

# FCC RADIO TEST REPORT

## FCC 47 CFR PART 15 SUBPART C

Test Standard	FCC Part 15.247 and RSS-247 Issue 2
FCC ID	M82-AIM8Q
ISED No.	9404A- AIM8Q
Brand name	ADVANTECH
Product name	Computer
FCC Model No.	AIM8Q, AIM8Qxxxxxxxxxxxxxxxxxx, AIM-x5BTxxxxxxxxxxxxx(where "x" may be any alphanumeric character, "-" or blank for marketing purpose and no impact safety related critical components and constructions)
IC Model No.	AIM8Q, AIM-25BT, AIM-35BT, AIM-55BT, AIM-65BT, AIM-75BT
Test Result	Pass

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:

Tested by:

A handwritten signature in black ink, appearing to read "Sam Chuang", written over a horizontal line.

Sam Chuang  
Manager

A handwritten signature in black ink, appearing to read "Ed Chiang", written over a horizontal line.

Ed Chiang  
Engineer

## **Revision History**

Rev.	Issue Date	Revisions	Revised By
00	June 8, 2017	Initial Issue	Vicki Huang

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### APPENDIX 1 - PHOTOGRAPHS OF EUT

## 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
FCC Model Name	AIM8Q, AIM8Qxxxxxxxxxxxxxxxx, AIM-x5BTxxxxxxxxxxxxx(where "x" may be any alphanumeric character, "-" or blank for marketing purpose and no impact safety related critical components and constructions)
IC Model Name	AIM8Q, AIM-25BT, AIM-35BT, AIM-55BT, AIM-65BT, AIM-75BT
Model Discrepancy	All models are electrically identical, different model names are for marketing purpose
Received Date	April 6, 2017
Date of Test	April 25 ~ May 17, 2017
Output Power(W)	IEEE 802.11b mode: 0.0310 (EIRP : 0.0380) IEEE 802.11g mode: 0.1074(EIRP : 0.1318) IEEE 802.11n HT 20 MHz mode: 0.0706 (EIRP : 0.0867) IEEE 802.11n HT 40 MHz mode: 0.0679 (EIRP : 0.0834)
Power Supply	1. VDC from Power Adapter Chicony / A16-018N1A I/P: 100-240Vac, 1A, 50-60Hz O/P: 5.15Vdc, 3A, 9.1Vdc, 2A, 18W 2. Battery ADVANTECH / AIM-BAT-8 Rating: 3.8V, 4900mAh, 18.62Wh

## 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
Bandwidth	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

Antenna Type	<input checked="" type="checkbox"/> PIFA <input type="checkbox"/> PCB <input type="checkbox"/> Dipole <input type="checkbox"/> Coils
Antenna Gain	Gain: 0.89dBi

## 1.4 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 30 to 1000 MHz	+/- 3.97
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 1 to 18GHz	+/- 3.58
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 18 to 26 GHz	+/- 3.59
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 26 to 40 GHz	+/- 3.81
Conducted Emission (Mains Terminals), 9kHz to 30MHz	+/- 2.48

**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	Eric Lee	
Radiation	Ed Chiang	
RF Conducted	Eric Lee	

**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 Date	Cal Due
Power Meter	Anritsu	ML2495A	1012009	07/04/2016	07/03/2017
Power Sensor	Anritsu	MA2411B	917072	07/04/2016	07/03/2017
Base Station	R&S	CMU 200	101245	07/29/2016	07/28/2017
Base Station	Anritsu	MT-8820C	6200938900	07/26/2016	07/25/2017
Spectrum Analyzer	R&S	FSV 40	101073	10/05/2016	10/04/2017
Base Station	Anritsu	MT-8820C	6200938900	07/26/2016	07/25/2017

3M 966 Chamber Test Site					
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due
Bilog Antenna	Sunol Sciences	JB3	A030105	07/03/2016	07/02/2017
Horn Antenna	EMCO	3117	00055165	02/20/2017	02/19/2018
Pre-Amplifier	EMCI	EMC 012635	980151	06/23/2016	06/22/2017
Pre-Amplifier	EMEC	EM330	060609	06/08/2016	06/07/2017
Spectrum Analyzer	Agilent	E4446A	US42510252	12/05/2016	12/04/2017
Loop Ant	COM-POWER	AL-130	121051	03/02/2017	03/01/2018
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R

AC Conducted Emissions Test Site					
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due
LISN	R&S	ENV216	101054	05/18/2017	05/17/2018
LISN	SCHWARZBECK	NSLK 8127	8127-541	02/14/2017	02/13/2018
Receiver	R&S	ESCI	101073	08/20/2016	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
	N/A				

Support Equipment					
No.	Equipment	Brand	Model	Series No.	FCC ID
	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 2 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

FCC Standard Section	IC Standard Section	Report Section	Test Item	Result
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)(a)	4.2	6 dB Bandwidth	Pass
-	RSS-GEN 6.6	4.2	Occupied Bandwidth (99%)	Pass
15.247(b)	RSS-247(5.4)(d)	4.3	Output Power Measurement	Pass
15.247(e)	RSS-247(5.2)(b)	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 :MCS8 IEEE 802.11n HT40 mode :MCS8
Test Channel Frequencies	<b>IEEE 802.11b mode :</b> 1. Lowest Channel : 2412MHz 2. Middle Channel : 2437MHz 3. Highest Channel : 2462MHz <b>IEEE 802.11g mode :</b> 1. Lowest Channel : 2412MHz 2. Middle Channel : 2437MHz 3. Highest Channel : 2462MHz <b>IEEE 802.11n HT20 mode :</b> 1. Lowest Channel : 2412MHz 2. Middle Channel : 2437MHz 3. Highest Channel : 2462MHz <b>IEEE 802.11n HT40 mode :</b> 1. Lowest Channel : 2422MHz 2. Middle Channel : 2437MHz 3. Highest Channel : 2452MHz
Operation Transmitter	IEEE 802.11b mode :1T1R IEEE 802.11g mode :1T1R IEEE 802.11n HT20 mode :1T1R IEEE 802.11n HT40 mode :1T1R

**Remark:**

1. EUT pre-scanned data rate of output power for each mode, the worst data rate were recorded in this report.

### 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	Mode 1:EUT power by AC adapter via power cable. Mode 2:EUT power by Battery.
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	Mode 1:EUT power by AC adapter via power cable. Mode 2:EUT power by Battery.
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 type="checkbox"/> Placed in fixed position at X-Plane (E2-Plane) <input type="checkbox"/> Placed in fixed position at Y-Plane (E1-Plane) <input checked="" type="checkbox"/> Placed in fixed position at Z-Plane (H-Plane)
Worst Polarity	<input type="checkbox"/> Horizontal <input checked="" type="checkbox"/> Vertical

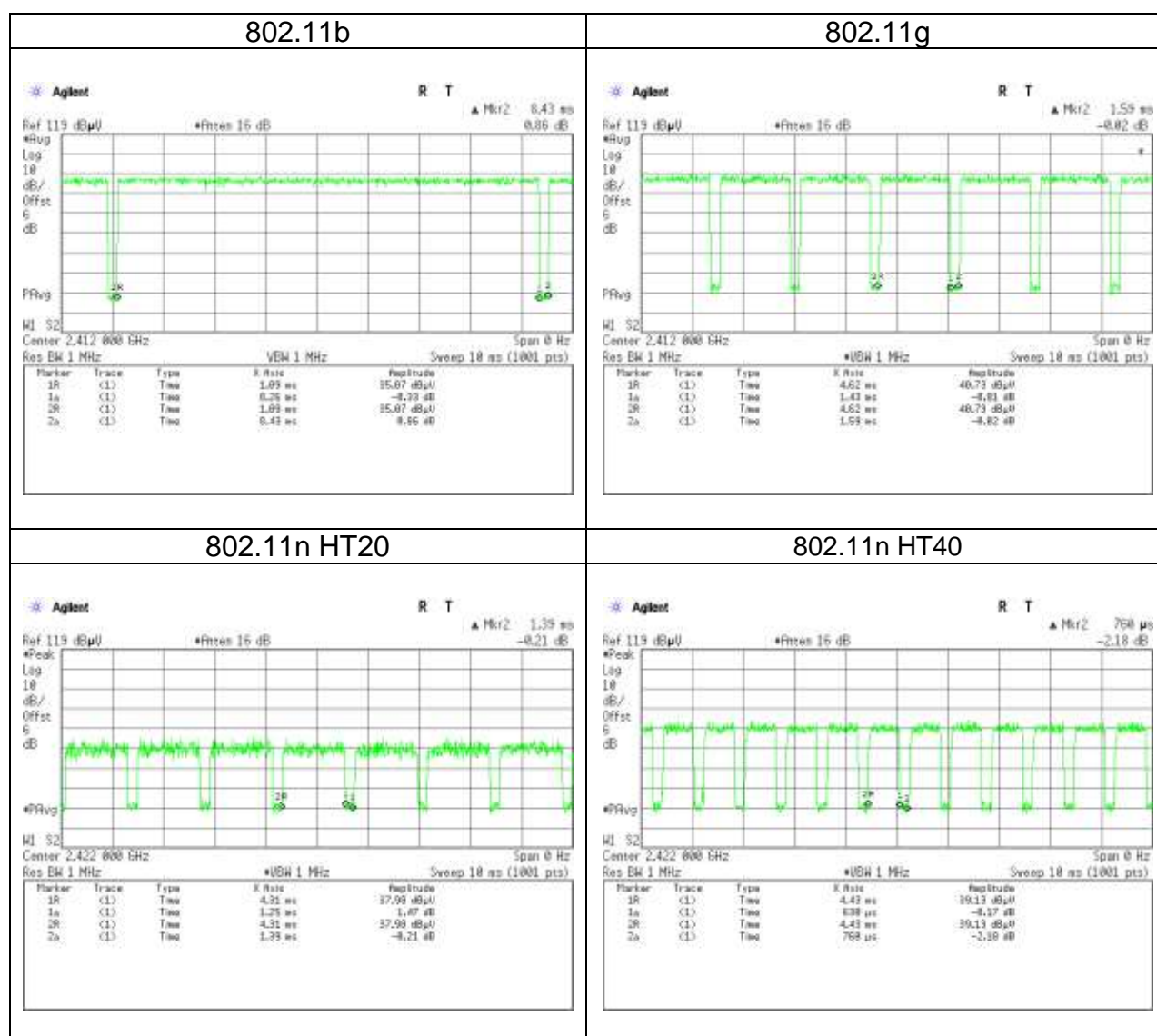
Radiated Emission Measurement Below 1G	
Test Condition	Radiated Emission Below 1G
Voltage/Hz	120V/60Hz
Test Mode	Mode 1:EUT power by AC adapter via power cable. Mode 2:EUT power by Battery.
Worst Mode	<input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> 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(Z-Plane and Vertical) were recorded in this report
3. AC power line conducted emission and for below 1G 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	8.2600	8.4300	97.98%	0.09
802.11g	1.4300	1.5900	89.94%	0.46
802.11n HT20	1.2500	1.3900	89.93%	0.46
802.11n HT40	0.6300	0.7600	82.89%	0.81



## 4. TEST RESULT

### 4.1 AC POWER LINE CONDUCTED EMISSION

#### 4.1.1 Test Limit

According to §15.207(a)(2) and RSS-GEN section 8.8,

Frequency Range (MHz)	Limits(dB $\mu$ V)	
	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

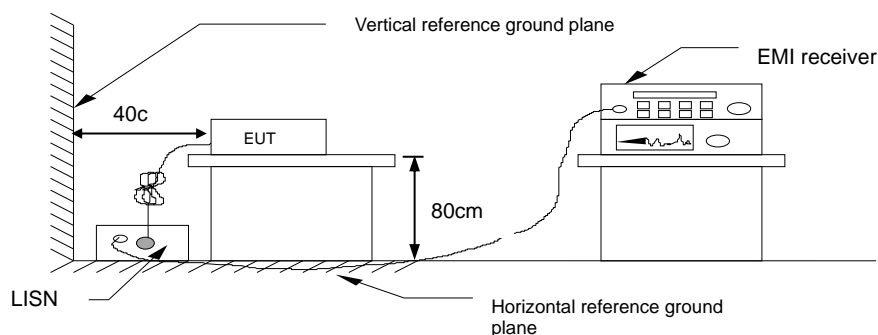
\* Decreases with the logarithm of the frequency.

#### 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

Pass.

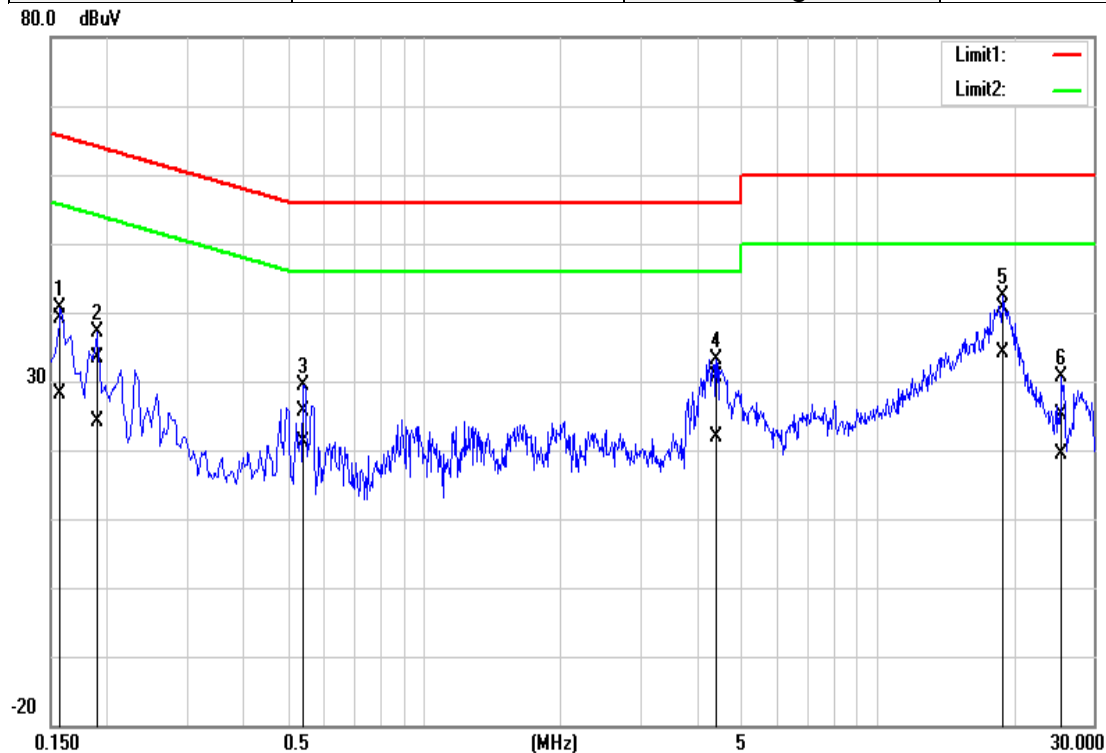
**Test Data**

Test Mode:	Mode 1	Temp/Hum	24(°C)/ 50%RH
Test Voltage:	120Vac / 60Hz	Test Date	2017/4/28
Phase:	Line	Test Engineer	Eric Lee



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)
1	0.1700	25.58	17.11	9.70	35.28	26.81	64.96	54.96	-29.68	-28.15
2	0.5420	17.46	15.06	9.68	27.14	24.74	56.00	46.00	-28.86	-21.26
3	2.7100	12.66	6.18	9.70	22.36	15.88	56.00	46.00	-33.64	-30.12
4	4.3340	21.67	13.33	9.71	31.38	23.04	56.00	46.00	-24.62	-22.96
5*	19.0420	27.50	22.00	9.85	37.35	31.85	60.00	50.00	-22.65	-18.15
6	28.2300	15.78	9.56	9.75	25.53	19.31	60.00	50.00	-34.47	-30.69

Test Mode:	Mode 1	Temp/Hum	27(°C)/ 53%RH
Test Voltage:	120Vac / 60Hz	Test Date	2017/4/28
Phase:	Neutral	Test Engineer	Eric Lee



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)
1	0.1580	29.41	18.42	9.71	39.12	28.13	65.57	55.57	-26.45	-27.44
2	0.1900	23.78	14.39	9.70	33.48	24.09	64.04	54.04	-30.56	-29.95
3	0.5420	15.99	11.45	9.69	25.68	21.14	56.00	46.00	-30.32	-24.86
4	4.4140	20.88	12.07	9.71	30.59	21.78	56.00	46.00	-25.41	-24.22
5*	19.0100	30.69	24.32	9.91	40.60	34.23	60.00	50.00	-19.40	-15.77
6	25.5900	15.29	9.54	9.85	25.14	19.39	60.00	50.00	-34.86	-30.61

## 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(a),

**6 dB Bandwidth** :

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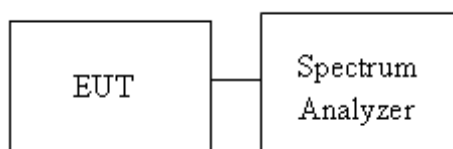
**Occupied Bandwidth(99%)** : For reporting purposes only.

### 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)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 6dB BW (MHz)	Chain 1 6dB BW (MHz)	6dB limit (kHz)
Low	2412	15.7597	-	10.0870	-	≥500
Mid	2437	15.1085	-	9.1304	-	
High	2462	15.1519	-	9.6087	-	

Test mode: IEEE 802.11g mode / 2412-2462 MHz						
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 6dB BW (MHz)	Chain 1 6dB BW (MHz)	6dB limit (kHz)
Low	2412	21.5340	-	16.3913	-	≥500
Mid	2437	19.7105	-	15.7826	-	
High	2462	19.0159	-	15.7826	-	

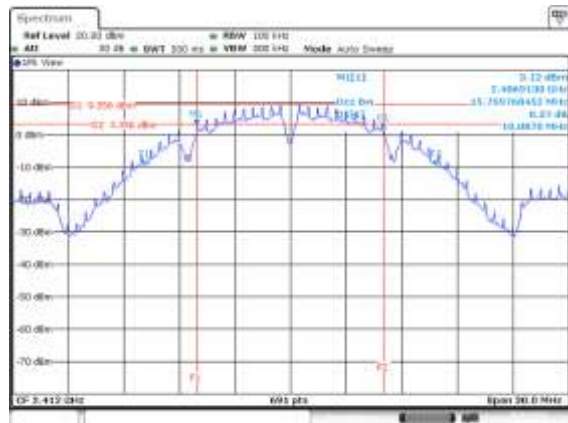
Test mode: IEEE 802.11n HT 20 MHz mode / 2412-2462 MHz						
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 6dB BW (MHz)	Chain 1 6dB BW (MHz)	6dB limit (kHz)
Low	2412	22.6628	-	17.6522	-	≥500
Mid	2437	20.8393	-	16.3913	-	
High	2462	20.1881	-	16.3913	-	

Test mode: IEEE 802.11n HT 40 MHz mode / 2422-2452 MHz						
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 6dB BW (MHz)	Chain 1 6dB BW (MHz)	6dB limit (kHz)
Low	2422	40.6367	-	35.2460	-	>500
Mid	2437	53.1403	-	35.2460	-	
High	2452	50.3617	-	35.8260	-	

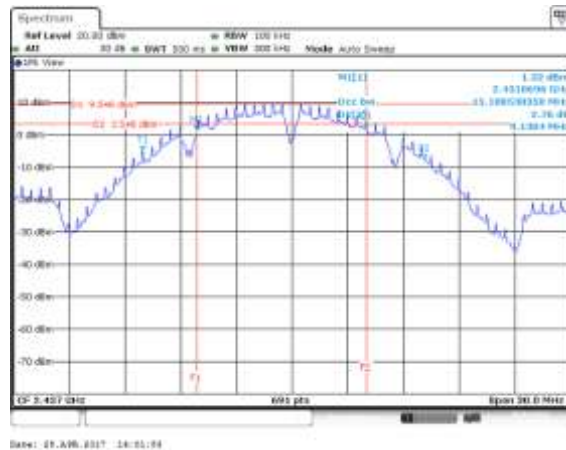
## Test Data

### IEEE 802.11b mode- chain 0

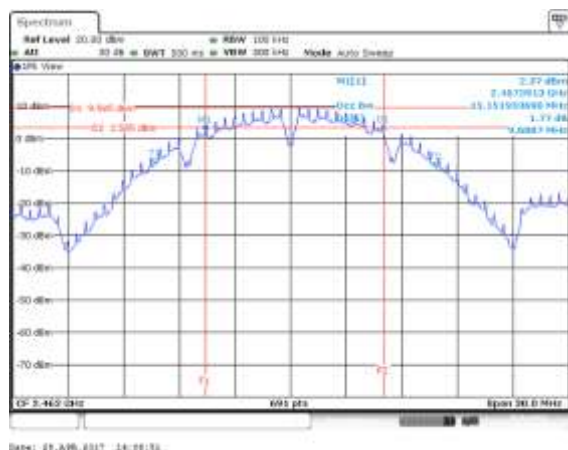
#### Low CH



#### Mid CH

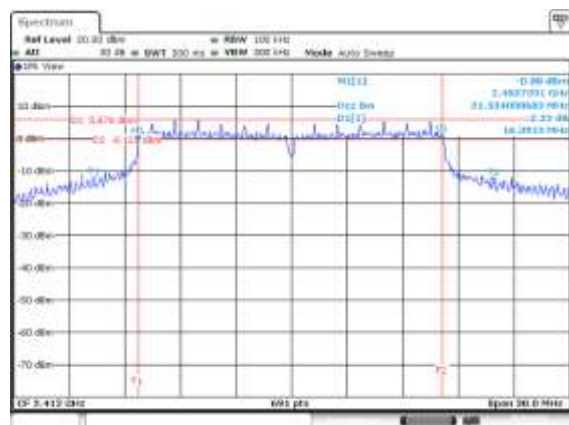


#### High CH

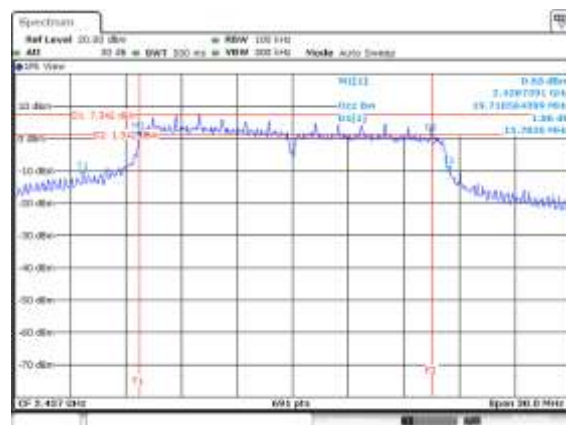


## IEEE 802.11g mode- chain 0

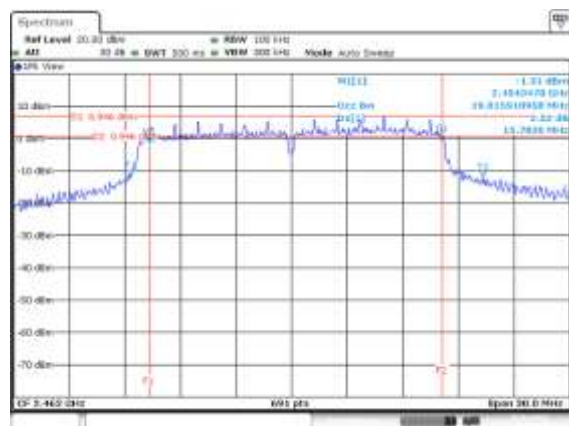
## Low CH



## Mid CH

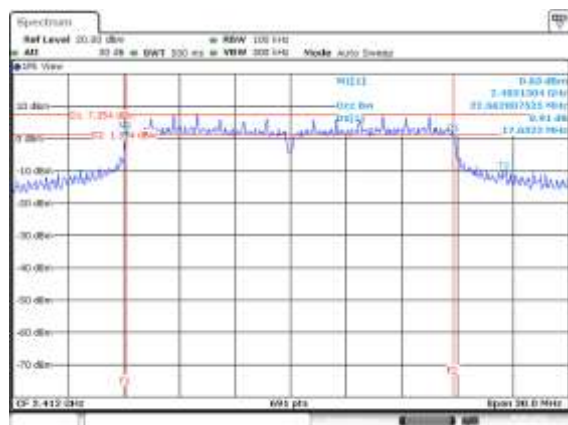


## High CH

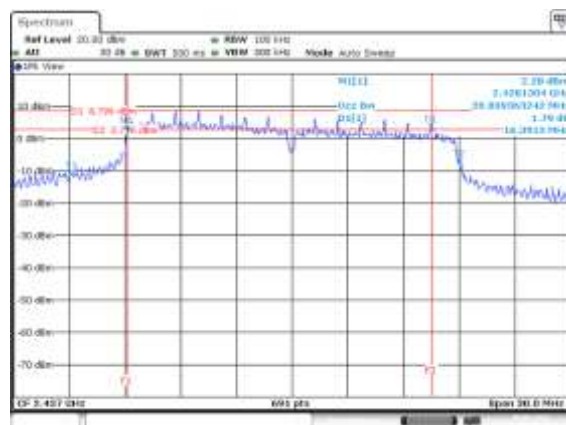


## IEEE 802.11n HT20 mode- chain 0

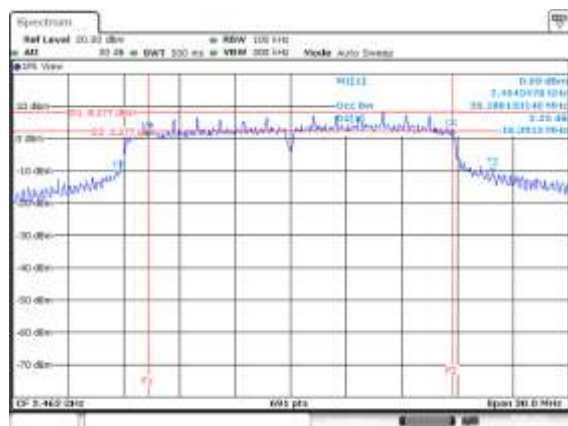
### Low CH



### Mid CH

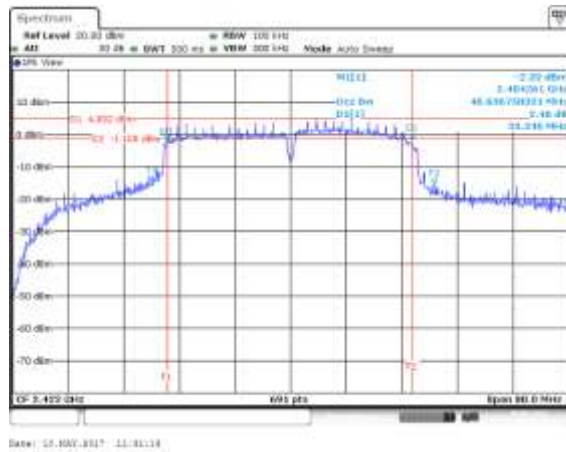


### High CH

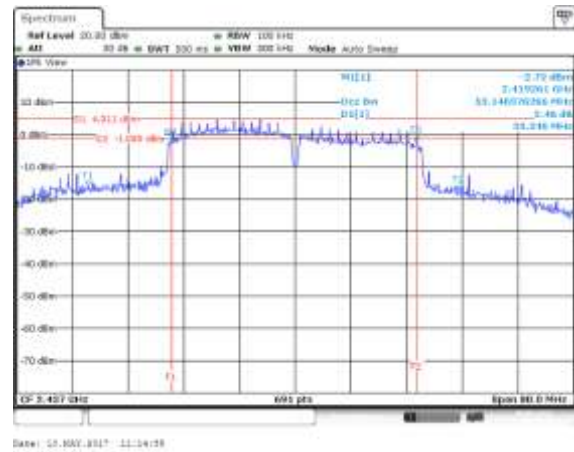


## IEEE 802.11n HT40 mode- chain 0

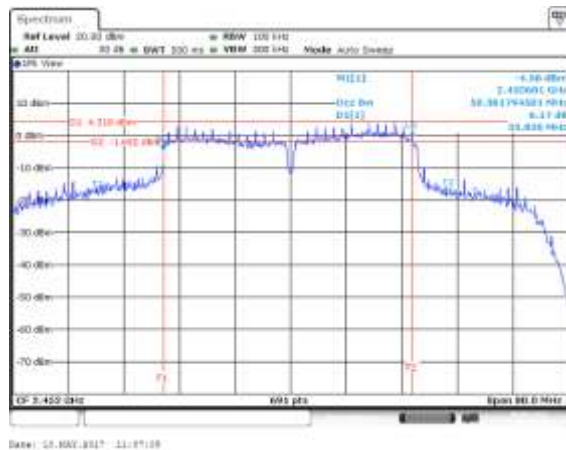
### Low CH



### 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(d),

#### Peak output power :

For systems using digital modulation in the 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt(30 dBm) and the e.i.r.p. shall not exceed 4Watt(36 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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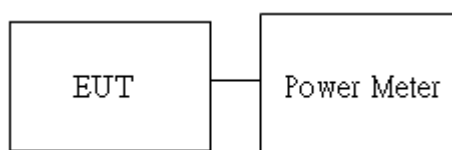
Average output power : For reporting purposes only.

### 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																
Config	CH	Freq. (MHz)	power set		PK Power(dBm)		PK Total Power (dBm)	PK Total Power (W)	ERP PK Total Power (dBm)	ERP PK Total Power (W)	DG (dBi)	Limit (dBm)	ERP Limit (dBm)			
			chain0	chain1	chain0	chain1										
IEEE 802.11b Data rate: 1Mbps	Low	2412	63	-	13.07	-	13.07	0.0203	13.96	0.0249	0.89	30	36			
	Mid	2437	63	-	13.37	-	13.37	0.0217	14.26	0.0267						
	High	2462	63	-	14.91	-	14.91	0.0310	15.80	0.0380						
IEEE 802.11g Data rate: 6Mbps	Low	2412	63	-	19.72	-	19.72	0.0938	20.61	0.1151						
	Mid	2437	63	-	20.31	-	20.31	0.1074	21.20	0.1318						
	High	2462	63	-	19.26	-	19.26	0.0843	20.15	0.1035						
IEEE 802.11n HT20 Data rate: MCS8	Low	2412	63	-	17.68	-	17.68	0.0586	18.57	0.0719						
	Mid	2437	63	-	18.49	-	18.49	0.0706	19.38	0.0867						
	High	2462	63	-	18.21	-	18.21	0.0662	19.10	0.0813						
IEEE 802.11n HT40 Data rate: MCS8	Low	2422	63	-	18.32	-	18.32	0.0679	19.21	0.0834						
	Mid	2437	63	-	17.55	-	17.55	0.0569	18.44	0.0698						
	High	2452	63	-	17.08	-	17.08	0.0511	17.97	0.0627						

**Average output power :**

Wifi 2.4G					
Config	CH	Freq. (MHz)	AV Power(dBm)		AV Total Power (dBm)
			chain0	chain1	
IEEE 802.11b Data rate: 1Mbps	Low	2412	10.52	-	10.52
	Mid	2437	10.79	-	10.79
	High	2462	12.39	-	12.39
IEEE 802.11g Data rate: 6Mbps	Low	2412	12.42	-	12.42
	Mid	2437	12.67	-	12.67
	High	2462	11.52	-	11.52
IEEE 802.11n HT20 Data rate: MCS8	Low	2412	8.35	-	8.35
	Mid	2437	8.53	-	8.53
	High	2462	9.25	-	9.25
IEEE 802.11n HT40 Data rate: MCS8	Low	2422	8.35	-	8.35
	Mid	2437	7.89	-	7.89
	High	2452	7.51	-	7.51

## 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 : [ Limit = 8 – (DG – 6) ] <input type="checkbox"/> Point-to-point operation :
-------	---

### 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

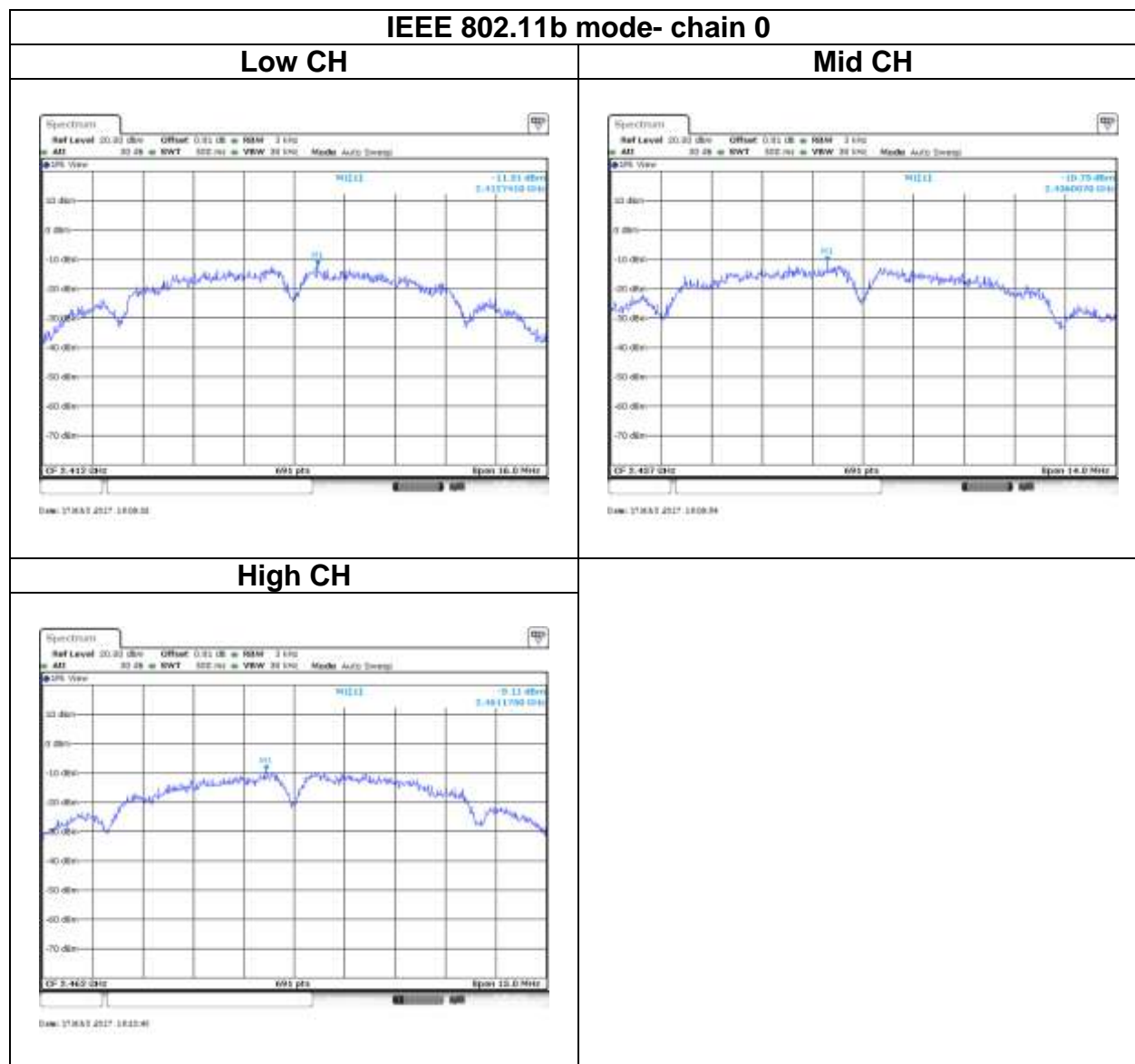
Test mode: IEEE 802.11b mode / 2412-2462 MHz					
Channel	Frequency (MHz)	Chain 0 PPSSD (dBm)	Chain 1 PPSSD (dBm)	Total PPSSD (dBm)	Limit (dBm)
Low	2412	-11.91	-	-11.91	5.50
Mid	2437	-10.75	-	-10.75	
High	2462	-9.11	-	-9.11	

Test mode: IEEE 802.11g mode / 2412-2462 MHz					
Channel	Frequency (MHz)	Chain 0 PPSSD (dBm)	Chain 1 PPSSD (dBm)	Total PPSSD (dBm)	Limit (dBm)
Low	2412	-11.79	-	-11.79	5.50
Mid	2437	-10.16	-	-10.16	
High	2462	-11.01	-	-11.01	

Test mode: IEEE 802.11n HT 20 MHz mode / 2412-2462 MHz					
Channel	Frequency (MHz)	Chain 0 PPSSD (dBm)	Chain 1 PPSSD (dBm)	Total PPSSD (dBm)	Limit (dBm)
Low	2412	-15.51	-	-15.51	5.50
Mid	2437	-13.28	-	-13.28	
High	2462	-13.93	-	-13.93	

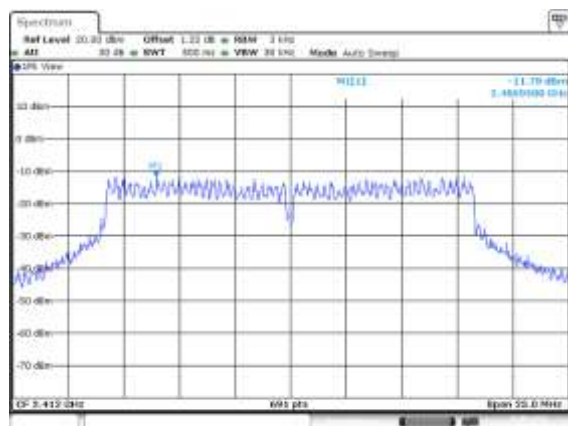
Test mode: IEEE 802.11n HT 40 MHz mode / 2422-2452 MHz					
Channel	Frequency (MHz)	Chain 0 PPSSD (dBm)	Chain 1 PPSSD (dBm)	Total PPSSD (dBm)	Limit (dBm)
Low	2422	-15.11	-	-15.11	5.50
Mid	2437	-15.14	-	-15.14	
High	2452	-15.74	-	-15.74	

## Test Data



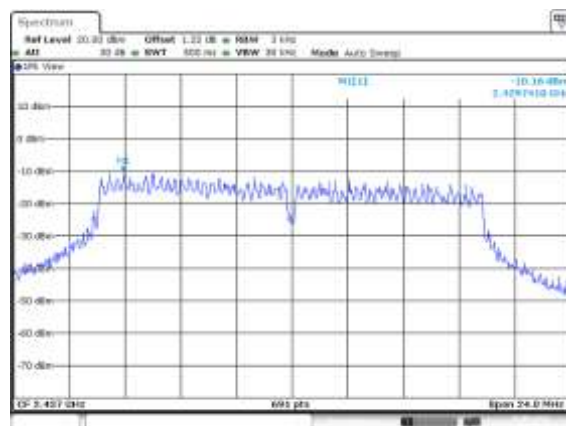
## IEEE 802.11g mode- chain 0

## Low CH



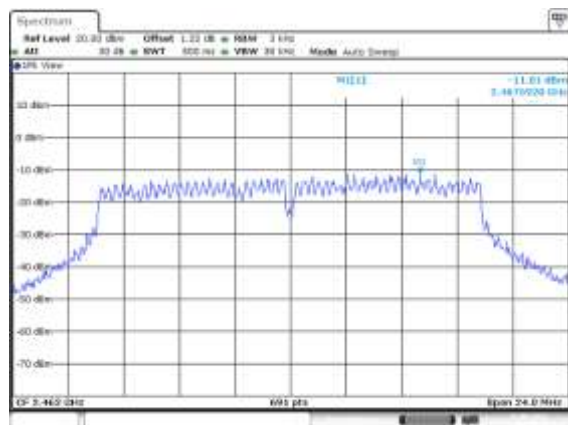
Date: 17/05/2017, 10:07:00

## Mid CH



Date: 17/05/2017, 10:07:00

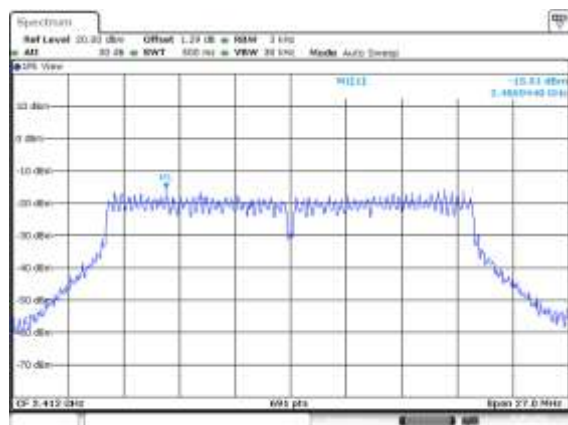
## High CH



Date: 17/05/2017, 10:08:01

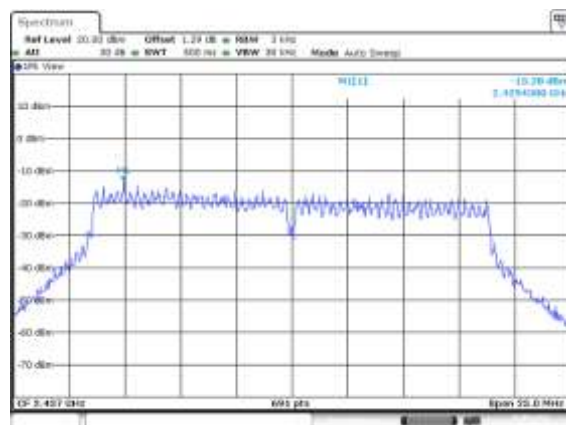
## IEEE 802.11n HT20 mode- chain 0

## Low CH



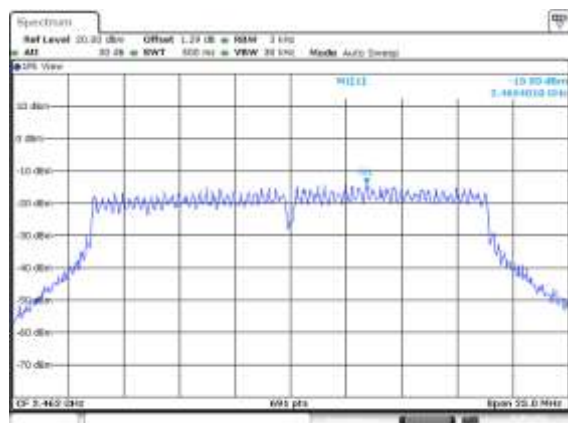
Date: 17 MAY 2017 18:00:42

## Mid CH



Date: 17 MAY 2017 18:00:42

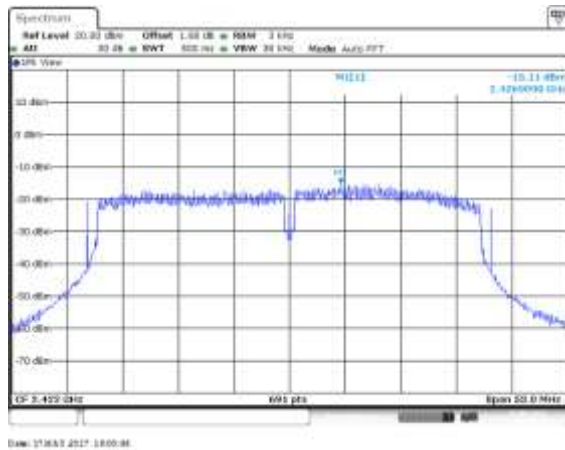
## High CH



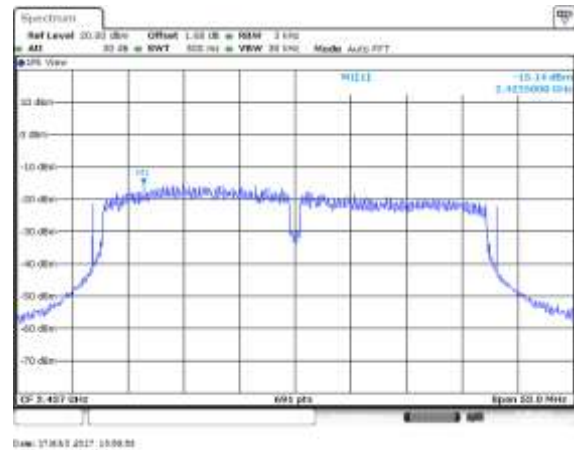
Date: 17 MAY 2017 18:00:47

## IEEE 802.11n HT40 mode-chain 0

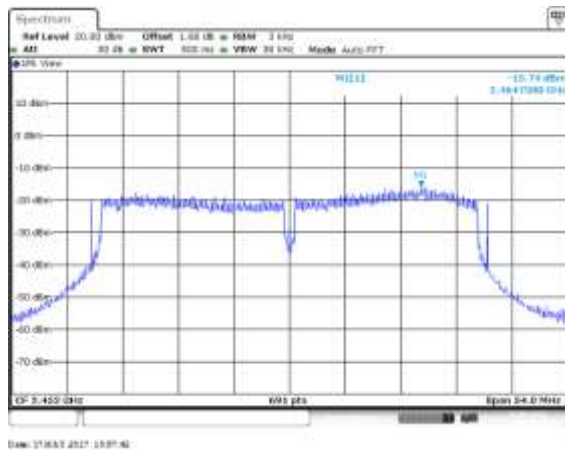
## Low CH



## 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.

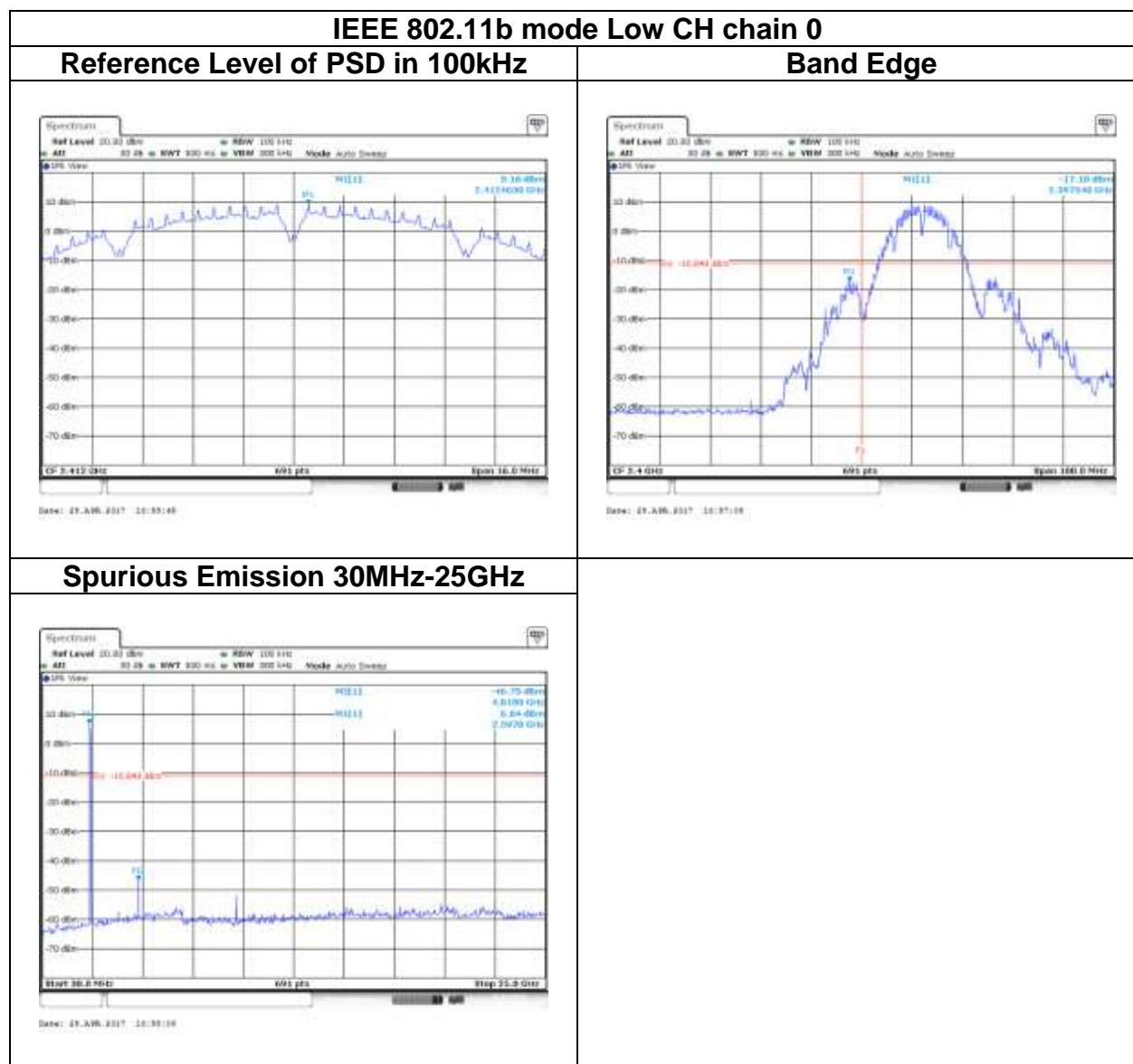
1. EUT RF output port connected to the SA by RF cable, and the path loss was compensated to result.
2. SA setting, RBW=100kHz, VBW=300kHz, Detector=Peak, Trace mode = max hold, SWT = Auto.
3. In any 100 kHz bandwidth outside the authorized frequency band, shall be attenuated at least 20 dB relative to 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



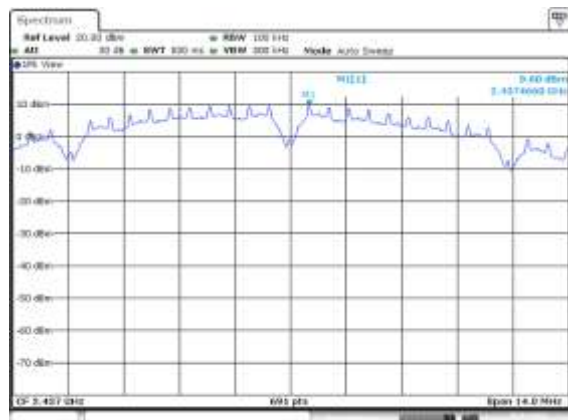
## 4.5.4 Test Result

### Test Data



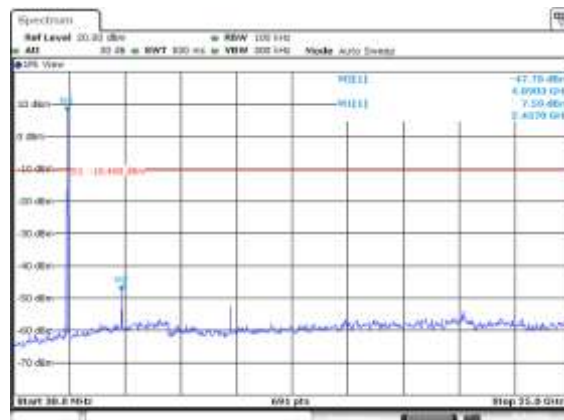
## IEEE 802.11b mode Mid CH chain 0

## Reference Level of PSD in 100kHz



Date: 27.AUG.2017 14:28:12

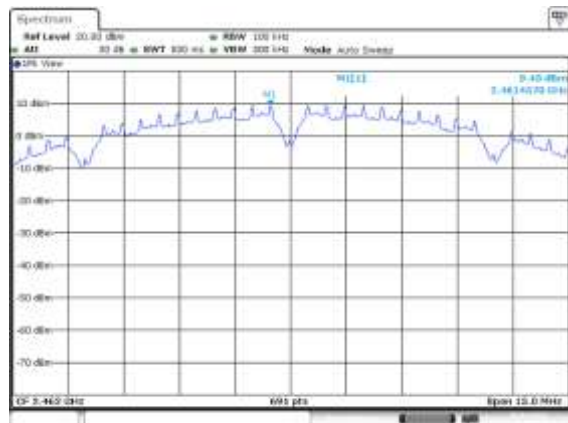
## Spurious Emission 30MHz-25GHz



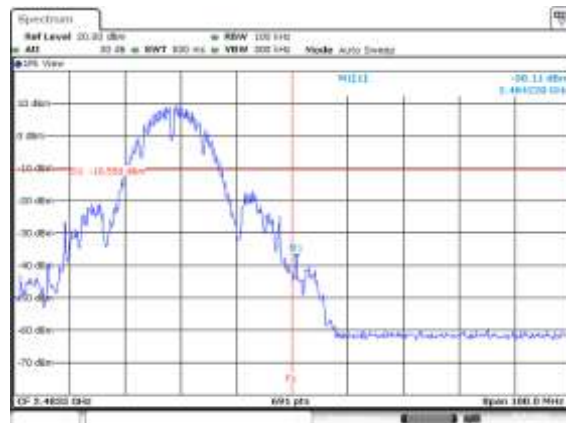
Date: 27.AUG.2017 14:28:28

## IEEE 802.11b mode High CH chain 0

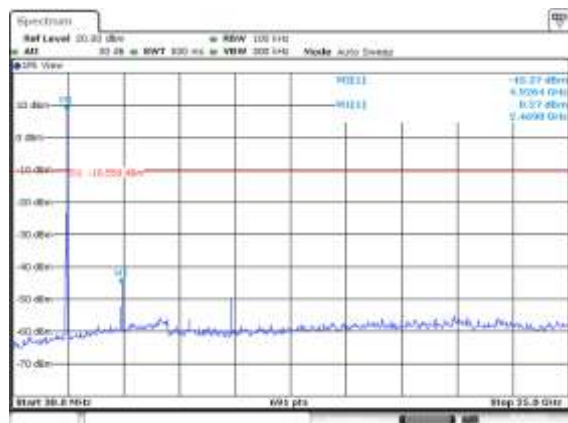
## Reference Level of PSD in 100kHz



## Band Edge

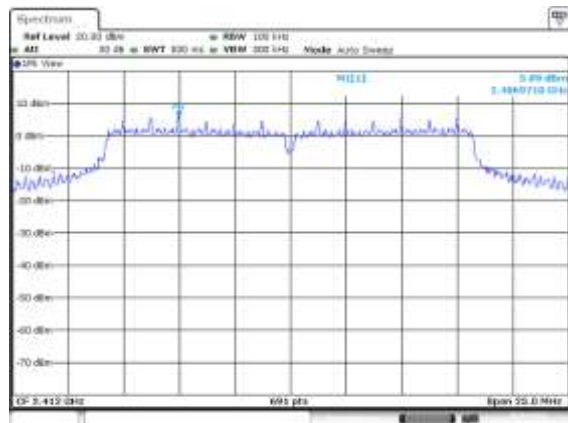


## Spurious Emission 30MHz-25GHz



## IEEE 802.11g mode Low CH chain 0

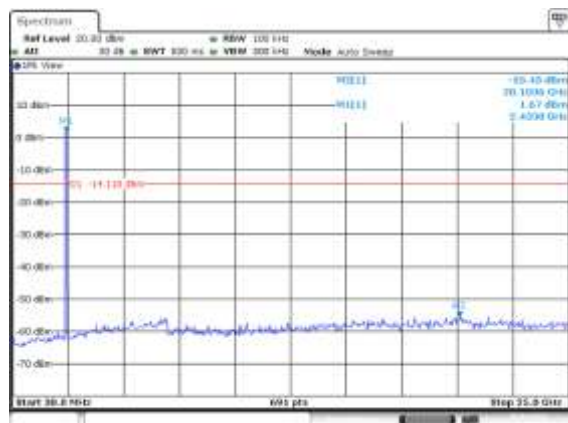
### Reference Level of PSD in 100kHz



### Band Edge

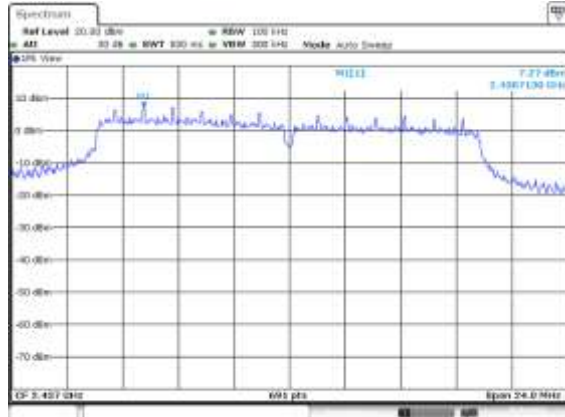


### Spurious Emission 30MHz-25GHz

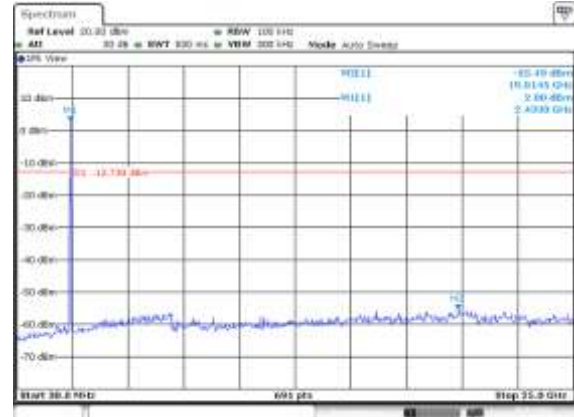


## IEEE 802.11g mode Mid CH chain 0

## Reference Level of PSD in 100kHz

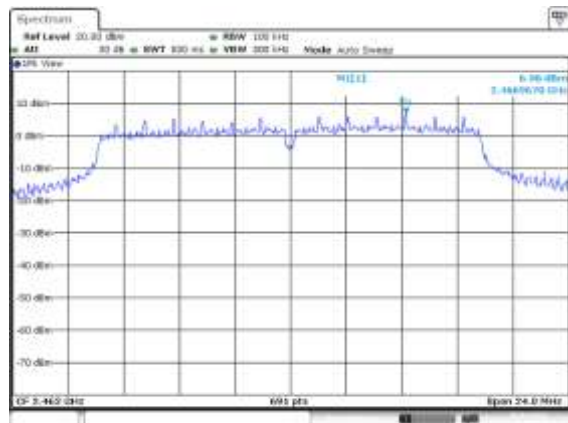


## Spurious Emission 30MHz-25GHz



## IEEE 802.11g mode High CH chain 0

## Reference Level of PSD in 100kHz



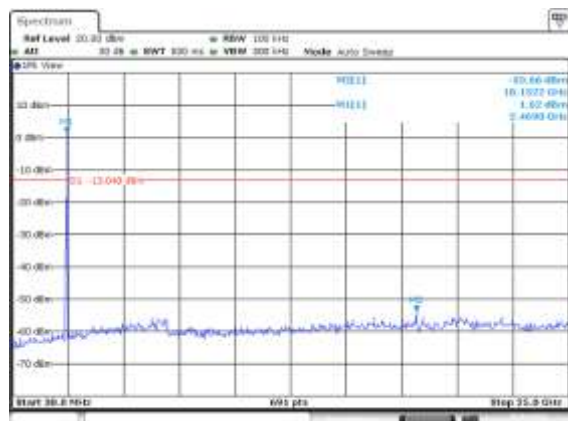
Date: 29.Aug.2017 14:07:12

## Band Edge



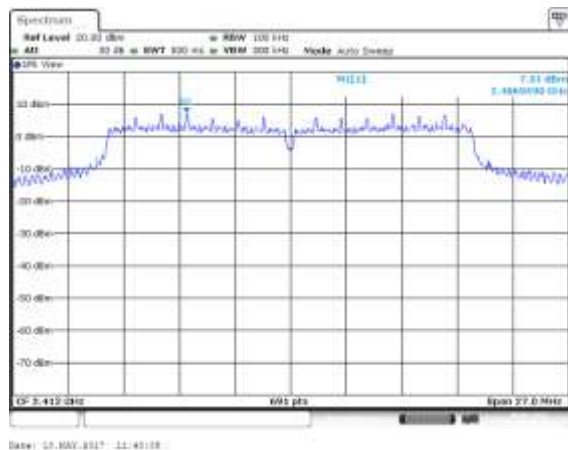
Date: 29.Aug.2017 14:08:12

## Spurious Emission 30MHz-25GHz



Date: 29.Aug.2017 14:09:18

### Reference Level of PSD in 100kHz



Spectrum

Ref Level: 20.00 dBm

Att: 0.00 dB

RBW: 100 kHz

VBW: 300 kHz

Mode: Auto Sweep

Trace View

W1111

W1111

24.29 dBm

20.1700 GHz

8.41 dBm

2.2970 GHz

10 dBm

0 dBm

-10 dBm

-20 dBm

-30 dBm

-40 dBm

-50 dBm

-60 dBm

-70 dBm

W1111

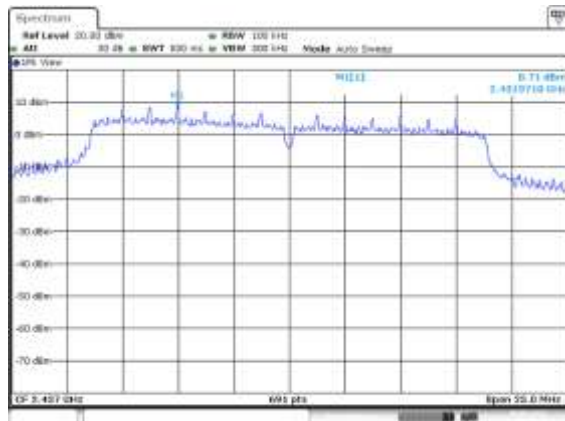
695 MHz

Stop: 25.00 GHz

Date: 05 MAY 2017 11:41:18

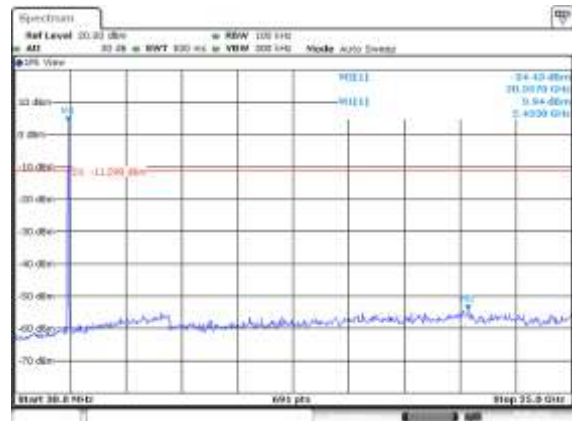
## IEEE 802.11 n HT20 mode Mid CH chain 0

## Reference Level of PSD in 100kHz



Date: 22 MAY 2017 11:47:04

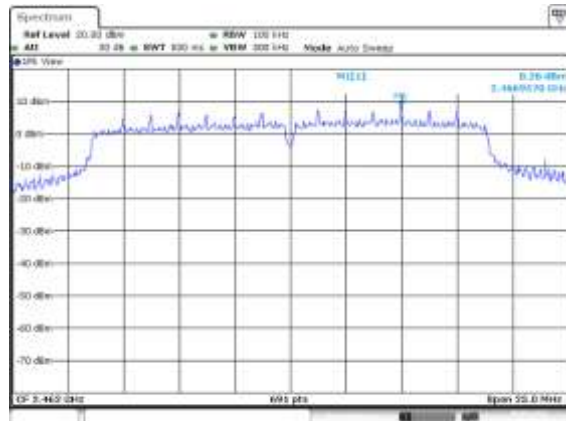
## Spurious Emission 30MHz-25GHz



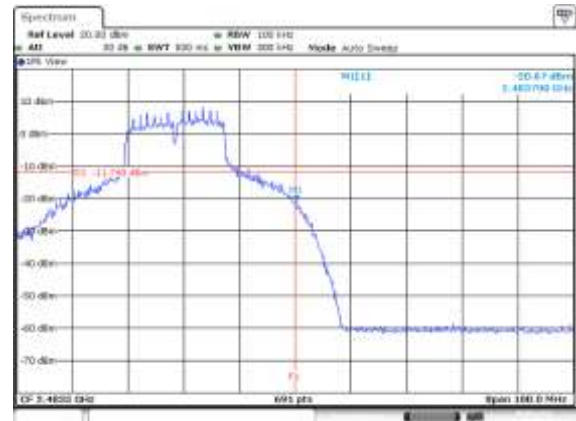
Date: 22 MAY 2017 11:48:08

## IEEE 802.11n HT20 mode High CH chain 0

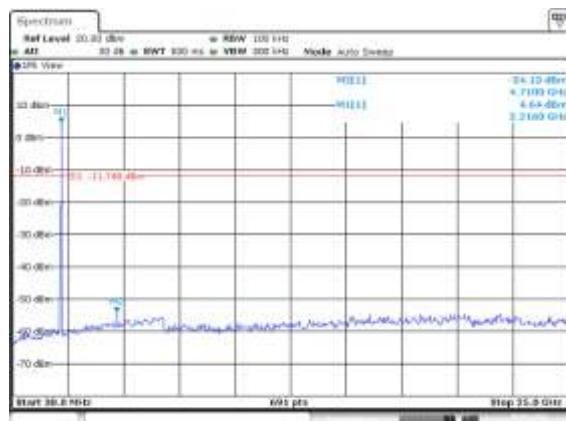
## Reference Level of PSD in 100kHz



## Band Edge

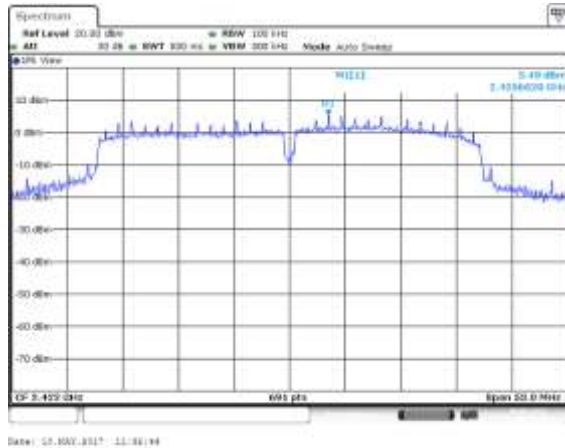


## Spurious Emission 30MHz-25GHz

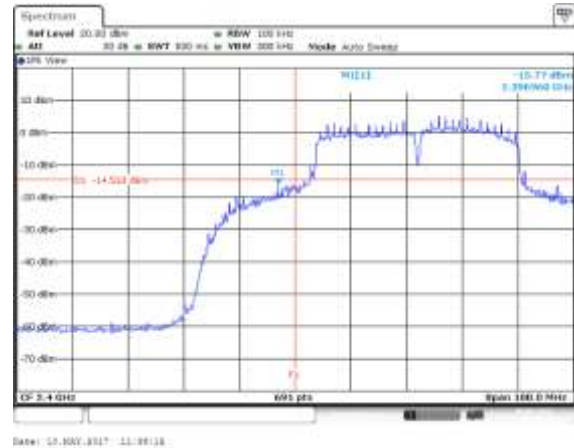


## IEEE 802.11 n HT40 mode Low CH chain 0

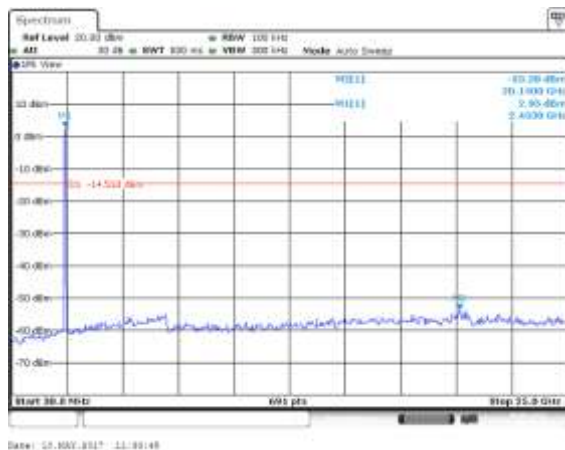
## Reference Level of PSD in 100kHz

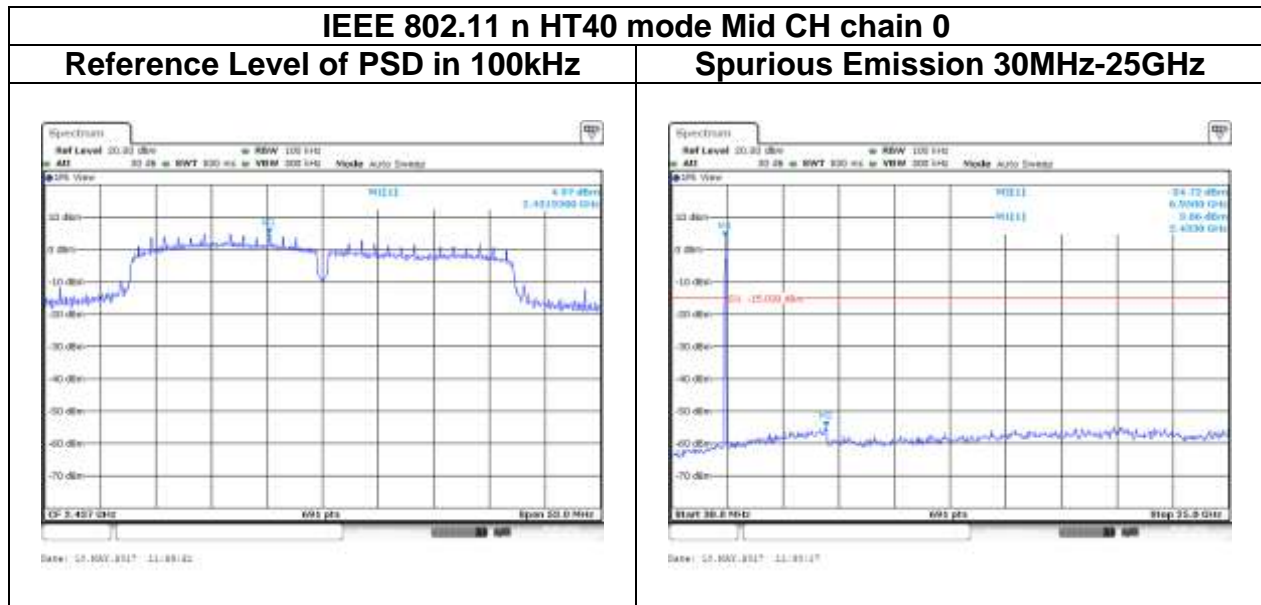


## Band Edge



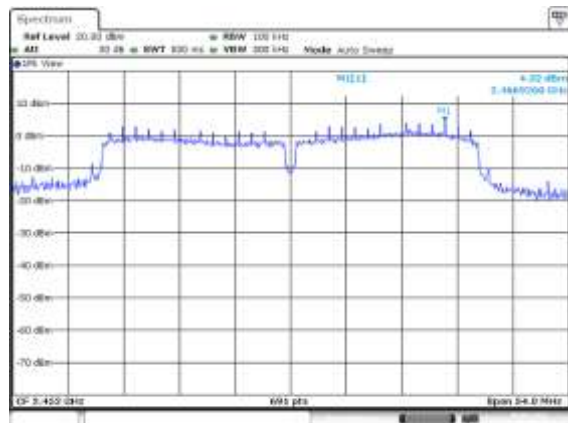
## Spurious Emission 30MHz-25GHz





## IEEE 802.11n HT40 mode High CH chain 0

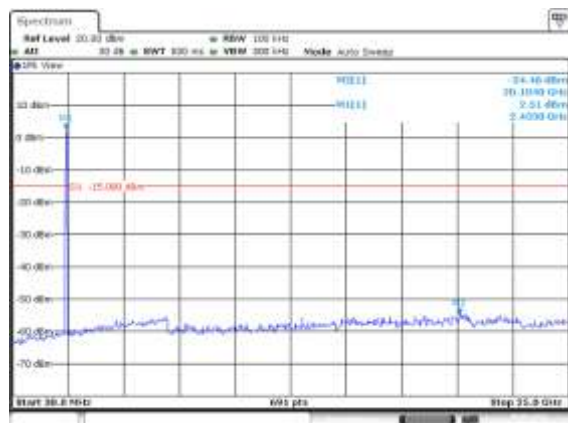
## Reference Level of PSD in 100kHz



## Band Edge



## Spurious Emission 30MHz-25GHz



## 4.6 RADIATION BANDEDGE 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	Field Strength (microvolts/m)	Measurement Distance (metres)
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

## 4.6.2 Test Procedure

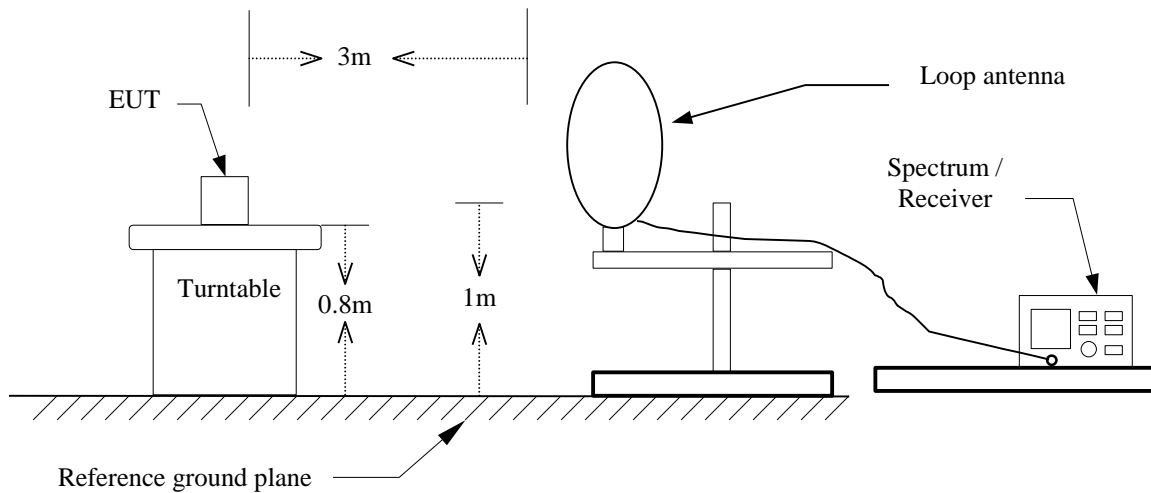
Test method Refer as KDB 558074 D01 v03r05, Section 12.1.

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.

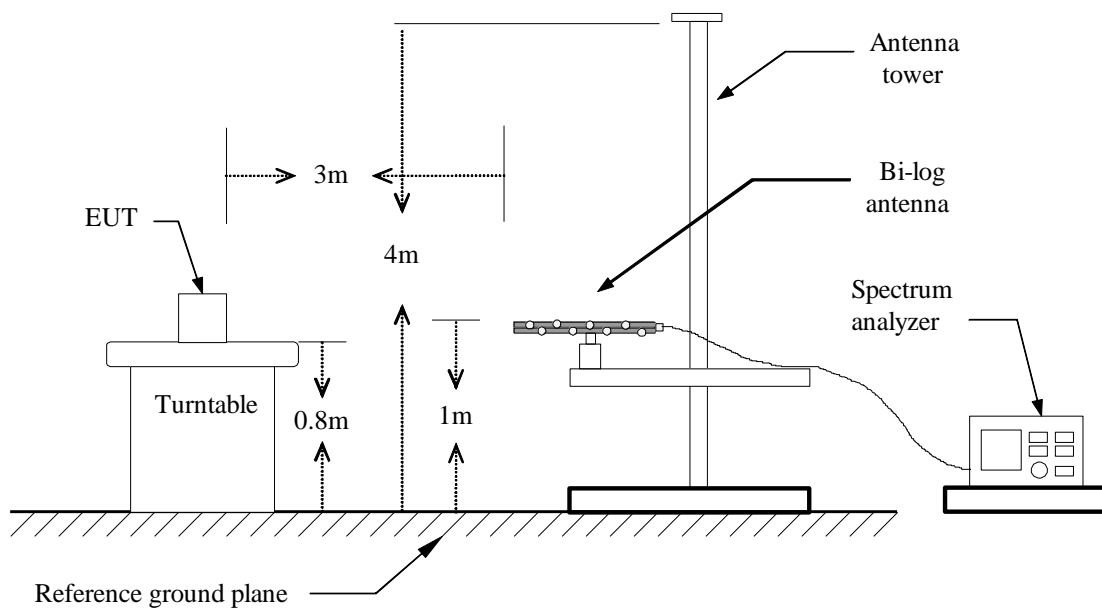
Configuration	Duty Cycle (%)	T(ms)	1/T (kHz)	VBW Setting
802.11b	83%	8.7000	0.115	115Hz
802.11g	17%	1.7000	0.588	620Hz
802.11n HT20	15%	1.3400	0.746	750Hz
802.11n HT40	9%	0.9000	1.111	1.2KHz

### 4.6.3 Test Setup

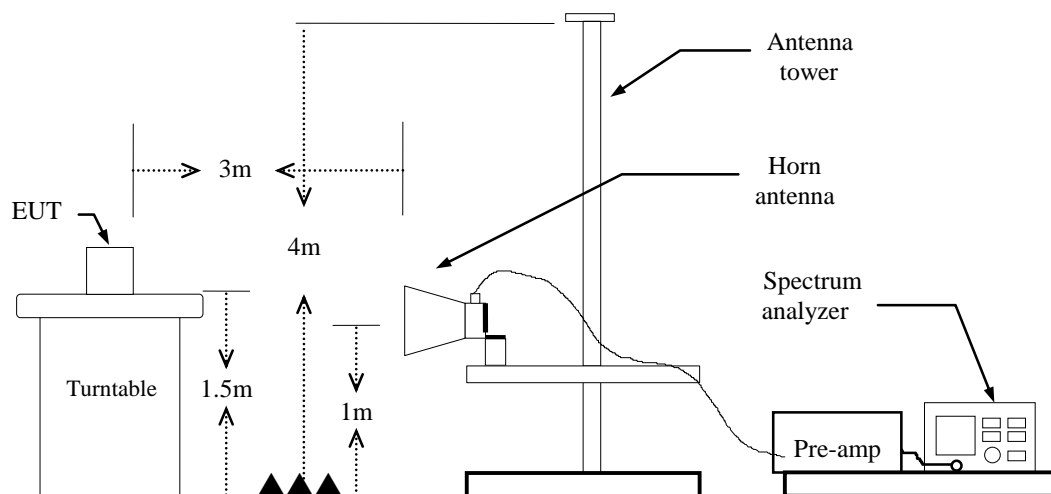
#### 9kHz ~ 30MHz



#### 30MHz ~ 1GHz



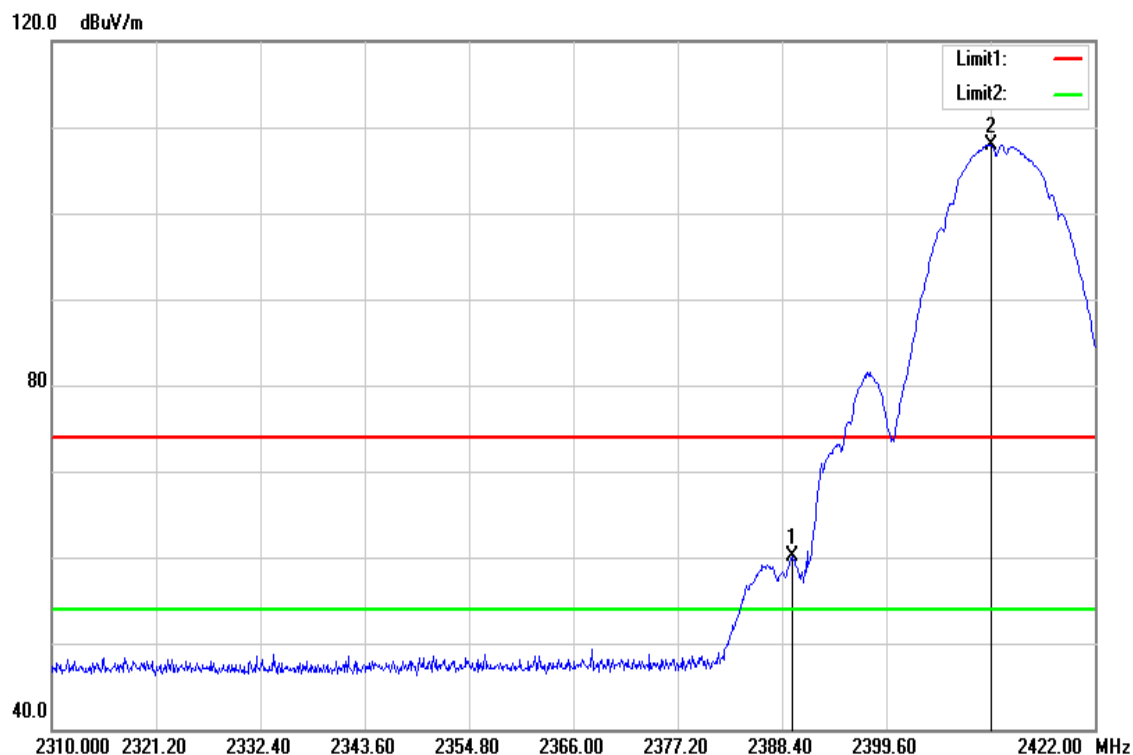
## Above 1 GHz



## 4.6.4 Test Result

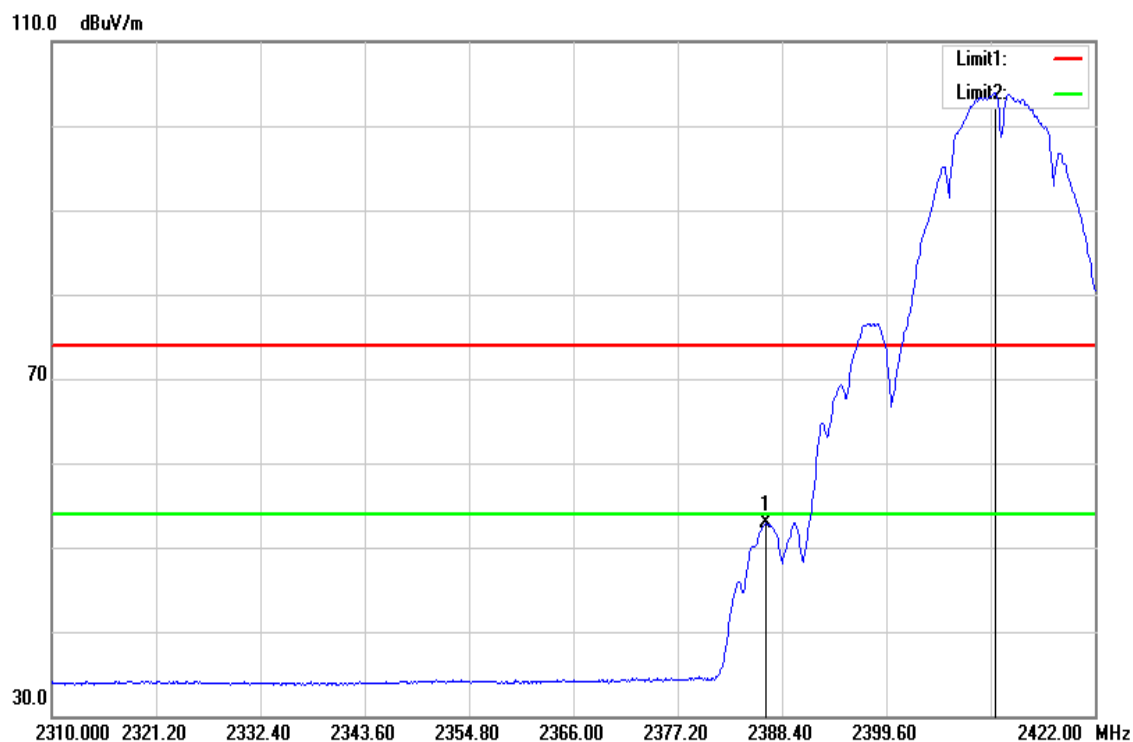
Band Edge Test Data

Test Mode	IEEE 802.11b Low CH	Temp/Hum	22(°C)/ 47%RH
Test Item	Band Edge	Test Date	May 2, 2017
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak	Test Voltage	120Vac / 60Hz



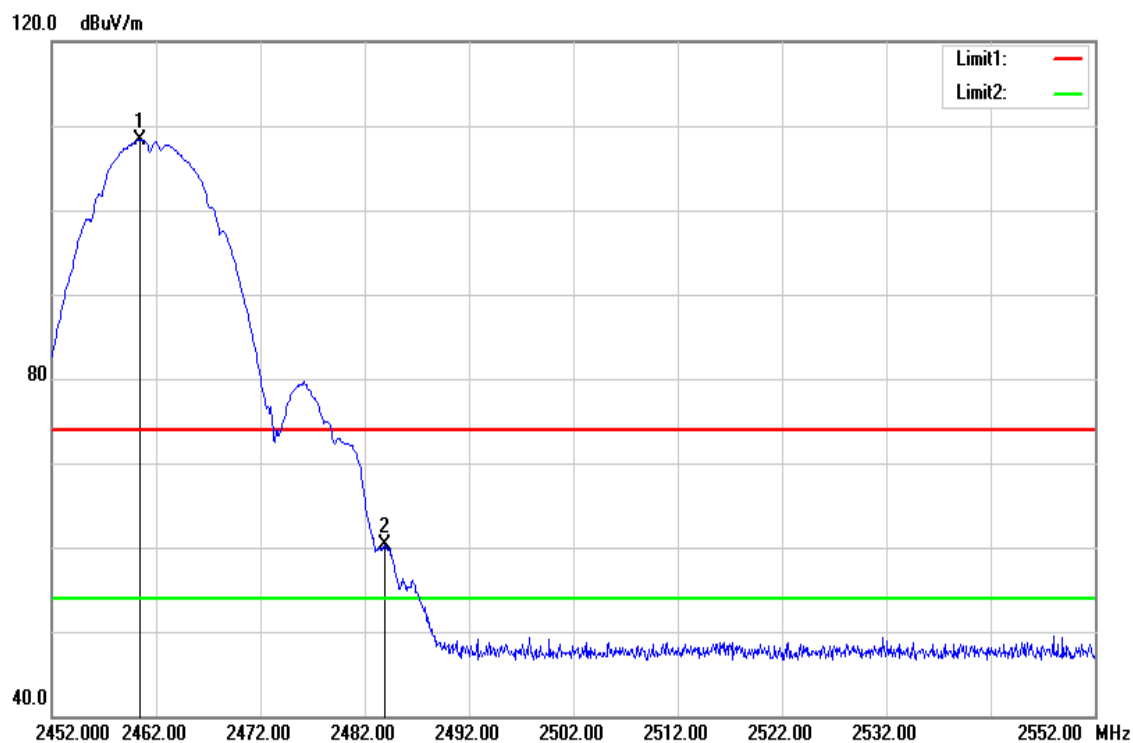
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2389.520	62.53	-2.49	60.04	74.00	-13.96	peak
2410.800	110.41	-2.42	107.99	--	--	peak

Test Mode	IEEE 802.11b Low CH	Temperature:	22(°C) / 47%RH
Test Item	Band Edge	Test Date	May 2, 2017
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Average	Test Voltage	120Vac / 60Hz



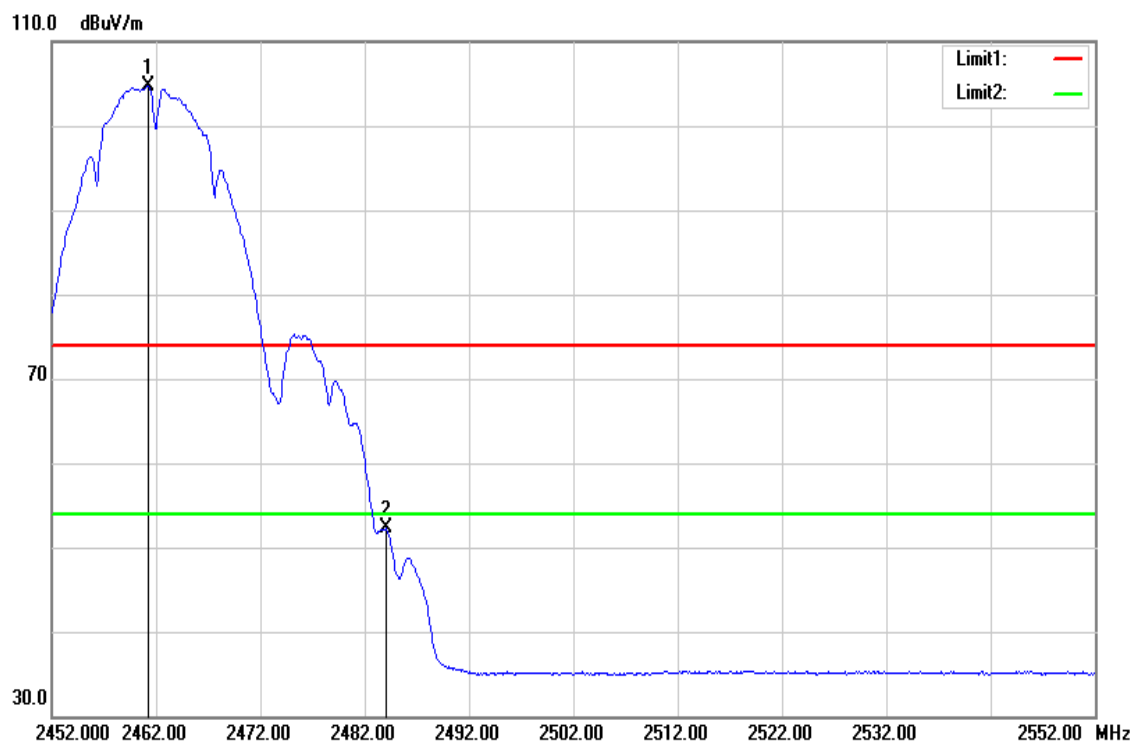
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2386.720	55.43	-2.52	52.91	54.00	-1.09	AVG
2411.248	106.31	-2.42	103.89	--	--	AVG

Test Mode	IEEE 802.11b High CH	Temp/Hum	22(°C)/ 47%RH
Test Item	Band Edge	Test Date	May 2, 2017
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak	Test Voltage	120Vac / 60Hz



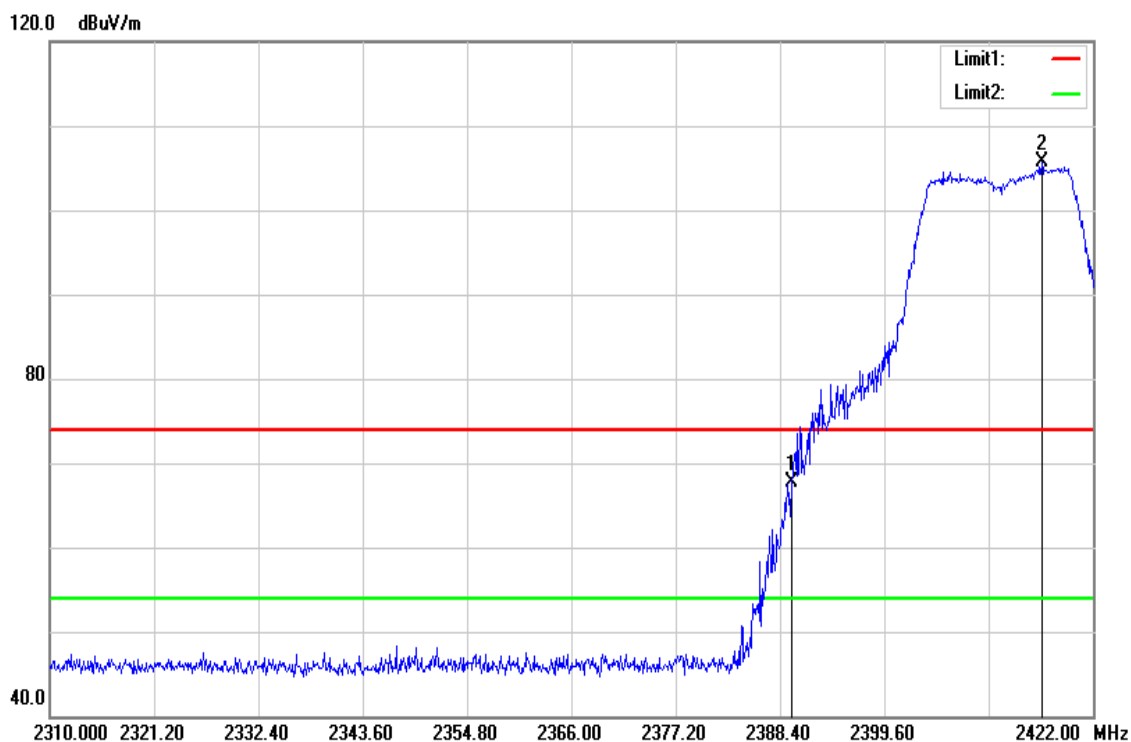
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2460.500	110.45	-2.10	108.35	--	--	peak
2483.900	62.25	-1.99	60.26	74.00	-13.74	peak

Test Mode	IEEE 802.11b High CH	Temperature:	22(°C)/ 47%RH
Test Item	Band Edge	Test Date	May 2, 2017
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Average	Test Voltage	120Vac / 60Hz



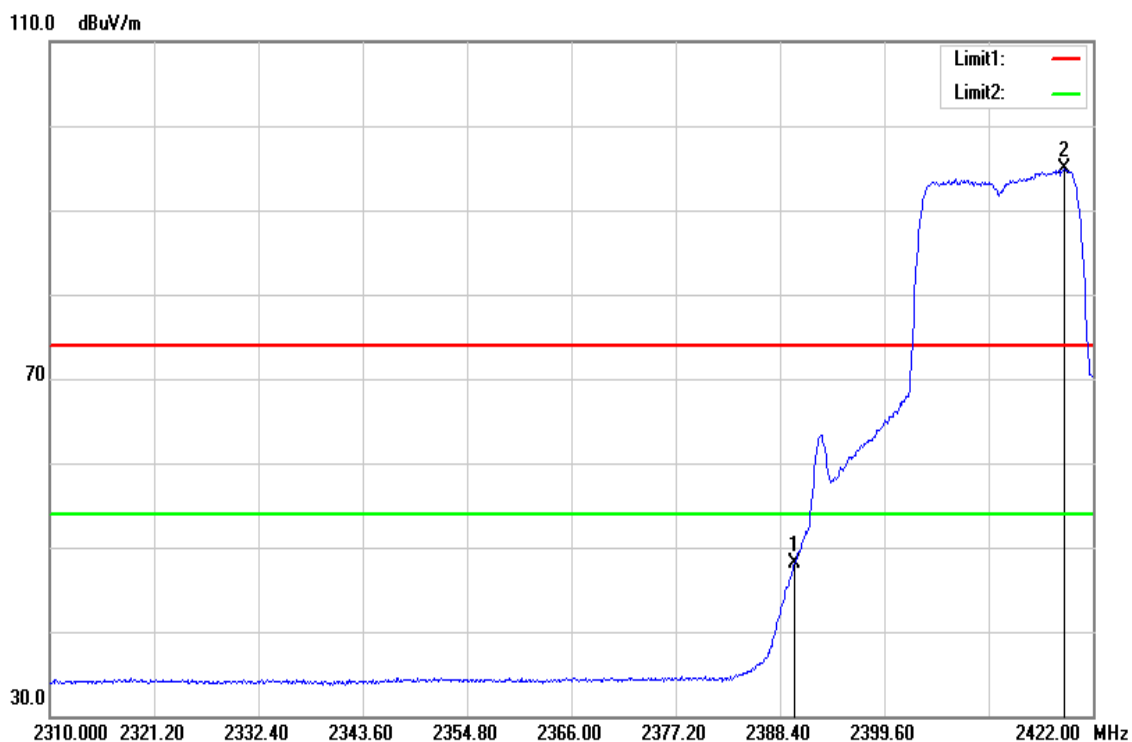
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2461.200	106.80	-2.10	104.70	--	--	AVG
2484.000	54.23	-1.99	52.24	54.00	-1.76	AVG

Test Mode	IEEE 802.11g Low CH	Temp/Hum	22(°C)/ 47%RH
Test Item	Band Edge	Test Date	May 2, 2017
Polarize	Vertical	Test Engineer	Kevin.Kuo
Detector	Peak	Test Voltage	120Vac / 60Hz



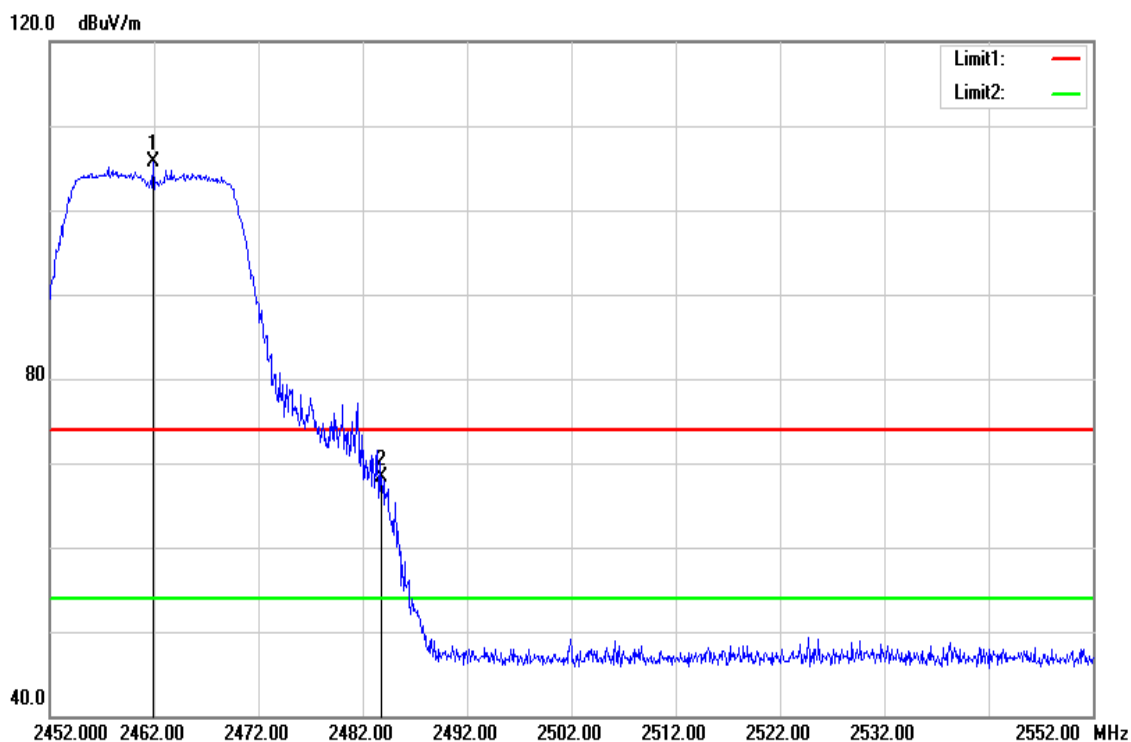
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2389.632	70.18	-2.49	67.69	74.00	-6.31	peak
2416.512	108.05	-2.38	105.67	--	--	peak

Test Mode	IEEE 802.11g Low CH	Temperature:	22(°C)/ 47%RH
Test Item	Band Edge	Test Date	May 2, 2017
Polarize	Vertical	Test Engineer	Kevin.Kuo
Detector	Average	Test Voltage	120Vac / 60Hz



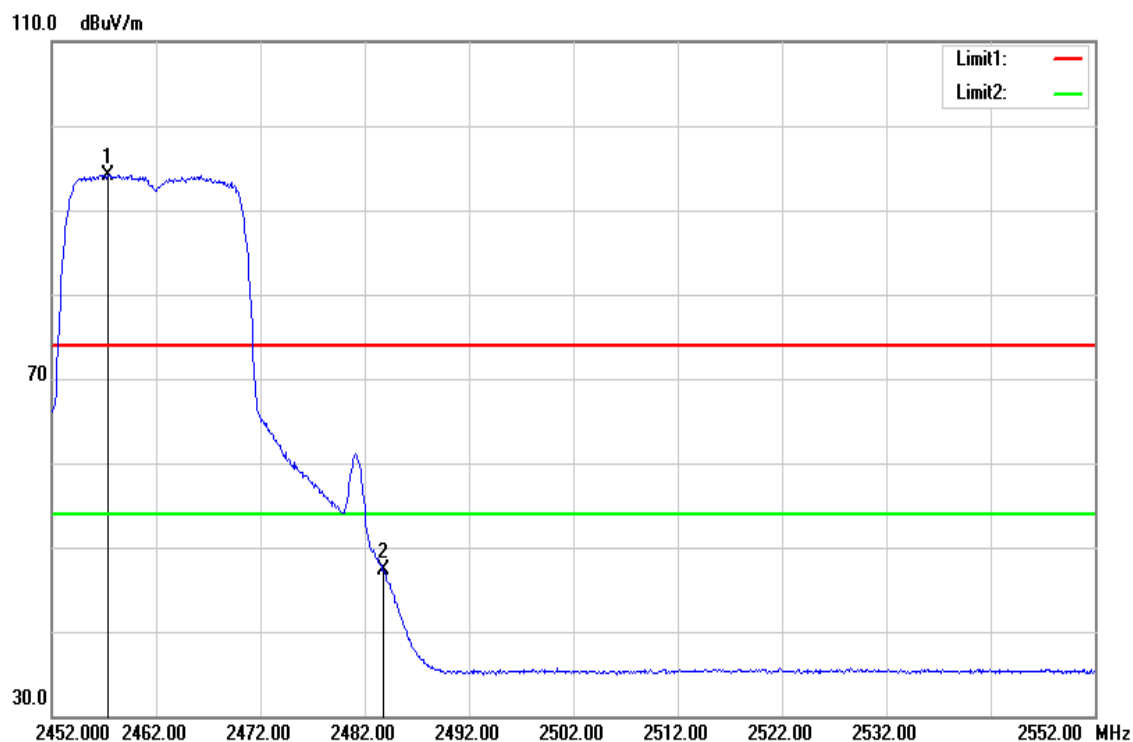
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2389.968	50.65	-2.49	48.16	54.00	-5.84	AVG
2418.864	97.23	-2.37	94.86	--	--	AVG

Test Mode	IEEE 802.11g High CH	Temp/Hum	22(°C)/ 47%RH
Test Item	Band Edge	Test Date	May 2, 2017
Polarize	Vertical	Test Engineer	Kevin.Kuo
Detector	Peak	Test Voltage	120Vac / 60Hz



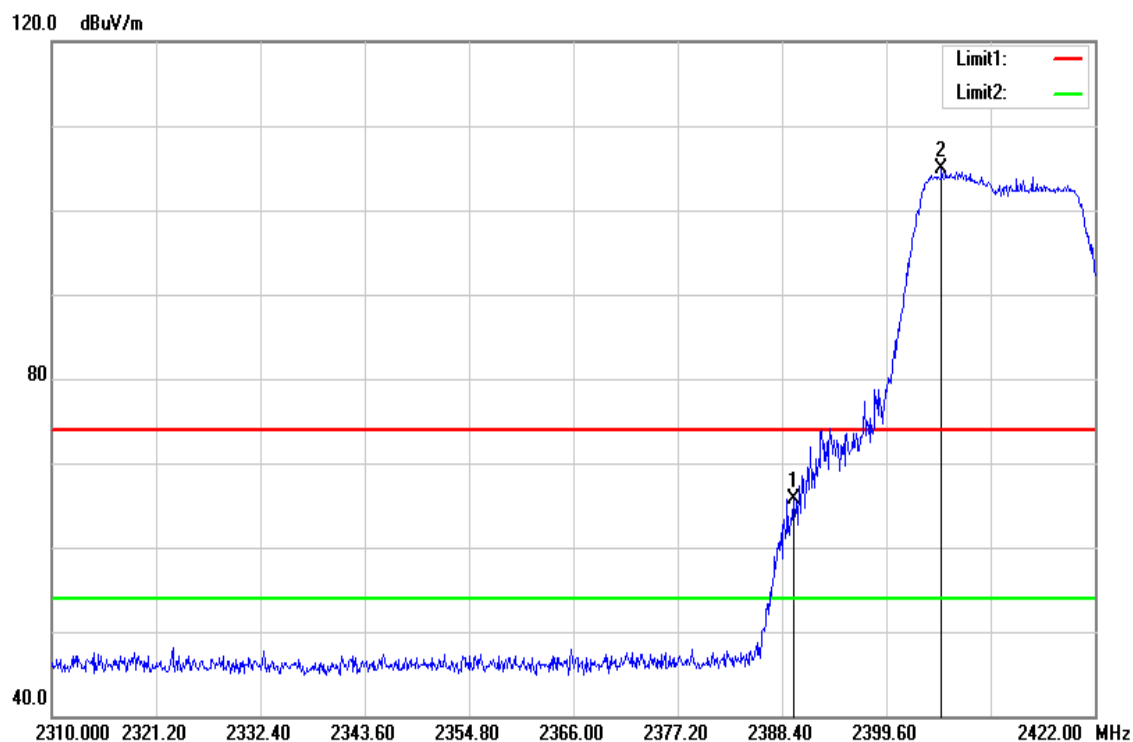
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2461.900	107.74	-2.10	105.64	--	--	peak
2483.800	70.22	-1.99	68.23	74.00	-5.77	peak

Test Mode	IEEE 802.11g High CH	Temperature:	22(°C)/ 47%RH
Test Item	Band Edge	Test Date	May 2, 2017
Polarize	Vertical	Test Engineer	Kevin.Kuo
Detector	Average	Test Voltage	120Vac / 60Hz



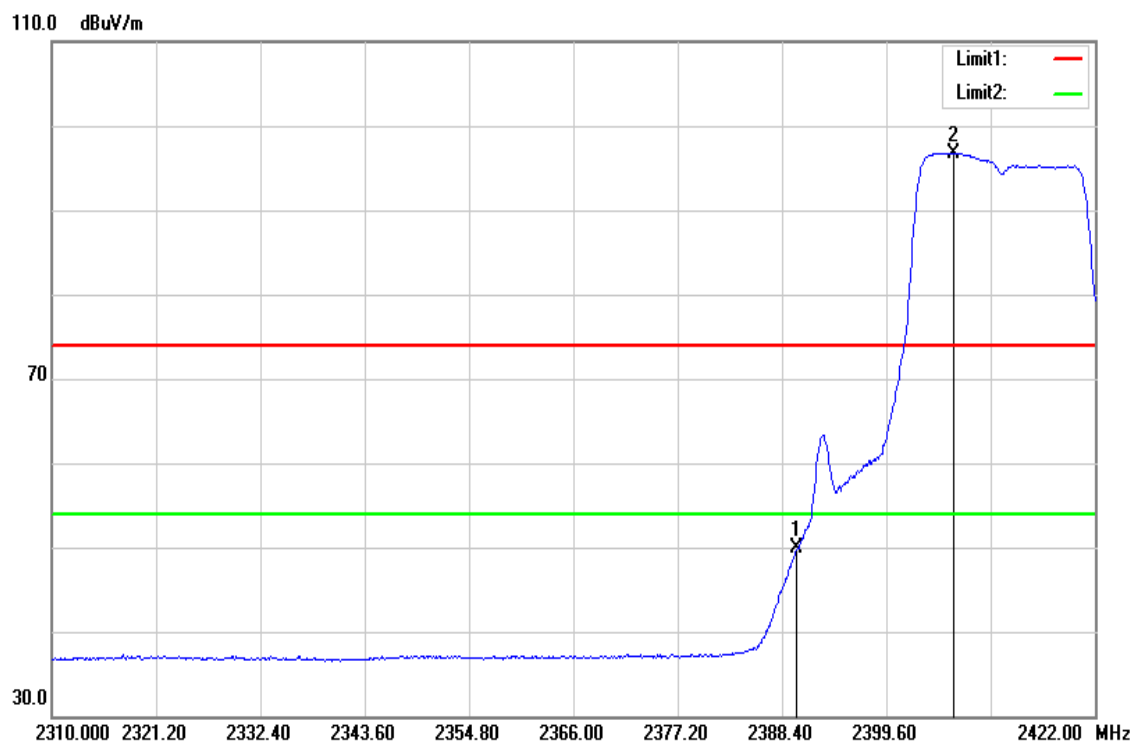
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2457.400	96.30	-2.11	94.19	--	--	AVG
2483.800	49.26	-1.99	47.27	54.00	-6.73	AVG

Test Mode	IEEE 802.11n HT20 Low CH	Temp/Hum	22(°C)/ 35%RH
Test Item	Band Edge	Test Date	May 12, 2017
Polarize	Vertical	Test Engineer	Kevin.Kuo
Detector	Peak	Test Voltage	120Vac / 60Hz



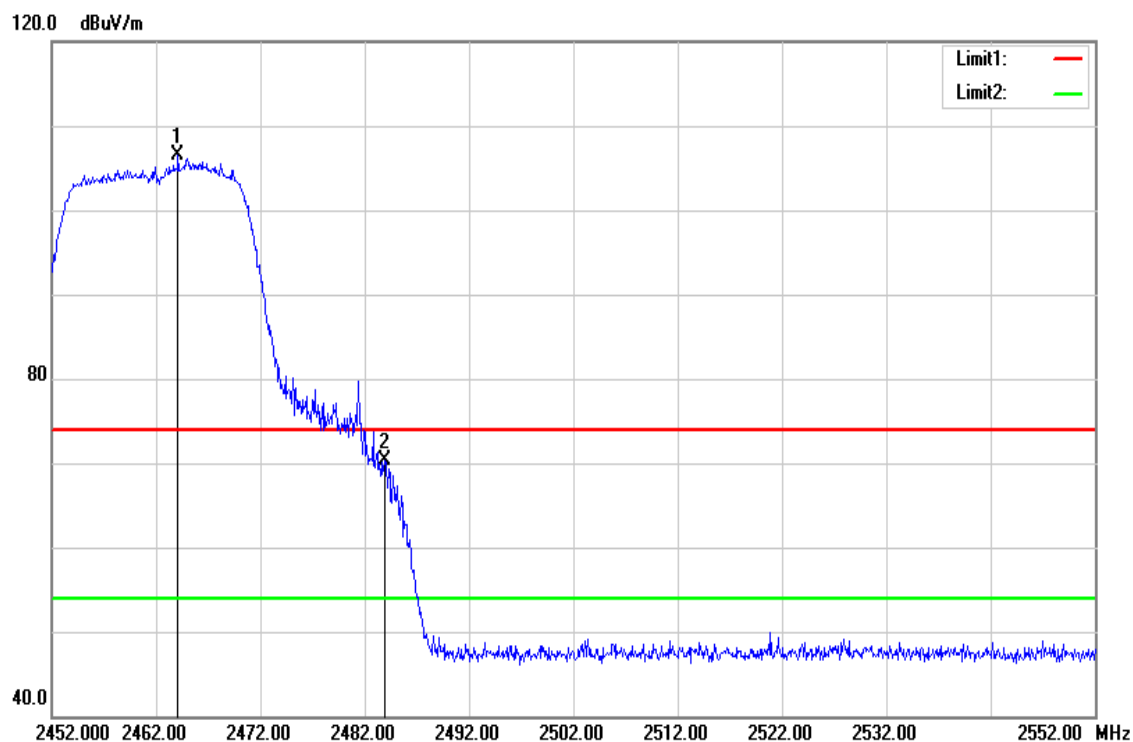
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2389.632	68.25	-2.49	65.76	74.00	-8.24	peak
2405.536	107.23	-2.42	104.81	--	--	peak

Test Mode	IEEE 802.11n HT20 Low CH	Temperature:	22(°C)/ 35%RH
Test Item	Band Edge	Test Date	May 12, 2017
Polarize	Vertical	Test Engineer	Kevin.Kuo
Detector	Average	Test Voltage	120Vac / 60Hz



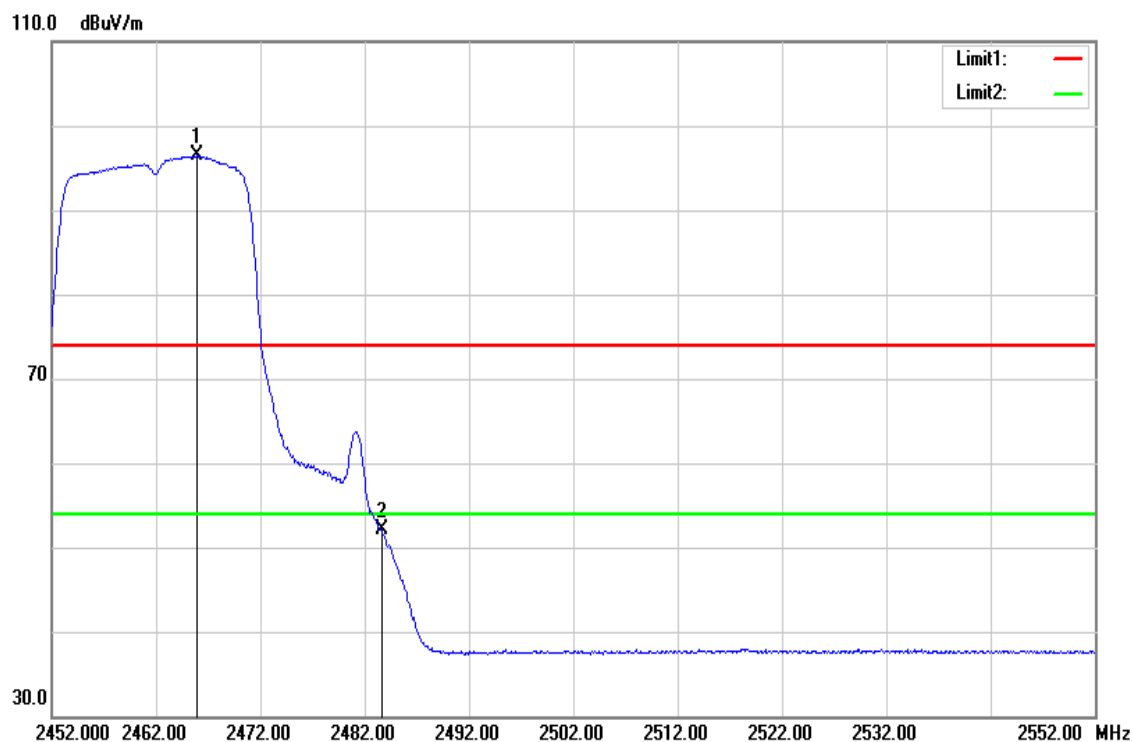
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390.000	52.30	-2.49	49.81	54.00	-4.19	AVG
2406.768	99.16	-2.42	96.74	--	--	AVG

Test Mode	IEEE 802.11n HT20 High CH	Temp/Hum	22(°C)/ 35%RH
Test Item	Band Edge	Test Date	May 12, 2017
Polarize	Vertical	Test Engineer	Kevin.Kuo
Detector	Peak	Test Voltage	120Vac / 60Hz



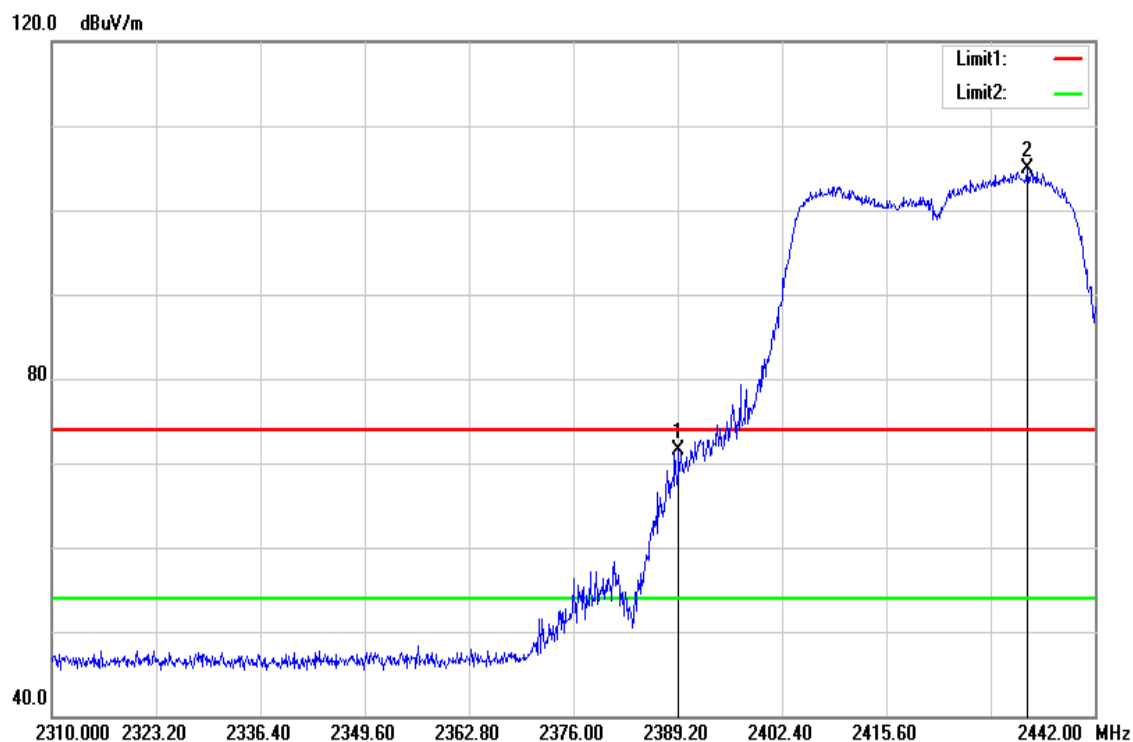
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2464.100	108.58	-2.09	106.49	--	--	peak
2483.900	72.38	-1.99	70.39	74.00	-3.61	peak

Test Mode	IEEE 802.11n HT20 High CH	Temperature:	22(°C)/ 35%RH
Test Item	Band Edge	Test Date	May 12, 2017
Polarize	Vertical	Test Engineer	Kevin.Kuo
Detector	Average	Test Voltage	120Vac / 60Hz



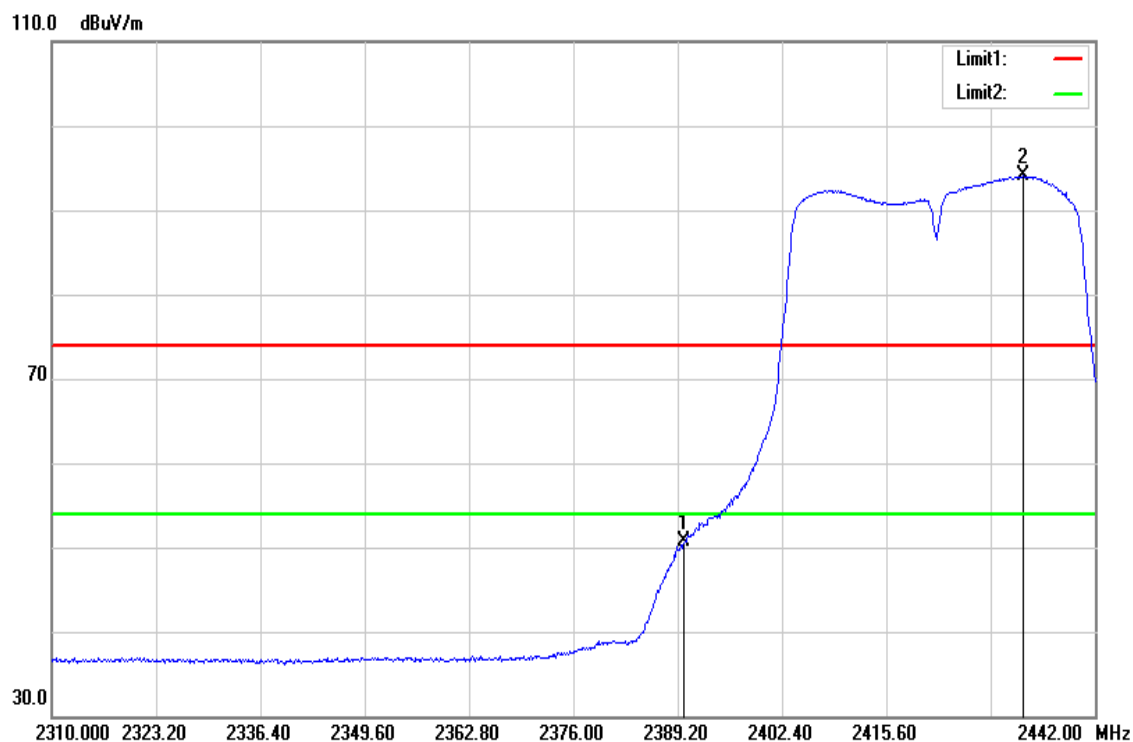
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2465.900	98.54	-2.08	96.46	--	--	AVG
2483.600	54.11	-1.99	52.12	54.00	-1.88	AVG

Test Mode	IEEE 802.11n HT40 Low CH	Temp/Hum	22(°C)/ 35%RH
Test Item	Band Edge	Test Date	May 12, 2017
Polarize	Vertical	Test Engineer	Kevin.Kuo
Detector	Peak	Test Voltage	120Vac / 60Hz



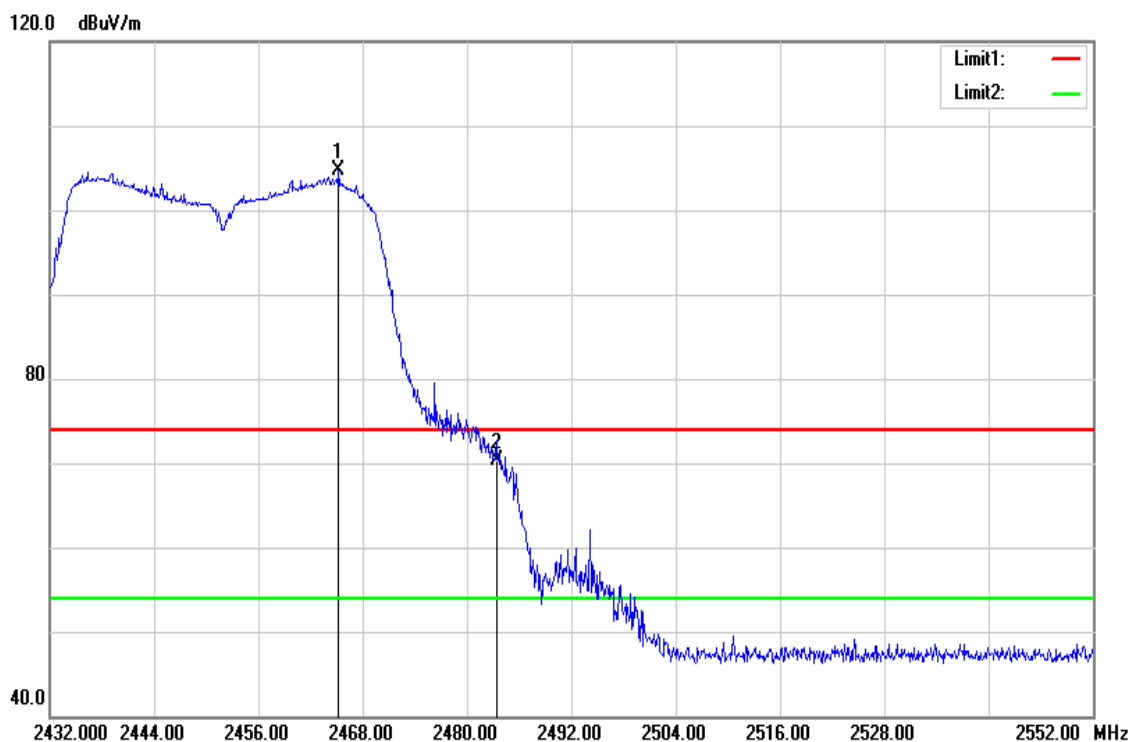
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2389.332	73.93	-2.50	71.43	74.00	-2.57	peak
2433.420	107.12	-2.26	104.86	--	--	peak

Test Mode	IEEE 802.11n HT40 Low CH	Temperature:	22(°C)/ 35%RH
Test Item	Band Edge	Test Date	May 12, 2017
Polarize	Vertical	Test Engineer	Kevin.Kuo
Detector	Average	Test Voltage	120Vac / 60Hz



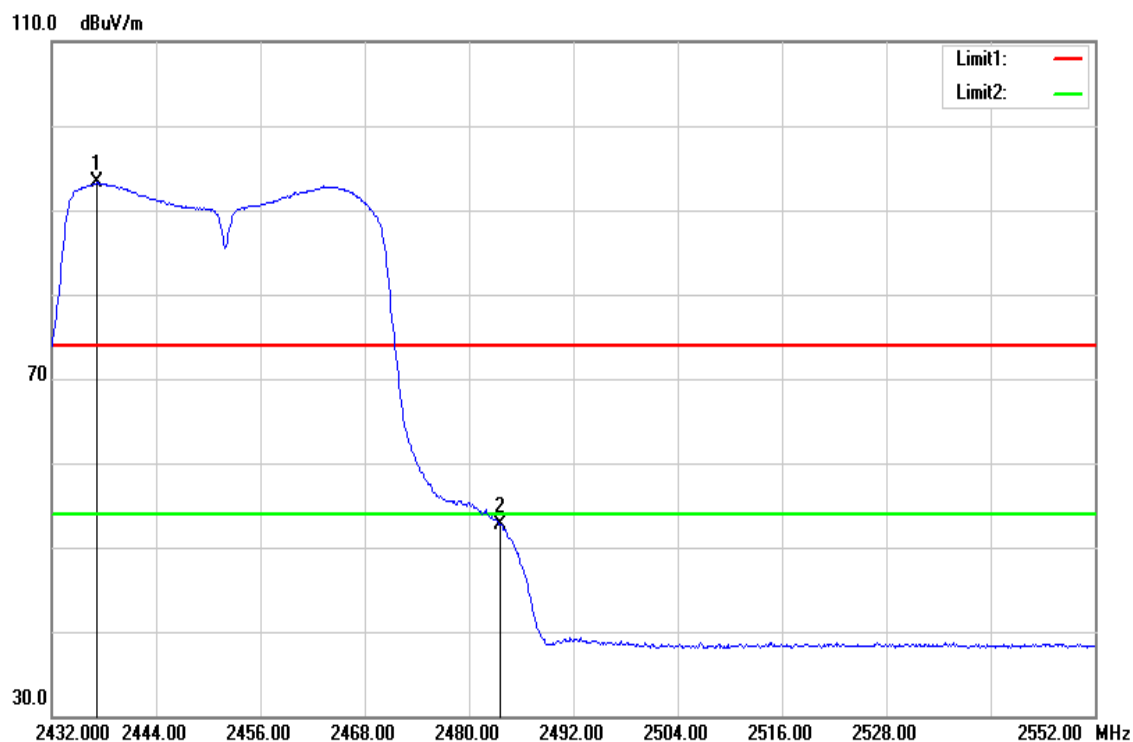
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390.000	53.19	-2.49	50.70	54.00	-3.30	AVG
2432.892	96.31	-2.26	94.05	--	--	AVG

Test Mode	IEEE 802.11n HT40 High CH	Temp/Hum	22(°C)/ 35%RH
Test Item	Band Edge	Test Date	May 12, 2017
Polarize	Vertical	Test Engineer	Kevin.Kuo
Detector	Peak	Test Voltage	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2465.240	106.74	-2.08	104.66	--	--	peak
2483.500	72.22	-1.99	70.23	74.00	-3.77	peak

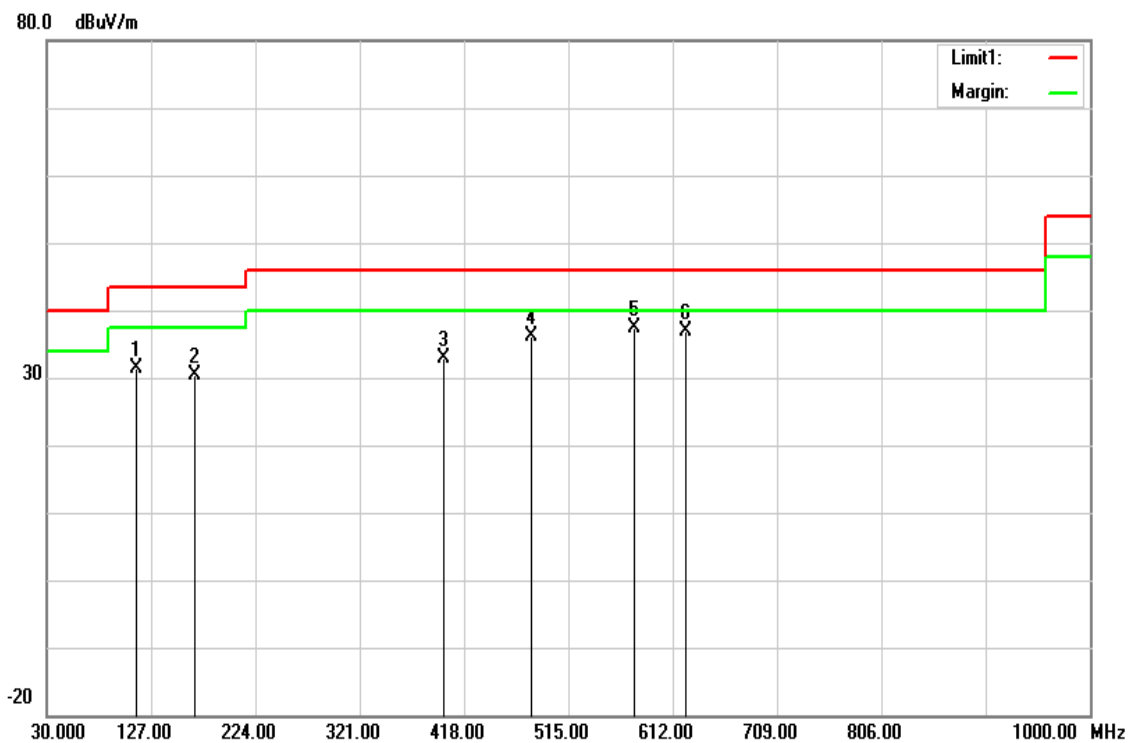
Test Mode	IEEE 802.11n HT40 High CH	Temperature:	22(°C)/ 35%RH
Test Item	Band Edge	Test Date	May 12, 2017
Polarize	Vertical	Test Engineer	Kevin.Kuo
Detector	Average	Test Voltage	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2437.160	95.44	-2.23	93.21	--	--	AVG
2483.600	54.64	-1.99	52.65	54.00	-1.35	AVG

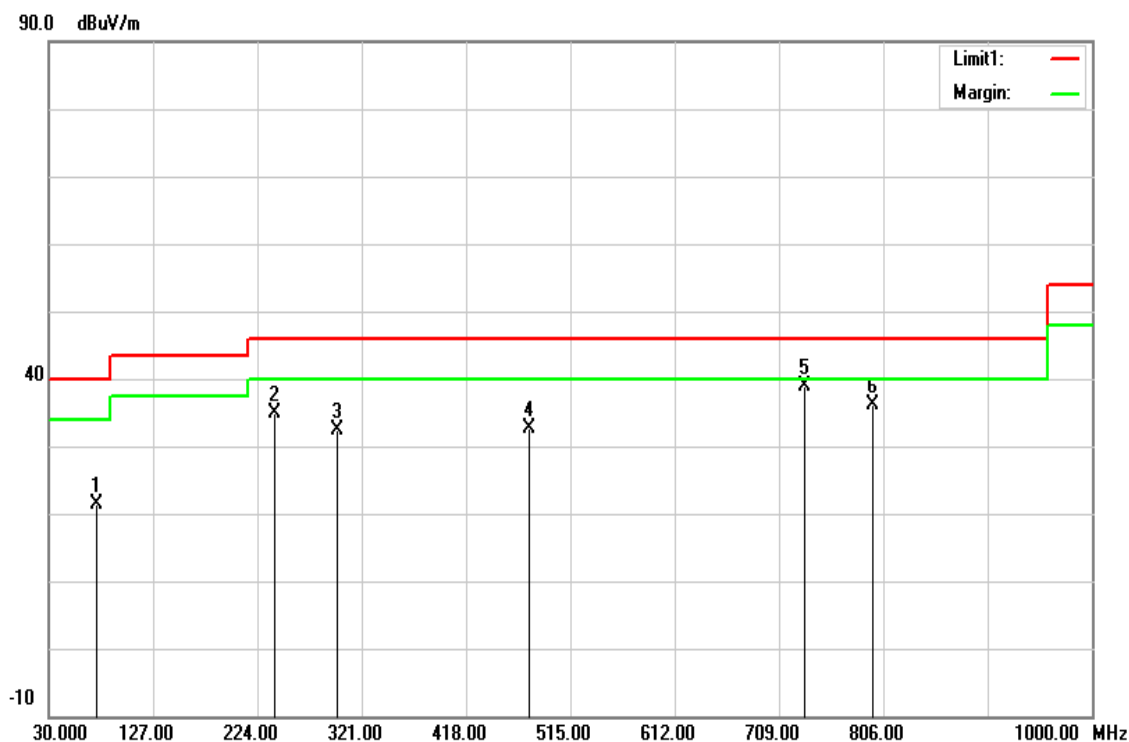
**Below 1G Test Data**

Test Mode	Mode 1	Temp/Hum	22(°C)/ 47%RH
Test Item	30MHz-1GHz	Test Date	May 3, 2017
Polarize	Vertical	Test Engineer	Kevin.Kuo
Detector	Peak	Test Voltage	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
113.4200	47.96	-16.66	31.30	43.50	-12.20	peak
167.7400	47.24	-16.74	30.50	43.50	-13.00	peak
399.5700	44.68	-11.71	32.97	46.00	-13.03	peak
480.0800	45.78	-9.62	36.16	46.00	-9.84	peak
576.1100	45.46	-8.11	37.35	46.00	-8.65	peak
623.6400	44.05	-7.20	36.85	46.00	-9.15	peak

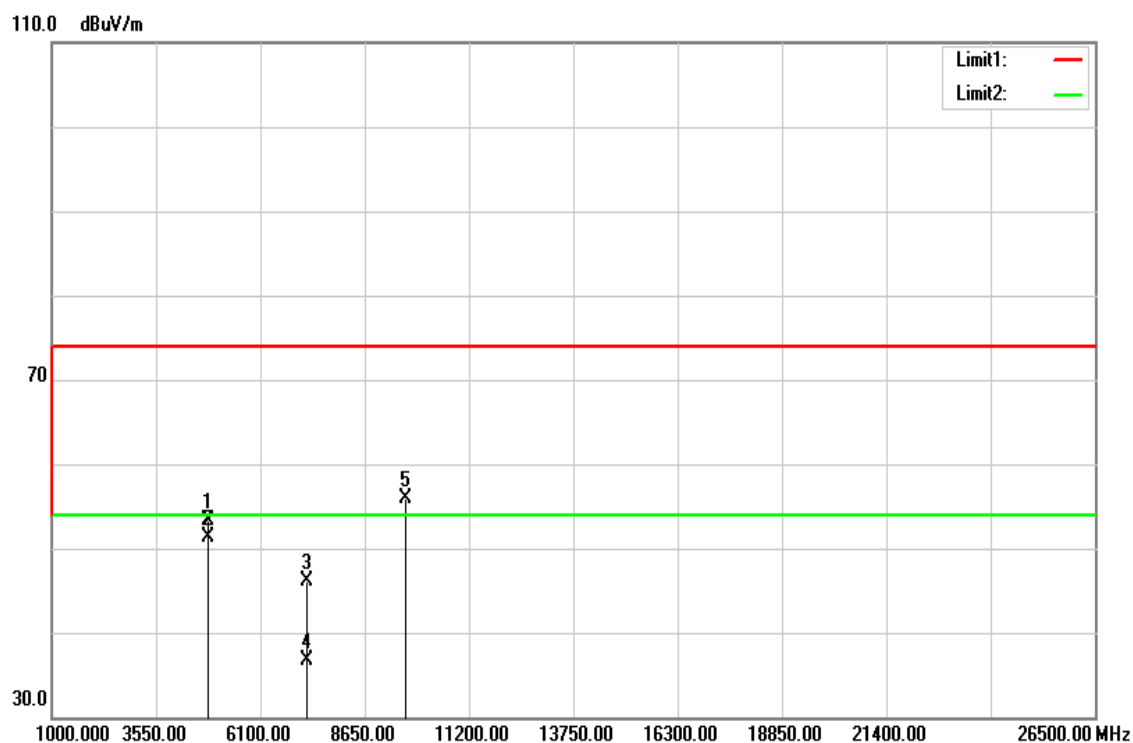
Test Mode	Mode 1	Temp/Hum	22(°C)/ 47%RH
Test Item	30MHz-1GHz	Test Date	May 3, 2017
Polarize	Horizontal	Test Engineer	Kevin.Kuo
Detector	Peak	Test Voltage	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
74.6200	42.41	-20.96	21.45	40.00	-18.55	peak
239.5200	51.34	-16.52	34.82	46.00	-11.18	peak
298.6900	46.76	-14.26	32.50	46.00	-13.50	peak
477.1700	42.23	-9.67	32.56	46.00	-13.44	peak
733.2500	44.18	-5.31	38.87	46.00	-7.13	peak
796.3000	40.70	-4.53	36.17	46.00	-9.83	peak

**Above 1G Test Data**

Test Mode	IEEE 802.11b Low CH	Temp/Hum	22(°C)/ 35%RH
Test Item	Harmonic	Test Date	May 16, 2017
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz

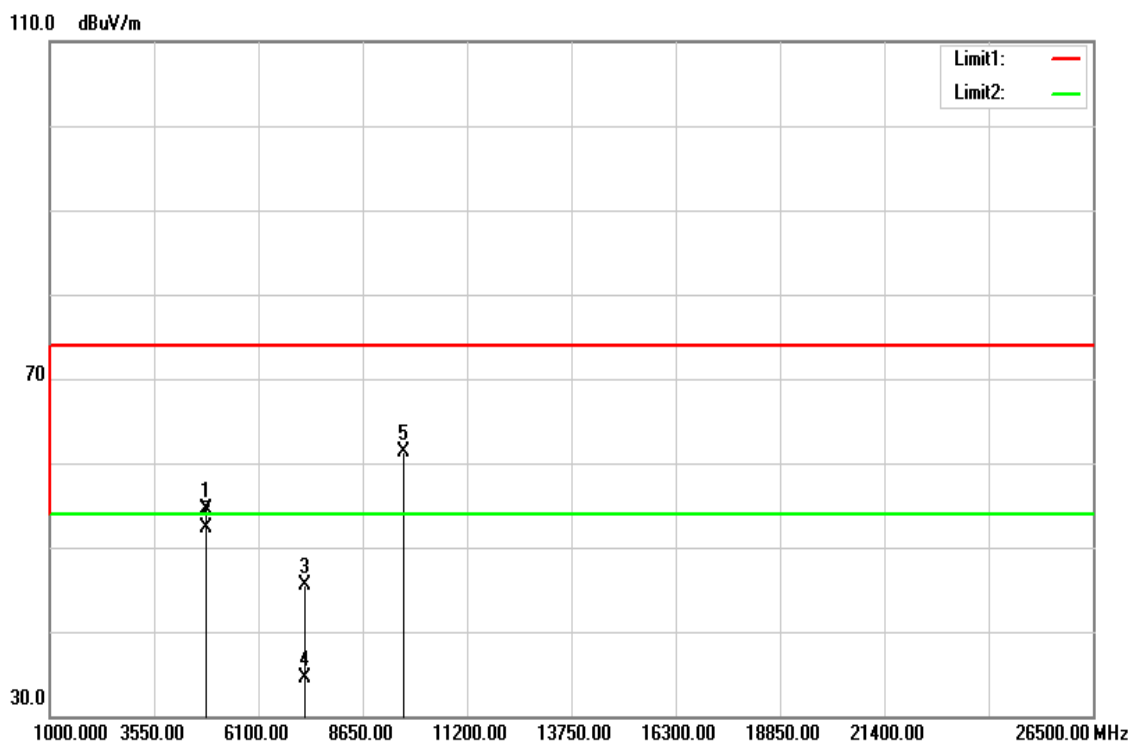


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	emark
4827.000	48.12	5.11	53.23	74.00	-20.77	peak
4827.000	46.29	5.11	51.40	54.00	-2.60	AVG
7236.000	33.39	12.71	46.10	74.00	-27.90	peak
7236.000	24.03	12.71	36.74	54.00	-17.26	AVG
9650.000	38.21	17.60	55.81	74.00	-18.19	peak
4827.000	48.12	5.11	53.23	74.00	-20.77	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 802.11b Low CH	Temp/Hum	22(°C)/ 35%RH
Test Item	Harmonic	Test Date	May 16, 2017
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz

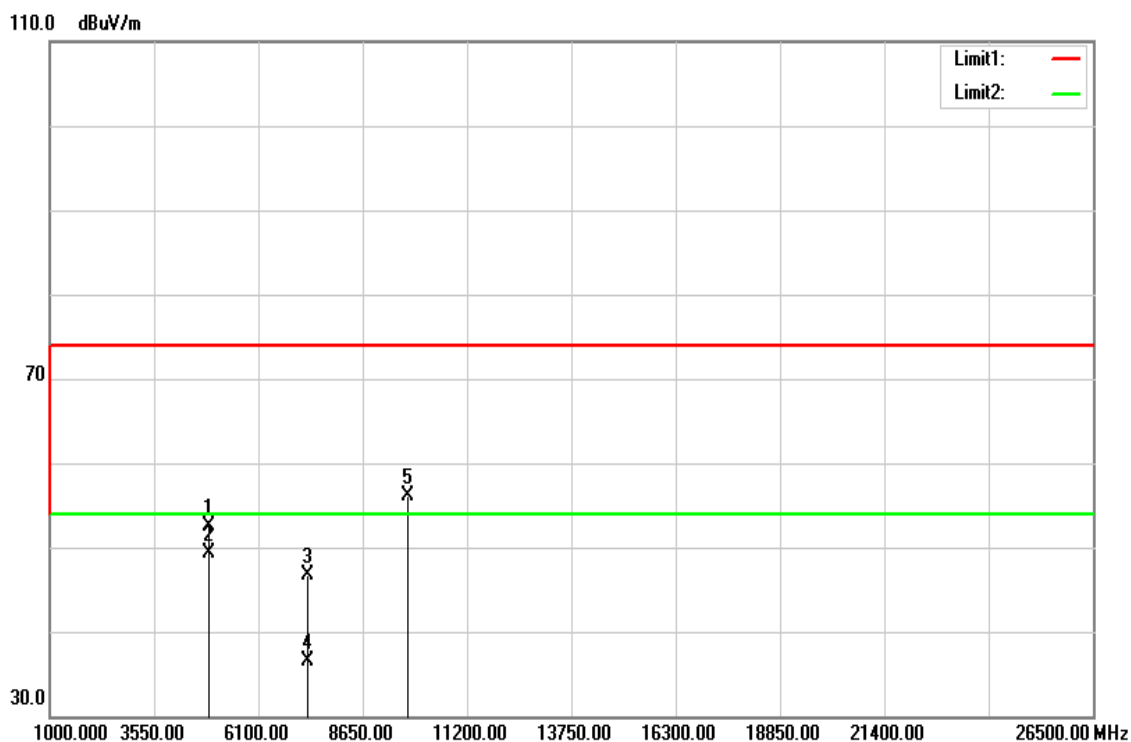


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (BuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4827.000	49.48	5.11	54.59	74.00	-19.41	peak
4827.000	47.17	5.11	52.28	54.00	-1.72	AVG
7236.000	32.85	12.71	45.56	74.00	-28.44	peak
7236.000	21.73	12.71	34.44	54.00	-19.56	AVG
9648.000	43.68	17.60	61.28	74.00	-12.72	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	22(°C)/ 35%RH
Test Item	Harmonic	Test Date	May 17, 2017
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz

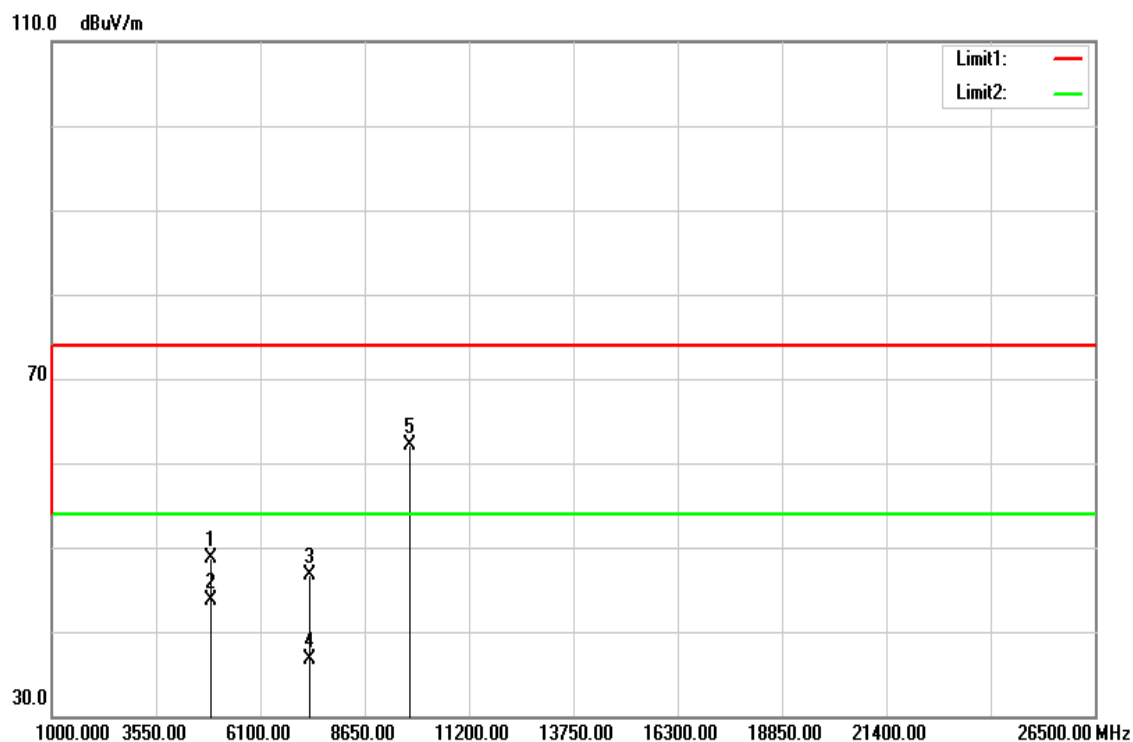


Frequency (MHz)	Reading (dBu )	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4876.000	47.27	5.24	52.51	74.00	-21.49	peak
4876.000	44.09	5.24	49.33	54.00	-4.67	AVG
7311.000	33.78	12.94	46.72	74.00	-27.28	peak
7311.000	23.53	12.94	36.47	54.00	-17.53	AVG
9748.000	38.45	17.60	56.05	74.00	-17.95	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 802.11b Mid CH	Temp/Hum	22(°C)/ 35%RH
Test Item	Harmonic	Test Date	May 17, 2017
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz

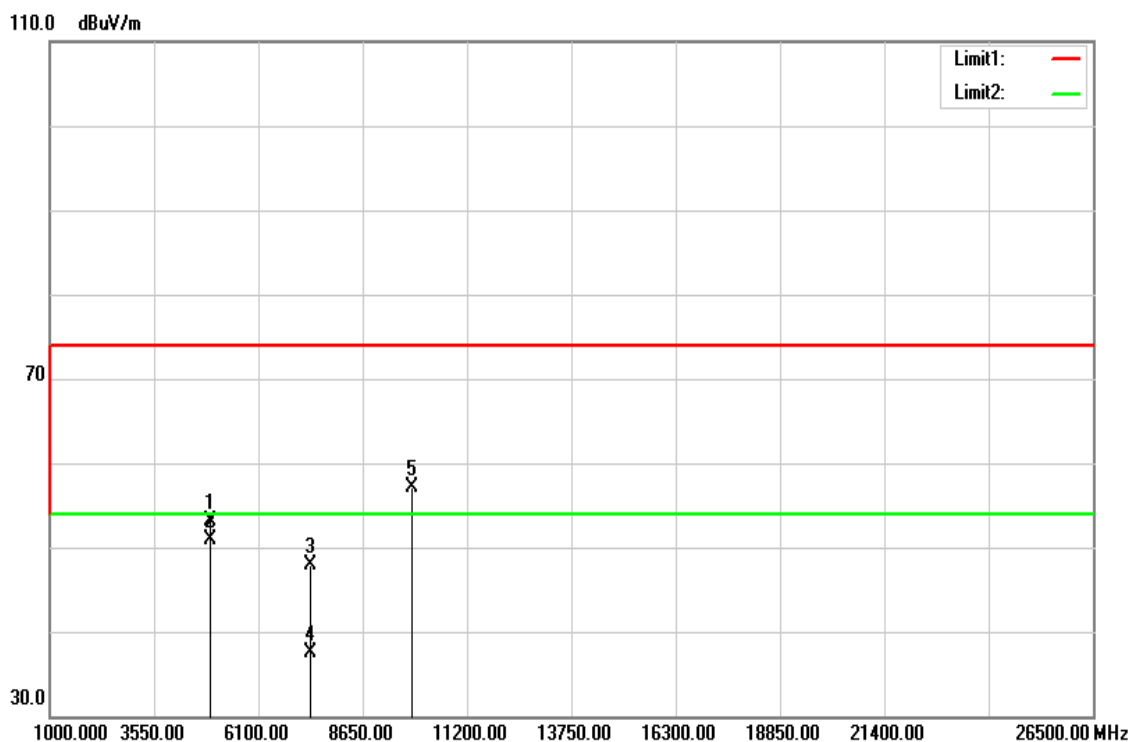


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4876.000	43.45	5.24	48.69	74.00	-25.31	peak
4876.000	38.51	5.24	43.75	54.00	-10.25	AVG
7311.000	33.76	12.94	46.70	74.00	-27.30	peak
7311.000	23.74	12.94	36.68	54.00	-17.32	AVG
9748.000	44.43	17.60	62.03	74.00	-11.97	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 802.11b High CH	Temp/Hum	22(°C)/ 35%RH
Test Item	Harmonic	Test Date	May 17, 2017
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz

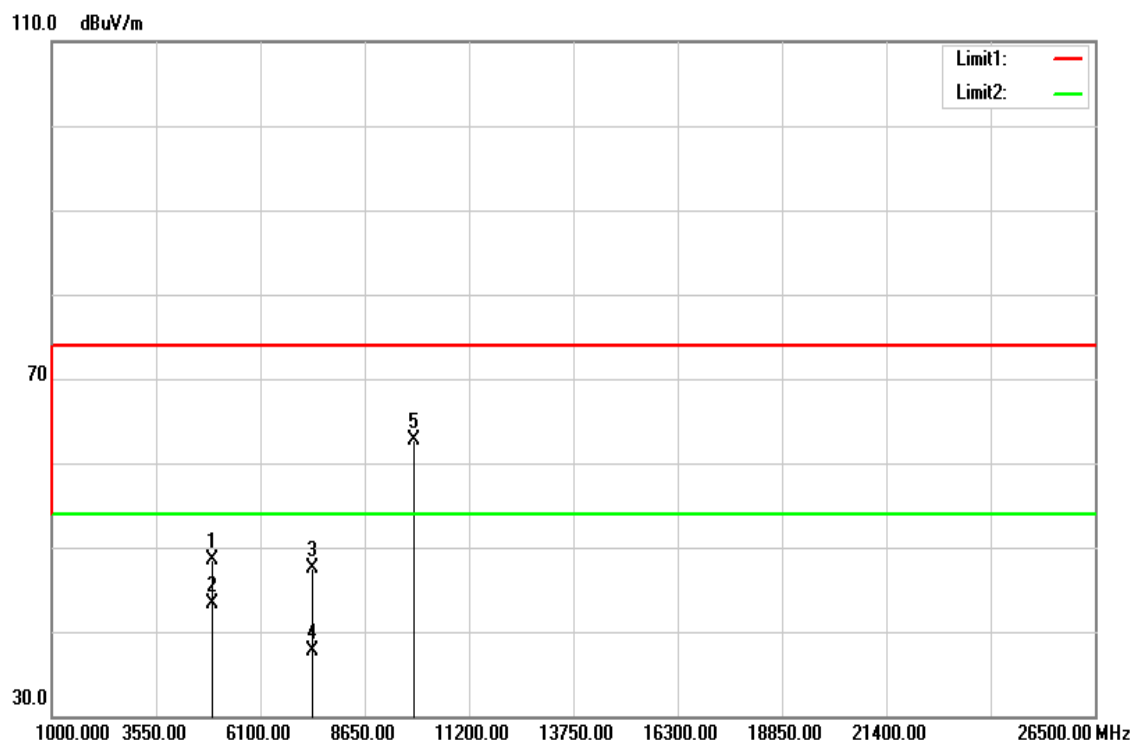


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4925.000	47.67	5.37	53.04	74.00	-20.96	peak
4925.000	45.56	5.37	50.93	54.00	-3.07	AVG
7386.000	34.66	13.17	47.83	74.00	-26.17	peak
7386.000	24.38	13.17	37.55	54.00	-16.45	AVG
9846.000	39.43	17.60	57.03	74.00	-16.97	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 802.11b High CH	Temp/Hum	22(°C)/ 35%RH
Test Item	Harmonic	Test Date	May 17, 2017
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz

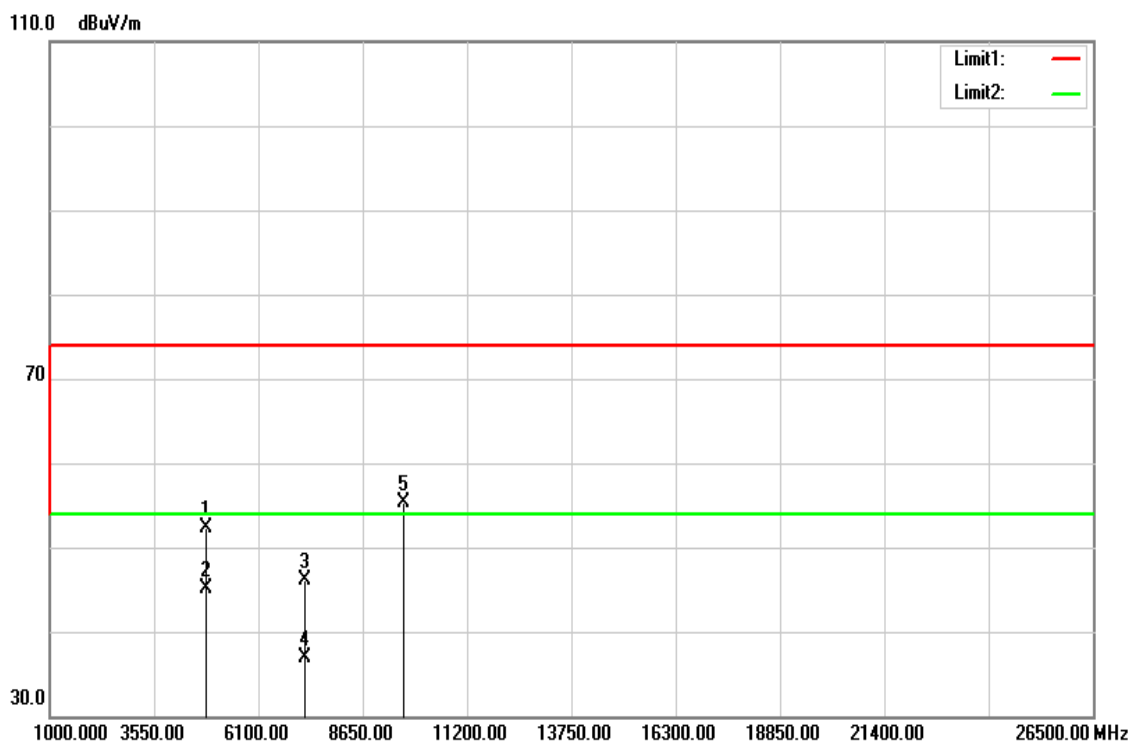


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4925.000	43.17	5.37	48.54	74.00	-25.46	peak
4925.000	37.90	5.37	43.27	54.00	-10.73	AVG
7386.000	34.27	13.17	47.44	74.00	-26.56	peak
7386.000	24.52	13.17	37.69	54.00	-16.31	AVG
9846.000	45.20	17.60	62.80	74.00	-11.20	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	22 (°C)/ 35%RH
Test Item	Harmonic	Test Date	May 16, 2017
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz

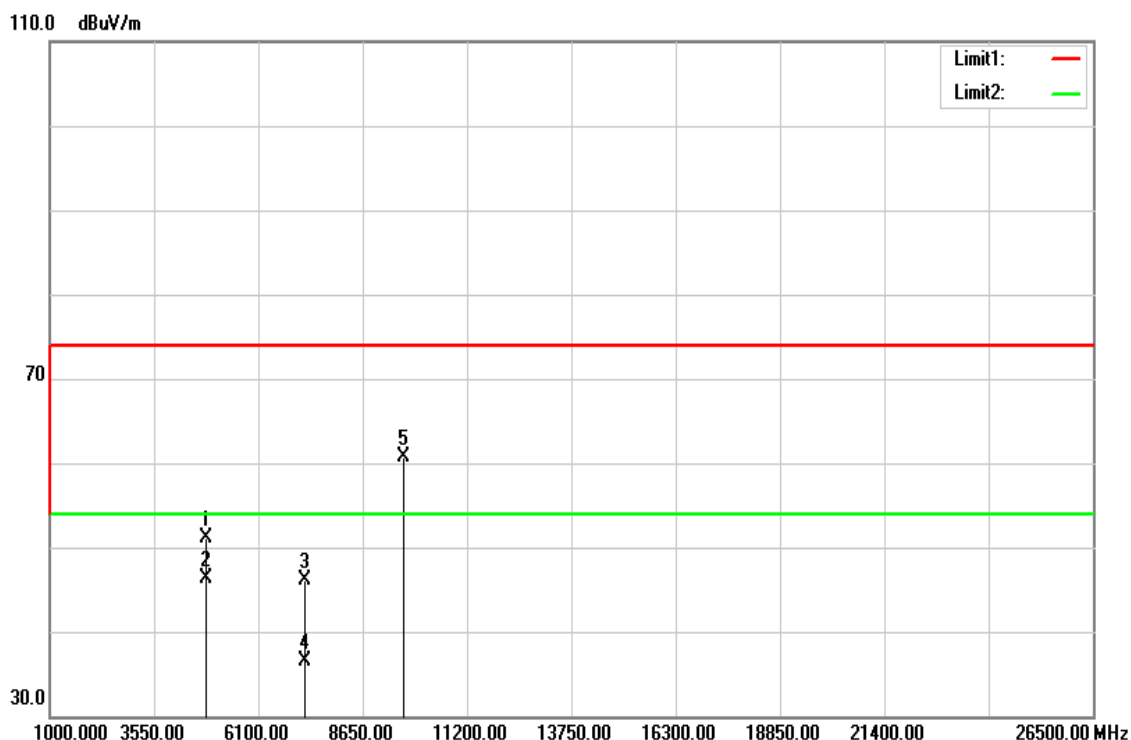


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4827.000	47.24	5.11	52.35	74.00	-21.65	peak
4827.000	39.90	5.11	45.01	54.00	-8.99	AVG
7236.000	33.33	12.71	46.04	74.00	-27.96	peak
7236.000	24.16	12.71	36.87	54.00	-17.13	AVG
9650.000	37.77	17.60	55.37	74.00	-18.63	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	22 (°C)/ 35%RH
Test Item	Harmonic	Test Date	May 16, 2017
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz

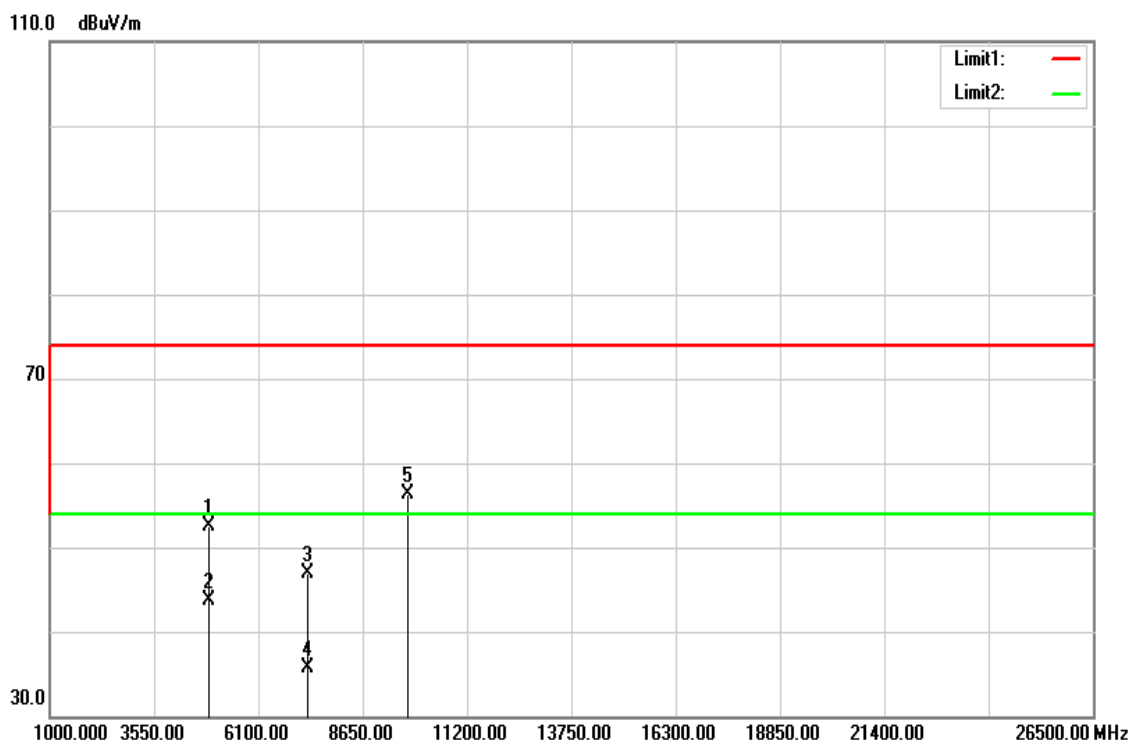


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4827.000	45.92	5.11	51.03	74.00	-22.97	peak
4827.000	41.24	5.11	46.35	54.00	-7.65	AVG
7236.000	33.46	12.71	46.17	74.00	-27.83	peak
7236.000	23.77	12.71	36.48	54.00	-17.52	AVG
9650.000	43.12	17.60	60.72	74.00	-13.28	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	22 (°C)/ 35%RH
Test Item	Harmonic	Test Date	May 16, 2017
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz

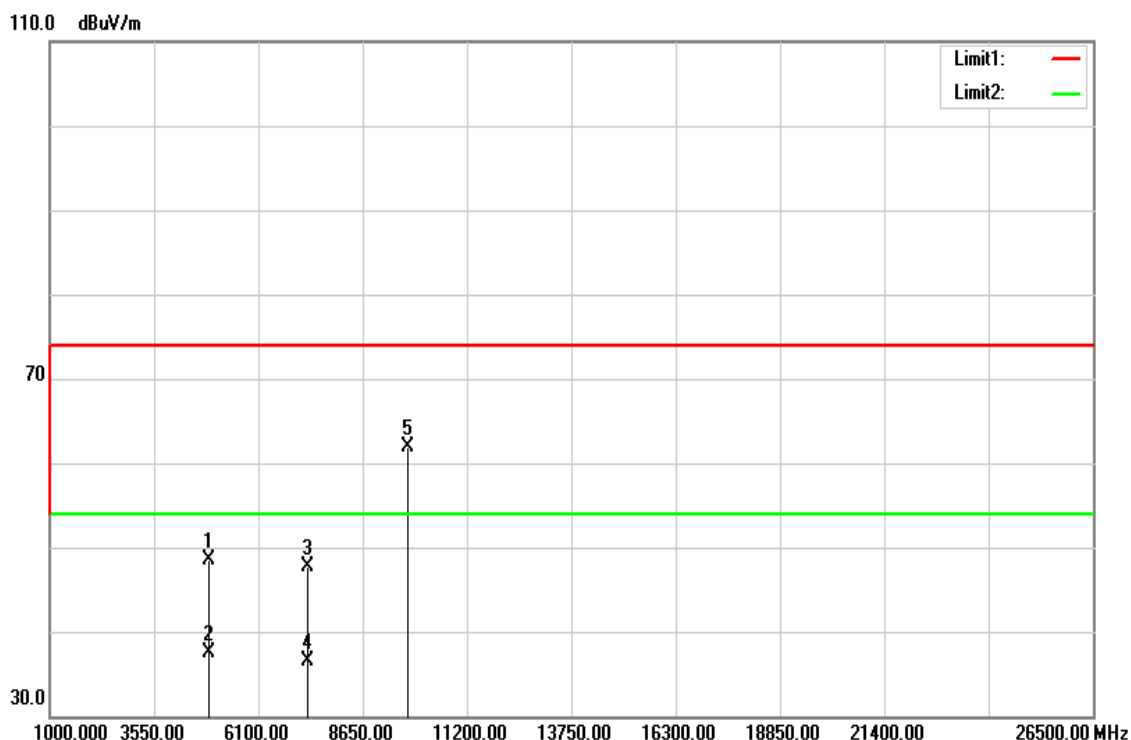


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4876.000	47.27	5.24	52.51	74.00	-21.49	peak
4876.000	38.40	5.24	43.64	54.00	-10.36	AVG
7311.000	33.95	12.94	46.89	74.00	-27.11	peak
7311.000	22.78	12.94	35.72	54.00	-18.28	AVG
9748.000	38.67	17.60	56.27	74.00	-17.73	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	22 (°C)/ 35%RH
Test Item	Harmonic	Test Date	May 16, 2017
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz

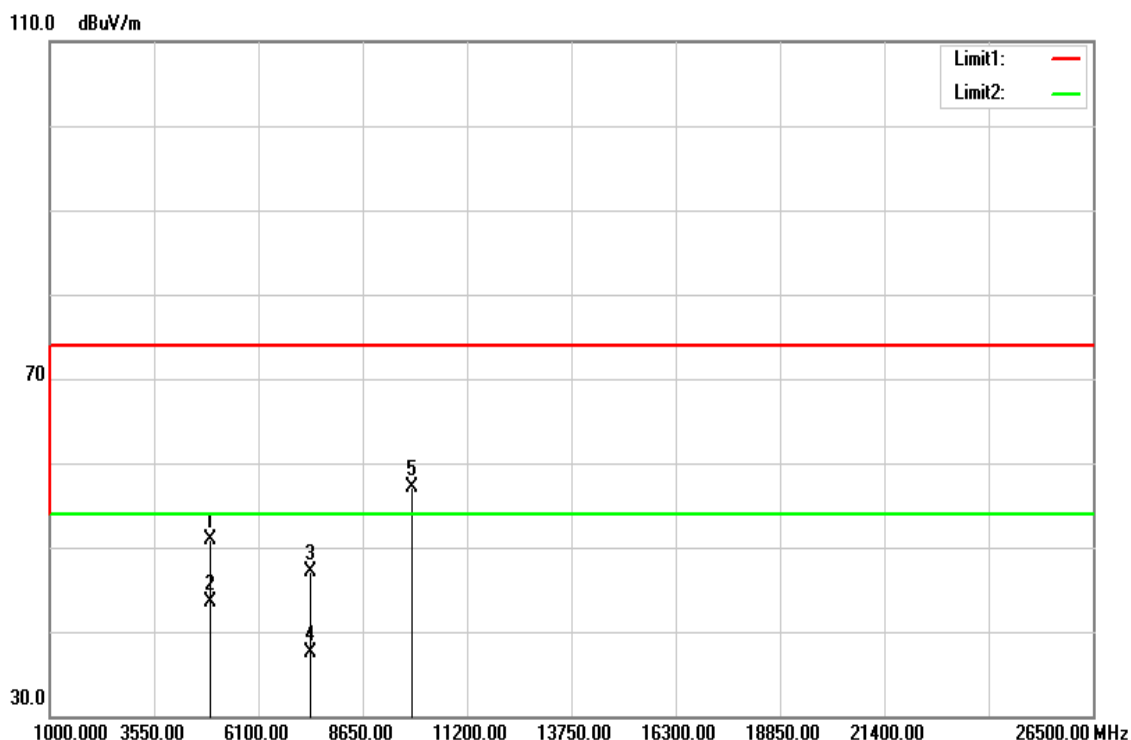


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin ( B )	Remark
4876.000	43.21	5.24	48.45	74.00	-25.55	peak
4876.000	32.34	5.24	37.58	54.00	-16.42	AVG
7311.000	34.73	12.94	47.67	74.00	-26.33	peak
7311.000	23.48	12.94	36.42	54.00	-17.58	AVG
9748.000	44.22	17.60	61.82	74.00	-12.18	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	22 (°C)/ 35%RH
Test Item	Harmonic	Test Date	May 17, 2017
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz

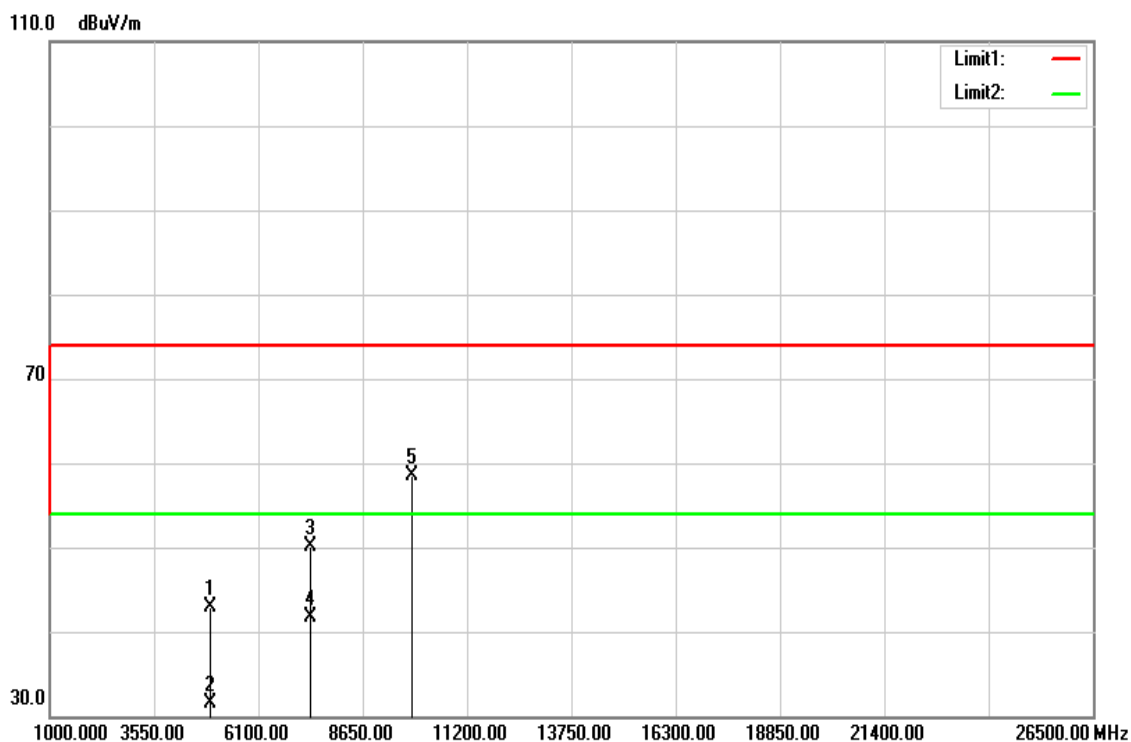


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4911.000	45.55	5.33	50.88	74.00	-23.12	peak
4911.000	38.24	5.33	43.57	54.00	-10.43	AVG
7386.000	33.95	13.17	47.12	74.00	-26.88	peak
7386.000	24.25	13.17	37.42	54.00	-16.58	AVG
9846.000	39.42	17.60	57.02	74.00	-16.98	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	22 (°C)/ 35%RH
Test Item	Harmonic	Test Date	May 17, 2017
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz

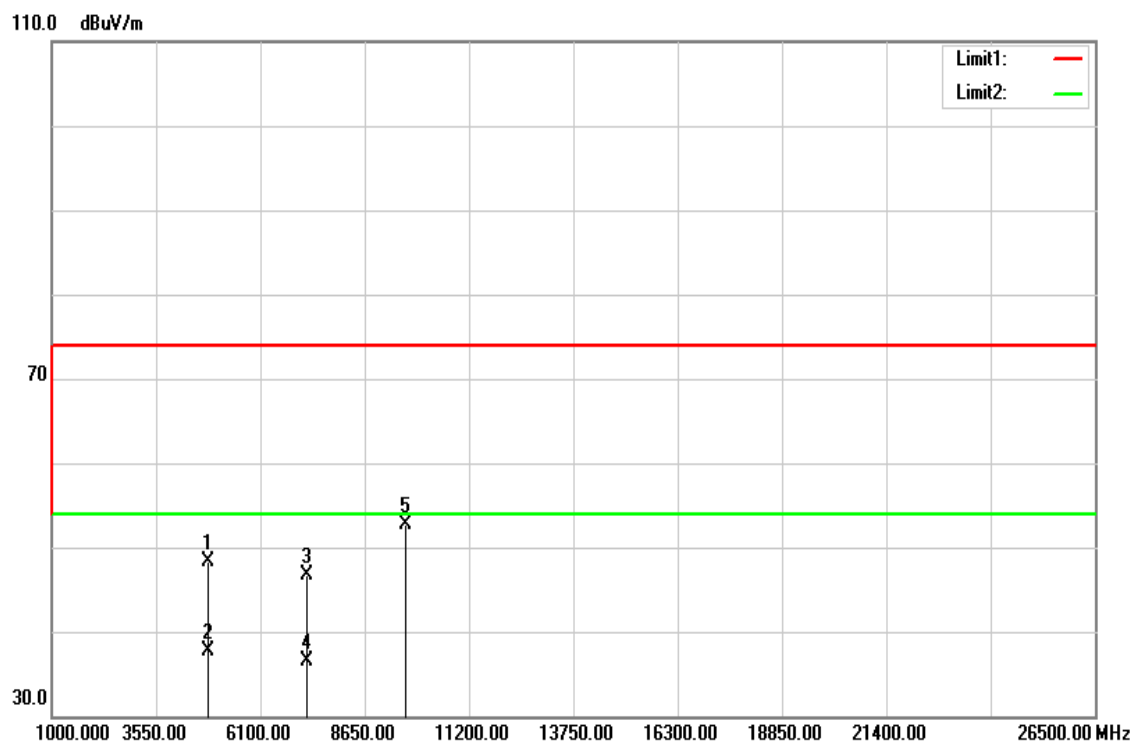


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4924.000	37.58	5.37	42.95	74.00	-31.05	peak
4924.000	26.18	5.37	31.55	54.00	-22.45	AVG
7386.000	36.91	13.17	50.08	74.00	-23.92	peak
7386.000	28.51	13.17	41.68	54.00	-12.32	AVG
9846.000	40.82	17.60	58.42	74.00	-15.58	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	22 (°C)/ 35%RH
Test Item	Harmonic	Test Date	May 16, 2017
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz

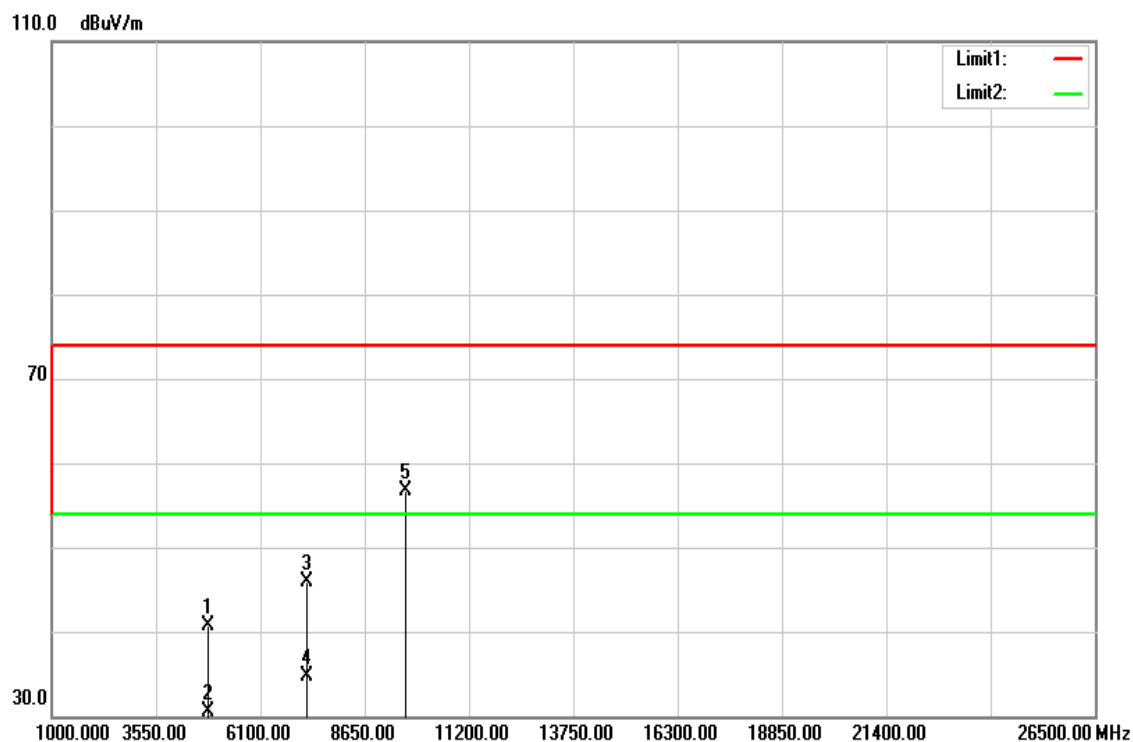


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	R mark
4827.000	43.12	5.11	48.23	74.00	-25.77	peak
4827.000	32.55	5.11	37.66	54.00	-16.34	AVG
7236.000	34.06	12.71	46.77	74.00	-27.23	peak
7236.000	23.87	12.71	36.58	54.00	-17.42	AVG
9648.000	35.12	17.60	52.72	74.00	-21.28	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	22 (°C)/ 35%RH
Test Item	Harmonic	Test Date	May 16, 2017
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz

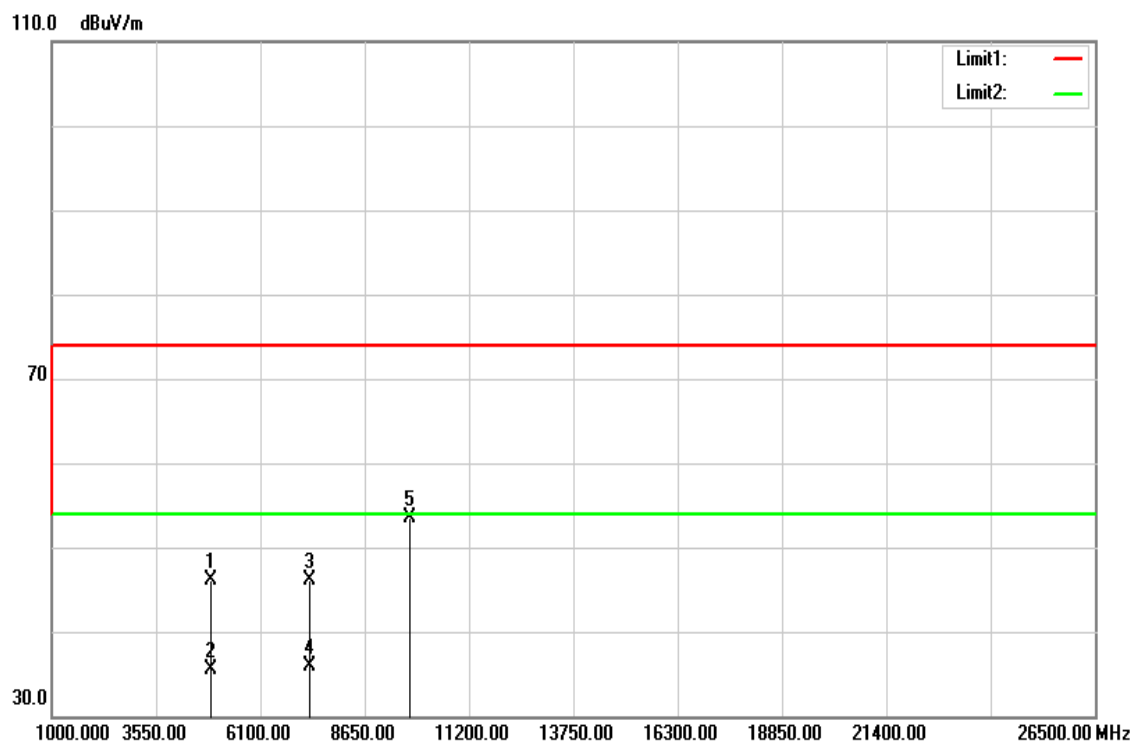


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4824.000	35.56	5.10	40.66	74.00	-33.34	peak
4824.000	25.31	5.10	30.41	54.00	-23.59	AVG
7236.000	33.17	12.71	45.88	74.00	-28.12	peak
7236.000	22.04	12.71	34.75	54.00	-19.25	AVG
9650.000	39.08	17.60	56.68	74.00	-17.32	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	22 (°C)/ 35%RH
Test Item	Harmonic	Test Date	May 16, 2017
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz

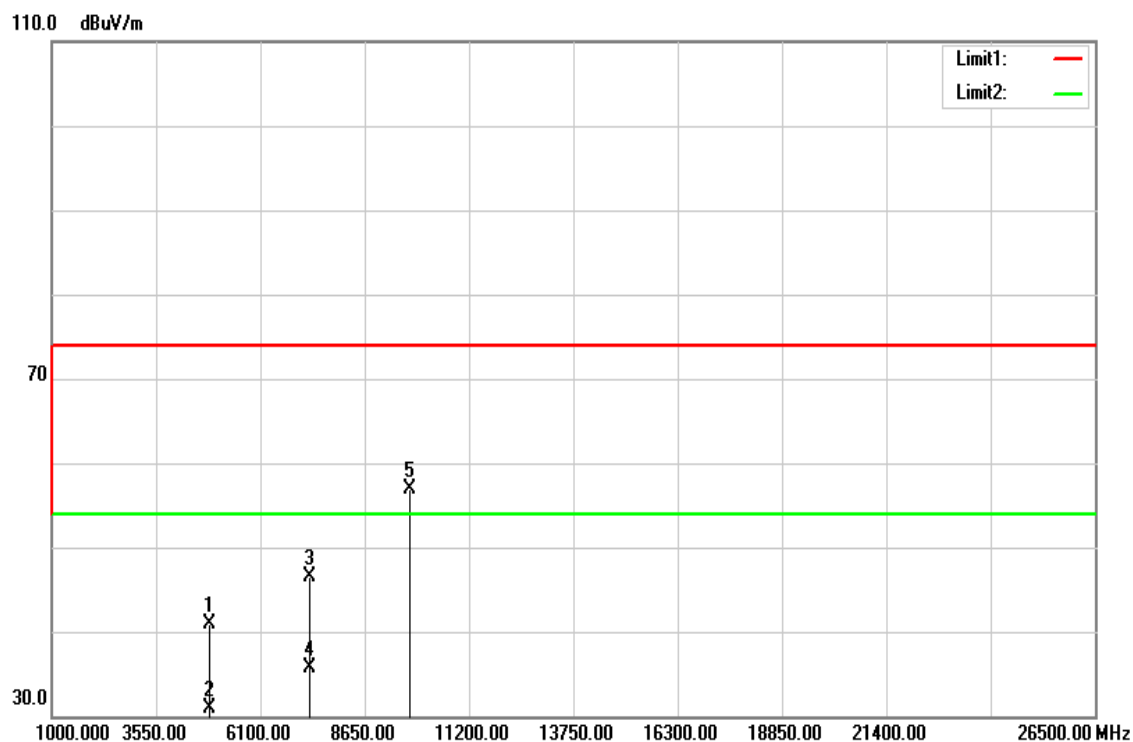


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	R mark
4876.000	40.87	5.24	46.11	74.00	-27.89	peak
4876.000	30.23	5.24	35.47	54.00	-18.53	AVG
7311.000	33.23	12.94	46.17	74.00	-27.83	peak
7311.000	23.00	12.94	35.94	54.00	-18.06	AVG
9748.000	35.83	17.60	53.43	74.00	-20.57	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 Mid CH	Temp/Hum	22 (°C)/ 35%RH
Test Item	Harmonic	Test Date	May 16, 2017
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz

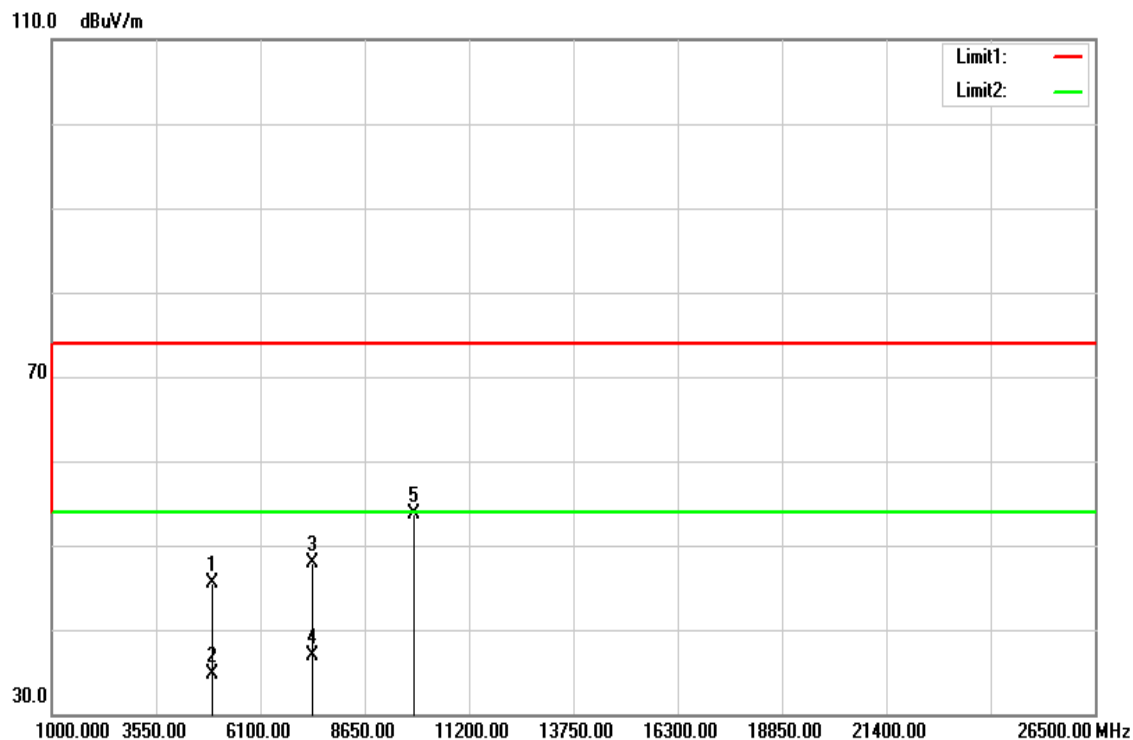


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4874.000	35.67	5.23	40.90	74.00	-33.10	peak
4874.000	25.59	5.23	30.82	54.00	-23.18	AVG
7311.000	33.49	12.94	46.43	74.00	-27.57	peak
7311.000	22.84	12.94	35.78	54.00	-18.22	AVG
9748.000	39.34	17.60	56.94	74.00	-17.06	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	22 (°C)/ 35%RH
Test Item	Harmonic	Test Date	May 17, 2017
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz

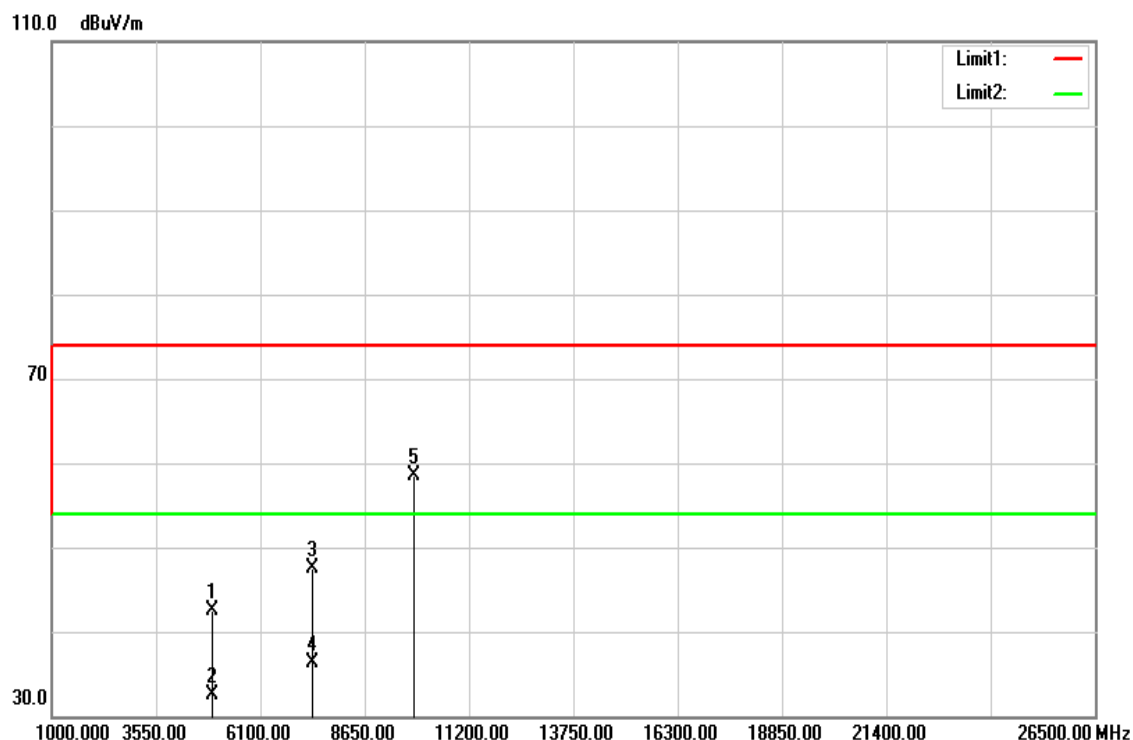


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4924.000	40.17	5.37	45.54	74.00	-28.46	peak
4924.000	29.39	5.37	34.76	54.00	-19.24	AVG
7386.000	34.74	13.17	47.91	74.00	-26.09	peak
7386.000	23.67	13.17	36.84	54.00	-17.16	AVG
9846.000	36.09	17.60	53.69	74.00	-20.31	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	22 (°C)/ 35%RH
Test Item	Harmonic	Test Date	May 17, 2017
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz

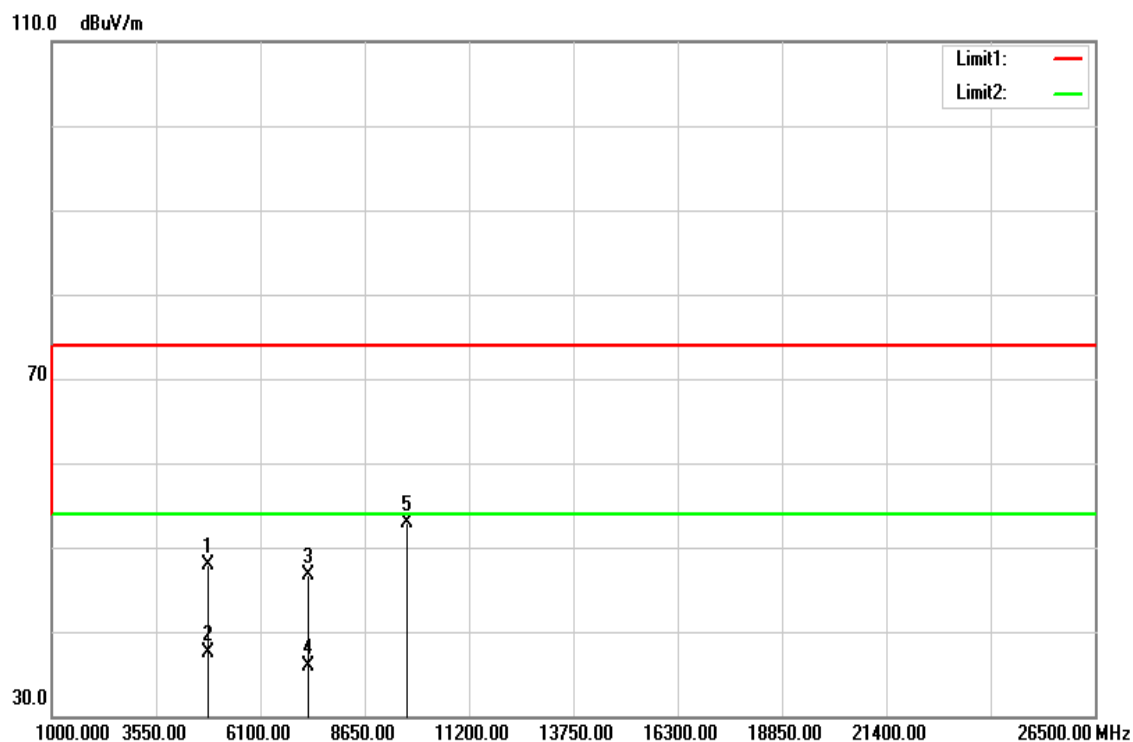


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4924.000	37.15	5.37	42.52	74.00	-31.48	peak
4924.000	27.07	5.37	32.44	54.00	-21.56	AVG
7386.000	34.39	13.17	47.56	74.00	-26.44	peak
7386.000	23.04	13.17	36.21	54.00	-17.79	AVG
9846.000	40.84	17.60	58.44	74.00	-15.56	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	22 (°C)/ 35%RH
Test Item	Harmonic	Test Date	May 17, 2017
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz

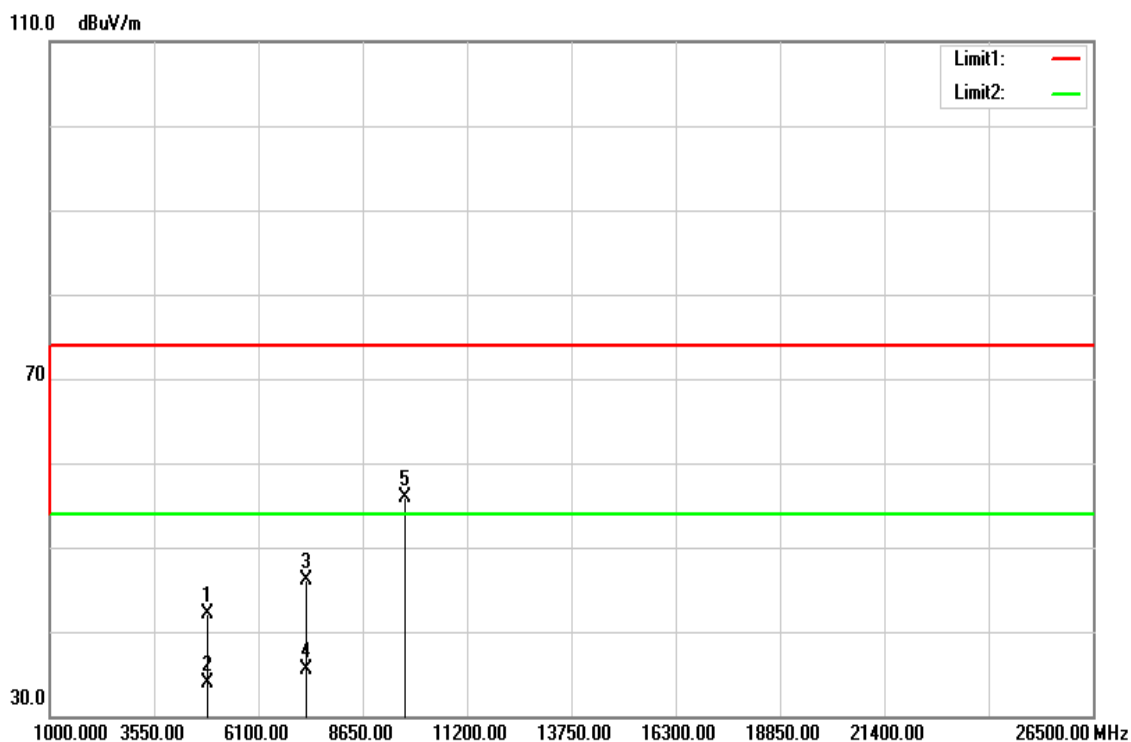


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4841.000	42.84	5.14	47.98	74.00	-26.02	peak
4841.000	32.40	5.14	37.54	54.00	-16.46	AVG
7266.000	33.96	12.80	46.76	74.00	-27.24	peak
7266.000	23.09	12.80	35.89	54.00	-18.11	AVG
9685.000	35.32	17.60	52.92	74.00	-21.08	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	22 (°C)/ 35%RH
Test Item	Harmonic	Test Date	May 17, 2017
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz

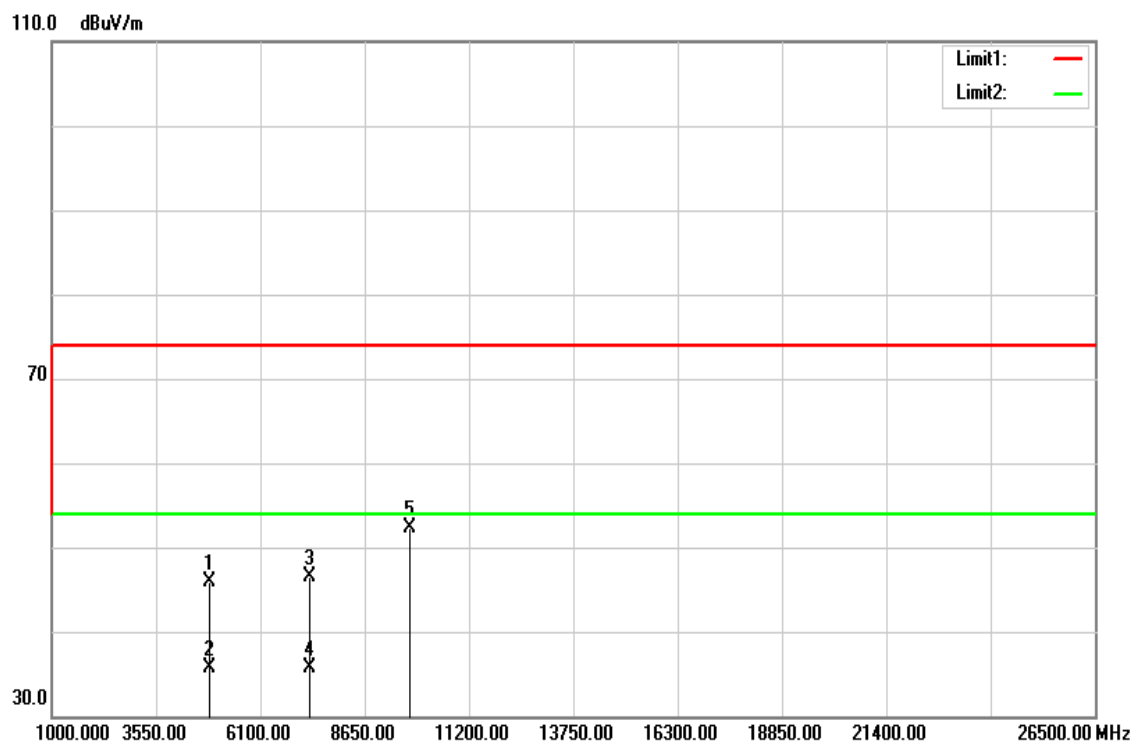


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4844.000	37.03	5.15	42.18	74.00	-31.82	peak
4844.000	28.70	5.15	33.85	54.00	-20.15	AVG
7266.000	33.23	12.80	46.03	74.00	-27.97	peak
7266.000	22.67	12.80	35.47	54.00	-18.53	AVG
9685.000	38.31	17.60	55.91	74.00	-18.09	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	22 (°C)/ 35%RH
Test Item	Harmonic	Test Date	May 17, 2017
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz

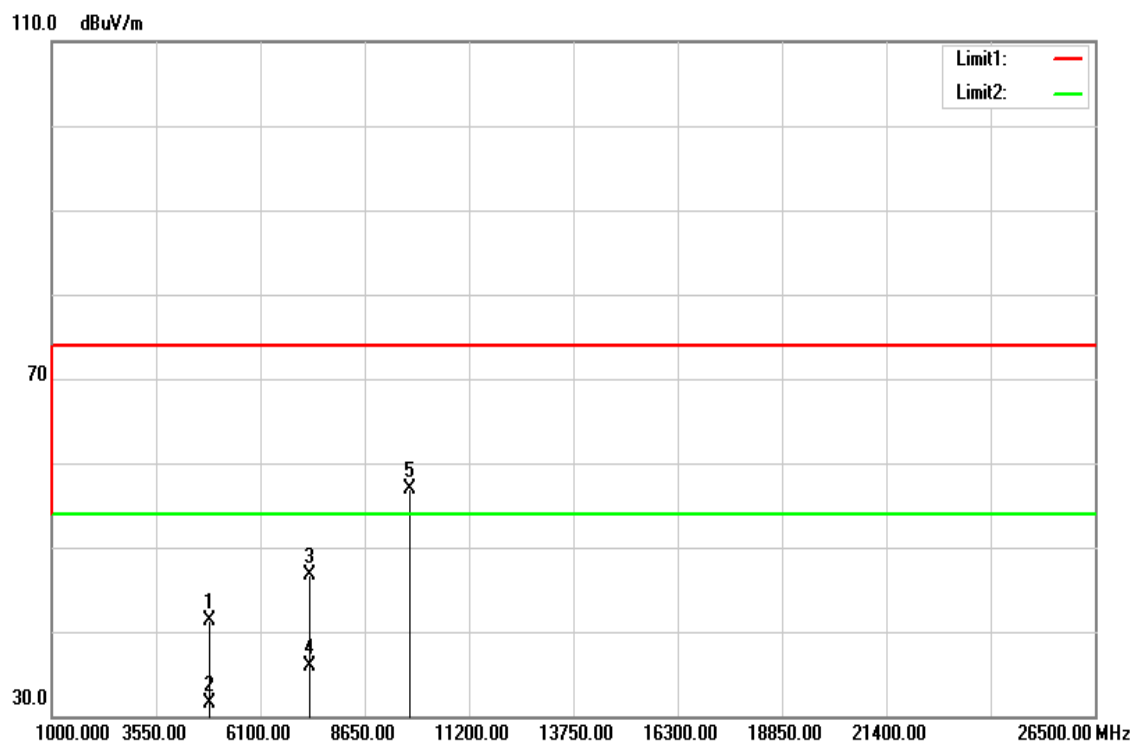


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4869.000	40.63	5.22	45.85	74.00	-28.15	peak
4869.000	30.57	5.22	35.79	54.00	-18.21	AVG
7311.000	33.60	12.94	46.54	74.00	-27.46	peak
7311.000	22.72	12.94	35.66	54.00	-18.34	AVG
9748.000	34.70	17.60	52.30	74.00	-21.70	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	22 (°C)/ 35%RH
Test Item	Harmonic	Test Date	May 17, 2017
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz

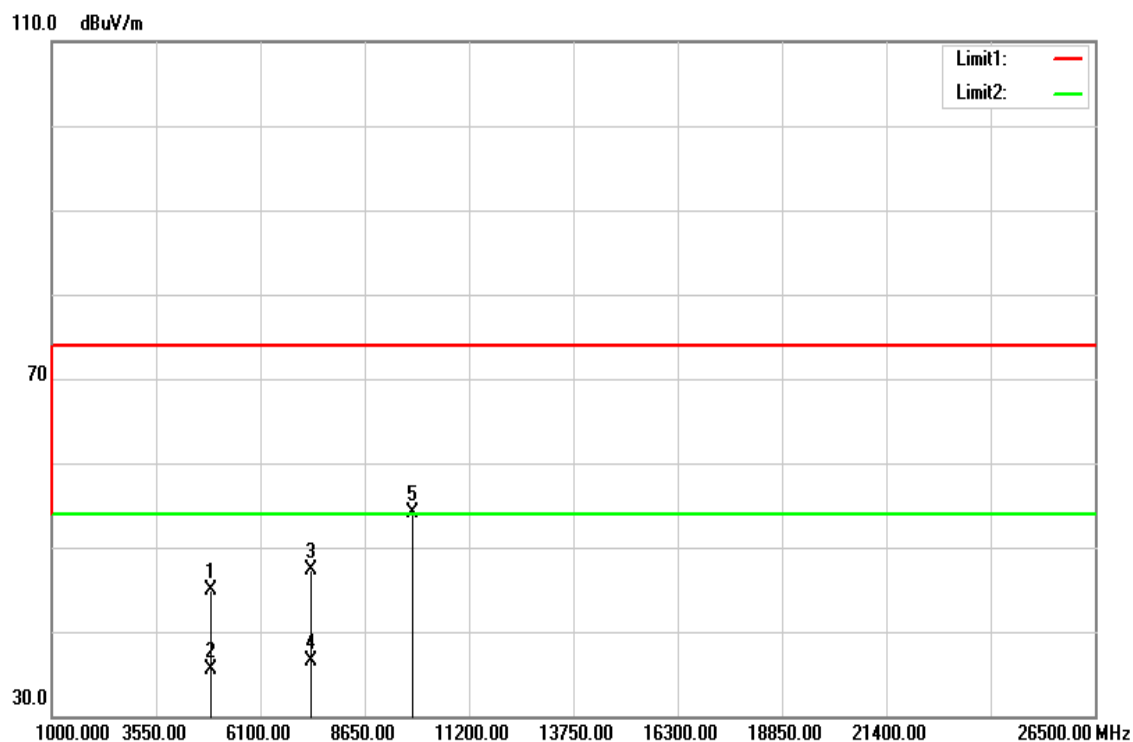


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4874.000	36.01	5.23	41.24	74.00	-32.76	peak
4874.000	26.21	5.23	31.44	54.00	-22.56	AVG
7311.000	33.78	12.94	46.72	74.00	-27.28	peak
7311.000	22.89	12.94	35.83	54.00	-18.17	AVG
9748.000	39.31	17.60	56.91	74.00	-17.09	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	22 (°C)/ 35%RH
Test Item	Harmonic	Test Date	May 17, 2017
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz

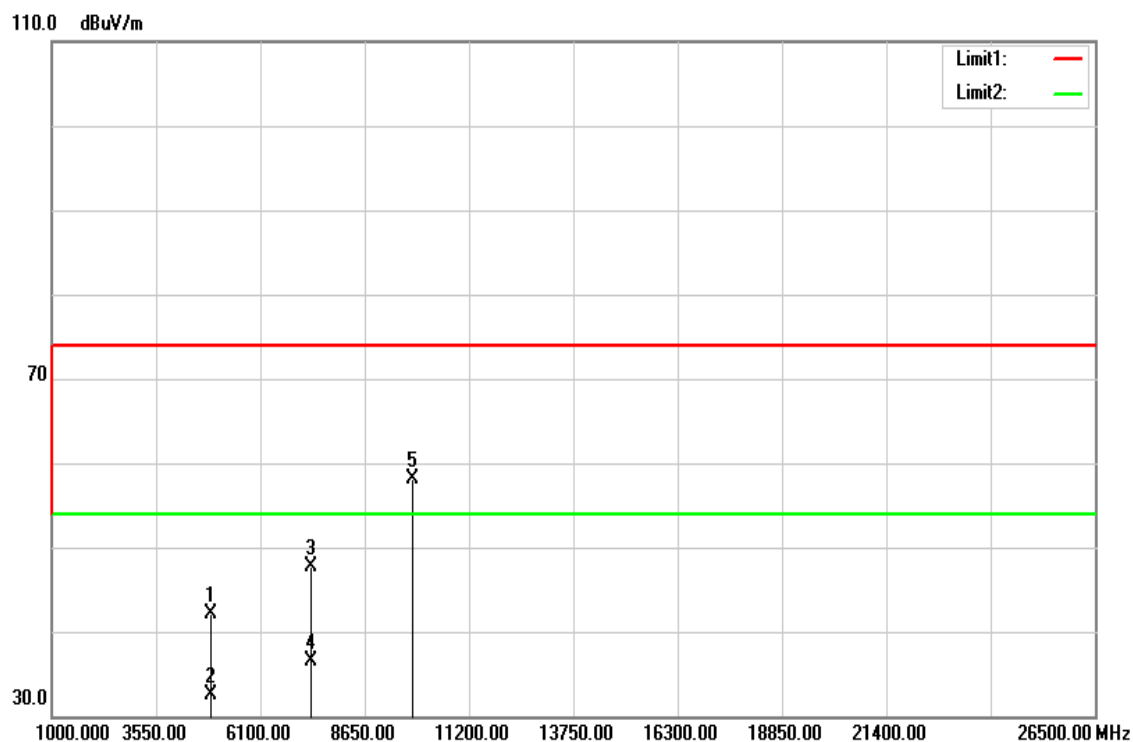


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4904.000	39.60	5.31	44.91	74.00	-29.09	peak
4904.000	30.15	5.31	35.46	54.00	-18.54	AVG
7356.000	34.12	13.08	47.20	74.00	-26.80	peak
7356.000	23.50	13.08	36.58	54.00	-17.42	AVG
9808.000	36.50	17.60	54.10	74.00	-19.90	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	22 (°C)/ 35%RH
Test Item	Harmonic	Test Date	May 17, 2017
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	36.79	5.31	42.10	74.00	-31.90	peak
4904.000	27.17	5.31	32.48	54.00	-21.52	AVG
7356.000	34.58	13.08	47.66	74.00	-26.34	peak
7356.000	23.49	13.08	36.57	54.00	-17.43	AVG
9811.000	40.44	17.60	58.04	74.00	-15.96	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