

# FCC RADIO TEST REPORT

## FCC 47 CFR PART 15 SUBPART C

<b>Test Standard</b>	<b>FCC Part 15.247 and RSS-247 Issue 1</b>
<b>FCC ID</b>	<b>M82-AIM37</b>
<b>ISED No.</b>	<b>9404A-AIM37</b>
<b>Trade name</b>	<b>Advantech Co., Ltd</b>
<b>Product name</b>	<b>Computer</b>
<b>IC Model No.</b>	<b>AIM-37AT</b>
<b>FCC Model No.</b>	<b>AIM-37AT ; AIM-37ATxxxxxxxxxxxxxxxxxxx ; AIM37ATxxxxxxxxxxxxxxxxxxx (where "x" may be any alphanumeric character, "-" or blank for marketing purpose and no impact safety related critical components and constructions)</b>
<b>Test Result</b>	<b>Pass</b>

The test Result was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were given in ANSI C63.10: 2013 and compliance standards.

The test results of this report relate only to the tested sample (EUT) identified in this report.

The test Report of full or partial shall not copy. Without written approval of CCS. Inc.

The sample selected for test was production product and was provided by manufacturer.



Approved by:

Sam Chuang  
Manager

Reviewed by:

Zeus Chen  
Supervisor

## Revision History

Rev.	Issue Date	Revisions	Revised By
00	November 21, 2016	Initial Issue	Doris Chu

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# 1. GENERAL INFORMATION

## 1.1 EUT INFORMATION

Applicant	Advantech Co., Ltd. No. 1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei 114, Taiwan, R.O.C.				
Equipment	Computer				
IC Model Name	AIM-37AT				
IC Model Discrepancy		barcode scan	Card Reader,	OS	
	SKU 1	V	V	Win10 IoT Enterprise	
	SKU 2	X	X	Win10 IoT Enterprise	
	SKU 3	X	X	Android 6.0	
FCC Model Name	AIM-37AT ; AIM-37ATxxxxxxxxxxxxxxxxxx ; AIM37ATxxxxxxxxxxxxxxxxxx (where "x" may be any alphanumeric character, "-" or blank for marketing purpose and no impact safety related critical components and constructions)				
FCC Model Discrepancy	Model Name		Model Discrepancy		
	-		-	barcode scan	Card Reader, OS
	AIM-37AT	SKU 1	V	V	Win10 IoT Enterprise
		SKU 2	X	X	Win10 IoT Enterprise
		SKU 3	X	X	Android 6.0
AIM-37ATxxxxxxxxxxxxxxxxxx ; AIM37ATxxxxxxxxxxxxxxxxxx (where "x" may be any alphanumeric character, "-" or blank for marketing purpose and no impact safety related critical components and constructions)		All the model number was just for marketing purpose only.			
EUT Functions	IEEE 802.11bgn+BT+NFC				
Received Date	Nov. 01, 2016				
Date of Test	Nov 8, 2016 ~ Nov 15, 2016				
Output Power(W)	IEEE 802.11b mode: 0.079 IEEE 802.11g mode: 0.247 IEEE 802.11n HT 20 MHz mode: 0.192 IEEE 802.11n HT 40 MHz mode: 0.201				

Power Operation	<input checked="" type="checkbox"/> AC <input checked="" type="checkbox"/> Adapter : 120V/60Hz <input type="checkbox"/> DC Type : <input type="checkbox"/> Battery <input type="checkbox"/> DC Power Supply <input type="checkbox"/> External DC adapter
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**Remark:**

*All listed models are using an identical RF module with the only differences on number of key buttons mounted for additional functions.*

*Due to similarity of RF product constructions of given model series, only dedicated model as described in test report with the most complexity constructions was selected for testing and record.*

## 1.2 EUT CHANNEL INFORMATION

Frequency Range	2412MHz-2462MHz
Modulation Type	1. IEEE 802.11b mode: CCK 2. IEEE 802.11g mode: OFDM 3. IEEE 802.11n HT 20 MHz mode: OFDM 4. IEEE 802.11n HT 40 MHz mode: OFDM
Number of channel	1. IEEE 802.11b mode: 11 Channels 2. IEEE 802.11g mode: 11 Channels 3. IEEE 802.11n HT 20 MHz mode: 11 Channels 4. IEEE 802.11n HT 40 MHz mode: 9 Channels

**Remark:**

Refer as ANSI 63.10:2013 clause 5.6.1 Table 4 and RSS-GEN Table A1 for test channels

Number of frequencies to be tested		
Frequency range in which device operates	Number of frequencies	Location in frequency range of operation
<input type="checkbox"/> 1 MHz or less	1	Middle
<input type="checkbox"/> 1 MHz to 10 MHz	2	1 near top and 1 near bottom
<input checked="" type="checkbox"/> More than 10 MHz	3	1 near top, 1 near middle, and 1 near bottom

## 1.3 ANTENNA INFORMATION

<b>Antenna Category</b>	<input checked="" type="checkbox"/> Integral: antenna permanently attached <input type="checkbox"/> External dedicated antennas <input type="checkbox"/> External Unique antenna connector
<b>Antenna Type</b>	<input checked="" type="checkbox"/> PIFA <input type="checkbox"/> PCB <input type="checkbox"/> Dipole <input type="checkbox"/> Printed <input type="checkbox"/> Coils
<b>Antenna Gain</b>	1.13 dBi

## 1.4 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
AC Powerline Conducted Emission	+/- 1.2575
Emission bandwidth, 20dB bandwidth	+/- 1.4003
RF output power, conducted	+/- 1.1372
Power density, conducted	+/- 1.4003
3M Semi Anechoic Chamber / 30M~200M	+/- 4.0138
3M Semi Anechoic Chamber / 200M~1000M	+/- 3.9483
3M Semi Anechoic Chamber / 1G~8G	+/- 2.5975
3M Semi Anechoic Chamber / 8G~18G	+/- 2.6112
3M Semi Anechoic Chamber / 18G~26G	+/- 2.7389
3M Semi Anechoic Chamber / 26G~40G	+/- 2.9683
3M Semi Anechoic Chamber / 40G~60G	+/- 1.8509
3M Semi Anechoic Chamber / 60G~75G	+/- 1.9869
3M Semi Anechoic Chamber / 75G~110G	+/- 2.9651
3M Semi Anechoic Chamber / 110G~170G	+/- 2.7807
3M Semi Anechoic Chamber / 170G~220G	+/- 3.6437
3M Semi Anechoic Chamber / 220G~325G	+/- 4.2982

**Remark:**

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$
2. ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report.

## 1.5 FACILITIES AND TEST LOCATION

All measurement facilities used to collect the measurement data are located at  
No.11, Wugong 6th Rd., Wugu Dist., New Taipei City 24891, Taiwan. (R.O.C.)

Test site	Test Engineer	Remark
AC Conduction Room	Anderson Kuo	
Radiation	Kevin Kuo	
RF Conducted	Ian Tu	

**Remark:** The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

## 1.6 INSTRUMENT CALIBRATION

RF Conducted Test Site				
Equipment	Manufacturer	Model	S/N	Cal Due
Spectrum Analyzer 10Hz-40GHz	R&S	FSV 40	101073	07/31/2017

3M 966 Chamber Test Site				
Equipment	Manufacturer	Model	S/N	Cal Due
Spectrum Analyzer	Agilent	E4446A	US42510252	12/07/2016
Loop Ant	COM-POWER	AL-130	121051	02/24/2017
Bilog Antenna	Sunol Sciences	JB3	A030105	07/02/2017
Pre-Amplifier	EMEC	EM330	60609	06/07/2017
Horn Antenna	ETC	MCTD 1209	DRH13M02003	09/01/2017
Pre-Amplifier	MITEQ	AMF-6F-260400-40-8P	985646	01/13/2017
Horn Antenna	EMCO	3116	26370	01/14/2017
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R
Turn Table	CCS	CC-T-1F	N/A	N.C.R

AC Conducted Emissions Test Site				
Equipment	Manufacturer	Model	S/N	Cal Due
LISN	SCHWARZBECK	NSLK 8127	8127-541	11/22/2016
Receiver	R&S	ESCI	101073	08/19/2017

**Remark:** Each piece of equipment is scheduled for calibration once a year.



## 1.7 SUPPORT AND EUT ACCESSORIES EQUIPMENT



EUT Accessories Equipment					
No.	Equipment	Brand	Model	Series No.	FCC ID
1	Adapter	APD	WA-15105R	N/A	N/A

Support Equipment					
No.	Equipment	Brand	Model	Series No.	FCC ID
1	Ear phone	Logitech	H150	N/A	N/A
2	SD Card	Kingston	4GB	N/A	N/A

## 1.8 TEST METHODOLOGY AND APPLIED STANDARDS

The test methodology, setups and results comply with all requirements in accordance with ANSI C63.10:2013, FCC Part 2, FCC Part 15.247, KDB 558074 D01 v03r05, RSS-247 Issue 1 and RSS-GEN Issue 4.

## 1.9 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3M Semi Anechoic Chamber (FCC MRA: TW1039) to perform FCC Part 15 measurements	 FCC MRA: TW1039
Canada	Industry Canada	3M Semi Anechoic Chamber (IC 2324G-1 / IC 2324G-2) to perform	 IC 2324G-1 IC 2324G-2

## 2. TEST SUMMERY

<b>FCC Standard Section</b>	<b>IC Standard Section</b>	<b>Report Section</b>	<b>Test Item</b>	<b>Result</b>
15.203	-	1.2	Antenna Requirement	Pass
15.207(a)	RSS-GEN 8.8	4.1	AC Conducted Emission	Pass
15.247(a)(2)	RSS-247(5.2)(1)	4.2	6 dB Bandwidth	Pass
-	RSS-GEN 6.6	4.2	Occupied Bandwidth(99%)	Pass
15.247(b)	RSS-247(5.4)(4)	4.3	Output Power Measurement	Pass
15.247(e)	RSS-247(5.2)(2)	4.4	Power Spectral Density	Pass
15.247(d)	RSS-247(5.5)	4.5	Conducted Band Edge	Pass
15.247(d)	RSS-247(5.5)	4.5	Conducted Emission	Pass
15.247(d)	RSS-GEN 8.9, 8.10	4.6	Radiation Band Edge	Pass
15.247(d)	RSS-GEN 8.9, 8.10	4.6	Radiation Spurious Emission	Pass

### 3. DESCRIPTION OF TEST MODES

#### 3.1 THE WORST MODE OF OPERATING CONDITION

Operation mode	IEEE 802.11b mode :1Mbps IEEE 802.11g mode :6Mbps IEEE 802.11n HT20 mode :MCS0 IEEE 802.11n HT40 mode :MCS0
Test Channel Frequencies	<p><b>IEEE 802.11b mode :</b></p> <ol style="list-style-type: none"> <li>1. Lowest Channel : 2412MHz</li> <li>2. Middle Channel : 2437MHz</li> <li>3. Highest Channel : 2462MHz</li> </ol> <p><b>IEEE 802.11g mode :</b></p> <ol style="list-style-type: none"> <li>1. Lowest Channel : 2412MHz</li> <li>2. Middle Channel : 2437MHz</li> <li>3. Highest Channel : 2462MHz</li> </ol> <p><b>IEEE 802.11n HT20 mode :</b></p> <ol style="list-style-type: none"> <li>1. Lowest Channel : 2412MHz</li> <li>2. Middle Channel : 2437MHz</li> <li>3. Highest Channel : 2462MHz</li> </ol> <p><b>IEEE 802.11n HT40 mode :</b></p> <ol style="list-style-type: none"> <li>1. Lowest Channel : 2422MHz</li> <li>2. Middle Channel : 2437MHz</li> <li>3. Highest Channel : 2452MHz</li> </ol>

*Remark:*

1. EUT pre-scanned data rate of output power for each mode, the worst data rate were recorded in this report.
2. Baseline testing was performed on the two variants(MP60 and MP60S) to determine the worst case on all conducted test and radiated test. Therefore worst case is MP60.

### 3.2 THE WORST MODE OF MEASUREMENT

AC Power Line Conducted Emission	
Test Condition	AC Power line conducted emission for line and neutral
Voltage/Hz	120V/60Hz
Test Mode	<input checked="" type="checkbox"/> Mode 1:EUT power by AC adapter via USB cable.
Worst Mode	<input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4

Radiated Emission Measurement Above 1G	
Test Condition	Band edge, Emission for Unwanted and Fundamental
Voltage/Hz	120V/60Hz
Test Mode	<input checked="" type="checkbox"/> Mode 1:EUT power by AC adapter via USB cable.
Worst Mode	<input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4
Worst Position	<input type="checkbox"/> Placed in fixed position. <input checked="" type="checkbox"/> Placed in fixed position at X-Plane (E2-Plane) <input type="checkbox"/> Placed in fixed position at Y-Plane (E1-Plane) <input type="checkbox"/> Placed in fixed position at Z-Plane (H-Plane)
Worst Polarity	<input checked="" type="checkbox"/> Horizontal <input type="checkbox"/> Vertical

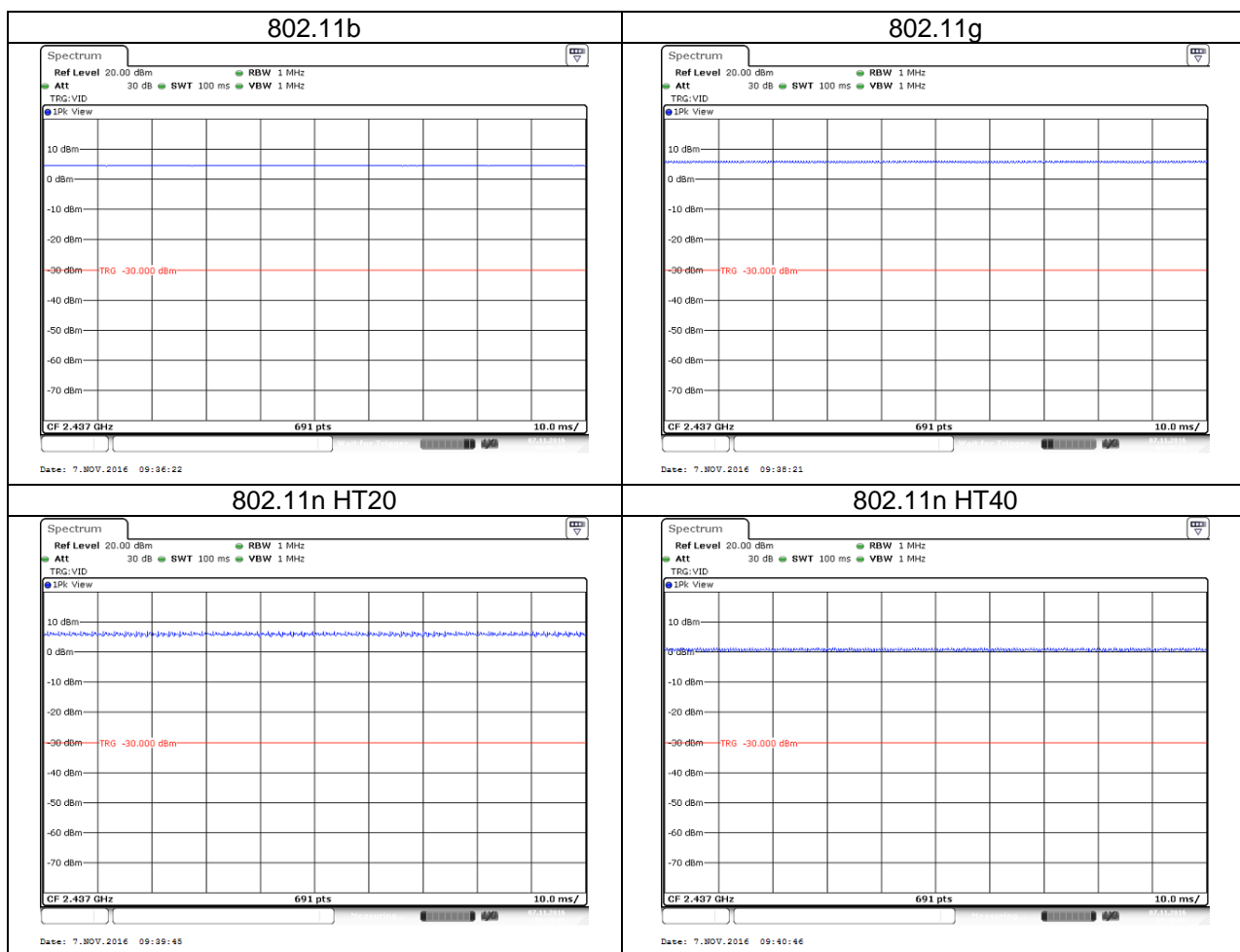
Radiated Emission Measurement Below 1G	
Test Condition	Radiated Emission Below 1G
Voltage/Hz	120V/60Hz
Test Mode	<input checked="" type="checkbox"/> Mode 1:EUT power by AC adapter via USB cable.
Worst Mode	<input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4

*Remark:*

1. The worst mode was record in this test report.
2. EUT pre-scanned in three axis ,X, Y, Z and two polarity, Horizontal and Vertical for radiated measurement. The worst case were recorded in this report.
3. For below 1G AC power line conducted emission and radiation emission were performed the EUT transmit at the highest output power channel as worse case.

### 3.3 EUT DUTY CYCLE

Duty Cycle				
Configuration	TX ON (ms)	TX ALL (ms)	Duty Cycle (%)	Duty Factor(dB)
802.11b	100	100	100%	0.00
802.11g	100	100	100%	0.00
802.11n HT20	100	100	100%	0.00
802.11n HT40	100	100	100%	0.00



## 4. TEST RESULT

### 4.1 AC POWER LINE CONDUCTED EMISSION

#### 4.1.1 Test Limit

According to §15.207(a) and RSS-GEN section 8.8,

Frequency Range (MHz)	Limits(dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

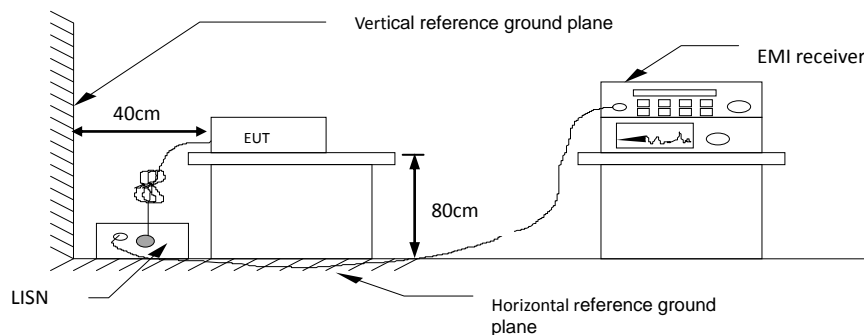
\* Decreases with the logarithm of the frequency.

#### 4.1.2 Test Procedure

Test method Refer as ANSI 63.10:2013 clause 6.2,

1. The EUT was placed on a non-conducted table, which is 0.8m above horizontal ground plane and 0.4m above vertical ground plane.
2. EUT connected to the line impedance stabilization network (LISN)
3. Receiver set RBW of 9kHz and Detector Peak, and note as quasi-peak and average.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. Recorded Line for Neutral and Line.

#### 4.1.3 Test Setup

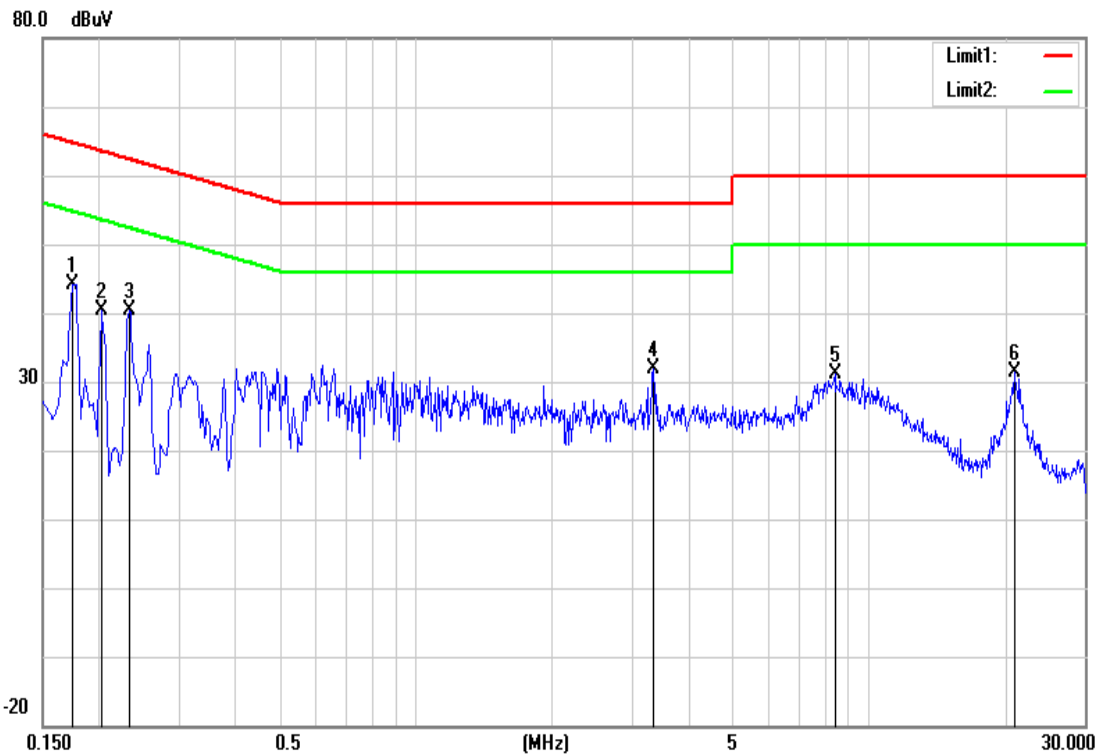


#### 4.1.4 Test Result

**Not applicable**

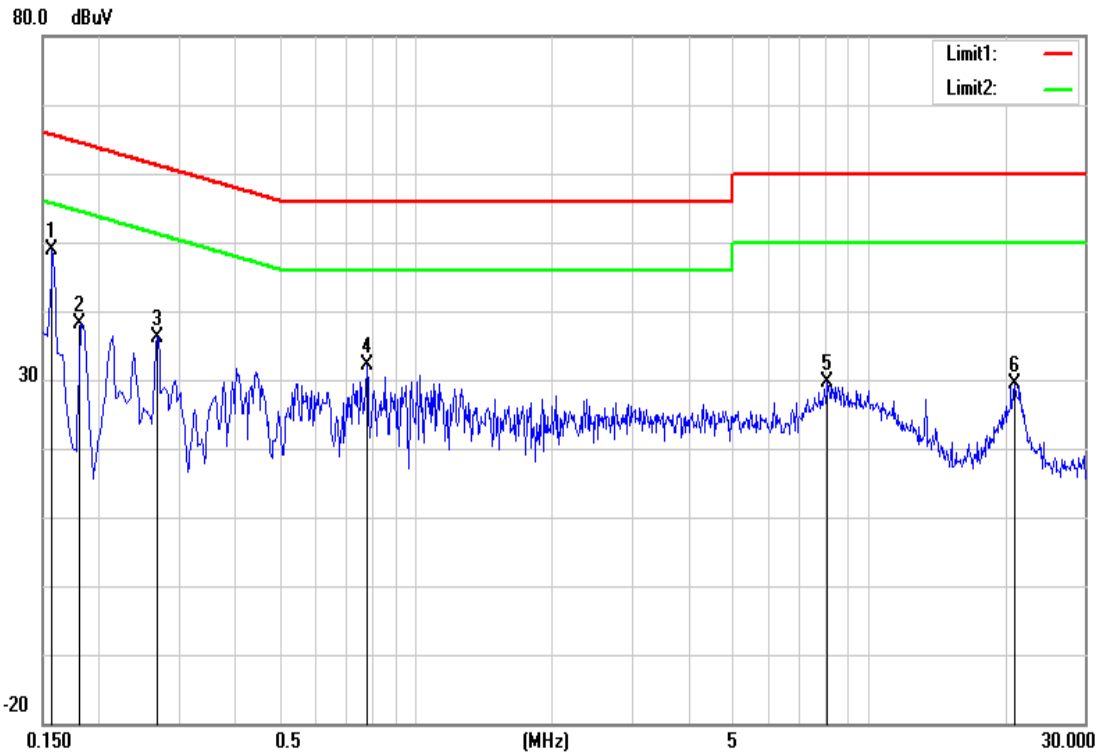
**Test Data**

Test Mode:	Mode 1	Temp/Hum	27(°C)/ 53%RH
Test Voltage:	120Vac / 60Hz	Test Date	Nov 15, 2016
Phase:	Line	Test Engineer	Anderson Kuo



Frequency (MHz)	Quasi Peak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	Quasi Peak result (dBuV)	Average result (dBuV)	Quasi Peak limit (dBuV)	Average limit (dBuV)	Quasi Peak margin (dB)	Average margin (dB)	Remark
0.1740	32.99	16.77	9.71	42.70	26.48	64.77	54.77	-22.07	-28.29	Pass
0.2020	20.72	6.10	9.70	30.42	15.80	63.53	53.53	-33.11	-37.73	Pass
0.2340	25.63	14.70	9.70	35.33	24.40	62.31	52.31	-26.98	-27.91	Pass
3.3620	12.48	6.95	9.74	22.22	16.69	56.00	46.00	-33.78	-29.31	Pass
8.4340	15.61	10.42	9.78	25.39	20.20	60.00	50.00	-34.61	-29.80	Pass
20.9500	14.27	8.30	9.87	24.14	18.17	60.00	50.00	-35.86	-31.83	Pass

Test Mode:	Mode 1	Temp/Hum	27(°C)/ 53%RH
Test Voltage:	120Vac / 60Hz	Test Date	Nov 15, 2016
Phase:	Neutral	Test Engineer	Anderson Kuo



Frequency (MHz)	Quasi Peak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	Quasi Peak result (dBuV)	Average result (dBuV)	Quasi Peak limit (dBuV)	Average limit (dBuV)	Quasi Peak margin (dB)	Average margin (dB)	Remark
0.1580	36.21	20.72	9.78	45.99	30.50	65.57	55.57	-19.58	-25.07	Pass
0.1820	24.05	10.83	9.77	33.82	20.60	64.39	54.39	-30.57	-33.79	Pass
0.2700	21.96	12.21	9.77	31.73	21.98	61.12	51.12	-29.39	-29.14	Pass
0.7820	16.29	8.77	9.76	26.05	18.53	56.00	46.00	-29.95	-27.47	Pass
8.1100	14.21	8.69	9.96	24.17	18.65	60.00	50.00	-35.83	-31.35	Pass
21.1060	13.76	7.64	10.28	24.04	17.92	60.00	50.00	-35.96	-32.08	Pass



## 4.2 6DB BANDWIDTH AND OCCUPIED BANDWIDTH(99%)

### 4.2.1 Test Limit

According to §15.247(a)(2) and RSS-247 section 5.2(1)

#### 6 dB Bandwidth :

Limit	Shall be at least 500kHz
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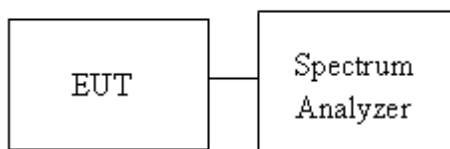
**Occupied Bandwidth(99%)** : For reporting purposes only.

### 4.2.2 Test Procedure

Test method Refer as KDB 558074 D01 v03r05, Section 8.1 and ANSI 63.10:2013 clause 6.9.2,

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT
3. SA set RBW = 100kHz, VBW = 300kHz and Detector = Peak, to measurement 6 dB Bandwidth and 99% Bandwidth.
4. Measure and record the result of 6 dB Bandwidth and 99% Bandwidth. in the test report.

### 4.2.3 Test Setup



### 4.2.4 Test Result

Test mode: IEEE 802.11b mode / 2412-2462 MHz				
Channel	Frequency (MHz)	OBW(99%) (MHz)	6dB BW (MHz)	6dB limit (kHz)
Low	2412	16.1070	10.1304	≥500
Mid	2437	15.6729	10.1304	
High	2462	15.4124	10.1304	

Test mode: IEEE 802.11g mode / 2412-2462 MHz				
Channel	Frequency (MHz)	OBW(99%) (MHz)	6dB BW (MHz)	6dB limit (kHz)
Low	2412	16.5412	16.6522	≥500
Mid	2437	16.5412	16.6522	
High	2462	16.5412	16.6522	

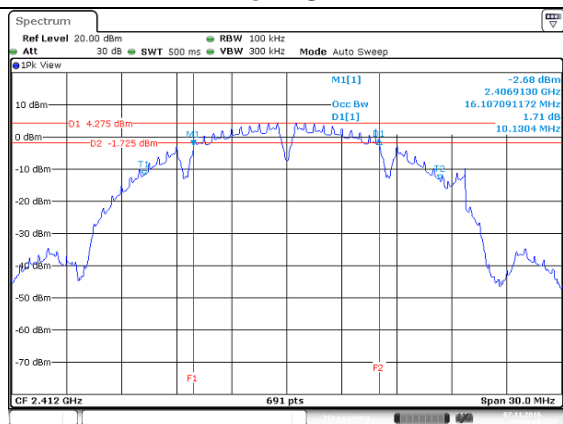
Test mode: IEEE 802.11n HT 20 MHz mode / 2412-2462 MHz				
Channel	Frequency (MHz)	OBW(99%) (MHz)	6dB BW (MHz)	6dB limit (kHz)
Low	2412	17.7134	17.8696	≥500
Mid	2437	17.7134	17.8696	
High	2462	17.7134	17.8696	

Test mode: IEEE 802.11n HT 40 MHz mode / 2422-2452 MHz				
Channel	Frequency (MHz)	OBW(99%) (MHz)	6dB BW (MHz)	6dB limit (kHz)
Low	2422	36.1215	36.638	≥500
Mid	2437	36.1215	36.638	
High	2452	36.1215	36.638	

**Test Data**

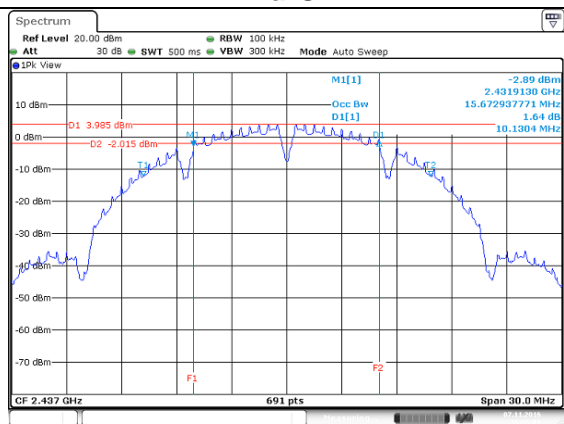
**IEEE 802.11b mode**

**Low CH**



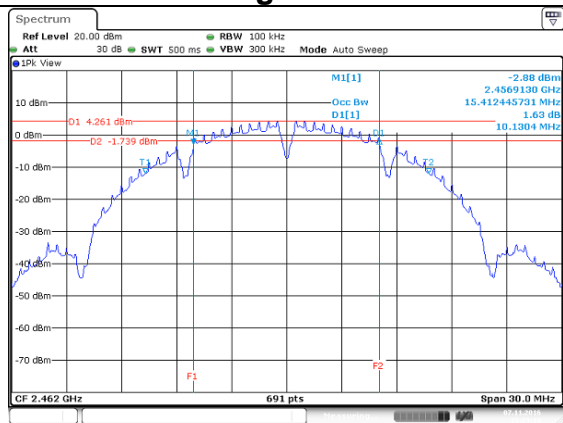
Date: 7.NOV.2016 15:18:21

**Mid CH**



Date: 7.NOV.2016 15:26:01

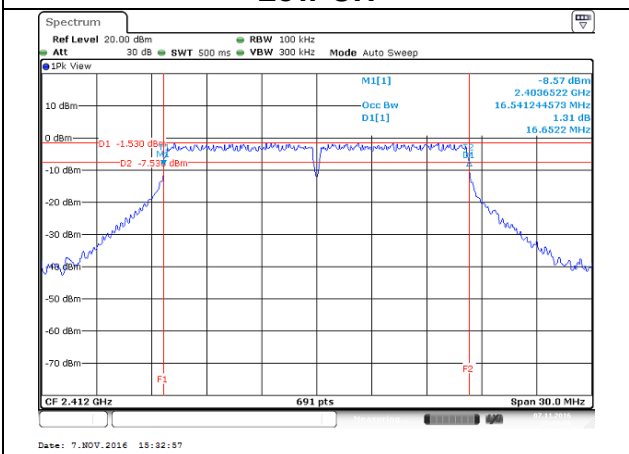
**High CH**



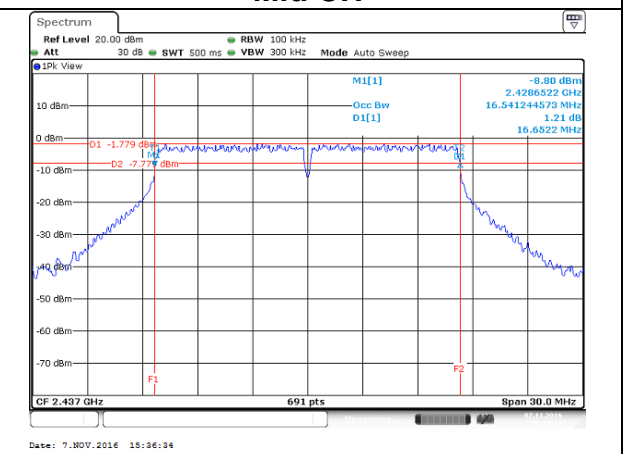
Date: 7.NOV.2016 15:29:17

IEEE 802.11g mode

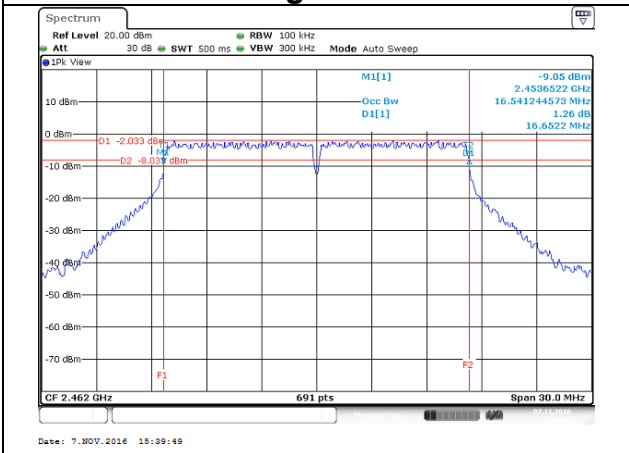
Low CH



Mid CH

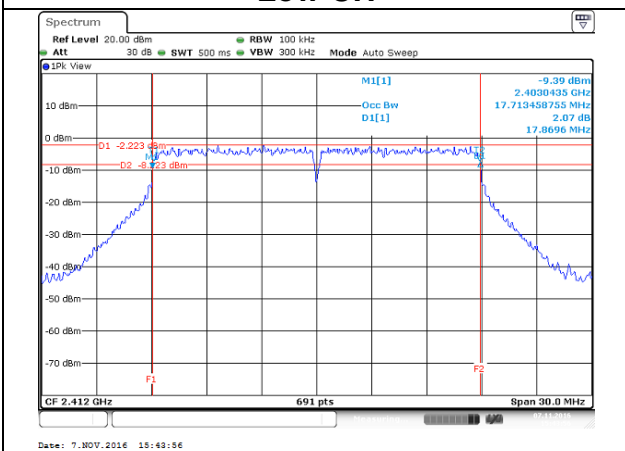


High CH

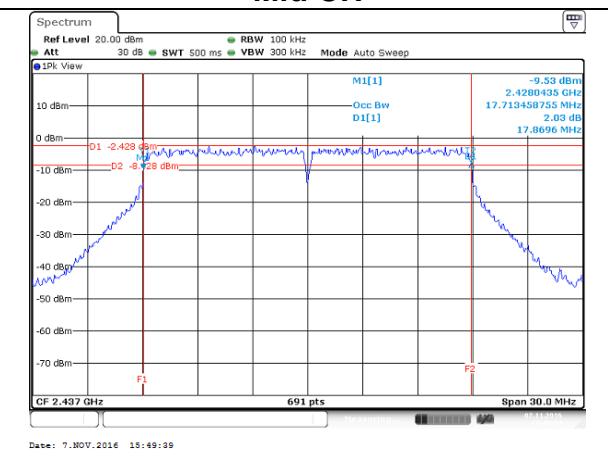


IEEE 802.11n HT20 mode

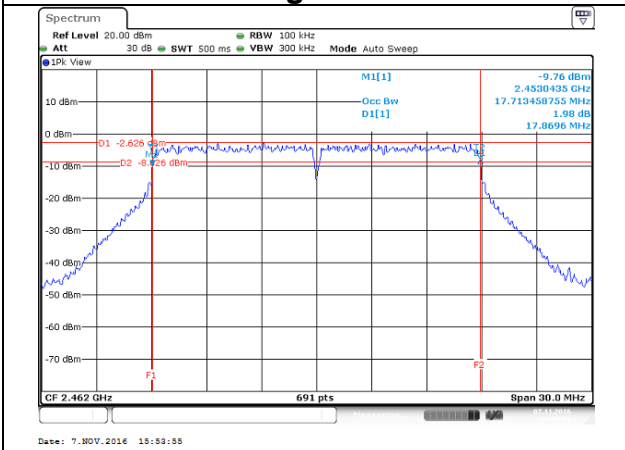
Low CH



Mid CH

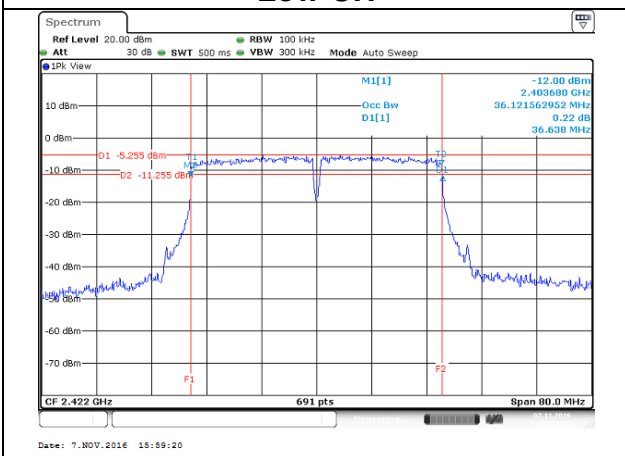


High CH

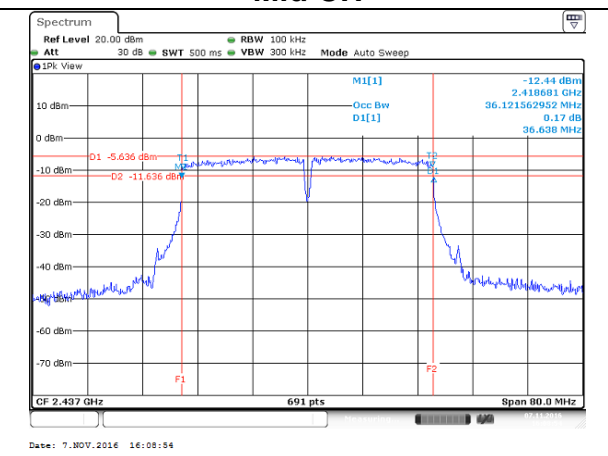


IEEE 802.11n HT40 mode

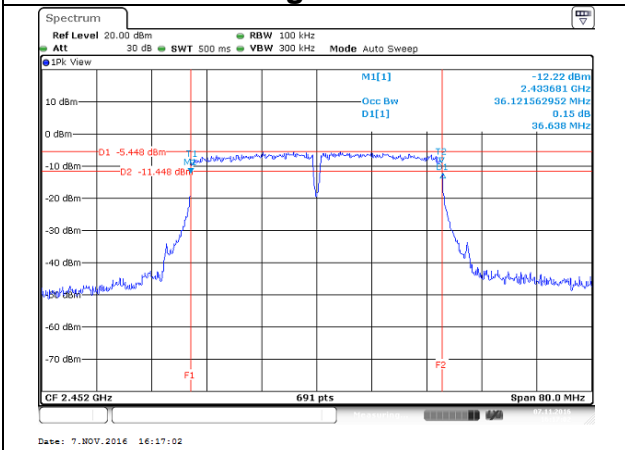
Low CH



Mid CH



High CH



## 4.3 OUTPUT POWER MEASUREMENT

### 4.3.1 Test Limit

According to §15.247(b) and RSS-247 section 5.4(4)

**Peak output power :**

For systems using digital modulation in the 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt(30 dBm), base on the use of antennas with directional gain not exceed 6 dBi If transmitting antennas of directional gain greater than 6dBi are used the peak output power the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

Limit	<input checked="" type="checkbox"/> Antenna not exceed 6 dBi : 30dBm <input type="checkbox"/> Antenna with DG greater than 6 dBi : [ Limit = 30 – (DG – 6)] <input type="checkbox"/> Point-to-point operation :
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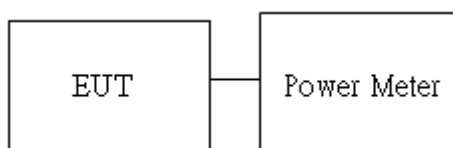
**Average output power** : For reporting purposes only.

### 4.3.2 Test Procedure

Test method Refer as KDB 558074 D01 v03r05, Section 9.1.2.

1. The EUT RF output connected to the power meter by RF cable.
2. Setting maximum power transmit of EUT.
3. The path loss was compensated to the results for each measurement.
4. Measure and record the result of Peak output power and Average output power. in the test report.

### 4.3.3 Test Setup



### 4.3.4 Test Result

**Peak output power :**

Wifi 2.4G Mode							
Config.	CH	Freq. (MHz)	PK Power (dBm)	EIRP PK Power (dBm)	PK Power (W)	EIRP PK Power (W)	FCC/IC Limit (dBm)
IEEE 802.11b Data rate: 1Mbps	1	2412	18.75	19.88	0.0750	0.0973	30
	6	2437	18.74	19.87	0.0748	0.0971	
	11	2462	18.98	20.11	0.0791	0.1026	
IEEE 802.11g Data rate: 6Mbps	1	2412	23.78	24.91	0.2388	0.3097	
	6	2437	23.85	24.98	0.2427	0.3148	
	11	2462	23.81	24.94	0.2404	0.3119	
IEEE 802.11n HT20 Data rate: MCS0	1	2412	22.84	23.97	0.1923	0.2495	
	6	2437	22.83	23.96	0.1919	0.2489	
	11	2462	22.81	23.94	0.1910	0.2477	
IEEE 802.11n HT40 Data rate: MCS0	3	2422	23.05	24.18	0.2018	0.2618	
	6	2437	22.81	23.94	0.1910	0.2477	
	9	2452	22.98	24.11	0.1986	0.2576	



**Average output power :**

Wifi 2.4G Mode			
Config.	CH	Freq. (MHz)	AV Power (dBm)
IEEE 802.11b Data rate: 1Mbps	1	2412	16.53
	6	2437	16.50
	11	2462	16.74
IEEE 802.11g Data rate: 6Mbps	1	2412	14.87
	6	2437	14.80
	11	2462	14.62
IEEE 802.11n HT20 Data rate: MCS0	1	2412	13.87
	6	2437	13.83
	11	2462	13.65
IEEE 802.11n HT40 Data rate: MCS0	3	2422	13.93
	6	2437	13.54
	9	2452	13.73

## 4.4 POWER SPECTRAL DENSITY

### 4.4.1 Test Limit

According to §15.247(e) and RSS-247 section 5.2(2)

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

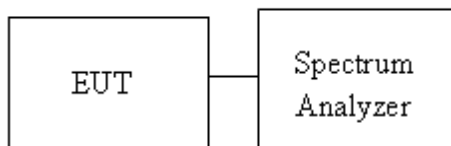
Limit	<input checked="" type="checkbox"/> Antenna not exceed 6 dBi : 8dBm <input type="checkbox"/> Antenna with DG greater than 6 dBi : 8dBm [ Limit = 8 – (DG – 6)] <input type="checkbox"/> Point-to-point operation :
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### 4.4.2 Test Procedure

Test method Refer as KDB 558074 D01 v03r05, Section 10.2

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT
3. SA set RBW = 3kHz, VBW = 30kHz, Span = 1.5 times DTS Bandwidth (6 dB BW), Detector = Peak, Sweep Time = Auto and Trace = Max hold.
4. The path loss and Duty Factor were compensated to the results for each measurement by SA.
5. Mark the maximum level.
6. Measure and record the result of power spectral density. in the test report.

### 4.4.3 Test Setup



#### 4.4.4 Test Result

<b>Test mode: IEEE 802.11b mode / 2412-2462 MHz</b>			
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>PSD (dBm)</b>	<b>IC/FCC Limit (dBm)</b>
Low	2412	-14.81	8
Mid	2437	-14.40	
High	2462	-14.63	

<b>Test mode: IEEE 802.11g mode / 2412-2462 MHz</b>			
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>PSD (dBm)</b>	<b>IC/FCC Limit (dBm)</b>
Low	2412	-14.76	8
Mid	2437	-15.00	
High	2462	-15.21	

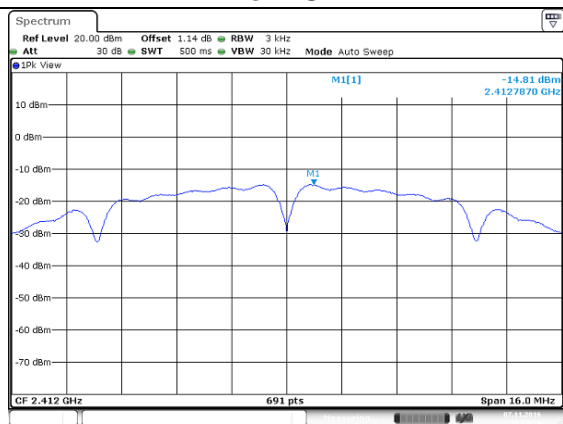
<b>Test mode: IEEE 802.11n HT 20 MHz mode / 2412-2462 MHz</b>			
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>PSD (dBm)</b>	<b>IC/FCC Limit (dBm)</b>
Low	2412	-14.89	8
Mid	2437	-14.04	
High	2462	-15.25	

<b>Test mode: IEEE 802.11n HT 40 MHz mode / 2422-2452 MHz</b>			
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>PSD (dBm)</b>	<b>IC/FCC Limit (dBm)</b>
Low	2422	-15.28	8
Mid	2437	-15.61	
High	2452	-15.42	

**Test Data**

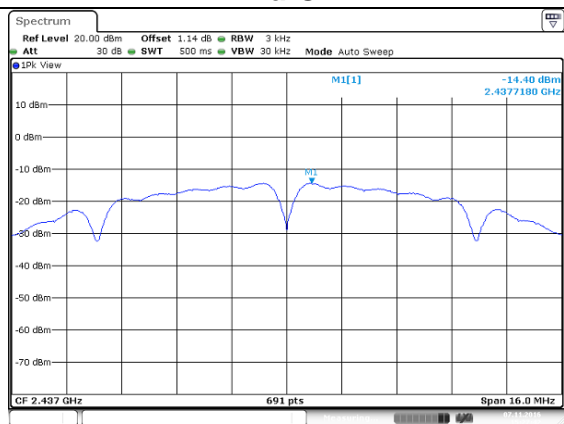
**IEEE 802.11b mode**

**Low CH**



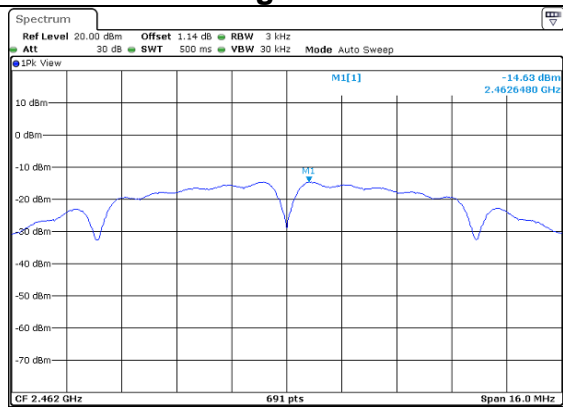
Date: 7.NOV.2016 15:23:18

**Mid CH**

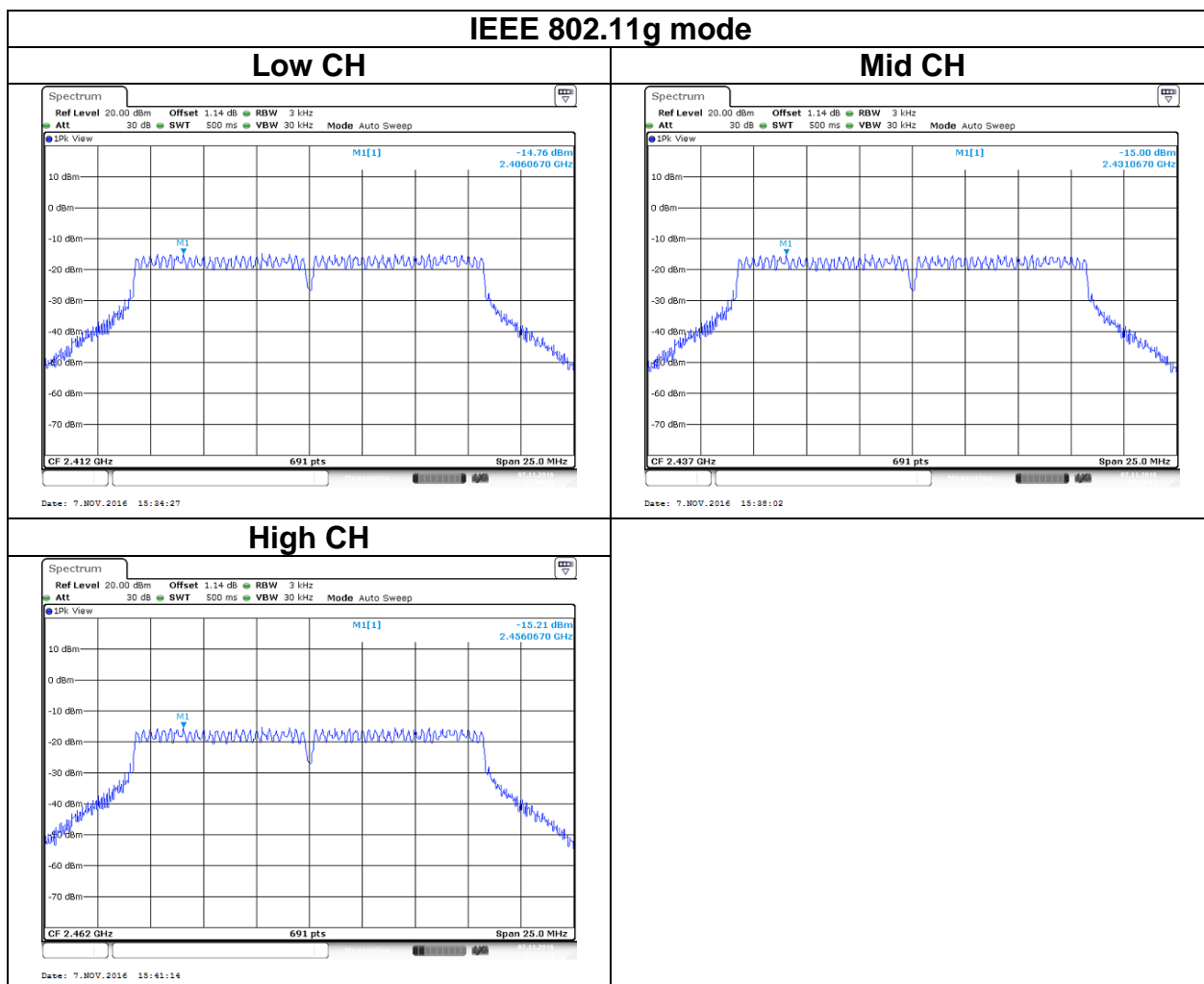


Date: 7.NOV.2016 15:27:42

**High CH**

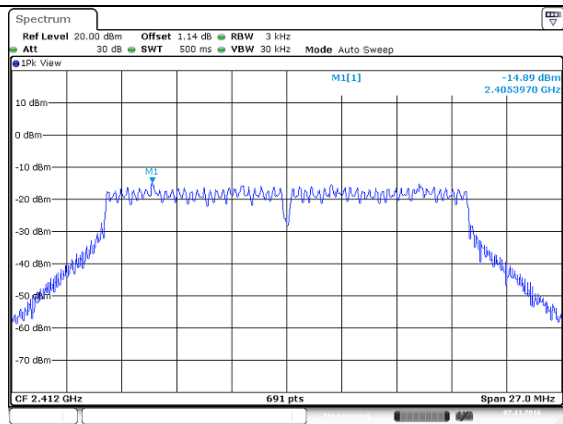


Date: 7.NOV.2016 15:30:46



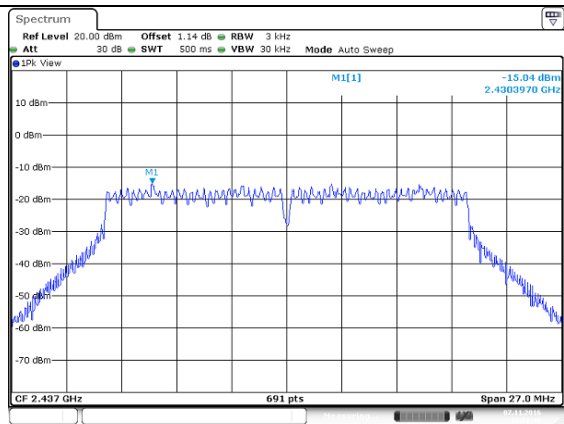
**IEEE 802.11n HT20 mode**

**Low CH**



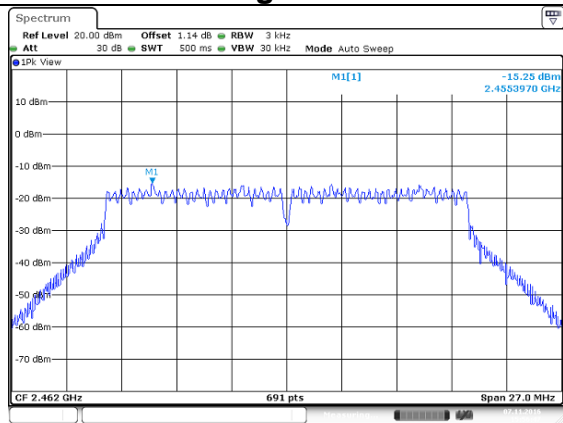
Date: 7.NOV.2016 15:46:21

**Mid CH**



Date: 7.NOV.2016 15:51:46

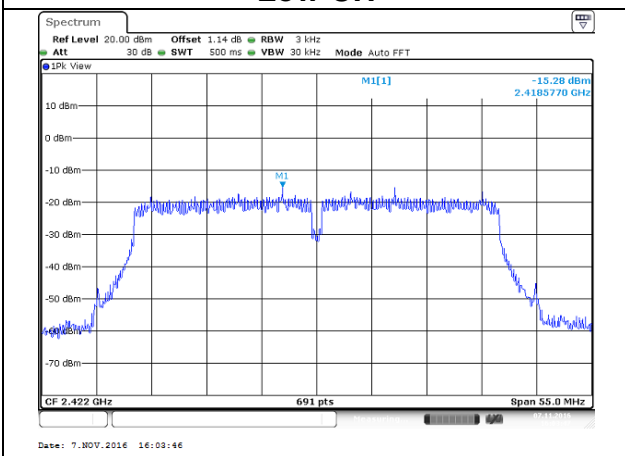
**High CH**



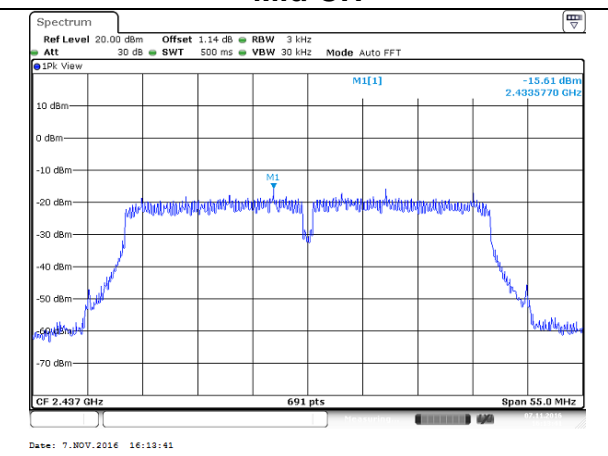
Date: 7.NOV.2016 15:56:47

**IEEE 802.11n HT40 mode**

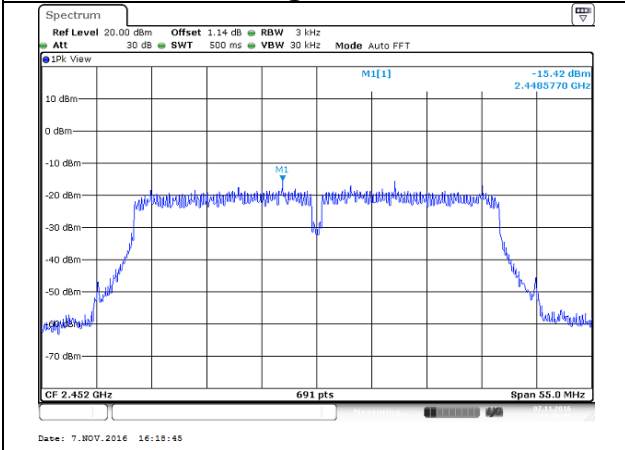
**Low CH**



**Mid CH**



**High CH**



## 4.5 CONDUCTED BANDEDGE AND SPURIOUS EMISSION

### 4.5.1 Test Limit

According to §15.247(d) and RSS-247 section 5.5

In any 100 kHz bandwidth outside the authorized frequency band,

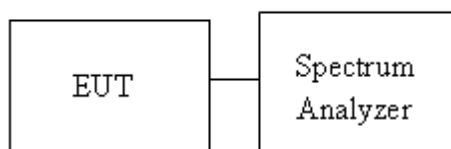
Non-restricted bands shall be attenuated at least 20 dB/30 dB relative to the maximum PSD level in 100 kHz by RF conducted or a radiated measurement which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

### 4.5.2 Test Procedure

Test method Refer as KDB 558074 D01 v03r05, Section 11.

1. EUT RF output port connected to the SA by RF cable, and the path loss was compensated to result.
2. SA setting, RBW=100kHz, VBW=300kHz, Detector=Peak, Trace mode = max hold, SWT = Auto.
3. In any 100 kHz bandwidth outside the authorized frequency band, shall be attenuated at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when conducted power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

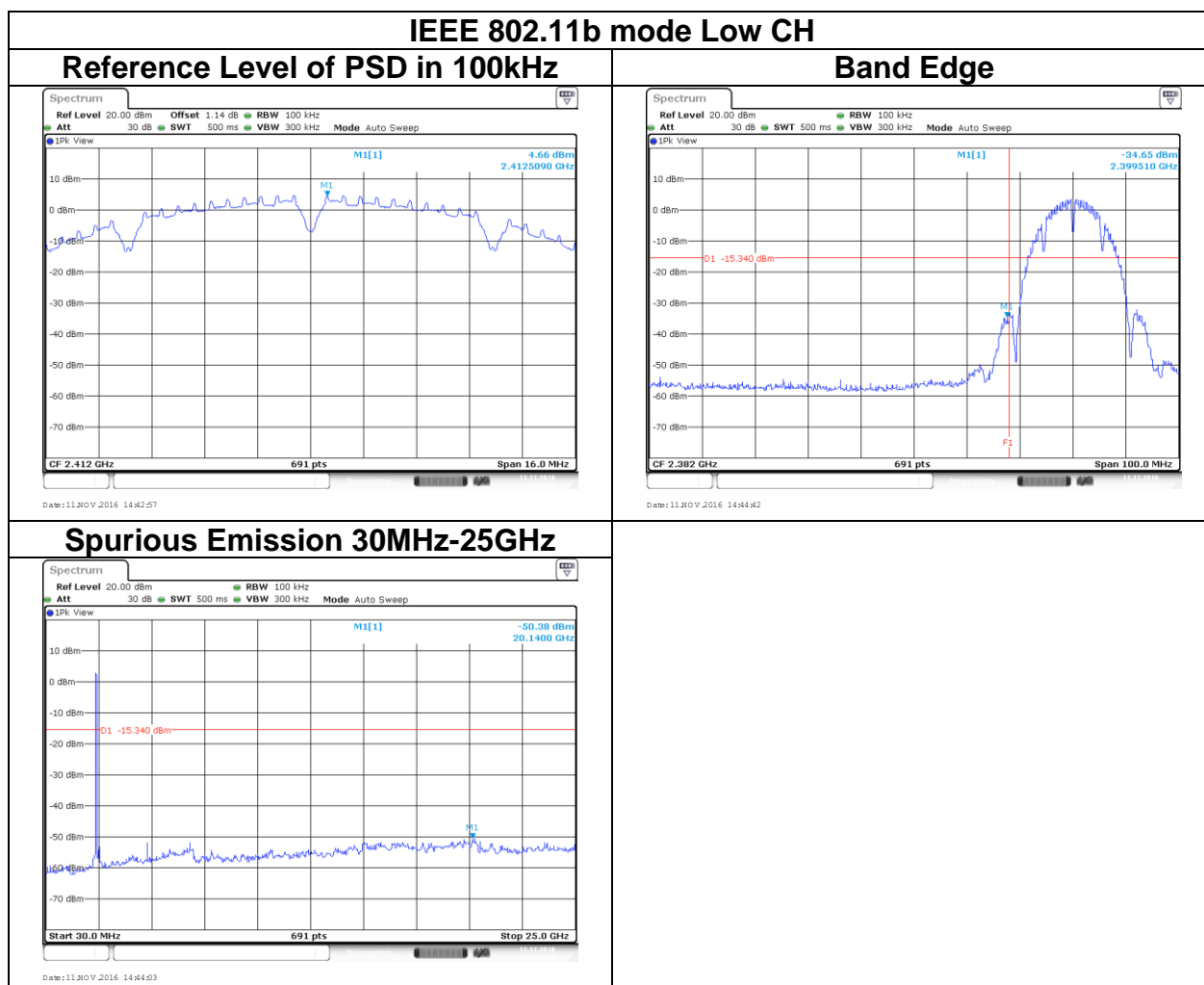
### 4.5.3 Test Setup

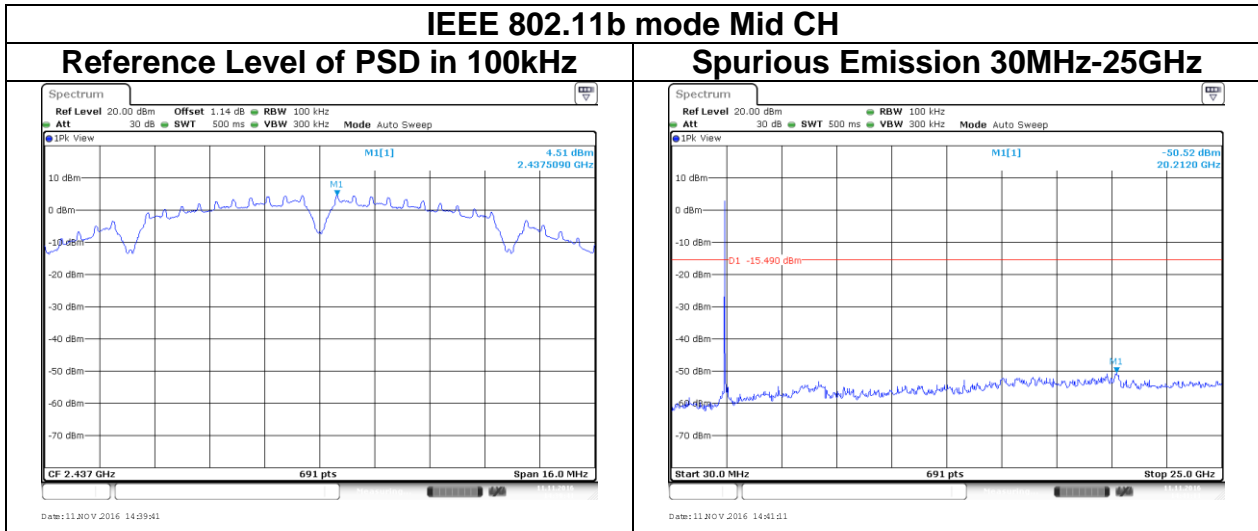




### 4.5.4 Test Result

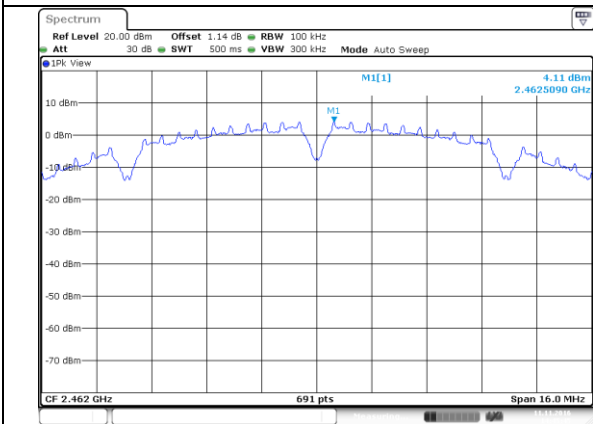
#### Test Data





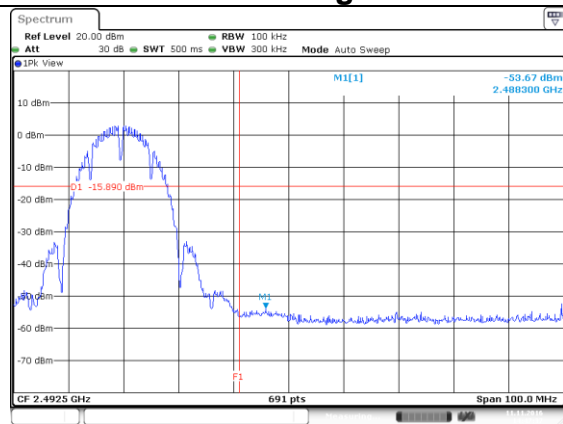
**IEEE 802.11b mode High CH**

**Reference Level of PSD in 100kHz**



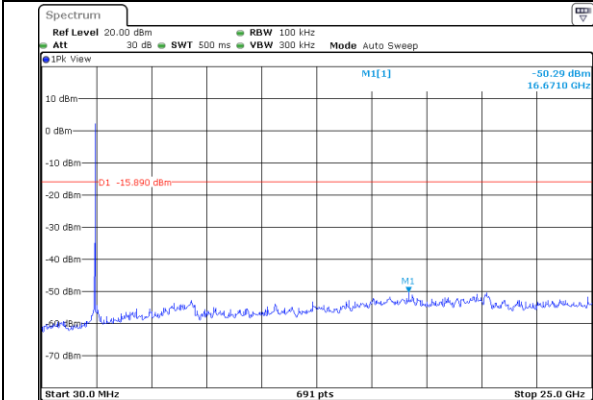
Date: 11 NOV 2016 14:45:45

**Band Edge**



Date: 11 NOV 2016 14:47:28

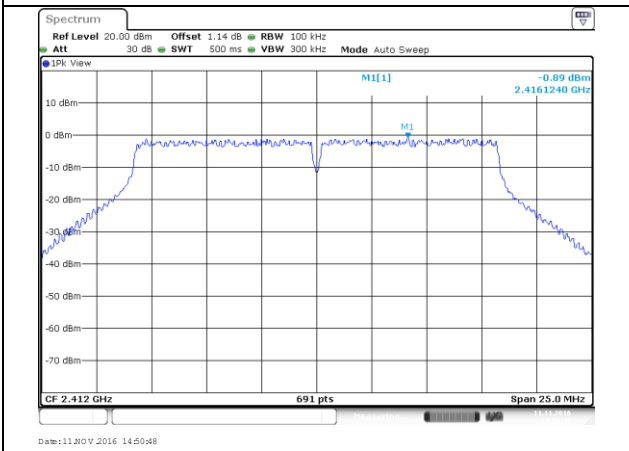
**Spurious Emission 30MHz-25GHz**



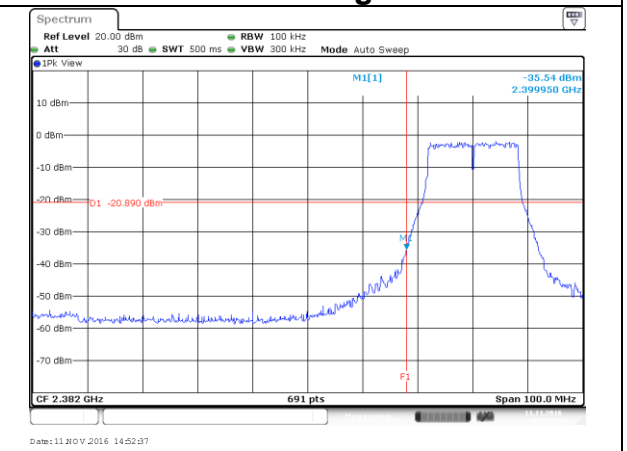
Date: 11 NOV 2016 14:46:40

**IEEE 802.11g mode Low CH**

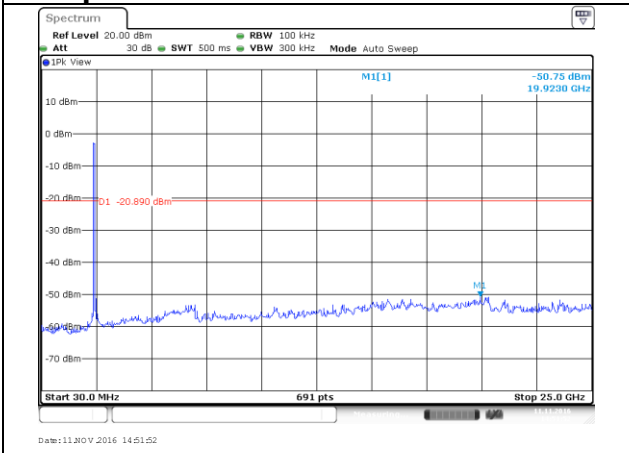
**Reference Level of PSD in 100kHz**

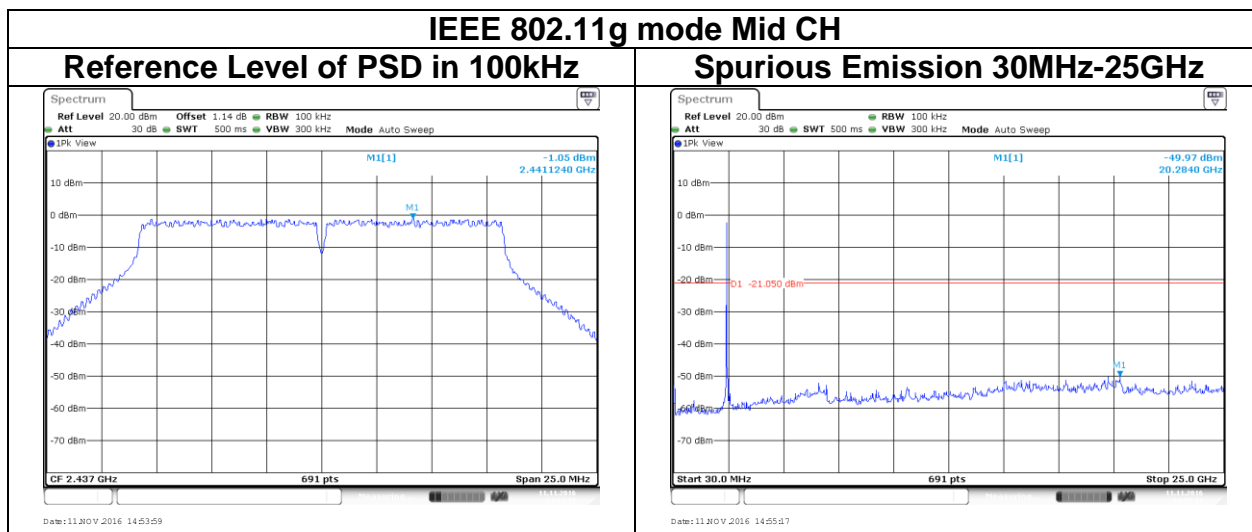


**Band Edge**



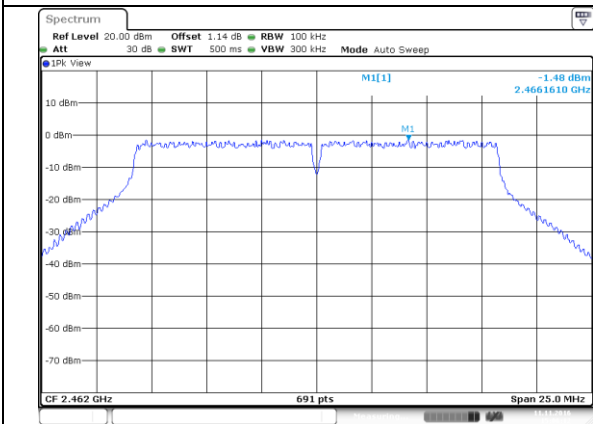
**Spurious Emission 30MHz-25GHz**



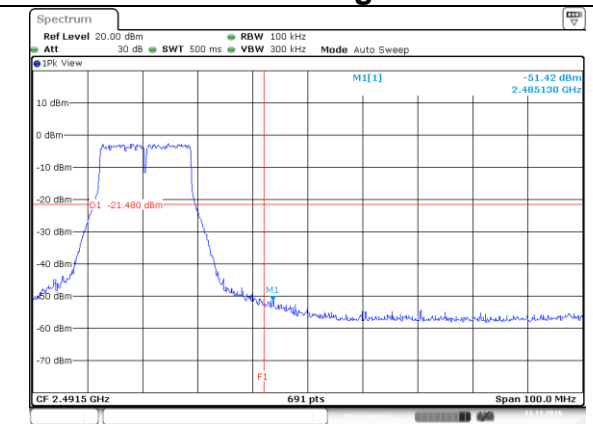


**IEEE 802.11g mode High CH**

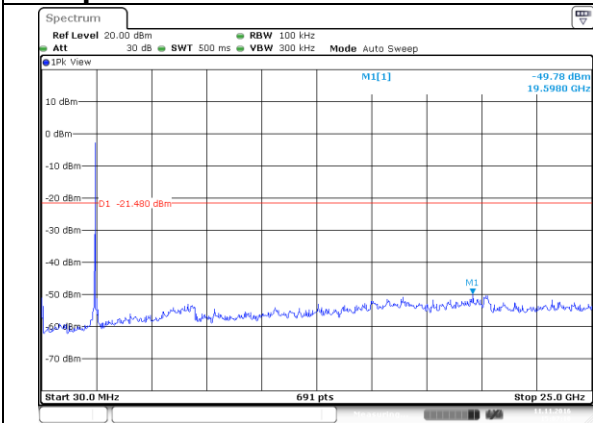
**Reference Level of PSD in 100kHz**



**Band Edge**

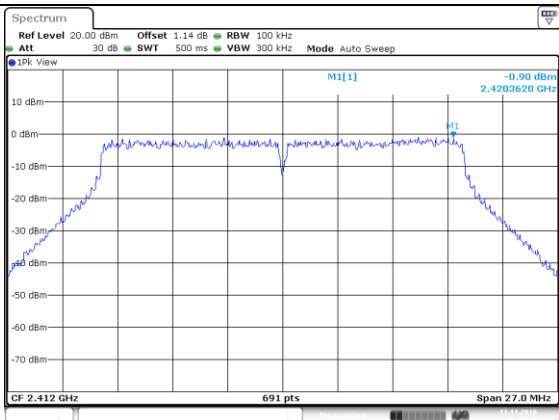


**Spurious Emission 30MHz-25GHz**



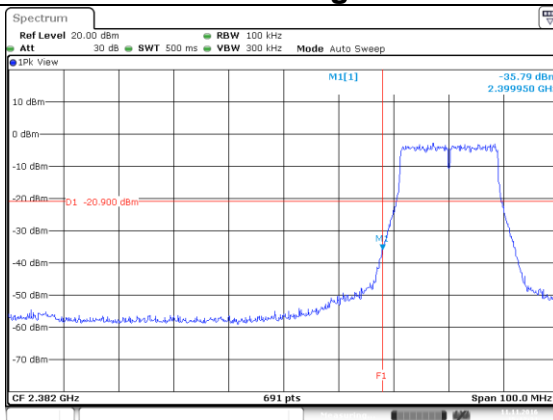
**IEEE 802.11n HT20 mode Low CH**

**Reference Level of PSD in 100kHz**



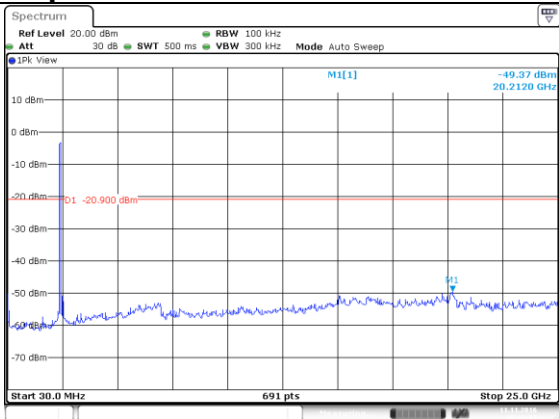
Date: 11 NOV 2016 15:20:16

**Band Edge**

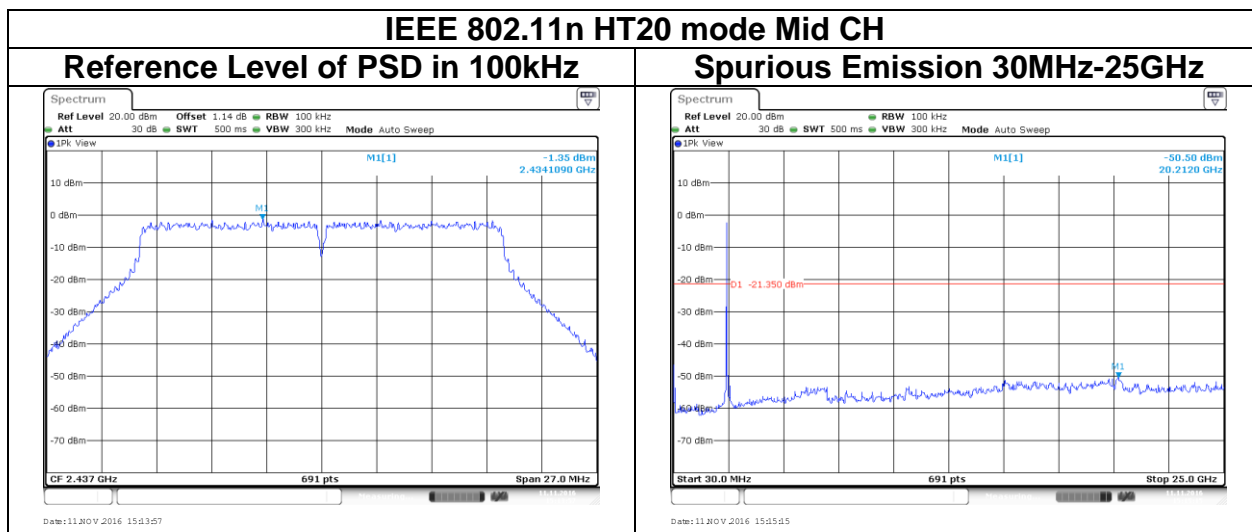


Date: 11 NOV 2016 15:21:31

**Spurious Emission 30MHz-25GHz**



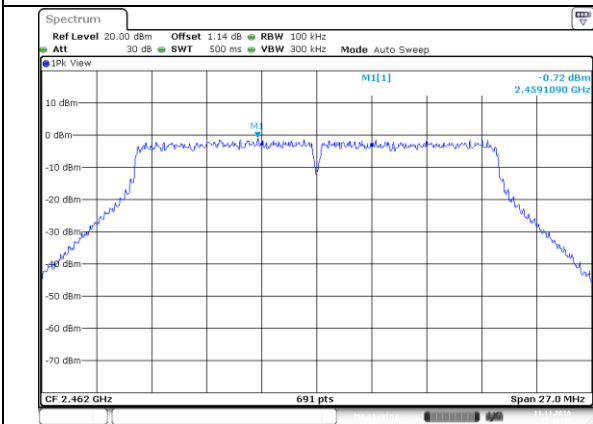
Date: 11 NOV 2016 15:21:34





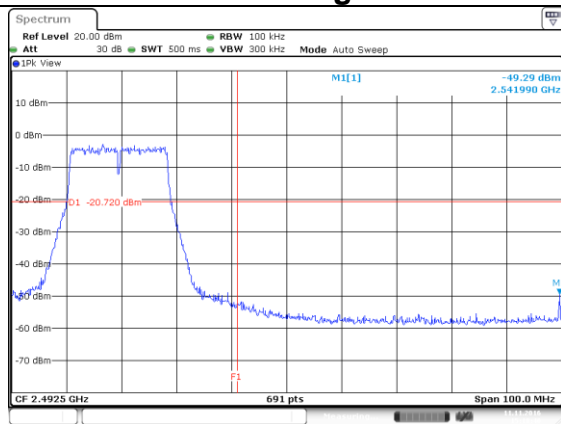
IEEE 802.11n HT20 mode High CH

Reference Level of PSD in 100kHz



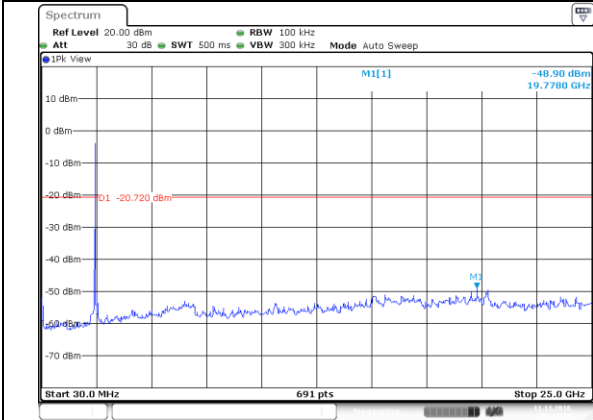
Date: 11 NOV 2016 15:16:45

Band Edge



Date: 11 NOV 2016 15:16:40

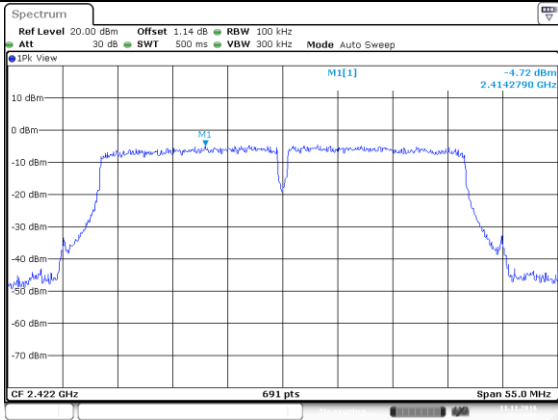
Spurious Emission 30MHz-25GHz



Date: 11 NOV 2016 15:17:42

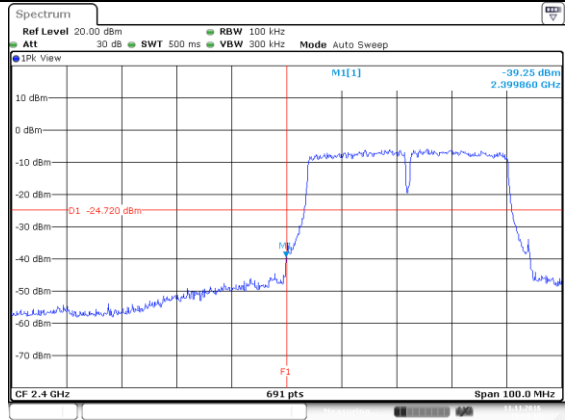
**IEEE 802.11n HT40 mode Low CH**

**Reference Level of PSD in 100kHz**



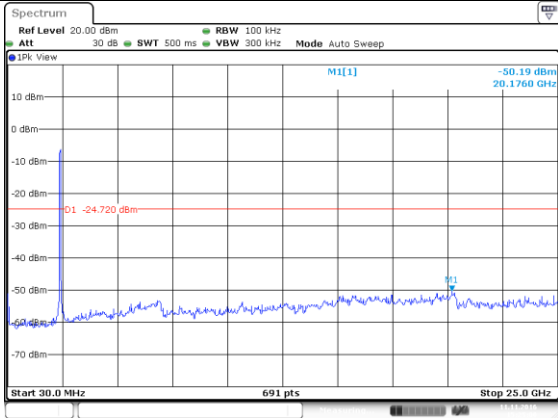
Date: 11 NOV 2016 15:21:02

**Band Edge**

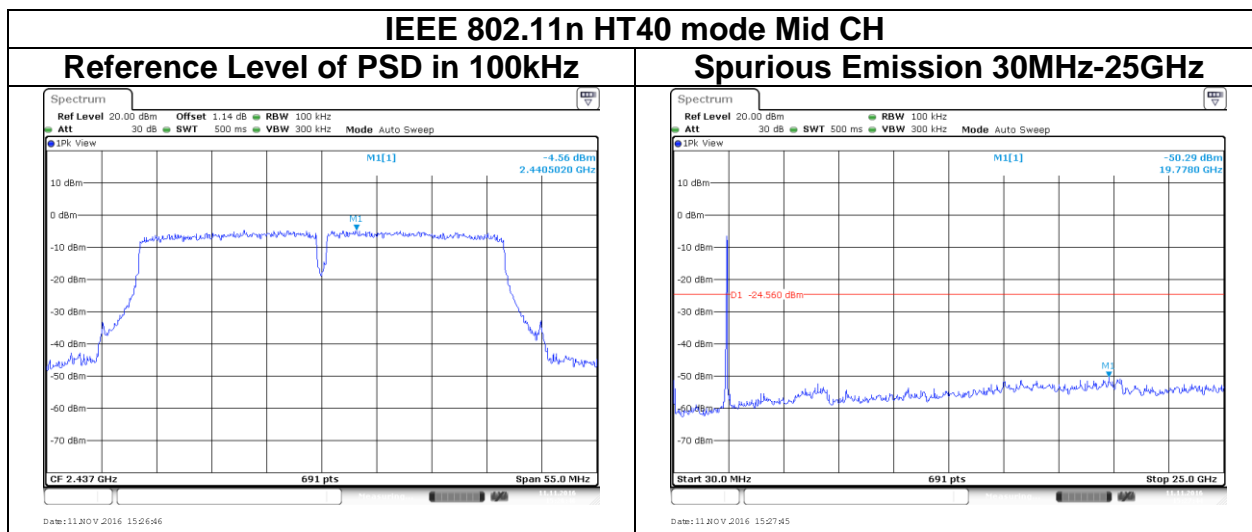


Date: 11 NOV 2016 15:33:48

**Spurious Emission 30MHz-25GHz**

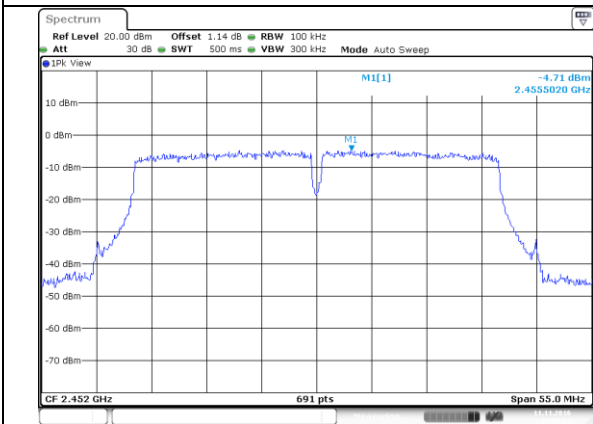


Date: 11 NOV 2016 15:25:01



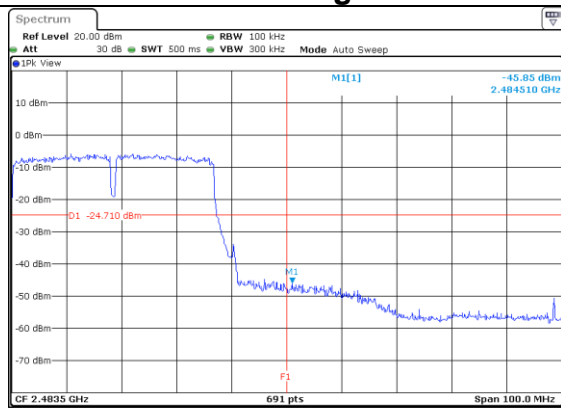
**IEEE 802.11n HT40 mode High CH**

**Reference Level of PSD in 100kHz**



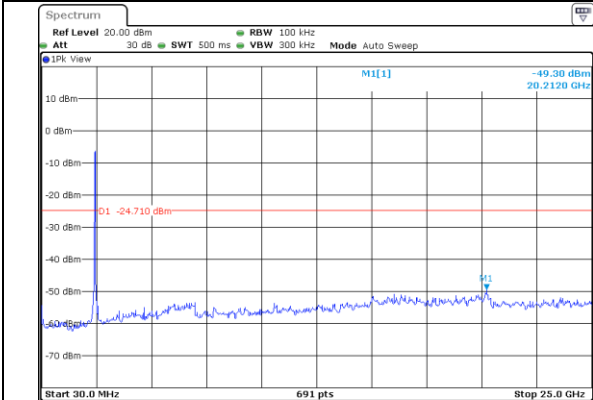
Date: 11 NOV 2016 15:29:24

**Band Edge**



Date: 11 NOV 2016 15:31:26

**Spurious Emission 30MHz-25GHz**



Date: 11 NOV 2016 15:30:32

## 4.6 RADIATION BANDEGE AND SPURIOUS EMISSION

### 4.6.1 Test Limit

FCC according to §15.247(d), §15.209 and §15.205,

IC according to RSS-247 section 5.5, RSS-Gen, Section 8.9 and 8.10

In any 100 kHz bandwidth outside the authorized frequency band, all harmonic and spurious must be least 20 dB below the highest emission level with the authorized frequency band. Radiation emission which fall in the restricted bands must also follow the FCC section 15.209 as below limit in table.

#### Below 30 MHz

Frequency	Field Strength (microvolts/m)	Magnetic H-Field (microamperes/m)	Measurement Distance (metres)
9-490 kHz	2,400/F (F in kHz)	2,400/F (F in kHz)	300
490-1,705 kHz	24,000/F (F in kHz)	24,000/F (F in kHz)	30
1.705-30 MHz	30	N/A	30

#### Above 30 MHz

Frequency (MHz)	Field Strength microvolts/m at 3 metres (watts, e.i.r.p.)	
	Transmitters	Receivers
30-88	100 (3 nW)	100 (3 nW)
88-216	150 (6.8 nW)	150 (6.8 nW)
216-960	200 (12 nW)	200 (12 nW)
Above 960	500 (75 nW)	500 (75 nW)

### 4.6.2 Test Procedure

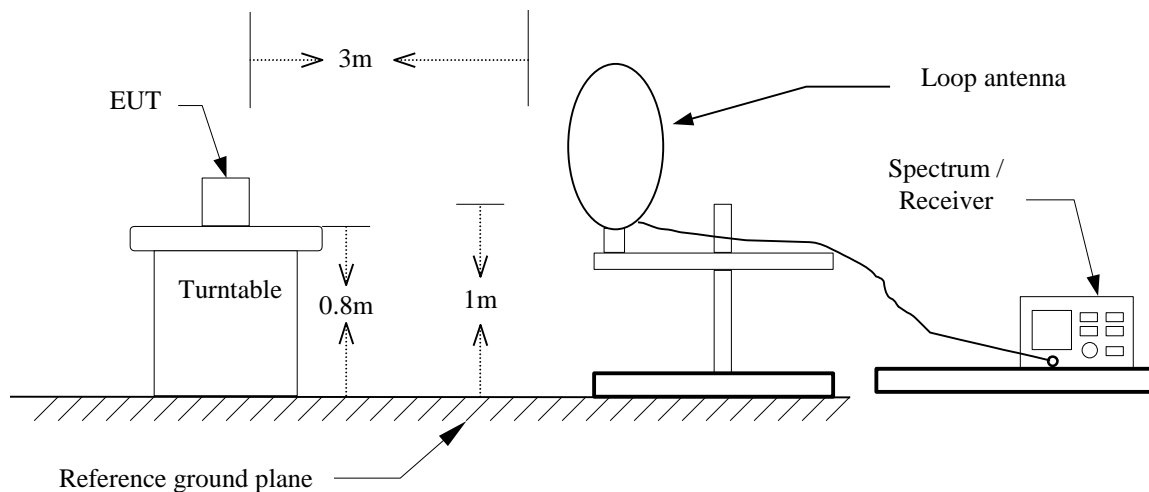
Test method Refer as KDB 558074 D01 v03r05, Section 12.1.

1. The EUT is placed on a turntable, Above 1 GHz is 1.5m and below 1 GHz is 0.8m above ground plane. The EUT Configured un accordance with ANSI C63.10, and the EUT set in a continuous mode.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level. And EUT is set 3m away from the receiving antenna, which is scanned from 1m to 4m above the ground plane to find out the highest emissions. Measurement are made polarized in both the vertical and the horizontal positions with antenna.
3. Span shall wide enough to full capture the emission measured. The SA from 30MHz to 26.5GHz set to the low, Mid and High channels with the EUT transmit.
5. The SA setting following :
  - (1) Below 1G : RBW = 100kHz, VBW  $\geq$  3 RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.
  - (2) Above 1G :
    - (2.1) For Peak measurement : RBW = 1MHz, VBW  $\geq$  3 RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.
    - (2.2) For Average measurement : RBW = 1MHz, VBW
      - If Duty Cycle  $\geq$  98%, VBW=10Hz.
      - If Duty Cycle < 98%, VBW=1/T.

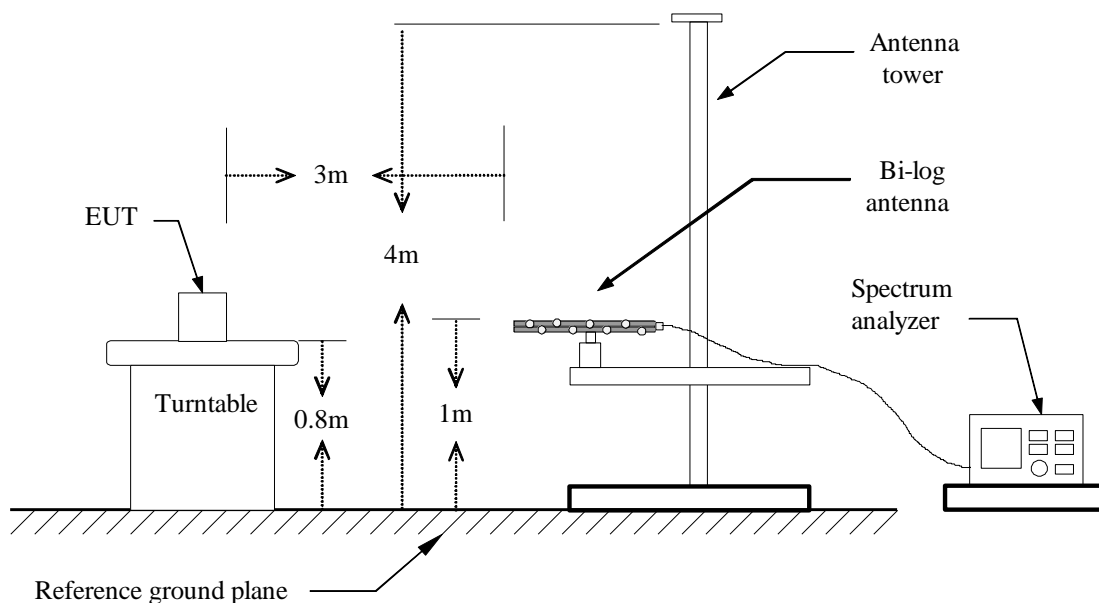
Configuration	Duty Cycle (%)	VBW
802.11b	100	10 Hz
802.11g	100	10 Hz
802.11n HT20	100	10 Hz
802.11n HT40	100	10 Hz

### 4.6.3 Test Setup

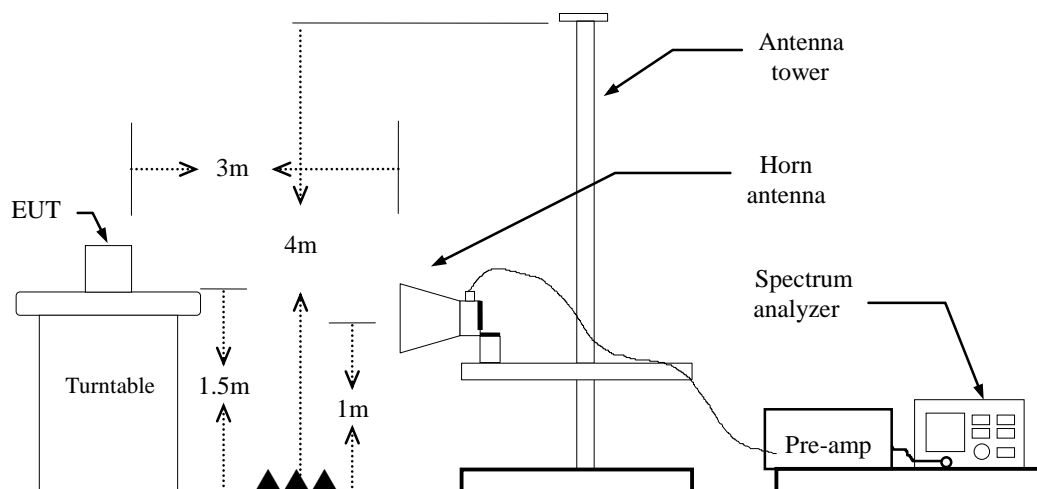
#### 9kHz ~ 30MHz



#### 30MHz ~ 1GHz



**Above 1 GHz**

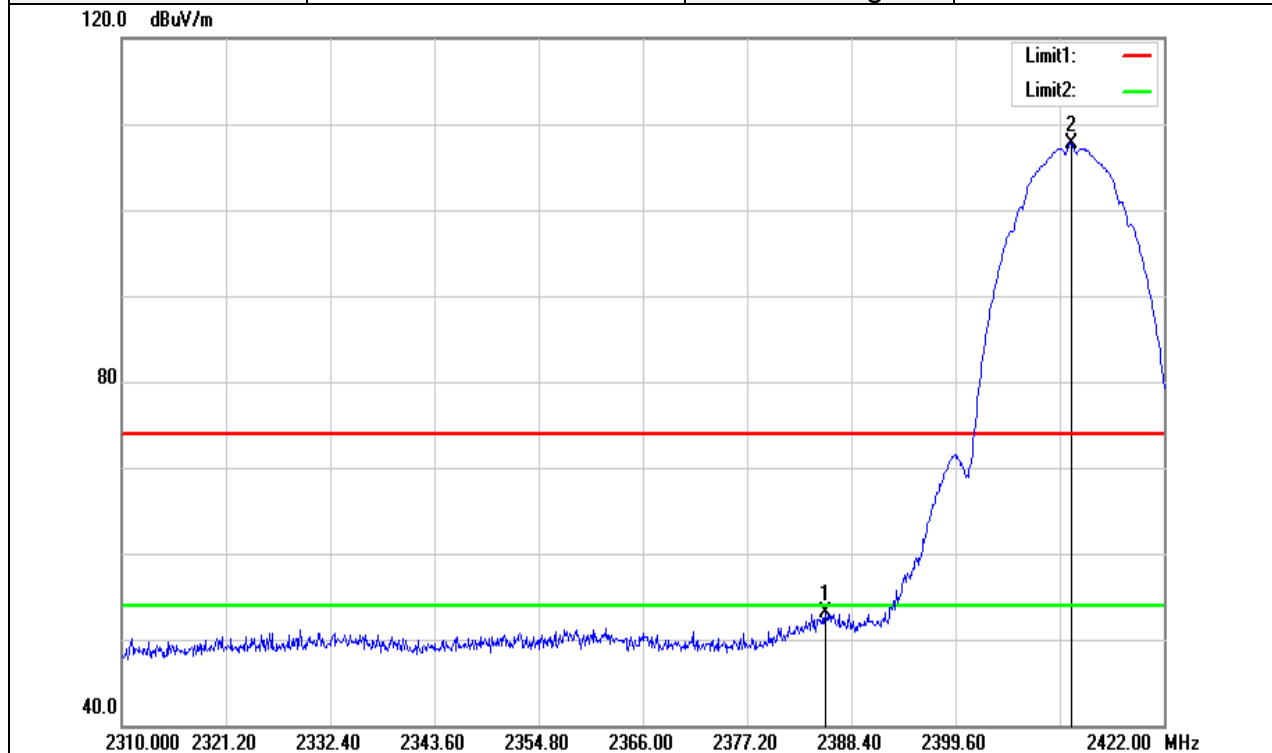




### 4.6.4 Test Result

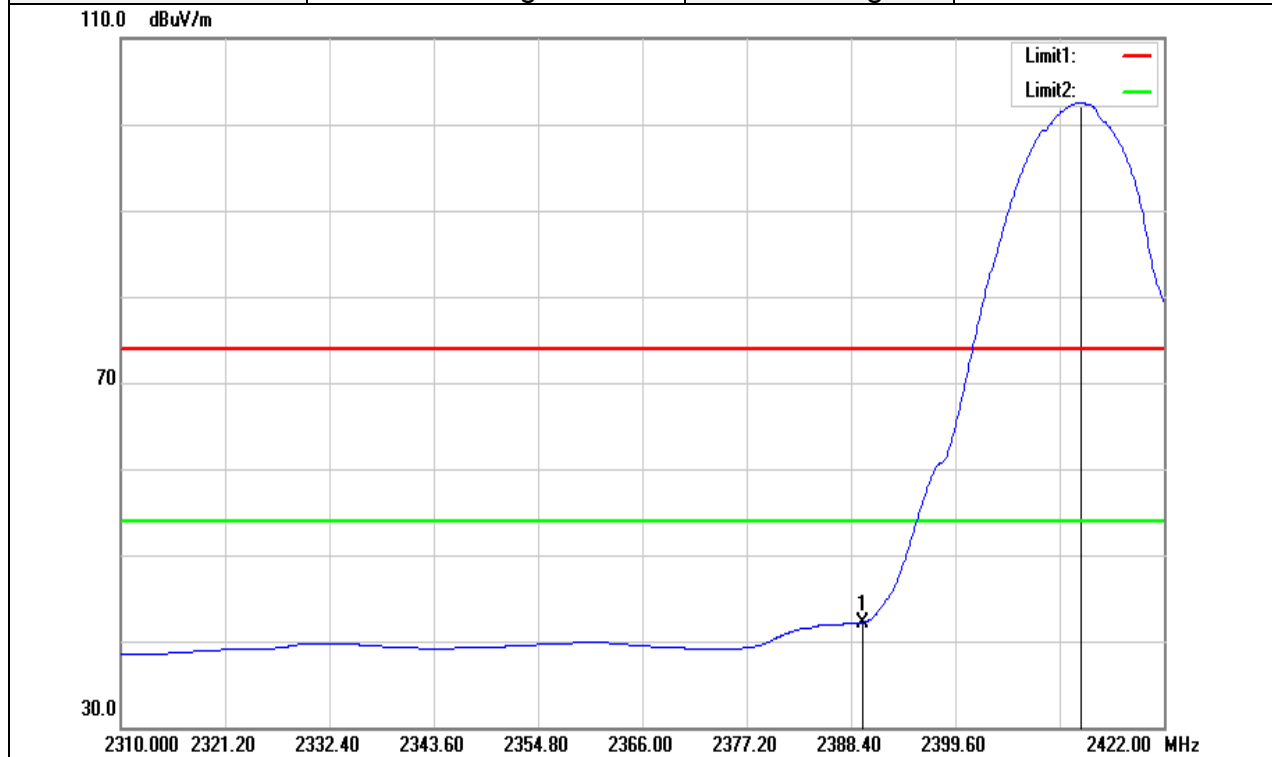
#### Band Edge Test Data

Test Mode:	IEEE 802.11b Low CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Nov 08, 2016
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak	Test Voltage:	120Vac / 60Hz



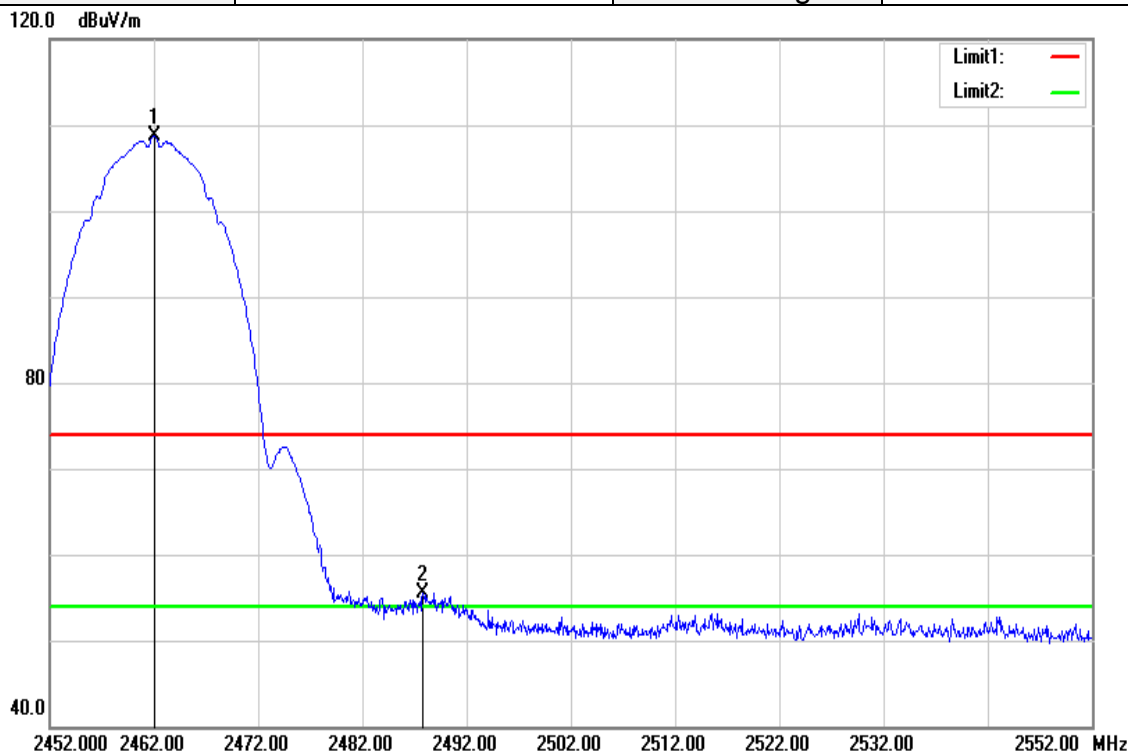
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2385.600	56.48	-3.32	53.16	74.00	-20.84	peak
2412.032	110.99	-3.23	107.76	-	-	peak

Test Mode:	IEEE 802.11b Low CH	Temperature:	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Nov 08, 2016
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Average	Test Voltage:	120Vac / 60Hz



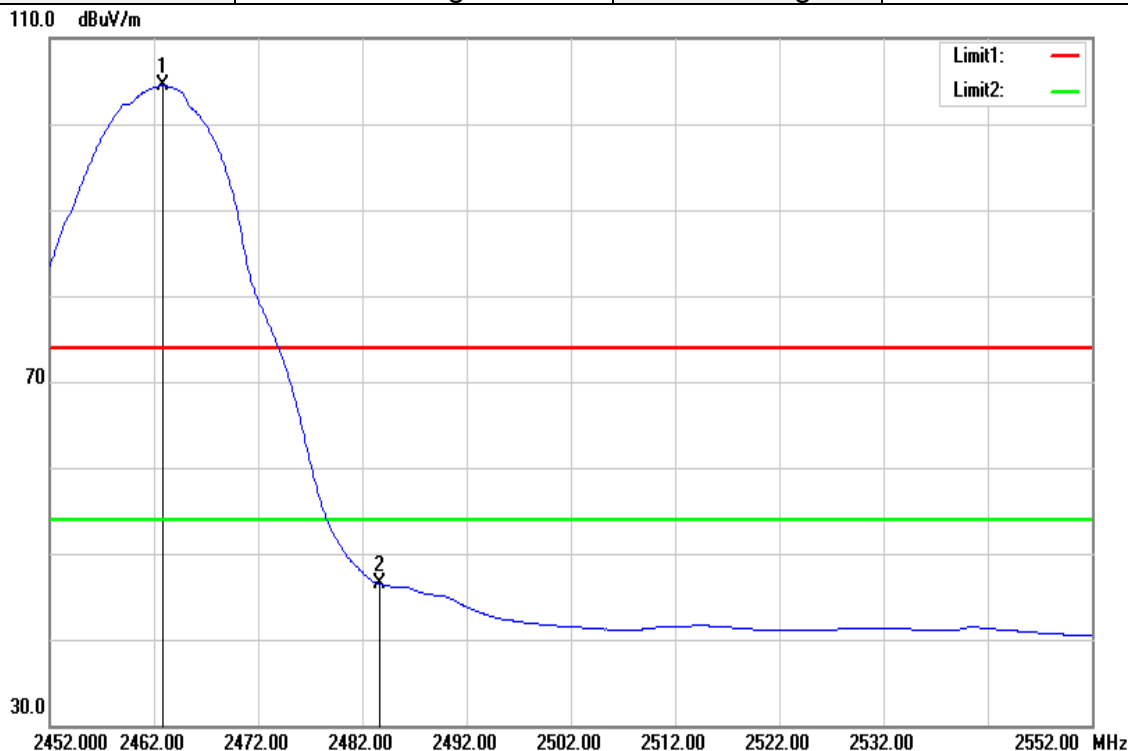
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2389.632	45.47	-3.28	42.19	54.00	-11.81	AVG
2413.040	105.70	-3.23	102.47	-	-	AVG

Test Mode:	IEEE 802.11b High CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Nov 08, 2016
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak	Test Voltage:	120Vac / 60Hz



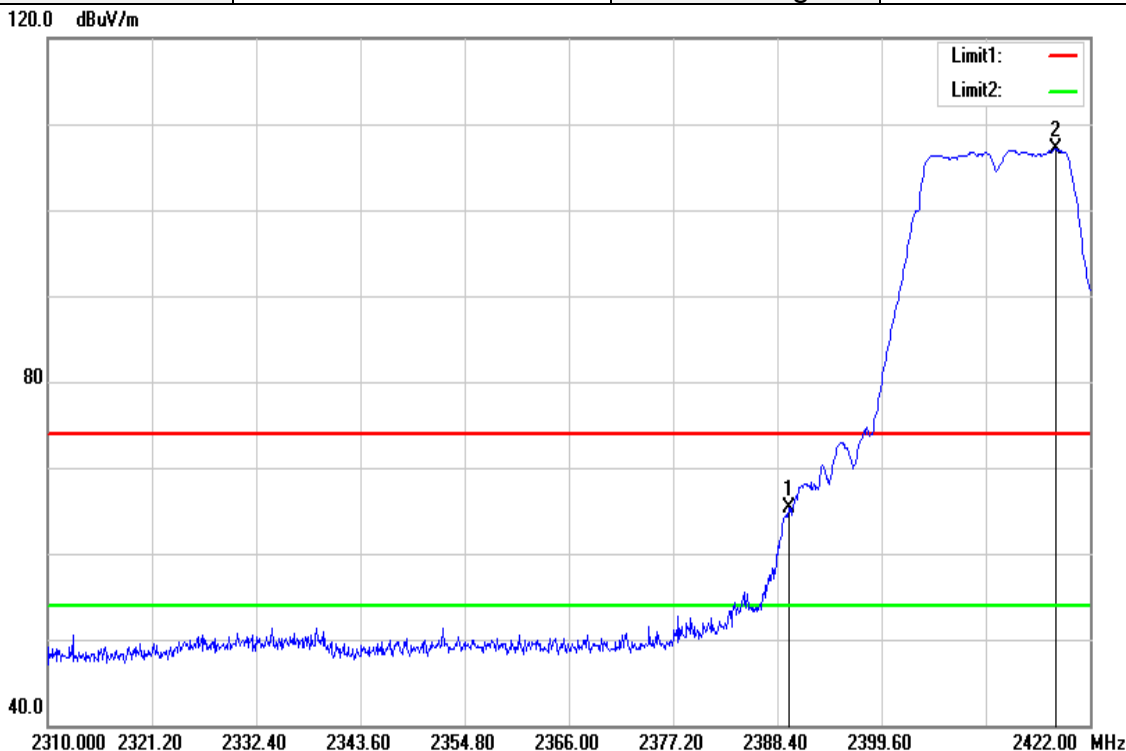
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2462.000	110.80	-2.10	108.70	-	-	peak
2487.800	57.50	-1.95	55.55	74.00	-18.45	peak

Test Mode:	IEEE 802.11b High CH	Temperature:	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Nov 08, 2016
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Average	Test Voltage:	120Vac / 60Hz



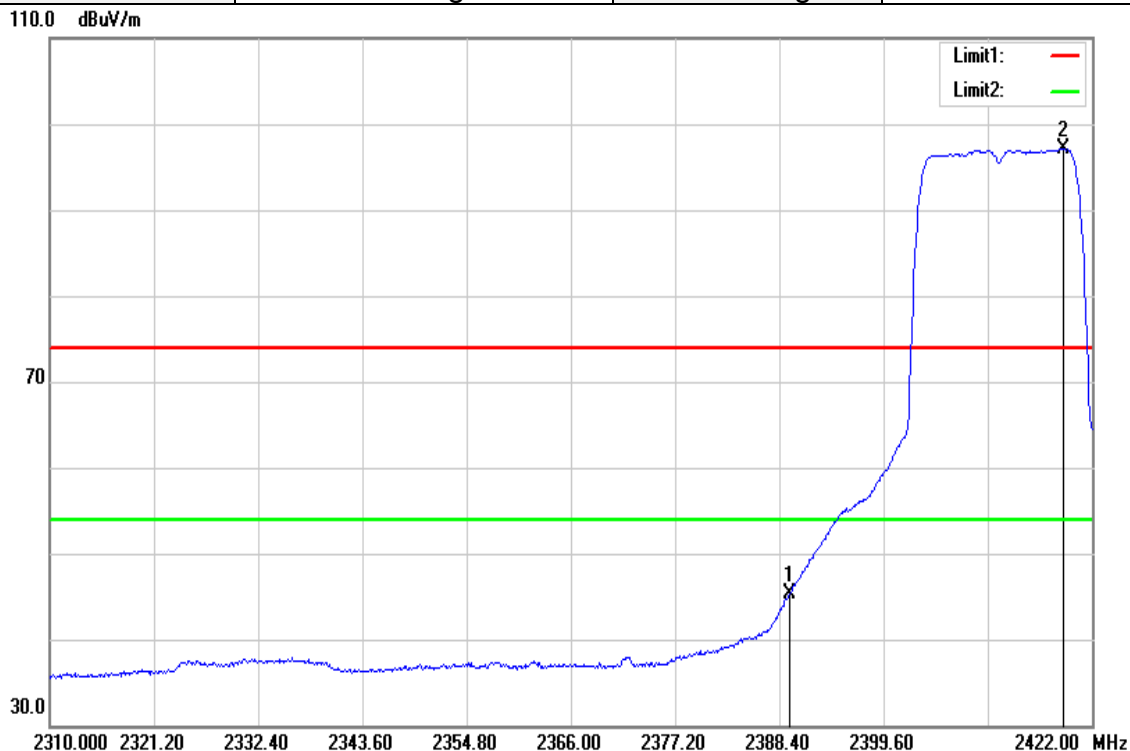
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2462.900	106.56	-2.09	104.47	-	-	AVG
2483.700	48.44	-1.99	46.45	54.00	-7.55	AVG

Test Mode:	IEEE 802.11g Low CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Nov 08, 2016
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak	Test Voltage:	120Vac / 60Hz



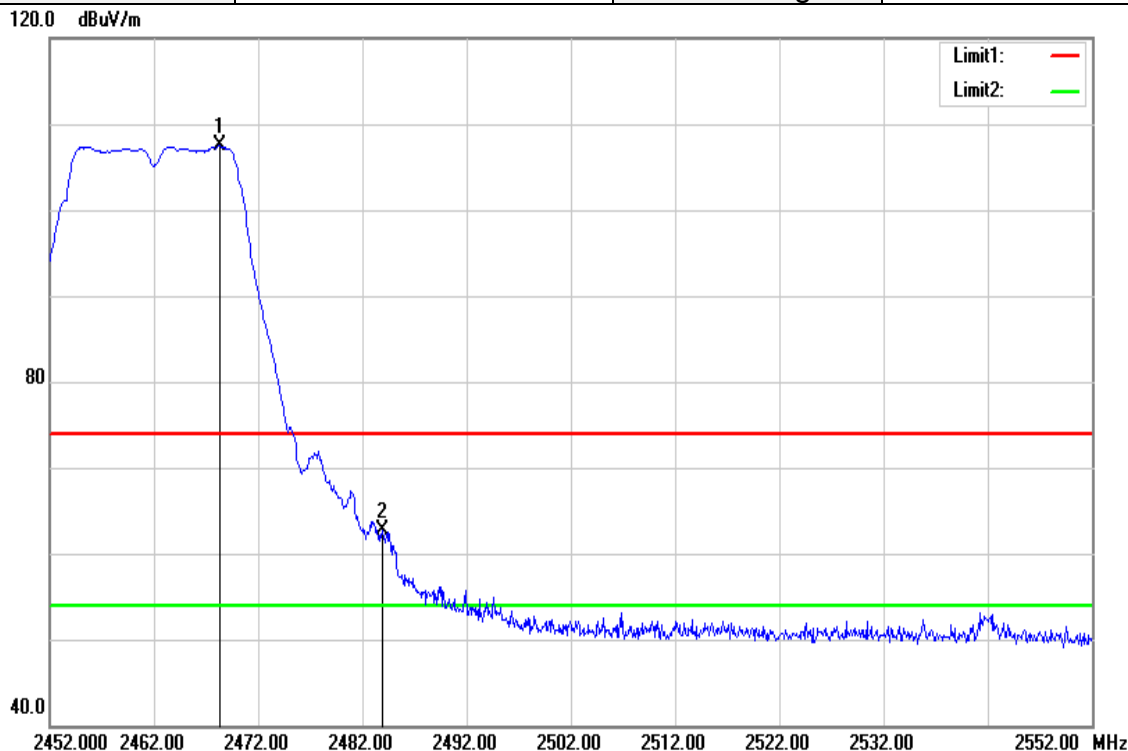
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2389.632	68.55	-3.28	65.27	74.00	-8.73	peak
2418.304	110.30	-3.22	107.08	-	-	peak

Test Mode:	IEEE 802.11g Low CH	Temperature:	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Nov 08, 2016
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Average	Test Voltage:	120Vac / 60Hz



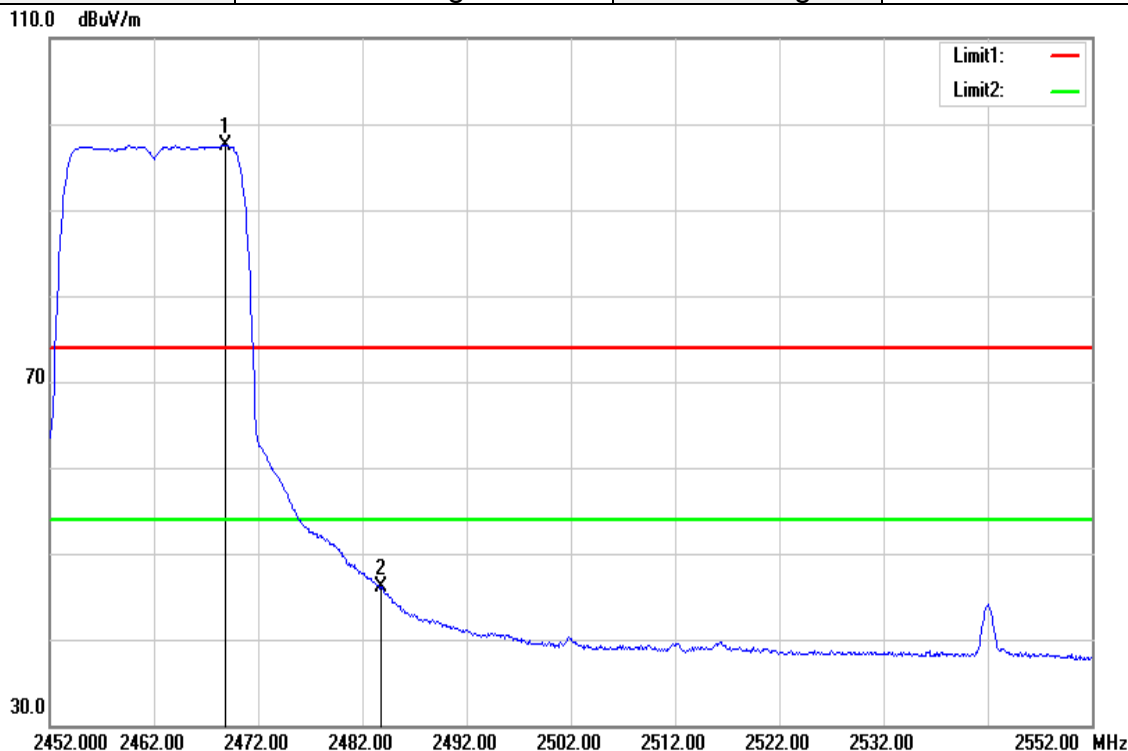
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2389.520	48.60	-3.28	45.32	54.00	-8.68	AVG
2418.864	100.42	-3.22	97.20	-	-	AVG

Test Mode:	IEEE 802.11g High CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Nov 08, 2016
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak	Test Voltage:	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2468.300	109.53	-2.07	107.46	-	-	peak
2483.900	64.67	-1.99	62.68	74.00	-11.32	peak

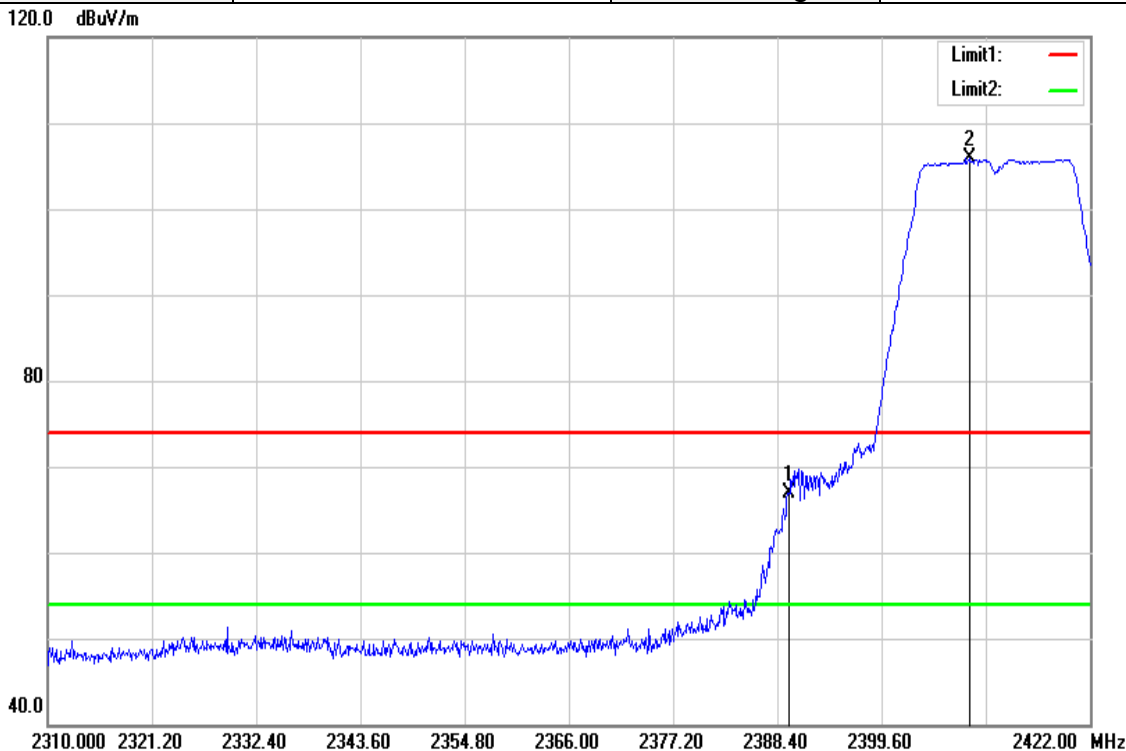
Test Mode:	IEEE 802.11g High CH	Temperature:	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Nov 08, 2016
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Average	Test Voltage:	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2468.800	99.67	-2.07	97.60	-	-	AVG
2483.800	48.17	-1.99	46.18	54.00	-7.82	AVG

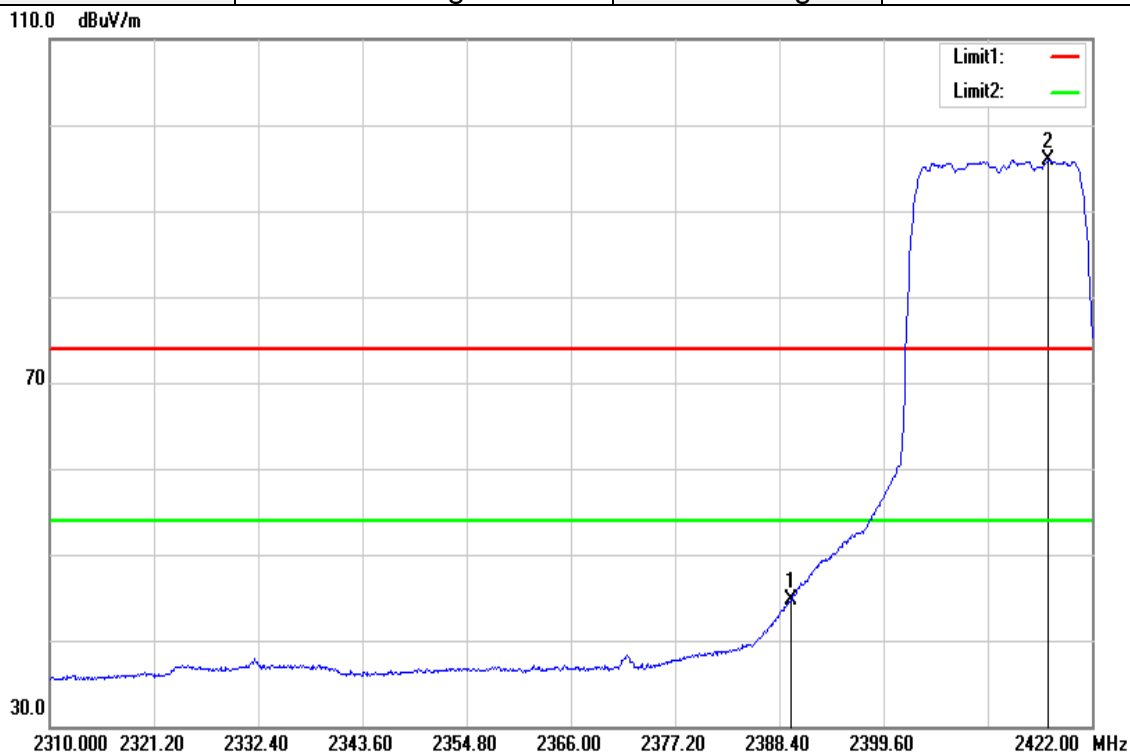


Test Mode:	IEEE 802.11n HT20 Low CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Nov 08, 2016
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak	Test Voltage:	120Vac / 60Hz



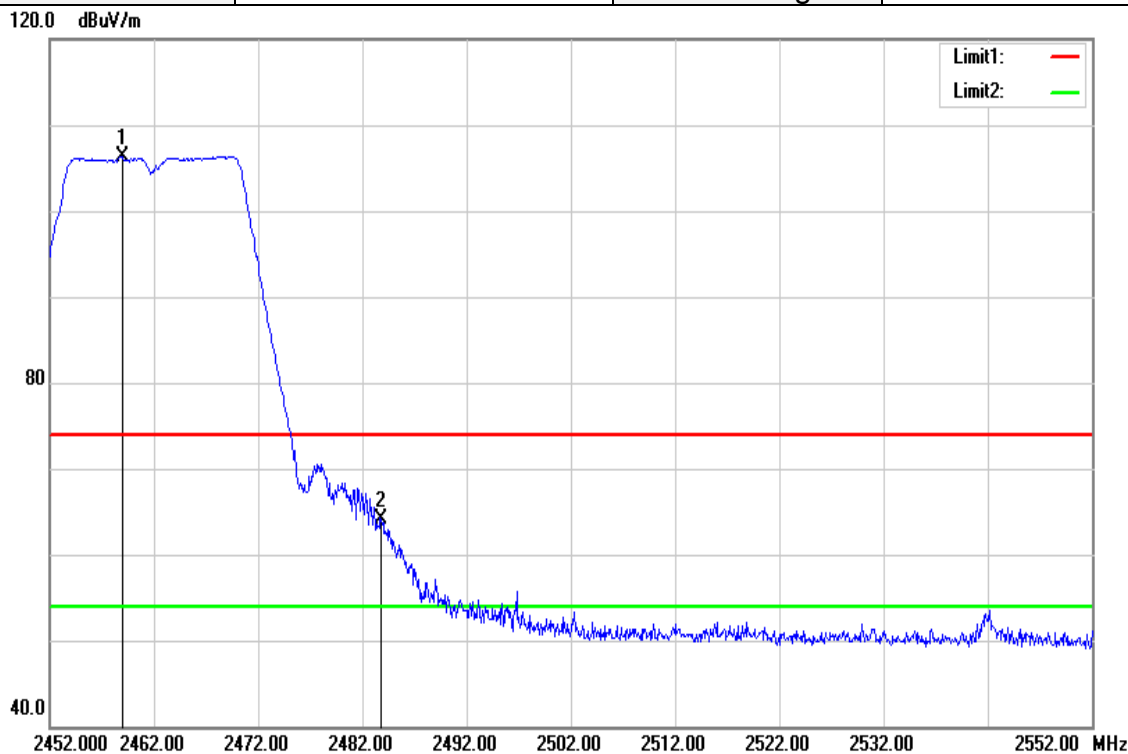
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2389.632	70.24	-3.28	66.96	74.00	-7.04	peak
2409.008	109.15	-3.24	105.91	-	-	peak

Test Mode:	IEEE 802.11n HT20 Low CH	Temperature:	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Nov 08, 2016
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Average	Test Voltage:	120Vac / 60Hz



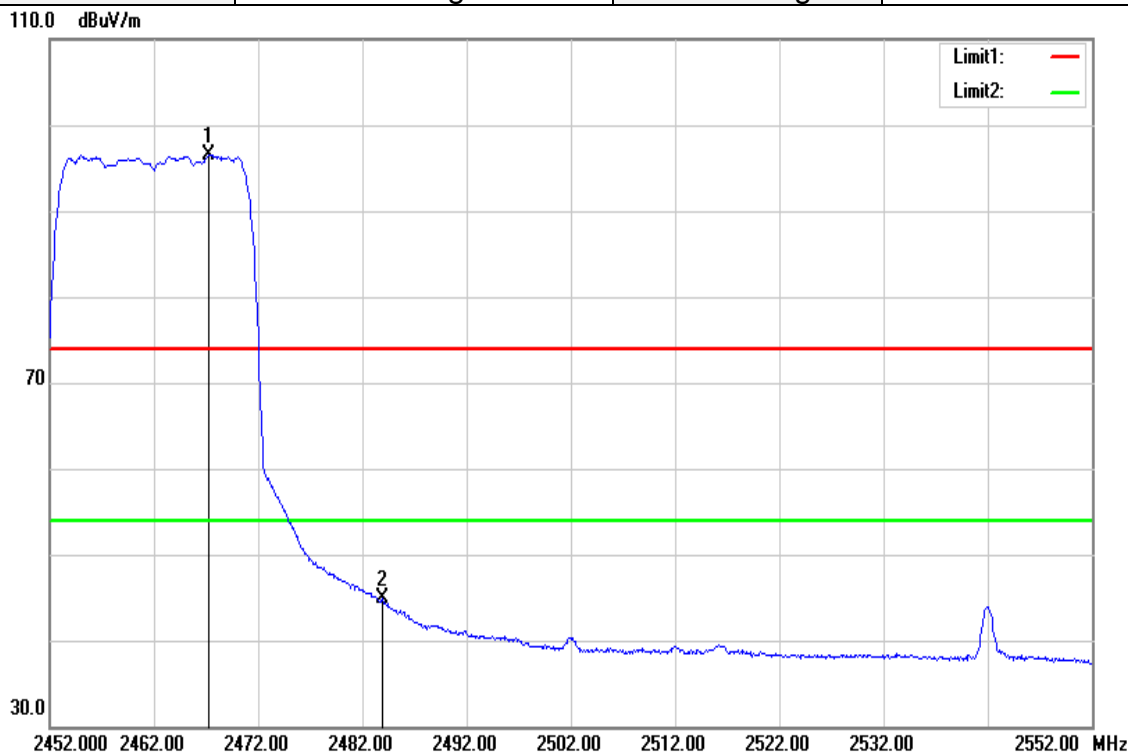
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2389.632	47.95	-3.28	44.67	54.00	-9.33	AVG
2417.296	99.10	-3.22	95.88	-	-	AVG

Test Mode:	IEEE 802.11n HT20 High CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Nov 08, 2016
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak	Test Voltage:	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2459.000	108.49	-2.11	106.38	-	-	peak
2483.800	66.11	-1.99	64.12	74.00	-9.88	peak

Test Mode:	IEEE 802.11n HT20 High CH	Temperature:	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Nov 08, 2016
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Average	Test Voltage:	120Vac / 60Hz



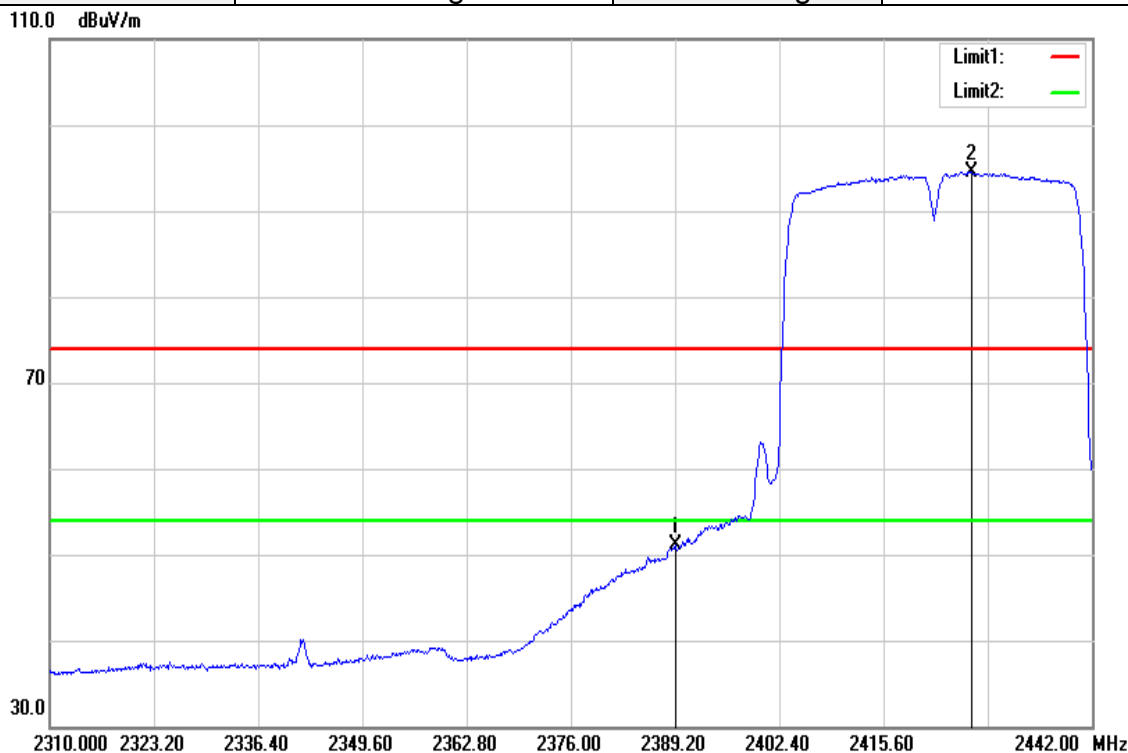
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2467.300	98.56	-2.08	96.48	-	-	AVG
2483.900	46.80	-1.99	44.81	54.00	-9.19	AVG

Test Mode:	IEEE 802.11n HT40 Low CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Nov 08, 2016
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak	Test Voltage:	120Vac / 60Hz



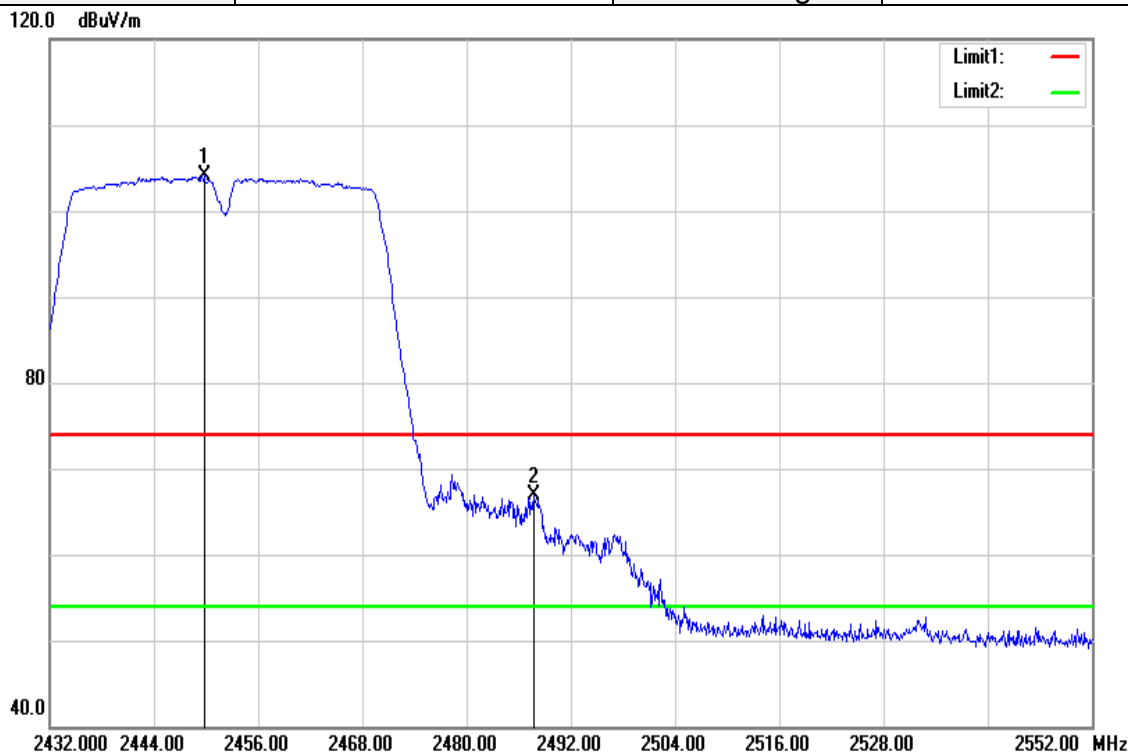
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2388.672	70.87	-2.50	68.37	74.00	-5.63	peak
2426.556	106.45	-2.31	104.14	-	-	peak

Test Mode:	IEEE 802.11n HT40 Low CH	Temperature:	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Nov 08, 2016
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Average	Test Voltage:	120Vac / 60Hz



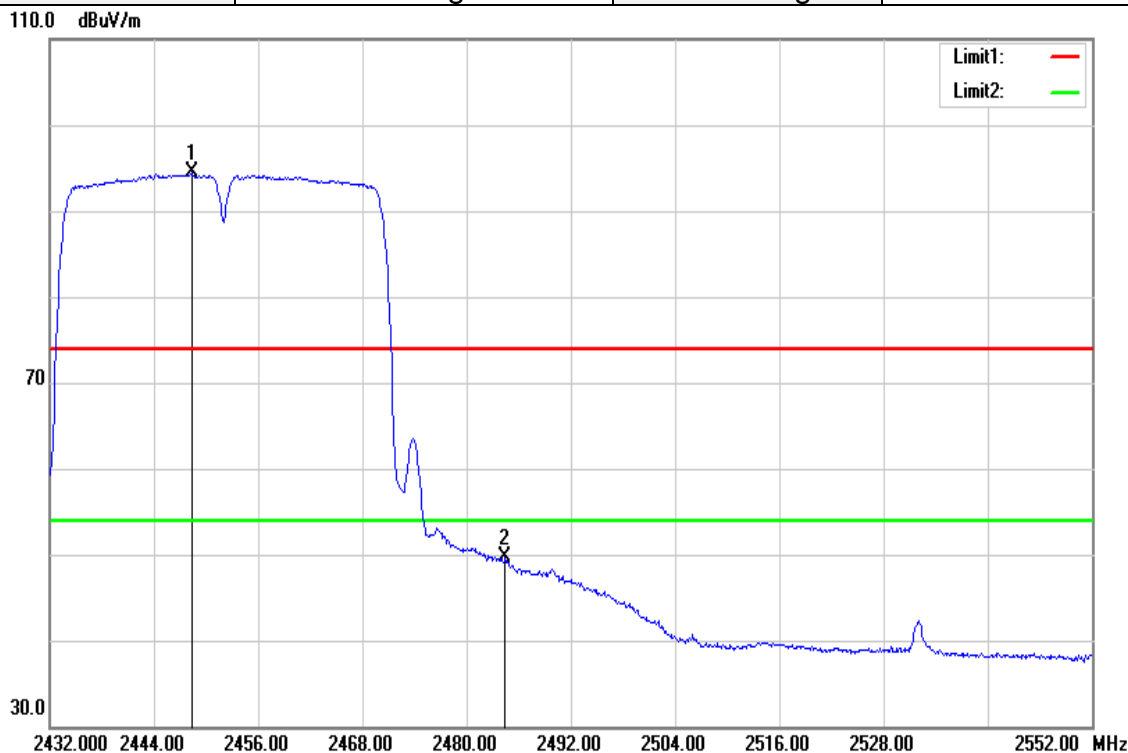
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2389.200	53.52	-2.50	51.02	54.00	-2.98	AVG
2426.688	96.80	-2.31	94.49	-	-	AVG

Test Mode:	IEEE 802.11n HT40 High CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Nov 08, 2016
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak	Test Voltage:	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2449.760	106.30	-2.14	104.16	-	-	peak
2487.680	68.81	-1.95	66.86	74.00	-7.14	peak

Test Mode:	IEEE 802.11n HT40 High CH	Temperature:	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Nov 08, 2016
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Average	Test Voltage:	120Vac / 60Hz

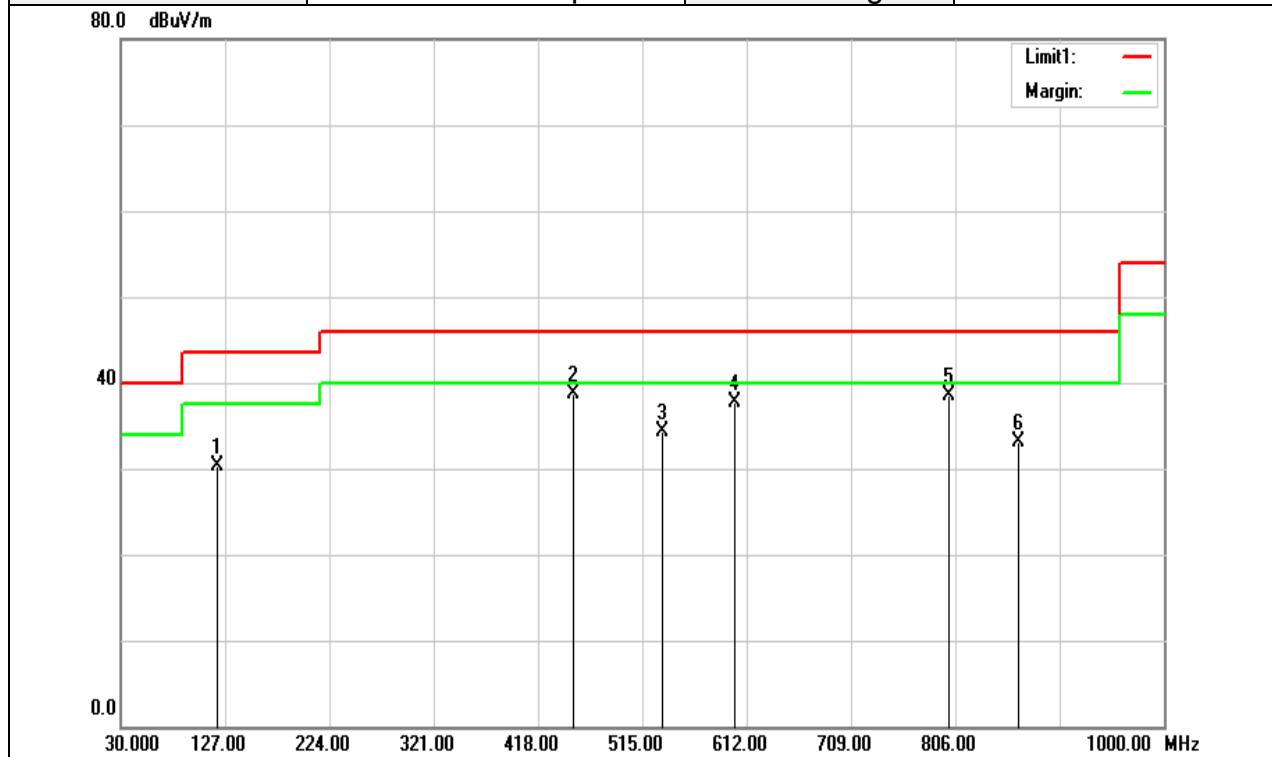


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2448.320	96.58	-2.15	94.43	-	-	AVG
2484.440	51.65	-1.99	49.66	54.00	-4.34	AVG



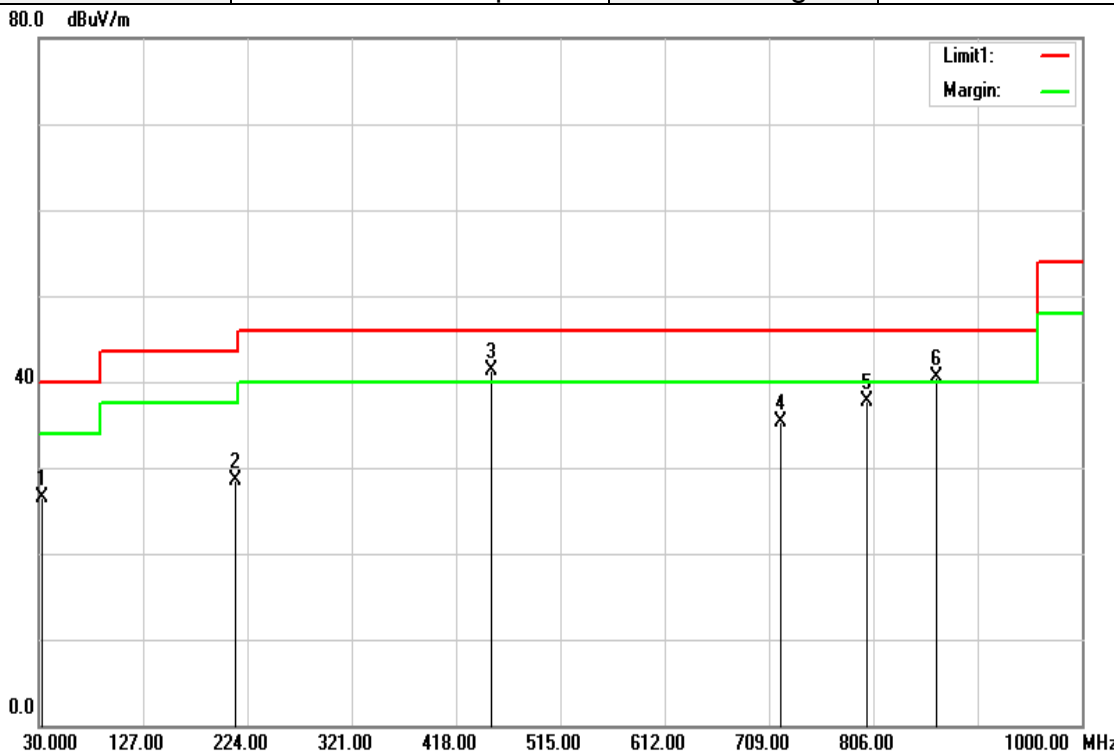
**Below 1G Test Data**

Test Mode:	IEEE 802.11g Low CH	Temp/Hum	27(°C)/ 53%RH
Test Item	30MHz-1GHz	Test Date	Nov 08, 2016
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak and Qusi-peak	Test Voltage:	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
120.2100	45.74	-15.50	30.24	43.50	-13.26	peak
450.9800	48.87	-10.17	38.70	46.00	-7.30	peak
533.4300	43.13	-8.74	34.39	46.00	-11.61	peak
600.3600	45.49	-7.75	37.74	46.00	-8.26	peak
800.1800	42.94	-4.50	38.44	46.00	-7.56	peak
864.2000	36.74	-3.61	33.13	46.00	-12.87	peak

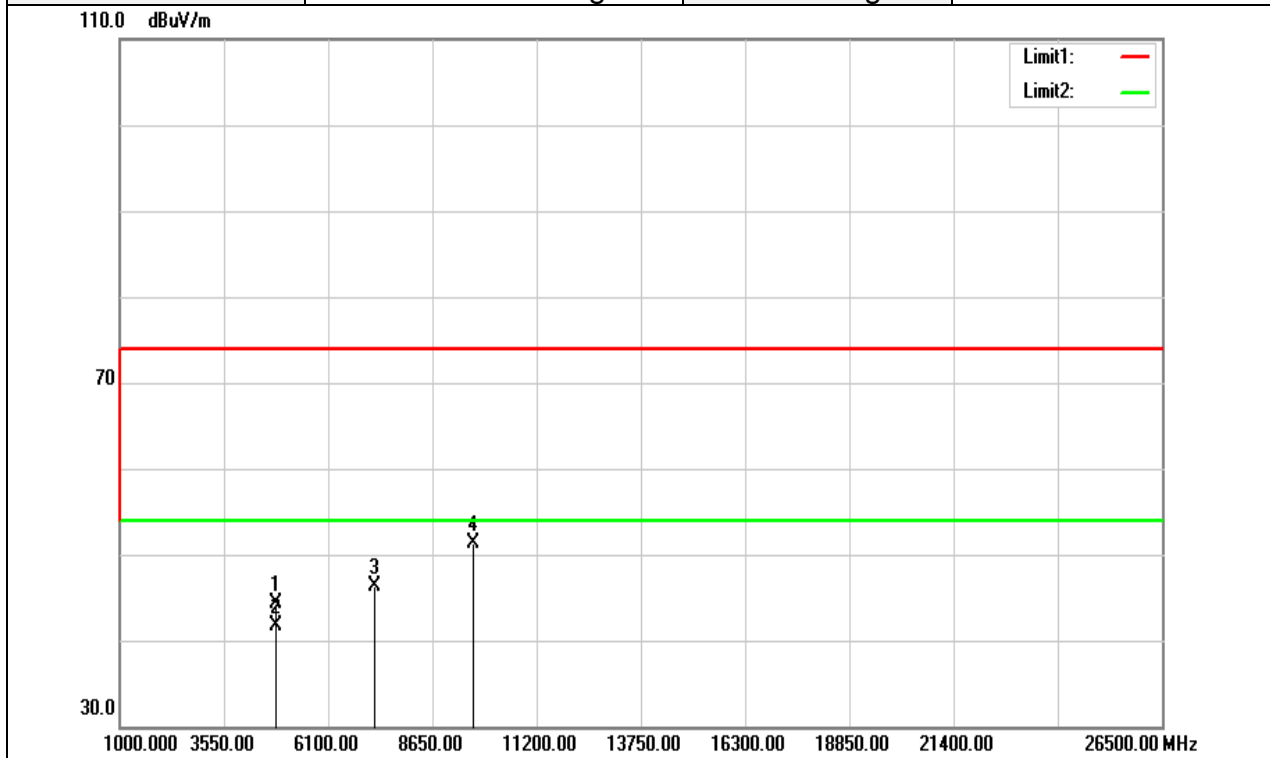
Test Mode:	IEEE 802.11g Low CH	Temp/Hum	27(°C)/ 53%RH
Test Item	30MHz-1GHz	Test Date	Nov 08, 2016
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak and Qusi-peak	Test Voltage:	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
32.9100	36.63	-10.07	26.56	40.00	-13.44	peak
213.3300	45.01	-16.49	28.52	43.50	-14.98	peak
450.9800	51.43	-10.17	41.26	46.00	-4.74	QP
719.6700	40.96	-5.62	35.34	46.00	-10.66	peak
800.1800	42.18	-4.50	37.68	46.00	-8.32	peak
864.2000	44.04	-3.61	40.43	46.00	-5.57	QP

**Above 1G Test Data**

Test Mode:	IEEE 802.11b Low CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Harmonic	Test Date	Nov 08, 2016
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage:	120Vac / 60Hz

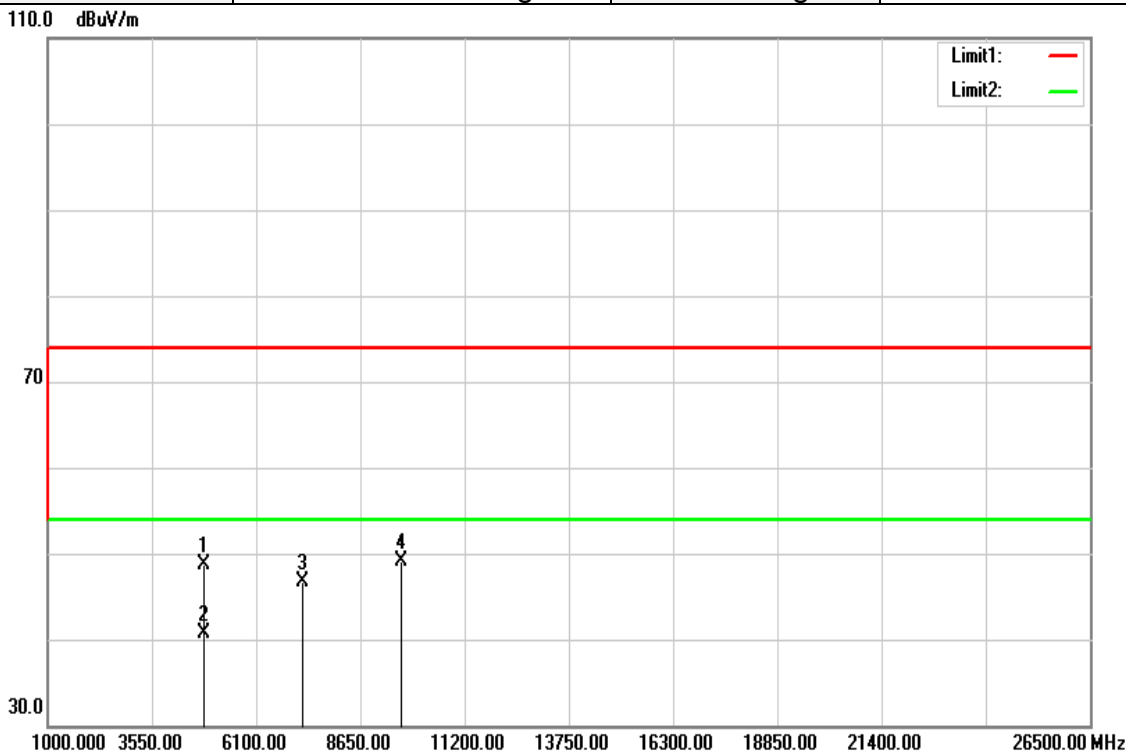


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4824.000	39.10	5.10	44.20	74.00	-29.80	peak
4824.000	36.64	5.10	41.74	54.00	-12.26	AVG
7236.000	33.51	12.71	46.22	74.00	-27.78	peak
9648.000	33.66	17.60	51.26	74.00	-22.74	peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode:	IEEE 802.11b Low CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Harmonic	Test Date	Nov 08, 2016
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage:	120Vac / 60Hz

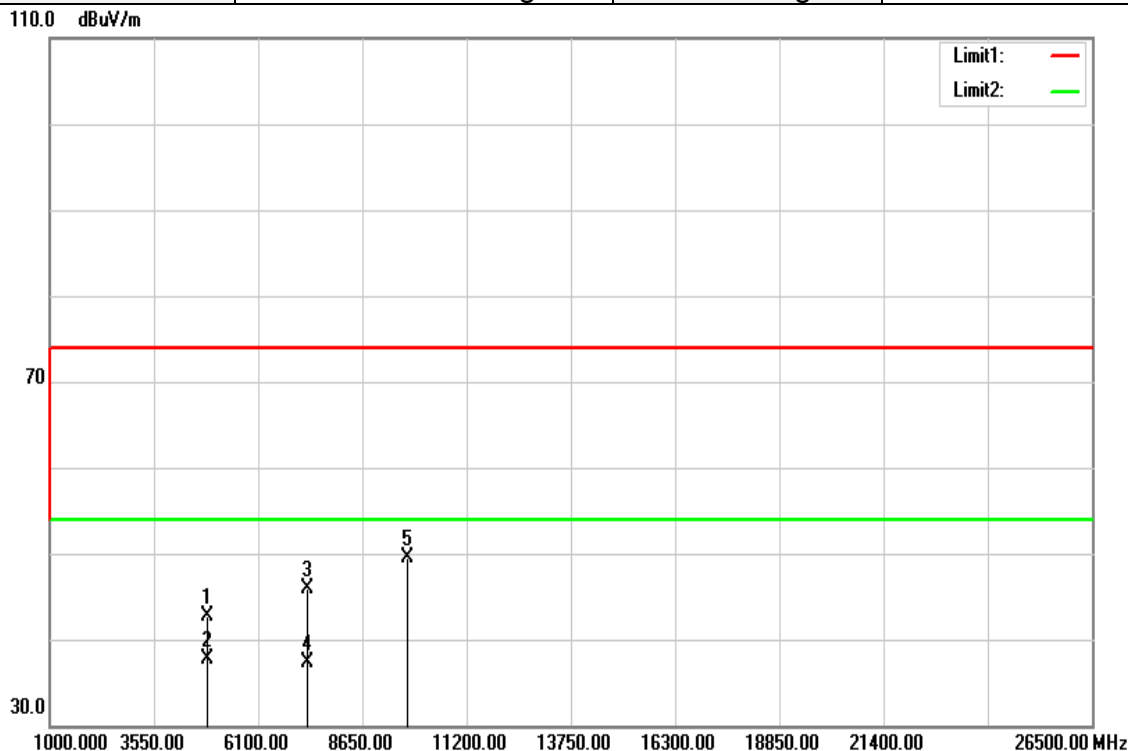


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4824.000	43.63	5.10	48.73	74.00	-25.27	peak
4824.000	35.58	5.10	40.68	54.00	-13.32	AVG
7236.000	33.98	12.71	46.69	74.00	-27.31	peak
9648.000	31.57	17.60	49.17	74.00	-24.83	peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode:	IEEE 802.11b Mid CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Harmonic	Test Date	Nov 08, 2016
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage:	120Vac / 60Hz

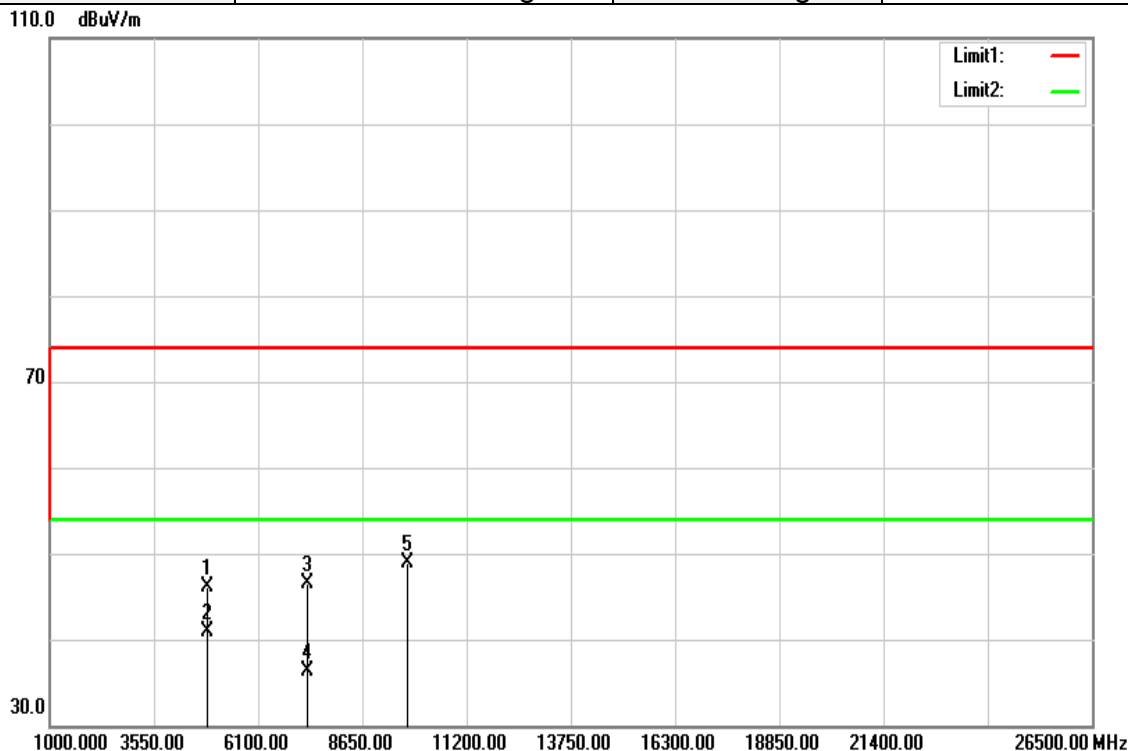


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4874.000	37.44	5.23	42.67	74.00	-31.33	peak
4874.000	32.47	5.23	37.70	54.00	-16.30	AVG
7311.000	33.04	12.94	45.98	74.00	-28.02	peak
7311.000	24.42	12.94	37.36	54.00	-16.64	AVG
9748.000	32.00	17.60	49.60	74.00	-24.40	peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode:	IEEE 802.11b Mid CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Harmonic	Test Date	Nov 08, 2016
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage:	120Vac / 60Hz

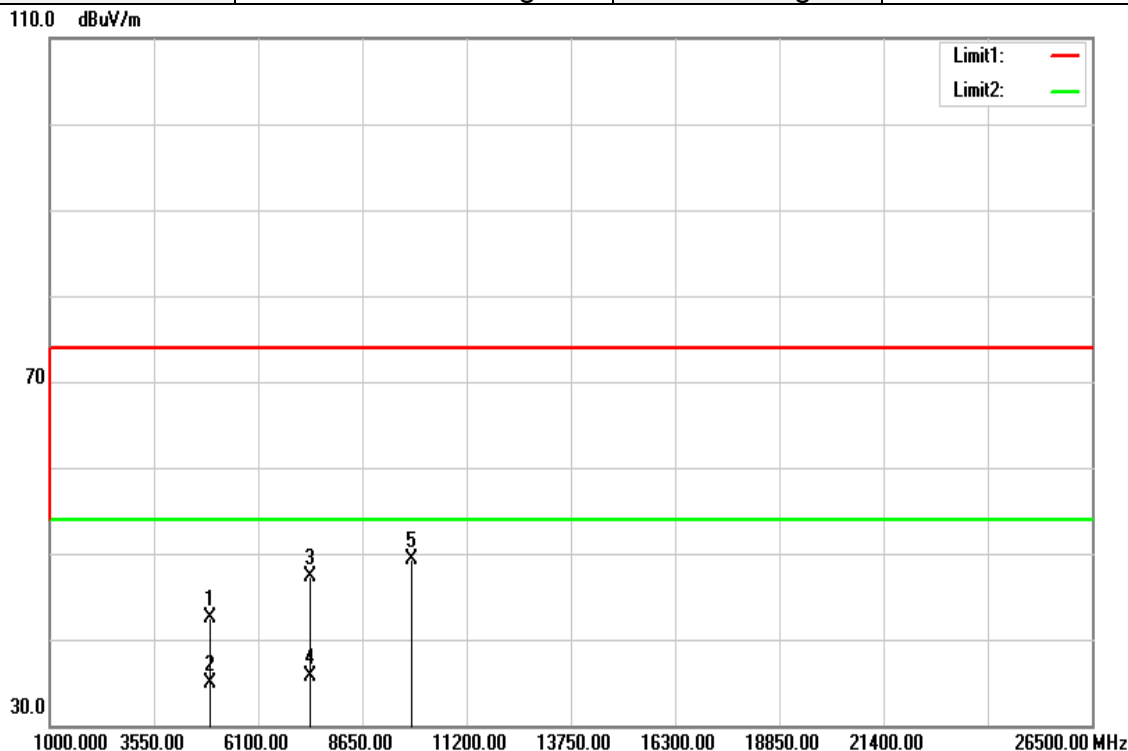


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4874.000	40.88	5.23	46.11	74.00	-27.89	peak
4874.000	35.74	5.23	40.97	54.00	-13.03	AVG
7311.000	33.59	12.94	46.53	74.00	-27.47	peak
7311.000	23.42	12.94	36.36	54.00	-17.64	AVG
9748.000	31.36	17.60	48.96	74.00	-25.04	peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode:	IEEE 802.11b High CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Harmonic	Test Date	Nov 08, 2016
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage:	120Vac / 60Hz

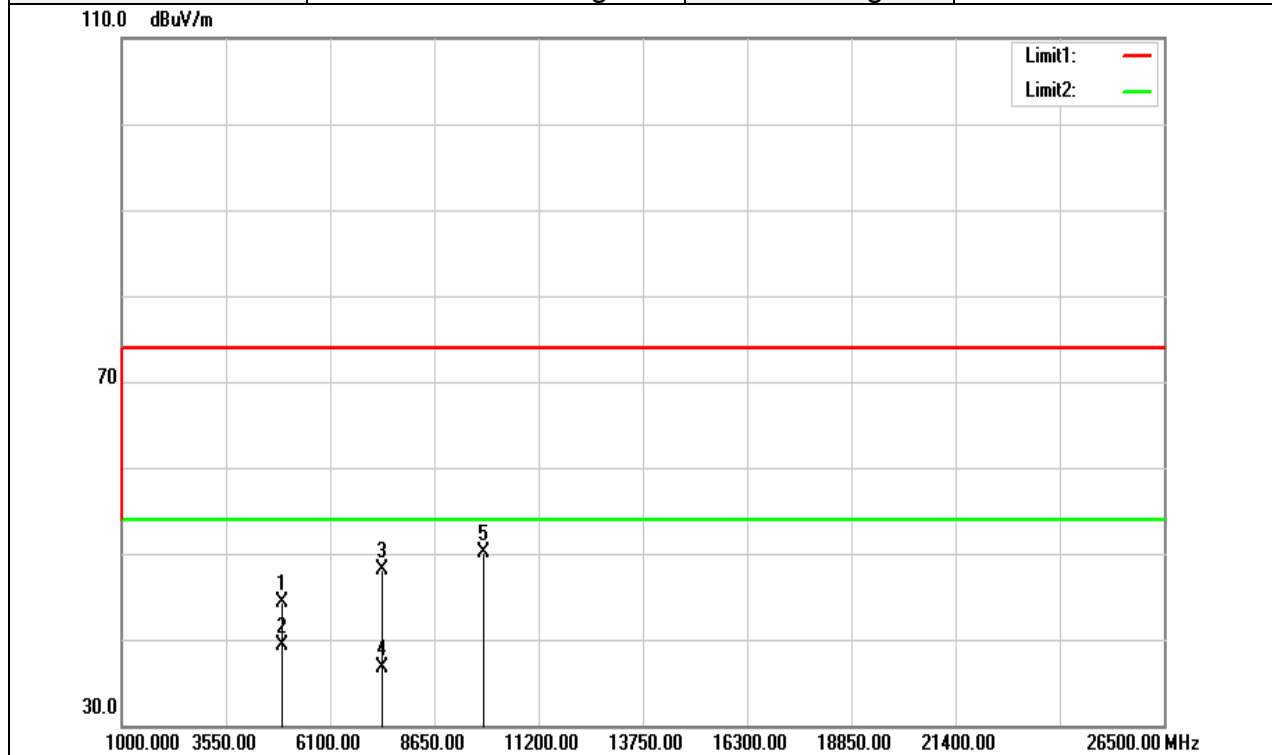


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4924.000	37.15	5.37	42.52	74.00	-31.48	peak
4924.000	29.45	5.37	34.82	54.00	-19.18	AVG
7386.000	34.03	13.17	47.20	74.00	-26.80	peak
7386.000	22.51	13.17	35.68	54.00	-18.32	AVG
9848.000	31.73	17.60	49.33	74.00	-24.67	peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode:	IEEE 802.11b High CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Harmonic	Test Date	Nov 08, 2016
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage:	120Vac / 60Hz



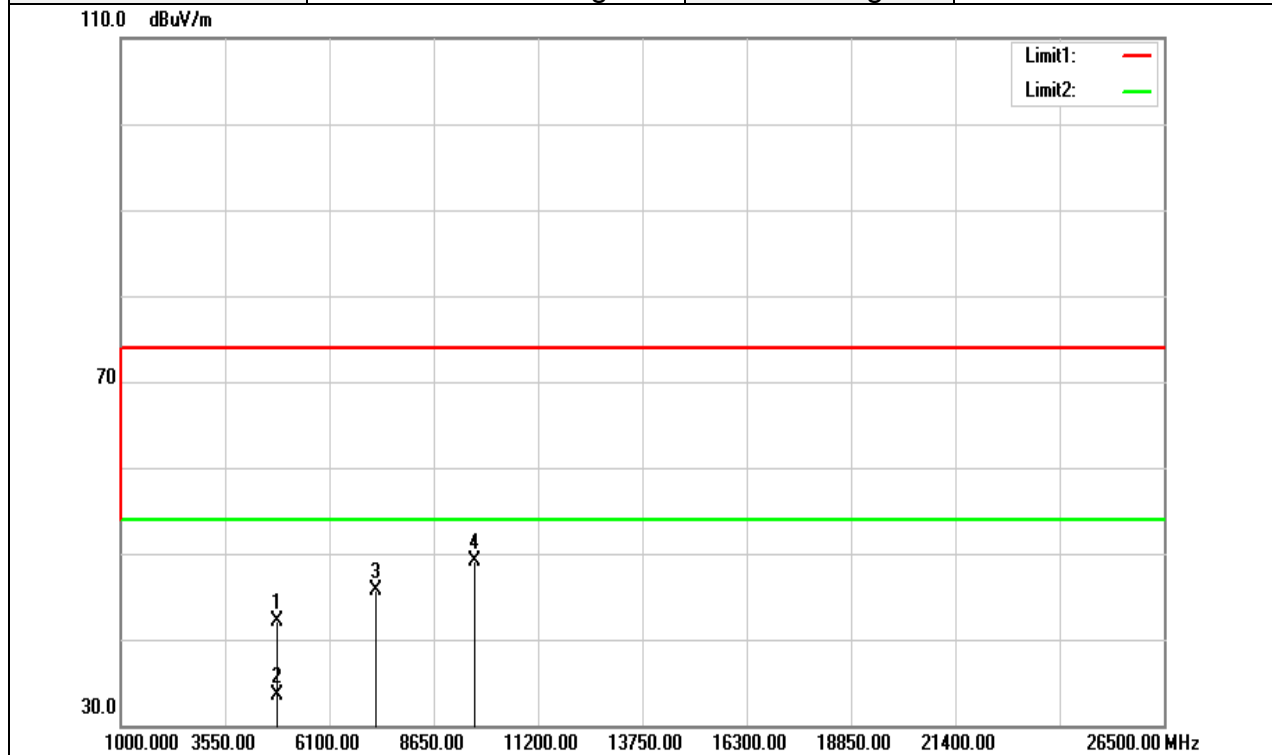
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4924.000	39.01	5.37	44.38	74.00	-29.62	peak
4924.000	33.94	5.37	39.31	54.00	-14.69	AVG
7386.000	34.98	13.17	48.15	74.00	-25.85	peak
7386.000	23.46	13.17	36.63	54.00	-17.37	AVG
9848.000	32.45	17.60	50.05	74.00	-23.95	peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit



Test Mode:	IEEE 802.11g Low CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Harmonic	Test Date	Nov 08, 2016
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage:	120Vac / 60Hz

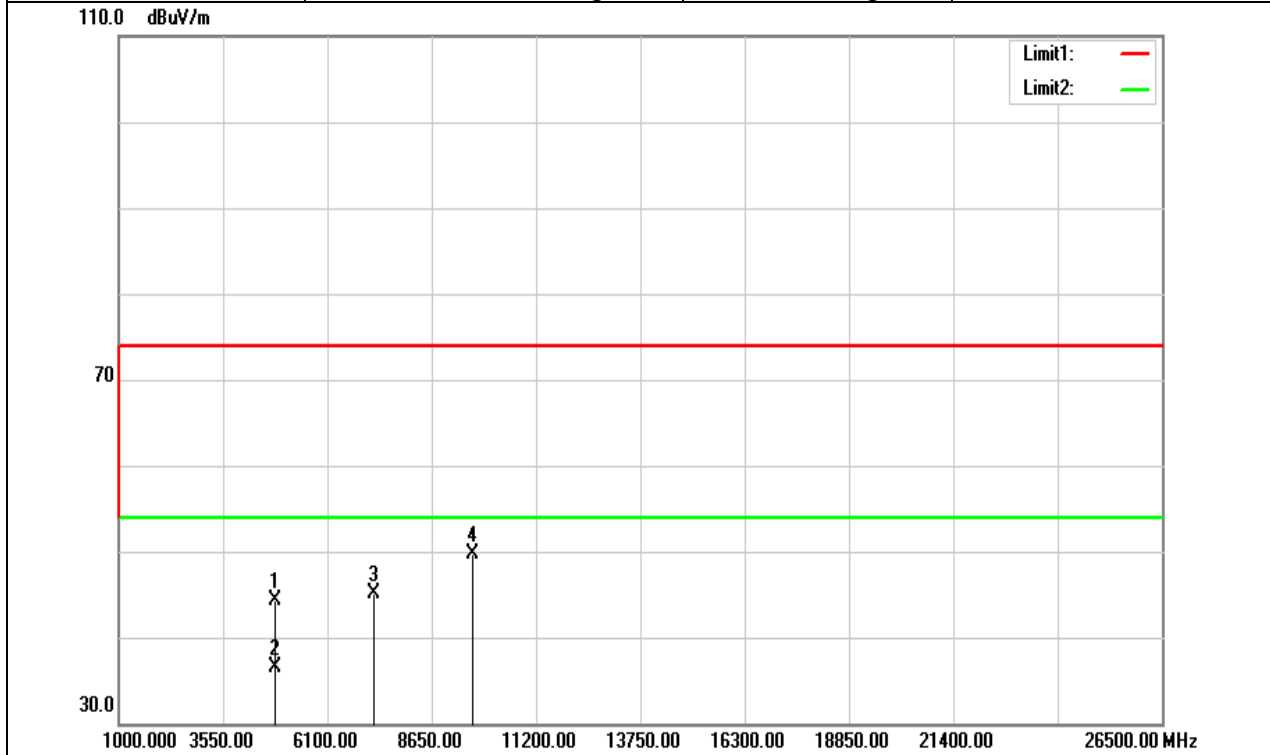


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4824.000	36.92	5.10	42.02	74.00	-31.98	peak
4824.000	28.46	5.10	33.56	54.00	-20.44	AVG
7236.000	33.03	12.71	45.74	74.00	-28.26	peak
9648.000	31.56	17.60	49.16	74.00	-24.84	peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode:	IEEE 802.11g Low CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Harmonic	Test Date	Nov 08, 2016
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage:	120Vac / 60Hz

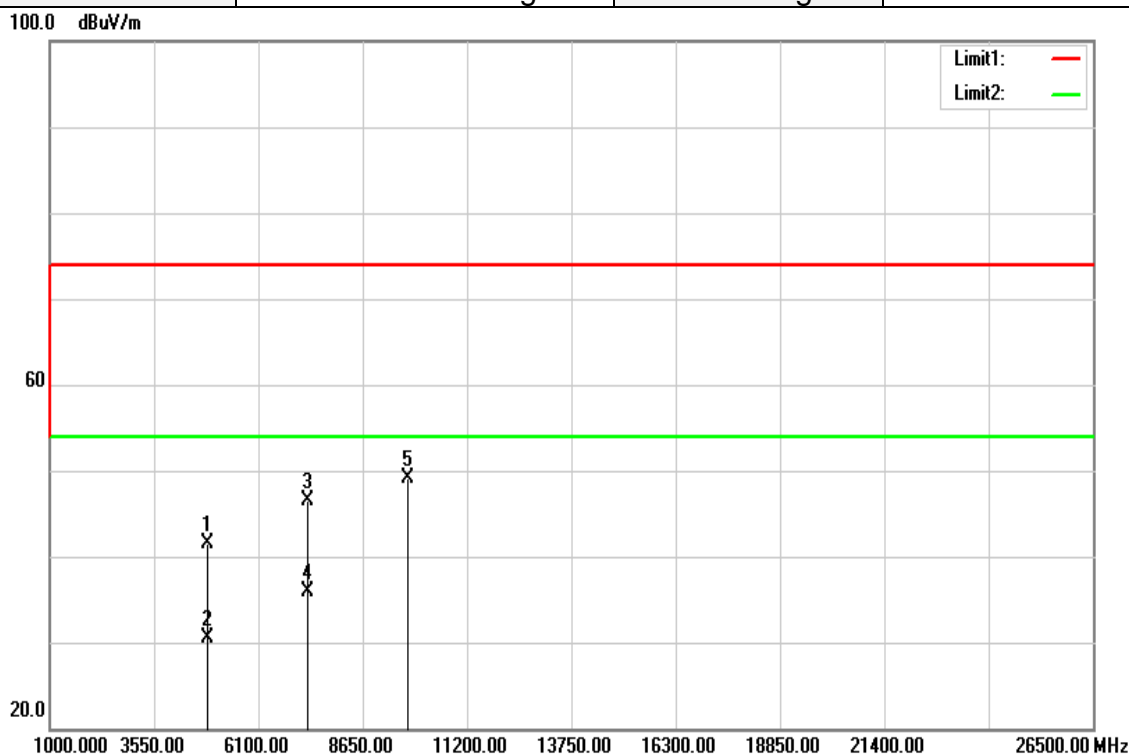


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4824.000	39.15	5.10	44.25	74.00	-29.75	peak
4824.000	31.40	5.10	36.50	54.00	-17.50	AVG
7236.000	32.34	12.71	45.05	74.00	-28.95	peak
9648.000	32.19	17.60	49.79	74.00	-24.21	peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode:	IEEE 802.11g Mid CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Harmonic	Test Date	Nov 08, 2016
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage:	120Vac / 60Hz

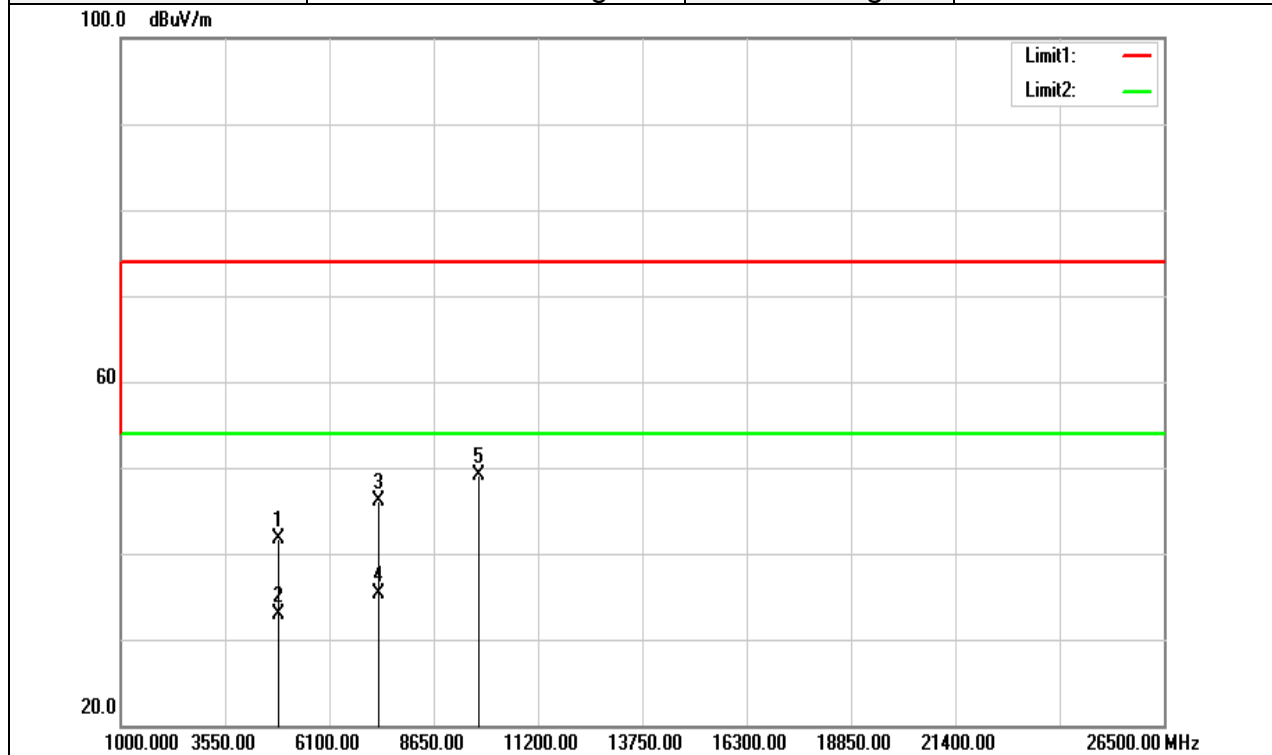


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4874.000	36.18	5.23	41.41	74.00	-32.59	peak
4874.000	25.23	5.23	30.46	54.00	-23.54	AVG
7311.000	33.54	12.94	46.48	74.00	-27.52	peak
7311.000	22.92	12.94	35.86	54.00	-18.14	AVG
9748.000	31.48	17.60	49.08	74.00	-24.92	peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode:	IEEE 802.11g Mid CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Harmonic	Test Date	Nov 08, 2016
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage:	120Vac / 60Hz

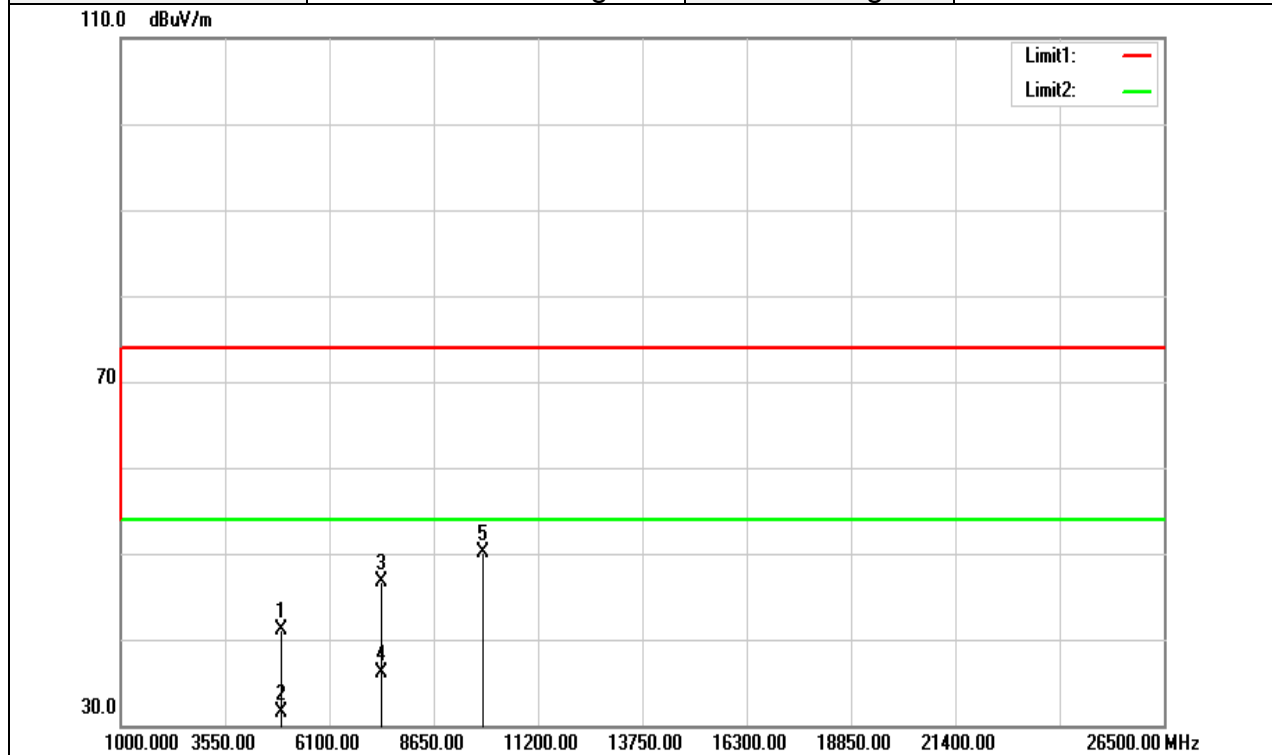


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4874.000	36.56	5.23	41.79	74.00	-32.21	peak
4874.000	27.58	5.23	32.81	54.00	-21.19	AVG
7311.000	33.16	12.94	46.10	74.00	-27.90	peak
7311.000	22.38	12.94	35.32	54.00	-18.68	AVG
9748.000	31.41	17.60	49.01	74.00	-24.99	peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode:	IEEE 802.11g High CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Harmonic	Test Date	Nov 08, 2016
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage:	120Vac / 60Hz

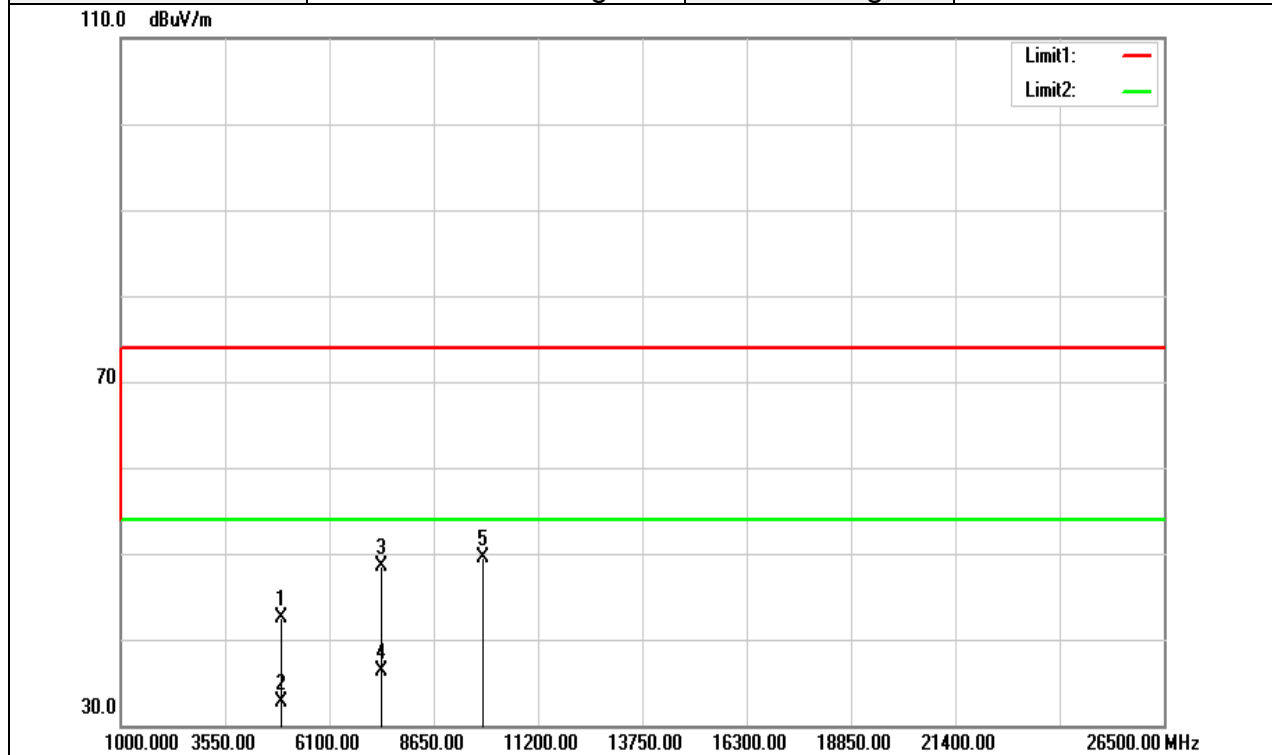


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4924.000	35.76	5.37	41.13	74.00	-32.87	peak
4924.000	26.10	5.37	31.47	54.00	-22.53	AVG
7386.000	33.58	13.17	46.75	74.00	-27.25	peak
7386.000	23.01	13.17	36.18	54.00	-17.82	AVG
9848.000	32.48	17.60	50.08	74.00	-23.92	peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode:	IEEE 802.11g High CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Harmonic	Test Date	Nov 08, 2016
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage:	120Vac / 60Hz

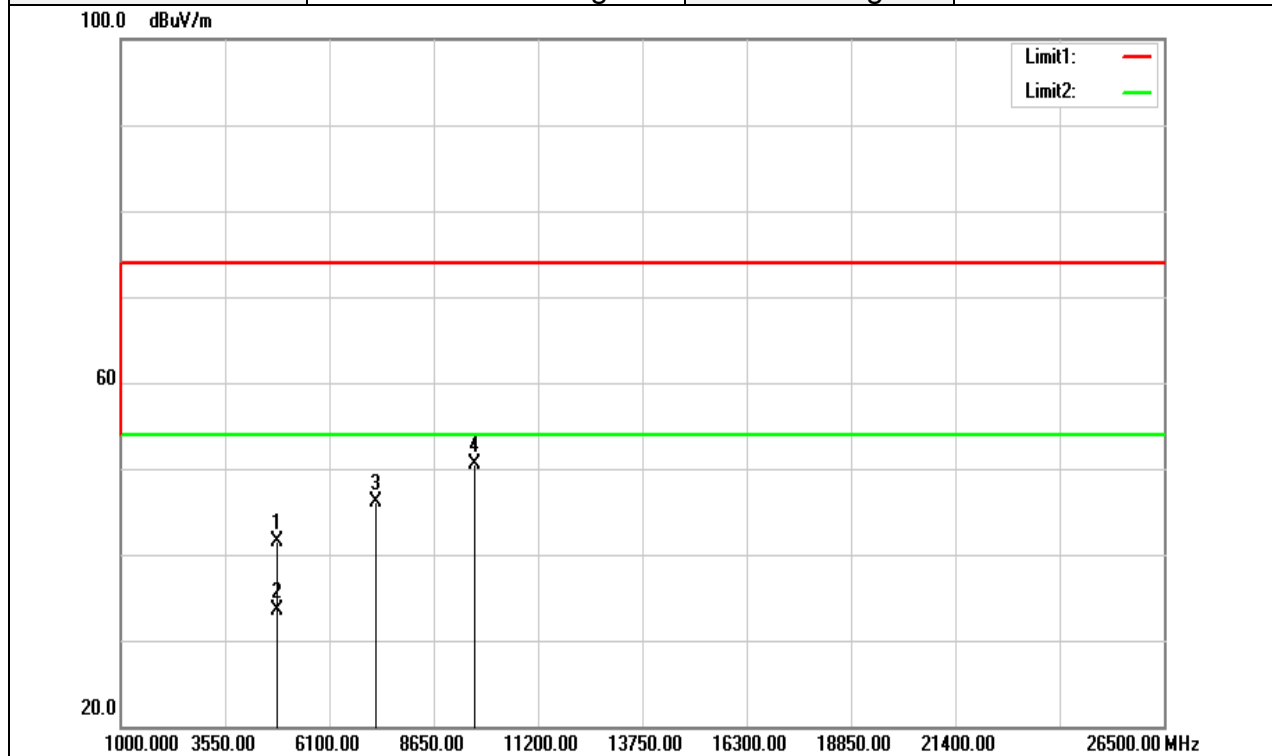


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4924.000	37.21	5.37	42.58	74.00	-31.42	peak
4924.000	27.43	5.37	32.80	54.00	-21.20	AVG
7386.000	35.38	13.17	48.55	74.00	-25.45	peak
7386.000	23.04	13.17	36.21	54.00	-17.79	AVG
9848.000	31.83	17.60	49.43	74.00	-24.57	peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode:	IEEE 802.11n HT20 Low CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Harmonic	Test Date	Nov 08, 2016
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage:	120Vac / 60Hz

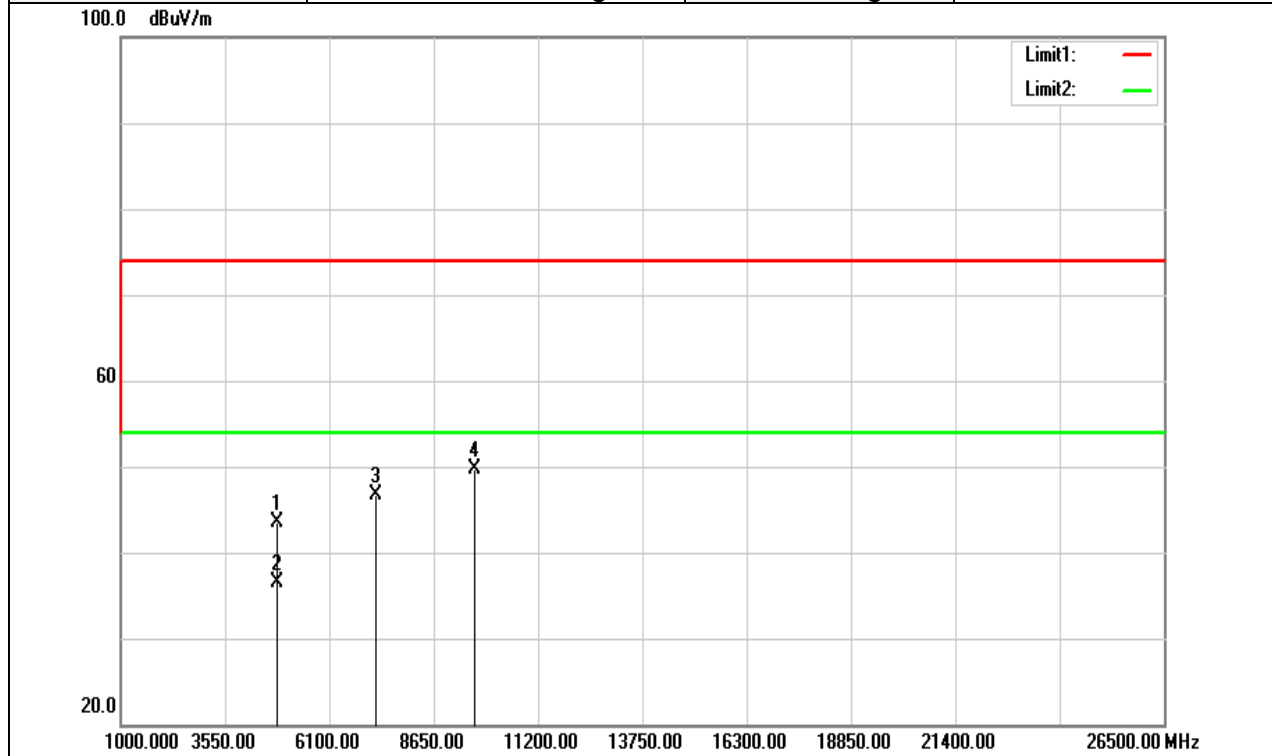


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4824.000	36.31	5.10	41.41	74.00	-32.59	peak
4824.000	28.37	5.10	33.47	54.00	-20.53	AVG
7236.000	33.48	12.71	46.19	74.00	-27.81	peak
9648.000	32.95	17.60	50.55	74.00	-23.45	peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode:	IEEE 802.11n HT20 Low CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Harmonic	Test Date	Nov 08, 2016
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage:	120Vac / 60Hz



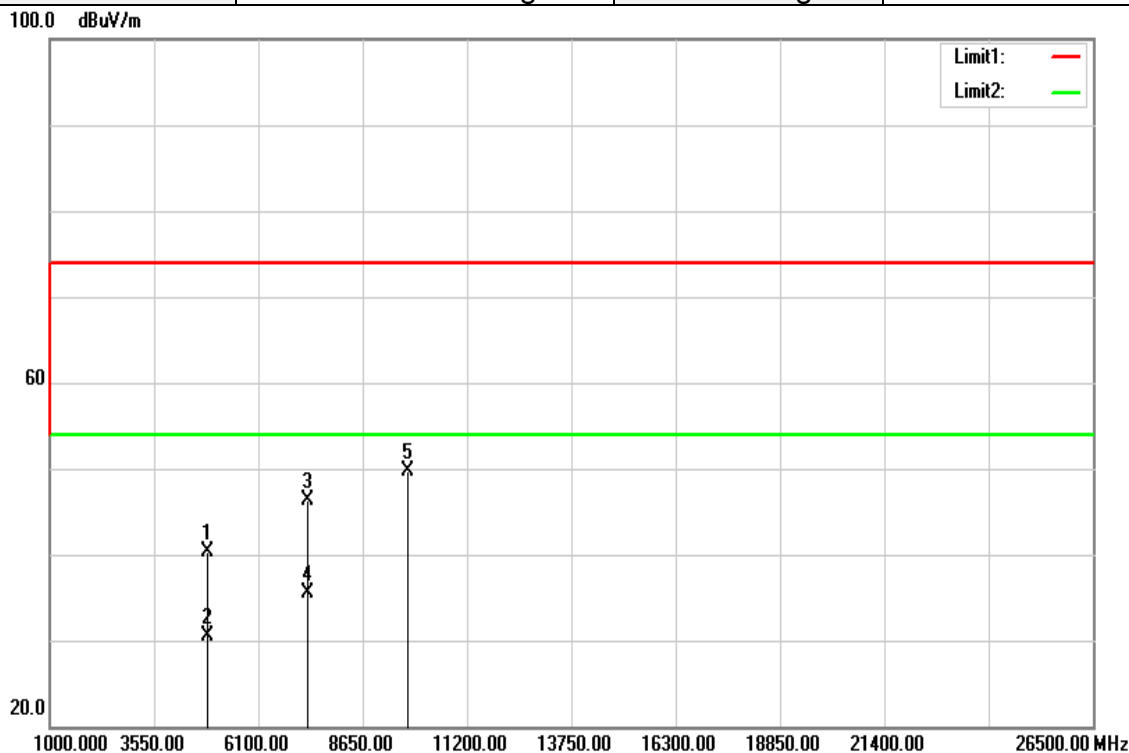
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4824.000	38.46	5.10	43.56	74.00	-30.44	4824.000
4824.000	31.35	5.10	36.45	54.00	-17.55	4824.000
7236.000	33.99	12.71	46.70	74.00	-27.30	7236.000
9648.000	32.11	17.60	49.71	74.00	-24.29	9648.000

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit



Test Mode:	IEEE 802.11n HT20 Mid CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Harmonic	Test Date	Nov 08, 2016
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage:	120Vac / 60Hz

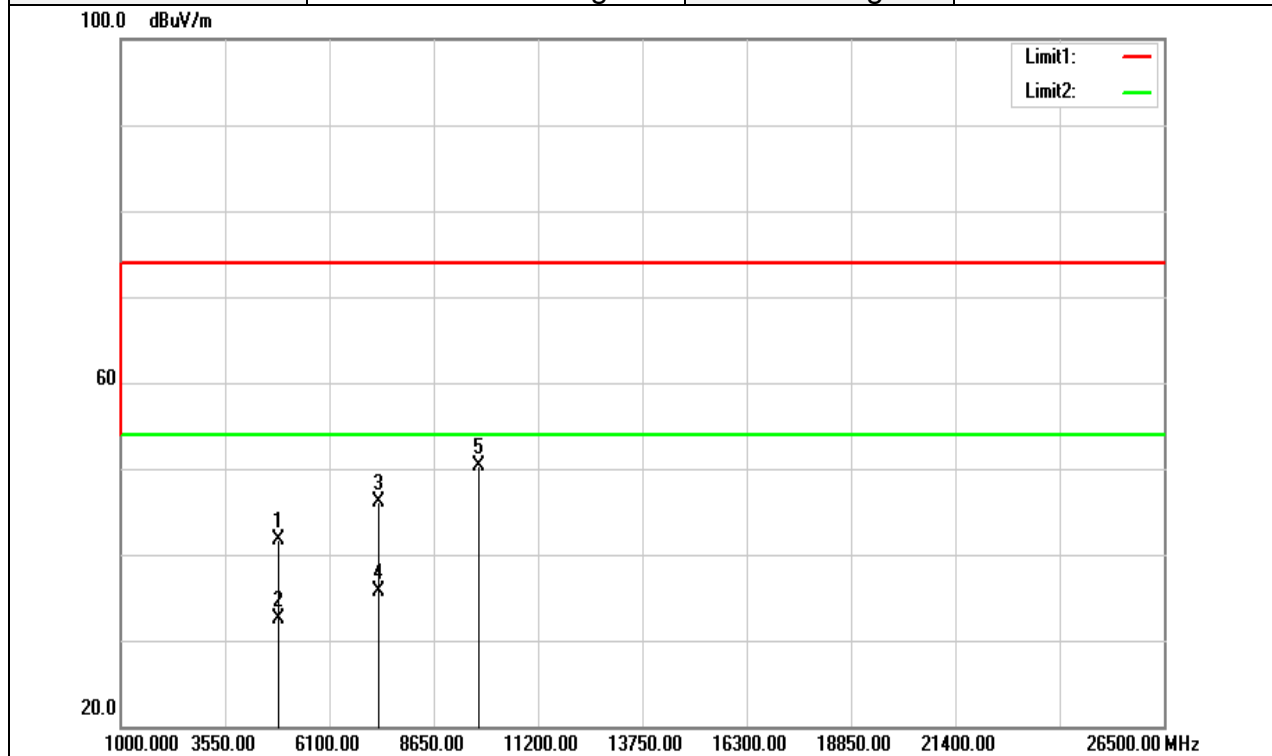


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4874.000	35.14	5.23	40.37	74.00	-33.63	peak
4874.000	25.23	5.23	30.46	54.00	-23.54	AVG
7311.000	33.39	12.94	46.33	74.00	-27.67	peak
7311.000	22.62	12.94	35.56	54.00	-18.44	AVG
9748.000	32.17	17.60	49.77	74.00	-24.23	peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode:	IEEE 802.11n HT20 Mid CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Harmonic	Test Date	Nov 08, 2016
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage:	120Vac / 60Hz

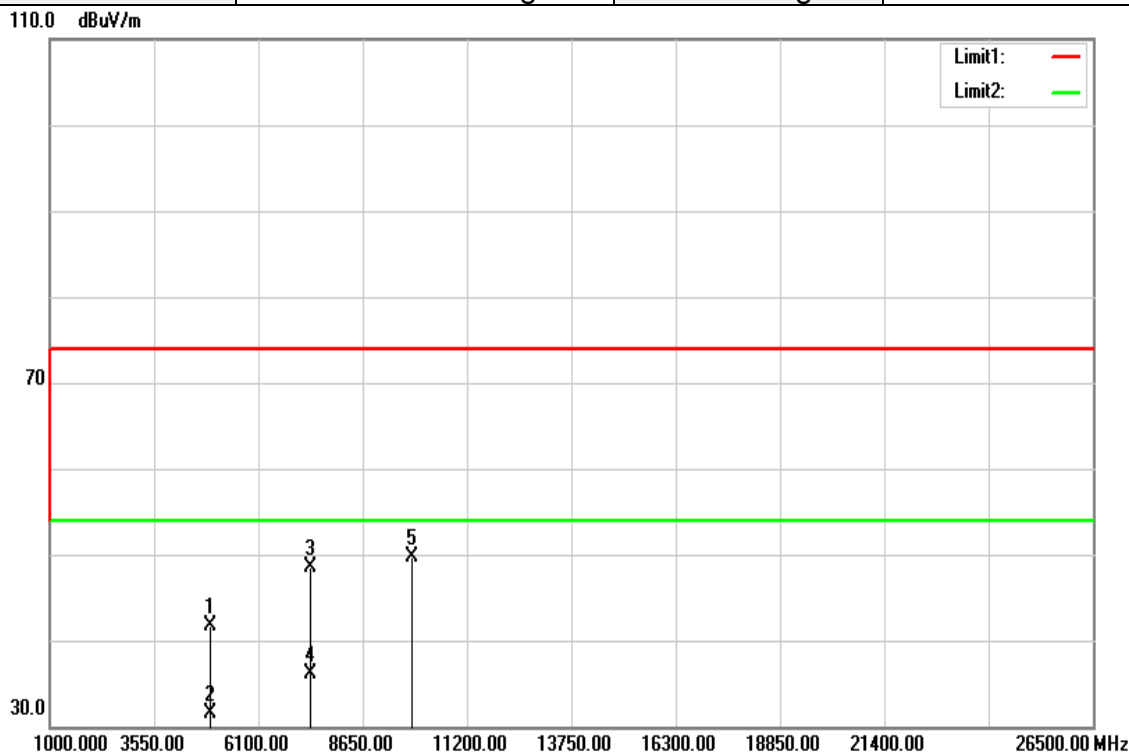


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4874.000	36.53	5.23	41.76	74.00	-32.24	peak
4874.000	27.30	5.23	32.53	54.00	-21.47	AVG
7311.000	33.19	12.94	46.13	74.00	-27.87	peak
7311.000	22.70	12.94	35.64	54.00	-18.36	AVG
9748.000	32.64	17.60	50.24	74.00	-23.76	peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode:	IEEE 802.11n HT20 High CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Harmonic	Test Date	Nov 08, 2016
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage:	120Vac / 60Hz

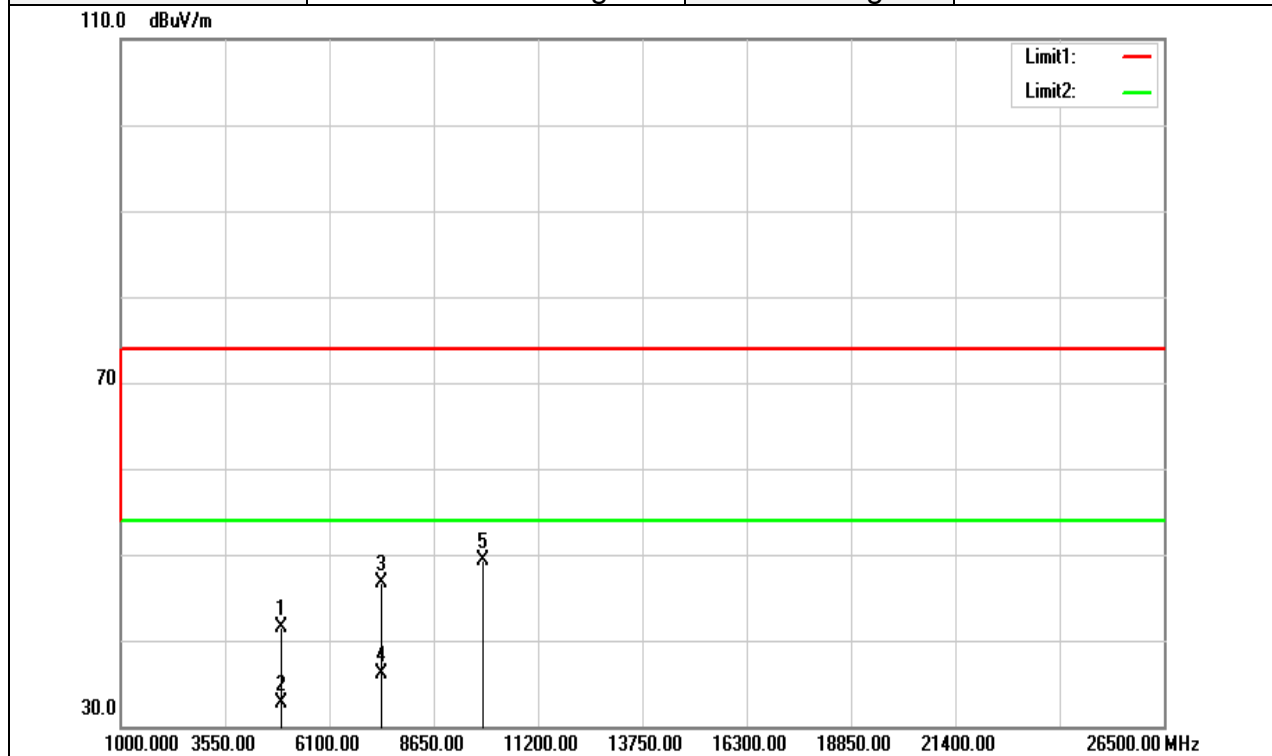


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4924.000	36.33	5.37	41.70	74.00	-32.30	peak
4924.000	26.05	5.37	31.42	54.00	-22.58	AVG
7386.000	35.32	13.17	48.49	74.00	-25.51	peak
7386.000	23.02	13.17	36.19	54.00	-17.81	AVG
9848.000	32.15	17.60	49.75	74.00	-24.25	peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode:	IEEE 802.11n HT20 High CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Harmonic	Test Date	Nov 08, 2016
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage:	120Vac / 60Hz

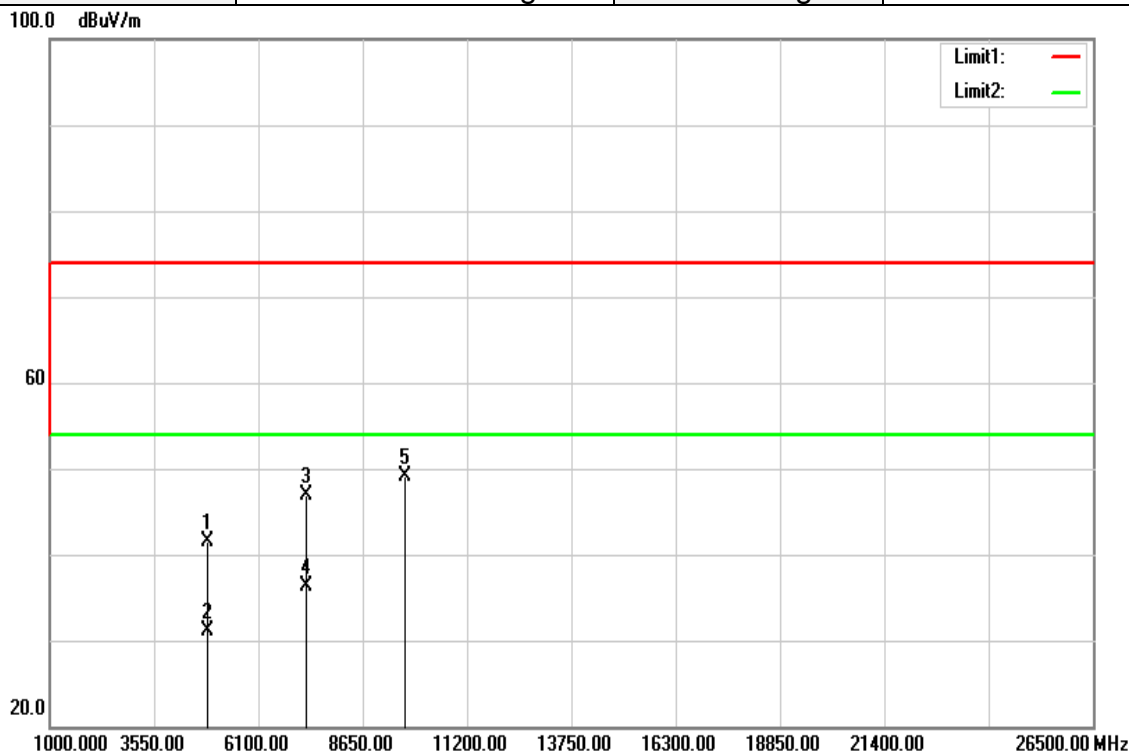


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4924.000	36.07	5.37	41.44	74.00	-32.56	peak
4924.000	27.29	5.37	32.66	54.00	-21.34	AVG
7386.000	33.53	13.17	46.70	74.00	-27.30	peak
7386.000	22.93	13.17	36.10	54.00	-17.90	AVG
9848.000	31.63	17.60	49.23	74.00	-24.77	peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode:	IEEE 802.11n HT40 Low CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Harmonic	Test Date	Nov 08, 2016
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage:	120Vac / 60Hz

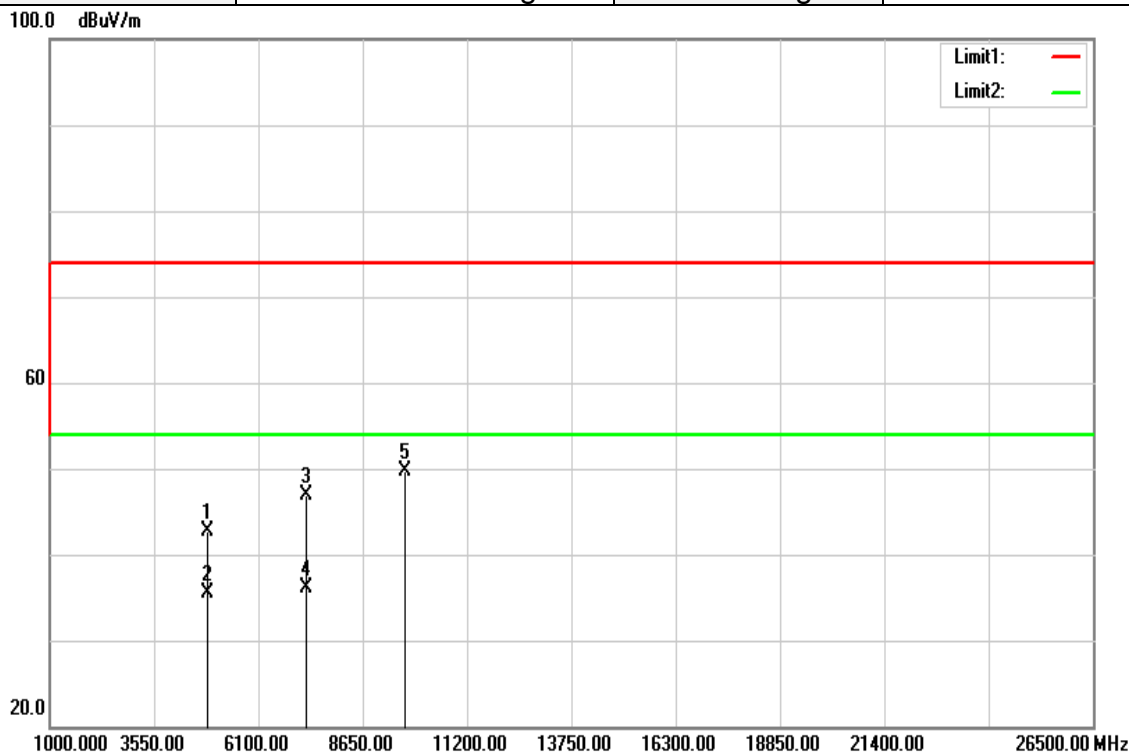


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4844.000	36.37	5.15	41.52	74.00	-32.48	peak
4844.000	25.94	5.15	31.09	54.00	-22.91	AVG
7266.000	34.11	12.80	46.91	74.00	-27.09	peak
7266.000	23.49	12.80	36.29	54.00	-17.71	AVG
9688.000	31.43	17.60	49.03	74.00	-24.97	peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode:	IEEE 802.11n HT40 Low CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Harmonic	Test Date	Nov 08, 2016
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage:	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4844.000	37.58	5.15	42.73	74.00	-31.27	peak
4844.000	30.31	5.15	35.46	54.00	-18.54	AVG
7266.000	34.18	12.80	46.98	74.00	-27.02	peak
7266.000	23.37	12.80	36.17	54.00	-17.83	AVG
9688.000	32.16	17.60	49.76	74.00	-24.24	peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode:	IEEE 802.11n HT40 Mid CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Harmonic	Test Date	Nov 08, 2016
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage:	120Vac / 60Hz

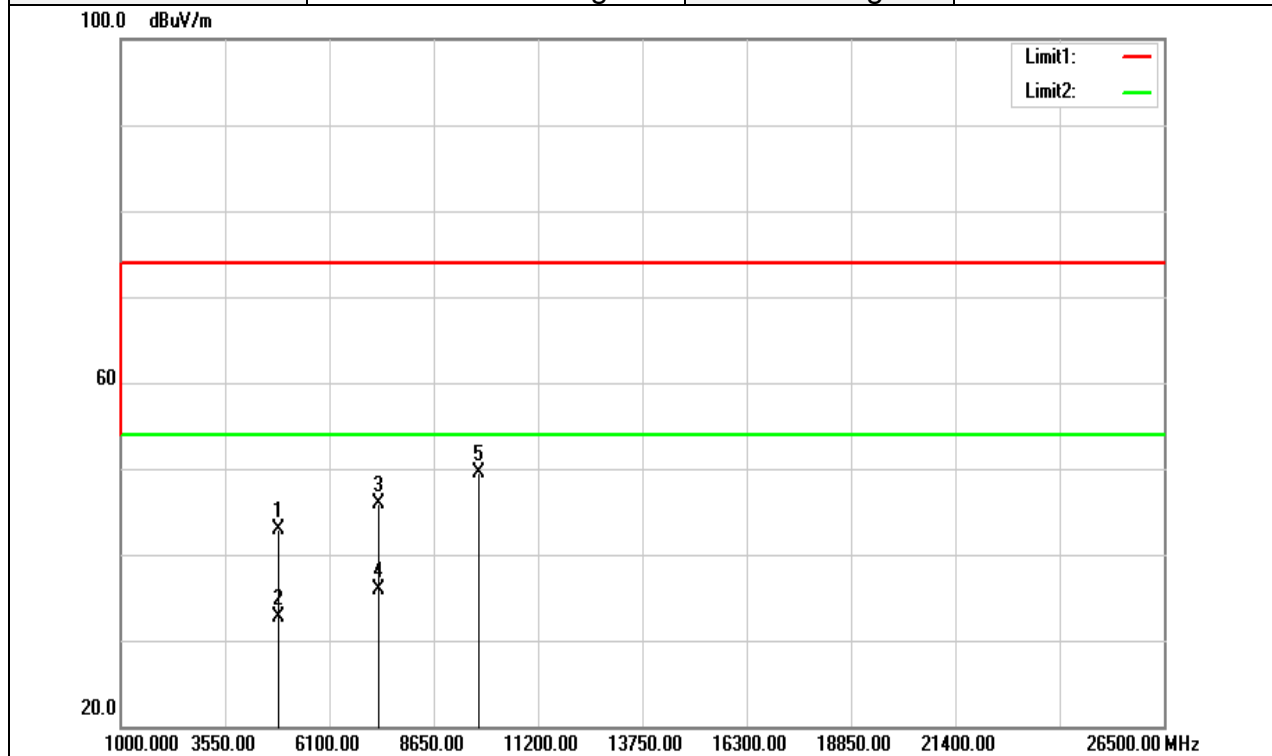


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4874.000	35.83	5.23	41.06	74.00	-32.94	peak
4874.000	25.89	5.23	31.12	54.00	-22.88	AVG
7311.000	33.23	12.94	46.17	74.00	-27.83	peak
7311.000	22.97	12.94	35.91	54.00	-18.09	AVG
9748.000	32.06	17.60	49.66	74.00	-24.34	peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode:	IEEE 802.11n HT40 Mid CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Harmonic	Test Date	Nov 08, 2016
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage:	120Vac / 60Hz



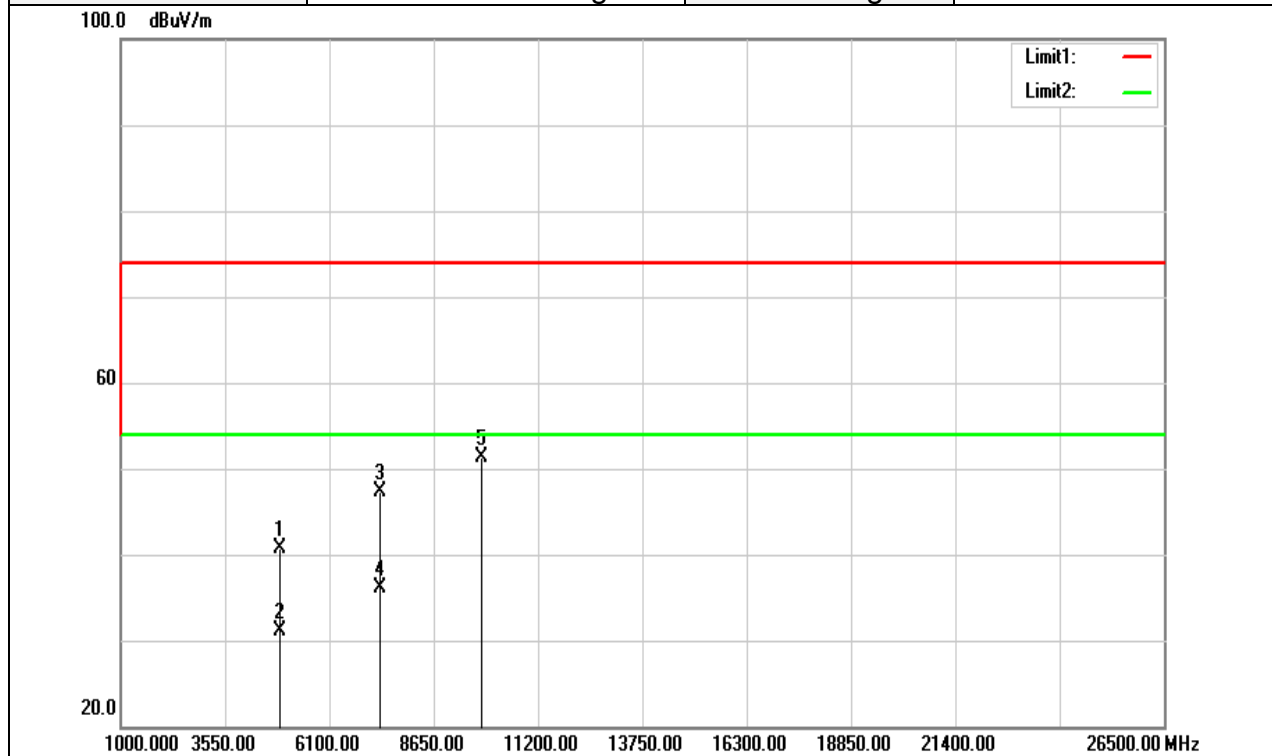
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4874.000	37.60	5.23	42.83	74.00	-31.17	peak
4874.000	27.57	5.23	32.80	54.00	-21.20	AVG
7311.000	32.87	12.94	45.81	74.00	-28.19	peak
7311.000	22.92	12.94	35.86	54.00	-18.14	AVG
9748.000	32.00	17.60	49.60	74.00	-24.40	peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit



Test Mode:	IEEE 802.11n HT40 High CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Harmonic	Test Date	Nov 08, 2016
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage:	120Vac / 60Hz

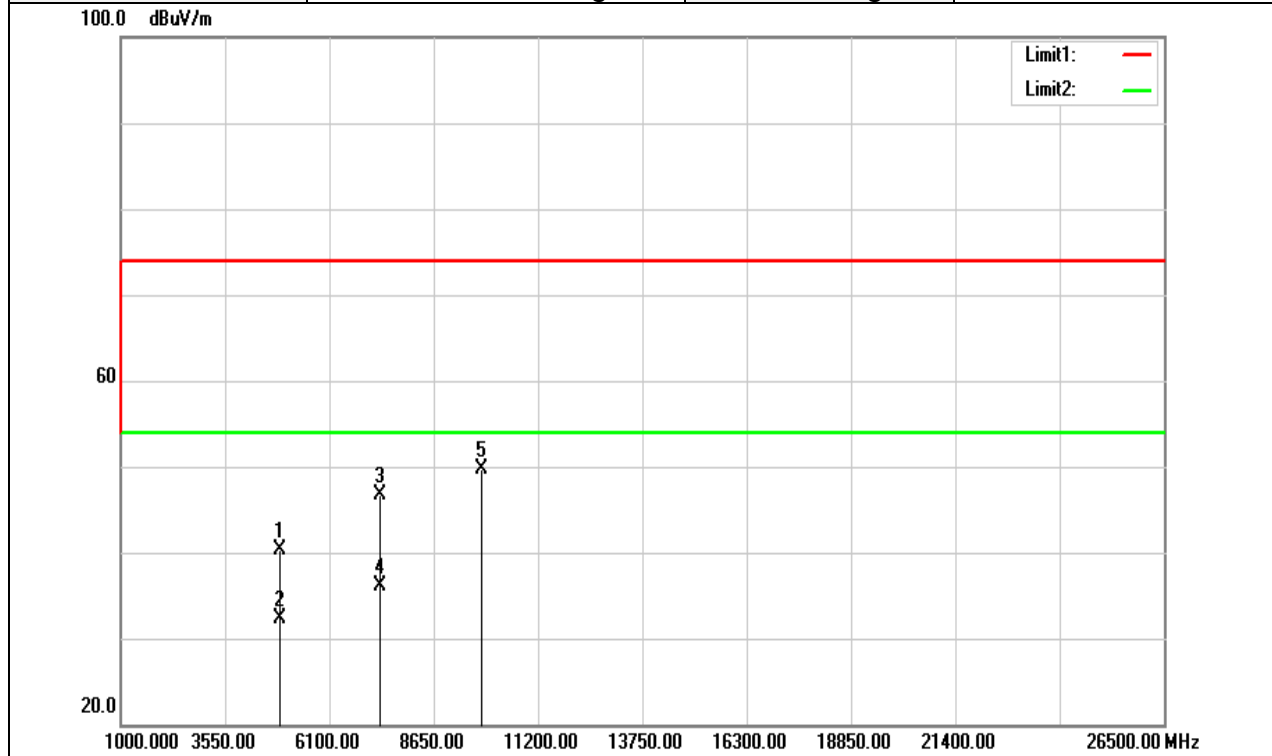


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4904.000	35.38	5.31	40.69	74.00	-33.31	peak
4904.000	25.71	5.31	31.02	54.00	-22.98	AVG
7356.000	34.24	13.08	47.32	74.00	-26.68	peak
7356.000	22.98	13.08	36.06	54.00	-17.94	AVG
9808.000	33.64	17.60	51.24	74.00	-22.76	peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode:	IEEE 802.11n HT40 High CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Harmonic	Test Date	Nov 08, 2016
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage:	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4904.000	35.04	5.31	40.35	74.00	-33.65	peak
4904.000	27.06	5.31	32.37	54.00	-21.63	AVG
7356.000	33.69	13.08	46.77	74.00	-27.23	peak
7356.000	22.98	13.08	36.06	54.00	-17.94	AVG
9808.000	32.15	17.60	49.75	74.00	-24.25	peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit