RADIO TEST REPORT
FCC 47 CFR PART 15 SUBPART C
INDUSTRY CANADA RSS-247

Test Standard	**FCC Part 15.247 + IC RSS-247 issue 2**
FCC ID	**PPQ-WCBN3509ANB**
ISED NO	**4491A-WCBN3509ANB**
Brand name	**LITE-ON**
Product name	**802.11a/b/g/n/ac 2Tx2R USB WLAN Module**
Model No.	**WCBN3509A(NB)**
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 Compliance Certification Services Inc.(Wugu Laboratory).

Testing Laboratory
1309

Approved by:

Sam Chuang
Manager

Tested by:

Jerry Chuang
Engineer

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Revision History

Rev.	Issue Date	Revisions	Revised By
00	December 1, 2017	Initial Issue	May Lin

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1.1 GENERAL INFORMATION

1.2 EUT INFORMATION

Applicant	LITE-ON Technology Corp. Bldg. C, 90, Chien 1 Road, Chung Ho, New Taipei City 23585, Taiwan, R.O.C
Manufacturer	LITE-ON TECHNOLOGY (Changzhou) CO., LTD A9 Building,No.88 Yanghu Road, Wujin Hi-Tech Industrial Development Zone ,Changzhou City,Jiangsu Province 213100 China
Equipment	802.11a/b/g/n/ac 2Tx2R USB WLAN Module
Model Name	WCBN3509A(NB)
Model Discrepancy	N/A
Received Date	November 27, 2017
Date of Test	November 27 ~ 30, 2017
Output Power(W)	IEEE 802.11b mode: 0.0687 (EIRP: 0.1626) IEEE 802.11g mode: 0.1300 (EIRP: 0.3076) IEEE 802.11n HT 20 MHz mode : 0.2301 (EIRP : 0.5445) IEEE 802.11n HT 40 MHz mode: 0.1687 (EIRP : 0.3990)
Power Supply	Powered from host device: DC 5V
HW Version	V04
FW Version	V37.27

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1.3 EUT CHANNEL INFORMATION

Frequency Range	802.11b/g/n HT20: 2412MHz ~ 2462MHz 802.11n HT40: 2422MHz ~ 2452MHz
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: 7 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**
☐ 1 MHz or less	1	Middle
☐ 1 MHz to 10 MHz	2	1 near top and 1 near bottom
☒ More than 10 MHz	3	1 near top, 1 near middle, and 1 near bottom

1.4 ANTENNA INFORMATION

Antenna Type ☒ PIFA ☐ PCB ☐ Dipole ☐ Coils

Antenna Gain

Brand	P/N	Type	Cable length	Peak Gain	Worst case
HongBo	290-10569	PIFA	300mm	3.74dBi	V

1. Power Directional Gain: 3.74
2. Power Density Directional Gain: 3.74

Other antenna information:

Brand	P/N	Type	Cable length	Peak Gain
HongBo	290-10310	PIFA	500mm	3.60dBi
Walsin	RFMTA401032IMLB702	PIFA	320mm	2.6dBi
Walsin	RFMTA401080IMLB701	PIFA	800mm	1.72dBi
Walsin	RFMTA401082IMLB701	PIFA	820mm	1.62dBi

Notes:
1. Power Directional Gain: 10LOG(((10^(Ant1/10)+10^(Ant2/10))/2))
2. Power Density Directional Gain: 10LOG(((10^(Ant1/10)+10^(Ant2/10))/2))+10log(NTX/NSS)

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1.5 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.

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1.6 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	Jerry Chuang	
RF Conducted	Jerry Chuang	

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

1.7 INSTRUMENT CALIBRATION

RF Conducted Test Site					
Equipment	**Manufacturer**	**Model**	**S/N**	**Cal Date**	**Cal Due**
Power Meter	Anritsu	ML2495A	1033009	04/11/2017	04/10/2018
Power Sensor	Anritsu	MA2411B	917072	07/03/2017	07/02/2018
Spectrum Analyzer	R&S	FSV 40	101073	10/02/2017	10/01/2018
Thermostatic/Hrgrosatic Chamber	GWINSTEK	GTC-288MH-CC	TH160402	05/23/2017	05/22/2018
SUCOFLEX Cable	HUBER SUHNER	SUCOFLEX 104PEA	25157	07/31/2017	07/30/2018
Divider	Solvang Technology	2-18GHz 4Way	STI08-0015	07/26/2017	07/25/2018
Coupler	Agilent	87301d	MY44350252	07/25/2017	07/24/2018

3M 966 Chamber Test Site					
Equipment	**Manufacturer**	**Model**	**S/N**	**Cal Date**	**Cal Due**
Bilog Antenna	Sunol Sciences	JB3	A030105	06/20/2017	06/19/2018
EMI Test Receiver	R&S	ESCI	100064	05/17/2017	05/16/2018
Horn Antenna	ETS LINDGREN	3117	00055165	02/20/2017	02/19/2018
K Type Cable	Huber+Suhner	SUCOFLEX 102	29406/2	01/10/2017	01/09/2018
K Type Cable	Huber+Suhner	SUCOFLEX 102	22470/2	01/10/2017	01/09/2018
Pre-Amplifier	MITEQ	AMF-6F-260400-40-8P	985646	01/10/2017	01/09/2018
Pre-Amplifier	EMCI	EMC 012635	980151	08/01/2017	07/31/2018
Pre-Amplifier	EMEC	EM330	060609	07/31/2017	07/30/2018
Spectrum Analyzer	Agilent	E4446A	US42510252	11/27/2017	11/26/2018
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
EMI Test Receiver	R&S	ESCI	100064	05/17/2017	05/16/2018

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

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1.8 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**
1	NB(H)	Acer	Aspire 4320 series	N/A	QDS-BRCM1018

1.9 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 662911 D01 v02 r01, KDB 558074 D01 V04, RSS-247 Issue 2 and RSS-GEN Issue 4.

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1.10 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

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1.11 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	**IEEE 802.11b mode :** 1. Lowest Channel : 2412MHz 2. Middle Channel : 2437MHz 3. Highest Channel : 2462MHz **IEEE 802.11g mode :** 1. Lowest Channel : 2412MHz 2. Middle Channel : 2437MHz 3. Highest Channel : 2462MHz **IEEE 802.11n HT20 mode :** 1. Lowest Channel : 2412MHz 2. Middle Channel : 2437MHz 3. Highest Channel : 2462MHz **IEEE 802.11n HT40 mode :** 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 : 2T2R IEEE 802.11n HT40 mode : 2T2R

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

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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	5V
Test Mode	Mode 1: EUT power by Host System.
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4

Radiated Emission Measurement Above 1G	
Test Condition	Band edge, Emission for Unwanted and Fundamental
Voltage/Hz	5V
Test Mode	Mode 1: EUT power by Host System.
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4
Worst Position	☐ Placed in fixed position. ☐ Placed in fixed position at X-Plane (E2-Plane) ☒ Placed in fixed position at Y-Plane (E1-Plane) ☐ Placed in fixed position at Z-Plane (H-Plane)
Worst Polarity	☒ Horizontal ☐ Vertical

Radiated Emission Measurement Below 1G	
Test Condition	Radiated Emission Below 1G
Voltage/Hz	5V
Test Mode	Mode 1: EUT power by Host System.
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ 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 (Y-Plane and Vertical) 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.

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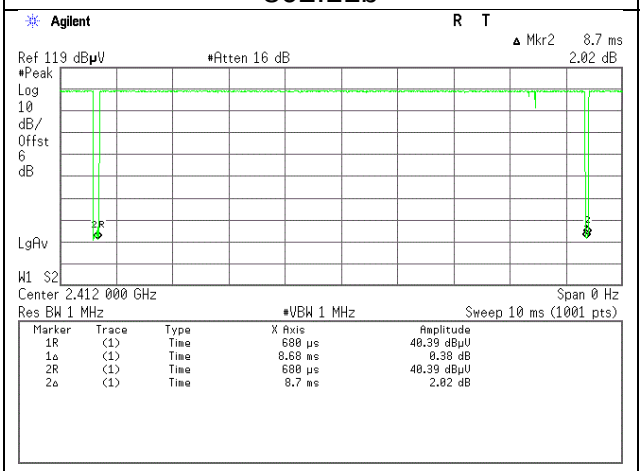
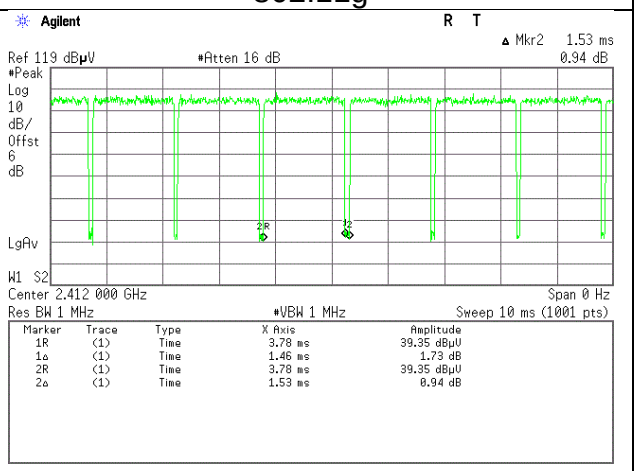
1.12 EUT DUTY CYCLE

Duty Cycle				
Configuration	TX ON (ms)	TX ALL (ms)	Duty Cycle (%)	Duty Factor(dB)
802.11b	8.6800	8.7000	99.77%	0.01
802.11g	1.4600	1.5300	95.42%	0.20
802.11n HT20	0.7400	0.7700	96.10%	0.17
802.11n HT40	0.3800	0.4400	86.36%	0.64

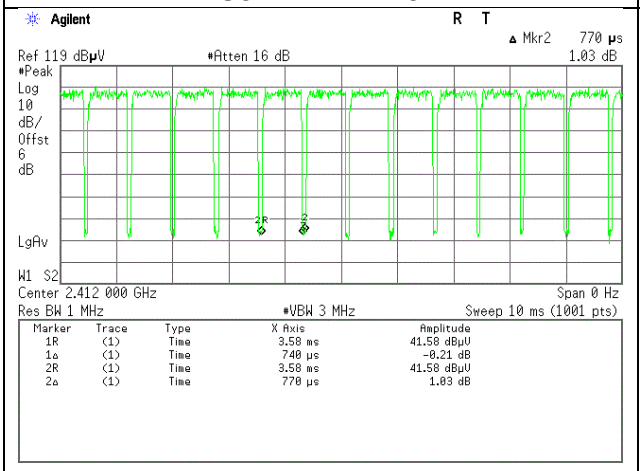
802.11b



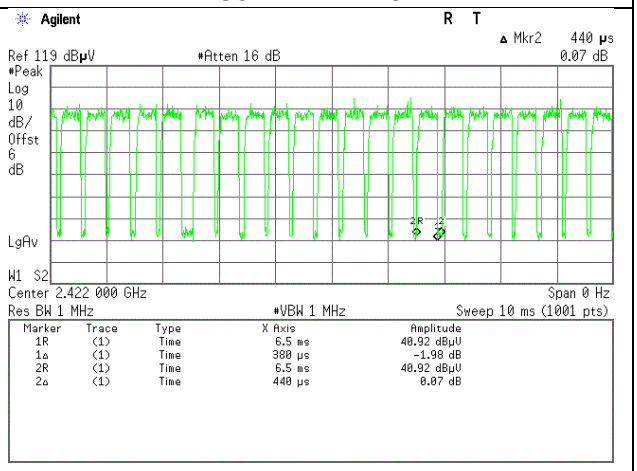
802.11g



802.11n HT20



802.11n HT40



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1.13 TEST RESULT

5.1 AC POWER LINE CONDUCTED EMISSION

5.1.1 Test Limit

According to §15.207(a)(2) 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

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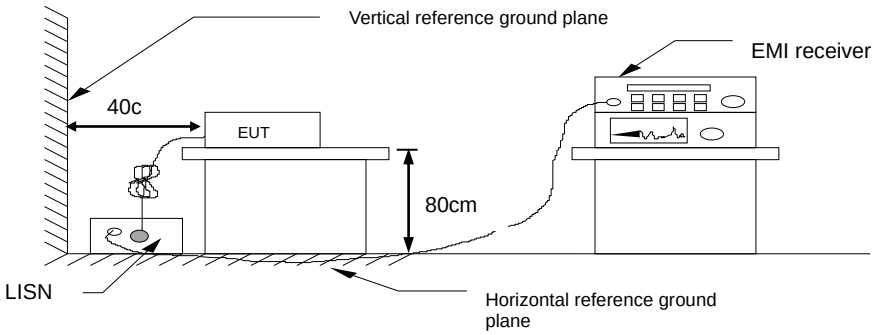
* Decreases with the logarithm of the frequency.

5.1.2 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.

5.1.3 Test Setup



5.1.4 Test Result

Pass.

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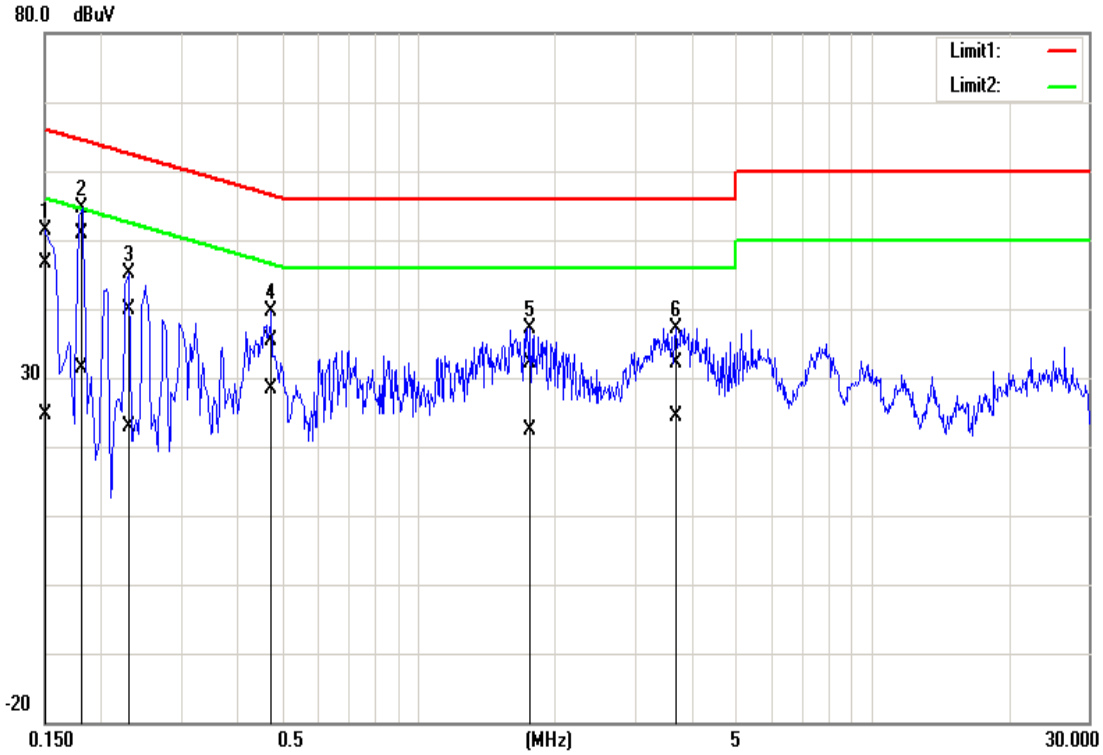
Test Data

Test Mode:	Mode 1	Temp/Hum	24.5(℃)/ 52.1%RH
Test Voltage:	120Vac / 60Hz	Test Date	2017/11/30
Phase:	Line	Test Engineer	Eric Lee



No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1	0.1500	46.67	24.58	0.08	46.75	24.66	66.00	56.00	-19.25	-31.34	Pass
2*	0.1820	50.67	31.37	0.09	50.76	31.46	64.39	54.39	-13.63	-22.93	Pass
3	0.2300	39.89	22.89	0.09	39.98	22.98	62.45	52.45	-22.47	-29.47	Pass
4	0.4740	35.26	28.39	0.10	35.36	28.49	56.44	46.44	-21.08	-17.95	Pass
5	1.7700	31.86	22.27	0.16	32.02	22.43	56.00	46.00	-23.98	-23.57	Pass
6	3.7020	31.99	24.15	0.22	32.21	24.37	56.00	46.00	-23.79	-21.63	Pass

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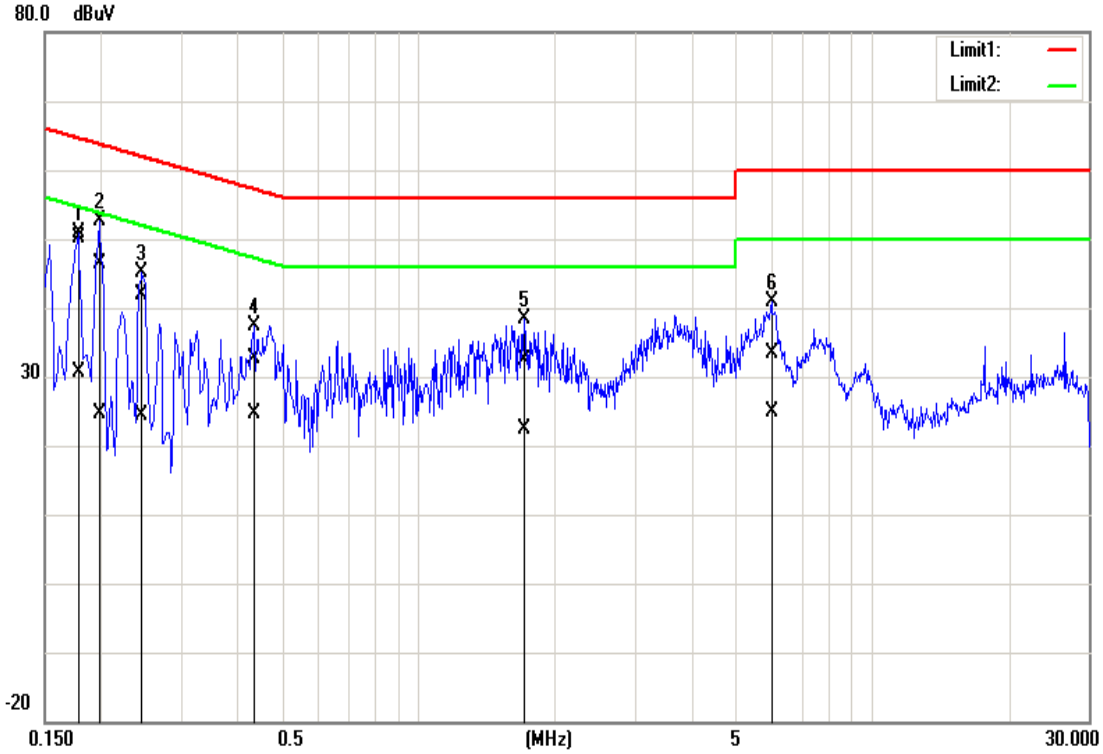
Test Mode:	Mode 1	Temp/Hum	24.5(℃)/ 52.1%RH
Test Voltage:	120Vac / 60Hz	Test Date	2017/11/30
Phase:	Neutral	Test Engineer	Eric Lee



No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1*	0.1780	50.05	30.43	0.16	50.21	30.59	64.57	54.58	-14.36	-23.99	Pass
2	0.1980	46.25	24.43	0.16	46.41	24.59	63.69	53.69	-17.28	-29.10	Pass
3	0.2460	41.66	24.15	0.16	41.82	24.31	61.89	51.89	-20.07	-27.58	Pass
4	0.4340	32.43	24.52	0.18	32.61	24.70	57.18	47.18	-24.57	-22.48	Pass
5	1.7100	32.18	22.20	0.23	32.41	22.43	56.00	46.00	-23.59	-23.57	Pass
6	6.0180	32.94	24.63	0.37	33.31	25.00	60.00	50.00	-26.69	-25.00	Pass

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5.2 6DB BANDWIDTH AND OCCUPIED BANDWIDTH(99%)

5.2.1 Test Limit

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

6 dB Bandwidth ：

Limit	Shall be at least 500kHz

Occupied Bandwidth(99%) ： For reporting purposes only.

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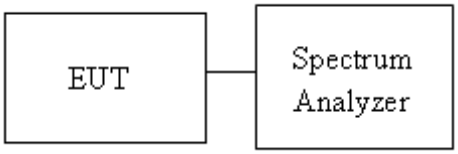
5.2.2 Test Procedure

Test method Refer as KDB 558074 D01 V04, 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.

5.2.3 Test Setup



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5.2.4 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	12.9811	-	8.0435	-	≥500
Mid	2437	12.9377	-	8.0435	-	
High	2462	12.9811	-	8.0000	-	

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	16.3675	-	16.3478	-	≥500
Mid	2437	16.4109	-	16.3043	-	
High	2462	16.4109	-	16.3043	-	

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	17.5397	17.5832	17.0435	17.1739	≥500
Mid	2437	17.5397	17.5832	17.0435	17.1304	
High	2462	17.5397	17.5832	17.0435	16.7826	

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	36.3531	36.1215	35.942	36.406	>500
Mid	2437	36.3531	36.2373	35.942	35.826	
High	2452	36.3531	36.1215	36.058	36.290	

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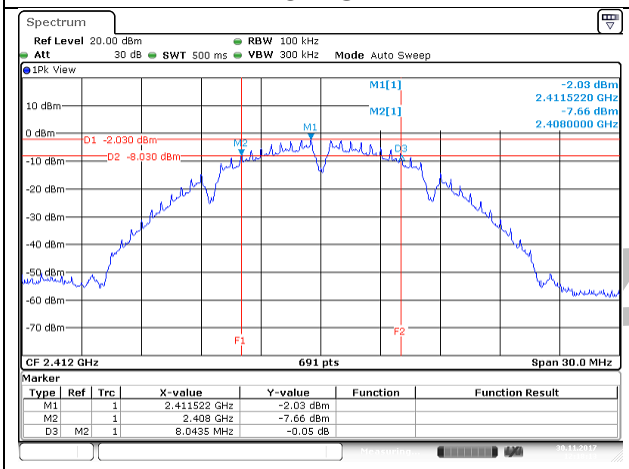
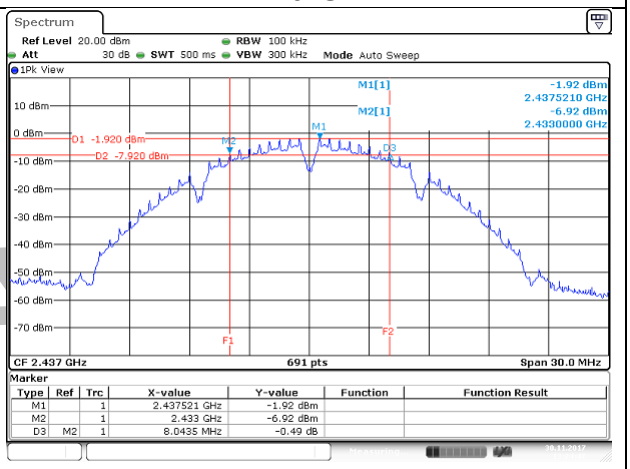
Test Data

IEEE 802.11b mode- chain 0

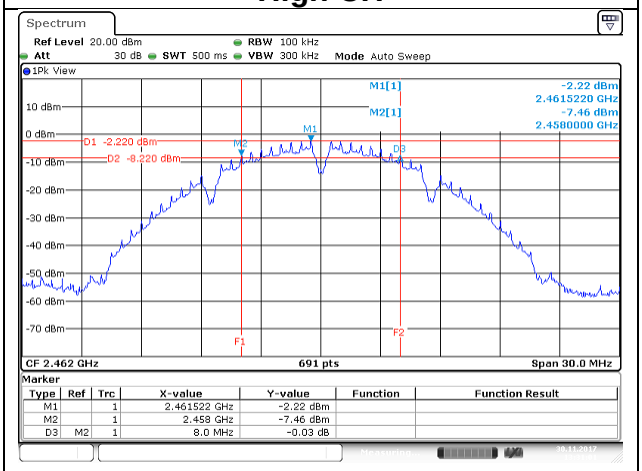
Low CH



Mid CH



High CH



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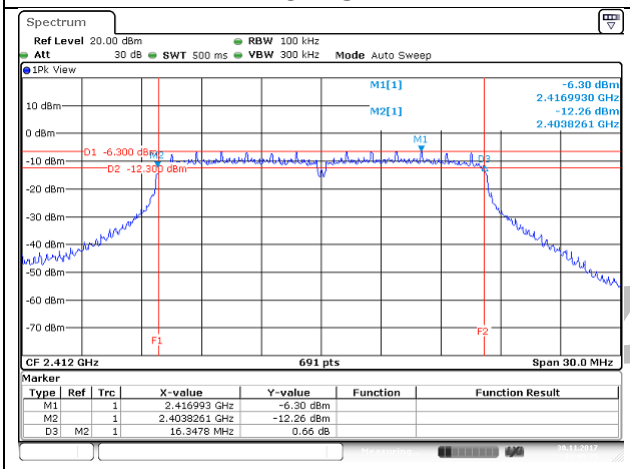
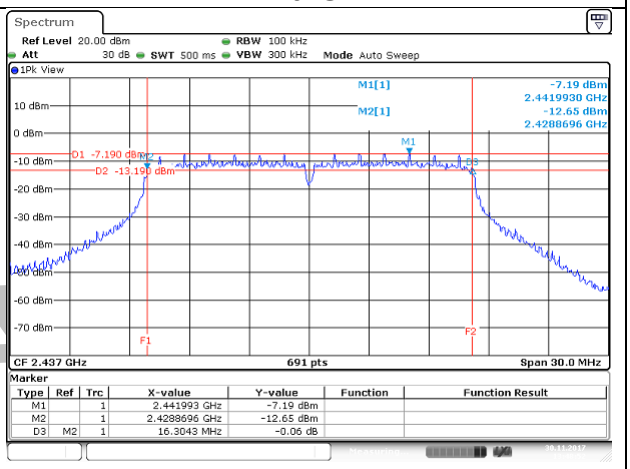
IEEE 802.11g mode- chain 0

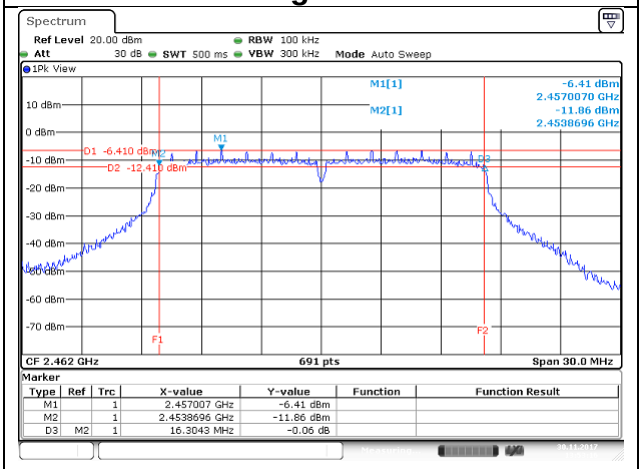
Low CH



Mid CH



High CH



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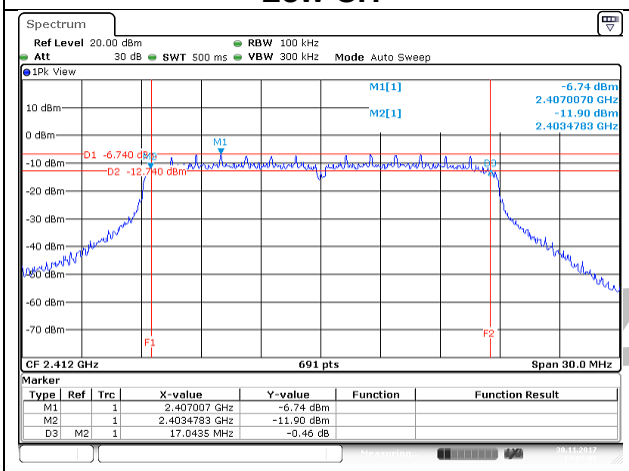
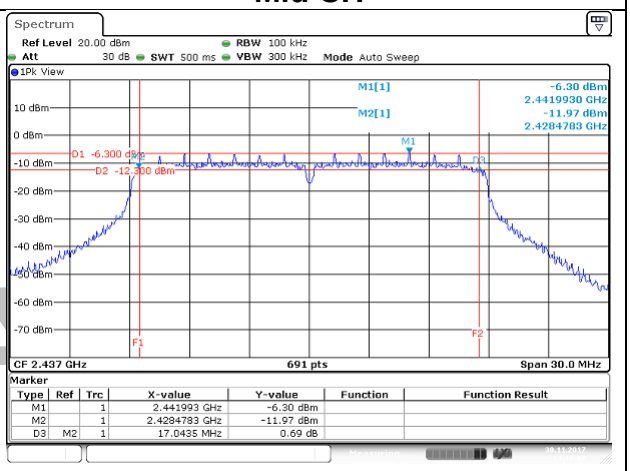
IEEE 802.11n HT20 mode- chain 0

Low CH



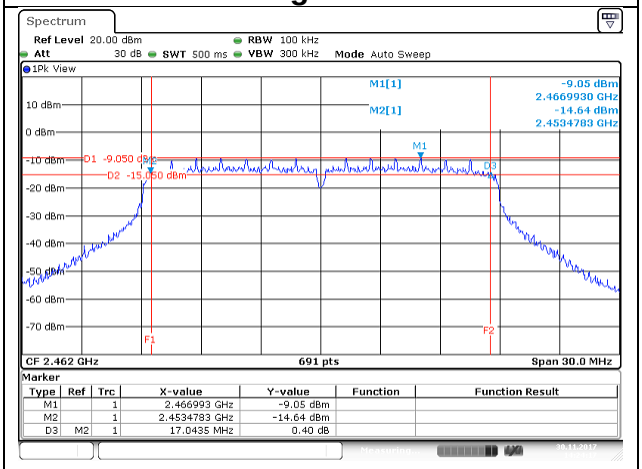
Date: 30.NOV.2017 14:07:07

Mid CH



Date: 30.NOV.2017 14:19:08

High CH



Date: 30.NOV.2017 14:24:18

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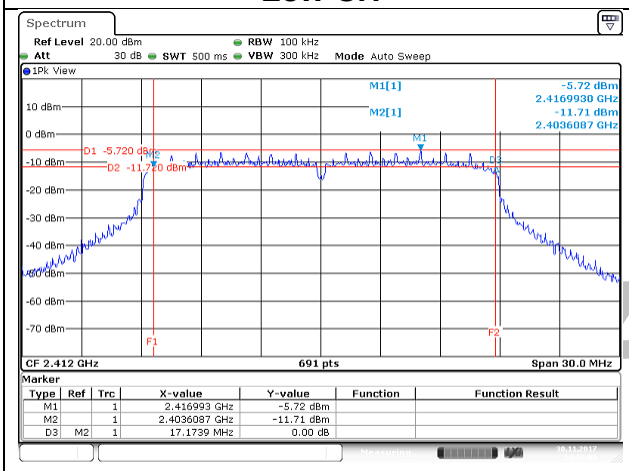
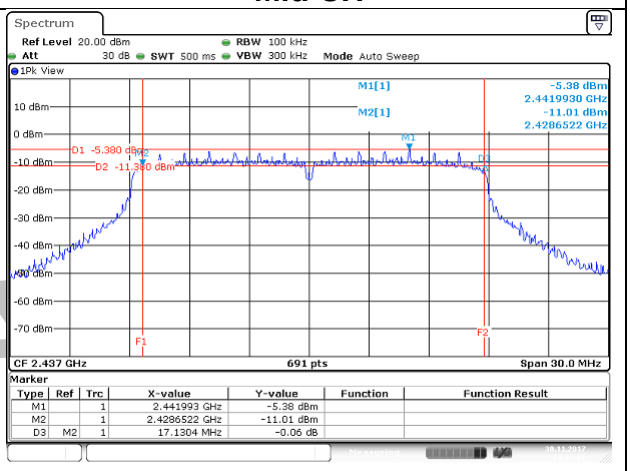
IEEE 802.11n HT20 mode- chain 1

Low CH



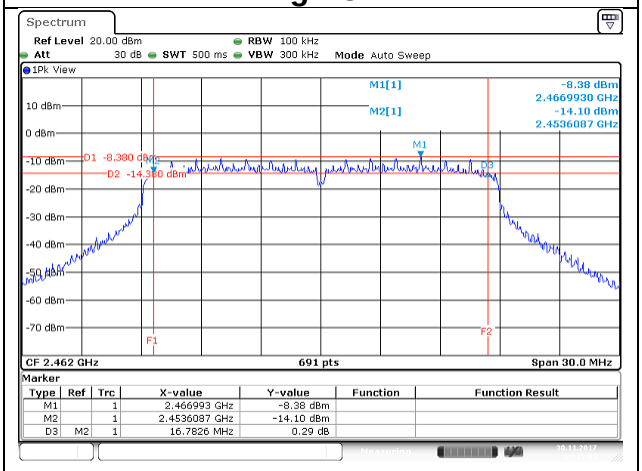
Date: 30.NOV.2017 14:12:00

Mid CH



Date: 30.NOV.2017 14:16:07

High CH



Date: 30.NOV.2017 14:35:06

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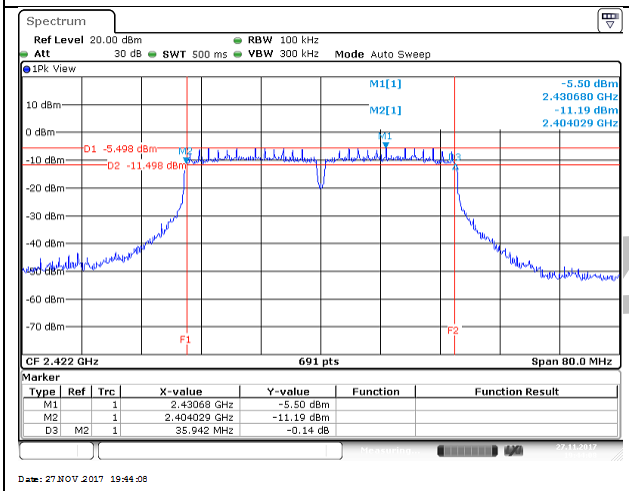
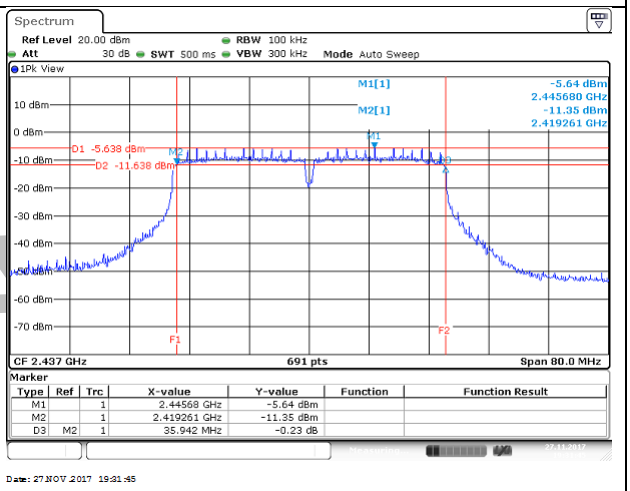
IEEE 802.11n HT40 mode- chain 0

Low CH



Mid CH



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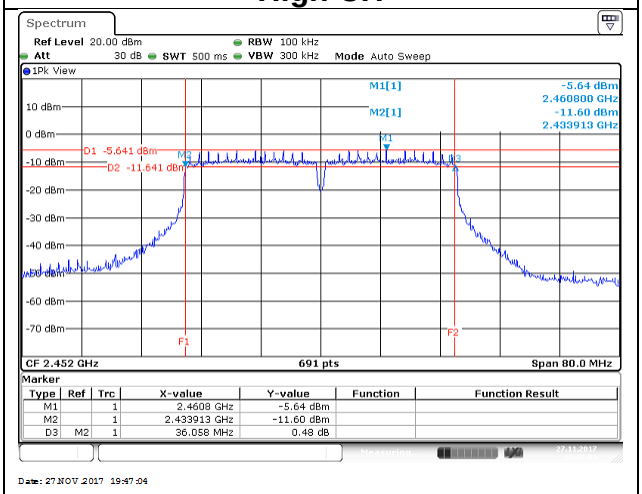

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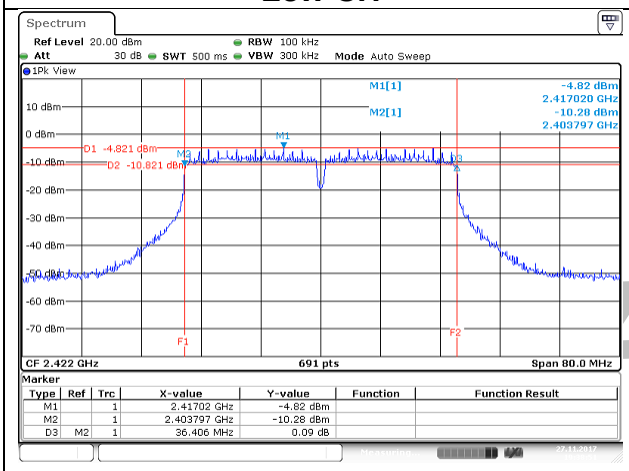
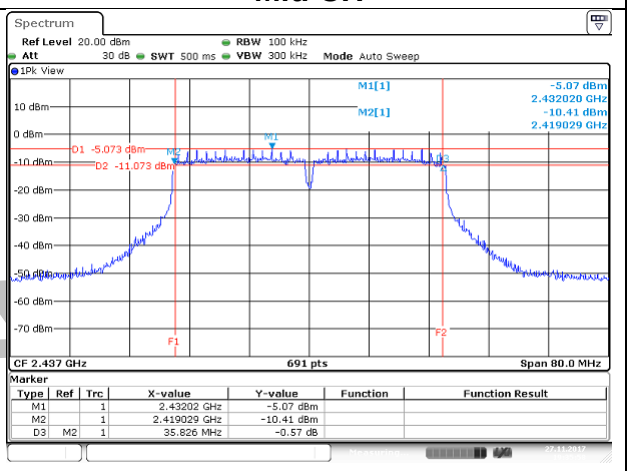
IEEE 802.11n HT40 mode- chain 1

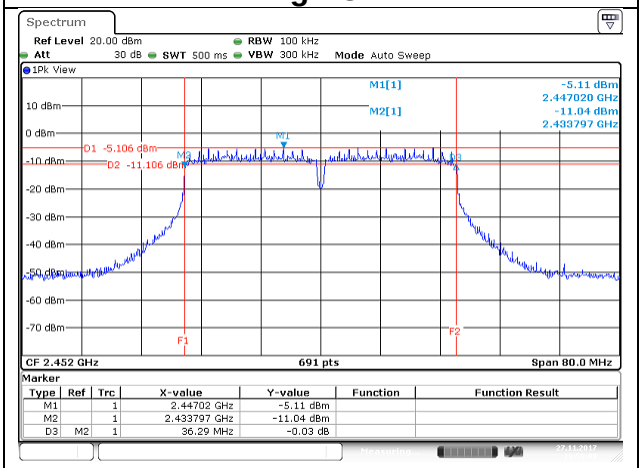
Low CH



Mid CH



High CH



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5.3 OUTPUT POWER MEASUREMENT

5.3.1 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.

DRAFT

Limit	☒ Antenna not exceed 6 dBi：30dBm ☐ Antenna with DG greater than 6 dBi： [Limit = 30 – (DG – 6)] ☐ Point-to-point operation：

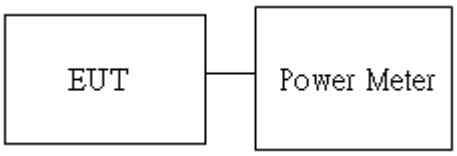
Average output power：For reporting purposes only.

5.3.2 Test Procedure

Test method Refer as KDB 558074 D01 V04, 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.

5.3.3 Test Setup



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5.3.4 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)	EIRP PK Total Power (dBm)	EIRP PK Total Power (W)	DG (dBi)	Limit (dBm)	EIRP Limit (dBm)
			chain0	chain1	chain0	chain1							
IEEE 802.11b Data rate: 1Mbps	Low	2412	17	-	18.11	-	18.11	0.0647	21.85	0.1531	3.74	30	36
	Mid	2437	17	-	18.37	-	18.37	0.0687	22.11	0.1626			
	High	2462	16	-	17.95	-	17.95	0.0624	21.69	0.1476			
IEEE 802.11g Data rate: 6Mbps	Low	2412	16	-	21.14	-	21.14	0.1300	24.88	0.3076			
	Mid	2437	15	-	20.41	-	20.41	0.1099	24.15	0.2600			
	High	2462	15	-	20.72	-	20.72	0.1180	24.46	0.2793			
IEEE 802.11n HT20 Data rate: MCS0	Low	2412	16	16	20.76	20.46	23.62	0.2301	27.36	0.5445			
	Mid	2437	16	16	20.64	20.36	23.51	0.2244	27.25	0.5309			
	High	2462	12.50	12.50	18.43	18.54	21.50	0.1413	25.24	0.3342			
IEEE 802.11n HT40 Data rate: MCS0	Low	2422	13.50	13.50	19.07	19.24	22.17	0.1648	25.91	0.3899			
	Mid	2437	13.50	13.50	19.07	19.45	22.27	0.1687	26.01	0.3990			
	High	2452	10	10	16.23	16.45	19.35	0.0861	23.09	0.2037			

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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	15.74	-	15.74
	Mid	2437	16.02	-	16.02
	High	2462	15.62	-	15.62
IEEE 802.11g Data rate: 6Mbps	Low	2412	14.69	-	14.69
	Mid	2437	13.95	-	13.95
	High	2462	14.47	-	14.47
IEEE 802.11n HT20 Data rate: MCS0	Low	2412	14.08	13.98	17.04
	Mid	2437	14.22	13.88	17.06
	High	2462	11.89	12.08	14.99
IEEE 802.11n HT40 Data rate: MCS0	Low	2422	12.29	12.73	15.53
	Mid	2437	12.41	12.87	15.66
	High	2452	9.72	9.88	12.81

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5.4 POWER SPECTRAL DENSITY

5.4.1 Test Limit

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

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	☒ Antenna not exceed 6 dBi：8dBm ☐ Antenna with DG greater than 6 dBi： [Limit = 8 – (DG – 6)] ☐ Point-to-point operation：

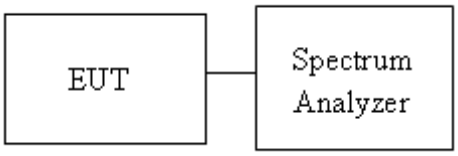
DRAFT

5.4.2 Test Procedure

Test method Refer as KDB 558074 D01 V04, 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.

5.4.3 Test Setup



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5.4.4 Test Result

Test mode: IEEE 802.11b mode / 2412-2462 MHz					
Channel	**Frequency (MHz)**	**Chain 0 PPSD (dBm)**	**Chain 1 PPSD (dBm)**	**Total PSSD (dBm)**	**Limit (dBm)**
Low	2412	-5.81	-	-5.81	8
Mid	2437	-4.73	-	-4.73	
High	2462	-4.55	-	-4.55	

Test mode: IEEE 802.11g mode / 2412-2462 MHz					
Channel	**Frequency (MHz)**	**Chain 0 PPSD (dBm)**	**Chain 1 PPSD (dBm)**	**Total PSSD (dBm)**	**Limit (dBm)**
Low	2412	-7.86	-	-7.86	8
Mid	2437	-9.42	-	-9.42	
High	2462	-9.73	-	-9.73	

Test mode: IEEE 802.11n HT 20 MHz mode / 2412-2462 MHz					
Channel	**Frequency (MHz)**	**Chain 0 PPSD (dBm)**	**Chain 1 PPSD (dBm)**	**Total PSSD (dBm)**	**Limit (dBm)**
Low	2412	-9.69	-10.15	-6.90	8
Mid	2437	-10.30	-9.39	-6.81	
High	2462	-11.96	-12.03	-8.98	

Test mode: IEEE 802.11n HT 40 MHz mode / 2422-2452 MHz					
Channel	**Frequency (MHz)**	**Chain 0 PPSD (dBm)**	**Chain 1 PPSD (dBm)**	**Total PSSD (dBm)**	**Limit (dBm)**
Low	2422	-17.65	-15.73	-13.57	8
Mid	2437	-17.97	-17.81	-14.88	
High	2452	-17.79	-16.11	-13.86	

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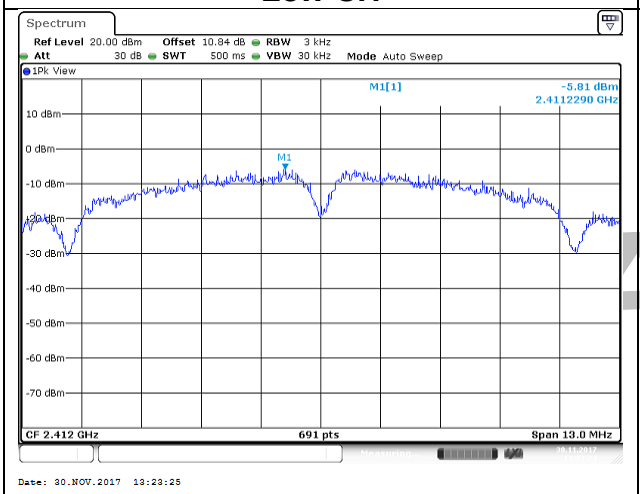
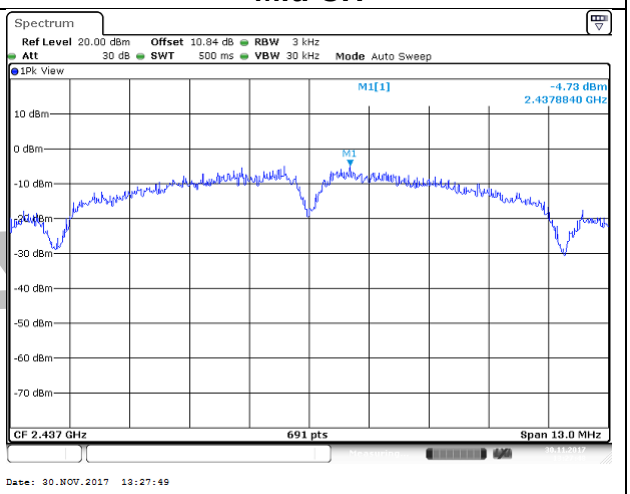
Test Data

IEEE 802.11b mode- chain 0

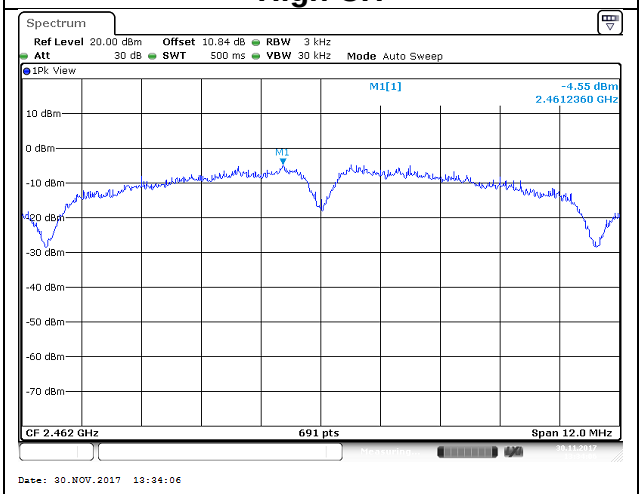
Low CH



Mid CH



High CH



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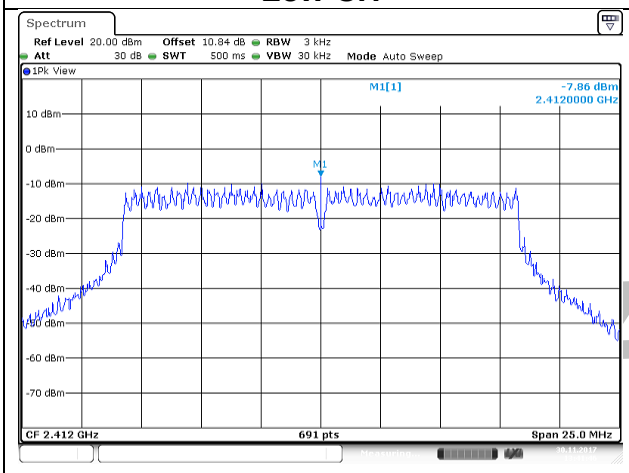
IEEE 802.11g mode- chain 0

Low CH



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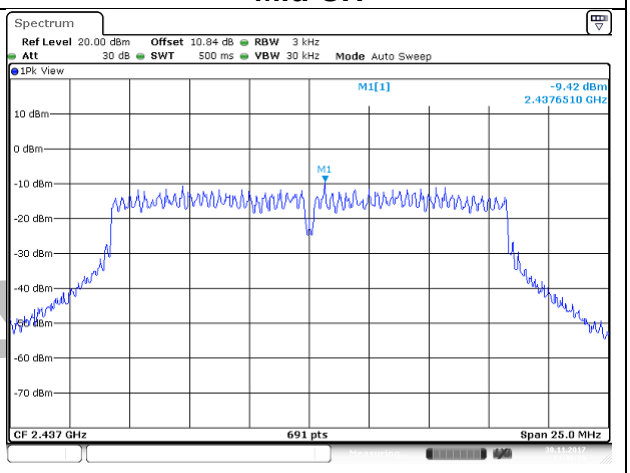
Mid CH



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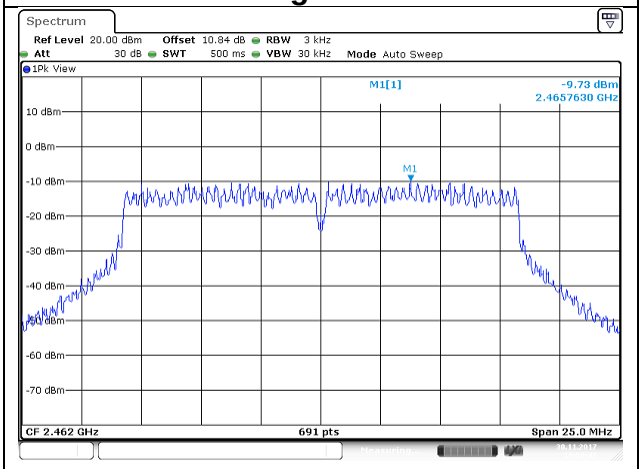
High CH



Date: 30.NOV.2017 13:59:48

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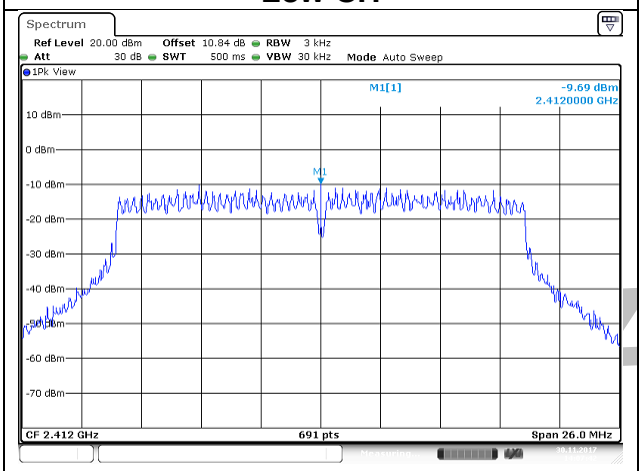
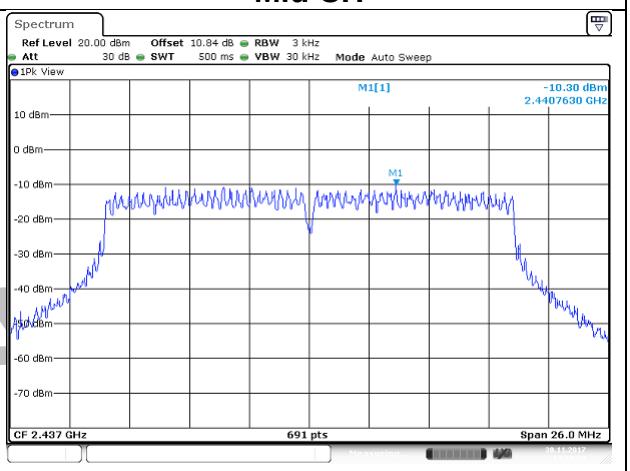
IEEE 802.11n HT20 mode- chain 0

Low CH



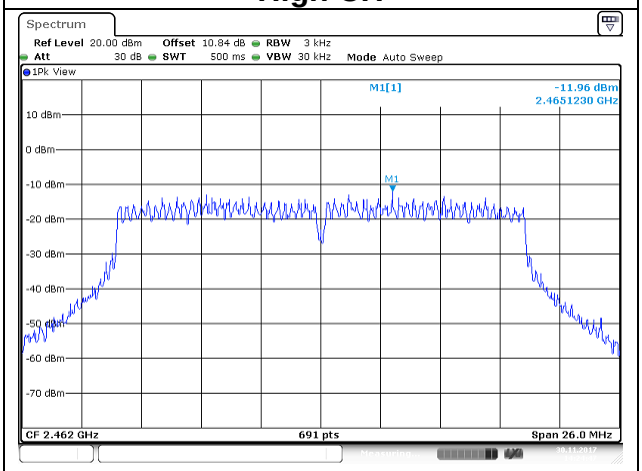
Date: 30.NOV.2017 14:07:42

Mid CH



Date: 30.NOV.2017 14:19:39

High CH



Date: 30.NOV.2017 14:24:48

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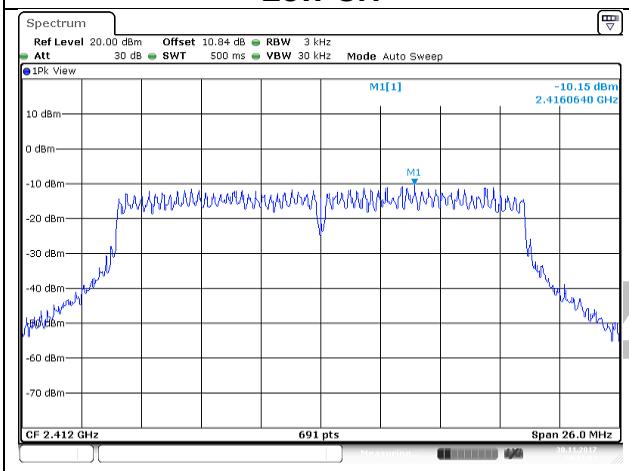
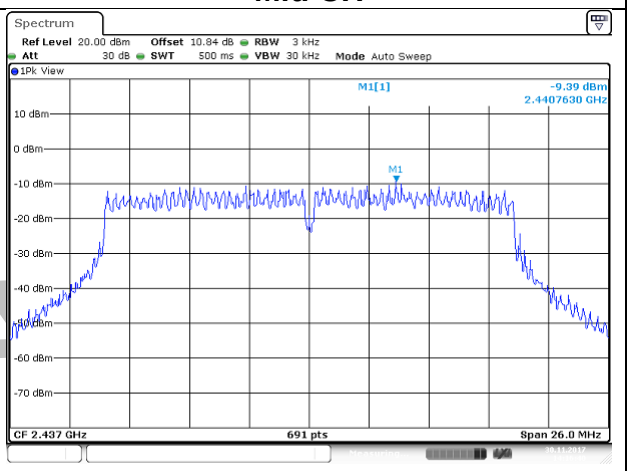
IEEE 802.11n HT20 mode- chain 1

Low CH



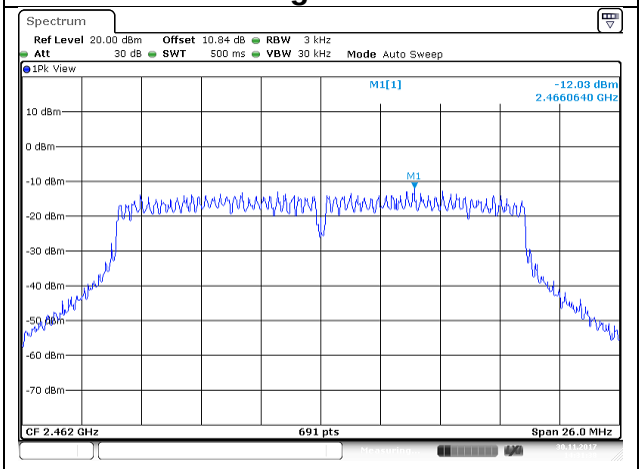
Date: 30.NOV.2017 14:12:34

Mid CH



Date: 30.NOV.2017 14:16:40

High CH



Date: 30.NOV.2017 14:31:38

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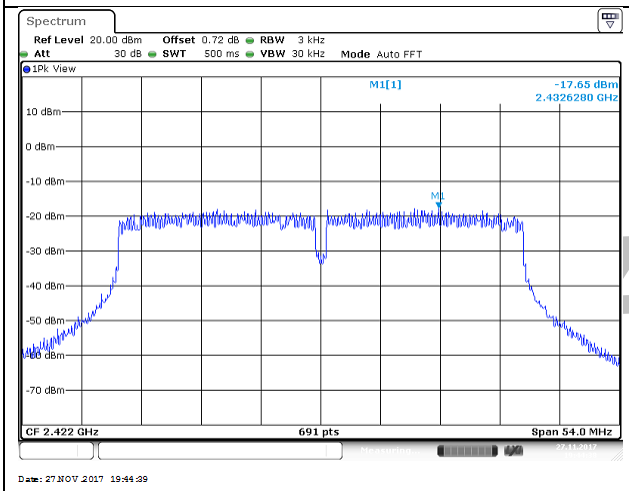
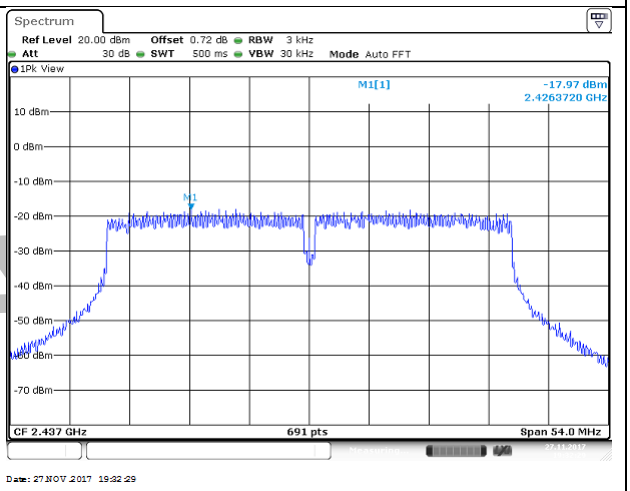
IEEE 802.11n HT40 mode- chain 0

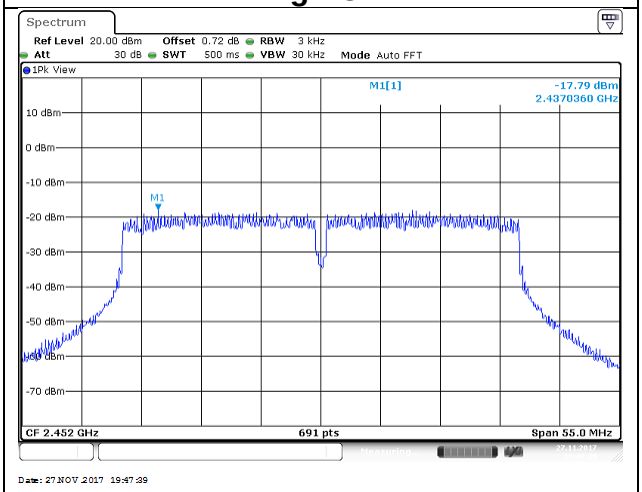
Low CH



Mid CH



High CH



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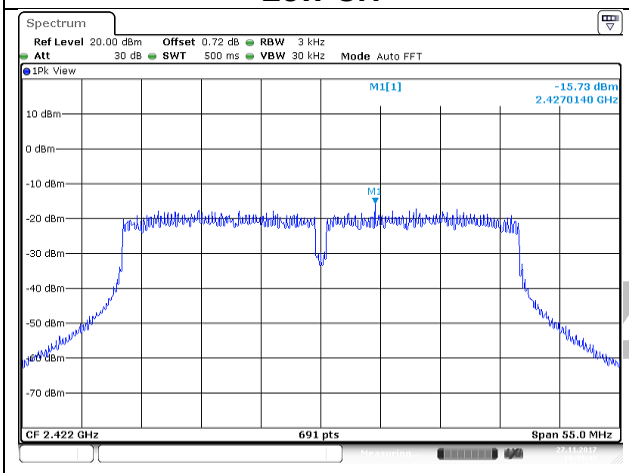
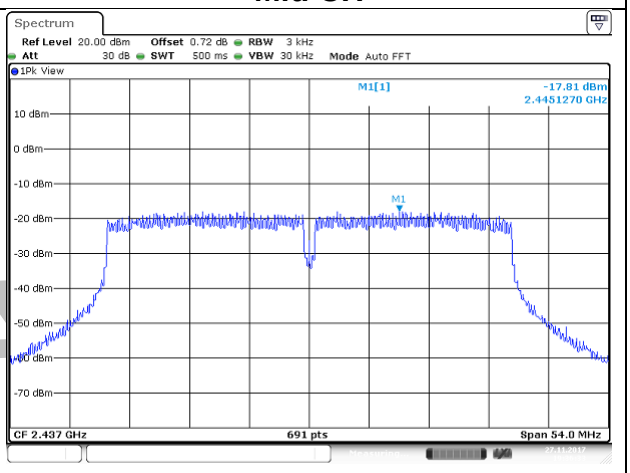
IEEE 802.11n HT40 mode- chain 1

Low CH



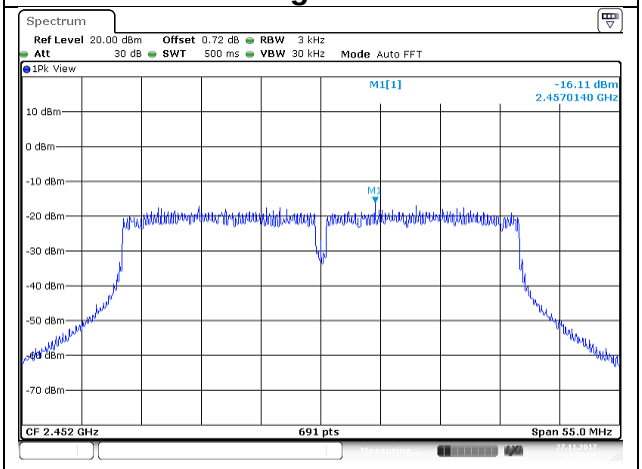
Date: 27.NOV.2017 19:39:43

Mid CH



Date: 27.NOV.2017 19:36:34

High CH



Date: 27.NOV.2017 19:50:37

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5.5 CONDUCTED BANDEDGE AND SPURIOUS EMISSION

5.5.1 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).

DRAFT

5.5.2 Test Procedure

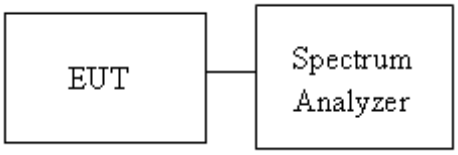
Test method Refer as KDB 662911 D01 v02 r01, KDB 558074 D01 V04, Section 11.

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. f 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.

5.5.3 Test Setup



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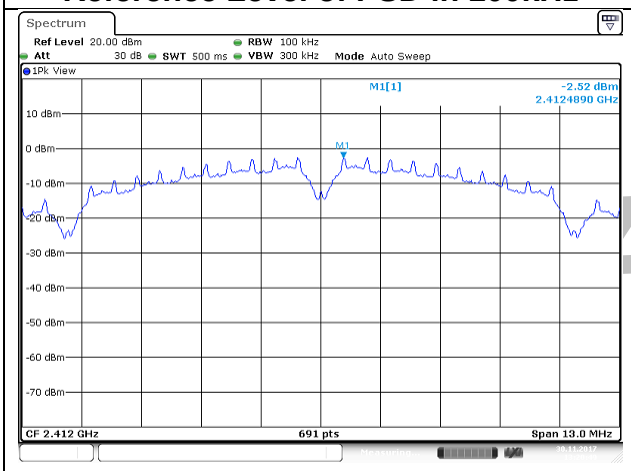
5.5.4 Test Result

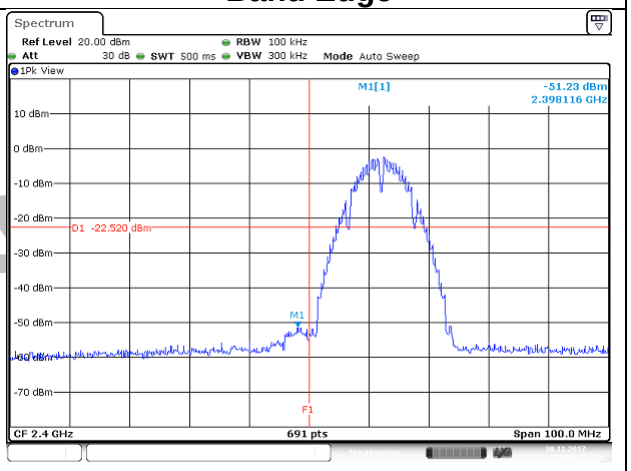
Test Data

IEEE 802.11b mode Low CH chain 0

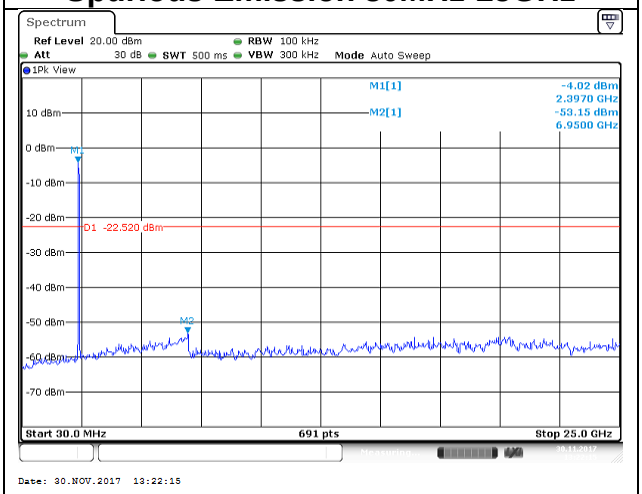
Reference Level of PSD in 100kHz



Band Edge



Spurious Emission 30MHz-25GHz



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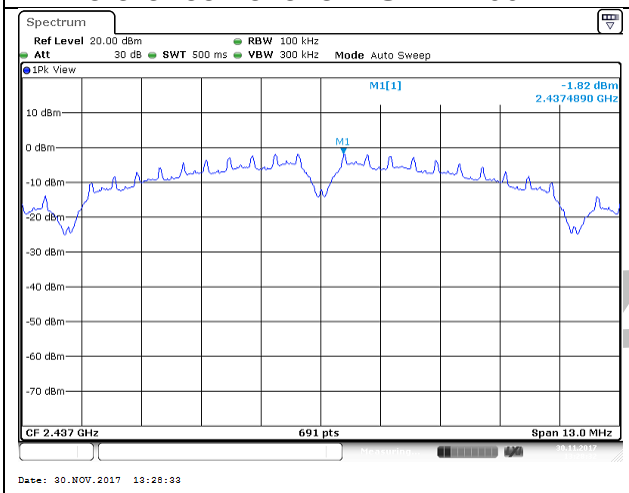
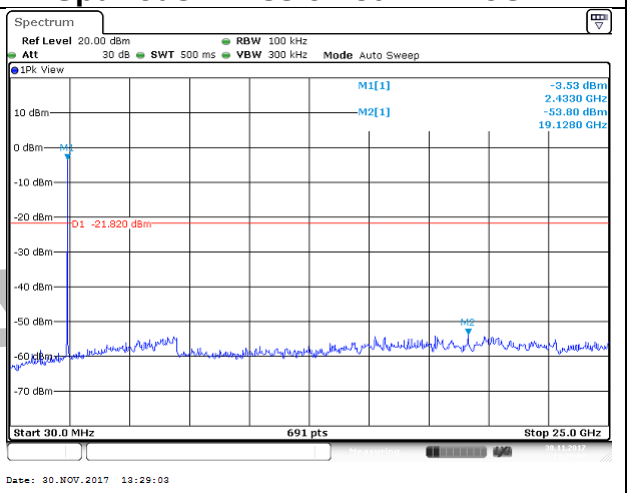
IEEE 802.11b mode Mid CH chain 0	
Reference Level of PSD in 100kHz	**Spurious Emission 30MHz-25GHz**
	

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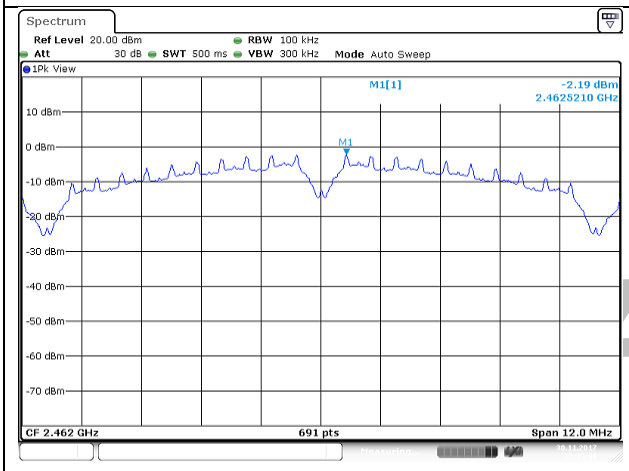
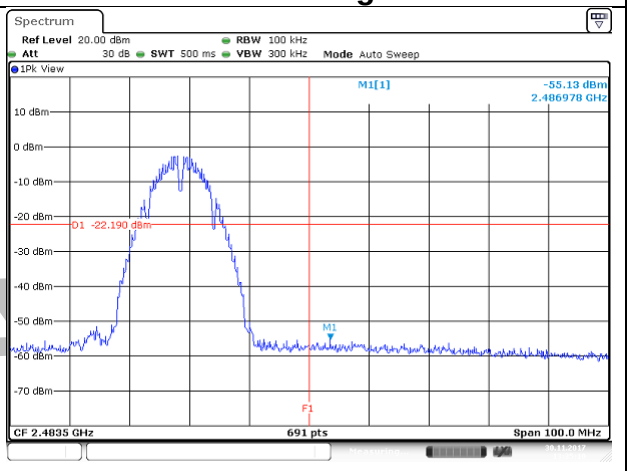
IEEE 802.11b mode High CH chain 0

Reference Level of PSD in 100kHz



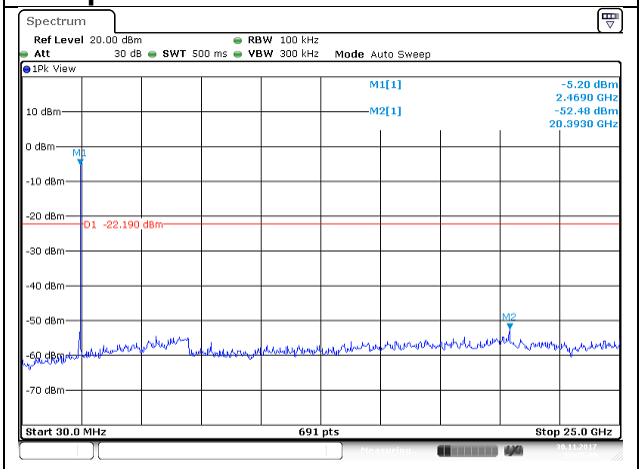
Date: 30.NOV.2017 13:34:42

Band Edge



Date: 30.NOV.2017 13:35:10

Spurious Emission 30MHz-25GHz



Date: 30.NOV.2017 13:35:41

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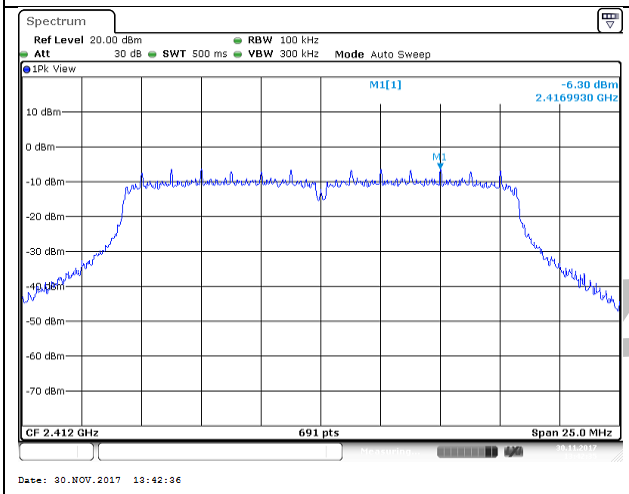
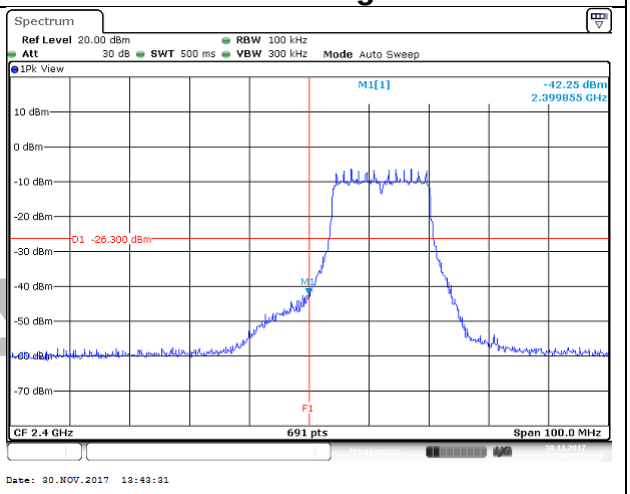
IEEE 802.11g mode Low CH chain 0

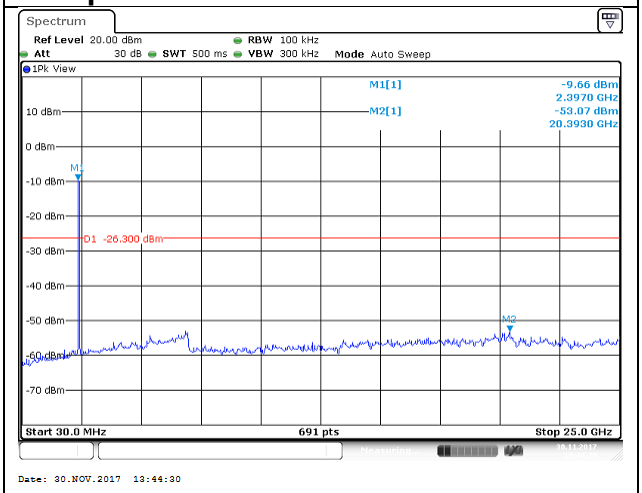
Reference Level of PSD in 100kHz



Band Edge



Spurious Emission 30MHz-25GHz



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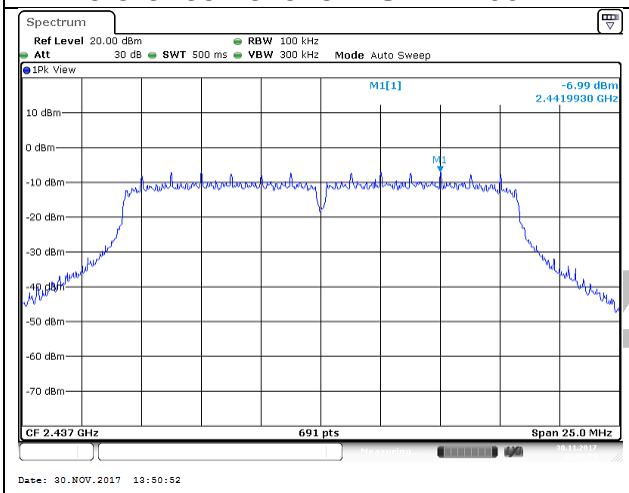
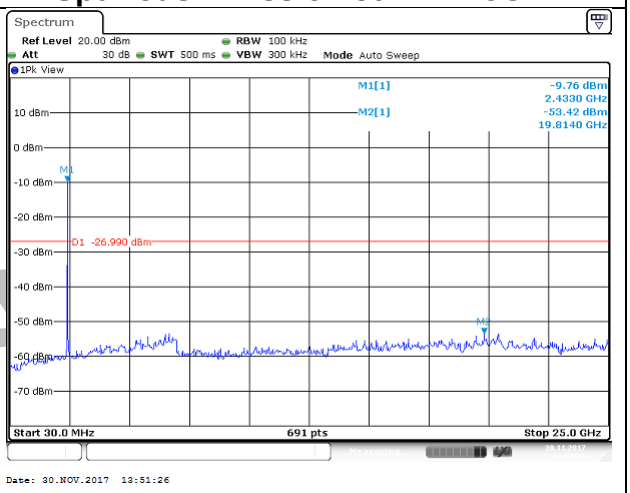
IEEE 802.11g mode Mid CH chain 0	
Reference Level of PSD in 100kHz	**Spurious Emission 30MHz-25GHz**
	

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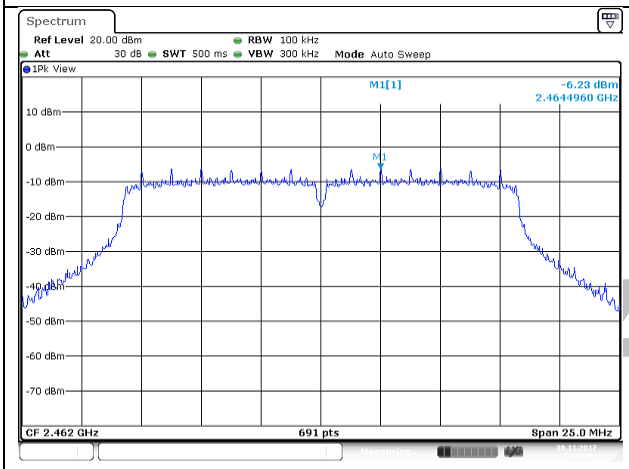
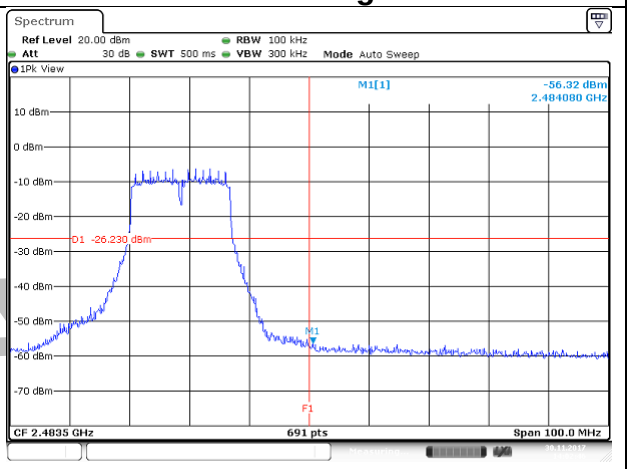
IEEE 802.11g mode High CH chain 0

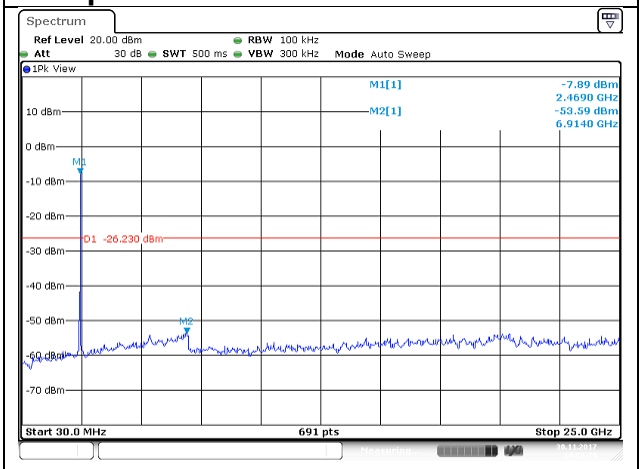
Reference Level of PSD in 100kHz



Band Edge



Spurious Emission 30MHz-25GHz



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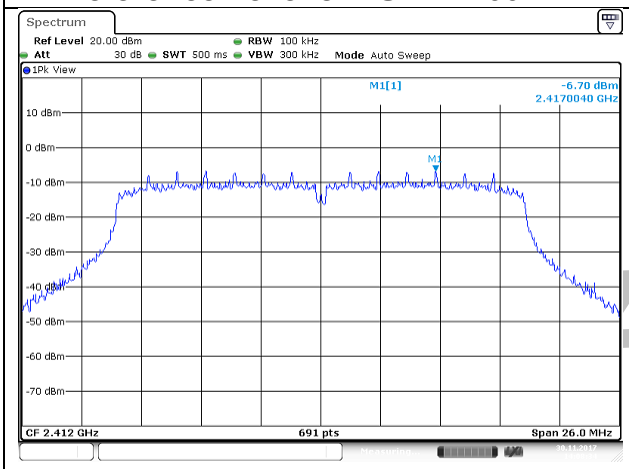
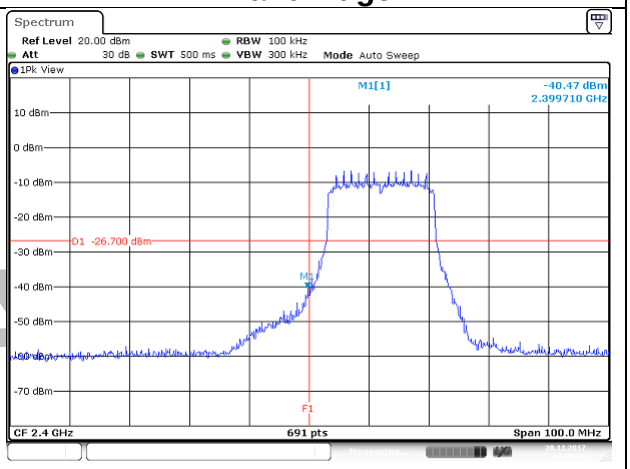
IEEE 802.11 n HT20 mode Low CH chain 0

Reference Level of PSD in 100kHz



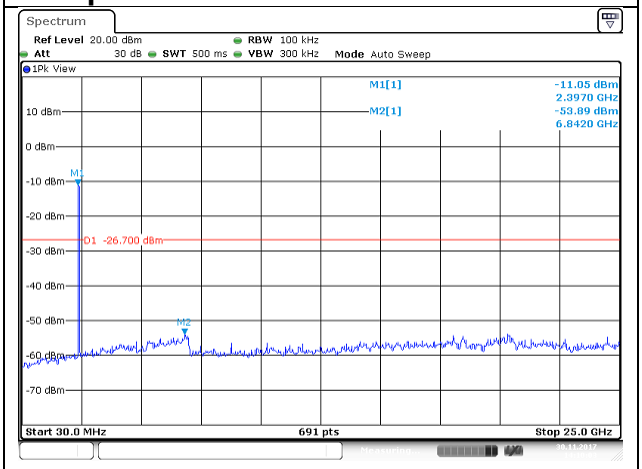
Date: 30.NOV.2017 14:08:35

Band Edge



Date: 30.NOV.2017 14:09:30

Spurious Emission 30MHz-25GHz



Date: 30.NOV.2017 14:10:03

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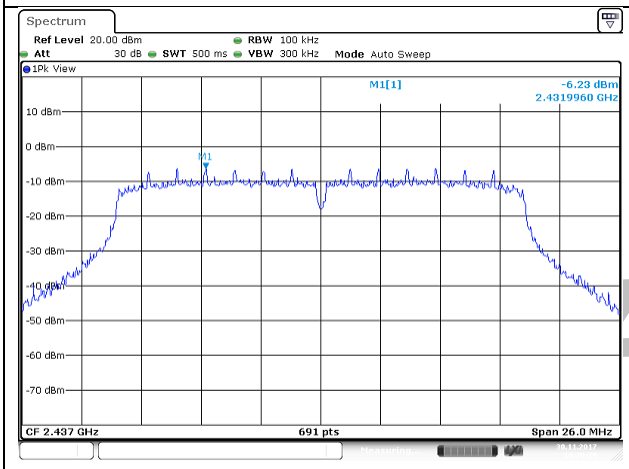
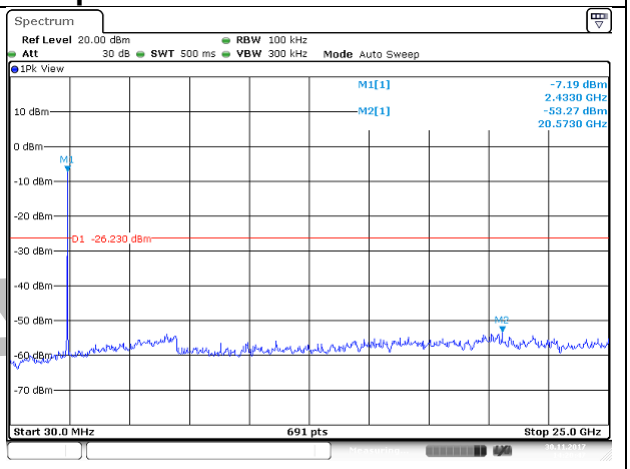
IEEE 802.11 n HT20 mode Mid CH chain 0	
Reference Level of PSD in 100kHz	**Spurious Emission 30MHz-25GHz**
	

Date: 30.NOV.2017 14:20:11

Date: 30.NOV.2017 14:20:48

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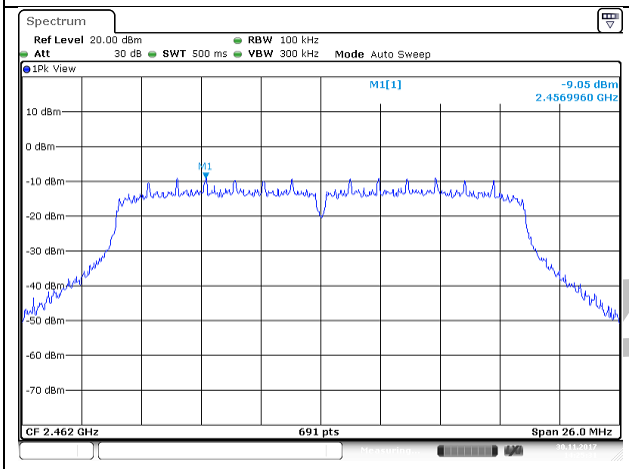
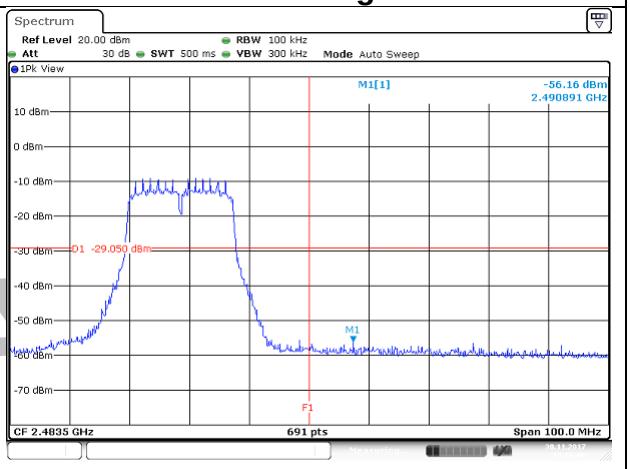
IEEE 802.11n HT20 mode High CH chain 0

Reference Level of PSD in 100kHz



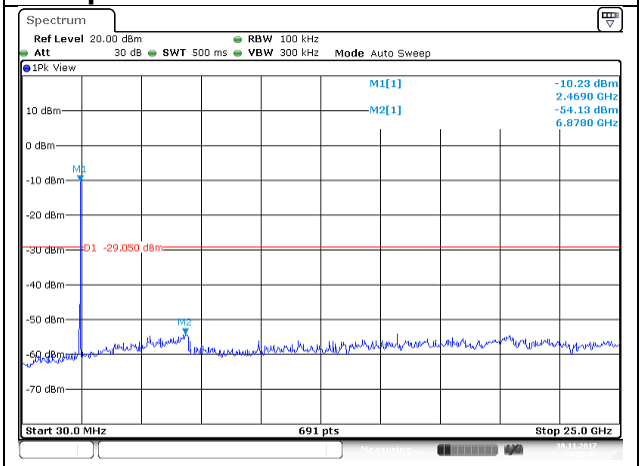
Date: 30.NOV.2017 14:25:32

Band Edge



Date: 30.NOV.2017 14:26:06

Spurious Emission 30MHz-25GHz



Date: 30.NOV.2017 14:26:36

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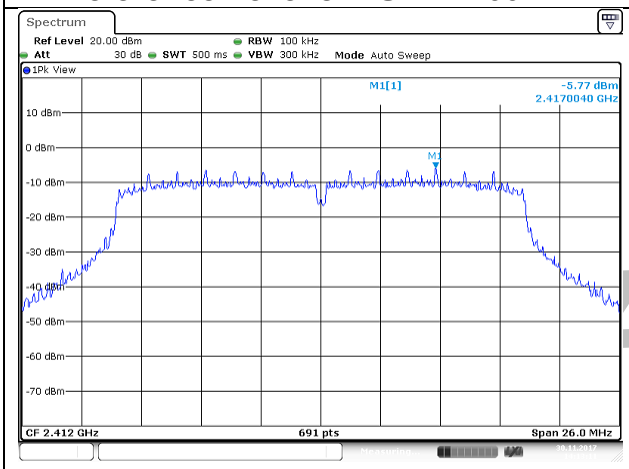
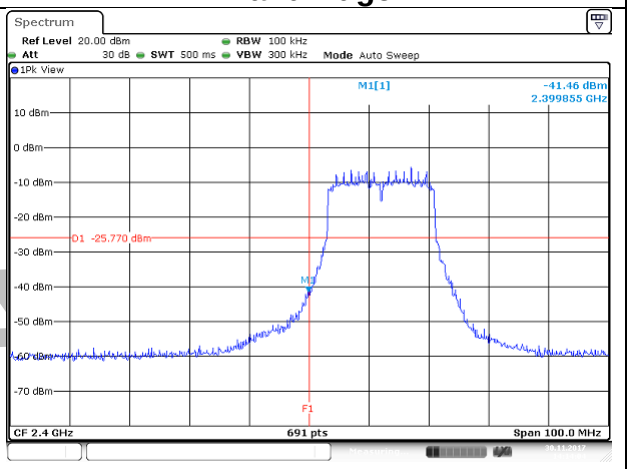
IEEE 802.11 n HT20 mode Low CH chain 1

Reference Level of PSD in 100kHz



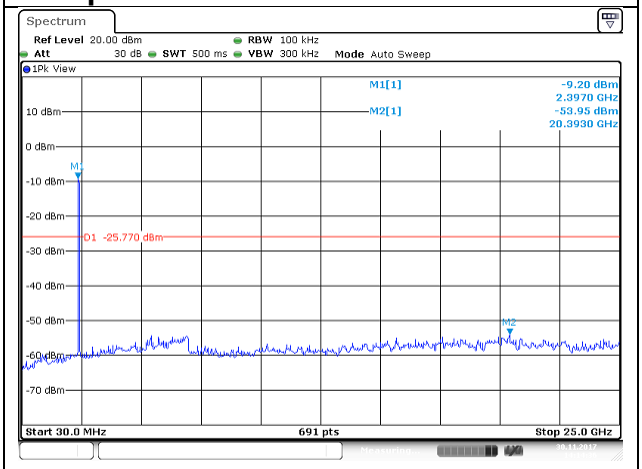
Date: 30.NOV.2017 14:13:11

Band Edge



Date: 30.NOV.2017 14:14:05

Spurious Emission 30MHz-25GHz



Date: 30.NOV.2017 14:14:36

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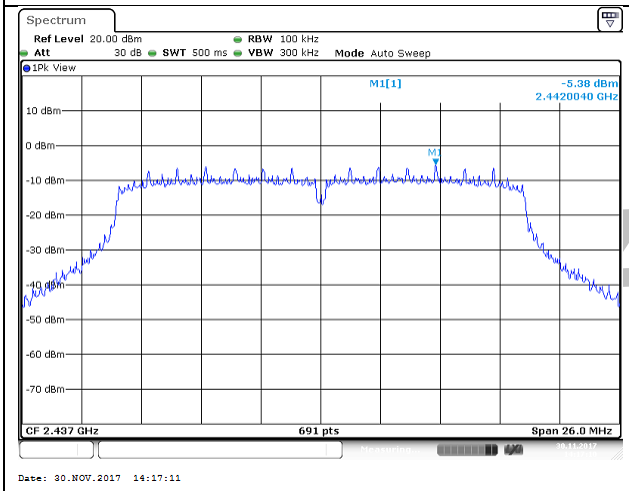
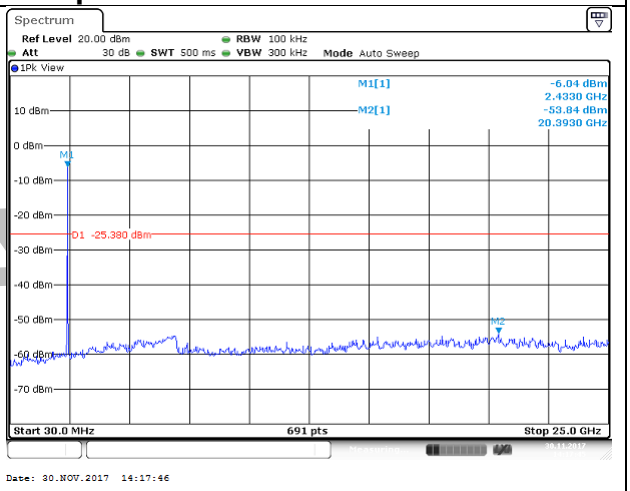
IEEE 802.11 n HT20 mode Mid CH chain 1	
Reference Level of PSD in 100kHz	**Spurious Emission 30MHz-25GHz**
	

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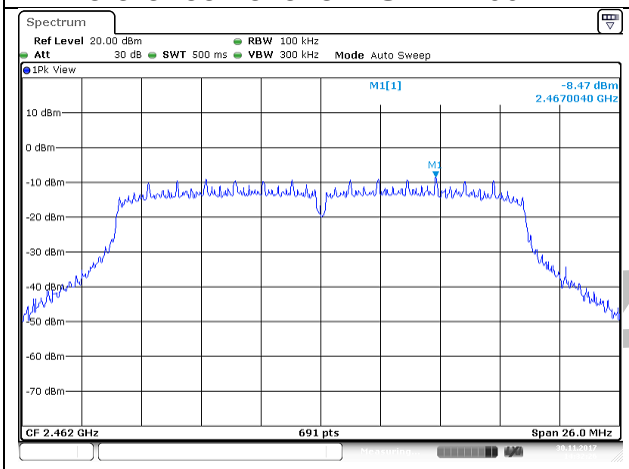
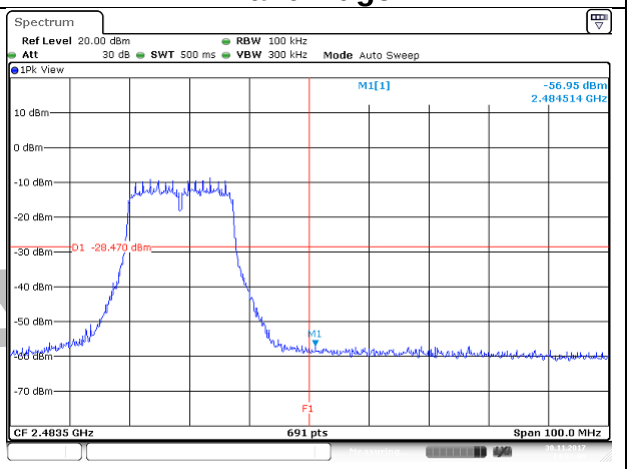
IEEE 802.11n HT20 mode High CH chain 1

Reference Level of PSD in 100kHz



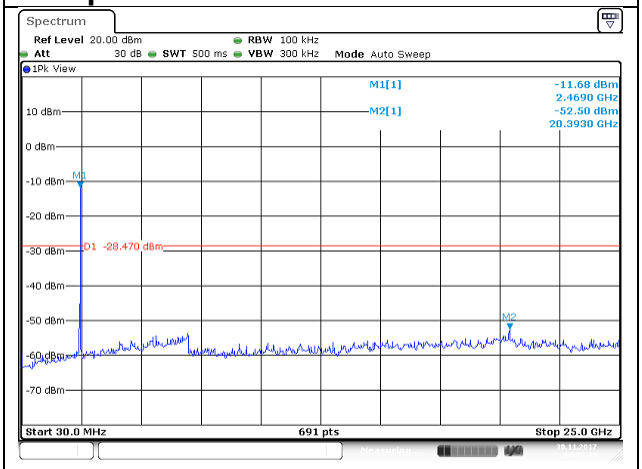
Date: 30.NOV.2017 14:32:26

Band Edge



Date: 30.NOV.2017 14:33:06

Spurious Emission 30MHz-25GHz



Date: 30.NOV.2017 14:33:38

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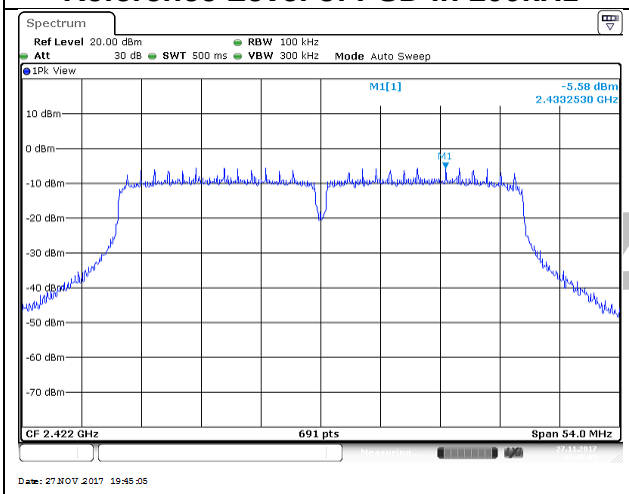
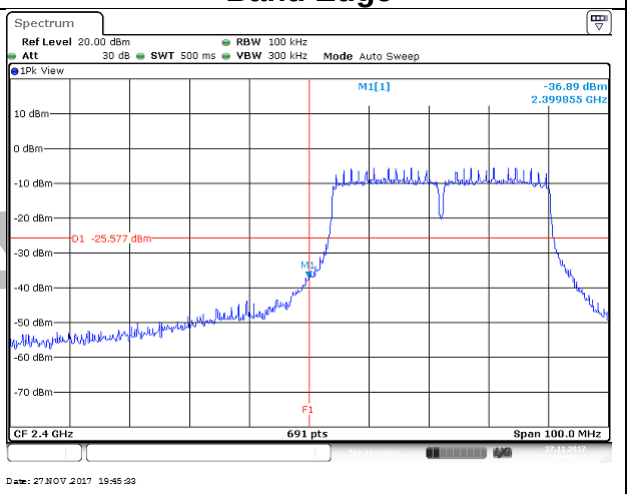
IEEE 802.11 n HT40 mode Low CH chain 0

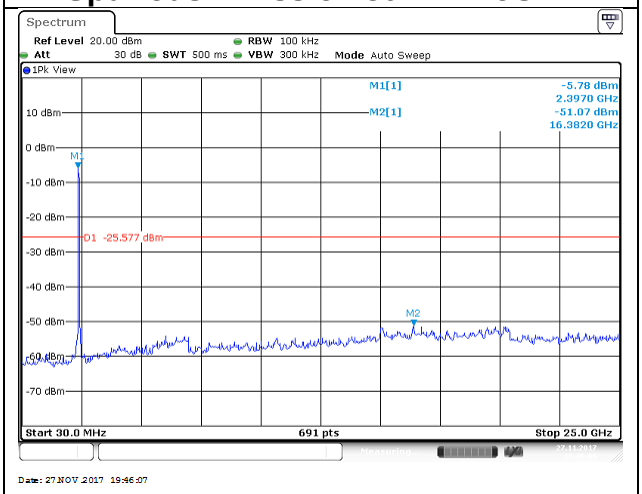
Reference Level of PSD in 100kHz



Band Edge



Spurious Emission 30MHz-25GHz



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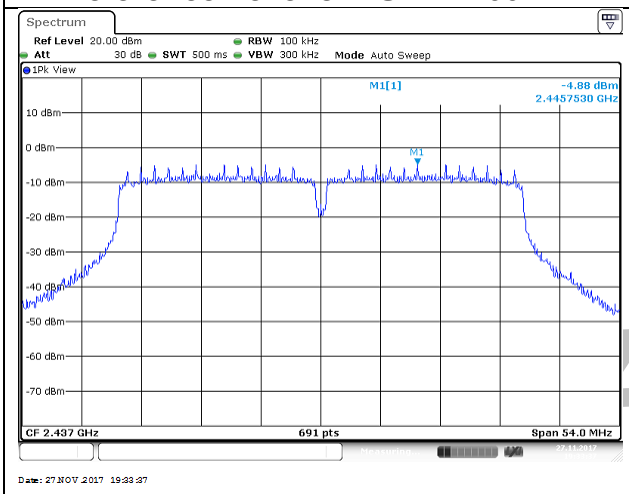
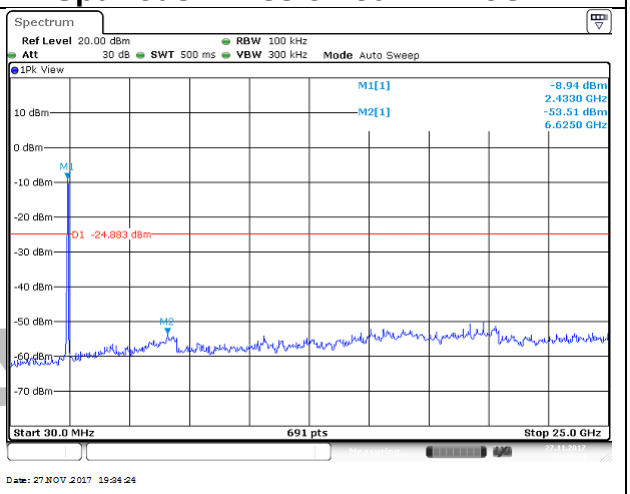
IEEE 802.11 n HT40 mode Mid CH chain 0

Reference Level of PSD in 100kHz	Spurious Emission 30MHz-25GHz
	

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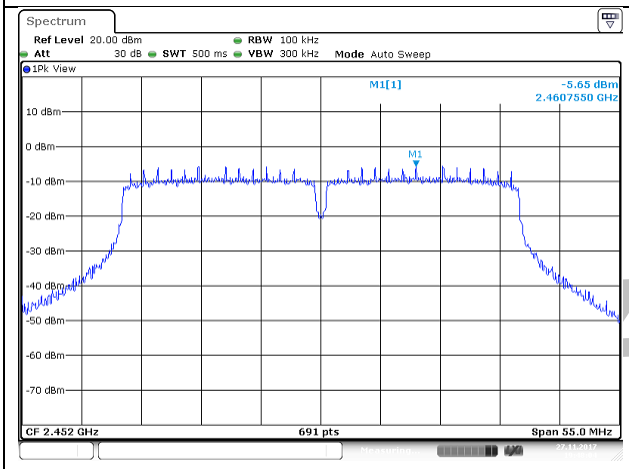
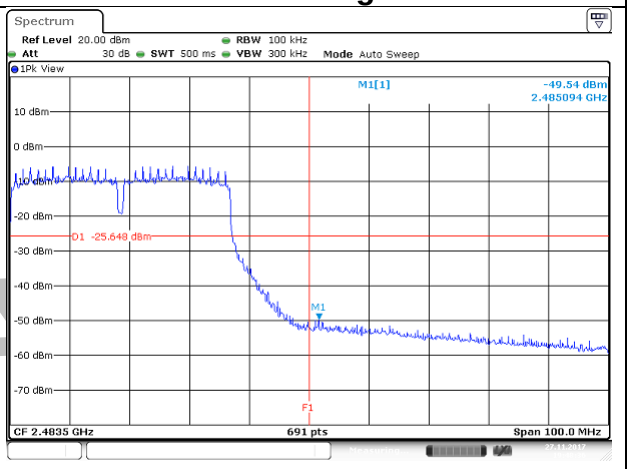
IEEE 802.11n HT40 mode High CH chain 0

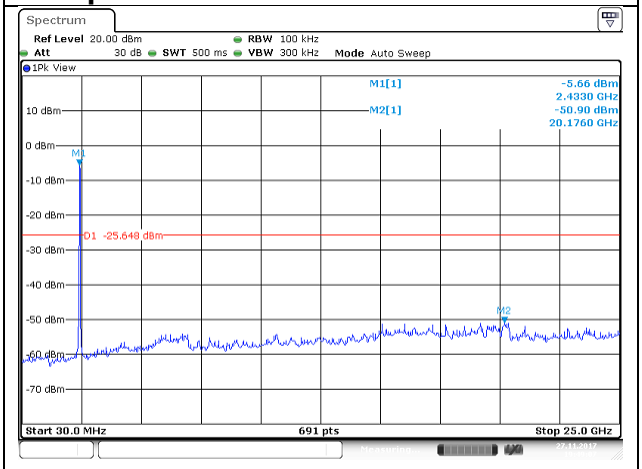
Reference Level of PSD in 100kHz



Band Edge



Spurious Emission 30MHz-25GHz



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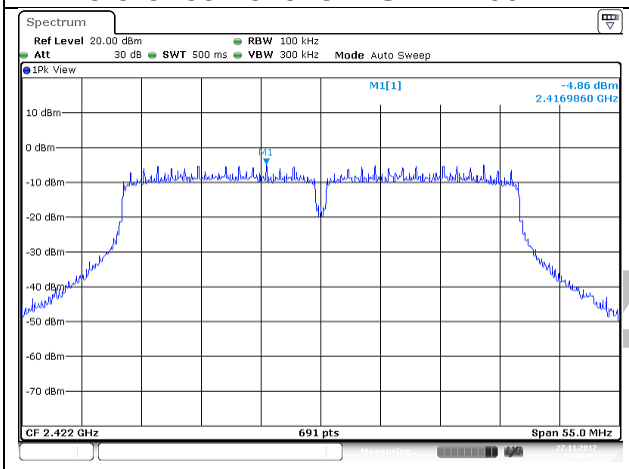
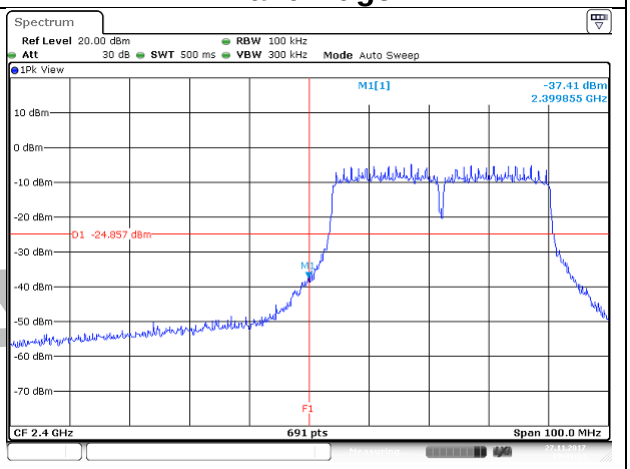
IEEE 802.11 n HT40 mode Low CH chain 1

Reference Level of PSD in 100kHz



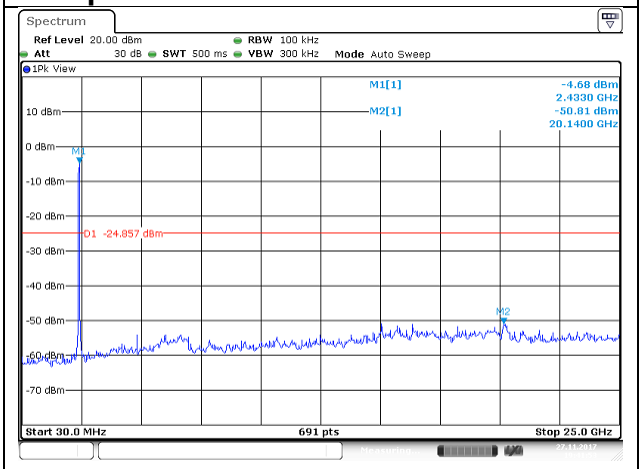
Date: 27.NOV.2017 19:40:43

Band Edge



Date: 27.NOV.2017 19:41:13

Spurious Emission 30MHz-25GHz



Date: 27.NOV.2017 19:41:53

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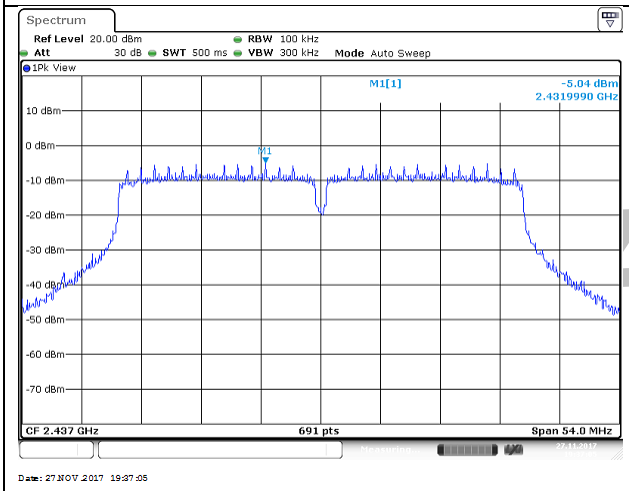
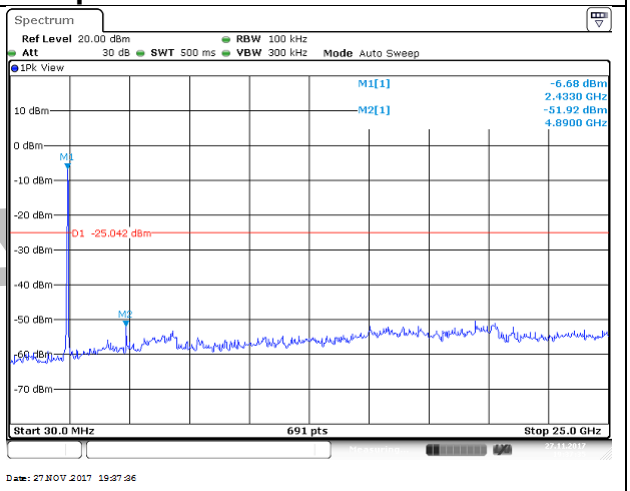
IEEE 802.11 n HT40 mode Mid CH chain 1	
Reference Level of PSD in 100kHz	**Spurious Emission 30MHz-25GHz**
	

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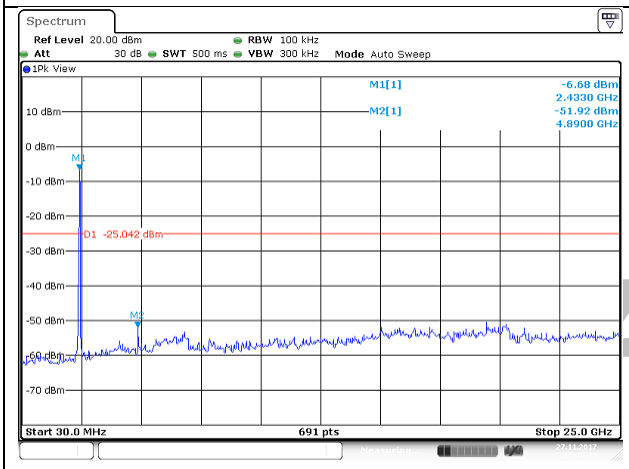
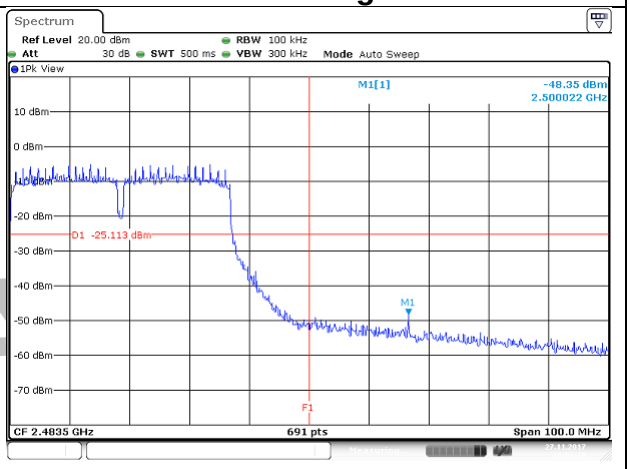
IEEE 802.11n HT40 mode High CH chain 1

Reference Level of PSD in 100kHz



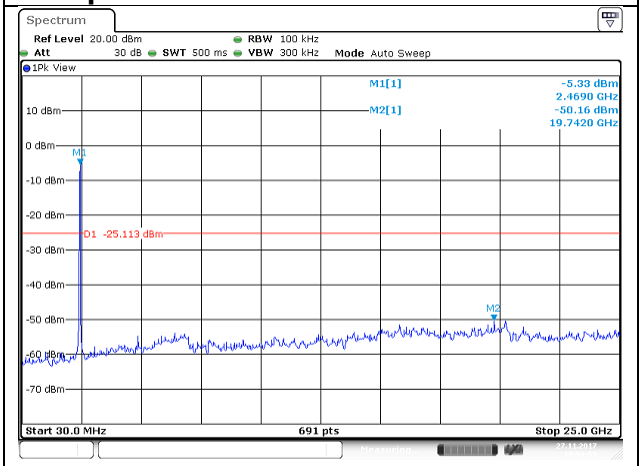
Date: 27.NOV.2017 19:37:36

Band Edge



Date: 27.NOV.2017 19:51:29

Spurious Emission 30MHz-25GHz



Date: 27.NOV.2017 19:51:55

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5.6 RADIATION BANDEDGE AND SPURIOUS EMISSION

5.6.1 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.

DRAFT

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

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5.6.2 Test Procedure

Test method Refer as KDB 662911 D01 v02 r01, KDB 558074 D01 V04, 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.

DRAFT

Remark:

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open are test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 937606.

4. The SA setting following：

(1) Below 1G：RBW = 100kHz, VBW ≥ 3 RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.

(2) Above 1G：

(2.1) For Peak measurement：RBW = 1MHz, VBW ≥ 3 RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.

(2.2) For Average measurement：RBW = 1MHz, VBW

˙If Duty Cycle ≥ 98%, VBW=10Hz.

˙If Duty Cycle < 98%, VBW=1/T.

Configuration	Duty Cycle (%)	T(ms)	1/T (kHz)	VBW Setting
802.11b	100%	8.6800	-	10Hz
802.11g	95%	1.4600	0.685	750Hz
802.11n HT20	96%	0.7400	1.351	1.5KHz
802.11n HT40	86%	0.3800	2.632	2.7KHz

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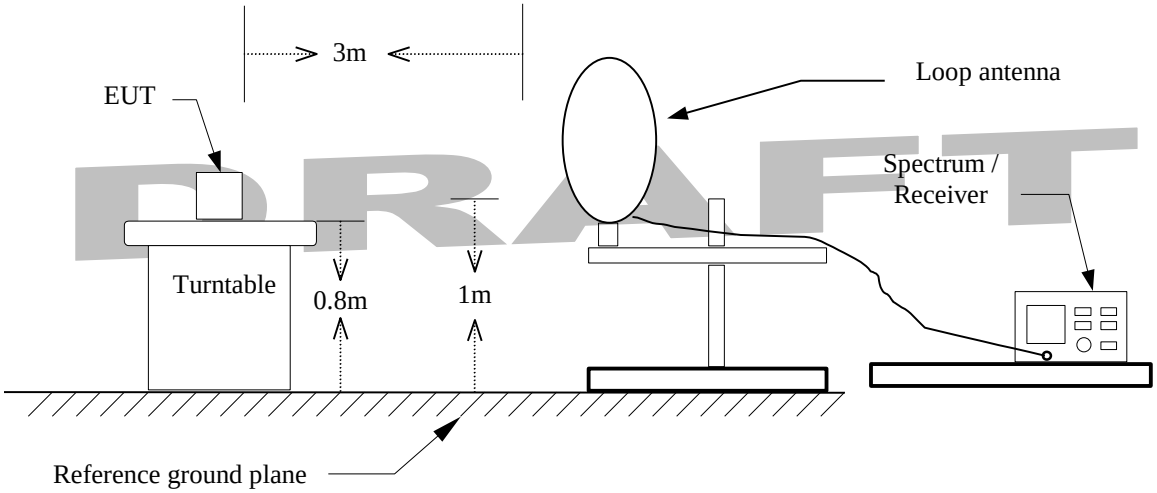
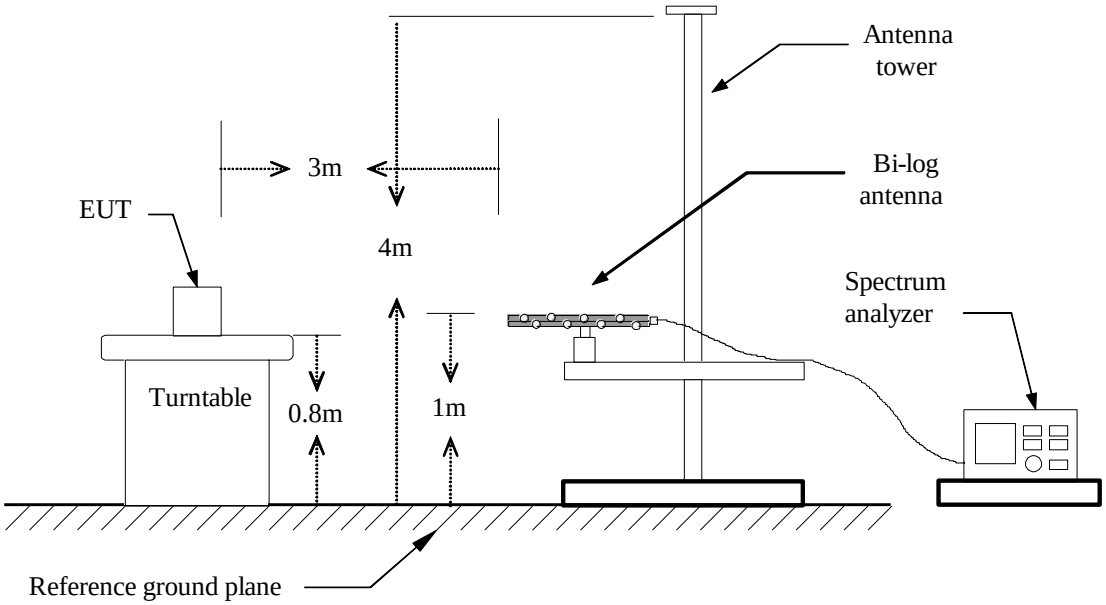
5.6.3 Test Setup

9kHz ~ 30MHz



30MHz ~ 1GHz



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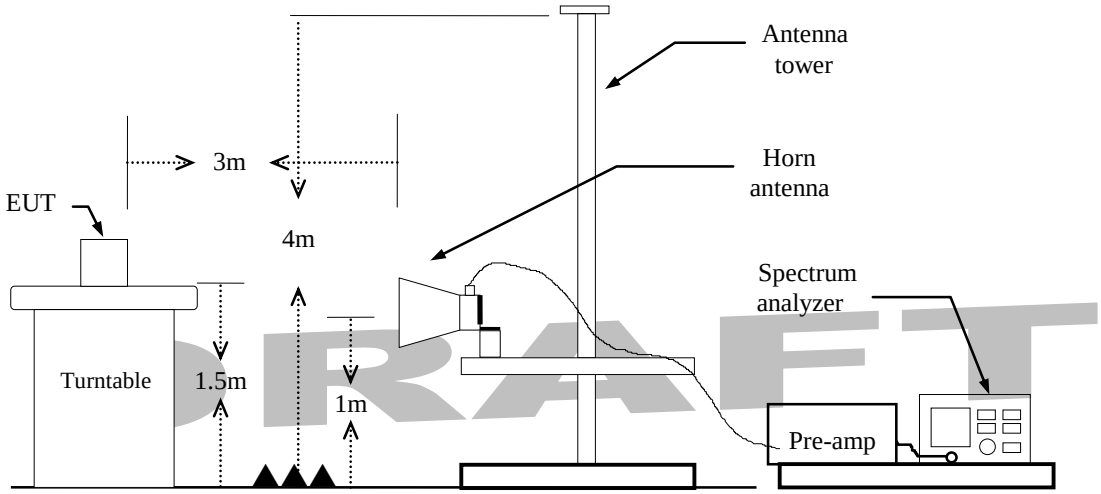
Above 1 GHz



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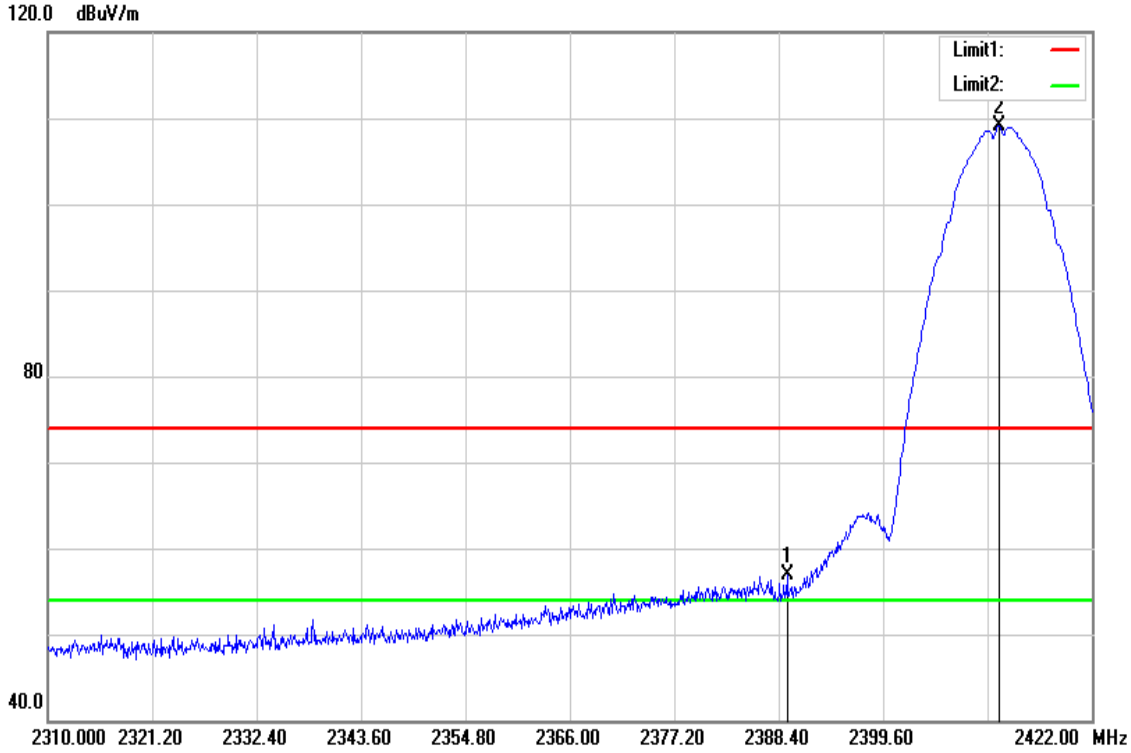
5.6.4 Test Result

Band Edge Test Data

Test Mode	IEEE 802.11b Low CH	Temp/Hum	24(℃)/ 33%RH
Test Item	Band Edge	Test Date	November 28, 2017
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak	Test Voltage	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2389.296	59.88	-2.98	56.90	74.00	-17.10	peak
2412.032	111.96	-2.92	109.04	-	-	peak

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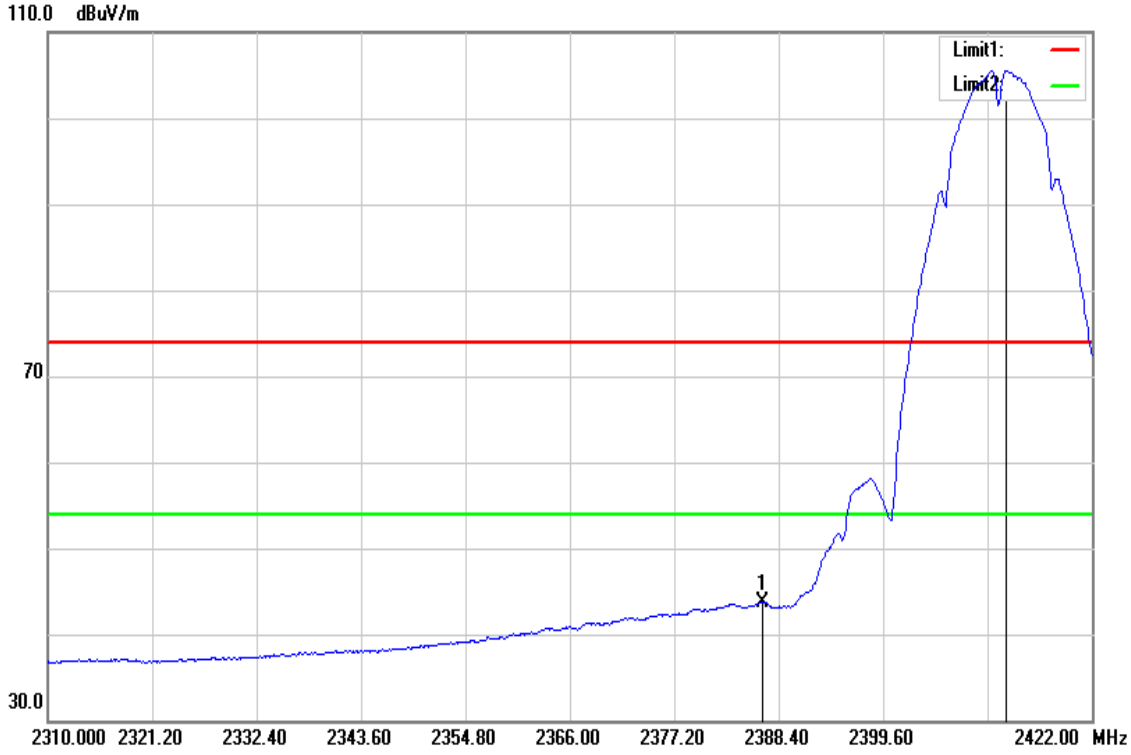
Test Mode	IEEE 802.11b Low CH	Temperature:	24(℃)/ 33%RH
Test Item	Band Edge	Test Date	November 28, 2017
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Average	Test Voltage	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2386.608	46.78	-2.99	43.79	54.00	-10.21	AVG
2412.816	108.49	-2.90	105.59	-	-	AVG

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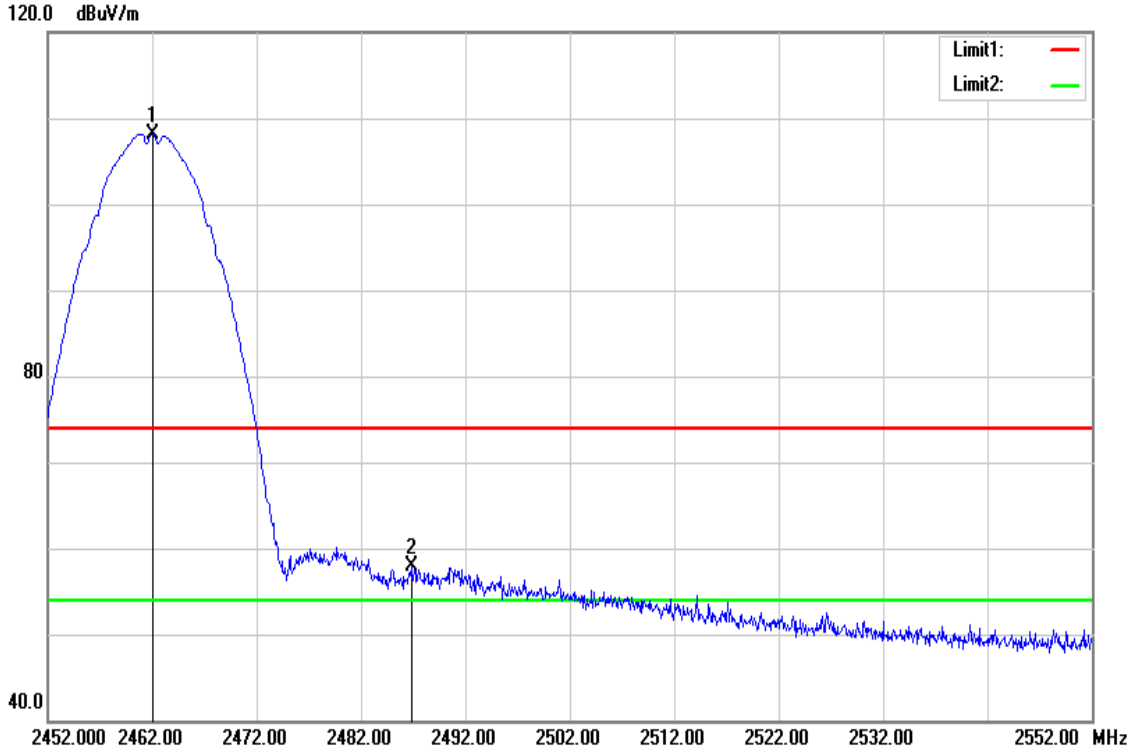
Test Mode	IEEE 802.11b High CH	Temp/Hum	24(℃)/ 33%RH
Test Item	Band Edge	Test Date	November 28, 2017
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak	Test Voltage	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2462.000	110.92	-2.76	108.16	-	-	peak
2486.800	60.68	-2.68	58.00	74.00	-16.00	peak

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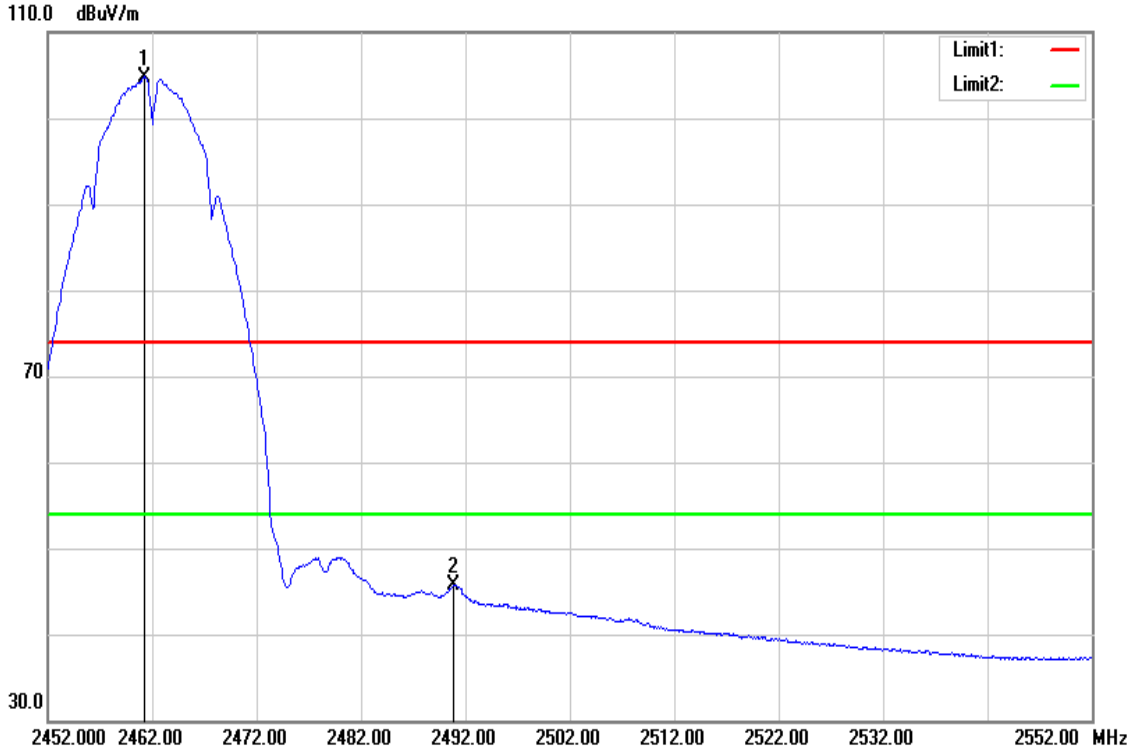
Test Mode	IEEE 802.11b High CH	Temperature:	24(℃)/ 33%RH
Test Item	Band Edge	Test Date	November 28, 2017
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Average	Test Voltage	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2461.300	107.56	-2.76	104.80	-	-	AVG
2490.900	48.38	-2.67	45.71	54.00	-8.29	AVG

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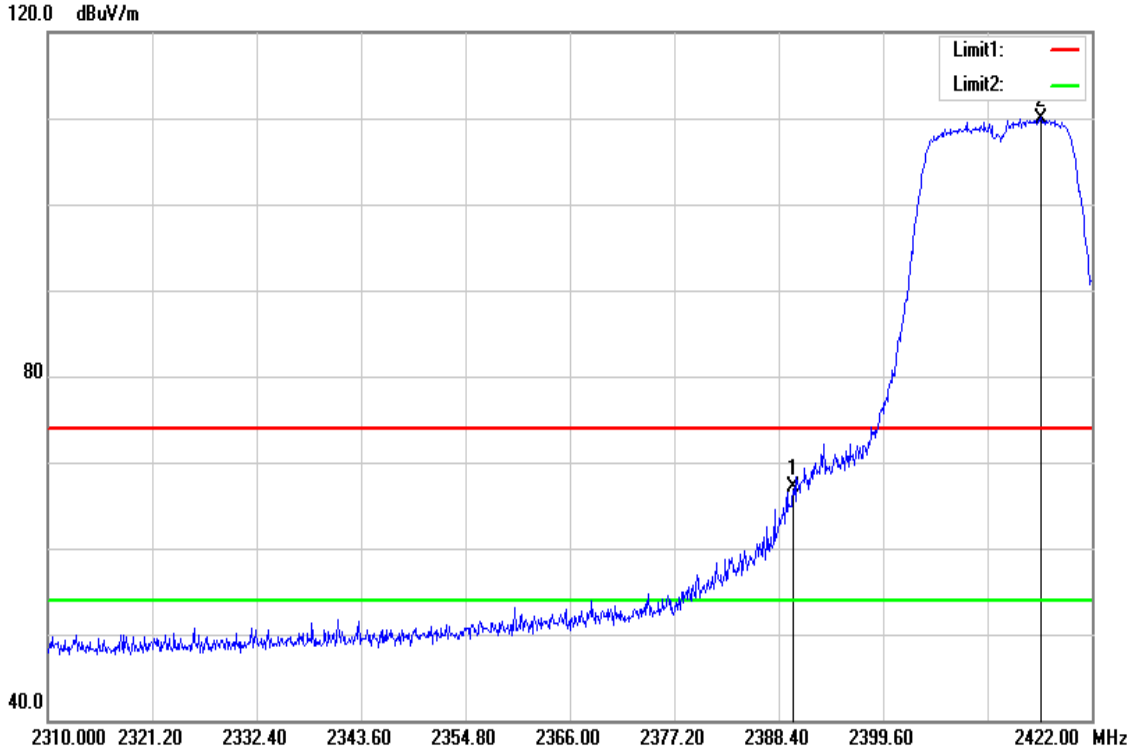
Test Mode	IEEE 802.11g Low CH	Temp/Hum	24(℃)/ 33%RH
Test Item	Band Edge	Test Date	November 28, 2017
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak	Test Voltage	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390.000	70.12	-2.98	67.14	74.00	-6.86	peak
2416.512	112.90	-2.90	110.00	-	-	peak

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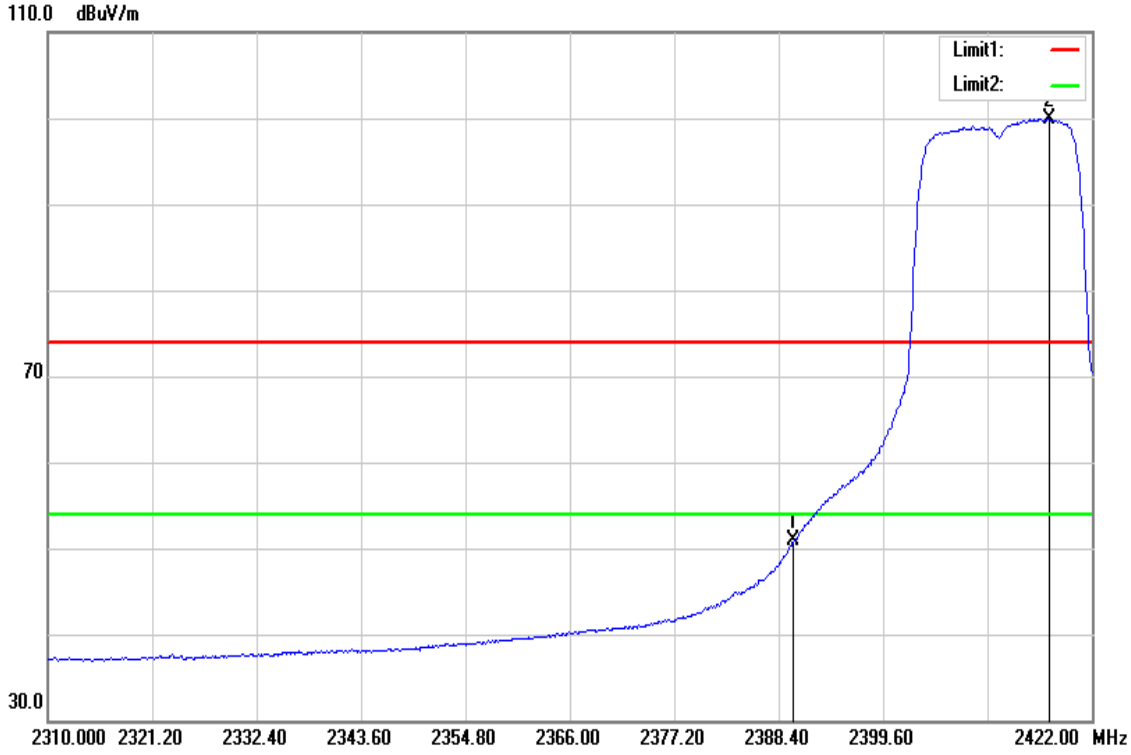
Test Mode	IEEE 802.11g Low CH	Temperature:	24(℃)/ 33%RH
Test Item	Band Edge	Test Date	November 28, 2017
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Average	Test Voltage	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390.000	53.96	-2.98	50.98	54.00	-3.02	AVG
2417.408	102.77	-2.90	99.87	-	-	AVG

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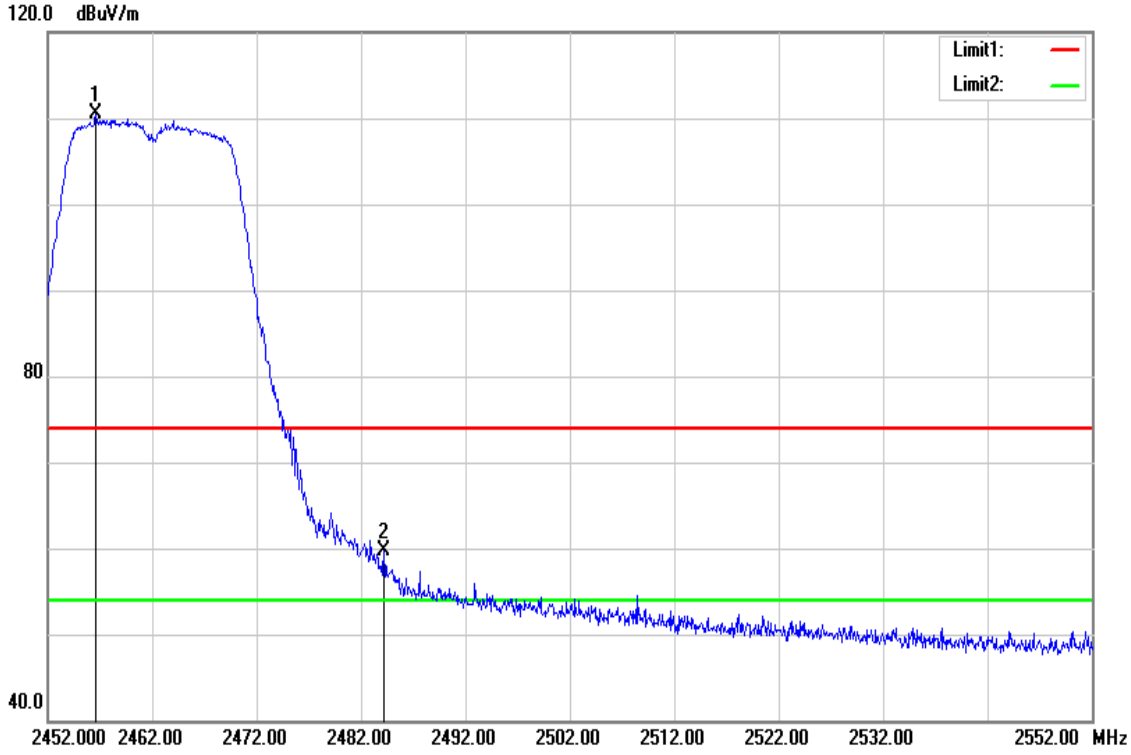
Test Mode	IEEE 802.11g High CH	Temp/Hum	24(℃)/ 33%RH
Test Item	Band Edge	Test Date	November 28, 2017
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak	Test Voltage	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2456.600	113.30	-2.78	110.52	-	-	peak
2484.200	62.39	-2.69	59.70	74.00	-14.30	peak

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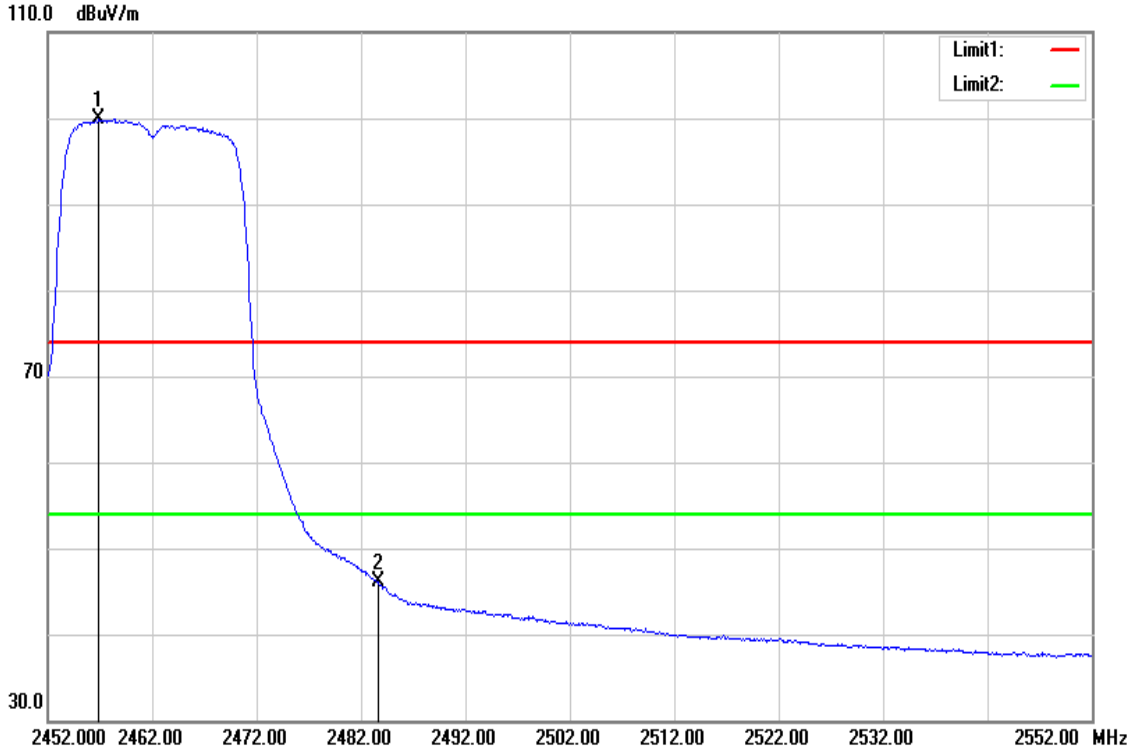
Test Mode	IEEE 802.11g High CH	Temperature:	24(℃)/ 33%RH
Test Item	Band Edge	Test Date	November 28, 2017
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Average	Test Voltage	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2456.900	102.61	-2.78	99.83	-	-	AVG
2483.600	48.80	-2.69	46.11	54.00	-7.89	AVG

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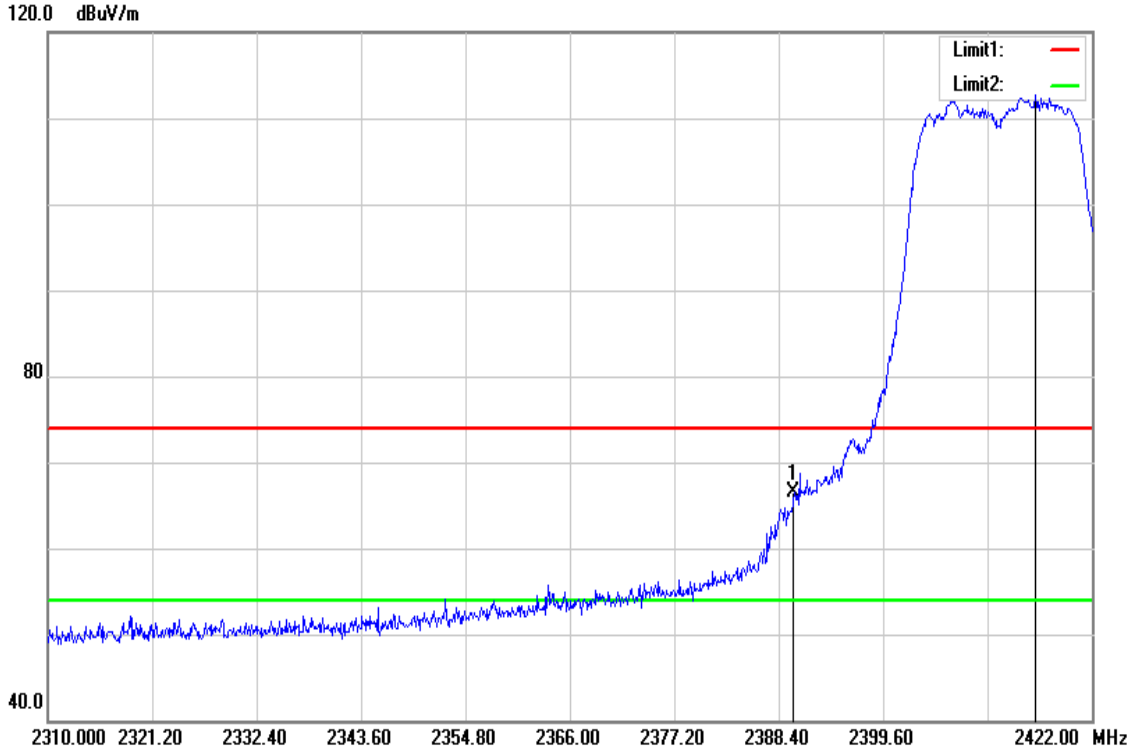
Test Mode	IEEE 802.11n HT20 Low CH	Temp/Hum	24(℃)/ 33%RH
Test Item	Band Edge	Test Date	November 28, 2017
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak	Test Voltage	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390.000	69.42	-2.98	66.44	74.00	-7.56	peak
2415.952	115.50	-2.90	112.60	-	-	peak

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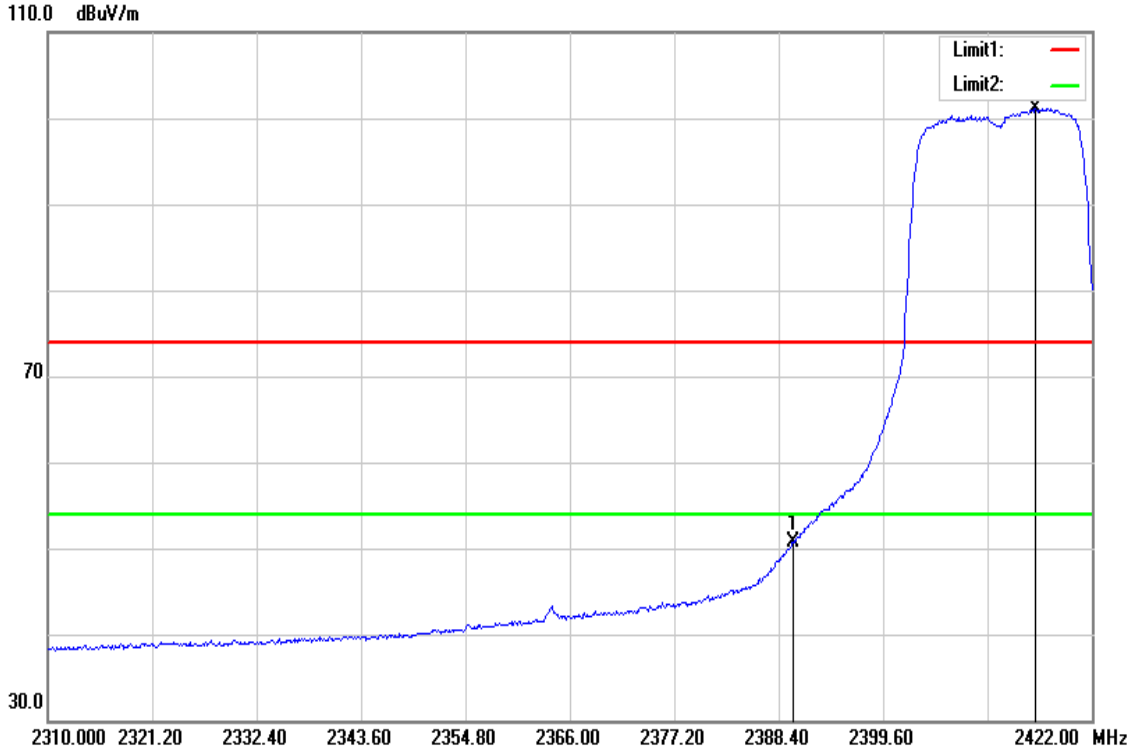
Test Mode	IEEE 802.11n HT20 Low CH	Temperature:	24(℃)/ 33%RH
Test Item	Band Edge	Test Date	November 28, 2017
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Average	Test Voltage	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390.000	53.71	-2.98	50.73	54.00	-3.27	AVG
2415.952	104.02	-2.90	101.12	-	-	AVG

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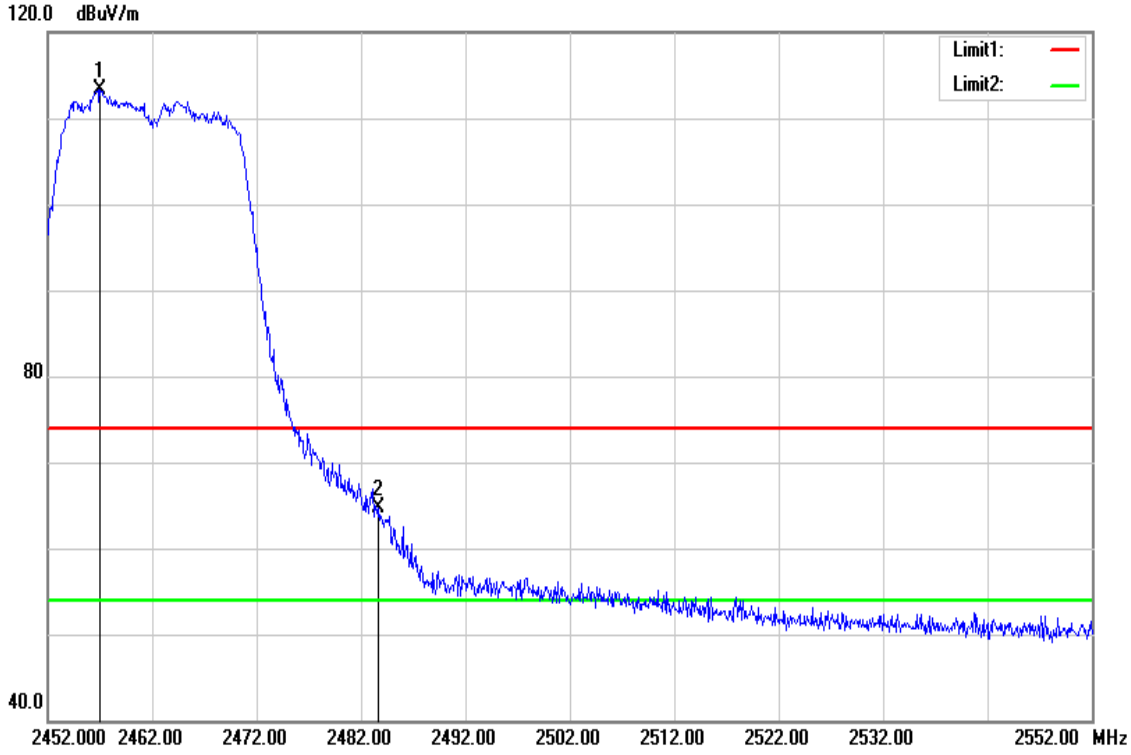
Test Mode	IEEE 802.11n HT20 High CH	Temp/Hum	24(℃)/ 33%RH
Test Item	Band Edge	Test Date	November 28, 2017
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak	Test Voltage	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2457.000	116.03	-2.78	113.25	-	-	peak
2483.700	67.43	-2.69	64.74	74.00	-9.26	peak

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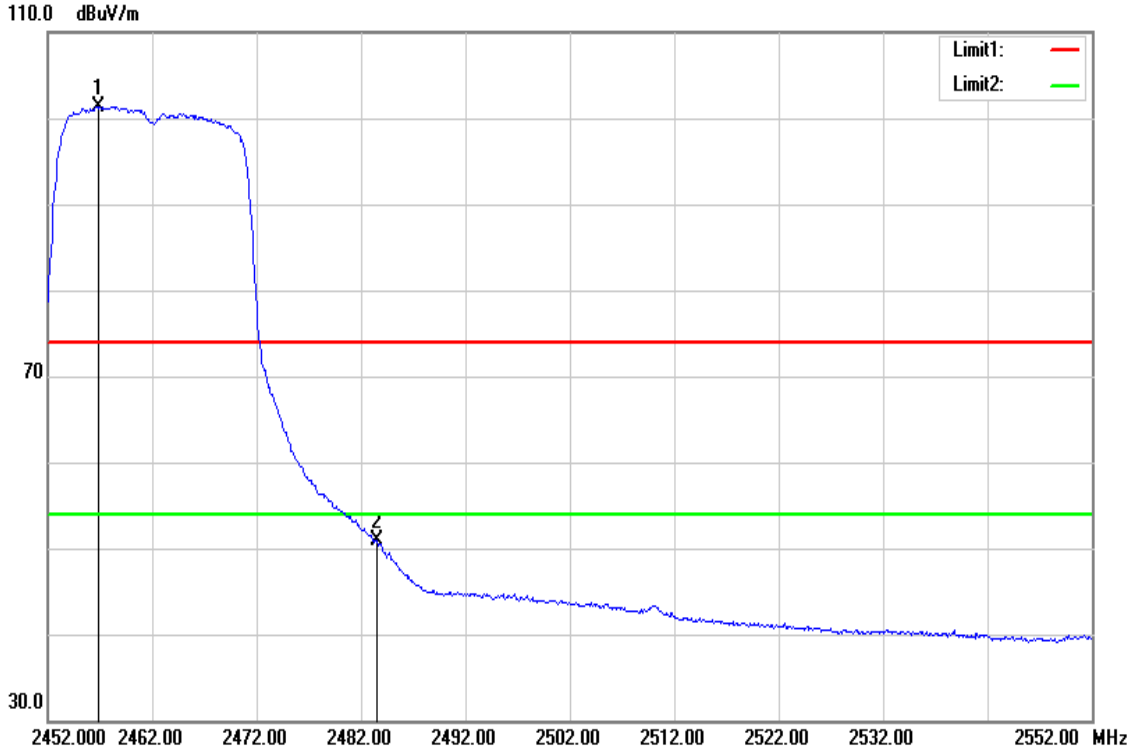
Test Mode	IEEE 802.11n HT20 High CH	Temperature:	24(℃)/ 33%RH
Test Item	Band Edge	Test Date	November 28, 2017
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Average	Test Voltage	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2456.800	104.18	-2.78	101.40	-	-	AVG
2483.500	53.56	-2.69	50.87	54.00	-3.13	AVG

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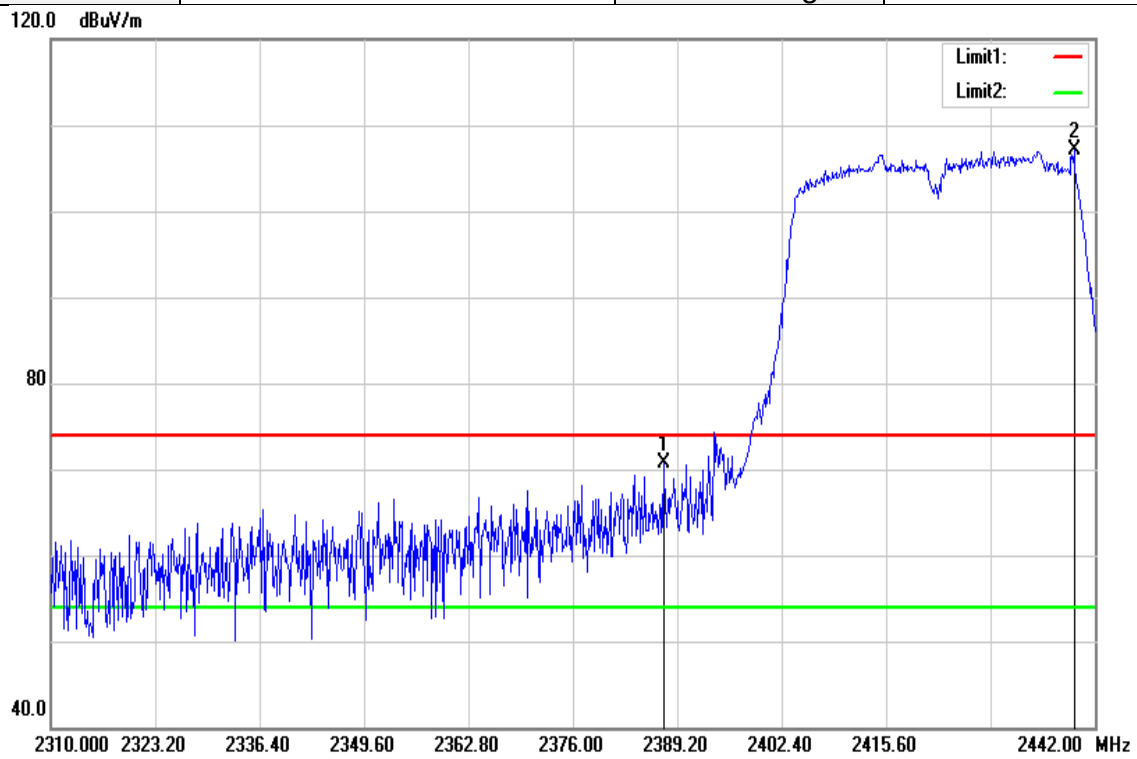
Test Mode	IEEE 802.11n HT40 Low CH	Temp/Hum	24(℃)/ 33%RH
Test Item	Band Edge	Test Date	November 28, 2017
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak	Test Voltage	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2387.484	73.63	-2.99	70.64	74.00	-3.36	peak
2439.360	109.87	-2.83	107.04	-	-	peak

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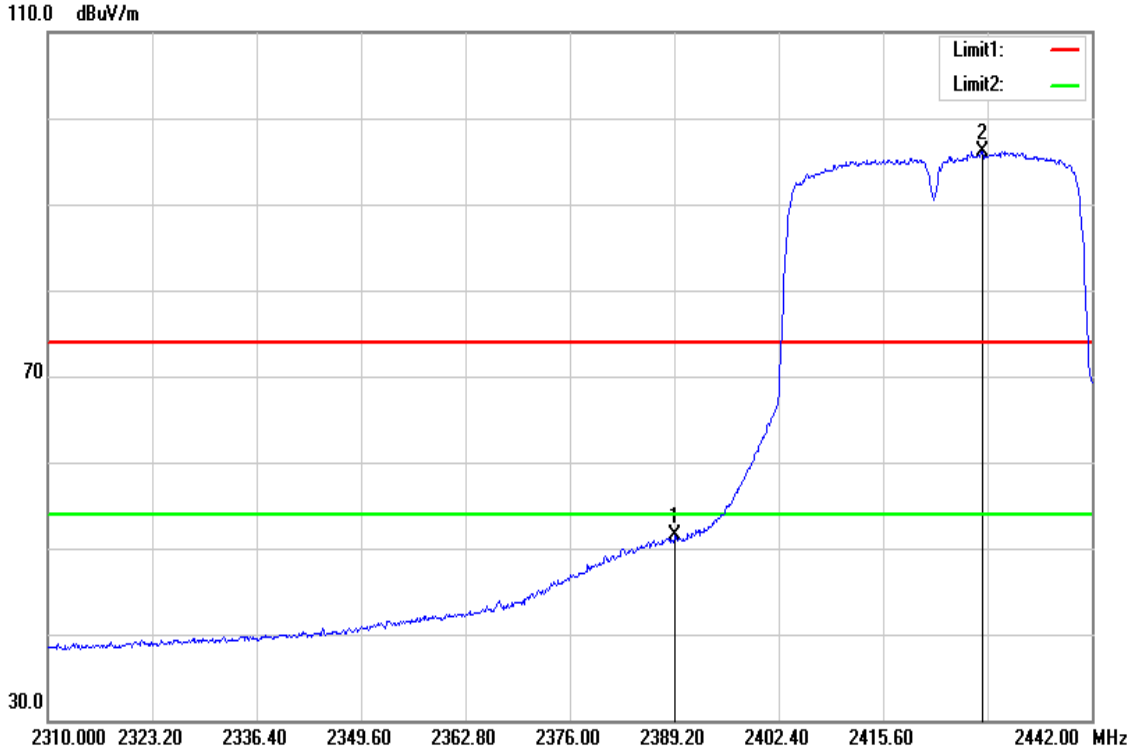
Test Mode	IEEE 802.11n HT40 Low CH	Temperature:	24(℃)/ 33%RH
Test Item	Band Edge	Test Date	November 28, 2017
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Average	Test Voltage	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2389.332	54.51	-2.98	51.53	54.00	-2.47	AVG
2428.140	98.93	-2.86	96.07	-	-	AVG

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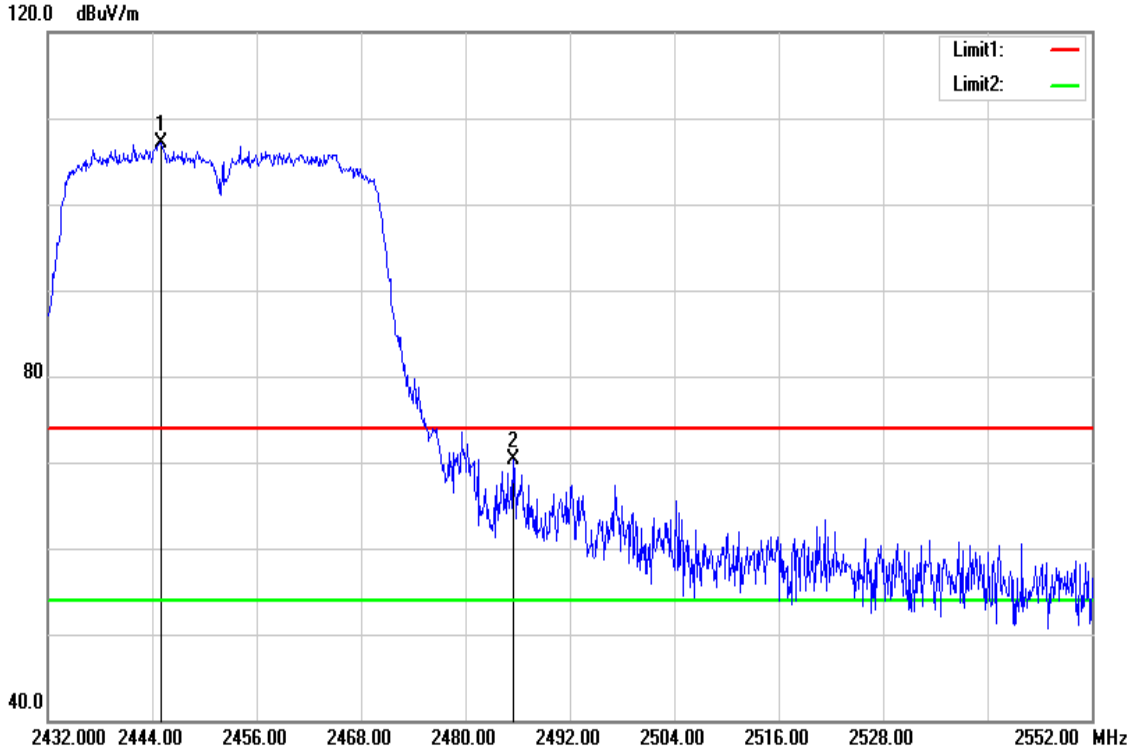
Test Mode	IEEE 802.11n HT40 High CH	Temp/Hum	24(℃)/ 33%RH
Test Item	Band Edge	Test Date	November 28, 2017
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak	Test Voltage	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2444.960	109.83	-2.81	107.02	-	-	peak
2485.520	72.96	-2.69	70.27	74.00	-3.73	peak

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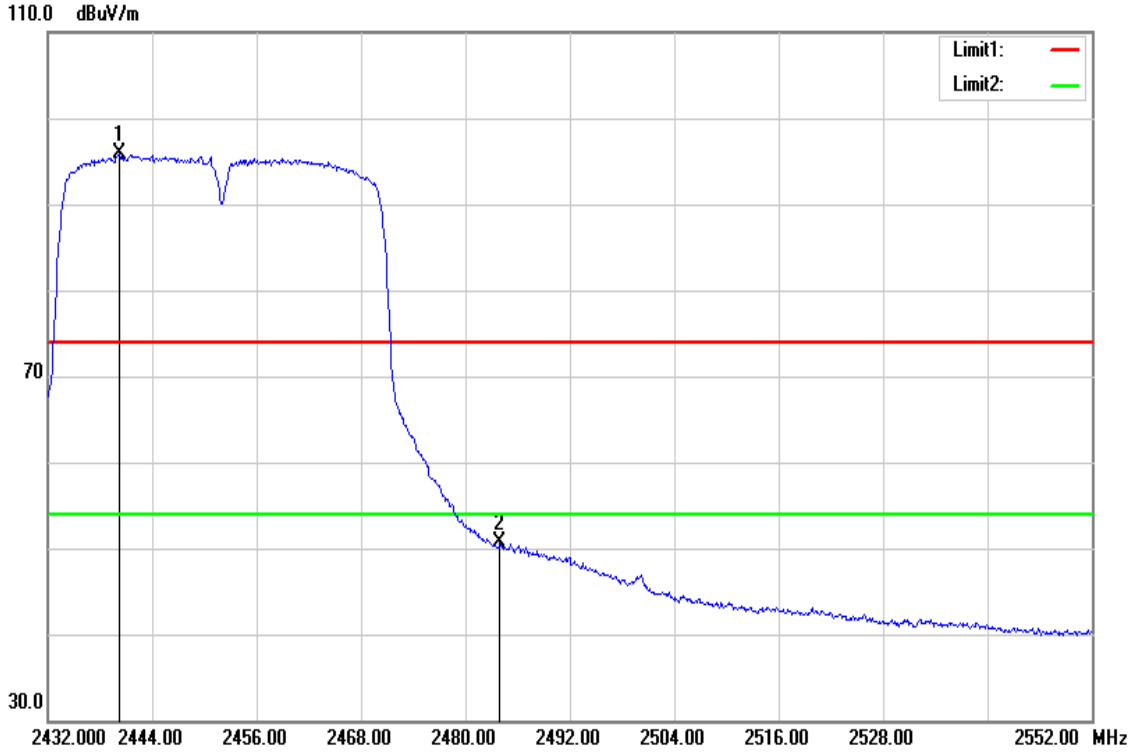
Test Mode	IEEE 802.11n HT40 High CH	Temperature:	24(℃)/ 33%RH
Test Item	Band Edge	Test Date	November 28, 2017
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Average	Test Voltage	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2440.280	98.76	-2.82	95.94	-	-	AVG
2483.960	53.36	-2.69	50.67	54.00	-3.33	AVG

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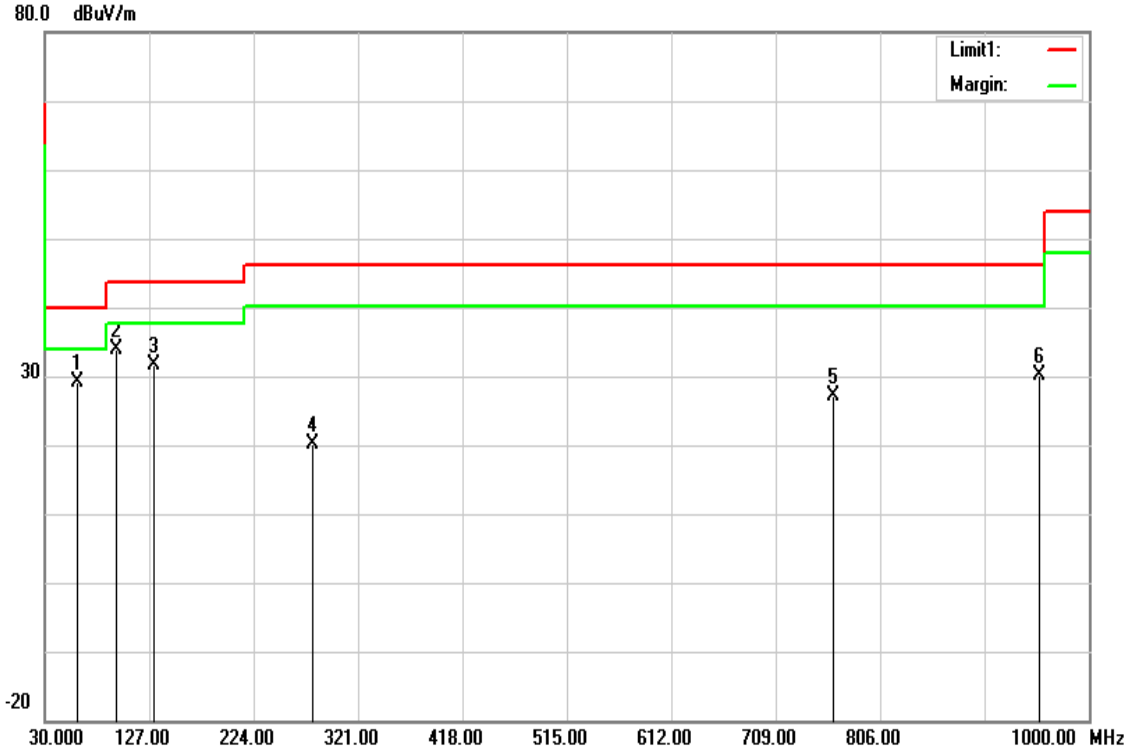
Below 1G Test Data

Test Mode	Mode 1	Temp/Hum	24(℃)/ 33%RH
Test Item	30MHz-1GHz	Test Date	November 30, 2017
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Peak	Test Voltage	120Vac / 60Hz

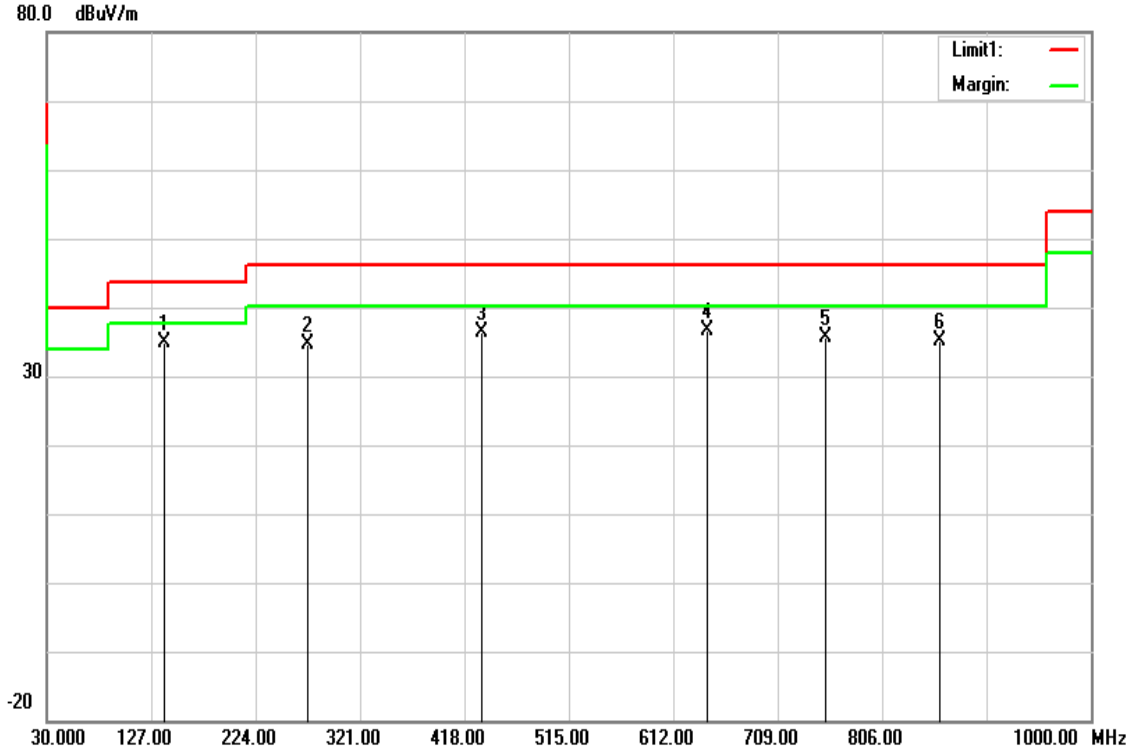


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
60.0700	51.04	-21.84	29.20	40.00	-10.80	peak
95.9600	53.47	-19.65	33.82	43.52	-9.70	peak
130.8800	46.96	-15.29	31.67	43.52	-11.85	peak
279.2900	34.40	-14.31	20.09	46.02	-25.93	peak
762.3500	31.08	-4.06	27.02	46.02	-19.00	peak
954.4100	31.25	-1.14	30.11	46.02	-15.91	peak

Note: No emission found between lowest internal used/generated frequency to 30MHz(9KHz~30MHz)

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Test Mode	Mode 1	Temp/Hum	24(℃)/ 33%RH
Test Item	30MHz-1GHz	Test Date	November 30, 2017
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak	Test Voltage	120Vac / 60Hz



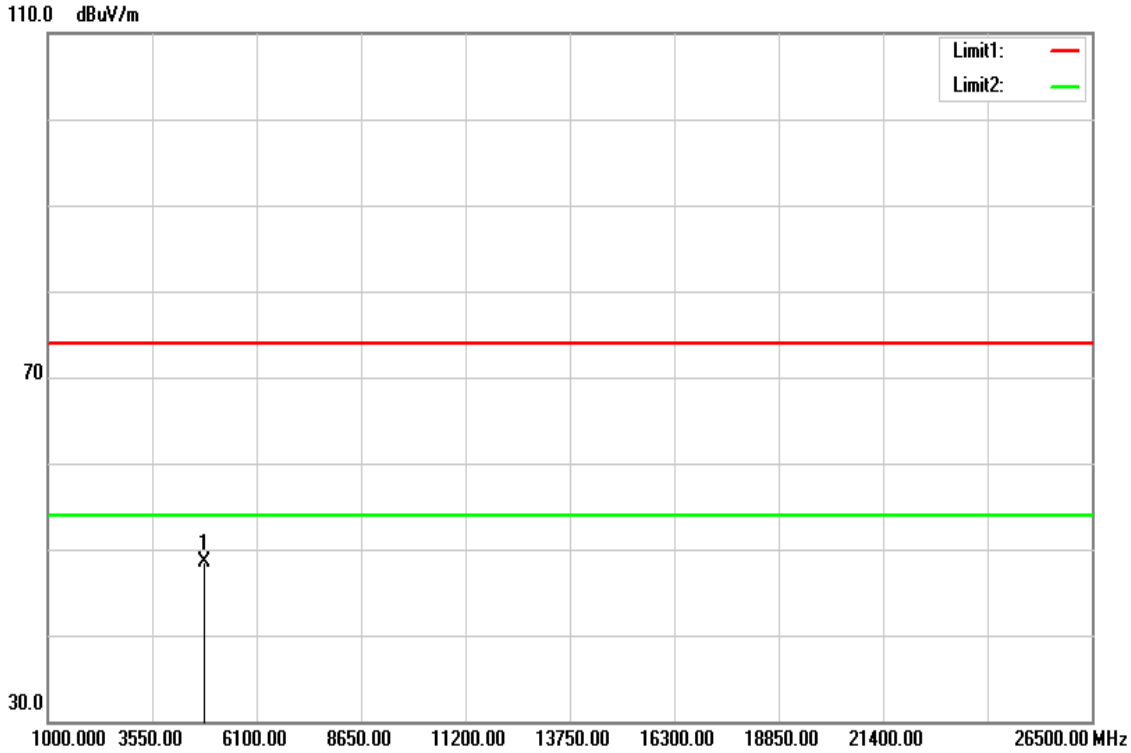
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB	Remark
138.6400	50.42	-15.50	34.92	43.52	-8.60	peak
272.5000	49.48	-14.74	34.74	46.02	-11.28	peak
433.5200	46.58	-10.19	36.39	46.02	-9.63	peak
643.0400	42.27	-5.74	36.53	46.02	-9.49	peak
753.6200	39.96	-4.23	35.73	46.02	-10.29	peak
859.3500	37.73	-2.70	35.03	46.02	-10.99	peak

Note: No emission found between lowest internal used/generated frequency to 30MHz(9KHz~30MHz)

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Above 1G Test Data

Test Mode	IEEE 802.11b Low CH	Temp/Hum	24(℃)/ 33%RH
Test Item	Harmonic	Test Date	November 29, 2017
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz



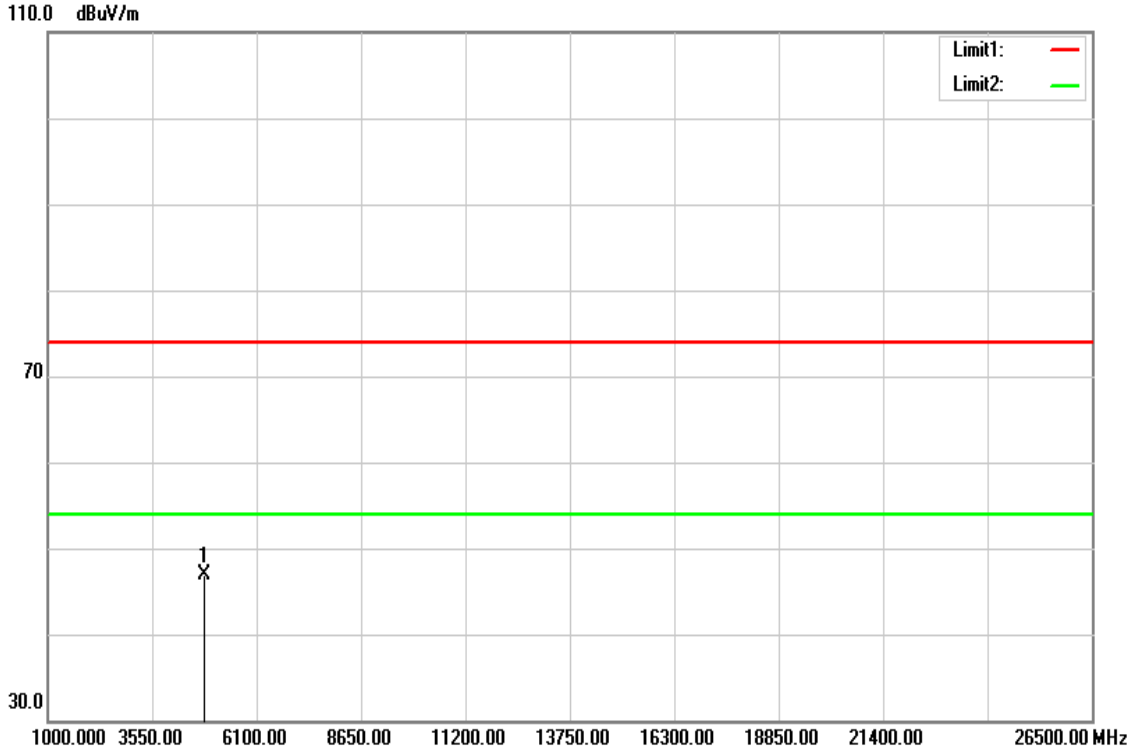
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4827.000	44.13	4.38	48.51	74.00	-25.49	peak
N/A						

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*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Test Mode	IEEE 802.11b Low CH	Temp/Hum	24(℃)/ 33%RH
Test Item	Harmonic	Test Date	November 29, 2017
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz



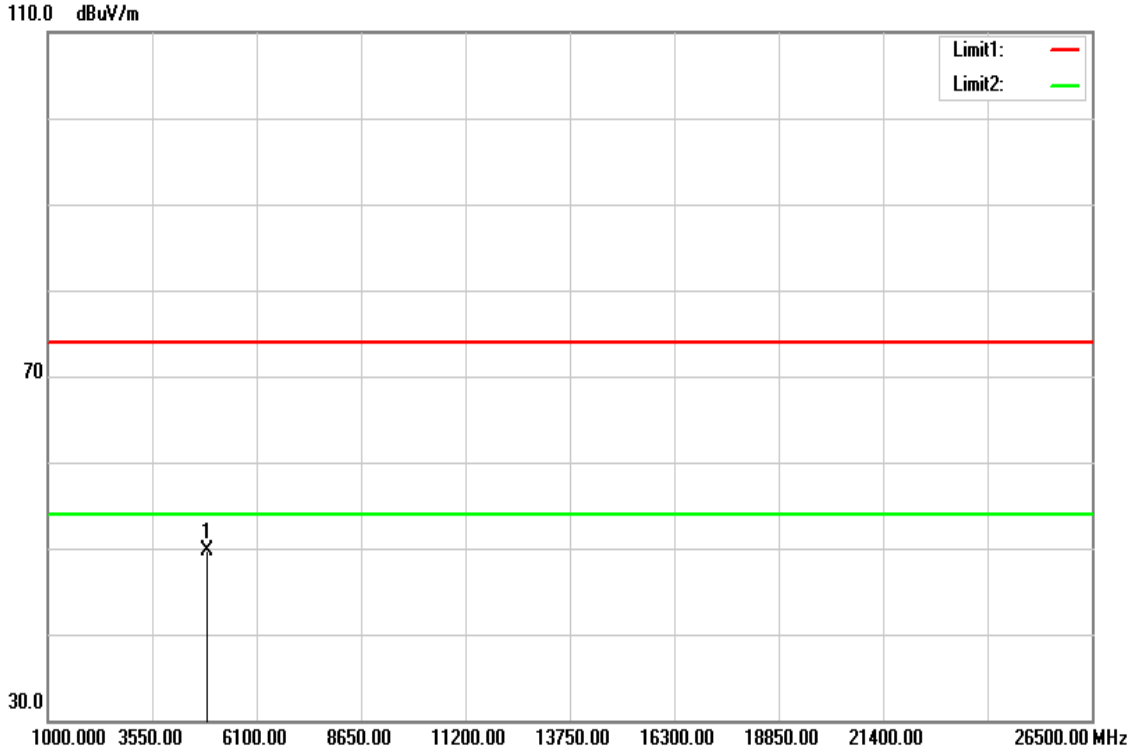
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4824.000	42.62	4.38	47.00	74.00	-27.00	peak
N/A						

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*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Test Mode	IEEE 802.11b Mid CH	Temp/Hum	24(℃)/ 33%RH
Test Item	Harmonic	Test Date	November 29, 2017
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz



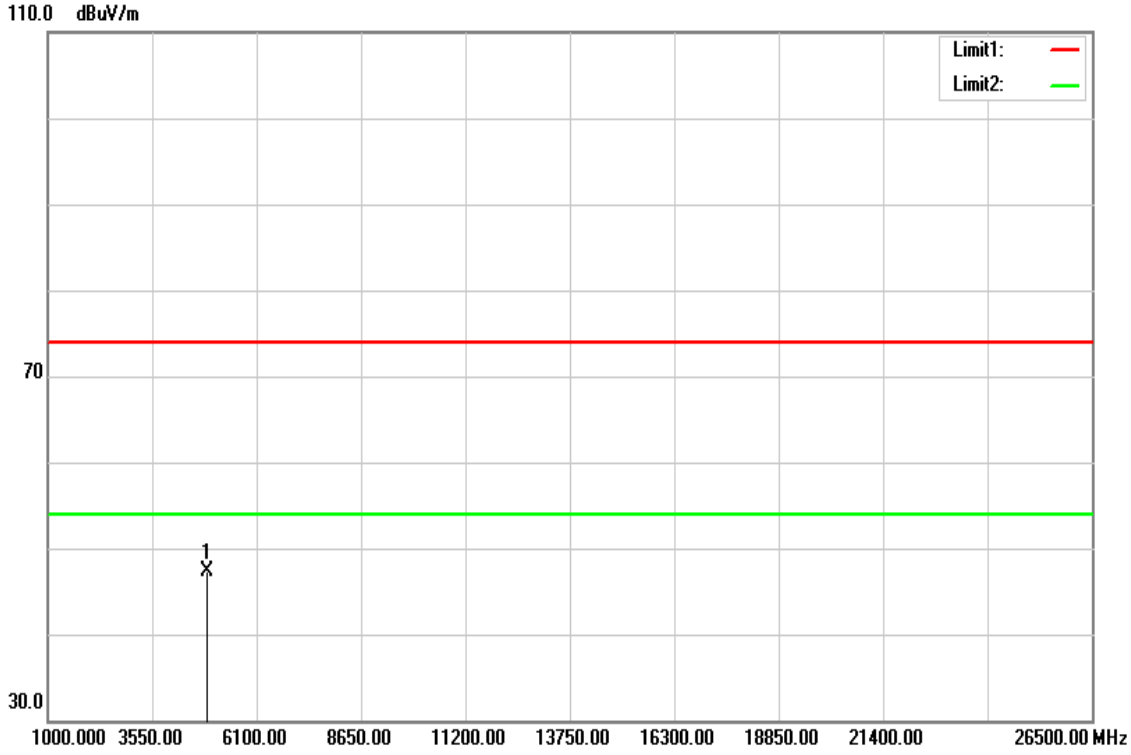
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4876.000	45.19	4.47	49.66	74.00	-24.34	peak
N/A						

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*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Test Mode	IEEE 802.11b Mid CH	Temp/Hum	24(℃)/ 33%RH
Test Item	Harmonic	Test Date	November 29, 2017
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz



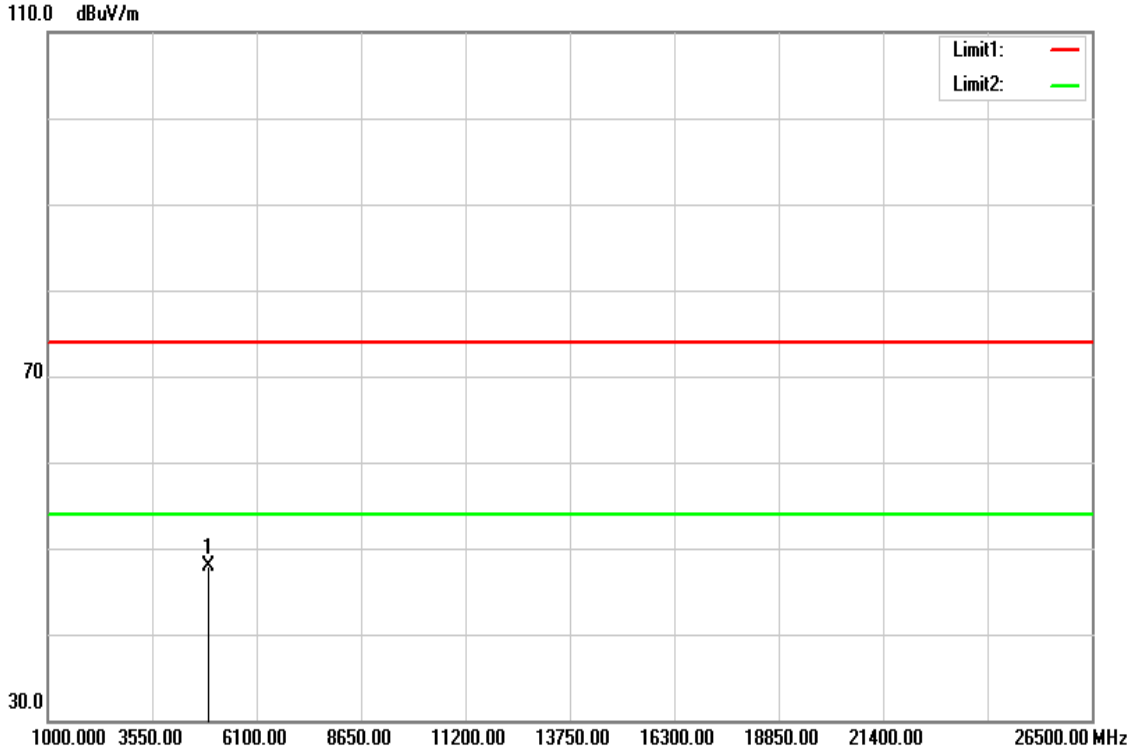
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4876.000	42.87	4.47	47.34	74.00	-26.66	peak
N/A						

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*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Test Mode	IEEE 802.11b High CH	Temp/Hum	24(℃)/ 33%RH
Test Item	Harmonic	Test Date	November 29, 2017
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz



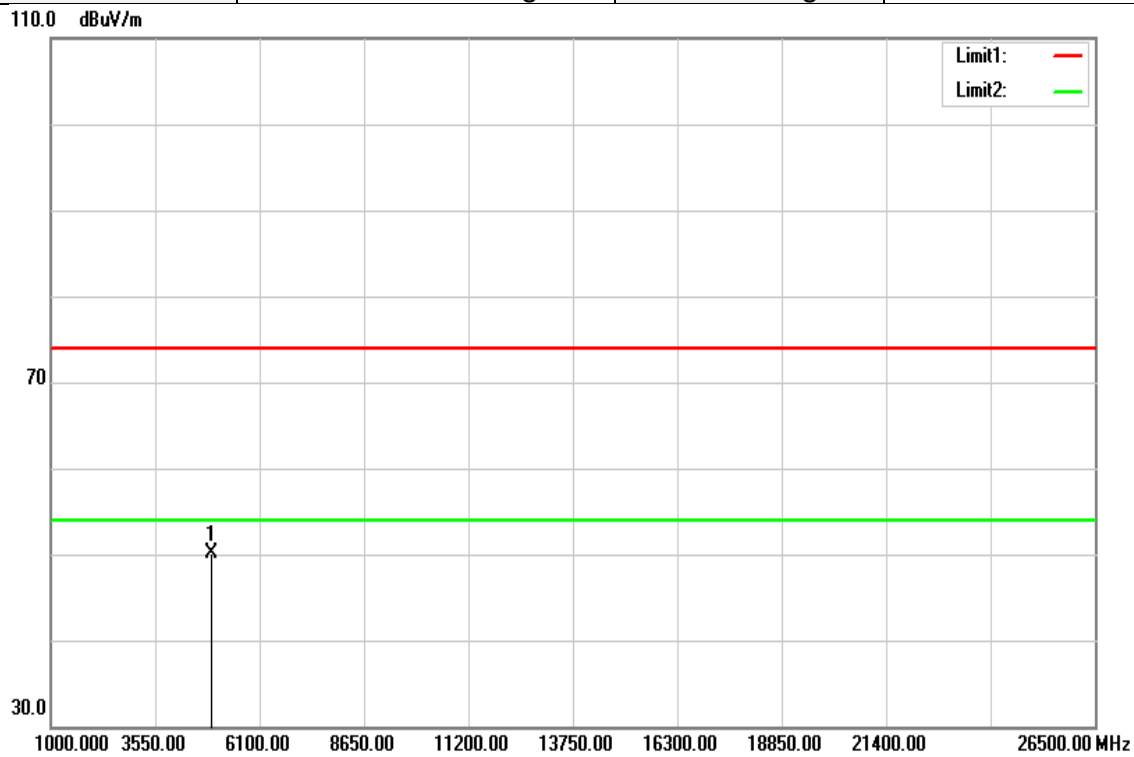
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4925.000	43.39	4.55	47.94	74.00	-26.06	peak
N/A						

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*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Test Mode	IEEE 802.11b High CH	Temp/Hum	24(℃)/ 33%RH
Test Item	Harmonic	Test Date	November 29, 2017
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz



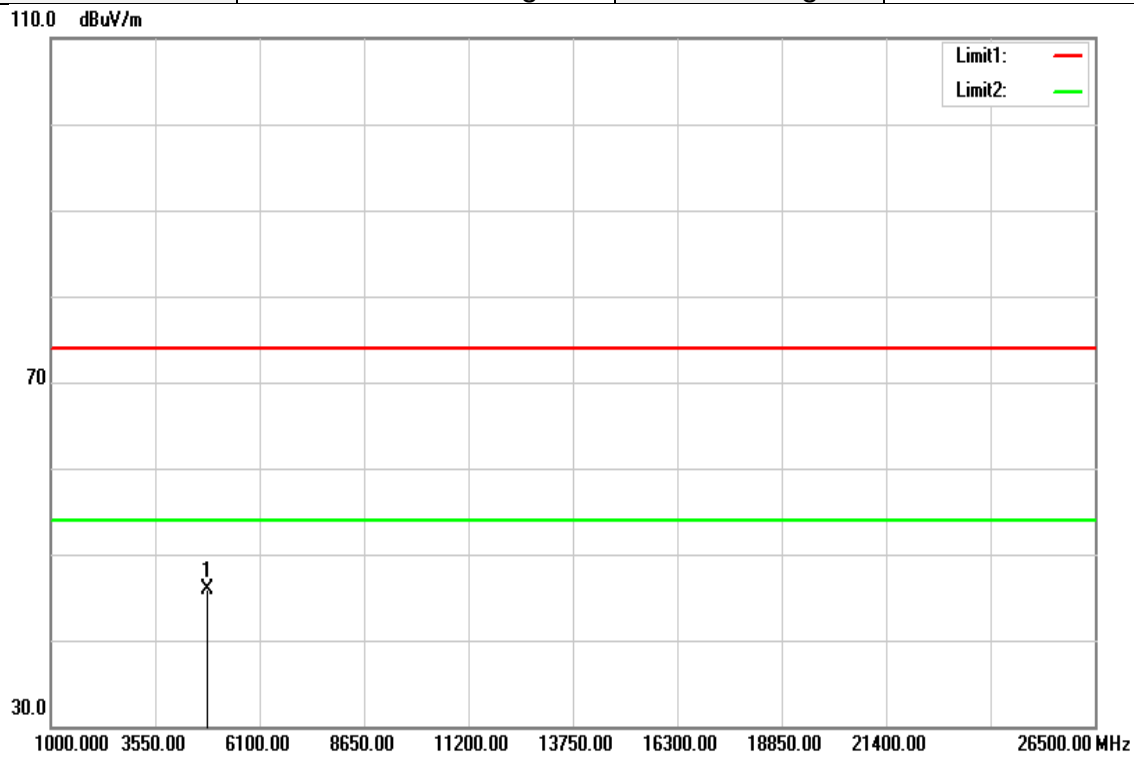
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4925.000	45.54	4.55	50.09	74.00	-23.91	peak
N/A						

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*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Test Mode	IEEE 802.11g Low CH	Temp/Hum	24(℃)/ 33%RH
Test Item	Harmonic	Test Date	November 29, 2017
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz



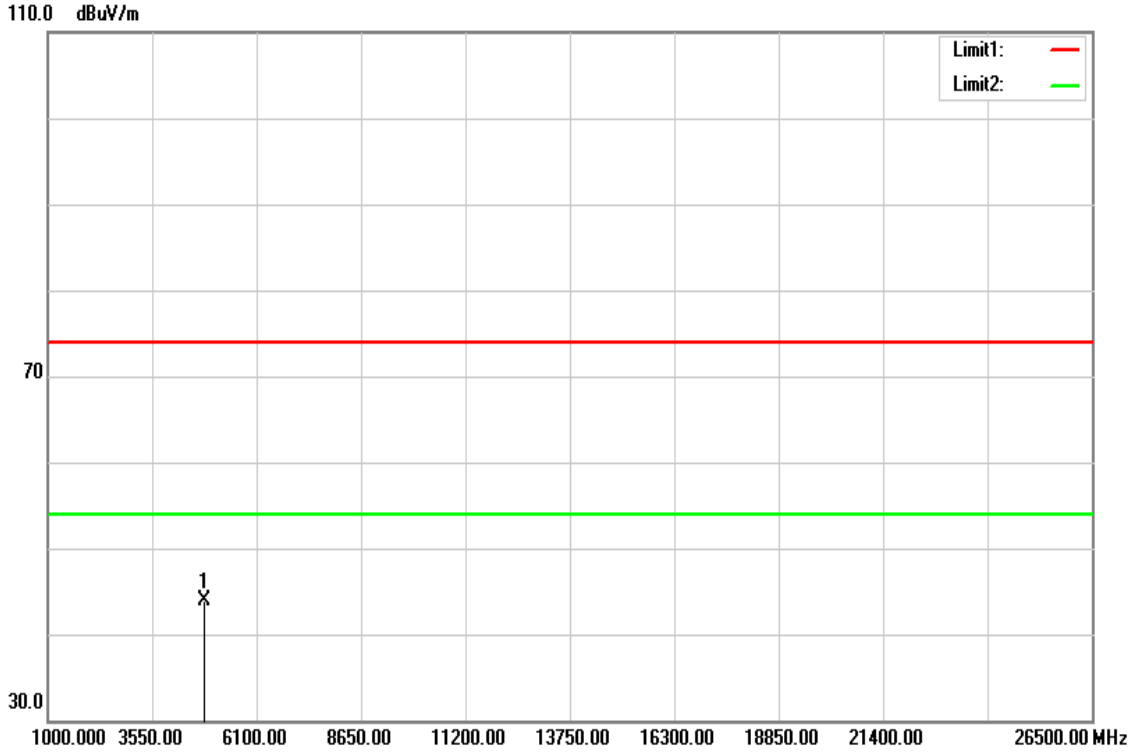
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4824.000	41.45	4.38	45.83	74.00	-28.17	peak
N/A						

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*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Test Mode	IEEE 802.11g Low CH	Temp/Hum	24(℃)/ 33%RH
Test Item	Harmonic	Test Date	November 29, 2017
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz



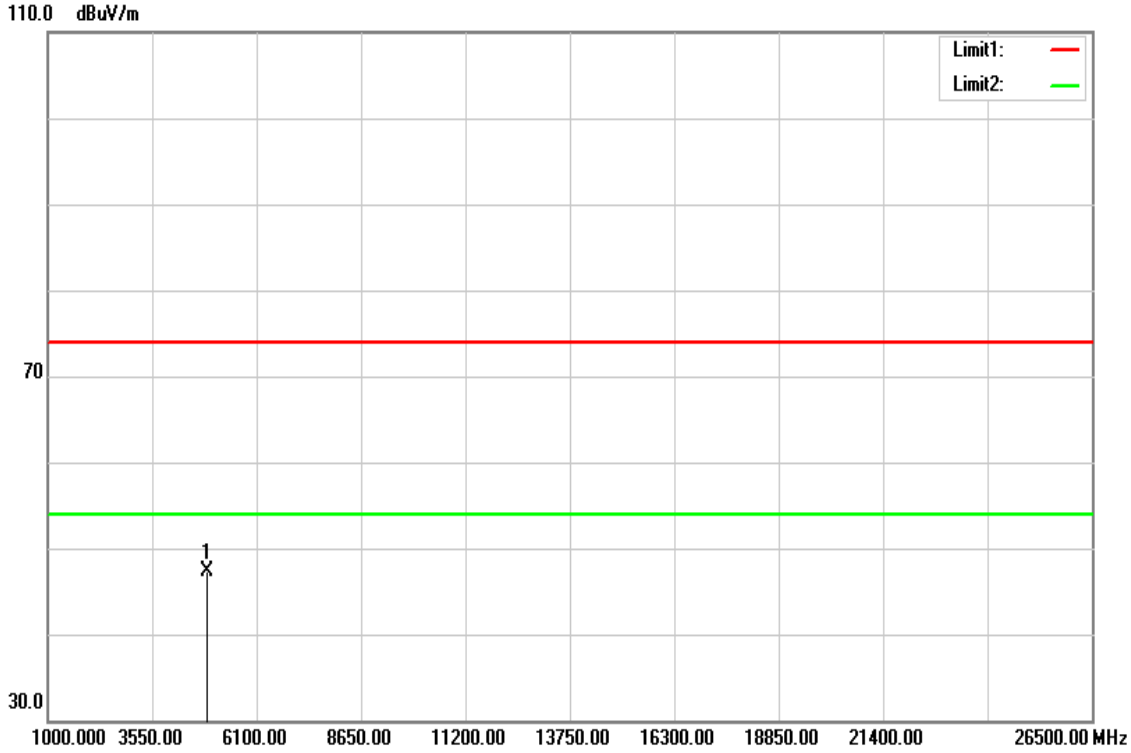
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4824.000	39.62	4.38	44.00	74.00	-30.00	peak
N/A						

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*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Test Mode	IEEE 802.11g Mid CH	Temp/Hum	24(℃)/ 33%RH
Test Item	Harmonic	Test Date	November 29, 2017
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz



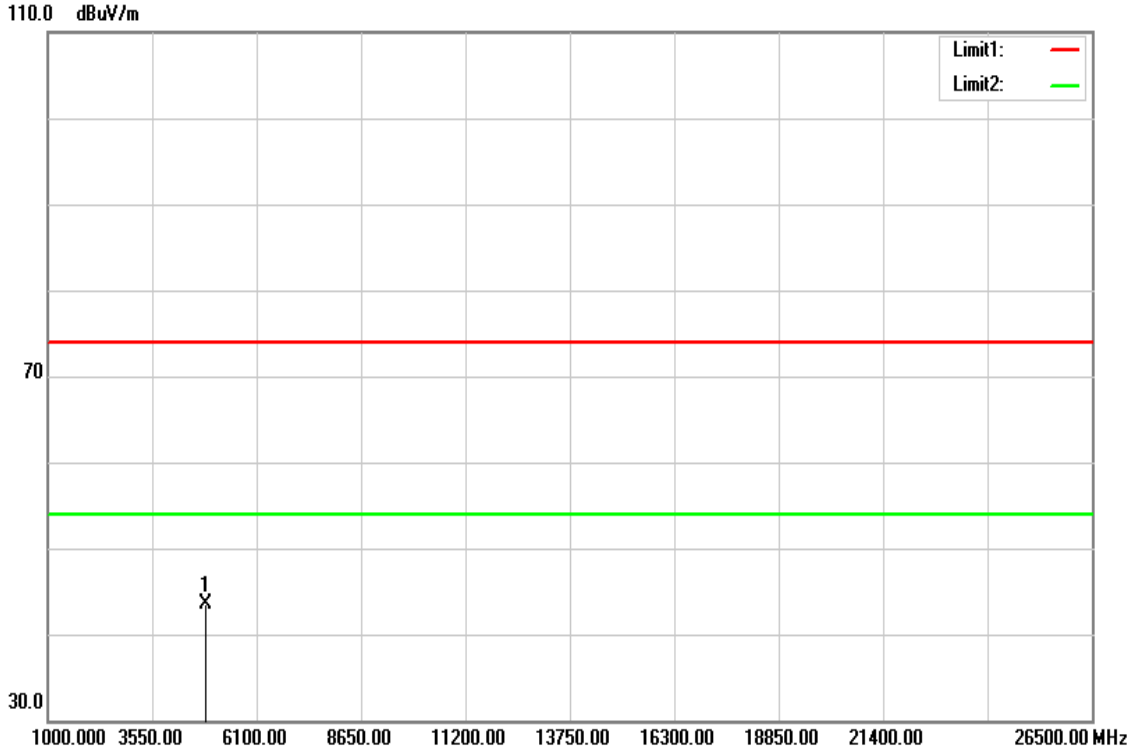
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4876.000	42.84	4.47	47.31	74.00	-26.69	peak
N/A						

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*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Test Mode	IEEE 802.11g Mid CH	Temp/Hum	24(℃)/ 33%RH
Test Item	Harmonic	Test Date	November 29, 2017
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz



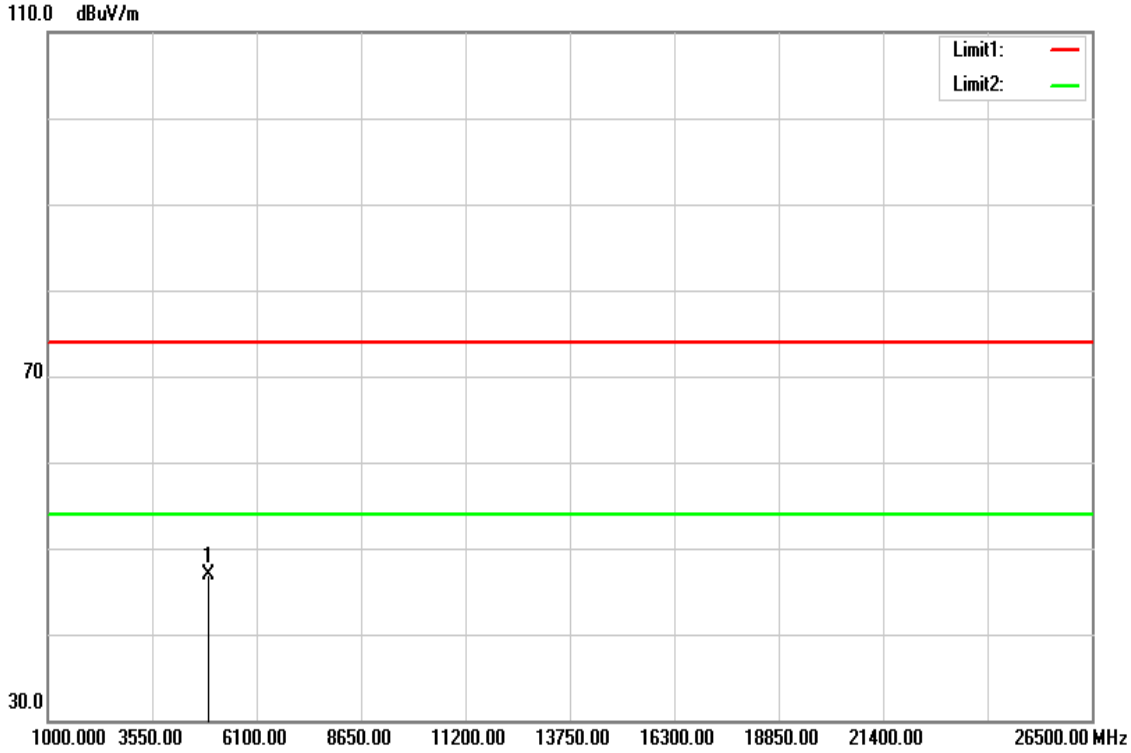
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4874.000	39.05	4.47	43.52	74.00	-30.48	peak
N/A						

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*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Test Mode	IEEE 802.11g High CH	Temp/Hum	24(℃)/ 33%RH
Test Item	Harmonic	Test Date	November 29, 2017
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz



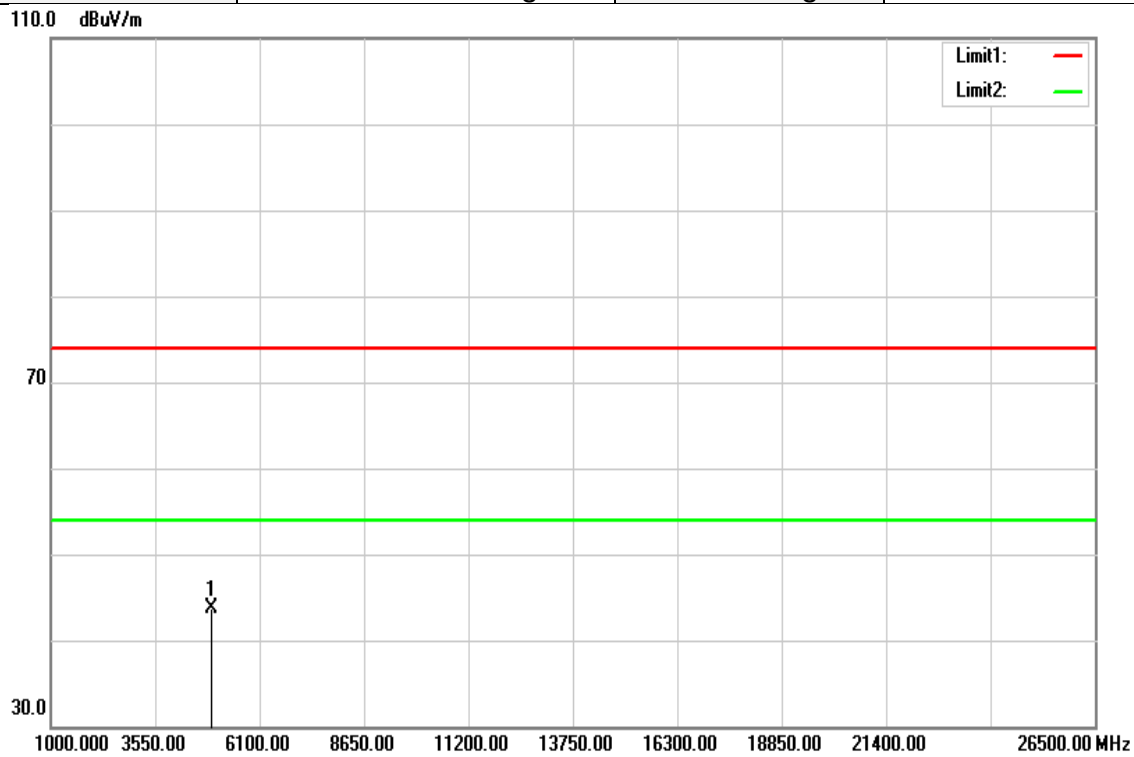
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4925.000	42.37	4.55	46.92	74.00	-27.08	peak
N/A						

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*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Test Mode	IEEE 802.11g High CH	Temp/Hum	24(℃)/ 33%RH
Test Item	Harmonic	Test Date	November 29, 2017
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz



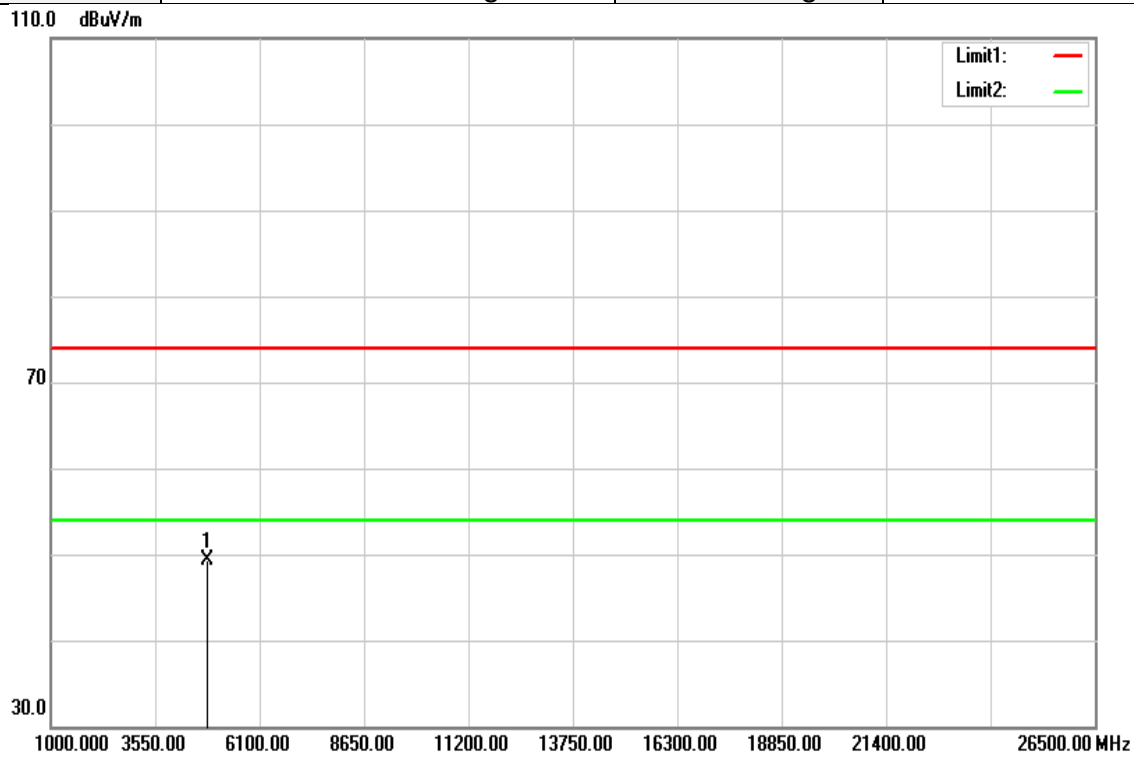
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4924.000	39.12	4.55	43.67	74.00	-30.33	peak
N/A						

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*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Test Mode	IEEE 802.11n HT20 Low CH	Temp/Hum	24(℃)/ 33%RH
Test Item	Harmonic	Test Date	November 29, 2017
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz



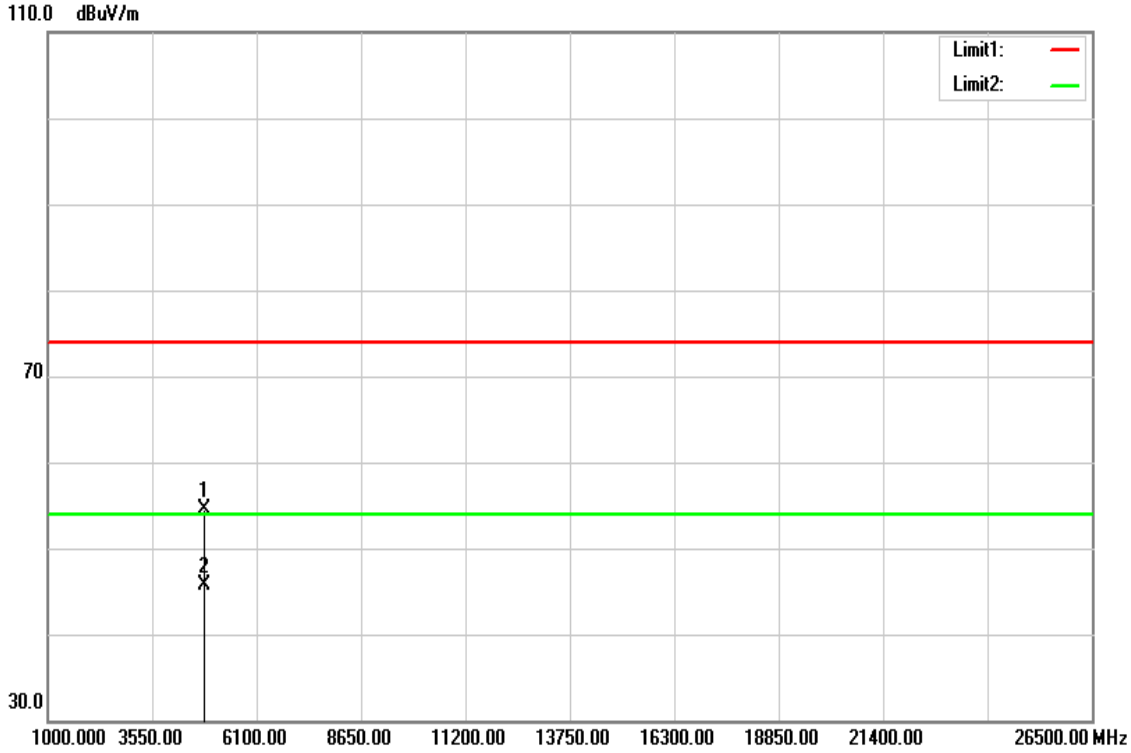
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4827.000	44.87	4.38	49.25	74.00	-24.75	peak
N/A						

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*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Test Mode	IEEE 802.11n HT20 Low CH	Temp/Hum	24(℃)/ 33%RH
Test Item	Harmonic	Test Date	November 29, 2017
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz



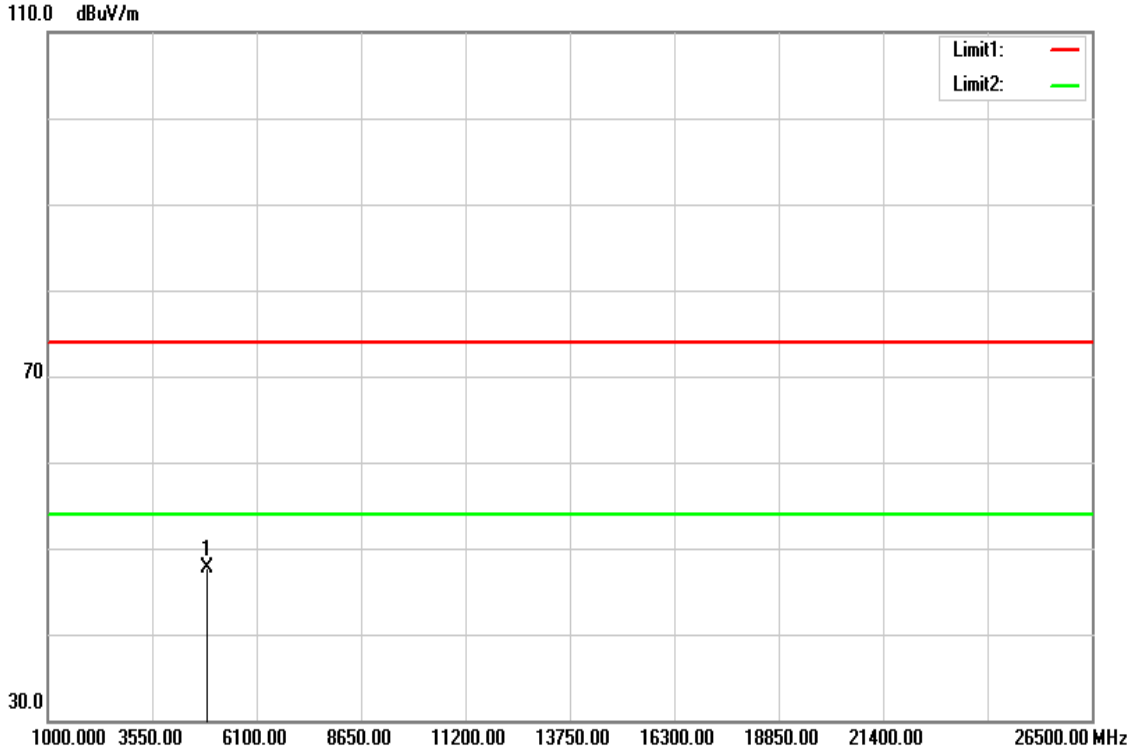
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4820.000	50.22	4.36	54.58	74.00	-19.42	peak
4820.000	41.31	4.36	45.67	54.00	-8.33	AVG
N/A						

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*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Test Mode	IEEE 802.11n HT20 Mid CH	Temp/Hum	24(℃)/ 33%RH
Test Item	Harmonic	Test Date	November 29, 2017
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz



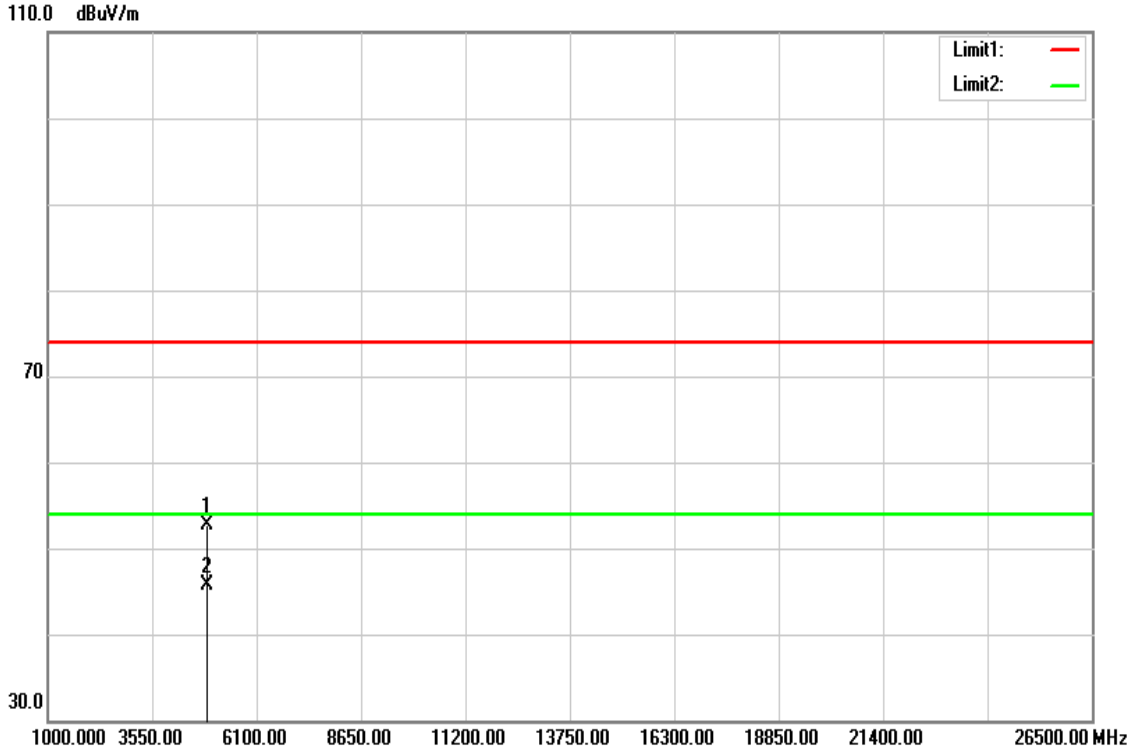
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4876.000	43.27	4.47	47.74	74.00	-26.26	peak
N/A						

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*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Test Mode	IEEE 802.11n HT20 Mid CH	Temp/Hum	24(℃)/ 33%RH
Test Item	Harmonic	Test Date	November 29, 2017
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz



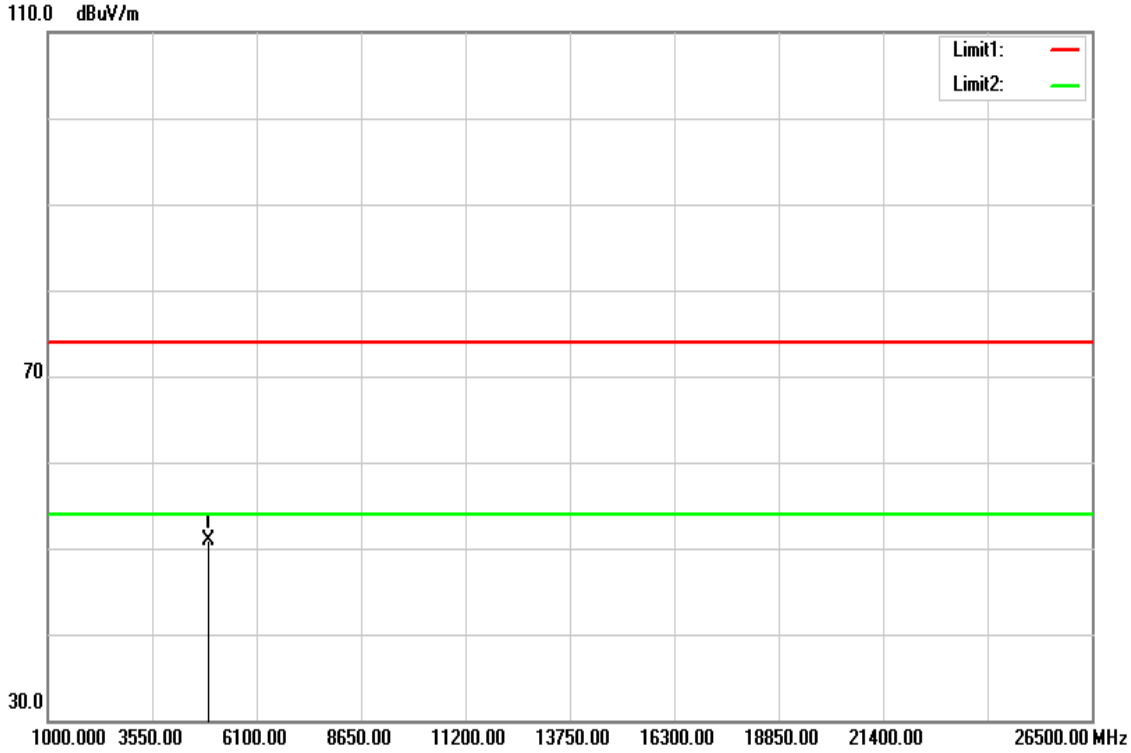
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4876.000	48.19	4.47	52.66	74.00	-21.34	peak
4876.000	41.21	4.47	45.68	54.00	-8.32	AVG
N/A						

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*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Test Mode	IEEE 802.11n HT20 High CH	Temp/Hum	24(℃)/ 33%RH
Test Item	Harmonic	Test Date	November 29, 2017
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz



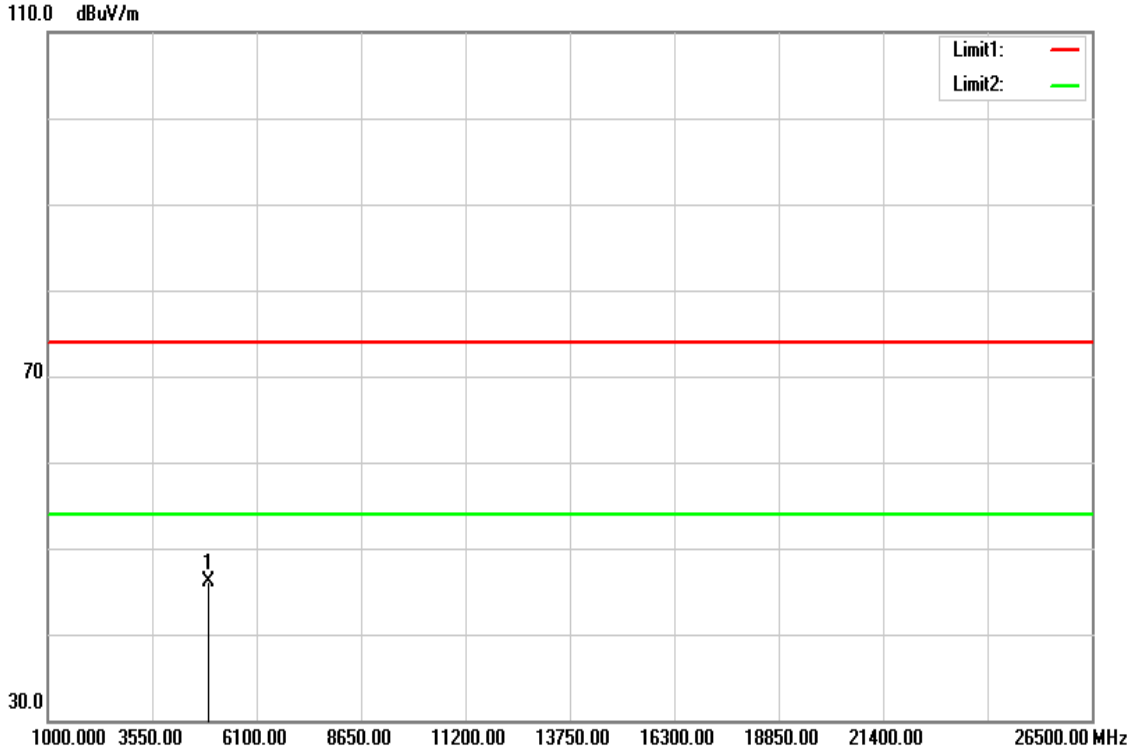
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4925.000	46.33	4.55	50.88	74.00	-23.12	peak
N/A						

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*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Test Mode	IEEE 802.11n HT20 High CH	Temp/Hum	24(℃)/ 33%RH
Test Item	Harmonic	Test Date	November 29, 2017
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz



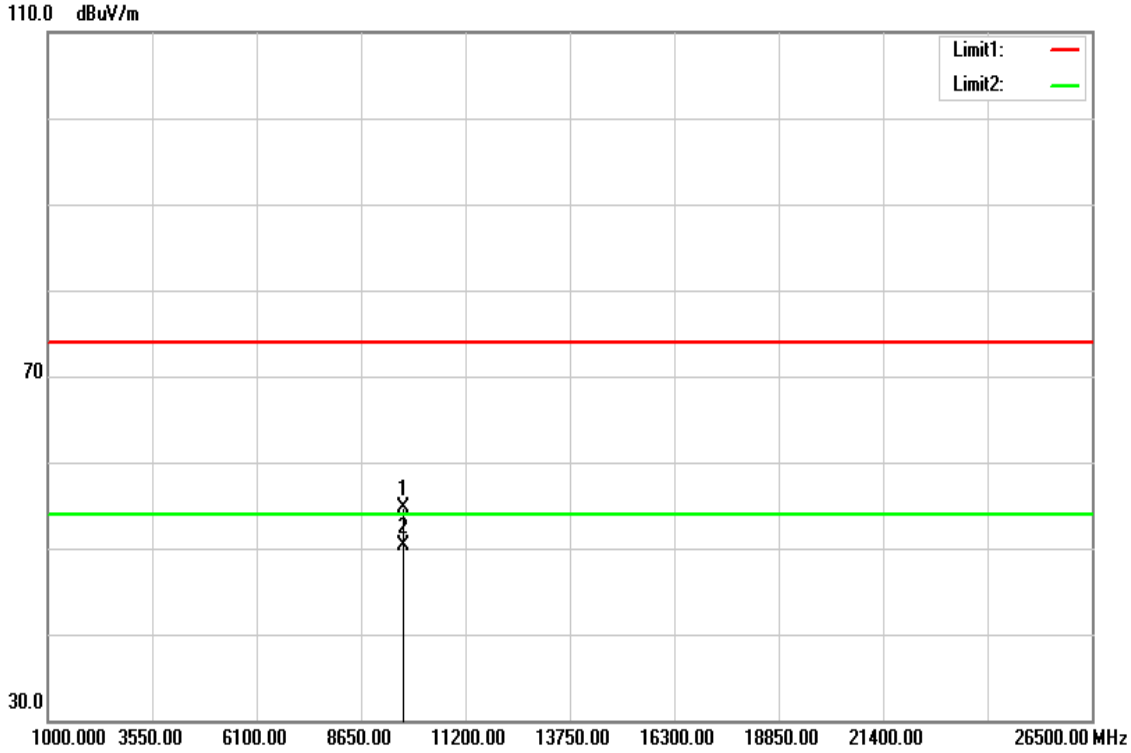
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4925.000	41.64	4.55	46.19	74.00	-27.81	peak
N/A						

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*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Test Mode	IEEE 802.11n HT40 Low CH	Temp/Hum	24(℃)/ 33%RH
Test Item	Harmonic	Test Date	November 29, 2017
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz



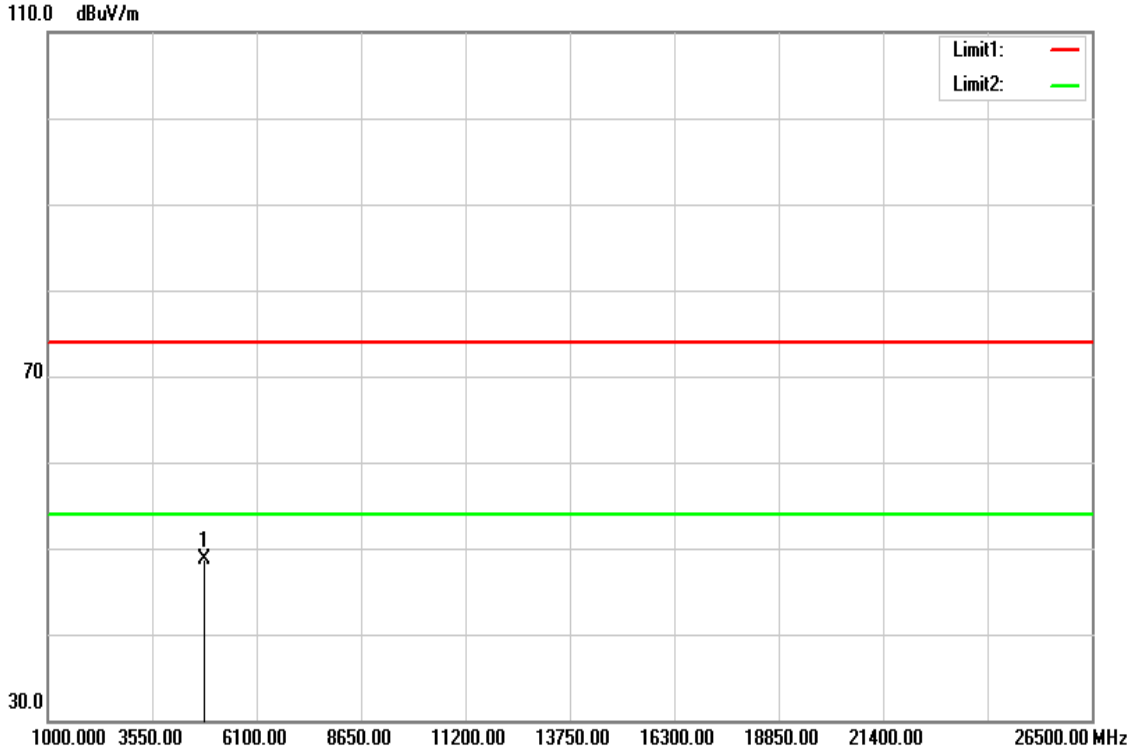
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
9685.000	41.69	13.07	54.76	74.00	-19.24	peak
9685.000	37.33	13.07	50.40	54.00	-3.60	AVG
N/A						

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*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Test Mode	IEEE 802.11n HT40 Low CH	Temp/Hum	24(℃)/ 33%RH
Test Item	Harmonic	Test Date	November 29, 2017
Polarize	Horizontal	Test Engineer	Jerry Chuang
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	44.38	4.41	48.79	74.00	-25.21	peak
N/A						

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*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Test Mode	IEEE 802.11n HT40 Mid CH	Temp/Hum	24(℃)/ 33%RH
Test Item	Harmonic	Test Date	November 29, 2017
Polarize	Vertical	Test Engineer	Jerry Chuang
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
9784.000	39.81	13.12	52.93	74.00	-21.07	peak
9784.000	38.88	13.12	52.00	54.00	-2.00	AVG
N/A						

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*

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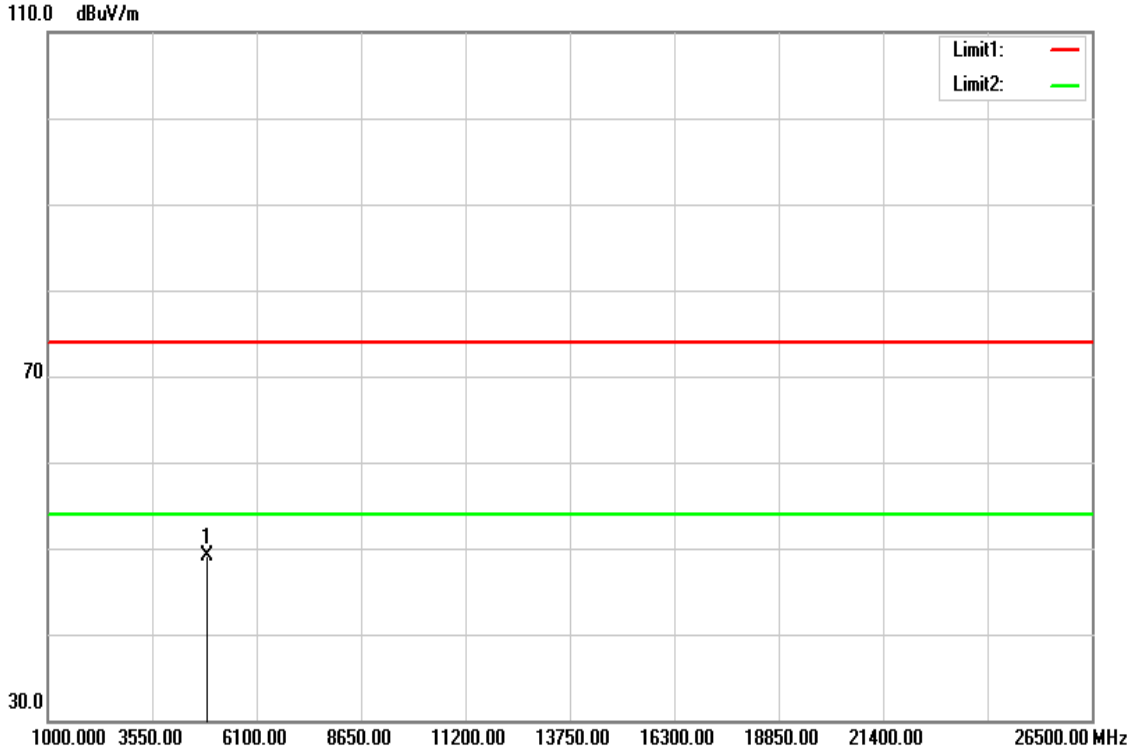
Test Mode	IEEE 802.11n HT40 Mid CH	Temp/Hum	24(℃)/ 33%RH
Test Item	Harmonic	Test Date	November 29, 2017
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4876.000	44.70	4.47	49.17	74.00	-24.83	peak
N/A						

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*

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Test Mode	IEEE 802.11n HT40 High CH	Temp/Hum	24(℃)/ 33%RH
Test Item	Harmonic	Test Date	November 29, 2017
Polarize	Vertical	Test Engineer	Jerry Chuang
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
9811.000	40.59	13.13	53.72	74.00	-20.28	peak
9811.000	38.47	13.13	51.60	54.00	-2.40	AVG
N/A						

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*

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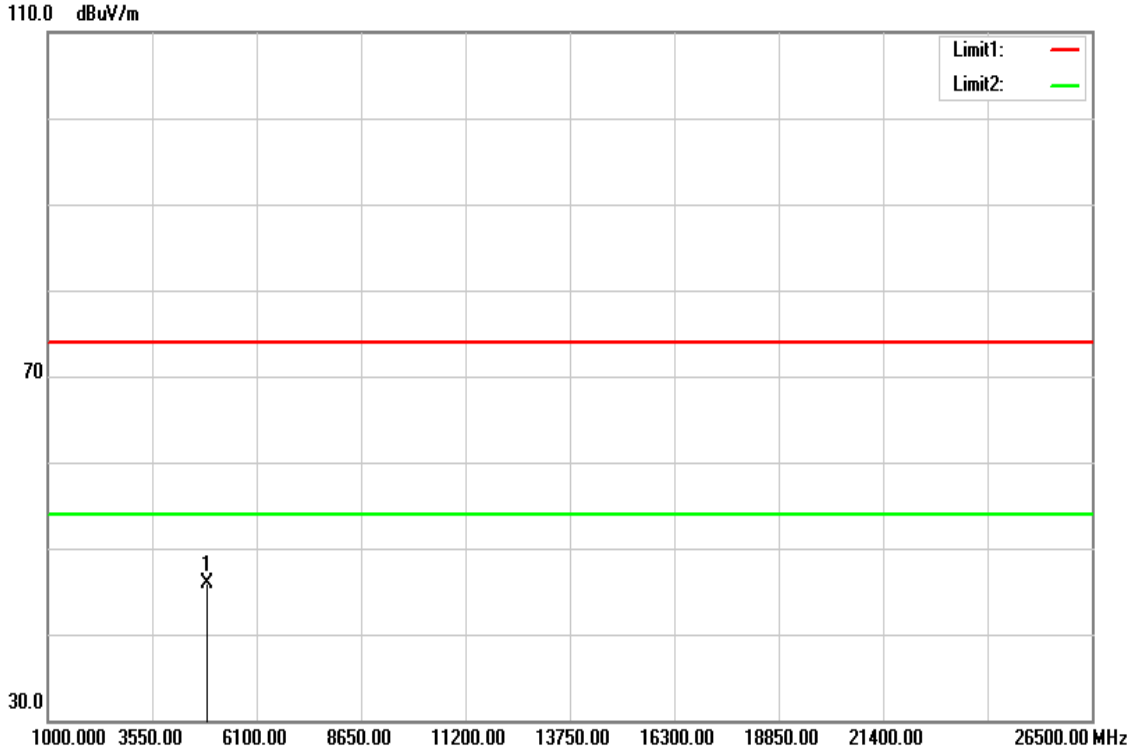
Test Mode	IEEE 802.11n HT40 High CH	Temp/Hum	24(℃)/ 33%RH
Test Item	Harmonic	Test Date	November 29, 2017
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak and Average	Test Voltage	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4904.000	41.41	4.51	45.92	74.00	-28.08	peak
N/A						

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*

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