HCT CO.,LTD.

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FCC / IC DTS REPORT

Certification

Applicant Name:
I&C Technology Co.,Ltd.

Address:
(Sampyeong-dong, I&C Building), 24, Pangyo-ro255beon-gil,Bundang-gu Seongnam-si, South Korea

Date of Issue:
August 08, 2018

Test Site/Location:
HCT CO., LTD., 74,Seoicheon-ro 578beon-gil,Majang-myeo,Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA

Report No.: HCT-RF-1808-FC006

IC Registration Number: 5944A-6

FCC ID:	**2ADXS-WFM60-SFP2501**
IC:	**12641A-WFM6SFP2501**
APPLICANT:	**I&C Technology Co.,Ltd.**

Model:	WFM60-SFP2501
EUT Type:	Dual Module
Peak Output Power:	Wi-Fi 802.11b(21.91 dBm) / Wi-Fi 802.11g (23.73 dBm) / Wi-Fi 802.11n_HT20 (23.82 dBm)
Frequency Range:	2412 MHz - 2462 MHz (2.4 GHz Band)
Modulation type:	CCK/DSSS/OFDM
FCC Classification:	Digital Transmission System(DTS)
FCC Rule Part(s):	Part 15.247
IC Rule Part(s):	RSS-247 Issue 2 (February 2017), RSS-Gen Issue 5(April 2018)

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC / IC Rules under normal use and maintenance.

Report prepared by : Jeong Ho Kim
Engineer of Telecommunication testing center

Approved by : Jong Seok Lee
Manager of Telecommunication testing center

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-1808-FC006	August 08, 2018	- First Approval Report

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1. GENERAL INFORMATION

Applicant:	I&C Technology Co.,Ltd.
Address:	(Sampyeong-dong , I&C Building), 24, Pangyo-ro255beon-gil,Bundang-gu Seongnam-si, South Korea
FCC ID:	2ADXS-WFM60-SFP2501
IC:	12641A-WFM6SFP2501
EUT Type:	Dual Module
Model:	WFM60-SFP2501
Date(s) of Tests:	July 03 , 2018 ~ August 01, 2018
Place of Tests:	HCT Co., Ltd. 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea

2. EUT DESCRIPTION

Model	WFM60-SFP2501	
EUT Type	Dual Module	
Power Supply	3.30 V	
Frequency Range	TX: 2412 MHz ~ 2462 MHz RX: 2412 MHz ~ 2462 MHz	
Max. RF Output Power	Peak	Wi-Fi 802.11b(21.91 dBm) / Wi-Fi 802.11g (23.73 dBm) / Wi-Fi 802.11n_HT20 (23.82 dBm)
	Average	Wi-Fi 802.11b(19.59 dBm) / Wi-Fi 802.11g (17.23 dBm) / Wi-Fi 802.11n_HT20 (16.80 dBm)
Modulation Type	DSSS/CCK(802.11b), OFDM(802.11g, 802.11n)	
Antenna Specification	Antenna type: WIFI Dual band PCB Antenna Peak Gain : 1.98 dBi	

3. TEST METHODOLOGY

FCC KDB 558074 D01 DTS Meas Guidance v04 dated April 05, 2017 entitled “Guidance for Performing Compliance Measurements on Digital Transmission Systems(DTS) and the measurement procedure described in ANSI C63.10(Version : 2013) ‘the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices’.

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C/ RSS-Gen issue 5, RSS-247 issue 2.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10. (Version :2013) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane below 1GHz. Above 1GHz with 1.5m using absorbers between the EUT and receive antenna. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 8 of ANSI C63.10. (Version: 2013)

Conducted Antenna Terminal

See Section from 9.1 to 9.2.(KDB 558074 v04)

3.4 DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Channel low, mid and high with highest data rate (worst case) is chosen for full testing.

4. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipments, which is traceable to recognized national standards.
Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated April 02, 2018 (Registration Number: KR0032).
For ISED, test facility was accepted dated October 19, 2015(Registration Number: 5944A-6)

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements. Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.
All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

6. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.”
*The antennas of this E.U.T are permanently attached.
*The E.U.T Complies with the requirement of §15.203

7. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.

All measurement uncertainty values are shown with a coverage factor of k = 2 to indicate a 95 % level of confidence.

Parameter	Expanded Uncertainty (±dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.82
Radiated Disturbance (9 kHz ~ 30 MHz)	3.40
Radiated Disturbance (30 MHz ~ 1 GHz)	4.80
Radiated Disturbance (1 GHz ~ 18 GHz)	5.70
Radiated Disturbance (18 GHz ~ 40 GHz)	5.71

8. SUMMARY TEST OF RESULTS

8.1 FCC Part

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
6 dB Bandwidth	§15.247(a)(2)	> 500 kHz	CONDUCTED	PASS
Conducted Maximum Peak Output Power	§15.247(b)(3)	< 1 Watt		PASS
Power Spectral Density	§15.247(e)	< 8 dBm / 3 kHz Band		PASS
Band Edge(Out of Band Emissions)	§15.247(d)	Conducted > 20 dBc		PASS
AC Power line Conducted Emissions	§15.207	cf. Section 9.8		PASS
Radiated Spurious Emissions	§15.205, 15.209	cf. Section 9.7.1	RADIATED	PASS
Radiated Restricted Band Edge	§15.247(d), 15.205, 15.209	cf. Section 9.7.2		PASS

8.2 IC Part

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
6 dB Bandwidth	RSS-247, 5.2.(a)	> 500 kHz	CONDUCTED	PASS
99% Bandwidth	RSS-GEN, 6.7	NA		PASS
Conducted Maximum Peak Output Power And e.i.r.p.	RSS-247, 5.4.(d)	< 1 Watt <4 Watt(e.i.r.p.)		PASS
Power Spectral Density	RSS-247, 5.2.(b)	< 8 dBm / 3 kHz Band		PASS
Band Edge(Out of Band Emissions)	RSS-247, 5.5	Conducted > 20 dBc		PASS
AC Power line Conducted Emissions	RSS-GEN, 8.8	RSS-GEN section 8.8 table 4		PASS
Radiated Spurious Emissions	RSS-GEN, 8.9	RSS-GEN section 8.9 table 5, 6	RADIATED	PASS
Receiver Spurious Emissions	RSS-GEN, 5 RSS-GEN, 7.3	RSS-GEN section 7.3 table 3		PASS
Radiated Restricted Band Edge	RSS-GEN, 8.10	RSS-GEN section 8.10 table 7		PASS

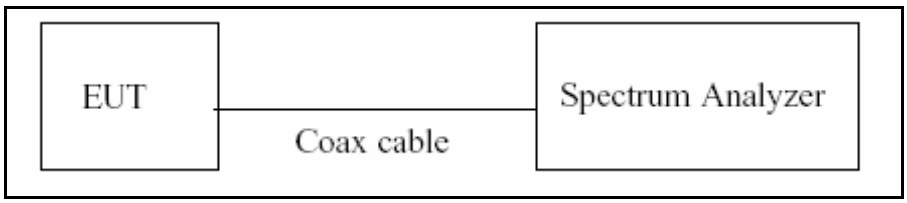
9. TEST RESULT

9.1 DUTY CYCLE

According to Section 6.0)b) in KDB 558074 v04

The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set RBW ≥ OBW if possible; otherwise, set RBW to the largest available value. Set VBW ≥ RBW. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if T ≤ 16.7 microseconds.)

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer. We tested accroding to the zero-span measurement method, 6.0)b) in KDB 558074 v04

The largest availble value of RBW is 8 MHz and VBW is 50 MHz. The zero-span method of measuring duty cycle shall not be used if T ≤ 6.25 microseconds. (50/6.25 = 8)

The zero-span method was used because all measured T data are > 6.25 microseconds and both RBW and VBW are > 50/*T*.

1. RBW = 8 MHz (the largest availble value)
2. VBW = 8 MHz (≥ RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on}/ T_{total} and Duty Cycle Factor = 10*log(1/Duty Cycle)

▣ **Duty Cycle Factor**

Mode	Data Rate	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
b	1 Mbps	32.110	32.310	0.99380997	0.027
	2 Mbps	16.200	16.400	0.98780488	0.053
	5.5 Mbps	5.934	6.154	0.96425089	0.158
	11 Mbps	3.026	3.247	0.93193717	0.306
g	6 Mbps	5.354	5.434	0.98527788	0.064
	9 Mbps	3.608	3.668	0.98364231	0.072
	12 Mbps	2.694	2.769	0.97291441	0.119
	18 Mbps	1.799	1.874	0.95997866	0.177
	24 Mbps	1.362	1.430	0.95244755	0.212
	36 Mbps	0.914	0.982	0.93075356	0.312
	48 Mbps	0.689	0.757	0.91017173	0.409
	54 Mbps	0.615	0.685	0.89781022	0.468
n_HT20	MCS0_6.5 Mbps	3.884	3.960	0.98080808	0.084
	MCS1_13 Mbps	1.956	2.024	0.96640316	0.148
	MCS2_19.5 Mbps	1.321	1.392	0.94899425	0.227
	MCS3_26 Mbps	0.997	1.068	0.93352060	0.299
	MCS4_39 Mbps	0.675	0.745	0.90604027	0.429
	MCS5_52 Mbps	0.516	0.586	0.88054608	0.552
	MCS6_58.5 Mbps	0.462	0.532	0.86842105	0.613
	MCS7_65 Mbps	0.419	0.487	0.86036961	0.653

Note : Duty Cycle Factor = 10*log(1/Duty Cycle). where, Duty Cycle = T_{on} / T_{total}

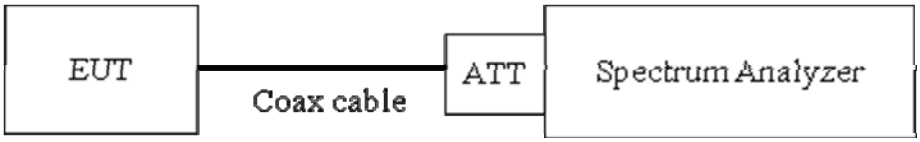
9.2 6dB BANDWIDTH

Test Requirements and limit, §15.247(a)(2) / RSS-247(Issue 2) Section 5.2.

The bandwidth at 6dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the receive antenna while the EUT is operating in transmission mode at the appropriate frequencies.

The minimum permissible 6dB bandwidth is 500 kHz.

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to (Procedure 8.1 in KDB 558074 v04)

RBW = 100 kHz

VBW ≥ 3 x RBW

Detector = Peak

Trace mode = max hold

Sweep = auto couple

Allow the trace to stabilize

Note : We tested 6 dB bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer. X dB is set 6 dB.

Conducted 6dB Bandwidth Measurements for 802.11b

802.11b Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	9.086	0.500	Pass
2417	2	9.030	0.500	Pass
2437	6	8.605	0.500	Pass
2457	10	9.052	0.500	Pass
2462	11	9.069	0.500	Pass

Conducted 6dB Bandwidth Measurements for 802.11g

802.11g Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	16.34	0.500	Pass
2417	2	16.29	0.500	Pass
2437	6	16.35	0.500	Pass
2457	10	16.33	0.500	Pass
2462	11	16.37	0.500	Pass

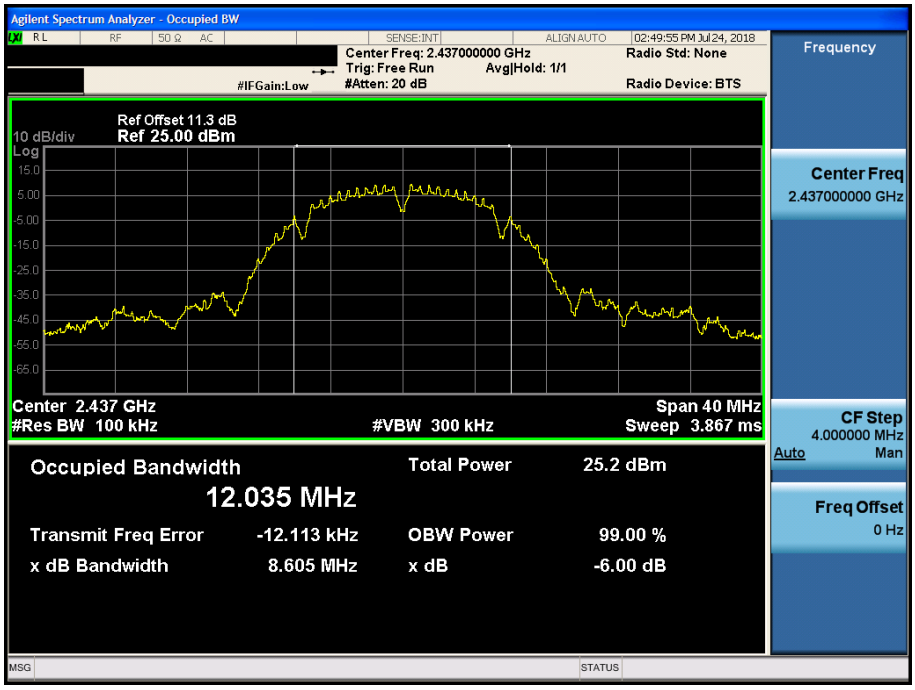
Conducted 6dB Bandwidth Measurements for 802.11n_HT20

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	16.35	0.500	Pass
2417	2	16.43	0.500	Pass
2437	6	16.29	0.500	Pass
2457	10	16.30	0.500	Pass
2462	11	16.31	0.500	Pass

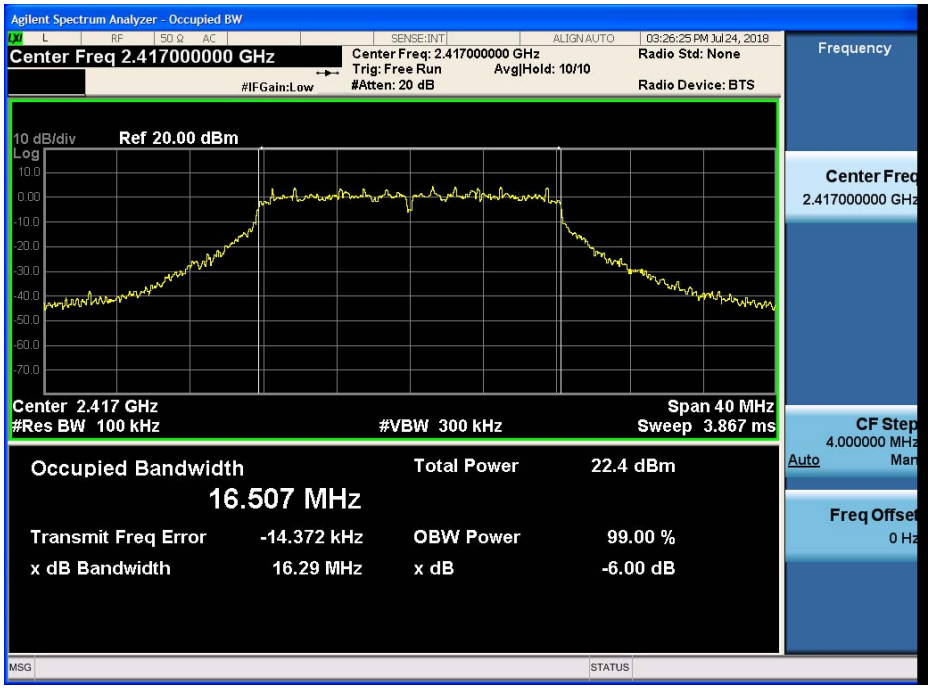
Note : In order to simplify the report, attached plots were only the most narrow 6 dB BW channel.

▣ RESULT PLOTS

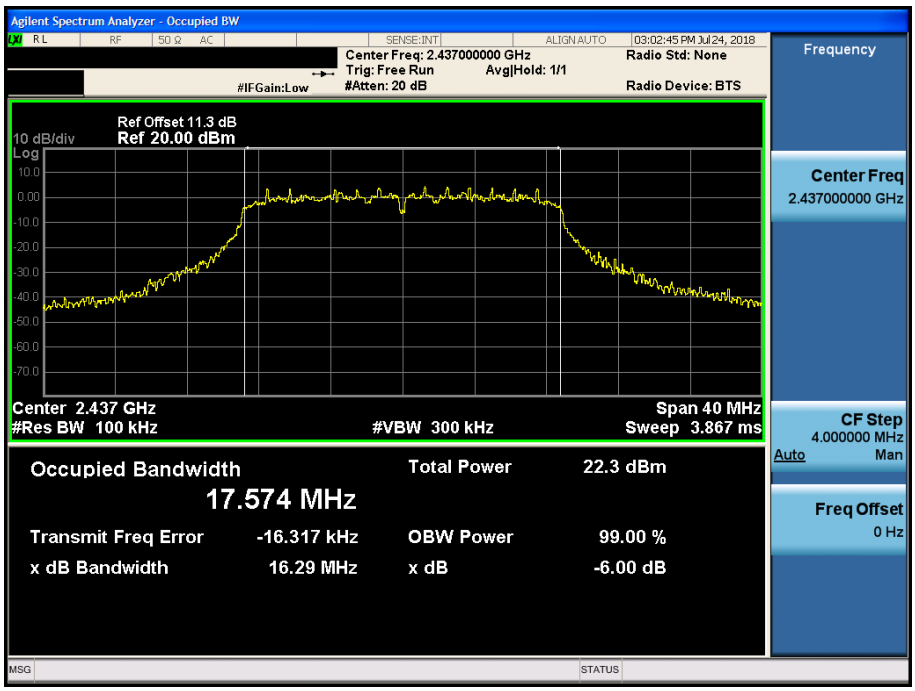
6dB Bandwidth plot (802.11b-CH 6)



6dB Bandwidth plot (802.11g-CH 2)



6dB Bandwidth plot (802.11n_HT20-CH 6)

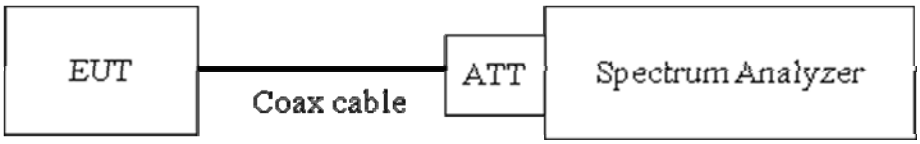


9.3 99% BANDWIDTH

Limit, RSS-Gen(Issue 5) Section 6.7

The 99 % bandwidth is used to determine the conducted power limits.

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer.

RBW = 1% ~ 5% of the occupied bandwidth
VBW ≒ 3 x RBW
Detector = Peak
Trace mode = max hold
Sweep = auto couple
Allow the trace to stabilize

Note : We tested OBW using the automatic bandwidth measurement capability of a spectrum analyzer.

▣ TEST RESULT

Conducted 99% Bandwidth Measurements for 802.11b

802.11b Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	12.248	N/A
2417	2	12.240	N/A
2437	6	12.074	N/A
2457	10	12.187	N/A
2462	11	12.177	N/A

Conducted 99% Bandwidth Measurements for 802.11g

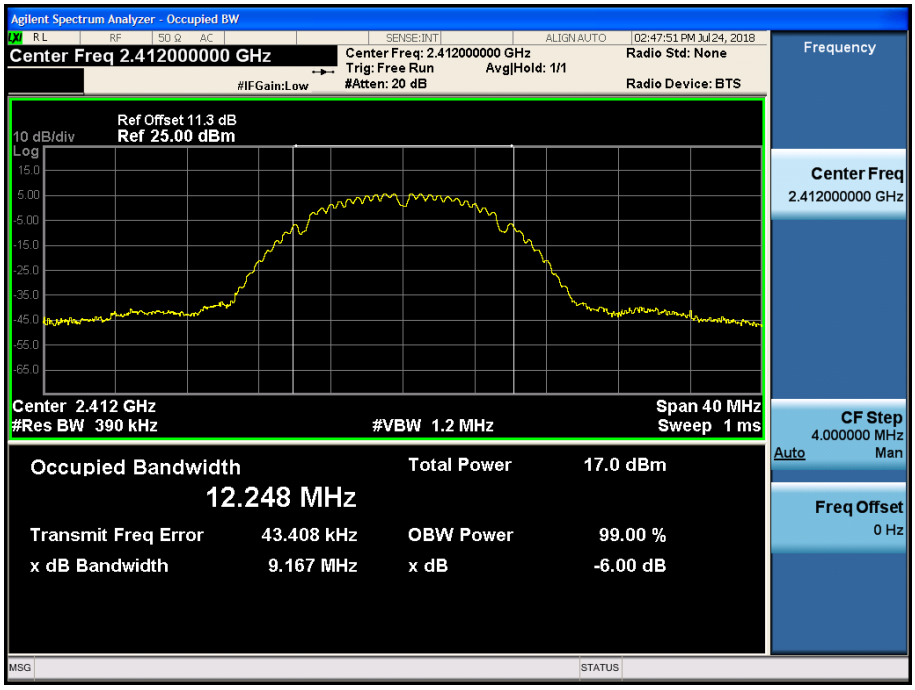
802.11g Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	17.252	N/A
2417	2	17.219	N/A
2437	6	17.267	N/A
2457	10	17.246	N/A
2462	11	17.318	N/A

Conducted 99% Bandwidth Measurements for 802.11n_HT20

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	18.037	N/A
2417	2	18.006	N/A
2437	6	18.025	N/A
2457	10	18.065	N/A
2462	11	18.049	N/A

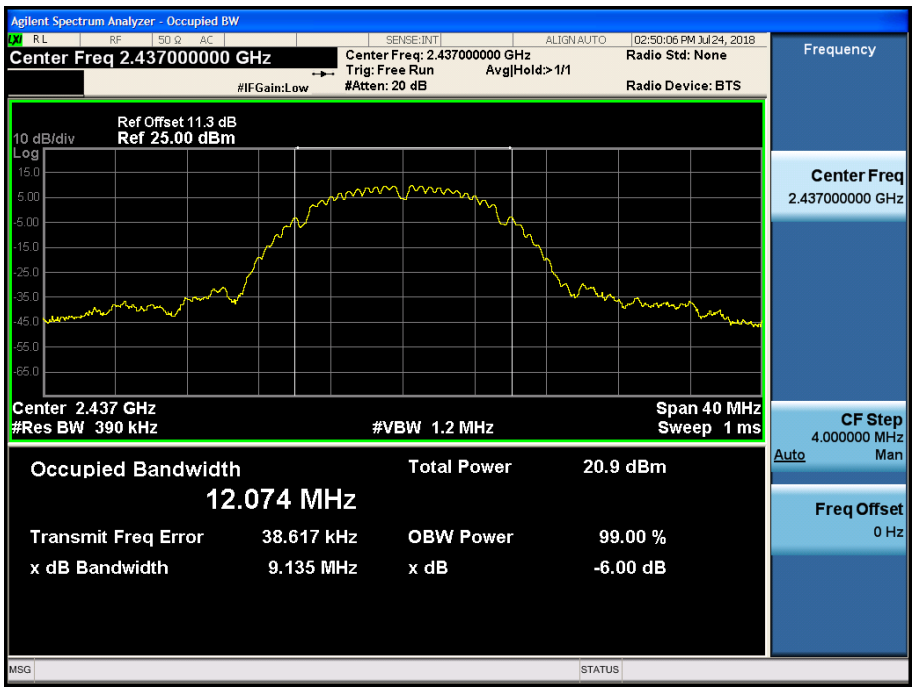
▣ RESULT PLOTS

99% Bandwidth plot (802.11b - CH 1)

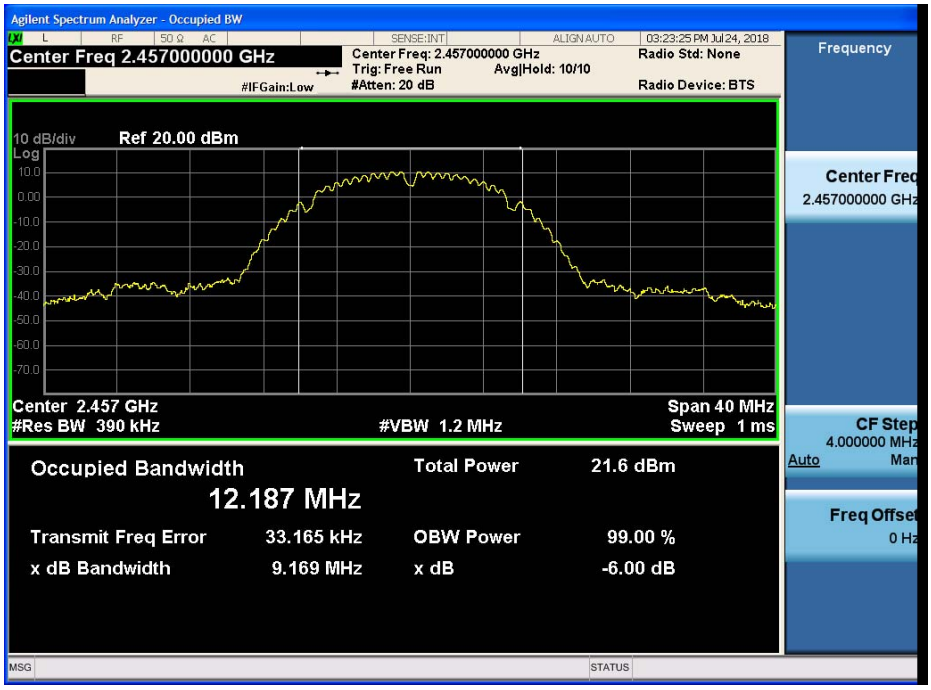


99% Bandwidth plot (802.11b - CH 2)

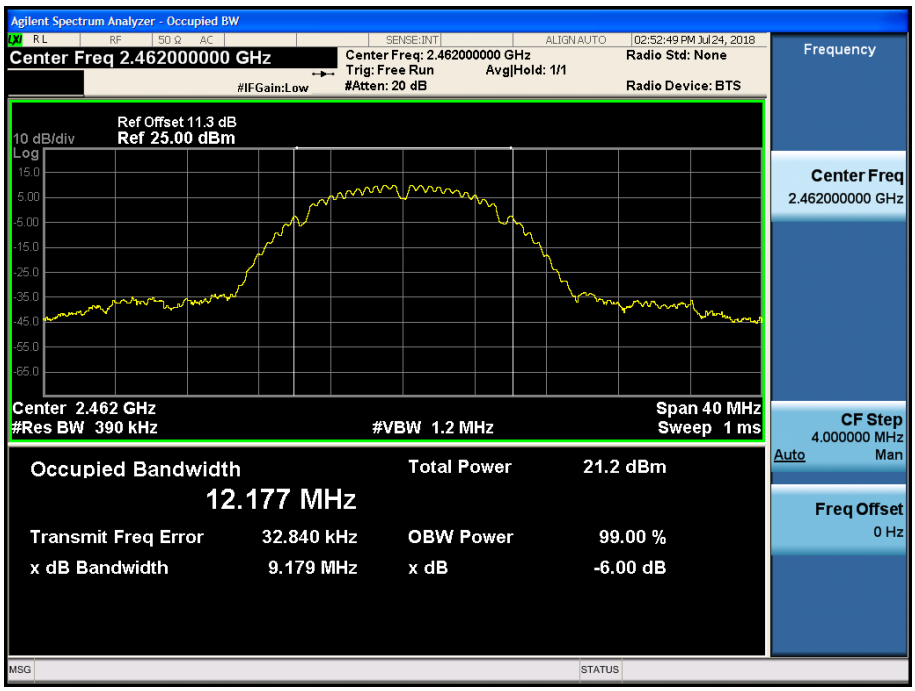
99% Bandwidth plot (802.11b - CH 6)



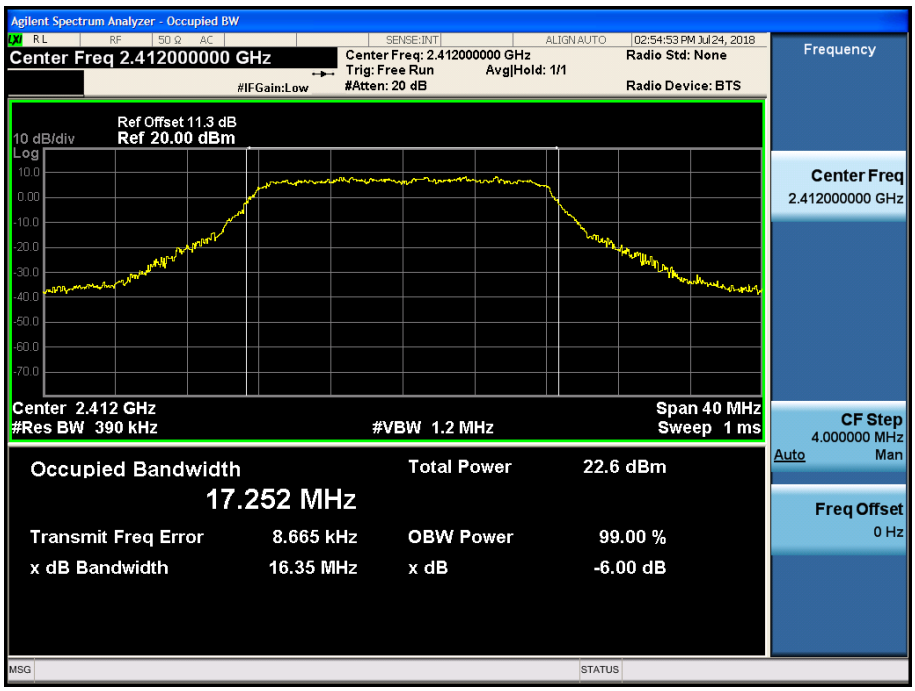
99% Bandwidth plot (802.11b - CH 10)



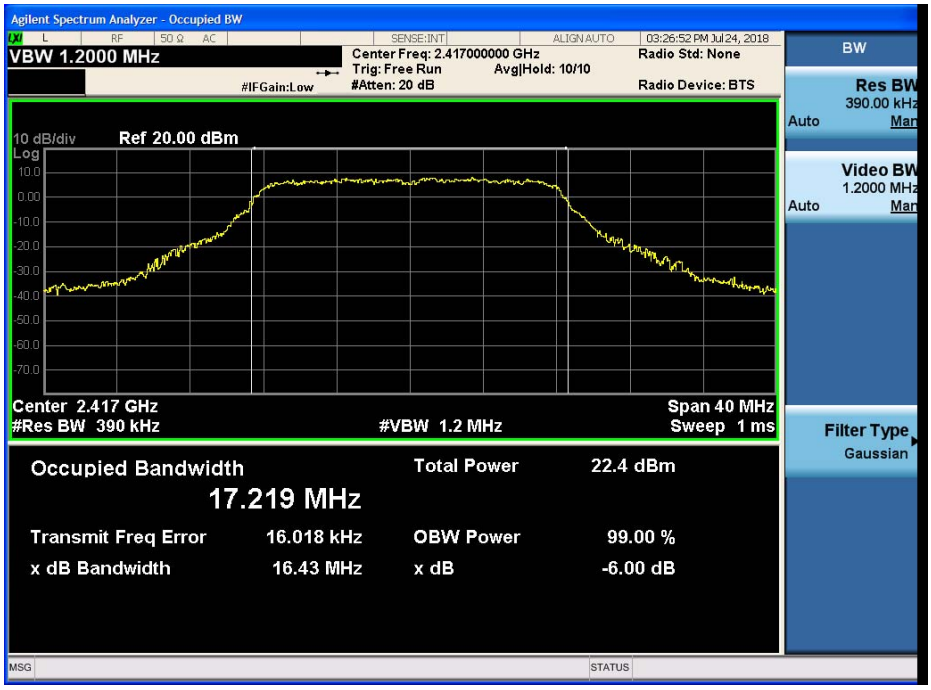
99% Bandwidth plot (802.11b - CH 11)



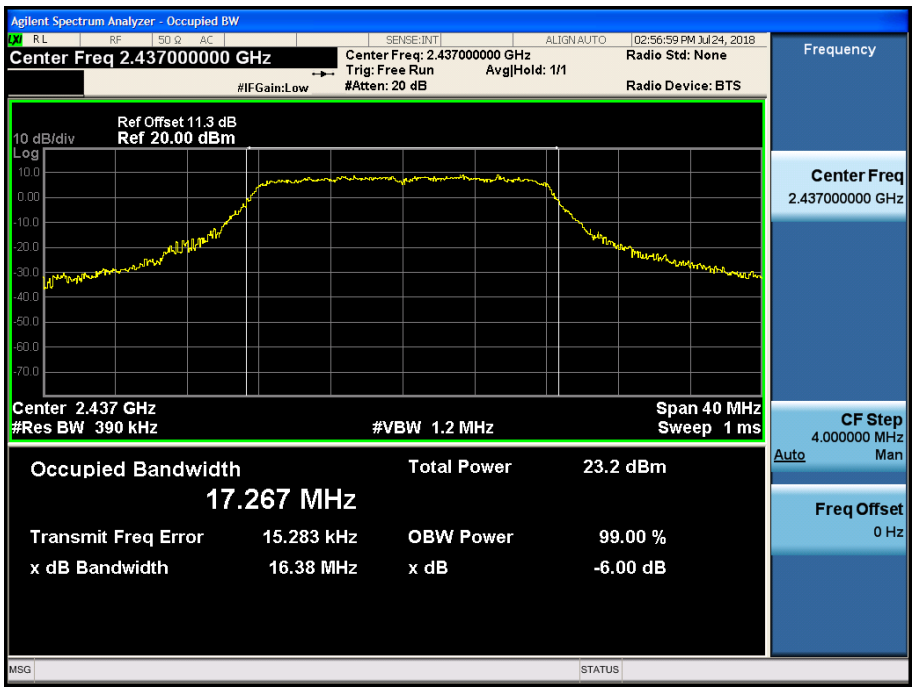
99% Bandwidth plot (802.11g - CH 1)



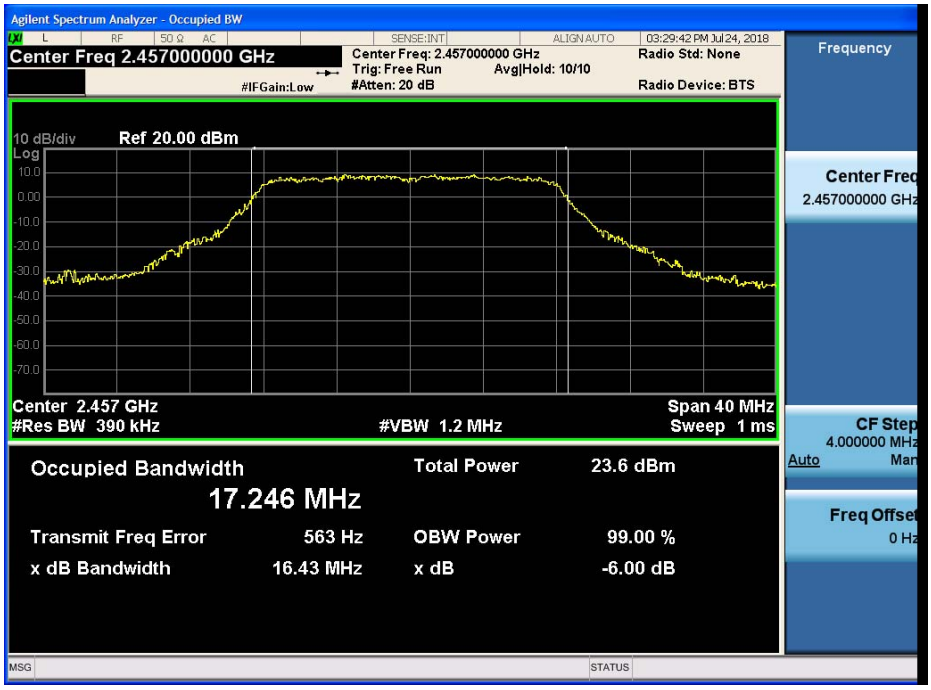
99% Bandwidth plot (802.11g - CH 2)



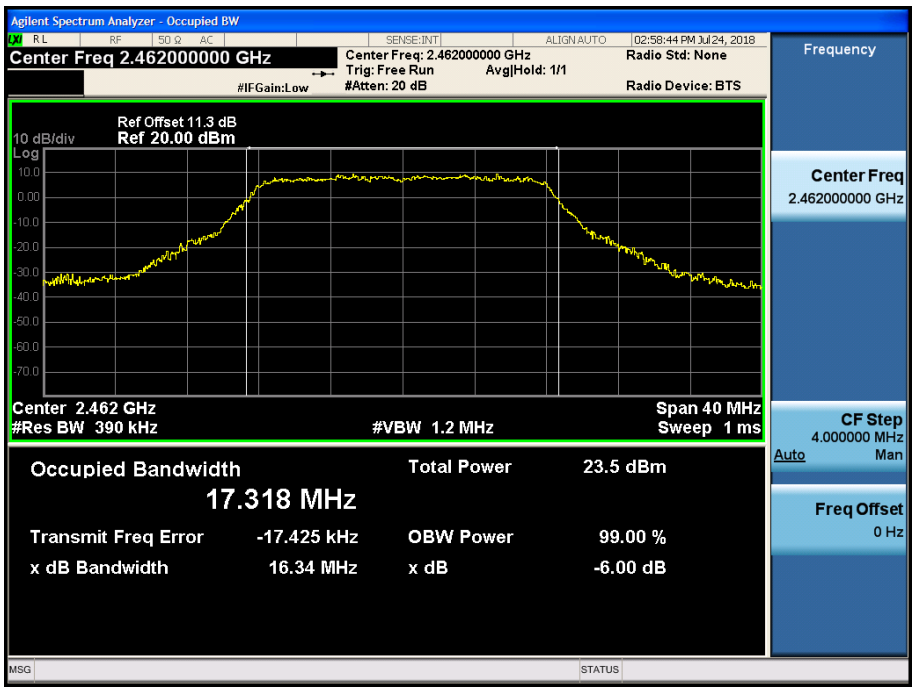
99% Bandwidth plot (802.11g - CH 6)



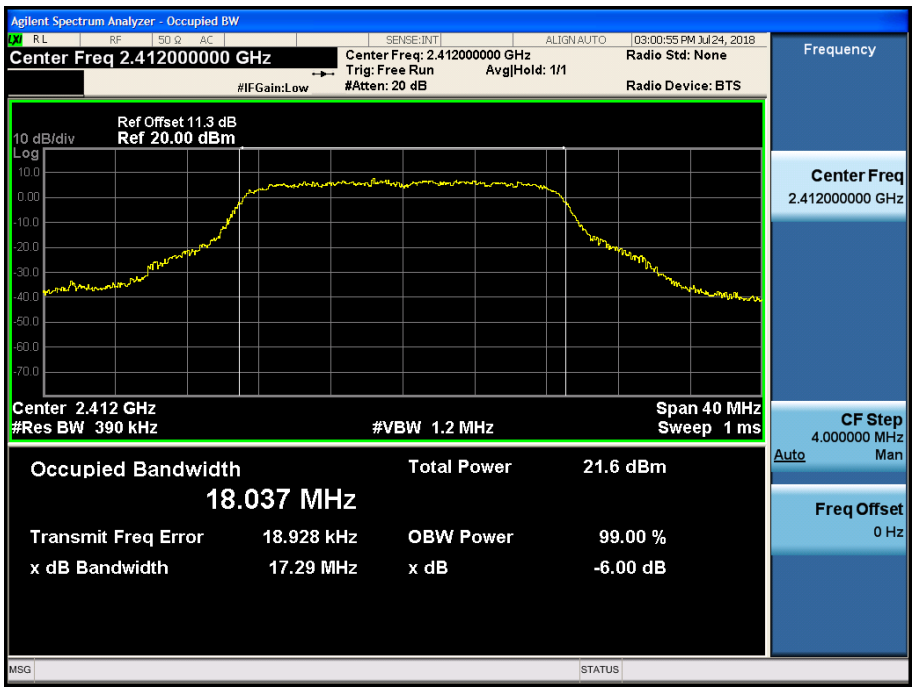
99% Bandwidth plot (802.11g - CH 10)



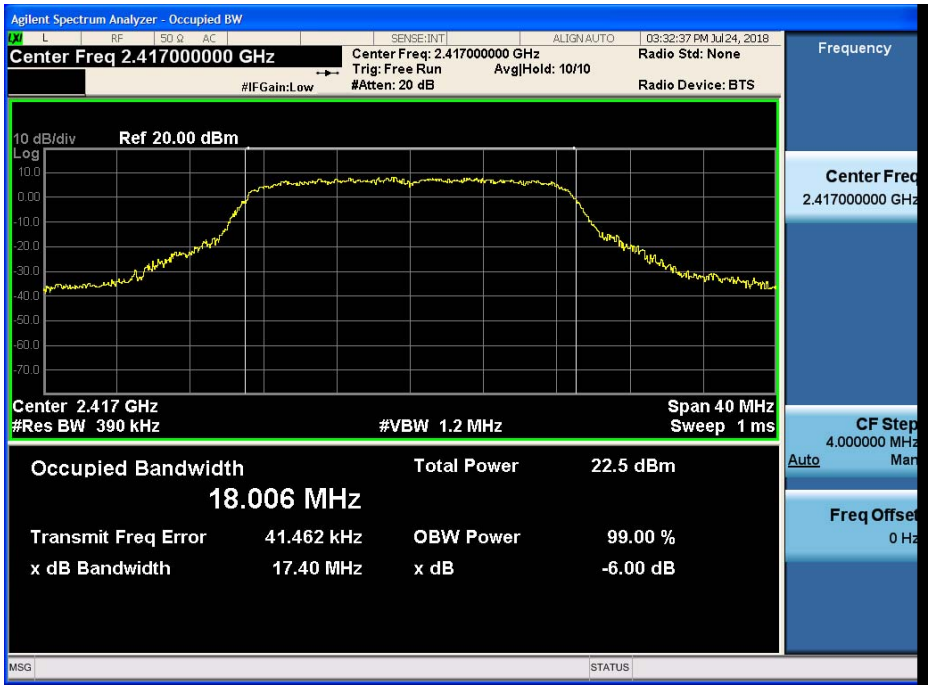
99% Bandwidth plot (802.11g - CH 11)



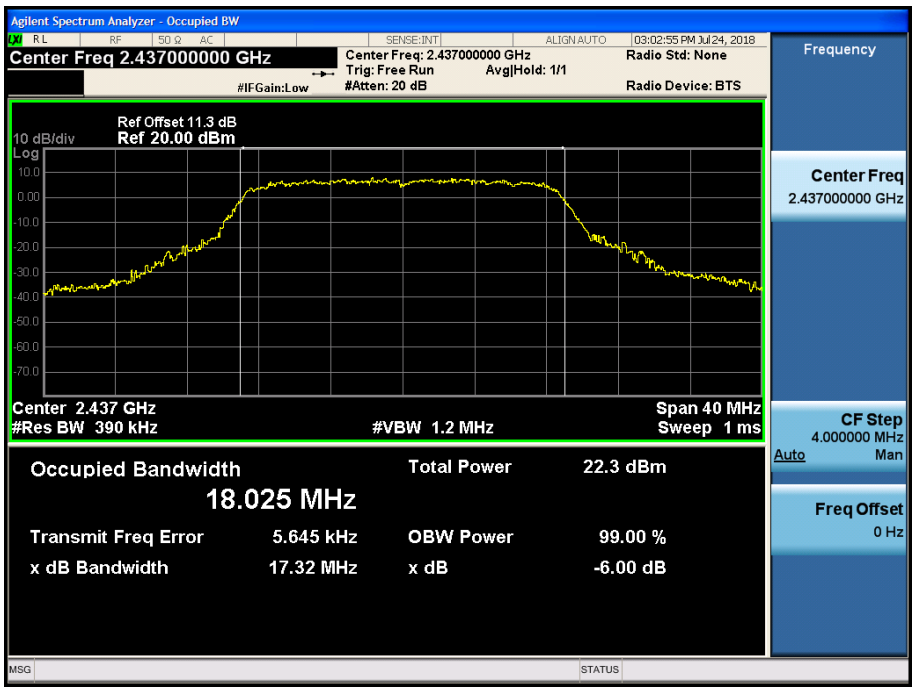
99% Bandwidth plot (802.11n_HT20 - CH 1)



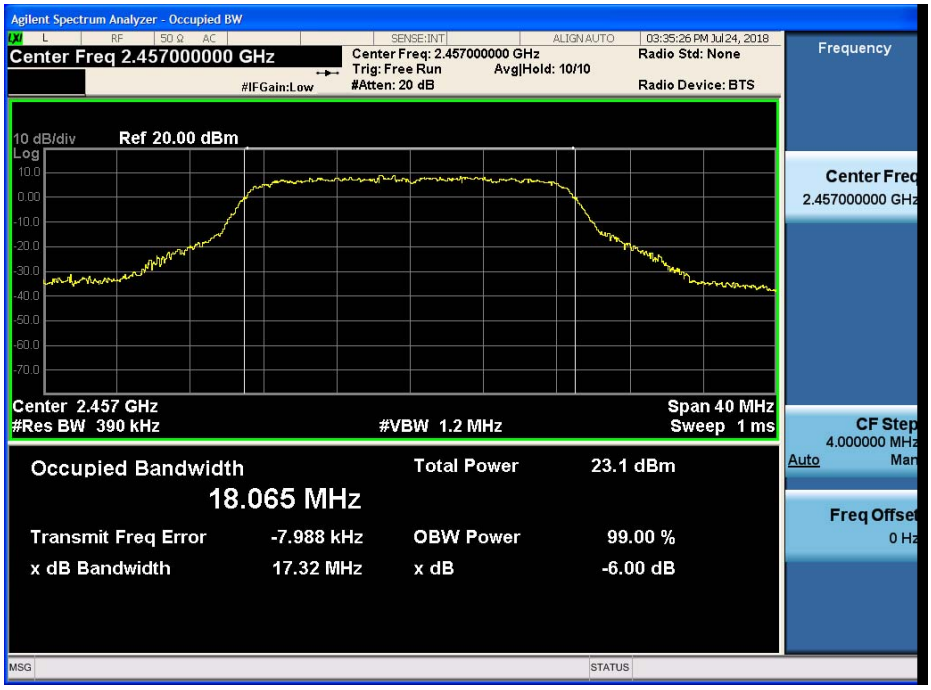
99% Bandwidth plot (802.11n_HT20 - CH 2)



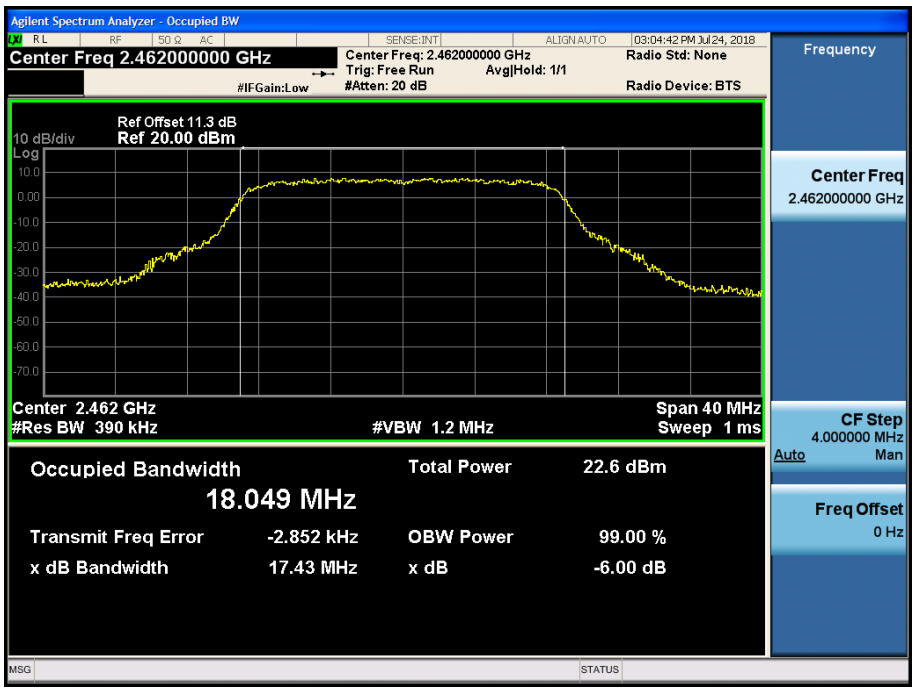
99% Bandwidth plot (802.11n_HT20 - CH 6)



99% Bandwidth plot (802.11n_HT20 - CH 10)



99% Bandwidth plot (802.11n_HT20 - CH 11)



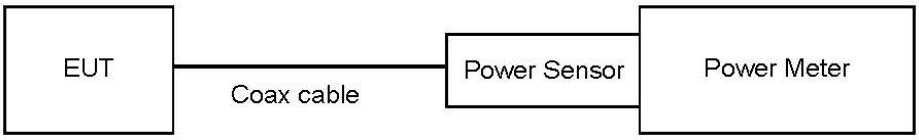
9.4 OUTPUT POWER (802.11b/g/n)

Test Requirements and limit, §15.247(b)(3) / RSS-247(Issue 2) Section 5.4.(d)

The transmitter output is connected to the input of an RF power sensor. Measurement is made using a broadband power meter capable of making peak and average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

The maximum permissible conducted output power is 1 Watt.

▣ TEST CONFIGURATION(20 MHz BW)



▣ TEST PROCEDURE(20 MHz BW)

- Peak Power (Procedure 9.1.2 in KDB 558074 v04)
  1. Measure the peak power of the transmitter.
- Average Power (Procedure 9.2.3.1 in KDB 558074 v04)
  1. Measure the duty cycle.
  2. Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
  3. Add 10 log (1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

Note :

1. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB. So, 10.6 dB is offset for 2.4 GHz Band.
   Actual value of loss for the attenuator and cable combination is below table.

Band	Frequency[MHz]	Loss[dB]
2.4 GHz	2412	10.6
	2437	10.6
	2462	10.6

(Actual value of loss for the attenuator and cable combination)

▣ TEST RESULTS-Peak

Conducted Output Power Measurements (802.11b Mode)

802.11b Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
2412	1	1 Mbps	17.64	30
		2 Mbps	17.66	30
		5.5 Mbps	17.54	30
		11 Mbps	17.70	30
2417	2	1 Mbps	17.58	30
		2 Mbps	17.61	30
		5.5 Mbps	17.43	30
		11 Mbps	17.55	30
2437	6	1 Mbps	21.41	30
		2 Mbps	21.46	30
		5.5 Mbps	21.29	30
		11 Mbps	21.42	30
2457	10	1 Mbps	21.77	30
		2 Mbps	21.83	30
		5.5 Mbps	21.69	30
		11 Mbps	21.91	30
2462	11	1 Mbps	21.73	30
		2 Mbps	21.82	30
		5.5 Mbps	21.72	30
		11 Mbps	21.87	30

▣ TEST RESULTS

Conducted Output Power Measurements (802.11g Mode)

802.11g Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	6 Mbps	22.93	30
		9 Mbps	23.22	30
		12 Mbps	23.25	30
		18 Mbps	23.41	30
		24 Mbps	23.32	30
		36 Mbps	22.94	30
		48 Mbps	21.80	30
		54 Mbps	21.96	30
2417	2	6 Mbps	22.94	30
		9 Mbps	23.64	30
		12 Mbps	23.59	30
		18 Mbps	23.54	30
		24 Mbps	23.45	30
		36 Mbps	23.44	30
		48 Mbps	22.79	30
		54 Mbps	22.81	30
2437	6	6 Mbps	23.47	30
		9 Mbps	23.56	30
		12 Mbps	23.57	30
		18 Mbps	23.53	30
		24 Mbps	23.44	30
		36 Mbps	23.40	30
		48 Mbps	22.72	30
		54 Mbps	22.74	30
2457	10	6 Mbps	23.46	30
		9 Mbps	23.73	30
		12 Mbps	23.68	30
		18 Mbps	23.65	30
		24 Mbps	23.49	30
		36 Mbps	23.45	30
		48 Mbps	22.74	30
		54 Mbps	22.83	30

2462	11	6 Mbps	23.53	30
		9 Mbps	23.66	30
		12 Mbps	23.63	30
		18 Mbps	23.65	30
		24 Mbps	23.49	30
		36 Mbps	23.38	30
		48 Mbps	22.54	30
		54 Mbps	22.60	30

▣ TEST RESULTS

Conducted Output Power Measurements (802.11n_HT20 Mode)

802.11n_HT20 Mode		MCS Index	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	0	22.79	30
		1	22.80	30
		2	23.76	30
		3	21.87	30
		4	22.17	30
		5	21.53	30
		6	21.73	30
		7	21.73	30
2417	2	0	23.33	30
		1	23.42	30
		2	23.78	30
		3	22.81	30
		4	22.94	30
		5	22.55	30
		6	22.74	30
		7	22.75	30
2437	6	0	23.40	30
		1	23.36	30
		2	23.75	30
		3	22.72	30
		4	22.92	30
		5	22.30	30
		6	22.52	30
		7	22.57	30
2457	10	0	23.52	30
		1	23.47	30
		2	23.81	30
		3	22.99	30
		4	23.15	30
		5	22.65	30
		6	22.83	30
		7	22.94	30

2462	11	0	23.35	30
		1	23.34	30
		2	23.82	30
		3	22.69	30
		4	22.89	30
		5	22.25	30
		6	22.49	30
		7	22.61	30

▣ TEST RESULTS-Average

Conducted Output Power Measurements (802.11b Mode)

802.11b Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	1 Mbps	14.60	0.027	14.63	30
		2 Mbps	14.43	0.988	15.42	30
		5.5 Mbps	14.27	0.964	15.23	30
		11 Mbps	14.13	0.932	15.06	30
2417	2	1 Mbps	14.43	0.027	14.46	30
		2 Mbps	14.37	0.988	15.36	30
		5.5 Mbps	14.23	0.964	15.19	30
		11 Mbps	14.02	0.932	14.95	30
2437	6	1 Mbps	18.19	0.027	18.22	30
		2 Mbps	18.10	0.988	19.09	30
		5.5 Mbps	17.88	0.964	18.84	30
		11 Mbps	17.82	0.932	18.75	30
2457	10	1 Mbps	18.67	0.027	18.70	30
		2 Mbps	18.60	0.988	19.59	30
		5.5 Mbps	18.41	0.964	19.37	30
		11 Mbps	18.30	0.932	19.23	30
2462	11	1 Mbps	18.56	0.027	18.59	30
		2 Mbps	18.51	0.988	19.50	30
		5.5 Mbps	18.32	0.964	19.28	30
		11 Mbps	18.22	0.932	19.15	30

▣ TEST RESULTS

Conducted Output Power Measurements (802.11g Mode)

802.11g Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	6 Mbps	15.98	0.064	16.04	30
		9 Mbps	15.81	0.072	15.88	30
		12 Mbps	16.00	0.119	16.12	30
		18 Mbps	15.95	0.177	16.13	30
		24 Mbps	15.91	0.212	16.12	30
		36 Mbps	15.13	0.931	16.06	30
		48 Mbps	14.40	0.910	15.31	30
		54 Mbps	13.70	0.468	14.17	30
2417	2	6 Mbps	15.98	0.064	16.04	30
		9 Mbps	16.58	0.072	16.65	30
		12 Mbps	16.78	0.119	16.90	30
		18 Mbps	16.67	0.177	16.85	30
		24 Mbps	16.64	0.212	16.85	30
		36 Mbps	15.86	0.931	16.79	30
		48 Mbps	15.16	0.910	16.07	30
		54 Mbps	14.37	0.468	14.84	30
2437	6	6 Mbps	16.65	0.064	16.71	30
		9 Mbps	16.37	0.072	16.44	30
		12 Mbps	16.58	0.119	16.70	30
		18 Mbps	16.55	0.177	16.73	30
		24 Mbps	16.50	0.212	16.71	30
		36 Mbps	15.66	0.931	16.59	30
		48 Mbps	14.90	0.910	15.81	30
		54 Mbps	14.13	0.468	14.60	30
2457	10	6 Mbps	16.99	0.064	17.05	30
		9 Mbps	16.88	0.072	16.95	30
		12 Mbps	17.11	0.119	17.23	30
		18 Mbps	16.94	0.177	17.12	30
		24 Mbps	16.81	0.212	17.02	30
		36 Mbps	15.93	0.931	16.86	30
		48 Mbps	15.34	0.910	16.25	30
		54 Mbps	14.72	0.468	15.19	30

2462	11	6 Mbps	17.03	0.064	17.09	30
		9 Mbps	16.73	0.072	16.80	30
		12 Mbps	16.88	0.119	17.00	30
		18 Mbps	16.80	0.177	16.98	30
		24 Mbps	16.71	0.212	16.92	30
		36 Mbps	15.88	0.931	16.81	30
		48 Mbps	15.18	0.910	16.09	30
		54 Mbps	14.47	0.468	14.94	30

▣ TEST RESULTS

Conducted Output Power Measurements (802.11n_HT20 Mode)

802.11n_HT20 Mode		MCS Index	Measured Power(dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	0	15.64	0.084	15.72	30
		1	15.54	0.148	15.69	30
		2	15.37	0.227	15.60	30
		3	15.32	0.299	15.62	30
		4	15.13	0.429	15.56	30
		5	14.40	0.552	14.95	30
		6	13.78	0.613	14.39	30
		7	12.85	0.653	13.50	30
2417	2	0	16.33	0.084	16.41	30
		1	16.34	0.148	16.49	30
		2	16.10	0.227	16.33	30
		3	16.09	0.299	16.39	30
		4	16.02	0.429	16.45	30
		5	15.28	0.552	15.83	30
		6	14.64	0.613	15.25	30
		7	13.73	0.653	14.38	30
2437	6	0	16.05	0.084	16.13	30
		1	15.94	0.148	16.09	30
		2	15.88	0.227	16.11	30
		3	15.86	0.299	16.16	30
		4	15.65	0.429	16.08	30
		5	14.85	0.552	15.40	30
		6	14.30	0.613	14.91	30
		7	13.32	0.653	13.97	30
2457	10	0	16.72	0.084	16.80	30
		1	16.52	0.148	16.67	30
		2	16.51	0.227	16.74	30
		3	16.49	0.299	16.79	30
		4	16.33	0.429	16.76	30
		5	15.57	0.552	16.12	30
		6	14.99	0.613	15.60	30
		7	14.14	0.653	14.79	30

2462	11	0	16.28	0.084	16.36	30
		1	16.20	0.148	16.35	30
		2	16.12	0.227	16.35	30
		3	16.13	0.299	16.43	30
		4	15.90	0.429	16.33	30
		5	15.16	0.552	15.71	30
		6	14.59	0.613	15.20	30
		7	13.72	0.653	14.37	30

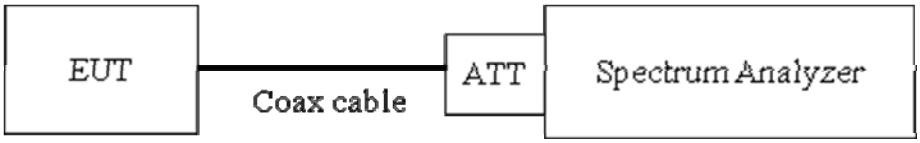
9.5 POWER SPECTRAL DENSITY (802.11b/g/n)

Test Requirements and limit, §15.247(e) / RSS-247(Issue 2) Section 5.2.(b)

The peak power spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies.

Minimum Standard – the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

We tested according to Procedure 10.2 in KDB 558074 v04

The spectrum analyzer is set to :

Set analyzer center frequency to DTS channel center frequency.

Span = 1.5 times the DTS channel bandwidth.

RBW = 3 kHz ≤ RBW ≤ 100 kHz.

VBW ≥ 3 x RBW.

Sweep = auto couple

Detector = peak

Trace Mode = max hold

Allow trace to fully stabilize.

Use the peak marker function to determine the maximum amplitude level within the RBW.

If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

▣ SAMPLE CALCULATION

PSD = Reading Value + ATT loss + Cable loss(1 ea)

Note :

1. Spectrum reading values are not plot data. The PSD results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset = Attenuator loss + Cable loss
3. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB. So, 20.7 dB is offset for 2.4 GHz Band.
   Actual value of loss for the attenuator and cable combination is below table.

Band	Frequency(MHz)	Loss(dB)
2.4 GHz	2412	11.3
	2437	11.3
	2462	11.3

(Actual value of loss for the attenuator and cable combination)

▣ TEST RESULTS

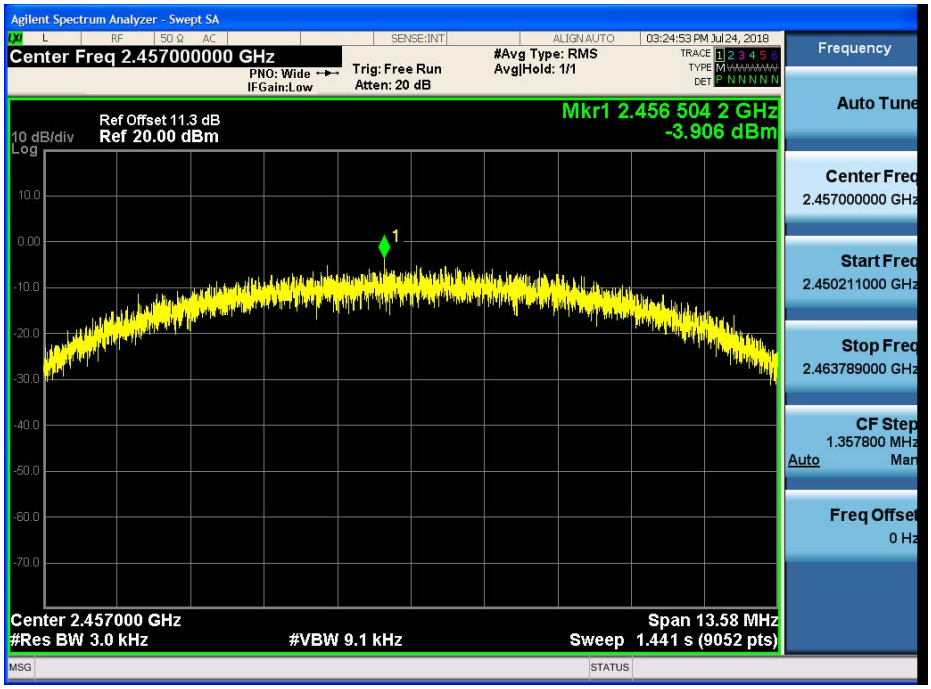
Conducted Power Density Measurements

Frequency (MHz)	Channel No.	Mode	Test Result		
			PSD (dBm)	Limit (dBm)	Pass/Fail
2412	1	802.11b	-9.008	8	Pass
2417	2		-9.213	8	Pass
2437	6		-4.555	8	Pass
2457	10		-3.906	8	Pass
2462	11		-4.098	8	Pass
2412	1	802.11g	-8.759	8	Pass
2417	2		-7.927	8	Pass
2437	6		-7.693	8	Pass
2457	10		-7.796	8	Pass
2462	11		-7.844	8	Pass
2412	1	802.11n	-10.171	8	Pass
2417	2		-8.804	8	Pass
2437	6		-8.867	8	Pass
2457	10		-8.673	8	Pass
2462	11		-8.632	8	Pass

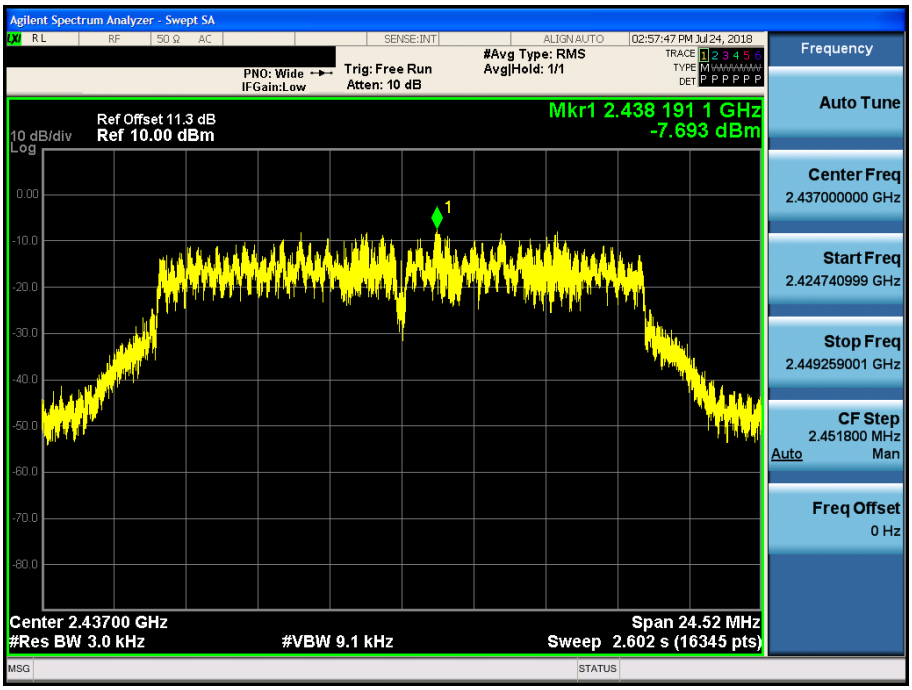
Note : In order to simplify the report, attached plots were only the highest PSD channel.

▣ RESULT PLOTS

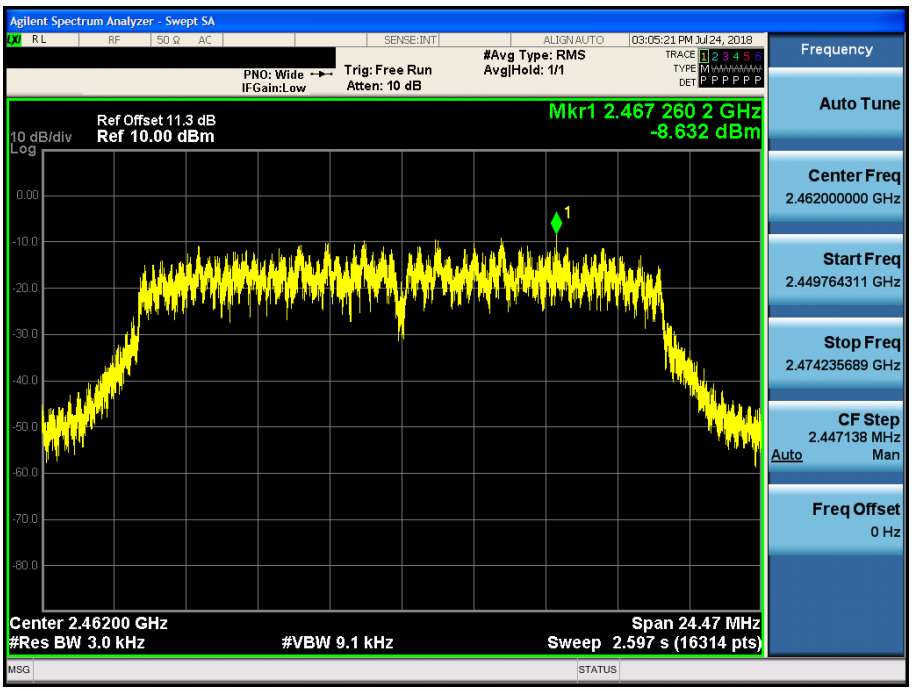
Power Spectral Density (802.11b-CH 10)



Power Spectral Density (802.11g-CH 6)



Power Spectral Density (802.11n_HT20 -CH 11)



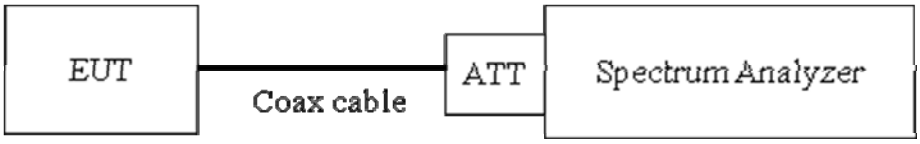
9.6 OUT OF BAND EMISSIONS AT THE BAND EDGE/ CONDUCTED SPURIOUS EMISSIONS

Test Requirements and limit, §15.247(d) / RSS-247(Issue 2) Section 5.5.

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) / RSS-Gen 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)).

Limit : 20 dBc

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. (Procedure 11.0 in KDB 558074 v04)

RBW = 100 kHz

VBW ≥ 3 x RBW

Set span to encompass the spectrum to be examined

Detector = Peak

Trace Mode = max hold

Sweep time = auto couple

Ensure that the number of measurement points ≥ Span/RBW

Allow trace to fully stabilize.

Use peak marker function to determine the maximum amplitude level.

Measurements are made over the 30 MHz to 10th harmonic range with the transmitter set to the lowest, middle, and highest channels.

Note :

1. The band edge results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset = Attenuator loss + Cable loss
3. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB. So, 11.3 dB is offset for 2.4 GHz Band. Actual value of loss for the attenuator and cable combination is below table.

Band	Frequency(MHz)	Loss(dB)
2.4 GHz	2412	11.3
	2437	11.3
	2462	11.3

(Actual value of loss for the attenuator and cable combination)

4. In case of conducted spurious emissions test(not band edge), please check factors blow table.

▣ FACTORS FOR FREQUENCY

Freq(MHz)	Factor(dB)
30	11.90
100	10.43
200	10.79
300	10.73
400	10.83
500	10.85
600	10.92
700	10.95
800	10.95
900	10.94
1000	10.99
2000	11.24
2400*	11.25
2500*	11.30
3000	11.39
4000	11.49
5000	11.67
6000	11.66
7000	11.95
8000	11.92
9000	12.08
10000	12.16
11000	12.16
12000	12.28
13000	12.43
14000	12.50
15000	12.58
16000	12.64

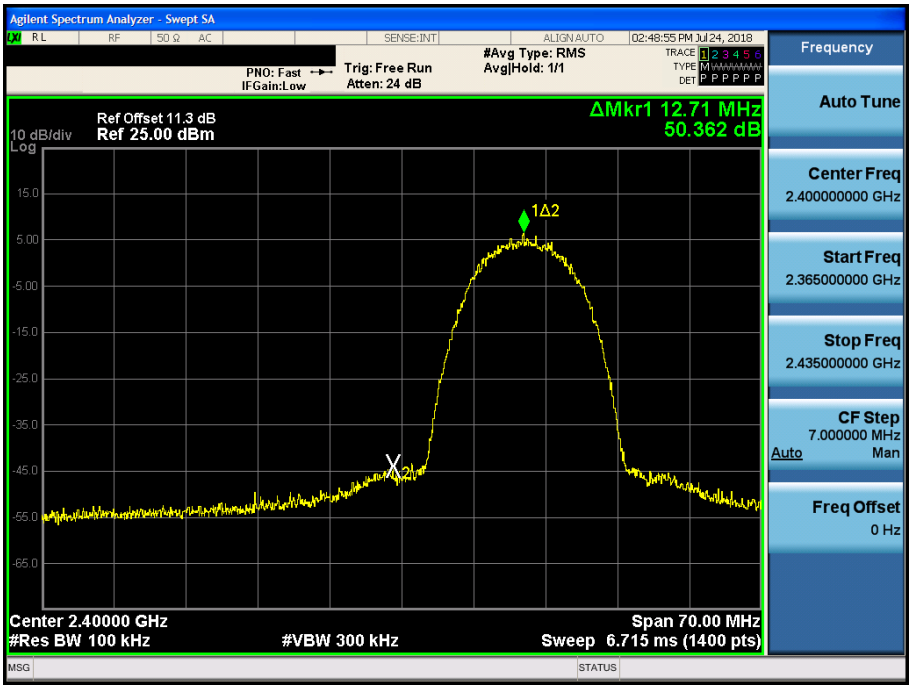
17000	12.62
18000	12.68
19000	12.67
20000	12.74
21000	12.77
22000	12.91
23000	13.20
24000	12.94
25000	13.13

Note : 1. '*' is fundamental frequency range.

2. Factor = Cable loss + Attenuator loss

▣ RESULT PLOTS

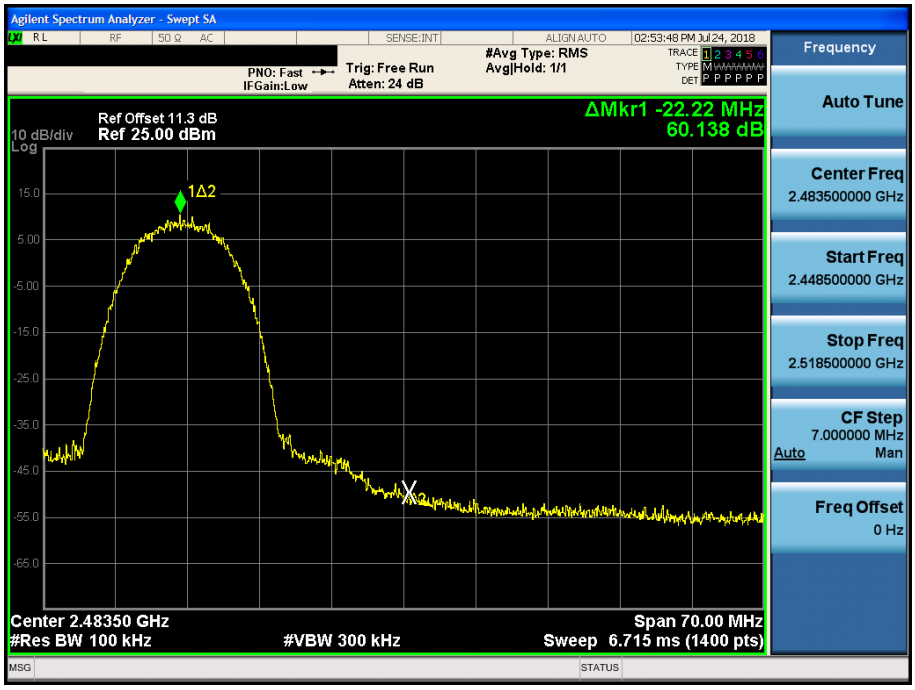
Band Edge (802.11b-CH1)



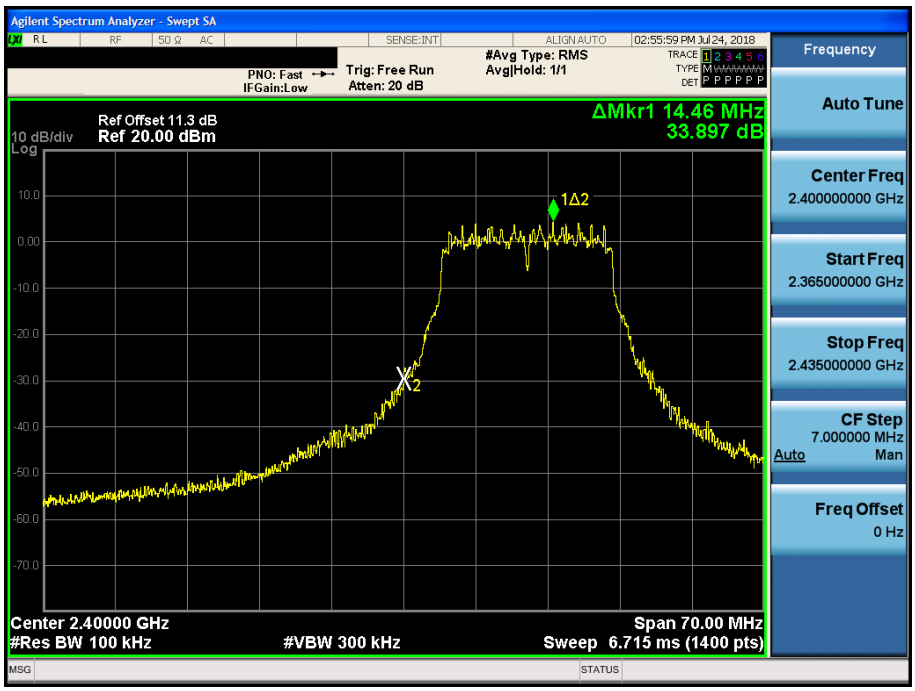
Band Edge (802.11b-CH2)

Band Edge (802.11b-CH10)

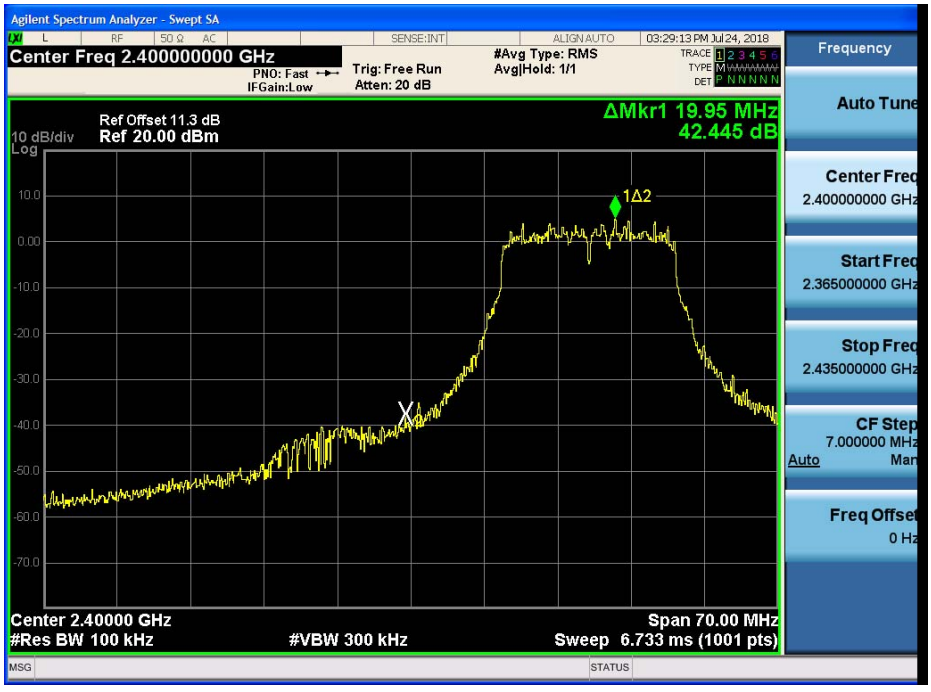
Band Edge (802.11b-CH11)



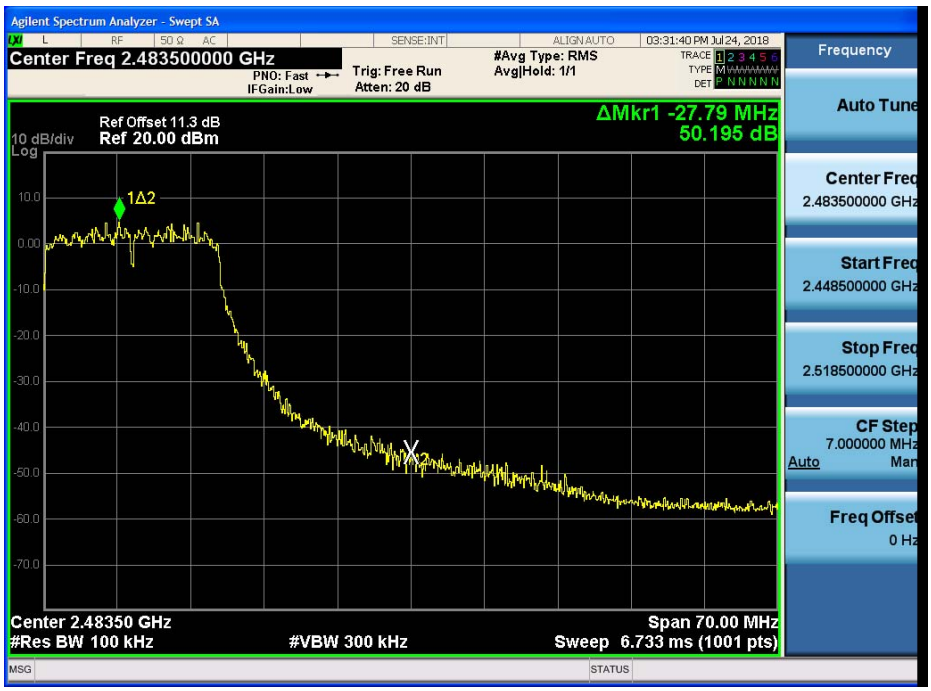
Band Edge (802.11g-CH1)



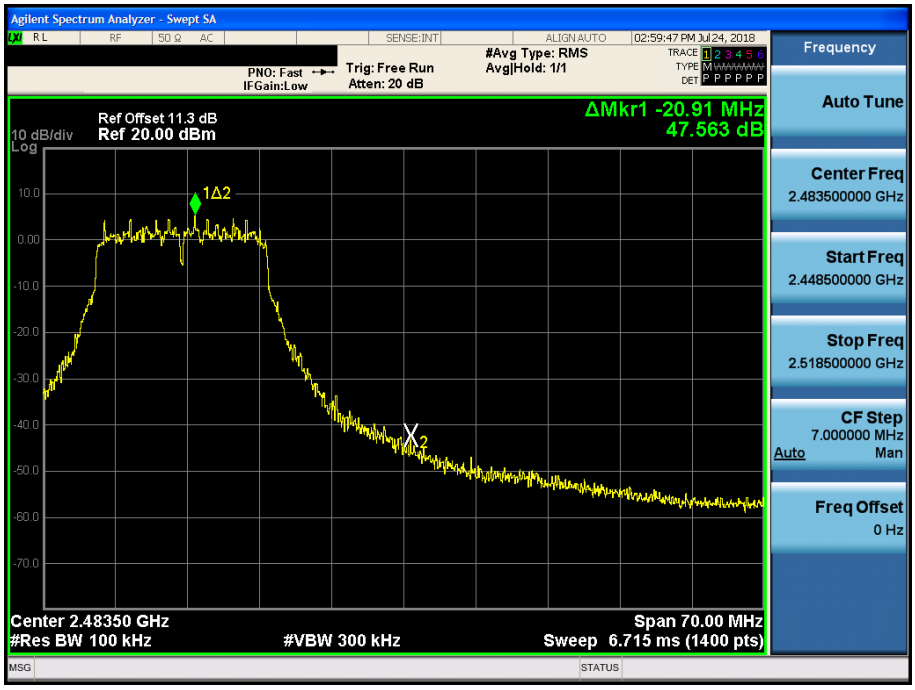
Band Edge (802.11g-CH2)



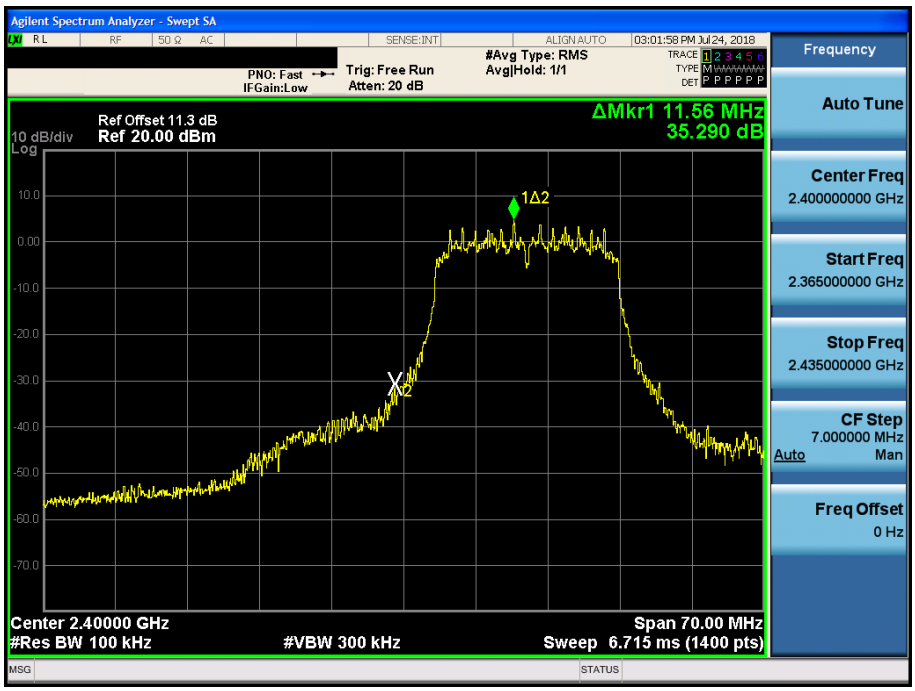
Band Edge (802.11g-CH10)



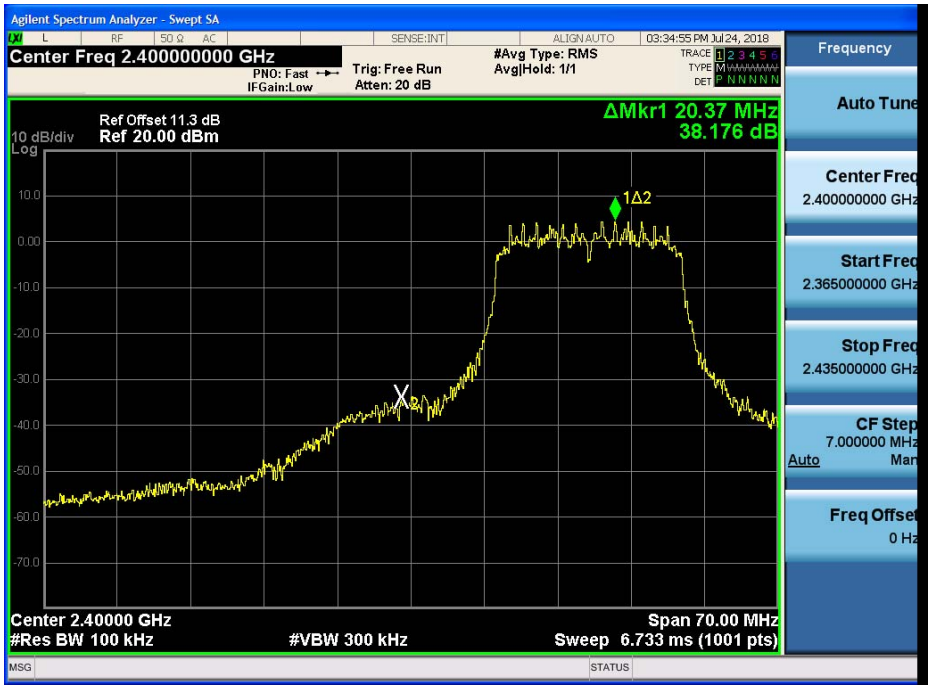
Band Edge (802.11g-CH11)



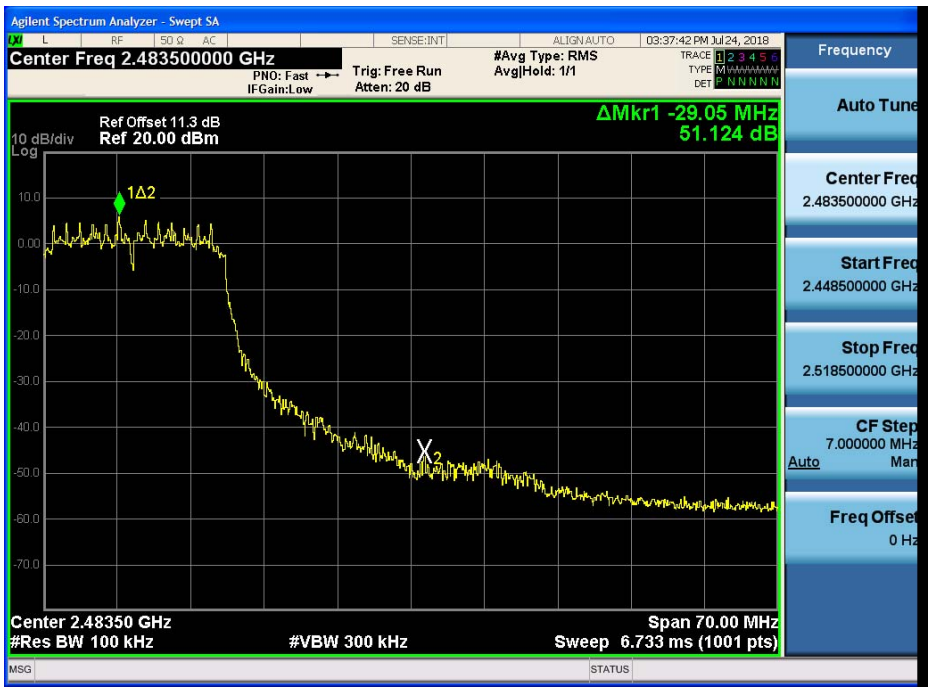
Band Edge (802.11n_HT20-CH1)



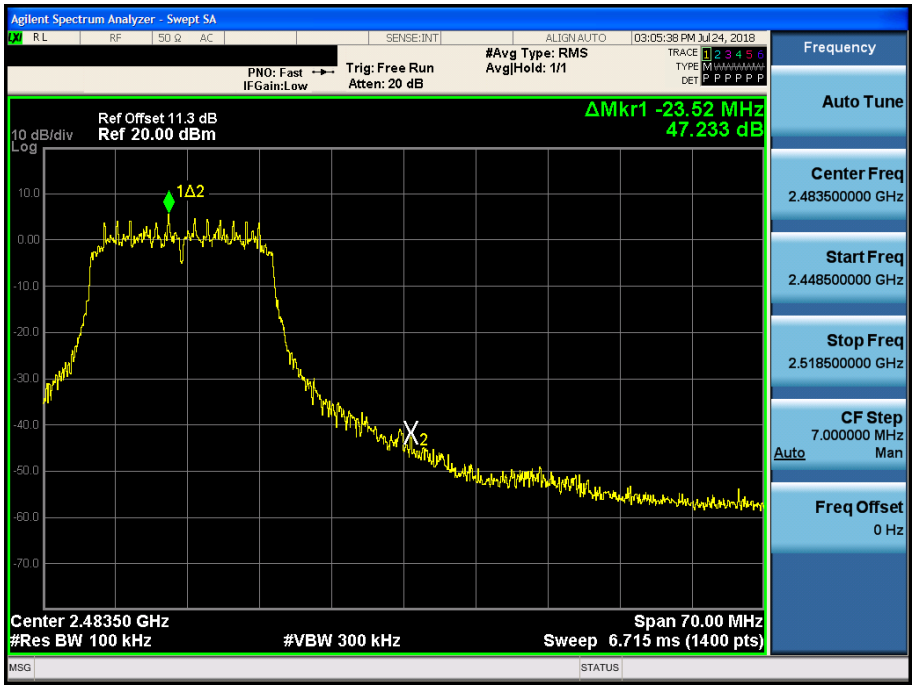
Band Edge (802.11n_HT20-CH2)



Band Edge (802.11n_HT20-CH10)

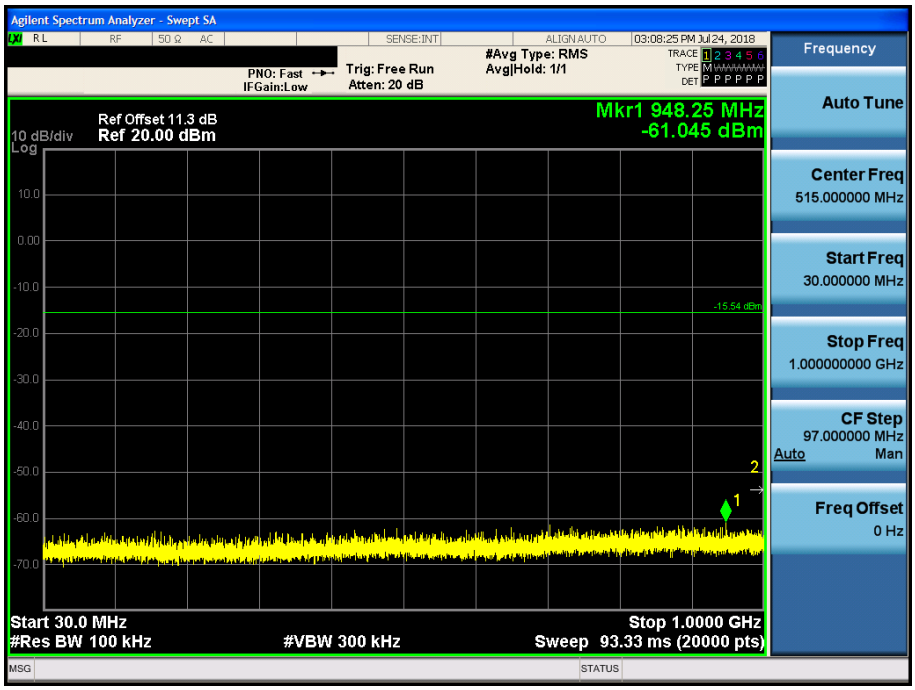


Band Edge (802.11n_HT20-CH11)



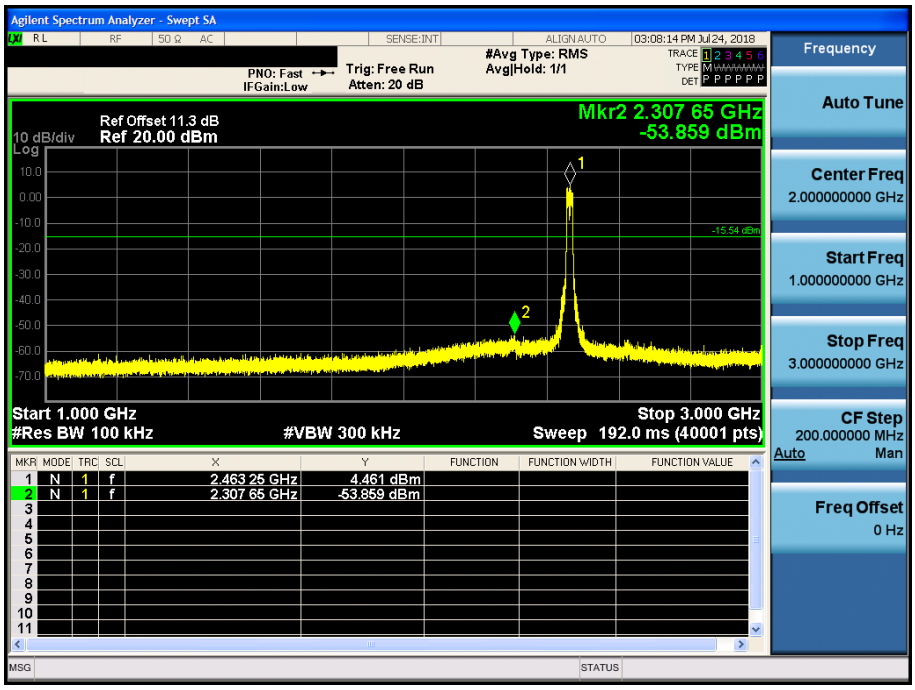
30 MHz ~ 1 GHz

Conducted Spurious Emission (802.11n_HT20 Ch.11)



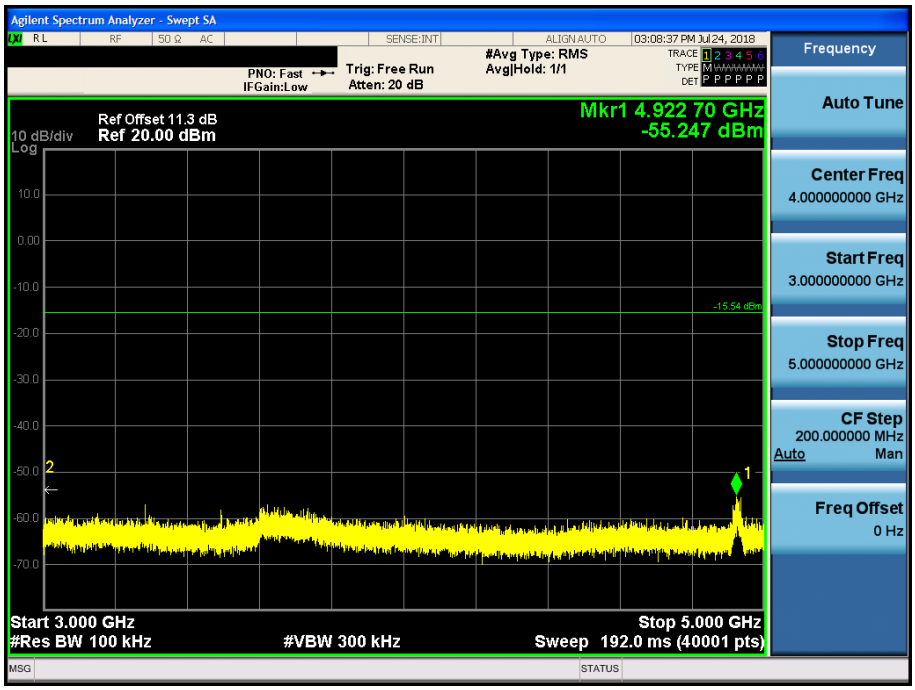
1 GHz ~ 3 GHz

Conducted Spurious Emission (802.11n_HT20 Ch.11)



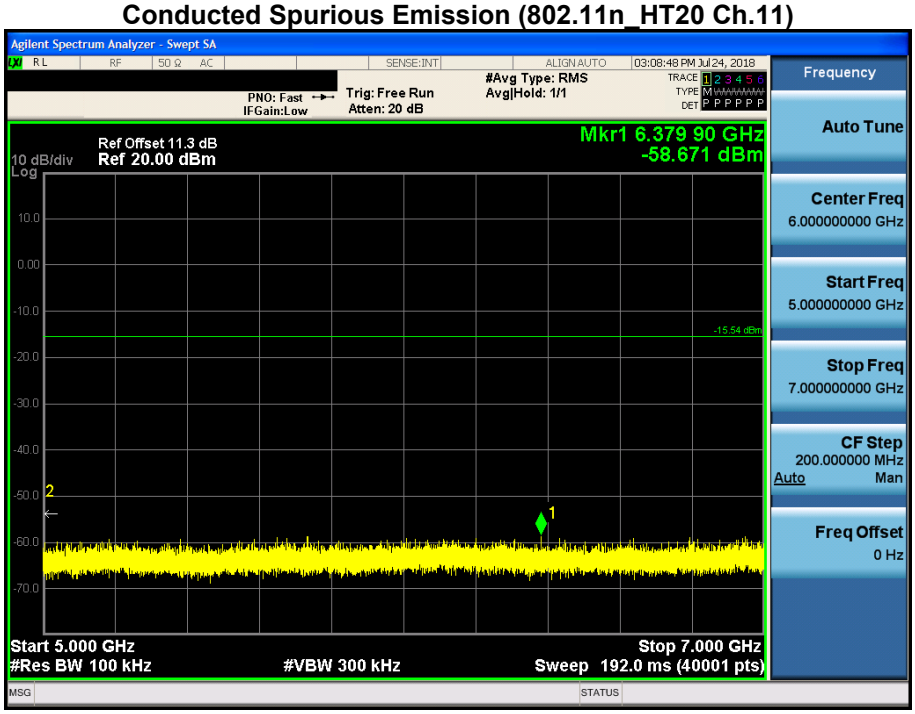
3 GHz ~ 5 GHz

Conducted Spurious Emission (802.11n_HT20 Ch.11)



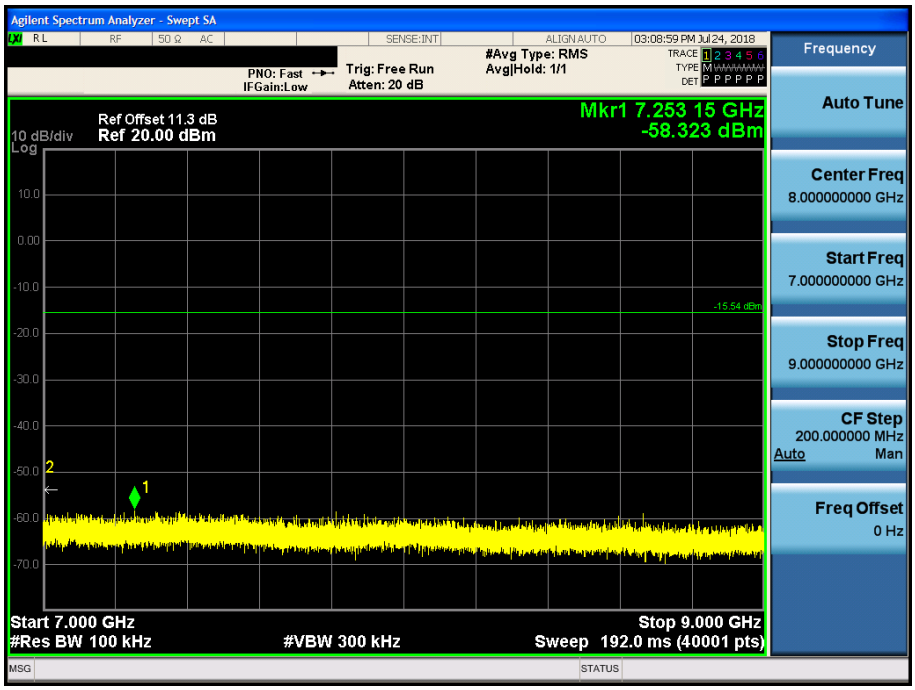
5 GHz ~ 7 GHz

Conducted Spurious Emission (802.11n_HT20 Ch.11)



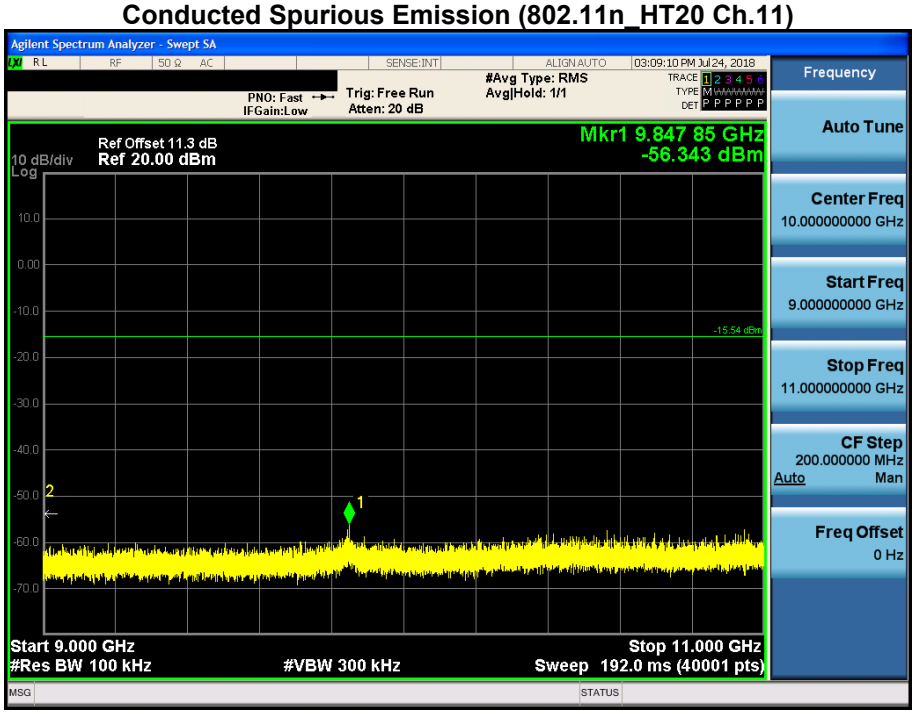
7 GHz ~ 9 GHz

Conducted Spurious Emission (802.11n_HT20 Ch.11)



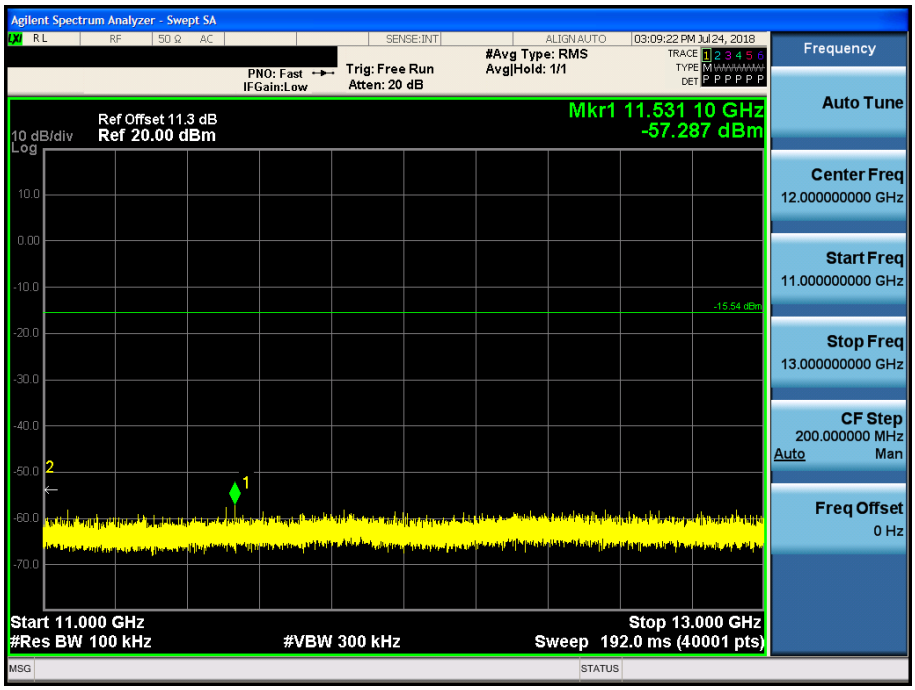
9 GHz ~ 11 GHz

Conducted Spurious Emission (802.11n_HT20 Ch.11)



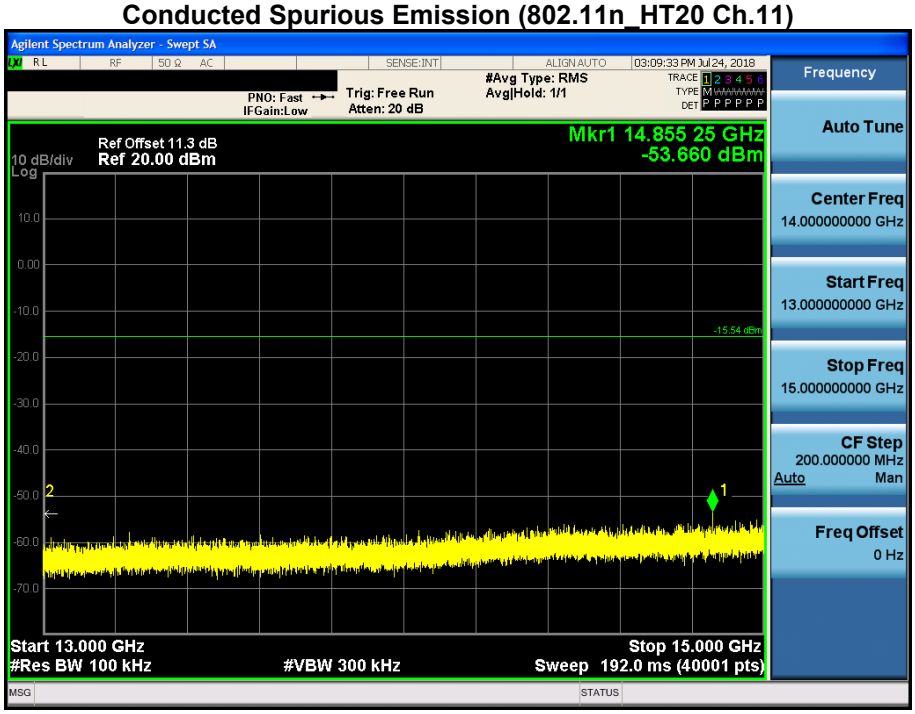
11 GHz ~ 13 GHz

Conducted Spurious Emission (802.11n_HT20 Ch.11)



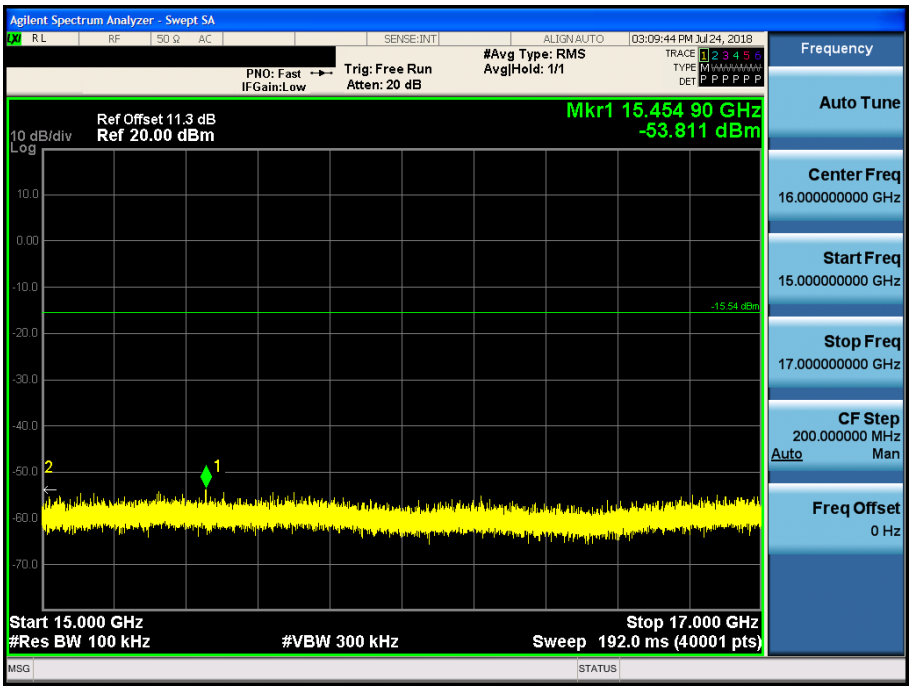
13 GHz ~ 15 GHz

Conducted Spurious Emission (802.11n_HT20 Ch.11)



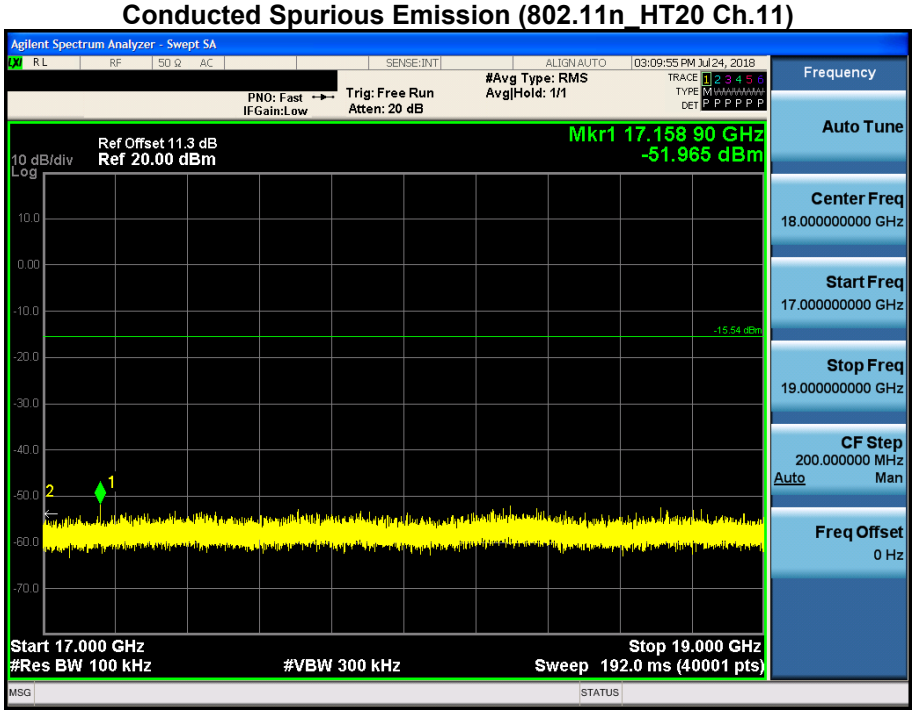
15 GHz ~ 17 GHz

Conducted Spurious Emission (802.11n_HT20 Ch.11)



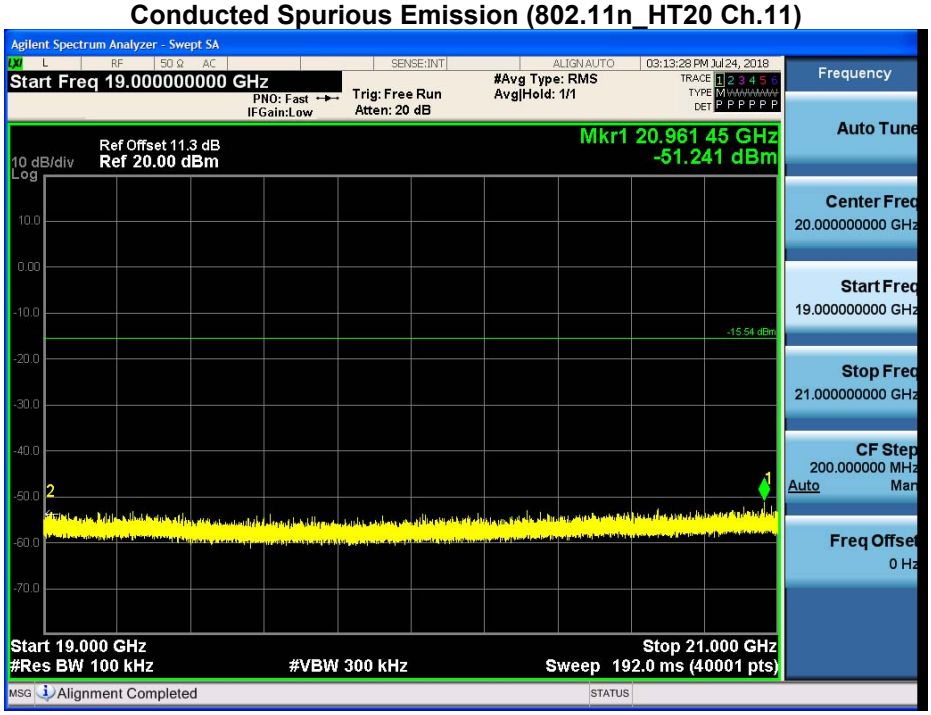
17 GHz ~ 19 GHz

Conducted Spurious Emission (802.11n_HT20 Ch.11)



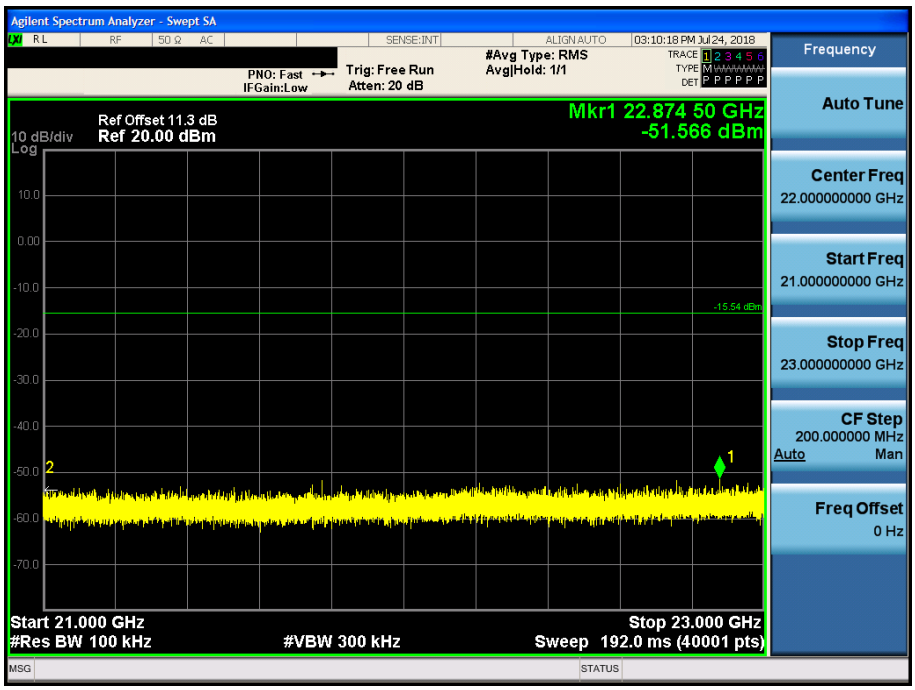
19 GHz ~ 21 GHz

Conducted Spurious Emission (802.11n_HT20 Ch.11)



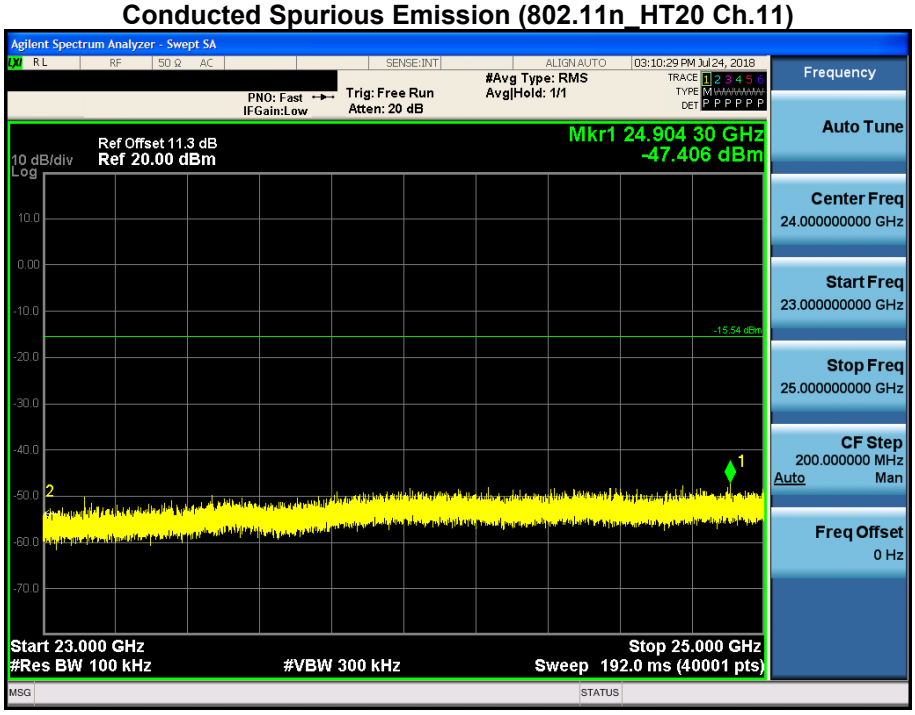
21 GHz ~ 23 GHz

Conducted Spurious Emission (802.11n_HT20 Ch.11)



23 GHz ~ 25 GHz

Conducted Spurious Emission (802.11n_HT20 Ch.11)



9.7 RADIATED MEASUREMENT

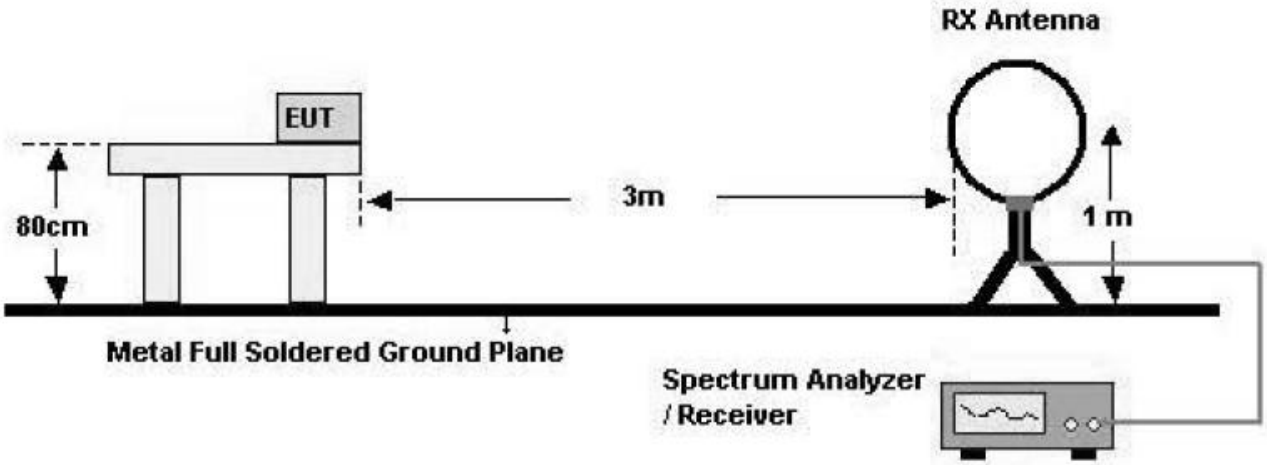
9.7.1 RADIATED SPURIOUS EMISSIONS.

Test Requirements and limit, §15.205, §15.209/ RSS-Gen(Issue 5) Section 8.9.

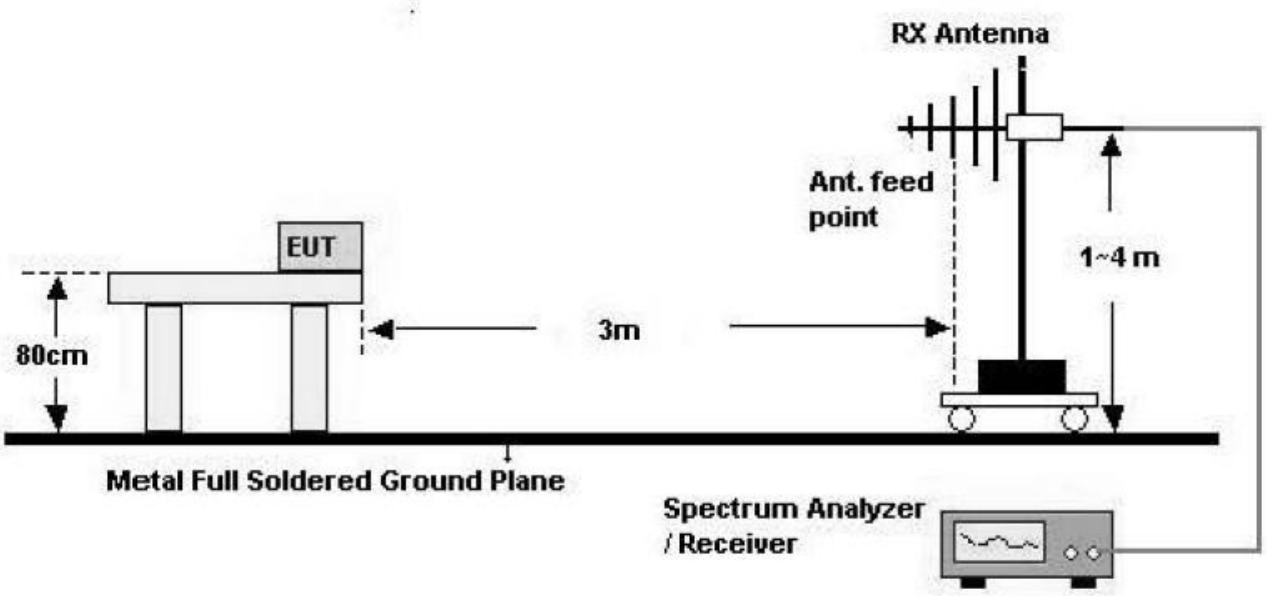
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

TEST CONFIGURATION

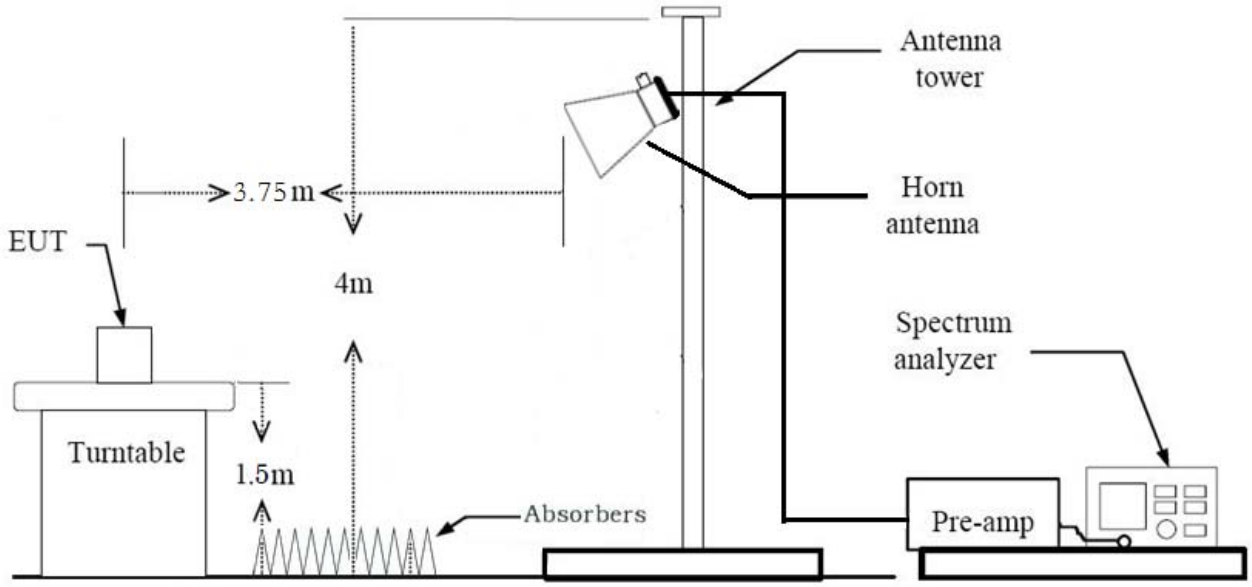
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



TEST PROCEDURE USED

Method 12.1 in KDB 558074 v04

Spectrum Setting

- Peak

Peak emission levels are measured by setting the instrument as follows:

RBW = cf. Table 1.

VBW ≥ 3 x RBW.

Detector = Peak.

Sweep time = auto.

Trace mode = max hold.

Allow sweeps to continue until the trace stabilizes.

(Note that the required measurement time may be longer for low duty cycle applications).

Table 1 —RBW as a function of frequency

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
> 1000 MHz	1 MHz

- Average (duty cycle ≥ 98%)

Set RBW = 1 MHz

Set VBW ≥ 3 x RBW

Detector = RMS

Averaging type = power (*i.e.*, RMS).

Sweep time = auto.

Trace mode = average (at least 100 traces).

- Average (duty cycle < 98%, duty cycle variations are less than ±2%)

Set RBW = 1 MHz

Set VBW ≥ 3 x RBW

Detector = RMS.

Averaging type = power (*i.e.*, RMS).

Sweep time = auto.

Trace mode = average (at least 100 traces).

A correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle.

Note :

1. We are performed the RSE and radiated band edge using standard radiated method(RMS).
2. According to SVSWR requirement in ANSI 63.4-2014, We performed the radiated test at 3.75 m distance from center of turn table. So, we applied the distance factor(reference distance : 3 m).
3. Distance extrapolation factor = 20 log (test distance / specific distance) (dB)
4. The duty cycle factor for 802.11 b/g/n_HT20

Mode	Worst Data rate (Mbps)	T_{on} (ms)	T_{total} (ms)	Duty Cycle (%)	Duty Cycle Factor (dB)
b	1	32.110	32.310	0.99380997	0.027
g	6	5.354	5.434	0.98527788	0.064
n_HT20	MCS0_6.5 Mbps	3.884	3.960	0.98080808	0.084

TEST RESULTS

9 kHz – 30MHz

Operation Mode: Normal Mode

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
㎒	dB㎶	dB /m	dB	(H/V)	dB㎶/m	dB㎶/m	dB
No Critical peaks found							

Notes:

1. Measuring frequencies from 9 kHz to the 30MHz.
2. The reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
3. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
4. Limit line = specific Limits (dBuV) + Distance extrapolation factor
5. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
6. The test results for below 30 MHz is correlated to an open site.
   The result on OATS is about 2 dB higher than semi-anechoic chamber (10 m chamber)

TEST RESULTS

Below 1 GHz

Operation Mode: Normal Mode

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
㎒	dB㎶	dB /m	dB	(H/V)	dB㎶/m	dB㎶/m	dB
No Critical peaks found							

Notes:

1. Measuring frequencies from 30 MHz to the 1 GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Above 1 GHz

Operation Mode: 802.11 b
Transfer Rate: 1 Mbps
Operating Frequency 2412
Channel No. 01 Ch

Frequency [MHz]	Reading [dBuV]	A.F.+C.L.-A.G+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4824	53.64	1.45	V	55.09	73.98	18.89	PK
4824	47.66	1.45	V	49.11	53.98	4.87	AV
7236	46.30	11.43	V	57.73	73.98	16.25	PK
7236	34.94	11.43	V	46.37	53.98	7.61	AV
4824	54.07	1.45	H	55.52	73.98	18.46	PK
4824	48.91	1.45	H	50.36	53.98	3.62	AV
7236	45.88	11.43	H	57.31	73.98	16.67	PK
7236	33.96	11.43	H	45.39	53.98	8.59	AV

Operation Mode: 802.11 g
Transfer Rate: 6 Mbps
Operating Frequency 2412
Channel No. 01 Ch

Frequency [MHz]	Reading [dBuV]	A.F.+C.L.-A.G+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4824	54.23	1.45	V	55.68	73.98	18.30	PK
4824	41.25	1.45	V	42.70	53.98	11.28	AV
7236	47.18	11.43	V	58.61	73.98	15.37	PK
7236	35.42	11.43	V	46.85	53.98	7.13	AV
4824	55.48	1.45	H	56.93	73.98	17.05	PK
4824	43.20	1.45	H	44.65	53.98	9.33	AV
7236	46.81	11.43	H	58.24	73.98	15.74	PK
7236	34.12	11.43	H	45.55	53.98	8.43	AV

Operation Mode: 802.11 n_HT20
Transfer MCS Index: 0
Operating Frequency 2412
Channel No. 01 Ch

Frequency [MHz]	Reading [dBuV]	A.F.+C.L.-A.G+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4824	54.22	1.45	V	55.67	73.98	18.31	PK
4824	41.83	1.45	V	43.28	53.98	10.70	AV
7236	46.18	11.43	V	57.61	73.98	16.37	PK
7236	35.09	11.43	V	46.52	53.98	7.46	AV
4824	55.02	1.45	H	56.47	73.98	17.51	PK
4824	42.49	1.45	H	43.94	53.98	10.04	AV
7236	45.89	11.43	H	57.32	73.98	16.66	PK
7236	34.69	11.43	H	46.12	53.98	7.86	AV

*A.F. : Antenna Factor / C.L. : Cable Loss / A.G. : Amplifier Gain / D.F. : Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Duty cycle factor applies only below 98%.
5. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
6. Distance extrapolation factor = 20 log (test distance / specific distance) (dB)
7. We have done 802.11b/g/n mode and all data rate. Worst data rate is the lowest data of each mode.
8. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Operation Mode: 802.11 b
Transfer Rate: 1 Mbps
Operating Frequency 2437
Channel No. 06 Ch

Frequency [MHz]	Reading [dBuV]	A.F.+C.L.-A.G+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4874	52.81	1.66	V	54.47	73.98	19.51	PK
4874	48.21	1.66	V	49.87	53.98	4.11	AV
7311	49.28	10.10	V	59.38	73.98	14.60	PK
7311	39.79	10.10	V	49.89	53.98	4.09	AV
4874	54.83	1.66	H	56.49	73.98	17.49	PK
4874	49.88	1.66	H	51.54	53.98	2.44	AV
7311	48.77	10.10	H	58.87	73.98	15.11	PK
7311	38.24	10.10	H	48.34	53.98	5.64	AV

Operation Mode: 802.11 g
Transfer Rate: 6 Mbps
Operating Frequency 2437
Channel No. 06 Ch

Frequency [MHz]	Reading [dBuV]	A.F.+C.L.-A.G+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4874	53.92	1.66	V	55.58	73.98	18.40	PK
4874	40.82	1.66	V	42.48	53.98	11.50	AV
7311	49.75	10.10	V	59.85	73.98	14.13	PK
7311	36.48	10.10	V	46.58	53.98	7.40	AV
4874	54.54	1.66	H	56.20	73.98	17.78	PK
4874	41.92	1.66	H	43.58	53.98	10.40	AV
7311	47.88	10.10	H	57.98	73.98	16.00	PK
7311	35.92	10.10	H	46.02	53.98	7.96	AV

Operation Mode:	802.11 n_HT20
Transfer MCS Index:	0
Operating Frequency	2437
Channel No.	06 Ch

Frequency [MHz]	Reading [dBuV]	A.F.+C.L.-A.G+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4874	53.54	1.66	V	55.20	73.98	18.78	PK
4874	38.99	1.66	V	40.65	53.98	13.33	AV
7311	47.89	10.10	V	57.99	73.98	15.99	PK
7311	35.93	10.10	V	46.03	53.98	7.95	AV
4874	54.21	1.66	H	55.87	73.98	18.11	PK
4874	40.53	1.66	H	42.19	53.98	11.79	AV
7311	47.68	10.10	H	57.78	73.98	16.20	PK
7311	34.92	10.10	H	45.02	53.98	8.96	AV

*A.F. : Antenna Factor / C.L. : Cable Loss / A.G. : Amplifier Gain / D.F. : Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Duty cycle factor applies only below 98%.
5. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
6. Distance extrapolation factor = 20 log (test distance / specific distance) (dB)
7. We have done 802.11b/g/n mode and all data rate. Worst data rate is the lowest data of each mode.
8. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Operation Mode: 802.11 b
Transfer Rate: 1 Mbps
Operating Frequency 2462
Channel No. 11 Ch

Frequency [MHz]	Reading [dBuV]	A.F.+C.L.-A.G+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4924	51.69	1.00	V	52.69	73.98	21.29	PK
4924	45.82	1.00	V	46.82	53.98	7.16	AV
7386	48.48	11.10	V	59.58	73.98	14.40	PK
7386	38.35	11.10	V	49.45	53.98	4.53	AV
4924	52.57	1.00	H	53.57	73.98	20.41	PK
4924	46.46	1.00	H	47.46	53.98	6.52	AV
7386	48.21	11.10	H	59.31	73.98	14.67	PK
7386	37.81	11.10	H	48.91	53.98	5.07	AV

Operation Mode: 802.11 g
Transfer Rate: 6 Mbps
Operating Frequency 2462
Channel No. 11 Ch

Frequency [MHz]	Reading [dBuV]	A.F.+C.L.-A.G+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4924	49.28	1.00	V	50.28	73.98	23.70	PK
4924	37.51	1.00	V	38.51	53.98	15.47	AV
7386	46.78	11.10	V	57.88	73.98	16.10	PK
7386	34.81	11.10	V	45.91	53.98	8.07	AV
4924	50.06	1.00	H	51.06	73.98	22.92	PK
4924	38.54	1.00	H	39.54	53.98	14.44	AV
7386	44.89	11.10	H	55.99	73.98	17.99	PK
7386	34.22	11.10	H	45.32	53.98	8.66	AV

Operation Mode:	802.11 n_HT20
Transfer MCS Index:	0
Operating Frequency	2462
Channel No.	11 Ch

Frequency [MHz]	Reading [dBuV]	A.F.+C.L.-A.G+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4924	48.69	1.00	V	49.69	73.98	24.29	PK
4924	36.98	1.00	V	37.98	53.98	16.00	AV
7386	45.82	11.10	V	56.92	73.98	17.06	PK
7386	34.32	11.10	V	45.42	53.98	8.56	AV
4924	49.69	1.00	H	50.69	73.98	23.29	PK
4924	38.47	1.00	H	39.47	53.98	14.51	AV
7386	45.23	11.10	H	56.33	73.98	17.65	PK
7386	33.12	11.10	H	44.22	53.98	9.76	AV

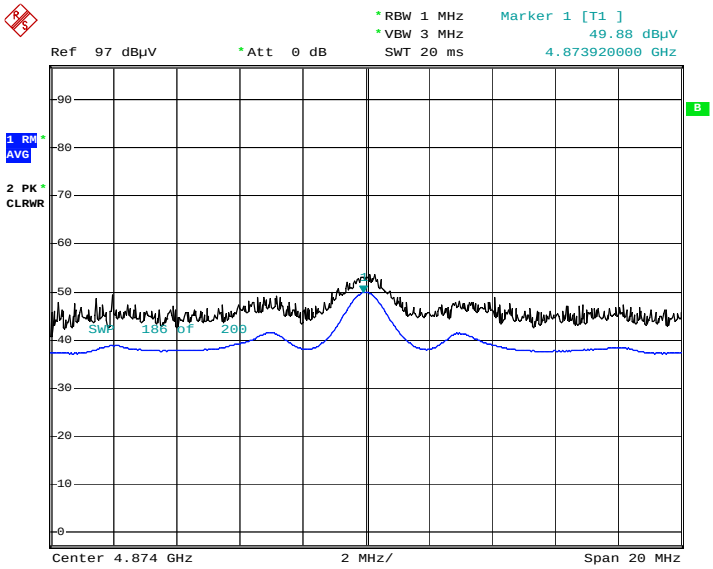
*A.F. : Antenna Factor / C.L. : Cable Loss / A.G. : Amplifier Gain / D.F. : Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Duty cycle factor applies only below 98%.
5. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor.
6. Distance extrapolation factor = 20 log (test distance / specific distance) (dB)
7. We have done 802.11b/g/n mode and all data rate. Worst data rate is the lowest data of each mode.
8. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

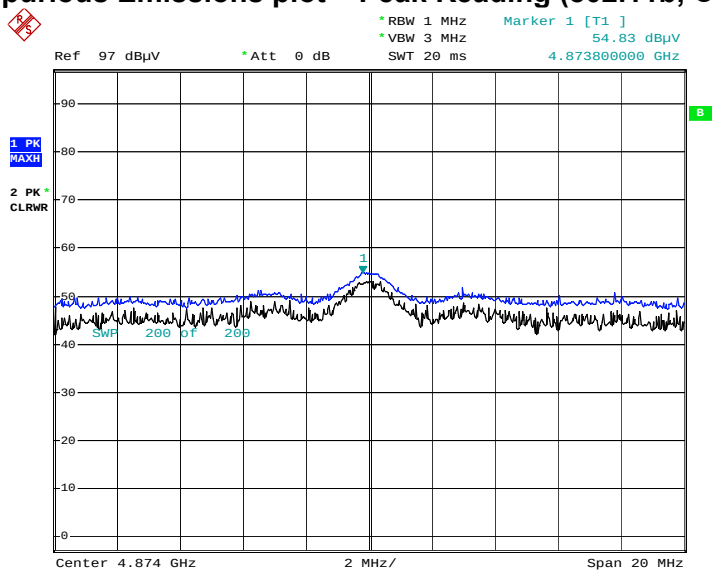
▣ RESULT PLOTS (Worst Case: Z-H)

Radiated Spurious Emissions plot – Average Reading (802.11b, Ch.6 2nd Harmonic)



Date: 13.JUL.2018 10:41:12

Radiated Spurious Emissions plot – Peak Reading (802.11b, Ch.6 2nd Harmonic)



Date: 13.JUL.2018 10:40:52

Note : Only the worst case plots for Radiated Spurious Emissions.

9.7.2 RADIATED RESTRICTED BAND EDGES

Test Requirements and limit, §15.247(d) §15.205, §15.209, RSS-Gen(Issue 5) 8.10

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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. 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)).

Operation Mode:	802.11b
Transfer Rate:	1 Mbps
Operating Frequency	2412 MHz, 2462 MHz
Channel No.	01 Ch, 11 Ch

Frequency [MHz]	Reading [dBuV]	A.F.+C.L.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2390.0	51.78	1.14	H	52.92	73.98	21.06	PK
2390.0	42.53	1.14	H	43.67	53.98	10.31	AV
2390.0	54.99	1.14	V	56.13	73.98	17.85	PK
2390.0	43.65	1.14	V	44.79	53.98	9.19	AV
2483.5	54.56	0.78	H	55.34	73.98	18.64	PK
2483.5	43.04	0.78	H	43.82	53.98	10.16	AV
2483.5	53.89	0.78	V	54.67	73.98	19.31	PK
2483.5	43.47	0.78	V	44.25	53.98	9.73	AV

*A.F. : Antenna Factor / C.L. : Cable Loss / D.F. : Distance Factor

Operation Mode: 802.11b
Transfer Rate: 1 Mbps
Operating Frequency 2417 MHz, 2457 MHz
Channel No. 02 Ch, 10 Ch

Frequency [MHz]	Reading [dBuV]	A.F.+C.L.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2390.0	53.62	1.14	H	54.76	73.98	19.22	PK
2390.0	42.88	1.14	H	44.02	53.98	9.96	AV
2390.0	54.08	1.14	V	55.22	73.98	18.76	PK
2390.0	43.18	1.14	V	44.32	53.98	9.66	AV
2483.5	52.92	0.78	H	53.70	73.98	20.28	PK
2483.5	41.82	0.78	H	42.60	53.98	11.38	AV
2483.5	53.27	0.78	V	54.05	73.98	19.93	PK
2483.5	42.25	0.78	V	43.03	53.98	10.95	AV

Operation Mode: 802.11g
Transfer Rate: 6 Mbps
Operating Frequency 2412 MHz, 2462 MHz
Channel No. 01 Ch, 11 Ch

Frequency [MHz]	Reading [dBuV]	A.F.+C.L.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2390.0	61.87	1.14	H	63.01	73.98	10.97	PK
2390.0	47.75	1.14	H	48.89	53.98	5.09	AV
2390.0	66.43	1.14	V	67.57	73.98	6.41	PK
2390.0	50.33	1.14	V	51.47	53.98	2.51	AV
2483.5	69.18	0.78	H	69.96	73.98	4.02	PK
2483.5	48.53	0.78	H	49.31	53.98	4.67	AV
2483.5	69.10	0.78	V	69.88	73.98	4.10	PK
2483.5	48.33	0.78	V	49.11	53.98	4.87	AV

Operation Mode:	802.11g
Transfer Rate:	6 Mbps
Operating Frequency	2417 MHz, 2457 MHz
Channel No.	02 Ch, 10 Ch

Frequency [MHz]	Reading [dBuV]	A.F.+C.L.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2390.0	61.81	1.14	H	62.95	73.98	11.03	PK
2390.0	43.82	1.14	H	44.96	53.98	9.02	AV
2390.0	62.29	1.14	V	63.43	73.98	10.55	PK
2390.0	44.13	1.14	V	45.27	53.98	8.71	AV
2483.5	66.95	0.78	H	67.73	73.98	6.25	PK
2483.5	45.76	0.78	H	46.54	53.98	7.44	AV
2483.5	68.35	0.78	V	69.13	73.98	4.85	PK
2483.5	47.12	0.78	V	47.90	53.98	6.08	AV

Operation Mode:	802.11n
Transfer Rate:	6.5 Mbps
Operating Frequency	2412 MHz, 2462 MHz
Channel No.	01 Ch, 11 Ch

Frequency [MHz]	Reading [dBuV]	A.F.+C.L.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2390.0	62.23	1.14	H	63.37	73.98	10.61	PK
2390.0	47.98	1.14	H	49.12	53.98	4.86	AV
2390.0	65.45	1.14	V	66.59	73.98	7.39	PK
2390.0	50.66	1.14	V	51.80	53.98	2.18	AV
2483.5	64.50	0.78	H	65.28	73.98	8.70	PK
2483.5	47.67	0.78	H	48.45	53.98	5.53	AV
2483.5	64.49	0.78	V	65.27	73.98	8.71	PK
2483.5	47.73	0.78	V	48.51	53.98	5.47	AV

Operation Mode:	802.11n
Transfer Rate:	6.5 Mbps
Operating Frequency	2417 MHz, 2457 MHz
Channel No.	02 Ch, 10 Ch

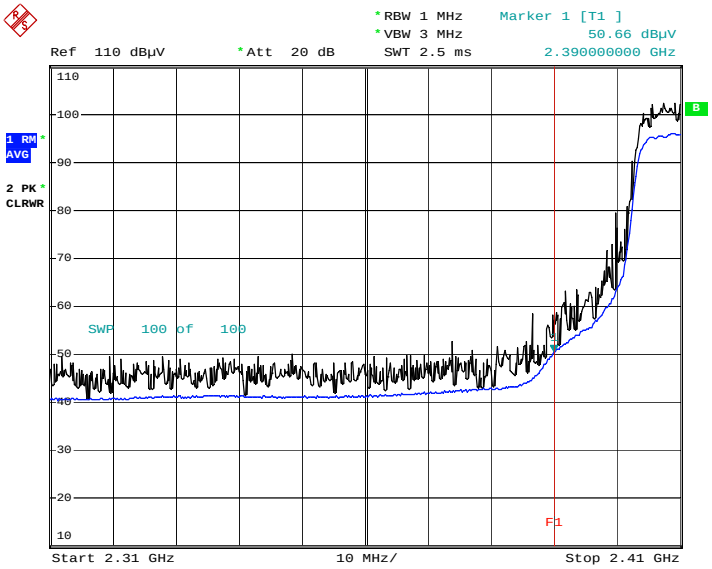
Frequency [MHz]	Reading [dBuV]	A.F.+C.L.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2390.0	63.15	1.14	H	64.29	73.98	9.69	PK
2390.0	47.59	1.14	H	48.73	53.98	5.25	AV
2390.0	64.27	1.14	V	65.41	73.98	8.57	PK
2390.0	48.48	1.14	V	49.62	53.98	4.36	AV
2483.5	66.82	0.78	H	67.60	73.98	6.38	PK
2483.5	48.21	0.78	H	48.99	53.98	4.99	AV
2483.5	67.67	0.78	V	68.45	73.98	5.53	PK
2483.5	49.40	0.78	V	50.18	53.98	3.80	AV

Notes:

1. Duty cycle factor applies only below 98%.
2. Total = Reading Value + Antenna Factor + Cable Loss + Distance Factor
3. Distance extrapolation factor = 20 log (test distance / specific distance) (dB)
4. We have done 802.11b/g/n mode and all data rate. Worst data rate is the lowest data of each mode.
5. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

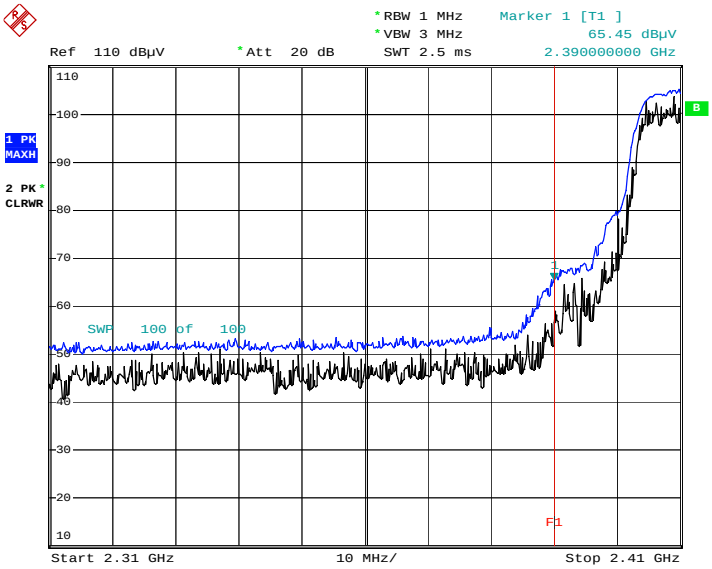
▣ RESULT PLOTS(Worst Case: Y-V)

Radiated Restricted Band Edges plot – Average Reading (802.11n_HT20, Ch.1)



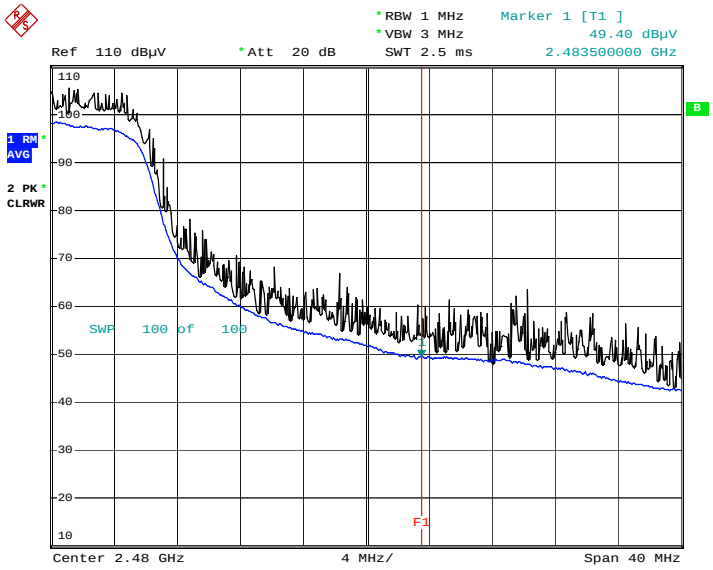
Date: 11.JUL.2018 17:49:41

Radiated Restricted Band Edges plot – Peak Reading (802.11n_HT20, Ch.1)

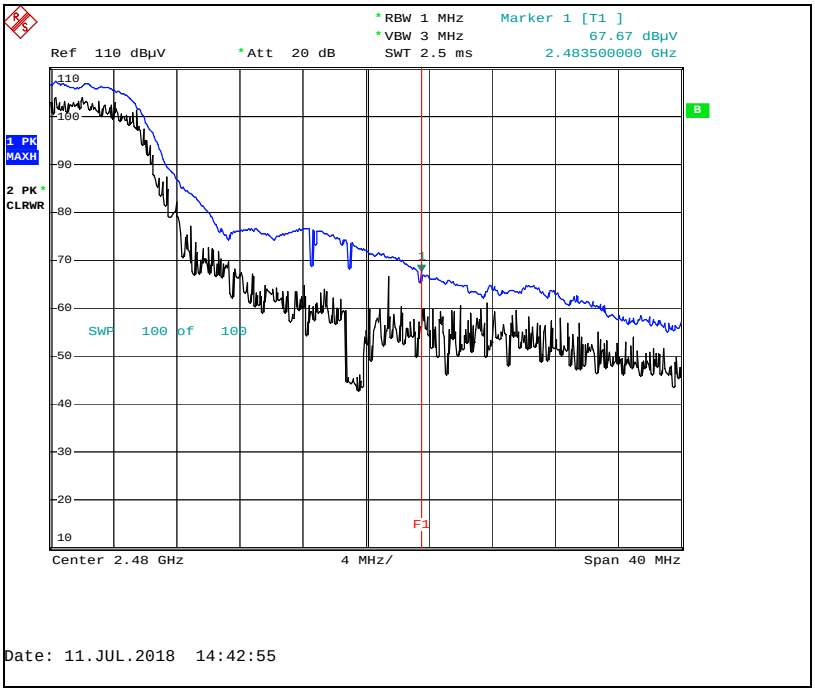


Date: 11.JUL.2018 17:50:41

Radiated Restricted Band Edges plot – Average Reading (802.11n_HT20, Ch.10)



Radiated Restricted Band Edges plot – Peak Reading (802.11n_HT20, Ch.10)



Note : Only the worst case plots for Radiated Restricted Band Edges.

9.7.3 RECEIVER SPURIOUS EMISSIONS

IC Rule(s): **RSS-GEN**

Test Requirements: **Blow the table**

Operating conditions: **Under normal test conditions**

Method of testing: **Radiated**

S/A. Settings: **F < 1 GHz: RBW: 120 kHz, VBW: 300 kHz (Quasi Peak)**
F > 1 GHz: RBW: 1 MHz, VBW: 1 MHz (Peak)

Mode of operation: **Receive**

Frequency (MHz)	Field Strength (microvolts/m at 3 meters)
30 – 88	100
88 - 216	150
216 – 960	200
Above 960	500

Operation Mode: Receive:

30 MHz ~ 1 GHz

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dBμV	dB /m	dB	(H/V)	dBμV/m	dBμV/m	dB
No critical peaks found							

Above 1 GHz

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dBμV	dB /m	dB	(H/V)	dBμV/m	dBμV/m	dB
No critical peaks found							

9.8 POWERLINE CONDUCTED EMISSIONS

Test Requirements and limit, §15.207, RSS-Gen(Issue 5) Section 8.8

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

Test Configuration

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

TEST PROCEDURE

1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors – Quasi Peak and Average Detector.
5. We are performed the AC Power Line Conducted Emission test for worst data rate, channel, operation mode.

Sample Calculation

Quasi-peak(Final Result) = Reading Value + Correction Factor

▣ RESULT PLOTS

Conducted Emissions (Line 1)

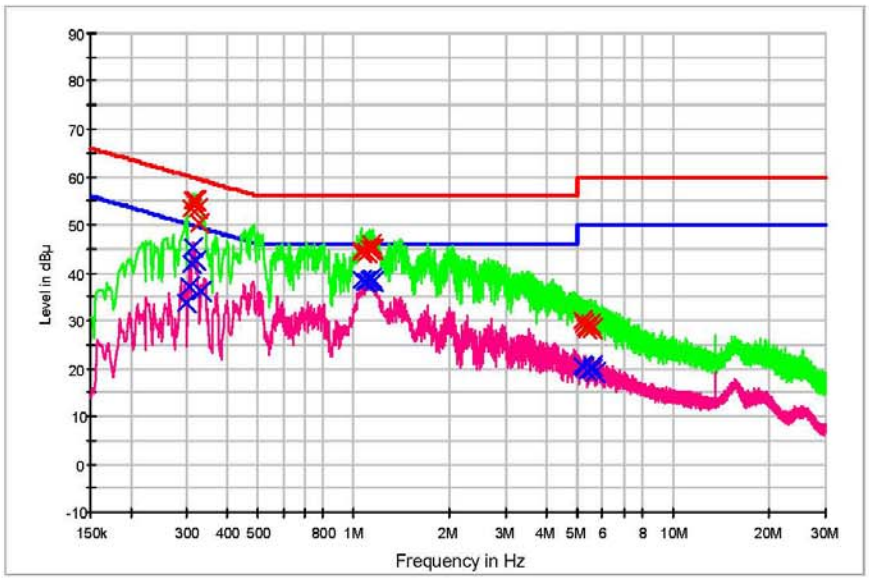
2.4G N 1 / 2

HCT TEST Report

Common Information

EUT:	WFM-SFP2501
Manufacturer:	I&C
Test Site:	SHIELD ROOM
Operating Conditions:	2.4G_WLAN_N

FCC CLASS B_Exten Cable



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.308000	53.3	9.000	Off	N	9.7	6.7	60.0
0.314000	55.2	9.000	Off	N	9.7	4.7	59.9
0.318000	55.1	9.000	Off	N	9.7	4.7	59.8
0.322000	55.0	9.000	Off	N	9.7	4.7	59.7
0.326000	53.4	9.000	Off	N	9.7	6.1	59.6
0.330000	50.4	9.000	Off	N	9.7	9.0	59.5
1.052000	44.3	9.000	Off	N	9.8	11.7	56.0
1.062000	44.5	9.000	Off	N	9.8	11.5	56.0
1.090000	44.2	9.000	Off	N	9.8	11.8	56.0
1.118000	45.0	9.000	Off	N	9.8	11.0	56.0
1.138000	45.8	9.000	Off	N	9.8	10.2	56.0
1.148000	44.9	9.000	Off	N	9.8	11.1	56.0
5.182000	30.1	9.000	Off	N	10.0	29.9	60.0
5.250000	29.2	9.000	Off	N	10.0	30.8	60.0
5.328000	28.6	9.000	Off	N	10.0	31.4	60.0
5.352000	28.3	9.000	Off	N	10.0	31.7	60.0
5.490000	29.4	9.000	Off	N	10.0	30.6	60.0
5.560000	28.5	9.000	Off	N	10.0	31.5	60.0

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2.4G N 2 / 2

Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.298000	33.8	9.000	Off	N	9.7	16.5	50.3
0.306000	37.2	9.000	Off	N	9.7	12.9	50.1
0.310000	41.8	9.000	Off	N	9.7	8.2	50.0
0.314000	45.2	9.000	Off	N	9.7	4.6	49.9
0.322000	42.6	9.000	Off	N	9.7	7.0	49.7
0.334000	36.0	9.000	Off	N	9.7	13.4	49.4
1.058000	38.4	9.000	Off	N	9.8	7.6	46.0
1.084000	38.1	9.000	Off	N	9.8	7.9	46.0
1.090000	38.3	9.000	Off	N	9.8	7.7	46.0
1.128000	38.4	9.000	Off	N	9.8	7.6	46.0
1.138000	38.8	9.000	Off	N	9.8	7.2	46.0
1.146000	38.0	9.000	Off	N	9.8	8.0	46.0
5.180000	20.7	9.000	Off	N	10.0	29.3	50.0
5.250000	20.3	9.000	Off	N	10.0	29.7	50.0
5.352000	19.3	9.000	Off	N	10.0	30.7	50.0
5.550000	20.4	9.000	Off	N	10.0	29.6	50.0
5.560000	20.0	9.000	Off	N	10.0	30.0	50.0
5.682000	19.3	9.000	Off	N	10.0	30.7	50.0

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Conducted Emissions (Line 2)

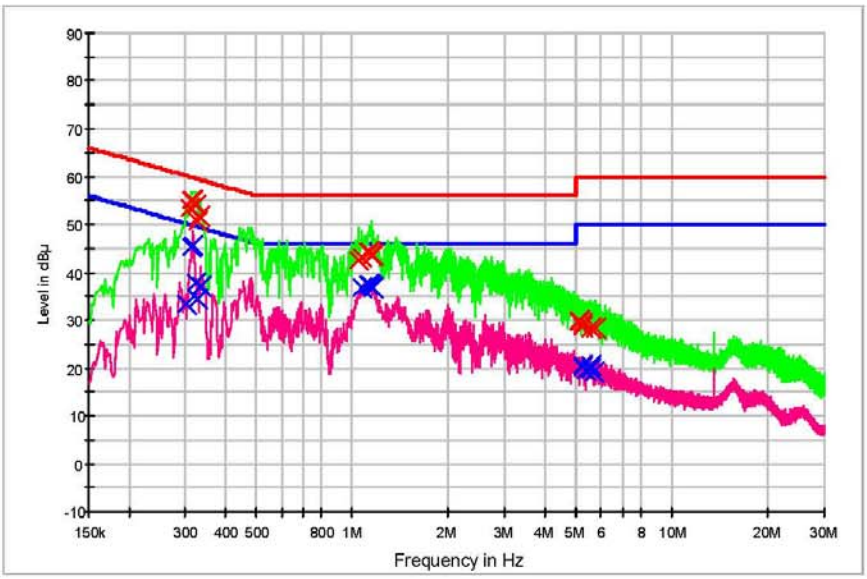
EMI Auto Test(4) 1 / 2

HCT TEST Report

Common Information

EUT:	WFM-SFP2501
Manufacturer:	I&C
Test Site:	SHIELD ROOM
Operating Conditions:	2.4G_WLAN_L1

FCC CLASS B_Exten Cable



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.310000	53.5	9.000	Off	L1	9.7	6.4	60.0
0.314000	55.1	9.000	Off	L1	9.7	4.7	59.9
0.318000	55.1	9.000	Off	L1	9.7	4.7	59.8
0.324000	54.1	9.000	Off	L1	9.7	5.5	59.6
0.330000	50.7	9.000	Off	L1	9.7	8.7	59.5
0.334000	51.6	9.000	Off	L1	9.7	7.8	59.4
1.042000	42.4	9.000	Off	L1	9.8	13.6	56.0
1.070000	43.3	9.000	Off	L1	9.8	12.7	56.0
1.128000	44.3	9.000	Off	L1	9.8	11.7	56.0
1.140000	44.3	9.000	Off	L1	9.8	11.7	56.0
1.152000	43.7	9.000	Off	L1	9.8	12.3	56.0
1.156000	43.6	9.000	Off	L1	9.8	12.4	56.0
5.144000	29.7	9.000	Off	L1	10.0	30.3	60.0
5.154000	30.0	9.000	Off	L1	10.0	30.0	60.0
5.238000	29.4	9.000	Off	L1	10.0	30.6	60.0
5.254000	28.5	9.000	Off	L1	10.0	31.5	60.0
5.536000	28.5	9.000	Off	L1	10.0	31.5	60.0
5.746000	28.2	9.000	Off	L1	10.0	31.8	60.0

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EMI Auto Test(4) 2 / 2

Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.302000	33.3	9.000	Off	L1	9.7	16.9	50.2
0.314000	45.2	9.000	Off	L1	9.7	4.6	49.9
0.318000	45.6	9.000	Off	L1	9.7	4.2	49.8
0.326000	37.9	9.000	Off	L1	9.7	11.7	49.6
0.330000	34.5	9.000	Off	L1	9.7	15.0	49.5
0.336000	37.1	9.000	Off	L1	9.7	12.2	49.3
1.070000	36.7	9.000	Off	L1	9.8	9.3	46.0
1.128000	37.3	9.000	Off	L1	9.8	8.7	46.0
1.132000	37.4	9.000	Off	L1	9.8	8.6	46.0
1.140000	37.3	9.000	Off	L1	9.8	8.7	46.0
1.150000	37.0	9.000	Off	L1	9.8	9.0	46.0
1.156000	36.7	9.000	Off	L1	9.8	9.3	46.0
5.238000	20.4	9.000	Off	L1	10.0	29.6	50.0
5.272000	20.0	9.000	Off	L1	10.0	30.0	50.0
5.352000	19.4	9.000	Off	L1	10.0	30.6	50.0
5.536000	19.8	9.000	Off	L1	10.0	30.2	50.0
5.574000	20.4	9.000	Off	L1	10.0	29.6	50.0
5.682000	19.2	9.000	Off	L1	10.0	30.8	50.0

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10. LIST OF TEST EQUIPMENT

10.1 LIST OF TEST EQUIPMENT(Conducted Test)

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Rohde & Schwarz	ENV216 / LISN	12/20/2017	Annual	102245
Rohde & Schwarz	ESCI / Test Receiver	06/27/2018	Annual	100033
ESPAC	SU-642 /Temperature Chamber	03/30/2018	Annual	0093008124
Agilent	N9020A / Signal Analyzer	06/08/2018	Annual	MY51110085
Agilent	N9030A / Signal Analyzer	11/22/2017	Annual	MY49431210
Agilent	N1911A / Power Meter	04/16/2018	Annual	MY45100523
Agilent	N1921A / Power Sensor	04/16/2018	Annual	MY52260025
Agilent	87300B / Directional Coupler	11/20/2017	Annual	3116A03621
Hewlett Packard	11667B / Power Splitter	06/07/2018	Annual	05001
Hewlett Packard	E3632A / DC Power Supply	06/26/2018	Annual	KR75303960
Agilent	8493C / Attenuator(10 dB)	07/10/2018	Annual	07560
Rohde & Schwarz	EMC32 / Software	N/A	N/A	N/A
HCT CO., LTD.	FCC WLAN&BT&BLE Conducted Test Software v3.0	N/A	N/A	N/A

10.2 LIST OF TEST EQUIPMENT(Radiated Test)

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Innco system	CO3000 / Controller(Antenna mast)	N/A	N/A	CO3000-4p
Innco system	MA4640/800-XP-EP / Antenna Position Tower	N/A	N/A	N/A
Audix	EM1000 / Controller	N/A	N/A	060520
Audix	Turn Table	N/A	N/A	N/A
Rohde & Schwarz	Loop Antenna	04/19/2017	Biennial	1513-175
Schwarzbeck	VULB 9168 / Hybrid Antenna	04/06/2017	Biennial	760
Schwarzbeck	BBHA 9120D / Horn Antenna	05/02/2017	Biennial	9120D-937
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	12/04/2017	Biennial	BBHA9170541
Rohde & Schwarz	FSP(9 kHz ~ 30 GHz) / Spectrum Analyzer	09/06/2017	Annual	100688
Rohde & Schwarz	FSV40-N / Spectrum Analyzer	09/27/2017	Annual	101068-SZ
Wainwright Instruments	WHK3.0/18G-10EF / High Pass Filter	06/07/2018	Annual	8
Wainwright Instruments	WHFX7.0/18G-8SS / High Pass Filter	05/09/2018	Annual	29
Wainwright Instruments	WRCJV2400/2483.5-2370/2520-60/12SS / Band Reject Filter	06/29/2018	Annual	2
Wainwright Instruments	WRCJV5100/5850-40/50-8EEK / Band Reject Filter	01/03/2018	Annual	2
Api tech.	18B-03 / Attenuator (3 dB)	06/07/2018	Annual	1
Agilent	8493C-10 / Attenuator(10 dB)	07/17/2018	Annual	08285
CERNEX	CBLU1183540 / Power Amplifier	07/10/2018	Annual	22964
CERNEX	CBL06185030 / Power Amplifier	07/10/2018	Annual	22965
CERNEX	CBL18265035 / Power Amplifier	01/10/2018	Annual	22966
CERNEX	CBL26405040 / Power Amplifier	06/29/2018	Annual	25956

11. ANNEX A_EUT AND TEST SETUP PHOTO

Please refer to test setup photo file no. as follows;

No.	Description
1	HCT-RF-1808-FC006-P