



MEASUREMENT REPORT

FCC PART 15 Subpart C WLAN 802.11b/g/n

FCC ID: X3ZWFMOD10

APPLICANT: Amp'ed RF Technology, Inc.

Application Type: Certification

Product: Dual band wifi module

Model No.: WF60

Brand Name: Amp'ed RF

FCC Classification: Digital Transmission System (DTS)

FCC Rule Part(s): Part 15 Subpart C (Section 15.247)

Test Procedure(s): ANSI C63.10-2013, KDB 558074 D01v05

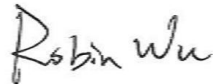
Test Date: November 15, 2018 ~ December 19, 2018

Reviewed By:



(Kevin Guo)

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
1812WSU012-U1	Rev. 01	Initial report	12-28-2018	Valid

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§2.1033 General Information

Applicant:	Amp'ed RF Technology, Inc.
Applicant Address:	1879 Lundy Ave, Suite 138, San Jose, CA, 95131
Manufacturer:	Amp'ed RF Technology, Inc.
Manufacturer Address:	1879 Lundy Ave, Suite 138, San Jose, CA, 95131
Test Site:	MRT Technology (Suzhou) Co., Ltd
Test Site Address:	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
FCC Registration No.:	893164
Test Device Serial No.:	N/A ☐ Production ☒ Pre-Production ☐ Engineering

Test Facility / Accreditations

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

- MRT facility is a FCC registered (MRT Reg. No. 893164) 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 Industry Canada 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:	Dual band wifi module
Model No.:	WF60
Brand Name:	Amp'ed RF
RF Specification:	802.11a/b/g/n-HT20

2.2. Product Specification Subjective to this Report

Frequency Range:	802.11b/g/n-HT20: 2412 ~ 2462 MHz
Type of Modulation:	802.11b: DSSS 802.11g/n: OFDM
Data Rate:	802.11b: 1/2/5.5/11Mbps 802.11g: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 65Mbps

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

2.3. Working Frequencies for this report

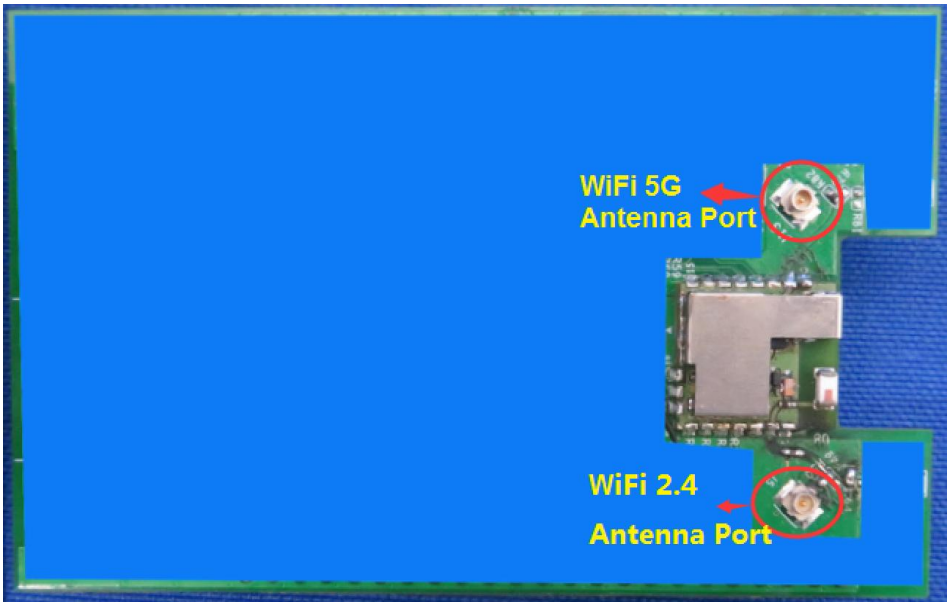
Channel List for 802.11b/g/n-HT20

Channel	Frequency	Channel	Frequency	Channel	Frequency
01	2412 MHz	02	2417 MHz	03	2422 MHz
04	2427 MHz	05	2432 MHz	06	2437 MHz
07	2442 MHz	08	2447 MHz	09	2452 MHz
10	2457 MHz	11	2462 MHz	--	--

2.4. Description of Available Antennas

Antenna Specification				
Model Name	Type	Frequency Band	Connector	Max. Peak Gain
146153	FPC Antenna	2400-2480	ipex	3.0
		5150-5250, 5725-5850	ipex	4.5

2.5. Description of Antenna RF Port

Software Control Port	2.4GHz & 5GHz RF Port
	

2.6. Test Mode

Test Mode	Mode 1: Transmit by 802.11b (1Mbps)
	Mode 2: Transmit by 802.11g (6Mbps)
	Mode 3: Transmit by 802.11n-HT20 (MCS0)

2.7. Description of Test Software

The test utility software used during testing was “etf”, and the version was “ETF_GUI_A40.00.0007”.

Power Parameter Value:

Test Mode	Test Channel No.	Test Channel (MHz)	Power Parameter Value
802.11b	01	2412	14.0
	06	2437	14.0
	11	2462	13.0
802.11g	01	2412	18.2
	06	2437	18.0
	11	2462	16.6
802.11n-HT20	01	2412	17.6
	06	2437	17.6
	11	2462	15.8

2.8. Device Capabilities

This device contains the following capabilities:

2.4GHz WLAN (DTS), 5GHz WLAN (NII)

The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz, and detector = peak. 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:

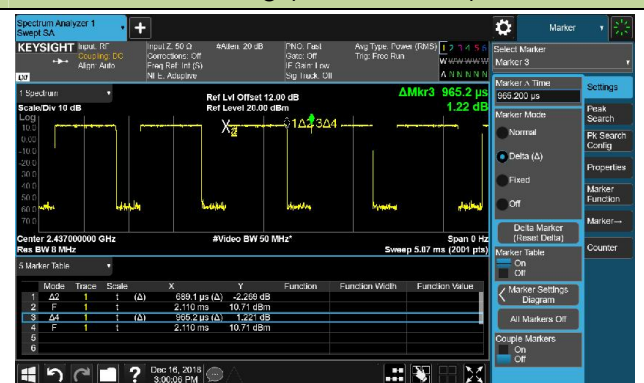
Test Mode	Duty Cycle
802.11b	93.27 %
802.11g	71.39 %
802.11n-HT20	69.94 %

Duty Cycle (T = Transmission Duration)

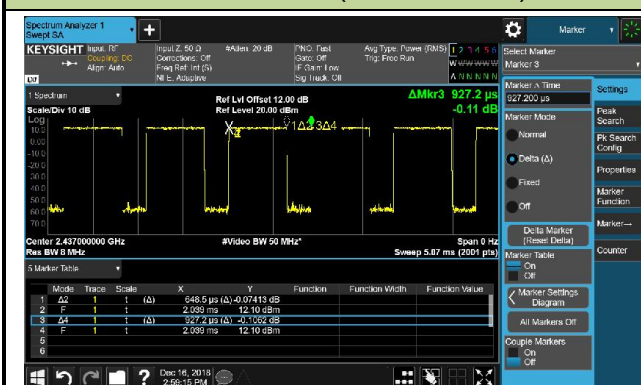
802.11b (T = 4.160 ms)



802.11g (T = 0.689 ms)



802.11n-HT20 (T = 0.649 ms)



2.9. Test Configuration

The **Dual band wifi module** was tested per the guidance of ANSI C63.10-2013. ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing.

2.10. EMI Suppression Device(s)/Modifications

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

2.11. 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.

3. DESCRIPTION of TEST

3.1. Evaluation Procedure

The measurement procedures described in the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2013), and the guidance provided in KDB 558074 D01v05 were used in the measurement of the **Dual band wifi module**.

Deviation from measurement procedure.....None

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 are 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. 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	2019/04/20
Two-Line V-Network	R&S	ENV216	MRTSUE06002	1 year	2019/06/15
Two-Line V-Network	R&S	ENV216	MRTSUE06003	1 year	2019/06/15
Temperature/Humidity Meter	Testo	608-H1	MRTSUE06404	1 year	2019/08/14
Shielding Anechoic Chamber	Mikebang	Chamber-SR2	MRTSUE06214	1 year	2019/05/10

Radiated Disturbance – AC1

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Keysight	N9030B	MRTSUE06395	1 year	2019/09/30
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2019/08/18
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2019/11/20
Bilog Period Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2019/04/12
Horn Antenna	Schwarzbeck	BBHA9120D	MRTSUE06023	1 year	2019/10/21
Broadband Horn Antenna	Schwarzbeck	BBHA9170	MRTSUE06024	1 year	2019/12/14
Microwave System Amplifier	Agilent	83017A	MRTSUE06076	1 year	2019/11/17
Preamplifier	Schwarzbeck	BBV 9721	MRTSUE06121	1 year	2019/06/13
Temperature/Humidity Meter	Testo	608-H1	MRTSUE06403	1 year	2019/08/14
Anechoic Chamber	TDK	Chamber-AC1	MRTSUE06212	1 year	2019/05/02

Conducted Test Equipment - TR3

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2019/04/20
Power Meter	Agilent	U2021XA	MRTSUE06030	1 year	2019/12/06
Temperature&Humidity Chamber	BAOYT	BYH-150CL	MRTSUE06051	1 year	2019/12/06
Temperature/Humidity Meter	Testo	608-H1	MRTSUE06401	1 year	2019/11/21

Software	Version	Function
e3	V8.3.5	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 - SR2
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 150kHz~30MHz: $\pm 3.46\text{dB}$
Radiated Emission Measurement – AC1
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 9kHz ~ 1GHz: $\pm 4.18\text{dB}$ 1GHz ~ 25GHz: $\pm 4.76\text{dB}$
Spurious Emissions, Conducted - TR3
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 0.78dB
Output Power - TR3
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 1.13dB
Power Spectrum Density - TR3
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 1.15dB
Occupied Bandwidth - TR3
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 0.28%

6. TEST RESULT

6.1. Summary

Product Name: Dual band wifi module

FCC ID: X3ZWFMOD10

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
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	$\leq 20\text{dBc (Peak)}$		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 & 6.7
15.207	AC Conducted Emissions 150kHz - 30MHz	< FCC 15.207 limits	Line Conducted	Pass	Section 6.8

Notes:

- 1) 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.
- 2) 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.

6.2. 6dB Bandwidth Measurement

6.2.1. Test Limit

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

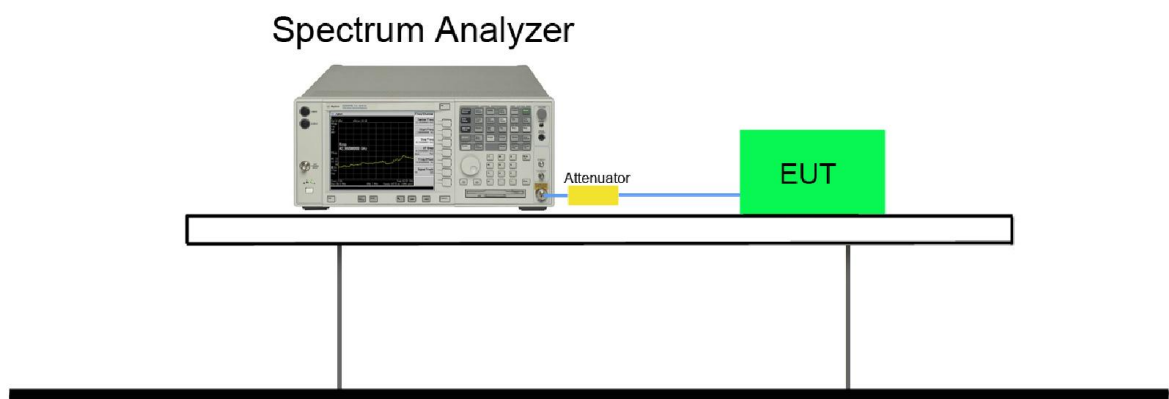
6.2.2. Test Procedure used

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

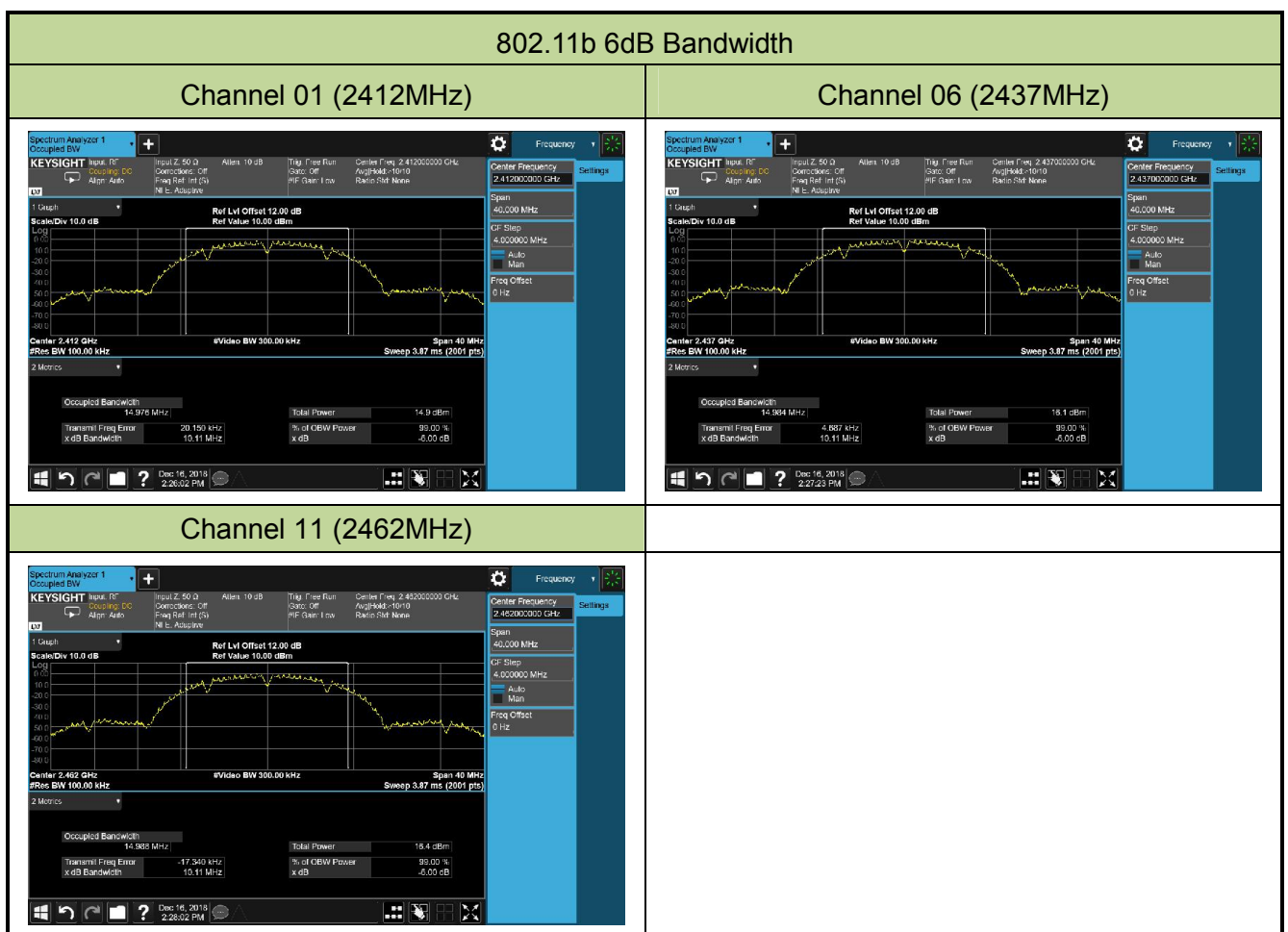
6.2.4. Test Setup



6.2.5. Test Result

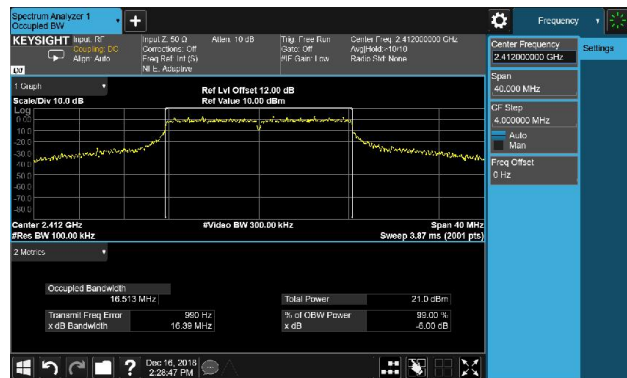
Product	Dual band wifi module	Temperature	25°C
Test Engineer	Dandy Li	Relative Humidity	52%
Test Site	TR3	Test Date	2018/12/16

Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
11b	1Mbps	01	2412	10.11	≥ 0.5	Pass
11b	1Mbps	06	2437	10.11	≥ 0.5	Pass
11b	1Mbps	11	2462	10.11	≥ 0.5	Pass
11g	6Mbps	01	2412	16.39	≥ 0.5	Pass
11g	6Mbps	06	2437	16.39	≥ 0.5	Pass
11g	6Mbps	11	2462	16.40	≥ 0.5	Pass
11n-HT20	MCS0	01	2412	17.58	≥ 0.5	Pass
11n-HT20	MCS0	06	2437	17.58	≥ 0.5	Pass
11n-HT20	MCS0	11	2462	17.59	≥ 0.5	Pass



802.11g 6dB Bandwidth

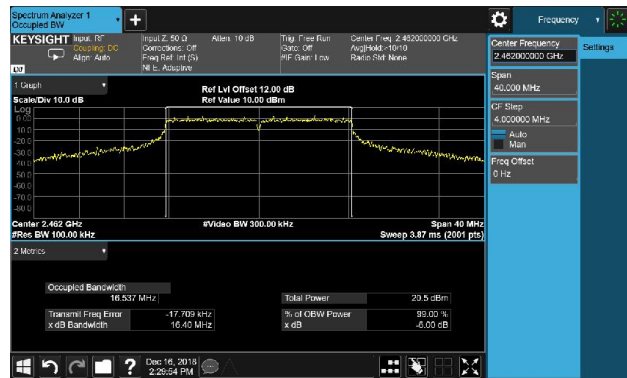
Channel 01 (2412MHz)



Channel 06 (2437MHz)

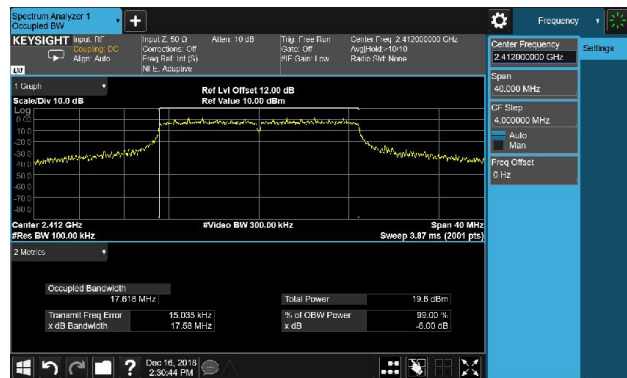


Channel 11 (2462MHz)

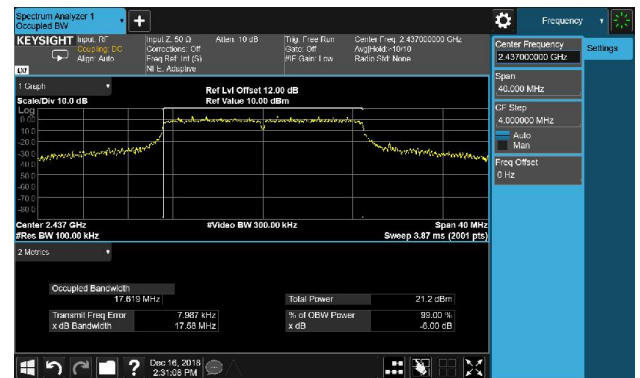


802.11n-HT20 6dB Bandwidth

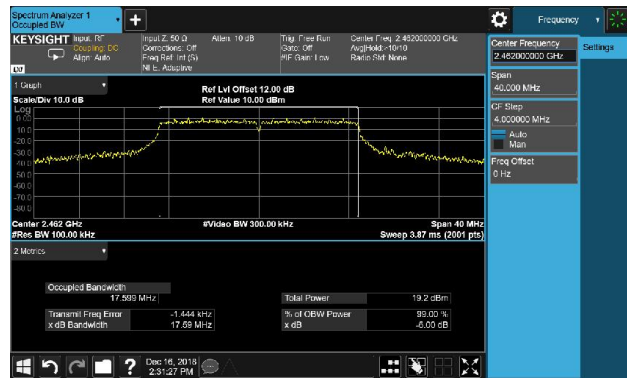
Channel 01 (2412MHz)



Channel 06 (2437MHz)



Channel 11 (2462MHz)



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 Section 11.9.1.3

ANSI C63.10 Section 11.9.2.3.2

6.3.3. Test Setting

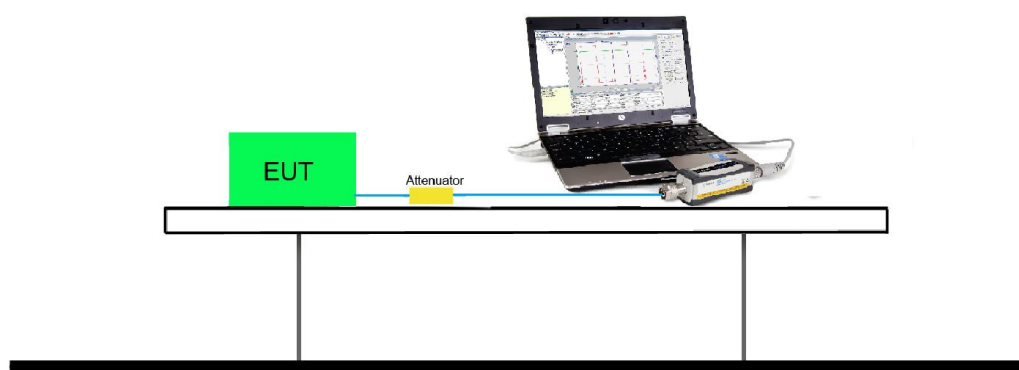
PKPM1 Peak-reading power meter method

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

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

Power output test was verified over all data rates of each mode shown as below table, and then choose the maximum power output (gray marker) for final test of each channel.

Test Mode	Bandwidth (MHz)	Channel No.	Frequency (MHz)	Data Rate/ MCS	Average Power (dBm)
802.11b	20	6	2437	1Mbps	8.92
				5.5Mbps	8.63
				11Mbps	8.14
802.11g	20	6	2437	6Mbps	16.34
				24Mbps	16.04
				54Mbps	15.96
802.11n	20	6	2437	MCS0	13.97
				MCS3	13.56
				MCS7	13.11

Product	Dual band wifi module	Temperature	23°C
Test Engineer	Dandy Li	Relative Humidity	51%
Test Site	TR3	Test Date	2018/12/16

Test Result of Peak Output Power

Test Mode	Channel No.	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Result
11b	01	2402	9.75	≤ 30	Pass
11b	06	2437	10.79	≤ 30	Pass
11b	11	2462	11.19	≤ 30	Pass
11g	01	2402	21.14	≤ 30	Pass
11g	06	2437	22.05	≤ 30	Pass
11g	11	2462	21.24	≤ 30	Pass
11n-HT20	01	2402	19.54	≤ 30	Pass
11n-HT20	06	2437	20.55	≤ 30	Pass
11n-HT20	11	2462	19.77	≤ 30	Pass

Test Result of Average Output Power (Reporting Only)

Test Mode	Channel No.	Frequency (MHz)	Average Power (dBm)	Limit (dBm)	Result
11b	01	2402	7.85	≤ 30	Pass
11b	06	2437	8.92	≤ 30	Pass
11b	11	2462	9.24	≤ 30	Pass
11g	01	2402	15.05	≤ 30	Pass
11g	06	2437	16.34	≤ 30	Pass
11g	11	2462	14.33	≤ 30	Pass
11n-HT20	01	2402	12.73	≤ 30	Pass
11n-HT20	06	2437	13.97	≤ 30	Pass
11n-HT20	11	2462	12.65	≤ 30	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.

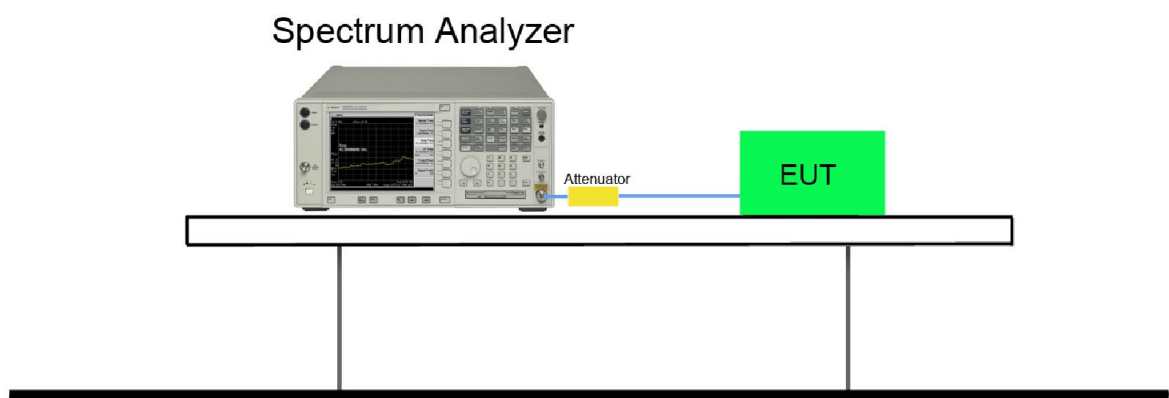
6.4.2. Test Procedure Used

ANSI C63.10 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 DTS channel bandwidth
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	Dual band wifi module	Temperature	23°C
Test Engineer	Dandy Li	Relative Humidity	52%
Test Site	TR3	Test Date	2018/12/16

Test Mode	Channel No.	Frequency (MHz)	PSD Result (dBm / 3kHz)	Limit (dBm / 3kHz)	Result
11b	01	2402	-15.86	≤ 8.00	Pass
11b	06	2437	-14.33	≤ 8.00	Pass
11b	11	2462	-14.09	≤ 8.00	Pass
11g	01	2402	-10.78	≤ 8.00	Pass
11g	06	2437	-9.62	≤ 8.00	Pass
11g	11	2462	-11.40	≤ 8.00	Pass
11n-HT20	01	2402	-11.92	≤ 8.00	Pass
11n-HT20	06	2437	-10.86	≤ 8.00	Pass
11n-HT20	11	2462	-12.77	≤ 8.00	Pass

802.11b - Peak PSD

Channel 01 (2412MHz)



Channel 06 (2437MHz)



Channel 11 (2462MHz)



802.11g - Peak PSD

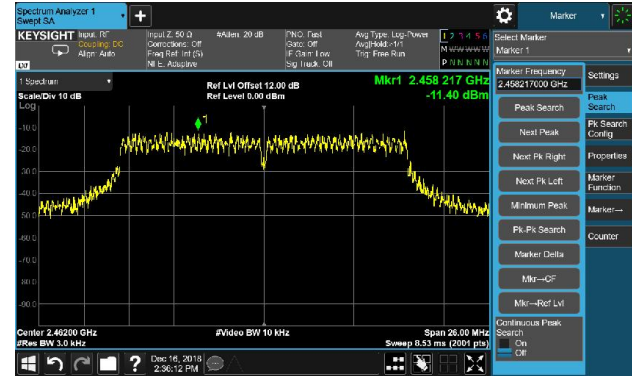
Channel 01 (2412MHz)



Channel 06 (2437MHz)



Channel 11 (2462MHz)



802.11n-HT20 - Peak PSD

Channel 01 (2412MHz)



Channel 06 (2437MHz)



Channel 11 (2462MHz)



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 100 kHz bandwidth per the PSD procedure.

6.5.2. Test Procedure Used

ANSI C63.10 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

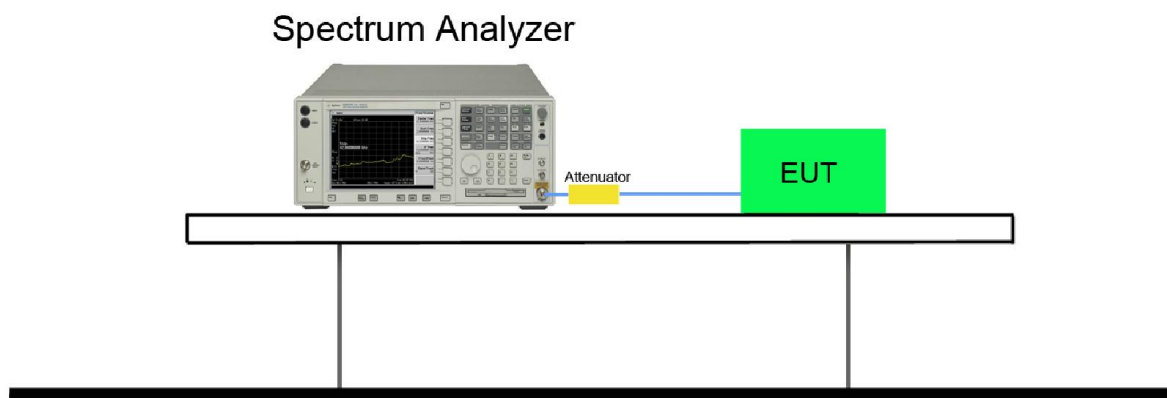
Emission level measurement

1. Set the center frequency and span to encompass frequency range to be measured
2. RBW = 1.3MHz
3. VBW = 4MHz
4. Detector = Peak
5. Trace mode = max hold
6. Sweep time = auto couple
7. The trace was allowed to stabilize

Test Notes

1. RBW was set to 1.3MHz rather than 100 kHz in order to increase the measurement speed.
2. The display line shown in the following plots denotes the limit at 20dB below the fundamental emission level measured in a 100 kHz bandwidth. However, since the traces in the following plots are measured with a 1.3MHz RBW, the display line may not necessarily appear to be 30dB below the level of the fundamental in a 1.3MHz bandwidth.
3. For plots showing conducted spurious emissions near the limit, the frequencies were investigated with a reduced RBW to ensure that no emissions were present.

6.5.4. Test Setup



6.5.5.Test Result

Product	Dual band wifi module	Temperature	23°C
Test Engineer	Dandy Li	Relative Humidity	52%
Test Site	TR3	Test Date	2018/12/16

Test Mode / Bandwidth	Channel No.	Frequency (MHz)	Limit	Result
11b	01	2402	20dBc	Pass
11b	06	2437	20dBc	Pass
11b	11	2462	20dBc	Pass
11g	01	2402	20dBc	Pass
11g	06	2437	20dBc	Pass
11g	11	2462	20dBc	Pass
11n-HT20	01	2402	20dBc	Pass
11n-HT20	06	2437	20dBc	Pass
11n-HT20	11	2462	20dBc	Pass

802.11b Out-of-Band Emissions

Channel 01 (2412MHz)

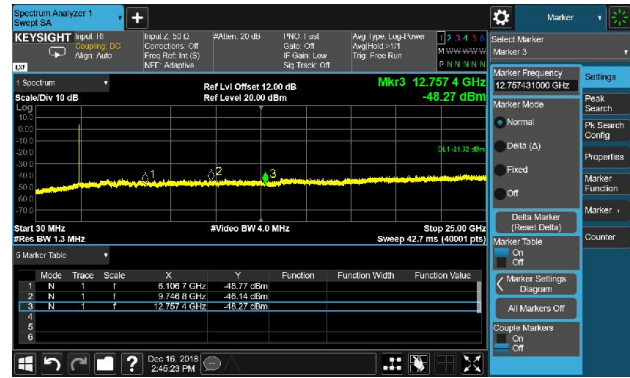
100kHz PSD reference Level



Low Band Edge



Spurious Emission



Channel 06 (2437MHz)

100kHz PSD reference Level



Spurious Emission



High Band Edge

[illegible]

802.11g Out-of-Band Emissions

Channel 01 (2412MHz)

100kHz PSD reference Level



Low Band Edge



Spurious Emission



Channel 06 (2437MHz)

100kHz PSD reference Level



Spurious Emission



Channel 11 (2462MHz)

100kHz PSD reference Level



High Band Edge



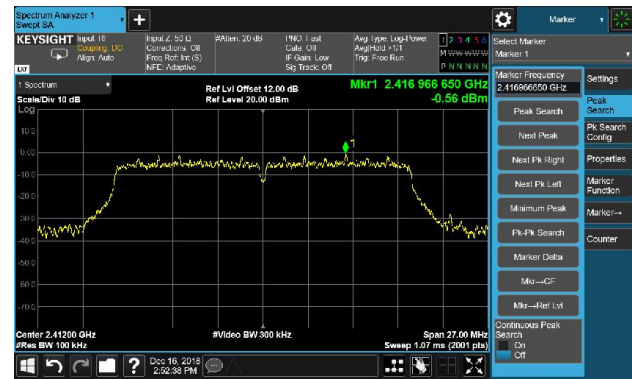
Spurious Emission



802.11n-HT20 Out-of-Band Emissions

Channel 01 (2412MHz)

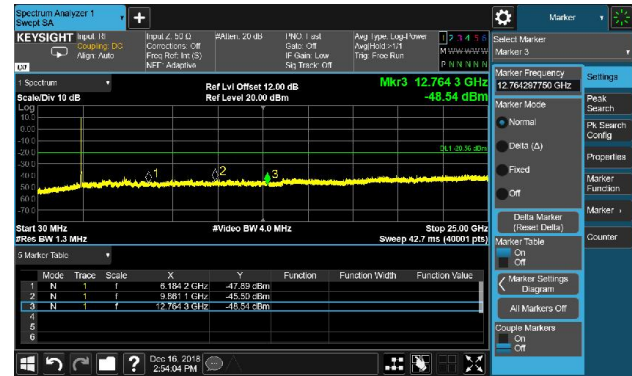
100kHz PSD reference Level



Low Band Edge



Spurious Emission



Channel 06 (2437MHz)

100kHz PSD reference Level



Spurious Emission



High Band Edge



KEYSIGHT Spectrum Analyzer 1 Sweep SA

Input: Input 1: 50 dB, Composite On, Pre-Ref: Int (S), NRE: Adaptive

Output: Output: 20 dB, Cable: Off, IF Gain: Low, Sp Trig: Off

Analysis: Avg Type: Log+Vrms, Peak: Min, Trg: Freq Run

Frequency: 12.775 GHz, 12.7755 GHz

Power: -47.00 dBm

Resolution Bandwidth (RBW): 4.0 MHz

Video Bandwidth (VBW): 25.00 MHz

Sweep: 42.7 ms (400001 pts)

Marker: Mkr3 12.7755 GHz -47.00 dBm

Marker Settings: Marker Frequency: 12.77554256 GHz, Marker Mode: Normal, Peak Search, Delta (A), Properties, Fixed, Marker Function, Delta Marker (Reset Delta), Marker Table, On/Off, Marker Settings, All Markers Off, Google Markers, On/Off

Marker Table:

Mode	Trace	Scale	F	F	Function	Function Width	Function Value
1	N	1	12.7751 GHz	-47.68 dBm			
2	N	1	12.7751 GHz	-47.00 dBm			
3	N	1	12.7755 GHz	-47.00 dBm			

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 [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

6.6.2. Test Procedure Used

ANSI C63.10 Section 6.3 (General Requirements)

ANSI C63.10 Section 6.4 (Standard test method below 30MHz)

ANSI C63.10 Section 6.5 (Standard test method above 30MHz to 1GHz)

ANSI C63.10 Section 6.6 (Standard test method above 1GHz)

6.6.3. Test Setting

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 or average
5. Sweep time = auto couple
6. Trace was allowed to stabilize

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

Peak Measurements above 1GHz

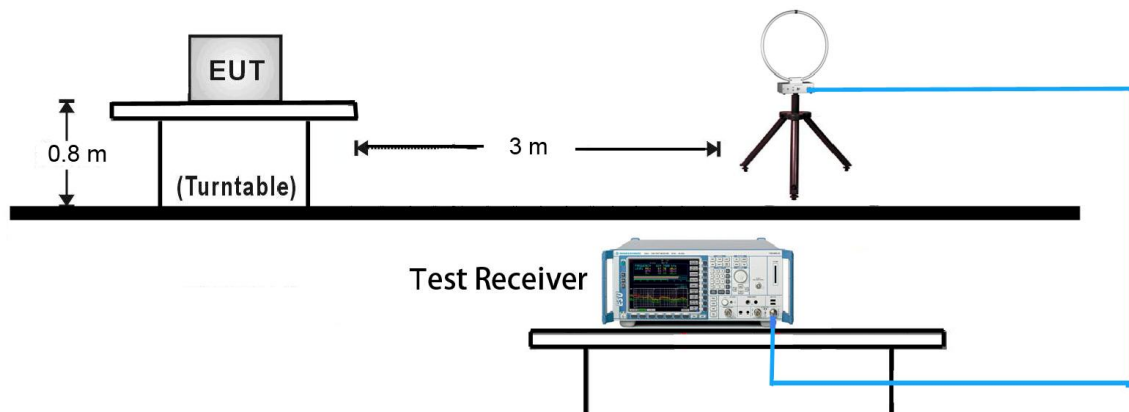
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

Average Measurements above 1GHz (Method VB)

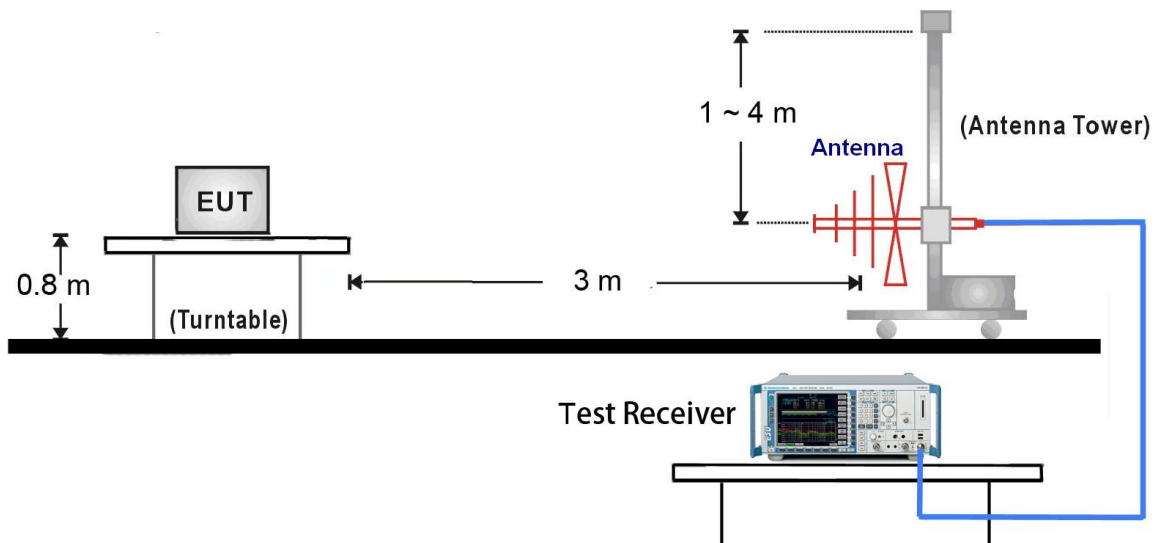
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW; If the EUT is configured to transmit with duty cycle $\geq 98\%$, set VBW = 10 Hz.
If the EUT duty cycle is $< 98\%$, set $\text{VBW} \geq 1/T$. T is the minimum transmission duration.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

6.6.4. Test Setup

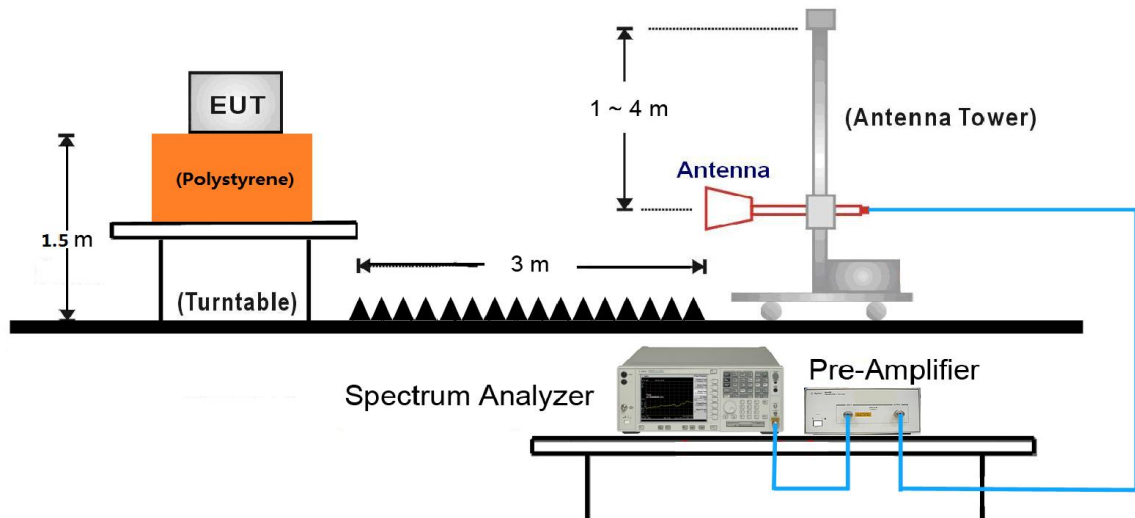
9kHz ~ 30MHz Test Setup:



30MHz ~ 1GHz Test Setup:



1GHz ~ 25GHz Test Setup:



6.6.5. Test Result

Product	Dual band wifi module	Temperature	26°C
Test Engineer	Cloud Guo	Relative Humidity	56%
Test Site	AC1	Test Date	2018/12/16
Test Mode:	802.11b	Test Channel:	01
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
	4825.0	43.2	5.9	49.1	74.0	-24.9	Peak	Horizontal
*	6032.0	37.5	7.9	45.4	76.9	-31.5	Peak	Horizontal
	7536.5	34.2	12.9	47.1	74.0	-26.9	Peak	Horizontal
*	7970.0	36.0	13.6	49.6	76.9	-27.3	Peak	Horizontal
	4824.0	46.6	5.9	52.5	54.0	-1.5	Average	Vertical
	4825.0	48.1	5.9	54.0	74.0	-20.0	Peak	Vertical
*	6491.0	36.0	9.9	45.9	76.9	-31.0	Peak	Vertical
	7460.0	36.5	12.9	49.4	74.0	-24.6	Peak	Vertical
*	7927.5	35.8	13.5	49.3	76.9	-27.6	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (96.9dBμV/m) or 15.209 which is higher.

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	Dual band wifi module	Temperature	26°C
Test Engineer	Cloud Guo	Relative Humidity	56%
Test Site	AC1	Test Date	2018/12/16
Test Mode:	802.11b	Test Channel:	06
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
	4876.0	43.6	6.0	49.6	74.0	-24.4	Peak	Horizontal
*	5785.5	36.4	7.5	43.9	77.5	-33.6	Peak	Horizontal
	7570.5	34.2	12.9	47.1	74.0	-26.9	Peak	Horizontal
*	7825.5	35.1	13.2	48.3	77.5	-29.2	Peak	Horizontal
	4876.0	46.6	6.0	52.6	74.0	-21.4	Peak	Vertical
*	7103.0	35.9	12.1	48.0	77.5	-29.5	Peak	Vertical
	8174.0	35.0	13.2	48.2	74.0	-25.8	Peak	Vertical
*	8735.0	35.1	13.0	48.1	77.5	-29.4	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (97.5dBμV/m) or 15.209 which is higher.

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	Dual band wifi module	Temperature	26°C
Test Engineer	Cloud Guo	Relative Humidity	56%
Test Site	AC1	Test Date	2018/12/16
Test Mode:	802.11b	Test Channel:	11
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
	4927.0	43.2	6.1	49.3	74.0	-24.7	Peak	Horizontal
*	5896.0	36.6	7.8	44.4	76.6	-32.2	Peak	Horizontal
	7375.0	35.4	12.6	48.0	74.0	-26.0	Peak	Horizontal
*	7842.5	35.9	13.3	49.2	76.6	-27.4	Peak	Horizontal
	4927.0	47.4	6.1	53.5	74.0	-20.5	Peak	Vertical
*	6380.5	35.5	9.2	44.7	76.6	-31.9	Peak	Vertical
	7536.5	35.2	12.9	48.1	74.0	-25.9	Peak	Vertical
*	8582.0	35.8	12.8	48.6	76.6	-28.0	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (96.6dBμV/m) or 15.209 which is higher.

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	Dual band wifi module	Temperature	26°C
Test Engineer	Cloud Guo	Relative Humidity	56%
Test Site	AC1	Test Date	2018/12/16
Test Mode:	802.11g	Test Channel:	01
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
	4824.0	47.8	5.9	53.7	54.0	-0.3	Average	Horizontal
	4825.0	55.9	5.9	61.8	74.0	-12.2	Peak	Horizontal
*	6032.0	38.7	7.9	46.6	83.5	-36.9	Peak	Horizontal
	7434.5	34.2	12.8	47.0	74.0	-27.0	Peak	Horizontal
*	7978.5	34.2	13.6	47.8	83.5	-35.7	Peak	Horizontal
	4824.0	44.9	5.9	50.8	54.0	-3.2	Average	Vertical
	4825.0	54.7	5.9	60.6	74.0	-13.4	Peak	Vertical
*	9661.5	39.2	15.4	54.6	83.5	-28.9	Peak	Vertical
	14481.0	42.4	21.1	63.5	74.0	-10.5	Peak	Vertical
	14481.0	31.1	21.1	52.2	54.0	-1.8	Average	Vertical
*	15127.0	34.9	20.0	54.9	83.5	-28.6	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (103.5dBμV/m) or 15.209 which is higher.

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	Dual band wifi module	Temperature	26°C
Test Engineer	Cloud Guo	Relative Humidity	56%
Test Site	AC1	Test Date	2018/12/16
Test Mode:	802.11g	Test Channel:	06
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
	4867.5	55.8	6.0	61.8	74.0	-12.2	Peak	Horizontal
	4876.0	47.4	6.0	53.4	54.0	-0.6	Average	Horizontal
*	6091.5	37.9	8.1	46.0	83.9	-37.9	Peak	Horizontal
	7485.5	35.4	12.8	48.2	74.0	-25.8	Peak	Horizontal
*	14617.0	36.9	21.2	58.1	83.9	-25.8	Peak	Horizontal
	4876.0	55.1	6.0	61.1	74.0	-12.9	Peak	Vertical
	4876.0	45.0	6.0	51.0	54.0	-3.0	Average	Vertical
*	6261.5	36.1	8.6	44.7	83.9	-39.2	Peak	Vertical
	7443.0	34.4	12.9	47.3	74.0	-26.7	Peak	Vertical
*	14642.5	42.6	21.2	63.8	83.9	-20.1	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (103.9dBμV/m) or 15.209 which is higher.

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	Dual band wifi module	Temperature	26°C
Test Engineer	Cloud Guo	Relative Humidity	56%
Test Site	AC1	Test Date	2018/12/16
Test Mode:	802.11g	Test Channel:	11
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
	4910.0	53.5	6.1	59.6	74.0	-14.4	Peak	Horizontal
	4923.0	44.9	6.1	51.0	54.0	-3.0	Average	Horizontal
*	6151.0	39.6	8.3	47.9	83.2	-35.3	Peak	Horizontal
	8420.5	35.5	12.6	48.1	74.0	-25.9	Peak	Horizontal
*	9840.0	34.0	16.7	50.7	83.2	-32.5	Peak	Horizontal
	4927.0	54.5	6.1	60.6	74.0	-13.4	Peak	Vertical
	4927.0	45.6	6.1	51.7	54.0	-2.3	Average	Vertical
*	6788.5	35.6	10.2	45.8	83.2	-37.4	Peak	Vertical
	10877.0	34.7	18.1	52.8	74.0	-21.2	Peak	Vertical
*	14770.0	39.7	21.1	60.8	83.2	-22.4	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (103.1dBμV/m) or 15.209 which is higher.

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	Dual band wifi module	Temperature	26°C
Test Engineer	Cloud Guo	Relative Humidity	56%
Test Site	AC1	Test Date	2018/12/16
Test Mode:	802.11n-HT20	Test Channel:	01
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
	4824.0	47.5	5.9	53.4	54.0	-0.6	Average	Horizontal
	4825.0	57.0	5.9	62.9	74.0	-11.1	Peak	Horizontal
*	6032.0	39.3	7.9	47.2	81.3	-34.1	Peak	Horizontal
	7562.0	36.1	12.9	49.0	74.0	-25.0	Peak	Horizontal
*	8786.0	35.0	13.3	48.3	81.3	-33.0	Peak	Horizontal
	4824.0	44.9	5.9	50.8	54.0	-3.2	Average	Vertical
	4825.0	54.0	5.9	59.9	74.0	-14.1	Peak	Vertical
*	6491.0	35.9	9.9	45.8	81.3	-35.5	Peak	Vertical
	14481.0	40.2	21.1	61.3	74.0	-12.7	Peak	Vertical
	14481.0	27.7	21.1	48.8	54.0	-5.2	Average	Vertical
*	15186.5	34.8	19.9	54.7	81.3	-26.6	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (101.3dBμV/m) or 15.209 which is higher.

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	Dual band wifi module	Temperature	26°C
Test Engineer	Cloud Guo	Relative Humidity	56%
Test Site	AC1	Test Date	2018/12/16
Test Mode:	802.11n-HT20	Test Channel:	06
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
	4824.0	46.7	5.9	52.6	54.0	-1.4	Average	Horizontal
	4876.0	54.9	6.0	60.9	74.0	-13.1	Peak	Horizontal
*	6091.5	38.8	8.1	46.9	81.8	-34.9	Peak	Horizontal
	8276.0	34.6	12.8	47.4	74.0	-26.6	Peak	Horizontal
*	14608.5	36.3	21.2	57.5	81.8	-24.3	Peak	Horizontal
	4867.0	46.3	6.0	52.3	54.0	-1.7	Average	Vertical
	4867.5	54.9	6.0	60.9	74.0	-13.1	Peak	Vertical
*	9755.0	36.3	16.2	52.5	81.8	-29.3	Peak	Vertical
	11871.5	34.1	17.2	51.3	74.0	-22.7	Peak	Vertical
*	14625.5	39.9	21.2	61.1	81.8	-20.7	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (101.8dBμV/m) or 15.209 which is higher.

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	Dual band wifi module	Temperature	26°C
Test Engineer	Cloud Guo	Relative Humidity	56%
Test Site	AC1	Test Date	2018/12/16
Test Mode:	802.11n-HT20	Test Channel:	11
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
	4918.5	54.0	6.1	60.1	74.0	-13.9	Peak	Horizontal
	4924.0	46.5	6.1	52.6	54.0	-1.4	Average	Horizontal
*	6151.0	38.4	8.3	46.7	81.8	-35.1	Peak	Horizontal
	8140.0	34.1	13.4	47.5	74.0	-26.5	Peak	Horizontal
*	9984.5	34.7	16.7	51.4	81.8	-30.4	Peak	Horizontal
	4918.5	57.7	6.1	63.8	74.0	-10.2	Peak	Vertical
	4924.0	45.5	6.1	51.6	54.0	-2.4	Average	Vertical
*	9848.5	37.2	16.7	53.9	81.8	-27.9	Peak	Vertical
	12092.5	35.4	17.5	52.9	74.0	-21.1	Peak	Vertical
*	14778.5	40.8	21.1	61.9	81.8	-19.9	Peak	Vertical

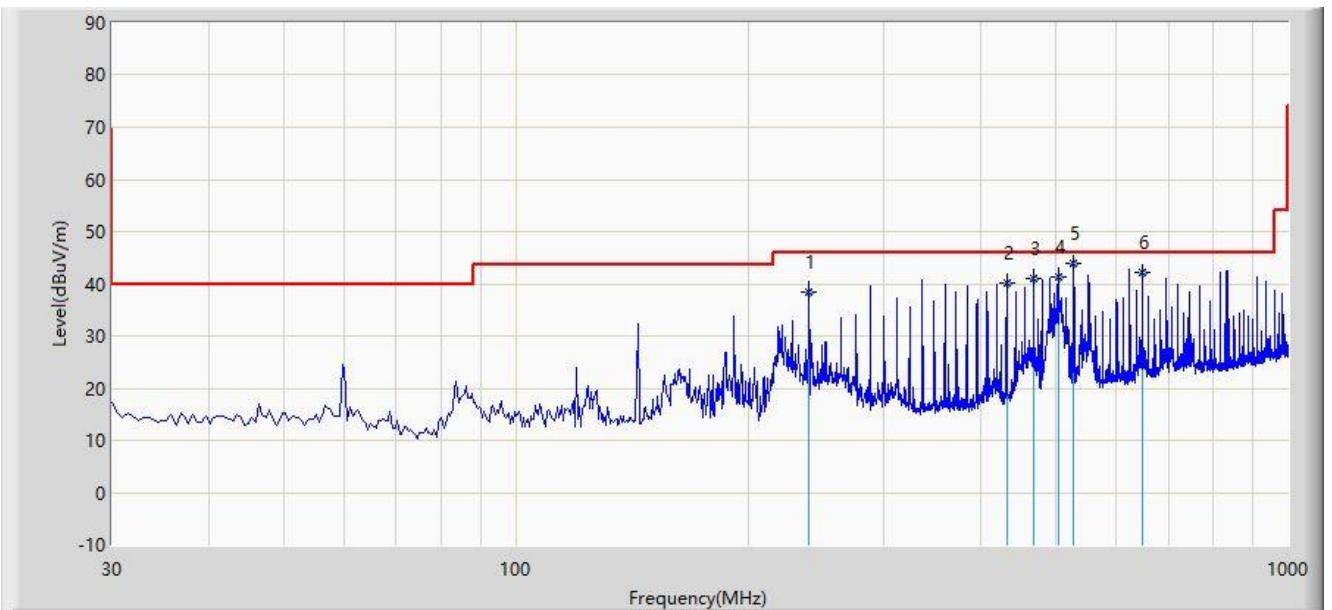
Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (101.3dBμV/m) or 15.209 which is higher.

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 worst case of Radiated Emission below 1GHz:

Site: AC1	Time: 2018/12/17 - 15:23
Limit: FCC_Part15.209_RE(3m)	Engineer: Flag Yang
Probe: VULB 9168 _20-2000MHz	Polarity: Horizontal
EUT: Dual band wifi module	Power: AC 120V/60Hz
Test Mode: Worst case	



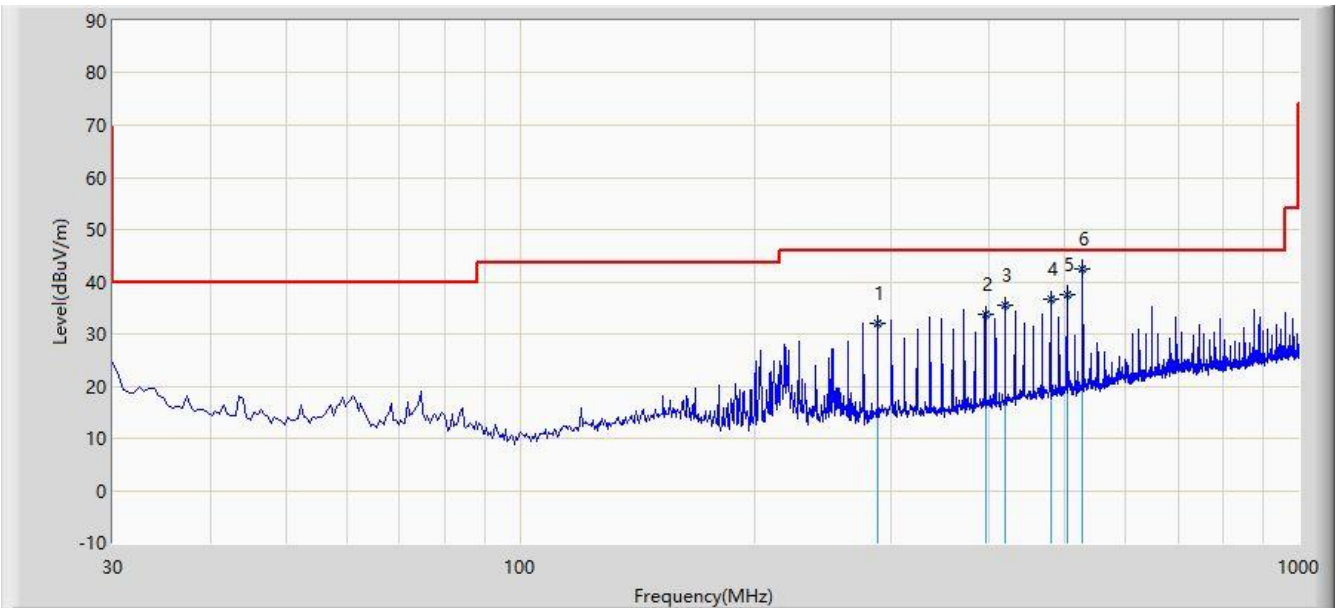
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	240.005	38.518	25.650	-7.482	46.000	12.868	QP
2			432.065	40.207	22.750	-5.793	46.000	17.457	QP
3			467.955	41.098	22.960	-4.902	46.000	18.137	QP
4			503.845	41.314	22.670	-4.686	46.000	18.644	QP
5			528.095	43.897	24.762	-2.103	46.000	19.135	QP
6			648.375	42.063	20.630	-3.937	46.000	21.433	QP

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

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

Note 2: The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz, 18GHz ~ 25GHz), therefore no data appear in the report.

Site: AC1	Time: 2018/12/17 - 15:23
Limit: FCC_Part15.209_RE(3m)	Engineer: Flag Yang
Probe: VULB 9168 _20-2000MHz	Polarity: Vertical
EUT: Dual band wifi module	Power: AC 120V/60Hz
Test Mode: Worst case	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			288.020	32.061	17.960	-13.939	46.000	14.101	QP
2			396.175	33.857	17.350	-12.143	46.000	16.507	QP
3			419.940	35.403	18.260	-10.597	46.000	17.143	QP
4			480.080	36.543	18.260	-9.457	46.000	18.283	QP
5			503.845	37.594	18.950	-8.406	46.000	18.644	QP
6		*	528.095	42.605	23.470	-3.395	46.000	19.135	QP

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

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

Note 2: The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz, 18GHz ~ 25GHz), therefore no data appear 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 - 156.525	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 47CFR 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 Section 6.3 (General Requirements)

ANSI C63.10 Section 6.6 (Standard test method above 1GHz)

6.7.3.Test Setting

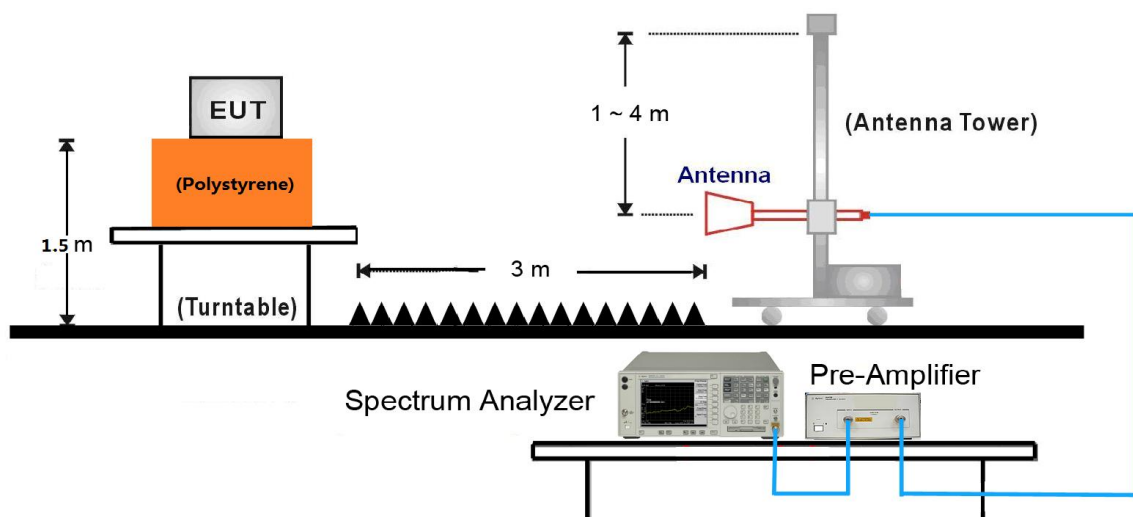
Peak Field Strength Measurements

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

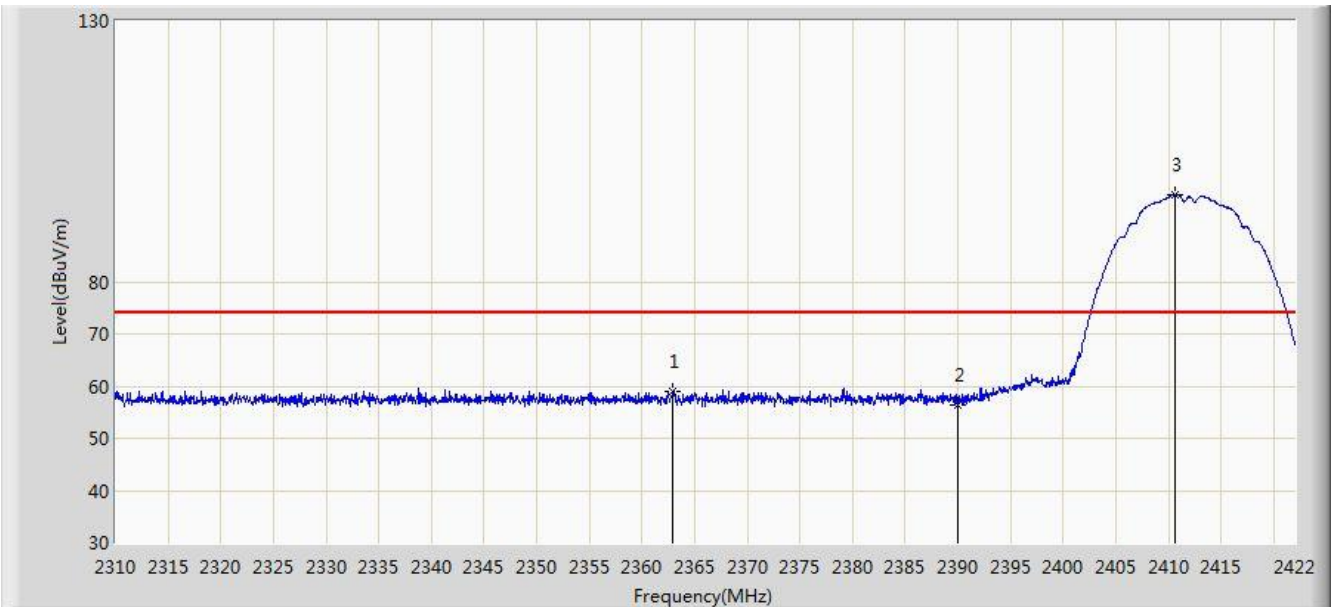
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW; If the EUT is configured to transmit with duty cycle $\geq 98\%$, set VBW = 10 Hz.
If the EUT duty cycle is $< 98\%$, set VBW $\geq 1/T$. T is the minimum transmission duration.
4.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

6.7.4.Test Setup



6.7.5.Test Result

Site: AC1	Time: 2018/12/14 - 21:47
Limit: FCC_Part15.209_RE(3m)	Engineer: Cloud Guo
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Dual band wifi module	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11b at Channel 2412MHz	

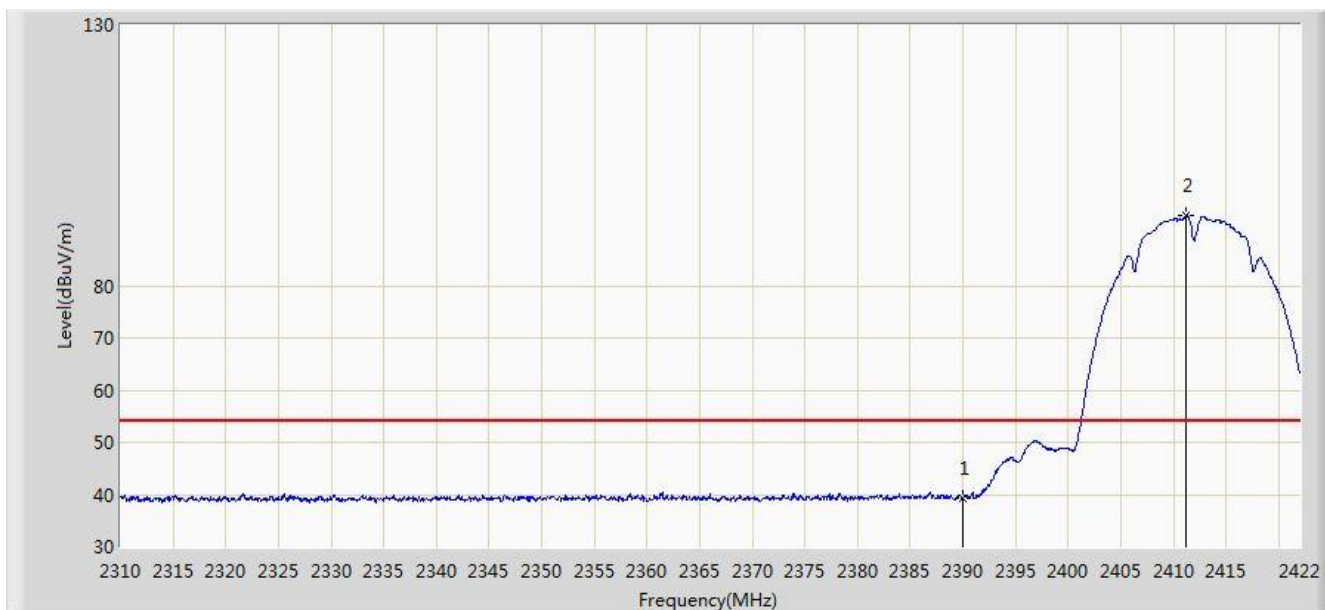


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2362.976	59.056	26.685	-14.944	74.000	32.371	PK
2			2390.000	56.484	24.157	-17.516	74.000	32.327	PK
3		*	2410.688	96.694	64.408	N/A	N/A	32.286	PK

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

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

Site: AC1	Time: 2018/12/14 - 21:51
Limit: FCC_Part15.209_RE(3m)	Engineer: Cloud Guo
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Dual band wifi module	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11b at Channel 2412MHz	

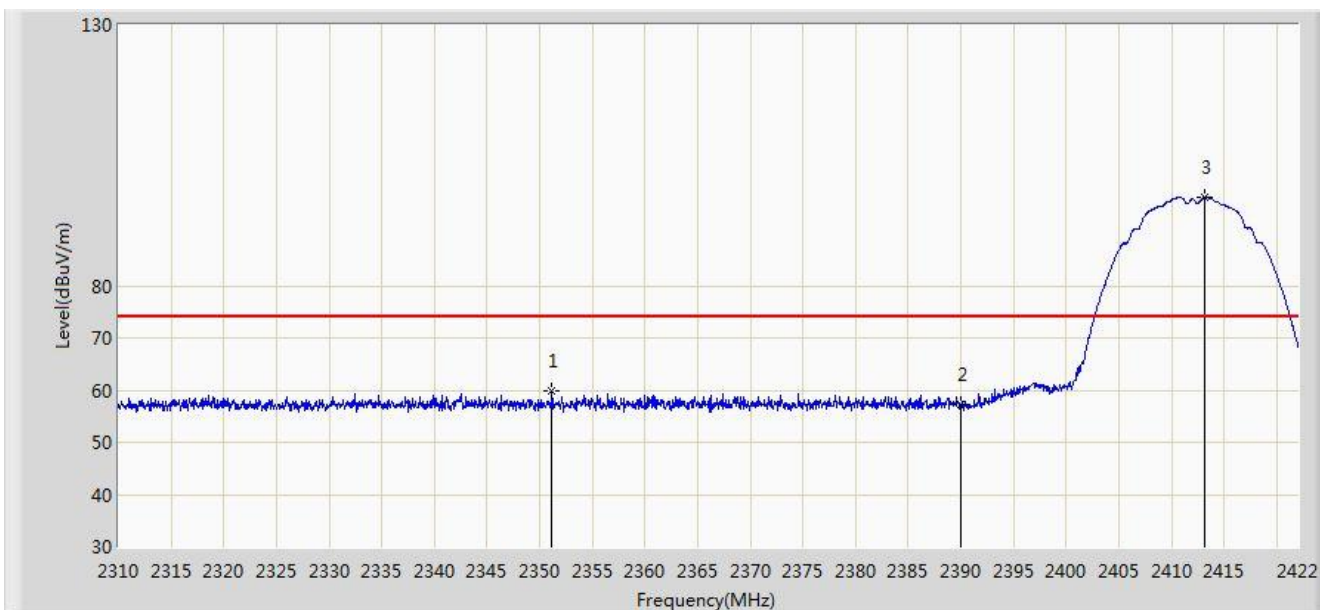


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	39.335	7.008	-14.665	54.000	32.327	AV
2		*	2411.248	93.405	61.120	N/A	N/A	32.285	AV

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

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

Site: AC1	Time: 2018/12/14 - 21:52
Limit: FCC_Part15.209_RE(3m)	Engineer: Cloud Guo
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Dual band wifi module	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11b at Channel 2412MHz	

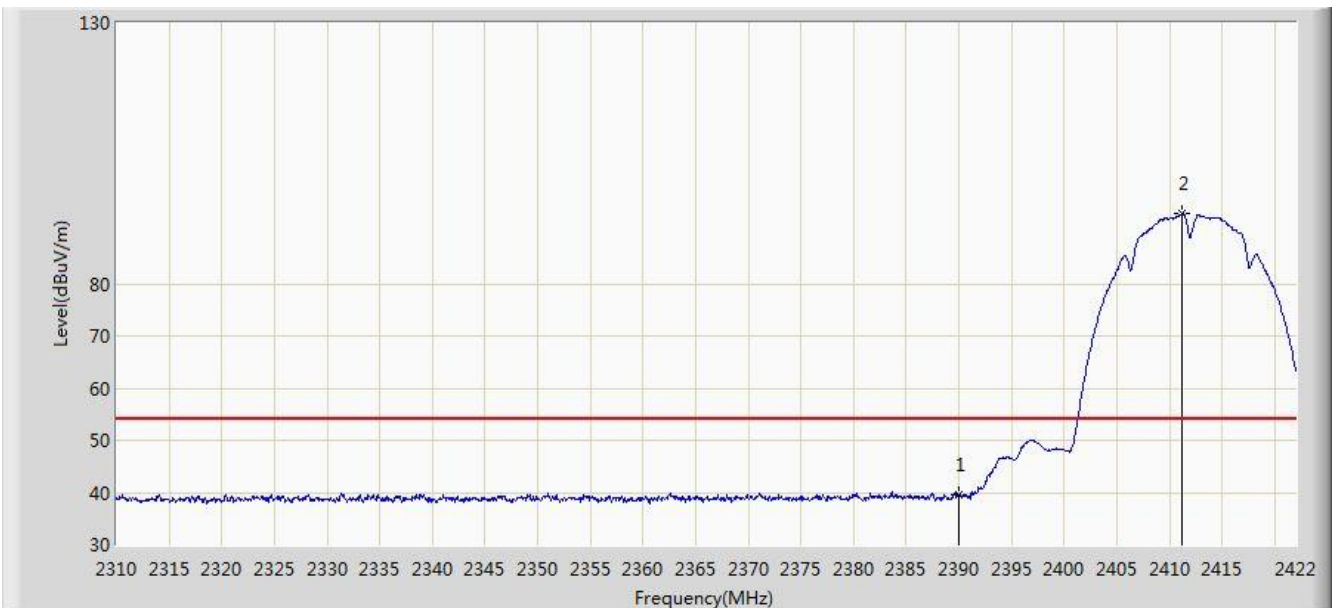


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2351.160	59.753	27.356	-14.247	74.000	32.397	PK
2			2390.000	57.179	24.852	-16.821	74.000	32.327	PK
3		*	2413.152	96.914	64.630	N/A	N/A	32.284	PK

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

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

Site: AC1	Time: 2018/12/14 - 21:55
Limit: FCC_Part15.209_RE(3m)	Engineer: Cloud Guo
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Dual band wifi module	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11b at Channel 2412MHz	

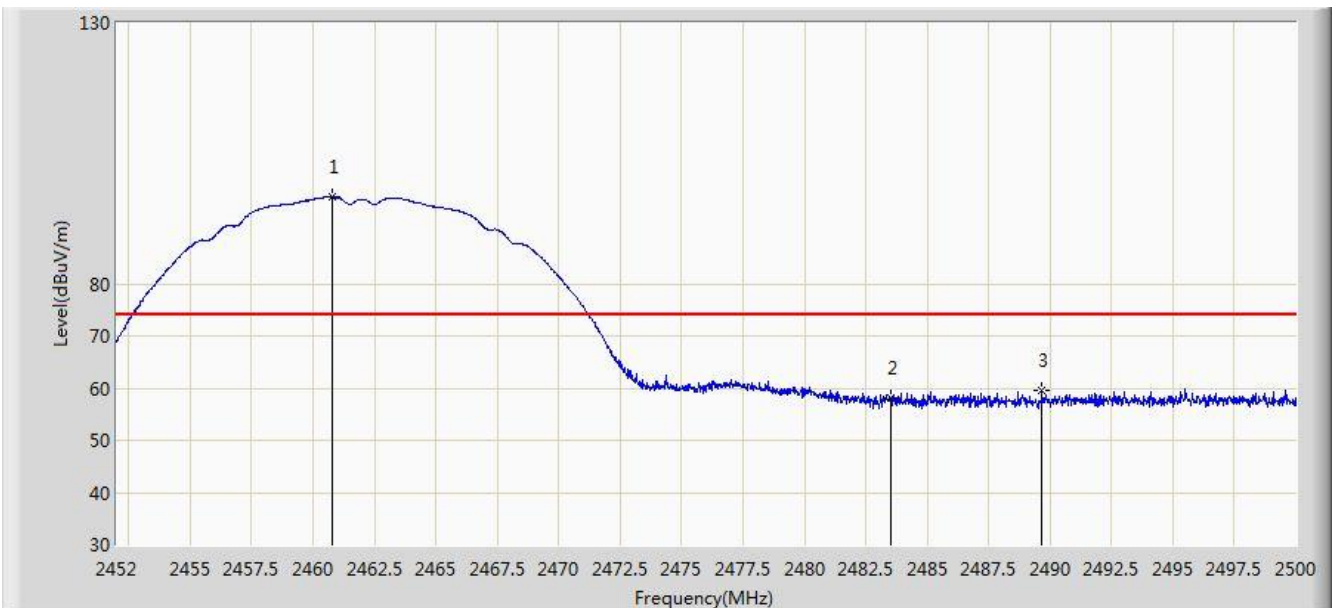


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	39.595	7.268	-14.405	54.000	32.327	AV
2		*	2411.192	93.363	61.078	N/A	N/A	32.285	AV

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

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

Site: AC1	Time: 2018/12/14 - 21:56
Limit: FCC_Part15.209_RE(3m)	Engineer: Cloud Guo
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Dual band wifi module	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11b at Channel 2462MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2460.784	96.624	64.346	N/A	N/A	32.278	PK
2			2483.500	58.007	25.668	-15.993	74.000	32.340	PK
3			2489.680	59.536	27.173	-14.464	74.000	32.364	PK

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

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

Site: AC1	Time: 2018/12/14 - 21:58
Limit: FCC_Part15.209_RE(3m)	Engineer: Cloud Guo
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Dual band wifi module	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11b at Channel 2462MHz	

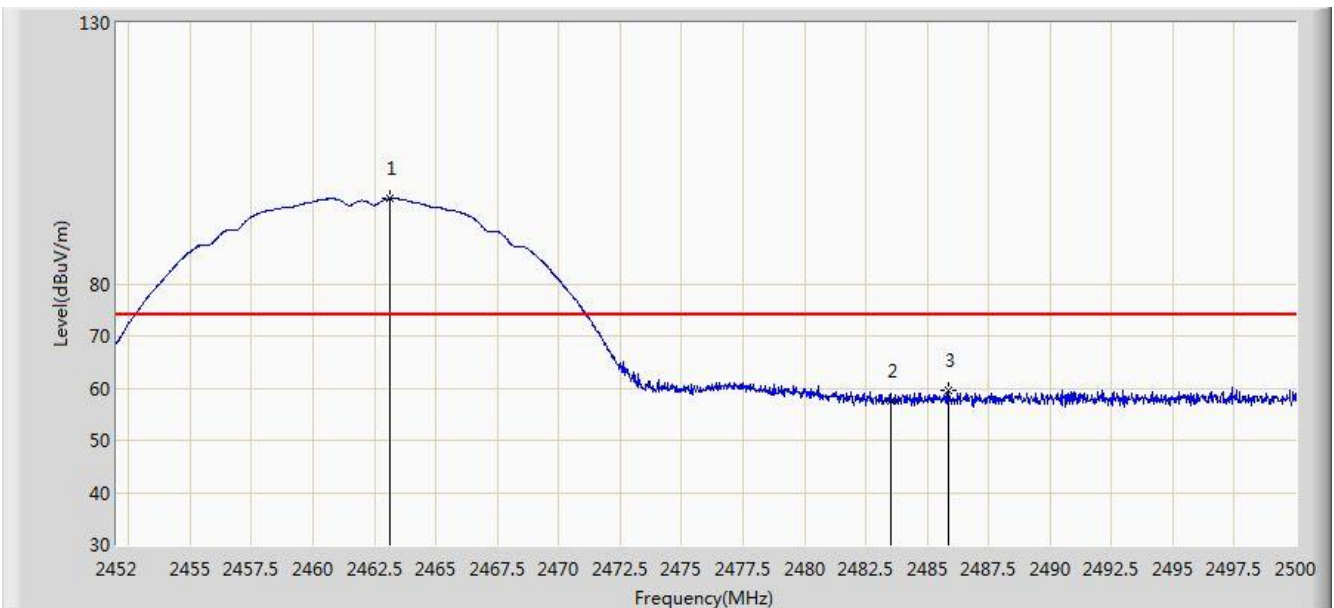


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2461.240	92.965	60.686	N/A	N/A	32.279	AV
2			2483.500	40.136	7.797	-13.864	54.000	32.340	AV

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

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

Site: AC1	Time: 2018/12/14 - 22:02
Limit: FCC_Part15.209_RE(3m)	Engineer: Cloud Guo
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Dual band wifi module	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11b at Channel 2462MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2463.112	96.292	64.010	N/A	N/A	32.282	PK
2			2483.500	57.644	25.305	-16.356	74.000	32.340	PK
3			2485.888	59.629	27.280	-14.371	74.000	32.349	PK

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

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

Site: AC1	Time: 2018/12/14 - 22:00
Limit: FCC_Part15.209_RE(3m)	Engineer: Cloud Guo
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Dual band wifi module	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11b at Channel 2462MHz	

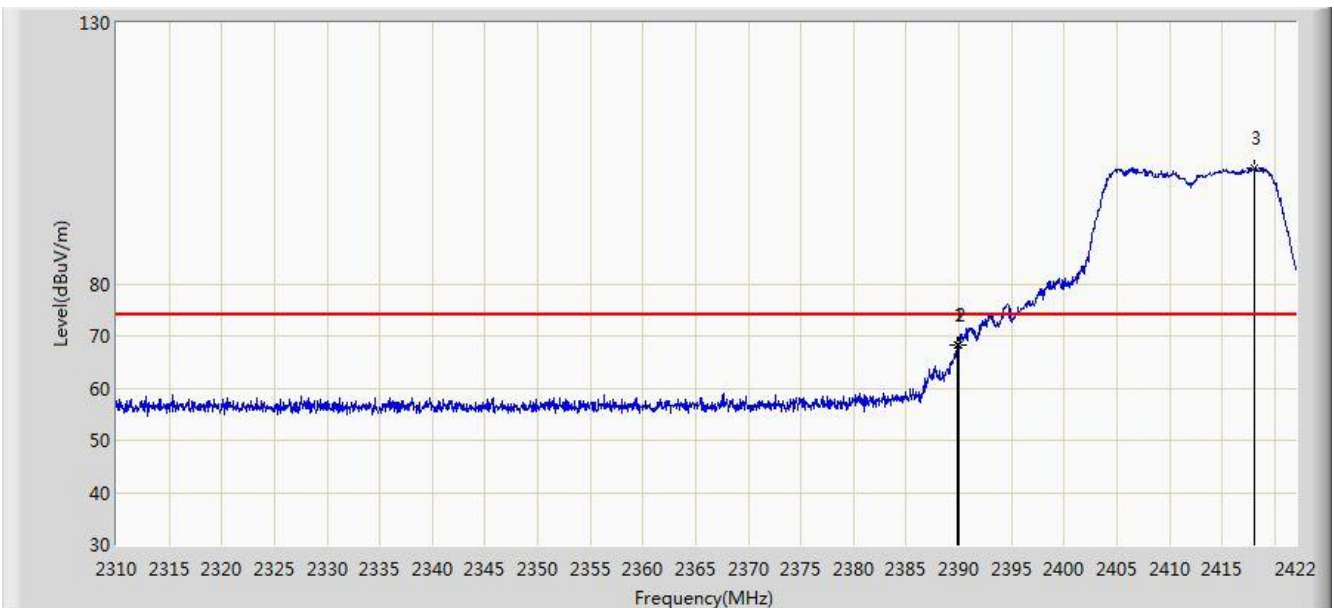


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2461.312	92.696	60.417	N/A	N/A	32.279	AV
2			2483.500	39.688	7.349	-14.312	54.000	32.340	AV

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

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

Site: AC1	Time: 2018/12/16 - 10:32
Limit: FCC_Part15.209_RE(3m)	Engineer: Cloud Guo
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Dual band wifi module	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11g at Channel 2412MHz	

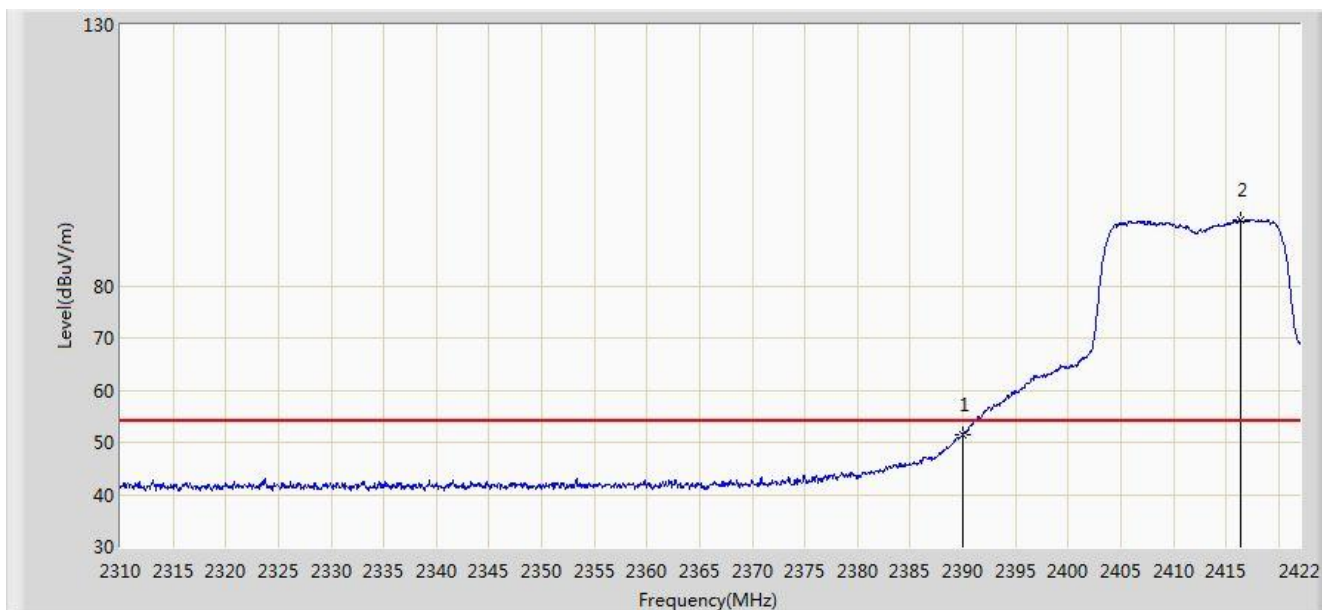


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2389.912	68.338	36.011	-5.662	74.000	32.327	PK
2			2390.000	68.182	35.855	-5.818	74.000	32.327	PK
3		*	2418.024	102.208	69.926	N/A	N/A	32.283	PK

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

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

Site: AC1	Time: 2018/12/16 - 14:11
Limit: FCC_Part15.209_RE(3m)	Engineer: Cloud Guo
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Dual band wifi module	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11g at Channel 2412MHz	

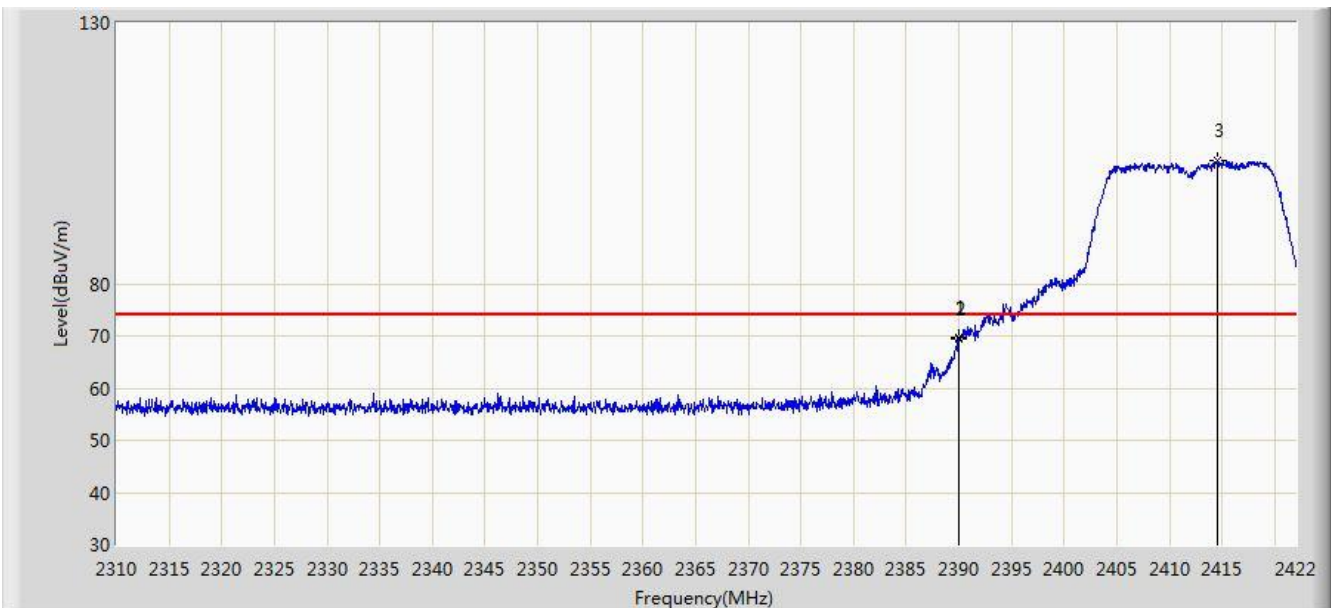


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	51.460	19.133	-2.540	54.000	32.327	AV
2		*	2416.344	92.673	60.390	N/A	N/A	32.283	AV

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

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

Site: AC1	Time: 2018/12/16 - 14:12
Limit: FCC_Part15.209_RE(3m)	Engineer: Cloud Guo
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Dual band wifi module	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11g at Channel 2412MHz	

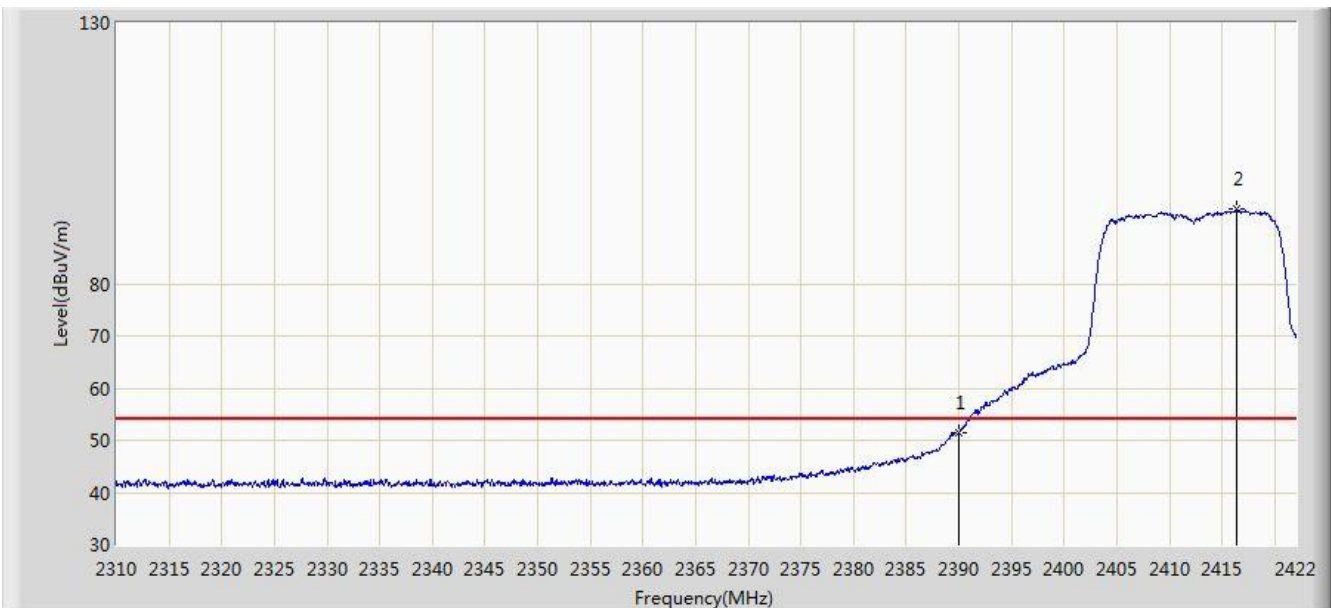


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2389.968	69.825	37.498	-4.175	74.000	32.327	PK
2			2390.000	69.462	37.135	-4.538	74.000	32.327	PK
3		*	2414.552	103.502	71.218	N/A	N/A	32.284	PK

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

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

Site: AC1	Time: 2018/12/16 - 14:14
Limit: FCC_Part15.209_RE(3m)	Engineer: Cloud Guo
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Dual band wifi module	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11g at Channel 2412MHz	

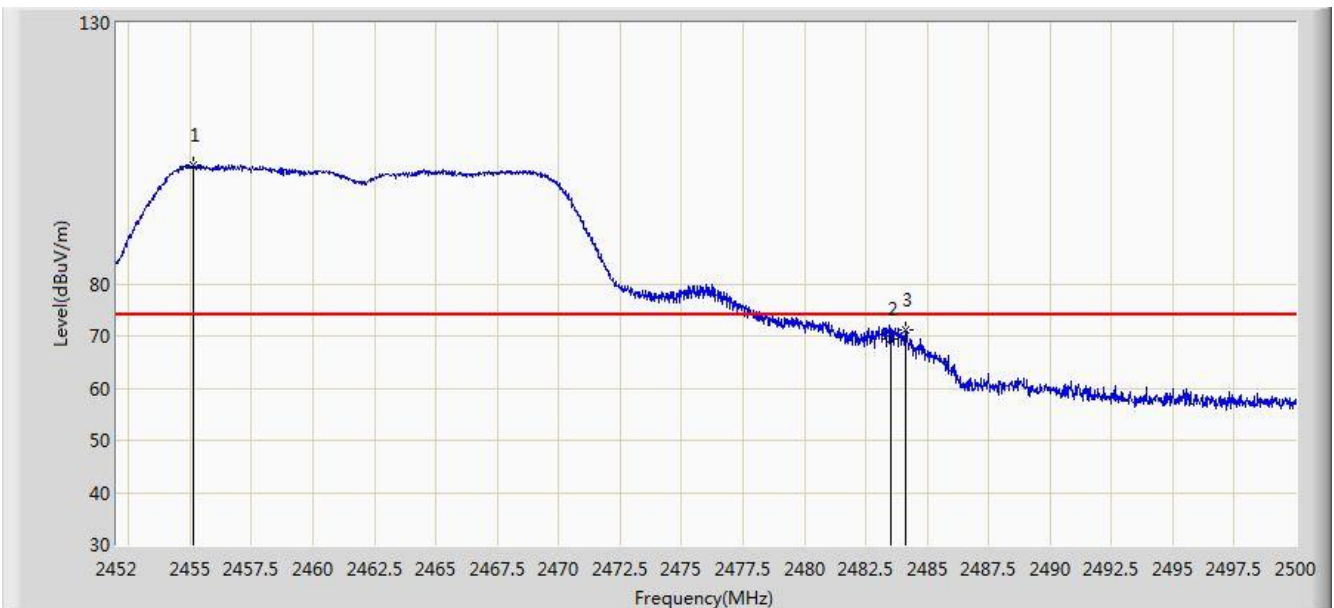


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	51.385	19.058	-2.615	54.000	32.327	AV
2		*	2416.344	94.226	61.943	N/A	N/A	32.283	AV

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

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

Site: AC1	Time: 2018/12/16 - 14:21
Limit: FCC_Part15.209_RE(3m)	Engineer: Cloud Guo
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Dual band wifi module	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11g at Channel 2462MHz	

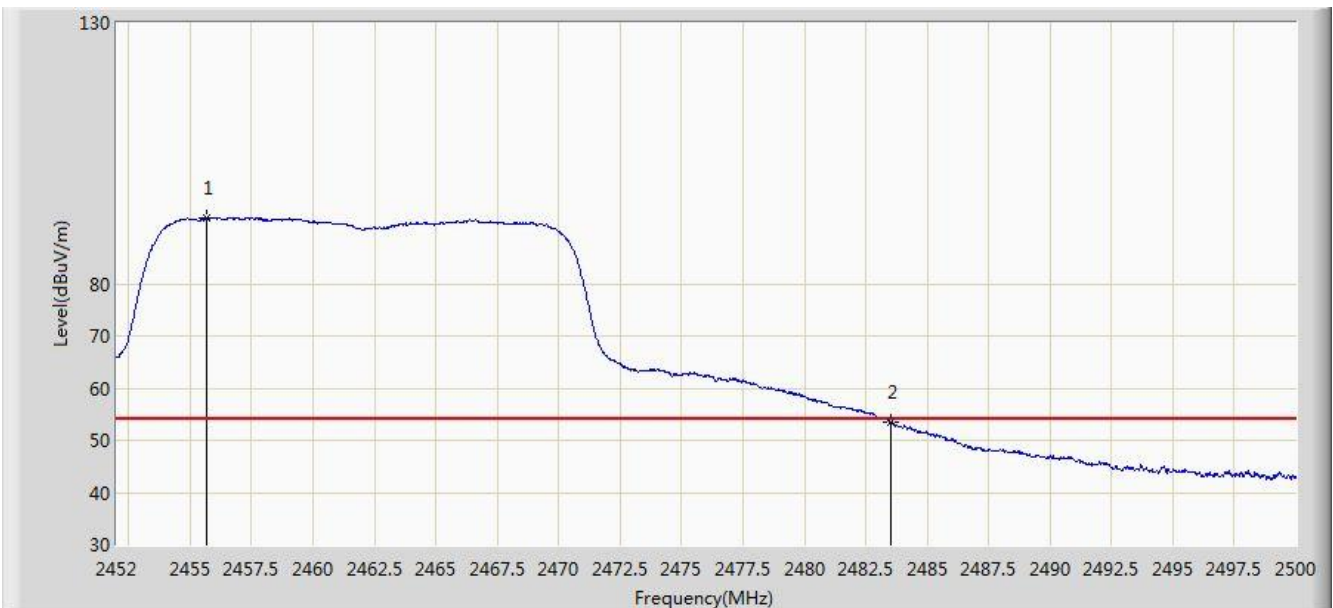


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2455.144	102.616	70.349	N/A	N/A	32.266	PK
2			2483.500	69.347	37.008	-4.653	74.000	32.340	PK
3			2484.136	71.205	38.863	-2.795	74.000	32.342	PK

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

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

Site: AC1	Time: 2018/12/16 - 14:19
Limit: FCC_Part15.209_RE(3m)	Engineer: Cloud Guo
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Dual band wifi module	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11g at Channel 2462MHz	

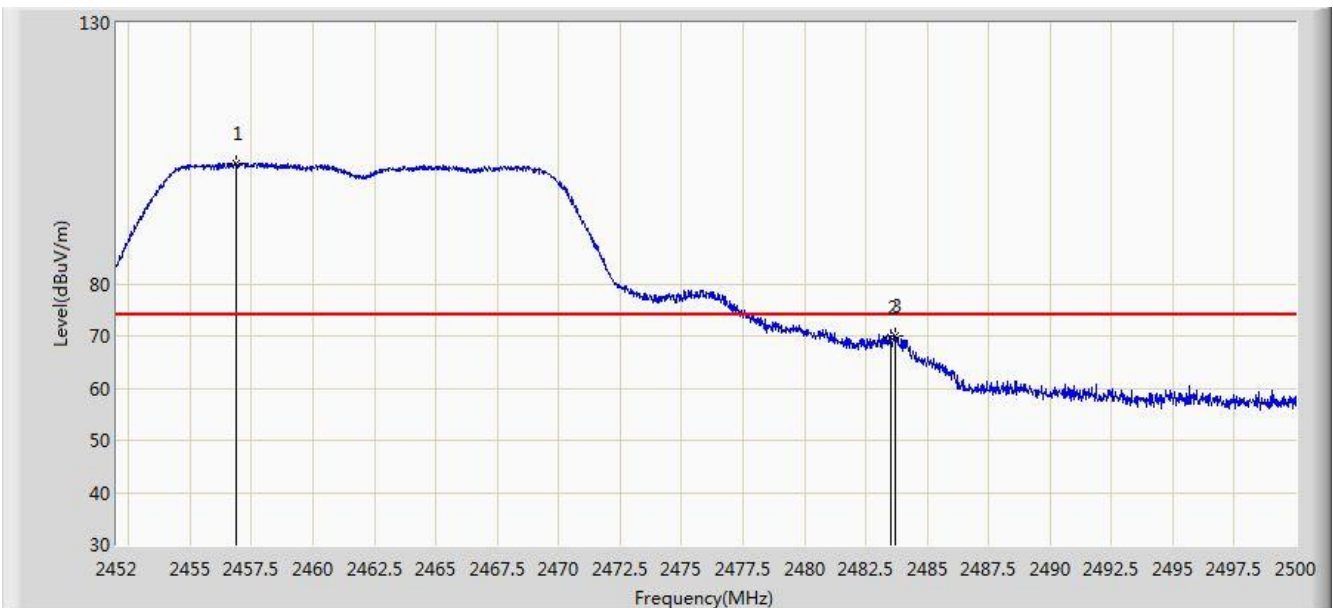


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2455.696	92.607	60.339	N/A	N/A	32.268	AV
2			2483.500	53.569	21.230	-0.431	54.000	32.340	AV

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

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

Site: AC1	Time: 2018/12/16 - 14:22
Limit: FCC_Part15.209_RE(3m)	Engineer: Cloud Guo
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Dual band wifi module	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11g at Channel 2462MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2456.848	103.146	70.876	N/A	N/A	32.270	PK
2			2483.500	69.644	37.305	-4.356	74.000	32.340	PK
3			2483.728	69.979	37.639	-4.021	74.000	32.340	PK

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

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

Site: AC1	Time: 2018/12/16 - 14:24
Limit: FCC_Part15.209_RE(3m)	Engineer: Cloud Guo
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Dual band wifi module	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11g at Channel 2462MHz	

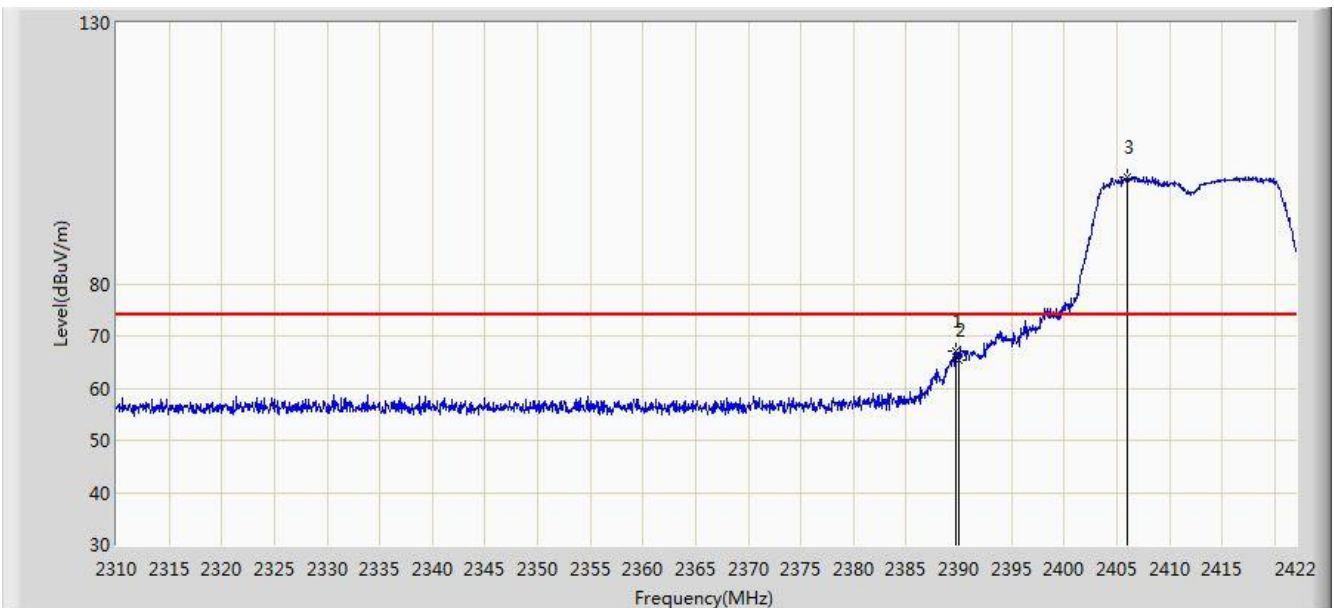


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2456.704	93.200	60.930	N/A	N/A	32.270	AV
2			2483.500	52.529	20.190	-1.471	54.000	32.340	AV

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

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

Site: AC1	Time: 2018/12/16 - 14:25
Limit: FCC_Part15.209_RE(3m)	Engineer: Cloud Guo
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Dual band wifi module	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11n-HT20 at Channel 2412MHz	

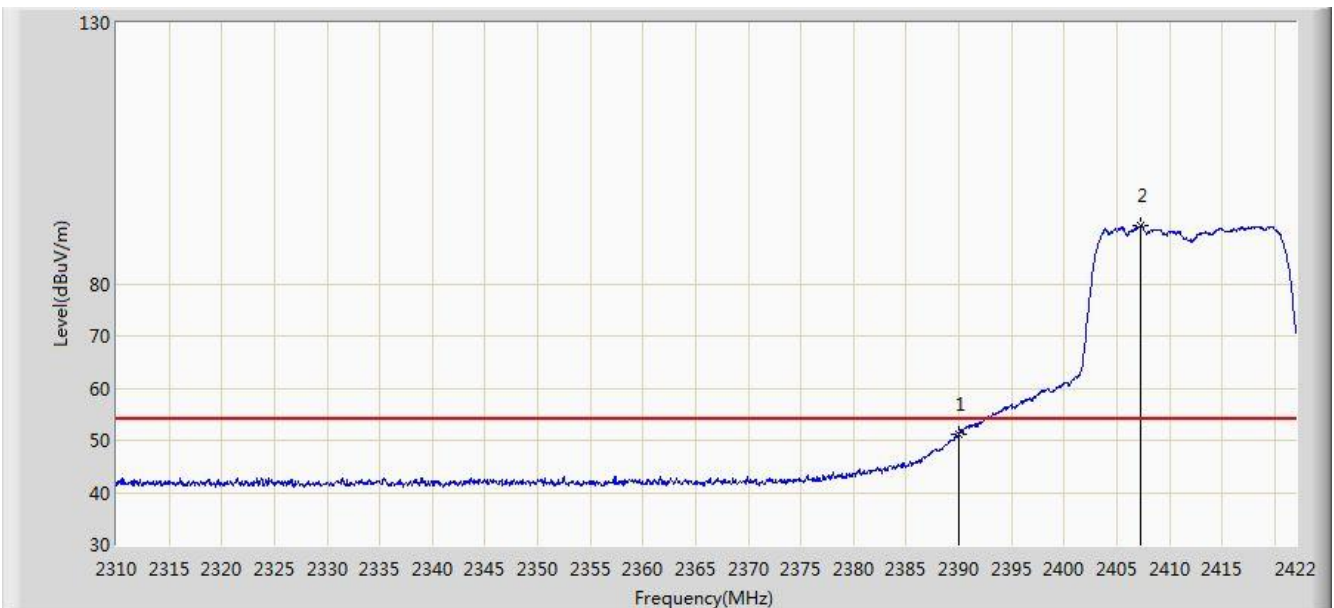


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2389.688	67.222	34.895	-6.778	74.000	32.328	PK
2			2390.000	65.443	33.116	-8.557	74.000	32.327	PK
3		*	2405.984	100.370	68.074	N/A	N/A	32.296	PK

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

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

Site: AC1	Time: 2018/12/16 - 14:27
Limit: FCC_Part15.209_RE(3m)	Engineer: Cloud Guo
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Dual band wifi module	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11n-HT20 at Channel 2412MHz	

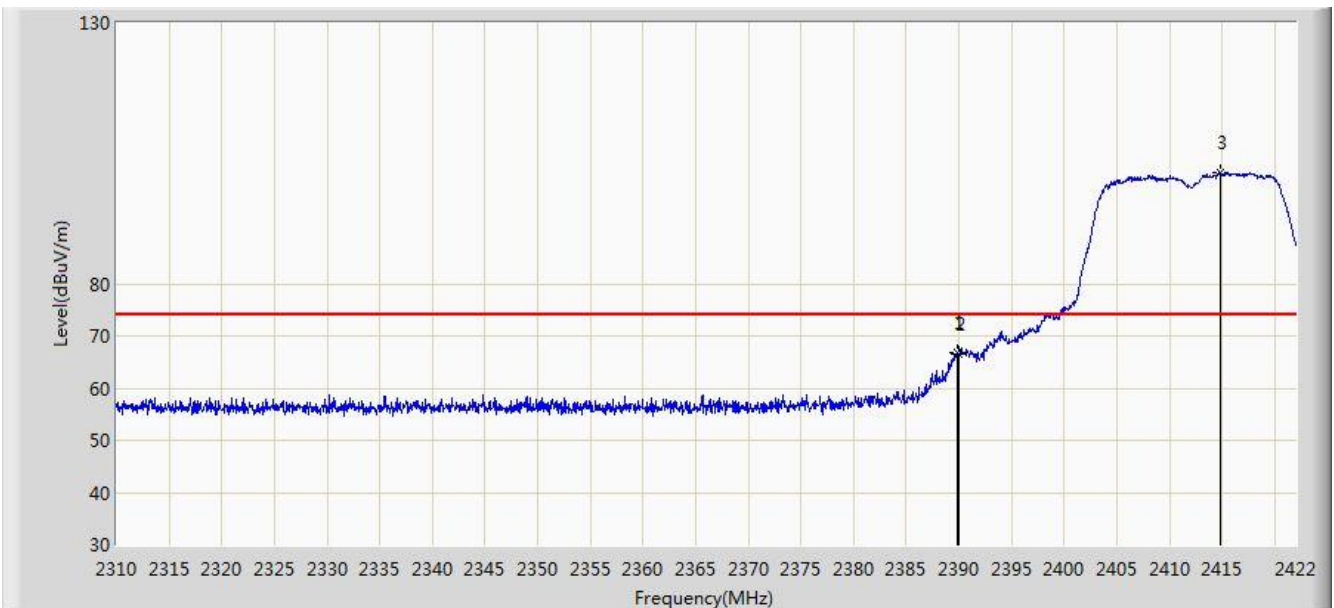


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	51.230	18.903	-2.770	54.000	32.327	AV
2		*	2407.216	91.034	58.741	N/A	N/A	32.294	AV

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

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

Site: AC1	Time: 2018/12/16 - 14:28
Limit: FCC_Part15.209_RE(3m)	Engineer: Cloud Guo
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Dual band wifi module	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11n-HT20 at Channel 2412MHz	

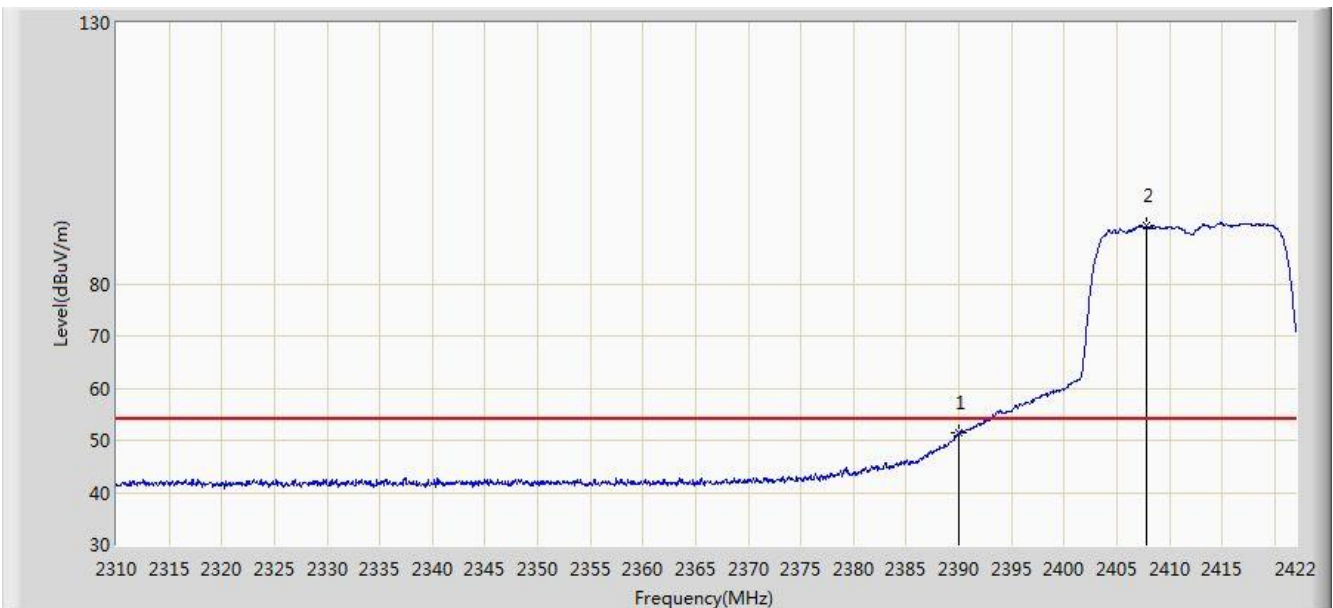


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2389.912	66.700	34.373	-7.300	74.000	32.327	PK
2			2390.000	66.518	34.191	-7.482	74.000	32.327	PK
3		*	2414.832	101.282	68.998	N/A	N/A	32.283	PK

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

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

Site: AC1	Time: 2018/12/16 - 14:29
Limit: FCC_Part15.209_RE(3m)	Engineer: Cloud Guo
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Dual band wifi module	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11n-HT20 at Channel 2412MHz	

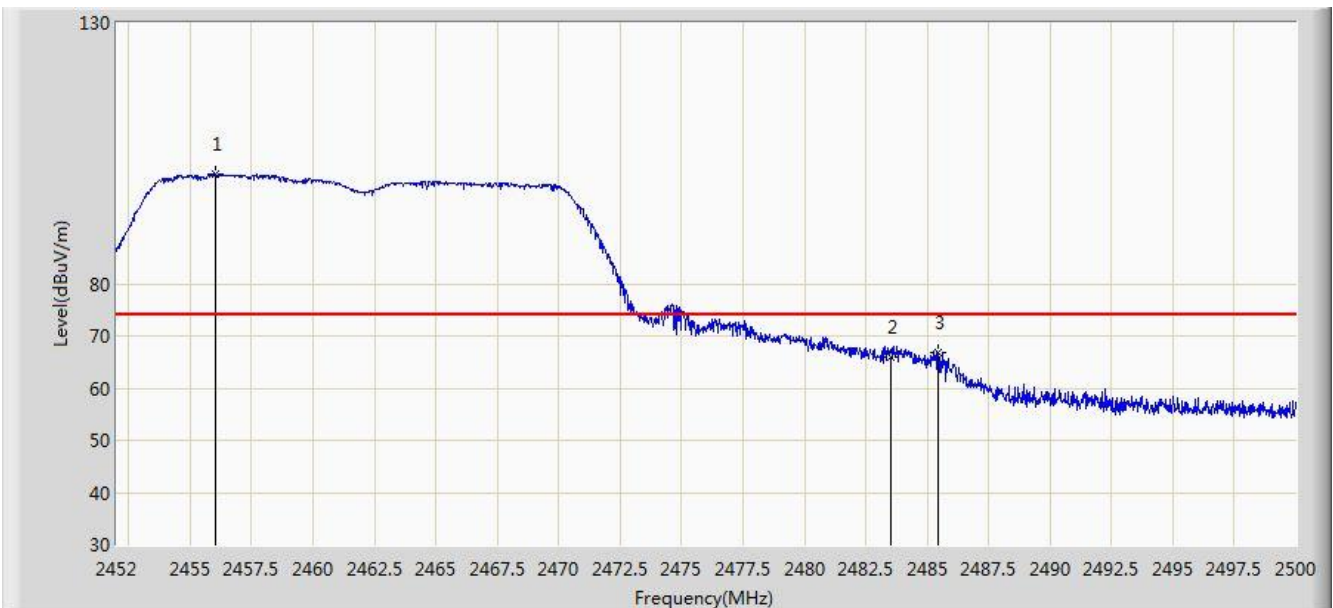


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	51.450	19.123	-2.550	54.000	32.327	AV
2		*	2407.888	91.040	58.748	N/A	N/A	32.292	AV

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

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

Site: AC1	Time: 2018/12/16 - 14:38
Limit: FCC_Part15.209_RE(3m)	Engineer: Cloud Guo
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Dual band wifi module	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11n-HT20 at Channel 2462MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2456.032	100.966	68.698	N/A	N/A	32.268	PK
2			2483.500	66.040	33.701	-7.960	74.000	32.340	PK
3			2485.432	66.821	34.474	-7.179	74.000	32.347	PK

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

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

Site: AC1	Time: 2018/12/16 - 14:37
Limit: FCC_Part15.209_RE(3m)	Engineer: Cloud Guo
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Dual band wifi module	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11n-HT20 at Channel 2462MHz	

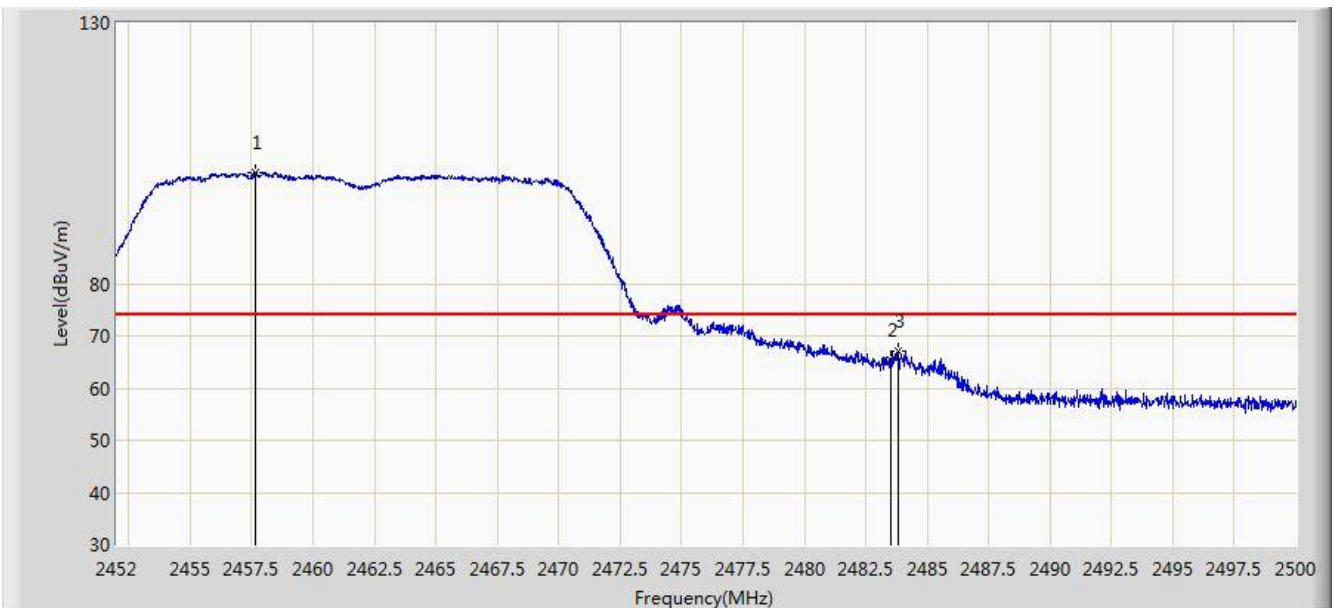


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2457.040	91.384	59.114	N/A	N/A	32.270	AV
2			2483.500	53.151	20.812	-0.849	54.000	32.340	AV

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

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

Site: AC1	Time: 2018/12/16 - 14:39
Limit: FCC_Part15.209_RE(3m)	Engineer: Cloud Guo
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Dual band wifi module	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11n-HT20 at Channel 2462MHz	

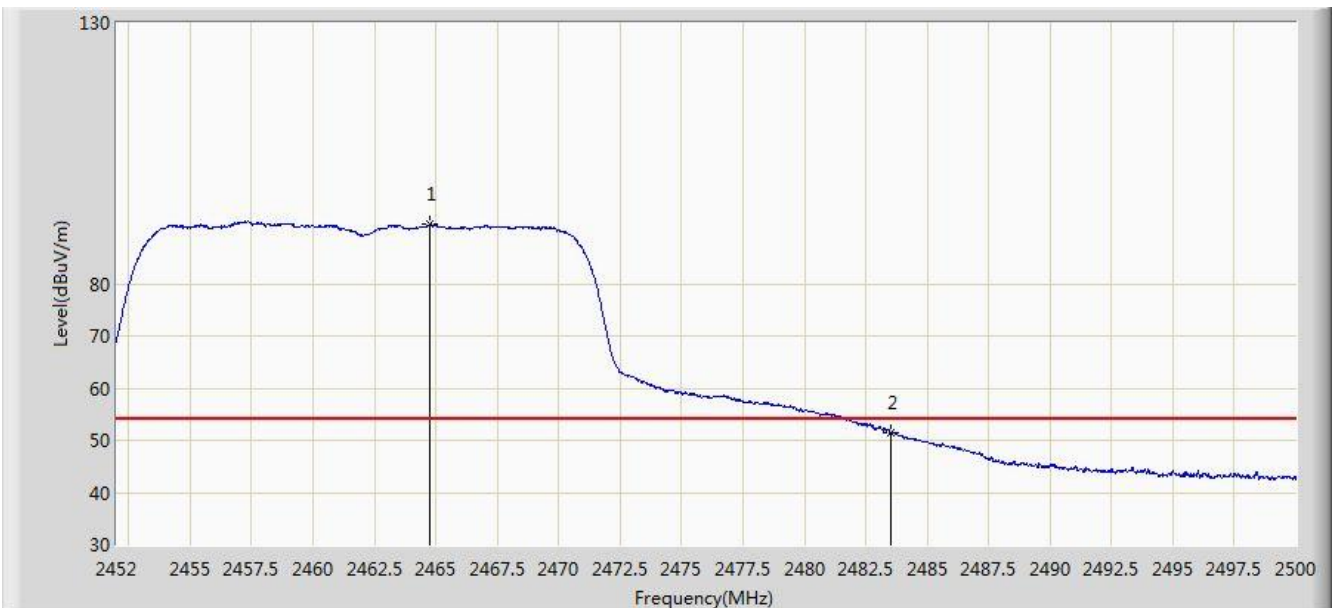


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2457.640	101.282	69.010	N/A	N/A	32.271	PK
2			2483.500	65.222	32.883	-8.778	74.000	32.340	PK
3			2483.800	67.128	34.788	-6.872	74.000	32.340	PK

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

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

Site: AC1	Time: 2018/12/16 - 14:41
Limit: FCC_Part15.209_RE(3m)	Engineer: Cloud Guo
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Dual band wifi module	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11n-HT20 at Channel 2462MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2464.768	91.337	59.051	N/A	N/A	32.286	AV
2			2483.500	51.484	19.145	-2.516	54.000	32.340	AV

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

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

6.8. AC Conducted Emissions Measurement

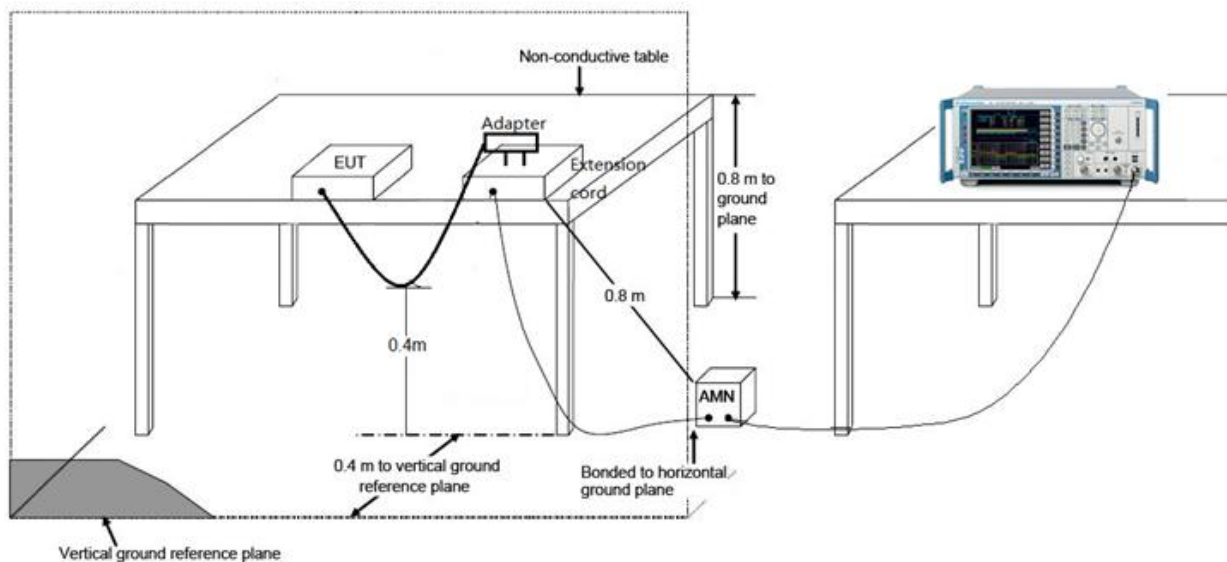
6.8.1. Test Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
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.

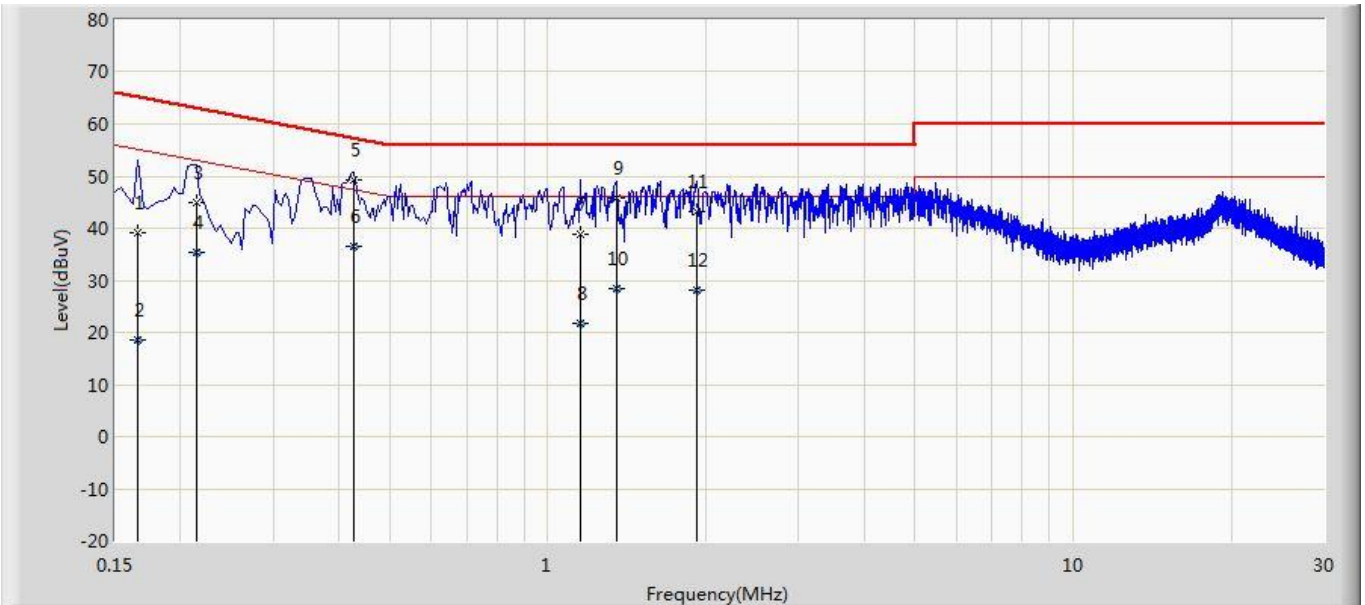
Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

6.8.2. Test Setup



6.8.3.Test Result

Site: SR2	Time: 2018/11/20 - 14:44
Limit: FCC_Part15.207_CE_AC Power_ClassB	Engineer: Cloud Guo
Probe: ENV216_101683_Filter On	Polarity: Line
EUT: Dual band wifi module	Power: AC 120V/60Hz
Test Mode 1	

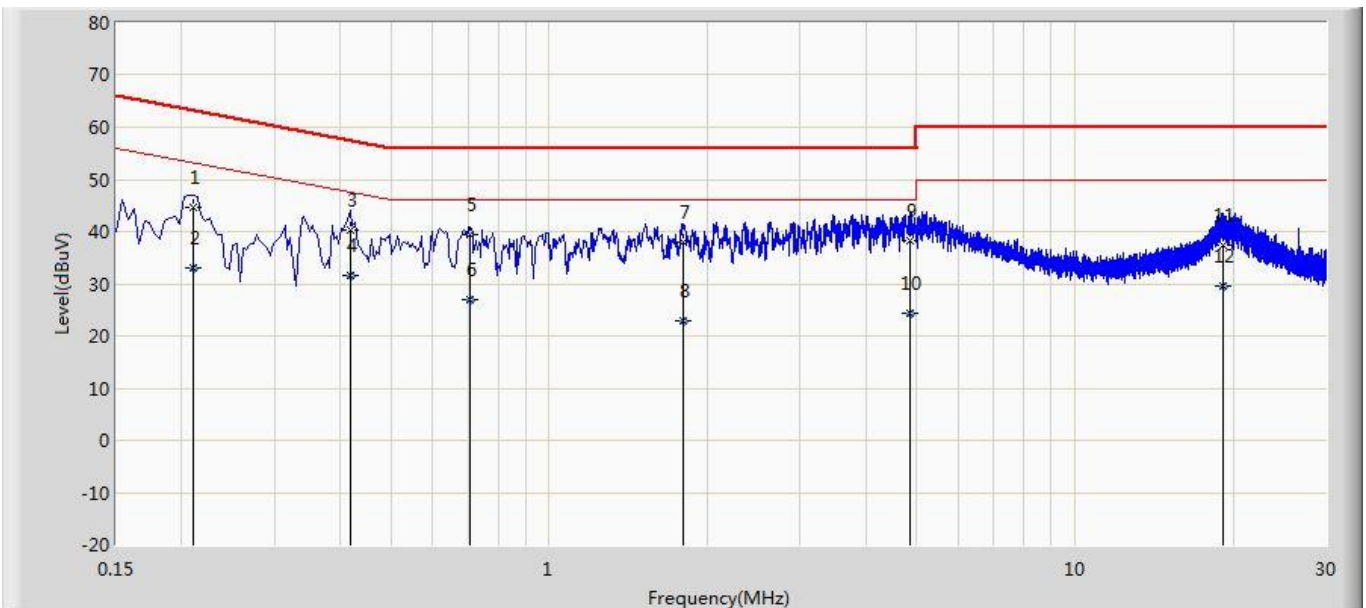


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1			0.166	39.195	29.107	-25.963	65.158	10.087	QP
2			0.166	18.446	8.359	-36.712	55.158	10.087	AV
3			0.214	44.969	35.013	-18.079	63.049	9.957	QP
4			0.214	35.402	25.445	-17.646	53.049	9.957	AV
5			0.426	49.148	39.041	-8.183	57.330	10.107	QP
6		*	0.426	36.552	26.446	-10.778	47.330	10.107	AV
7			1.150	38.845	28.941	-17.155	56.000	9.904	QP
8			1.150	21.663	11.759	-24.337	46.000	9.904	AV
9			1.354	45.767	35.872	-10.233	56.000	9.895	QP
10			1.354	28.266	18.370	-17.734	46.000	9.895	AV
11			1.926	43.195	33.321	-12.805	56.000	9.874	QP
12			1.926	28.130	18.256	-17.870	46.000	9.874	AV

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

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

Site: SR2	Time: 2018/11/20 - 14:53
Limit: FCC_Part15.207_CE_AC Power_ClassB	Engineer: Cloud Guo
Probe: ENV216_101683_Filter On	Polarity: Neutral
EUT: Dual band wifi module	Power: AC 120V/60Hz
Test Mode 1	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1			0.210	44.554	34.559	-18.652	63.205	9.995	QP
2			0.210	32.947	22.953	-20.258	53.205	9.995	AV
3			0.418	40.329	30.204	-17.158	57.488	10.126	QP
4			0.418	31.522	21.396	-15.966	47.488	10.126	AV
5			0.706	39.429	29.357	-16.571	56.000	10.071	QP
6		*	0.706	26.917	16.845	-19.083	46.000	10.071	AV
7			1.798	37.832	27.951	-18.168	56.000	9.880	QP
8			1.798	22.920	13.040	-23.080	46.000	9.880	AV
9			4.866	38.138	28.103	-17.862	56.000	10.035	QP
10			4.866	24.430	14.395	-21.570	46.000	10.035	AV
11			19.074	37.490	27.347	-22.510	60.000	10.143	QP
12			19.074	29.672	19.528	-20.328	50.000	10.143	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 **Dual band wifi module** is in compliance with Part 15C of the FCC Rules.

The End

Appendix A – Test Setup Photograph

Refer to “1811WSU012-UT” file.

Appendix B – EUT Photograph

Refer to “1811WSU012-UE” file.