CONFORMANCE TEST REPORT
FOR
FCC 47 CFR, Part 15 Subpart C

Report No.: 11-06-MAS-176-01

Client:	OpenPeak Inc.
Product:	Cisco CIUS 4G
Model:	CIUS-7-AT-K9
Series Model:	CIUS-7-K9
FCC ID:	VGBCSCO4G710
Manufacturer:	Celestica Thailand Ltd.
Date test item received:	2011/06/13
Date test campaign completed:	2011/11/24
Date of issue:	2011/11/25

Total number of pages of this test report: 77 pages

Total number of pages of photos: Setup photos 3 pages

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Client	: OpenPeak Inc.
Address	: 1750 Clint Moore Rd. Boca Raton, FL, USA 33487
Manufacturer	: Celestica Thailand Ltd.
Address	: 49/18 Moo 5, Laem Chabang Industrial Estate, Tungsukhla Chonburi, Thailand 20230
EUT	: Cisco CIUS 4G
Brand/Trade name	: Cisco Systems Inc.
Model No.	: CIUS-7-AT-K9
Series Model No.	: CIUS-7-K9
Power Source	: Adapter 1: (APD / DA-20A05) Input: 100-240Vac, 50-60Hz, 1.0A Max Output: 5V, 4A Max Adapter 2: (ENG / 3A-204DB05) Input: 100-240Vac, 50-60Hz, 0.5A Output: 5V, 4.0A
Regulations applied	: FCC 47 CFR, Part 15 Subpart C

The testing described in this report has been carried out to the best of our knowledge and ability, and our responsibility is limited to the exercise of reasonable care. This certification is not intended to believe the sellers from their legal and/or contractual obligations.
The compliance test is only certified for the test equipment and the results of the testing report relate only to the item tested. The compliance test of this report was conducted in accordance with the appropriate standards. It's not intention to assure the quality and performance of the product. This report shall not be reproduced except in full, without the approval of ETC. This report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

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⑤ FCC Registration Number: 90588, 91094, 91095
⑥ Industry Canada Site Regisitation number: IC 2949A

NVLAP Lab Code 200133-0

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1 GENERAL INFORMATION

1.1 Product Description

a) Type of EUT : Cisco CIUS 4G
b) Trade Name : Cisco Systems, Inc.
c) Model No. : CIUS-7-AT-K9
d) Series Model No. : CIUS-7-K9
e) FCC ID : VGBCSCO4G710

1.2 Characteristics of Device

The EUT is a Mobile Collaboration tablet with Bluetooth as one of wirelesss technology. Bluetooth is a short-range radio link intended to be a cable replacement between portable or fixed electronic devices. Bluetooth operates in the unlicensed ISM Band at 2.4GHz. In this band, 79 RF channels spaced 1MHz apart are defined. The rated output power is 9.85 dBm (9.66 mW).

1.3 Test Methodology

All testing were performed according to the procedures in ANSI C63.4 (2003) an FCC CFR 47 Part 2 and Part 15.

1.4 Modifiction List of EUT

N/A

1.5 Test Facility

The semi-anechoic chamber and conducted measurement facility used to collect the radiated and conducted data are located inside the Building at No.8, Lane 29, Wen-ming Road, Lo-shan Tsun, Kweishan Hsiang, Taoyuan, Taiwan, R.O.C.
This site has been accreditation as a FCC filing site.

1.6 Test Summary

Requirement	FCC Paragraph #	Test Pass
Radiated Emission	15.209	☒
Conducted Emission	15.207	☒
Antenna Requirement	15.203	☒
20dB Emission Bandwidth	15.247 (a)(1)	☒
Output Power	15.247 (b)(1)	☒
OUT-OF-BAND RF Conducted Spurious Emission	15.247 (c)	☒
Number of Hopping Channels	15.247 (b)(1)	☒
Hopping Channel Carrier Frequency Seperated	15.247 (a)(1)	☒
Dwell Time	15.247 (a)(1)(iii)	☒

2 PROVISIONS APPLICABLE

2.1 Definition

Unintentional radiator:

A device that intentionally generates and radio frequency energy for use within the device, or that sends radio frequency signals by conduction to associated equipment via connecting wiring, but which is not intended to emit RF energy by radiation or induction.

Class A Digital Device:

A digital device which is marketed for use in commercial or business environment; exclusive of a device which is market for use by the general public, or which is intended to be used in the home.

Class B Digital Device :

A digital device which is marketed for use in a residential environment notwithstanding use in a commercial, business of industrial environment. Example of such devices that are marketed for the general public.

Note : A manufacturer may also qualify a device intended to be marketed in a commercial, business, or industrial environment as a Class B digital device, and in fact is encouraged to do so, provided the device complies with the technical specifications for a Class B Digital Device. In the event that a particular type of device has been found to repeatedly cause harmful interference to radio communications, the Commission may classify such a digital device as a Class B Digital Device, Regardless of its intended use.

Intentional radiator:

A device that intentionally generates and emits radio frequency energy by radiation or induction.

2.2 Requirement for Compliance

(1) Conducted Emission Requirement

For unintentional device, according to §15.107(a) Line Conducted Emission Limits is as following:

Frequency MHz	Quasi Peak dB μV	Average dB μV
0.15 - 0.5	66-56*	56-46*
0.5 - 5.0	56	46
5.0 - 30.0	60	50

*Decreases with the logarithm of the frequency.

For intentional device, according to §15.207(a) Line Conducted Emission Limits is same as above table.

(2) Radiated Emission Requirement

For unintentional device, according to §15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency MHz	Distance Meters	Radiated dB μV/m	Radiated μV/m
30 - 88	3	40.0	100
88 - 216	3	43.5	150
216 - 960	3	46.0	200
above 960	3	54.0	500

For intentional device, according to §15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

(3) Antenna Requirement

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to §15.247 (c),(i) Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point-to point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. (ii) Systems operating in the 5725-5850 MHz band that are used exclusively for fixed, point-to point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted output power.

(4) 20dB Bandwidth Requirement

For frequency hopping systems, according to 15.247(a)(1), hopping channel carrier frequencies seperated by a minimum of 25kHz or the 20dB bandwidth of hopping channel, whichever is greater.

(5) Output Power Requirement

For frequency hopping systems, according to 15.247(b)(1), operating in the 2400-2483.5MHz band employing at least 75 hopping channels. The maximum peak output power of the transmitter shall not exceed 1 Watt. If transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(6) 100 kHz Bandwidth of Frequency Band Edges Requirement

According to 15.247(c), if any 100 kHz bandwidth outside these frequency bands, the radio frequency power that is produced by the modulation products of the spreading sequence, the information sequence and the carrier frequency shall be either at least 20 dB below that in any 100 kHz bandwidth within the band that contains the highest level of the desired power or shall not exceed the general levels specified in §15.209(a), whichever results in the lesser attenuation.

(7) Number of Hopping Channels

According to 15.247(b)(1), for frequency hopping systems, operating in the 2400-2483.5MHz band employing at least 75 hopping channels.

(8) Channel Carrier Frequencies Seperation

According to 15.247(a)(1)(iii), the frequency hopping systems shall have hopping channel carrier frequencies seperated by minimum of 25kHz or the 20dB bandwidth of hopping channel, whichever is greater.

(9) Dwell Time

According to 15.247(a)(1)(iii), frequency hopping system in the 2400-2483.5MHz band employing at least 15 non-overlapping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 second multiplied by the number of hopping channels employed.

(10) Power Spectral Density

According to 15.247(d), for bluetooth device, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater them 8dBm in any 3kHz band during any time interral of continuous transmission.

2.3 Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below :

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42-16.423	399.9-410	4.5-5.25
0.495 - 0.505 **	16.69475 - 16.69525	608-614	5.35-5.46
2.1735 - 2.1905	16.80425 - 16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475 - 156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2655-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41			

** : Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

2.4 Labeling Requirement

The device shall bear the following statement in a conspicuous location on the device :

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

2.5 User Information

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual.

The Federal Communications Commission Radio Frequency Interference Statement includes the following paragraph.

This equipment has been tested and found to comply with the limits for a Class B Digital Device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction may cause harmful interference to radio communication. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.

-- Increase the separation between the equipment and receiver.

-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-- Consult the dealer or an experienced radio / TV technician for help.

To comply with the FCC RF exposure compliance requirement, this device and its antenna must not be co-located or operating to conjunction with any other antenna or transmitter.

3. SYSTEM TEST CONFIGURATION

3.1 Justification

For the purposes of this test report ancillary equipment is defined as equipment which is used in conjunction with the EUT to provide operational and control features to the EUT during the test. Notebook PC was used to control the RF channel under the hightest, middle and lowest frequency and transmit the maximun RF power. Customer would not use it. But never the less ancillary equipment can influence the test results..

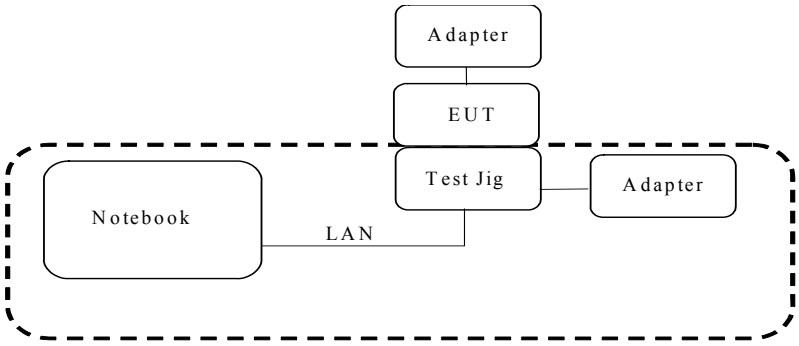
3.2 Devices for Tested System

3.2.1

Device	Manufacture	Model	Cable Description
* Cisco CIUS 4G	Celestica Thailand Ltd.	CIUS-7-AT-K9	2.5m*1, Unshielded Power Line / Adapter
Test Jig	N/A	N/A	1.8m*1, Unshielded Power Line 1.8m*1 Unshielded Signal Line
Notebook	HP	nx6320	3.1m*1, Unshielded Power Line

Remark

1. "*" means equipment under test.



Note: A HP notebook performs the control test mode. The notebook removes away after the control command is ready.

3.2.2 Test Mode Description

3.2.2.1 Modulation Type

Test Mode	Type	Note
A	NON-EDR	GFSK
B	EDR	π/4-DQPSK, 8-DPSK(註1)

Test Channel	Frequency (MHz)
Channel Low(L)	2402
Channel Mid(M)	2441
Channel Low(H)	2480

3.2.2.2 Test Mode and Worse Case Determination

Item	Test Item	Test Mode	Test Frequency (MHz)
1	Output Power	A	L,M,H
		B	L,M,H
	Worse Case	Mode A (note 1)	
2.	Conducted Emission	A (note 3)	M(Worse Case)
3	Out of Band Conducted Emission	A,B	L,M,H
4.1	Number of Channel	A	L~H
4.2	Channel Seperation	A	M (note 2)
4.3	Dwell Time	A	M (note 2)
4.4	Chammel Bandwidth	A,B	L,M,H
5.1	Radiated Emission (below 1GHz)	A	M (Worse Case)
5.2	Radiated Emission (above 1GHz)	A	L,M,H
5.3	Radiated Emission at Bandedge	A,B	L,H

note:

1. The worse case is determined as the modulation with highest output power.
2. Pretest result is no difference in three test modes by channl low, middle and high. Choose one for final testing and record the result.
3. The worse case is determined as the adaptor:1 with highest noise conducted emission. Choose that for final testing and record the result.

4 RADIATED EMISSION MEASUREMENT

4.1 Applicable Standard

For unintentional radiator, the radiated emission shall comply with §15.109(a).

For intentional radiators, according to §15.247 (a), operation under this provision is limited to frequency hopping and digitally modulated, and the out band emission shall be comply with § 15.247 (c)

4.2 Measurement Procedure

1. Setup the configuration per figure 1 and 2 for frequencies measured below and above 1 GHz respectively. Turn on EUT and make sure that it is in continuous operating function.
2. For emission frequencies measured below 1 GHz, a pre-scan is performed in a semi-anechoic chamber to determine the accurate frequencies of higher emissions and then each selected frequency is precisely measured. As the same purpose, for emission measured above 1 GHz, a pre-scan also be performed with a 1 meter measuring distance before final test.
3. For emission measured below and above 1 GHz, set the spectrum analyzer on a 120 kHz and 1 MHz resolution bandwidth respectively for each frequency measured in step 2.
4. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from 0 ° to 360 ° with a speed as slow as possible, and keep the azimuth that highest emission is indicated on the spectrum analyzer. Vary the antenna position again and record the highest value as a final reading. A RF test receiver is also used to confirm emissions measured.

Figure 1 : Frequencies measured below 1 GHz configuration

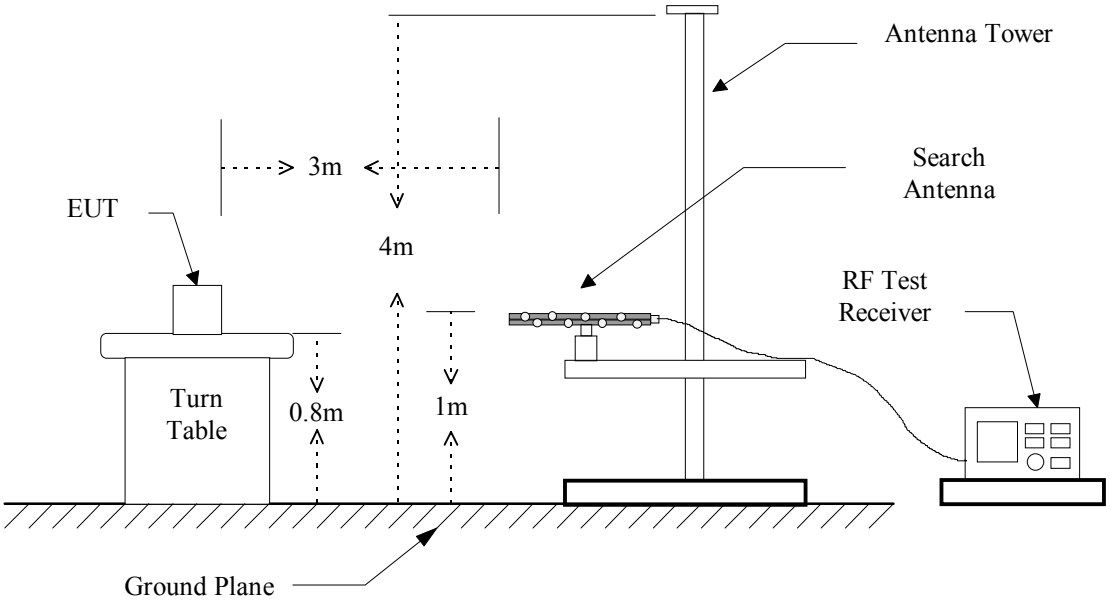
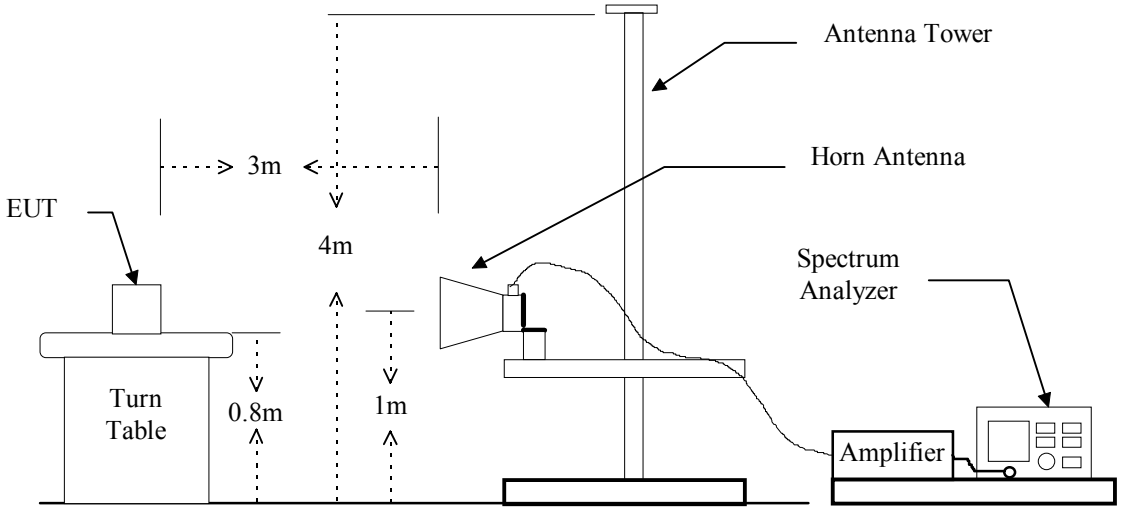


Figure 2 : Frequencies measured above 1 GHz configuration



4.3 Measuring Instrument

The following instrument are used for radiated emissions measurement :

Equipment	Manufacturer	Model No.	Next Cal. Due
EMI Test Receiver	R&S	ESIB7	07/25/2012
Spectrum Analyzer	Rohde & Schwarz	FSU46	11/25/2011
Horn Antenna	EMCO	3115	07/21/2012
BiLog Antenna	Schaffner	CBL 6112B	09/02/2011
Horn Antenna	EMCO	3116	07/21/2012
Preamplifier	Hewlett-Packard	8449B	10/25/2012

Measuring instrument setup in measured frequency band when specified detector function is used :

Frequency Band (MHz)	Instrument	Function	Resolution Bandwidth	Video Bandwidth
30 to 1000	RF Test Receiver	Quasi-Peak	120 kHz	300 kHz
	RF Test Receiver	Peak	120 kHz	300 kHz
Above 1000	Spectrum Analyzer	Peak	1 MHz	1 MHz
	Spectrum Analyzer	Average	1 MHz	10 Hz

4.4 Radiated Emission Data

4.4.1 RF Portion

a) Channel 0

Operation Mode : Transmitting
Fundamental Frequency : 2402 MHz
Test Date : Aug. 11, 2011 Temperature : 28℃ Humidity : 55%

Frequency (MHz)	Reading (dBuV) H Peak	H Ave	V Peak	V Ave	Factor (dB) Corr.	Result @3m (dBuV/m) Peak (H/V Max.)	Result @3m (dBuV/m) Ave (H/V Max.)	Limit @3m (dBuV/m) Peak	Limit @3m (dBuV/m) Ave.
4804.000	---	---	---	---	-2.68	---	---	74.0	54.0
7206.000	---	---	50.7	---	-2.44	48.3	---	74.0	54.0
12010.000	---	---	52.3	---	-1.79	50.5	---	74.0	54.0
14412.000	---	---	51.2	---	-0.24	51.0	---	74.0	54.0

b) Channel 39

Fundamental Frequency : 2441 MHz

Frequency (MHz)	Reading (dBuV) H Peak	H Ave	V Peak	V Ave	Factor (dB) Corr.	Result @3m (dBuV/m) Peak (H/V Max.)	Result @3m (dBuV/m) Ave (H/V Max.)	Limit @3m (dBuV/m) Peak	Limit @3m (dBuV/m) Ave.
4882.000	---	---	---	---	-2.65	---	---	74.0	54.0
7323.000	---	---	50.3	---	-2.47	47.8	---	74.0	54.0
9764.000	---	---	---	---	-2.60	---	---	74.0	54.0
14646.000	---	---	51.1	---	-0.46	50.6	---	74.0	54.0

c) Channel 78

Fundamental Frequency : 2480 MHz

Frequency (MHz)	Reading (dBuV) H Peak	H Ave	V Peak	V Ave	Factor (dB) Corr.	Result @3m (dBuV/m) Peak (H/V Max.)	Result @3m (dBuV/m) Ave (H/V Max.)	Limit @3m (dBuV/m) Peak	Limit @3m (dBuV/m) Ave.
4960.000	---	---	---	---	-2.62	---	---	74.0	54.0
7440.000	---	---	53.6	---	-2.49	51.1	---	74.0	54.0
9920.000	---	---	---	---	-2.60	---	---	74.0	54.0
12400.000	---	---	54.3	---	-1.40	52.9	---	74.0	54.0
17360.000	---	---	---	---	-0.17	---	---	74.0	54.0

Note :

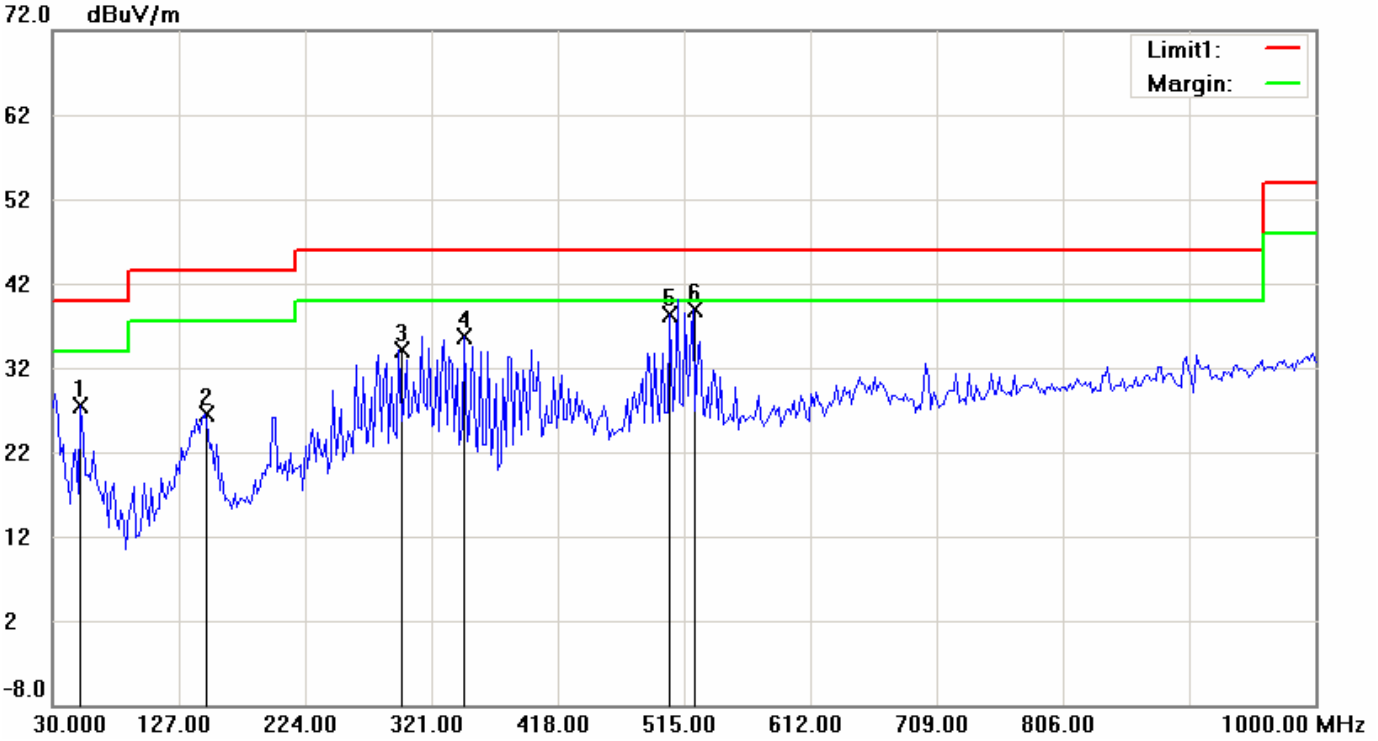
1. Item of margin shown in above table refer to average limit.
2. Remark "---" means that the emissions level is too low to be measured.
3. Item "Margin" referred to Average limit while there is only peak result.
4. The radiation emissions have been measured to beyond the tenth harmonic of the fundamental frequency and show the significant frequencies, other means the value is too low to be detected.

4.4.2 Other Emission

4.4.2.1 below 1GHz

File: 11-06-MAS-176(5G) **Data:** #139 **Date:** 2011/8/11 **Temperature:** 28 ℃

Time: AM 11:56:35 **Humidity:** 55 %



Condition: FCC Part15 RE-Class B_30-1000MHz **Polarization:** Horizontal

EUT: **Distance:** 3m

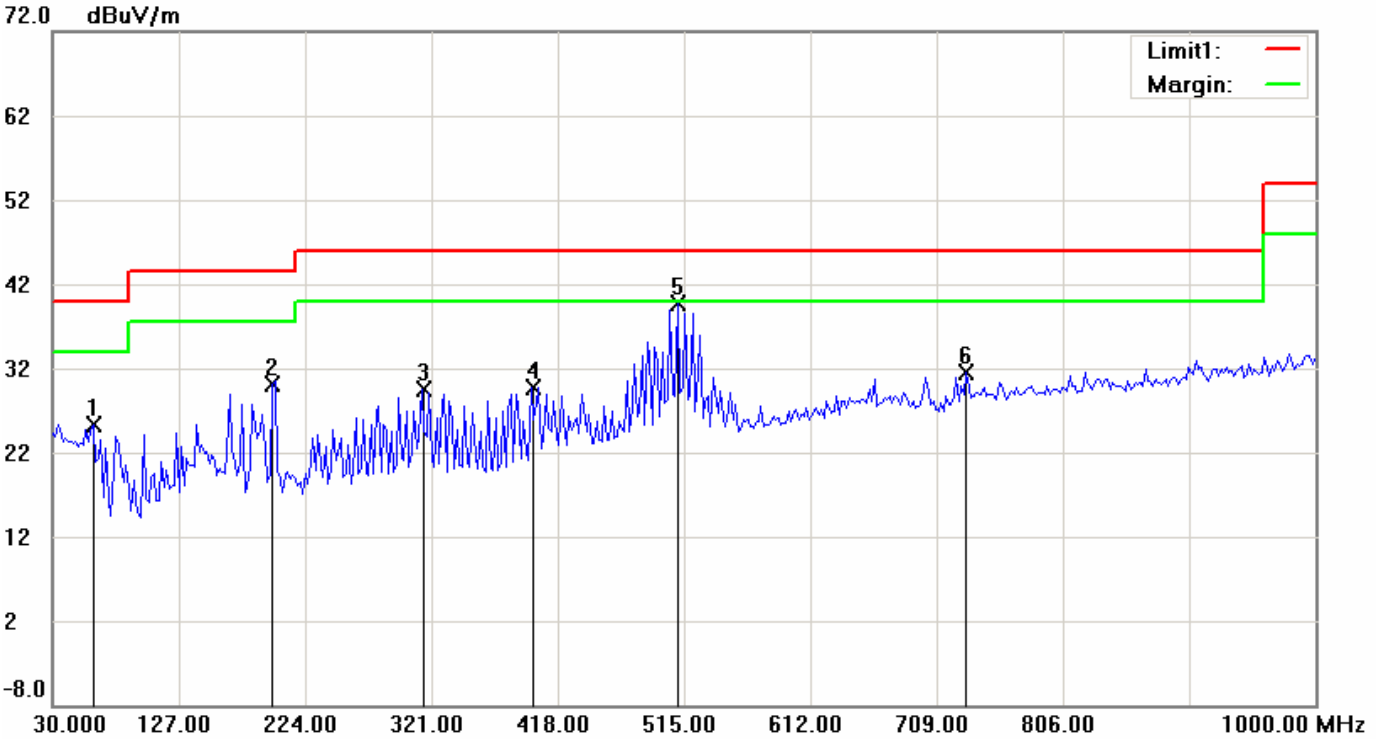
Model:

Test Mode:

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	51.3828	17.62	peak	9.79	27.41	40.00	-12.59
2	146.6333	13.12	peak	13.30	26.42	43.50	-17.08
3	296.3126	16.58	peak	17.45	34.03	46.00	-11.97
4	346.8536	17.57	peak	18.16	35.73	46.00	-10.27
5	504.3086	14.21	peak	24.09	38.30	46.00	-7.70
6	521.8036	15.03	peak	23.82	38.85	46.00	-7.15

File: **11-06-MAS-176(5G)** **Data:** **#140** **Date:** **2011/8/11** **Temperature:** **28 ℃**

Time: **PM 12:00:39** **Humidity:** **55 %**



Condition: **FCC Part15 RE-Class B_30-1000MHz** **Polarization:** **Vertical**

EUT: **Distance:** **3m**

Model:

Test Mode:

No.	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
	(MHz)	(dBuV/m)		dB/m	(dBuV/m)	(dBuV/m)	(dB)
1	61.1022	17.00	peak	8.35	25.35	40.00	-14.65
2	199.1182	14.38	peak	15.64	30.02	43.50	-13.48
3	313.8076	11.82	peak	17.73	29.55	46.00	-16.45
4	397.3948	10.17	peak	19.58	29.75	46.00	-16.25
5	510.1403	15.70	peak	24.01	39.71	46.00	-6.29
6	731.7435	4.80	peak	26.68	31.48	46.00	-14.52

4.4.2.2 above 1GHz

4.4.2.2.1 Fundamental Frequency : 2402 MHz

Frequency	Ant Pol	Reading (dBuV) @3m			Factor	Result (dBuV) @3m			Limit (dBuV/m) @3m		
(MHz)	H/V	Peak	QP	AVG	(dB/m)	Peak	QP	AVG	Peak	QP	AVG
1047.1150	H	53.1	----	----	-5.30	47.8	----	----	74.0	----	54.0
1047.1150	V	52.7	----	----	-5.30	47.4	----	----	74.0	----	54.0

4.4.2.2.2 Fundamental Frequency : 2441 MHz

Frequency	Ant Pol	Reading (dBuV) @3m			Factor	Result (dBuV) @3m			Limit (dBuV/m) @3m		
(MHz)	H/V	Peak	QP	AVG	(dB/m)	Peak	QP	AVG	Peak	QP	AVG
1047.1150	H	----	----	----	-5.30	----	----	----	74.0	----	54.0
1047.1150	V	53.1	----	----	-5.30	47.8	----	----	74.0	----	54.0

4.4.2.2.3 Fundamental Frequency : 2480 MHz

Frequency	Ant Pol	Reading (dBuV) @3m			Factor	Result (dBuV) @3m			Limit (dBuV/m) @3m		
(MHz)	H/V	Peak	QP	AVG	(dB/m)	Peak	QP	AVG	Peak	QP	AVG
1047.1150	H	54.0	----	----	-5.30	48.7	----	----	74.0	----	54.0
1047.1150	V	52.3	----	----	-5.30	47.0	----	----	74.0	----	54.0

Note:
1. Place of Measurement: Measuring site of the ETC.
2. If the data table appeared symbol of "***" means the value was too low to be measured.
3. The estimated measurement uncertainty of the result measurement is
   ±4.6dB (30MHz≦f<300MHz).
   ±4.4dB (300MHz≦f<1000MHz).
   ±4.1dB (1GHz≦f≦18GHz).
   ±4.4dB (18GHz<f≦40GHz).

4 Remark "----" means that the emissions level is too low to be measured.

4.4.3 Radiated Measurement at Bandedge with Fundamental Frequencies

4.4.3.1 Operation Mode : NON-EDR

(A) Channel 0
Fundamental Frequency : 2402 MHz
Test Date: Aug. 11, 2011 Temperature : 28℃ Humidity : 55%

Frequency (MHz)	Reading (dBuV) H Peak	H Ave	V Peak	V Ave	Factor (dB) Corr.	Result @3m (dBuV/m) Peak (H/V Max.)	Result @3m (dBuV/m) Ave (H/V Max.)	Limit @3m (dBuV/m) Peak	Limit @3m (dBuV/m) Ave.
2390.000	26.8	17.8	23.7	15.7	30.3	57.1	48.1	74	54

Note:
The result is the highest value of radiated emission from restrict band of 2310 ~2390 MHz.

(B) Channel 78
Operation Mode : Transmitting
Fundamental Frequency : 2480 MHz

Frequency (MHz)	Reading (dBuV) H Peak	H Ave	V Peak	V Ave	Factor (dB) Corr.	Result @3m (dBuV/m) Peak (H/V Max.)	Result @3m (dBuV/m) Ave (H/V Max.)	Limit @3m (dBuV/m) Peak	Limit @3m (dBuV/m) Ave.
2483.500	27.7	16.5	25.6	14.8	30.3	58.0	46.8	74	54

Note:
The result is the highest value of radiated emission from restrict band of 2483.5 ~2500 MHz.

4.4.3.2 Operation Mode : EDR

(A) Channel 0
Fundamental Frequency : 2402 MHz
Test Date: Aug. 11, 2011 Temperature : 28℃ Humidity : 55%

Frequency (MHz)	Reading (dBuV) H Peak	H Ave	V Peak	V Ave	Factor (dB) Corr.	Result @3m (dBuV/m) Peak (H/V Max.)	Result @3m (dBuV/m) Ave (H/V Max.)	Limit @3m (dBuV/m) Peak	Limit @3m (dBuV/m) Ave.
2390.000	26.3	18.2	24.7	16.2	30.3	56.6	48.5	74	54

Note:
The result is the highest value of radiated emission from restrict band of 2310 ~2390 MHz.

(B) Channel 78
Operation Mode : Transmitting
Fundamental Frequency : 2480 MHz

Frequency (MHz)	Reading (dBuV) H Peak	H Ave	V Peak	V Ave	Factor (dB) Corr.	Result @3m (dBuV/m) Peak (H/V Max.)	Result @3m (dBuV/m) Ave (H/V Max.)	Limit @3m (dBuV/m) Peak	Limit @3m (dBuV/m) Ave.
2483.500	27.6	16.8	27.3	16.0	30.3	57.9	47.1	74	54

Note:
The result is the highest value of radiated emission from restrict band of 2483.5 ~2500 MHz.

4.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor, High Pass Filter Loss(if used) and Cable Loss, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

where

Corrected Factor = Antenna Factor + Cable Loss + High Pass Filter Loss - Amplifier Gain

5 CONDUCTED EMISSION MEASUREMENT

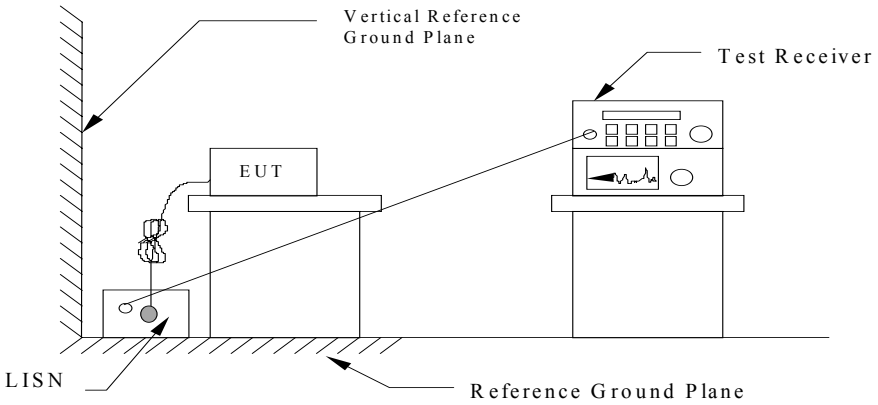
5.1 Standard Applicable

For unintentional and intentional device, Line Conducted Emission Limits are in accordance to § 15.107(a) and §15.207(a) respectively. Both Limits are identical specification.

5.2 Measurement Procedure

1. Setup the configuration per figure 3.
2. A preliminary scan with a spectrum monitor is performed to identify the frequency of emission that has the highest amplitude relative to the limit by operating the EUT in selected modes of operation, typical cable positions, and with a typical system configuration.
3. Record the 6 highest emissions relative to the limit.
4. Measure each frequency obtained from step 3 by a test receiver set on quasi peak detector function, and then record the accuracy frequency and emission level. If all emissions measured in the specified band are attenuated more than 20 dB from the limit, this step would be ignored, and the peak detector function would be used.
5. Confirm the highest three emissions with variation of the EUT cable configuration and record the final data.
6. Repeat all above procedures on measuring each operation mode of EUT.

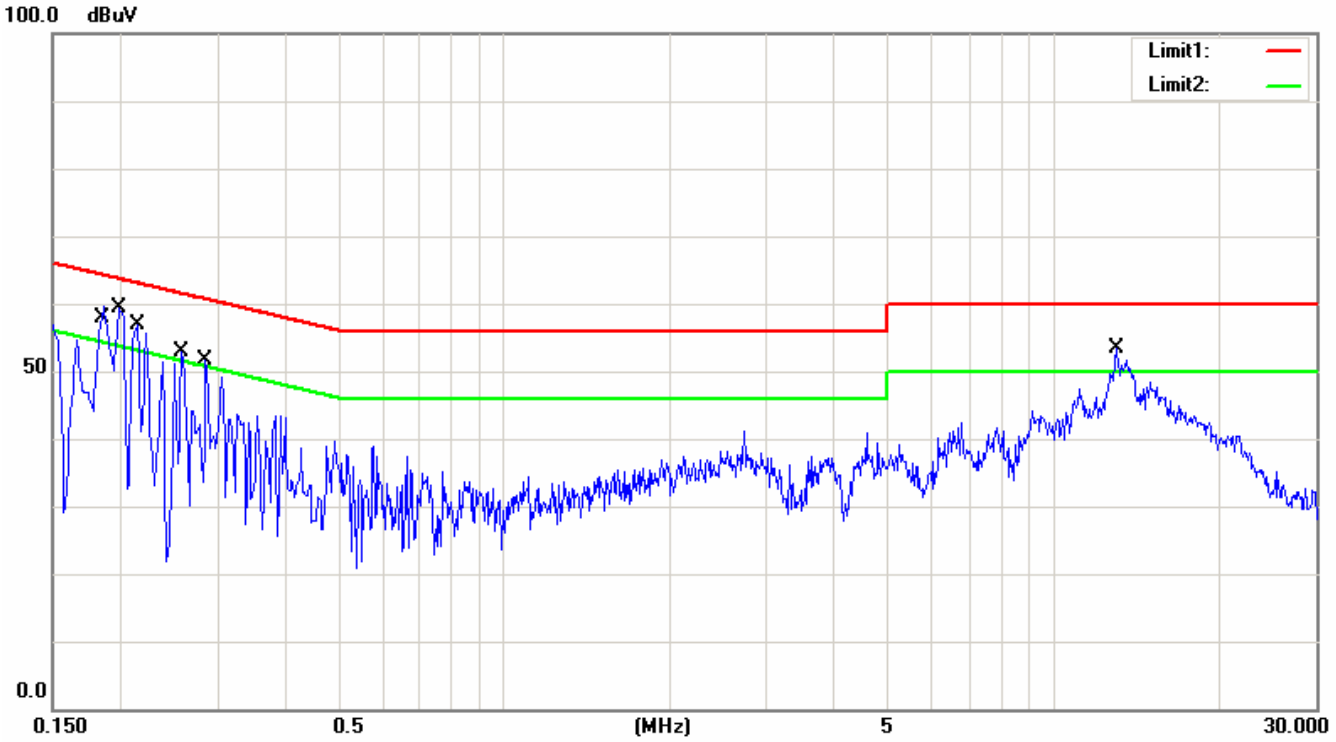
Figure 3 : Conducted emissions measurement configuration



5.3 Conducted Emission Data

File: 11-06-MAS-176 **Data:** #1 **Date:** 2011/8/18 **Temperature:** 25 ℃

Time: pm 06:39:43 **Humidity:** 62 %



Condition: **Phase:** L1

EUT: **Power:** AC 110V/60Hz

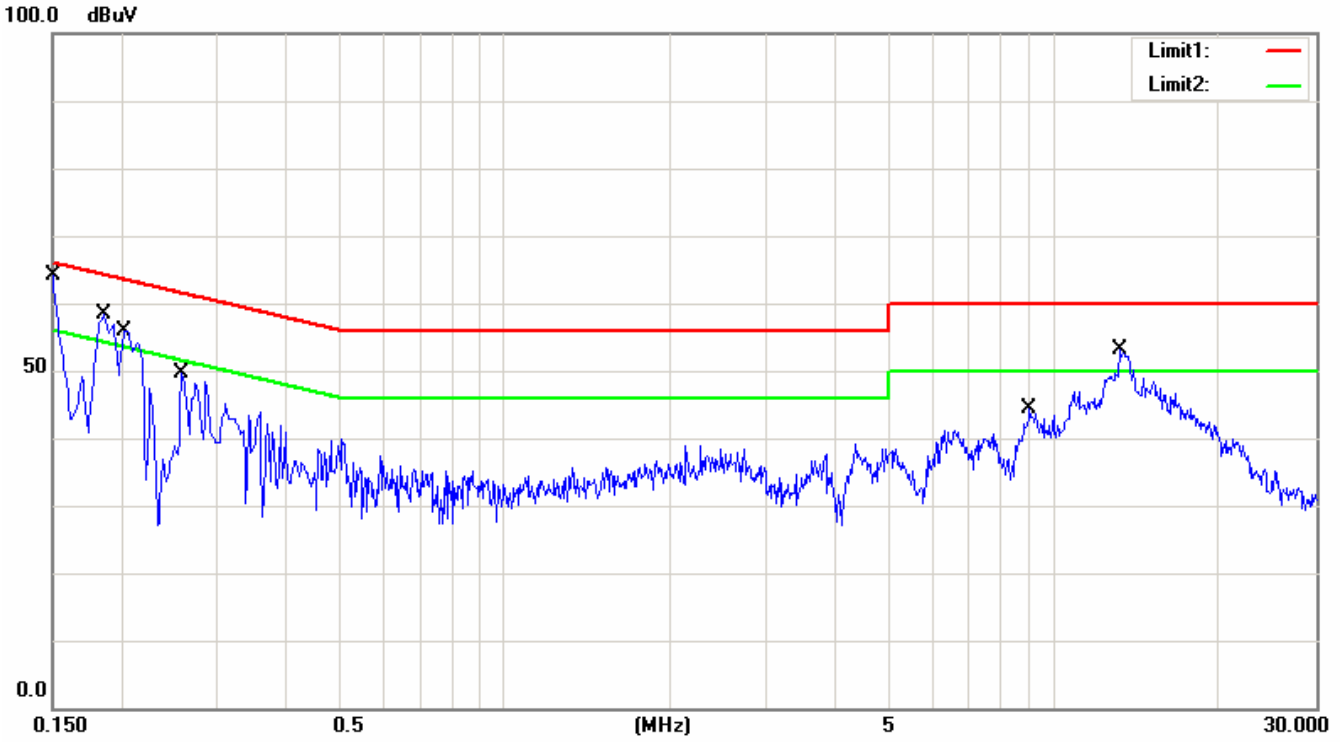
Model:

Test Mode: Adapter 1: (APD / DA-20A05)

No.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected dB	Result (dBuV)	Limit (dBuV)	Margin (dB)
1	0.1824	49.33	QP	9.72	59.05	64.38	-5.33
2	0.1824	28.11	AVG	9.72	37.83	54.38	-16.55
3	0.1963	47.16	QP	9.72	56.88	63.77	-6.89
4	0.1963	28.23	AVG	9.72	37.95	53.77	-15.82
5	0.2150	43.92	QP	9.72	53.64	63.01	-9.37
6	0.2150	24.28	AVG	9.72	34.00	53.01	-19.01
7	0.2552	38.12	QP	9.72	47.84	61.59	-13.75
8	0.2552	18.45	AVG	9.72	28.17	51.59	-23.42
9	0.2855	38.32	QP	9.72	48.04	60.65	-12.61
10	0.2855	18.00	AVG	9.72	27.72	50.65	-22.93
11	12.9685	34.86	QP	9.93	44.79	60.00	-15.21
12	12.9685	28.11	AVG	9.93	38.04	50.00	-11.96

File: 11-06-MAS-176 **Data:** #2 **Date:** 2011/8/18 **Temperature:** 25 ℃

Time: pm 06:45:05 **Humidity:** 62 %



Condition: **Phase:** N

EUT: **Power:** AC 110V/60Hz

Model:

Test Mode: Adapter 1: (APD / DA-20A05)

No.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected dB	Result (dBuV)	Limit (dBuV)	Margin (dB)
1	0.1500	18.60	QP	9.69	28.29	66.03	-37.74
2	0.1500	14.75	AVG	9.69	24.44	56.03	-31.59
3	0.1853	46.40	QP	9.68	56.08	64.24	-8.16
4	0.1853	25.37	AVG	9.68	35.05	54.24	-19.19
5	0.2002	44.29	QP	9.68	53.97	63.60	-9.63
6	0.2002	26.72	AVG	9.68	36.40	53.60	-17.20
7	0.2592	35.96	QP	9.68	45.64	61.46	-15.82
8	0.2592	19.66	AVG	9.68	29.34	51.46	-22.12
9	9.0462	27.60	QP	9.86	37.46	60.00	-22.54
10	9.0462	21.99	AVG	9.86	31.85	50.00	-18.15
11	13.1598	38.75	QP	9.94	48.69	60.00	-11.31
12	13.1598	32.00	AVG	9.94	41.94	50.00	-8.06

Note:

1. Place of measurement: EMC LAB. of the ETC.
2. "***" means the value was too low to be measured.
3. If the data table appeared symbol of "----" means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
4. "#" means the noise was too low, so record the peak value.
5. The estimated measurement uncertainty of the result measurement is ±2.5dB.

5.4 Result Data Calculation

The result data is calculated by adding the LISN Factor to the measured reading. The basic equation with a sample calculation is as follows:

RESULT = READING + LISN FACTOR (Included Cable Loss)

5.5 Conducted Measurement EquiPMent

The following test equiPMent are used during the conducted test.

EquiPMent	Manufacturer	Model No.	Next Cal. Due
RF Test Receiver	Rohde and Schwarz	ESCS30	09/06/2011
LISN	EMCO	37100/2M	03/04/2011

6 ANTENNA REQUIREMENT

6.1 Standard Applicable

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to §15.247 (c),(i) Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point-to point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. (ii) Systems operating in the 5725-5850 MHz band that are used exclusively for fixed, point-to point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted output power.

6.2 Antenna Construction and Directional Gain

The peak gain of antenna used is 2.6 dBi.

Antenna Type	802.11a/b/g/n FPC antenna
Model Number	N/A
Brand Name	N/A
Peak Antenna Gain	2.6 dBi

The directional gain of antenna doesn't greater than 6 dBi, the power won't be reduced.

7 20dB EMISSION BANDWIDTH MEASUREMENT

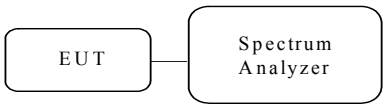
7.1 Standard Applicable

According to 15.247(a)(1), for frequency hopping systems, hopping channel carrier frequencies seperated by a minimum of 25kHz or two-thirds the 20dB bandwidth of hopping channel, whichever is greater.

7.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. The setup of the EUT as shown in figure 4. Turn on the EUT and connect it to measurement instrument. Then set it to any convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

Figure 4: Emission bandwidth measurement configuration.



7.3 Measurement EquiPMent

EquiPMent	Manufacturer	Model No.	Next Cal. Due
Spectrum Analyzer	Agilent	E4446A	09/18/2012

7.4 Measurement Data

7.4.1 Operation Mode: NON-EDR

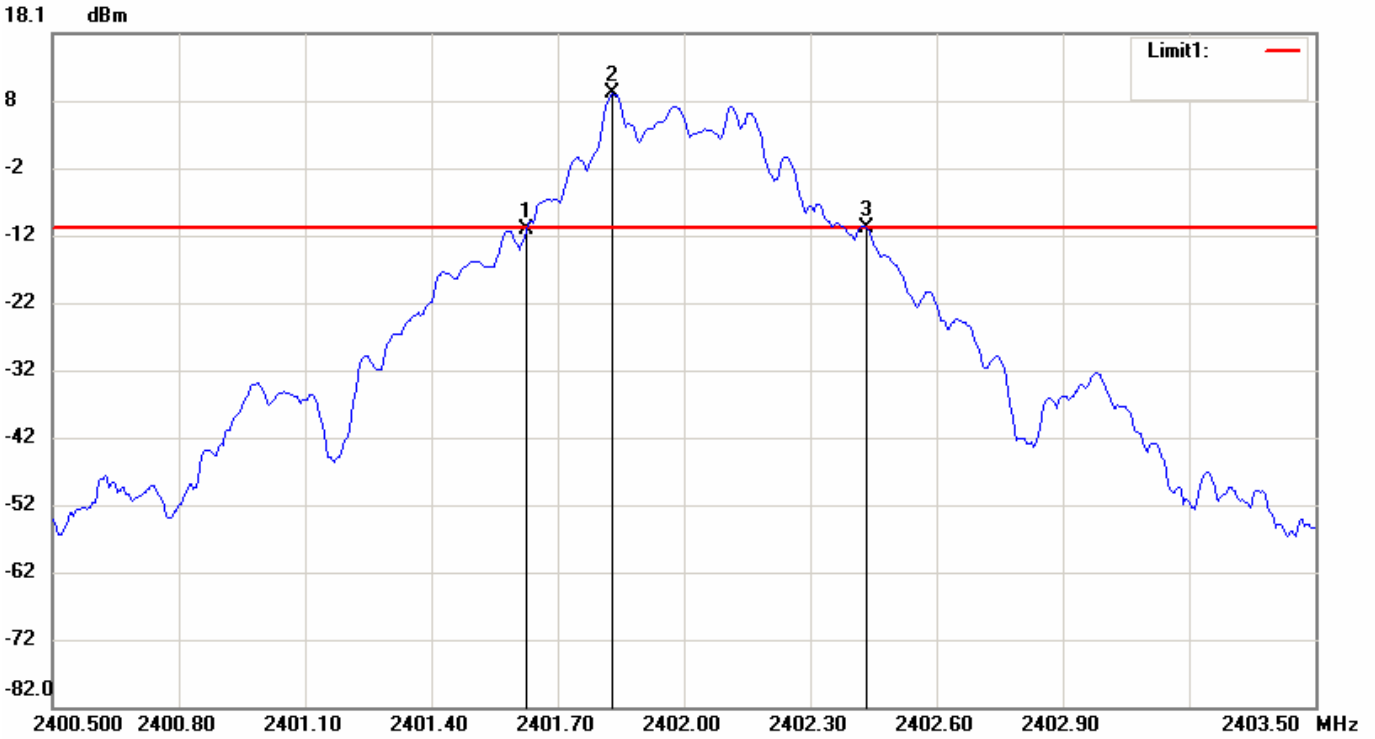
Test Date : Jun. 29, 2011 Temperature : 24℃ Humidity: 60%

Channel	20 dB Bandwidth (MHz)	Chart
L	0.810	Page 29
M	0.815	Page 30
H	0.885	Page 31

Note: Please refer to page 29 to page 34 for chart.

File: **Cisco(BT)** **Data:** **#2** **Date:** **2011/6/29** **Temperature:** **24 ℃**

Time: **AM 11:45:45** **Humidity:** **60 %**



Condition: **-10.91dBm**

EUT: **Sweep Time: 3.2ms** **Att.: 20dB**

Model: **RBW: 30 KHz** **VBW: 100 KHz**

Test Mode:

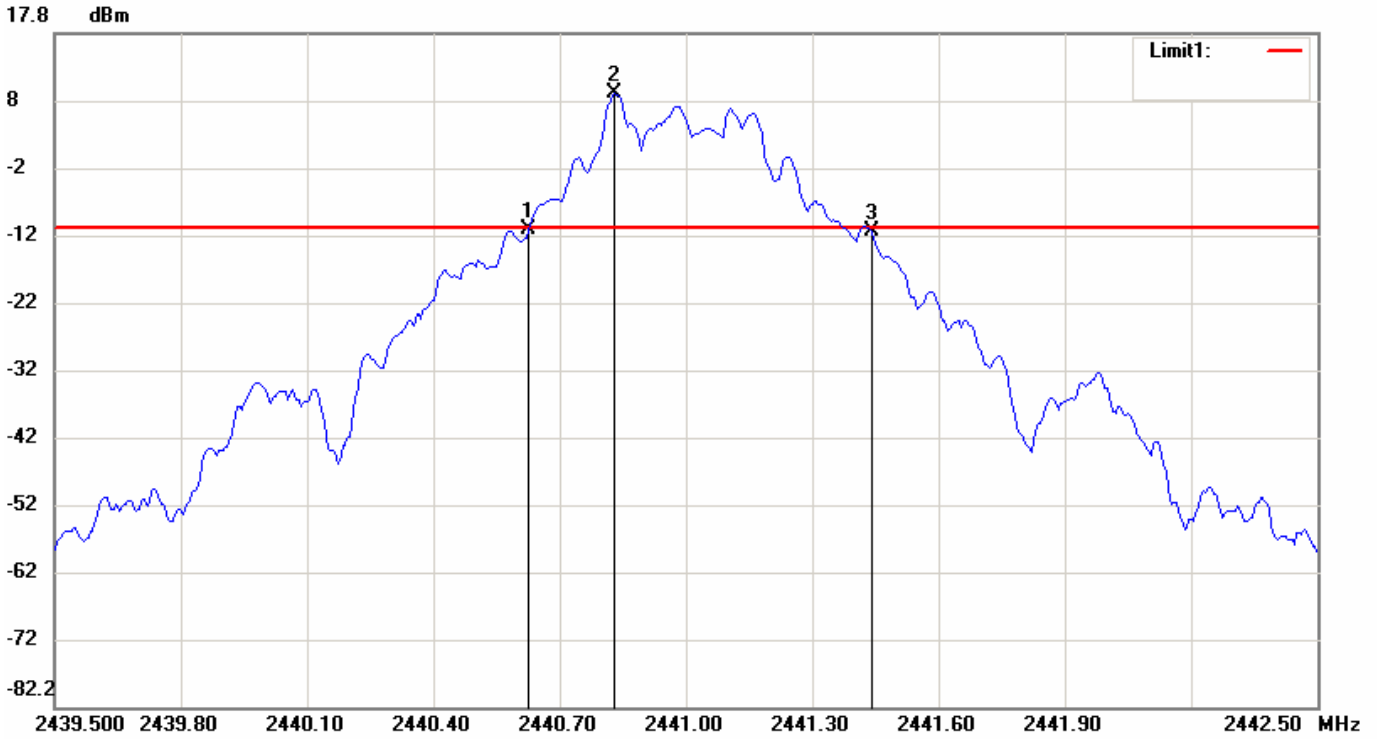
Note: **FCC-Bluetooth Channel 00-20dB EBW**

No.	Frequency(MHz)	Level(dBm)
1	2401.62500	-11.13
2	2401.83000	9.09
3	2402.43500	-10.94

No.		△Frequency(MHz)	△Level(dB)
1	mk3-mk1	0.81	0.19

File: **Cisco(BT)** **Data:** **#18** **Date:** **2011/6/29** **Temperature:** **24 ℃**

Time: **PM 12:01:03** **Humidity:** **60 %**



Condition: **-11.11dBm**

EUT: **Sweep Time: 3.2ms** **Att.: 20dB**

Model: **RBW: 30 KHz** **VBW: 100 KHz**

Test Mode:

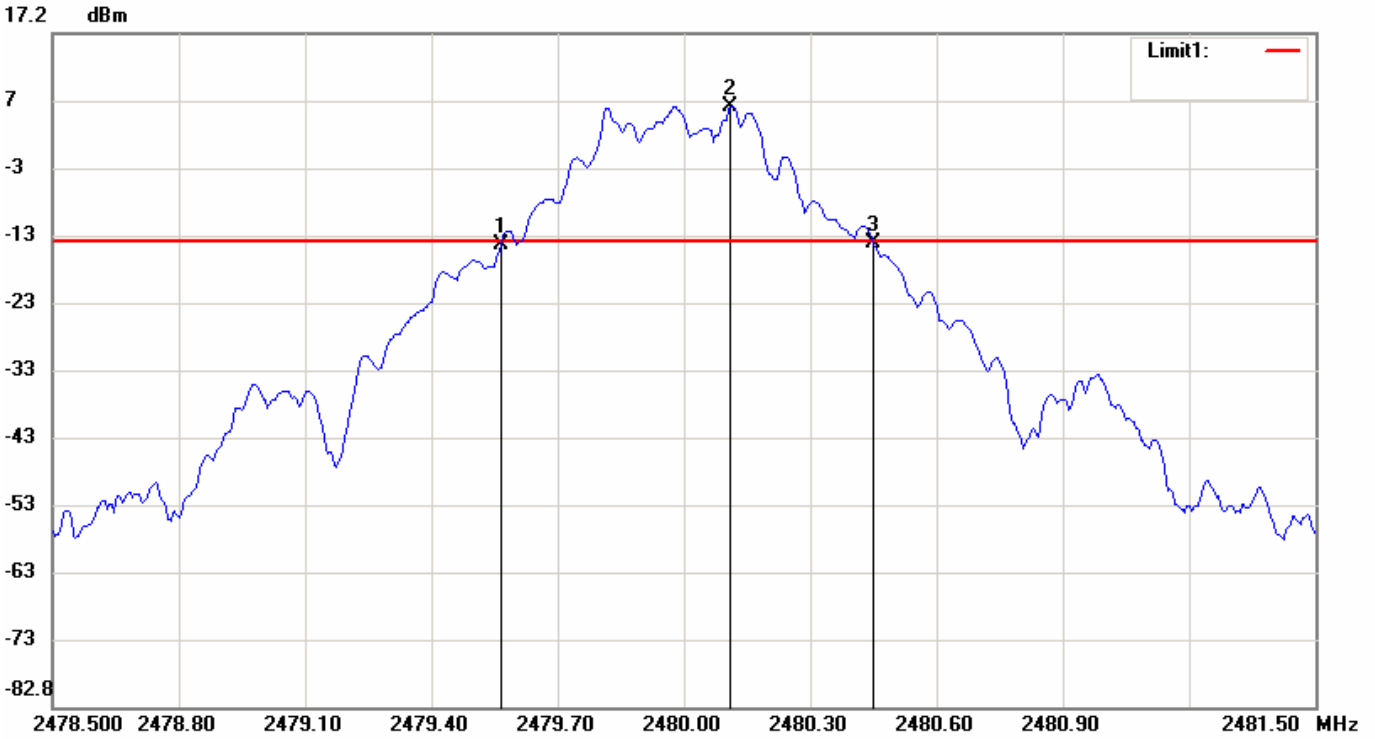
Note: **FCC-Bluetooth Channel 39-20dB EBW**

No.	Frequency(MHz)	Level(dBm)
1	2440.62500	-11.27
2	2440.83000	8.89
3	2441.44000	-11.66

No.		△Frequency(MHz)	△Level(dB)
1	mk3-mk1	0.815	-0.39

File: Cisco(BT) **Data: #10** **Date: 2011/6/29** **Temperature: 24 ℃**

Time: AM 11:53:33 **Humidity: 60 %**



Condition: **-13.69dBm**

EUT: **Sweep Time: 3.2ms** **Att.: 20dB**

Model: **RBW: 30 KHz** **VBW: 100 KHz**

Test Mode:

Note: **FCC-Bluetooth Channel 78-20dB EBW**

No.	Frequency(MHz)	Level(dBm)
1	2479.56500	-14.04
2	2480.11000	6.31
3	2480.45000	-13.89

No.		△Frequency(MHz)	△Level(dB)
1	mk3-mk1	0.885	0.15

7.4.2 Operation Mode: EDR

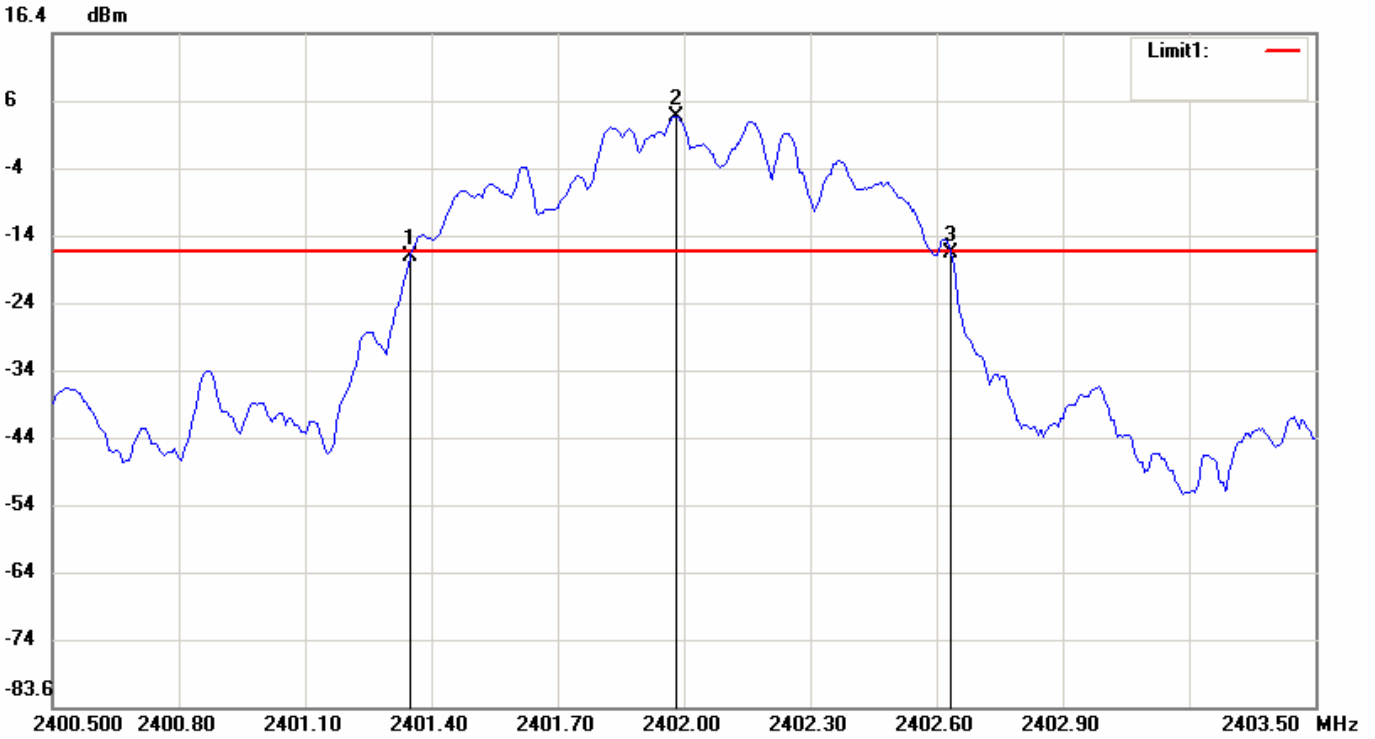
Test Date : Jun. 29, 2011 Temperature : 24℃ Humidity: 60%

Channel	20 dB Bandwidth (MHz)	Chart
L	1.285	Page 33
M	1.285	Page 34
H	1.280	Page 35

Note: Please refer to page 33 to page 35 for chart.

File: **Cisco(BT)** **Data:** **#36** **Date:** **2011/6/29** **Temperature:** **24 ℃**

Time: **PM 12:51:42** **Humidity:** **60 %**



Condition: **-16.02dBm** **Vertical**

EUT: **Sweep Time: 3.2ms** **Att.: 20dB**

Model: **RBW: 30 KHz** **VBW: 100 KHz**

Test Mode:

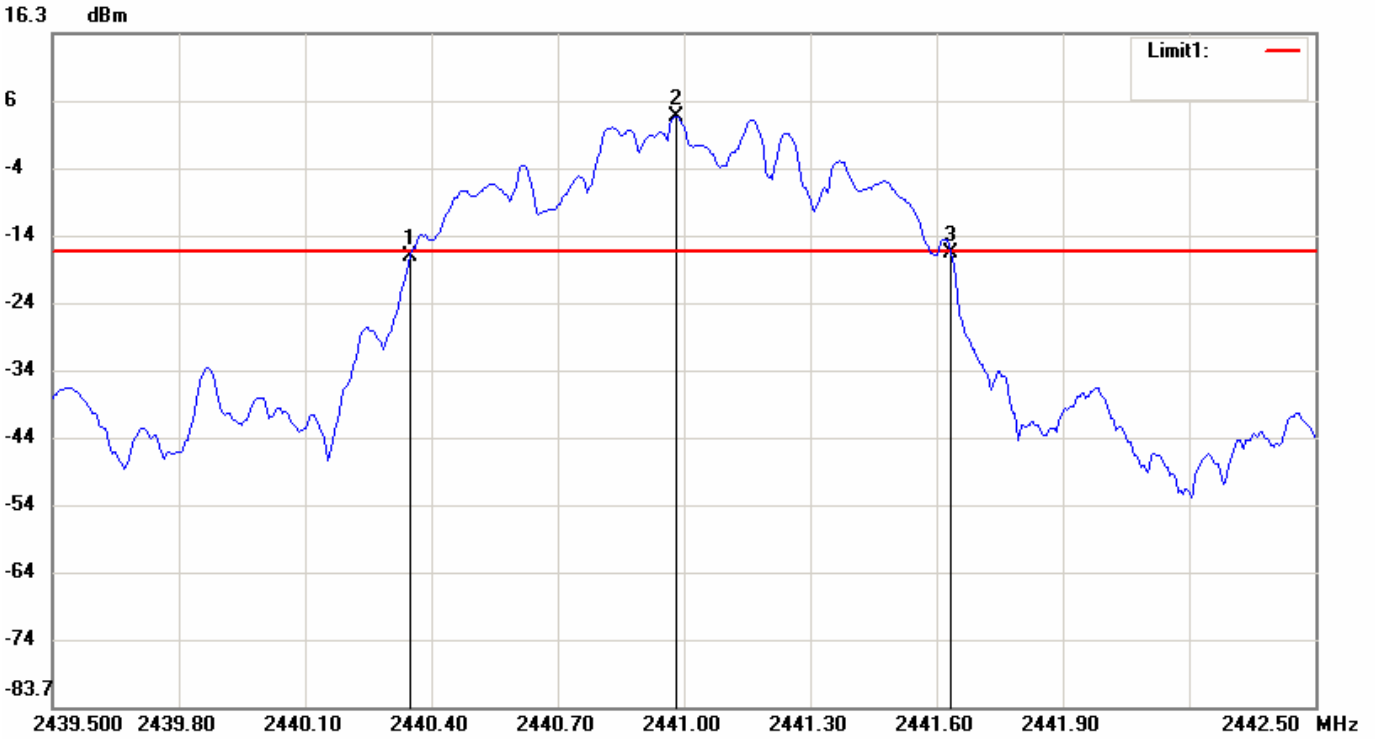
Note: **FCC-Bluetooth Channel 00-20dB EBW**

No.	Frequency(MHz)	Level(dBm)
1	2401.35000	-16.80
2	2401.98000	3.98
3	2402.63500	-16.23

No.		△Frequency(MHz)	△Level(dB)
1	mk3-mk1	1.285	0.57

File: **Cisco(BT)** **Data:** **#52** **Date:** **2011/6/29** **Temperature:** **24 ℃**

Time: **PM 01:07:23** **Humidity:** **60 %**



Condition: **-16.11dBm**

EUT: **Sweep Time: 3.2ms** **Att.: 20dB**

Model: **RBW: 30 KHz** **VBW: 100 KHz**

Test Mode:

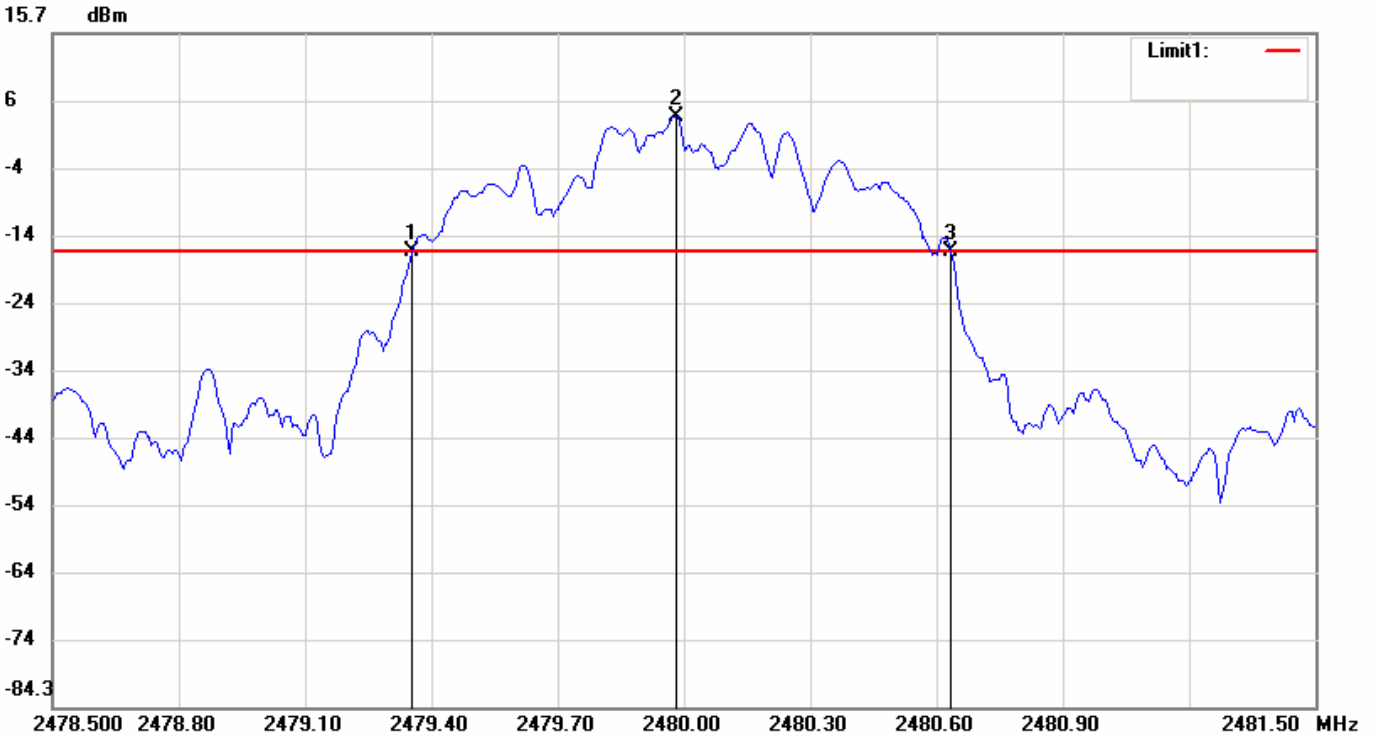
Note: **FCC-Bluetooth Channel 39-20dB EBW**

No.	Frequency(MHz)	Level(dBm)
1	2440.35000	-16.87
2	2440.98000	3.89
3	2441.63500	-16.27

No.		△Frequency(MHz)	△Level(dB)
1	mk3-mk1	1.285	0.6

File: **Cisco(BT)** **Data:** **#44** **Date:** **2011/6/29** **Temperature:** **24 ℃**

Time: **PM 12:59:12** **Humidity:** **60 %**



Condition: **-16.62dBm**

EUT: **Sweep Time: 3.2ms** **Att.: 20dB**

Model: **RBW: 30 KHz** **VBW: 100 KHz**

Test Mode:

Note: **FCC-Bluetooth Channel 78-20dB EBW**

No.	Frequency(MHz)	Level(dBm)
1	2479.35500	-16.67
2	2479.98000	3.38
3	2480.63500	-16.68

No.		△Frequency(MHz)	△Level(dB)
1	mk3-mk1	1.28	-0.01

8 OUTPUT POWER MEASUREMENT

8.1 Standard Applicable

For frequency hopping system, according to 15.247(b), the maximum peak output power of the transmitter shall not exceed 1 Watt. If Receving antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

8.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. The setup of the EUT as shown in figure 4. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 1 MHz and VBW to 3 MHz.
4. Measure the highest amplitude appearing on spectral display and record the level to calculate result data.
5. Repeat above procedures until all frequencies measured were complete.

8.3 Measurement EquiPMent

EquiPMent	Manufacturer	Model No.	Next Cal. Due
Spectrum Analyzer	Agilent	E4446A	09/18/2012

8.4 Measurement Data

8.4.1 Operation Mode: NON-EDR

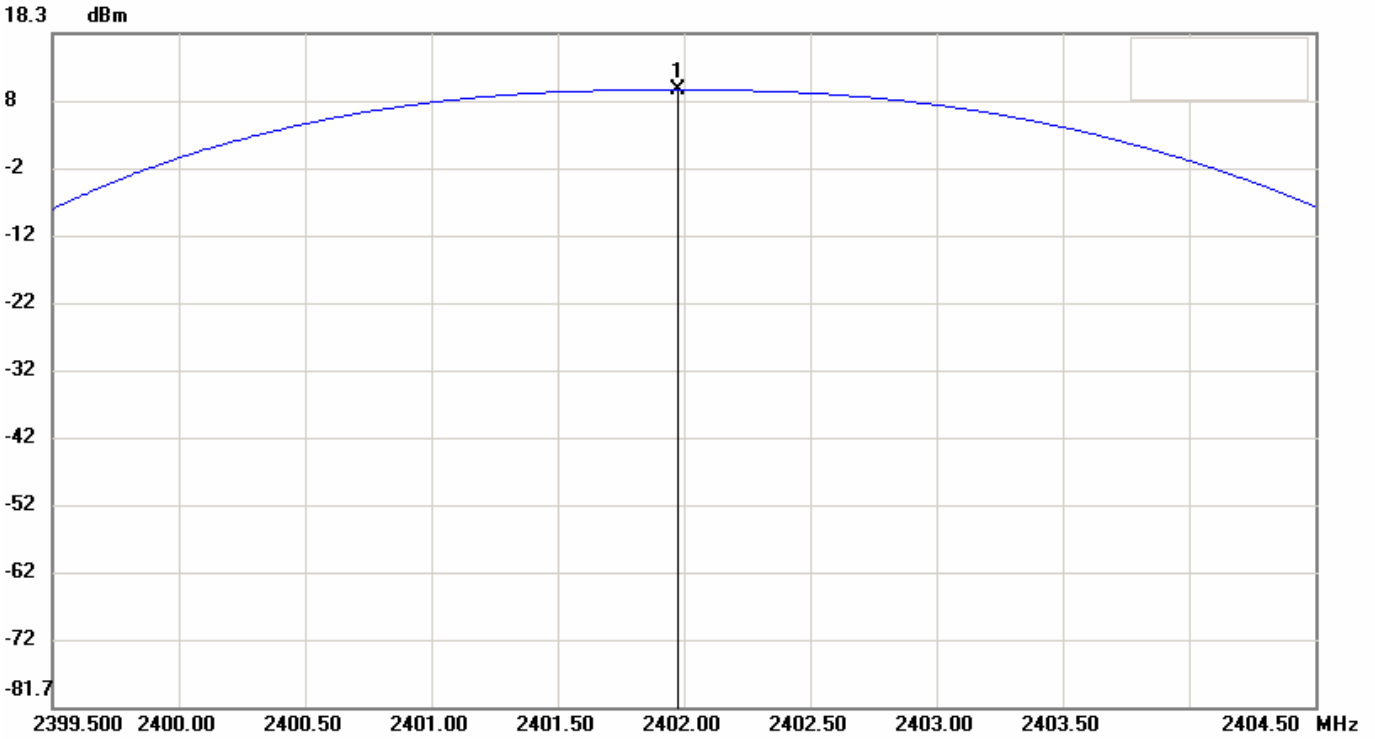
Test Date : Jun. 29, 2011 Temperature : 24℃ Humidity: 60%

Channel	Maximum Peak Output Power (dBm)	Maximum Peak Output Power (mW)	FCC Limit (mW)	Chart
L	9.85	9.66	1000	Page 38
M	9.66	9.25	1000	Page 39
H	9.05	8.04	1000	Page 40

Note: Please refer to page 38 to page 40 for chart.

File: Cisco(BT) **Data: #1** **Date: 2011/6/29** **Temperature: 24 ℃**

Time: AM 11:45:14 **Humidity: 60 %**



Condition:

EUT: **Sweep Time: 1ms** **Att.: 20dB**

Model: **RBW: 2000 KHz** **VBW: 2000 KHz**

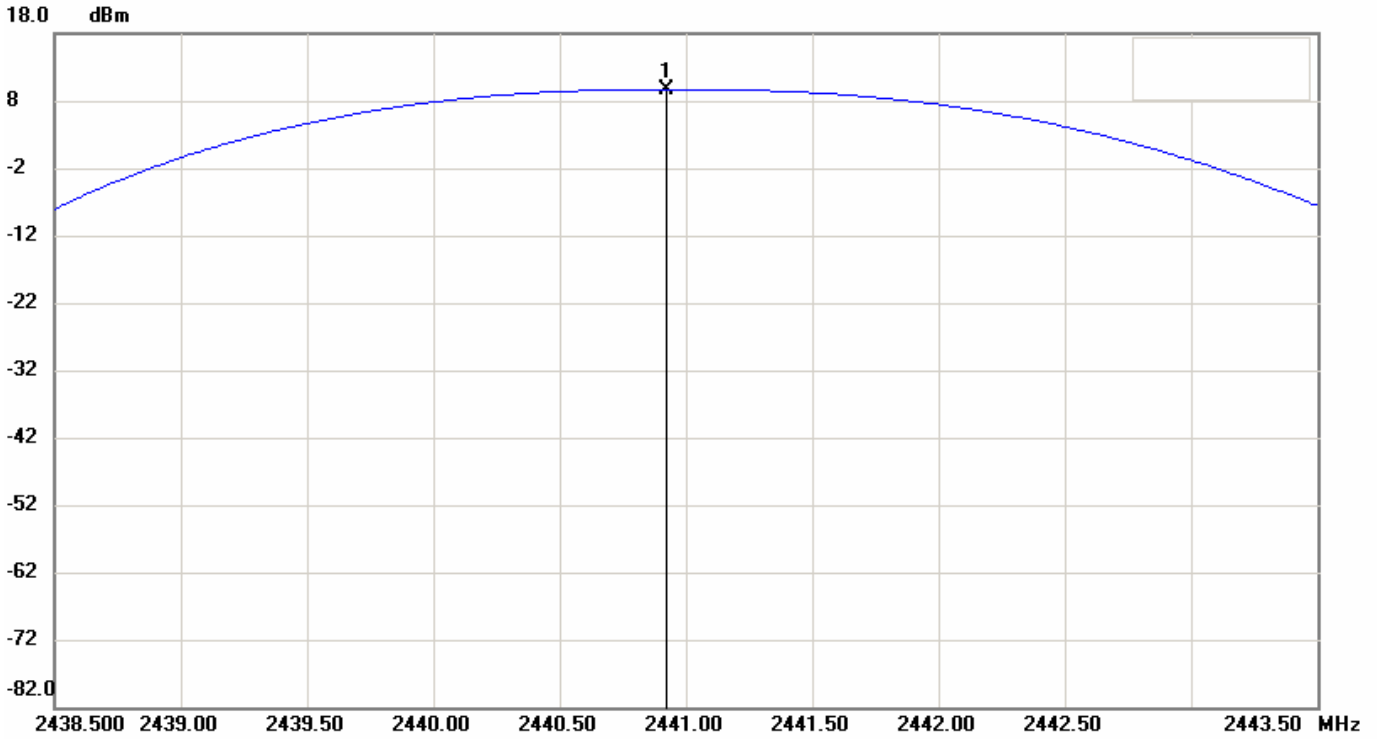
Test Mode:

Note: **FCC Bluetooth CH00 Output Power (NON-EDR)**

No.	Frequency(MHz)	Level(dBm)
1	2401.96670	9.85

File: **Cisco(BT)** **Data:** **#17** **Date:** **2011/6/29** **Temperature:** **24 ℃**

Time: **PM 12:00:28** **Humidity:** **60 %**



Condition:

EUT: **Sweep Time: 1ms** **Att.: 20dB**

Model: **RBW: 2000 KHz** **VBW: 2000 KHz**

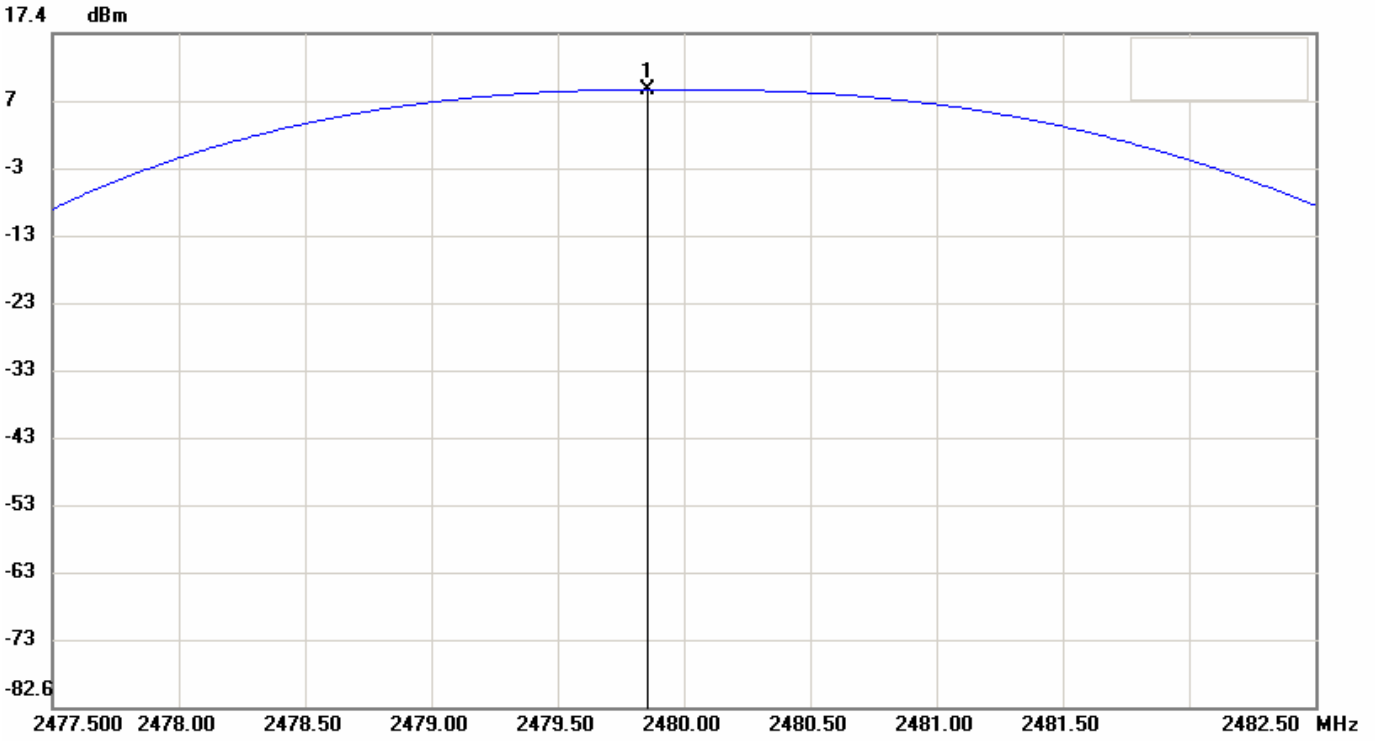
Test Mode:

Note: **FCC Bluetooth CH39 Output Power (NON-EDR)**

No.	Frequency(MHz)	Level(dBm)
1	2440.91670	9.66

File: Cisco(BT) **Data: #9** **Date: 2011/6/29** **Temperature: 24 ℃**

Time: AM 11:52:40 **Humidity: 60 %**



Condition:

EUT: **Sweep Time: 1ms** **Att.: 20dB**

Model: **RBW: 2000 KHz** **VBW: 2000 KHz**

Test Mode:

Note: **FCC Bluetooth CH78 Output Power (NON-EDR)**

No.	Frequency(MHz)	Level(dBm)
1	2479.85830	9.05

8.4.2 Operation Mode: EDR

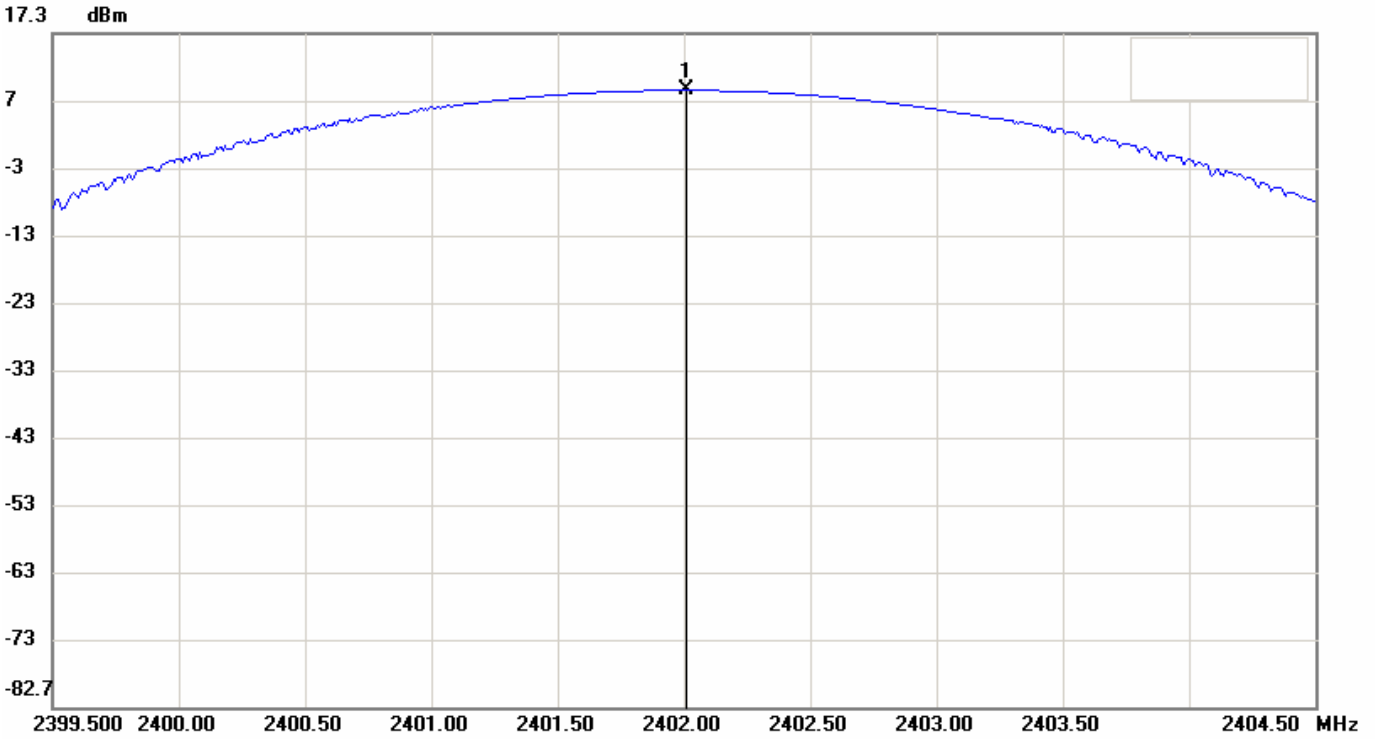
Test Date : Jun. 29, 2011 Temperature : 24℃ Humidity: 60%

Channel	Maximum Peak Output Power (dBm)	Maximum Peak Output Power (mW)	FCC Limit (mW)	Chart
L	8.89	7.74	1000	Page 42
M	8.77	7.53	1000	Page 43
H	8.22	6.64	1000	Page 44

Note: Please refer to page 42 to page 44 for chart.

File: **Cisco(BT)** **Data:** **#35** **Date:** **2011/6/29** **Temperature:** **24 ℃**

Time: **PM 12:51:10** **Humidity:** **60 %**



Condition:

EUT: **Sweep Time: 1ms** **Att.: 20dB**

Model: **RBW: 2000 KHz** **VBW: 2000 KHz**

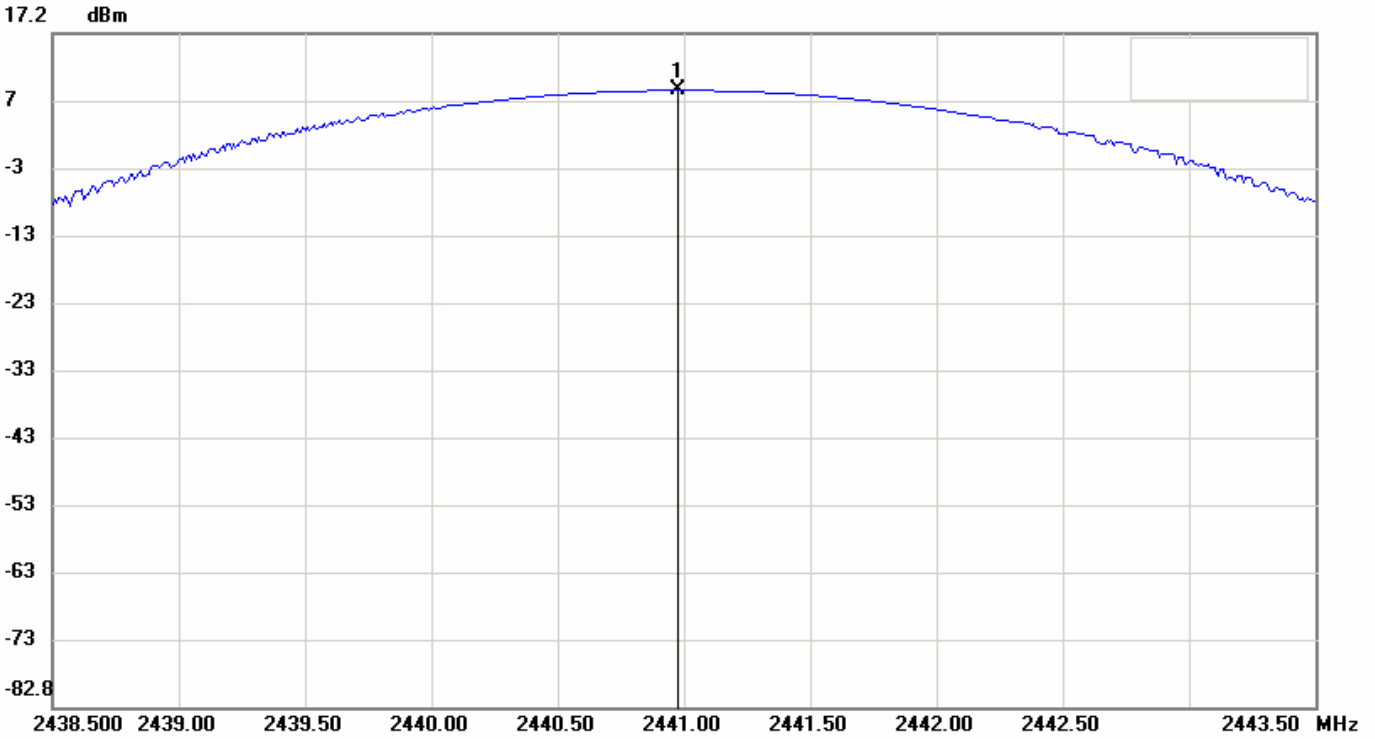
Test Mode:

Note: **FCC Bluetooth CH00 Output Power (EDR)**

No.	Frequency(MHz)	Level(dBm)
1	2402.00830	8.89

File: **Cisco(BT)** **Data:** **#51** **Date:** **2011/6/29** **Temperature:** **24 ℃**

Time: **PM 01:06:53** **Humidity:** **60 %**



Condition:

EUT: **Sweep Time: 1ms** **Att.: 20dB**

Model: **RBW: 2000 KHz** **VBW: 2000 KHz**

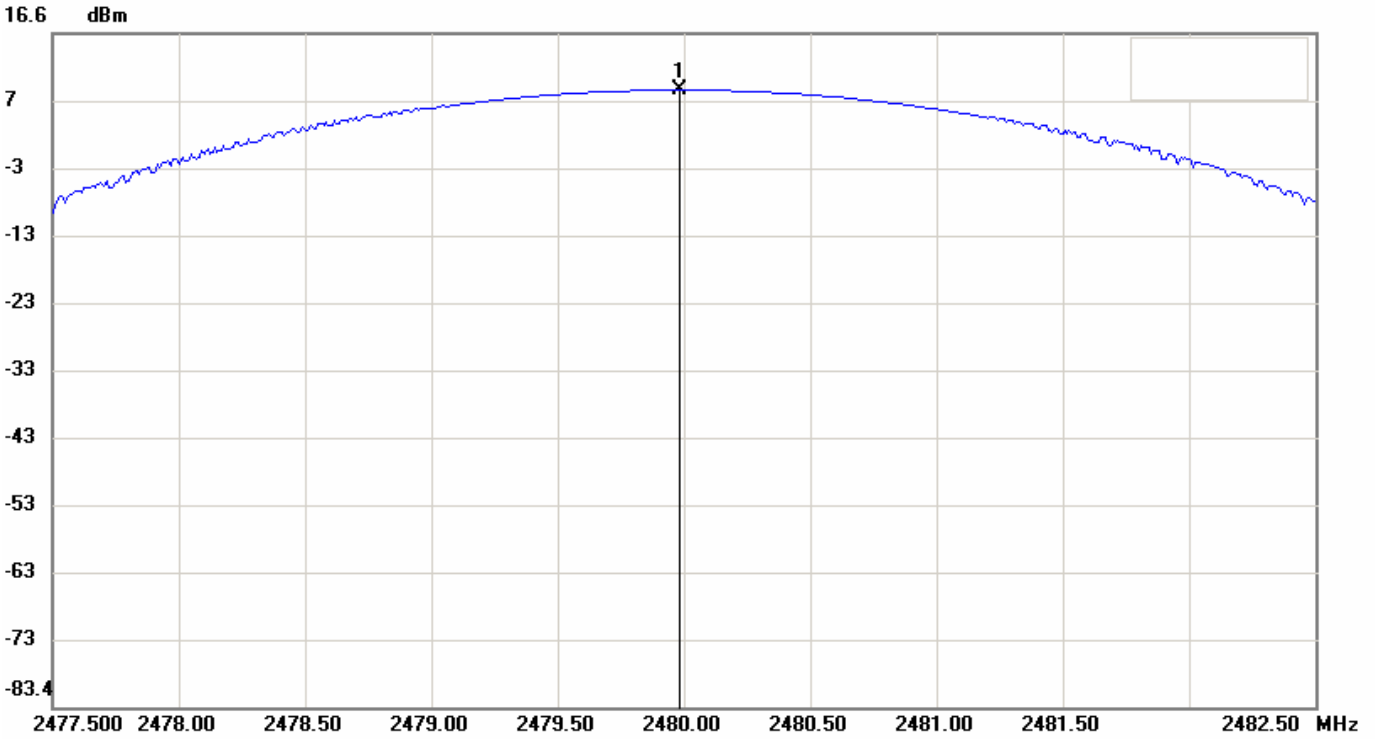
Test Mode:

Note: **FCC Bluetooth CH39 Output Power (EDR)**

No.	Frequency(MHz)	Level(dBm)
1	2440.96670	8.77

File: **Cisco(BT)** **Data:** **#43** **Date:** **2011/6/29** **Temperature:** **24 ℃**

Time: **PM 12:58:43** **Humidity:** **60 %**



Condition:

EUT: **Sweep Time: 1ms** **Att.: 20dB**

Model: **RBW: 2000 KHz** **VBW: 2000 KHz**

Test Mode:

Note: **FCC Bluetooth CH78 Output Power (EDR)**

No.	Frequency(MHz)	Level(dBm)
1	2479.98330	8.22

9 OUT-OF-BAND RF CONDUCTED SPURIOUS EMISSION MEASUREMENT

9.1 Standard Applicable

According to 15.247(c), if any 100 kHz bandwidth outside these frequency bands, the radio frequency power that is produced by the modulation products of the spreading sequence, the information sequence and the carrier frequency shall be either at least 20 dB below that in any 100 kHz bandwidth within the band that contains the highest level of the desired power or shall not exceed the general levels specified in §15.209(a), whichever results in the lesser attenuation.

9.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. The setup of the EUT as shown in figure 4. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

9.3 Measurement EquiPMent

EquiPMent	Manufacturer	Model No.	Next Cal. Due
Spectrum Analyzer	Agilent	E4446A	09/18/2012

9.4 Measurement Data

9.4.1 Operation Mode: NON-EDR

Test Date : Jun. 29, 2011 Temperature : 24℃ Humidity: 60%

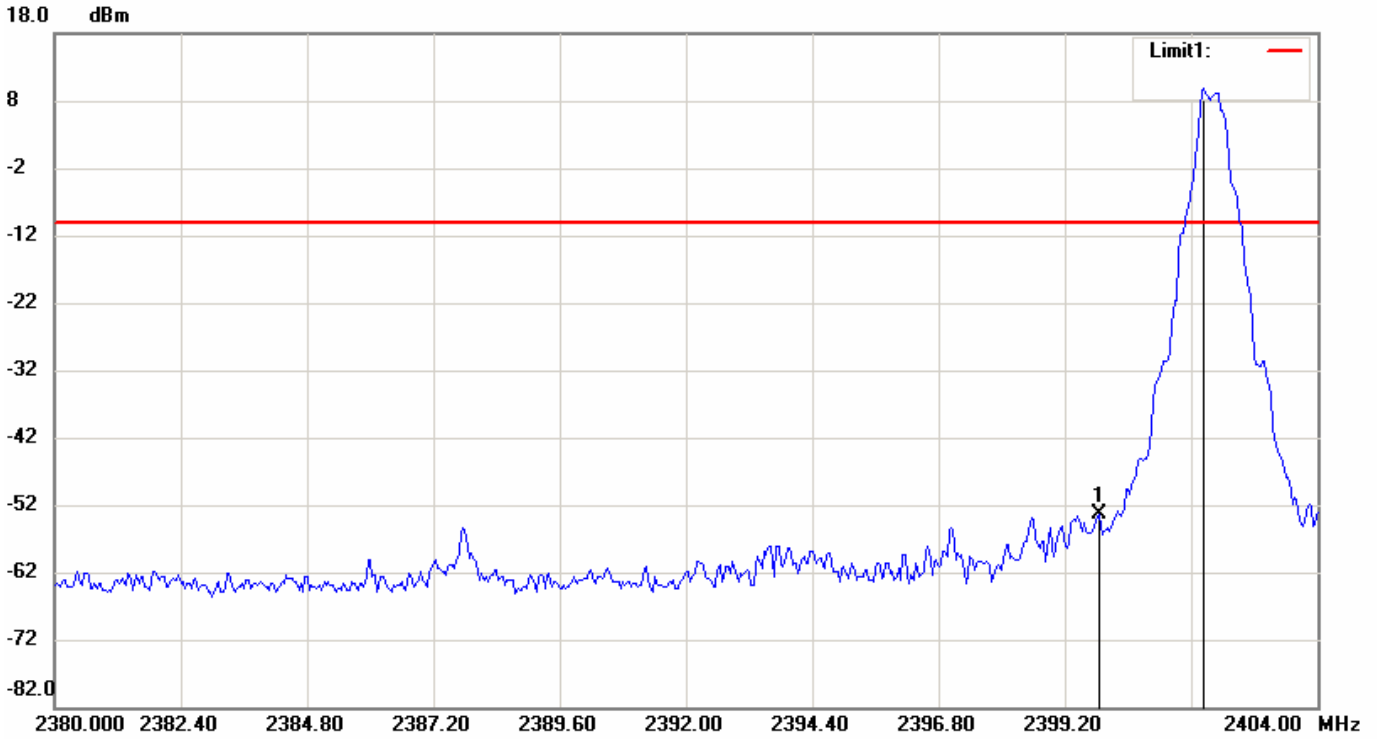
Test Date : Nov. 24, 2011 Temperature : 23℃ Humidity: 54%

Channel	Test Frequency Range	Note	Chart
L	2350 MHz - 2450 MHz	Lower Band Edge	Page 47-48
H	2433.5 MHz - 2533.5 MHz	Upper Band Edge	Page 49-50
L	30 MHz - 25 GHz		Page 51
M	30 MHz - 25 GHz		Page 52
H	30 MHz - 25 GHz		Page 53

Note: Please refer to page 47 to page 53 for chart.

File: **Cisco(BT)** **Data:** **#8** **Date:** **2011/6/29** **Temperature:** **24 ℃**

Time: **AM 11:51:46** **Humidity:** **60 %**



Condition: **-10.19dBm**

EUT: **Sweep Time: 2.32ms** **Att.: 20dB**

Model: **RBW: 100 KHz** **VBW: 300 KHz**

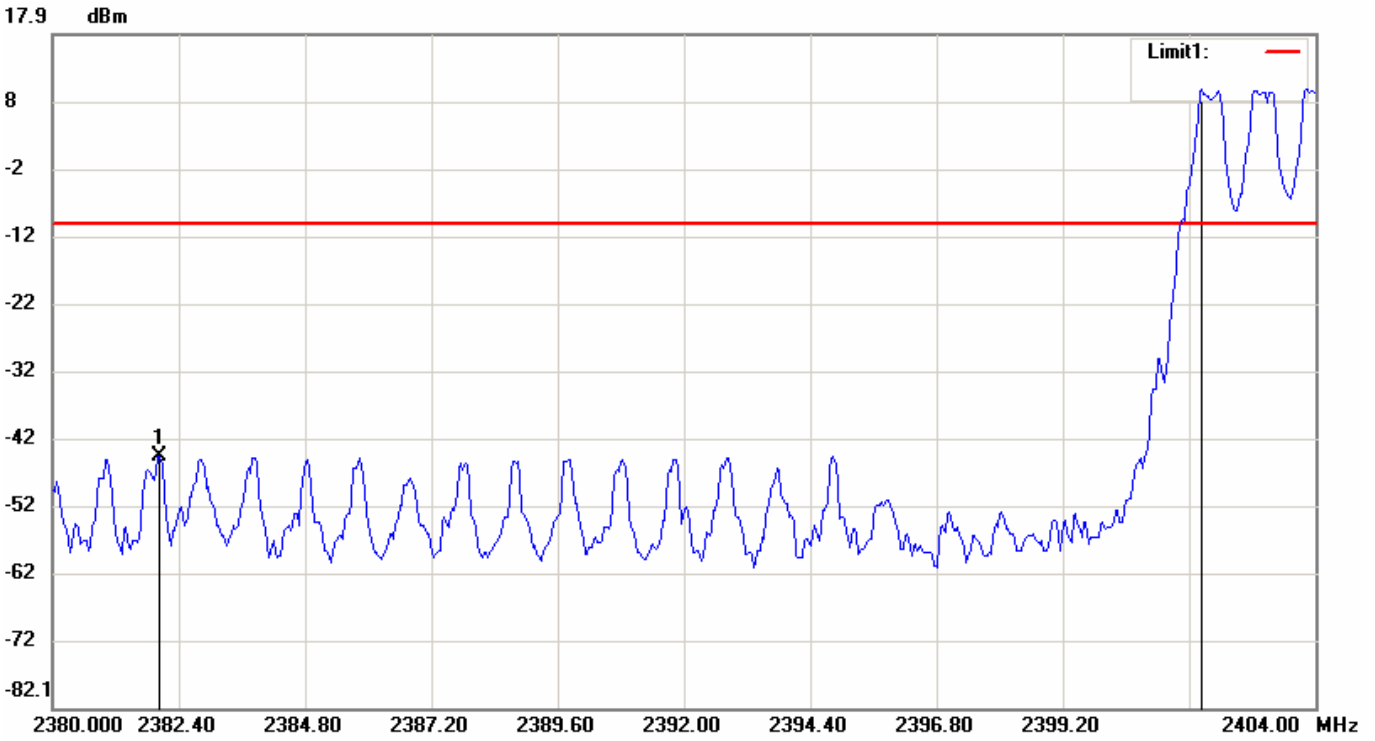
Test Mode:

Note: **FCC-Bluetooth Channel 00-Bandedge (Fixed)**

No.	Frequency(MHz)	Level(dBm)
1	2399.84000	-53.37
2	2401.84000	9.81

File: **Cisco(BT)** **Data:** **#63** **Date:** **2011/11/24** **Temperature:** **23 ℃**

Time: **PM 06:49:07** **Humidity:** **54 %**



Condition: **-10.26dBm** **RF Conducted**

EUT: **Sweep Time: 2.32ms** **Att.: 20dB**

Model: **RBW: 100 KHz** **VBW: 300 KHz**

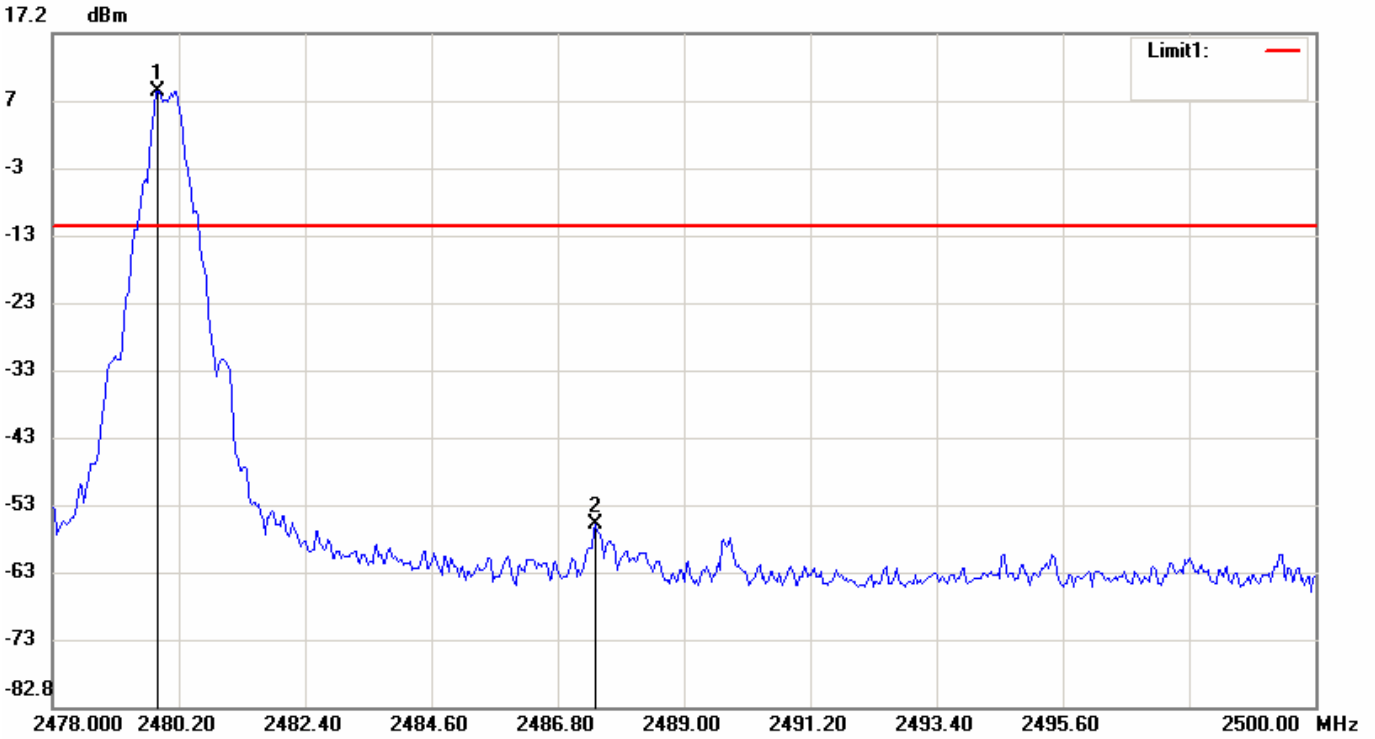
Test Mode:

Note: **FCC-Bluetooth Channel 00-Bandedge (Hopping)**

No.	Frequency(MHz)	Level(dBm)
1	2382.04000	-44.71
2	2401.84000	9.74

File: **Cisco(BT)** **Data:** **#16** **Date:** **2011/6/29** **Temperature:** **24 ℃**

Time: **AM 11:59:35** **Humidity:** **60 %**



Condition: **-11.36dBm**

EUT: **Sweep Time: 2.12ms** **Att.: 20dB**

Model: **RBW: 100 KHz** **VBW: 300 KHz**

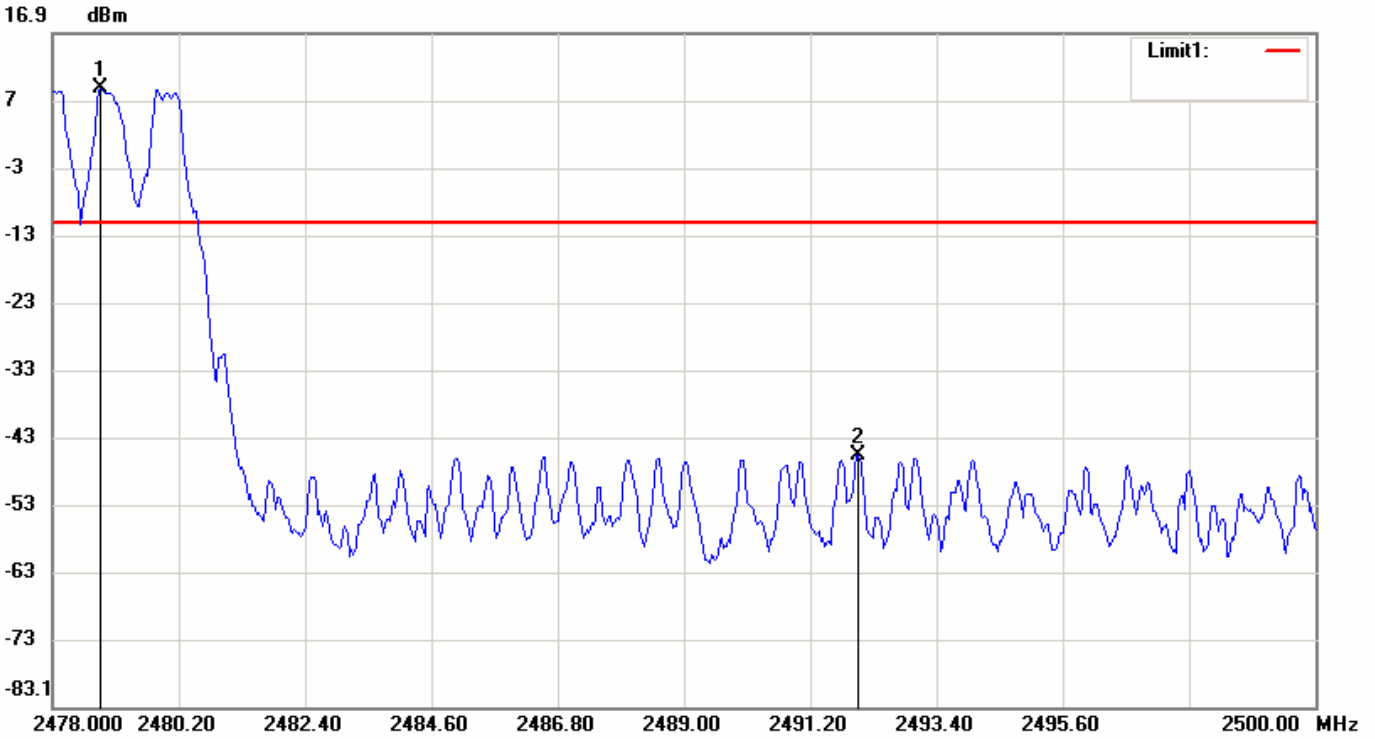
Test Mode:

Note: **FCC-Bluetooth Channel 78-Bandedge (Fixed)**

No.	Frequency(MHz)	Level(dBm)
1	2479.83330	8.64
2	2487.46000	-55.66

File: **Cisco(BT)** **Data:** **#64** **Date:** **2011/11/24** **Temperature:** **23 ℃**

Time: **PM 06:51:02** **Humidity:** **54 %**



Condition: **-11.35dBm** **RF Conducted**

EUT: **Sweep Time: 2.12ms** **Att.: 20dB**

Model: **RBW: 100 KHz** **VBW: 300 KHz**

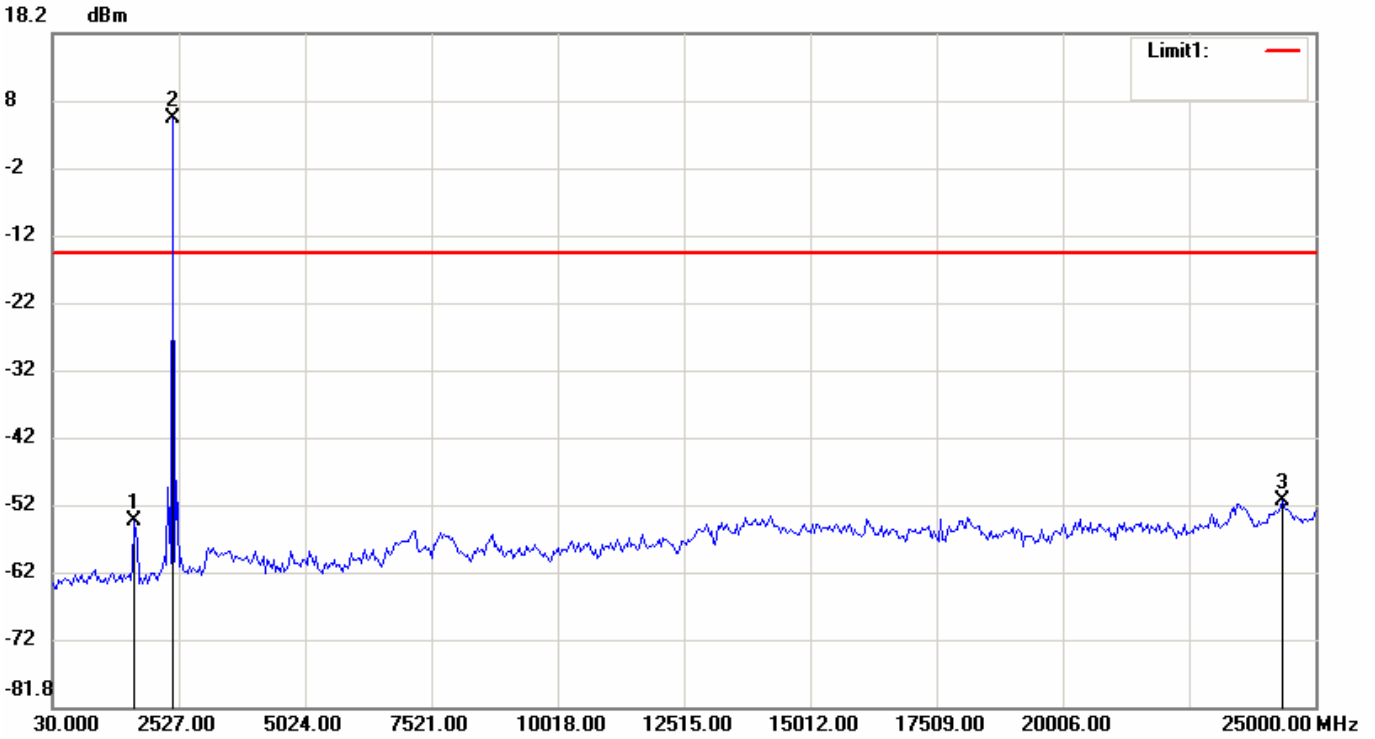
Test Mode:

Note: **FCC-Bluetooth Channel 78-Bandedge (Hopping)**

No.	Frequency(MHz)	Level(dBm)
1	2478.84330	8.65
2	2492.04330	-45.78

File: **Cisco(BT)** **Data:** **#3** **Date:** **2011/6/29** **Temperature:** **24 ℃**

Time: **AM 11:47:00** **Humidity:** **60 %**



Condition: **-14.37dBm**

EUT: **Sweep Time: 2386.4ms** **Att.: 20dB**

Model: **RBW: 100 KHz** **VBW: 300 KHz**

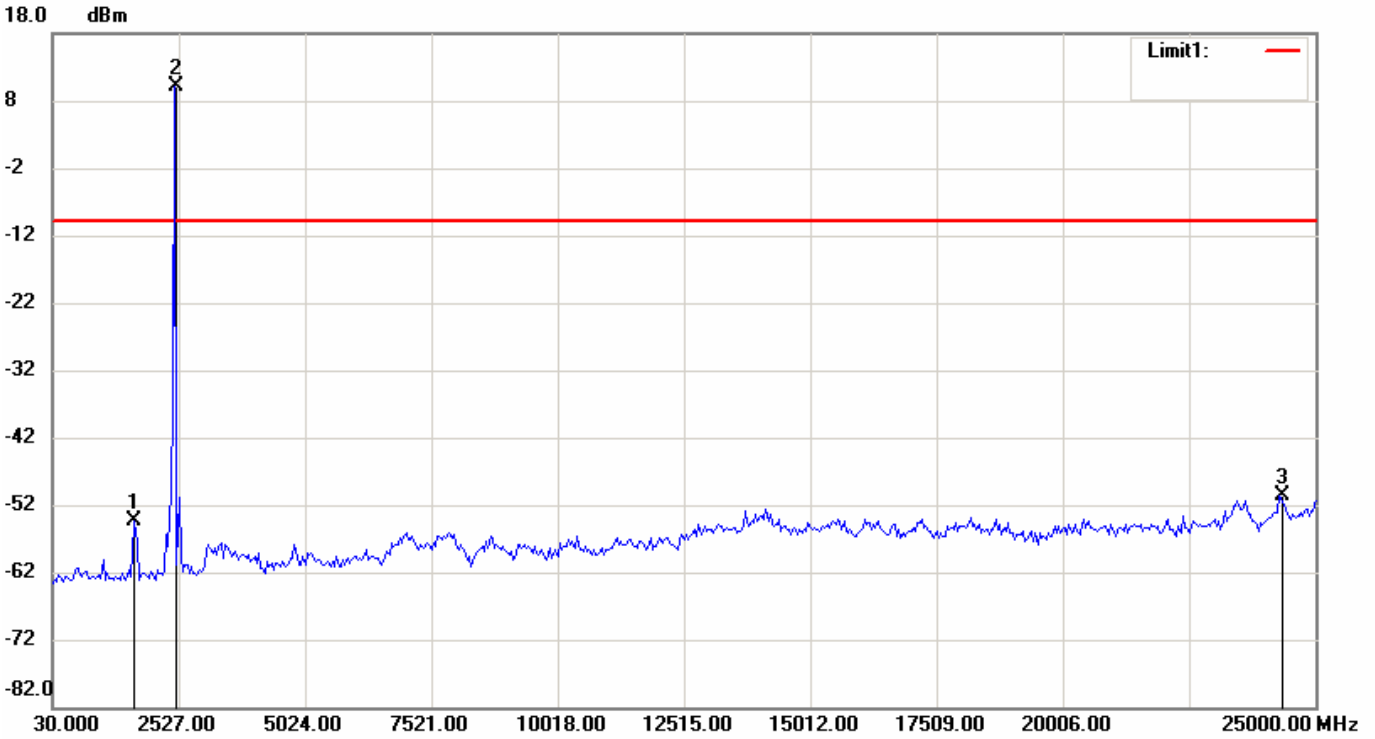
Test Mode:

Note: **FCC-BT Channel 00-Conducted Spurious**

No.	Frequency(MHz)	Level(dBm)
1	1653.05000	-54.04
2	2402.15000	5.63
3	24334.13330	-51.12

File: **Cisco(BT)** **Data:** **#19** **Date:** **2011/6/29** **Temperature:** **24 ℃**

Time: **PM 12:02:19** **Humidity:** **60 %**



Condition: **-9.82dBm**

EUT: **Sweep Time: 2386.4ms** **Att.: 20dB**

Model: **RBW: 100 KHz** **VBW: 300 KHz**

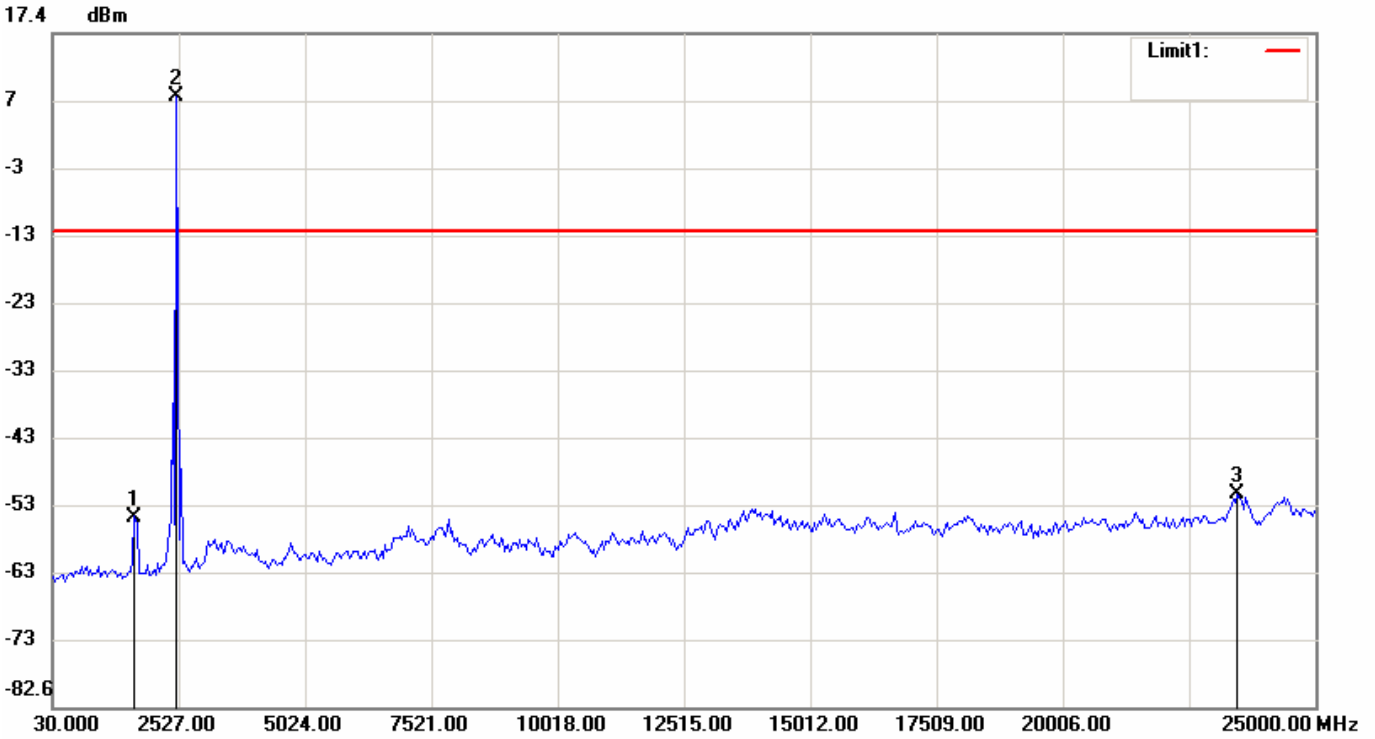
Test Mode:

Note: **FCC-BT Channel 39-Conducted Spurious**

No.	Frequency(MHz)	Level(dBm)
1	1653.05000	-54.48
2	2443.76670	10.18
3	24292.51670	-50.74

File: **Cisco(BT)** **Data:** **#11** **Date:** **2011/6/29** **Temperature:** **24 ℃**

Time: **AM 11:54:48** **Humidity:** **60 %**



Condition: **-12.07dBm**

EUT: **Sweep Time: 2386.4ms** **Att.: 20dB**

Model: **RBW: 100 KHz** **VBW: 300 KHz**

Test Mode:

Note: **FCC-BT Channel 78-Conducted Spurious**

No.	Frequency(MHz)	Level(dBm)
1	1653.05000	-54.35
2	2485.38330	7.93
3	23460.18330	-50.87

9.4.2 Operation Mode: EDR

Test Date : Jun. 29, 2011 Temperature : 24℃ Humidity: 60%

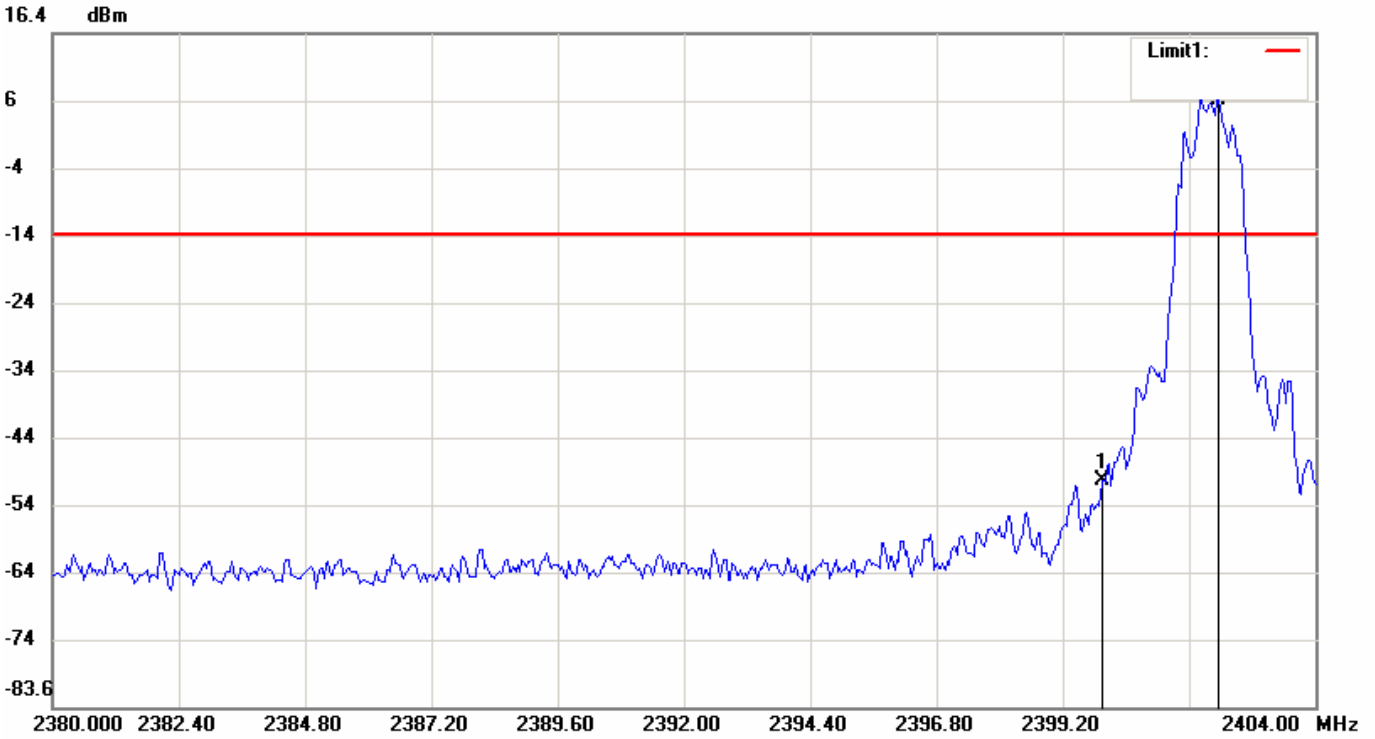
Test Date : Nov. 24, 2011 Temperature : 23℃ Humidity: 54%

Channel	Test Frequency Range	Note	Chart
L	2350 MHz - 2450 MHz	Lower Band Edge	Page 55-56
H	2433.5 MHz - 2533.5 MHz	Upper Band Edge	Page 57-58
L	30 MHz - 25 GHz		Page 59
M	30 MHz - 25 GHz		Page 60
H	30 MHz - 25 GHz		Page 61

Note: Please refer to page 55 to page 61 for chart.

File: **Cisco(BT)** **Data:** **#42** **Date:** **2011/6/29** **Temperature:** **24 ℃**

Time: **PM 12:57:42** **Humidity:** **60 %**



Condition: **-13.45dBm**

EUT: **Sweep Time: 2.32ms** **Att.: 20dB**

Model: **RBW: 100 KHz** **VBW: 300 KHz**

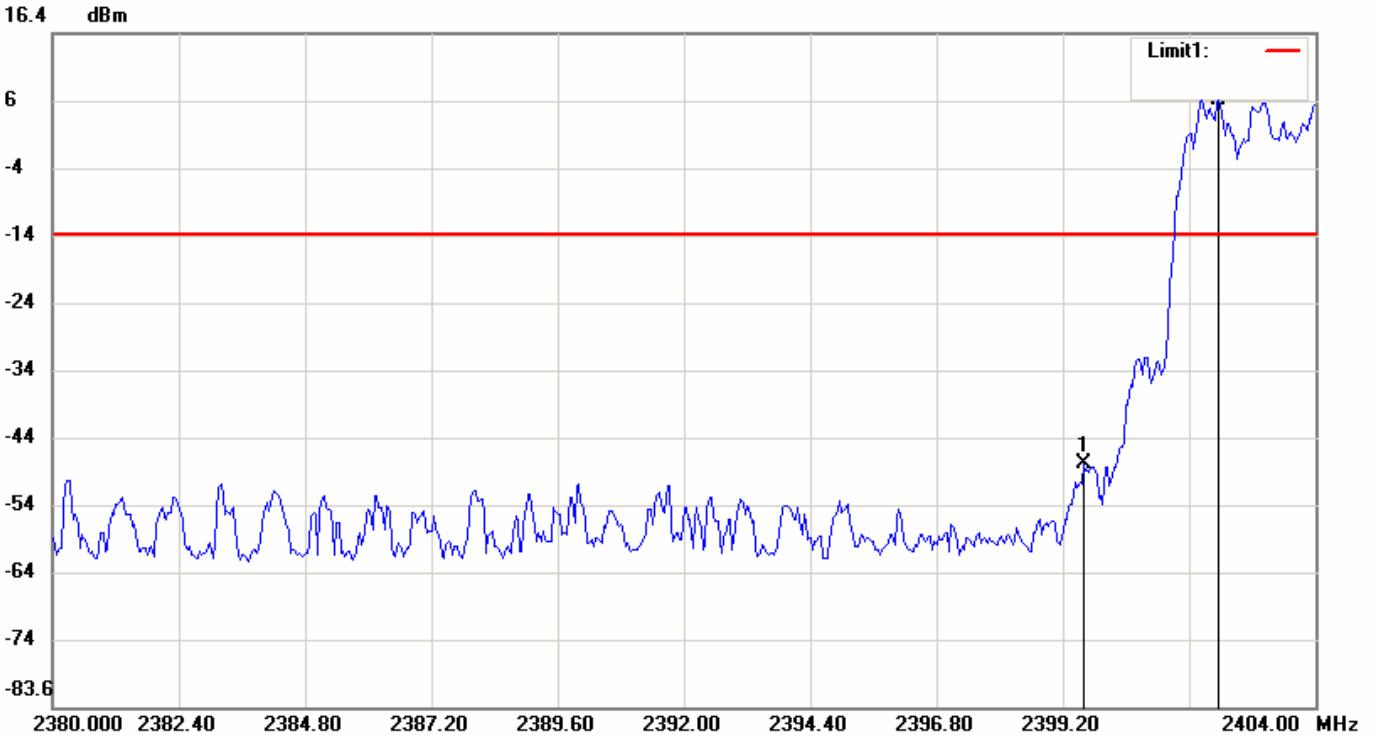
Test Mode:

Note: **FCC-Bluetooth Channel 00-Bandedge (Fixed)**

No.	Frequency(MHz)	Level(dBm)
1	2399.96000	-50.05
2	2402.16000	6.55

File: **Cisco(BT)** **Data:** **#65** **Date:** **2011/11/24** **Temperature:** **23 ℃**

Time: **PM 06:53:06** **Humidity:** **54 %**



Condition: **-13.52dBm** **RF Conducted**

EUT: **Sweep Time: 2.32ms** **Att.: 20dB**

Model: **RBW: 100 KHz** **VBW: 300 KHz**

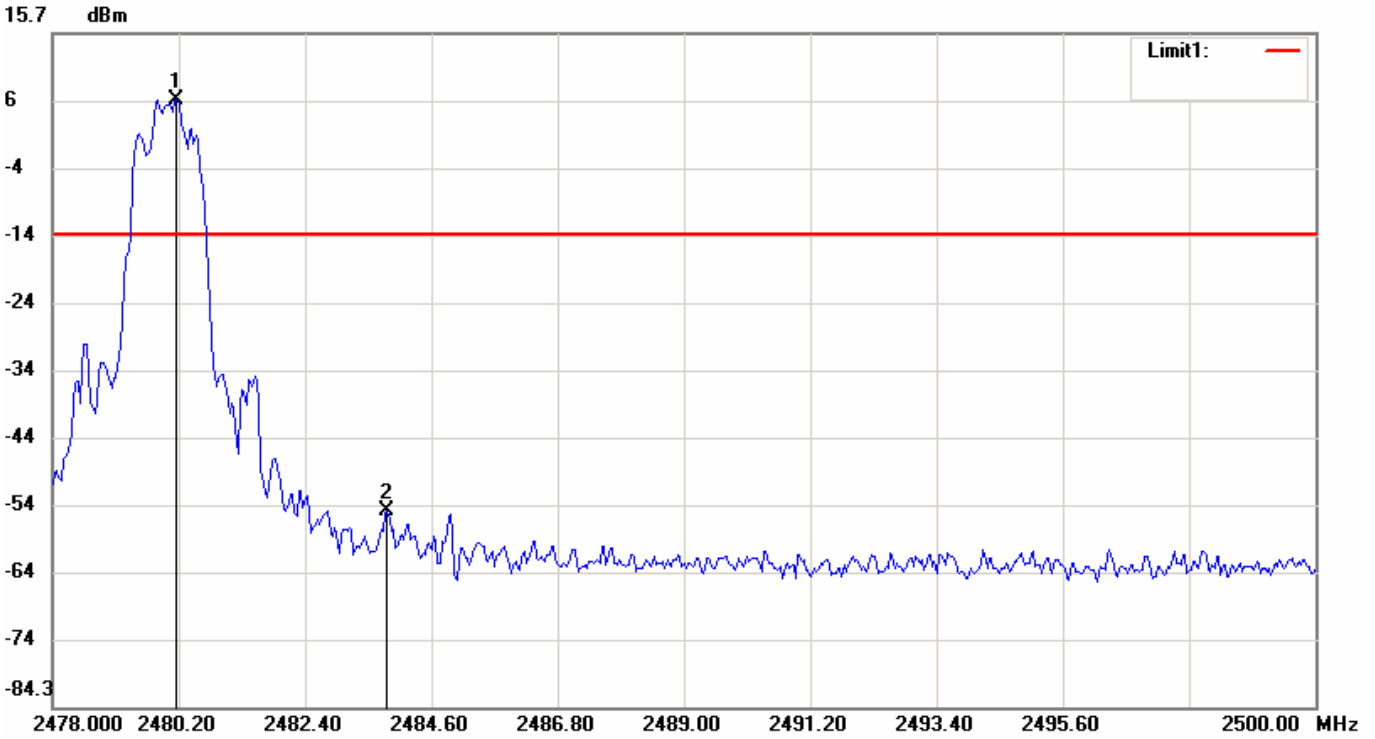
Test Mode:

Note: **FCC-Bluetooth Channel 00-Bandedge (Hopping)**

No.	Frequency(MHz)	Level(dBm)
1	2399.60000	-47.56
2	2402.16000	6.48

File: **Cisco(BT)** **Data:** **#50** **Date:** **2011/6/29** **Temperature:** **24 ℃**

Time: **PM 01:05:13** **Humidity:** **60 %**



Condition: **-14.07dBm**

EUT: **Sweep Time: 2.12ms** **Att.: 20dB**

Model: **RBW: 100 KHz** **VBW: 300 KHz**

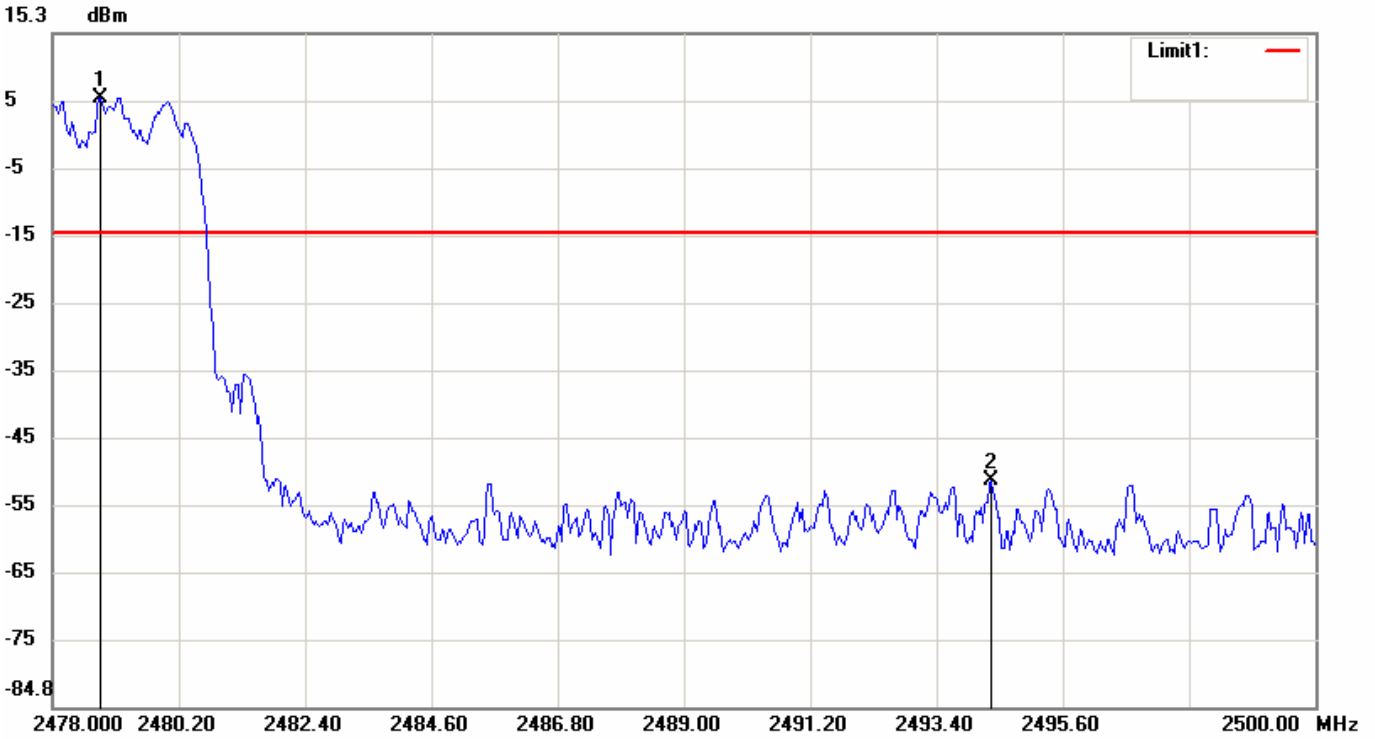
Test Mode:

Note: **FCC-Bluetooth Channel 78-Bandedge (Fixed)**

No.	Frequency(MHz)	Level(dBm)
1	2480.16330	5.93
2	2483.83000	-55.18

File: **Cisco(BT)** **Data:** **#66** **Date:** **2011/11/24** **Temperature:** **23 ℃**

Time: **PM 06:55:01** **Humidity:** **54 %**



Condition: **-14.36dBm** **RF Conducted**

EUT: **Sweep Time: 2.12ms** **Att.: 20dB**

Model: **RBW: 100 KHz** **VBW: 300 KHz**

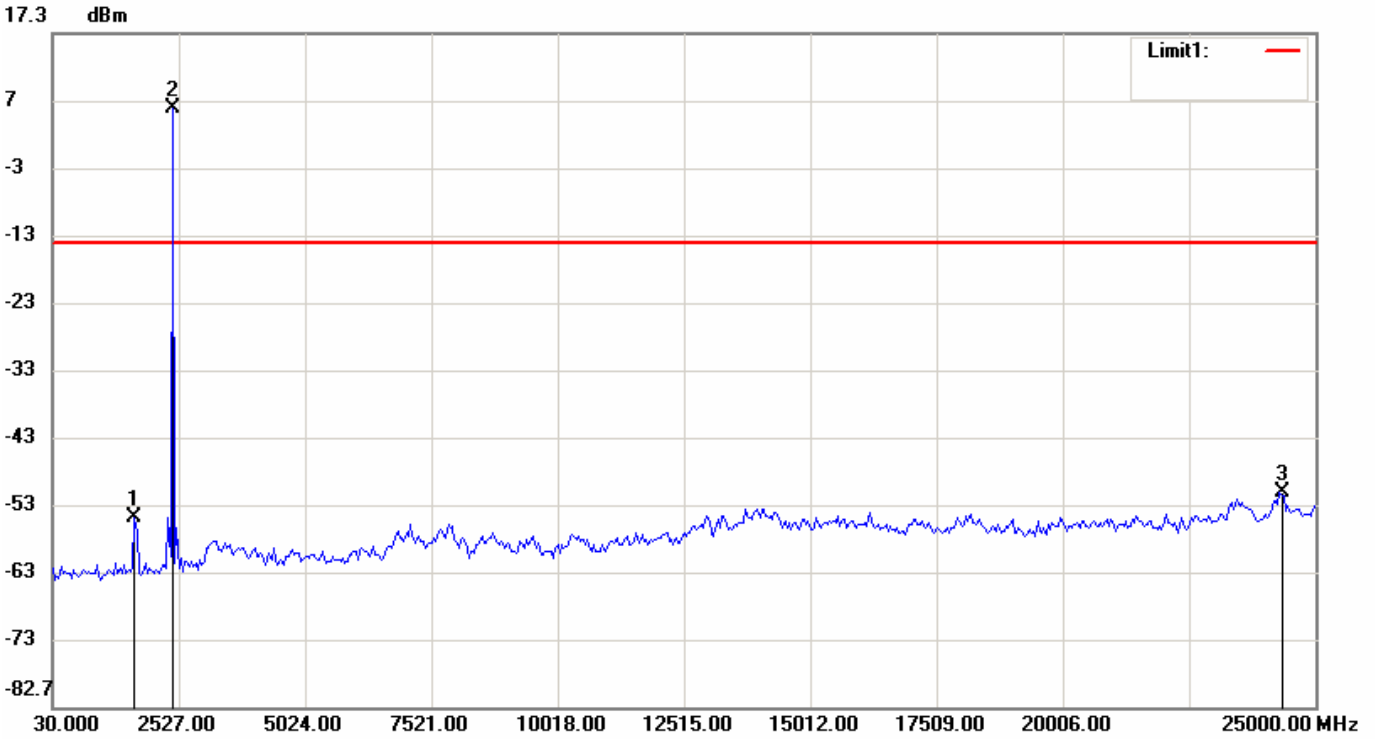
Test Mode:

Note: **FCC-Bluetooth Channel 78-Bandedge (Hopping)**

No.	Frequency(MHz)	Level(dBm)
1	2478.84330	5.64
2	2494.35330	-51.15

File: **Cisco(BT)** **Data:** **#37** **Date:** **2011/6/29** **Temperature:** **24 ℃**

Time: **PM 12:52:56** **Humidity:** **60 %**



Condition: **-13.88dBm**

EUT: **Sweep Time: 2386.4ms** **Att.: 20dB**

Model: **RBW: 100 KHz** **VBW: 300 KHz**

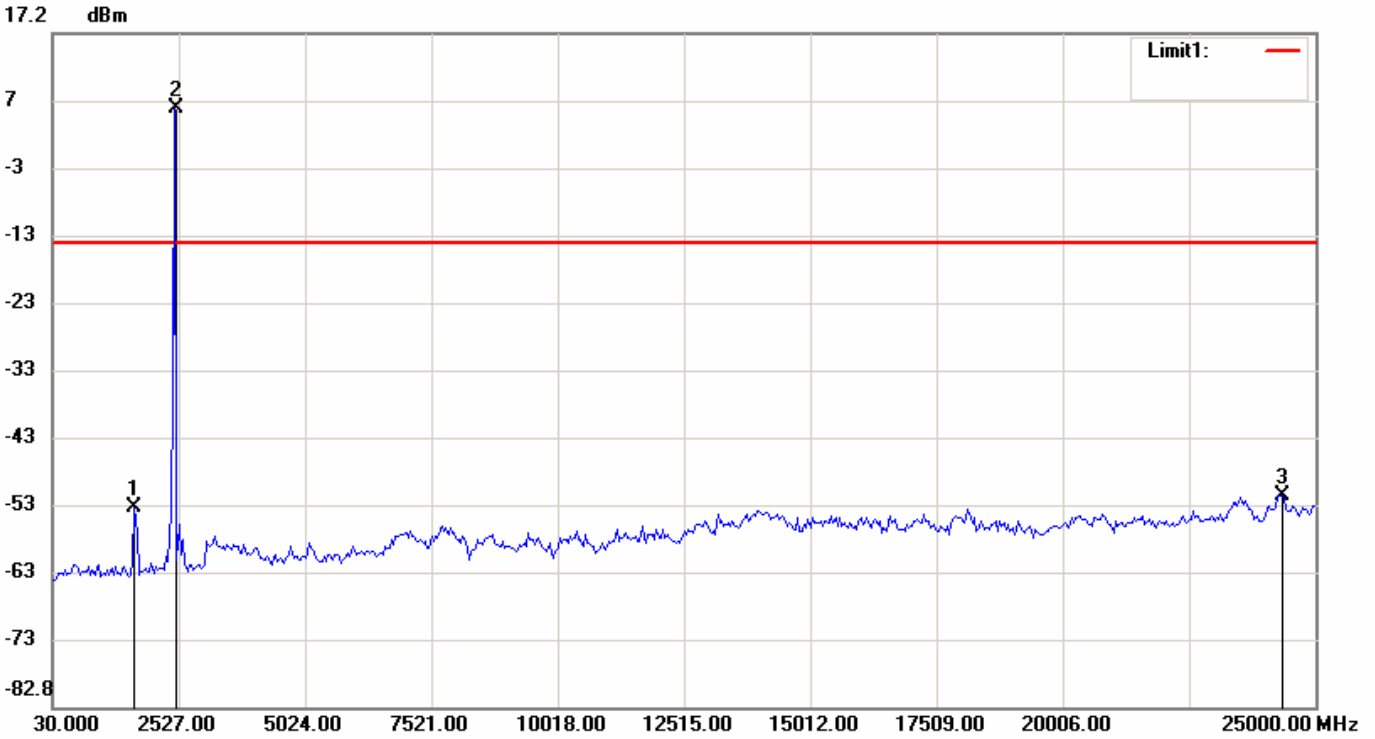
Test Mode:

Note: **FCC-BT Channel 00-Conducted Spurious**

No.	Frequency(MHz)	Level(dBm)
1	1653.05000	-54.50
2	2402.15000	6.12
3	24292.51670	-50.79

File: **Cisco(BT)** **Data:** **#53** **Date:** **2011/6/29** **Temperature:** **24 ℃**

Time: **PM 01:08:38** **Humidity:** **60 %**



Condition: **-13.91dBm**

EUT: **Sweep Time: 2386.4ms** **Att.: 20dB**

Model: **RBW: 100 KHz** **VBW: 300 KHz**

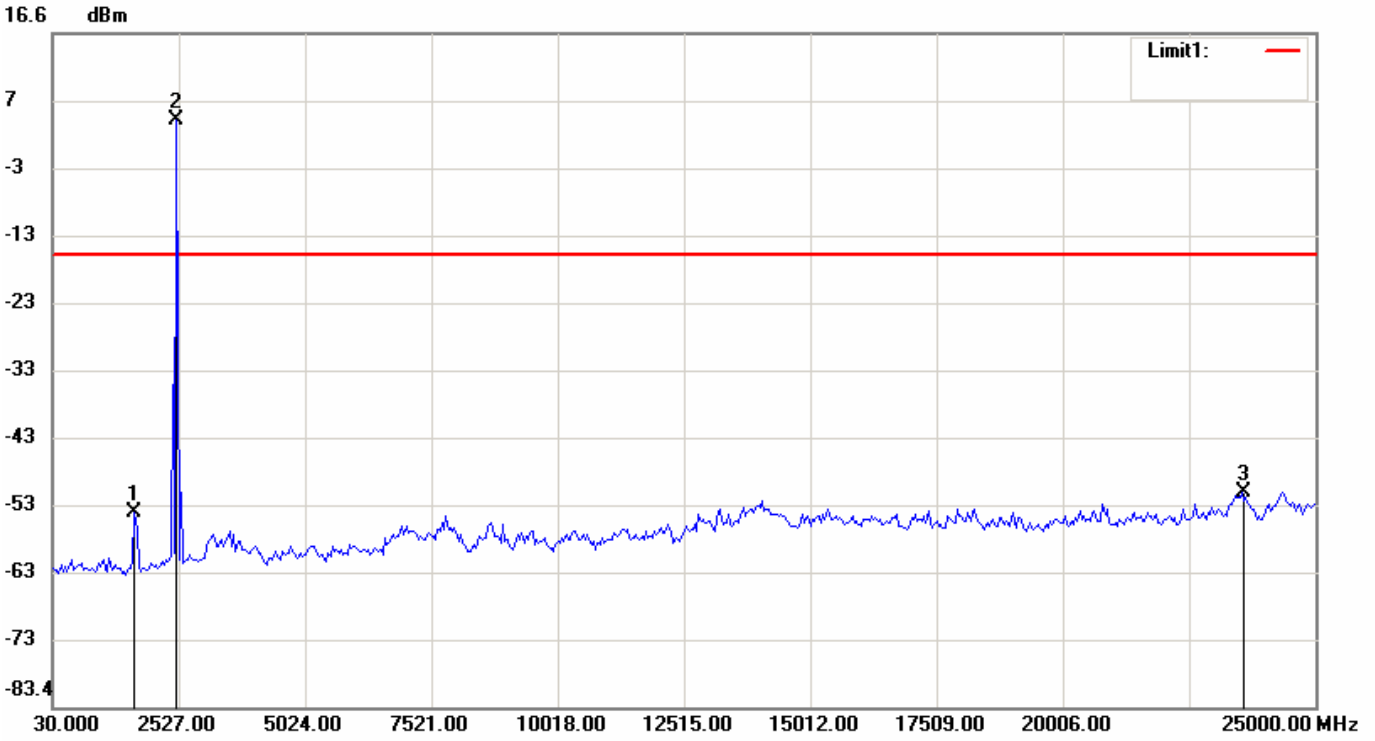
Test Mode:

Note: **FCC-BT Channel 39-Conducted Spurious**

No.	Frequency(MHz)	Level(dBm)
1	1653.05000	-53.25
2	2443.76670	6.09
3	24292.51670	-51.33

File: **Cisco(BT)** **Data:** **#45** **Date:** **2011/6/29** **Temperature:** **24 ℃**

Time: **PM 01:00:27** **Humidity:** **60 %**



Condition: **-16.17dBm**

EUT: **Sweep Time: 2386.4ms** **Att.: 20dB**

Model: **RBW: 100 KHz** **VBW: 300 KHz**

Test Mode:

Note: **FCC-BT Channel 78-Conducted Spurious**

No.	Frequency(MHz)	Level(dBm)
1	1653.05000	-54.36
2	2485.38330	3.83
3	23543.41670	-51.49

10 NUMBER of HOPPING CHANNELS

10.1 Standard Applicable

According to 15.247(b)(1), for frequency hopping systems, operating in the 2400-2483.5MHz band employing at least 75 hopping channels

10.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. The setup of the EUT as shown in figure 4. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set EUT to hopping operating mode and set spectrum analyzer miximum to measure the number of hopping channels.

10.3 Measurement EquiPMent

EquiPMent	Manufacturer	Model No.	Next Cal. Due
Spectrum Analyzer	Agilent	E4446A	09/18/2012

10.4 Measurement Data

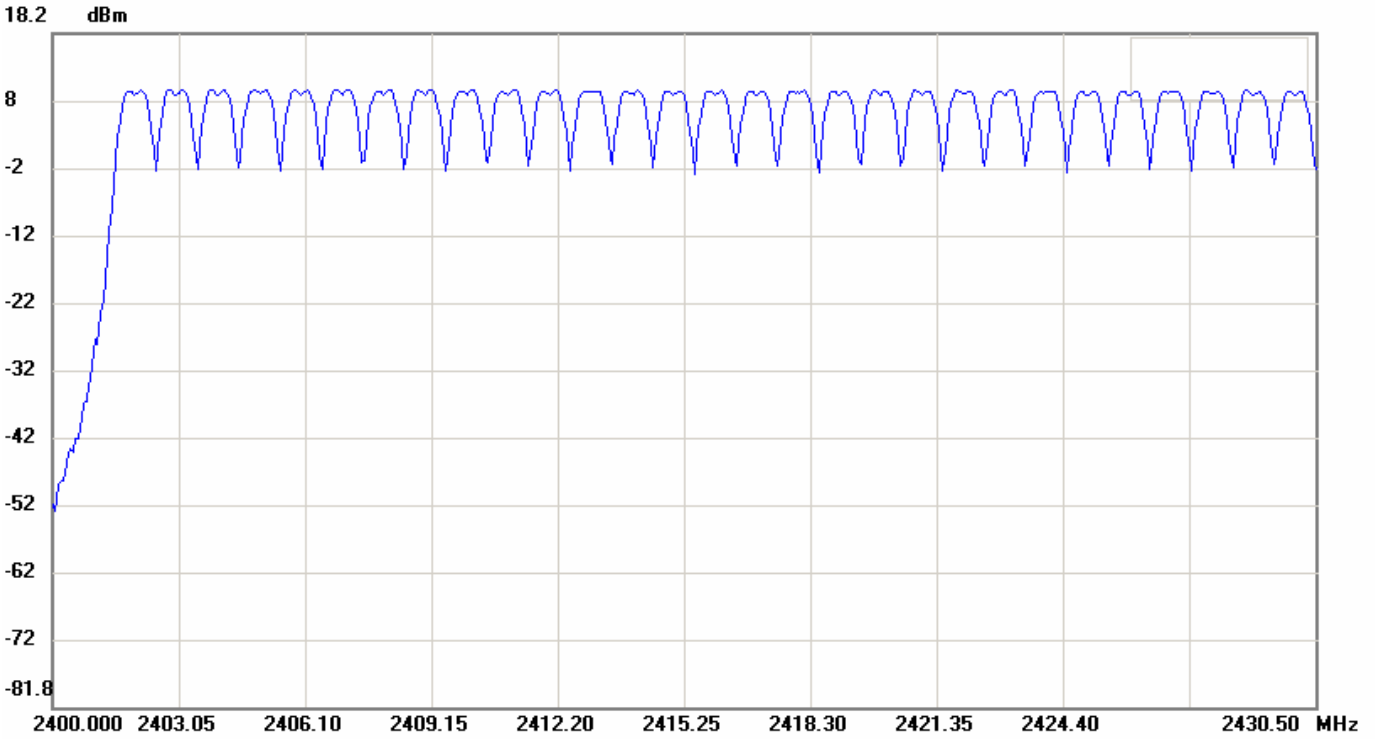
Test Date : Jun. 29, 2011 Temperature : 24℃ Humidity: 60%

Number of hopping channels = 79 channels

Note: Please refer to page 63 to page 65 for chart.

File: **Cisco(BT)** **Data:** **#32** **Date:** **2011/6/29** **Temperature:** **24 ℃**

Time: **PM 12:42:42** **Humidity:** **60 %**



Condition:

EUT: **Sweep Time: 1ms** **Att.: 20dB**

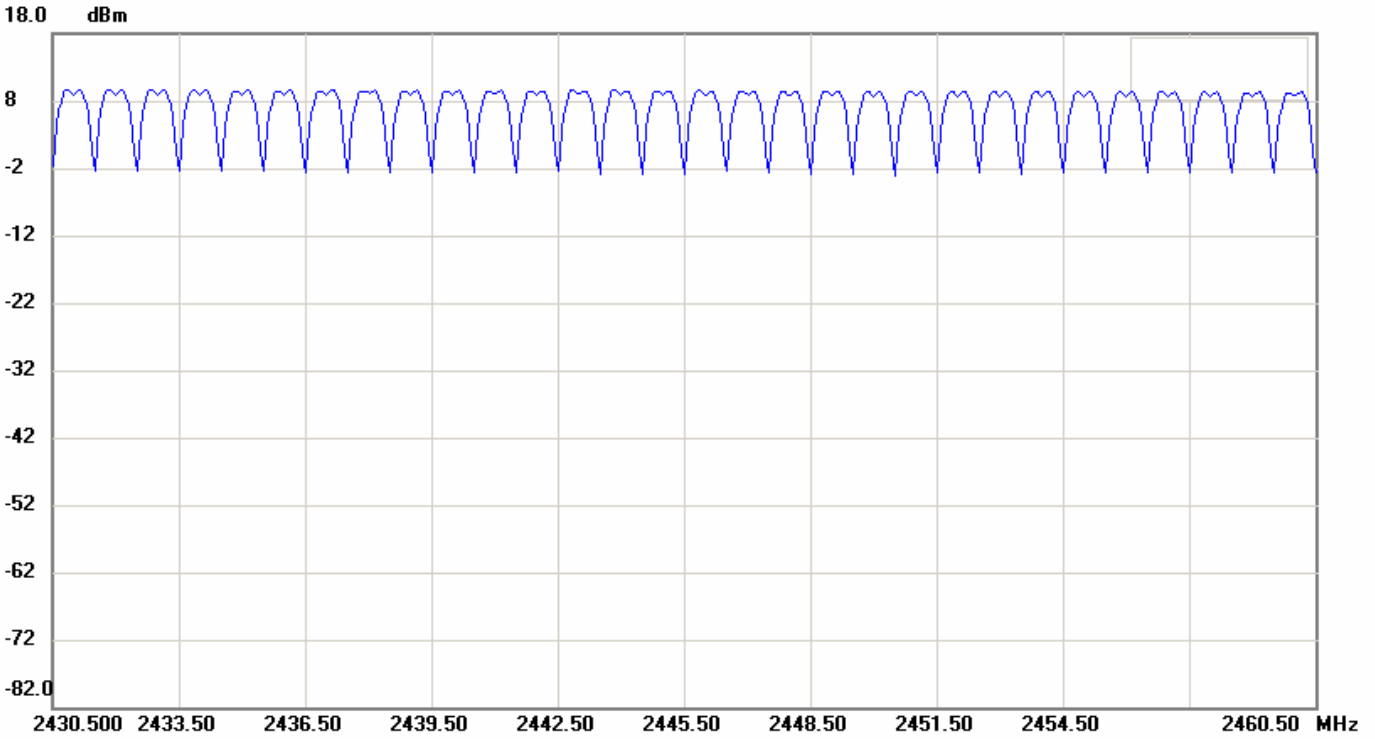
Model: **RBW: 300 KHz** **VBW: 300 KHz**

Test Mode:

Note: **FCC-Bluetooth Number of Hopping Channels -Part1**

File: Cisco(BT) **Data: #33** **Date: 2011/6/29** **Temperature: 24 ℃**

Time: PM 12:44:28 **Humidity: 60 %**



Condition:

EUT: **Sweep Time: 1ms** **Att.: 20dB**

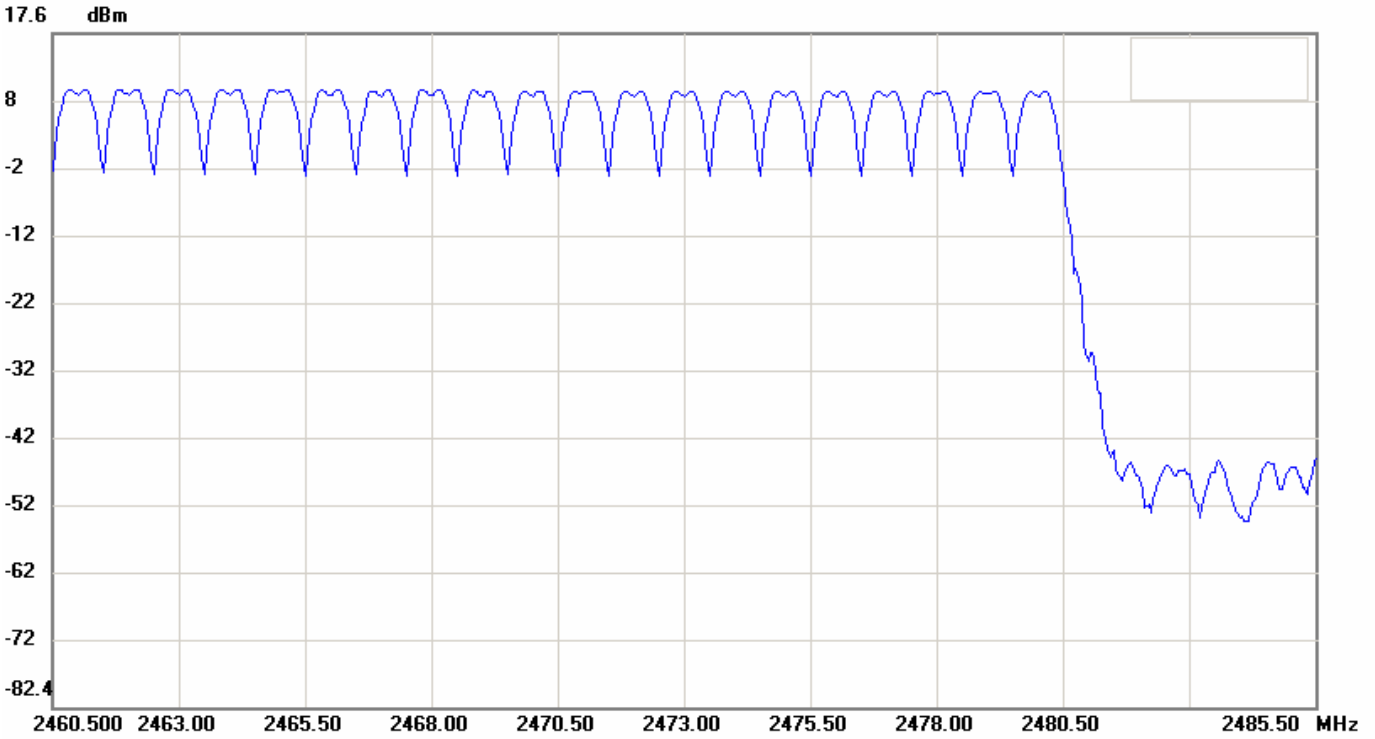
Model: **RBW: 300 KHz** **VBW: 300 KHz**

Test Mode:

Note: **FCC-Bluetooth Number of Hopping Channels -Part2**

File: **Cisco(BT)** **Data:** **#34** **Date:** **2011/6/29** **Temperature:** **24 ℃**

Time: **PM 12:46:15** **Humidity:** **60 %**



Condition:

EUT: **Sweep Time: 1ms** **Att.: 20dB**

Model: **RBW: 300 KHz** **VBW: 300 KHz**

Test Mode:

Note: **FCC-Bluetooth Number of Hopping Channels -Part3**

11 HOPPING CHANNEL CARRIER FREQUENCY SEPARATED

11.1 Standard Applicable

According to 15.247(a)(1), the frequency hopping system shall have hopping channel carrier frequencies seperated by minimum of 25kHz or the two-thirds of 20dB bandwidth of hopping channel, whichever is greater.

Alternatively, frequency hopping systems operating in the 2400 – 2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125mW.

11.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. The setup of the EUT as shown in figure 4. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any measurement frequency within its operating ragne and make sure the instrument is operated in its linear range.
3. Set spectrum analyzer maximum hold to measure channel carrier frequency , then adjust channel carrier frequency to adjacent channel.
4. Repeat above procedure until all measured frequencies were complete.

11.3 Measurement EquiPMent

EquiPMent	Manufacturer	Model No.	Next Cal. Due
Spectrum Analyzer	Agilent	E4446A	09/18/2012

11.4 Measurement Data

Test Date : Jun. 29, 2011 Temperature : 24℃ Humidity: 60%

Channel	Frequency (MHz)	Hopping Channel Carrier Frequency Separated (MHz)	Chart
39	2441	0.99	Page 68

Note: 1. Please refer to page 68 for chart.

2. CH Low, CH Mid and CH High have the same test result. Only Mid test result showed in the test report.

File: **Cisco(BT)** **Data:** **#58** **Date:** **2011/9/14** **Temperature:** **28 ℃**

Time: **PM 05:56:42** **Humidity:** **55 %**

Condition: **RF Conducted**

EUT: **Sweep Time: 3.2ms** **Att.: 10dB**

Model: **RBW: 30 KHz** **VBW: 100 KHz**

Test Mode:

Note: **FCC-Bluetooth Carrier Frequency Separation**

No.	Frequency(MHz)	Level(dBm)
1	2440.97000	-24.22
2	2441.96000	-25.09

No.		△Frequency(MHz)	△Level(dB)
1	mk2-mk1	0.99	-0.87

12 Dwell Time

12.1 Standard Applicable

According to 15.247(a)(1)(iii), frequency hopping system in the 2400-2483.5MHz band employing at least 15 non-overlapping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 second multiplied by the number of hopping channels employed.

12.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. The setup of the EUT as shown in figure 4.

12.3 Measurement EquiPMent

EquiPMent	Manufacturer	Model No.	Next Cal. Due
Spectrum Analyzer	Agilent	E4446A	09/18/2012

12.4 Measurement Data

Test Date : Jun. 29, 2011 Temperature : 24℃ Humidity: 60%

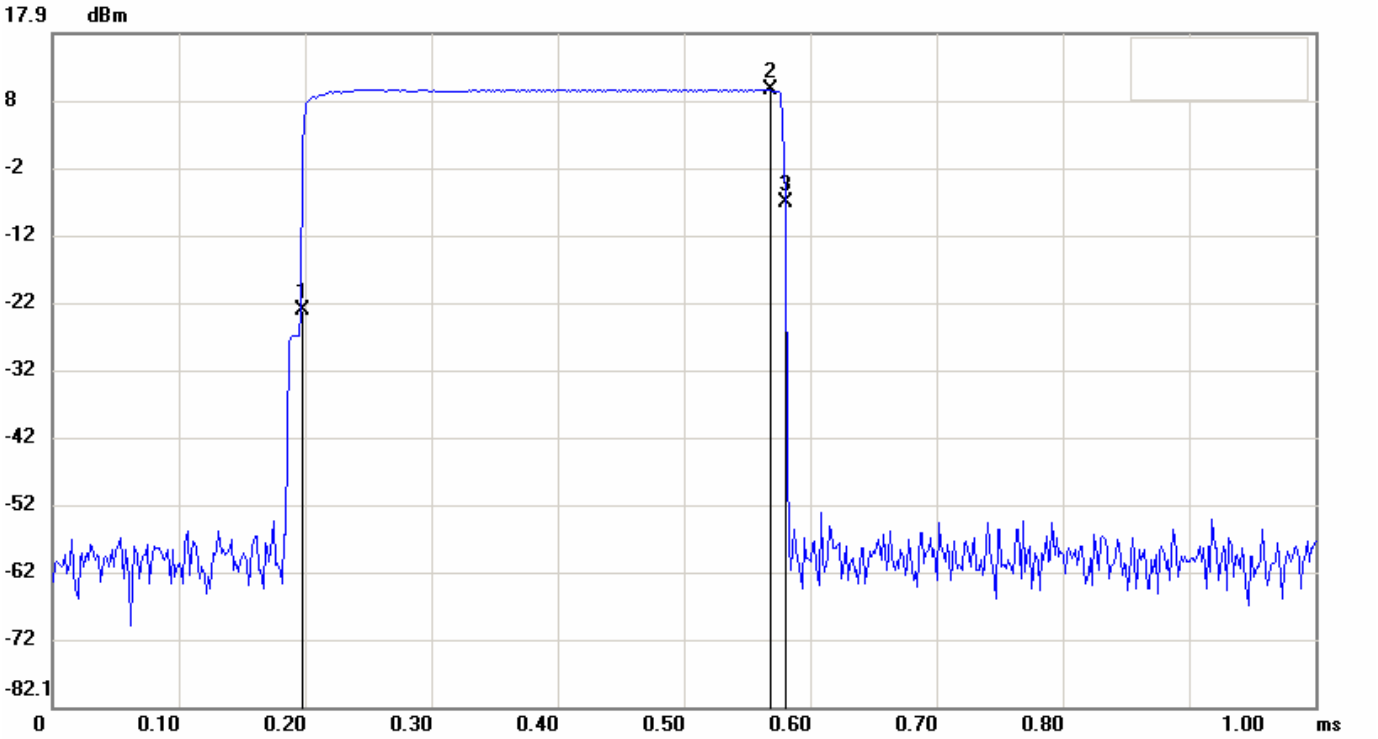
12.4.1 DH1

Test period=0.4(second/channel)× 79 channel=31.6sec
2402MHz dwell time= 383.3 us× 320 = 122.656 ms

Note: Please refer to page 70 to page 71 for chart.

File: **Cisco(BT)** **Data:** **#25** **Date:** **2011/6/29** **Temperature:** **24 ℃**

Time: **PM 12:37:58** **Humidity:** **60 %**



Condition: **-0.41dBm**

EUT: **Sweep Time: 1ms** **Att.: 20dB**

Model: **RBW: 1000 KHz** **VBW: 1000 KHz**

Test Mode:

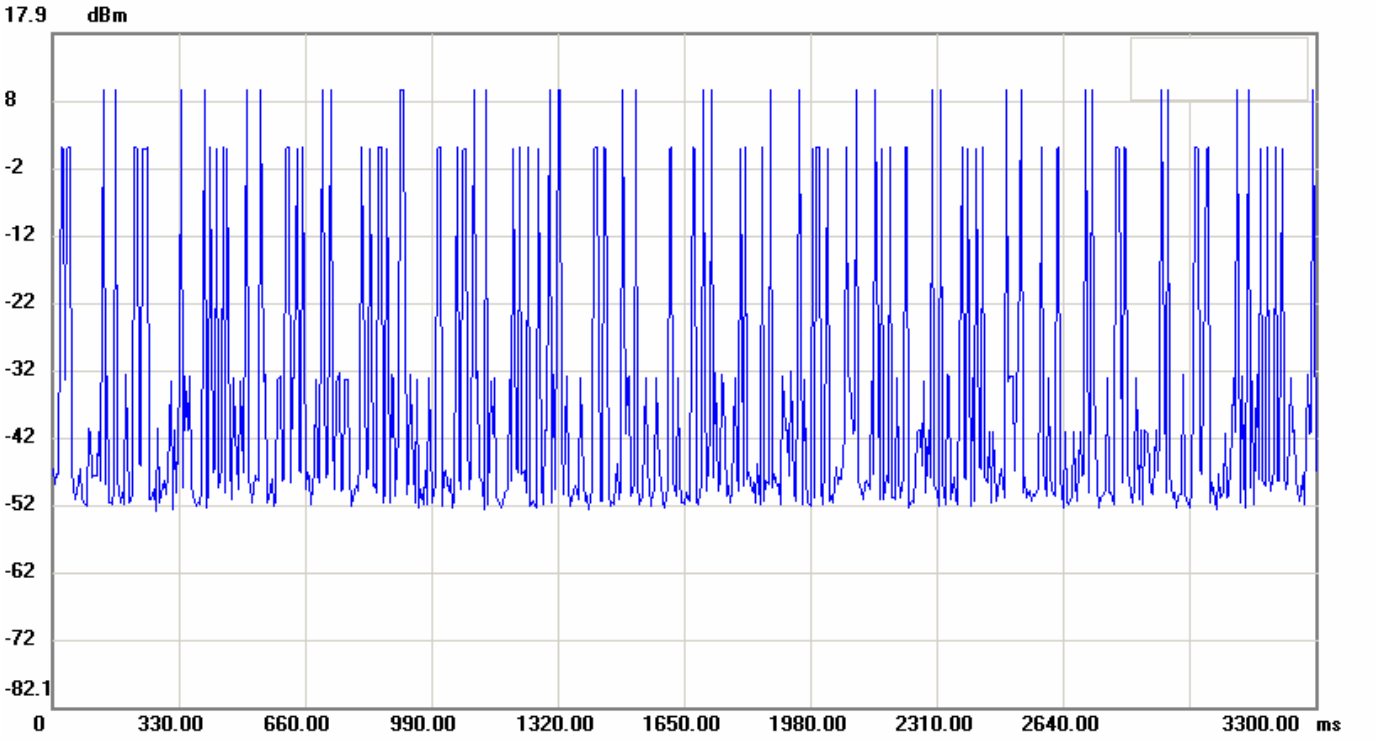
Note: **DH1 pulse width**

No.	Sweep time(ms)	Level(dBm)
1	0.1967	-23.30
2	0.5683	9.59
3	0.5800	-7.24

No.		△Time(ms)	△Level(dB)
1	mk3-mk1	0.3833	16.06

File: **Cisco(BT)** **Data:** **#24** **Date:** **2011/6/29** **Temperature:** **24 ℃**

Time: **PM 12:37:45** **Humidity:** **60 %**



Condition:

EUT: **Sweep Time: 3300ms** **Att.: 20dB**

Model: **RBW: 1000 KHz** **VBW: 1000 KHz**

Test Mode:

Note: **DH1 Hops per 3.16 seconds**

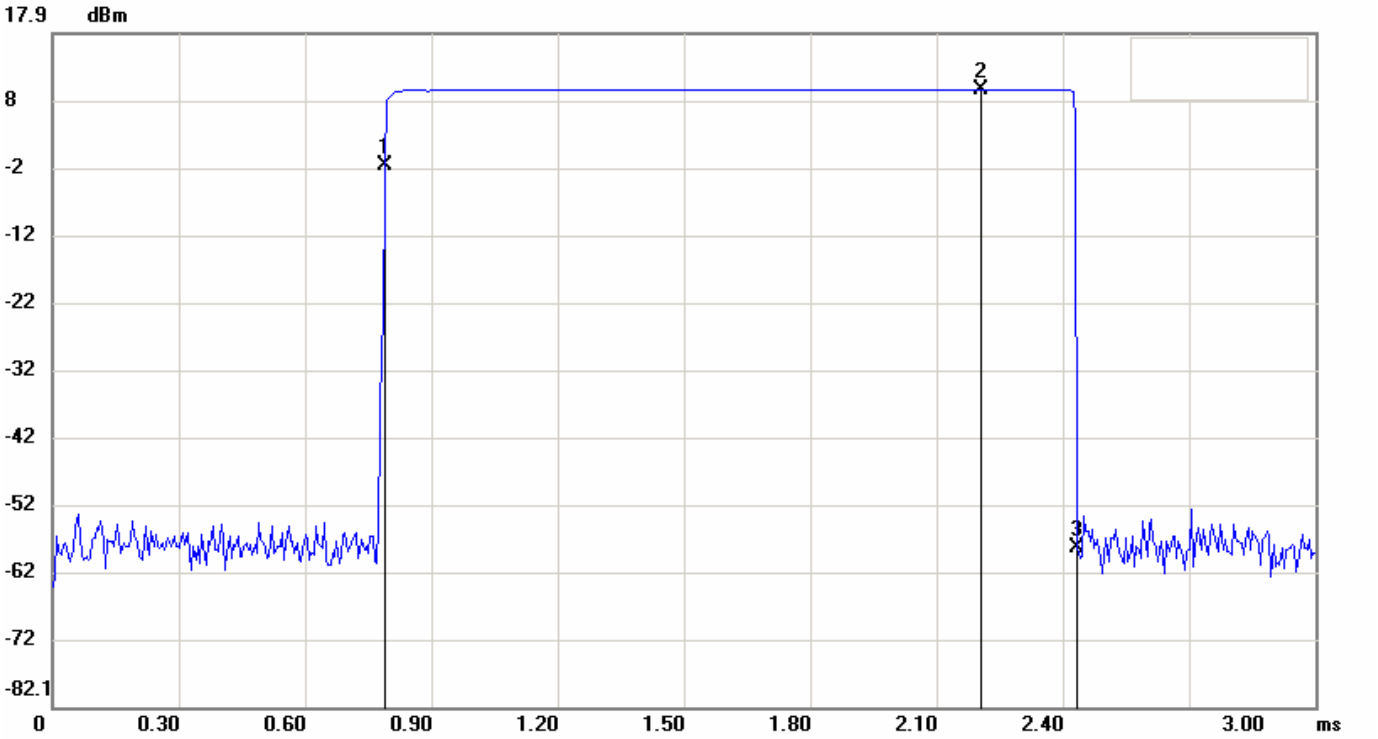
12.4.2 DH3

Test period=0.4(second/channel)$\times$79 channel=31.6sec
2441MHz dwell time= 1.645 ms$\times$80 = 131.6 ms

Note: Please refer to page 73 to page 74 for chart.

File: **Cisco(BT)** **Data:** **#27** **Date:** **2011/6/29** **Temperature:** **24 ℃**

Time: **PM 12:38:36** **Humidity:** **60 %**



Condition: **-0.390000000000001dBm**

EUT: **Sweep Time: 3ms** **Att.: 20dB**

Model: **RBW: 1000 KHz** **VBW: 1000 KHz**

Test Mode:

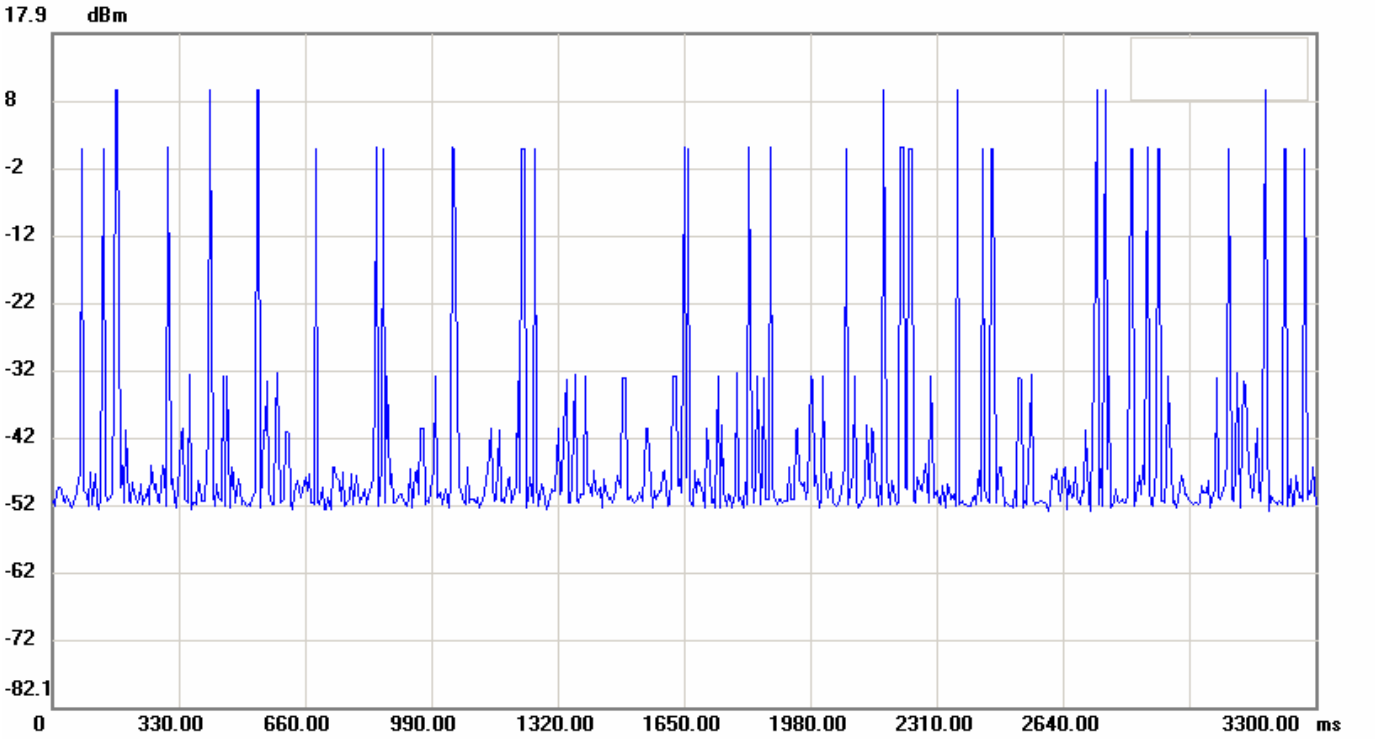
Note: **DH3 pusle width**

No.	Sweep time(ms)	Level(dBm)
1	0.7900	-1.65
2	2.2050	9.61
3	2.4350	-58.51

No.		△Time(ms)	△Level(dB)
1	mk3-mk1	1.645	-56.86

File: **Cisco(BT)** **Data:** **#26** **Date:** **2011/6/29** **Temperature:** **24 ℃**

Time: **PM 12:38:24** **Humidity:** **60 %**



Condition:

EUT: **Sweep Time: 3300ms** **Att.: 20dB**

Model: **RBW: 1000 KHz** **VBW: 1000 KHz**

Test Mode:

Note: **DH3 Hops per 3.16 seconds**

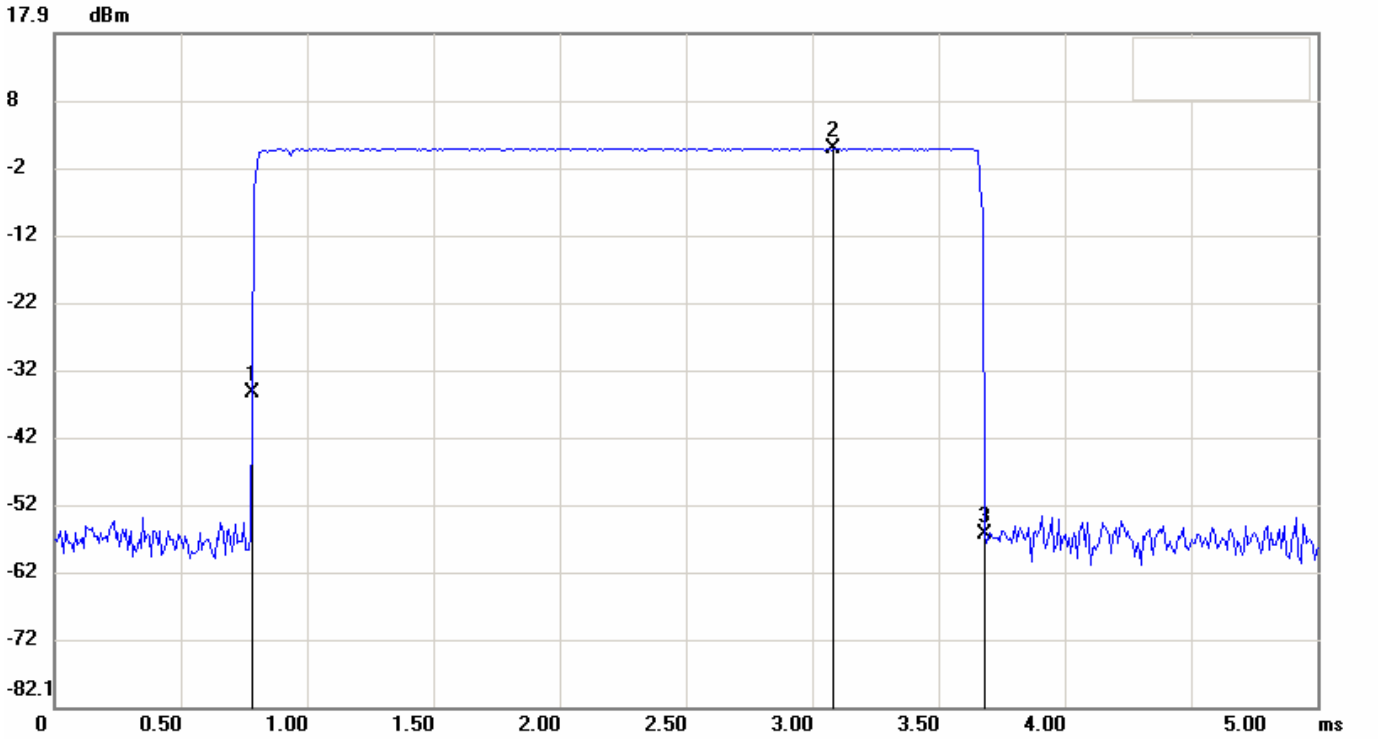
12.4.3 DH5

Test period=0.4(second/channel)$\times$79 channel=31.6sec
2480MHz dwell time= 2.9 ms$\times$80 = 232 ms

Note: Please refer to page 76 to page 77 for chart.

File: **Cisco(BT)** **Data:** **#30** **Date:** **2011/6/29** **Temperature:** **24 ℃**

Time: **PM 12:39:57** **Humidity:** **60 %**



Condition: **-9.21dBm**

EUT: **Sweep Time: 5ms** **Att.: 20dB**

Model: **RBW: 1000 KHz** **VBW: 1000 KHz**

Test Mode:

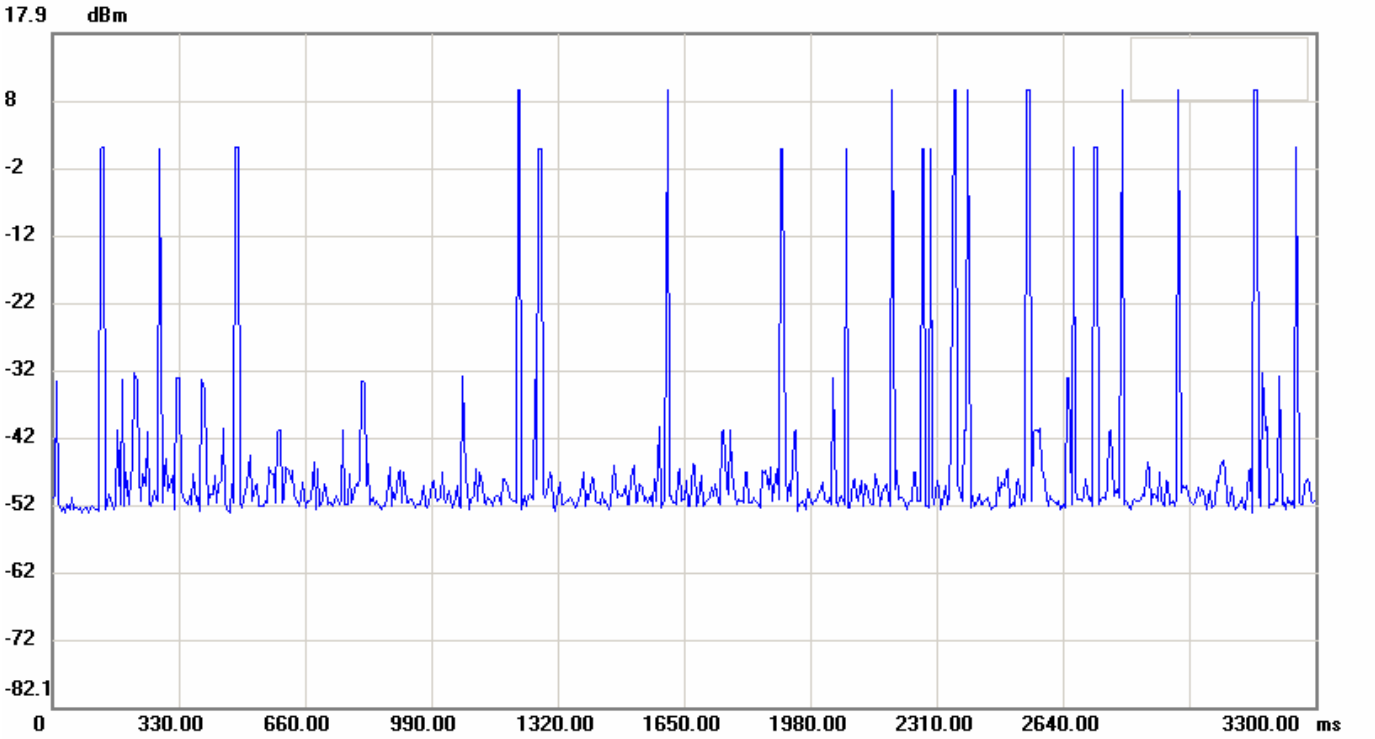
Note: **DH5 pulse width**

No.	Sweep time(ms)	Level(dBm)
1	0.7833	-35.57
2	3.0833	0.79
3	3.6833	-56.41

No.		△Time(ms)	△Level(dB)
1	mk3-mk1	2.9	-20.84

File: **Cisco(BT)** **Data:** **#29** **Date:** **2011/6/29** **Temperature:** **24 ℃**

Time: **PM 12:39:43** **Humidity:** **60 %**



Condition:

EUT: **Sweep Time: 3300ms** **Att.: 20dB**

Model: **RBW: 1000 KHz** **VBW: 1000 KHz**

Test Mode:

Note: **DH5 Hops per 3.16 seconds**