FCC TEST REPORT

for

47 CFR Part 15 Subpart C

Equipment : Bluetooth USB Adapter

Model No. : MBD-C2.1-2

FCC ID. : SI4-MBDC212

Filing Type : Certification

Applicant : Mavin Technology Inc.
Room 305, Bldg. 52, No. 195-28, Sec. 4 Chung Hsin Rd., Chutung, Hsinchu, Taiwan, 310, R.O.C.

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SPORTON International Inc.

6F, No.106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

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History of this test report

Original Report Issue Date: Sep. 14, 2004

■ No additional attachment.

☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

Certificate No. : F483147

CERTIFICATE OF COMPLIANCE

for

47 CFR Part 15 Subpart C

Equipment : Bluetooth USB Adapter

Model No. : MBD-C2.1-2

FCC ID. : SI4-MBDC212

Filing Type : Certification

Applicant : Mavin Technology Inc.
Room 305, Bldg. 52, No. 195-28, Sec. 4 Chung Hsin Rd., Chutung, Hsinchu, Taiwan, 310, R.O.C.

I **HEREBY** CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4 - 2001** and the equipment under test was ***passed*** all test items required in FCC Part 15 subpart C, relative to the equipment under test. Testing was carried out on Sep. 14, 2004 at **SPORTON International Inc.** LAB.

Daniel Lee 9/16/2004

Daniel Lee
Manager

1. General Description of Equipment under Test

1.1. Applicant

Mavin Technology Inc.
Room 305, Bldg. 52, No. 195-28, Sec. 4, Chung Hsin Rd., Chutung, Hsinchu, Taiwan, 310, R.O.C.

1.2. Manufacturer

Mavin Technology Inc.
Room 305, Bldg. 52, No. 195-28, Sec. 4, Chung Hsin Rd., Chutung, Hsinchu, Taiwan, 310, R.O.C.

1.3. Basic Description of Equipment under Test

Equipment	: Bluetooth USB Adapter
Model No.	: MBD-C2.1-2
FCC ID	: SI4-MDBC212
Trade Name	: Mavin
Power Supply Type	: From System

1.4. Feature of Equipment under Test

Product Feature & Specification				
1. Type of Modulation	GFSK			
2. Frequency Band	2.400GHz ~ 2.4835GHz			
3. Carrier Frequency of each channel	2402+K MHz ; K=0 ~ 78			
4. Bandwidth of each channel	1MHz			
5. Maximum Output Power to Antenna	4 dBm			
6. Type of Antenna Connector	N/A			
7. Antenna Type	PCB Antenna			
8. Antenna Gain	0 dBi			
9. Function Type	Transmitter		Transceiver	V
10. Power Rating (DC/AC , Voltage)	DC 3.3V			
11. Temperature Range (Operating)	-40°C to + 105°C			

2. Test Configuration of Equipment under Test

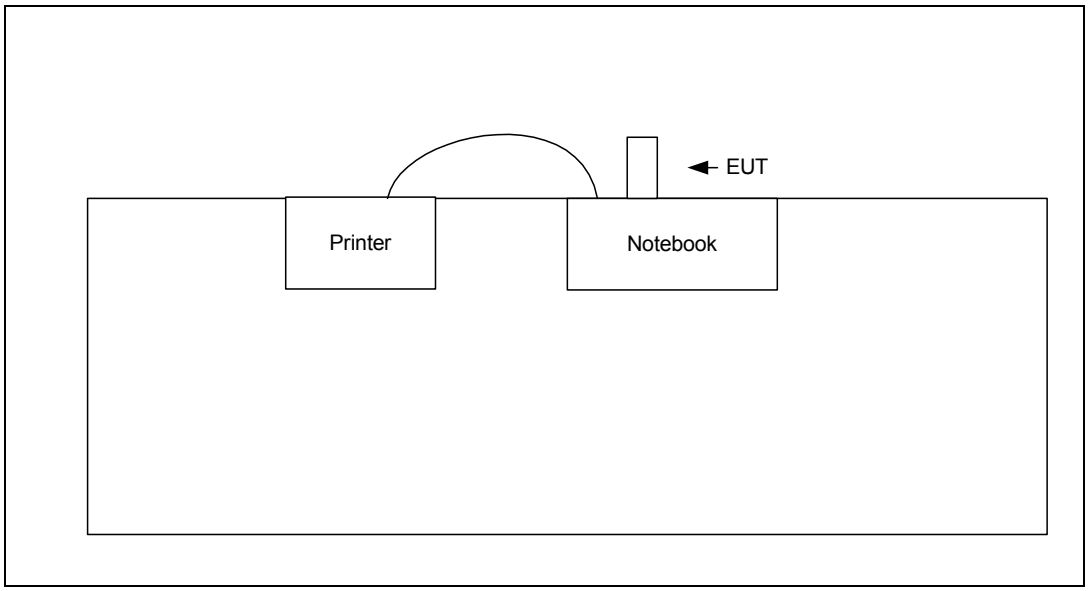
2.1. Test Manner

a. The EUT has been associated with peripherals pursuant to ANSI C63.4-2001 and configuration operated in a manner, which tended to maximize its emission characteristics in a typical application.
b. The complete test system included DELL Notebook, EPSON Printer and EUT for EMI test.
c. The following test modes were tested for conduction test:
   Mode 1: RX CH00 2402 MHz
d. The following test modes were tested for radiation test:
   Mode 1: TX CH00 2402MHz
   Mode 2: TX CH39 2441MHz
   Mode 3: TX CH78 2480MHz
e. Frequency range investigated: conduction 150 KHz to 30 MHz, radiation 30 MHz to 25000MHz.

2.2. Description of Test System

Item	Asset	Model Name	Power Cord	S/N
1.	Notebook (DELL)	PP05L	N/A	SP0015
2.	Printer (EPSON)	LQ-300	N/A	SP0023

2.3. Connection Diagram of Test System



3. Operation of Equipment under Test

An executive program, EMCTEST.exe on WIN 2000 continuously generating a complete line of " H " pattern was used as the test software.

The program was executed as follows:

a. Turn on the power of all equipment.
b. The PC reads the test program from the hard disk drive and runs it.
c. The PC sends " H" messages to the monitor, and the monitor displays " H " patterns on the screen.
d. The PC sends " H " messages to the printer, then the printer prints them on the paper.
e. The PC sends " H " messages to the modem.
f. The PC sends " H " messages to the internal hard disk, and the hard disk reads and writes the message.
g. Repeat the steps from c to f.

At the same time, the following program was executed:

"Blue Test" sends continuous transmitting for radiation test.

"Blue Test " connects with slave for conduction test.

4. General Information of Test

Test Site Location	:	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiag, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 886-3-327-3456 FAX : 886-3-318-0055
Test Site No	:	CO01-HY, 03CH06-HY

4.1. Test Voltage

110V/60Hz or DC 3.7V

4.2. Standard for Methods of Measurement

ANSI C63.4-2001

4.3. Test in Compliance with

47 CFR Part 15 Subpart C

4.4. Frequency Range Investigated

Conduction: from 150 KHz to 30 MHz
Radiation: from 30 MHz to 25000MHz

4.5. Test Distance

The test distance of radiated emission from antenna to EUT is 3 m.

5. Report of Measurements and Examinations

5.1. List of Measurements and Examinations

FCC Rule	Description of Test	Result
15.247(a)(1)	Hopping Channel Bandwidth	Pass
15.247(a)(1)	Hopping Channel Separation	Pass
15.247(a)(1)(iii)	Number of Hopping Frequency Used	Pass
15.247(a)(1)(iii)	Dwell Time of Each Frequency within a 30 Second Period	Pass
15.247(b)(1)	Output Power	Pass
15.247(c)	100KHz Bandwidth of Frequency Band Edges	Pass
15.207	Conducted Emission	Pass
15.209	Radiated Emission	Pass
15.203	Antenna Requirement	Pass

5.2. Hopping Channel Separation

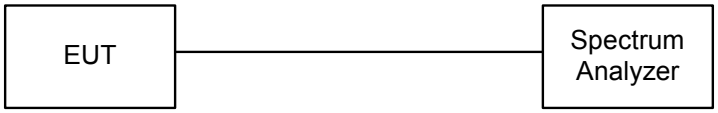
5.2.1. Measuring Instruments：

As described in chapter 7 of this test report.

5.2.2. Test Procedure：

1. The transmitter output was connected to the spectrum analyze directly.
2. Set RBW of spectrum analyzer to 30kHz and VBW to 100kHz.
3. The Hopping Channel Separation is defined as the channel is separated with the next channel.

5.2.3. Test Setup Layout：



5.2.4. Test Result：The spectrum analyzer plots are attached as below

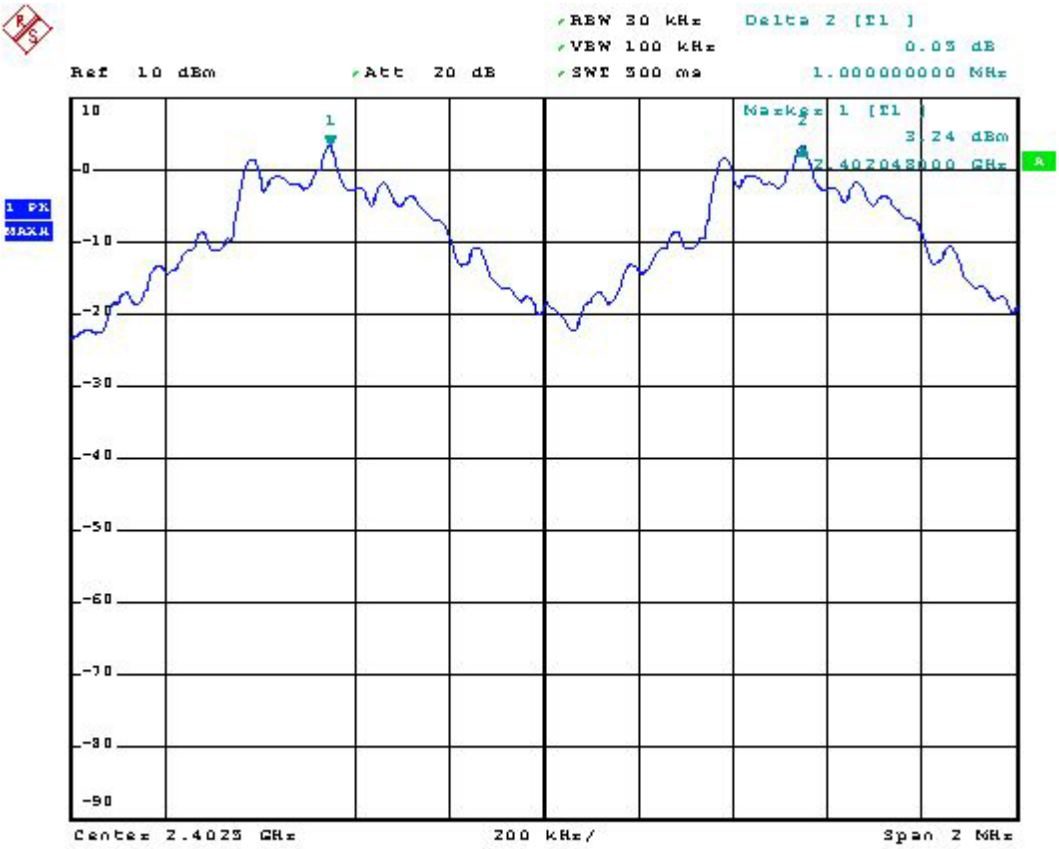
- Test Mode: Mode 1~Mode 3
- Temperature: 26°C
- Relative Humidity: 53 %

Channel	Frequency (MHz)	Hopping Channel Separation (MHz)	Limits (MHz)	Plot Ref. No.
00	2402	1.0	0.772	Mode 1
39	2441	1.0	0.766	Mode 2
78	2480	1.0	0.772	Mode 3

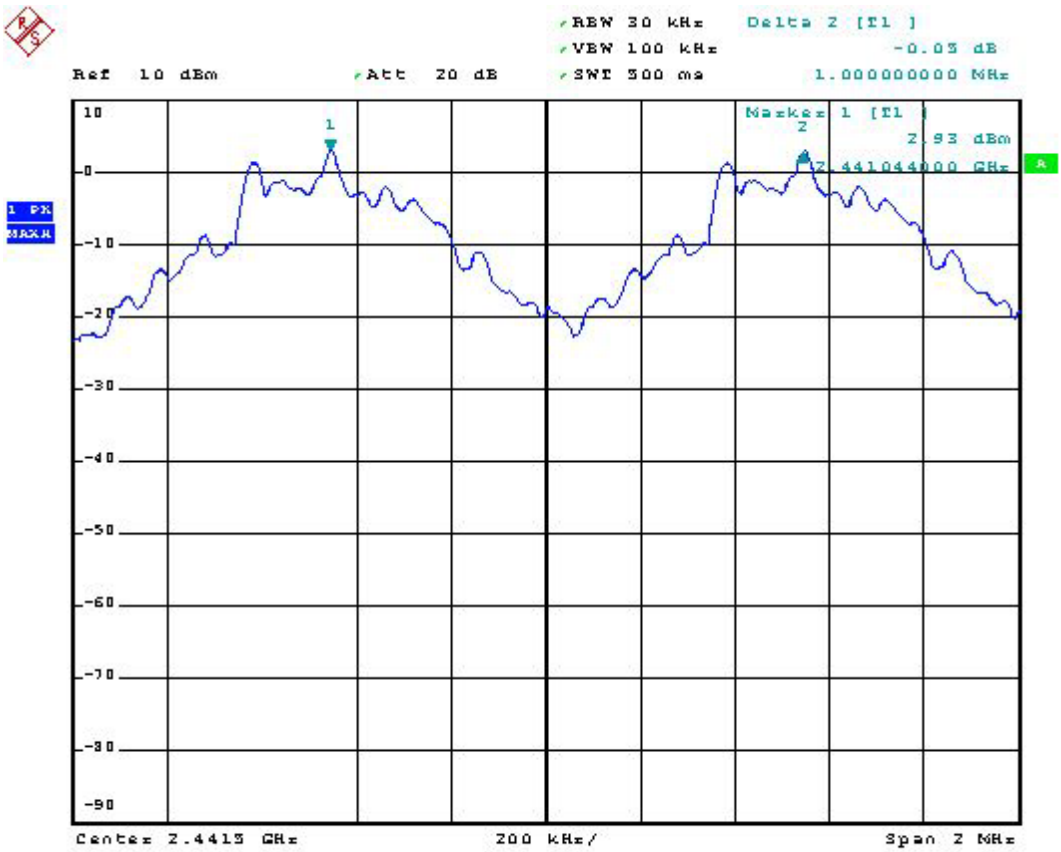
Remark: Limit is the greater one of 25kHz or the 20dB bandwidth of the hopping channel.

5.2.5 Hopping Channel Separation

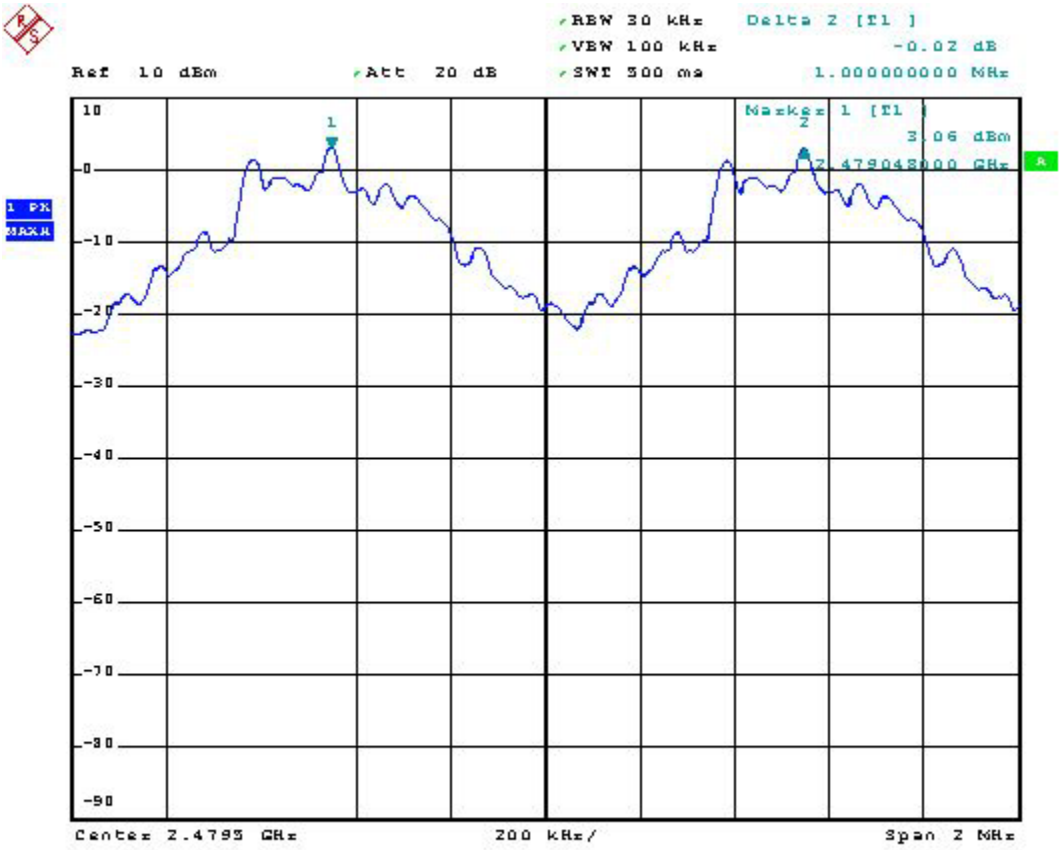
Mode 1: CH00 (2402MHz)



Mode 2: CH39 (2441MHz)



Mode 3: CH78 (2480MHz)



5.3. Number of Hopping Frequency

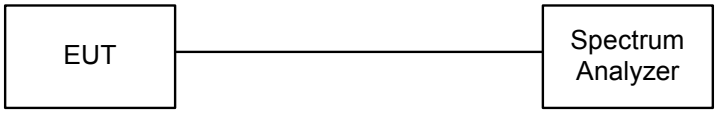
5.3.1. Measuring Instruments：

As described in chapter 7 of this test report.

5.3.2. Test Procedure：

1. The transmitter output was connected to the spectrum analyze directly.
2. Set RBW of spectrum analyzer to 100kHz and VBW to 100kHz.
3. The number of hopping frequency used is defined as the device has the numbers of total channel.

5.3.3. Test Setup Layout：

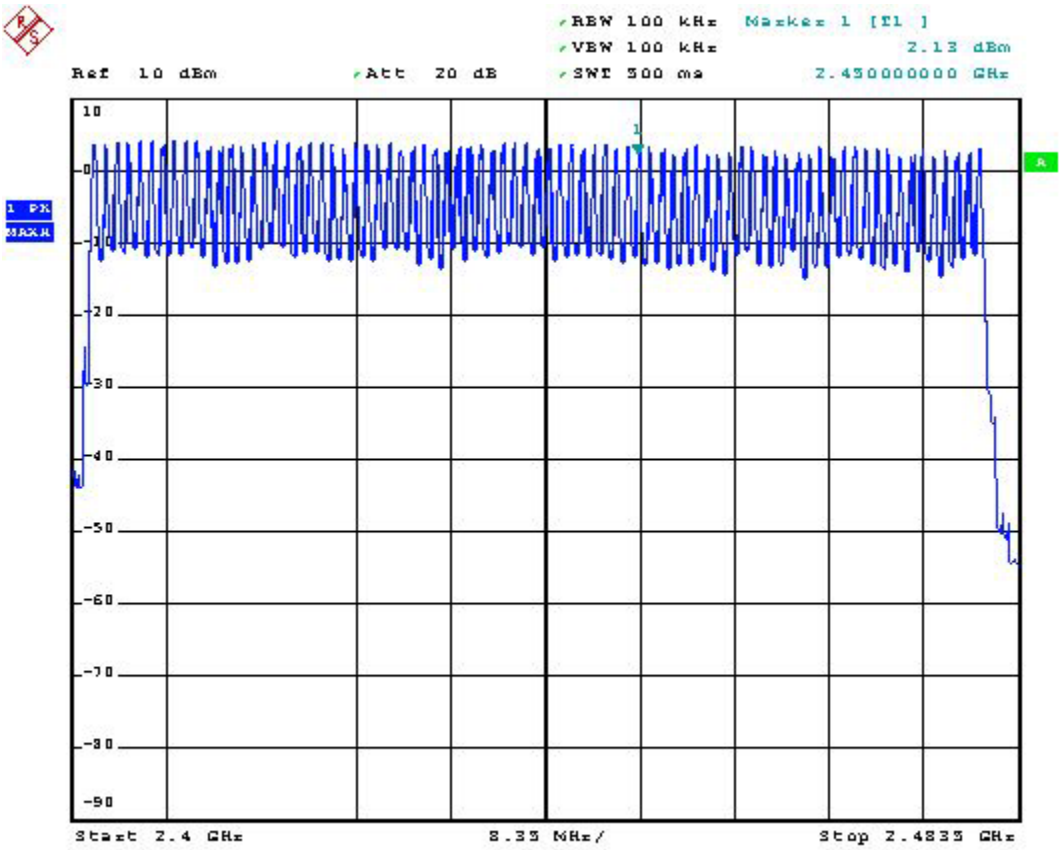


5.3.4. Test Result：See spectrum analyzer plots below

- Temperature: 26°C
- Relative Humidity: 53 %

Number of Hopping Frequency (Channel)	Limits (Channel)
79	75

5.3.5 Number of Hopping Frequency



5.4 Hopping Channel Bandwidth

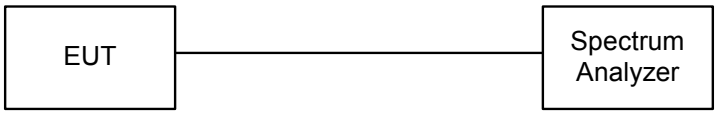
5.4.1 Measuring Instruments：

As described in chapter 7 of this test report.

5.4.2 Test Procedure：

1. The transmitter output was connected to the spectrum analyzer directly.
2. Set RBW of spectrum analyzer to 30kHz and VBW to 300kHz.
3. The Hopping Channel bandwidth is defined as the frequency range where the power is higher than peak power minus 20dB.

5.4.3 Test Setup Layout：



5.4.4 Test Result：See spectrum analyzer plots below

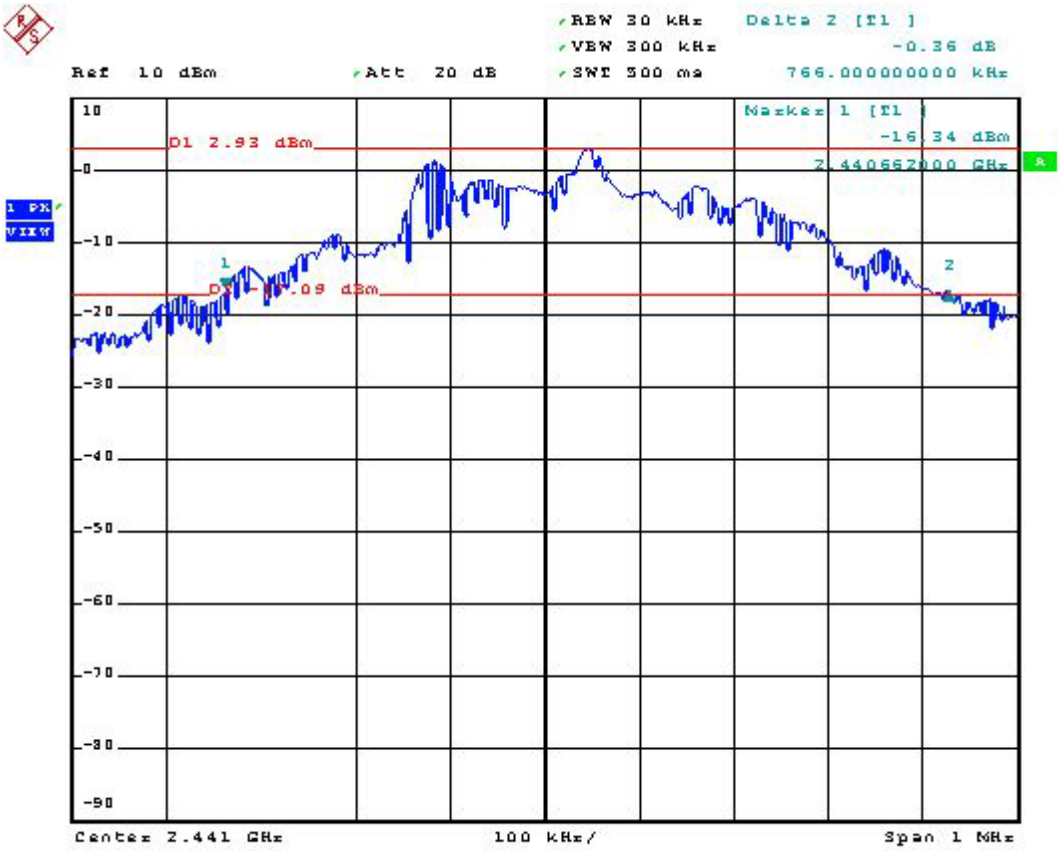
- Test Mode: Mode 1~Mode 3
- Temperature: 26°C
- Relative Humidity: 53 %

Channel	Frequency (MHz)	Hopping Channel Bandwidth (MHz)	Limits (MHz)	Plot Ref. No.
00	2402	0.772	1.0	Mode 1
39	2441	0.766	1.0	Mode 2
78	2480	0.772	1.0	Mode 3

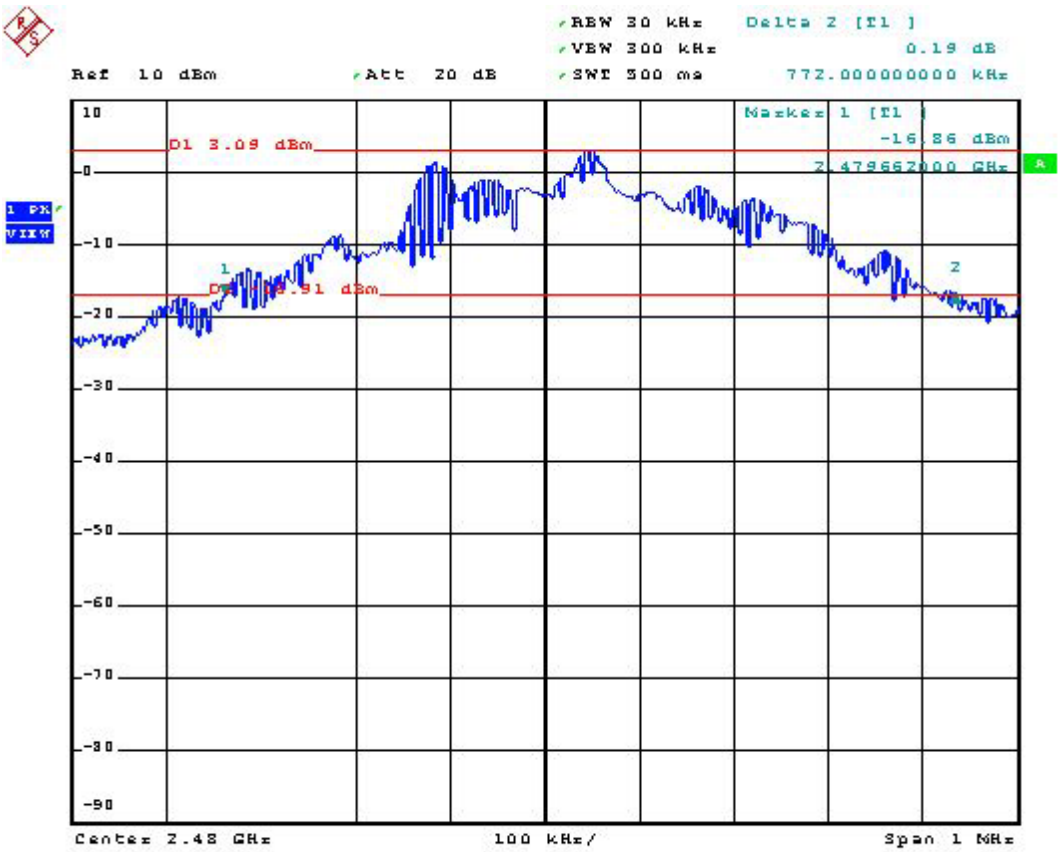
5.4.5 Hopping Channel Bandwidth

Mode 1: CH00 (2402MHz)

Mode 2: CH39 (2441MHz)



Mode 3: CH78 (2480MHz)



5.5 Dwell Time of Each Frequency within a 30 Seconds Period

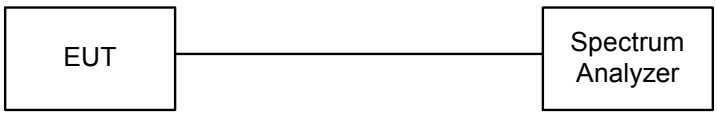
5.5.1 Measuring Instruments：

As described in chapter 7 of this test report.

5.5.2 Test Procedure：

1. The transmitter output was connected to the spectrum analyzer directly.
2. Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
3. Set the center frequency on any frequency would be measured and set the frequency span to zero span.
4. The equation = 30*(1600/79)*t (t = the time duration of one single pulse)

5.5.3 Test Setup Layout：



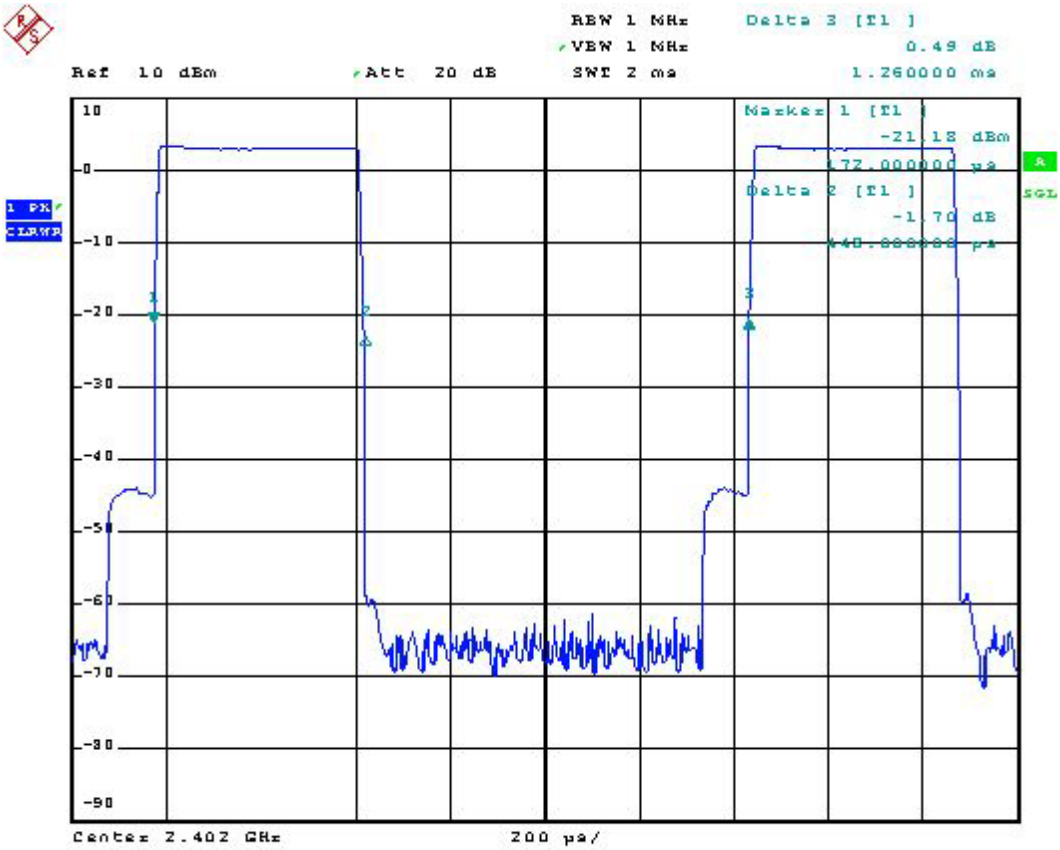
5.5.4 Test Result：See spectrum analyzer plots below

- Test Mode: Mode 1~Mode 3
- Temperature: 26°C
- Relative Humidity: 53 %

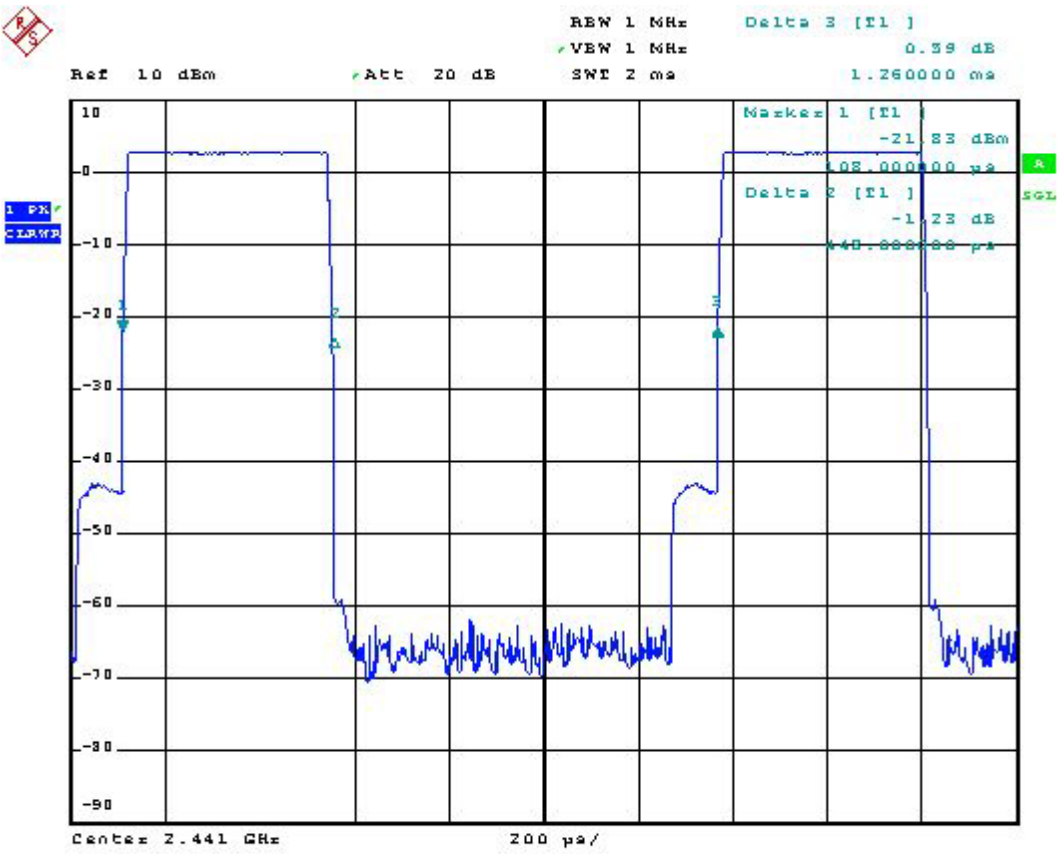
Channel	Frequency (MHz)	Dwell Time (s)	Limits (s)	Plot Ref. No.
00	2402	0.27	0.4	Mode 1
39	2441	0.27	0.4	Mode 2
78	2480	0.27	0.4	Mode 3

5.5.5 Dwell Time of Each Frequency

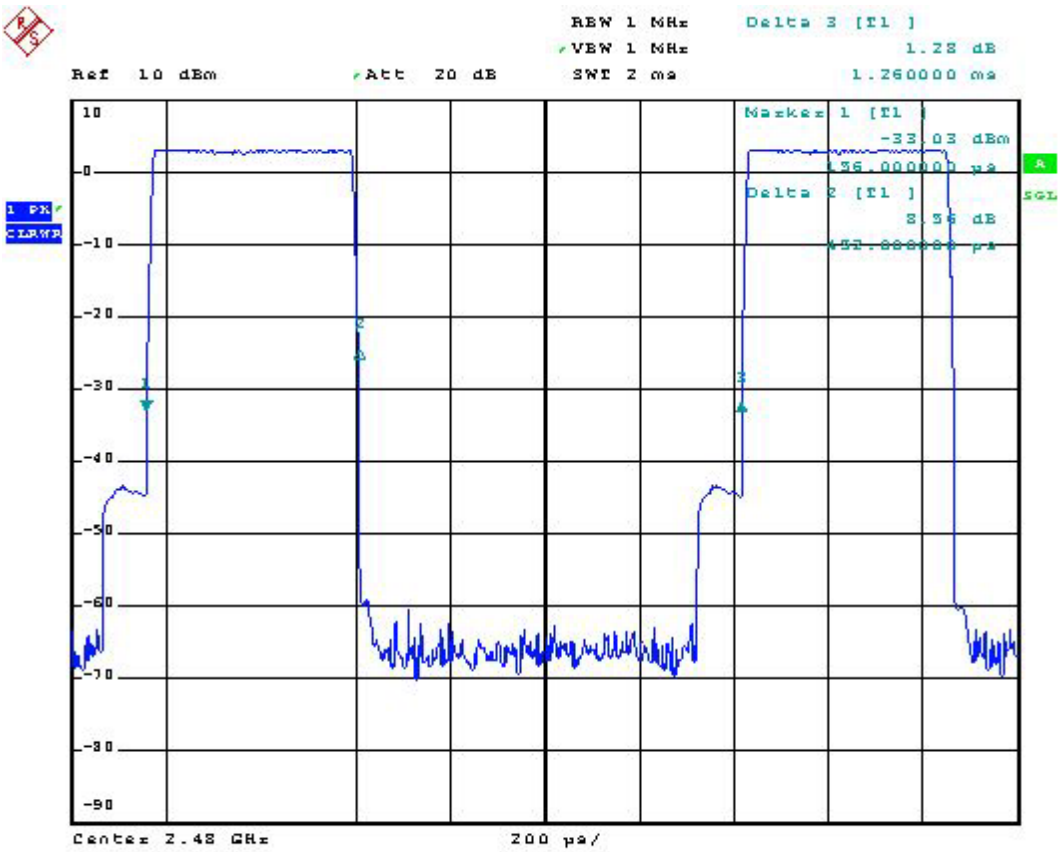
Mode 1: CH00 (2402MHz)



Mode 2: CH39 (2441MHz)



Mode 3: CH78 (2480MHz)



5.6 Output Power

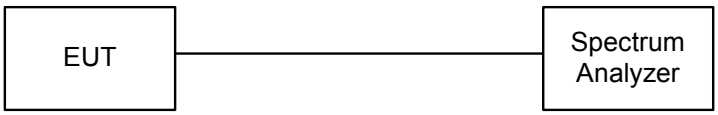
5.6.1 Measuring Instruments：

As described in chapter 7 of this test report.

5.6.2 Test Procedure：

1. The transmitter output was connected to the spectrum analyzer directly.
2. The center frequency of the spectrum analyzer was set to the fundamental frequency and set RBW to 3MHz and VBW to 3MHz.

5.6.3 Test Setup Layout：



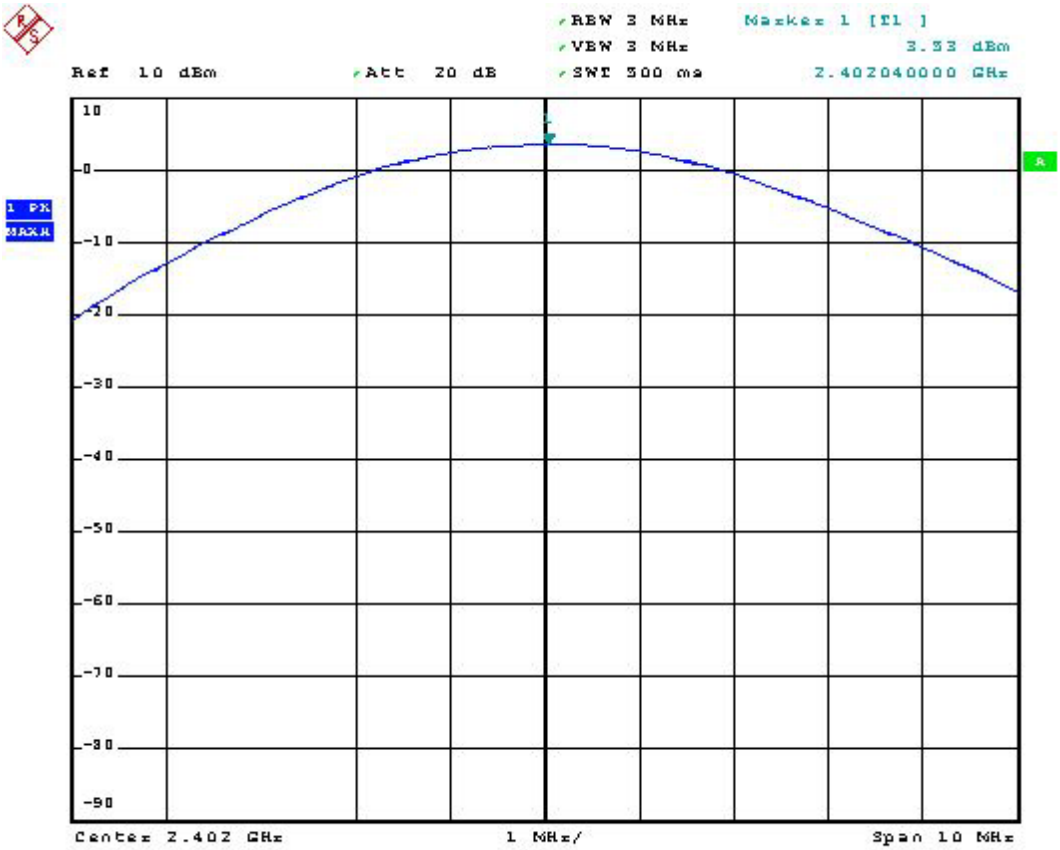
5.6.4 Test Result：See spectrum analyzer plots below

- Test Mode: Mode 1~Mode 3
- Temperature: 26°C
- Relative Humidity: 50 %

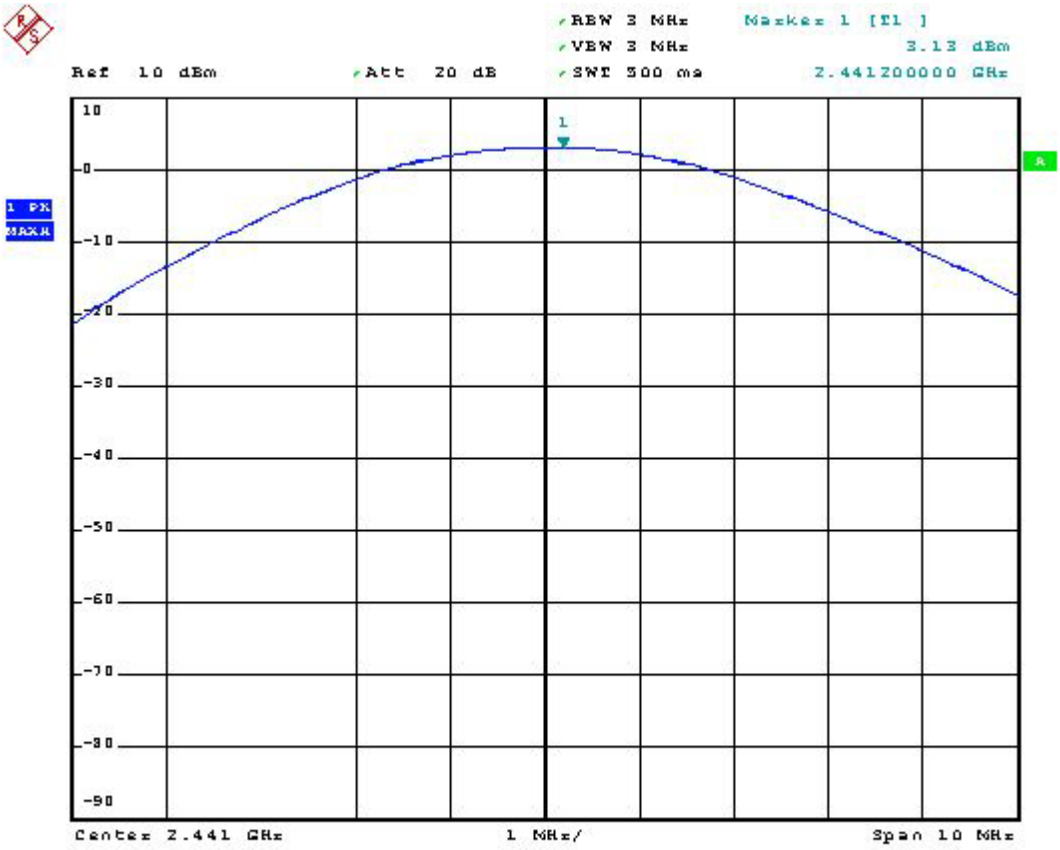
Channel	Frequency (MHz)	Measured Output Power (dBm)	Limits (Watt/dBm)	Plot Ref. No.
00	2402	3.53	1W/30 dBm	Mode 1
39	2441	3.13	1W/30 dBm	Mode 2
78	2480	3.29	1W/30 dBm	Mode 3

5.6.5 Output Power

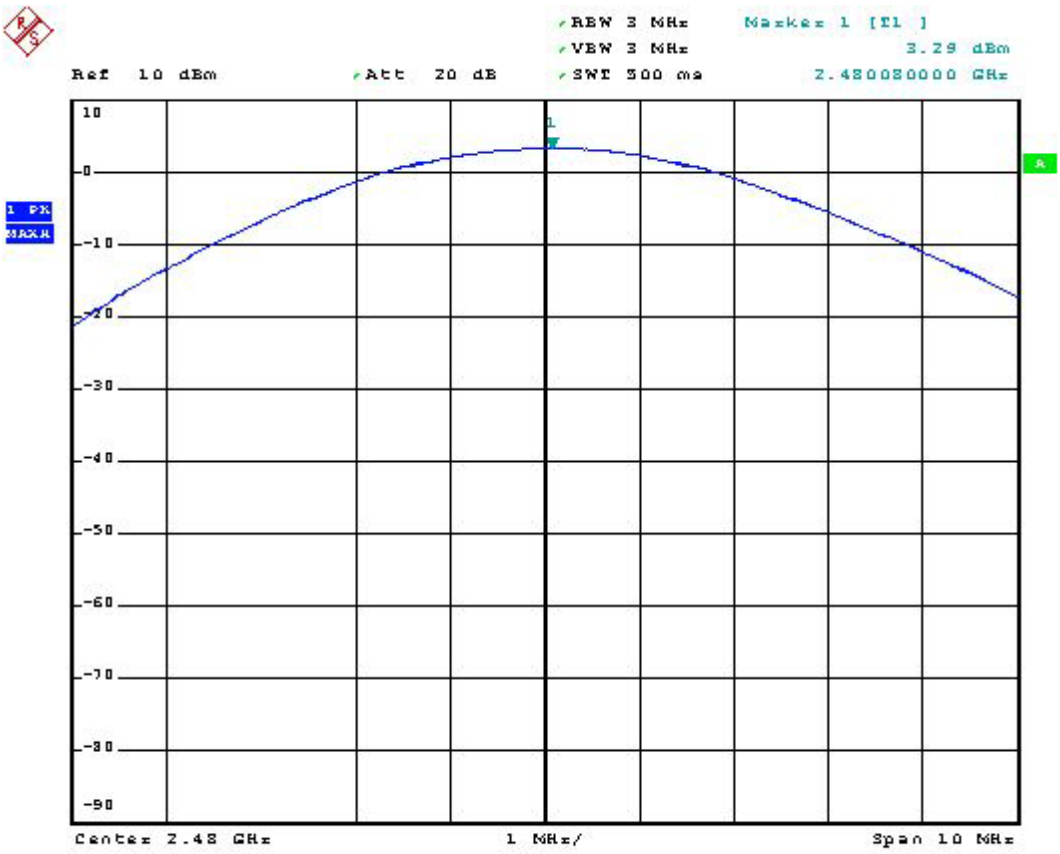
Mode 1: CH00 (2402MHz)



Mode 2: CH39 (2441MHz)



Mode 3: CH78 (2480MHz)



5.7 100KHz Bandwidth of Frequency Band Edges

5.7.1 Measuring Instruments：

As described in chapter 7 of this test report.

5.7.2 Test Procedure：

1. The transmitter output was connected to the spectrum analyzer via a low lose cable.
2. Set both RBW and VBW of spectrum analyzer to 100kHz with suitable frequency span including 100 KHz bandwidth from band edge.
3. The band edges was measured and recorded.

5.7.3 Test Result：

- Test Mode: Mode 1 and Mode 3
- Temperature: 26°C
- Relative Humidity: 53 %

Test Result in lower band (Channel 00)： PASS

Test Result in higher band(Channel 78)： PASS

5.7.4 Note on Band edge Emission

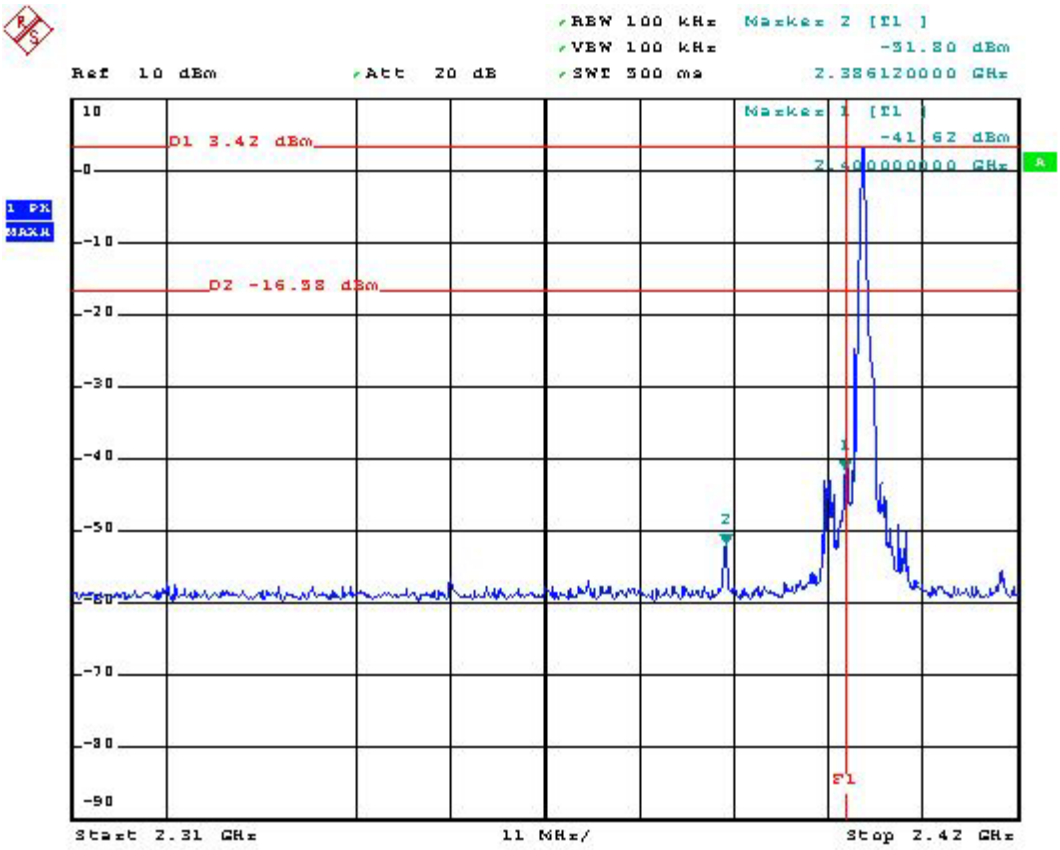
The delta between fundamental and peak spurious emission (2400MHz) for CH00 is 45.04dB.
The delta between fundamental and peak spurious emission (2484.1MHz) for CH78 is 56.01dB.

Channel	Polarity	The emission of carrier power strength	Frequency	The maximum field strength in band edge	Limit	Margin	Remark	Result
		(dBμV/m)	(GHz)	(dBμV/m)	(dBμV/m)	(dB)		
00	H	97.01	2.400	51.97	74	-22.03	Peak	Pass
	H	73.65	2.400	28.61	54	-25.39	Average	Pass
	V	94.29	2.400	49.25	74	-24.75	Peak	Pass
	V	71.82	2.400	26.78	54	-27.22	Average	Pass
78	H	89.97	2.48410	33.96	74	-40.04	Peak	Pass
	H	66.27	2.48410	10.26	54	-43.74	Average	Pass
	V	91.98	2.48410	35.97	74	-38.03	Peak	Pass
	V	75.48	2.48410	19.47	54	-34.53	Average	Pass

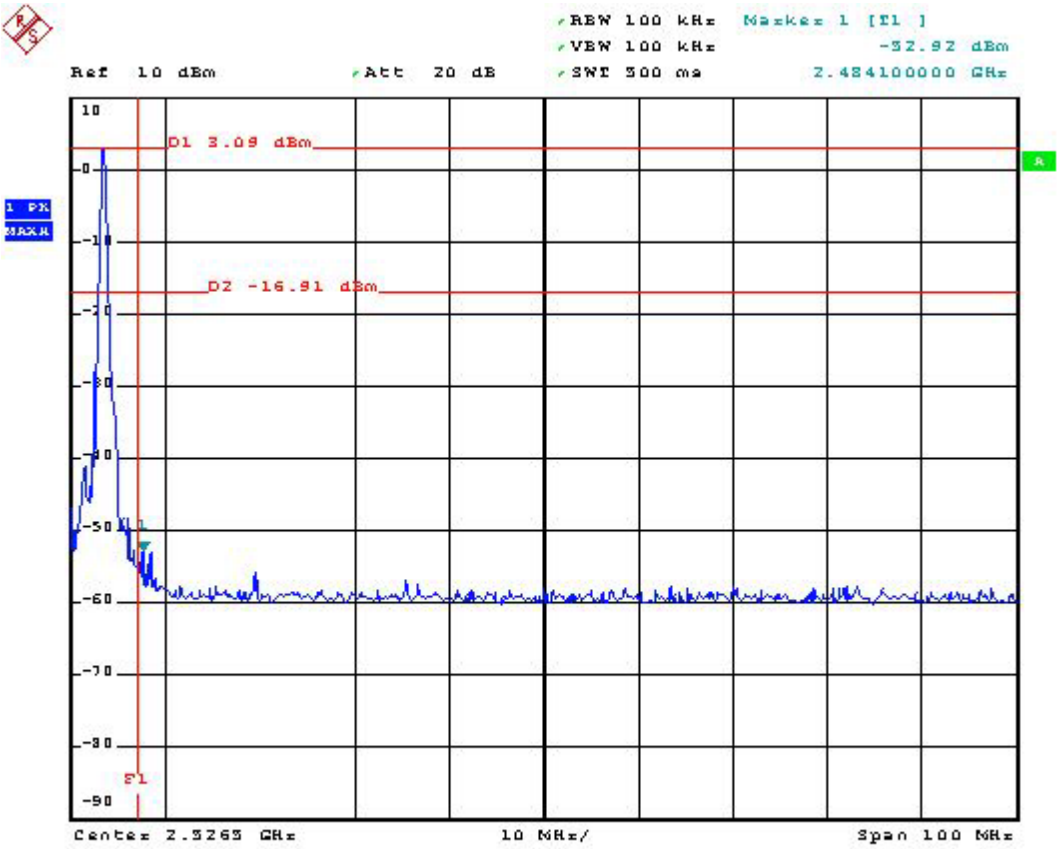
∗Remark: The data above can refer to radiated emission in section 5.9.

5.7.5 Frequency Band Edge

Mode 1: CH00 (2402 MHz)



Mode 3: CH78 (2480 MHz)



5.8 Test of Conducted Emission

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 kHz and return leads of the EUT according to the methods defined in ANSI C63.4-2001 Section 3.1. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

5.8.1 Major Measuring Instruments：

● Test Receiver	(R&S ESCS 30)
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 KHz

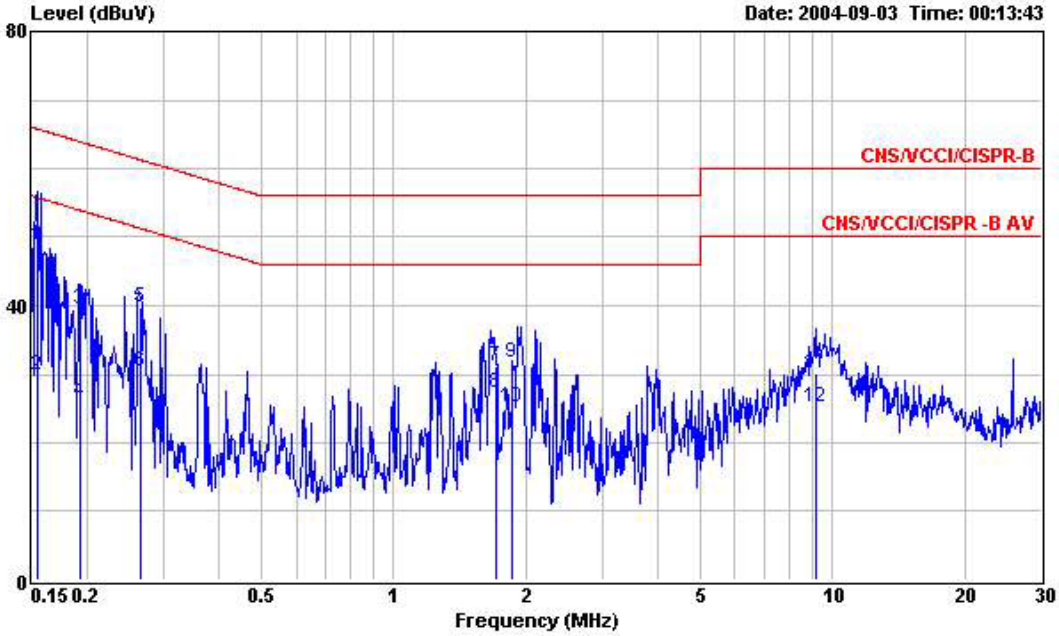
5.8.2 Test Procedures：

a. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
b. Connect EUT to the power port of a line impedance stabilization network (LISN).
c. All the support units are connected to the other LISN.
d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
e. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
f. Both sides of AC line were checked for maximum conducted interference.
g. The frequency range from 150 KHz to 30 MHz was searched.
h. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

5.8.3 Test Result of Conducted Emission：

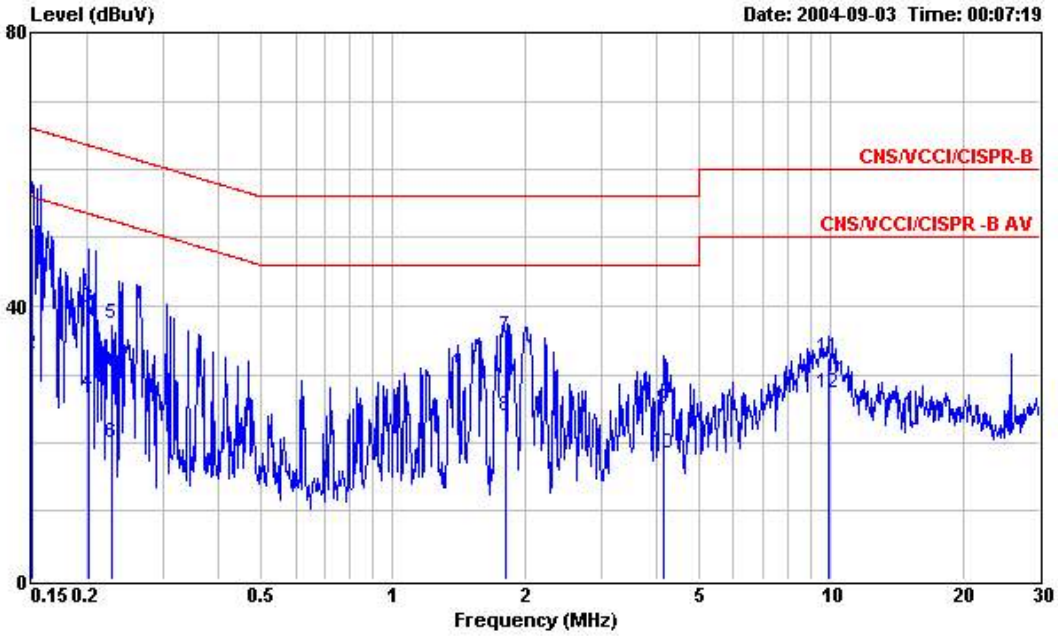
- Test Mode: Mode 1
- Frequency Range of Test: from 150KHz to 30 MHz
- Temperature: 23°C
- Relative Humidity: 50 %

■ The test that passed at the minimum margin was marked by a frame in the following data



Site : C(
Condition : CI 1/008 LINE
EUT : Bluetooth USB Dongle
Power : 120Vac/60Hz
Model : Bluetooth USB Dongle Class II
Memo : RX_CH00-2402MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.155	48.79	-16.96	65.75	48.66	0.10	0.03	QP
2	0.155	29.81	-25.94	55.75	29.68	0.10	0.03	Average
3	0.193	39.43	-24.47	63.90	39.30	0.10	0.03	QP
4	0.193	25.91	-27.99	53.90	25.78	0.10	0.03	Average
5	0.265	39.78	-21.50	61.28	39.65	0.10	0.03	QP
6	0.265	30.37	-20.91	51.28	30.24	0.10	0.03	Average
7	1.711	31.22	-24.78	56.00	31.05	0.10	0.07	QP
8	1.711	27.24	-18.76	46.00	27.07	0.10	0.07	Average
9	1.870	31.56	-24.44	56.00	31.39	0.10	0.07	QP
10	1.870	25.09	-20.91	46.00	24.92	0.10	0.07	Average
11	9.160	30.18	-29.82	60.00	29.86	0.19	0.13	QP
12	9.160	25.25	-24.75	50.00	24.93	0.19	0.13	Average



Site : CO01-HY
Condition : CNS/VCCI/CISPR-B 2003 2001/008 NEUTRAL
EUT : Bluetooth USB Dongle
Power : 120Vac/60Hz
Model : Bluetooth USB Dongle Class II
Memo : RX_CH00-2402MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.151	51.39	-14.58	65.97	51.26	0.10	0.03	QP
2	0.151	32.93	-23.04	55.97	32.80	0.10	0.03	Average
3	0.202	39.69	-23.83	63.52	39.56	0.10	0.03	QP
4	0.202	27.32	-26.20	53.52	27.19	0.10	0.03	Average
5	0.228	37.29	-25.24	62.53	37.16	0.10	0.03	QP
6	0.228	19.96	-32.57	52.53	19.83	0.10	0.03	Average
7	1.810	35.70	-20.30	56.00	35.53	0.10	0.07	QP
8	1.813	23.81	-22.19	46.00	23.64	0.10	0.07	Average
9	4.140	25.05	-30.95	56.00	24.76	0.20	0.09	QP
10	4.140	18.38	-27.62	46.00	18.09	0.20	0.09	Average
11	9.860	32.59	-27.41	60.00	32.26	0.20	0.13	QP
12	9.860	27.20	-22.80	50.00	26.87	0.20	0.13	Average

Test Engineer: _____

Jay

5.9 Test of Radiated Emission

Radiated emissions from 30 MHz to 26.5 GHz were measured according to the methods defined in ANSI C63.4-2001. The EUT was placed on a nonmetallic stand, 0.8 meter above the ground plane, as shown in section 5.9.3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions

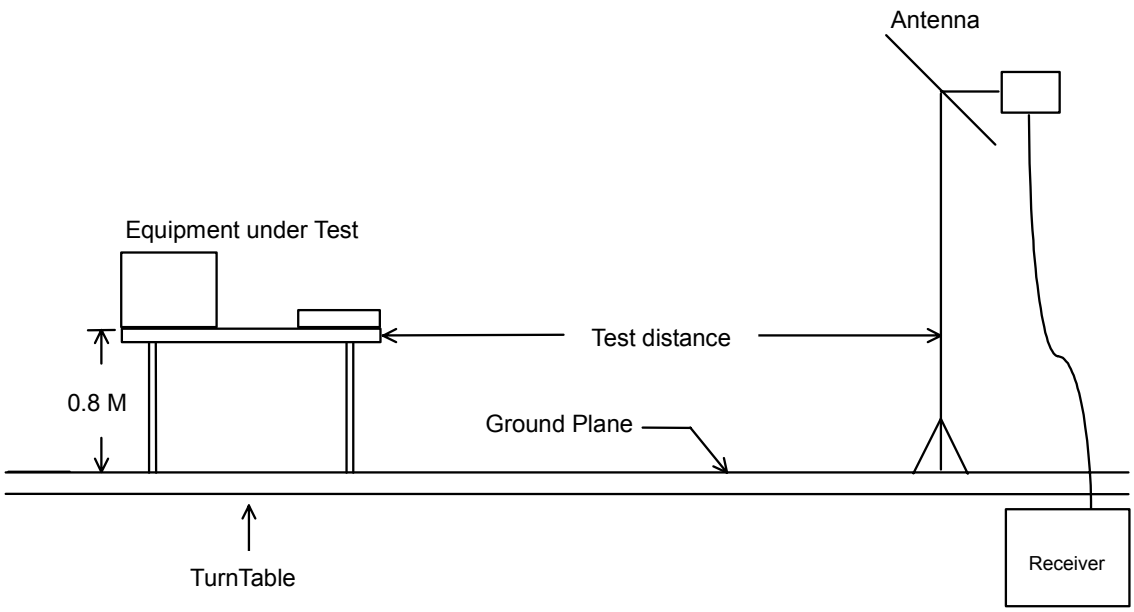
5.9.1 Major Measuring Instruments

- Amplifier (MITEQ AFS44)
  - RF Gain 40 dB
  - Signal Input 100 MHz to 26.5 GHz
- Amplifier (PA-103)
  - RF Gain 30 dB
  - Signal Input 100 MHz to 1 GHz
- Spectrum analyzer (R&S FSP40)
  - Attenuation 10 dB
  - Start Frequency 1 GHz
  - Stop Frequency 24 GHz
  - Resolution Bandwidth 1 MHz
  - Video Bandwidth 1 MHz
  - Signal Input 9 kHz to 40 GHz

5.9.2 Test Procedures

1. The EUT was placed on a rotatable table top 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
7. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the quasi-peak method and reported.

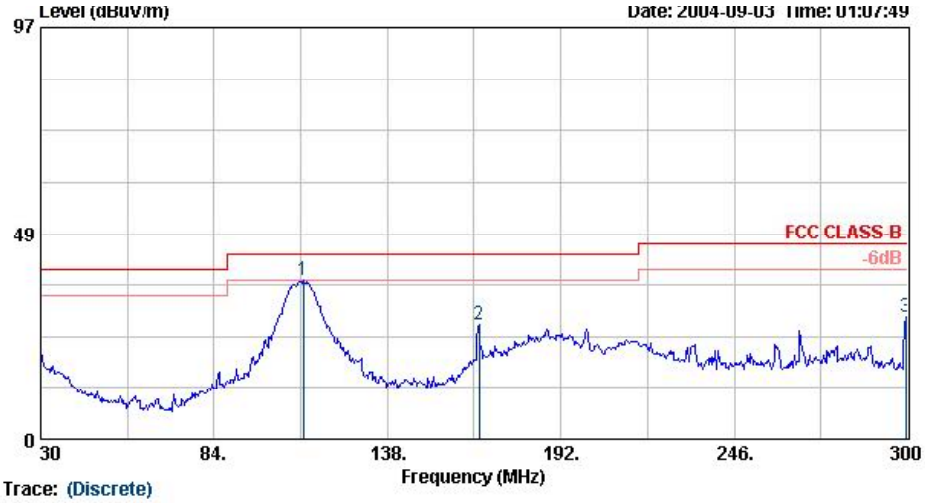
5.9.3 Typical Test Setup Layout of Radiated Emission



5.9.4 Test Result of Radiated Emission

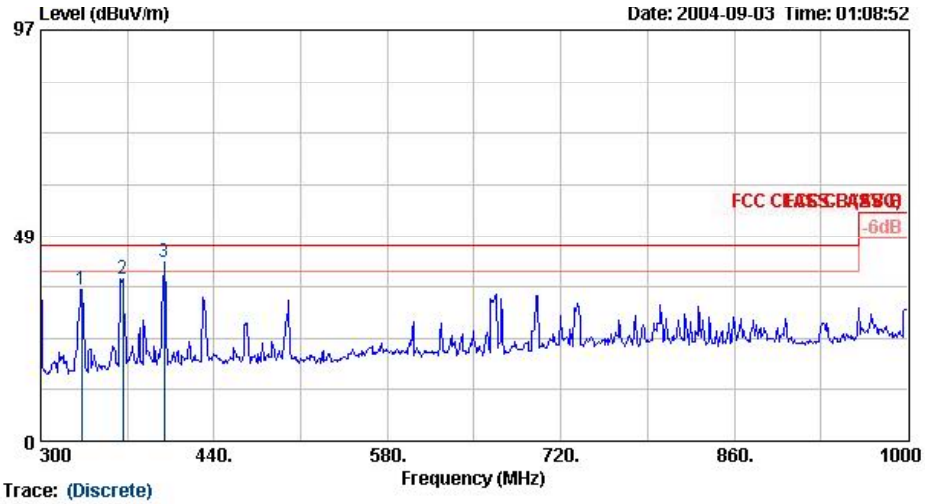
- Test Mode: Mode 1
- Test Distance: 3 m
- Temperature: 26°C
- Relative Humidity: 53 %
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

■ The test that passed at the minimum margin was marked by the frame in the following test record



Site : 03CH06-HY
Condition : FCC CLASS-B 3m BI LOG 2004 0629 HORIZONTAL 114cm 0deg
EUT : Bluetooth USB Dongle
Power : 120Vac/60Hz
Model : Bluetooth USB Dongle Class II
Memo : Tx_CH00_2402MHz

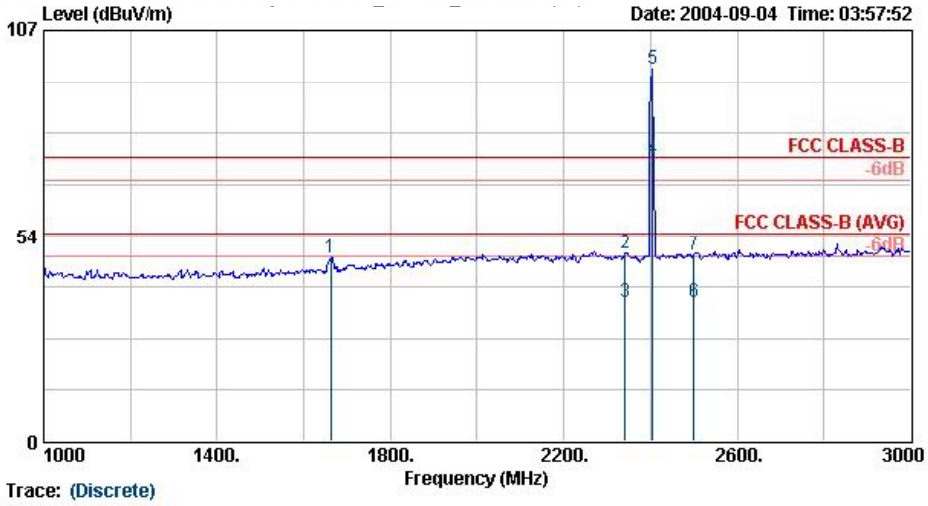
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 @	111.81	37.35	-6.15	43.50	56.99	11.54	32.07	0.89	114	0
2 @	166.62	27.09	-16.41	43.50	48.79	9.15	32.04	1.19	114	0
3 @	299.46	28.74	-17.26	46.00	45.93	12.98	31.92	1.75	114	0



Trace: (Discrete)

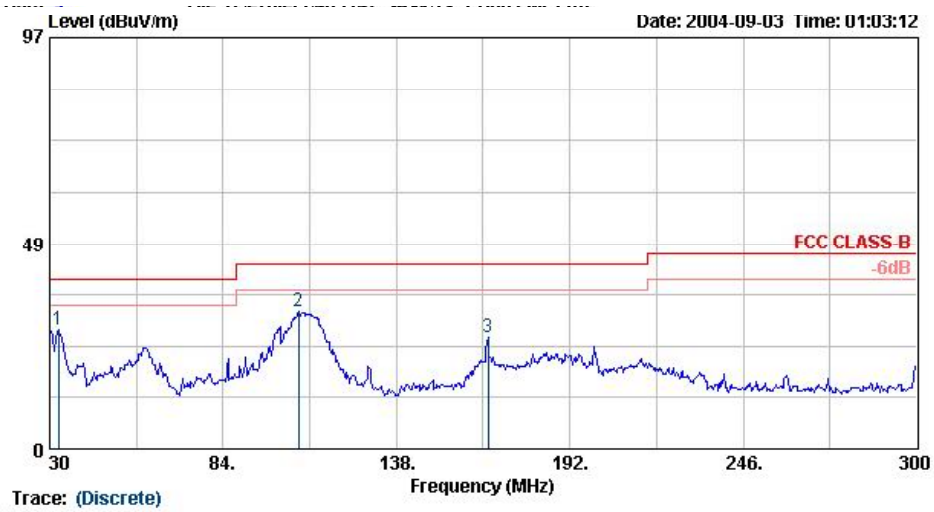
Site : 03CH06-HY
Condition : FCC CLASS-B 3m BI LOG 2004 0629 HORIZONTAL 114cm 360deg
EUT : Bluetooth USB Dongle
Power : 120Vac/60Hz
Model : Bluetooth USB Dongle Class II
Memo : Tx_CH00_2402MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 @	[illegible].90	35.61	-10.39	46.00	51.81	13.89	31.95	1.86	114	360
2 @	366.50	38.19	-7.81	46.00	52.97	14.81	31.45	1.87	114	360
3 @	399.40	42.10	-3.90	46.00	55.65	15.85	31.50	2.10	114	360



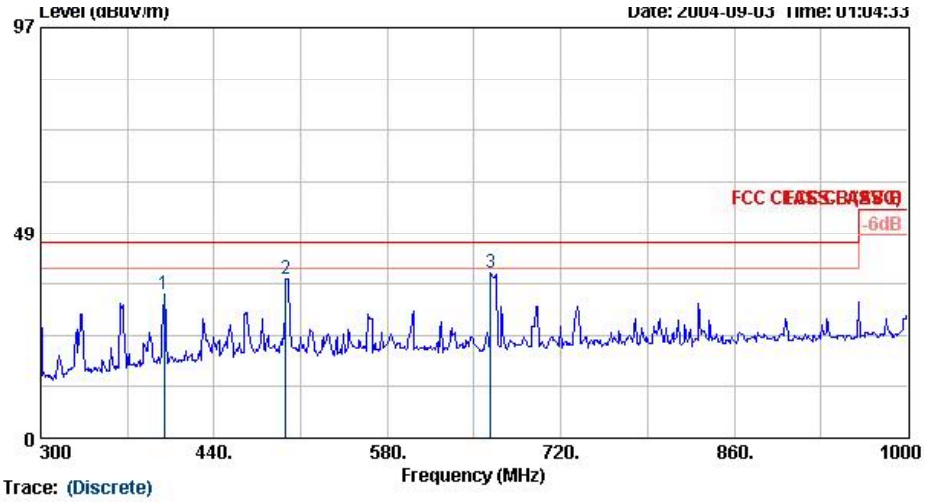
Site : 03CH06-HY
Condition : FCC CLASS-B 3m HF-HORN AH-118 HORIZONTAL 114cm 360deg
EUT : Bluetooth USB Dongle
Power : 120Vac/60Hz
Model : Bluetooth USB Dongle Class II
Memo : Tx_CH00_2402MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 @	1662.00	47.67	-26.33	74.00	62.49	26.33	43.91	2.76	114	88
2 @	2342.00	49.03	-24.97	74.00	60.29	28.34	42.89	3.29	114	88
3 @	2342.00	36.05	-17.95	54.00	47.30	28.34	42.89	3.29	114	88
4 @	2404.00	73.65			84.79	28.41	42.88	3.32	114	88
5 @	2404.00	97.01			108.15	28.41	42.88	3.32	114	88
6 @	2500.00	36.30	-17.70	54.00	47.27	28.50	42.86	3.39	114	88
7 @	2500.00	48.55	-25.45	74.00	59.52	28.50	42.86	3.39	114	88



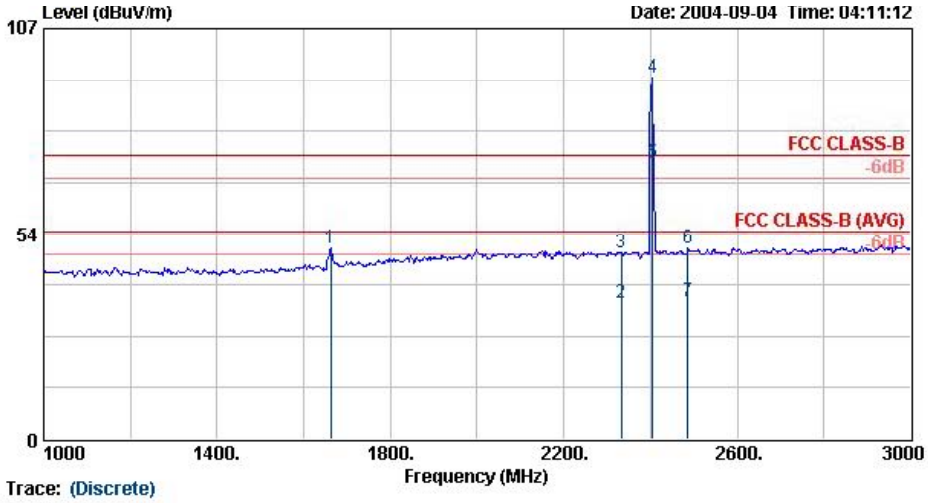
Site : 03CH06-HY
Condition : FCC CLASS-B 3m BI LOG 2004 0629 VERTICAL 114cm 0deg
EUT : Bluetooth USB Dongle
Power : 120Vac/60Hz
Model : Bluetooth USB Dongle Class II
Memo : Tx_CH00_2402MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 @	32.70	28.16	-11.84	40.00	43.61	16.20	32.13	0.49	114	0
2 @	107.49	32.63	-10.87	43.50	52.69	11.17	32.15	0.92	114	0
3 @	166.62	26.18	-17.32	43.50	47.88	9.15	32.04	1.19	114	0



Site : 03CH06-HY
Condition : FCC CLASS-B 3m BI LOG 2004 0629 VERTICAL 114cm 360deg
EUT : Bluetooth USB Dongle
Power : 120Vac/60Hz
Model : Bluetooth USB Dongle Class II
Memo : Tx_CH00_2402MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 @	399.40	33.91	-12.09	46.00	47.46	15.85	31.50	2.10	114	360
2 @	498.10	37.43	-8.57	46.00	49.36	17.30	31.43	2.21	114	360
3 @	663.30	38.99	-7.01	46.00	49.01	18.91	31.61	2.67	114	360



Site : 03CH06-HY
Condition : FCC CLASS-B 3m HF-HORN AH-118 VERTICAL 114cm 360deg
EUT : Bluetooth USB Dongle
Power : 120Vac/60Hz
Model : Bluetooth USB Dongle Class II
Memo : Tx_CH00_2402MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 @	1662.00	49.57	-24.43	74.00	64.39	26.33	43.91	2.76	100	340
2 @	2332.00	35.48	-18.52	54.00	46.77	28.33	42.89	3.27	100	340
3 @	2332.00	48.65	-25.35	74.00	59.95	28.33	42.89	3.27	100	340
4 @	2404.00	94.29			105.43	28.41	42.88	3.32	100	340
5 @	2404.00	71.82			82.96	28.41	42.88	3.32	100	340
6 @	2486.00	49.52	-24.48	74.00	60.53	28.48	42.86	3.38	100	340
7 @	2486.00	35.84	-18.16	54.00	46.85	28.48	42.86	3.38	100	340

- For 3GHz ~ 25GHz
  Remark: Frequency from 3000MHz to 25000MHz, the emission emitted by the EUT is too low to be measured

■ Field strength of fundamental and harmonics

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Preamp Factor (dB)	Limits (dBuV/m)	Emission (dBuV/m)	Margin (dB)	Detect Mode
2404.000	H	28.41	3.32	65.28	42.88	-	97.01	-	Peak
2404.000	H	28.41	3.32	41.92	42.88	-	73.65	-	A.V.
2404.000	V	28.41	3.32	62.56	42.88	-	94.29	-	Peak
2404.000	V	28.41	3.32	40.09	42.88	-	71.82	-	A.V.
4804.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
7206.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
9608.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
12010.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
14412.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
16814.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
19216.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
21618.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
24020.000	V/H	-	-	-	-	-	-	-	Peak, A.V.

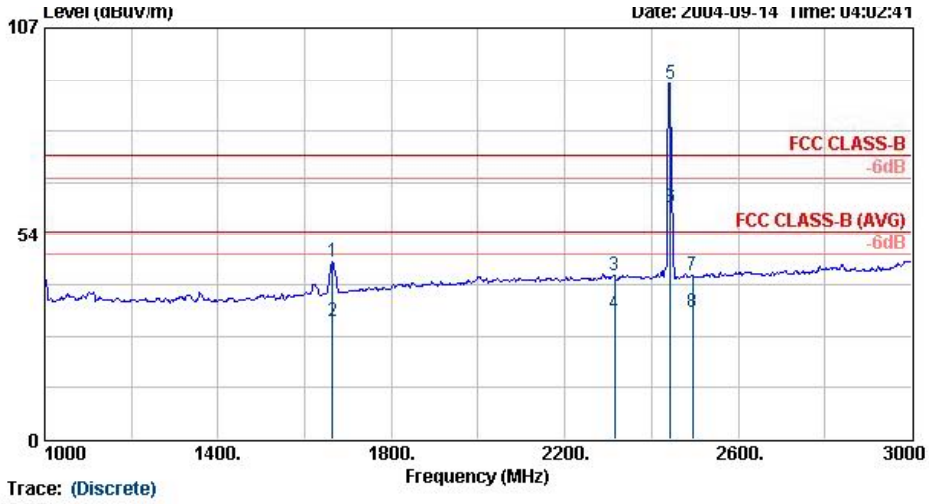
Remark: The emission emitted by the EUT is too low to be measured except the emission listed above

Test Engineer: _____

Jay

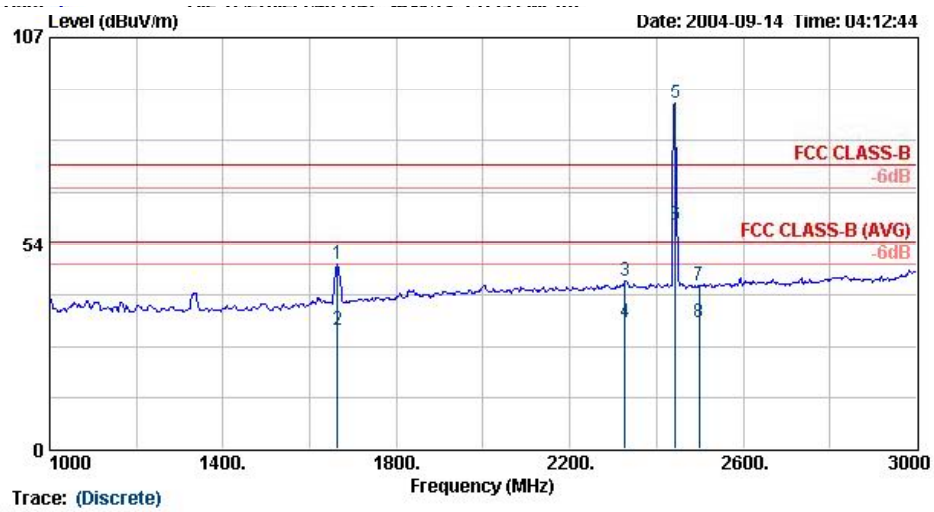
- Test Mode: Mode 2
- Test Distance: 3 M
- Temperature: 26 °C
- Relative Humidity: 53 %
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

■ The test that passed at the minimum margin was marked by the frame in the following test record



Site : 03CH06-HY
Condition : FCC CLASS-B 3m HF-HORN AH-118 HORIZONTAL 114cm 280deg
EUT : Bluetooth USB Dongle
Power : 120Vac/60Hz
Model : Bluetooth USB Dongle Class II
Memo : Tx_CH39_2441MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 @	1664.00	46.12	-27.88	74.00	60.94	26.33	43.91	2.76	114	280
2 @	1664.00	30.82	-23.18	54.00	45.64	26.33	43.91	2.76	114	280
3 @	2314.00	42.69	-31.31	74.00	54.00	28.31	42.89	3.27	114	280
4 @	2314.00	32.65	-21.35	54.00	43.96	28.31	42.89	3.27	114	280
5 @	2444.00	92.83			103.89	28.45	42.87	3.36	114	280
6 @	2444.00	60.35			71.41	28.45	42.87	3.36	114	280
7 @	2494.00	42.53	-31.47	74.00	53.50	28.50	42.86	3.39	114	280
8 @	2494.00	33.05	-20.95	54.00	44.02	28.50	42.86	3.39	114	280



Site : 03CH06-HY
Condition : FCC CLASS-B 3m HF-HORN AH-118 VERTICAL 135cm 64deg
EUT : Bluetooth USB Dongle
Power : 120Vac/60Hz
Model : Bluetooth USB Dongle Class II
Memo : Tx_CH39_2441MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 @	1664.00	47.97	-26.03	74.00	62.79	26.33	43.91	2.76	135	64
2 @	1664.00	30.86	-23.14	54.00	45.68	26.33	43.91	2.76	135	64
3 @	2328.00	43.90	-30.10	74.00	55.19	28.33	42.89	3.27	135	64
4 @	2328.00	33.09	-20.91	54.00	44.38	28.33	42.89	3.27	135	64
5 @	2444.00	89.87			100.94	28.45	42.87	3.36	135	64
6 @	2444.00	58.31			69.37	28.45	42.87	3.36	135	64
7 @	2498.00	42.75	-31.25	74.00	53.72	28.50	42.86	3.39	135	64
8 @	2498.00	33.11	-20.89	54.00	44.08	28.50	42.86	3.39	135	64

- For 3GHz ~ 25GHz
  Remark: Frequency from 3000MHz to 25000MHz, the emission emitted by the EUT is too low to be measured

■ Field strength of fundamental and harmonics

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Preamp Factor (dB)	Limits (dBuV/m)	Emission (dBuV/m)	Margin (dB)	Detect Mode
2444.000	H	28.45	3.36	61.02	42.87	-	92.83	-	Peak
2444.000	H	28.45	3.36	28.54	42.87	-	60.35	-	A.V.
2444.000	V	28.45	3.36	58.06	42.87	-	89.87	-	Peak
2444.000	V	28.45	3.36	26.50	42.87	-	58.31	-	A.V.
4882.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
7323.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
9764.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
12205.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
14646.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
17087.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
19528.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
21969.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
24410.000	V/H	-	-	-	-	-	-	-	Peak, A.V.

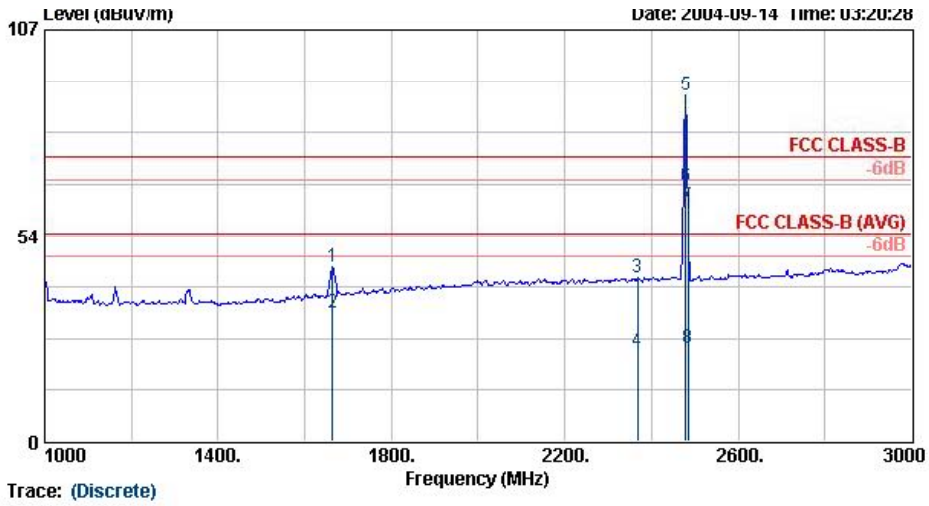
Remark: The emission emitted by the EUT is too low to be measured except the emission listed above

Test Engineer: _____

Jay

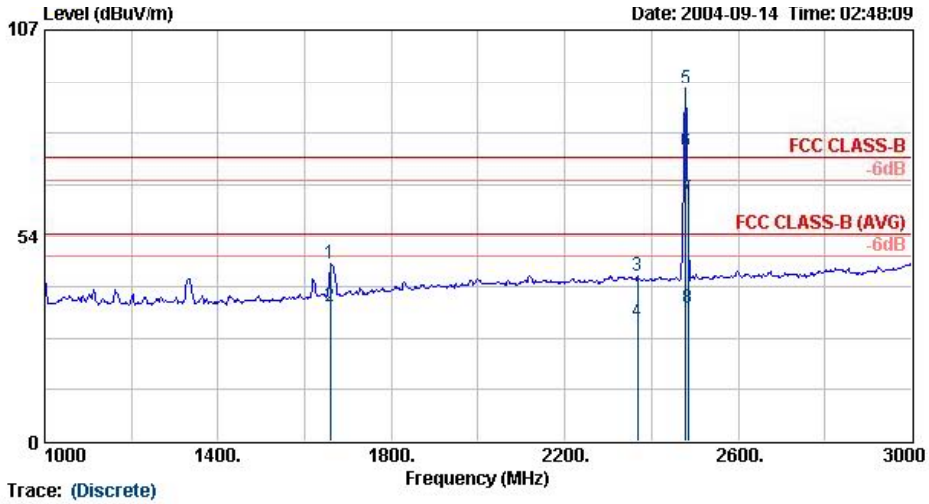
- Test Mode: Mode 3
- Test Distance: 3 M
- Temperature: 26 °C
- Relative Humidity: 53 %
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

The test that passed at the minimum margin was marked by the frame in the following test record



Site : 03CH06-HY
Condition : FCC CLASS-B 3m HF-HORN AH-118 HORIZONTAL 114cm 350deg
EUT : Bluetooth USB Dongle
Power : 120Vac/60Hz
Model : Bluetooth USB Dongle Class II
Memo : Tx_CH78_2480MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 @	1664.00	45.48	-28.52	74.00	60.30	26.33	43.91	2.76	114	350
2 @	1664.00	33.54	-20.46	54.00	48.36	26.33	43.91	2.76	127	152
3 @	2368.00	42.55	-31.45	74.00	53.76	28.36	42.88	3.31	114	350
4 @	2368.00	23.66	-30.34	54.00	34.87	28.36	42.88	3.31	114	350
5 @	2478.00	89.97			100.97	28.48	42.86	3.38	114	350
6 @	2478.00	66.27			77.28	28.48	42.86	3.38	114	229
7 @	2483.50	61.32	-12.68	74.00	72.32	28.48	42.86	3.38	114	350
8 @	2483.50	24.42	-29.58	54.00	35.43	28.48	42.86	3.38	136	228



Site : 03CH06-HY
Condition : FCC CLASS-B 3m HF-HORN AH-118 VERTICAL 114cm 360deg
EUT : Bluetooth USB Dongle
Power : 120Vac/60Hz
Model : Bluetooth USB Dongle Class II
Memo : Tx_CH78_2480MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 @	1658.00	46.01	-27.99	74.00	60.83	26.33	43.91	2.76	114	360
2 @	1658.00	35.13	-18.87	54.00	49.95	26.33	43.91	2.76	123	272
3 @	2368.00	42.77	-31.23	74.00	53.99	28.36	42.88	3.31	114	360
4 @	2368.00	31.17	-22.83	54.00	42.38	28.36	42.88	3.31	114	360
5 @	2478.00	91.98			102.99	28.48	42.86	3.38	114	360
6 @	2478.00	75.48			86.49	28.48	42.86	3.38	114	163
7 @	2484.00	63.33	-10.67	74.00	74.34	28.48	42.86	3.38	114	360
8 @	2484.00	34.46	-19.54	54.00	45.47	28.48	42.86	3.38	114	165

- For 3GHz ~ 25GHz
  Remark: Frequency from 3000MHz to 25000MHz, the emission emitted by the EUT is too low to be measured

■ Field strength of fundamental and harmonics

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Preamp Factor (dB)	Limits (dBuV/m)	Emission (dBuV/m)	Margin (dB)	Detect Mode
2478.000	H	28.48	3.38	58.11	42.86	-	89.97	-	Peak
2478.000	H	28.48	3.38	34.41	42.86	-	66.27	-	A.V.
2478.000	V	28.48	3.38	60.12	42.86	-	91.98	-	Peak
2478.000	V	28.48	3.38	43.62	42.86	-	75.48	-	A.V.
4960.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
7440.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
9920.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
12400.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
14880.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
17360.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
19840.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
22320.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
24800.000	V/H	-	-	-	-	-	-	-	Peak, A.V.

Remark: The emission emitted by the EUT is too low to be measured except the emission listed above

Test Engineer: _____

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6. Antenna Requirements

The EUT use a PCB Antenna without connector. It is considered to meet antenna requirement of FCC.

Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that assembled by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if directional gain of transmitting antennas greater than 6dBi are used, the power shall be reduced by the same amount in unit dB comparing to the directional gain of the antenna minus 6dBi.

Antenna Connected Construction

The antenna used in this product is PCB Antenna without connector.

7. List of Measuring Equipments Used

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
EMC Receiver	R&S	ESCS 30	100132	9 KHz – 2.75 GHz	Jun. 23, 2004	Jun. 23, 2005	Conduction (CO01-HY)
LISN	MessTec	NNB-2/16Z	2001/008	9 KHz – 30 MHz	May 03, 2004	May 03, 2005	Conduction (CO01-HY)
LISN (Support Unit)	MessTec	NNB-2/16Z	2001/009	9 KHz – 30 MHz	Apr. 19, 2004	Apr. 19, 2005	Conduction (CO01-HY)
EMI Filter	LINDGREN	LRE-2060	1004	< 450 Hz	N/A	N/A	Conduction (CO01-HY)
EMI Filter	LINDGREN	N6006	201052	0 ~ 60 Hz	N/A	N/A	Conduction (CO01-HY)
RF Cable-CON	Suhner Switzerland	RG223/U	CB029	9KHz~30MHz	Dec. 24, 2003	Dec. 24, 2004	Conduction (CO01-HY)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
Spectrum analyzer	R&S	FSP40	100057	9KHz-40GHz	Feb. 26, 2004	Feb. 26, 2005	Radiation (03CH06-HY)
Bilog Antenna	SCHAFFNER	CBL6112B	2885	30MHz -2GHz	Dec. 18, 2003	Dec. 18, 2004	Radiation (03CH06-HY)
Horn Antenna	Com-Power	AH118	071025	1G-18G	Feb. 11, 2004	Feb. 11, 2005	Radiation (03CH06-HY)
PreAmplifier	Com-Power	PA-103	161055	1MHz - 1000MHz	Apr. 26, 2004	Apr. 26, 2005	Radiation (03CH06-HY)
HF Amplifier	MITEQ	AFS44	973248	0.1G - 26.5G	May. 20, 2004	May. 20, 2005	Radiation (03CH06-HY)

8. Uncertainty of Test Site

Uncertainty of Conducted Emission Measurement (30MHz ~ 1000MHz)

Contribution	Uncertainty of x_i		$u(x_i)$
	dB	Probability Distribution	
Receiver reading	0.10	Normal(k=2)	0.05
Cable loss	0.10	Normal(k=2)	0.05
AMN insertion loss	2.50	Rectangular	0.63
Receiver Spec	1.50	Rectangular	0.43
Site imperfection	1.39	Rectangular	0.80
Mismatch Receiver VSWR Γ1= LISN VSWR Γ2= Uncertainty=20log(1-Γ1*Γ2)	+0.34/-0.35	U-shape	0.24
combined standard uncertainty Uc(y)	**1.13**		
Measuring uncertainty for a level of confidence of 95% U=2Uc(y)	**2.26**		

Uncertainty of Radiated Emission Measurement (150kHz ~ 30MHz)

Contribution	Uncertainty of x_i		$u(x_i)$
	dB	Probability Distribution	
Receiver reading	0.41	Normal(k=2)	0.21
Antenna factor calibration	0.83	Normal(k=2)	0.42
Cable loss calibration	0.25	Normal(k=2)	0.13
Pre Amplifier Gain calibration	0.27	Normal(k=2)	0.14
RCV/SPA specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site imperfection	1.43	Rectangular	0.83
Mismatch Receiver VSWR Γ1= 0.20 Antenna VSWR Γ2= 0.23 Uncertainty=20log(1-Γ1*Γ2)	+0.39/-0.41	U-shaped	0.28
combined standard uncertainty Uc(y)	**1.27**		
Measuring uncertainty for a level of confidence of 95% U=2Uc(y)	**2.54**		

$U=\sqrt{\{(1/2)^2+(0.3/2)^2+(2^2+0.5^2+2^2+0.25^2+2^2)/3+(0.54)^2/2\}}=2.2$ for 10m test distance

$U=\sqrt{\{(1/2)^2+(0.3/2)^2+(2^2+3^2+2^2+0.25^2+2^2)/3+(0.54)^2/2\}}=2.7$ for 3m test distance

Uncertainty of Conducted Emission Measurement (1GHz ~ 40GHz)

Contribution	Uncertainty of x_i		$u(x_i)$	Ci	$Ci*u($
	dB	Probability Distribution			
Receiver reading	±0.10	Normal(k=1)	0.10	1	0.10
Antenna factor calibration	±1.70	Normal(k=2)	0.85	1	0.85
Cable loss calibration	±0.50	Normal(k=2)	0.25	1	0.25
Receiver Correction	±2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	±1.50	Rectangular	0.87	1	0.87
Site imperfection	±2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR Γ1= 0.197 Antenna VSWR Γ2= 0.194 Uncertainty=20log(1-Γ1*Γ2*Γ3)	+0.34/-0.35	U-shaped	0.244	1	0.244
Combined standard uncertainty Uc(y)	**2.36**				
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	**4.72**				

U=√{(0.3/2)² +(2²+1.5²+0.2²)/3+(0.2)²/2}=1.66