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MEASUREMENT REPORT

FCC PART 15.247 802.11b/g/n

FCC ID: 2AJ3WEBEQPZ05

APPLICANT: Hangzhou Eboylamp Electronics Co.,Ltd.

Application Type: Certification

Product: SMART LED LAMP

Model No.: EBE-QPZ05

FCC Classification: Digital Transmission System (DTS)

FCC Rule Part(s): Part 15.247

Test Procedure(s): ANSI C63.10-2013, KDB 558074 D01v03r05

Test Date: December 12, 2016 ~ January 16, 2017

Reviewed By
Manager : Robin Wu
(Robin Wu)



Approved By
CEO : Marlinchen
(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 D01v03r05. 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
1611RSU01101	Rev. 01	Initial report	01-20-2017	Valid

CONTENTS

Description	Page
§2.1033 General Information	5
1. INTRODUCTION	6
1.1. Scope	6
1.2. MRT Test Location	6
2. PRODUCT INFORMATION	7
2.1. Equipment Description	7
2.2. Operation Frequency / Channel List	7
2.3. Test Mode	8
2.4. Test Software	8
2.5. Device Capabilities	9
2.6. Test Configuration	10
2.7. EMI Suppression Device(s)/Modifications	10
2.8. Labeling Requirements	10
3. DESCRIPTION OF TEST	11
3.1. Evaluation Procedure	11
3.2. AC Line Conducted Emissions	11
3.3. Radiated Emissions	12
4. ANTENNA REQUIREMENTS	13
5. TEST EQUIPMENT CALIBRATION DATE	14
6. MEASUREMENT UNCERTAINTY	15
7. TEST RESULT	16
7.1. Summary	16
7.2. 6dB Bandwidth Measurement	17
7.2.1. Test Limit	17
7.2.2. Test Procedure used	17
7.2.3. Test Setting	17
7.2.4. Test Setup	17
7.2.5. Test Result	18
7.3. Output Power Measurement	22
7.3.1. Test Limit	22
7.3.2. Test Procedure Used	22
7.3.3. Test Setting	22

7.3.4. Test Setup.....	22
7.3.5. Test Result of Output Power	23
7.3.6. Test Result of Average Output Power (Reporting Only).....	26
7.4. Power Spectral Density Measurement	27
7.4.1. Test Limit	27
7.4.2. Test Procedure Used	27
7.4.3. Test Setting.....	27
7.4.4. Test Setup.....	27
7.4.5. Test Result.....	28
7.5. Conducted Band Edge and Out-of-Band Emissions.....	32
7.5.1. Test Limit	32
7.5.2. Test Procedure Used	32
7.5.3. Test Settinng	32
7.5.4. Test Setup.....	33
7.5.5. Test Result.....	34
7.6. Radiated Spurious Emission Measurement	40
7.6.1. Test Limit	40
7.6.2. Test Procedure Used	40
7.6.3. Test Setting.....	40
7.6.4. Test Setup.....	42
7.6.5. Test Result.....	44
7.7. Radiated Restricted Band Edge Measurement	55
7.7.1. Test Result.....	55
7.8. AC Conducted Emissions Measurement.....	79
7.8.1. Test Limit	79
7.8.2. Test Setup.....	79
7.8.3. Test Result.....	80
8. CONCLUSION.....	82

§2.1033 General Information

Applicant:	Hangzhou Eboylamp Electronics Co.,Ltd.
Applicant Address:	No.326Liangyun Street,Yuhang District, Hangzhou, Zhejiang
Manufacturer:	Hangzhou Eboylamp Electronics Co.,Ltd.
Manufacturer Address:	No.326Liangyun Street,Yuhang District, Hangzhou, Zhejiang
Test Site:	MRT Technology (Suzhou) Co., Ltd
Test Site Address:	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
MRT Registration No.:	809388
FCC Rule Part(s):	Part 15.247
FCC ID:	2AJ3WEBEQPZ05
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	SMART LED LAMP
Model No.	EBC-QPZ05
WLAN Specification	
Frequency Range	802.11b/g/n-HT20: 2412 ~ 2462 MHz
Maximum Peak Output Power	802.11b: 12.51dBm 802.11g: 17.78dBm 802.11n-HT20: 17.65dBm
Type of Modulation	802.11b: DSSS 802.11g/n: OFDM
Antenna Gain	3.0dBi

2.2. Operation Frequency / Channel List

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	--	--

2.3. Test Mode

Test Mode	Mode 1: Transmit by 802.11b
	Mode 2: Transmit by 802.11g
	Mode 3: Transmit by 802.11n-HT20

2.4. Test Software

The test utility software used during testing was “SecureCRT”.

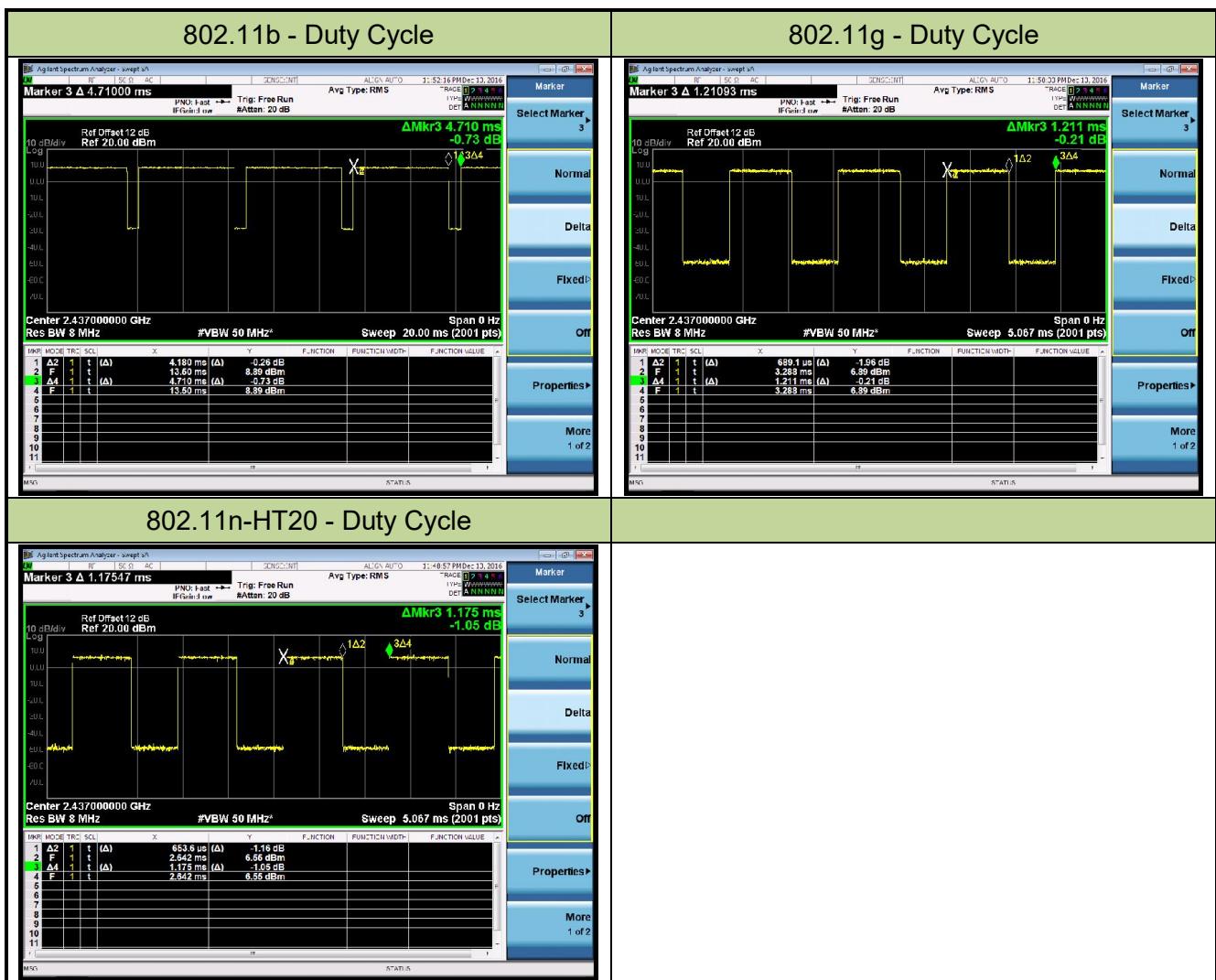
2.5. Device Capabilities

This device contains the following capabilities:

2.4GHz WLAN (DTS)

Note: 2.4GHz WLAN (DTS) operation is possible in 20MHz channel bandwidths. The maximum achievable duty cycle was determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

Test Mode	Duty Cycle
802.11b	88.7%
802.11g	56.9%
802.11n-HT20	55.6%



2.6. Test Configuration

The **SMART LED LAMP** was tested per the guidance of KDB 558074 D01v03r05. ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing.

2.7. EMI Suppression Device(s)/Modifications

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

2.8. Labeling Requirements

Per 2.1074 & 15.19; Docket 95-19

The label shall be permanently affixed at a conspicuous location on the device; instruction manual or pamphlet supplied to the user and be readily visible to the purchaser at the time of purchase. However, when the device is so small wherein placement of the label with specified statement is not practical, only the FCC ID must be displayed on the device per Section 15.19(a)(5). Please see attachment for FCC ID label and label location.

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 D01v03r05 were used in the measurement of the **SMART LED LAMP**.

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.

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 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 1-25GHz was placed on top of the 1.5 meter high, 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, if applicable, turntable azimuth, and receive antenna height was noted for each frequency found.

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

4. ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:

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

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

Conclusion:

The **SMART LED LAMP FCC ID: 2AJ3WEBEQPZ05** unit complies with the requirement of §15.203.

5. TEST EQUIPMENT CALIBRATION DATE

Conducted Emissions - SR2

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR7	101209	1 year	2017/06/21
Two-Line V-Network	R&S	ENV216	101683	1 year	2017/06/21
Two-Line V-Network	R&S	ENV216	101684	1 year	2017/06/21
Temperature/Humidity Meter	Yuhuaze	N/A	N/A	1 year	2017/12/20
Shielding Anechoic Chamber	MIX-BEP	Chamber-SR2	N/A	1 year	2017/05/10

Radiated Emission - AC1

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
EXA Signal Analyzer	Agilent	N9010A	MY56070124	1 year	2017/06/23
EMI Test Receiver	R&S	ESR7	101209	1 year	2017/06/21
Preamplifier	Agilent	83017A	MY52090106	1 year	2017/03/28
Broadband Coaxial Preamplifier	Schwarzbeck	BBV 9718	302	N/A	N/A
Loop Antenna	Schwarzbeck	FMZB1519	1519-041	1 year	2017/11/21
TRILOG Antenna	Schwarzbeck	VULB9162	9162-047	1 year	2017/10/22
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1167	1 year	2017/10/22
Broadband Horn Antenna	Schwarzbeck	BBHA9170	BBHA9170549	1 year	2017/01/04
Digital Thermometer & Hygrometer	Minggao	N/A	N/A	1 year	2017/12/14
Anechoic Chamber	RIKEN	Chamber-AC2	N/A	1 year	2017/05/10

Conducted Test Equipment - TR3

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9020A	MY52090106	1 year	2017/05/08
USB Wideband Power Sensor	Boonton	55006	8911	1 year	2017/05/08
Temperature/Humidity Meter	Yuhuaze	N/A	N/A	1 year	2017/12/20

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 - SR2
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_{c(y)}$): 150kHz~30MHz: 3.46dB
Radiated Emission Measurement - AC2
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_{c(y)}$): 9kHz ~ 1GHz: 4.18dB 1GHz ~ 25GHz: 4.76dB
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%

7. TEST RESULT

7.1. Summary

Company Name: Hangzhou Ebolamp Electronics Co.,Ltd.
FCC ID: 2AJ3WEBEQPZ05
FCC Classification: Digital Transmission System (DTS)
Data Rate(s) Tested: 1Mbps ~ 11Mbps (b); 6Mbps ~ 54Mbps (g);
6.5/7.2Mbps ~ 65.0/72.2Mbps (n-HT20);

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
15.247(a)(2)	6dB Bandwidth	≥ 500kHz	Conducted	Pass	Section 7.2
15.247(b)(3)	Output Power	≤ 30dBm		Pass	Section 7.3
15.247(e)	Power Spectral Density	≤ 8dBm/3kHz		Pass	Section 7.4
15.247(d)	Band Edge / Out-of-Band Emissions	≥ 20dBc		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.

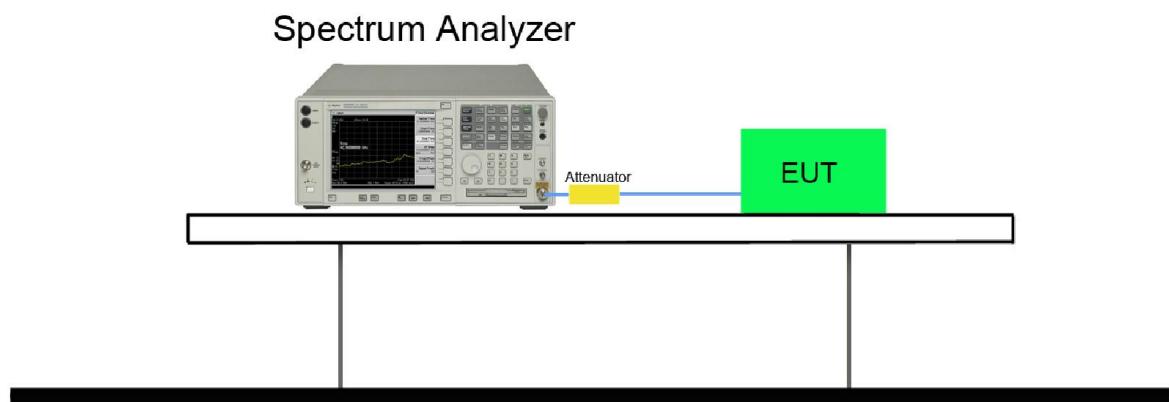
7.2.2. Test Procedure used

KDB 558074 D01v03r05 – Section 8.2 Option 2

7.2.3. Test Setting

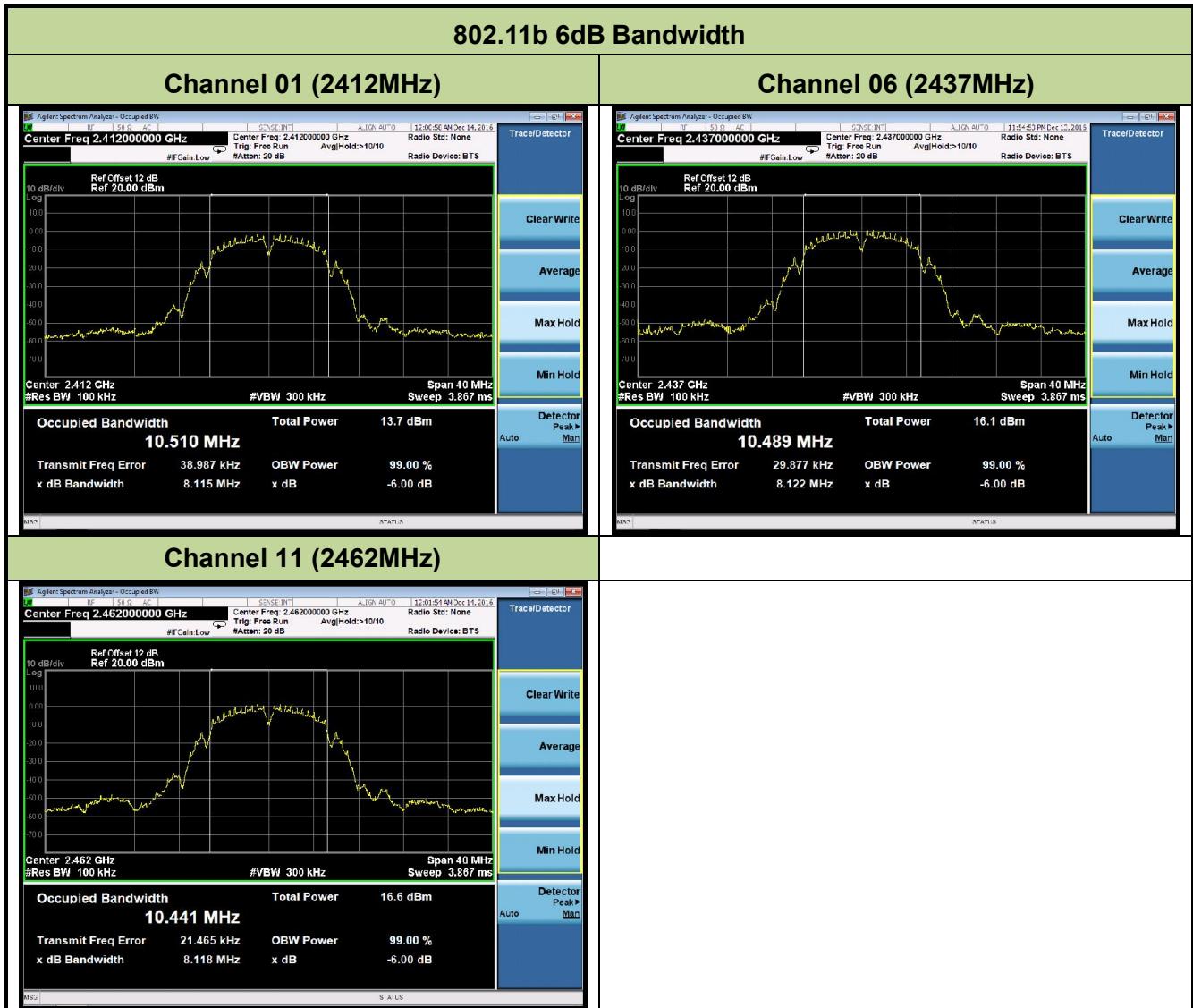
1. The Spectrum's automatic bandwidth measurement capability was used to perform the 6dB bandwidth measurement. The "X" dB bandwidth parameter was set to $X = 6$. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. Set RBW = 100 kHz
3. VBW $\geq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

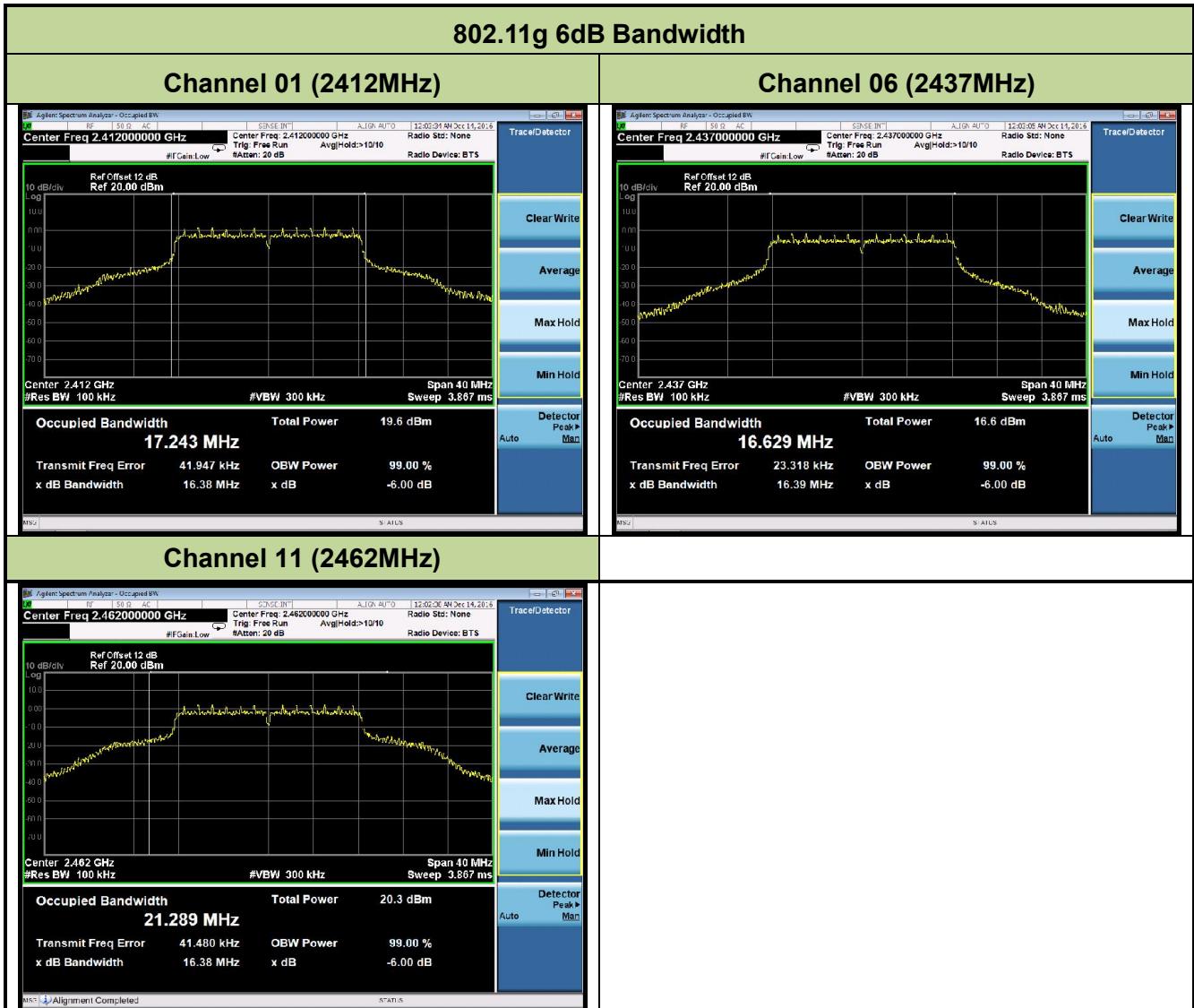
7.2.4. Test Setup

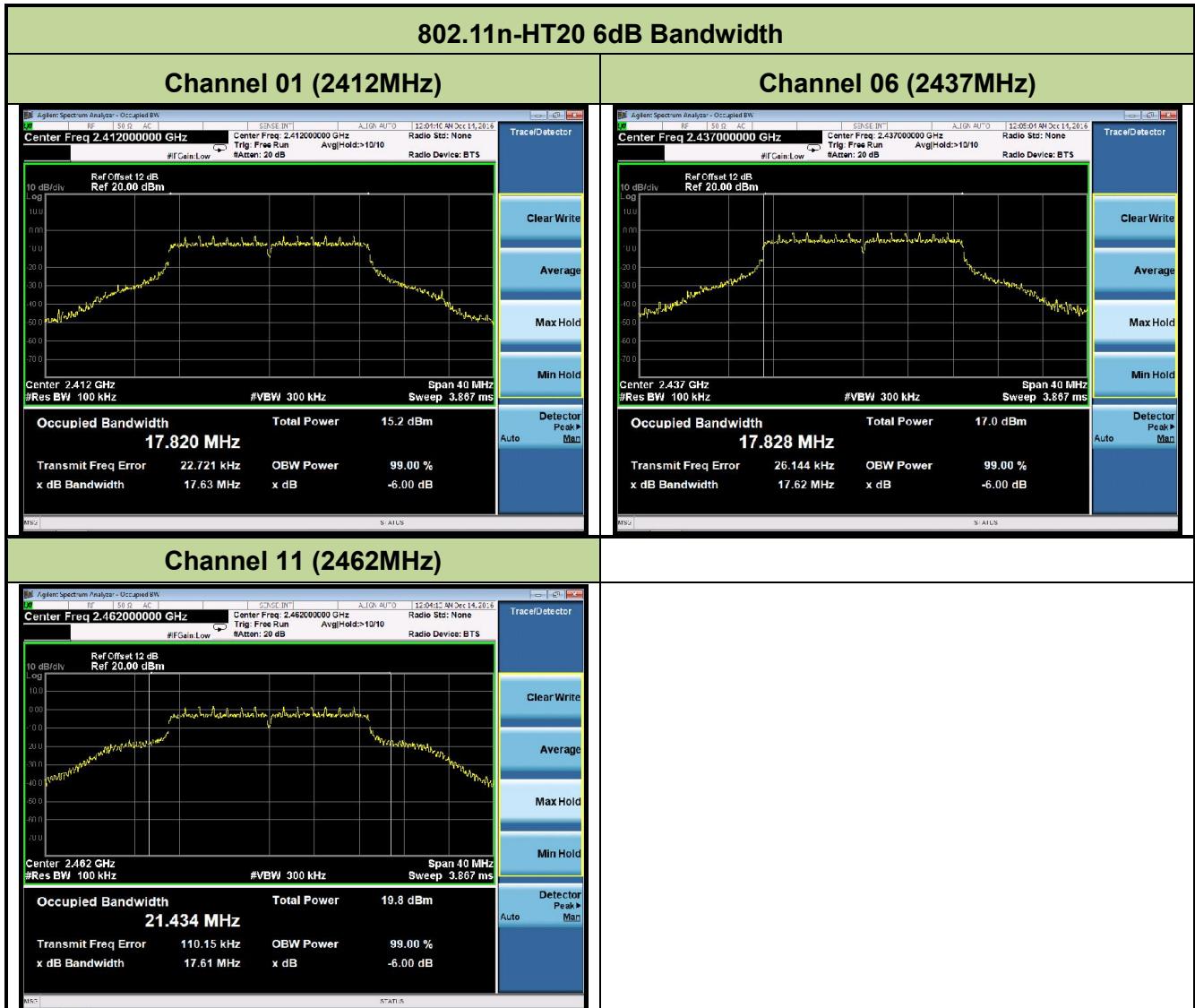


7.2.5. Test Result

Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
802.11b	1	01	2412	8.12	≥0.5	Pass
802.11b	1	06	2437	8.12	≥0.5	Pass
802.11b	1	11	2462	8.12	≥0.5	Pass
802.11g	6	01	2412	16.38	≥0.5	Pass
802.11g	6	06	2437	16.39	≥0.5	Pass
802.11g	6	11	2462	16.38	≥0.5	Pass
802.11n-HT20	6.5	01	2412	17.63	≥0.5	Pass
802.11n-HT20	6.5	06	2437	17.62	≥0.5	Pass
802.11n-HT20	6.5	11	2462	17.61	≥0.5	Pass







7.3. Output Power Measurement

7.3.1. Test Limit

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

7.3.2. Test Procedure Used

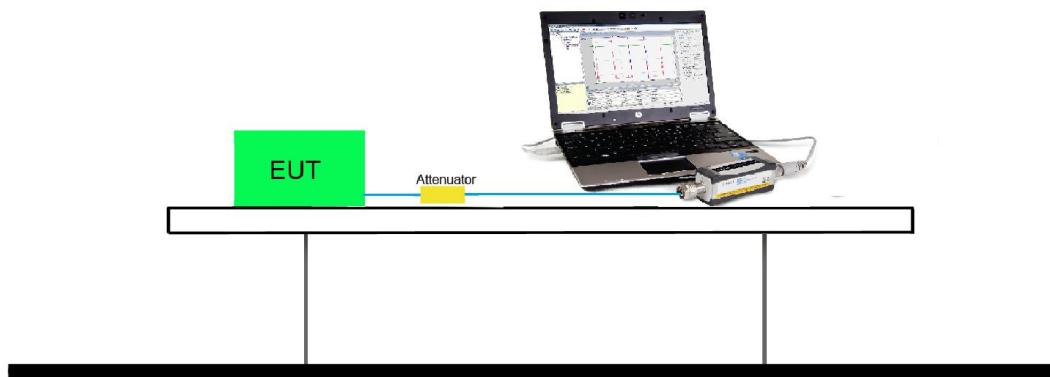
KDB 558074 D01v03r05 - Section 9.1.2 PKPM1 Peak Power Method (for signals with $BW \leq 50MHz$)

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

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

MCS Index for 802.11n	N _{TX}	Data Rate (Mbps)					
		802.11b	802.11g	20MHz Bandwidth		40MHz Bandwidth	
				800ns GI	400ns GI	800ns GI	400ns GI
0	1	1	6	6.5	7.2	13.5	15.0
1	1	2	9	13.0	14.4	27.0	30.0
2	1	5.5	12	19.5	21.7	40.5	45.0
3	1	11	18	26.0	28.9	54.0	60.0
4	1	--	24	39.0	43.3	81.0	90.0
5	1	--	36	52.0	57.8	108.0	120.0
6	1	--	48	58.5	65.0	121.5	135.0
7	1	--	54	65.0	72.2	135.0	150.0

Output power at various data rates:

Test Mode	Bandwidth (MHz)	Channel No.	Frequency (MHz)	Data Rate (Mbps)	Average Power (dBm)
802.11b	20	6	2437	1	8.34
				5.5	8.28
				11	8.15
802.11g	20	6	2437	6	8.36
				24	8.25
				54	8.06
802.11n	20	6	2437	6.5	7.81
				7.2	7.35
				26.0	7.28
				28.9	7.17
				65.0	7.09
				72.2	7.05

Test Result of Peak Output Power

Test Mode	Data Rate (Mbps)	Channel No.	Freq. (MHz)	Peak Power (dBm)	Limit (dBm)	Result
11b	1	1	2412	9.53	≤30	Pass
11b	1	6	2437	12.05	≤30	Pass
11b	1	11	2462	12.51	≤30	Pass
11g	6	1	2412	17.46	≤30	Pass
11g	6	6	2437	17.78	≤30	Pass
11g	6	11	2462	17.66	≤30	Pass
11n-HT20	6.5	1	2412	16.41	≤30	Pass
11n-HT20	6.5	6	2437	17.65	≤30	Pass
11n-HT20	6.5	11	2462	17.38	≤30	Pass

7.3.6. Test Result of Average Output Power (Reporting Only)

Test Mode	Data Rate (Mbps)	Channel No.	Freq. (MHz)	Average Power (dBm)	Limit (dBm)	Result
11b	1	1	2412	5.90	≤30	Pass
11b	1	6	2437	8.34	≤30	Pass
11b	1	11	2462	8.93	≤30	Pass
11g	6	1	2412	8.65	≤30	Pass
11g	6	6	2437	8.36	≤30	Pass
11g	6	11	2462	11.58	≤30	Pass
11n-HT20	6.5	1	2412	6.31	≤30	Pass
11n-HT20	6.5	6	2437	7.81	≤30	Pass
11n-HT20	6.5	11	2462	10.44	≤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

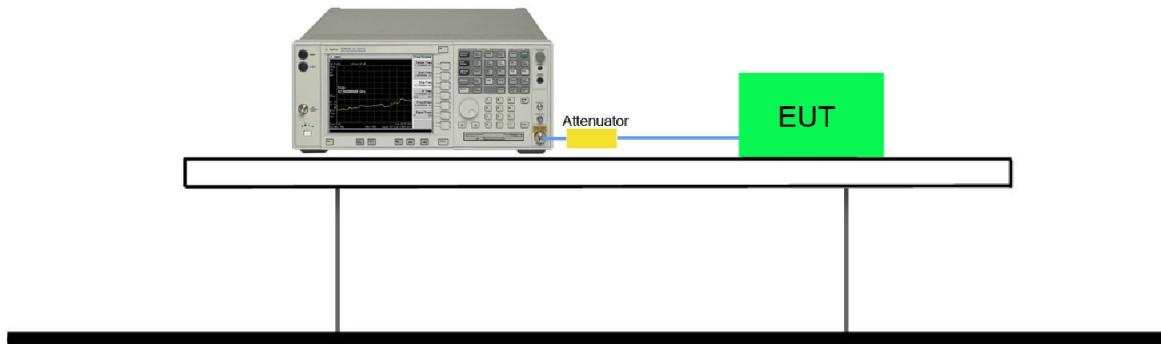
KDB 558074 D01v03r05 - Section 10.2 Method PKPSD

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

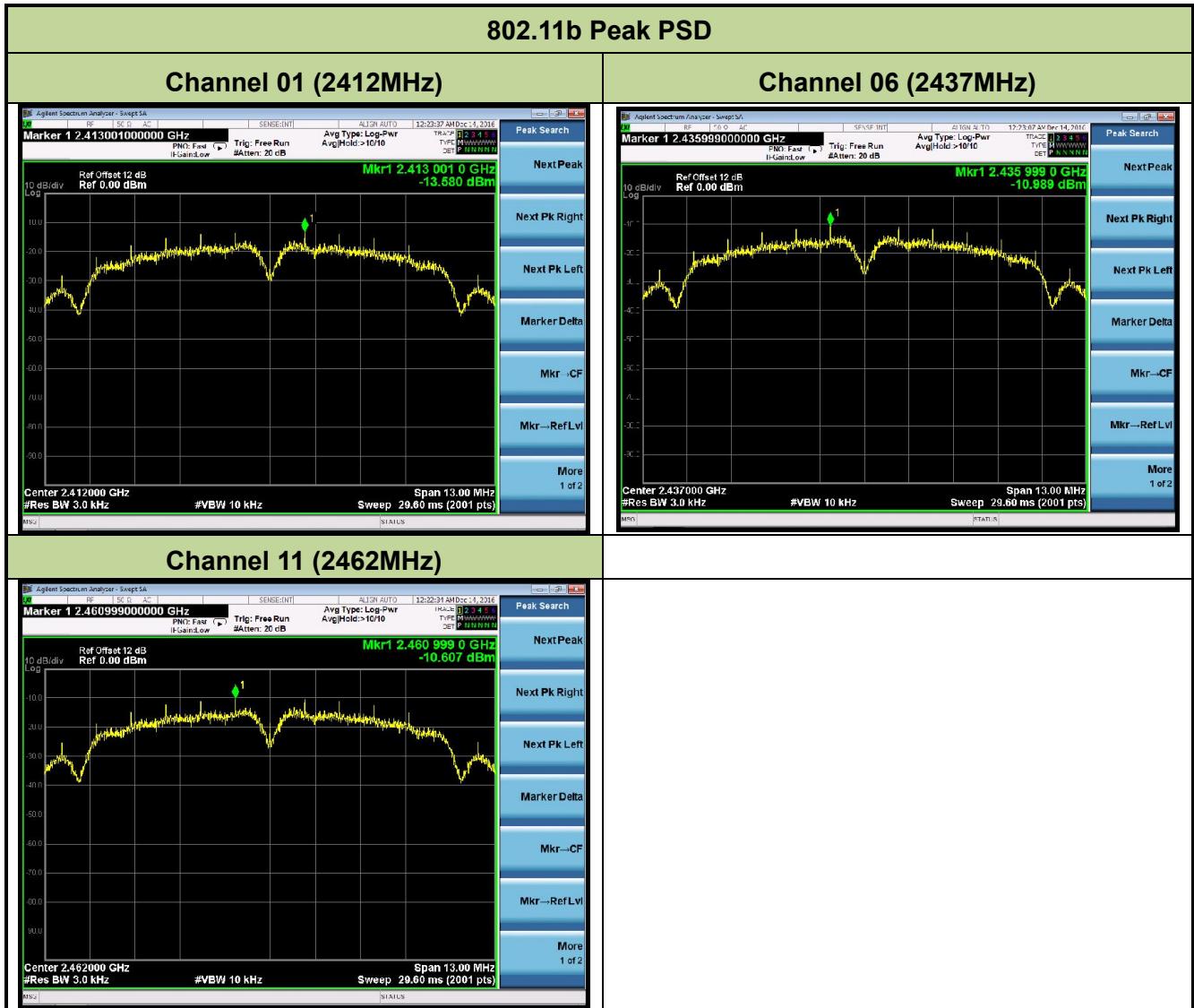
7.4.4. Test Setup

Spectrum Analyzer

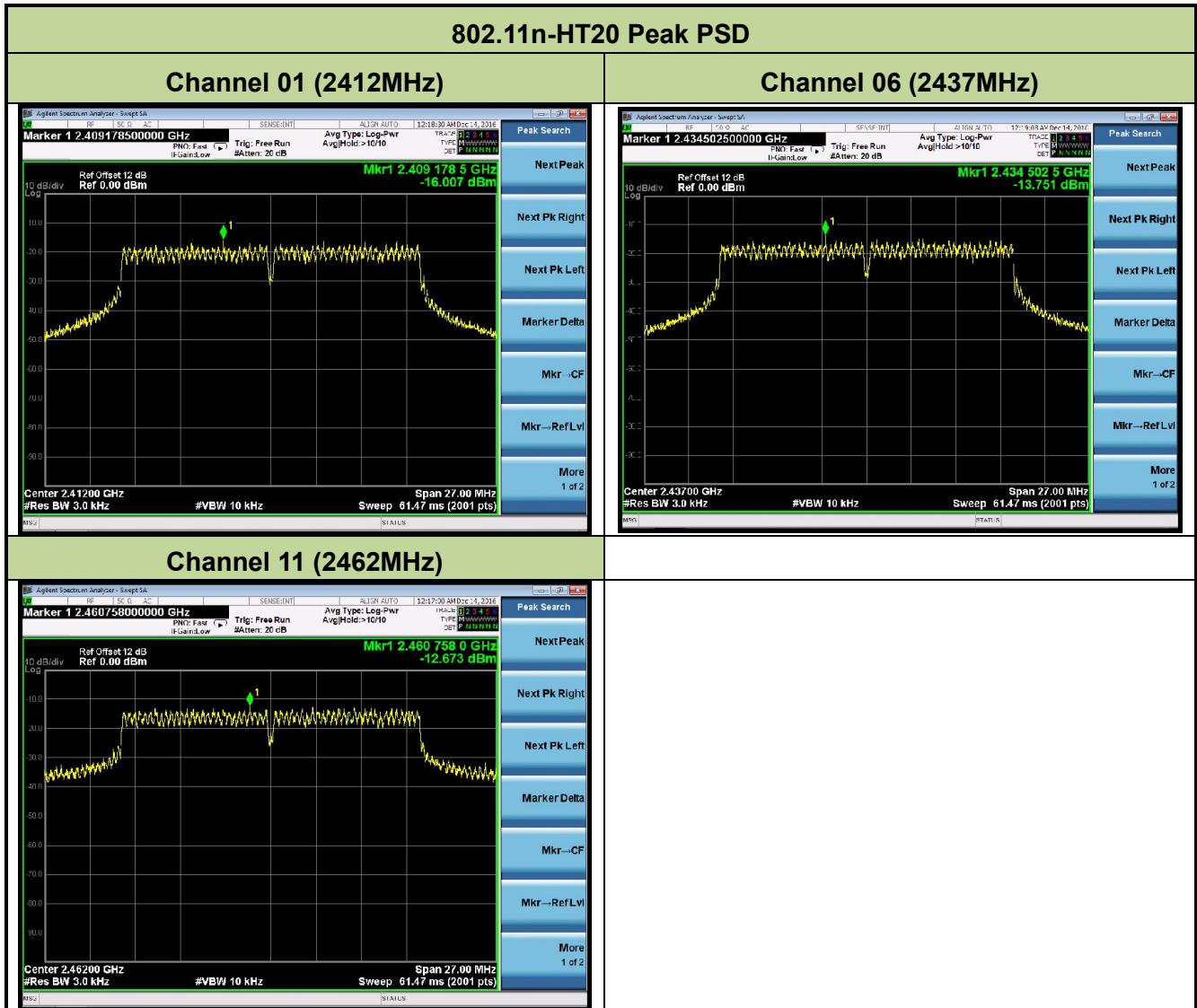


7.4.5. Test Result

Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	PSD (dBm / 3kHz)	Limit (dBm / 3kHz)	Result
11b	1	1	2412	-13.58	≤8.0	Pass
11b	1	6	2437	-10.99	≤8.0	Pass
11b	1	11	2462	-10.61	≤8.0	Pass
11g	6	1	2412	-12.29	≤8.0	Pass
11g	6	6	2437	-14.61	≤8.0	Pass
11g	6	11	2462	-11.71	≤8.0	Pass
11n-HT20	6.5	1	2412	-16.01	≤8.0	Pass
11n-HT20	6.5	6	2437	-13.75	≤8.0	Pass
11n-HT20	6.5	11	2462	-12.67	≤8.0	Pass







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 100 kHz bandwidth per the PSD procedure.

7.5.2. Test Procedure Used

KDB 558074 D01v03r05 - Section 11.2 & Section 11.3

7.5.3. Test Setting

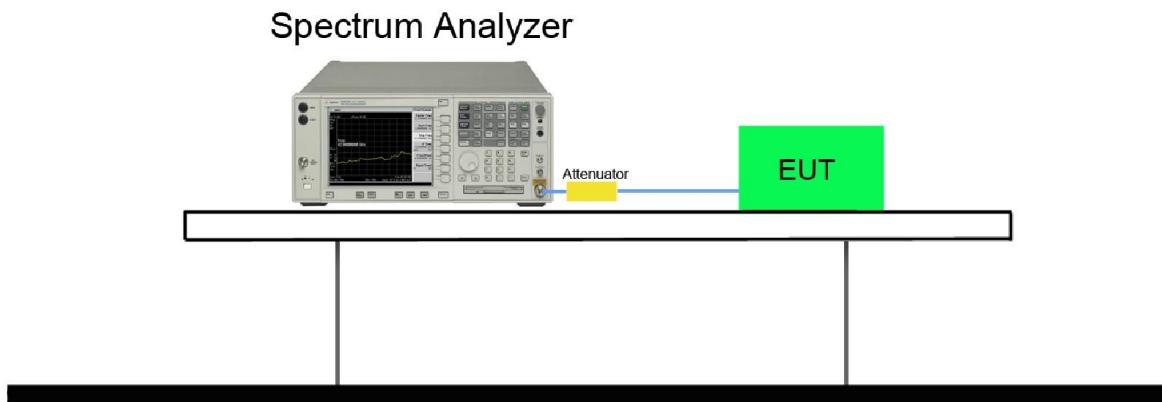
1. Reference level measurement

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

2. Emission level measurement

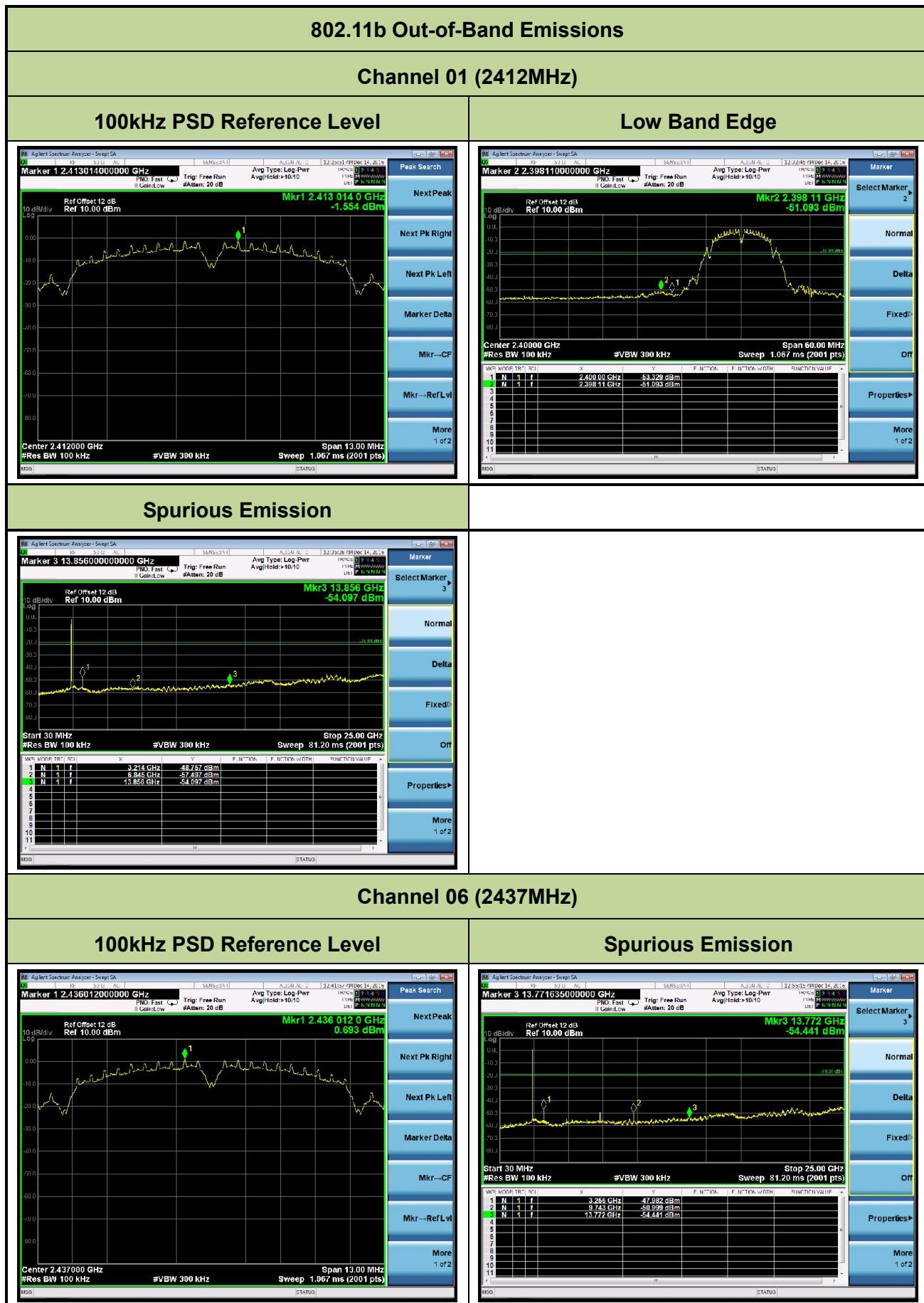
- (a) Set the center frequency and span to encompass frequency range to be measured
- (b) RBW = 100kHz
- (c) VBW = 300kHz
- (d) Detector = Peak
- (e) Trace mode = max hold
- (f) Sweep time = auto couple
- (g) The trace was allowed to stabilize

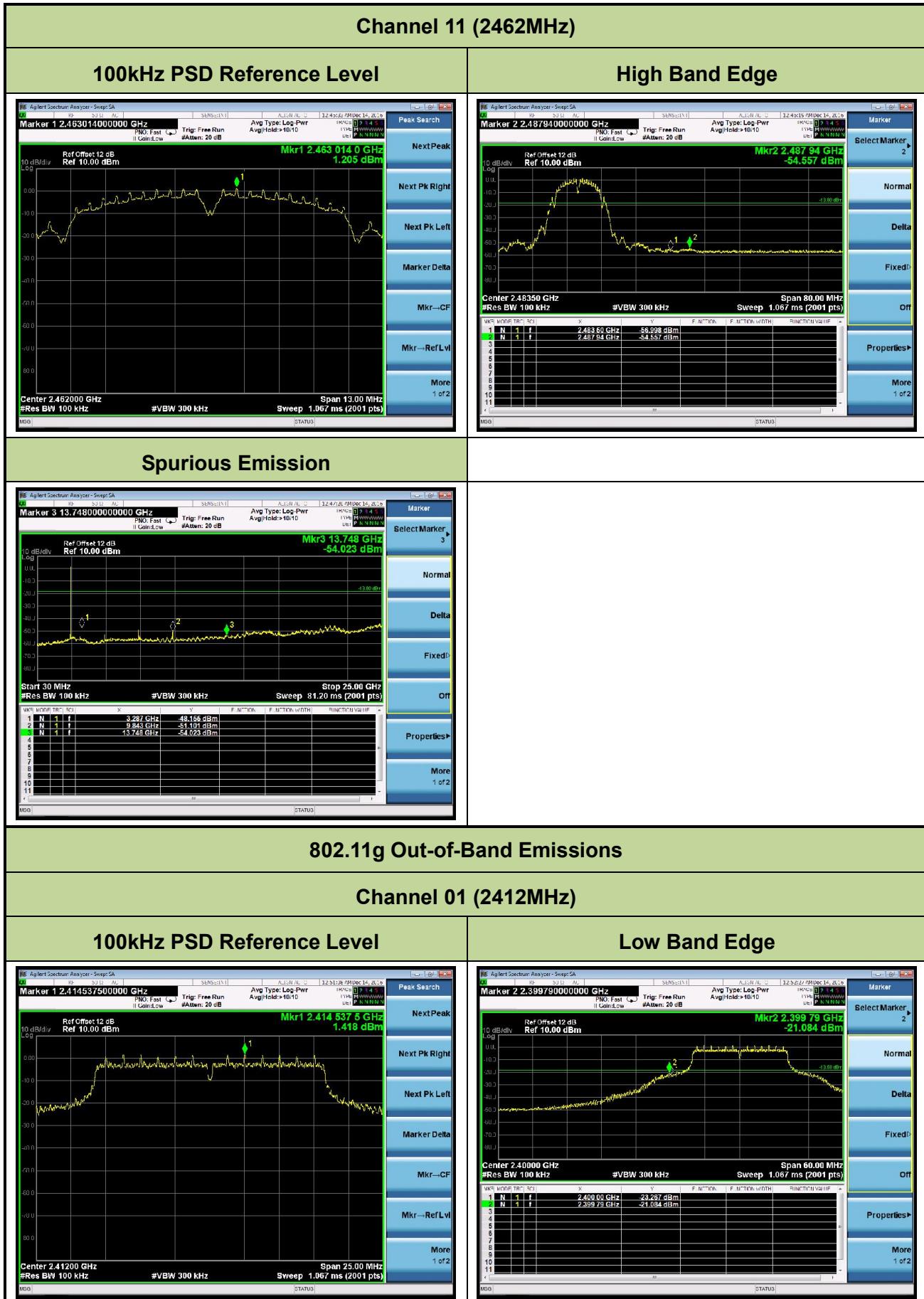
7.5.4. Test Setup

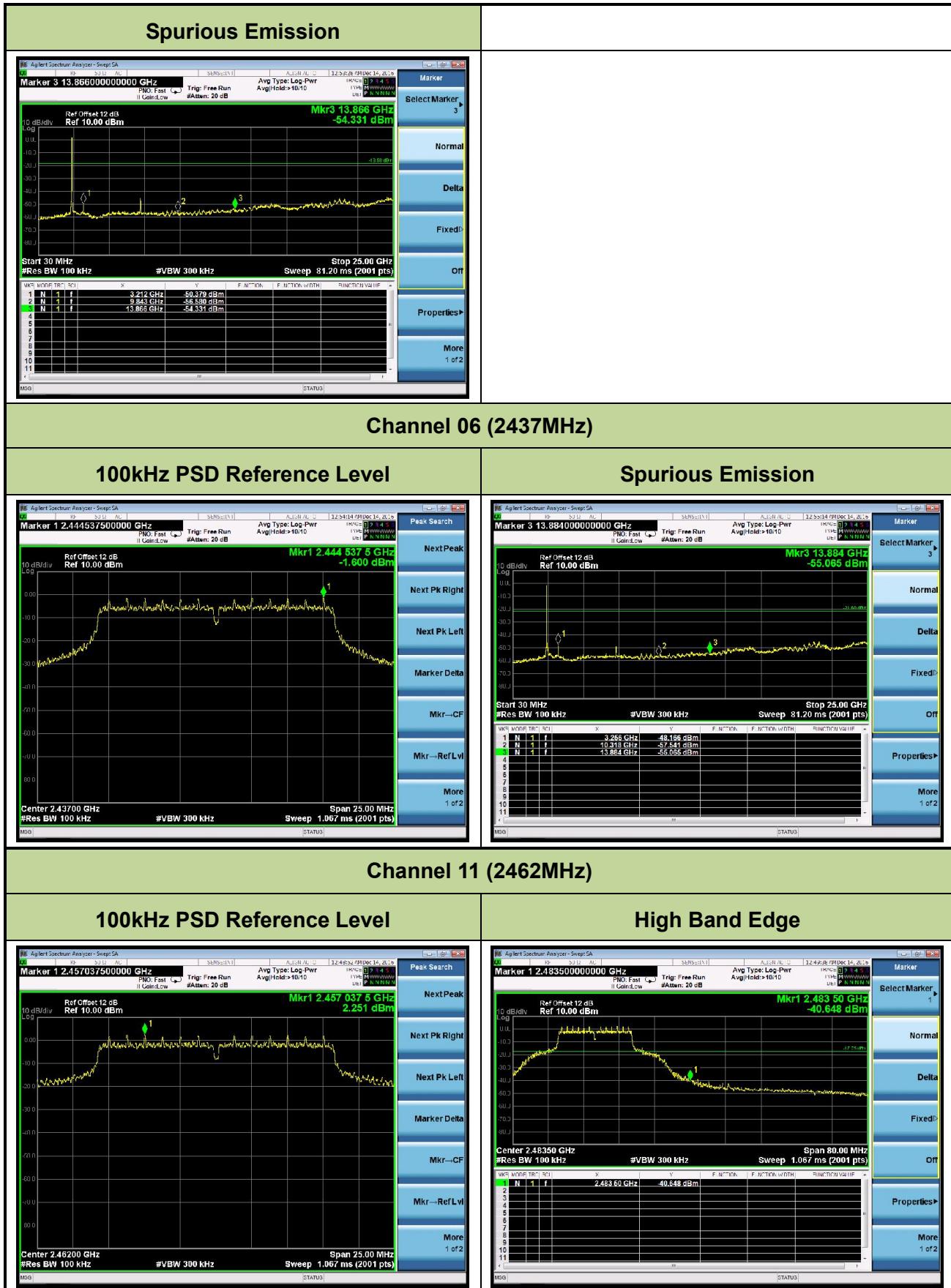


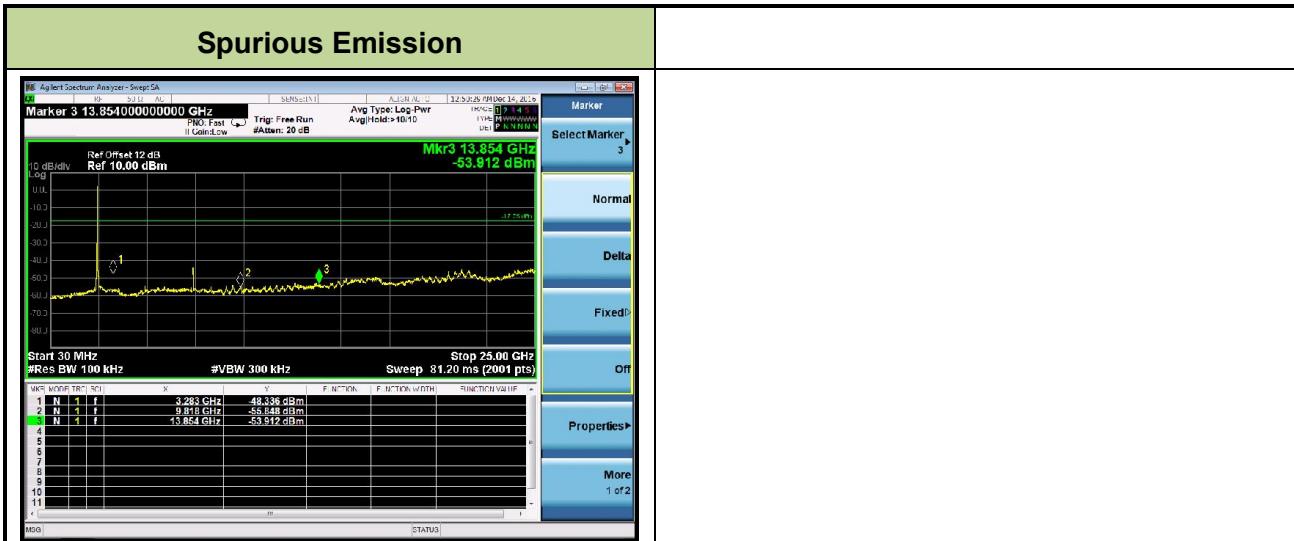
7.5.5. Test Result

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
802.11n-HT20	6.5	01	2412	20dBc	Pass
802.11n-HT20	6.5	06	2437	20dBc	Pass
802.11n-HT20	6.5	11	2462	20dBc	Pass



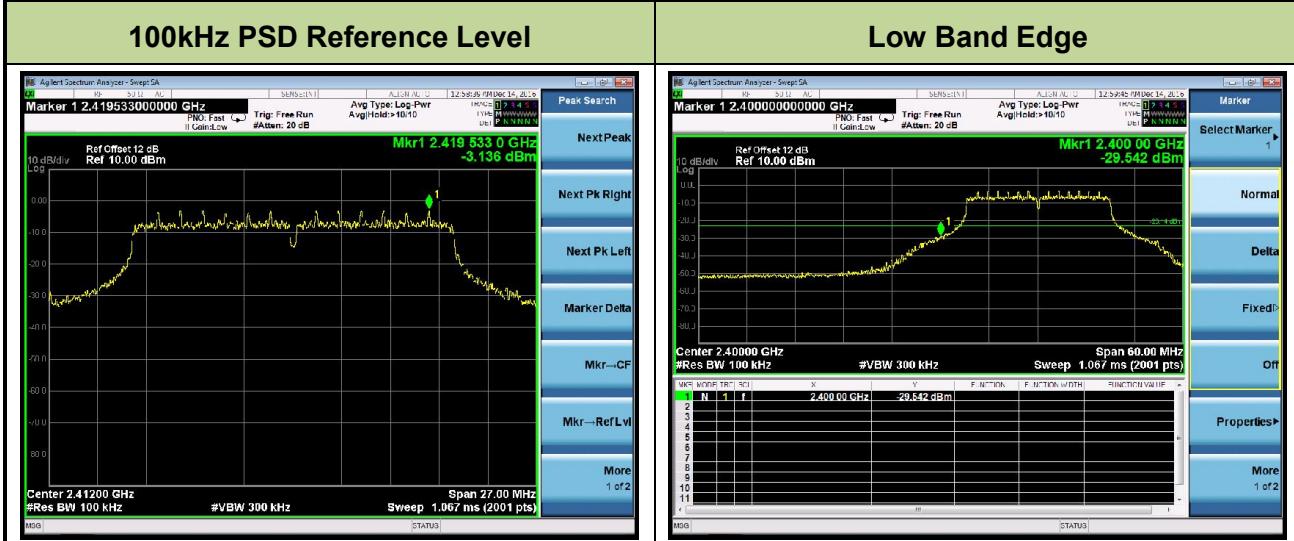






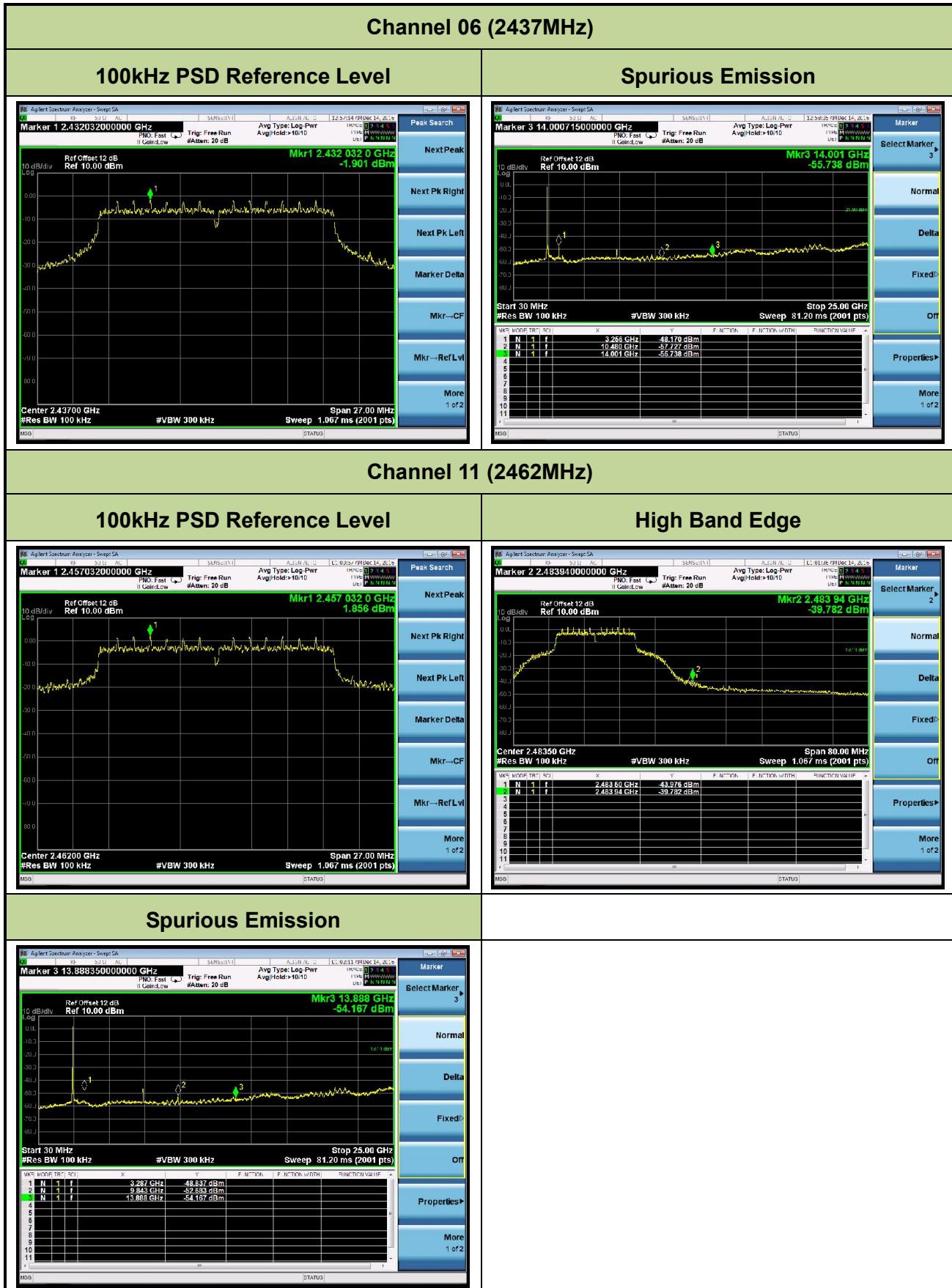
802.11n-HT20 Out-of-Band Emissions

Channel 01 (2412MHz)



Spurious Emission





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 [uV/m]	Measured Distance [Meters]
0.009 – 0.490	2400/F (kHz)	300
0.490 – 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

7.6.2. Test Procedure Used

KDB 558074 D01v03r05 – Section 12.2.3 (quasi-peak measurements)

KDB 558074 D01v03r05 – Section 12.2.4 (peak power measurements)

KDB 558074 D01v03r05 – Section 12.2.5 (average power measurements)

7.6.3. Test Setting

Peak Field Strength Measurements per Section 12.2.4 of KDB 558074 D01v03r05

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

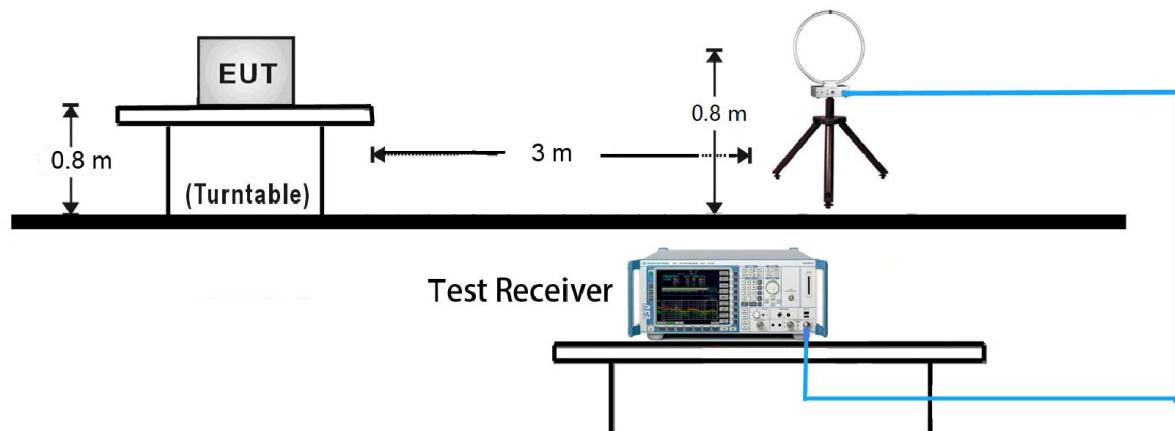
Frequency	RBW
9 ~ 150 kHz	200 ~ 300 Hz
0.15 ~ 30 MHz	9 ~ 10 kHz
30 ~ 1000 MHz	100 ~ 120 kHz
> 1000 MHz	1 MHz

Average Field Strength Measurements per Section 12.2.5.3 of KDB 558074 D01v03r05

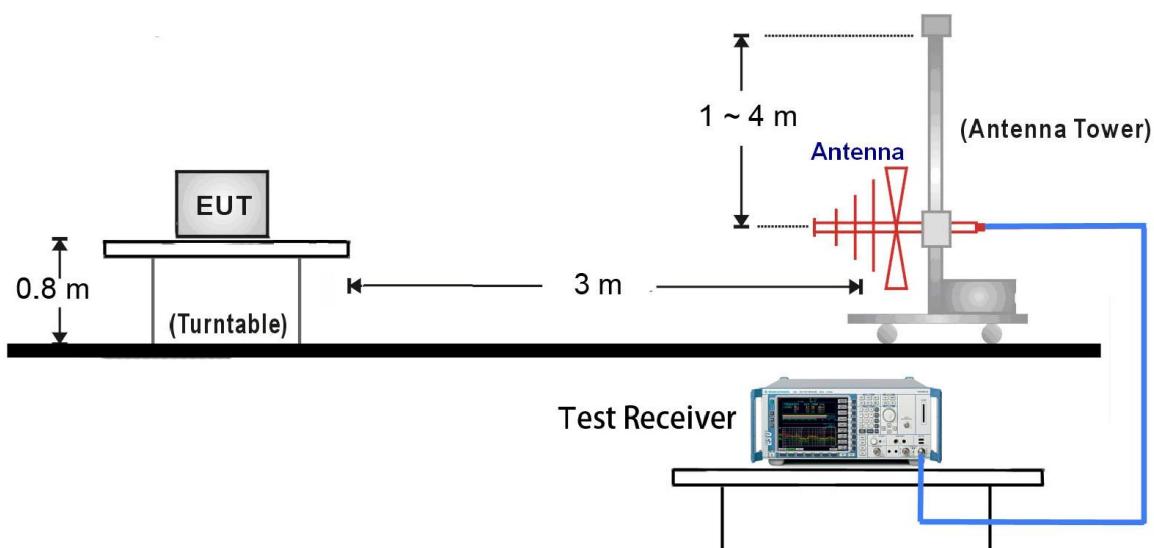
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW $\geq 1/T$
4. De As an alternative, the instrument may be set to linear detector mode. Ensure that video filtering is applied in linear voltage domain (rather than in a log or dB domain).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

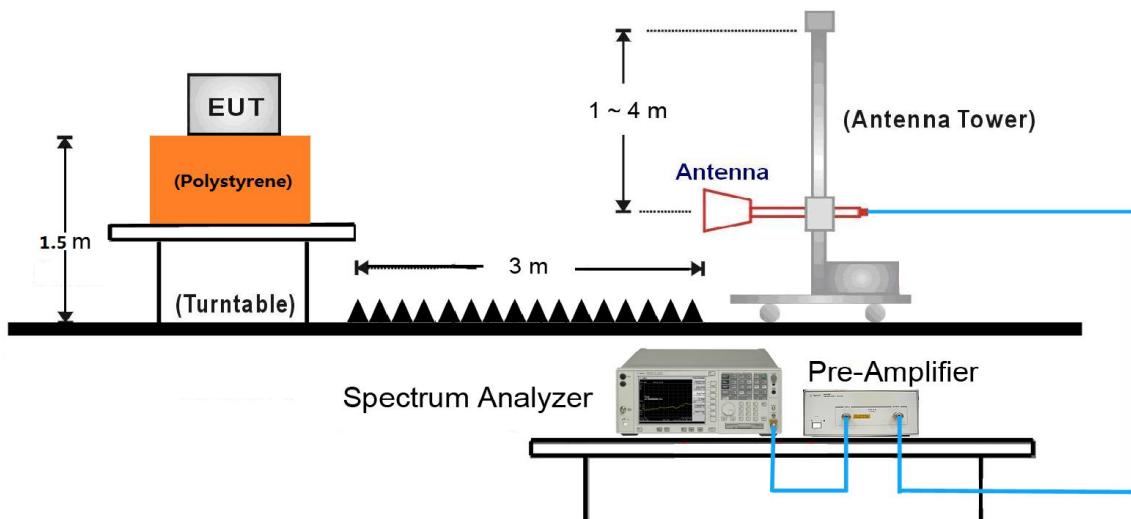
7.6.4. Test Setup

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:	Jone Zhang
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. 3. Testing is carried out with frequency rang 9 kHz to the tenth harmonics. There are the ambient noise within frequency range 9 kHz ~ 30 MHz and 18GHz ~ 25GHz, the permissible value is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dB μ V)	Factor (dB)	Measure Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Polarization
	4825.0	54.7	2.7	57.4	74.0	-16.6	Peak	Horizontal
	4825.0	45.6	2.7	48.3	54.0	-5.7	Average	Horizontal
*	7239.0	40.5	7.8	48.3	87.2	-38.9	Peak	Horizontal
	8199.5	34.6	8.3	42.9	74.0	-31.1	Peak	Horizontal
*	9644.5	35.8	11.0	46.8	87.2	-40.4	Peak	Horizontal
	4825.0	48.7	2.7	51.4	74.0	-22.6	Peak	Vertical
	4825.0	42.3	2.7	45.0	54.0	-9.0	Average	Vertical
*	6338.0	35.1	5.1	40.2	87.2	-47.0	Peak	Vertical
	8301.5	35.0	8.0	43.0	74.0	-31.0	Peak	Vertical
*	9644.5	35.8	11.0	46.8	87.2	-40.4	Peak	Vertical

Note 1: “*” is not in restricted band, its limit is 20dBc of the fundamental emission level (107.2dB μ V/m) or 15.209 which is higher.

Note 2: Measure Level (dB μ V/m) = Reading Level (dB μ V) + 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:	Jone Zhang
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. 3. Testing is carried out with frequency rang 9 kHz to the tenth harmonics. There are the ambient noise within frequency range 9 kHz ~ 30 MHz and 18GHz ~ 25GHz, the permissible value is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dB μ V)	Factor (dB)	Measure Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Polarization
	4876.0	55.9	2.7	58.6	74.0	-15.4	Peak	Horizontal
	4874.1	50.2	2.7	52.9	54.0	-1.1	Average	Horizontal
	6278.5	35.6	4.9	40.5	88.2	-47.7	Peak	Horizontal
	7307.0	40.3	8.0	48.3	74.0	-25.7	Peak	Horizontal
*	9746.5	35.7	11.3	47.0	88.2	-41.2	Peak	Horizontal
	4876.0	50.1	2.7	52.8	74.0	-21.2	Peak	Vertical
*	7171.0	35.9	7.7	43.6	88.2	-44.6	Peak	Vertical
	8420.5	36.1	8.2	44.3	74.0	-29.7	Peak	Vertical
*	9746.5	35.7	11.3	47.0	88.2	-41.2	Peak	Vertical
Note 1: “*” is not in restricted band, its limit is 20dBc of the fundamental emission level (105.3dB μ V/m) or 15.209 which is higher.								
Note 2: Measure Level (dB μ V/m) = Reading Level (dB μ V) + 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:	Jone Zhang
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. 3. Testing is carried out with frequency rang 9 kHz to the tenth harmonics. There are the ambient noise within frequency range 9 kHz ~ 30 MHz and 18GHz ~ 25GHz, the permissible value is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dB μ V)	Factor (dB)	Measure Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Polarization
	4927.0	52.3	2.8	55.1	74.0	-18.9	Peak	Horizontal
	4925.4	48.5	2.8	51.3	54.0	-2.7	Average	Horizontal
	6261.5	34.5	4.8	39.3	84.0	-44.7	Peak	Horizontal
	8429.0	36.4	8.2	44.6	74.0	-29.4	Peak	Horizontal
*	10197.0	35.4	11.8	47.2	84.0	-36.8	Peak	Horizontal
	4927.0	45.8	2.8	48.6	74.0	-25.4	Peak	Vertical
*	6431.5	34.7	5.6	40.3	84.0	-43.7	Peak	Vertical
	8463.0	35.5	8.2	43.7	74.0	-30.3	Peak	Vertical
*	10197.0	35.4	11.8	47.2	84.0	-36.8	Peak	Vertical
Note 1: “*” is not in restricted band, its limit is 20dBc of the fundamental emission level (104.0dB μ V/m) or 15.209 which is higher.								
Note 2: Measure Level (dB μ V/m) = Reading Level (dB μ V) + 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:	Jone Zhang
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. 3. Testing is carried out with frequency rang 9 kHz to the tenth harmonics. There are the ambient noise within frequency range 9 kHz ~ 30 MHz and 18GHz ~ 25GHz, the permissible value is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dB μ V)	Factor (dB)	Measure Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Polarization
	4816.5	53.0	2.7	55.7	74.0	-18.3	Peak	Horizontal
	4825.0	33.8	2.7	36.5	54.0	-17.5	Average	Horizontal
*	7239.0	53.7	7.8	61.5	86.7	-25.2	Peak	Horizontal
	8412.0	35.2	8.1	43.3	74.0	-30.7	Peak	Horizontal
*	9644.5	37.2	11.0	48.2	86.7	-38.5	Peak	Horizontal
	4816.5	49.7	2.7	52.4	74.0	-21.6	Peak	Vertical
	4824.1	31.6	2.7	34.3	54.0	-19.7	Average	Vertical
*	7222.0	45.5	7.8	53.3	86.7	-33.4	Peak	Vertical
	8386.5	34.4	8.1	42.5	74.0	-31.5	Peak	Vertical
*	9644.5	37.2	11.0	48.2	86.7	-38.5	Peak	Vertical

Note 1: “**” is not in restricted band, its limit is 20dBc of the fundamental emission level (106.7dB μ V/m) or 15.209 which is higher.

Note 2: Measure Level (dB μ V/m) = Reading Level (dB μ V) + 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:	Jone Zhang
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. 3. Testing is carried out with frequency rang 9 kHz to the tenth harmonics. There are the ambient noise within frequency range 9 kHz ~ 30 MHz and 18GHz ~ 25GHz, the permissible value is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dB μ V)	Factor (dB)	Measure Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Polarization
	4876.0	51.9	2.7	54.6	74.0	-19.4	Peak	Horizontal
	4873.9	32.3	2.7	35.0	54.0	-19.0	Average	Horizontal
*	6321.0	35.3	5.0	40.3	86.9	-46.6	Peak	Horizontal
	7307.0	42.7	8.0	50.7	74.0	-23.3	Peak	Horizontal
*	10061.0	35.7	11.5	47.2	86.9	-39.7	Peak	Horizontal
	4867.5	47.1	2.7	49.8	74.0	-24.2	Peak	Vertical
*	6797.0	36.0	6.0	42.0	86.9	-44.9	Peak	Vertical
	8174.0	34.1	8.4	42.5	74.0	-31.5	Peak	Vertical
*	10171.5	34.8	11.7	46.5	86.9	-40.4	Peak	Vertical
Note 1: “*” is not in restricted band, its limit is 20dBc of the fundamental emission level (106.1dB μ V/m) or 15.209 which is higher.								
Note 2: Measure Level (dB μ V/m) = Reading Level (dB μ V) + 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:	Jone Zhang
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. 3. Testing is carried out with frequency rang 9 kHz to the tenth harmonics. There are the ambient noise within frequency range 9 kHz ~ 30 MHz and 18GHz ~ 25GHz, the permissible value is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dB μ V)	Factor (dB)	Measure Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Polarization
	4927.0	52.7	2.8	55.5	74.0	-18.5	Peak	Horizontal
	4923.8	32.2	2.8	35.0	54.0	-19.0	Average	Horizontal
*	6236.0	35.9	4.7	40.6	86.4	-45.8	Peak	Horizontal
	7383.5	44.3	7.9	52.2	74.0	-21.8	Peak	Horizontal
*	9840.0	34.9	11.6	46.5	86.4	-39.9	Peak	Horizontal
	4927.0	45.4	2.8	48.2	74.0	-25.8	Peak	Vertical
*	6295.5	34.7	4.9	39.6	86.4	-46.8	Peak	Vertical
	7383.5	37.3	7.9	45.2	74.0	-28.8	Peak	Vertical
*	9840.0	34.9	11.6	46.5	86.4	-39.9	Peak	Vertical
Note 1: “*” is not in restricted band, its limit is 20dBc of the fundamental emission level (106.4dB μ V/m) or 15.209 which is higher.								
Note 2: Measure Level (dB μ V/m) = Reading Level (dB μ V) + 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:	Jone Zhang
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. 3. Testing is carried out with frequency rang 9 kHz to the tenth harmonics. There are the ambient noise within frequency range 9 kHz ~ 30 MHz and 18GHz ~ 25GHz, the permissible value is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dB μ V)	Factor (dB)	Measure Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Polarization
	4816.5	52.5	2.7	55.2	74.0	-18.8	Peak	Horizontal
	4825.0	33.5	2.7	36.2	54.0	-17.8	Average	Horizontal
*	7239.0	49.3	7.8	57.1	83.5	-26.4	Peak	Horizontal
	8454.5	35.8	8.2	44.0	74.0	-30.0	Peak	Horizontal
*	10197.0	34.9	11.8	46.7	83.5	-36.8	Peak	Horizontal
	4825.0	47.5	2.7	50.2	74.0	-23.8	Peak	Vertical
*	6168.0	33.2	4.6	37.8	83.5	-45.7	Peak	Vertical
	8429.0	35.0	8.2	43.2	74.0	-30.8	Peak	Vertical
*	10197.0	34.9	11.8	46.7	83.5	-36.8	Peak	Vertical
Note 1: “*” is not in restricted band, its limit is 20dBc of the fundamental emission level (103.5dB μ V/m) or 15.209 which is higher.								
Note 2: Measure Level (dB μ V/m) = Reading Level (dB μ V) + 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:	Jone Zhang
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. 3. Testing is carried out with frequency rang 9 kHz to the tenth harmonics. There are the ambient noise within frequency range 9 kHz ~ 30 MHz and 18GHz ~ 25GHz, the permissible value is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dB μ V)	Factor (dB)	Measure Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Polarization
	4876.0	51.8	2.7	54.5	74.0	-19.5	Peak	Horizontal
	4874.3	31.8	2.7	34.5	54.0	-19.5	Average	Horizontal
*	6227.5	35.0	4.7	39.7	84.5	-44.8	Peak	Horizontal
	7315.5	41.7	8.0	49.7	74.0	-24.3	Peak	Horizontal
*	9959.0	33.8	11.4	45.2	84.5	-39.3	Peak	Horizontal
	4867.5	50.1	2.7	52.8	74.0	-21.2	Peak	Vertical
*	6406.0	34.2	5.5	39.7	84.5	-44.8	Peak	Vertical
	7298.5	37.0	8.0	45.0	74.0	-29.0	Peak	Vertical
*	9959.0	33.8	11.4	45.2	84.5	-39.3	Peak	Vertical
Note 1: “*” is not in restricted band, its limit is 20dBc of the fundamental emission level (103.4dB μ V/m) or 15.209 which is higher.								
Note 2: Measure Level (dB μ V/m) = Reading Level (dB μ V) + 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:	Jone Zhang
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. 3. Testing is carried out with frequency rang 9 kHz to the tenth harmonics. There are the ambient noise within frequency range 9 kHz ~ 30 MHz and 18GHz ~ 25GHz, the permissible value is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dB μ V)	Factor (dB)	Measure Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Polarization
	4927.0	50.5	2.8	53.3	74.0	-20.7	Peak	Horizontal
	4924.5	32.5	2.8	35.3	54.0	-18.7	Average	Horizontal
*	6159.5	33.5	4.6	38.1	84.1	-46.0	Peak	Horizontal
	7375.0	38.5	7.9	46.4	74.0	-27.6	Peak	Horizontal
*	10010.0	33.6	11.4	45.0	84.1	-39.1	Peak	Horizontal
	4927.0	47.9	2.8	50.7	74.0	-23.3	Peak	Vertical
	4927.5	31.0	2.8	33.8	54.0	-20.2	Average	Vertical
*	6227.5	34.3	4.7	39.0	84.1	-45.1	Peak	Vertical
	8259.0	35.9	8.1	44.0	74.0	-30.0	Peak	Vertical
*	10010.0	33.6	11.4	45.0	84.1	-39.1	Peak	Vertical

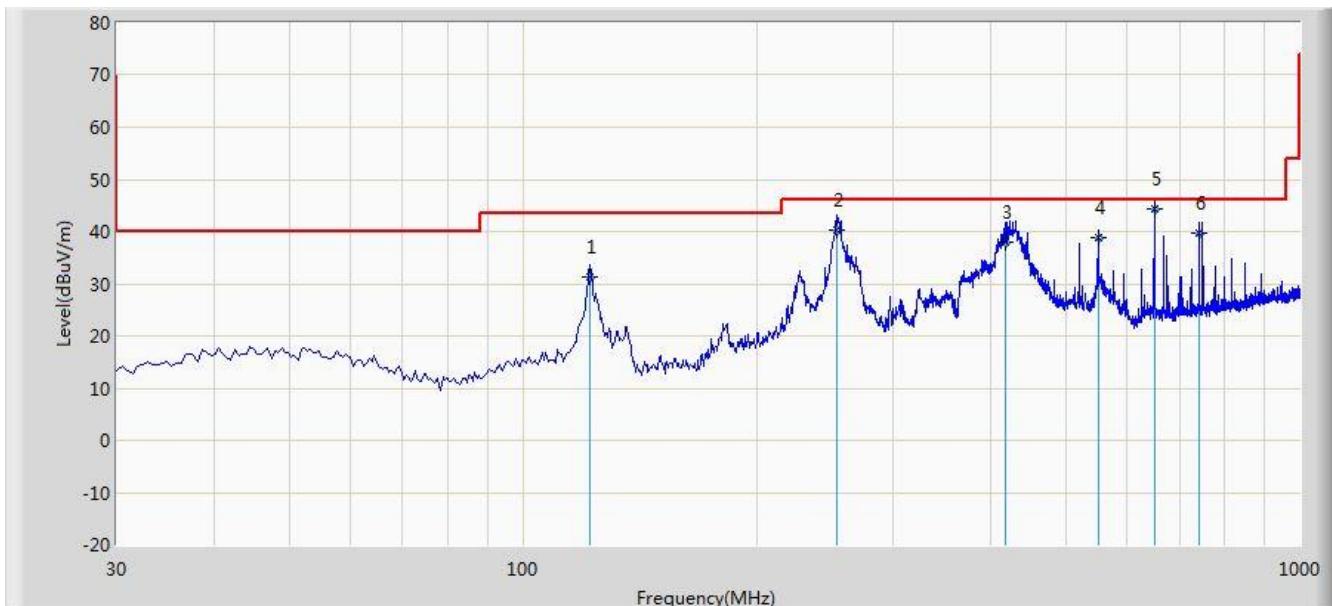
Note 1: “**” is not in restricted band, its limit is 20dBc of the fundamental emission level (104.1dB μ V/m) or 15.209 which is higher.

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

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

The worst case of Radiated Emission below 1GHz:

Site: AC2	Time: 2016/12/26 - 01:20
Limit: FCC_Part15.209_RE(3m)	Engineer: Lewis Huang
Probe: VULB9162_0.03-8GHz	Polarity: Horizontal
EUT: SMART LED LAMP	Power: AC 120V/60Hz
Worse Case Mode: Transmit by 802.11n-HT20 at Channel 2462MHz	

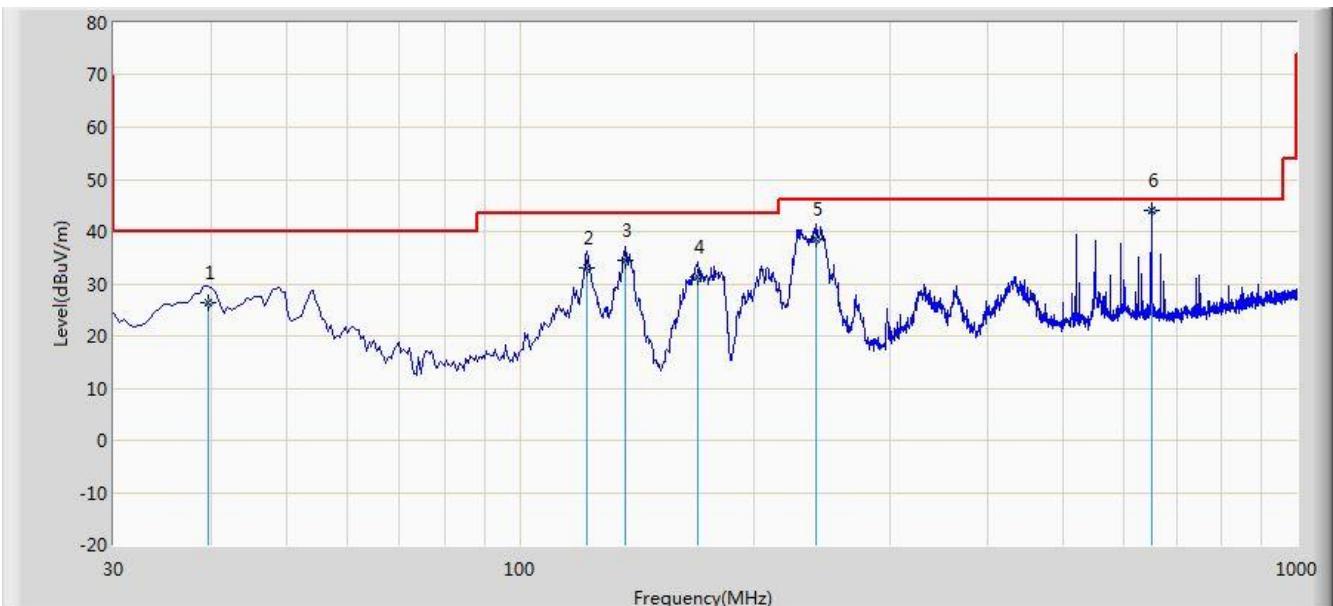


No	Flag	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Over Limit (dB)	Limit (dB μ V/m)	Factor (dB)	Type
1			122.150	31.288	20.320	-12.212	43.500	10.968	QP
2			254.070	40.410	26.630	-5.590	46.000	13.780	QP
3			418.485	38.048	21.030	-7.952	46.000	17.019	QP
4			549.920	38.801	19.650	-7.199	46.000	19.151	QP
5	*		650.315	44.249	23.520	-1.751	46.000	20.729	QP
6			742.465	39.815	17.640	-6.185	46.000	22.175	QP

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

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

Site: AC2	Time: 2016/12/26 - 01:21
Limit: FCC_Part15.209_RE(3m)	Engineer: Lewis Huang
Probe: VULB9162_0.03-8GHz	Polarity: Vertical
EUT: SMART LED LAMP	Power: AC 120V/60Hz
Worse Case Mode: Transmit by 802.11n-HT20 at Channel 2462MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Over Limit (dB)	Limit (dB μ V/m)	Factor (dB)	Type
1			39.700	26.426	12.620	-13.574	40.000	13.806	QP
2			122.150	33.028	22.060	-10.472	43.500	10.968	QP
3			136.700	34.491	24.840	-9.009	43.500	9.651	QP
4			169.195	31.285	21.050	-12.215	43.500	10.235	QP
5			240.975	38.463	25.010	-7.537	46.000	13.453	QP
6	*		649.830	43.971	23.250	-2.029	46.000	20.722	QP

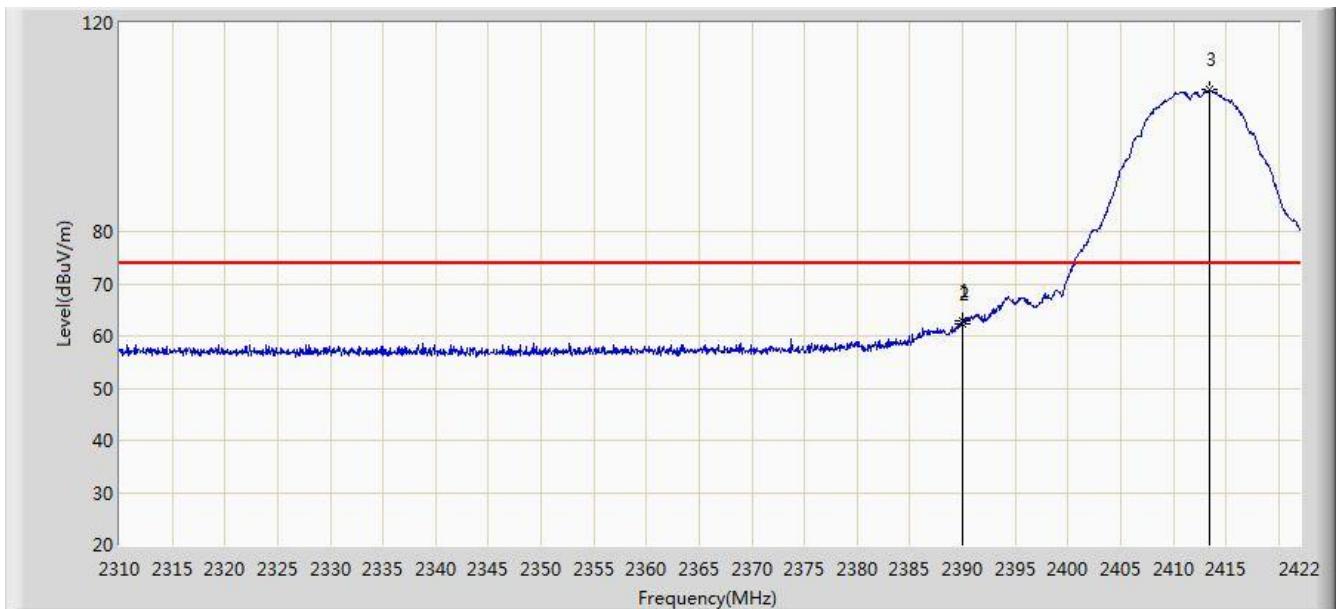
Note: Measure Level (dB μ V/m) = Reading Level (dB μ V) + Factor (dB)

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

7.7. Radiated Restricted Band Edge Measurement

7.7.1. Test Result

Site: AC1	Time: 2016/12/12 - 11:24
Limit: FCC_Part15.209_RE(3m)	Engineer: Jone Zhang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT:SMART LED LAMP	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			2389.968	62.829	31.626	-11.171	74.000	31.203	PK
2			2390.000	62.446	31.243	-11.554	74.000	31.203	PK
3			2413.432	107.162	75.995	N/A	N/A	31.168	PK

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

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

Site: AC1	Time: 2016/12/12 - 11:27
Limit: FCC_Part15.209_RE(3m)	Engineer: Jone Zhang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT:SMART LED LAMP	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11b at Channel 2412MHz	

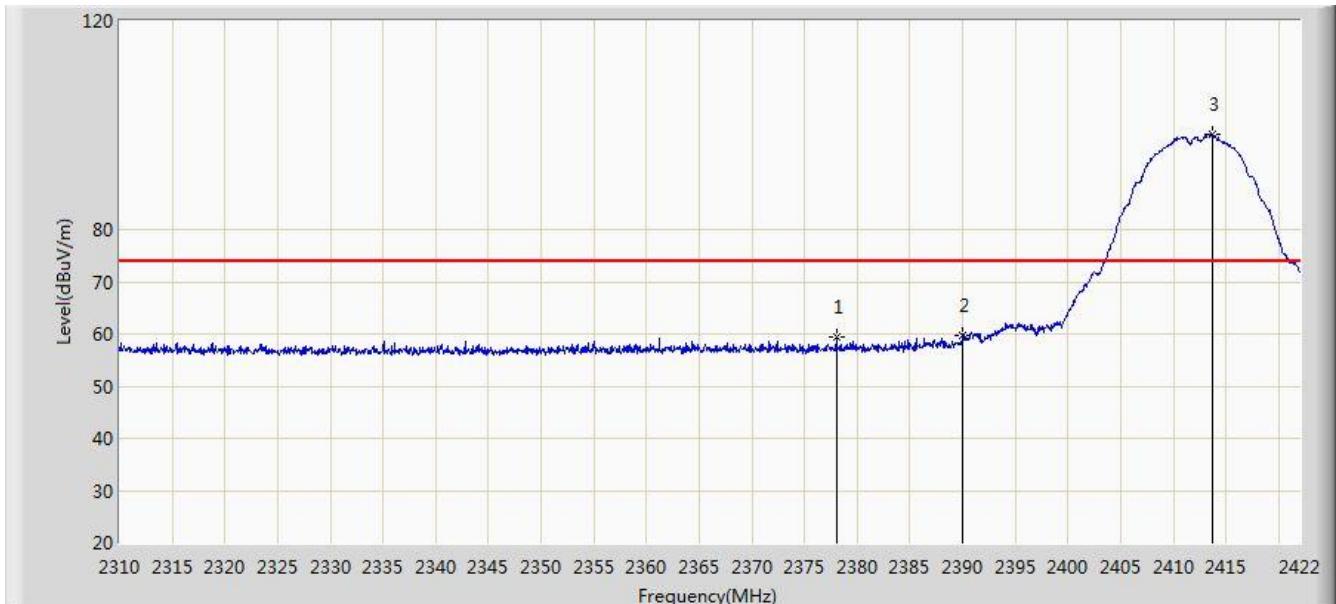


No	Flag	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Over Limit (dB)	Limit (dB μ V/m)	Factor (dB)	Type
1			2390.000	52.313	21.110	-1.687	54.000	31.203	AV
2			2412.816	99.192	68.024	N/A	N/A	31.168	AV

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

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

Site: AC1	Time: 2016/12/12 - 11:28
Limit: FCC_Part15.209_RE(3m)	Engineer: Jone Zhang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT:SMART LED LAMP	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11b at Channel 2412MHz	

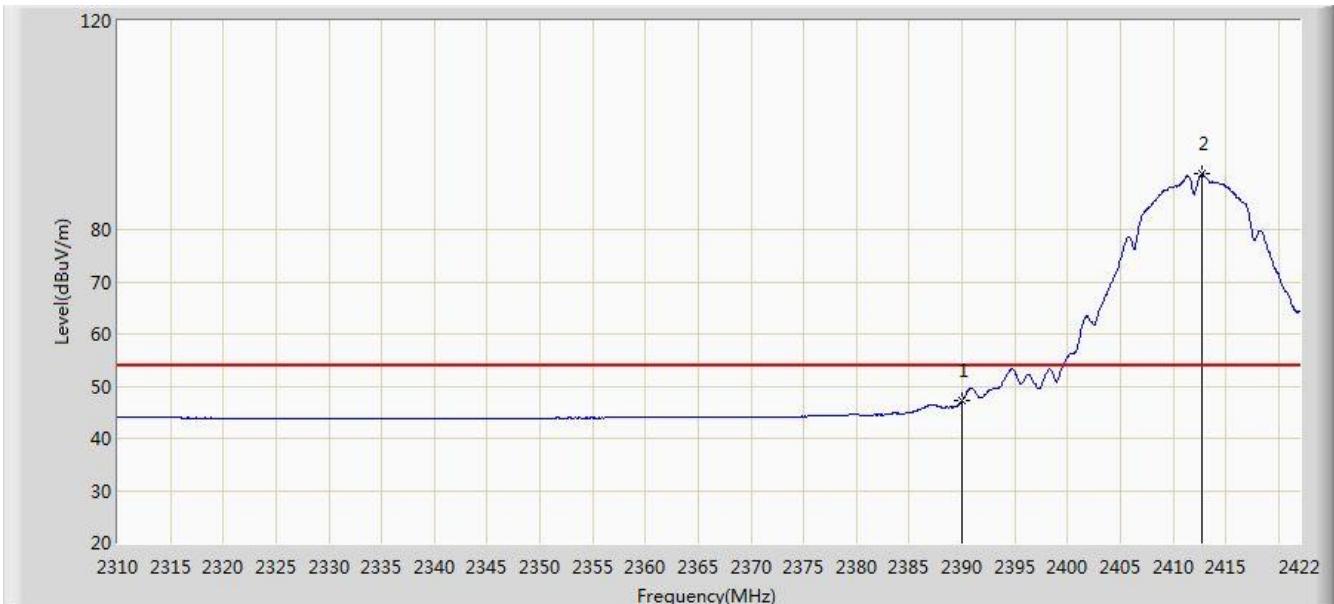


No	Flag	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Over Limit (dB)	Limit (dB μ V/m)	Factor (dB)	Type
1			2378.040	59.400	28.175	-14.600	74.000	31.225	PK
2			2390.000	59.627	28.424	-14.373	74.000	31.203	PK
3			2413.656	98.178	67.011	N/A	N/A	31.167	PK

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

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

Site: AC1	Time: 2016/12/12 - 11:31
Limit: FCC_Part15.209_RE(3m)	Engineer: Jone Zhang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT:SMART LED LAMP	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11b at Channel 2412MHz	

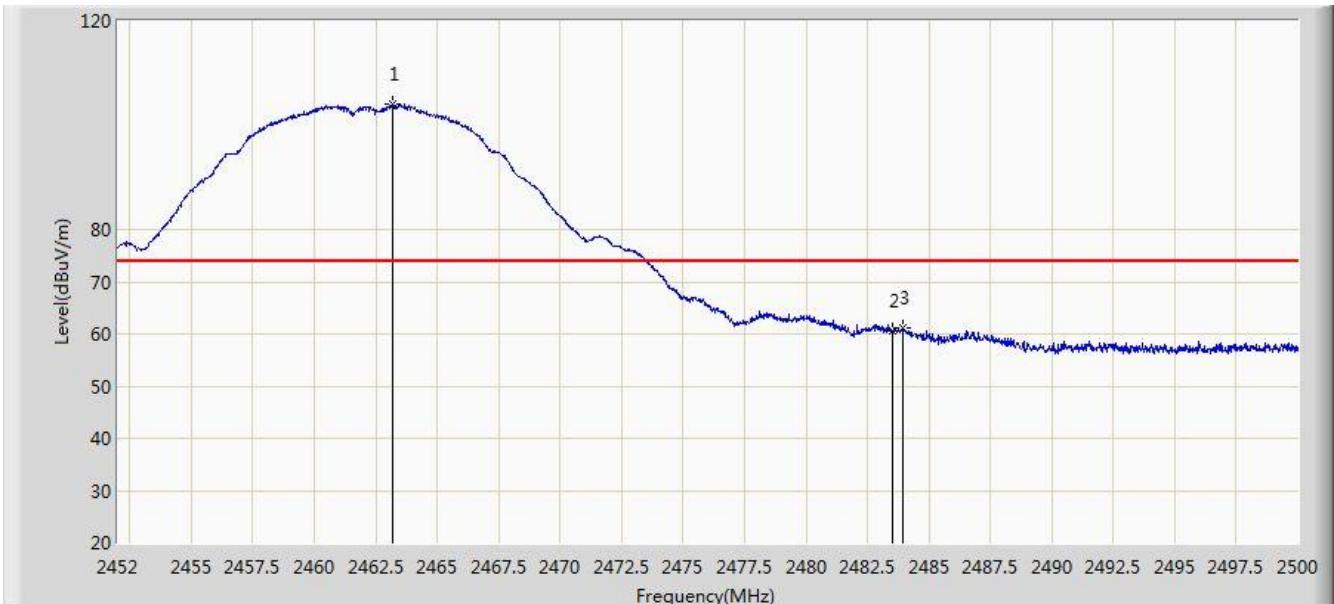


No	Flag	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Over Limit (dB)	Limit (dB μ V/m)	Factor (dB)	Type
1			2390.000	47.203	16.000	-6.797	54.000	31.203	AV
2			2412.704	90.656	59.488	N/A	N/A	31.168	AV

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

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

Site: AC1	Time: 2016/12/12 - 11:39
Limit: FCC_Part15.209_RE(3m)	Engineer: Jone Zhang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT:SMART LED LAMP	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11b at Channel 2462MHz	

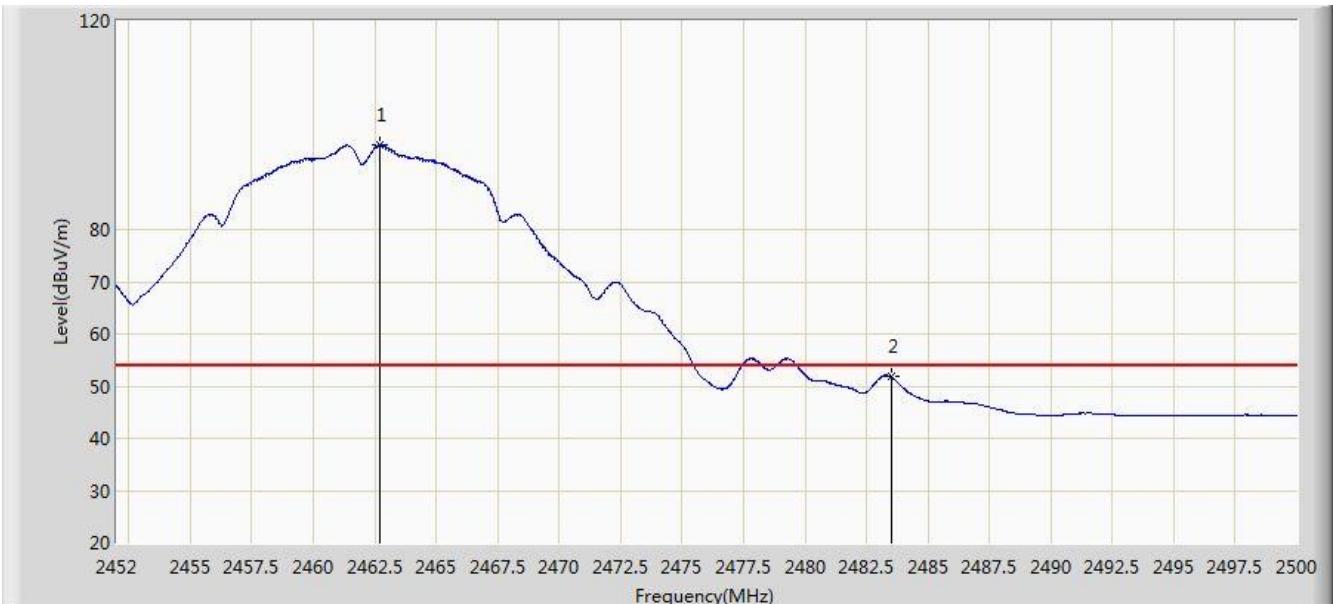


No	Flag	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Over Limit (dB)	Limit (dB μ V/m)	Factor (dB)	Type
1			2463.208	104.025	72.887	N/A	N/A	31.137	PK
2			2483.500	60.443	29.250	-13.557	74.000	31.194	PK
3			2483.944	61.206	30.012	-12.794	74.000	31.194	PK

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

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

Site: AC1	Time: 2016/12/12 - 11:40
Limit: FCC_Part15.209_RE(3m)	Engineer: Jone Zhang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT:SMART LED LAMP	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11b at Channel 2462MHz	

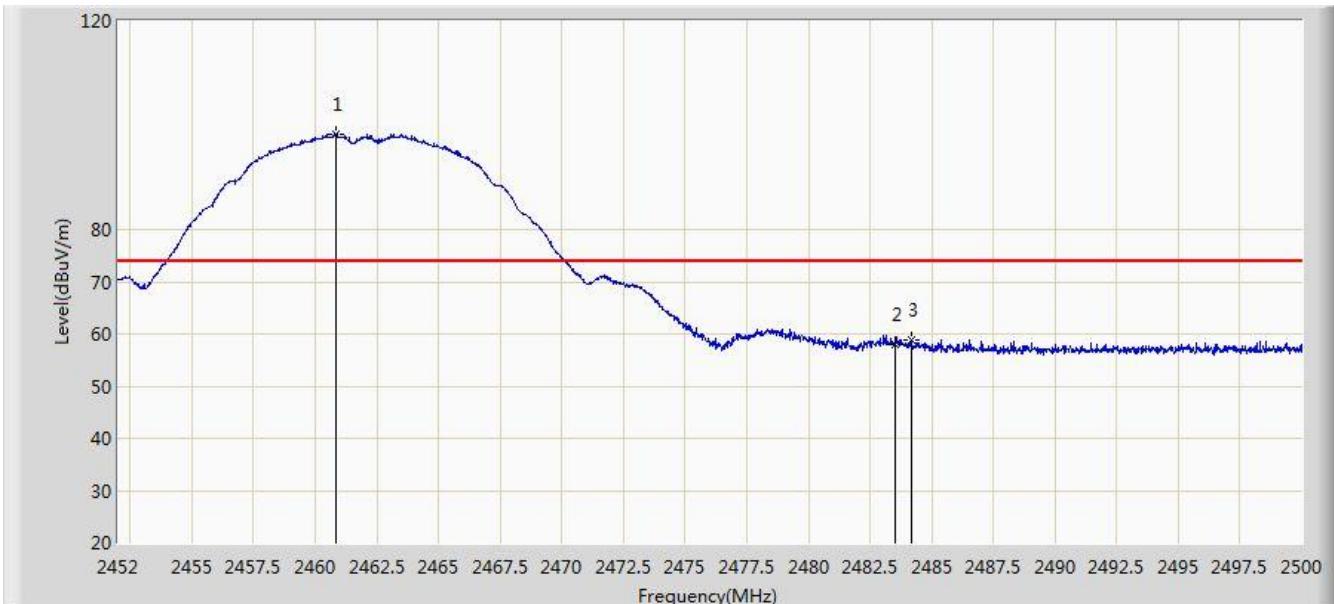


No	Flag	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Over Limit (dB)	Limit (dB μ V/m)	Factor (dB)	Type
1			2462.728	96.246	65.109	N/A	N/A	31.137	AV
2			2483.500	51.755	20.562	-2.245	54.000	31.194	AV

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

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

Site: AC1	Time: 2016/12/12 - 11:42
Limit: FCC_Part15.209_RE(3m)	Engineer: Jone Zhang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT:SMART LED LAMP	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11b at Channel 2462MHz	

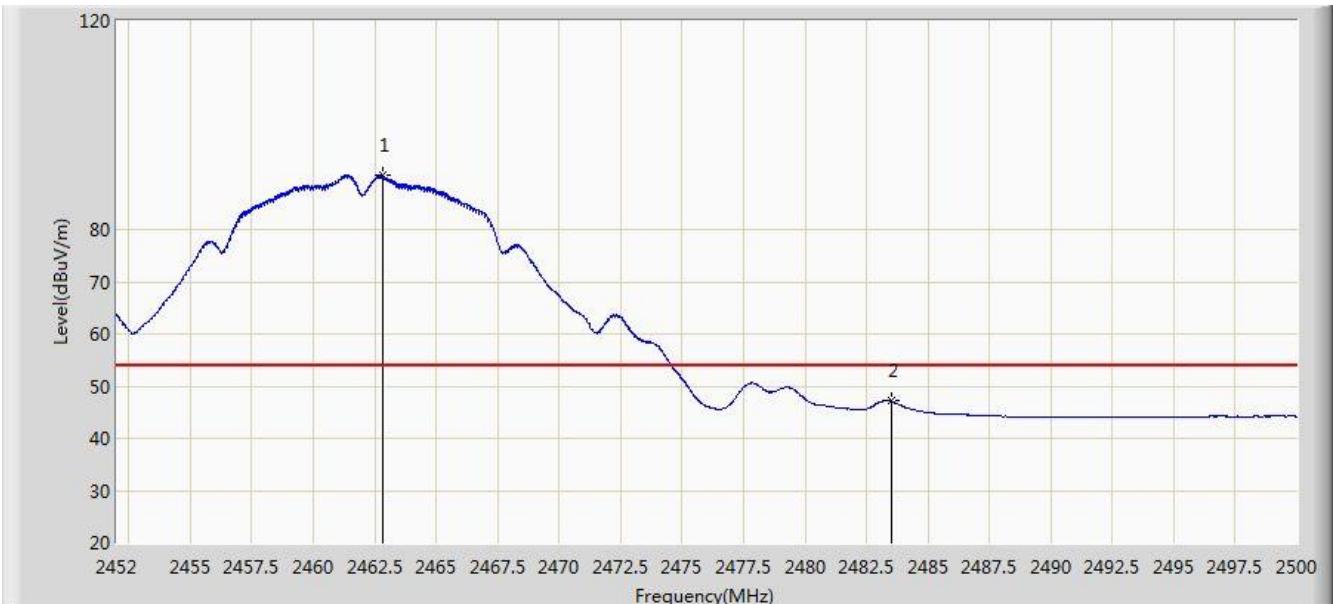


No	Flag	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Over Limit (dB)	Limit (dB μ V/m)	Factor (dB)	Type
1			2460.832	98.122	66.989	N/A	N/A	31.133	PK
2			2483.500	58.028	26.835	-15.972	74.000	31.194	PK
3			2484.208	58.765	27.570	-15.235	74.000	31.195	PK

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

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

Site: AC1	Time: 2016/12/12 - 11:43
Limit: FCC_Part15.209_RE(3m)	Engineer: Jone Zhang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT:SMART LED LAMP	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11b at Channel 2462MHz	

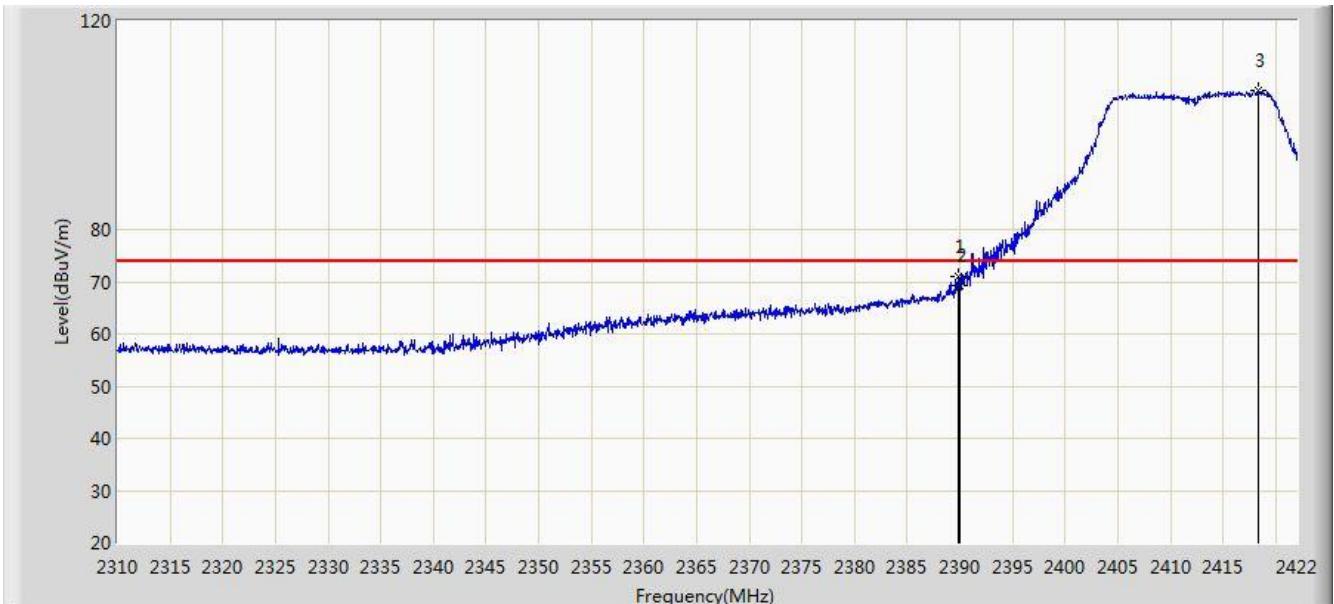


No	Flag	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Over Limit (dB)	Limit (dB μ V/m)	Factor (dB)	Type
1			2462.800	90.347	59.210	N/A	N/A	31.137	AV
2			2483.500	47.120	15.927	-6.880	54.000	31.194	AV

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

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

Site: AC1	Time: 2016/12/12 - 17:47
Limit: FCC_Part15.209_RE(3m)	Engineer: Jone Zhang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT:SMART LED LAMP	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11g at Channel 2412MHz	

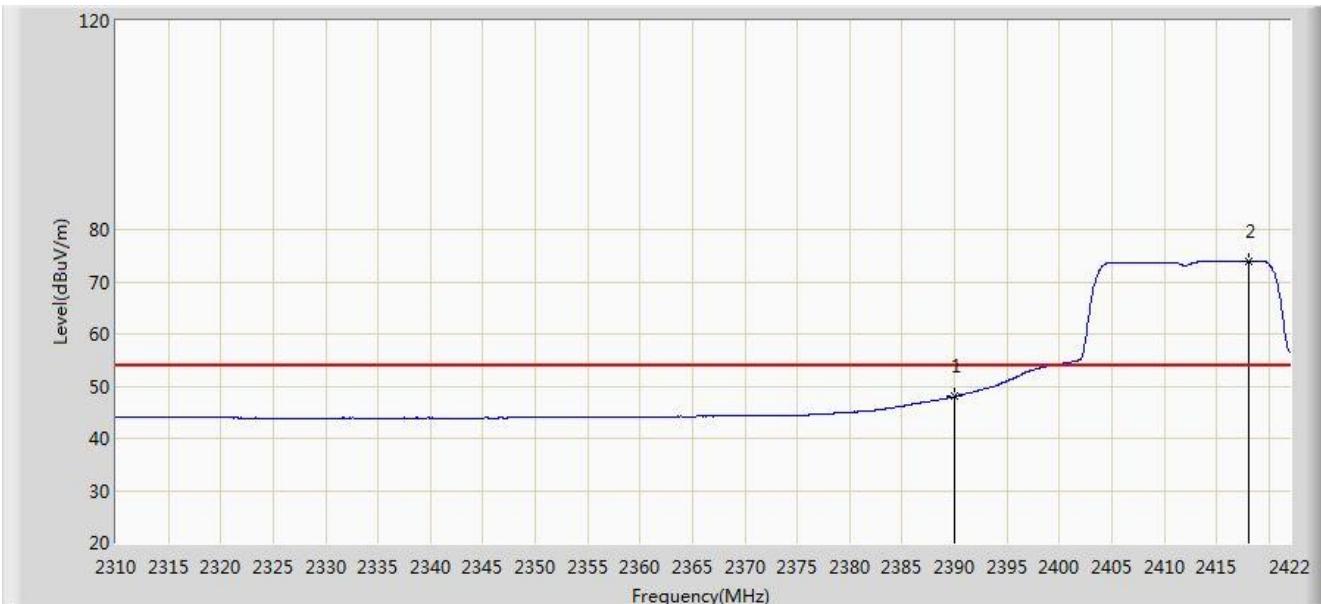


No	Flag	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Over Limit (dB)	Limit (dB μ V/m)	Factor (dB)	Type
1			2389.800	70.928	39.725	-3.072	74.000	31.203	PK
2			2390.000	69.333	38.130	-4.667	74.000	31.203	PK
3			2418.416	106.656	75.498	N/A	N/A	31.159	PK

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

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

Site: AC1	Time: 2016/12/12 - 17:52
Limit: FCC_Part15.209_RE(3m)	Engineer: Jone Zhang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT:SMART LED LAMP	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11g at Channel 2412MHz	

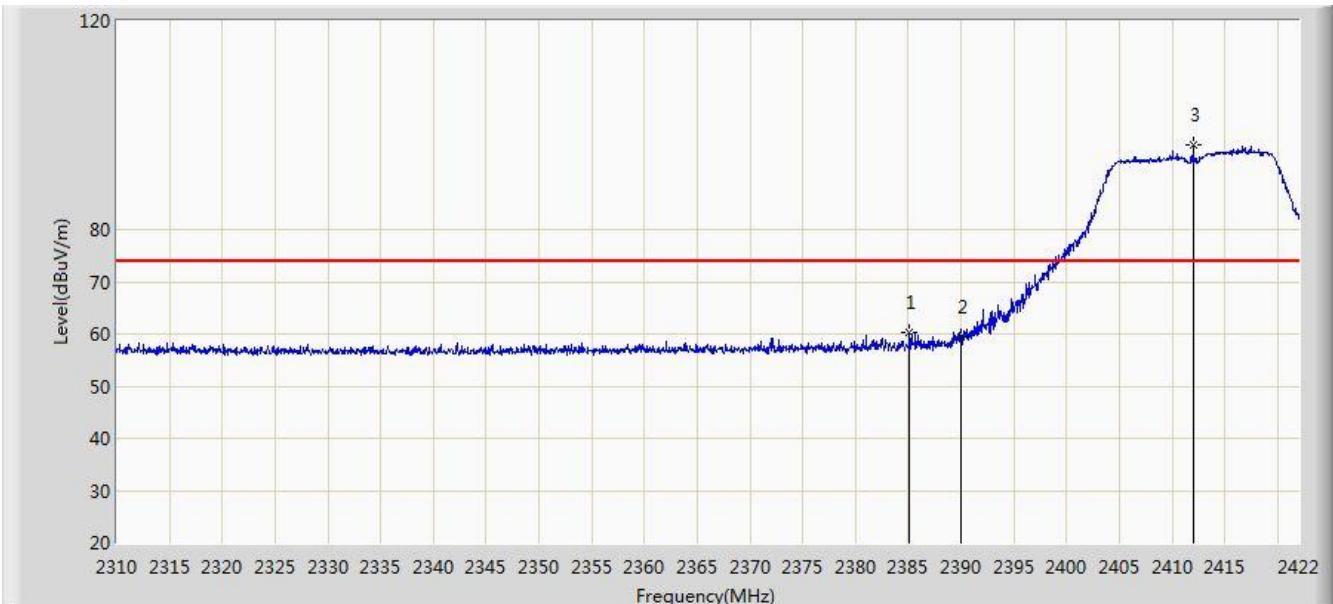


No	Flag	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Over Limit (dB)	Limit (dB μ V/m)	Factor (dB)	Type
1			2390.000	48.028	16.825	-5.972	54.000	31.203	AV
2			2418.136	73.937	42.778	N/A	N/A	31.159	AV

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

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

Site: AC1	Time: 2016/12/12 - 18:03
Limit: FCC_Part15.209_RE(3m)	Engineer: Jone Zhang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT:SMART LED LAMP	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11g at Channel 2412MHz	

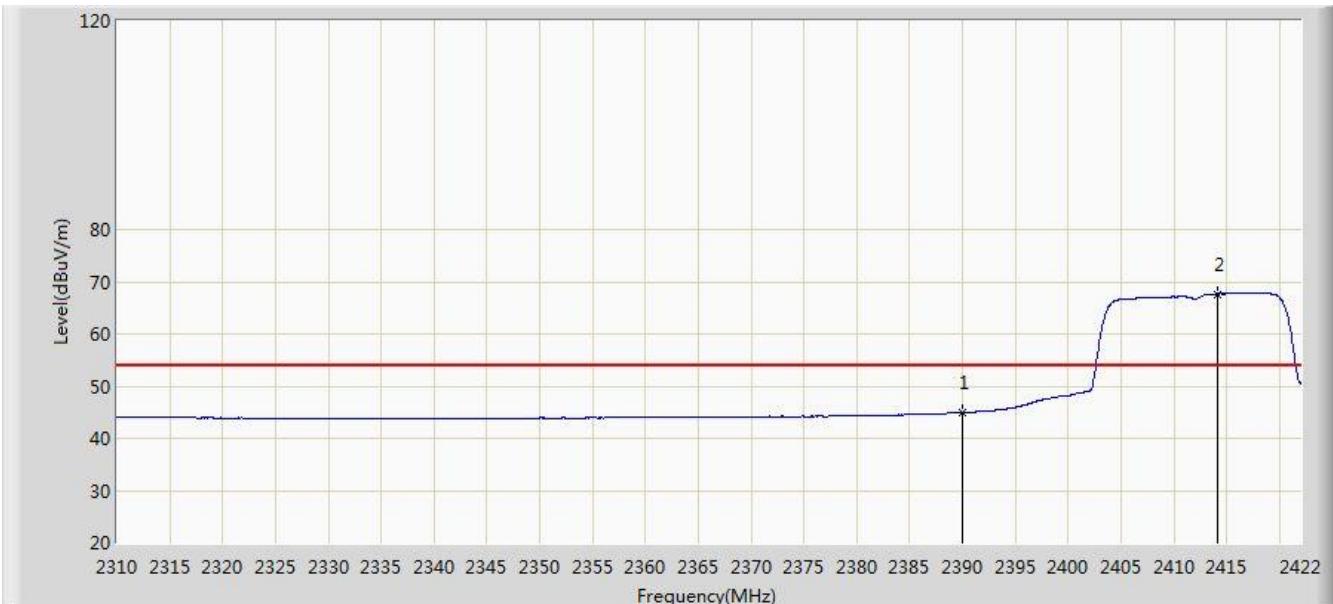


No	Flag	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Over Limit (dB)	Limit (dB μ V/m)	Factor (dB)	Type
1			2385.096	60.397	29.185	-13.603	74.000	31.212	PK
2			2390.000	59.314	28.111	-14.686	74.000	31.203	PK
3			2412.032	96.153	64.983	N/A	N/A	31.170	PK

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

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

Site: AC1	Time: 2016/12/12 - 18:06
Limit: FCC_Part15.209_RE(3m)	Engineer: Jone Zhang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT:SMART LED LAMP	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11g at Channel 2412MHz	

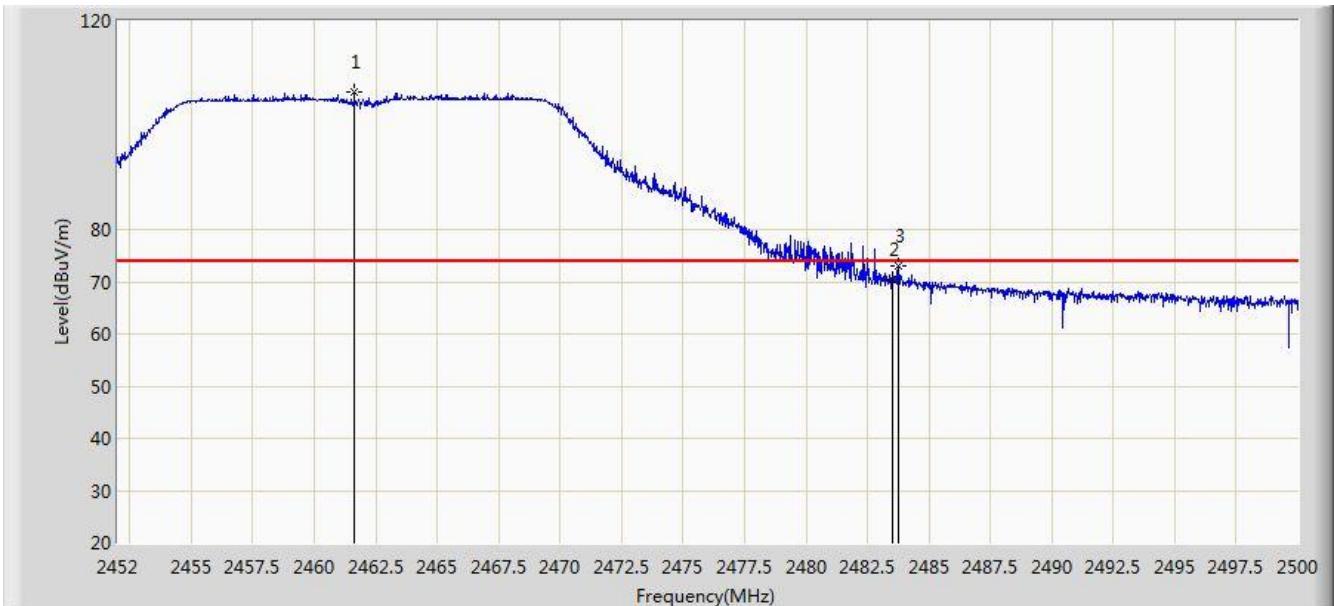


No	Flag	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Over Limit (dB)	Limit (dB μ V/m)	Factor (dB)	Type
1			2390.000	44.906	13.703	-9.094	54.000	31.203	AV
2			2414.104	67.672	36.506	N/A	N/A	31.166	AV

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

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

Site: AC1	Time: 2016/12/12 - 18:21
Limit: FCC_Part15.209_RE(3m)	Engineer: Jone Zhang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT:SMART LED LAMP	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11g at Channel 2462MHz	

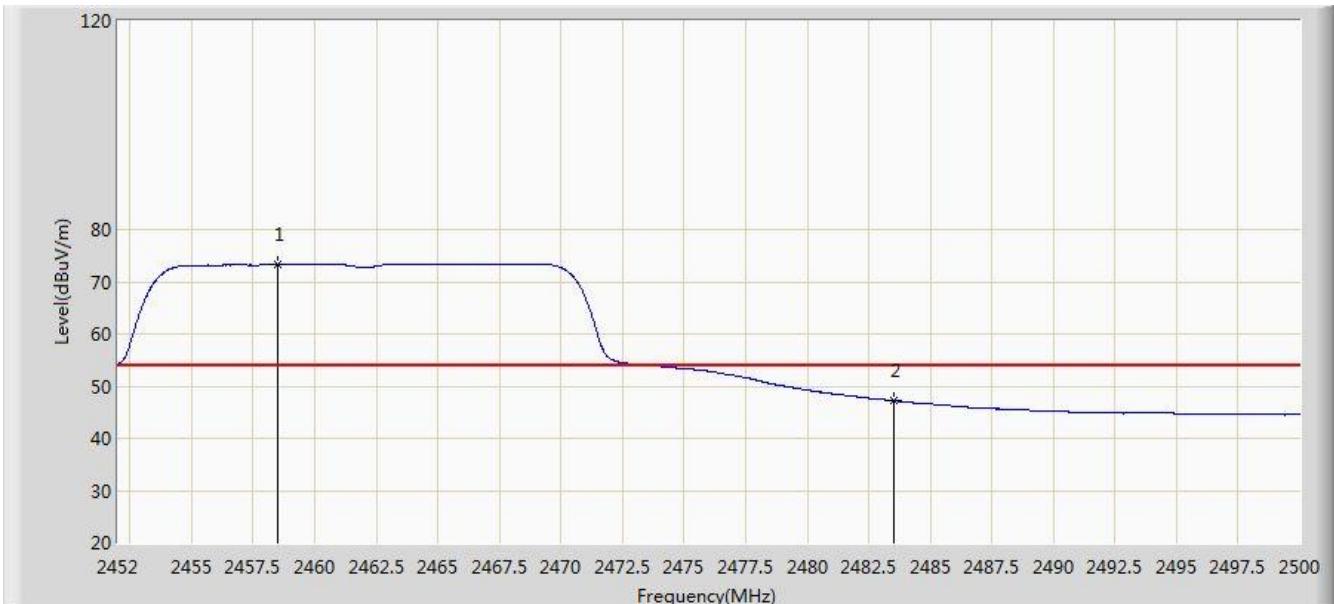


No	Flag	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Over Limit (dB)	Limit (dB μ V/m)	Factor (dB)	Type
1			2461.624	106.404	75.269	N/A	N/A	31.135	PK
2			2483.500	70.313	39.120	-3.687	74.000	31.194	PK
3			2483.776	73.177	41.983	-0.823	74.000	31.194	PK

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

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

Site: AC1	Time: 2016/12/12 - 18:25
Limit: FCC_Part15.209_RE(3m)	Engineer: Jone Zhang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT:SMART LED LAMP	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11g at Channel 2462MHz	

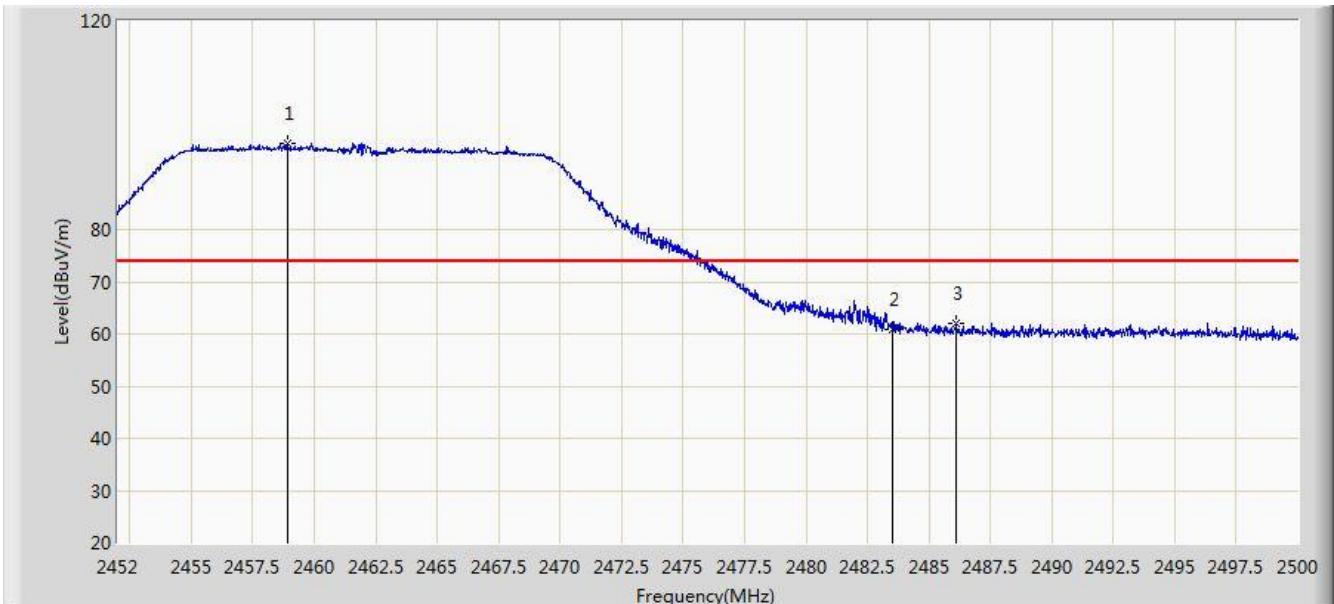


No	Flag	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Over Limit (dB)	Limit (dB μ V/m)	Factor (dB)	Type
1			2458.480	73.266	42.137	N/A	N/A	31.129	AV
2			2483.500	47.218	16.025	-6.782	54.000	31.194	AV

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

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

Site: AC1	Time: 2016/12/12 - 18:26
Limit: FCC_Part15.209_RE(3m)	Engineer: Jone Zhang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT:SMART LED LAMP	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11g at Channel 2462MHz	

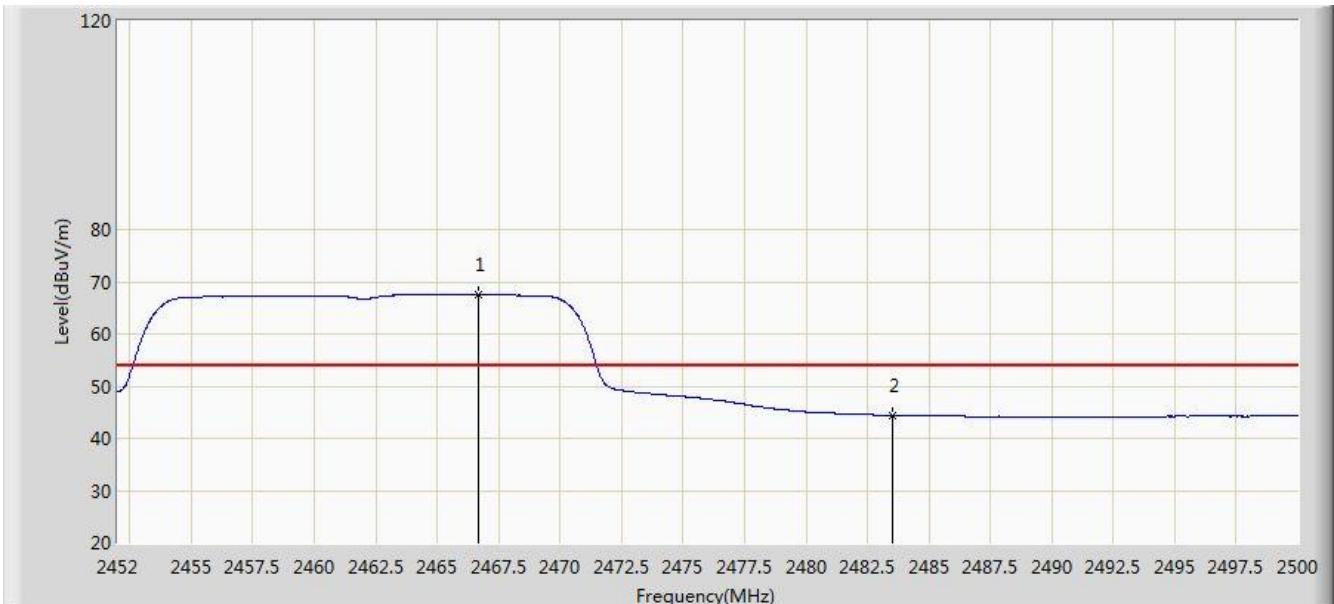


No	Flag	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Over Limit (dB)	Limit (dB μ V/m)	Factor (dB)	Type
1			2458.912	96.408	65.278	N/A	N/A	31.130	PK
2			2483.500	60.991	29.798	-13.009	74.000	31.194	PK
3			2486.128	62.043	30.843	-11.957	74.000	31.200	PK

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

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

Site: AC1	Time: 2016/12/12 - 18:37
Limit: FCC_Part15.209_RE(3m)	Engineer: Jone Zhang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT:SMART LED LAMP	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11g at Channel 2462MHz	

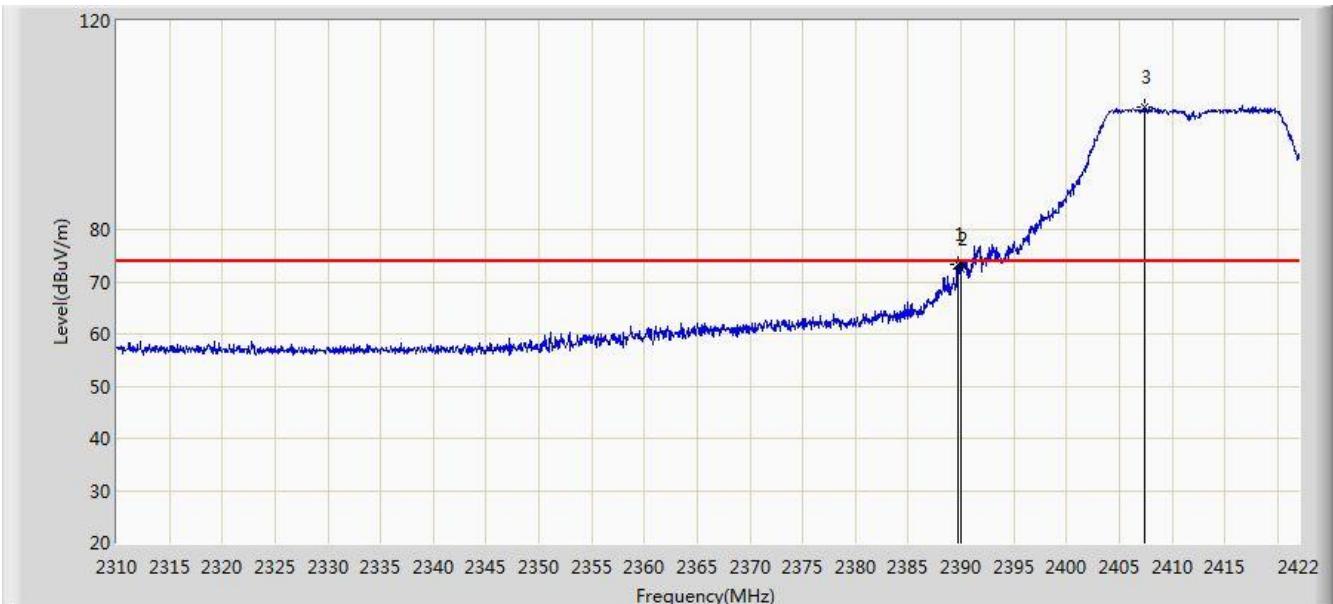


No	Flag	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Over Limit (dB)	Limit (dB μ V/m)	Factor (dB)	Type
1			2466.688	67.420	36.273	N/A	N/A	31.147	AV
2			2483.500	44.455	13.262	-9.545	54.000	31.194	AV

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

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

Site: AC1	Time: 2016/12/12 - 18:39
Limit: FCC_Part15.209_RE(3m)	Engineer: Jone Zhang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT:SMART LED LAMP	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11n-HT20 at Channel 2412MHz	

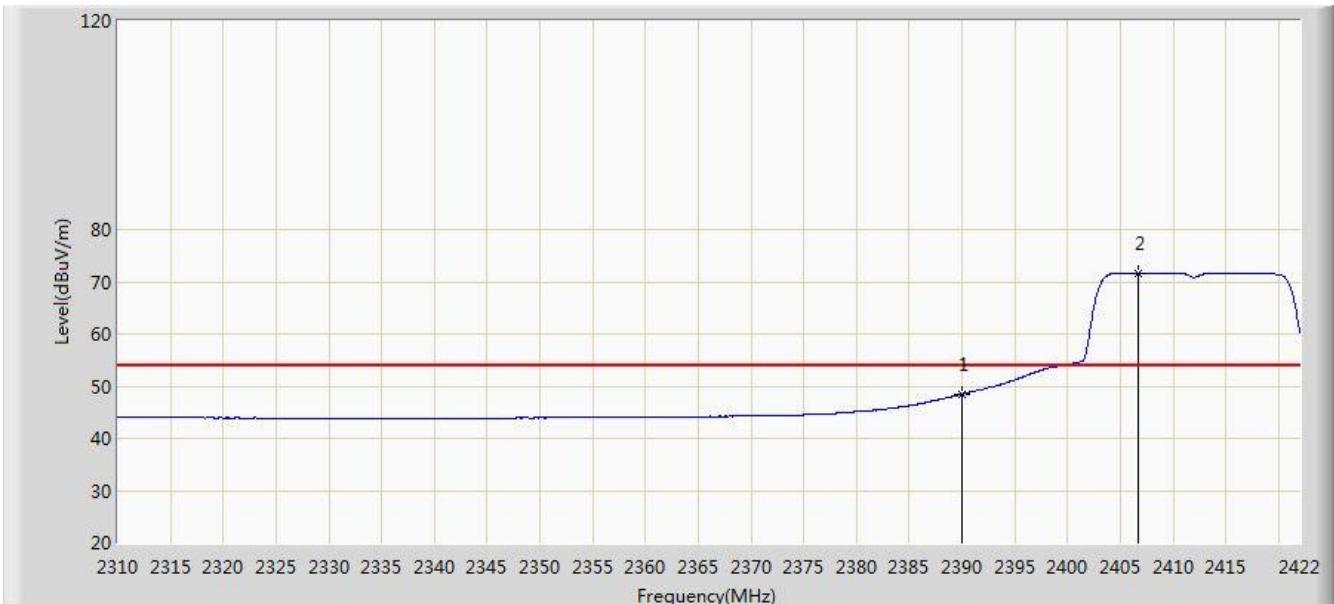


No	Flag	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Over Limit (dB)	Limit (dB μ V/m)	Factor (dB)	Type
1			2389.744	73.453	42.250	-0.547	74.000	31.203	PK
2			2390.000	72.465	41.262	-1.535	74.000	31.203	PK
3			2407.440	103.451	72.275	N/A	N/A	31.176	PK

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

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

Site: AC1	Time: 2016/12/12 - 18:44
Limit: FCC_Part15.209_RE(3m)	Engineer: Jone Zhang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT:SMART LED LAMP	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11n-HT20 at Channel 2412MHz	

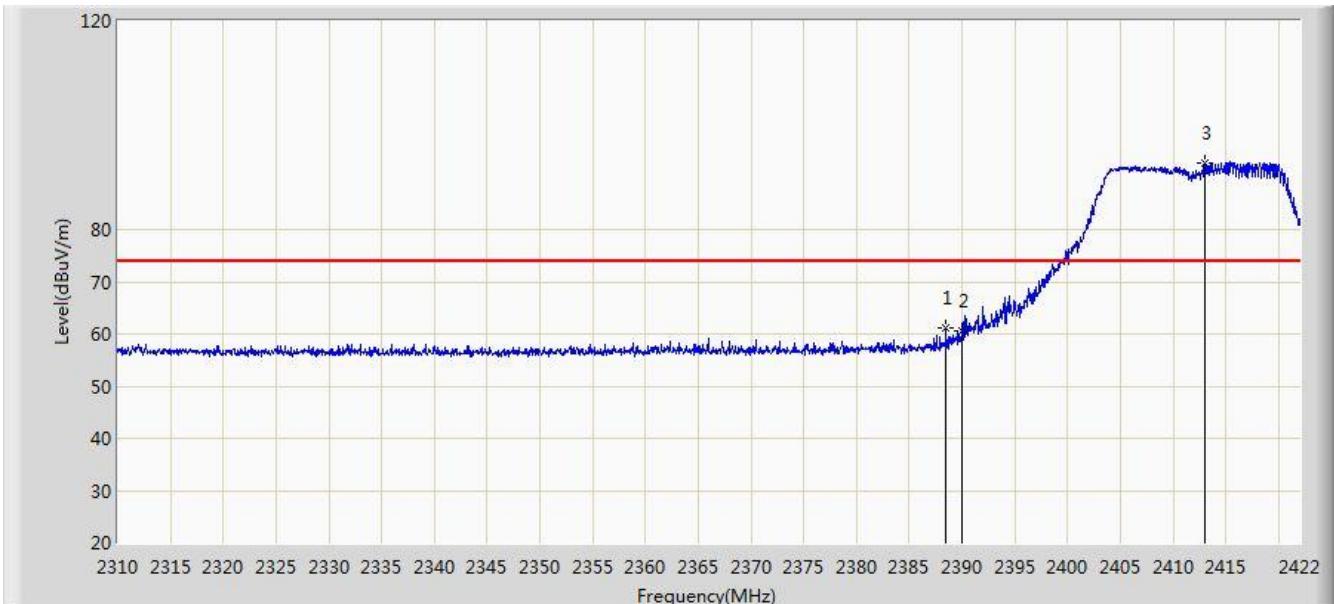


No	Flag	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Over Limit (dB)	Limit (dB μ V/m)	Factor (dB)	Type
1			2390.000	48.454	17.251	-5.546	54.000	31.203	AV
2			2406.712	71.712	40.535	N/A	N/A	31.177	AV

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

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

Site: AC1	Time: 2016/12/12 - 18:45
Limit: FCC_Part15.209_RE(3m)	Engineer: Jone Zhang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT:SMART LED LAMP	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11n-HT20 at Channel 2412MHz	

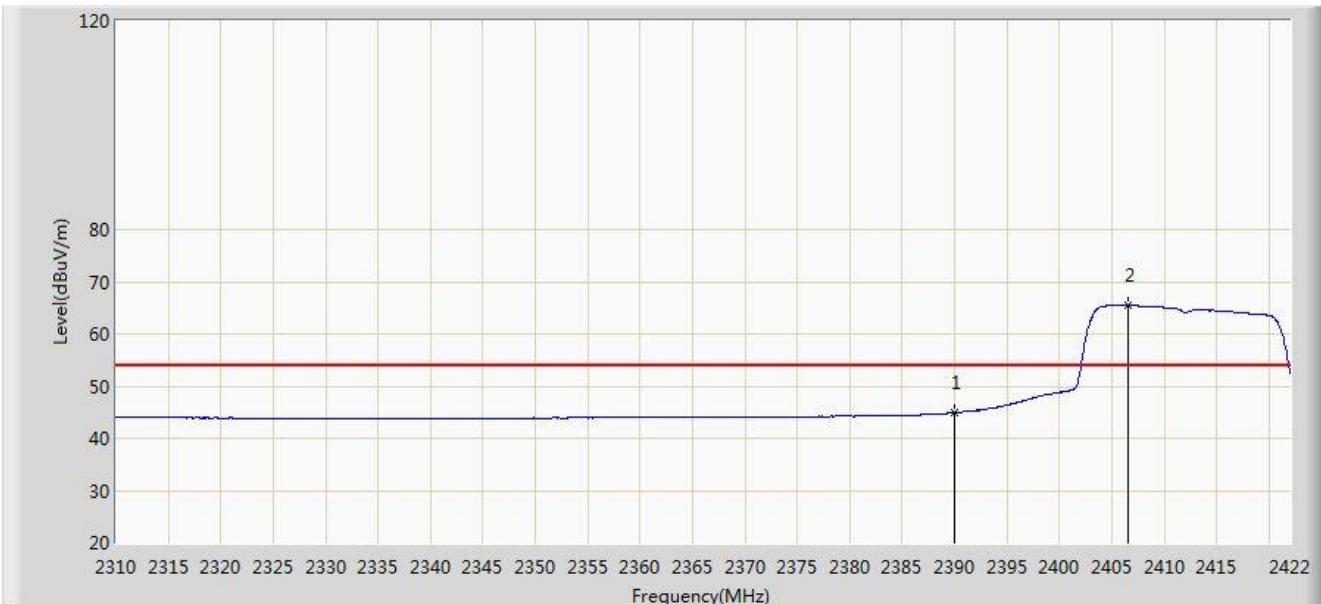


No	Flag	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Over Limit (dB)	Limit (dB μ V/m)	Factor (dB)	Type
1			2388.456	61.125	29.919	-12.875	74.000	31.206	PK
2			2390.000	60.499	29.296	-13.501	74.000	31.203	PK
3			2412.984	92.887	61.719	N/A	N/A	31.168	PK

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

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

Site: AC1	Time: 2016/12/12 - 18:46
Limit: FCC_Part15.209_RE(3m)	Engineer: Jone Zhang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT:SMART LED LAMP	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11n-HT20 at Channel 2412MHz	

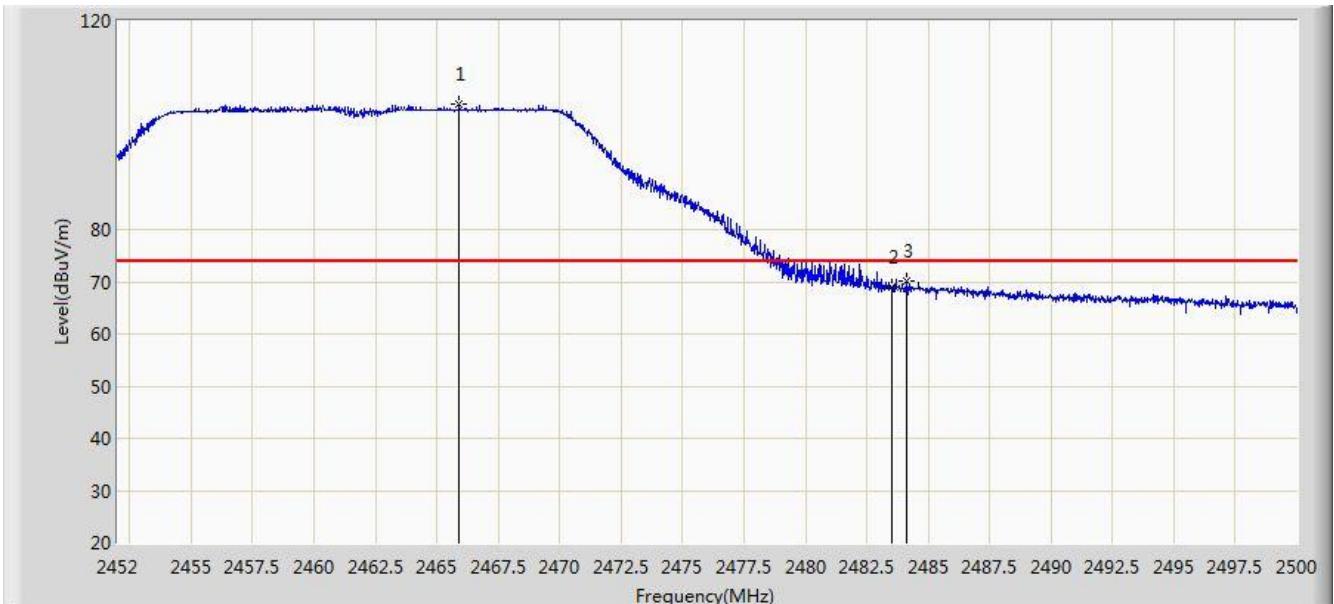


No	Flag	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Over Limit (dB)	Limit (dB μ V/m)	Factor (dB)	Type
1			2390.000	44.886	13.683	-9.114	54.000	31.203	AV
2			2406.600	65.452	34.274	N/A	N/A	31.177	AV

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

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

Site: AC1	Time: 2016/12/12 - 18:52
Limit: FCC_Part15.209_RE(3m)	Engineer: Jone Zhang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT:SMART LED LAMP	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11n-HT20 at Channel 2462MHz	

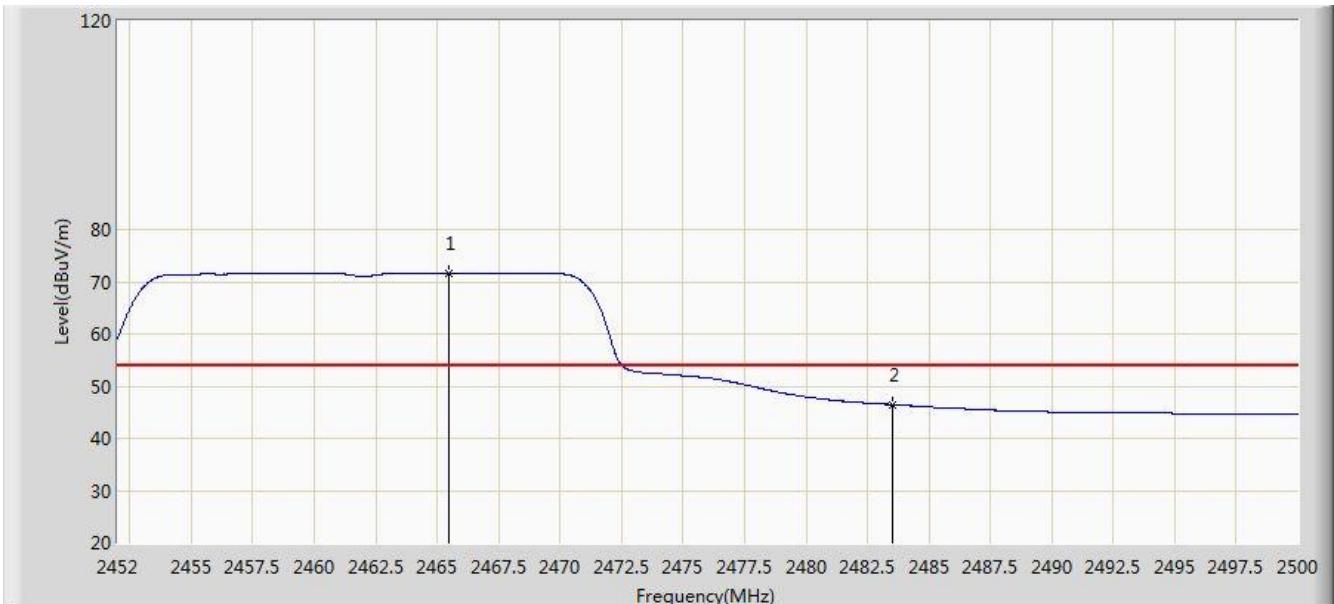


No	Flag	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Over Limit (dB)	Limit (dB μ V/m)	Factor (dB)	Type
1			2465.920	104.083	72.938	N/A	N/A	31.145	PK
2			2483.500	68.920	37.727	-5.080	74.000	31.194	PK
3			2484.112	70.065	38.870	-3.935	74.000	31.195	PK

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

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

Site: AC1	Time: 2016/12/12 - 18:54
Limit: FCC_Part15.209_RE(3m)	Engineer: Jone Zhang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT:SMART LED LAMP	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11n-HT20 at Channel 2462MHz	

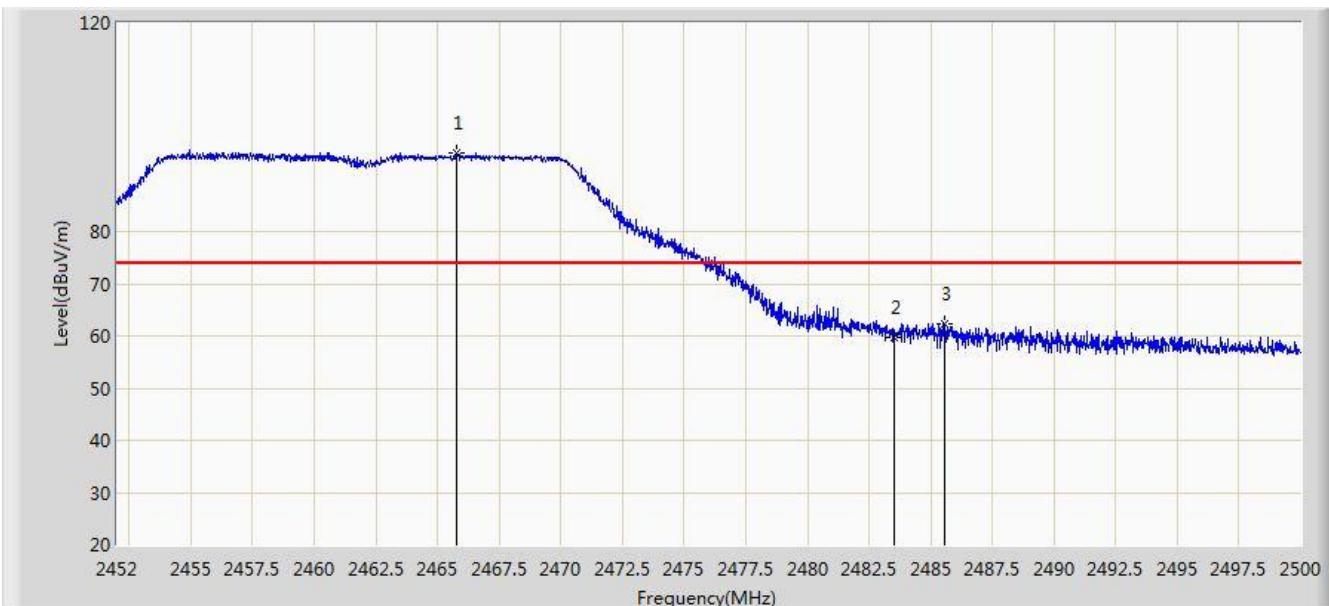


No	Flag	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Over Limit (dB)	Limit (dB μ V/m)	Factor (dB)	Type
1			2465.488	71.674	40.530	N/A	N/A	31.143	AV
2			2483.500	46.443	15.250	-7.557	54.000	31.194	AV

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

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

Site: AC1	Time: 2016/12/12 - 18:55
Limit: FCC_Part15.209_RE(3m)	Engineer: Jone Zhang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT:SMART LED LAMP	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11n-HT20 at Channel 2462MHz	

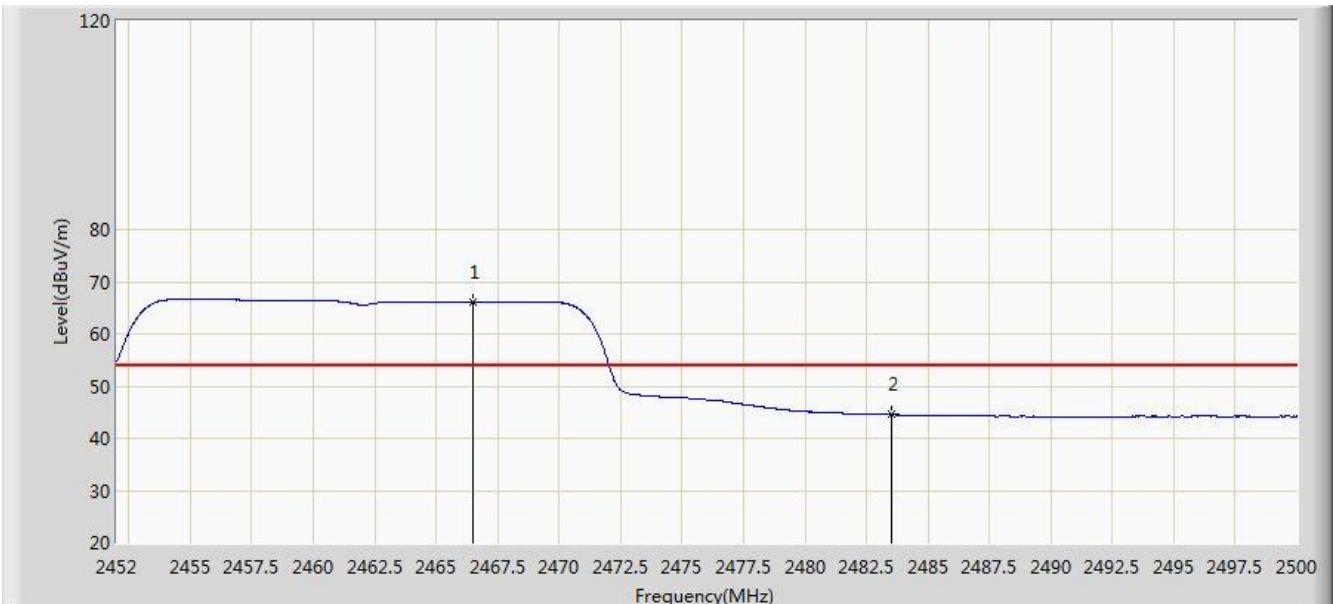


No	Flag	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Over Limit (dB)	Limit (dB μ V/m)	Factor (dB)	Type
1			2465.752	95.065	63.921	N/A	N/A	31.145	PK
2			2483.500	59.769	28.576	-14.231	74.000	31.194	PK
3			2485.576	62.227	31.028	-11.773	74.000	31.198	PK

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

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

Site: AC1	Time: 2016/12/12 - 18:57
Limit: FCC_Part15.209_RE(3m)	Engineer: Jone Zhang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT:SMART LED LAMP	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			2466.520	66.132	34.986	N/A	N/A	31.147	AV
2			2483.500	44.544	13.351	-9.456	54.000	31.194	AV

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

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

7.8. AC Conducted Emissions Measurement

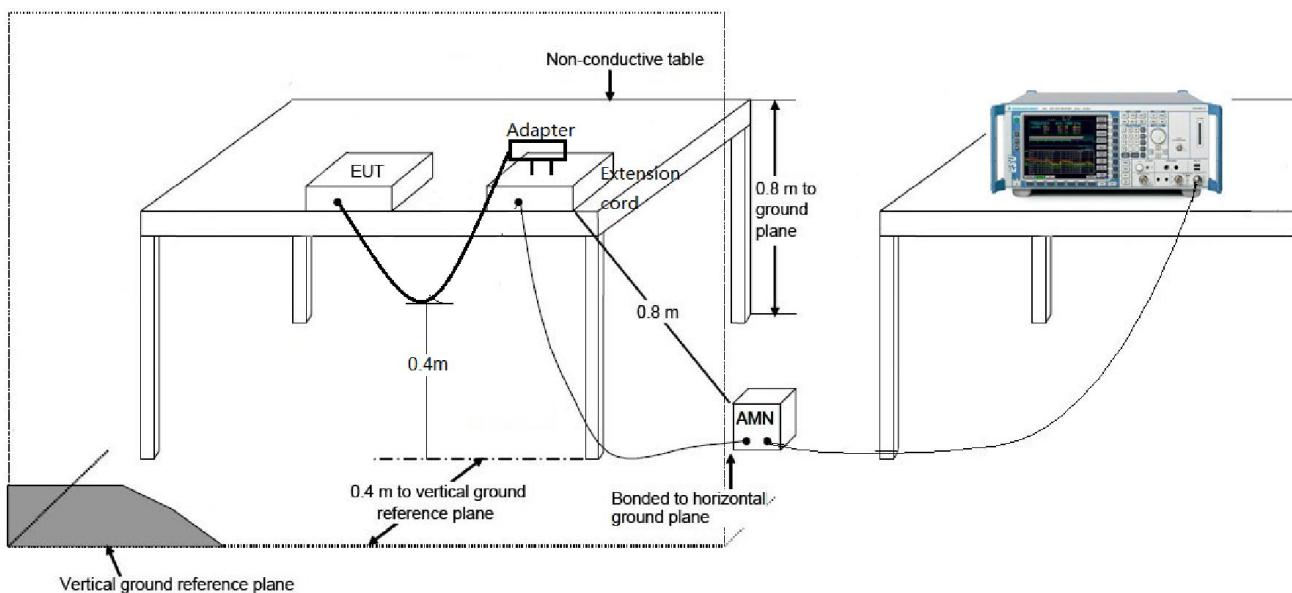
7.8.1. Test Limit

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.

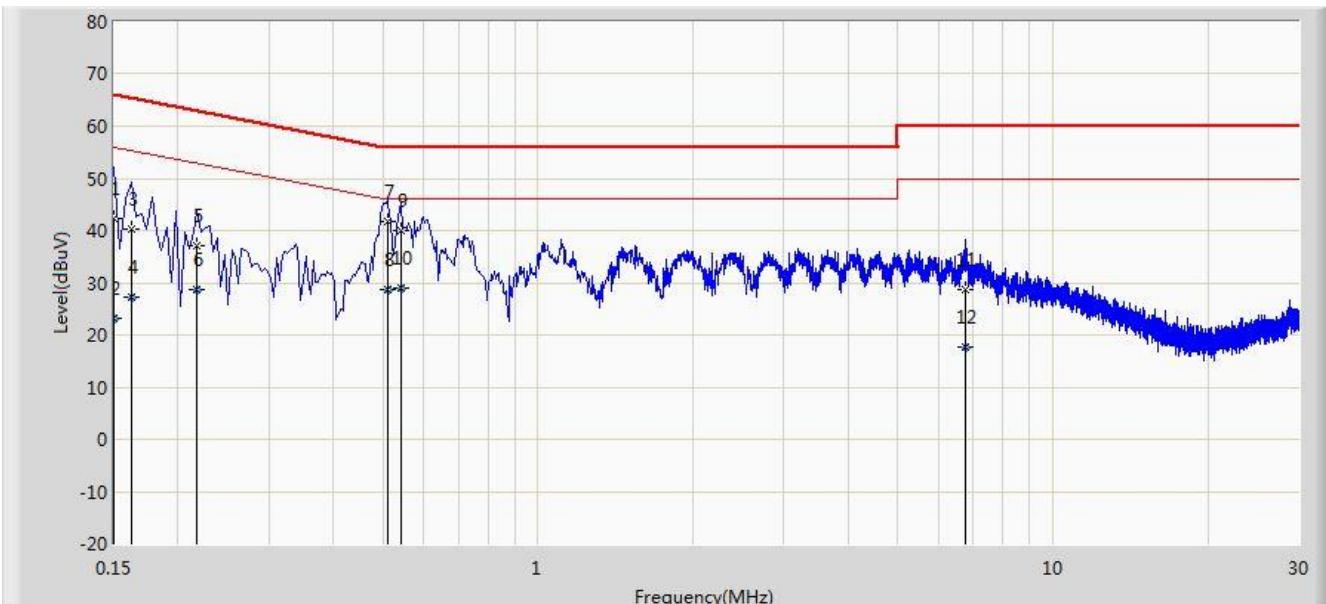
Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

7.8.2. Test Setup



7.8.3. Test Result

Site: SR2	Time: 2016/12/16 - 16:26
Limit: FCC_Part15.207_CE_AC Power	Engineer: Bruce Wang
Probe: ENV216_101683_Filter On	Polarity: Line
EUT: SMART LED LAMP	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11n-HT20 at Channel 2462MHz	

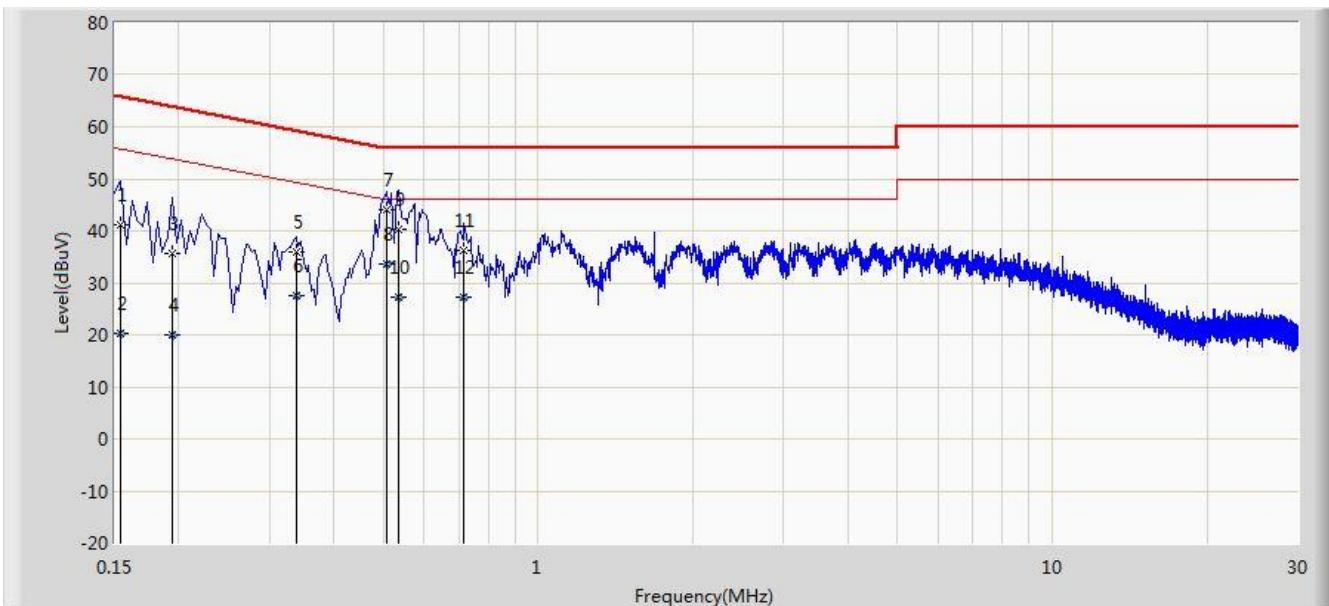


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1			0.150	42.270	31.101	-23.730	66.000	11.168	QP
2			0.150	23.289	12.121	-32.711	56.000	11.168	AV
3			0.162	40.168	30.071	-25.193	65.361	10.097	QP
4			0.162	27.295	17.198	-28.066	55.361	10.097	AV
5			0.218	37.131	27.186	-25.764	62.895	9.945	QP
6			0.218	28.626	18.681	-24.269	52.895	9.945	AV
7	*	*	0.510	41.808	31.651	-14.192	56.000	10.157	QP
8			0.510	28.595	18.438	-17.405	46.000	10.157	AV
9			0.542	39.961	29.816	-16.039	56.000	10.145	QP
10			0.542	29.122	18.977	-16.878	46.000	10.145	AV
11			6.738	28.678	18.530	-31.322	60.000	10.148	QP
12			6.738	17.542	7.394	-32.458	50.000	10.148	AV

Note: Measure Level (dB μ V) = Reading Level (dB μ V) + Factor (dB)

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

Site: SR2	Time: 2016/12/16 - 16:32
Limit: FCC_Part15.207_CE_AC Power	Engineer: Bruce Wang
Probe: ENV216_101683_Filter On	Polarity: Neutral
EUT: SMART LED LAMP	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11n-HT20 at Channel 2462MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dB μ V)	Reading Level (dB μ V)	Over Limit (dB)	Limit (dB μ V)	Factor (dB)	Type
1			0.154	41.245	30.529	-24.537	65.781	10.716	QP
2			0.154	20.154	9.438	-35.628	55.781	10.716	AV
3			0.194	35.564	25.542	-28.300	63.864	10.021	QP
4			0.194	19.998	9.977	-33.865	53.864	10.021	AV
5			0.338	35.869	25.803	-23.384	59.252	10.066	QP
6			0.338	27.398	17.332	-21.854	49.252	10.066	AV
7	*	*	0.506	44.089	33.912	-11.911	56.000	10.177	QP
8			0.506	33.758	23.581	-12.242	46.000	10.177	AV
9			0.534	40.231	30.063	-15.769	56.000	10.168	QP
10			0.534	27.240	17.072	-18.760	46.000	10.168	AV
11			0.718	36.255	26.190	-19.745	56.000	10.065	QP
12			0.718	27.210	17.145	-18.790	46.000	10.065	AV

Note: Measure Level (dB μ V) = Reading Level (dB μ V) + 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 **SMART LED LAMP FCC ID:**

2AJ3WEBEQPZ05 is in compliance with Part 15C of the FCC Rules.

The End
