RF TEST REPORT

Report No.: 18020543-FCC-R2
Supersede Report No.: N/A

Applicant	Nanjing Hanlong Technology Co., Ltd.
Product Name	IP PHONE
Model No.	UC912E
Serial No.	N/A
Test Standard	FCC Part 15.247: 2017, ANSI C63.10: 2013
Test Date	May 29 to June 29, 2018
Issue Date	August 8, 2018
Test Result	☑ **Pass** ☐ **Fail**
Equipment complied with the specification	☑
Equipment did not comply with the specification	☐

peter Wei	Amos. Xia	
Peter Wei **Test Engineer**	**Amos Xia** **Engineer Reviewer**	

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Test result presented in this test report is applicable to the tested sample only

Issued by:
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Laboratories Introduction

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Accreditations for Conformity Assessment

Country/Region	Scope
USA	EMC, RF/Wireless, SAR, Telecom
Canada	EMC, RF/Wireless, SAR, Telecom
Taiwan	EMC, RF, Telecom, SAR, Safety
Hong Kong	RF/Wireless, SAR, Telecom
Australia	EMC, RF, Telecom, SAR, Safety
Korea	EMI, EMS, RF, SAR, Telecom, Safety
Japan	EMI, RF/Wireless, SAR, Telecom
Singapore	EMC, RF, SAR, Telecom
Europe	EMC, RF, SAR, Telecom, Safety

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1. Report Revision History

Report No.	Report Version	Description	Issue Date
18020543-FCC-R2	NONE	Original	June 27, 2017

2. Customer information

Applicant Name	Nanjing Hanlong Technology Co., Ltd.
Applicant Add	5th Floor, 1st Building, Huashen Tech Park, 10 Huashen Temple, Yuhuatai Dis, Nanjing China
Manufacturer	Nanjing Hanlong Technology Co., Ltd.
Manufacturer Add	5th Floor, 1st Building, Huashen Tech Park, 10 Huashen Temple, Yuhuatai Dis, Nanjing China

3. Test site information

Lab performing tests	SIEMIC (Nanjing-China) Laboratories
Lab Address	2-1 Longcang Avenue Yuhua Economic and Technology Development Park, Nanjing, China
FCC Test Site No.	694825
IC Test Site No.	4842B-1
Test Software	EZ_EMC

4. Equipment under Test (EUT) Information

Description of EUT:	IP PHONE
Main Model:	UC912E
Serial Model:	N/A
Date EUT received:	May 21, 2018
Test Date(s):	May 29 to June 29, 2018
Antenna Gain:	WIFI:802.11b/g/n(20M/40M): 3.8 dBi
Type of Modulation:	WIFI:802.11b/g/n(20M/40M): DSSS, OFDM
RF Operating Frequency (ies):	WIFI:802.11b/g/n(20M): 2412-2472 MHz 802.11n(40M):2422-2462 MHz
Max. Output Power:	WIFI:802.11b: 20.03 dBm 802.11n(40M): 18.51 dBm
Number of Channels:	WIFI :802.11b/g/n(20M): 13CH WIFI :802.11n(40M): 9CH
Port:	Power Port, Internet Port, PC Port, Earphone Port, Phone Port
Input Power:	AC Adapter: MODEL: RD0501200-C55-KOG INPUT: 100-240V~50/60Hz 250mA OUTPUT: DC 5V 1.2A POE: DC48V 500 mA
Trade Name :	Htek
FCC ID:	2ACUGUC912ESERIAL

Operating channel list

Channel	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	2467
13	2472

5. Test Summary

The product was tested in accordance with the following specifications.
All testing has been performed according to below product classification:

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliance
§15.247 (a)(2)	DTS (6 dB&20 dB) CHANNEL BANDWIDTH	Compliance
§15.247(b)(3)	Conducted Maximum Output Power	Compliance
§15.247(e)	Power Spectral Density	Compliance
§15.247(d)	Band-Edge & Unwanted Emissions into Non-Restricted Frequency Bands	Compliance
§15.207 (a),	AC Power Line Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Radiated Spurious Emissions & Unwanted Emissions into Restricted Frequency Bands	Compliance

Measurement Uncertainty

Emissions		
Test Item	**Description**	**Uncertainty**
Band Edge and Radiated Spurious Emissions	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+5.6dB/-4.5dB
-	-	-

6. Measurements, Examination And Derived Results

6.1 Antenna Requirement

Applicable Standard

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. 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 manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules.
§15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.
And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

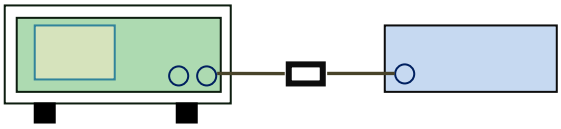
The EUT has 1 antenna:
A permanently attached antenna for BT/WIFI/BLE, the gain is 3.8 dBi .

Antenna must be permanently attached to the unit ,it meets up with the ANTENNA REQUIREMENT.

Result: Compliant.

6.2 DTS (6 dB&20 dB) Channel Bandwidth

Temperature	28℃
Relative Humidity	54%
Atmospheric Pressure	1021mbar
Test date :	June 29, 2018
Tested By :	Peter Wei

Spec	Item	Requirement	Applicable
§ 15.247(a)(2) RSS Gen(4.6.1)	a)	6dB BW≥500kHz;	☑
	b)	99% BW: For FCC reference only; required by IC.	N/A
Test Setup			
Test Procedure	558074 D01 DTS MEAS Guidance V04, 8.1 DTS bandwidth 6dB bandwidth a) Set RBW = 100 kHz. b) Set the video bandwidth (VBW) ≥ 3 × RBW. c) Detector = Peak. d) Trace mode = max hold. e) Sweep = auto couple. f) Allow the trace to stabilize. g) Measure the maximum width of the emission that is constrained by the frequencies associate d with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission. 20dB bandwidth C63.10 Occupied Bandwidth (OBW=20dB bandwidth) 1. Set RBW = 1%-5% OBW. 2. Set the video bandwidth (VBW) ≥ 3 x RBW. 3. Set the span range between 2 times and 5 times of the OBW. 4. Sweep time=Auto, Detector=PK, Trace=Max hold. 5. Once the reference level is established, the equipment is conditioned with typical modulatin g signals to produce the worst- case (i.e., the widest) bandwidth. Unless otherwise specified for an unlicensed wireless device, measure the bandwidth at the 20 dB levels with respect to the reference level.		
Remark			
Result	☑ Pass ☐ Fail		

Test Data ☑ Yes ☐ N/A

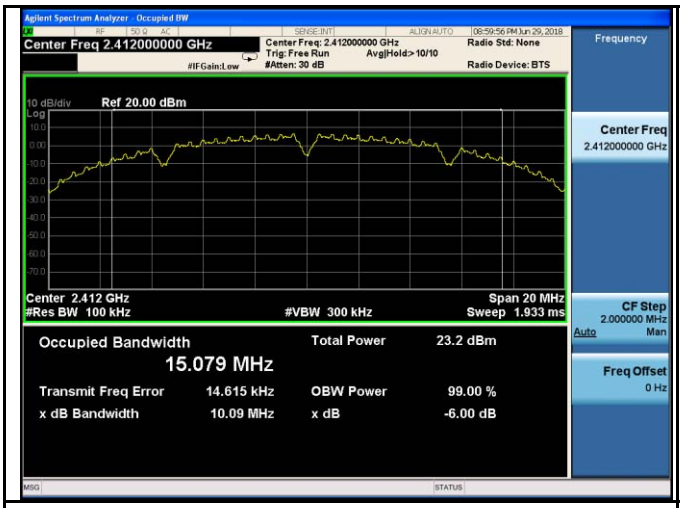
Test Plot ☑ Yes (See below) ☐ N/A

Measurement result

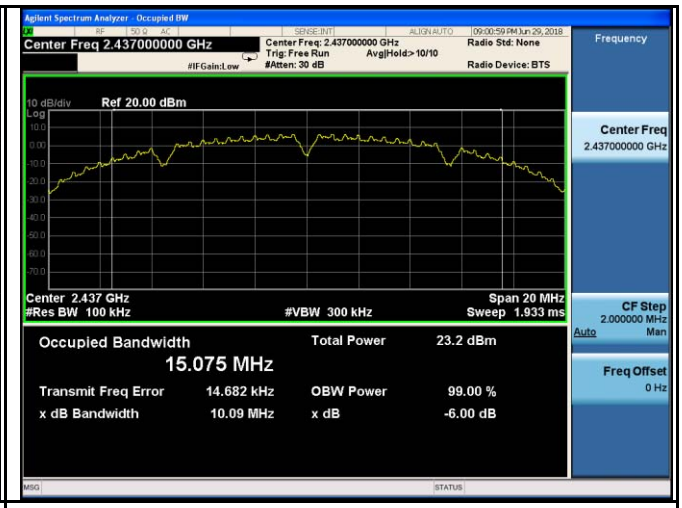
Test mode	CH	Freq (MHz)	6dB Bandwidth (MHz)	20dB Bandwidth (MHz)	Limit (MHz)
802.11b	1	2412	10.09	17.29	≥0.5
	6	2437	10.09	17.30	≥0.5
	11	2462	10.09	17.29	≥0.5
	12	2467	10.10	17.30	≥0.5
	13	2472	10.09	17.30	≥0.5
802.11g	1	2412	16.57	19.39	≥0.5
	6	2437	16.57	19.32	≥0.5
	11	2462	16.57	19.42	≥0.5
	12	2467	16.57	19.44	≥0.5
	13	2472	16.57	19.37	≥0.5
802.11n (20M)	1	2412	17.84	20.36	≥0.5
	6	2437	17.84	20.31	≥0.5
	11	2462	17.85	20.45	≥0.5
	12	2467	17.84	20.32	≥0.5
	13	2472	17.84	20.34	≥0.5
802.11n (40M)	3	2422	36.47	40.13	≥0.5
	6	2437	36.47	40.14	≥0.5
	9	2452	36.46	40.15	≥0.5
	10	2457	36.46	40.11	≥0.5
	11	2462	36.47	40.20	≥0.5

Test Plots

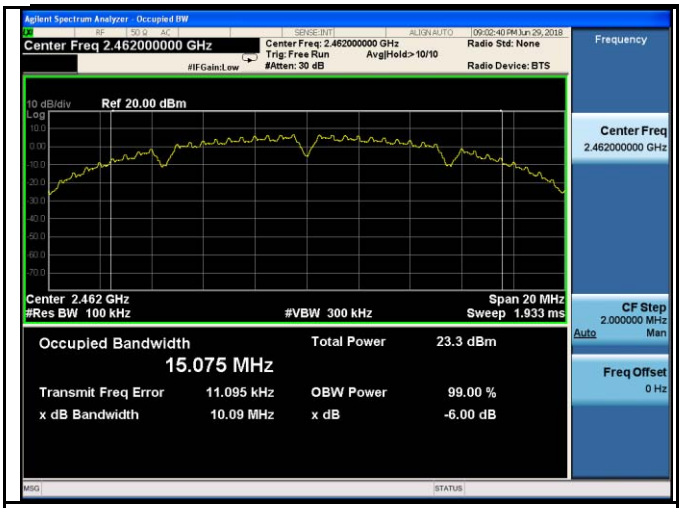
6dB Bandwidth measurement result



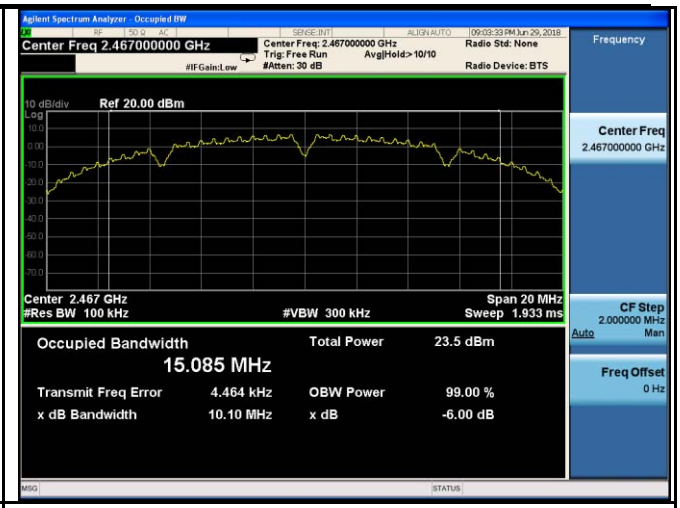
802.11b 6dB Bandwidth - CH 1



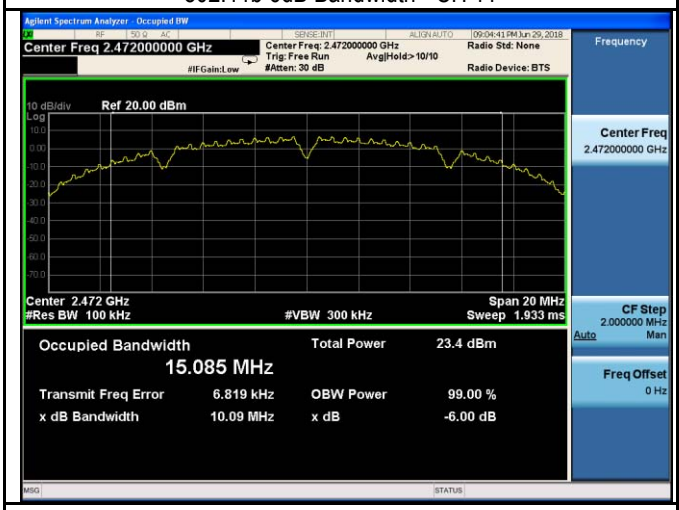
802.11b 6dB Bandwidth - CH 6



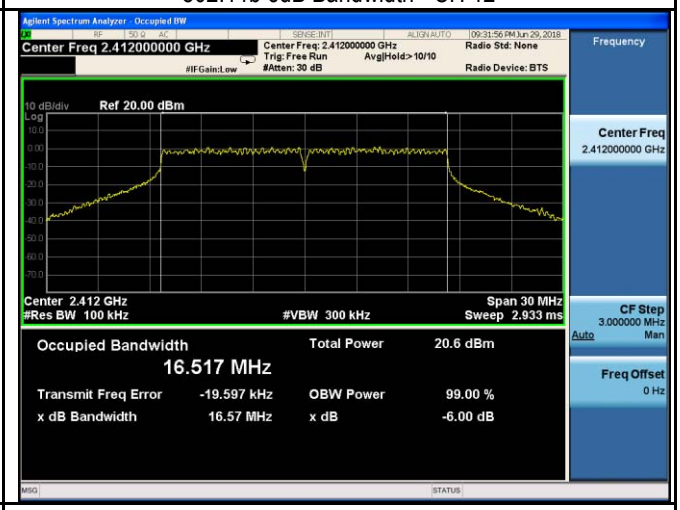
802.11b 6dB Bandwidth - CH 11



802.11b 6dB Bandwidth - CH 12

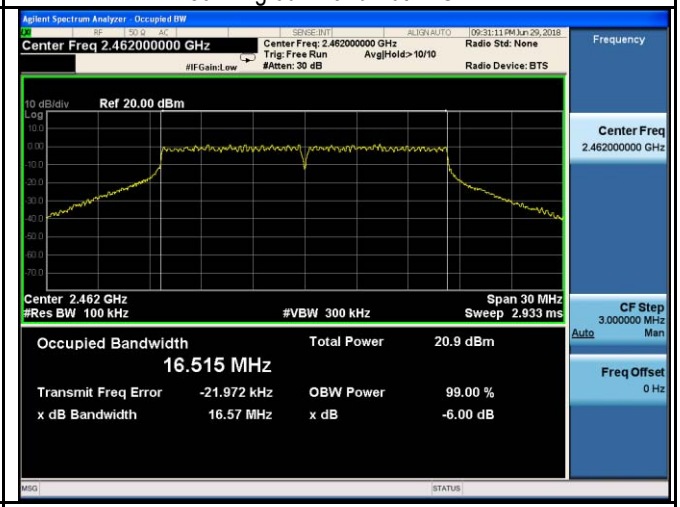


802.11b 6dB Bandwidth - CH 13



802.11g 6dB Bandwidth - CH 1

802.11g 6dB Bandwidth - CH 6



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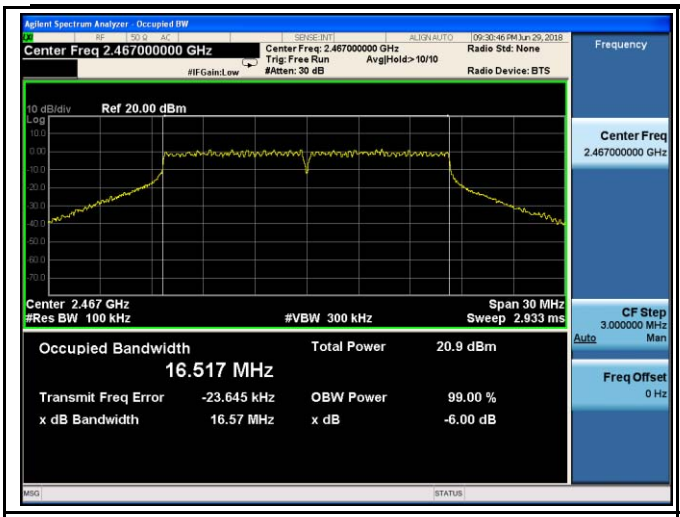

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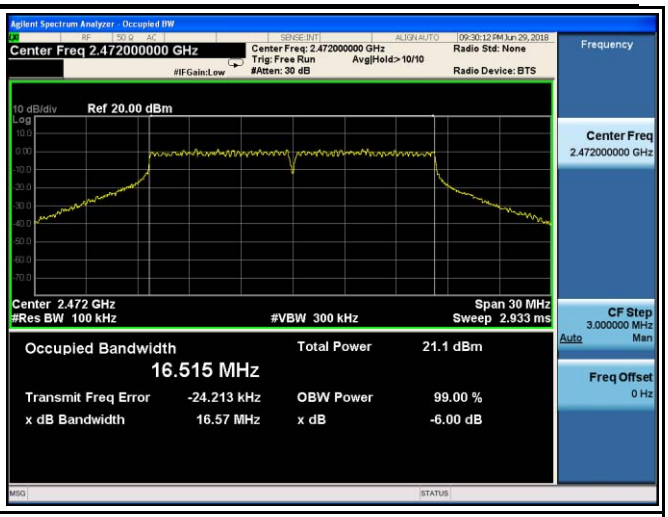

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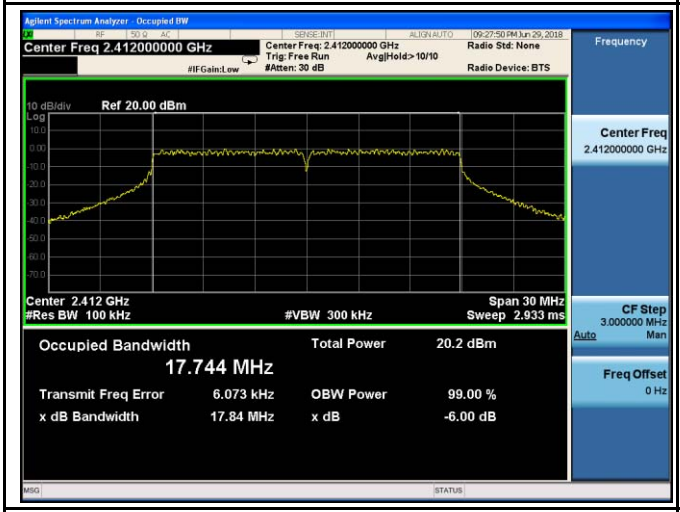
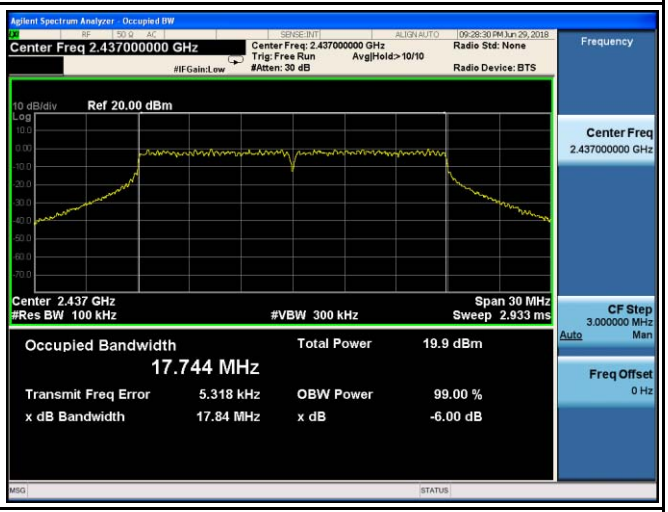
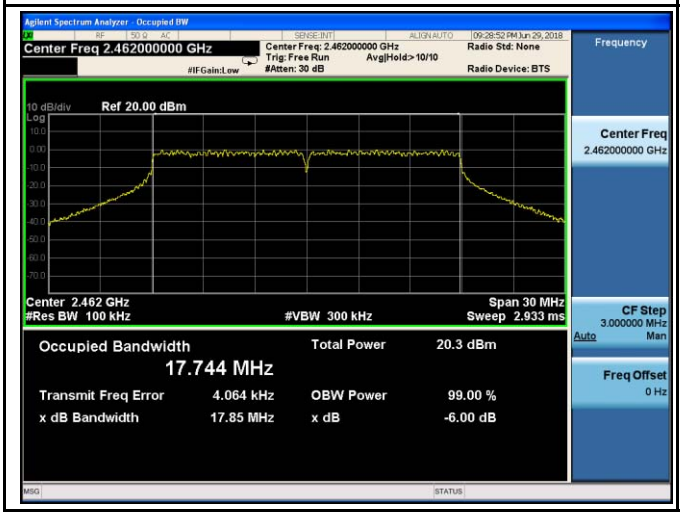


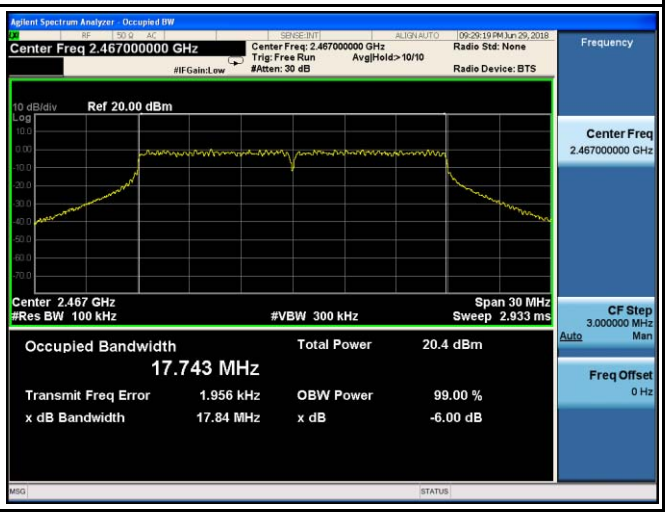
802.11n20 6dB Bandwidth - CH 1



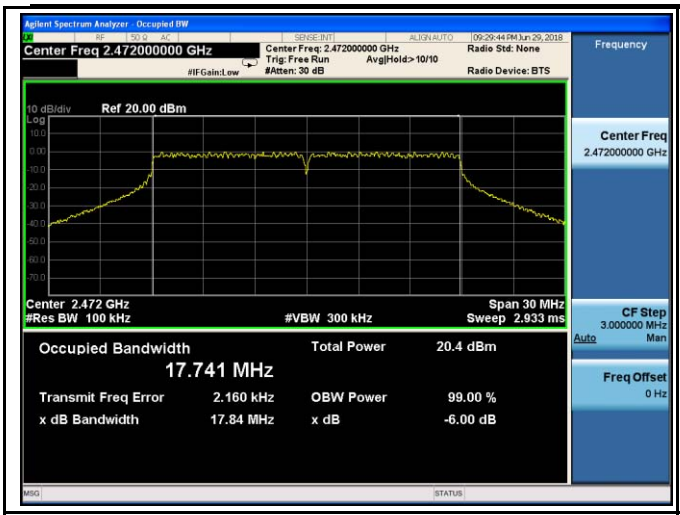
802.11n20 6dB Bandwidth - CH 6



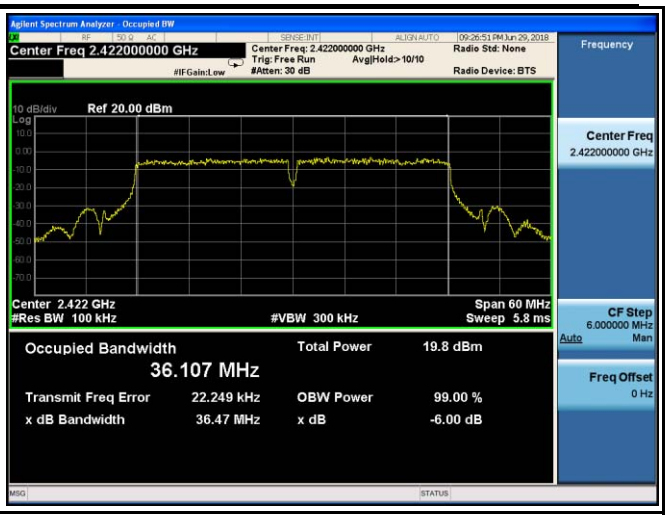
802.11n20 6dB Bandwidth - CH 11



802.11n20 6dB Bandwidth - CH 12



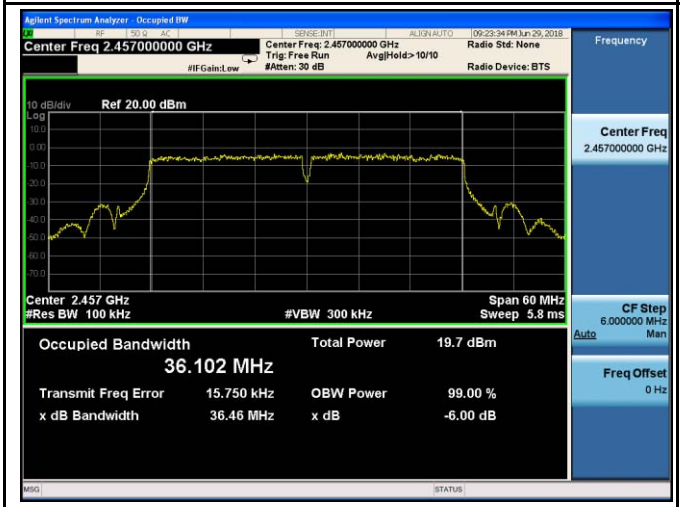
802.11n20 6dB Bandwidth - CH 13



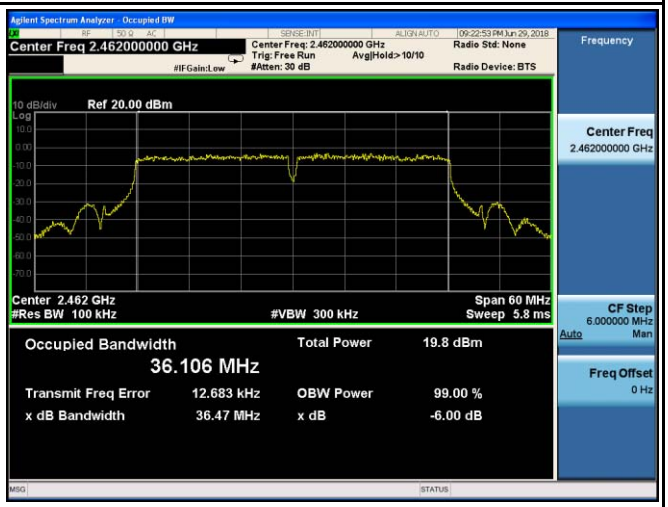
802.11n40 6dB Bandwidth - CH 3

802.11n40 6dB Bandwidth - CH 6

802.11n40 6dB Bandwidth - CH 9

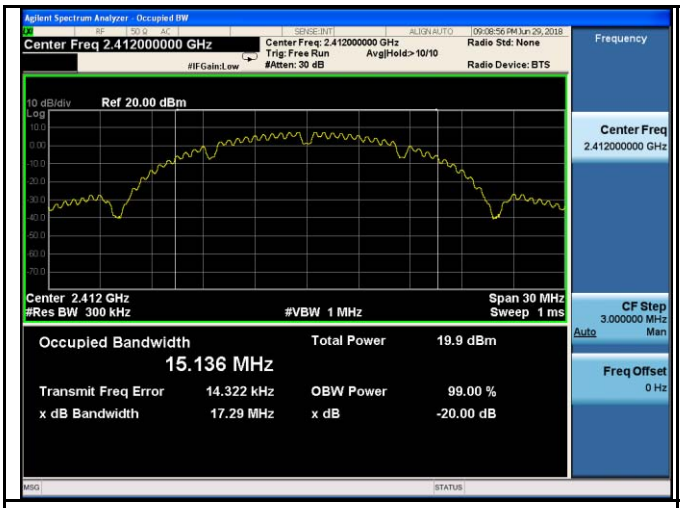


802.11n40 6dB Bandwidth - CH 10



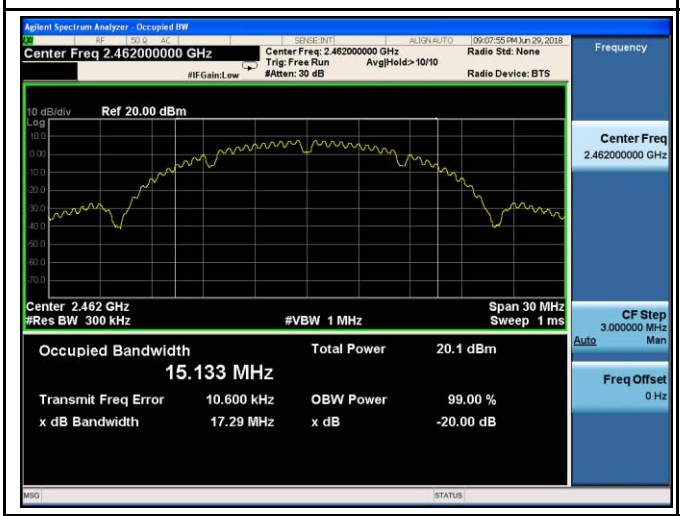
802.11n40 6dB Bandwidth - CH 11

20 dB Bandwidth measurement result



802.11b 20dB Bandwidth - CH 1

802.11b 20dB Bandwidth - CH 6



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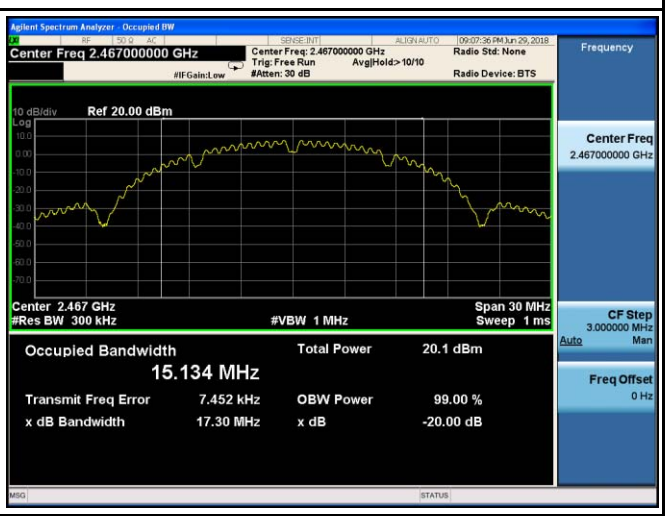

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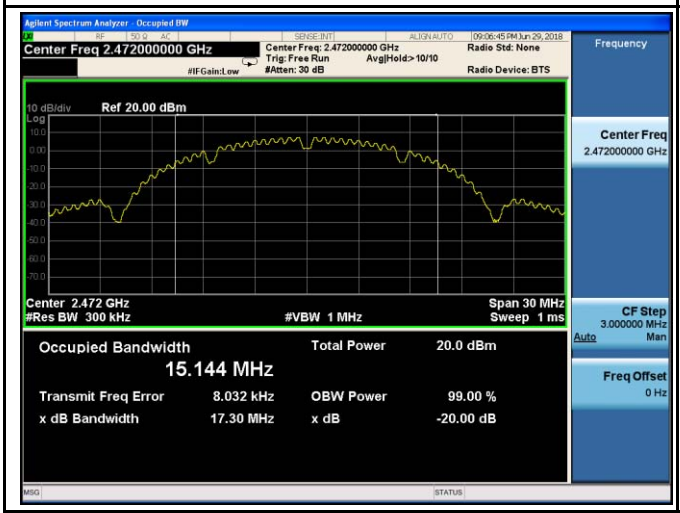
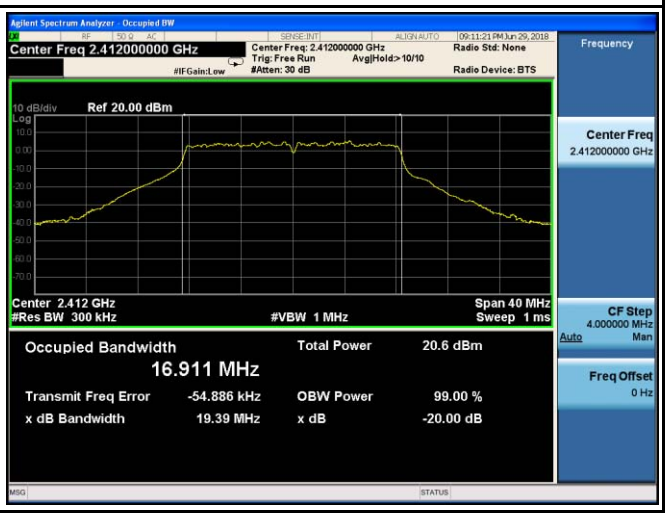
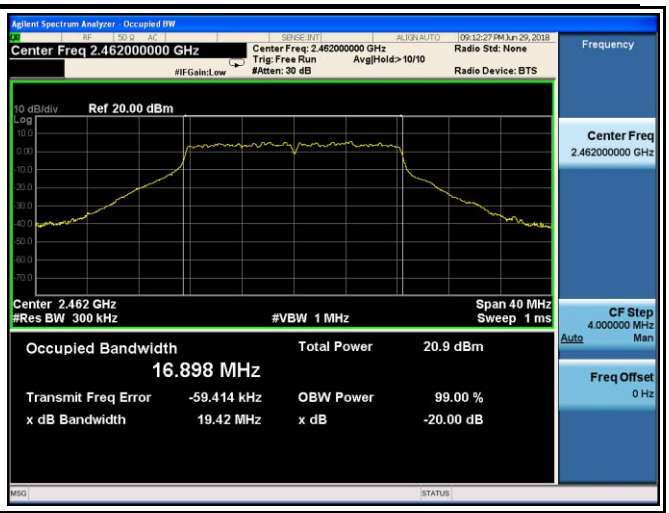


802.11b 20dB Bandwidth - CH 13



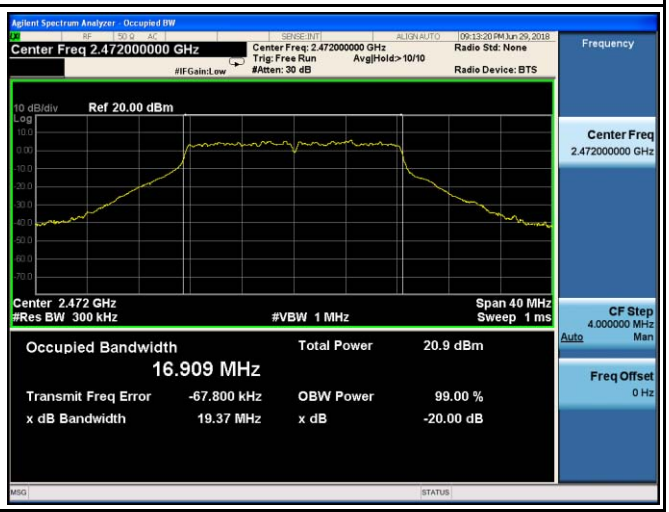
802.11g 20dB Bandwidth - CH 1

802.11g 20dB Bandwidth - CH 6



802.11g 20dB Bandwidth - CH 11

802.11g 20dB Bandwidth - CH 12



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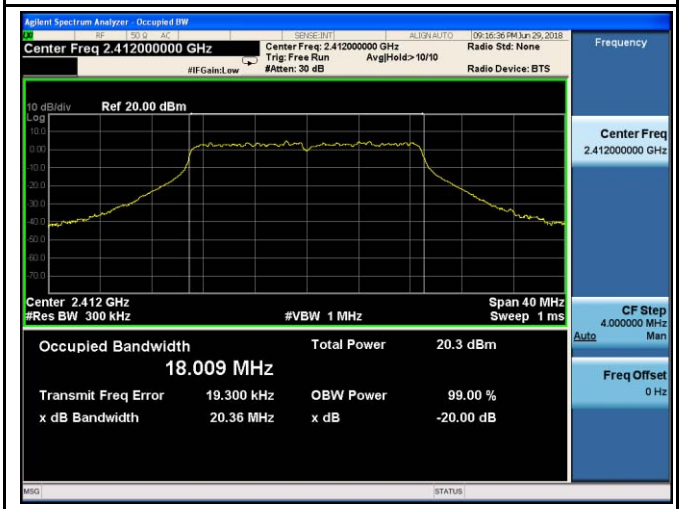
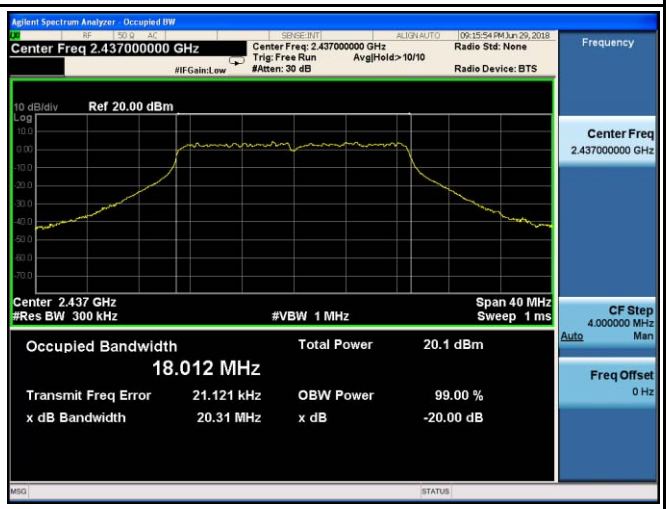


802.11n20 20dB Bandwidth - CH 1

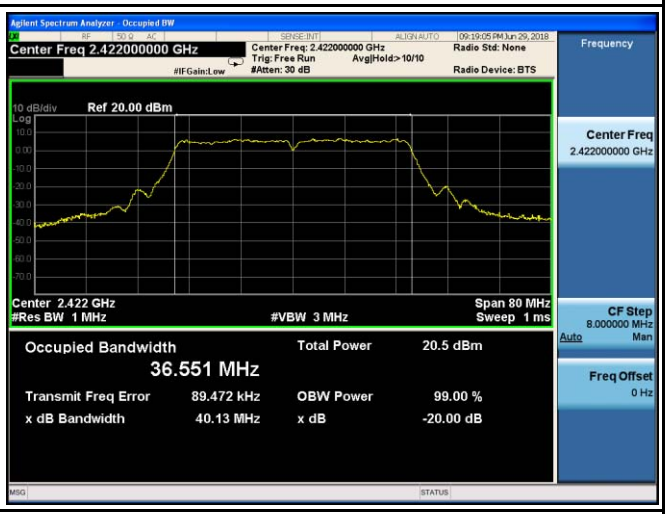


802.11n20 20dB Bandwidth - CH 6

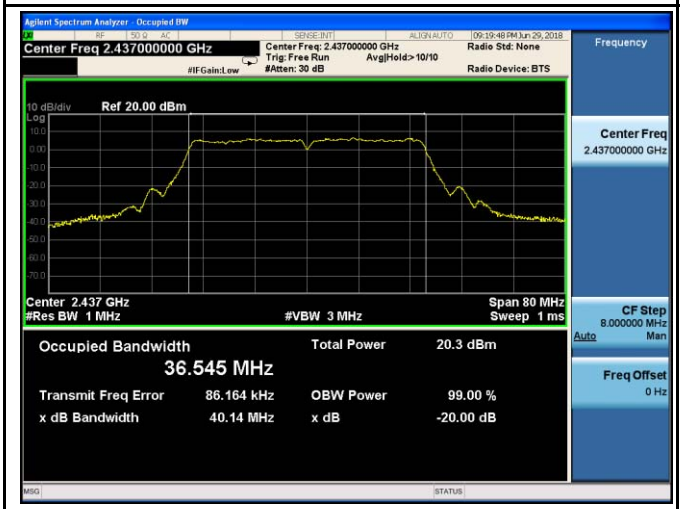
802.11n20 20dB Bandwidth - CH 11

802.11n20 20dB Bandwidth - CH 12

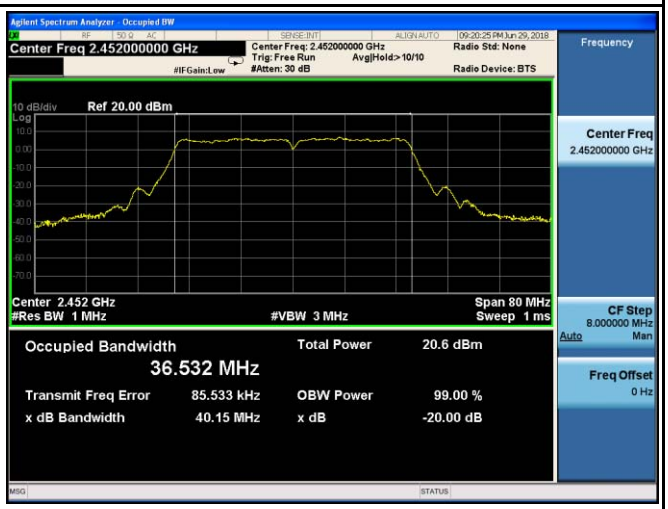
802.11n20 20dB Bandwidth - CH 13



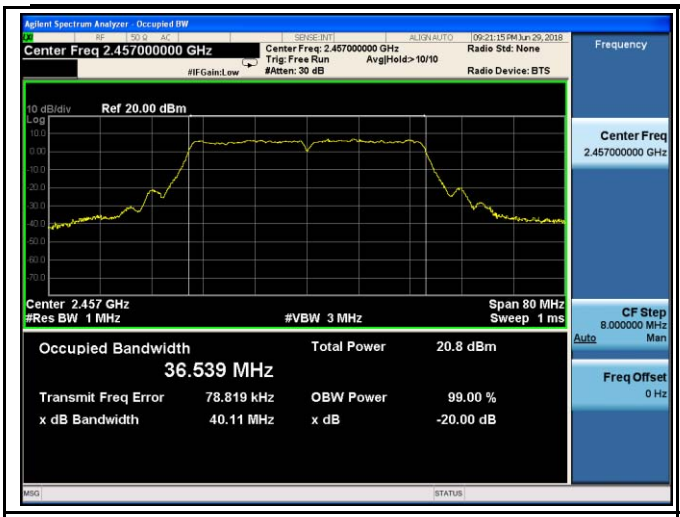
802.11n40 20dB Bandwidth - CH 3



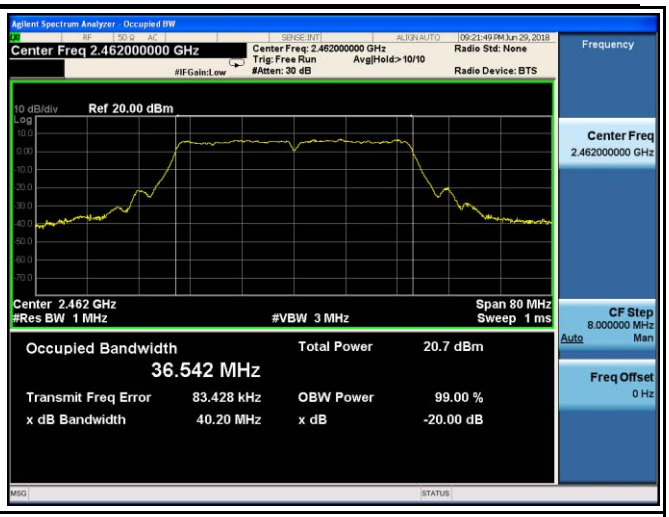
802.11n40 20dB Bandwidth - CH 6



802.11n40 20dB Bandwidth - CH 9



802.11n40 20dB Bandwidth - CH 10

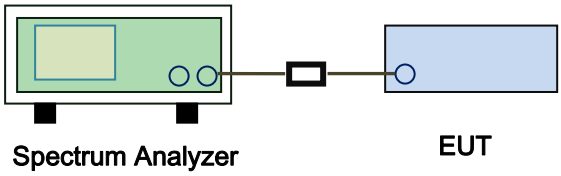


802.11n40 20dB Bandwidth - CH 11

6.3 Maximum Output Power

Temperature	28℃
Relative Humidity	54%
Atmospheric Pressure	1021mbar
Test date :	June 29, 2018
Tested By :	Peter Wei

Requirement(s):

Spec	Item	Requirement	Applicable
§15.247(b) (3)	a)	FHSS in 2400-2483.5MHz with ≥ 75 channels: ≤1 Watt	☐
	b)	FHSS in 5725-5850MHz: ≤1 Watt	☐
	c)	For all other FHSS in the 2400-2483.5MHz band: ≤0.125 Watt.	☐
	d)	FHSS in 902-928MHz with ≥ 50 channels: ≤1 Watt	☐
	e)	FHSS in 902-928MHz with ≥ 25 & <50 channels: ≤0.25 Watt	☐
	f)	DTS in 902-928MHz, 2400-2483.5MHz: ≤1 Watt	☑
Test Setup			
Test Procedure	558074 D01 DTS MEAS Guidance V04, 9.1.2 Integrated band power method Maximum output power measurement procedure - a) Set span to at least 1.5 times the OBW. - b) Set RBW = 1-5% of the OBW, not to exceed 1 MHz. - c) Set VBW ≥ 3 x RBW. - d) Number of points in sweep ≥ 2 × span / RBW. (This gives bin-to-bin spacing ≤ RBW/2, so that narrowband signals are not lost between frequency bins.) - e) Sweep time = auto. - f) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode. - g) If transmit duty cycle < 98 %, use a sweep trigger with the level set to enable triggering only on full power pulses. The transmitter shall operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98 %, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run". - h) Trace average at least 100 traces in power averaging (i.e., RMS) mode. - i) Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function, with band limits set equal to the OBW band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.		
Remark			
Result	☑ Pass ☐ Fail		

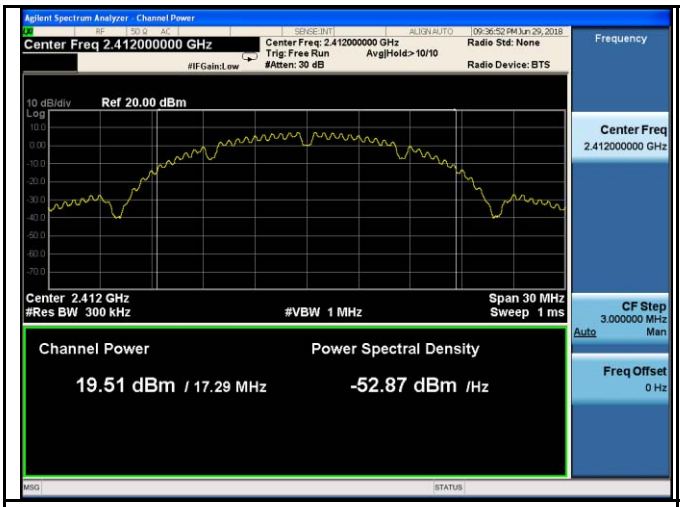
Test Data ☑ Yes ☐ N/A

Test Plot ☑ Yes (See below) ☐ N/A

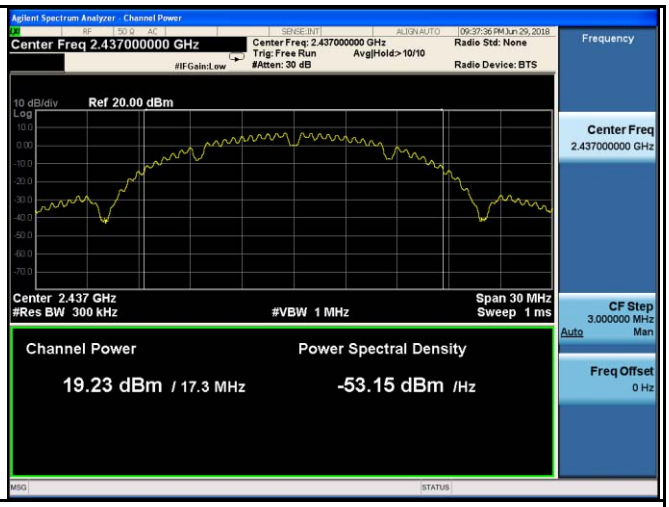
Output Power measurement result

Type	Test mode	CH	Freq (MHz)	Conducted Power (dBm)	Limit (dBm)	Result
Output power	802.11b	1	2412	19.51	30	Pass
		6	2437	19.23	30	Pass
		11	2462	19.52	30	Pass
		12	2467	19.55	30	Pass
		13	2472	19.65	30	Pass
	802.11g	1	2412	19.85	30	Pass
		6	2437	19.68	30	Pass
		11	2462	20.03	30	Pass
		12	2467	19.98	30	Pass
		13	2472	20.01	30	Pass
	802.11n(20M)	1	2412	19.54	30	Pass
		6	2437	19.34	30	Pass
		11	2462	19.81	30	Pass
		12	2467	19.76	30	Pass
		13	2472	19.56	30	Pass
	802.11n(40M)	3	2422	18.18	30	Pass
		6	2437	18.05	30	Pass
		9	2452	18.35	30	Pass
		10	2457	18.46	30	Pass
		11	2462	18.51	30	Pass

Test Plots



802.11b - AV Output power - CH 1



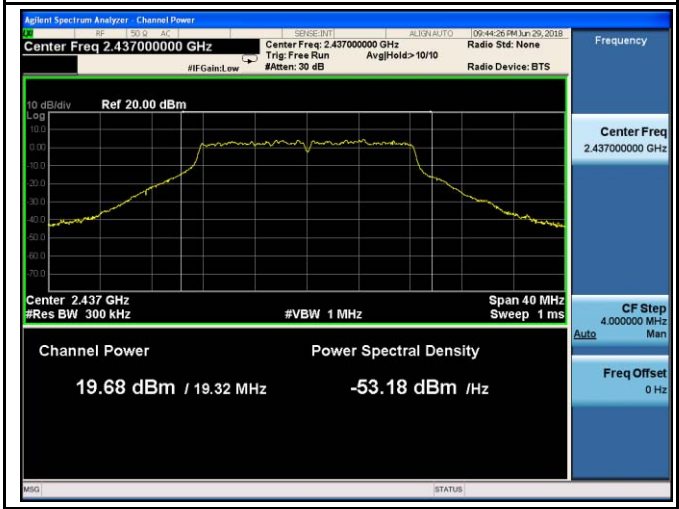
802.11b - AV Output power - CH 6

802.11b - AV Output power - CH 11

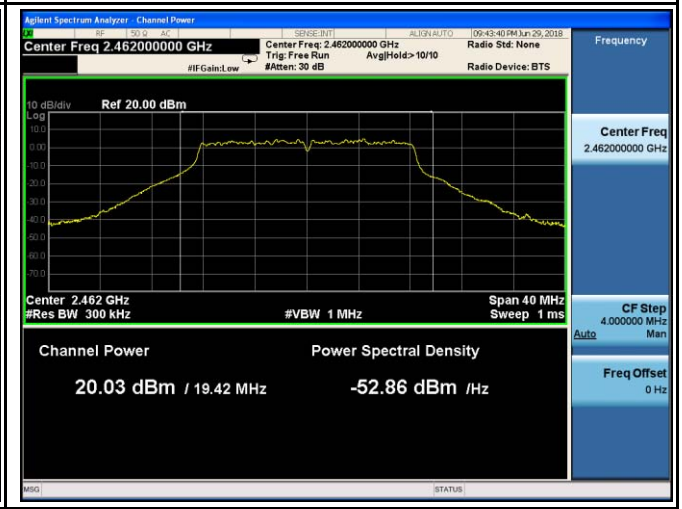
802.11b - AV Output power - CH 12

802.11b - AV Output power - CH 13

802.11g - AV Output power - CH 1

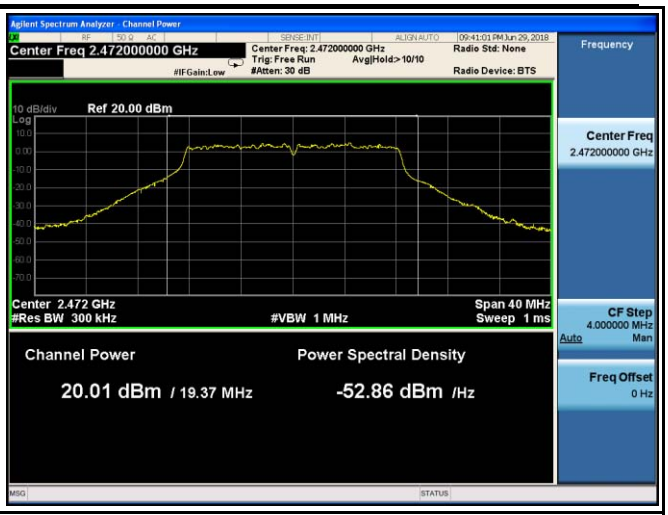


802.11g - AV Output power - CH 6



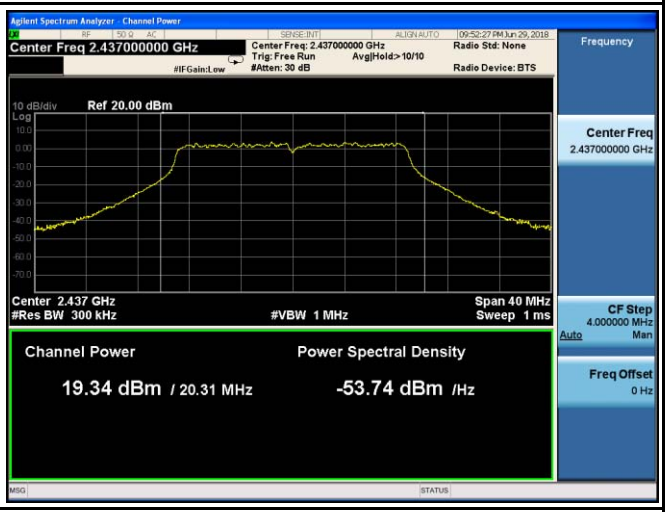
802.11g - AV Output power - CH 11

802.11g - AV Output power - CH 12



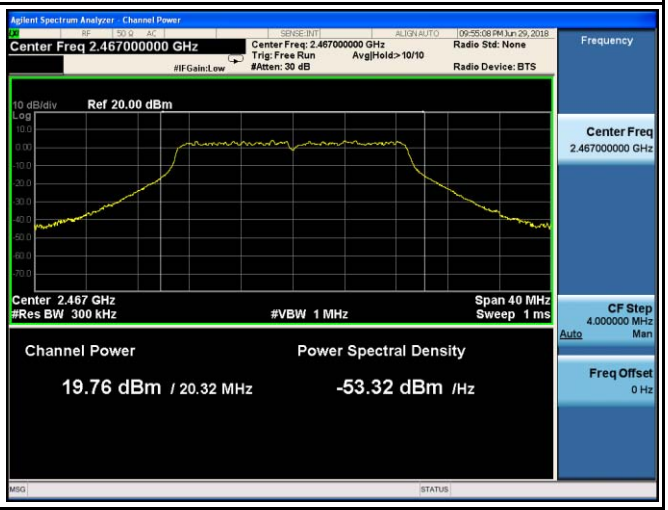
802.11g - AV Output power - CH 13

802.11n20 - AV Output power - CH 1



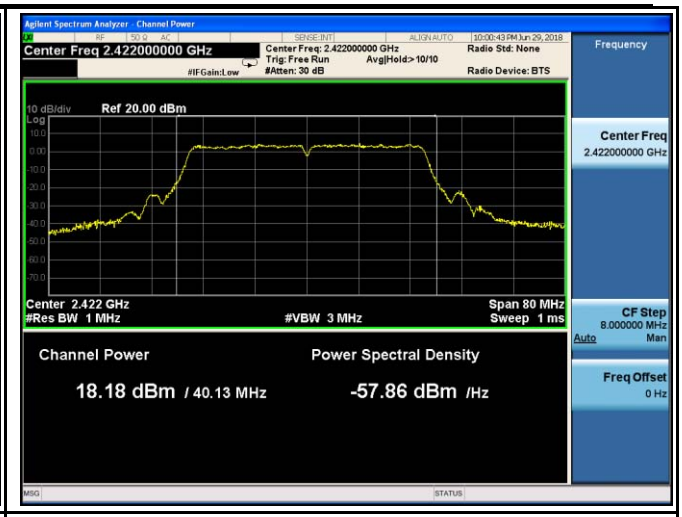
802.11n20 - AV Output power - CH 6

802.11n20 - AV Output power - CH 11

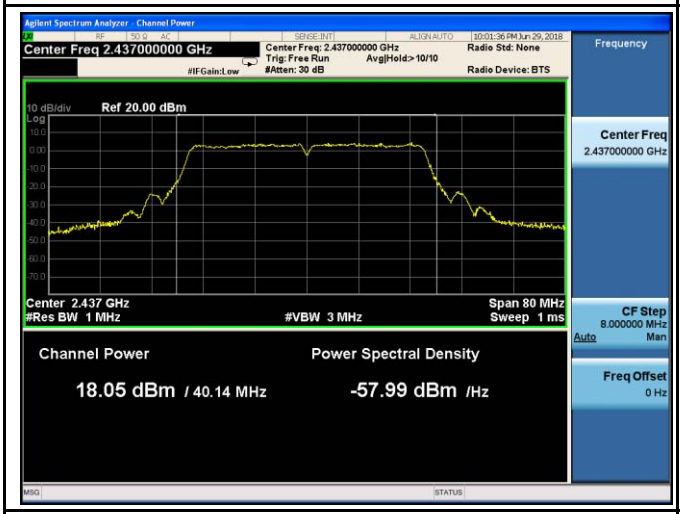


802.11n20 - AV Output power - CH 12

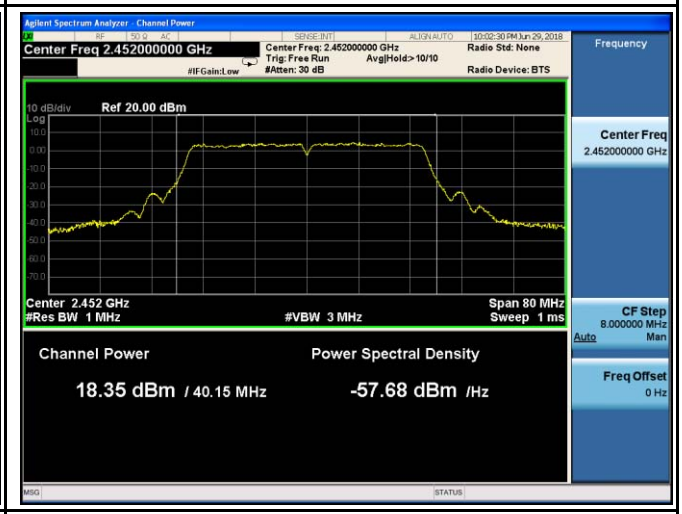
802.11n20 - AV Output power - CH 13



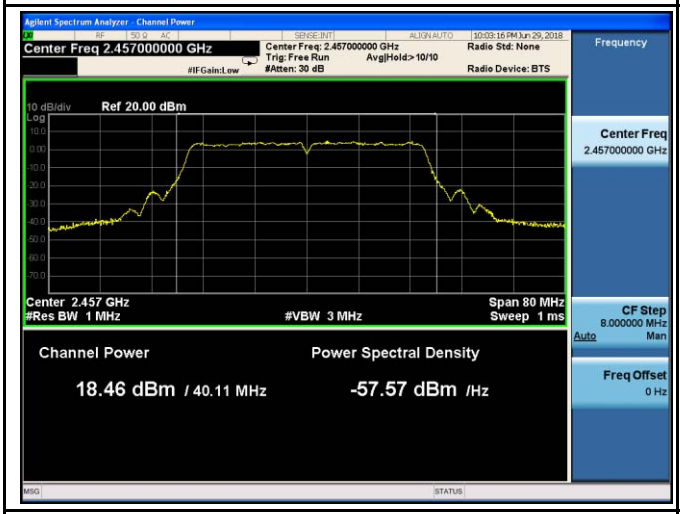
802.11n40 - AV Output power - CH 3



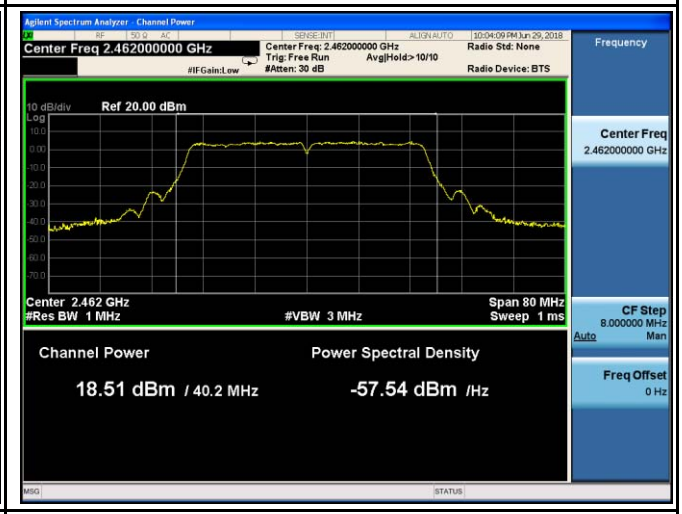
802.11n40 - AV Output power - CH 6



802.11n40 - AV Output power - CH 9



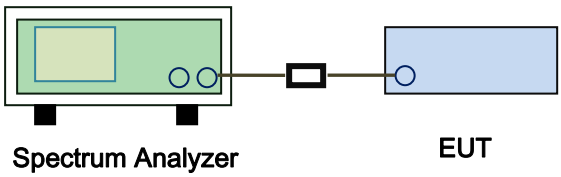
802.11n40 - AV Output power - CH 10



802.11n40 - AV Output power - CH 11

6.4 Power Spectral Density

Temperature	28℃
Relative Humidity	54%
Atmospheric Pressure	1021mbar
Test date :	June 29, 2018
Tested By :	Peter Wei

Spec	Item	Requirement	Applicable
§15.247(e)	a)	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 Setup			
Test Procedure	558074 D01 DTS MEAS Guidance V04, 10.2 power spectral density method power spectral density measurement procedure - a) Set analyzer center frequency to DTS channel center frequency. - b) Set the span to 1.5 times the DTS bandwidth. - c) Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz. - d) Set the VBW ≥ 3 × 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 amplitude level within the RBW. - j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.		
Remark			
Result	☑ Pass ☐ Fail		

Test Data ☑ Yes ☐ N/A

Test Plot ☑ Yes (See below) ☐ N/A

Power Spectral Density measurement result

Type	Test mode	CH	Freq (MHz)	PSD (dBm)	Limit (dBm)	Result
PSD	802.11b	1	2412	0.837	8	Pass
		6	2437	0.935	8	Pass
		11	2462	1.181	8	Pass
		12	2467	1.160	8	Pass
		13	2472	1.193	8	Pass
	802.11g	1	2412	-2.761	8	Pass
		6	2437	-2.864	8	Pass
		11	2462	-2.566	8	Pass
		12	2467	-2.502	8	Pass
		13	2472	-2.441	8	Pass
	802.11n(20M)	1	2412	-3.997	8	Pass
		6	2437	-3.519	8	Pass
		11	2462	-3.655	8	Pass
		12	2467	-3.666	8	Pass
		13	2472	-3.424	8	Pass
	802.11n(40M)	3	2422	-6.453	8	Pass
		6	2437	-6.884	8	Pass
		9	2452	-6.126	8	Pass
		10	2457	-6.298	8	Pass
		11	2462	-6.118	8	Pass

Test Plots
Power Spectral Density measurement result

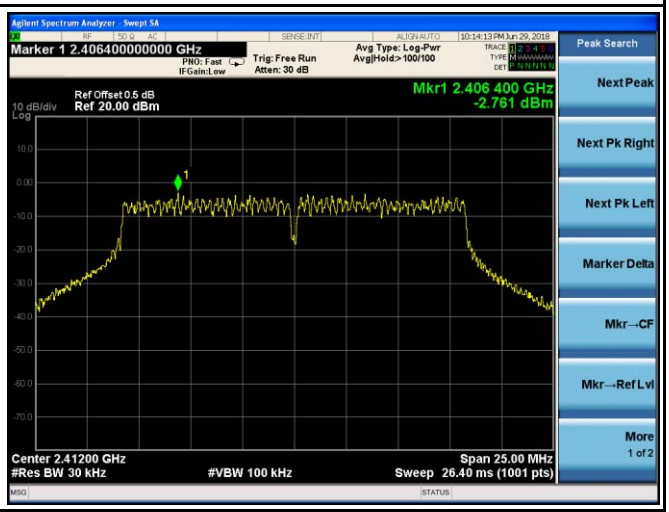
PSD - CH 1 - 802.11b

PSD - CH 6 - 802.11b

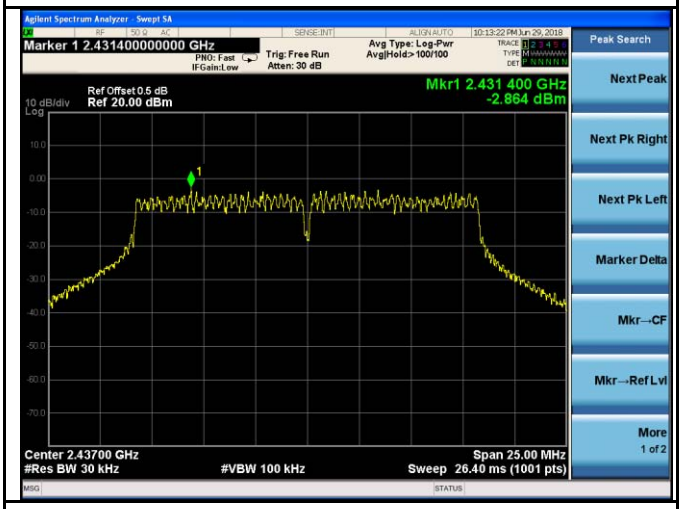
PSD - CH 11 - 802.11b

PSD - CH 12 - 802.11b

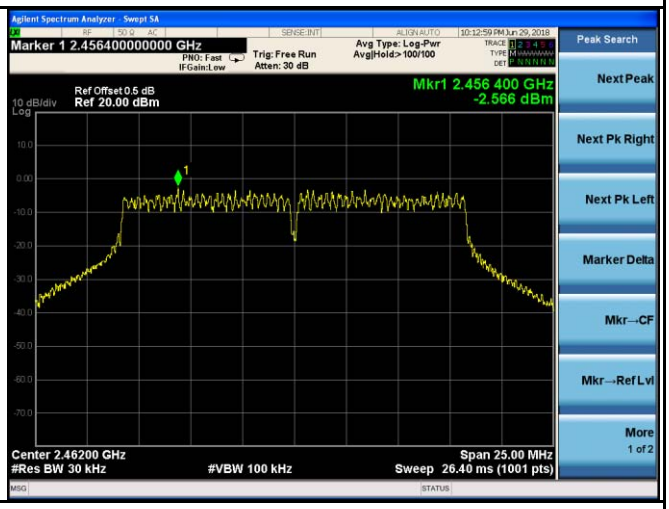
PSD - CH 13 - 802.11b



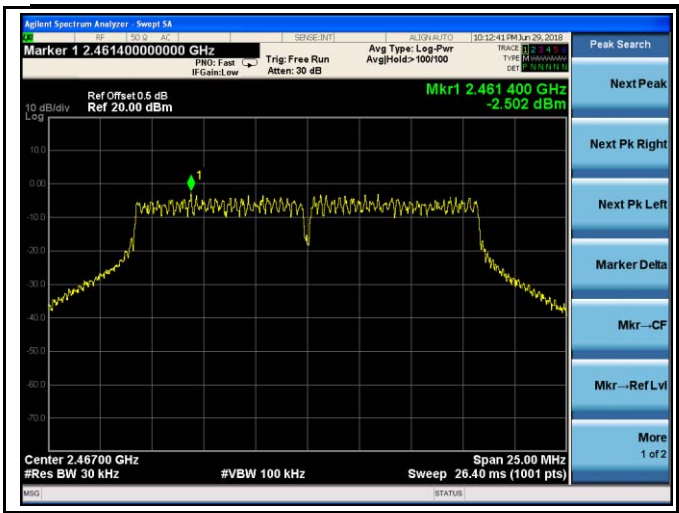
PSD - CH 1 – 802.11g



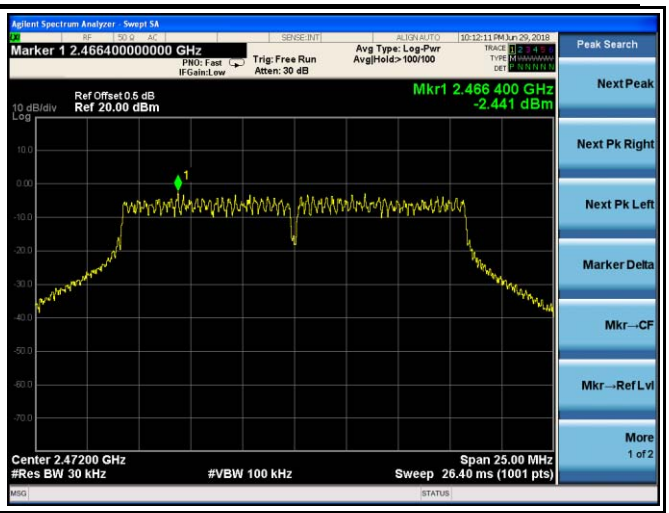
PSD - CH 6 – 802.11g



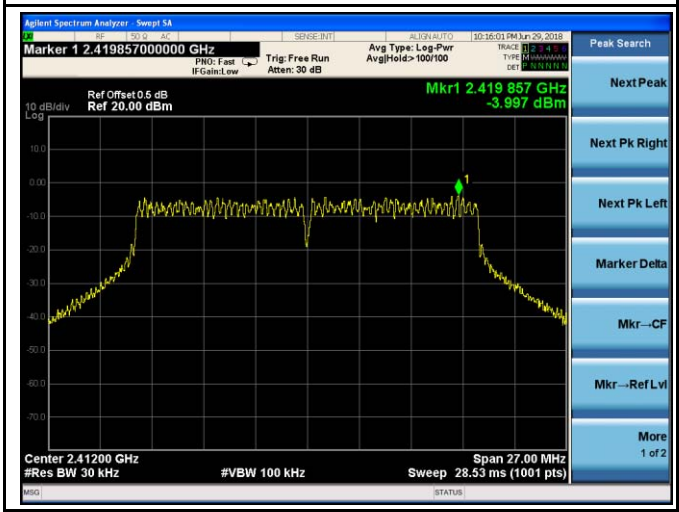
PSD - CH 11 – 802.11g



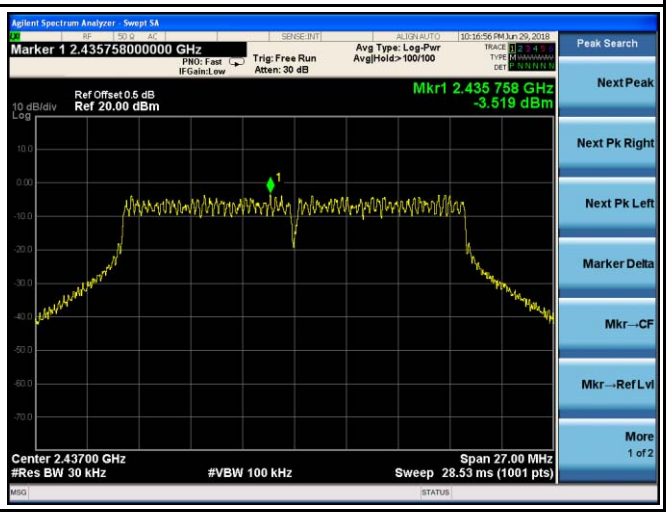
PSD - CH 12 – 802.11g



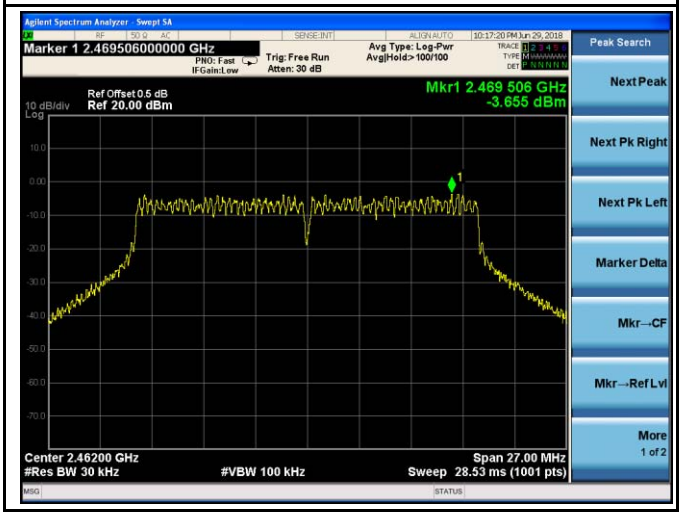
PSD - CH 13 – 802.11g



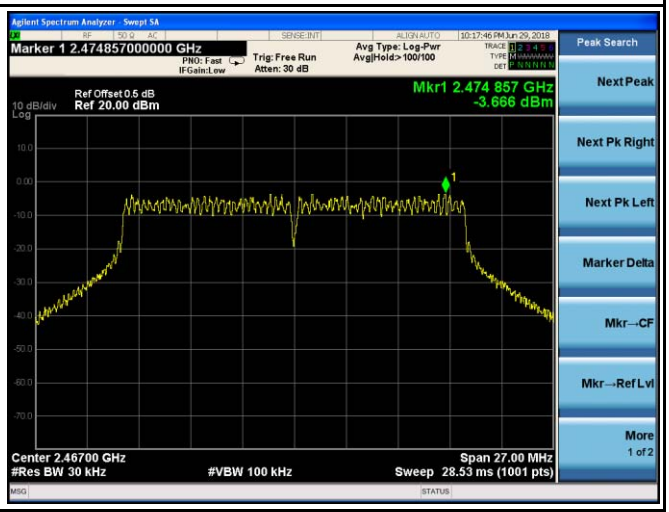
PSD - CH 1 – 802.11n20



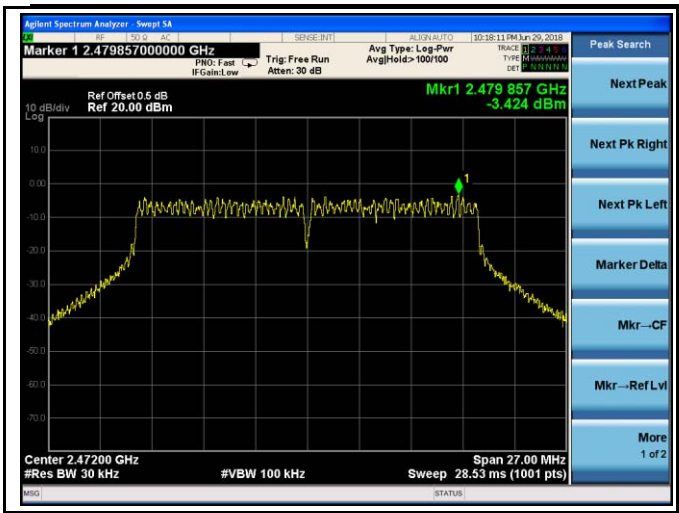
PSD - CH 6 – 802.11n20



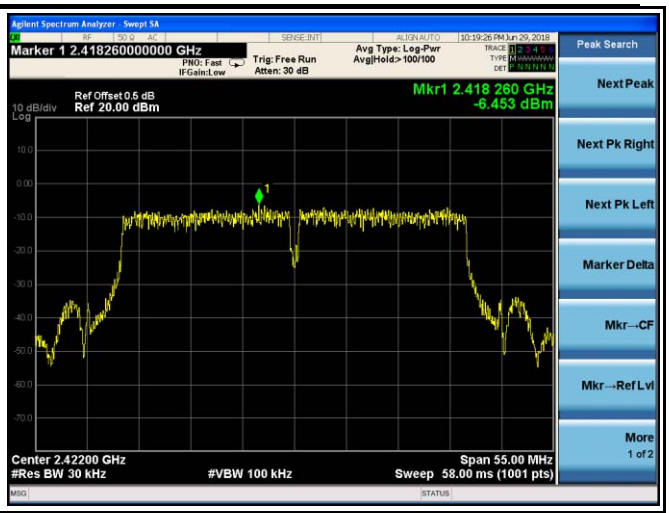
PSD - CH 11 – 802.11n20



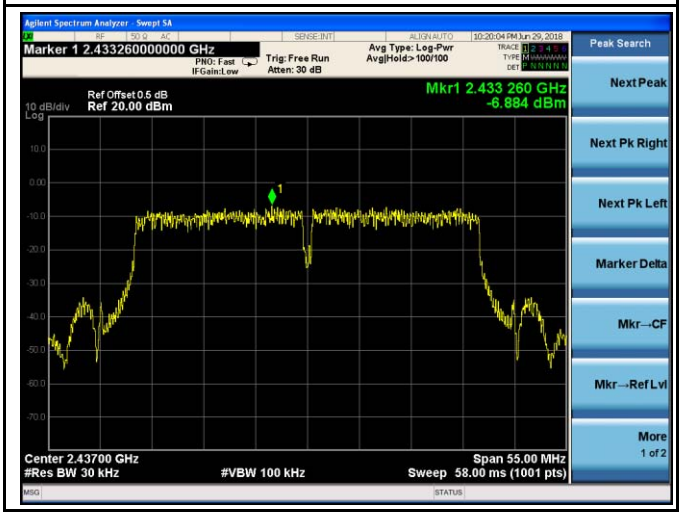
PSD - CH 12 – 802.11n20



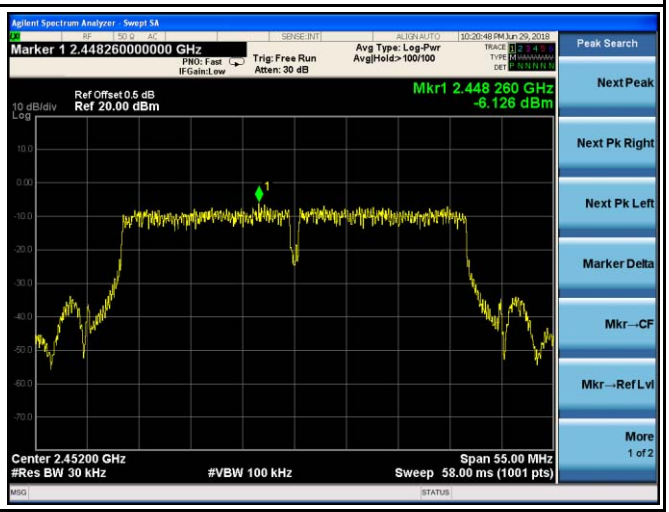
PSD - CH 13 – 802.11n20



PSD - CH 3 – 802.11n40

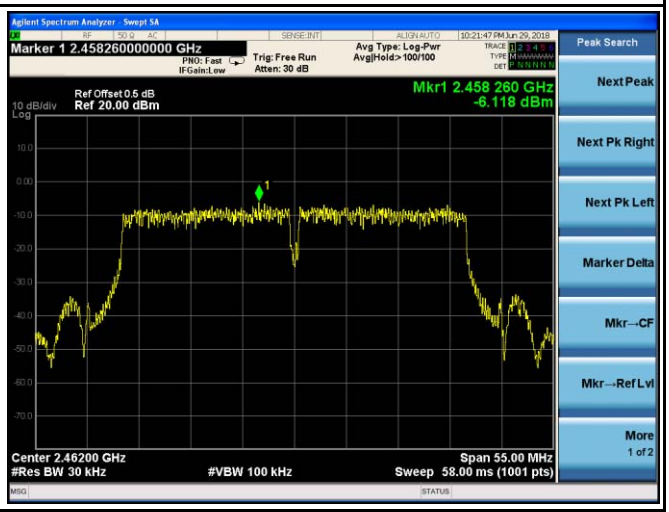


PSD - CH 6 – 802.11n40



PSD - CH 9 – 802.11n40

PSD - CH 10 – 802.11n40

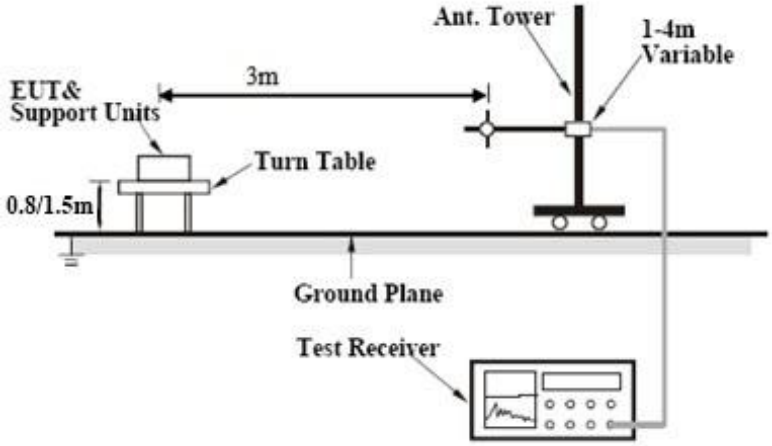


PSD - CH 11 – 802.11n40

6.5 Band-Edge & Unwanted Emissions into Non-Restricted Frequency Bands

Temperature	28℃
Relative Humidity	54%
Atmospheric Pressure	1021mbar
Test date :	June 21, 2018
Tested By :	Peter Wei

Requirement(s):

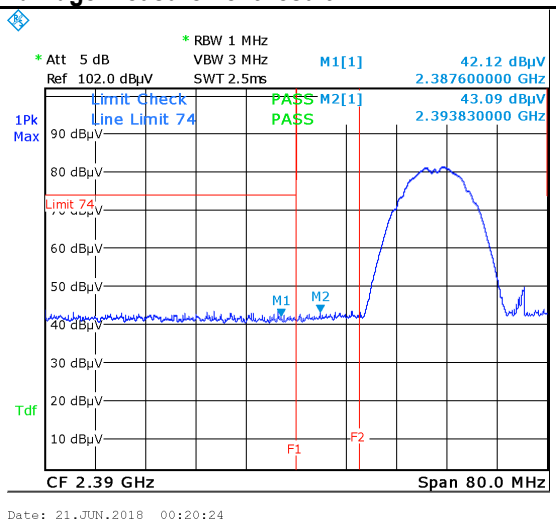
Spec	Item	Requirement	Applicable
§15.247(d)	a)	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 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.	☑
Test Setup			
Test Procedure	Radiated Method Only - 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. Put it on the Rotated table and turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range. - 3. First, set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge, check the emission of EUT, if pass then set Spectrum Analyzer as below: a. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasiy Peak detection at frequency below 1GHz. b. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz with Peak detection for Peak measurement at frequency above 1GHz. c. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz with Peak detection for Average Measurement as below at frequency above 1GHz. - 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.		
Remark			
Result	☑ Pass ☐ Fail		

Test Data ☑ Yes ☐ N/A

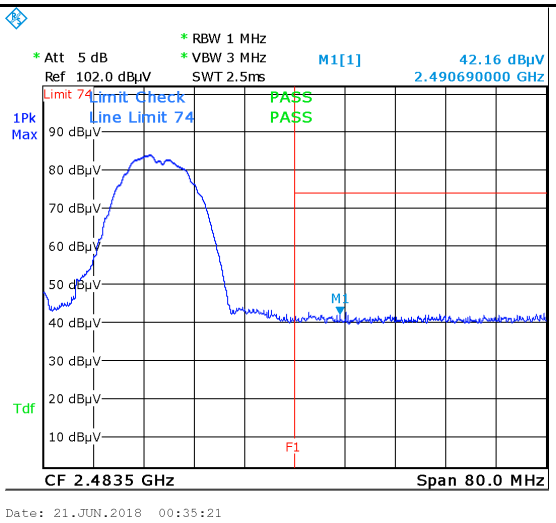
Test Plot ☑ Yes (See below) ☐ N/A

Test Plots

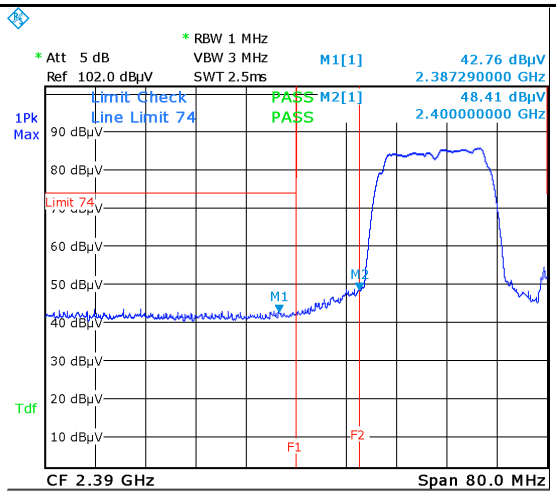
Band Edge measurement result



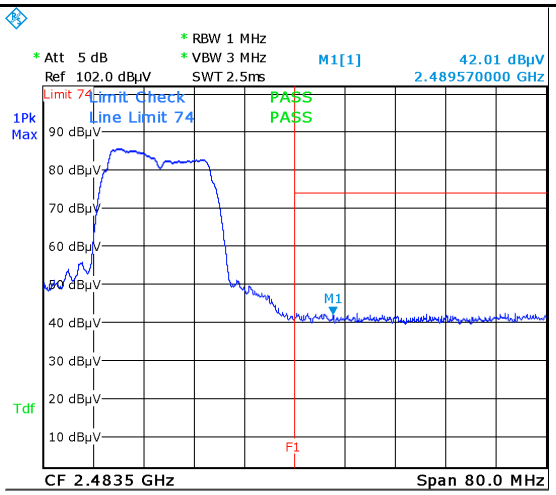
CH1 – 802.11b – PK



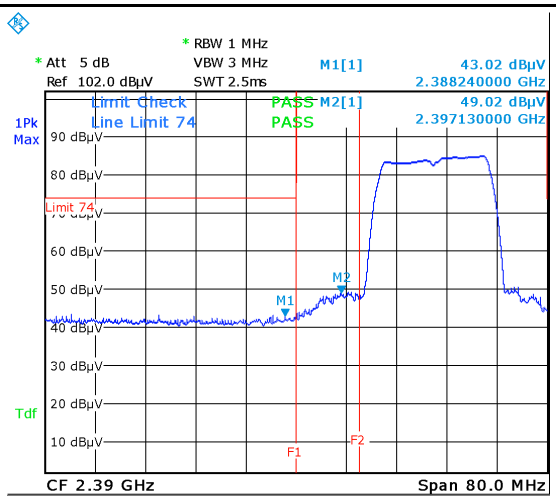
CH11 – 802.11b – PK



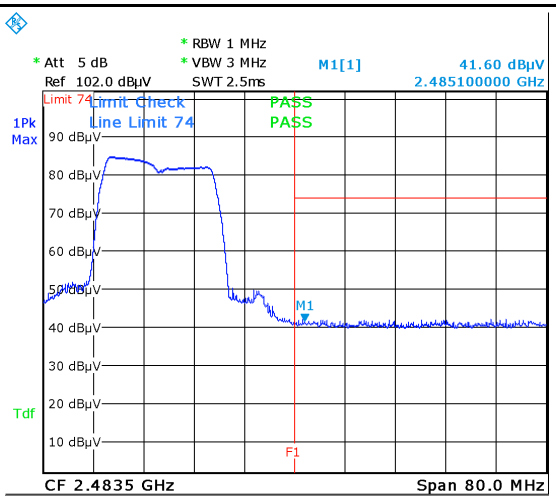
CH1 – 802.11g – PK



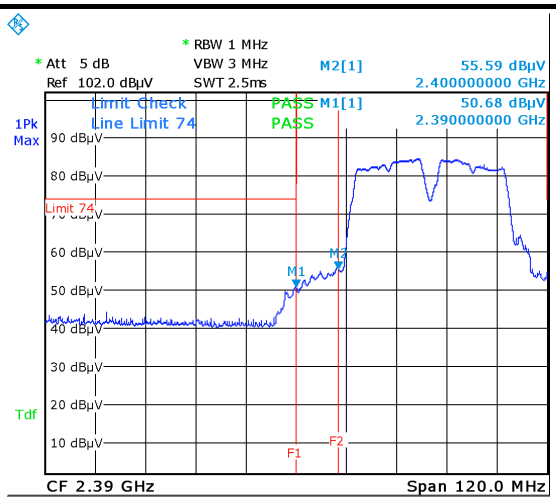
CH11 – 802.11g – PK



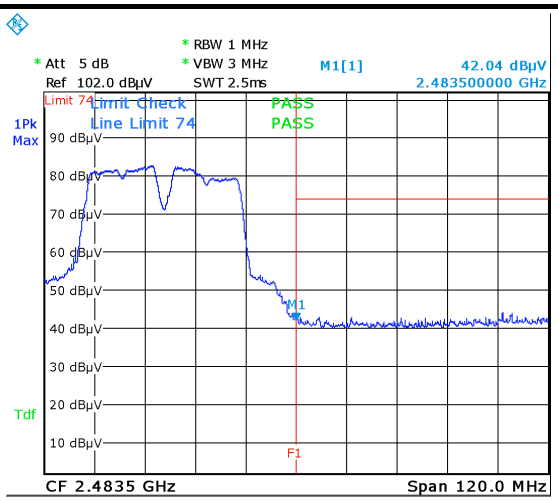
CH1 – 802.11n20 – PK



CH11 – 802.11n20 – PK



CH1 – 802.11n40 – PK



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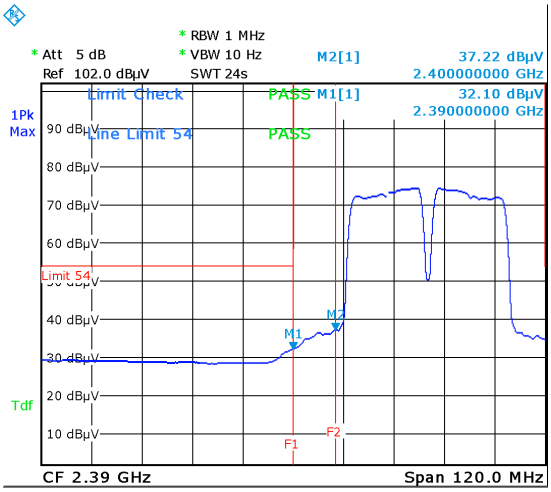

CH1 – 802.11n40 – AV