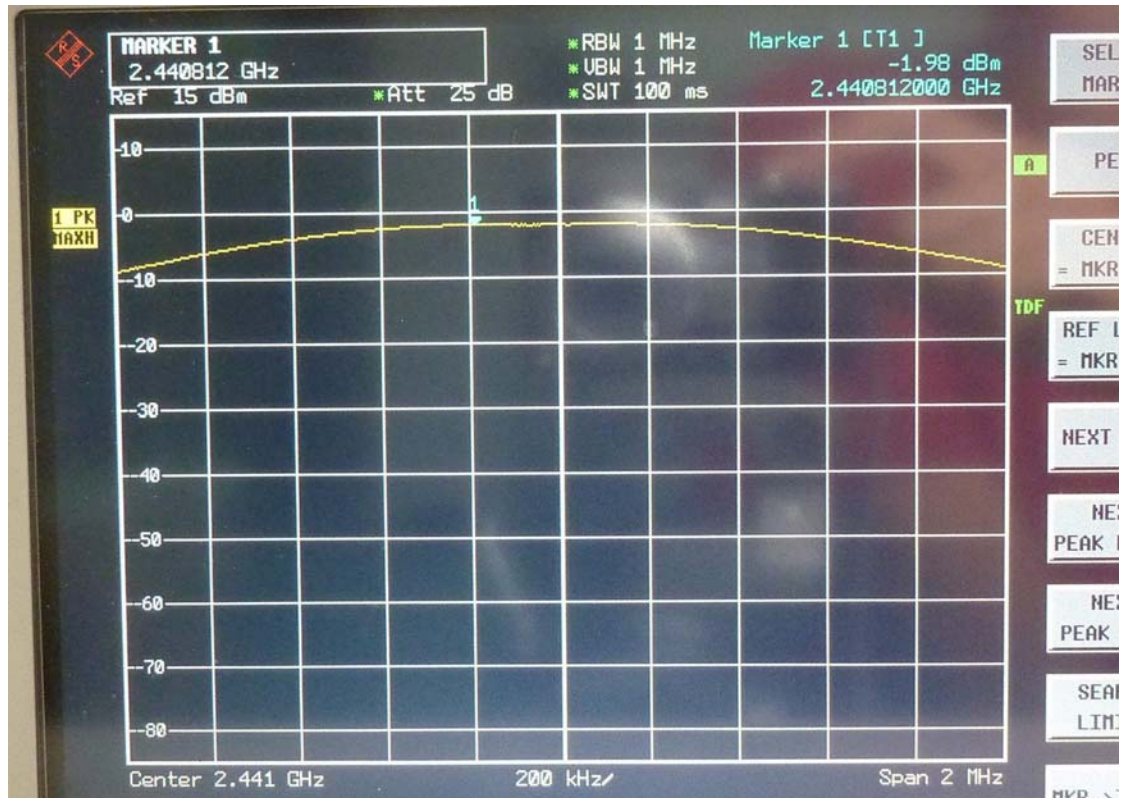




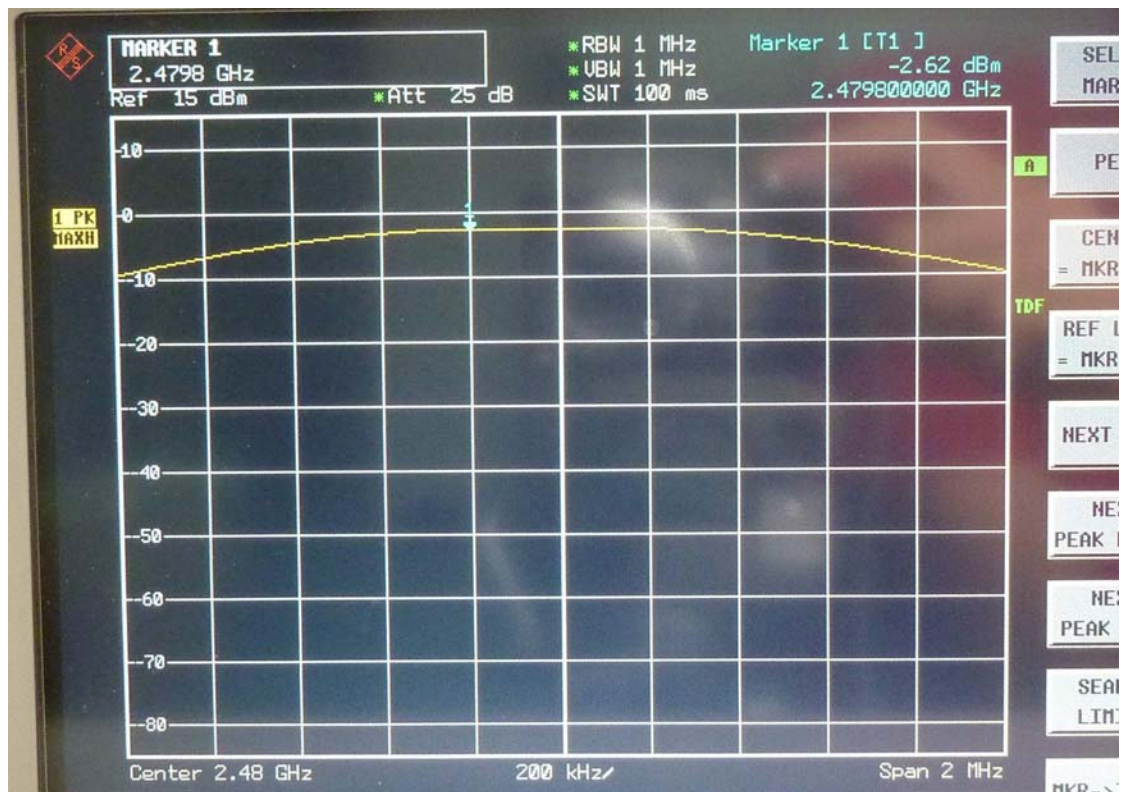


# TEST REPORT

CH39:



CH78:



 <b>Spectrum Research &amp; Testing Lab., Inc.</b> No. 101-10, Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan, Taiwan	<h1>TEST REPORT</h1>	Reference No.: A09093003 Report No.: FCCA09093003 FCC ID: XTA0800V2B27012 Page:30 of 63 Date : Nov. 03, 2009
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## 4.6 BAND EDGE TEST

### 4.6.1 LIMIT

FCC Part15, Subpart C Section 15.249 (c), Emission radiated outside of the specified frequency bands, except for harmonics, shall attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Operating Frequency Range (MHz)	Limit (dBμV/m)	
	Peak	Average
902-928	74	54
2400-2483.5		
5725-5850		

### 4.6.2 TEST EQUIPMENT

The following test equipment was used during the test :

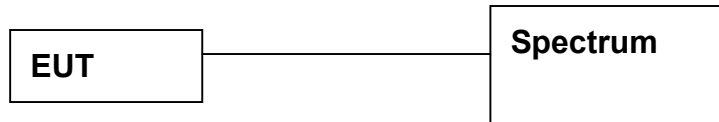
Equipment/ Facilities	Specification	Manufacturer	Model#/ Serial#	Due Date of Cal. & Cal. Center
SPECTRUM	9kHz-7GHz	ROHDE & SCHWARZ	FSP7/ 100289	APR. 2010 ETC
SPECTRUM	9KHz-26.5GHz	HP	8953E/ 3710A03220	MAY 2010 ETC
PRE-AMPLIFIER	1GHz-26.5GHz Gain:30dB	HP	8449B/ 3008A01019	NOV. 2009 ETC
HORN ANTENNA	1GHz to 18GHz	EMCO	3115/ 6881	NOV. 2009 ETC
K-TYPE CABLE	15M	HUBER SUHNER	SF102-40/2*11 / 23932/2	MAY 2010 ETC
K-TYPE CABLE	1M	HUBER SUHNER	SF102-40/2*11 / 28934/2	NOV. 2010 ETC
OATS	3 - 10 M measurement	SRT	SRT-1	NOV. 2009 SRT

**NOTE:** The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.



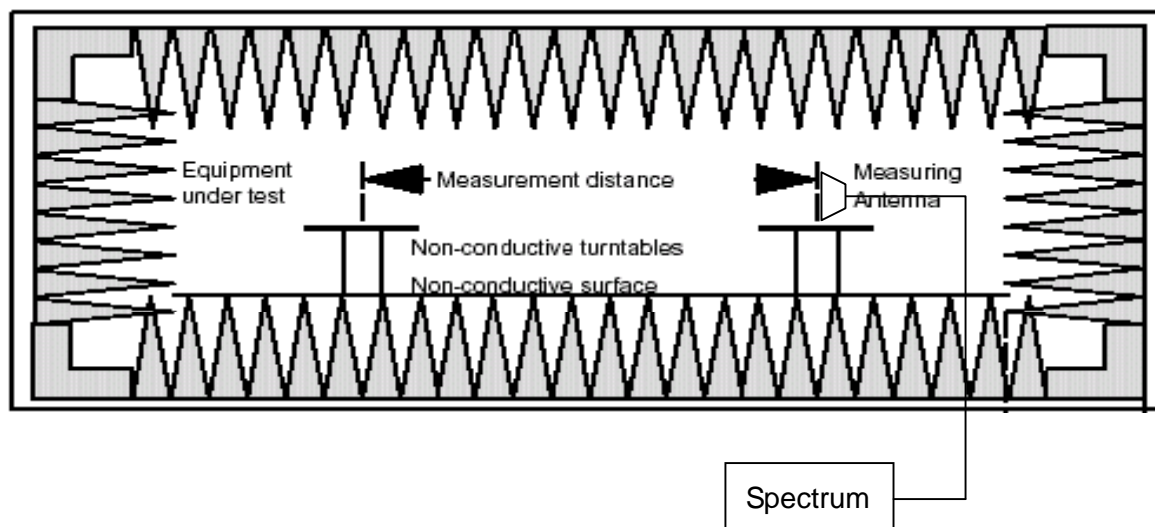
## 4.6.3 TEST SET-UP

### FOR RF CONDUCTED TEST (dBc)



The EUT was connected to the spectrum through a 50 $\Omega$  RF cable.

### FOR RADIATED EMISSION TEST



#### NOTE :

1. The EUT system was put on a wooden table with 0.8m heights above a ground plane.
2. For the actual test configuration, please refer to the photos of testing.



## 4.6.4 TEST PROCEDURE

1. The EUT was operating in hopping mode or could be controlled its channel.  
Printed out the test result from the spectrum by hard copy function.
2. The EUT was tested according to the requirement of ANSI C63.4 and CISPR 22. The measurements were made at an open area test site with 3 meter measurement distance under 1 GHz and with 3m distance above 1GHz. The frequency spectrum measured started from 30 MHz. Under 1 GHz. All readings were quasi-peak values with 120 kHz resolution bandwidth of the test receiver. Above 1 GHz, the measurements were made at an open area test site with 3 meter measurement distance and all readings were peak and average values with 1 MHz resolution bandwidth of the test receiver. The EUT system was operated in all typical methods by users. The cables connected to EUT and support units were moved to find the maximum emission levels for each frequency.

## 4.6.5 EUT OPERATING CONDITION

Same as section 4.1.5 of this report.

## 4.6.6 TEST RESULT

Bluetooth Module:	1	Temperature:	24°C
Spectrum Detector:	PK	Humidity:	67%RH
		Tested Date:	Oct. 06, 2009
Test Result:	PASS	Tested by:	Shunm Wang

### 1. Conducted emission test

Frequency (MHz)	PEAK POWER OUTPUT (dBm)	Emission read Value (dBm)	Result of Band edge (dBc)	Band edge LIMIT (dBc)
<2400	-3.62	-48.44	44.82	>20dBc
>2483.5	-1.86	-50.89	49.03	>20dBc

### 2. Radiated emission test

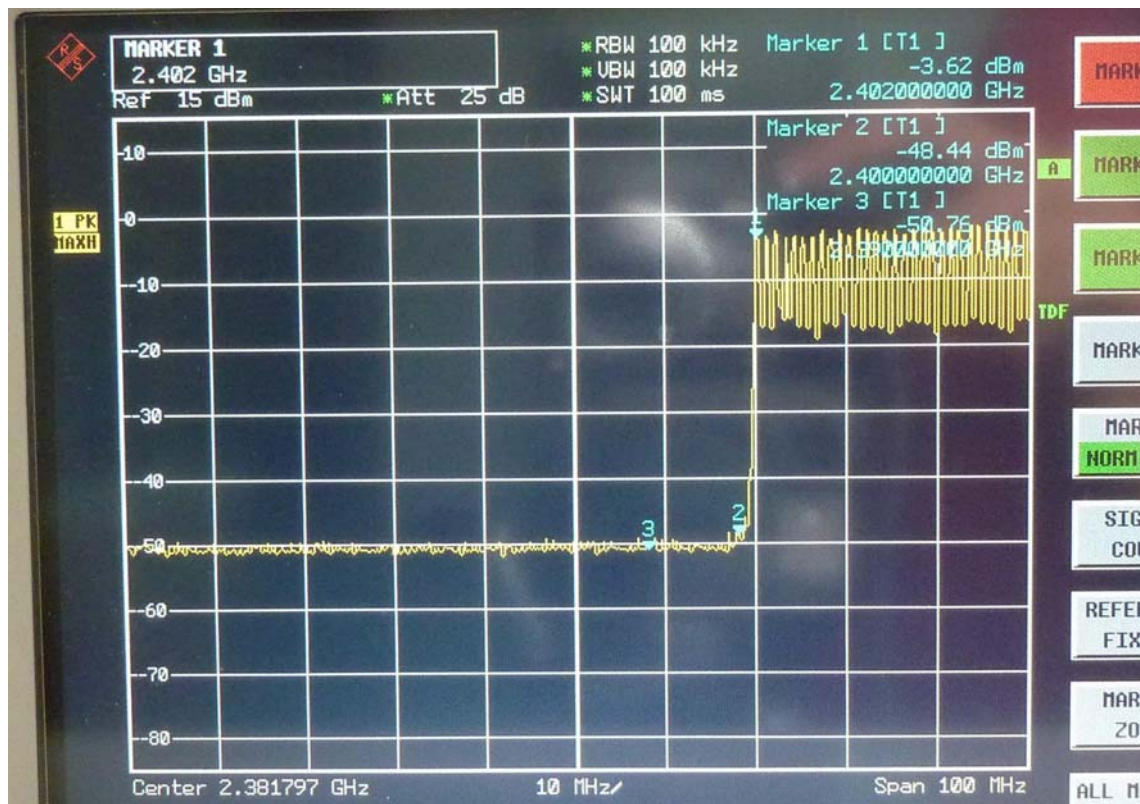
Frequency (MHz)	Correct Factor (dB)	Ant. Fac. (dB)	Ant. Pol. (H/V)	Reading (dBuV)		Emission (dBuV/m)		Limit Line (dBuV/m)		Over Limit (dBuV/m)	
				PK	AV	PK	AV	PK	AV	PK	AV
2390.00	-23.63	28.08	H	46.5	40.2	50.9	44.6	74.0	54.0	-23.1	-9.4
2390.00	-23.63	28.08	V	48.1	41.0	52.5	45.4	74.0	54.0	-21.5	-8.6
2483.50	-23.42	28.27	H	49.7	43.5	54.5	48.3	74.0	54.0	-19.5	-5.7
2483.50	-23.42	28.27	V	50.2	44.9	55.0	49.7	74.0	54.0	-19.0	-4.3



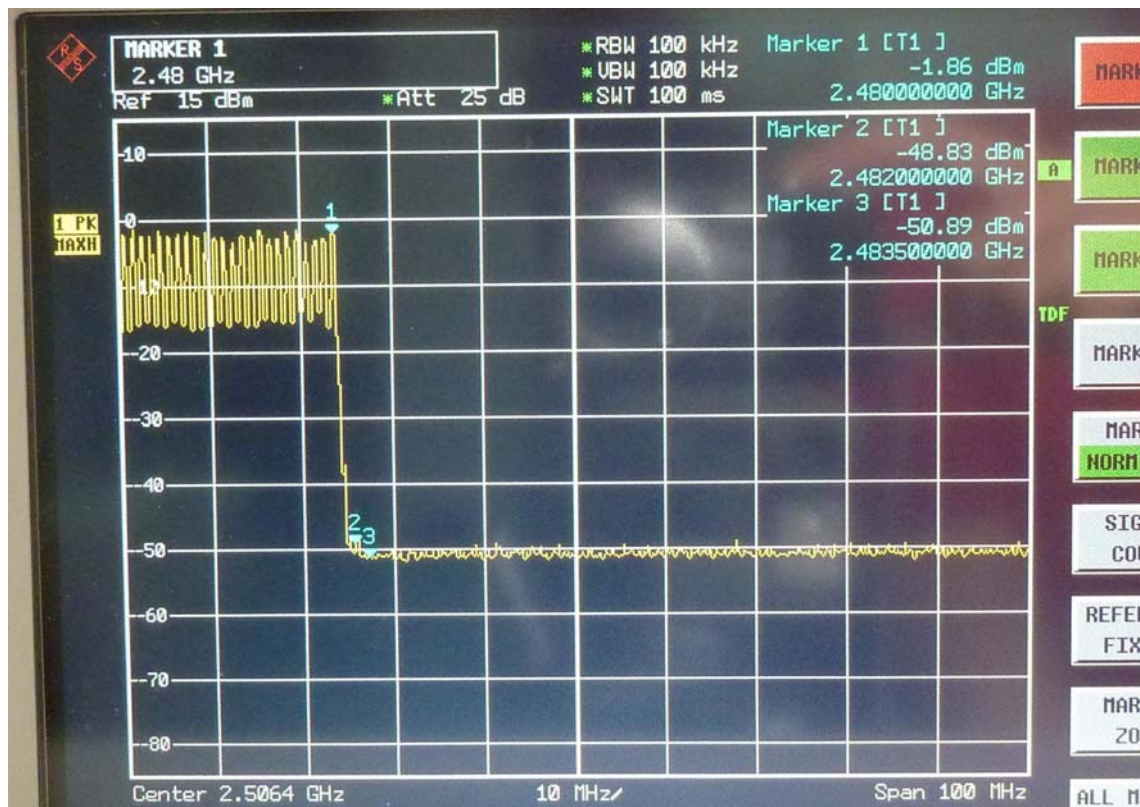


# TEST REPORT

CH0:



CH78:



 <b>Spectrum Research &amp; Testing Lab., Inc.</b> No. 101-10, Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan, Taiwan	<h1>TEST REPORT</h1>	Reference No.: A09093003
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Bluetooth Module:	<u>2</u>	Temperature:	<u>24°C</u>
Spectrum Detector:	<u>PK</u>	Humidity:	<u>67%RH</u>
		Tested Date:	<u>Oct. 06, 2009</u>
Test Result:	<u>PASS</u>	Tested by:	<u>Shunm Wang</u>

## 1. Conducted emission test

Frequency (MHz)	PEAK POWER OUTPUT (dBm)	Emission read Value (dBm)	Result of Band edge (dBc)	Band edge LIMIT (dBc)
<2400	-2.26	-49.56	47.3	>20dBc
>2483.5	-2.86	-50.36	47.5	>20dBc

## 2. Radiated emission test

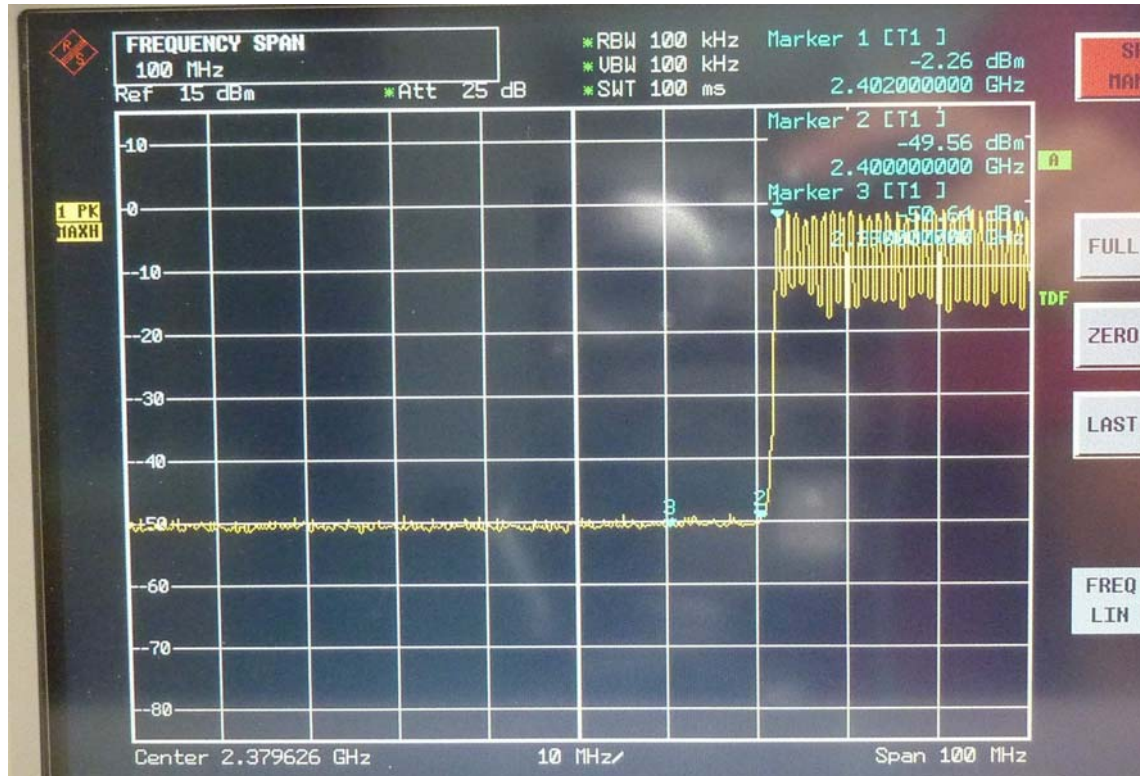
Frequency (MHz)	Correct Factor (dB)	Ant. Fac. (dB)	Ant. Pol. (H/V)	Reading (dBuV)		Emission (dBuV/m)		Limit Line (dBuV/m)		Over Limit (dBuV/m)	
				PK	AV	PK	AV	PK	AV	PK	AV
2390.00	-23.63	28.08	H	46.3	40.1	50.7	44.5	74.0	54.0	-23.3	-9.5
2390.00	-23.63	28.08	V	47.9	39.9	52.3	44.3	74.0	54.0	-21.7	-9.7
2483.50	-23.42	28.27	H	49.6	43.2	54.4	48.0	74.0	54.0	-19.6	-6.0
2483.50	-23.42	28.27	V	50.0	44.8	54.8	49.6	74.0	54.0	-19.2	-4.4



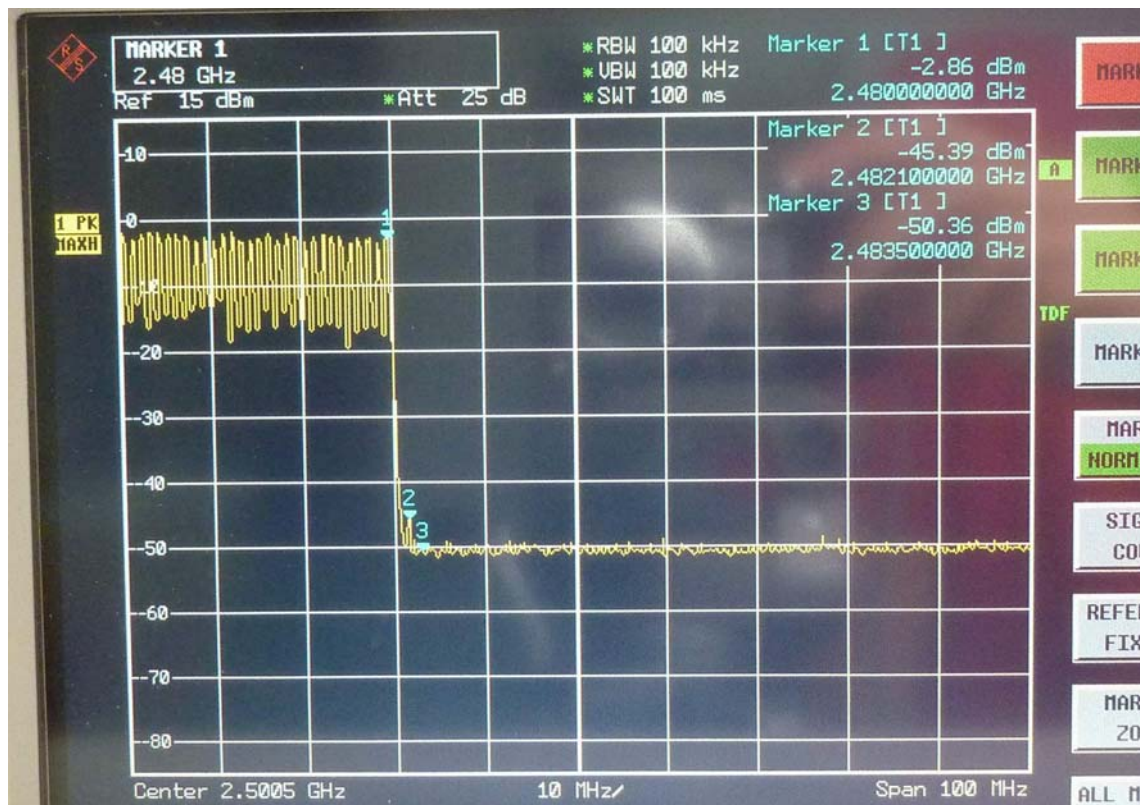


# TEST REPORT

CH0:



CH78:





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## 4.7 FUNDAMENTAL & SPURIOUS RADIATED EMISSION TEST

### 4.7.1 LIMIT

FCC Part15, Subpart C Section 15.209 limit of radiated emission for frequency below1000MHz. The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Distance (m)	Field Strength (dB $\mu$ V/m)
30 - 88	3	40.0
88 - 216	3	43.5
216 - 960	3	46.0
ABOVE 960	3	54.0

**NOTE** : 1. In the emission tables above , the tighter limit applies at the band edges.  
 2. Distance refers to the distance between measuring instrument , antenna , and the closest point of any part of the device or system.

FCC Part 15, Section15.35(b) limit of radiated emission for frequency above 1000 MHz

Frequency (MHz)	Class A (dBuV/m) (at 3m)		Class B (dBuV/m) (at 3m)	
	Peak	Average	Peak	Average
Above 1000	80.0	60.0	74.0	54.0

FCC Part 15, Subpart C Section 15.249. The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency (MHz)	Filed Strength of Fundamental (dBuV/m) (at 3m)		Field Strength of Harmonics (dBuV/m) (at 3m)	
	Peak	Average	Peak	Average
902-928	114	94	74.0	54.0
2400-2483.5	114	94	74.0	54.0
5725-5875	114	94	74.0	54.0
24000-24250	128	108	88.0	68.0

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#### 4.7.2 TEST EQUIPMENT

The following test equipment was used during the radiated emission test :

Equipment/ Facilities	Specification	Manufacturer	Model#/ Serial#	Due Date of Cal. & Cal. Center
EMI TEST RECEIVER	20 MHz TO 1000 MHz	ROHDE & SCHWARZ	ESVS30 / 841977/003	DEC. 2009 ETC
BI-LOG ANTENNA	30MHz to 2GHz	SCHFFNER	CBL6141A / 4128	MAY 2010 ETC
COAXIAL CABLE	30M	TIMES	LMR-400 / #30M	MAY 2010 ETC
FILTER	2 LINE, 30A	FIL.COIL	FC-943 / 869	NRC
OATS	3 – 10 M MEASUREMENT	SRT	SRT-1	MAY 2010 SRT
SPECTRUM	9KHz-26.5GHz	HP	8953E/ 3710A03220	MAY 2010 ETC
SPECTRUM	9kHz-7GHz	ROHDE & SCHWARZ	FSP7/ 100289	APR. 2010 ETC
PRE-AMPLIFIER	1 GHz TO 26.5 GHz	AGILENT	8449B/ 3008A01019	NOV. 2009 ETC
HORN ANTENNA	1 GHz TO 18 GHz	EMCO	3115/ 9602-4681	FEB. 2010 ETC
K-TYPE CABLE	15M	HUBER SUHNER	SF102-40/2*11 / 23932/2	MAY 2010 ETC
K-TYPE CABLE	1M	HUBER SUHNER	SF102-40/2*11 / 28934/2	NOV. 2010 ETC

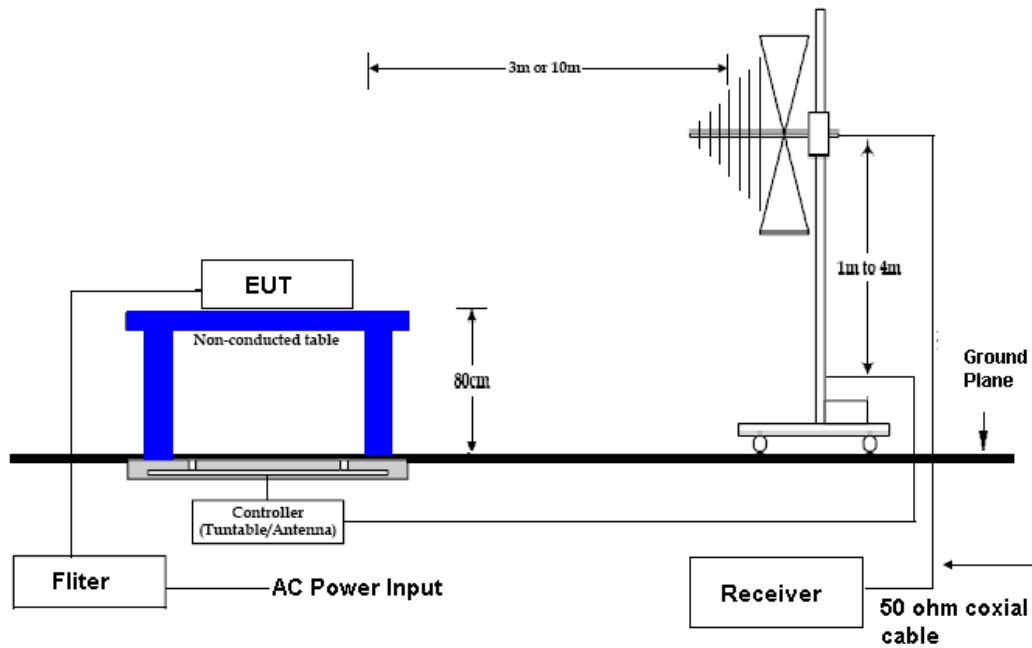
#### NOTE:

The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA



## 4.7.3 TEST SET-UP

### TEST SET- UP (30MHz – 1000MHz)



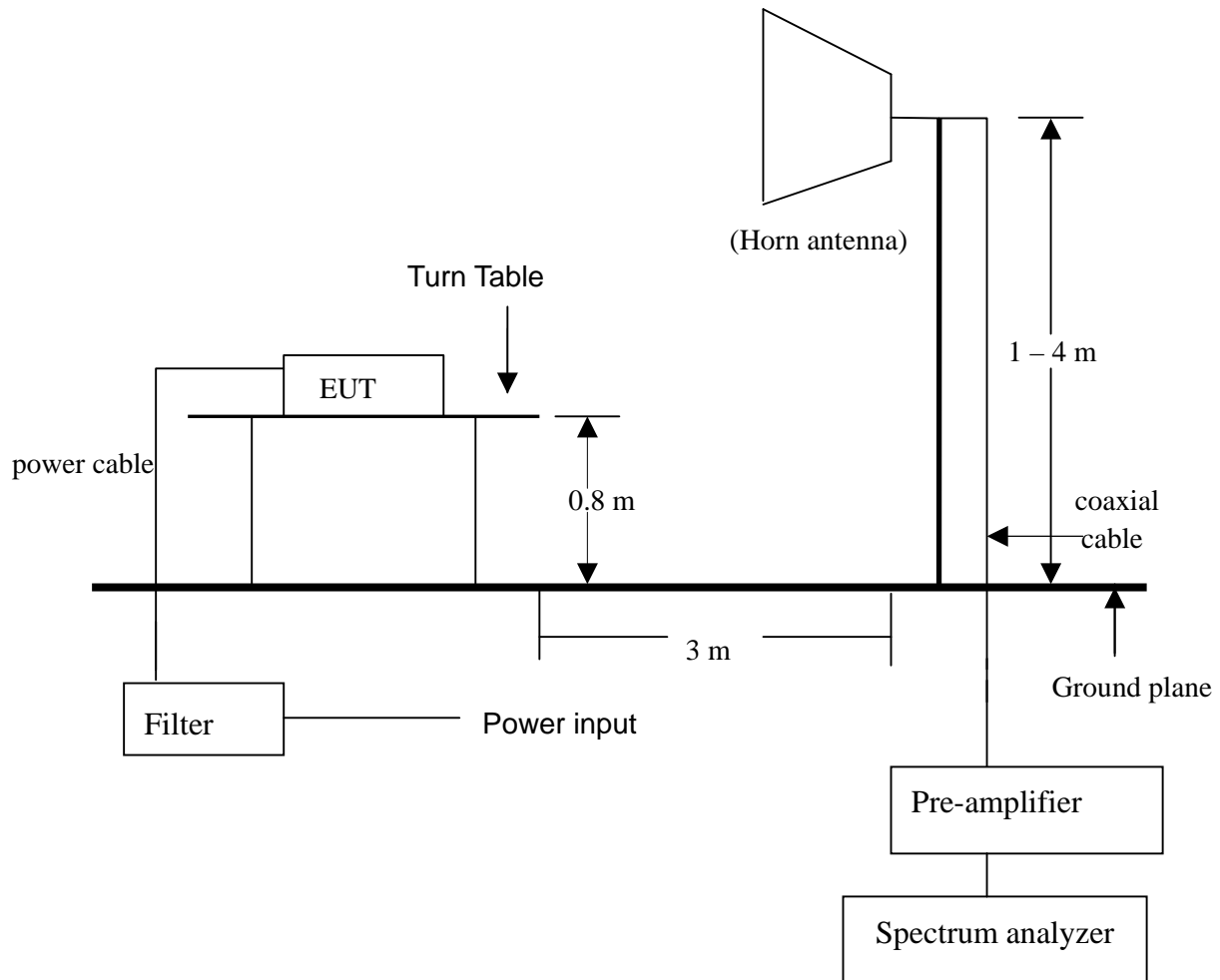
#### NOTE :

1. The EUT system was put on a wooden table with 0.8m heights above a ground plane.
2. For the actual test configuration, please refer to the photos of testing.





## TEST SET- UP (1GHz - 25GHz)



### NOTE :

- 1.The EUT system was put on a wooden table with 0.8m heights above a ground plane.
- 2.For the actual test configuration, please refer to the photos of testing.

 <b>Spectrum Research &amp; Testing Lab., Inc.</b> No. 101-10, Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan, Taiwan	<h1>TEST REPORT</h1>	Reference No.: A09093003 Report No.: FCCA09093003 FCC ID: XTA0800V2B27012 Page:40 of 63 Date : Nov. 03, 2009
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#### 4.7.4 TEST PROCEDURE

The EUT was tested according to the requirement of ANSI C63.4 and CISPR 22. The measurements were made at an open area test site with 3 meter measurement distance under 1 GHz and with 3m distance above 1GHz. The frequency spectrum measured started from 30 MHz. Under 1 GHz. All readings were quasi-peak values with 120 kHz resolution bandwidth of the test receiver. Above 1 GHz, the measurements were made at an open area test site with 3 meter measurement distance and all readings were peak and average values with 1 MHz resolution bandwidth of the test receiver. The EUT system was operated in all typical methods by users. The cables connected to EUT and support units were moved to find the maximum emission levels for each frequency.

#### 4.7.5 EUT OPERATING CONDITION

Same as section 4.1.5 of this report.



## TEST REPORT

### 4.7.6 TEST RESULT

Temperature:	25°C	Humidity:	59 %RH
Frequency Range:	30 – 1000 MHz	Measured Distance:	3m
Receiver Detector:	Q.P.	Bluetooth module	1
		Tested Mode:	TX-2441MHz
Tested By:	Shunm Wang	Tested Date:	Oct. 09, 2009

Antenna Polarization: Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
141.5500	1.55	12.38	18.8	32.7	43.5	-10.8	23	2.62
243.4011	2.05	12.75	22.1	36.9	46.0	-9.1	226	2.34
365.2156	2.65	15.58	18.5	36.7	46.0	-9.3	154	1.94
500.1135	3.10	18.10	19.0	40.2	46.0	-5.8	39	1.24
625.0357	3.47	20.20	15.4	39.1	46.0	-6.9	54	1.32
750.0260	3.80	22.40	12.3	38.5	46.0	-7.5	167	1.04

Antenna Polarization: Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
32.4253	0.80	22.68	11.1	34.6	40.0	-5.4	172	1
141.5580	1.55	12.38	22.5	36.4	43.5	-7.1	27	1.13
243.4600	2.05	12.75	19.7	34.5	46.0	-11.5	352	1.21
384.0510	2.70	16.05	17.0	35.8	46.0	-10.2	104	1.06
750.0269	3.80	22.40	13.4	39.6	46.0	-6.4	221	1.24
950.0752	4.31	25.00	8.6	37.9	46.0	-8.1	319	1.12

#### NOTE :

1. Measurement uncertainty is +/-3.7dB.
2. "\*\*": Measurement does not apply for this frequency.
3. Emission Level = Reading Value + Ant. Factor + Cable Loss.
4. The field strength of other emission frequencies were very low against the limit.





## TEST REPORT

Temperature:	25°C	Humidity:	59 %RH
Frequency Range:	30 – 1000 MHz	Measured Distance:	3m
Receiver Detector:	Q.P.	Bluetooth module	1
		Tested Mode:	RX
Tested By:	Shunm Wang	Tested Date:	Oct. 09, 2009

Antenna Polarization: Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
141.5510	1.55	12.38	16.5	30.4	43.5	-13.1	22	2.59
243.4010	2.05	12.75	20.1	34.9	46.0	-11.1	224	2.33
365.2150	2.65	15.58	16.2	34.4	46.0	-11.6	156	1.94
500.1130	3.10	18.10	17.4	38.6	46.0	-7.4	34	1.24
625.0350	3.47	20.20	13.5	37.2	46.0	-8.8	50	1.32
750.0261	3.80	22.40	10.2	36.4	46.0	-9.6	162	1.05

Antenna Polarization: Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
32.4250	0.80	22.68	9.9	33.4	40.0	-6.6	176	1.02
141.5500	1.55	12.38	20.1	34.0	43.5	-9.5	28	1.13
243.4000	2.05	12.75	17.6	32.4	46.0	-13.6	355	1.21
384.0500	2.70	16.05	15.3	34.1	46.0	-11.9	113	1.04
750.0260	3.80	22.40	11.9	38.1	46.0	-7.9	221	1.25
950.0750	4.31	25.00	7.5	36.8	46.0	-9.2	308	1.12

### NOTE :

1. Measurement uncertainty is +/-3.7dB.
2. "": Measurement does not apply for this frequency.
3. Emission Level = Reading Value + Ant. Factor + Cable Loss.
4. The field strength of other emission frequencies were very low against the limit.



## TEST REPORT

Temperature:	25°C	Humidity:	59 %RH
Frequency Range:	30 – 1000 MHz	Measured Distance:	3m
Receiver Detector:	Q.P.	Bluetooth module	2
		Tested Mode:	TX-2441MHz
Tested By:	Shunm Wang	Tested Date:	Oct. 09, 2009

Antenna Polarization: Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
141.5500	1.55	12.38	18.7	32.6	43.5	-10.9	20	2.61
243.4011	2.05	12.75	22.0	36.8	46.0	-9.2	229	2.35
365.2156	2.65	15.58	18.4	36.6	46.0	-9.4	150	1.95
500.1135	3.10	18.10	19.1	40.3	46.0	-5.7	41	1.25
625.0357	3.47	20.20	15.5	39.2	46.0	-6.8	56	1.33
750.0260	3.80	22.40	12.2	38.4	46.0	-7.6	163	1.05

Antenna Polarization: Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
32.4253	0.80	22.68	11.2	34.7	40.0	-5.3	175	1
141.5580	1.55	12.38	22.4	36.3	43.5	-7.2	26	1.12
243.4600	2.05	12.75	19.6	34.4	46.0	-11.6	350	1.22
384.0510	2.70	16.05	17.1	35.9	46.0	-10.1	101	1.04
750.0269	3.80	22.40	13.5	39.7	46.0	-6.3	226	1.25
950.0752	4.31	25.00	8.5	37.8	46.0	-8.2	318	1.13

### NOTE :

1. Measurement uncertainty is +/-3.7dB.
2. "\*\*": Measurement does not apply for this frequency.
3. Emission Level = Reading Value + Ant. Factor + Cable Loss.
4. The field strength of other emission frequencies were very low against the limit.



## TEST REPORT

Temperature:	25°C	Humidity:	59 %RH
Frequency Range:	30 – 1000 MHz	Measured Distance:	3m
Receiver Detector:	Q.P.	Bluetooth module	2
		Tested Mode:	RX
Tested By:	Shunm Wang	Tested Date:	Oct. 09, 2009

Antenna Polarization: Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
141.5500	1.55	12.38	16.4	30.3	43.5	-13.2	23	2.6
243.4000	2.05	12.75	20.2	35.0	46.0	-11.0	221	2.32
365.2140	2.65	15.58	16.3	34.5	46.0	-11.5	155	1.95
500.1120	3.10	18.10	17.3	38.5	46.0	-7.5	36	1.25
625.0360	3.47	20.20	13.4	37.1	46.0	-8.9	52	1.31
750.0259	3.80	22.40	10.1	36.3	46.0	-9.7	163	1.06

Antenna Polarization: Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
32.4240	0.80	22.68	9.8	33.3	40.0	-6.7	175	1.03
141.5570	1.55	12.38	20.2	34.1	43.5	-9.4	27	1.12
243.4010	2.05	12.75	17.5	32.3	46.0	-13.7	354	1.22
384.0510	2.70	16.05	15.2	34.0	46.0	-12.0	111	1.05
750.0267	3.80	22.40	11.8	38.0	46.0	-8.0	226	1.24
950.0756	4.31	25.00	7.6	36.9	46.0	-9.1	310	1.16

### NOTE :

1. Measurement uncertainty is +/-3.7dB.
2. "": Measurement does not apply for this frequency.
3. Emission Level = Reading Value + Ant. Factor + Cable Loss.
4. The field strength of other emission frequencies were very low against the limit.





## TEST REPORT

Temperature:	25 °C	Humidity:	67 %RH
Frequency Range:	1 – 25 GHz	Measured Distance:	3m
Receiver Detector:	PK. or AV.	Tested Mode:	TX-2402MHz
Bluetooth Module:	1		
Tested By:	Shunm Wang	Tested Date:	Oct. 08, 2009

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2402.00	-23.55	28.10	84.2	80.3	88.8	84.9	74.0	54.0	(F)	(F)	13	1.42
4804.00	-19.11	33.07	37.5	34.2	51.5	48.2	74.0	54.0	-22.5	-5.8	351	1.35
7206.00	-14.87	35.51	*	*	*	*	74.0	54.0	*	*	*	*
1070.50	-29.44	24.28	49.9	40.2	44.7	35.0	74.0	54.0	-29.3	-19.0	104	1.25
1603.00	-26.22	25.79	43.6	*	43.2	*	74.0	54.0	-30.8	*	226	1.33
1643.50	-25.69	25.94	44.4	*	44.6	*	74.0	54.0	-29.4	*	320	1.19

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2402.00	-32.16	28.00	88.4	84.4	92.9	89.0	74.0	54.0	(F)	(F)	22	1.39
4804.00	-30.47	33.64	39.5	36.1	53.5	50.1	74.0	54.0	-20.5	-3.9	345	1.36
7206.00	-28.90	36.26	*	*	*	*	74.0	54.0	*	*	*	*
1261.15	-33.70	24.77	46.2	39.9	43.0	36.7	74.0	54.0	-31.0	-17.3	311	1.31
1606.38	-32.91	25.70	44.7	*	45.5	*	74.0	54.0	-28.5	*	217	1.32
1910.27	-32.61	26.86	48.5	42.6	48.1	42.2	74.0	54.0	-25.9	-11.8	230	1.11

### NOTE :

1. Measurement uncertainty is +/-3.7dB.
2. "\*\*": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field strength of fundamental frequency.



## TEST REPORT

Temperature:	25 °C	Humidity:	67 %RH
Frequency Range:	1 – 25 GHz	Measured Distance:	3m
Receiver Detector:	PK. or AV.	Tested Mode:	TX-2441MHz
Bluetooth Module:	1		
Tested By:	Shunm Wang	Tested Date:	Oct. 08, 2009

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2441.00	-23.50	28.18	86.6	82.1	91.3	86.8	74.0	54.0	(F)	(F)	5	1.41
4882.00	-19.00	33.24	38.1	34.6	52.3	48.8	74.0	54.0	-21.7	-5.2	359	1.33
7323.00	-14.98	35.75	*	*	*	*	74.0	54.0	*	*	*	*
1816.00	-25.87	26.60	44.5	*	45.2	*	74.0	54.0	-28.8	*	26	1.21
1835.50	-25.73	26.67	44.6	*	45.6	*	74.0	54.0	-28.4	*	159	1.18
1906.00	-25.20	26.94	43.2	*	45.0	*	74.0	54.0	-29.1	*	357	1.09

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2441.00	-23.50	28.18	88.8	84.5	93.5	89.2	74.0	54.0	(F)	(F)	109	1.61
4882.00	-19.00	33.24	39.5	35.9	53.7	50.1	74.0	54.0	-20.3	-3.9	93	1.55
7323.00	-14.98	35.75	*	*	*	*	74.0	54.0	*	*	115	1.56
1628.50	-25.89	25.89	45.7	*	45.7	*	74.0	54.0	-28.3	*	292	1.35
1816.00	-25.87	26.60	44.2	*	44.9	*	74.0	54.0	-29.1	*	152	1.22
1843.00	-25.68	26.70	44.2	*	45.2	*	74.0	54.0	-28.8	*	76	1.18

### NOTE :

1. Measurement uncertainty is +/-3.7dB.
2. "\*\*": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field strength of fundamental frequency.



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## TEST REPORT

Reference No.: A09093003  
Report No.: FCCA09093003  
FCC ID: XTA0800V2B27012  
Page: 47 of 63  
Date : Nov. 03, 2009

Temperature:	25 °C	Humidity:	67 %RH
Frequency Range:	1 – 25 GHz	Measured Distance:	3m
Receiver Detector:	PK. or AV.	Tested Mode:	TX-2480MHz
Bluetooth Module:	1		
Tested By:	Shunm Wang	Tested Date:	Oct. 08, 2009

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2480.00	-23.42	28.26	86.4	81.9	91.2	86.7	74.0	54.0	(F)	(F)	8	1.39
4960.00	-18.75	33.41	37.8	34.2	52.5	48.9	74.0	54.0	-21.5	-5.1	1	1.31
7440.00	-14.89	35.98	*	*	*	*	74.0	54.0	*	*	*	*
1070.00	-29.44	24.28	47.9	40.5	42.8	35.3	74.0	54.0	-31.2	-18.7	35	1.19
1843.00	-25.68	26.70	44.1	*	45.1	*	74.0	54.0	-28.9	*	116	1.32
1906.00	-25.20	26.94	46.8	40.1	48.5	41.8	74.0	54.0	-25.5	-12.2	205	1.22

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2480.00	-23.42	28.26	88.4	84.1	93.2	88.9	74.0	54.0	(F)	(F)	11	1.35
4960.00	-18.75	33.41	39.1	35.5	53.8	50.2	74.0	54.0	-20.2	-3.8	352	1.32
7440.00	-14.89	35.98	*	*	*	*	74.0	54.0	*	*	*	*
1378.00	-25.98	25.08	43.9	*	43.0	*	74.0	54.0	-31.0	*	153	1.15
1501.00	-24.56	25.40	43.3	*	44.1	*	74.0	54.0	-29.9	*	228	1.32
1655.50	-25.64	25.99	41.9	*	42.3	*	74.0	54.0	-31.7	*	168	1.26

### NOTE :

1. Measurement uncertainty is +/- 3.7dB.
2. "\*\*": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.: Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F): The field strength of fundamental frequency.



# TEST REPORT

Temperature:	25 °C	Humidity:	67 %RH
Frequency Range:	1 – 25 GHz	Measured Distance:	3m
Receiver Detector:	PK. or AV.	Tested Mode:	RX
Bluetooth Module:	1		
Tested By:	Shunm Wang	Tested Date:	Oct. 08, 2009

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1003.00	-29.79	24.11	44.4	*	38.7	*	74.0	54.0	-35.3	*	124	1.65
1633.00	-25.82	25.91	*	*	*	*	74.0	54.0	*	*	*	
1816.00	-25.87	26.60	44.1	*	44.8	*	74.0	54.0	-29.2	*	351	1.37
1835.50	-25.73	26.67	43.9	*	44.8	*	74.0	54.0	-29.2	*	173	1.51
2431.00	-23.51	28.16	*	*	*	*	74.0	54.0	*	*	*	*
2461.00	-23.47	28.22	*	*	*	*	74.0	54.0	*	*	*	*

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1253.50	-27.96	24.76	45.2	*	41.9	*	74.0	54.0	-32.1	*	153	1.25
1603.00	-26.22	25.79	44.8	*	44.3	*	74.0	54.0	-29.7	*	262	1.33
1648.00	-25.63	25.96	44.7	*	45.1	*	74.0	54.0	-28.9	*	113	1.24
1753.00	-26.11	26.36	43.1	*	43.3	*	74.0	54.0	-30.7	*	56	1.15
1816.00	-25.87	26.60	44.5	*	45.3	*	74.0	54.0	-28.7	*	109	1.22
1906.00	-25.20	26.94	44.3	*	46.1	*	74.0	54.0	-27.9	*	27	1.45

## NOTE :

1. Measurement uncertainty is +/- 3.7dB.
2. "\*\*": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field strength of fundamental frequency.





# TEST REPORT

Temperature:	25 °C	Humidity:	67 %RH
Frequency Range:	1 – 25 GHz	Measured Distance:	3m
Receiver Detector:	PK. or AV.	Tested Mode:	TX-2402MHz
Bluetooth Module:	2		
Tested By:	Shunm Wang	Tested Date:	Oct. 08, 2009

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2402.00	-23.55	28.10	85.9	81.3	90.4	85.9	74.0	54.0	(F)	(F)	12	1.41
4804.00	-19.11	33.07	37.9	34.5	51.9	48.5	74.0	54.0	-22.1	-5.5	353	1.34
7206.00	-14.87	35.51	*	*	*	*	74.0	54.0	*	*	*	*
1816.00	-25.87	26.60	44.4	*	45.1	*	74.0	54.0	-28.9	*	179	1.42
1843.00	-25.68	26.70	43.6	*	44.7	*	74.0	54.0	-29.3	*	132	1.24
1906.00	-25.20	26.94	47.4	41.2	49.2	42.9	74.0	54.0	-24.8	-11.1	54	1.16

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2402.00	-23.55	28.10	89.2	84.6	93.8	89.2	74.0	54.0	(F)	(F)	18	1.37
4804.00	-19.11	33.07	39.7	36.2	53.7	50.2	74.0	54.0	-20.3	-3.8	349	1.35
7206.00	-14.87	35.51	*	*	*	*	74.0	54.0	*	*	*	*
1253.50	-27.96	24.76	44.8	*	41.6	*	74.0	54.0	-32.4	*	153	1.28
1606.00	-26.18	25.80	43.3	*	43.0	*	74.0	54.0	-31.0	*	254	1.16
1636.00	-25.78	25.92	43.5	*	43.6	*	74.0	54.0	-30.4	*	77	1.42

## NOTE :

1. Measurement uncertainty is +/-3.7dB.
2. "\*\*": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field strength of fundamental frequency.



# TEST REPORT

Temperature:	25 °C	Humidity:	67 %RH
Frequency Range:	1 – 25 GHz	Measured Distance:	3m
Receiver Detector:	PK. or AV.	Tested Mode:	TX-2441MHz
Bluetooth Module:	2		
Tested By:	Shunm Wang	Tested Date:	Oct. 08, 2009

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2441.00	-23.50	28.18	86.0	81.9	90.7	86.6	74.0	54.0	(F)	(F)	2	1.39
4882.00	-19.00	33.24	37.9	34.2	52.1	48.4	74.0	54.0	-21.9	-5.6	355	1.34
7323.00	-14.98	35.75	*	*	*	*	74.0	54.0	*	*	*	*
1610.50	-26.13	25.82	46.1	*	45.8	*	74.0	54.0	-28.2	*	49	1.35
1835.50	-25.73	26.67	44.8	*	45.7	*	74.0	54.0	-28.3	*	313	1.24
1906.00	-25.20	26.94	45.5	*	47.3	*	74.0	54.0	-26.7	*	119	1.12

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2441.00	-23.50	28.18	89.4	84.9	94.1	89.6	74.0	54.0	(F)	(F)	10	1.35
4882.00	-19.00	33.24	40.0	36.1	54.2	50.3	74.0	54.0	-19.8	-3.7	351	1.31
7323.00	-14.98	35.75	*	*	*	*	74.0	54.0	*	*	*	*
1253.50	-27.96	24.76	44.4	*	41.2	*	74.0	54.0	-32.8	*	106	1.42
1378.00	-25.98	25.08	41.9	*	41.0	*	74.0	54.0	-33.0	*	25	1.36
1501.00	-24.56	25.40	41.9	*	42.8	*	74.0	54.0	-31.2	*	339	1.15

## NOTE :

1. Measurement uncertainty is +/-3.7dB.
2. "\*\*": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field strength of fundamental frequency.



# TEST REPORT

Temperature:	25 °C	Humidity:	67 %RH
Frequency Range:	1 – 25 GHz	Measured Distance:	3m
Receiver Detector:	PK. or AV.	Tested Mode:	TX-2480MHz
Bluetooth Module:	2		
Tested By:	Shunm Wang	Tested Date:	Oct. 08, 2009

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2480.00	-23.42	28.26	81.7	76.9	86.5	81.7	74.0	54.0	(F)	(F)	13	1.35
4960.00	-18.75	33.41	35.1	32.0	49.8	46.7	74.0	54.0	-24.2	-7.3	355	1.29
7440.00	-14.89	35.98	*	*	*	*	74.0	54.0	*	*	*	*
1003.00	-29.79	24.11	43.7	*	38.0	*	74.0	54.0	-36.0	*	117	1.25
1655.50	-25.64	25.99	42.7	*	43.1	*	74.0	54.0	-30.9	*	46	1.42
1906.00	-25.20	26.94	45.6	39.8	47.3	41.5	74.0	54.0	-26.7	-12.5	308	1.33

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2480.00	-23.42	28.26	87.4	83.5	92.3	88.3	74.0	54.0	(F)	(F)	23	1.23
4960.00	-18.75	33.41	38.7	35.0	53.4	49.7	74.0	54.0	-20.6	-4.3	359	1.31
7440.00	-14.89	35.98	*	*	*	*	74.0	54.0	*	*	*	*
1253.50	-27.96	24.76	45.2	*	41.9	*	74.0	54.0	-32.1	*	268	1.29
1655.50	-25.64	25.99	46.6	40.1	47.0	40.5	74.0	54.0	-27.0	-13.5	144	1.31
1753.00	-26.11	26.36	43.9	*	44.2	*	74.0	54.0	-29.8	*	39	1.05

## NOTE :

1. Measurement uncertainty is +/- 3.7dB.
2. "\*\*": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field strength of fundamental frequency.



# TEST REPORT

Temperature:	25 °C	Humidity:	67 %RH
Frequency Range:	1 – 25 GHz	Measured Distance:	3m
Receiver Detector:	PK. or AV.	Tested Mode:	RX
Bluetooth Module:	2		
Tested By:	Shunm Wang	Tested Date:	Oct. 08, 2009

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1003.00	-29.79	24.11	44.3	*	38.6	*	74.0	54.0	-35.4	*	126	1.63
1606.00	-26.18	25.80	43.8	*	43.4	*	74.0	54.0	-30.6	*	159	1.34
1651.00	-25.61	25.97	46.2	40.2	46.6	40.6	74.0	54.0	-27.4	-13.4	155	1.28
1816.00	-25.87	26.60	43.9	*	44.6	*	74.0	54.0	-29.4	*	233	1.45
2443.00	-23.50	28.19	*	*	*	*	74.0	54.0	*	*	*	*
2473.00	-23.44	28.25	*	*	*	*	74.0	54.0	*	*	*	*

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1606.00	-26.18	25.80	43.7	*	43.3	*	74.0	54.0	-30.7	*	205	1.35
1640.00	-25.73	25.93	47.0	40.5	47.2	40.7	74.0	54.0	-26.8	-13.3	179	1.17
1651.00	-25.61	25.97	47.9	41.2	48.3	41.6	74.0	54.0	-25.7	-12.4	325	1.22
1753.00	-26.11	26.36	43.9	*	44.1	*	74.0	54.0	-29.9	*	60	1.17
1816.00	-25.87	26.60	44.5	*	45.3	*	74.0	54.0	-28.7	*	100	1.22
1835.00	-25.73	26.67	43.7	*	44.7	*	74.0	54.0	-29.3	*	115	1.45

## NOTE :

1. Measurement uncertainty is +/- 3.7dB.
2. "\*\*": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field strength of fundamental frequency.



 <b>Spectrum Research &amp; Testing Lab., Inc.</b> No. 101-10, Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan, Taiwan	<h1>TEST REPORT</h1>	Reference No.: A09093003 Report No.: FCCA09093003 FCC ID: XTA0800V2B27012 Page:53 of 63 Date : Nov. 03, 2009
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## 5. CONDUCTED EMISSION TEST FOR POWER PORT

### 5.1 LIMIT

Frequency (MHz)	Class A (dBμV)		Class B (dBμV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

#### NOTE :

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

### 5.2 TEST EQUIPMENT

The following test equipment was used for the test:

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
EMI TEST RECEIVER	9kHz TO 2.75 GHz	ROHDE & SCHWARZ	ESCS30 / 100376	NOV.2009 ETC
LISN	50 μH, 50 ohm	FCC	FCC-LISN-50-25-2 / 01017	OCT. 2010 ETC
LISN	50μH, 50 ohm	SOLAR	9252-50-R24-BNC / 951315	JUN. 2010 ETC
50 OHM TERMINATOR	50 ohm	HP	11593A / #2	MAY 2010 ETC
COAXIAL CABLE	5M	TIMES	LMR-400 / #5M(L3TCAB003)	MAY. 2010 ETC
Filter	2 LINE, 30A	FIL.COIL	FC-943 / 771	NCR
GROUND PLANE	2M (H) x 3M (W)	SRT	N/A	NCR
GROUND PLANE	2.5M (H) x 3M (W)	SRT	N/A	NCR

**NOTE:** The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

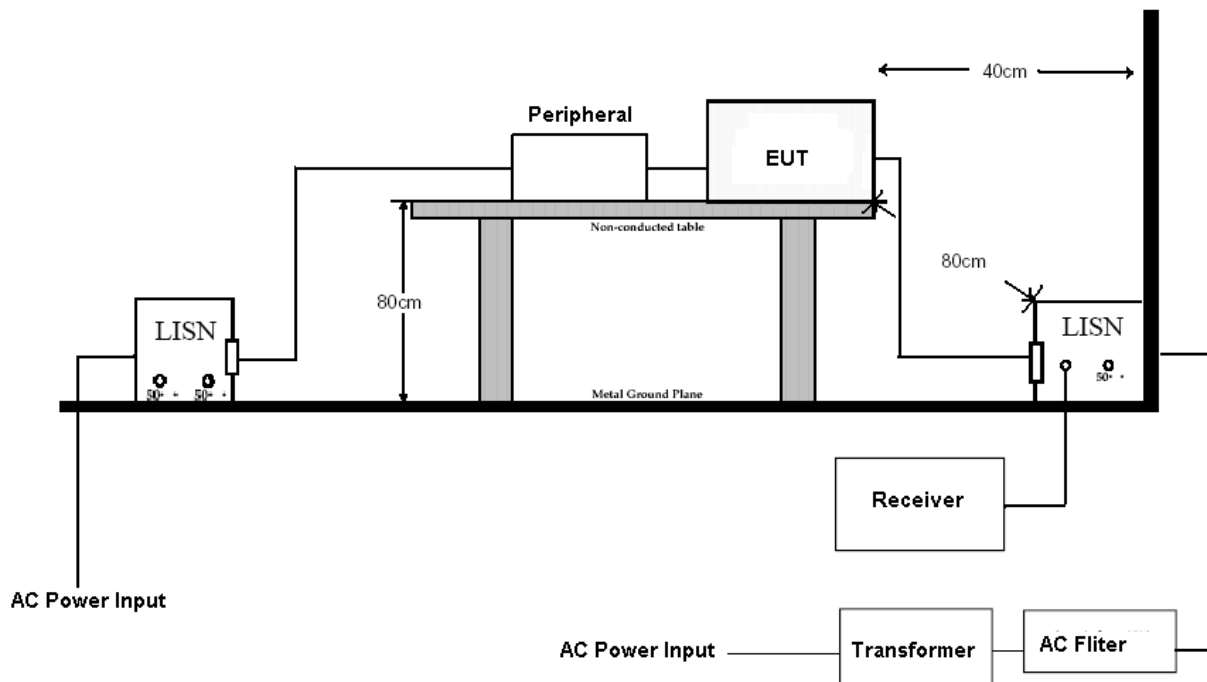


## 5.3 TEST PROCEDURE

The EUT was tested according to the requirement of ANSI C63.4:2003 and CISPR22:2003. The frequency spectrum from 0.15 MHz to 30 MHz was investigated. The LISN used was 50 ohm/50 $\mu$ H as specified. All readings were quasi-peak and average values with 10 kHz resolution bandwidth of the test receiver. The EUT system was operated in all typical methods by users. Both lines of the power mains of EUT were measured and the cables connected to EUT and support units were moved to find the maximum emission levels for each frequency.

First, find the margin or higher points at least 6 points by software, then use manual to find the maximum data. The procedure is referred on the test procedure of SRT LAB.

## 5.4 TEST SETUP



### NOTE:

1. The EUT was put on a wooden table with 0.8m heights above ground plane, and 0.4m away from reference ground plane (> 2mx2m).
2. For the actual test configuration, please refer to the photos of testing.
3. The serial no. of the LISN connected to EUT is 01017.
4. The serial no. of the LISN connected to support units is 01018.



## TEST REPORT

### 5.5 TEST RESULT

Temperature:	25 °C	Humidity:	57 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	TX 2441MHz
Receiver Detector:	Q.P. and AV.	Modulation Type:	GFSK
Bluetooth Module:	1	Tested Channel:	CH 39
Tested By:	Shunm Wang	Tested Date:	OCT. 07, 2009

Power Line Measured : Line

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dB $\mu$ V)		Emission Level (dB $\mu$ V)		Limit (dB $\mu$ V)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.486	0.16	30.45	18.44	30.61	18.60	56.24	46.24	-25.63	-27.64
0.498	0.16	30.95	19.47	31.11	19.63	56.04	46.04	-24.93	-26.41
0.812	0.10	28.47	17.84	28.57	17.94	56.00	46.00	-27.44	-28.07
1.398	0.06	26.21	14.53	26.27	14.59	56.00	46.00	-29.73	-31.41
1.794	0.06	26.35	17.90	26.41	17.96	56.00	46.00	-29.59	-28.04
5.213	0.12	25.11	13.13	25.23	13.25	60.00	50.00	-34.77	-36.75

Power Line Measured : Neutral

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dB $\mu$ V)		Emission Level (dB $\mu$ V)		Limit (dB $\mu$ V)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.390	0.17	35.41	25.11	35.58	25.28	58.07	48.07	-22.49	-22.79
0.501	0.14	31.66	20.61	31.80	20.75	56.00	46.00	-24.20	-25.25
0.716	0.11	34.47	27.05	34.58	27.16	56.00	46.00	-21.42	-18.84
4.962	0.16	29.39	19.74	29.55	19.90	56.00	46.00	-26.45	-26.10
5.102	0.16	28.84	19.20	29.00	19.36	60.00	50.00	-31.00	-30.64
5.132	0.16	29.34	20.44	29.50	20.60	60.00	50.00	-30.50	-29.40

#### NOTE :

1. Measurement uncertainty is +/-2dB
2. Emission level = Reading value + Correction factor
3. Correction Factor = Cable loss + Insertion loss of LISN
4. Margin value = Emission level - Limit
5. The emission of other frequencies was very low against the limit.
6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.



## TEST REPORT

Temperature:	25 °C	Humidity:	57 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	TX 2441MHz
Receiver Detector:	Q.P. and AV.	Modulation Type:	GFSK
Bluetooth Module:	2	Tested Channel:	CH 39
Tested By:	Shunm Wang	Tested Date:	OCT. 07, 2009

### Power Line Measured : Line

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dB $\mu$ V)		Emission Level (dB $\mu$ V)		Limit (dB $\mu$ V)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.378	0.17	32.22	19.08	32.39	19.25	58.33	48.33	-25.94	-29.08
0.384	0.17	33.12	19.83	33.29	20.00	58.19	48.19	-24.90	-28.19
0.716	0.11	24.45	10.94	24.56	11.05	56.00	46.00	-31.44	-34.95
1.447	0.06	27.13	15.01	27.19	15.07	56.00	46.00	-28.81	-30.93
4.853	0.11	26.87	12.66	26.98	12.77	56.00	46.00	-29.02	-33.23
5.071	0.12	26.32	11.76	26.44	11.88	60.00	50.00	-33.56	-38.12

### Power Line Measured : Neutral

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dB $\mu$ V)		Emission Level (dB $\mu$ V)		Limit (dB $\mu$ V)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.465	0.16	30.39	18.75	30.55	18.91	56.61	46.61	-26.06	-27.70
0.489	0.16	32.46	19.76	32.62	19.92	56.19	46.19	-23.57	-26.27
0.509	0.14	33.60	22.10	33.74	22.24	56.00	46.00	-22.26	-23.76
2.635	0.11	26.32	16.60	26.43	16.71	56.00	46.00	-29.57	-29.29
4.972	0.16	28.29	18.20	28.45	18.36	56.00	46.00	-27.55	-27.64
5.020	0.16	28.52	18.42	28.68	18.58	60.00	50.00	-31.32	-31.42

### NOTE :

1. Measurement uncertainty is +/-2dB
2. Emission level = Reading value + Correction factor
3. Correction Factor = Cable loss + Insertion loss of LISN
4. Margin value = Emission level - Limit
5. The emission of other frequencies was very low against the limit.
6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.





## TEST REPORT

Temperature:	25 °C	Humidity:	57 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	RX
Receiver Detector:	Q.P. and AV.	Modulation Type:	GFSK
Bluetooth Module:	1	Tested Channel:	NA
Tested By:	Shunm Wang	Tested Date:	OCT. 07, 2009

### Power Line Measured : Line

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dB $\mu$ V)		Emission Level (dB $\mu$ V)		Limit (dB $\mu$ V)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.387	0.17	32.82	19.68	32.99	19.85	58.13	48.13	-25.14	-28.28
0.489	0.16	28.51	14.41	28.67	14.57	56.19	46.19	-27.52	-31.62
1.129	0.05	29.11	14.29	29.16	14.34	56.00	46.00	-26.84	-31.66
3.754	0.10	26.52	11.82	26.62	11.92	56.00	46.00	-29.38	-34.08
4.784	0.11	26.92	11.56	27.03	11.67	56.00	46.00	-28.97	-34.33
5.000	0.12	26.06	11.53	26.18	11.65	56.00	46.00	-29.82	-34.35

### Power Line Measured : Neutral

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dB $\mu$ V)		Emission Level (dB $\mu$ V)		Limit (dB $\mu$ V)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.378	0.17	37.24	20.14	37.41	20.31	58.33	48.33	-20.92	-28.02
0.393	0.17	36.74	26.34	36.91	26.51	58.00	48.00	-21.09	-21.49
1.201	0.09	31.44	19.17	31.53	19.26	56.00	46.00	-24.47	-26.74
1.418	0.10	31.30	21.40	31.40	21.50	56.00	46.00	-24.60	-24.50
1.428	0.10	30.59	19.04	30.69	19.14	56.00	46.00	-25.31	-26.86
5.883	0.17	26.72	17.09	26.89	17.26	60.00	50.00	-33.11	-32.74

### NOTE :

1. Measurement uncertainty is +/-2dB
2. Emission level = Reading value + Correction factor
3. Correction Factor = Cable loss + Insertion loss of LISN
4. Margin value = Emission level - Limit
5. The emission of other frequencies was very low against the limit.
6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.



## TEST REPORT

Temperature:	25 °C	Humidity:	57 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	RX
Receiver Detector:	Q.P. and AV.	Modulation Type:	GFSK
Bluetooth Module:	2	Tested Channel:	NA
Tested By:	Shunm Wang	Tested Date:	OCT. 07, 2009

### Power Line Measured : Line

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dB $\mu$ V)		Emission Level (dB $\mu$ V)		Limit (dB $\mu$ V)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.387	0.17	32.78	20.31	32.95	20.48	58.13	48.13	-25.18	-27.65
0.489	0.16	28.31	14.81	28.47	14.97	56.19	46.19	-27.72	-31.22
1.076	0.05	28.53	12.46	28.58	12.51	56.00	46.00	-27.42	-33.49
2.655	0.08	25.82	9.99	25.90	10.07	56.00	46.00	-30.10	-35.93
4.685	0.11	26.76	11.83	26.87	11.94	56.00	46.00	-29.13	-34.06
5.051	0.12	26.24	11.34	26.36	11.46	60.00	50.00	-33.64	-38.54

### Power Line Measured : Neutral

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dB $\mu$ V)		Emission Level (dB $\mu$ V)		Limit (dB $\mu$ V)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.378	0.17	37.28	24.49	37.45	24.66	58.33	48.33	-20.88	-23.67
0.489	0.16	32.78	20.15	32.94	20.31	56.19	46.19	-23.25	-25.88
1.158	0.09	31.80	19.37	31.89	19.46	56.00	46.00	-24.11	-26.54
2.358	0.10	30.21	14.26	30.31	14.36	56.00	46.00	-25.69	-31.64
4.833	0.15	30.26	18.90	30.41	19.05	56.00	46.00	-25.59	-26.95
5.081	0.16	29.70	18.86	29.86	19.02	60.00	50.00	-30.14	-30.98

### NOTE :

1. Measurement uncertainty is +/-2dB
2. Emission level = Reading value + Correction factor
3. Correction Factor = Cable loss + Insertion loss of LISN
4. Margin value = Emission level - Limit
5. The emission of other frequencies was very low against the limit.
6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.



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### **6 Antenna application**

#### **6.1 Antenna requirement**

The EUT's antenna is met the requirement of FCC part15C section15.203 and 15.204.

#### **6.2 Result**

The EUT's antenna used a Ceramic Chip Antenna on PCB. The antenna's gain is 2 dBi and meets the requirement.



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### 8. TERMS OF ABBREVIATION

AV.	Average detection
AZ(°)	Turn table azimuth
Correct.	Correction
EL(m)	Antenna height (meter)
EUT	Equipment Under Test
Horiz.	Horizontal direction
LISN	Line Impedance Stabilization Network
NSA	Normalized Site Attenuation
Q.P.	Quasi-peak detection
SRT Lab	Spectrum Research & Testing Laboratory, Inc.
Vert.	Vertical direction