



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

**Report No.: 16-03-MAS-057-01**




Client: Qisda Corporation  
 Product: MOD-SM QIS BT/WLAN CWM-02B-BT2-SP D5  
 Model: GW52  
 FCC ID: BABGW52

Manufacturer/supplier: Qisda Optronics(SuZhou) Co., Ltd

Date test item received: 2016/03/11  
 Date test campaign completed: 2016/04/26  
 Date of issue: 2016/04/26

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*Total number of pages of this test report: 105 pages  
 Total number of pages of photos: External photos 2 pages  
 Internal photos 2 pages  
 Setup photos 4 pages*

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Address : 169 Zhujiang Road , New District , Suzhou , China  
EUT : MOD-SM QIS BT/WLAN CWM-02B-BT2-SP D5  
Trade name : Harman  
Model No. : GW52  
Power Source : 3.7Vdc  
Regulations applied : FCC 47 CFR, Part 15 Subpart C

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## 1 GENERAL INFORMATION

### 1.1 Product Description

- a) Type of EUT : MOD-SM QIS BT/WLAN CWM-02B-BT2-SP D5  
 b) Trade Name : Harman  
 c) Model No. : GW52  
 d) FCC ID : VRSGW52

### 1.2 Characteristics of Device

GW52 is built on the Marvell® 88W8787 low-cost highly-integrated IEEE 802.11b/g/n MAC/Baseband/RF WLAN and Bluetooth Baseband/RF system-on-chip (SoC). The module supports IEEE 802.11n with maximum data rates up to 72Mbps (20 MHz channel) and 150 Mbps (40MHz), 802.11g payload data rates of 6, 9, 12, 18, 24, 36, 48, and 54 Mbps, as well as 802.11b data rates of 1, 2, 5.5 and 11 Mbps for WLAN operation. For Bluetooth operation, the module supports Bluetooth 3.0 + High Speed (HS) (also compliant with Bluetooth 2.1 + EDR). For security, the 88W8787 supports the IEEE 802.11i security standard through implementation of the Advanced Encryption Standard (AES)/Counter Mode CBC-MAC Protocol (CCMP), and Wired Equivalent Privacy (WEP) with Temporal Key Integrity Protocol (TKIP) security mechanisms. For security, the 88W8787 supports the IEEE 802.11i security standard through implementation of the Advanced Encryption Standard (AES)/Counter Mode CBC-MAC Protocol (CCMP), and Wired Equivalent Privacy (WEP) with Temporal Key Integrity Protocol (TKIP) security mechanisms. The module also supports Internet Protocol Security (IPsec) with DES/3DES/AES encryption and MD5/SHA-1 authentication as well as 802.11e Quality of Service (QoS). The module supports dual SDIO host interface for connecting the WLAN and Bluetooth to the host processor. For Bluetooth application the high-speed UART (up to 4MB/s, PCM/Inter-IC Sound (I2S), are supported. The rated output power is 0.68 dBm (1.17 mW).

### 1.3 Test Methodology

All testing were performed according to the procedures in ANSI C63.10 (2013) and FCC CFR 47 Part 2 and Part 15 and DA 00-705.

### 1.4 Modification 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	15.247 (c)	<input checked="" type="checkbox"/>
Conducted Emission	15.207	<input checked="" type="checkbox"/>
Antenna Requirement	15.203	<input checked="" type="checkbox"/>
20dB Emission Bandwidth	15.247 (a)(1)	<input checked="" type="checkbox"/>
Output Power	15.247 (b)(1)	<input checked="" type="checkbox"/>
OUT-OF-BAND RF Conducted Spurious Emission	15.247 (c)	<input checked="" type="checkbox"/>
Number of Hopping Channels	15.247 (b)(1)	<input checked="" type="checkbox"/>
Hopping Channel Carrier Frequency Separated	15.247 (a)(1)	<input checked="" type="checkbox"/>
Dwell Time	15.247 (a)(1)(iii)	<input checked="" type="checkbox"/>
Maximum Permissible Exposure	15.247 (b)(5)	<input checked="" type="checkbox"/>

## 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 $\mu$ V	Average dB $\mu$ V
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 $\mu$ V/m	Radiated $\mu$ V/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 radiator device, according to §15.209(a), the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table::

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

\*\* Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

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 separated 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(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 Separation**

According to 15.247(a)(1)(iii), the frequency hopping systems shall have hopping channel carrier frequencies separated 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 than 8dBm in any 3kHz band during any time interval 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 highest, middle and lowest frequency and transmit the maximum RF power. Customer would not use it. But never the less ancillary equipment can influence the test results..

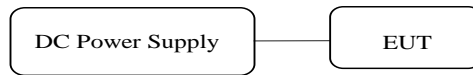
#### 3.2 Devices for Tested System

##### 3.2.1

Device	Manufacture	Model No.	Cable Description
* MOD-SM QIS BT/WLAN CWM- 02B-BT2-SP D5	Qisda Optronics(SuZ hou) Co., Ltd	GW52	----
DC Power Supply	GW	GPS-3030D	1.8m*1 Unshielded Power Line 1.0m*1 Unshielded Signal Line

#### Remark

1. “\*” means equipment under test.



2. Test Software:MFG-MF-8787-FC8-SYSKT-1.2.7.51-14.0.34.

3.2.2 Test Mode Description

3.2.2.1 Modulation Type

Test Mode	Type	Note
A	NON-EDR	GFSK
B	EDR	$\pi/4$ -DQPSK, 8-DPSK (note 1)

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

3.2.2.2 Test Mode and Worse Case Determination

The EUT was set in continuous operation function for all measurements.

Item	Test Item	Test Mode	Test Frequency (MHz)
1	Output Power	A	L, M, H
		B	L, M, H
	Worse Case	Mode B (note 1)	
2.	20dB Emission Bandwidth	A、B	M (Worse Case)
3	Conducted Emission	-	-
4	Out of Band Conducted Emission	A、B	L, M, H
5.1	Number of Channel	A	L~H
5.2	Channel Separation	A	M (note 2)
5.3	Dwell Time	A	M (note 2)
6.1	Radiated Emission (below 1GHz)	B	M (Worse Case)
6.2	Radiated Emission (above 1GHz)	B	L, M, H
6.3	Radiated Emission (BandEdge)	A, B	L, H

note:

- 8-DPSK is the worse case determined as the modulation with highest output power.
- Pretest result is no difference in three test modes by channel low, middle and high. Choose one for final testing and record the result.
- The worse case is determined as the modulation with highest output power.
- Pretest result is no difference in three test modes by channel low, middle and high. Choose mode A, channel middle 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

#### A. Preliminary Measurement For Portable Devices.

For movable devices, the following procedure was performed to determine the maximum emission axis of EUT (X, Y and Z axis):

1. With the receiving antenna is H polarization, rotate the EUT in turns with three orthogonal axes to determine the axis of maximum emission.
2. With the receiving antenna is V polarization, rotate the EUT in turns with three orthogonal axes to determine the axis of maximum emission.
3. Compare the results derived from above two steps. The axis of maximum emission from EUT was determined and the configuration was used to perform the final measurement.
4. The position in which the maximum noise occurred was "X axis". (Please see the test setup photos)

#### B. Final Measurement

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

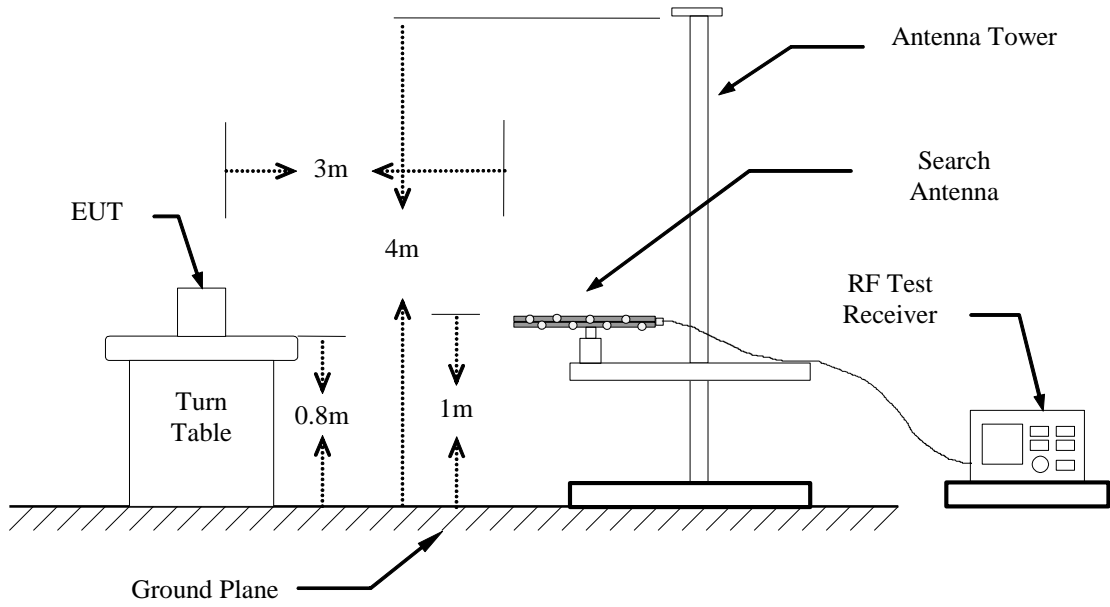
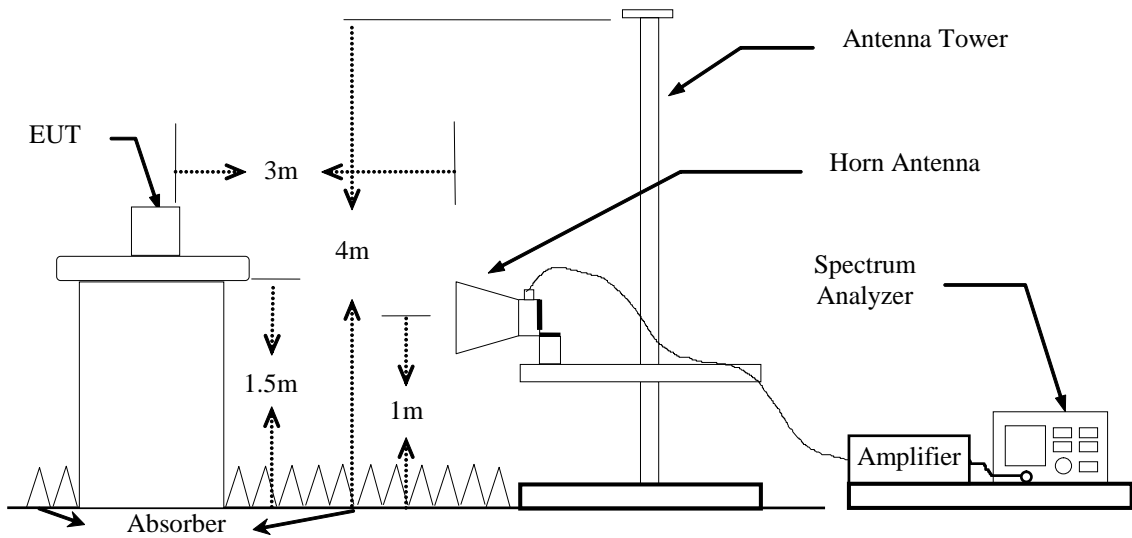


Figure 2 : Frequencies measured above 1 GHz configuration



### 4.3 Measuring Instrument

The following instrument are used for radiated emissions measurement :

Equipment	Manufacturer	Model No.
EMI Receiver	R&S	ESCI
Spectrum Analyzer	R&S	FSU46
Horn Antenna	EMCO	3115
BiLog Antenna	Schaffner	CBL6112B
Horn Antenna	EMCO	3116
Preamplifier	Hewlett-Packard	8449A

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
	Spectrum Analyzer	Peak	120 kHz	300 kHz
Above 1000	Spectrum Analyzer	Peak	1 MHz	1 MHz
	Spectrum Analyzer	Average	1 MHz	10 Hz (Note)

**Note:** For average measuring, If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a “duty cycle correction factor”, derived from  $20\log(\text{dwell time}/100 \text{ ms})$ . This correction is only for signals that hop with the fundamental signal, such as band-edge and harmonic. Other spurious signals those are independent of the hopping signal would not use this correction.



Duty Factor:

$$20\log \frac{1 \times 2.97(\text{ms})}{100(\text{ms})} = -30.54 \text{ dB}$$

The plotted graph of Duty Factor please see page 18 ~ 19.

- Note:**
1. Worst case duty cycle = on time/100 ms.
  2. Worst case duty factor =  $20\log(\text{duty cycle})$ .
  3. DH5 has highest duty cycle worst case and is reported.

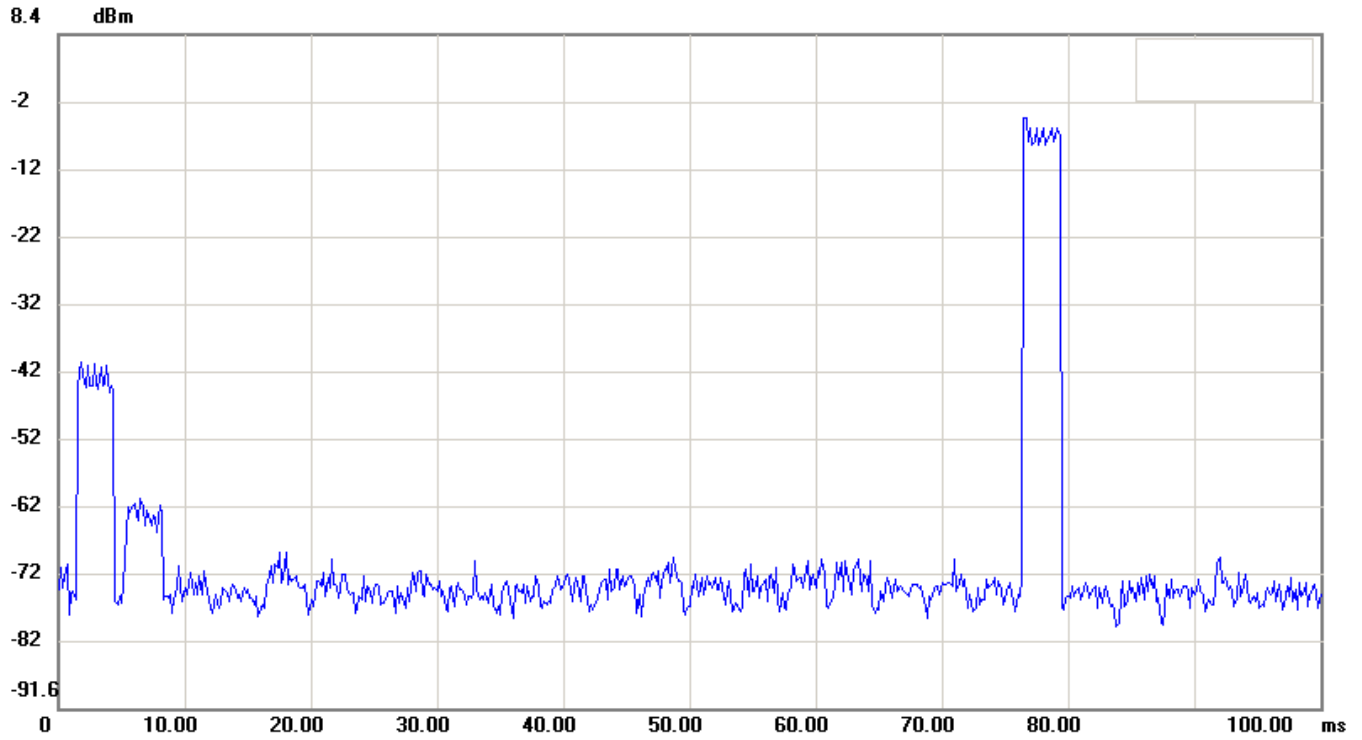
File: 16-03-MAS-057 Data: #3

Date: 2016/4/26

Temperature: 23 °C

Time: AM 10:04:38

Humidity: 58 %



Condition:

RF Conducted

EUT:

Sweep Time: 100ms Att.: 10dB

Model:

RBW: 100 KHz VBW: 300 KHz

Test Mode:

Note:

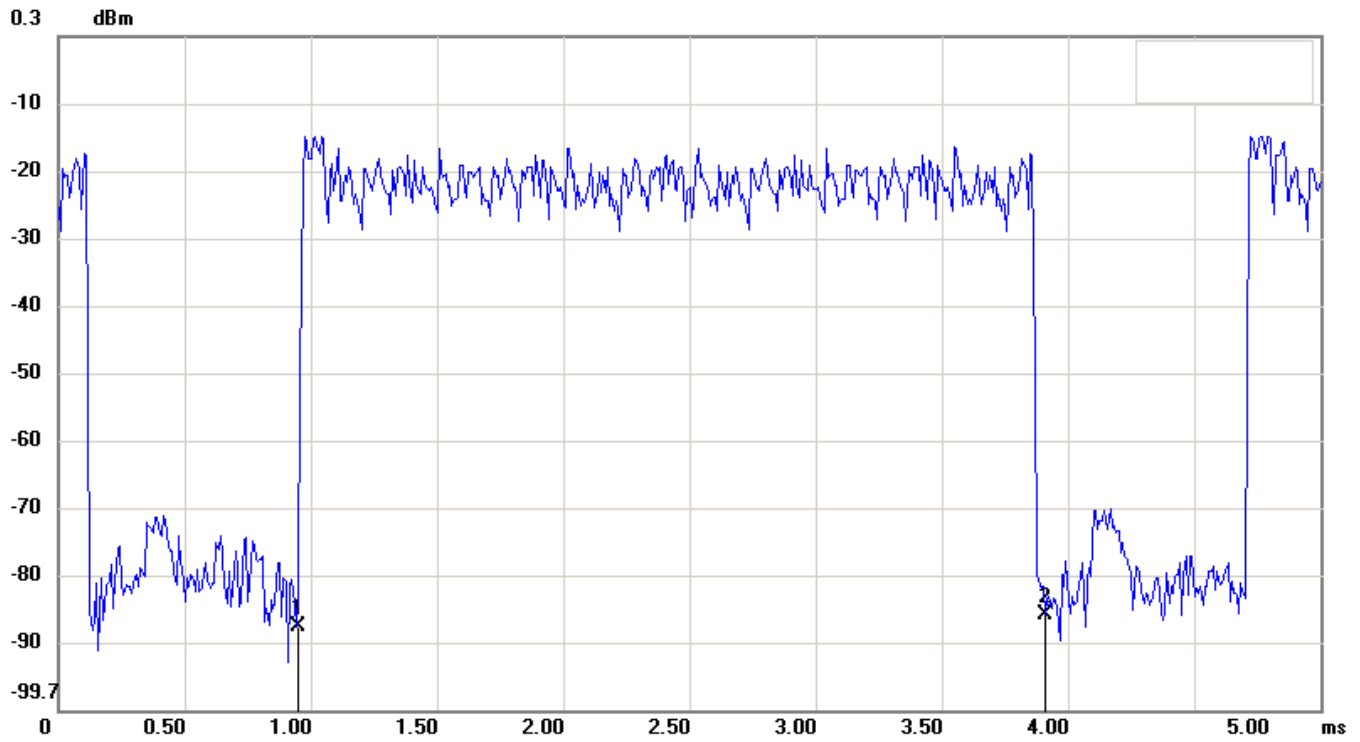
File: 16-03-MAS-057 Data: #2

Date: 2016/4/25

Temperature: 23 °C

Time: PM 03:29:43

Humidity: 58 %



Condition:

RF Conducted

EUT:

Sweep Time: 5ms Att.: 20dB

Model:

RBW: 100 KHz VBW: 300 KHz

Test Mode:

Note:

No.	Sweep time(ms)	Level(dBm)
1	0.9417	-87.23
2	3.9083	-85.54

No.		$\Delta$ Time(ms)	$\Delta$ Level(dB)
1	mk2-mk1	2.9666	1.69

## 4.4 Radiated Emission Data

### 4.4.1 RF Portion

a) Channel 0

Operation Mode : Tx

Fundamental Frequency : 2402 MHz

Test Date : Apr. 01, 2016

Temperature : 20°C

Humidity : 60%

Frequency (MHz)	Ant Pol H/V	Reading (dBuV/m)@3m		Correct (dB)	Factor (dB)	Result (dBuV/m)@3m		Limit (dBuV/m)@3m		Margin (worse) (dB)
		Peak	AVG			Peak	AVG	Peak	AVG	
4804.0000	H	---	---	-2.36	-30.54	---	---	74.0	54.0	---
4804.0000	V	54.4	---	-2.36	-30.54	52.0	---	74.0	54.0	-2.0
7206.0000	H	---	---	0.55	-30.54	---	---	74.0	54.0	---
7206.0000	V	---	---	0.55	-30.54	---	---	74.0	54.0	---
9608.0000	H	---	---	2.30	-30.54	---	---	74.0	54.0	---
9608.0000	V	---	---	2.30	-30.54	---	---	74.0	54.0	---
12010.0000	H	---	---	4.79	-30.54	---	---	74.0	54.0	---
12010.0000	V	---	---	4.79	-30.54	---	---	74.0	54.0	---
14412.0000	H	---	---	9.37	-30.54	---	---	74.0	54.0	---
14412.0000	V	---	---	9.37	-30.54	---	---	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. If the peak result is under the average limit, that is deemed to meet the average limit.
4. If there is only peak result, item “Margin” referred to “peak result – average limit”.
5. 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.

## b) Channel 39

Fundamental Frequency : 2441 MHz

Frequency (MHz)	Ant Pol	Reading (dBuV/m)@3m		Correct (dB)	Factor (dB)	Result (dBuV/m)@3m		Limit (dBuV/m)@3m		Margin (worse) (dB)
		Peak	AVG			Peak	AVG	Peak	AVG	
4882.0000	H	---	---	-2.21	-30.54	---	---	74.0	54.0	---
4882.0000	V	53.1	---	-2.21	-30.54	50.9	---	74.0	54.0	-3.1
7323.0000	H	---	---	0.83	-30.54	---	---	74.0	54.0	---
7323.0000	V	---	---	0.83	-30.54	---	---	74.0	54.0	---
9764.0000	H	---	---	2.41	-30.54	---	---	74.0	54.0	---
9764.0000	V	---	---	2.41	-30.54	---	---	74.0	54.0	---
12205.0000	H	---	---	4.92	-30.54	---	---	74.0	54.0	---
12205.0000	V	---	---	4.92	-30.54	---	---	74.0	54.0	---
14646.0000	H	---	---	8.48	-30.54	---	---	74.0	54.0	---
14646.0000	V	---	---	8.48	-30.54	---	---	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. If the peak result is under the average limit, that is deemed to meet the average limit.
4. If there is only peak result, item “Margin” referred to “peak result – average limit”.
5. 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.

## c) Channel 78

Fundamental Frequency : 2480 MHz

Frequency (MHz)	Ant Pol H/V	Reading (dBuV/m)@3m		Correct (dB)	Factor (dB)	Result (dBuV/m)@3m		Limit (dBuV/m)@3m		Margin (worse) (dB)
		Peak	AVG			Peak	AVG	Peak	AVG	
4960.0000	H	---	---	-2.05	-30.54	---	---	74.0	54.0	---
4960.0000	V	53.2	---	-2.05	-30.54	51.2	---	74.0	54.0	-2.8
7440.0000	H	---	---	1.11	-30.54	---	---	74.0	54.0	---
7440.0000	V	---	---	1.11	-30.54	---	---	74.0	54.0	---
9920.0000	H	---	---	2.51	-30.54	---	---	74.0	54.0	---
9920.0000	V	---	---	2.51	-30.54	---	---	74.0	54.0	---
12400.0000	H	---	---	5.05	-30.54	---	---	74.0	54.0	---
12400.0000	V	---	---	5.05	-30.54	---	---	74.0	54.0	---
14880.0000	H	---	---	7.34	-30.54	---	---	74.0	54.0	---
14880.0000	V	---	---	7.34	-30.54	---	---	74.0	54.0	---

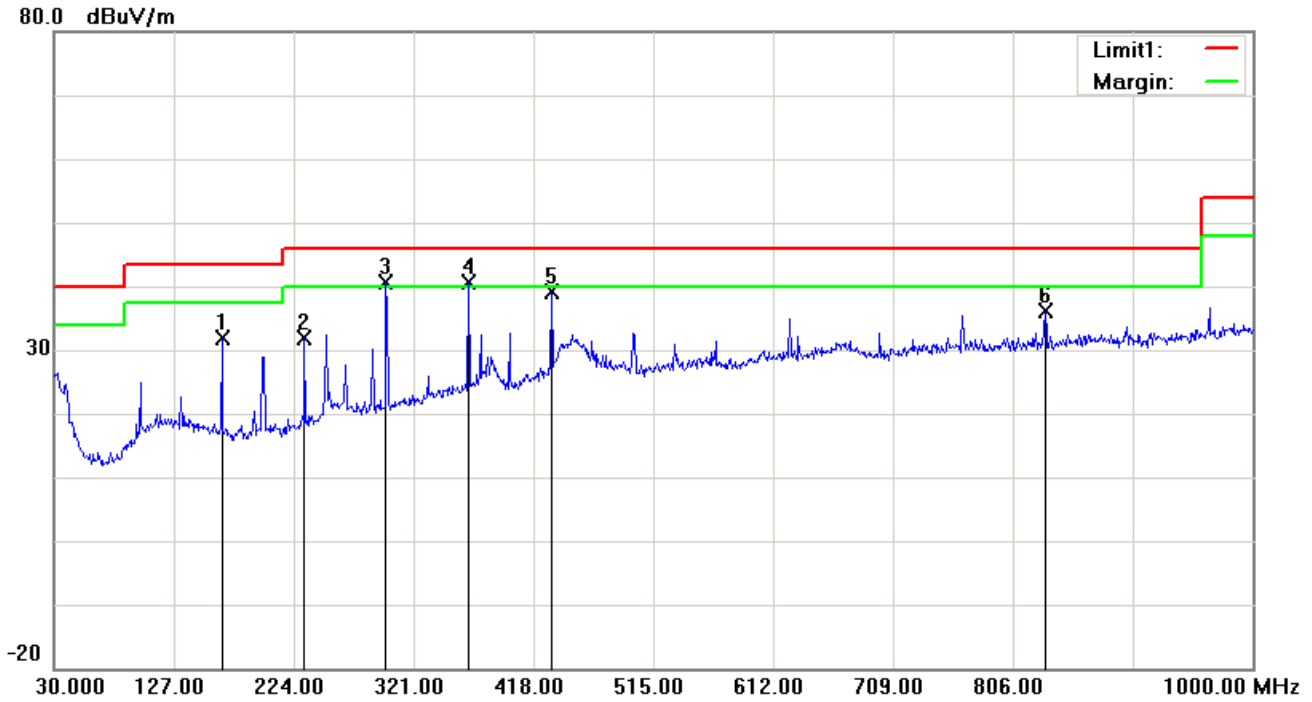
## Note :

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. If the peak result is under the average limit, that is deemed to meet the average limit.
4. If there is only peak result, item “Margin” referred to “peak result – average limit”.
5. 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 30MHz to 1GHz

File: 16-03-MAS-057 Data: #1 Date: 2016/4/1 Temperature: 20 °C  
Time: AM 11:40:44 Humidity: 60 %



Condition: FCC Class B 3M Radiation Polarization: Horizontal  
EUT: Power:  
Model: Distance: 3m  
Test Mode:  
Note:

No.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	165.8000	20.03	peak	11.94	31.97	43.50	-11.53
2	232.7300	18.77	peak	13.14	31.91	46.00	-14.09
3	298.6900	24.85	peak	15.72	40.57	46.00	-5.43
4	365.6200	22.89	peak	17.83	40.72	46.00	-5.28
5	432.5500	19.75	peak	19.37	39.12	46.00	-6.88
6	832.1900	11.85	peak	24.36	36.21	46.00	-9.79

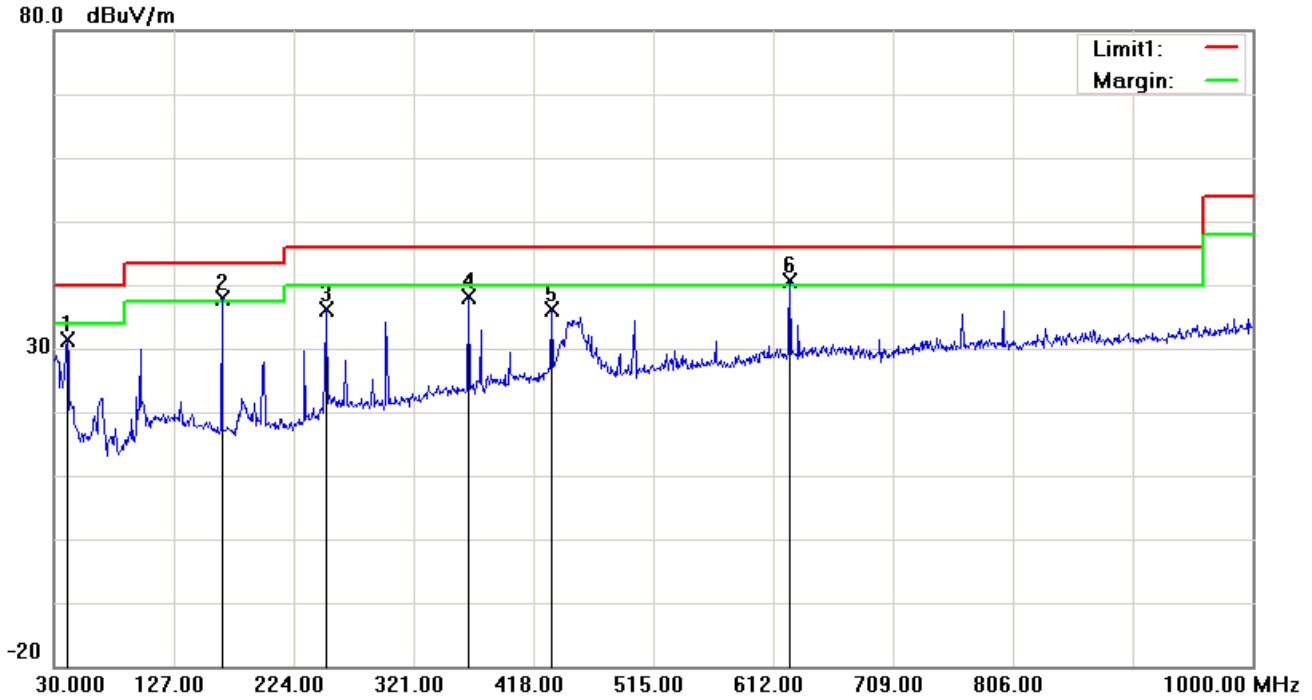
File: 16-03-MAS-057 Data: #2

Date: 2016/4/1

Temperature: 20 °C

Time: AM 11:43:51

Humidity: 60 %



Condition: FCC Class B 3M Radiation

Polarization: Vertical

EUT:

Power:

Model:

Distance: 3m

Test Mode:

Note:

No.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	40.6700	17.14	peak	14.36	31.50	40.00	-8.50
2	165.8000	26.01	peak	11.94	37.95	43.50	-5.55
3	250.1900	21.30	peak	14.79	36.09	46.00	-9.91
4	365.6200	20.30	peak	17.83	38.13	46.00	-7.87
5	432.5500	16.70	peak	19.37	36.07	46.00	-9.93
6	625.5800	18.48	peak	22.21	40.69	46.00	-5.31



**4.4.2.2 above 1GHz**

## 4.4.2.2.1 Fundamental Frequency : 2402 MHz

Frequency (MHz)	Ant Pol	Reading (dBuV/m)@3m		Correct (dB)	Factor (dB)	Result (dBuV/m)@3m		Limit (dBuV/m)@3m		Margin (worse) (dB)
		Peak	AVG			Peak	AVG	Peak	AVG	
1000.0000	H	53.4	---	-14.10	-30.54	39.3	---	74.0	54.0	-14.7
1125.6410	H	49.8	---	-13.59	-30.54	36.2	---	74.0	54.0	-17.8
1199.6794	H	49.2	---	-13.28	-30.54	35.9	---	74.0	54.0	-18.1
1199.6794	V	49.2	---	-13.28	-30.54	35.9	---	74.0	54.0	-18.1
1639.4230	V	50.4	---	-11.28	-30.54	39.1	---	74.0	54.0	-14.9
1886.2180	V	47.8	---	-9.88	-30.54	37.9	---	74.0	54.0	-16.1

## 4.4.2.2.2 Fundamental Frequency : 2441 MHz

Frequency (MHz)	Ant Pol	Reading (dBuV/m)@3m		Correct (dB)	Factor (dB)	Result (dBuV/m)@3m		Limit (dBuV/m)@3m		Margin (worse) (dB)
		Peak	AVG			Peak	AVG	Peak	AVG	
1000.0000	H	53.1	---	-14.10	-30.54	39.0	---	74.0	54.0	-15.0
1123.3974	H	48.2	---	-13.60	-30.54	34.6	---	74.0	54.0	-19.4
1641.1666	V	49.5	---	-11.27	-30.54	38.2	---	74.0	54.0	-15.8

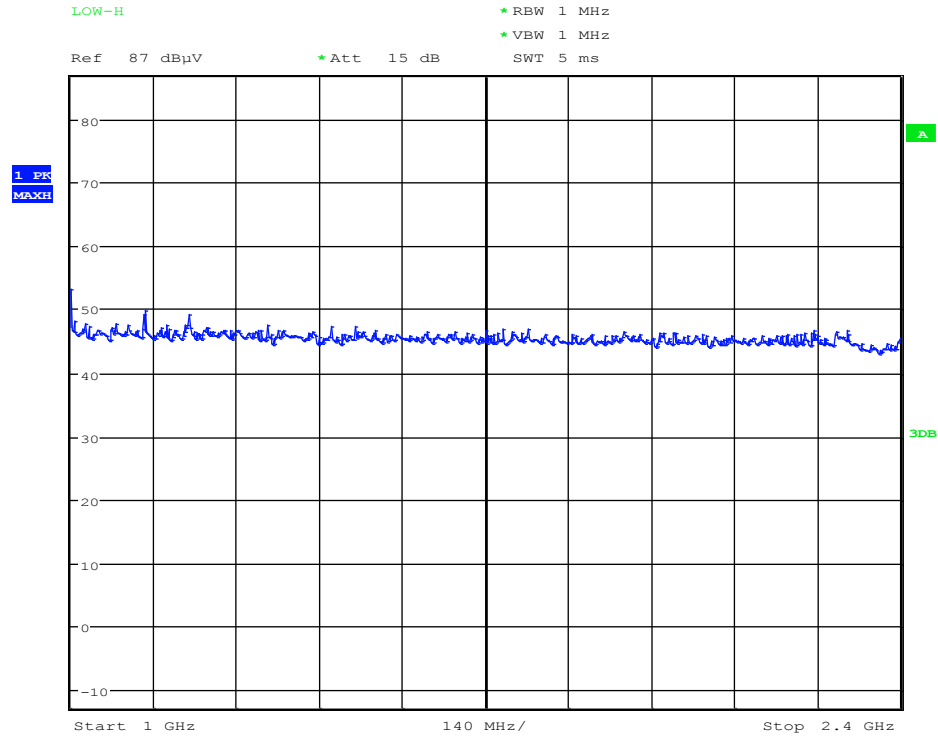
## 4.4.2.2.3 Fundamental Frequency : 2480 MHz

Frequency (MHz)	Ant Pol	Reading (dBuV/m)@3m		Correct (dB)	Factor (dB)	Result (dBuV/m)@3m		Limit (dBuV/m)@3m		Margin (worse) (dB)
		Peak	AVG			Peak	AVG	Peak	AVG	
1000.0000	H	52.5	---	-14.10	-30.54	38.4	---	74.0	54.0	-15.6
1000.0000	V	49.8	---	-14.10	-30.54	35.7	---	74.0	54.0	-18.3
1123.3974	V	48.9	---	-13.60	-30.54	35.3	---	74.0	54.0	-18.7
1637.1794	V	49.7	---	-11.29	-30.54	38.4	---	74.0	54.0	-15.6
1888.4614	V	48.4	---	-9.87	-30.54	38.5	---	74.0	54.0	-15.5

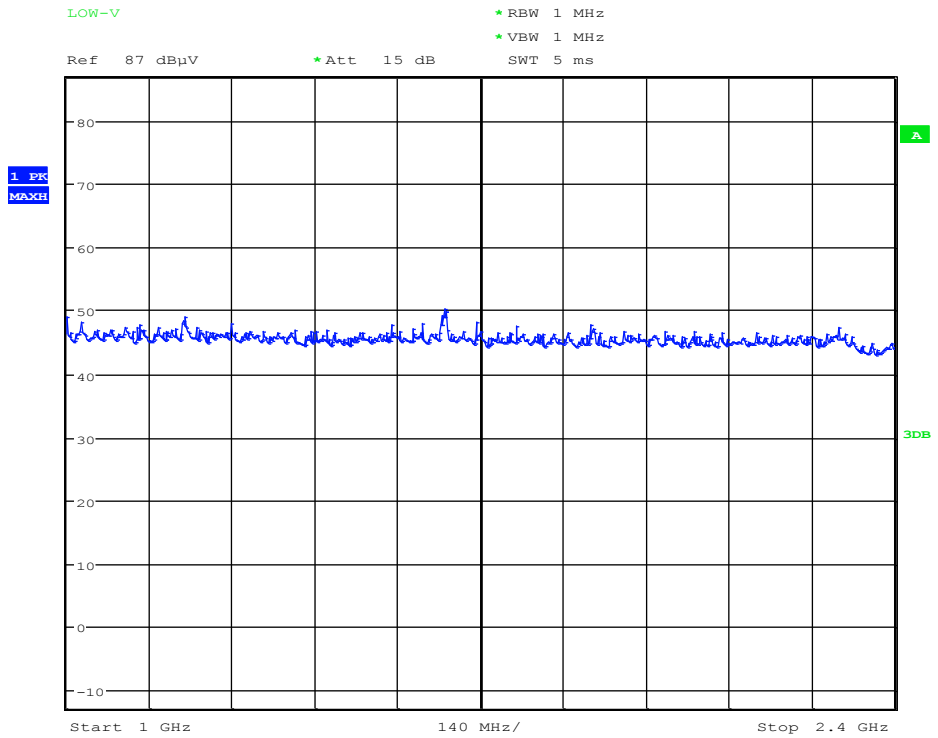
**4.4.2.3 below 30MHz**

Frequency (MHz)	Reading (dBuV/m)	Duty (dB)	Factor (dB)	Result @3m (dBuV/m)			Limit @3m (dBuV/m)	
	Peak			Peak	QP	AVG	Peak	AVG
Radiated emission frequencies from 9 kHz to 30 MHz were too low to be measured.								

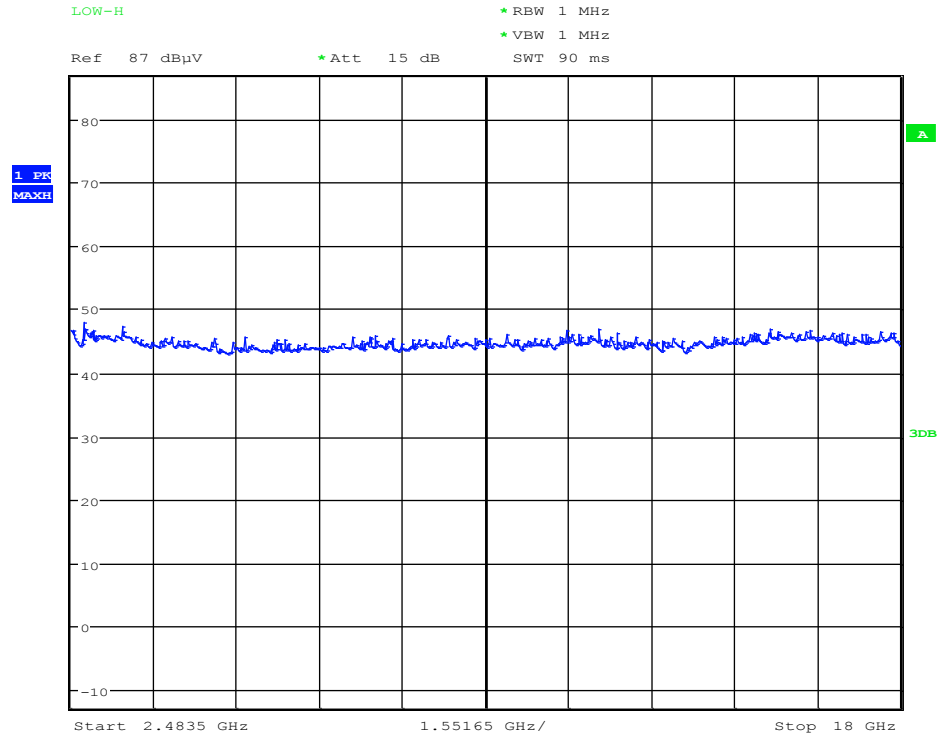
- Note: 1. Place of Measurement: Measuring site of the ETC.
2. Item of margin shown in above table refer to average limit.
  3. Remark “---” means that the emissions level is too low to be measured.
  4. If the peak result is under the average limit, that is deemed to meet the average limit.
  5. If there is only peak result, item “Margin” referred to “peak result – average limit”.
  6. 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.
  7. The estimated measurement uncertainty of the result measurement is
    - ±4.2dB (9kHz ≤ f ≤ 30MHz)
    - ±4.6dB (30MHz ≤ f < 300MHz).
    - ±4.4dB (300MHz ≤ f < 1000MHz).
    - ±2.9dB (1GHz ≤ f < 18GHz).
    - ±3.5dB (18GHz ≤ f ≤ 40GHz).
  8. Please refer to page 27 to page 35 for chart



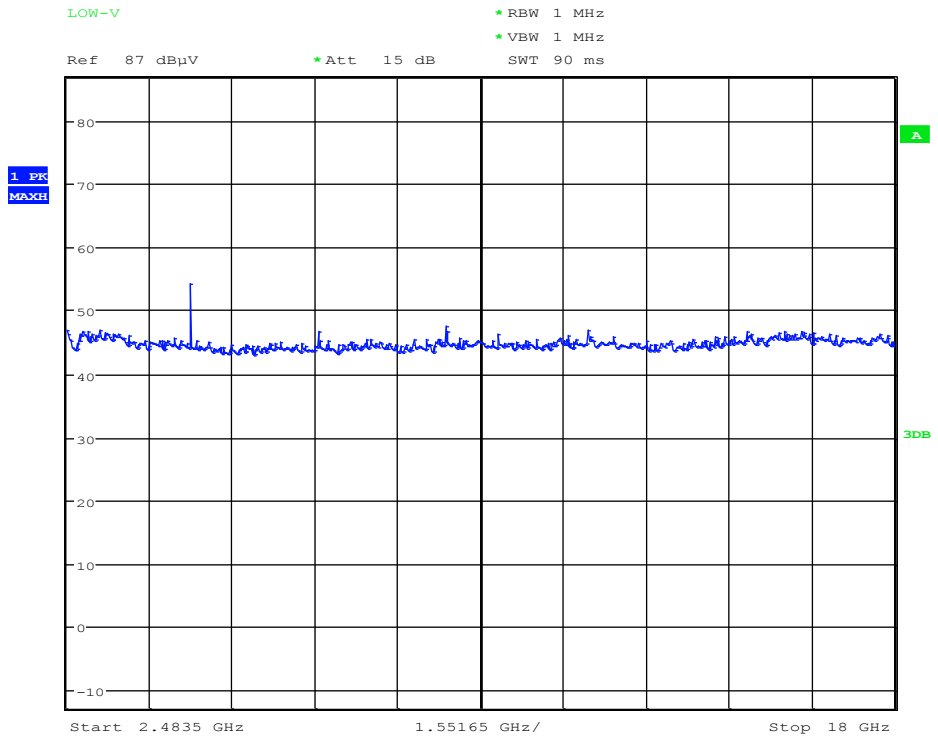
Date: 24.MAR.2016 05:58:29



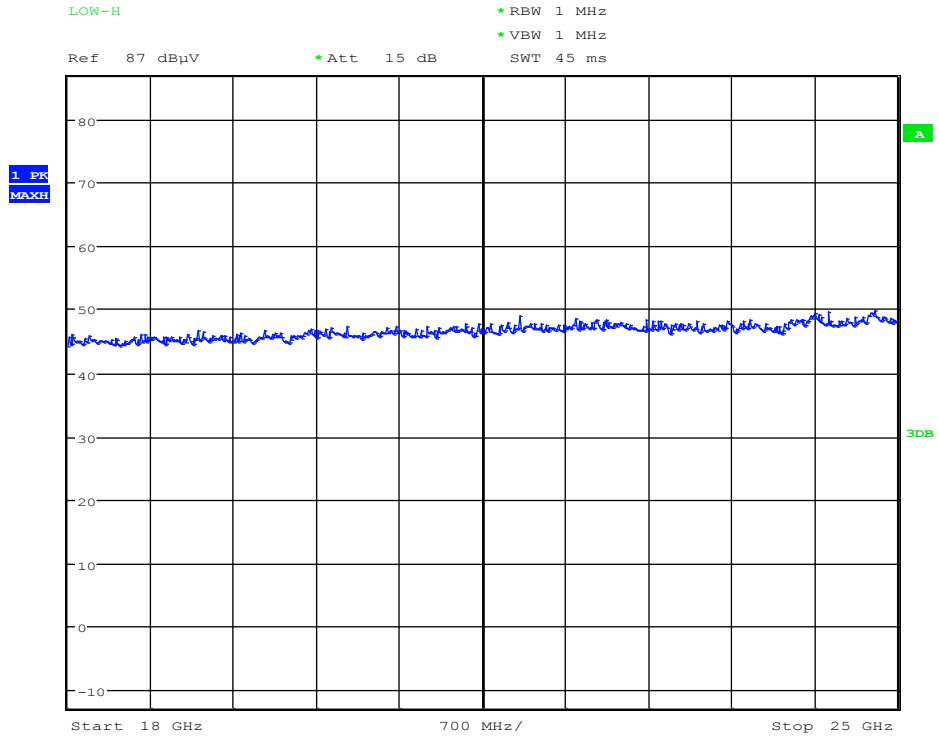
Date: 24.MAR.2016 06:02:02



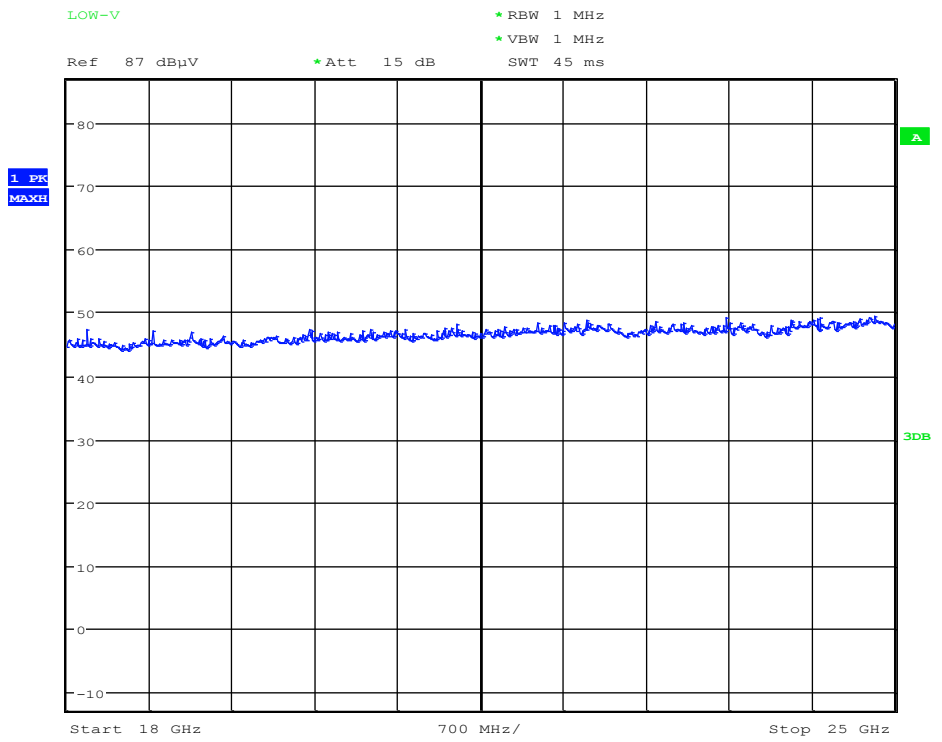
Date: 24.MAR.2016 05:59:40



Date: 24.MAR.2016 06:03:12



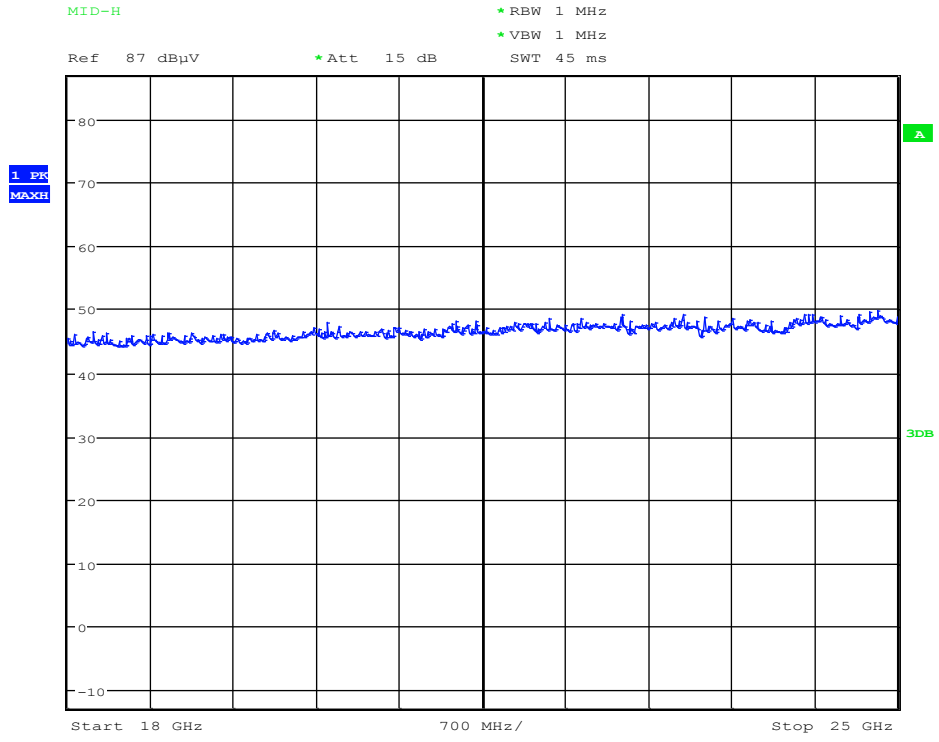
Date: 24.MAR.2016 06:00:51



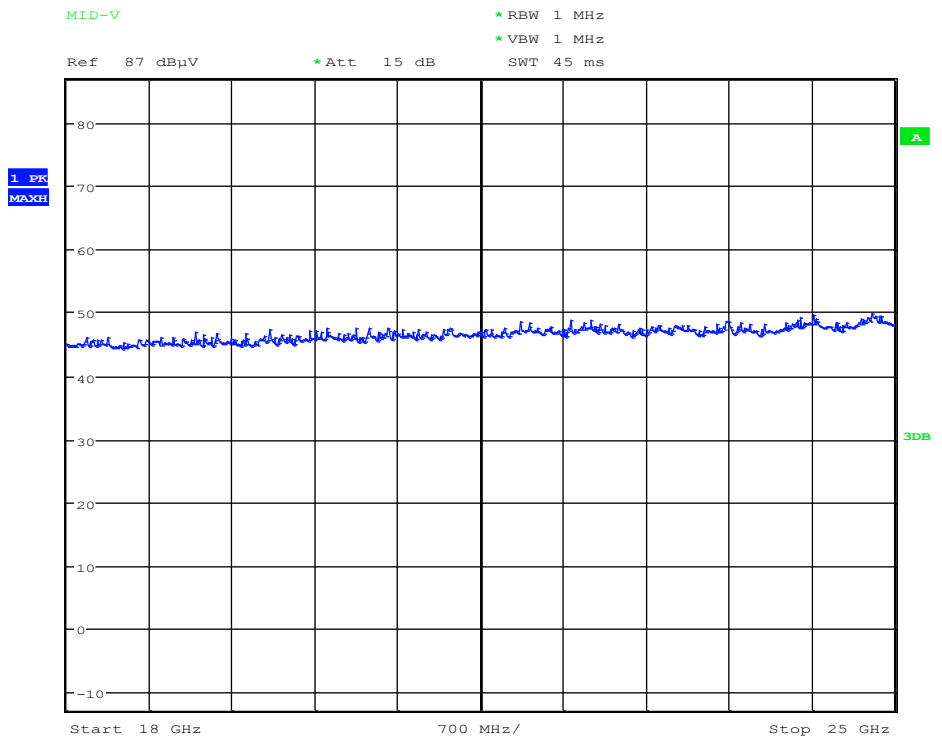
Date: 24.MAR.2016 06:04:24





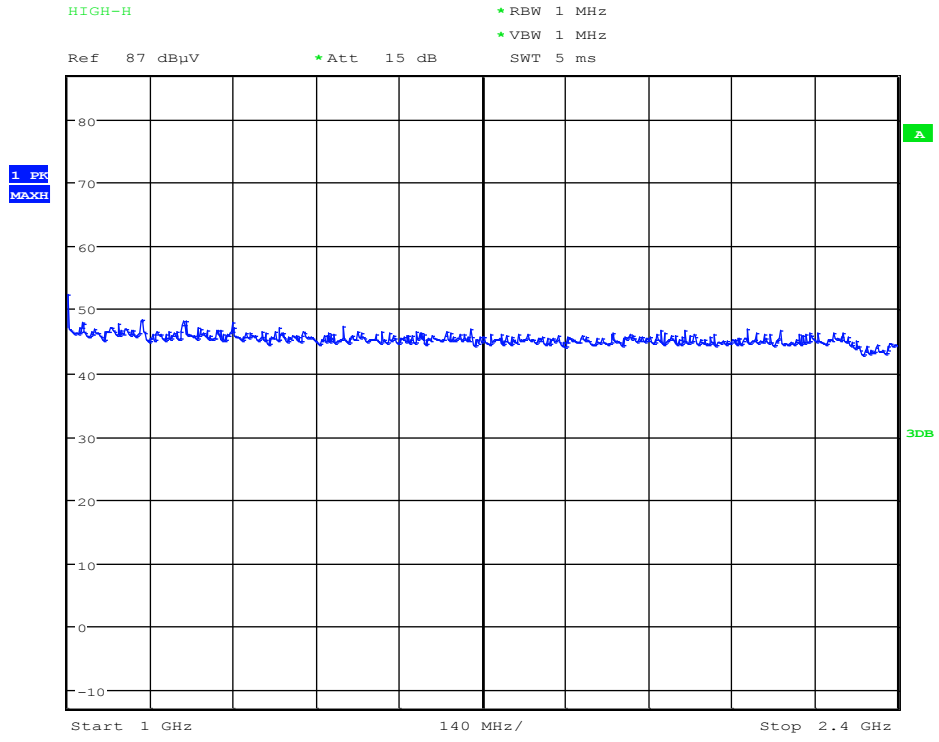


Date: 24.MAR.2016 06:10:18

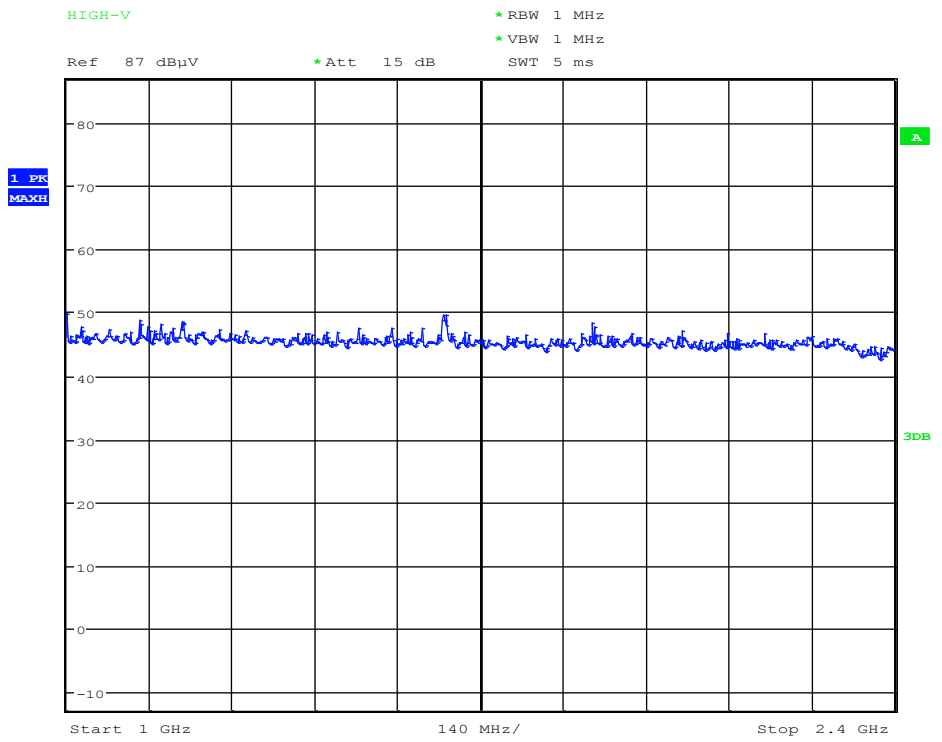


Date: 24.MAR.2016 06:13:53

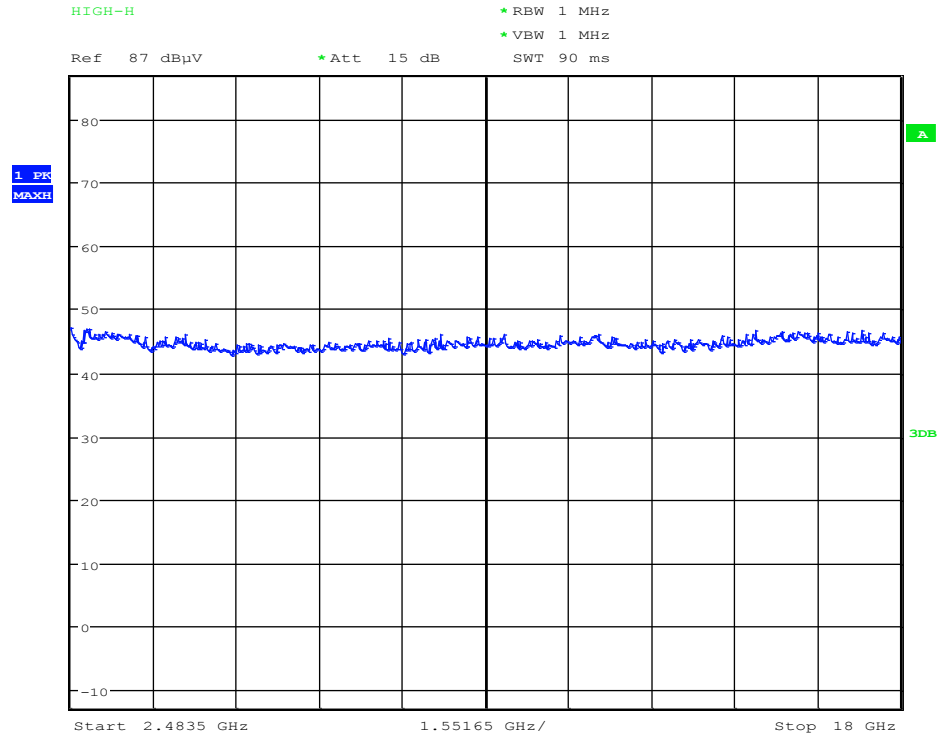




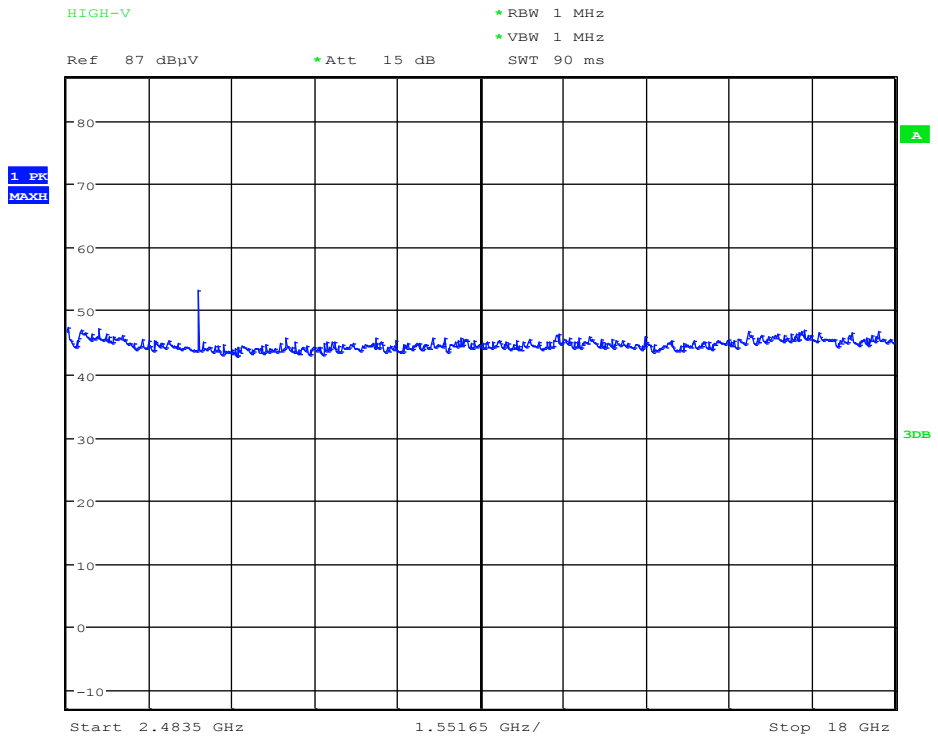
Date: 24.MAR.2016 06:16:16



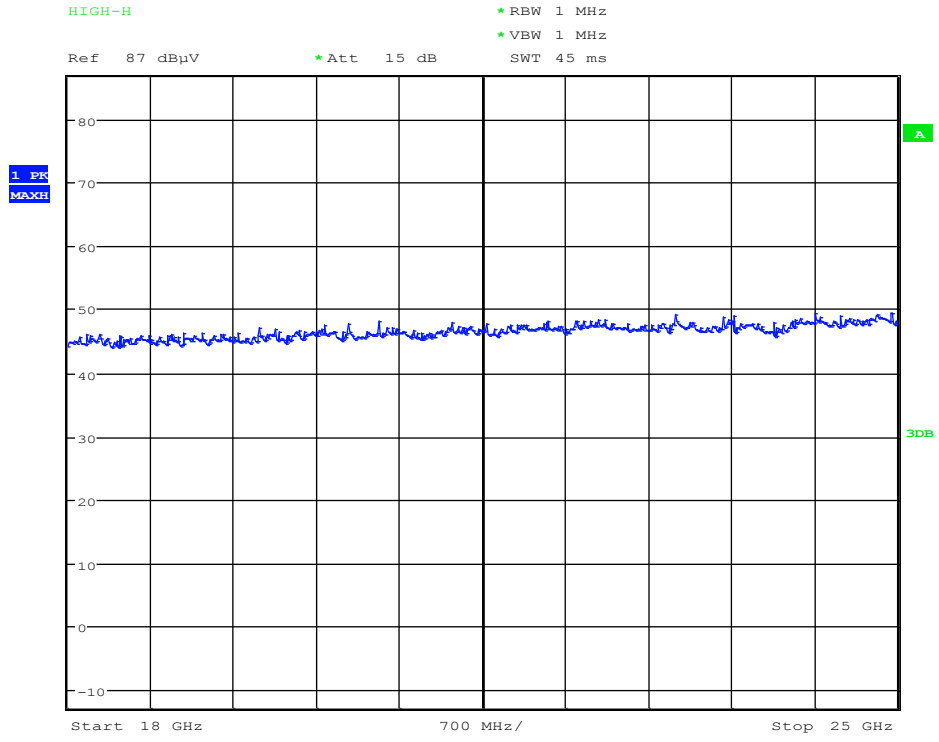
Date: 24.MAR.2016 06:19:50



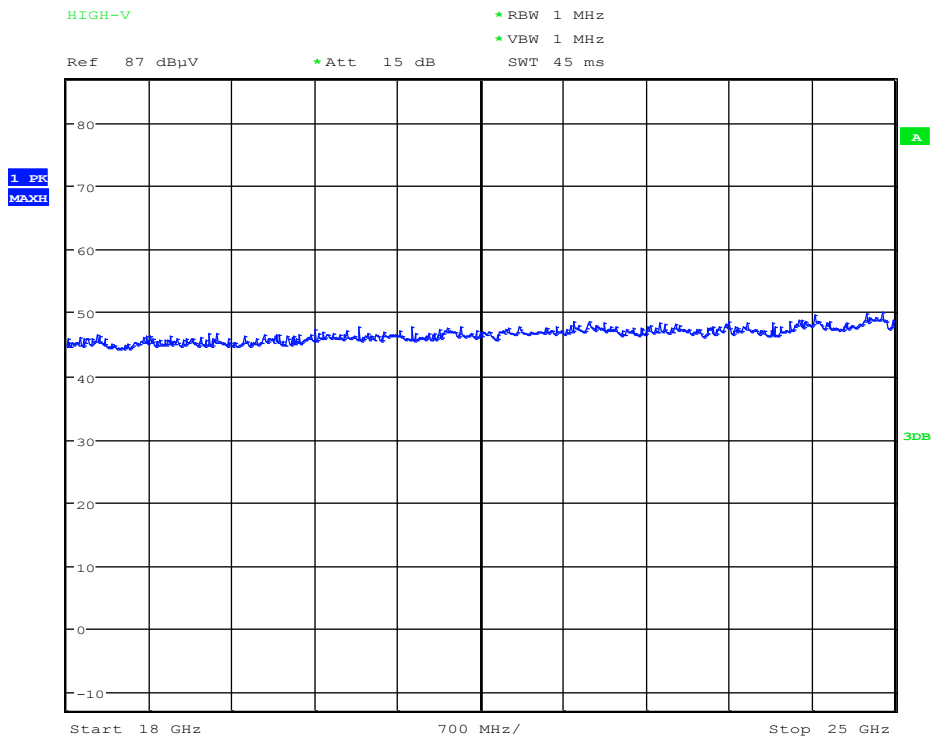
Date: 24.MAR.2016 06:17:28



Date: 24.MAR.2016 06:21:00



Date: 24.MAR.2016 06:18:38



Date: 24.MAR.2016 06:22:12

**4.4.3 Radiated Measurement at Bandedge with Fundamental Frequencies**

4.4.3.1 Operation Mode : NON-EDR

(A) Channel 0

Operation Mode : Transmitting

Fundamental Frequency : 2402 MHz

Frequency (MHz)	Reading @3m (dBuV/m)		Antenna Factor (dB)	Duty Factor (dB)	Result (dBuV/m)		Limit @3m (dBuV/m)		Margin (worse) (dB)	
	H Peak	V Peak			Peak	Ave	Peak	Ave	Peak	Ave
2390.000	25.5	25.29	28.55	-30.54	54.05	23.51	74	54	-19.95	-30.49

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

File: 16-03-MAS-057\_BT

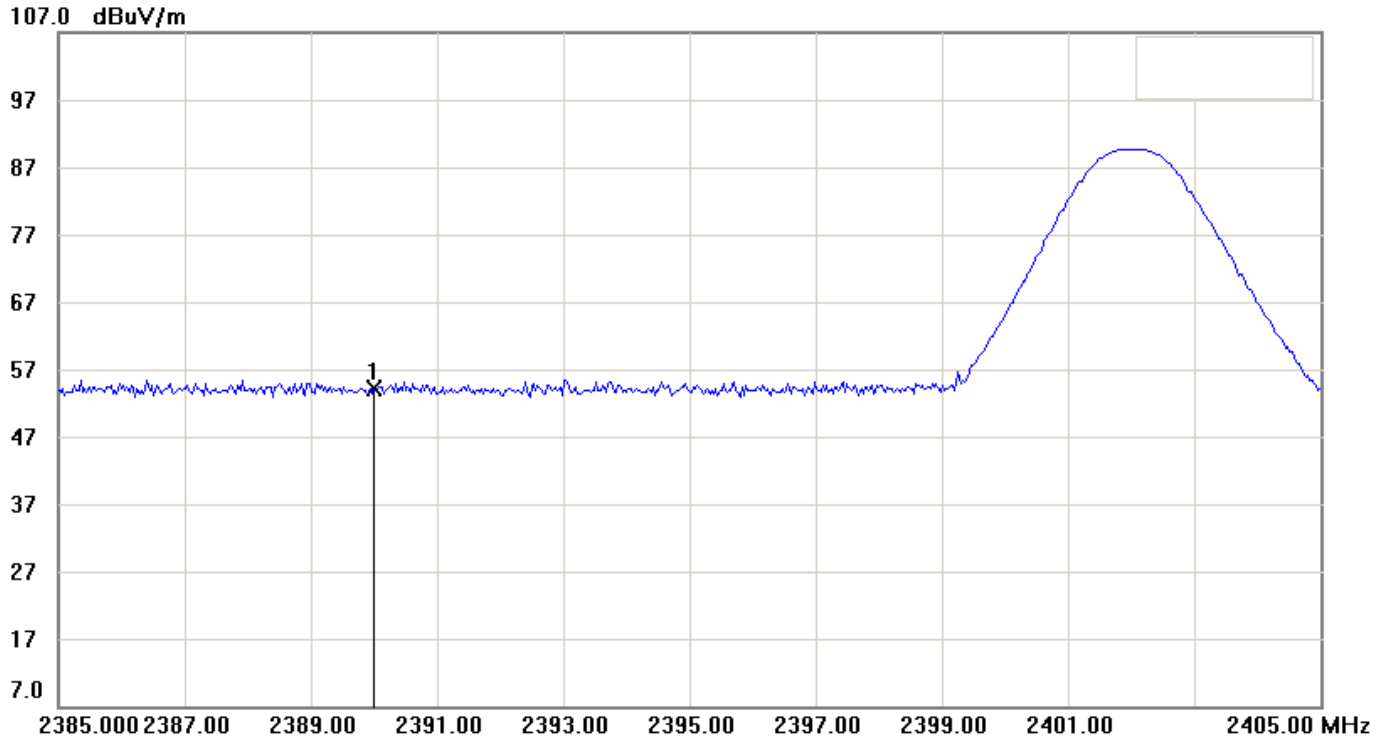
Data: #37

Date: 2016/3/24

Temperature: 22 °C

Time: PM 01:39:22

Humidity: 65 %



Condition:

Polarization: Horizontal

EUT:

Distance: 3m

Model:

Test Mode:

Note: NON-EDR

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Comment
1	2390.0000	25.50	peak	28.55	54.05	74	-19.95	150	63	

File: 16-03-MAS-057\_BT

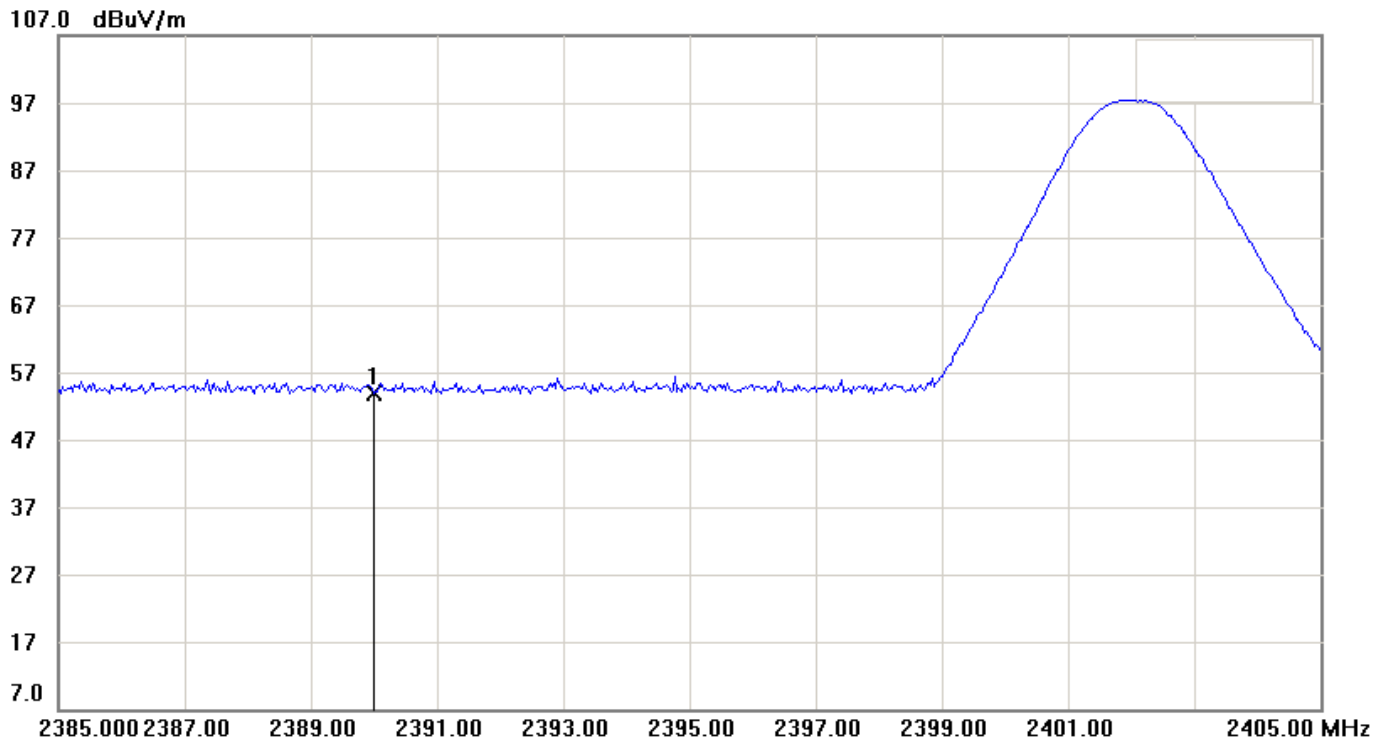
Data: #49

Date: 2016/3/24

Temperature: 22 °C

Time: PM 02:08:34

Humidity: 65 %



Condition:

Polarization: Vertical

EUT:

Distance: 3m

Model:

Test Mode:

Note: NON-EDR

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Comment
1	2390.0000	25.29	peak	28.59	53.88	74	-20.12	150	62	

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

Frequency (MHz)	Reading @3m (dBuV/m)		Antenna Factor (dB)	Duty Factor (dB)	Result (dBuV/m)		Limit @3m (dBuV/m)		Margin (worse) (dB)	
	H Peak	V Peak			Peak	Ave	Peak	Ave	Peak	Ave
2483.500	25.90	25.97	28.85	-30.54	54.75	24.21	74	54	-19.25	-29.79

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

File: 16-03-MAS-057\_BT

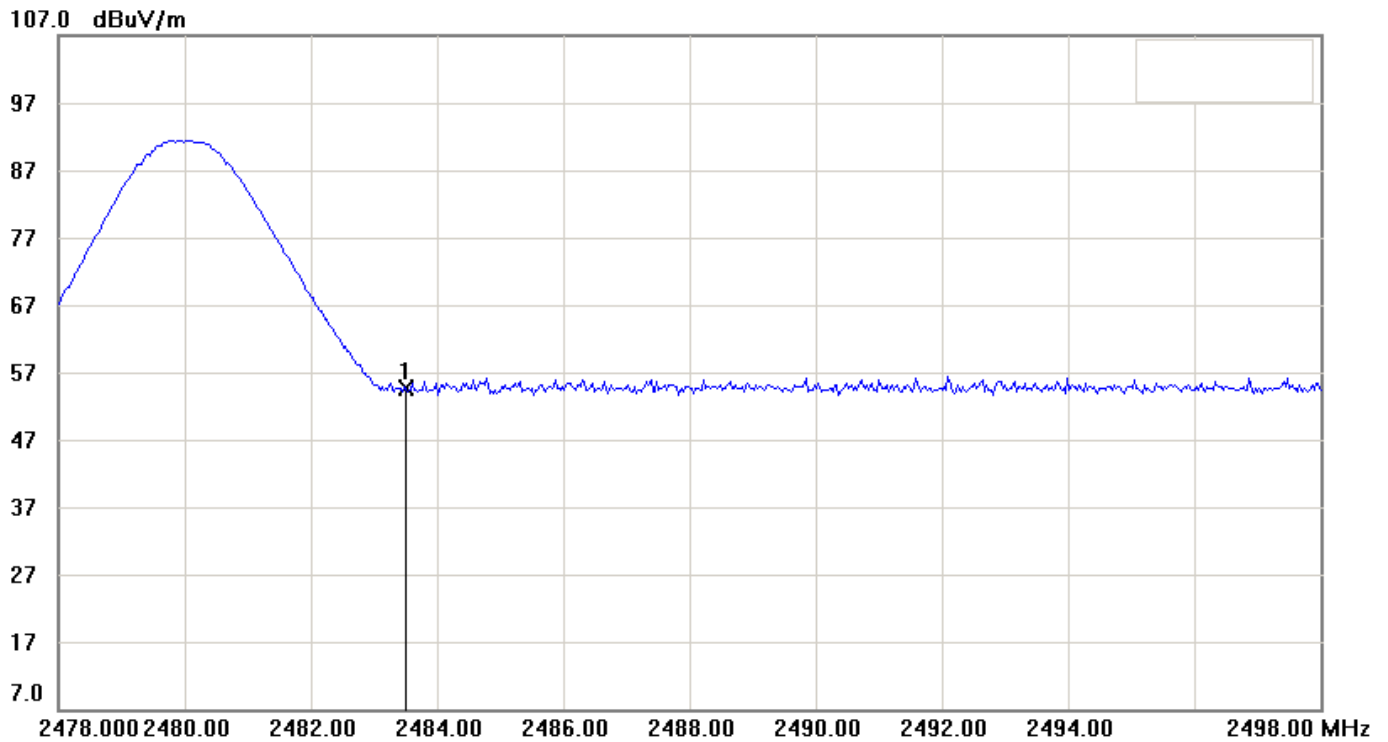
Data: #39

Date: 2016/3/24

Temperature: 22 °C

Time: PM 01:44:56

Humidity: 65 %



Condition:

Polarization: Horizontal

EUT:

Distance: 3m

Model:

Test Mode:

Note: NON-EDR

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Comment
1	2483.5000	25.90	peak	28.85	54.75	74	-19.25	150	61	



File: 16-03-MAS-057\_BT

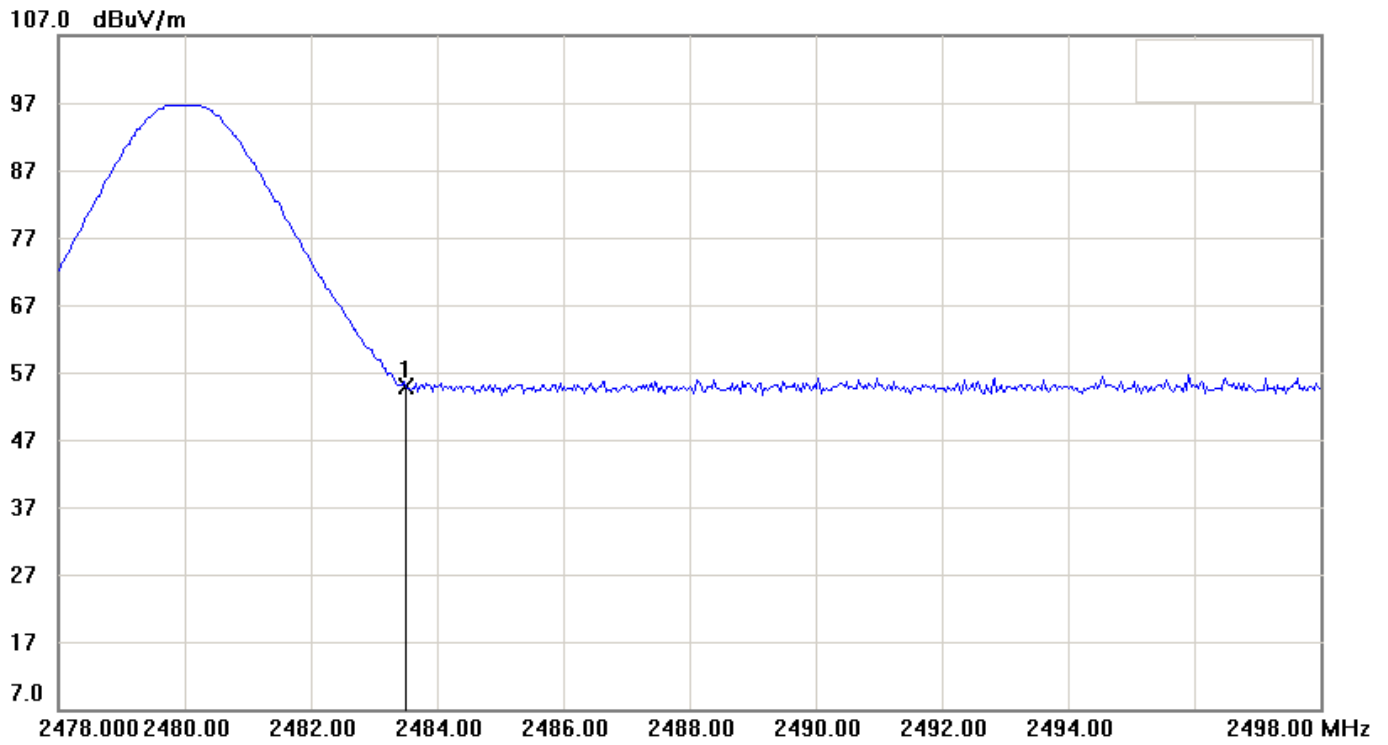
Data: #41

Date: 2016/3/24

Temperature: 22 °C

Time: PM 01:48:41

Humidity: 65 %



Condition:

Polarization:

Vertical

EUT:

Distance:

3m

Model:

Test Mode:

Note: NON-EDR

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Comment
1	2483.5000	25.97	peak	28.85	54.82	74	-19.18	150	63	

4.4.3.2 Operation Mode : EDR

(A) Channel 0

Fundamental Frequency : 2402 MHz

Test Date: Mar. 24, 2016

Temperature : 22°C

Humidity : 65%

Frequency (MHz)	Reading @3m (dBuV/m)		Antenna Factor (dB)	Duty Factor (dB)	Result (dBuV/m)		Limit @3m (dBuV/m)		Margin (worse) (dB)	
	H Peak	V Peak			Peak	Ave	Peak	Ave	Peak	Ave
2390.000	25.37	25.2	29.55	-30.54	54.92	24.38	74	54	-19.08	-29.62

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

File: 16-03-MAS-057\_BT

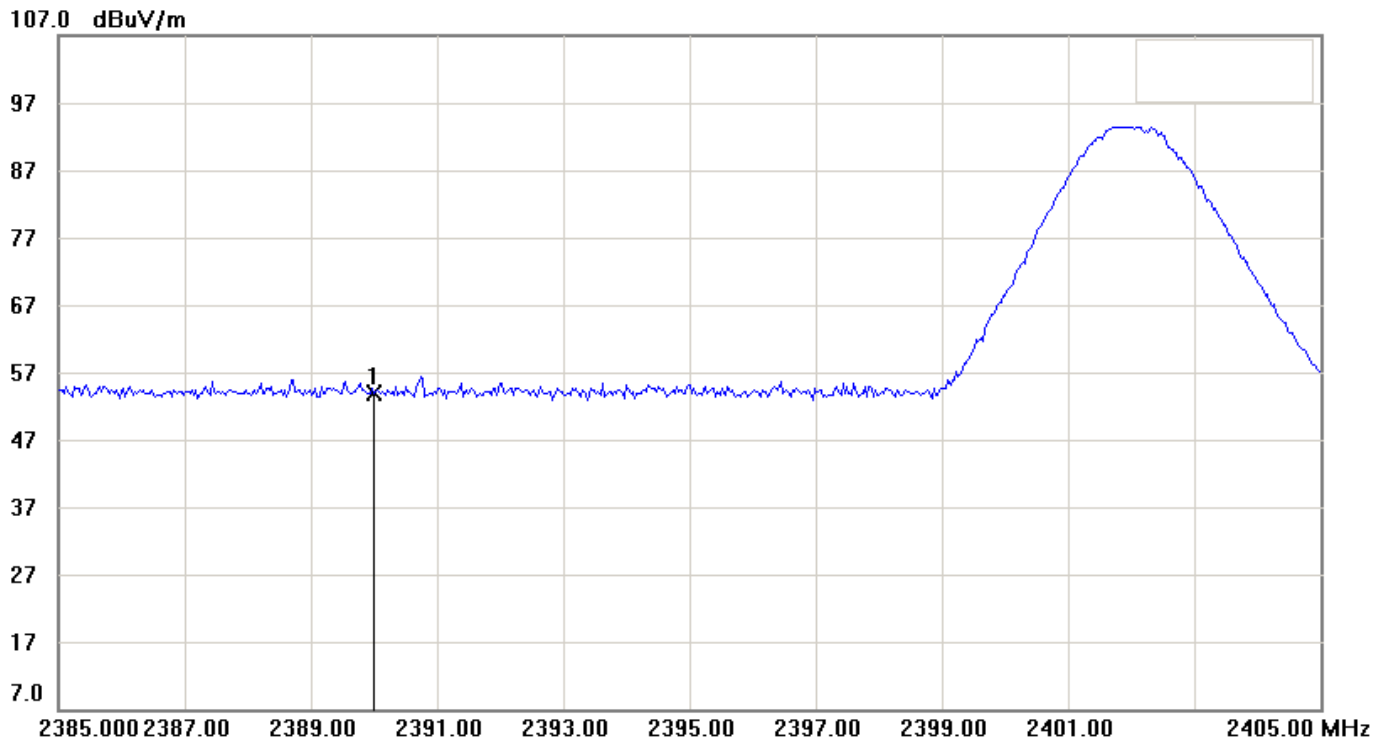
Data: #35

Date: 2016/3/24

Temperature: 22 °C

Time: PM 01:34:46

Humidity: 65 %



Condition:

Polarization: Horizontal

EUT:

Distance: 3m

Model:

Test Mode:

Note: EDR

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Comment
1	2390.0000	25.37	peak	28.55	53.92	74	-20.08	150	61	

File: 16-03-MAS-057\_BT

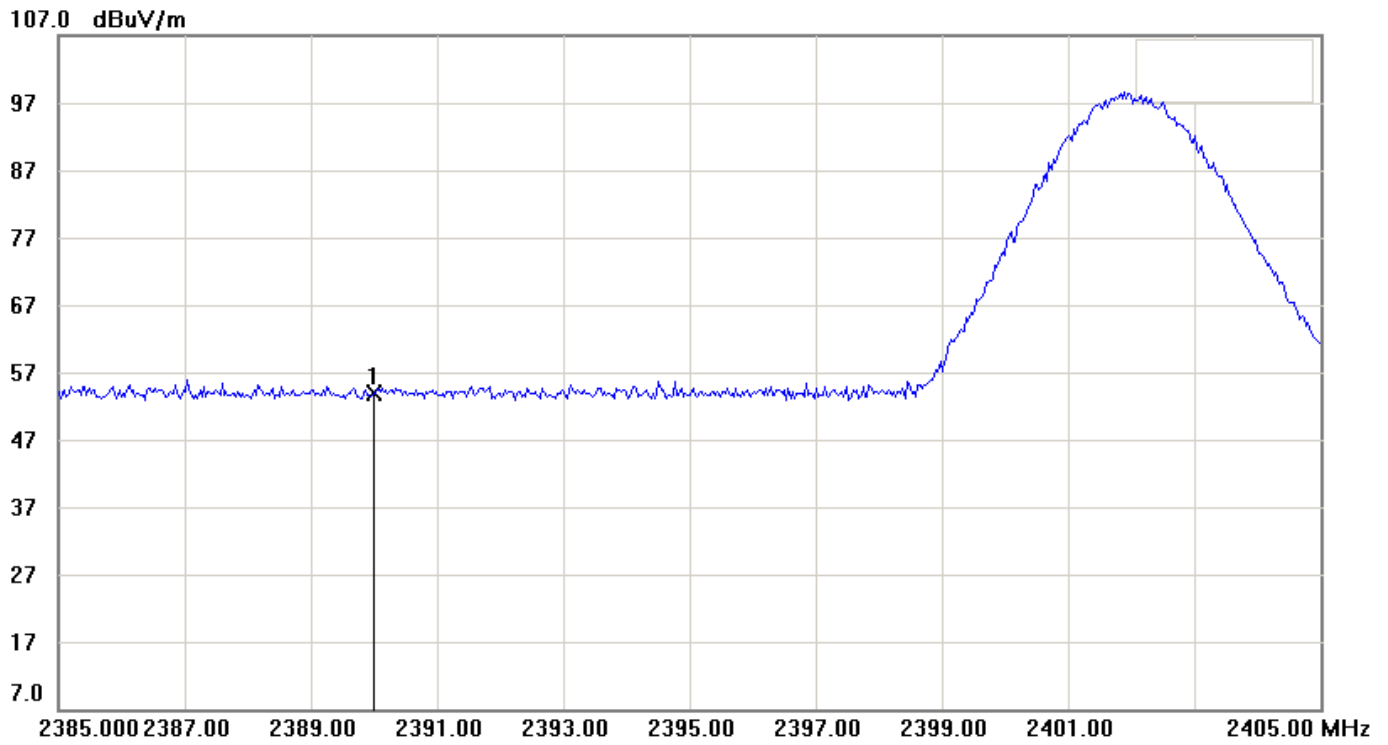
Data: #47

Date: 2016/3/24

Temperature: 22 °C

Time: PM 02:00:58

Humidity: 65 %



Condition:

Polarization:

Vertical

EUT:

Distance:

3m

Model:

Test Mode:

Note: EDR

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Comment
1	2390.0000	25.20	peak	28.59	53.79	74	-20.21	150	62	

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

Frequency	Reading @3m (dBuV/m)		Antenna Factor	Duty Factor	Result		Limit @3m		Margin (worse)	
	H	V			(dBuV/m)		(dBuV/m)		(dB)	
(MHz)	Peak	Peak	(dB)	(dB)	Peak	Ave	Peak	Ave	Peak	Ave
2483.500	28.3	28.8	29.8	-30.54	58.6	28.06	74	54	-15.4	-25.94

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

File: 16-03-MAS-057\_BT

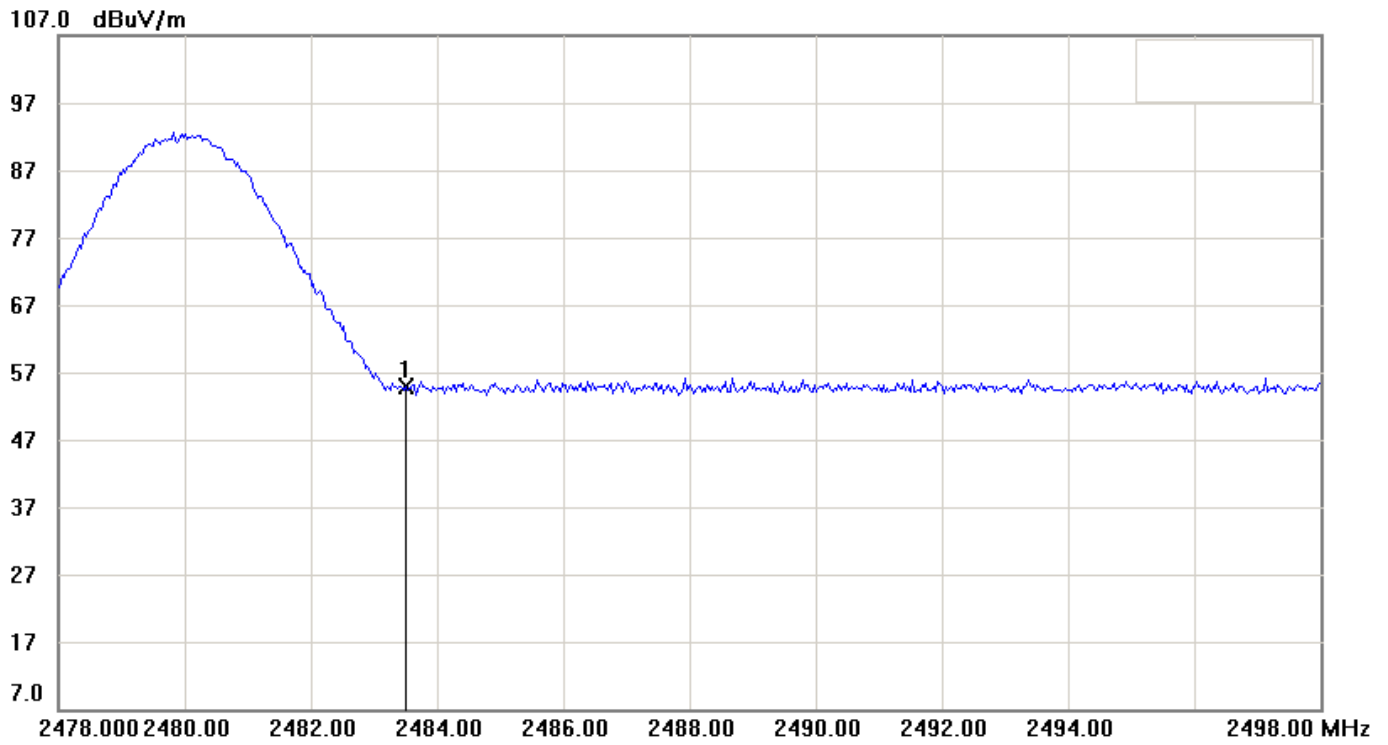
Data: #43

Date: 2016/3/24

Temperature: 22 °C

Time: PM 01:52:47

Humidity: 65 %



Condition:

Polarization: Horizontal

EUT:

Distance: 3m

Model:

Test Mode:

Note: EDR

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Comment
1	2483.5000	26.02	peak	28.85	54.87	74	-19.13	150	60	

File: 16-03-MAS-057\_BT

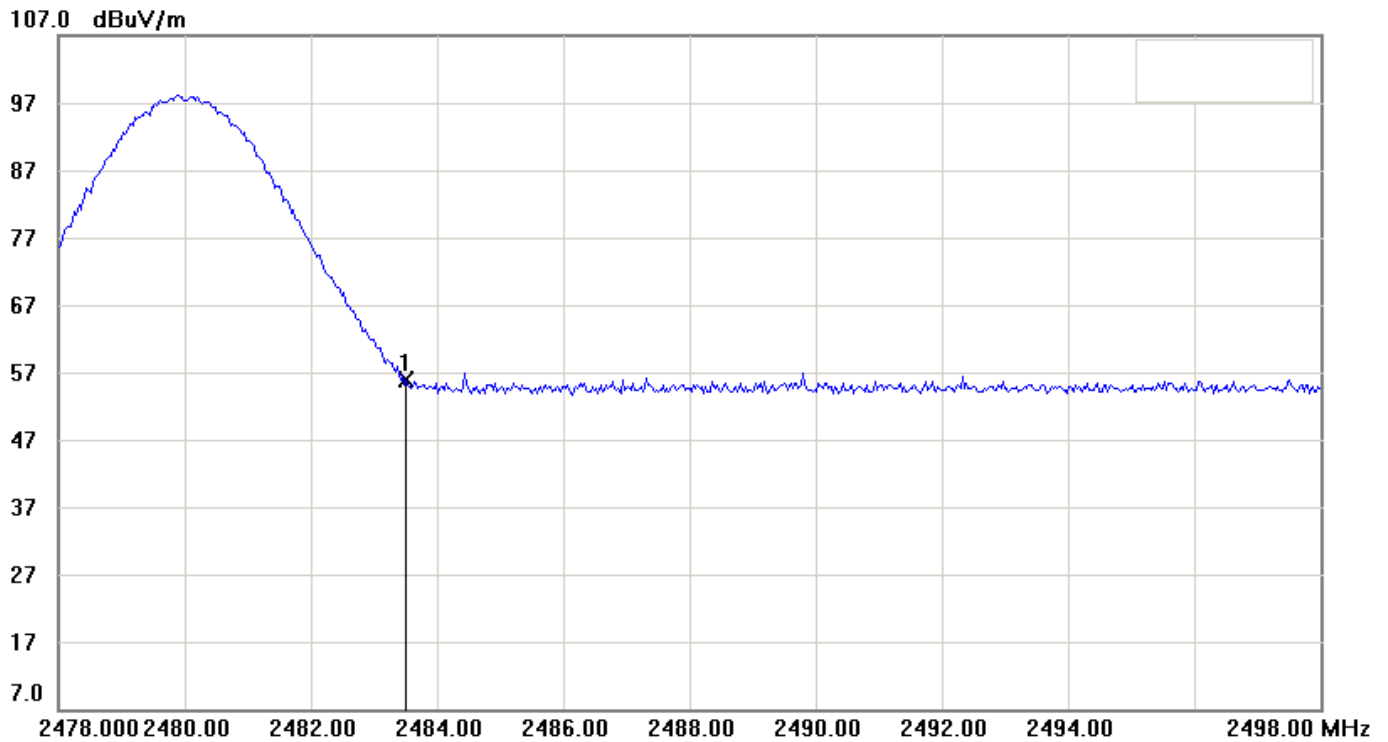
Data: #45

Date: 2016/3/24

Temperature: 22 °C

Time: PM 01:55:24

Humidity: 65 %



Condition:

Polarization: Vertical

EUT:

Distance: 3m

Model:

Test Mode:

Note: EDR

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Comment
1	2483.5000	26.91	peak	28.85	55.76	74	-18.24	150	61	

## 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:

$$\mathbf{Result = Reading + Corrected Factor + Duty Factor (if needed)}$$

where

$$\text{Corrected Factor} = \text{Antenna Factor} + \text{Cable Loss} + \text{High Pass Filter Loss} - \text{Amplifier Gain}$$



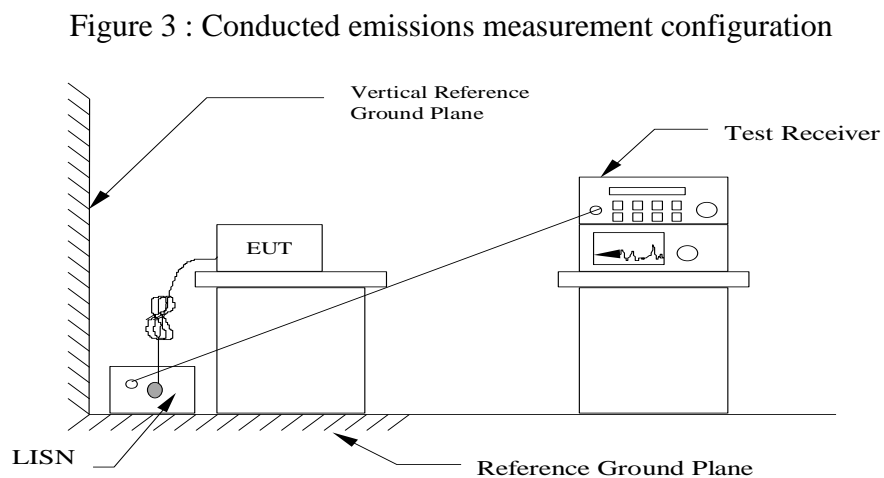
## 5 CONDUCTED EMISSION MEASUREMENT

### 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.



### 5.3 Conducted Emission Data

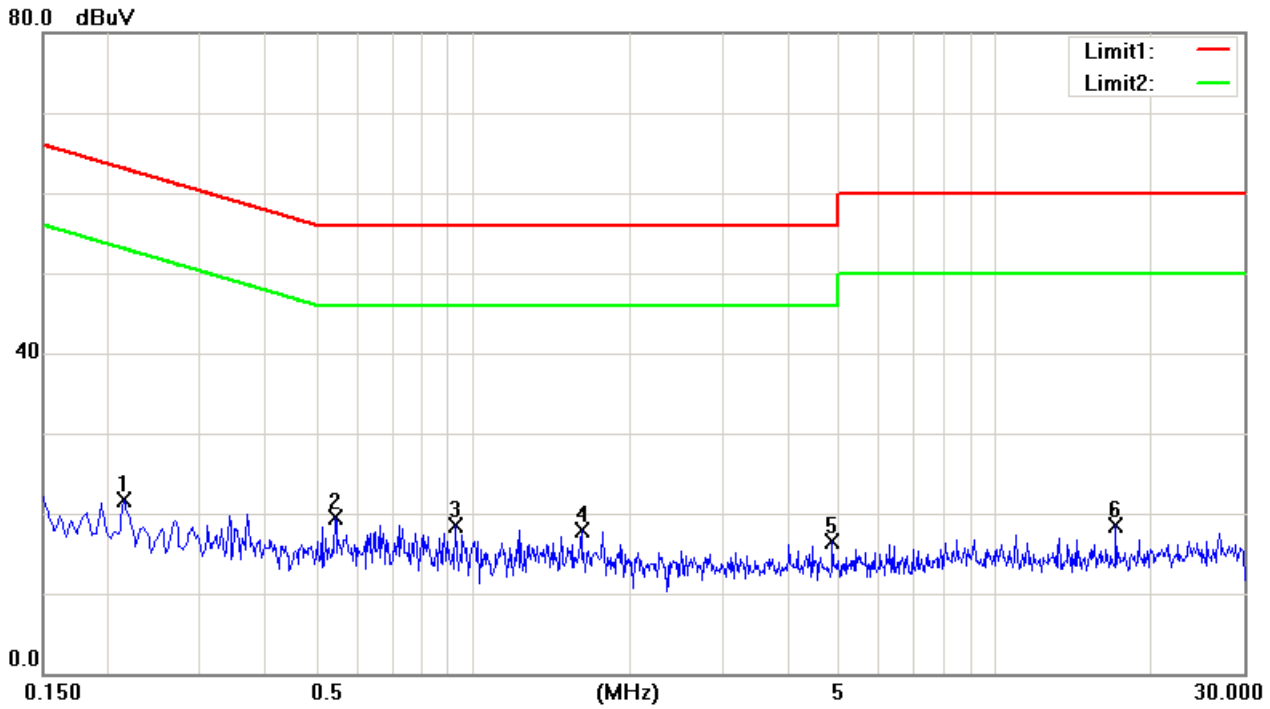
File: 16-03-MAS-057 Data: #1

Date: 2016/3/29

Temperature: 18 °C

Time: AM 10:23:08

Humidity: 66 %



Condition:

Phase:

L1

EUT:

Model:

Test Mode:

Note:

No.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected dB	Result (dBuV)	Limit (dBuV)	Margin (dB)
1	0.2140	12.09	peak	9.65	21.74	63.05	-41.31
2	0.5460	9.84	peak	9.66	19.50	56.00	-36.50
3	0.9260	8.85	peak	9.67	18.52	56.00	-37.48
4	1.6140	8.26	peak	9.69	17.95	56.00	-38.05
5	4.8780	6.65	peak	9.76	16.41	56.00	-39.59
6	17.0580	8.58	peak	9.89	18.47	60.00	-41.53

- 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  $\pm 2.5$ dB.

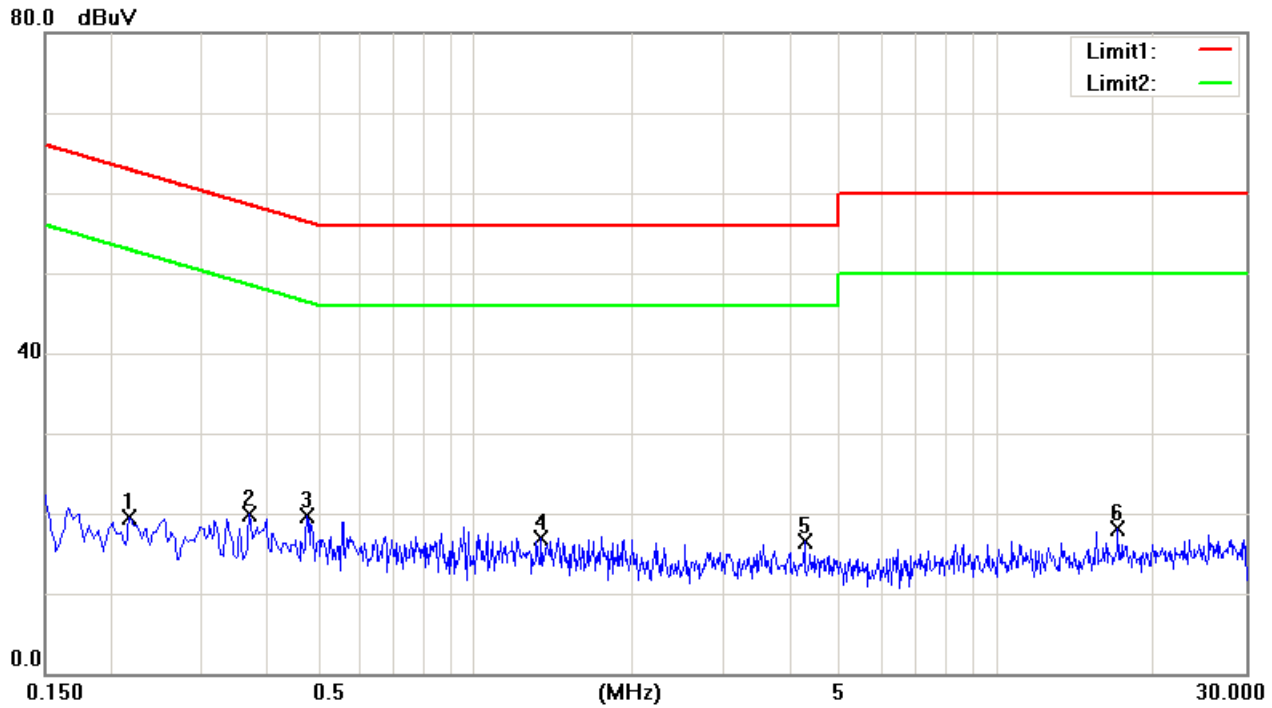
File: 16-03-MAS-057 Data: #2

Date: 2016/3/29

Temperature: 18 °C

Time: AM 10:23:40

Humidity: 66 %



Condition:

Phase:

N

EUT:

Model:

Test Mode:

Note:

No.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected dB	Result (dBuV)	Limit (dBuV)	Margin (dB)
1	0.2180	9.87	peak	9.63	19.50	62.89	-43.39
2	0.3700	10.28	peak	9.64	19.92	58.50	-38.58
3	0.4780	10.06	peak	9.64	19.70	56.37	-36.67
4	1.3420	7.29	peak	9.67	16.96	56.00	-39.04
5	4.2740	6.80	peak	9.72	16.52	56.00	-39.48
6	17.0500	8.09	peak	9.97	18.06	60.00	-41.94

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  $\pm 2.5\text{dB}$ .

## 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:

$$\mathbf{RESULT = READING + LISN FACTOR (Included Cable Loss)}$$

## 5.5 Conducted Measurement EquipMent

The following test equipMent are used during the conducted test.

<b>EquipMent</b>	<b>Manufacturer</b>	<b>Model No.</b>
EMI Test Receiver	R&S	ESCI
V-LISN	R&S	ENV216

## 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 antenna is a Dipole antenna.

Antenna Type	Dipole antenna
Antenna Gain	2 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 separated by a minimum of 25kHz or 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.
Spectrum Analyzer	Agilent	E4446A

## 7.4 Measurement Data

7.4.1 Operation Mode: NON-EDR

Test Date: Mar. 22, 2016

Temperature : 21°C

Humidity: 62%

Channel	20 dB Bandwidth (MHz)	Chart
L	0.950	Page 56
M	0.990	Page 57
H	0.965	Page 58

*Note: Please refer to page 56 to page 58 for chart.*

File: 16-03-MAS-057\_BT

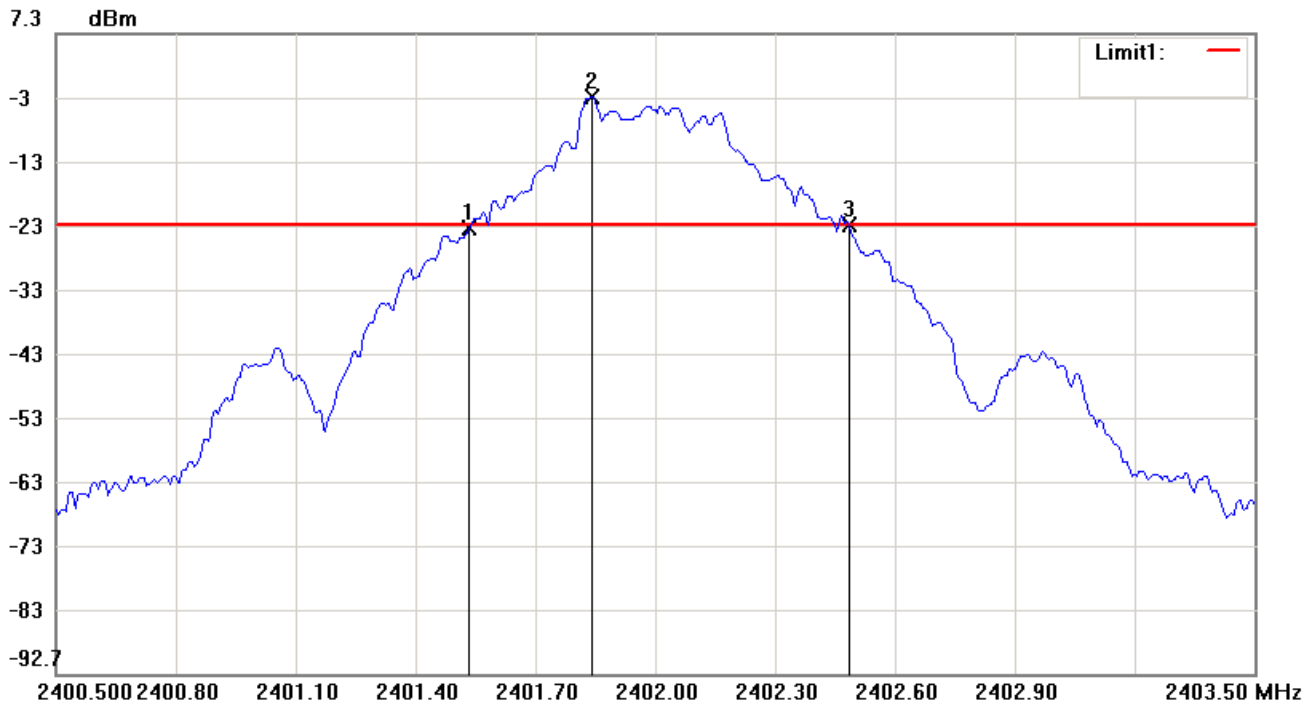
Data: #3

Date: 2016/3/22

Temperature: 21 °C

Time: PM 05:33:21

Humidity: 62 %



Condition: -22.53dBm

RF Conducted

EUT:

Sweep Time: 3.2ms Att.: 10dB

Model:

RBW: 30 KHz

VBW: 100 KHz

Test Mode:

Note: FCC-Bluetooth Channel 00-20dB EBW

No.	Frequency(MHz)	Level(dBm)
1	2401.53500	-23.01
2	2401.84000	-2.53
3	2402.48500	-22.64

No.		ΔFrequency(MHz)	ΔLevel(dB)
1	mk3-mk1	0.95	0.37



File: 16-03-MAS-057\_BT

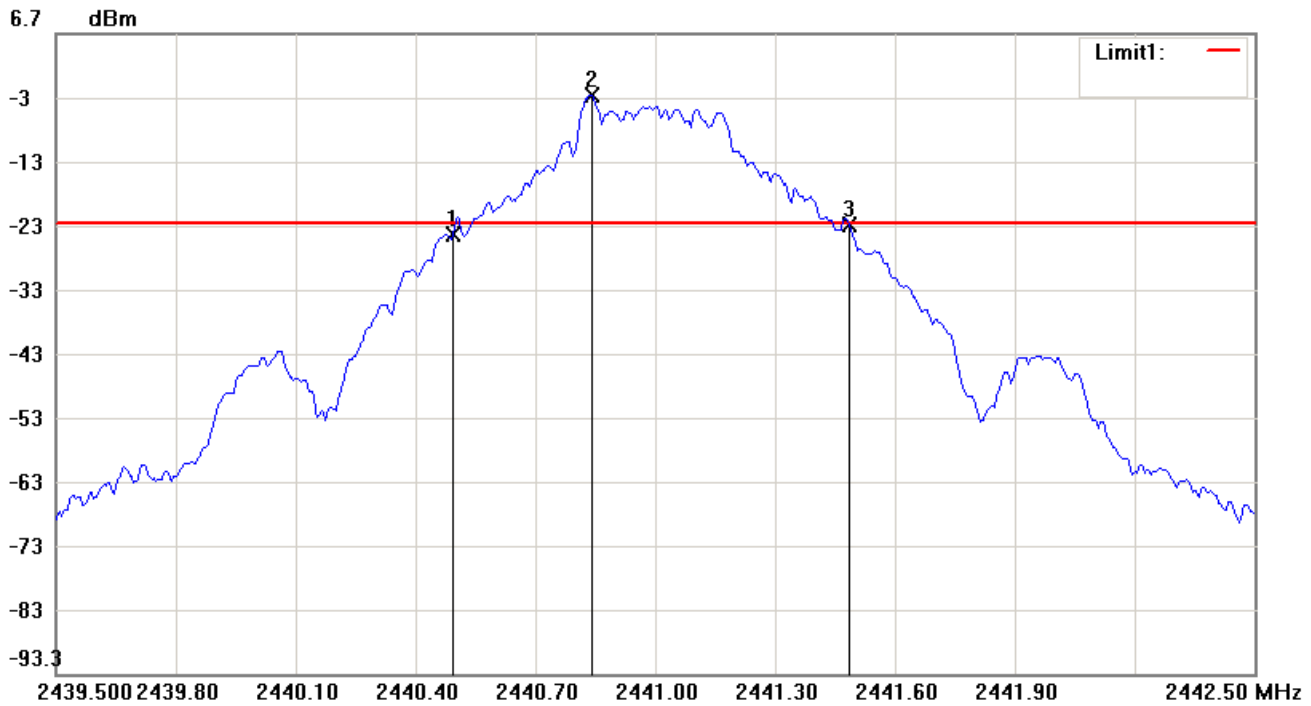
Data: #11

Date: 2016/3/22

Temperature: 21 °C

Time: PM 05:41:34

Humidity: 62 %



Condition: -22.96dBm

RF Conducted

EUT:

Sweep Time: 3.2ms Att.: 10dB

Model:

RBW: 30 KHz

VBW: 100 KHz

Test Mode:

Note: FCC-Bluetooth Channel 39-20dB EBW

No.	Frequency(MHz)	Level(dBm)
1	2440.49500	-24.69
2	2440.84000	-2.96
3	2441.48500	-23.12

No.		ΔFrequency(MHz)	ΔLevel(dB)
1	mk3-mk1	0.99	1.57

File: 16-03-MAS-057\_BT

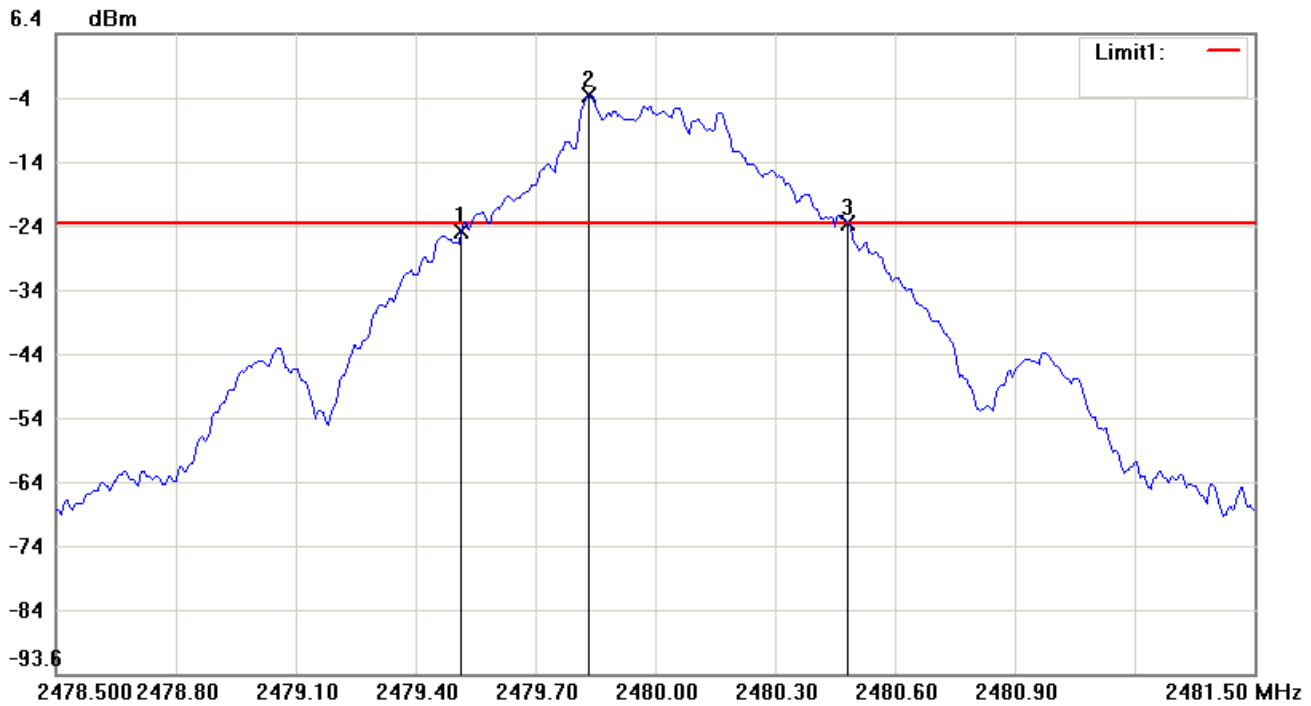
Data: #7

Date: 2016/3/22

Temperature: 21 °C

Time: PM 05:36:49

Humidity: 62 %



Condition: -23.17dBm

RF Conducted

EUT:

Sweep Time: 3.2ms Att.: 10dB

Model:

RBW: 30 KHz

VBW: 100 KHz

Test Mode:

Note: FCC-Bluetooth Channel 78-20dB EBW

No.	Frequency(MHz)	Level(dBm)
1	2479.51500	-24.44
2	2479.83500	-3.17
3	2480.48000	-23.32

No.		ΔFrequency(MHz)	ΔLevel(dB)
1	mk3-mk1	0.965	1.12

7.4.2 Operation Mode: EDR

Test Date: Mar. 22, 2016

Temperature : 21°C

Humidity: 62%

Channel	20 dB Bandwidth (MHz)	Chart
L	1.315	Page 60
M	1.310	Page 61
H	1.315	Page 62

**Note: Please refer to page 60 to page 62 for chart.**

File: 16-03-MAS-057\_BT

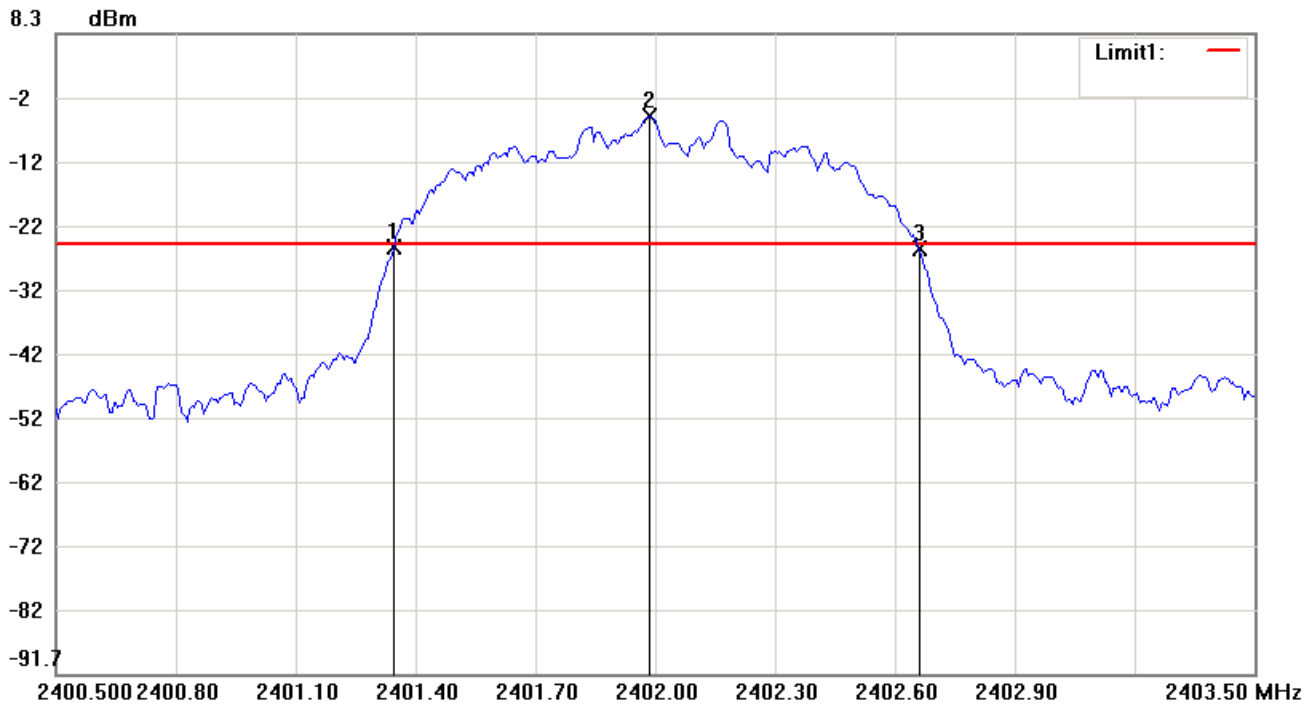
Data: #26

Date: 2016/3/22

Temperature: 21 °C

Time: PM 05:57:40

Humidity: 62 %



Condition: -24.62dBm

RF Conducted

EUT:

Sweep Time: 3.2ms Att.: 10dB

Model:

RBW: 30 KHz

VBW: 100 KHz

Test Mode:

Note: FCC-Bluetooth Channel 00-20dB EBW

No.	Frequency(MHz)	Level(dBm)
1	2401.34500	-25.15
2	2401.98500	-4.62
3	2402.66000	-25.21

No.		ΔFrequency(MHz)	ΔLevel(dB)
1	mk3-mk1	1.315	-0.06

File: 16-03-MAS-057\_BT

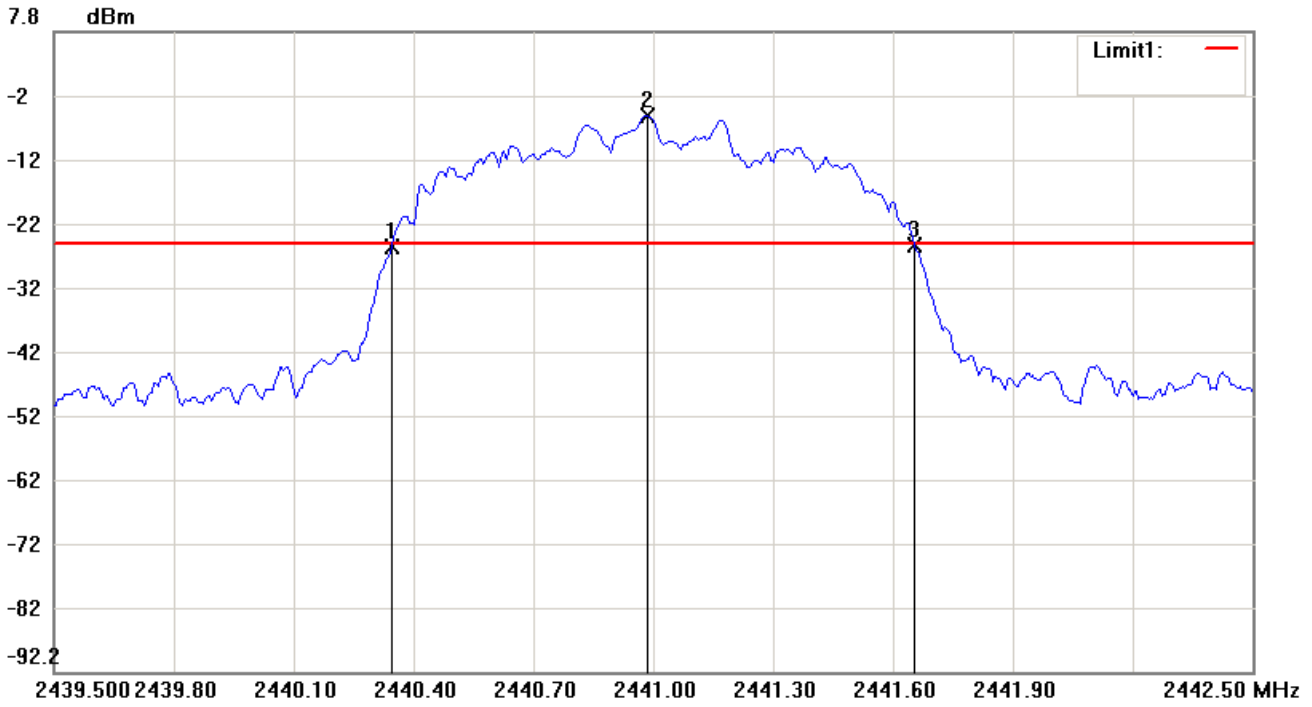
Data: #34

Date: 2016/3/22

Temperature: 21 °C

Time: PM 06:04:53

Humidity: 62 %



Condition: -25.35dBm

RF Conducted

EUT:

Sweep Time: 3.2ms Att.: 10dB

Model:

RBW: 30 KHz VBW: 100 KHz

Test Mode:

Note: FCC-Bluetooth Channel 39-20dB EBW

No.	Frequency(MHz)	Level(dBm)
1	2440.34500	-25.82
2	2440.98500	-5.35
3	2441.65500	-25.53

No.		ΔFrequency(MHz)	ΔLevel(dB)
1	mk3-mk1	1.31	0.29

File: 16-03-MAS-057\_BT

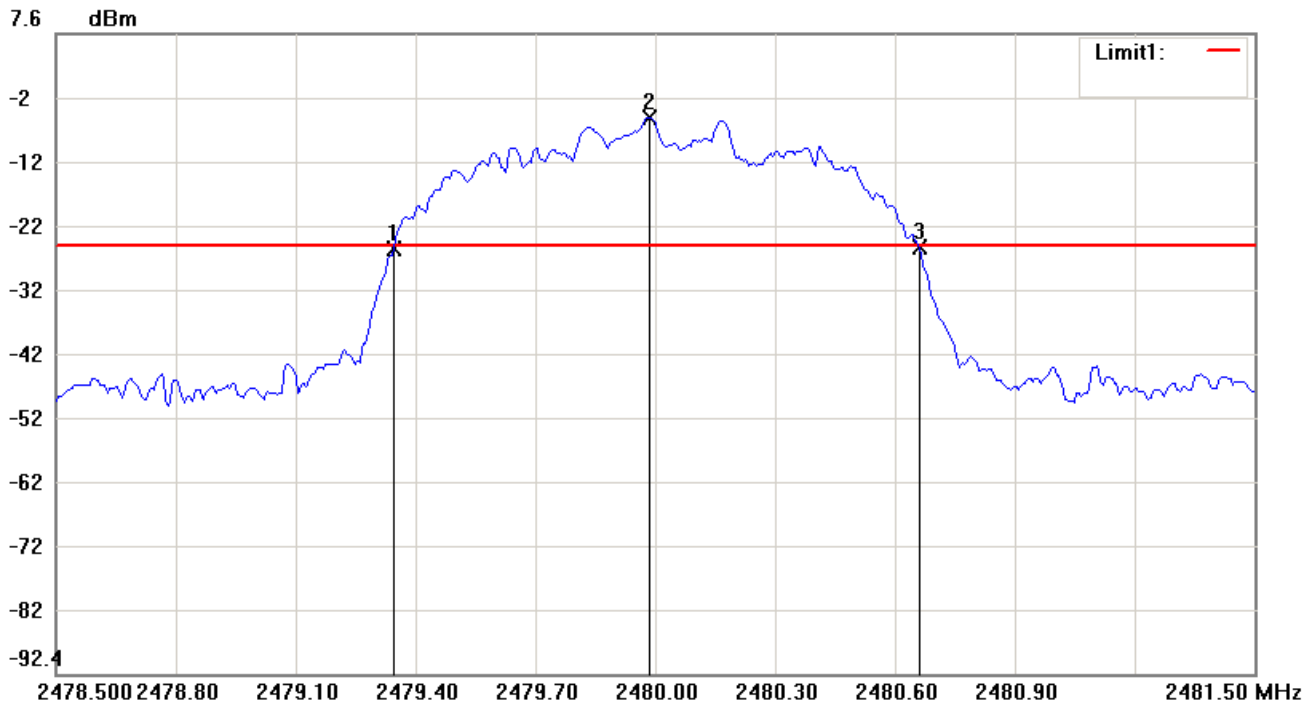
Data: #30

Date: 2016/3/22

Temperature: 21 °C

Time: PM 06:01:21

Humidity: 62 %



Condition: -25.43dBm

RF Conducted

EUT:

Sweep Time: 3.2ms Att.: 10dB

Model:

RBW: 30 KHz VBW: 100 KHz

Test Mode:

Note: FCC-Bluetooth Channel 78-20dB EBW

No.	Frequency(MHz)	Level(dBm)
1	2479.34500	-25.98
2	2479.98500	-5.43
3	2480.66000	-25.86

No.		ΔFrequency(MHz)	ΔLevel(dB)
1	mk3-mk1	1.315	0.12

## 8 OUTPUT POWER MEASUREMENT

### 8.1 Standard Applicable

For frequency hopping system, according to 15.247(b) (1) For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts. If Receiving 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. Add cable loss factor to measurement instrument to get maximum peak output power. 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 2 MHz and VBW to 2 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.
Spectrum Analyzer	Agilent	E4446A

## 8.4 Measurement Data

8.4.1 Operation Mode: NON-EDR

Test Date: Mar. 22, 2016

Temperature : 21°C

Humidity: 62%

Channel	Maximum Peak Output Power (dBm)	Maximum Peak Output Power (mW)	FCC Limit (mW)	Chart
L	-1.42	0.72	125	Page 65
M	-2.09	0.62	125	Page 66
H	-2.38	0.58	125	Page 67

*Note: Please refer to page 65 to page 67 for chart.*



File: 16-03-MAS-057\_BT

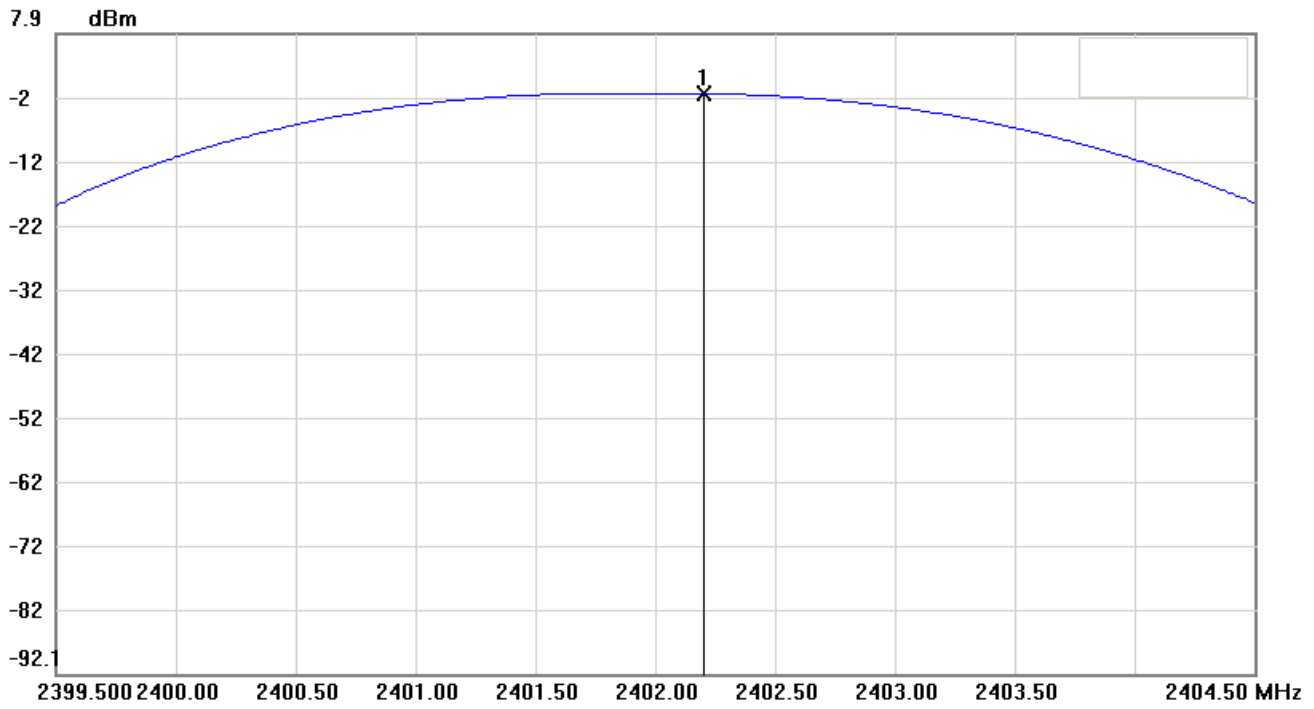
Data: #2

Date: 2016/3/22

Temperature: 21 °C

Time: PM 05:32:54

Humidity: 62 %



Condition:

RF Conducted

EUT:

Sweep Time: 1ms Att.: 10dB

Model:

RBW: 2000 KHz VBW: 2000 KHz

Test Mode:

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

No.	Frequency(MHz)	Level(dBm)
1	2402.20000	-1.42

File: 16-03-MAS-057\_BT

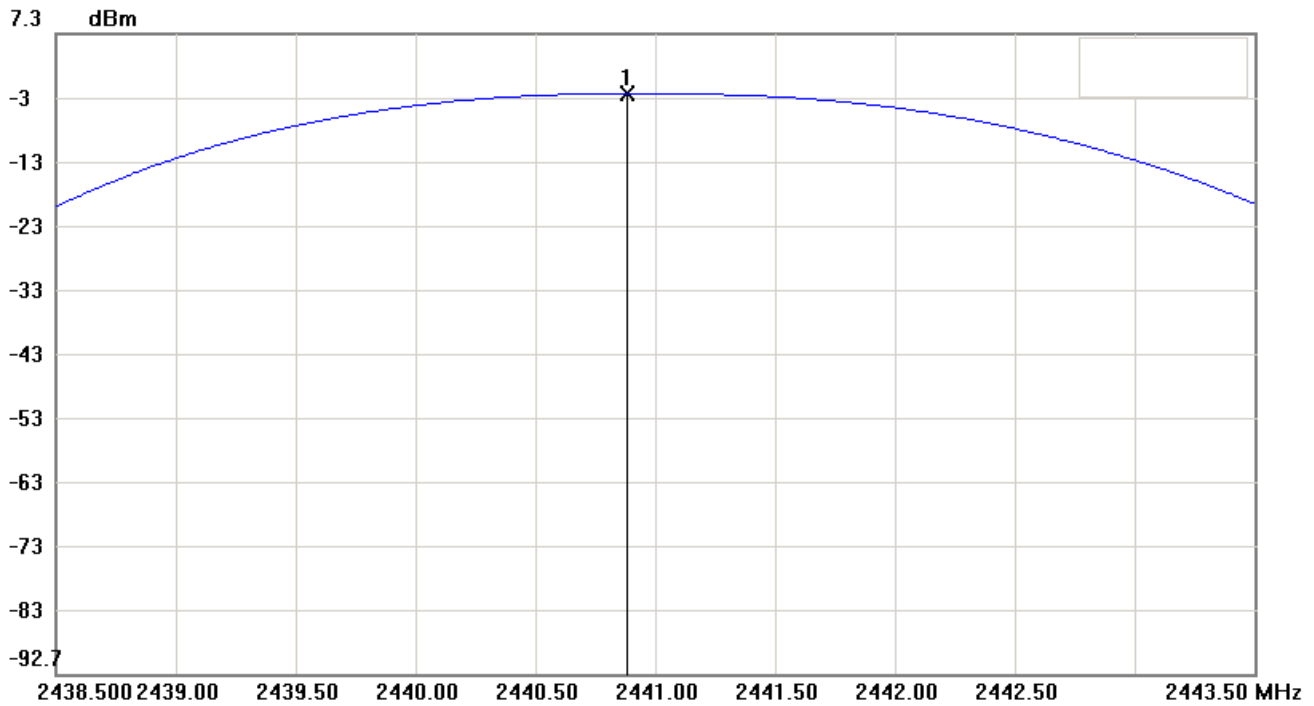
Data: #10

Date: 2016/3/22

Temperature: 21 °C

Time: PM 05:41:09

Humidity: 62 %



Condition:

RF Conducted

EUT:

Sweep Time: 1ms Att.: 10dB

Model:

RBW: 2000 KHz VBW: 2000 KHz

Test Mode:

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

No.	Frequency(MHz)	Level(dBm)
1	2440.88330	-2.09

File: 16-03-MAS-057\_BT

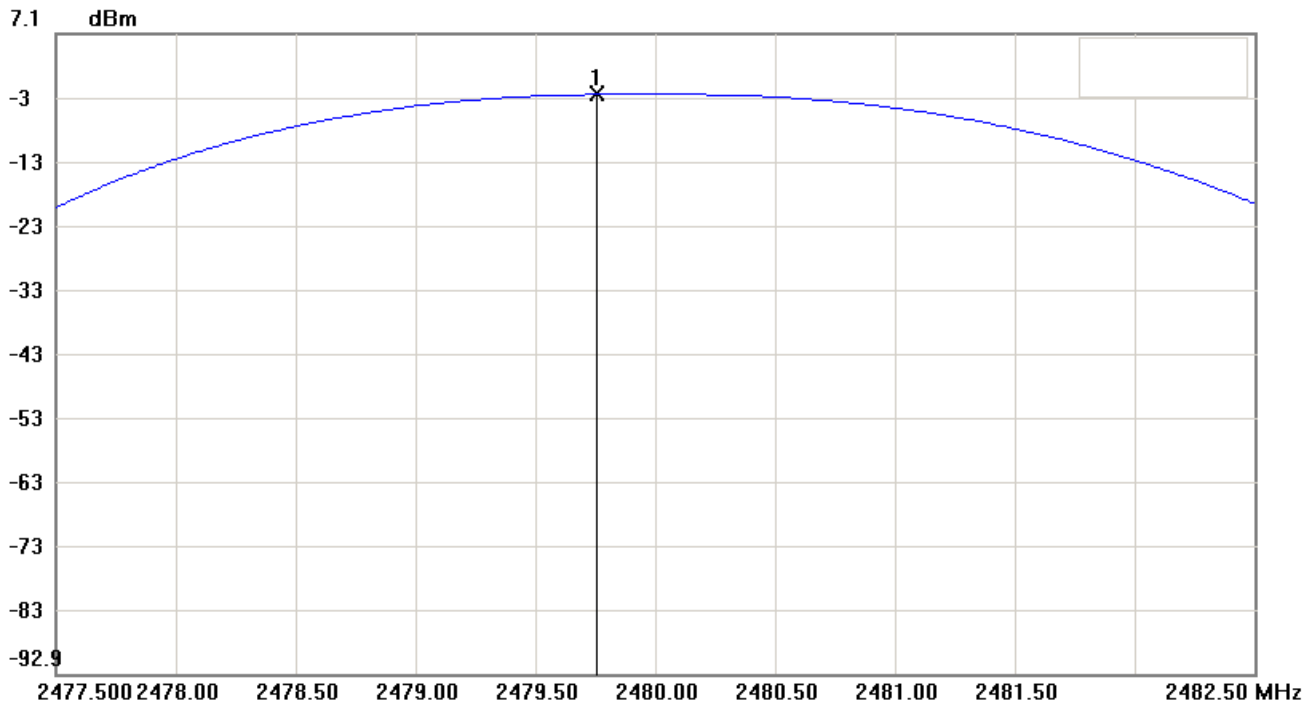
Data: #6

Date: 2016/3/22

Temperature: 21 °C

Time: PM 05:36:24

Humidity: 62 %



Condition:

RF Conducted

EUT:

Sweep Time: 1ms Att.: 10dB

Model:

RBW: 2000 KHz VBW: 2000 KHz

Test Mode:

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

No.	Frequency(MHz)	Level(dBm)
1	2479.75830	-2.38

8.4.2 Operation Mode: EDR

Test Date: Mar. 22, 2016

Temperature : 21°C

Humidity: 62%

Channel	Maximum Peak Output Power (dBm)	Maximum Peak Output Power (mW)	FCC Limit (mW)	Chart
L	0.68	1.17	125	Page 69
M	0.11	1.03	125	Page 70
H	-0.05	0.99	125	Page 71

**Note: Please refer to page 69 to page 71 for chart.**

File: 16-03-MAS-057\_BT

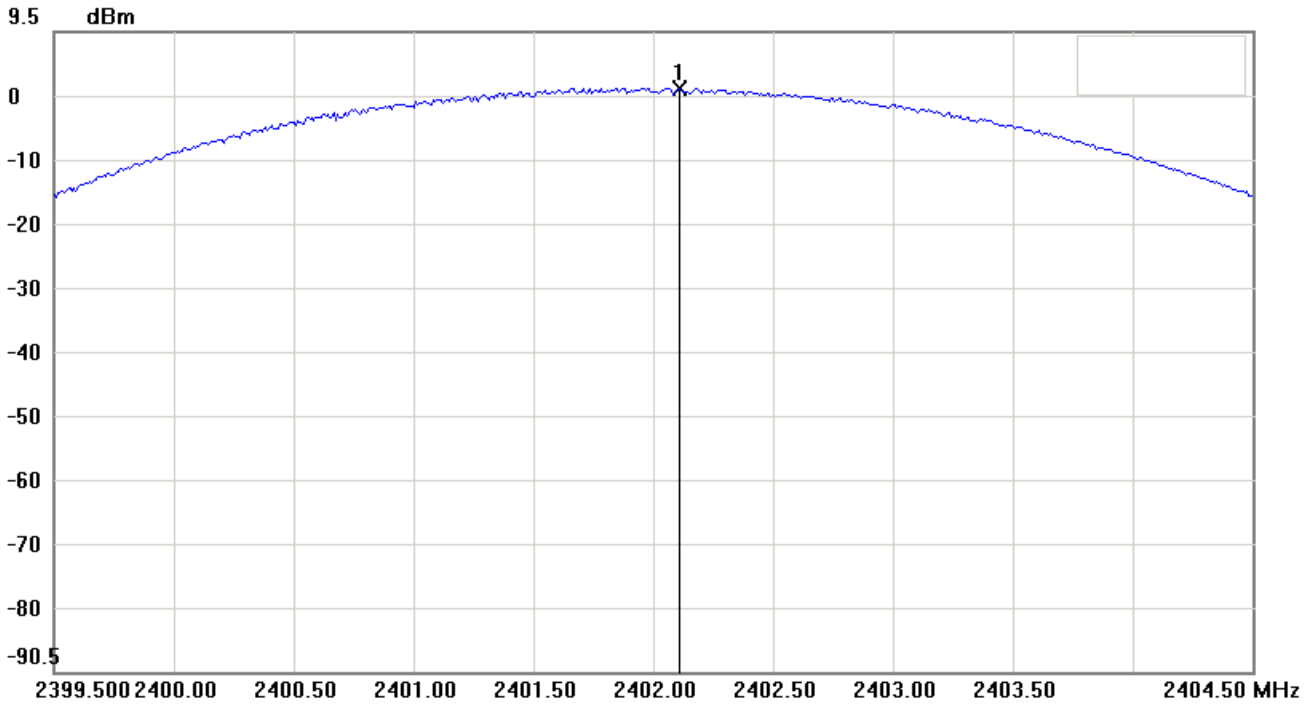
Data: #25

Date: 2016/3/22

Temperature: 21 °C

Time: PM 05:57:14

Humidity: 62 %



Condition:

RF Conducted

EUT:

Sweep Time: 1ms Att.: 10dB

Model:

RBW: 2000 KHz VBW: 2000 KHz

Test Mode:

Note: FCC Bluetooth CH00 Output Power (EDR)

No.	Frequency(MHz)	Level(dBm)
1	2402.10830	0.68

File: 16-03-MAS-057\_BT

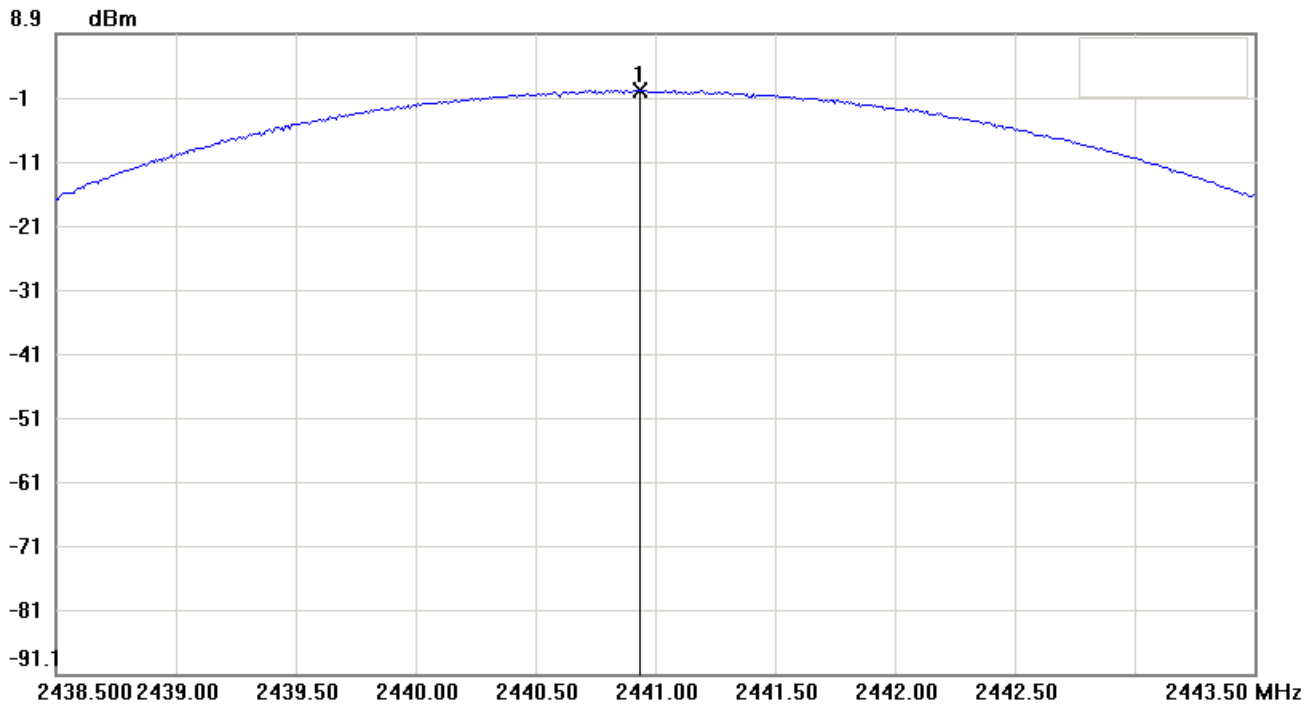
Data: #33

Date: 2016/3/22

Temperature: 21 °C

Time: PM 06:04:28

Humidity: 62 %



Condition:

RF Conducted

EUT:

Sweep Time: 1ms Att.: 10dB

Model:

RBW: 2000 KHz VBW: 2000 KHz

Test Mode:

Note: FCC Bluetooth CH39 Output Power (EDR)

No.	Frequency(MHz)	Level(dBm)
1	2440.93330	0.11

File: 16-03-MAS-057\_BT

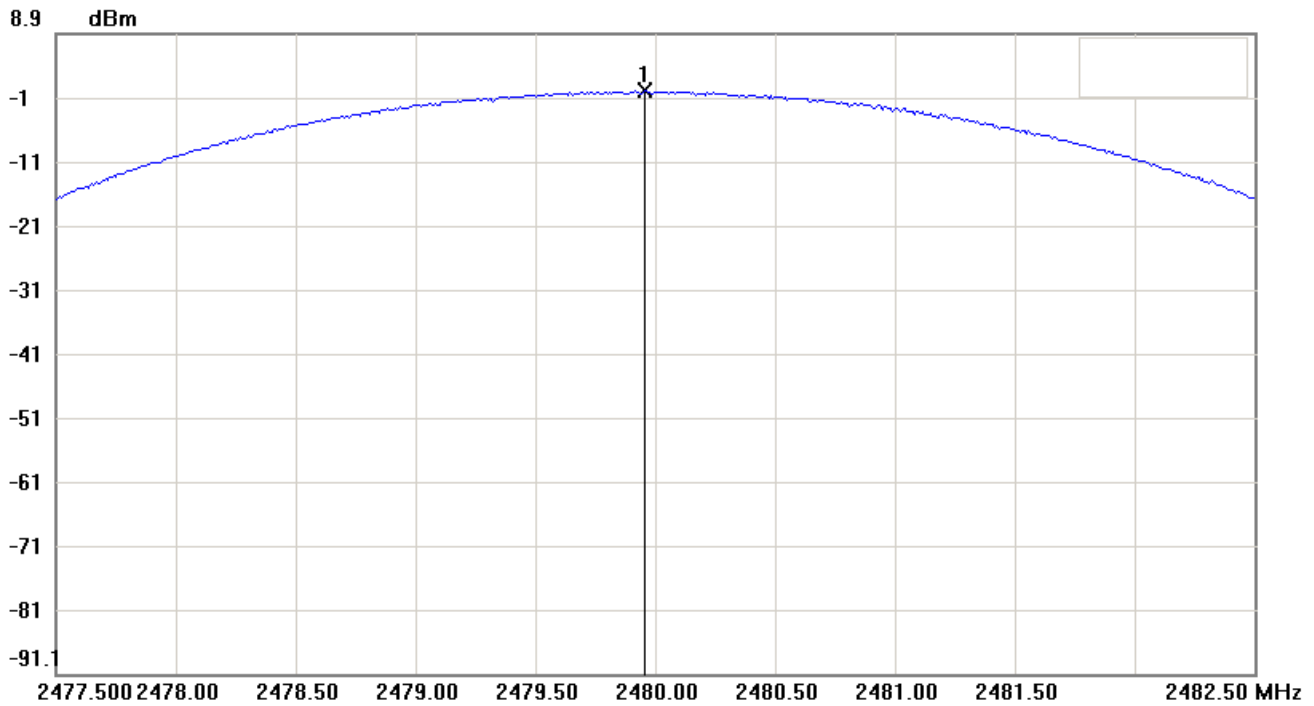
Data: #29

Date: 2016/3/22

Temperature: 21 °C

Time: PM 06:00:55

Humidity: 62 %



Condition:

RF Conducted

EUT:

Sweep Time: 1ms Att.: 10dB

Model:

RBW: 2000 KHz VBW: 2000 KHz

Test Mode:

Note: FCC Bluetooth CH78 Output Power (EDR)

No.	Frequency(MHz)	Level(dBm)
1	2479.95830	-0.05

## 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.
Spectrum Analyzer	Agilent	E4446A



## 9.4 Measurement Data

9.4.1 Operation Mode: NON-EDR

Test Date: Mar. 22, 2016

Temperature : 21°C

Humidity: 62%

Channel	Test Frequency Range	Note	Chart
0	2310 MHz - 2410 MHz	Lower Band Edge	Page 74-75
78	2483.5 MHz - 2533.5 MHz	Upper Band Edge	Page 76-77
0	30 MHz - 25 GHz		Page 78
39	30 MHz - 25 GHz		Page 79
78	30 MHz - 25 GHz		Page 80

**Note: Please refer to page 74 to page 80 for chart.**

File: 16-03-MAS-057\_BT

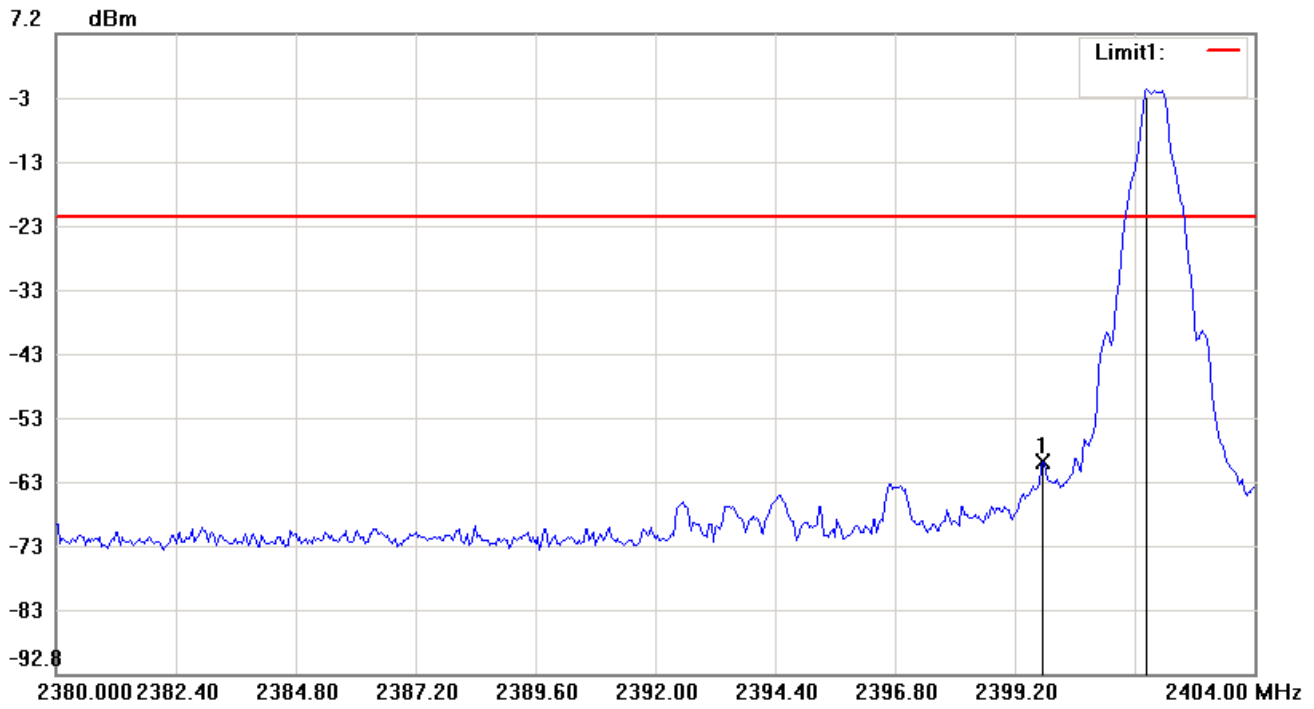
Data: #5

Date: 2016/3/22

Temperature: 21 °C

Time: PM 05:35:33

Humidity: 62 %



Condition: -21.4dBm

RF Conducted

EUT:

Sweep Time: 2.32ms Att.: 10dB

Model:

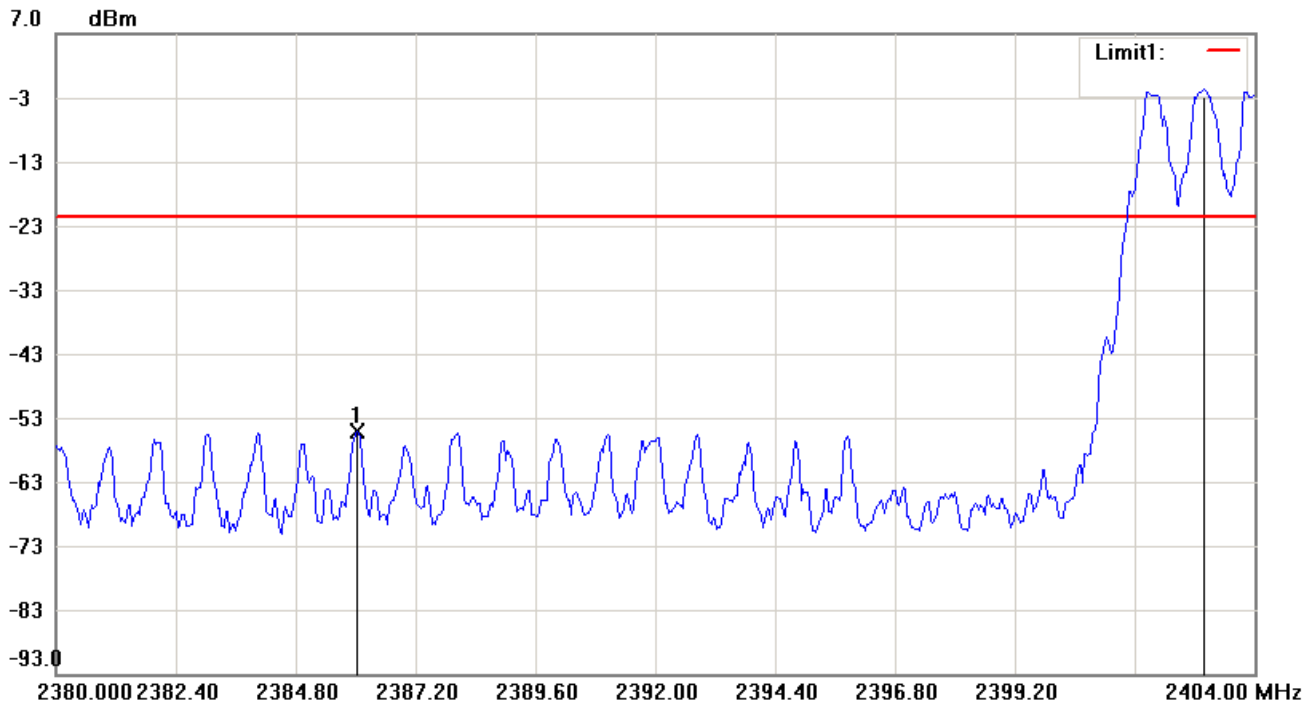
RBW: 100 KHz VBW: 300 KHz

Test Mode:

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

No.	Frequency(MHz)	Level(dBm)
1	2399.76000	-59.61
2	2401.84000	-1.40

File: 16-03-MAS-057\_BT      Data: #13      Date: 2016/3/22      Temperature: 21 °C  
 Time: PM 05:46:08      Humidity: 62 %



Condition: -21.74dBm      RF Conducted  
 EUT:      Sweep Time: 2.32ms      Att.: 10dB  
 Model:      RBW: 100 KHz      VBW: 300 KHz  
 Test Mode:  
 Note:      FCC-Bluetooth Channel 00-Bandedge (Hopping)

No.	Frequency(MHz)	Level(dBm)
1	2386.04000	-55.23
2	2403.00000	-1.74

File: 16-03-MAS-057\_BT

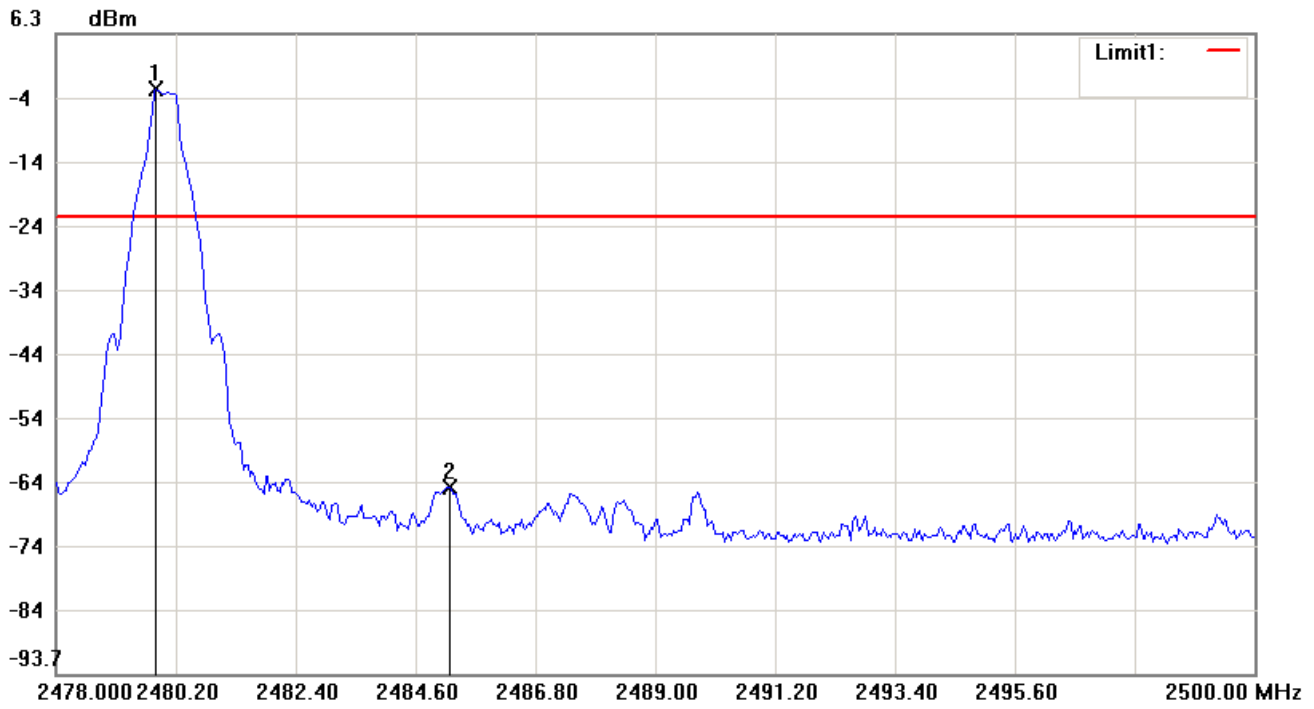
Data: #9

Date: 2016/3/22

Temperature: 21 °C

Time: PM 05:39:01

Humidity: 62 %



Condition: -22.39dBm

RF Conducted

EUT:

Sweep Time: 2.12ms Att.: 10dB

Model:

RBW: 100 KHz VBW: 300 KHz

Test Mode:

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

No.	Frequency(MHz)	Level(dBm)
1	2479.83330	-2.39
2	2485.22330	-64.61

File: 16-03-MAS-057\_BT

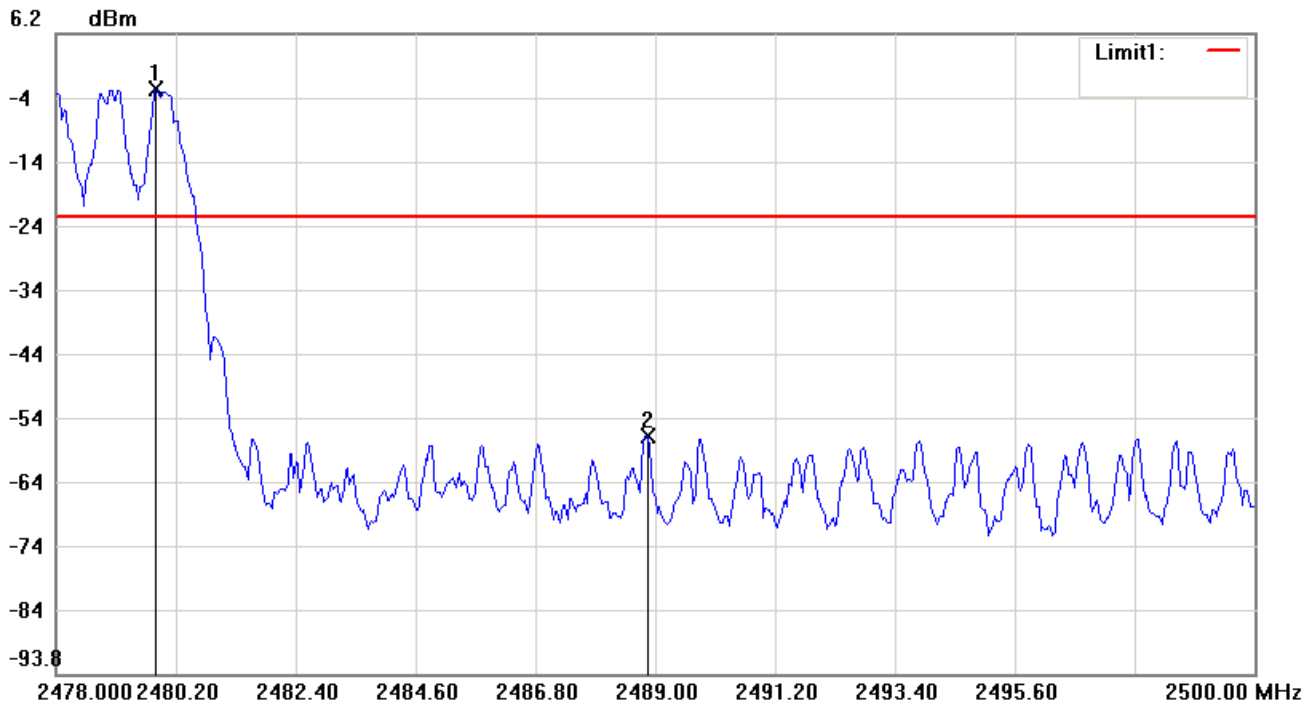
Data: #14

Date: 2016/3/22

Temperature: 21 °C

Time: PM 05:47:50

Humidity: 62 %



Condition: -22.33dBm

RF Conducted

EUT:

Sweep Time: 2.12ms Att.: 10dB

Model:

RBW: 100 KHz VBW: 300 KHz

Test Mode:

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

No.	Frequency(MHz)	Level(dBm)
1	2479.83330	-2.33
2	2488.81670	-56.61

File: 16-03-MAS-057\_BT

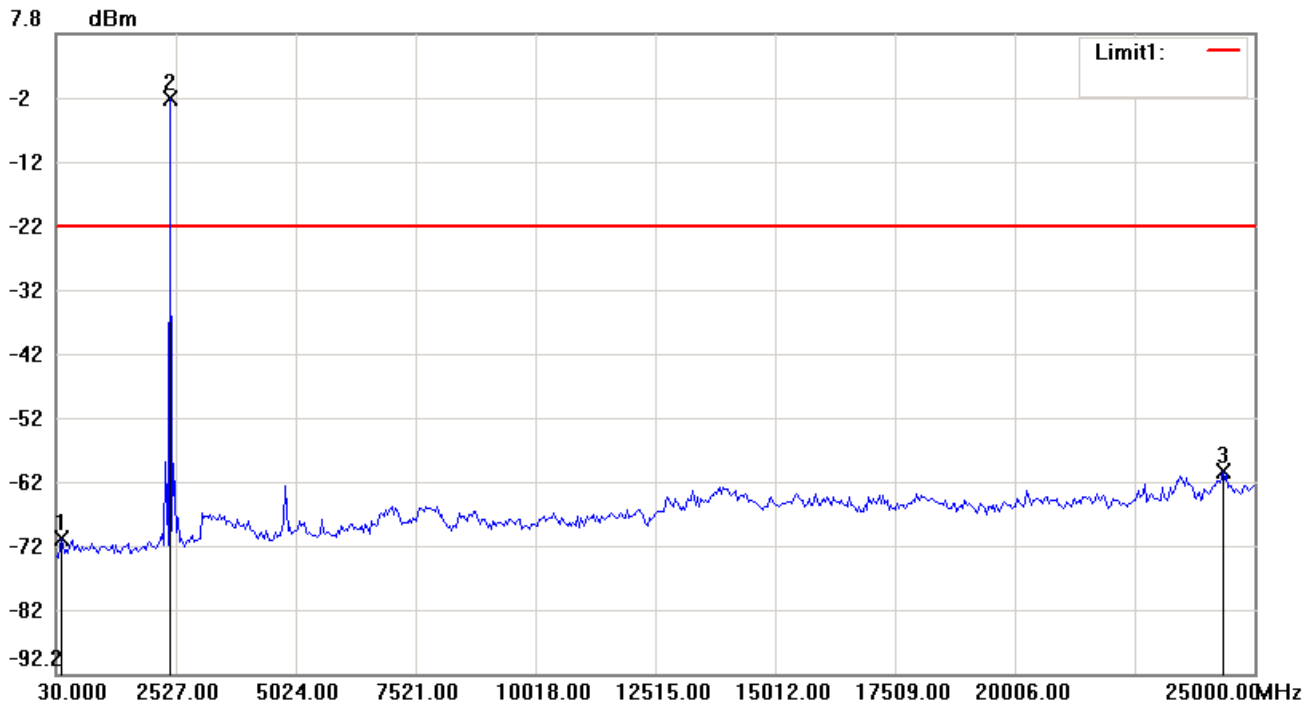
Data: #4

Date: 2016/3/22

Temperature: 21 °C

Time: PM 05:34:50

Humidity: 62 %



Condition: -22.33dBm

RF Conducted

EUT:

Sweep Time: 2386.4ms Att.: 10dB

Model:

RBW: 100 KHz VBW: 300 KHz

Test Mode:

Note: FCC-BT Channel 00-Conducted Spurious

No.	Frequency(MHz)	Level(dBm)
1	154.8500	-70.99
2	2402.15000	-2.33
3	24334.13330	-60.52

File: 16-03-MAS-057\_BT

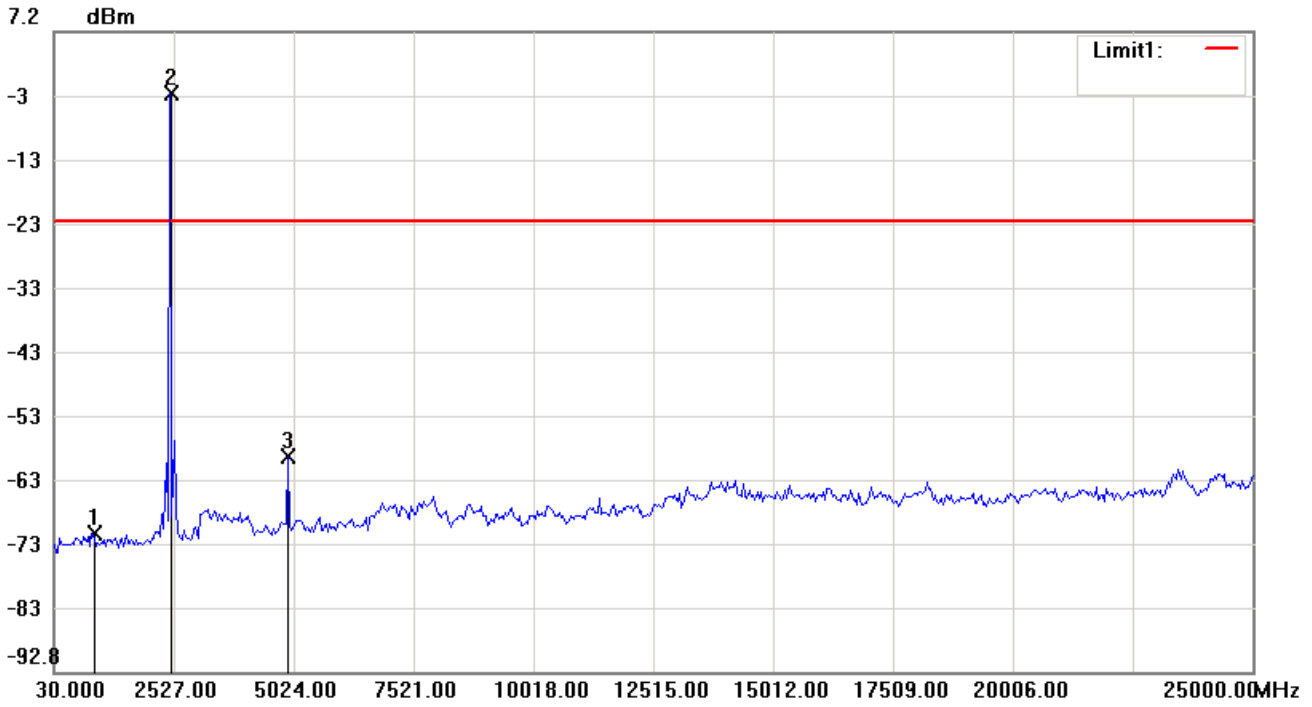
Data: #12

Date: 2016/3/22

Temperature: 21 °C

Time: PM 05:43:03

Humidity: 62 %



Condition: -22.4dBm

RF Conducted

EUT:

Sweep Time: 2386.4ms Att.: 10dB

Model:

RBW: 100 KHz VBW: 300 KHz

Test Mode:

Note: FCC-BT Channel 39-Conducted Spurious

No.	Frequency(MHz)	Level(dBm)
1	820.7167	-71.18
2	2443.76670	-2.40
3	4899.15000	-59.02

File: 16-03-MAS-057\_BT

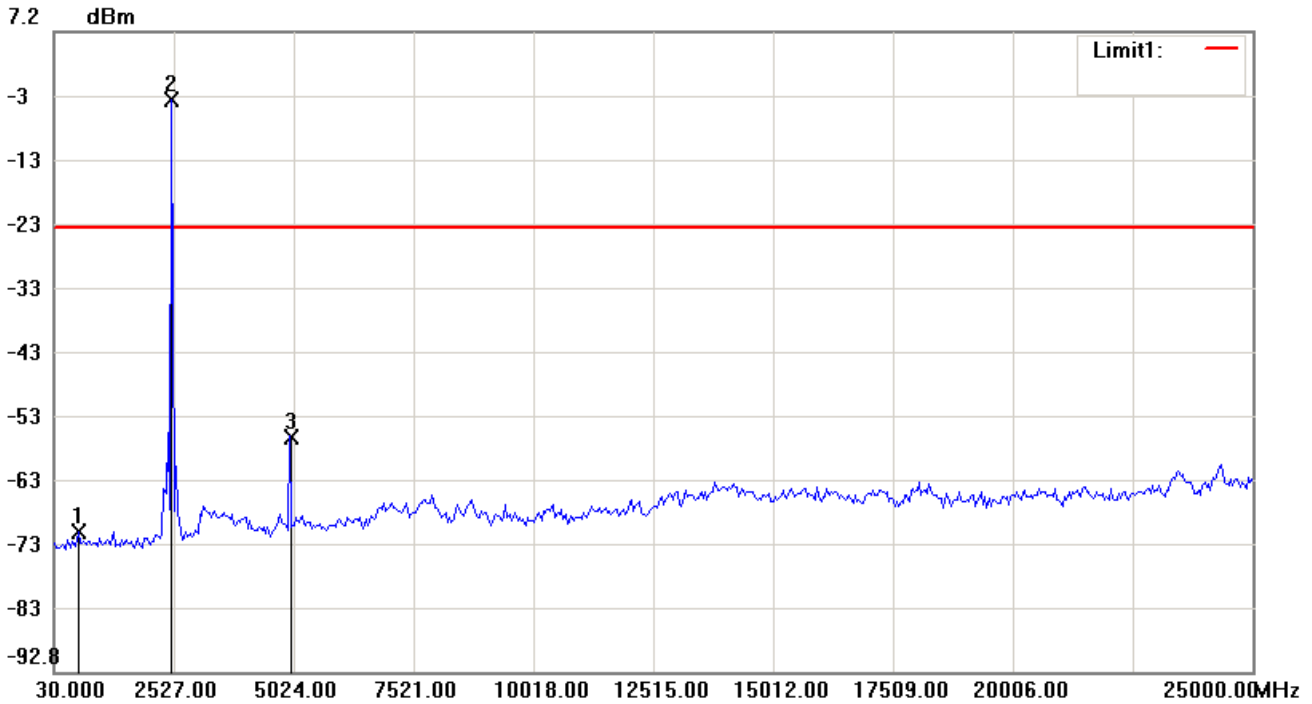
Data: #8

Date: 2016/3/22

Temperature: 21 °C

Time: PM 05:38:18

Humidity: 62 %



Condition: -23.57dBm

RF Conducted

EUT:

Sweep Time: 2386.4ms Att.: 10dB

Model:

RBW: 100 KHz VBW: 300 KHz

Test Mode:

Note: FCC-BT Channel 78-Conducted Spurious

No.	Frequency(MHz)	Level(dBm)
1	529.4000	-71.05
2	2485.38330	-3.57
3	4940.76670	-56.10



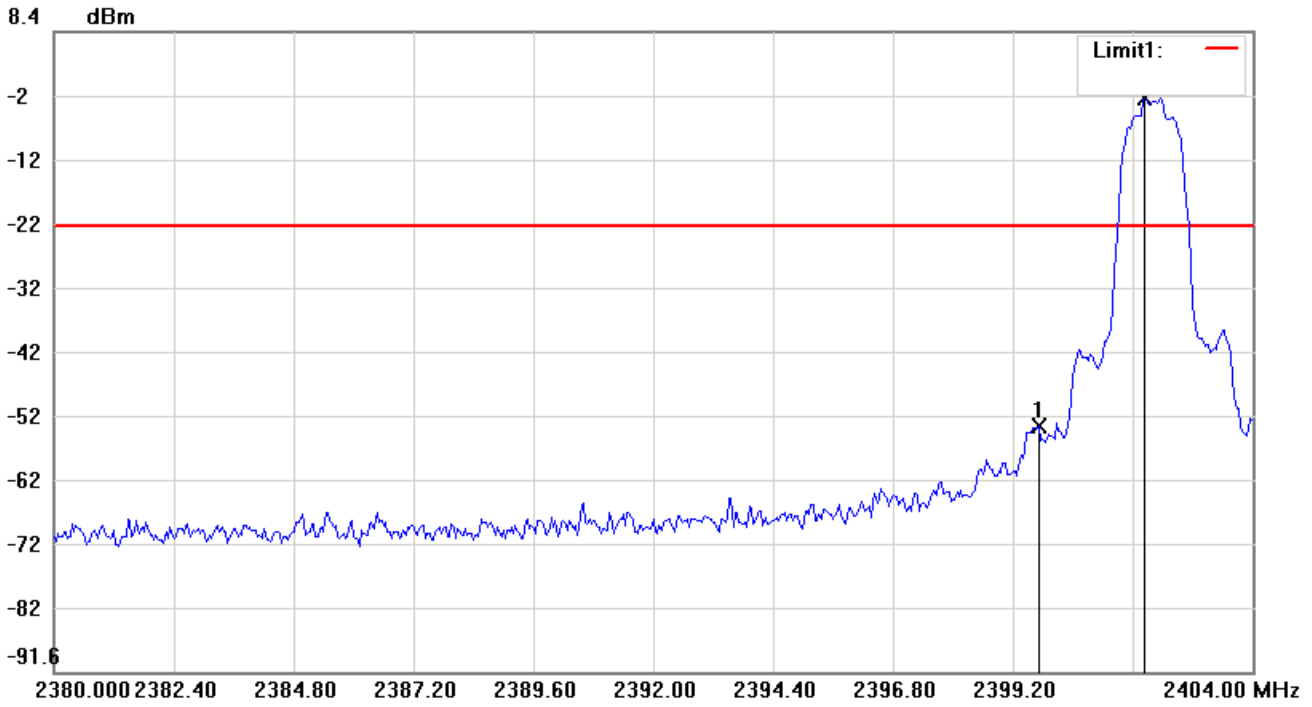
9.4.2 Operation Mode: EDR

Test Date: Mar. 22, 2016    Temperature : 21°C Humidity: 62%

Channel	Test Frequency Range	Note	Chart
0	2310 MHz - 2410 MHz	Lower Band Edge	Page 82-83
78	2483.5 MHz - 2533.5 MHz	Upper Band Edge	Page 84-85
0	30 MHz - 25 GHz		Page 86
39	30 MHz - 25 GHz		Page 87
78	30 MHz - 25 GHz		Page 88

**Note: Please refer to page 82 to page 88 for chart.**

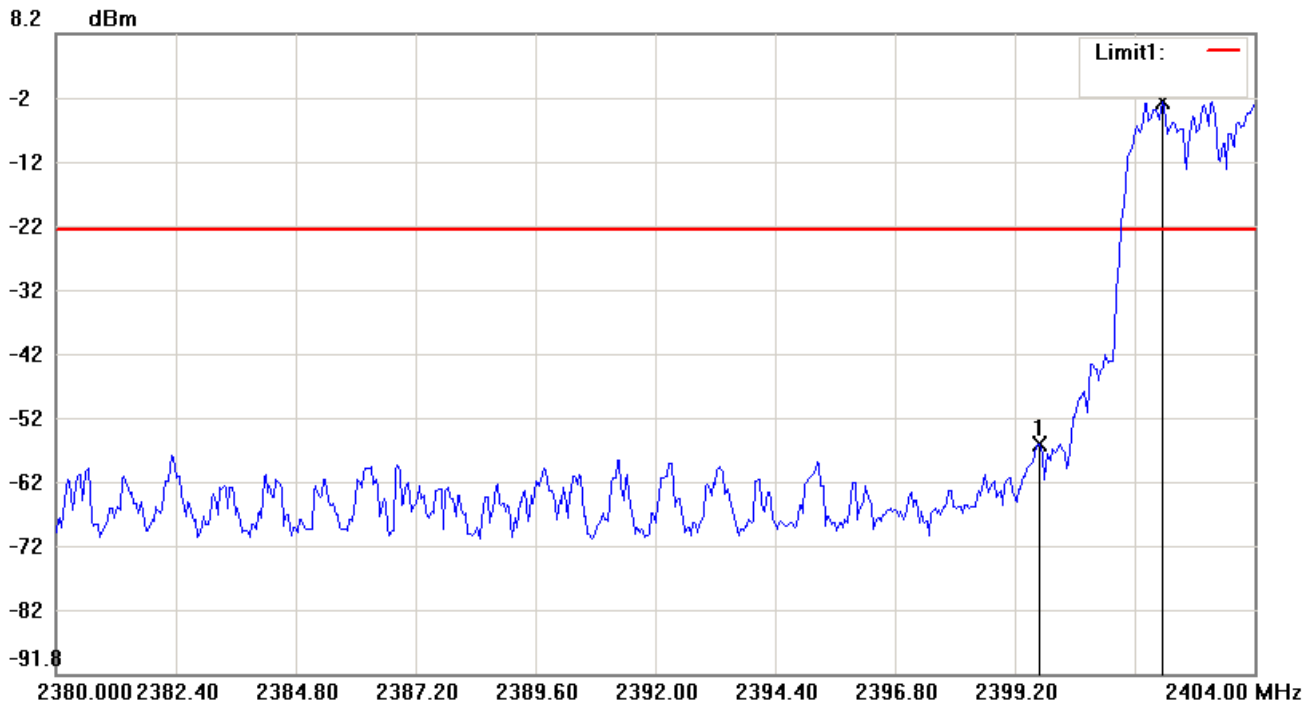
File: 16-03-MAS-057\_BT      Data: #28      Date: 2016/3/22      Temperature: 21 °C  
 Time: PM 05:59:52      Humidity: 62 %



Condition: -21.9dBm      RF Conducted  
 EUT:      Sweep Time: 2.32ms      Att.: 10dB  
 Model:      RBW: 100 KHz      VBW: 300 KHz  
 Test Mode:  
 Note:      FCC-Bluetooth Channel 00-Bandedge (Fixed)

No.	Frequency(MHz)	Level(dBm)
1	2399.72000	-53.26
2	2401.84000	-1.90

File: 16-03-MAS-057\_BT      Data: #36      Date: 2016/3/22      Temperature: 21 °C  
 Time: PM 06:08:15      Humidity: 62 %



Condition: -22.5dBm      RF Conducted  
 EUT:      Sweep Time: 2.32ms      Att.: 10dB  
 Model:      RBW: 100 KHz      VBW: 300 KHz  
 Test Mode:  
 Note:      FCC-Bluetooth Channel 00-Bandedge (Hopping)

No.	Frequency(MHz)	Level(dBm)
1	2399.68000	-55.90
2	2402.16000	-2.50

File: 16-03-MAS-057\_BT

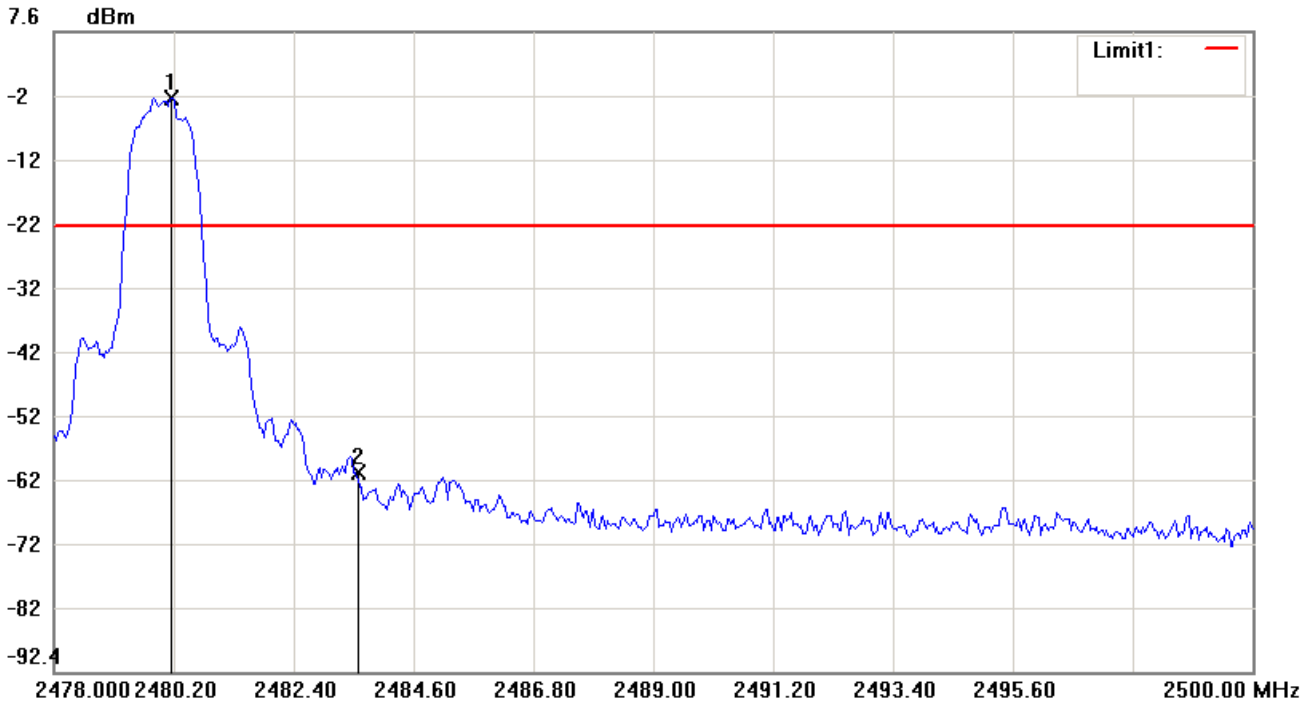
Data: #32

Date: 2016/3/22

Temperature: 21 °C

Time: PM 06:03:34

Humidity: 62 %



Condition: -22.79dBm

RF Conducted

EUT:

Sweep Time: 2.12ms Att.: 10dB

Model:

RBW: 100 KHz VBW: 300 KHz

Test Mode:

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

No.	Frequency(MHz)	Level(dBm)
1	2480.16330	-2.79
2	2483.53670	-61.19

File: 16-03-MAS-057\_BT

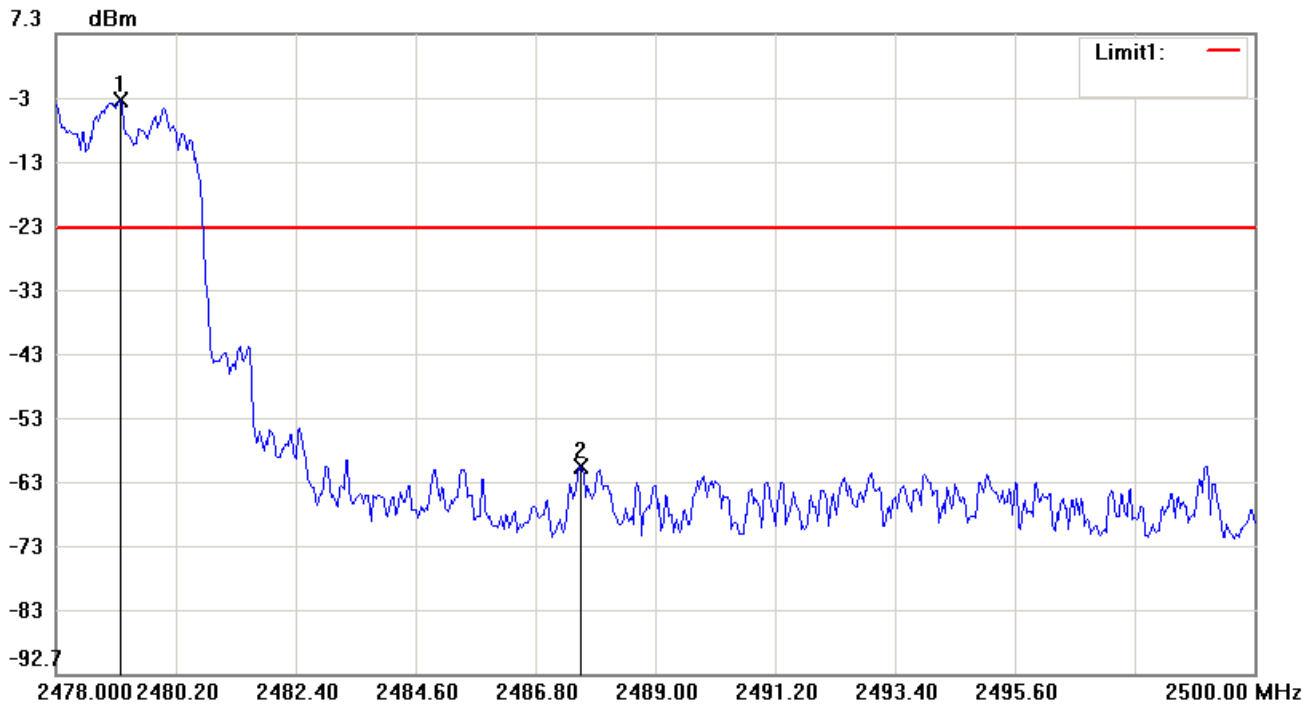
Data: #37

Date: 2016/3/22

Temperature: 21 °C

Time: PM 06:09:57

Humidity: 62 %



Condition: -23.13dBm

RF Conducted

EUT:

Sweep Time: 2.12ms Att.: 10dB

Model:

RBW: 100 KHz VBW: 300 KHz

Test Mode:

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

No.	Frequency(MHz)	Level(dBm)
1	2479.17330	-3.13
2	2487.64330	-60.34

File: 16-03-MAS-057\_BT

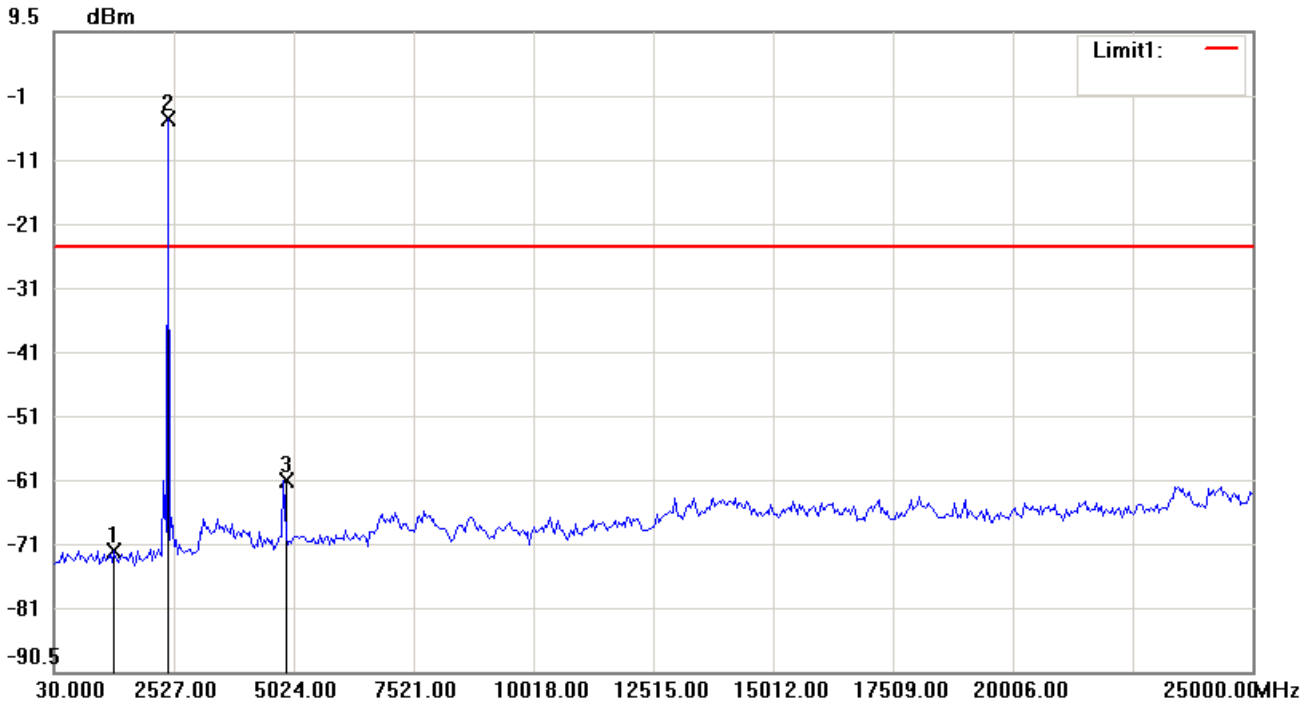
Data: #27

Date: 2016/3/22

Temperature: 21 °C

Time: PM 05:59:08

Humidity: 62 %



Condition: -24.13dBm

RF Conducted

EUT:

Sweep Time: 2386.4ms Att.: 10dB

Model:

RBW: 100 KHz VBW: 300 KHz

Test Mode:

Note: FCC-BT Channel 00-Conducted Spurious

No.	Frequency(MHz)	Level(dBm)
1	1278.50000	-71.55
2	2402.15000	-4.13
3	4815.91670	-60.73

File: 16-03-MAS-057\_BT

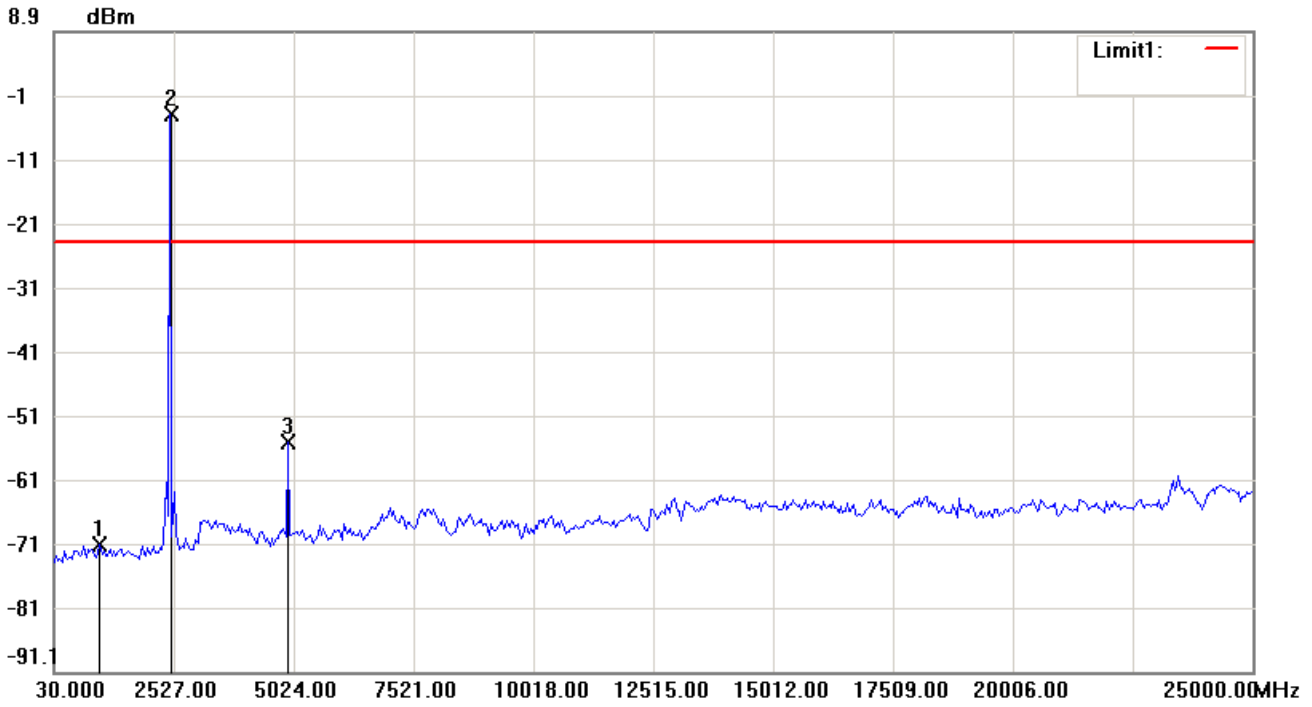
Data: #35

Date: 2016/3/22

Temperature: 21 °C

Time: PM 06:06:22

Humidity: 62 %



Condition: -23.96dBm

RF Conducted

EUT:

Sweep Time: 2386.4ms Att.: 10dB

Model:

RBW: 100 KHz VBW: 300 KHz

Test Mode:

Note: FCC-BT Channel 39-Conducted Spurious

No.	Frequency(MHz)	Level(dBm)
1	987.1833	-71.35
2	2443.76670	-3.96
3	4899.15000	-55.19

File: 16-03-MAS-057\_BT

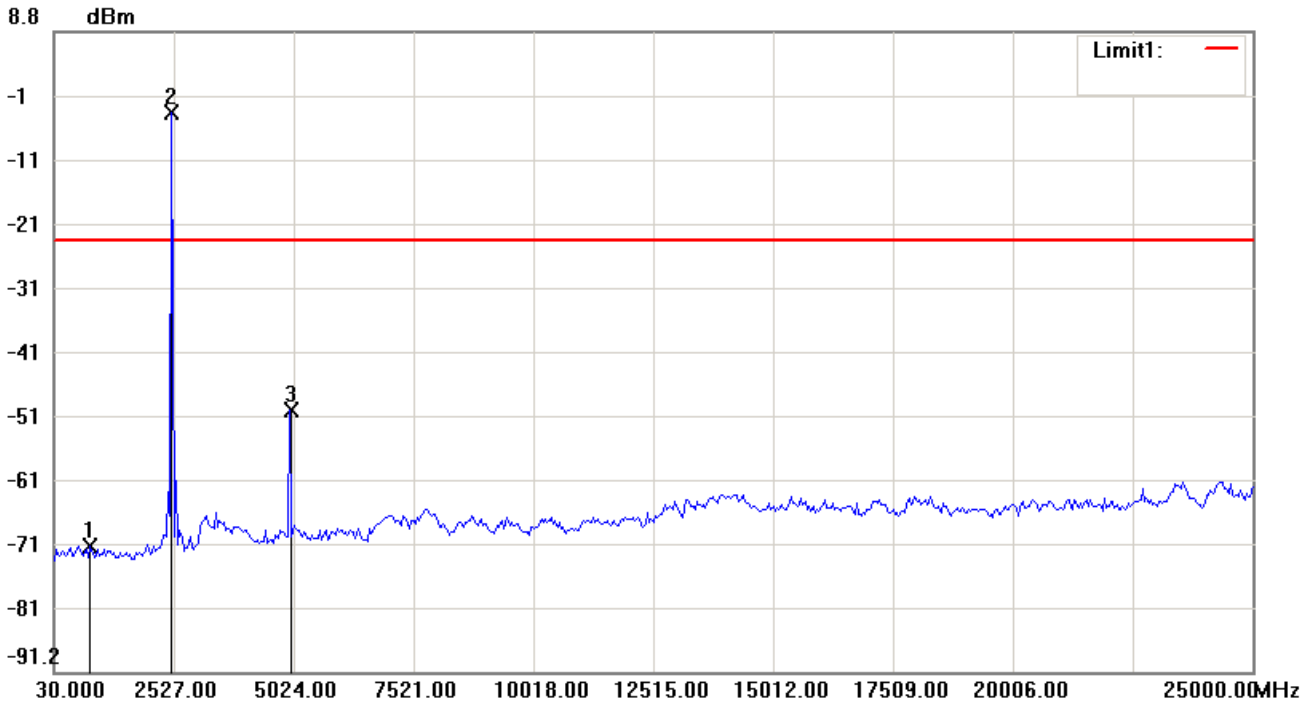
Data: #31

Date: 2016/3/22

Temperature: 21 °C

Time: PM 06:02:49

Humidity: 62 %



Condition: -23.79dBm

RF Conducted

EUT:

Sweep Time: 2386.4ms Att.: 10dB

Model:

RBW: 100 KHz VBW: 300 KHz

Test Mode:

Note: FCC-BT Channel 78-Conducted Spurious

No.	Frequency(MHz)	Level(dBm)
1	779.1000	-71.66
2	2485.38330	-3.79
3	4940.76670	-50.47



## 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 maximum to measure the number of hopping channels.

### 10.3 Measurement EquipMent

EquipMent	Manufacturer	Model No.
Spectrum Analyzer	Agilent	E4446A

### 10.4 Measurement Data

Test Date: Mar. 22, 2016

Temperature : 21°C

Humidity: 62%

Number of hopping channels = 79 channels

*Note: Please refer to page 90 to page 92 for chart.*

File: 16-03-MAS-  
057\_BT

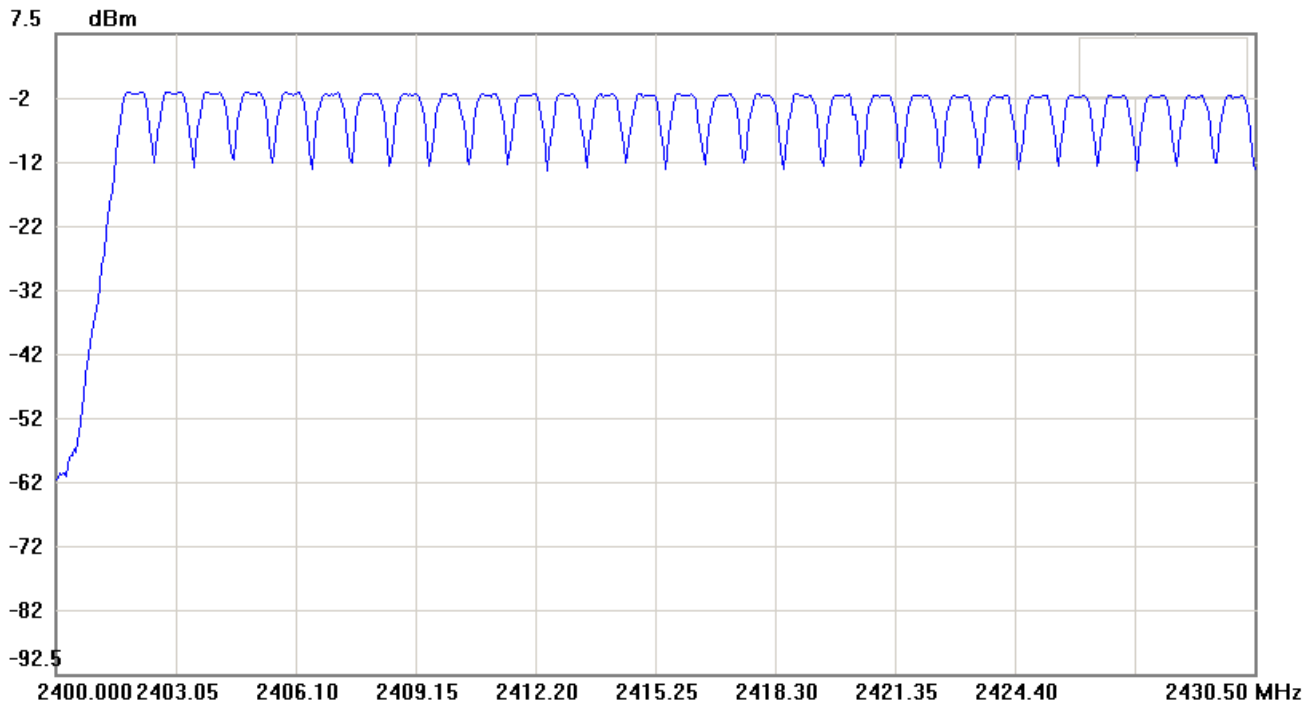
Data: #22

Date: 2016/3/22

Temperature: 21 °C

Time: PM 05:52:44

Humidity: 62 %



Condition:

RF Conducted

EUT:

Sweep Time: 1ms Att.: 10dB

Model:

RBW: 300 KHz VBW: 300 KHz

Test Mode:

Note: FCC-Bluetooth Number of Hopping Channels -Part1

File: 16-03-MAS-  
057\_BT

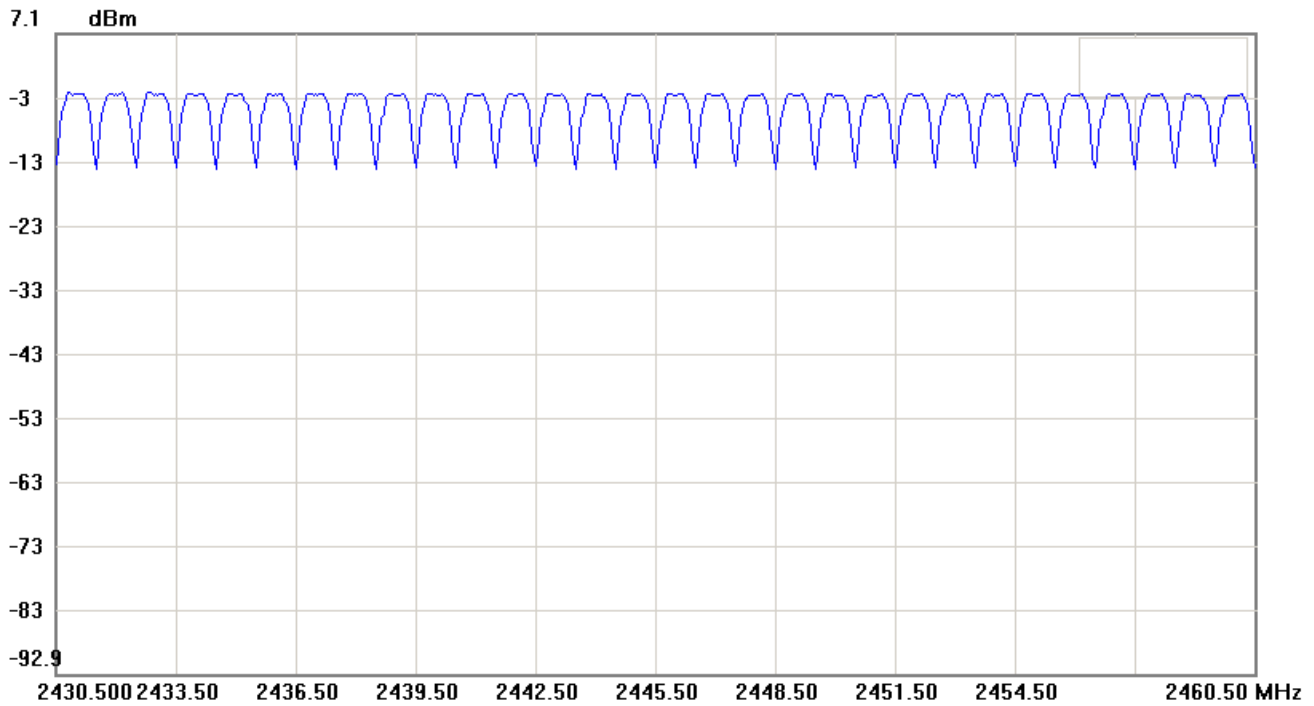
Data: #23

Date: 2016/3/22

Temperature: 21 °C

Time: PM 05:54:27

Humidity: 62 %



Condition:

RF Conducted

EUT:

Sweep Time: 1ms Att.: 10dB

Model:

RBW: 300 KHz VBW: 300 KHz

Test Mode:

Note: FCC-Bluetooth Number of Hopping Channels -Part2

File: 16-03-MAS-057\_BT

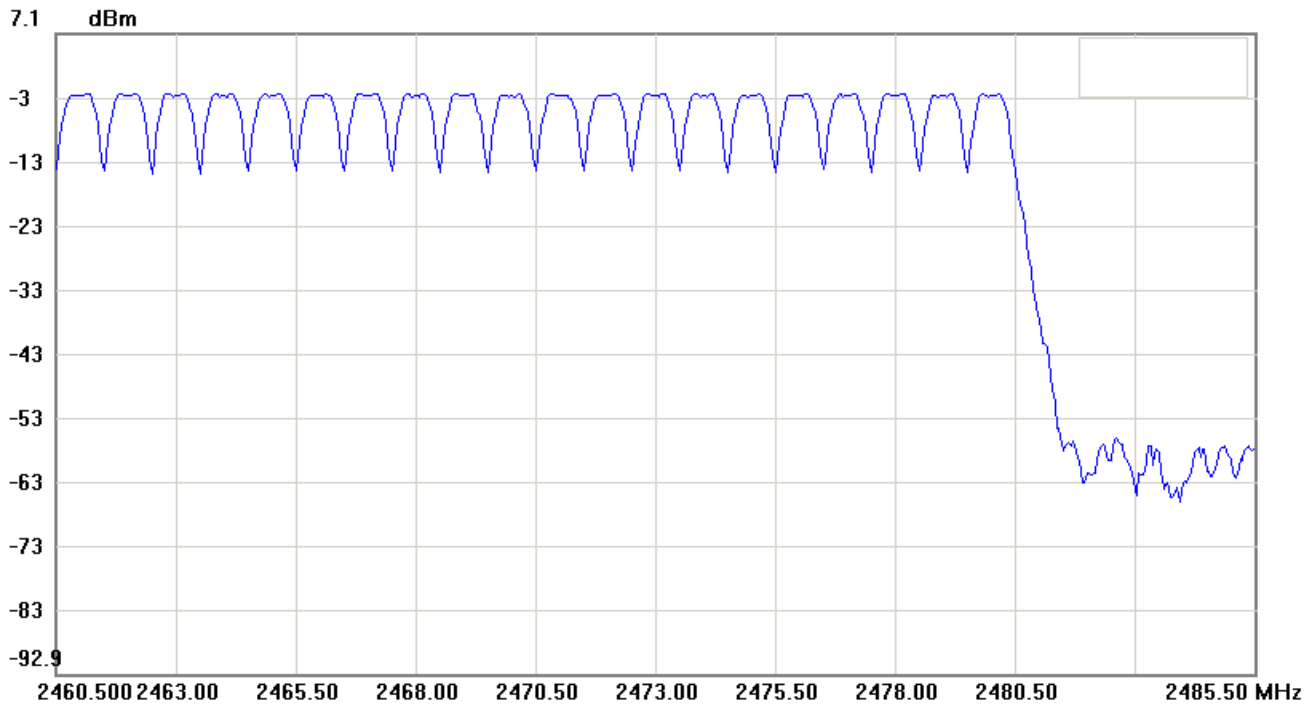
Data: #24

Date: 2016/3/22

Temperature: 21 °C

Time: PM 05:56:11

Humidity: 62 %



Condition:

RF Conducted

EUT:

Sweep Time: 1ms Att.: 10dB

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 separated by minimum of 25kHz or the 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 range 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

<b>EquipMent</b>	<b>Manufacturer</b>	<b>Model No.</b>
Spectrum Analyzer	Agilent	E4446A

## 11.4 Measurement Data

Test Date: Mar. 22, 2016

Temperature : 21°C

Humidity: 62%

Channel	Hopping Channel Carrier Frequency Separated (MHz)	Chart
M	1.180	Page 95

*Note: 1. Please refer to page 95 for chart.*

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

File: 16-03-MAS-057\_BT

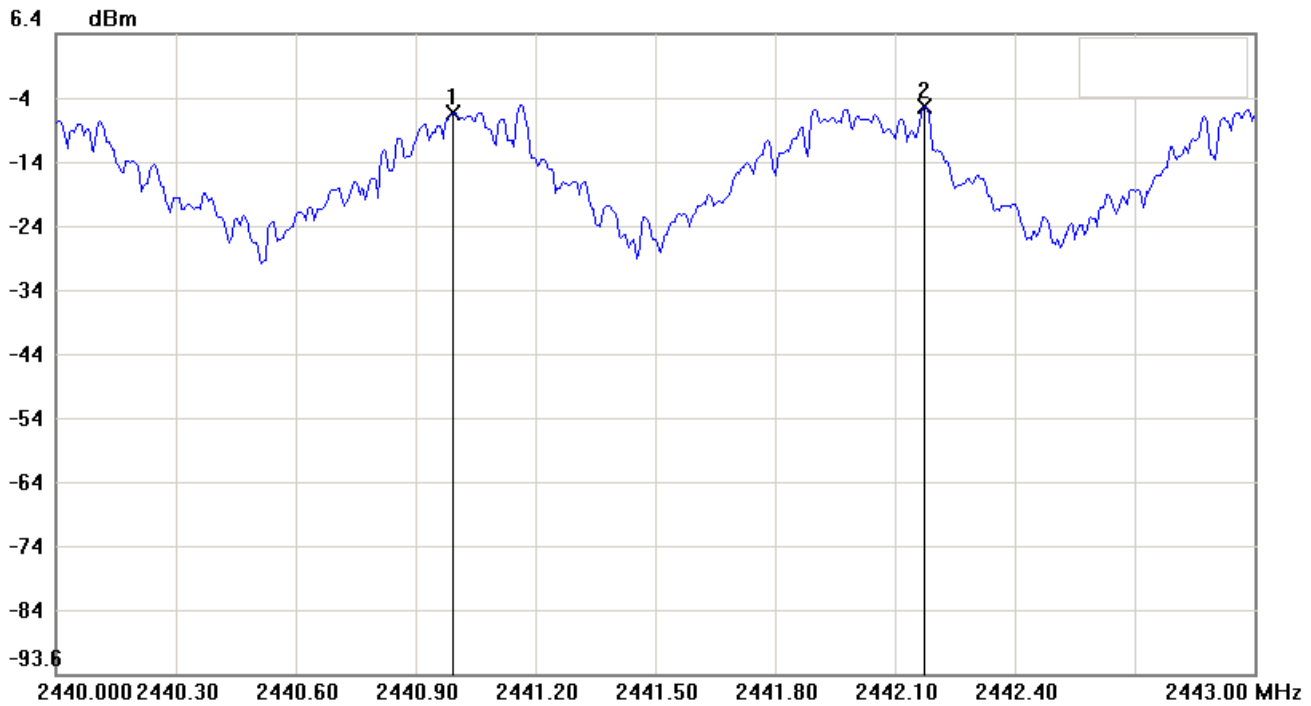
Data: #21

Date: 2016/3/22

Temperature: 21 °C

Time: PM 05:50:57

Humidity: 62 %



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	2440.99500	-5.92
2	2442.17500	-5.06

No.		ΔFrequency(MHz)	ΔLevel(dB)
1	mk2-mk1	1.18	0.86

## 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.
Spectrum Analyzer	Agilent	E4446A

### 12.4 Measurement Data

Test Date: Mar. 22, 2016

Temperature : 21°C

Humidity: 62%

#### 12.4.1 3DH1

Test period=0.4(second/channel)×79 channel=31.6sec

2402MHz dwell time= 388.3 us×330 = 128.139 ms

*Note: 1.Please refer to page 97 to page 98 for chart.*

*2. This device complies with the Bluetooth specifications and can operate in hopping mode on N channels, where  $20 < or = N < or = 79$ . As the same pseudo random hopping channel selection mechanism is used for all cases of N, by complying with the dwell time requirements of channel occupancy  $< 0.4s$  in  $N \times 0.4s$  for  $N = 79$ , compliance with any value for N is demonstrated.*



File: 16-03-MAS-057\_BT

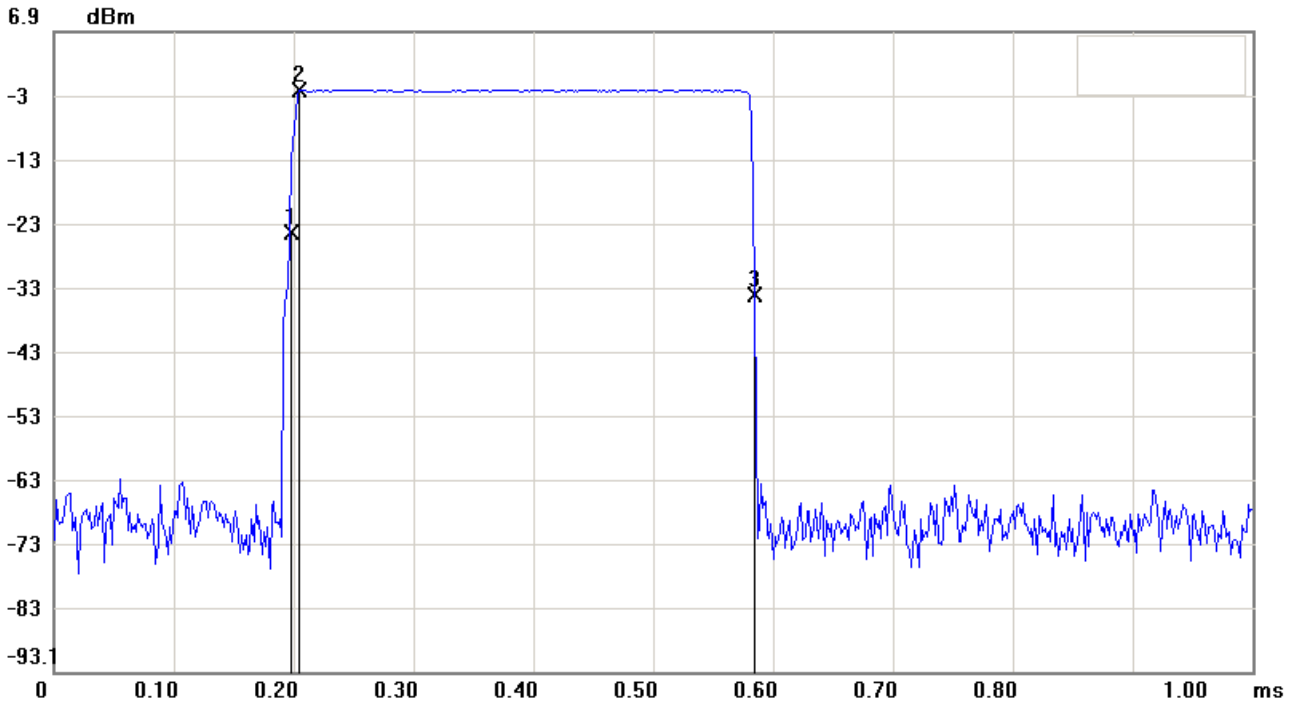
Data: #16

Date: 2016/3/22

Temperature: 21 °C

Time: PM 05:48:49

Humidity: 62 %



Condition: -22.24dBm

RF Conducted

EUT:

Sweep Time: 1ms Att.: 10dB

Model:

RBW: 1000 KHz VBW: 1000 KHz

Test Mode:

Note: DH1 pulse width

No.	Sweep time(ms)	Level(dBm)
1	0.1967	-24.42
2	0.2050	-2.24
3	0.5850	-34.11

No.		$\Delta$ Time(ms)	$\Delta$ Level(dB)
1	mk3-mk1	0.3883	-9.69

File: 16-03-MAS-  
057\_BT

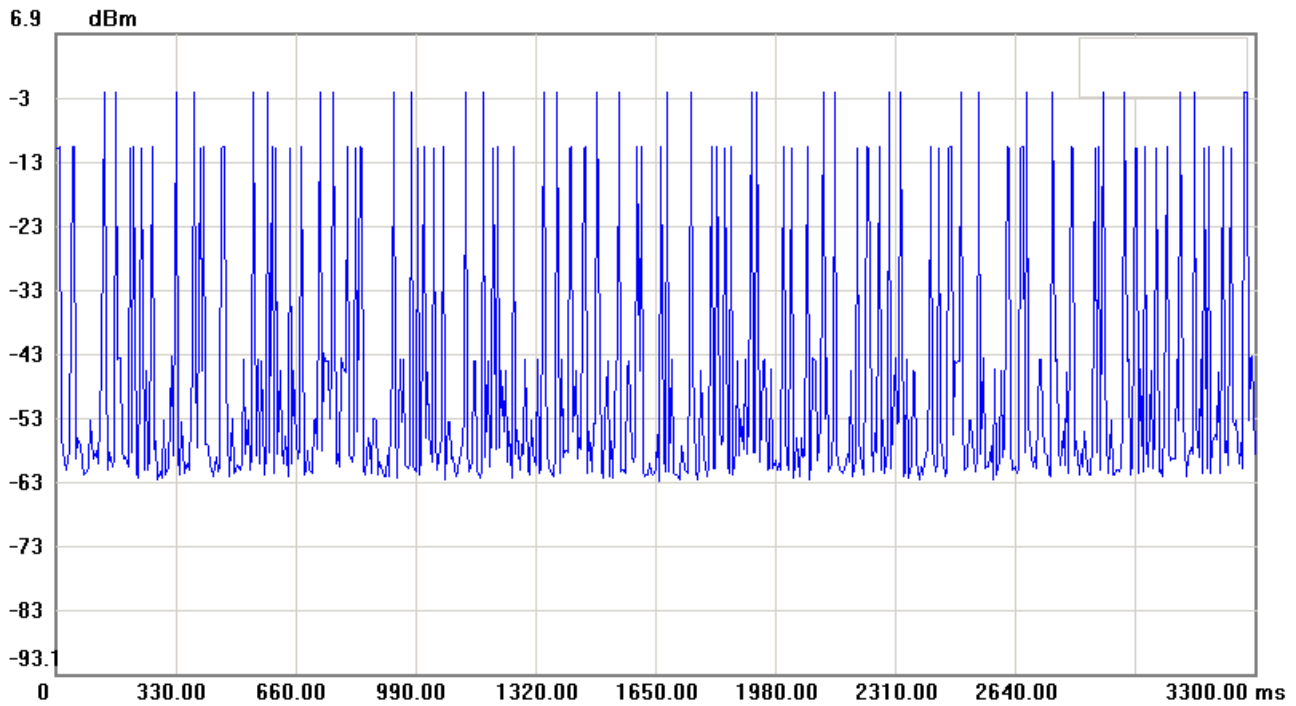
Data: #15

Date: 2016/3/22

Temperature: 21 °C

Time: PM 05:48:38

Humidity: 62 %



Condition:

RF Conducted

EUT:

Sweep Time: 3300ms Att.: 10dB

Model:

RBW: 1000 KHz VBW: 1000 KHz

Test Mode:

Note: DH1 Hops per 3.16 seconds

## 12.4.2 3DH3

Test period=0.4(second/channel) × 79 channel=31.6sec

2441MHz dwell time= 1.65 ms × 110 = 181.5 ms

*Note: 1. Please refer to page 100 to page 101 for chart.*

*2. This device complies with the Bluetooth specifications and can operate in hopping mode on N channels, where  $20 \leq N \leq 79$ . As the same pseudo random hopping channel selection mechanism is used for all cases of N, by complying with the dwell time requirements of channel occupancy  $< 0.4s$  in  $N \times 0.4s$  for  $N = 79$ , compliance with any value for N is demonstrated.*

File: 16-03-MAS-057\_BT

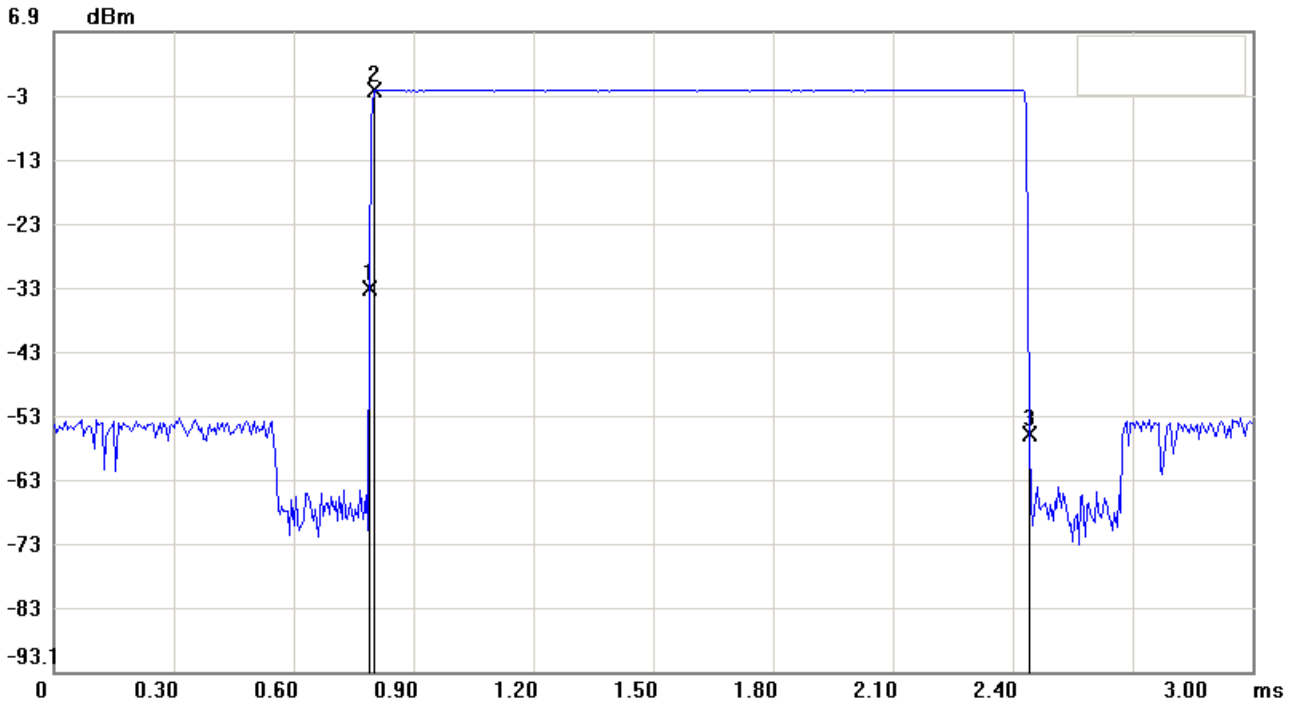
Data: #18

Date: 2016/3/22

Temperature: 21 °C

Time: PM 05:49:25

Humidity: 62 %



Condition: -22.25dBm

RF Conducted

EUT:

Sweep Time: 3ms Att.: 10dB

Model:

RBW: 1000 KHz VBW: 1000 KHz

Test Mode:

Note: DH3 pulse width

No.	Sweep time(ms)	Level(dBm)
1	0.7900	-33.20
2	0.8000	-2.25
3	2.4400	-55.81

No.		ΔTime(ms)	ΔLevel(dB)
1	mk3-mk1	1.65	-22.61

File: 16-03-MAS-  
057\_BT

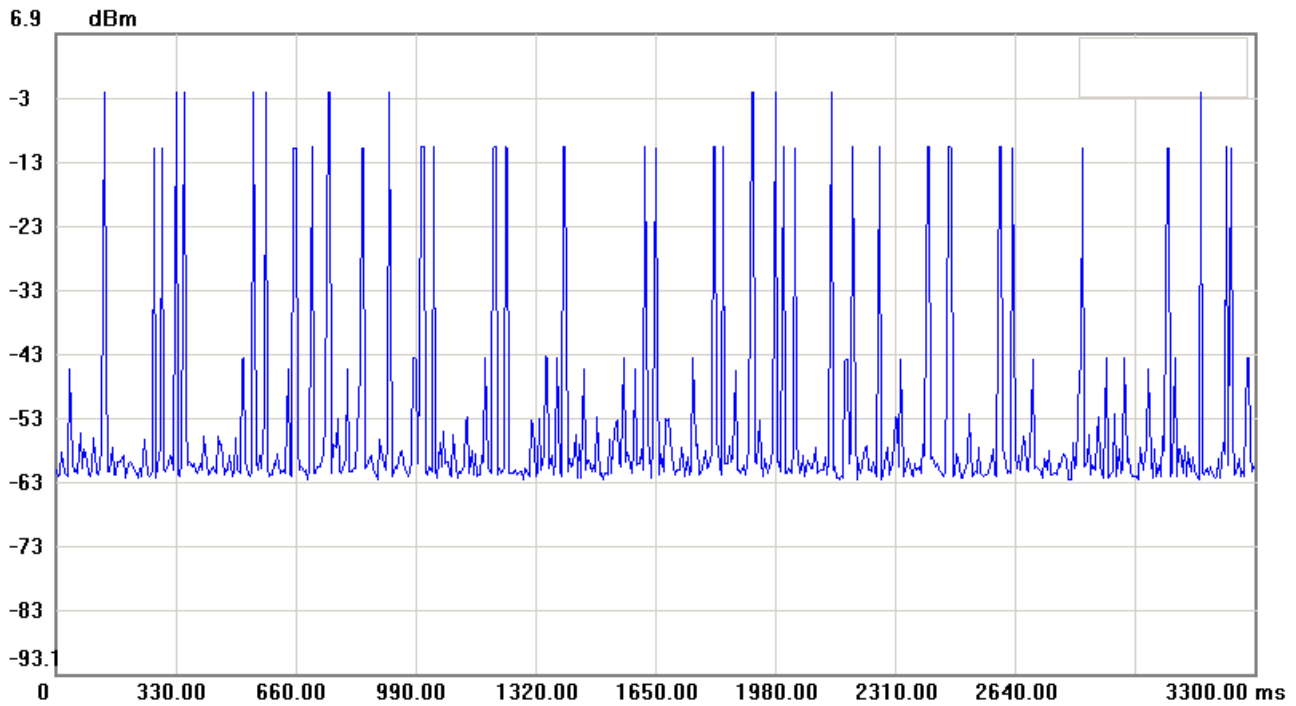
Data: #17

Date: 2016/3/22

Temperature: 21 °C

Time: PM 05:49:15

Humidity: 62 %



Condition:

RF Conducted

EUT:

Sweep Time: 3300ms Att.: 10dB

Model:

RBW: 1000 KHz VBW: 1000 KHz

Test Mode:

Note: DH3 Hops per 3.16 seconds

## 12.4.3 3DH5

Test period=0.4(second/channel)×79 channel=31.6sec

2480MHz dwell time= 2.9 ms×100 = 290 ms

*Note: 1. Please refer to page 103 to page 104 for chart.*

*2. This device complies with the Bluetooth specifications and can operate in hopping mode on N channels, where  $20 \leq N \leq 79$ . As the same pseudo random hopping channel selection mechanism is used for all cases of N, by complying with the dwell time requirements of channel occupancy  $< 0.4s$  in  $N \times 0.4s$  for  $N = 79$ , compliance with any value for N is demonstrated.*

File: 16-03-MAS-057\_BT

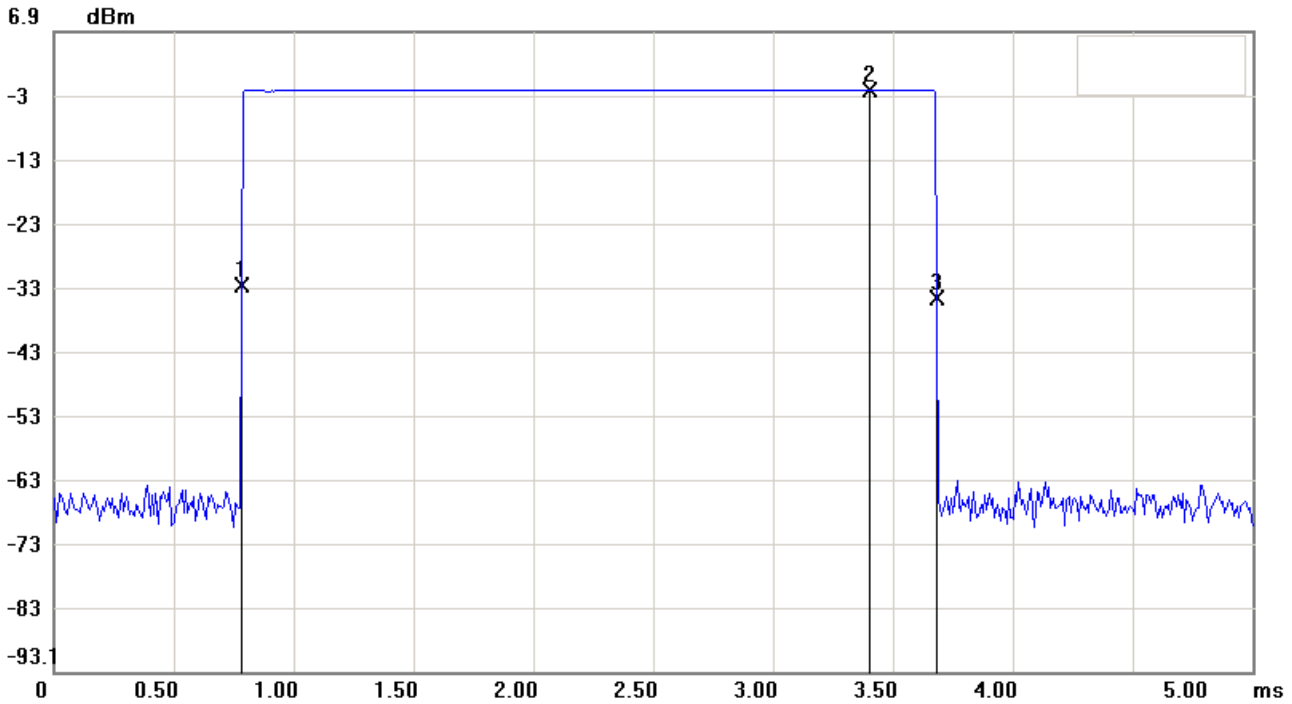
Data: #20

Date: 2016/3/22

Temperature: 21 °C

Time: PM 05:50:03

Humidity: 62 %



Condition: -22.23dBm

RF Conducted

EUT:

Sweep Time: 5ms Att.: 10dB

Model:

RBW: 1000 KHz VBW: 1000 KHz

Test Mode:

Note: DH5 pulse width

No.	Sweep time(ms)	Level(dBm)
1	0.7833	-32.68
2	3.3917	-2.23
3	3.6833	-34.59

No.		ΔTime(ms)	ΔLevel(dB)
1	mk3-mk1	2.9	-1.91

File: 16-03-MAS-  
057\_BT

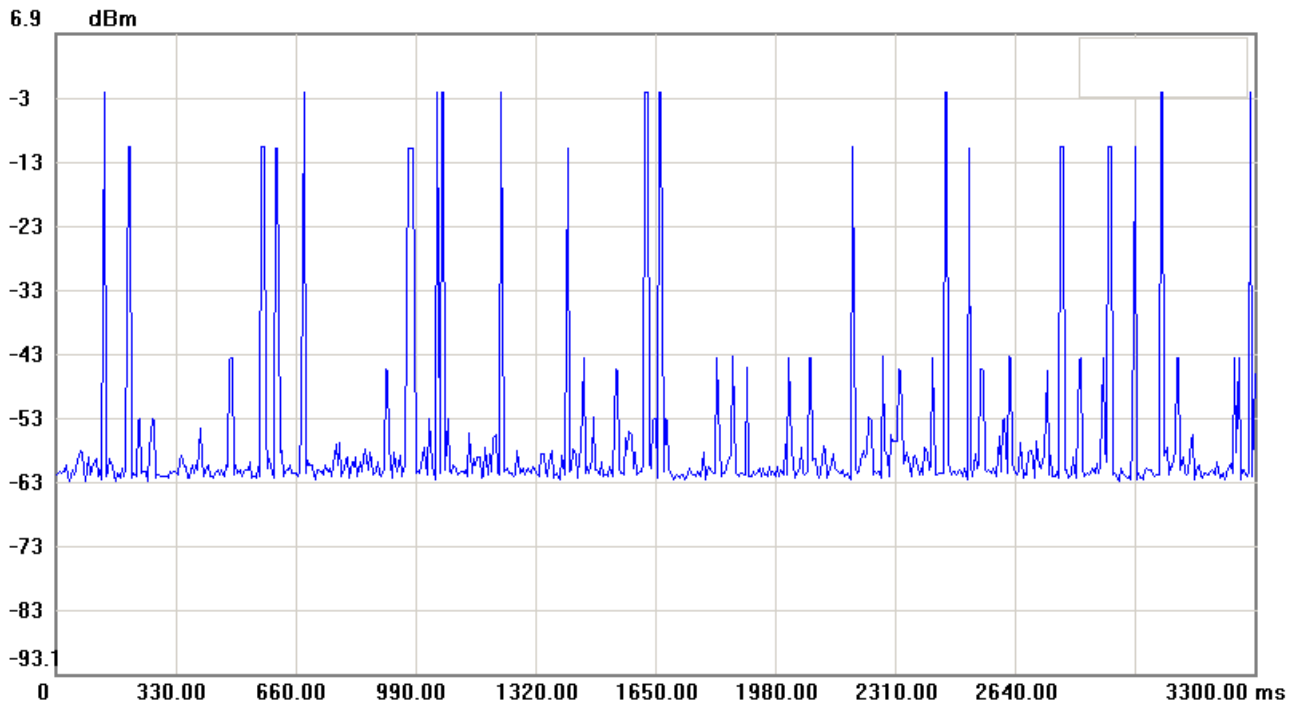
Data: #19

Date: 2016/3/22

Temperature: 21 °C

Time: PM 05:49:51

Humidity: 62 %



Condition:

RF Conducted

EUT:

Sweep Time: 3300ms Att.: 10dB

Model:

RBW: 1000 KHz VBW: 1000 KHz

Test Mode:

Note: DH5 Hops per 3.16 seconds



**13 Measurement EquipMent**

<b>EquipMent</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>S/N</b>	<b>Calibration Date</b>	<b>Next Cal. Due</b>
EMI Receiver	R&S	ESCI	13054423-001	01/28/2016	01/27/2017
Spectrum Analyzer	R&S	FSU46	13040904-001	01/22/2016	01/21/2017
Horn Antenna	EMCO	3115	13059201-001	09/10/2015	09/09/2016
BiLog Antenna	Schaffner	CBL6112B	2927	10/16/2015	10/15/2016
Horn Antenna	EMCO	3116	13059202-001	08/22/2015	08/21/2016
PRE-Amplifier	Agilent	8449B	13040709-001	11/21/2015	11/20/2016
EMI Test Receiver	R&S	ESCI	13054418-001	05/04/2015	05/03/2016
V-LISN	R&S	ENV216	13057719-001	05/13/2015	05/12/2016
Spectrum Analyzer	Agilent	E4446A	13052013-001	10/07/2015	10/06/2016