MEASUREMENT REPORT
FCC PART 15.247 WLAN 802.11b/g/n

FCC ID:	YZZGXV3240D
APPLICANT:	Grandstream Networks, Inc.

Application Type:	Certification
Product:	IP Multimedia Phone
Model No.:	GXV3240D
Brand Name:	Grandstream
FCC Classification:	Digital Transmission System (DTS)
FCC Rule Part(s):	Part 15.247
Test Procedure(s):	KDB 558074 D01v03r02
Test Date:	Nov. 21 ~ Dec. 09, 2014

Reviewed By : Robin Wu
(Robin Wu)

Approved By : Marlin Chen
(Marlin Chen)

ACCREDITED
TESTING LABORATORY
CERTIFICATE #3628.01

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 D01v03r02. 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
1411RSU03602	Rev. 01	Initial report	12-09-2014
1411RSU03602	Rev. 02	Correct some radiated emission limits	12-11-2014

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§2.1033 General Information

Applicant:	Grandstream Networks, Inc.
Applicant Address:	5F, Bldg #1, No.2 Kefa Rd., Science & Technology Park, Shenzhen, China
Manufacturer:	Grandstream Networks, Inc.
Manufacturer Address:	5F, Bldg #1, No.2 Kefa Rd., Science & Technology Park, Shenzhen, China
Test Site:	MRT Technology (Suzhou) Co., Ltd
Test Site Address:	D8 Building, Youxin Industrial Park, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
MRT Registration No.:	809388
FCC Rule Part(s):	Part 15.247
Model No.:	GXV3240D
FCC ID:	YZZGXV3240D
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.**

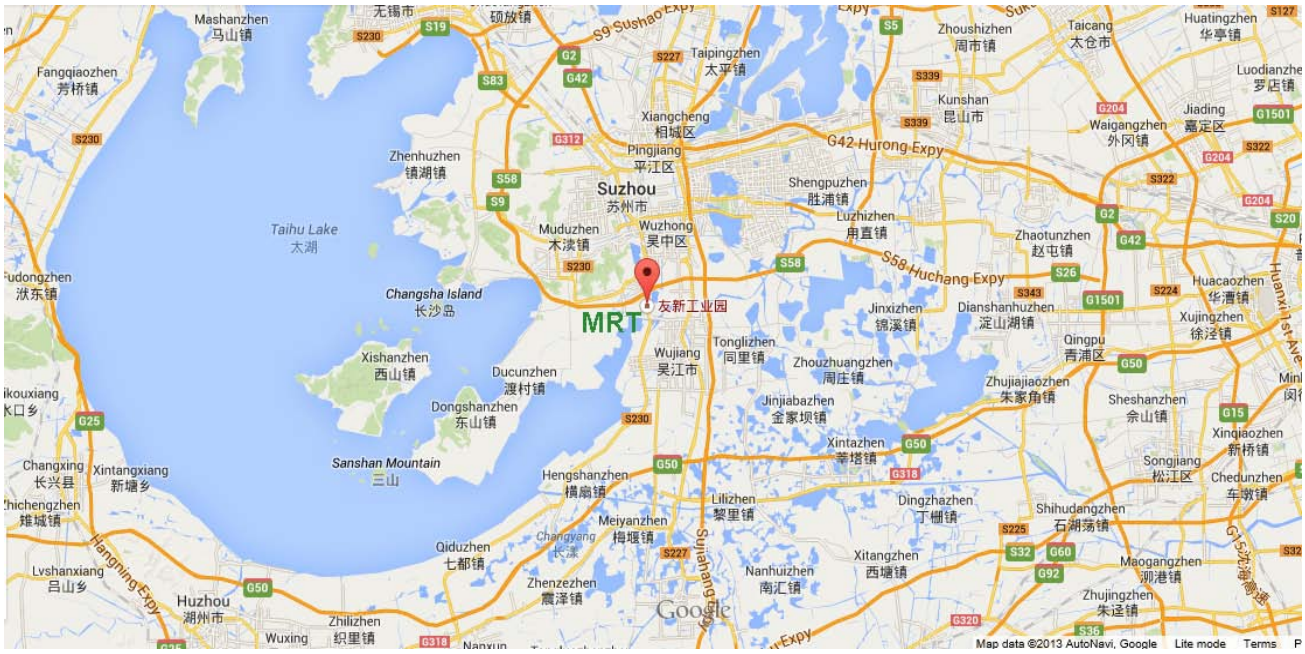
1. INTRODUCTION

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, 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	IP Multimedia Phone
Model No.	GXV3240D
Bluetooth Version	v2.1 + EDR
WLAN Specification	
Frequency Range	802.11b/g/n-HT20: 2412 ~ 2462 MHz 802.11a/n-HT20: 5180~5320 MHz, 5500~5700 MHz, 5745~5825 MHz
Type of Modulation	802.11b: DSSS 802.11a/g/n: OFDM
Data Rate	802.11b: 1/2/5.5/11Mbps 802.11a/g: 6/9/12/18/24/36/48/54Mbps 802.11n-HT20: up to 72.2Mbps
Component	
Adapter	Model: SFF1200150A1BY Input: 100-240V ~ 50/60Hz 0.4A Output: 12.0V ~ 1.5A

2.2. Operation Frequency / Channel List

Channel List for 802.11b/g/n-HT20

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

2.3. Description of Available Antennas

Antenna Type	Frequency Band (GHz)	Manufacturer	Model	Tx Paths	Max Peak Gain (dBi)
	2.4	DONGGUAN SENLING INDUSTRIAL	SLB-20209 0048	1	2.0
	5.5			1	2.0

2.4. Test Mode

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

2.5. Test Software

The test utility software used during testing was “RF Test Tool”.

2.6. Device Capabilities

This device contains the following capabilities:

Bluetooth (1x, EDR), 2.4GHz WLAN (DTS), 5GHz WLAN (UNII)

Note: 2.4GHz WLAN (DTS) operation is possible in 20MHz channel bandwidth. The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz, and detector = peak per the guidance of Section 6.0 b) of KDB 558074 D01v03r02. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

- ☐ 802.11b – 99.5%
- ☐ 802.11g/n-HT20 - 96.7%

2.7. Test Configuration

The **IP Multimedia Phone FCC ID: YZZGXV3240D** was tested per the guidance of KDB 558074 D01v03r02. ANSI C63.4-2009 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing.

2.8. EMI Suppression Device(s)/Modifications

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

2.9. Labeling Requirements

Per 2.1074 & 15.19; Docket 95-19

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

3. DESCRIPTION OF TEST

3.1. Evaluation Procedure

The measurement procedures described in the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2009), and the guidance provided in KDB 558074 D01v03r02 were used in the measurement of the **IP Multimedia Phone FCC ID: YZZGXV3240D.**

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 C63.10-2009 at Clause 4.3.

Line conducted emissions test results are shown in Section 7.8.

3.3. Radiated Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed. A MF Model 210SS turntable is used for radiated measurement. It is a continuously rotatable, remote controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm high PVC support structure is placed on top of the turntable.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33(b)(1) depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up was placed on top of the 0.8 meter high, 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, if applicable, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions. According to 3dB 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 IP Multimedia Phone is **permanently attached.**
- There are no provisions for connection to an external antenna.

Conclusion:

The **IP Multimedia Phone FCC ID: YZZGXV3240D** unit complies with the requirement of §15.203.

5. TEST EQUIPMENT CALIBRATION DATE

Conducted Emissions

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR7	101209	1 year	2015/11/07
Two-Line V-Network	R&S	ENV216	101683	1 year	2015/11/07
Two-Line V-Network	R&S	ENV216	101684	1 year	2015/11/07
Temperature/ Meter Humidity	Anymetre	TH101B	SR2-01	1 year	2015/11/15

Radiated Emission

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9010A	MY5144016A	1 year	2015/01/04
Preamplifier	MRT	AP01G18	1310002	1 year	2015/10/06
Loop Antenna	Schwarzbeck	FMZB1519	1519-041	1 year	2015/11/08
TRILOG Antenna	Schwarzbeck	VULB9162	9162-047	1 year	2015/11/08
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1167	1 year	2015/11/08
Broadband Horn Antenna	Schwarzbeck	BBHA9170	9170-549	1 year	2015/12/11
Temperature/Humidity Meter	Anymetre	TH101B	AC1-01	1 year	2015/11/15

Conducted Test Equipment

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9010A	MY5144016A	1 year	2015/01/04
Power Sensor	Agilent	U2021XA	MY52450003	1 year	2015/12/09
Temperature/Humidity Meter	Anymetre	TH101B	TR3-01	1 year	2015/11/15

6. MEASUREMENT UNCERTAINTY

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

AC Conducted Emission Measurement
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 150kHz~30MHz: ± 3.46dB
Radiated Emission Measurement
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

Product Name: **IP Multimedia Phone**
FCC ID: **YZZGXV3240D**
FCC Classification: **Digital Transmission System (DTS)**
Data Rate(s) Tested: **1Mbps ~ 11Mbps (b)**
6Mbps ~ 54Mbps (g)
6.5/7.2Mbps ~ 65/72.2Mbps (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	≤ 28.33dBm		Pass	Section 7.3
15.247(e)	Power Spectral Density	≤ 3dBm/3kHz		Pass	Section 7.4
15.247(d)	Band Edge / Out-of-Band Emissions	≥ 20dBc(Peak)		Pass	Section 7.5
15.205 15.209	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209	Radiated	Pass	Section 7.6 & 7.7
15.207	AC Conducted Emissions 150kHz - 30MHz	< FCC 15.207 limits	Line Conducted	Pass	Section 7.8

Notes:

1) All modes of operation and data rates were investigated. For radiated emission test, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst case emissions.
2) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables and attenuators.

7.2. 6dB Bandwidth Measurement

7.2.1. Test Limit

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

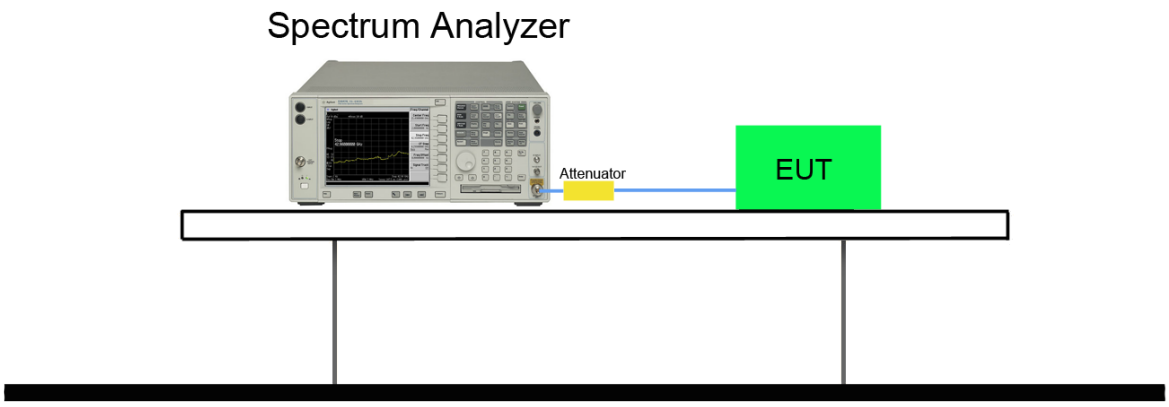
7.2.2. Test Procedure used

KDB 558074 D01v03r02 – 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



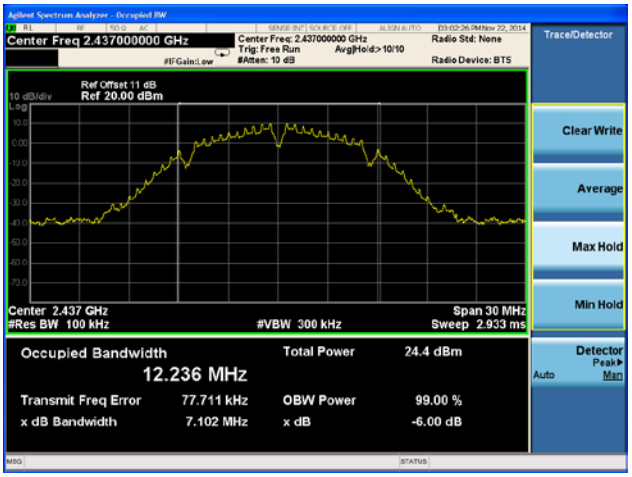
7.2.5. Test Result

Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
11b	1	01	2412	7.564	≥0.5	Pass
11b	1	06	2437	7.102	≥0.5	Pass
11b	1	11	2462	7.570	≥0.5	Pass
11g	6	01	2412	15.130	≥0.5	Pass
11g	6	06	2437	15.130	≥0.5	Pass
11g	6	11	2462	15.130	≥0.5	Pass
11n-HT20	6.5	01	2412	15.130	≥0.5	Pass
11n-HT20	6.5	06	2437	15.960	≥0.5	Pass
11n-HT20	6.5	11	2462	15.130	≥0.5	Pass

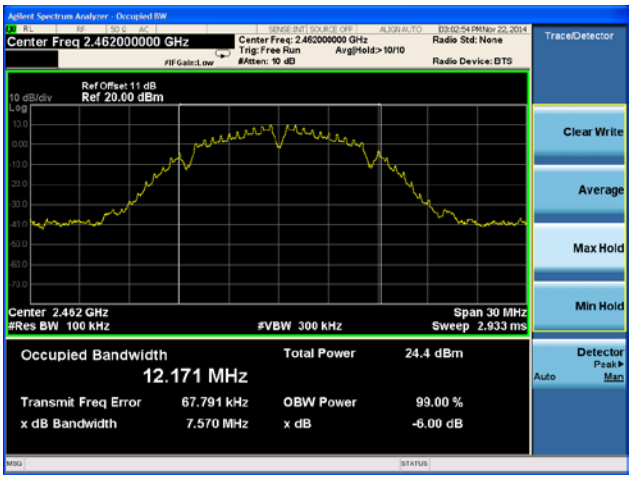
802.11b 6dB Bandwidth

Channel 01 (2412MHz)

Channel 06 (2437MHz)

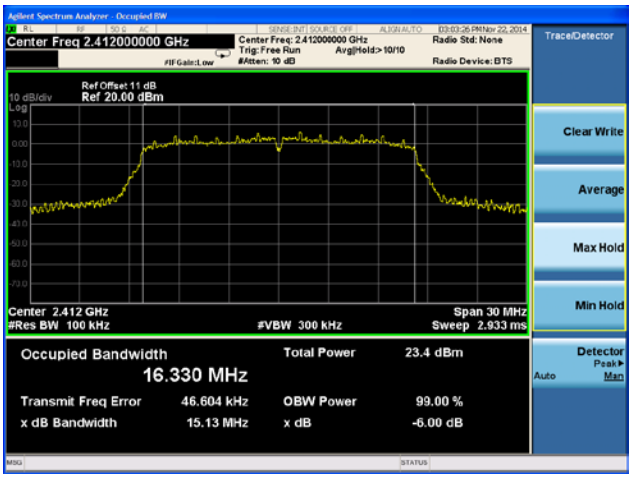


Channel 11 (2462MHz)

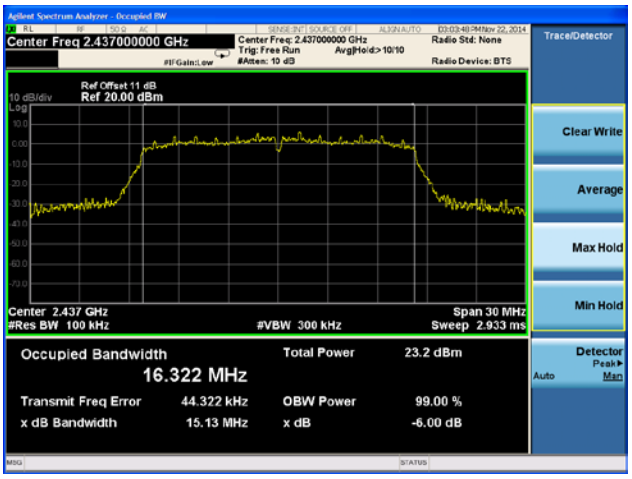


802.11g 6dB Bandwidth

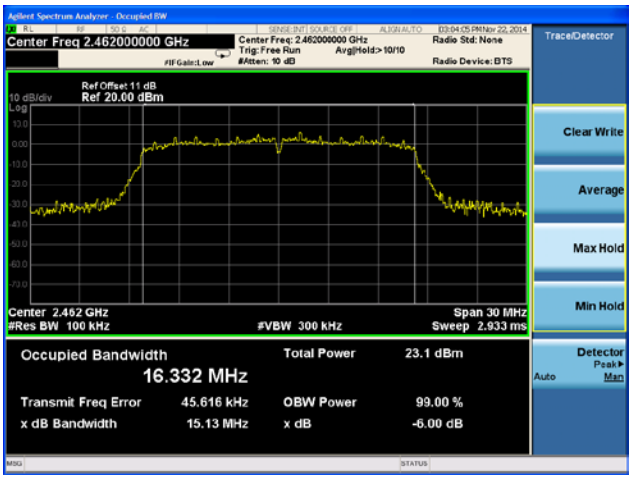
Channel 01 (2412MHz)



Channel 06 (2437MHz)

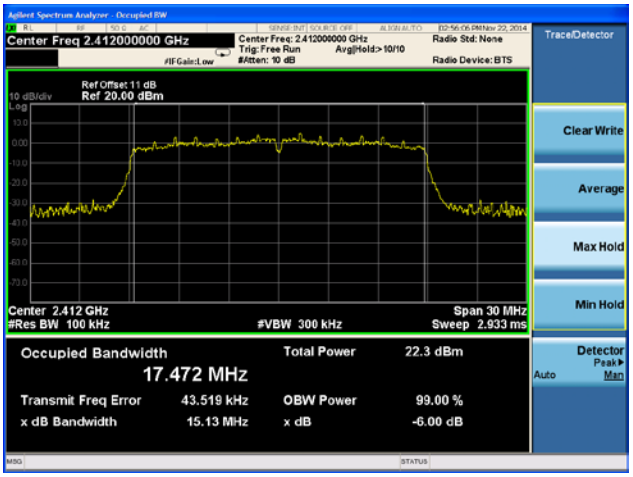


Channel 11 (2462MHz)

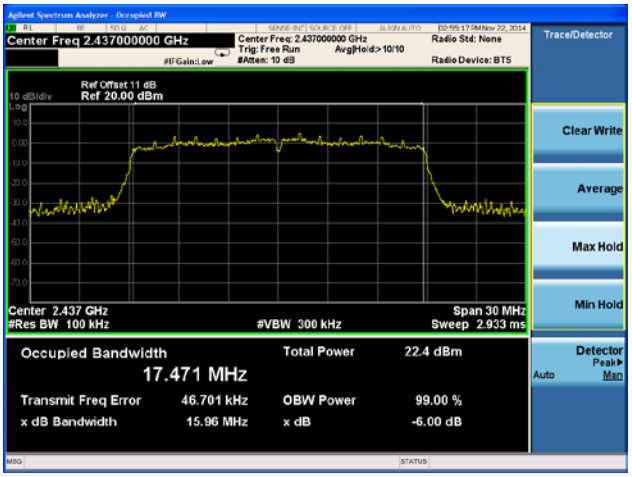


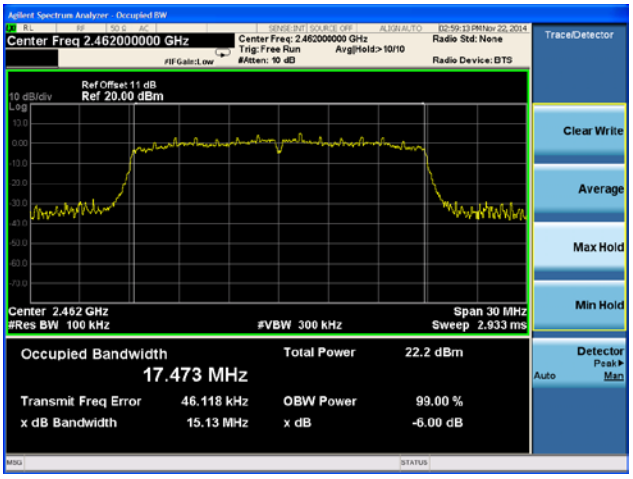
802.11n-HT20 6dB Bandwidth

Channel 01 (2412MHz)



Channel 06 (2437MHz)



Channel 11 (2462MHz)	
	

7.3. Output Power Measurement

7.3.1. Test Limit

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

7.3.2. Test Procedure Used

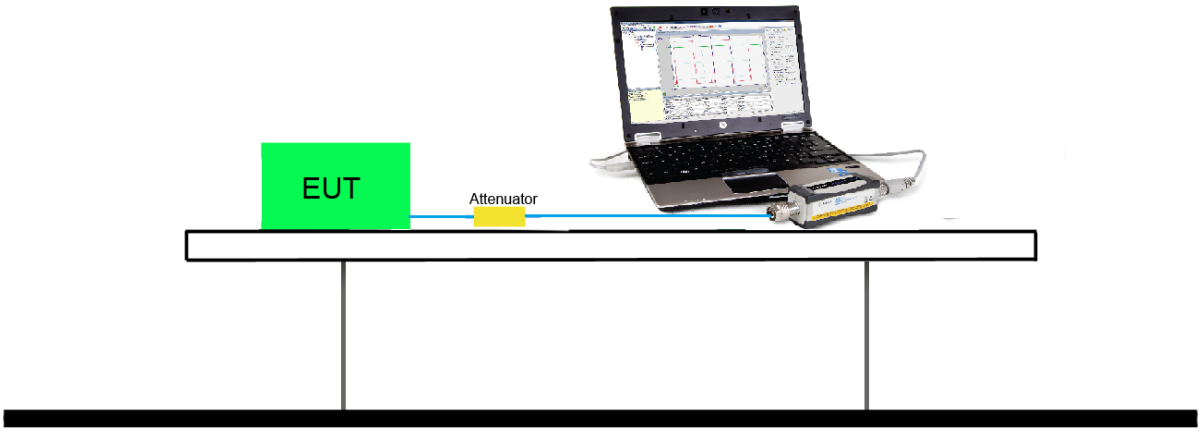
KDB 558074 D01v03r02 - Section 9.1.2 PKPM1 Peak Power Method (for signals with BW ≤ 50MHz)

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.

Test Mode	Bandwidth (MHz)	Channel No.	Frequency (MHz)	Data Rate (Mbps)	Peak Power (dBm)
11b	20	6	2437	1	19.96
				5.5	19.54
				11	19.04
11g	20	6	2437	6	24.58
				24	24.11
				54	23.89
11n	20	6	2437	6.5(MCS0)	24.06
				39(MCS4)	23.81
				65(MCS7)	23.47

Test Result of Peak Output Power

Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Result
11b	1	1	2412	19.75	≤ 30	Pass
11b	1	6	2437	19.96	≤ 30	Pass
11b	1	11	2462	19.72	≤ 30	Pass
11g	6	1	2412	24.42	≤ 30	Pass
11g	6	6	2437	24.58	≤ 30	Pass
11g	6	11	2462	24.85	≤ 30	Pass
11n-HT20	6.5	1	2412	23.93	≤ 30	Pass
11n-HT20	6.5	6	2437	24.06	≤ 30	Pass
11n-HT20	6.5	11	2462	24.40	≤ 30	Pass

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

Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	Average Power (dBm)	Limit (dBm)	Result
11b	1	1	2412	16.68	≤ 30	Pass
11b	1	6	2437	16.76	≤ 30	Pass
11b	1	11	2462	16.83	≤ 30	Pass
11g	6	1	2412	15.75	≤ 30	Pass
11g	6	6	2437	15.88	≤ 30	Pass
11g	6	11	2462	15.93	≤ 30	Pass
11n-HT20	6.5	1	2412	14.66	≤ 30	Pass
11n-HT20	6.5	6	2437	14.64	≤ 30	Pass
11n-HT20	6.5	11	2462	14.87	≤ 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.

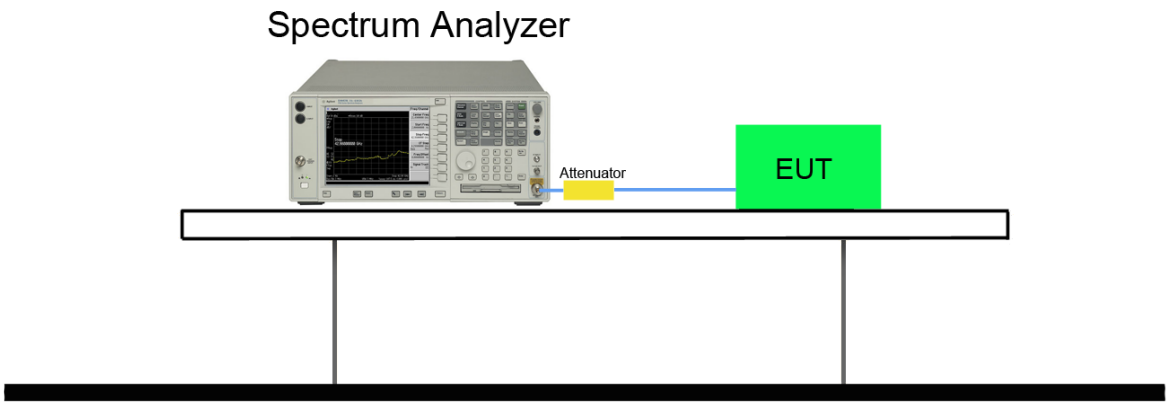
7.4.2. Test Procedure Used

KDB 558074 D01v03r02 - Section 10.2 Method PKPSD

7.4.3. Test Setting

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

7.4.4. Test Setup



7.4.5. Test Result

Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	PSD Result (dBm / 3kHz)	Limit (dBm / 3kHz)	Result
11b	1	1	2412	-3.753	≤ 8	Pass
11b	1	6	2437	-3.675	≤ 8	Pass
11b	1	11	2462	-3.994	≤ 8	Pass
11g	6	1	2412	-7.801	≤ 8	Pass
11g	6	6	2437	-7.843	≤ 8	Pass
11g	6	11	2462	-8.203	≤ 8	Pass
11n-HT20	6.5	1	2412	-9.480	≤ 8	Pass
11n-HT20	6.5	6	2437	-9.249	≤ 8	Pass
11n-HT20	6.5	11	2462	-9.532	≤ 8	Pass

802.11b PSD

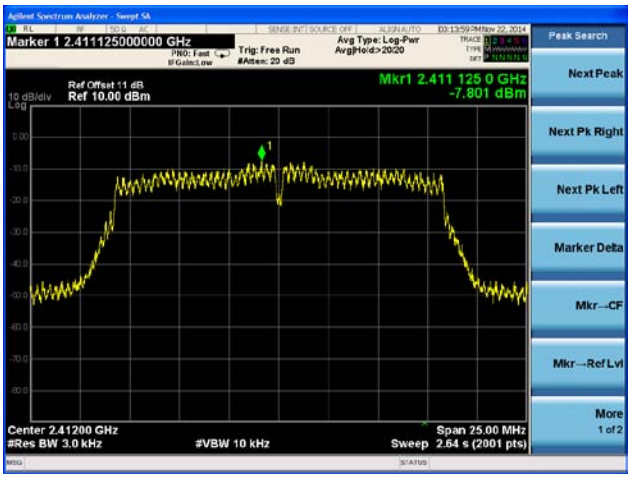
Channel 01 (2412MHz)

Channel 06 (2437MHz)

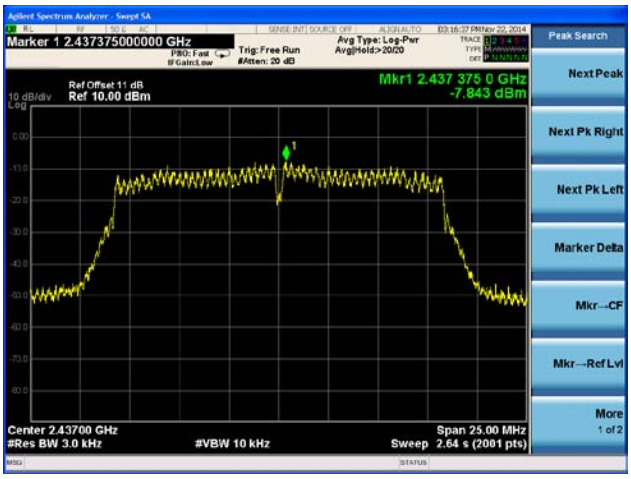
Channel 11 (2462MHz)

802.11g PSD

Channel 01 (2412MHz)



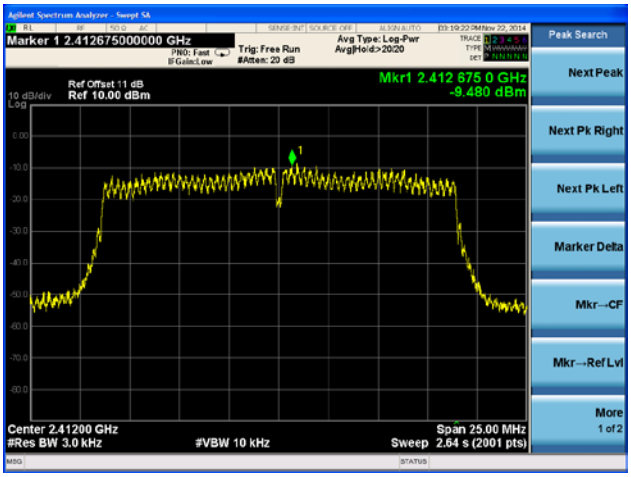
Channel 06 (2437MHz)



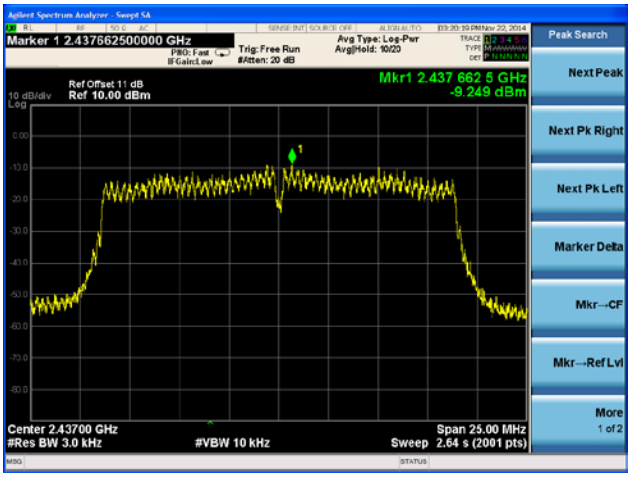
Channel 11 (2462MHz)

802.11n-HT20 PSD

Channel 01 (2412MHz)



Channel 06 (2437MHz)



Channel 11 (2462MHz)	

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

7.5.1. Test Limit

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

7.5.2. Test Procedure Used

KDB 558074 D01v03r02 – 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

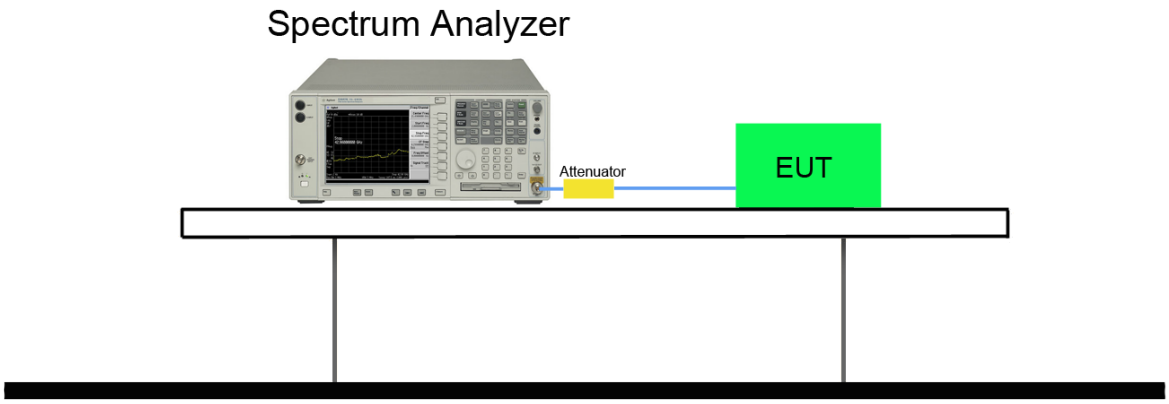
(d) Detector = Peak

(e) Trace mode = max hold

(f) Sweep time = auto couple

(g) The trace was allowed to stabilize

7.5.4. Test Setup

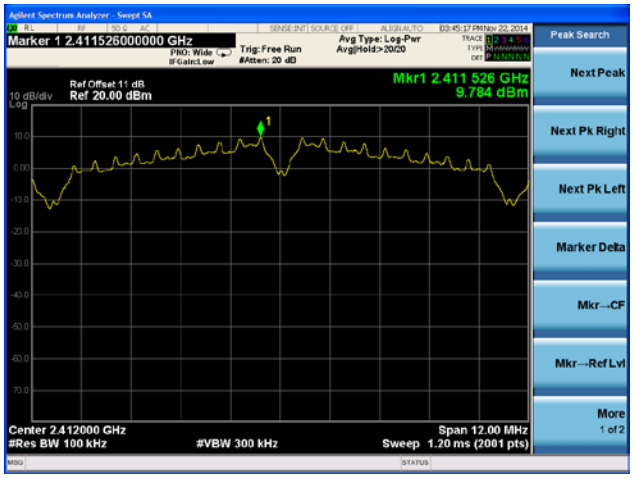
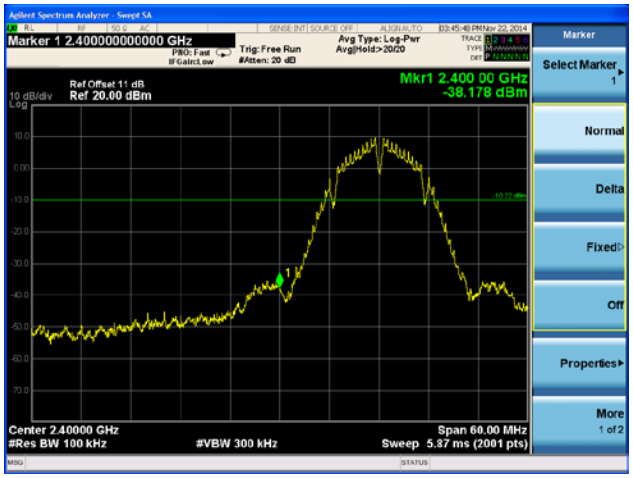


7.5.5. Test Result

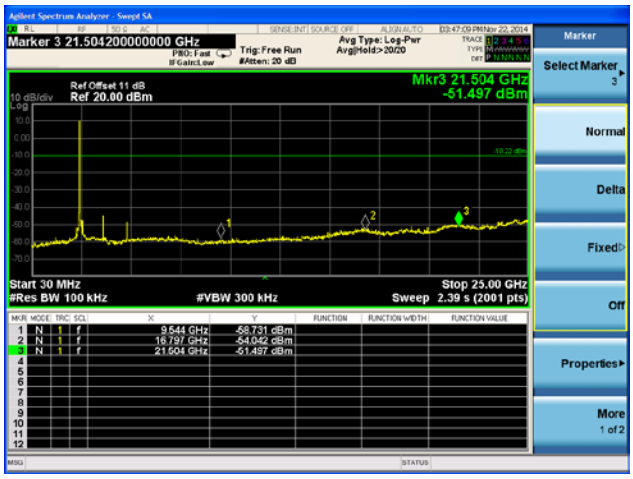
Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	Limit	Result
11b	1	01	2412	20dBc	Pass
11b	1	06	2437	20dBc	Pass
11b	1	11	2462	20dBc	Pass
11g	6	01	2412	20dBc	Pass
11g	6	06	2437	20dBc	Pass
11g	6	11	2462	20dBc	Pass
11n-HT20	6.5	01	2412	20dBc	Pass
11n-HT20	6.5	06	2437	20dBc	Pass
11n-HT20	6.5	11	2462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

802.11b Out-of-Band Emissions

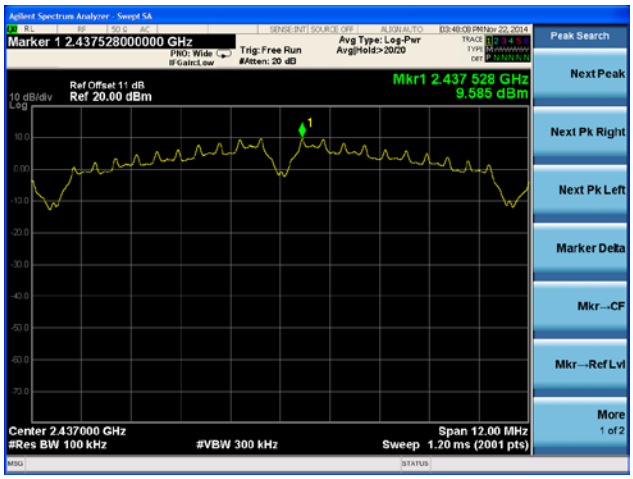
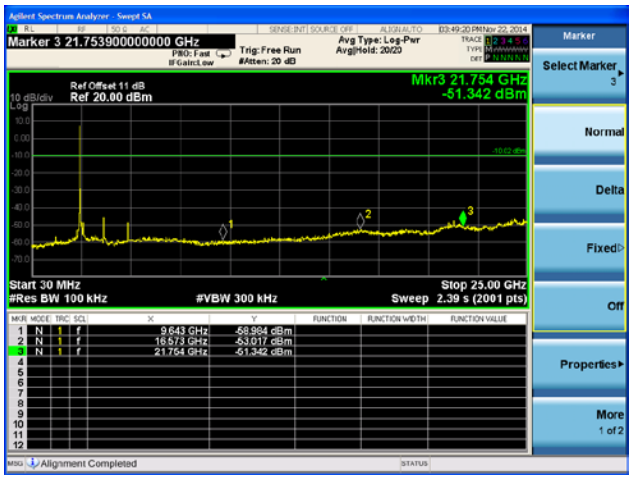
Channel 01 (2412MHz)

100kHz PSD Reference Level	Low Band Edge
	

Spurious Emission

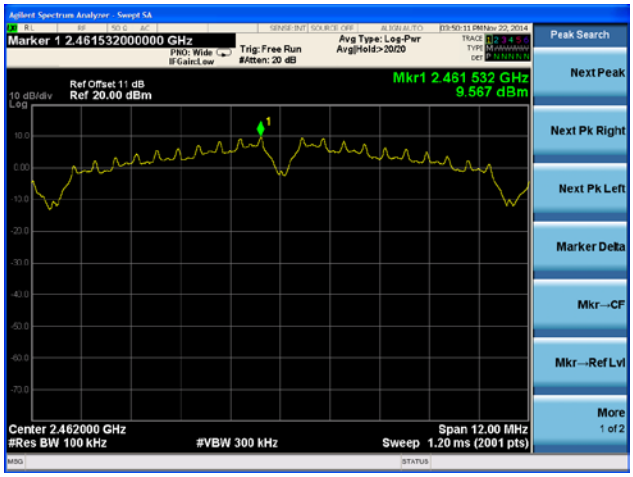


Channel 06 (2437MHz)

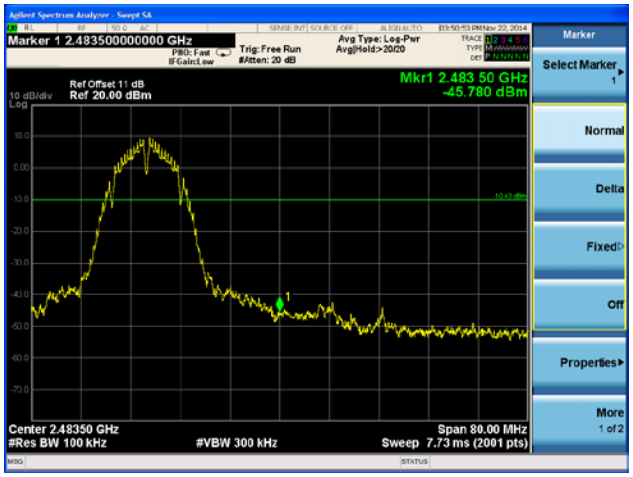
100kHz PSD Reference Level	Spurious Emission
	

Channel 11 (2462MHz)

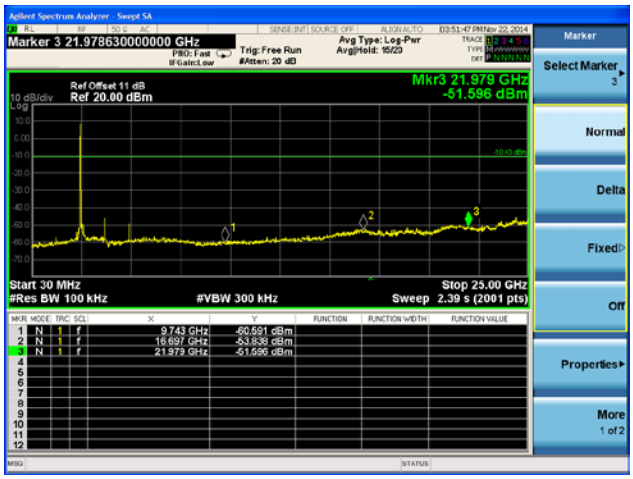
100kHz PSD Reference Level



High Band Edge



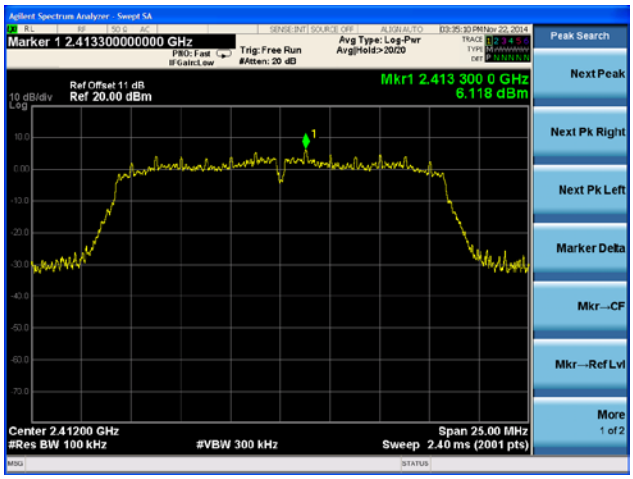
Spurious Emission



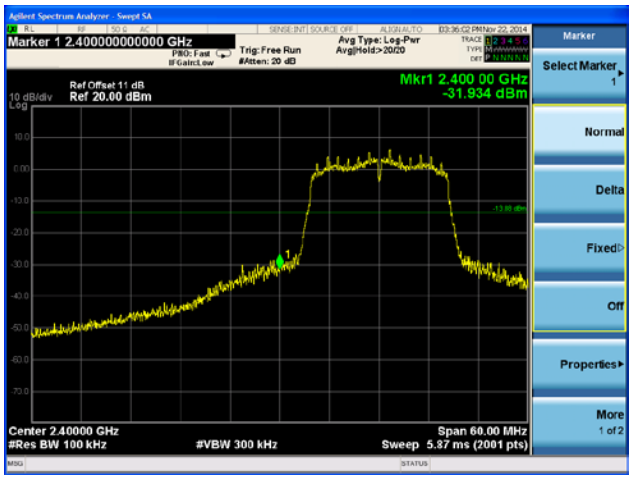
802.11g Out-of-Band Emissions

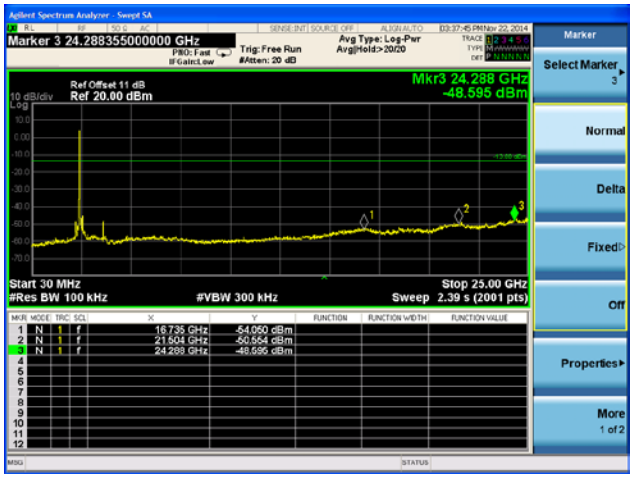
Channel 01 (2412MHz)

100kHz PSD Reference Level

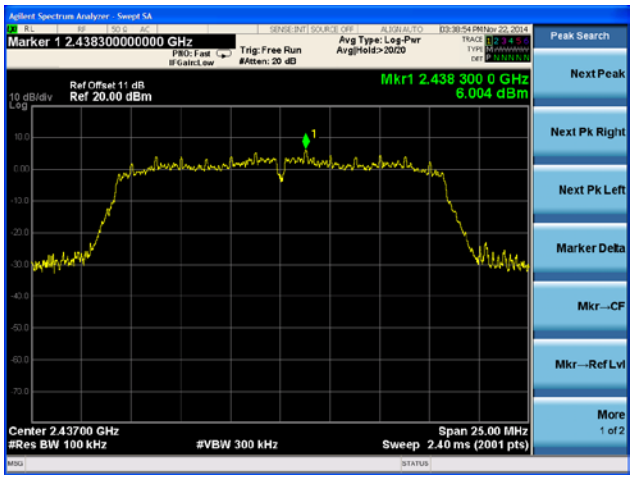
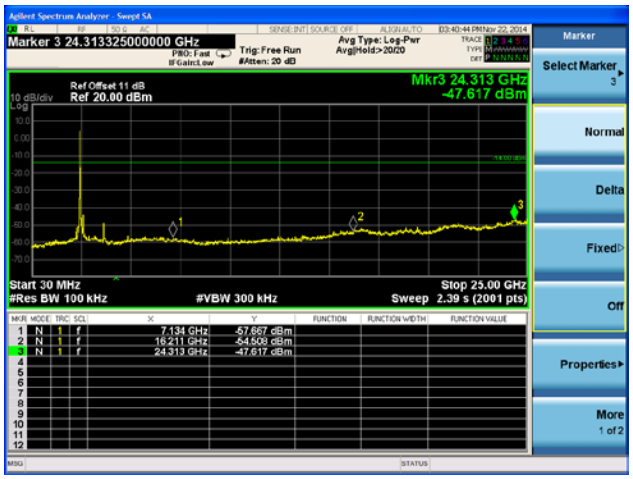


Low Band Edge

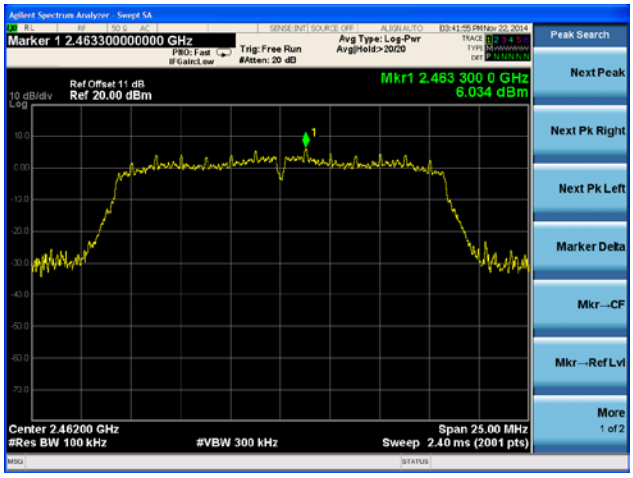
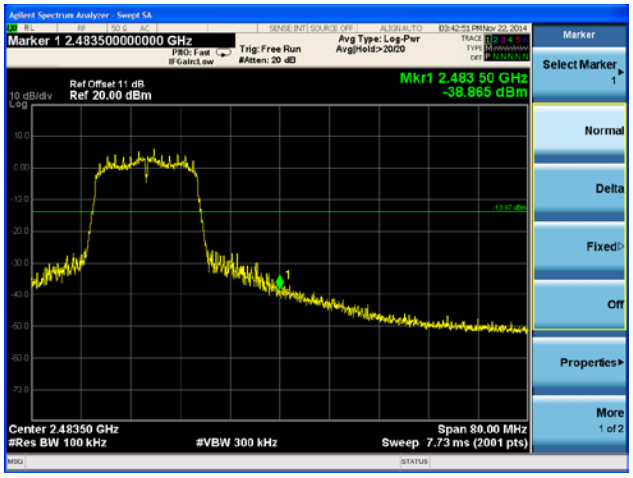


Spurious Emission	
	

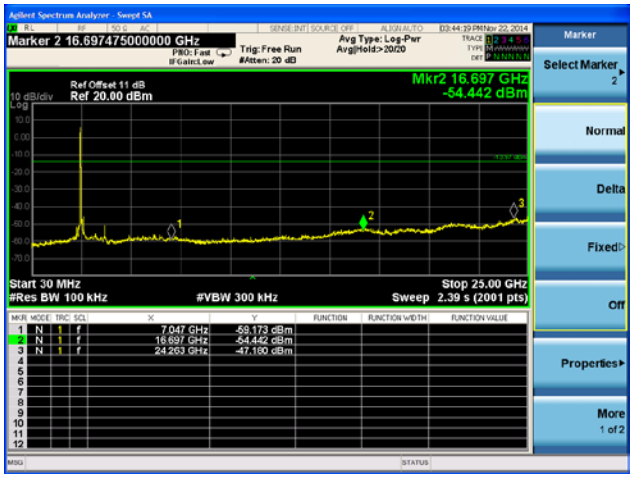
Channel 06 (2437MHz)

100kHz PSD Reference Level	Spurious Emission
	

Channel 11 (2462MHz)

100kHz PSD Reference Level	High Band Edge
	

Spurious Emission

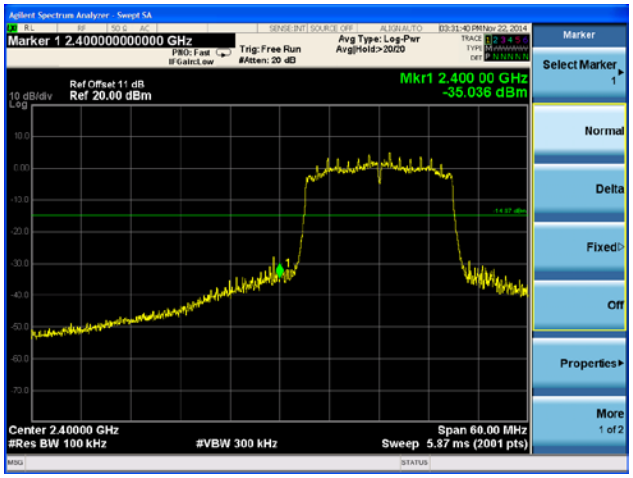


802.11n-HT20 Out-of-Band Emissions

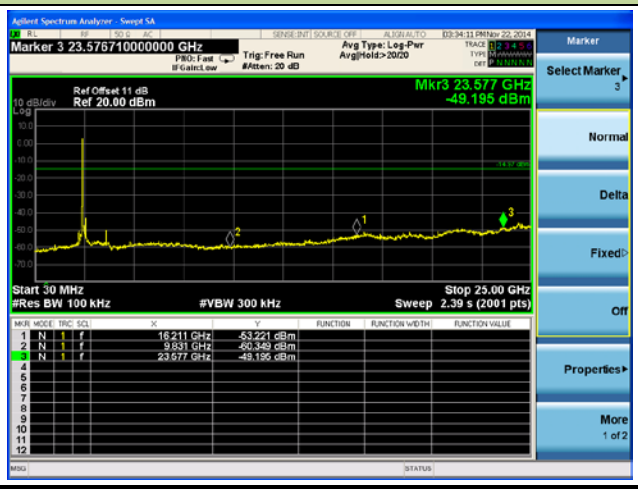
Channel 01 (2412MHz)

100kHz PSD Reference Level

Low Band Edge

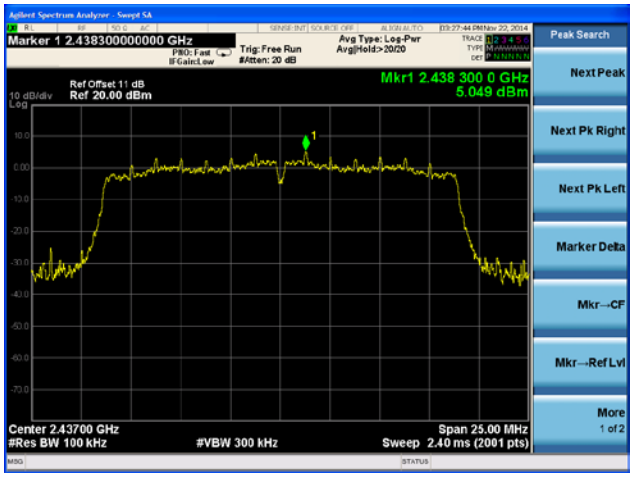


Spurious Emission

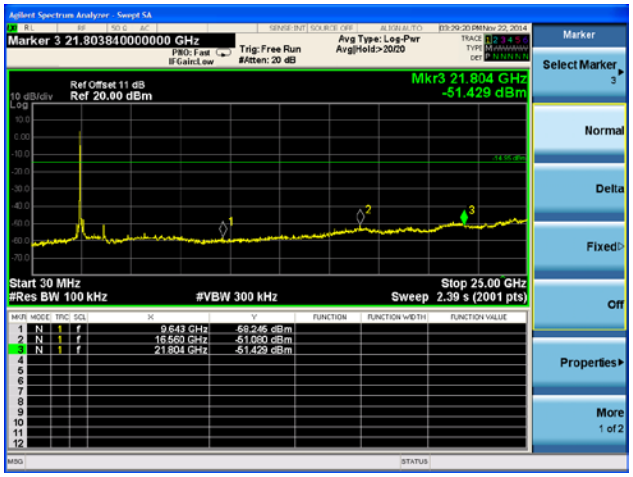


Channel 06 (2437MHz)

100kHz PSD Reference Level

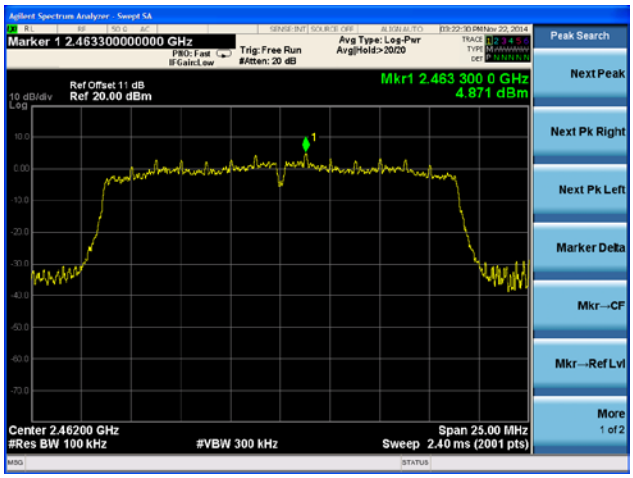


Spurious Emission

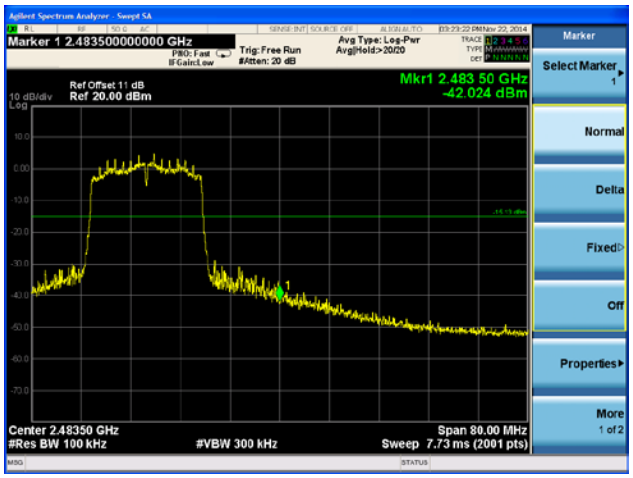


Channel 11 (2462MHz)

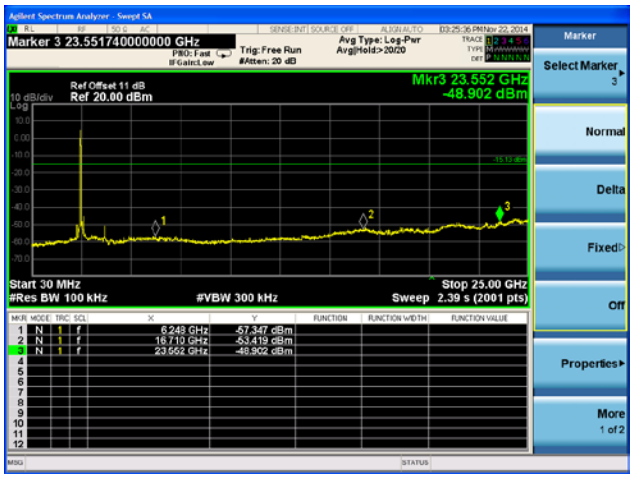
100kHz PSD Reference Level



High Band Edge



Spurious Emission



7.6. Radiated Spurious Emission Measurement

7.6.1. Test Limit

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

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

7.6.2. Test Procedure Used

KDB 558074 D01v03r02 – Section 12.2.3 (quasi-peak measurements)

KDB 558074 D01v03r02 – Section 12.2.4 (peak power measurements)

KDB 558074 D01v03r02 – Section 12.2.5 (average power measurements)

7.6.3. Test Setting

Peak Field Strength Measurements per Section 12.2.4 of KDB 558074 D01v03r02

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

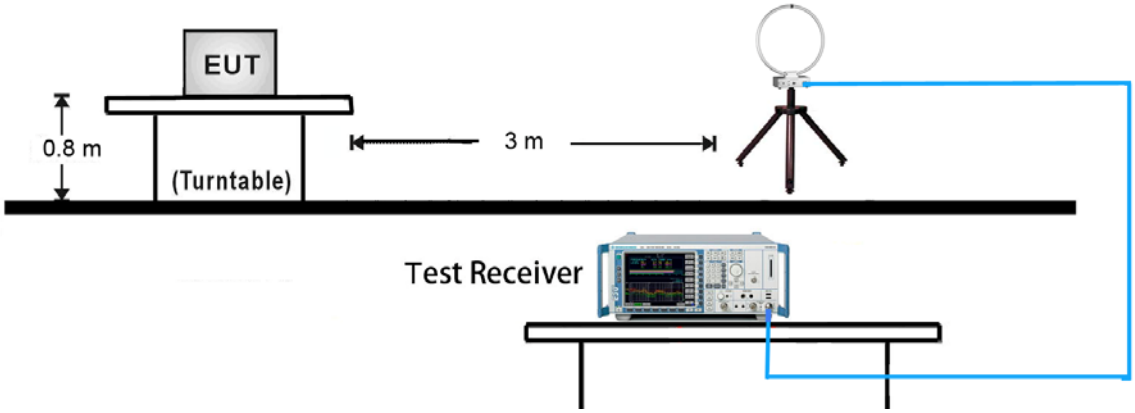
Frequency	RBW
9 ~ 150 kHz	200 ~ 300 Hz
0.15 ~ 30 MHz	9 ~ 10 kHz
30 ~ 1000 MHz	100 ~ 120 kHz
> 1000 MHz	1 MHz

Average Field Strength Measurements per Section 12.2.5.3 of KDB 558074 D01v03r02

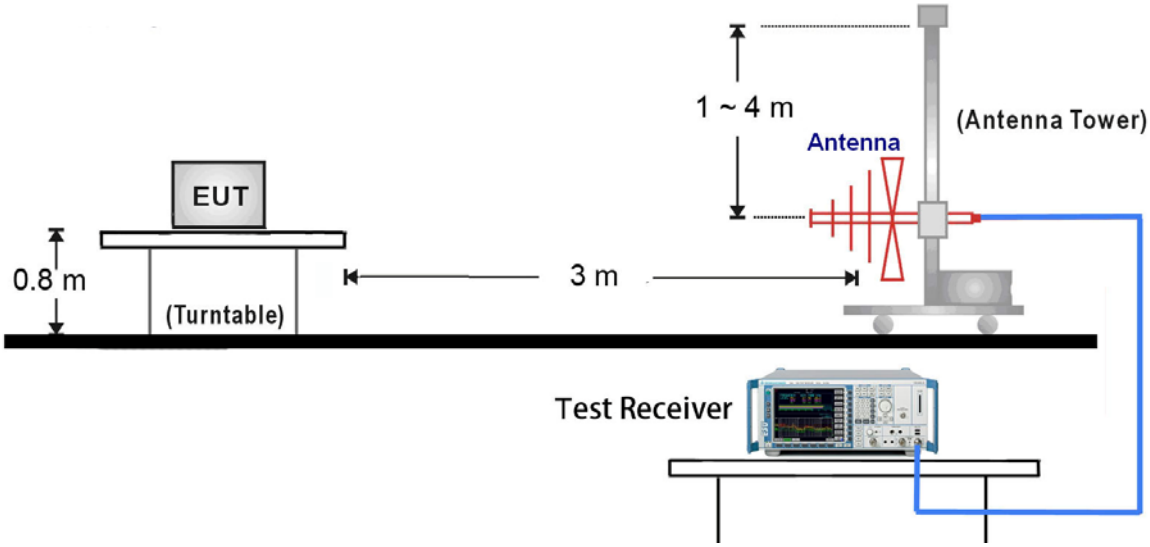
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW ≥ 1/T
4. De As an alternative, the instrument may be set to linear detector mode. Ensure that video filtering is applied in linear voltage domain (rather than in a log or dB domain).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

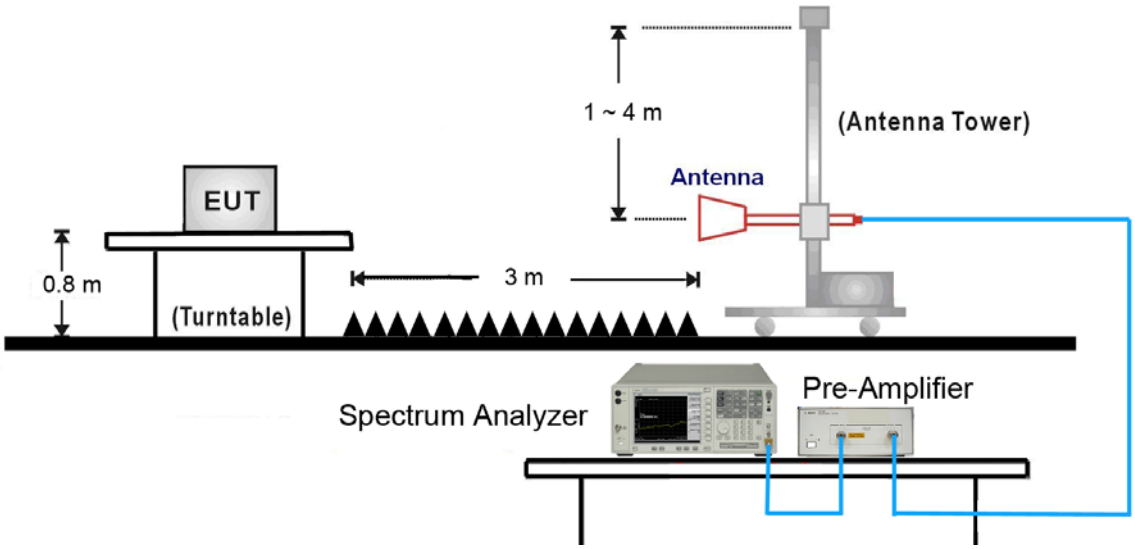
9kHz ~ 30MHz Test Setup:



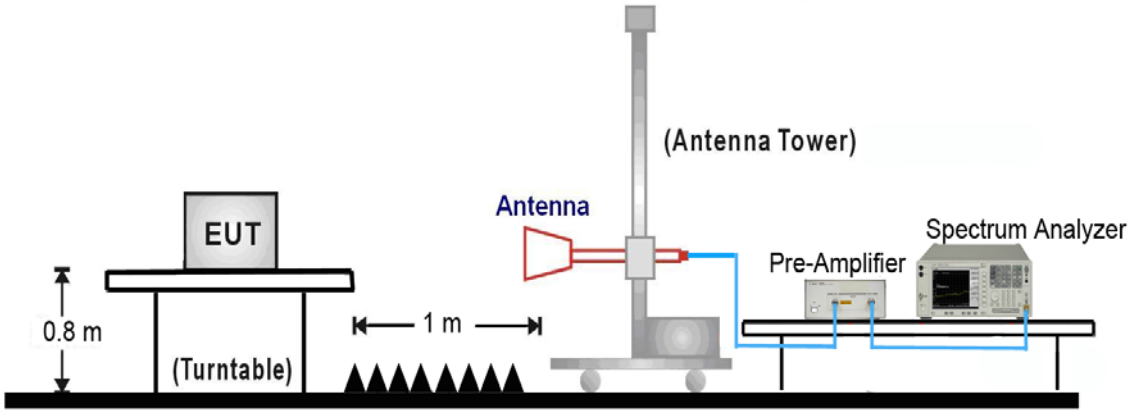
30MHz ~ 1GHz Test Setup:



1GHz ~ 18GHz Test Setup:



18GHz ~25GHz Test Setup:



7.6.5. Test Result

Test Mode:	11b	Test Site:	AC1
Test Channel:	06	Test Engineer:	Roy Cheng
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. **The worst case of Radiated Spurious Emission.** 3. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
*	3227.0	36.2	3.5	39.7	86.2	-46.5	Peak	Horizontal
*	3414.0	37.7	3.4	41.1	86.2	-45.1	Peak	Horizontal
	3652.0	43.8	4.0	47.8	74.0	-26.2	Peak	Horizontal
	4876.0	45.6	6.6	52.2	74.0	-21.8	Peak	Horizontal
*	3184.5	37.3	3.6	40.9	86.2	-45.3	Peak	Vertical
*	3490.5	35.7	3.8	39.5	86.2	-46.7	Peak	Vertical
	3652.0	43.5	4.0	47.5	74.0	-26.5	Peak	Vertical
	4876.0	46.0	6.6	52.6	74.0	-21.4	Peak	Vertical

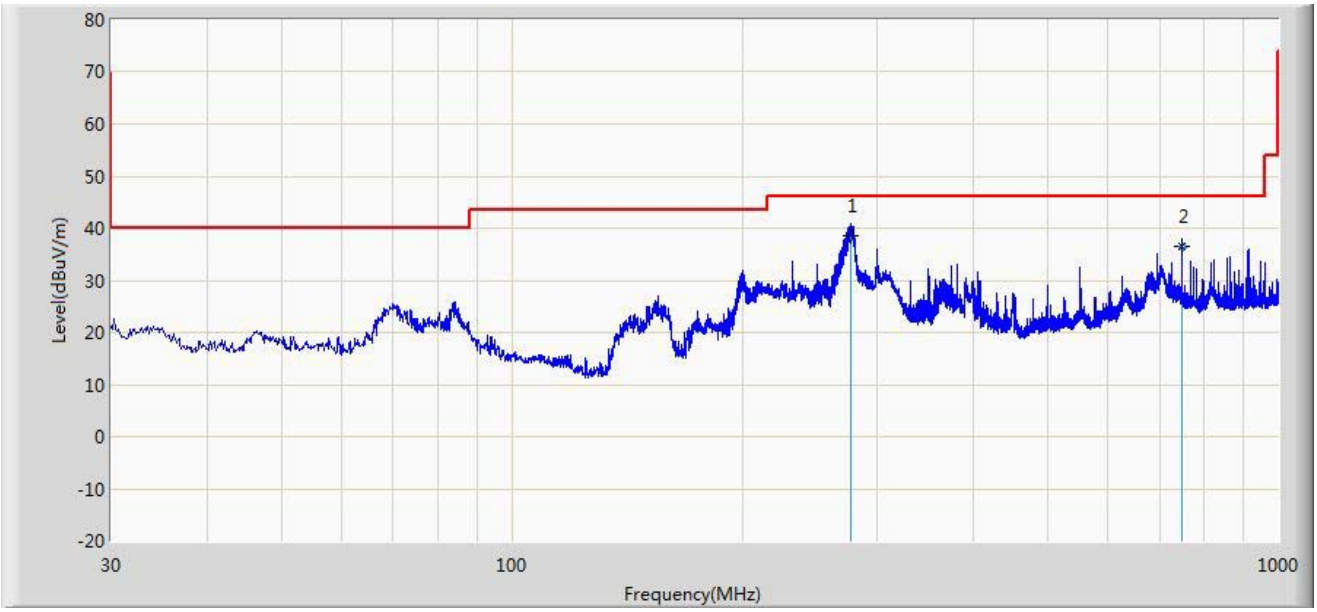
Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (106.2dBμV/m)

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

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

The worst case of Radiated Emission below 1GHz:

Site: AC1	Time: 2014/12/02 - 16:29
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: VULB9162_0.03-8GHz	Polarity: Horizontal
EUT: IP Multimedia Phone	Power: AC 120V/60Hz
Worse Case Mode : 802.11n-HT20 at channel 2412MHz	

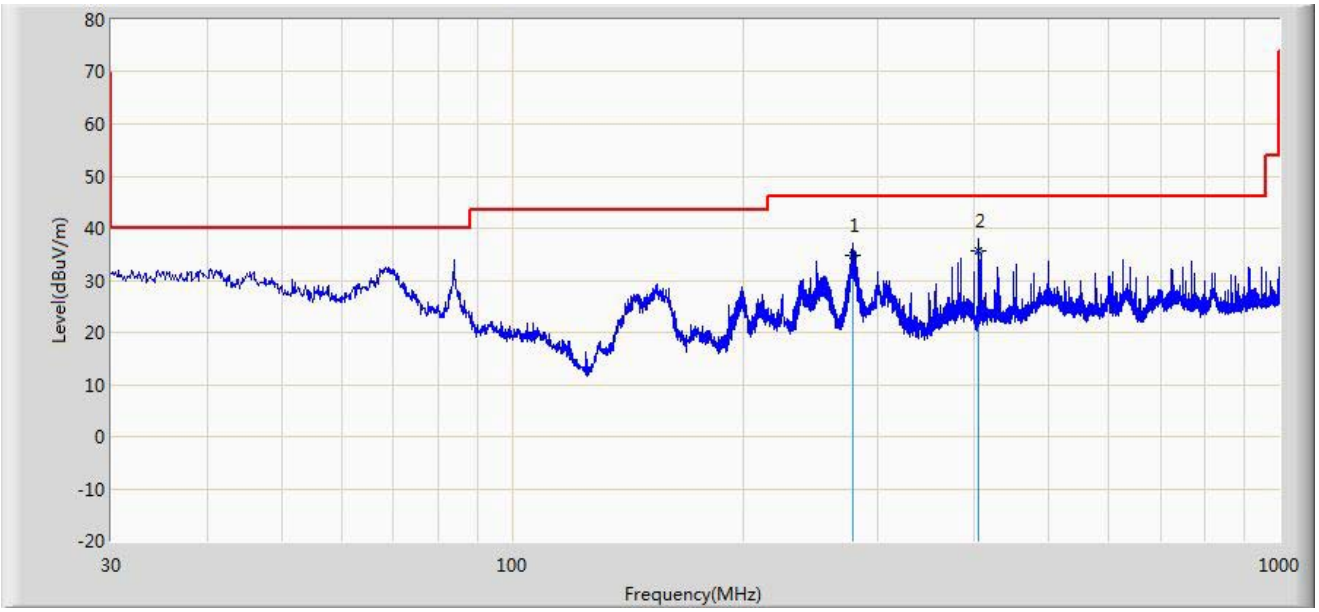


No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	276.774	38.582	24.840	-7.418	46.000	13.742	QP
2		749.402	36.480	14.960	-9.520	46.000	21.520	QP

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

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

Site: AC1	Time: 2014/12/02 - 16:31
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: VULB9162_0.03-8GHz	Polarity: Vertical
EUT: IP Multimedia Phone	Power: AC 120V/60Hz
Worse Case Mode : 802.11n-HT20 at channel 2412MHz	

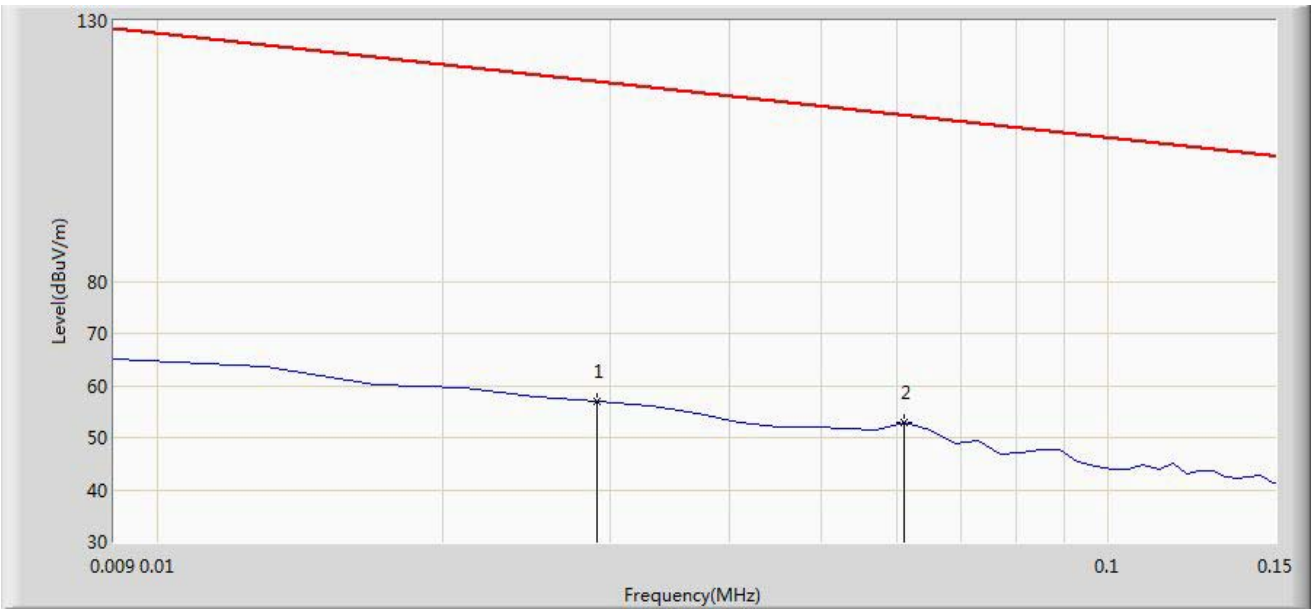


No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		277.721	34.696	20.940	-11.304	46.000	13.756	QP
2	*	405.337	35.704	19.410	-10.296	46.000	16.294	QP

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

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

Site: AC1	Time: 2014/12/01 - 17:32
Limit: FCC_Part15.209_RE(3m)	Engineer: Roy Cheng
Probe: FMZB1519_0.009-30MHz	Polarity: Face on
EUT: IP Multimedia Phone	Power: AC 120V/60Hz
Note: There is the ambient noise within frequency range 9kHz~30MHz.	

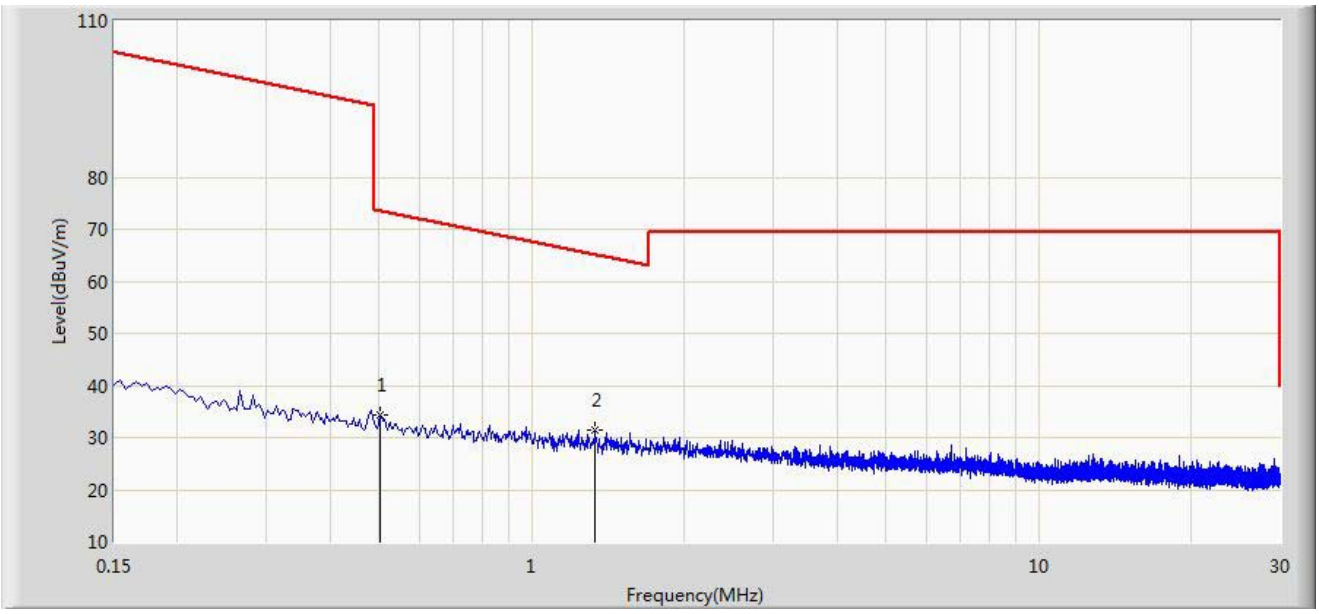


No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		0.029	56.898	35.849	-61.458	118.356	21.049	QP
2	*	0.061	52.856	32.545	-59.042	111.898	20.311	QP

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

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

Site: AC1	Time: 2014/12/01 - 17:46
Limit: FCC_Part15.209_RE(3m)	Engineer: Roy Cheng
Probe: FMZB1519_0.009-30MHz	Polarity: Face on
EUT: IP Multimedia Phone	Power: AC 120V/60Hz
Note: There is the ambient noise within frequency range 9kHz~30MHz.	

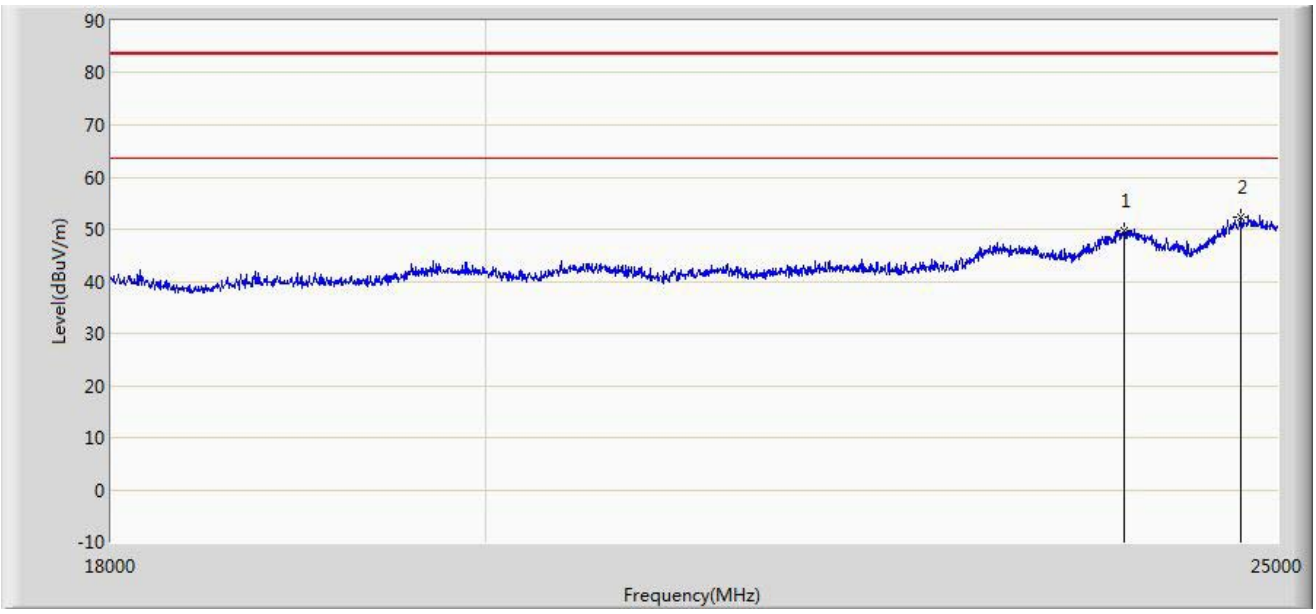


No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		0.502	34.381	13.958	-39.209	73.590	20.423	QP
2	*	1.334	31.591	11.100	-33.510	65.101	20.491	QP

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

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

Site: AC1	Time: 2014/12/01 - 21:11
Limit: FCC_Part15.209_RE(1m)	Engineer: Roy Cheng
Probe: BBHA9170_18-40GHz	Polarity: Horizontal
EUT: IP Multimedia Phone	Power: AC 120V/60Hz
Note: There is the ambient noise within frequency range 18GHz~25GHz.	

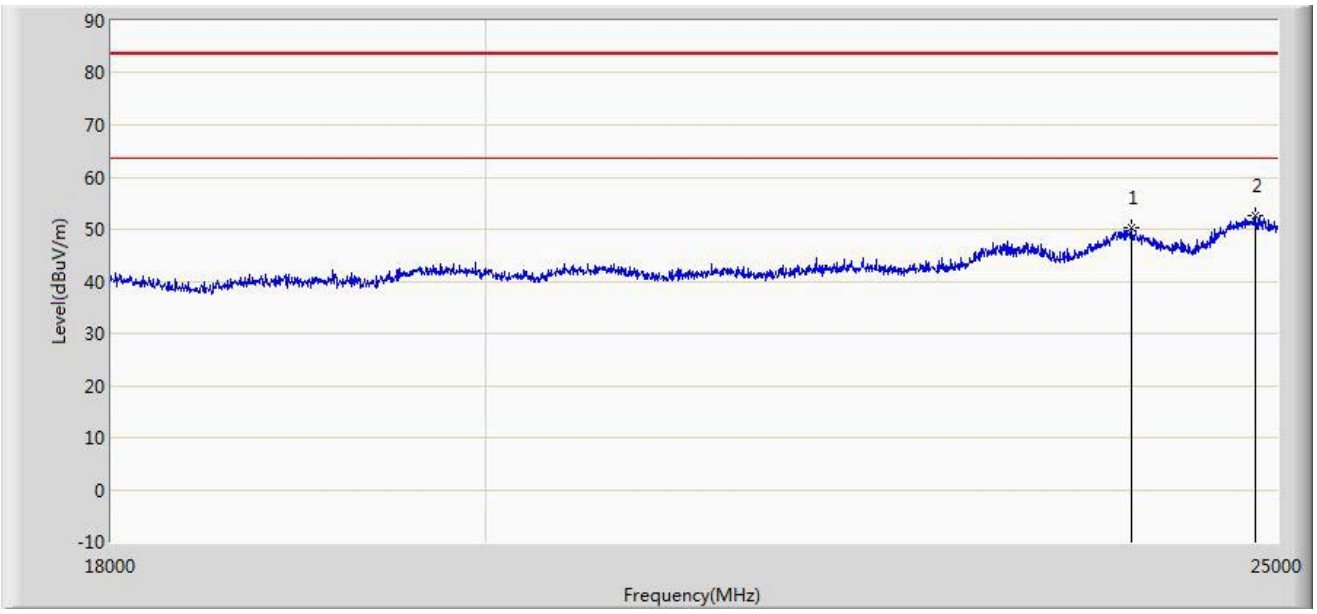


No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		23943.000	49.787	35.877	-33.713	83.500	13.910	PK
2	*	24741.000	52.380	37.686	-31.120	83.500	14.694	PK

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: 2014/12/01 - 21:12
Limit: FCC_Part15.209_RE(1m)	Engineer: Roy Cheng
Probe: BBHA9170_18-40GHz	Polarity: Vertical
EUT: IP Multimedia Phone	Power: AC 120V/60Hz
Note: There is the ambient noise within frequency range 18GHz~25GHz.	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		23999.000	50.381	36.437	-33.119	83.500	13.944	PK
2	*	24846.000	52.507	37.739	-30.993	83.500	14.768	PK

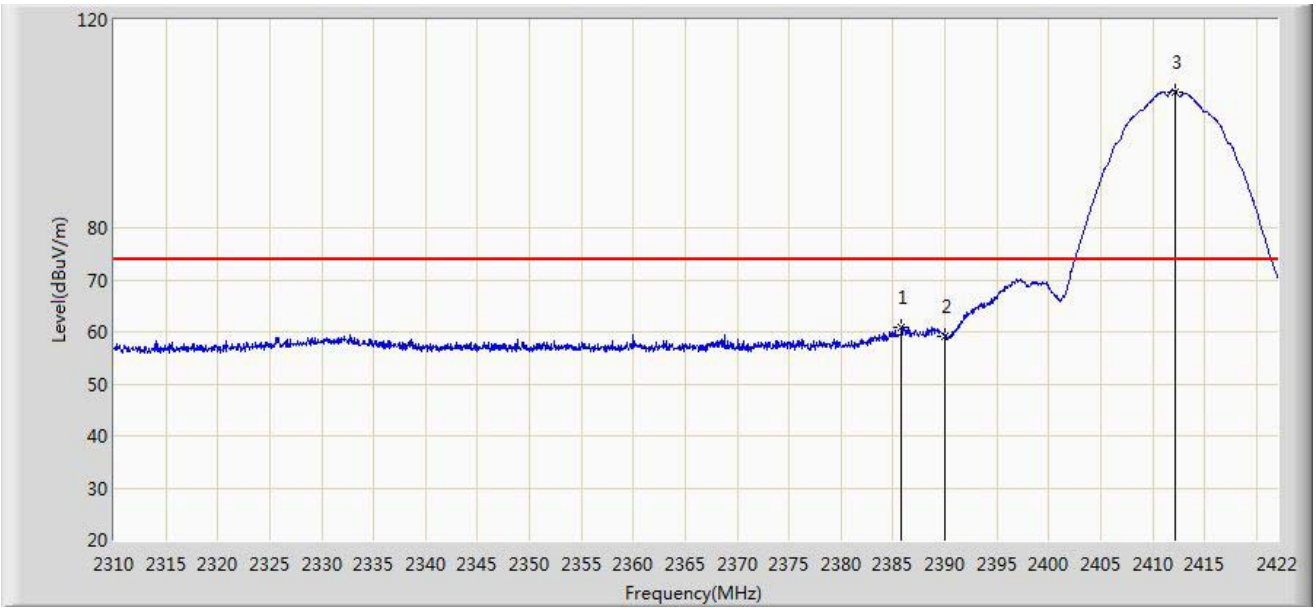
Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

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: 2014/11/20 - 16:09
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: IP Multimedia Phone	Power: AC 120V/60Hz
Note: Mode 1: Transmit by 802.11b at channel 2412MHz	

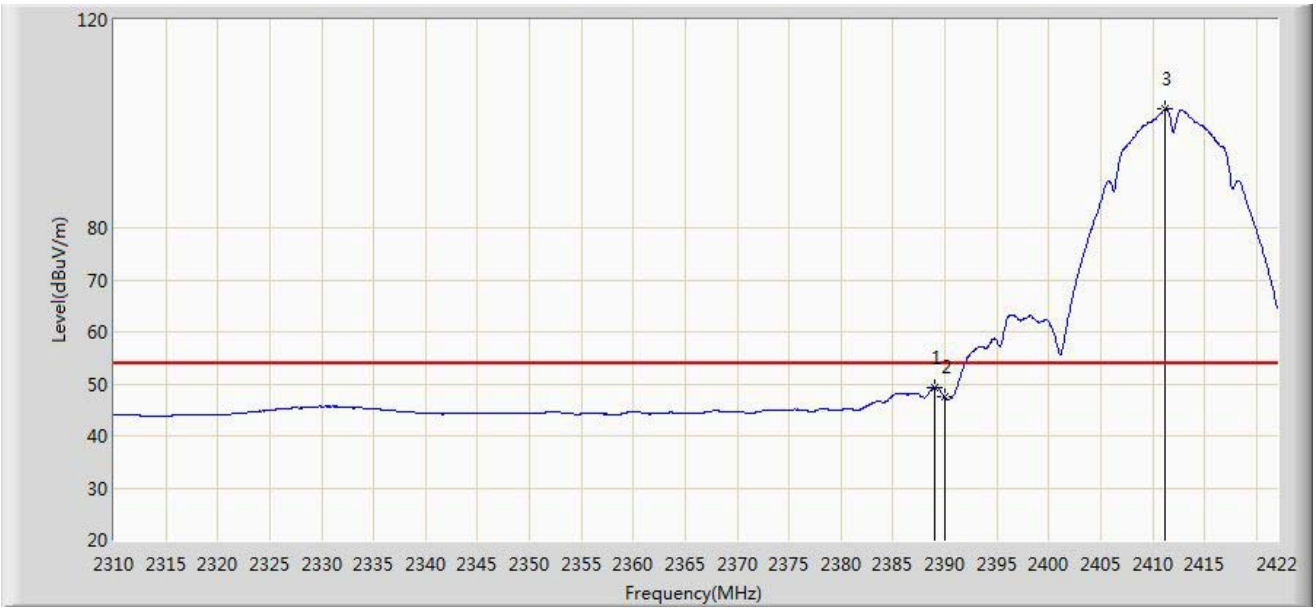


No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2385.824	60.840	30.147	-13.160	74.000	30.694	PK
2		2390.000	59.058	28.374	-14.942	74.000	30.684	PK
3	*	2412.200	106.199	75.555	32.199	74.000	30.644	PK

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

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

Site: AC1	Time: 2014/11/20 - 16:13
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: IP Multimedia Phone	Power: AC 120V/60Hz
Note: Mode 1: Transmit by 802.11b at channel 2412MHz	

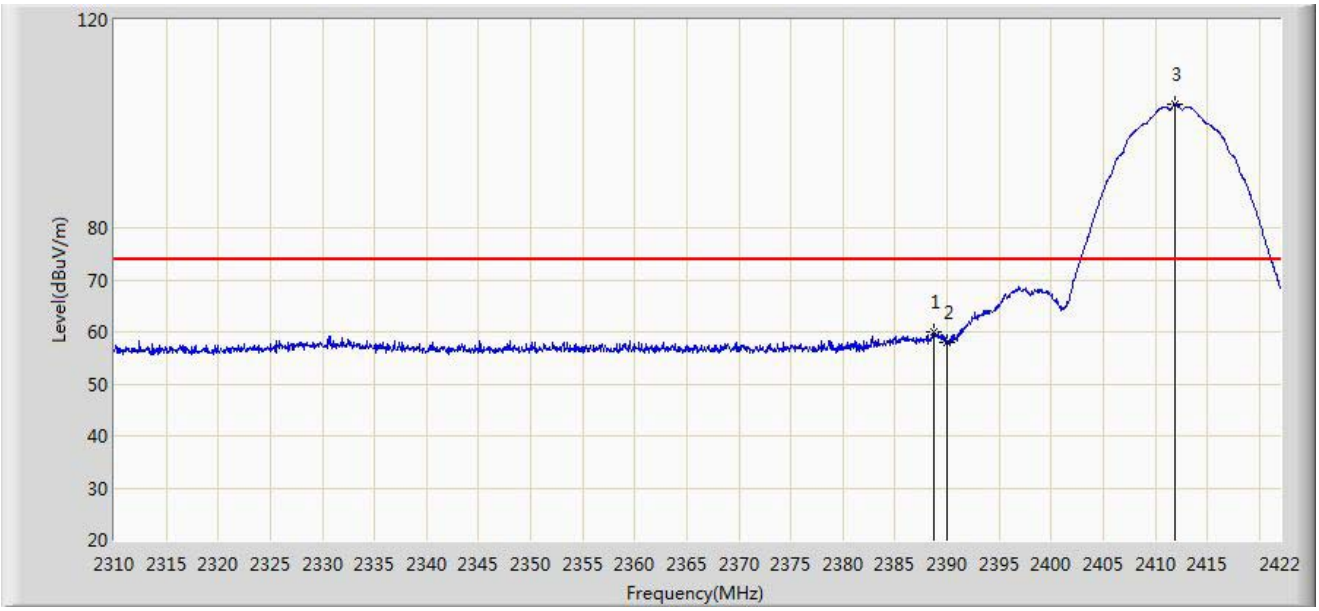


No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2388.960	49.366	18.680	-4.634	54.000	30.686	AV
2		2390.000	47.398	16.714	-6.602	54.000	30.684	AV
3	*	2411.136	102.868	72.222	48.868	54.000	30.646	AV

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

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

Site: AC1	Time: 2014/11/20 - 16:14
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: IP Multimedia Phone	Power: AC 120V/60Hz
Note: Mode 1: Transmit by 802.11b at channel 2412MHz	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2388.680	60.087	29.400	-13.913	74.000	30.686	PK
2		2390.000	58.040	27.356	-15.960	74.000	30.684	PK
3	*	2411.864	103.745	73.100	29.745	74.000	30.645	PK

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

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

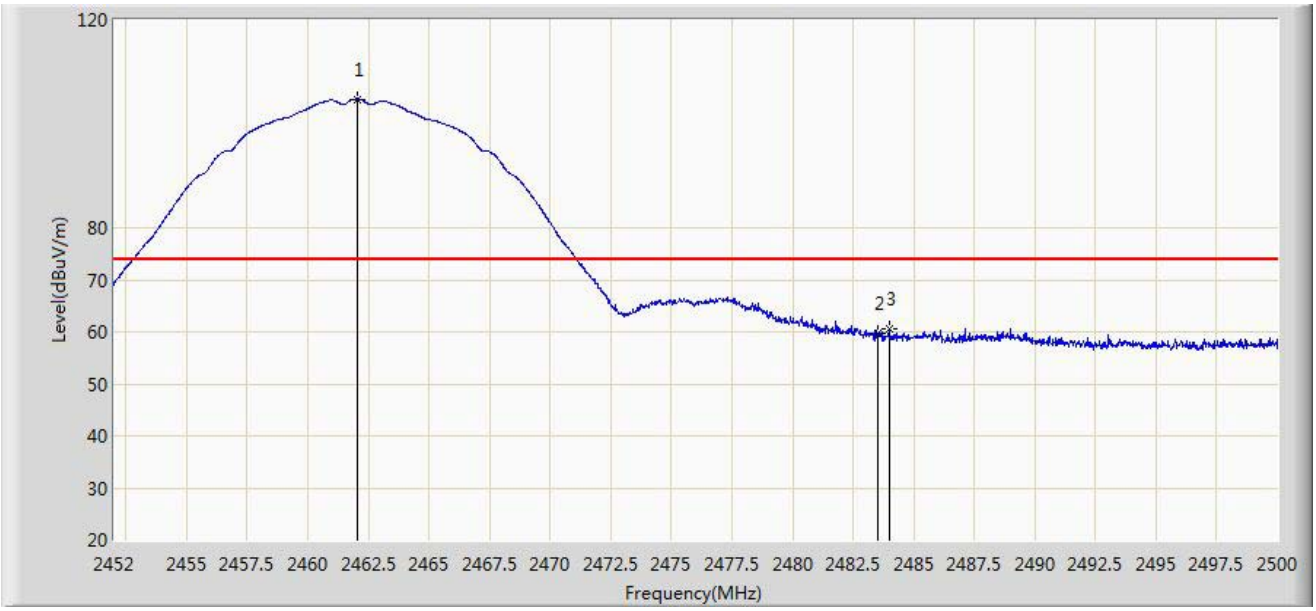
Site: AC1	Time: 2014/11/20 - 16:17
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: IP Multimedia Phone	Power: AC 120V/60Hz
Note: Mode 1: Transmit by 802.11b at channel 2412MHz	

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2389.352	47.225	16.540	-6.775	54.000	30.685	AV
2		2390.000	45.732	15.048	-8.268	54.000	30.684	AV
3	*	2411.304	100.019	69.373	46.019	54.000	30.646	AV

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

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

Site: AC1	Time: 2014/11/20 - 16:18
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: IP Multimedia Phone	Power: AC 120V/60Hz
Note: Mode 1: Transmit by 802.11b at channel 2462MHz	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2462.056	104.782	74.171	30.782	74.000	30.611	PK
2		2483.500	59.812	29.139	-14.188	74.000	30.673	PK
3		2483.992	60.521	29.847	-13.479	74.000	30.675	PK

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

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

Site: AC1	Time: 2014/11/20 - 16:20
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: IP Multimedia Phone	Power: AC 120V/60Hz
Note: Mode 1: Transmit by 802.11b at channel 2462MHz	

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2461.312	101.231	70.621	47.231	54.000	30.611	AV
2		2483.500	47.176	16.503	-6.824	54.000	30.673	AV

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

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

Site: AC1	Time: 2014/11/20 - 16:23
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: IP Multimedia Phone	Power: AC 120V/60Hz
Note: Mode 1: Transmit by 802.11b at channel 2462MHz	

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2462.056	102.266	71.655	28.266	74.000	30.611	PK
2		2483.500	58.072	27.399	-15.928	74.000	30.673	PK
3		2489.872	60.206	29.515	-13.794	74.000	30.691	PK

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

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

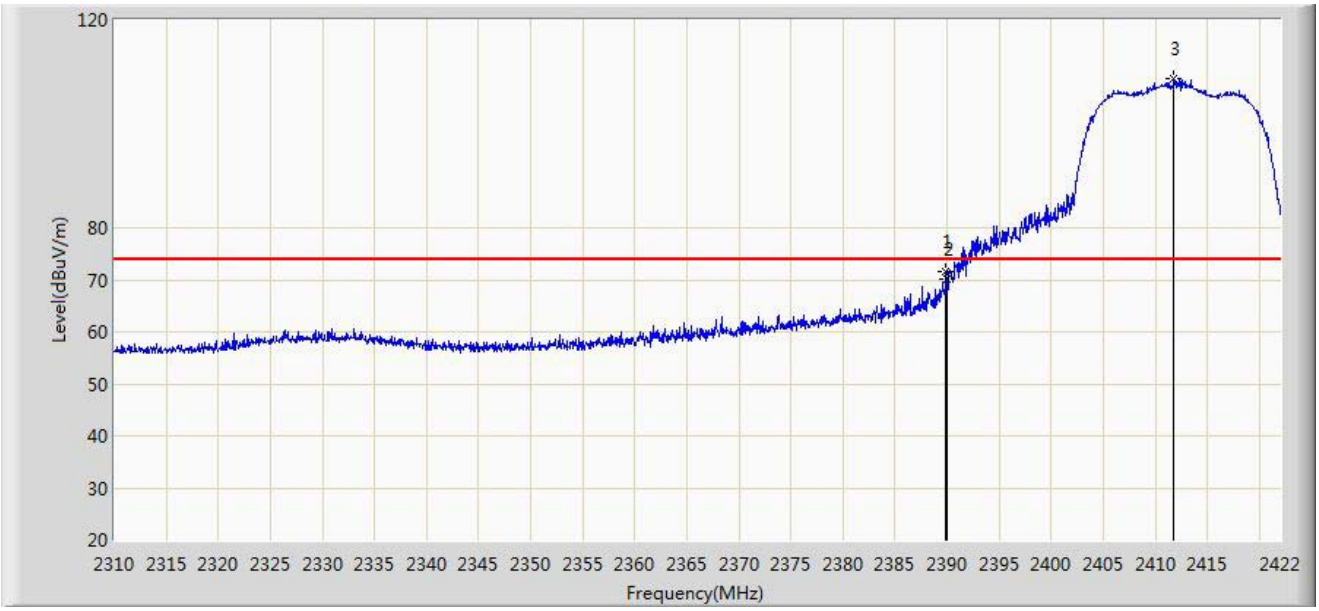
Site: AC1	Time: 2014/11/20 - 16:25
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: IP Multimedia Phone	Power: AC 120V/60Hz
Note: Mode 1: Transmit by 802.11b at channel 2462MHz	

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2461.312	98.567	67.957	44.567	54.000	30.611	AV
2		2483.500	45.031	14.358	-8.969	54.000	30.673	AV

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

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

Site: AC1	Time: 2014/11/20 - 16:26
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: IP Multimedia Phone	Power: AC 120V/60Hz
Note: Mode 2: Transmit by 802.11g at channel 2412MHz	

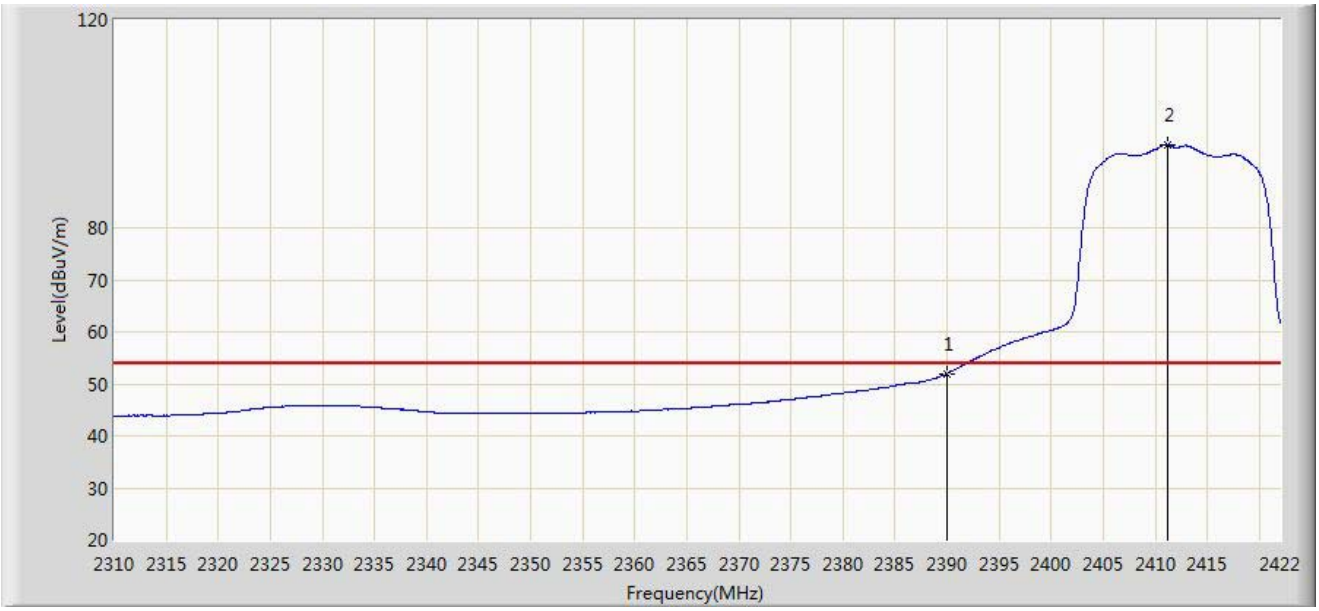


No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2389.856	71.527	40.843	-2.473	74.000	30.684	PK
2		2390.000	70.149	39.465	-3.851	74.000	30.684	PK
3	*	2411.752	108.703	78.058	34.703	74.000	30.646	PK

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

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

Site: AC1	Time: 2014/11/20 - 16:29
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: IP Multimedia Phone	Power: AC 120V/60Hz
Note: Mode 2: Transmit by 802.11g at channel 2412MHz	

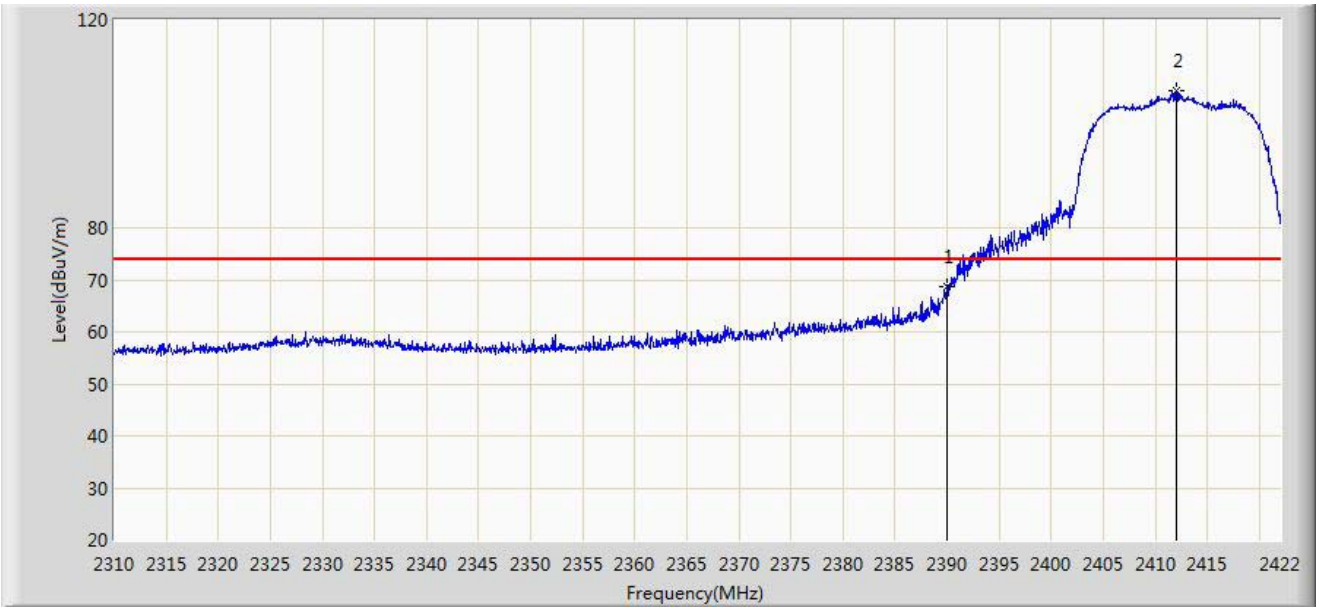


No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	51.956	21.272	-2.044	54.000	30.684	AV
2	*	2411.136	95.957	65.311	41.957	54.000	30.646	AV

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

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

Site: AC1	Time: 2014/11/20 - 16:30
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: IP Multimedia Phone	Power: AC 120V/60Hz
Note: Mode 2: Transmit by 802.11g at channel 2412MHz	

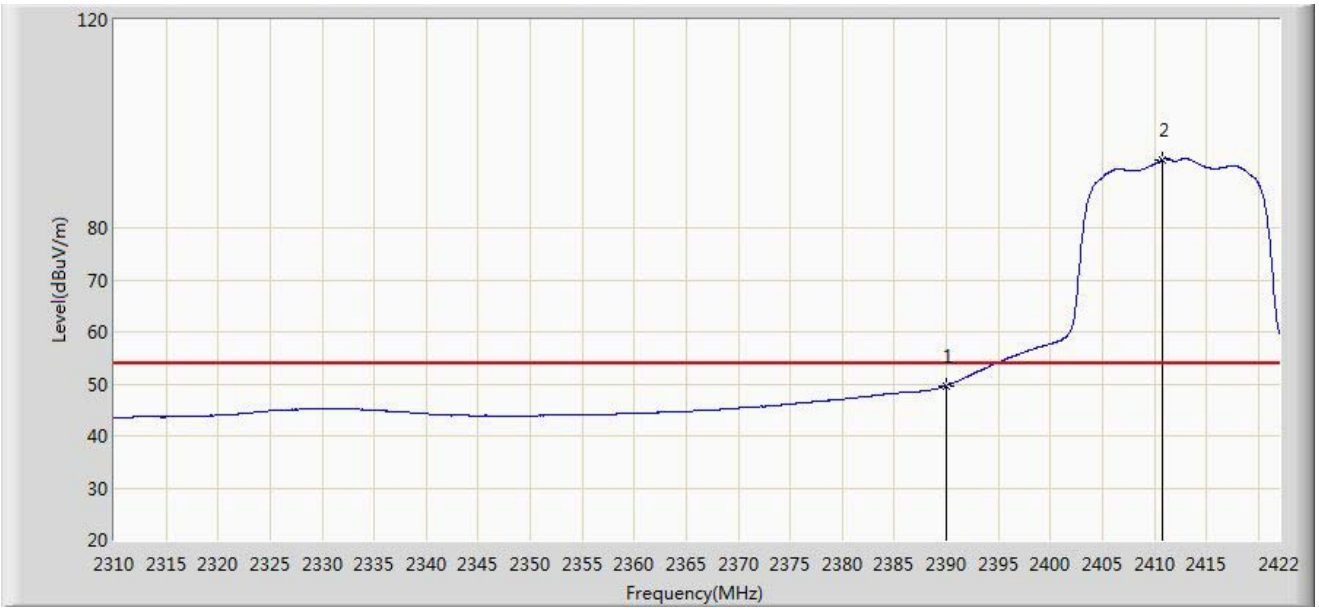


No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	68.682	37.998	-5.318	74.000	30.684	PK
2	*	2412.032	106.454	75.809	32.454	74.000	30.645	PK

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

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

Site: AC1	Time: 2014/11/20 - 16:32
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: IP Multimedia Phone	Power: AC 120V/60Hz
Note: Mode 2: Transmit by 802.11g at channel 2412MHz	

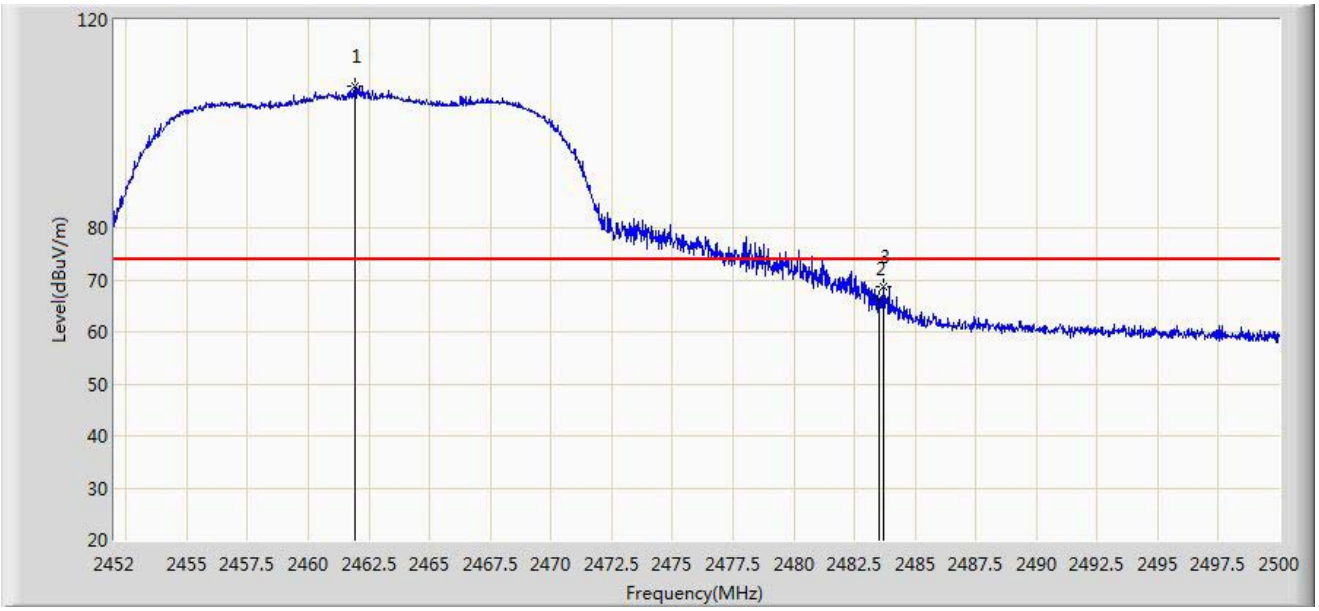


No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	49.648	18.964	-4.352	54.000	30.684	AV
2	*	2410.800	93.170	62.523	39.170	54.000	30.647	AV

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

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

Site: AC1	Time: 2014/11/20 - 16:33
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: IP Multimedia Phone	Power: AC 120V/60Hz
Note: Mode 2: Transmit by 802.11g at channel 2462MHz	

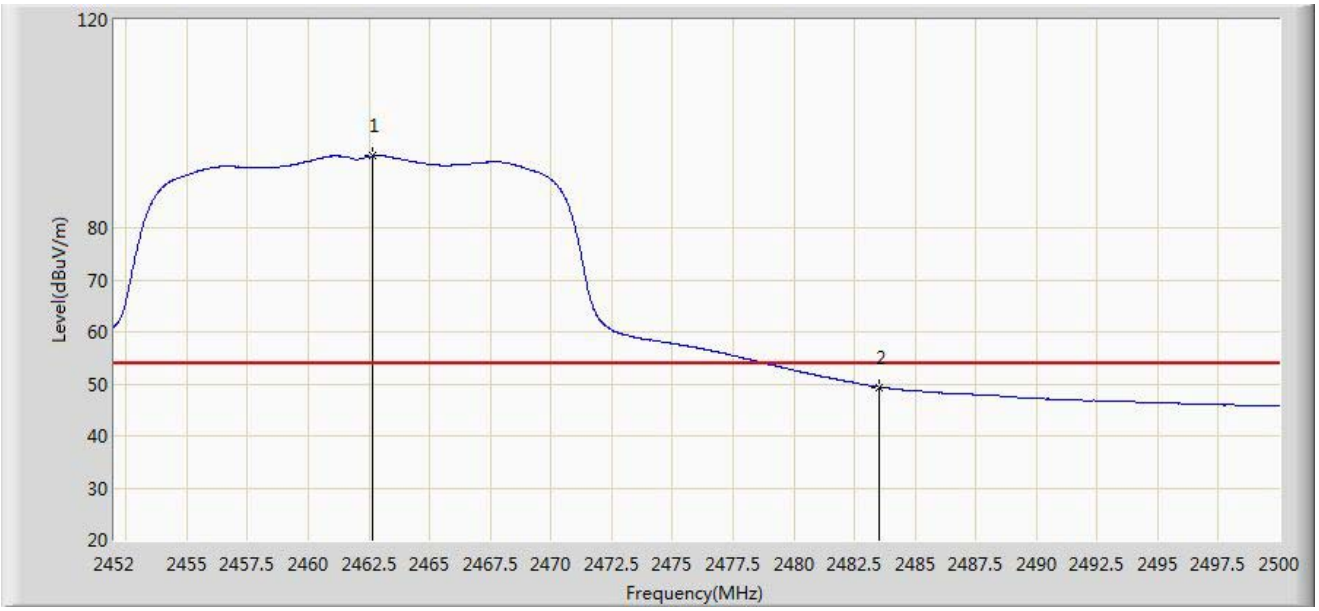


No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2461.912	107.315	76.704	33.315	74.000	30.611	PK
2		2483.500	66.364	35.691	-7.636	74.000	30.673	PK
3		2483.728	68.720	38.047	-5.280	74.000	30.673	PK

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

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

Site: AC1	Time: 2014/11/20 - 16:36
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: IP Multimedia Phone	Power: AC 120V/60Hz
Note: Mode 2: Transmit by 802.11g at channel 2462MHz	

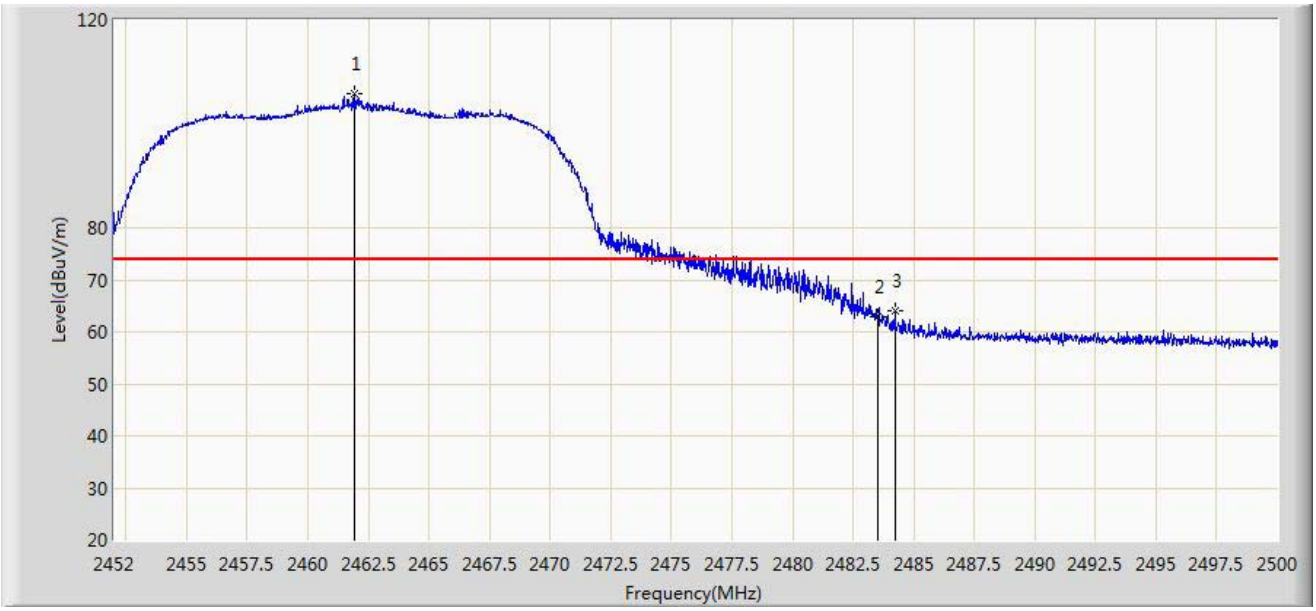


No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2462.656	93.775	63.162	39.775	54.000	30.613	AV
2		2483.500	49.420	18.747	-4.580	54.000	30.673	AV

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

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

Site: AC1	Time: 2014/11/20 - 16:37
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: IP Multimedia Phone	Power: AC 120V/60Hz
Note: Mode 2: Transmit by 802.11g at channel 2462MHz	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2461.912	105.815	75.204	31.815	74.000	30.611	PK
2		2483.500	62.777	32.104	-11.223	74.000	30.673	PK
3		2484.232	63.981	33.306	-10.019	74.000	30.675	PK

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

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

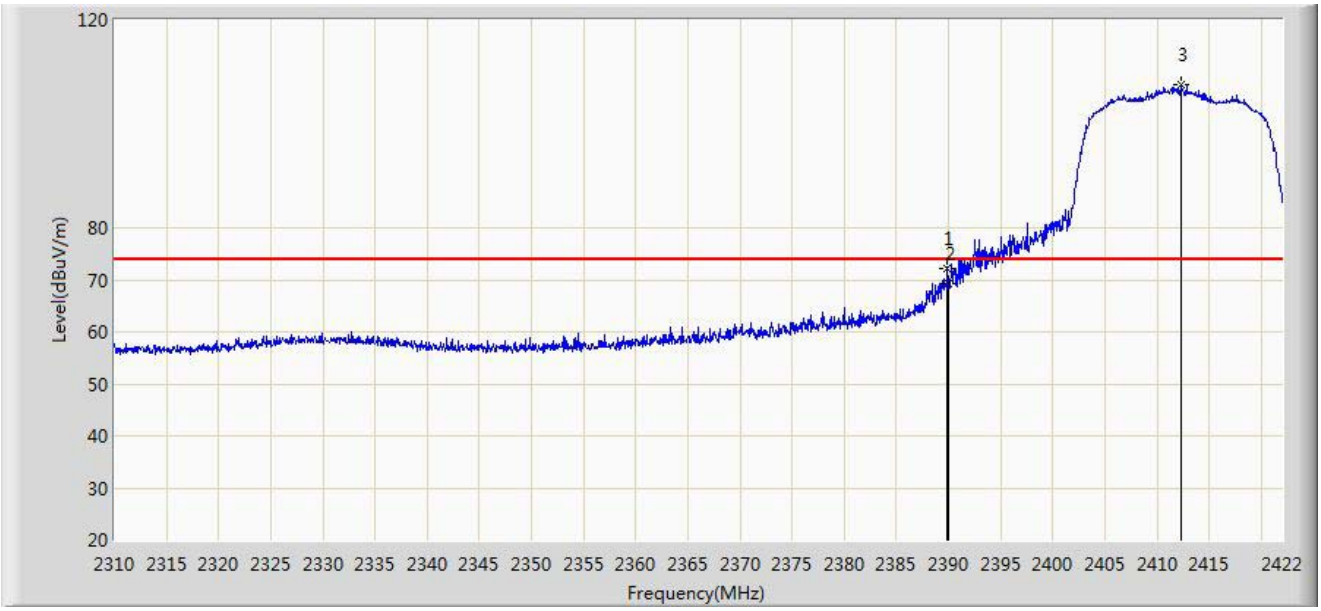
Site: AC1	Time: 2014/11/20 - 16:39
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: IP Multimedia Phone	Power: AC 120V/60Hz
Note: Mode 2: Transmit by 802.11g at channel 2462MHz	

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2461.384	91.676	61.066	37.676	54.000	30.611	AV
2		2483.500	46.655	15.982	-7.345	54.000	30.673	AV

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

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

Site: AC1	Time: 2014/11/20 - 16:40
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: IP Multimedia Phone	Power: AC 120V/60Hz
Note: Mode 3: Transmit by 802.11n-HT20 at channel 2412MHz	

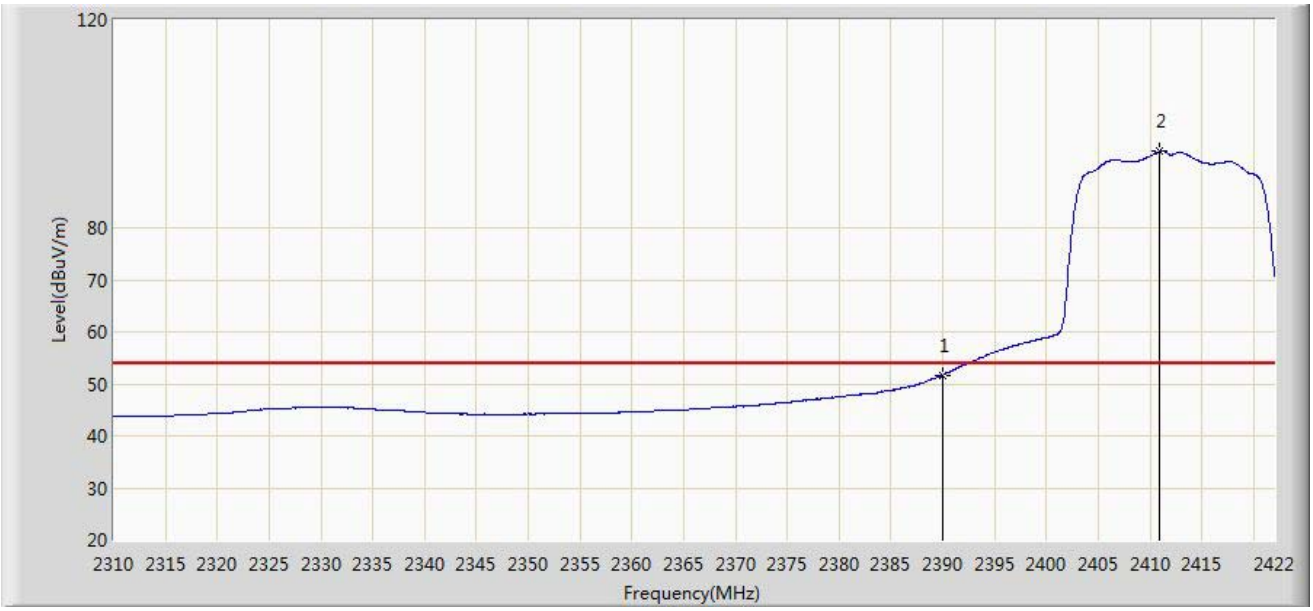


No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2389.856	72.256	41.572	-1.744	74.000	30.684	PK
2		2390.000	69.314	38.630	-4.686	74.000	30.684	PK
3	*	2412.256	107.623	76.979	33.623	74.000	30.644	PK

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

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

Site: AC1	Time: 2014/11/20 - 16:43
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: IP Multimedia Phone	Power: AC 120V/60Hz
Note: Mode 3: Transmit by 802.11n-HT20 at channel 2412MHz	

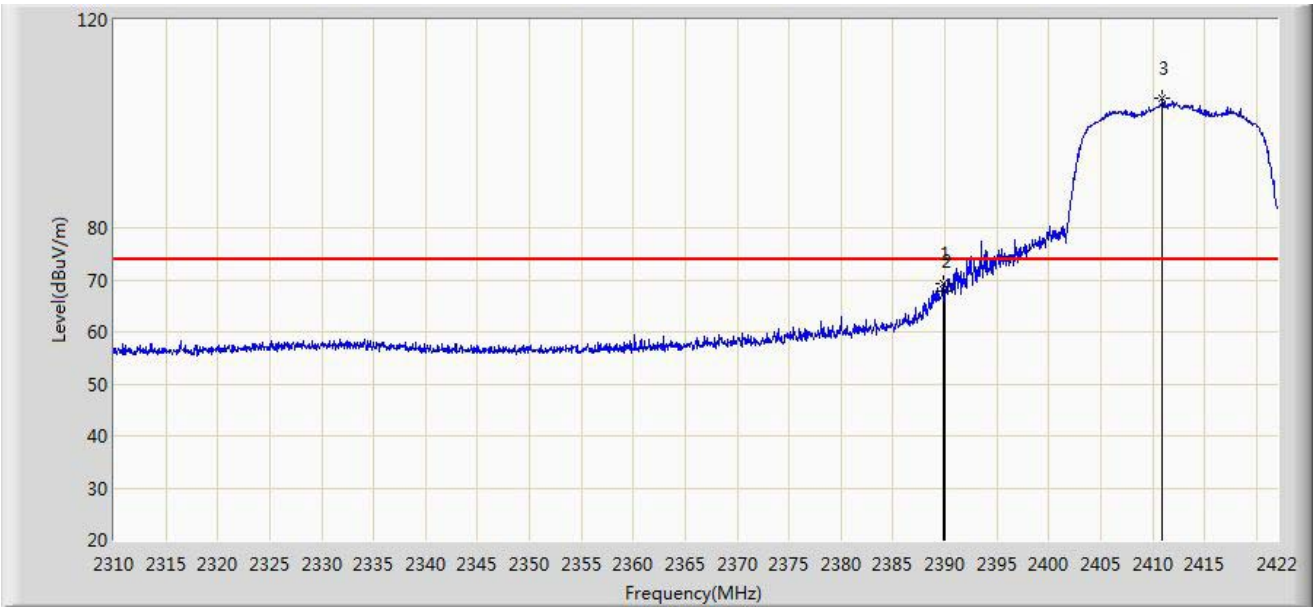


No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	51.712	21.028	-2.288	54.000	30.684	AV
2	*	2410.968	94.691	64.045	40.691	54.000	30.646	AV

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

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

Site: AC1	Time: 2014/11/20 - 16:44
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: IP Multimedia Phone	Power: AC 120V/60Hz
Note: Mode 3: Transmit by 802.11n-HT20 at channel 2412MHz	

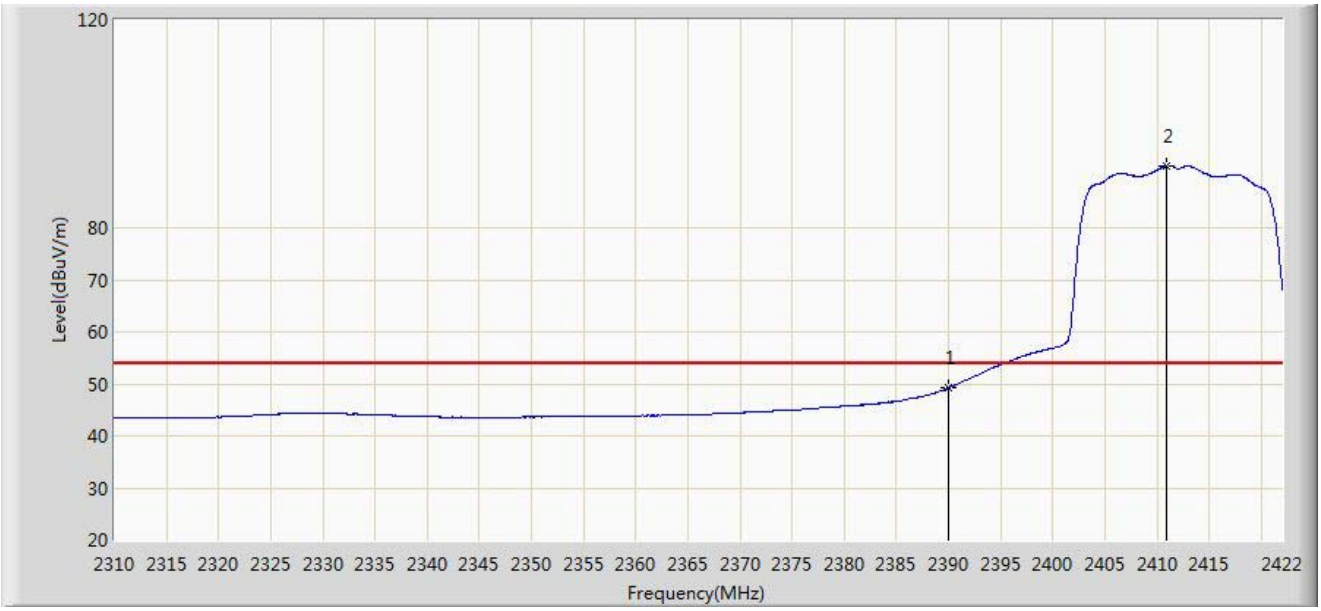


No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2389.800	69.336	38.652	-4.664	74.000	30.684	PK
2		2390.000	67.684	37.000	-6.316	74.000	30.684	PK
3	*	2410.968	104.789	74.143	30.789	74.000	30.646	PK

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

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

Site: AC1	Time: 2014/11/20 - 16:46
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: IP Multimedia Phone	Power: AC 120V/60Hz
Note: Mode 3: Transmit by 802.11n-HT20 at channel 2412MHz	

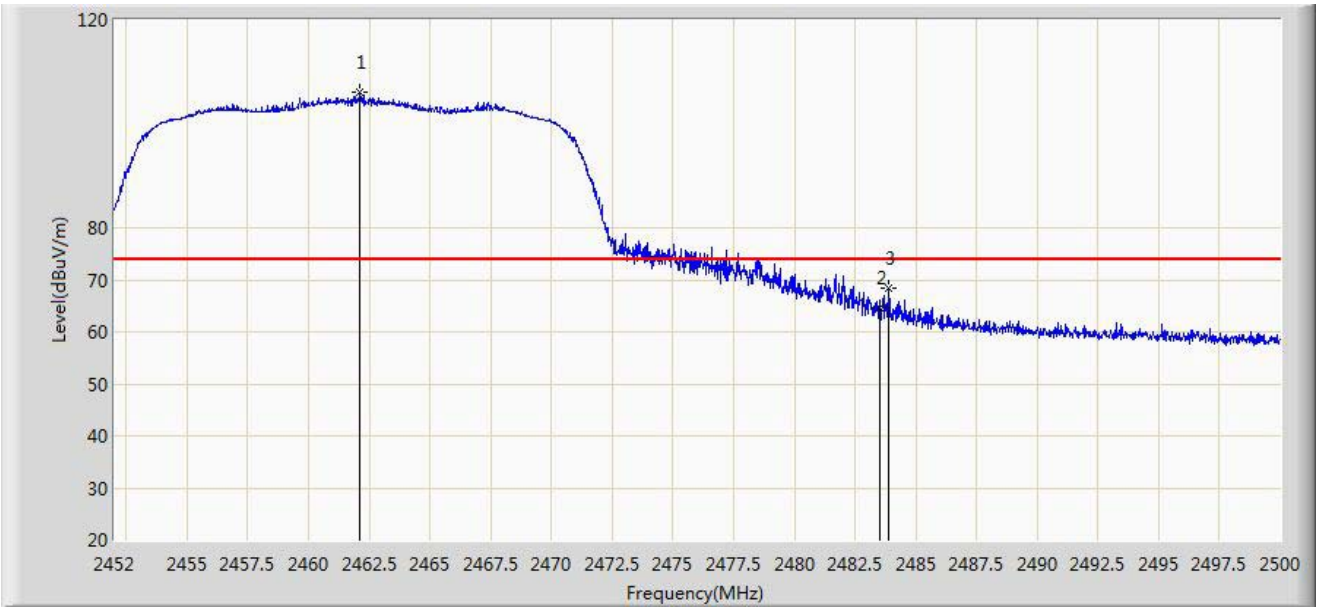


No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	49.246	18.562	-4.754	54.000	30.684	AV
2	*	2410.968	91.992	61.346	37.992	54.000	30.646	AV

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

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

Site: AC1	Time: 2014/11/20 - 16:47
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: IP Multimedia Phone	Power: AC 120V/60Hz
Note: Mode 3: Transmit by 802.11n-HT20 at channel 2462MHz	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2462.128	105.987	75.375	31.987	74.000	30.611	PK
2		2483.500	64.613	33.940	-9.387	74.000	30.673	PK
3		2483.872	68.530	37.856	-5.470	74.000	30.673	PK

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

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

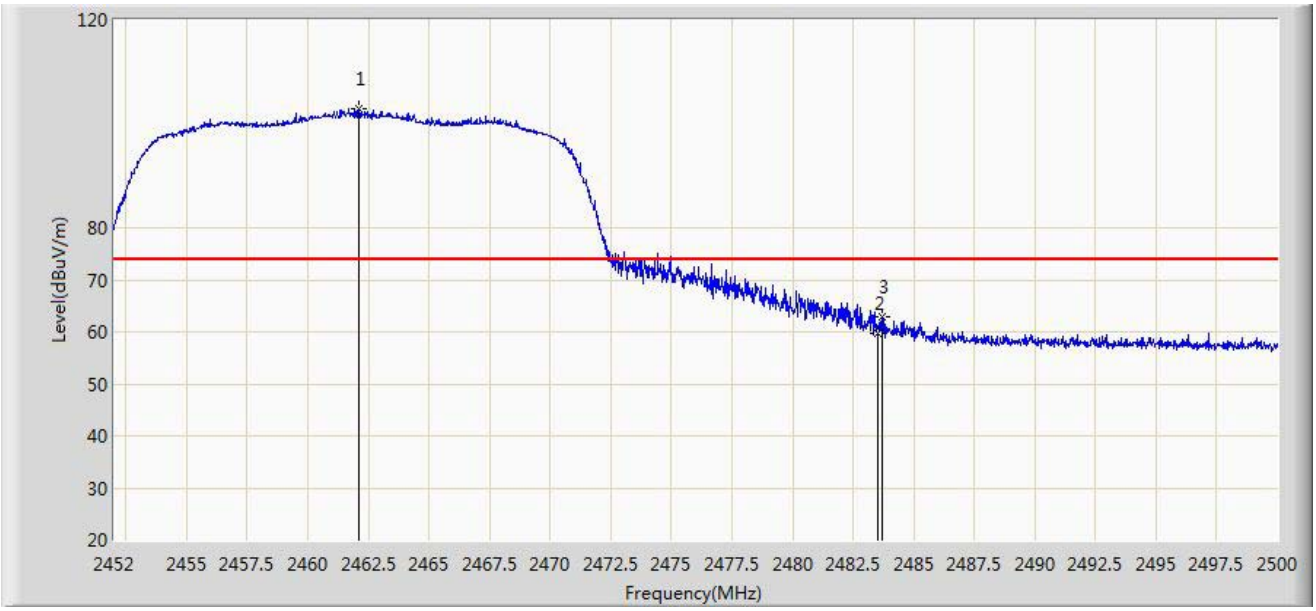
Site: AC1	Time: 2014/11/20 - 16:49
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: IP Multimedia Phone	Power: AC 120V/60Hz
Note: Mode 3: Transmit by 802.11n-HT20 at channel 2462MHz	

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2461.168	92.865	62.255	38.865	54.000	30.611	AV
2		2483.500	49.078	18.405	-4.922	54.000	30.673	AV

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

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

Site: AC1	Time: 2014/11/20 - 16:50
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: IP Multimedia Phone	Power: AC 120V/60Hz
Note: Mode 3: Transmit by 802.11n-HT20 at channel 2462MHz	

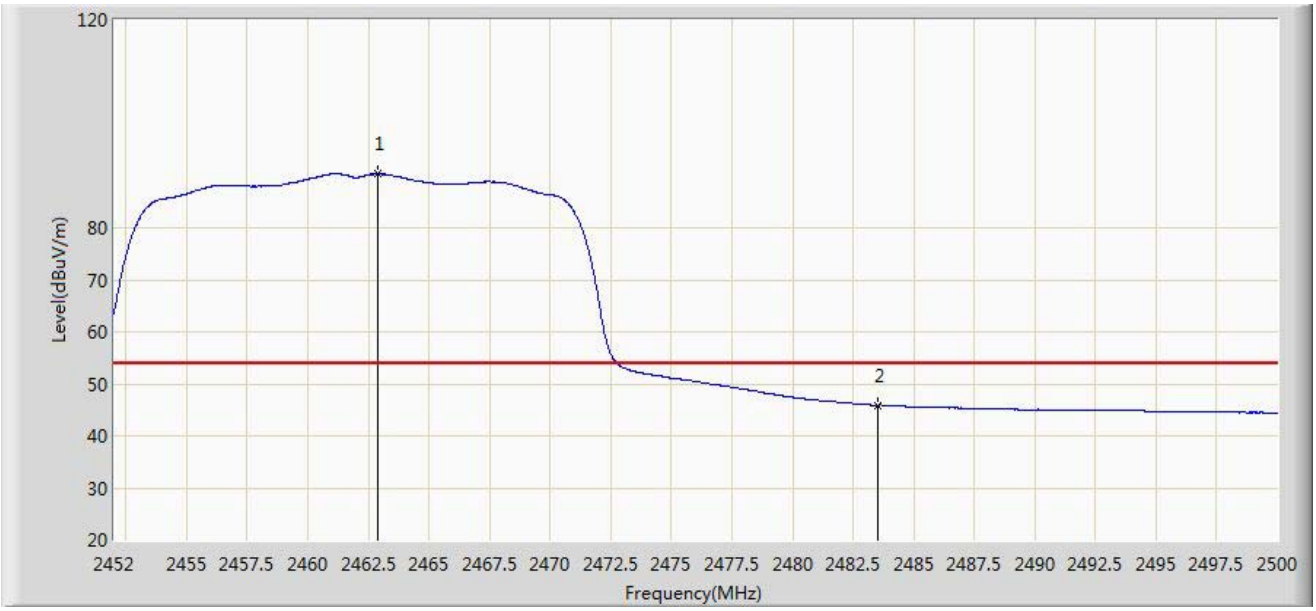


No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2462.128	102.795	72.183	28.795	74.000	30.611	PK
2		2483.500	59.851	29.178	-14.149	74.000	30.673	PK
3		2483.680	62.939	32.266	-11.061	74.000	30.673	PK

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

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

Site: AC1	Time: 2014/11/20 - 16:52
Limit: FCC_Part15.209_RE(3m)	Engineer: Milo Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: IP Multimedia Phone	Power: AC 120V/60Hz
Note: Mode 3: Transmit by 802.11n-HT20 at channel 2462MHz	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2462.872	90.350	59.737	36.350	54.000	30.613	AV
2		2483.500	45.915	15.242	-8.085	54.000	30.673	AV

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

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

7.8. AC Conducted Emissions Measurement

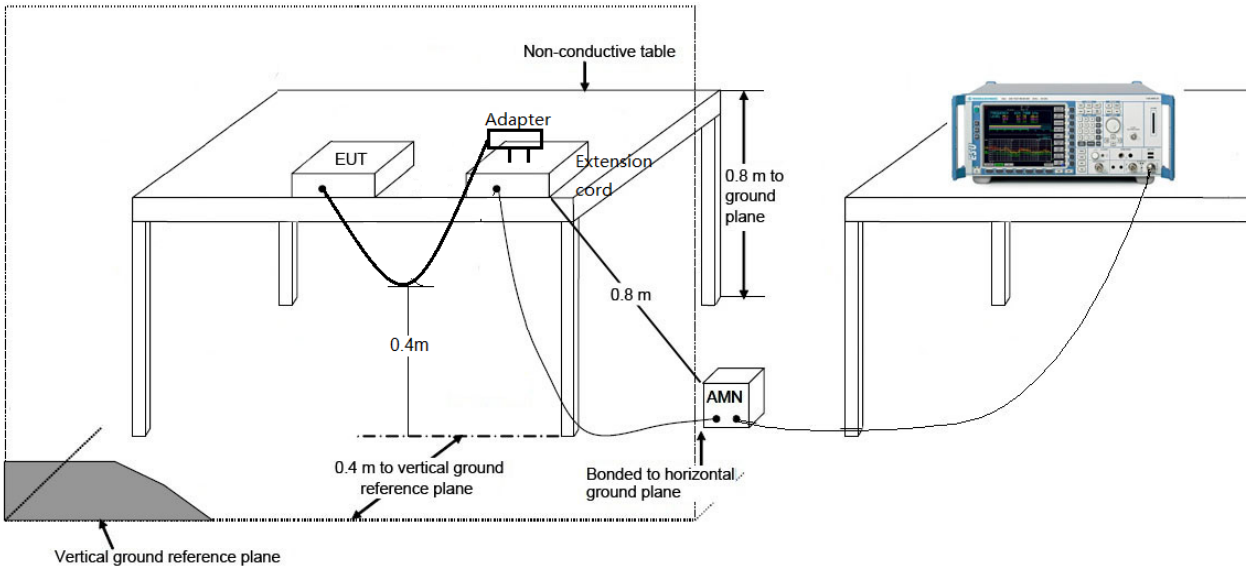
7.8.1. Test Limit

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.

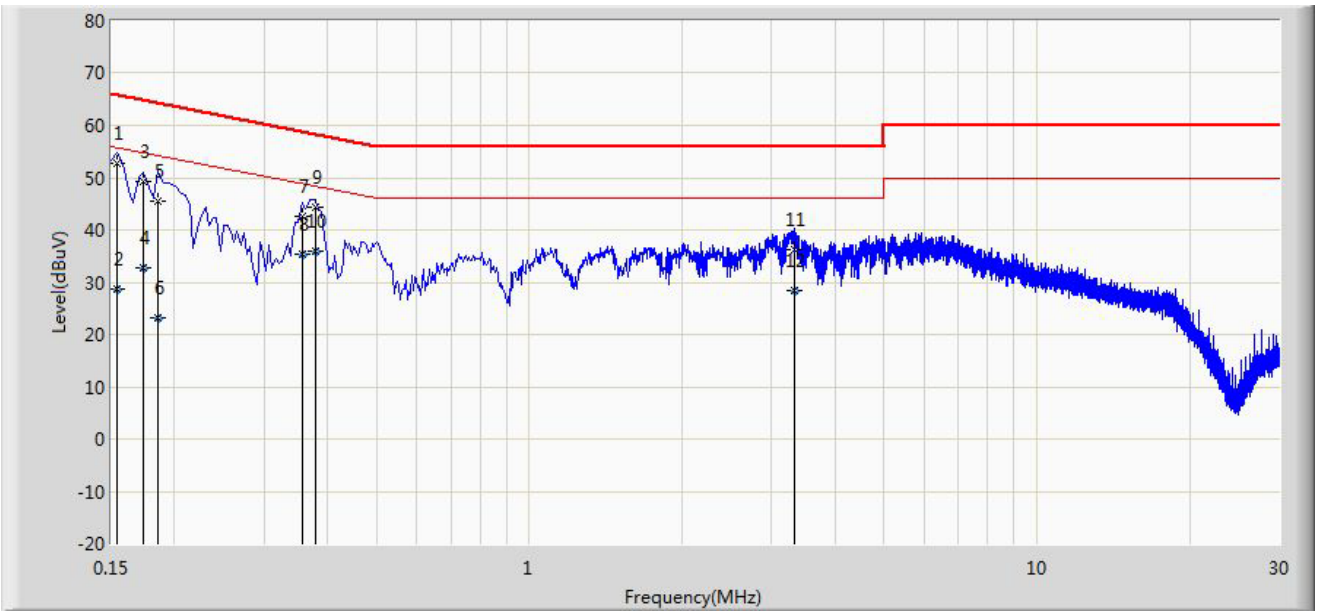
Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

7.8.2. Test Setup



7.8.3. Test Result

Site: SR2	Time: 2014/12/01 - 19:01
Limit: FCC_Part15.207_CE_AC Power	Engineer: Milo Li
Probe: ENV216_101683_Filter On	Polarity: Line
EUT: IP Multimedia Phone	Power: AC 120V/60Hz
Note: Mode1	

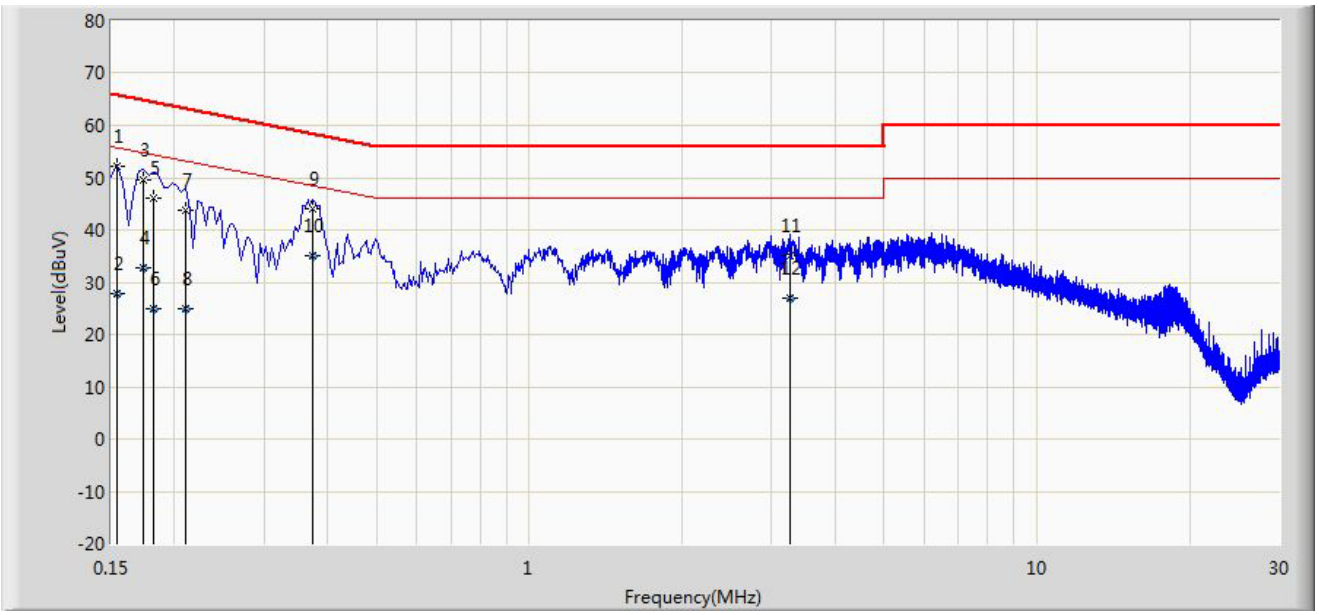


No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		0.154	52.863	42.124	-12.918	65.781	10.740	QP
2		0.154	28.786	18.046	-26.996	55.781	10.740	AV
3		0.174	49.372	39.304	-15.395	64.767	10.068	QP
4		0.174	32.676	22.609	-22.091	54.767	10.068	AV
5		0.186	45.491	35.452	-18.723	64.213	10.039	QP
6		0.186	23.086	13.047	-31.127	54.213	10.039	AV
7		0.358	42.736	32.684	-16.039	58.775	10.051	QP
8		0.358	35.298	25.247	-13.477	48.775	10.051	AV
9		0.378	44.346	34.279	-13.977	58.323	10.067	QP
10	*	0.378	36.082	26.015	-12.241	48.323	10.067	AV
11		3.318	36.286	26.392	-19.714	56.000	9.894	QP
12		3.318	28.444	18.550	-17.556	46.000	9.894	AV

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

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

Site: SR2	Time: 2014/12/01 - 19:05
Limit: FCC_Part15.207_CE_AC Power	Engineer: Milo Li
Probe: ENV216_101683_Filter On	Polarity: Neutral
EUT: IP Multimedia Phone	Power: AC 120V/60Hz
Note: Mode1	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		0.154	52.099	41.383	-13.683	65.781	10.716	QP
2		0.154	27.783	17.068	-27.998	55.781	10.716	AV
3		0.174	49.549	39.493	-15.218	64.767	10.057	QP
4		0.174	32.787	22.730	-21.980	54.767	10.057	AV
5		0.182	46.055	36.013	-18.339	64.394	10.042	QP
6		0.182	24.881	14.839	-29.513	54.394	10.042	AV
7		0.210	43.880	33.886	-19.325	63.205	9.995	QP
8		0.210	25.007	15.013	-28.198	53.205	9.995	AV
9		0.374	44.039	33.946	-14.372	58.412	10.093	QP
10	*	0.374	35.020	24.927	-13.391	48.412	10.093	AV
11		3.266	35.030	25.142	-20.970	56.000	9.888	QP
12		3.266	26.932	17.044	-19.068	46.000	9.888	AV

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

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

8. CONCLUSION

The data collected relate only the item(s) tested and show that the **IP Multimedia Phone FCC ID: YZZGXV3240D** is in compliance with Part 15C of the FCC Rules.

The End