TEST REPORT

Reference No.	:	WTS16S0960401-2E V1
FCC ID	:	2AIE9-K4008
Applicant	:	Shenzhen Hongkaijiawei Technology Co., Ltd
Address	:	Room 7c, Block A, Hongsong Building, Tairan six road, Chegongmiao, Futian District, Shenzhen, China
Manufacturer	:	Shenzhen Hongkaijiawei Technology Co., Ltd
Address	:	11/F, Block3, Jincheng Industrial Park, Longhua new district, Shenzhen, Guangdong, China
Product Name	:	3G smart phone
Model No.	:	K4008, Ojji Maxx
Brand	:	Ojji
Standards	:	FCC CFR47 Part 15.247:2015
Date of Receipt sample	:	Sep. 09, 2016
Date of Test	:	Sep. 12 – Oct. 20, 2016
Date of Issue	:	Oct. 29, 2016
Test Result	:	**Pass**

Remarks:
The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

Prepared By:
Waltek Services (Shenzhen) Co., Ltd.
Address: 1/F., Fukangtai Building, West Baima Road, Songgang Street, Baoan District, Shenzhen, Guangdong, China
Tel :+86-755-83551033
Fax:+86-755-83552400

Compiled by:

Zero Zhou / Test Engineer

Approved by:

Philo Zhong / Manager

2 Test Summary

Test Items	Test Requirement	Result
Radiated Spurious Emissions	15.247(d) 15.205(a) 15.209(a)	PASS
Conducted Spurious Emissions	15.247(d)	PASS
Conducted Emissions	15.207(a)	PASS
6dB Bandwidth	15.247(a)(2)	PASS
Maximum Peak Output Power	15.247(b)(3),(4)	PASS
Power Spectral Density	15.247(e)	PASS
Band Edge	15.247(d)	PASS
Antenna Requirement	15.203	PASS
Maximum Permissible Exposure (Exposure of Humans to RF Fields)	1.1307(b)(1)	PASS

3 Contents

Page

1 COVER PAGE 1
2 TEST SUMMARY 2
3 CONTENTS 3
4 REPORT REVISION HISTORY 5
5 GENERAL INFORMATION 6
5.1 GENERAL DESCRIPTION OF E.U.T. 6
5.2 DETAILS OF E.U.T. 6
5.3 CHANNEL LIST 7
5.4 TEST MODE 8
5.5 TEST FACILITY 8
6 EQUIPMENT USED DURING TEST 9
6.1 EQUIPMENTS LIST 9
6.2 DESCRIPTION OF SUPPORT UNITS 10
6.3 MEASUREMENT UNCERTAINTY 10
6.4 TEST EQUIPMENT CALIBRATION 10
7 CONDUCTED EMISSION 11
7.1 E.U.T. OPERATION 11
7.2 EUT SETUP 11
7.3 MEASUREMENT DESCRIPTION 11
7.4 CONDUCTED EMISSION TEST RESULT 12
8 RADIATED EMISSIONS 14
8.1 EUT OPERATION 14
8.2 TEST SETUP 15
8.3 SPECTRUM ANALYZER SETUP 16
8.4 TEST PROCEDURE 17
8.5 CORRECTED AMPLITUDE & MARGIN CALCULATION 17
8.6 SUMMARY OF TEST RESULTS 18
9 CONDUCTED SPURIOUS EMISSIONS 23
9.1 TEST PROCEDURE 23
9.2 TEST RESULT 24
10 BAND EDGE MEASUREMENT 34
10.1 TEST PRODUCE 34
10.2 TEST RESULT 35
11 6 DB BANDWIDTH MEASUREMENT 44
11.1 TEST PROCEDURE: 44
11.2 TEST RESULT: 44
12 MAXIMUM PEAK OUTPUT POWER 50
12.1 TEST PROCEDURE: 50
12.2 TEST RESULT: 51
13 POWER SPECTRAL DENSITY 57
13.1 TEST PROCEDURE: 57
13.2 TEST RESULT: 57
14 ANTENNA REQUIREMENT 63

15 RF EXPOSURE..... 64

4 Report Revision History

Report No.	Report Version	Description	Issue Date
WTS16S0960401-2E	NONE	Original	Oct. 21, 2016
WTS16S0960401-2E	V1	Version 1	Oct. 29, 2016

5 General Information

5.1 General Description of E.U.T.

Product Name	: 3G smart phone
Model No.	: K4008, Ojji Maxx
Model Description	: Only different for model names
GSM Band(s)	: GSM 850/900/1800/1900MHz
GPRS Class	: 12
WCDMA Band(s)	: FDD Band II/V
LTE Band(s)	:N/A
Wi-Fi Specification	: 2.4G: 802.11b/g/n HT20
Bluetooth Version	: Bluetooth v3.0+EDR
GPS	: Support
NFC	: N/A
Hardware Version	:C4_V1.2
Software Version	: TC4_T991_V01_20160727
Storage Location	: Internal Storage

5.2 Details of E.U.T.

Operation Frequency	: GSM/GPRS 850: 824~849MHz PCS/GPRS 1900: 1850~1910MHz WCDMA Band II: 1850~1910MHz WCDMA Band V: 824~849MHz WiFi: 802.11b/g/n HT20: 2412~2462MHz Bluetooth: 2402~2480MHz
Max. RF output power	: GSM 850: 33.0dBm PCS1900: 30.02dBm WCDMA Band II: 22.46dBm WCDMA Band V: 22.23dBm WiFi(2.4G): 9.43dBm Bluetooth: 8.85dBm
Type of Modulation	: GSM,GPRS: GMSK WCDMA: BPSK WiFi: CCK, OFDM Bluetooth: GFSK, Pi/4 DQPSK, 8DPSK
Antenna installation	: GSM/WCDMA: internal permanent antenna WiFi/Bluetooth: internal permanent antenna
Antenna Gain	: GSM 850: -1.1dBi PCS1900: -1.0dBi

WCDMA Band II: -1.0dBi
WCDMA Band V: -1.1dBi
WiFi(2.4G): -0.7dBi
Bluetooth: -0.7dBi

Technical Data : Battery DC 3.7V, 1300mAh
DC 5V, 0.6A, charging from adapter
(Adapter Input: 100-240V~50/60Hz)

Adapter : Manufacture: SHENZHEN CHANGSHENG GAONENG ELECTRONIC CO.,LTD
Model No.: CSGN-PT001

5.3 Channel List

WIFI

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	2412	2	2417	3	2422	4	2427
5	2432	6	2437	7	2442	8	2447
9	2452	10	2457	11	2462	12	-

5.4 Test Mode

Table 1 Tests Carried Out Under FCC part 15.247

Test Items	Mode	Data Rate	Channel	TX/RX
Maximum Peak Output Power	802.11b	11 Mbps	1/6/11	TX
	802.11g	54 Mbps	1/6/11	TX
	802.11n HT20	108 Mbps	1/6/11	TX
Power Spectral Density	802.11b	11 Mbps	1/6/11	TX
	802.11g	54 Mbps	1/6/11	TX
	802.11n HT20	108 Mbps	1/6/11	TX
6dB Bandwidth	802.11b	11 Mbps	1/6/11	TX
	802.11g	54 Mbps	1/6/11	TX
	802.11n HT20	108 Mbps	1/6/11	TX
Band Edge	802.11b	11 Mbps	1/6/11	TX
	802.11g	54 Mbps	1/6/11	TX
	802.11n HT20	108 Mbps	1/6/11	TX
Transmitter Spurious Emissions	802.11b	11 Mbps	1/6/11	TX
	802.11g	54 Mbps	1/6/11	TX
	802.11n HT20	108 Mbps	1/6/11	TX

Note :Parameters set by test software during channel & power tests, the software provided by the customer was used to set the operating channels as well as the output power level. The RF output power set is the power expected by the manufacturer and is going to be fixed on the firmware of the final product .

5.5 Test Facility

The test facility has a test site registered with the following organizations:

- **IC – Registration No.: 7760A**

  Waltek Services(Shenzhen) Co., Ltd. Has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration number 7760A, October 15, 2015.

- **FCC Test Site 1#– Registration No.: 880581**

  Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory `has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 880581, April 29, 2014.

- **FCC Test Site 2#– Registration No.: 328995**

  Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory `has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 328995, December 3, 2014.

6 Equipment Used during Test

6.1 Equipments List

Conducted Emissions at Mains Terminals Disturbance Voltage						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1.	EMI Test Receiver	R&S	ESCI	101155	Apr.18,2016	Apr.17,2017
2.	LISN	SCHWARZBECK	NSLK 8128	8128-289	Apr.18,2016	Apr.17,2017
3.	Limiter	York	MTS-IMP-136	261115-001-0024	Apr.18,2016	Apr.17,2017
4.	Cable	LARGE	RF300	-	Apr.18,2016	Apr.17,2017
3m Semi-anechoic Chamber for Radiation						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1	EMC Analyzer	Agilent	E7405A	MY45114943	Apr.18,2016	Apr.17,2017
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	Apr.18,2016	Apr.17,2017
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	Apr.18,2016	Apr.17,2017
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	Apr.18,2016	Apr.17,2017
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	Apr.18,2016	Apr.17,2017
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	669	Apr.18,2016	Apr.17,2017
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	Mar.17,2016	Mar.16,2017
8	Coaxial Cable (above 1GHz)	Top	1000MHz-25GHz	EW02014-7	Apr.09,2016	Apr.08,2017
9	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	Apr.18,2016	Apr.17,2017
10	Universal Radio Communication Tester	R&S	CMU 200	112461	Apr.10,2016	Apr.09,2017
11	Signal Generator	R&S	SMR20	100046	Apr.10,2016	Apr.09,2017
RF Conducted Testing						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1.	EMC Analyzer (9k~26.5GHz)	Agilent	E7405A	MY45114943	Apr.18,2016	Apr.17,2017
2.	Spectrum Analyzer (9k-6GHz)	R&S	FSL6	100959	Apr.18,2016	Apr.17,2017
3.	Humidity Chamber	GF	GTH-225-40-1P	IAA061213	Apr.18,2016	Apr.17,2017

6.2 Description of Support Units

Equipment	Manufacturer	Model No.	Series No.
/	/	/	/

6.3 Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	± 1 x 10^{-6}
RF Power	± 1.0 dB
RF Power Density	± 2.2 dB
Radiated Spurious Emissions test	± 5.03 dB (30M~1000MHz)
	± 5.47 dB (1000M~25000MHz)
Conducted Spurious Emissions test	± 3.64 dB (AC mains 150KHz~30MHz)

6.4 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

7 Conducted Emission

Test Requirement:	FCC CFR 47 Part 15 Section 15.207
Test Method:	ANSI C63.10:2013
Test Result:	PASS
Frequency Range:	150kHz to 30MHz
Class/Severity:	Class B
Limit:	66-56 dBμV between 0.15MHz & 0.5MHz
	56 dBμV between 0.5MHz & 5MHz
	60 dBμV between 5MHz & 30MHz
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth)

7.1 E.U.T. Operation

Operating Environment **:**

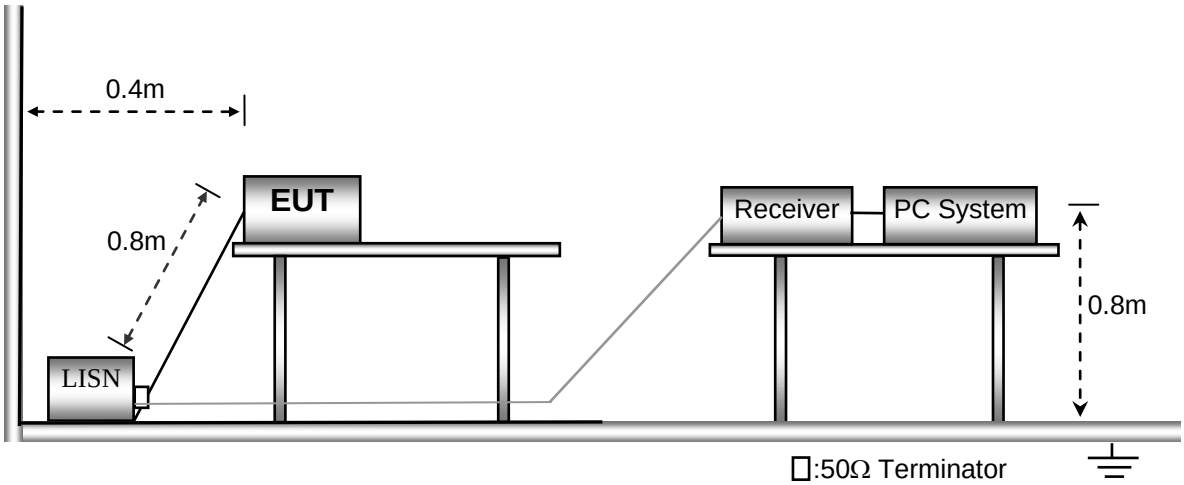
Temperature:	21.5 °C
Humidity:	51.9 % RH
Atmospheric Pressure:	101.2kPa

EUT Operation **:**

The test was performed in WIFI link mode, the worst data were shown in the report.

7.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10.



7.3 Measurement Description

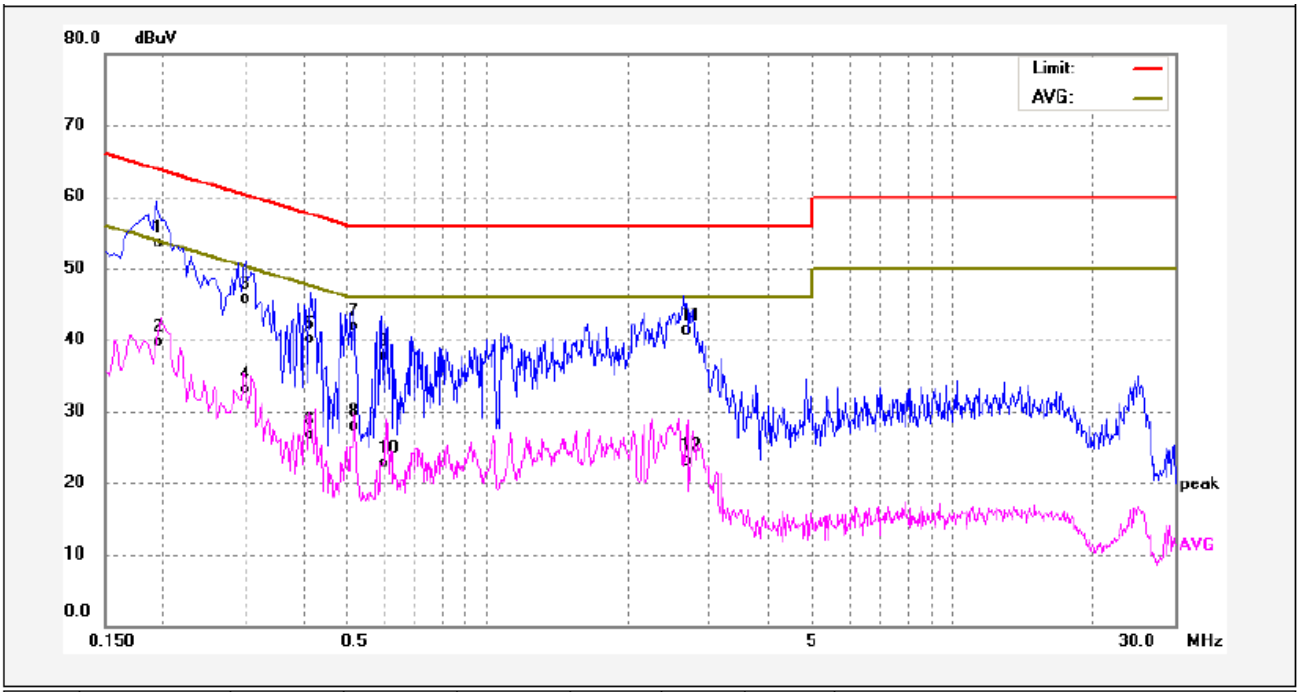
The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

7.4 Conducted Emission Test Result

An initial pre-scan was performed on the live and neutral lines.

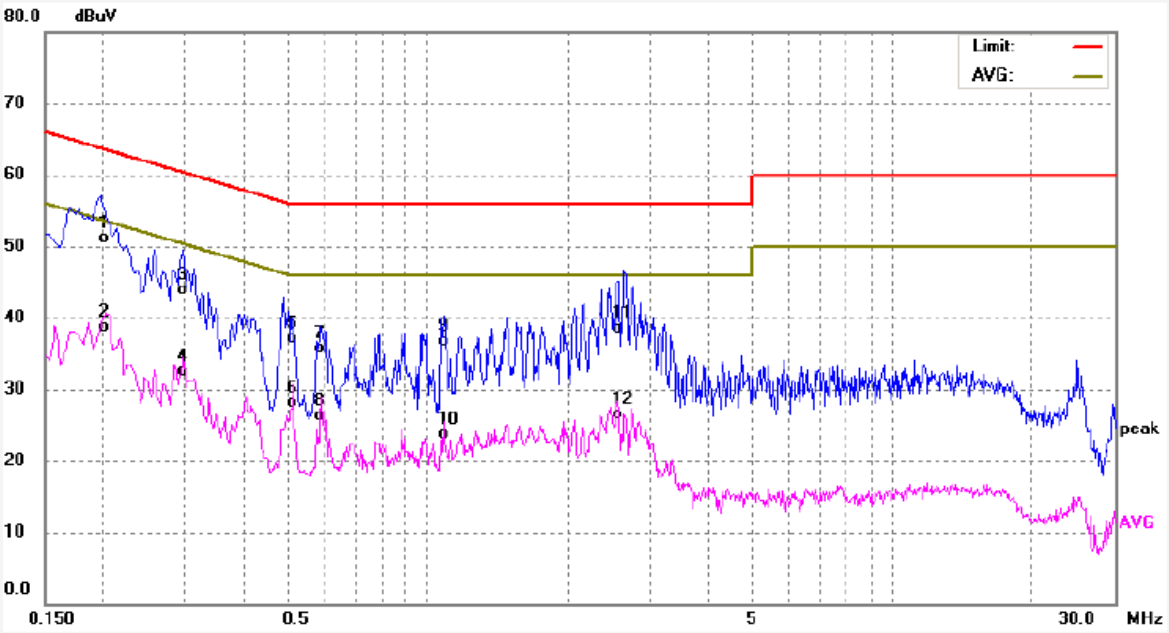
Worst Mode: WIFI mode

Live line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1940	43.16	10.26	53.42	63.86	-10.44	QP	
2	0.1940	29.35	10.26	39.61	53.86	-14.25	AVG	
3	0.3020	35.47	10.28	45.75	60.19	-14.44	QP	
4	0.3020	22.83	10.28	33.11	50.19	-17.08	AVG	
5	0.4180	29.93	10.27	40.20	57.49	-17.29	QP	
6	0.4180	16.48	10.27	26.75	47.49	-20.74	AVG	
7	0.5180	31.66	10.26	41.92	56.00	-14.08	QP	
8	0.5180	17.67	10.26	27.93	46.00	-18.07	AVG	
9	0.5899	27.31	10.30	37.61	56.00	-18.39	QP	
10	0.5899	12.34	10.30	22.64	46.00	-23.36	AVG	
11	2.6500	30.91	10.49	41.40	56.00	-14.60	QP	
12	2.6500	12.54	10.49	23.03	46.00	-22.97	AVG	

Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.2020	40.84	10.26	51.10	63.52	-12.42	QP	
2	0.2020	28.36	10.26	38.62	53.52	-14.90	AVG	
3	0.2980	33.58	10.28	43.86	60.30	-16.44	QP	
4	0.2980	22.26	10.28	32.54	50.30	-17.76	AVG	
5	0.5140	26.81	10.26	37.07	56.00	-18.93	QP	
6	0.5140	17.76	10.26	28.02	46.00	-17.98	AVG	
7	0.5899	25.33	10.30	35.63	56.00	-20.37	QP	
8	0.5899	15.93	10.30	26.23	46.00	-19.77	AVG	
9	1.0780	26.37	10.40	36.77	56.00	-19.23	QP	
10	1.0780	13.33	10.40	23.73	46.00	-22.27	AVG	
11	2.5620	28.04	10.48	38.52	56.00	-17.48	QP	
12	2.5620	16.12	10.48	26.60	46.00	-19.40	AVG	

8 Radiated Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.247

Test Method: ANSI C63.10:2013

Test Result: PASS

Measurement Distance: 3m

Limit:

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	$20\log^{(2400/F(kHz))} + 80$
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	$20\log^{(24000/F(kHz))} + 40$
1.705 ~ 30	30	30	100 * 30	$20\log^{(30)} + 40$
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

8.1 EUT Operation

Operating Environment **:**

Temperature: 23.5 °C

Humidity: 52.1 % RH

Atmospheric Pressure: 101.2kPa

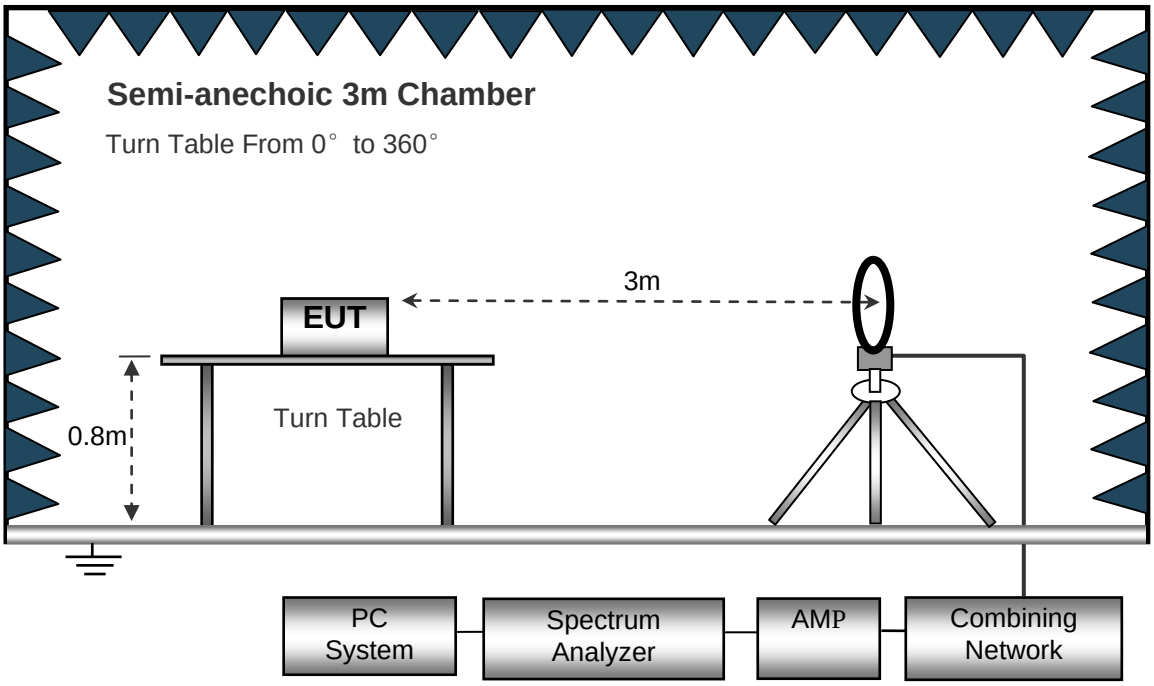
EUT Operation **:**

The test was performed in WIFI link mode, the test data were shown in the report.

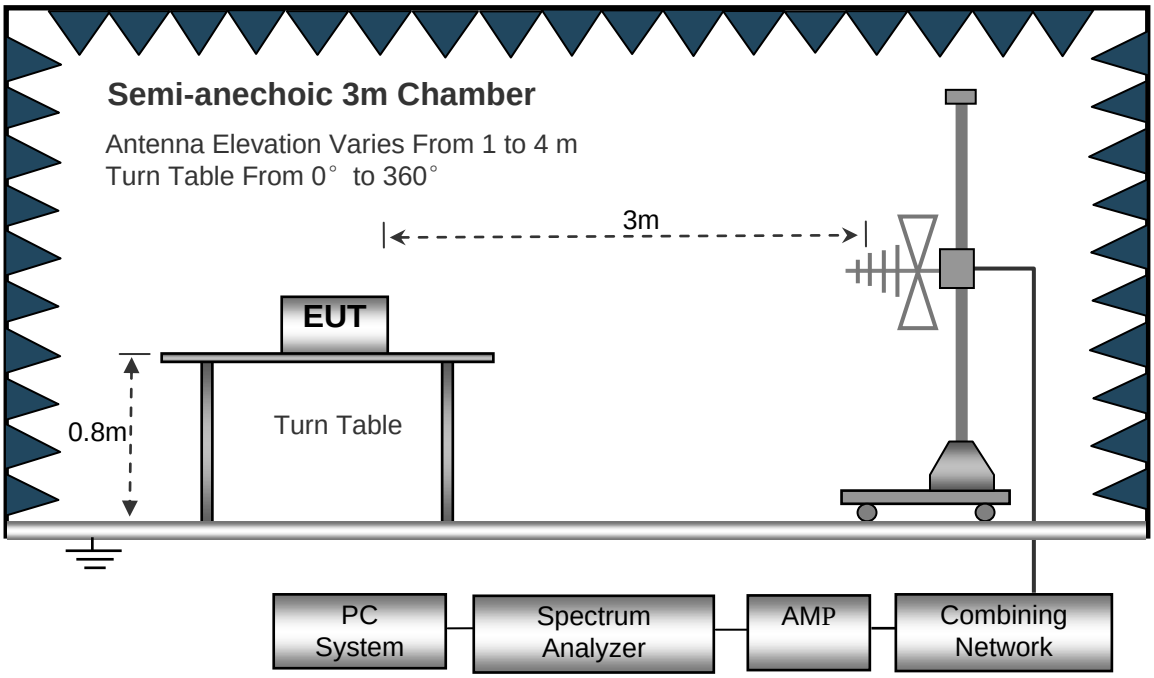
8.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.10.

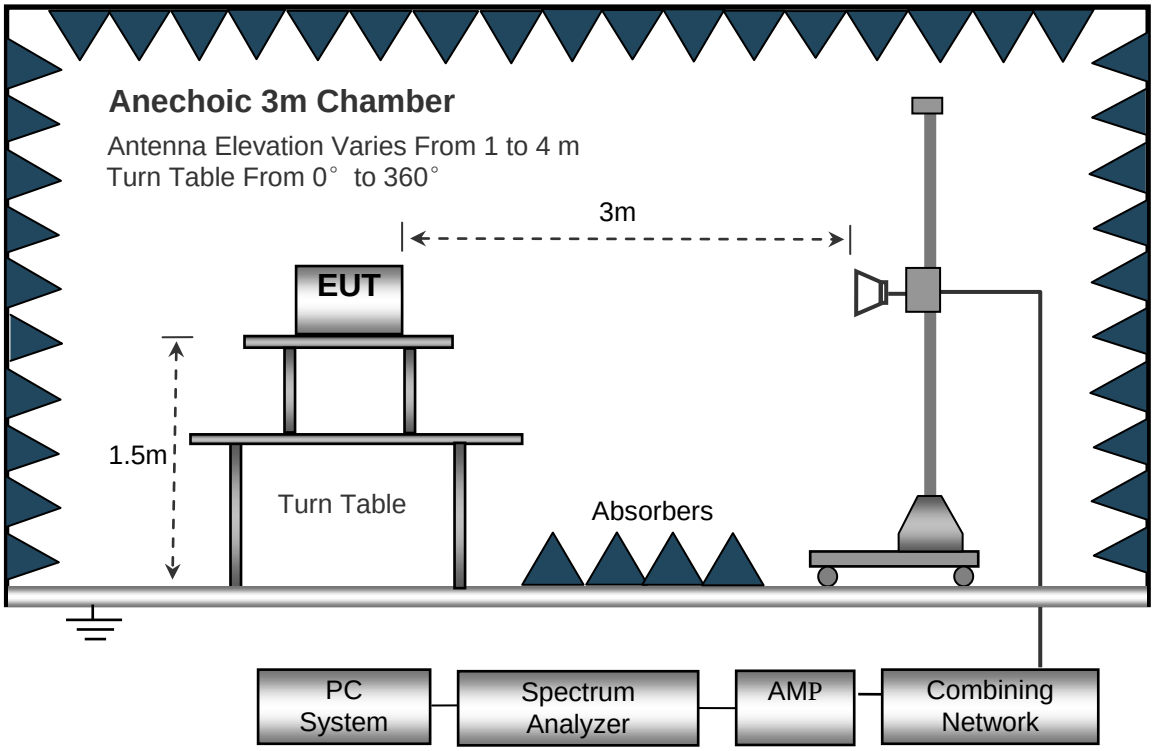
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.



8.3 Spectrum Analyzer Setup

Below 30MHz

Sweep Speed ..... Auto
IF Bandwidth..... 10kHz
Video Bandwidth..... 10kHz
Resolution Bandwidth..... 10kHz

30MHz ~ 1GHz

Sweep Speed ..... Auto
Detector ..... PK
Resolution Bandwidth..... 100kHz
Video Bandwidth..... 300kHz

Above 1GHz

Sweep Speed ..... Auto
Detector ..... PK
Resolution Bandwidth..... 1MHz
Video Bandwidth..... 3MHz
Detector ..... Ave.
Resolution Bandwidth..... 1MHz
Video Bandwidth..... 10Hz

8.4 Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane for below 1GHz and 1.5m for above 1GHz.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are performed in X,Y and Z axis positioning(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand),the worst condition was tested putting the eut in Z axis,so the worst data were shown as follow.
8. A 2.4GHz high –pass filter is used druing radiated emissions above 1GHz measurement.

8.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – Limit

8.6 Summary of Test Results

Wifi:
Test Frequency: 9KHz~30MHz

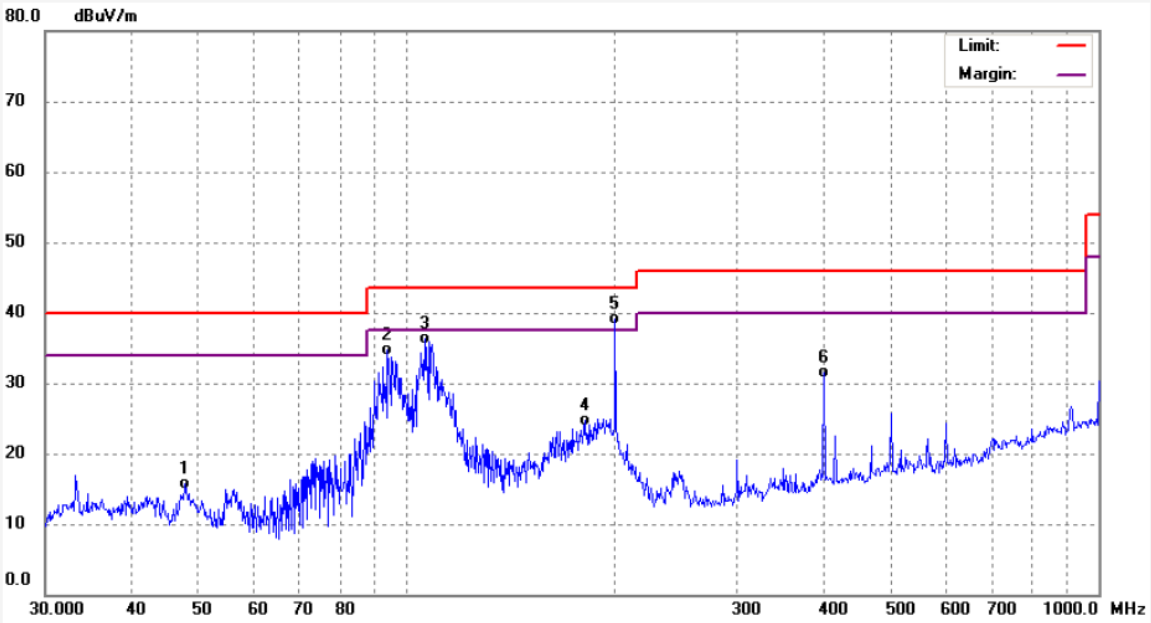
Remark: only the worst data (802.11g middle CH mode) were reported

Frequency	Measurement results dBμV @3m	Detector PK/QP	Correct factor dB/m	Extrapolation factor dB	Measurement results (calculated) dBμV/m @30m	Limits dBμV/m @30m	Margin dB
(MHz)	Measurement results	Detector	Correct factor	Extrapolation factor	Measurement results (calculated)	Limits	Margin
802.11g							
6.125	25.63	QP	21.84	40.00	7.47	29.54	-22.07
8.316	24.75	QP	21.02	40.00	5.77	29.54	-23.77
26.580	26.42	QP	20.55	40.00	6.97	29.54	-22.57

Test Frequency : 30MHz ~ 1GHz

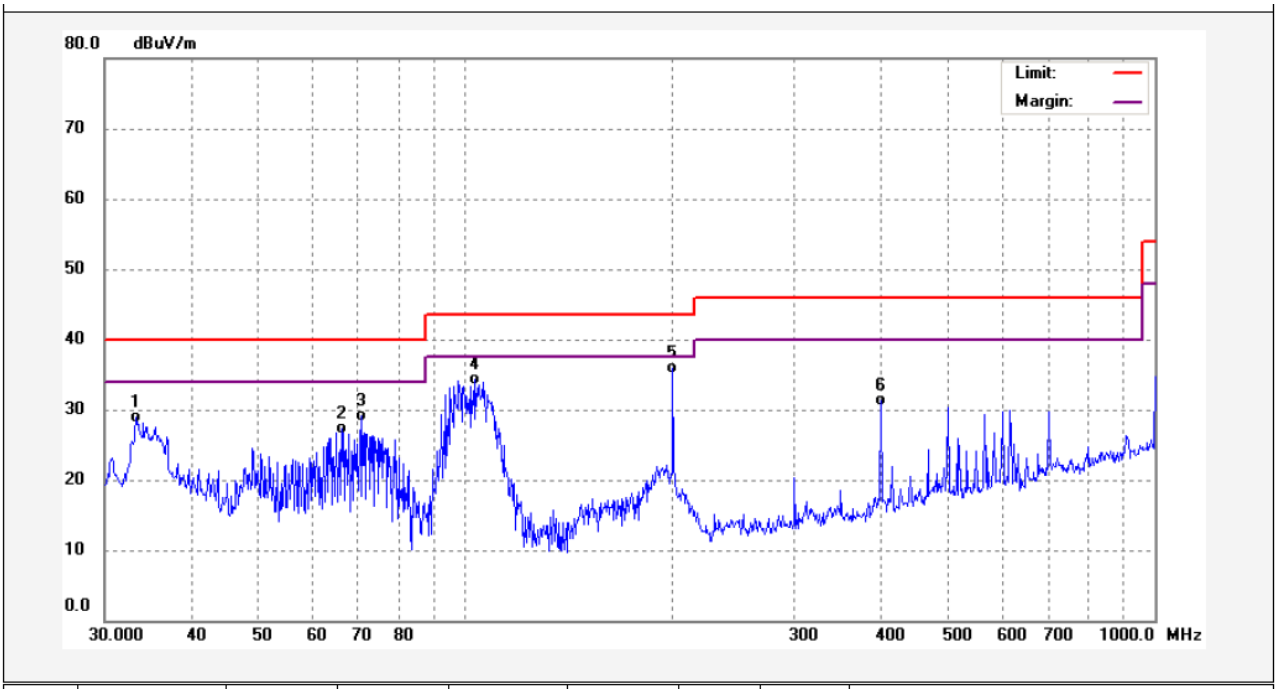
Remark: only the worst data (802.11b mode Low Channel) were reported

Low Channel – Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	47.8260	32.08	-16.40	15.68	40.00	-24.32	QP	
2	93.7685	52.80	-18.07	34.73	43.50	-8.77	QP	
3	106.0126	53.85	-17.52	36.33	43.50	-7.17	QP	
4	180.6488	43.25	-18.53	24.72	43.50	-18.78	QP	
5	199.9856	56.90	-17.76	39.14	43.50	-4.36	QP	
6	400.4319	43.65	-12.11	31.54	46.00	-14.46	QP	

Low Channel – Vertical

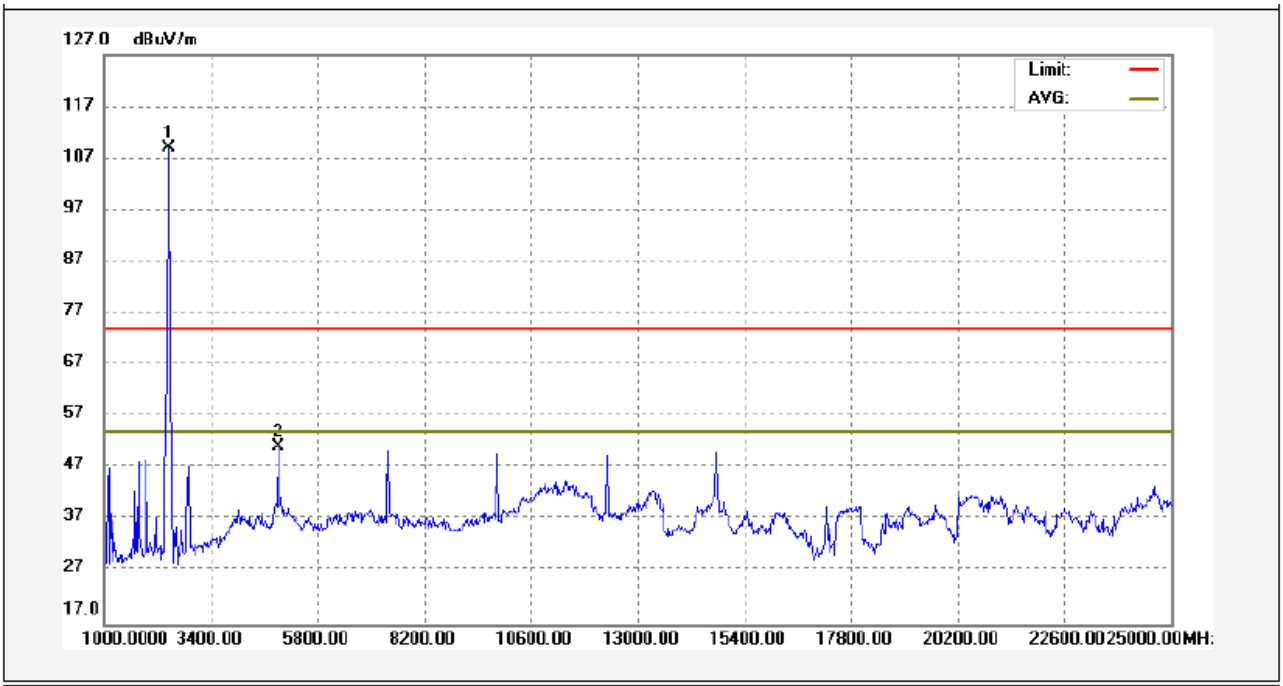


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	33.3279	45.16	-16.33	28.83	40.00	-11.17	QP	
2	66.2662	46.94	-19.58	27.36	40.00	-12.64	QP	
3	70.5836	49.31	-20.21	29.10	40.00	-10.90	QP	
4	103.4421	51.99	-17.77	34.22	43.50	-9.28	QP	
5	199.9856	53.60	-17.76	35.84	43.50	-7.66	QP	
6	400.4319	43.48	-12.11	31.37	46.00	-14.63	QP	

Test Frequency : Above 1GHz

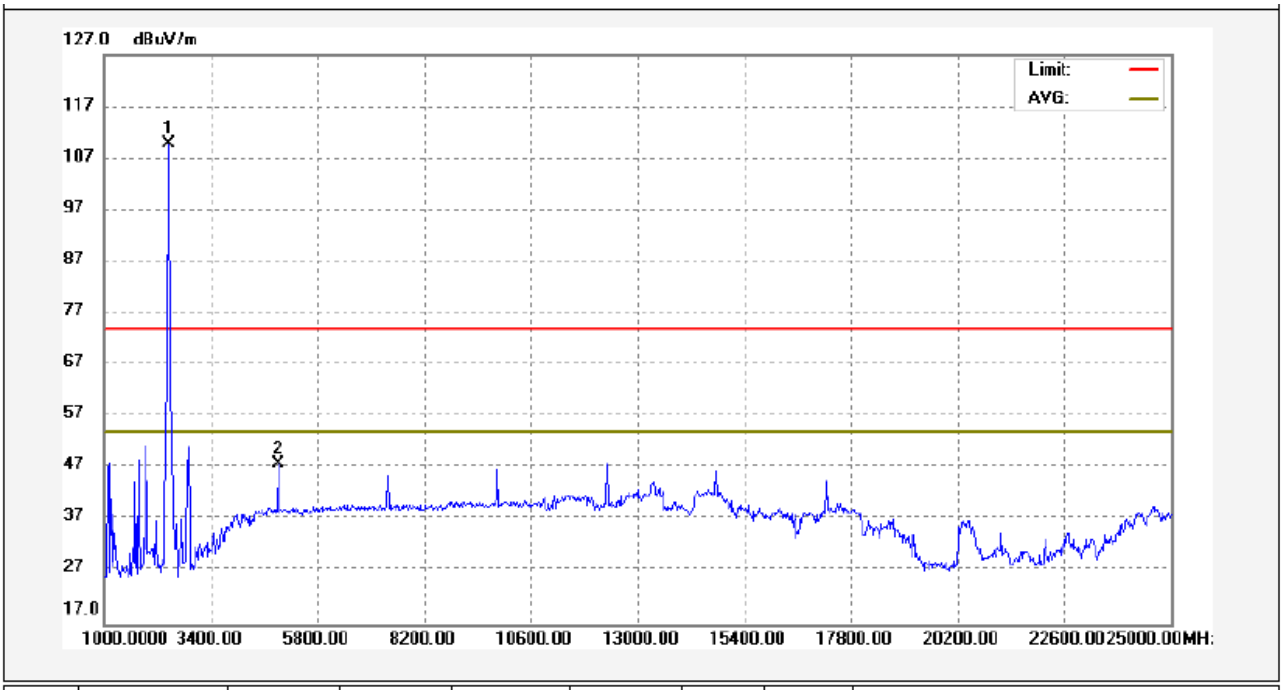
Remark: only the worst data (802.11b mode Middle Channel) were reported

Middle Channel – Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2439.100	124.36	-15.30	109.06				
2	4912.000	52.87	-1.55	51.32	74.00	-22.68	peak	

Middle Channel – Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2439.100	125.25	-15.30	109.95				
2	4912.000	49.39	-1.55	47.84	74.00	-26.16	peak	

Test Frequency: 18GHz~25GHz

The measurements were more than 20 dB below the limit and not reported.

9 Conducted Spurious Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB 558074 D01 DTS Meas Guidance v03r05 April 8, 2016

Test Result: PASS

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

9.1 Test Procedure

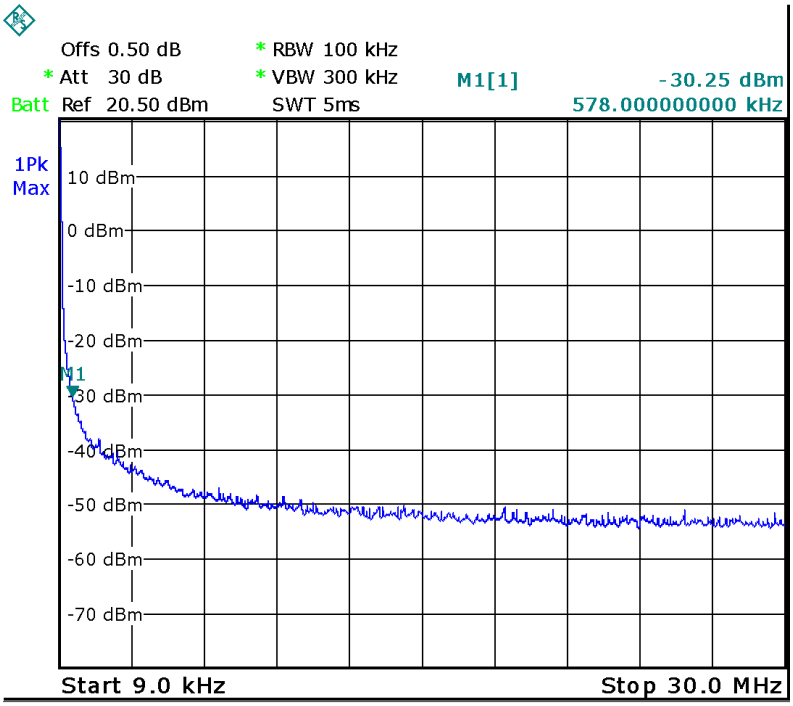
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer:
   RBW = 100kHz, VBW = 300kHz, Sweep = auto
   Detector function = peak, Trace = max hold

9.2 Test Result

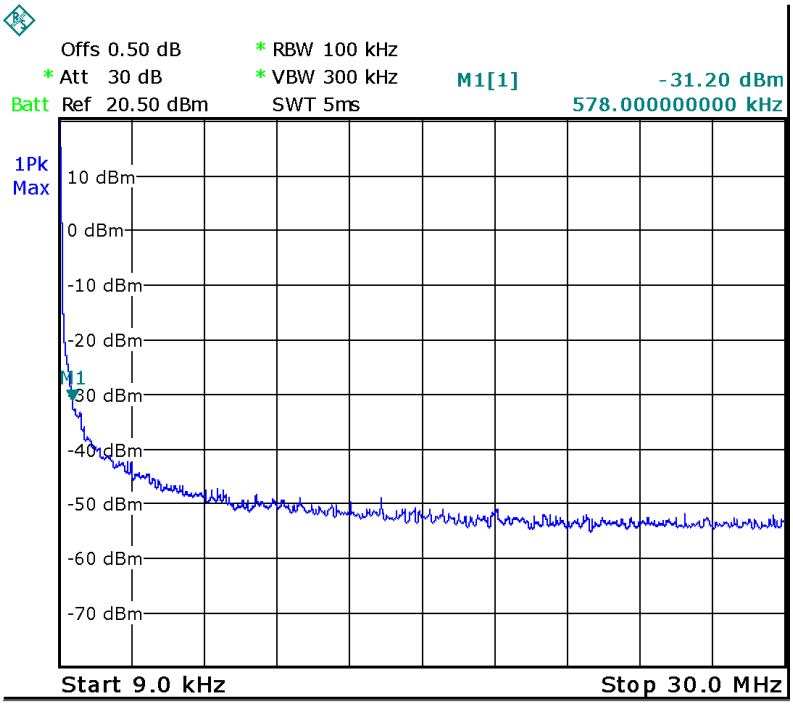
9KHz – 30MHz

802.11b

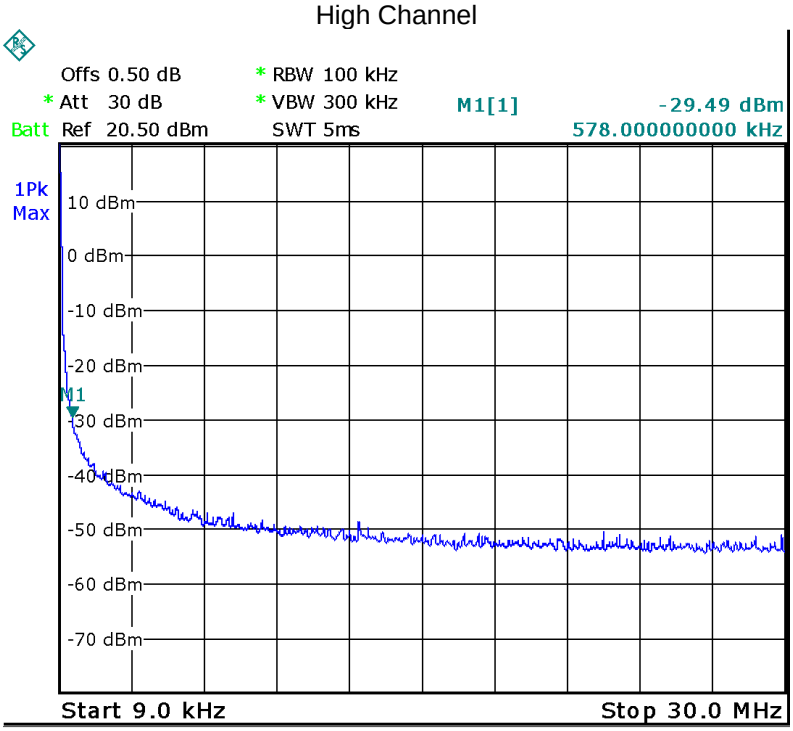
Low Channel



Middle Channel

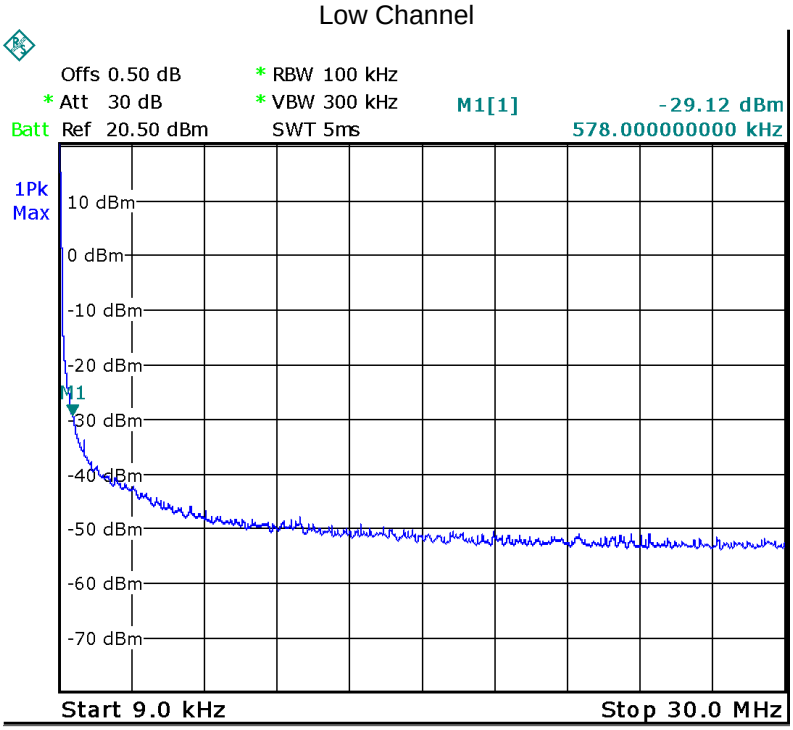


High Channel

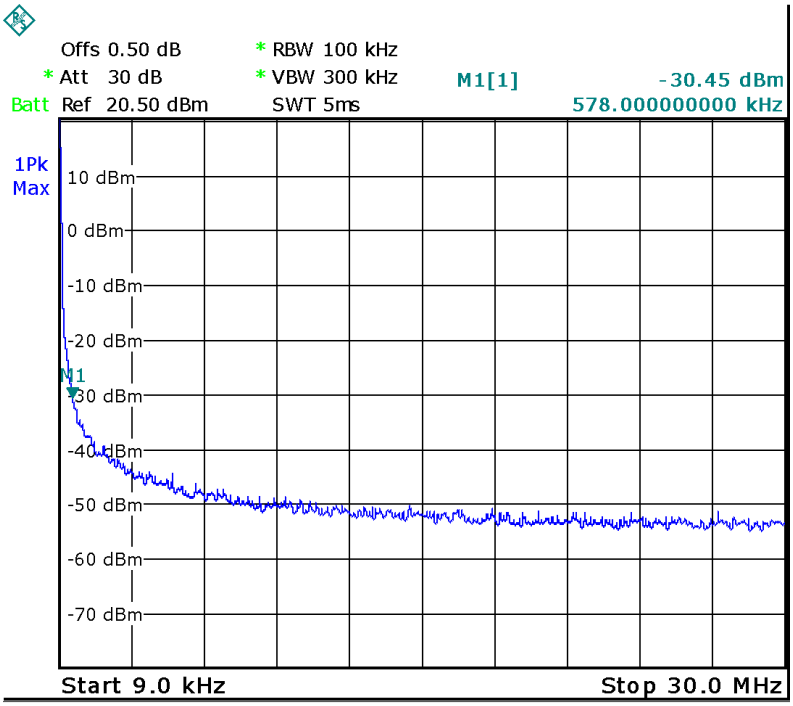


802.11g

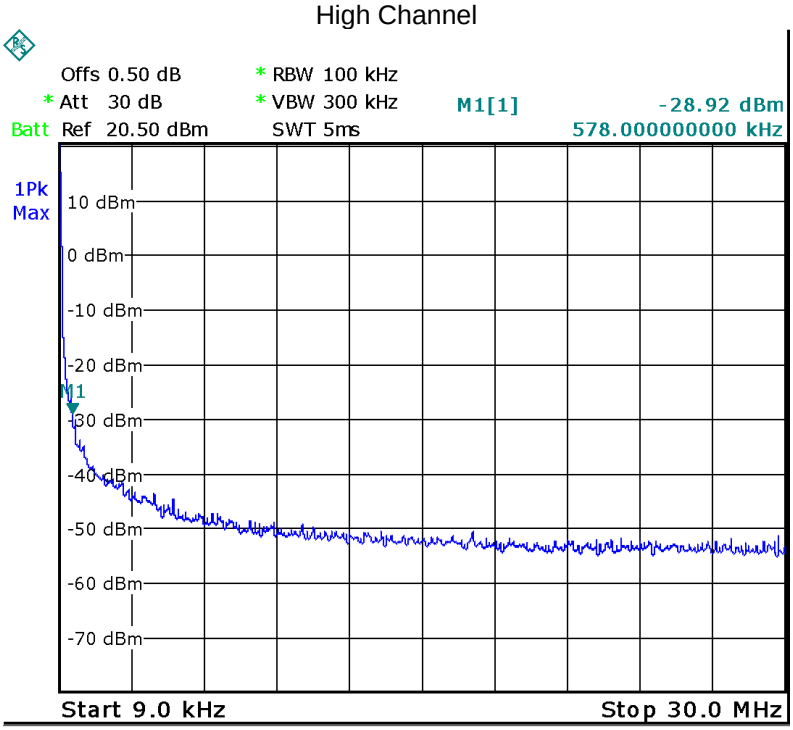
Low Channel



Middle Channel

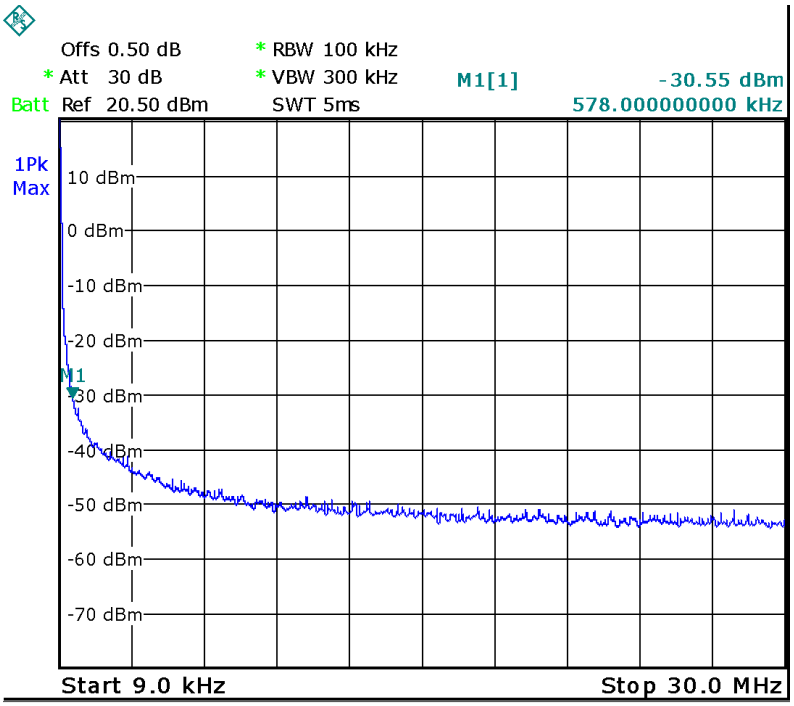


High Channel

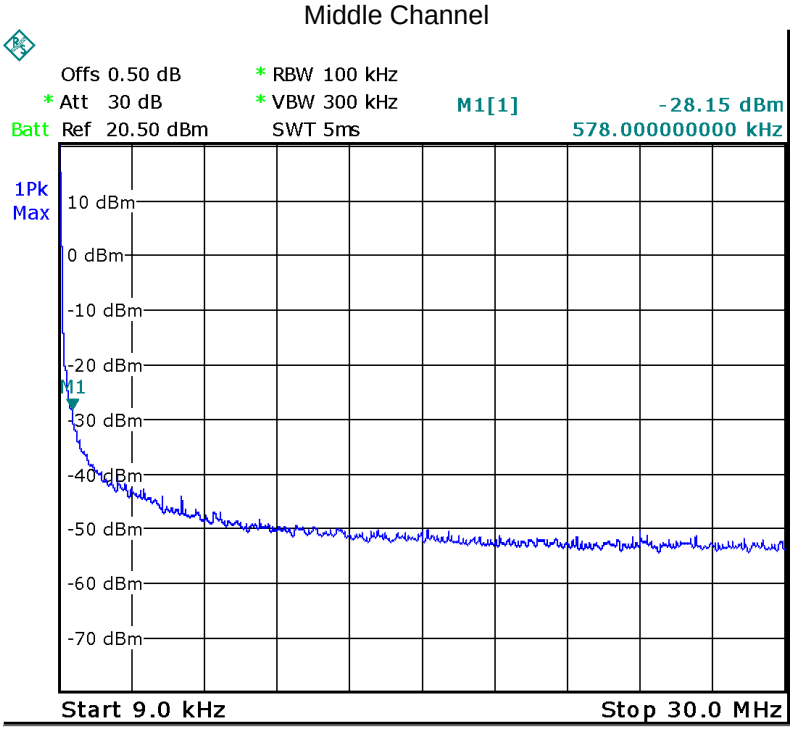


802.11n HT20

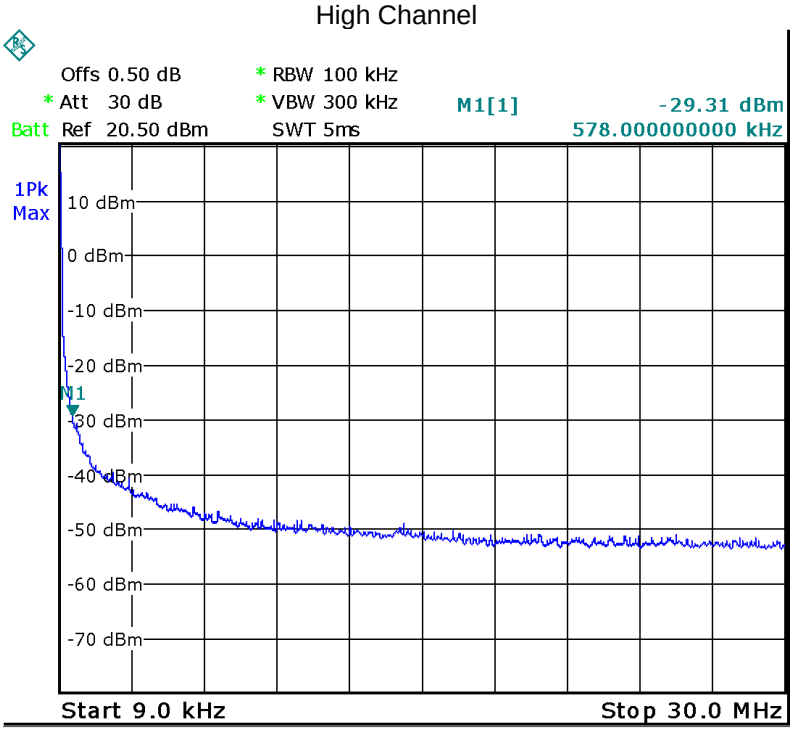
Low Channel



Middle Channel



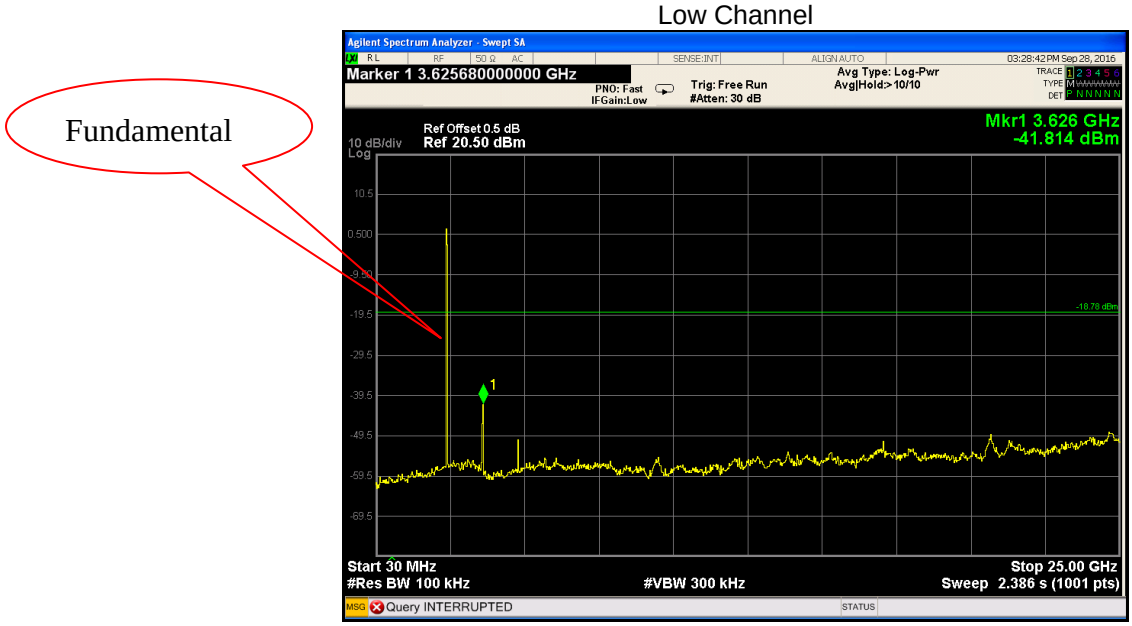
High Channel



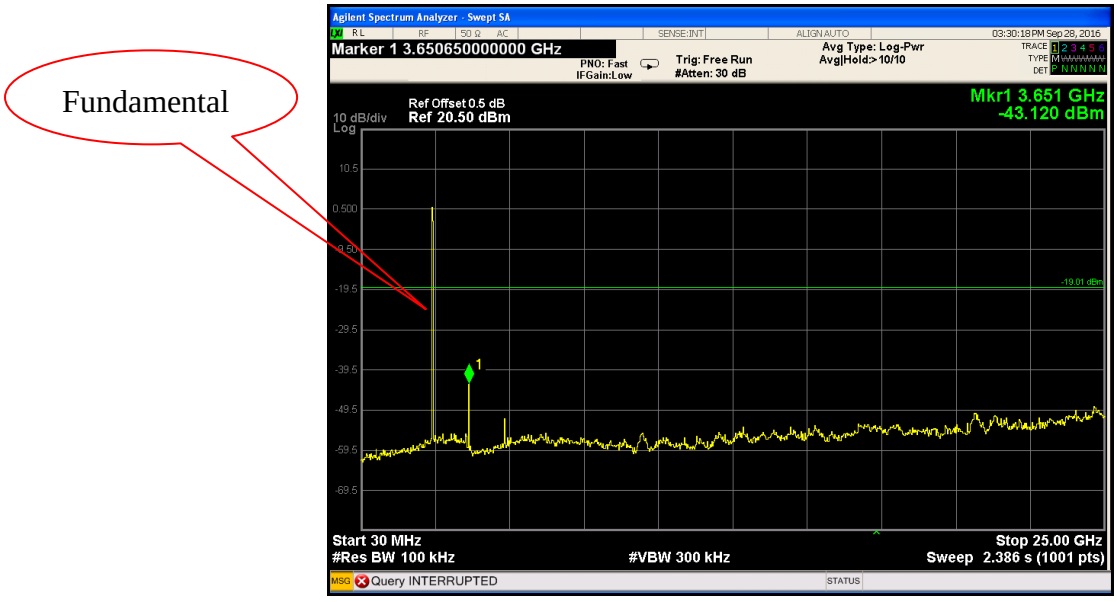
Above 30MHz

802.11b

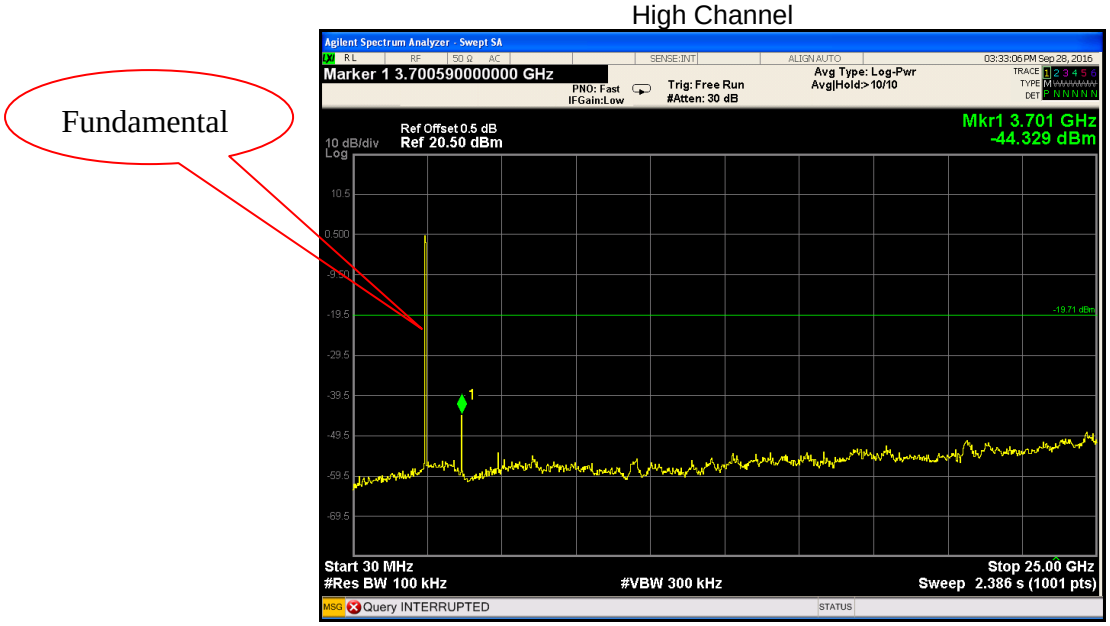
Low Channel



Middle Channel

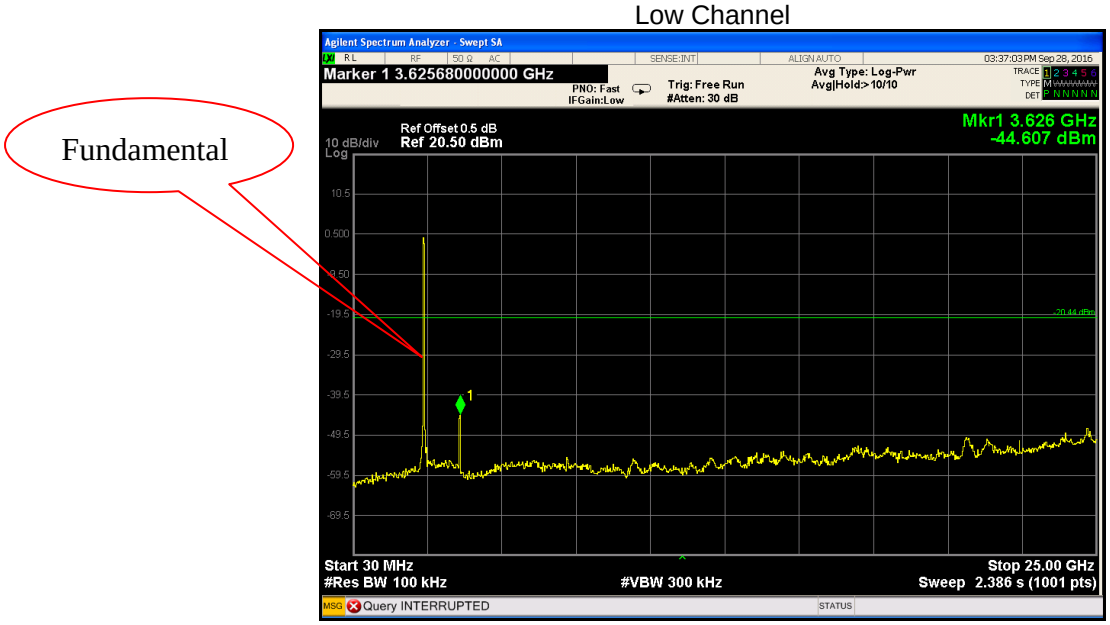


High Channel

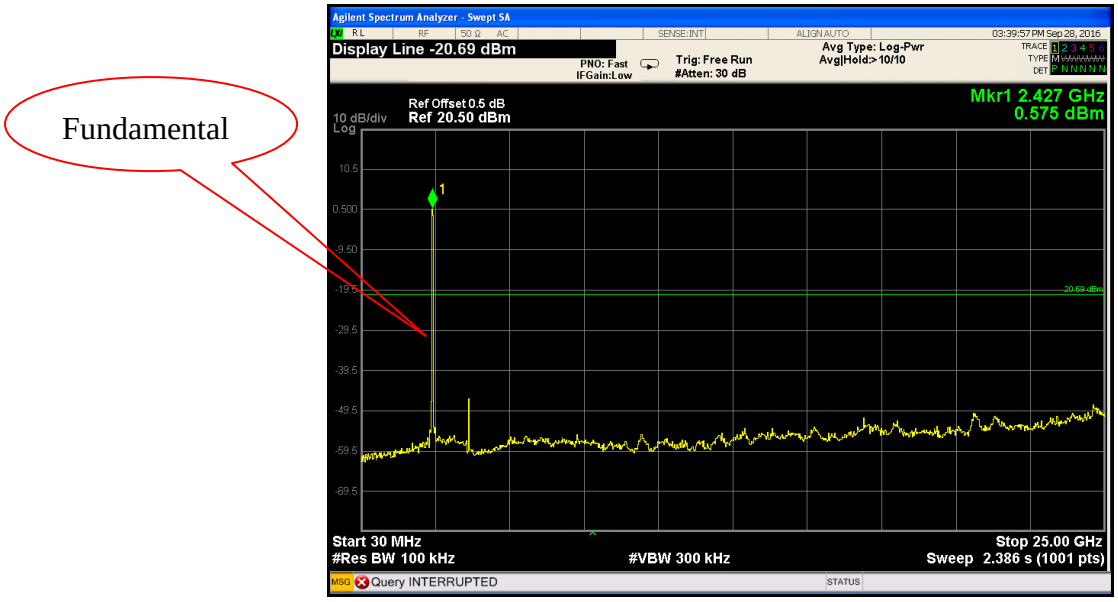


802.11g

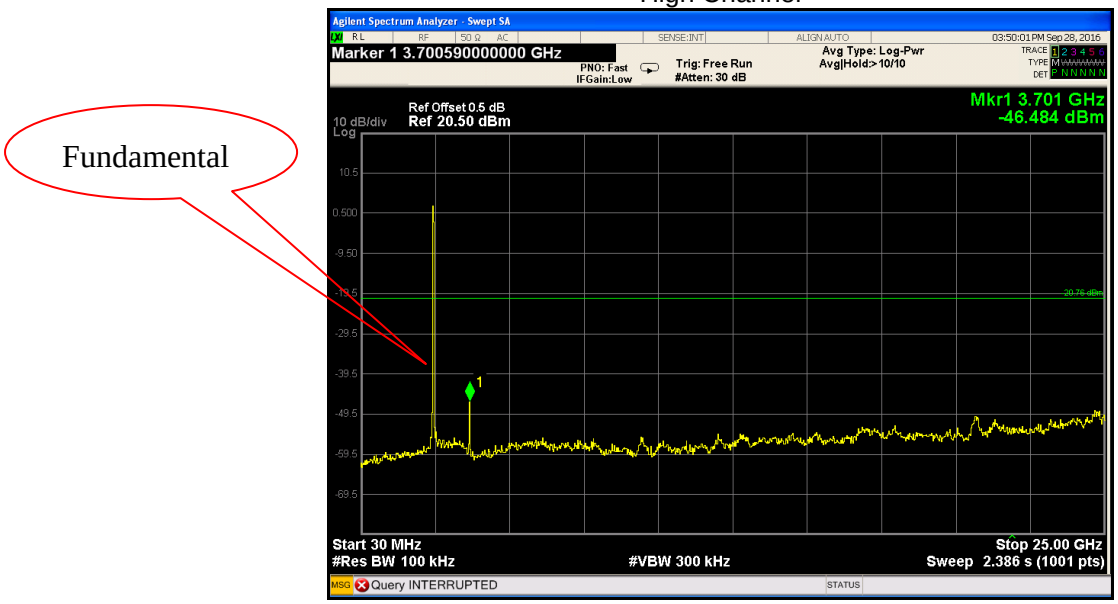
Low Channel



Middle Channel

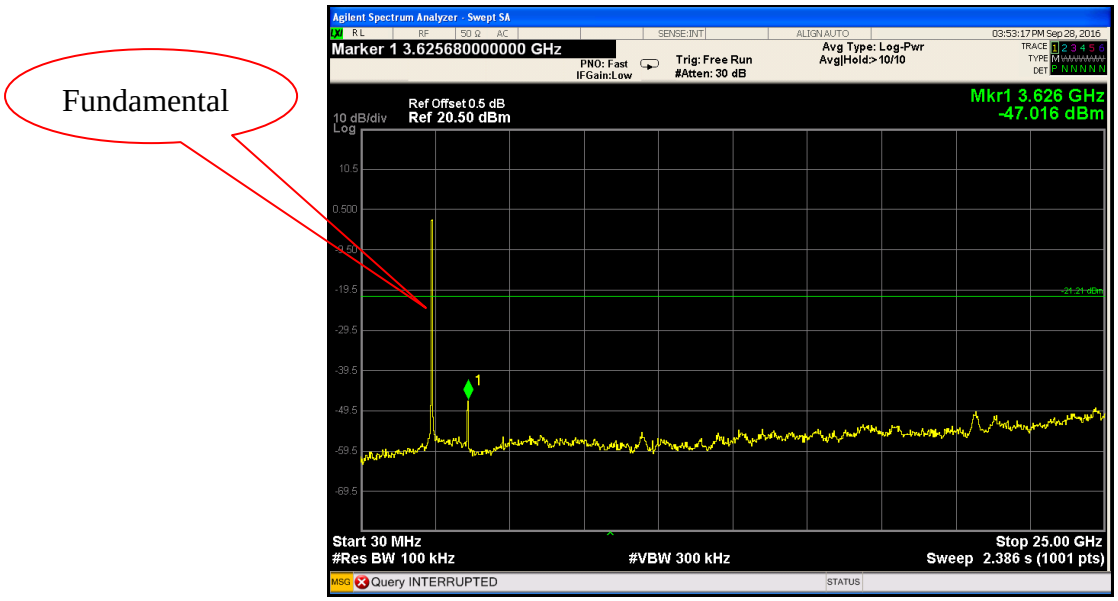


High Channel

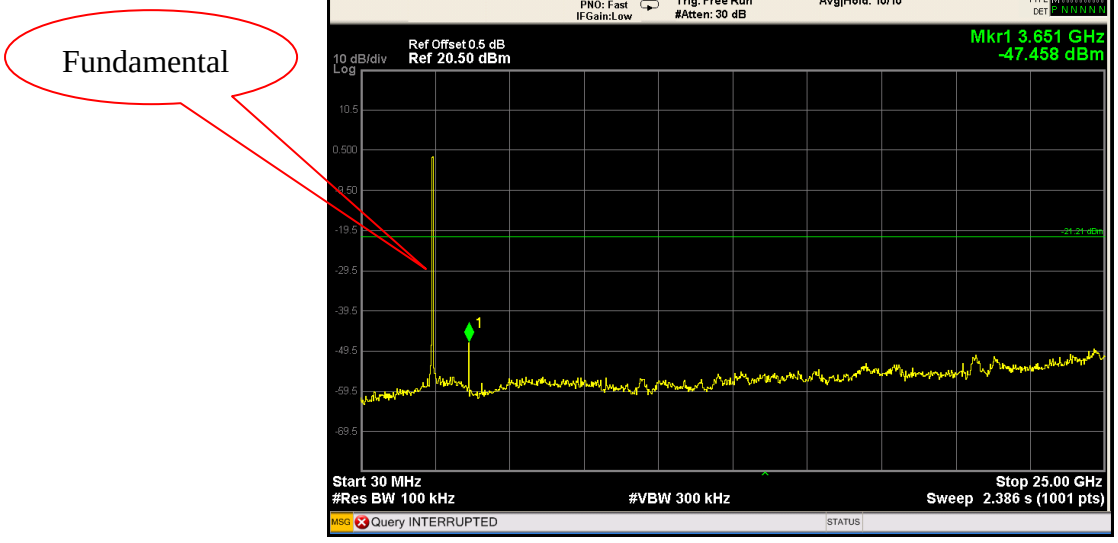


802.11n HT20

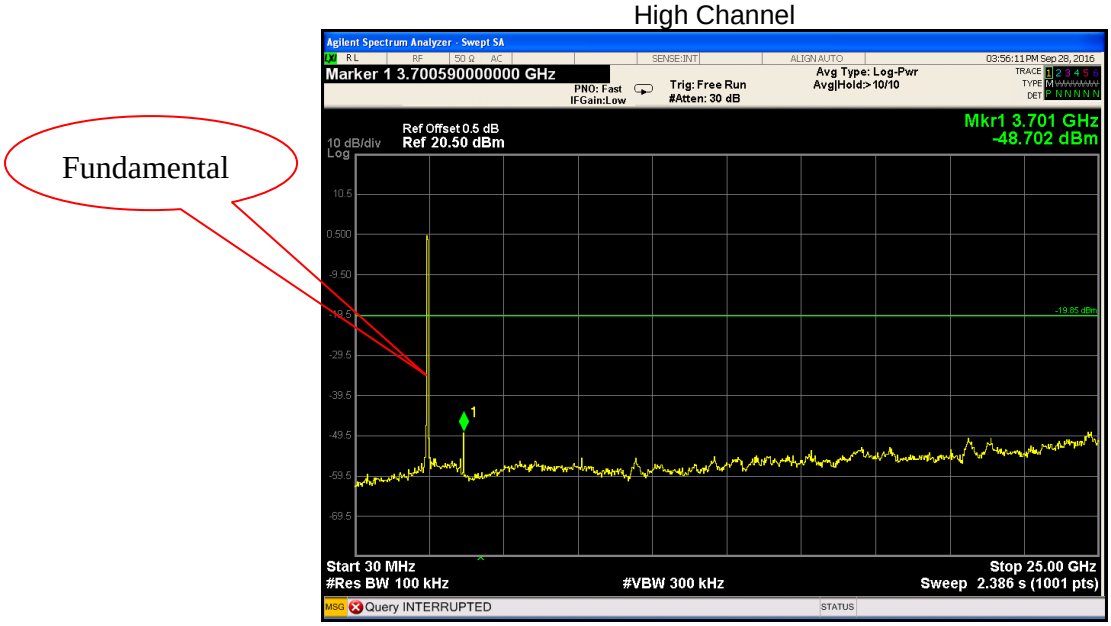
Low Channel



Middle Channel



High Channel



10 Band Edge Measurement

Test Requirement:	FCC CFR47 Part 15 Section 15.247
Test Method:	KDB 558074 D01 DTS Meas Guidance v03r05 April 8, 2016
Test Limit:	Regulation 15.247 (d),In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions 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) (see §15.205(c)).
Test Mode:	Transmitting

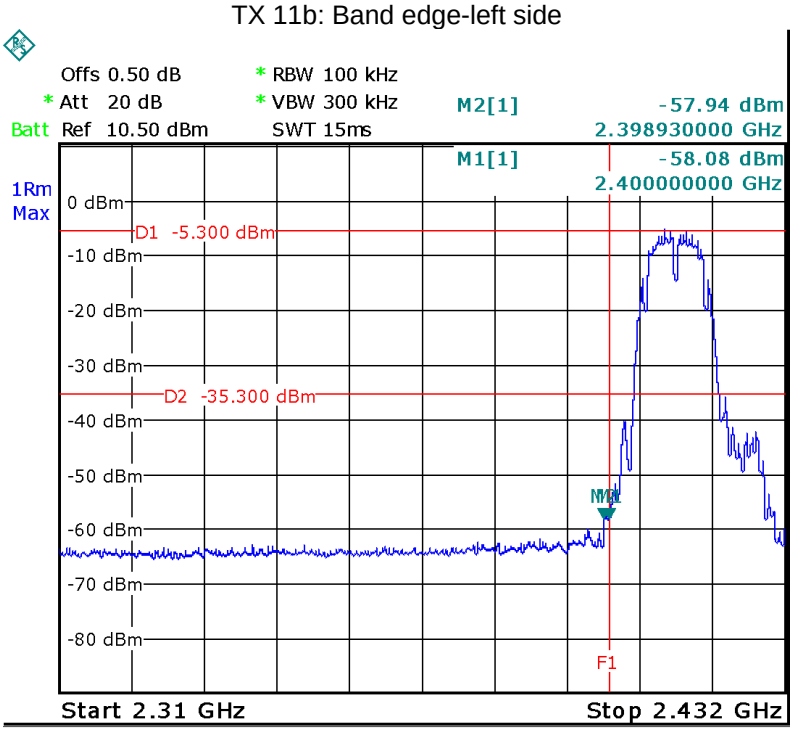
10.1 Test Produce

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

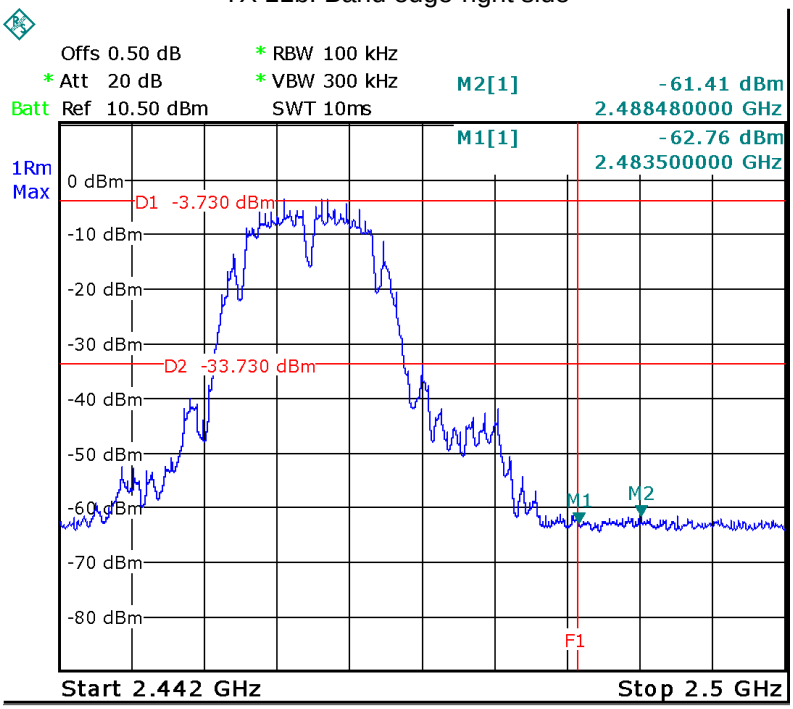
10.2 Test Result

Test result plots shown as follows:

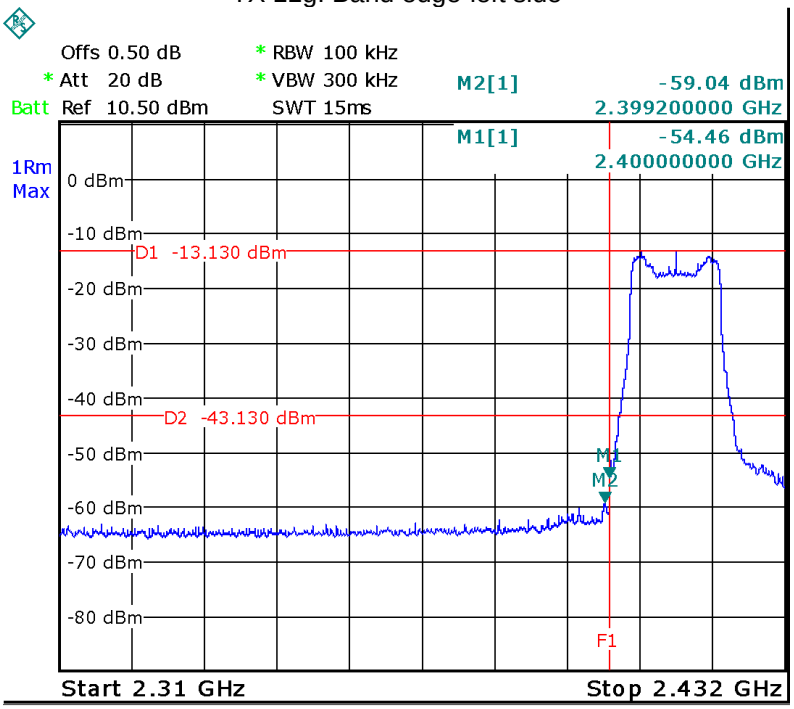
TX 11b: Band edge-left side



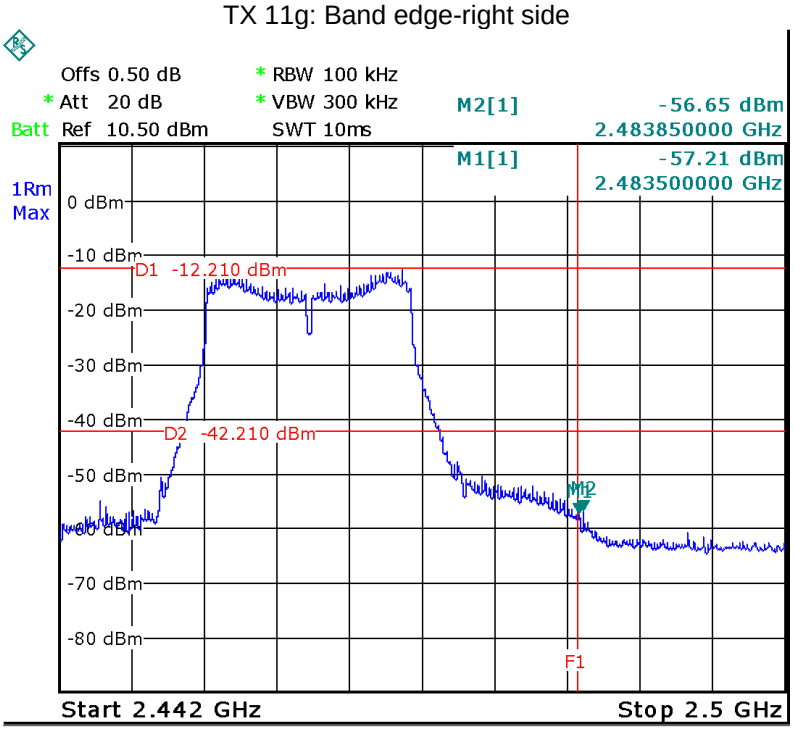
TX 11b: Band edge-right side



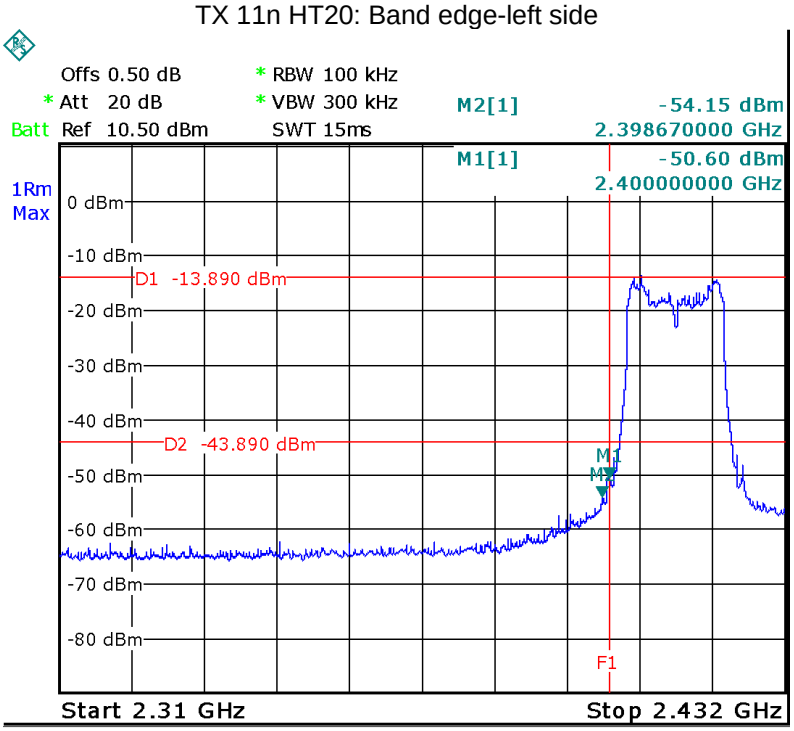
TX 11g: Band edge-left side



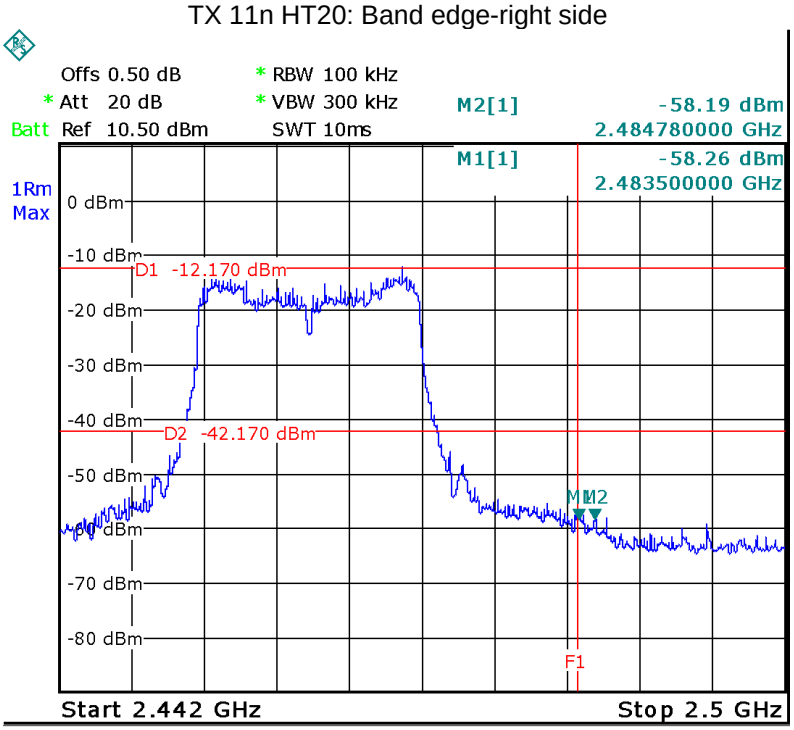
TX 11g: Band edge-right side



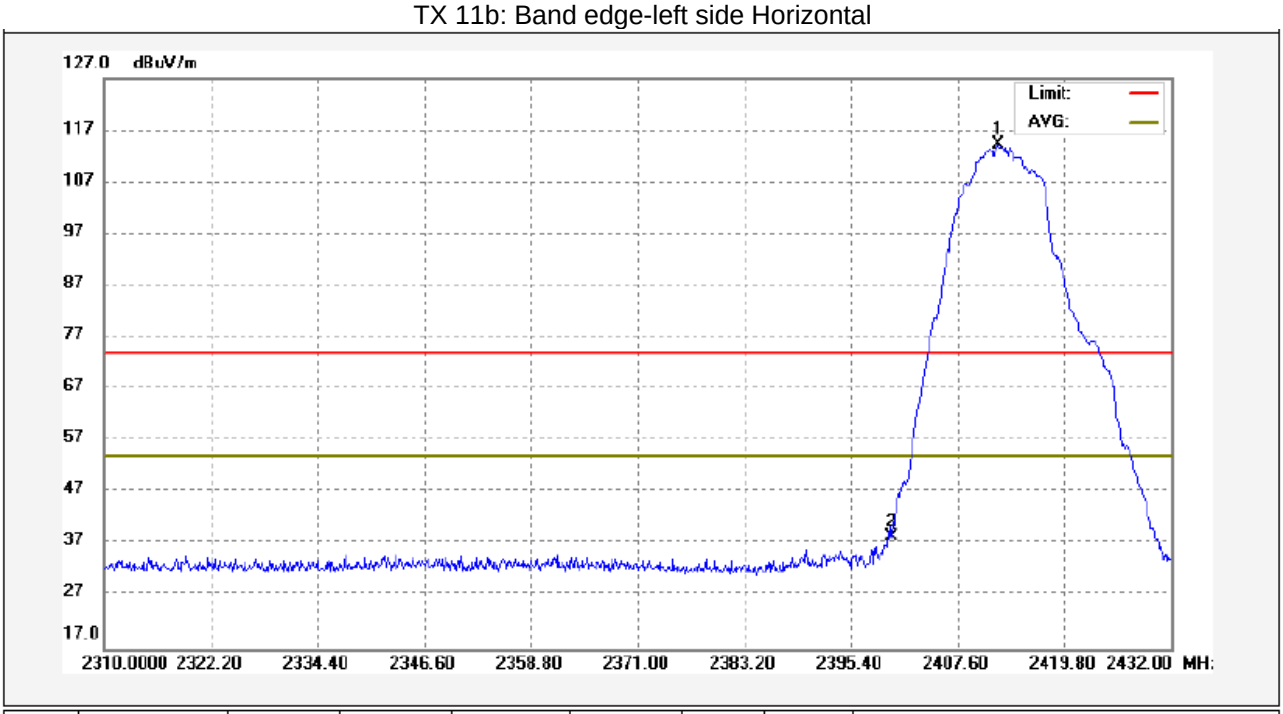
TX 11n HT20: Band edge-left side



TX 11n HT20: Band edge-right side

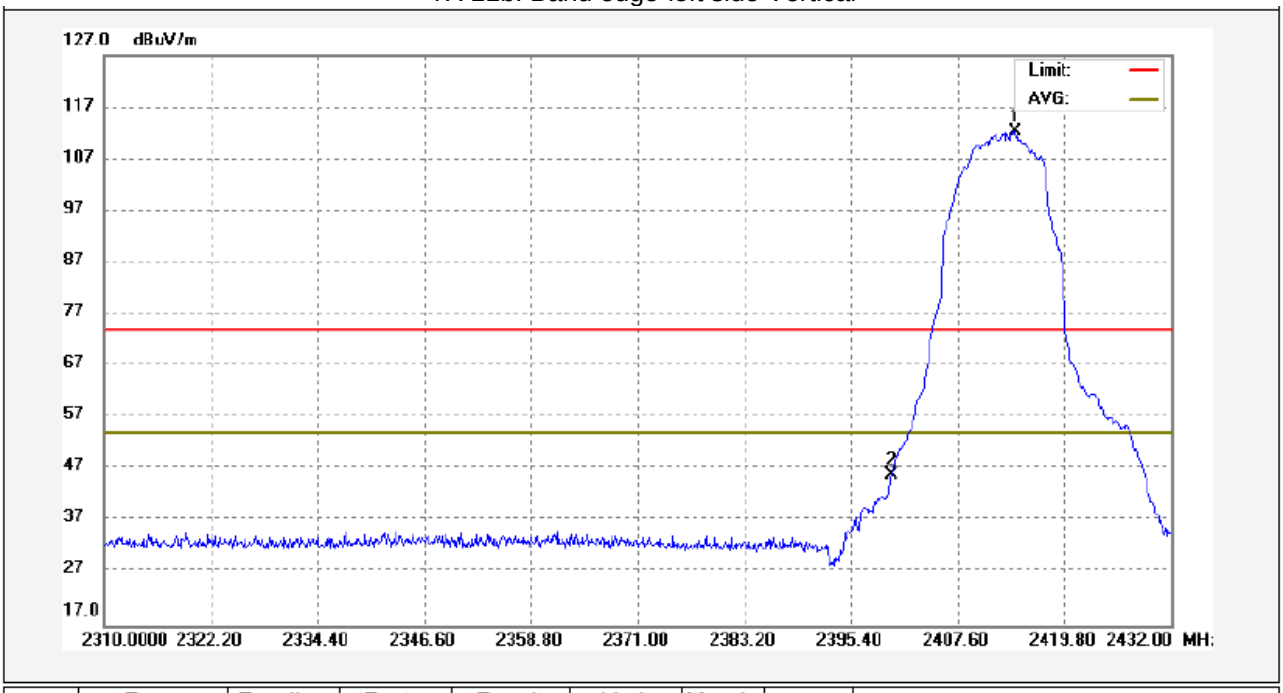


TX 11b: Band edge-left side Horizontal



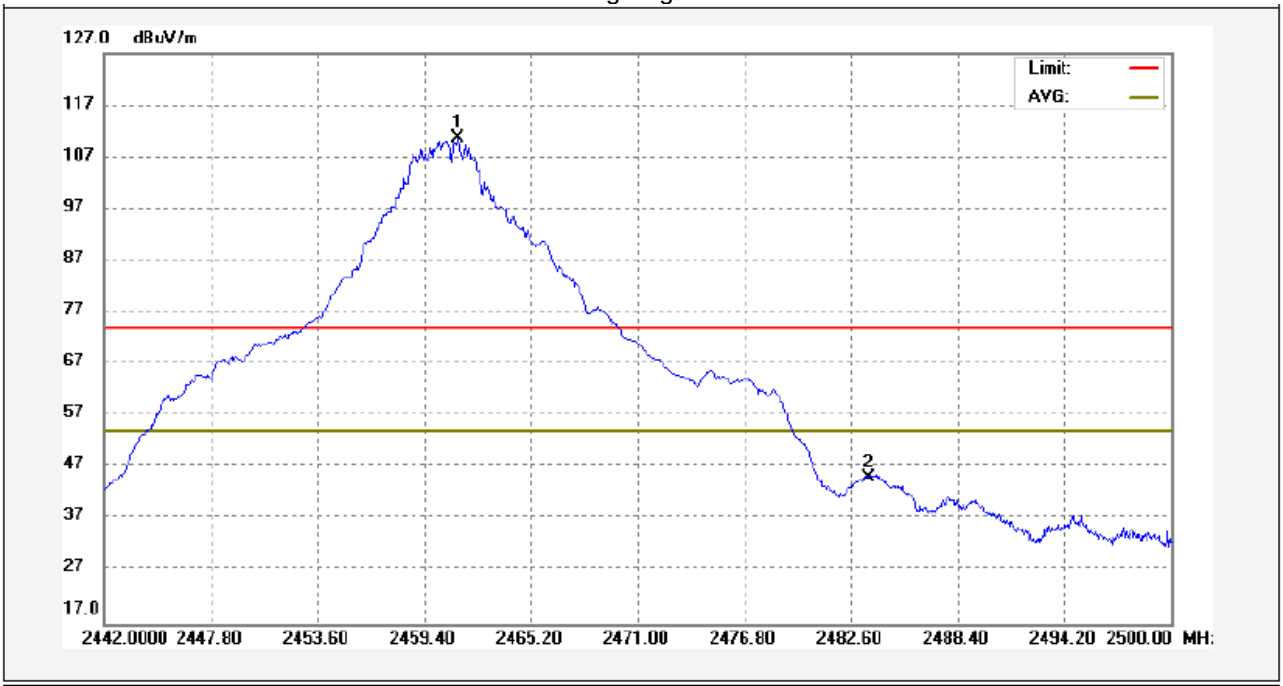
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2412.236	129.44	-15.26	114.18				
2	2400.000	53.87	-15.24	38.63	74.00	-35.37	peak	

TX 11b: Band edge-left side Vertical



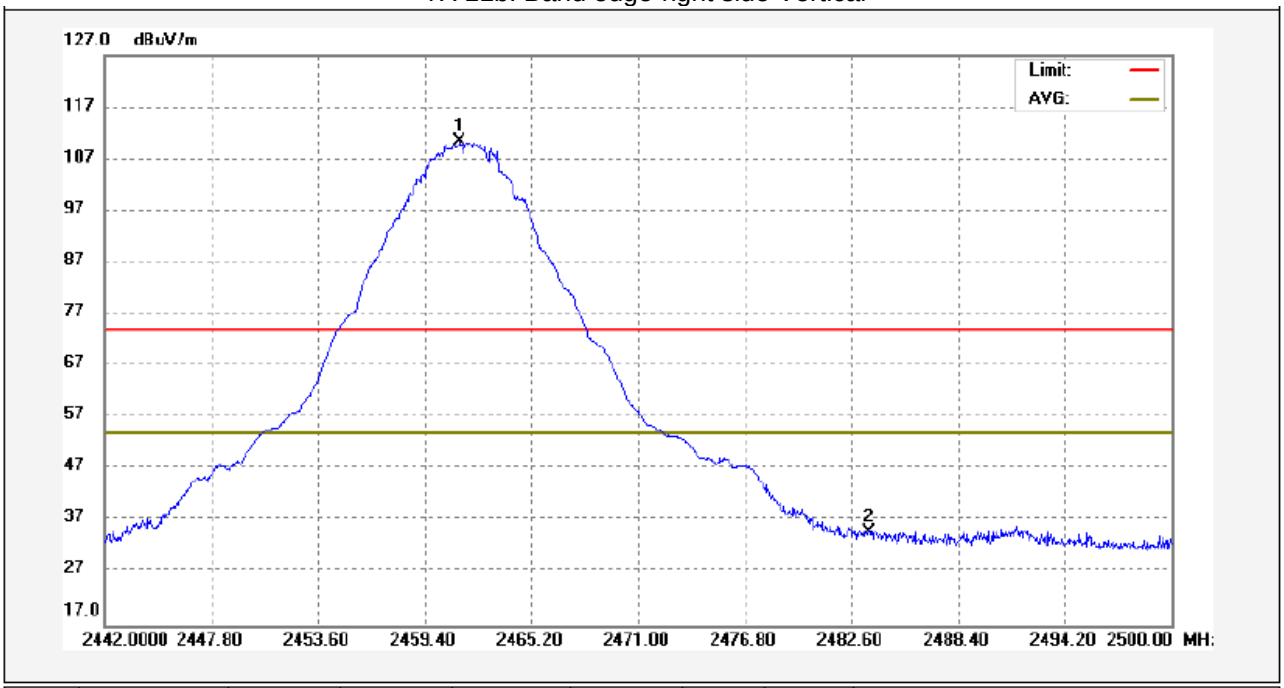
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2414.188	127.46	-15.25	112.21				
2	2400.000	61.37	-15.24	46.13	74.00	-27.87	peak	

TX 11b: Band edge-right side Horizontal



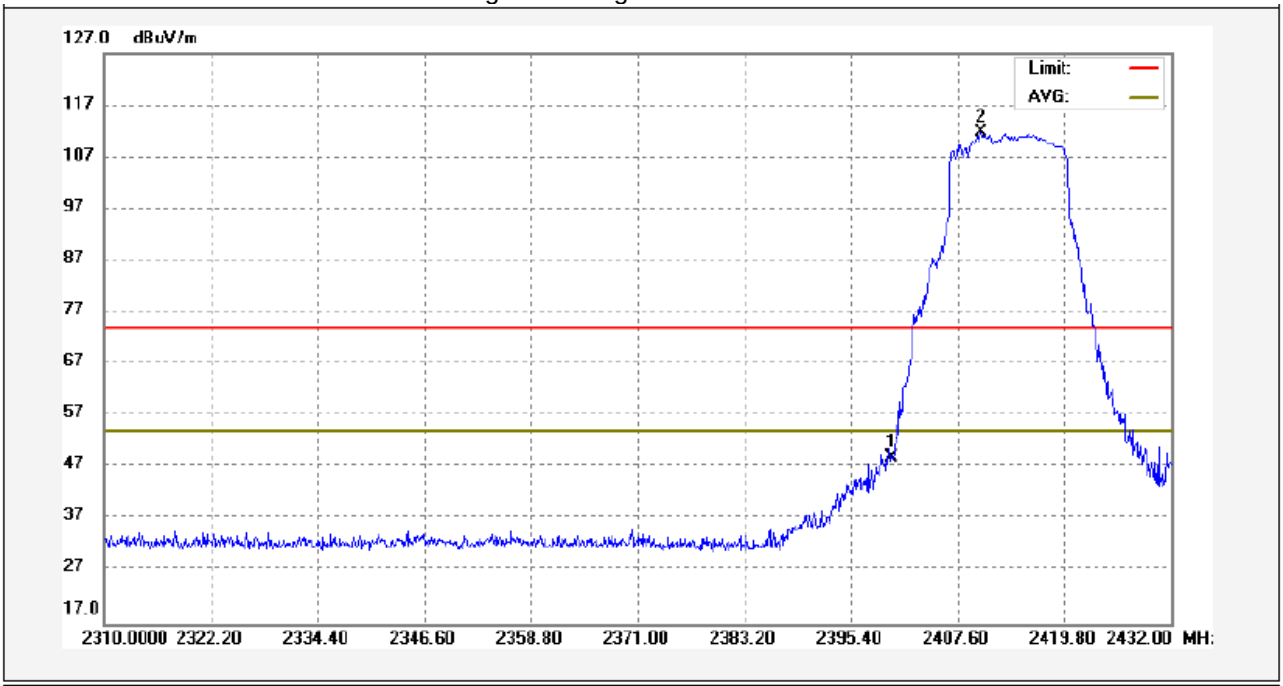
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2461.198	126.01	-15.35	110.66				
2	2483.500	60.62	-15.39	45.23	74.00	-28.77	peak	

TX 11b: Band edge-right side Vertical



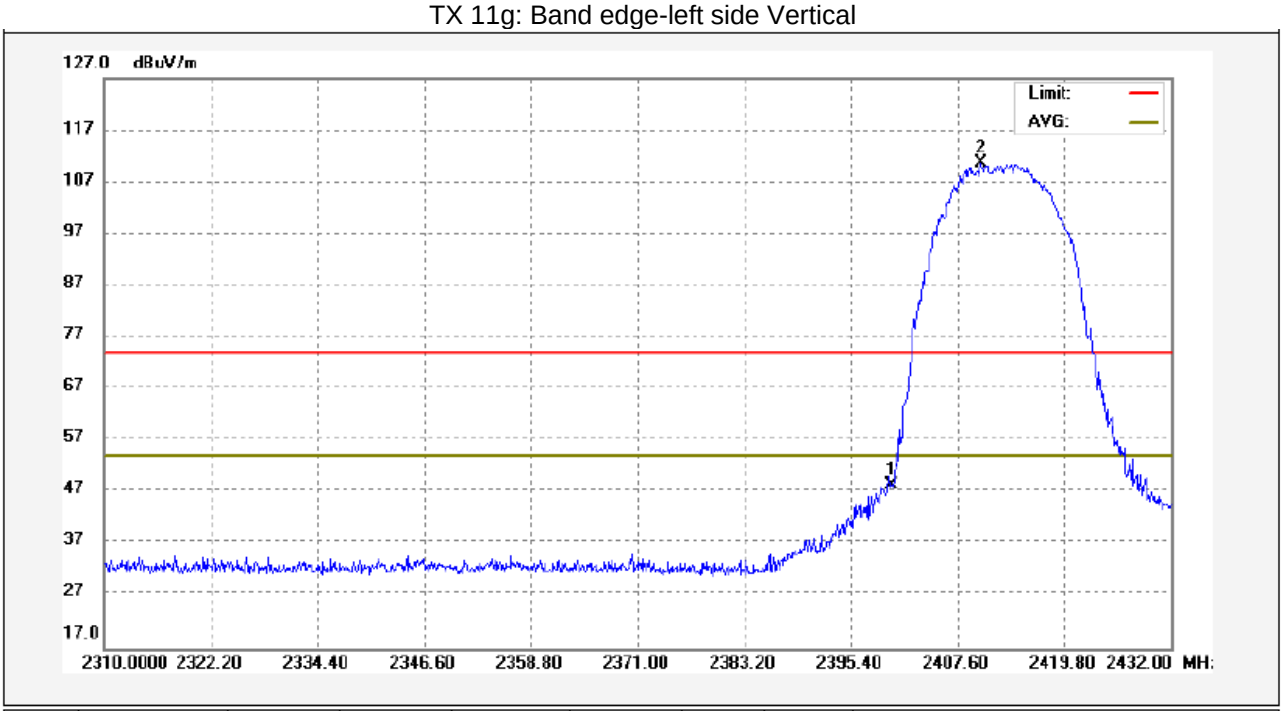
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2461.314	125.60	-15.35	110.25				
2	2483.500	50.36	-15.39	34.97	74.00	-39.03	peak	

TX 11g: Band edge-left side Horizontal



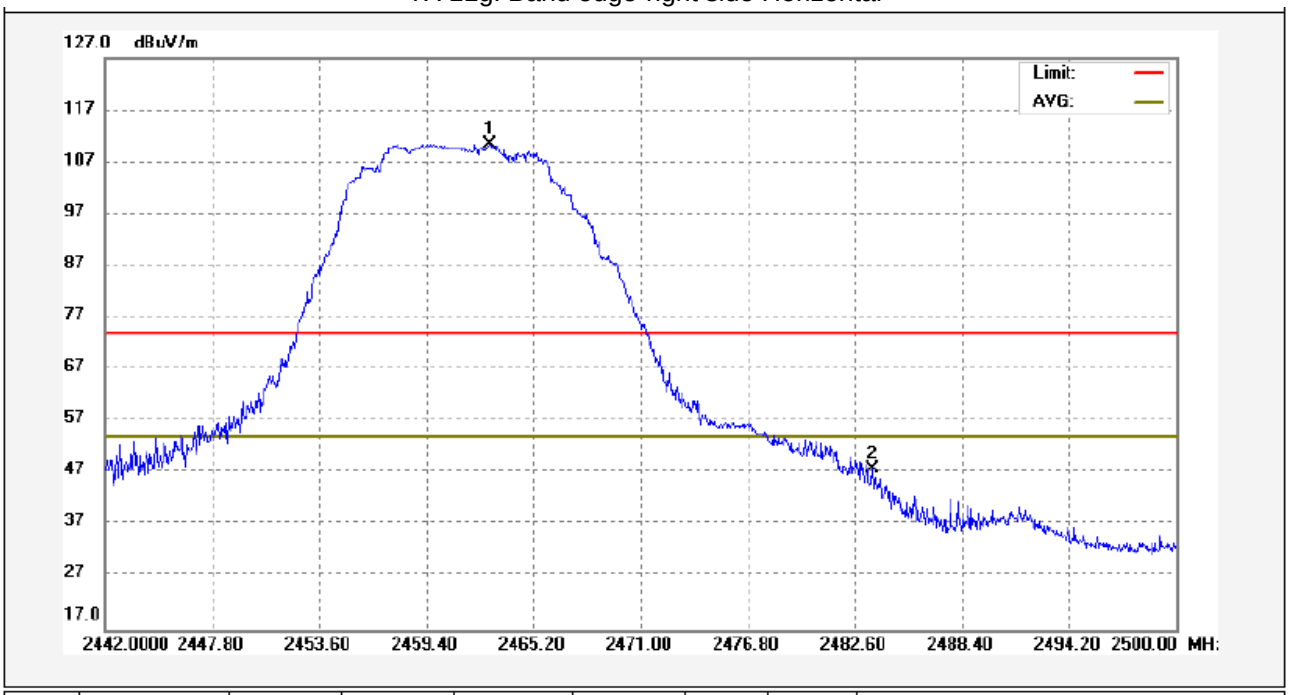
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2400.000	64.21	-15.24	48.97	74.00	-25.03	peak	
2	2410.284	126.89	-15.25	111.64				

TX 11g: Band edge-left side Vertical



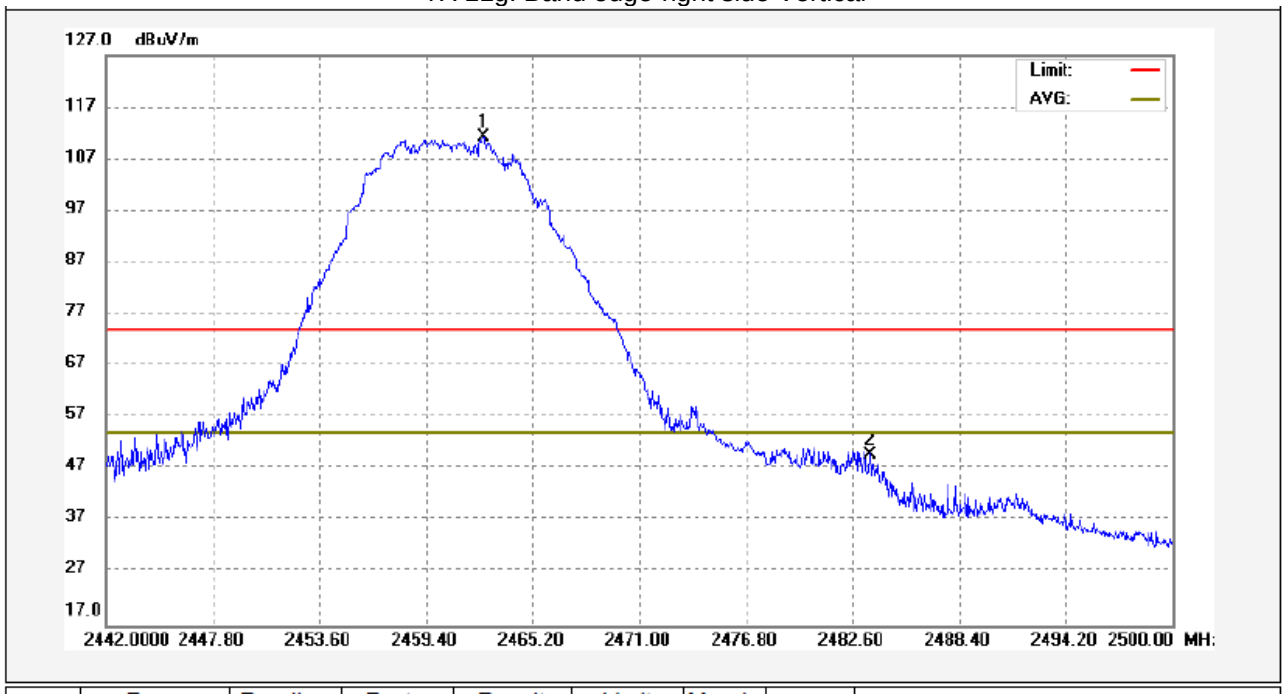
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2400.000	63.71	-15.24	48.47	74.00	-25.53	peak	
2	2410.284	125.89	-15.25	110.64				

TX 11g: Band edge-right side Horizontal



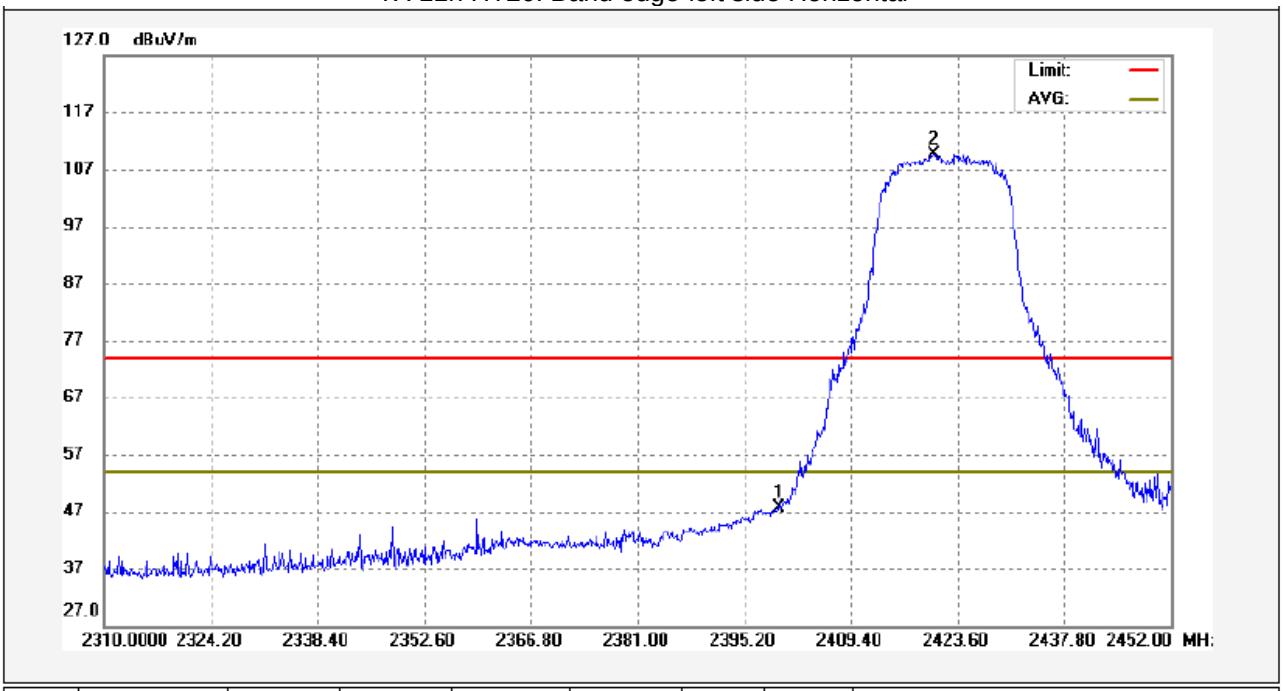
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2462.822	125.85	-15.35	110.50				
2	2483.500	63.30	-15.39	47.91	74.00	-26.09	peak	

TX 11g: Band edge-right side Vertical



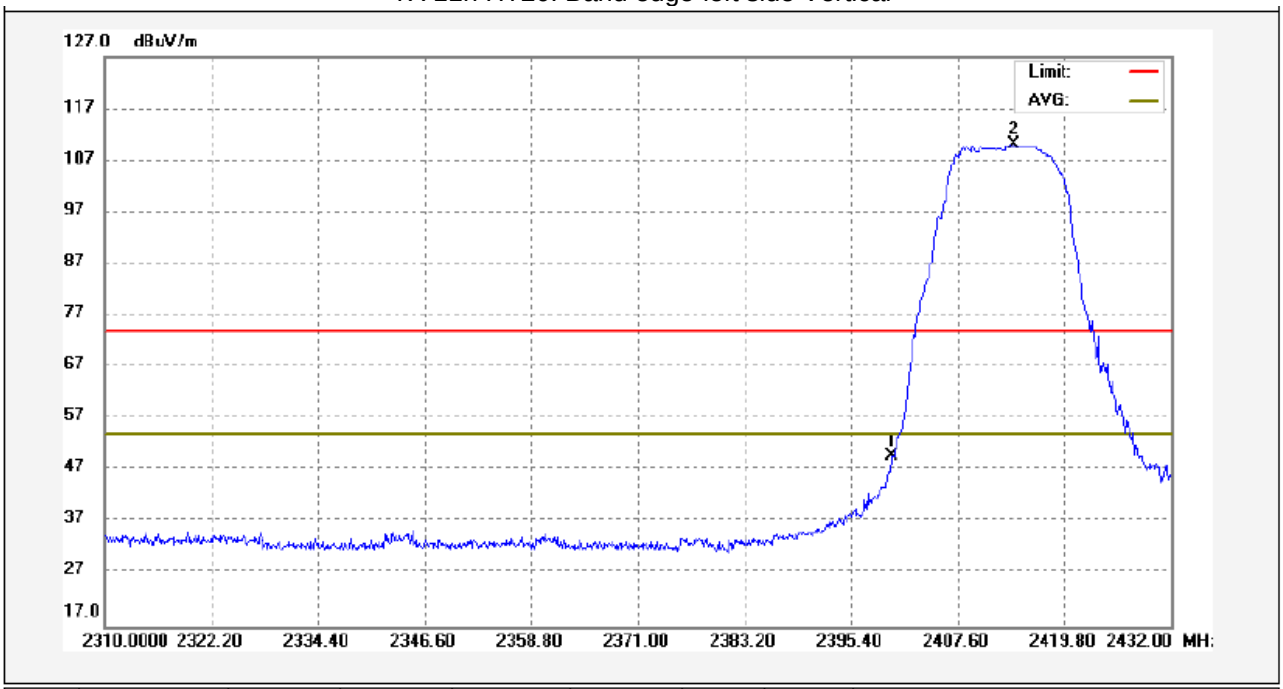
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2462.532	126.62	-15.35	111.27				
2	2483.500	65.30	-15.39	49.91	74.00	-24.09	peak	

TX 11n HT20: Band edge-left side Horizontal



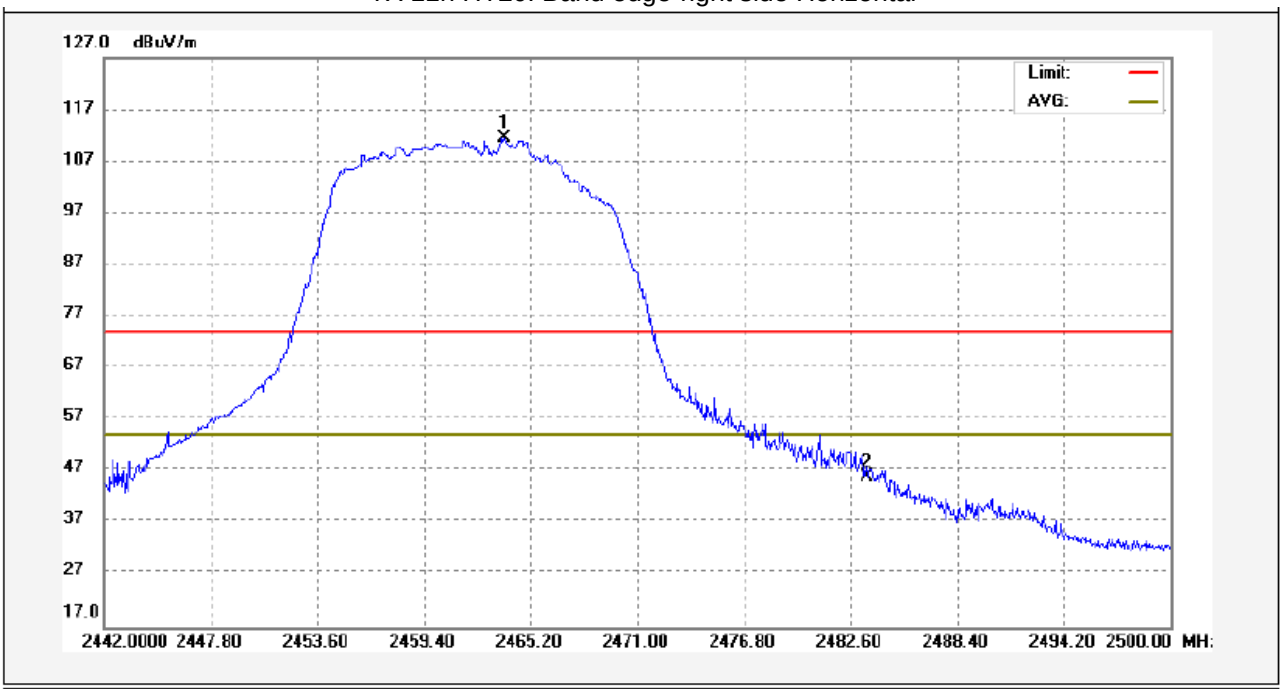
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2400.000	62.93	-15.24	47.69	74.00	-26.31	peak	
2	2420.476	124.86	-15.27	109.59	74.00	35.59	peak	

TX 11n HT20: Band edge-left side Vertical



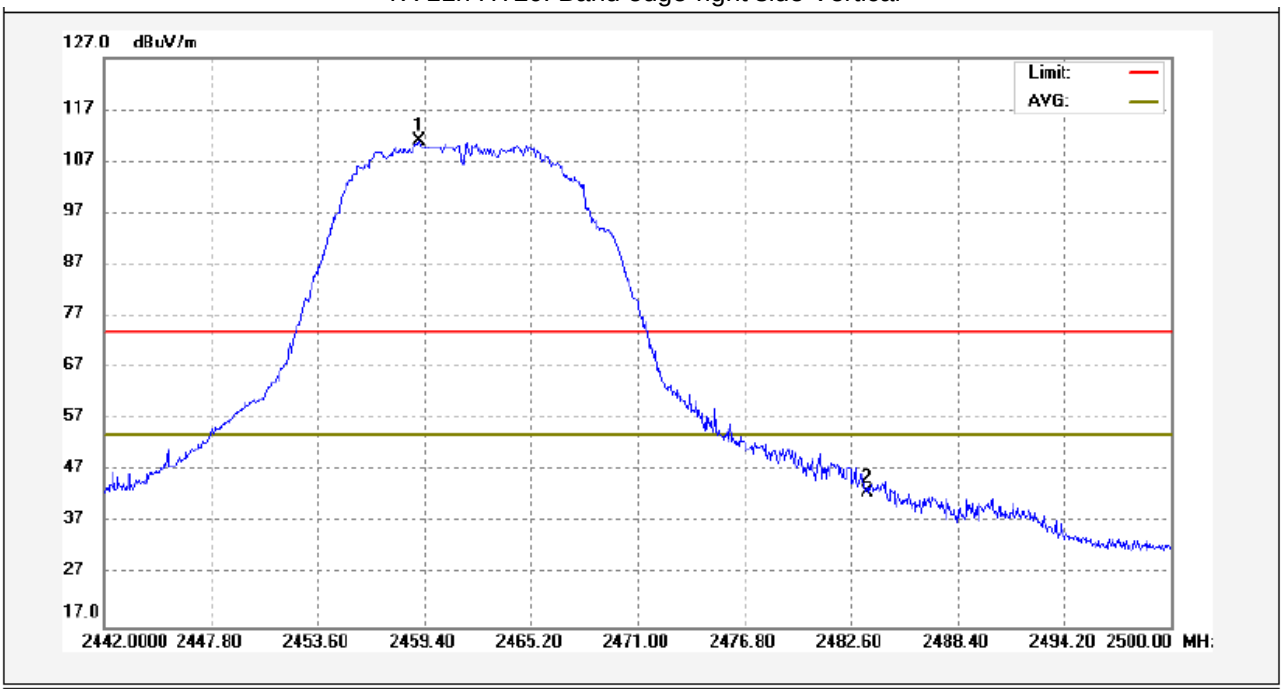
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2400.000	65.07	-15.24	49.83	74.00	-24.17	peak	
2	2413.944	125.22	-15.25	109.97				

TX 11n HT20: Band edge-right side Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2463.750	126.69	-15.34	111.35				
2	2483.500	61.48	-15.39	46.09	74.00	-27.91	peak	

TX 11n HT20: Band edge-right side Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2459.110	126.14	-15.34	110.80				
2	2483.500	58.48	-15.39	43.09	74.00	-30.91	peak	

11 6 dB Bandwidth Measurement

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB 558074 D01 DTS Meas Guidance v03r05 April 8, 2016

11.1 Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;

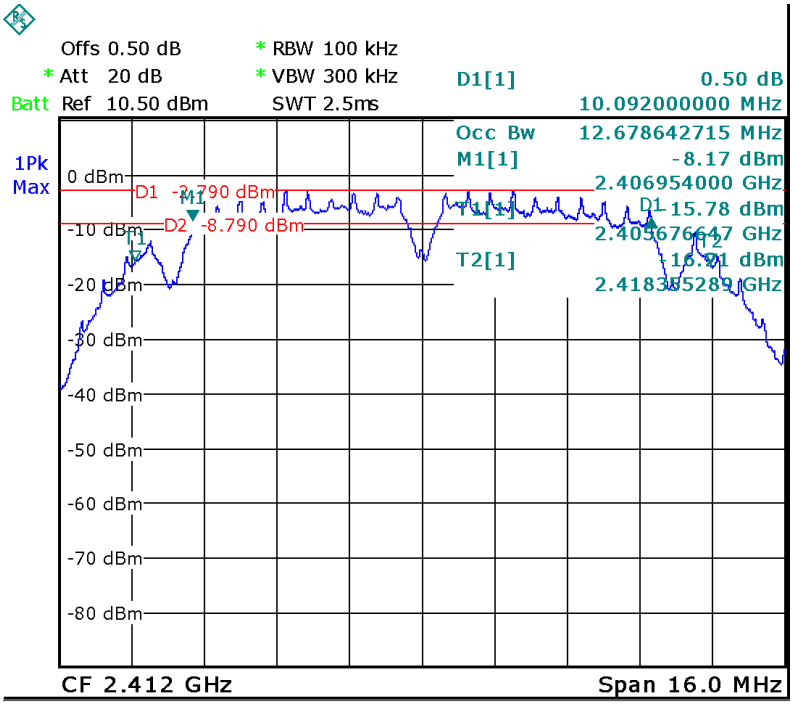
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz

11.2 Test Result:

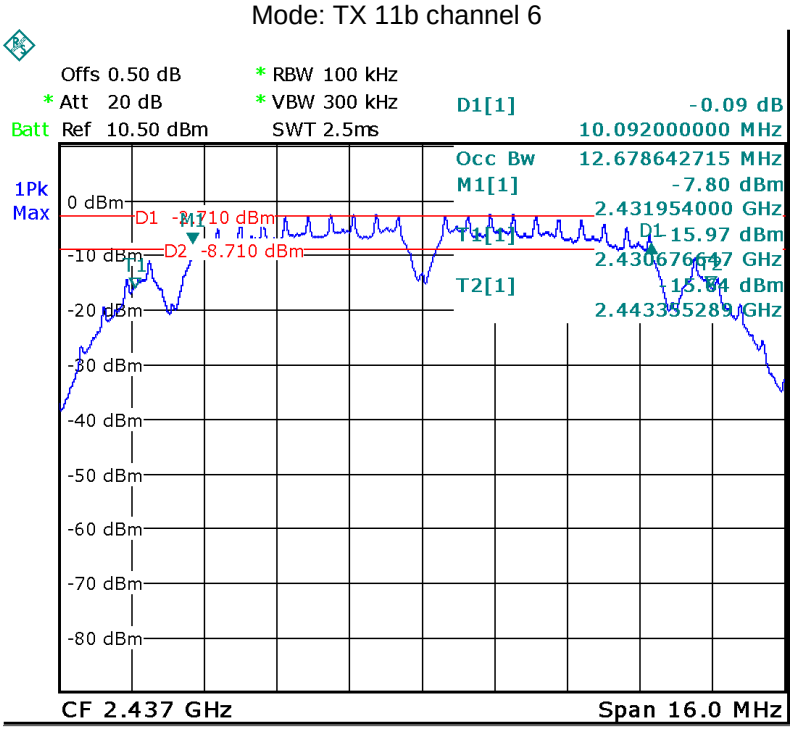
Operation mode	Bandwidth (MHz)		
TX 11b	Channel 1	Channel 6	Channel 11
	10.092	10.092	10.092
TX 11g	Channel 1	Channel 6	Channel 11
	16.367	16.367	16.367
TX 11n HT20	Channel 1	Channel 6	Channel 11
	17.569	17.569	17.623

Test result plot as follows:

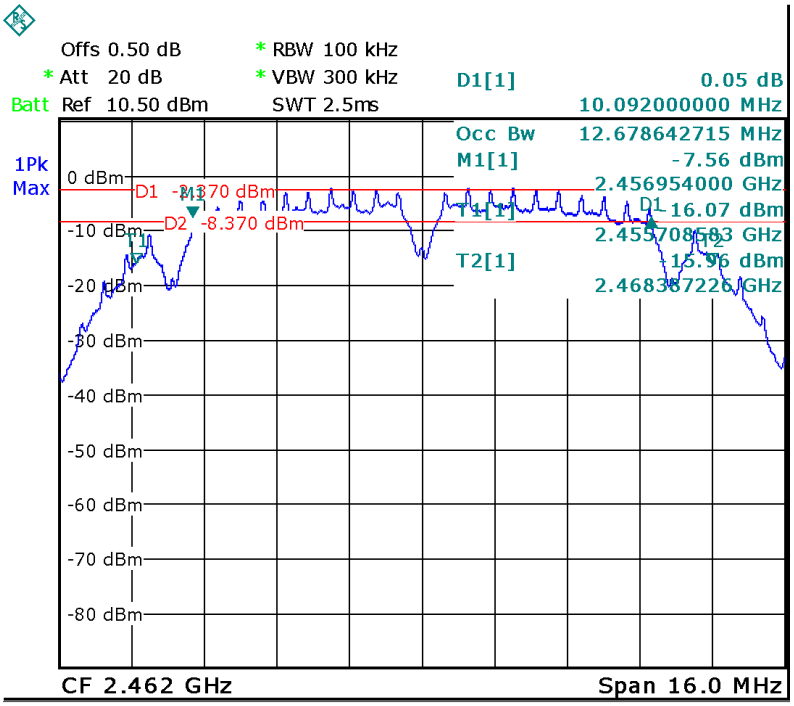
Mode: TX 11b channel 1



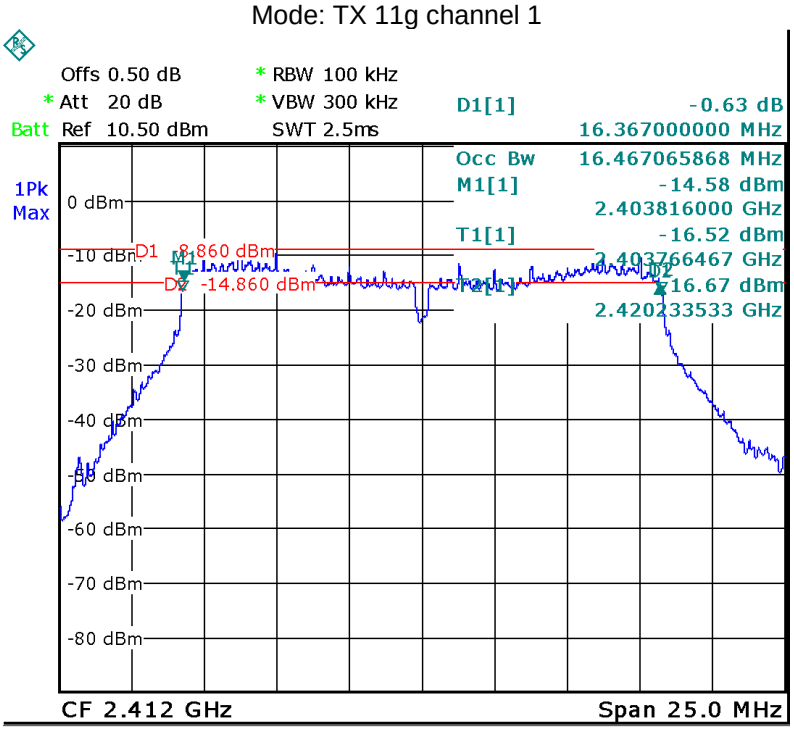
Mode: TX 11b channel 6



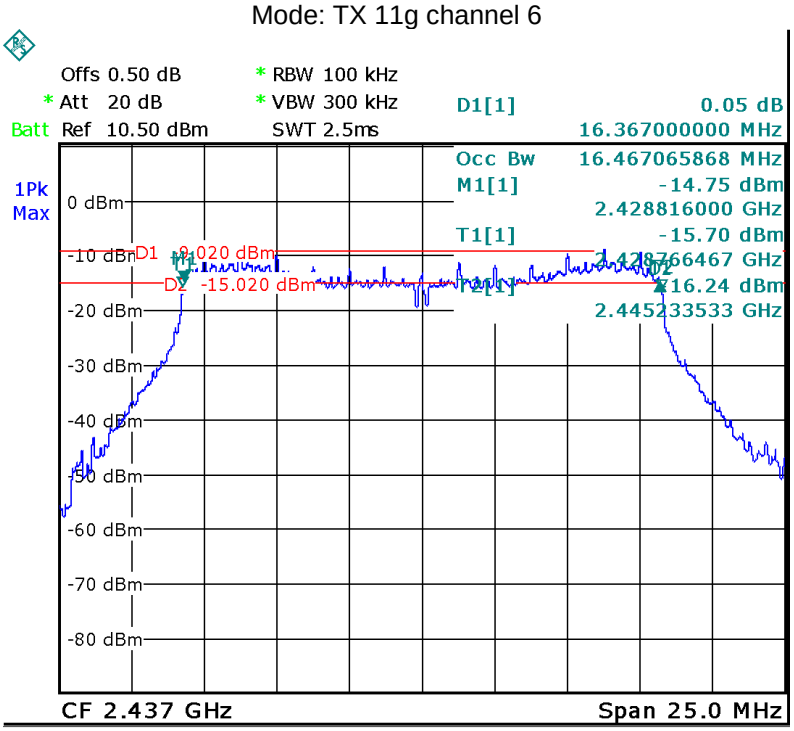
Mode: TX 11b channel 11



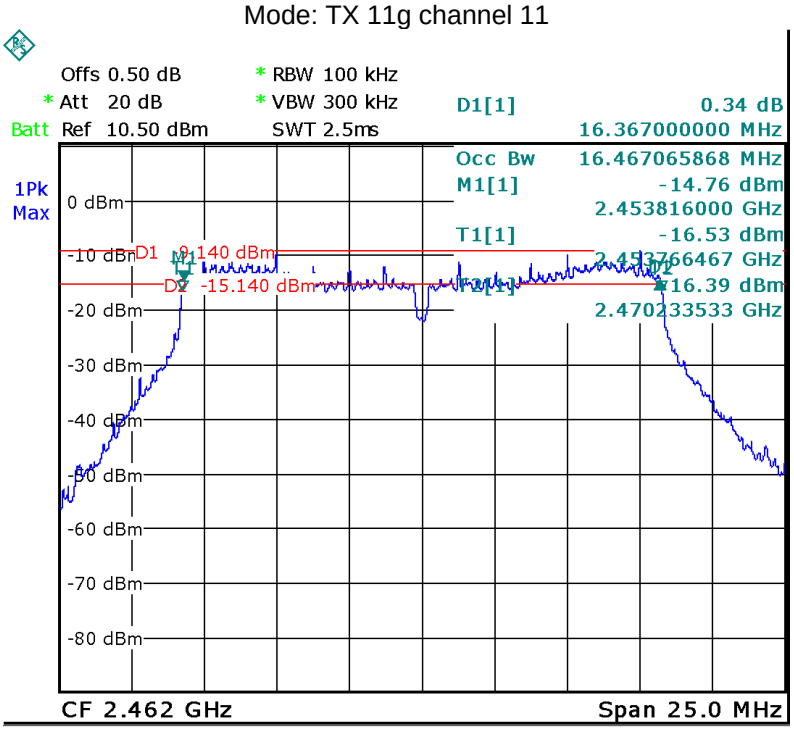
Mode: TX 11g channel 1



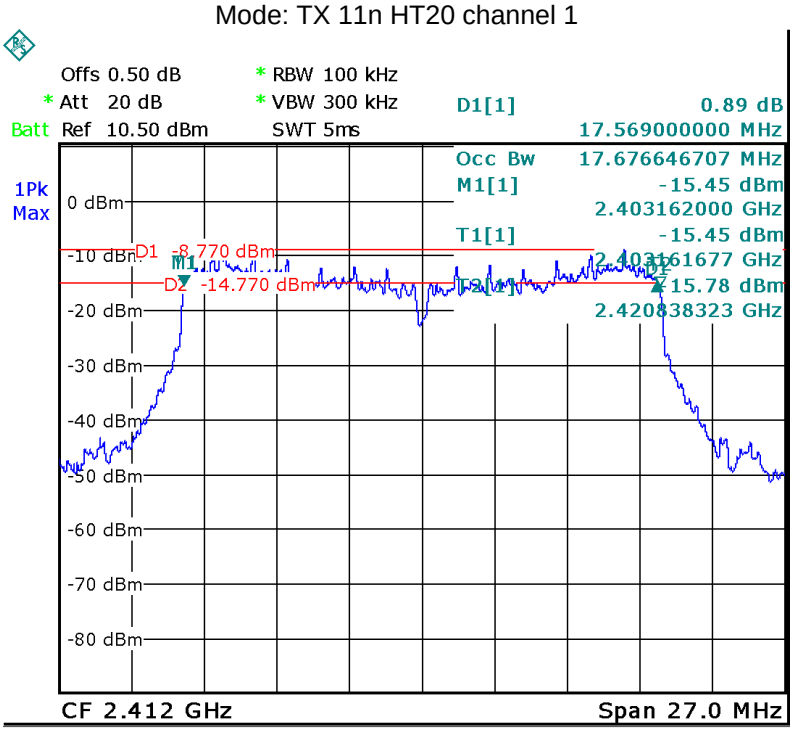
Mode: TX 11g channel 6



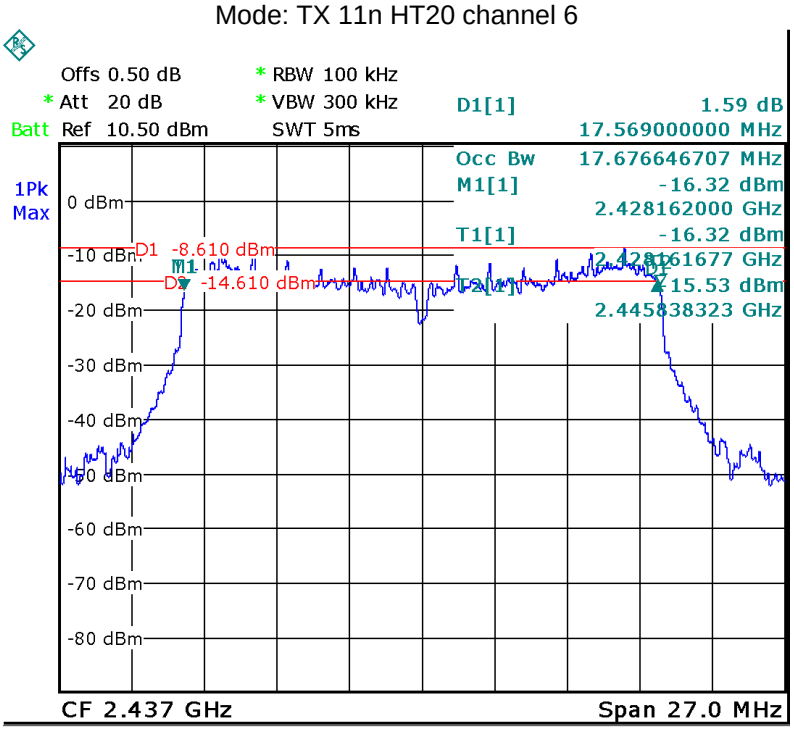
Mode: TX 11g channel 11



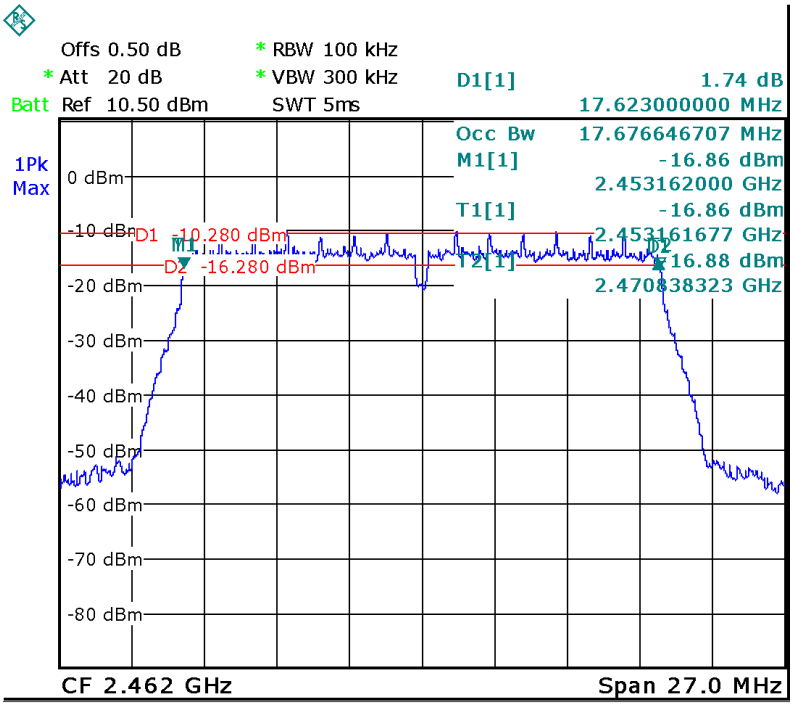
Mode: TX 11n HT20 channel 1



Mode: TX 11n HT20 channel 6



Mode: TX 11n HT20 channel 11



12 Maximum Peak Output Power

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB 558074 D01 DTS Meas Guidance v03r05 April 8, 2016

12.1 Test Procedure:

KDB 558074 D01 DTS Meas Guidance v03r05 April 8, 2016

section 9.1.1 (For BLE)

This procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the DTS bandwidth.

a)Set the RBW ≥ DTS bandwidth.

b)Set VBW ≥ 3 RBW.

c)Set span ≥ 3 x RBW

d)Sweep time = auto couple.

e)Detector = peak.

f)Trace mode = max hold.

g)Allow trace to fully stabilize.

h)Use peak marker function to determine the peak amplitude level.

section 9.1.2 (For WIFI)

This procedure may be used when the maximum available RBW of the measurement instrument is less than the DTS bandwidth.

a)Set the RBW = 1 MHz.

b)Set the VBW ≥ 3 RBW

c)Set the span ≥ 1.5 x DTS bandwidth.

d)Detector = peak.

e)Sweep time = auto couple.

f)Trace mode = max hold.

g)Allow trace to fully stabilize.

h)Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges (for some instruments, this may require a manual override to select peak detector). If the instrument does not have a band power function, sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the DTS bandwidth.

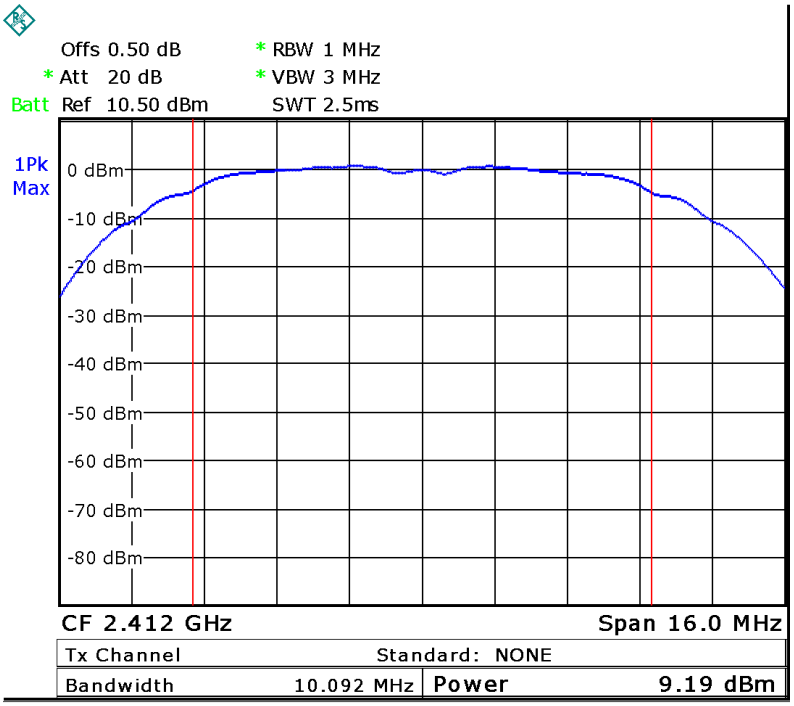
12.2 Test Result:

Test mode :TX 11b		
Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
9.19	9.32	9.40
Limit: 1W/30dBm		

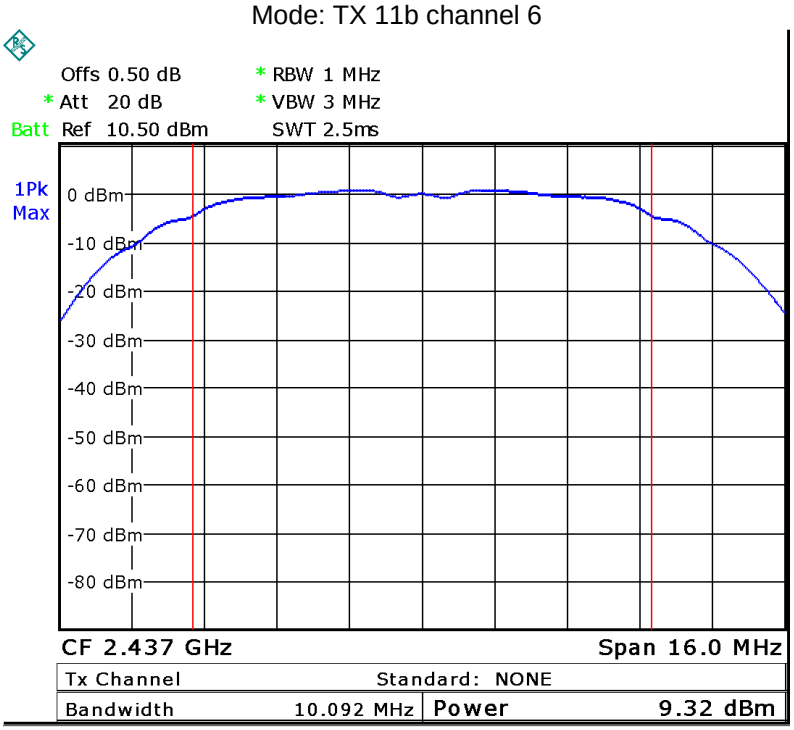
Test mode :TX 11g		
Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
9.19	9.43	9.20
Limit: 1W/30dBm		

Test mode :TX 11n HT20		
Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
9.13	9.25	9.39
Limit: 1W/30dBm		

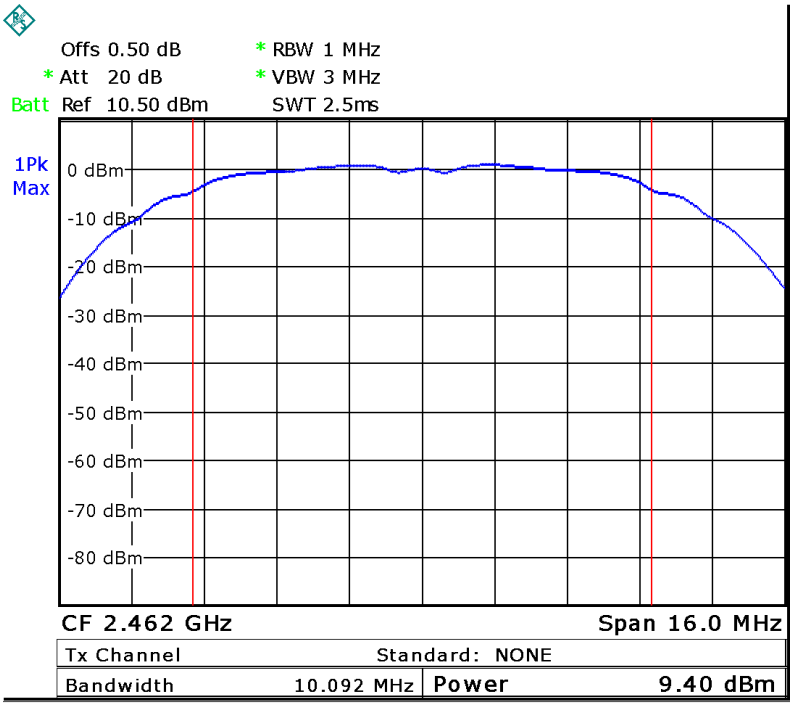
Mode: TX 11b channel 1



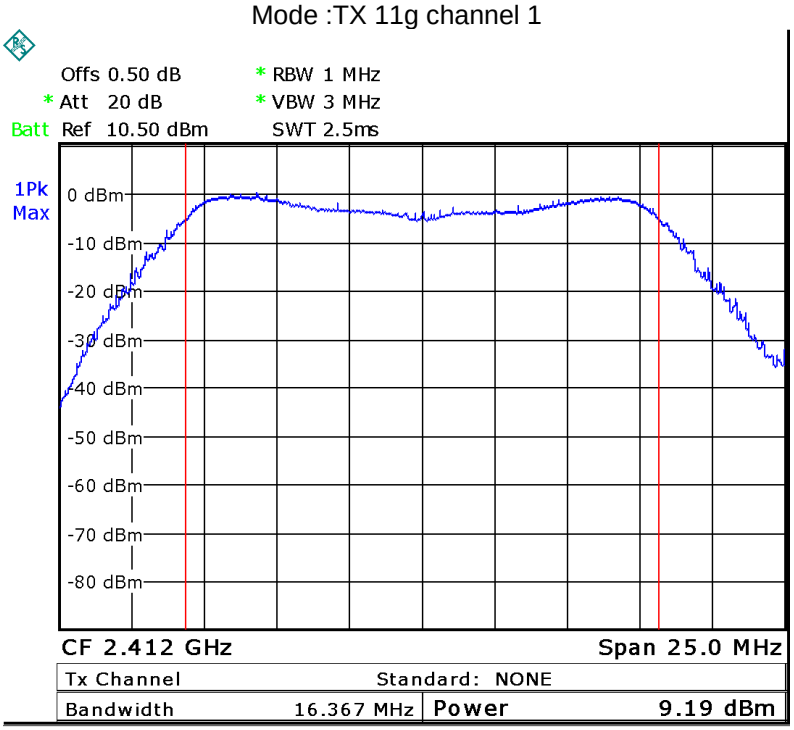
Mode: TX 11b channel 6



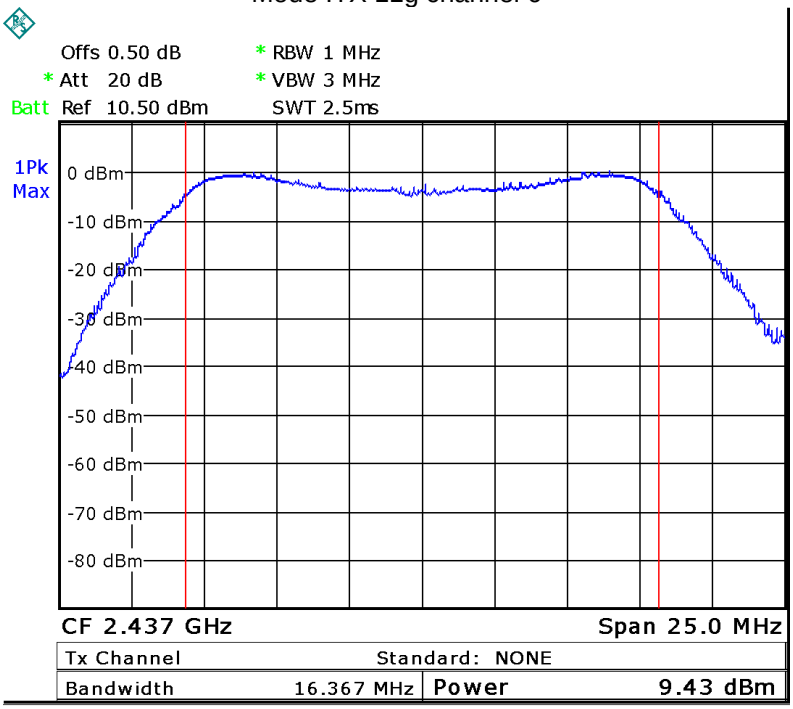
Mode: TX 11b channel 11



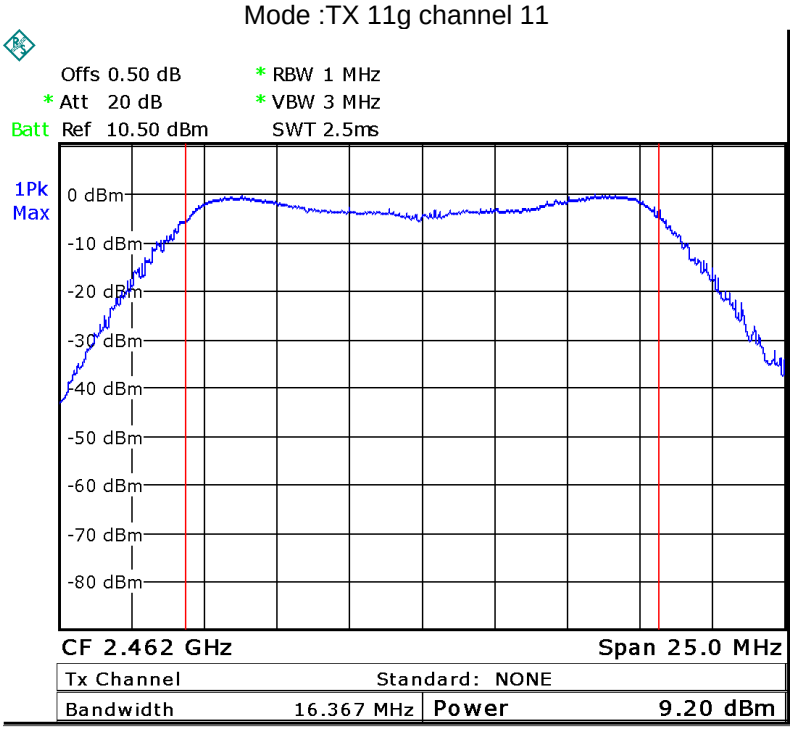
Mode :TX 11g channel 1



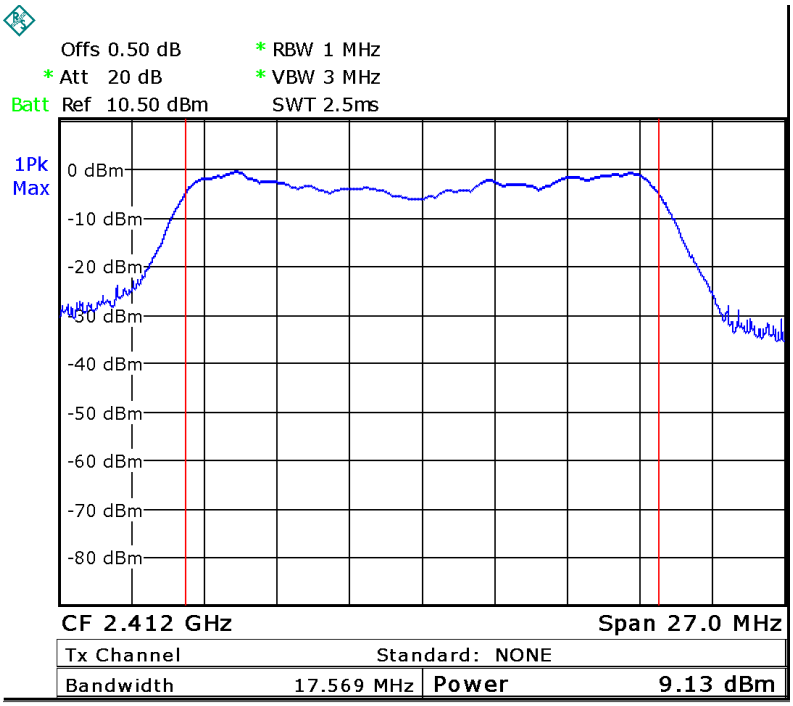
Mode :TX 11g channel 6



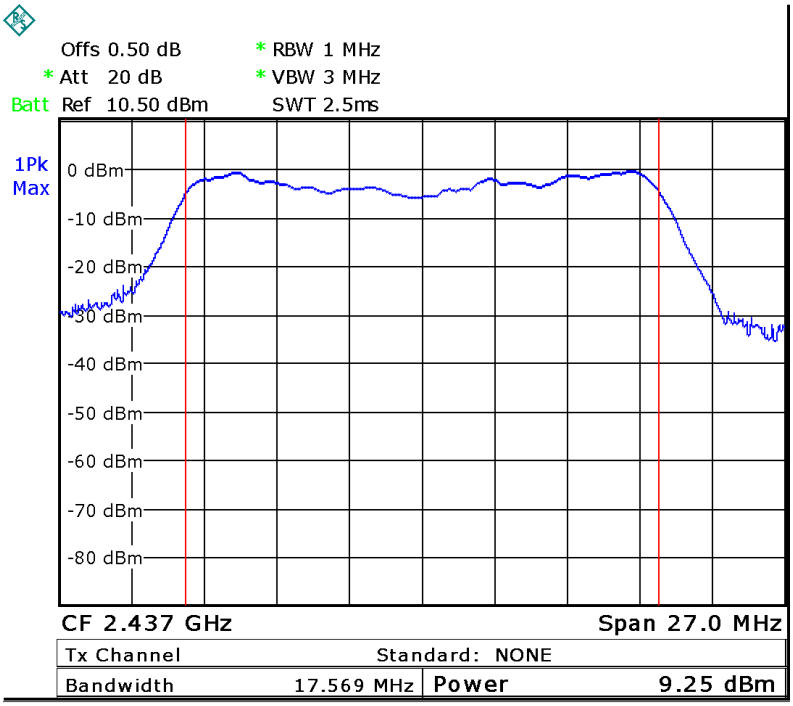
Mode :TX 11g channel 11



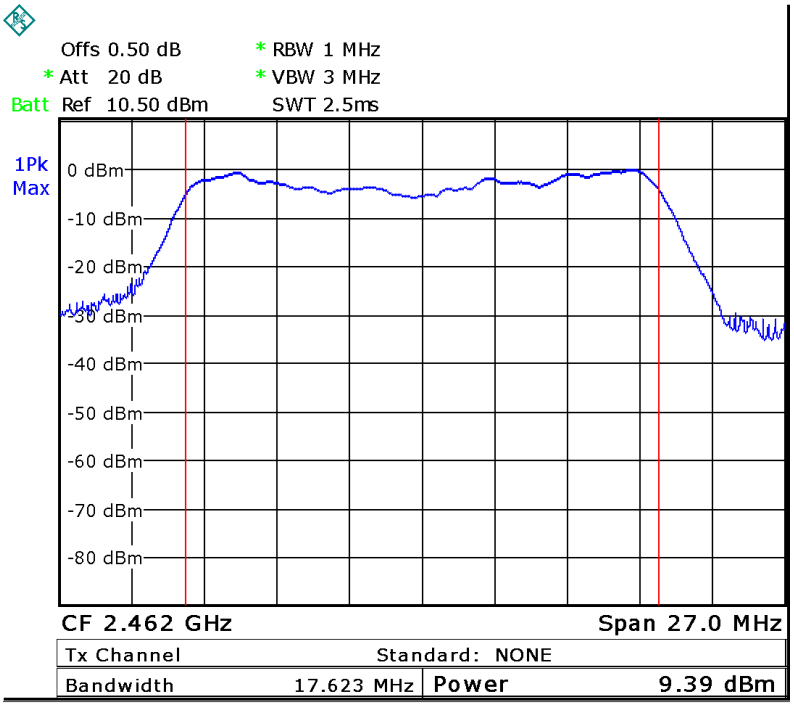
Mode: TX 11n HT20 channel 1



Mode: TX 11n HT20 channel 6



Mode: TX 11n HT20 channel 11



13 Power Spectral density

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB 558074 D01 DTS Meas Guidance v03r05 April 8, 2016

13.1 Test Procedure:

KDB 558074 D01 DTS Meas Guidance v03r05 April 8, 2016

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

2. Set the spectrum analyzer: RBW = 3kHz. VBW = 10kHz , Span = 1.5 times the DTS channel bandwidth(6 dB bandwidth). Sweep = auto; Detector Function = Peak. Trace = Max hold.

3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section Submit this plot.

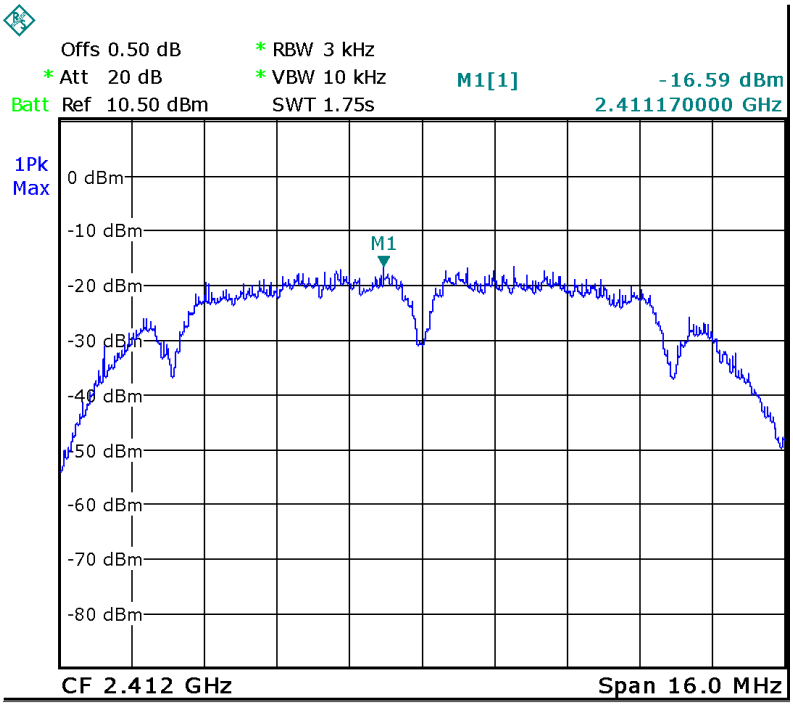
13.2 Test Result:

Test mode :TX 11b		
Power Spectral (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-16.59	-17.20	-17.46
Limit: 8dBm per 3kHz		

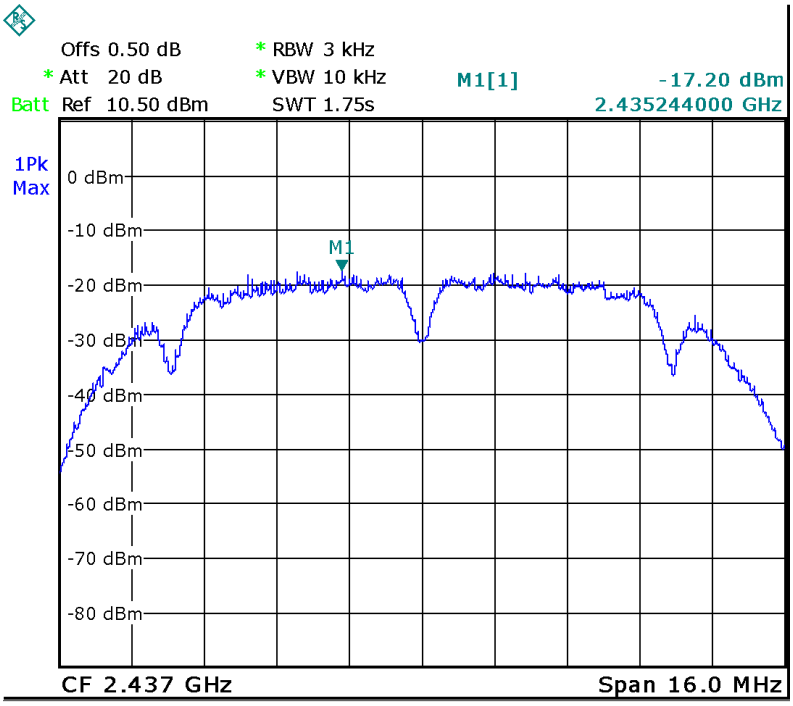
Test mode :TX 11g		
Power Spectral (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-23.20	-23.12	-22.16
Limit: 8dBm per 3kHz		

Test mode :TX 11n HT20		
Power Spectral (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-24.33	-24.43	-23.93
Limit: 8dBm per 3kHz		

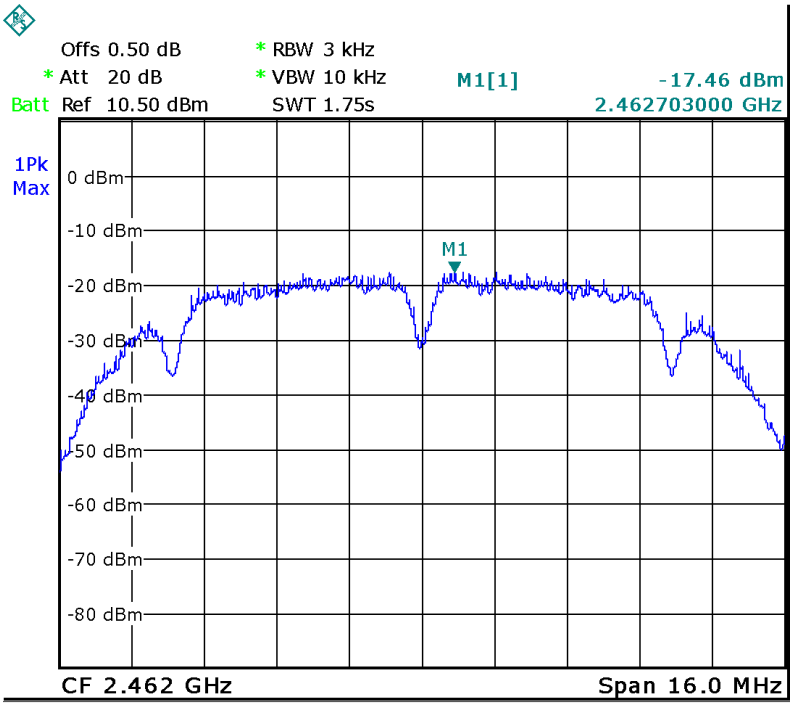
Test Plots
Mode: TX 11b channel 1



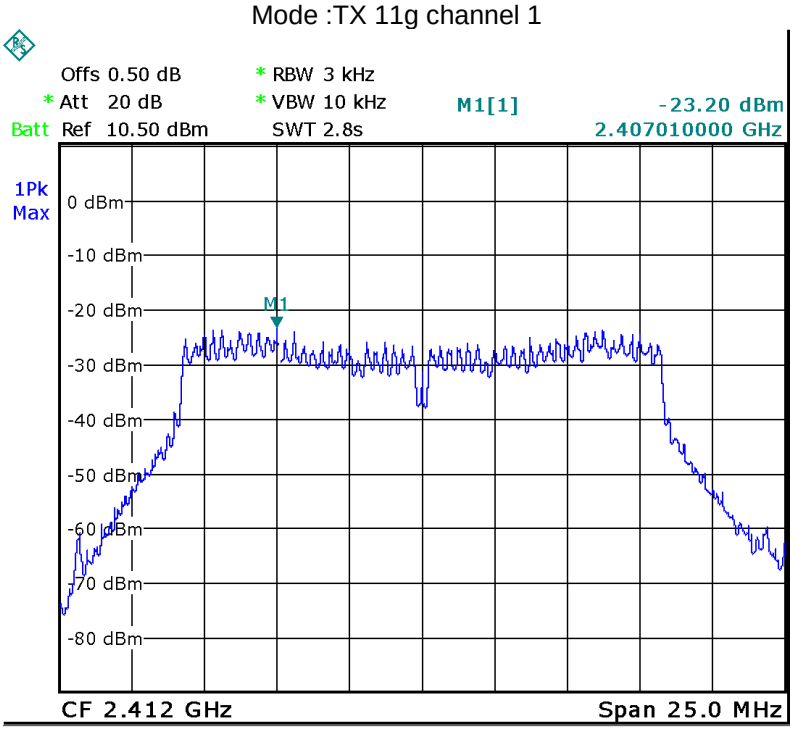
Mode: TX 11b channel 6



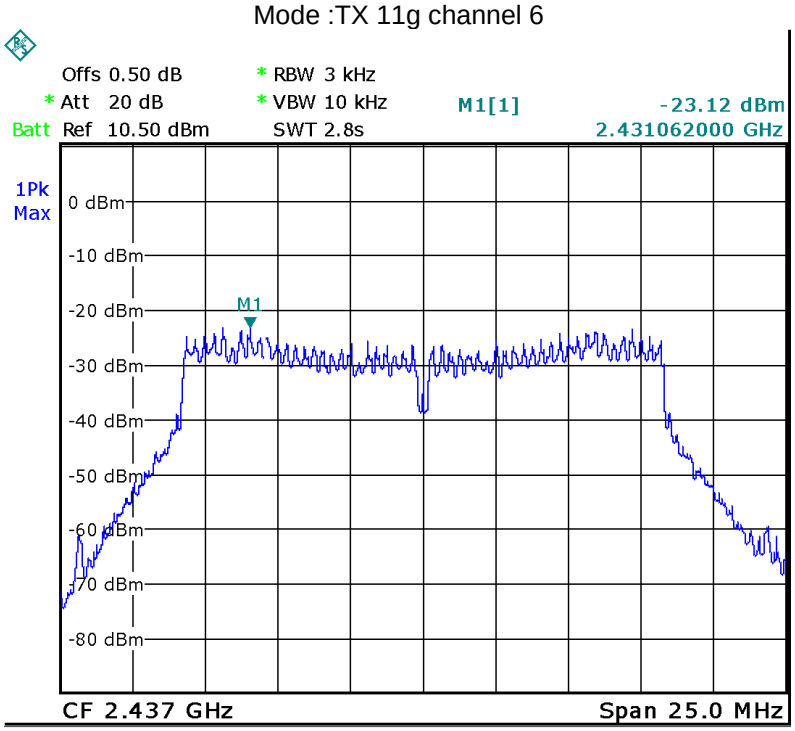
Mode: TX 11b channel 11



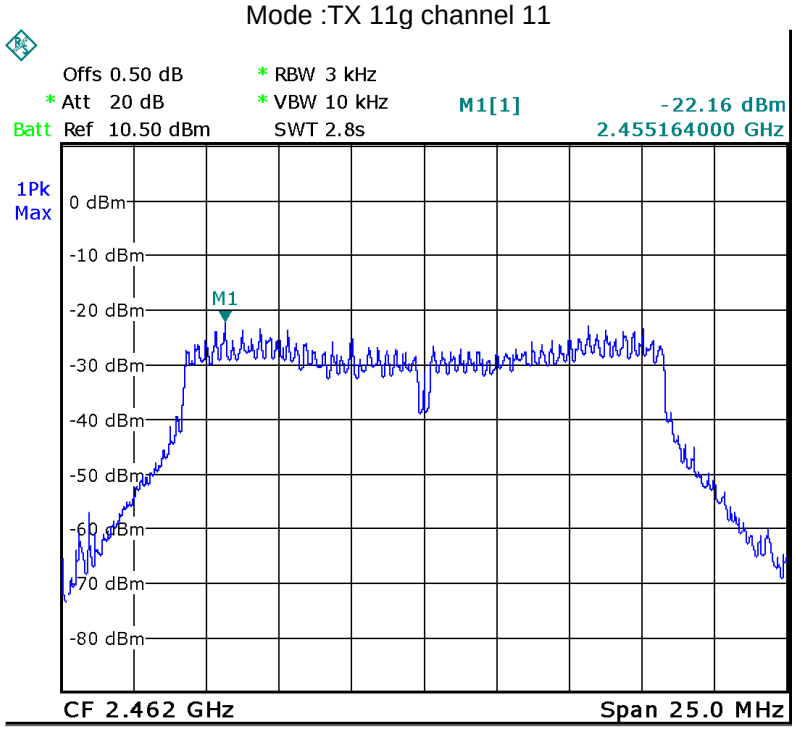
Mode :TX 11g channel 1



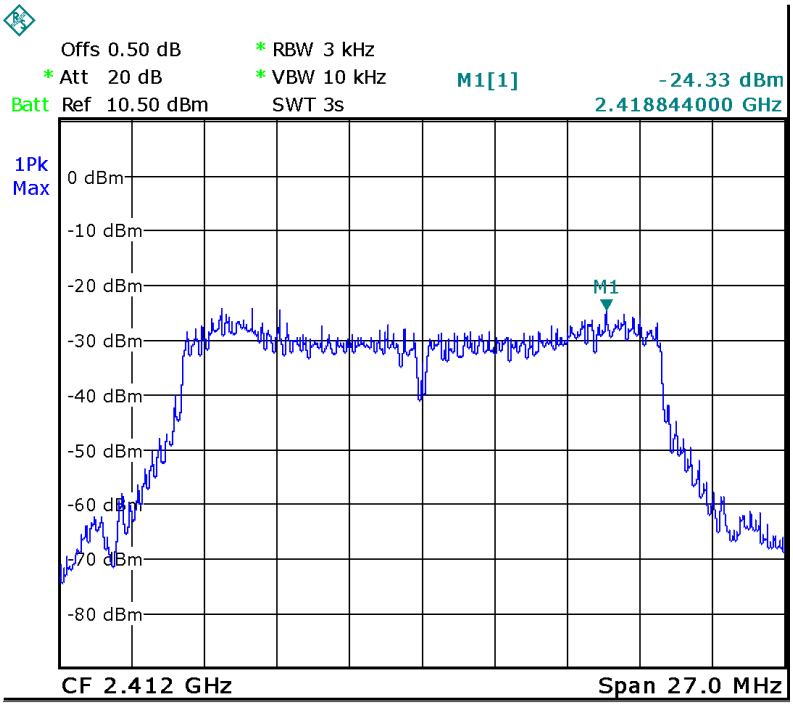
Mode :TX 11g channel 6



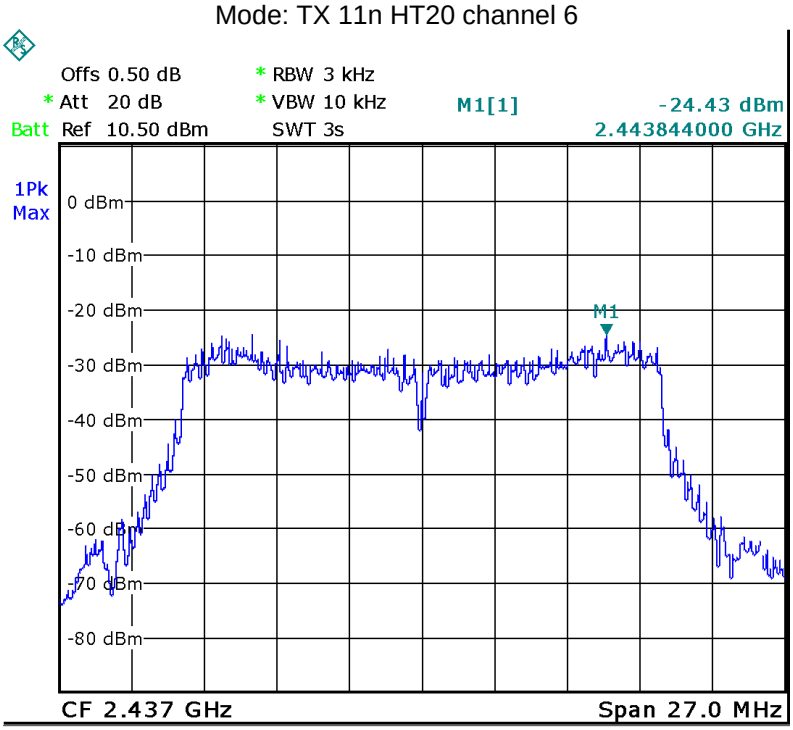
Mode :TX 11g channel 11



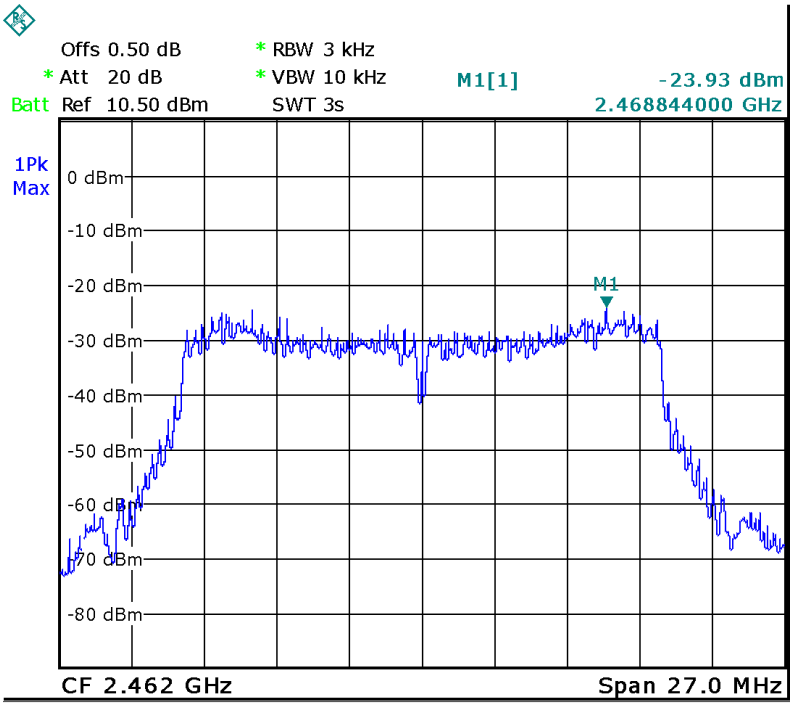
Mode: TX 11n HT20 channel 1



Mode: TX 11n HT20 channel 6



Mode: TX 11n HT20 channel 11



14 Antenna Requirement

According to the FCC Part 15 Paragraph 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. This product has an integrated antenna fulfill the requirement of this section.

15 RF Exposure

Remark: refer to SAR test report: WTS16S0960400E

======End of Report======