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Report No.: 1608RSU02207
Report Version: V01
Issue Date: 11-10-2016

MEASUREMENT REPORT
FCC PART 15.247 802.11b/g/n

FCC ID:	2AJ23-HY-W20
APPLICANT:	QUANZHOU HEYI ELECTRONICS CO., LTD.
Application Type:	Certification
Product:	Network Alarm System
Model No.:	HY-W20, HY-W5, HY-W6, HY-W7, HY-W21, HY-G20, HY-L20, HY-W30, HY-G30, HY-L30
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:	August 14 ~ November 09, 2016

Reviewed By : Robin Wu
(Robin Wu)

Approved By : Marlin Chen
(Marlin Chen)

ACCREDITED
TESTING LABORATORY
CERTIFICATE #3628.01

Revision History

Report No.	Version	Description	Issue Date	Note
1608RSU02207	Rev. 01	Initial report	11-10-2016	Valid

CONTENTS

§2.1033 General Information

Applicant:	QUANZHOU HEYI ELECTRONICS CO., LTD.
Applicant Address:	No.4-12, Chongrui Street, Qingmeng Economic Developmment Zone, Quanzhou, China
Manufacturer:	QUANZHOU HEYI ELECTRONICS CO., LTD.
Manufacturer Address:	No.4-12, Chongrui Street, Qingmeng Economic Developmment Zone, Quanzhou, China
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:	2AJ23-HY-W20
Test Device Serial No.:	N/A ☐ Production ☒ Pre-Production ☐ 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	Network Alarm System
Model No.	HY-W20, HY-W5, HY-W6, HY-W7, HY-W21, HY-G20, HY-L20, HY-W30, HY-G30, HY-L30
WLAN Specification	
Frequency Range	802.11b/g/n-HT20: 2412 ~ 2462 MHz 802.11n-HT40: 2422 ~ 2452 MHz
Maximum Peak Output Power	802.11b: 22.36dBm 802.11g: 24.16dBm 802.11n-HT20: 24.09dBm 802.11n-HT40: 23.97dBm
Type of Modulation	802.11b: DSSS 802.11g/n: OFDM
Antenna Gain	2.0dBi
Components	
Adapter	M/N: ZTHY050100 INPUT: 100-240V ~ 50/60Hz, 1.5A OUTPUT: 5Vdc, 1000mA

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	--	--

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	--	--	--	--

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
	Mode 4: Transmit by 802.11n-HT40

2.4. Test Software

The test utility software used during testing was “HFWifiTestTools.exe”.

2.5. Device Capabilities

This device contains the following capabilities:

2.4GHz WLAN (DTS)

Note: 2.4GHz WLAN (DTS) operation is possible in 20MHz and 40MHz 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	98.8%
802.11g	93.3%
802.11n-HT20	93.2%
802.11n-HT40	89.8%

2.6. Test Configuration

The **Network Alarm System** 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 **Network Alarm System**.

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 **Network Alarm System** is **permanently attached.**
- There are no provisions for connection to an external antenna.

Conclusion:

The **Network Alarm System FCC ID: 2AJ23-HY-W20** 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	2017/11/03
Two-Line V-Network	R&S	ENV216	101683	1 year	2017/11/03
Two-Line V-Network	R&S	ENV216	101684	1 year	2017/11/03
Temperature/Humidity Meter	Yuhuaze	HTC-2	N/A	1 year	2016/12/20
Shielding Anechoic Chamber	Mikebang	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	2017/11/03
Microwave System Amplifier	Agilent	83017A	MY53270040	1 year	2017/03/29
Broadband Coaxial Preamplifier	Schwarzbeck	BBV 9718	302	1 year	2016/12/11
Loop Antenna	Schwarzbeck	FMZB1519	1519-041	1 year	2016/12/14
Bilog Period Antenna	Schwarzbeck	VULB9168	662	1 year	2016/12/10
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1167	1 year	2017/11/07
Broadband Horn Antenna	Schwarzbeck	BBHA9170	BBHA9170549	1 year	2017/01/04
Temperature/Humidity Meter	Yuhuaze	HTC-2	N/A	1 year	2016/12/20
Anechoic Chamber	TDK	Chamber-AC1	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	HTC-2	N/A	1 year	2016/12/20

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=2Uc(y)): 150kHz~30MHz: 3.46dB
Radiated Emission Measurement - AC1
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 9kHz ~ 1GHz: 4.18dB 1GHz ~ 25GHz: 4.76dB

7. TEST RESULT

7.1. Summary

Company Name: QUANZHOU HEYI ELECTRONICS CO., LTD.
FCC ID: 2AJ23-HY-W20
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); 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	≥ 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.

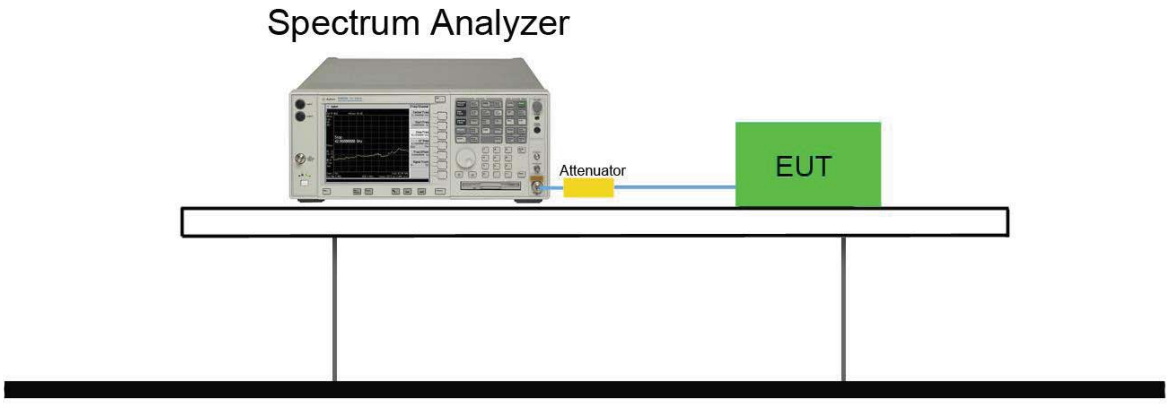
7.2.2. Test Procedure used

KDB 558074 D01v03r05 - Section 8.2 Option 2

7.2.3. Test Setting

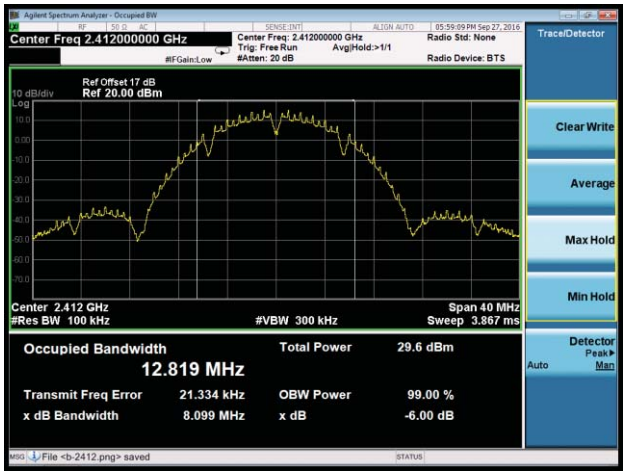
1. The Spectrum's automatic bandwidth measurement capability was used to perform the 6dB bandwidth measurement. The "X" dB bandwidth parameter was set to X = 6. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. Set RBW = 100 kHz
3. VBW ≥ 3 ×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

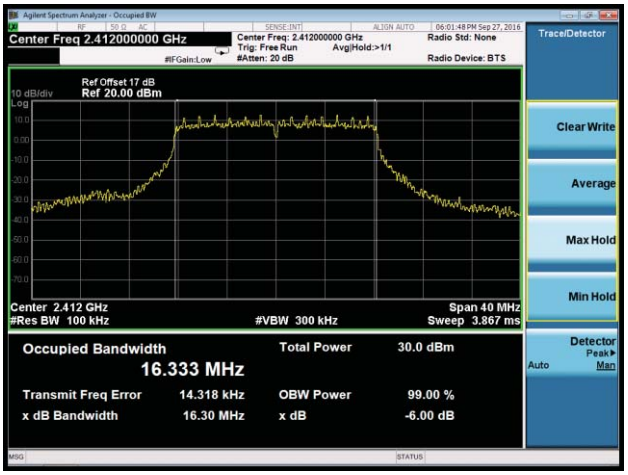
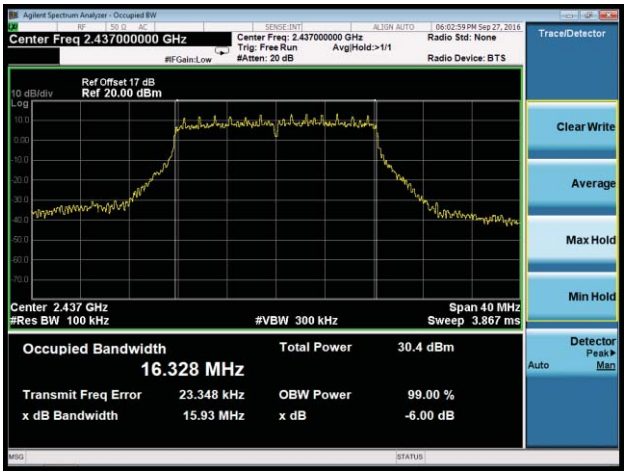
7.2.4. Test Setup

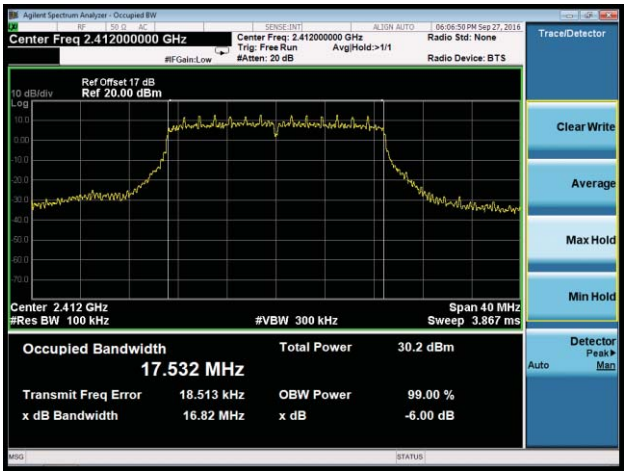
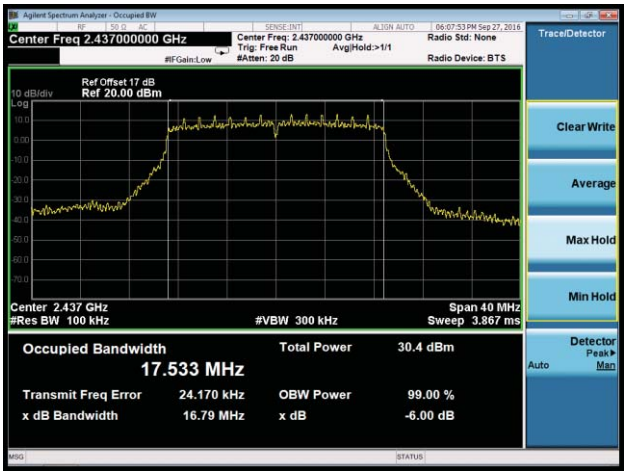


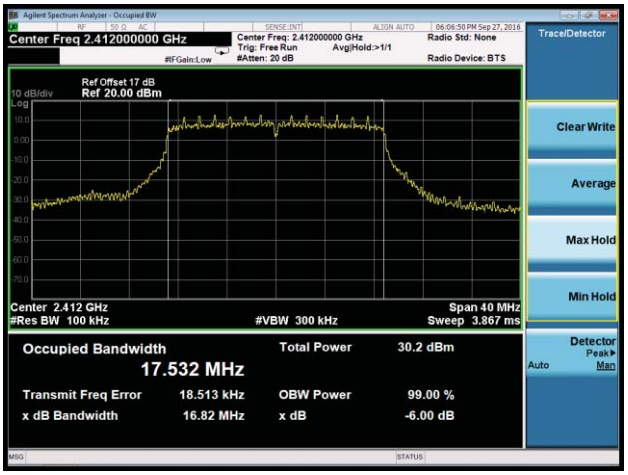
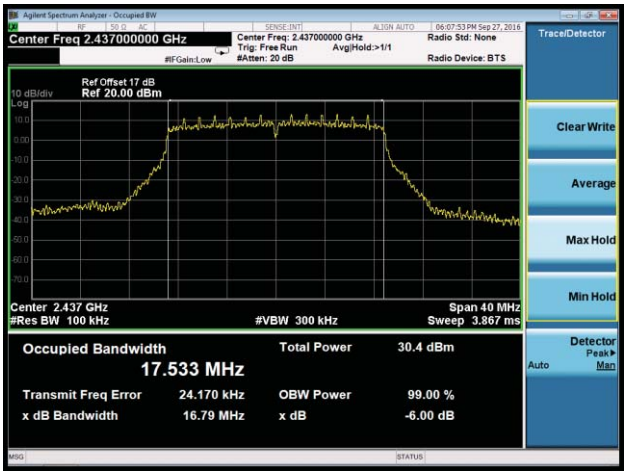
7.2.5. Test Result

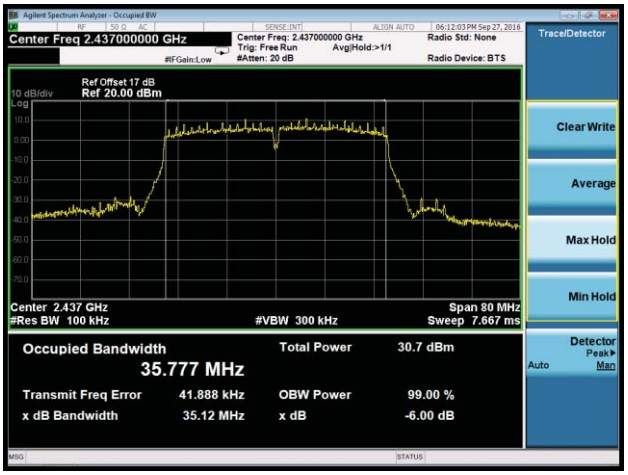
Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
802.11b	1	01	2412	8.10	≥ 0.5	Pass
802.11b	1	06	2437	8.09	≥ 0.5	Pass
802.11b	1	11	2462	8.09	≥ 0.5	Pass
802.11g	6	01	2412	16.30	≥ 0.5	Pass
802.11g	6	06	2437	15.93	≥ 0.5	Pass
802.11g	6	11	2462	16.07	≥ 0.5	Pass
802.11n-HT20	6.5	01	2412	16.82	≥ 0.5	Pass
802.11n-HT20	6.5	06	2437	16.79	≥ 0.5	Pass
802.11n-HT20	6.5	11	2462	16.58	≥ 0.5	Pass
802.11n-HT40	13.5	03	2422	35.18	≥ 0.5	Pass
802.11n-HT40	13.5	06	2437	35.12	≥ 0.5	Pass
802.11n-HT40	13.5	09	2452	35.10	≥ 0.5	Pass

802.11b 6dB Bandwidth	
Channel 01 (2412MHz)	**Channel 06 (2437MHz)**
	
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-HT20 6dB Bandwidth	
Channel 01 (2412MHz)	**Channel 06 (2437MHz)**
	
Channel 11 (2462MHz)	
	

802.11n-HT40 6dB Bandwidth	
Channel 03 (2422MHz)	**Channel 06 (2437MHz)**
	
Channel 09 (2452MHz)	
	

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

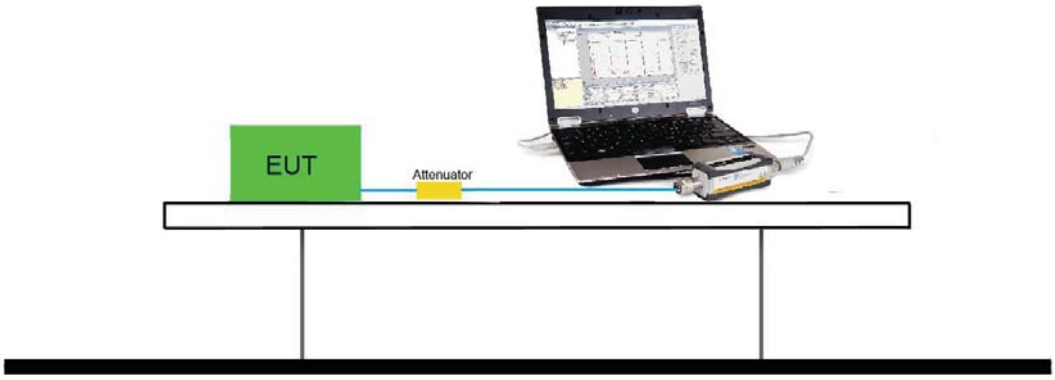
KDB 558074 D01v03r05 - Section 9.1.2 PKPM1 Peak Power Method (for signals with BW ≤ 50MHz)

7.3.3. Test Setting

Method PKPM1 (Peak Power Measurement of Signals with DTS BW ≤ 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)	Peak Power (dBm)
802.11b	20	6	2437	1	21.04
				5.5	20.87
				11	20.58
802.11g	20	6	2437	6	23.14
				24	22.96
				54	22.73
802.11n	20	6	2437	6.5	23.33
				7.2	23.12
				26.0	22.97
				28.9	22.89
				65.0	22.73
				72.2	22.57
802.11n	40	6	2437	13.5	23.41
				15.0	23.32
				54	23.24
				60	23.18
				135	23.05
				150	22.87

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	19.77	≤ 30	Pass
11b	1	6	2437	21.04	≤ 30	Pass
11b	1	11	2462	22.36	≤ 30	Pass
11g	6	1	2412	21.96	≤ 30	Pass
11g	6	6	2437	23.14	≤ 30	Pass
11g	6	11	2462	24.16	≤ 30	Pass
11n-HT20	6.5	1	2412	22.11	≤ 30	Pass
11n-HT20	6.5	6	2437	23.33	≤ 30	Pass
11n-HT20	6.5	11	2462	24.09	≤ 30	Pass
11n-HT40	13.5	3	2422	22.60	≤ 30	Pass
11n-HT40	13.5	6	2437	23.41	≤ 30	Pass
11n-HT40	13.5	9	2452	23.97	≤ 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	16.58	≤ 30	Pass
11b	1	6	2437	17.87	≤ 30	Pass
11b	1	11	2462	19.29	≤ 30	Pass
11g	6	1	2412	13.11	≤ 30	Pass
11g	6	6	2437	14.57	≤ 30	Pass
11g	6	11	2462	15.97	≤ 30	Pass
11n-HT20	6.5	1	2412	14.12	≤ 30	Pass
11n-HT20	6.5	6	2437	14.56	≤ 30	Pass
11n-HT20	6.5	11	2462	15.21	≤ 30	Pass
11n-HT40	13.5	3	2422	14.09	≤ 30	Pass
11n-HT40	13.5	6	2437	14.45	≤ 30	Pass
11n-HT40	13.5	9	2452	14.95	≤ 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.

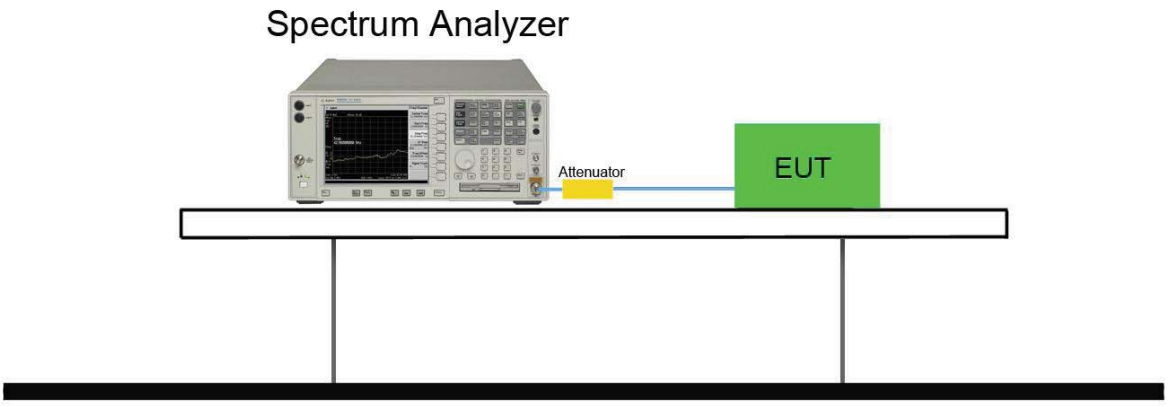
7.4.2. Test Procedure Used

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

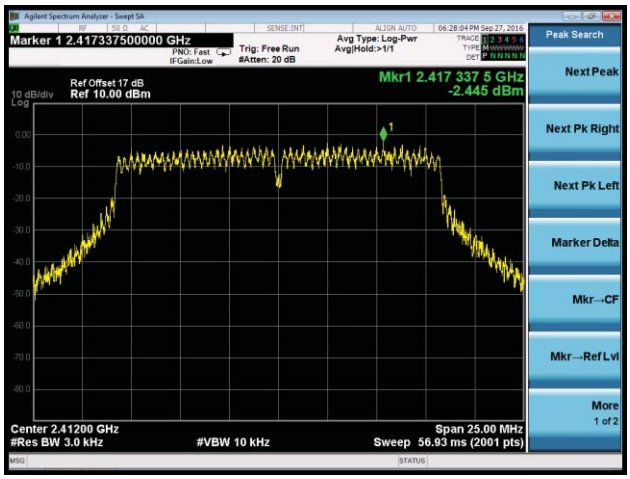
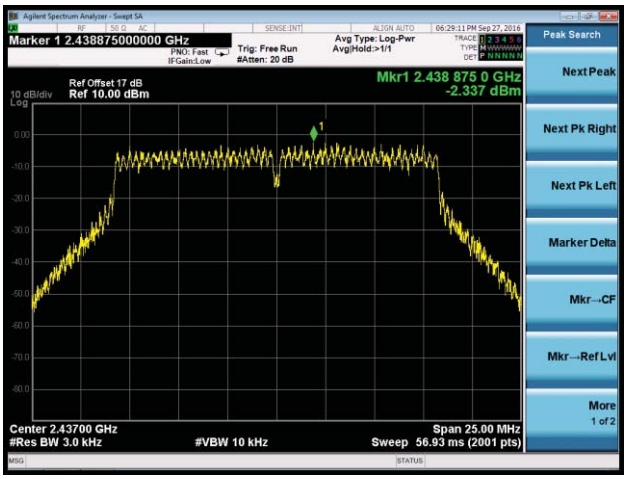
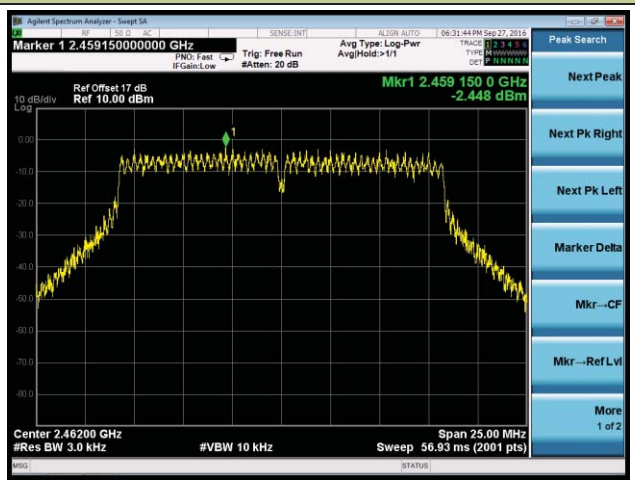
7.4.4. Test Setup

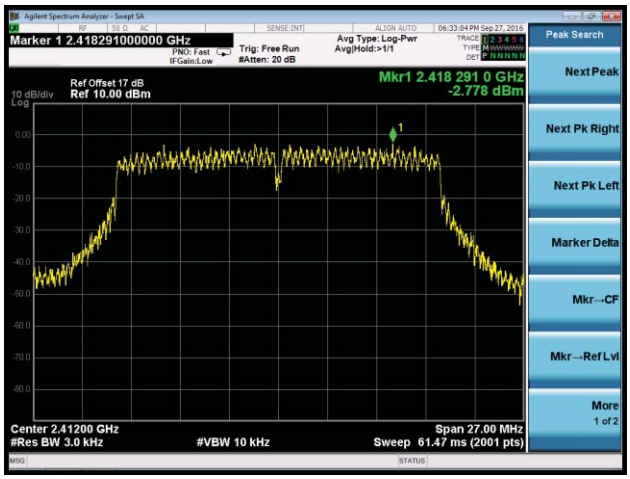
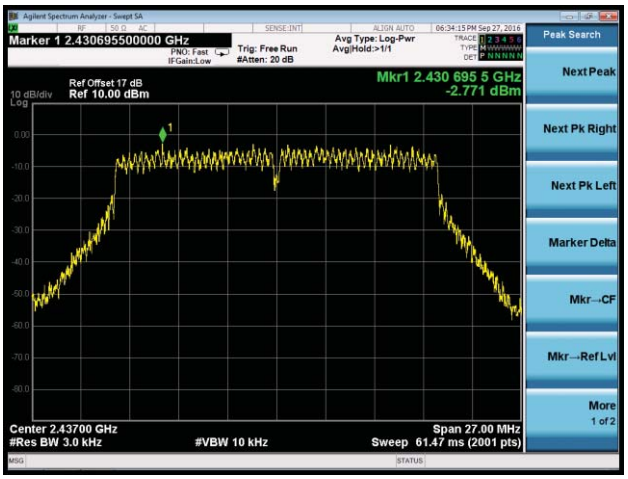
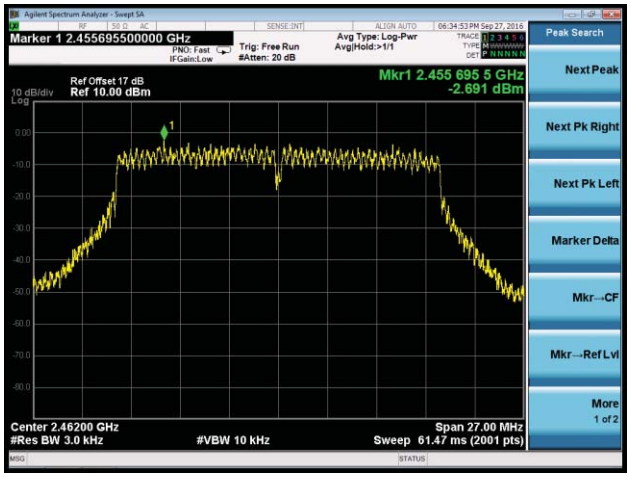


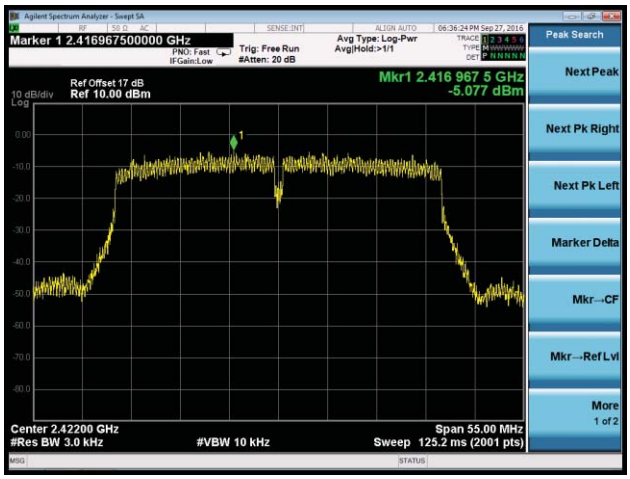
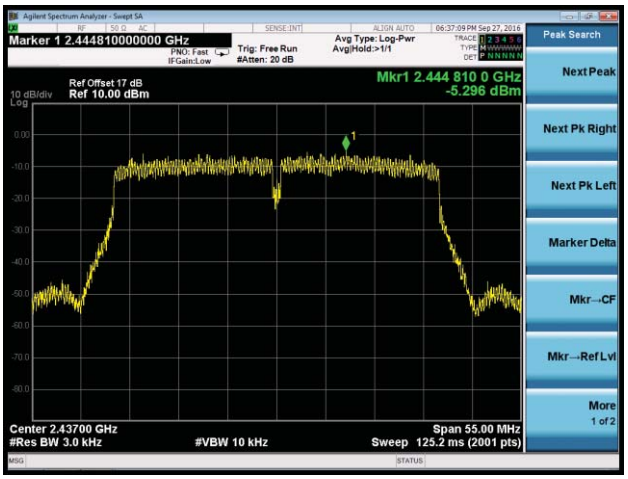
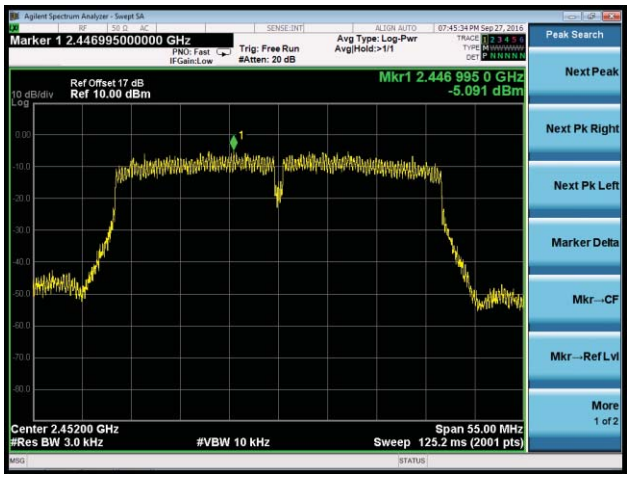
7.4.5. Test Result

Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	PSD (dBm / 3kHz)	Limit (dBm / 3kHz)	Result
11b	1	1	2412	0.36	≤ 8.0	Pass
11b	1	6	2437	-0.24	≤ 8.0	Pass
11b	1	11	2462	0.35	≤ 8.0	Pass
11g	6	1	2412	-2.45	≤ 8.0	Pass
11g	6	6	2437	-2.34	≤ 8.0	Pass
11g	6	11	2462	-2.45	≤ 8.0	Pass
11n-HT20	6.5	1	2412	-2.78	≤ 8.0	Pass
11n-HT20	6.5	6	2437	-2.77	≤ 8.0	Pass
11n-HT20	6.5	11	2462	-2.69	≤ 8.0	Pass
11n-HT40	13.5	3	2422	-5.08	≤ 8.0	Pass
11n-HT40	13.5	6	2437	-5.30	≤ 8.0	Pass
11n-HT40	13.5	9	2452	-5.09	≤ 8.0	Pass

802.11b Peak PSD	
Channel 01 (2412MHz)	Channel 06 (2437MHz)
	
Channel 11 (2462MHz)	
	

802.11g Peak PSD	
Channel 01 (2412MHz)	Channel 06 (2437MHz)
	
Channel 11 (2462MHz)	
	

802.11n-HT20 Peak PSD	
Channel 01 (2412MHz)	Channel 06 (2437MHz)
	
Channel 11 (2462MHz)	
	

802.11n-HT40 Peak PSD	
Channel 03 (2422MHz)	Channel 06 (2437MHz)
	
Channel 09 (2452MHz)	
	

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 Settitng

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 ≥ 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

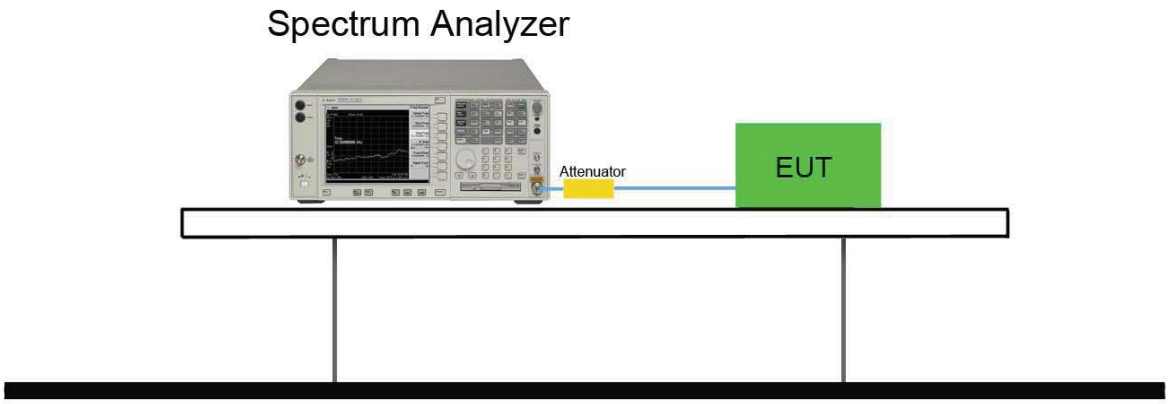
(d) Detector = Peak

(e) Trace mode = max hold

(f) Sweep time = auto couple

(g) The trace was allowed to stabilize

7.5.4. Test Setup

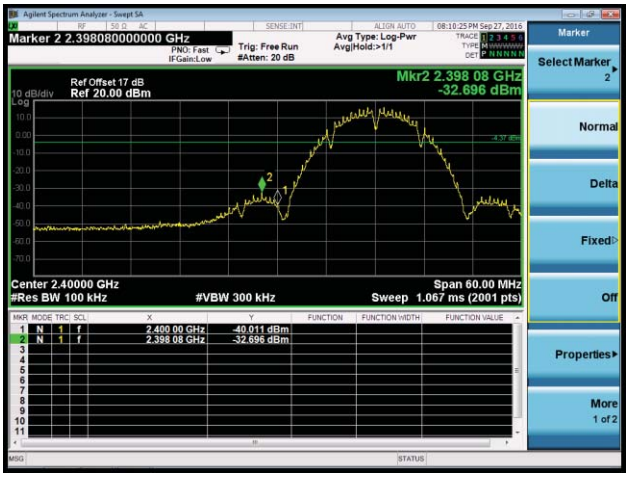


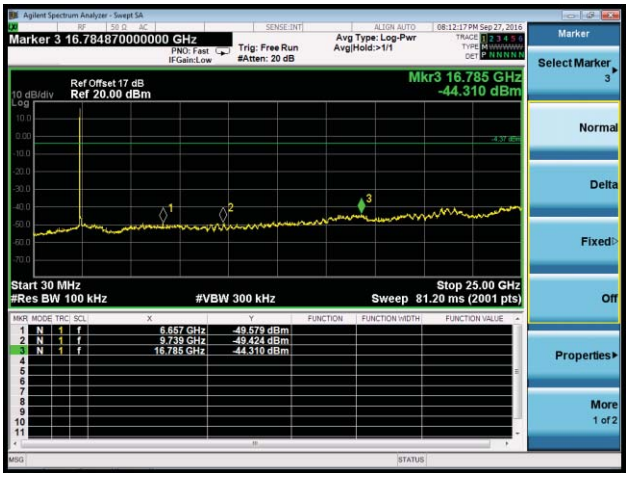
7.5.5. Test Result

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-HT40	13.5	03	2422	20dBc	Pass
802.11n-HT40	13.5	06	2437	20dBc	Pass
802.11n-HT40	13.5	09	2452	20dBc	Pass

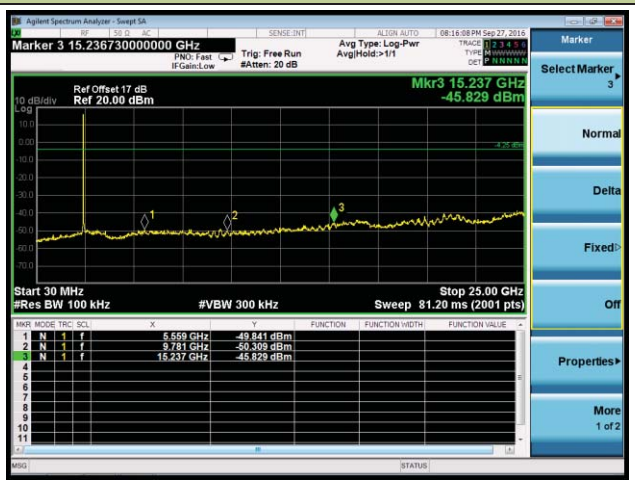
802.11b Out-of-Band Emissions

Channel 01 (2412MHz)

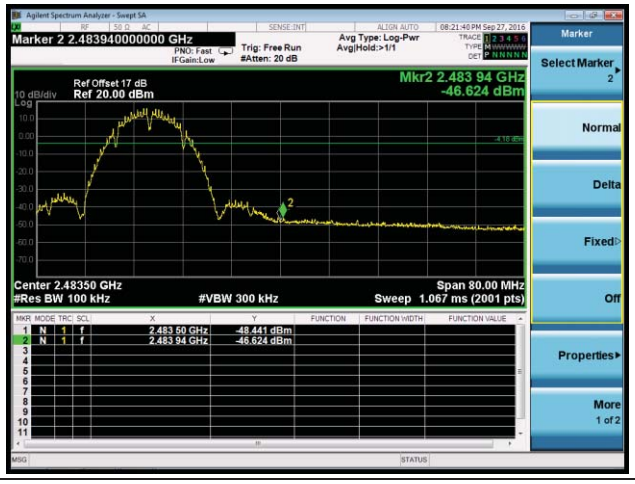
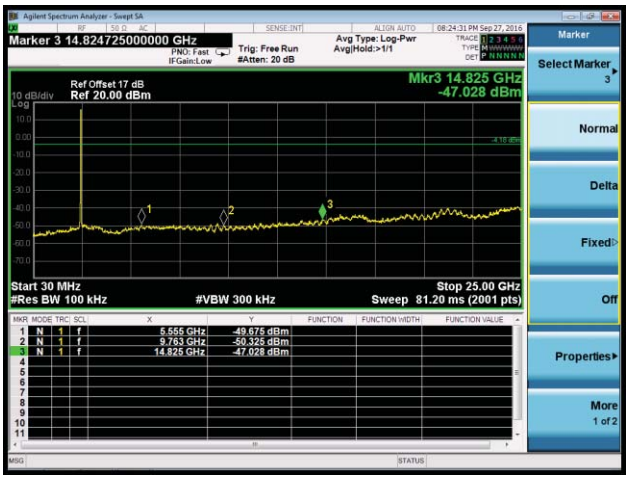
100kHz PSD Reference Level	Low Band Edge
	

Spurious Emission	
	

Channel 06 (2437MHz)

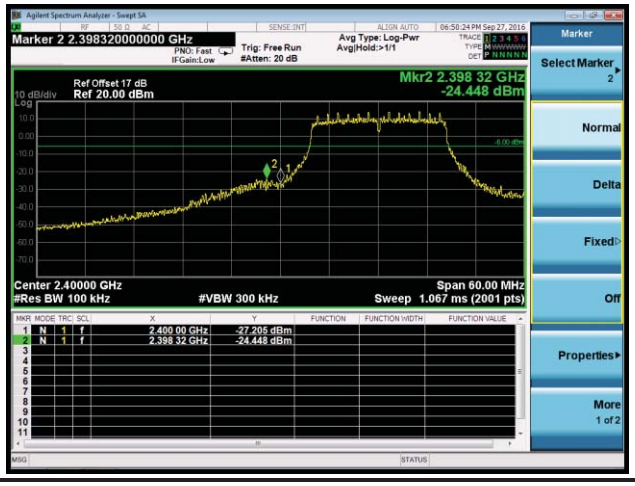
100kHz PSD Reference Level	Spurious Emission
	

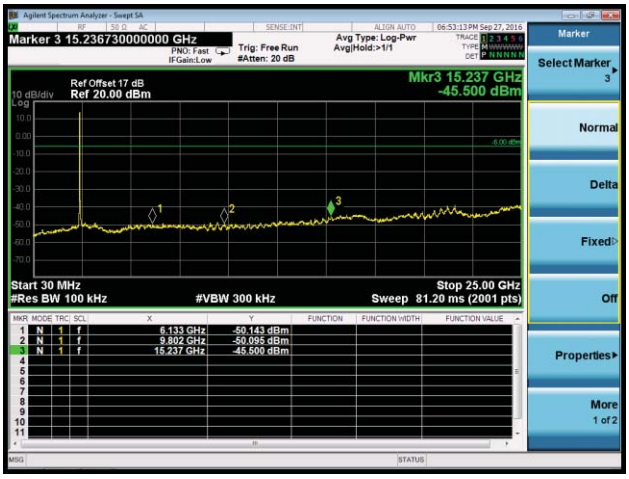
Channel 11 (2462MHz)

100kHz PSD Reference Level	High Band Edge
	
Spurious Emission	
	

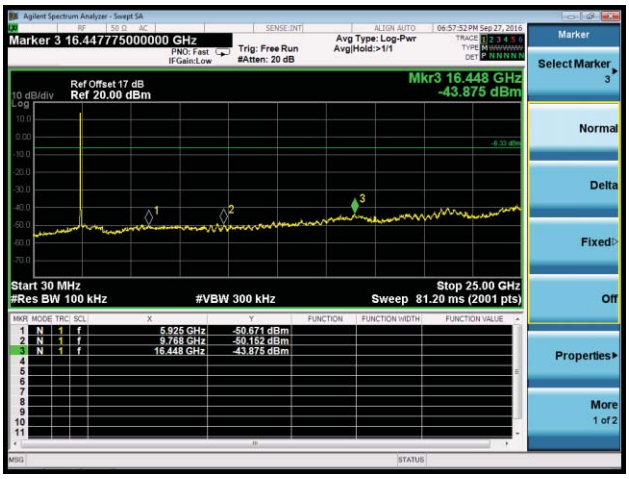
802.11g Out-of-Band Emissions

Channel 01 (2412MHz)

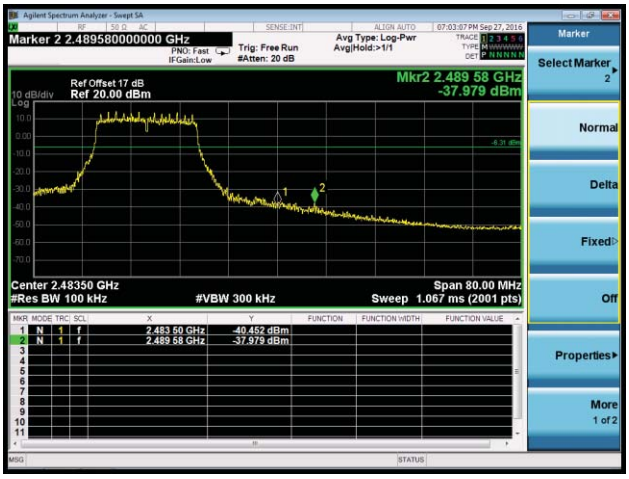
100kHz PSD Reference Level	Low Band Edge
	

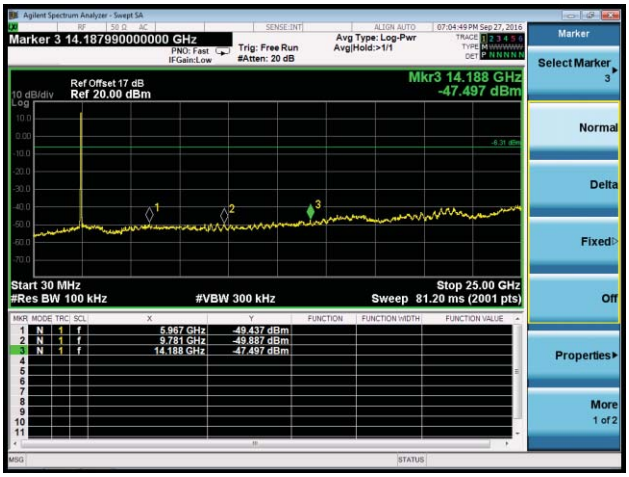
Spurious Emission	
	

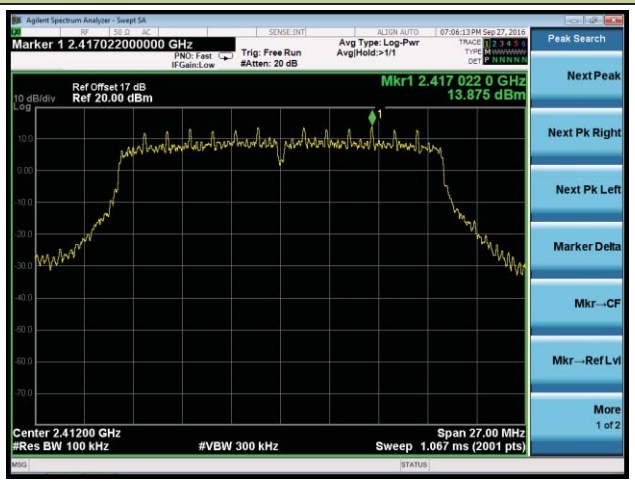
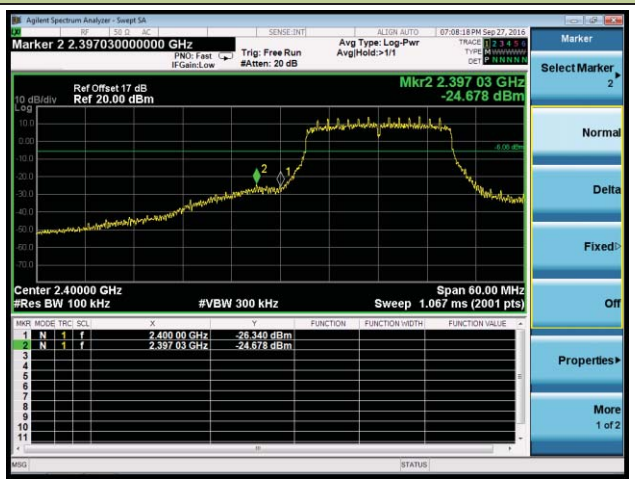
Channel 06 (2437MHz)

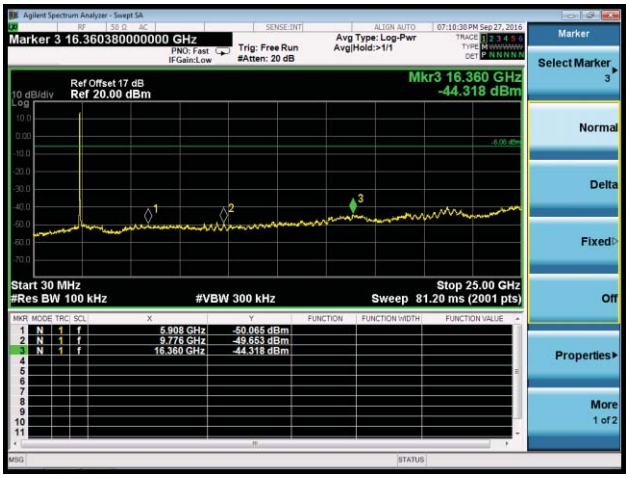
100kHz PSD Reference Level	Spurious Emission
	

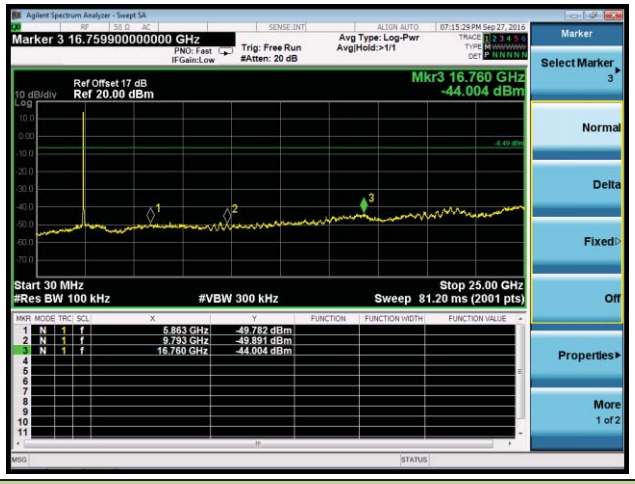
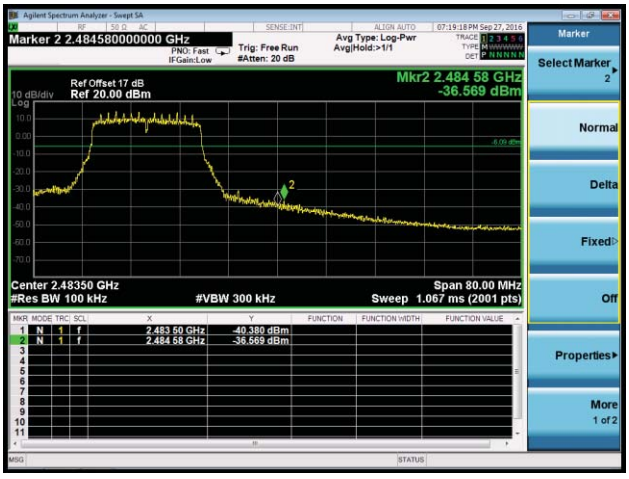
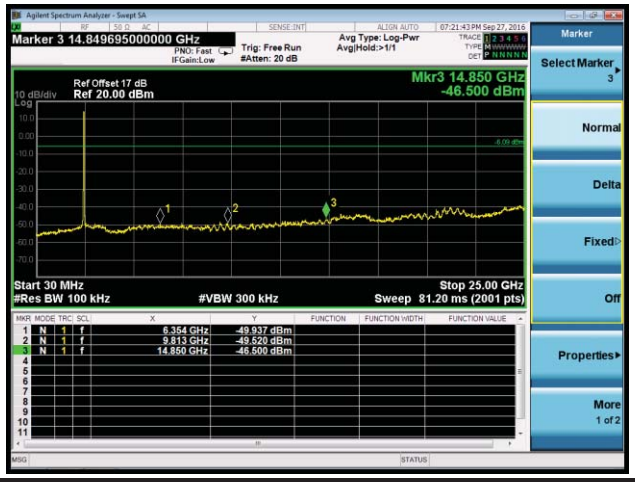
Channel 11 (2462MHz)

100kHz PSD Reference Level	High Band Edge
	

Spurious Emission	
	

802.11n-HT20 Out-of-Band Emissions	
Channel 01 (2412MHz)	
100kHz PSD Reference Level	Low Band Edge
	

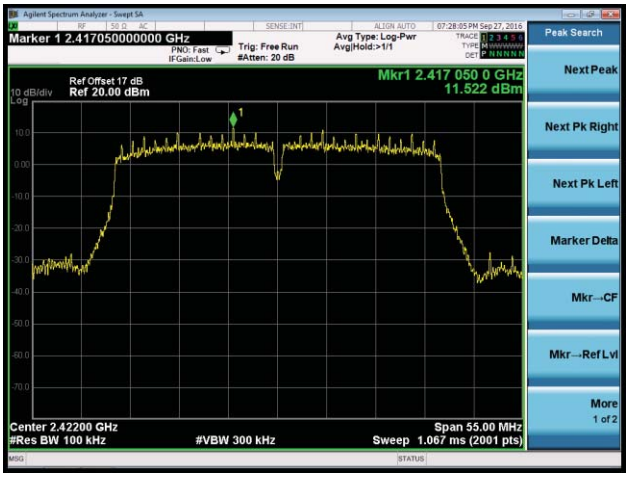
Spurious Emission	
	

Channel 06 (2437MHz)	
100kHz PSD Reference Level	**Spurious Emission**
	
Channel 11 (2462MHz)	
100kHz PSD Reference Level	**High Band Edge**
	
Spurious Emission	
	

802.11n-HT40 Out-of-Band Emissions

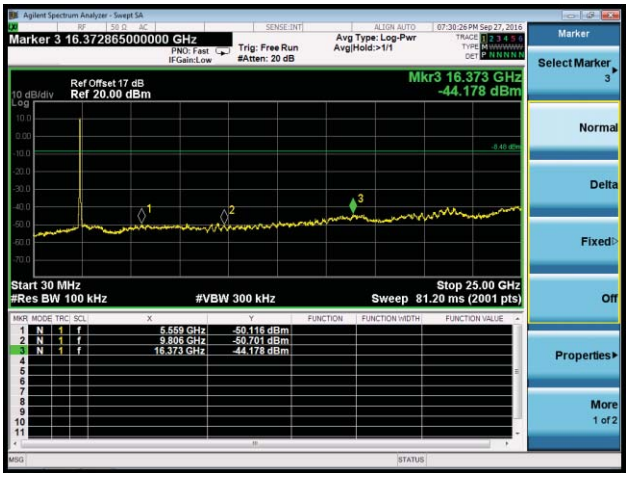
Channel 03 (2422MHz)

100kHz PSD Reference Level



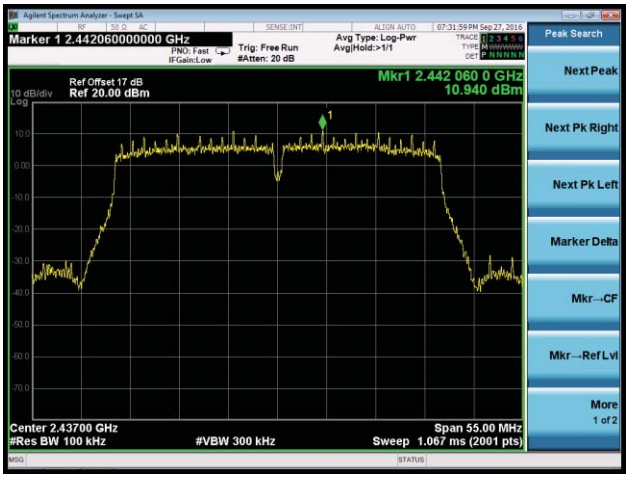
Low Band Edge

Spurious Emission

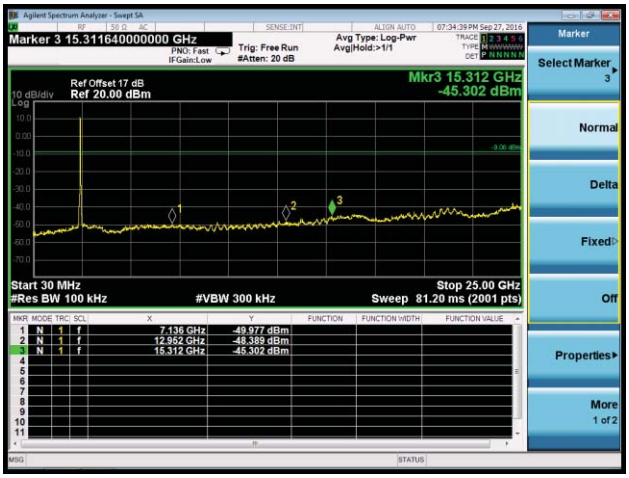


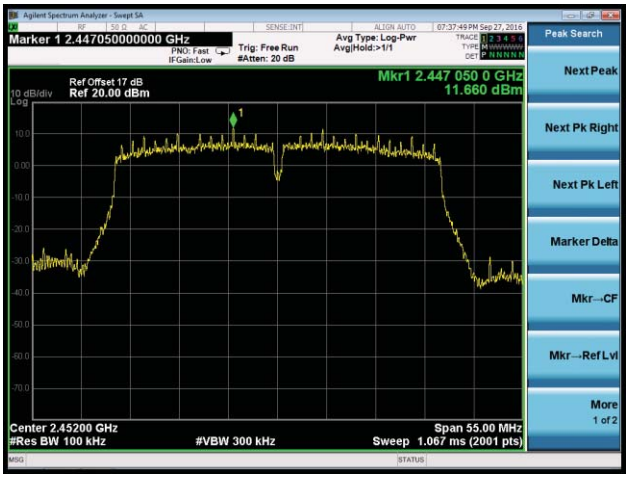
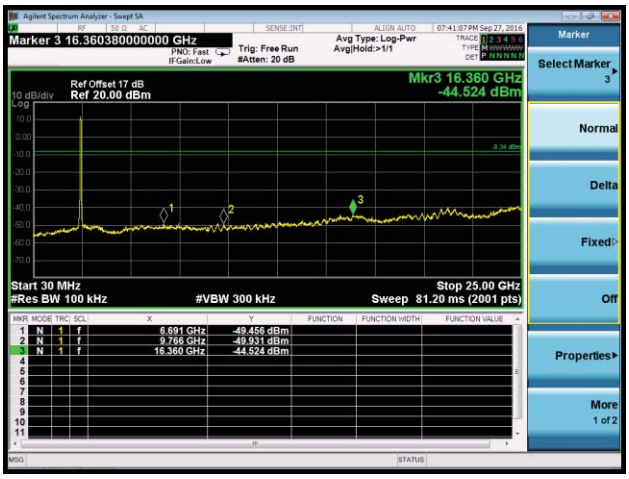
Channel 06 (2437MHz)

100kHz PSD Reference Level



Spurious Emission



Channel 09 (2452MHz)	
100kHz PSD Reference Level	**High Band Edge**
	
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

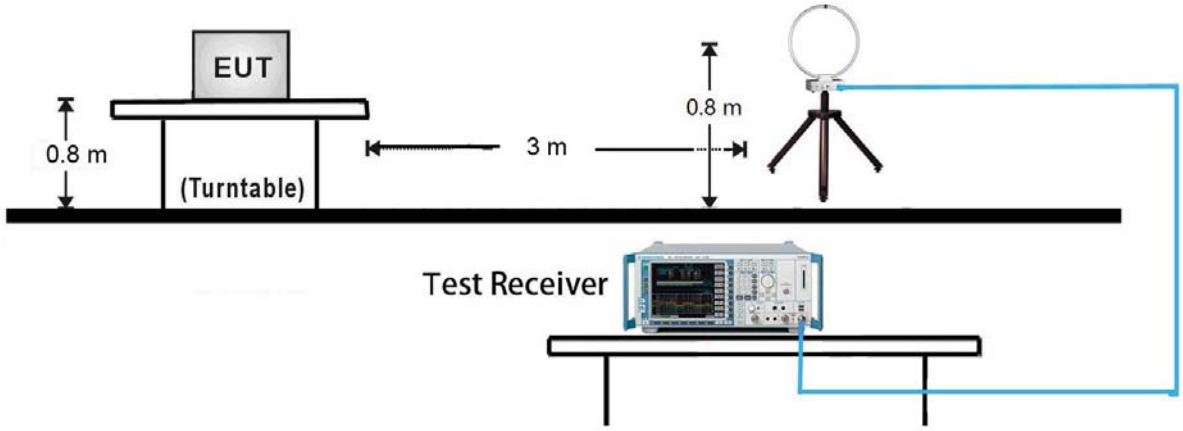
Frequency	RBW
9 ~ 150 kHz	200 ~ 300 Hz
0.15 ~ 30 MHz	9 ~ 10 kHz
30 ~ 1000 MHz	100 ~ 120 kHz
> 1000 MHz	1 MHz

Average Field Strength Measurements per Section 12.2.5.3 of KDB 558074 D01v03r05

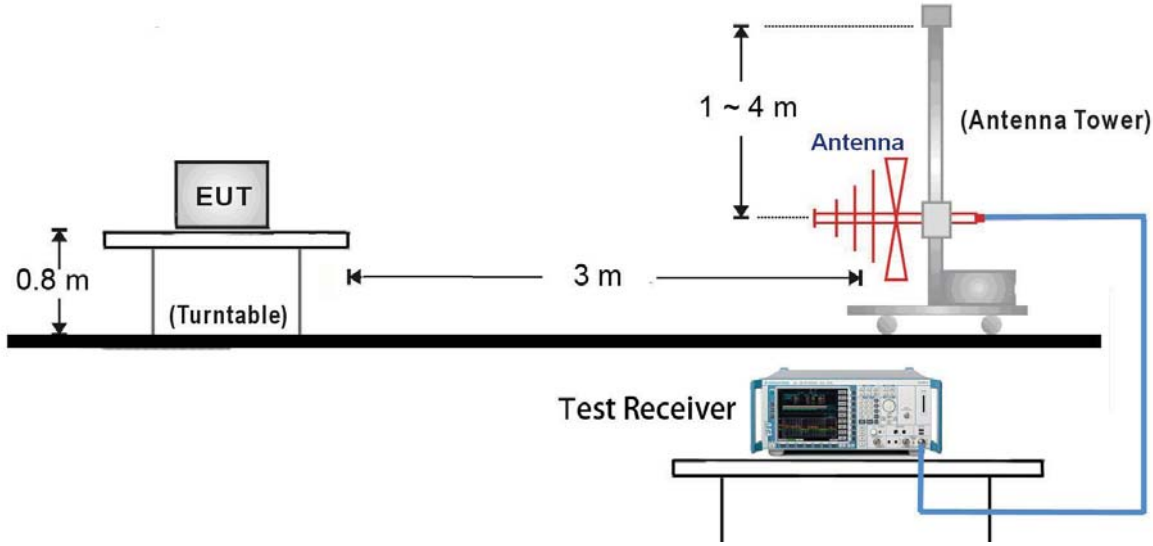
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW ≥ 1/T
4. De As an alternative, the instrument may be set to linear detector mode. Ensure that video filtering is applied in linear voltage domain (rather than in a log or dB domain). 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

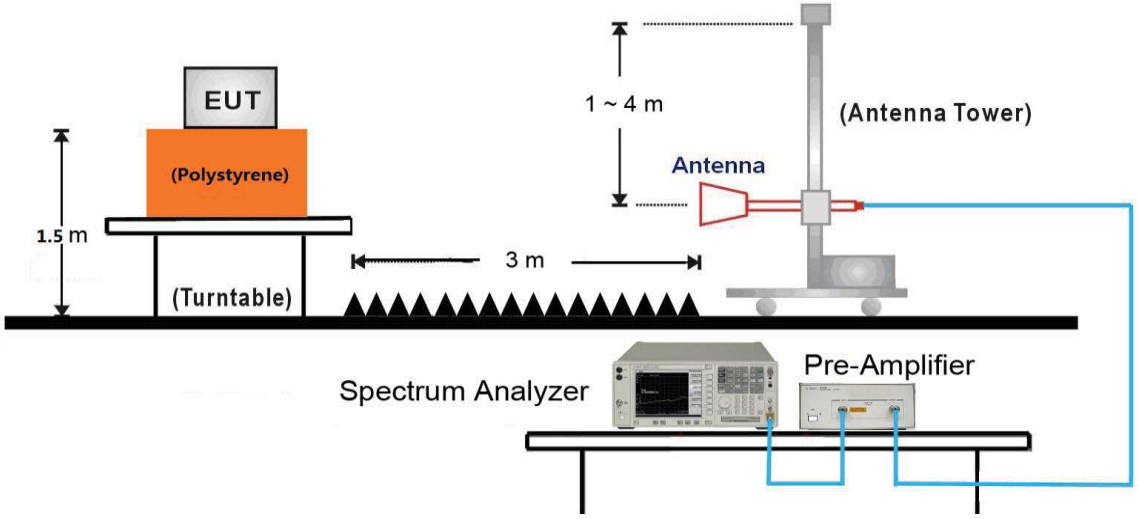
9kHz ~ 30MHz Test Setup:



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:	Lewis Huang
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
	3881.5	35.0	0.1	35.1	74.0	-38.9	Peak	Horizontal
	4825.0	45.8	2.7	48.5	74.0	-25.5	Peak	Horizontal
*	6431.5	34.9	5.6	40.5	83.2	-42.7	Peak	Horizontal
*	9806.0	35.0	11.5	46.5	83.2	-36.7	Peak	Horizontal
	3822.0	34.8	-0.1	34.7	74.0	-39.3	Peak	Vertical
	4825.0	44.2	2.7	46.9	74.0	-27.1	Peak	Vertical
*	6431.5	36.4	5.6	42.0	83.2	-41.2	Peak	Vertical
*	9814.5	34.3	11.6	45.9	83.2	-37.3	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (103.2dBμV/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:	06	Test Engineer:	Lewis Huang
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
	3737.0	36.0	-0.4	35.6	74.0	-38.4	Peak	Horizontal
	4876.0	46.4	2.7	49.1	74.0	-24.9	Peak	Horizontal
*	6584.5	34.6	6.0	40.6	83.9	-43.3	Peak	Horizontal
*	9831.5	34.1	11.6	45.7	83.9	-38.2	Peak	Horizontal
	3771.0	36.0	-0.3	35.7	74.0	-38.3	Peak	Vertical
	4876.0	44.5	2.7	47.2	74.0	-26.8	Peak	Vertical
*	6499.5	35.9	6.0	41.9	83.9	-42.0	Peak	Vertical
*	9797.5	34.3	11.5	45.8	83.9	-38.1	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (103.9dBμV/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:	802.11b	Test Site:	AC1
Test Channel:	11	Test Engineer:	Lewis Huang
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
	3796.5	35.7	-0.2	35.5	74.0	-38.5	Peak	Horizontal
	4927.0	47.4	2.8	50.2	74.0	-23.8	Peak	Horizontal
*	6448.5	35.4	5.7	41.1	83.2	-42.1	Peak	Horizontal
*	9848.5	33.7	11.6	45.3	83.2	-37.9	Peak	Horizontal
	3796.5	35.1	-0.2	34.9	74.0	-39.1	Peak	Vertical
	4927.0	44.8	2.8	47.6	74.0	-26.4	Peak	Vertical
*	6542.0	34.3	5.9	40.2	83.2	-43.0	Peak	Vertical
*	9908.0	33.6	11.6	45.2	83.2	-38.0	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (103.2dBμV/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:	802.11g	Test Site:	AC1
Test Channel:	01	Test Engineer:	Lewis Huang
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
	3805.0	35.4	-0.2	35.2	74.0	-38.8	Peak	Horizontal
	4816.5	40.4	2.7	43.1	74.0	-30.9	Peak	Horizontal
*	6491.0	34.8	5.9	40.7	83.7	-43.0	Peak	Horizontal
*	9789.0	34.7	11.4	46.1	83.7	-37.6	Peak	Horizontal
	3771.0	35.7	-0.3	35.4	74.0	-38.6	Peak	Vertical
	4825.0	40.0	2.7	42.7	74.0	-31.3	Peak	Vertical
*	6610.0	35.1	6.0	41.1	83.7	-42.6	Peak	Vertical
*	9814.5	34.3	11.6	45.9	83.7	-37.8	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (103.7dBμV/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:	06	Test Engineer:	Lewis Huang
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
	3813.5	34.5	-0.2	34.3	74.0	-39.7	Peak	Horizontal
	4876.0	42.0	2.7	44.7	74.0	-29.3	Peak	Horizontal
*	6525.0	34.8	5.9	40.7	85.7	-45.0	Peak	Horizontal
*	9814.5	33.6	11.6	45.2	85.7	-40.5	Peak	Horizontal
	3830.5	34.4	-0.1	34.3	74.0	-39.7	Peak	Vertical
	4867.5	40.1	2.7	42.8	74.0	-31.2	Peak	Vertical
*	6499.5	35.0	6.0	41.0	85.7	-44.7	Peak	Vertical
*	9882.5	34.0	11.6	45.6	85.7	-40.1	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (105.7dBμV/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:	11	Test Engineer:	Lewis Huang
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	3830.5	34.0	-0.1	33.9	74.0	-40.1	Peak	Horizontal
	4927.0	42.8	2.8	45.6	74.0	-28.4	Peak	Horizontal
*	6593.0	35.6	6.0	41.6	85.2	-43.6	Peak	Horizontal
*	9823.0	33.6	11.6	45.2	85.2	-40.0	Peak	Horizontal
	3847.5	34.3	0.0	34.3	74.0	-39.7	Peak	Vertical
	4927.0	38.6	2.8	41.4	74.0	-32.6	Peak	Vertical
*	6533.5	35.5	5.9	41.4	85.2	-43.8	Peak	Vertical
*	9848.5	32.8	11.6	44.4	85.2	-40.8	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (105.2dBμV/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:	802.11n-HT20	Test Site:	AC1
Test Channel:	01	Test Engineer:	Lewis Huang
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
	3907.0	35.4	0.2	35.6	74.0	-38.4	Peak	Horizontal
	4816.5	40.0	2.7	42.7	74.0	-31.3	Peak	Horizontal
*	6576.0	34.3	6.0	40.3	82.0	-41.7	Peak	Horizontal
*	9780.5	34.2	11.4	45.6	82.0	-36.4	Peak	Horizontal
	3898.5	34.9	0.2	35.1	74.0	-38.9	Peak	Vertical
	4825.0	39.8	2.7	42.5	74.0	-31.5	Peak	Vertical
*	6431.5	34.6	5.6	40.2	82.0	-41.8	Peak	Vertical
*	9831.5	33.8	11.6	45.4	82.0	-36.6	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (102.0dBμV/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-HT20	Test Site:	AC1
Test Channel:	06	Test Engineer:	Lewis Huang
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
	3907.0	34.5	0.2	34.7	74.0	-39.3	Peak	Horizontal
	4876.0	41.4	2.7	44.1	74.0	-29.9	Peak	Horizontal
*	6610.0	34.8	6.0	40.8	82.5	-41.7	Peak	Horizontal
*	9780.5	33.1	11.4	44.5	82.5	-38.0	Peak	Horizontal
	3881.5	34.2	0.1	34.3	74.0	-39.7	Peak	Vertical
	4876.0	39.0	2.7	41.7	74.0	-32.3	Peak	Vertical
*	6499.5	34.3	6.0	40.3	82.5	-42.2	Peak	Vertical
*	9814.5	33.7	11.6	45.3	82.5	-37.2	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)

Test Mode:	802.11n-HT20	Test Site:	AC1
Test Channel:	11	Test Engineer:	Lewis Huang
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
	3907.0	33.8	0.2	34.0	74.0	-40.0	Peak	Horizontal
	4927.0	41.2	2.8	44.0	74.0	-30.0	Peak	Horizontal
*	6482.5	34.0	5.9	39.9	81.7	-41.8	Peak	Horizontal
*	9806.0	33.7	11.5	45.2	81.7	-36.5	Peak	Horizontal
	3898.5	34.3	0.2	34.5	74.0	-39.5	Peak	Vertical
	4927.0	40.3	2.8	43.1	74.0	-30.9	Peak	Vertical
*	6567.5	35.0	6.0	41.0	81.7	-40.7	Peak	Vertical
*	9797.5	33.4	11.5	44.9	81.7	-36.8	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (101.7dBμV/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:	802.11n-HT40	Test Site:	AC1
Test Channel:	03	Test Engineer:	Lewis Huang
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
	3805.0	34.5	-0.2	34.3	74.0	-39.7	Peak	Horizontal
	4842.0	37.7	2.7	40.4	74.0	-33.6	Peak	Horizontal
*	6533.5	34.7	5.9	40.6	77.8	-37.2	Peak	Horizontal
*	9916.5	33.9	11.5	45.4	77.8	-32.4	Peak	Horizontal
	3907.0	35.5	0.2	35.7	74.0	-38.3	Peak	Vertical
	4842.0	36.8	2.7	39.5	74.0	-34.5	Peak	Vertical
*	6559.0	34.7	6.0	40.7	77.8	-37.1	Peak	Vertical
*	9780.5	33.7	11.4	45.1	77.8	-32.7	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (97.8dBμV/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:	Lewis Huang
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	3830.5	34.2	-0.1	34.1	74.0	-39.9	Peak	Horizontal
	4876.0	37.5	2.7	40.2	74.0	-33.8	Peak	Horizontal
*	6542.0	35.2	5.9	41.1	79.2	-38.1	Peak	Horizontal
*	9865.5	33.4	11.6	45.0	79.2	-34.2	Peak	Horizontal
	3813.5	34.9	-0.2	34.7	74.0	-39.3	Peak	Vertical
	4876.0	36.7	2.7	39.4	74.0	-34.6	Peak	Vertical
*	6865.0	35.1	6.4	41.5	79.2	-37.7	Peak	Vertical
*	9865.5	34.1	11.6	45.7	79.2	-33.5	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (99.2dBμV/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:	802.11n-HT40	Test Site:	AC1
Test Channel:	09	Test Engineer:	Lewis Huang
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	3830.5	34.1	-0.1	34.0	74.0	-40.0	Peak	Horizontal
	4901.5	37.7	2.7	40.4	74.0	-33.6	Peak	Horizontal
*	6542.0	34.3	5.9	40.2	77.8	-37.6	Peak	Horizontal
*	9806.0	34.5	11.5	46.0	77.8	-31.8	Peak	Horizontal
	3847.5	35.0	0.0	35.0	74.0	-39.0	Peak	Vertical
	4901.5	36.7	2.7	39.4	74.0	-34.6	Peak	Vertical
*	6593.0	33.6	6.0	39.6	77.8	-38.2	Peak	Vertical
*	9797.5	33.5	11.5	45.0	77.8	-32.8	Peak	Vertical

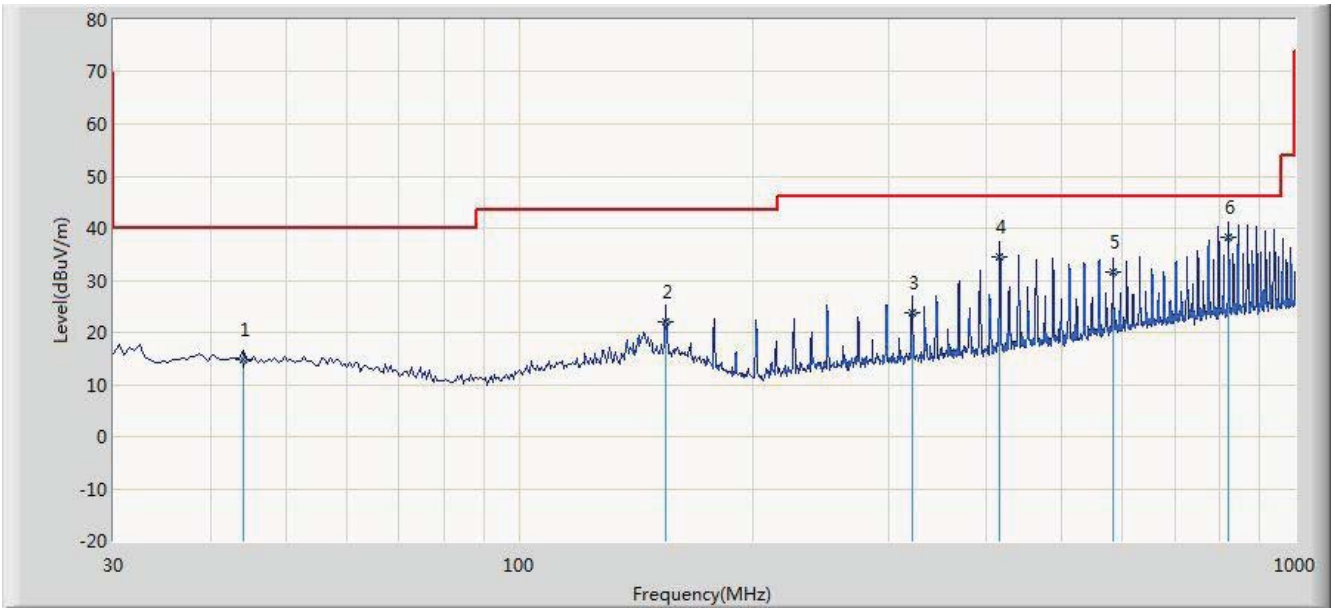
Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (97.8dBμV/m).

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: AC2	Time: 2016/10/10 - 17:43
Limit: FCC_Part15.209_RE(3m)	Engineer: Lewis Huang
Probe: VULB9162_0.03-8GHz	Polarity: Horizontal
EUT: Network Alarm System	Power: AC 120V/60Hz
Worse Case Mode: Transmit by 802.11n-HT40 at Channel 2452MHz	

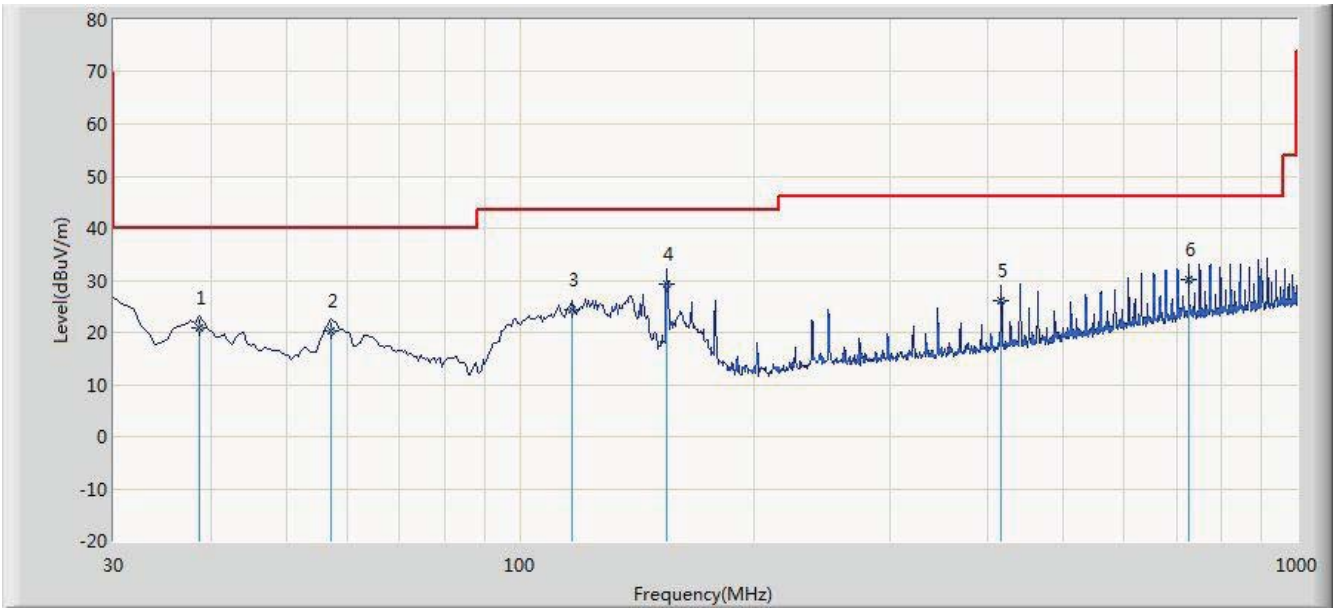


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			44.065	14.641	0.397	-25.359	40.000	14.244	QP
2			154.623	22.120	6.934	-21.380	43.500	15.186	QP
3			321.489	23.880	8.987	-22.120	46.000	14.893	QP
4			416.532	34.544	17.612	-11.456	46.000	16.931	QP
5			583.465	31.473	11.352	-14.527	46.000	20.122	QP
6			821.520	38.397	14.978	-7.603	46.000	23.419	QP

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

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

Site: AC2	Time: 2016/10/10 - 17:55
Limit: FCC_Part15.209_RE(3m)	Engineer: Lewis Huang
Probe: VULB9162_0.03-8GHz	Polarity: Vertical
EUT: Network Alarm System	Power: AC 120V/60Hz
Worse Case Mode: Transmit by 802.11n-HT40 at Channel 2452MHz	

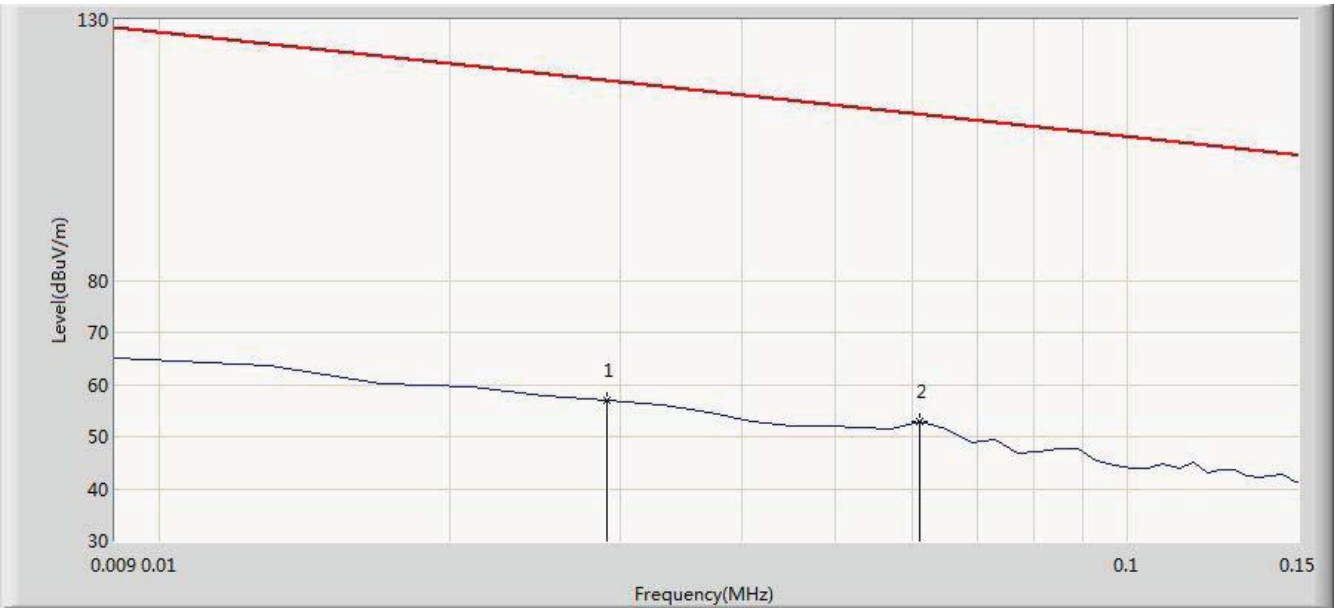


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			38.730	20.800	6.430	-19.200	40.000	14.370	QP
2			57.160	20.152	6.586	-19.848	40.000	13.566	QP
3			116.815	24.401	11.632	-19.099	43.500	12.769	QP
4			154.645	29.151	13.965	-14.349	43.500	15.186	QP
5			416.526	26.147	9.215	-19.853	46.000	16.931	QP
6			725.968	30.197	7.819	-15.803	46.000	22.378	QP

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

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

Site: AC1	Time: 2016/09/07 - 10:44
Limit: FCC_Part15.209_RE(3m)	Engineer: Roy Cheng
Probe: FMZB1519_0.009-30MHz	Polarity: Face on
EUT: Network Alarm System	Power: AC 120V/60Hz
Note: There is the ambient noise within frequency range 9kHz~30MHz.	

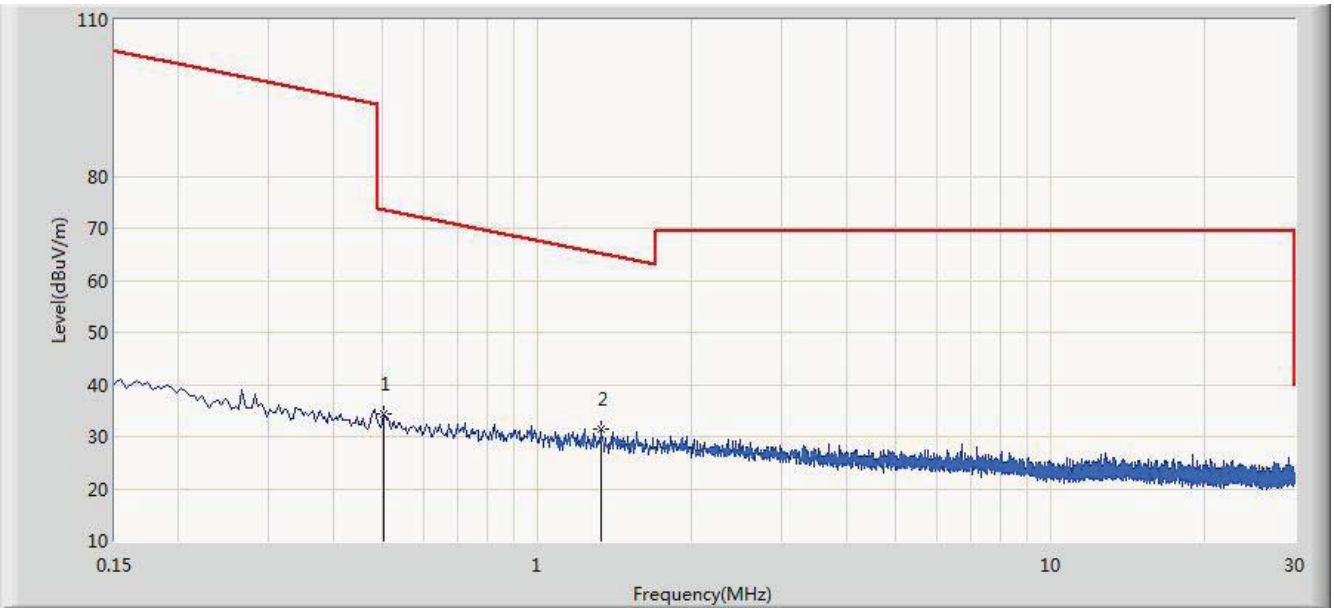


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			0.029	56.893	35.844	-61.463	118.356	21.049	QP
2		*	0.061	52.853	32.542	-59.045	111.898	20.311	QP

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

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

Site: AC1	Time: 2016/09/07 - 10:44
Limit: FCC_Part15.209_RE(3m)	Engineer: Roy Cheng
Probe: FMZB1519_0.009-30MHz	Polarity: Face on
EUT: Network Alarm System	Power: AC 120V/60Hz
Note: There is the ambient noise within frequency range 9kHz~30MHz.	

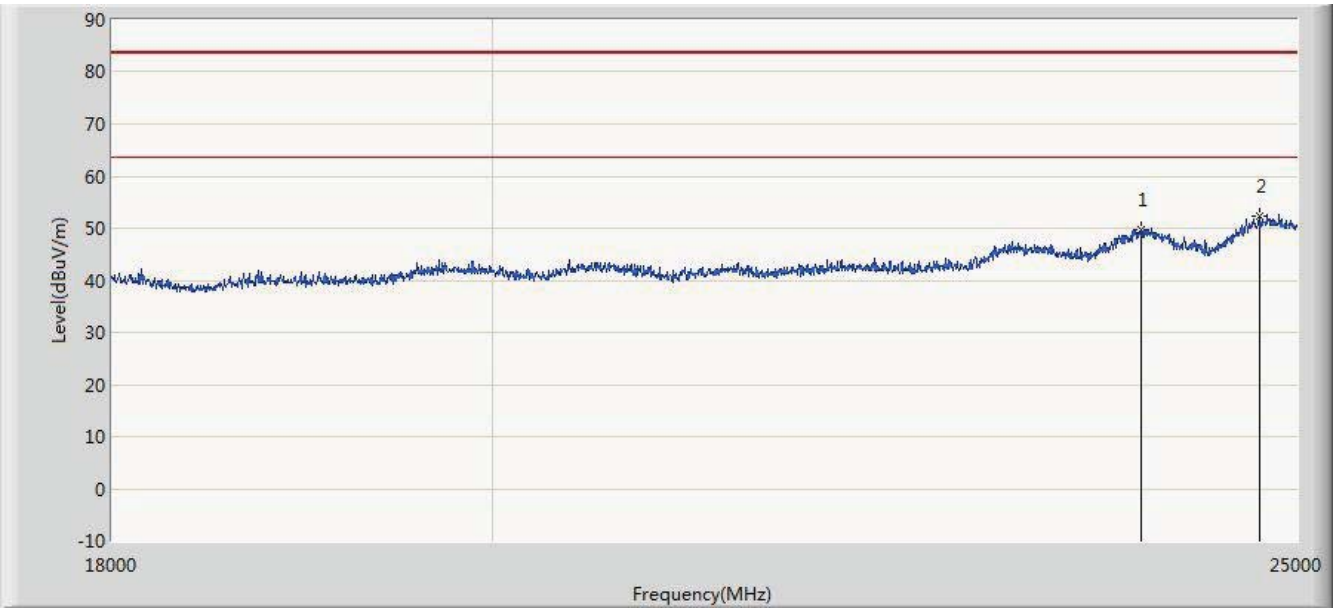


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			0.502	34.370	13.947	-39.220	73.590	20.423	QP
2		*	1.334	31.595	11.104	-33.530	65.125	20.491	QP

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

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

Site: AC1	Time: 2016/09/07 - 13:21
Limit: FCC_Part15.209_RE(1m)	Engineer: Roy Cheng
Probe: BBHA9170_18-40GHz	Polarity: Horizontal
EUT: Network Alarm System	Power: AC 120V/60Hz
Note: There is the ambient noise within frequency range 18GHz~25GHz.	

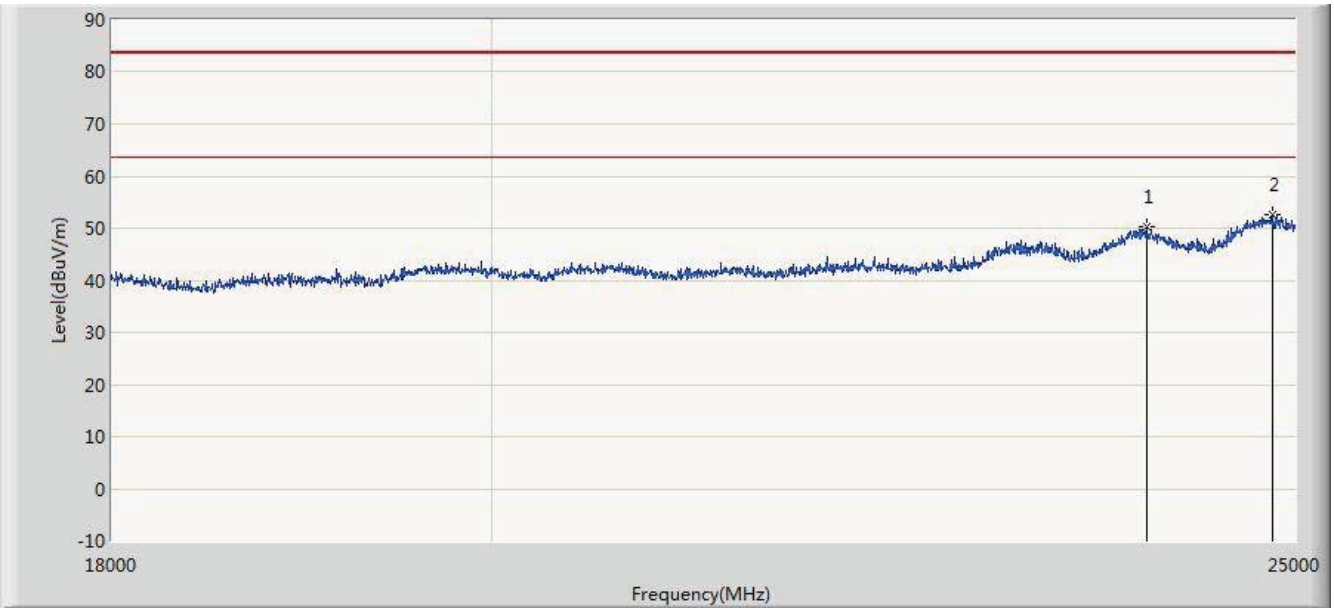


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			23943.000	49.776	35.866	-33.724	83.500	13.910	PK
2		*	24741.000	52.375	37.681	-31.125	83.500	14.694	PK

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: 2016/09/07 - 13:27
Limit: FCC_Part15.209_RE(1m)	Engineer: Roy Cheng
Probe: BBHA9170_18-40GHz	Polarity: Vertical
EUT: Network Alarm System	Power: AC 120V/60Hz
Note: There is the ambient noise within frequency range 18GHz~25GHz.	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			23999.000	50.379	36.435	-33.121	83.500	13.944	PK
2		*	24846.000	52.503	37.735	-30.997	83.500	14.768	PK

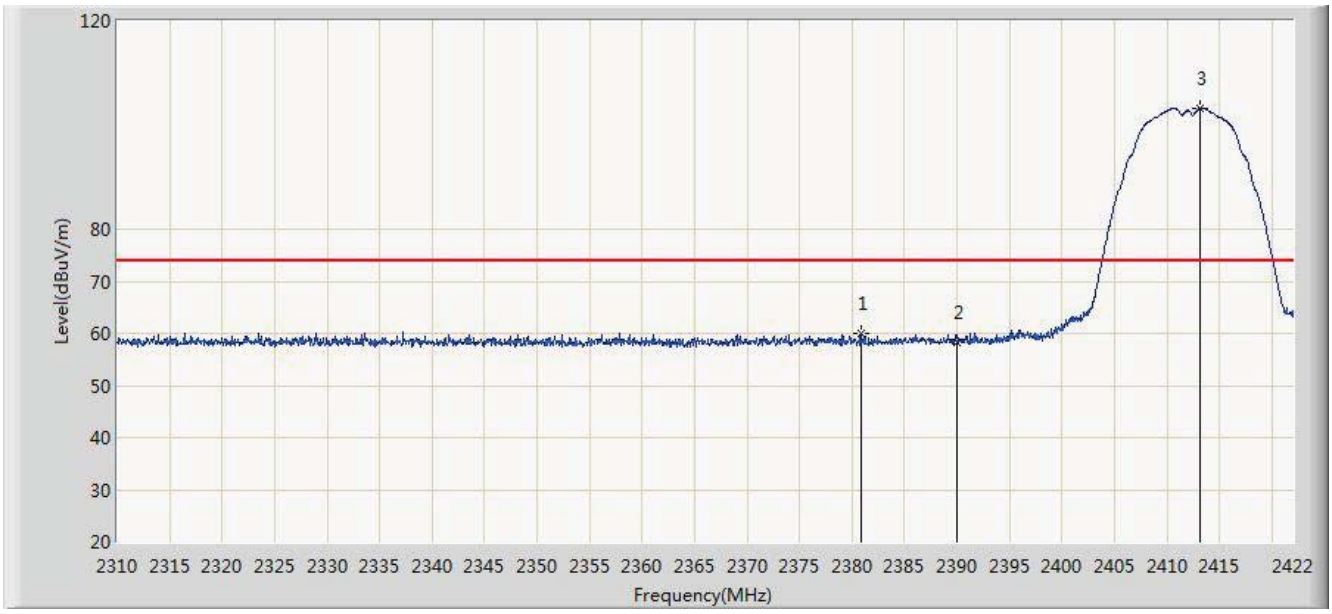
Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

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: 2016/09/07 - 10:43
Limit: FCC_Part15.209_RE(3m)	Engineer: Roy Cheng
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Network Alarm System	Power: AC 120V/60Hz
Test Mode: Transmit at channel 2412MHz by 802.11b	

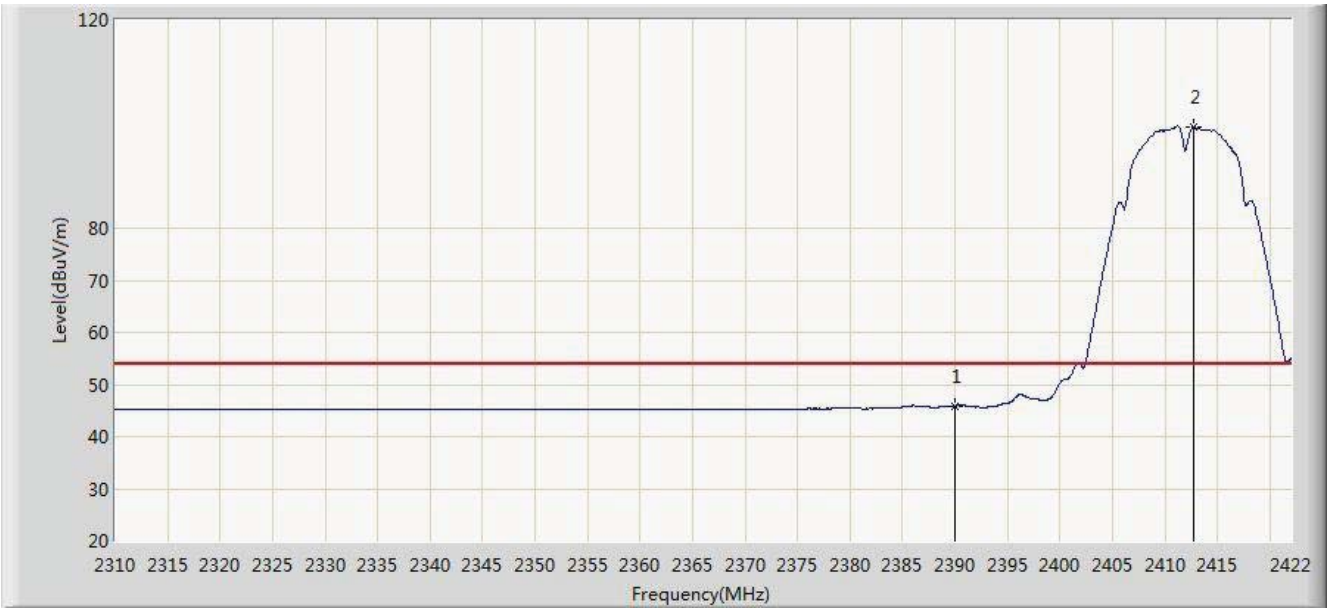


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2380.896	60.032	28.813	-13.968	74.000	31.219	PK
2			2390.000	58.261	27.058	-15.739	74.000	31.203	PK
3		*	2413.208	103.169	72.002	N/A	N/A	31.167	PK

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

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

Site: AC1	Time: 2016/09/07 - 10:45
Limit: FCC_Part15.209_RE(3m)	Engineer: Roy Cheng
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Network Alarm System	Power: AC 120V/60Hz
Test Mode: Transmit at channel 2412MHz by 802.11b	

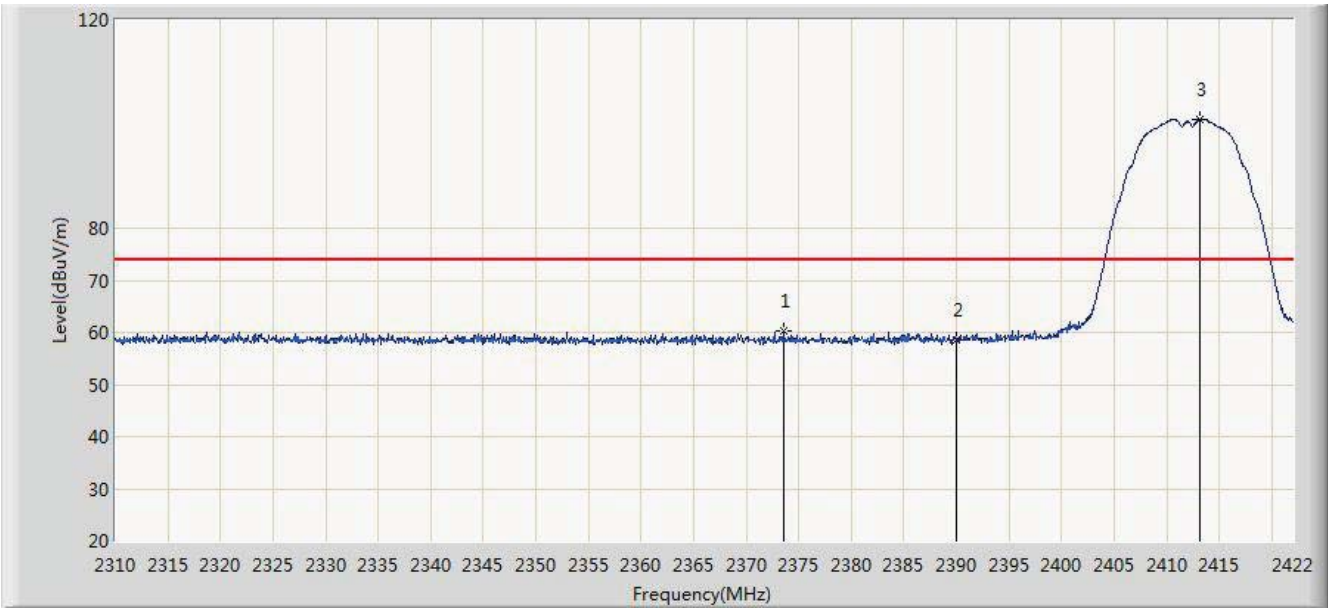


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	45.901	14.698	-8.099	54.000	31.203	AV
2		*	2412.704	99.427	68.259	N/A	N/A	31.168	AV

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

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

Site: AC1	Time: 2016/09/07 - 10:48
Limit: FCC_Part15.209_RE(3m)	Engineer: Roy Cheng
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Network Alarm System	Power: AC 120V/60Hz
Test Mode: Transmit at channel 2412MHz by 802.11b	

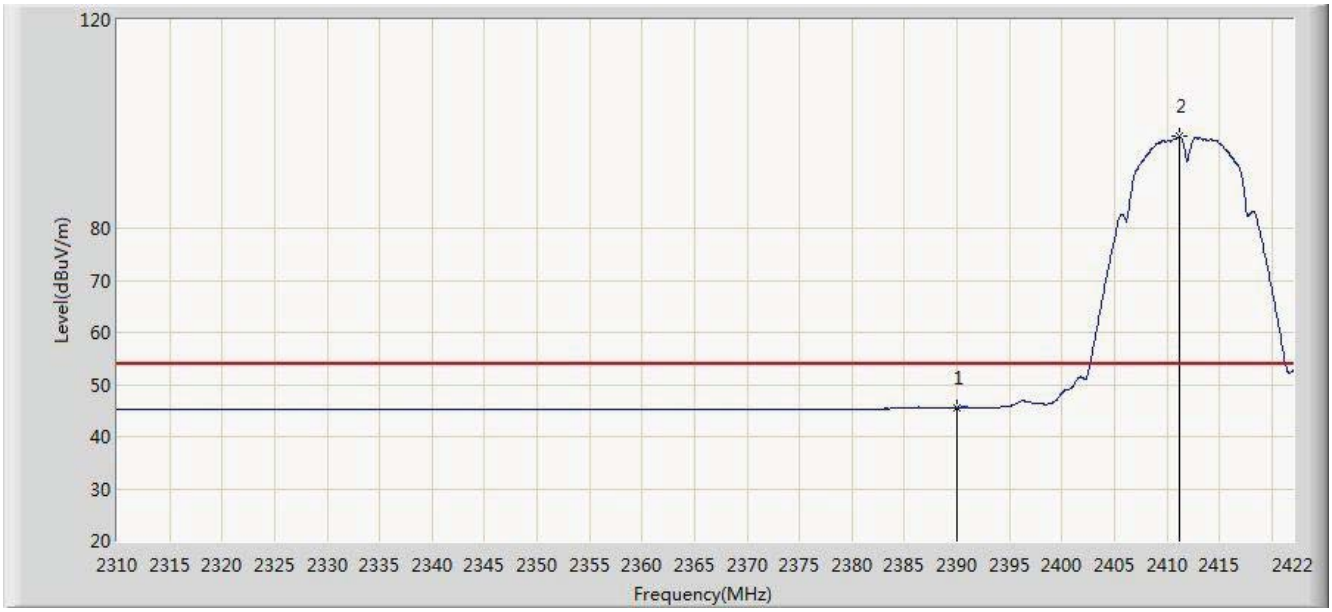


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2373.560	60.145	28.912	-13.855	74.000	31.234	PK
2			2390.000	58.558	27.355	-15.442	74.000	31.203	PK
3		*	2413.152	100.907	69.739	N/A	N/A	31.167	PK

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

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

Site: AC1	Time: 2016/09/07 - 10:52
Limit: FCC_Part15.209_RE(3m)	Engineer: Roy Cheng
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Network Alarm System	Power: AC 120V/60Hz
Test Mode: Transmit at channel 2412MHz by 802.11b	

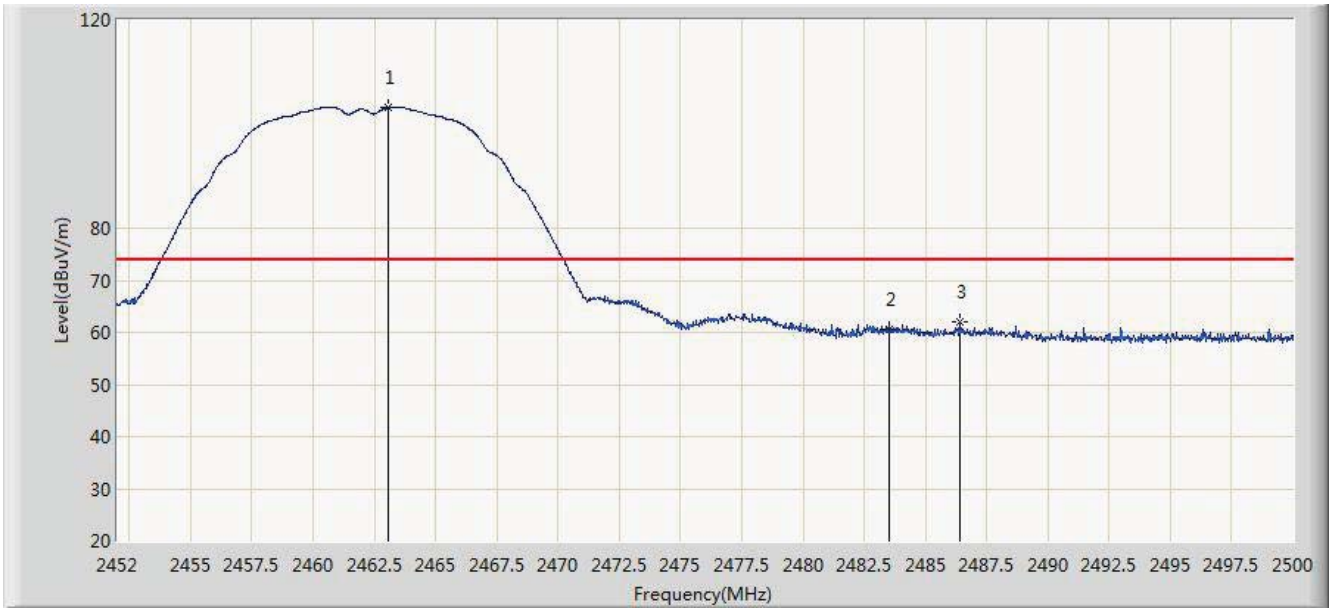


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	45.617	14.414	-8.383	54.000	31.203	AV
2		*	2411.136	97.553	66.382	N/A	N/A	31.171	AV

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

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

Site: AC1	Time: 2016/09/07 - 11:06
Limit: FCC_Part15.209_RE(3m)	Engineer: Roy Cheng
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Network Alarm System	Power: AC 120V/60Hz
Test Mode: Transmit at channel 2462MHz by 802.11b	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2463.088	103.223	72.086	N/A	N/A	31.137	PK
2			2483.500	60.530	29.337	-13.470	74.000	31.194	PK
3			2486.392	62.055	30.854	-11.945	74.000	31.201	PK

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

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