

MEASUREMENT REPORT

FCC PART 15.247 / Bluetooth-LE

FCC ID: HD5-WCT0TR1001

Applicant: Honeywell International Inc
Honeywell Safety and Productivity Solutions

Application Type: Certification

Product: WIFI/BT Board

Model No.: WCT0TR1001

Brand Name: Intermec

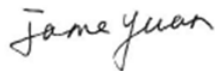
FCC Classification: Digital Transmission System (DTS)

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

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

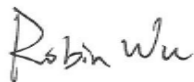
Test Date: November 20 ~ 30, 2020

Reviewed By:



(Jame Yuan)

Approved By:



(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.

Revision History

Report No.	Version	Description	Issue Date	Note
2010RSU087-U3	Rev. 01	Initial Report	11-30-2020	Valid

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1. General Information

1.1. Applicant

Honeywell International Inc
Honeywell Safety and Productivity Solutions
9680 Old Baires Road, Fort Mill, SC 29707 United States

1.2. Manufacturer

Honeywell International Inc
Honeywell Safety and Productivity Solutions
9680 Old Baires Road, Fort Mill, SC 29707 United States

1.3. Testing Facility

☒	Test Site – MRT Suzhou Laboratory		
	Laboratory Location (Suzhou – Wuzhong)		
	D8 Building, No.2 Tian’edang Rd., Wuzhong Economic Development Zone, Suzhou, China		
	Laboratory Location (Suzhou – SIP)		
	4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China		
	Laboratory Accreditations		
A2LA: 3628.01		CNAS: L10551	
FCC: CN1166		ISED: CN0001	
VCCI: R-20025, G-20034, C-20020, T-20020			
☐	Test Site – MRT Shenzhen Laboratory		
	Laboratory Location (Shenzhen)		
	1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China		
	Laboratory Accreditations		
	A2LA: 3628.02		CNAS: L10551
	FCC: CN1284		ISED: CN0105
☐	Test Site – MRT Taiwan Laboratory		
	Laboratory Location (Taiwan)		
	No. 38, Fuxing 2 nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)		
	Laboratory Accreditations		
	TAF: L3261-190725		
FCC: 291082, TW3261		ISED: TW3261	

2. PRODUCT INFORMATION

2.1. Feature of Equipment under Test

Product Name	WIFI/BT Board
Model No.	WCT0TR1001
Serial No.	20201030 Sample18#
Wi-Fi Specification	802.11b/g/n
Bluetooth Version	v4.2 dual mode
Antenna Delivery	1*TX + 1*RX

2.2. Product Specification Subjective to this Report

Bluetooth Frequency	2402~2480MHz
Channel Number	40
Type of modulation	GFSK
Data Rate	1Mbps

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

2.3. Description of Available Antennas

Antenna Type	Frequency Band (GHz)	Manufacturer	Antenna Gain (dBi)	
			With Cable	Without Cable
PCB Antenna	2.4~2.5	WALSIN TECHNOLOGY CORPORATION	1.99	
Dipole Antenna	2.4~2.5		1.90	5.00

Note 1: All antenna information is provided by the manufacturer.

Note 2: The RF cable used with dipole antenna, its cable loss is 3.1dB declared by the manufacturer.

2.4. 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	--	--	--	--

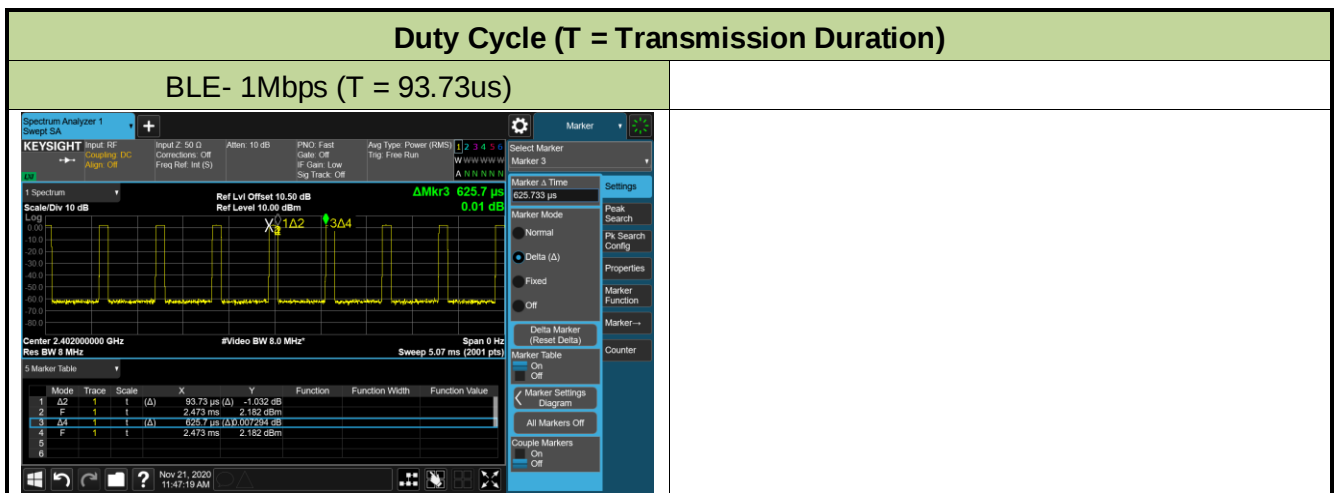
2.5. Test Mode

Test Mode	Mode 1: Transmit by BLE-1Mbps
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2.6. 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	14.98%

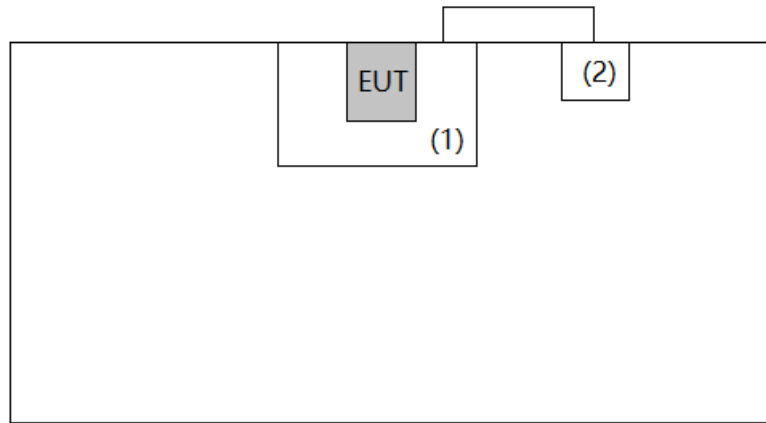


2.7. EMI Suppression Device(s)/Modifications

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

2.8. Description of Test Configuration and Software

The device was tested per the guidance ANSI C63.10: 2013 that was used to reference the appropriate EUT setup for radiated spurious emissions and AC line conducted emission testing.



Product	Manufacturer	Model No.
1 Desktop Printer	Honeywell International Inc	PC43t or PC43d / PD43
2 Adapter	Intermec Technologies Corp.	FSP060-RAA

Note 1: The test utility software used during testing was "IPOP", and the version was 4.1.

Note 2: Detail power setting refer to operation description.

2.9. 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.

2.10. Test Environment Condition

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

3. 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.

4. TEST EQUIPMENT CALIBRATION DATE

Conducted Emission - (WZ-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	ENV216	MRTSUE06002	1 year	2021/09/09
Thermal Hygrometer	testo	608-H1	MRTSUE06404	1 year	2021/07/26
Shielding Room	MIX-BEP	Chamber-SR2	MRTSUE06215	N/A	N/A

Conducted Emission - (SIP-SR2)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR3	MRTSUE06613	1 year	2021/07/02
Two-Line V-Network	R&S	ENV216	MRTSUE06003	1 year	2021/09/09
Thermal Hygrometer	testo	608-H1	MRTSUE06621	1 year	2020/12/29

Radiated Emission - (WZ-AC1)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2021/01/18
PXA Signal Analyzer	Keysight	N9030B	MRTSUE06395	1 year	2021/08/30
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2021/11/08
Bilog Period Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2021/08/08
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06023	1 year	2021/09/27
Horn Antenna	Schwarzbeck	BBHA9170	MRTSUE06597	1 year	2020/12/17
Microwave System Amplifier	Agilent	83017A	MRTSUE06076	1 year	2021/11/14
Preamplifier	Schwarzbeck	BBV 9721	MRTSUE06121	1 year	2021/06/11
Thermal Hygrometer	testo	608-H1	MRTSUE06403	1 year	2021/07/26
Anechoic Chamber	TDK	Chamber-AC1	MRTSUE06212	1 year	2021/04/30

Radiated Emission - (WZ-AC2)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
MXE EMI Receiver	Keysight	N9038A	MRTSUE06125	1 year	2021/07/02
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2021/11/08
Bilog Period Antenna	Schwarzbeck	VULB 9162	MRTSUE06022	1 year	2021/05/26
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06171	1 year	2021/10/25
Horn Antenna	Schwarzbeck	BBHA9170	MRTSUE06597	1 year	2020/12/17
Broadband Coaxial Preamplifier	Schwarzbeck	BBV 9718	MRTSUE06176	1 year	2021/11/14
Preamplifier	Schwarzbeck	BBV 9721	MRTSUE06121	1 year	2021/06/11
Thermal Hygrometer	Minggao	ETH529	MRTSUE06170	1 year	2020/12/15
Anechoic Chamber	RIKEN	Chamber-WZ-AC2	MRTSUE06213	1 year	2021/04/30

Radiated Emission - (SIP-AC1)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR3	MRTSUE06612	1 year	2021/07/02
EXA Signal Analyzer	Keysight	N9010B	MRTSUE06559	1 year	2021/07/23
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2021/11/08
Bilog Period Antenna	Schwarzbeck	VULB9168	MRTSUE06645	1 year	2021/08/30
Double Ridged Horn Antenna	R&S	HF907	MRTSUE06610	1 year	2021/08/30
Preamplifier	EMCI	EMC051845SE	MRTSUE06600	1 year	2021/11/09
Thermal Hygrometer	testo	608-H1	MRTSUE06620	1 year	2020/12/29
Anechoic Chamber	RIKEN	SIP-AC1	MRTSUE06554	1 year	2020/12/25

Radiated Emission - (SIP-WZ-AC2)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR3	MRTSUE06613	1 year	2021/07/02
MXA Signal Analyzer	Keysight	N9020B	MRTSUE06604	1 year	2021/09/26
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2021/11/08
Bilog Period Antenna	Schwarzbeck	VULB9168	MRTSUE06646	1 year	2021/08/30
Horn Antenna	Schwarzbeck	BBHA9120D	MRTSUE06648	1 year	2020/12/17
Horn Antenna	Schwarzbeck	BBHA9170	MRTSUE06599	1 year	2020/12/17
Preamplifier	EMCI	EMC051845SE	MRTSUE06644	1 year	2021/11/09
Preamplifier	EMCI	EMC184045SE	MRTSUE06602	1 year	2021/10/21
Thermal Hygrometer	testo	608-H1	MRTSUE06624	1 year	2020/12/29
Anechoic Chamber	RIKEN	SIP-WZ-AC2	MRTSUE06781	1 year	2020/12/25

Radiated Emission - (SIP-AC3)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR3	MRTSUE06612	1 year	2021/07/02
EXA Signal Analyzer	Keysight	N9010B	MRTSUE06559	1 year	2021/07/23
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2021/11/08
Bilog Period Antenna	Schwarzbeck	VULB9168	MRTSUE06647	1 year	2021/08/08
Double Ridged Horn Antenna	R&S	HF907	MRTSUE06611	1 year	2021/09/13
Horn Antenna	Schwarzbeck	BBHA9170	MRTSUE06598	1 year	2020/12/17
Preamplifier	EMCI	EMC012645SE	MRTSUE06642	1 year	2021/01/16
Preamplifier	EMCI	EMC184045SE	MRTSUE06641	1 year	2021/01/16
Thermal Hygrometer	testo	608-H1	MRTSUE06622	1 year	2020/12/29
Anechoic Chamber	RIKEN	SIP-AC3	MRTSUE06782	1 year	2020/12/25

Conducted Test Equipment - (WZ-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	MRTSUE06607	1 year	2021/01/08
Signal Analyzer	R&S	FSV40	MRTSUE06218	1 year	2021/04/14
Power Meter	Agilent	U2021XA	MRTSUE06030	1 year	2021/10/22
USB wideband power sensor	Keysight	U2021XA	MRTSUE06446	1 year	2021/08/30
USB wideband power sensor	Keysight	U2021XA	MRTSUE06447	1 year	2021/08/08
Bluetooth Test Set	Anritsu	MT8852B-042	MRTSUE06389	1 year	2021/06/11
Attenuator	MVE	10dB	MRTSUE06545	N/A	N/A
Audio Analyzer	Agilent	U8903B	MRTSUE06143	1 year	2021/06/11
Modulation Analyzer	HP	HP8901A	MRTSUE06098	1 year	2021/09/26
Wideband Radio Communication Tester	R&S	CMW 500	MRTSUE06243	1 year	2021/10/20
DC Power Supply	GWINSTEK	DPS-3303C	MRTSUE06064	N/A	N/A
Temperature & Humidity Chamber	BAOYT	BYH-150CL	MRTSUE06051	1 year	2021/10/21
Thermal Hygrometer	testo	608-H1	MRTSUE06401	1 year	2021/07/26

Conducted Test Equipment - (SIP-SR5)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Signal Analyzer	R&S	FSV40	MRTSUE06218	1 year	2021/04/14
PXA Signal Analyzer	Keysight	N9030B	MRTSUE06395	1 year	2021/08/30
Attenuator	MVE	10dB	MRTSUE06545	N/A	N/A
USB wideband power sensor	Agilent	U2021XA	MRTSUE06595	1 year	2021/09/26
USB wideband power sensor	Agilent	U2021XA	MRTSUE06596	1 year	2021/09/26
Wideband Radio Communication Tester	R&S	CMW 500	MRTSUE06243	1 year	2021/10/20
Bluetooth Test Set	Anritsu	MT8852B-042	MRTSUE06389	1 year	2021/06/11
Temperature Chamber	BAOYT	BYG-408CS	MRTSUE06847	1 year	2021/03/31
Thermal Hygrometer	testo	622	MRTSUE06629	1 year	2020/12/30

Software	Version	Function
EMI Software	V3	EMI Test Software

5. 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 $k = 2$.

AC Conducted Emission Measurement
Measurement Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 9kHz~150kHz: 3.74dB 150kHz~30MHz: 3.44dB
Radiated Disturbance
Measurement Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 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
Spurious Emissions, Conducted
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 0.78dB
Output Power
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 1.13dB
Power Spectrum Density
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 1.15dB
Occupied Bandwidth
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 0.28%

6. TEST RESULT

6.1. 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 6.2
N/A	99% Bandwidth	N/A		Pass	
15.247(b)(3)	Output Power	$\leq 1\text{Watt}$		Pass	Section 6.3
15.247(e)	Power Spectral Density	$\leq 8\text{dBm} / 3\text{kHz}$		Pass	Section 6.4
15.247(d)	Band Edge / Out-of-Band Emissions	$\geq 20\text{dBc(Peak)}$		Pass	Section 6.5
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 6.6 Section 6.7
15.207	AC Conducted Emissions 150kHz - 30MHz	< FCC 15.207 limits >	Line Conducted	Pass	Section 6.8

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.

6.2. 6dB Bandwidth Measurement

6.2.1. Test Limit

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

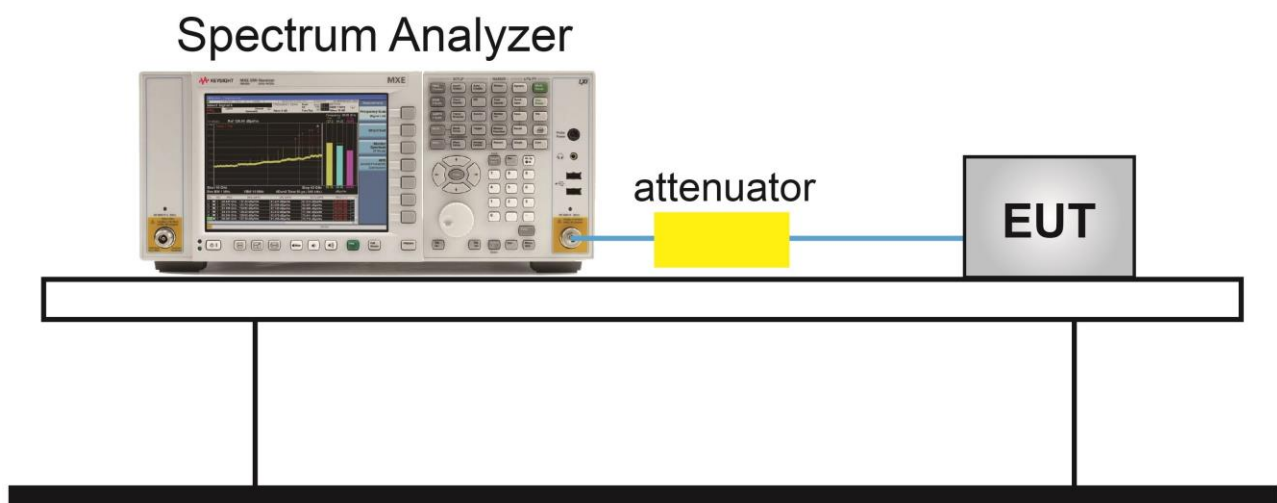
6.2.2. Test Procedure used

ANSI C63.10-2013 - Section 11.8

6.2.3. 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

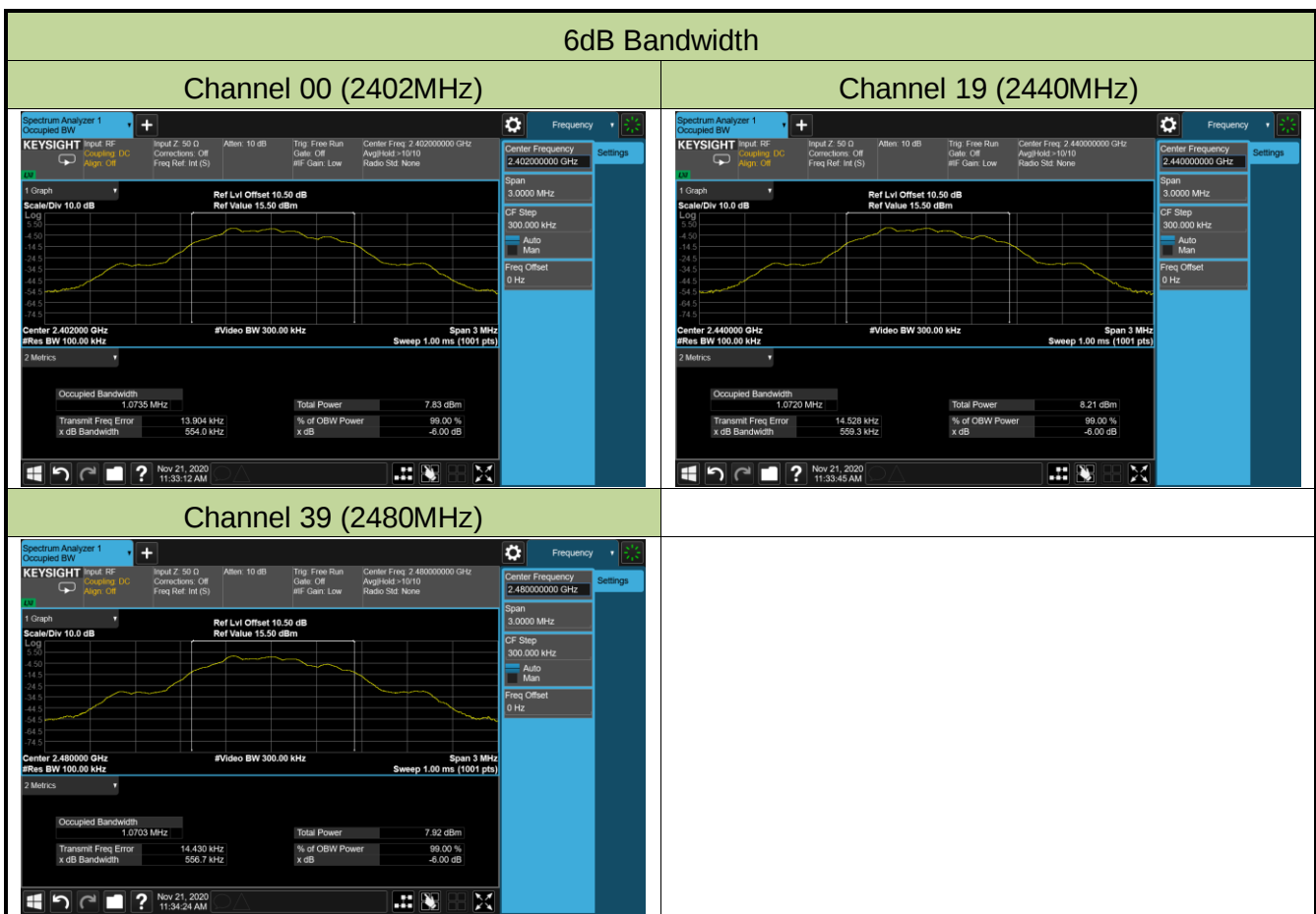
6.2.4. Test Setup



6.2.5. Test Result

Product	WIFI/BT Board	Test Engineer	Dandy Li
Test Site	WZ-TR3	Test Date	2020/11/21

Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
BLE	1	00	2402	0.554	≥ 0.5	Pass
BLE	1	19	2440	0.559	≥ 0.5	Pass
BLE	1	39	2480	0.557	≥ 0.5	Pass



6.3. Output Power Measurement

6.3.1. Test Limit

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

6.3.2. Test Procedure Used

ANSI C63.10-2013 - Section 11.9.1.3

ANSI C63.10-2013 - Section 11.9.2.3.2

6.3.3. Test Setting

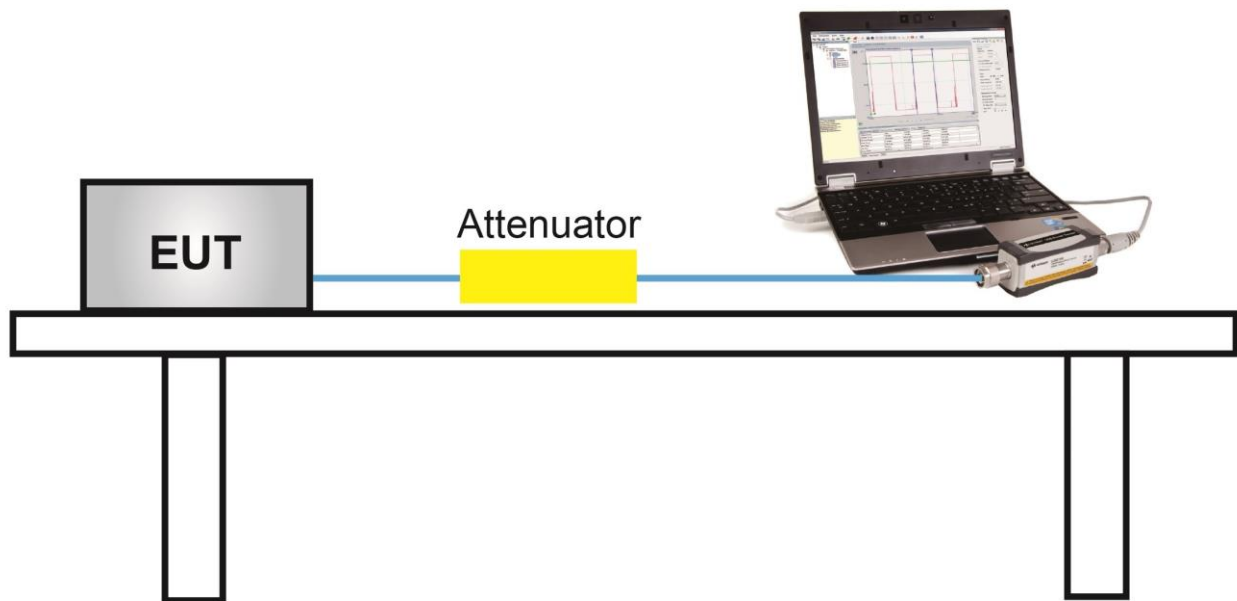
Method PKPM1 (Peak Power Measurement)

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.

6.3.4. Test Setup



6.3.5. Test Result of Output Power

Product	WIFI/BT Board	Test Engineer	Dandy Li
Test Site	WZ-TR3	Test Date	2020/11/20

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	2.53	≤ 30.00	Pass
BLE	1	19	2440	2.85	≤ 30.00	Pass
BLE	1	39	2480	2.52	≤ 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	2.04	≤ 30.00	Pass
BLE	1	19	2440	2.42	≤ 30.00	Pass
BLE	1	39	2480	2.08	≤ 30.00	Pass

6.4. Power Spectral Density Measurement

6.4.1. 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.

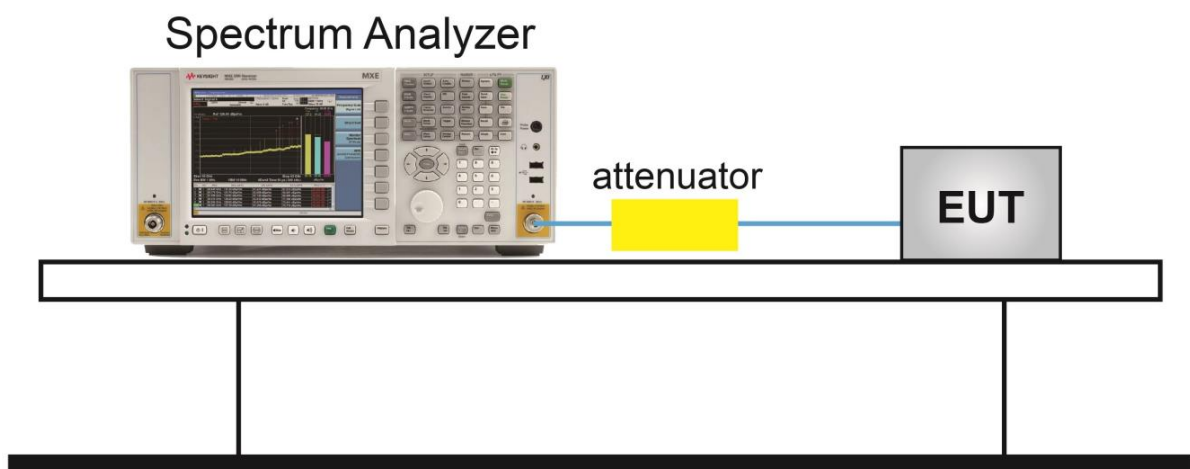
6.4.2. Test Procedure Used

ANSI C63.10-2013 - Section 11.10.2

6.4.3. 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

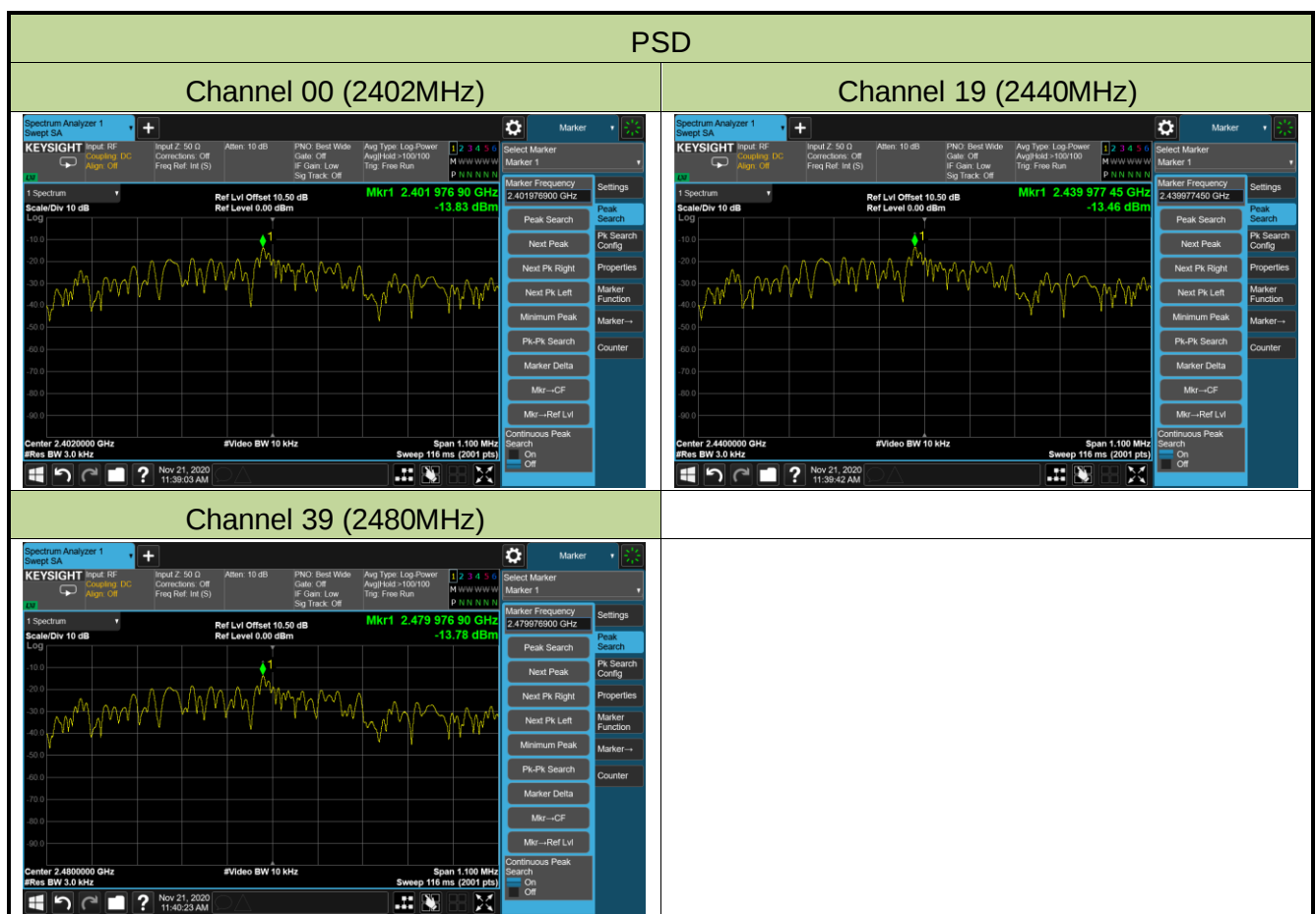
6.4.4. Test Setup



6.4.5. Test Result

Product	WIFI/BT Board	Test Engineer	Dandy Li
Test Site	WZ-TR3	Test Date	2020/11/21

Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	PSD Result (dBm / 3kHz)	Limit (dBm / 3kHz)	Result
BLE	1	00	2402	-13.83	≤ 8.00	Pass
BLE	1	19	2440	-13.46	≤ 8.00	Pass
BLE	1	39	2480	-13.78	≤ 8.00	Pass



6.5. Conducted Band Edge and Out-of-Band Emissions

6.5.1. 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.

6.5.2. Test Procedure Used

ANSI C63.10-2013 - Section 11.11

6.5.3. Test Setting

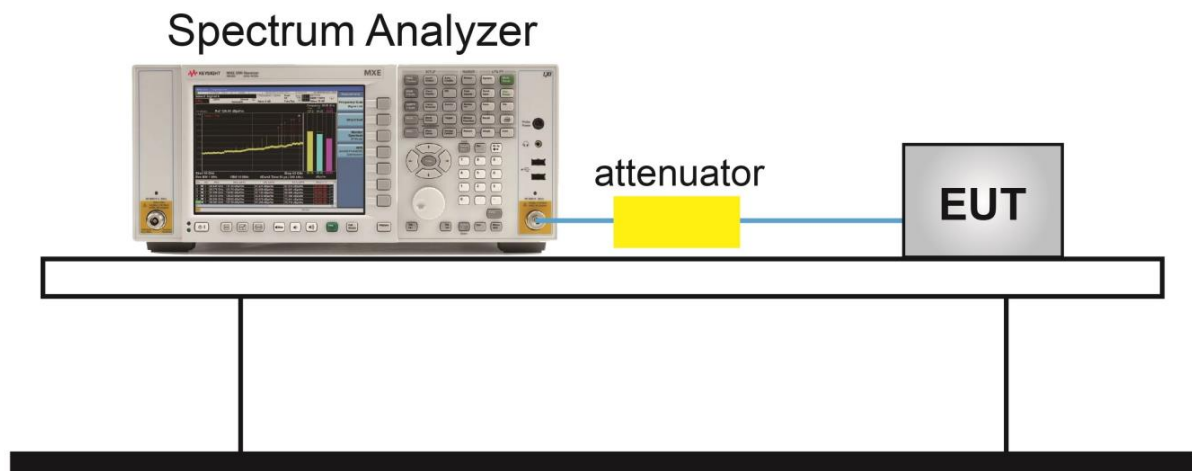
Reference level measurement

1. Set instrument center frequency to DTS channel center frequency
2. Set the span to ≥ 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

6.5.4. Test Setup



6.5.5. Test Result

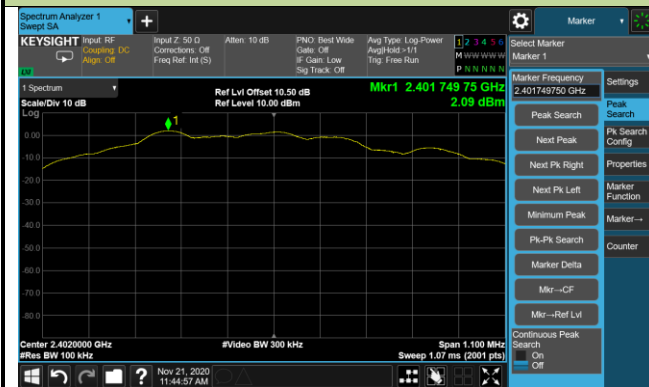
Product	WIFI/BT Board	Test Engineer	Dandy Li
Test Site	WZ-TR3	Test Date	2020/11/21

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

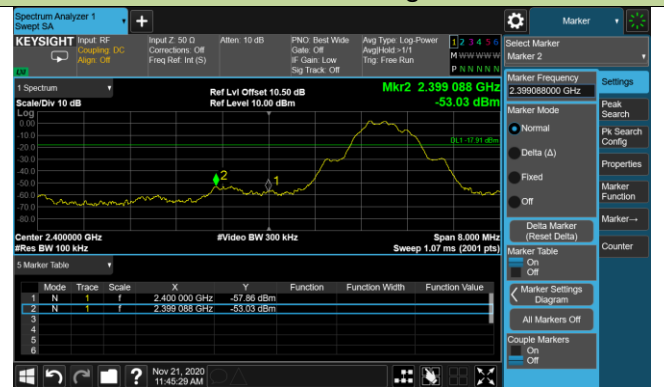
BLE Out-of-Band Emissions – 1Mbps

Channel 00 (2402MHz)

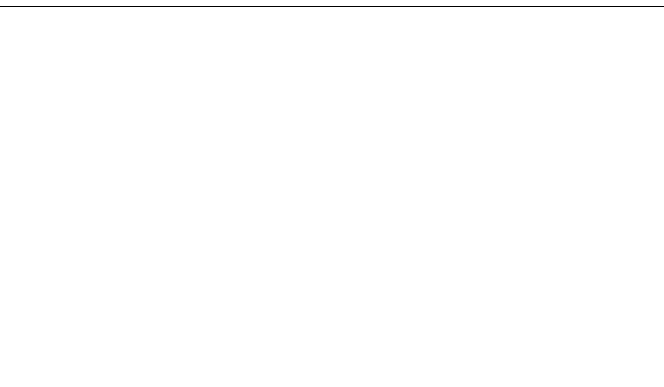
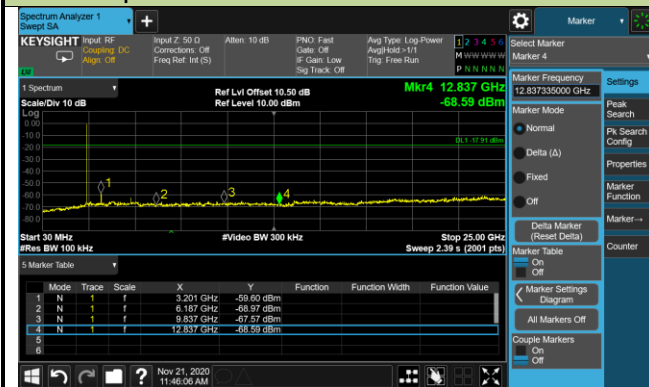
100kHz PSD reference Level



Low Band Edge

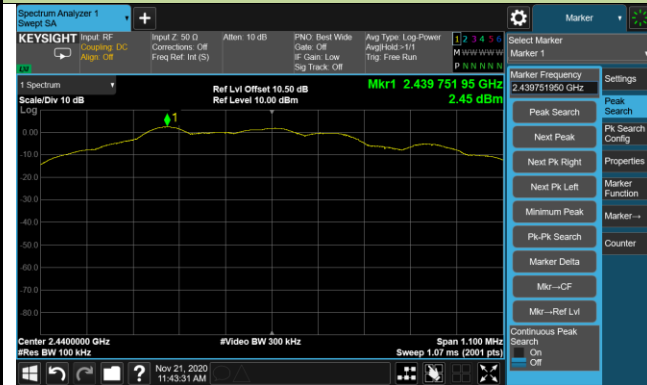


Spurious Emission 30MHz ~ 25GHz

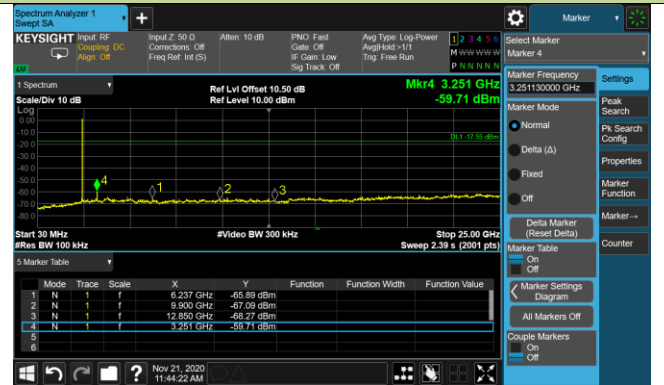


Channel 19 (2440MHz)

100kHz PSD reference Level



Spurious Emission 30MHz ~ 25GHz

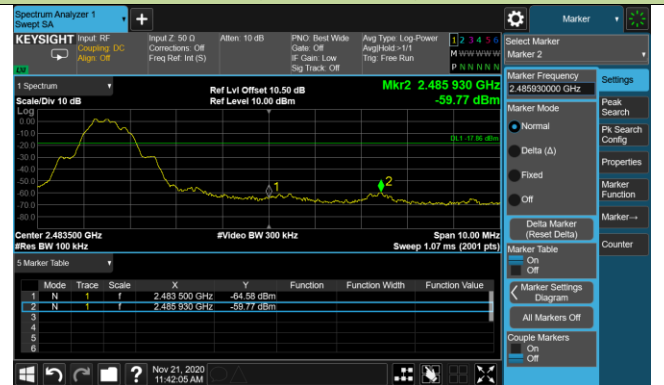


Channel 39 (2480MHz)

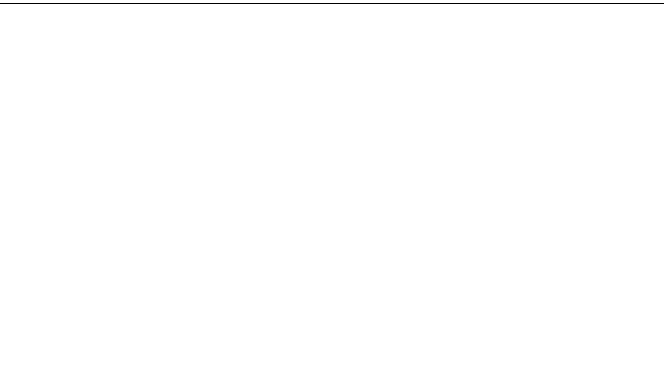
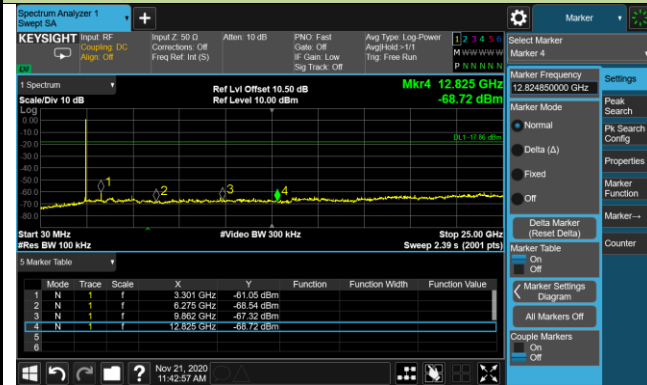
100kHz PSD reference Level



High Band Edge



Spurious Emission 30MHz ~ 25GHz



6.6. Radiated Spurious Emission Measurement

6.6.1. 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

6.6.2. Test Procedure Used

ANSI C63.10-2013 - Section 6.3 & 6.4 & 6.5 & 6.6

6.6.3. 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

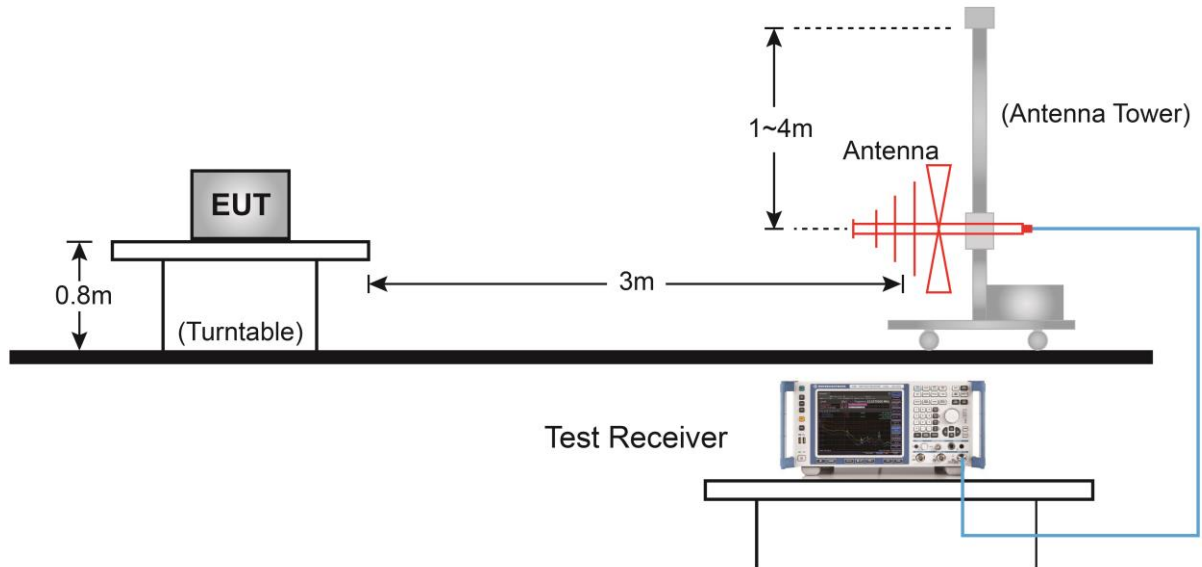
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

Average Measurements above 1GHz (Method VB)

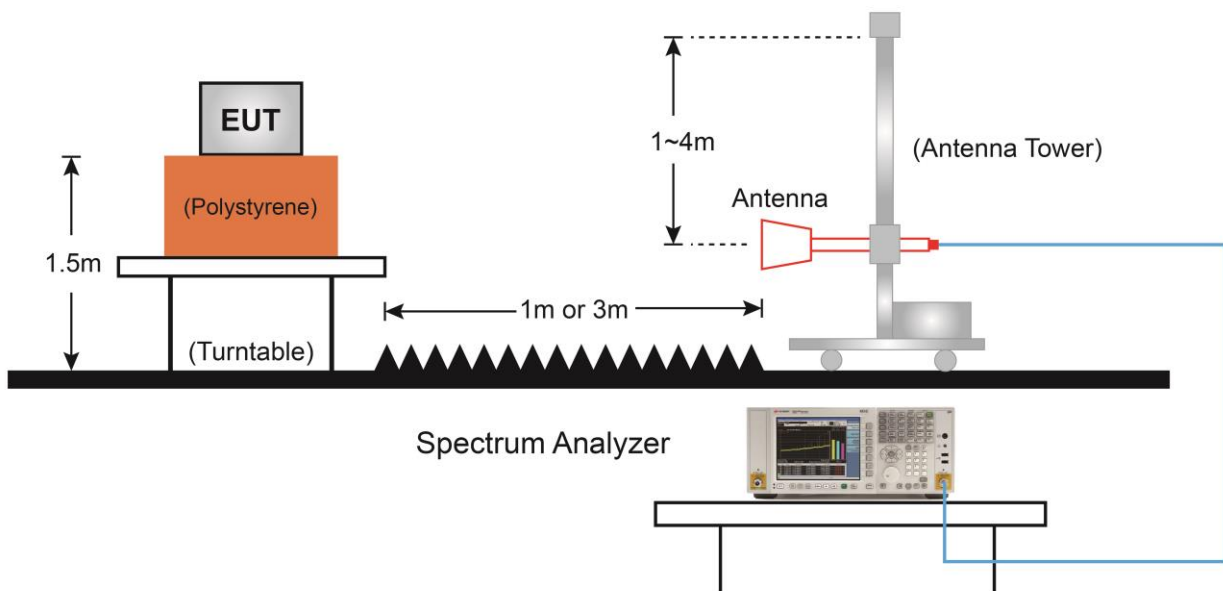
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW; If the EUT is configured to transmit with duty cycle $\geq 98\%$, set VBW = 10Hz
If the EUT duty cycle is $< 98\%$, set VBW $\geq 1/T$. T is the minimum transmission duration
4. Detector = Peak
5. Sweep time = auto
6. Trace mode = max hold
7. Trace was allowed to stabilize

6.6.4. Test Setup

Below 1GHz Test Setup:



Above 1GHz Test Setup:



6.6.5. Test Result

Product used with PCB Antenna

Product	WIFI/BT Board	Test Engineer	Antony Yang
Test Site	WZ-AC2	Test Date	2020/11/20
Test Mode	BLE	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
	4034.5	37.1	1.0	38.1	74.0	-35.9	Peak	Horizontal
	4808.0	40.2	3.8	44.0	74.0	-30.0	Peak	Horizontal
*	6576.0	34.1	8.0	42.1	74.0	-31.9	Peak	Horizontal
*	9610.5	34.4	13.1	47.5	74.0	-26.5	Peak	Horizontal
	3805.0	37.9	0.3	38.2	74.0	-35.8	Peak	Vertical
	4825.0	35.7	3.5	39.2	74.0	-34.8	Peak	Vertical
*	6023.5	35.0	5.8	40.8	74.0	-33.2	Peak	Vertical
*	9772.0	31.8	13.1	44.9	74.0	-29.1	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	WIFI/BT Board	Test Engineer	Antony Yang
Test Site	WZ-AC2	Test Date	2020/11/20
Test Mode	BLE	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
	4119.5	36.5	1.3	37.8	74.0	-36.2	Peak	Horizontal
	4884.5	39.1	3.3	42.4	74.0	-31.6	Peak	Horizontal
*	6448.5	34.2	7.3	41.5	74.0	-32.5	Peak	Horizontal
*	8828.5	33.0	12.1	45.1	74.0	-28.9	Peak	Horizontal
	4034.5	36.7	1.0	37.7	74.0	-36.3	Peak	Vertical
	4910.0	36.0	3.6	39.6	74.0	-34.4	Peak	Vertical
*	6227.5	35.1	6.1	41.2	74.0	-32.8	Peak	Vertical
*	7851.0	31.4	10.6	42.0	74.0	-32.0	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	WIFI/BT Board	Test Engineer	Antony Yang
Test Site	WZ-AC2	Test Date	2020/11/20
Test Mode	BLE	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
	4000.5	36.6	0.9	37.5	74.0	-36.5	Peak	Horizontal
	4961.0	38.2	3.2	41.4	74.0	-32.6	Peak	Horizontal
*	7179.5	33.5	10.7	44.2	74.0	-29.8	Peak	Horizontal
*	8624.5	32.7	11.9	44.6	74.0	-29.4	Peak	Horizontal
	4162.0	36.1	1.7	37.8	74.0	-36.2	Peak	Vertical
	4680.5	36.3	3.5	39.8	74.0	-34.2	Peak	Vertical
*	6678.0	32.5	8.0	40.5	74.0	-33.5	Peak	Vertical
*	8616.0	32.3	12.0	44.3	74.0	-29.7	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 used with Dipole Antenna

Product	WIFI/BT Board	Test Engineer	Antony Yang
Test Site	WZ-AC2	Test Date	2020/11/20
Test Mode	BLE	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
	4111.0	36.9	1.2	38.1	74.0	-35.9	Peak	Horizontal
	4918.5	35.4	3.7	39.1	74.0	-34.9	Peak	Horizontal
*	6219.0	34.9	6.1	41.0	74.0	-33.0	Peak	Horizontal
*	7842.5	32.1	10.7	42.8	74.0	-31.2	Peak	Horizontal
	4102.5	36.9	1.1	38.0	74.0	-36.0	Peak	Vertical
	4808.0	37.2	3.8	41.0	74.0	-33.0	Peak	Vertical
*	7188.0	33.5	10.8	44.3	74.0	-29.7	Peak	Vertical
*	8769.0	32.7	12.5	45.2	74.0	-28.8	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	WIFI/BT Board	Test Engineer	Antony Yang
Test Site	WZ-AC2	Test Date	2020/11/20
Test Mode	BLE	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
	4026.0	36.6	1.2	37.8	74.0	-36.2	Peak	Horizontal
	4816.5	36.7	3.7	40.4	74.0	-33.6	Peak	Horizontal
*	6873.5	34.1	8.8	42.9	74.0	-31.1	Peak	Horizontal
*	8862.5	32.8	12.3	45.1	74.0	-28.9	Peak	Horizontal
	4060.0	36.1	1.1	37.2	74.0	-36.8	Peak	Vertical
	4884.5	37.9	3.3	41.2	74.0	-32.8	Peak	Vertical
*	6848.0	34.6	8.7	43.3	74.0	-30.7	Peak	Vertical
*	8735.0	32.0	12.3	44.3	74.0	-29.7	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	WIFI/BT Board	Test Engineer	Antony Yang
Test Site	WZ-AC2	Test Date	2020/11/20
Test Mode	BLE	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
	4170.5	36.1	1.6	37.7	74.0	-36.3	Peak	Horizontal
	4808.0	36.2	3.8	40.0	74.0	-34.0	Peak	Horizontal
*	6329.5	32.8	6.5	39.3	74.0	-34.7	Peak	Horizontal
*	8939.0	30.7	12.1	42.8	74.0	-31.2	Peak	Horizontal
	4034.5	35.8	1.0	36.8	74.0	-37.2	Peak	Vertical
	4961.0	36.8	3.2	40.0	74.0	-34.0	Peak	Vertical
*	6644.0	33.3	7.8	41.1	74.0	-32.9	Peak	Vertical
*	10171.5	30.7	14.1	44.8	74.0	-29.2	Peak	Vertical

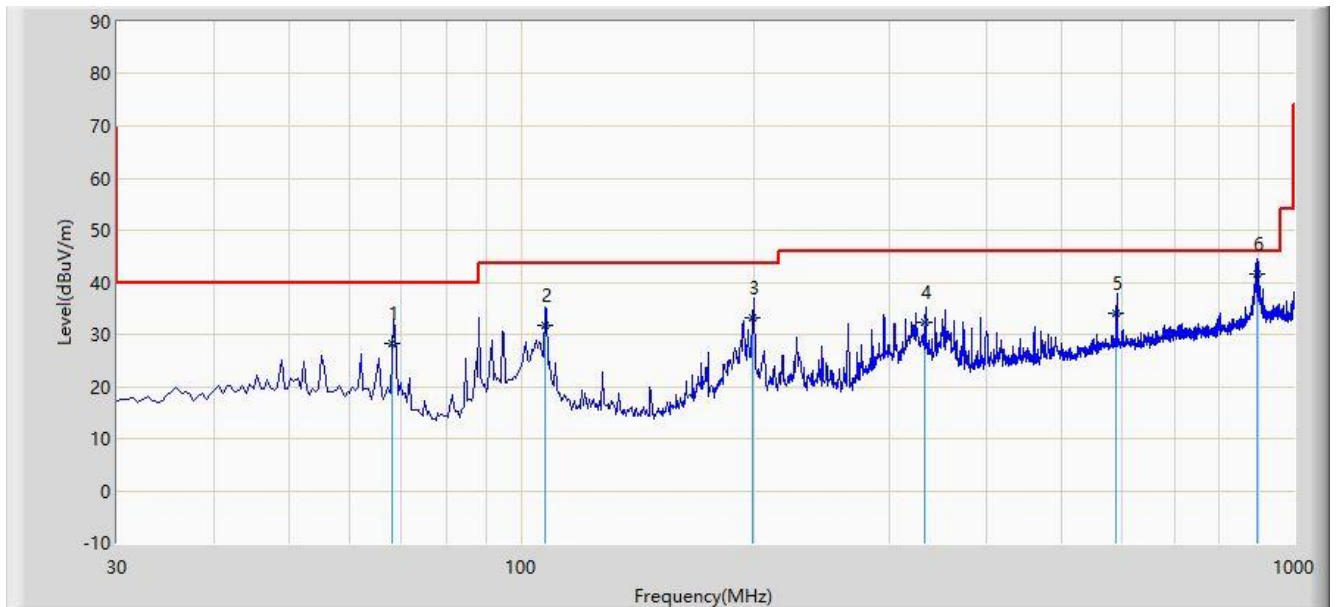
Note 1: "*" means test frequency didn't fall into restricted band.

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

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

The Result of Radiated Emission below 1GHz:

Site: WZ-AC2	Time: 2020/11/21 - 11:41
Limit: FCC_Part15.209_RE(3m)	Engineer: Dillon Diao
Probe: WZ-AC2_VULB9162_0.03-7GHz	Polarity: Horizontal
EUT: WIFI/BT Board	Power: AC 120V/60Hz
Test Mode: Transmit by BLE 1Mbps at Channel 2440MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB)	Type
1			68.200	28.318	11.240	-11.682	40.000	17.078	QP
2			107.200	31.710	13.240	-11.790	43.500	18.470	QP
3			199.650	33.161	14.210	-10.339	43.500	18.951	QP
4			333.210	32.435	10.260	-13.565	46.000	22.174	QP
5			589.650	33.917	6.570	-12.083	46.000	27.346	QP
6		*	894.620	41.503	10.230	-4.497	46.000	31.273	QP

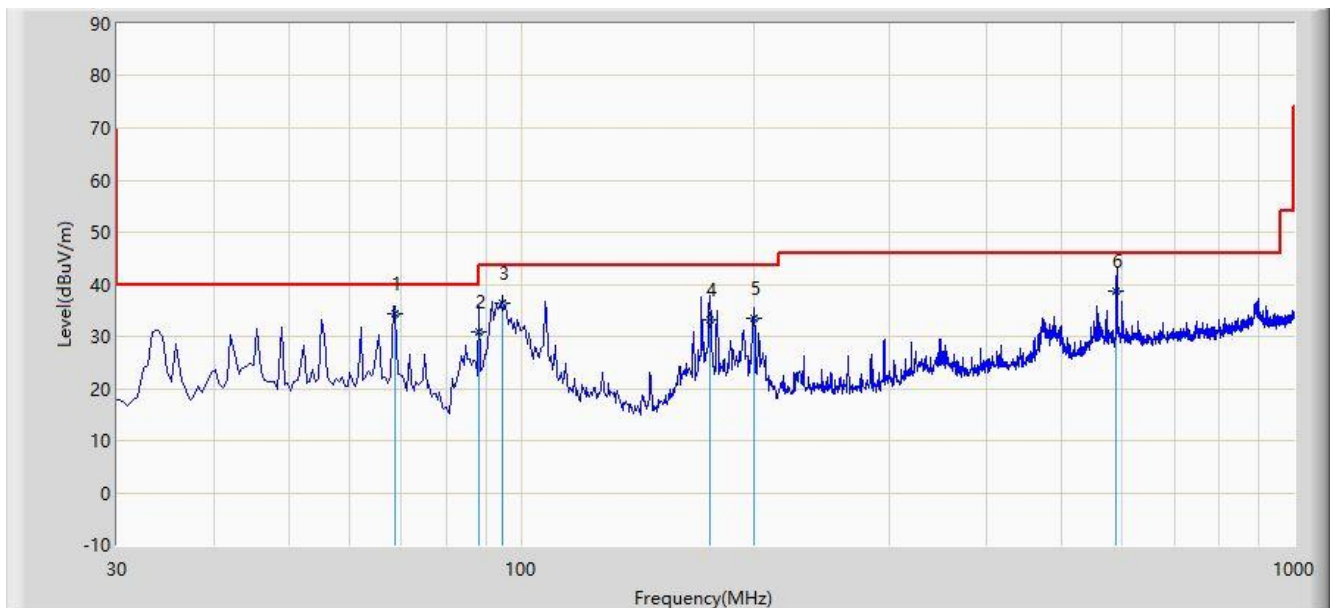
Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

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: WZ-AC2	Time: 2020/11/21 - 11:42
Limit: FCC_Part15.209_RE(3m)	Engineer: Dillon Diao
Probe: WZ-AC2_VULB9162_0.03-7GHz	Polarity: Vertical
EUT: WIFI/BT Board	Power: AC 120V/60Hz
Test Mode: Transmit by BLE 1Mbps at Channel 2440MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	68.820	34.395	17.520	-5.605	40.000	16.875	QP
2			88.240	30.812	14.870	-12.688	43.500	15.942	QP
3			94.520	36.277	18.520	-7.223	43.500	17.756	QP
4			175.500	33.072	16.540	-10.428	43.500	16.533	QP
5			200.210	33.526	14.630	-9.974	43.500	18.896	QP
6			589.620	38.686	11.340	-7.314	46.000	27.346	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.

6.7. Radiated Restricted Band Edge Measurement

6.7.1. 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
¹ 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	(²)
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

6.7.2.Test Procedure Used

ANSI C63.10-2013 - Section 6.3 & 6.6 & 11.13

6.7.3.Test Setting

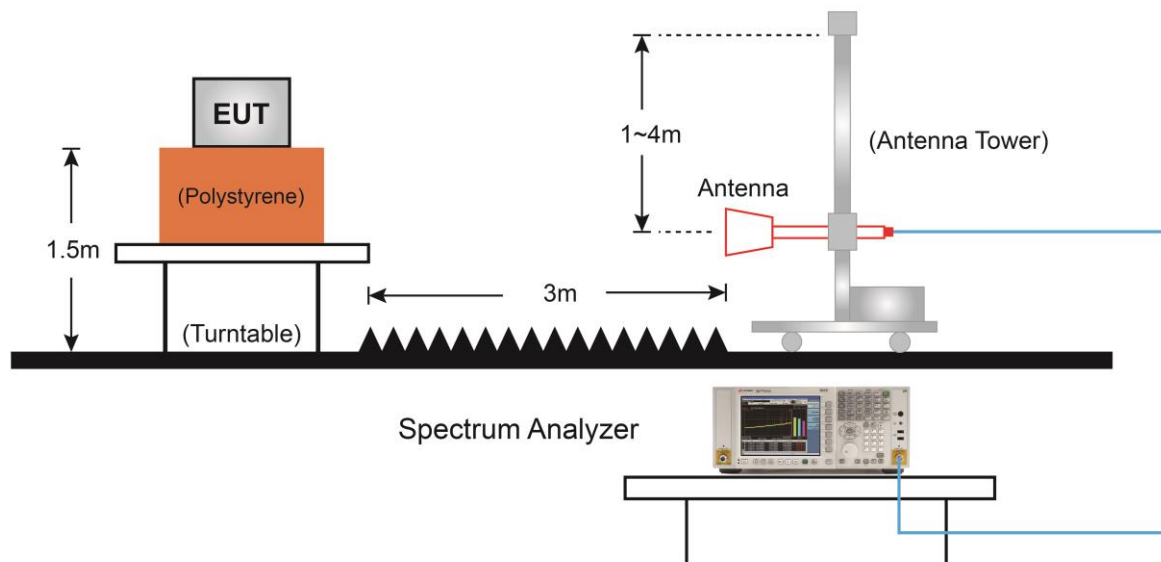
Peak Field Strength Measurements

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

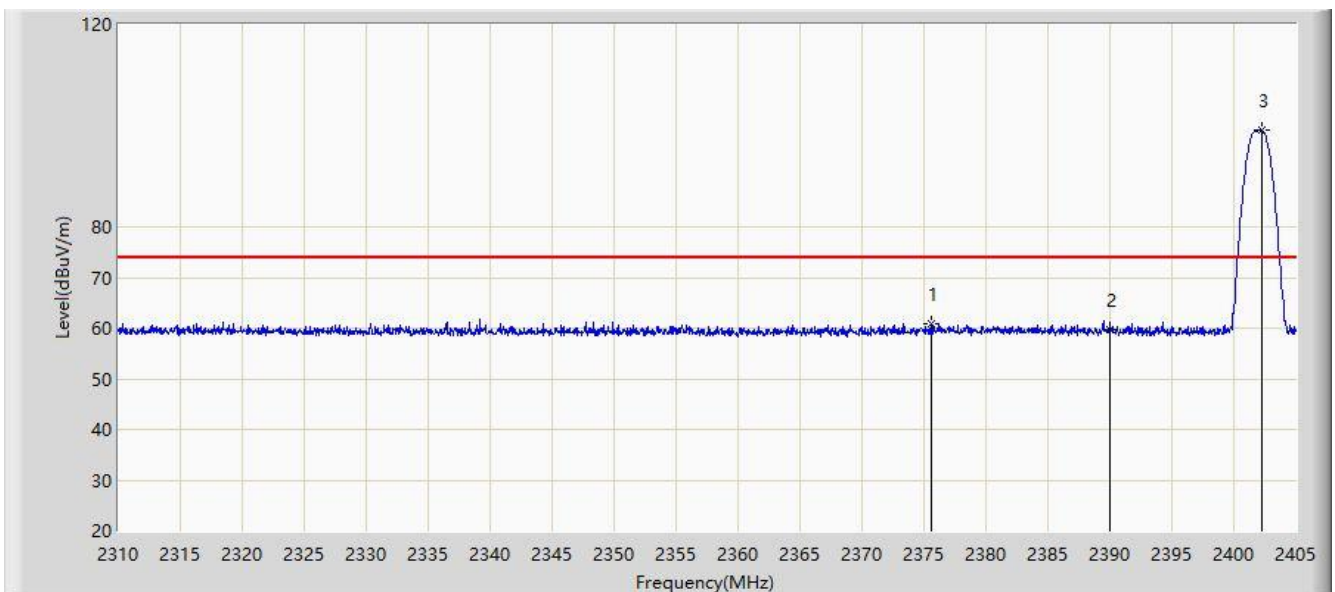
6.7.4. Test Setup



6.7.5.Test Result

Product used with PCB Antenna

Site: WZ-AC2	Time: 2020/11/20 - 11:23
Limit: FCC_Part15.209_RE(3m)	Engineer: Antony Yang
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: WIFI/BT Board	Power: AC 120V/60Hz
Test Mode: Transmit by BLE at Channel 2402MHz	

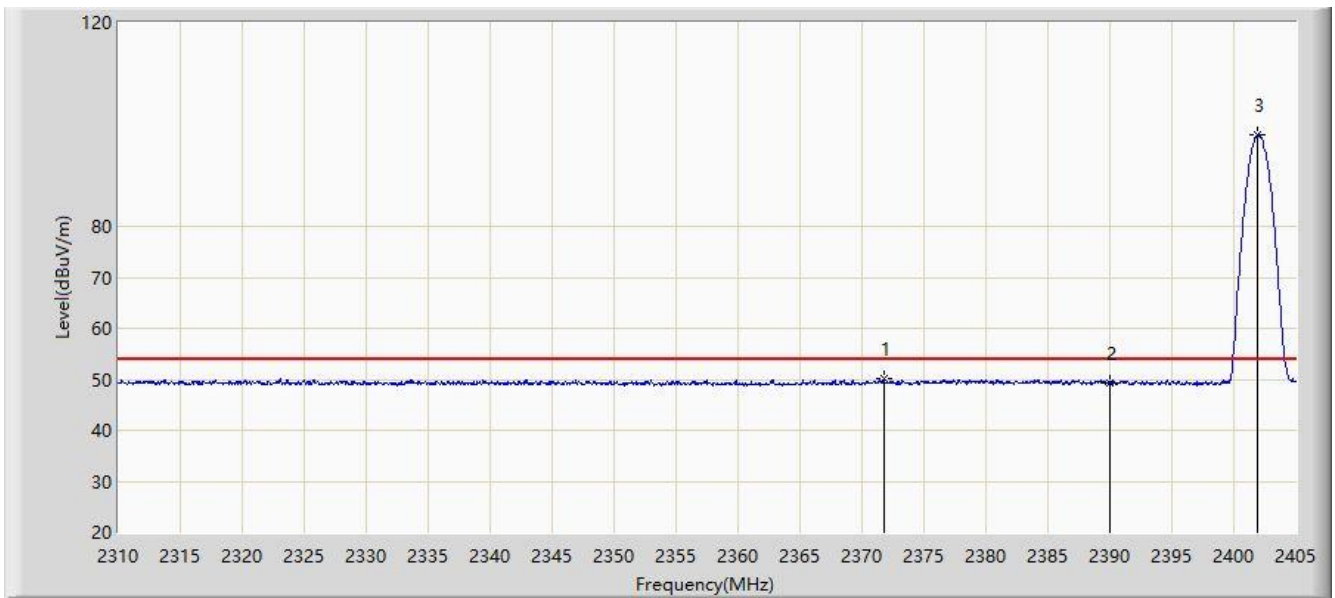


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2375.645	60.983	28.165	-13.017	74.000	32.819	PK
2			2390.000	59.801	27.140	-14.199	74.000	32.660	PK
3		*	2402.292	99.136	66.566	N/A	N/A	32.571	PK

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

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

Site: WZ-AC2	Time: 2020/11/20 - 11:26
Limit: FCC_Part15.209_RE(3m)	Engineer: Antony Yang
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: WIFI/BT Board	Power: AC 120V/60Hz
Test Mode: Transmit by BLE at Channel 2402MHz	

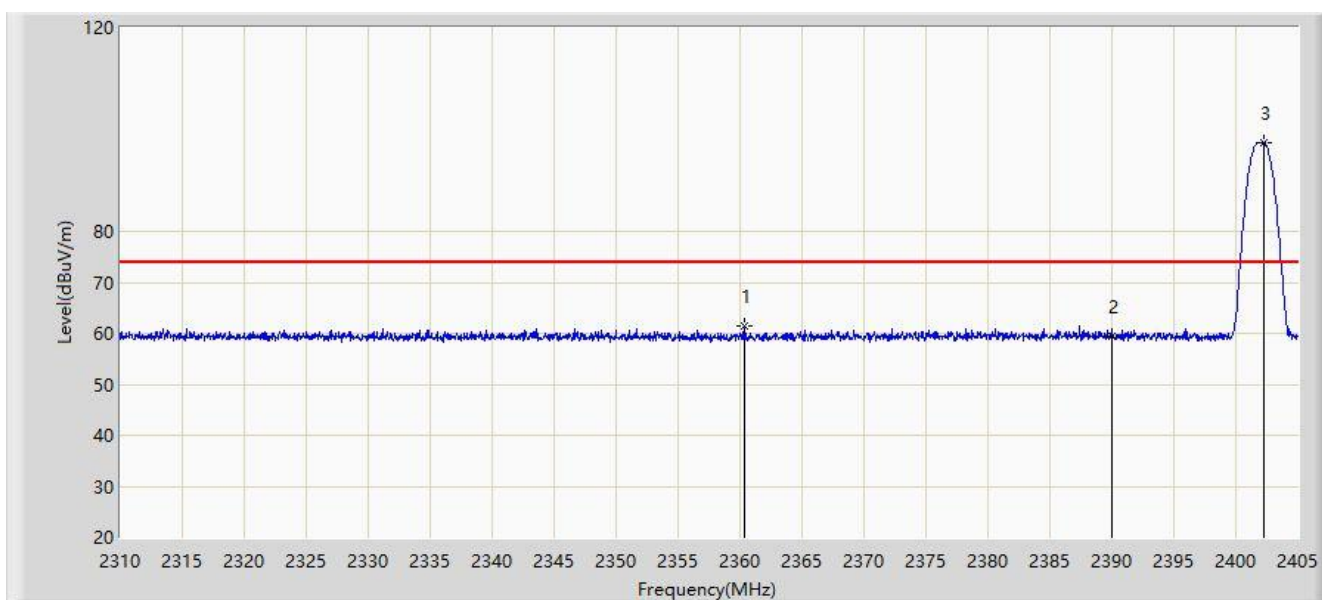


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2371.798	50.040	17.271	-3.960	54.000	32.769	AV
2			2390.000	49.333	16.672	-4.667	54.000	32.660	AV
3		*	2401.913	97.890	65.325	N/A	N/A	32.565	AV

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

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

Site: WZ-AC2	Time: 2020/11/20 - 11:28
Limit: FCC_Part15.209_RE(3m)	Engineer: Antony Yang
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Vertical
EUT: WIFI/BT Board	Power: AC 120V/60Hz
Test Mode: Transmit by BLE at Channel 2402MHz	

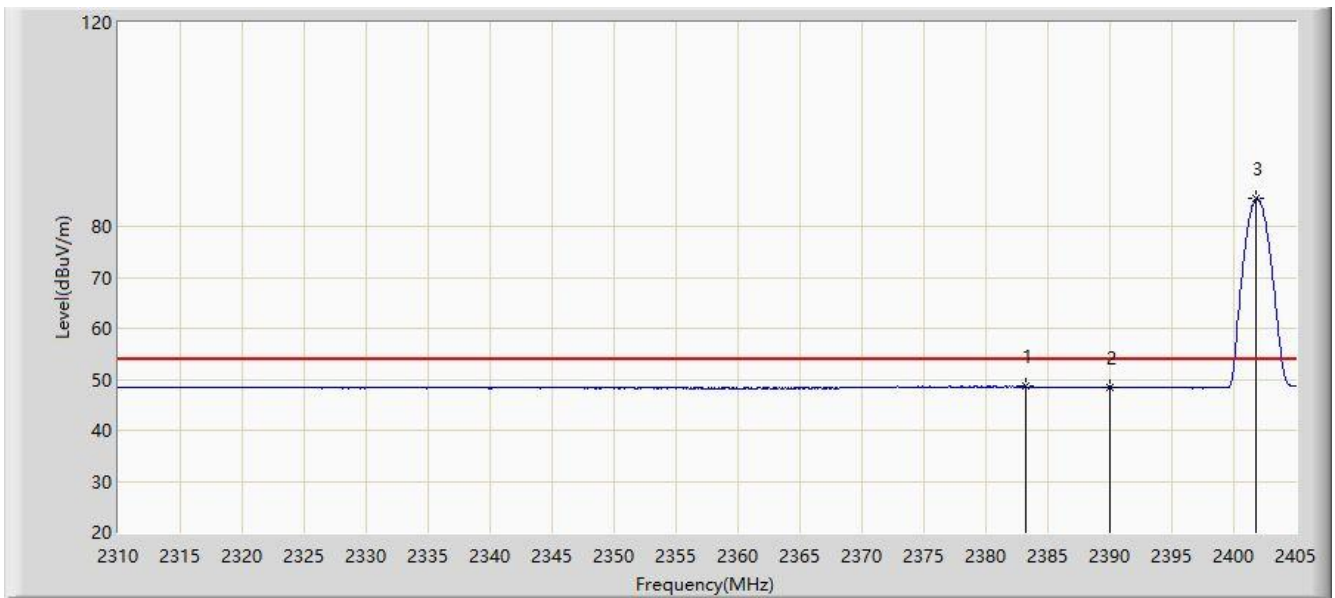


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2360.302	61.553	28.902	-12.447	74.000	32.651	PK
2			2390.000	59.472	26.811	-14.528	74.000	32.660	PK
3		*	2402.292	97.366	64.796	N/A	N/A	32.571	PK

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

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

Site: WZ-AC2	Time: 2020/11/20 - 11:29
Limit: FCC_Part15.209_RE(3m)	Engineer: Antony Yang
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Vertical
EUT: WIFI/BT Board	Power: AC 120V/60Hz
Test Mode: Transmit by BLE at Channel 2402MHz	

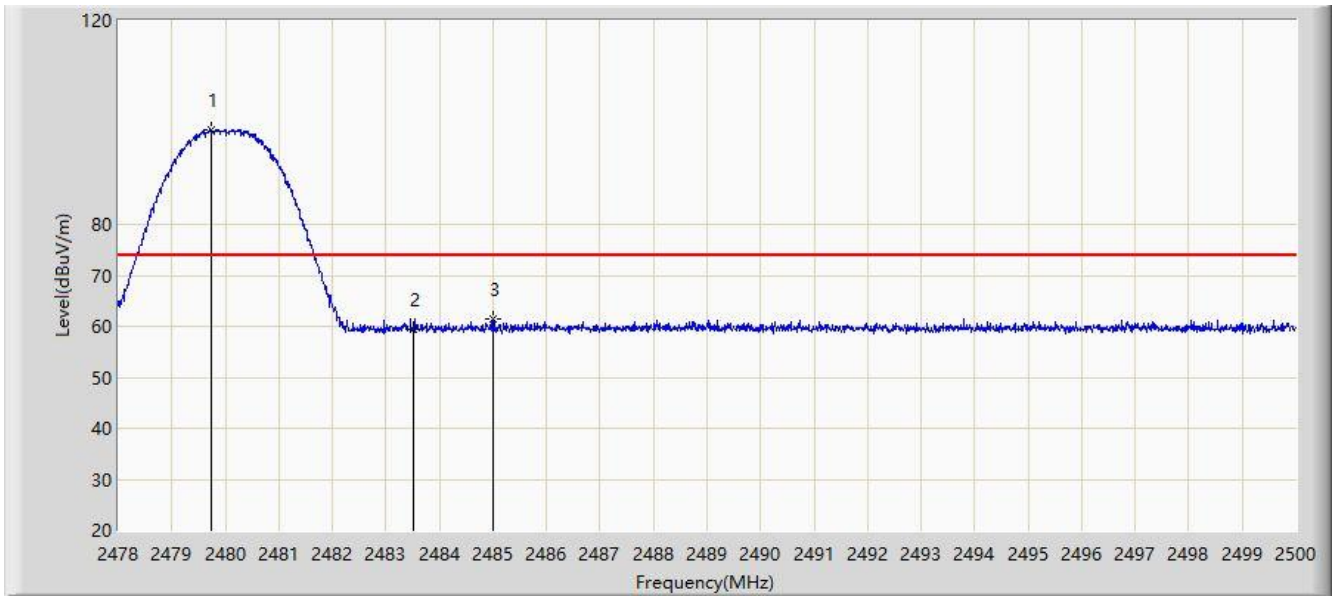


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2383.198	48.661	15.860	-5.339	54.000	32.801	AV
2			2390.000	48.539	15.878	-5.461	54.000	32.660	AV
3		*	2401.817	85.467	52.903	N/A	N/A	32.564	AV

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

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

Site: WZ-AC2	Time: 2020/11/20 - 11:45
Limit: FCC_Part15.209_RE(3m)	Engineer: Antony Yang
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: WIFI/BT Board	Power: AC 120V/60Hz
Test Mode: Transmit by BLE at Channel 2480MHz	

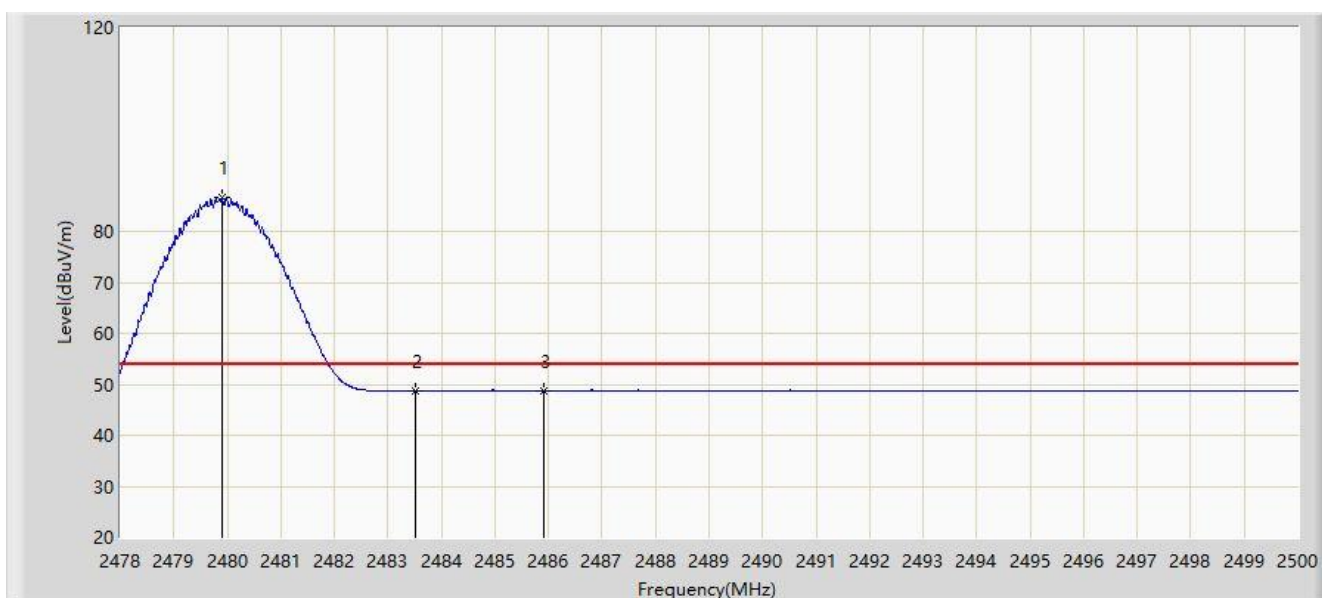


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2479.727	98.585	65.937	N/A	N/A	32.648	PK
2			2483.500	59.479	26.778	-14.521	74.000	32.701	PK
3			2484.996	61.581	28.860	-12.419	74.000	32.721	PK

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

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

Site: WZ-AC2	Time: 2020/11/20 - 11:46
Limit: FCC_Part15.209_RE(3m)	Engineer: Antony Yang
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: WIFI/BT Board	Power: AC 120V/60Hz
Test Mode: Transmit by BLE at Channel 2480MHz	

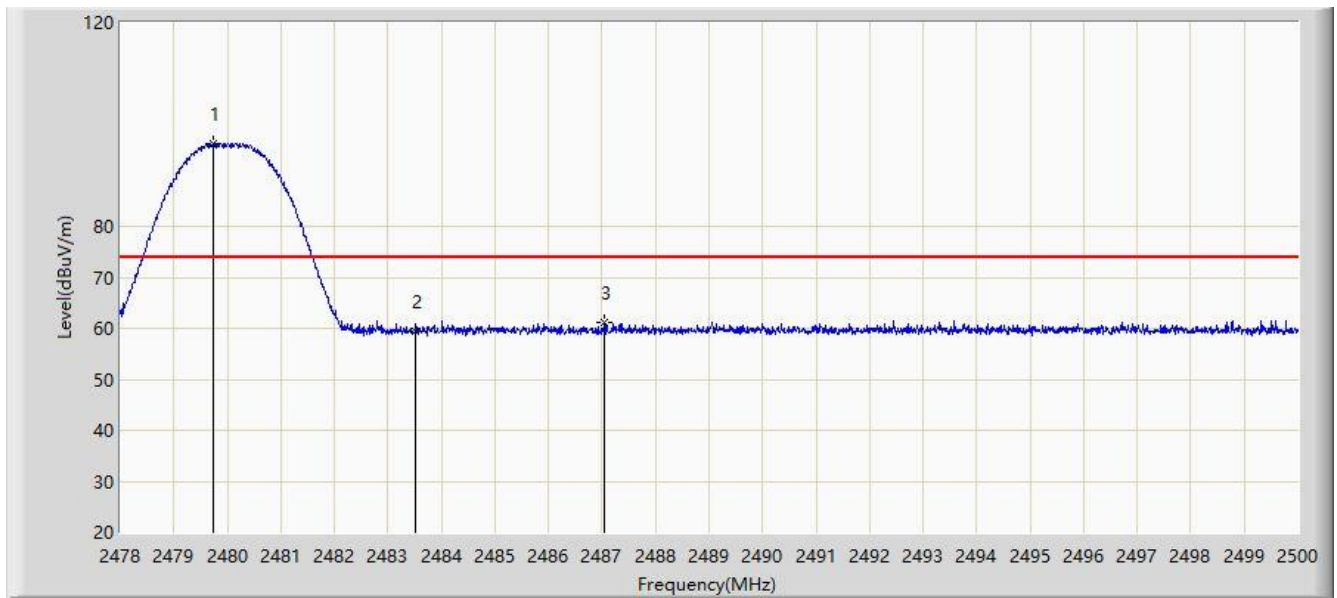


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2479.892	86.626	53.976	N/A	N/A	32.650	AV
2			2483.500	48.720	16.019	-5.280	54.000	32.701	AV
3			2485.909	48.734	16.000	-5.266	54.000	32.734	AV

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

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

Site: WZ-AC2	Time: 2020/11/20 - 11:48
Limit: FCC_Part15.209_RE(3m)	Engineer: Antony Yang
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Vertical
EUT: WIFI/BT Board	Power: AC 120V/60Hz
Test Mode: Transmit by BLE at Channel 2480MHz	

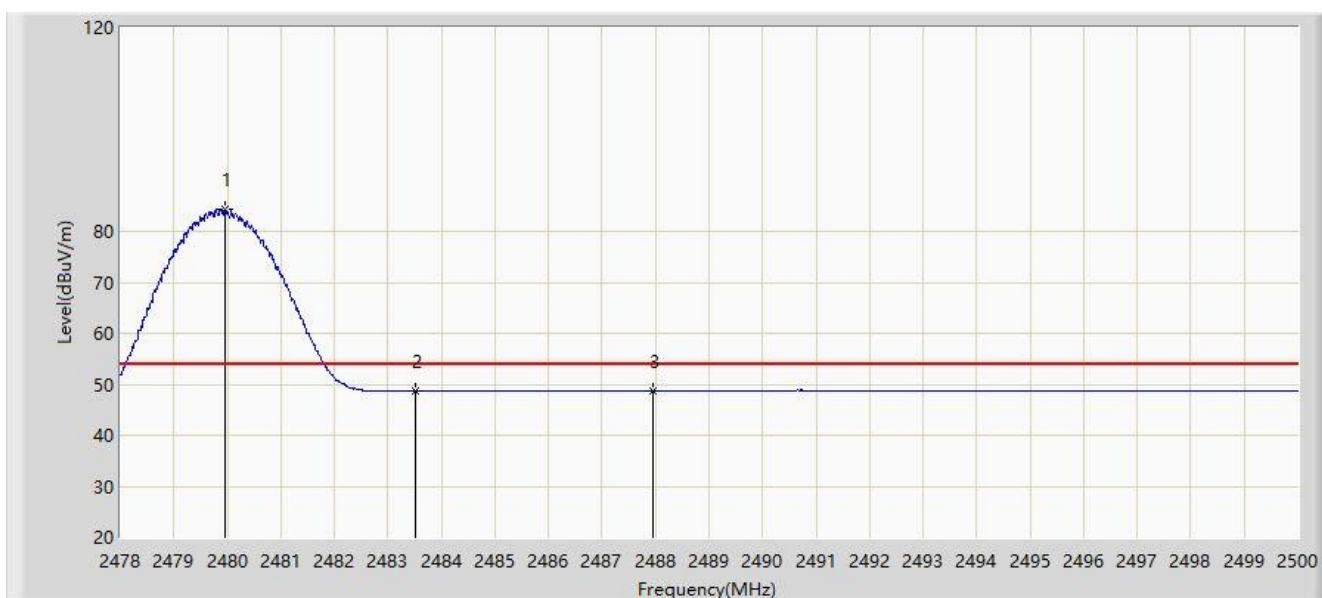


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2479.738	96.236	63.588	N/A	N/A	32.648	PK
2			2483.500	59.320	26.619	-14.680	74.000	32.701	PK
3			2487.042	61.301	28.551	-12.699	74.000	32.750	PK

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

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

Site: WZ-AC2	Time: 2020/11/20 - 11:49
Limit: FCC_Part15.209_RE(3m)	Engineer: Antony Yang
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Vertical
EUT: WIFI/BT Board	Power: AC 120V/60Hz
Test Mode: Transmit by BLE at Channel 2480MHz	



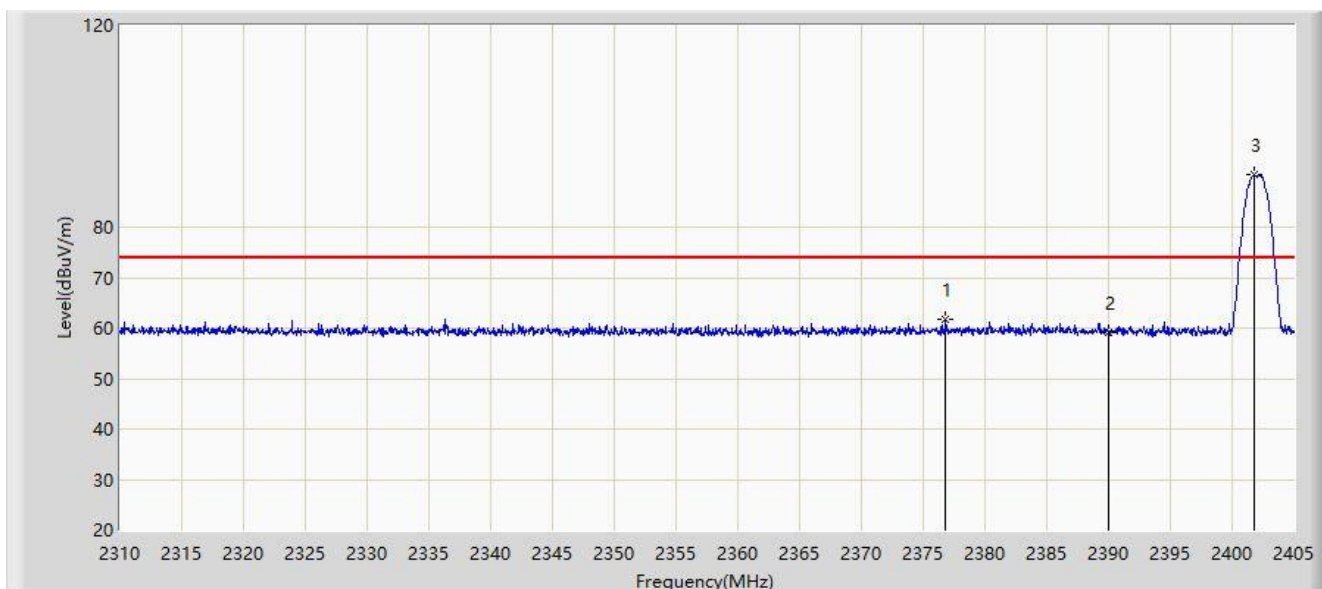
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2479.947	84.281	51.630	N/A	N/A	32.651	AV
2			2483.500	48.635	15.934	-5.365	54.000	32.701	AV
3			2487.944	48.762	16.008	-5.238	54.000	32.754	AV

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

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

Product used with Dipole Antenna

Site: WZ-AC2	Time: 2020/11/20 - 10:09
Limit: FCC_Part15.209_RE(3m)	Engineer: Antony Yang
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: BLEWIFI/BT Board	Power: AC 120V/60Hz
Test Mode: Transmit by BLE at Channel 2402MHz	

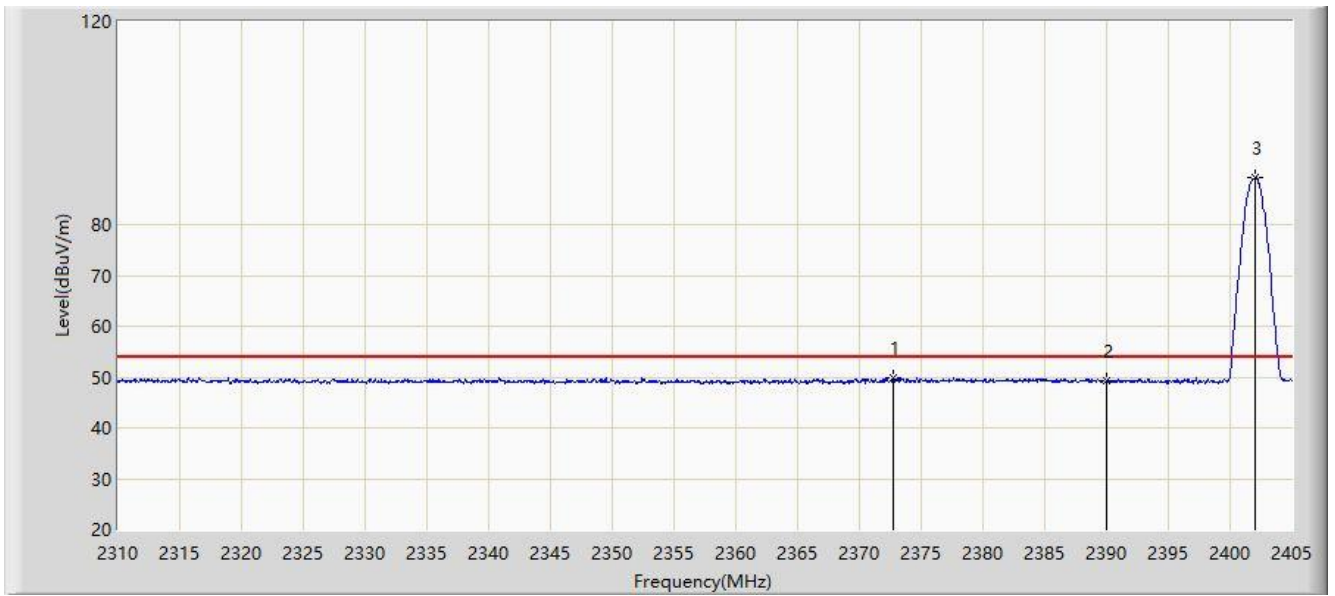


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2376.810	61.694	28.861	-12.306	74.000	32.834	PK
2			2390.000	59.096	26.435	-14.904	74.000	32.660	PK
3		*	2401.749	90.359	57.796	N/A	N/A	32.563	PK

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

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

Site: WZ-AC2	Time: 2020/11/20 - 10:21
Limit: FCC_Part15.209_RE(3m)	Engineer: Antony Yang
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: BLEWIFI/BT Board	Power: AC 120V/60Hz
Test Mode: Transmit by BLE at Channel 2402MHz	

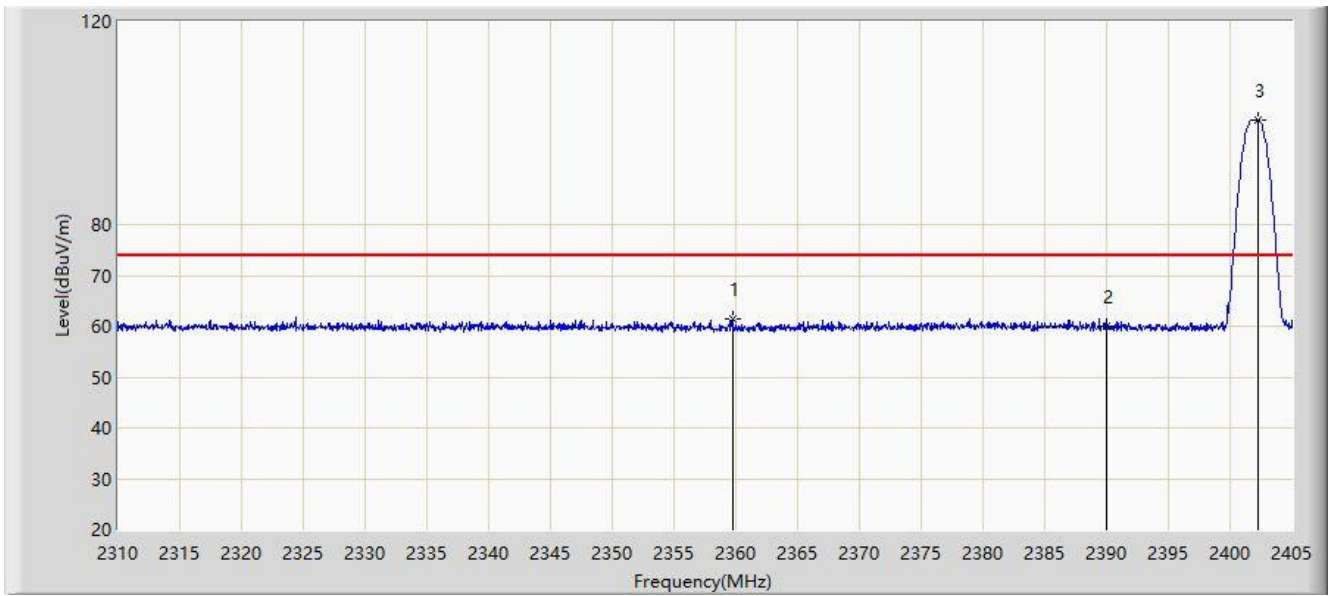


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2372.781	49.774	16.992	-4.226	54.000	32.781	AV
2			2390.000	49.218	16.557	-4.782	54.000	32.660	AV
3		*	2402.004	89.177	56.611	N/A	N/A	32.566	AV

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

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

Site: WZ-AC2	Time: 2020/11/20 - 10:23
Limit: FCC_Part15.209_RE(3m)	Engineer: Antony Yang
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Vertical
EUT: BLEWIFI/BT Board	Power: AC 120V/60Hz
Test Mode: Transmit by BLE at Channel 2402MHz	

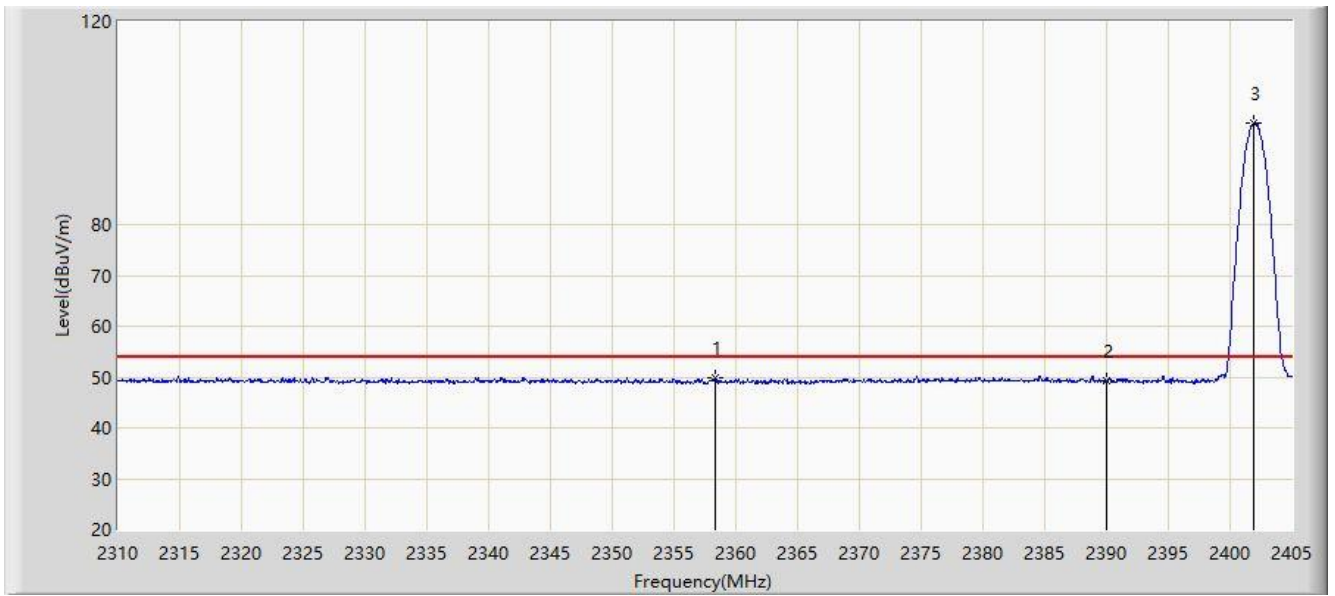


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2359.725	61.351	28.696	-12.649	74.000	32.655	PK
2			2390.000	60.017	27.356	-13.983	74.000	32.660	PK
3		*	2402.310	100.673	68.102	N/A	N/A	32.571	PK

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

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

Site: WZ-AC2	Time: 2020/11/20 - 10:29
Limit: FCC_Part15.209_RE(3m)	Engineer: Antony Yang
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Vertical
EUT: BLEWIFI/BT Board	Power: AC 120V/60Hz
Test Mode: Transmit by BLE at Channel 2402MHz	

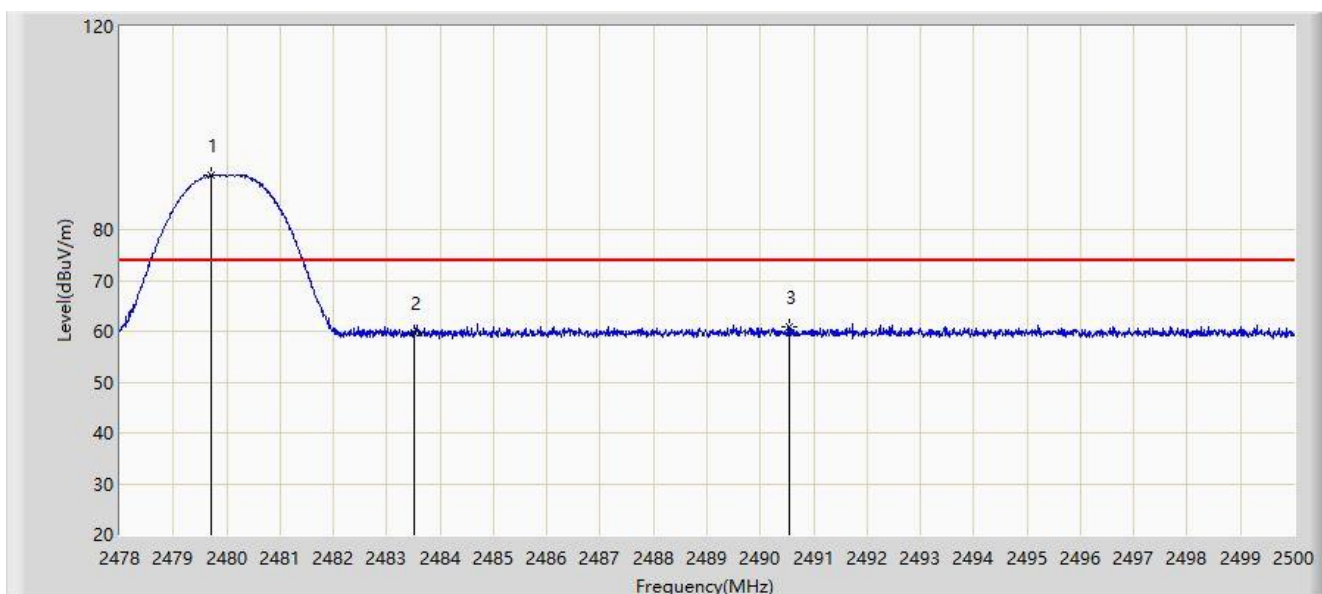


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2358.348	49.771	17.105	-4.229	54.000	32.666	AV
2			2390.000	49.138	16.477	-4.862	54.000	32.660	AV
3		*	2401.902	100.097	67.532	N/A	N/A	32.565	AV

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

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

Site: WZ-AC2	Time: 2020/11/20 - 10:33
Limit: FCC_Part15.209_RE(3m)	Engineer: Antony Yang
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: BLEWIFI/BT Board	Power: AC 120V/60Hz
Test Mode: Transmit by BLE at Channel 2480MHz	

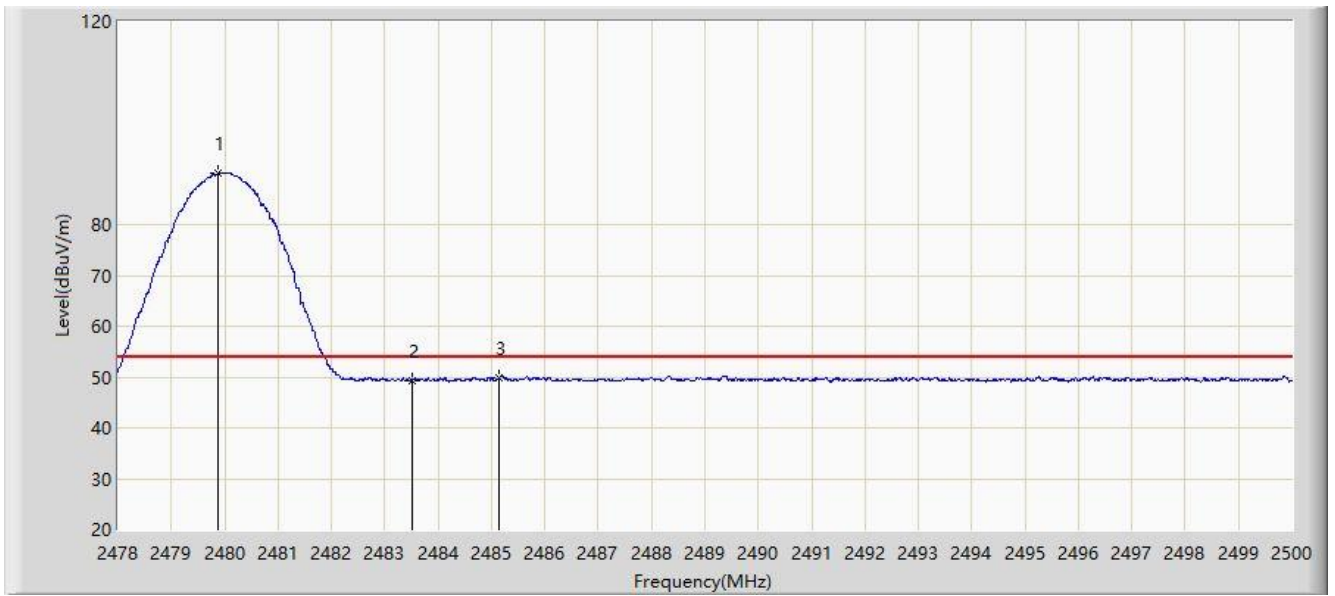


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2479.705	90.769	58.121	N/A	N/A	32.647	PK
2			2483.500	59.762	27.061	-14.238	74.000	32.701	PK
3			2490.551	60.756	28.022	-13.244	74.000	32.733	PK

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

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

Site: WZ-AC2	Time: 2020/11/20 - 10:38
Limit: FCC_Part15.209_RE(3m)	Engineer: Antony Yang
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: BLEWIFI/BT Board	Power: AC 120V/60Hz
Test Mode: Transmit by BLE at Channel 2480MHz	

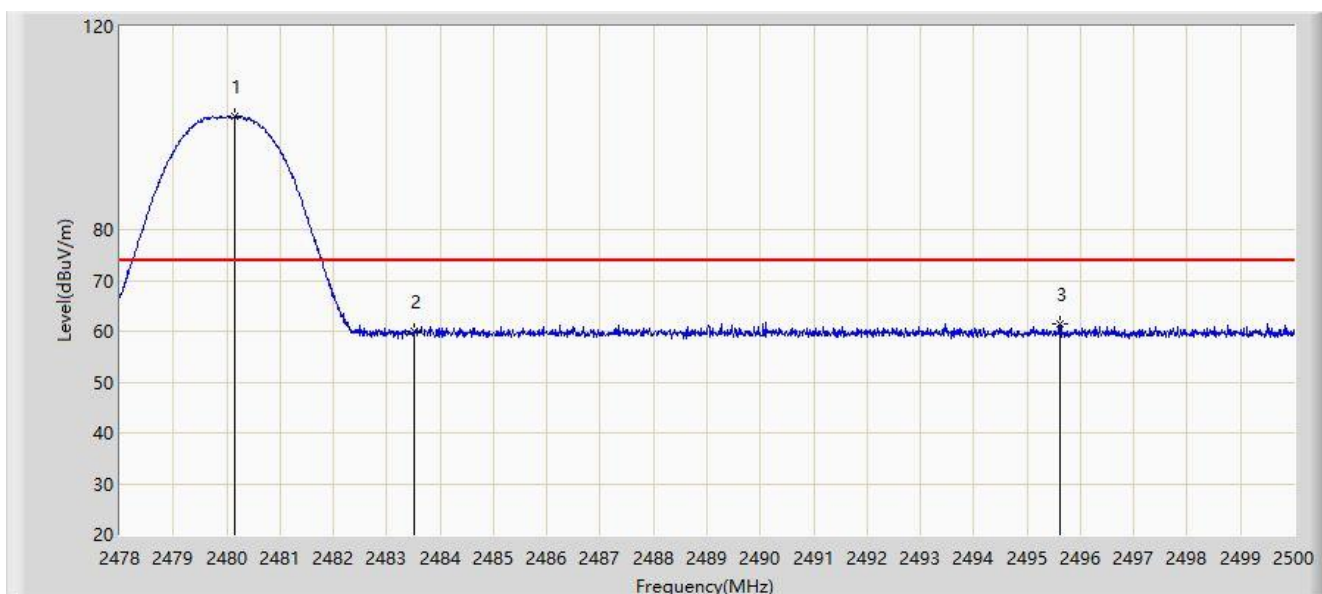


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2479.870	90.042	57.392	N/A	N/A	32.650	AV
2			2483.500	49.322	16.621	-4.678	54.000	32.701	AV
3			2485.150	49.970	17.246	-4.030	54.000	32.724	AV

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

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

Site: WZ-AC2	Time: 2020/11/20 - 10:40
Limit: FCC_Part15.209_RE(3m)	Engineer: Antony Yang
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Vertical
EUT: BLEWIFI/BT Board	Power: AC 120V/60Hz
Test Mode: Transmit by BLE at Channel 2480MHz	

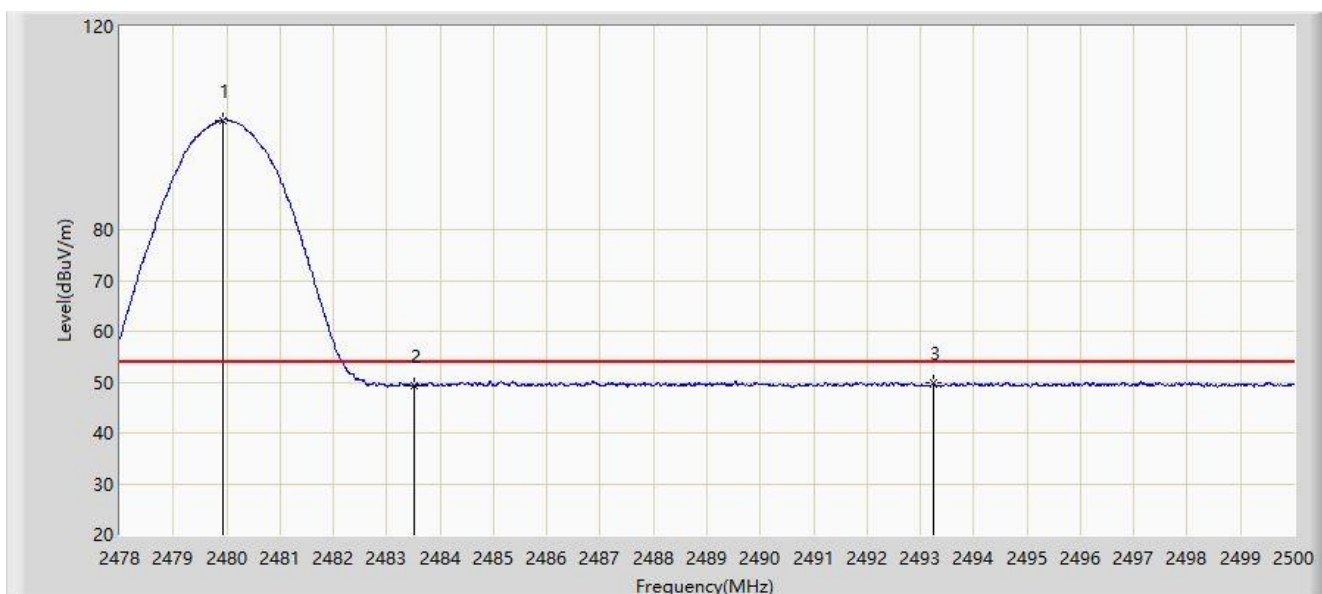


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2480.145	102.215	69.561	N/A	N/A	32.654	PK
2			2483.500	59.951	27.250	-14.049	74.000	32.701	PK
3			2495.611	61.540	28.847	-12.460	74.000	32.693	PK

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

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

Site: WZ-AC2	Time: 2020/11/20 - 10:41
Limit: FCC_Part15.209_RE(3m)	Engineer: Antony Yang
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Vertical
EUT: BLEWIFI/BT Board	Power: AC 120V/60Hz
Test Mode: Transmit by BLE at Channel 2480MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2479.925	101.540	68.889	N/A	N/A	32.651	AV
2			2483.500	49.150	16.449	-4.850	54.000	32.701	AV
3			2493.246	49.838	17.126	-4.162	54.000	32.712	AV

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

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

6.8. AC Conducted Emissions Measurement

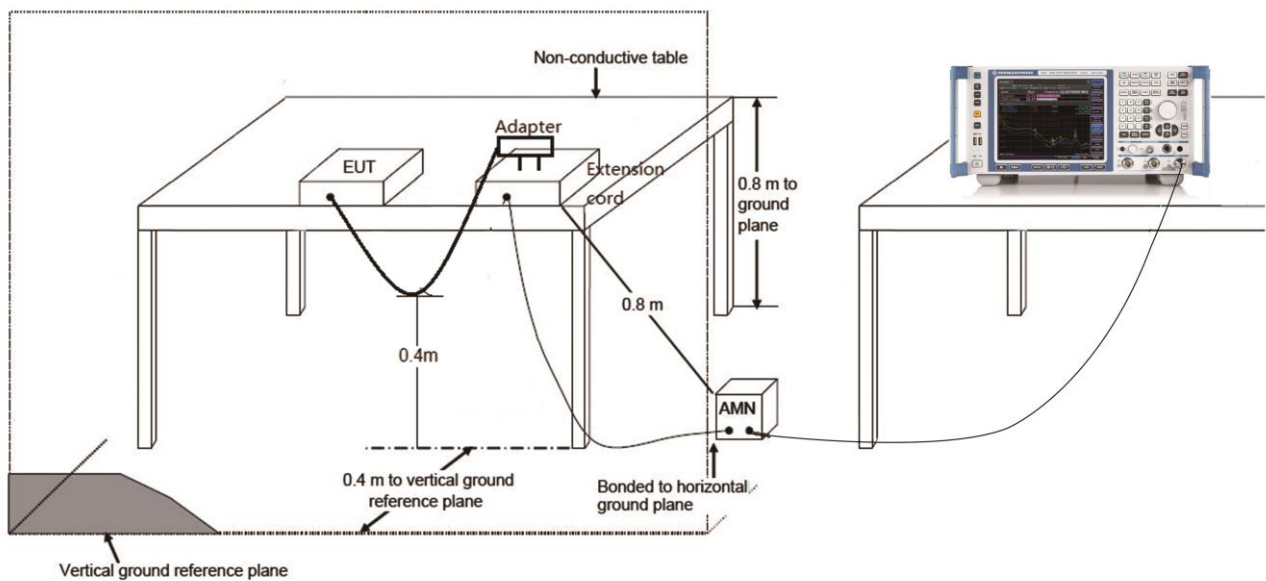
6.8.1. Test Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dB μ V)	Average (dB μ 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.

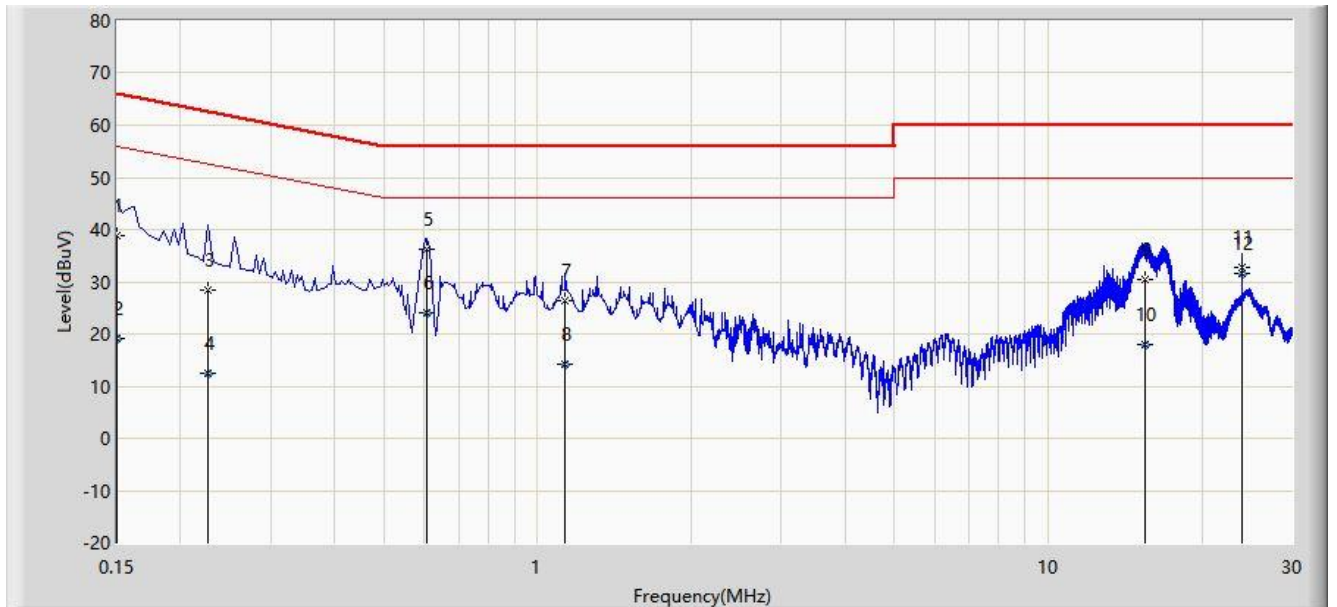
Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

6.8.2. Test Setup



6.8.3.Test Result

Site: WZ-SR2	Time: 2020/11/21 - 15:46
Limit: FCC_Part15.207_CE_AC Power	Engineer: Dandy Li
Probe: ENV216_101683_Filter On	Polarity: Line
EUT: WIFI/BT Board	Power: AC 120V/60Hz
Test Mode: Transmit by BLE at Channel 2440MHz (PCB Antenna)	

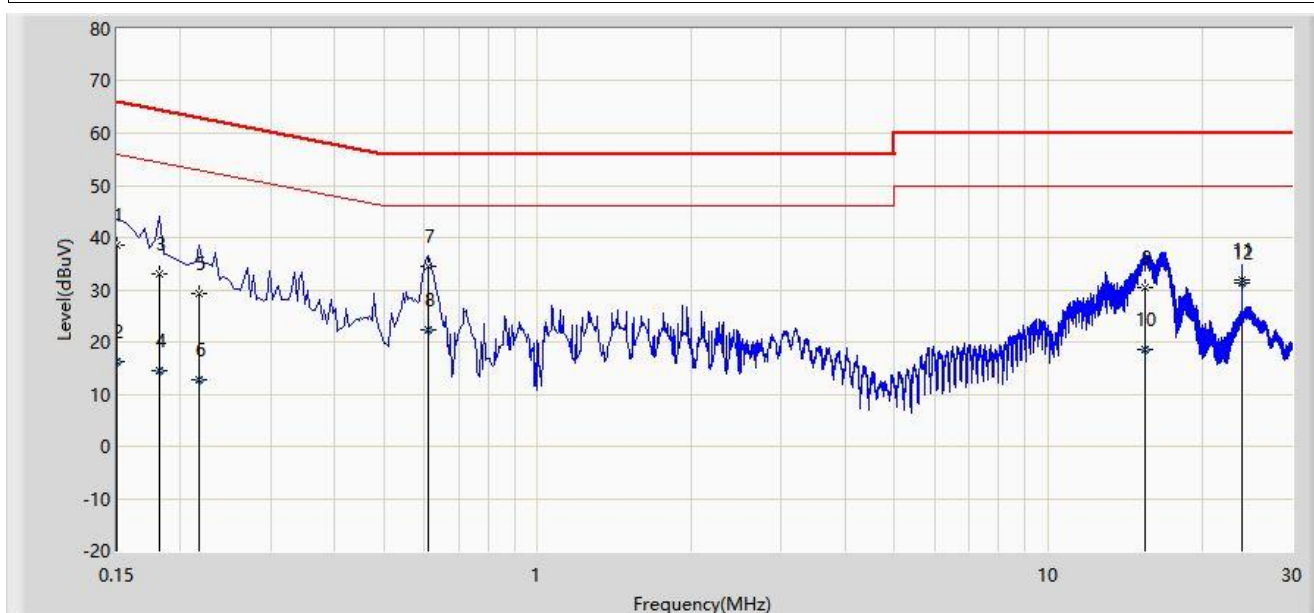


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV)	Factor	Type
1			0.150	38.703	29.090	-27.297	66.000	9.613	QP
2			0.150	19.108	9.495	-36.892	56.000	9.613	AV
3			0.226	28.470	18.826	-34.125	62.595	9.645	QP
4			0.226	12.537	2.893	-40.058	52.595	9.645	AV
5			0.606	36.143	26.432	-19.857	56.000	9.711	QP
6			0.606	24.138	14.427	-21.862	46.000	9.711	AV
7			1.134	26.348	16.596	-29.652	56.000	9.753	QP
8			1.134	14.291	4.539	-31.709	46.000	9.753	AV
9			15.470	30.482	20.277	-29.518	60.000	10.205	QP
10			15.470	17.911	7.706	-32.089	50.000	10.205	AV
11			23.998	32.740	22.334	-27.260	60.000	10.406	QP
12		*	23.998	31.560	21.154	-18.440	50.000	10.406	AV

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

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

Site: WZ-SR2	Time: 2020/11/21 - 15:51
Limit: FCC_Part15.207_CE_AC Power	Engineer: Dandy Li
Probe: ENV216_101683_Filter On	Polarity: Neutral
EUT: WIFI/BT Board	Power: AC 120V/60Hz
Test Mode: Transmit by BLE at Channel 2440MHz (PCB Antenna)	

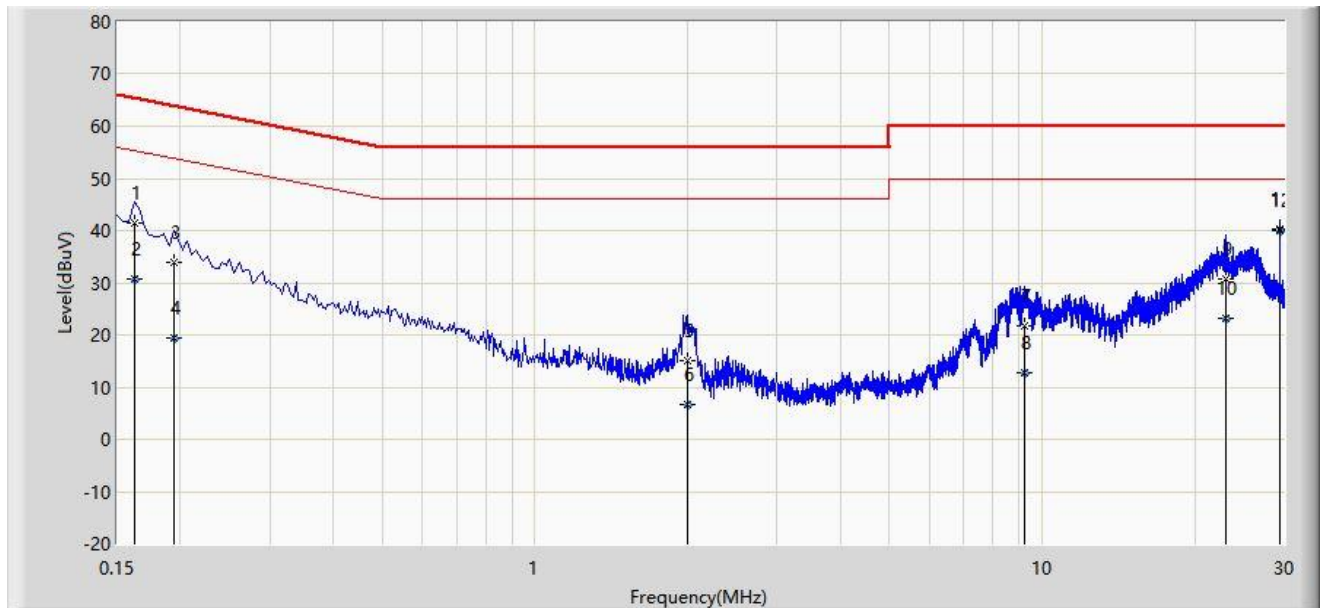


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV)	Factor	Type
1			0.150	38.521	28.918	-27.479	66.000	9.603	QP
2			0.150	16.294	6.690	-39.706	56.000	9.603	AV
3			0.182	33.118	23.498	-31.276	64.394	9.620	QP
4			0.182	14.580	4.960	-39.814	54.394	9.620	AV
5			0.218	29.407	19.775	-33.487	62.895	9.633	QP
6			0.218	12.799	3.166	-40.096	52.895	9.633	AV
7			0.610	34.420	24.719	-21.580	56.000	9.701	QP
8			0.610	22.321	12.620	-23.679	46.000	9.701	AV
9			15.482	30.470	20.265	-29.530	60.000	10.205	QP
10			15.482	18.616	8.411	-31.384	50.000	10.205	AV
11			23.998	31.945	21.535	-28.055	60.000	10.410	QP
12		*	23.998	31.174	20.764	-18.826	50.000	10.410	AV

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

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

Site: WZ-SR2	Time: 2020/11/30 - 17:34
Limit: FCC_Part15.207_CE_AC Power	Engineer: Dillon Diao
Probe: ENV216_101683_Filter On	Polarity: Line
EUT: WIFI/BT Board	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11g at channel 2412MHz (Dipole Antenna)	

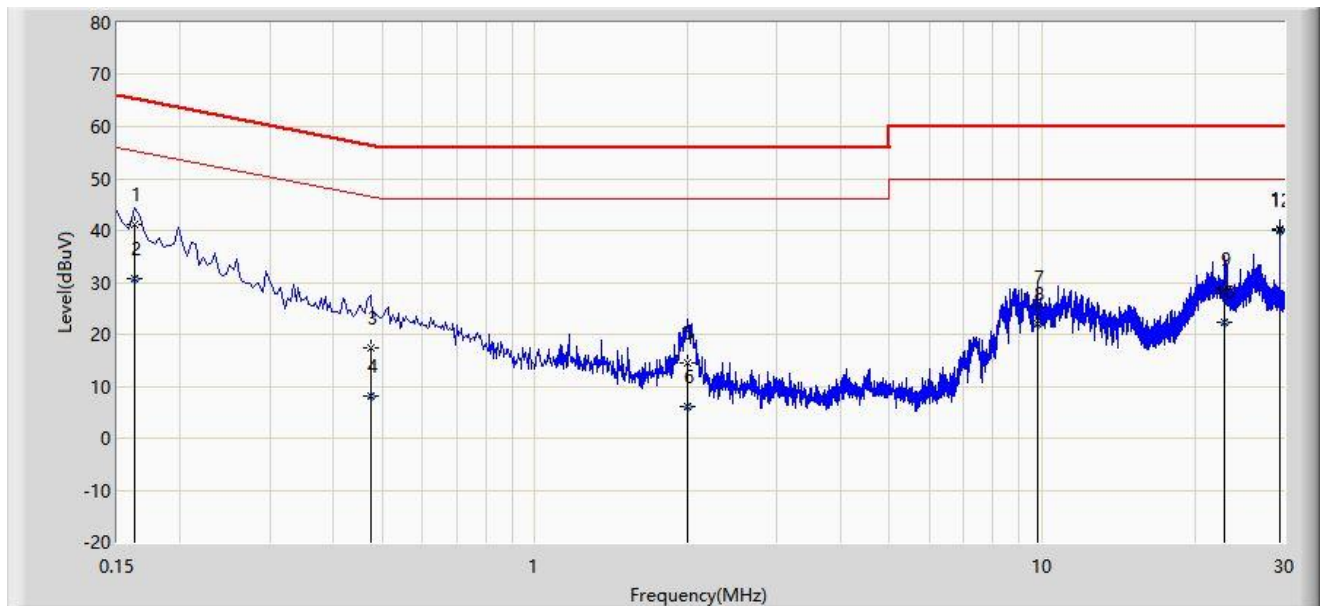


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV)	Factor (dB)	Type
1			0.162	41.464	31.845	-23.897	65.361	9.619	QP
2			0.162	30.643	21.024	-24.718	55.361	9.619	AV
3			0.194	34.012	24.378	-29.851	63.864	9.635	QP
4			0.194	19.460	9.825	-34.404	53.864	9.635	AV
5			1.998	15.108	5.347	-40.892	56.000	9.761	QP
6			1.998	6.673	-3.088	-39.327	46.000	9.761	AV
7			9.238	21.761	11.732	-38.239	60.000	10.029	QP
8			9.238	12.761	2.732	-37.239	50.000	10.029	AV
9			23.082	30.744	20.345	-29.256	60.000	10.399	QP
10			23.082	23.167	12.767	-26.833	50.000	10.399	AV
11			29.454	40.351	29.913	-19.649	60.000	10.438	QP
12		*	29.454	40.034	29.596	-9.966	50.000	10.438	AV

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

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

Site: WZ-SR2	Time: 2020/11/30 - 17:42
Limit: FCC_Part15.207_CE_AC Power	Engineer: Dillon Diao
Probe: ENV216_101683_Filter On	Polarity: Neutral
EUT: WIFI/BT Board	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11g at channel 2412MHz (Dipole Antenna)	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV)	Factor (dB)	Type
1			0.162	41.107	31.498	-24.254	65.361	9.609	QP
2			0.162	30.736	21.126	-24.625	55.361	9.609	AV
3			0.474	17.264	7.582	-39.180	56.444	9.683	QP
4			0.474	7.985	-1.697	-38.459	46.444	9.683	AV
5			1.994	14.558	4.797	-41.442	56.000	9.761	QP
6			1.994	6.028	-3.733	-39.972	46.000	9.761	AV
7			9.818	25.319	15.272	-34.681	60.000	10.047	QP
8			9.818	21.994	11.947	-28.006	50.000	10.047	AV
9			22.914	28.646	18.272	-31.354	60.000	10.375	QP
10			22.914	22.374	11.999	-27.626	50.000	10.375	AV
11			29.454	40.338	29.852	-19.662	60.000	10.486	QP
12		*	29.454	40.085	29.599	-9.915	50.000	10.486	AV

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

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

7. 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.

The End

Appendix A - Test Setup Photograph

Refer to “2010RSU087-UT” file.

Appendix B - EUT Photograph

Refer to "2010RSU087-UE" file.