



MEASUREMENT REPORT

FCC PART 15.247 WLAN 802.11b/g/n

FCC ID: 2AFNB-WF-06C05R

APPLICANT: Shanghai Wavebomb Electronic Science & Technology Co., Ltd

Product: Whome Smart bulb speakers

Model No.: WF-06W05W, WF-08C10C, WF-06C05R, WF-06C05S, WF-06W05B

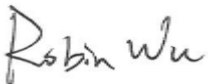
Brand Name: Whome


FCC Classification: Digital Transmission System (DTS)

FCC Rule Part(s): Part 15.247

Test Procedure(s): ANSI C63.10-2009, KDB 558074 D01v03r03

Test Date: Mar. 26 ~ Apr. 22, 2015

Reviewed By : 
(Robin Wu)

Approved By : 
(Marlin Chen)



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 KDB 558074 D01v03r03. 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
1506RSU02201	Rev. 01	Initial report	08-23-2015
1506RSU02201	Rev. 02	Added the FCC ID	08-25-2015

CONTENTS

Description	Page
1. INTRODUCTION	6
1.1. Scope	6
1.2. MRT Test Location	6
2. PRODUCT INFORMATION	7
2.1. Equipment Description.....	7
2.2. Device Capabilities	8
2.3. Test Configuration	8
2.4. EMI Suppression Device(s)/Modifications.....	8
2.5. Labeling Requirements.....	8
2.6. Test Software	错误！未定义书签。
3. DESCRIPTION OF TEST	9
3.1. Evaluation Procedure	9
3.2. AC Line Conducted Emissions	9
3.3. Radiated Emissions	10
4. ANTENNA REQUIREMENTS.....	11
5. TEST EQUIPMENT CALIBRATION DATE	12
6. MEASUREMENT UNCERTAINTY.....	13
7. TEST RESULT	14
7.1. Summary	14
7.2. 6dB Bandwidth Measurement.....	15
7.2.1. Test Limit	15
7.2.2. Test Procedure used.....	15
7.2.3. Test Setting.....	15
7.2.4. Test Setup.....	15
7.2.5. Test Result.....	16
7.3. Output Power Measurement.....	20
7.3.1. Test Limit	20
7.3.2. Test Procedure Used	20
7.3.3. Test Setting.....	20
7.3.4. Test Setup.....	20
7.3.5. Test Result of Output Power	21
7.4. Power Spectral Density Measurement	23
7.4.1. Test Limit	23

7.4.2.	Test Procedure Used	23
7.4.3.	Test Setting	23
7.4.4.	Test Setup.....	23
7.4.5.	Test Result	24
7.5.	Conducted Band Edge and Out-of-Band Emissions.....	28
7.5.1.	Test Limit	28
7.5.2.	Test Procedure Used	28
7.5.3.	Test Setting	28
7.5.4.	Test Setup.....	29
7.5.5.	Test Result	30
7.6.	Radiated Spurious Emission Measurement	38
7.6.1.	Test Limit	38
7.6.2.	Test Procedure Used	38
7.6.3.	Test Setting	38
7.6.4.	Test Setup.....	40
7.6.5.	Test Result	42
7.7.	Radiated Restricted Band Edge Measurement	60
7.7.1.	Test Result	60
7.8.	AC Conducted Emissions Measurement.....	92
7.8.1.	Test Limit	92
7.8.2.	Test Setup.....	92
7.8.3.	Test Result	93
8.	CONCLUSION.....	95

§2.1033 General Information

Applicant:	Shanghai Wavebomb Electronic Science & Technology Co., Ltd
Applicant Address:	Room N208, No.9450, Humin Road, Xuhui District, Shanghai City, China
Manufacturer:	Kunshan Heisei Electronics Co., Ltd
Manufacturer Address:	No.758, Zhenchuan East Rd., Kunshan City, China
Test Site:	MRT Technology (Suzhou) Co., Ltd
Test Site Address:	D8 Building, Youxin Industrial Park, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
MRT Registration No.:	809388
FCC Rule Part(s):	Part 15.247
Model No.:	WF-06W05W, WF-08C10C, WF-06C05R, WF-06C05S, WF-06W05B
FCC ID:	2AFNB-WF-06C05R
Test Device Serial No.:	N/A <input type="checkbox"/> Production <input checked="" type="checkbox"/> Pre-Production <input type="checkbox"/> Engineering
FCC Classification:	Digital Transmission System (DTS)

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. 809388) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules.
- 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-4179, G-814, C-4664, T-2206) 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 and Radio testing for FCC, Industry Canada, EU and TELEC Rules.



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, Youxin Industrial Park, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2009 on September 30, 2013.



2. PRODUCT INFORMATION

2.1. Equipment Description

Product Name	Whome Smart bulb speakers
Model No.	WF-06W05W, WF-08C10C, WF-06C05R, WF-06C05S, WF-06W05B
Frequency Range	802.11b/g/n-HT20: 2412 ~ 2462 MHz n-HT40: 2422 ~ 2452 MHz
Maximum Output Power	802.11b: 12.67dBm; 802.11g: 21.71dBm; 802.11n-HT20: 20.91dBm; 802.11n-HT40: 18.03dBm
Type of Modulation	802.11b: DSSS 802.11g/n: OFDM
Antenna Type	Internal
Antenna Gain	2.0dBi

Note: The difference between different models is color.

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	N/A	N/A

Channel List for 802.11n-HT40

Channel	Frequency	Channel	Frequency	Channel	Frequency
03	2422 MHz	04	2427 MHz	05	2432 MHz
06	2437 MHz	07	2442 MHz	08	2447 MHz
09	2452 MHz	N/A	N/A	N/A	N/A

2.2. Device Capabilities

This device contains the following capabilities:

802.11b/g/n WLAN (DTS)

Note: 2.4GHz WLAN (DTS) operation is possible in 20MHz and 40MHz. 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 per the guidance of Section 6.0 b) of KDB 558074 D01v03r03. 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:

- ☐ 802.11b – 99.4%
- 802.11g – 97.0%
- 802.11n-HT20 – 96.6%
- ☐ 802.11n-HT20 – 96.1%

2.3. Test Configuration

The **Whome Smart bulb speakers** was tested per the guidance of KDB 558074 D01v03r03. ANSI C63.10-2009 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing.

2.4. EMI Suppression Device(s)/Modifications

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

2.5. 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 trade name and 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 C63.10-2009), and the guidance provided in KDB 558074 D01v03r03 were used in the measurement of the **Whome Smart bulb speakers**.

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 were used for final measurements on the same test site. The analyzer is set to CISPR quasi-peak and average detectors with a 9kHz resolution bandwidth for final measurements.

An extension cord was used to connect to a single LISN which powered by EUT. The extension cord was calibrated with LISN, the impedance and insertion loss are compliance with the requirements as stated in ANSI C63.10-2009 at Clause 4.3.

Line conducted emissions test results are shown in Section 7.8.

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 was placed on top of the 0.8 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 BeamWidth of horn antenna, the horn antenna should be always directed to the EUT when rising height.

4. ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:

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

- The antenna of the **Whome Smart bulb speakers** is **permanently attached**.
- There are no provisions for connection to an external antenna.

Conclusion:

The **Whome Smart bulb speakers** unit complies with the requirement of §15.203.

5. TEST EQUIPMENT CALIBRATION DATE

Conducted Emissions

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2015/11/07
Two-Line V-Network	R&S	ENV216	MRTSUE06002	1 year	2015/11/07
Two-Line V-Network	R&S	ENV216	MRTSUE06003	1 year	2015/11/07
Temperature/Humidity Meter	Ouleinuo	N/A	MRTSUE06114	1 year	2015/11/20

Radiated Emission

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	E4447A	MRTSUE06028	1 year	2015/10/09
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2015/11/07
Preamplifier	Agilent	83017A	MRTSUE06020	1 year	2015/12/13
Preamplifier	Schwarzbeck	BBV 9721	MRTSUE06121	1 year	2016/04/15
Loop Antenna	Schwarzbeck	FMZB1519	MRTSUE06025	1 year	2015/11/08
TRILOG Antenna	Schwarzbeck	VULB9162	MRTSUE06022	1 year	2015/11/08
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	MRTSUE06023	1 year	2015/11/08
Broadband Horn Antenna	Schwarzbeck	BBHA9170	MRTSUE06024	1 year	2016/01/05
Temperature/Humidity Meter	Ouleinuo	N/A	MRTSUE06115	1 year	2015/11/20

Conducted Test Equipment

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	E4447A	MRTSUE06028	1 year	2015/10/09
USB Wideband Power Sensor	Boonton	55006	MRTSUE06109	1 year	2015/10/15
Temperature/Humidity Meter	Ouleinuo	N/A	MRTSUE06112	1 year	2015/11/20

Software	Version	Function
e3	V8.3.5	EMI Test Software

6. MEASUREMENT UNCERTAINTY

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

AC Conducted Emission Measurement
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 150kHz~30MHz: 3.46dB
Radiated Emission Measurement
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 9kHz ~ 1GHz: 4.18dB 1GHz ~ 25GHz: 4.76dB

7. TEST RESULT

7.1. Summary

Company Name: Shanghai Wavebomb Electronic Science & Technology Co., Ltd
FCC Classification: Digital Transmission System (DTS)
Data Rate(s) 1Mbps ~ 11Mbps (b); 6Mbps ~ 54Mbps (g);
Tested: 6.5/7.2Mbps ~ 65/72.2Mbps (n-HT20);
13.5/15Mbps ~ 135/150Mbps (n-HT40);

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

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.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables and attenuators.

7.2. 6dB Bandwidth Measurement

7.2.1. Test Limit

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

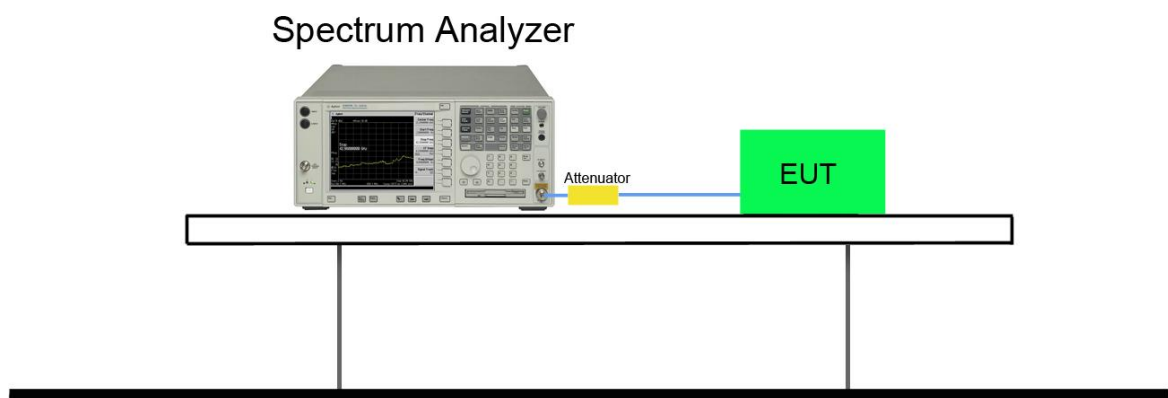
7.2.2. Test Procedure used

KDB 558074 D01v03r03 - Section 8.2 Option 2

7.2.3. Test Setting

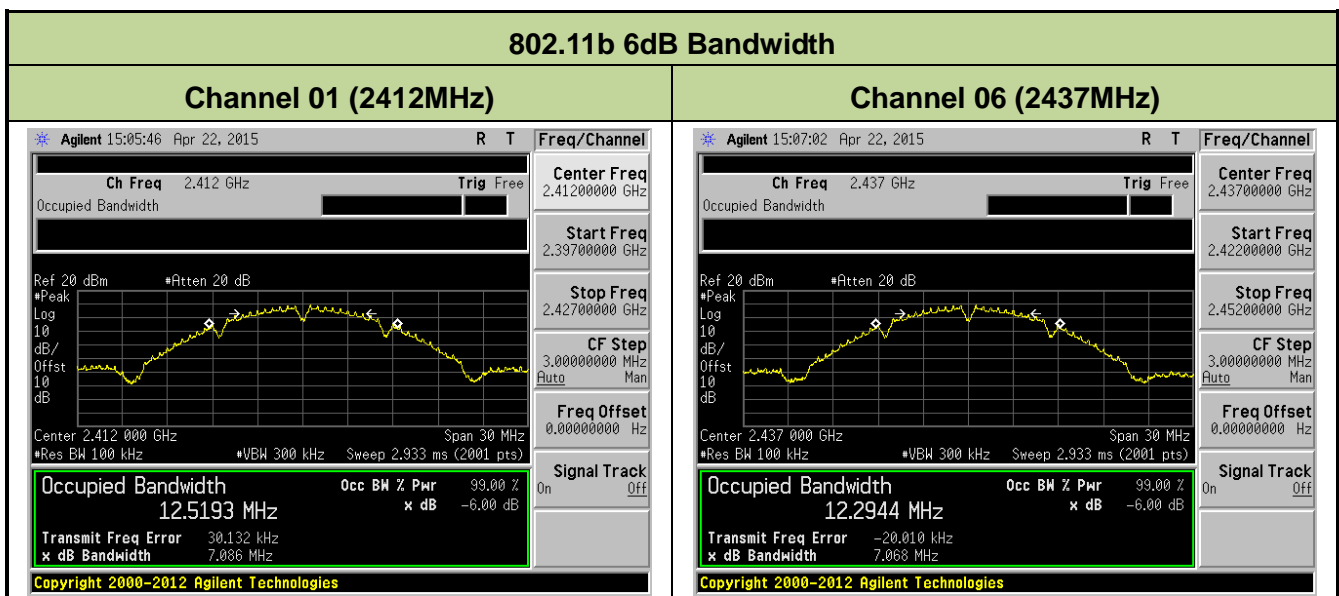
1. The Spectrum's automatic bandwidth measurement capability was used to perform the 6dB bandwidth measurement. The "X" dB bandwidth parameter was set to $X = 6$. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. Set RBW = 100 kHz
3. $VBW \geq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

7.2.4. Test Setup

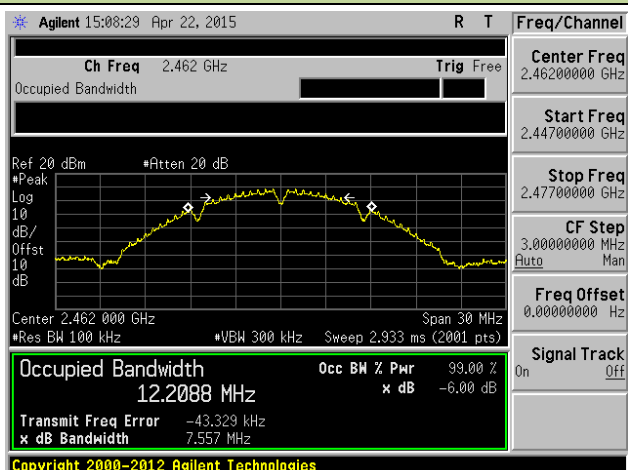


7.2.5. Test Result

Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
802.11b	1	01	2412	7.09	≥ 0.5	Pass
802.11b	1	06	2437	7.07	≥ 0.5	Pass
802.11b	1	11	2462	7.56	≥ 0.5	Pass
802.11g	6	01	2412	16.31	≥ 0.5	Pass
802.11g	6	06	2437	16.35	≥ 0.5	Pass
802.11g	6	11	2462	16.34	≥ 0.5	Pass
802.11n-HT20	6.5	01	2412	17.57	≥ 0.5	Pass
802.11n-HT20	6.5	06	2437	17.58	≥ 0.5	Pass
802.11n-HT20	6.5	11	2462	17.32	≥ 0.5	Pass
802.11n-HT40	13.5	03	2422	35.13	≥ 0.5	Pass
802.11n-HT40	13.5	06	2437	35.13	≥ 0.5	Pass
802.11n-HT40	13.5	09	2452	35.12	≥ 0.5	Pass

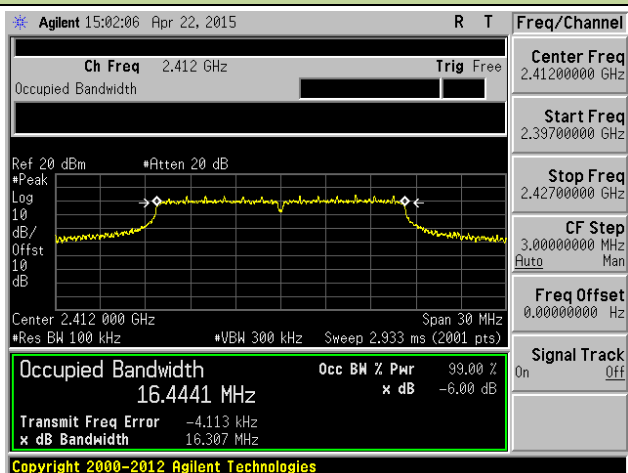


Channel 11 (2462MHz)

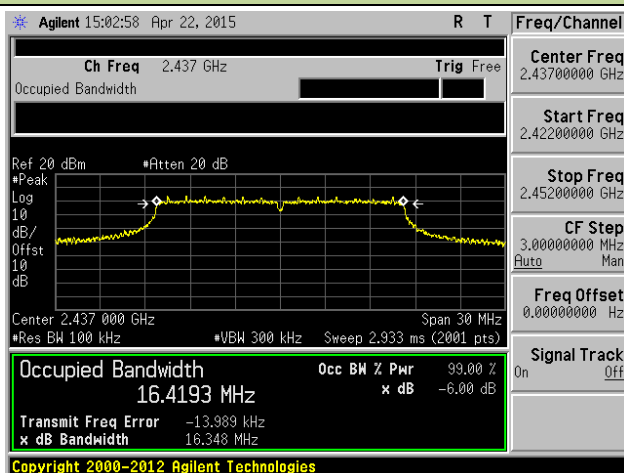


802.11g 6dB Bandwidth

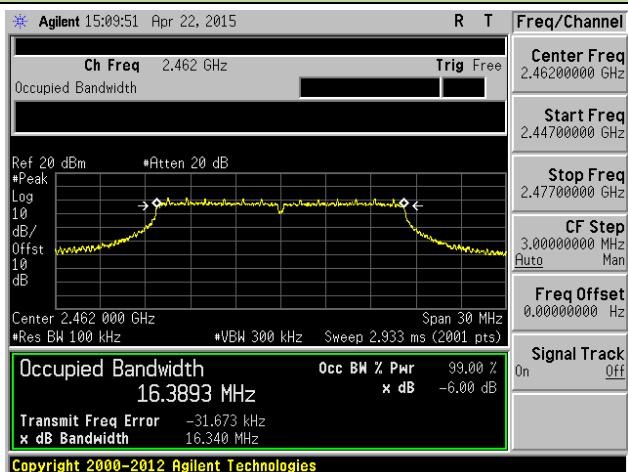
Channel 01 (2412MHz)



Channel 06 (2437MHz)

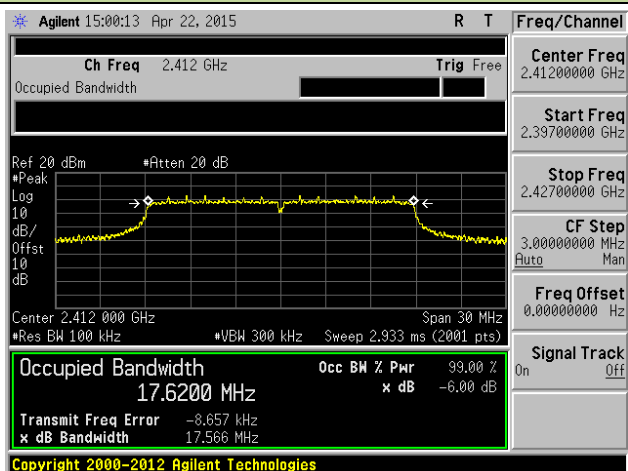


Channel 11 (2462MHz)

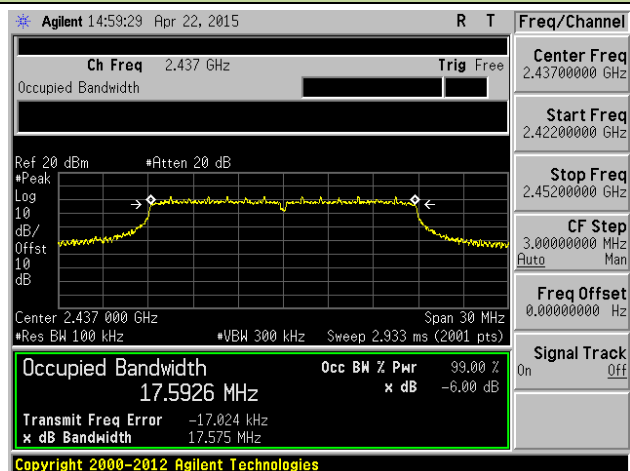


802.11n-HT20 6dB Bandwidth

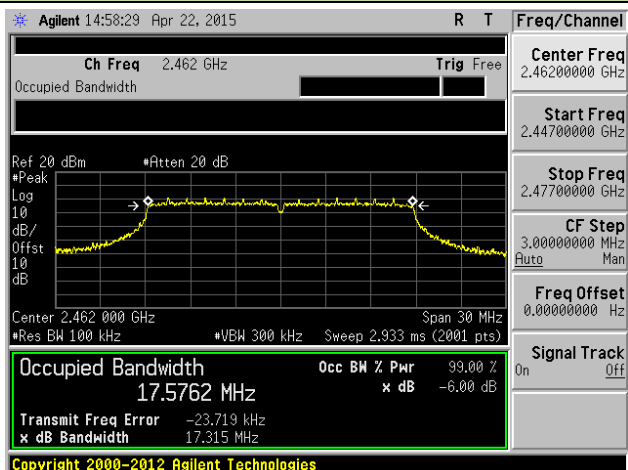
Channel 01 (2412MHz)



Channel 06 (2437MHz)

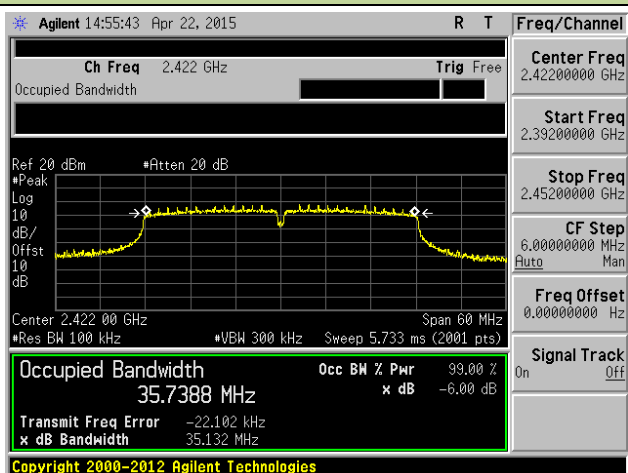


Channel 11 (2462MHz)

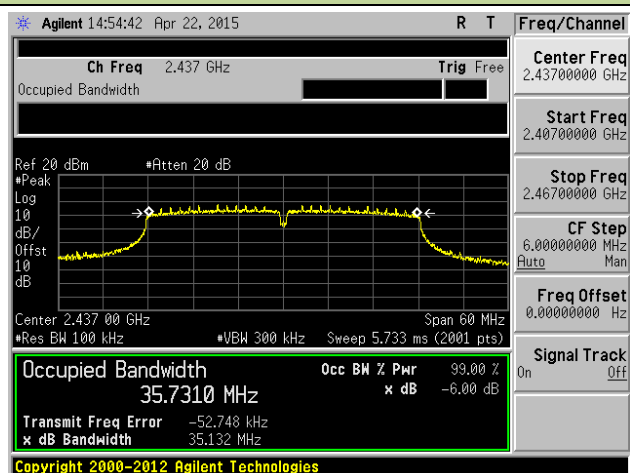


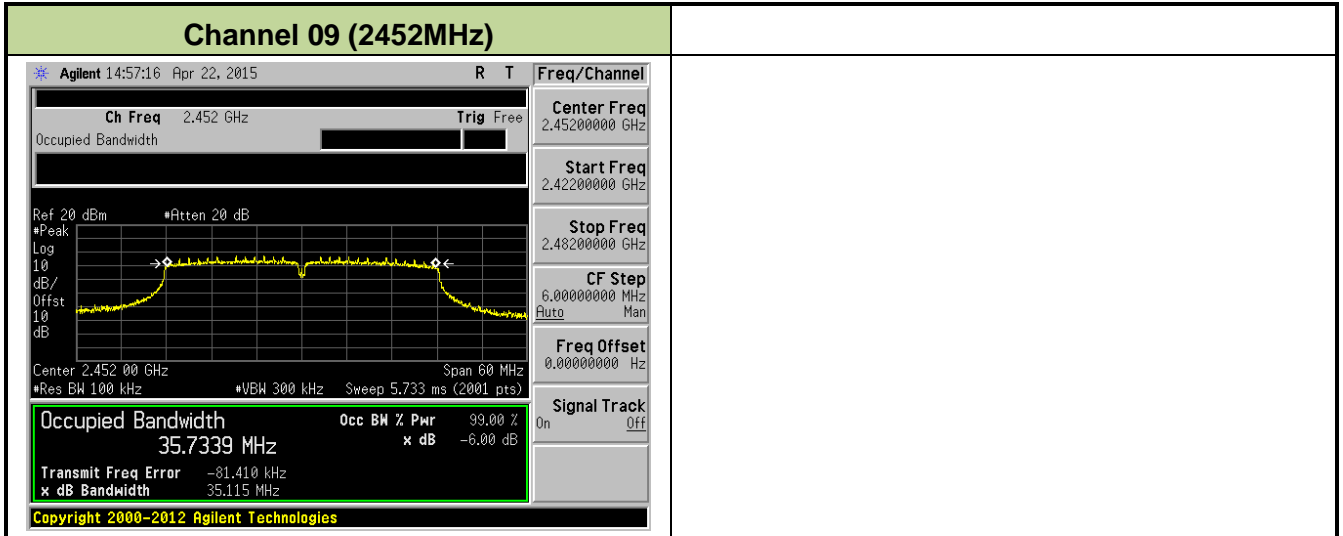
802.11n-HT40 6dB Bandwidth

Channel 03 (2422MHz)



Channel 06 (2437MHz)





7.3. Output Power Measurement

7.3.1. Test Limit

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

7.3.2. Test Procedure Used

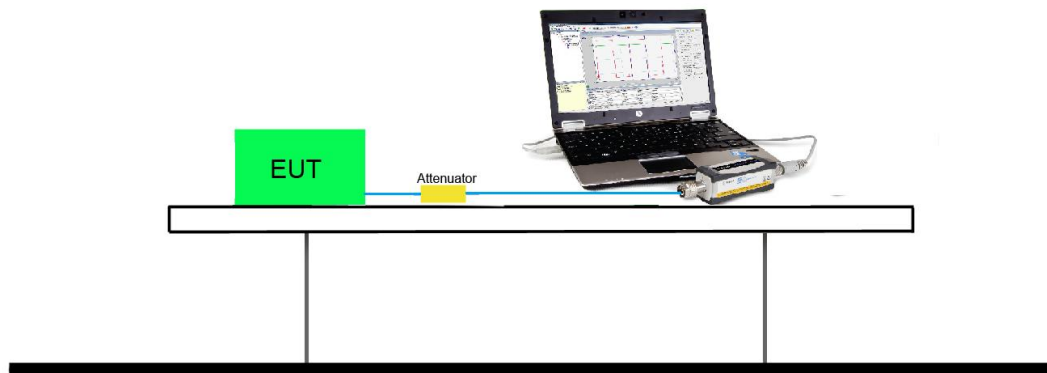
KDB 558074 D01v03r03 - Section 9.1.2 PKPM1 Peak Power Method (for signals with BW \leq 50MHz)

7.3.3. Test Setting

Method PKPM1 (Peak Power Measurement of Signals with DTS BW \leq 50MHz)

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.

7.3.4. Test Setup



7.3.5. Test Result of Output Power

Output power at various data rates:

Test Mode	Bandwidth (MHz)	Channel No.	Frequency (MHz)	Data Rate (Mbps)	Peak Power (dBm)
802.11b	20	06	2437	1	12.51
				5.5	12.20
				11	11.90
802.11g	20	06	2437	6	21.71
				24	21.34
				54	20.96
802.11n	20	06	2437	6.5(MCS0)	20.91
				39(MCS4)	20.64
				65(MCS7)	20.18
802.11n	40	06	2437	13.5(MCS0)	17.67
				81(MCS4)	17.31
				135(MCS7)	16.94

Test Result of Peak Output Power

Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Result
11b	1	01	2412	12.67	≤ 30	Pass
11b	1	06	2437	12.51	≤ 30	Pass
11b	1	11	2462	12.01	≤ 30	Pass
11g	6	01	2412	21.68	≤ 30	Pass
11g	6	06	2437	21.71	≤ 30	Pass
11g	6	11	2462	20.03	≤ 30	Pass
11n-HT20	6.5	01	2412	20.81	≤ 30	Pass
11n-HT20	6.5	06	2437	20.91	≤ 30	Pass
11n-HT20	6.5	11	2462	19.90	≤ 30	Pass
11n-HT40	13.5	03	2422	18.03	≤ 30	Pass
11n-HT40	13.5	06	2437	17.67	≤ 30	Pass
11n-HT40	13.5	09	2452	17.71	≤ 30	Pass

Test Result of Average Output Power (Reporting Only)

Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	Average Power (dBm)	Limit (dBm)	Result
11b	1	01	2412	9.46	≤ 30	Pass
11b	1	06	2437	9.11	≤ 30	Pass
11b	1	11	2462	8.94	≤ 30	Pass
11g	6	01	2412	14.55	≤ 30	Pass
11g	6	06	2437	14.64	≤ 30	Pass
11g	6	11	2462	11.89	≤ 30	Pass
11n-HT20	6.5	01	2412	13.63	≤ 30	Pass
11n-HT20	6.5	06	2437	13.67	≤ 30	Pass
11n-HT20	6.5	11	2462	12.24	≤ 30	Pass
11n-HT40	13.5	03	2422	10.68	≤ 30	Pass
11n-HT40	13.5	06	2437	10.36	≤ 30	Pass
11n-HT40	13.5	09	2452	10.17	≤ 30	Pass

7.4. Power Spectral Density Measurement

7.4.1. Test Limit

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

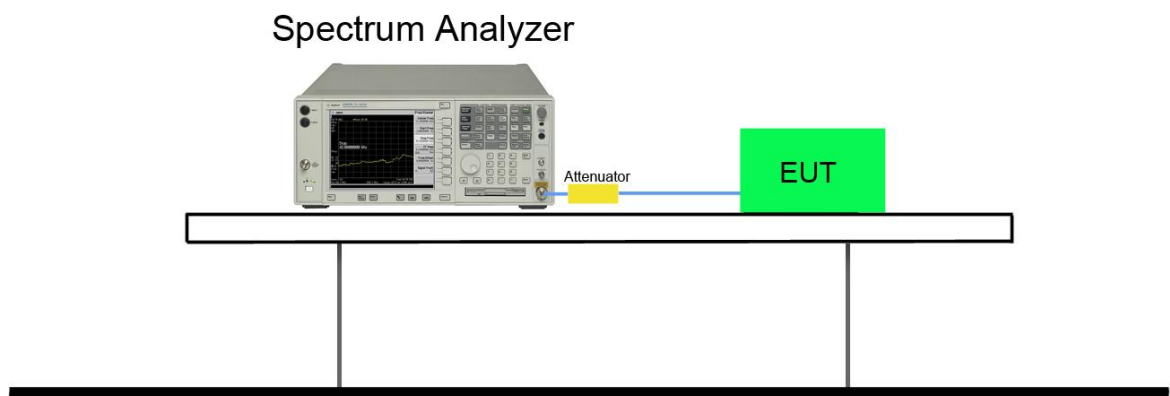
7.4.2. Test Procedure Used

KDB 558074 D01v03r03 - Section 10.2 Method PKPSD

7.4.3. Test Setting

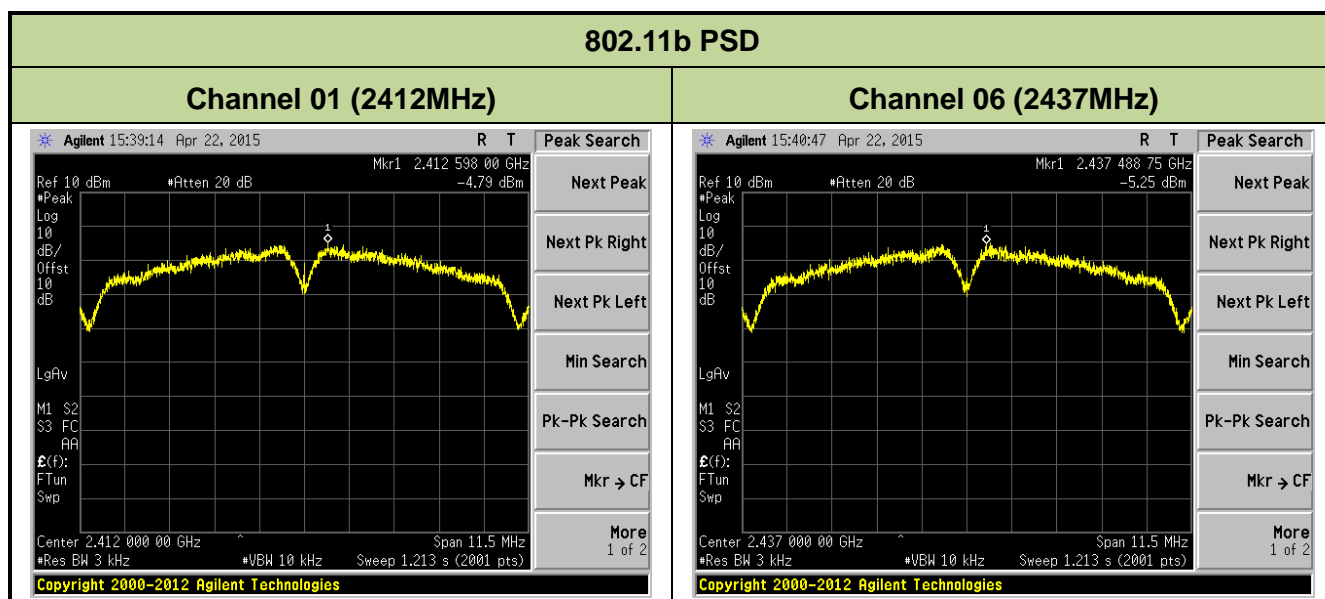
1. Analyzer was set to the center frequency of the DTS channel under investigation
2. Span = 1.5 times the DTS channel bandwidth
3. RBW = 3kHz
4. VBW = 10kHz
5. Detector = peak
6. Sweep time = auto couple
7. Trace mode = max hold
8. Trace was allowed to stabilize

7.4.4. Test Setup

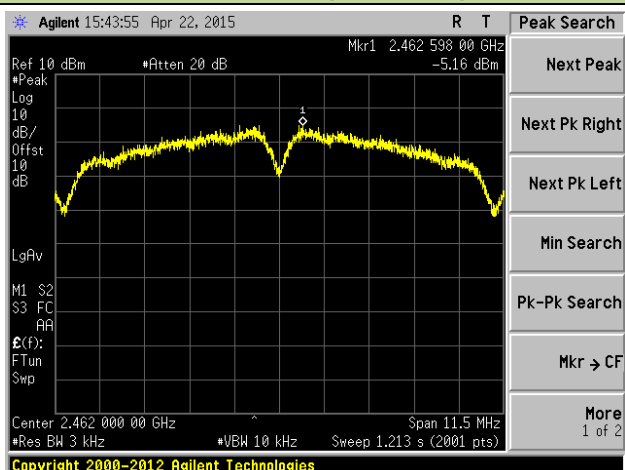


7.4.5. Test Result

Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	PSD Result (dBm / 3kHz)	Limit (dBm / 3kHz)	Result
11b	1	01	2412	-4.79	≤ 8	Pass
11b	1	06	2437	-5.25	≤ 8	Pass
11b	1	11	2462	-5.16	≤ 8	Pass
11g	6	01	2412	-9.47	≤ 8	Pass
11g	6	06	2437	-10.11	≤ 8	Pass
11g	6	11	2462	-11.88	≤ 8	Pass
11n-HT20	6.5	01	2412	-11.37	≤ 8	Pass
11n-HT20	6.5	06	2437	-11.03	≤ 8	Pass
11n-HT20	6.5	11	2462	-12.50	≤ 8	Pass
11n-HT40	13.5	03	2422	-16.15	≤ 8	Pass
11n-HT40	13.5	06	2437	-15.98	≤ 8	Pass
11n-HT40	13.5	09	2452	-16.33	≤ 8	Pass

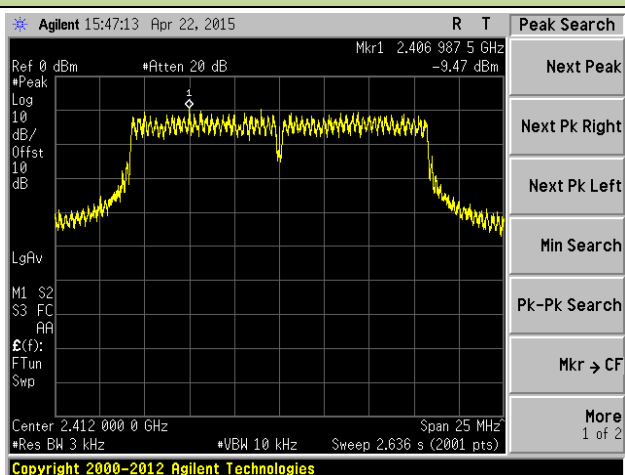


Channel 11 (2462MHz)

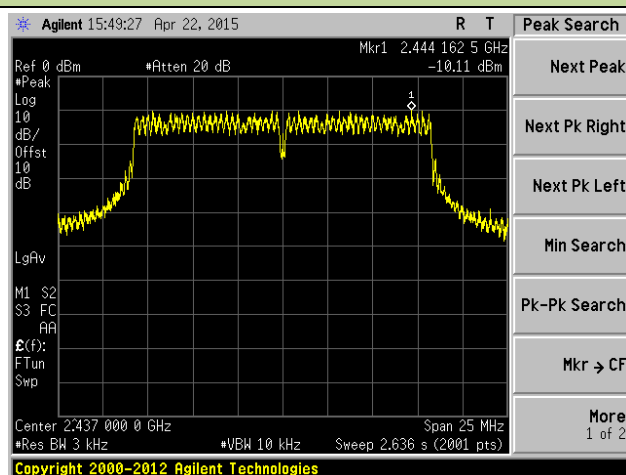


802.11g PSD

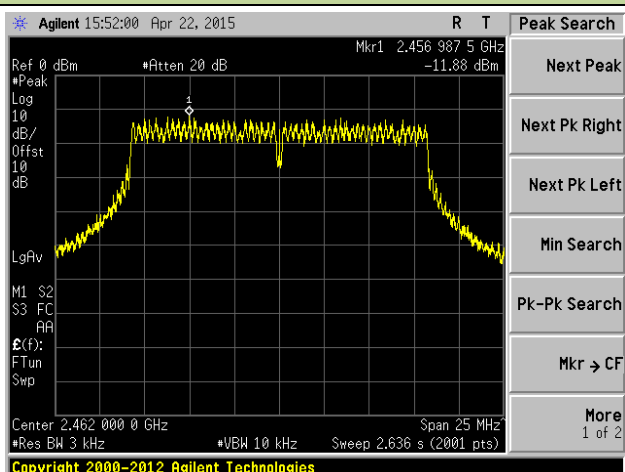
Channel 01 (2412MHz)



Channel 06 (2437MHz)

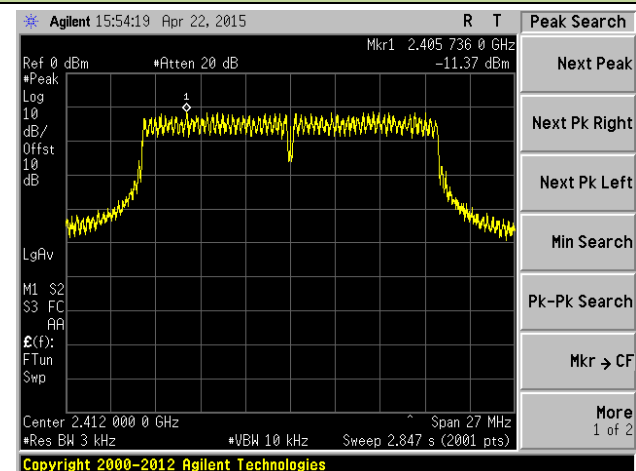


Channel 11 (2462MHz)

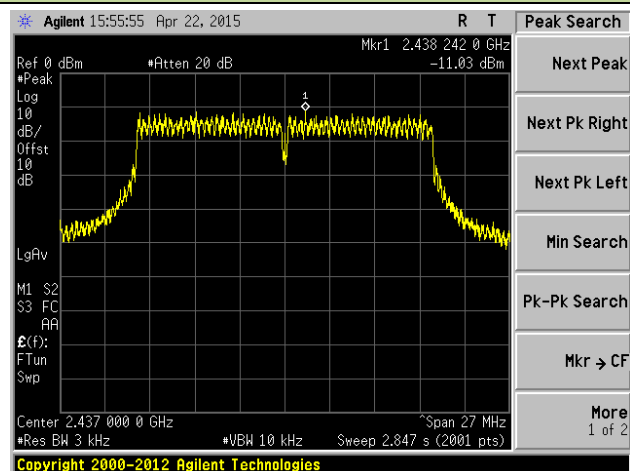


802.11n-HT20 PSD

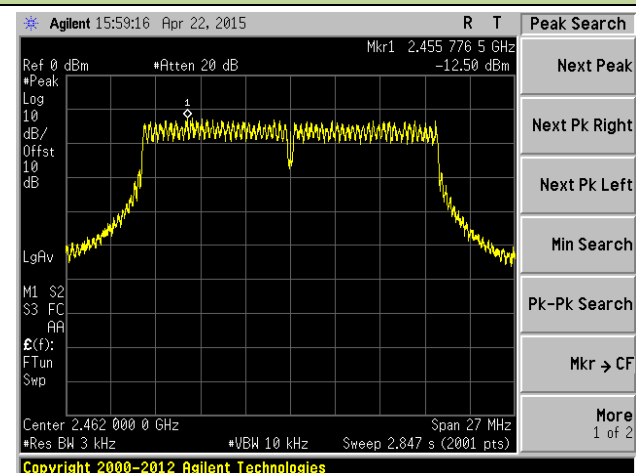
Channel 01 (2412MHz)



Channel 06 (2437MHz)

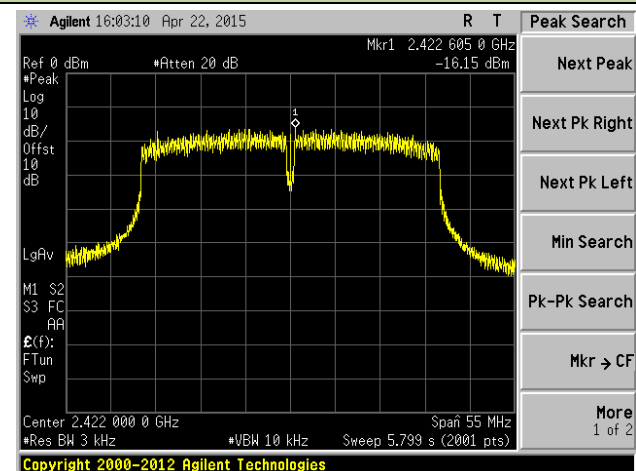


Channel 11 (2462MHz)

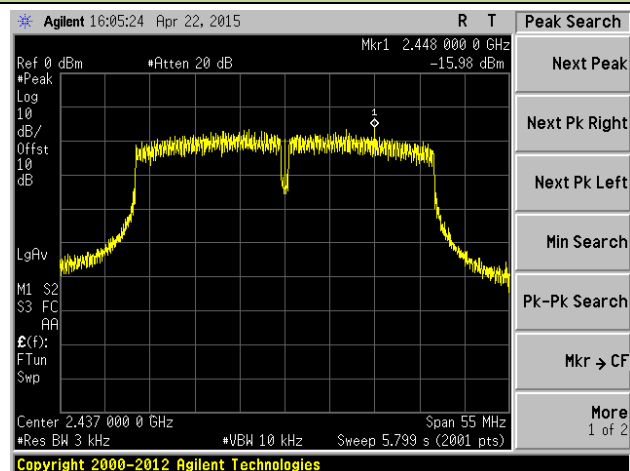


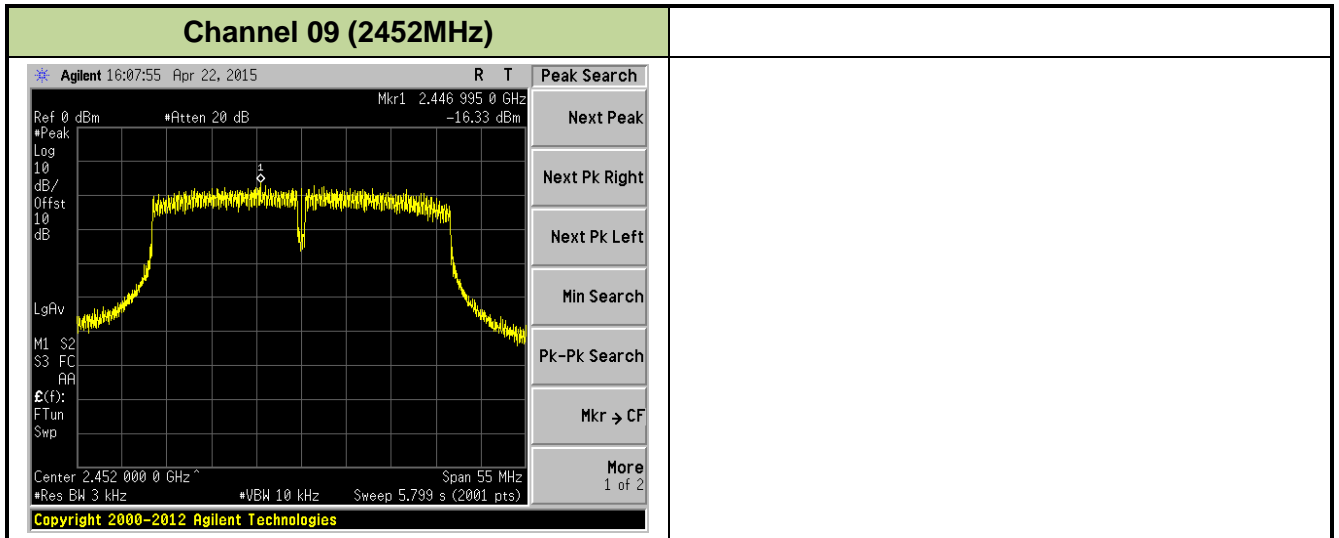
802.11n-HT40 PSD

Channel 03 (2422MHz)



Channel 06 (2437MHz)





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

7.5.1. Test Limit

The limit for out-of-band spurious emissions at the band edge is 20dB below the fundamental emission level, as determined from the in-band power measurement of the DTS channel performed in a 100kHz bandwidth per the PSD procedure (Section 9.1).

7.5.2. Test Procedure Used

KDB 558074 D01v03r03 - Section 11.2 & Section 11.3

7.5.3. Test Settling

1. Reference level measurement

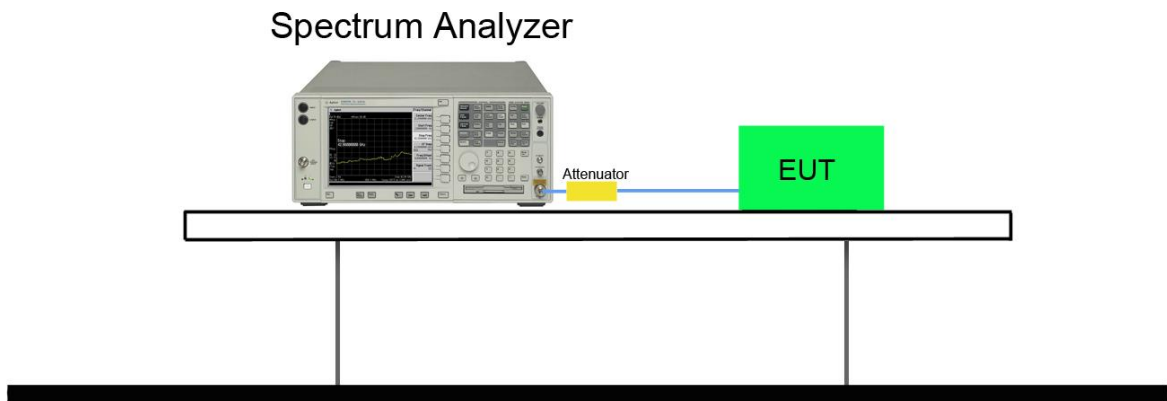
- (a) Set instrument center frequency to DTS channel center frequency
- (b) Set the span to ≥ 1.5 times the DTS bandwidth
- (c) Set the RBW = 100 kHz
- (d) Set the VBW $\geq 3 \times$ RBW
- (e) Detector = peak
- (f) Sweep time = auto couple
- (g) Trace mode = max hold
- (h) Allow trace to fully stabilize

2. Emission level measurement

- (a) Set the center frequency and span to encompass frequency range to be measured
- (b) RBW = 100kHz
- (c) VBW = 300kHz
- (d) Detector = Peak
- (e) Number of sweep points $\geq 2 \times$ Span/RBW
- (f) Trace mode = max hold
- (g) Sweep time = auto couple

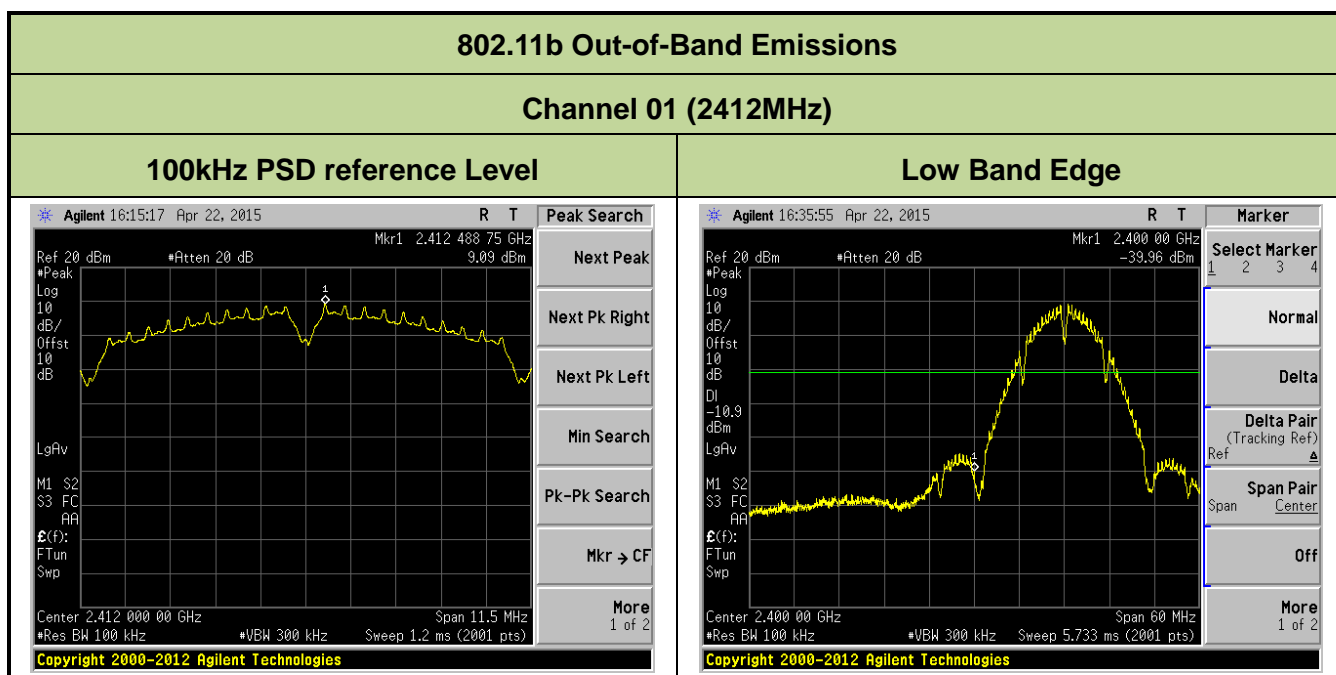
(h) The trace was allowed to stabilize

7.5.4. Test Setup

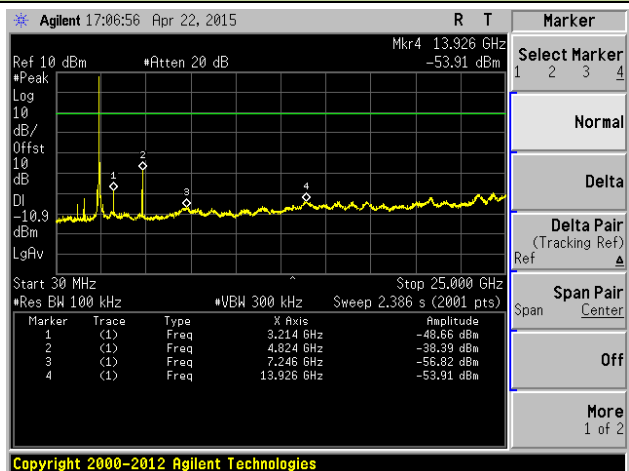


7.5.5. Test Result

Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	Limit	Result
802.11b	1	01	2412	20dBc	Pass
802.11b	1	06	2437	20dBc	Pass
802.11b	1	11	2462	20dBc	Pass
802.11g	6	01	2412	20dBc	Pass
802.11g	6	06	2437	20dBc	Pass
802.11g	6	11	2462	20dBc	Pass
11n-HT20	6.5	01	2412	20dBc	Pass
11n-HT20	6.5	06	2437	20dBc	Pass
11n-HT20	6.5	11	2462	20dBc	Pass
11n-HT40	13.5	03	2422	20dBc	Pass
11n-HT40	13.5	06	2437	20dBc	Pass
11n-HT40	13.5	09	2452	20dBc	Pass

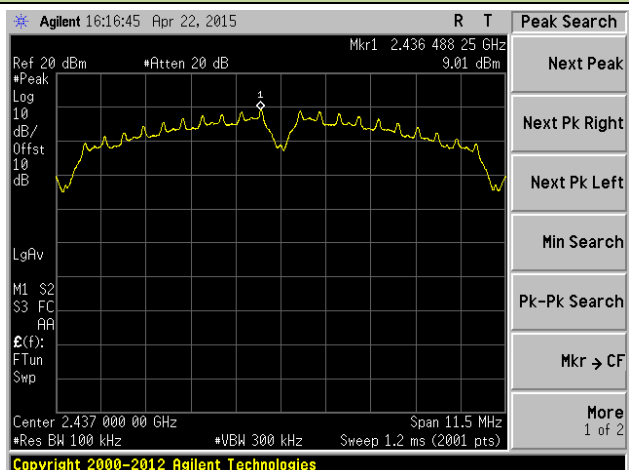


Spurious Emission 30MHz ~ 25GHz

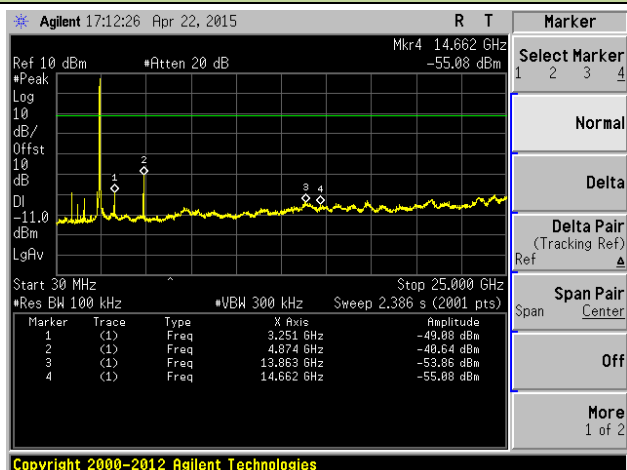


Channel 06 (2437MHz)

100kHz PSD reference Level

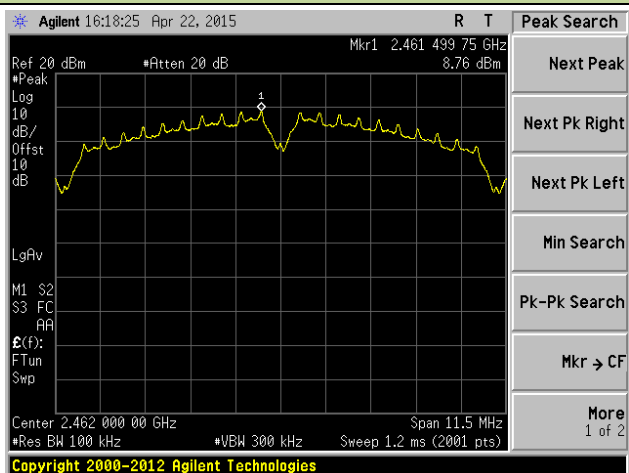


Spurious Emission 30MHz ~ 25GHz

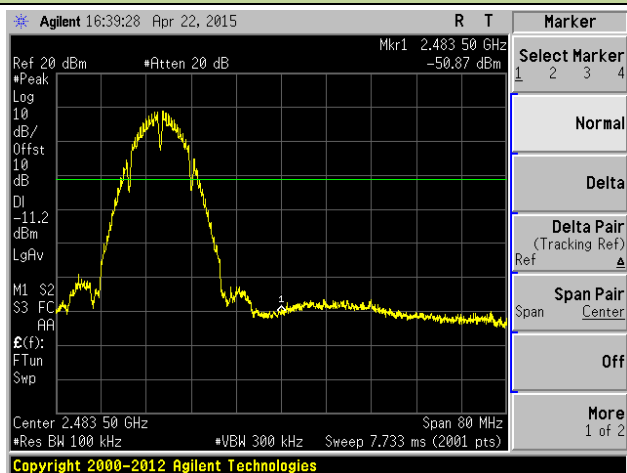


Channel 11 (2462MHz)

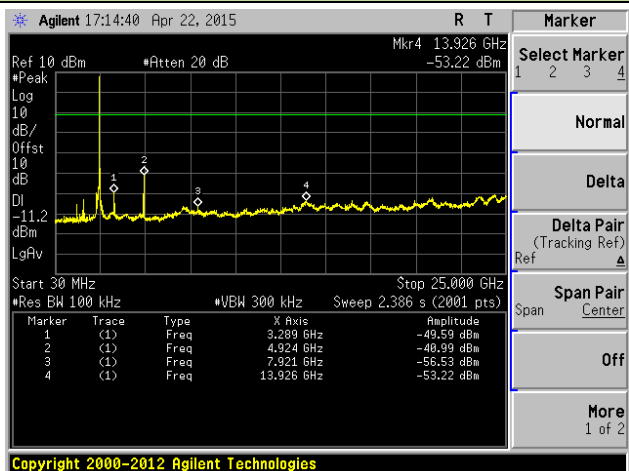
100kHz PSD reference Level



High Band Edge



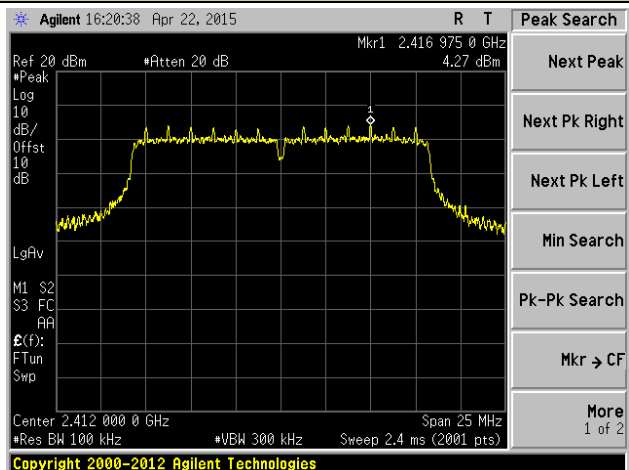
Spurious Emission 30MHz ~ 25GHz



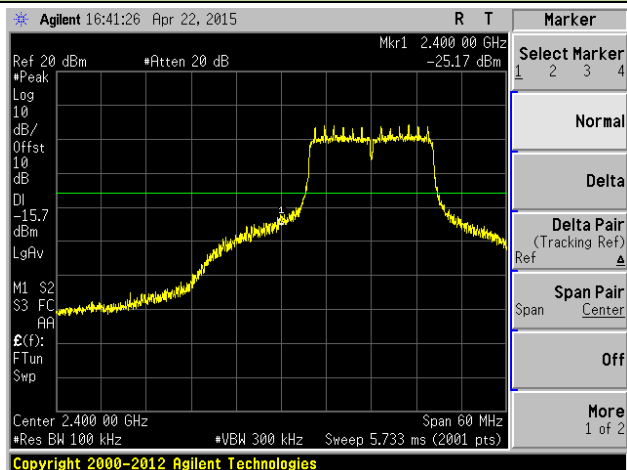
802.11g Out-of-Band Emissions

Channel 01 (2412MHz)

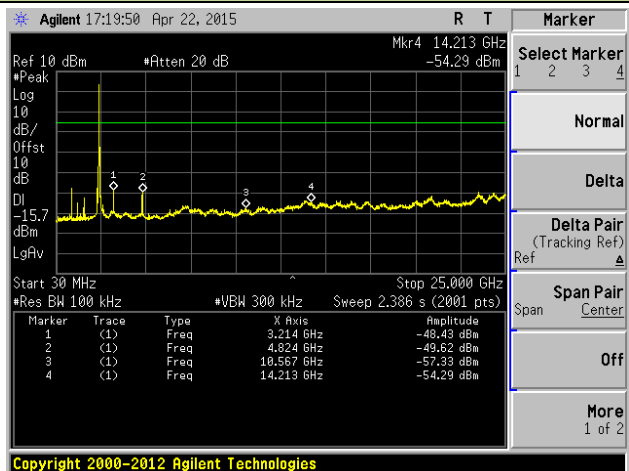
100kHz PSD reference Level



Low Band Edge

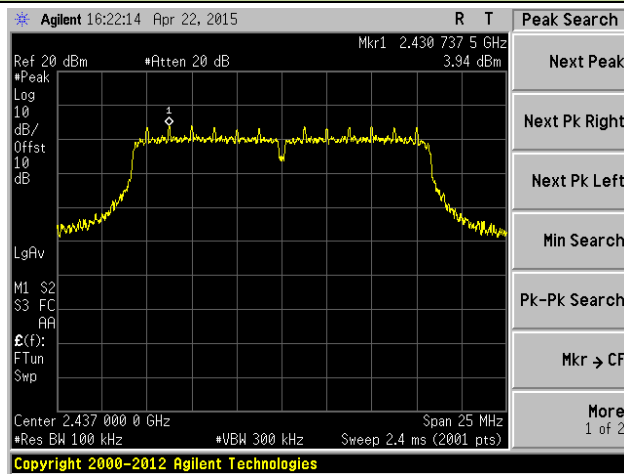


Spurious Emission 30MHz ~ 25GHz

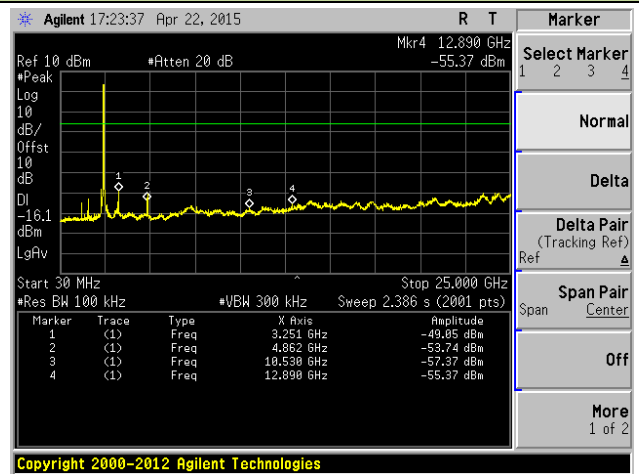


Channel 06 (2437MHz)

100kHz PSD reference Level

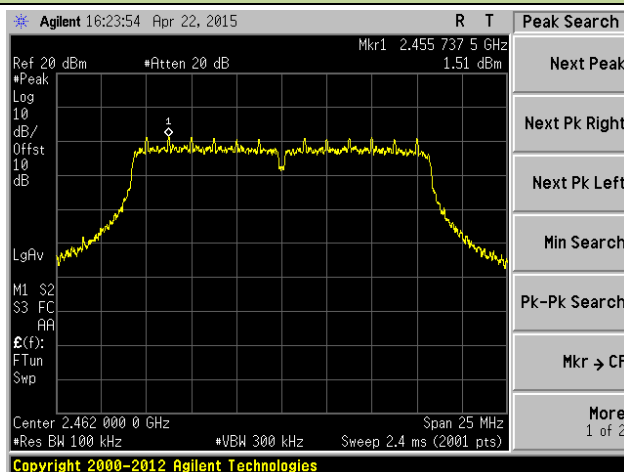


Spurious Emission 30MHz ~ 25GHz

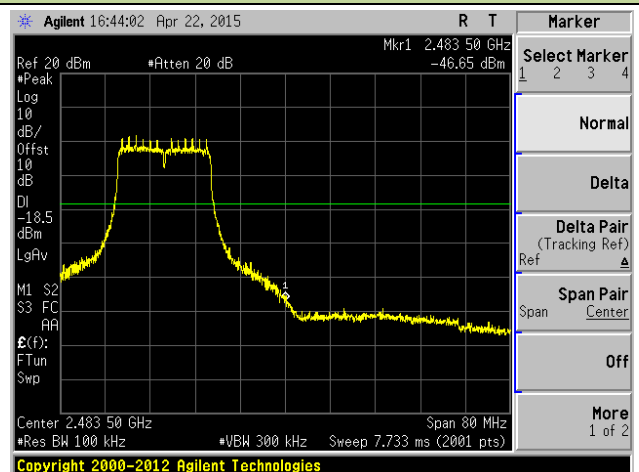


Channel 11 (2462MHz)

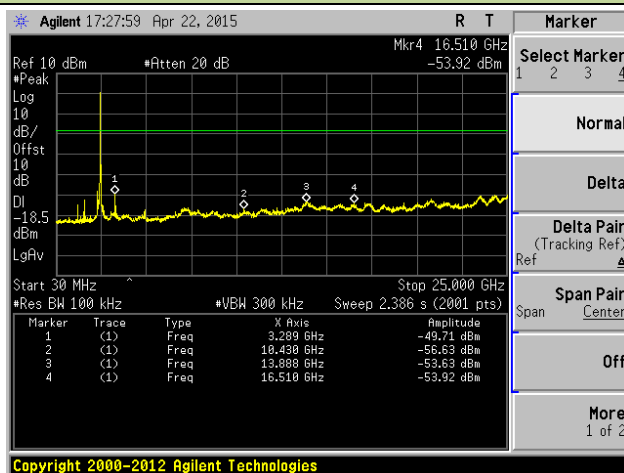
100kHz PSD reference Level



High Band Edge



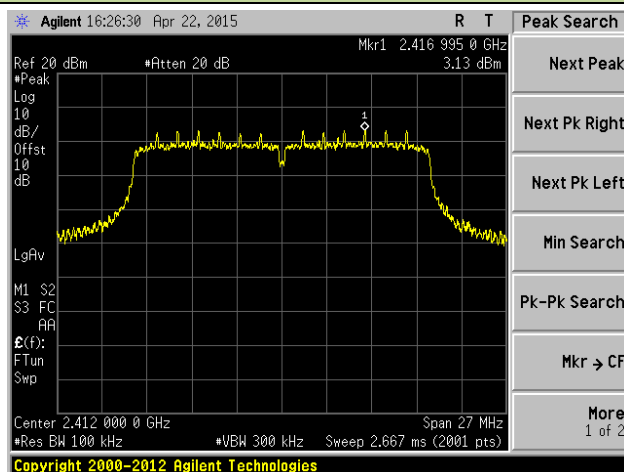
Spurious Emission 30MHz ~ 25GHz



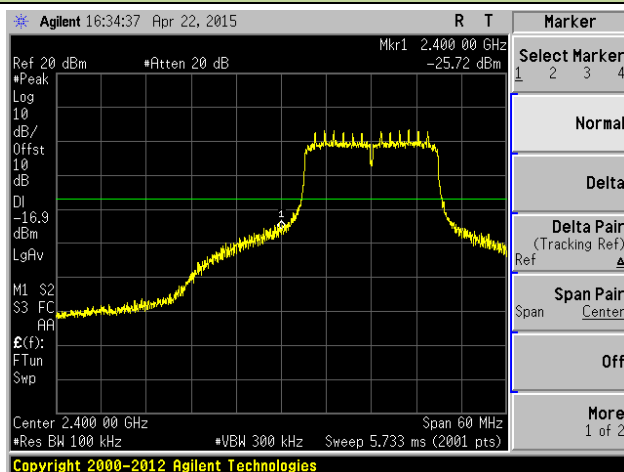
802.11n-HT20 Out-of-Band Emissions

Channel 01 (2412MHz)

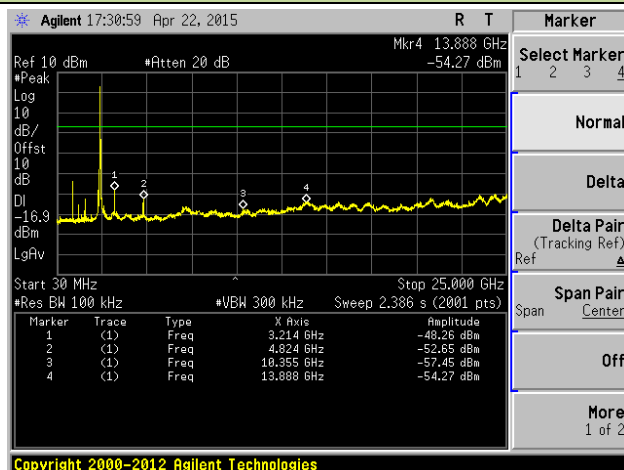
100kHz PSD reference Level



Low Band Edge

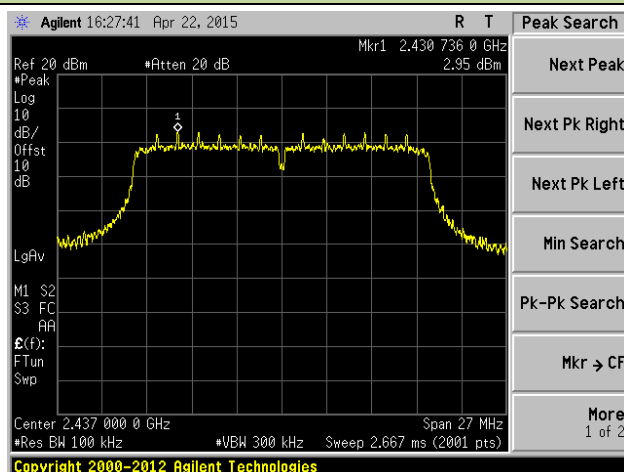


Spurious Emission 30MHz ~ 25GHz

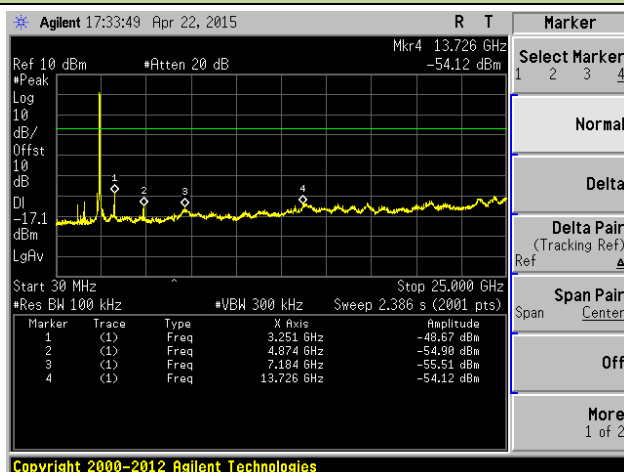


Channel 06 (2437MHz)

100kHz PSD reference Level

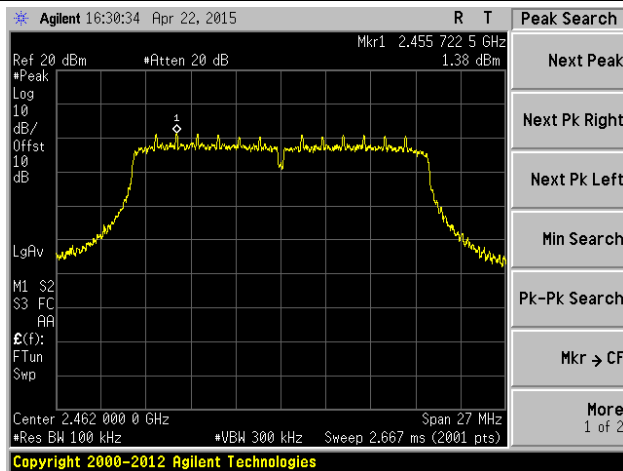


Spurious Emission 30MHz ~ 25GHz

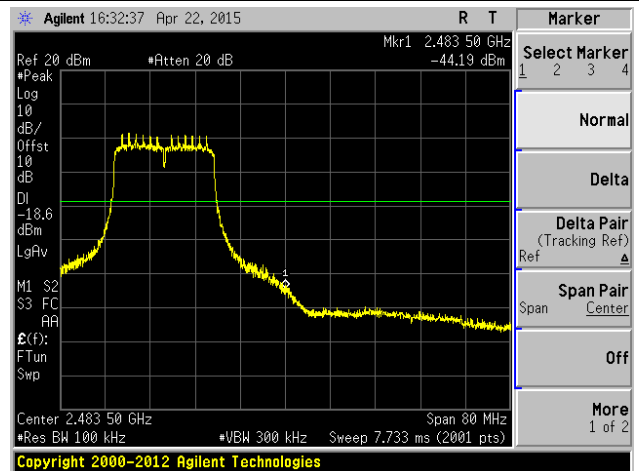


Channel 11 (2462MHz)

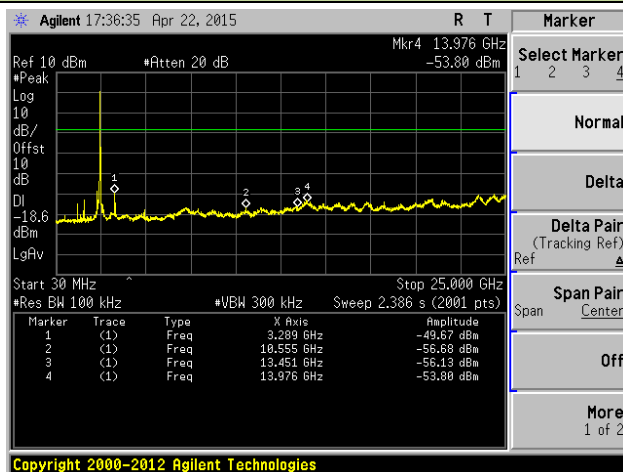
100kHz PSD reference Level



High Band Edge



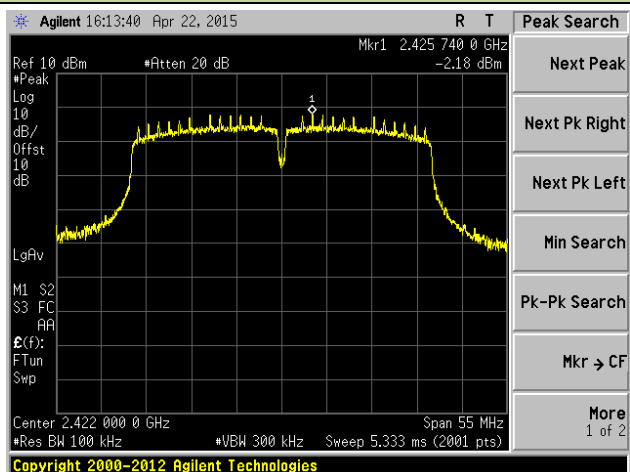
Spurious Emission 30MHz ~ 25GHz



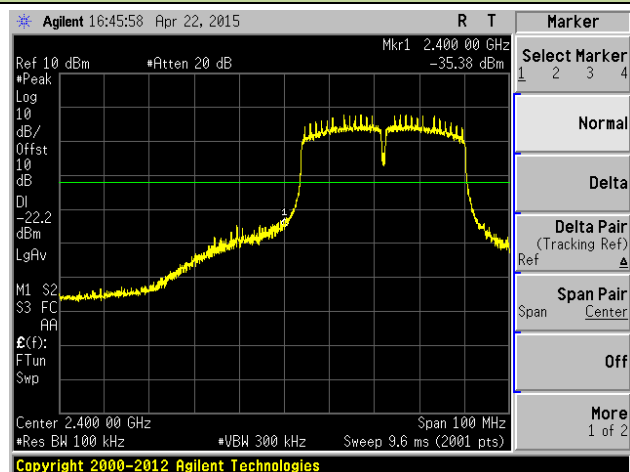
802.11n-HT40 Out-of-Band Emissions

Channel 03 (2422MHz)

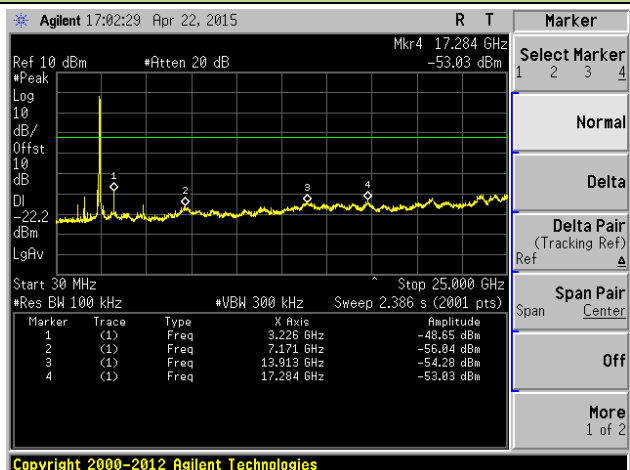
100kHz PSD reference Level



Low Band Edge

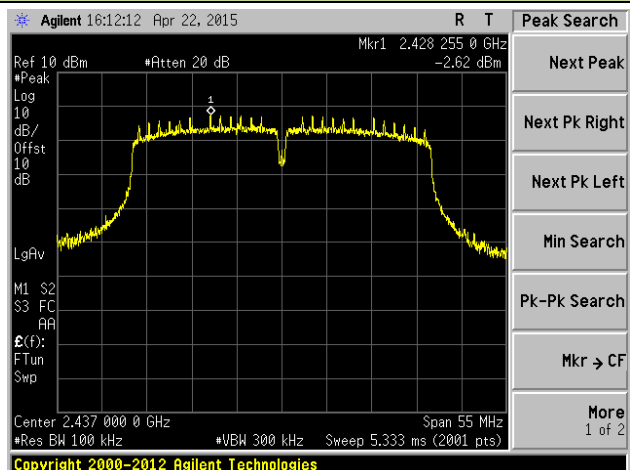


Spurious Emission 30MHz ~ 25GHz

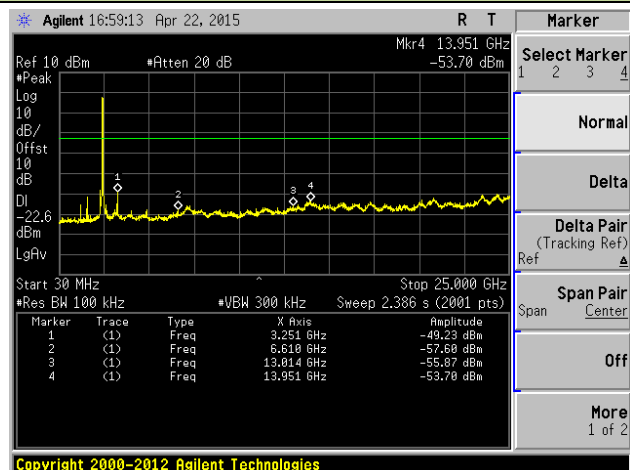


Channel 06 (2437MHz)

100kHz PSD reference Level

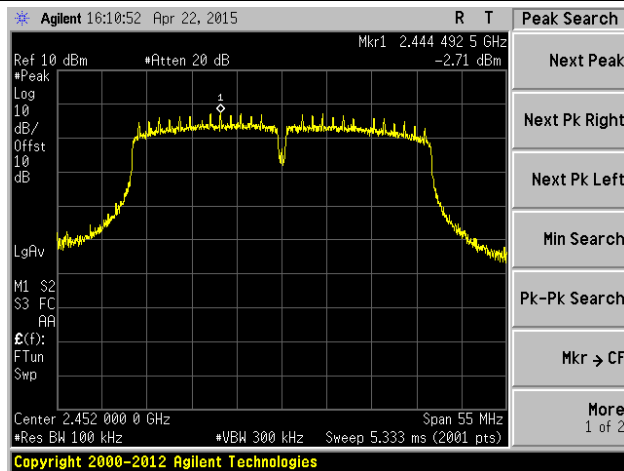


Spurious Emission 30MHz ~ 25GHz

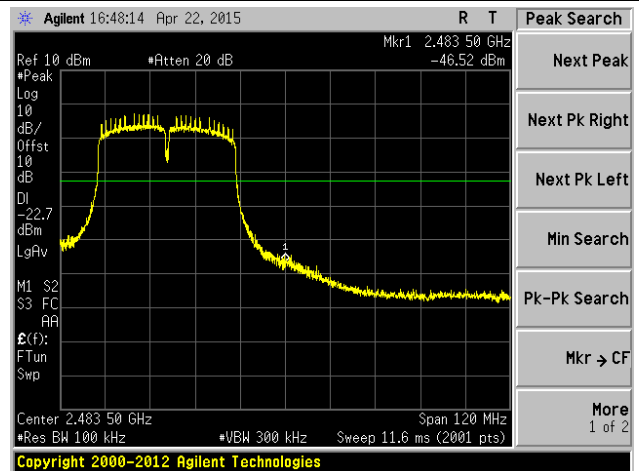


Channel 09 (2452MHz)

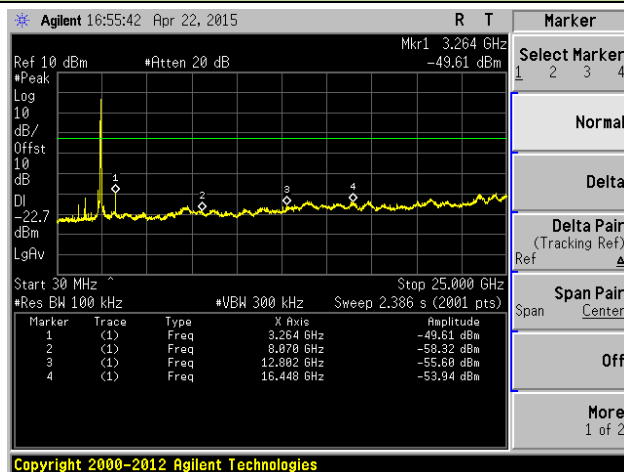
100kHz PSD reference Level



High Band Edge



Spurious Emission 30MHz ~ 25GHz



7.6. Radiated Spurious Emission Measurement

7.6.1. Test Limit

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

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

7.6.2. Test Procedure Used

KDB 558074 D01v03r03 - Section 12.2.3 (quasi-peak measurements)

KDB 558074 D01v03r03 - Section 12.2.4 (peak power measurements)

KDB 558074 D01v03r03 - Section 12.2.5 (average power measurements)

7.6.3. Test Setting

Peak Field Strength Measurements per Section 12.2.4 of KDB 558074 D01v03r03

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = as specified in Table 1
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple

6. Trace mode = max hold
7. Trace was allowed to stabilize

Table 1 - RBW as a function of frequency

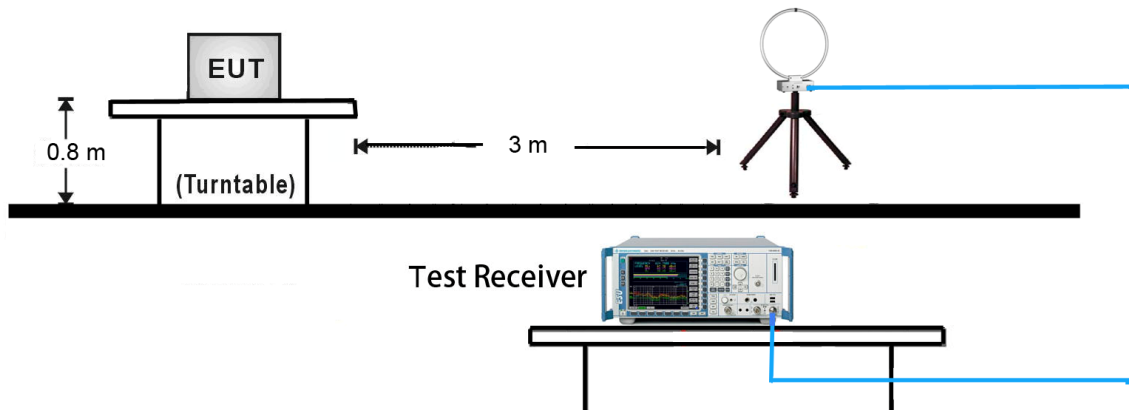
Frequency	RBW
9 ~ 150 kHz	200 ~ 300 Hz
0.15 ~ 30 MHz	9 ~ 10 kHz
30 ~ 1000 MHz	100 ~ 120 kHz
> 1000 MHz	1 MHz

Average Field Strength Measurements per Section 12.2.5.1 of KDB 558074 D01v03r03

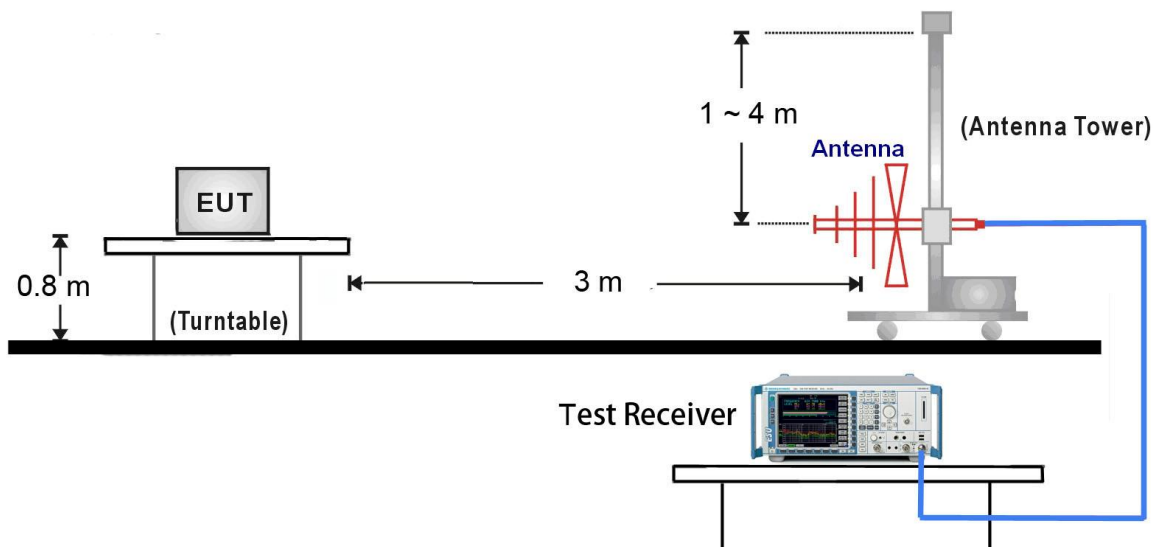
1. RBW = 1MHz.
2. VBW $\geq 3 \times$ RBW.
3. Detector = RMS, if span/(# of points in sweep) \leq (RBW/2). Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.
4. Averaging type = power (*i.e.*, RMS).
 - As an alternative, the detector and averaging type may be set for linear voltage averaging.
 - Some instruments require linear display mode in order to use linear voltage averaging. Log or dB averaging shall not be used.
5. Sweep time = auto.
6. Perform a trace average of at least 100 traces.

7.6.4. Test Setup

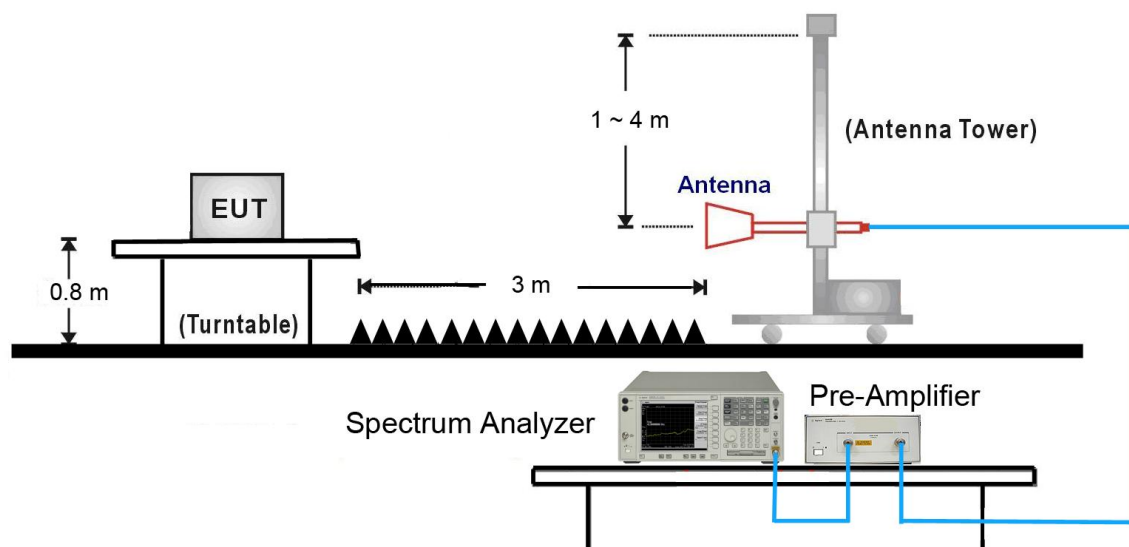
9kHz ~ 30MHz Test Setup:



30MHz ~ 1GHz Test Setup:



1GHz ~ 25GHz Test Setup:



7.6.5. Test Result

Test Mode:	802.11b	Test Site:	AC1
Test Channel:	01	Test Engineer:	Milo Li
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
*	3533.0	39.0	-1.0	38.0	87.0	-49.0	Peak	Horizontal
*	4434.0	38.1	1.5	39.6	87.0	-47.4	Peak	Horizontal
	4825.0	51.9	2.7	54.6	74.0	-19.4	Peak	Horizontal
	4824.1	50.7	2.7	53.4	54.0	-0.6	Average	Horizontal
	7553.5	37.3	8.3	45.6	74.0	-28.4	Peak	Horizontal
*	3218.5	43.9	-1.6	42.3	87.0	-44.7	Peak	Vertical
*	3584.0	39.1	-0.8	38.3	87.0	-48.7	Peak	Vertical
	4825.0	51.7	2.7	54.4	74.0	-19.6	Peak	Vertical
	4824.0	50.4	2.7	53.1	54.0	-0.9	Average	Vertical
	7485.5	35.6	8.2	43.8	74.0	-30.2	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (107.0dBμV/m).

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

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

Test Mode:	802.11b	Test Site:	AC1
Test Channel:	06	Test Engineer:	Milo Li
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
*	3524.5	40.1	-1.0	39.1	88.2	-49.1	Peak	Horizontal
*	4459.5	36.2	1.5	37.7	88.2	-50.5	Peak	Horizontal
	4876.0	43.4	2.7	46.1	74.0	-27.9	Peak	Horizontal
	7400.5	37.0	7.9	44.9	74.0	-29.1	Peak	Horizontal
*	3252.5	42.7	-1.7	41.0	88.2	-47.2	Peak	Vertical
*	3533.0	39.8	-1.0	38.8	88.2	-49.4	Peak	Vertical
	4876.0	49.2	2.7	51.9	74.0	-22.1	Peak	Vertical
	7519.5	37.1	8.3	45.4	74.0	-28.6	Peak	Vertical
Note 1: “*” is not in restricted band, its limit is 20dBc of the fundamental emission level (108.2dBμV/m). Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)								

Test Mode:	802.11b	Test Site:	AC1
Test Channel:	11	Test Engineer:	Milo Li
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
*	3210.0	41.1	-1.6	39.5	88.7	-49.2	Peak	Horizontal
*	3516.0	40.2	-1.1	39.1	88.7	-49.6	Peak	Horizontal
	4927.0	39.8	2.8	42.6	74.0	-31.4	Peak	Horizontal
	7502.5	37.3	8.3	45.6	74.0	-28.4	Peak	Horizontal
*	3286.5	43.8	-1.8	42.0	88.7	-46.7	Peak	Vertical
*	3550.0	40.6	-0.9	39.7	88.7	-49.0	Peak	Vertical
	4927.0	47.2	2.8	50.0	74.0	-24.0	Peak	Vertical
	7630.0	37.4	8.0	45.4	74.0	-28.6	Peak	Vertical
Note 1: “*” is not in restricted band, its limit is 20dBc of the fundamental emission level (108.7dBμV/m). Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)								

Test Mode:	802.11g	Test Site:	AC1
Test Channel:	01	Test Engineer:	Milo Li
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
*	3040.0	39.4	-2.0	37.4	86.3	-48.9	Peak	Horizontal
*	3541.5	39.1	-0.9	38.2	86.3	-48.1	Peak	Horizontal
	4825.0	53.6	2.7	56.3	74.0	-17.7	Peak	Horizontal
	4824.9	39.9	2.7	42.6	54.0	-11.4	Average	Horizontal
	7502.5	36.3	8.3	44.6	74.0	-29.4	Peak	Horizontal
*	3218.5	43.0	-1.6	41.4	86.3	-44.9	Peak	Vertical
*	3592.5	39.8	-0.7	39.1	86.3	-47.2	Peak	Vertical
	4833.5	62.7	2.7	65.4	74.0	-8.6	Peak	Vertical
	4824.2	49.4	2.7	52.1	54.0	-1.9	Average	Vertical
	7409.0	36.9	8.0	44.9	74.0	-29.1	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (106.3dBμV/m).

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

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

Test Mode:	802.11g	Test Site:	AC1
Test Channel:	06	Test Engineer:	Milo Li
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
*	3125.0	40.0	-1.6	38.4	85.1	-46.7	Peak	Horizontal
*	3473.5	39.0	-1.3	37.7	85.1	-47.4	Peak	Horizontal
	4876.0	50.5	2.7	53.2	74.0	-20.8	Peak	Horizontal
	8029.5	37.3	8.7	46.0	74.0	-28.0	Peak	Horizontal
*	3252.5	42.4	-1.7	40.7	85.1	-44.4	Peak	Vertical
*	3592.5	38.2	-0.7	37.5	85.1	-47.6	Peak	Vertical
	4867.5	61.3	2.7	64.0	74.0	-10.0	Peak	Vertical
	4874.5	49.3	2.7	52.0	54.0	-2.0	Average	Vertical
	7307.0	37.0	8.0	45.0	74.0	-29.0	Peak	Vertical
Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (105.1dBμV/m). Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)								

Test Mode:	802.11g	Test Site:	AC1
Test Channel:	11	Test Engineer:	Milo Li
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
*	3312.0	39.7	-1.9	37.8	84.9	-47.1	Peak	Horizontal
*	3575.5	38.5	-0.8	37.7	84.9	-47.2	Peak	Horizontal
	4927.0	45.9	2.8	48.7	74.0	-25.3	Peak	Horizontal
	7621.5	37.2	8.0	45.2	74.0	-28.8	Peak	Horizontal
*	3286.5	42.5	-1.8	40.7	84.9	-44.2	Peak	Vertical
*	3567.0	39.1	-0.8	38.3	84.9	-46.6	Peak	Vertical
	4927.0	53.6	2.8	56.4	74.0	-17.6	Peak	Vertical
	4923.3	39.8	2.8	42.6	54.0	-11.4	Average	Vertical
	7570.5	36.6	8.2	44.8	74.0	-29.2	Peak	Vertical
Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (104.9dBμV/m). Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)								

Test Mode:	802.11n-HT20	Test Site:	AC1
Test Channel:	01	Test Engineer:	Milo Li
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
*	3218.5	39.8	-1.6	38.2	84.5	-46.3	Peak	Horizontal
*	3533.0	39.9	-1.0	38.9	84.5	-45.6	Peak	Horizontal
	4825.0	48.5	2.7	51.2	74.0	-22.8	Peak	Horizontal
	7553.5	36.6	8.3	44.9	74.0	-29.1	Peak	Horizontal
*	3218.5	43.4	-1.6	41.8	84.5	-42.7	Peak	Vertical
*	3550.0	38.7	-0.9	37.8	84.5	-46.7	Peak	Vertical
	4825.0	59.1	2.7	61.8	74.0	-12.2	Peak	Vertical
	4825.3	46.5	2.7	49.2	54.0	-4.8	Average	Vertical
	7468.5	36.5	8.1	44.6	74.0	-29.4	Peak	Vertical
Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (104.5dBμV/m). Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)								

Test Mode:	802.11n-HT20	Test Site:	AC1
Test Channel:	06	Test Engineer:	Milo Li
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
*	3201.5	40.2	-1.6	38.6	85.9	-47.3	Peak	Horizontal
*	3550.0	38.4	-0.9	37.5	85.9	-48.4	Peak	Horizontal
	4876.0	48.8	2.7	51.5	74.0	-22.5	Peak	Horizontal
	7570.5	36.2	8.2	44.4	74.0	-29.6	Peak	Horizontal
*	3252.5	42.3	-1.7	40.6	85.9	-45.3	Peak	Vertical
*	3550.0	37.7	-0.9	36.8	85.9	-49.1	Peak	Vertical
	4876.0	58.1	2.7	60.8	74.0	-13.2	Peak	Vertical
	4877.2	45.3	2.7	48.0	54.0	-6.0	Average	Vertical
	7307.0	36.6	8.0	44.6	74.0	-29.4	Peak	Vertical
Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (105.9dBμV/m). Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)								

Test Mode:	802.11n-HT20	Test Site:	AC1
Test Channel:	11	Test Engineer:	Milo Li
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
*	3142.0	39.9	-1.6	38.3	86.0	-47.7	Peak	Horizontal
*	3482.0	39.3	-1.2	38.1	86.0	-47.9	Peak	Horizontal
	4927.0	45.8	2.8	48.6	74.0	-25.4	Peak	Horizontal
	7451.5	35.7	8.0	43.7	74.0	-30.3	Peak	Horizontal
*	3286.5	41.9	-1.8	40.1	86.0	-45.9	Peak	Vertical
*	3482.0	39.5	-1.2	38.3	86.0	-47.7	Peak	Vertical
	4918.5	54.3	2.8	57.1	74.0	-16.9	Peak	Vertical
	4919.2	42.3	2.8	45.1	54.0	-8.9	Average	Vertical
	7613.0	36.9	8.1	45.0	74.0	-29.0	Peak	Vertical
Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (106.0dBμV/m). Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)								

Test Mode:	802.11n-HT40	Test Site:	AC1
Test Channel:	03	Test Engineer:	Milo Li
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
*	3227.0	40.2	-1.6	38.6	81.9	-43.3	Peak	Horizontal
*	3524.5	39.0	-1.0	38.0	81.9	-43.9	Peak	Horizontal
	4850.5	42.4	2.7	45.1	74.0	-28.9	Peak	Horizontal
	7256.0	36.7	7.9	44.6	74.0	-29.4	Peak	Horizontal
*	3227.0	43.7	-1.6	42.1	81.9	-39.8	Peak	Vertical
*	3397.0	40.3	-1.7	38.6	81.9	-43.3	Peak	Vertical
	4842.0	51.8	2.7	54.5	74.0	-19.5	Peak	Vertical
	4842.3	37.1	2.7	39.8	54.0	-14.2	Average	Vertical
	8029.5	36.8	8.7	45.5	74.0	-28.5	Peak	Vertical
Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (101.9dBμV/m). Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)								

Test Mode:	802.11n-HT40	Test Site:	AC1
Test Channel:	06	Test Engineer:	Milo Li
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.		

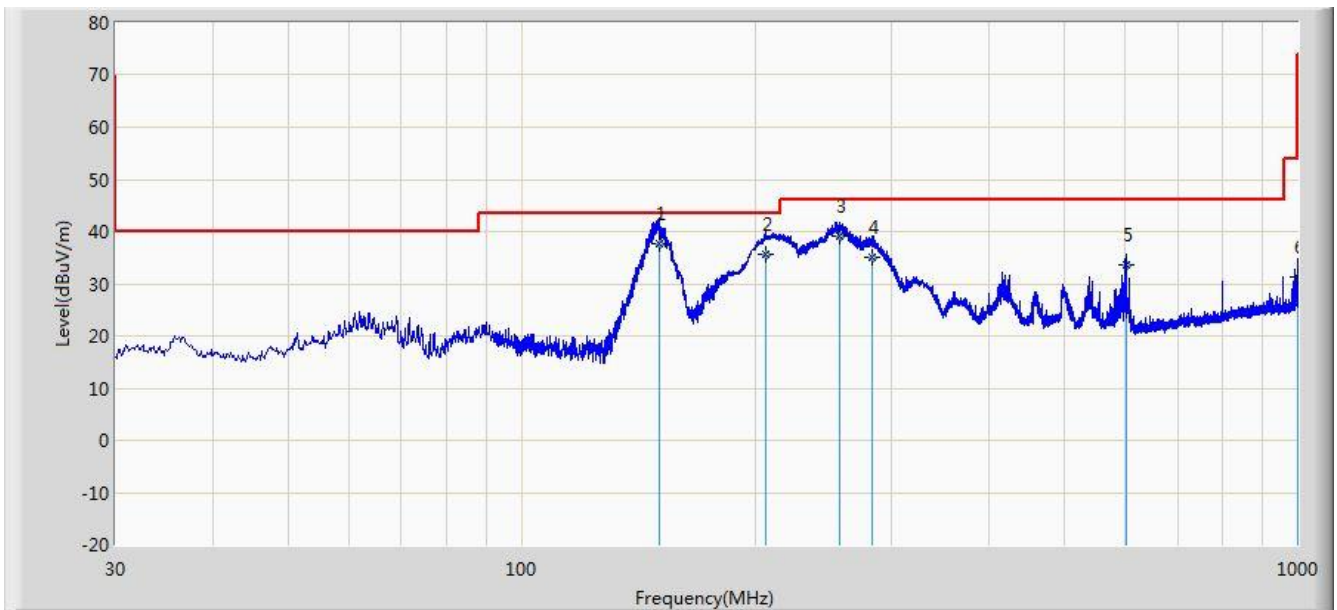
Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
*	3133.5	39.3	-1.6	37.7	81.9	-44.2	Peak	Horizontal
*	3524.5	38.4	-1.0	37.4	81.9	-44.5	Peak	Horizontal
	4867.5	41.4	2.7	44.1	74.0	-29.9	Peak	Horizontal
	8046.5	37.0	8.8	45.8	74.0	-28.2	Peak	Horizontal
*	3252.5	43.4	-1.7	41.7	81.9	-40.2	Peak	Vertical
*	3567.0	38.7	-0.8	37.9	81.9	-44.0	Peak	Vertical
	4876.0	51.3	2.7	54.0	74.0	-20.0	Peak	Vertical
	4876.5	38.5	2.7	41.2	54.0	-12.8	Average	Vertical
	7604.5	36.4	8.1	44.5	74.0	-29.5	Peak	Vertical
Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (101.9dBμV/m). Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)								

Test Mode:	802.11n-HT40	Test Site:	AC1
Test Channel:	09	Test Engineer:	Milo Li
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
*	3176.0	39.9	-1.6	38.3	82.5	-44.2	Peak	Horizontal
*	3490.5	39.2	-1.2	38.0	82.5	-44.5	Peak	Horizontal
	4927.0	43.2	2.8	46.0	74.0	-28.0	Peak	Horizontal
	8114.5	36.8	8.6	45.4	74.0	-28.6	Peak	Horizontal
*	3286.5	42.4	-1.8	40.6	82.5	-41.9	Peak	Vertical
*	3541.5	39.3	-0.9	38.4	82.5	-44.1	Peak	Vertical
	4918.5	48.5	2.8	51.3	74.0	-22.7	Peak	Vertical
	4918.9	35.5	2.8	38.3	54.0	-15.7	Average	Vertical
	7545.0	36.3	8.3	44.6	74.0	-29.4	Peak	Vertical
Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (102.5dBμV/m). 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: 2015/04/22 - 09:30
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: VULB9162_0.03-8GHz	Polarity: Horizontal
EUT: Whome Smart bulb speakers	Power: AC 120V/60Hz
Worse Case Mode: 802.11n-HT20 at Channel 2412MHz	

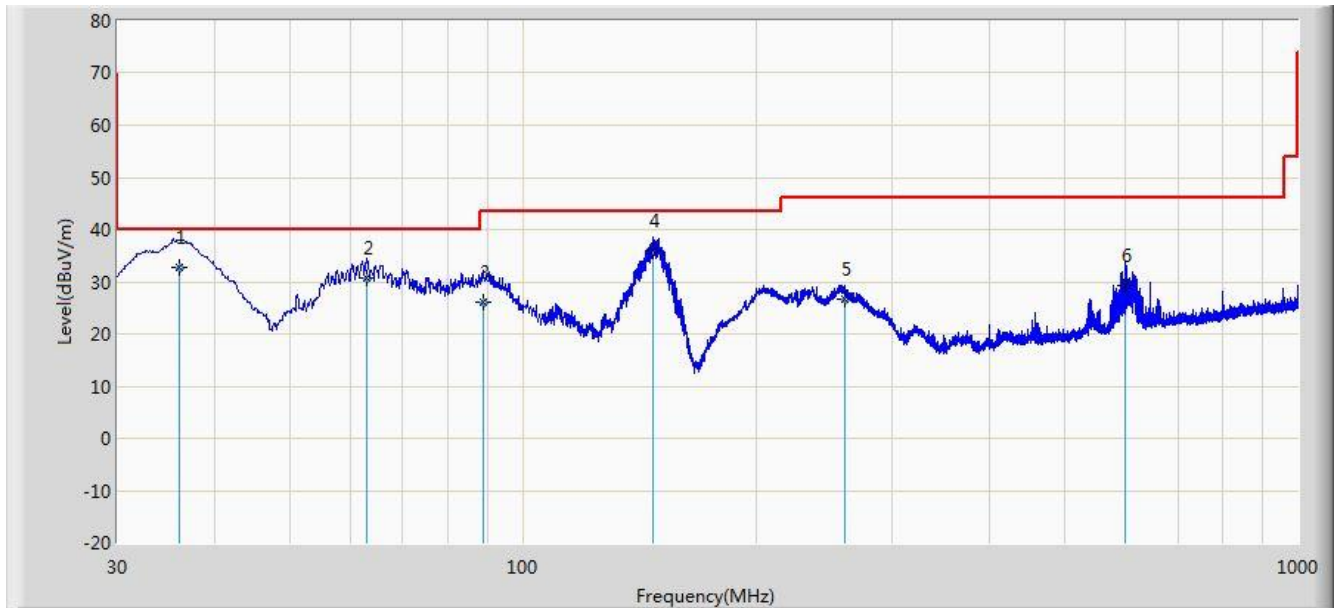


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	150.390	37.795	28.340	-5.705	43.500	9.455	QP
2			206.340	35.538	23.200	-7.962	43.500	12.338	QP
3			256.710	39.136	25.360	-6.864	46.000	13.776	QP
4			282.710	35.098	20.920	-10.902	46.000	14.178	QP
5			600.310	33.576	13.610	-12.424	46.000	19.966	QP
6			1000.000	31.268	6.350	-22.732	54.000	24.918	QP

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

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

Site: AC1	Time: 2015/04/22 - 09:30
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: VULB9162_0.03-8GHz	Polarity: Vertical
EUT: Whome Smart bulb speakers	Power: AC 120V/60Hz
Worse Case Mode: 802.11n-HT20 at Channel 2412MHz	

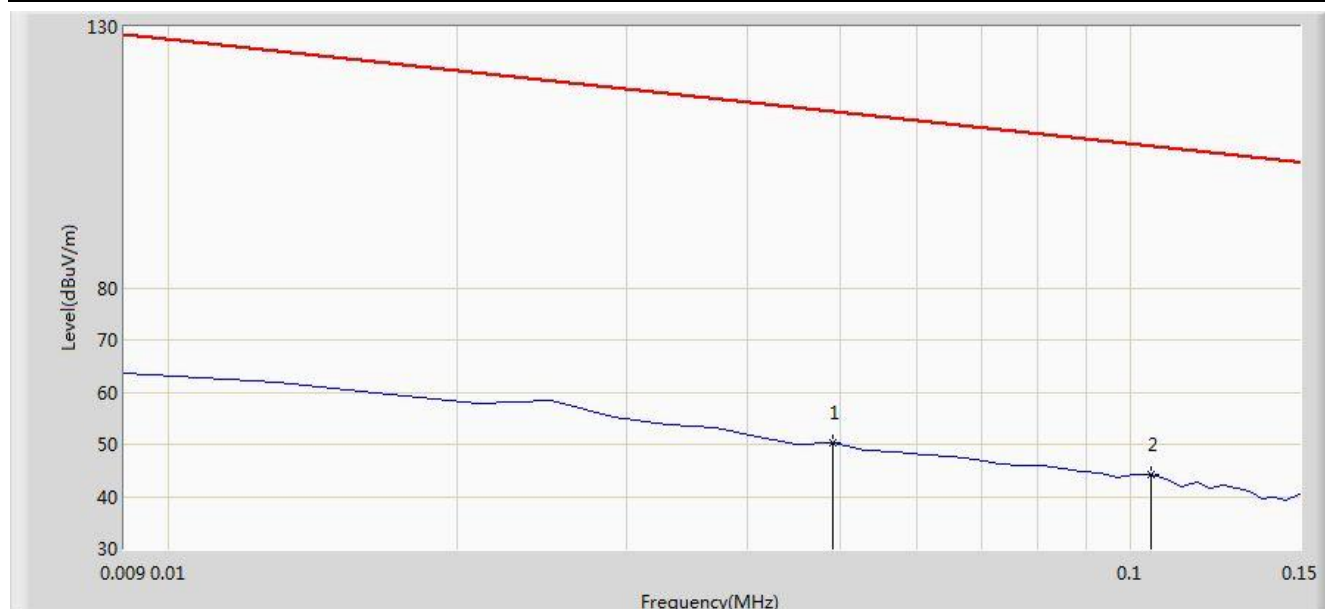


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	36.058	32.729	19.620	-7.271	40.000	13.109	QP
2			62.820	30.857	17.620	-9.143	40.000	13.237	QP
3			88.820	26.162	15.240	-17.338	43.500	10.922	QP
4			147.304	35.812	26.390	-7.688	43.500	9.422	QP
5			260.610	26.539	12.690	-19.461	46.000	13.848	QP
6			600.010	29.262	9.300	-16.738	46.000	19.962	QP

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

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

Site: AC1	Time: 2015/04/22 - 15:32
Limit: FCC_Part15.209_RE(3m)	Engineer: Roy Cheng
Probe: FMZB1519_0.009-30MHz	Polarity: Face On
EUT: Whome Smart bulb speakers	Power: AC 120V/60Hz
Note: There is the ambient noise within frequency range 9kHz~30MHz.	

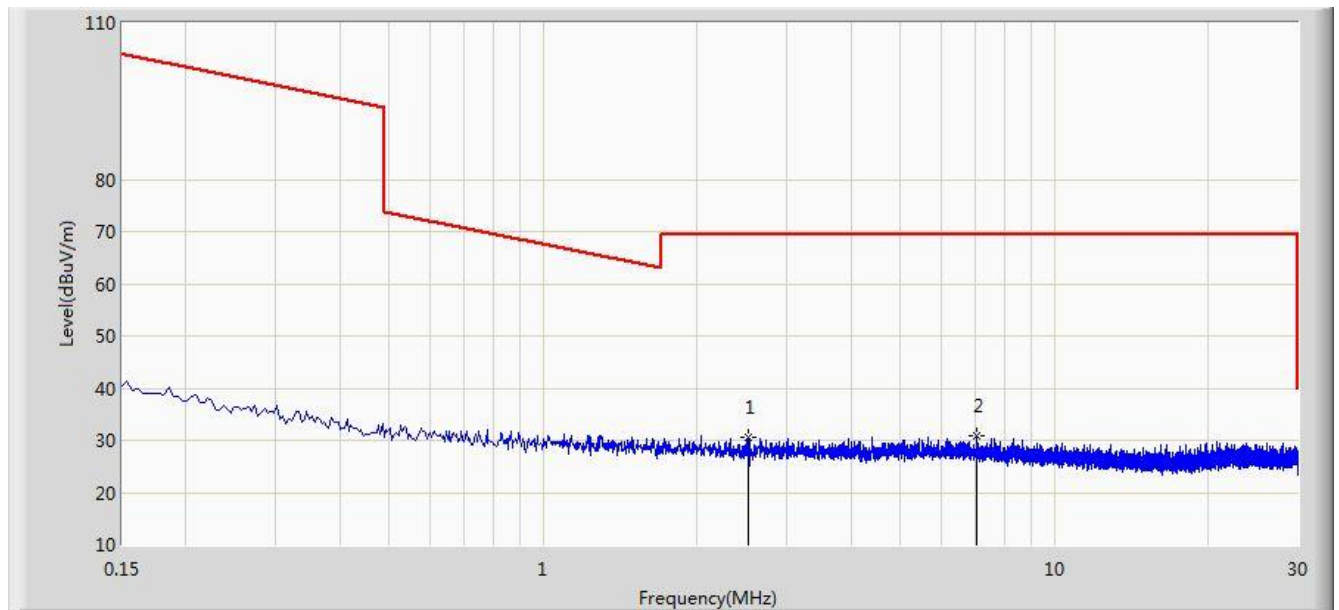


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			0.049	50.367	29.861	-63.422	113.789	20.505	QP
2		*	0.105	44.143	23.996	-63.029	107.173	20.147	QP

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

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

Site: AC1	Time: 2015/04/22 - 15:41
Limit: FCC_Part15.209_RE(3m)	Engineer: Roy Cheng
Probe: FMZB1519_0.009-30MHz	Polarity: Face On
EUT: Whome Smart bulb speakers	Power: AC 120V/60Hz
Note: There is the ambient noise within frequency range 9kHz~30MHz.	

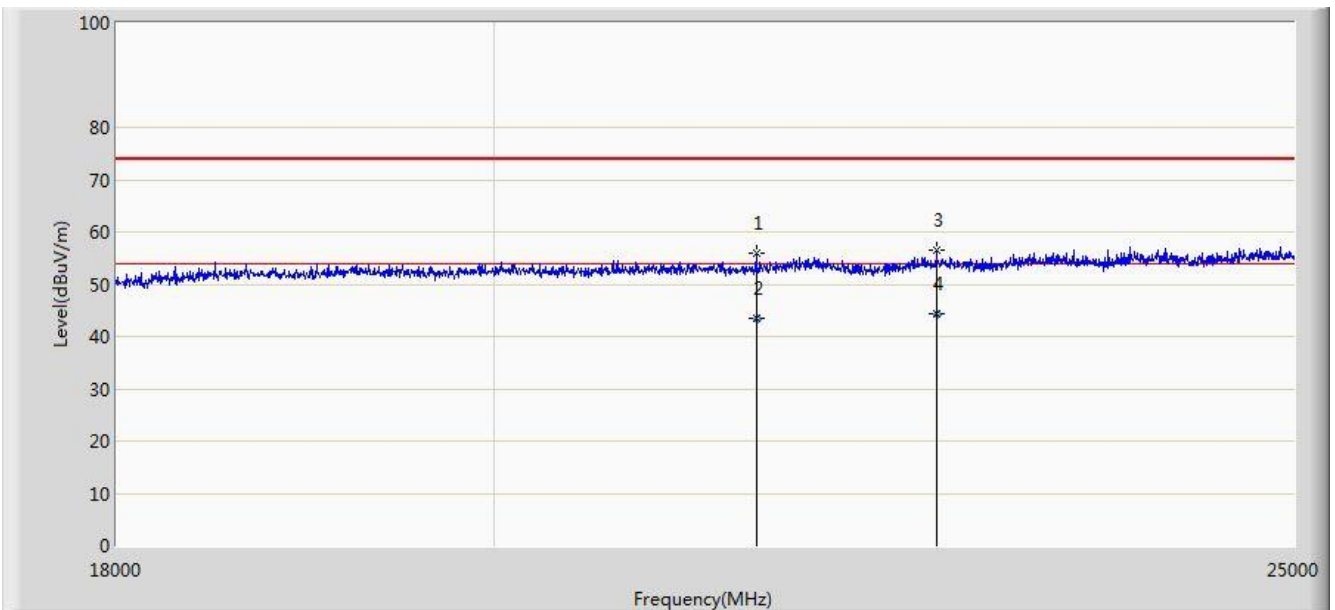


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2.513	30.495	10.336	-39.005	69.500	20.159	QP
2		*	7.041	30.974	10.579	-38.526	69.500	20.395	QP

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

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

Site: AC1	Time: 2015/04/22 - 15:45
Limit: FCC_Part15.209_RE(3m)	Engineer: Roy Cheng
Probe: BBHA9170_18-40GHz	Polarity: Horizontal
EUT: Whome Smart bulb speakers	Power: AC 120V/60Hz
Note: There is the ambient noise within frequency range 18 ~ 25GHz.	

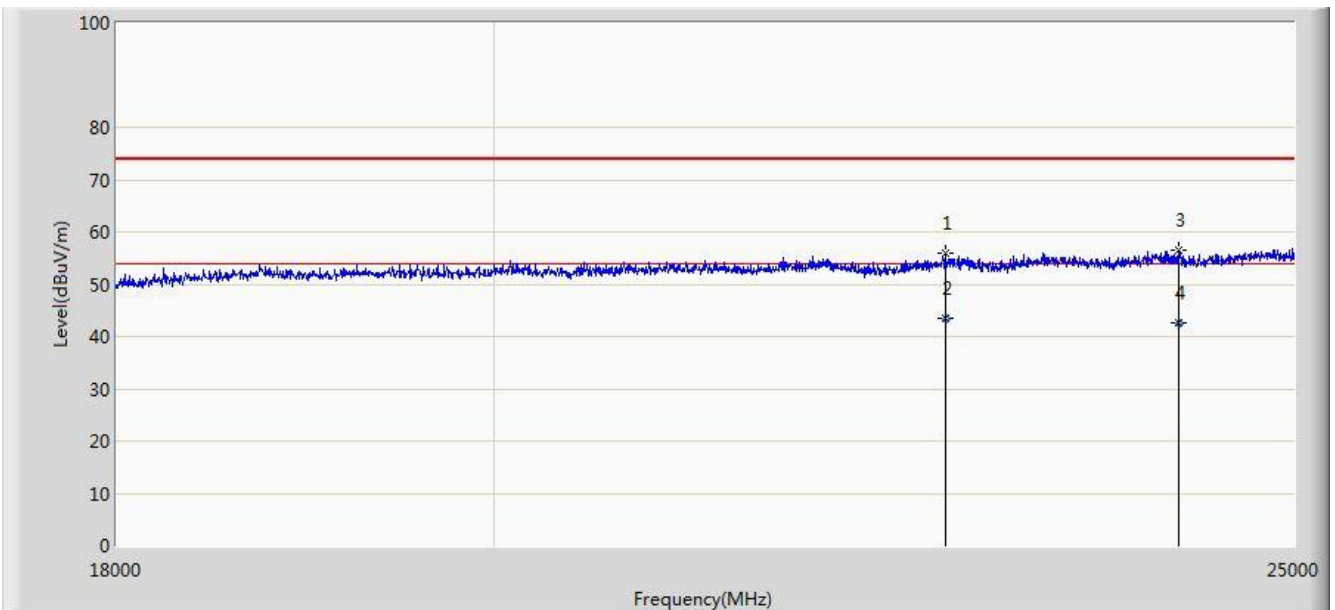


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			21517.500	55.869	17.883	-18.131	74.000	37.986	PK
2			21517.650	43.351	5.365	-10.649	54.000	37.986	AV
3			22630.500	56.509	18.223	-17.491	74.000	38.286	PK
4		*	22630.540	44.310	6.024	-9.690	54.000	38.286	AV

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

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

Site: AC1	Time: 2015/04/22 - 15:59
Limit: FCC_Part15.209_RE(3m)	Engineer: Roy Cheng
Probe: BBHA9170_18-40GHz	Polarity: Vertical
EUT: Whome Smart bulb speakers	Power: AC 120V/60Hz
Note: There is the ambient noise within frequency range 18 ~ 25GHz.	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			22686.500	55.811	17.457	-18.189	74.000	38.354	PK
2		*	22686.540	43.598	5.244	-10.402	54.000	38.354	AV
3			24205.500	56.430	17.607	-17.570	74.000	38.823	PK
4			24205.658	42.518	3.695	-11.482	54.000	38.823	AV

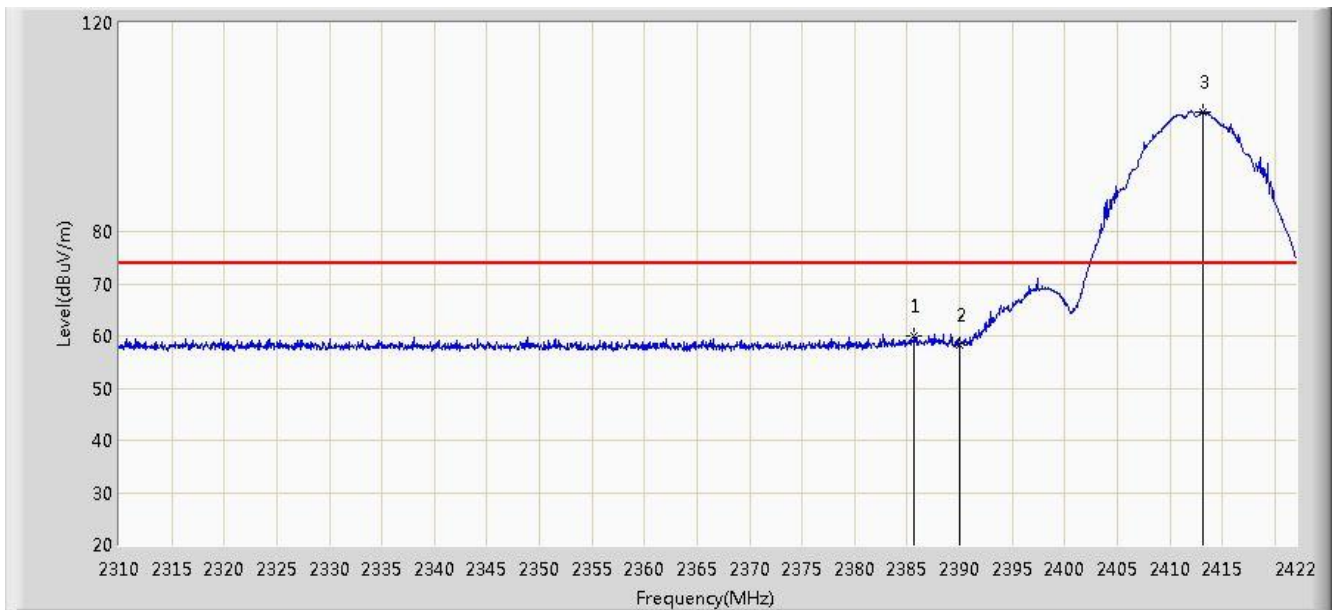
Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

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

7.7. Radiated Restricted Band Edge Measurement

7.7.1. Test Result

Site: AC1	Time: 2015/04/22 - 04:36
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Whome Smart bulb speakers	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11b at Channel 2412MHz	

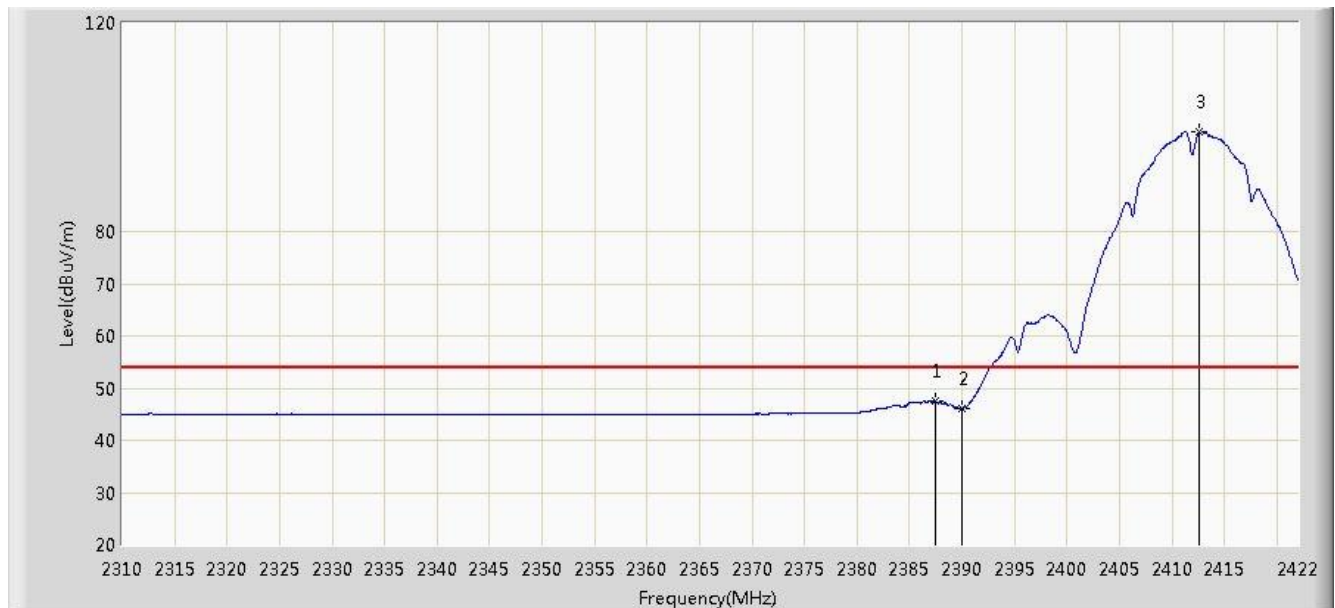


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2385.656	59.927	28.716	-14.073	74.000	31.211	PK
2			2390.000	58.343	27.140	-15.657	74.000	31.203	PK
3		*	2413.208	102.896	71.729	N/A	N/A	31.167	PK

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

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

Site: AC1	Time: 2015/04/22 - 04:57
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Whome Smart bulb speakers	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11b at Channel 2412MHz	

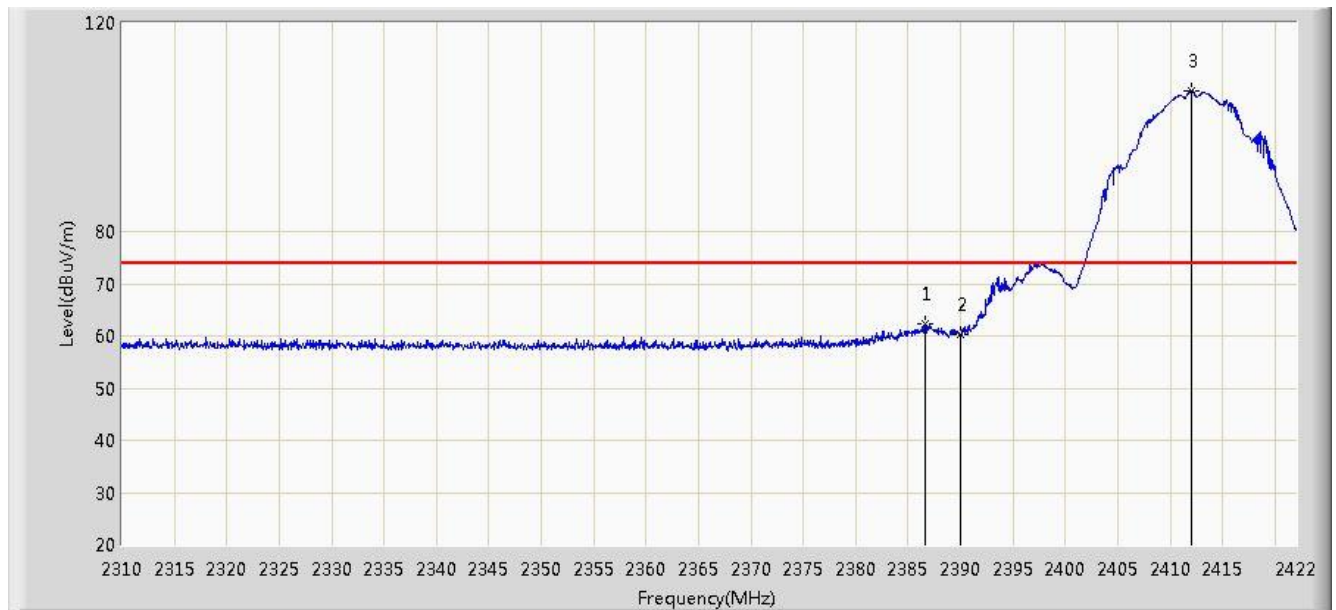


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2387.448	47.493	16.286	-6.507	54.000	31.207	AV
2			2390.000	46.185	14.982	-7.815	54.000	31.203	AV
3		*	2412.592	99.066	67.897	N/A	N/A	31.169	AV

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

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

Site: AC1	Time: 2015/04/22 - 04:57
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Whome Smart bulb speakers	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11b at Channel 2412MHz	

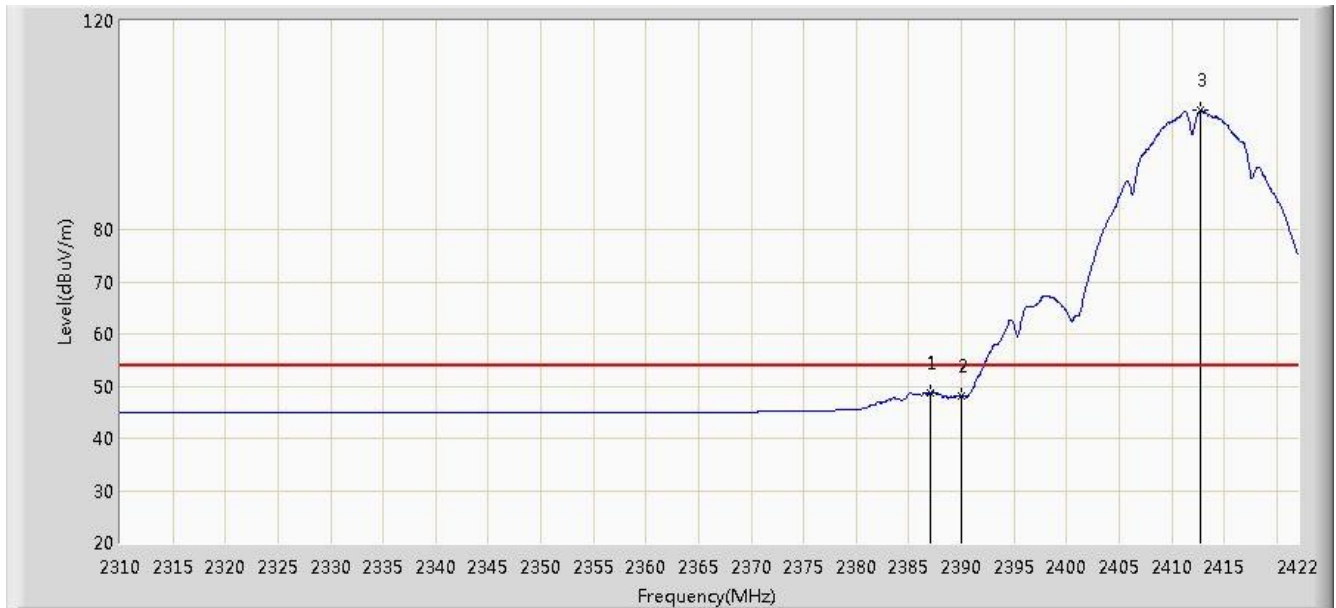


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2386.664	62.366	31.157	-11.634	74.000	31.208	PK
2			2390.000	60.381	29.178	-13.619	74.000	31.203	PK
3		*	2412.032	107.018	75.848	N/A	N/A	31.170	PK

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

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

Site: AC1	Time: 2015/04/22 - 05:00
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Whome Smart bulb speakers	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11b at Channel 2412MHz	

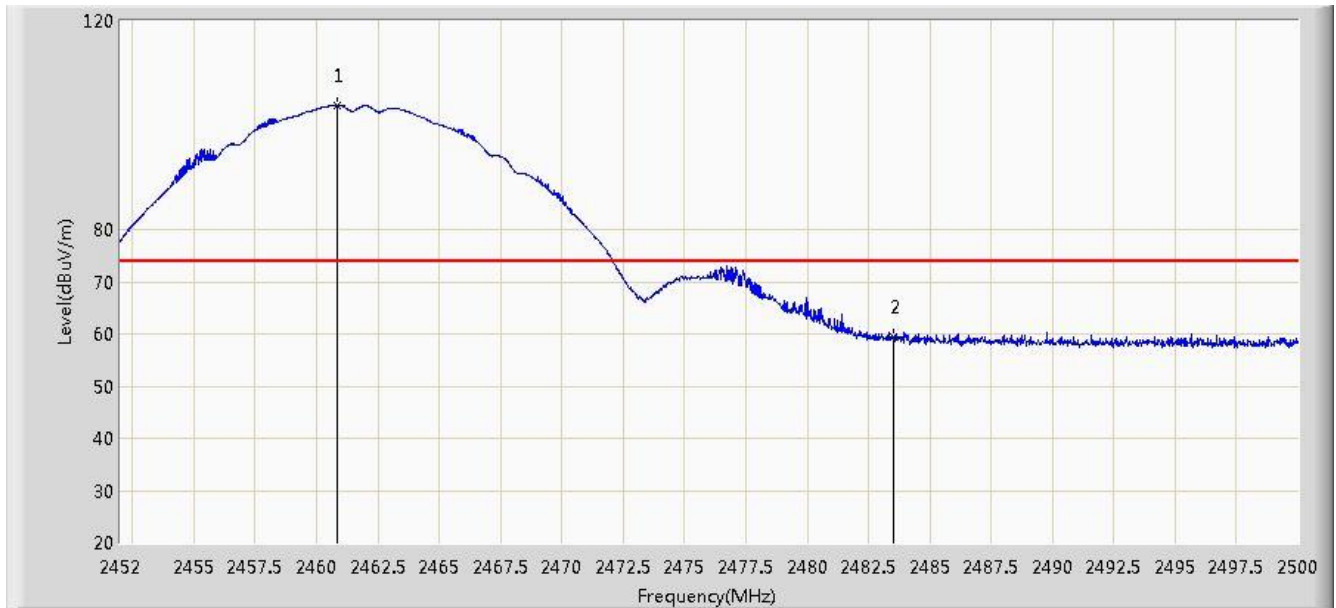


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2387.000	48.757	17.549	-5.243	54.000	31.209	AV
2			2390.000	48.116	16.913	-5.884	54.000	31.203	AV
3		*	2412.760	102.806	71.638	N/A	N/A	31.168	AV

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

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

Site: AC1	Time: 2015/04/22 - 05:01
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Whome Smart bulb speakers	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		*	2460.856	103.815	72.682	N/A	N/A	31.133	PK
2			2483.500	59.387	28.194	-14.613	74.000	31.194	PK

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

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

Site: AC1	Time: 2015/04/22 - 05:02
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Whome Smart bulb speakers	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11b at Channel 2462MHz	

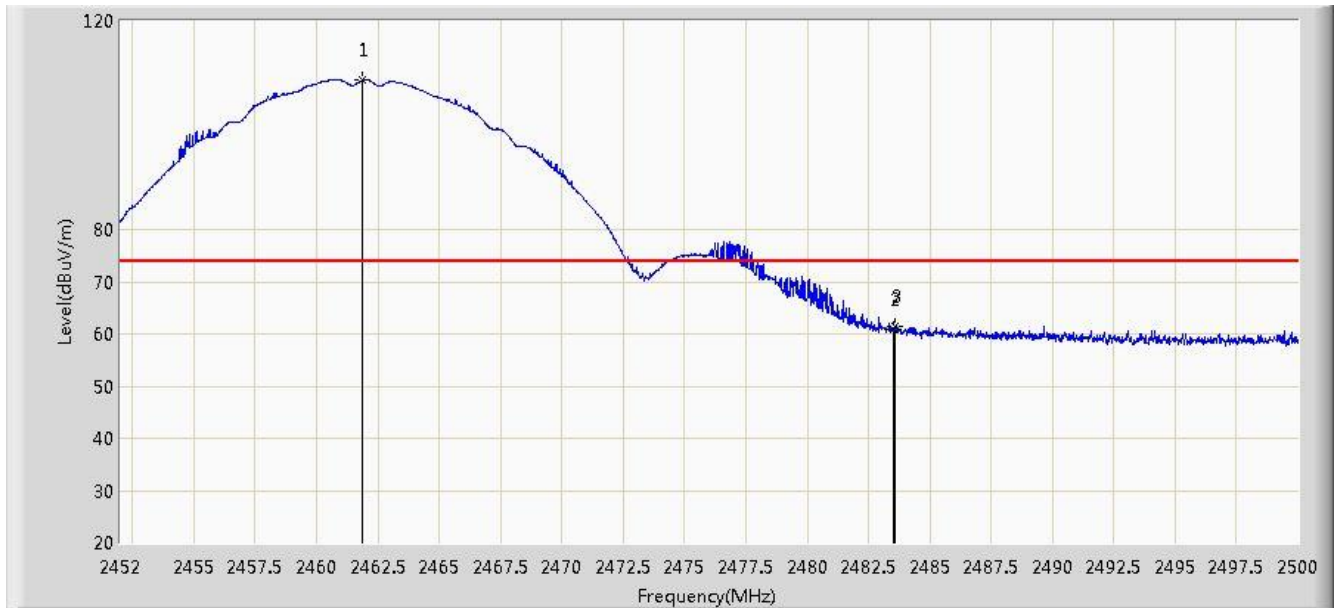


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2461.240	100.427	69.293	N/A	N/A	31.134	AV
2			2483.500	47.388	16.195	-6.612	54.000	31.194	AV

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

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

Site: AC1	Time: 2015/04/22 - 05:03
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Whome Smart bulb speakers	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		*	2461.888	108.665	77.530	N/A	N/A	31.135	PK
2			2483.500	60.917	29.724	-13.083	74.000	31.194	PK
3			2483.560	61.508	30.315	-12.492	74.000	31.194	PK

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

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

Site: AC1	Time: 2015/04/22 - 05:05
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Whome Smart bulb speakers	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11b at Channel 2462MHz	

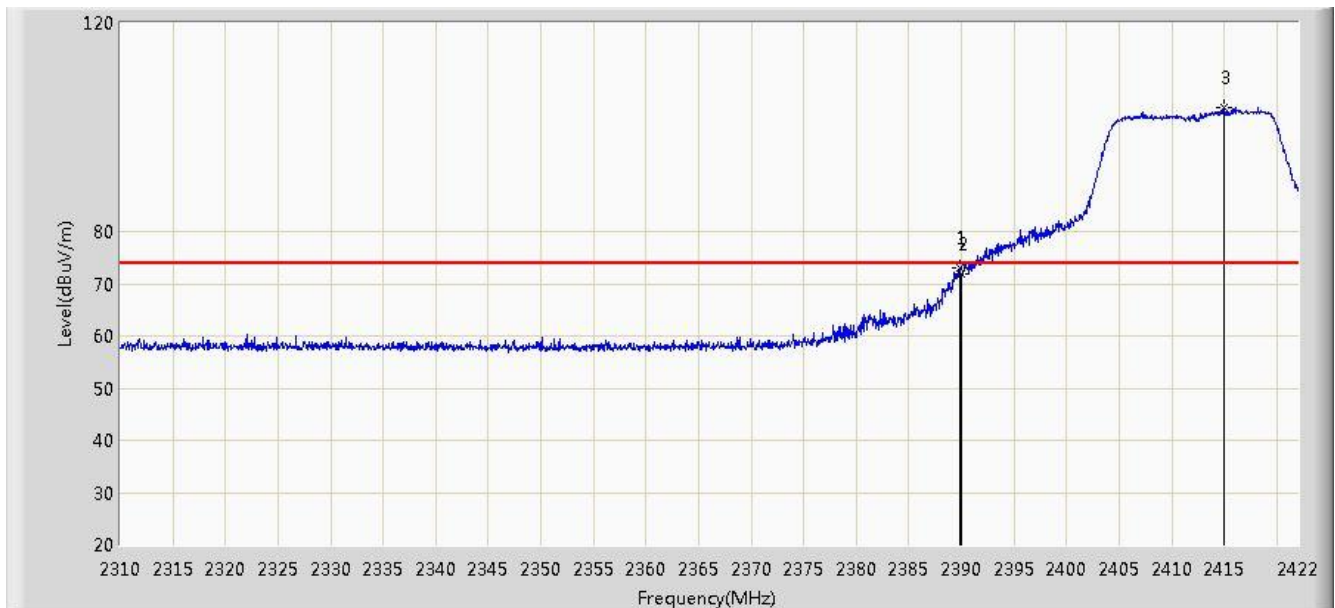


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2461.312	105.317	74.183	N/A	N/A	31.134	AV
2			2483.500	50.245	19.052	-3.755	54.000	31.194	AV

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

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

Site: AC1	Time: 2015/04/22 - 05:07
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Whome Smart bulb speakers	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11g at Channel 2412MHz	

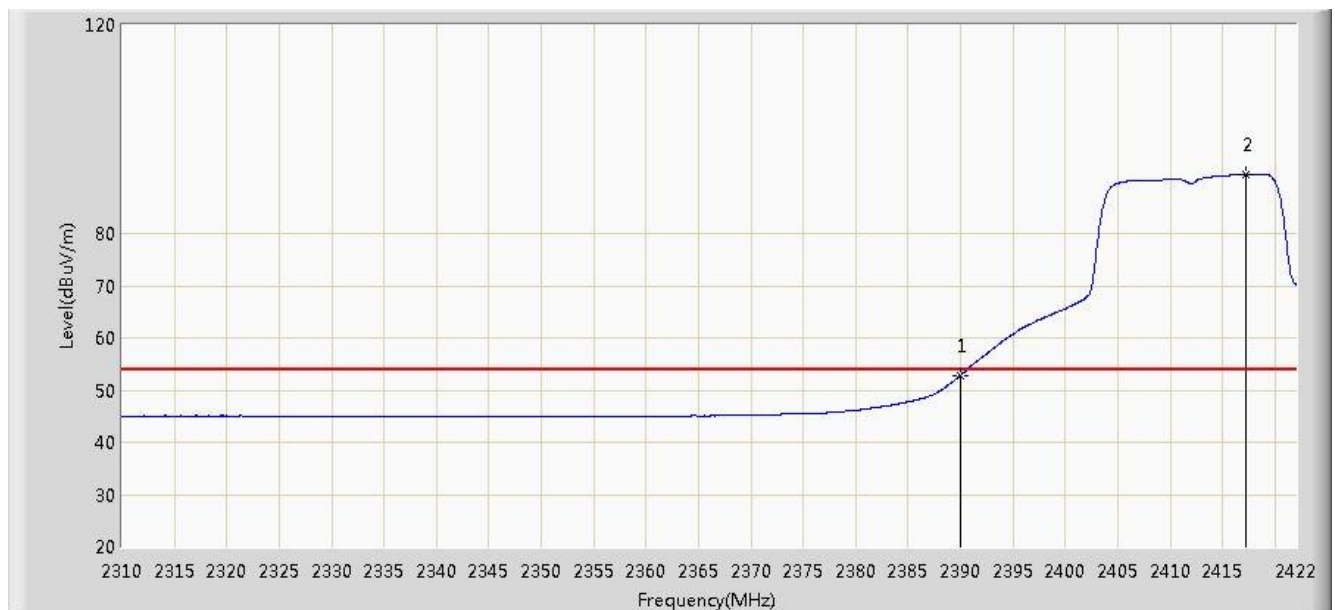


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2389.800	72.968	41.765	-1.032	74.000	31.203	PK
2			2390.000	71.791	40.588	-2.209	74.000	31.203	PK
3		*	2415.000	103.705	72.541	N/A	N/A	31.165	PK

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

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

Site: AC1	Time: 2015/04/22 - 05:11
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Whome Smart bulb speakers	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11g at Channel 2412MHz	

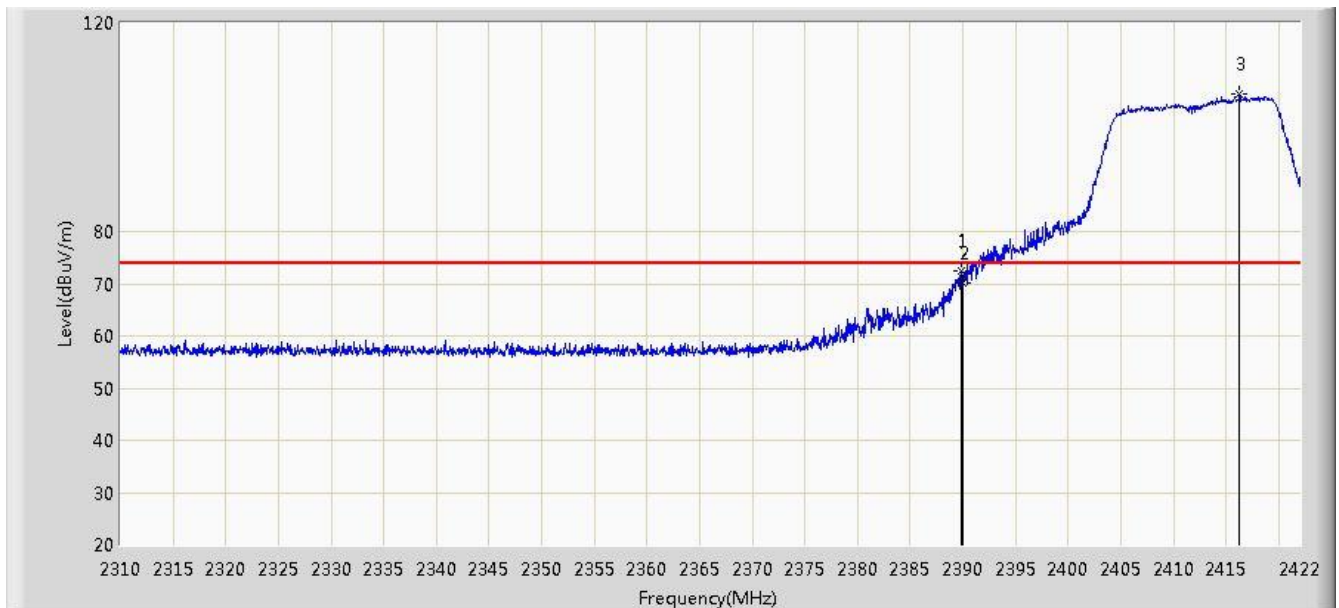


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	52.845	21.642	-1.155	54.000	31.203	AV
2		*	2417.240	91.376	60.215	N/A	N/A	31.160	AV

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

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

Site: AC1	Time: 2015/04/22 - 05:11
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Whome Smart bulb speakers	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11g at Channel 2412MHz	

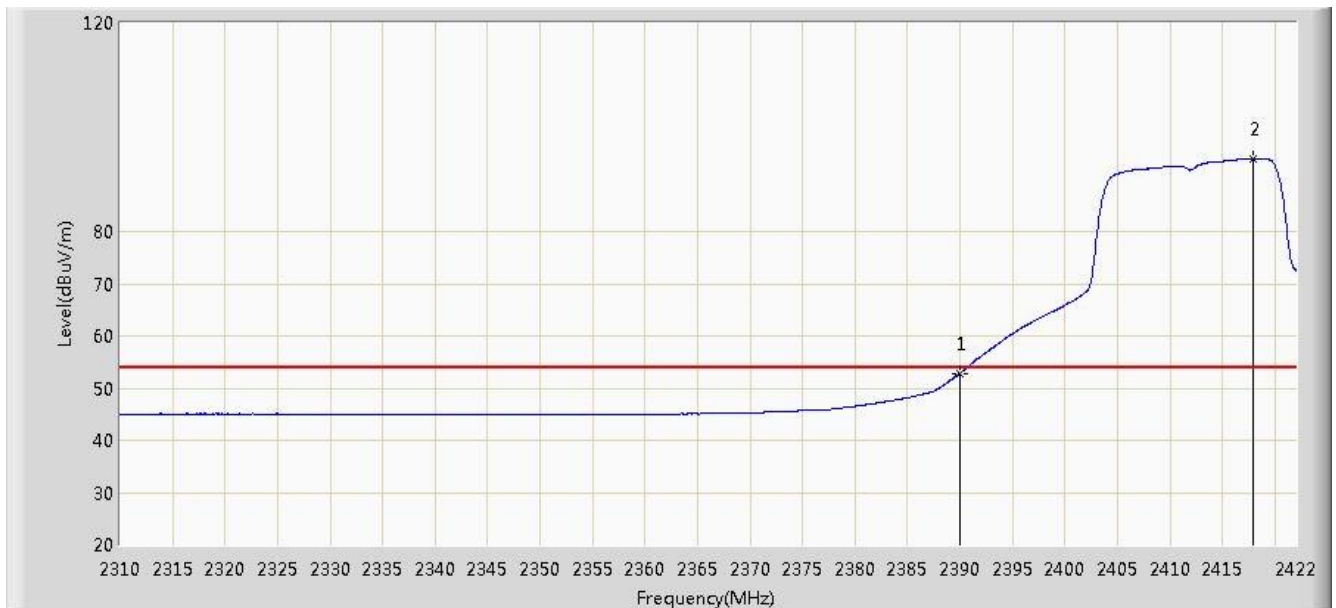


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2389.912	72.434	41.231	-1.566	74.000	31.203	PK
2			2390.000	70.079	38.876	-3.921	74.000	31.203	PK
3		*	2416.232	106.347	75.185	N/A	N/A	31.162	PK

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

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

Site: AC1	Time: 2015/04/22 - 05:13
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Whome Smart bulb speakers	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	52.867	21.664	-1.133	54.000	31.203	AV
2		*	2417.912	94.022	62.863	N/A	N/A	31.159	AV

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

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

Site: AC1	Time: 2015/04/22 - 05:14
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Whome Smart bulb speakers	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		*	2457.280	102.813	71.686	N/A	N/A	31.127	PK
2			2483.500	72.395	41.202	-1.605	74.000	31.194	PK
3			2483.656	72.416	41.222	-1.584	74.000	31.194	PK

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

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

Site: AC1	Time: 2015/04/22 - 05:17
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Whome Smart bulb speakers	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11g at Channel 2462MHz	

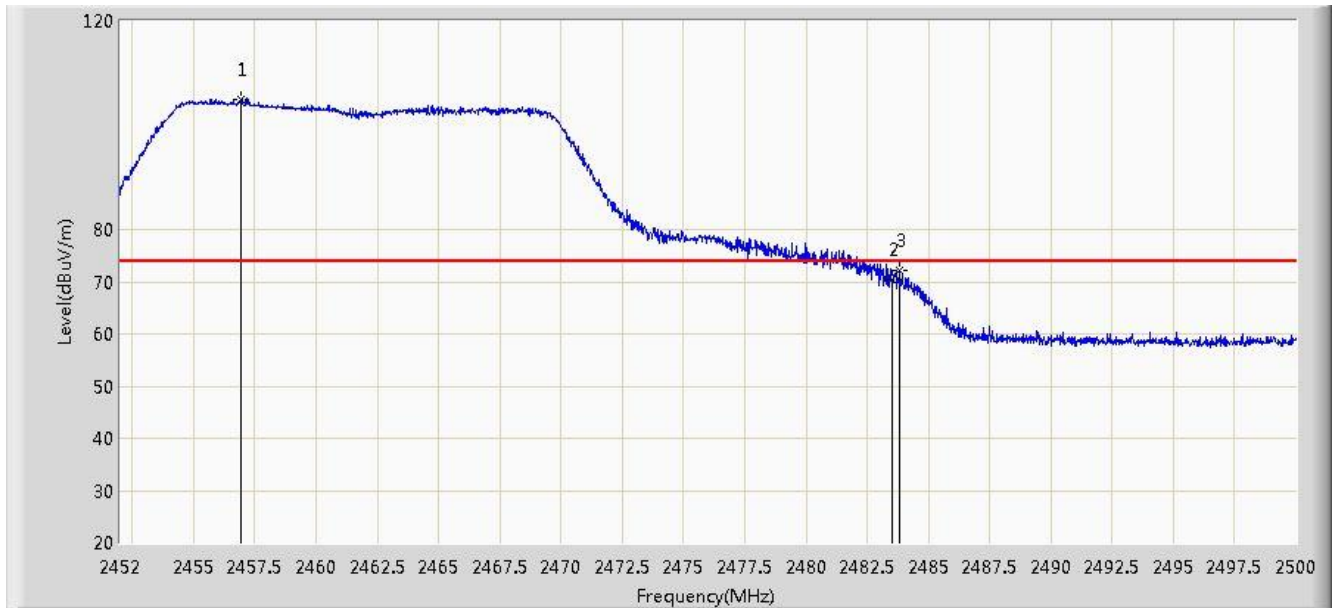


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2455.792	90.360	59.236	N/A	N/A	31.125	AV
2			2483.500	50.760	19.567	-3.240	54.000	31.194	AV

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

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

Site: AC1	Time: 2015/04/22 - 05:18
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Whome Smart bulb speakers	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		*	2456.944	104.940	73.814	N/A	N/A	31.127	PK
2			2483.500	70.456	39.263	-3.544	74.000	31.194	PK
3			2483.848	72.298	41.104	-1.702	74.000	31.194	PK

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

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

Site: AC1	Time: 2015/04/22 - 05:19
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Whome Smart bulb speakers	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		*	2455.480	92.751	61.627	N/A	N/A	31.123	AV
2			2483.500	51.063	19.870	-2.937	54.000	31.194	AV

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

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

Site: AC1	Time: 2015/04/22 - 05:20
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Whome Smart bulb speakers	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11n-HT20 at Channel 2412MHz	

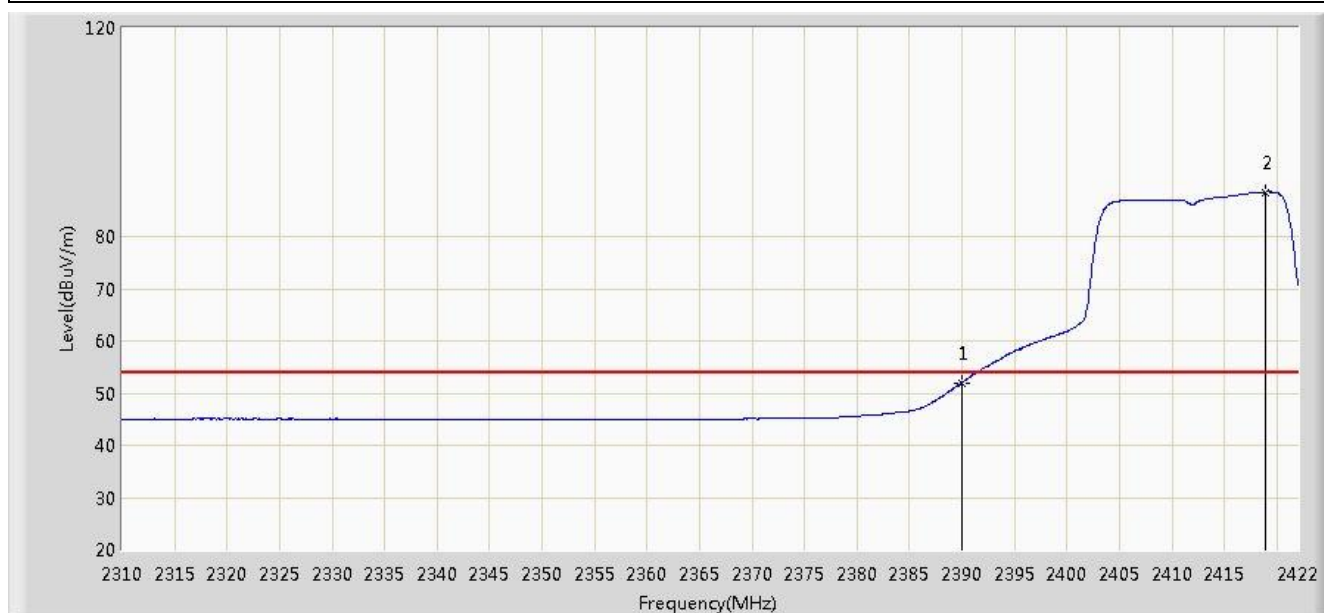


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2389.632	71.791	40.588	-2.209	74.000	31.204	PK
2			2390.000	70.890	39.687	-3.110	74.000	31.203	PK
3		*	2418.472	100.448	69.290	N/A	N/A	31.159	PK

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

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

Site: AC1	Time: 2015/04/22 - 05:23
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Whome Smart bulb speakers	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11n-HT20 at Channel 2412MHz	

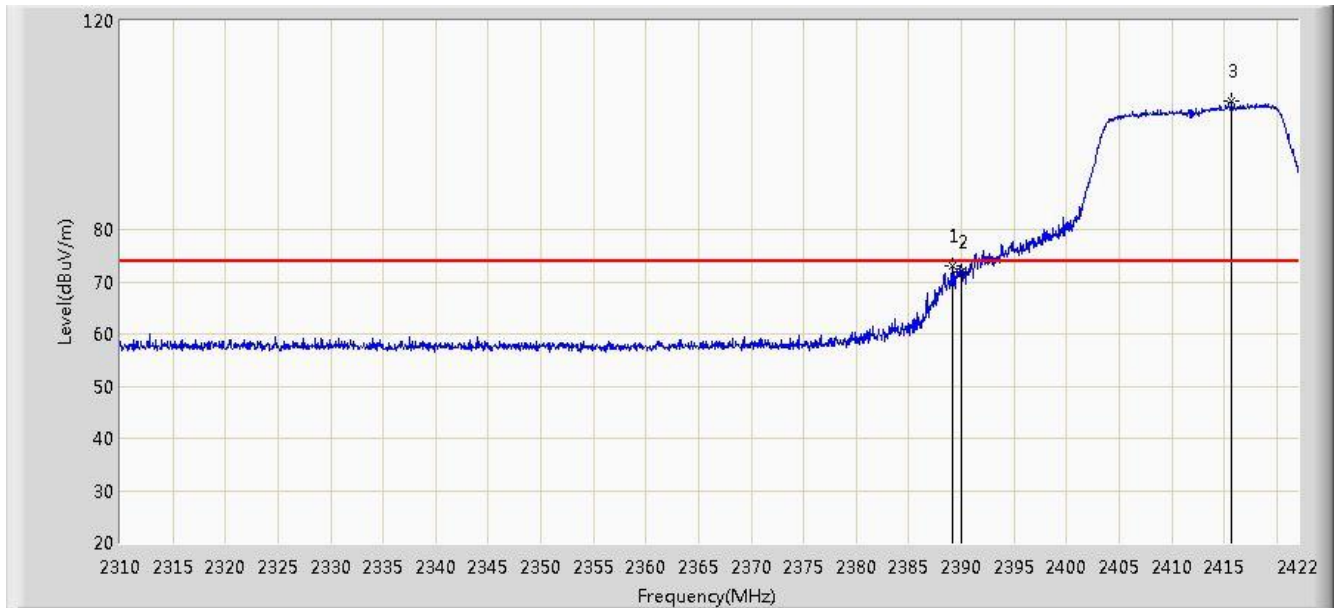


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	52.027	20.824	-1.973	54.000	31.203	AV
2		*	2418.976	88.536	57.378	N/A	N/A	31.157	AV

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

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

Site: AC1	Time: 2015/04/22 - 05:24
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Whome Smart bulb speakers	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11n-HT20 at Channel 2412MHz	

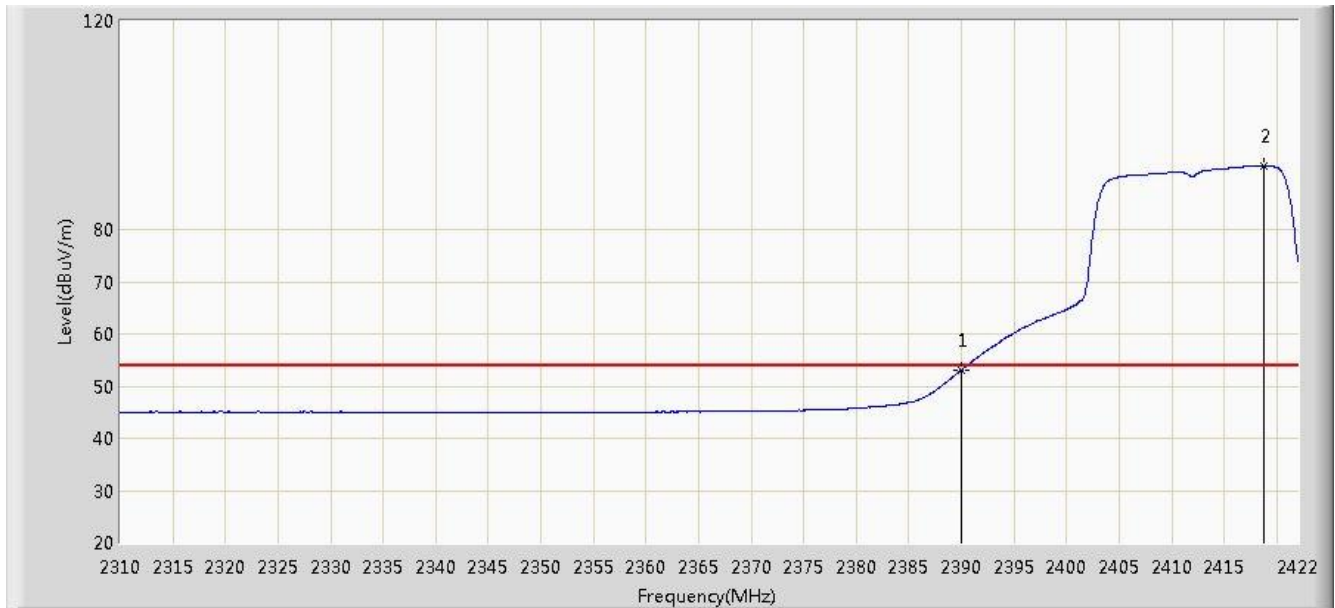


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2389.128	72.934	41.730	-1.066	74.000	31.204	PK
2			2390.000	71.848	40.645	-2.152	74.000	31.203	PK
3		*	2415.728	104.497	73.334	N/A	N/A	31.163	PK

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

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

Site: AC1	Time: 2015/04/22 - 05:25
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Whome Smart bulb speakers	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11n-HT20 at Channel 2412MHz	

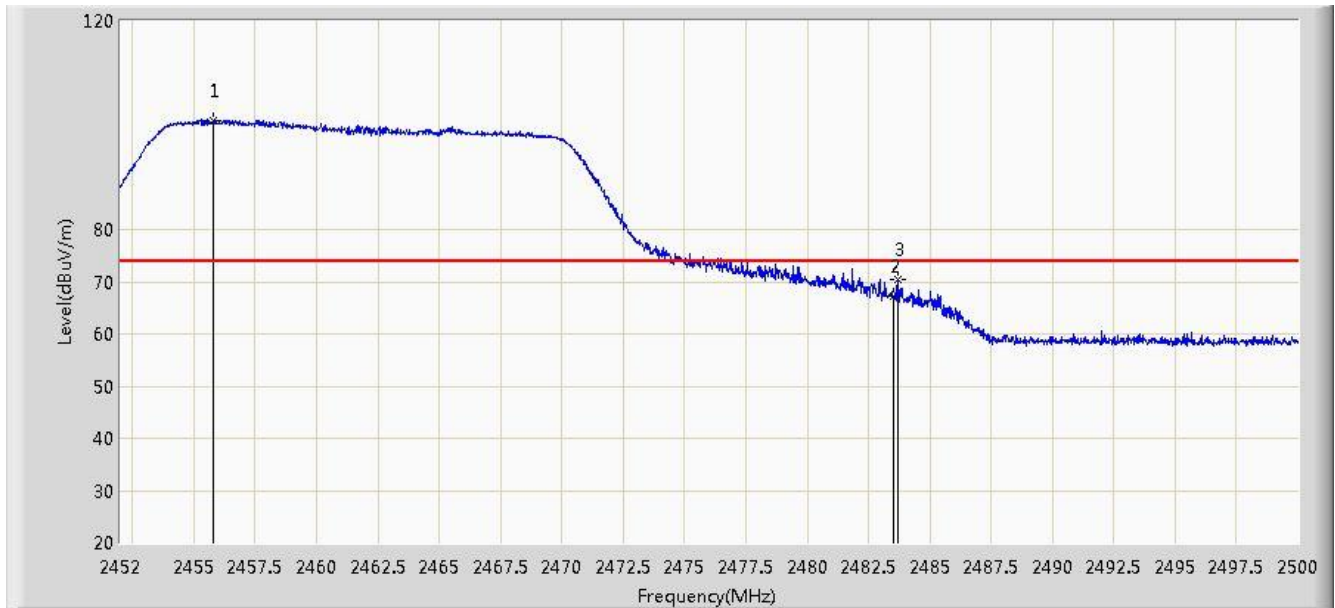


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	53.046	21.843	-0.954	54.000	31.203	AV
2		*	2418.808	92.143	60.985	N/A	N/A	31.158	AV

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

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

Site: AC1	Time: 2015/04/22 - 05:25
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Whome Smart bulb speakers	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		*	2455.816	100.950	69.826	N/A	N/A	31.125	PK
2			2483.500	67.119	35.926	-6.881	74.000	31.194	PK
3			2483.728	70.371	39.177	-3.629	74.000	31.194	PK

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

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

Site: AC1	Time: 2015/04/22 - 05:28
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Whome Smart bulb speakers	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11n-HT20 at Channel 2462MHz	

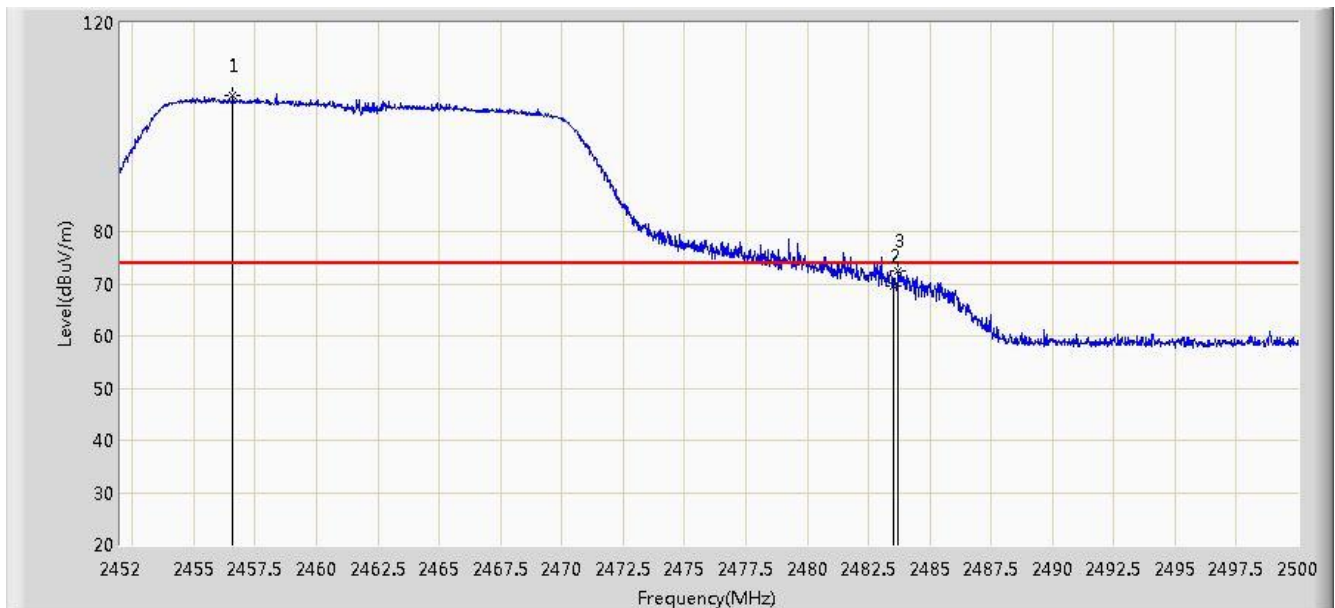


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2455.120	88.839	57.716	N/A	N/A	31.123	AV
2			2483.500	48.955	17.762	-5.045	54.000	31.194	AV

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

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

Site: AC1	Time: 2015/04/22 - 05:28
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Whome Smart bulb speakers	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		*	2456.584	106.022	74.896	N/A	N/A	31.125	PK
2			2483.500	69.559	38.366	-4.441	74.000	31.194	PK
3			2483.728	72.464	41.270	-1.536	74.000	31.194	PK

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

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

Site: AC1	Time: 2015/04/22 - 05:29
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Whome Smart bulb speakers	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11n-HT20 at Channel 2462MHz	

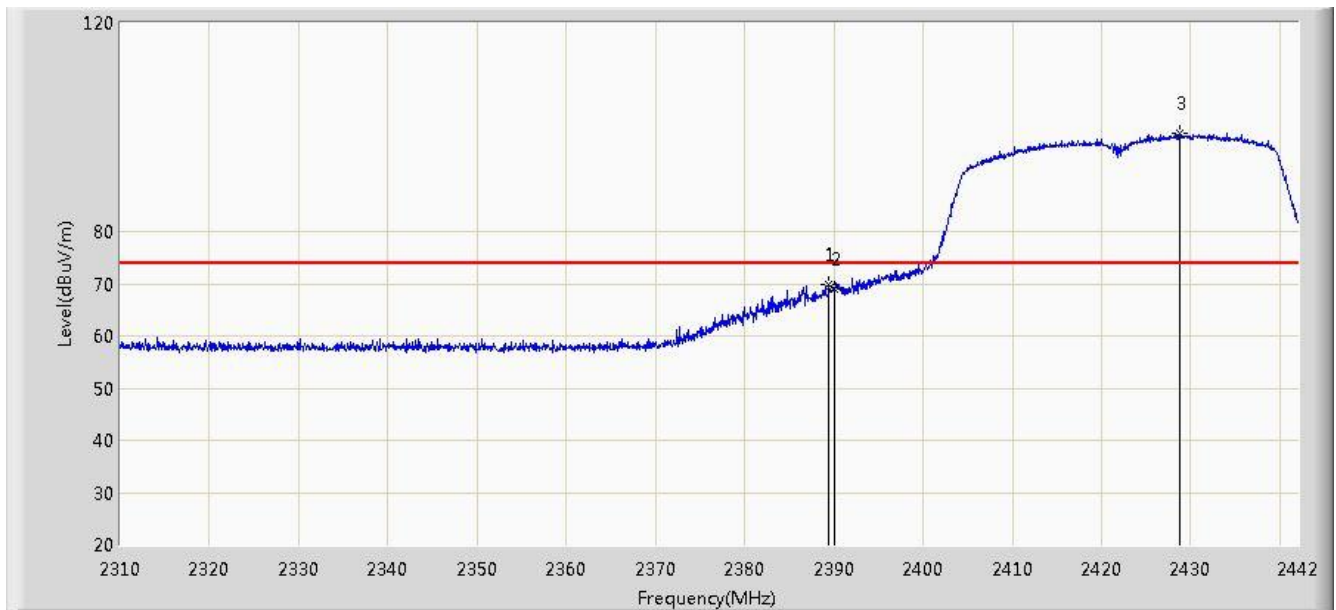


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2455.864	92.645	61.521	N/A	N/A	31.125	AV
2			2483.500	50.726	19.533	-3.274	54.000	31.194	AV

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

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

Site: AC1	Time: 2015/04/22 - 05:30
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Whome Smart bulb speakers	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11n-HT40 at Channel 2422MHz	

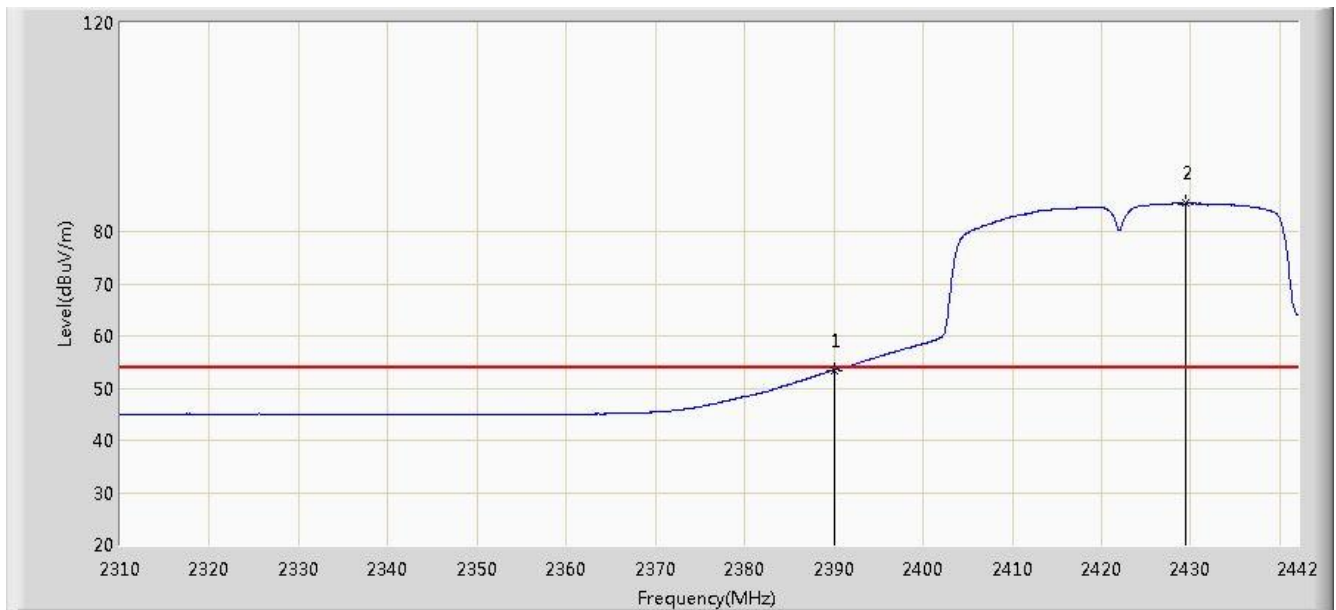


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2389.398	69.896	38.692	-4.104	74.000	31.203	PK
2			2390.000	68.849	37.646	-5.151	74.000	31.203	PK
3		*	2428.800	98.776	67.636	N/A	N/A	31.140	PK

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

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

Site: AC1	Time: 2015/04/22 - 05:32
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Whome Smart bulb speakers	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11n-HT40 at Channel 2422MHz	

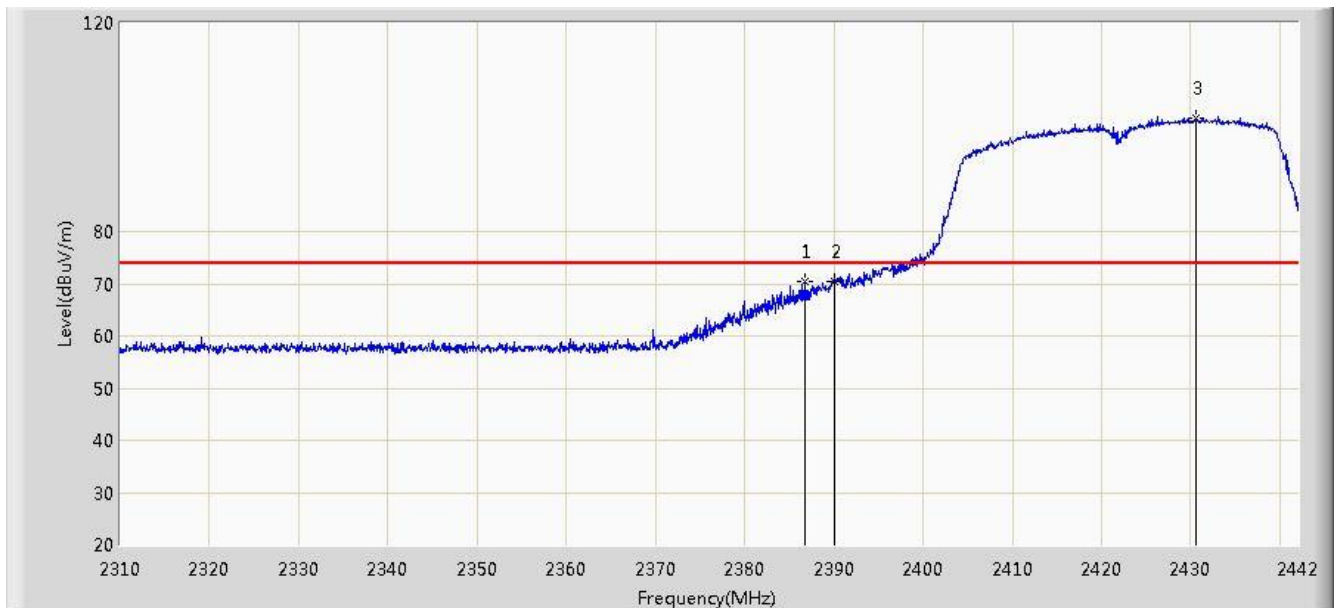


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	53.427	22.224	-0.573	54.000	31.203	AV
2		*	2429.460	85.392	54.253	N/A	N/A	31.139	AV

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

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

Site: AC1	Time: 2015/04/22 - 05:32
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Whome Smart bulb speakers	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11n-HT40 at Channel 2422MHz	

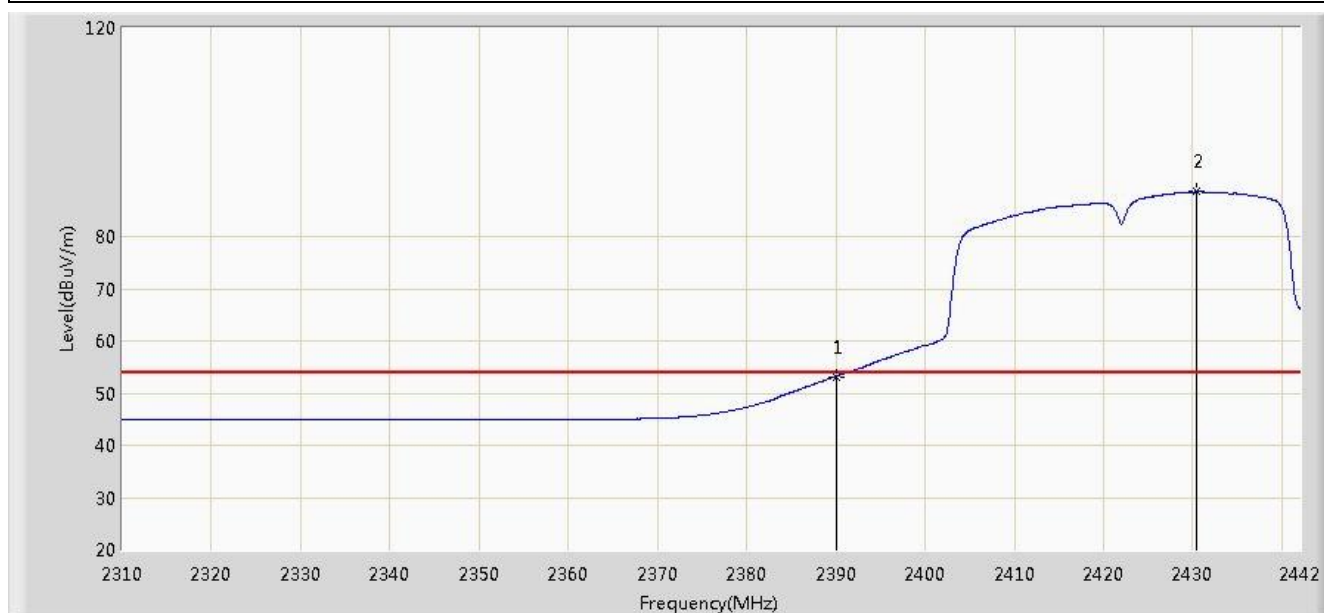


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2386.692	70.303	39.094	-3.697	74.000	31.208	PK
2			2390.000	70.545	39.342	-3.455	74.000	31.203	PK
3		*	2430.516	101.878	70.741	N/A	N/A	31.137	PK

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

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

Site: AC1	Time: 2015/04/22 - 05:34
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Whome Smart bulb speakers	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11n-HT40 at Channel 2422MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	53.125	21.922	-0.875	54.000	31.203	AV
2		*	2430.450	88.591	57.454	N/A	N/A	31.137	AV

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

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

Site: AC1	Time: 2015/04/22 - 05:35
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Whome Smart bulb speakers	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11n-HT40 at Channel 2452MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2443.118	99.735	68.623	N/A	N/A	31.112	PK
2			2483.500	65.695	34.502	-8.305	74.000	31.194	PK
3			2483.816	68.208	37.014	-5.792	74.000	31.194	PK

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

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

Site: AC1	Time: 2015/04/22 - 05:36
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Whome Smart bulb speakers	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11n-HT40 at Channel 2452MHz	

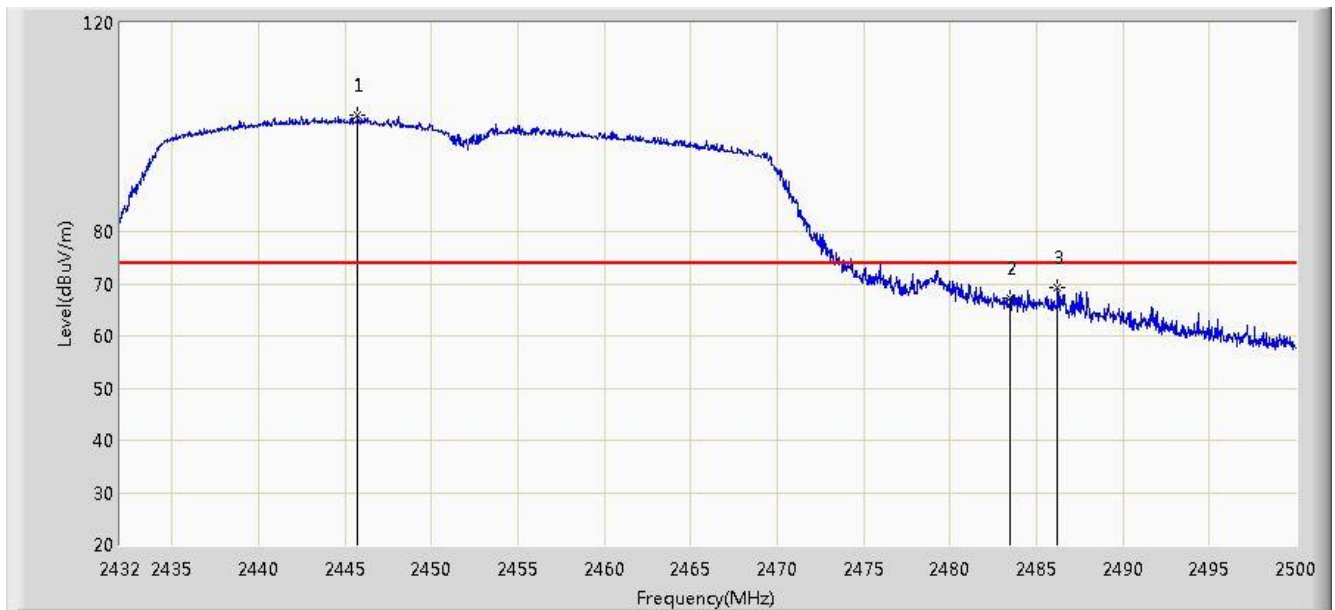


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2443.492	86.949	55.837	N/A	N/A	31.111	AV
2			2483.500	52.187	20.994	-1.813	54.000	31.194	AV

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

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

Site: AC1	Time: 2015/04/22 - 05:41
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Whome Smart bulb speakers	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11n-HT40 at Channel 2452MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2445.736	102.461	71.353	N/A	N/A	31.108	PK
2			2483.500	67.124	35.931	-6.876	74.000	31.194	PK
3			2486.230	69.267	38.066	-4.733	74.000	31.201	PK

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

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

Site: AC1	Time: 2015/04/22 - 05:40
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Whome Smart bulb speakers	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11n-HT40 at Channel 2452MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2445.600	89.159	58.051	N/A	N/A	31.108	AV
2			2483.500	52.267	21.074	-1.733	54.000	31.194	AV

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

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

7.8. AC Conducted Emissions Measurement

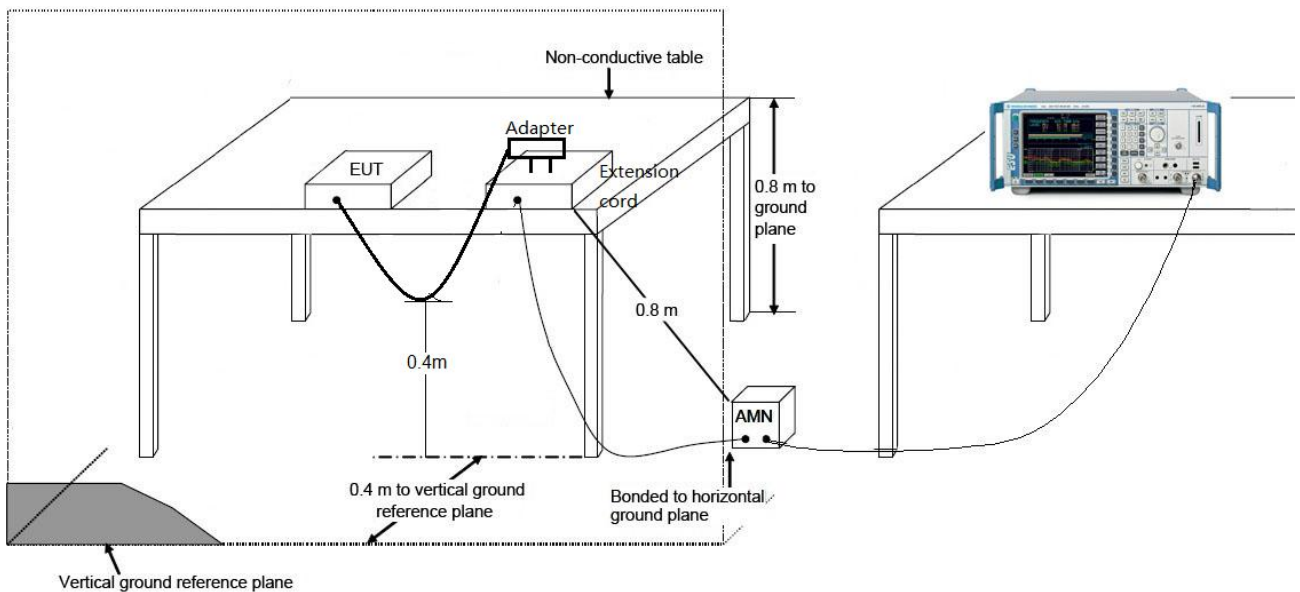
7.8.1. Test Limit

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

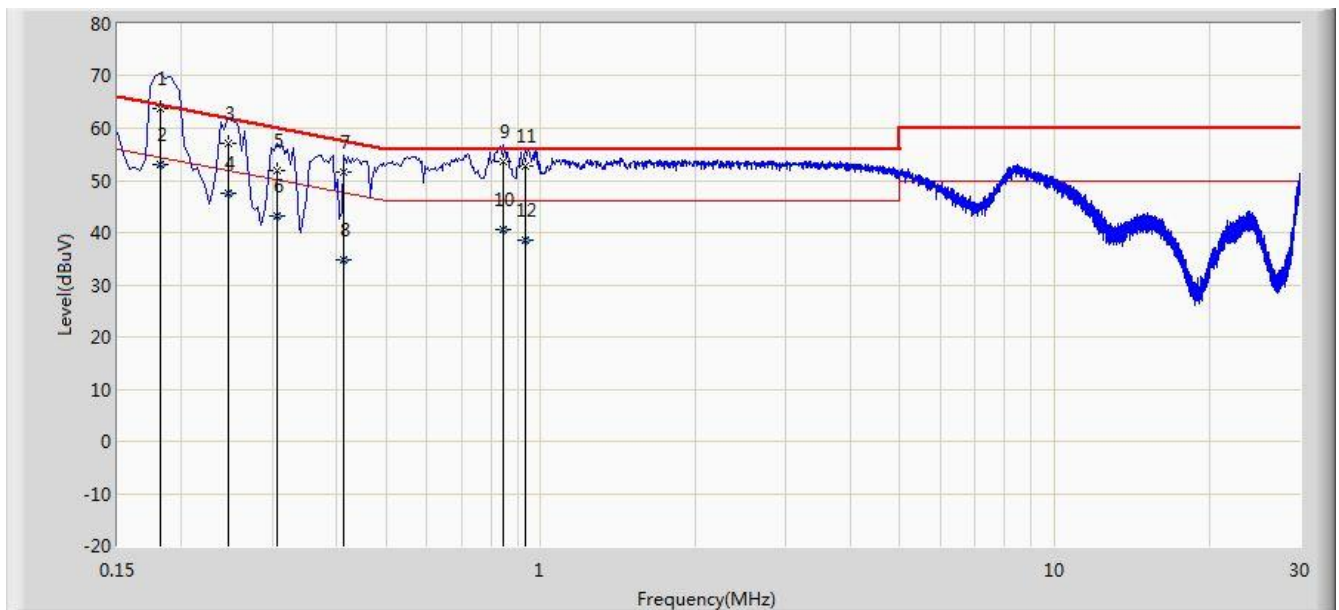
Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

7.8.2. Test Setup



7.8.3. Test Result

Site: SR2	Time: 2015/04/24 - 10:21
Limit: FCC_Part15.207_CE_AC Power	Engineer: Milo Li
Probe: ENV216_101683_Filter On	Polarity: Line
EUT: Whome Smart bulb speakers	Power: AC 120V/60Hz
Note: Normal Operation	

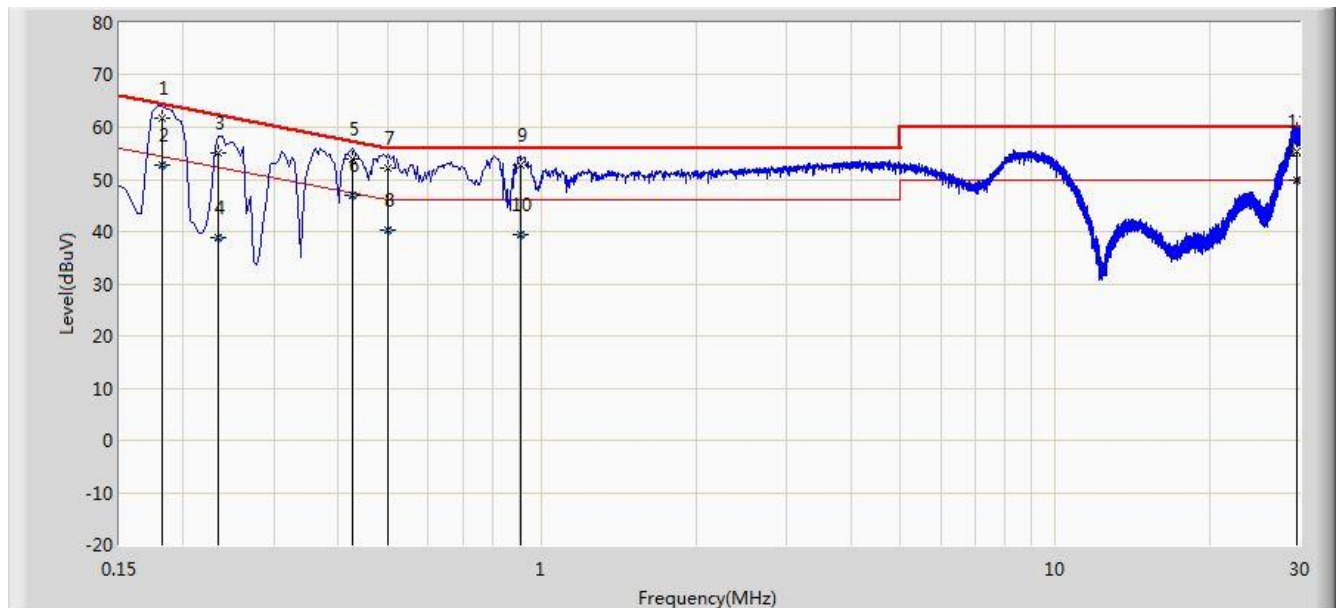


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		*	0.182	63.728	53.680	-0.666	64.394	10.048	QP
2			0.182	53.088	43.040	-1.306	54.394	10.048	AV
3			0.246	57.144	47.183	-4.748	61.891	9.961	QP
4			0.246	47.460	37.499	-4.431	51.891	9.961	AV
5			0.306	51.920	41.911	-8.159	60.078	10.009	QP
6			0.306	43.179	33.170	-6.899	50.078	10.009	AV
7			0.414	51.505	41.408	-6.063	57.568	10.097	QP
8			0.414	34.918	24.822	-12.649	47.568	10.097	AV
9			0.846	53.639	43.651	-2.361	56.000	9.988	QP
10			0.846	40.502	30.514	-5.498	46.000	9.988	AV
11			0.934	52.688	42.746	-3.312	56.000	9.942	QP
12			0.934	38.430	28.488	-7.570	46.000	9.942	AV

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

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

Site: SR2	Time: 2015/04/24 - 10:30
Limit: FCC_Part15.207_CE_AC Power	Engineer: Milo Li
Probe: ENV216_101683_Filter On	Polarity: Neutral
EUT: Whome Smart bulb speakers	Power: AC 120V/60Hz
Note: Normal Operation	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1			0.182	61.663	51.621	-2.731	64.394	10.042	QP
2			0.182	52.628	42.585	-1.766	54.394	10.042	AV
3			0.234	55.054	45.065	-7.253	62.307	9.989	QP
4			0.234	38.849	28.860	-13.458	52.307	9.989	AV
5			0.426	53.921	43.789	-3.409	57.330	10.132	QP
6			0.426	46.954	36.822	-0.376	47.330	10.132	AV
7			0.502	52.181	42.004	-3.819	56.000	10.177	QP
8			0.502	40.219	30.042	-5.781	46.000	10.177	AV
9			0.910	52.618	42.659	-3.382	56.000	9.959	QP
10			0.910	39.339	29.380	-6.661	46.000	9.959	AV
11			29.518	55.439	45.006	-4.561	60.000	10.434	QP
12		*	29.518	49.781	39.348	-0.219	50.000	10.434	AV

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

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

8. CONCLUSION

The data collected relate only the item(s) tested and show that the **Whome Smart bulb speakers** is in compliance with Part 15C of the FCC Rules.

The End
