TEST REPORT

Reference No.	:	WTS16S1166013-1E V3
FCC ID	:	2AKIG-313805
Applicant	:	Sound Service Musikanlagen-Vertriebsgesellschaft mbH
Address	:	Am Spitzberg 3, DE-15834 Rangsdorf, Germany
Manufacturer	:	CMG Global Limited
Address	:	Flat A, 9/Floor, Wah Kit Commercial Centre, 300-302 Des Voeux Road Central, Hong Kong, China
Product Name	:	Nowsonic Stage Router Pro
Model No.	:	313805
Brand	:	Nowsonic
Standards	:	FCC CFR47 Part 15.247:2016
Date of Receipt sample	:	Nov. 21, 2016
Date of Test	:	Nov. 22 –Dec.25, 2016
Date of Issue	:	Feb. 23, 2017
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 Laboratories Introduction

Waltek Services Test Group Ltd is a professional third-party testing and certification organization with multi-year product testing and certification experience, established strictly in accordance with ISO/IEC 17025 requirements, and accredited by CNAS (China National Accreditation Service for Conformity Assessment) AQSIQ, CMA and IECEE for CBTL. 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.

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 and have branches in Foshan, Dongguan, Zhongshan, Suzhou,Ningbo and Hong Kong, Our test capability covered four large fields: safety test. ElectroMagnetic Compatibility(EMC), reliablity and energy performance, Chemical test. 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.

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4 Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTS16S1166013-1E	Nov. 21, 2016	Nov. 22 – Dec.25, 2016	Dec. 27, 2016	original	-	Replaced
WTS16S1166013-1E V1	Nov. 21, 2016	Nov. 22 – Dec.25, 2016	Feb. 13, 2017	Version 1	Updated	Replaced
WTS16S1166013-1E V2	Nov. 21, 2016	Nov. 22 – Dec.25, 2016	Feb. 15, 2017	Version 2	Updated	Replaced
WTS16S1166013-1E V3	Nov. 21, 2016	Nov. 22 – Dec.25, 2016	Feb. 23, 2017	Version 2	Updated	Valid

5 General Information

5.1 General Description of E.U.T.

Product Name:	Nowsonic Stage Router Pro
Model No.:	313805
Model Description:	N/A
Wi-Fi Specification:	2.4G-802.11b/g/n HT20/n HT40
Antenna Gain:	4.0 dBi
Type of Modulation:	IEEE 802.11b MIMO(CCK/QPSK/BPSK,11Mbps max.) IEEE 802.11g MIMO(BPSK/QPSK/16QAM/64QAM,54Mbps max.) IEEE 802.11nMIMO(BPSK/QPSK/16QAM/64QAM,HT20:72Mbps max., HT40:150Mbps max.)
The lowest oscillator:	25MHz
The Maximum Output Power:	22.76 dBm
Hardware Version:	V2.0
Software Version:	nowpro_en_9_970
Storage location	Internal storage

5.2 Details of E.U.T.

Technical Data: AC 120V/60Hz

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	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

Note 1: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 .

Note 2: The transmitter output signals for this device are completely uncorrelated. The device don't transmit simultaneously in multiple channels in single or multiple frequency bands and uses carrier aggregation techniques similar to IEEE 802.11ac.

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 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

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	Sep.12,2016	Sep.11,2017
2.	LISN	R&S	ENV216	101215	Sep.12,2016	Sep.11,2017
3.	Cable	Top	TYPE16(3.5M)	-	Sep.12,2016	Sep.11,2017
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	Sep.12,2016	Sep.11,2017
2.	LISN	SCHWARZBECK	NSLK 8128	8128-289	Sep.12,2016	Sep.11,2017
3.	Limiter	York	MTS-IMP-136	261115-001-0024	Sep.12,2016	Sep.11,2017
4.	Cable	LARGE	RF300	-	Sep.12,2016	Sep.11,2017
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	Apr.29, 2016	Apr.28, 2017
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	Apr.09,2016	Apr.08,2017
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	Apr.09,2016	Apr.08,2017
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	Sep.12,2016	Sep.11,2017
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	Apr.09,2016	Apr.08,2017
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	Apr.09,2016	Apr.08,2017
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	Apr.13,2016	Apr.12,2017
8	Coaxial Cable (above 1GHz)	Top	1GHz-25GHz	EW02014-7	Apr.13,2016	Apr.12,2017
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	Apr.13,2016	Apr.12,2017
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	Apr.09,2016	Apr.08,2017
3	Amplifier	Compliance pirection systems inc	PAP-0203	22024	Apr.13,2016	Apr.12,2017
4	Cable	HUBER+SUHNER	CBL2	525178	Apr.13,2016	Apr.12,2017

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	Sep.12,2016	Sep.11,2017
2.	Spectrum Analyzer (9k-6GHz)	R&S	FSL6	100959	Sep.12,2016	Sep.11,2017
3.	Signal Analyzer (9k~26.5GHz)	Agilent	N9010A	MY50520207	Sep.12,2016	Sep.11,2017

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 (150KHz~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

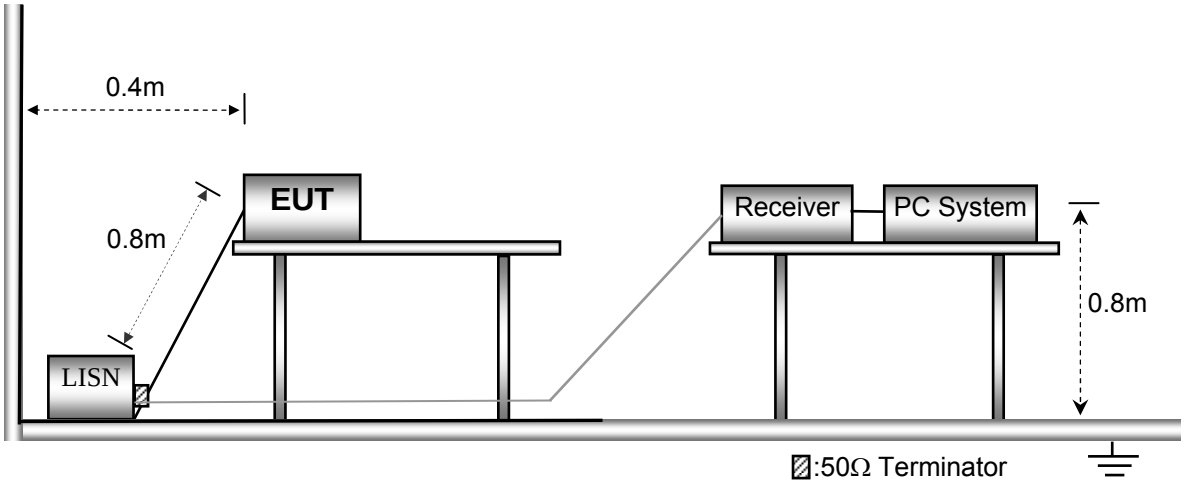
Atmospheric Pressure: 101.2kPa

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

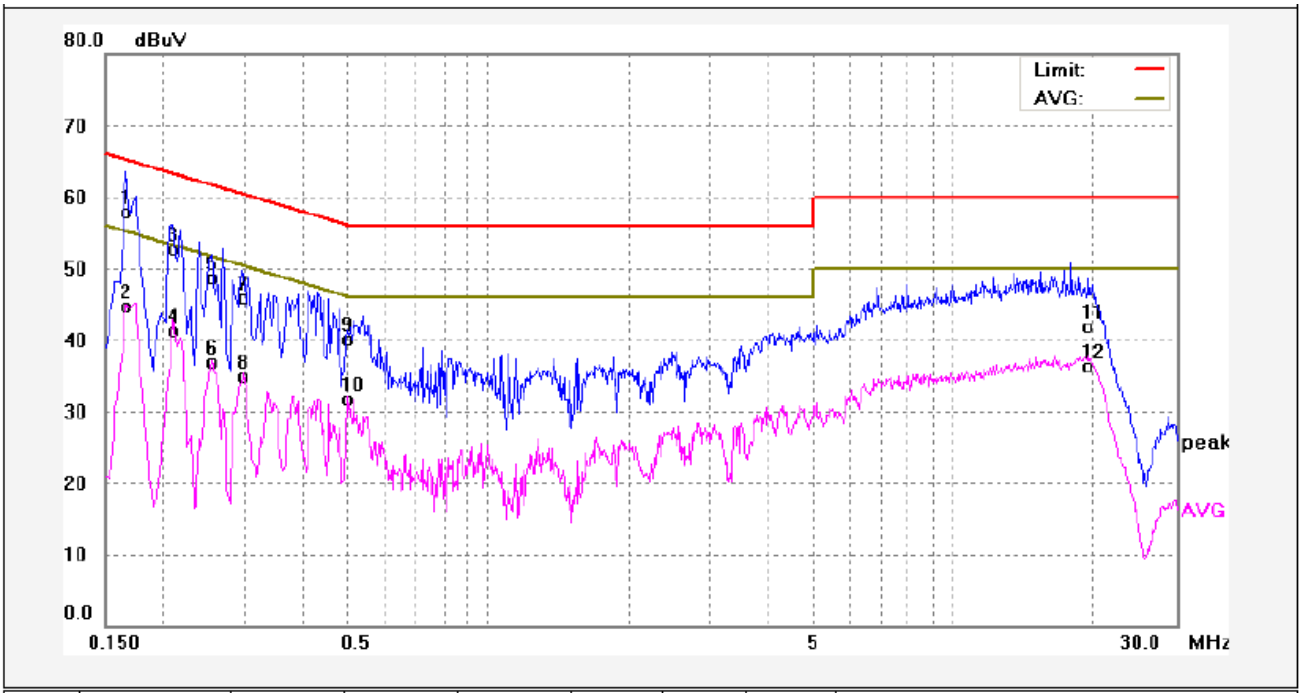
The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

8.4 Conducted Emission Test Result

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

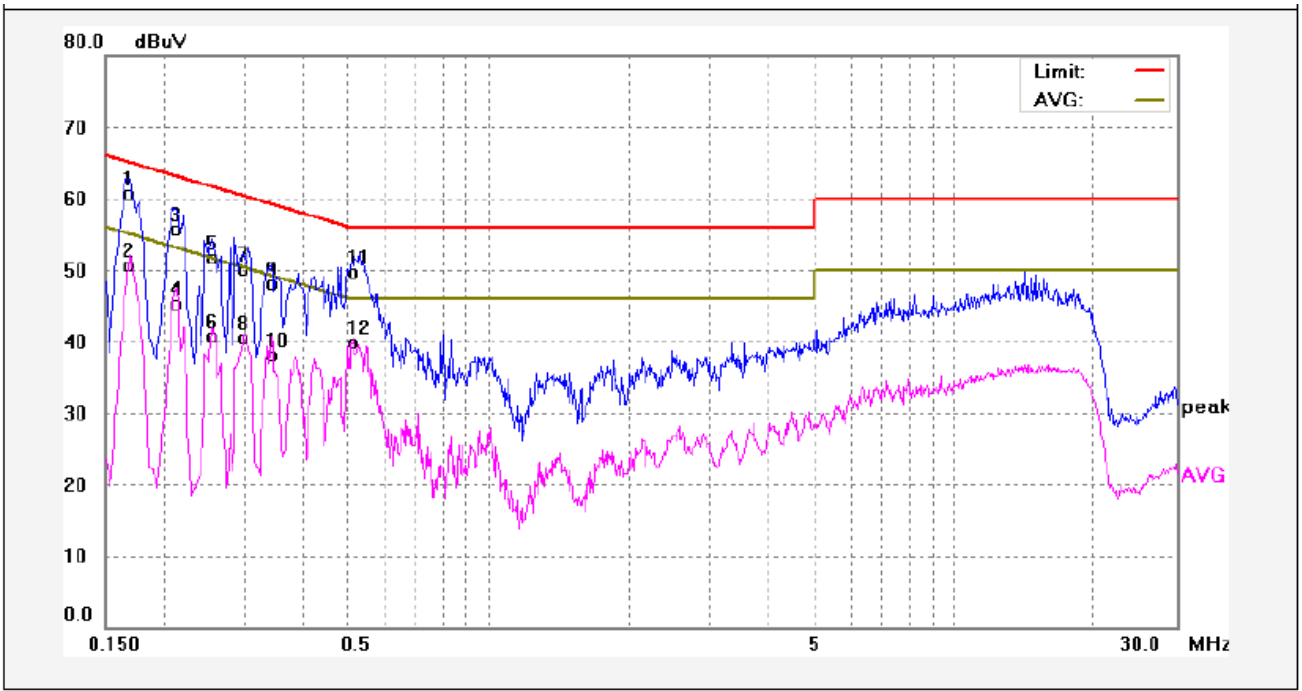
Worst Mode: WIFI mode (b mode low channel ANT 1+ANT 2)

Live line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1660	48.19	9.64	57.83	65.15	-7.32	QP	
2	0.1660	34.98	9.64	44.62	55.15	-10.53	AVG	
3	0.2100	43.15	9.62	52.77	63.20	-10.43	QP	
4	0.2100	31.71	9.62	41.33	53.20	-11.87	AVG	
5	0.2540	39.07	9.64	48.71	61.62	-12.91	QP	
6	0.2540	27.28	9.64	36.92	51.62	-14.70	AVG	
7	0.2980	36.25	9.64	45.89	60.30	-14.41	QP	
8	0.2980	25.26	9.64	34.90	50.30	-15.40	AVG	
9	0.4980	30.39	9.65	40.04	56.03	-15.99	QP	
10	0.4980	21.96	9.65	31.61	46.03	-14.42	AVG	
11	19.3660	31.54	10.33	41.87	60.00	-18.13	QP	
12	19.3660	25.91	10.33	36.24	50.00	-13.76	AVG	

Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1700	51.15	9.64	60.79	64.96	-4.17	QP	
2	0.1700	41.00	9.64	50.64	54.96	-4.32	AVG	
3	0.2140	46.15	9.63	55.78	63.04	-7.26	QP	
4	0.2140	35.61	9.63	45.24	53.04	-7.80	AVG	
5	0.2540	41.97	9.64	51.61	61.62	-10.01	QP	
6	0.2540	31.03	9.64	40.67	51.62	-10.95	AVG	
7	0.2980	40.47	9.64	50.11	60.30	-10.19	QP	
8	0.2980	30.79	9.64	40.43	50.30	-9.87	AVG	
9	0.3420	38.52	9.63	48.15	59.15	-11.00	QP	
10	0.3420	28.53	9.63	38.16	49.15	-10.99	AVG	
11	0.5140	40.13	9.66	49.79	56.00	-6.21	QP	
12	0.5140	30.23	9.66	39.89	46.00	-6.11	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

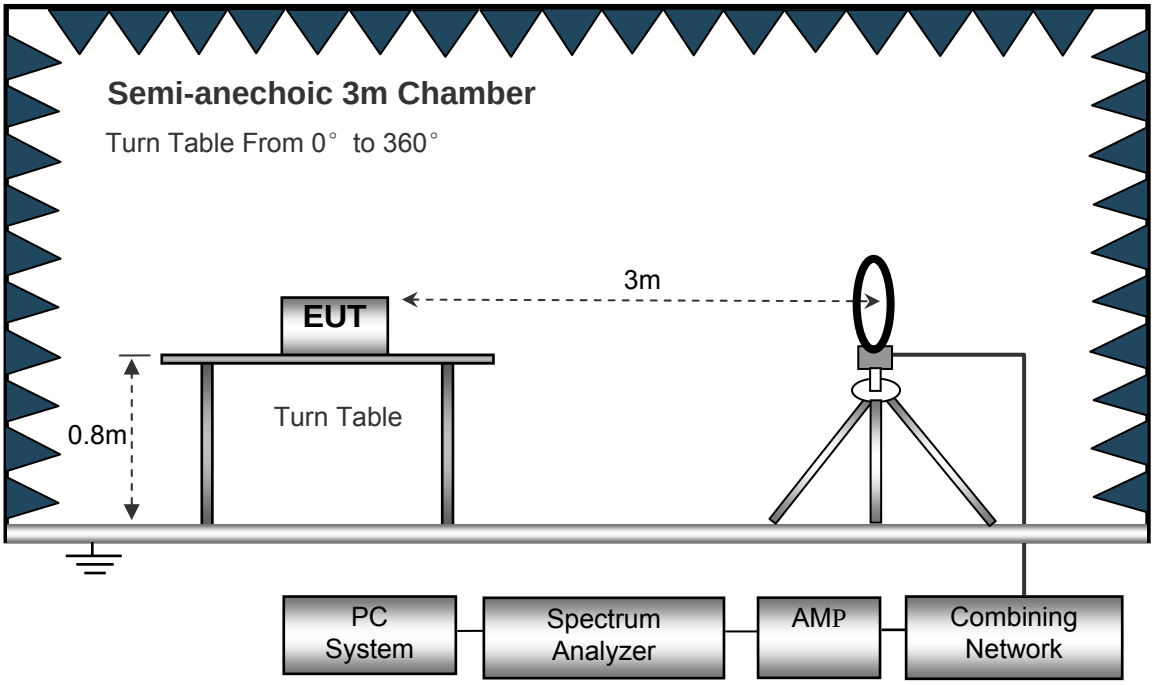
EUT Operation **:**

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

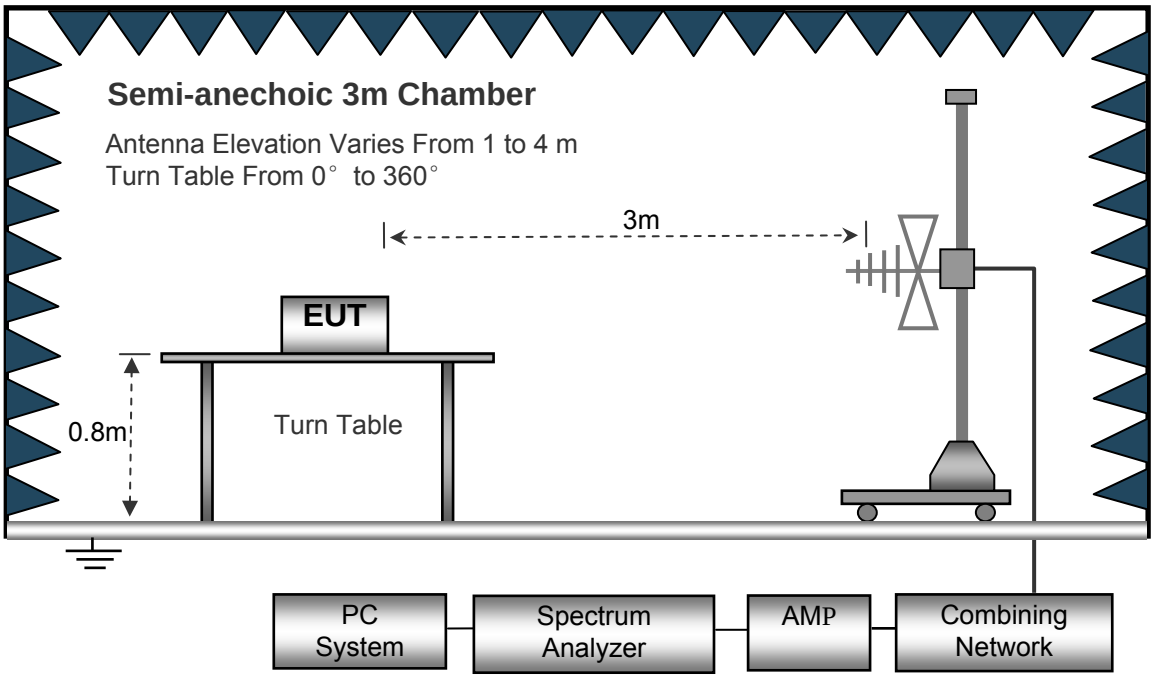
9.2 Test Setup

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

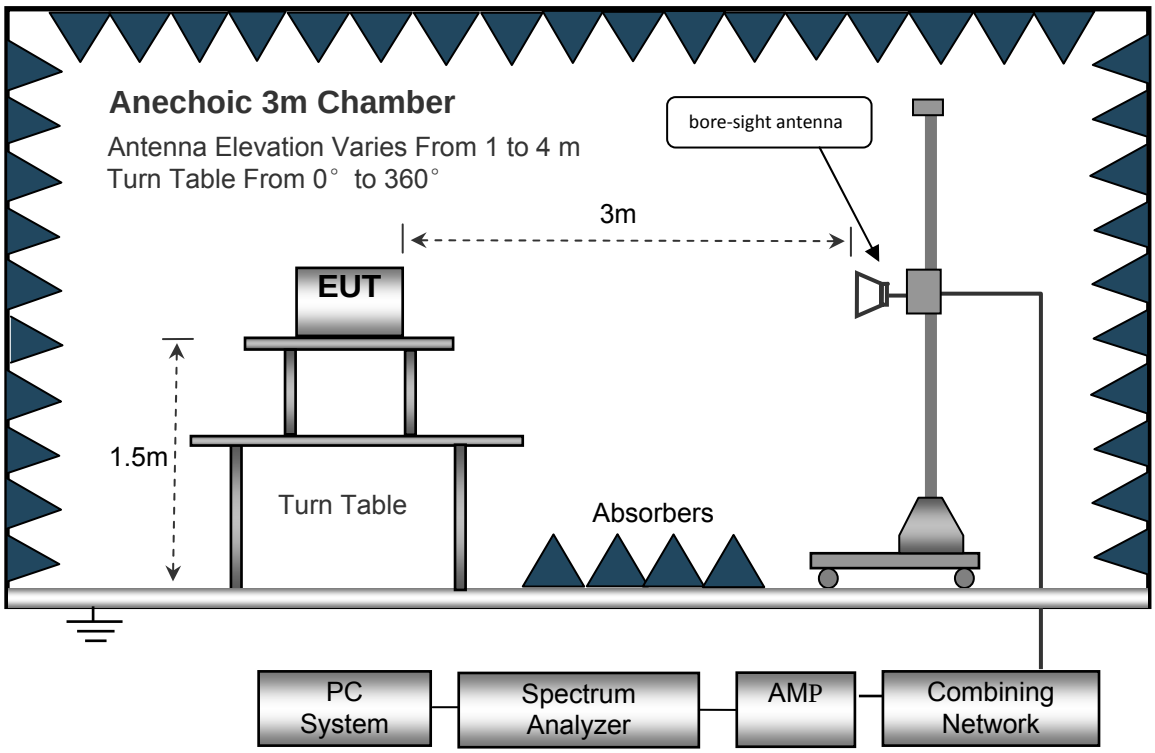
The test setup for emission measurement below 30MHz.



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

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 ANT1+ANT2							
6.021	26.23	QP	21.84	40.00	8.07	29.54	-21.47
8.304	28.51	QP	21.02	40.00	9.53	29.54	-20.01
26.127	24.11	QP	20.55	40.00	4.66	29.54	-24.88
802.11g ANT1+ANT2							
6.021	26.77	QP	21.84	40.00	8.61	29.54	-20.93
8.304	27.56	QP	21.02	40.00	8.58	29.54	-20.96
26.127	25.51	QP	20.55	40.00	6.06	29.54	-23.48
802.11n(HT20) ANT1+ANT2							
6.022	26.08	QP	21.84	40.00	7.92	29.54	-21.62
8.304	24.56	QP	21.02	40.00	5.58	29.54	-23.96
26.127	25.35	QP	20.55	40.00	5.90	29.54	-23.64
802.11n(HT40) ANT1+ANT2							
6.022	24.22	QP	21.84	40.00	6.06	29.54	-23.48
8.304	24.36	QP	21.02	40.00	5.38	29.54	-24.16
26.127	25.14	QP	20.55	40.00	5.69	29.54	-23.85

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 ANT1+ANT2									
223.45	41.05	QP	9.79	1.21	H	11.62	29.43	46.00	-16.57
223.45	36.26	QP	53.73	1.38	H	11.62	24.64	46.00	-21.36
4824.00	50.44	PK	342.50	1.71	V	1.06	49.38	74.00	-24.62
4824.00	46.32	Ave	342.50	1.71	V	1.06	45.26	54.00	-8.74
7236.00	41.08	PK	137.24	1.28	H	1.33	42.41	74.00	-31.59
7236.00	41.96	Ave	137.24	1.28	H	1.33	43.29	54.00	-10.71
2318.27	45.79	PK	357.93	1.41	V	13.19	32.60	74.00	-41.40
2318.27	38.05	Ave	357.93	1.41	V	13.19	24.86	54.00	-29.14
2383.36	42.60	PK	315.71	1.66	H	13.14	29.46	74.00	-44.54
2383.36	36.16	Ave	315.71	1.66	H	13.14	23.02	54.00	-30.98
2487.42	44.15	PK	156.08	1.64	V	13.08	31.07	74.00	-42.93
2487.42	36.94	Ave	156.08	1.64	V	13.08	23.86	54.00	-30.14

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 ANT1+ANT2									
223.45	40.17	QP	6.62	1.19	H	11.62	28.55	46.00	-17.45
223.45	37.03	QP	65.68	1.79	V	11.62	25.41	46.00	-20.59
4874.00	50.85	PK	2.98	1.57	V	0.62	50.23	74.00	-23.77
4874.00	45.43	Ave	2.98	1.57	V	0.62	44.81	54.00	-9.19
7311.00	42.05	PK	166.91	1.13	H	2.21	44.26	74.00	-29.74
7311.00	42.74	Ave	166.91	1.13	H	2.21	44.95	54.00	-9.05
2349.66	46.28	PK	96.34	1.94	V	13.19	33.09	74.00	-40.91
2349.66	37.92	Ave	96.34	1.94	V	13.19	24.73	54.00	-29.27
2384.51	43.85	PK	206.90	1.34	H	13.14	30.71	74.00	-43.29
2384.51	36.38	Ave	206.90	1.34	H	13.14	23.24	54.00	-30.76
2489.76	44.38	PK	157.26	1.29	V	13.08	31.30	74.00	-42.70
2489.76	37.90	Ave	157.26	1.29	V	13.08	24.82	54.00	-29.18

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 ANT1+ANT2									
223.45	38.73	QP	282.93	1.87	H	11.62	27.11	46.00	-18.89
223.45	36.67	QP	327.56	1.99	V	11.62	25.05	46.00	-20.95
4924.00	51.39	PK	39.91	1.96	V	0.24	51.15	74.00	-22.85
4924.00	44.37	Ave	39.91	1.96	V	0.24	44.13	54.00	-9.87
7386.00	43.28	PK	358.67	1.87	H	2.84	46.12	74.00	-27.88
7386.00	42.90	Ave	358.67	1.87	H	2.84	45.74	54.00	-8.26
2318.57	46.83	PK	41.61	1.15	V	13.19	33.64	74.00	-40.36
2318.57	38.35	Ave	41.61	1.15	V	13.19	25.16	54.00	-28.84
2376.92	42.93	PK	215.63	1.42	H	13.14	29.79	74.00	-44.21
2376.92	37.15	Ave	215.63	1.42	H	13.14	24.01	54.00	-29.99
2497.96	42.14	PK	214.20	1.91	V	13.08	29.06	74.00	-44.94
2497.96	38.03	Ave	214.20	1.91	V	13.08	24.95	54.00	-29.05

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 ANT1+ANT2									
223.45	39.55	QP	227.64	1.94	H	11.62	27.93	46.00	-18.07
223.45	36.44	QP	23.35	1.27	V	11.62	24.82	46.00	-21.18
4824.00	52.20	PK	173.49	1.41	V	1.06	51.14	74.00	-22.86
4824.00	42.93	Ave	173.49	1.41	V	1.06	41.87	54.00	-12.13
7236.00	42.77	PK	0.87	1.93	H	1.33	44.10	74.00	-29.90
7236.00	42.25	Ave	0.87	1.93	H	1.33	43.58	54.00	-10.42
2327.32	46.54	PK	178.55	1.37	V	13.19	33.35	74.00	-40.65
2327.32	37.68	Ave	178.55	1.37	V	13.19	24.49	54.00	-29.51
2385.51	44.60	PK	180.53	1.87	H	13.14	31.46	74.00	-42.54
2385.51	38.90	Ave	180.53	1.87	H	13.14	25.76	54.00	-28.24
2495.24	44.85	PK	109.12	1.09	V	13.08	31.77	74.00	-42.23
2495.24	38.06	Ave	109.12	1.09	V	13.08	24.98	54.00	-29.02

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 ANT1+ANT2									
223.45	38.68	QP	276.56	1.77	H	11.62	27.06	46.00	-18.94
223.45	36.58	QP	332.15	1.05	V	11.62	24.96	46.00	-21.04
4874.00	52.14	PK	124.43	1.90	V	0.62	51.52	74.00	-22.48
4874.00	43.85	Ave	124.43	1.90	V	0.62	43.23	54.00	-10.77
7311.00	41.81	PK	182.25	1.50	H	2.21	44.02	74.00	-29.98
7311.00	43.66	Ave	182.25	1.50	H	2.21	45.87	54.00	-8.13
2340.88	45.69	PK	162.16	1.23	V	13.19	32.50	74.00	-41.50
2340.88	39.16	Ave	162.16	1.23	V	13.19	25.97	54.00	-28.03
2351.66	42.09	PK	201.39	1.77	H	13.14	28.95	74.00	-45.05
2351.66	37.30	Ave	201.39	1.77	H	13.14	24.16	54.00	-29.84
2490.83	43.78	PK	35.72	1.47	V	13.08	30.70	74.00	-43.30
2490.83	36.25	Ave	35.72	1.47	V	13.08	23.17	54.00	-30.83

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 ANT1+ANT2									
223.45	37.78	QP	292.04	1.33	H	11.62	26.16	46.00	-19.84
223.45	36.20	QP	291.12	1.31	V	11.62	24.58	46.00	-21.42
4924.00	52.36	PK	43.25	1.52	V	0.24	52.12	74.00	-21.88
4924.00	43.93	Ave	43.25	1.52	V	0.24	43.69	54.00	-10.31
7386.00	41.57	PK	298.71	1.86	H	2.84	44.41	74.00	-29.59
7386.00	45.07	Ave	298.71	1.86	H	2.84	47.91	54.00	-6.09
2316.85	46.00	PK	322.07	1.18	V	13.19	32.81	74.00	-41.19
2316.85	39.62	Ave	322.07	1.18	V	13.19	26.43	54.00	-27.57
2369.72	42.61	PK	109.74	1.91	H	13.14	29.47	74.00	-44.53
2369.72	36.44	Ave	109.74	1.91	H	13.14	23.30	54.00	-30.70
2499.63	43.08	PK	208.54	1.75	V	13.08	30.00	74.00	-44.00
2499.63	36.01	Ave	208.54	1.75	V	13.08	22.93	54.00	-31.07

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 ANT1+ANT2									
223.45	37.77	QP	0.41	1.85	H	11.62	26.15	46.00	-19.85
223.45	36.59	QP	227.59	1.94	V	11.62	24.97	46.00	-21.03
4824.00	51.40	PK	32.39	1.47	V	1.06	50.34	74.00	-23.66
4824.00	43.16	Ave	32.39	1.47	V	1.06	42.10	54.00	-11.90
7236.00	42.14	PK	231.32	1.31	H	1.33	43.47	74.00	-30.53
7236.00	44.62	Ave	231.32	1.31	H	1.33	45.95	54.00	-8.05
2321.28	45.33	PK	281.07	1.54	V	13.19	32.14	74.00	-41.86
2321.28	37.98	Ave	281.07	1.54	V	13.19	24.79	54.00	-29.21
2380.47	42.77	PK	26.64	1.36	H	13.14	29.63	74.00	-44.37
2380.47	36.49	Ave	26.64	1.36	H	13.14	23.35	54.00	-30.65
2495.97	42.79	PK	308.76	1.00	V	13.08	29.71	74.00	-44.29
2495.97	37.97	Ave	308.76	1.00	V	13.08	24.89	54.00	-29.11

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 ANT1+ANT2									
223.45	39.19	QP	333.12	1.74	H	11.62	27.57	46.00	-18.43
223.45	36.16	QP	278.93	1.30	V	11.62	24.54	46.00	-21.46
4874.00	52.22	PK	357.55	1.30	V	0.62	51.60	74.00	-22.40
4874.00	44.51	Ave	357.55	1.30	V	0.62	43.89	54.00	-10.11
7311.00	43.08	PK	171.71	1.08	H	2.21	45.29	74.00	-28.71
7311.00	43.40	Ave	171.71	1.08	H	2.21	45.61	54.00	-8.39
2337.45	45.29	PK	215.61	1.46	V	13.19	32.10	74.00	-41.90
2337.45	38.31	Ave	215.61	1.46	V	13.19	25.12	54.00	-28.88
2354.15	44.75	PK	97.62	1.21	H	13.14	31.61	74.00	-42.39
2354.15	37.36	Ave	97.62	1.21	H	13.14	24.22	54.00	-29.78
2494.63	43.30	PK	172.87	1.21	V	13.08	30.22	74.00	-43.78
2494.63	36.15	Ave	172.87	1.21	V	13.08	23.07	54.00	-30.93

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 ANT1+ANT2									
223.45	40.05	QP	276.76	1.89	H	11.62	28.43	46.00	-17.57
223.45	35.16	QP	104.56	1.52	V	11.62	23.54	46.00	-22.46
4924.00	52.02	PK	18.12	1.82	V	0.24	51.78	74.00	-22.22
4924.00	44.04	Ave	18.12	1.82	V	0.24	43.80	54.00	-10.20
7386.00	42.08	PK	318.89	1.54	H	2.84	44.92	74.00	-29.08
7386.00	42.88	Ave	318.89	1.54	H	2.84	45.72	54.00	-8.28
2344.59	45.60	PK	83.87	1.33	V	13.19	32.41	74.00	-41.59
2344.59	38.10	Ave	83.87	1.33	V	13.19	24.91	54.00	-29.09
2351.48	42.31	PK	104.10	1.19	H	13.14	29.17	74.00	-44.83
2351.48	36.22	Ave	104.10	1.19	H	13.14	23.08	54.00	-30.92
2486.79	42.38	PK	101.04	1.06	V	13.08	29.30	74.00	-44.70
2486.79	36.83	Ave	101.04	1.06	V	13.08	23.75	54.00	-30.25

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 ANT1+ANT2									
223.45	41.00	QP	175.52	1.92	H	11.62	29.38	46.00	-16.62
223.45	36.27	QP	60.14	1.38	V	11.62	24.65	46.00	-21.35
4844.00	49.09	PK	282.53	1.48	V	1.06	48.03	74.00	-25.97
4844.00	41.30	Ave	282.53	1.48	V	1.06	40.24	54.00	-13.76
7266.00	40.08	PK	24.44	1.69	H	1.33	41.41	74.00	-32.59
7266.00	40.56	Ave	24.44	1.69	H	1.33	41.89	54.00	-12.11
2316.03	45.97	PK	41.14	1.57	V	13.19	32.78	74.00	-41.22
2316.03	39.79	Ave	41.14	1.57	V	13.19	26.60	54.00	-27.40
2378.23	42.86	PK	349.73	1.25	H	13.14	29.72	74.00	-44.28
2378.23	38.74	Ave	349.73	1.25	H	13.14	25.60	54.00	-28.40
2495.06	42.66	PK	209.25	1.72	V	13.08	29.58	74.00	-44.42
2495.06	38.92	Ave	209.25	1.72	V	13.08	25.84	54.00	-28.16

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 ANT1+ANT2									
223.45	40.93	QP	341.67	1.88	H	11.62	29.31	46.00	-16.69
223.45	35.33	QP	250.87	1.81	V	11.62	23.71	46.00	-22.29
4874.00	48.11	PK	126.72	1.74	V	0.62	47.49	74.00	-26.51
4874.00	41.98	Ave	126.72	1.74	V	0.62	41.36	54.00	-12.64
7311.00	40.96	PK	16.66	1.82	H	2.21	43.17	74.00	-30.83
7311.00	39.83	Ave	16.66	1.82	H	2.21	42.04	54.00	-11.96
2341.35	46.55	PK	234.82	1.10	V	13.19	33.36	74.00	-40.64
2341.35	37.02	Ave	234.82	1.10	V	13.19	23.83	54.00	-30.17
2354.21	43.13	PK	333.97	1.94	H	13.14	29.99	74.00	-44.01
2354.21	38.24	Ave	333.97	1.94	H	13.14	25.10	54.00	-28.90
2490.33	42.55	PK	29.59	1.92	V	13.08	29.47	74.00	-44.53
2490.33	36.67	Ave	29.59	1.92	V	13.08	23.59	54.00	-30.41

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 ANT1+ANT2									
223.45	40.88	QP	101.97	1.96	H	11.62	29.26	46.00	-16.74
223.45	36.15	QP	209.88	1.88	V	11.62	24.53	46.00	-21.47
4904.00	48.45	PK	159.56	1.08	V	0.24	48.21	74.00	-25.79
4904.00	41.97	Ave	159.56	1.08	V	0.24	41.73	54.00	-12.27
7356.00	41.08	PK	289.18	1.46	H	2.84	43.92	74.00	-30.08
7356.00	40.80	Ave	289.18	1.46	H	2.84	43.64	54.00	-10.36
2312.52	46.35	PK	327.19	1.58	V	13.19	33.16	74.00	-40.84
2312.52	37.74	Ave	327.19	1.58	V	13.19	24.55	54.00	-29.45
2368.15	43.12	PK	5.06	1.27	H	13.14	29.98	74.00	-44.02
2368.15	38.39	Ave	5.06	1.27	H	13.14	25.25	54.00	-28.75
2493.64	44.23	PK	308.49	1.14	V	13.08	31.15	74.00	-42.85
2493.64	37.74	Ave	308.49	1.14	V	13.08	24.66	54.00	-29.34

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:

RBW = 1MHz, VBW = 3MHz, Sweep = auto

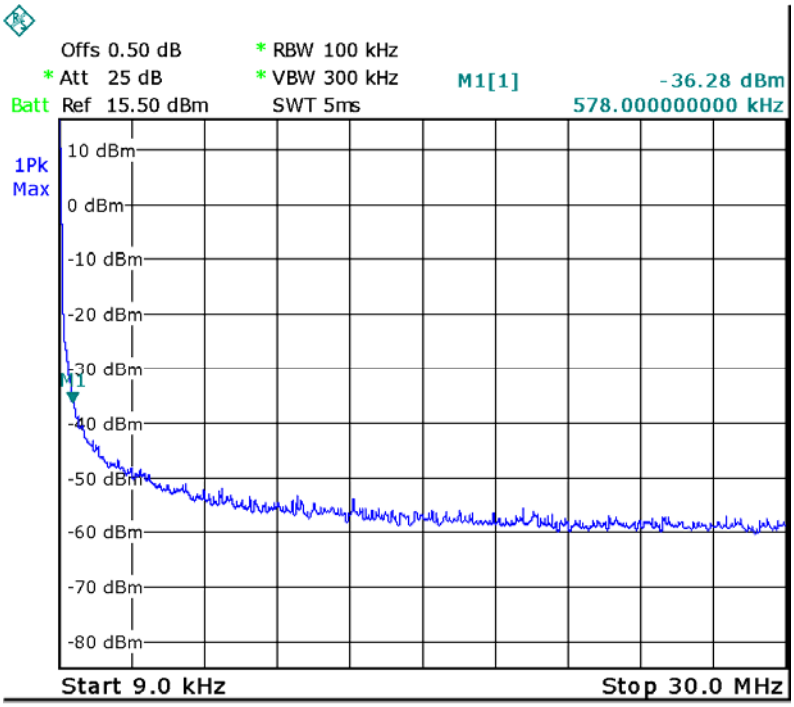
Detector function = peak, Trace = max hold

10.2 Test Result

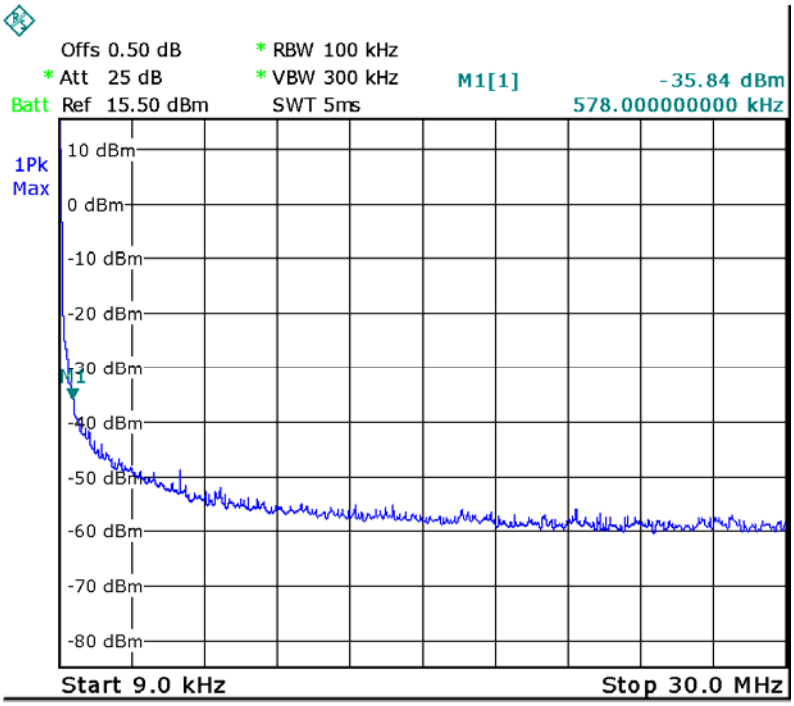
9KHz – 30MHz ANT1+ANT2

802.11b

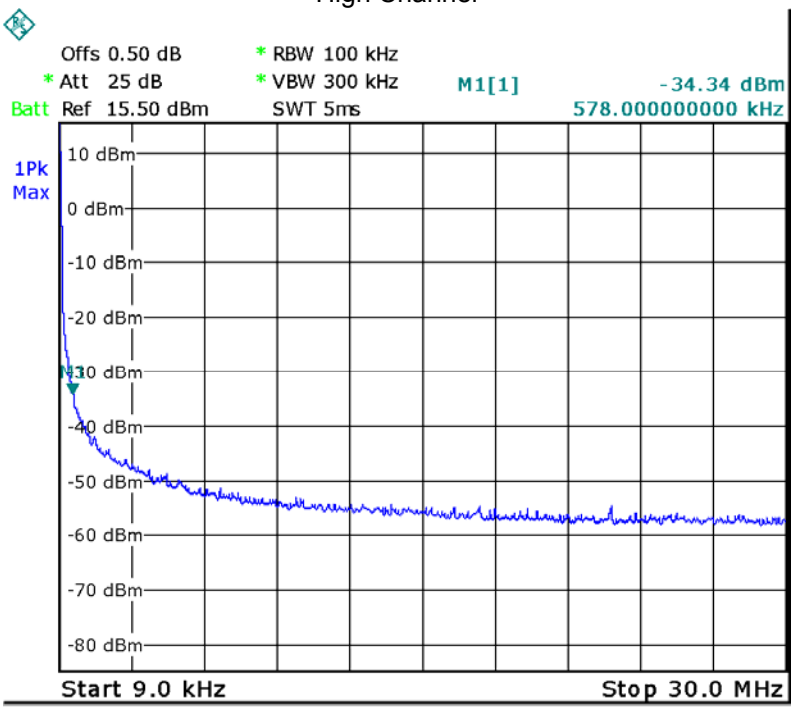
Low Channel



Middle Channel

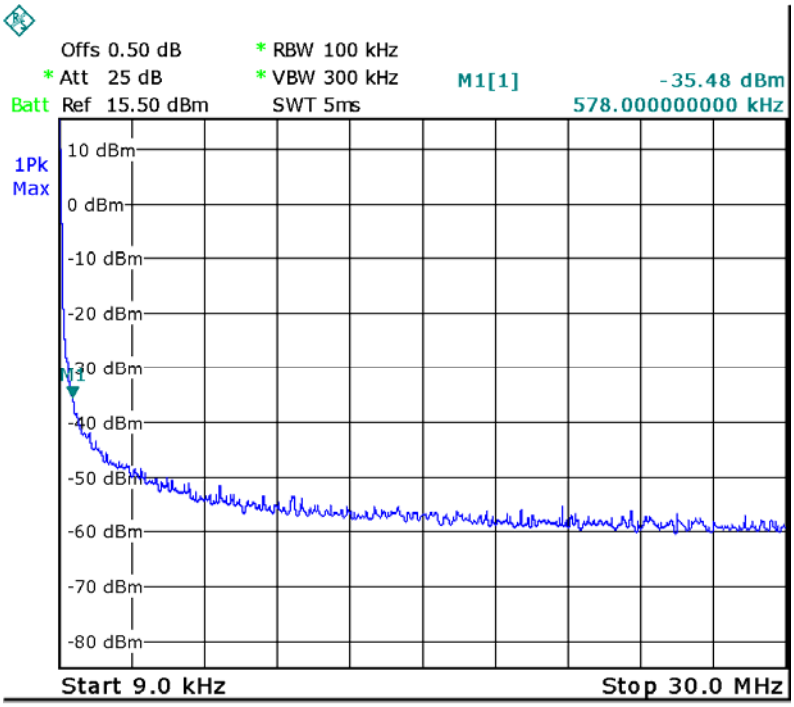


High Channel

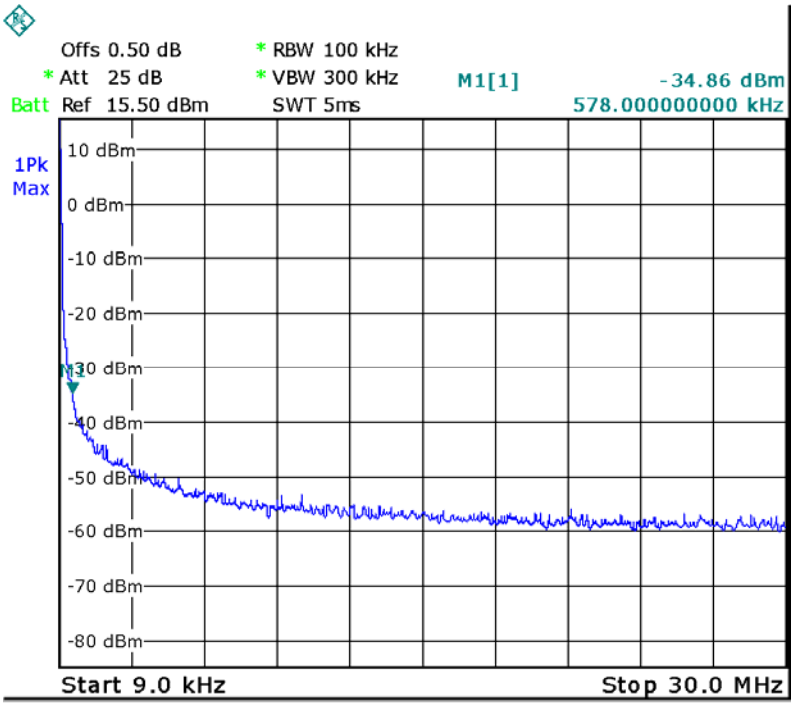


802.11g

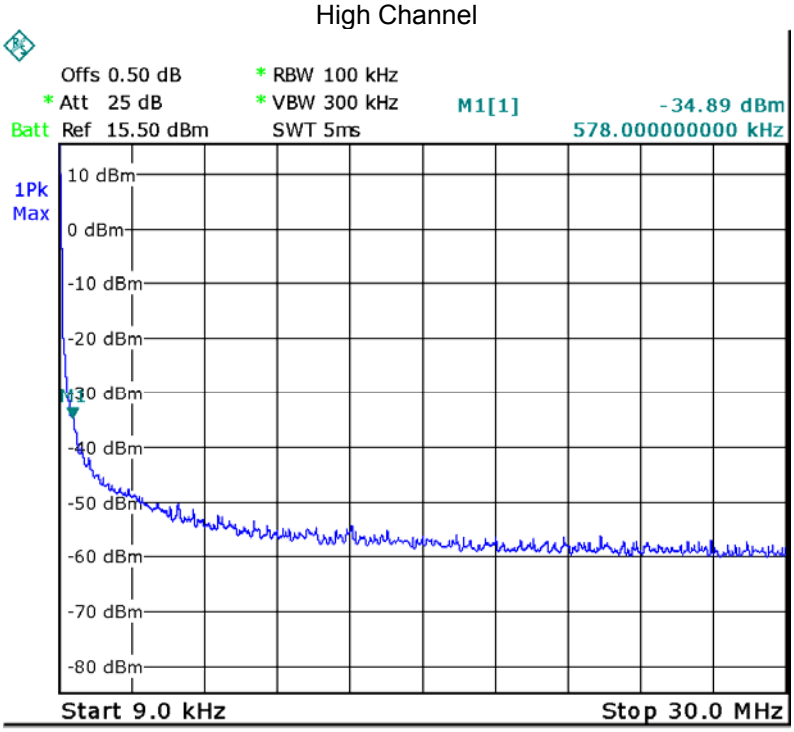
Low Channel



Middle Channel

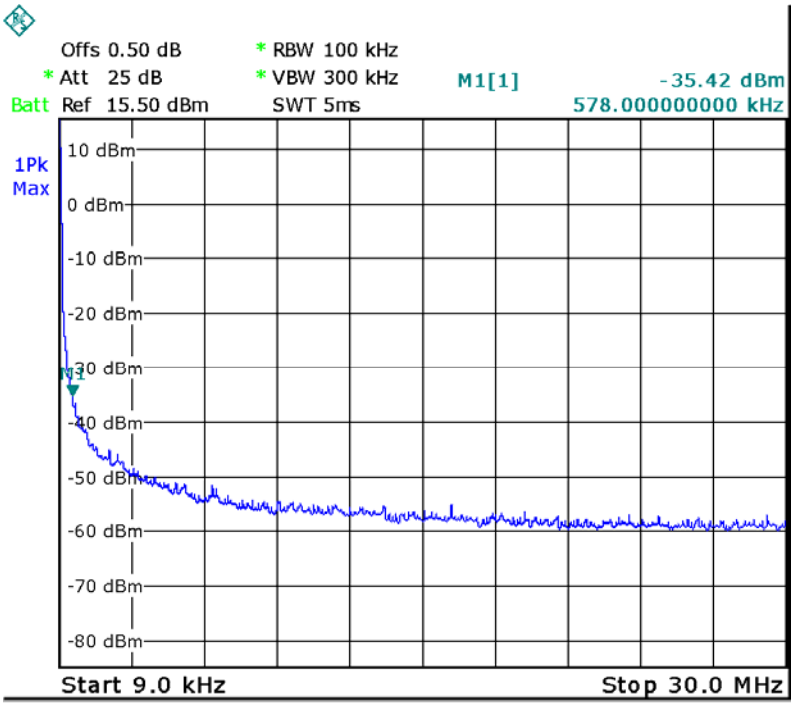


High Channel

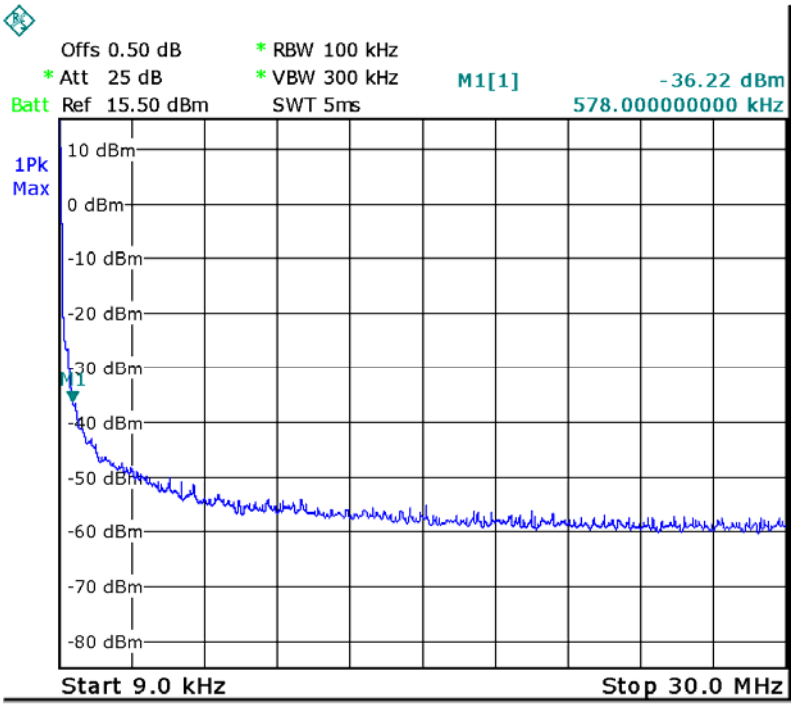


802.11n HT20

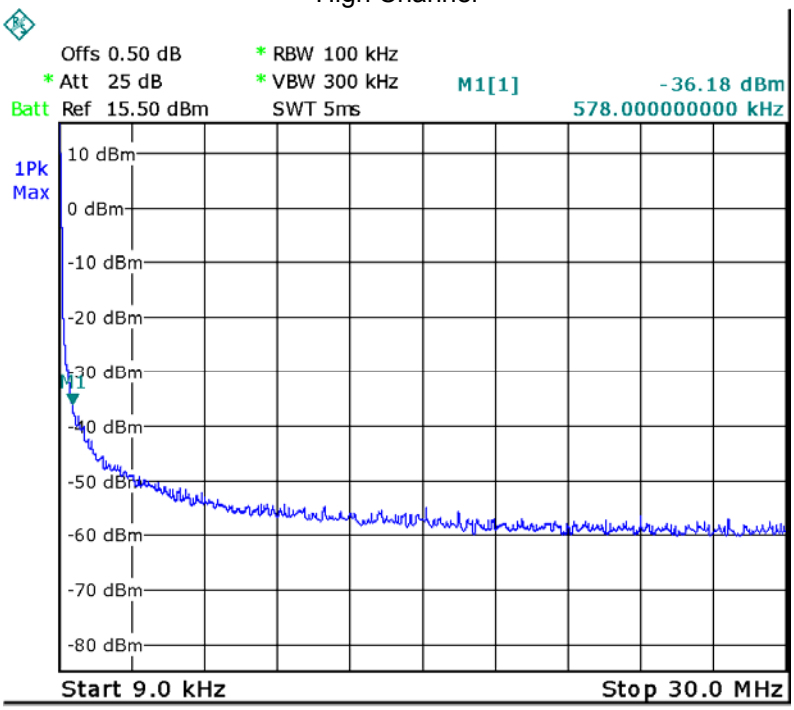
Low Channel



Middle Channel

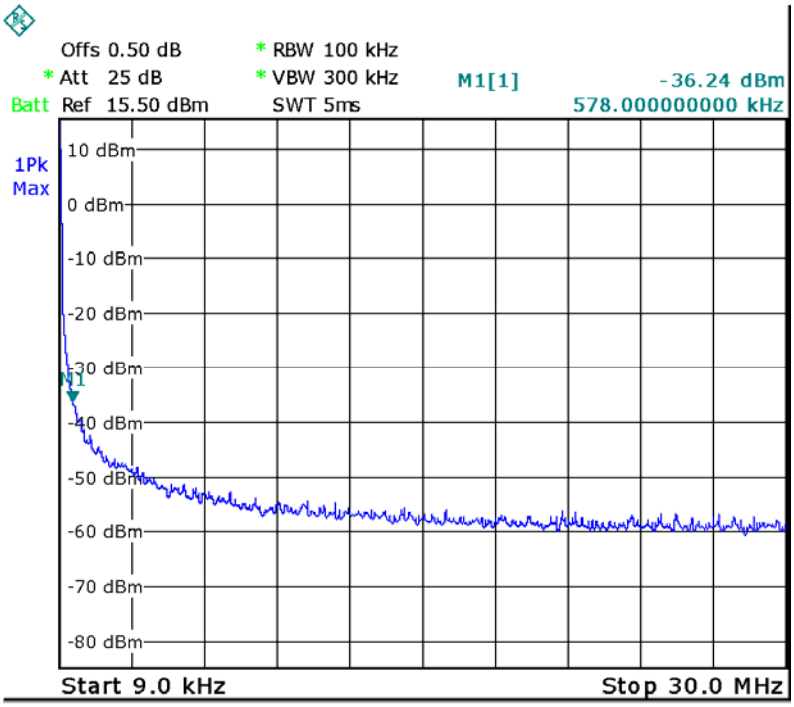


High Channel

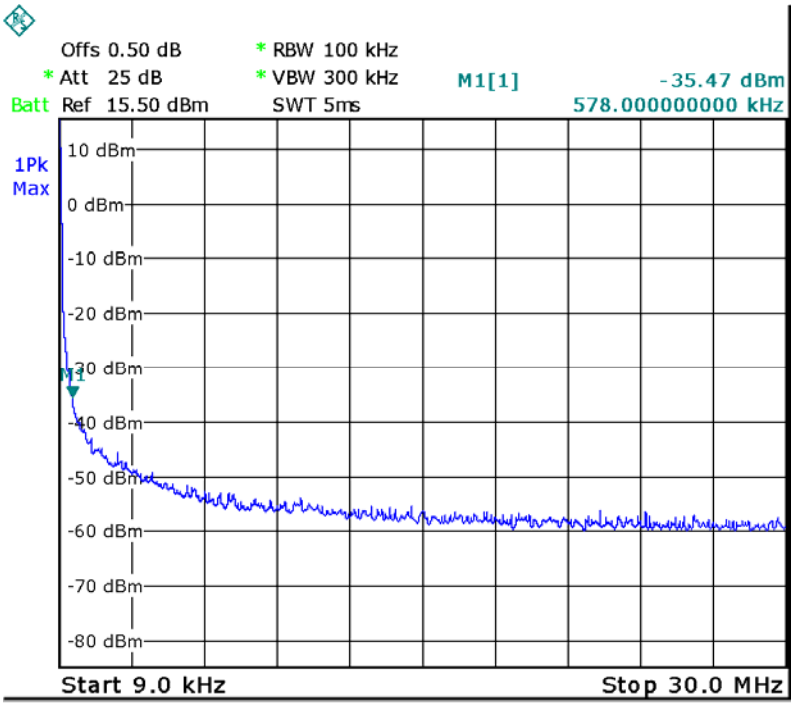


802.11n HT40

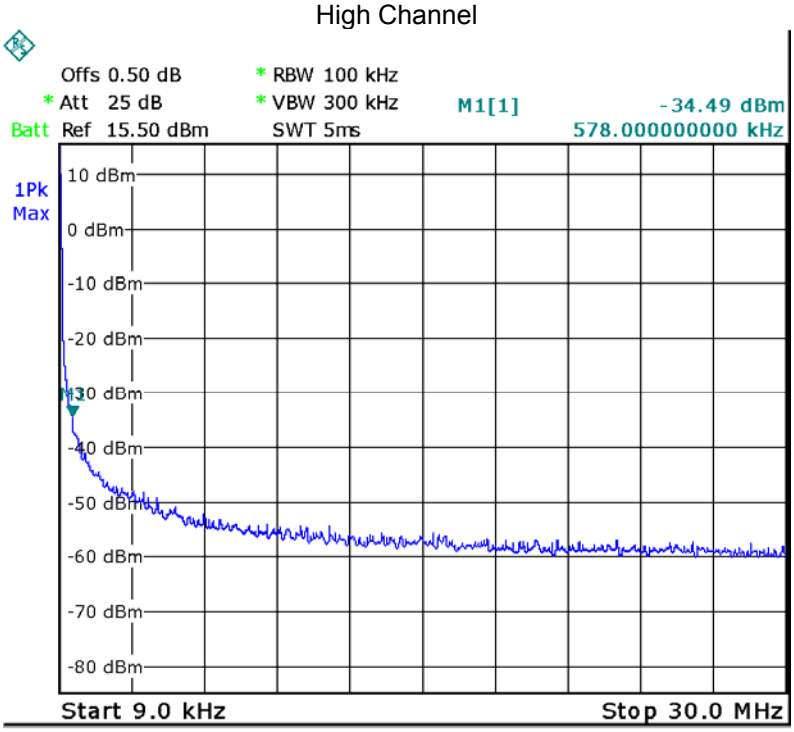
Low Channel



Middle Channel



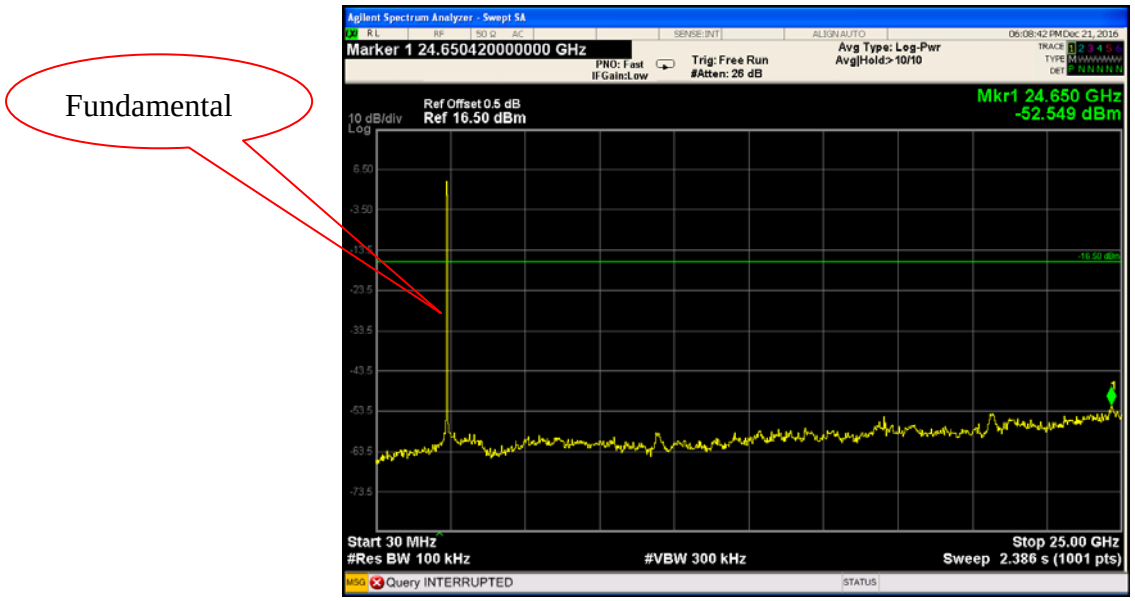
High Channel



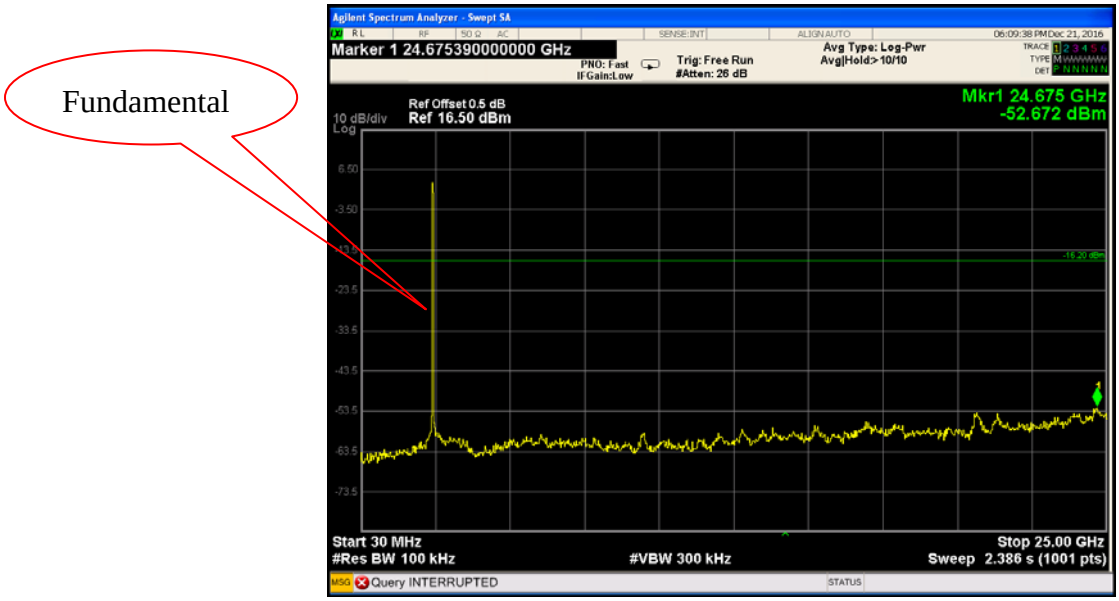
Above 30MHz

802.11b

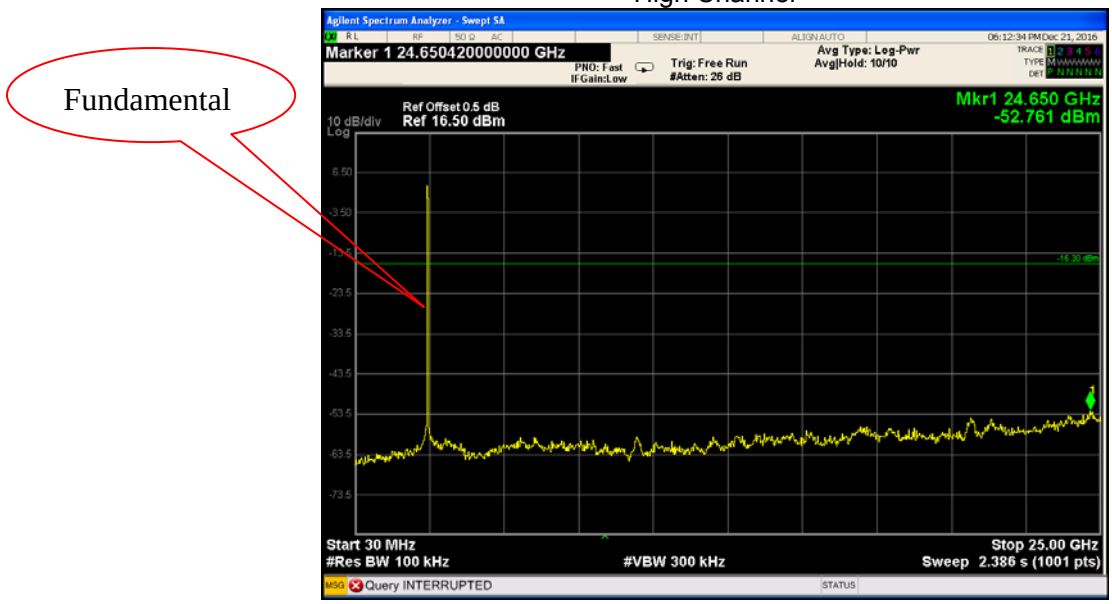
Low Channel



Middle Channel

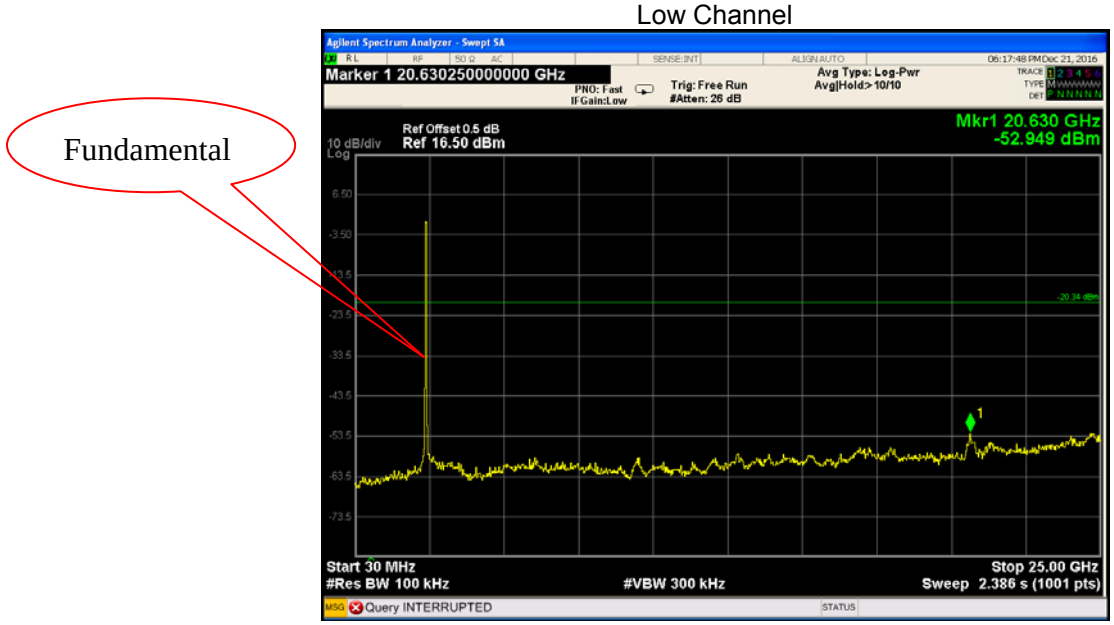


High Channel

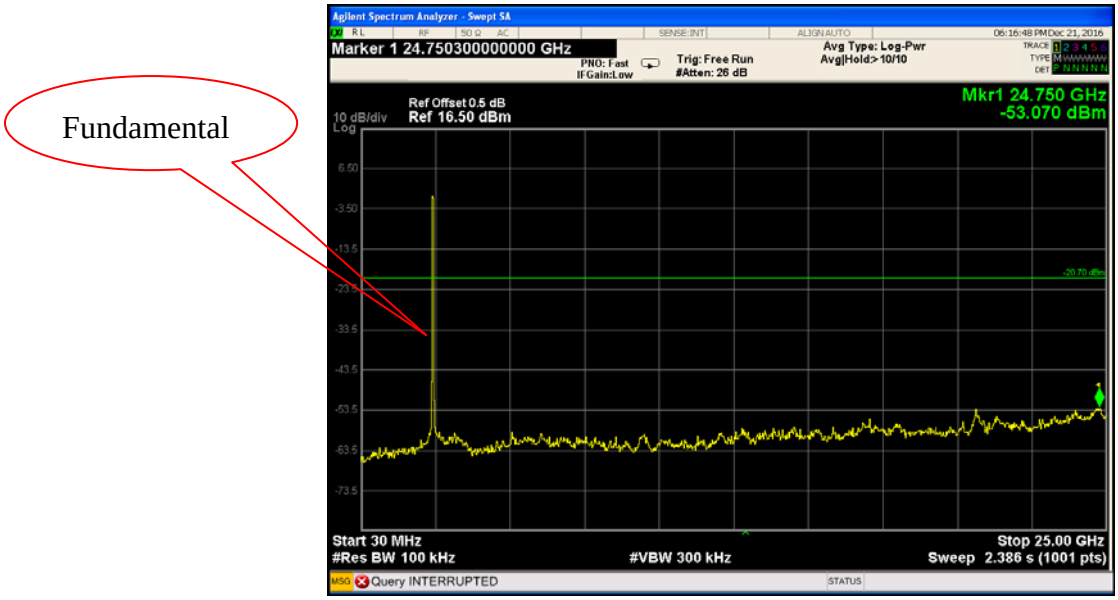


802.11g

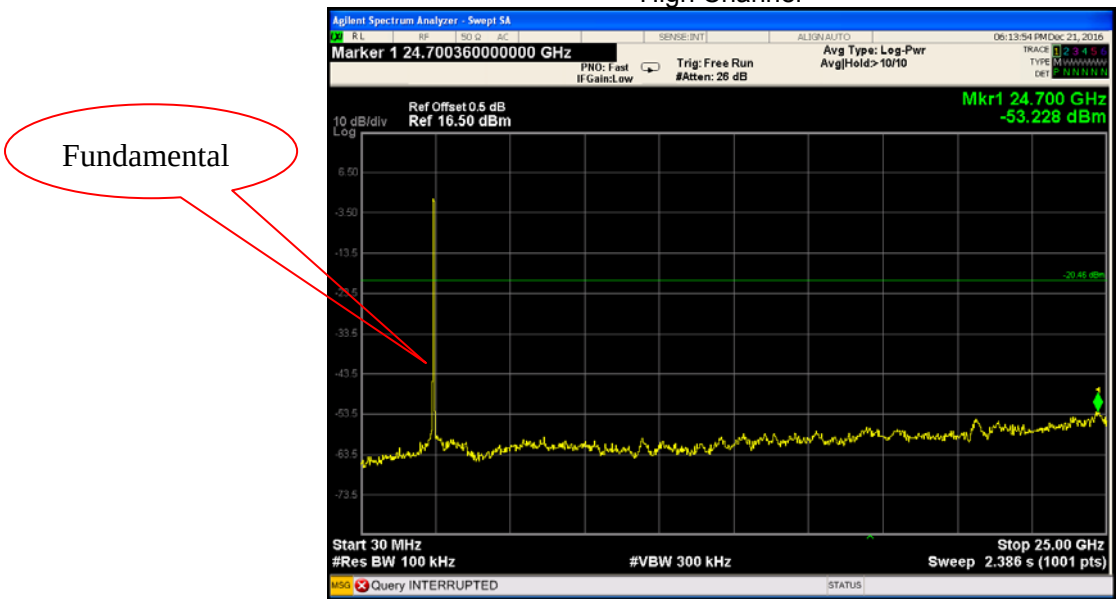
Low Channel



Middle Channel

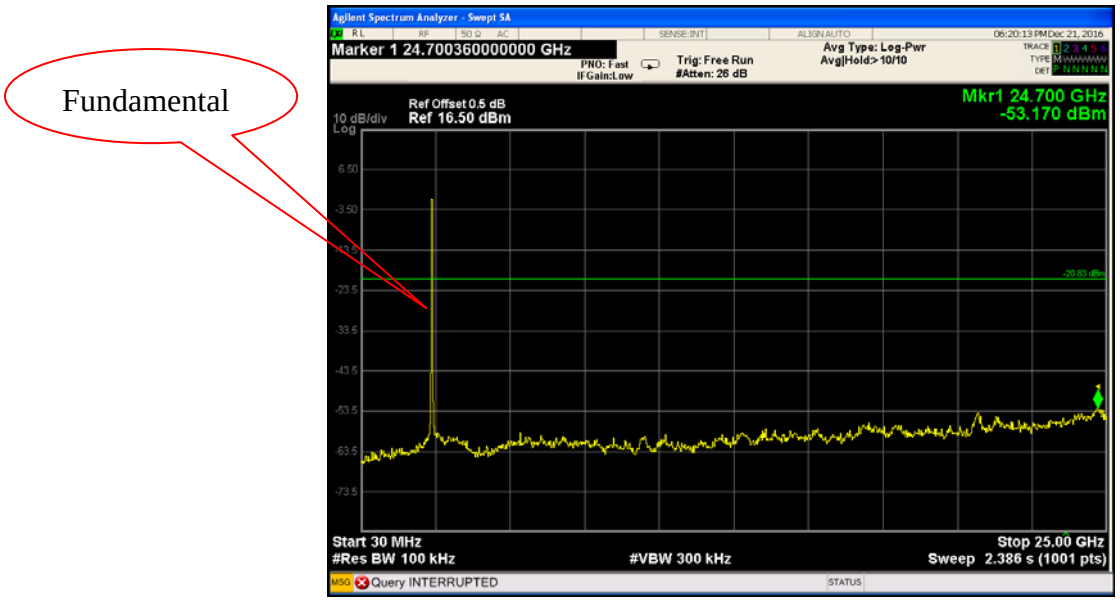


High Channel

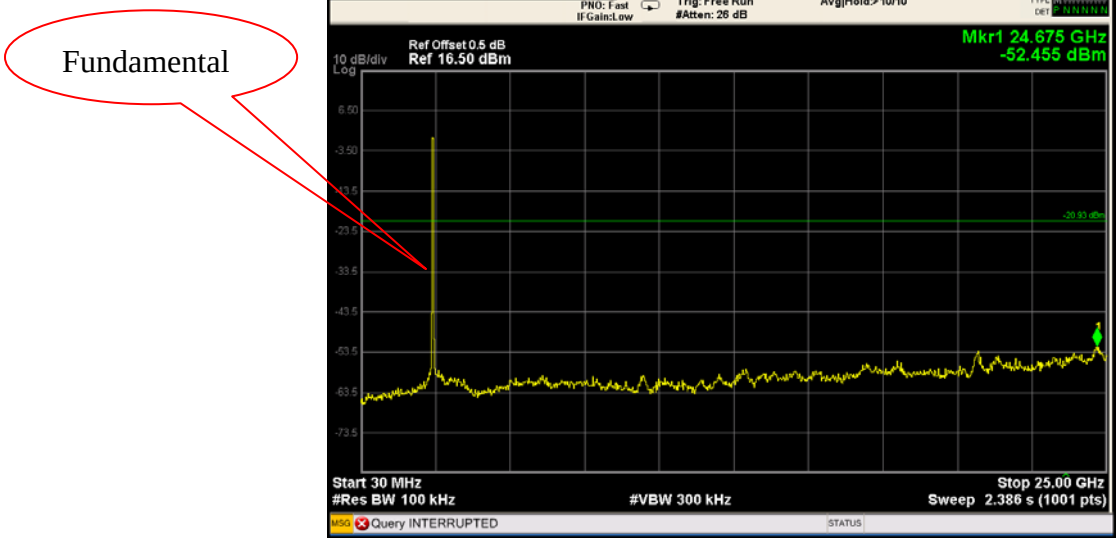


802.11n HT20

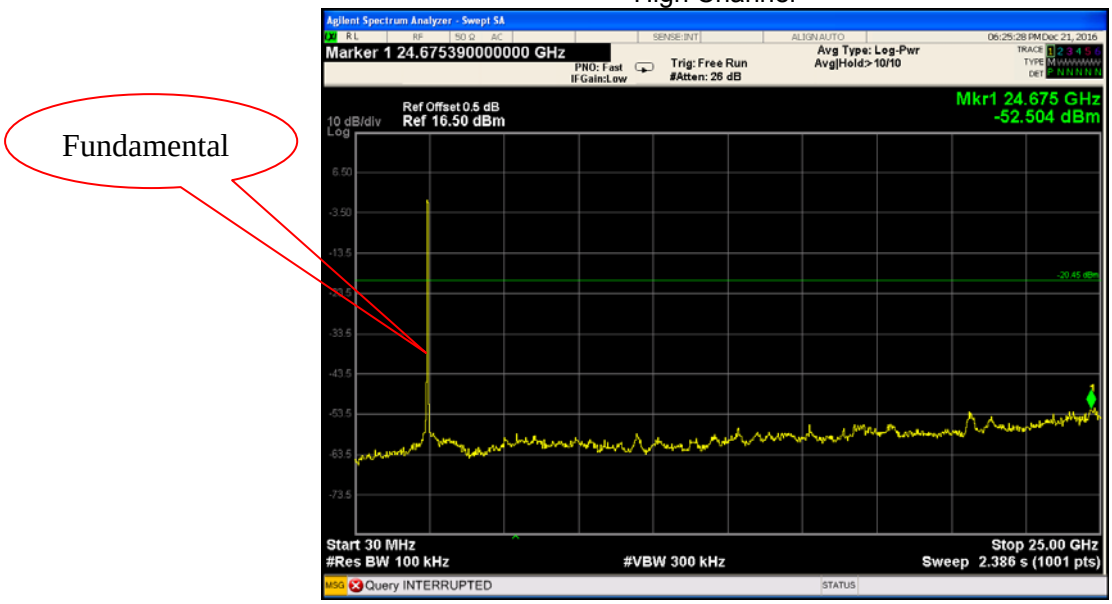
Low Channel



Middle Channel

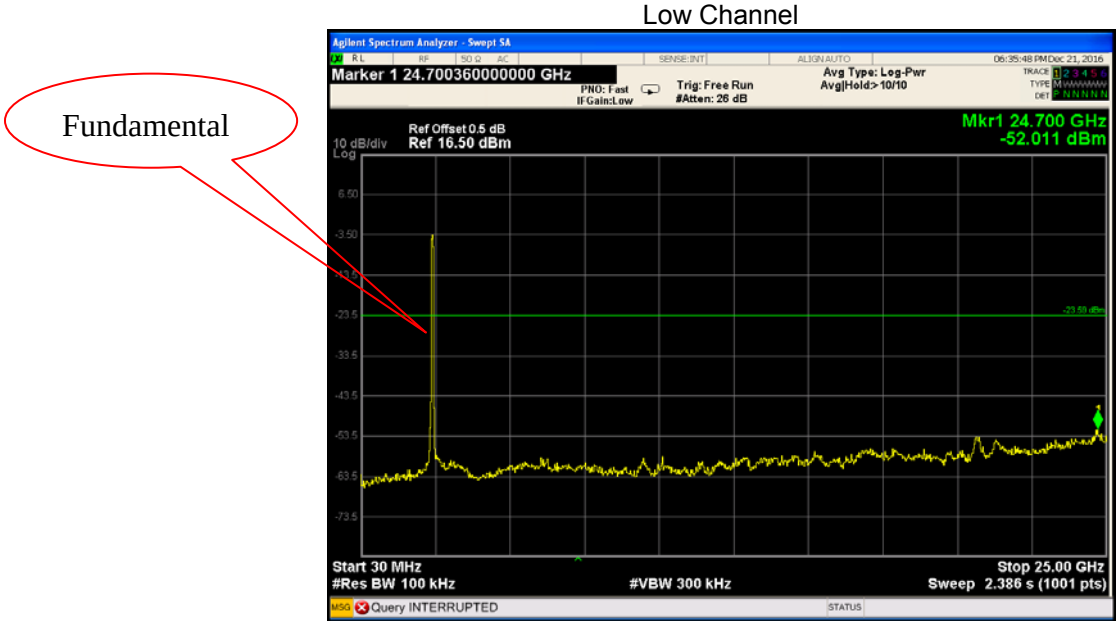


High Channel

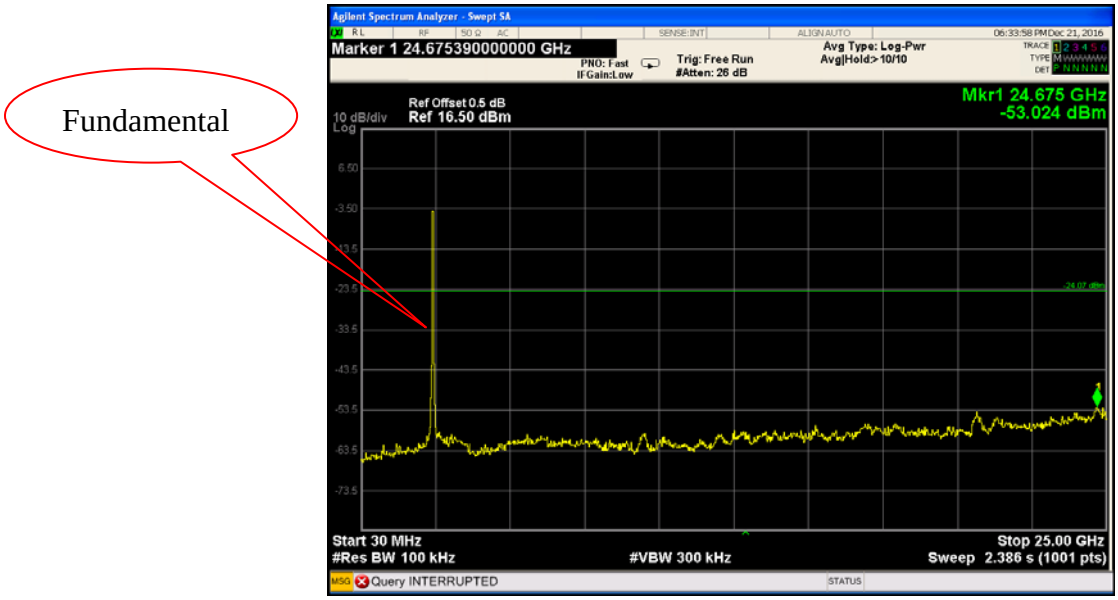


802.11n HT40

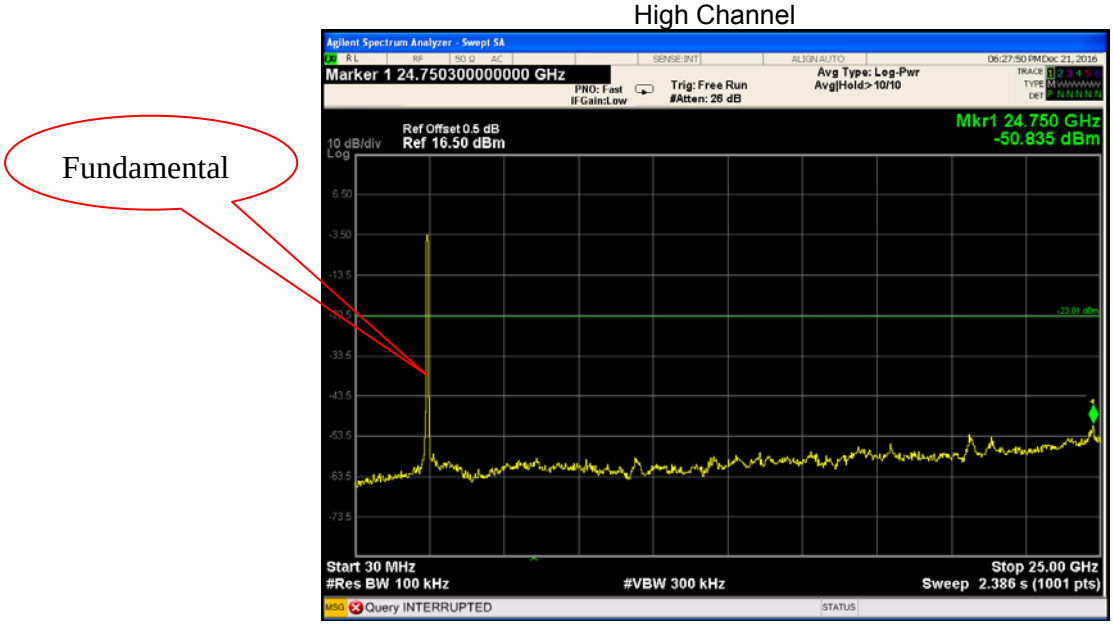
Low Channel



Middle Channel



High Channel



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

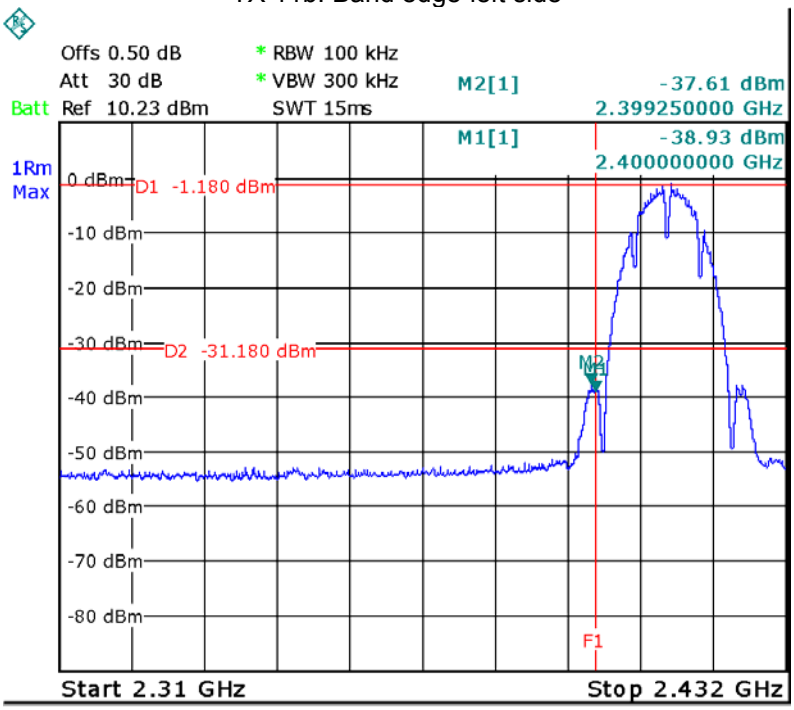
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then 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

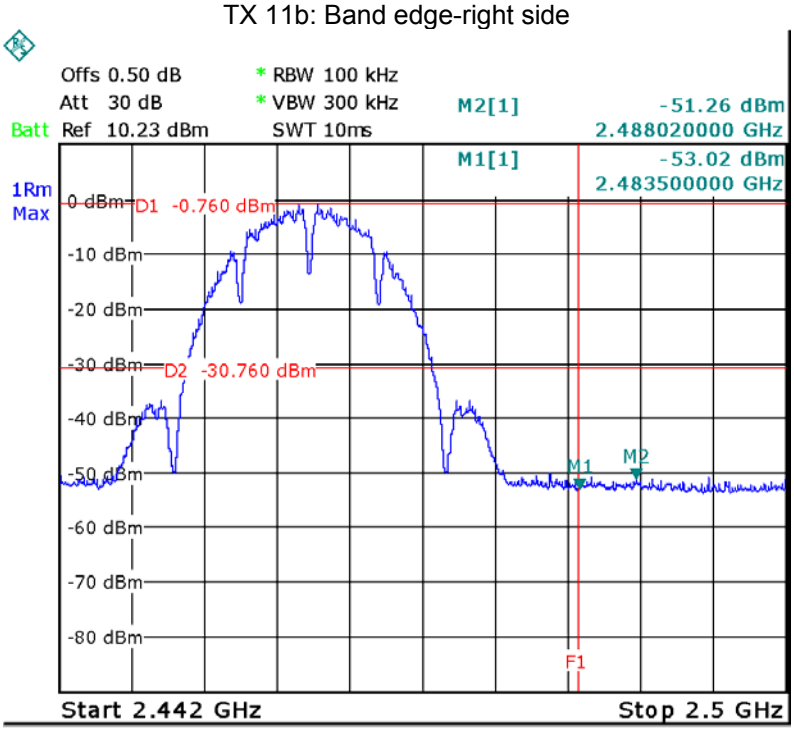
Test result plots shown as follows:

ANT 1

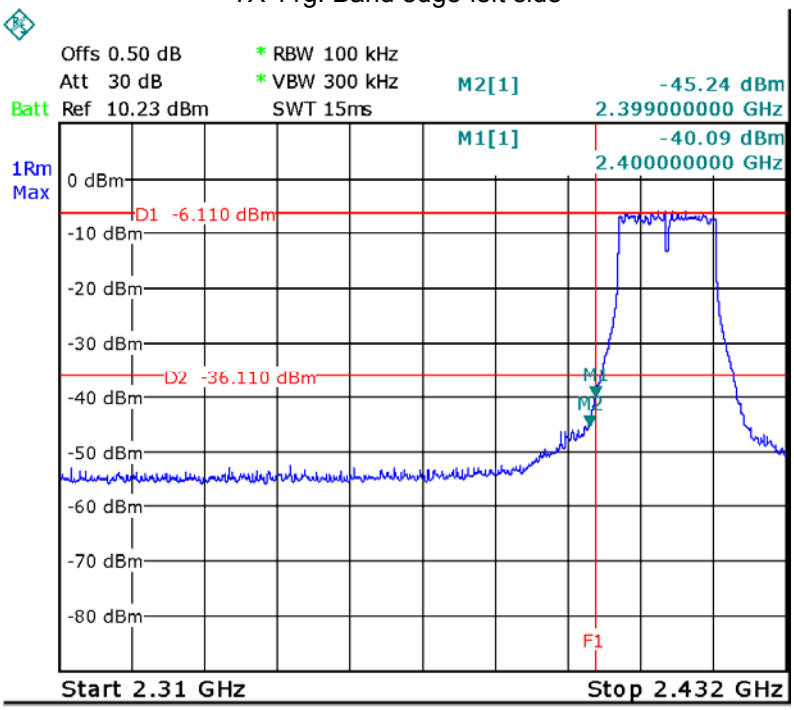
TX 11b: Band edge-left side



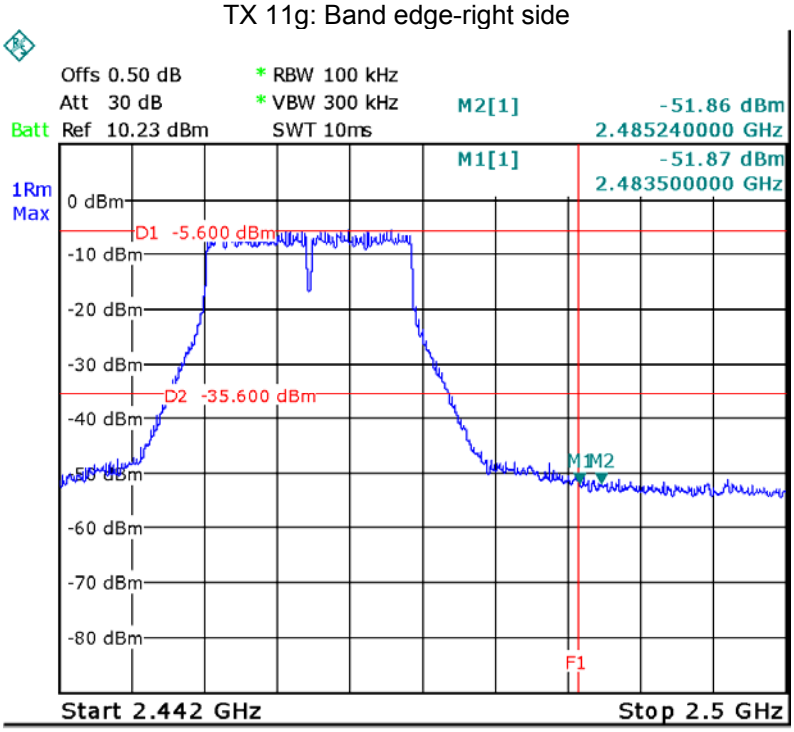
TX 11b: Band edge-right side



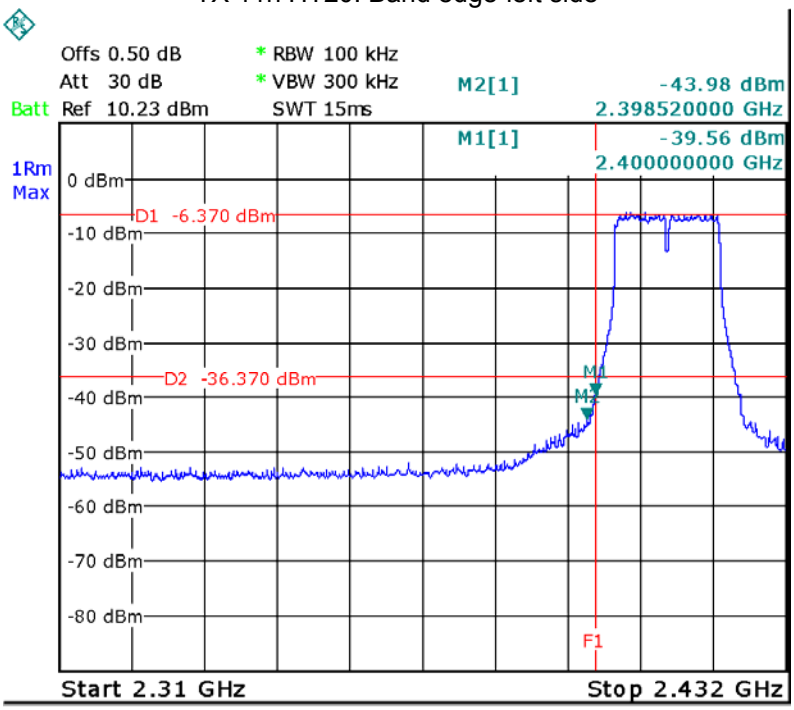
TX 11g: Band edge-left side



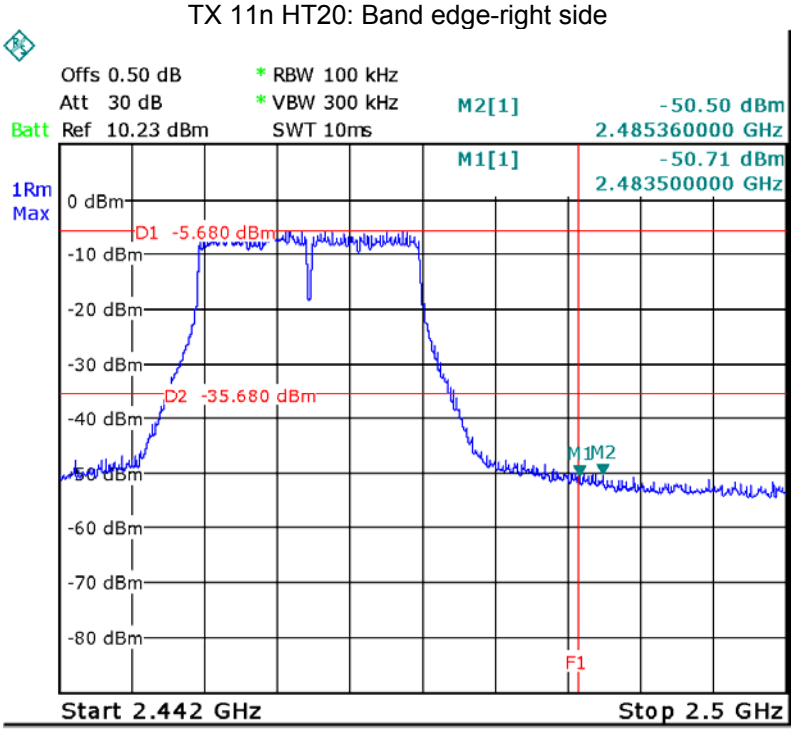
TX 11g: Band edge-right side



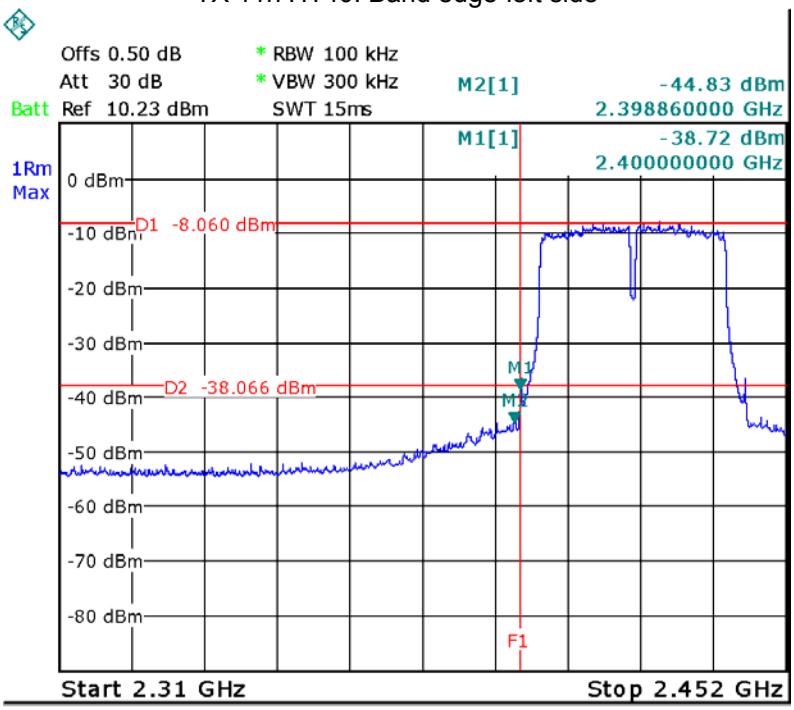
TX 11n HT20: Band edge-left side



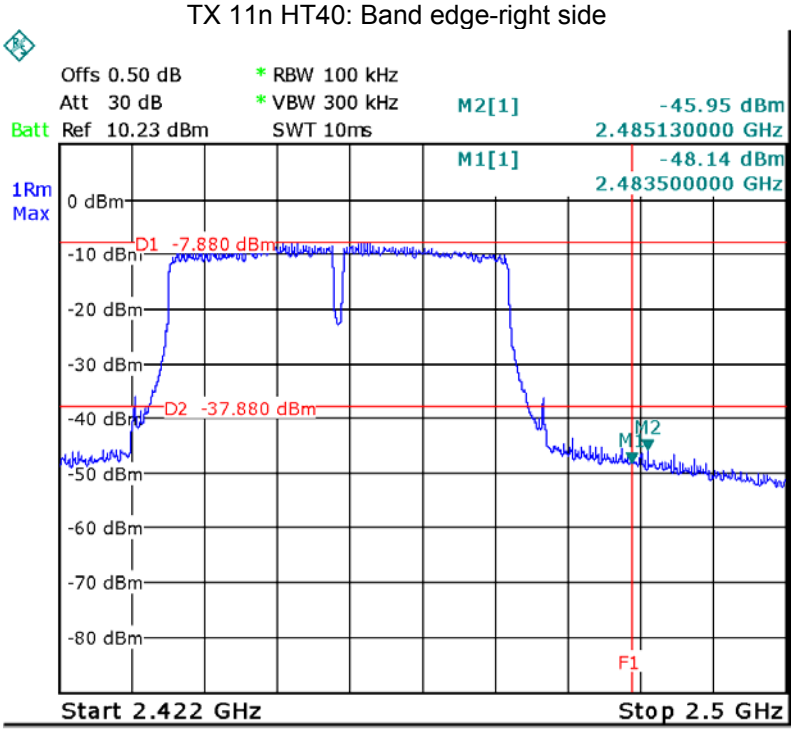
TX 11n HT20: Band edge-right side



TX 11n HT40: Band edge-left side

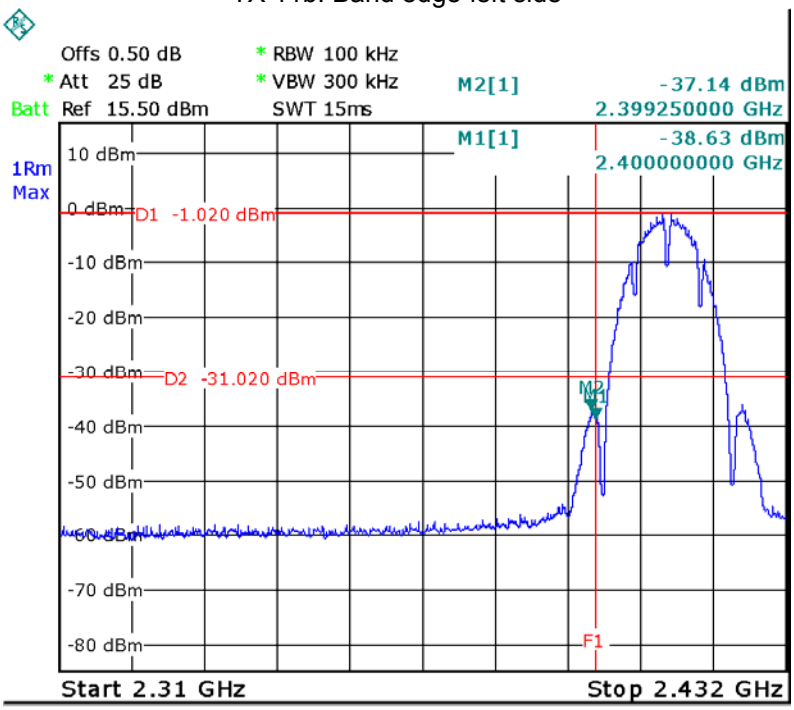


TX 11n HT40: Band edge-right side

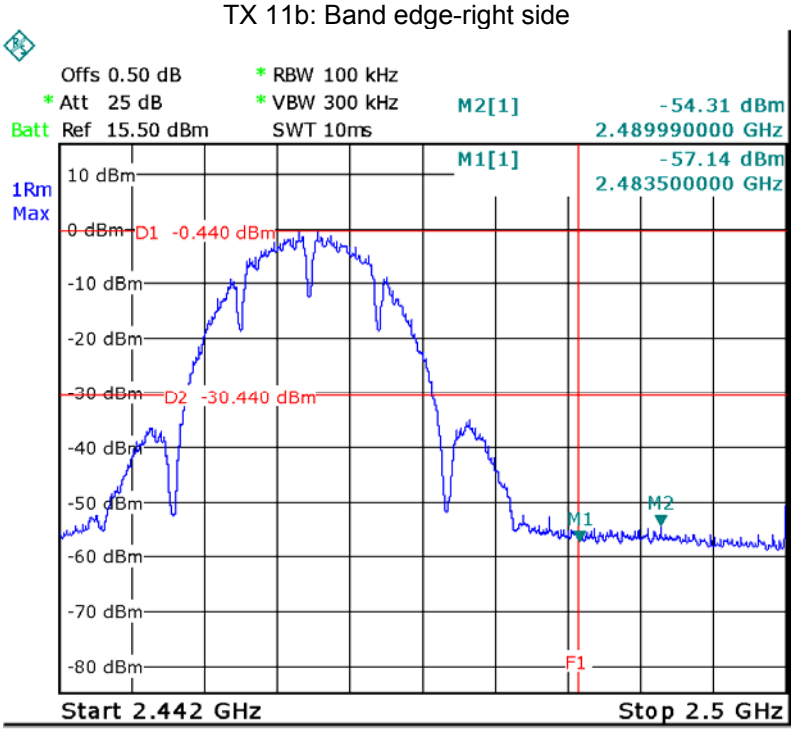


ANT 2

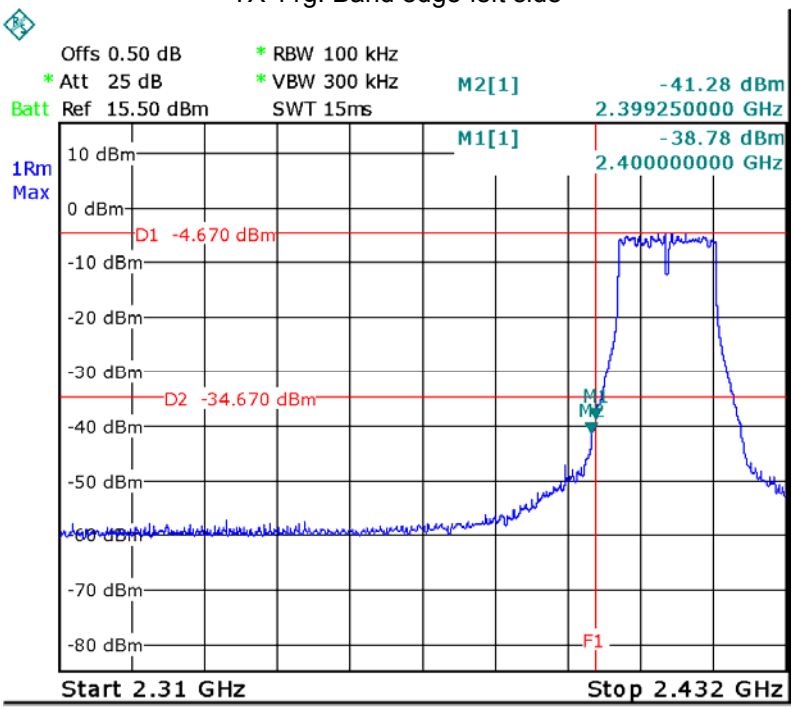
TX 11b: Band edge-left side



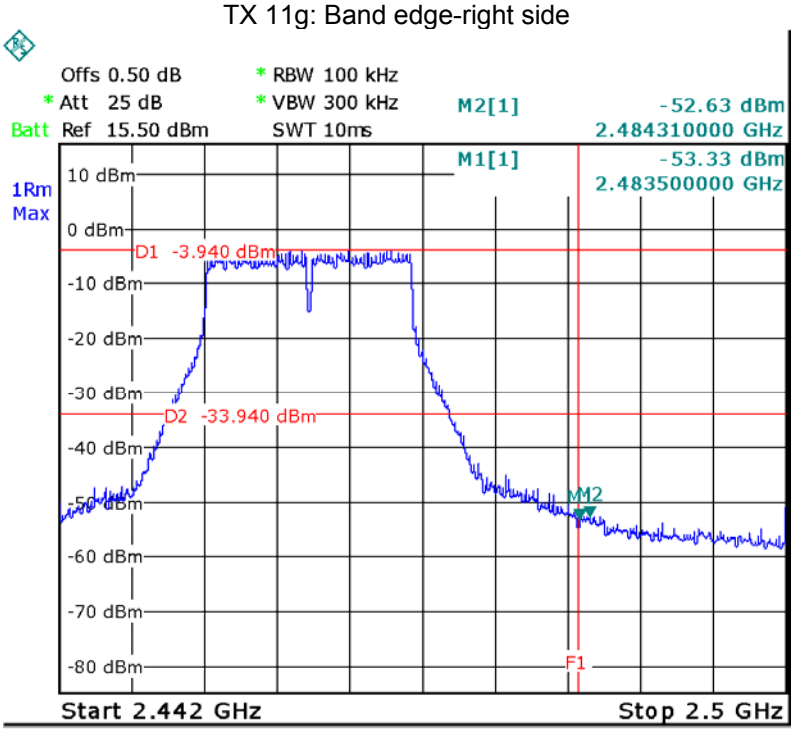
TX 11b: Band edge-right side



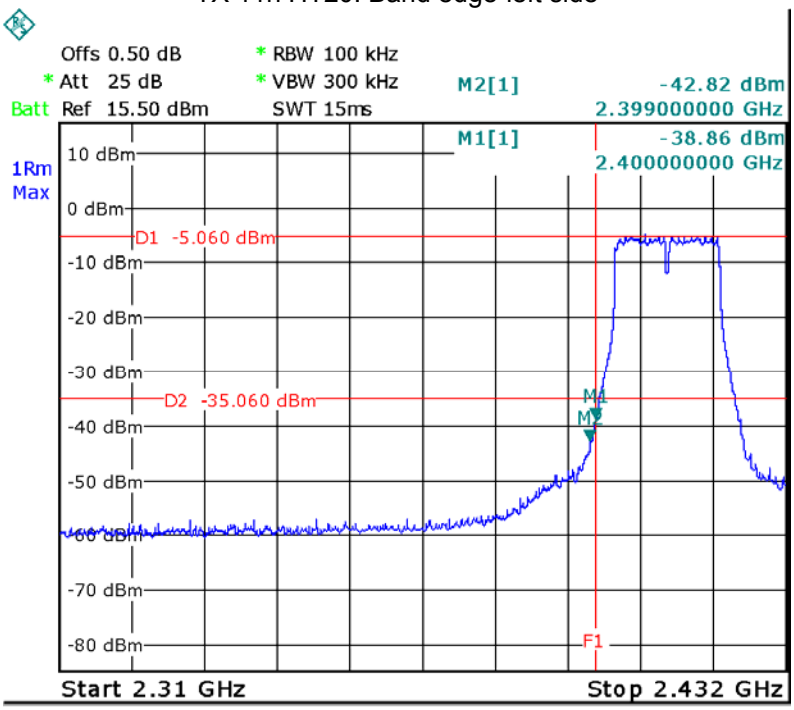
TX 11g: Band edge-left side



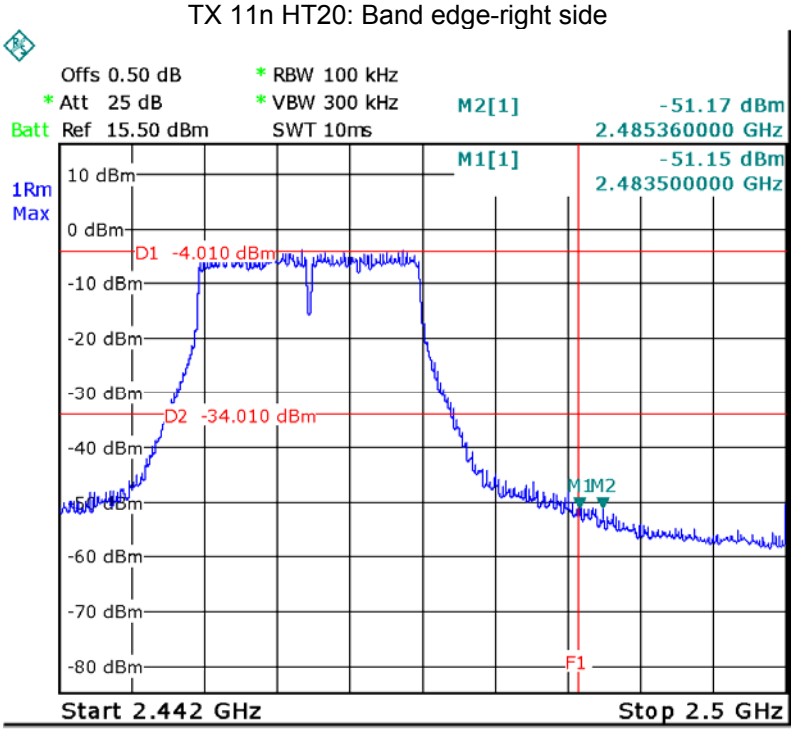
TX 11g: Band edge-right side



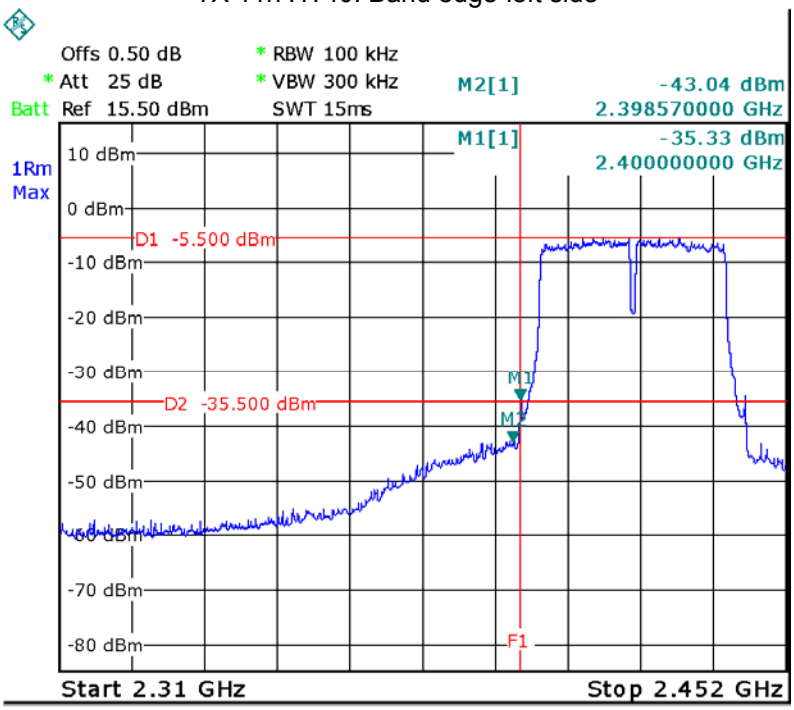
TX 11n HT20: Band edge-left side



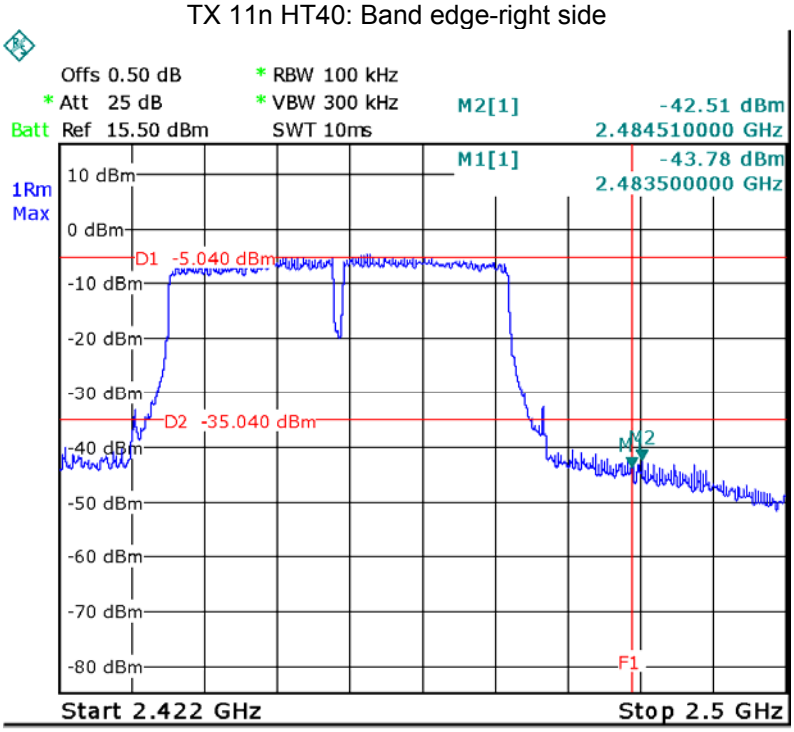
TX 11n HT20: Band edge-right side



TX 11n HT40: Band edge-left side



TX 11n HT40: Band edge-right side



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:

ANT 1:

Operation mode	Test Channel	Bandwidth (MHz)	Limit (kHz)
TX 11b	Channel 1	10.124	500
	Channel 6	10.124	500
	Channel 11	10.124	500
TX 11g	Channel 1	16.567	500
	Channel 6	16.567	500
	Channel 11	16.567	500
TX 11n HT20	Channel 1	17.838	500
	Channel 6	17.838	500
	Channel 11	17.838	500
TX 11n HT40	Channel 3	35.560	500
	Channel 6	35.560	500
	Channel 9	35.560	500

ANT 2:

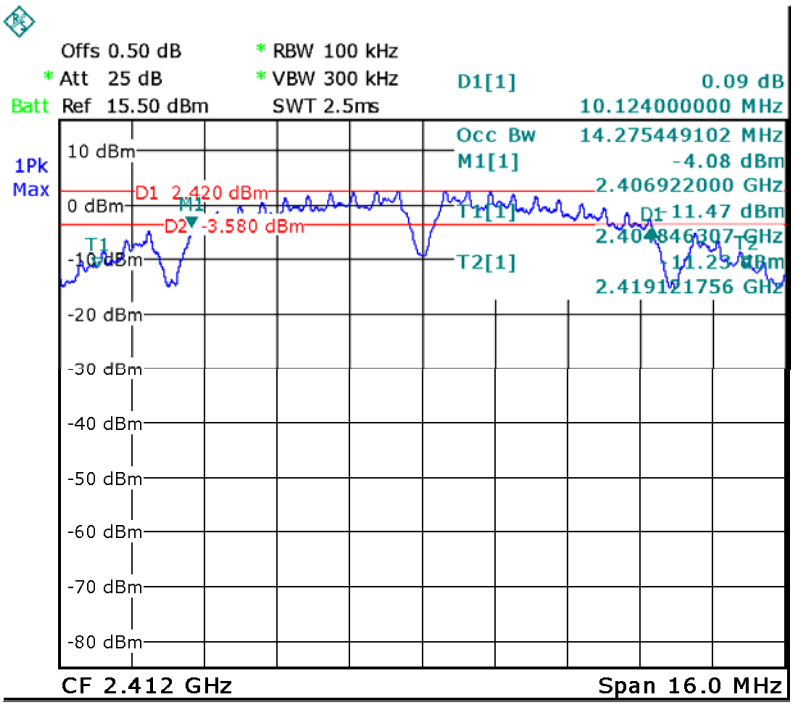
Operation mode	Test Channel	Bandwidth (MHz)	Limit (kHz)
TX 11b	Channel 1	10.092	500
	Channel 6	10.092	500
	Channel 11	10.092	500
TX 11g	Channel 1	16.617	500
	Channel 6	16.617	500
	Channel 11	16.617	500
TX 11n HT20	Channel 1	17.838	500
	Channel 6	17.838	500
	Channel 11	17.838	500

TX 11n HT40	Channel 3	35.560	500
	Channel 6	35.560	500
	Channel 9	35.560	500

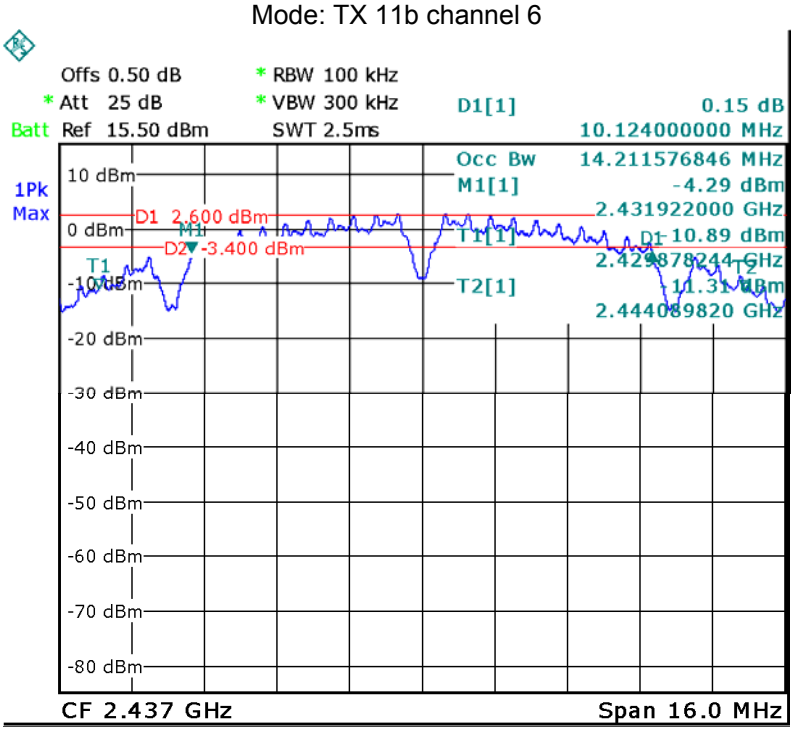
Test result plot:

ANT 1

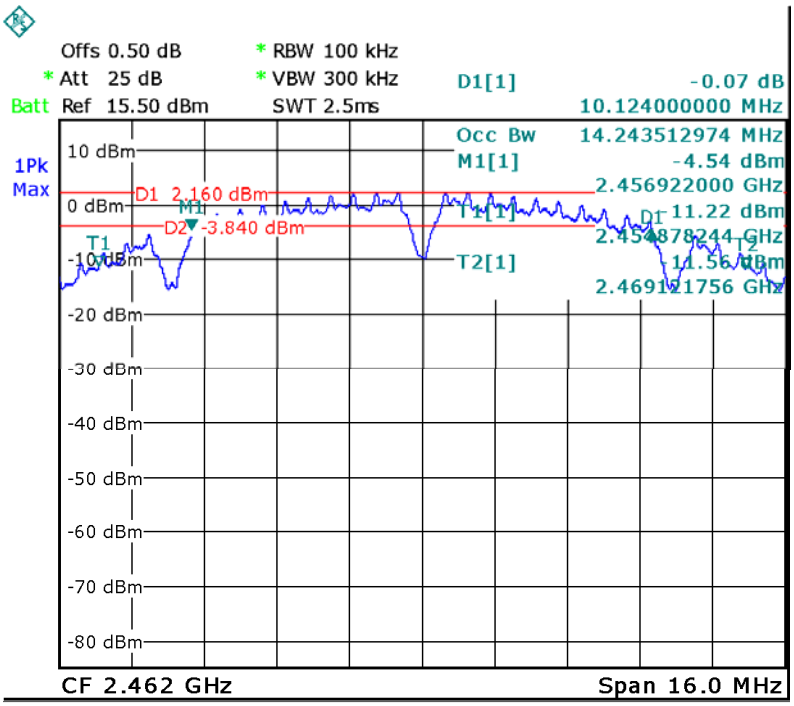
Mode: TX 11b channel 1



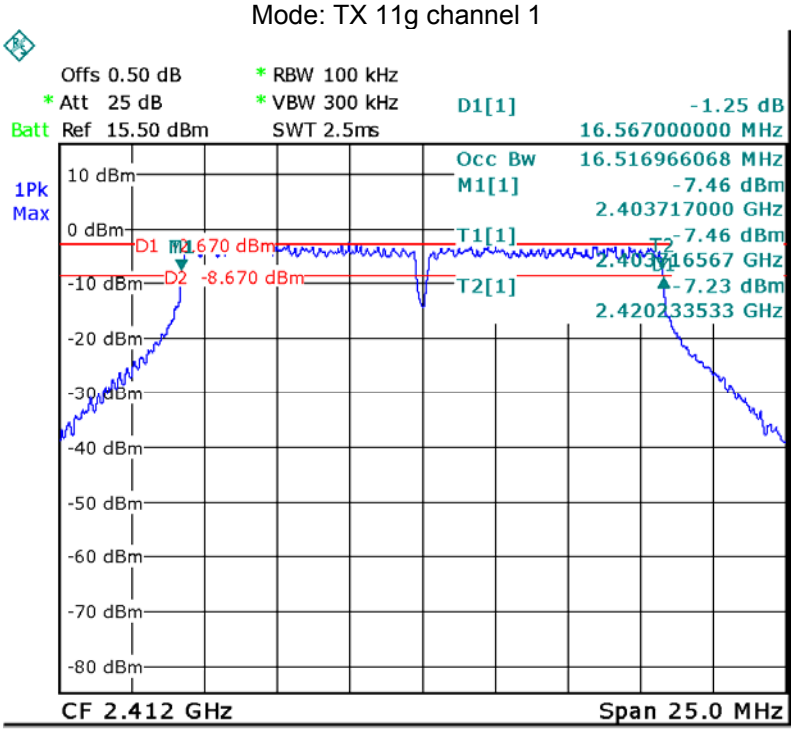
Mode: TX 11b channel 6



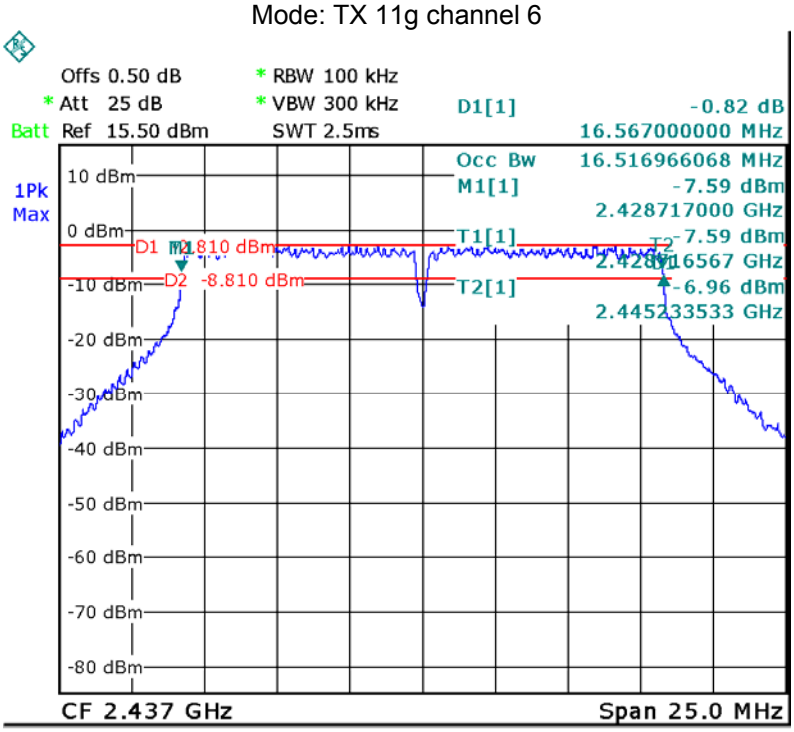
Mode: TX 11b channel 11



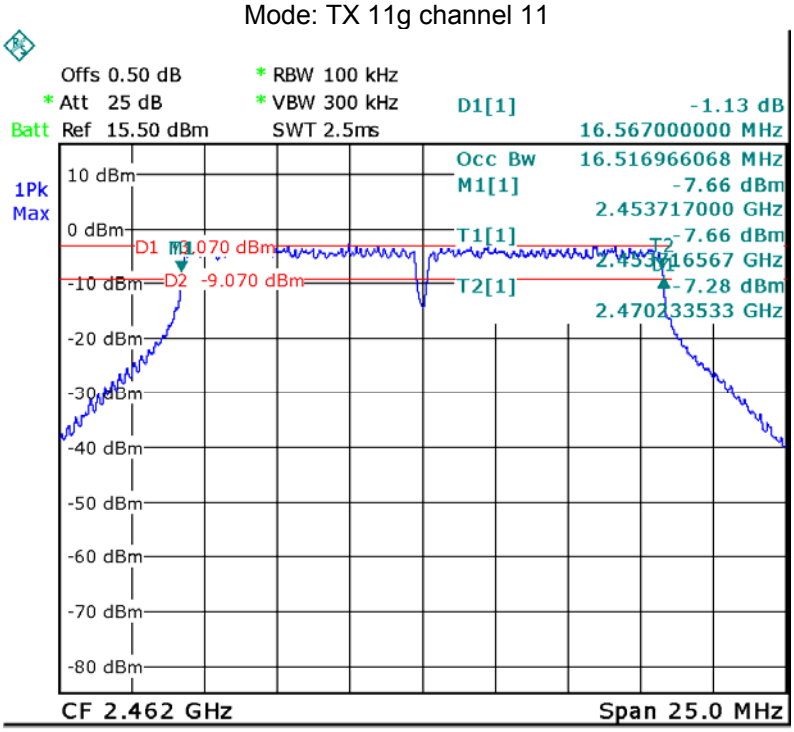
Mode: TX 11g channel 1



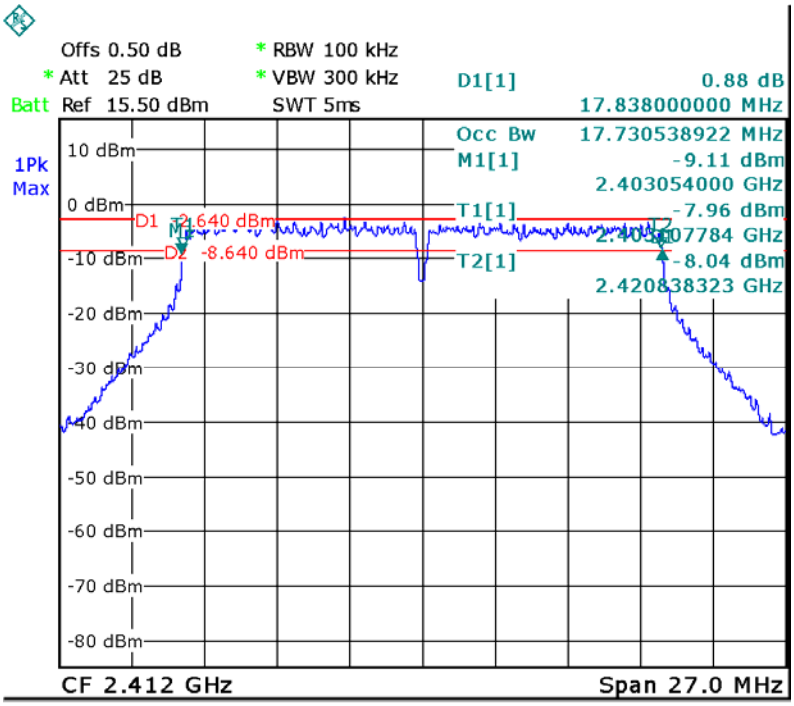
Mode: TX 11g channel 6



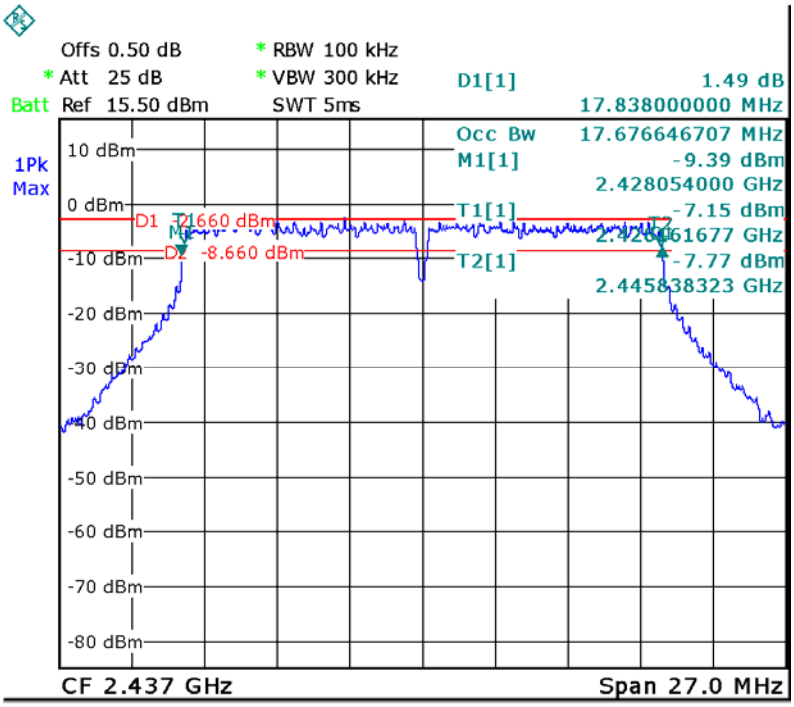
Mode: TX 11g channel 11



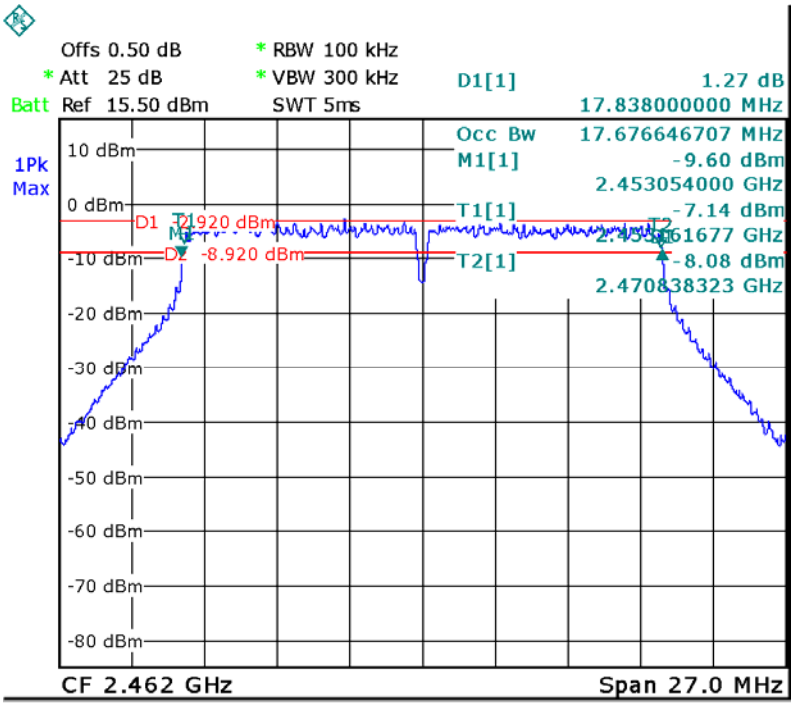
Mode: TX 11n HT20 channel 1



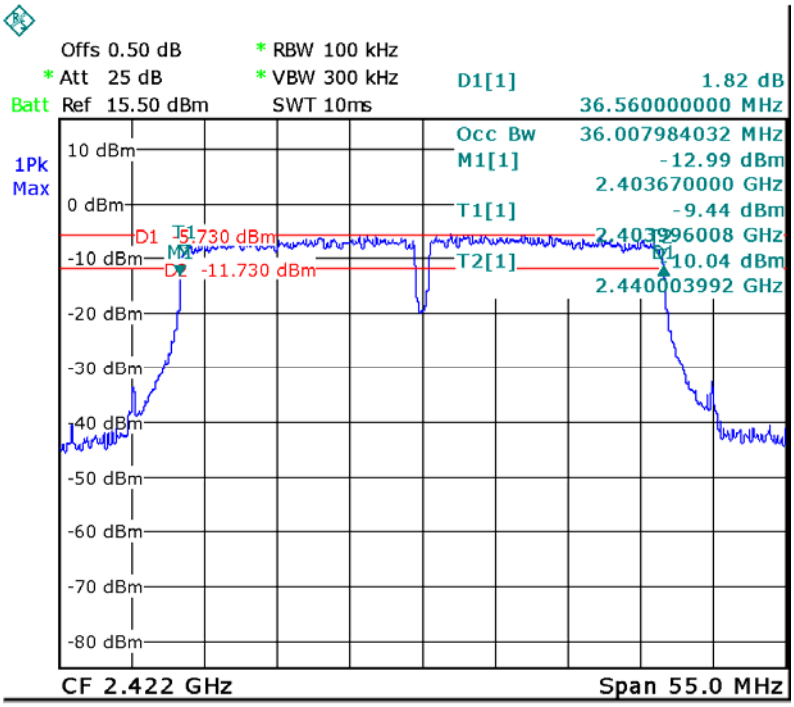
Mode: TX 11n HT20 channel 6



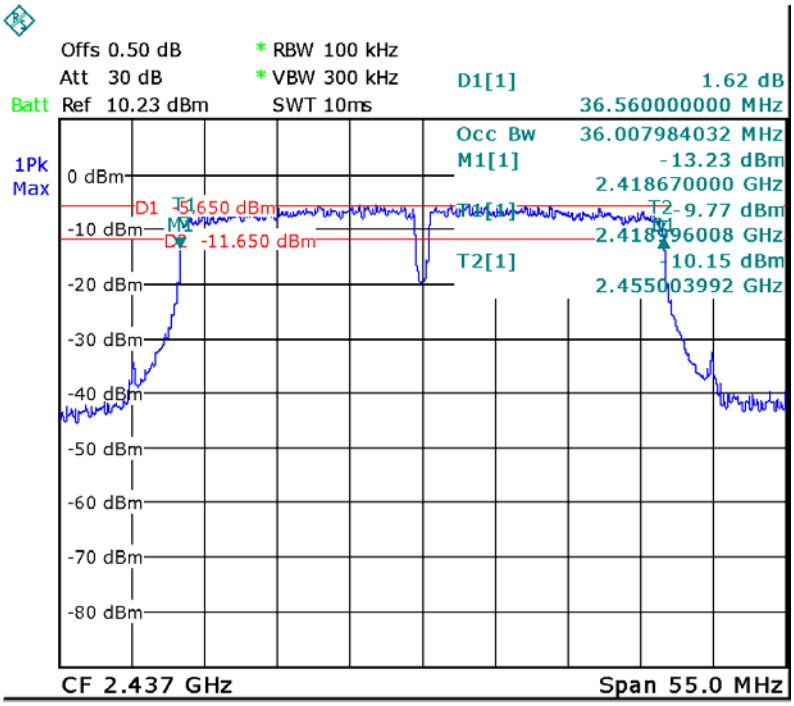
Mode: TX 11n HT20 channel 11



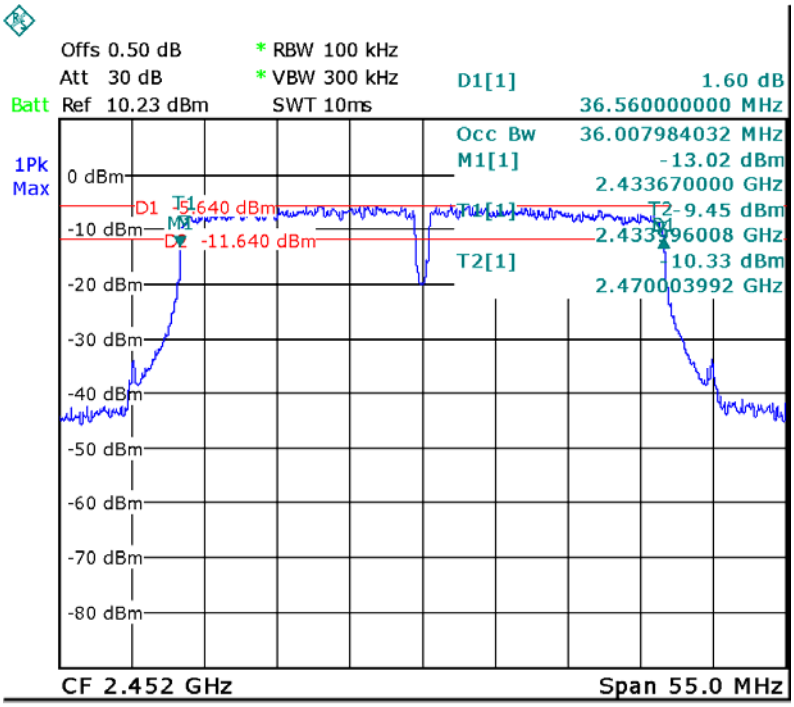
Mode: TX 11n HT40 channel 3



Mode: TX 11n HT40 channel 6

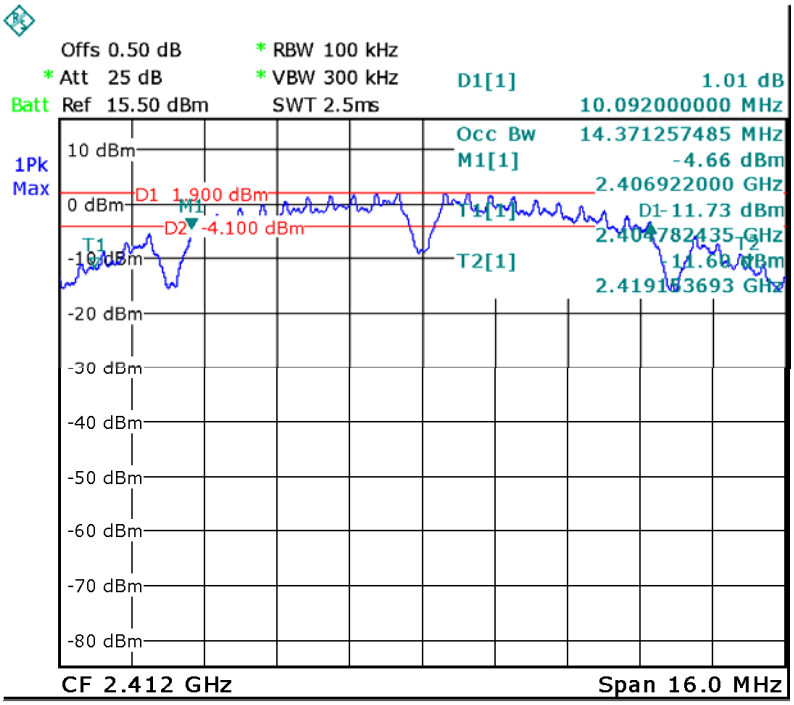


Mode: TX 11n HT40 channel 9

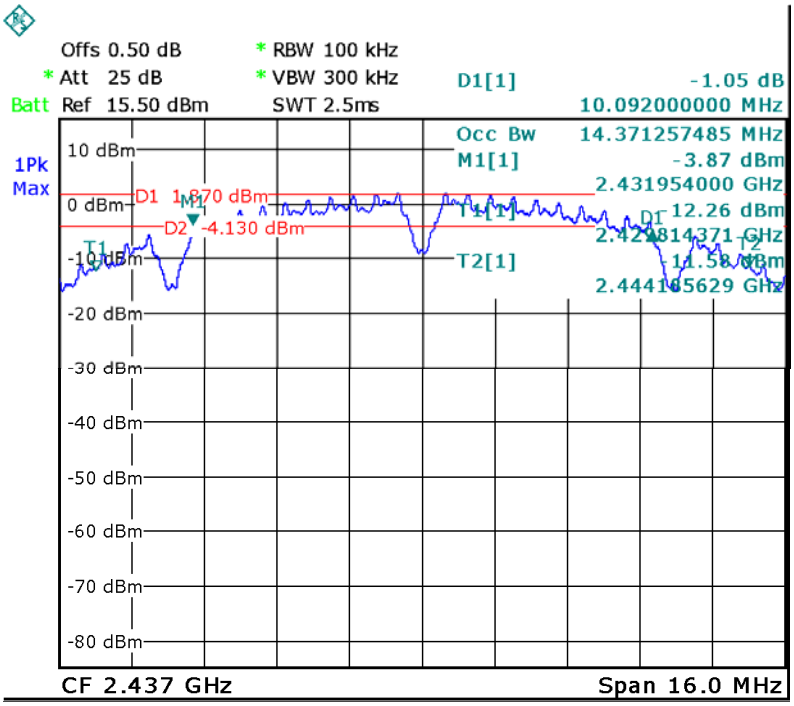


ANT 2

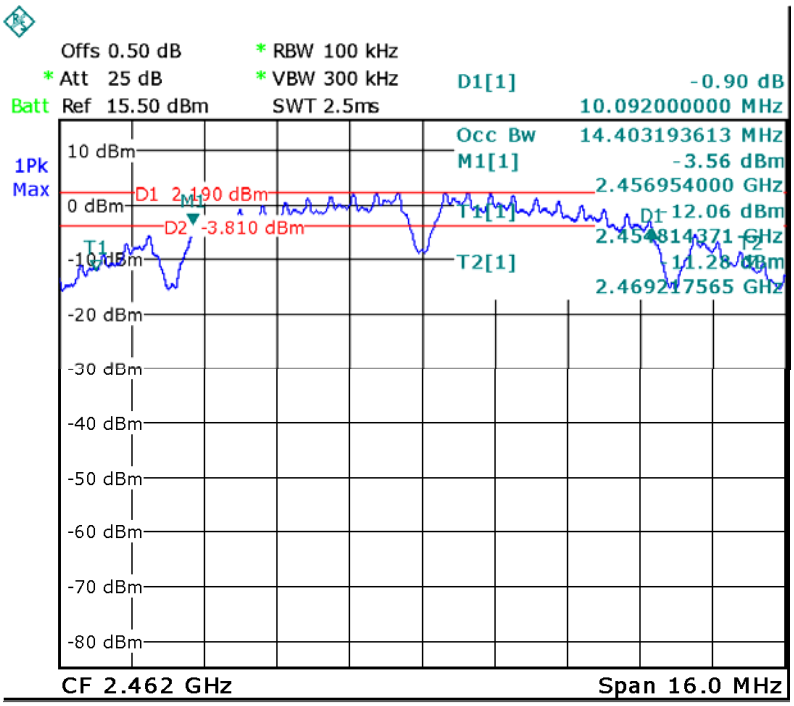
Mode: TX 11b channel 1



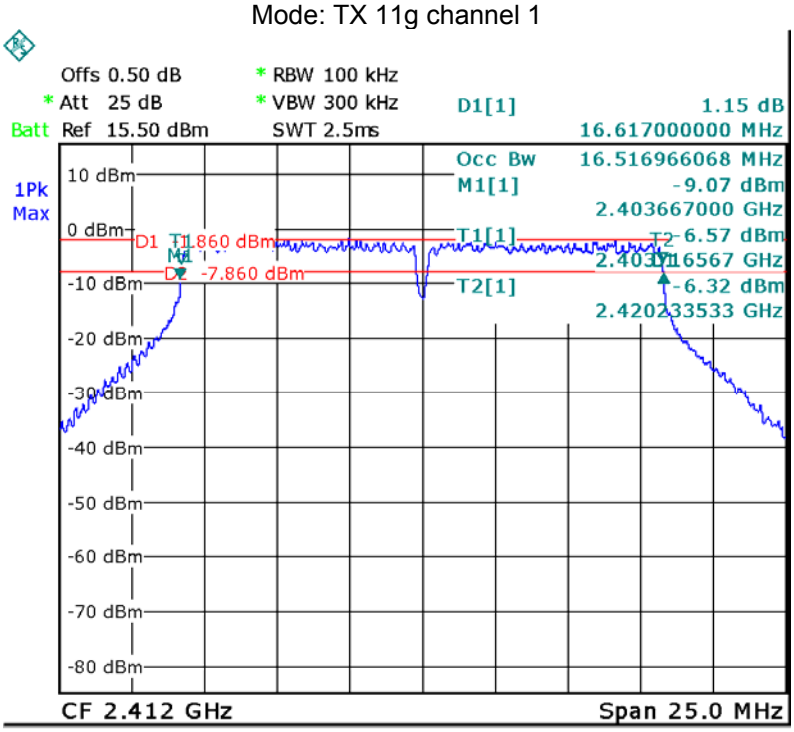
Mode: TX 11b channel 6



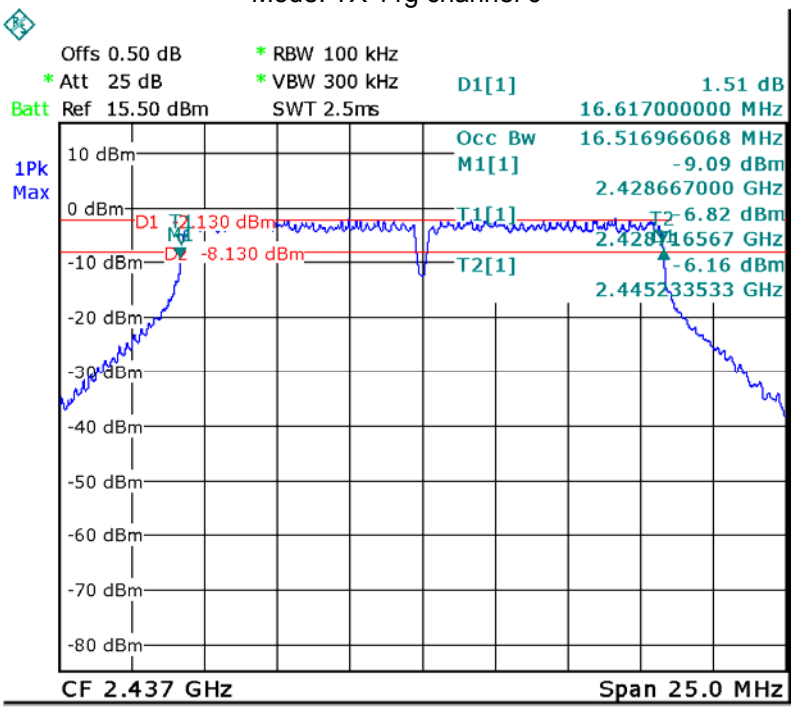
Mode: TX 11b channel 11



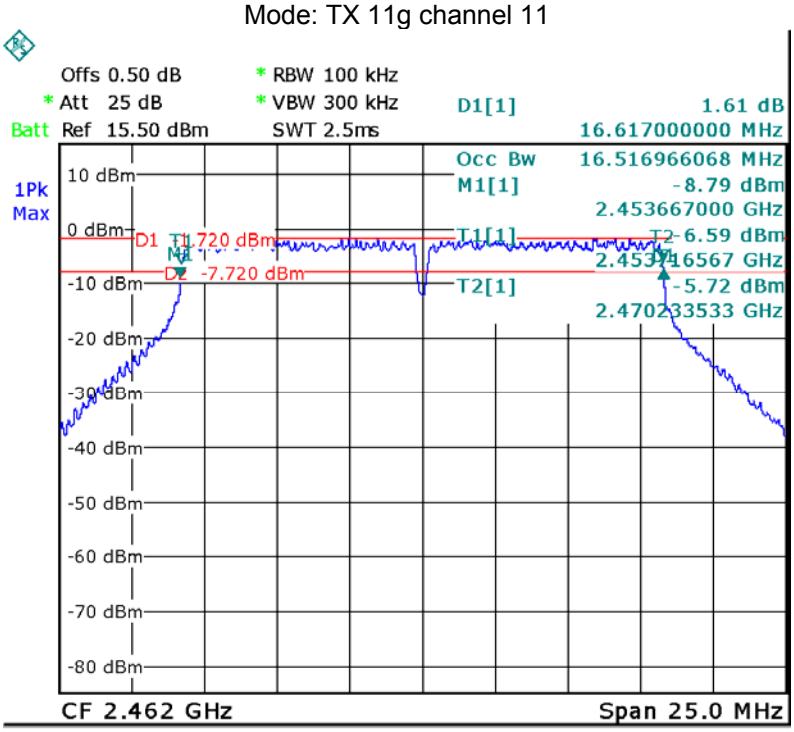
Mode: TX 11g channel 1



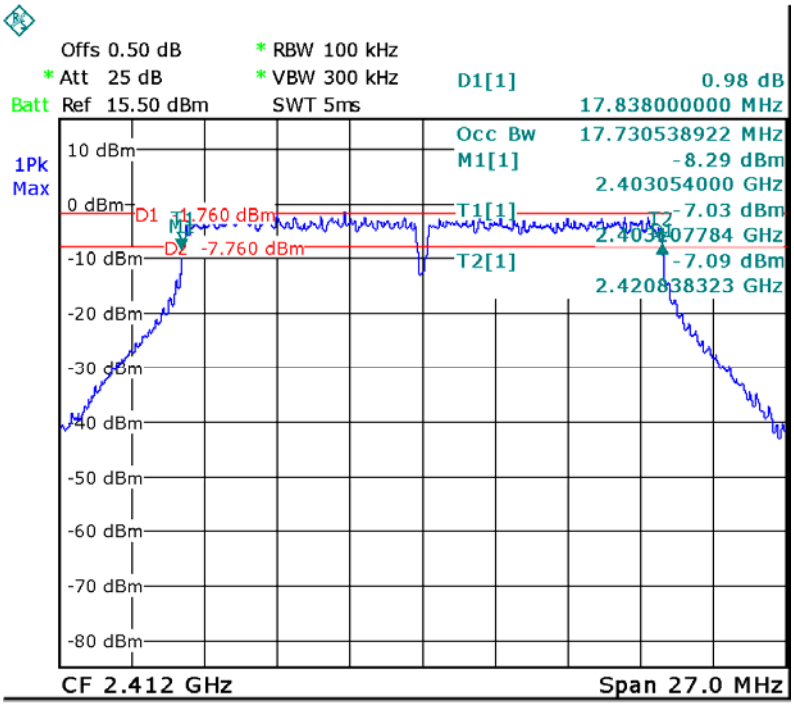
Mode: TX 11g channel 6



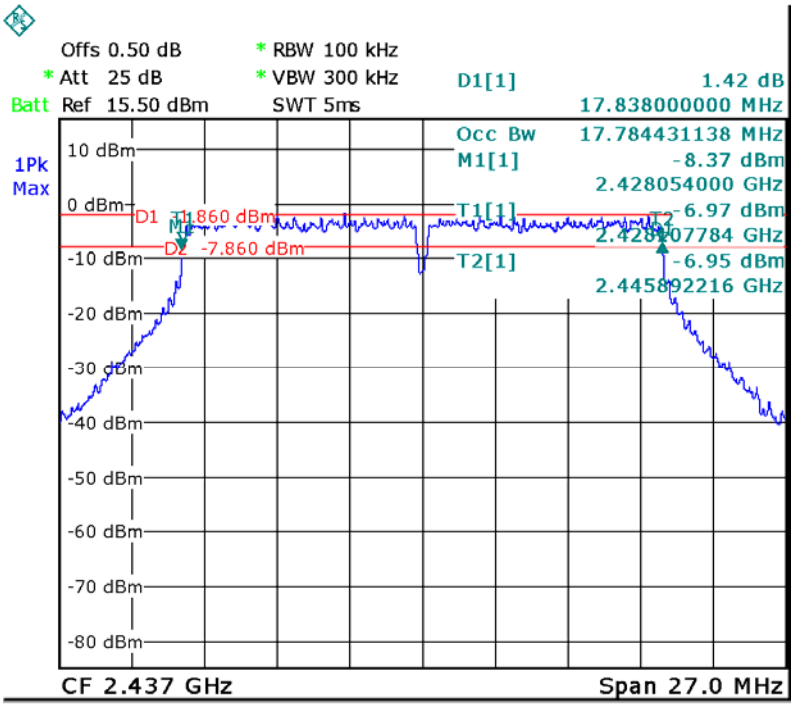
Mode: TX 11g channel 11



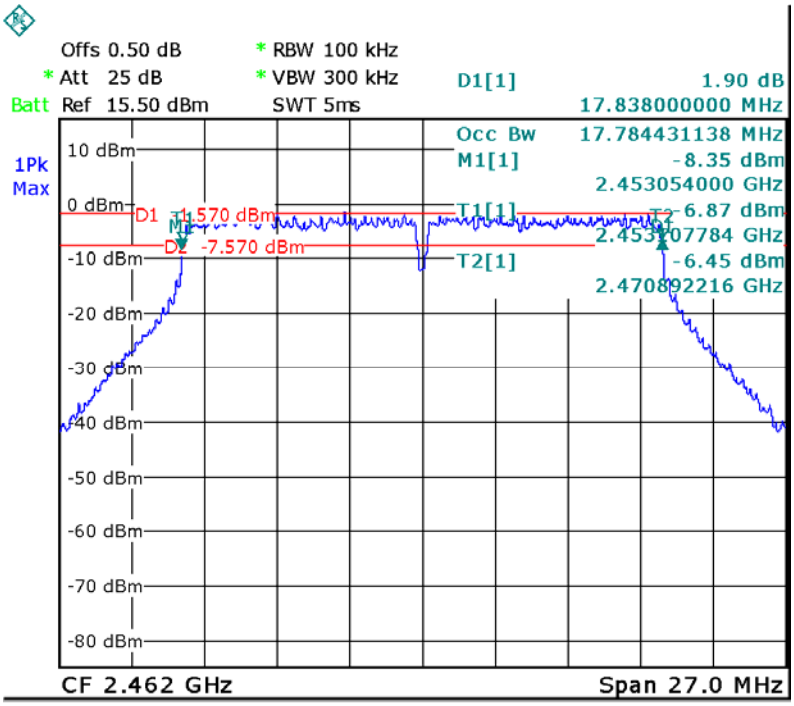
Mode: TX 11n HT20 channel 1



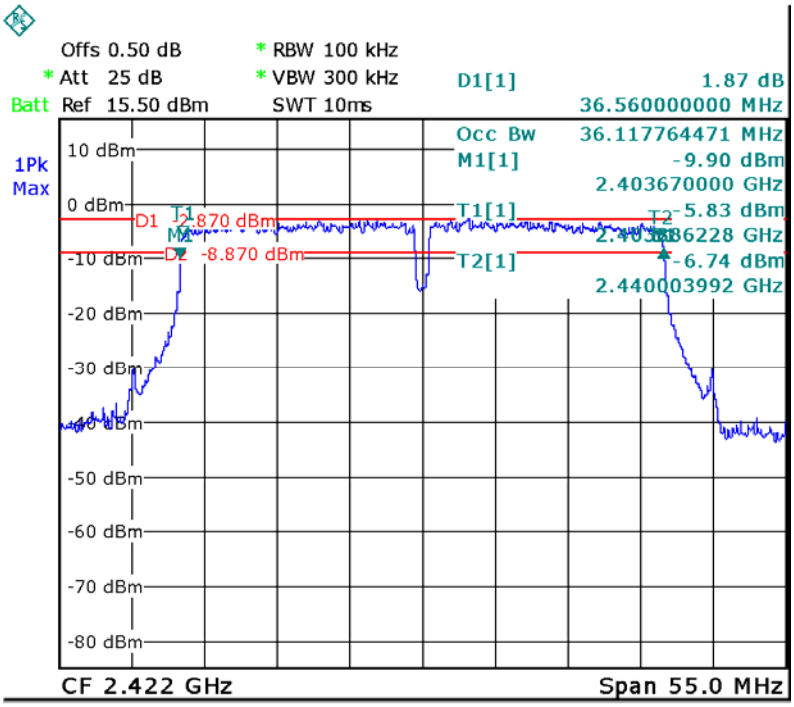
Mode: TX 11n HT20 channel 6



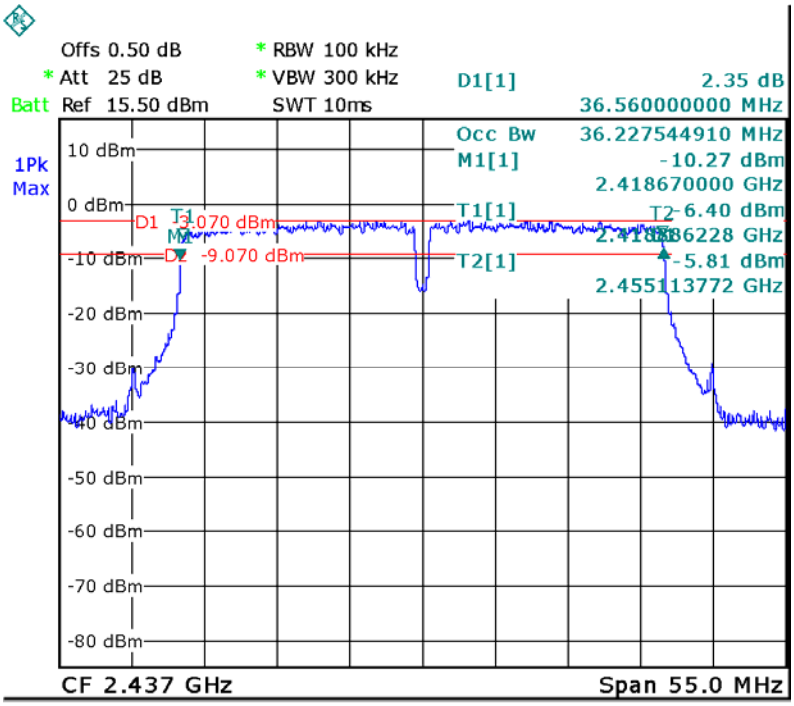
Mode: TX 11n HT20 channel 11



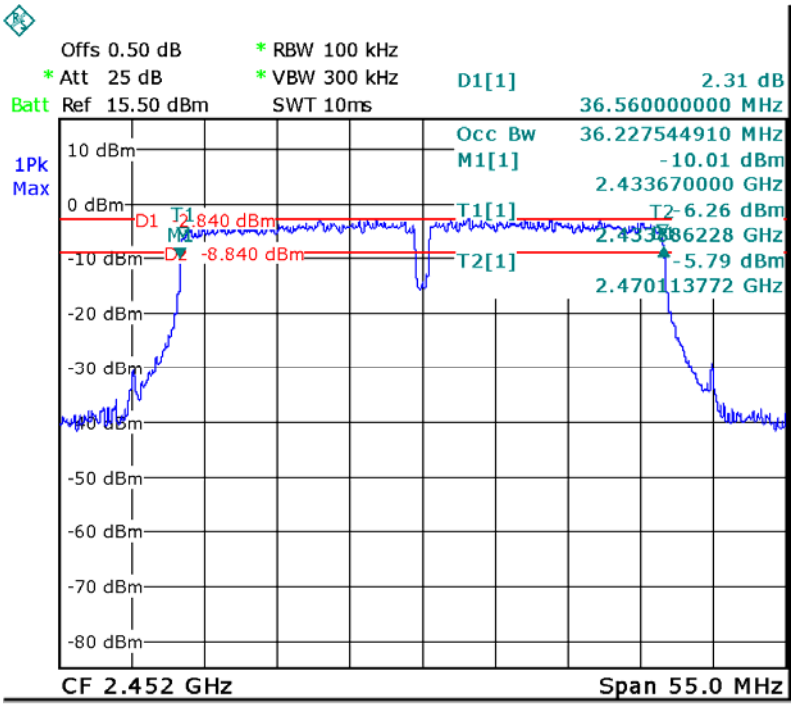
Mode: TX 11n HT40 channel 3



Mode: TX 11n HT40 channel 6



Mode: TX 11n HT40 channel 9



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:

ANT 1:

Operation mode	Channel Frequency (MHz)	Maximum Peak Output Power (dBm)	Limit
TX 11b	Low-2412	15.26	1W/30dBm
	Middle-2437	15.50	1W/30dBm
	High-2462	15.09	1W/30dBm
TX 11g	Low-2412	18.93	1W/30dBm
	Middle-2437	18.18	1W/30dBm
	High-2462	18.95	1W/30dBm
TX 11n HT20	Low-2412	19.24	1W/30dBm
	Middle-2437	19.47	1W/30dBm
	High-2462	19.21	1W/30dBm
TX 11n HT40	Low-2422	19.79	1W/30dBm
	Middle-2437	19.74	1W/30dBm
	High-2452	19.64	1W/30dBm

ANT 2:

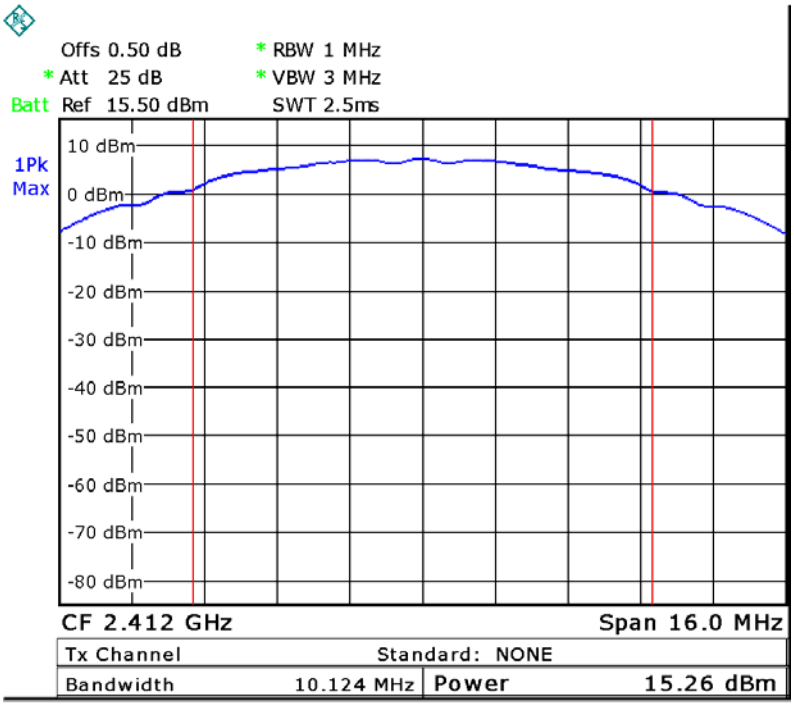
Operation mode	Channel Frequency (MHz)	Maximum Peak Output Power (dBm)	Limit
TX 11b	Low-2412	14.91	1W/30dBm
	Middle-2437	14.85	1W/30dBm
	High-2462	15.03	1W/30dBm
TX 11g	Low-2412	19.91	1W/30dBm
	Middle-2437	19.89	1W/30dBm
	High-2462	20.17	1W/30dBm
TX 11n HT20	Low-2412	20.23	1W/30dBm
	Middle-2437	20.25	1W/30dBm
	High-2462	20.52	1W/30dBm
TX 11n HT40	Low-2422	22.58	1W/30dBm
	Middle-2437	22.54	1W/30dBm
	High-2452	22.66	1W/30dBm

ANT1+ANT 2:

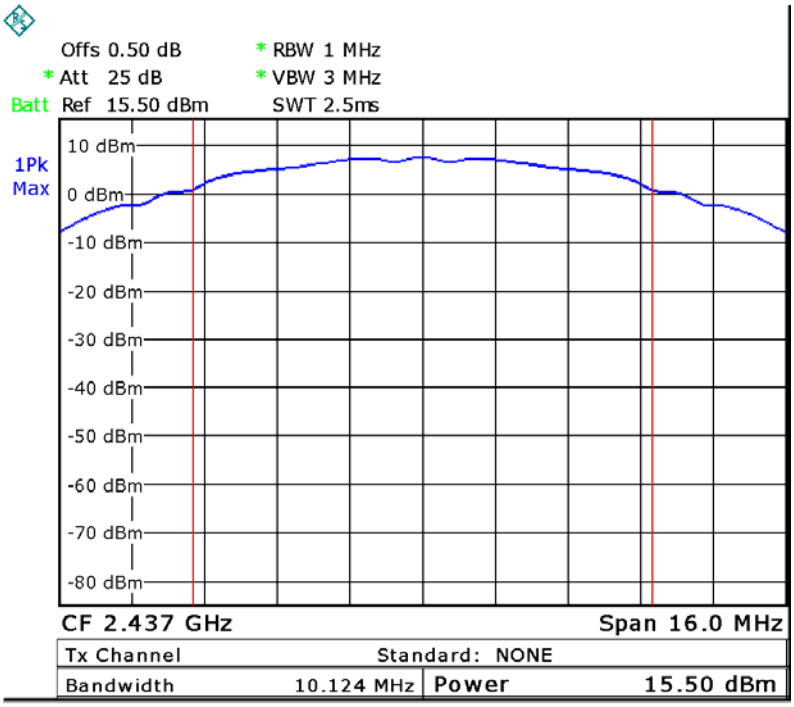
Operation mode	Channel Frequency (MHz)	Maximum Peak Output Power (dBm)	Limit
TX 11b	Low-2412	16.81	1W/30dBm
	Middle-2437	17.11	1W/30dBm
	High-2462	16.72	1W/30dBm
TX 11g	Low-2412	22.72	1W/30dBm
	Middle-2437	23.08	1W/30dBm
	High-2462	22.60	1W/30dBm
TX 11n HT20	Low-2412	22.48	1W/30dBm
	Middle-2437	22.76	1W/30dBm
	High-2462	22.34	1W/30dBm
TX 11n HT40	Low-2422	22.63	1W/30dBm
	Middle-2437	22.51	1W/30dBm
	High-2452	22.39	1W/30dBm

ANT 1 **Test Plot**

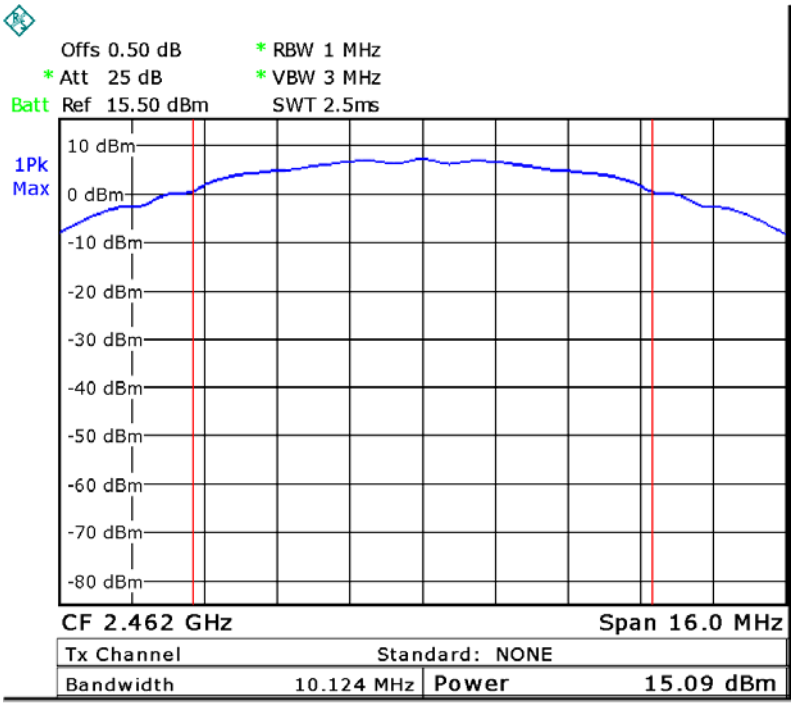
Mode: TX 11b channel 1



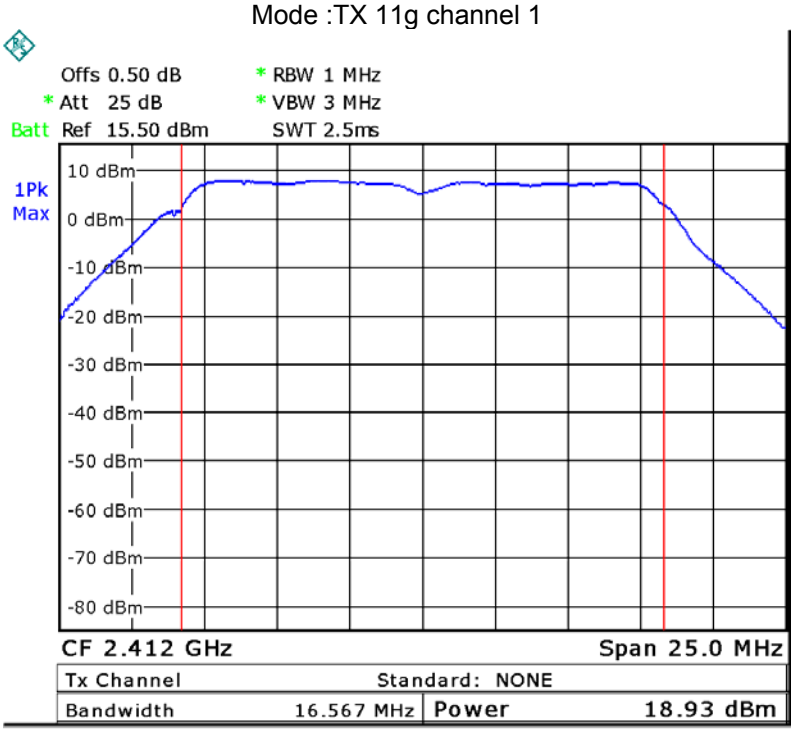
Mode: TX 11b channel 6



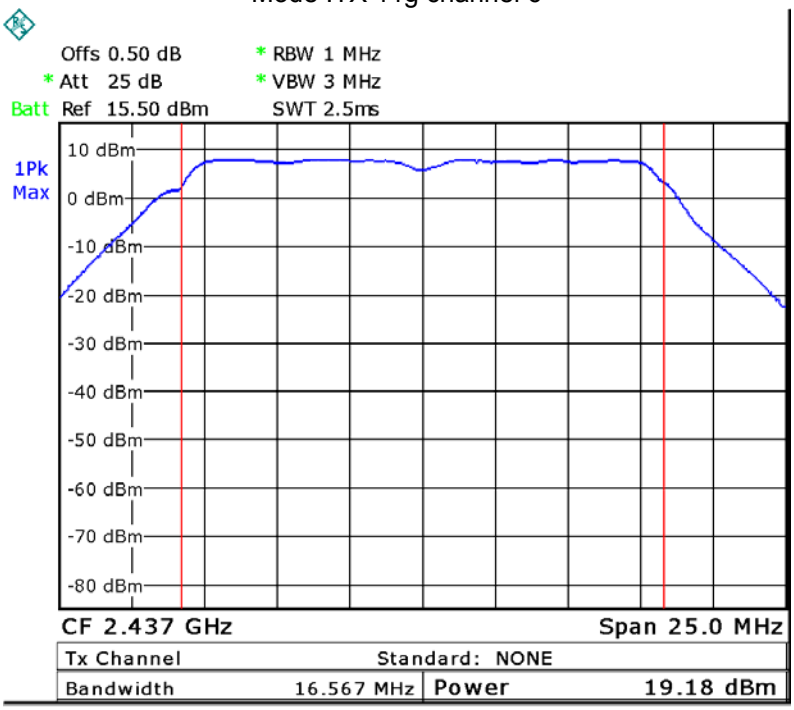
Mode: TX 11b channel 11



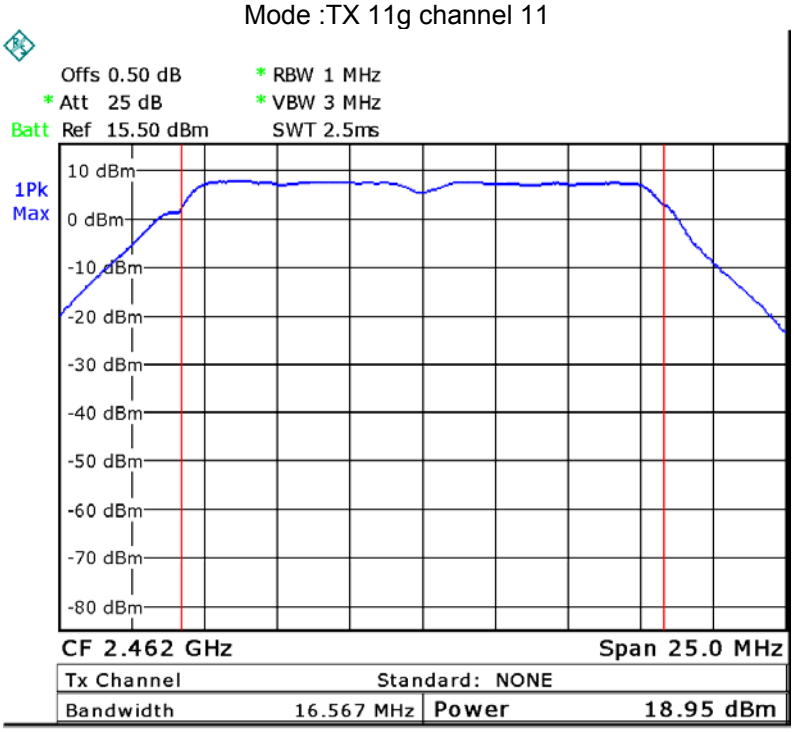
Mode :TX 11g channel 1



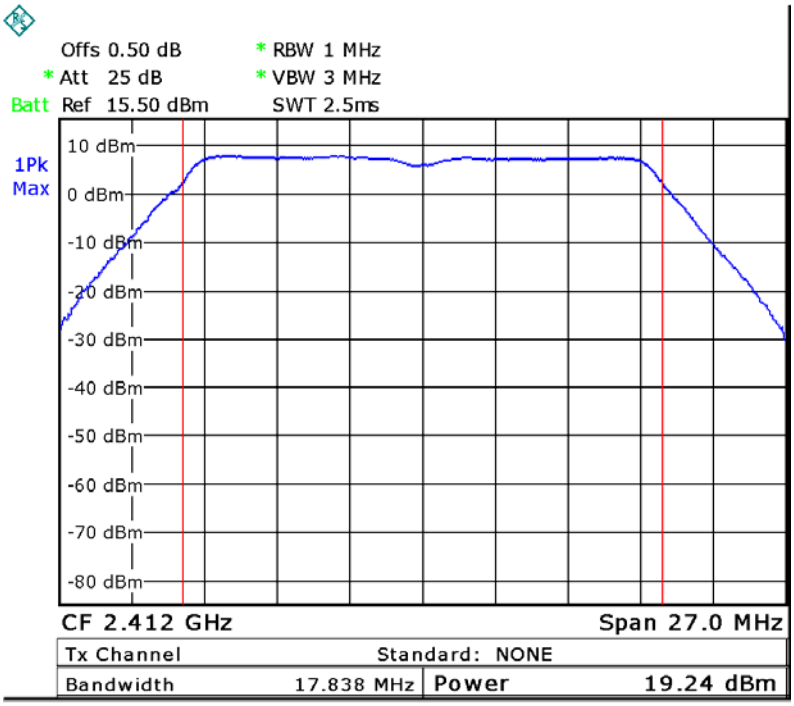
Mode :TX 11g channel 6



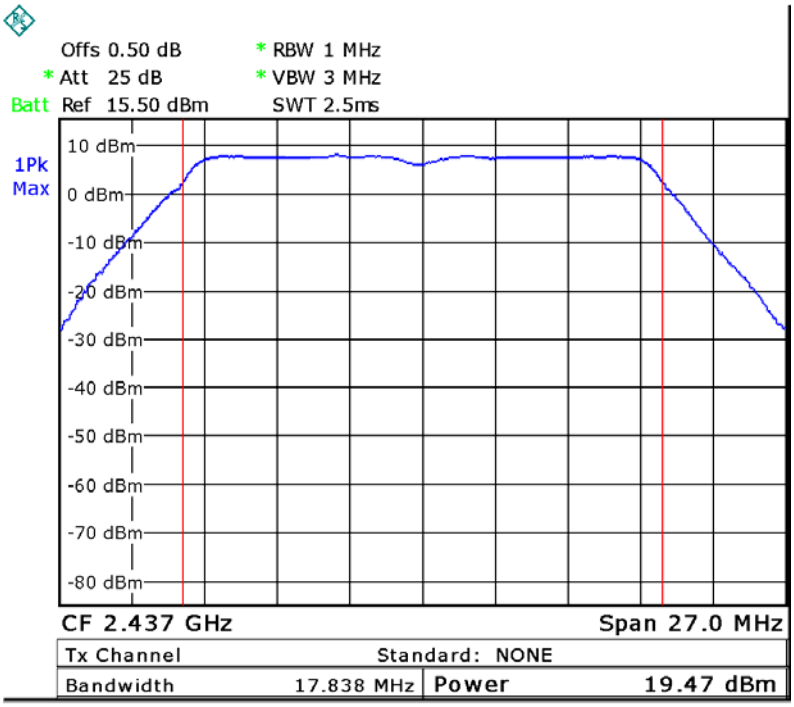
Mode :TX 11g channel 11



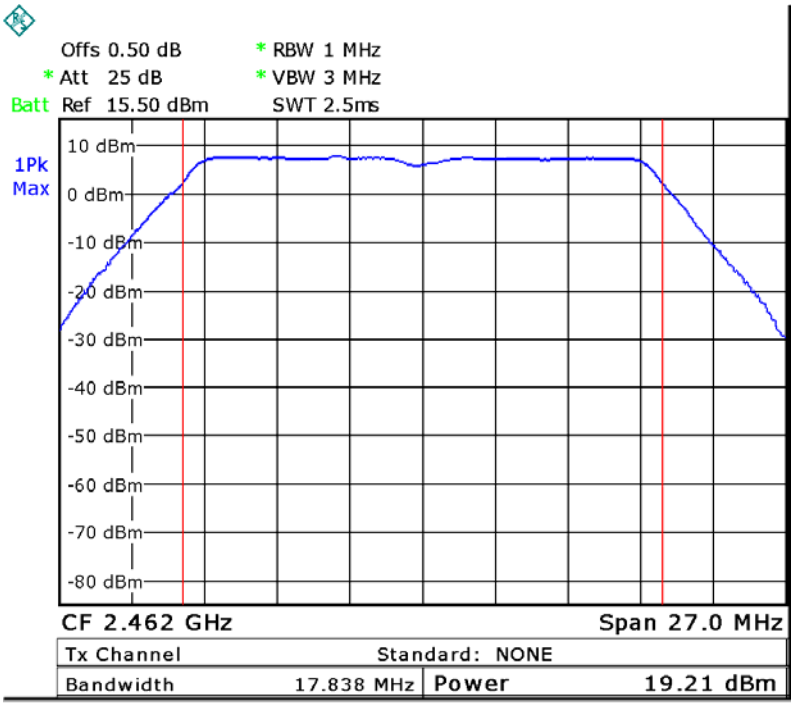
Mode: TX 11n HT20 channel 1



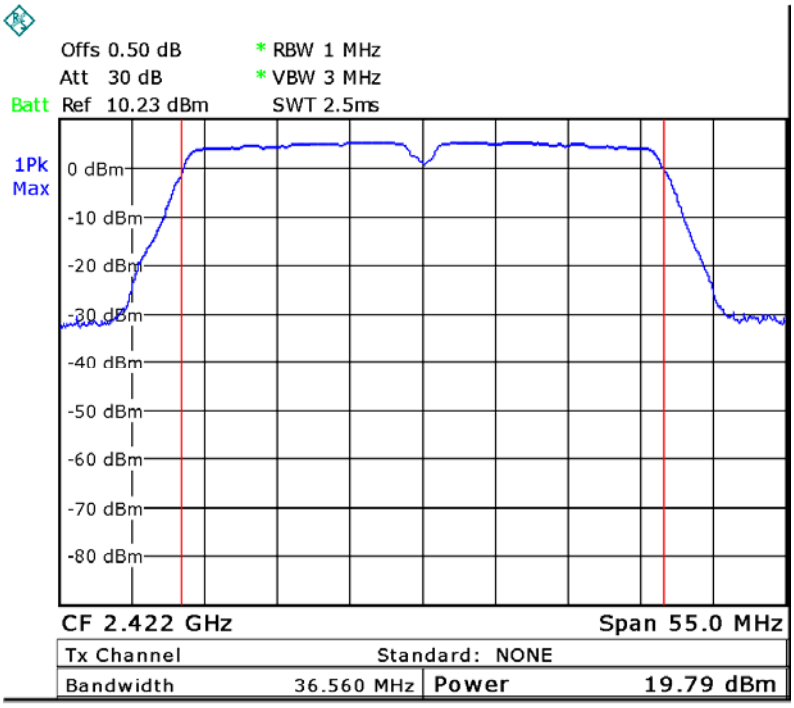
Mode: TX 11n HT20 channel 6



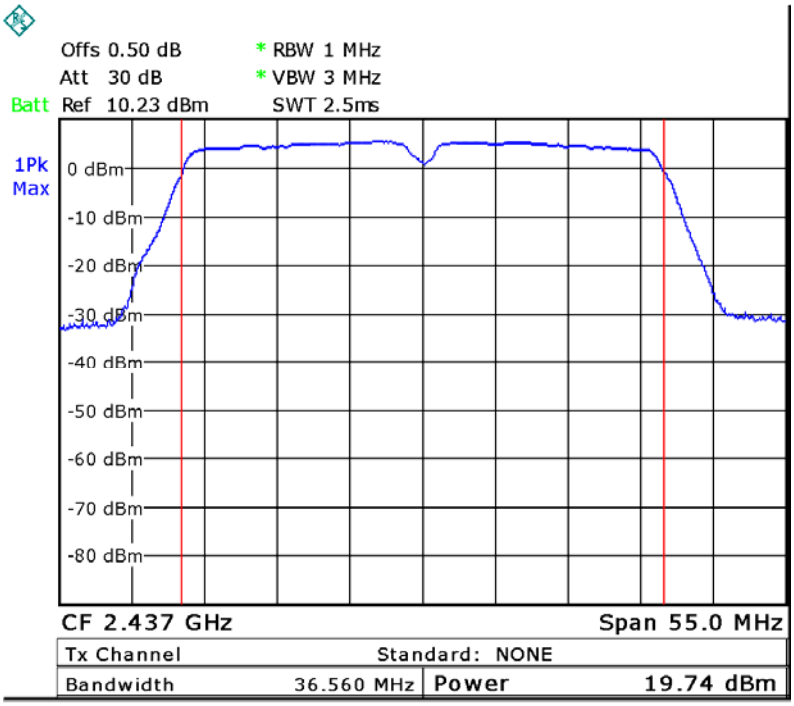
Mode: TX 11n HT20 channel 11



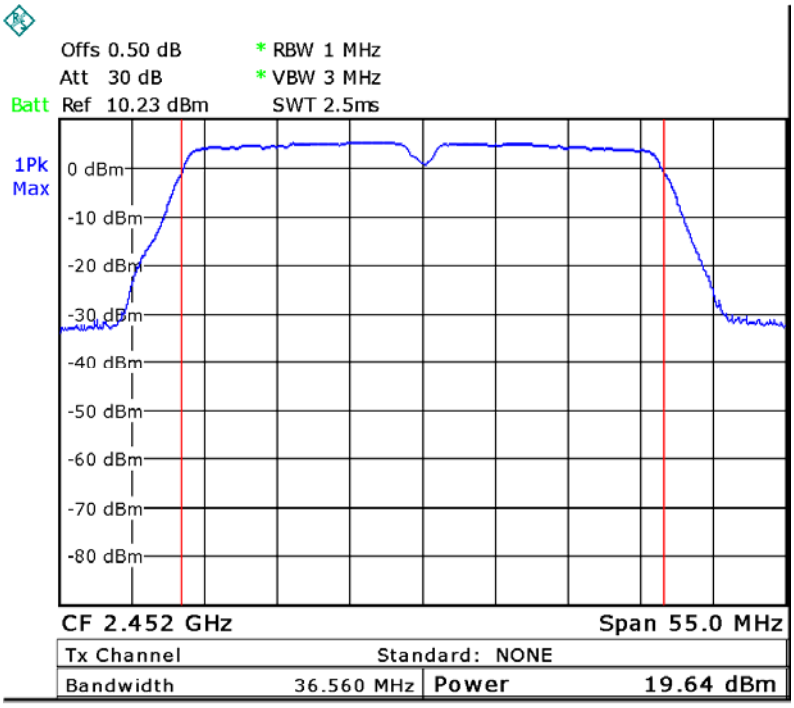
Mode: TX 11n HT40 channel 3



Mode: TX 11n HT40 channel 6

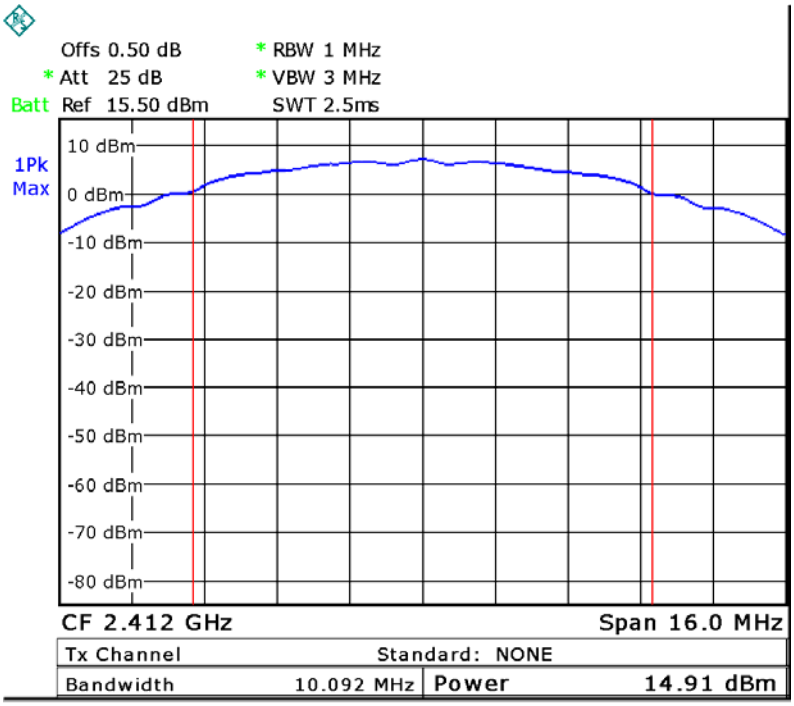


Mode: TX 11n HT40 channel 9

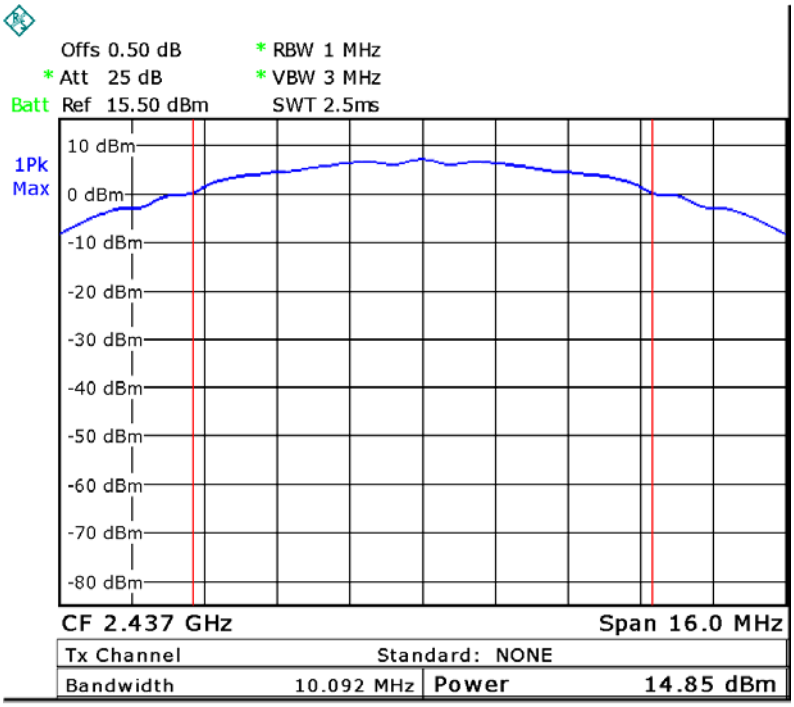


ANT 2 **Test Plot**

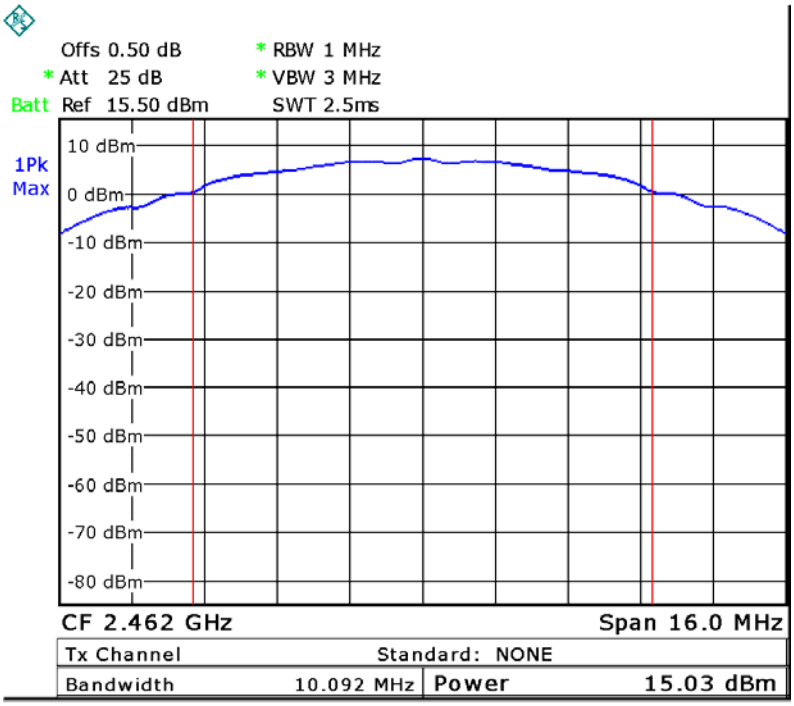
Mode: TX 11b channel 1



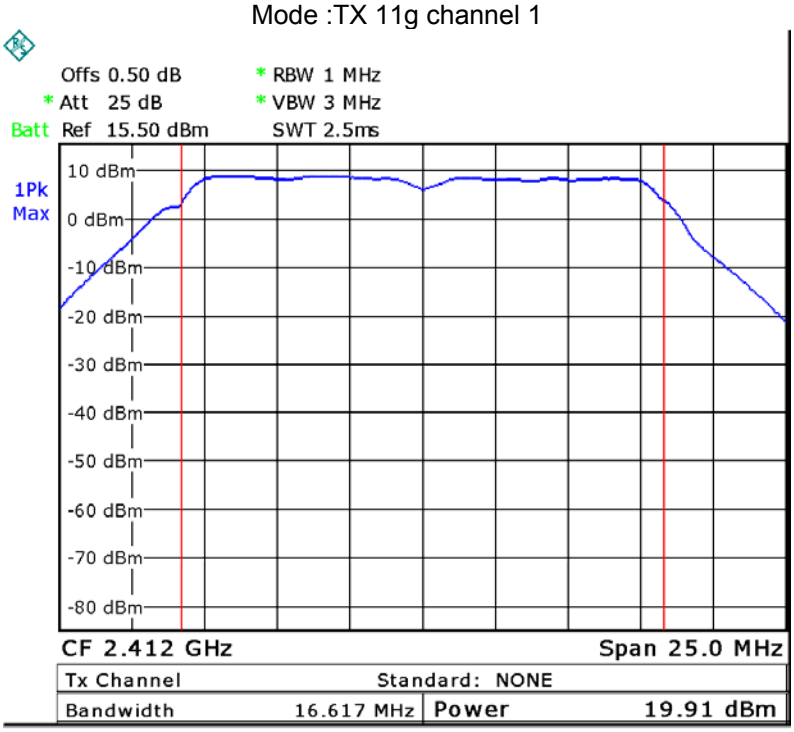
Mode: TX 11b channel 6



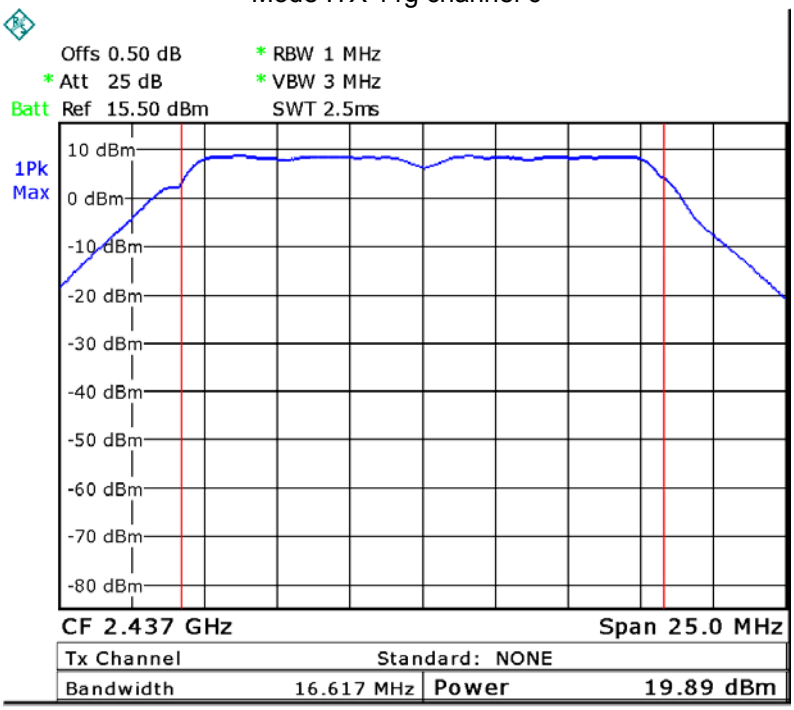
Mode: TX 11b channel 11



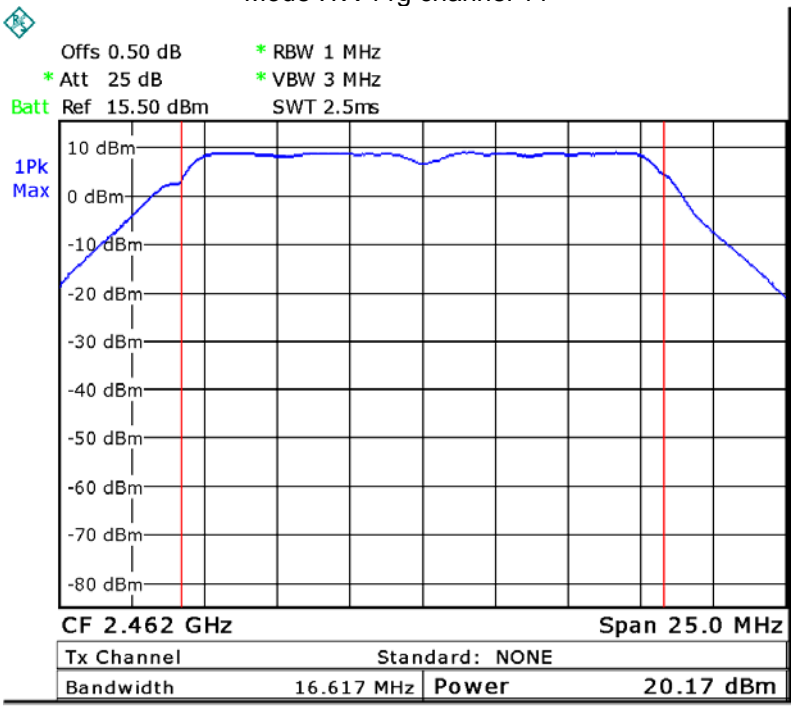
Mode :TX 11g channel 1



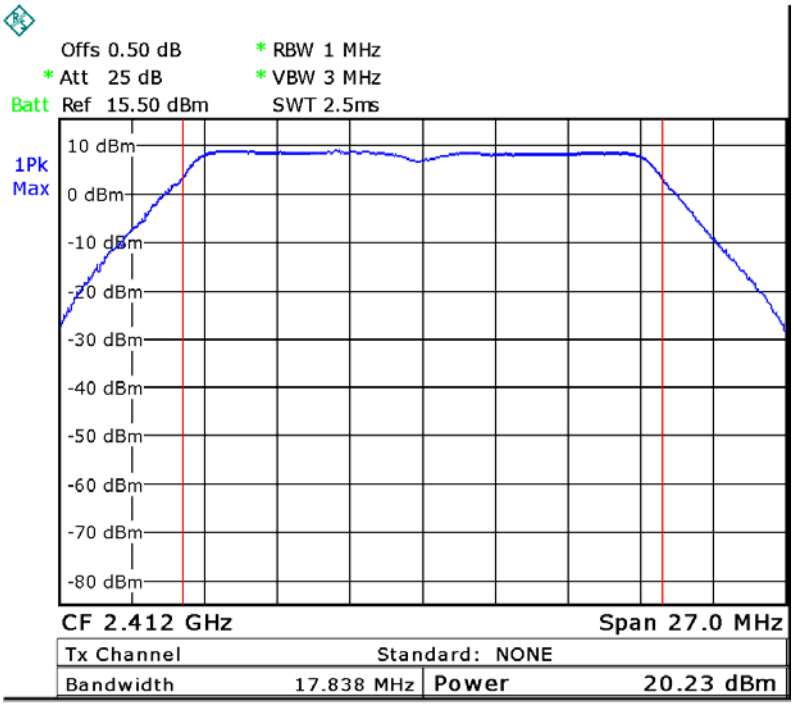
Mode :TX 11g channel 6



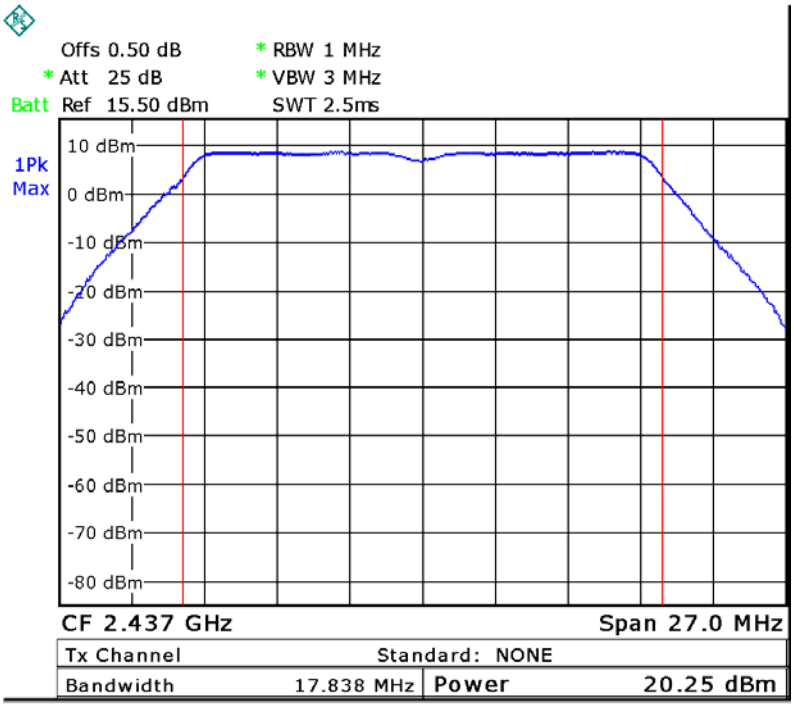
Mode :TX 11g channel 11



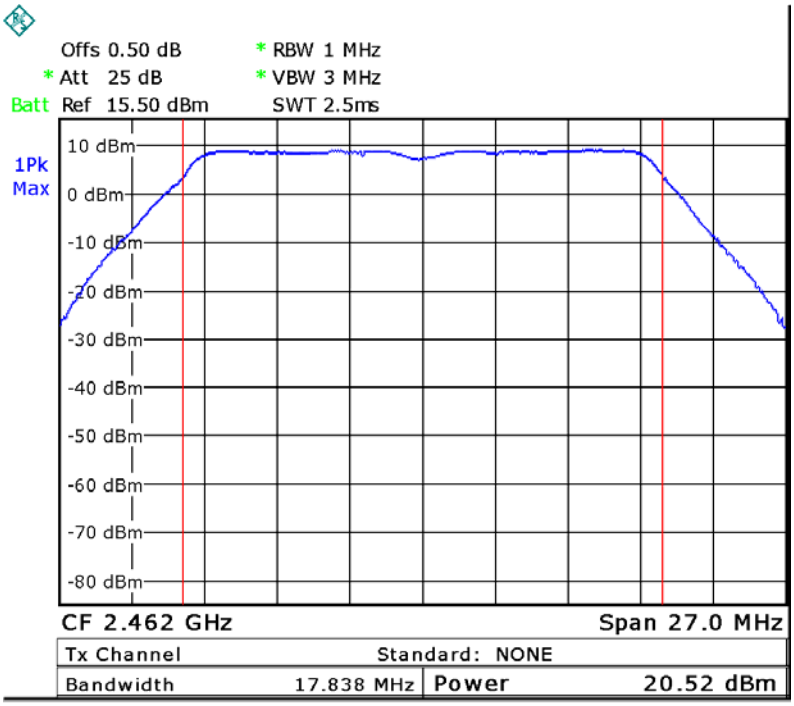
Mode: TX 11n HT20 channel 1



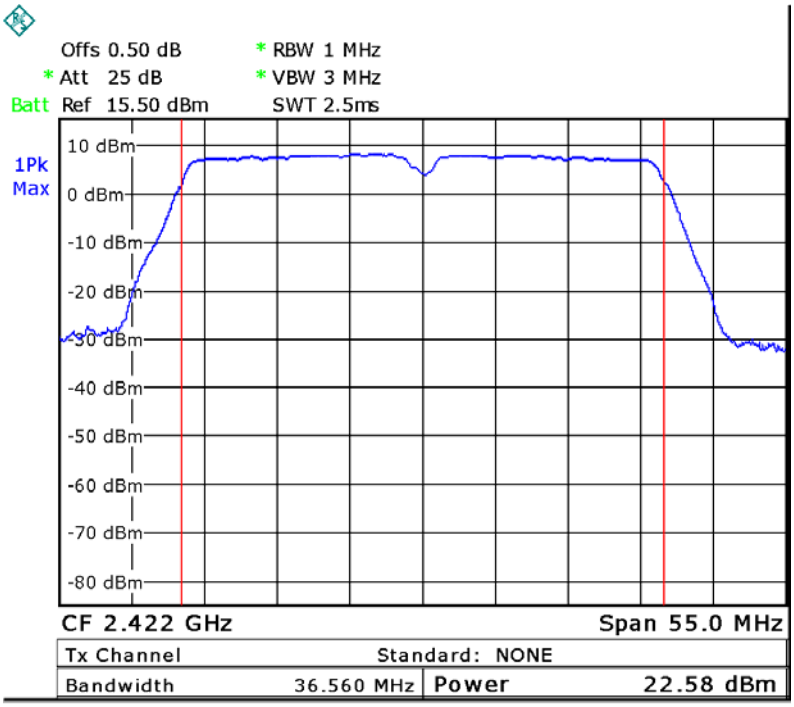
Mode: TX 11n HT20 channel 6



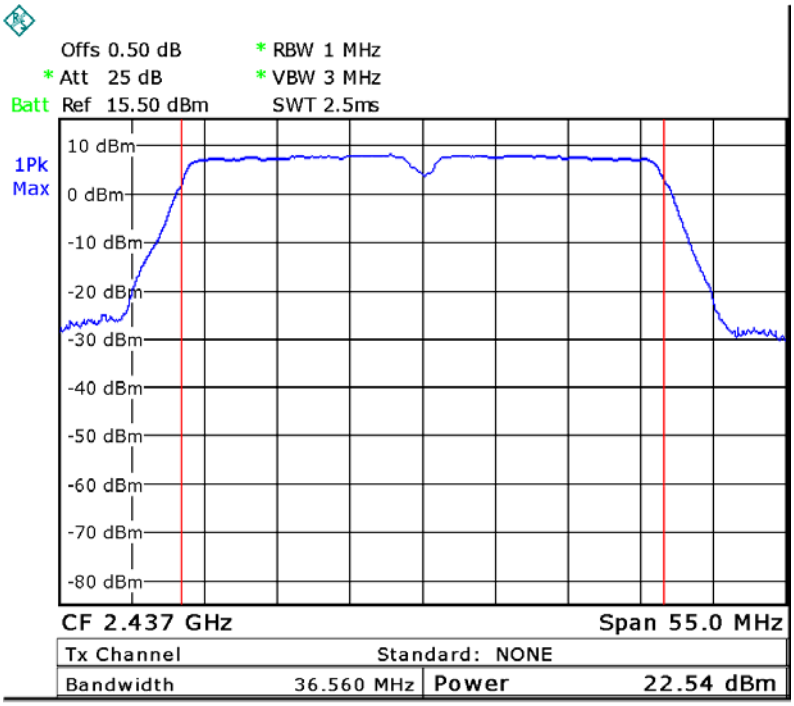
Mode: TX 11n HT20 channel 11



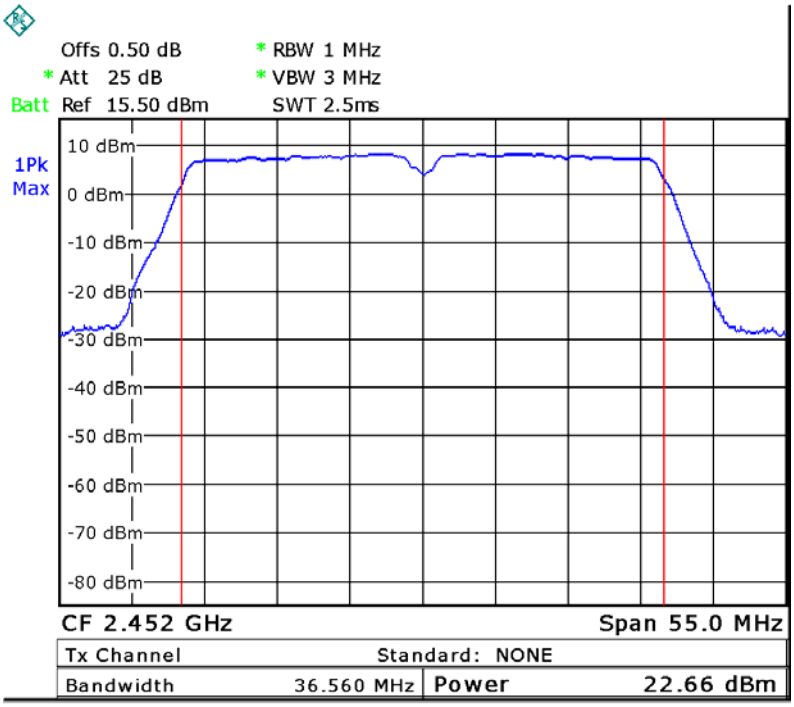
Mode: TX 11n HT40 channel 3



Mode: TX 11n HT40 channel 6

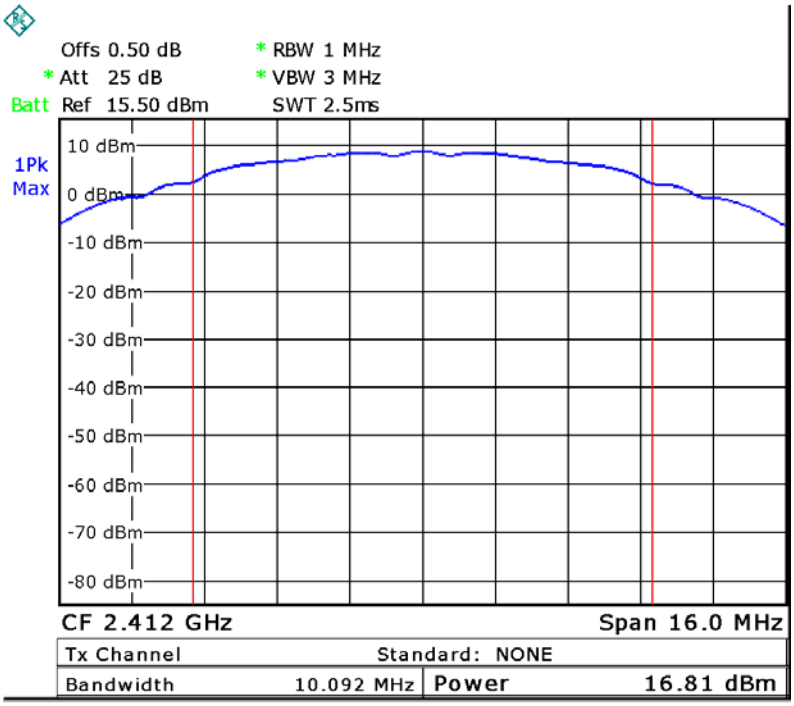


Mode: TX 11n HT40 channel 9

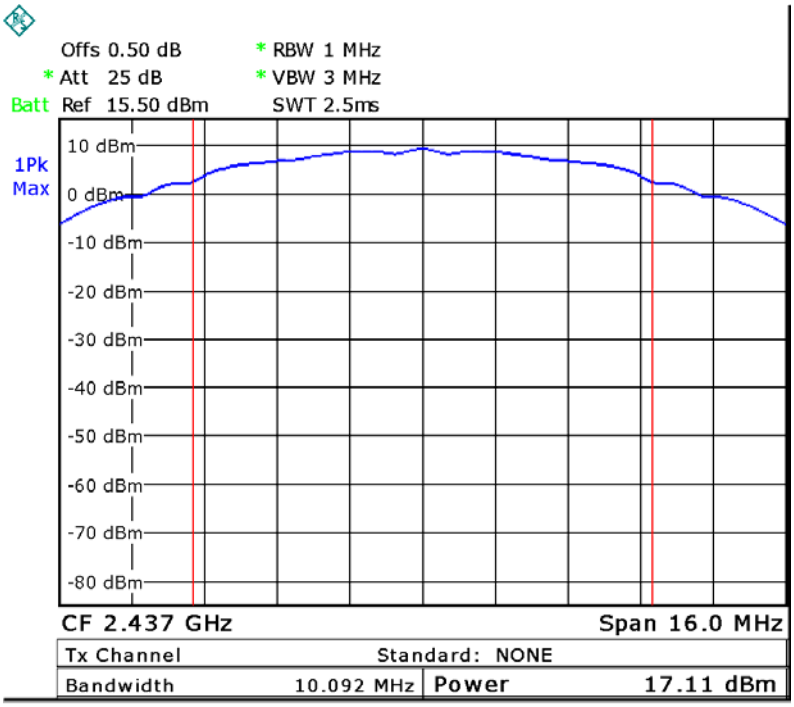


ANT 1+ANT 2 **Test Plot**

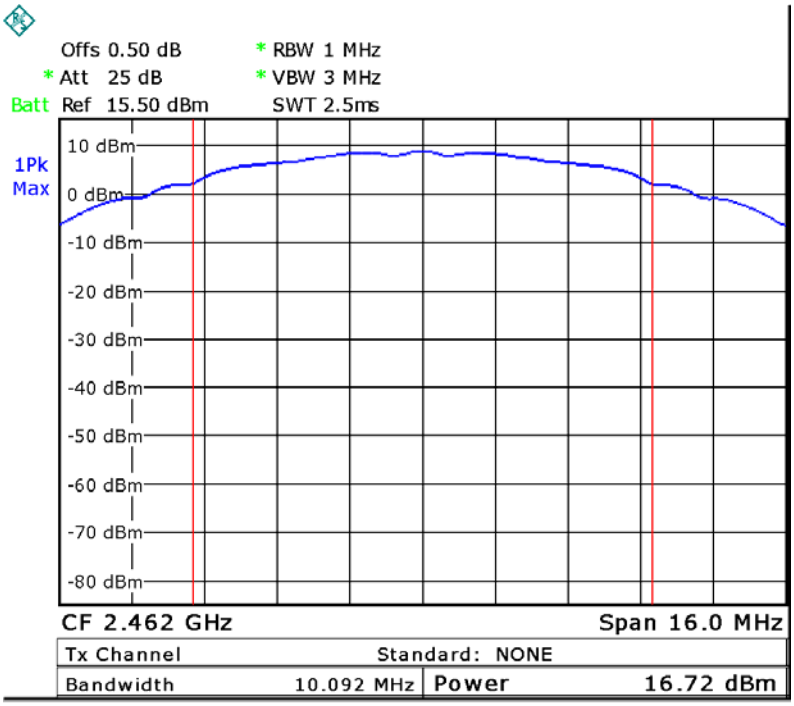
Mode: TX 11b channel 1



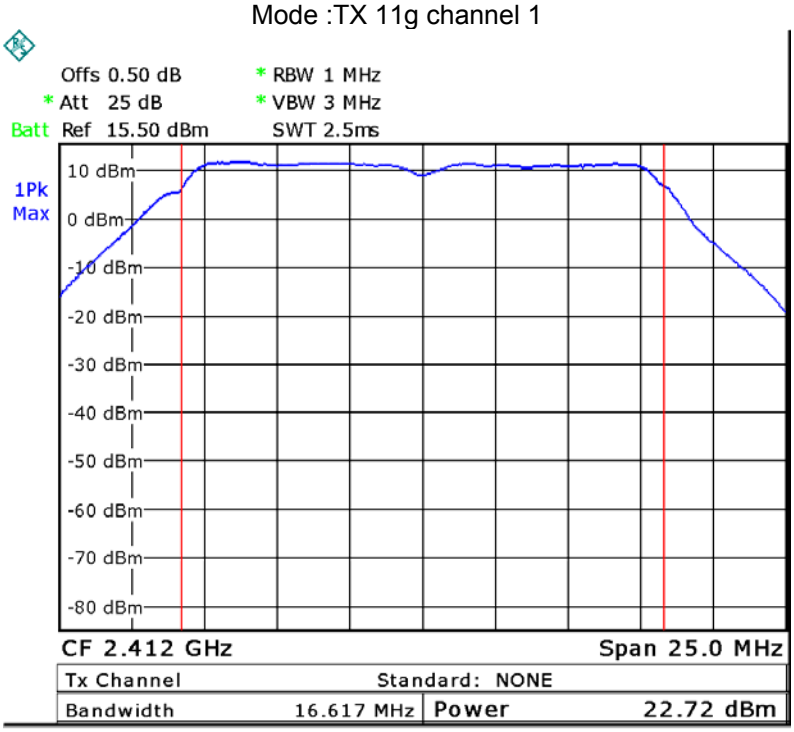
Mode: TX 11b channel 6



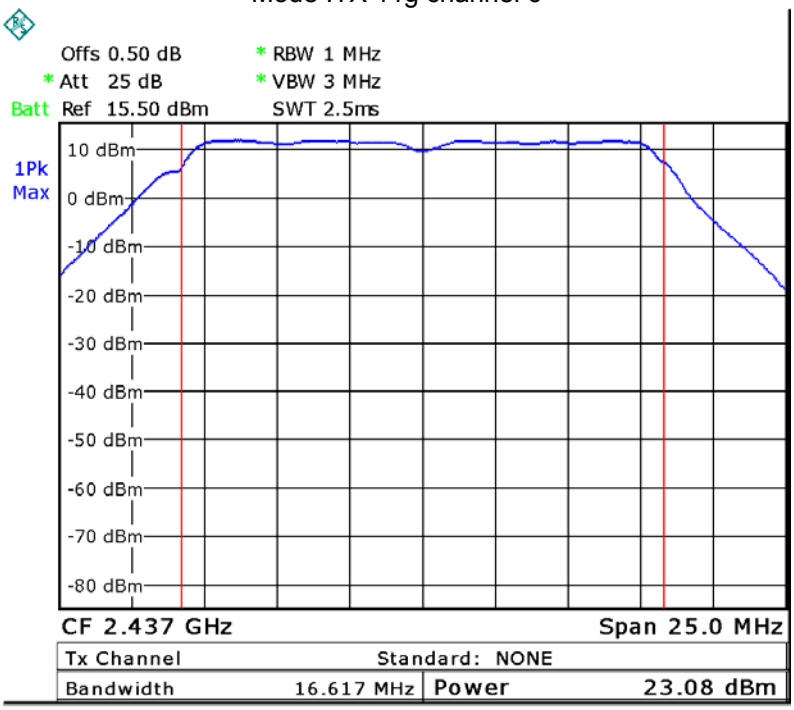
Mode: TX 11b channel 11



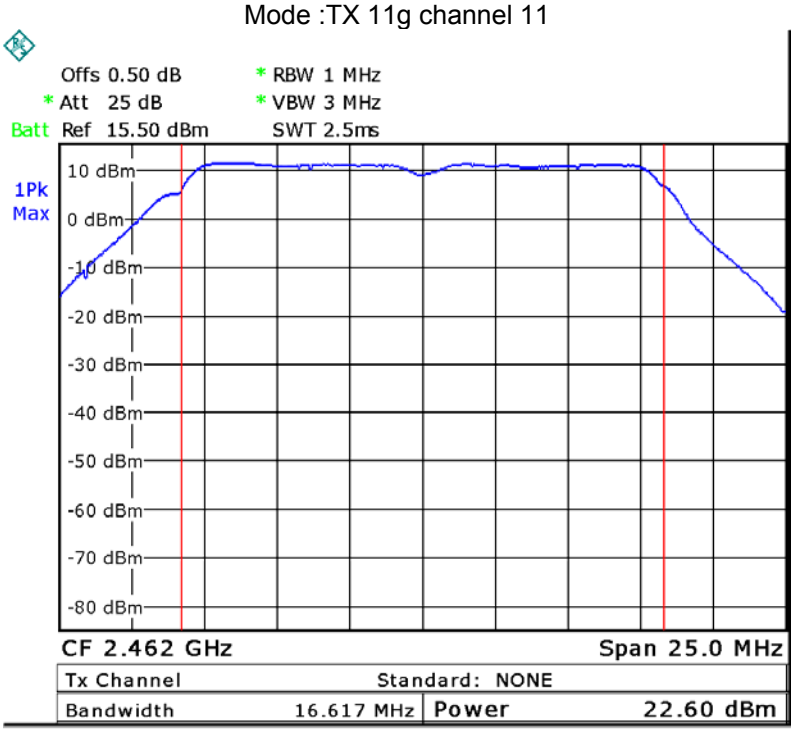
Mode :TX 11g channel 1



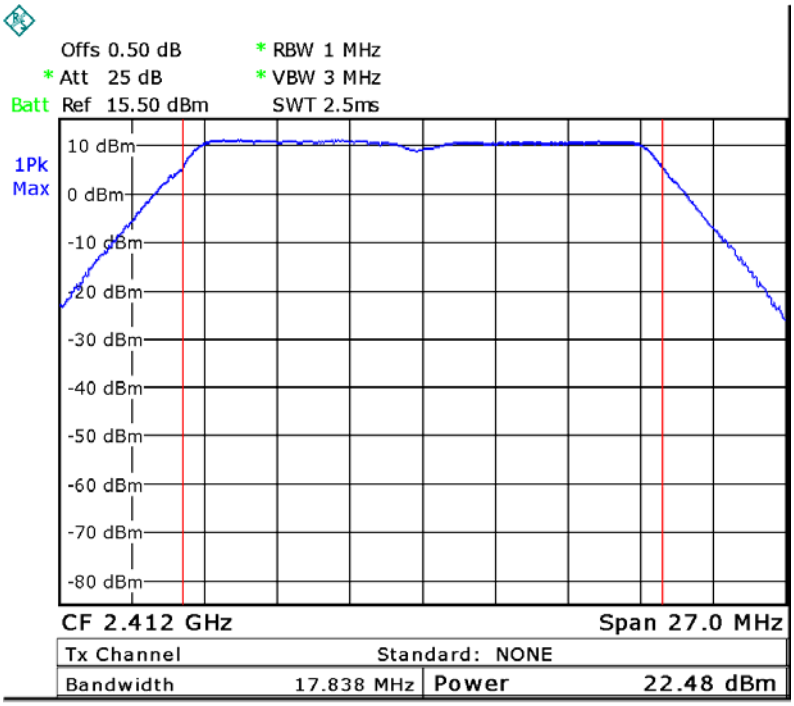
Mode :TX 11g channel 6



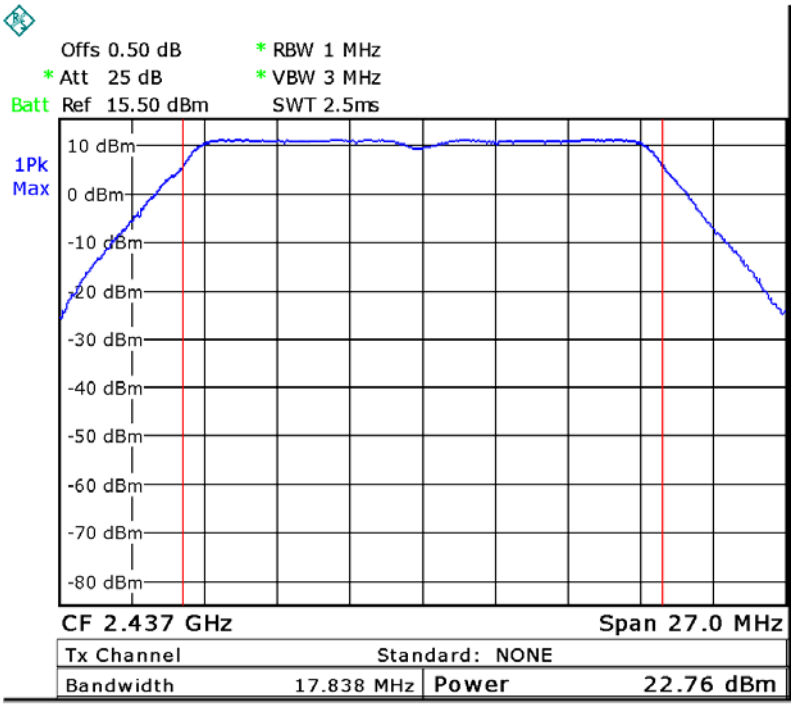
Mode :TX 11g channel 11



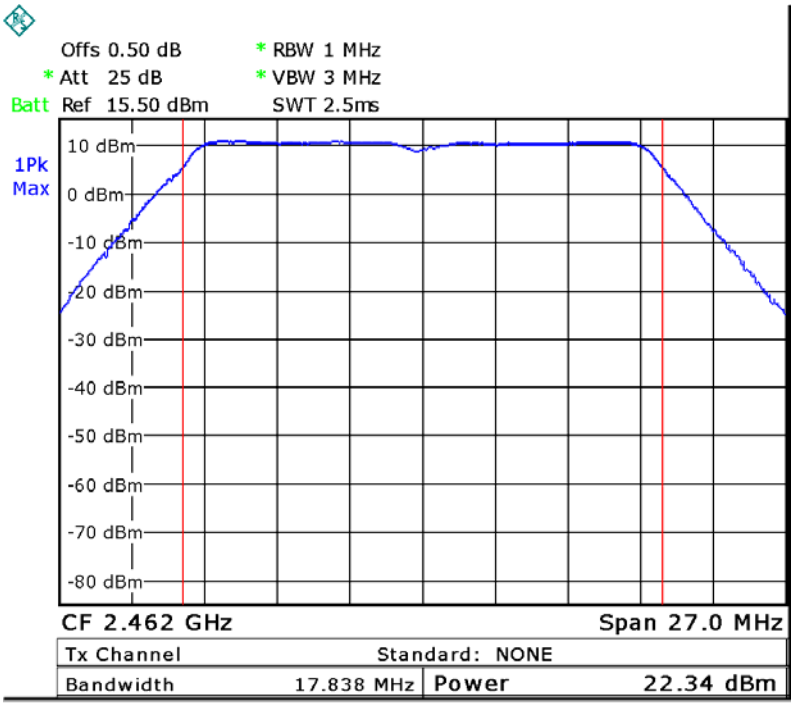
Mode: TX 11n HT20 channel 1



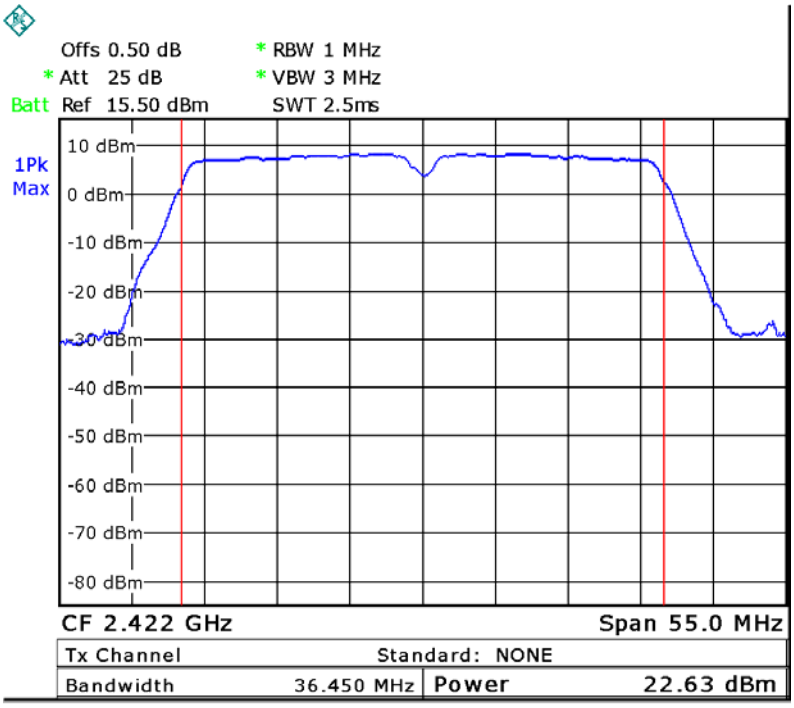
Mode: TX 11n HT20 channel 6



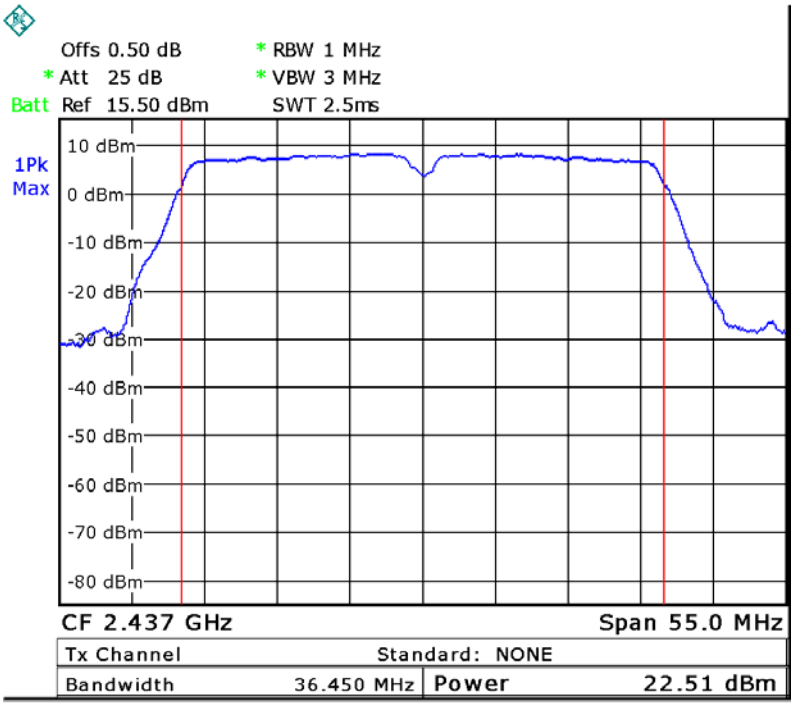
Mode: TX 11n HT20 channel 11



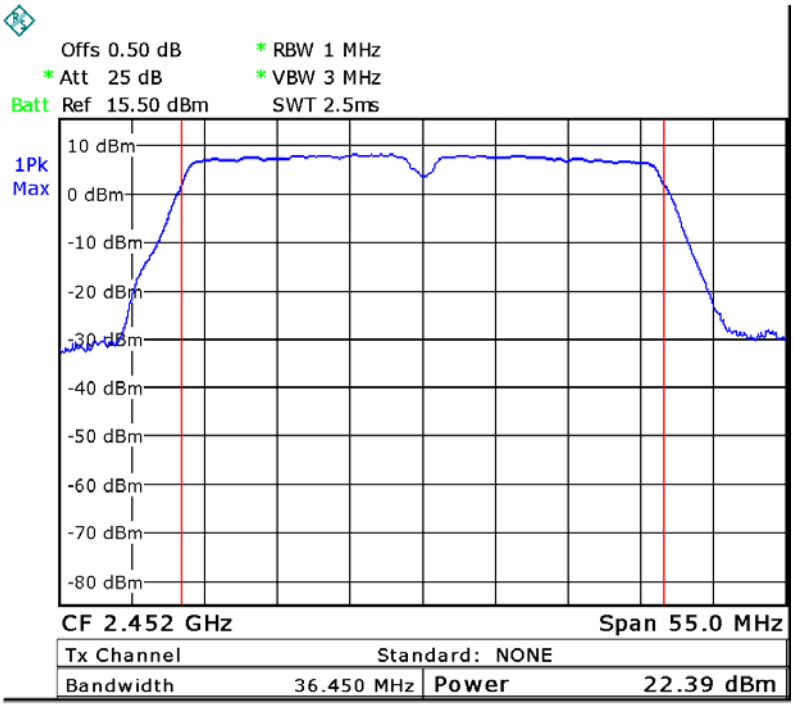
Mode: TX 11n HT40 channel 3



Mode: TX 11n HT40 channel 6



Mode: TX 11n HT40 channel 9



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:

ANT 1:

Operation mode	Channel Frequency (MHz)	Power Spectral (dBm per 3kHz)	Limit
TX 11b	Low-2412	-17.59	8dBm per 3kHz
	Middle-2437	-17.84	8dBm per 3kHz
	High-2462	-17.92	8dBm per 3kHz
TX 11g	Low-2412	-17.38	8dBm per 3kHz
	Middle-2437	-17.47	8dBm per 3kHz
	High-2462	-17.89	8dBm per 3kHz
TX 11n HT20	Low-2412	-17.18	8dBm per 3kHz
	Middle-2437	-16.89	8dBm per 3kHz
	High-2462	-16.97	8dBm per 3kHz
TX 11n HT40	Low-2422	-16.64	8dBm per 3kHz
	Middle-2437	-17.87	8dBm per 3kHz
	High-2452	-19.24	8dBm per 3kHz

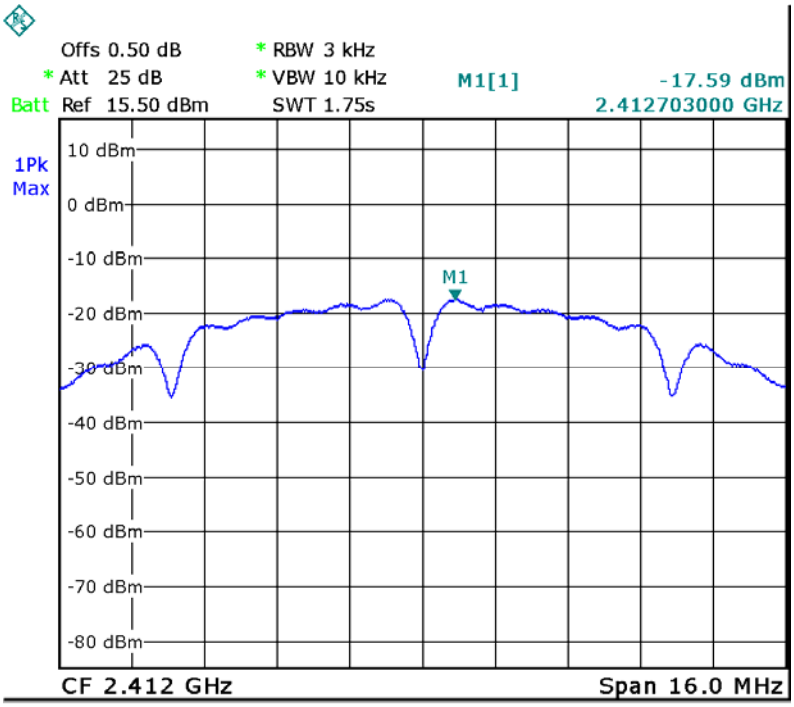
ANT 2:

Operation mode	Channel Frequency (MHz)	Power Spectral (dBm per 3kHz)	Limit
TX 11b	Low-2412	-18.08	8dBm per 3kHz
	Middle-2437	-18.63	8dBm per 3kHz
	High-2462	-18.04	8dBm per 3kHz
TX 11g	Low-2412	-16.16	8dBm per 3kHz
	Middle-2437	-16.79	8dBm per 3kHz
	High-2462	-16.60	8dBm per 3kHz
TX 11n HT20	Low-2412	-15.90	8dBm per 3kHz
	Middle-2437	-16.26	8dBm per 3kHz
	High-2462	-15.59	8dBm per 3kHz
TX 11n HT40	Low-2422	-15.78	8dBm per 3kHz
	Middle-2437	-15.28	8dBm per 3kHz
	High-2452	-14.21	8dBm per 3kHz

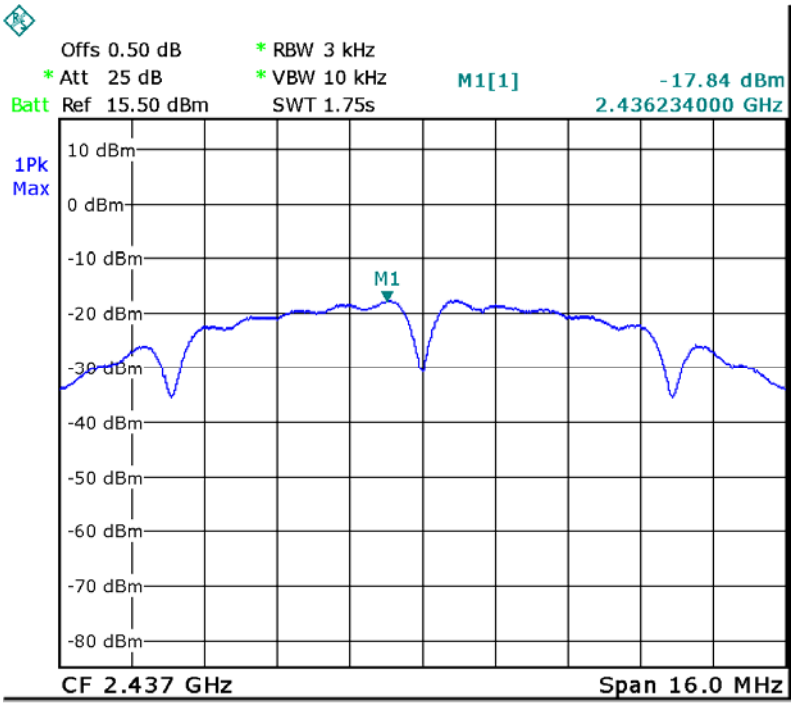
ANT 1+ANT 2:

Operation mode	Channel Frequency (MHz)	Power Spectral (dBm per 3kHz)	Limit
TX 11b	Low-2412	-15.87	8dBm per 3kHz
	Middle-2437	-16.09	8dBm per 3kHz
	High-2462	-16.15	8dBm per 3kHz
TX 11g	Low-2412	-13.65	8dBm per 3kHz
	Middle-2437	-13.81	8dBm per 3kHz
	High-2462	-14.12	8dBm per 3kHz
TX 11n HT20	Low-2412	-13.52	8dBm per 3kHz
	Middle-2437	-13.74	8dBm per 3kHz
	High-2462	-14.58	8dBm per 3kHz
TX 11n HT40	Low-2422	-16.48	8dBm per 3kHz
	Middle-2437	-15.69	8dBm per 3kHz
	High-2452	-14.71	8dBm per 3kHz

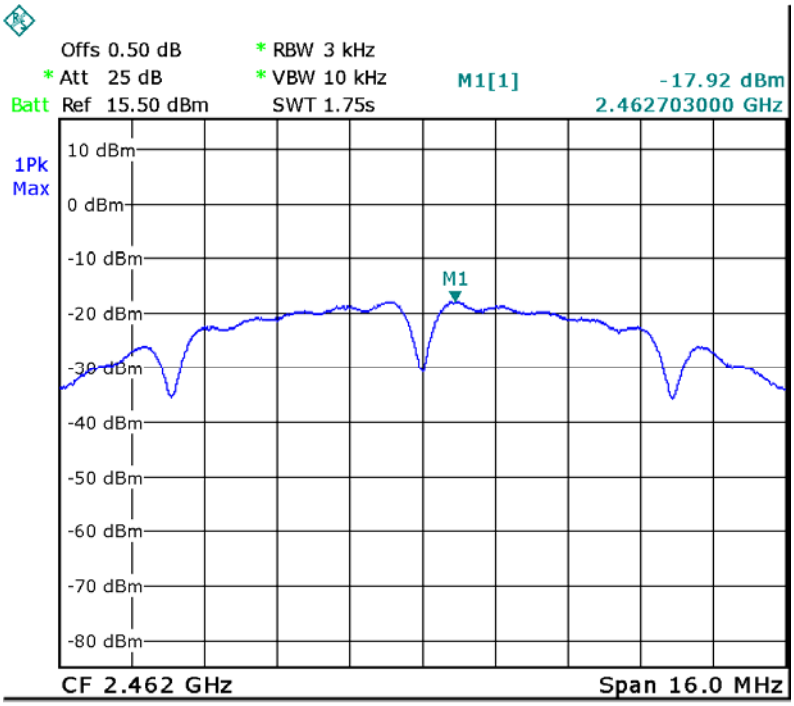
ANT 1 **Test Plot**
Mode: TX 11b channel 1



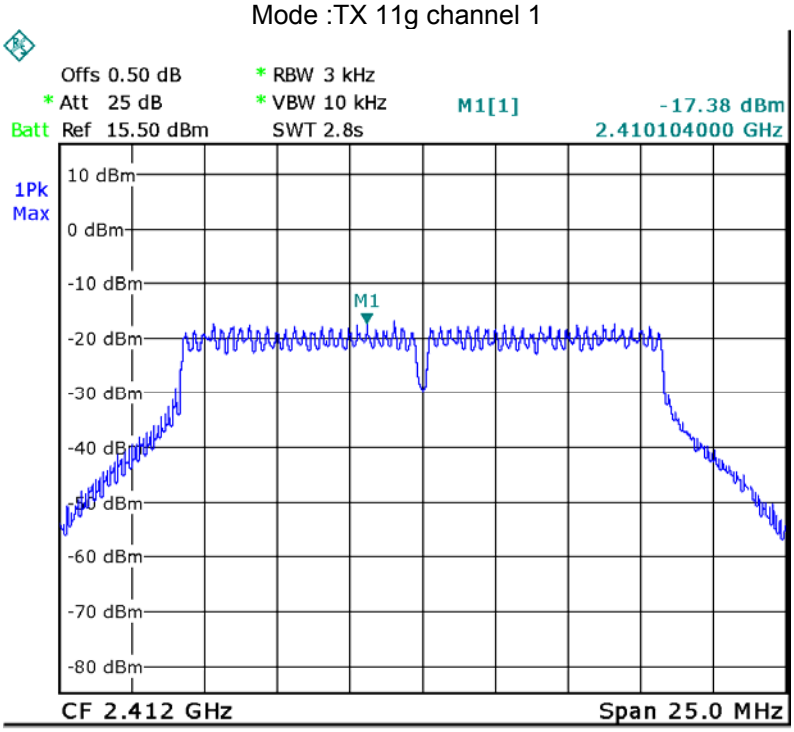
Mode: TX 11b channel 6



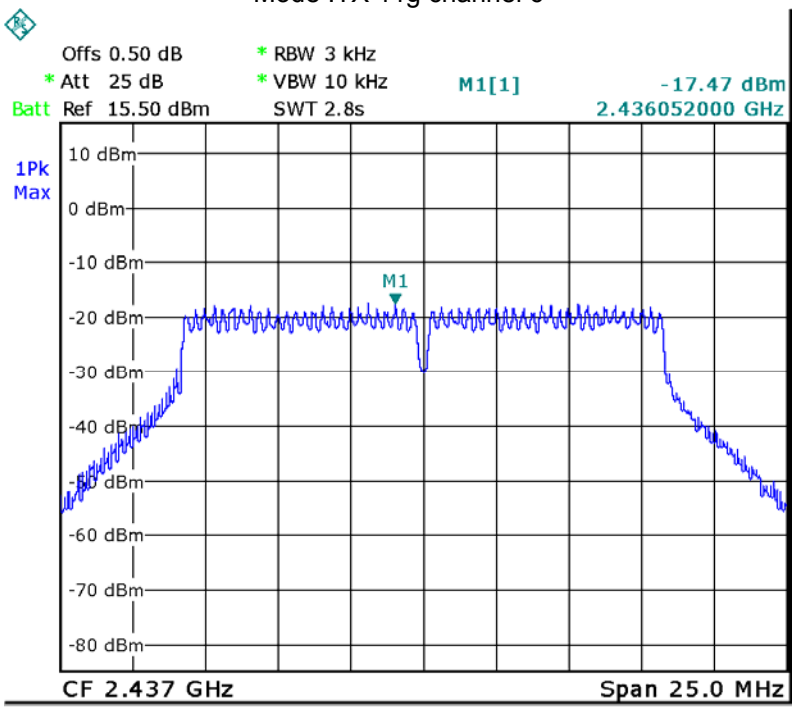
Mode: TX 11b channel 11



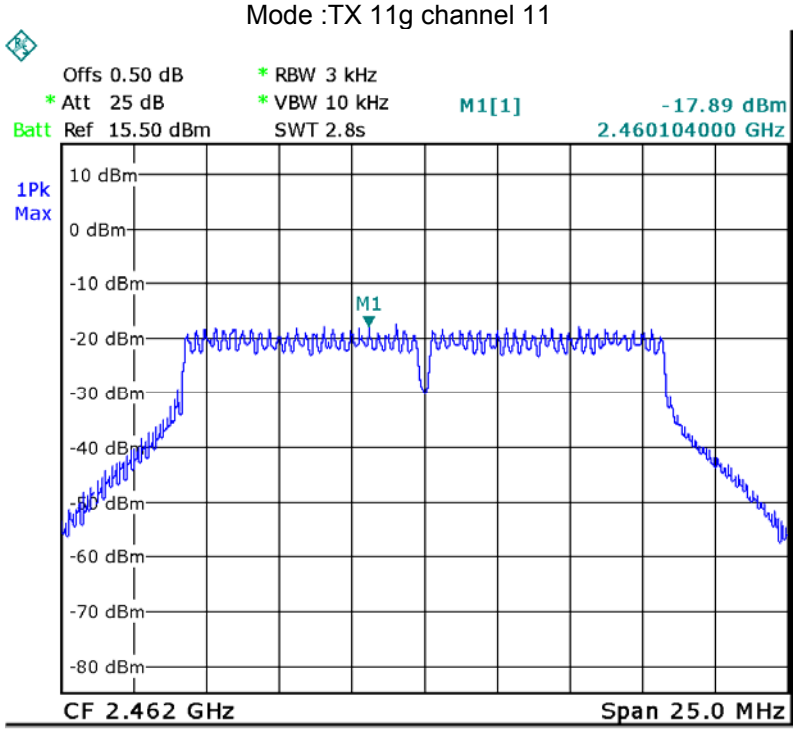
Mode :TX 11g channel 1



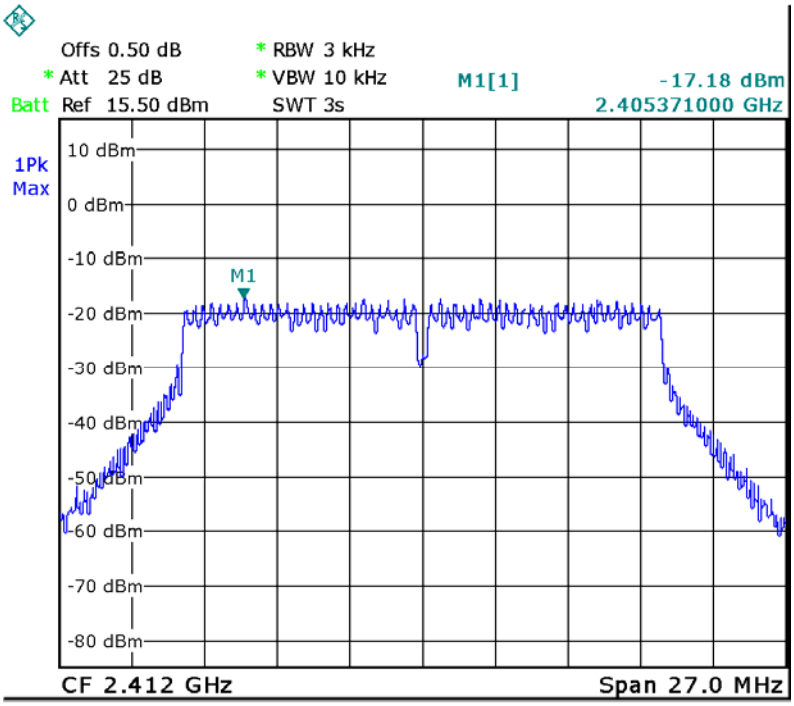
Mode :TX 11g channel 6



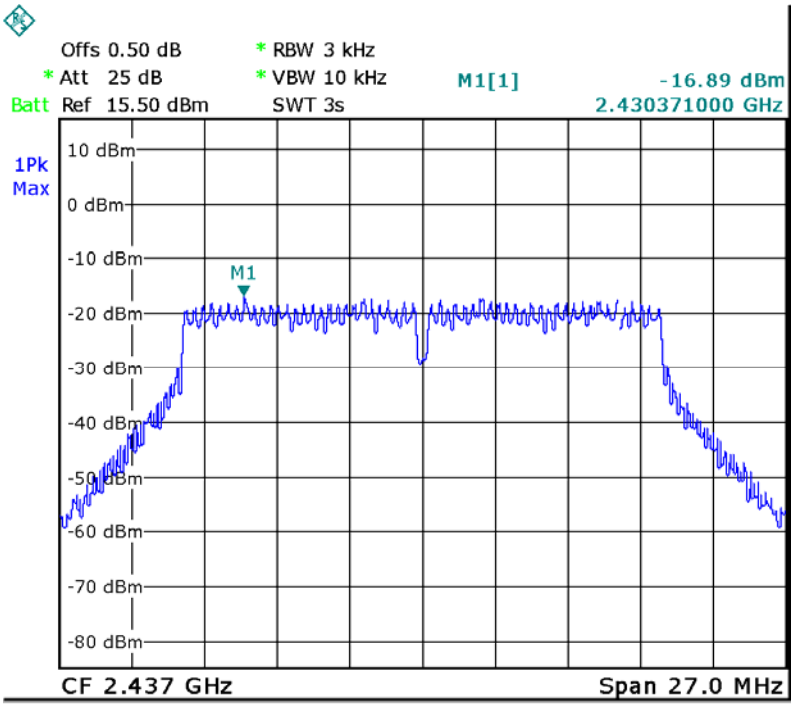
Mode :TX 11g channel 11



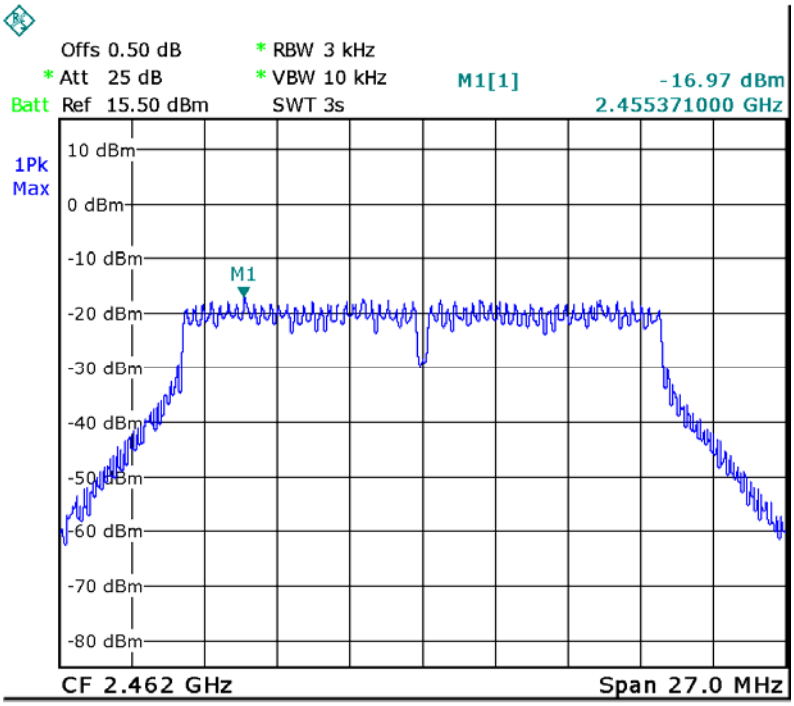
Mode: TX 11n HT20 channel 1



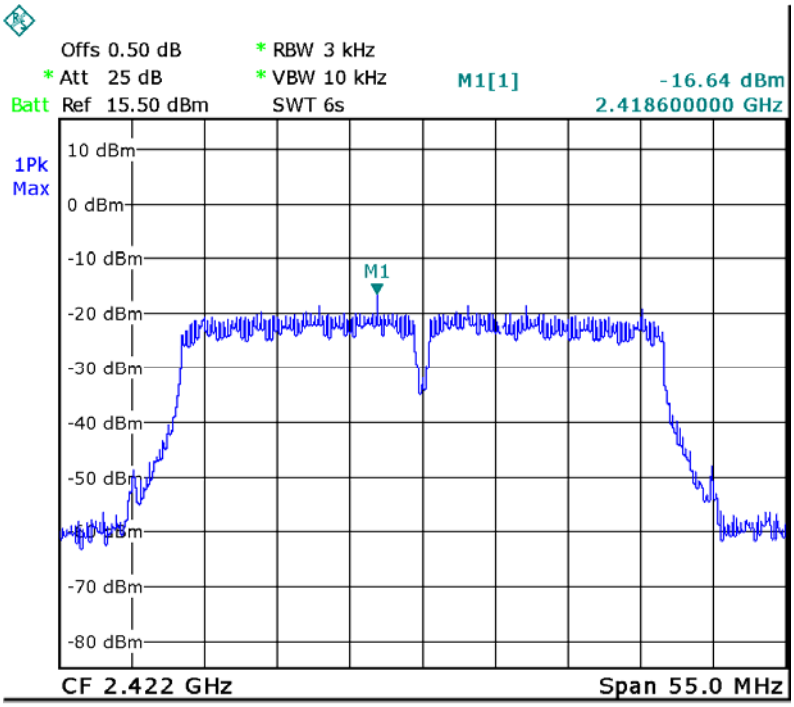
Mode: TX 11n HT20 channel 6



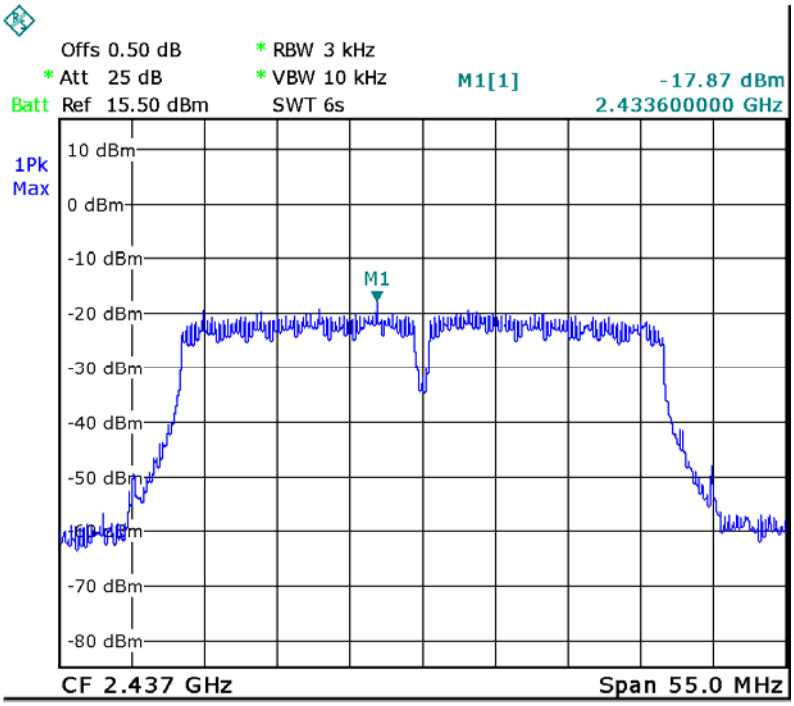
Mode: TX 11n HT20 channel 11



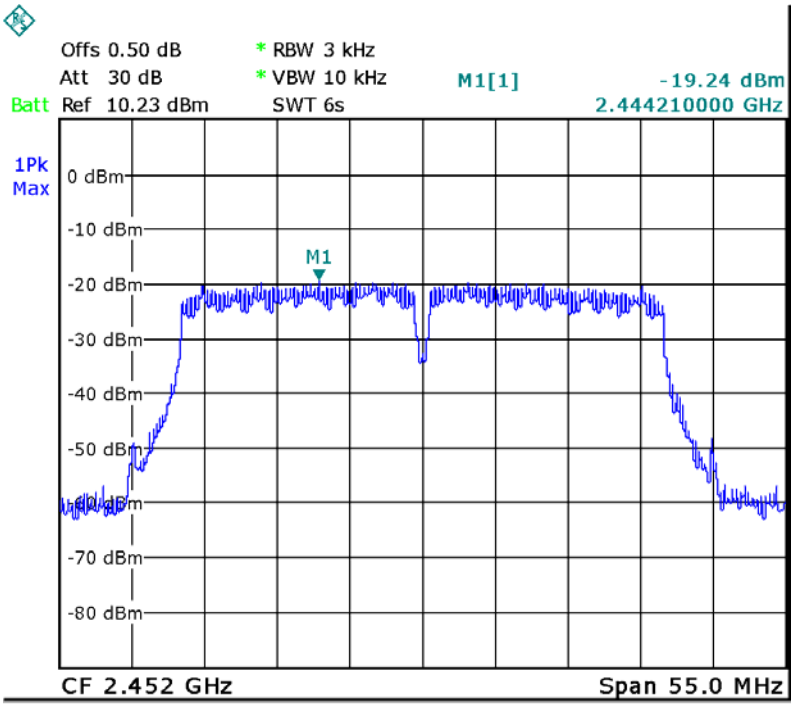
Mode: TX 11n HT40 channel 3



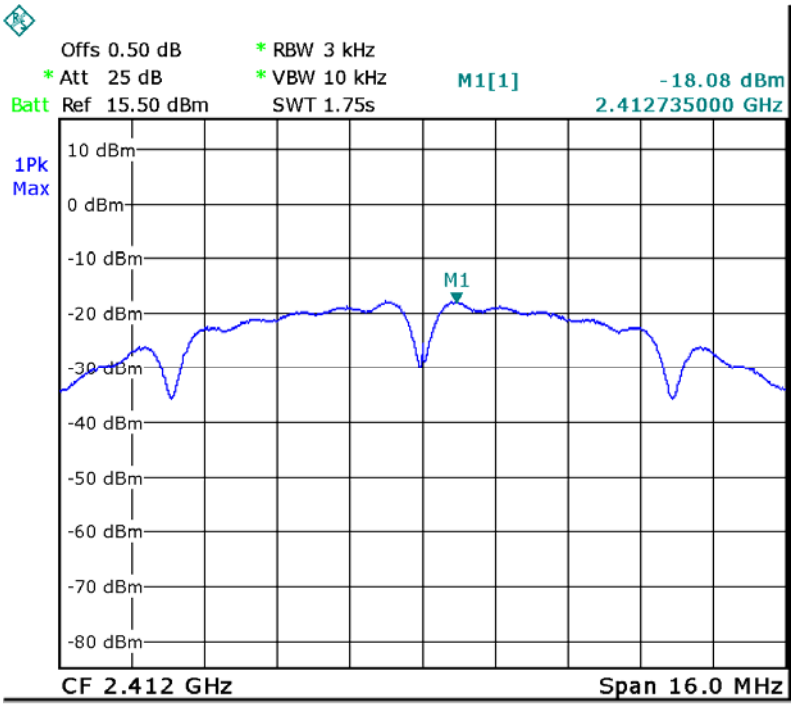
Mode: TX 11n HT40 channel 6



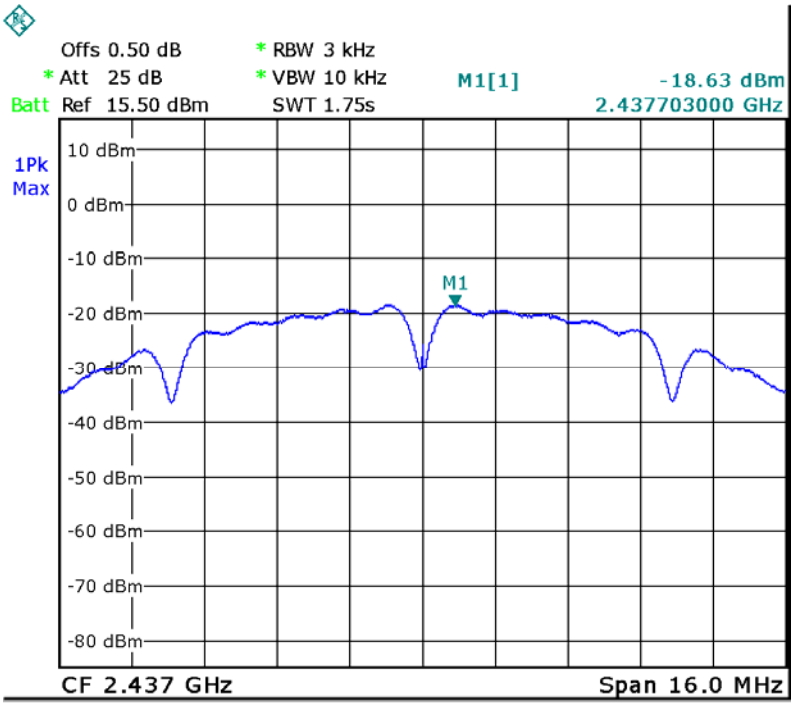
Mode: TX 11n HT40 channel 9



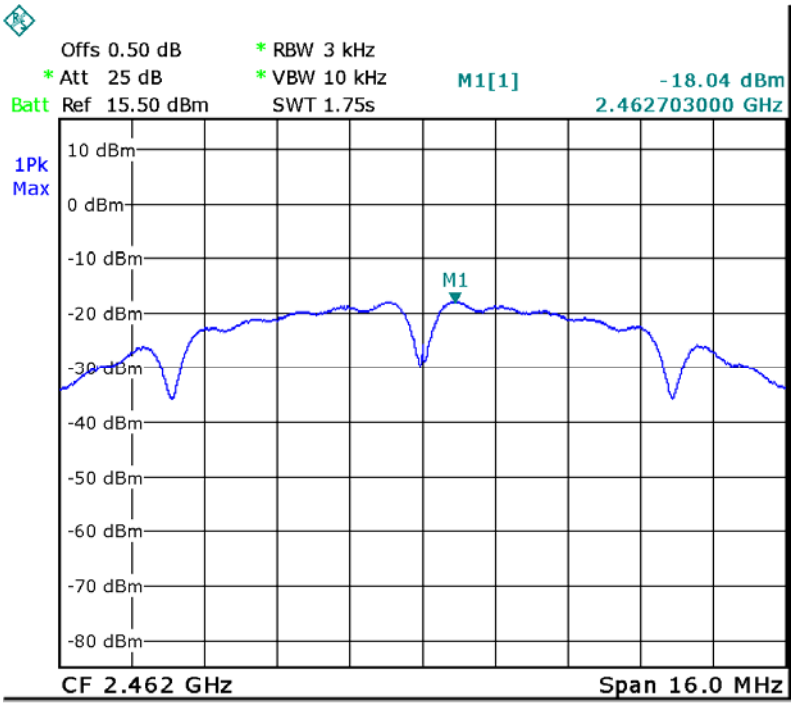
ANT 2 **Test Plot**
Mode: TX 11b channel 1



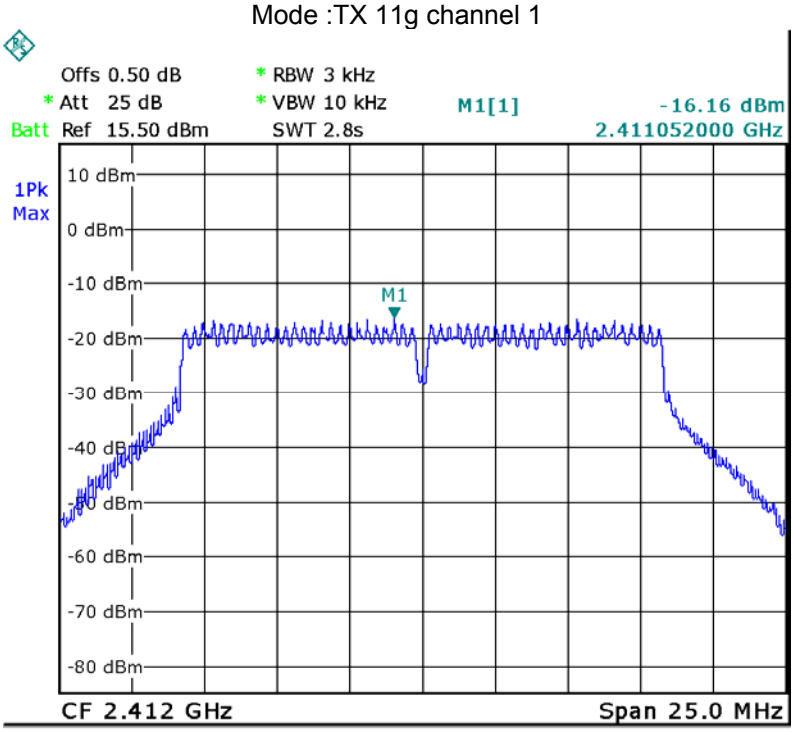
Mode: TX 11b channel 6



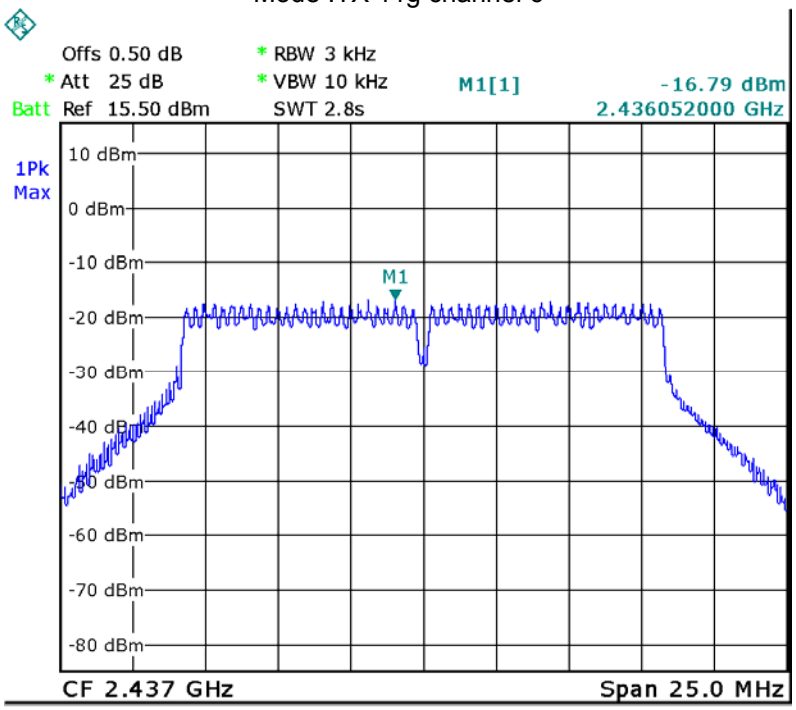
Mode: TX 11b channel 11



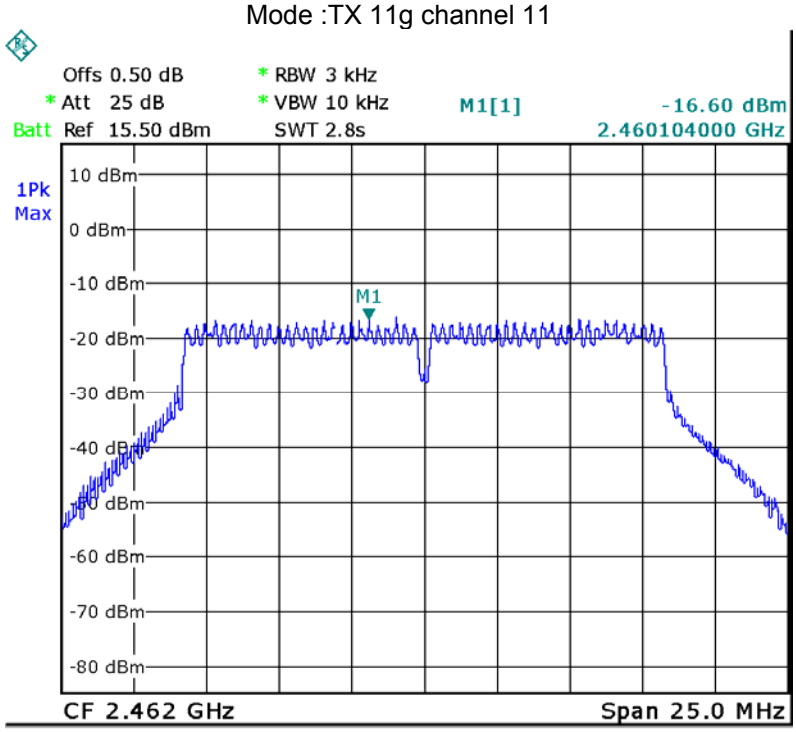
Mode :TX 11g channel 1



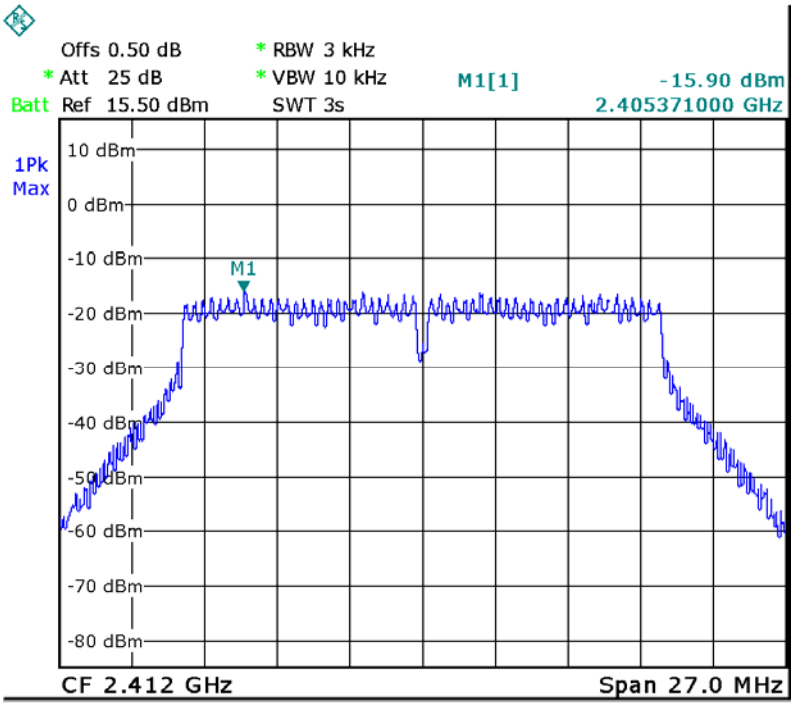
Mode :TX 11g channel 6



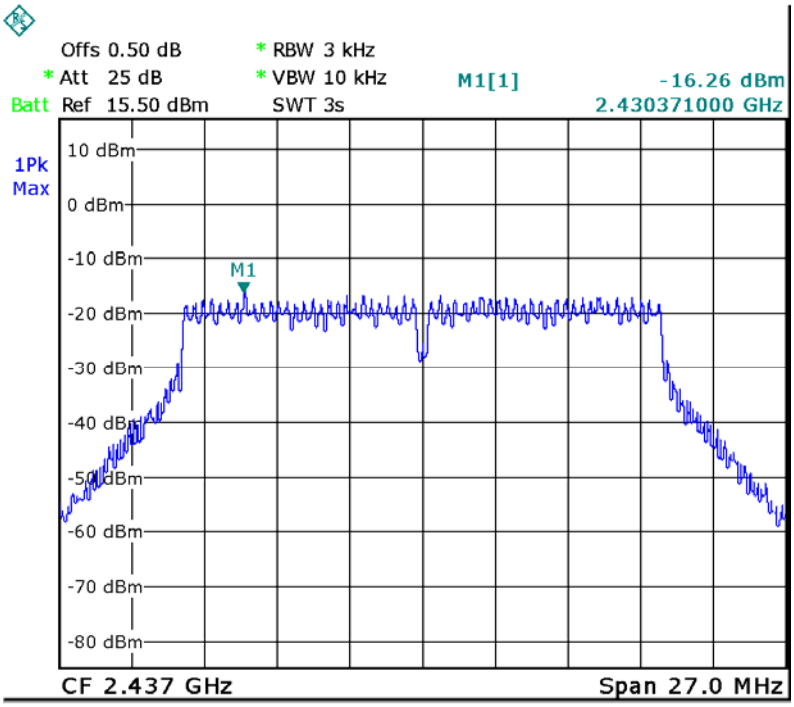
Mode :TX 11g channel 11



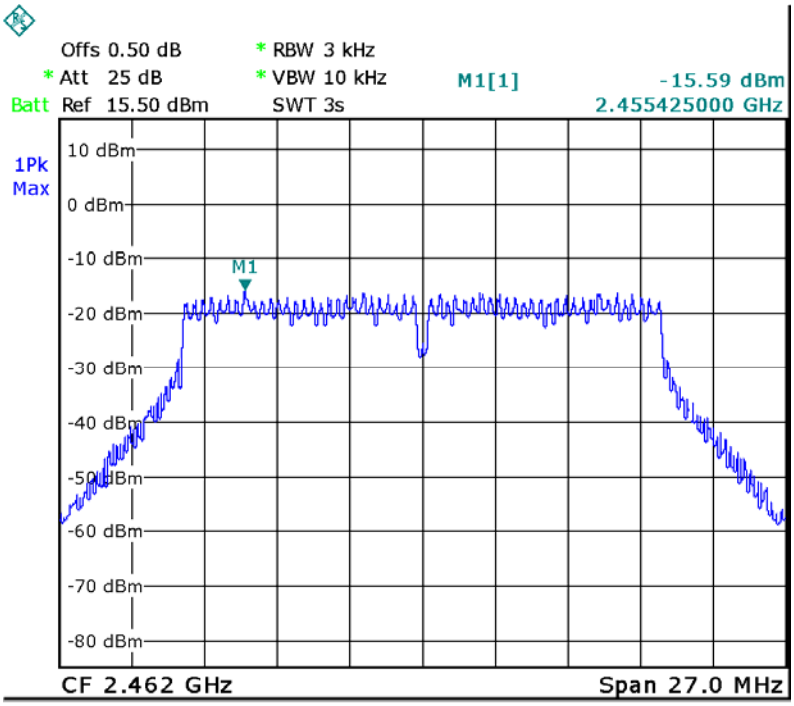
Mode: TX 11n HT20 channel 1



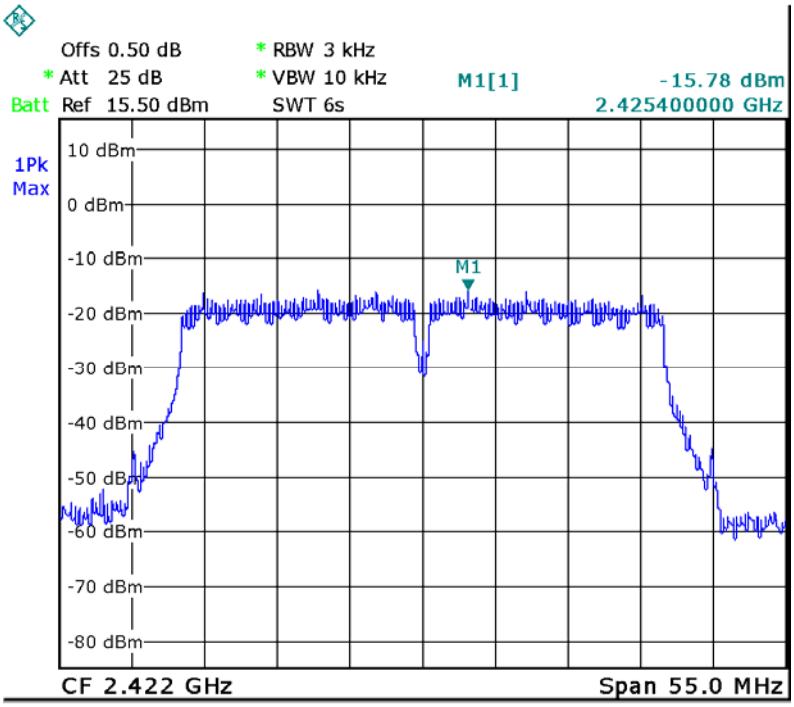
Mode: TX 11n HT20 channel 6



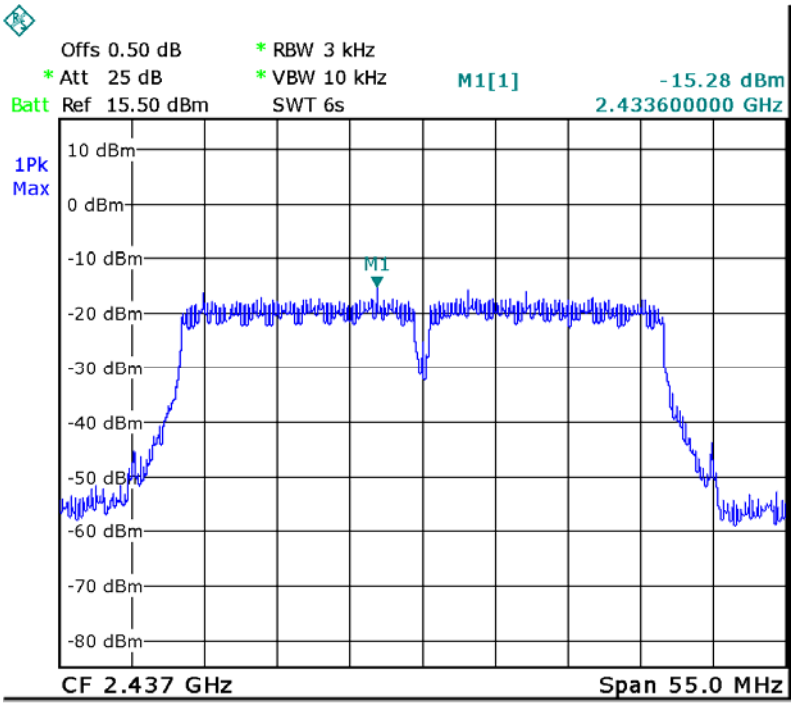
Mode: TX 11n HT20 channel 11



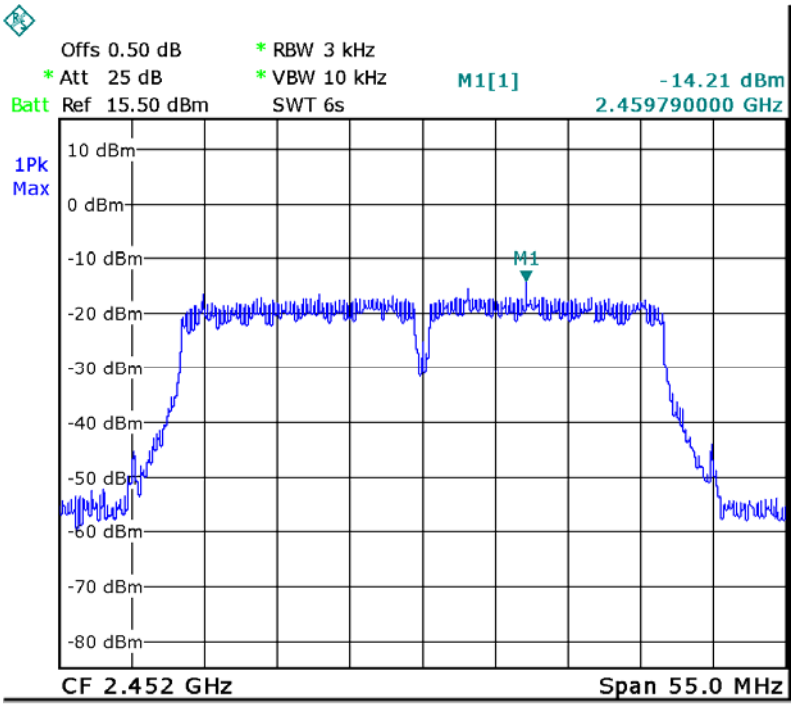
Mode: TX 11n HT40 channel 3



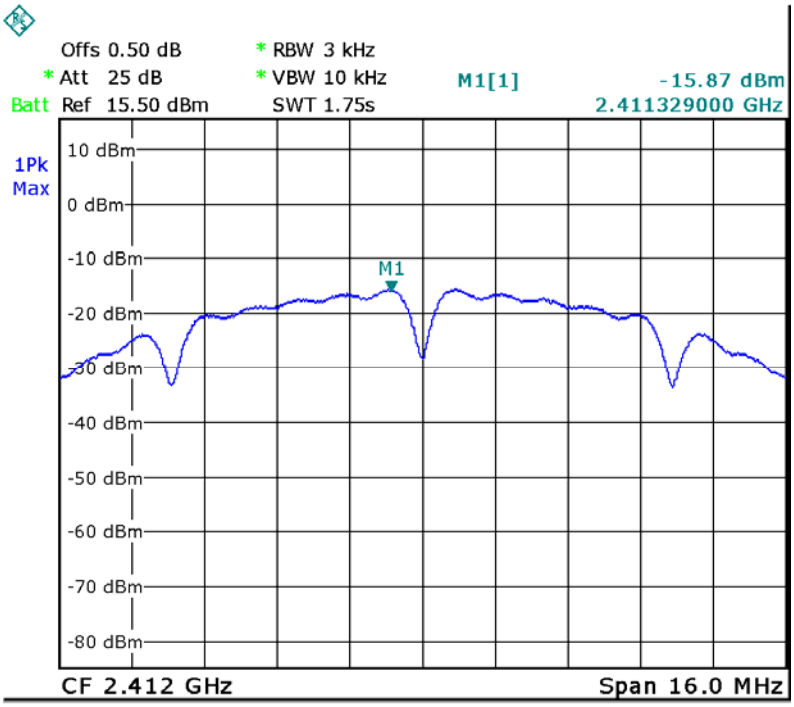
Mode: TX 11n HT40 channel 6



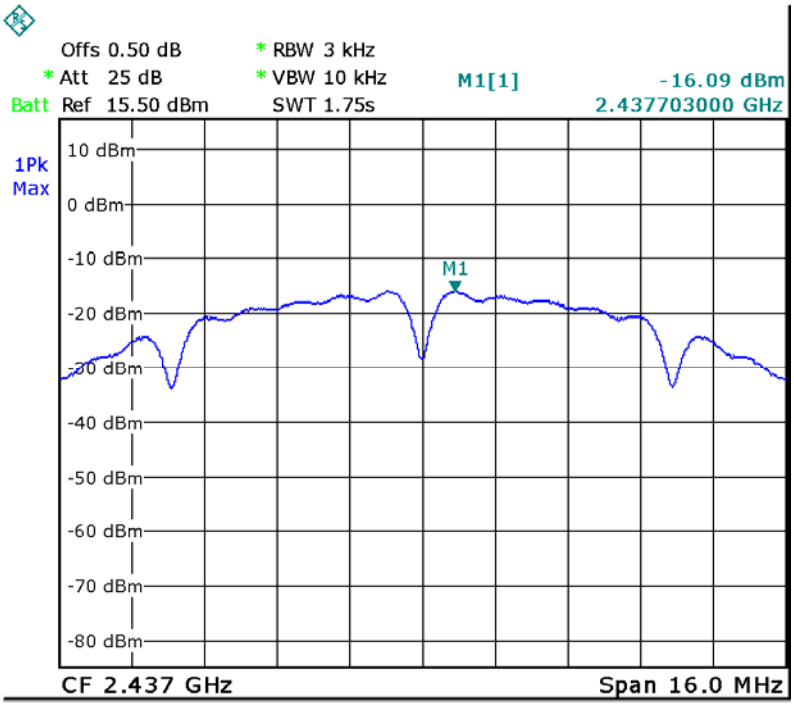
Mode: TX 11n HT40 channel 9



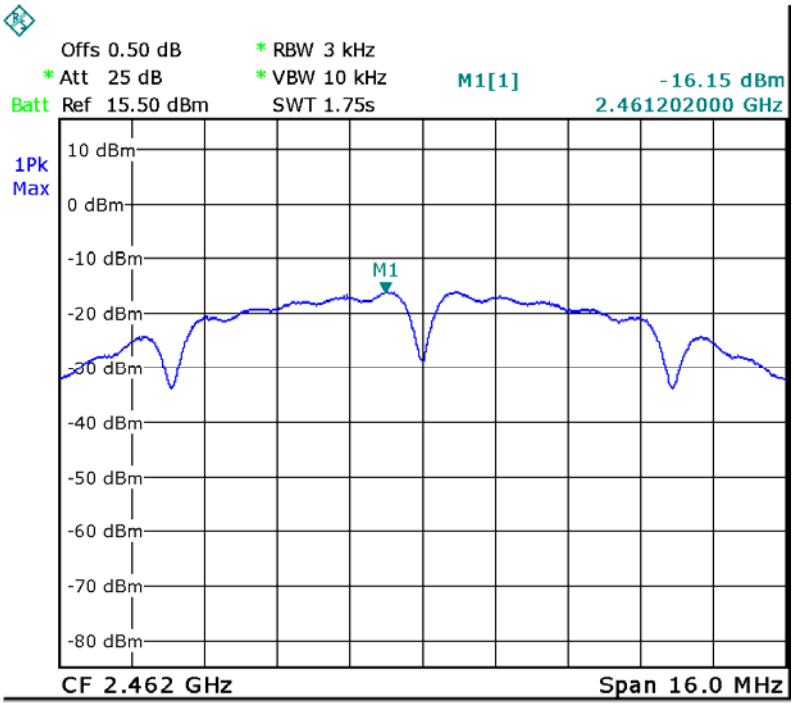
ANT 1+ANT 2 **Test Plot**
Mode: TX 11b channel 1



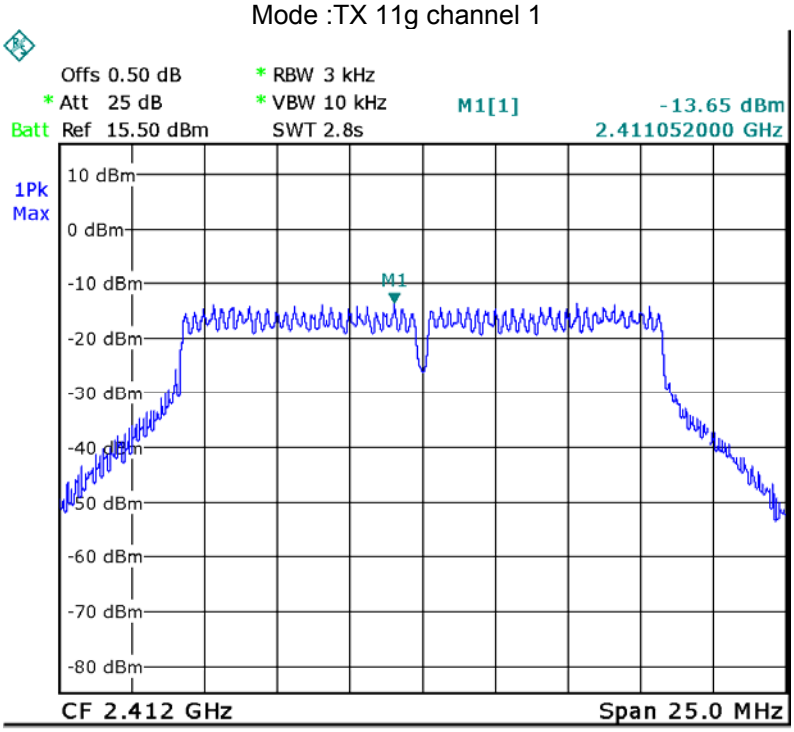
Mode: TX 11b channel 6



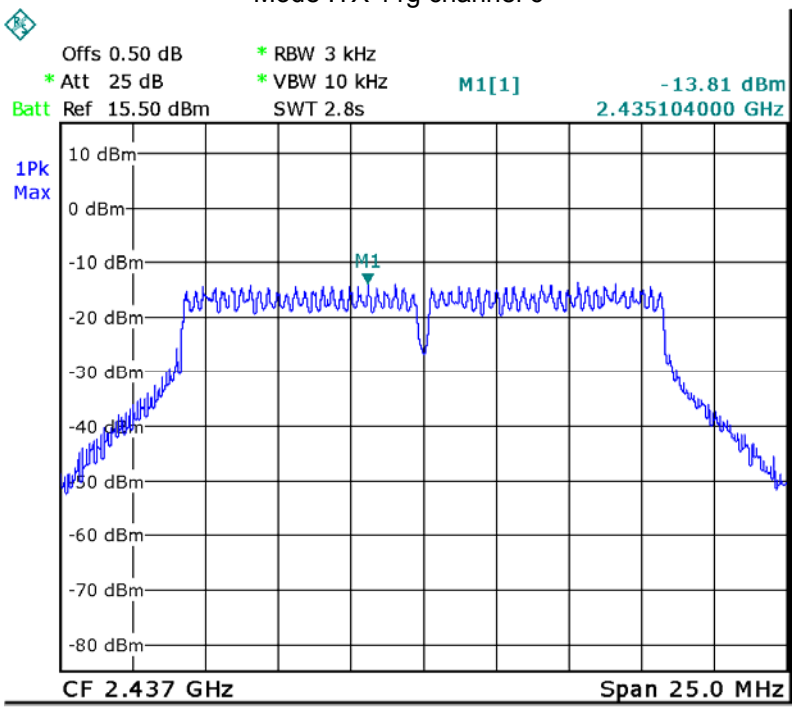
Mode: TX 11b channel 11



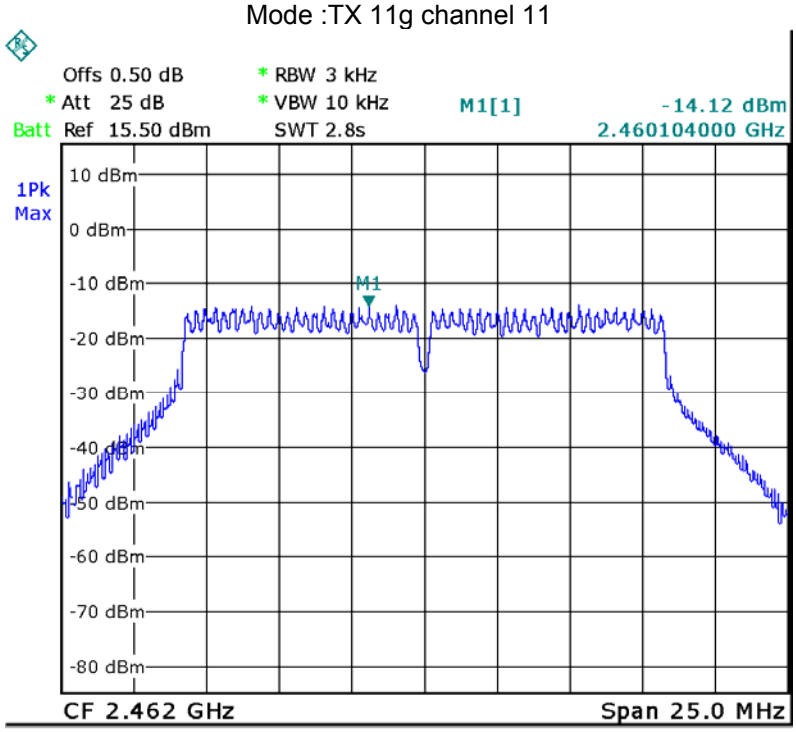
Mode :TX 11g channel 1



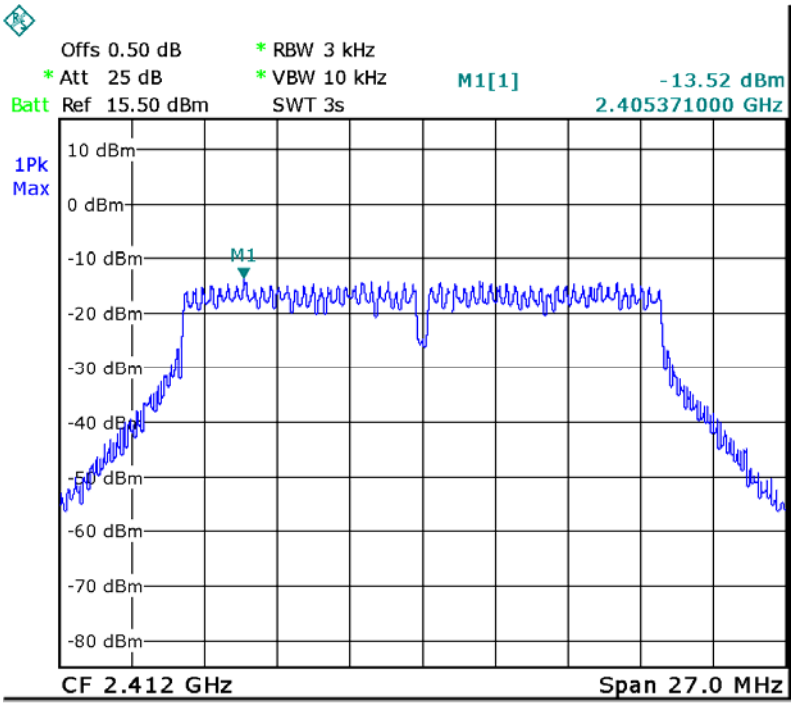
Mode :TX 11g channel 6



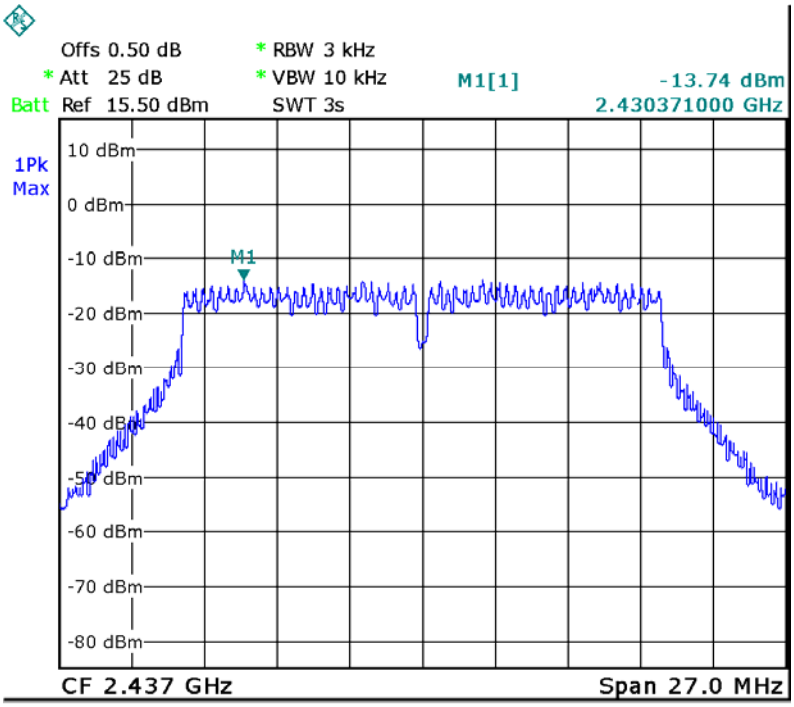
Mode :TX 11g channel 11



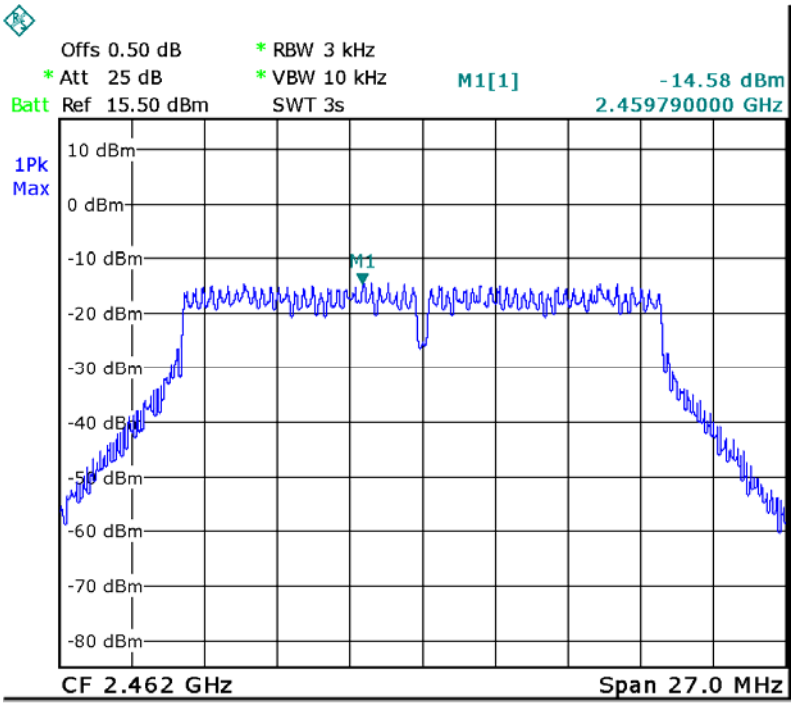
Mode: TX 11n HT20 channel 1



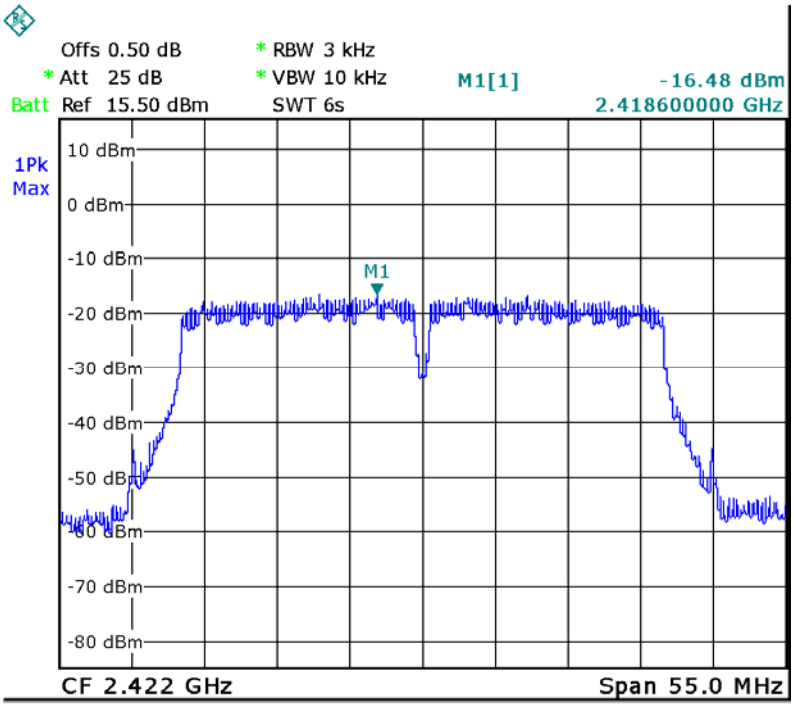
Mode: TX 11n HT20 channel 6



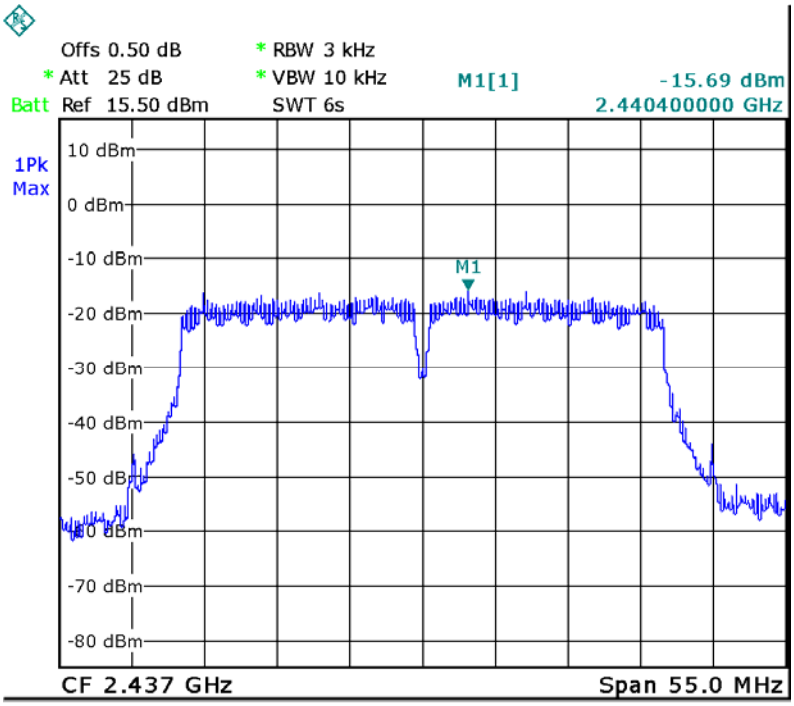
Mode: TX 11n HT20 channel 11



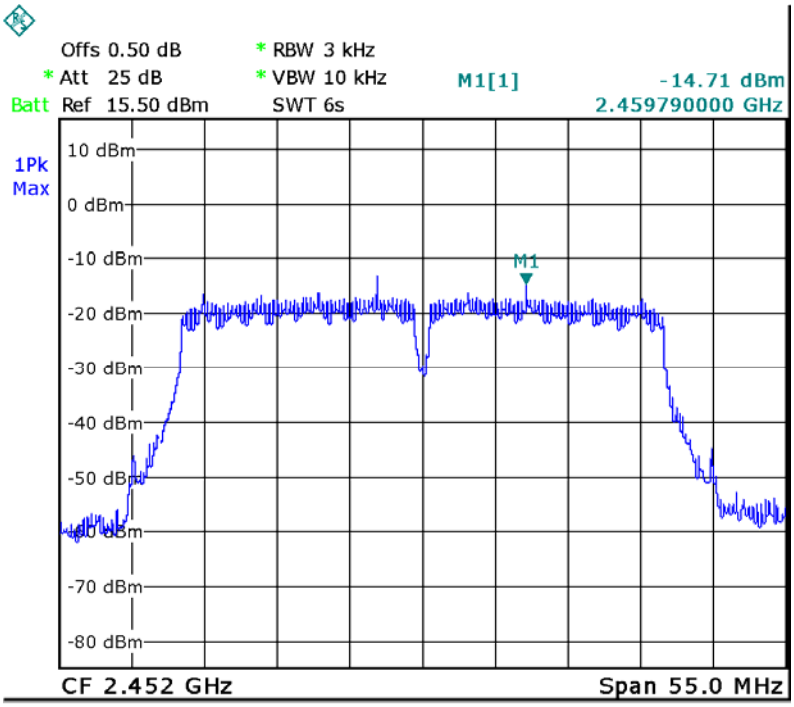
Mode: TX 11n HT40 channel 3



Mode: TX 11n HT40 channel 6



Mode: TX 11n HT40 channel 9



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 have four external antenna fulfill the requirement of this section through a special antenna interface with special custom thread. The size of the thread is a relatively common type of antenna interface and is designed for this product only. So as to meet the user can not replace the purpose of the antenna.

16 RF Exposure

Test Requirement: FCC Part 1.1307

Evaluation Method: FCC Part 2.1091

16.1 Requirements

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2 m normally can be maintained between the user and the device.

16.2 The procedures / limit

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm^2)	Averaging Time $\|E\|^2$,$\|H\|^2$or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm^2)	Averaging Time $\|E\|^2$,$\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

Note: f = frequency in MHz ; *Plane-wave equivalent power density

16.3 MPE Calculation Method

$$S = \frac{P \times G}{4 \times \pi \times R^2}$$

S = power density (in appropriate units, e.g. mW/cm^2)
P = output power to the antenna (in appropriate units, e.g., mW).
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

From the peak EUT RF output power, the minimum mobile separation distance, R=20cm, as well as the gain of the used antenna, the RF power density can be obtained

Antenna Gain (dBi)	Antenna Gain (numeric)	Max. Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (mW/cm^2)	Limit of Power Density (mW/cm^2)
4.00	2.512	22.76	188.80	0.094345	1

17 Photographs of test setup and EUT.

Note: Please refer to appendix: WTS16S1166013E_Photo.

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