



# MEASUREMENT REPORT

## FCC PART 15.247 / Bluetooth-LE

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**FCC ID:** HD5-CT40PL0N

**APPLICANT:** Honeywell International Inc  
Honeywell Safety and Productivity Solutions

**Application Type:** Certification

**Product:** Mobile Computer

**Model No.:** CT40P-L0N

**Brand Name:** Honeywell

**FCC Classification:** Digital Transmission System (DTS)

**FCC Rule Part(s):** Part15 Subpart C (Section 15.247)

**Test Procedure(s):** ANSI C63.10-2013

**Test Date:** July 07 ~ 27, 2020

Reviewed By:

*Jame Yuan*

( Jame Yuan )

Approved By:

*Robin Wu*

( Robin Wu )



The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013. Test results reported herein relate only to the item(s) tested.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

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## Revision History

Report No.	Version	Description	Issue Date	Note
2006RSU069-U3	Rev. 01	Initial Report	07-27-2020	Valid

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## General Information

<b>Applicant:</b>	Honeywell International Inc Honeywell Safety and Productivity Solutions
<b>Applicant Address:</b>	9680 Old Bailes Road, Fort Mill, SC 29707 United States
<b>Manufacturer:</b>	Honeywell International Inc Honeywell Safety and Productivity Solutions
<b>Manufacturer Address:</b>	9680 Old Bailes Road, Fort Mill, SC 29707 United States
<b>Test Site:</b>	MRT Technology (Suzhou) Co., Ltd
<b>Test Site Address:</b>	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China

## Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Tian'edang Rd., Suzhou, China.

- MRT facility is an FCC registered (MRT Designation No. CN1166) test facility with the site description report on file and has met all the requirements specified in ANSI C63.4-2014.
- MRT facility is an IC registered (MRT Reg. No. 11384A-1) test laboratory with the site description on file at Industry Canada.
- MRT facility is a VCCI registered (R-20025, G-20034, C-20020, T-20020) test laboratory with the site description on file at VCCI Council.
- MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (A2LA) under the American Association for Laboratory Accreditation Program (A2LA Cert. No. 3628.01) in EMC, Telecommunications, Radio and SAR testing.



## 1. INTRODUCTION

### 1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Innovation, Science and Economic Development Canada and Certification and Engineering Bureau.

### 1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taihu Lake. These measurement tests were conducted at the MRT Technology (Suzhou) Co., Ltd. Facility located at D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China. The measurement facility compliant with the test site requirements specified in ANSI C63.4-2014.



## 2. PRODUCT INFORMATION

### 2.1. Feature of Equipment under Test

Product Name	Mobile Computer
Model No.	CT40P-L0N
Serial No.	19252B5D57 (Conducted Sample) 20010B217B (Radiated Sample)
Hardware Version	V2.0
Software Version	OS.03.001
Qualcomm Chipset	
Wi-Fi Specification	802.11a/b/g/n/ac
Bluetooth Version	v5.0 dual mode
Antenna Delivery	2*TX + 2*RX
Nordic Chipset	
Bluetooth Version	v5.1 single mode, LE only
NXP Chipset	
NFC Working Frequency	13.56MHz
<b>Accessories</b>	
USB Adapter	Model No.: ADS-12B-06 05010E Input Power: 100 - 240V ~ 50/60Hz, Max. 0.3A Output Power: 5VDC 2.0A
Rechargeable Li-ion Battery	Model No.: CT50-BTSC Capacitance: 4020mAh/15.5Wh Rated Voltage: 3.85V

### 2.2. Product Specification Subjective to this Report

Bluetooth Frequency	2402~2480MHz
Channel Number	40
Type of modulation	GFSK
Data Rate	Up to 2Mbps
Antenna Type	FPC Antenna
Antenna Gain	0.60dBi

Note: For other features of this EUT, test report will be issued separately.

### 2.3. Working Frequencies for this Report

Channel	Frequency	Channel	Frequency	Channel	Frequency
00	2402 MHz	01	2404 MHz	02	2406 MHz
03	2408 MHz	04	2410 MHz	05	2412 MHz
06	2414 MHz	07	2416 MHz	08	2418 MHz
09	2420 MHz	10	2422 MHz	11	2424 MHz
12	2426 MHz	13	2428 MHz	14	2430 MHz
15	2432 MHz	16	2434 MHz	17	2436 MHz
18	2438 MHz	19	2440 MHz	20	2442 MHz
21	2444 MHz	22	2446 MHz	23	2448 MHz
24	2450 MHz	25	2452 MHz	26	2454 MHz
27	2456 MHz	28	2458 MHz	29	2460 MHz
30	2462 MHz	31	2464 MHz	32	2466 MHz
33	2468 MHz	34	2470 MHz	35	2472 MHz
36	2474 MHz	37	2476 MHz	38	2478 MHz
39	2480 MHz	--	--	--	--

### 2.4. Test Mode

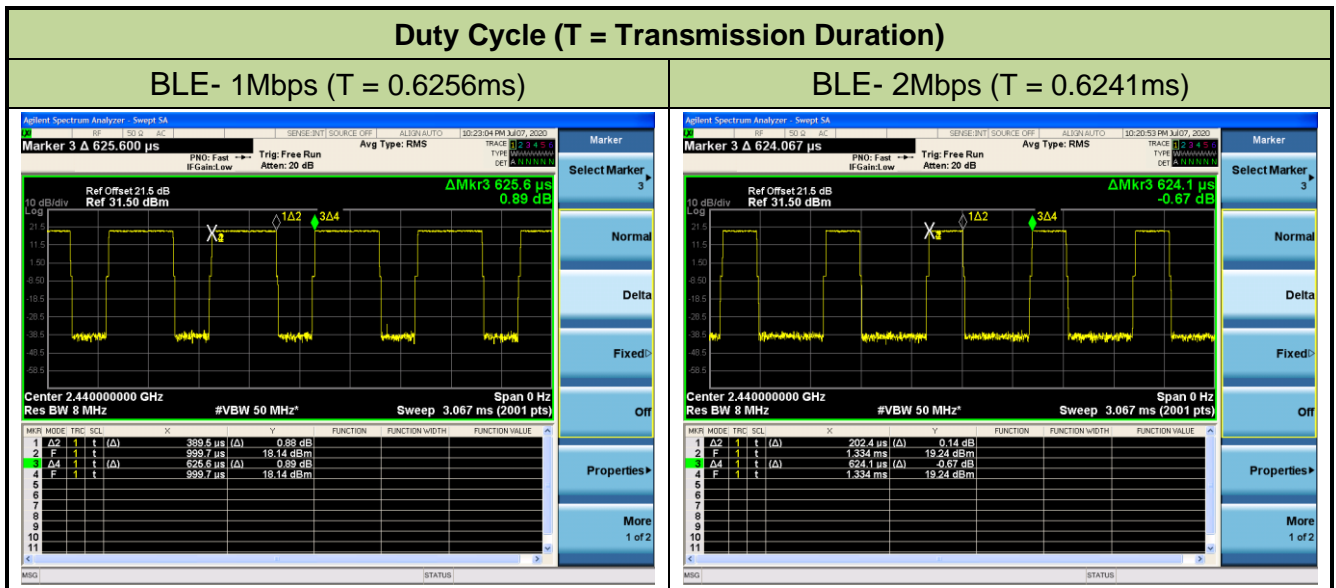
Test Mode	Mode 1: Transmit by BLE-1Mbps
	Mode 2: Transmit by BLE-2Mbps



## 2.5. Duty Cycle

The maximum achievable duty cycles were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

Test Mode	Duty Cycle
BLE- 1Mbps	62.26%
BLE- 2Mbps	32.43%



## 2.6. EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

## 2.7. Description of Test Software

The test utility software used during testing was "QRCT", and the version was 3.0.268.0.

## 2.8. Labeling Requirements

Per 2.1074 & 15.19; Docket 95-19

The label shall be permanently affixed at a conspicuous location on the device; instruction manual or pamphlet supplied to the user and be readily visible to the purchaser at the time of purchase.

However, when the device is so small wherein placement of the label with specified statement is not practical, only the FCC ID must be displayed on the device per Section 15.19(a)(5). Please see attachment for FCC ID label and label location.

## 2.9. Test Environment Condition

Ambient Temperature	15°C~35°C
Relative Humidity	20%RH ~75%RH

### **3. DESCRIPTION OF TEST**

#### **3.1. Evaluation Procedure**

The measurement procedure described in the document titled “American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices” (ANSI C63.10-2013) was used in the measurement.

#### **3.2. AC Line Conducted Emissions**

The line-conducted facility is located inside an 8'x4'x4' shielded enclosure. A 1m x 2m wooden table 80cm high is placed 40cm away from the vertical wall and 80cm away from the sidewall of the shielded room. Two 10kHz-30MHz, 50Ω/50uH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room floor. Power to the LISNs is filtered by external high-current high-insertion loss power line filters. These filters attenuate ambient signal noise from entering the measurement lines. These filters are also bonded to the shielded enclosure.

The EUT is powered from one LISN and the support equipment is powered from the second LISN. All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion) and draped over the back edge of the test table. All cables were at least 40cm above the horizontal reference ground-plane. Power cables for support equipment were routed down to the second LISN while ensuring that that cables were not draped over the second LISN.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the receiver and exploratory measurements were made to determine the frequencies producing the maximum emission from the EUT. The receiver was scanned from 150kHz to 30MHz. The detector function was set to peak mode for exploratory measurements while the bandwidth of the analyzer was set to 9kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Each emission was also maximized by varying: power lines, the mode of operation or data exchange speed, or support equipment whichever determined the worst-case emission. Once the worst case emissions have been identified, the one EUT cable configuration/arrangement and mode of operation that produced these emissions were used for final measurements on the same test site. The analyzer is set to CISPR quasi-peak and average detectors with a 9kHz resolution bandwidth for final measurements.

An extension cord was used to connect to a single LISN which powered by EUT. The extension cord was calibrated with LISN, the impedance and insertion loss are compliance with the requirements as stated in ANSI C63.10-2013.

### **3.3. Radiated Emissions**

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the Antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed. A MF Model 210SS turntable is used for radiated measurement. It is a continuously rotatable, remote controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm high PVC support structure is placed on top of the turntable. For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive Antenna height using a broadband Antenna from 30MHz up to the upper frequency shown in 15.33(b)(1) depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn Antennas were used. For frequencies below 30MHz, a calibrated loop Antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband Antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up for frequencies below 1GHz was placed on top of the 0.8 meter high, 1 x 1.5 meter table; and test set-up for frequencies 1-40GHz was placed on top of the 1.5 meter high, 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, if applicable, turntable azimuth, and receive Antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn Antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive Antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive Antenna, whichever produced the worst-case emissions. According to 3dB Beam-Width of horn Antenna, the horn Antenna should be always directed to the EUT when rising height.

## 4. ANTENNA REQUIREMENTS

### **Excerpt from §15.203 of the FCC Rules/Regulations:**

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.”

- The antenna of the device is **permanently attached**.
- There are no provisions for connection to an external antenna.

### **Conclusion:**

The unit complies with the requirement of §15.203.

## 5. TEST EQUIPMENT CALIBRATION DATE

### Conducted Emissions - SR2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR3	MRTSUE06185	1 year	2021/01/18
Two-Line V-Network	R&S	ENV 216	MRTSUE06002	1 year	2021/06/11
Two-Line V-Network	R&S	ENV 216	MRTSUE06003	1 year	2021/06/11
Thermohygrometer	Testo	608-H1	MRTSUE06404	1 year	2020/08/08
Shielding Room	MIX-BEP	Chamber-SR2	MRTSUE06215	N/A	N/A

### Radiated Emissions - AC1

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2020/08/01
PXA Signal Analyzer	Keysight	9030B	MRTSUE06395	1 year	2020/09/03
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2020/11/13
Bilog Period Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2021/04/03
Broad Band Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06023	1 year	2020/10/13
Broad Band Horn Antenna	Schwarzbeck	BBHA 9170	MRTSUE06024	1 year	2020/12/29
Microwave System Amplifier	Agilent	83017A	MRTSUE06076	1 year	2020/11/15
Preamplifier	Schwarzbeck	BBV 9721	MRTSUE06121	1 year	2021/06/11
Thermohygrometer	Testo	608-H1	MRTSUE06403	1 year	2020/08/08
Anechoic Chamber	TDK	Chamber-AC1	MRTSUE06212	1 year	2021/04/30

### Radiated Emission - AC2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Keysight	N9038A	MRTSUE06125	1 year	2020/08/01
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2020/11/13
Bilog Period Antenna	Schwarzbeck	VULB 9162	MRTSUE06022	1 year	2020/10/13
Horn Antenna	Schwarzbeck	BBHA9120D	MRTSUE06171	1 year	2020/10/27
Broad Band Horn Antenna	Schwarzbeck	BBHA 9170	MRTSUE06024	1 year	2020/12/29
Broadband Coaxial Preamplifier	Schwarzbeck	BBV 9718	MRTSUE06176	1 year	2020/11/15
Preamplifier	Schwarzbeck	BBV 9721	MRTSUE06121	1 year	2021/06/11
Temperature/Humidity Meter	Minggao	ETH529	MRTSUE06170	1 year	2020/12/15
Anechoic Chamber	RIKEN	Chamber-AC2	MRTSUE06213	1 year	2021/04/30

## Conducted Test Equipment - TR3

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EXA Signal Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2021/04/14
EXA Signal Analyzer	Keysight	N9010B	MRTSUE06452	1 year	2020/07/11
Signal Analyzer	R&S	FSV40	MRTSUE06218	1 year	2021/04/14
Power Meter	Agilent	U2021XA	MRTSUE06030	1 year	2020/11/17
USB wideband power sensor	Keysight	U2021XA	MRTSUE06446	1 year	2021/06/11
USB wideband power sensor	Keysight	U2021XA	MRTSUE06447	1 year	2021/06/11
Bluetooth Test Set	Anritsu	MT8852B-042	MRTSUE06389	1 year	2021/06/11
Audio Analyzer	Agilent	U8903B	MRTSUE06143	1 year	2021/06/11
Modulation Analyzer	HP	8901A	MRTSUE06098	1 year	2020/10/10
Wideband Radio Communication Tester	R&S	CMW 500	MRTSUE06243	1 year	2020/11/07
DC Power Supply	GWINSTEK	DPS-3303C	MRTSUE06064	N/A	N/A
Attenuator	MVE	6dB	MRTSUE06534	1 year	2020/12/12
Attenuator	MVE	10dB	MRTSUE06543	1 year	2020/12/12
Temperature & Humidity Chamber	BAOYT	BYH-150CL	MRTSUE06051	1 year	2020/11/07
Thermohygrometer	testo	608-H1	MRTSUE06401	1 year	2020/08/08

Software	Version	Function
EMI Software	V3	EMI Test Software

## 6. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k = 2$ .

<b>AC Conducted Emission Measurement</b>
Measurement Uncertainty for a Level of Confidence of 95% ( $U=2Uc(y)$ ): 9kHz~150kHz: 3.74dB 150kHz~30MHz: 3.44dB
<b>Radiated Disturbance</b>
Measurement Uncertainty for a Level of Confidence of 95% ( $U=2Uc(y)$ ): Horizontal: 30MHz~300MHz: 5.04dB 300MHz~1GHz: 4.95dB 1GHz~40GHz: 6.40dB Vertical: 30MHz~300MHz: 5.24dB 300MHz~1GHz: 6.03dB 1GHz~40GHz: 6.40dB
<b>Spurious Emissions, Conducted</b>
Measuring Uncertainty for a Level of Confidence of 95% ( $U=2Uc(y)$ ): 0.78dB
<b>Output Power</b>
Measuring Uncertainty for a Level of Confidence of 95% ( $U=2Uc(y)$ ): 1.13dB
<b>Power Spectrum Density</b>
Measuring Uncertainty for a Level of Confidence of 95% ( $U=2Uc(y)$ ): 1.15dB
<b>Occupied Bandwidth</b>
Measuring Uncertainty for a Level of Confidence of 95% ( $U=2Uc(y)$ ): 0.28%



## 7. TEST RESULT

### 7.1. Summary

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
15.247(a)(2)	6dB Bandwidth	$\geq 500\text{kHz}$	Conducted	Pass	Section 7.2
N/A	99% Bandwidth	N/A		Pass	
15.247(b)(3)	Output Power	$\leq 1\text{Watt}$		Pass	Section 7.3
15.247(e)	Power Spectral Density	$\leq 8\text{dBm} / 3\text{kHz}$		Pass	Section 7.4
15.247(d)	Band Edge / Out-of-Band Emissions	$\geq 20\text{dBc(Peak)}$		Pass	Section 7.5
15.205 15.209	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209	Radiated	Pass	Section 7.6 Section 7.7
15.207	AC Conducted Emissions 150kHz - 30MHz	< FCC 15.207 limits >	Line Conducted	Pass	Section 7.8

#### Notes:

- 1) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
- 2) All modes of operation and data rates were investigated. For radiated emission test, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst case emissions.

## 7.2. 6dB Bandwidth Measurement

### 7.2.1. Test Limit

The minimum 6dB bandwidth shall be at least 500 kHz.

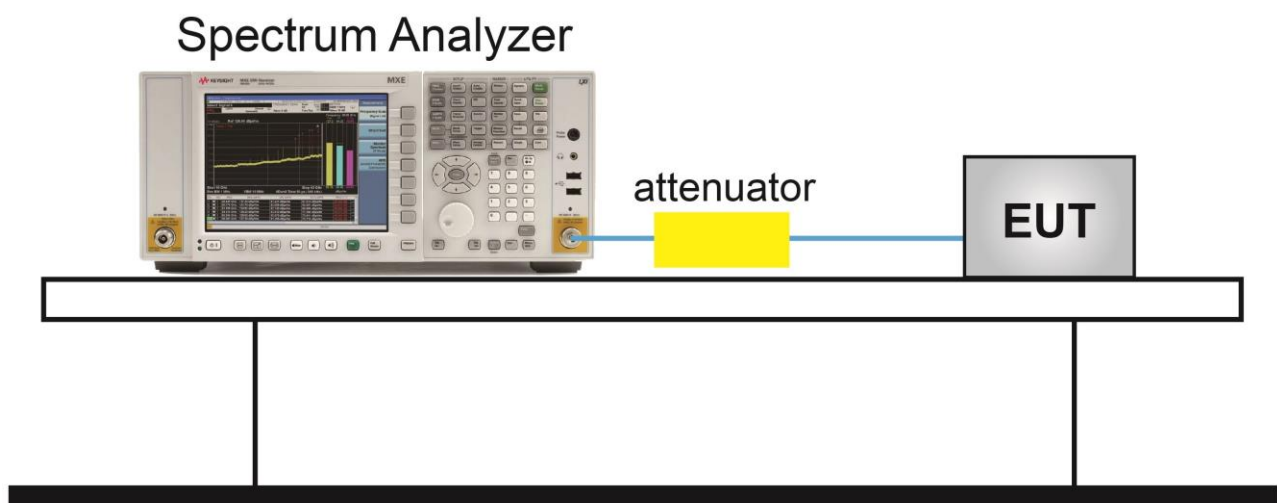
### 7.2.2. Test Procedure used

ANSI C63.10-2013 - Section 11.8

### 7.2.3. Test Setting

1. The Spectrum's automatic bandwidth measurement capability was used to perform the 6dB bandwidth measurement. The "X" dB bandwidth parameter was set to  $X = 6$ . The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. Set RBW = 100 kHz
3.  $VBW \geq 3 \times RBW$
4. Detector = Peak
5. Trace mode = Max hold
6. Sweep = Auto couple
7. Allow the trace was allowed to stabilize

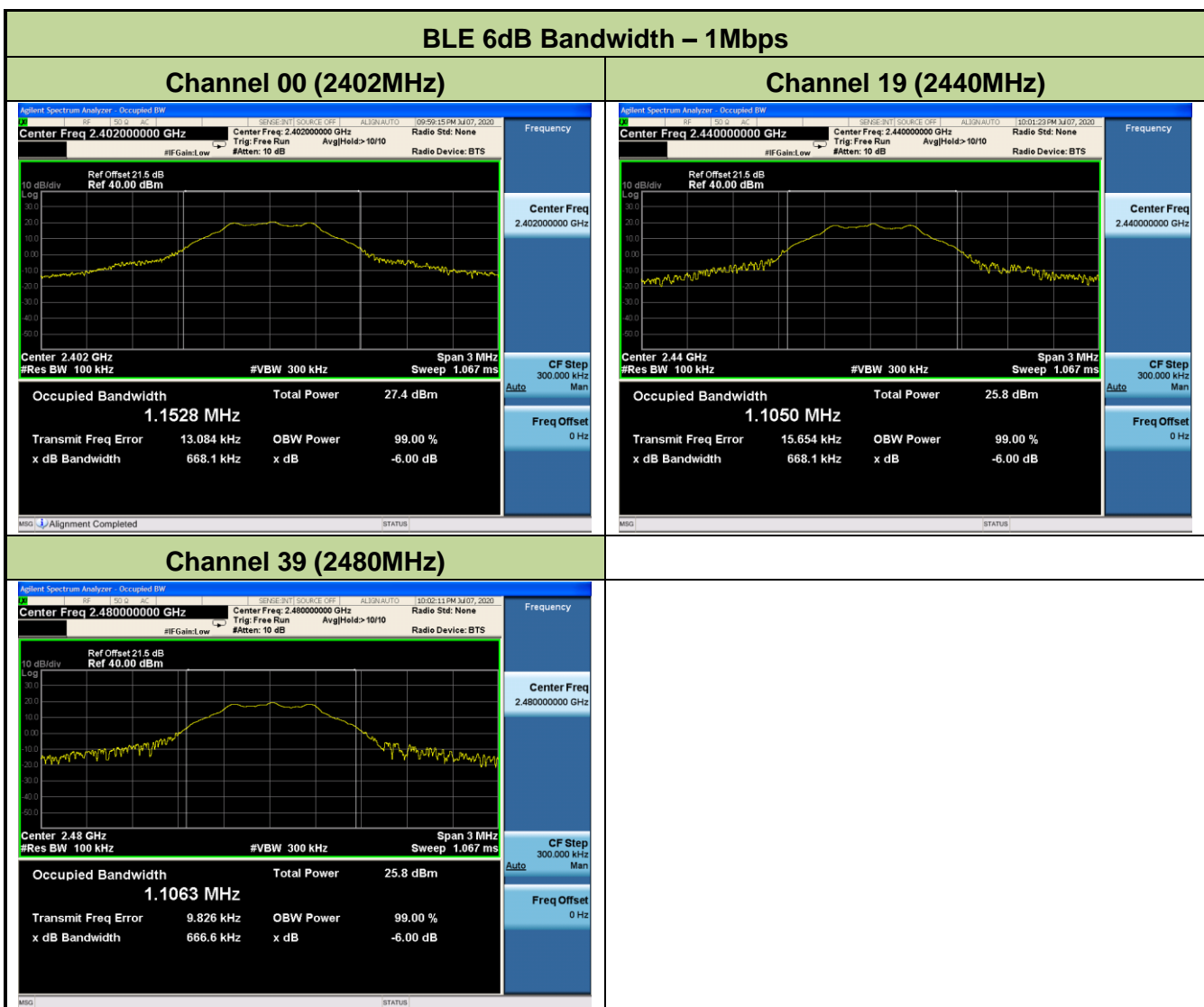
### 7.2.4. Test Setup



### 7.2.5. Test Result

Product	Mobile Computer	Test Engineer	Gordon Qi
Test Site	TR3	Test Date	2020/07/07

Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
BLE	1	00	2402	0.668	$\geq 0.5$	Pass
BLE	1	19	2440	0.668	$\geq 0.5$	Pass
BLE	1	39	2480	0.666	$\geq 0.5$	Pass
BLE	2	00	2402	1.139	$\geq 0.5$	Pass
BLE	2	19	2440	1.133	$\geq 0.5$	Pass
BLE	2	39	2480	1.144	$\geq 0.5$	Pass



## BLE 6dB Bandwidth – 2Mbps

### Channel 00 (2402MHz)



### Channel 19 (2440MHz)



### Channel 39 (2480MHz)



### **7.3. Output Power Measurement**

#### **7.3.1. Test Limit**

The maximum output power shall be less 1 Watt (30dBm).

#### **7.3.2. Test Procedure Used**

ANSI C63.10-2013 - Section 11.9.1.3

ANSI C63.10-2013 - Section 11.9.2.3.2

#### **7.3.3. Test Setting**

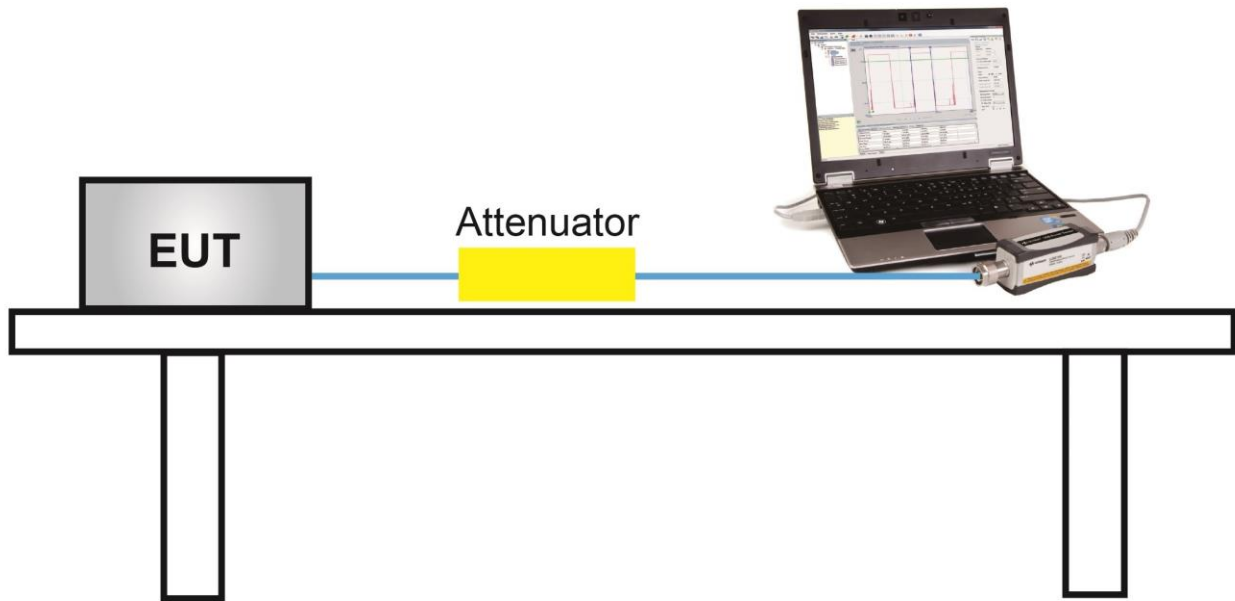
##### **Method PKPM1 (Peak Power Measurement)**

Peak power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The pulse sensor employs a VBW = 50MHz so this method was only used for signals whose DTS bandwidth was less than or equal to 50MHz.

##### **Method AVGPM-G (Measurement using a gated RF average-reading power meter)**

Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since this measurement is made only during the ON time of the transmitter, no duty cycle correction is required.

### 7.3.4. Test Setup



### 7.3.5. Test Result of Output Power

Product	Mobile Computer	Test Engineer	Gordon Qi
Test Site	TR3	Test Date	2020/07/07

### Test Result of Peak Output Power

Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Result
BLE	1	00	2402	3.64	≤ 30.00	Pass
BLE	1	19	2440	2.93	≤ 30.00	Pass
BLE	1	39	2480	3.03	≤ 30.00	Pass
BLE	2	00	2402	3.64	≤ 30.00	Pass
BLE	2	19	2440	2.85	≤ 30.00	Pass
BLE	2	39	2480	3.07	≤ 30.00	Pass

### Test Result of Average Output Power (Reporting Only)

Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	Average Power (dBm)	Limit (dBm)	Result
BLE	1	00	2402	1.36	≤ 30.00	Pass
BLE	1	19	2440	0.31	≤ 30.00	Pass
BLE	1	39	2480	0.56	≤ 30.00	Pass
BLE	2	00	2402	1.34	≤ 30.00	Pass
BLE	2	19	2440	0.26	≤ 30.00	Pass
BLE	2	39	2480	0.52	≤ 30.00	Pass

## 7.4. Power Spectral Density Measurement

### 7.4.1. Test Limit

The maximum permissible power spectral density is 8dBm in any 3 kHz band.

The same method of determining the conducted output power shall be used to determine the power spectral density.

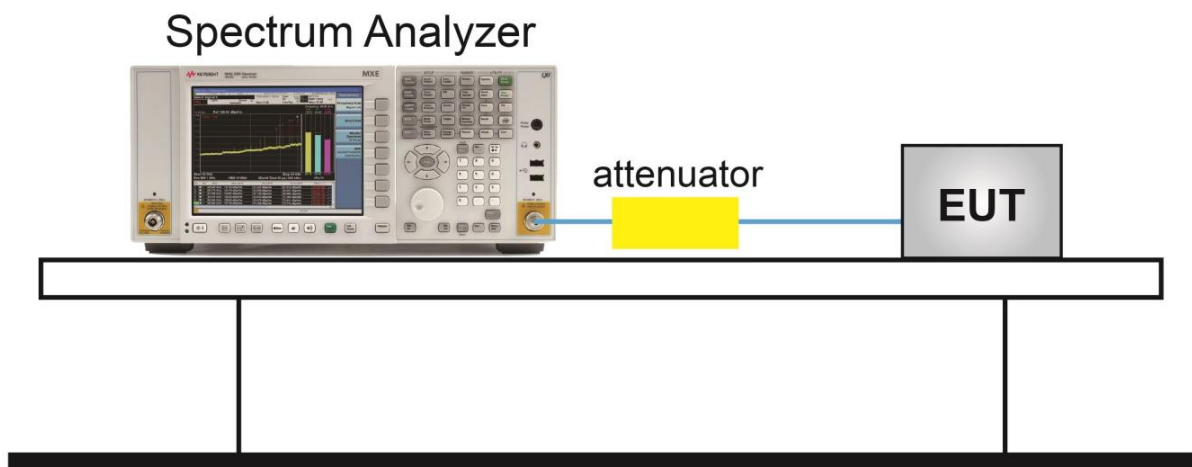
### 7.4.2. Test Procedure Used

ANSI C63.10-2013 - Section 11.10.2

### 7.4.3. Test Setting

1. Analyzer was set to the center frequency of the DTS channel under investigation
2. Span = 1.5 times the OBW
3. RBW = 3kHz
4. VBW = 10kHz
5. Detector = Peak
6. Sweep time = Auto couple
7. Trace mode = Max hold
8. Trace was allowed to stabilize

### 7.4.4. Test Setup

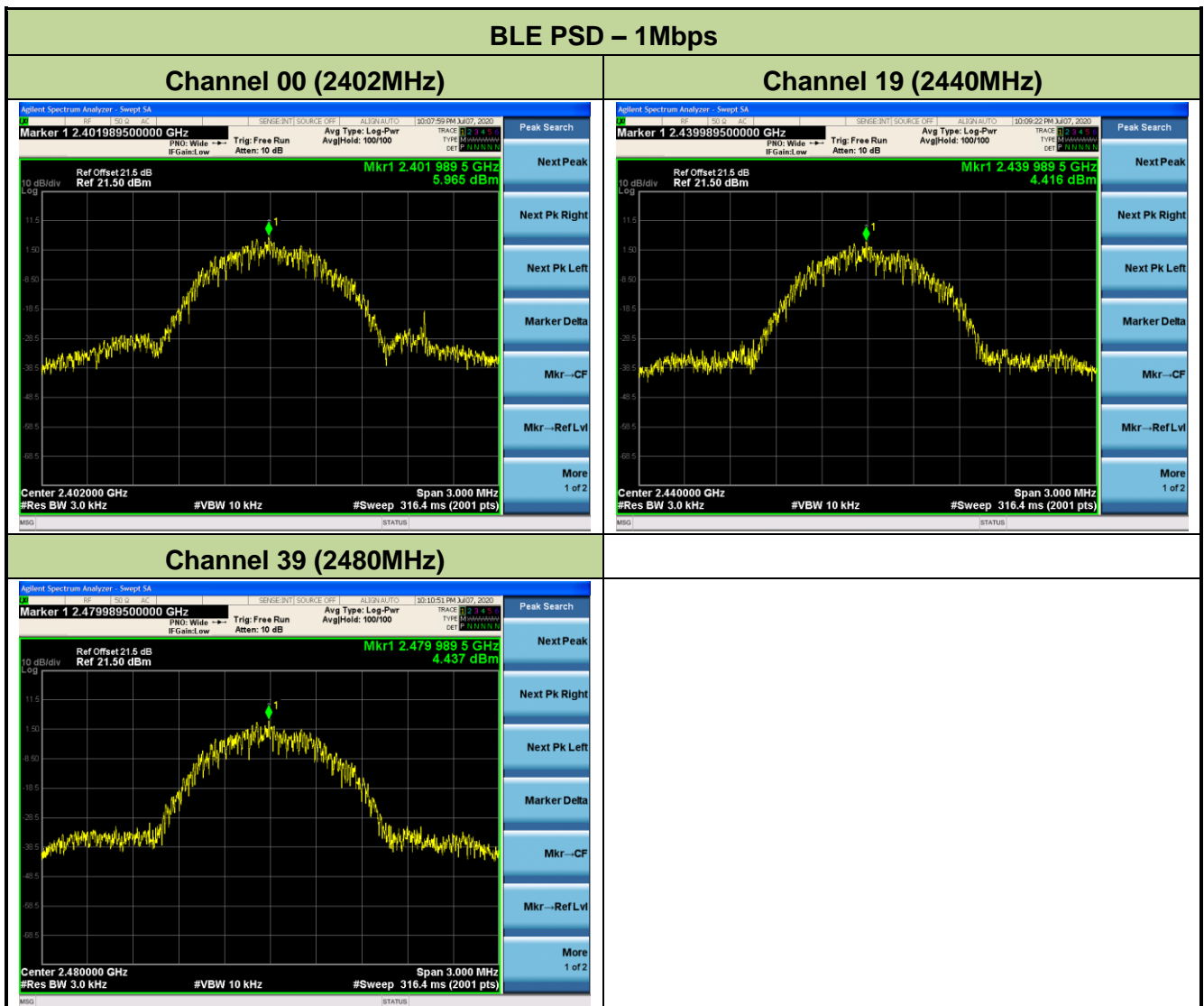




### 7.4.5. Test Result

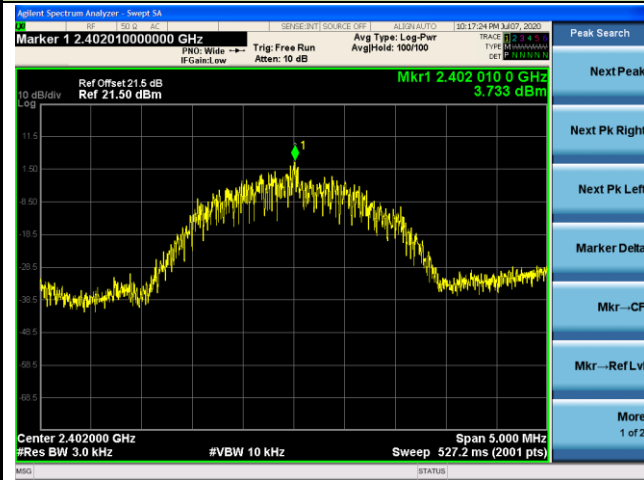
Product	Mobile Computer	Test Engineer	Gordon Qi
Test Site	TR3	Test Date	2020/07/07

Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	PSD Result (dBm / 3kHz)	Limit (dBm / 3kHz)	Result
BLE	1	00	2402	5.97	≤ 8.00	Pass
BLE	1	19	2440	4.42	≤ 8.00	Pass
BLE	1	39	2480	4.44	≤ 8.00	Pass
BLE	2	00	2402	3.73	≤ 8.00	Pass
BLE	2	19	2440	2.61	≤ 8.00	Pass
BLE	2	39	2480	2.35	≤ 8.00	Pass



## BLE PSD – 2Mbps

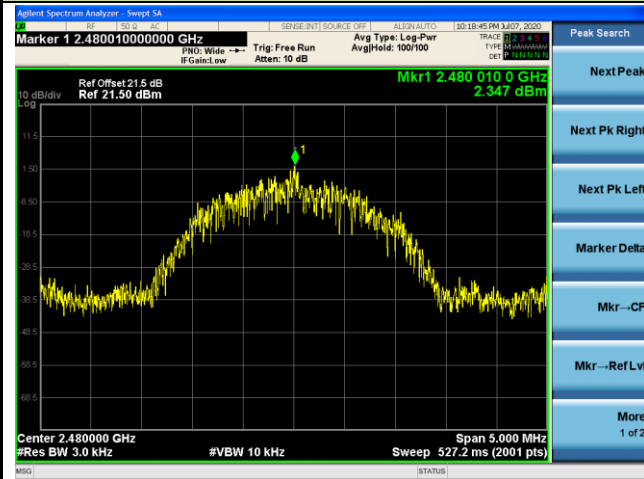
### Channel 00 (2402MHz)



### Channel 19 (2440MHz)



### Channel 39 (2480MHz)



## **7.5. Conducted Band Edge and Out-of-Band Emissions**

### **7.5.1. Test Limit**

The limit for out-of-band spurious emissions at the band edge is 20dB below the fundamental emission level, as determined from the in-band power measurement of the DTS channel performed in a 100kHz bandwidth per the PSD procedure.

### **7.5.2. Test Procedure Used**

ANSI C63.10-2013 - Section 11.11

### **7.5.3. Test Setting**

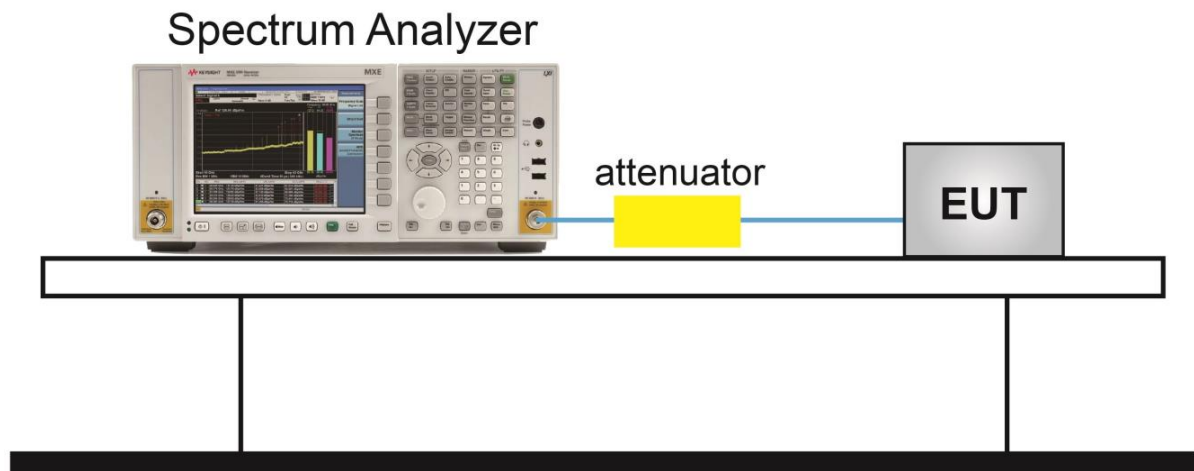
#### **Reference level measurement**

1. Set instrument center frequency to DTS channel center frequency
2. Set the span to  $\geq 1.5$  times the DTS bandwidth
3. Set the RBW = 100 kHz
4. Set the VBW  $\geq 3 \times$  RBW
5. Detector = Peak
6. Sweep time = Auto couple
7. Trace mode = Max hold
8. Allow trace to fully stabilize

#### **Emission level measurement**

1. Set the center frequency and span to encompass frequency range to be measured
2. RBW = 100kHz
3. VBW = 300kHz
4. Detector = Peak
5. Trace mode = Max hold
6. Sweep time = Auto couple
7. The trace was allowed to stabilize

#### 7.5.4. Test Setup



### 7.5.5. Test Result

Product	Mobile Computer	Test Engineer	Gordon Qi
Test Site	TR3	Test Date	2020/07/08

Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	Limit	Result
BLE	1	00	2402	20dBc	Pass
BLE	1	19	2440	20dBc	Pass
BLE	1	39	2480	20dBc	Pass
BLE	2	00	2402	20dBc	Pass
BLE	2	19	2440	20dBc	Pass
BLE	2	39	2480	20dBc	Pass

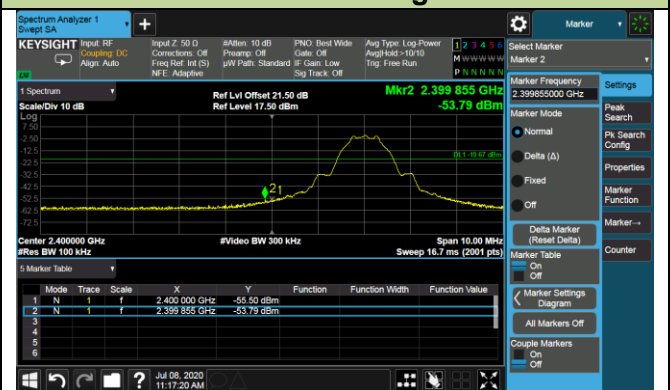
### BLE Out-of-Band Emissions – 1Mbps

#### Channel 00 (2402MHz)

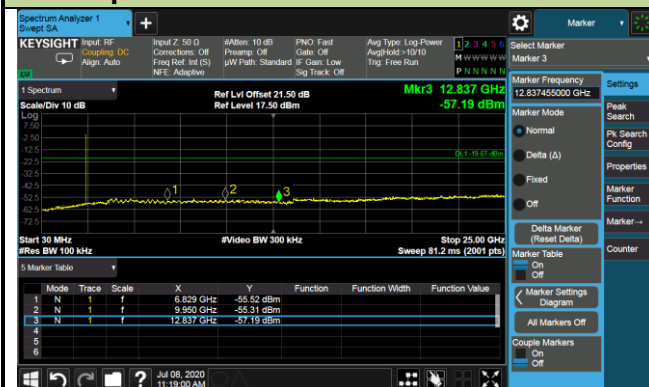
#### 100kHz PSD reference Level



#### Low Band Edge



#### Spurious Emission 30MHz ~ 25GHz



### Channel 19 (2440MHz)

#### 100kHz PSD reference Level



#### Spurious Emission 30MHz ~ 25GHz



### Channel 39 (2480MHz)

#### 100kHz PSD reference Level



#### High Band Edge



#### Spurious Emission 30MHz ~ 25GHz



## BLE Out-of-Band Emissions – 2Mbps

### Channel 00 (2402MHz)

#### 100kHz PSD reference Level



#### Low Band Edge



#### Spurious Emission 30MHz ~ 25GHz



### Channel 19 (2440MHz)

#### 100kHz PSD reference Level



#### Spurious Emission 30MHz ~ 25GHz



## Channel 39 (2480MHz)

### 100kHz PSD reference Level



### High Band Edge



### Spurious Emission 30MHz ~ 25GHz





## 7.6. Radiated Spurious Emission Measurement

### 7.6.1. Test Limit

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency (MHz)	Field Strength ( $\mu\text{V/m}$ )	Measured Distance (m)
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

### 7.6.2. Test Procedure Used

ANSI C63.10-2013 - Section 6.3

ANSI C63.10-2013 - Section 6.4

ANSI C63.10-2013 - Section 6.5

ANSI C63.10-2013 - Section 6.6

### 7.6.3. Test Setting

**Table 1 - RBW as a function of frequency**

Frequency	RBW
9 ~ 150 kHz	200 ~ 300 Hz
0.15 ~ 30 MHz	9 ~ 10 kHz
30 ~ 1000 MHz	100 ~ 120 kHz
> 1000 MHz	1 MHz

**Quasi-Peak Measurements below 1GHz**

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Span was set greater than 1MHz
3. RBW = as specified in Table 1
4. Detector = CISPR quasi-peak
5. Sweep time = auto couple
6. Trace was allowed to stabilize

**Peak Measurements above 1GHz**

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

**Average Measurements above 1GHz (Method VB)**

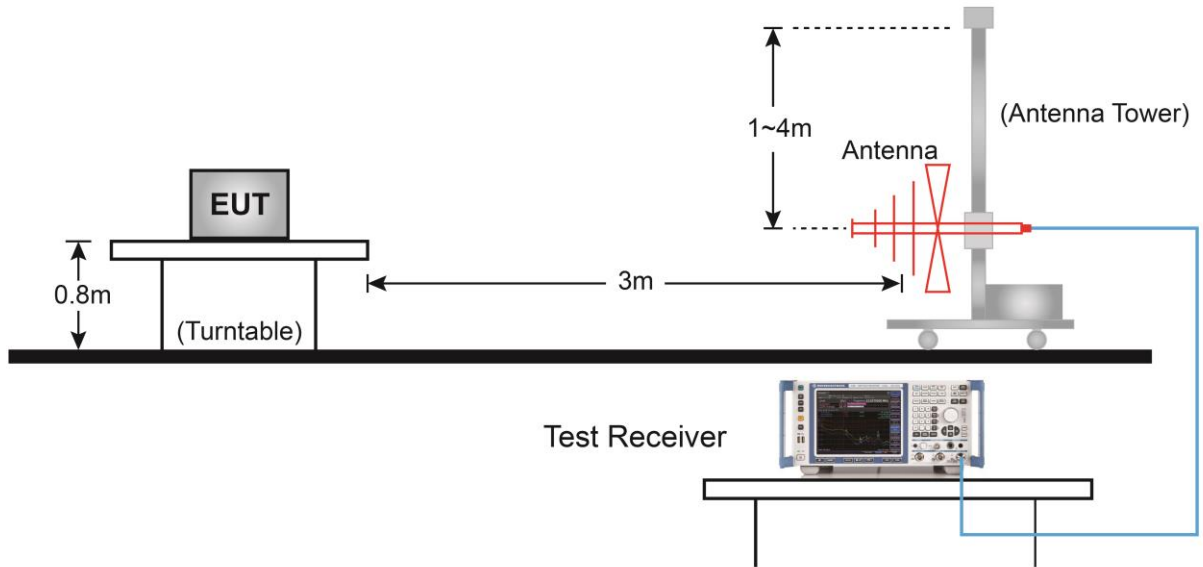
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW; If the EUT is configured to transmit with duty cycle  $\geq 98\%$ , set VBW = 10Hz

If the EUT duty cycle is  $< 98\%$ , set VBW  $\geq 1/T$ . T is the minimum transmission duration

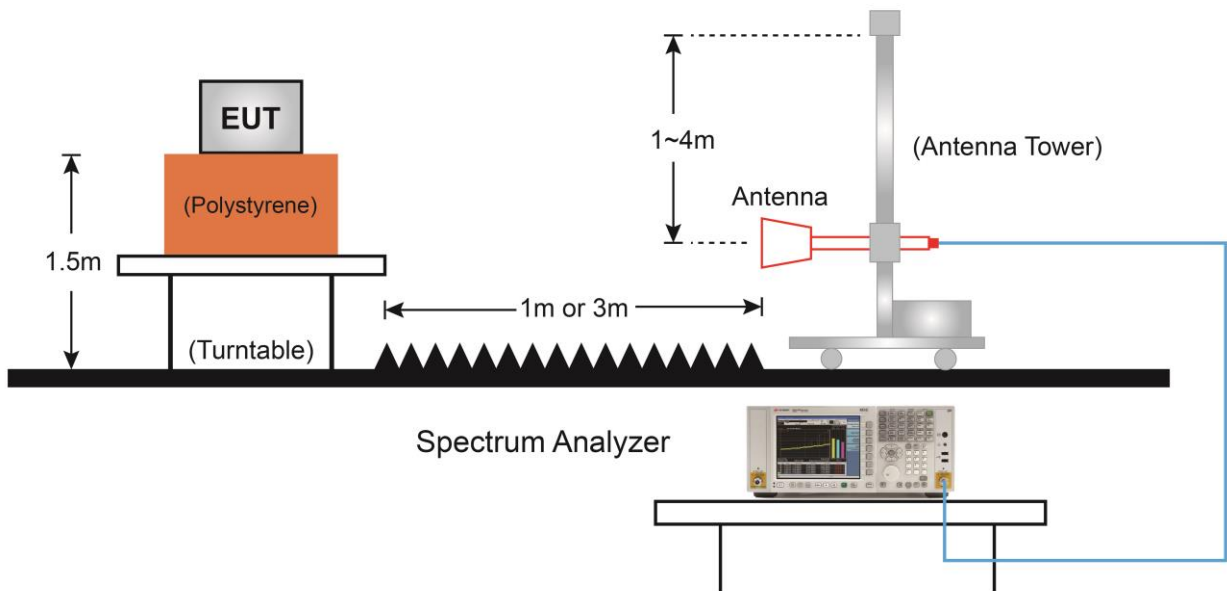
4. Detector = Peak
5. Sweep time = auto
6. Trace mode = max hold
7. Trace was allowed to stabilize

#### 7.6.4. Test Setup

##### Below 1GHz Test Setup:



##### Above 1GHz Test Setup:



### 7.6.5. Test Result

Product	Mobile Computer	Test Engineer	Antony Yang
Test Site	AC1	Test Date	2020/07/11
Test Mode	BLE - 1Mbps	Test Channel:	00
Remark	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	3728.5	38.6	2.6	41.2	74.0	-32.8	Peak	Horizontal
	4782.5	38.2	5.7	43.9	74.0	-30.1	Peak	Horizontal
*	5241.5	35.6	6.1	41.7	74.0	-32.3	Peak	Horizontal
*	6516.5	36.0	8.6	44.6	74.0	-29.4	Peak	Horizontal
	3720.0	44.6	2.6	47.2	74.0	-26.8	Peak	Vertical
	4791.0	36.9	5.8	42.7	74.0	-31.3	Peak	Vertical
*	5241.5	34.9	6.1	41.0	74.0	-33.0	Peak	Vertical
*	6771.5	36.8	9.0	45.8	74.0	-28.2	Peak	Vertical

Note 1: "\*" means test frequency didn't fall into restricted band.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre\_Amplifier Gain (dB)

Product	Mobile Computer	Test Engineer	Antony Yang
Test Site	AC1	Test Date	2020/07/11
Test Mode	BLE - 1Mbps	Test Channel:	19
Remark	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	3992.0	37.7	3.5	41.2	74.0	-32.8	Peak	Horizontal
	4697.5	38.1	5.2	43.3	74.0	-30.7	Peak	Horizontal
*	5241.5	36.0	6.1	42.1	74.0	-31.9	Peak	Horizontal
*	6576.0	37.3	8.7	46.0	74.0	-28.0	Peak	Horizontal
	3992.0	39.5	3.5	43.0	74.0	-31.0	Peak	Vertical
	4799.5	36.9	5.9	42.8	74.0	-31.2	Peak	Vertical
*	5241.5	35.0	6.1	41.1	74.0	-32.9	Peak	Vertical
*	6542.0	37.8	8.4	46.2	74.0	-27.8	Peak	Vertical

Note 1: "\*" means test frequency didn't fall into restricted band.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre\_Amplifier Gain (dB)

Product	Mobile Computer	Test Engineer	Antony Yang
Test Site	AC1	Test Date	2020/07/11
Test Mode	BLE - 1Mbps	Test Channel:	39
Remark	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	4017.5	37.1	3.5	40.6	74.0	-33.4	Peak	Horizontal
	4731.5	36.6	5.8	42.4	74.0	-31.6	Peak	Horizontal
*	5199.0	35.8	6.3	42.1	74.0	-31.9	Peak	Horizontal
*	6754.5	37.9	8.9	46.8	74.0	-27.2	Peak	Horizontal
	3720.0	39.9	2.6	42.5	74.0	-31.5	Peak	Vertical
	4782.5	38.9	5.7	44.6	74.0	-29.4	Peak	Vertical
*	5233.0	36.0	6.1	42.1	74.0	-31.9	Peak	Vertical
*	7103.0	37.5	10.4	47.9	74.0	-26.1	Peak	Vertical

Note 1: "\*" means test frequency didn't fall into restricted band.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre\_Amplifier Gain (dB)

Product	Mobile Computer	Test Engineer	Antony Yang
Test Site	AC1	Test Date	2020/07/11
Test Mode	BLE - 2Mbps	Test Channel:	00
Remark	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	3830.5	36.8	3.1	39.9	74.0	-34.1	Peak	Horizontal
	4774.0	37.1	5.6	42.7	74.0	-31.3	Peak	Horizontal
*	5241.5	34.8	6.1	40.9	74.0	-33.1	Peak	Horizontal
*	7128.5	37.0	10.5	47.5	74.0	-26.5	Peak	Horizontal
	3728.5	40.5	2.6	43.1	74.0	-30.9	Peak	Vertical
	4782.5	41.3	5.7	47.0	74.0	-27.0	Peak	Vertical
*	5284.0	36.2	5.8	42.0	74.0	-32.0	Peak	Vertical
*	6771.5	36.8	9.0	45.8	74.0	-28.2	Peak	Vertical

Note 1: "\*" means test frequency didn't fall into restricted band.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre\_Amplifier Gain (dB)

Product	Mobile Computer	Test Engineer	Antony Yang
Test Site	AC1	Test Date	2020/07/11
Test Mode	BLE - 2Mbps	Test Channel:	19
Remark	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	3728.5	38.2	2.6	40.8	74.0	-33.2	Peak	Horizontal
	4799.5	38.4	5.9	44.3	74.0	-29.7	Peak	Horizontal
*	5224.5	35.9	6.1	42.0	74.0	-32.0	Peak	Horizontal
*	6737.5	36.6	8.9	45.5	74.0	-28.5	Peak	Horizontal
	3728.5	39.7	2.6	42.3	74.0	-31.7	Peak	Vertical
	4799.5	37.7	5.9	43.6	74.0	-30.4	Peak	Vertical
*	5836.5	36.9	7.0	43.9	74.0	-30.1	Peak	Vertical
*	6924.5	36.8	9.3	46.1	74.0	-27.9	Peak	Vertical

Note 1: "\*" means test frequency didn't fall into restricted band.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre\_Amplifier Gain (dB)



Product	Mobile Computer	Test Engineer	Antony Yang
Test Site	AC1	Test Date	2020/07/11
Test Mode	BLE - 2Mbps	Test Channel:	39
Remark	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	3720.0	38.7	2.6	41.3	74.0	-32.7	Peak	Horizontal
	4782.5	36.7	5.7	42.4	74.0	-31.6	Peak	Horizontal
*	5258.5	35.8	6.2	42.0	74.0	-32.0	Peak	Horizontal
*	7035.0	37.1	9.7	46.8	74.0	-27.2	Peak	Horizontal
	3720.0	39.3	2.6	41.9	74.0	-32.1	Peak	Vertical
	4782.5	37.9	5.7	43.6	74.0	-30.4	Peak	Vertical
*	5241.5	35.7	6.1	41.8	74.0	-32.2	Peak	Vertical
*	7128.5	36.9	10.5	47.4	74.0	-26.6	Peak	Vertical

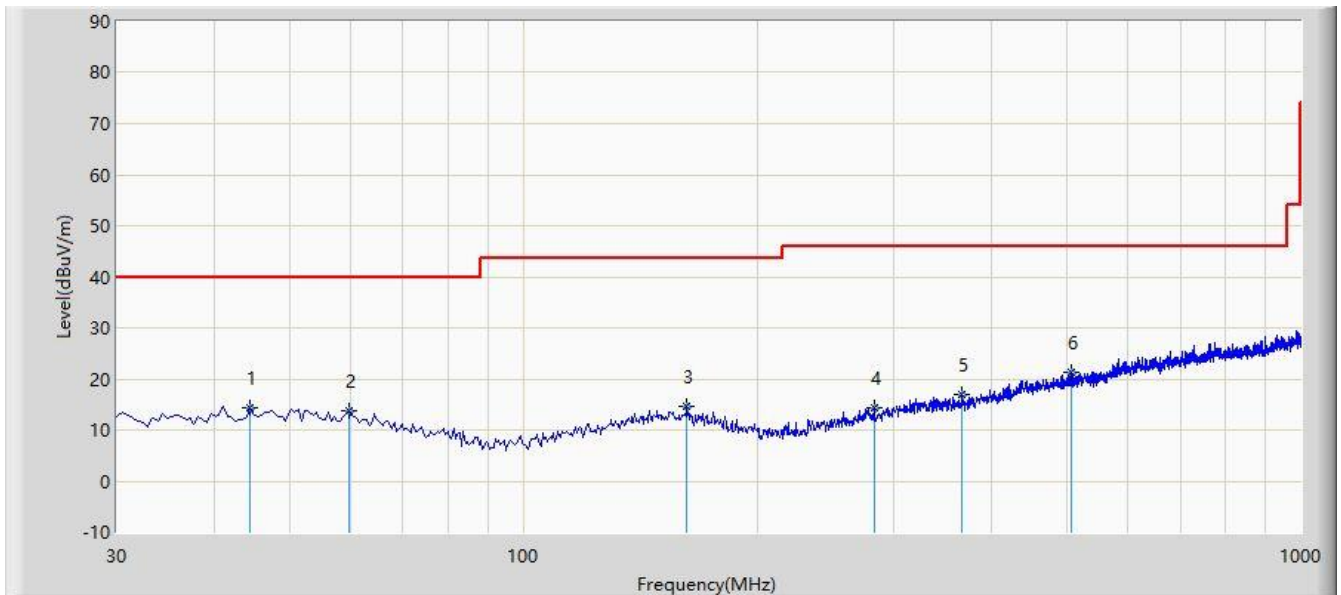
Note 1: "\*" means test frequency didn't fall into restricted band.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre\_Amplifier Gain (dB)

### The Result of Radiated Emission below 1GHz:

Site: AC1	Time: 2020/07/11 - 16:10
Limit: FCC_Part15.209_RE(3m)	Engineer: Antony Yang
Probe: AC1_VULB 9168 _30-1000MHz	Polarity: Horizontal
EUT: Mobile Computer	Power: AC 120V/60Hz
<b>Test Mode:</b> Transmit by Bluetooth LE at Channel 2440MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			44.550	14.451	0.089	-25.549	40.000	14.362	QP
2			59.585	13.626	-0.265	-26.374	40.000	13.891	QP
3			162.405	14.529	0.088	-28.971	43.500	14.441	QP
4			282.685	14.351	-0.037	-31.649	46.000	14.387	QP
5			366.590	16.963	0.573	-29.037	46.000	16.390	QP
6		*	506.755	21.275	1.518	-24.725	46.000	19.757	QP

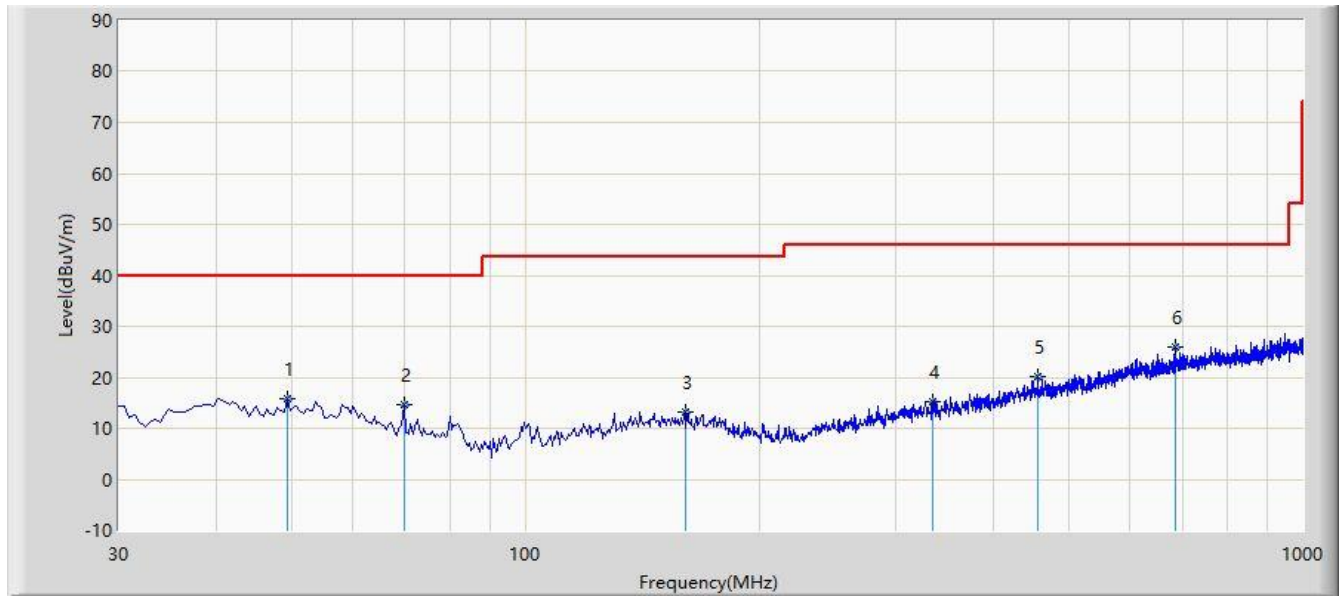
Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Note 2: The amplitude of radiated emissions (frequency range from 9kHz to 30MHz and 18GHz to 25GHz) is that proximity to ambient noise, which also are attenuated more than 20 dB below the permissible value.

Therefore, the data is not presented in the report.

Site: AC1	Time: 2020/07/11 - 16:12
Limit: FCC_Part15.209_RE(3m)	Engineer: Antony Yang
Probe: AC1_VULB 9168 _30-1000MHz	Polarity: Vertical
EUT: Mobile Computer	Power: AC 120V/60Hz
<b>Test Mode:</b> Transmit by Bluetooth LE at Channel 2440MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			49.400	15.831	1.369	-24.169	40.000	14.462	QP
2			69.770	14.708	2.463	-25.292	40.000	12.245	QP
3			160.465	13.155	-1.324	-30.345	43.500	14.479	QP
4			333.610	15.324	-0.480	-30.676	46.000	15.804	QP
5			455.830	20.087	1.111	-25.913	46.000	18.976	QP
6		*	685.720	25.858	2.932	-20.142	46.000	22.926	QP

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Note 2: The amplitude of radiated emissions (frequency range from 9kHz to 30MHz and 18GHz to 25GHz) is that proximity to ambient noise, which also are attenuated more than 20 dB below the permissible value.

Therefore, the data is not presented in the report.

## 7.7. Radiated Restricted Band Edge Measurement

### 7.7.1. Test Limit

#### For 15.205 requirement:

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part 15, must also comply with the radiated emission limits specified in Section 15.209(a).

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 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	2690 - 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	( <sup>2</sup> )
13.36 - 13.41	--	--	--

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [uV/m]	Measured Distance [Meters]
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

#### 7.7.2.Test Procedure Used

ANSI C63.10-2013 - Section 6.3

ANSI C63.10-2013 - Section 6.6

ANSI C63.10-2013 - Section 11.13

#### 7.7.3.Test Setting

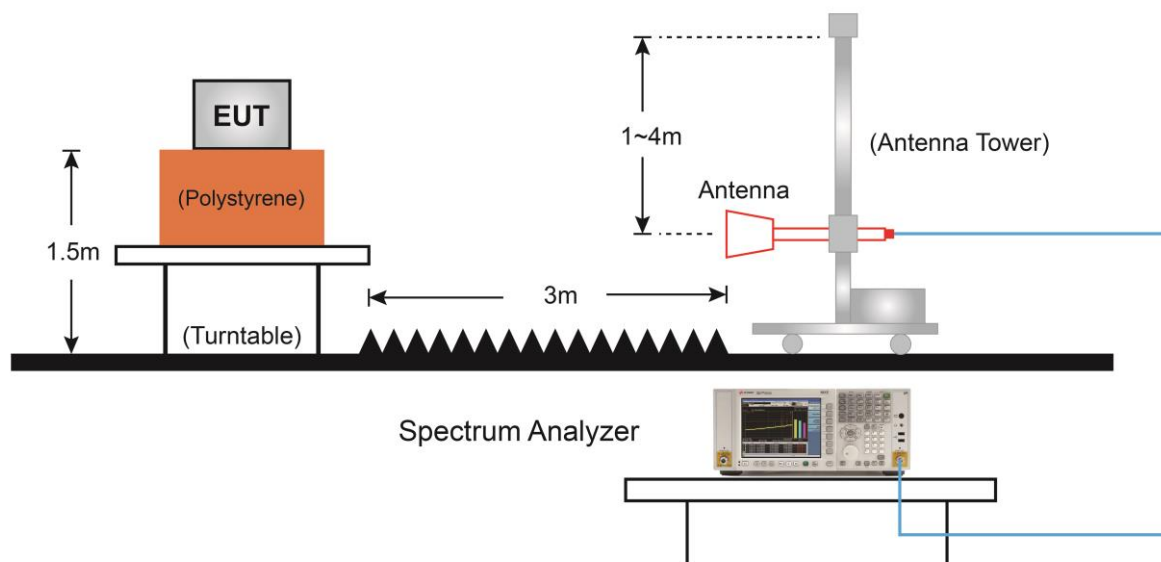
##### Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

### Average Field Strength Measurements

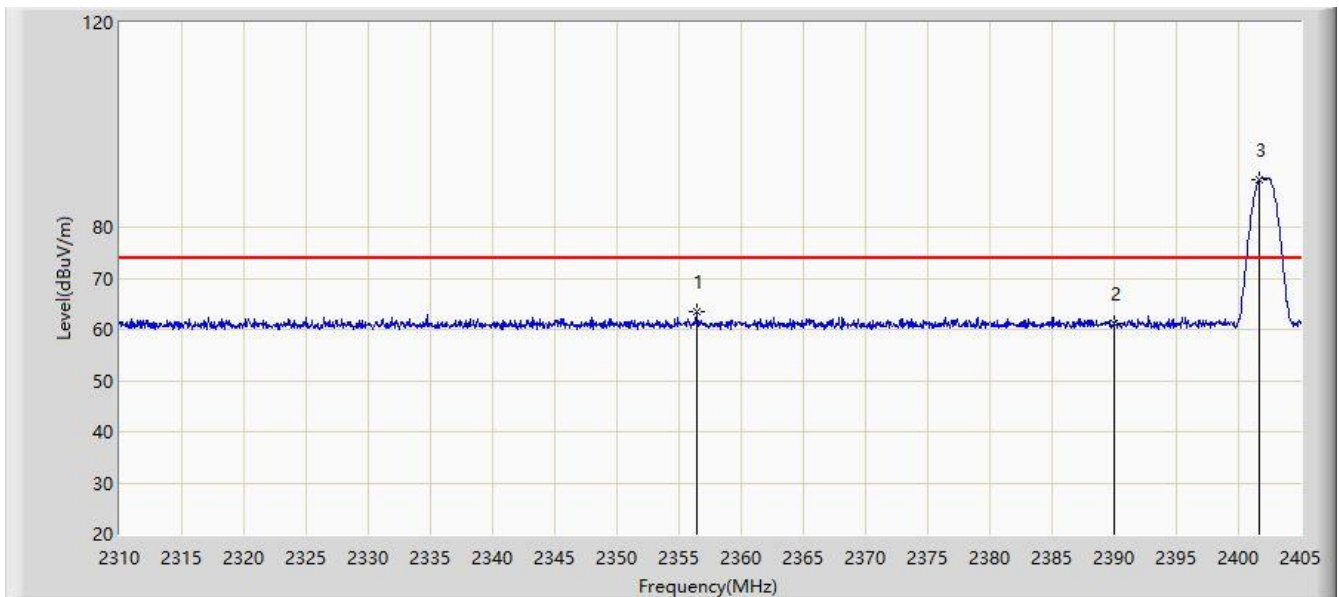
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW  $\geq 1/T$
4. De As an alternative, the instrument may be set to linear detector mode. Ensure that video filtering is applied in linear voltage domain (rather than in a log or dB domain). Some instruments require linear display mode in order to accomplish this. Others have a setting for Average-VBW Type, which can be set to "Voltage" regardless of the display mode
5. Detector = Peak
6. Sweep time = auto
7. Trace mode = max hold
8. Allow max hold to run for at least 50 times (1/duty cycle) traces

#### **7.7.4.Test Setup**



### 7.7.5.Test Result

Site: AC1	Time: 2020/07/15 - 17:49
Limit: FCC_Part15.209_RE(3m)	Engineer: Buter Shi
Probe: AC1_BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Mobile Computer	Power: AC 120V/60Hz
Test Mode: Transmit by BLE 1M at Channel 2402MHz	

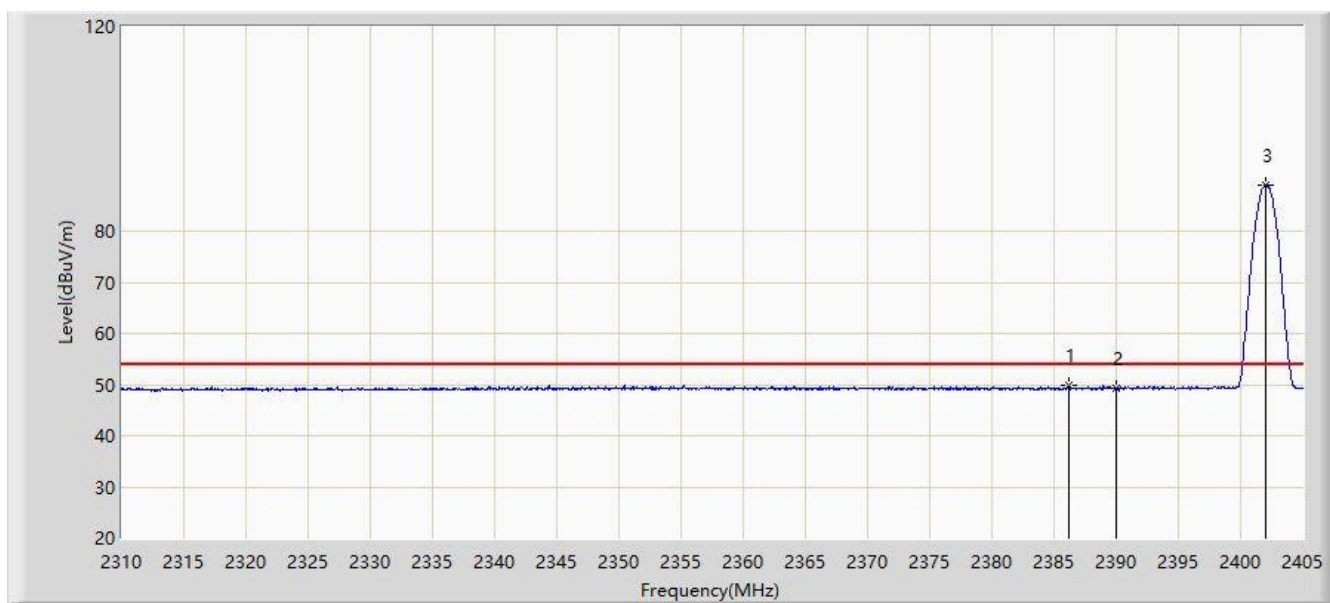


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2356.407	63.505	30.733	-10.495	74.000	32.772	PK
2			2390.000	61.184	28.472	-12.816	74.000	32.712	PK
3		*	2401.722	89.417	56.673	N/A	N/A	32.744	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2020/07/15 - 18:02
Limit: FCC_Part15.209_RE(3m)	Engineer: Buter Shi
Probe: AC1_BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Mobile Computer	Power: AC 120V/60Hz
Test Mode: Transmit by BLE 1M at Channel 2402MHz	



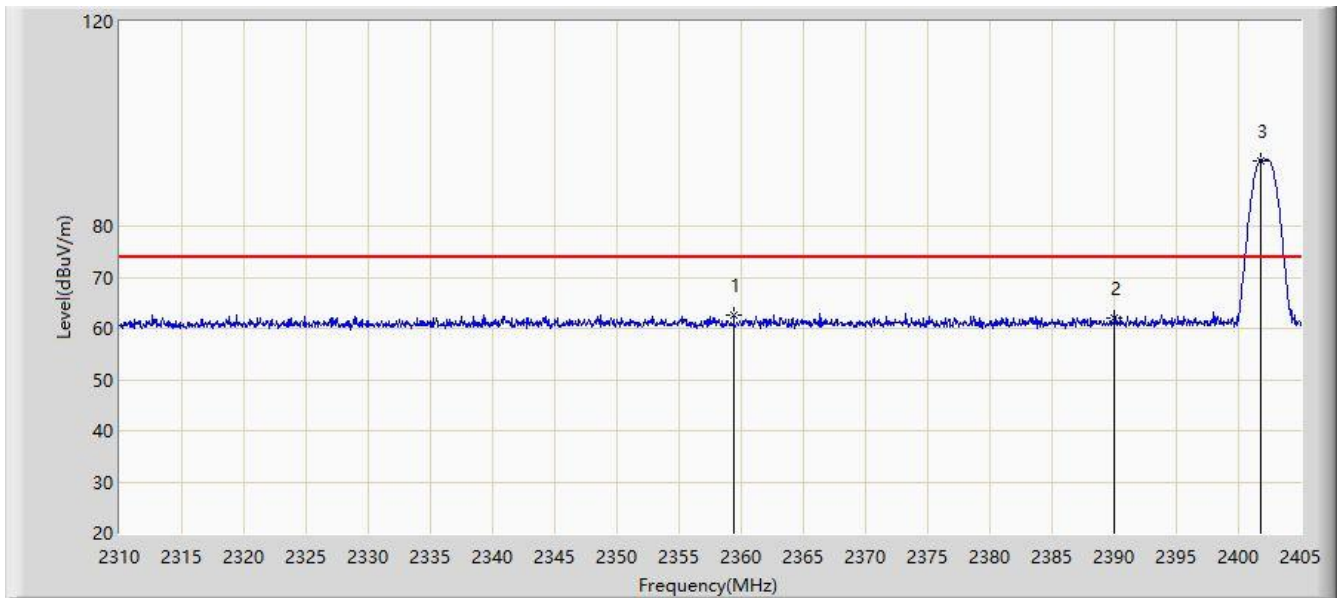
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2386.190	49.891	17.197	-4.109	54.000	32.694	AV
2			2390.000	49.212	16.500	-4.788	54.000	32.712	AV
3		*	2402.008	89.111	56.367	N/A	N/A	32.744	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)



Site: AC1	Time: 2020/07/15 - 18:04
Limit: FCC_Part15.209_RE(3m)	Engineer: Buter Shi
Probe: AC1_BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Mobile Computer	Power: AC 120V/60Hz
Test Mode: Transmit by BLE 1M at Channel 2402MHz	

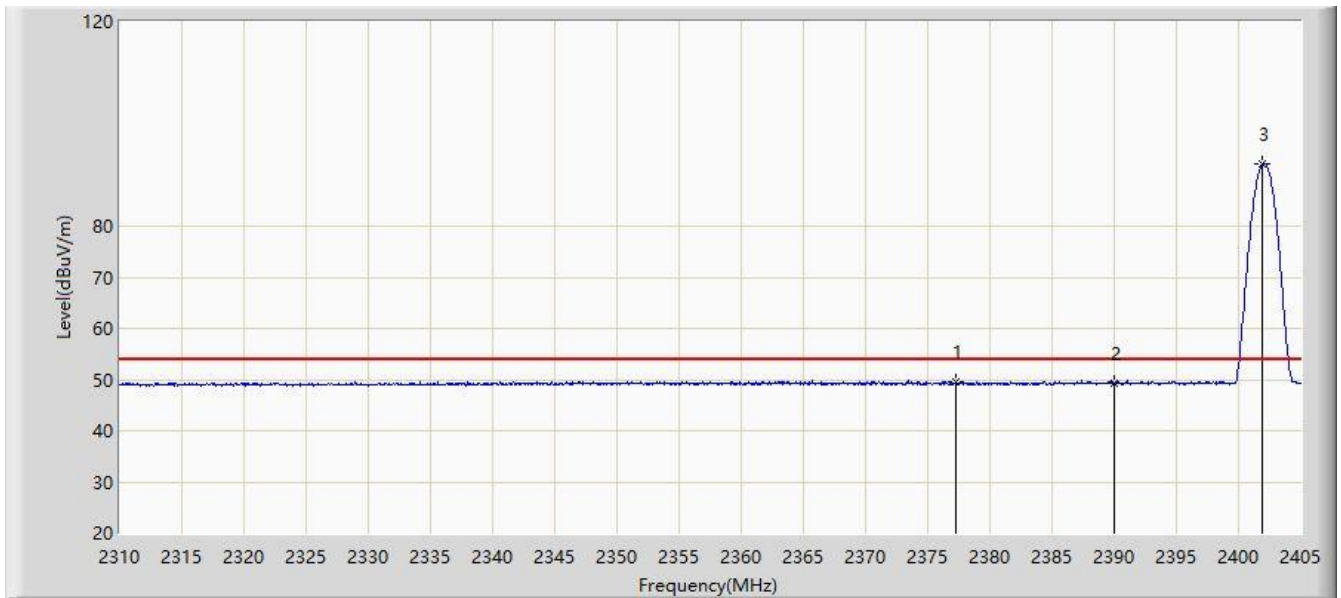


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2359.400	62.745	29.980	-11.255	74.000	32.765	PK
2			2390.000	62.014	29.302	-11.986	74.000	32.712	PK
3		*	2401.770	92.851	60.107	N/A	N/A	32.744	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2020/07/15 - 18:07
Limit: FCC_Part15.209_RE(3m)	Engineer: Buter Shi
Probe: AC1_BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Mobile Computer	Power: AC 120V/60Hz
Test Mode: Transmit by BLE 1M at Channel 2402MHz	

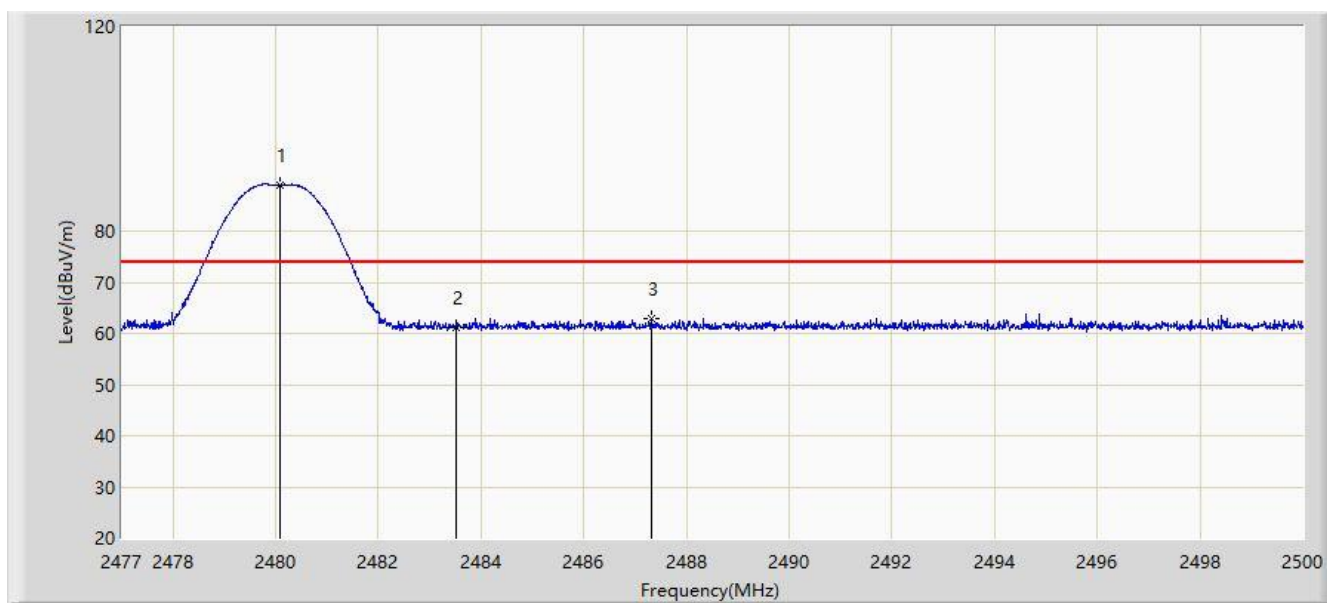


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2377.212	49.504	16.827	-4.496	54.000	32.677	AV
2			2390.000	49.295	16.583	-4.705	54.000	32.712	AV
3		*	2401.960	92.216	59.472	N/A	N/A	32.744	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2020/07/15 - 18:14
Limit: FCC_Part15.209_RE(3m)	Engineer: Buter Shi
Probe: AC1_BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Mobile Computer	Power: AC 120V/60Hz
Test Mode: Transmit by BLE 1M at Channel 2480MHz	

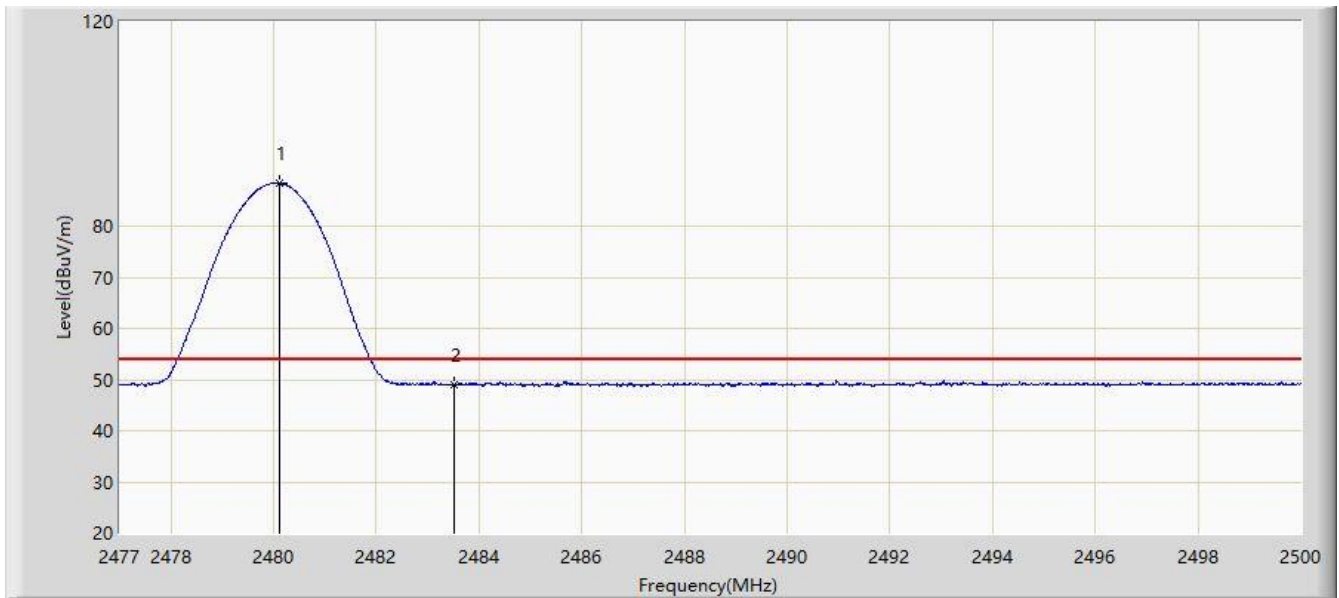


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2480.082	89.103	56.423	N/A	N/A	32.680	PK
2			2483.500	61.085	28.435	-12.915	74.000	32.651	PK
3			2487.327	62.851	30.234	-11.149	74.000	32.617	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2020/07/15 - 18:17
Limit: FCC_Part15.209_RE(3m)	Engineer: Buter Shi
Probe: AC1_BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Mobile Computer	Power: AC 120V/60Hz
Test Mode: Transmit by BLE 1M Mode at Channel 2480MHz	

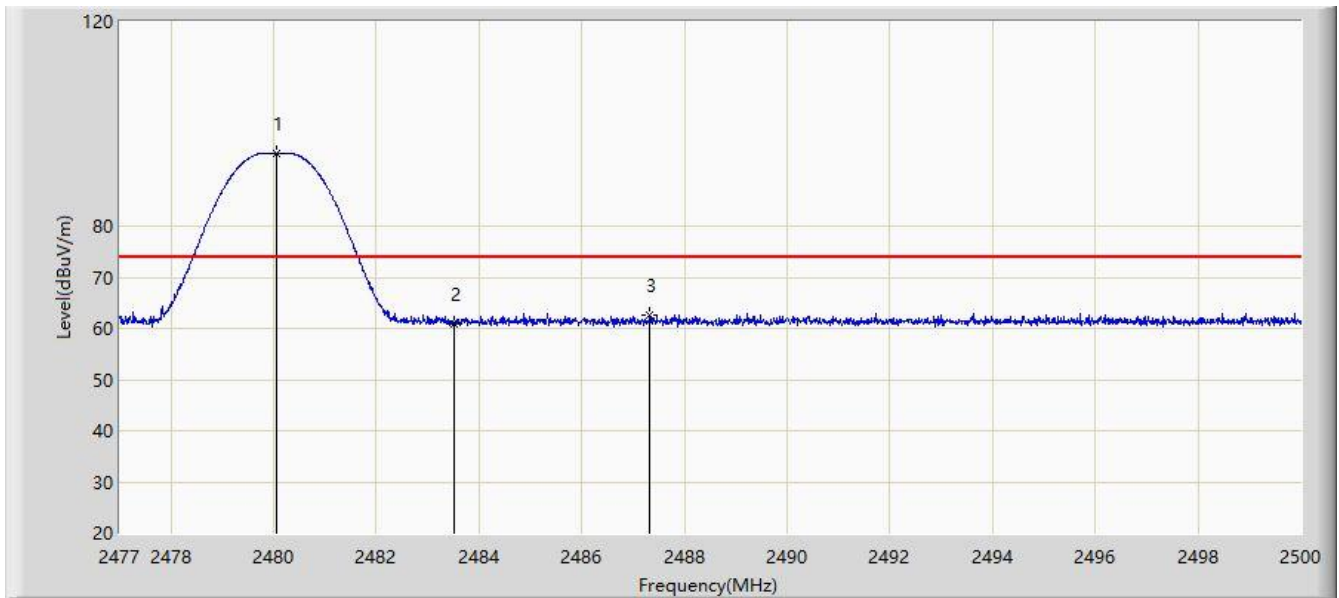


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2480.105	88.379	55.699	N/A	N/A	32.679	AV
2			2483.500	48.955	16.305	-5.045	54.000	32.651	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2020/07/15 - 18:18
Limit: FCC_Part15.209_RE(3m)	Engineer: Buter Shi
Probe: AC1_BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Mobile Computer	Power: AC 120V/60Hz
Test Mode: Transmit by BLE 1M at Channel 2480MHz	

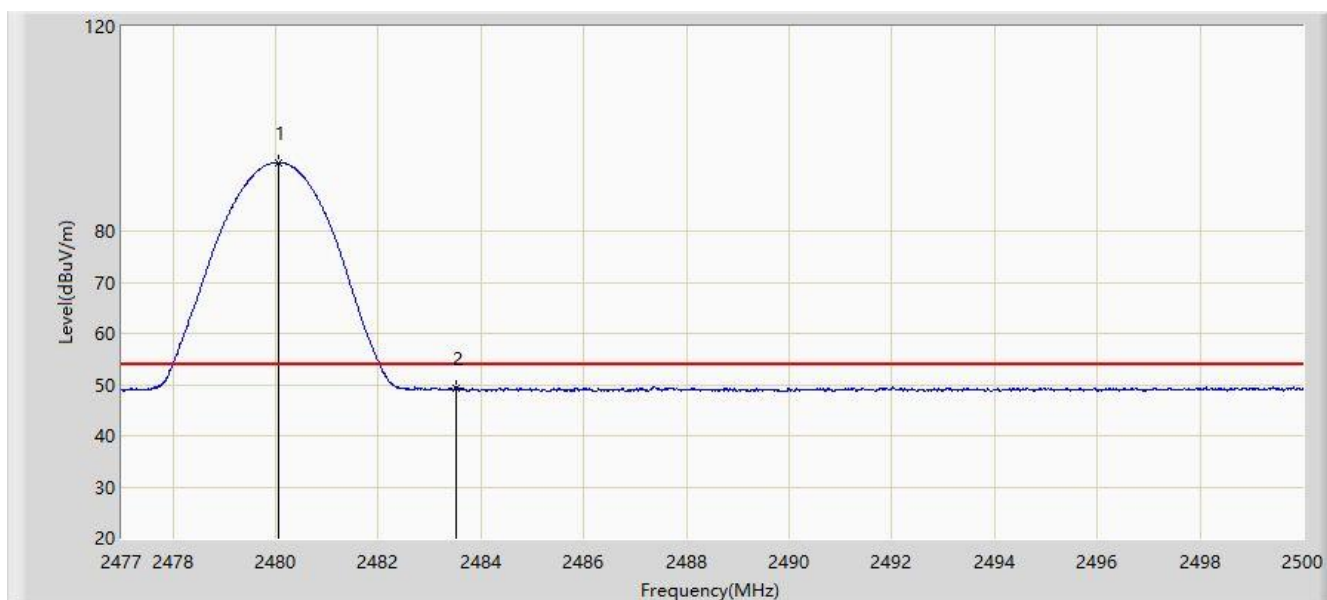


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2480.059	94.174	61.494	N/A	N/A	32.681	PK
2			2483.500	60.900	28.250	-13.100	74.000	32.651	PK
3			2487.315	62.484	29.867	-11.516	74.000	32.617	PK

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2020/07/15 - 18:20
Limit: FCC_Part15.209_RE(3m)	Engineer: Buter Shi
Probe: AC1_BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Mobile Computer	Power: AC 120V/60Hz
Test Mode: Transmit by BLE 1M at Channel 2480MHz	

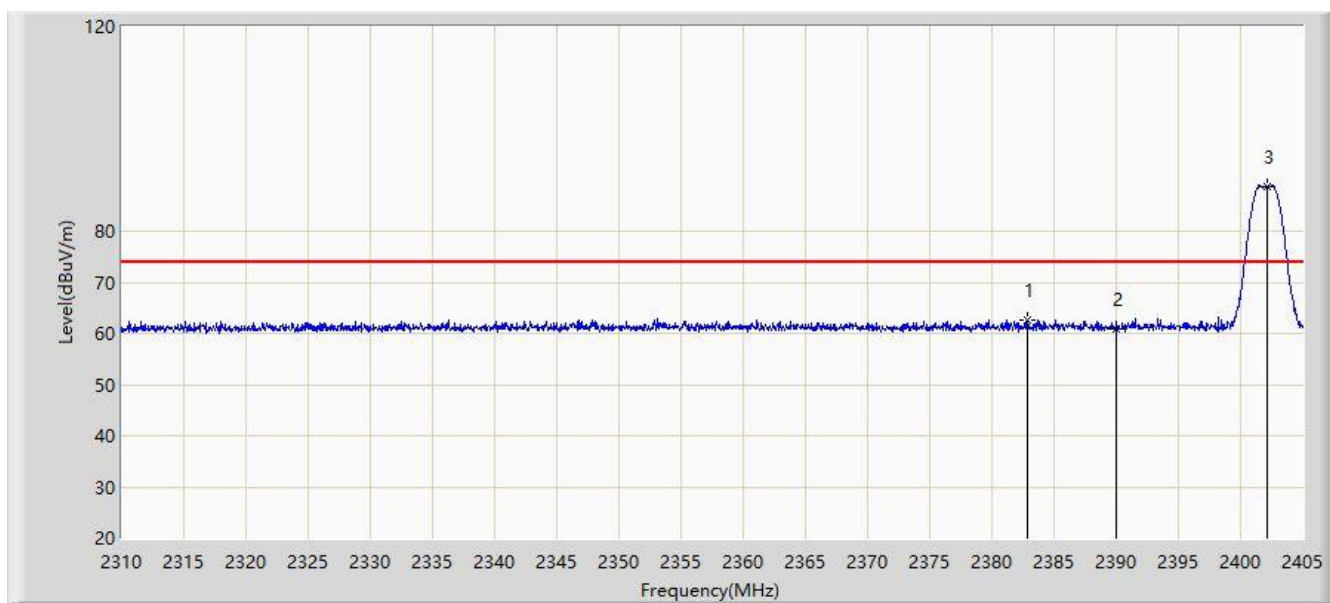


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2480.059	93.420	60.740	N/A	N/A	32.681	AV
2			2483.500	49.131	16.481	-4.869	54.000	32.651	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2020/07/15 - 18:21
Limit: FCC_Part15.209_RE(3m)	Engineer: Buter Shi
Probe: AC1_BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Mobile Computer	Power: AC 120V/60Hz
Test Mode: Transmit by BLE 2M at Channel 2402MHz	

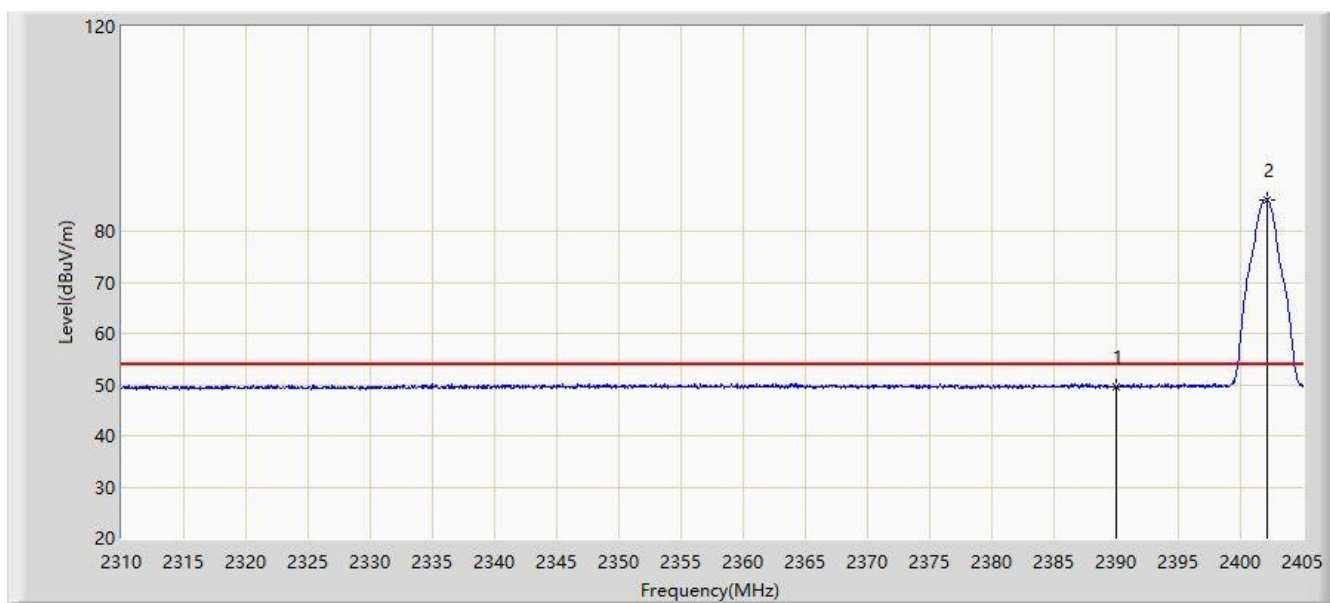


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2382.913	62.551	29.872	-11.449	74.000	32.679	PK
2			2390.000	60.969	28.257	-13.031	74.000	32.712	PK
3		*	2402.150	88.817	56.073	N/A	N/A	32.744	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2020/07/15 - 18:25
Limit: FCC_Part15.209_RE(3m)	Engineer: Buter Shi
Probe: AC1_BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Mobile Computer	Power: AC 120V/60Hz
Test Mode: Transmit by BLE 2M at Channel 2402MHz	



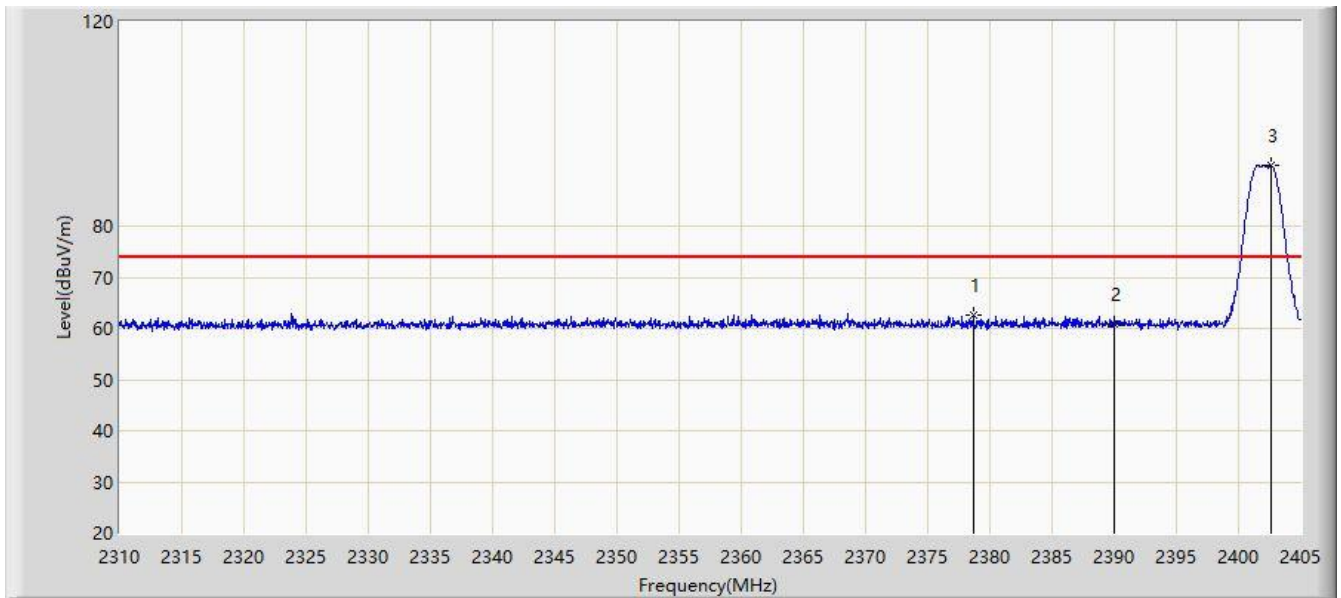
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	49.485	16.773	-4.515	54.000	32.712	AV
2		*	2402.150	86.186	53.442	N/A	N/A	32.744	AV

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)



Site: AC1	Time: 2020/07/15 - 18:27
Limit: FCC_Part15.209_RE(3m)	Engineer: Buter Shi
Probe: AC1_BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Mobile Computer	Power: AC 120V/60Hz
Test Mode: Transmit by BLE 2M at Channel 2402MHz	

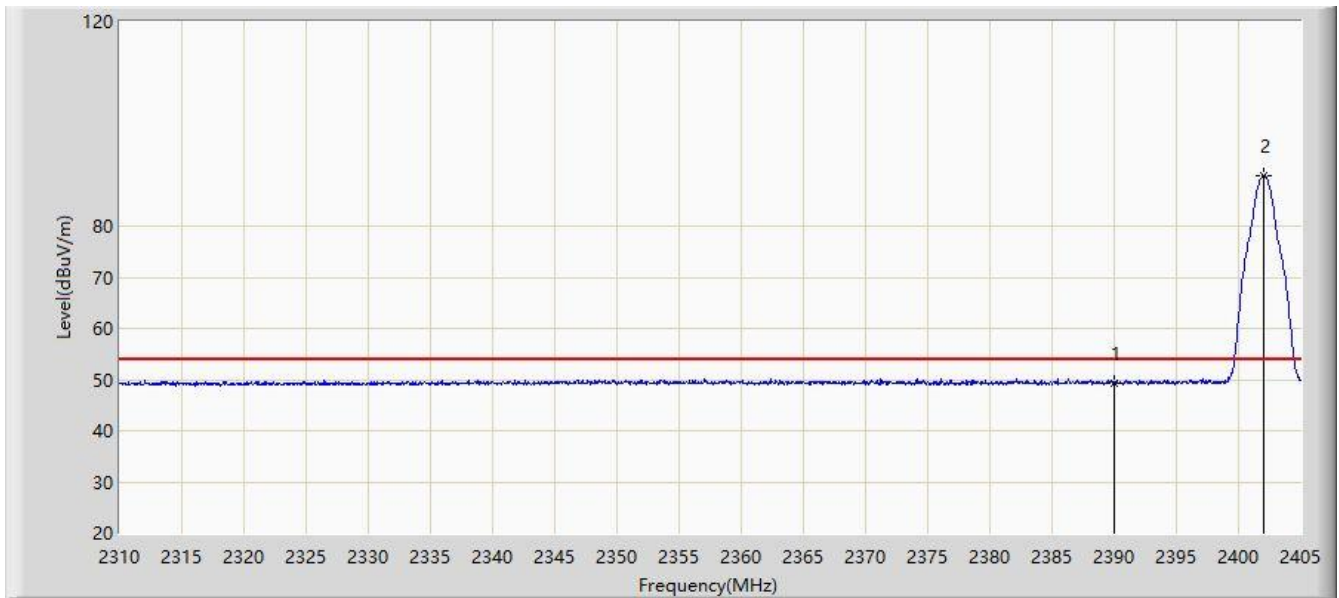


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2378.637	62.746	30.076	-11.254	74.000	32.669	PK
2			2390.000	60.975	28.263	-13.025	74.000	32.712	PK
3		*	2402.577	91.933	59.190	N/A	N/A	32.743	PK

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2020/07/15 - 18:28
Limit: FCC_Part15.209_RE(3m)	Engineer: Buter Shi
Probe: AC1_BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Mobile Computer	Power: AC 120V/60Hz
Test Mode: Transmit by BLE 2M at Channel 2402MHz	

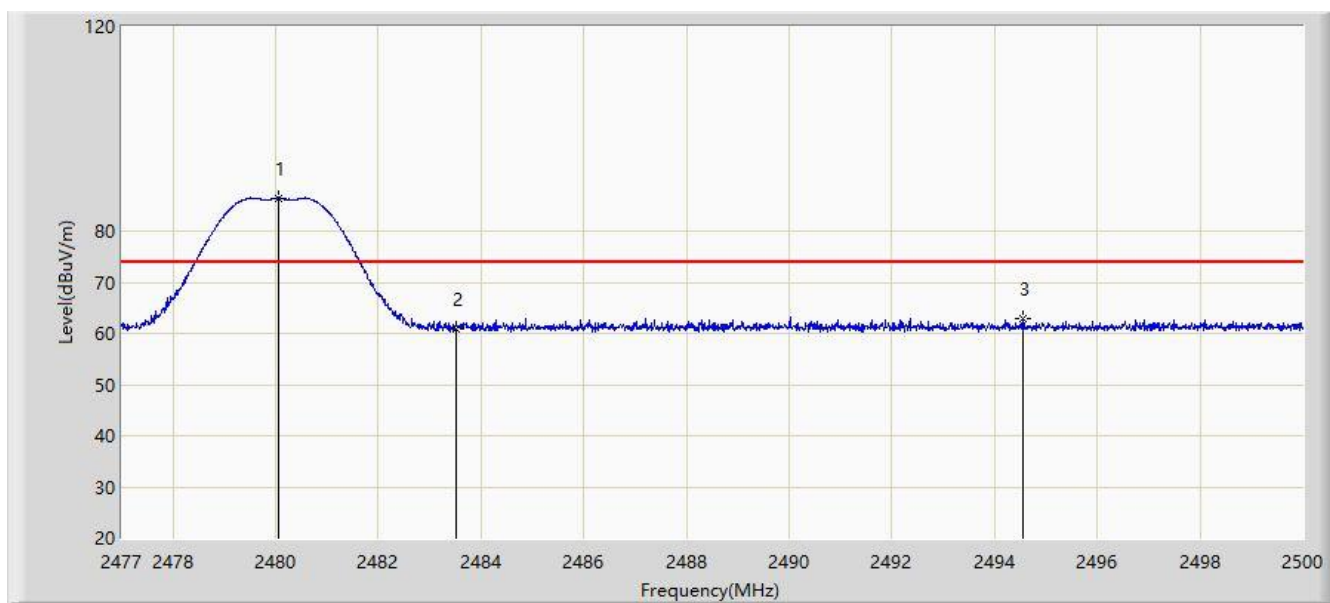


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	49.410	16.698	-4.590	54.000	32.712	AV
2		*	2402.008	89.873	57.129	N/A	N/A	32.744	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2020/07/15 - 18:29
Limit: FCC_Part15.209_RE(3m)	Engineer: Buter Shi
Probe: AC1_BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Mobile Computer	Power: AC 120V/60Hz
Test Mode: Transmit by BLE 2M at Channel 2480MHz	

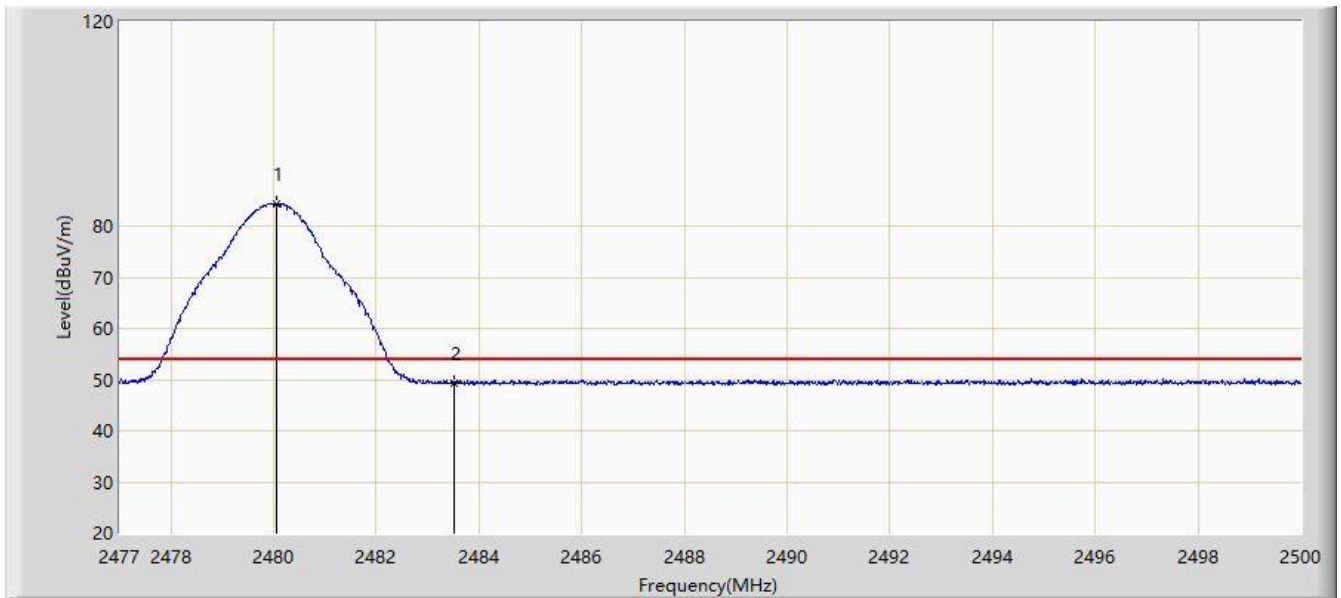


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2480.059	86.418	53.738	N/A	N/A	32.681	PK
2			2483.500	60.904	28.254	-13.096	74.000	32.651	PK
3			2494.561	63.042	30.424	-10.958	74.000	32.618	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2020/07/15 - 18:31
Limit: FCC_Part15.209_RE(3m)	Engineer: Buter Shi
Probe: AC1_BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Mobile Computer	Power: AC 120V/60Hz
Test Mode: Transmit by BLE 2M at Channel 2480MHz	

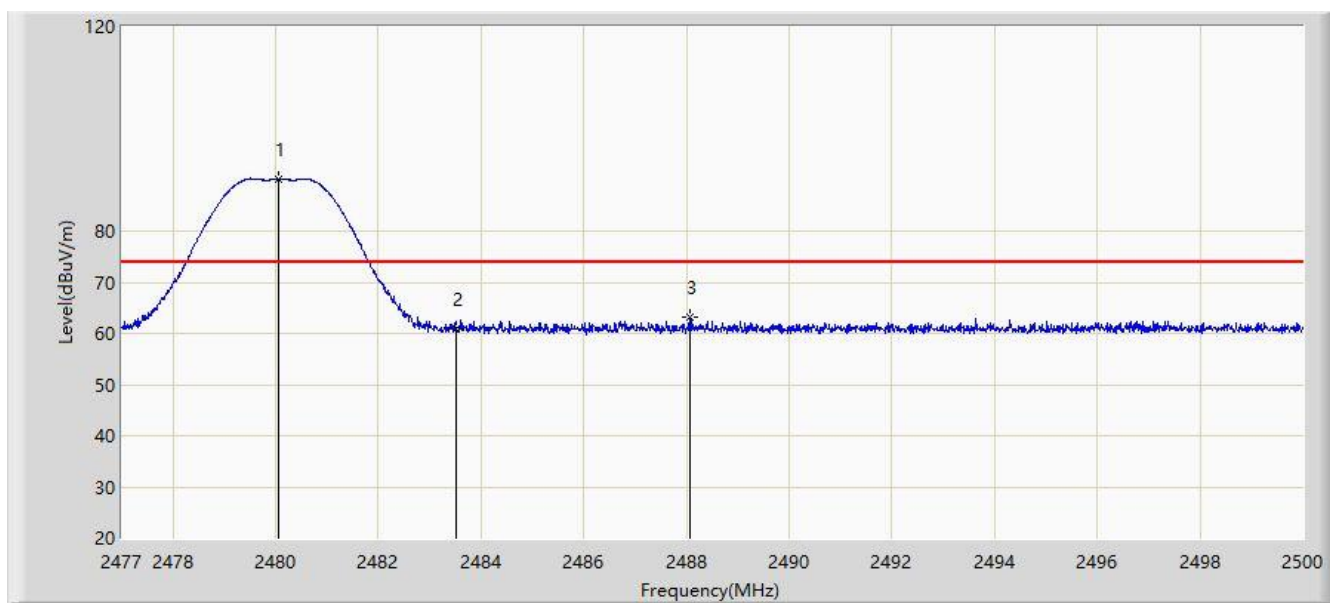


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2480.059	84.445	51.765	N/A	N/A	32.681	AV
2			2483.500	49.390	16.740	-4.610	54.000	32.651	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2020/07/15 - 18:31
Limit: FCC_Part15.209_RE(3m)	Engineer: Buter Shi
Probe: AC1_BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Mobile Computer	Power: AC 120V/60Hz
Test Mode: Transmit by BLE 2M at Channel 2480MHz	

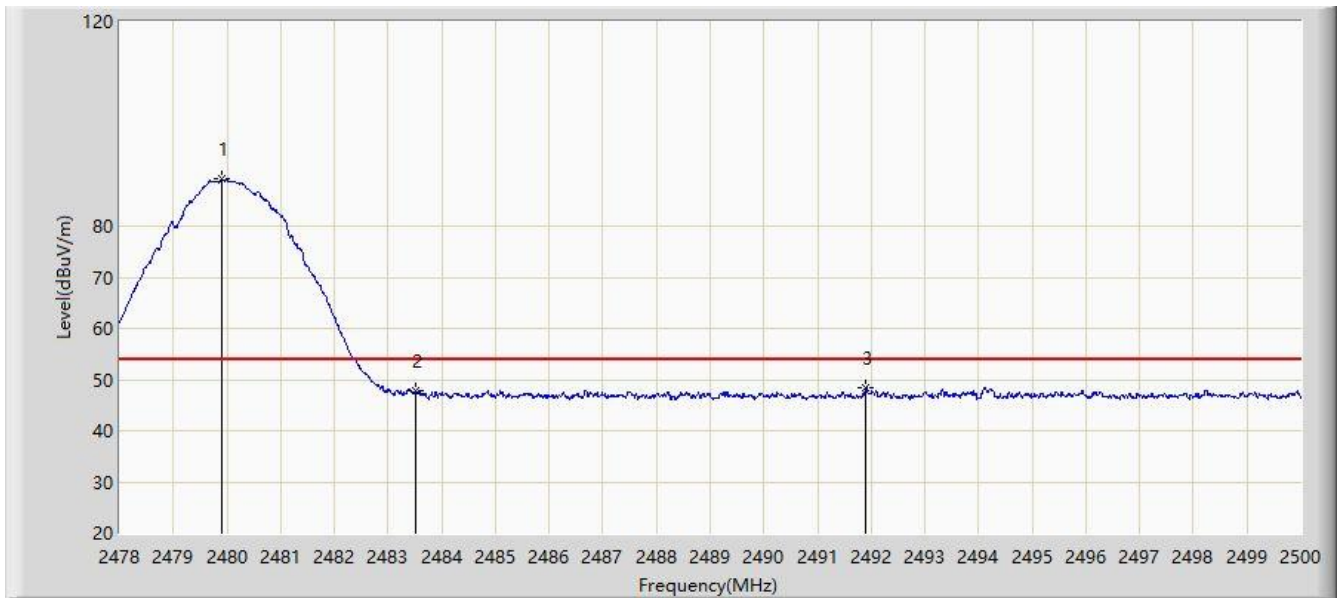


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2480.059	90.208	57.528	N/A	N/A	32.681	PK
2			2483.500	60.956	28.306	-13.044	74.000	32.651	PK
3			2488.063	63.087	30.472	-10.913	74.000	32.615	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2020/07/20 - 09:43
Limit: FCC_Part15.209_RE(3m)	Engineer: Buter Shi
Probe: AC1_BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Mobile Computer	Power: AC 120V/60Hz
Test Mode: Transmit by BLE 2M at Channel 2480MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2479.892	89.209	56.527	N/A	N/A	32.682	AV
2			2483.500	47.748	15.098	-6.252	54.000	32.651	AV
3			2491.904	48.302	15.685	-5.698	54.000	32.617	AV

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

## 7.8. AC Conducted Emissions Measurement

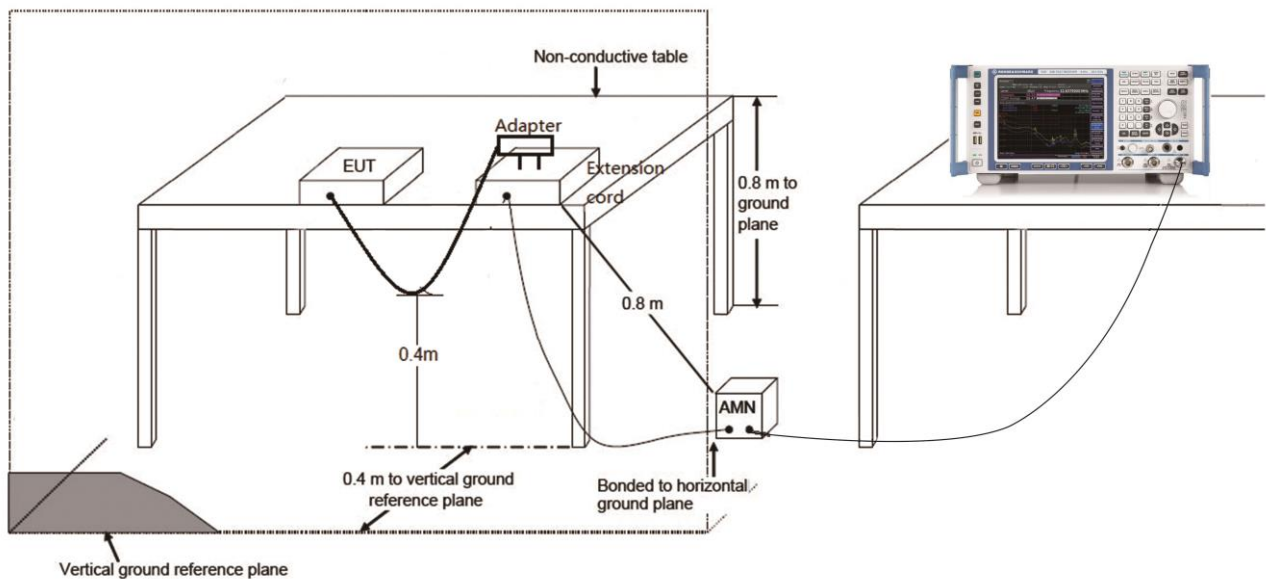
### 7.8.1. Test Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dB $\mu$ V)	Average (dB $\mu$ V)
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.

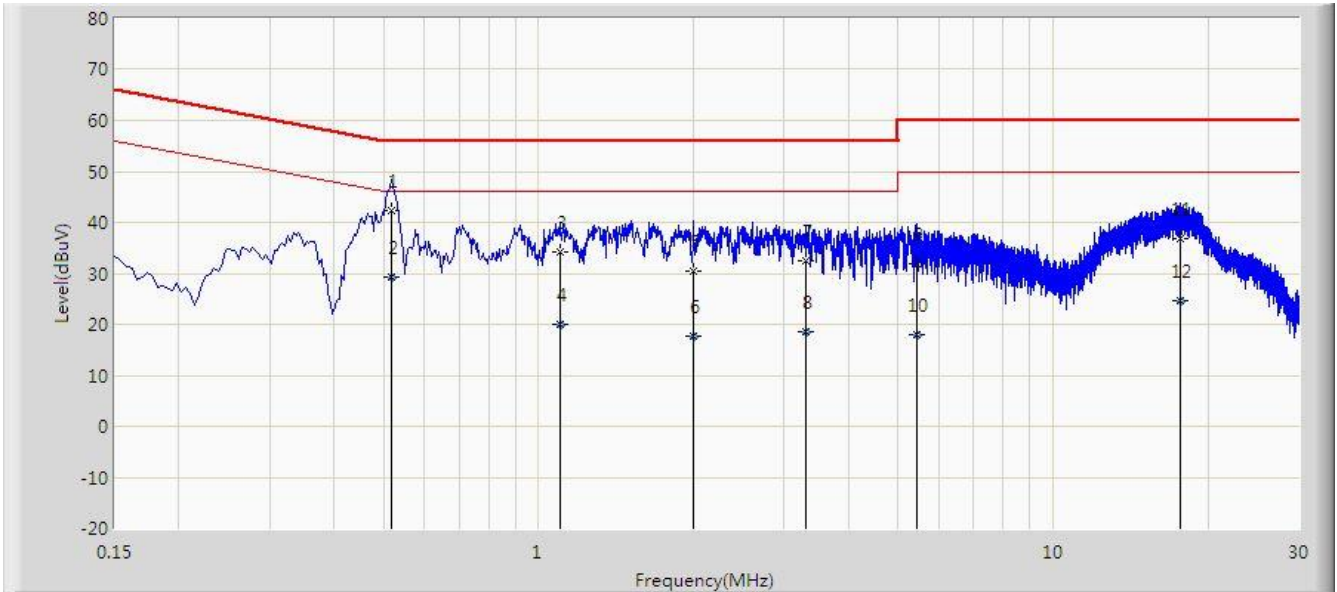
Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

### 7.8.2. Test Setup



### 7.8.3.Test Result

Site: SR2	Time: 2020/07/13 - 18:25
Limit: FCC_Part15.207_CE_AC Power	Engineer: Hyde Yu
Probe: ENV216_101683_Filter On	Polarity: Line
EUT: Mobile Computer	Power: AC 120V/60Hz
<b>Test Mode:</b> Transmit by BLE at Channel 2402MHz	



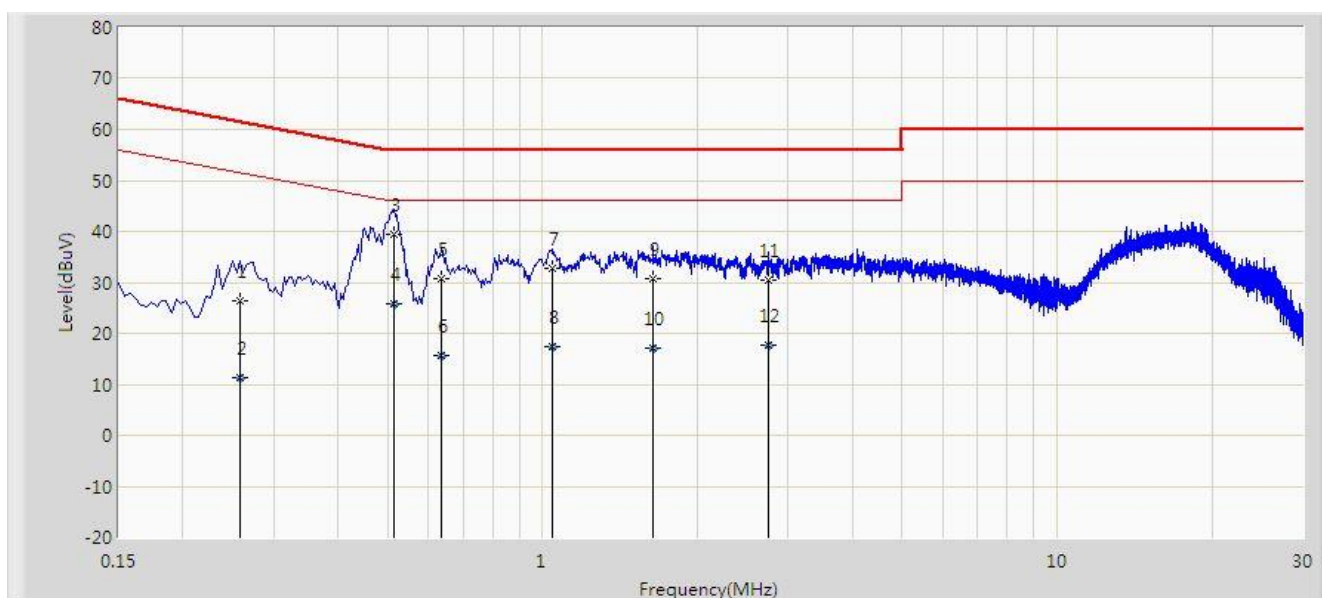
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV)	Factor	Type
1		*	0.518	42.308	32.568	-13.692	56.000	9.740	QP
2			0.518	29.355	19.615	-16.645	46.000	9.740	AV
3			1.098	34.229	24.386	-21.771	56.000	9.843	QP
4			1.098	20.109	10.266	-25.891	46.000	9.843	AV
5			1.998	30.481	20.657	-25.519	56.000	9.823	QP
6			1.998	17.569	7.745	-28.431	46.000	9.823	AV
7			3.310	32.453	22.532	-23.547	56.000	9.920	QP
8			3.310	18.429	8.509	-27.571	46.000	9.920	AV
9			5.418	31.990	21.762	-28.010	60.000	10.227	QP
10			5.418	17.893	7.666	-32.107	50.000	10.227	AV
11			17.686	36.745	26.434	-23.255	60.000	10.311	QP
12			17.686	24.665	14.354	-25.335	50.000	10.311	AV

Note: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB)



Site: SR2	Time: 2020/07/13 - 18:29
Limit: FCC_Part15.207_CE_AC Power	Engineer: Hyde Yu
Probe: ENV216_101683_Filter On	Polarity: Neutral
EUT: Mobile Computer	Power: AC 120V/60Hz
<b>Test Mode:</b> Transmit by BLE at Channel 2402MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV)	Factor	Type
1			0.258	26.262	16.629	-35.233	61.496	9.633	QP
2			0.258	11.390	1.757	-40.105	51.496	9.633	AV
3		*	0.514	39.471	29.811	-16.529	56.000	9.659	QP
4			0.514	25.912	16.253	-20.088	46.000	9.659	AV
5			0.634	30.623	20.950	-25.377	56.000	9.673	QP
6			0.634	15.731	6.058	-30.269	46.000	9.673	AV
7			1.042	32.646	22.947	-23.354	56.000	9.699	QP
8			1.042	17.466	7.767	-28.534	46.000	9.699	AV
9			1.638	30.665	20.915	-25.335	56.000	9.750	QP
10			1.638	17.151	7.401	-28.849	46.000	9.750	AV
11			2.742	30.362	20.569	-25.638	56.000	9.793	QP
12			2.742	17.677	7.884	-28.323	46.000	9.793	AV

Note: Measure Level (dBuV) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB)

## 8. CONCLUSION

The data collected relate only the item(s) tested and show that the device is in compliance with Part 15C of the FCC rules.

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The End

## **Appendix A - Test Setup Photograph**

Refer to “2006RSU069-UT” file.

## **Appendix B - EUT Photograph**

Refer to "2006RSU069-UE" file.