

TEST REPORT

Reference No..... : WTS19S01006323-1W V1
FCC ID : 2AJ90-SWV733B2
Applicant..... : Lidl US, LLC
Address..... : 3500 S. Clark Street Arlington Virginia 22202, United States
Manufacturer : Winstars Technology Limited
Address..... : Block 1-5, TaiSong Industrial Park, DaLang community, DaLang Street, Longhua District, Shenzhen, China
Product..... : WiFi Range EXtender
Model(s) : SWV 733 B2
Brand Name..... : SILVER CREST
Standards..... : FCC CFR47 Part 15.247:2017
Date of Receipt sample : 2019-01-25
Date of Test : 2019-01-26 to 2019-02-17
Date of Issue..... : 2019-05-05
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:

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Ford Wang / Project Engineer

Approved by:

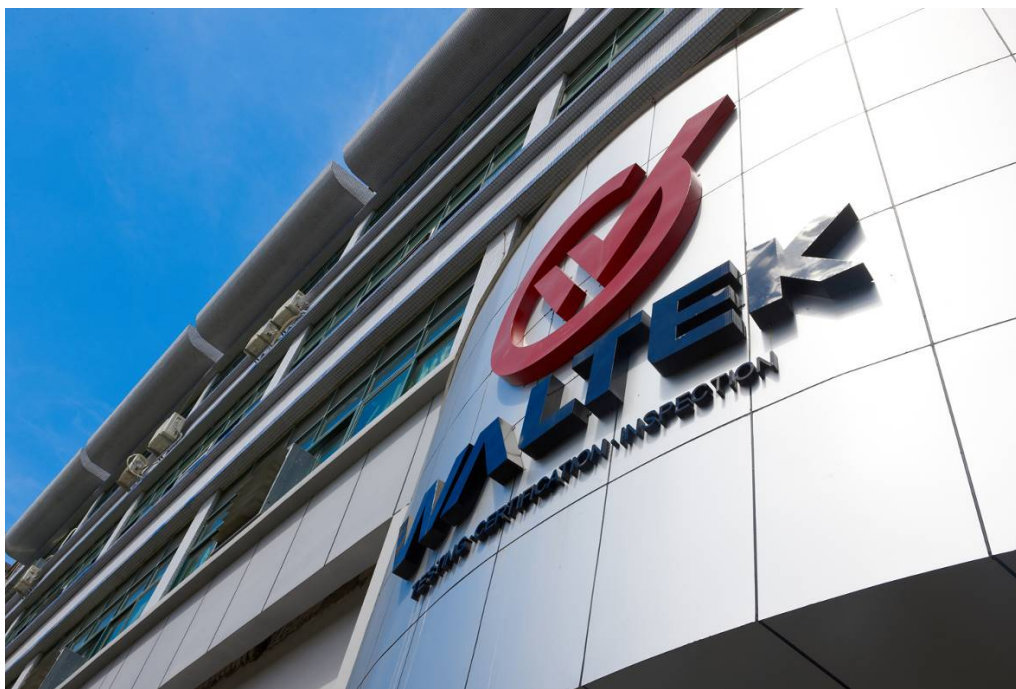


Philo Zhong

Philo Zhong / Manager

2 Laboratories Introduction

Waltek Services (Shenzhen) Co., Ltd is a professional third-party testing and certification laboratory with multi-year product testing and certification experience, established strictly in accordance with ISO/IEC 17025 requirements, and accredited by ILAC (International Laboratory Accreditation Cooperation) member. A2LA (American Association for Laboratory Accreditation, the certification number is 4243.01) of USA, CNAS (China National Accreditation Service for Conformity Assessment, the registration number is L3110) of China. 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), CEC (California energy efficiency), ISED (Innovation, Science and Economic Development Canada). It's the strategic partner and data recognition laboratory of international authoritative organizations, such as Intertek (ETL-SEMKO), TÜV Rheinland, TÜV SÜD, etc.



Waltek Services (Shenzhen) Co., Ltd is one of the largest and the most comprehensive third party testing laboratory in China. Our test capability covered four large fields: safety test. Electro Magnetic Compatibility (EMC), and energy performance, wireless radio. 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.

Test Facility:**A. Accreditations for Conformity Assessment (International)**

Country/Region	Scope Covered By	Scope	Note
USA	ISO/IEC 17025	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		WPC	-
Thailand		NTC	-
Singapore		IDA	-
Note: 1. FCC Designation No.: CN1201. Test Firm Registration No.: 523476. 2. ISED CAB identifier: CN0013			

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

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4 Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTS19S01006 323-1W	2019-01-25	2019-01-26 to 2019-02-17	2019-02-18	original	-	Replaced
WTS19S01006 323-1W V1	2019-01-25	2019-01-26 to 2019-02-17	2019-05-05	Version 1	Updated	Valid

5 General Information

5.1 General Description of E.U.T.

Product:	WiFi Range EXtender
Model(s):	SWV 733 B2
Model Description:	N/A
Wi-Fi Specification:	2.4G-802.11b/g/n HT20/n HT40 5G-802.11a/ n(HT20/40)/ac(HT20/40/80)
Hardware Version:	WS-WN578A2-A-V1.2
Software Version:	RT76A2.V4330.180626
Highest frequency (Exclude Radio):	580MHz
Storage Location:	Internal Storage
Note:	N/A

5.2 Details of E.U.T.

Operation Frequency:	802.11b/g/n HT20: 2412~2462MHz 802.11n HT40: 2422~2452MHz
Max. RF output power:	ANT 0: 24.10dBm ANT 1: 22.83dBm
Type of Modulation:	CCK, OFDM
Antenna installation:	internal permanent antenna
Antenna Gain:	ANT 0: 2.5dBi ANT 1: 2.5dBi
Ratings:	Input: AC 120V, 60Hz 0.1A

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 :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 .

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	2018-09-12	2019-09-11
2.	LISN	R&S	ENV216	101215	2018-09-12	2019-09-11
3.	Cable	Top	TYPE16(3.5M)	-	2018-09-12	2019-09-11
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	2018-09-12	2019-09-11
2.	LISN	SCHWARZBECK	NSLK 8128	8128-289	2018-09-12	2019-09-11
3.	Limiter	York	MTS-IMP-136	261115-001-0024	2018-09-12	2019-09-11
4.	Cable	LARGE	RF300	-	2018-09-12	2019-09-11
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	2018-04-29	2019-04-28
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	2018-04-09	2019-04-08
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	2018-04-09	2019-04-08
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	2018-09-12	2019-09-11
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	2018-04-09	2019-04-08
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	2018-04-09	2019-04-08
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	2018-04-13	2019-04-12
8	Coaxial Cable (above 1GHz)	Top	1GHz-25GHz	EW02014-7	2018-04-13	2019-04-12
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	2018-04-13	2019-04-12
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	2018-04-09	2019-04-08
3	Amplifier	Compliance pirection systems inc	PAP-0203	22024	2018-04-13	2019-04-12
4	Cable	HUBER+SUHNER	CBL2	525178	2018-04-13	2019-04-12

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	2018-09-12	2019-09-11
2.	Spectrum Analyzer (9k-6GHz)	R&S	FSL6	100959	2018-09-12	2019-09-11
3.	Signal Analyzer (9k~26.5GHz)	Agilent	N9010A	MY50520207	2018-09-12	2019-09-11

7.2 Description of Support Units

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

7.3 Measurement Uncertainty

Parameter	Uncertainty
Conducted Emission	± 3.64 dB(AC mains 150KHz~30MHz)
Radiated Spurious Emissions	± 5.08 dB (Bilog antenna 30M~1000MHz)
	± 5.47 dB (Horn antenna 1000M~25000MHz)
Radio Frequency	$\pm 1 \times 10^{-7}$ Hz
RF Power	± 0.42 dB
RF Power Density	± 0.7 dB
Conducted Spurious Emissions	± 2.76 dB (9kHz~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 (dB μ V)	
	Quasi-peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5	56	46
5 to 30	60	50

8.1 E.U.T. Operation

Operating Environment :

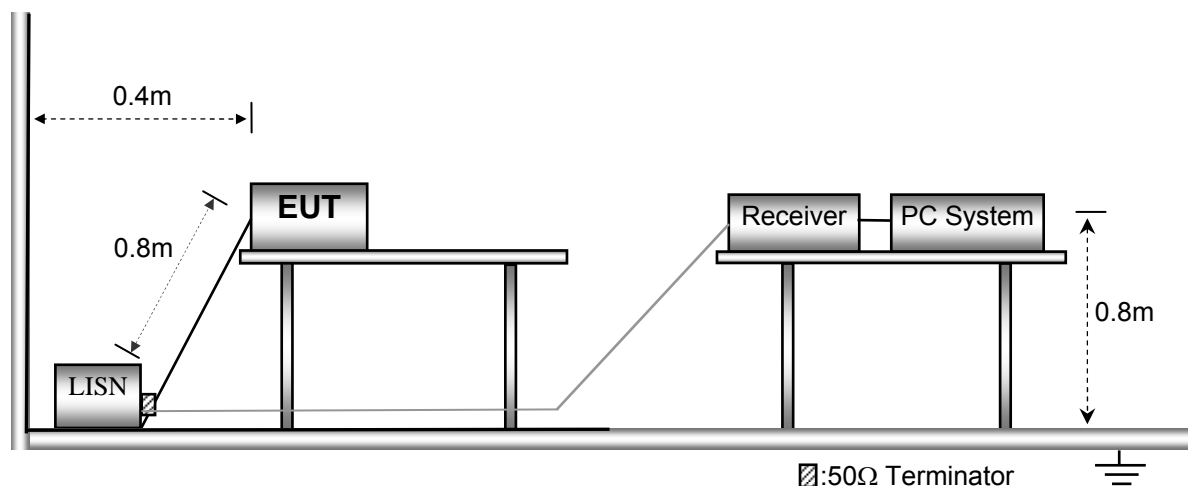
Temperature:	21.5 °C
Humidity:	51.9 % RH
Atmospheric Pressure:	101.2kPa

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

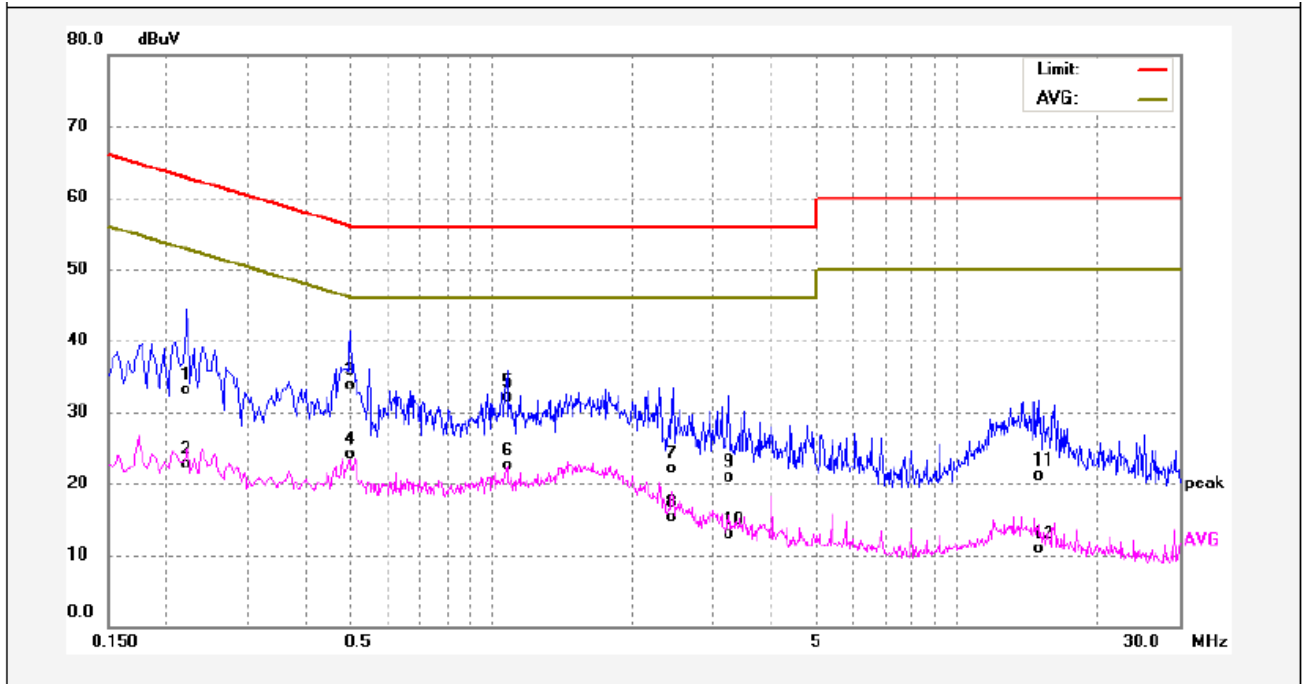
The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

8.4 Conducted Emission Test Result

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

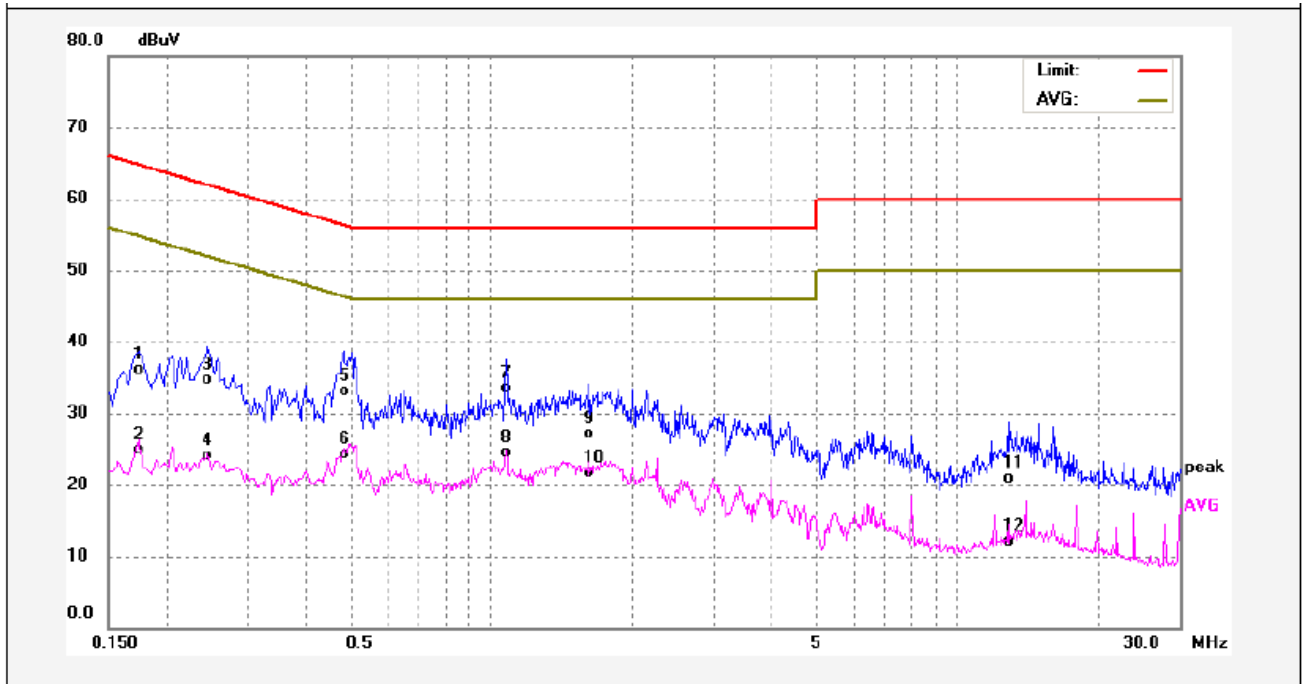
Worst Mode: WIFI mode (802.11b mode low channel)

Live line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.2220	22.80	10.35	33.15	62.74	-29.59	QP	
2	0.2220	12.33	10.35	22.68	52.74	-30.06	AVG	
3	0.4980	23.25	10.42	33.67	56.03	-22.36	QP	
4	0.4980	13.62	10.42	24.04	46.03	-21.99	AVG	
5	1.0780	21.63	10.44	32.07	56.00	-23.93	QP	
6	1.0780	12.14	10.44	22.58	46.00	-23.42	AVG	
7	2.4500	11.41	10.65	22.06	56.00	-33.94	QP	
8	2.4500	4.72	10.65	15.37	46.00	-30.63	AVG	
9	3.2340	10.15	10.71	20.86	56.00	-35.14	QP	
10	3.2340	2.18	10.71	12.89	46.00	-33.11	AVG	
11	14.9580	10.14	10.88	21.02	60.00	-38.98	QP	
12	14.9580	0.10	10.88	10.98	50.00	-39.02	AVG	

Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1740	25.75	10.29	36.04	64.76	-28.72	QP	
2	0.1740	14.64	10.29	24.93	54.76	-29.83	AVG	
3	0.2460	24.24	10.38	34.62	61.89	-27.27	QP	
4	0.2460	13.76	10.38	24.14	51.89	-27.75	AVG	
5	0.4820	22.65	10.42	33.07	56.30	-23.23	QP	
6	0.4820	13.92	10.42	24.34	46.30	-21.96	AVG	
7	1.0740	23.13	10.44	33.57	56.00	-22.43	QP	
8	1.0740	14.03	10.44	24.47	46.00	-21.53	AVG	
9	1.6220	16.62	10.50	27.12	56.00	-28.88	QP	
10	1.6220	11.28	10.50	21.78	46.00	-24.22	AVG	
11	12.9020	9.79	11.03	20.82	60.00	-39.18	QP	
12	12.9020	1.06	11.03	12.09	50.00	-37.91	AVG	

9 Radiated Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.247

Test Method: KDB 558074 D01 15.247 Meas Guidance v05 August 24, 2018;
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

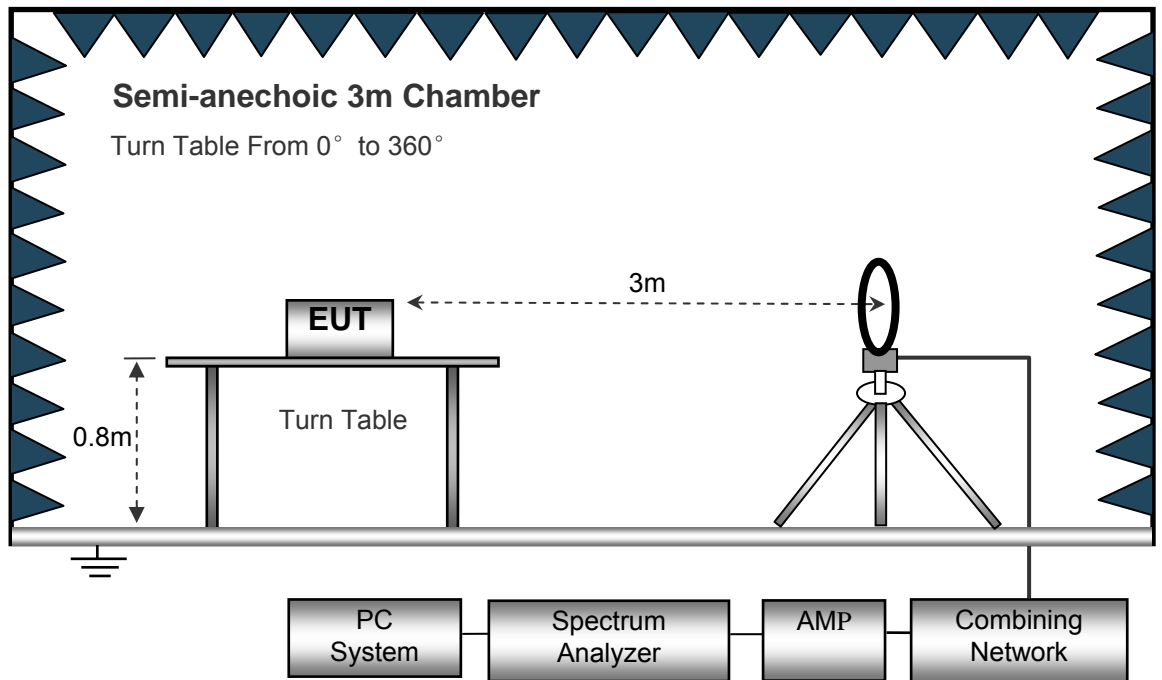
EUT Operation :

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

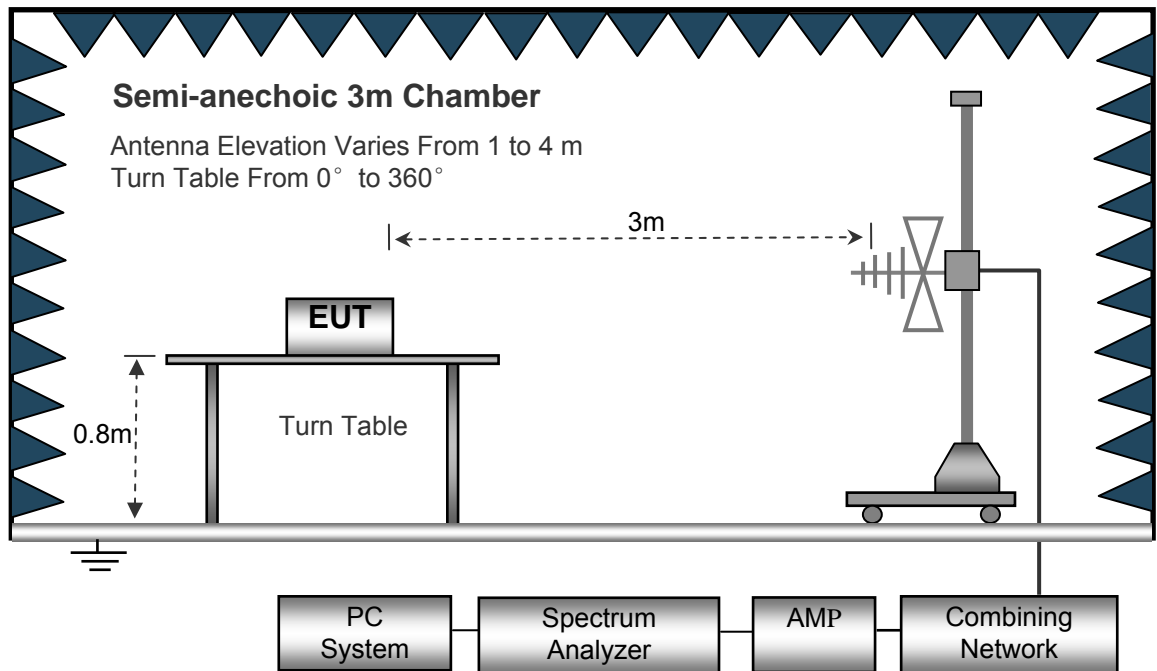
9.2 Test Setup

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

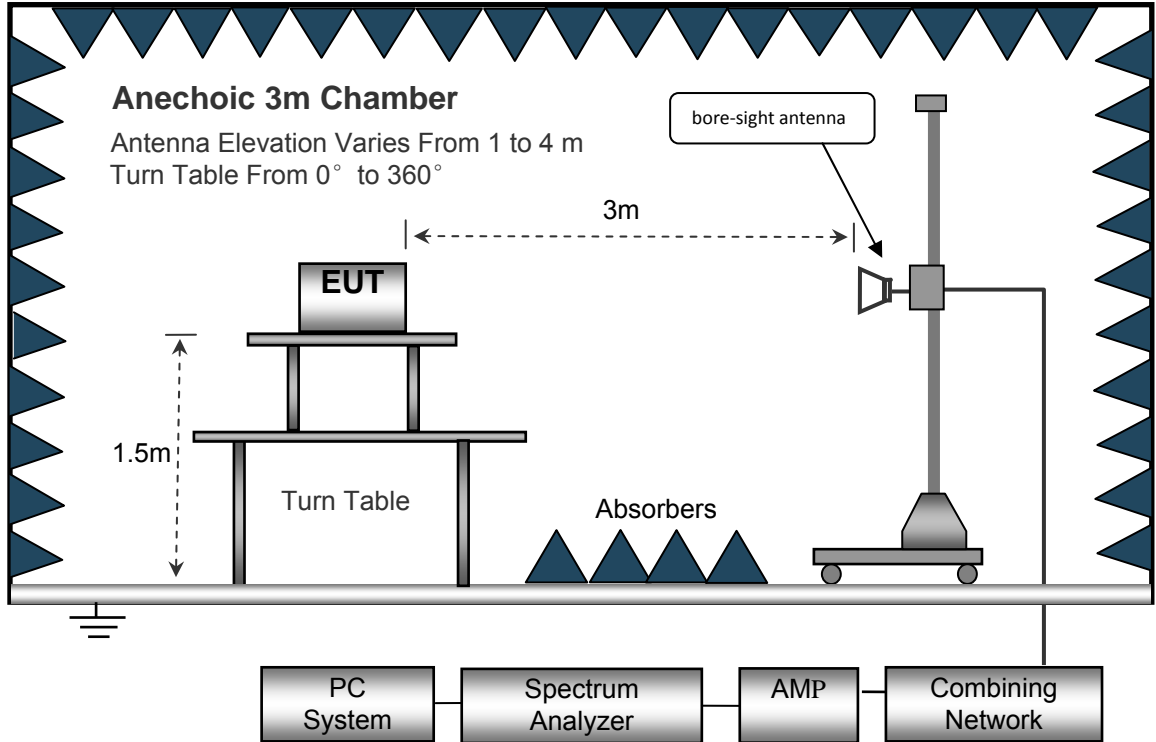
The test setup for emission measurement below 30MHz.



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 during 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:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

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:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Limit}$$

9.6 Summary of Test Results

Wifi:

Test Frequency: 9KHz~30MHz

Frequency	Measurement results dB μ V @3m	Detector PK/QP	Correct factor dB/m	Extrapolation factor dB	Measurement results (calculated) dB μ V/m @30m	Limits dB μ V/m @30m	Margin dB
(MHz)	Measurement results	Detector	Correct factor	Extrapolation factor	Measurement results (calculated)	Limits	Margin
802.11b							
6.032	25.17	QP	21.84	40.00	7.01	29.54	-22.53
15.730	24.65	QP	21.35	40.00	6.00	29.54	-23.54
25.680	25.13	QP	20.67	40.00	5.80	29.54	-23.74
802.11g							
6.032	24.53	QP	21.84	40.00	6.37	29.54	-23.17
8.051	24.71	QP	21.02	40.00	5.73	29.54	-23.81
26.215	25.06	QP	20.55	40.00	5.61	29.54	-23.93
ANT0+ANT1 802.11n(HT20)							
6.032	25.17	QP	21.84	40.00	7.01	29.54	-22.53
8.051	25.03	QP	21.02	40.00	6.05	29.54	-23.49
26.215	24.42	QP	20.55	40.00	4.97	29.54	-24.57
ANT0+ANT1 802.11n(HT40)							
6.032	25.11	QP	21.84	40.00	6.95	29.54	-22.59
8.051	25.23	QP	21.02	40.00	6.25	29.54	-23.29
26.215	24.57	QP	20.55	40.00	5.12	29.54	-24.42

Remark: All test data were reported and only the worst case (low channel mode) test graphs were showed in test report

Test Frequency : 30MHz ~ 18GHz

ANT0

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
11b: Low Channel 2412MHz									
223.45	41.38	QP	87	1.8	H	-11.62	29.76	46.00	-16.24
223.45	37.64	QP	31	1.7	V	-11.62	26.02	46.00	-19.98
4824.00	48.48	PK	50	1.4	V	-1.06	47.42	74.00	-26.58
4824.00	44.60	Ave	50	1.4	V	-1.06	43.54	54.00	-10.46
7236.00	41.73	PK	288	1.5	H	1.33	43.06	74.00	-30.94
7236.00	40.84	Ave	288	1.5	H	1.33	42.17	54.00	-11.83
2323.36	46.60	PK	195	1.9	V	-13.19	33.41	74.00	-40.59
2323.36	39.24	Ave	195	1.9	V	-13.19	26.05	54.00	-27.95
2359.85	42.74	PK	290	1.5	H	-13.14	29.60	74.00	-44.40
2359.85	38.58	Ave	290	1.5	H	-13.14	25.44	54.00	-28.56
2497.89	42.39	PK	176	1.2	V	-13.08	29.31	74.00	-44.69
2497.89	36.28	Ave	176	1.2	V	-13.08	23.20	54.00	-30.80

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
11b: Middle Channel 2437MHz									
223.45	40.52	QP	61	2.0	H	-11.62	28.90	46.00	-17.10
223.45	37.34	QP	251	1.1	V	-11.62	25.72	46.00	-20.28
4874.00	49.96	PK	190	1.8	V	-0.62	49.34	74.00	-24.66
4874.00	44.28	Ave	190	1.8	V	-0.62	43.66	54.00	-10.34
7311.00	41.49	PK	208	1.2	H	2.21	43.70	74.00	-30.30
7311.00	39.58	Ave	208	1.2	H	2.21	41.79	54.00	-12.21
2321.87	45.05	PK	109	1.7	V	-13.19	31.86	74.00	-42.14
2321.87	39.52	Ave	109	1.7	V	-13.19	26.33	54.00	-27.67
2365.06	43.73	PK	30	1.7	H	-13.14	30.59	74.00	-43.41
2365.06	38.02	Ave	30	1.7	H	-13.14	24.88	54.00	-29.12
2484.04	42.01	PK	149	1.0	V	-13.08	28.93	74.00	-45.07
2484.04	36.73	Ave	149	1.0	V	-13.08	23.65	54.00	-30.35

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
11b: High Channel 2462MHz									
223.45	41.80	QP	120	1.3	H	-11.62	30.18	46.00	-15.82
223.45	36.77	QP	139	1.2	V	-11.62	25.15	46.00	-20.85
4924.00	50.07	PK	129	1.4	V	-0.24	49.83	74.00	-24.17
4924.00	43.52	Ave	129	1.4	V	-0.24	43.28	54.00	-10.72
7386.00	40.01	PK	20	1.7	H	2.84	42.85	74.00	-31.15
7386.00	39.70	Ave	20	1.7	H	2.84	42.54	54.00	-11.46
2338.03	46.29	PK	52	2.0	V	-13.19	33.10	74.00	-40.90
2338.03	38.78	Ave	52	2.0	V	-13.19	25.59	54.00	-28.41
2363.89	42.12	PK	0	1.6	H	-13.14	28.98	74.00	-45.02
2363.89	37.65	Ave	0	1.6	H	-13.14	24.51	54.00	-29.49
2490.90	42.16	PK	202	1.6	V	-13.08	29.08	74.00	-44.92
2490.90	36.99	Ave	202	1.6	V	-13.08	23.91	54.00	-30.09

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
11g: Low Channel 2412MHz									
223.45	41.23	QP	206	1.4	H	-11.62	29.61	46.00	-16.39
223.45	36.94	QP	111	1.4	V	-11.62	25.32	46.00	-20.68
4824.00	50.29	PK	62	1.3	V	-1.06	49.23	74.00	-24.77
4824.00	43.49	Ave	62	1.3	V	-1.06	42.43	54.00	-11.57
7236.00	38.68	PK	208	1.7	H	1.33	40.01	74.00	-33.99
7236.00	38.23	Ave	208	1.7	H	1.33	39.56	54.00	-14.44
2324.08	45.35	PK	2	1.9	V	-13.19	32.16	74.00	-41.84
2324.08	38.40	Ave	2	1.9	V	-13.19	25.21	54.00	-28.79
2362.38	43.53	PK	232	1.5	H	-13.14	30.39	74.00	-43.61
2362.38	37.64	Ave	232	1.5	H	-13.14	24.50	54.00	-29.50
2491.62	44.00	PK	83	1.8	V	-13.08	30.92	74.00	-43.08
2491.62	36.64	Ave	83	1.8	V	-13.08	23.56	54.00	-30.44

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
11g: Middle Channel 2437MHz									
223.45	41.92	QP	119	1.0	H	-11.62	30.30	46.00	-15.70
223.45	37.30	QP	304	1.4	V	-11.62	25.68	46.00	-20.32
4874.00	50.47	PK	43	1.2	V	-0.62	49.85	74.00	-24.15
4874.00	44.00	Ave	43	1.2	V	-0.62	43.38	54.00	-10.62
7311.00	39.70	PK	112	1.6	H	2.21	41.91	74.00	-32.09
7311.00	38.16	Ave	112	1.6	H	2.21	40.37	54.00	-13.63
2344.92	46.67	PK	235	1.1	V	-13.19	33.48	74.00	-40.52
2344.92	38.60	Ave	235	1.1	V	-13.19	25.41	54.00	-28.59
2370.54	42.70	PK	70	1.7	H	-13.14	29.56	74.00	-44.44
2370.54	37.04	Ave	70	1.7	H	-13.14	23.90	54.00	-30.10
2490.87	44.02	PK	95	1.5	V	-13.08	30.94	74.00	-43.06
2490.87	37.34	Ave	95	1.5	V	-13.08	24.26	54.00	-29.74

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
11g: High Channel 2462MHz									
223.45	43.39	QP	195	1.7	H	-11.62	31.77	46.00	-14.23
223.45	37.90	QP	273	1.8	V	-11.62	26.28	46.00	-19.72
4924.00	50.30	PK	190	1.8	V	-0.24	50.06	74.00	-23.94
4924.00	43.52	Ave	190	1.8	V	-0.24	43.28	54.00	-10.72
7386.00	39.24	PK	194	1.8	H	2.84	42.08	74.00	-31.92
7386.00	37.66	Ave	194	1.8	H	2.84	40.50	54.00	-13.50
2325.00	45.45	PK	119	1.3	V	-13.19	32.26	74.00	-41.74
2325.00	39.72	Ave	119	1.3	V	-13.19	26.53	54.00	-27.47
2383.49	43.41	PK	345	1.5	H	-13.14	30.27	74.00	-43.73
2383.49	36.08	Ave	345	1.5	H	-13.14	22.94	54.00	-31.06
2499.76	42.97	PK	221	1.0	V	-13.08	29.89	74.00	-44.11
2499.76	36.11	Ave	221	1.0	V	-13.08	23.03	54.00	-30.97

ANT1

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
11b: Low Channel 2412MHz									
223.45	41.05	QP	32	1.9	H	-11.62	29.43	46.00	-16.57
223.45	36.26	QP	134	1.7	V	-11.62	24.64	46.00	-21.36
4824.00	50.44	PK	235	1.9	V	-1.06	49.38	74.00	-24.62
4824.00	46.32	Ave	235	1.9	V	-1.06	45.26	54.00	-8.74
7236.00	41.08	PK	307	1.3	H	1.33	42.41	74.00	-31.59
7236.00	41.96	Ave	307	1.3	H	1.33	43.29	54.00	-10.71
2316.44	45.38	PK	199	1.3	V	-13.19	32.19	74.00	-41.81
2316.44	38.31	Ave	199	1.3	V	-13.19	25.12	54.00	-28.88
2363.28	44.17	PK	240	1.1	H	-13.14	31.03	74.00	-42.97
2363.28	37.92	Ave	240	1.1	H	-13.14	24.78	54.00	-29.22
2485.02	44.07	PK	31	1.7	V	-13.08	30.99	74.00	-43.01
2485.02	36.50	Ave	31	1.7	V	-13.08	23.42	54.00	-30.58

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
11b: Middle Channel 2437MHz									
223.45	40.15	QP	274	1.3	H	-11.62	28.53	46.00	-17.47
223.45	37.45	QP	112	1.8	V	-11.62	25.83	46.00	-20.17
4874.00	50.25	PK	16	1.8	V	-0.62	49.63	74.00	-24.37
4874.00	47.05	Ave	16	1.8	V	-0.62	46.43	54.00	-7.57
7311.00	41.81	PK	159	1.4	H	2.21	44.02	74.00	-29.98
7311.00	42.25	Ave	159	1.4	H	2.21	44.46	54.00	-9.54
2324.58	45.73	PK	251	1.7	V	-13.19	32.54	74.00	-41.46
2324.58	39.35	Ave	251	1.7	V	-13.19	26.16	54.00	-27.84
2366.72	42.94	PK	358	1.3	H	-13.14	29.80	74.00	-44.20
2366.72	38.24	Ave	358	1.3	H	-13.14	25.10	54.00	-28.90
2484.69	42.18	PK	108	1.9	V	-13.08	29.10	74.00	-44.90
2484.69	37.67	Ave	108	1.9	V	-13.08	24.59	54.00	-29.41

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
11b: High Channel 2462MHz									
223.45	40.08	QP	218	1.9	H	-11.62	28.46	46.00	-17.54
223.45	36.56	QP	126	1.6	V	-11.62	24.94	46.00	-21.06
4924.00	49.59	PK	121	1.3	V	-0.24	49.35	74.00	-24.65
4924.00	45.80	Ave	121	1.3	V	-0.24	45.56	54.00	-8.44
7386.00	40.59	PK	117	1.7	H	2.84	43.43	74.00	-30.57
7386.00	43.04	Ave	117	1.7	H	2.84	45.88	54.00	-8.12
2312.98	46.93	PK	174	1.8	V	-13.19	33.74	74.00	-40.26
2312.98	37.36	Ave	174	1.8	V	-13.19	24.17	54.00	-29.83
2373.07	42.29	PK	350	1.4	H	-13.14	29.15	74.00	-44.85
2373.07	37.23	Ave	350	1.4	H	-13.14	24.09	54.00	-29.91
2488.56	42.54	PK	53	1.8	V	-13.08	29.46	74.00	-44.54
2488.56	37.78	Ave	53	1.8	V	-13.08	24.70	54.00	-29.30

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
11g: Low Channel 2412MHz									
223.45	41.19	QP	36	2.0	H	-11.62	29.57	46.00	-16.43
223.45	37.11	QP	30	1.4	V	-11.62	25.49	46.00	-20.51
4824.00	50.35	PK	127	1.6	V	-1.06	49.29	74.00	-24.71
4824.00	46.77	Ave	127	1.6	V	-1.06	45.71	54.00	-8.29
7236.00	41.69	PK	200	1.7	H	1.33	43.02	74.00	-30.98
7236.00	43.11	Ave	200	1.7	H	1.33	44.44	54.00	-9.56
2312.98	46.37	PK	175	1.9	V	-13.19	33.18	74.00	-40.82
2312.98	37.45	Ave	175	1.9	V	-13.19	24.26	54.00	-29.74
2354.09	42.77	PK	129	1.0	H	-13.14	29.63	74.00	-44.37
2354.09	37.37	Ave	129	1.0	H	-13.14	24.23	54.00	-29.77
2492.87	42.74	PK	249	1.5	V	-13.08	29.66	74.00	-44.34
2492.87	37.12	Ave	249	1.5	V	-13.08	24.04	54.00	-29.96

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
11g: Middle Channel 2437MHz									
223.45	42.60	QP	200	1.9	H	-11.62	30.98	46.00	-15.02
223.45	36.16	QP	21	1.3	V	-11.62	24.54	46.00	-21.46
4874.00	50.29	PK	252	2.0	V	-0.62	49.67	74.00	-24.33
4874.00	46.81	Ave	252	2.0	V	-0.62	46.19	54.00	-7.81
7311.00	40.39	PK	316	1.6	H	2.21	42.60	74.00	-31.40
7311.00	44.13	Ave	316	1.6	H	2.21	46.34	54.00	-7.66
2343.60	45.42	PK	99	1.8	V	-13.19	32.23	74.00	-41.77
2343.60	39.29	Ave	99	1.8	V	-13.19	26.10	54.00	-27.90
2375.27	43.64	PK	23	1.1	H	-13.14	30.50	74.00	-43.50
2375.27	37.20	Ave	23	1.1	H	-13.14	24.06	54.00	-29.94
2493.25	42.07	PK	340	1.7	V	-13.08	28.99	74.00	-45.01
2493.25	37.24	Ave	340	1.7	V	-13.08	24.16	54.00	-29.84

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
11g: High Channel 2462MHz									
223.45	41.30	QP	42	1.9	H	-11.62	29.68	46.00	-16.32
223.45	36.70	QP	283	1.1	V	-11.62	25.08	46.00	-20.92
4924.00	50.33	PK	166	1.5	V	-0.24	50.09	74.00	-23.91
4924.00	46.71	Ave	166	1.5	V	-0.24	46.47	54.00	-7.53
7386.00	39.52	PK	47	1.0	H	2.84	42.36	74.00	-31.64
7386.00	44.84	Ave	47	1.0	H	2.84	47.68	54.00	-6.32
2320.85	45.57	PK	337	1.5	V	-13.19	32.38	74.00	-41.62
2320.85	37.92	Ave	337	1.5	V	-13.19	24.73	54.00	-29.27
2357.73	44.16	PK	177	1.1	H	-13.14	31.02	74.00	-42.98
2357.73	37.79	Ave	177	1.1	H	-13.14	24.65	54.00	-29.35
2489.99	44.25	PK	280	1.9	V	-13.08	31.17	74.00	-42.83
2489.99	38.80	Ave	280	1.9	V	-13.08	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)
(ANT0+ANT1) 11n20: Low Channel 2412MHz									
223.45	42.02	QP	309	1.9	H	-11.62	30.40	46.00	-15.60
223.45	36.47	QP	100	1.4	V	-11.62	24.85	46.00	-21.15
4824.00	51.79	PK	67	1.8	V	-1.06	50.73	74.00	-23.27
4824.00	45.85	Ave	67	1.8	V	-1.06	44.79	54.00	-9.21
7236.00	38.54	PK	278	2.0	H	1.33	39.87	74.00	-34.13
7236.00	43.88	Ave	278	2.0	H	1.33	45.21	54.00	-8.79
2322.79	45.40	PK	87	1.4	V	-13.19	32.21	74.00	-41.79
2322.79	38.35	Ave	87	1.4	V	-13.19	25.16	54.00	-28.84
2358.45	44.14	PK	181	1.5	H	-13.14	31.00	74.00	-43.00
2358.45	36.38	Ave	181	1.5	H	-13.14	23.24	54.00	-30.76
2491.62	44.16	PK	122	1.6	V	-13.08	31.08	74.00	-42.92
2491.62	38.89	Ave	122	1.6	V	-13.08	25.81	54.00	-28.19

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
(ANT0+ANT1) 11n20: Middle Channel 2437MHz									
223.45	41.83	QP	204	1.0	H	-11.62	30.21	46.00	-15.79
223.45	35.46	QP	221	1.3	V	-11.62	23.84	46.00	-22.16
4874.00	51.14	PK	211	1.8	V	-0.62	50.52	74.00	-23.48
4874.00	47.13	Ave	211	1.8	V	-0.62	46.51	54.00	-7.49
7311.00	37.66	PK	27	1.9	H	2.21	39.87	74.00	-34.13
7311.00	42.69	Ave	27	1.9	H	2.21	44.90	54.00	-9.10
2346.81	46.22	PK	309	1.6	V	-13.19	33.03	74.00	-40.97
2346.81	38.57	Ave	309	1.6	V	-13.19	25.38	54.00	-28.62
2368.90	43.37	PK	319	1.2	H	-13.14	30.23	74.00	-43.77
2368.90	38.15	Ave	319	1.2	H	-13.14	25.01	54.00	-28.99
2491.69	43.34	PK	253	1.3	V	-13.08	30.26	74.00	-43.74
2491.69	36.73	Ave	253	1.3	V	-13.08	23.65	54.00	-30.35

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)
(ANT0+ANT1) 11n20: High Channel 2462MHz									
223.45	42.49	QP	352	2.0	H	-11.62	30.87	46.00	-15.13
223.45	34.20	QP	307	1.9	V	-11.62	22.58	46.00	-23.42
4924.00	50.86	PK	255	1.3	V	-0.24	50.62	74.00	-23.38
4924.00	47.81	Ave	255	1.3	V	-0.24	47.57	54.00	-6.43
7386.00	37.81	PK	212	1.9	H	2.84	40.65	74.00	-33.35
7386.00	41.27	Ave	212	1.9	H	2.84	44.11	54.00	-9.89
2346.88	45.79	PK	62	1.6	V	-13.19	32.60	74.00	-41.40
2346.88	37.60	Ave	62	1.6	V	-13.19	24.41	54.00	-29.59
2360.35	42.45	PK	118	1.1	H	-13.14	29.31	74.00	-44.69
2360.35	38.63	Ave	118	1.1	H	-13.14	25.49	54.00	-28.51
2495.40	43.79	PK	270	1.7	V	-13.08	30.71	74.00	-43.29
2495.40	37.93	Ave	270	1.7	V	-13.08	24.85	54.00	-29.15

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
(ANT0+ANT1) 11n40: Low Channel 2422MHz									
223.45	42.71	QP	292	1.4	H	-11.62	31.09	46.00	-14.91
223.45	33.44	QP	349	1.1	V	-11.62	21.82	46.00	-24.18
4844.00	48.99	PK	323	1.5	V	-1.06	47.93	74.00	-26.07
4844.00	45.83	Ave	323	1.5	V	-1.06	44.77	54.00	-9.23
7266.00	36.51	PK	136	1.6	H	1.33	37.84	74.00	-36.16
7266.00	39.58	Ave	136	1.6	H	1.33	40.91	54.00	-13.09
2332.81	46.67	PK	45	1.5	V	-13.19	33.48	74.00	-40.52
2332.81	37.25	Ave	45	1.5	V	-13.19	24.06	54.00	-29.94
2383.72	44.27	PK	95	1.5	H	-13.14	31.13	74.00	-42.87
2383.72	36.29	Ave	95	1.5	H	-13.14	23.15	54.00	-30.85
2485.31	42.79	PK	91	1.2	V	-13.08	29.71	74.00	-44.29
2485.31	36.99	Ave	91	1.2	V	-13.08	23.91	54.00	-30.09

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
(ANT0+ANT1) 11n40: Middle Channel 2437MHz									
223.45	42.30	QP	137	2.0	H	-11.62	30.68	46.00	-15.32
223.45	33.64	QP	272	1.1	V	-11.62	22.02	46.00	-23.98
4874.00	48.15	PK	187	1.7	V	-0.62	47.53	74.00	-26.47
4874.00	45.93	Ave	187	1.7	V	-0.62	45.31	54.00	-8.69
7311.00	37.37	PK	296	1.7	H	2.21	39.58	74.00	-34.42
7311.00	38.65	Ave	296	1.7	H	2.21	40.86	54.00	-13.14
2334.59	45.82	PK	38	1.3	V	-13.19	32.63	74.00	-41.37
2334.59	39.12	Ave	38	1.3	V	-13.19	25.93	54.00	-28.07
2372.50	43.02	PK	149	1.9	H	-13.14	29.88	74.00	-44.12
2372.50	37.60	Ave	149	1.9	H	-13.14	24.46	54.00	-29.54
2498.82	44.53	PK	70	1.2	V	-13.08	31.45	74.00	-42.55
2498.82	38.36	Ave	70	1.2	V	-13.08	25.28	54.00	-28.72

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
(ANT0+ANT1) 11n40: High Channel 2452MHz									
223.45	43.01	QP	353	1.1	H	-11.62	31.39	46.00	-14.61
223.45	32.70	QP	250	1.7	V	-11.62	21.08	46.00	-24.92
4904.00	47.16	PK	258	1.9	V	-0.24	46.92	74.00	-27.08
4904.00	46.01	Ave	258	1.9	V	-0.24	45.77	54.00	-8.23
7356.00	36.77	PK	42	1.7	H	2.84	39.61	74.00	-34.39
7356.00	38.89	Ave	42	1.7	H	2.84	41.73	54.00	-12.27
2323.36	45.82	PK	144	1.7	V	-13.19	32.63	74.00	-41.37
2323.36	39.82	Ave	144	1.7	V	-13.19	26.63	54.00	-27.37
2389.82	44.42	PK	175	1.8	H	-13.14	31.28	74.00	-42.72
2389.82	36.23	Ave	175	1.8	H	-13.14	23.09	54.00	-30.91
2484.46	42.59	PK	324	1.6	V	-13.08	29.51	74.00	-44.49
2484.46	36.65	Ave	324	1.6	V	-13.08	23.57	54.00	-30.43

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 15.247 Meas Guidance v05 August 24, 2018;
ANSI C63.10:2013

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:
 - a) Set instrument center frequency to DTS channel center frequency.
 - b) Set the span to ≈ 1.5 times the DTS bandwidth.
 - c) Set the RBW = 100 kHz.
 - d) Set the VBW $\approx [3 \times \text{RBW}]$.
 - e) Detector = peak.
 - f) Sweep time = auto couple.
 - g) Trace mode = max hold.
 - h) Allow trace to fully stabilize.
 - i) Use the peak marker function to determine the maximum PSD level.

Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

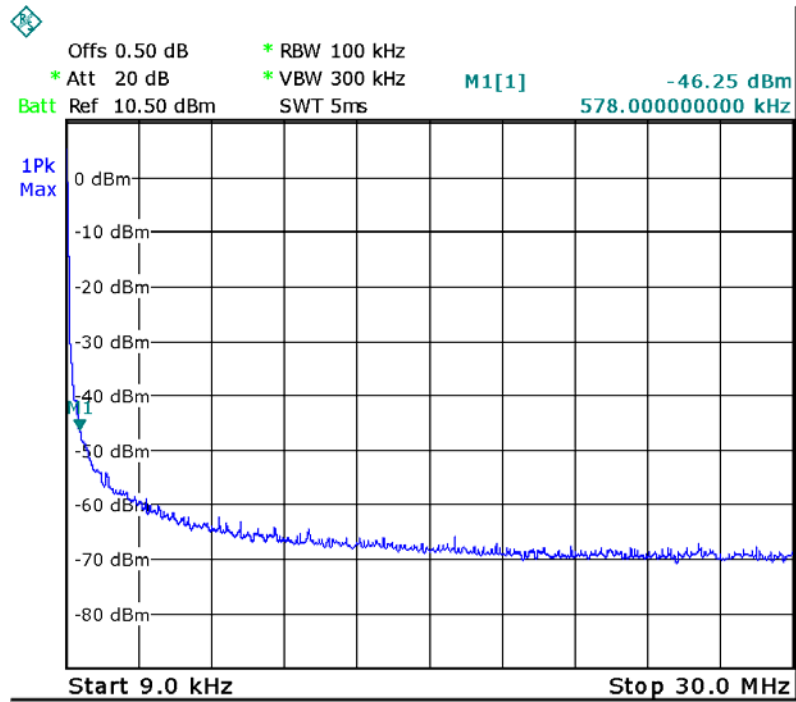
10.2 Test Result

ANT 0

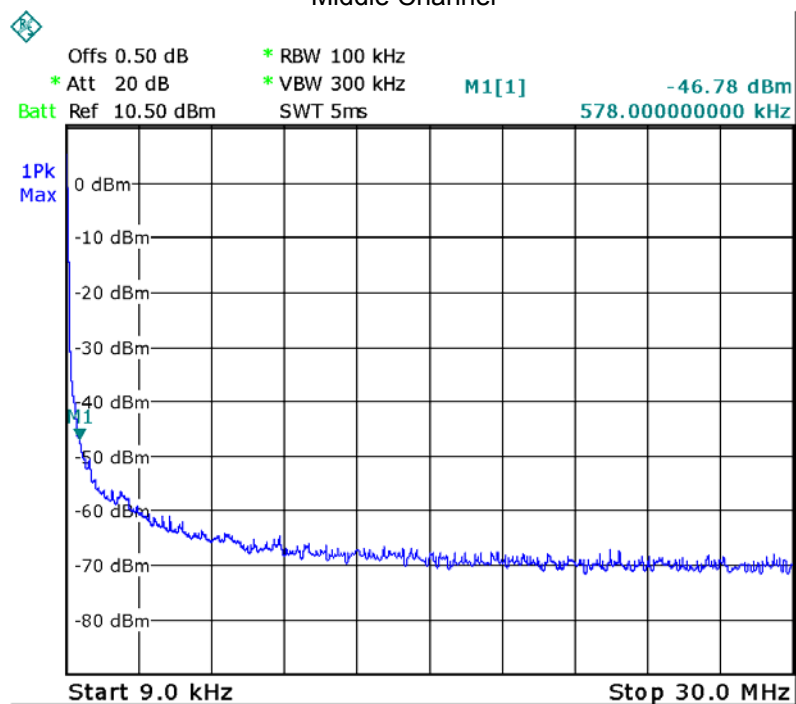
9KHz – 30MHz

802.11b

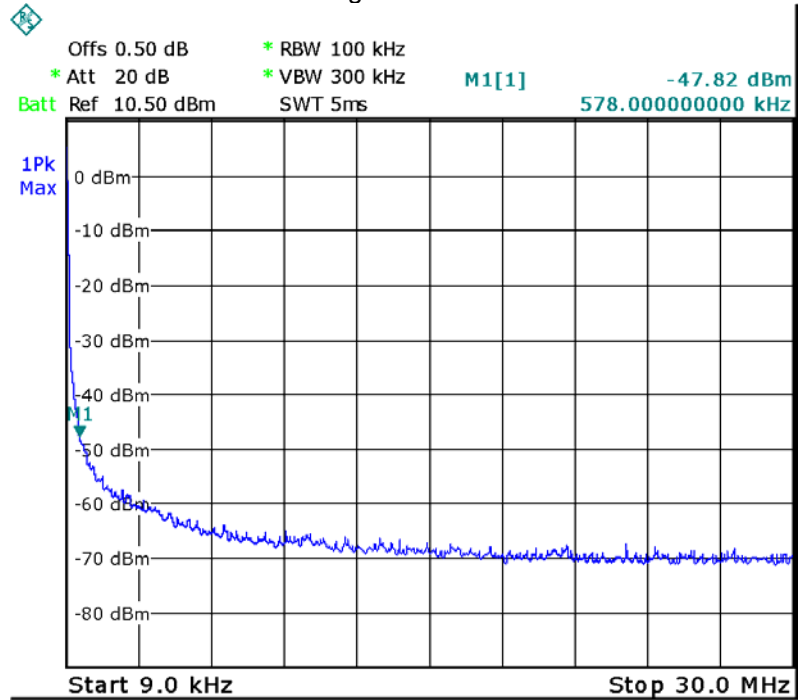
Low Channel



Middle Channel

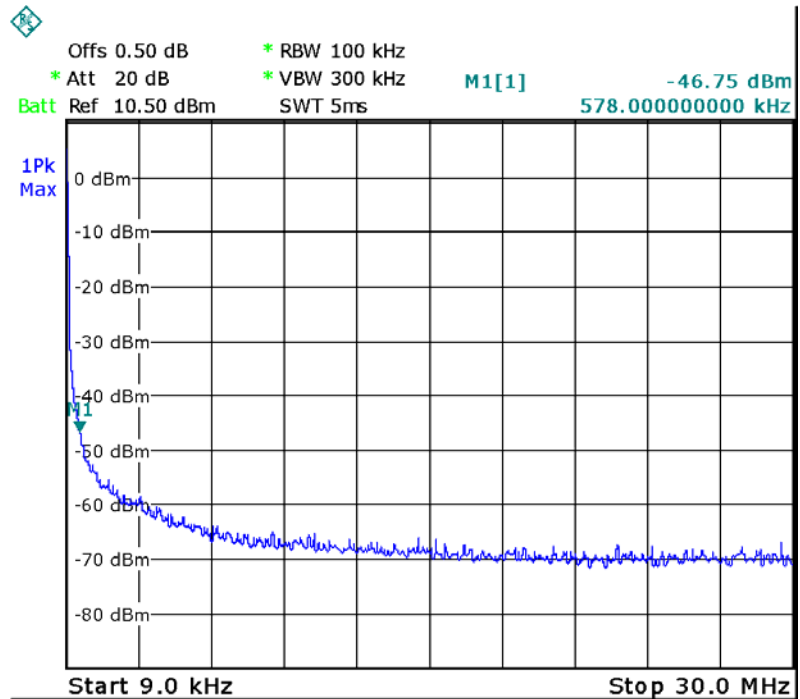


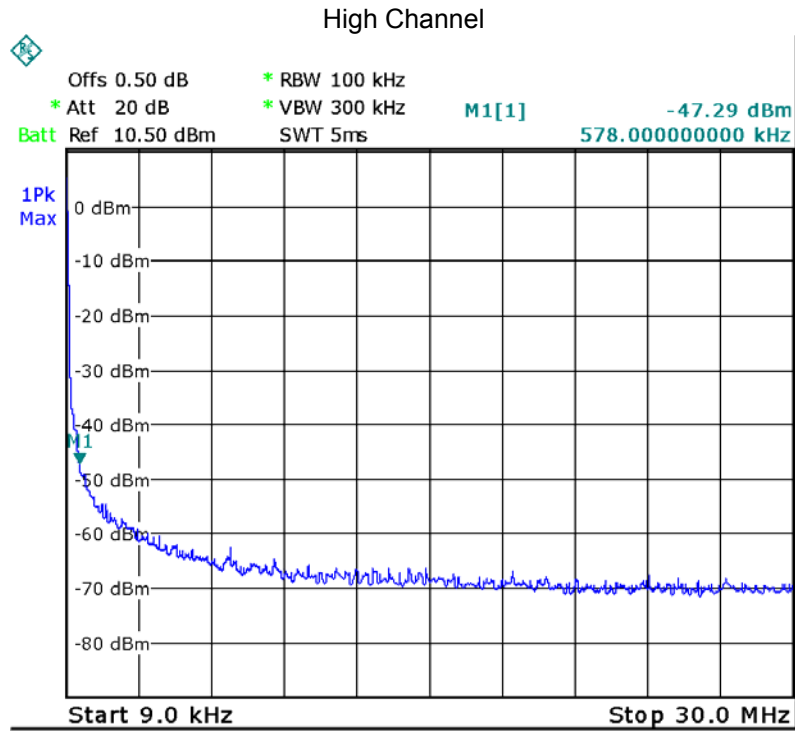
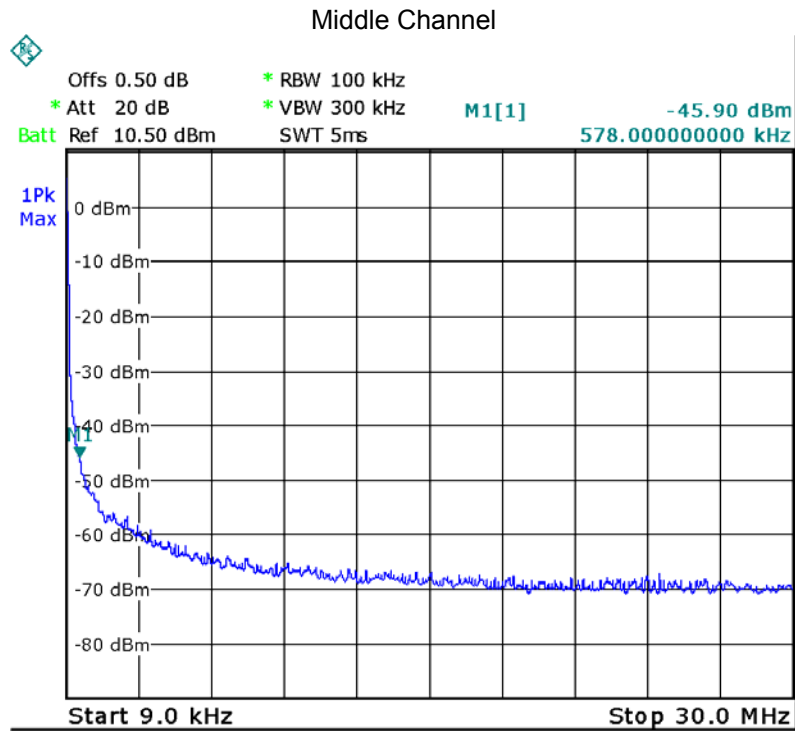
High Channel



802.11g

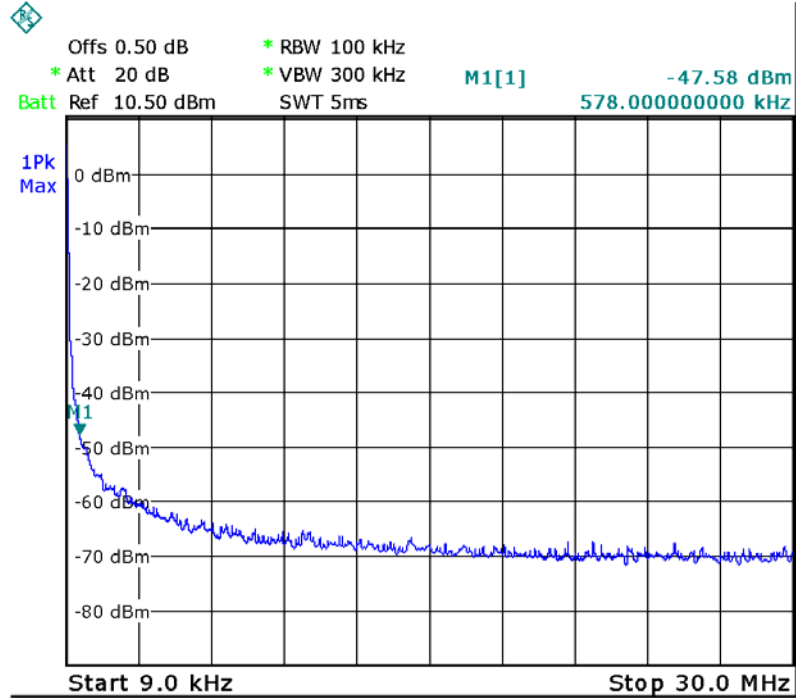
Low Channel



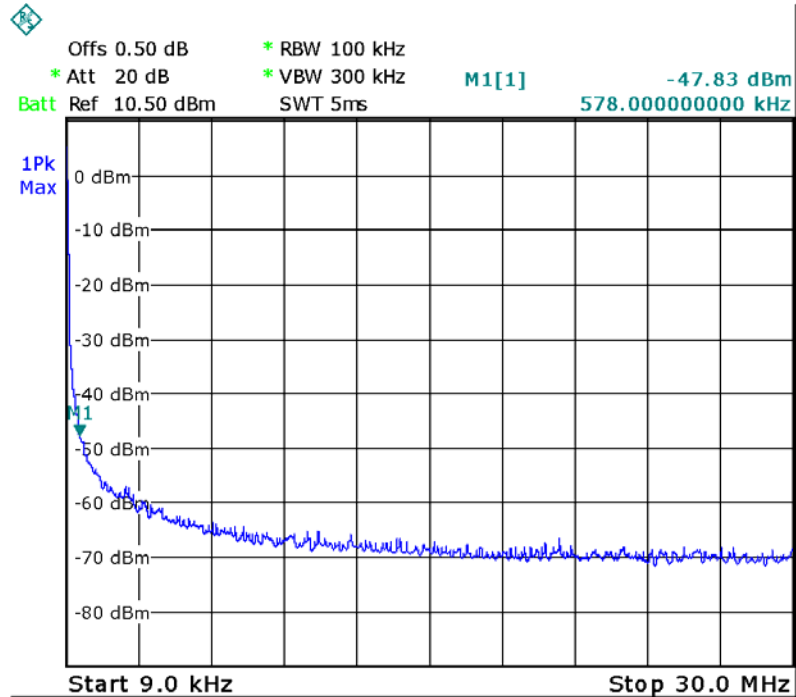


802.11n HT20

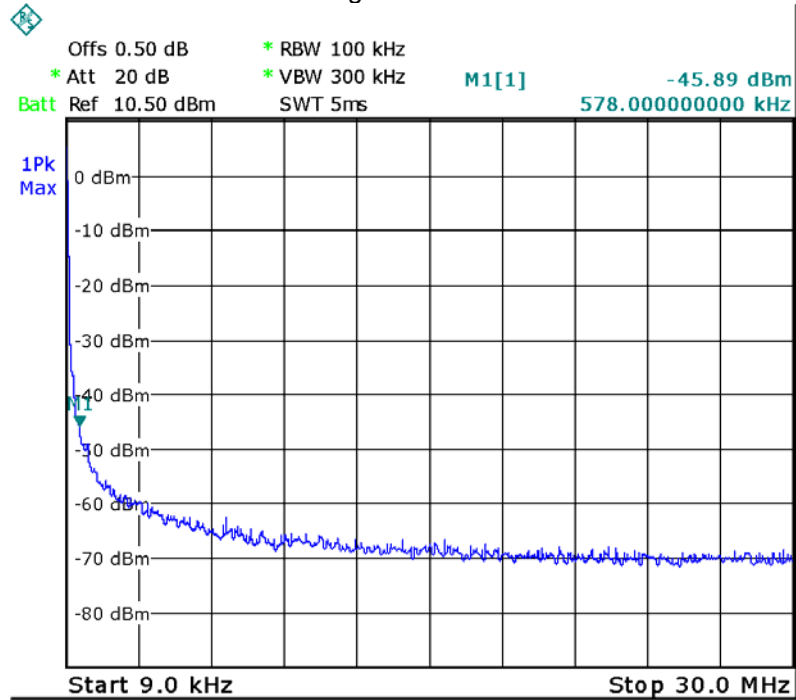
Low Channel



Middle Channel

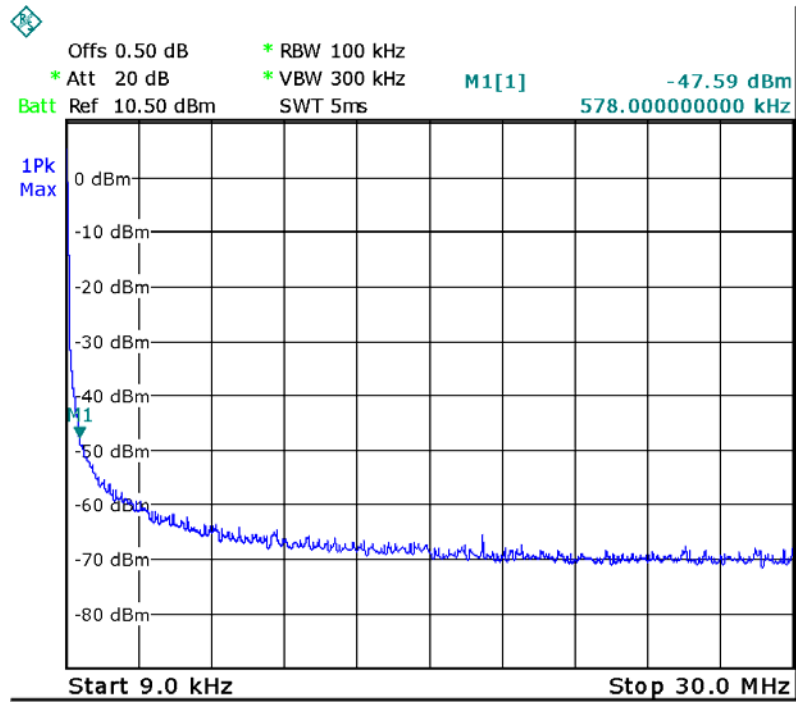


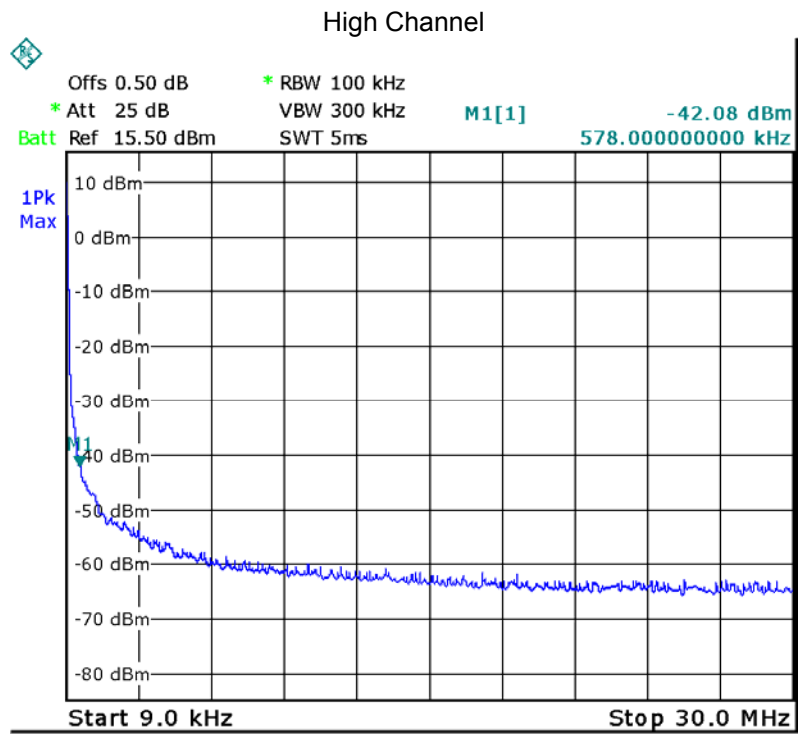
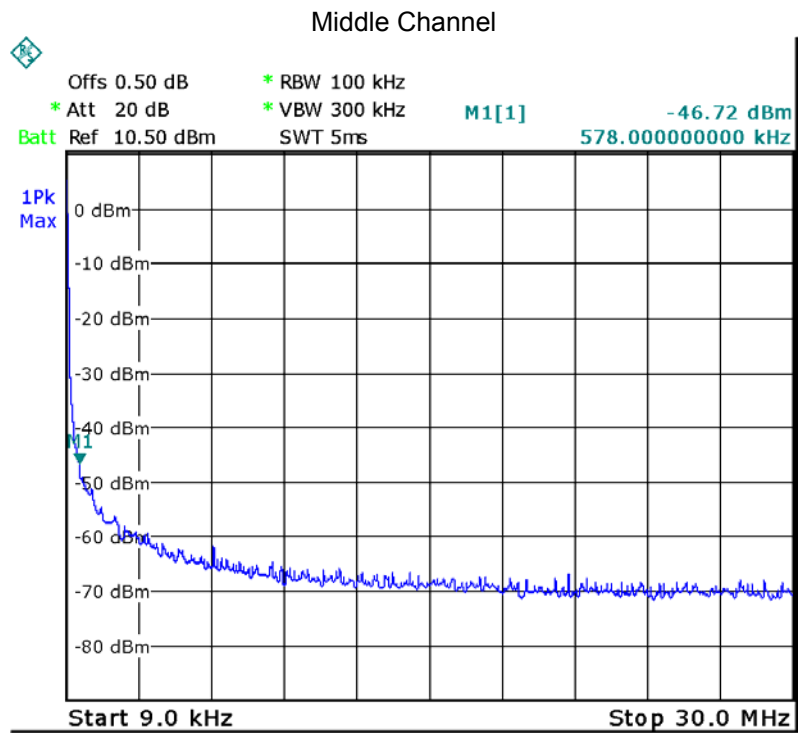
High Channel



802.11n HT40

Low Channel



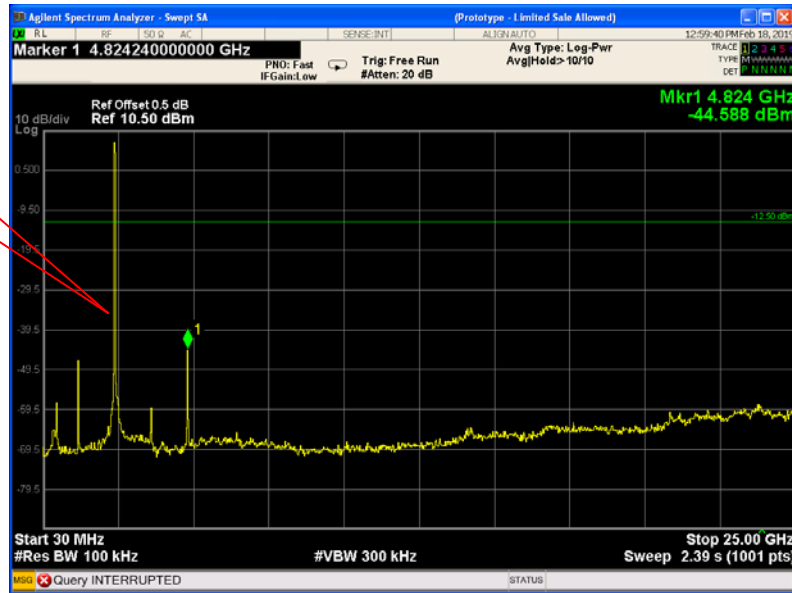


Above 30MHz

802.11b

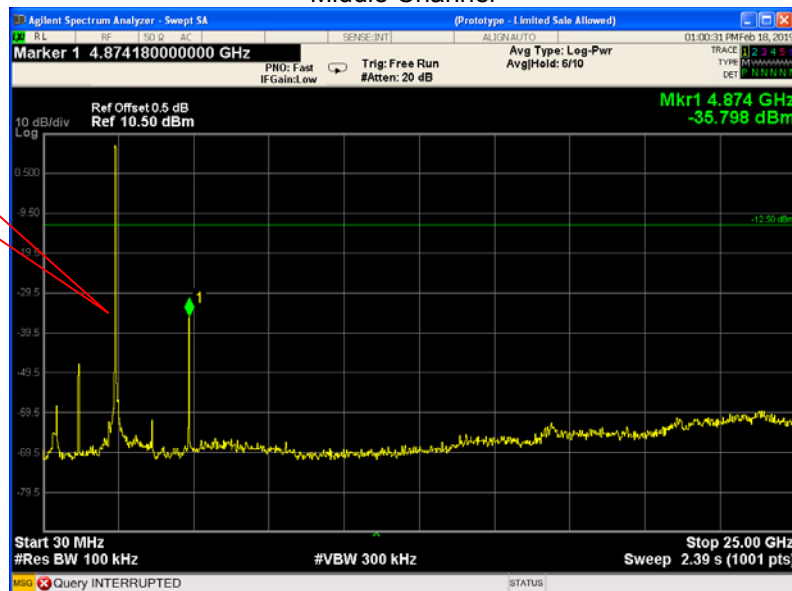
Low Channel

Fundamental



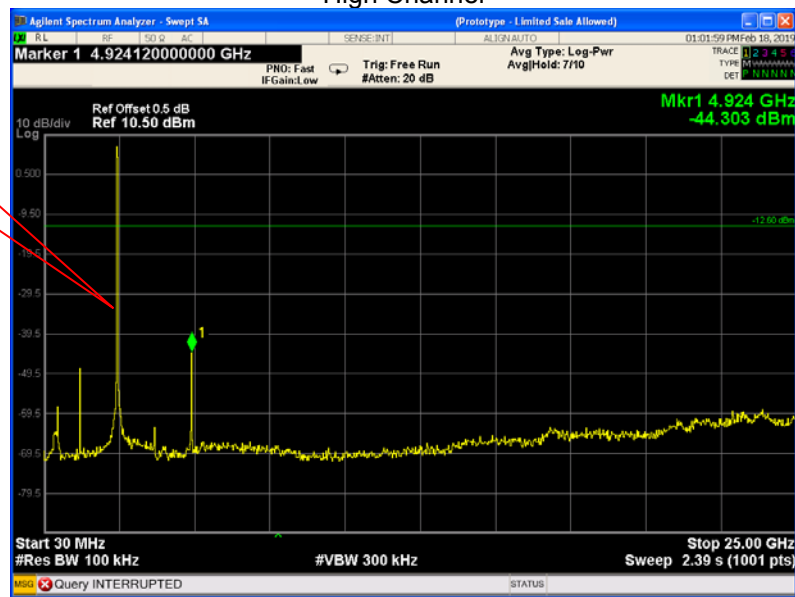
Middle Channel

Fundamental



High Channel

Fundamental



802.11g

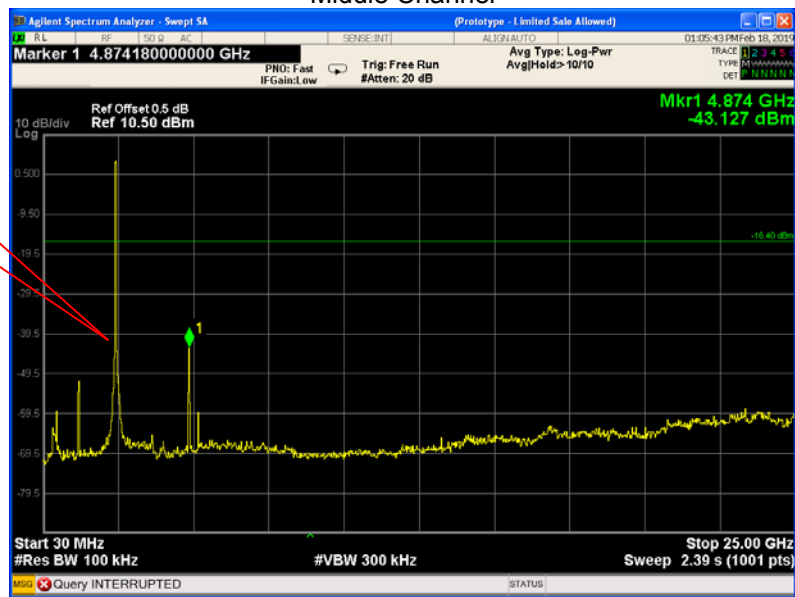
Low Channel

Fundamental



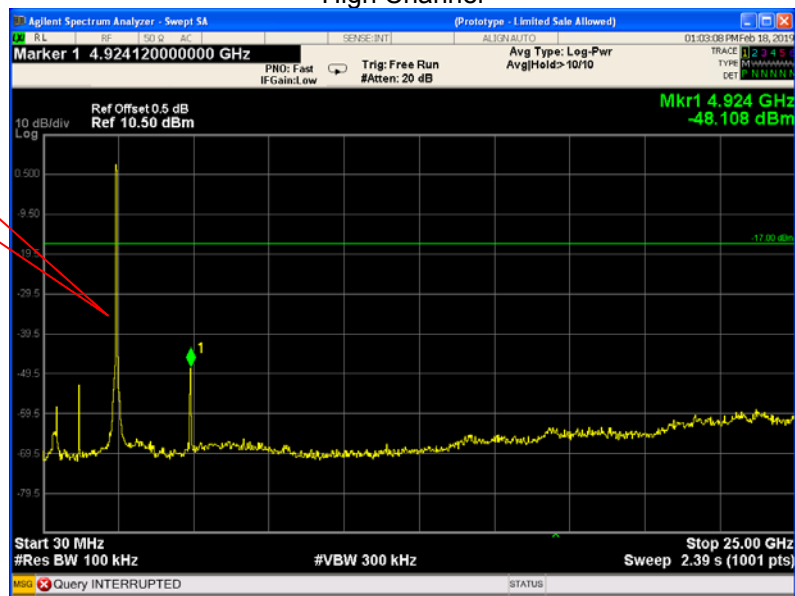
Middle Channel

Fundamental



High Channel

Fundamental



802.11n HT20

Low Channel

Fundamental



Middle Channel

Fundamental



High Channel

Fundamental



802.11n HT40

Low Channel

Fundamental



Middle Channel

Fundamental



High Channel

Fundamental

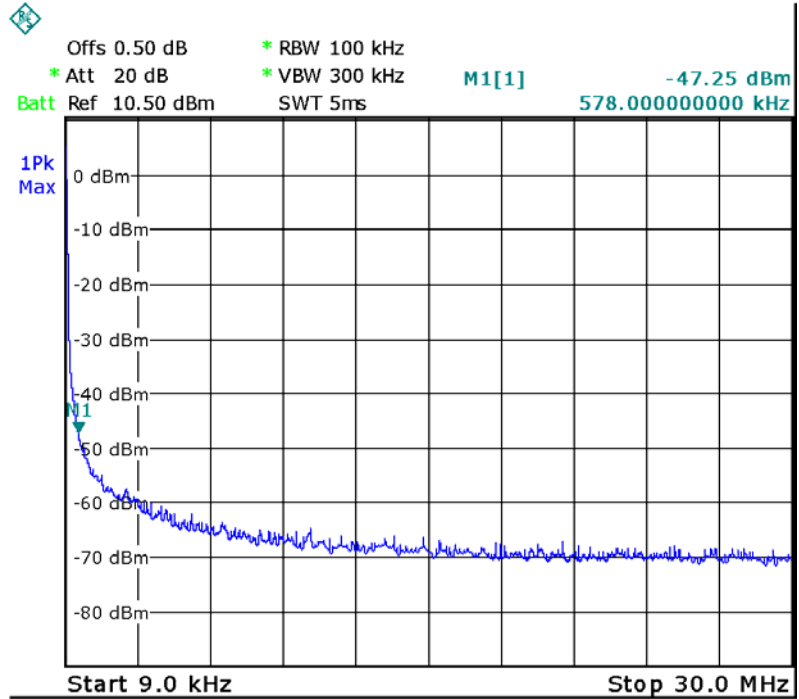


ANT 1

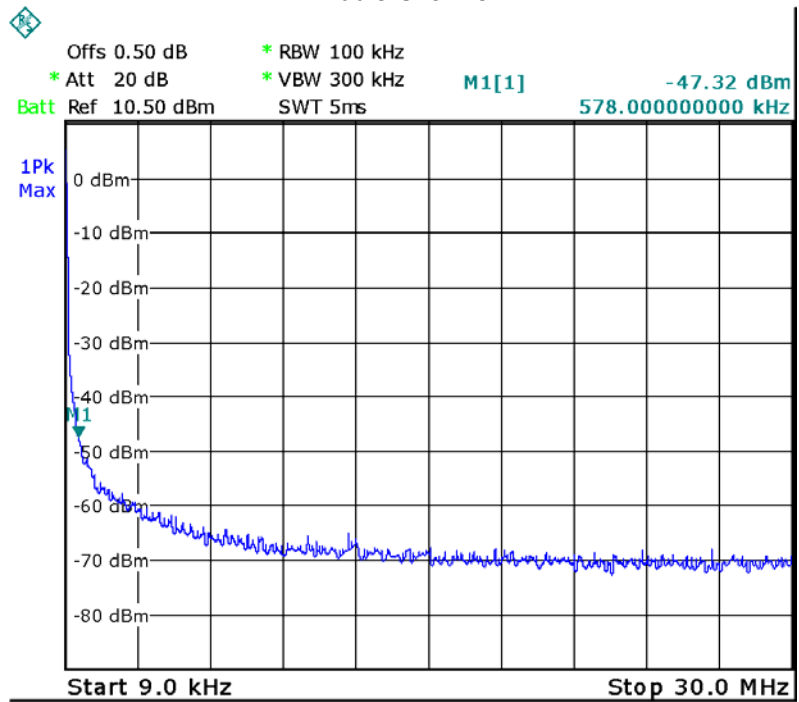
9KHz – 30MHz

802.11b

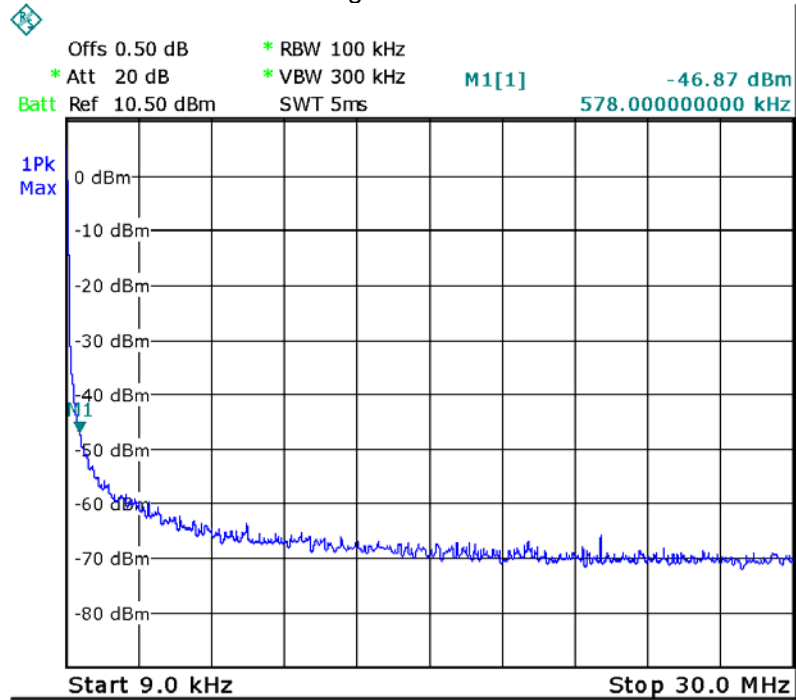
Low Channel



Middle Channel

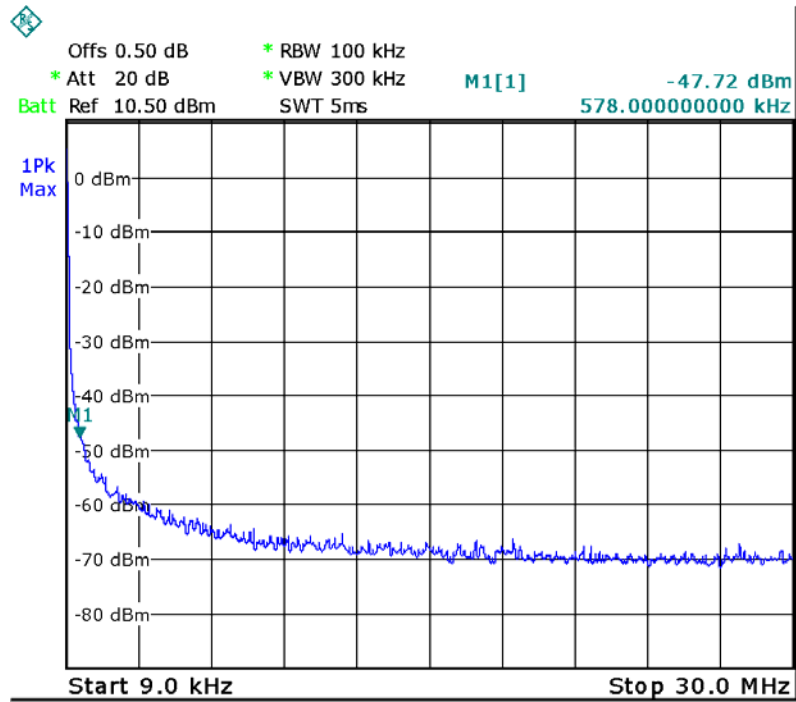


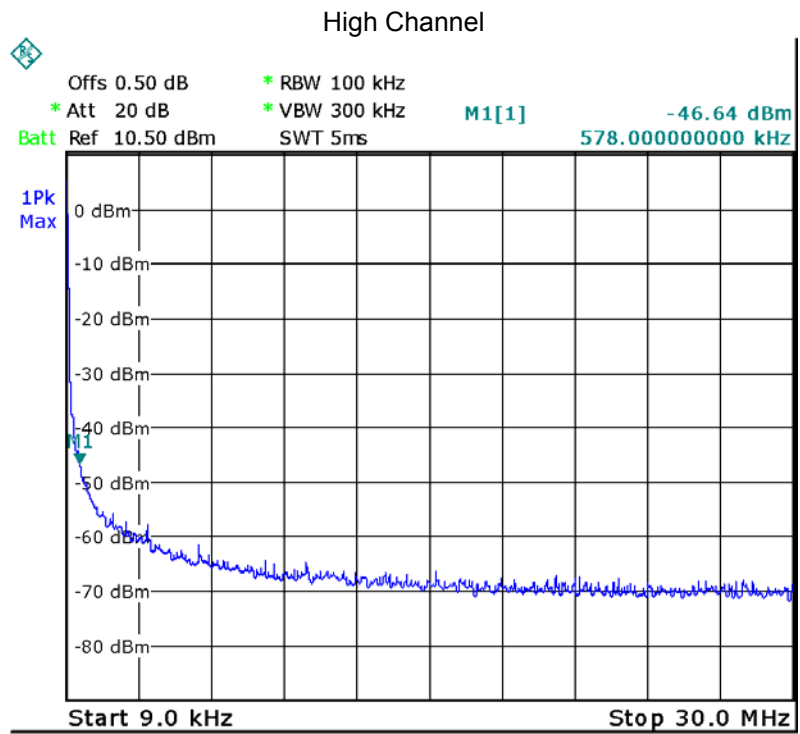
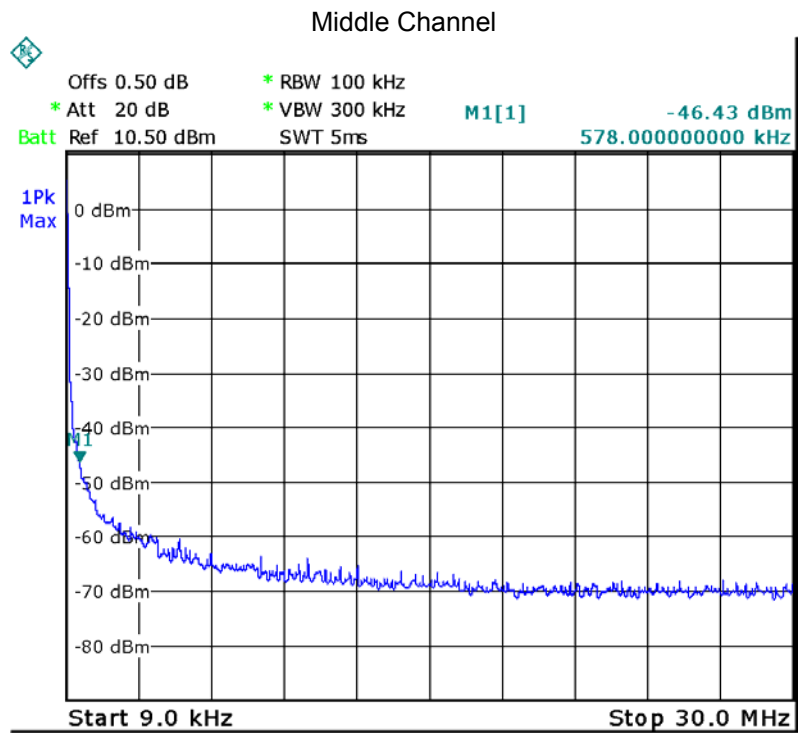
High Channel



802.11g

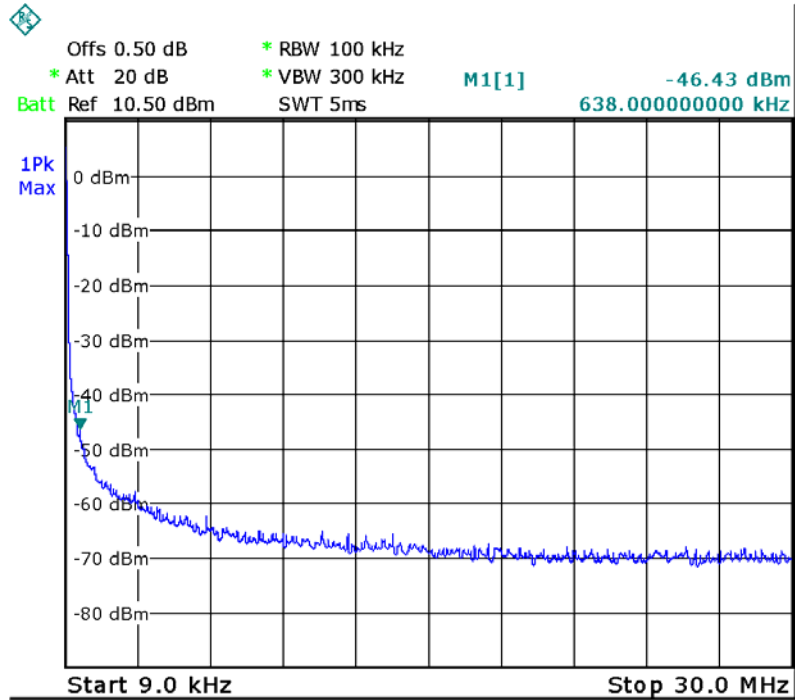
Low Channel



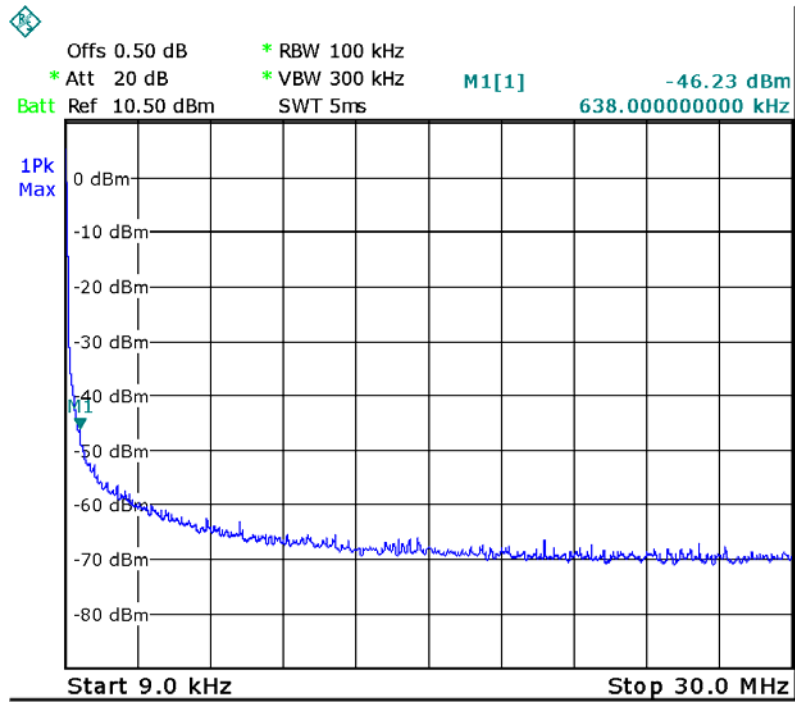


802.11n HT20

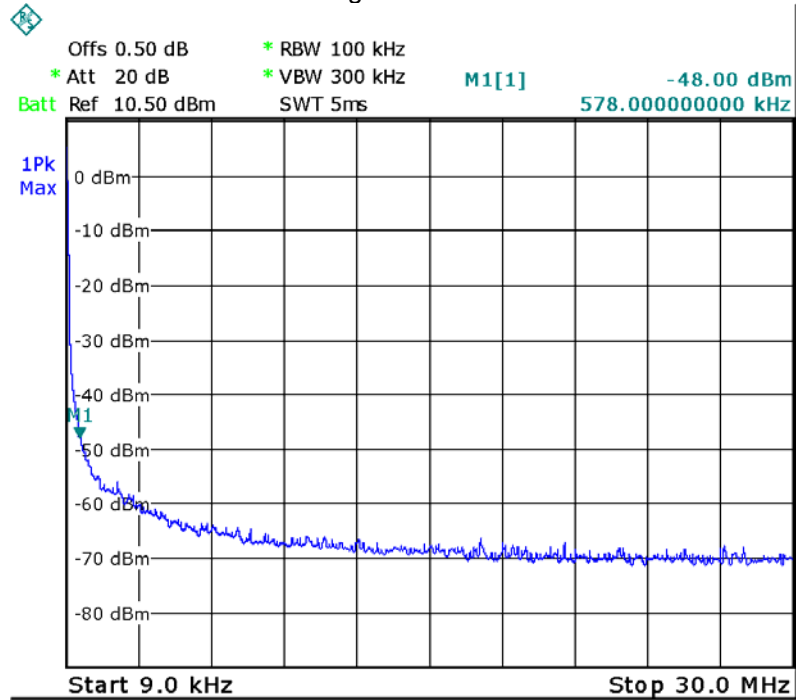
Low Channel



Middle Channel

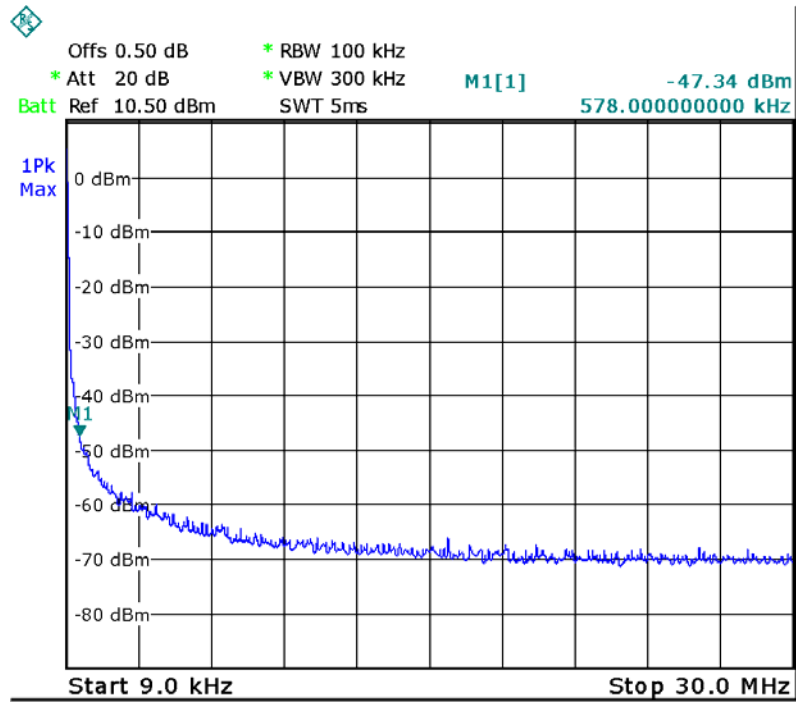


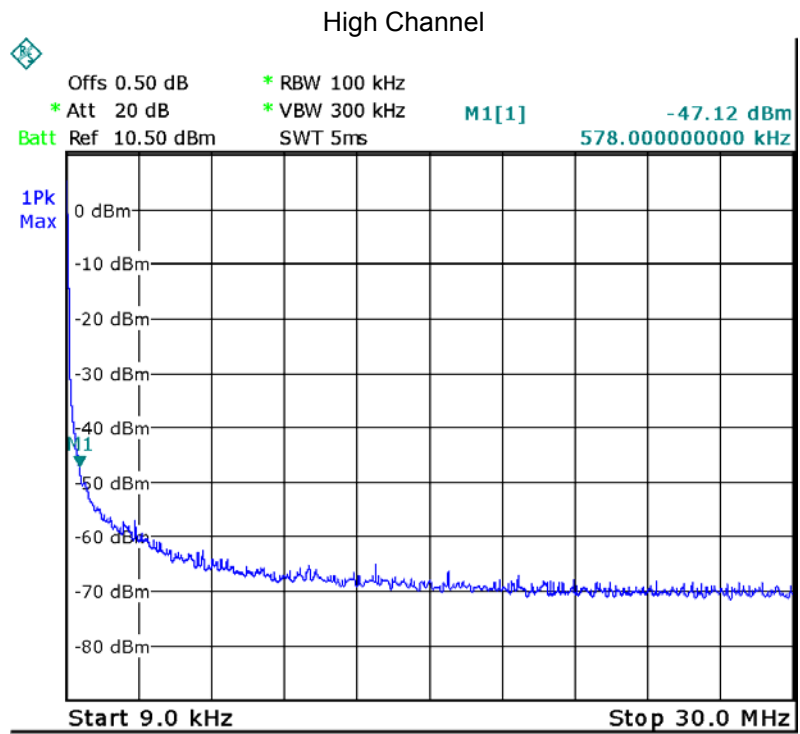
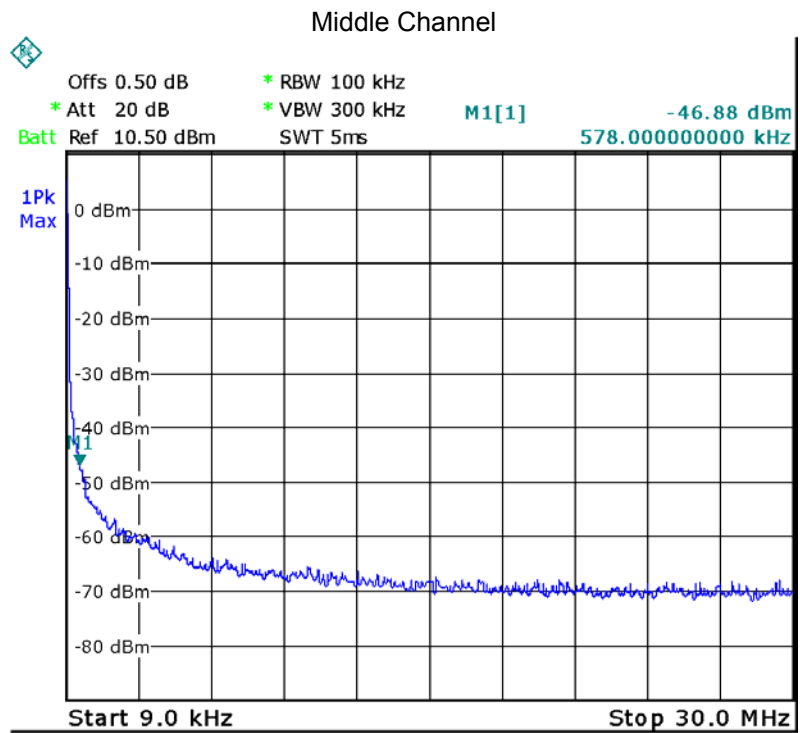
High Channel



802.11n HT40

Low Channel



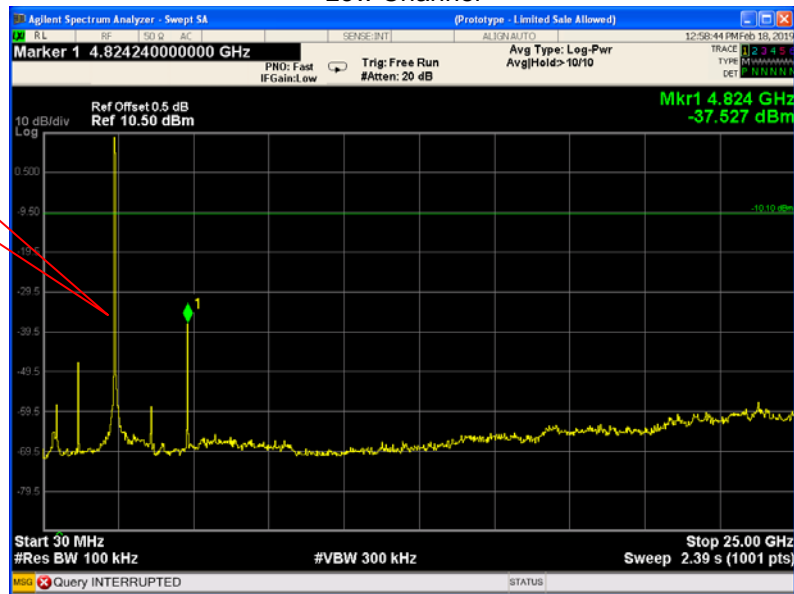


Above 30MHz

802.11b

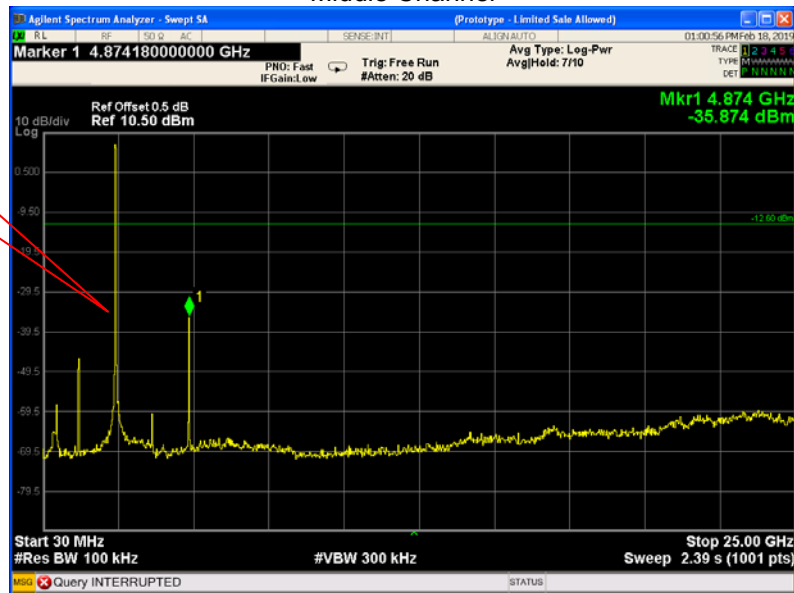
Low Channel

Fundamental



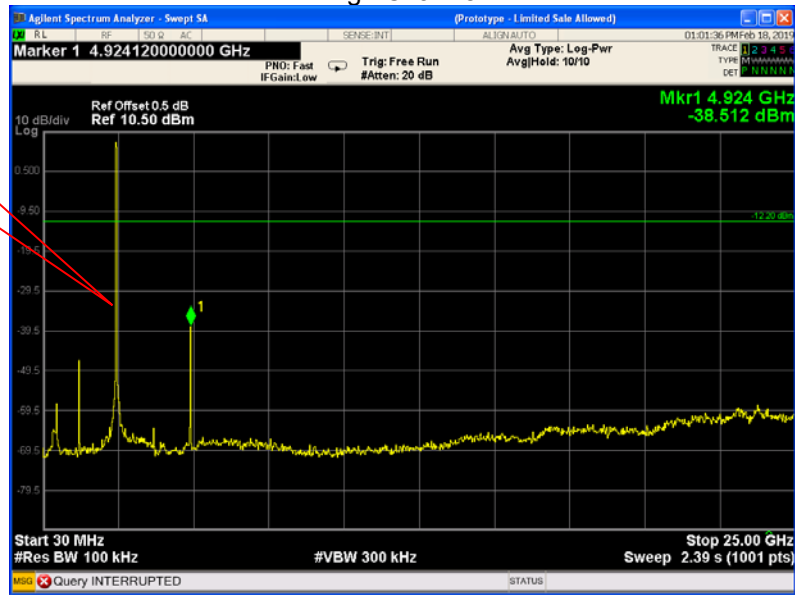
Middle Channel

Fundamental



High Channel

Fundamental



802.11g

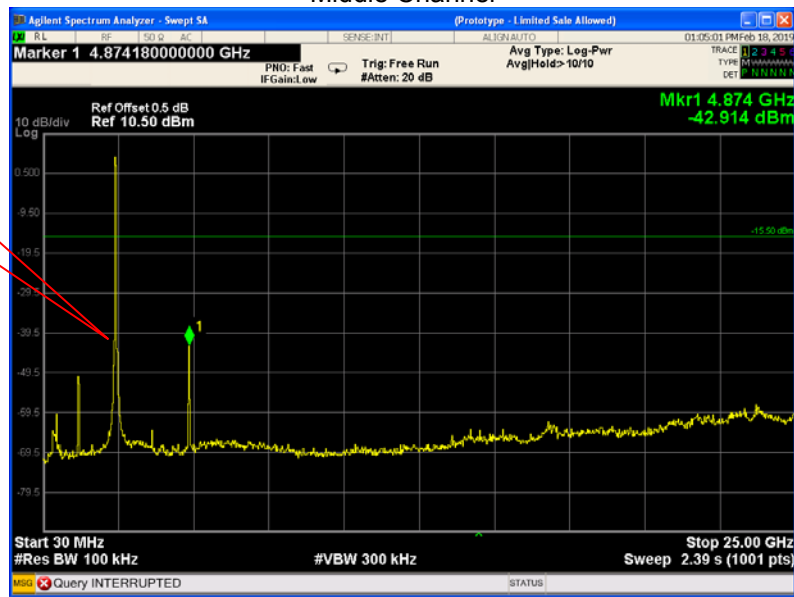
Low Channel

Fundamental



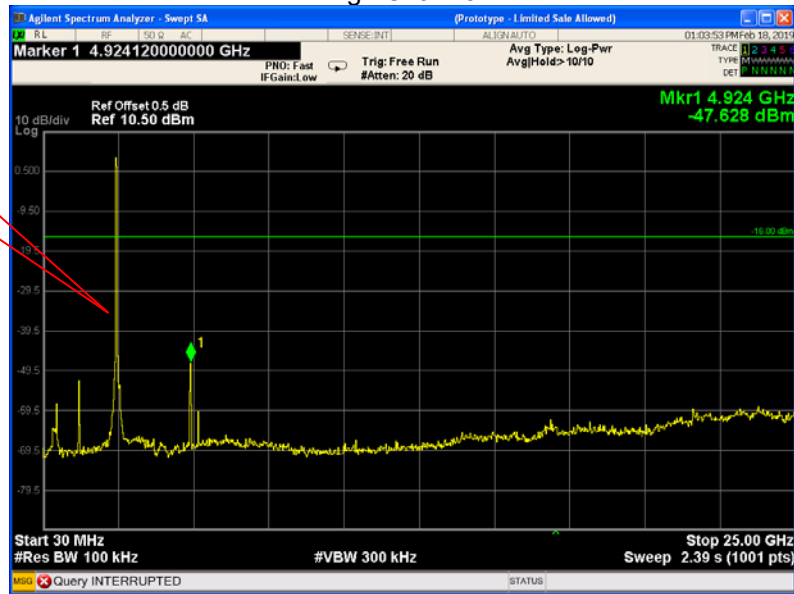
Middle Channel

Fundamental



High Channel

Fundamental



802.11n HT20

Low Channel

Fundamental



Middle Channel

Fundamental



High Channel

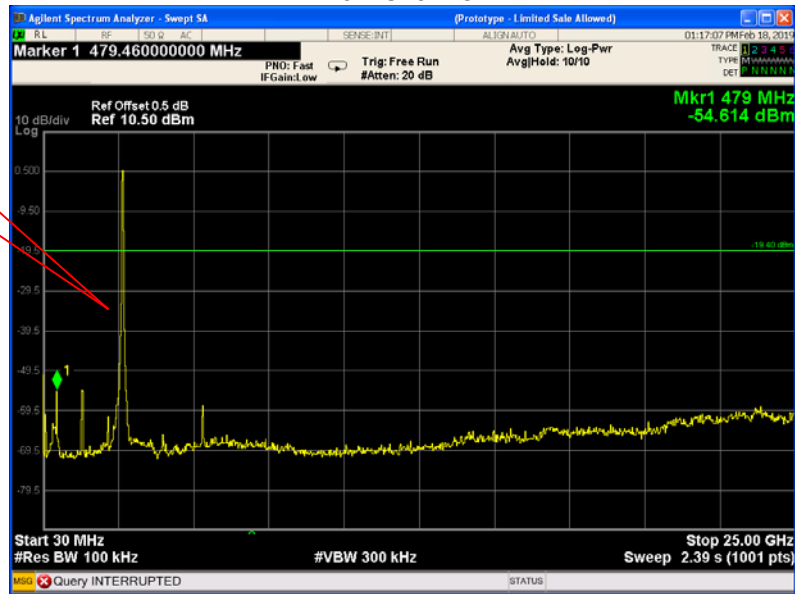
Fundamental



802.11n HT40

Low Channel

Fundamental



Middle Channel

Fundamental



High Channel

Fundamental



11 Band Edge Measurement

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB 558074 D01 15.247 Meas Guidance v05 August 24, 2018;
ANSI C63.10:2013

Test Limit: Regulation 15.247 (d), In any 100 kHz bandwidth outside the frequency band 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 Procedure

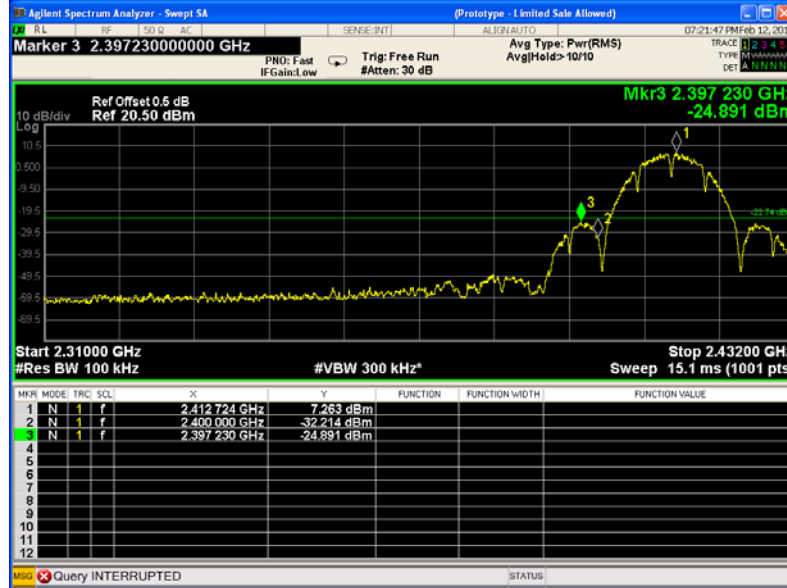
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then 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 0

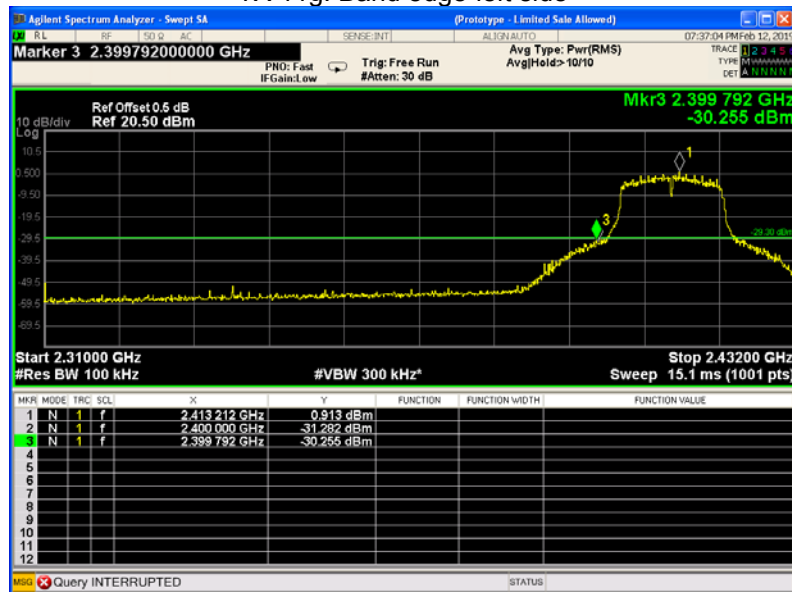
TX 11b: Band edge-left side



TX 11b: Band edge-right side



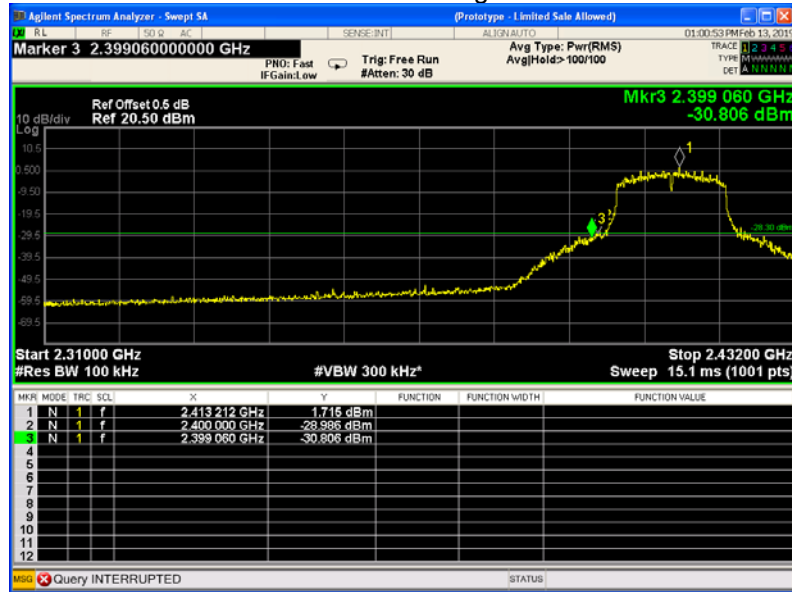
TX 11g: Band edge-left side



TX 11g: Band edge-right side



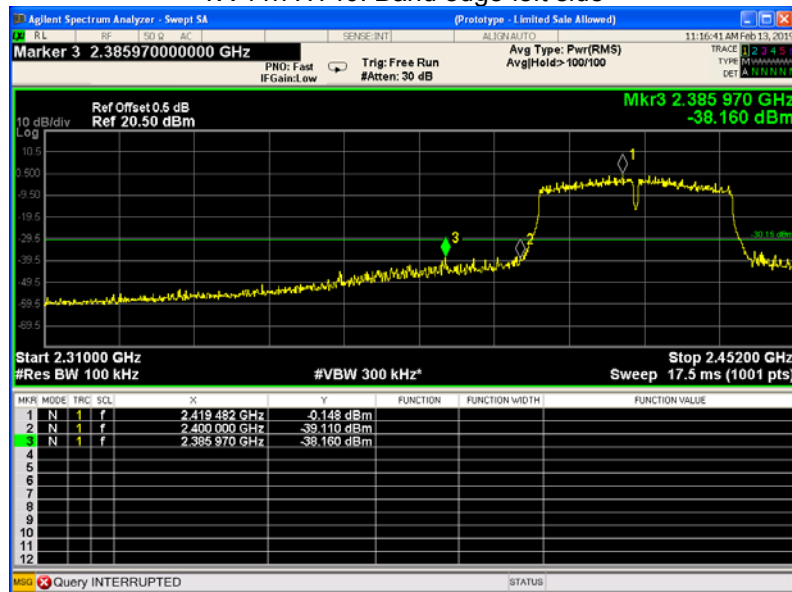
TX 11n HT20: Band edge-left side



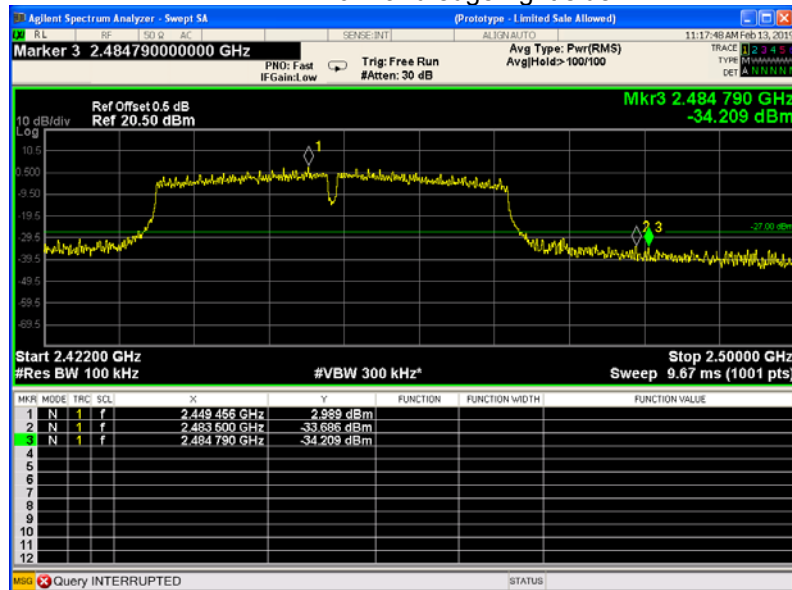
TX 11n HT20: Band edge-right side



TX 11n HT40: Band edge-left side

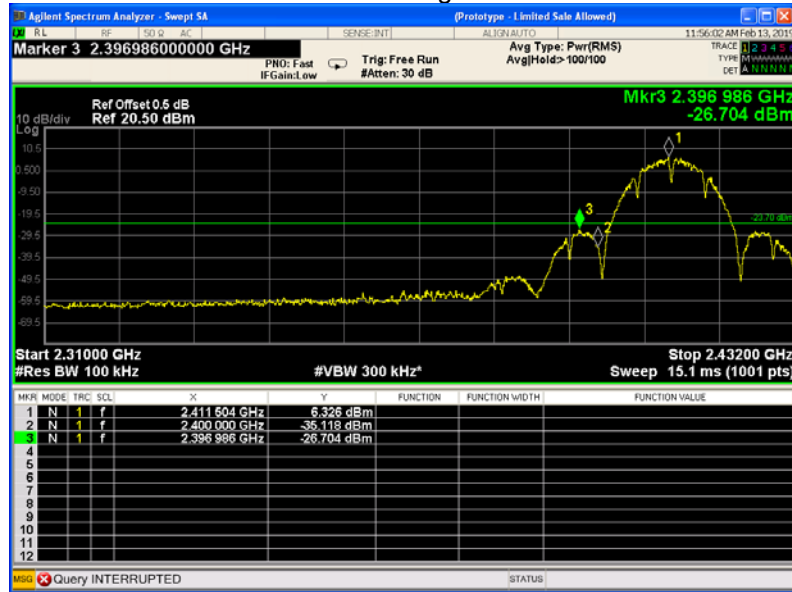


TX 11n HT40: Band edge-right side



ANT 1

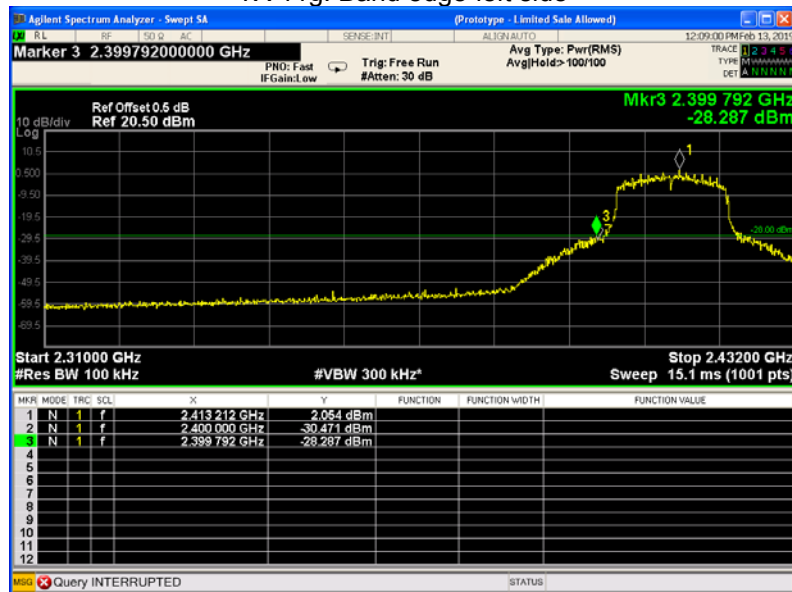
TX 11b: Band edge-left side



TX 11b: Band edge-right side



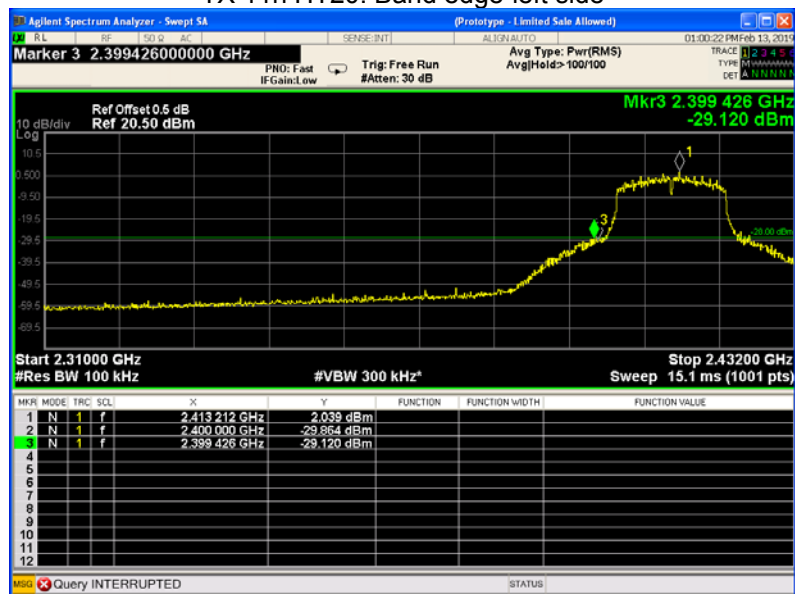
TX 11g: Band edge-left side



TX 11g: Band edge-right side



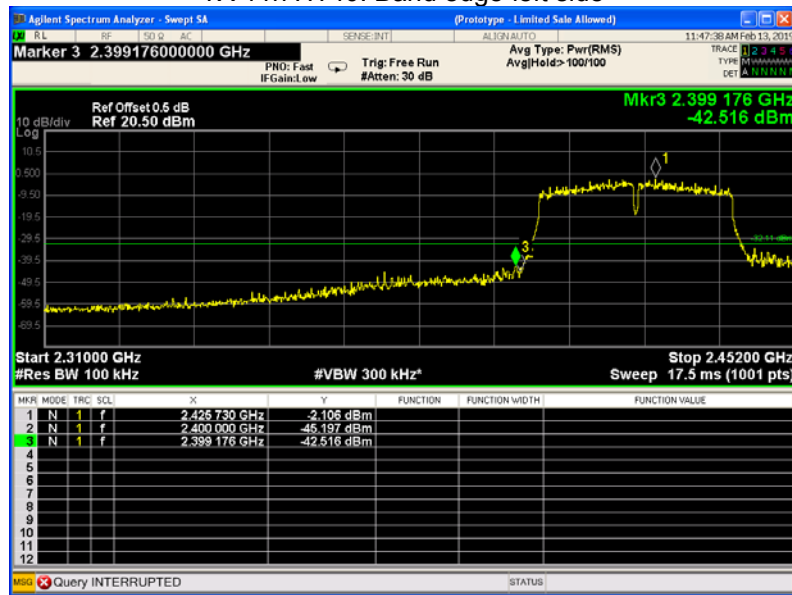
TX 11n HT20: Band edge-left side



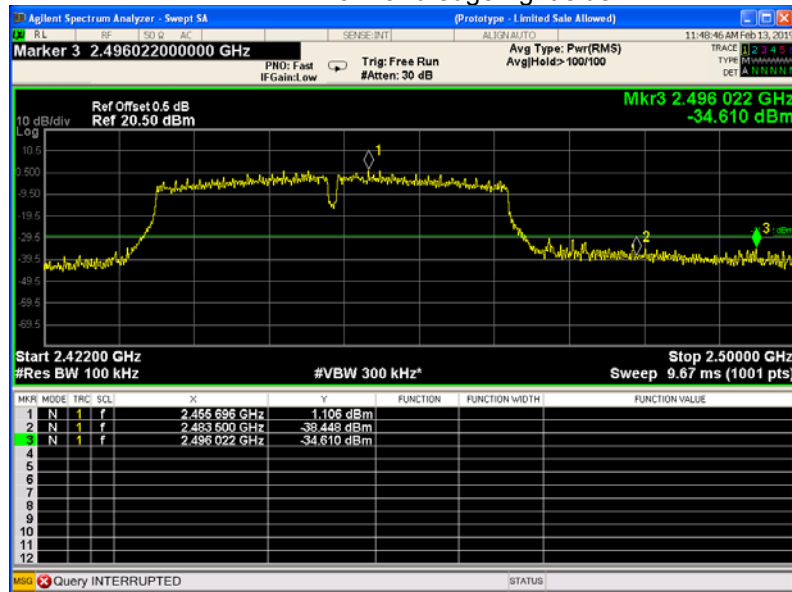
TX 11n HT20: Band edge-right side



TX 11n HT40: Band edge-left side



TX 11n HT40: Band edge-right side



12 6 dB Bandwidth Measurement

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB 558074 D01 15.247 Meas Guidance v05 August 24, 2018;

ANSI C63.10:2013

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 0

Operation mode	Test Channel	6dB Bandwidth (MHz)	99% Bandwidth (MHz)
TX 11b	Channel 1	10.06	14.257
	Channel 6	10.08	14.484
	Channel 11	10.05	14.135
TX 11g	Channel 1	15.09	16.297
	Channel 6	15.09	16.328
	Channel 11	15.07	16.373
TX 11n HT20	Channel 1	15.10	17.486
	Channel 6	15.10	17.506
	Channel 11	15.09	17.490
TX 11n HT40	Channel 3	35.06	35.746
	Channel 6	35.07	35.829
	Channel 9	35.07	35.770

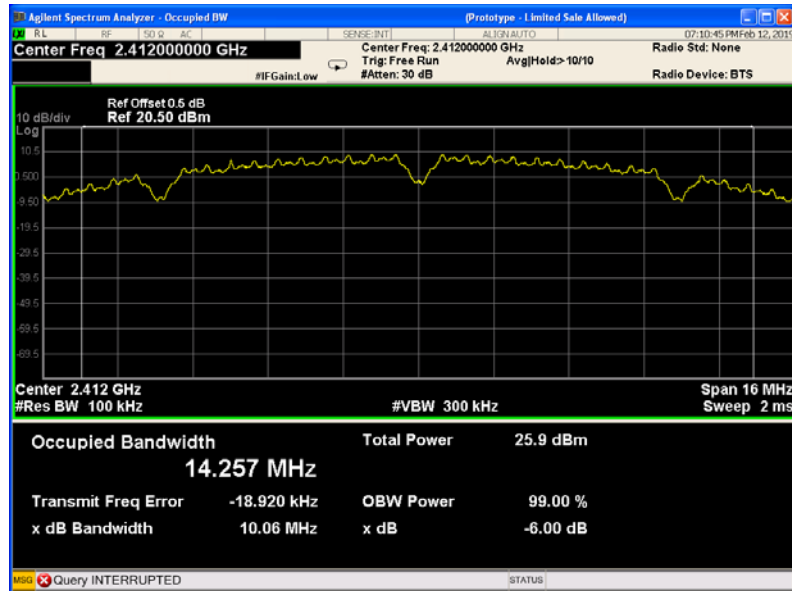
ANT 1

Operation mode	Test Channel	6dB Bandwidth (MHz)	99% Bandwidth (MHz)
TX 11b	Channel 1	10.06	14.176
	Channel 6	10.06	14.316
	Channel 11	10.06	14.209
TX 11g	Channel 1	15.10	17.494
	Channel 6	15.10	17.518
	Channel 11	15.07	17.490
TX 11n HT20	Channel 1	15.09	17.487
	Channel 6	15.10	17.507
	Channel 11	15.11	17.493
TX 11n HT40	Channel 3	35.09	35.779
	Channel 6	35.09	35.774
	Channel 9	35.09	35.787

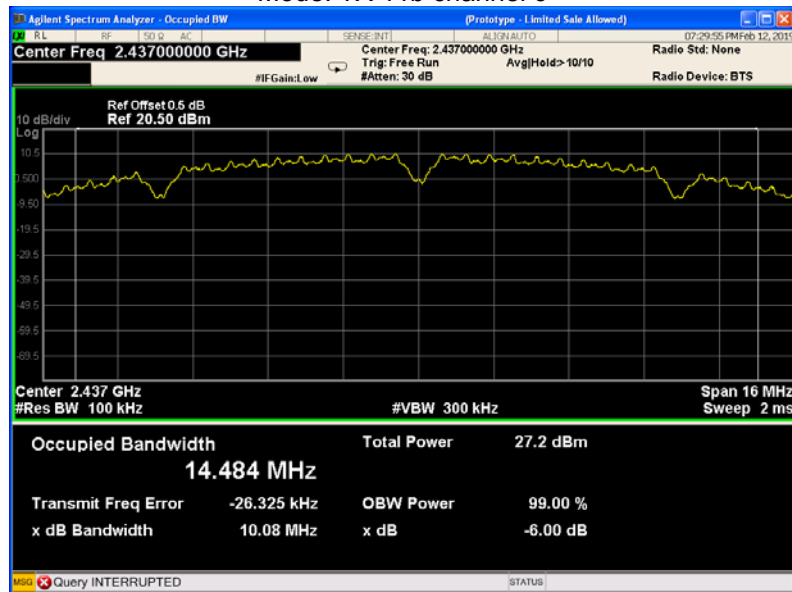
Test result plot:

ANT 0

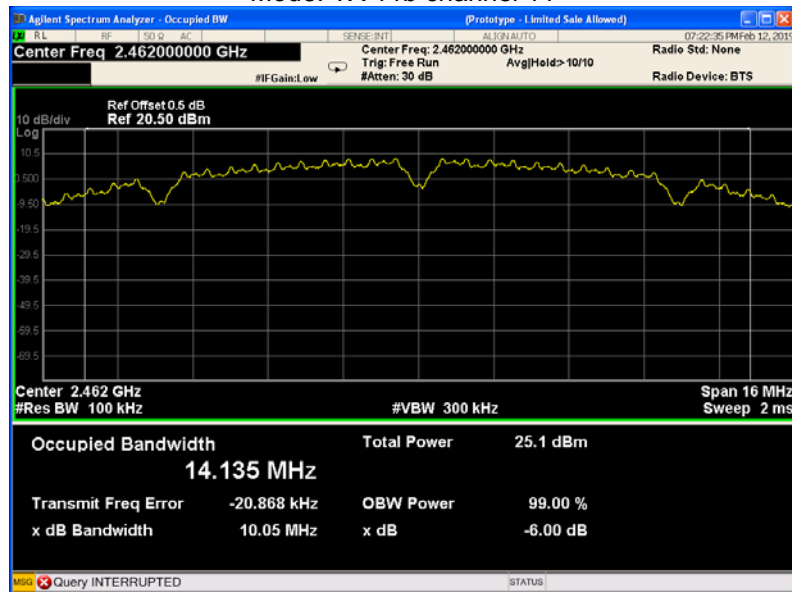
Mode: TX 11b channel 1



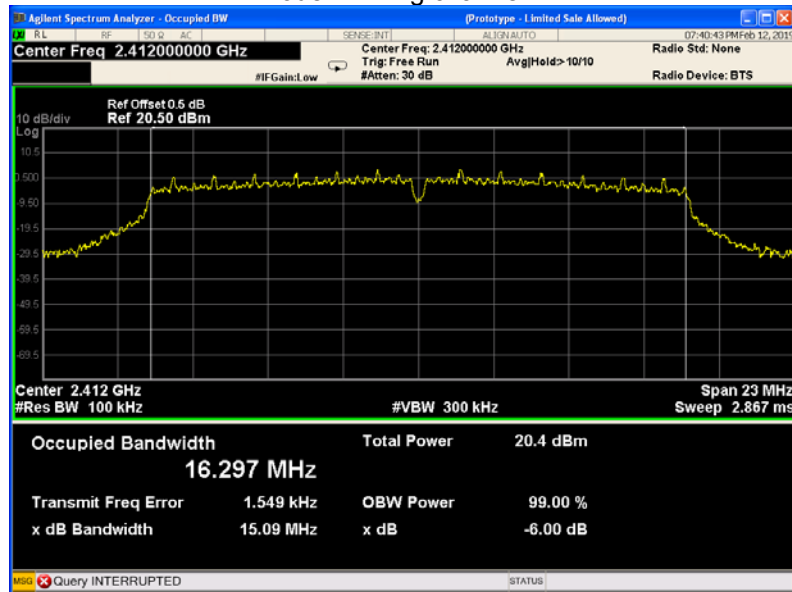
Mode: TX 11b channel 6



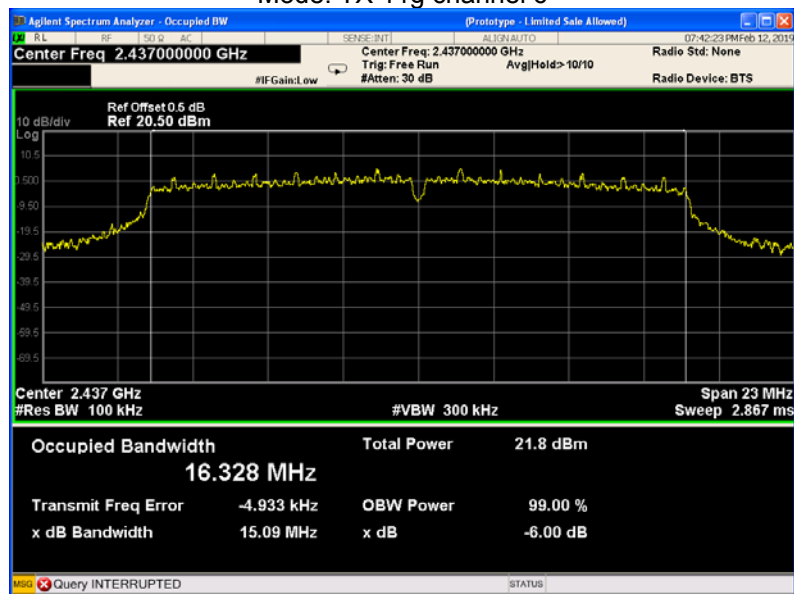
Mode: TX 11b channel 11



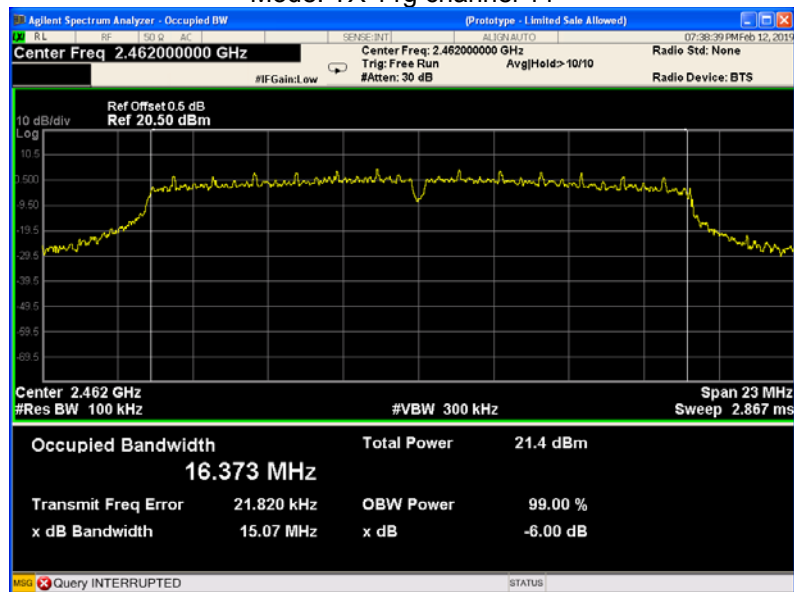
Mode: TX 11g channel 1



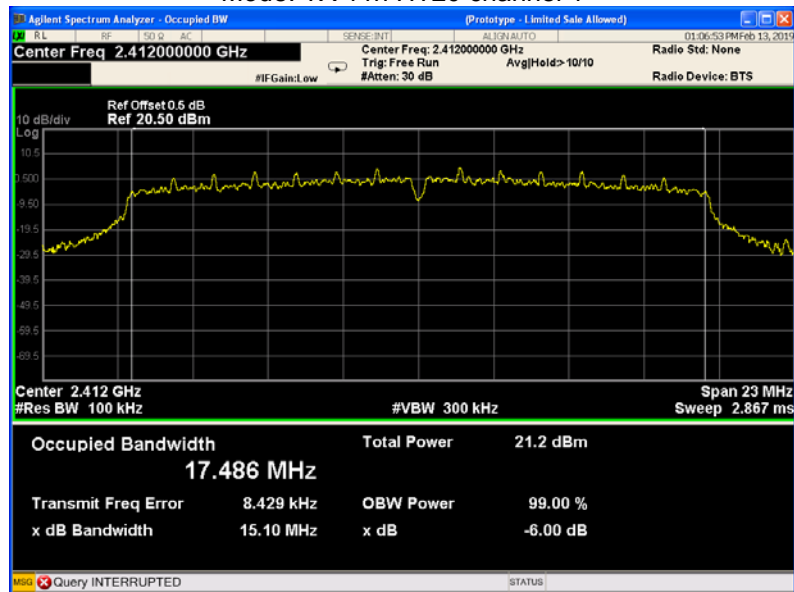
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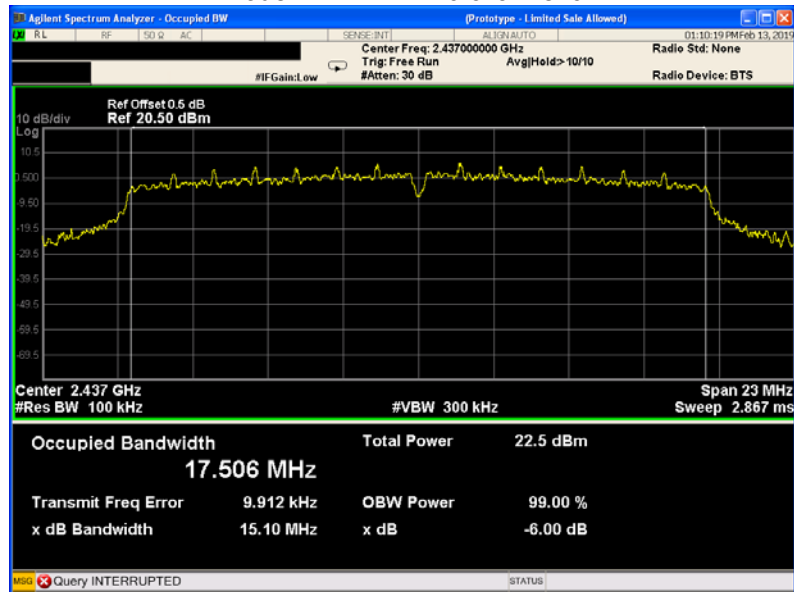
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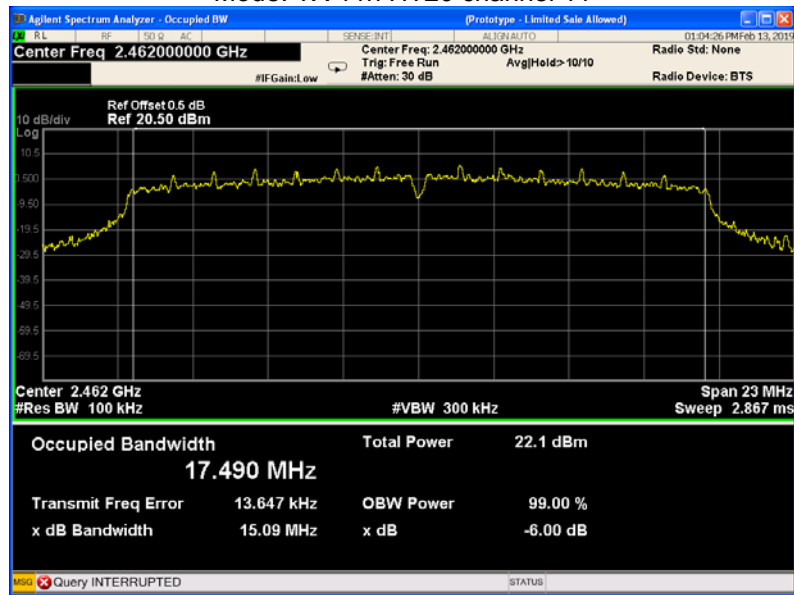
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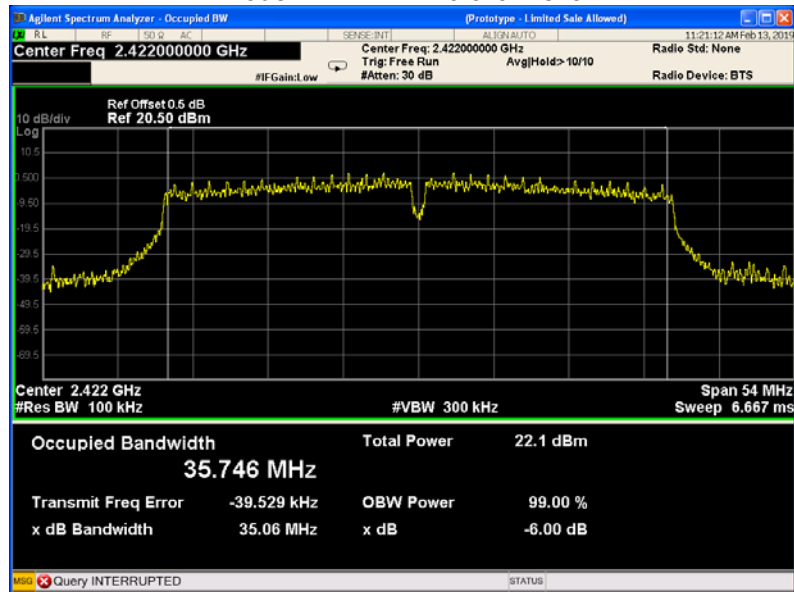
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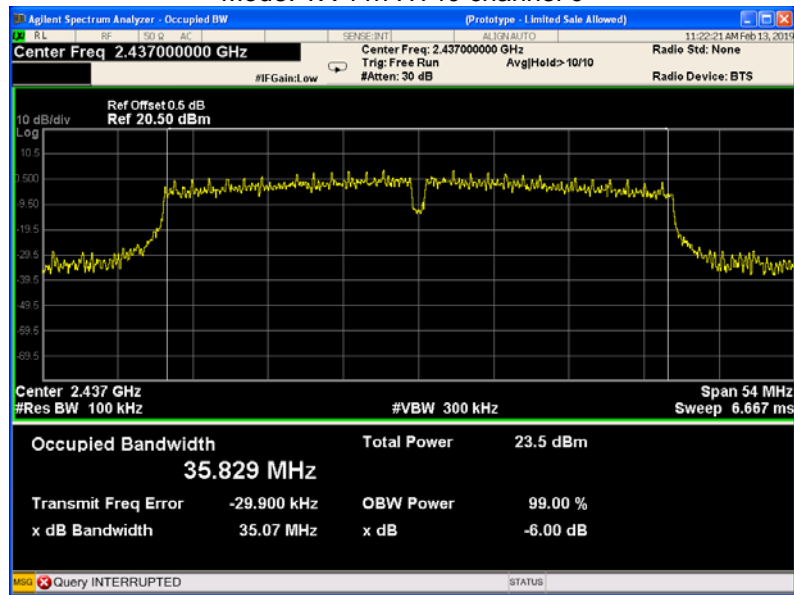
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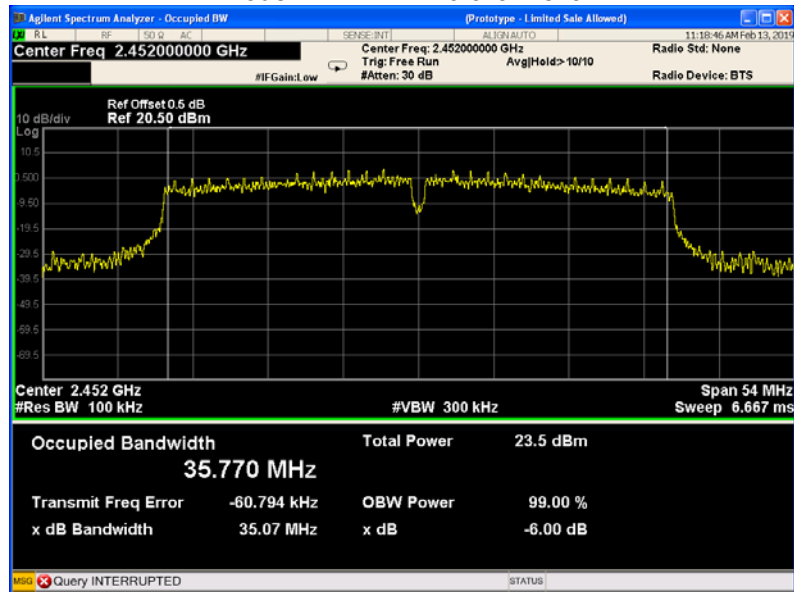
Mode: TX 11n HT40 channel 3



Mode: TX 11n HT40 channel 6

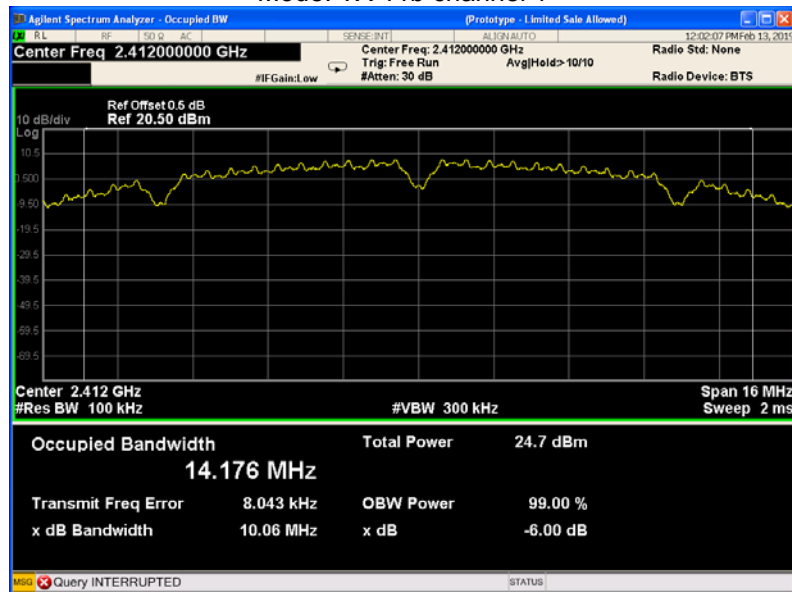


Mode: TX 11n HT40 channel 9

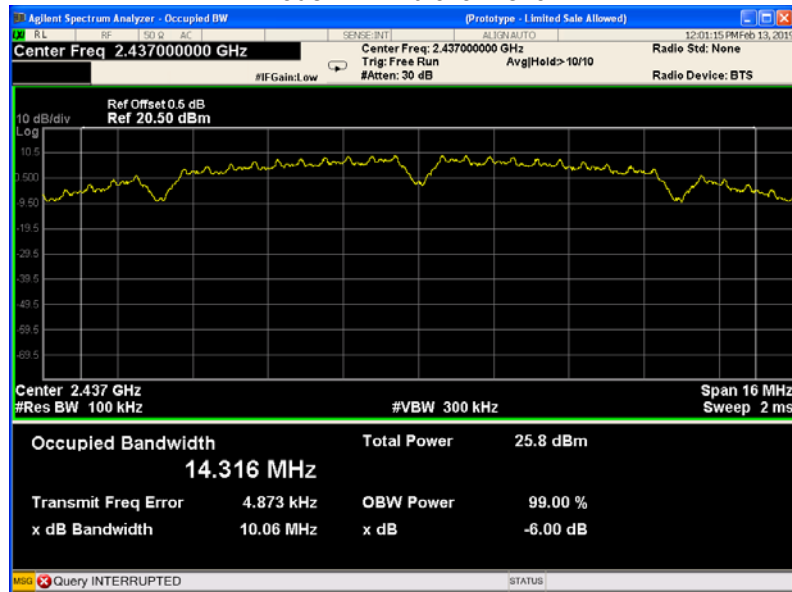


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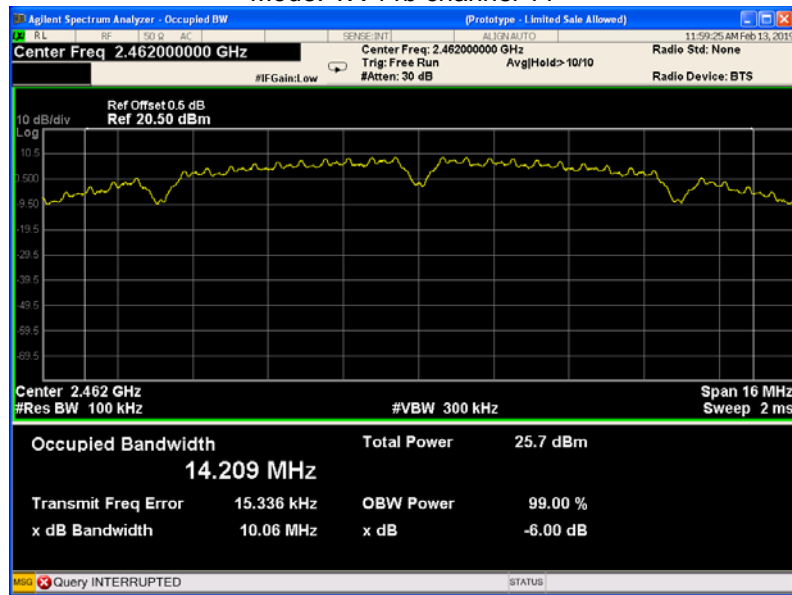
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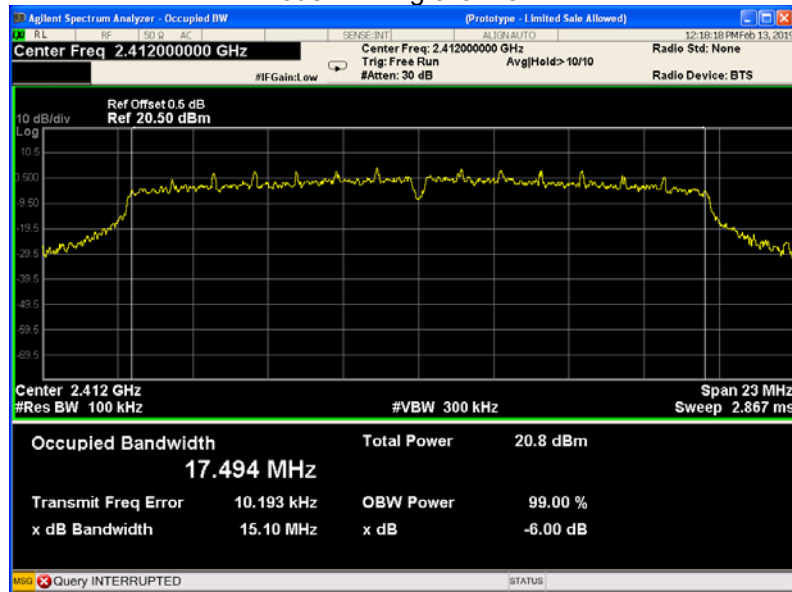
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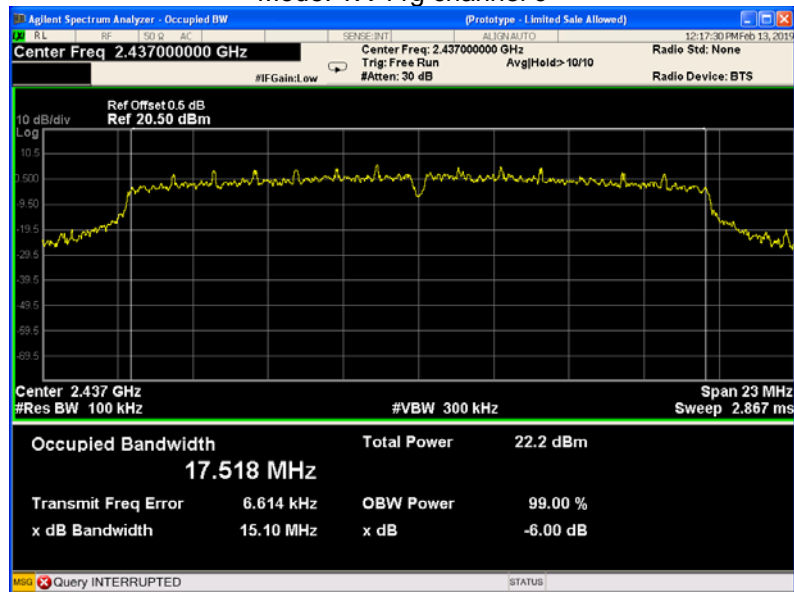
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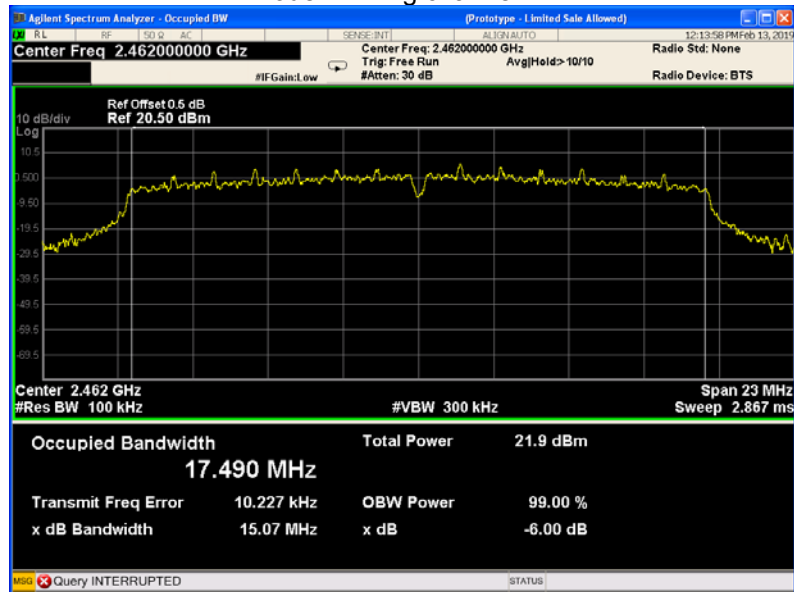
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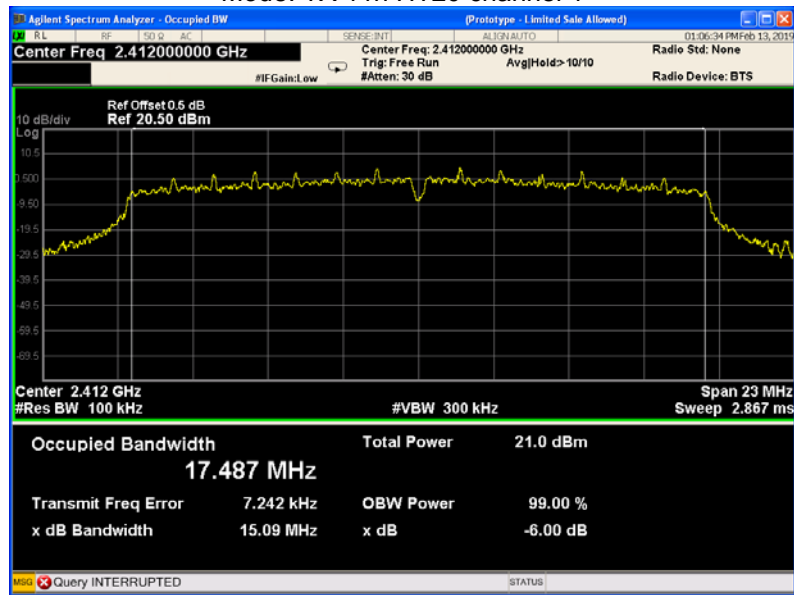
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Mode: TX 11g channel 11



Mode: TX 11n HT20 channel 1



Mode: TX 11n HT20 channel 6

