TEST REPORT

Reference No.	:	WTS17S1093493-2E
FCC ID	:	2AGTF-R520
Applicant	:	Distribuidora Sinn, S.A. de C.V.
Address	:	Lago Zurich No.219 Piso 12, Colonia Ampliacion Granada, Del.Miguel Hidalgo, Mexico City, Mexico
Manufacturer	:	Shenzhen Konka Telecommunications Technology Co., Ltd.
Address	:	No.9008 Shennan Avenue, Overseas Chinese Town, ShenZhen, P.R.China
Product Name	:	Smart Phone
Model No.	:	R520
Brand	:	RINNO
Standards	:	FCC CFR47 Part 15.247:2016
Date of Receipt sample	:	2017-07-08
Date of Test	:	2017-07-09 to 2017-11-24
Date of Issue	:	2017-11-25
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:

Ford Wang

Ford Wang / Project Engineer

Approved by:

Philo Zhong

Philo Zhong / Manager

2 Laboratories Introduction

Waltek Services Test Group Ltd. is one of the largest and the most comprehensive third party testing organizations in China, our headquarter located in Shenzhen (CNAS Registration No. L3110, A2LA Certificate Number: 4243.01) and have branches in Foshan (CNAS Registration No. L6478), Dongguan (CNAS Registration No. L9950), Zhongshan, Suzhou (CNAS Registration No. L7754), Ningbo and Hong Kong, Our test capability covered four large fields: safety test. Electronic Magnetic Compatibility(EMC), reliability and energy performance, Chemical test. Meanwhile, Waltek has got recognition as registration and accreditation laboratory from EMSD (Electrical and Mechanical Services Department), and American Energy star, FCC(The Federal Communications Commission), CPSC(Consumer Product Safety Commission), CEC(California energy efficiency), IC(Industry Canada) and ELI(Efficient Lighting Initiative). It's the strategic partner and data recognition laboratory of international authoritative organizations, such as UL, Intertek(ETL-SEMKO), CSA, TÜV Rheinland, TÜV SÜD, etc. As a professional, comprehensive, justice international test organization, we still keep the scientific and rigorous work attitude to help each client satisfy the international standards and assist their product enter into globe market smoothly.

Waltek Services (Shenzhen) Co., Ltd.

A. Accreditations for Conformity Assessment (International)

Country/Region	Accreditation Body	Scope	Note
USA	**CNAS (Registration No.: L3110) A2LA (Certificate No.: 4243.01)**	FCC ID \ DOC \ VOC	1
Canada		IC ID \ VOC	2
Japan		MIC-T \ MIC-R	-
Europe		EMCD \ RED	-
Taiwan		NCC	-
Hong Kong		OFCA	-
Australia		RCM	-
India	**International Services**	WPC	-
Thailand		NTC	-
Singapore		IDA	-

Note:
1. FCC Designation No.: CN1201. Test Firm Registration No.: 523476.
2. IC Canada Registration No.: 7760A

B. TCBs and Notify Bodies Recognized Testing Laboratory.

Recognized Testing Laboratory of …	Notify body number
TUV Rheinland	Optional.
Intertek	
TUV SUD	
SGS	
Phoenix Testlab GmbH	0700
Element Materials Technology Warwick Ltd	0891
Timco Engineering, Inc.	1177
Eurofins Product Service GmbH	0681

3 Contents

Page

1 COVER PAGE 1

2 LABORATORIES INTRODUCTION 2

3 CONTENTS 4

4 REVISION HISTORY 6

5 GENERAL INFORMATION 7

5.1 GENERAL DESCRIPTION OF E.U.T. 7
5.2 DETAILS OF E.U.T. 7
5.3 CHANNEL LIST 9
5.4 TEST MODE 9
5.5 SUBCONTRACTED 10

6 TEST SUMMARY 11

7 EQUIPMENT USED DURING TEST 12

7.1 EQUIPMENTS LIST 12
7.2 DESCRIPTION OF SUPPORT UNITS 13
7.3 MEASUREMENT UNCERTAINTY 13
7.4 TEST EQUIPMENT CALIBRATION 13

8 CONDUCTED EMISSION 14

8.1 E.U.T. OPERATION 14
8.2 EUT SETUP 14
8.3 MEASUREMENT DESCRIPTION 14
8.4 CONDUCTED EMISSION TEST RESULT 15

9 RADIATED EMISSIONS 19

9.1 EUT OPERATION 19
9.2 TEST SETUP 20
9.3 SPECTRUM ANALYZER SETUP 21
9.4 TEST PROCEDURE 22
9.5 CORRECTED AMPLITUDE & MARGIN CALCULATION 22
9.6 SUMMARY OF TEST RESULTS 23

10 CONDUCTED SPURIOUS EMISSIONS 39

10.1 TEST PROCEDURE 39
10.2 TEST RESULT 40

11 BAND EDGE MEASUREMENT 56

11.1 TEST PRODUCE 56
11.2 TEST RESULT 57

12 6 DB BANDWIDTH MEASUREMENT 62

12.1 TEST PROCEDURE: 62
12.2 TEST RESULT: 62

13 MAXIMUM PEAK OUTPUT POWER 71

13.1 TEST PROCEDURE: 71
13.2 TEST RESULT: 72

14 POWER SPECTRAL DENSITY 81

14.1 TEST PROCEDURE: 81
14.2 TEST RESULT: 81

15 ANTENNA REQUIREMENT 90

16 RF EXPOSURE 91

17 PHOTOGRAPHS OF TEST SETUP AND EUT. 92

4 Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTS17S10934 93-2E	2017-07-08	2017-07-09 to 2017-11-24	2017-11-25	original	-	Valid

5 General Information

5.1 General Description of E.U.T.

Product Name:	Smart Phone
Model No.:	R520
Model Description:	N/A
GSM Band(s):	GSM 850/900/1900MHz
GPRS/EGPRS Class:	12
WCDMA Band(s):	FDD Band II/IV/V/VIII
LTE Band(s):	FDD Band 2/4/7
Wi-Fi Specification:	2.4G-802.11b/g/n HT20/n HT40
Bluetooth Version:	Bluetooth v4.0 with BLE
GPS:	Support
NFC:	N/A
Hardware Version:	V1.0
Software Version:	KAA_SMART8_CLA_EN_N_1.02.601
Highest frequency (Exclude Radio):	1.25GHz
Storage Location:	Internal Storage
Note:	N/A

5.2 Details of E.U.T.

Operation Frequency:	GSM/GPRS/EDGE 850: 824~849MHz PCS/GPRS/EDGE 1900: 1850~1910MHz WCDMA Band II: 1850~1910MHz WCDMA Band V: 824~849MHz WCDMA Band IV:1710~1755MHz LTE Band 2: 1850~1910MHz LTE Band 4: 1710~1755MHz LTE Band 7: 2500-2570MHz WiFi: 802.11b/g/n HT20: 2412~2462MHz 802.11n HT40: 2422~2452MHz Bluetooth: 2402~2480MHz
Max. RF output power:	GSM 850: 32.88dBm PCS1900: 30.09dBm WCDMA Band II: 22.42dBm WCDMA Band V: 22.41dBm WCDMA Band IV: 22.54dBm

	LTE Band 2: 22.98dBm LTE Band 4: 22.88dBm LTE Band 7: 22.90dBm WiFi(2.4G): 9.50dBm Bluetooth: -1.39dBm
Type of Modulation:	GSM,GPRS: GMSK EDGE: GMSK, 8PSK WCDMA: BPSK, 16QAM LTE: QPSK, 16QAM WiFi: CCK, OFDM Bluetooth: GFSK, Pi/4 DQPSK, 8DPSK
Antenna installation:	GSM/WCDMA/LTE: internal permanent antenna WiFi/Bluetooth: internal permanent antenna
Antenna Gain:	GSM 850: -0.65dBi PCS1900: 0.75dBi WCDMA Band II: 0.75dBi WCDMA Band V: -0.65dBi WCDMA Band IV: 0.87dBi LTE Band 2: 0.75dBi LTE Band 4: 0.87dBi LTE Band 7: 0.79dBi WiFi(2.4G): -0.15dBi Bluetooth: -0.15dBi
Technical Data:	Battery DC 3.85V, 4000mAh DC 5V, 2.0A, charging from adapter (Adapter Input: 100-240V~50/60Hz 0.35A)
Adapter:	Manufacture: Shenzhen Kosun Industrial Co.,Ltd. Model No.: A8A-050200U-US1

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	-

BT BLE

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
0	2402	1	2404	2	2406	3	2408
4	2410	5	2412	6	2414	7	2416
8	2418	9	2420	10	2422	11	2424
12	2426	13	2428	14	2430	15	2432
16	2434	17	2436	18	2438	19	2440
20	2442	21	2444	22	2446	23	2448
24	2450	25	2452	26	2454	27	2456
28	2458	29	2460	30	2462	31	2464
32	2466	33	2468	34	2470	35	2472
36	2474	37	2476	38	2478	39	2480

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	1 Mbps	1/6/11	TX
	802.11g	6 Mbps	1/6/11	TX
	802.11n HT20	MCS0	1/6/11	TX
	802.11n HT40	MCS0	3/6/9	TX
Power Spectral Density	802.11b	1 Mbps	1/6/11	TX
	802.11g	6 Mbps	1/6/11	TX
	802.11n HT20	MCS0	1/6/11	TX
	802.11n HT40	MCS0	3/6/9	TX
6dB Bandwidth	802.11b	1 Mbps	1/6/11	TX
	802.11g	6 Mbps	1/6/11	TX
	802.11n HT20	MCS0	1/6/11	TX
	802.11n HT40	MCS0	3/6/9	TX

Band Edge	802.11b	1 Mbps	1/6/11	TX
	802.11g	6 Mbps	1/6/11	TX
	802.11n HT20	MCS0	1/6/11	TX
	802.11n HT40	MCS0	3/6/9	TX
Transmitter Spurious Emissions	802.11b	1 Mbps	1/6/11	TX
	802.11g	6 Mbps	1/6/11	TX
	802.11n HT20	MCS0	1/6/11	TX
	802.11n HT40	MCS0	3/6/9	TX

Table 2 Tests Carried Out Under FCC part 15.247

Test Items	Mode	Data Rate	Channel	TX/RX
Maximum Peak Output Power	BT BLE	1 Mbps	0/19/39	TX
Power Spectral Density	BT BLE	1 Mbps	0/19/39	TX
6dB Bandwidth	BT BLE	1 Mbps	0/19/39	TX
Band Edge	BT BLE	1 Mbps	0/19/39	TX
Transmitter Spurious Emissions	BT BLE	1 Mbps	0/19/39	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 Subcontracted

Whether parts of tests for the product have been subcontracted to other labs:

☐ Yes ☒ No

If Yes, list the related test items and lab information:

Test Lab:

Lab address:

6 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

Note 1: This smart phone R520 is exactly the same as original one SMART 8, the original FCC ID is UT3SMART8 and the original report is WTS17S0681404-2E. For market purpose, this only changed the adapter, so all the test data is based on original report WTS17S0681404-2E except for the adapter related test items.

Note 2: Retest the test data for 18-40GHz of spurious emissions.

7 Equipment Used during Test

7.1 Equipments List

Conducted Emissions Test Site 1#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1.	EMI Test Receiver	R&S	ESCI	100947	2017-09-12	2018-09-11
2.	LISN	R&S	ENV216	101215	2017-09-12	2018-09-11
3.	Cable	Top	TYPE16(3.5M)	-	2017-09-12	2018-09-11
Conducted Emissions Test Site 2#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1.	EMI Test Receiver	R&S	ESCI	101155	2017-09-12	2018-09-11
2.	LISN	SCHWARZBECK	NSLK 8128	8128-289	2017-09-12	2018-09-11
3.	Limiter	York	MTS-IMP-136	261115-001-0024	2017-09-12	2018-09-11
4.	Cable	LARGE	RF300	-	2017-09-12	2018-09-11
3m Semi-anechoic Chamber for Radiation Emissions Test site 1#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1	Spectrum Analyzer	R&S	FSP	100091	2017-04-29	2018-04-28
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	2017-04-09	2018-04-08
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	2017-04-09	2018-04-08
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	2017-09-12	2018-09-11
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	2017-04-09	2018-04-08
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	2017-04-09	2018-04-08
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	2017-04-13	2018-04-12
8	Coaxial Cable (above 1GHz)	Top	1GHz-25GHz	EW02014-7	2017-04-13	2018-04-12
3m Semi-anechoic Chamber for Radiation Emissions Test site 2#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No**	**Last Calibration Date**	**Calibration Due Date**
1	Test Receiver	R&S	ESCI	101296	2017-04-13	2018-04-12
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	2017-04-09	2018-04-08
3	Amplifier	Compliance pirection systems inc	PAP-0203	22024	2017-04-13	2018-04-12
4	Cable	HUBER+SUHNER	CBL2	525178	2017-04-13	2018-04-12

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	2017-09-12	2018-09-11
2.	Spectrum Analyzer (9k-6GHz)	R&S	FSL6	100959	2017-09-12	2018-09-11
3.	Signal Analyzer (9k~26.5GHz)	Agilent	N9010A	MY50520207	2017-09-12	2018-09-11

7.2 Description of Support Units

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

7.3 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 (Bilog antenna 30M~1000MHz)
	± 5.47 dB (Horn antenna 1000M~25000MHz)
Conducted Emissions test	± 3.64 dB (AC mains 150KHz~30MHz)
Conducted Spurious Emissions test	± 3.12 dB (9kHz~30MHz)
	± 4.21 dB (30M~1000MHz)
	± 5.14 dB (1000M~26500MHz)
Confidence interval：95%. Confidence factor:k=2	

7.4 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.

8 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:

Frequency (MHz)	Limit (dBμV)	
	Quasi-peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5	56	60
5 to 30	60	50

8.1 E.U.T. Operation

Operating Environment **:**

Temperature: 21.5 °C

Humidity: 51.9 % RH

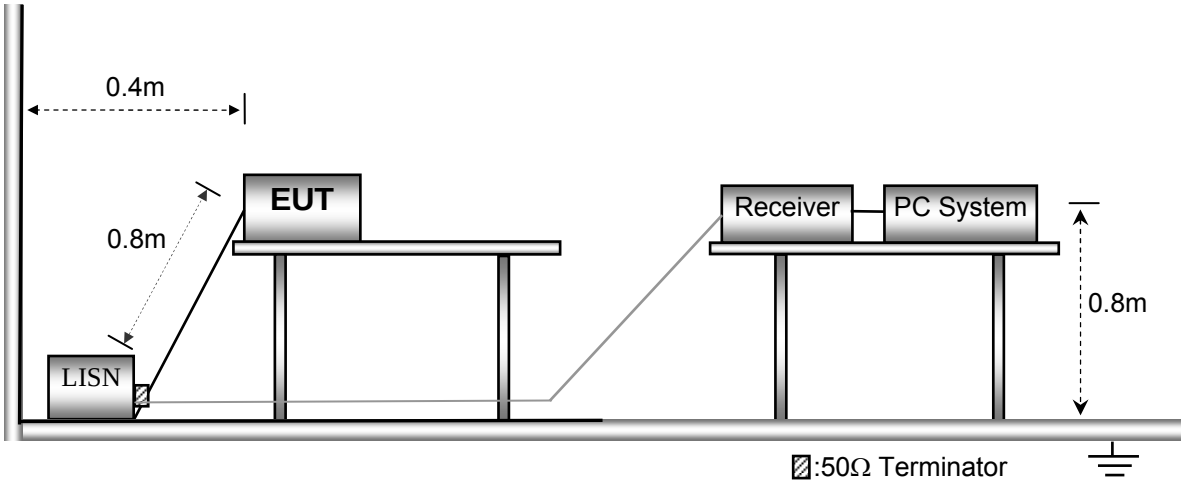
Atmospheric Pressure: 101.2kPa

EUT Operation **:**

The test was performed in TX transmitting mode, the worst data were shown in the report.

8.2 EUT Setup

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



8.3 Measurement Description

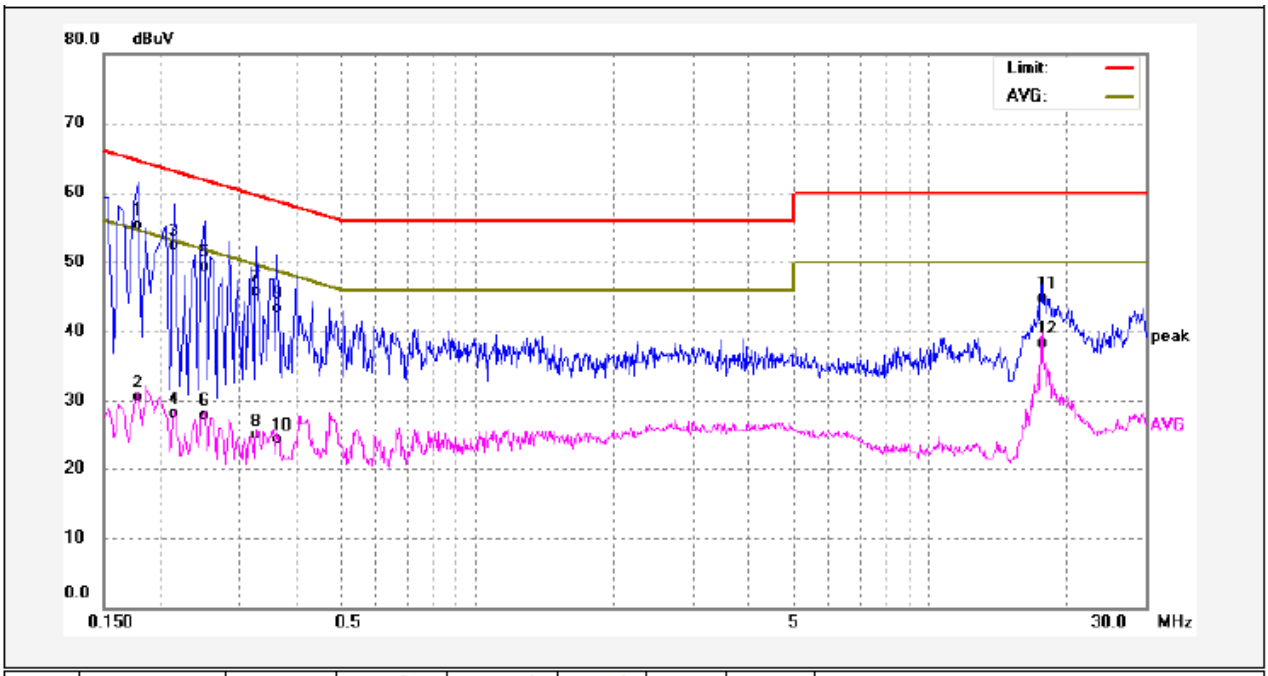
The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

8.4 Conducted Emission Test Result

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

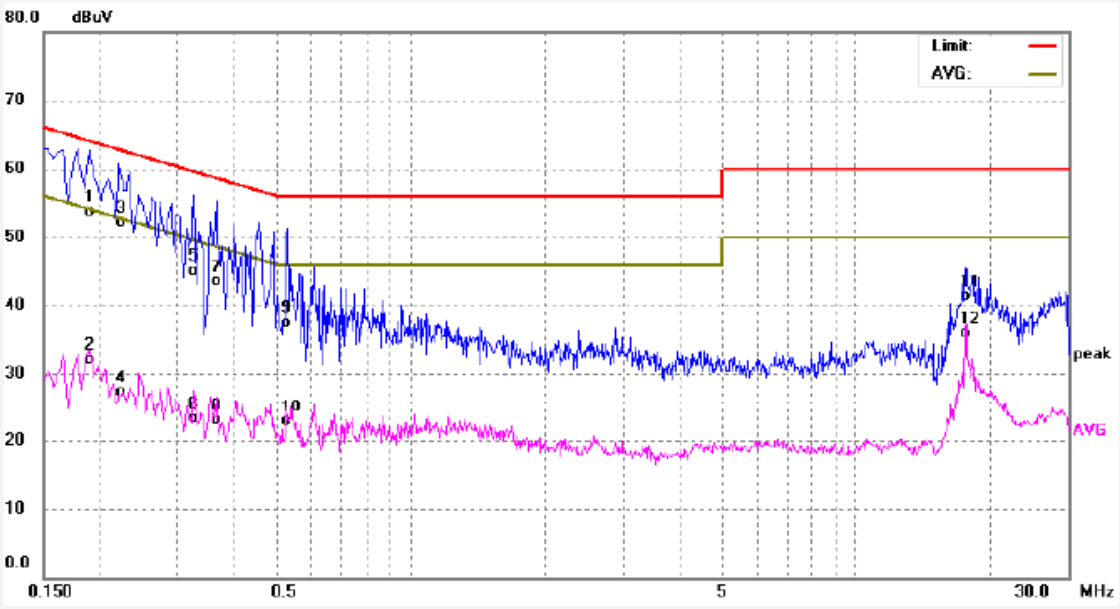
Worst Mode: WIFI mode (802.11b mode low channel)

Live line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1780	45.35	9.87	55.22	64.57	-9.35	QP	
2	0.1780	20.62	9.87	30.49	54.57	-24.08	AVG	
3	0.2140	42.37	9.94	52.31	63.04	-10.73	QP	
4	0.2140	18.09	9.94	28.03	53.04	-25.01	AVG	
5	0.2500	39.24	10.01	49.25	61.75	-12.50	QP	
6	0.2500	17.86	10.01	27.87	51.75	-23.88	AVG	
7	0.3260	35.77	10.02	45.79	59.55	-13.76	QP	
8	0.3260	14.87	10.02	24.89	49.55	-24.66	AVG	
9	0.3620	33.18	10.05	43.23	58.68	-15.45	QP	
10	0.3620	14.31	10.05	24.36	48.68	-24.32	AVG	
11	17.7220	34.29	10.43	44.72	60.00	-15.28	QP	
12	17.7220	27.96	10.43	38.39	50.00	-11.61	AVG	

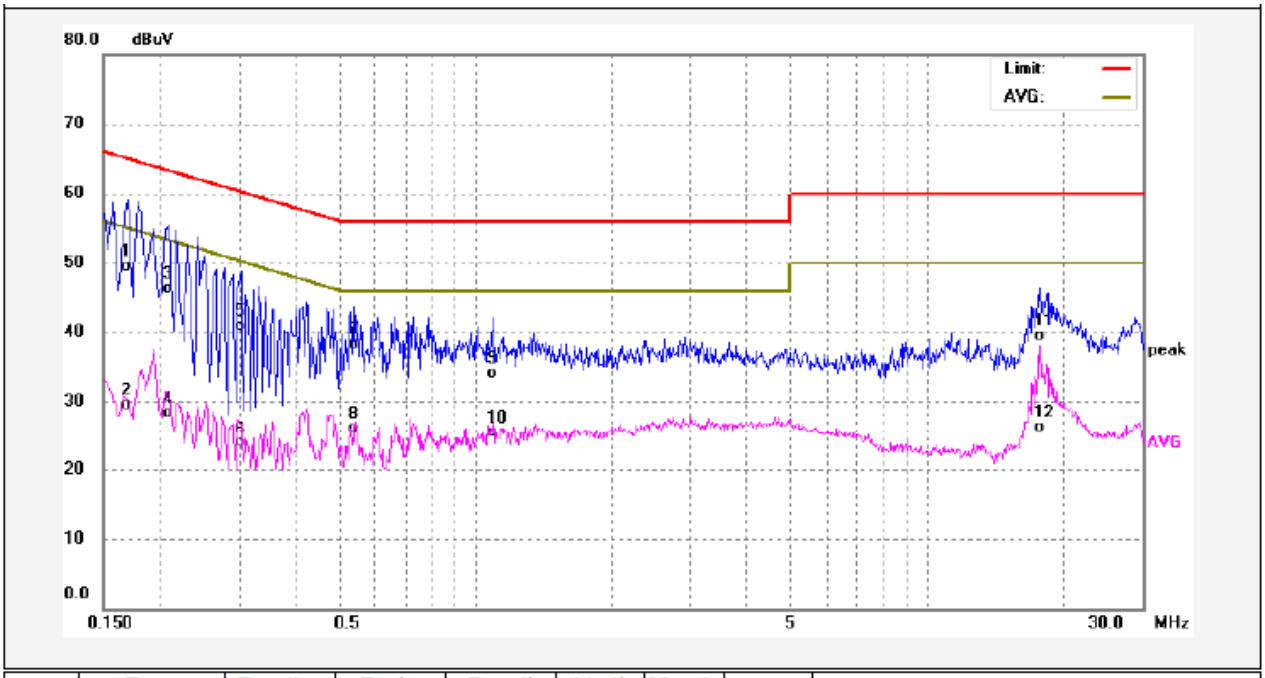
Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1900	43.79	9.90	53.69	64.03	-10.34	QP	
2	0.1900	22.19	9.90	32.09	54.03	-21.94	AVG	
3	0.2220	42.18	9.96	52.14	62.74	-10.60	QP	
4	0.2220	17.36	9.96	27.32	52.74	-25.42	AVG	
5	0.3260	35.03	10.02	45.05	59.55	-14.50	QP	
6	0.3260	13.35	10.02	23.37	49.55	-26.18	AVG	
7	0.3660	33.52	10.05	43.57	58.59	-15.02	QP	
8	0.3660	13.04	10.05	23.09	48.59	-25.50	AVG	
9	0.5299	27.38	10.07	37.45	56.00	-18.55	QP	
10	0.5299	12.80	10.07	22.87	46.00	-23.13	AVG	
11	17.6460	30.90	10.43	41.33	60.00	-18.67	QP	
12	17.6460	25.39	10.43	35.82	50.00	-14.18	AVG	

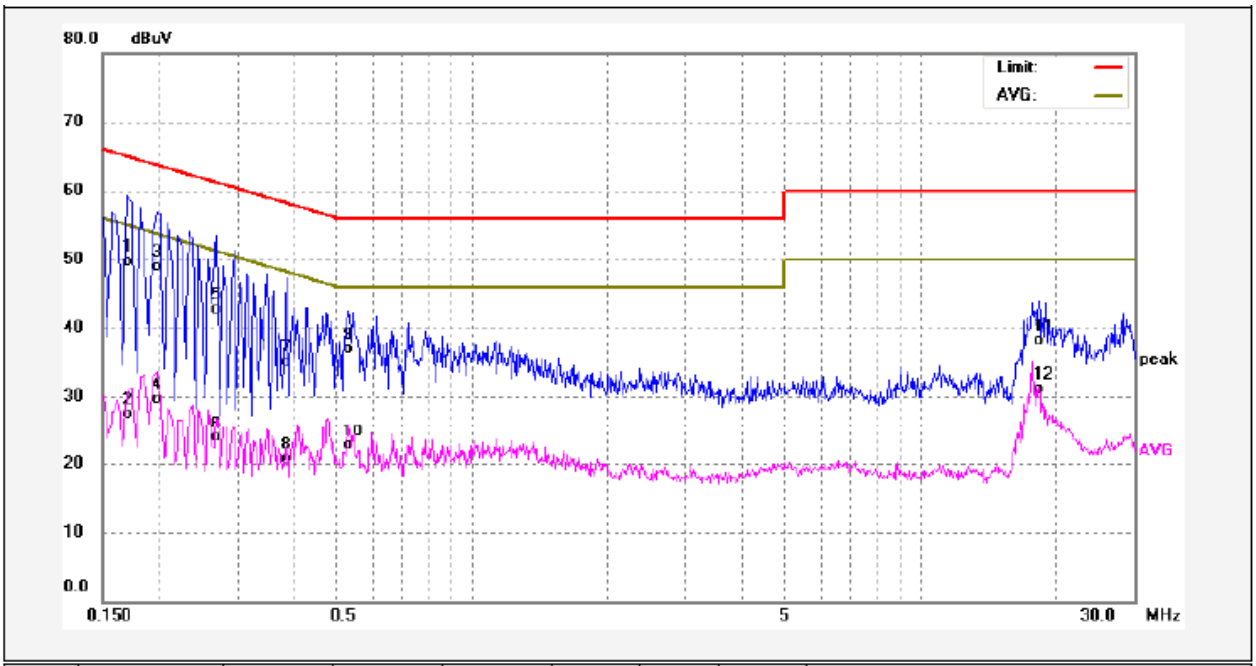
Worst Mode: BLE mode (low channel)

Live line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1700	39.65	9.86	49.51	64.96	-15.45	QP	
2	0.1700	19.61	9.86	29.47	54.96	-25.49	AVG	
3	0.2100	36.41	9.93	46.34	63.20	-16.86	QP	
4	0.2100	18.31	9.93	28.24	53.20	-24.96	AVG	
5	0.3020	30.98	9.98	40.96	60.19	-19.23	QP	
6	0.3020	13.90	9.98	23.88	50.19	-26.31	AVG	
7	0.5380	28.23	10.07	38.30	56.00	-17.70	QP	
8	0.5380	15.99	10.07	26.06	46.00	-19.94	AVG	
9	1.0900	23.90	10.24	34.14	56.00	-21.86	QP	
10	1.0900	15.33	10.24	25.57	46.00	-20.43	AVG	
11	17.7700	29.14	10.43	39.57	60.00	-20.43	QP	
12	17.7700	15.84	10.43	26.27	50.00	-23.73	AVG	

Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1700	39.84	9.86	49.70	64.96	-15.26	QP	
2	0.1700	17.66	9.86	27.52	54.96	-27.44	AVG	
3	0.1980	39.07	9.91	48.98	63.69	-14.71	QP	
4	0.1980	19.78	9.91	29.69	53.69	-24.00	AVG	
5	0.2700	32.70	10.00	42.70	61.12	-18.42	QP	
6	0.2700	13.96	10.00	23.96	51.12	-27.16	AVG	
7	0.3860	24.99	10.04	35.03	58.15	-23.12	QP	
8	0.3860	10.60	10.04	20.64	48.15	-27.51	AVG	
9	0.5299	26.77	10.07	36.84	56.00	-19.16	QP	
10	0.5299	12.58	10.07	22.65	46.00	-23.35	AVG	
11	18.3580	27.57	10.44	38.01	60.00	-21.99	QP	
12	18.3580	20.68	10.44	31.12	50.00	-18.88	AVG	

9 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	$20\log^{(500)}$

9.1 EUT Operation

Operating Environment **:**

Temperature: 23.5 °C

Humidity: 52.1 % RH

Atmospheric Pressure: 101.2kPa

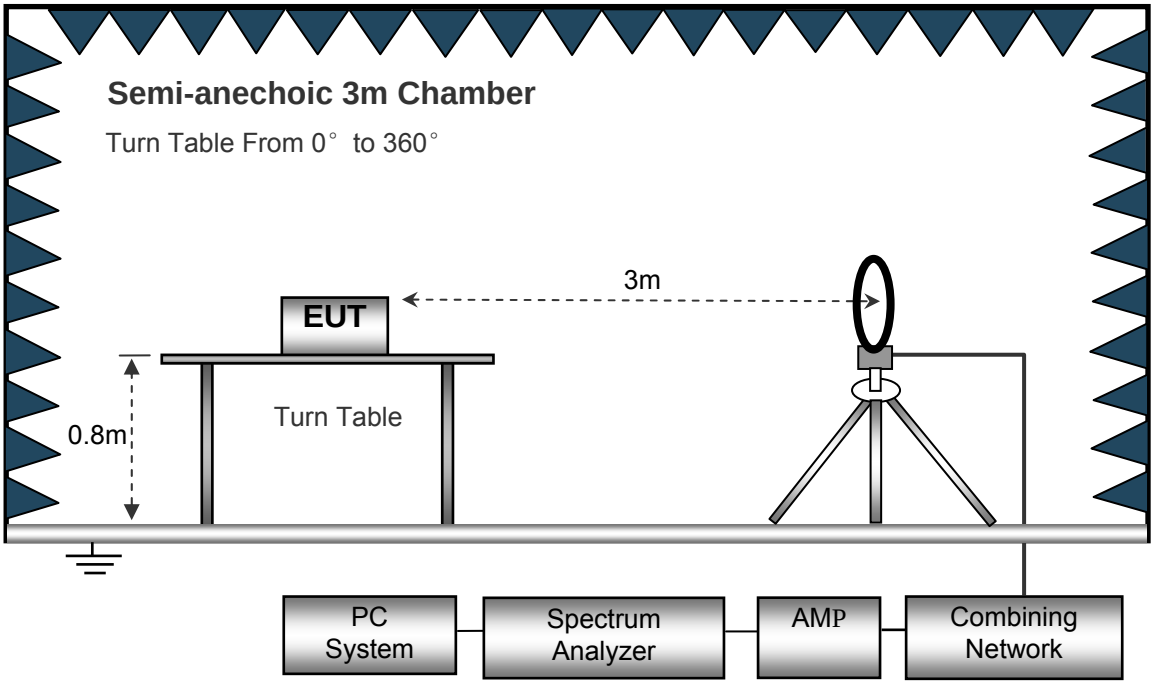
EUT Operation **:**

The test was performed in TX transmitting mode, the test data were shown in the report.

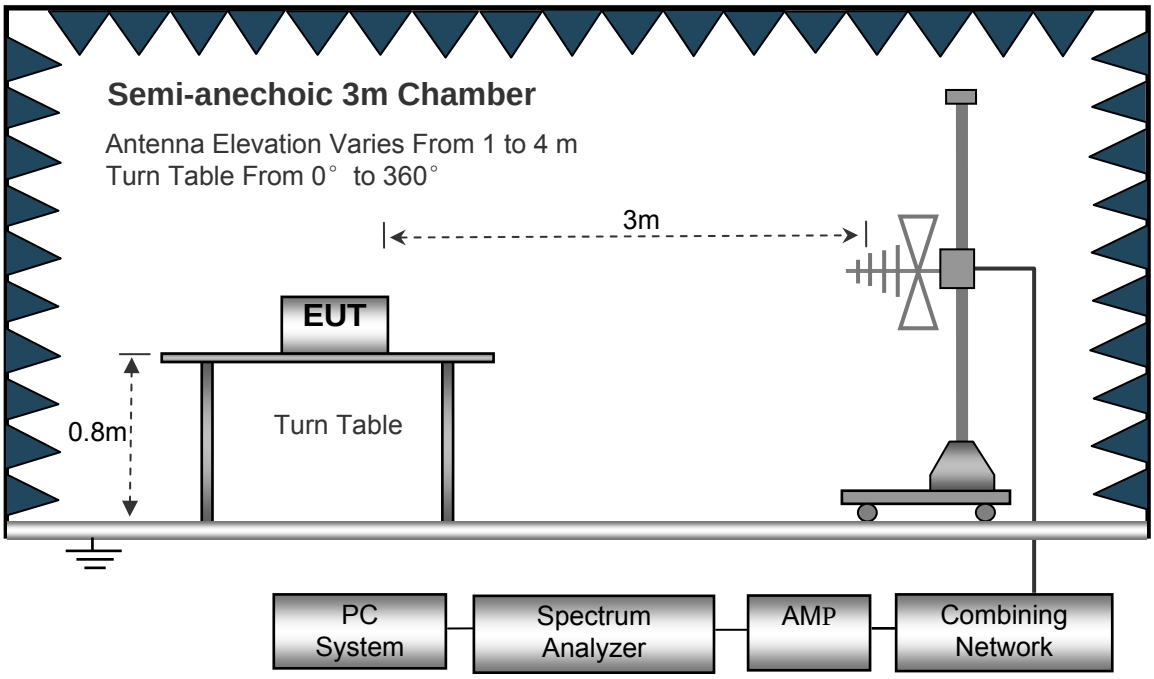
9.2 Test Setup

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

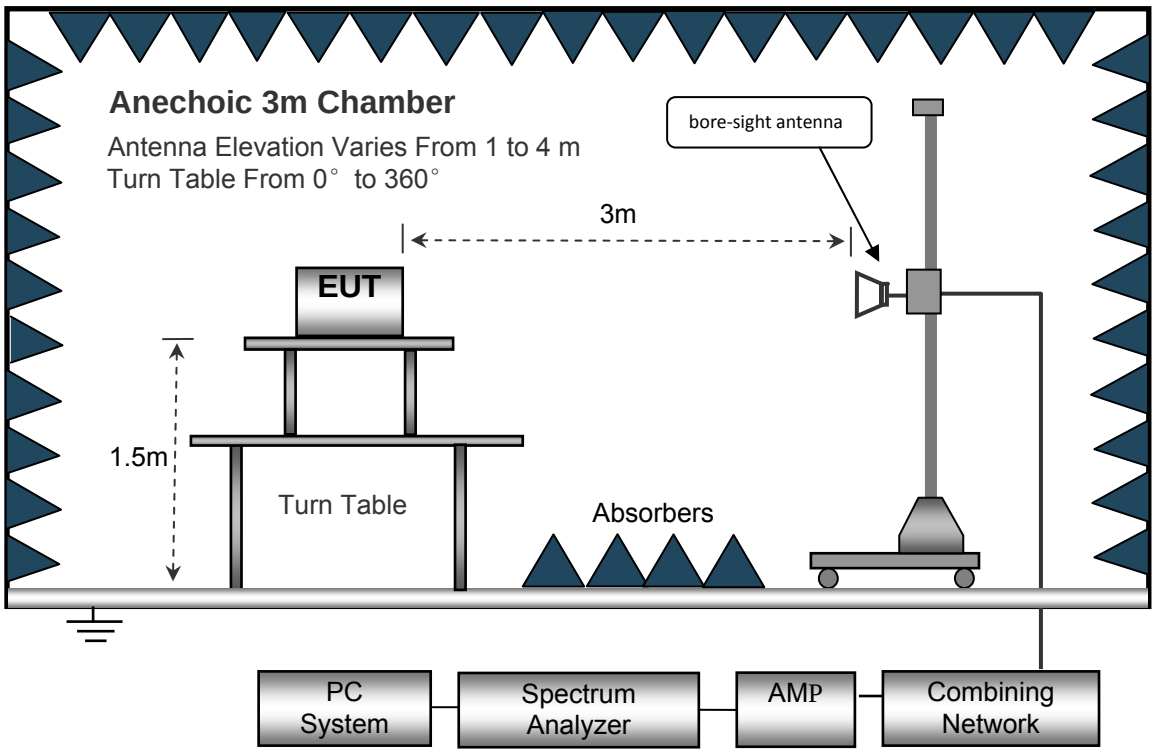
The test setup for emission measurement below 30MHz.



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



The test setup for emission measurement above 1 GHz.



9.3 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

9.4 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.

9.5 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

9.6 Summary of Test Results

Wifi:
Test Frequency: 9KHz~30MHz

Remark: only the worst data (Low channel 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
802.11b							
6.173	25.68	QP	21.84	40.00	7.52	29.54	-22.02
11.462	25.93	QP	21.02	40.00	6.95	29.54	-22.59
26.127	25.71	QP	20.55	40.00	6.26	29.54	-23.28
802.11g							
6.173	25.21	QP	21.84	40.00	7.05	29.54	-22.49
11.462	26.57	QP	21.02	40.00	7.59	29.54	-21.95
26.127	26.25	QP	20.55	40.00	6.80	29.54	-22.74
802.11n(HT20)							
6.173	26.58	QP	21.84	40.00	8.42	29.54	-21.12
11.462	26.82	QP	21.02	40.00	7.84	29.54	-21.70
26.127	25.71	QP	20.55	40.00	6.26	29.54	-23.28
802.11n(HT40)							
6.173	26.08	QP	21.84	40.00	7.92	29.54	-21.62
11.462	26.49	QP	21.02	40.00	7.51	29.54	-22.03
26.127	25.74	QP	20.55	40.00	6.29	29.54	-23.25

Test Frequency : 30MHz ~ 18GHz

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
11b: Low Channel 2412MHz									
225.46	41.62	QP	155.13	1.63	H	11.02	30.60	46.00	-15.40
225.46	35.76	QP	335.02	1.87	V	11.02	24.74	46.00	-21.26
4824.00	52.49	PK	231.46	1.01	V	1.08	51.41	74.00	-22.59
4824.00	41.66	Ave	231.46	1.01	V	1.08	40.58	54.00	-13.42
7236.00	42.61	PK	255.87	1.51	H	1.33	43.94	74.00	-30.06
7236.00	40.09	Ave	255.87	1.51	H	1.33	41.42	54.00	-12.58
2335.40	45.59	PK	275.03	1.07	V	13.11	32.48	74.00	-41.52
2335.40	37.35	Ave	275.03	1.07	V	13.11	24.24	54.00	-29.76
2384.64	42.55	PK	110.35	1.58	H	13.06	29.49	74.00	-44.51
2384.64	36.41	Ave	110.35	1.58	H	13.04	23.37	54.00	-30.63
2491.27	42.39	PK	146.79	1.74	V	13.00	29.39	74.00	-44.61
2491.27	38.32	Ave	146.79	1.74	V	13.00	25.32	54.00	-28.68

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
11b: Middle Channel 2437MHz									
225.46	41.26	QP	28.14	1.07	H	11.02	30.24	46.00	-15.76
225.46	35.89	QP	50.52	1.34	V	11.02	24.87	46.00	-21.13
4874.00	51.86	PK	171.08	1.62	V	1.08	50.78	74.00	-23.22
4874.00	42.12	Ave	171.08	1.62	V	1.08	41.04	54.00	-12.96
7311.00	43.79	PK	16.34	1.43	H	2.21	46.00	74.00	-28.00
7311.00	40.79	Ave	16.34	1.43	H	2.21	43.00	54.00	-11.00
2314.31	46.64	PK	291.74	1.93	V	13.19	33.45	74.00	-40.55
2314.31	38.60	Ave	291.74	1.93	V	13.19	25.41	54.00	-28.59
2359.17	43.30	PK	105.75	1.94	H	13.14	30.16	74.00	-43.84
2359.17	37.20	Ave	105.75	1.94	H	13.14	24.06	54.00	-29.94
2485.40	42.30	PK	109.69	1.82	V	13.08	29.22	74.00	-44.78
2485.40	37.98	Ave	109.69	1.82	V	13.08	24.90	54.00	-29.10

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
11b: High Channel 2462MHz									
225.46	42.72	QP	251.34	1.84	H	11.02	31.70	46.00	-14.30
225.46	37.07	QP	337.19	1.08	V	11.02	26.05	46.00	-19.95
4924.00	53.00	PK	328.03	1.66	V	1.08	51.92	74.00	-22.08
4924.00	41.80	Ave	328.03	1.66	V	1.08	40.72	54.00	-13.28
7386.00	44.33	PK	308.25	1.54	H	2.84	47.17	74.00	-26.83
7386.00	39.78	Ave	308.25	1.54	H	2.84	42.62	54.00	-11.38
2343.25	46.08	PK	278.61	1.98	V	13.11	32.97	74.00	-41.03
2343.25	38.58	Ave	278.61	1.98	V	13.11	25.47	54.00	-28.53
2370.80	42.11	PK	329.49	1.64	H	13.06	29.05	74.00	-44.95
2370.80	37.71	Ave	329.49	1.64	H	13.04	24.67	54.00	-29.33
2484.97	44.87	PK	141.41	1.22	V	13.00	31.87	74.00	-42.13
2484.97	36.43	Ave	141.41	1.22	V	13.00	23.43	54.00	-30.57

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
11g: Low Channel 2412MHz									
225.46	41.43	QP	235.75	1.36	H	11.02	30.41	46.00	-15.59
225.46	38.38	QP	256.13	1.26	V	11.02	27.36	46.00	-18.64
4824.00	52.10	PK	309.04	1.04	V	1.08	51.02	74.00	-22.98
4824.00	42.21	Ave	309.04	1.04	V	1.08	41.13	54.00	-12.87
7236.00	45.08	PK	129.60	1.31	H	1.33	46.41	74.00	-27.59
7236.00	40.61	Ave	129.60	1.31	H	1.33	41.94	54.00	-12.06
2330.99	46.74	PK	23.35	1.70	V	13.11	33.63	74.00	-40.37
2330.99	37.65	Ave	23.35	1.70	V	13.11	24.54	54.00	-29.46
2366.38	44.23	PK	62.94	1.65	H	13.06	31.17	74.00	-42.83
2366.38	37.32	Ave	62.94	1.65	H	13.04	24.28	54.00	-29.72
2488.36	42.68	PK	66.53	1.41	V	13.00	29.68	74.00	-44.32
2488.36	38.94	Ave	66.53	1.41	V	13.00	25.94	54.00	-28.06

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
11g: Middle Channel 2437MHz									
225.46	40.69	QP	16.84	1.12	H	11.02	29.67	46.00	-16.33
225.46	38.21	QP	320.12	1.79	V	11.02	27.19	46.00	-18.81
4874.00	52.38	PK	227.89	1.19	V	1.08	51.30	74.00	-22.70
4874.00	41.57	Ave	227.89	1.19	V	1.08	40.49	54.00	-13.51
7311.00	46.37	PK	18.06	1.35	H	2.21	48.58	74.00	-25.42
7311.00	41.17	Ave	18.06	1.35	H	2.21	43.38	54.00	-10.62
2317.92	46.40	PK	227.07	1.73	V	13.11	33.29	74.00	-40.71
2317.92	37.01	Ave	227.07	1.73	V	13.11	23.90	54.00	-30.10
2377.16	44.77	PK	223.73	1.84	H	13.06	31.71	74.00	-42.29
2377.16	36.05	Ave	223.73	1.84	H	13.04	23.01	54.00	-30.99
2495.92	42.76	PK	151.79	1.47	V	13.00	29.76	74.00	-44.24
2495.92	37.92	Ave	151.79	1.47	V	13.00	24.92	54.00	-29.08

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
11g: High Channel 2462MHz									
225.46	39.88	QP	142.88	1.37	H	11.02	28.86	46.00	-17.14
225.46	37.63	QP	113.57	1.42	V	11.02	26.61	46.00	-19.39
4924.00	51.59	PK	238.25	1.73	V	1.08	50.51	74.00	-23.49
4924.00	41.08	Ave	238.25	1.73	V	1.08	40.00	54.00	-14.00
7386.00	47.77	PK	290.91	1.45	H	2.84	50.61	74.00	-23.39
7386.00	41.38	Ave	290.91	1.45	H	2.84	44.22	54.00	-9.78
2313.80	46.95	PK	112.01	1.36	V	13.11	33.84	74.00	-40.16
2313.80	38.59	Ave	112.01	1.36	V	13.11	25.48	54.00	-28.52
2378.70	44.94	PK	123.29	1.04	H	13.06	31.88	74.00	-42.12
2378.70	36.44	Ave	123.29	1.04	H	13.04	23.40	54.00	-30.60
2497.98	42.08	PK	59.27	1.13	V	13.00	29.08	74.00	-44.92
2497.98	38.44	Ave	59.27	1.13	V	13.00	25.44	54.00	-28.56

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
11n20: Low Channel 2412MHz									
225.46	39.00	QP	211.30	1.43	H	11.02	27.98	46.00	-18.02
225.46	36.13	QP	123.31	1.71	V	11.02	25.11	46.00	-20.89
4824.00	53.06	PK	223.68	1.21	V	1.08	51.98	74.00	-22.02
4824.00	39.62	Ave	223.68	1.21	V	1.08	38.54	54.00	-15.46
7236.00	46.35	PK	353.08	1.41	H	1.33	47.68	74.00	-26.32
7236.00	40.59	Ave	353.08	1.41	H	1.33	41.92	54.00	-12.08
2339.62	45.69	PK	34.32	1.83	V	13.11	32.58	74.00	-41.42
2339.62	39.10	Ave	34.32	1.83	V	13.11	25.99	54.00	-28.01
2370.21	42.16	PK	189.75	1.39	H	13.06	29.10	74.00	-44.90
2370.21	37.07	Ave	189.75	1.39	H	13.04	24.03	54.00	-29.97
2486.66	43.21	PK	274.02	1.92	V	13.00	30.21	74.00	-43.79
2486.66	38.72	Ave	274.02	1.92	V	13.00	25.72	54.00	-28.28

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
11n20: Middle Channel 2437MHz									
225.46	38.13	QP	243.31	1.78	H	11.02	27.11	46.00	-18.89
225.46	36.93	QP	36.48	1.06	V	11.02	25.91	46.00	-20.09
4874.00	53.92	PK	305.98	1.16	V	1.08	52.84	74.00	-21.16
4874.00	40.38	Ave	305.98	1.16	V	1.08	39.30	54.00	-14.70
7311.00	45.76	PK	14.04	1.77	H	2.21	47.97	74.00	-26.03
7311.00	42.05	Ave	14.04	1.77	H	2.21	44.26	54.00	-9.74
2325.61	45.30	PK	339.61	1.47	V	13.11	32.19	74.00	-41.81
2325.61	39.94	Ave	339.61	1.47	V	13.11	26.83	54.00	-27.17
2355.54	44.16	PK	112.92	1.96	H	13.06	31.10	74.00	-42.90
2355.54	38.49	Ave	112.92	1.96	H	13.04	25.45	54.00	-28.55
2498.88	43.16	PK	206.03	1.90	V	13.00	30.16	74.00	-43.84
2498.88	37.22	Ave	206.03	1.90	V	13.00	24.22	54.00	-29.78

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
11n20: High Channel 2462MHz									
225.46	39.06	QP	35.17	1.80	H	11.02	28.04	46.00	-17.96
225.46	37.58	QP	54.21	1.86	V	11.02	26.56	46.00	-19.44
4924.00	55.27	PK	68.19	1.76	V	1.08	54.19	74.00	-19.81
4924.00	40.35	Ave	68.19	1.76	V	1.08	39.27	54.00	-14.73
7386.00	46.01	PK	94.32	1.40	H	2.84	48.85	74.00	-25.15
7386.00	42.94	Ave	94.32	1.40	H	2.84	45.78	54.00	-8.22
2330.95	46.92	PK	281.85	1.45	V	13.11	33.81	74.00	-40.19
2330.95	37.72	Ave	281.85	1.45	V	13.11	24.61	54.00	-29.39
2365.56	43.78	PK	141.60	1.09	H	13.06	30.72	74.00	-43.28
2365.56	38.94	Ave	141.60	1.09	H	13.04	25.90	54.00	-28.10
2494.87	42.08	PK	267.12	1.89	V	13.00	29.08	74.00	-44.92
2494.87	38.88	Ave	267.12	1.89	V	13.00	25.88	54.00	-28.12

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
11n40: Low Channel 2422MHz									
225.46	37.80	QP	155.65	1.57	H	11.02	26.78	46.00	-19.22
225.46	38.79	QP	226.60	1.85	V	11.02	27.77	46.00	-18.23
4844.00	53.05	PK	288.15	1.45	V	1.08	51.97	74.00	-22.03
4844.00	37.68	Ave	288.15	1.45	V	1.08	36.60	54.00	-17.40
7266.00	43.96	PK	230.97	1.35	H	1.33	45.29	74.00	-28.71
7266.00	40.09	Ave	230.97	1.35	H	1.33	41.42	54.00	-12.58
2333.64	45.83	PK	98.16	1.02	V	13.11	32.72	74.00	-41.28
2333.64	38.25	Ave	98.16	1.02	V	13.11	25.14	54.00	-28.86
2373.30	42.47	PK	103.26	1.36	H	13.06	29.41	74.00	-44.59
2373.30	36.17	Ave	103.26	1.36	H	13.04	23.13	54.00	-30.87
2498.30	44.64	PK	262.16	1.12	V	13.00	31.64	74.00	-42.36
2498.30	36.06	Ave	262.16	1.12	V	13.00	23.06	54.00	-30.94

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
11n40: Middle Channel 2437MHz									
225.46	38.35	QP	107.04	1.45	H	11.02	27.33	46.00	-18.67
225.46	38.13	QP	264.69	1.08	V	11.02	27.11	46.00	-18.89
4874.00	53.18	PK	344.23	1.20	V	1.08	52.10	74.00	-21.90
4874.00	38.37	Ave	344.23	1.20	V	1.08	37.29	54.00	-16.71
7311.00	44.76	PK	346.36	1.96	H	2.21	46.97	74.00	-27.03
7311.00	39.85	Ave	346.36	1.96	H	2.21	42.06	54.00	-11.94
2323.98	46.24	PK	14.52	1.51	V	13.11	33.13	74.00	-40.87
2323.98	37.28	Ave	14.52	1.51	V	13.11	24.17	54.00	-29.83
2386.27	43.92	PK	264.55	1.22	H	13.06	30.86	74.00	-43.14
2386.27	37.00	Ave	264.55	1.22	H	13.04	23.96	54.00	-30.04
2496.87	44.87	PK	273.05	1.01	V	13.00	31.87	74.00	-42.13
2496.87	36.79	Ave	273.05	1.01	V	13.00	23.79	54.00	-30.21

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
11n40: High Channel 2452MHz									
225.46	37.96	QP	77.70	1.26	H	11.02	26.94	46.00	-19.06
225.46	37.26	QP	236.86	1.36	V	11.02	26.24	46.00	-19.76
4904.00	54.17	PK	269.75	1.58	V	1.08	53.09	74.00	-20.91
4904.00	38.38	Ave	269.75	1.58	V	1.08	37.30	54.00	-16.70
7356.00	44.82	PK	190.96	1.89	H	2.84	47.66	74.00	-26.34
7356.00	39.84	Ave	190.96	1.89	H	2.84	42.68	54.00	-11.32
2327.40	45.67	PK	10.45	1.73	V	13.11	32.56	74.00	-41.44
2327.40	37.28	Ave	10.45	1.73	V	13.11	24.17	54.00	-29.83
2363.19	42.79	PK	266.54	1.76	H	13.06	29.73	74.00	-44.27
2363.19	38.46	Ave	266.54	1.76	H	13.04	25.42	54.00	-28.58
2496.69	44.80	PK	300.15	1.43	V	13.00	31.80	74.00	-42.20
2496.69	36.47	Ave	300.15	1.43	V	13.00	23.47	54.00	-30.53

Test Frequency: 18GHz~25GHz

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

BT BLE:

Test Frequency: 9KHz~26MHz

Remark: only the worst data (GFSK modulation Low channel 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
6.253	25.74	QP	21.84	40.00	7.58	29.54	-21.96
14.602	24.59	QP	21.02	40.00	5.61	29.54	-23.93
26.079	25.44	QP	20.55	40.00	5.99	29.54	-23.55

Test Frequency : 26MHz ~ 30MHz

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

Test Frequency : 30MHz ~ 18GHz

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
GFSK Low Channel 2402MHz									
265.17	35.47	QP	85	1.7	H	-13.35	22.12	46.00	-23.88
265.17	41.06	QP	44	1.2	V	-13.35	27.71	46.00	-18.29
4804.00	47.82	PK	323	1.7	V	-1.06	46.76	74.00	-27.24
4804.00	42.63	Ave	323	1.7	V	-1.06	41.57	54.00	-12.43
7206.00	40.62	PK	279	1.6	H	1.33	41.95	74.00	-32.05
7206.00	35.37	Ave	279	1.6	H	1.33	36.70	54.00	-17.30
2310.90	45.91	PK	21	1.9	V	-13.19	32.72	74.00	-41.28
2310.90	38.93	Ave	21	1.9	V	-13.19	25.74	54.00	-28.26
2377.36	43.01	PK	137	1.8	H	-13.14	29.87	74.00	-44.13
2377.36	37.99	Ave	137	1.8	H	-13.14	24.85	54.00	-29.15
2485.91	42.82	PK	330	1.2	V	-13.08	29.74	74.00	-44.26
2485.91	36.99	Ave	330	1.2	V	-13.08	23.91	54.00	-30.09

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
GFSK Middle Channel 2440MHz									
265.17	36.77	QP	19	1.9	H	-13.35	23.42	46.00	-22.58
265.17	42.34	QP	28	1.3	V	-13.35	28.99	46.00	-17.01
4880.00	48.19	PK	316	1.1	V	-0.62	47.57	74.00	-26.43
4880.00	42.86	Ave	316	1.1	V	-0.62	42.24	54.00	-11.76
7320.00	40.31	PK	91	1.4	H	2.21	42.52	74.00	-31.48
7320.00	36.19	Ave	91	1.4	H	2.21	38.40	54.00	-15.60
2337.83	45.76	PK	348	1.4	V	-13.19	32.57	74.00	-41.43
2337.83	38.07	Ave	348	1.4	V	-13.19	24.88	54.00	-29.12
2375.28	43.46	PK	167	1.9	H	-13.14	30.32	74.00	-43.68
2375.28	36.80	Ave	167	1.9	H	-13.14	23.66	54.00	-30.34
2497.69	43.72	PK	167	1.6	V	-13.08	30.64	74.00	-43.36
2497.69	37.01	Ave	167	1.6	V	-13.08	23.93	54.00	-30.07

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
GFSK High Channel 2480MHz									
265.17	37.24	QP	155	2.0	H	-13.35	23.89	46.00	-22.11
265.17	42.42	QP	301	1.3	V	-13.35	29.07	46.00	-16.93
4960.00	48.98	PK	95	1.5	V	-0.24	48.74	74.00	-25.26
4960.00	43.35	Ave	95	1.5	V	-0.24	43.11	54.00	-10.89
7440.00	39.54	PK	128	1.1	H	2.84	42.38	74.00	-31.62
7440.00	37.33	Ave	128	1.1	H	2.84	40.17	54.00	-13.83
2336.85	46.30	PK	333	1.9	V	-13.19	33.11	74.00	-40.89
2336.85	39.76	Ave	333	1.9	V	-13.19	26.57	54.00	-27.43
2383.03	43.37	PK	292	1.0	H	-13.14	30.23	74.00	-43.77
2383.03	36.94	Ave	292	1.0	H	-13.14	23.80	54.00	-30.20
2497.24	43.96	PK	238	1.5	V	-13.08	30.88	74.00	-43.12
2497.24	36.32	Ave	238	1.5	V	-13.08	23.24	54.00	-30.76

Test Frequency: 18GHz~25GHz

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

10 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)).

10.1 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:

Blow 1GHz:

RBW = 100kHz, VBW = 300kHz, Sweep = auto

Detector function = peak, Trace = max hold

Above 1GHz:

For WIFI mode

RBW = 100KHz, VBW = 100KHz, Sweep = auto

Detector function = peak, Trace = max hold

For BLE mode

RBW = 100kHz, VBW = 300kHz, Sweep = auto

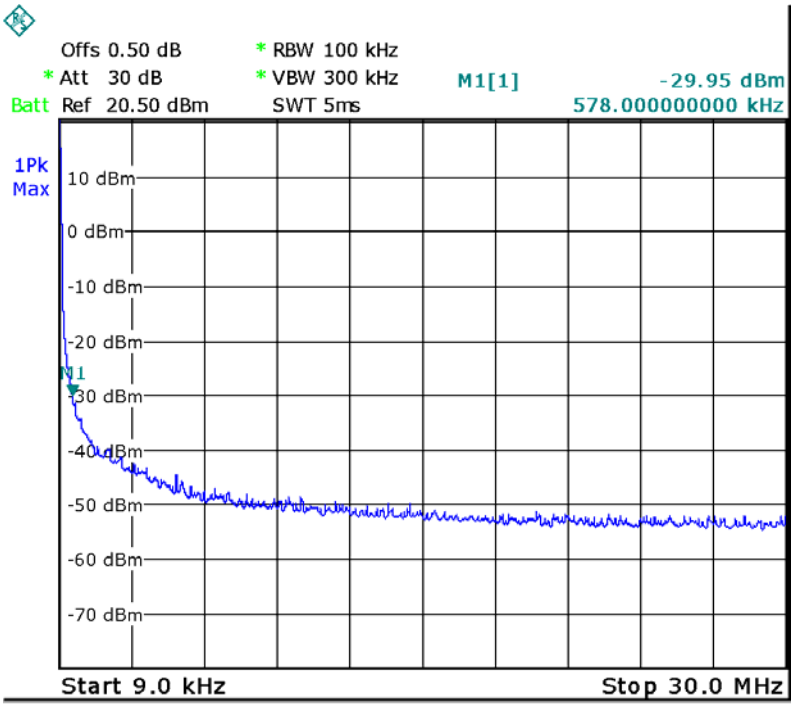
Detector function = peak, Trace = max hold

10.2 Test Result

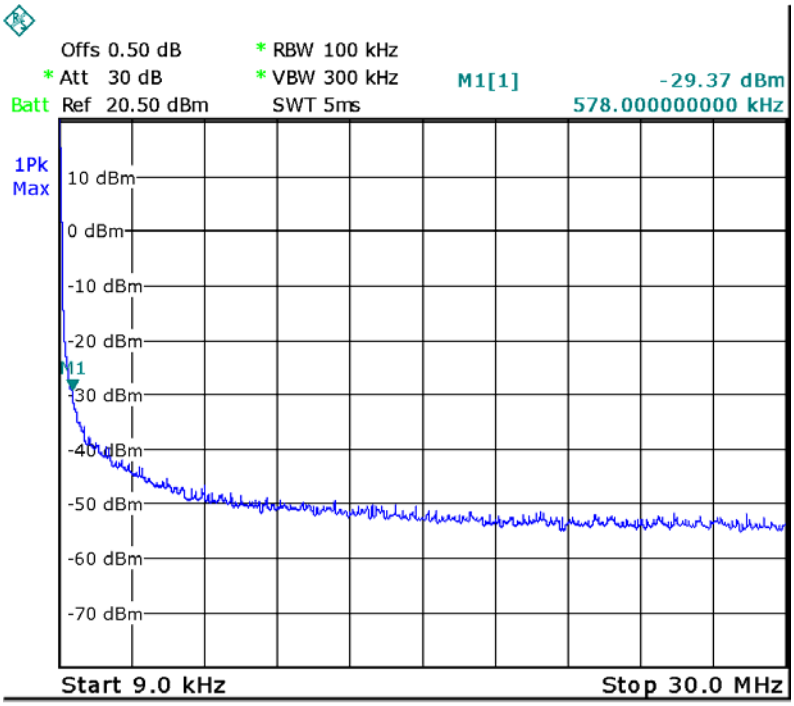
9KHz – 30MHz

802.11b

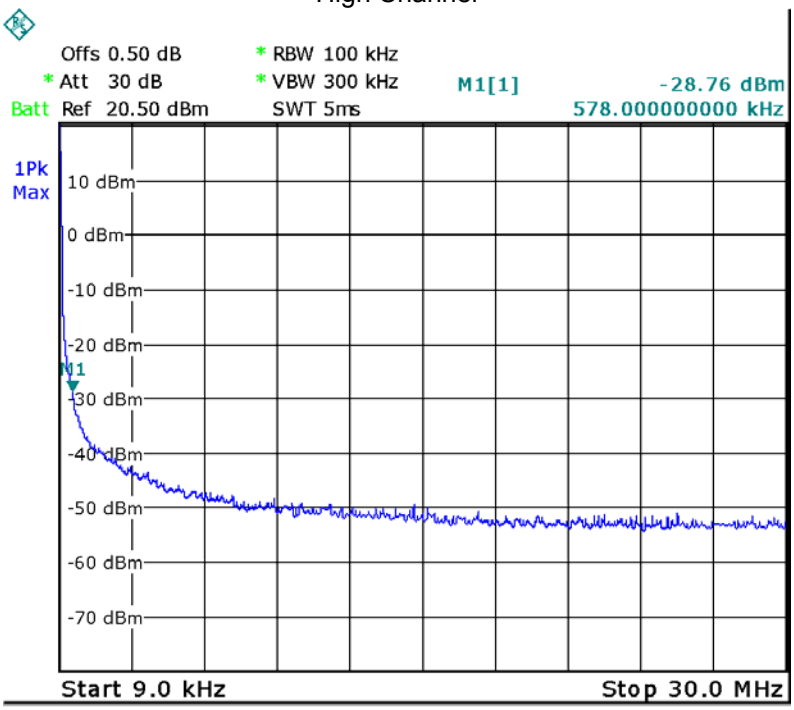
Low Channel



Middle Channel

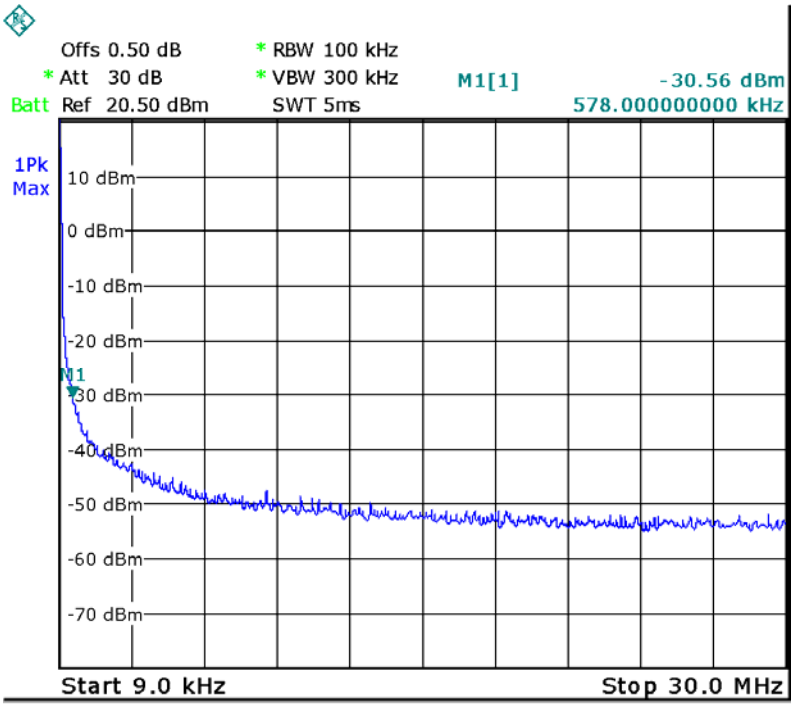


High Channel

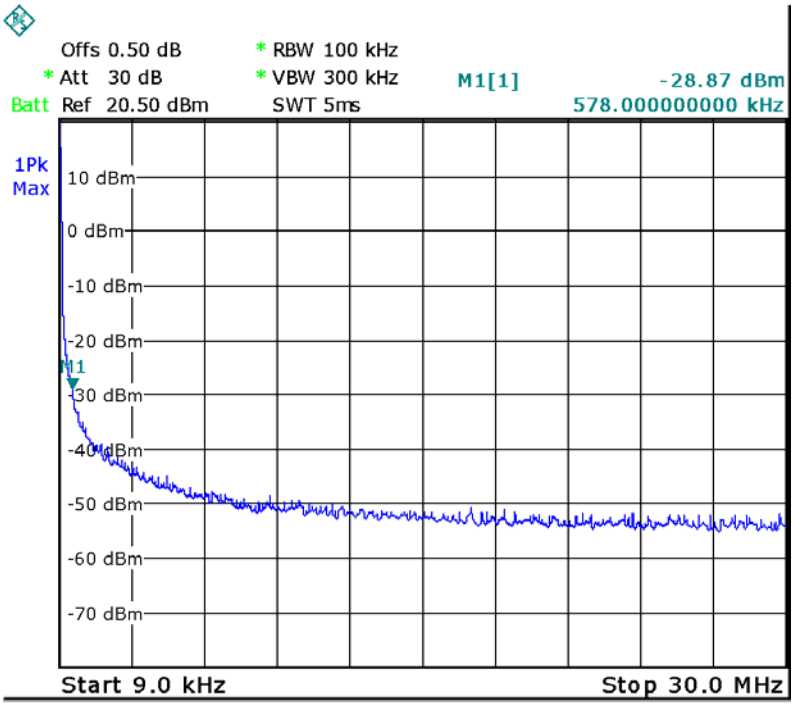


802.11g

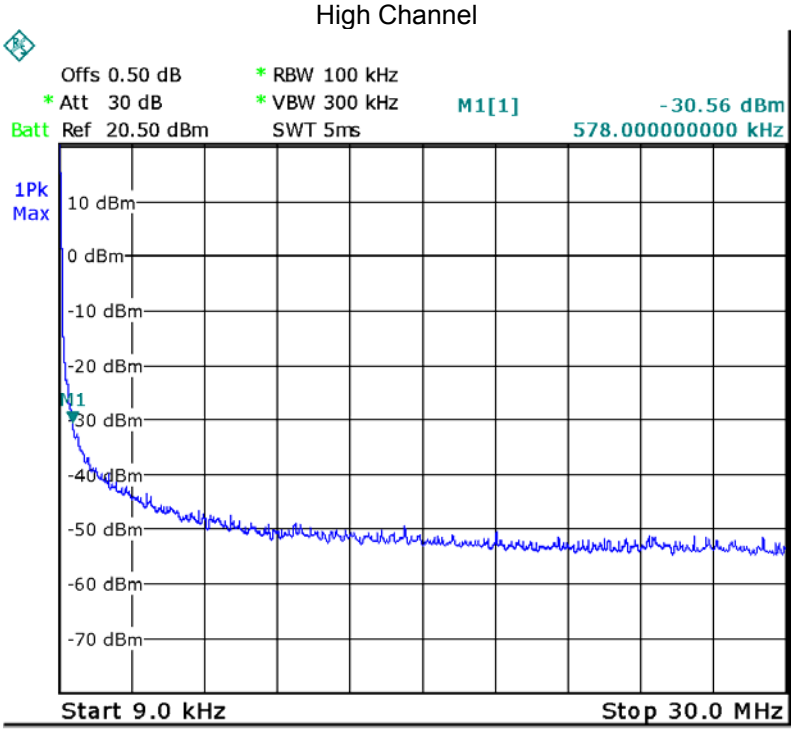
Low Channel



Middle Channel

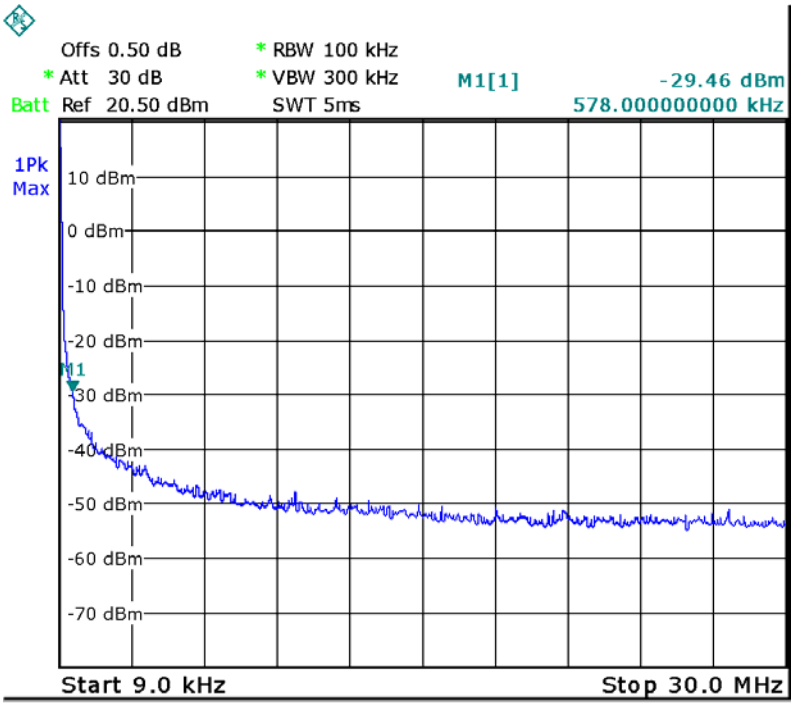


High Channel

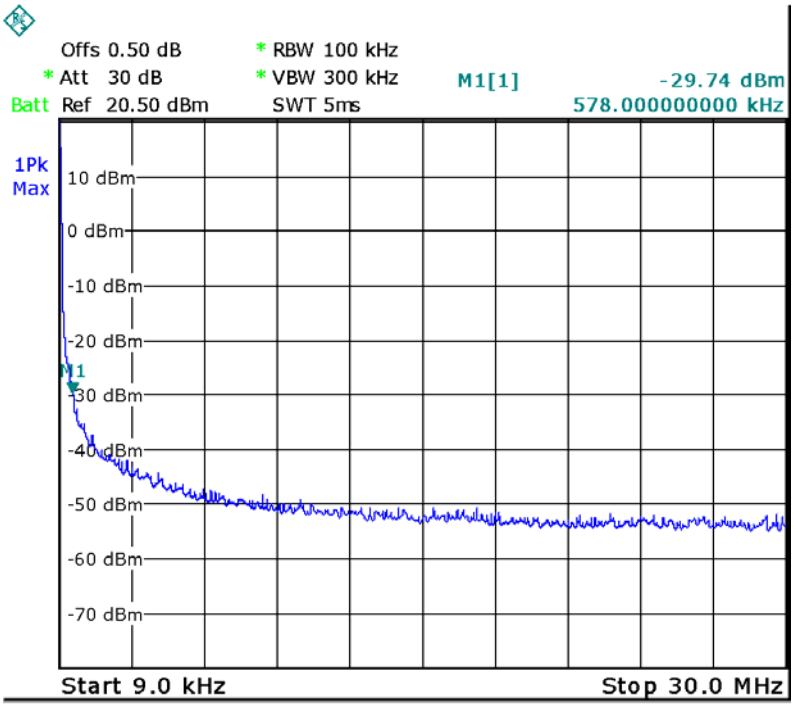


802.11n HT20

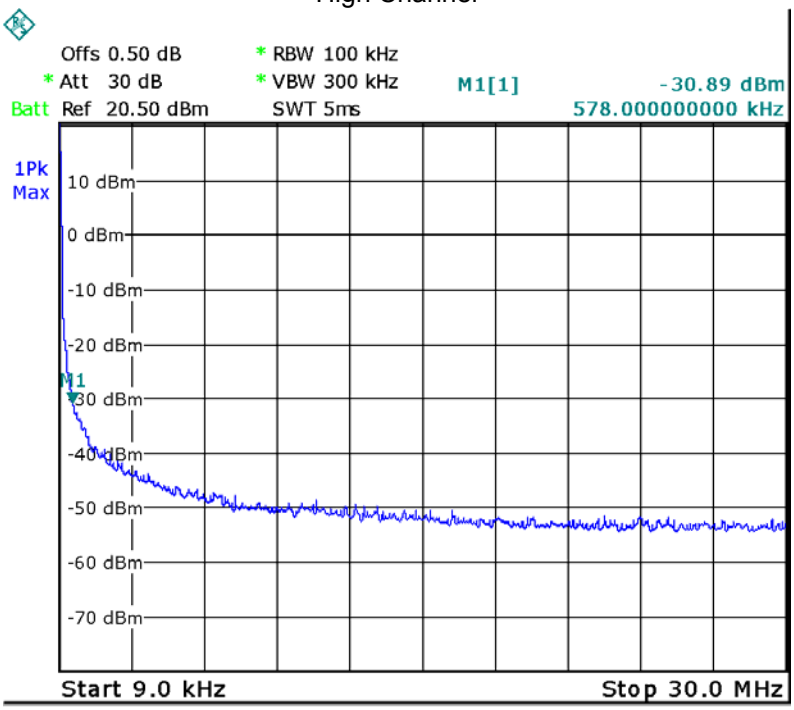
Low Channel



Middle Channel

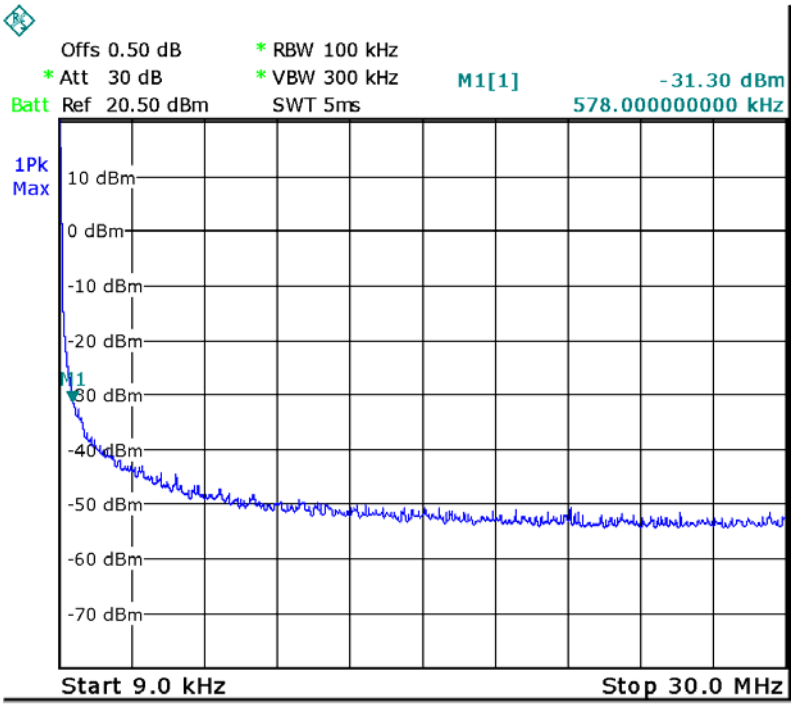


High Channel

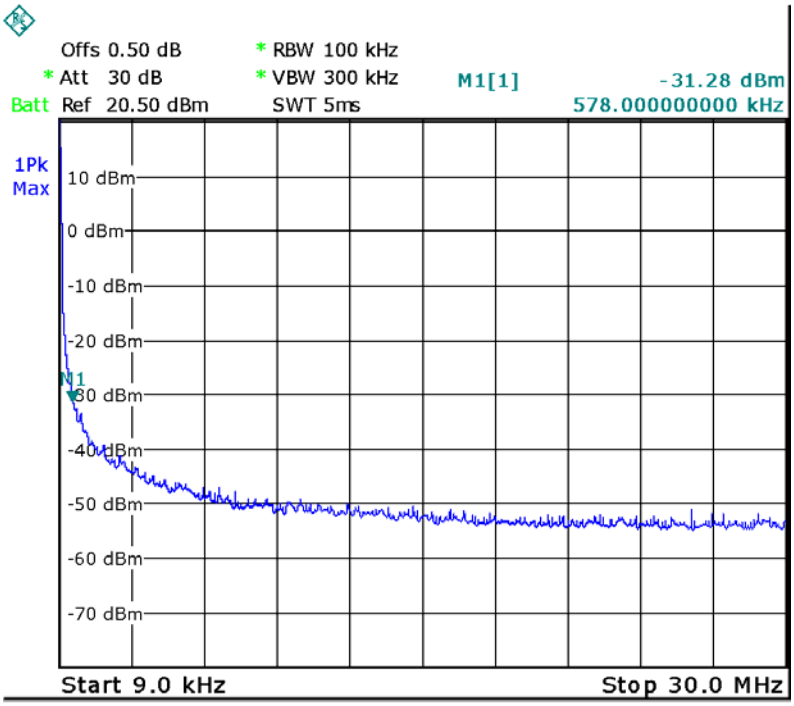


802.11n HT40

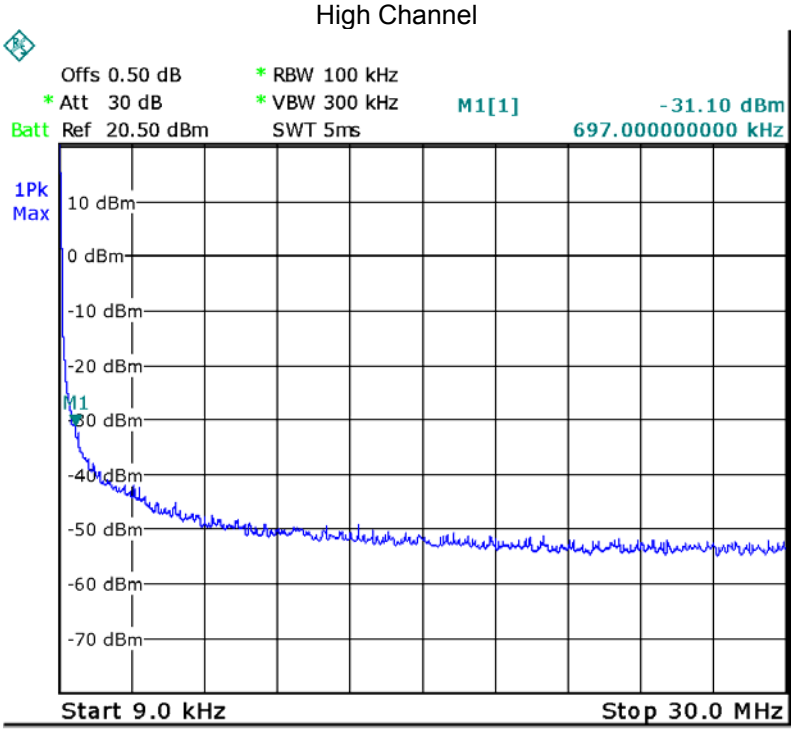
Low Channel



Middle Channel

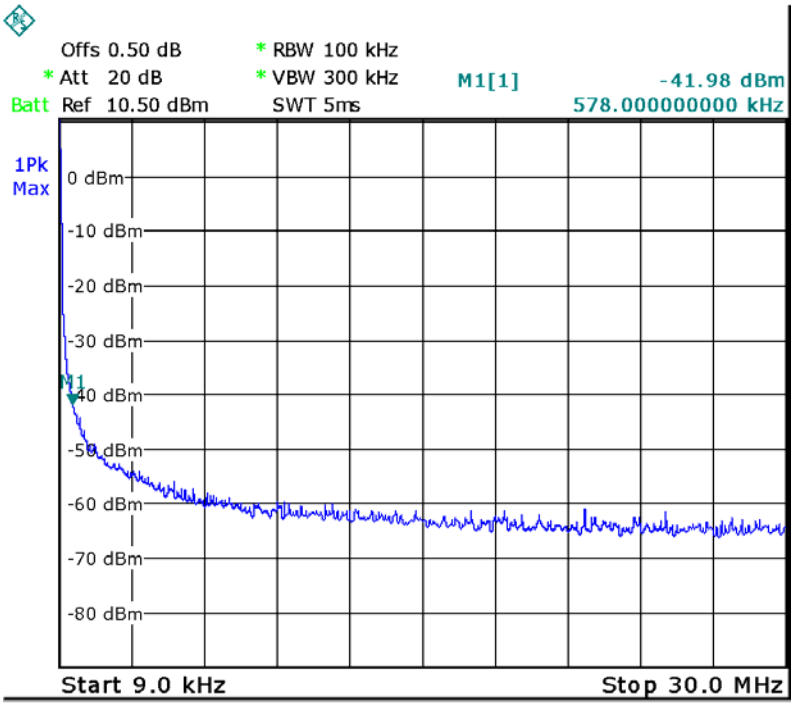


High Channel

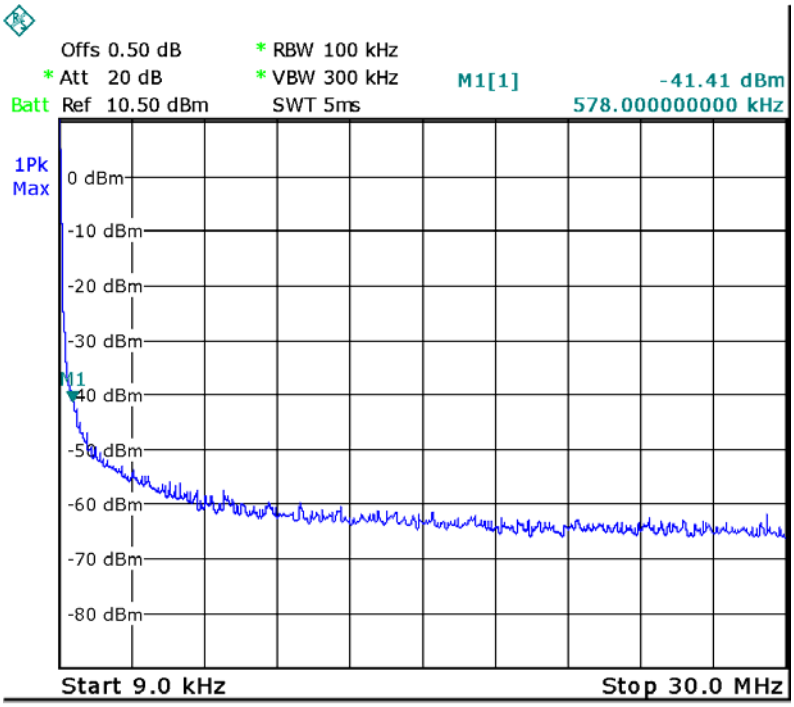


BLE

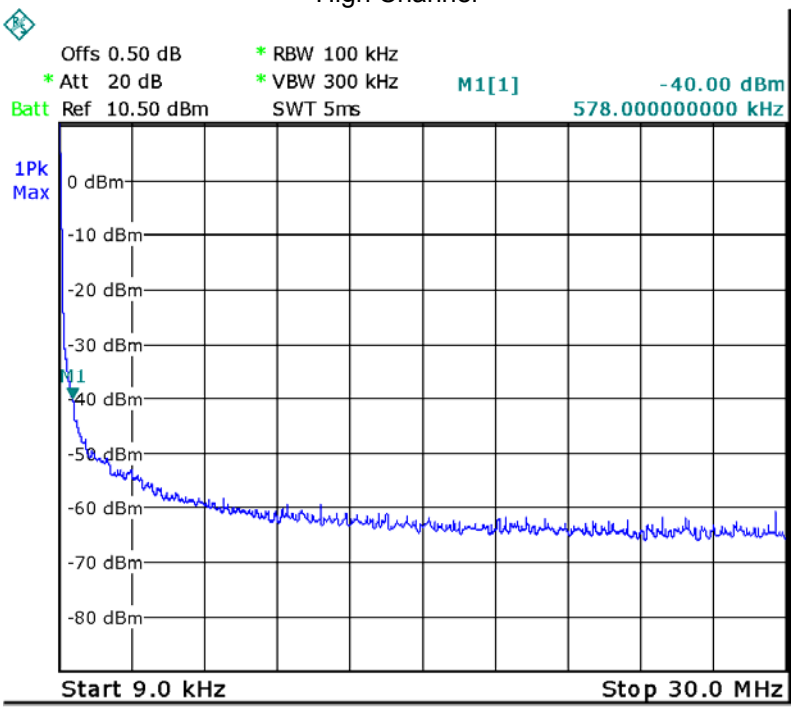
Low Channel



Middle Channel



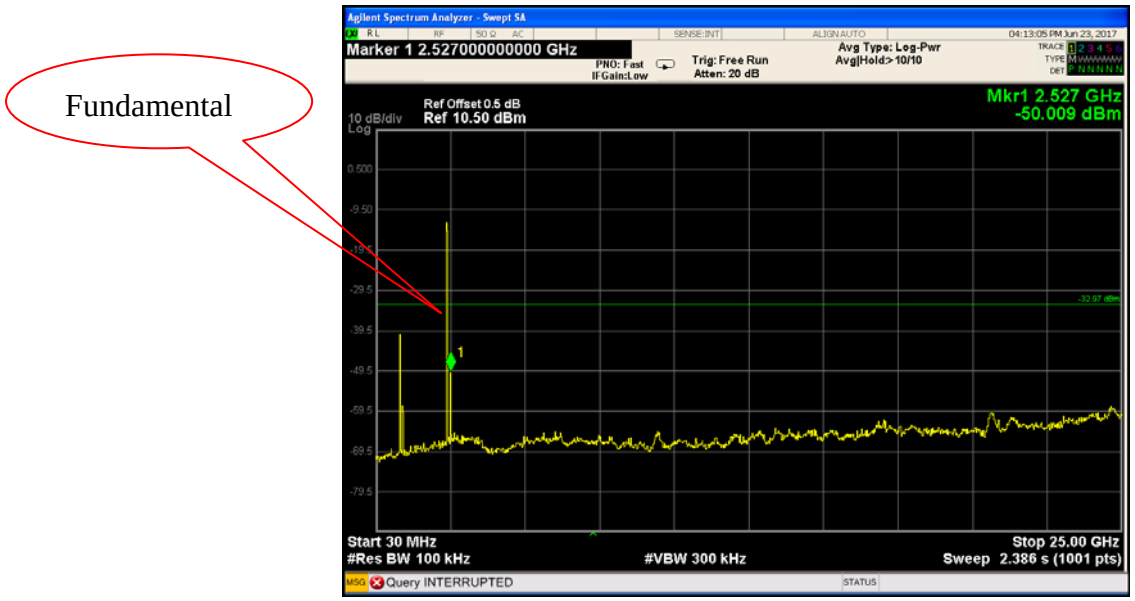
High Channel



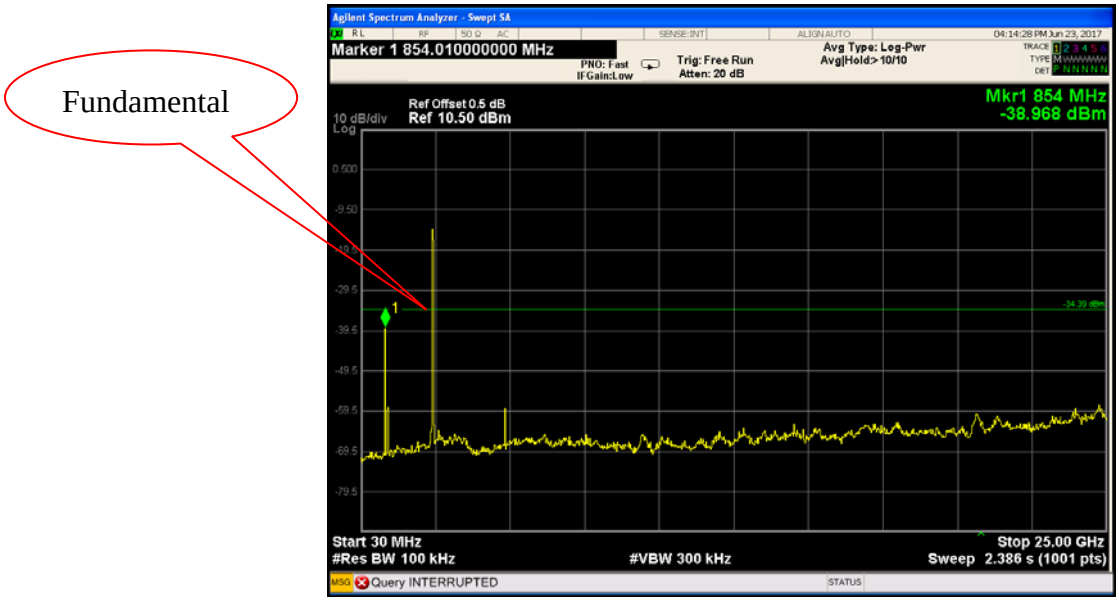
Above 30MHz

802.11b

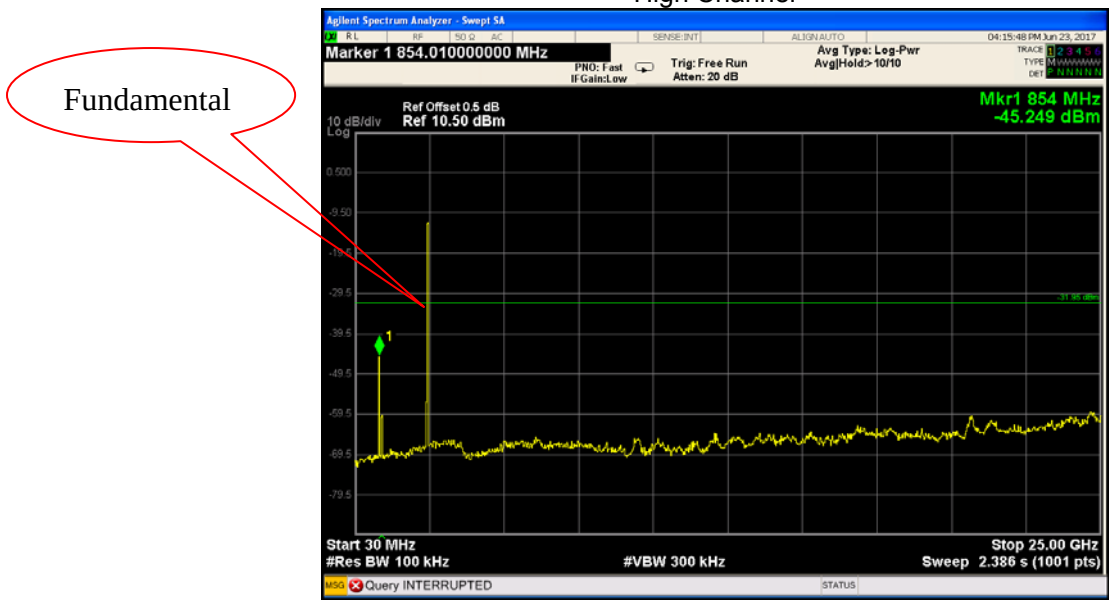
Low Channel



Middle Channel

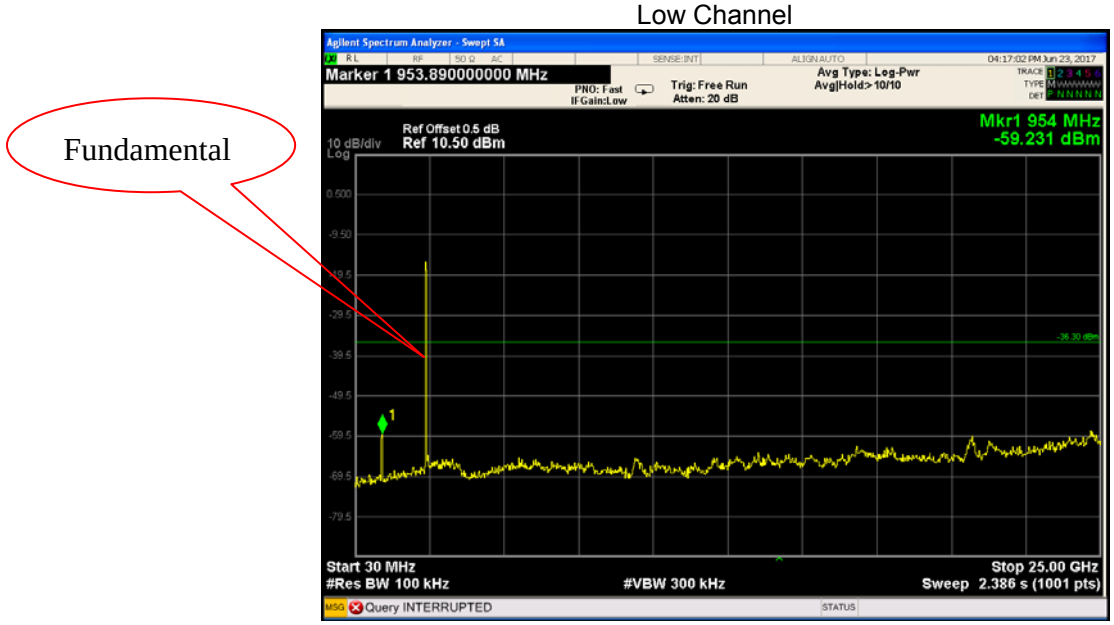


High Channel



802.11g

Low Channel

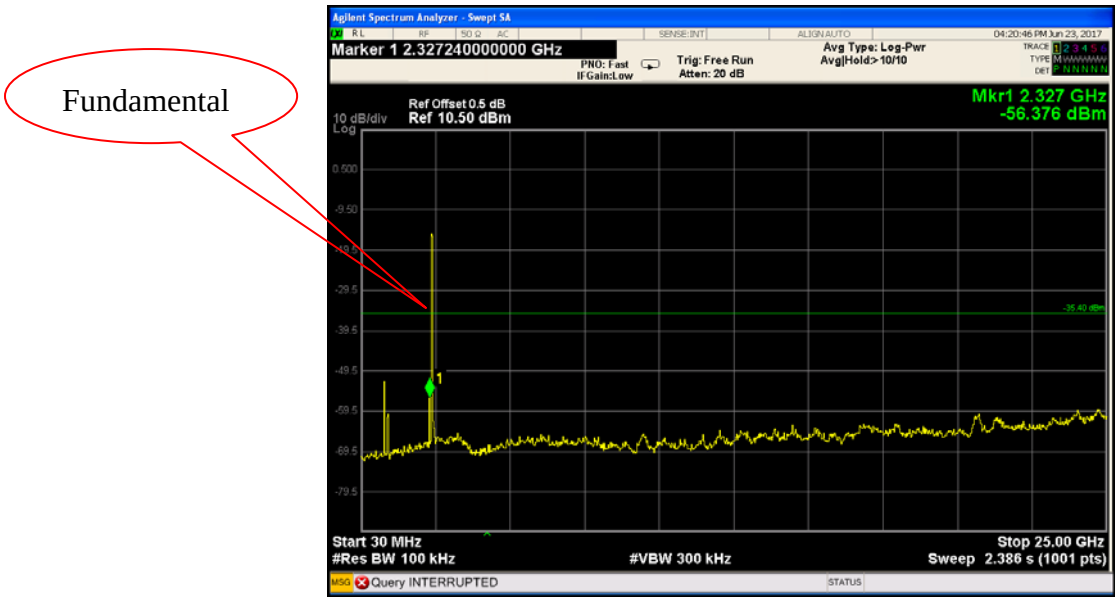


Middle Channel

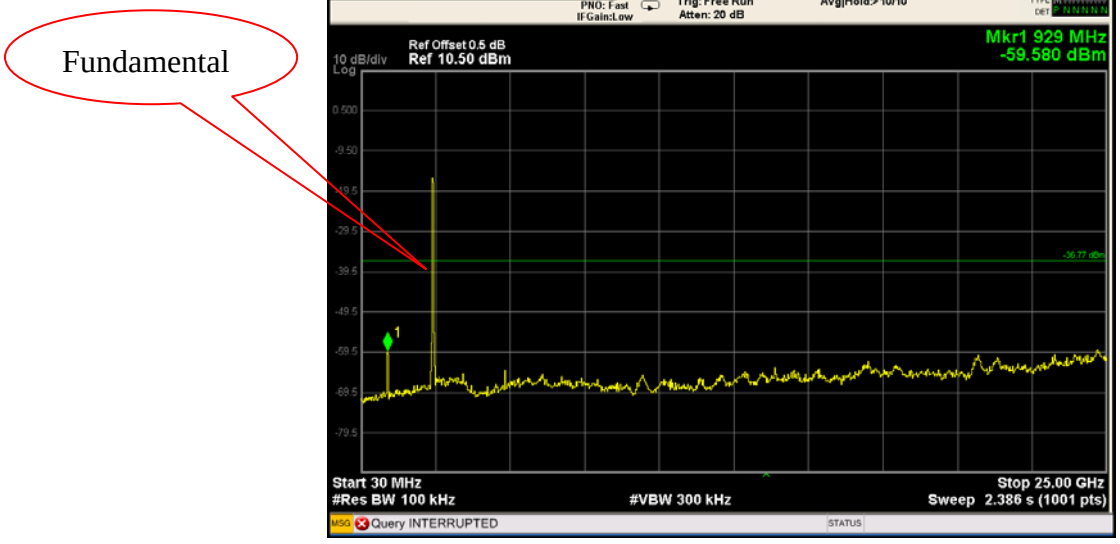
High Channel

802.11n HT20

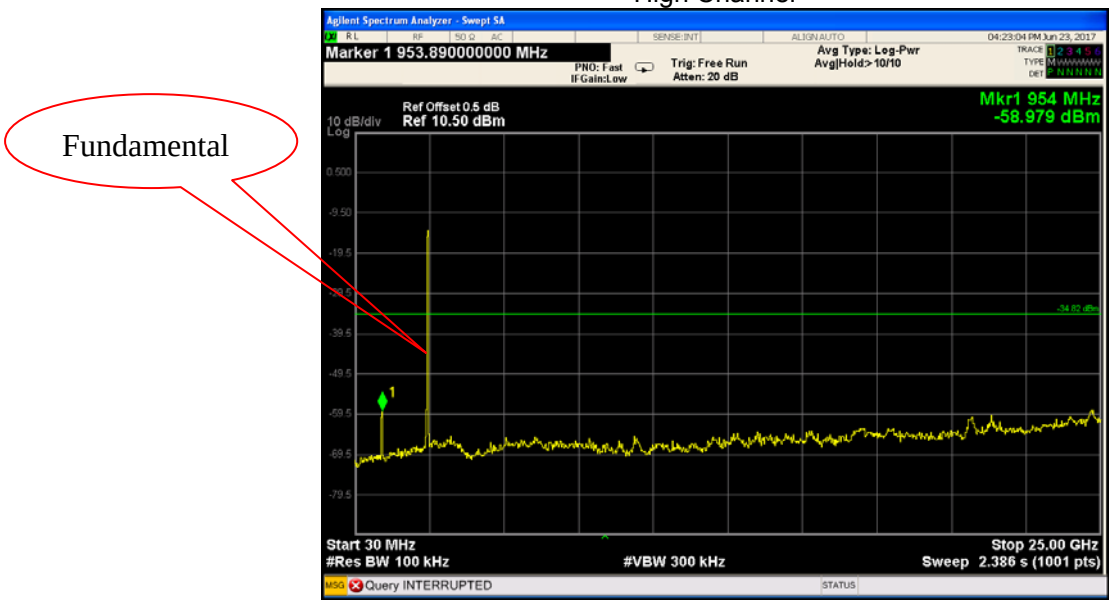
Low Channel



Middle Channel

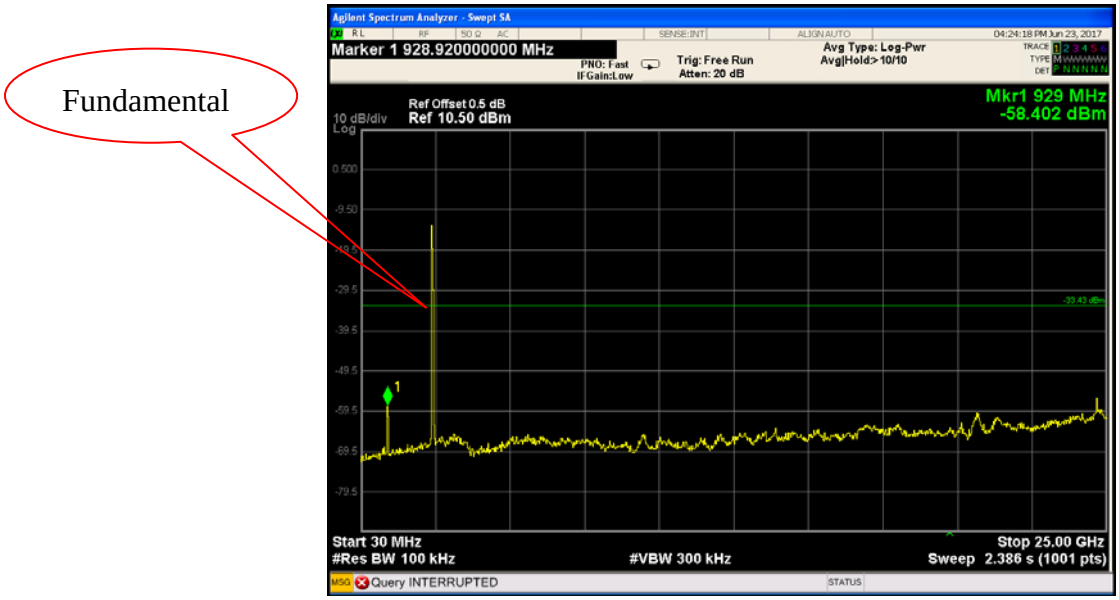


High Channel

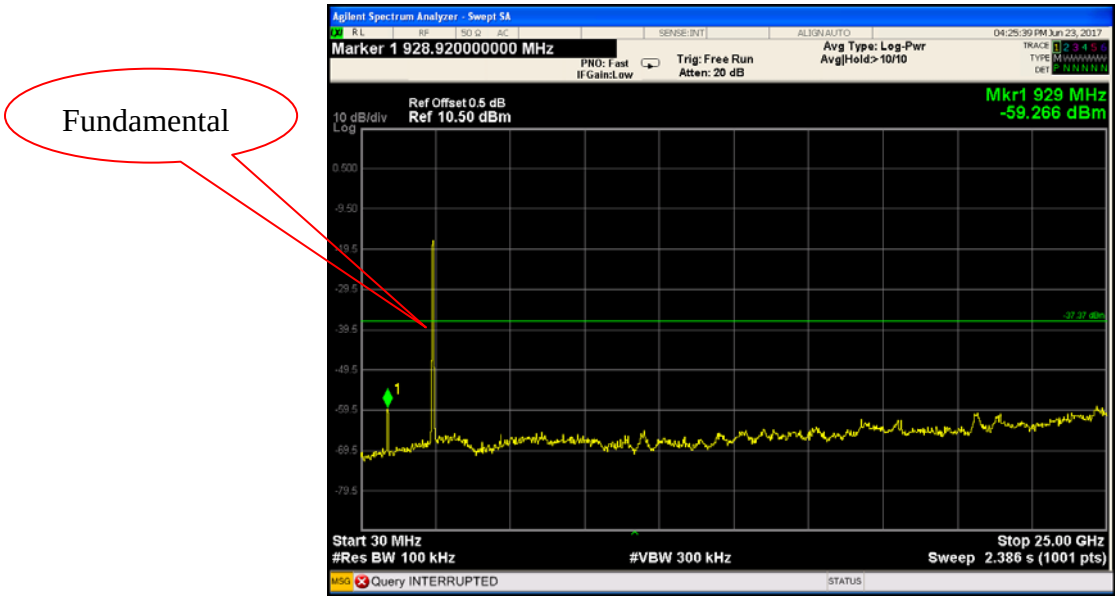


802.11n HT40

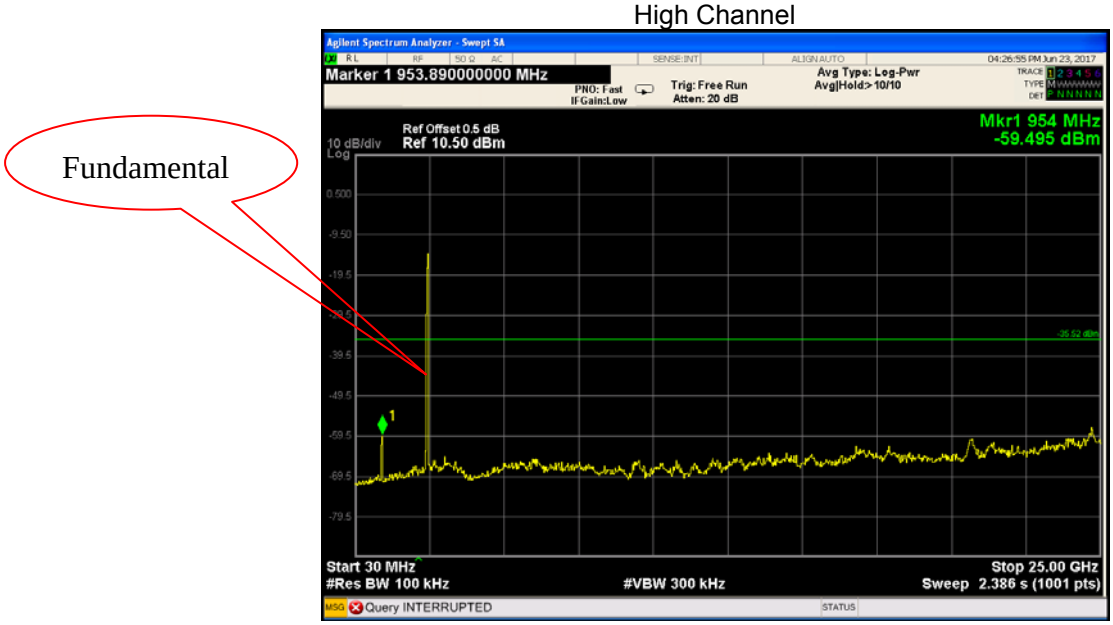
Low Channel



Middle Channel

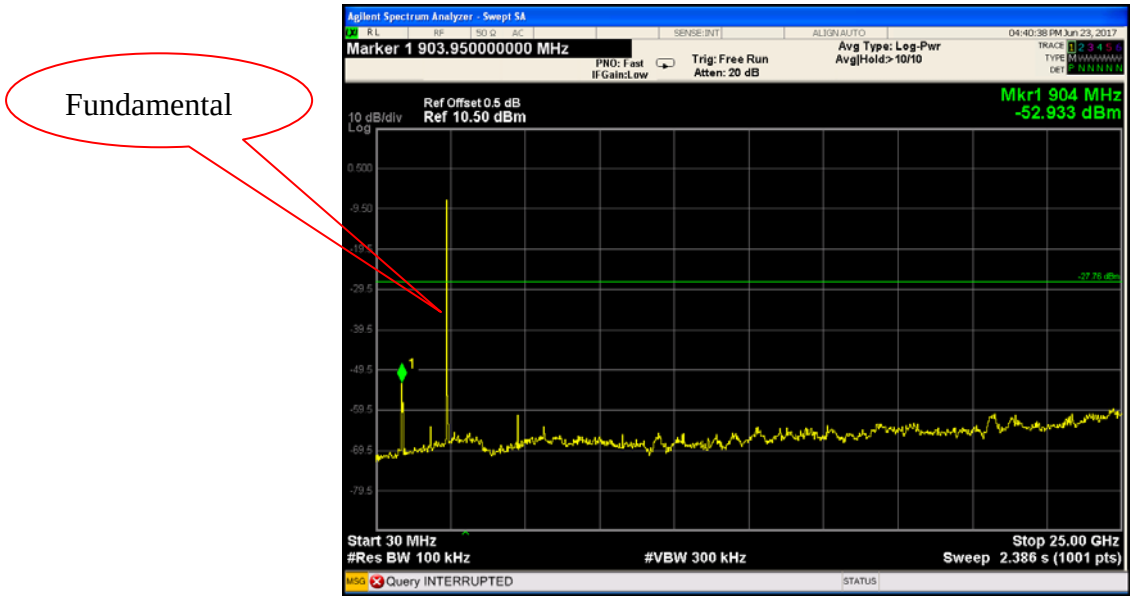


High Channel

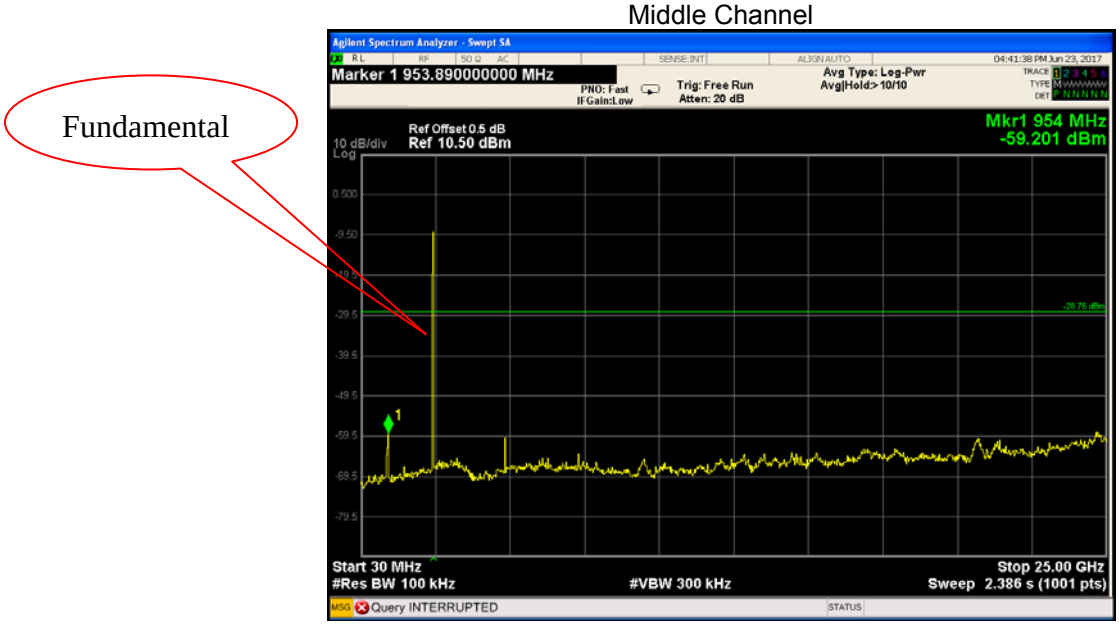


BLE

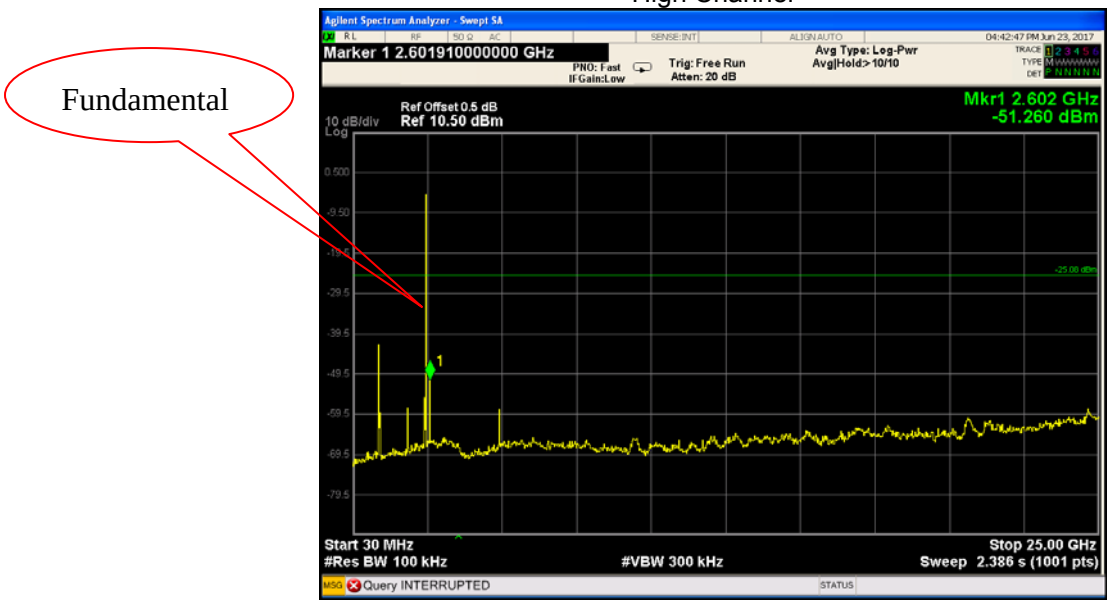
Low Channel



Middle Channel



High Channel



11 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

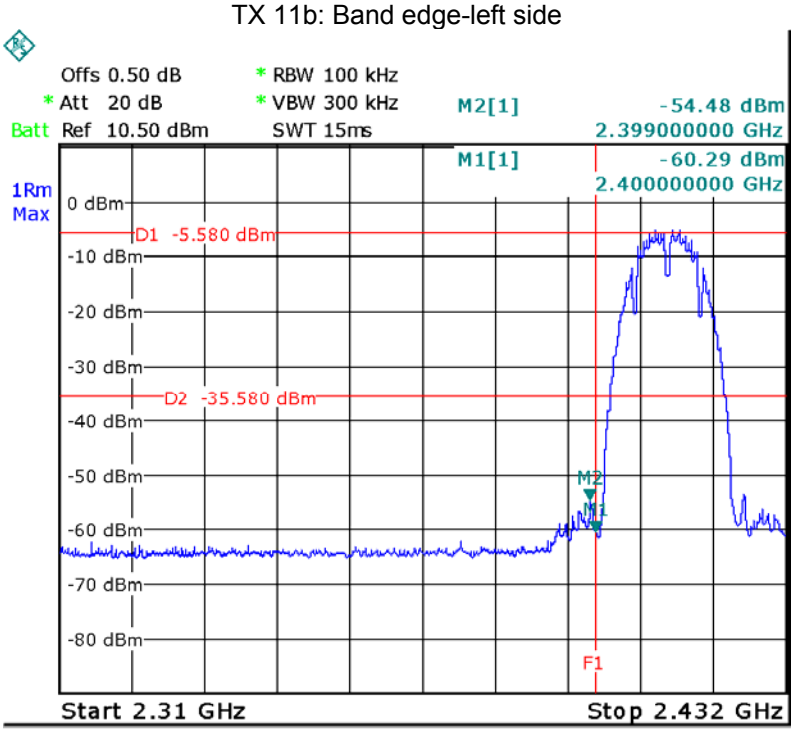
11.1 Test Produce

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.

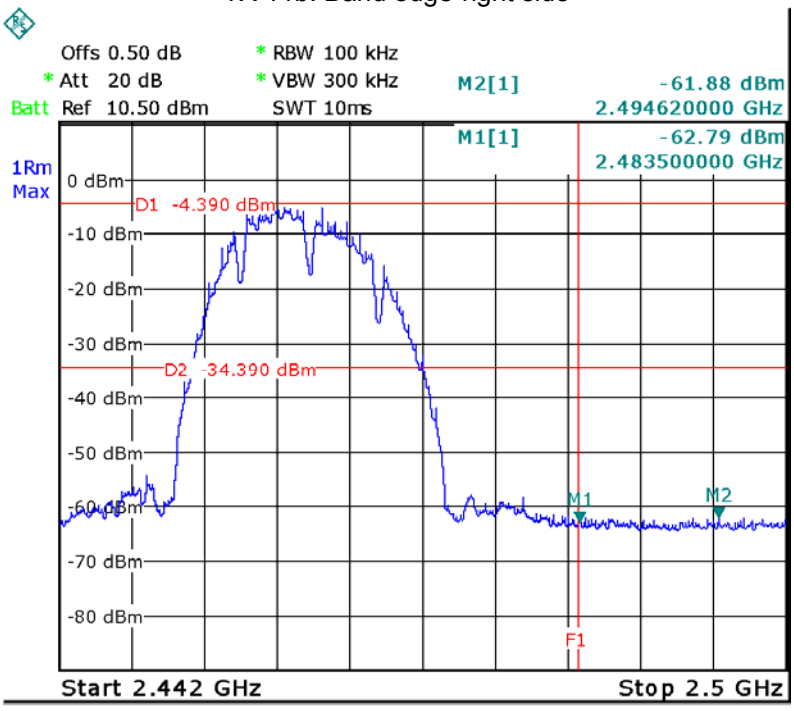
11.2 Test Result

Test result plots shown as follows:

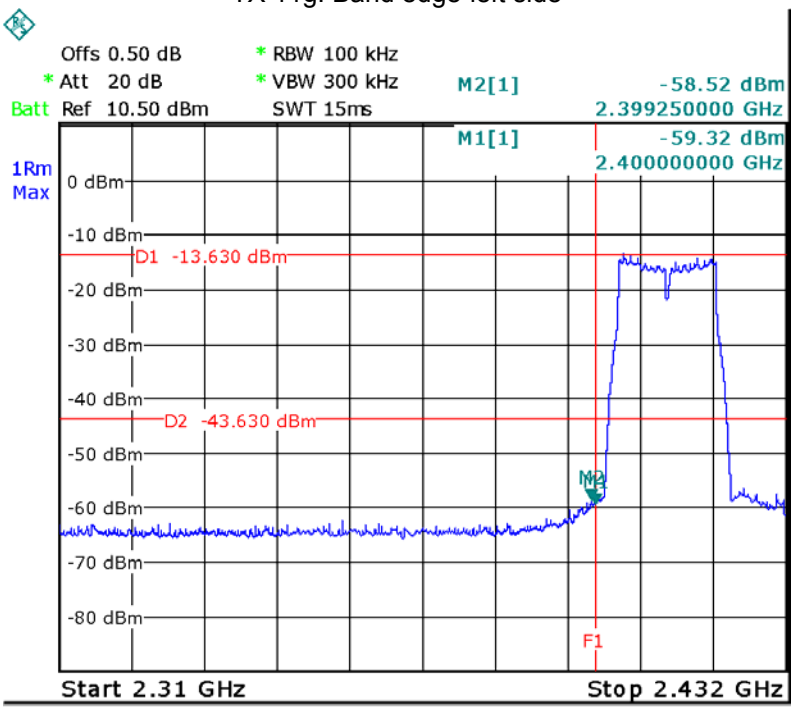
TX 11b: Band edge-left side



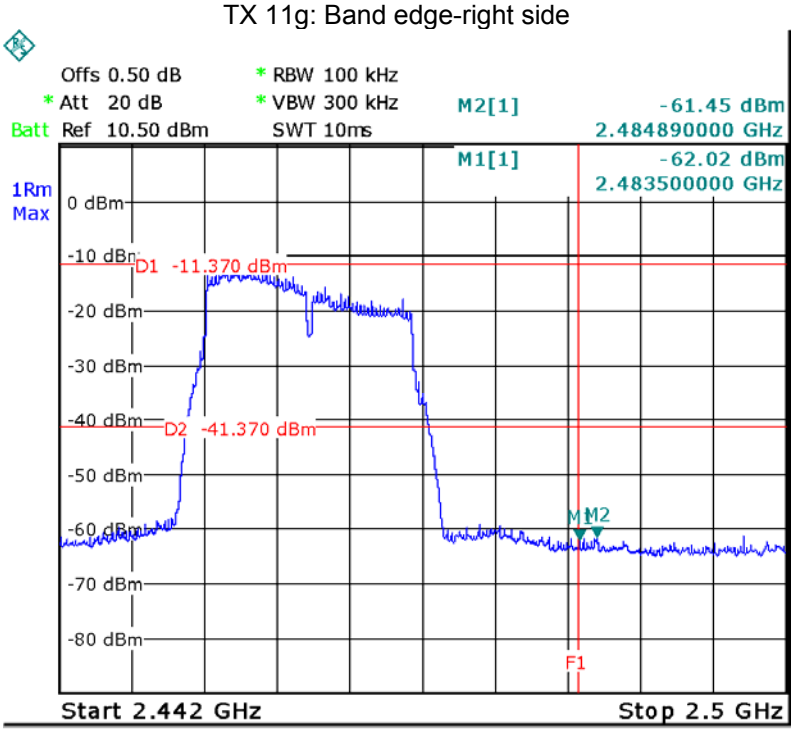
TX 11b: Band edge-right side



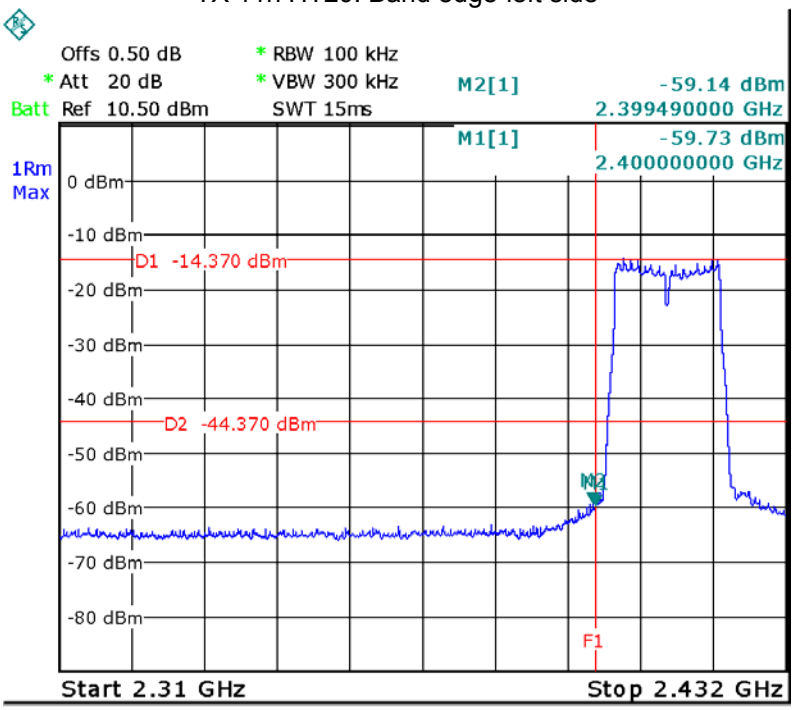
TX 11g: Band edge-left side



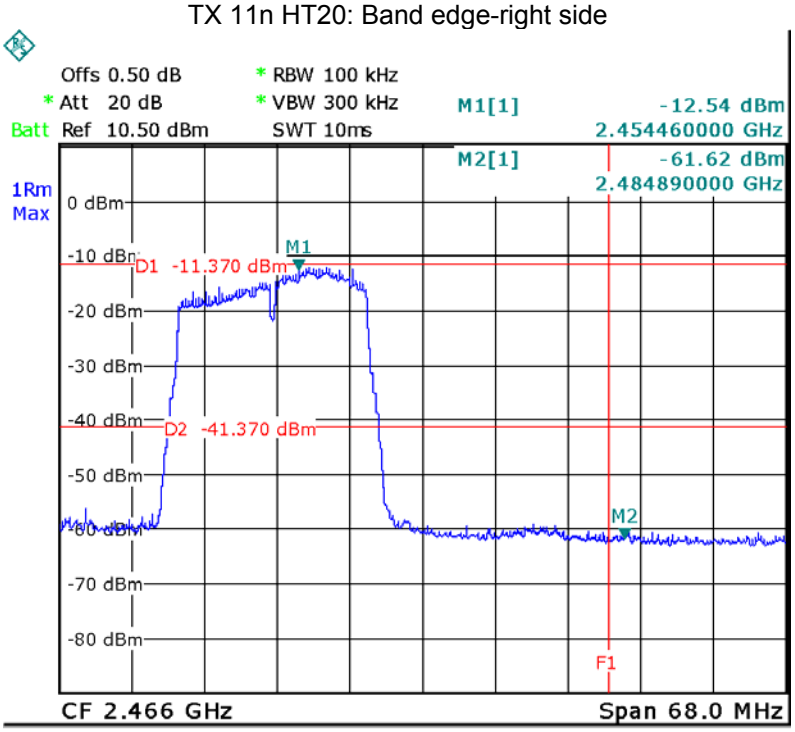
TX 11g: Band edge-right side



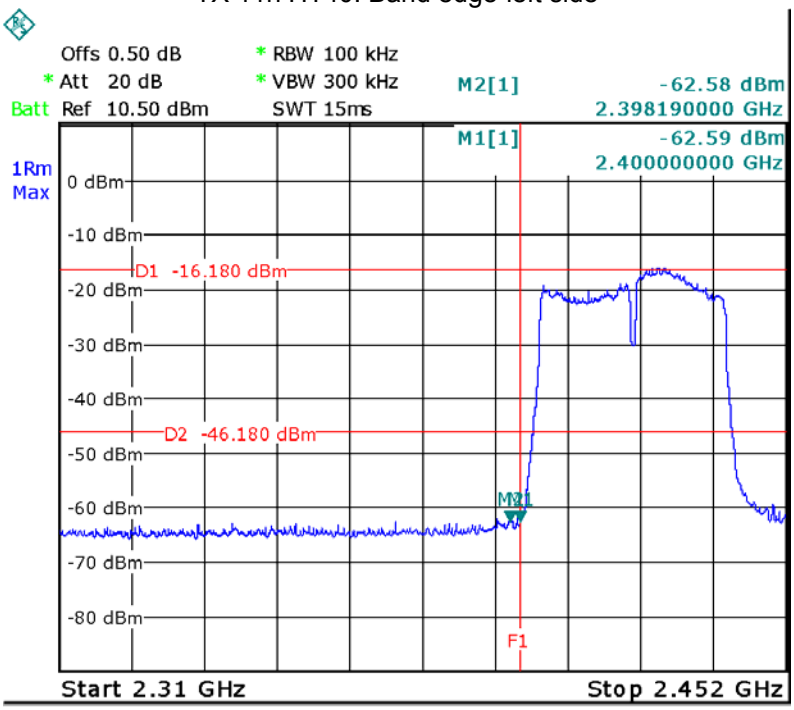
TX 11n HT20: Band edge-left side



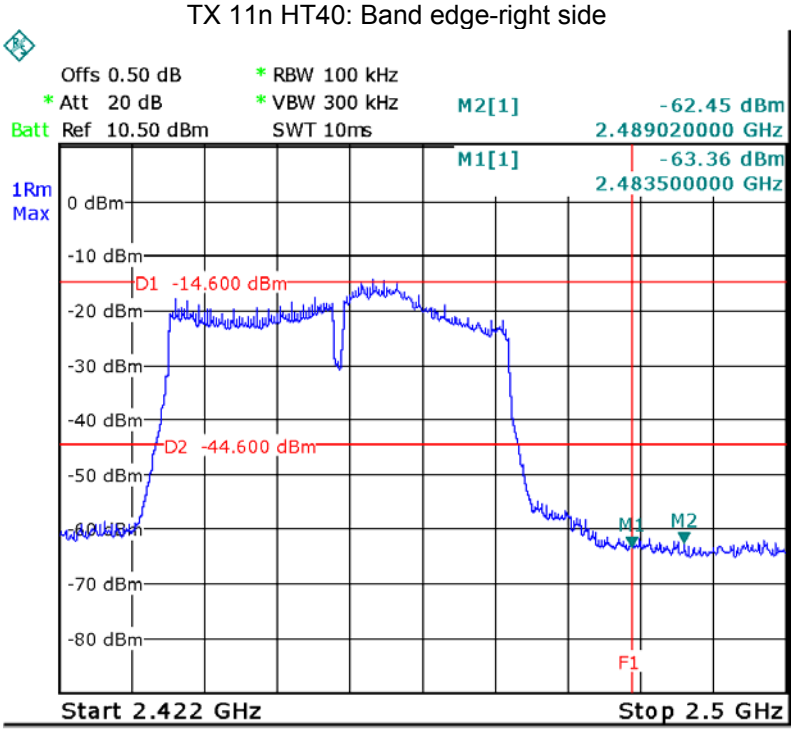
TX 11n HT20: Band edge-right side



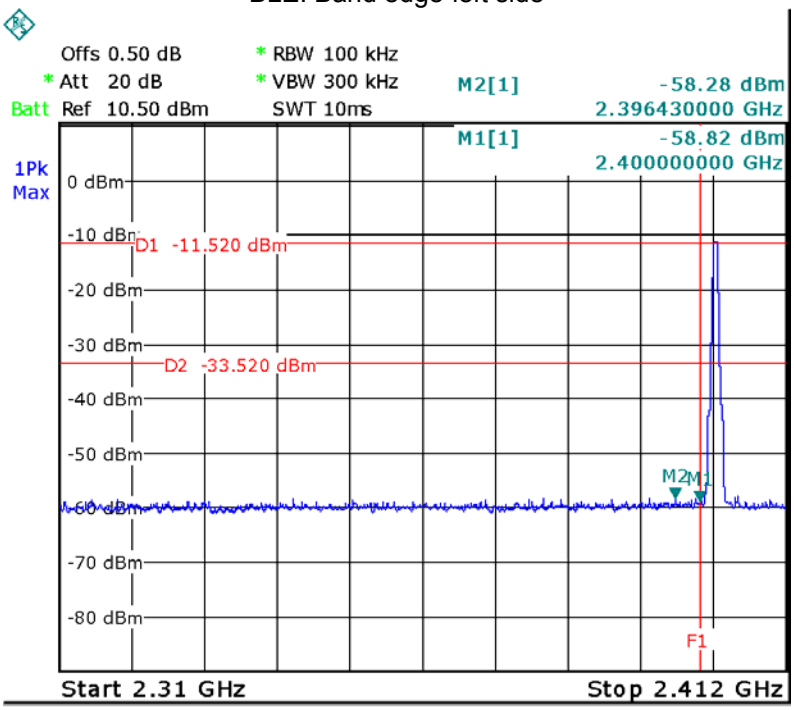
TX 11n HT40: Band edge-left side



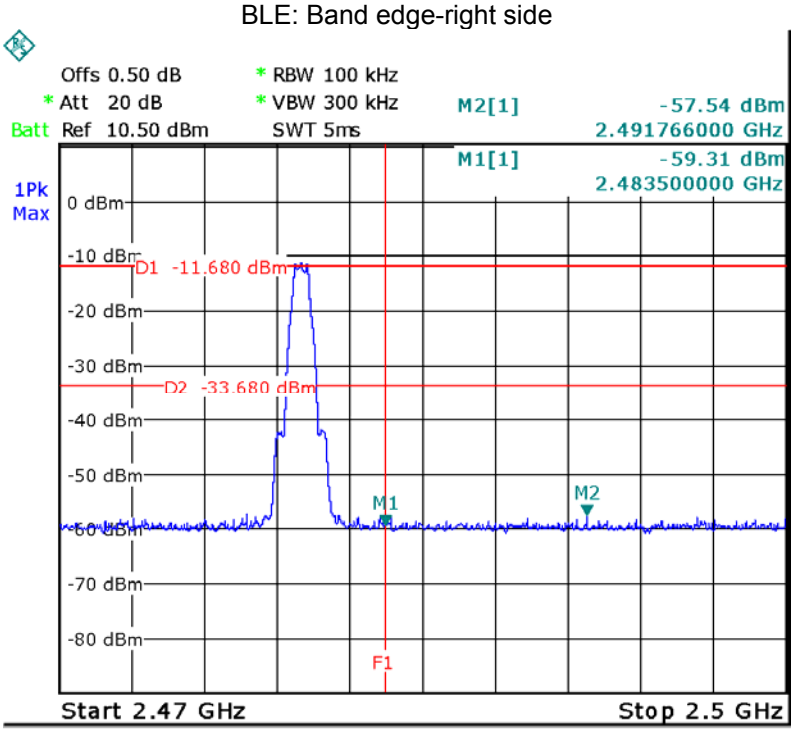
TX 11n HT40: Band edge-right side



BLE: Band edge-left side



BLE: Band edge-right side



12 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

12.1 Test Procedure:

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

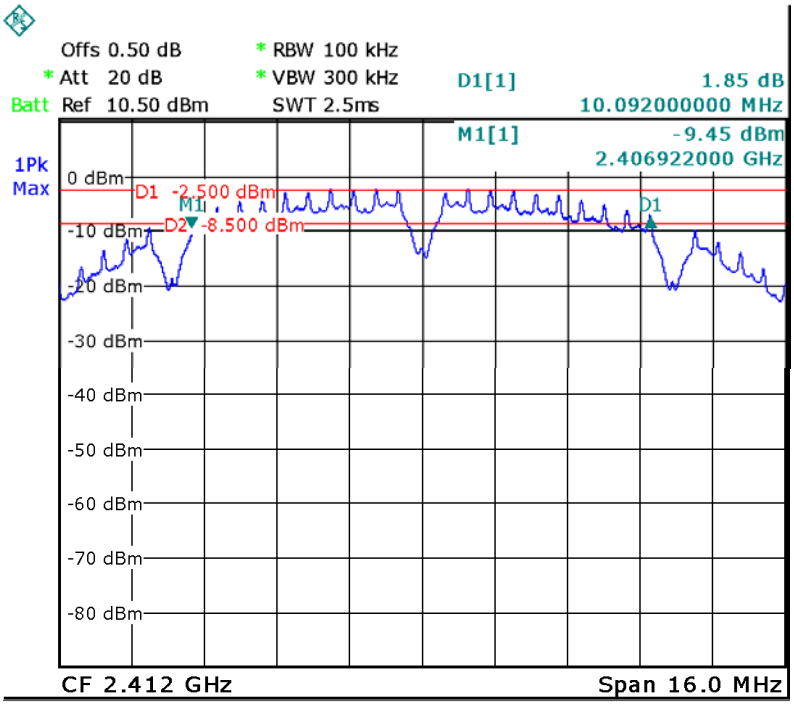
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz

12.2 Test Result:

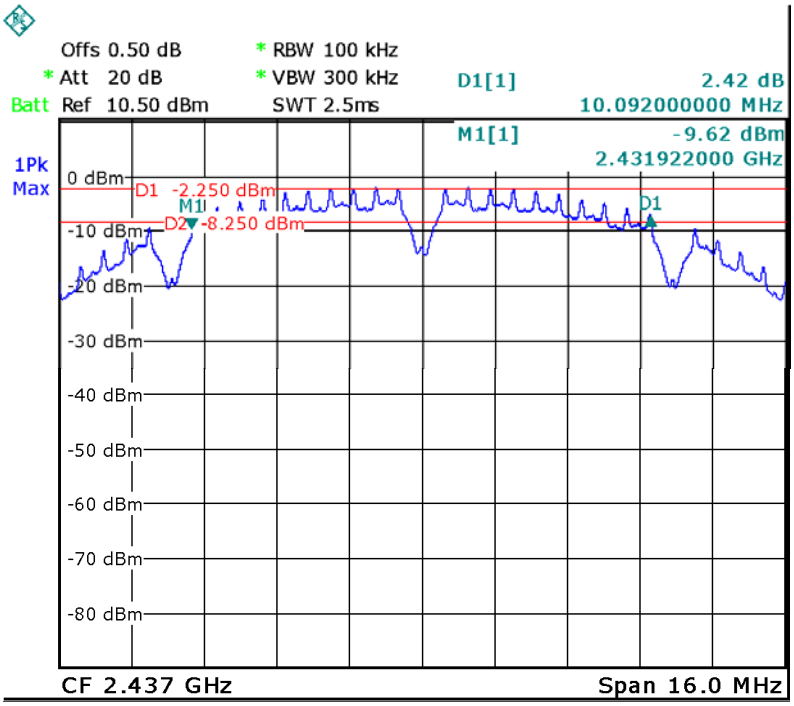
Operation mode	Test Channel	Bandwidth (MHz)	Limit (kHz)
TX 11b	Channel 1	10.092	500
	Channel 6	10.092	500
	Channel 11	10.092	500
TX 11g	Channel 1	16.417	500
	Channel 6	16.467	500
	Channel 11	16.417	500
TX 11n HT20	Channel 1	17.623	500
	Channel 6	17.623	500
	Channel 11	17.623	500
TX 11n HT40	Channel 3	36.120	500
	Channel 6	36.120	500
	Channel 9	36.120	500
BLE	Channel 0	0.725	500
	Channel 19	0.725	500
	Channel 39	0.725	500

Test result plot:

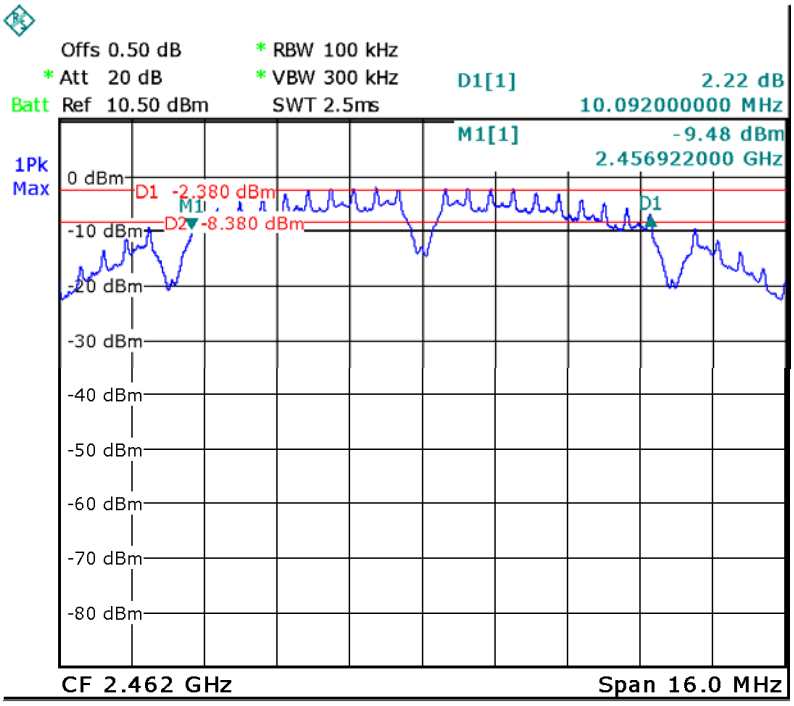
Mode: TX 11b channel 1



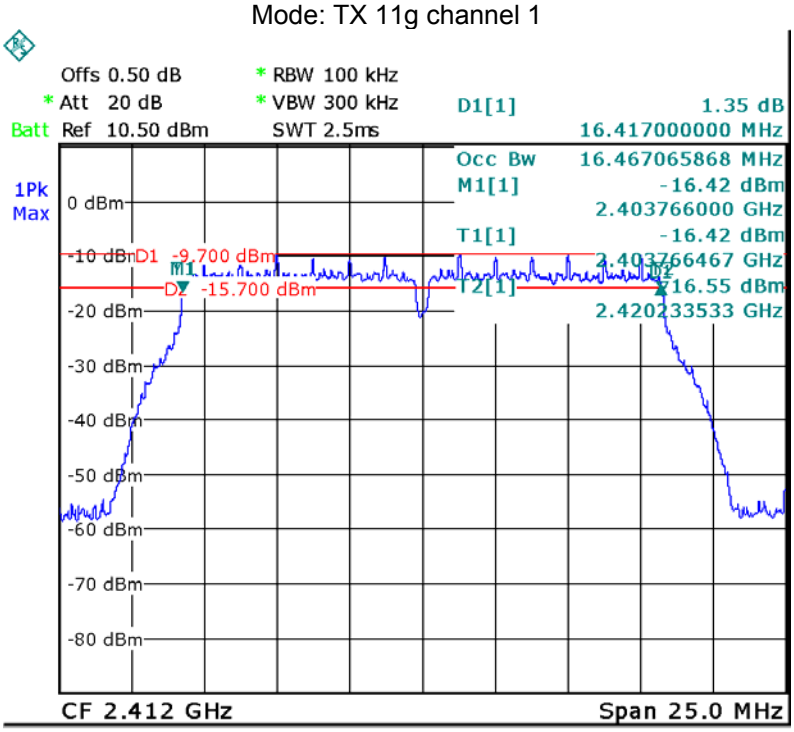
Mode: TX 11b channel 6



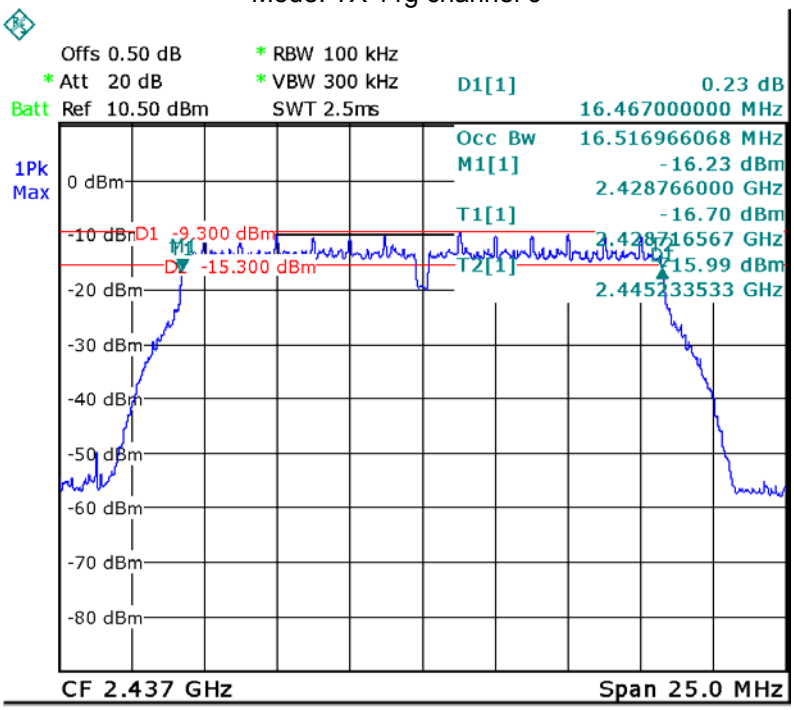
Mode: TX 11b channel 11



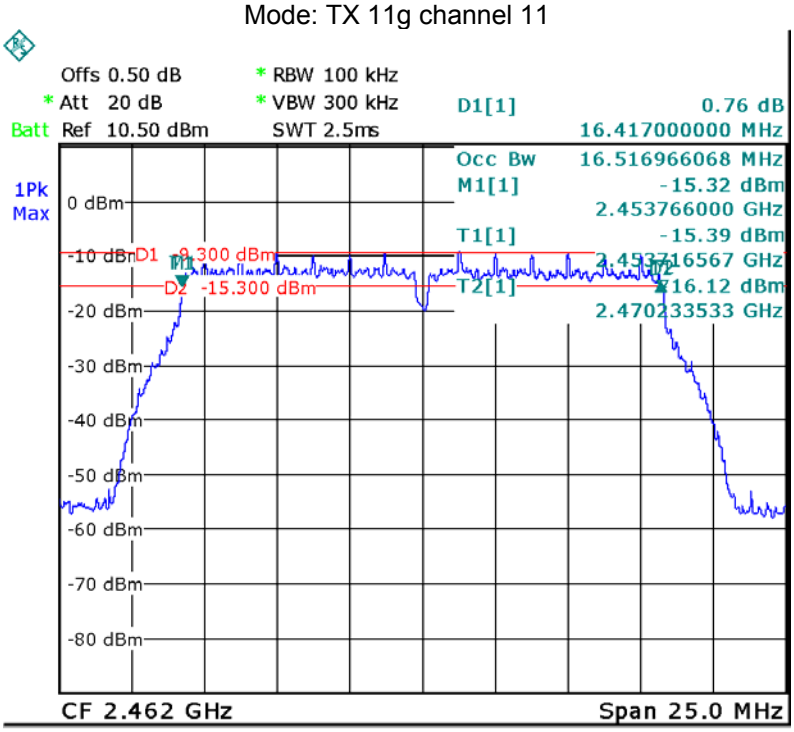
Mode: TX 11g channel 1



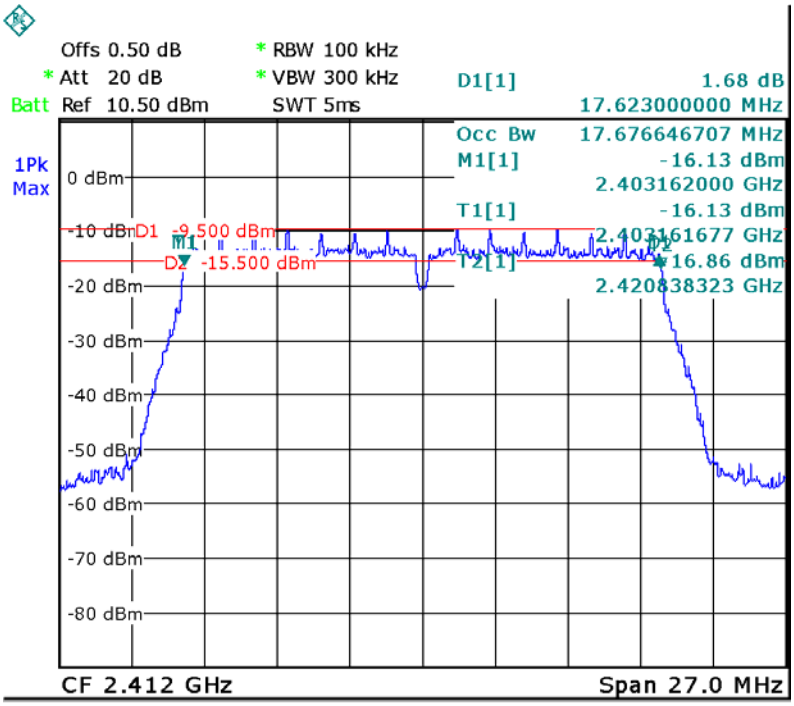
Mode: TX 11g channel 6



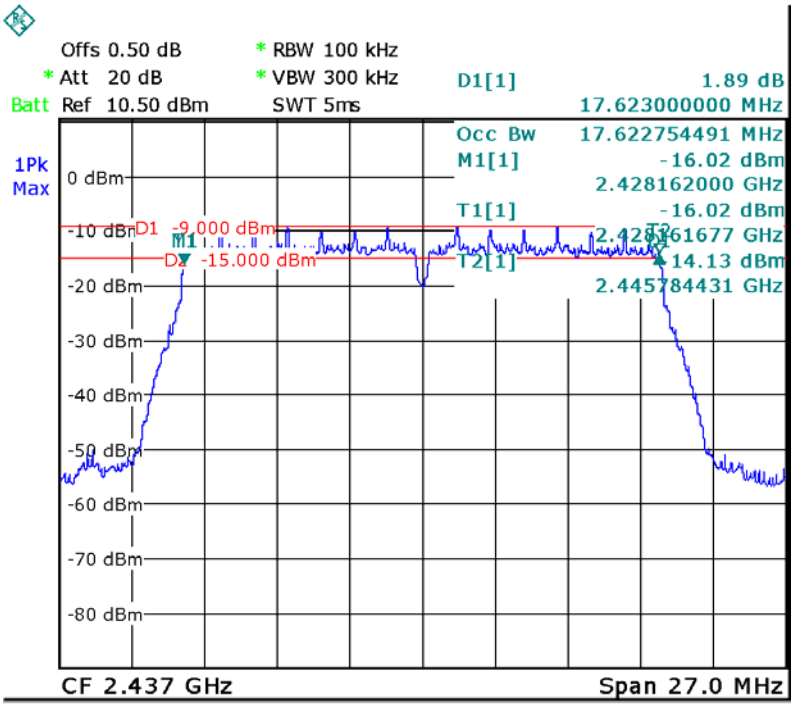
Mode: TX 11g channel 11



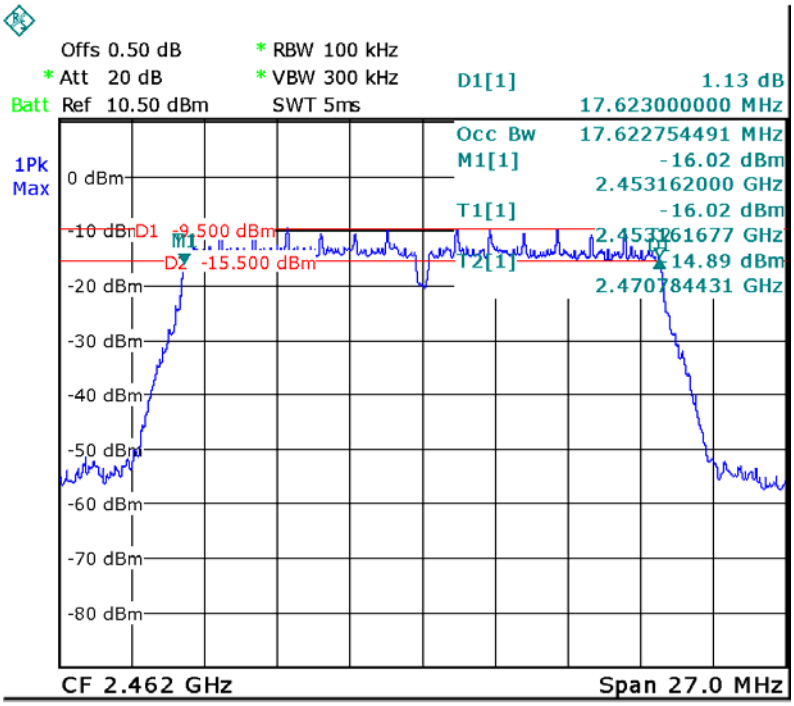
Mode: TX 11n HT20 channel 1



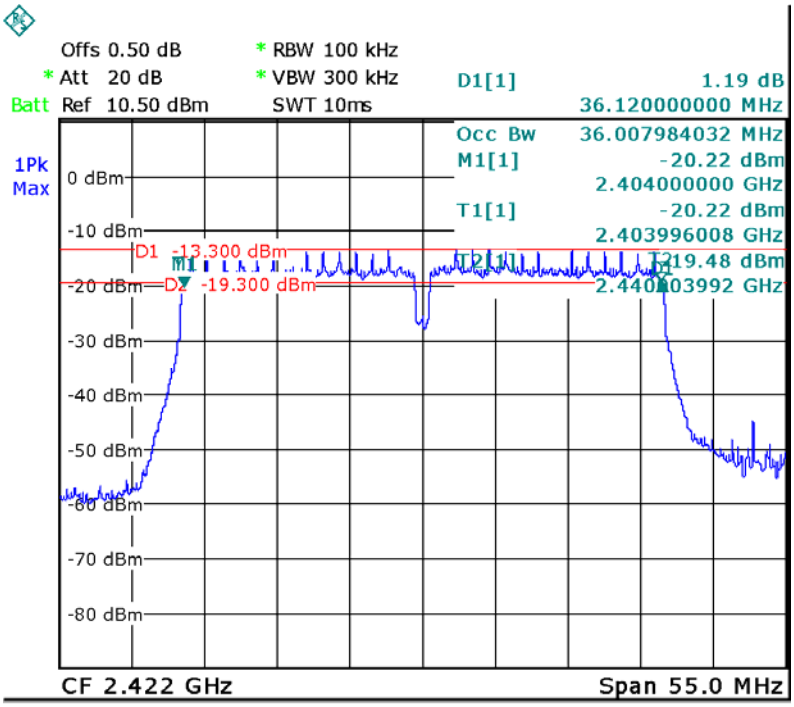
Mode: TX 11n HT20 channel 6



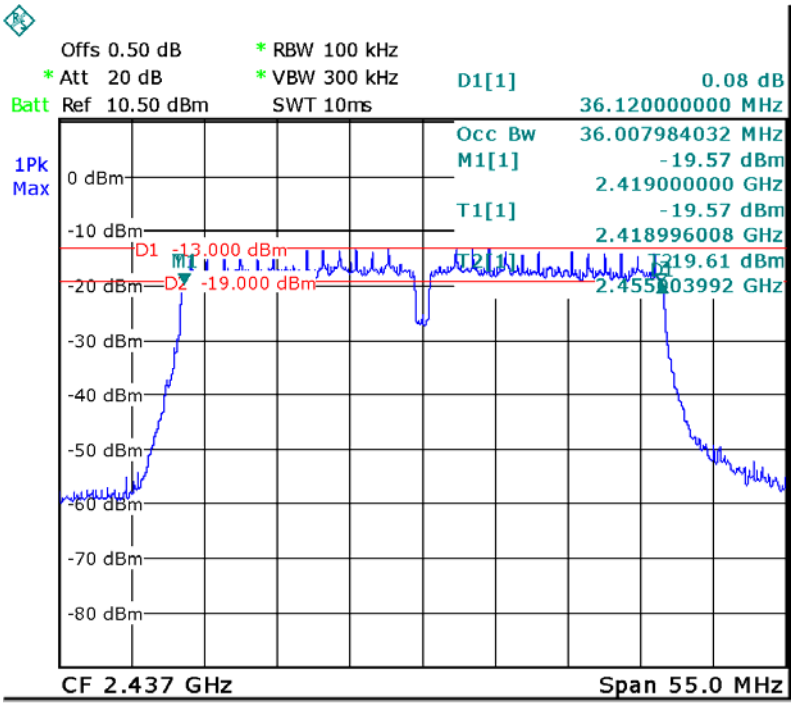
Mode: TX 11n HT20 channel 11



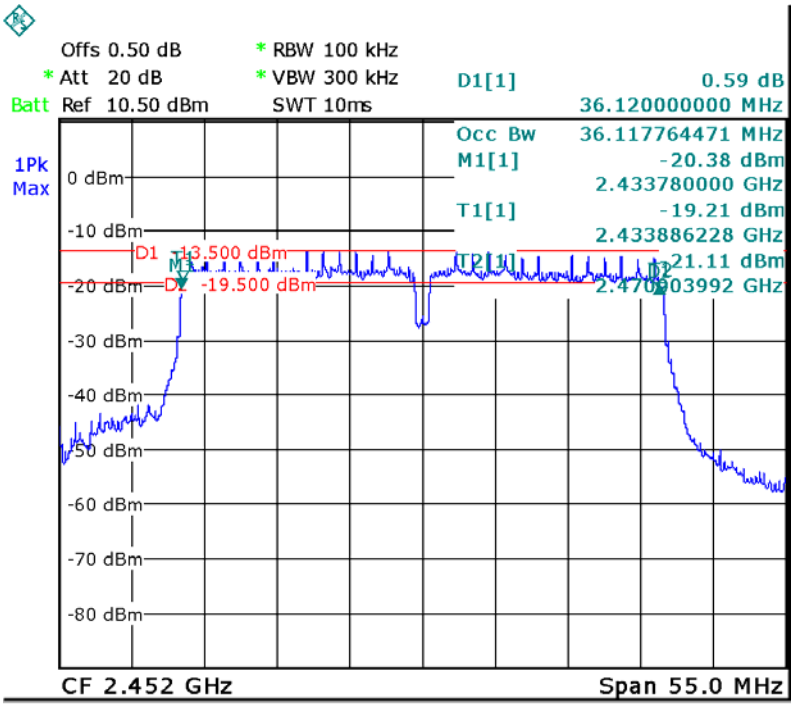
Mode: TX 11n HT40 channel 3



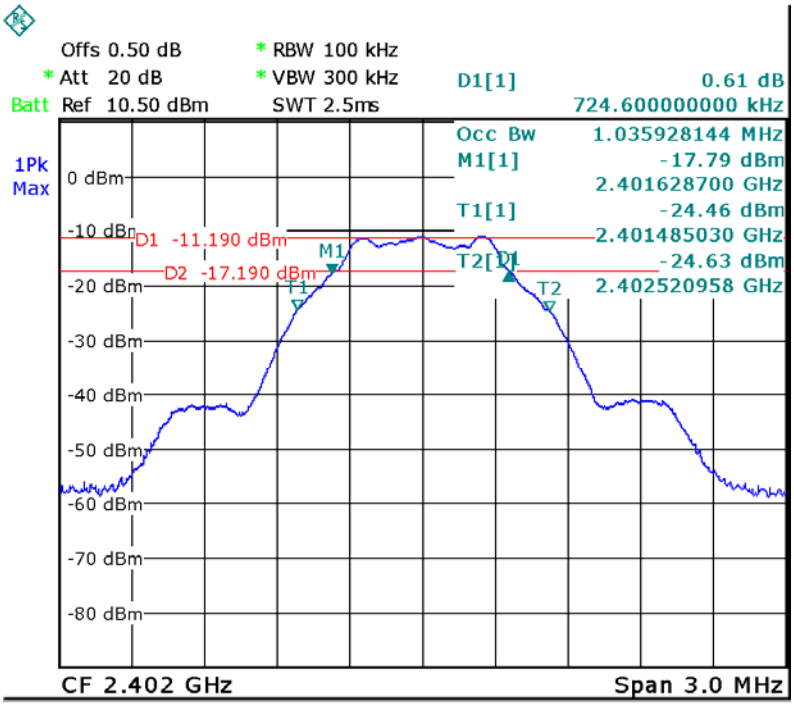
Mode: TX 11n HT40 channel 6



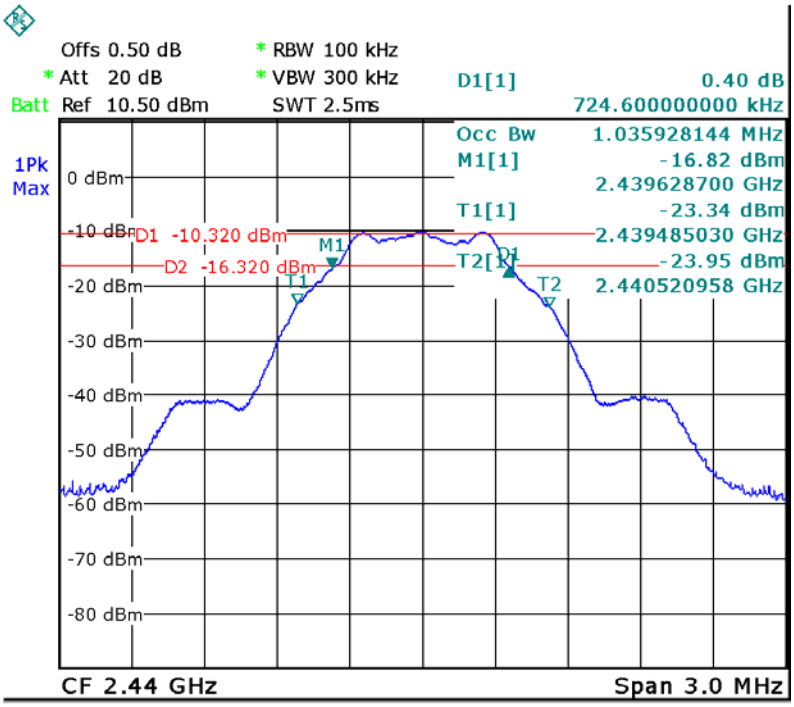
Mode: TX 11n HT40 channel 9



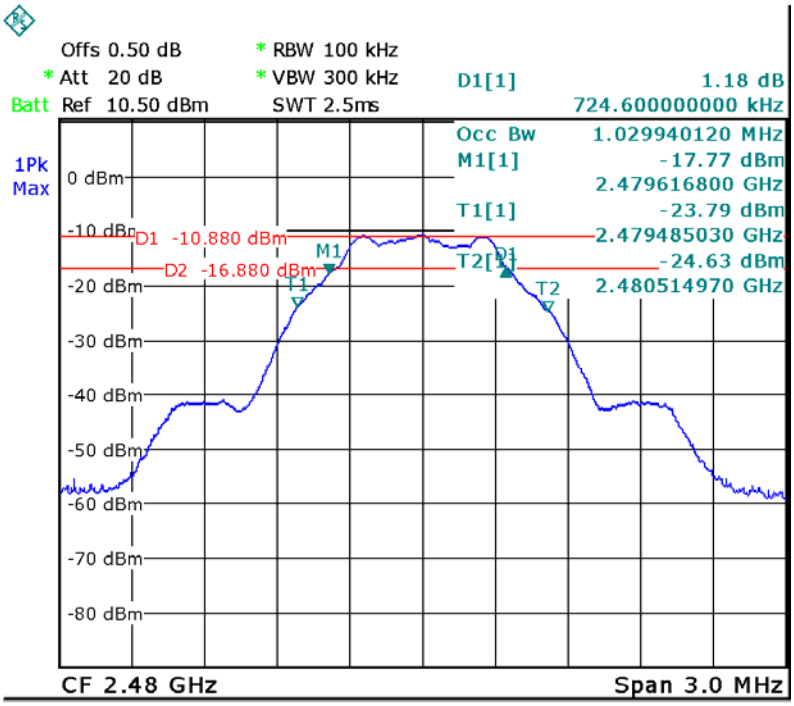
BLE: channel 0



BLE: channel 19



BLE: channel 39



13 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

13.1 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.

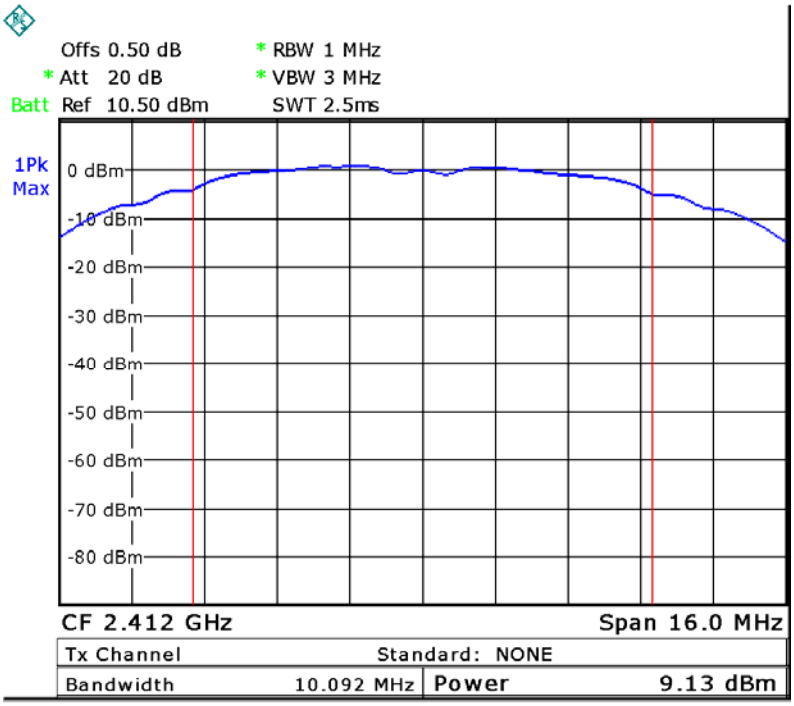
h)Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges (for some instruments, this may require a manual override to select peak detector). If the instrument does not have a band power function, sum the spectrum levels (in linear power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

13.2 Test Result:

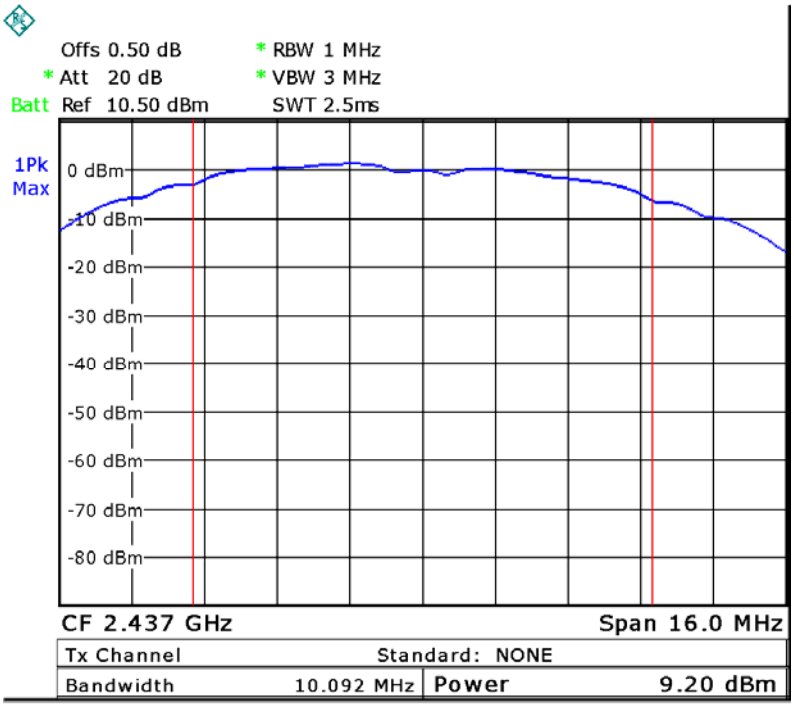
Operation mode	Channel Frequency (MHz)	Maximum Peak Output Power (dBm)	Limit
TX 11b	Low-2412	9.13	1W/30dBm
	Middle-2437	9.20	1W/30dBm
	High-2462	9.22	1W/30dBm
TX 11g	Low-2412	9.38	1W/30dBm
	Middle-2437	9.21	1W/30dBm
	High-2462	9.12	1W/30dBm
TX 11n HT20	Low-2412	9.35	1W/30dBm
	Middle-2437	9.04	1W/30dBm
	High-2462	9.38	1W/30dBm
TX 11n HT40	Low-2422	9.50	1W/30dBm
	Middle-2437	9.33	1W/30dBm
	High-2452	9.20	1W/30dBm
BLE	Low-2402	-9.86	1W/30dBm
	Middle-2440	-9.23	1W/30dBm
	High-2480	-9.80	1W/30dBm

Test Plot

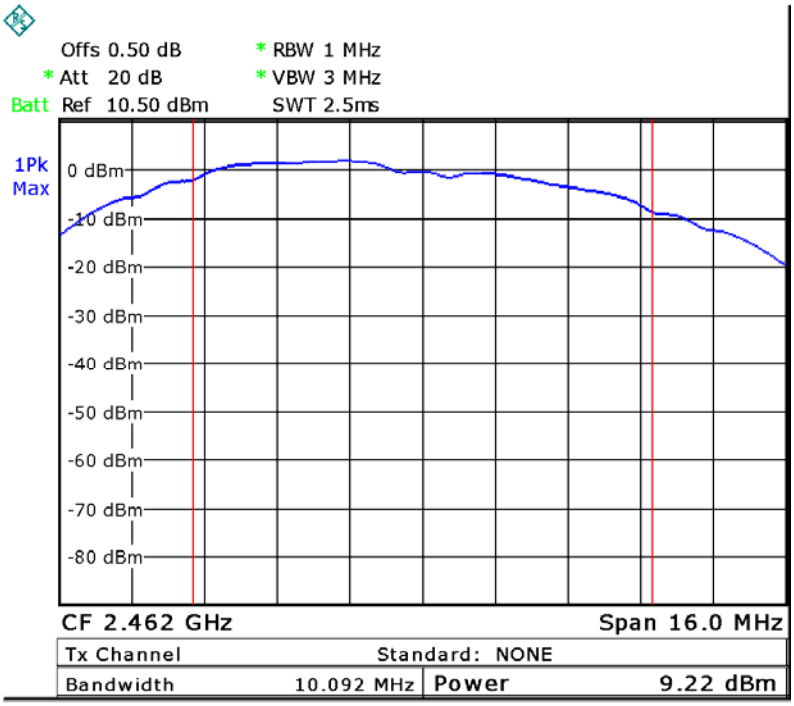
Mode: TX 11b channel 1



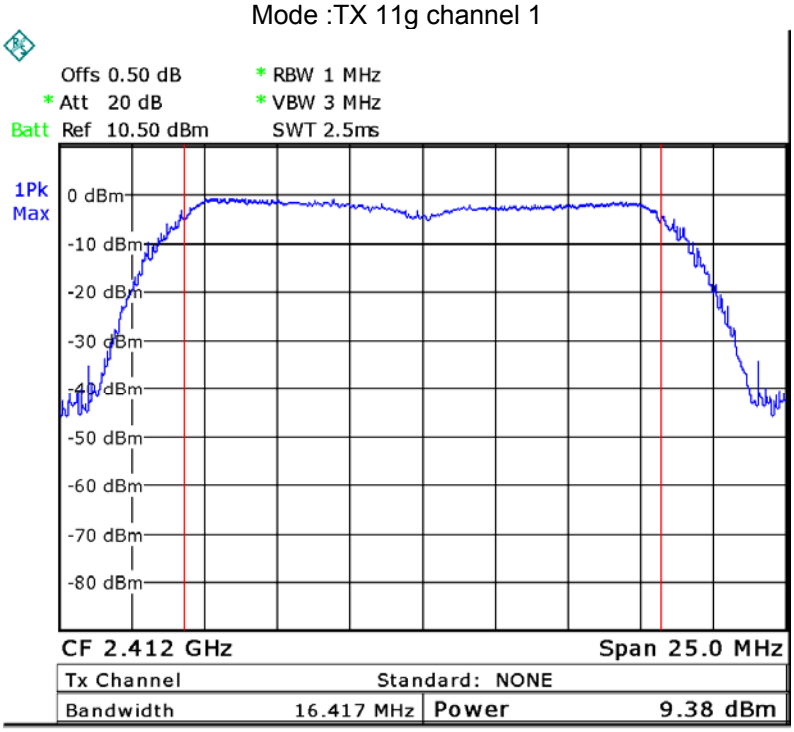
Mode: TX 11b channel 6



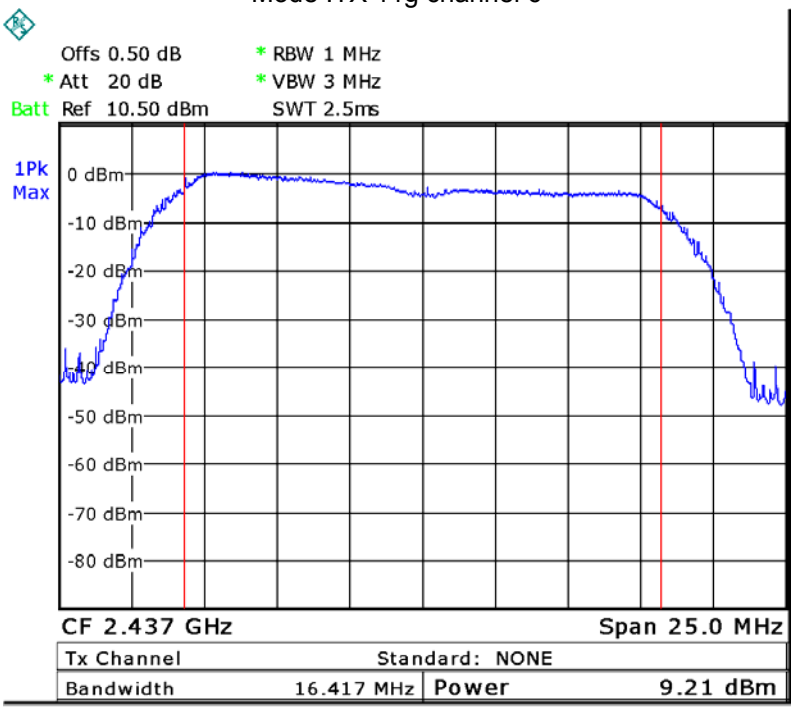
Mode: TX 11b channel 11



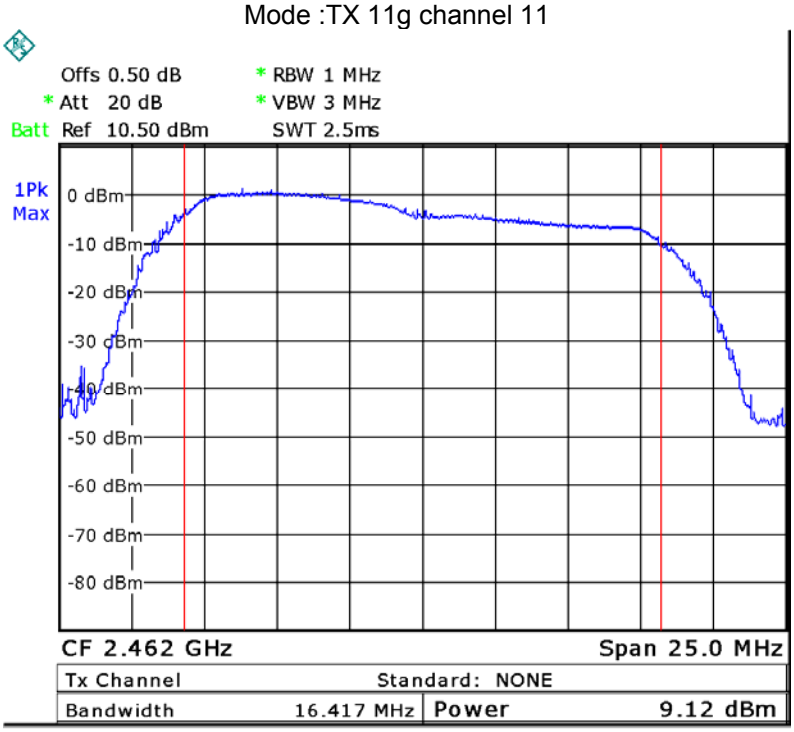
Mode :TX 11g channel 1



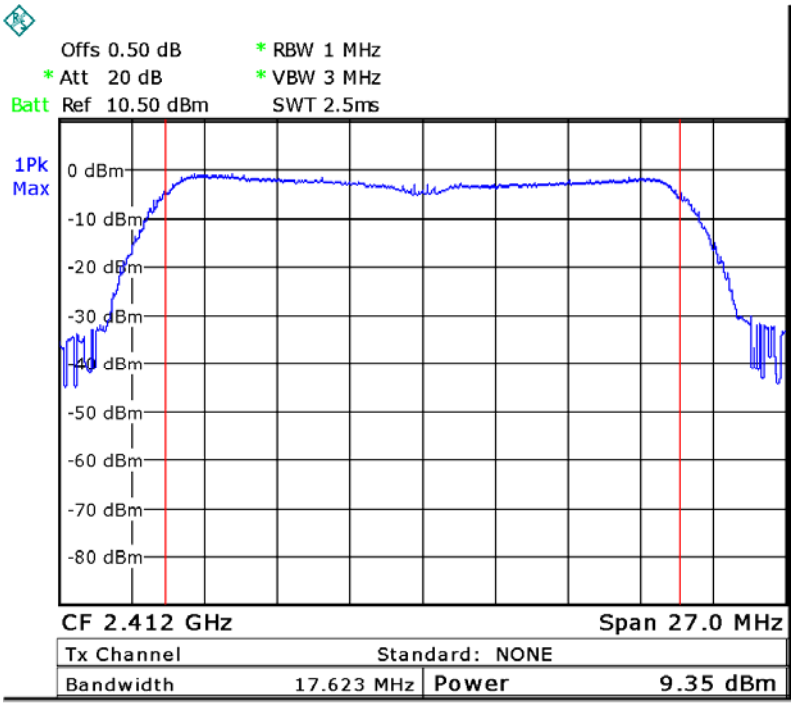
Mode :TX 11g channel 6



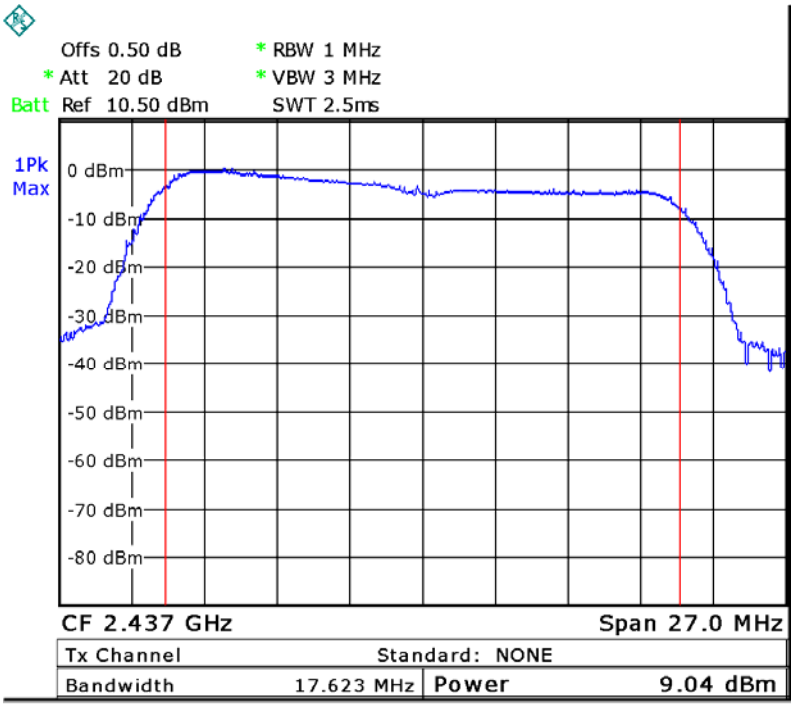
Mode :TX 11g channel 11



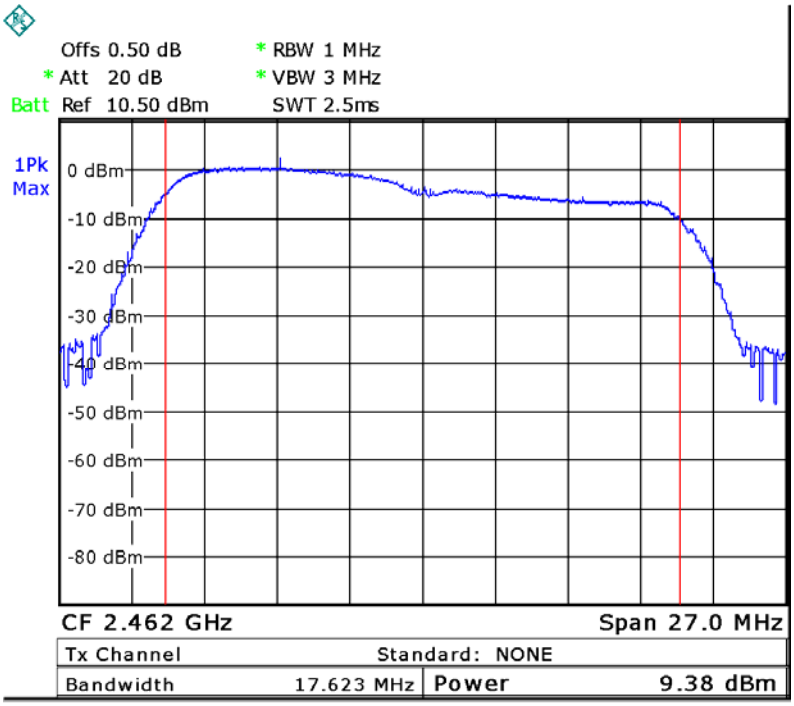
Mode: TX 11n HT20 channel 1



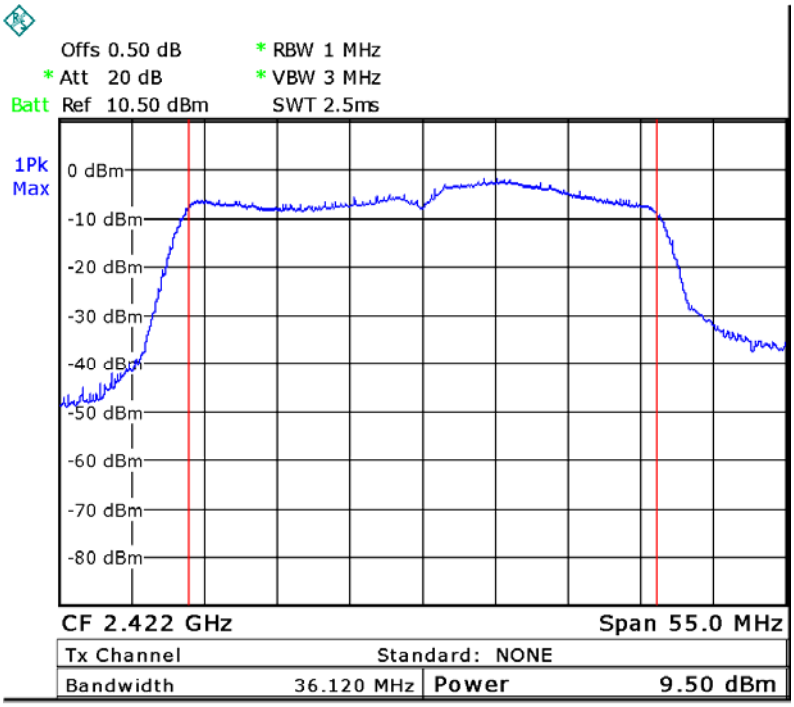
Mode: TX 11n HT20 channel 6



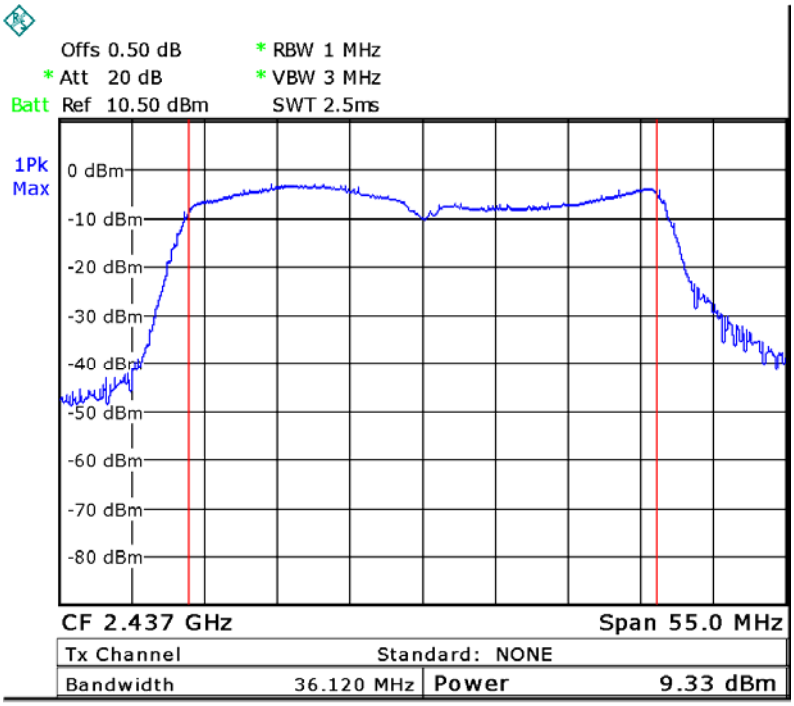
Mode: TX 11n HT20 channel 11



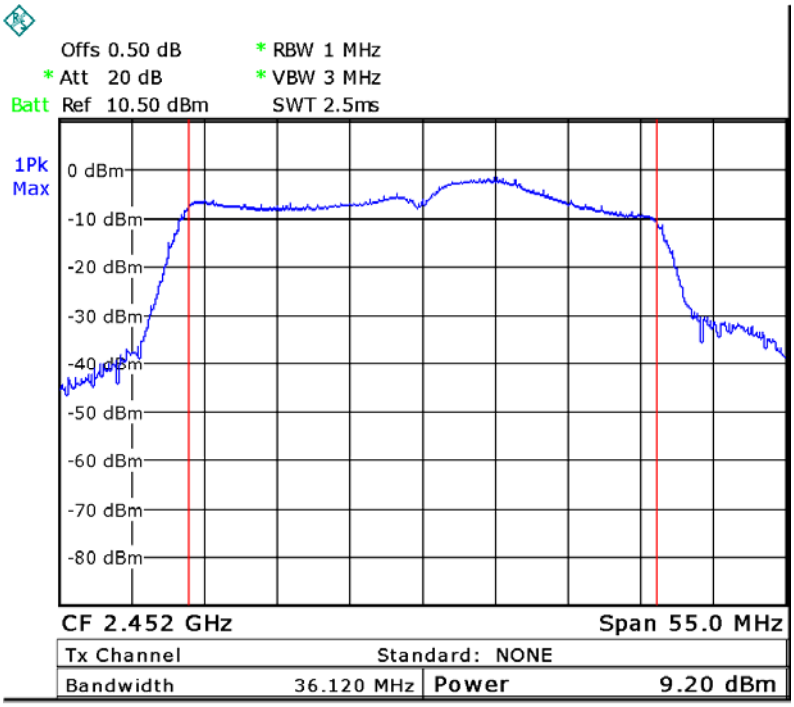
Mode: TX 11n HT40 channel 3



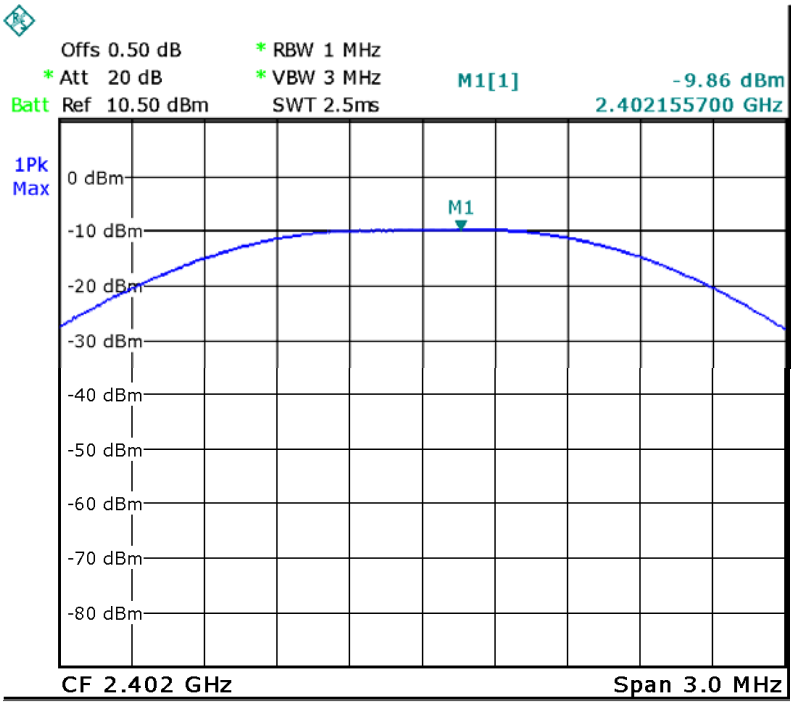
Mode: TX 11n HT40 channel 6



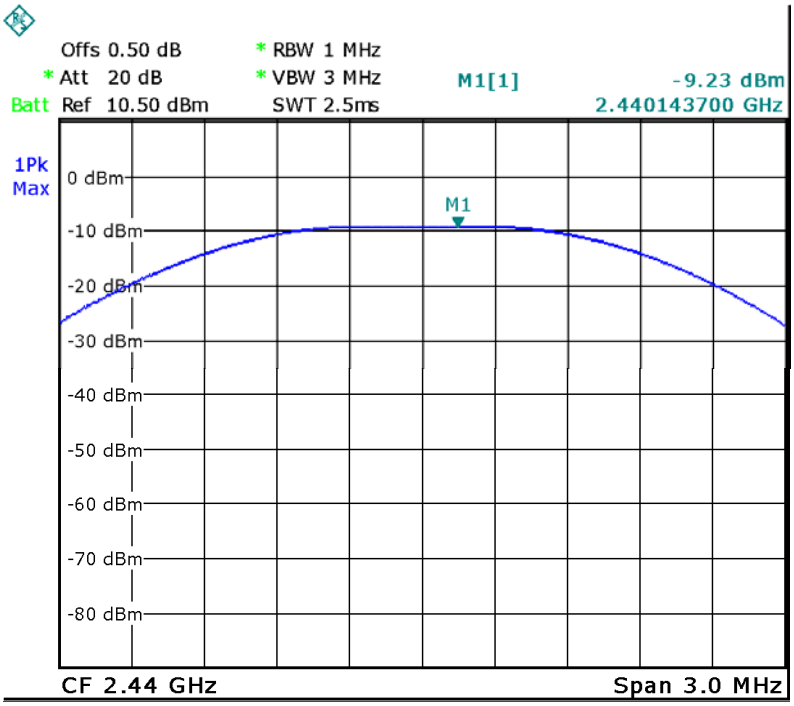
Mode: TX 11n HT40 channel 9



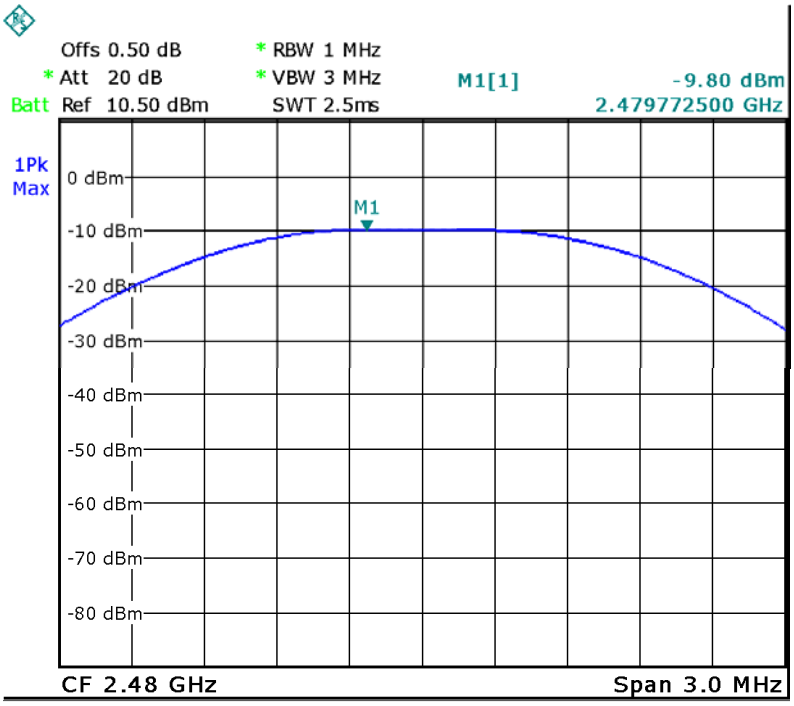
BLE: channel 0



BLE: channel 19



BLE: channel 39



14 Power Spectral density

Test Requirement: FCC CFR47 Part 15 Section 15.247

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

14.1 Test Procedure:

KDB 558074 D01 DTS Meas Guidance v03r05 April 8, 2016 section 10.2

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.

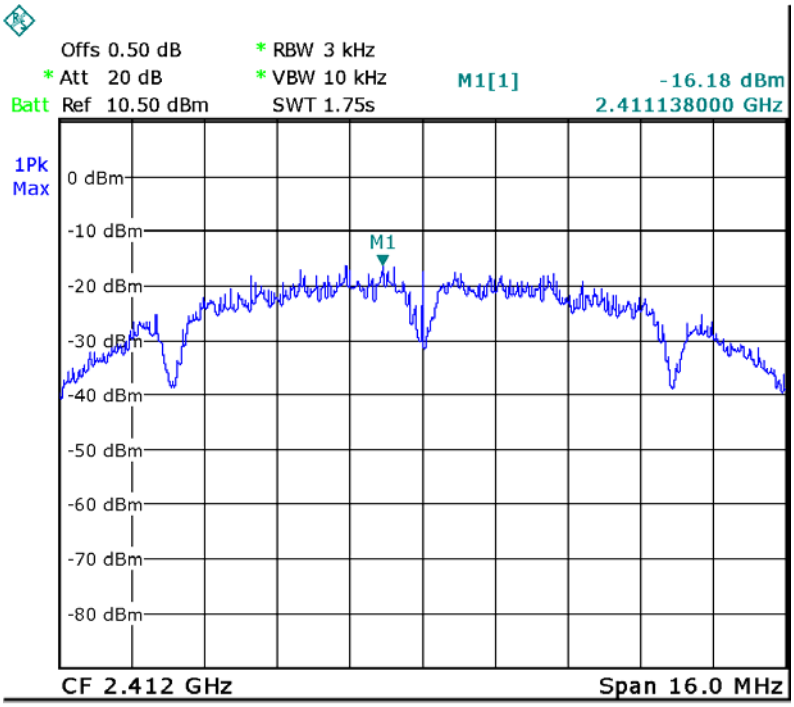
3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section Submit this plot.

14.2 Test Result:

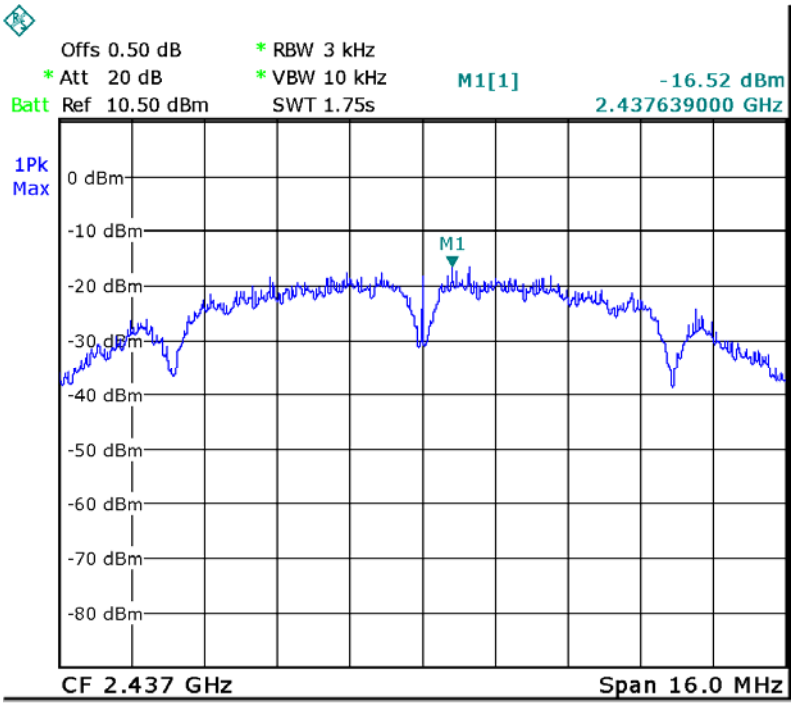
Operation mode	Channel Frequency (MHz)	Power Spectral (dBm per 3kHz)	Limit
TX 11b	Low-2412	-16.18	8dBm per 3kHz
	Middle-2437	-16.52	8dBm per 3kHz
	High-2462	-17.51	8dBm per 3kHz
TX 11g	Low-2412	-16.67	8dBm per 3kHz
	Middle-2437	-18.17	8dBm per 3kHz
	High-2462	-18.78	8dBm per 3kHz
TX 11n HT20	Low-2412	-17.34	8dBm per 3kHz
	Middle-2437	-18.53	8dBm per 3kHz
	High-2462	-18.41	8dBm per 3kHz
TX 11n HT40	Low-2422	-18.07	8dBm per 3kHz
	Middle-2437	-19.52	8dBm per 3kHz
	High-2452	-16.30	8dBm per 3kHz
BLE	Low-2402	-26.17	8dBm per 3kHz
	Middle-2440	-24.84	8dBm per 3kHz
	High-2480	-25.43	8dBm per 3kHz

Test Plot

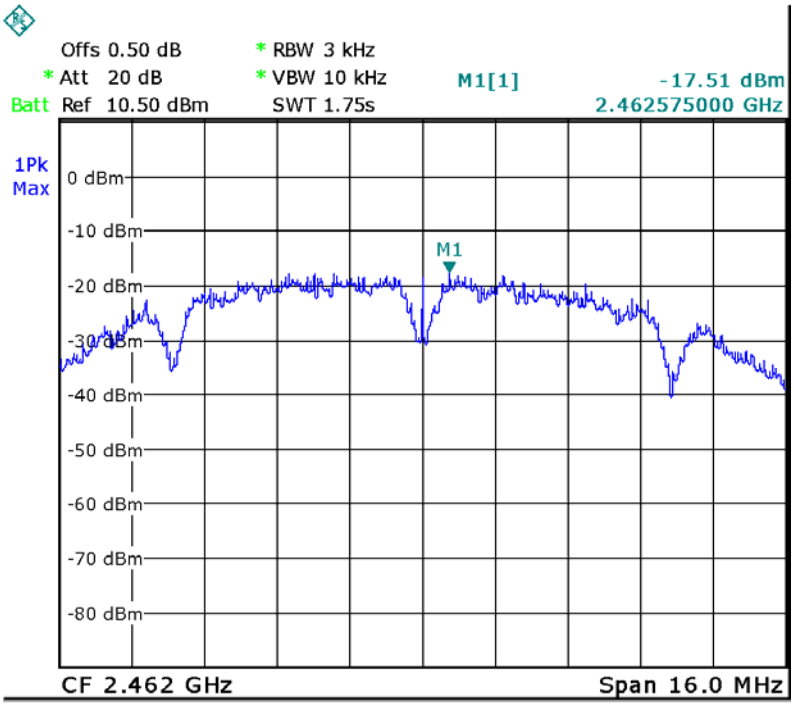
Mode: TX 11b channel 1



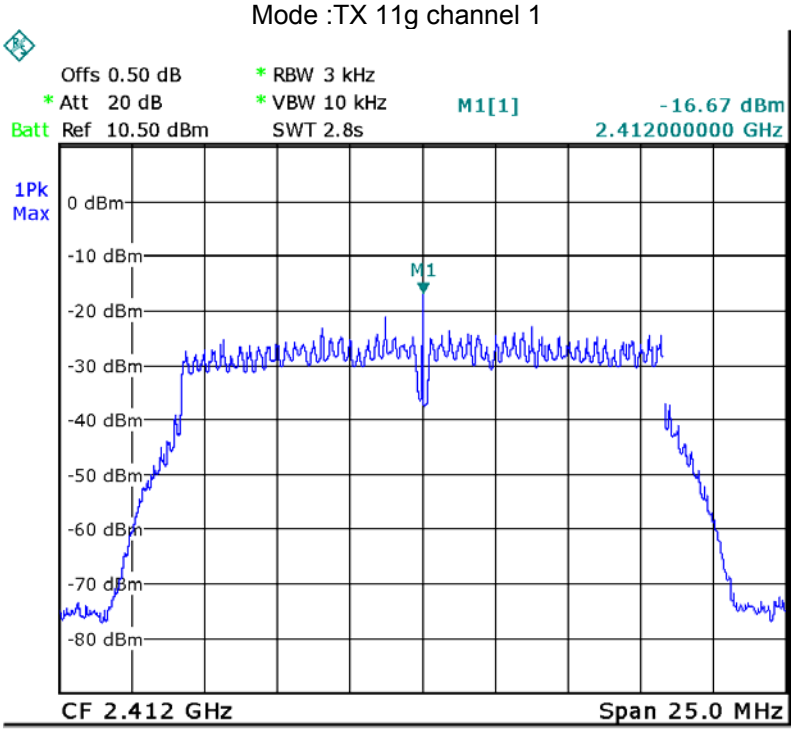
Mode: TX 11b channel 6



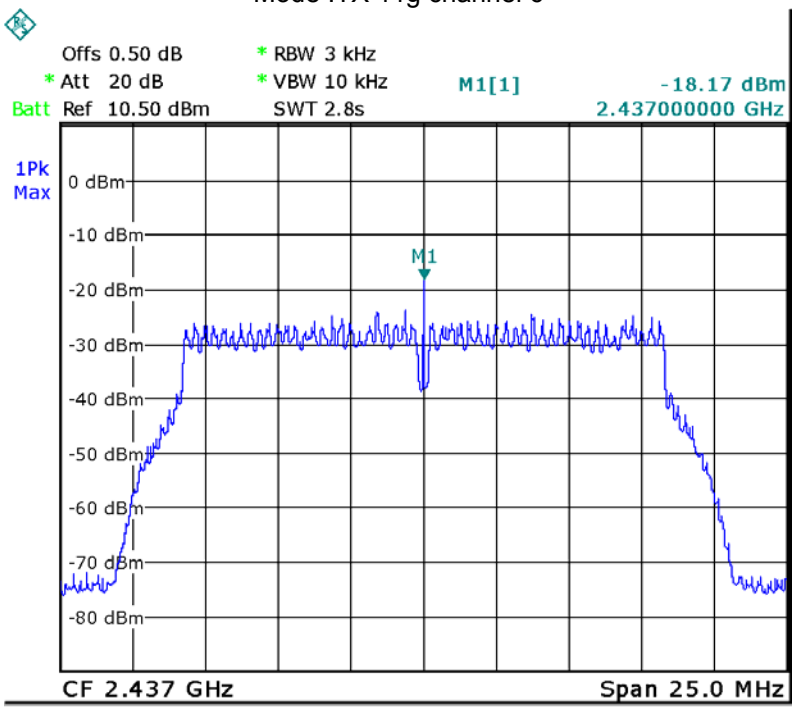
Mode: TX 11b channel 11



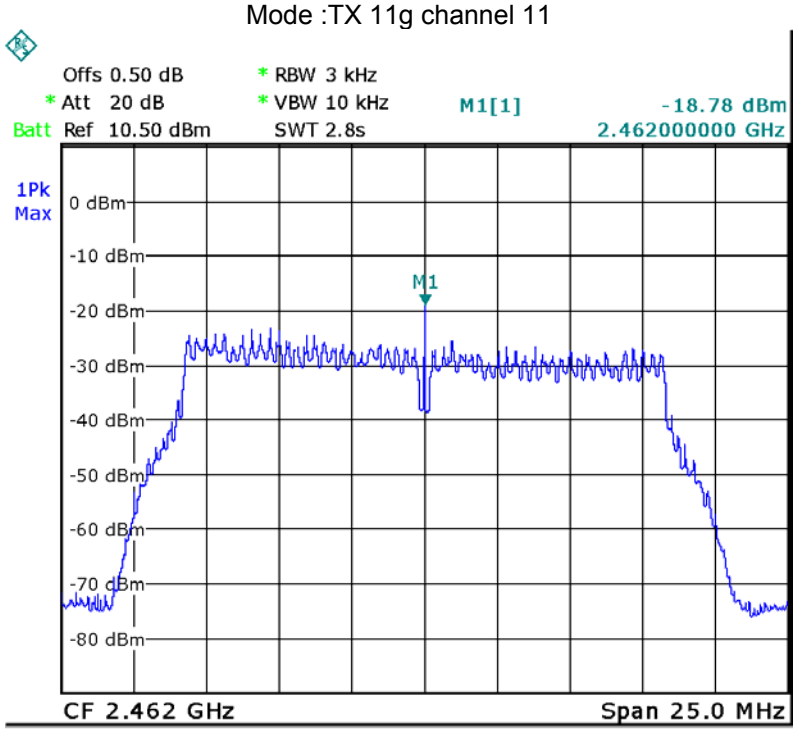
Mode :TX 11g channel 1



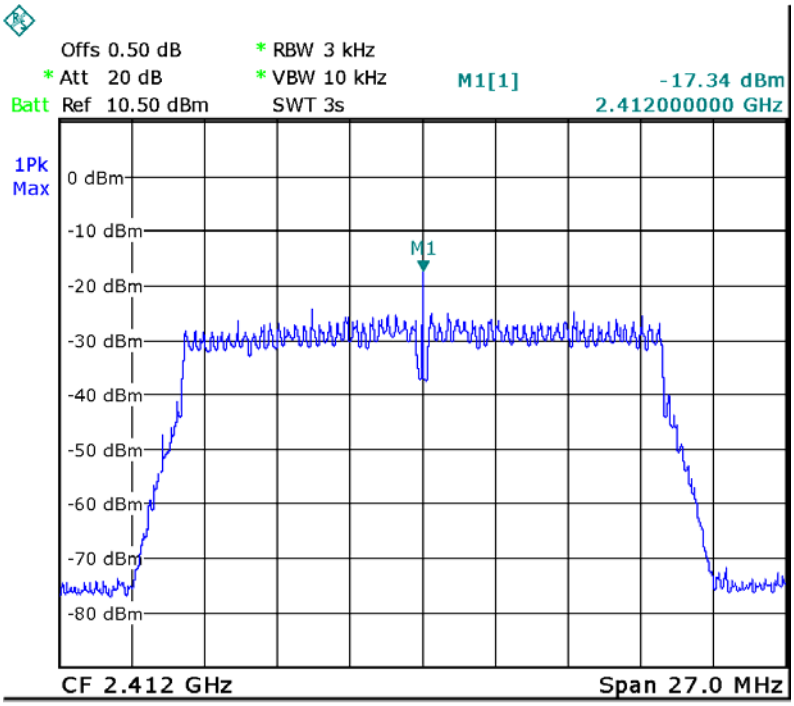
Mode :TX 11g channel 6



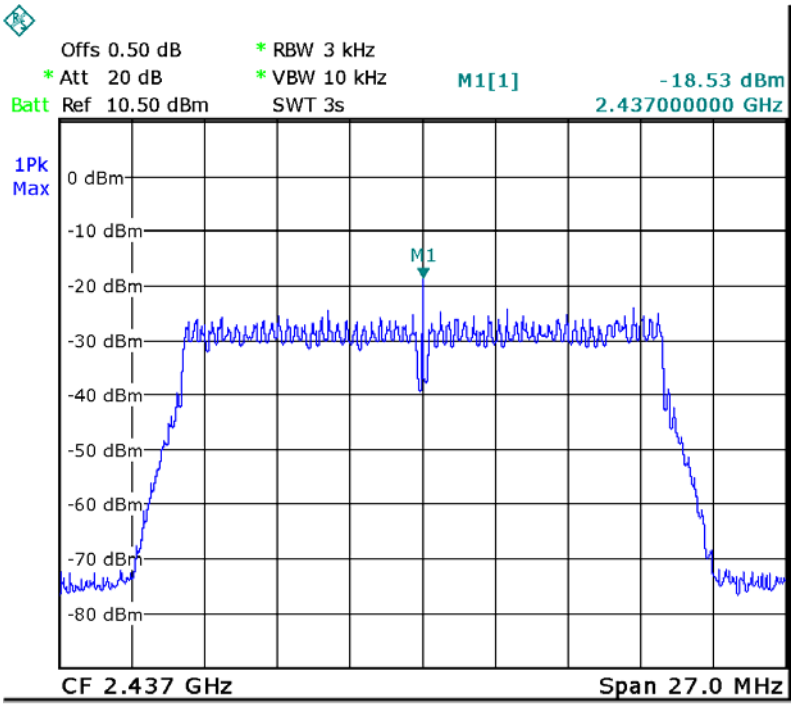
Mode :TX 11g channel 11



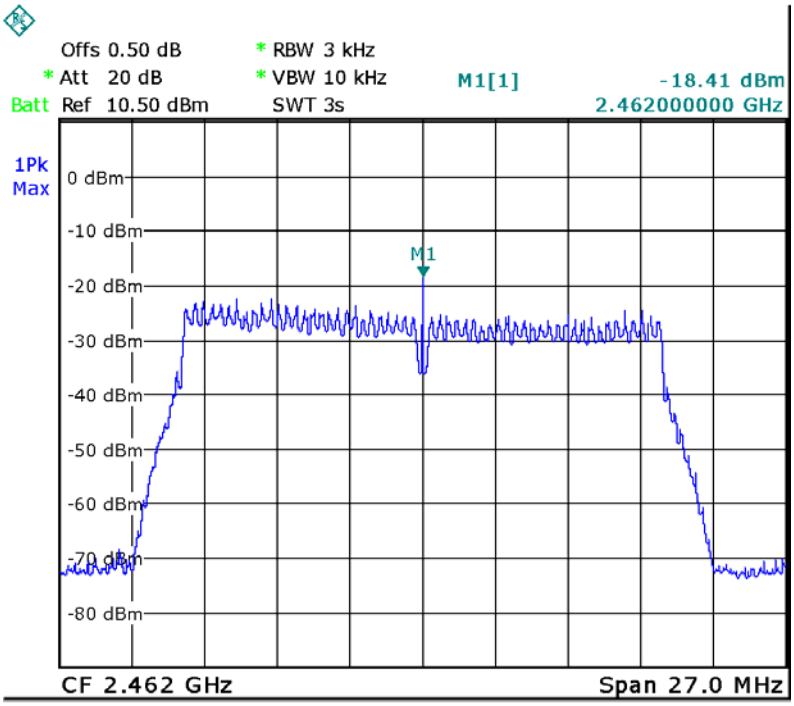
Mode: TX 11n HT20 channel 1



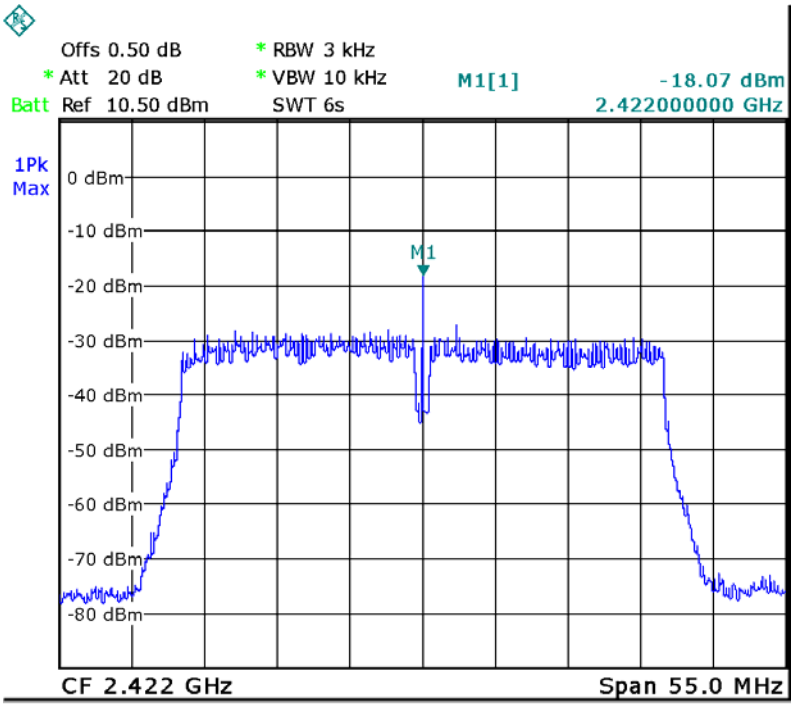
Mode: TX 11n HT20 channel 6



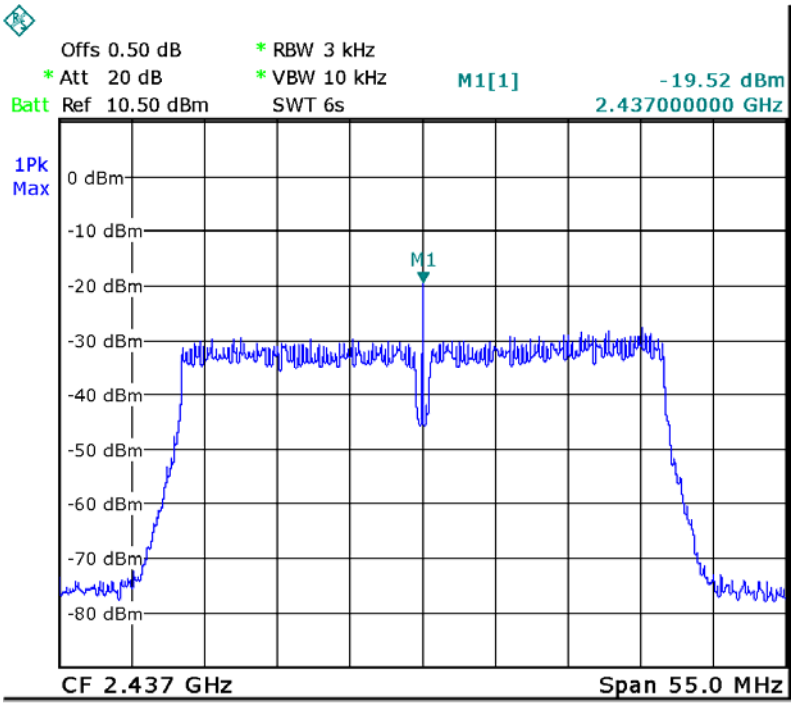
Mode: TX 11n HT20 channel 11



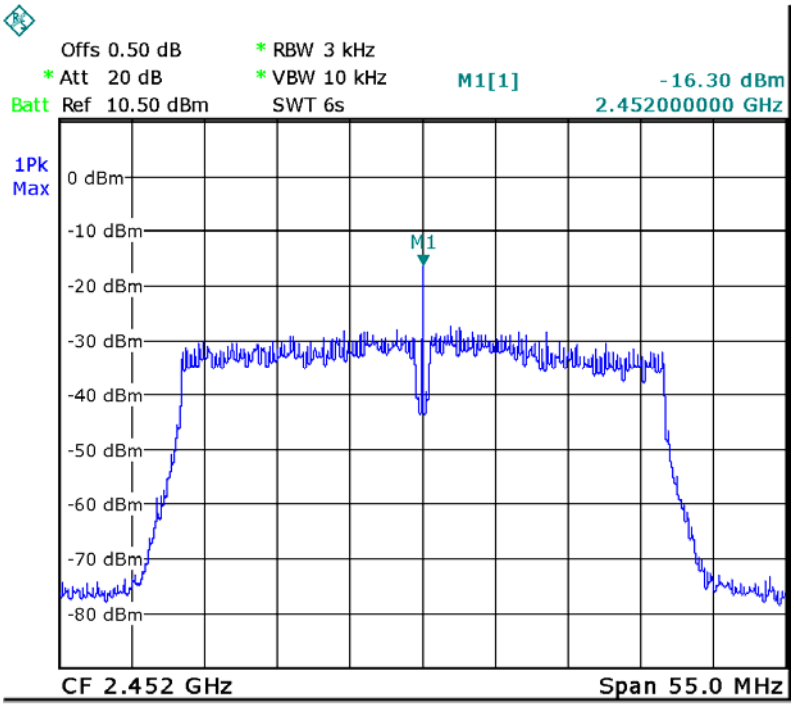
Mode: TX 11n HT40 channel 3



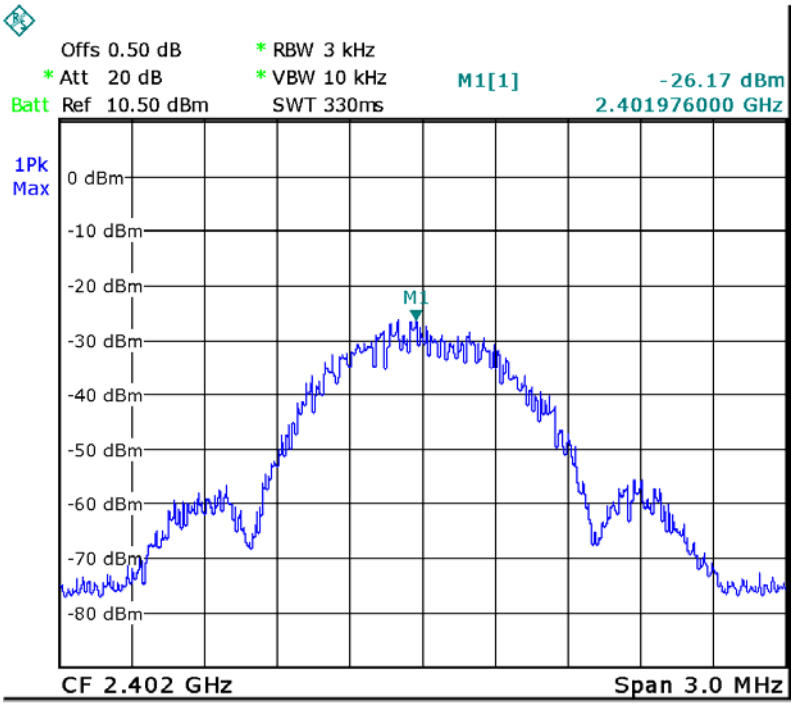
Mode: TX 11n HT40 channel 6



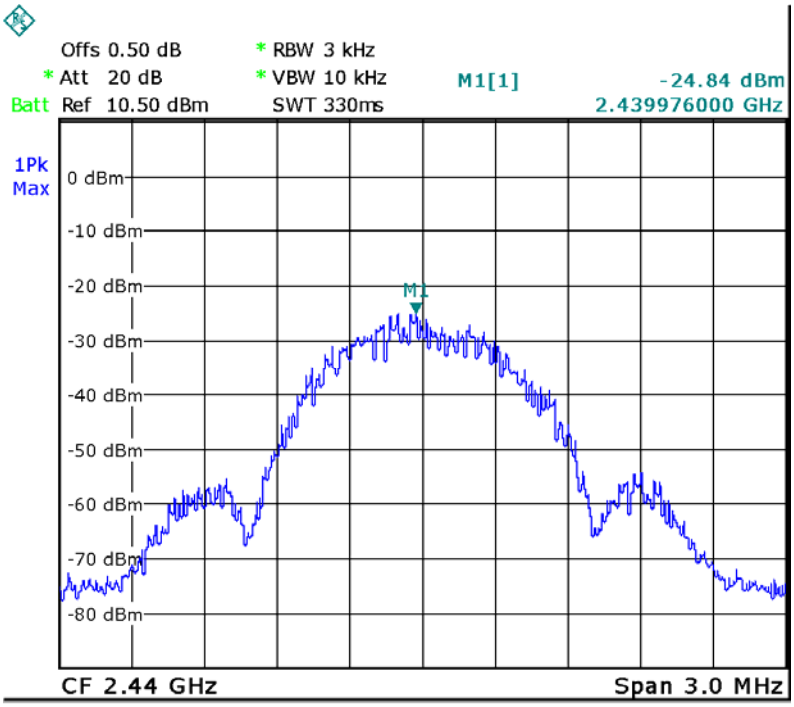
Mode: TX 11n HT40 channel 9



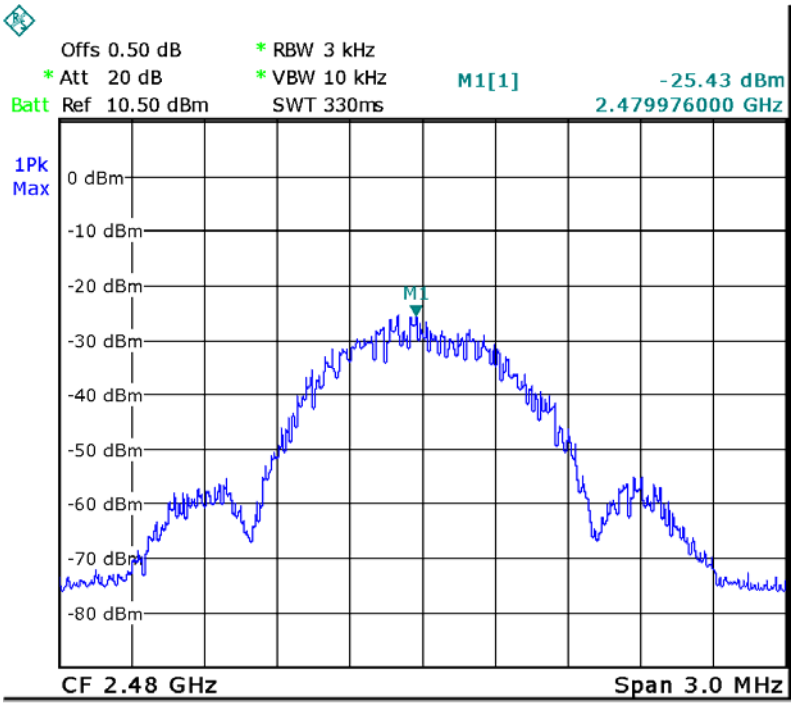
BLE: channel 0



BLE: channel 19



BLE: channel 39



15 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.

16 RF Exposure

Remark: refer to SAR test report: WTS17S1093493-5E.

17 Photographs of test setup and EUT.

Note: Please refer to appendix: WTS17S1093493E_Photo.

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