

TEST REPORT

On behalf of

Shanghai Teraoka Electronic Co., Ltd.

Product Name: Wireless Ethernet Bridge

Model No.: WB-10

FCC ID: 2ARYWWB-10

Prepared For: Shanghai Teraoka Electronic Co., Ltd.
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The statement is based on a single evaluation of one sample of the above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab logo. The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

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TEST REPORT

Applicant : Shanghai Teraoka Electronic Co., Ltd.
EUT Description : Wireless Ethernet Bridge
(A) Model No. : Refer to Sec.2.1
(B) Power Supply : DC 5V
(C) Test Voltage : DC 5V (From PC)

Test Procedure Used:

*FCC RULES AND REGULATIONS PART 15 SUBPART C
AND ANSI C63.10-2013*

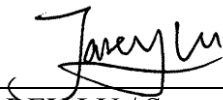
The device described above is tested by Audix Technology (Shanghai) Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits.

The test results are contained in this test report and Audix Technology (Shanghai) Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. This report also shows that the EUT to be technically compliance with the FCC limits.

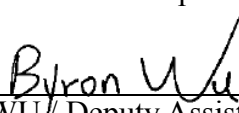
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Date of Test : 2018.12.18-2019.01.26 Date of Report : 2019.01.28

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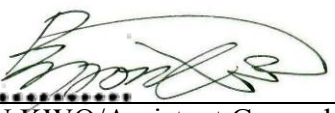

JAREY LU / Supervisor

Reviewer :


BYRON WU / Deputy Assistant Manager

 For and on behalf of
Audix Technology (Shanghai) Co., Ltd.

Signatory :


Authorized Signature(s) BYRON KWO/Assistant General Manager

1 SUMMARY OF STANDARDS AND RESULTS

1.1 Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

Description / Test Item	Test Standard	Results	Meets Limit
EMISSION			
Conducted Emission	FCC Rules And Regulations Part 15 Subpart C And ANSI C63.10:2013	Pass	15.207
Radiated Emission	FCC Rules And Regulations Part 15 Subpart C And ANSI C63.10:2013	Pass	15.209(a) 15.205(a)(c)
6 dB Bandwidth Measurement	FCC Rules And Regulations Part 15 Subpart C And ANSI C63.10:2013	Pass	15.247(a)(2)
Maximum Peak Output Power Measurement	FCC Rules And Regulations Part 15 Subpart C And ANSI C63.10:2013	Pass	15.247(b)(3)
Emission Limitations Measurement	FCC Rules And Regulations Part 15 Subpart C And ANSI C63.10:2013	Pass	15.247(d)
Band Edge Measurement	FCC Rules And Regulations Part 15 Subpart C And ANSI C63.10:2013	Pass	15.247(d)
Power Spectral Density Measurement	FCC Rules And Regulations Part 15 Subpart C And ANSI C63.10:2013	Pass	15.247(e)
N/A is an abbreviation for Not Applicable.			

2 GENERAL INFORMATION

2.1 Description of Equipment Under Test

Description : Wireless Ethernet Bridge

Type of EUT : ☒ Production ☐ Pre-product ☐ Pro-type

Model Number : WB-10

Radio Tech : IEEE 802.11b/g/n

Tested Tech : IEEE 802.11 b/g/n

Channel Freq. : IEEE 802.11b/g: 2412MHz - 2462MHz;
IEEE 802.11n HT20: 2412MHz - 2462MHz;
IEEE 802.11n HT40: 2422MHz – 2452MHz.

Modulation : IEEE 802.11b: DSSS (CCK,DQPSK,DBPSK);
IEEE 802.11g:
OFDM (64QAM, 16QAM, QPSK,BPSK);
IEEE 802.11n HT20, HT40:
OFDM (64QAM, 16QAM, QPSK, BPSK).

Antenna info. : Antenna Type: RP-SMA Antenna
Antenna Gain: 5.46dBi
The antenna is unique antenna that is comply with
15.203 requirement.

Test Mode : The EUT was set at continuous TX with duty cycle
100% during all the test in the report

Applicant : Shanghai Teraoka Electronic Co., Ltd.
6058 Nanting Road, Tinglin Town, Jinshan District,
Shanghai, China

Manufacturer : same as Applicant

Factory : same as Applicant

2.2 Test Information

Tested mode, channel, and data rate information				
Modulation	data rate (Mbps)	Test Channel		Frequency (MHz)
IEEE 802.11b	11	Low:	1	2412
	11	Middle:	6	2437
	11	High:	11	2462
IEEE 802.11g	MCS7	Low:	1	2412
	MCS7	Middle:	6	2437
	MCS7	High:	11	2462
IEEE 802.11n HT20	MCS7	Low:	1	2412
	MCS7	Middle:	6	2437
	MCS7	High:	11	2462
IEEE 802.11n HT40	MCS7	Low:	3	2422
	MCS7	High:	9	2452

2.3 Tested Supporting System Details

2.3.1 PC

Manufacturer : Acer
Model Number : P238

2.4 Description of Test Facility

Name of Firm : Audix Technology (Shanghai) Co., Ltd.
Site Location : 3F and 4F, 34Bldg, 680 Guiping Rd.,
Caohejing Hi-Tech Park,
Shanghai 200233, China.
Accredited by NVLAP, Lab Code : 200371-0
FCC Designation Number : CN5027
Test Firm Registration Number : 954668

2.5 Measurement Uncertainty

Conducted Disturbance Expanded Uncertainty (0.15-30MHz):

U = 3.4dB

Radiated Emission Expanded Uncertainty (30-1000MHz):

U = 3.99dB

Radiated Emission Expanded Uncertainty (1000M-26.5GHz):

U = 4.98dB

6 dB Bandwidth Expanded Uncertainty

: U = 6×10^{-8} MHz

Maximum Peak Output Power Expanded Uncertainty

: U = 0.84 dB

Power Spectral Density Expanded Uncertainty

: U = 0.38 dB

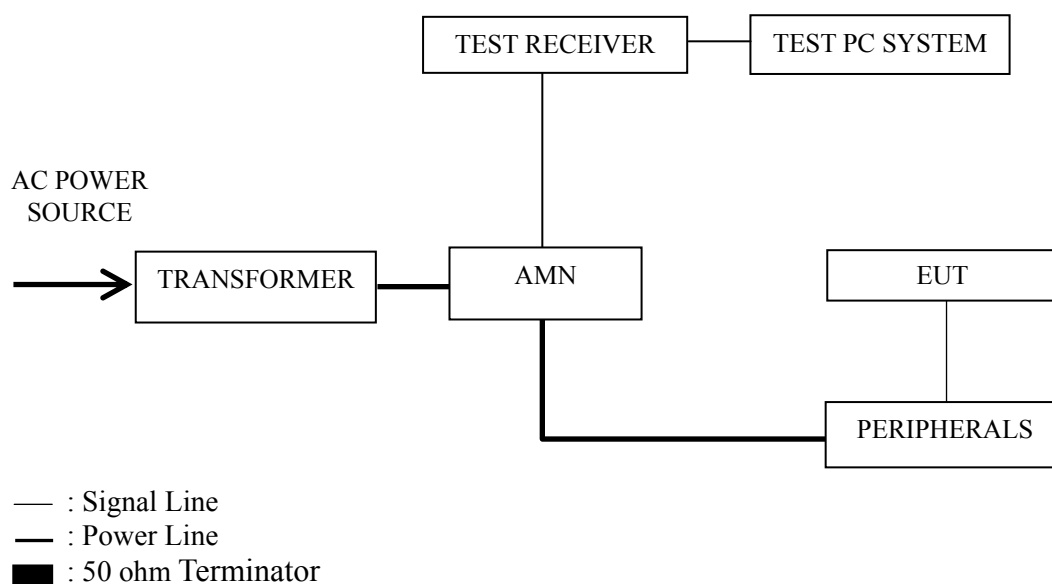
3 CONDUCTED EMISSION

3.1 Test Equipment

The following test equipment are used during the conducted emission test in a shielded room.

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	R&S	ESCI	101302	Apr 27, 2018	Apr 26, 2019
2.	Artificial Mains Network (AMN)	R&S	ENV4200	100125	Jun 24, 2018	Jun 23, 2019
3.	Software	Audix	E3	6.2009-1-15	--	--

3.2 Block Diagram of Test Setup



3.3 Conducted Emission Limits (§15.207)

Frequency (MHz)	Field strength limits (μV/m)	
	(μV/m)	dB(μV/m)
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

NOTE 1 - *Decreases with the logarithm of the frequency.
 NOTE 2 - Emission Level dB (μV/m) = 20 log Emission Level (μV/m)
 NOTE 3 - The tighter limit applies at the band edges.

3.4 Operating Condition of EUT

3.4.1 Setup the EUT as shown in Sec. 3.2.

3.4.2 Turn on the power of all equipment.

3.4.3 Turn the EUT on the test mode, and then test.

3.5 Test Procedures

The EUT was placed upon a non-metallic table, which is 0.8 m above the horizontal conducting ground plane and 0.4 m from a vertical reference plane. The EUT was connected to the power mains through an Artificial Mains Network (AMN) to provide a 50 Ω coupling impedance for the measuring equipment. Both sides of AC line (Line & Neutral) were checked to find out the maximum conducted emission according to FCC Part 15 Subpart C and ANSI C63.10: 2013 requirements during conducted disturbance test.

The I.F. bandwidth of Test Receiver ESCI was set at 9 kHz.

The frequency range from 150 kHz to 30 MHz was checked.

Test with a dummy load in lieu of the antenna to determine compliance with Section 15.207 limits within the transmitter's fundamental emission band. (According to KDB 174176 D01 Line Conducted FAQ)

3.6 Test Results

<PASS>

The frequency and amplitude of the highest radiated emission relative the limit is reported. All the emissions not reported below are too low against the FCC limit.

Worst case emission:

No.	Operation	Modulation	Channel	Frequency	Data Page
1.	Transmitting	IEEE 802.11b	1	2412 MHz	P10
2.	Receiving	IEEE 802.11b/g/n	--	--	P11

NOTE 1 – Level = Read Level + AMN Factor + Cable Loss

NOTE 2 – “QP” means “Quasi-Peak” values

NOTE 3 – The emission levels which not reported are too low against the official limit.

Worst case emission

EUT : Wireless Ethernet Bridge Temperature : 22°C

Model No. : WB-10 Humidity : 51%RH

Test Mode : Transmitting Date of Test : 2018.12.21

IEEE 802.11b:

Polarization	Frequency (MHz)	Meter Reading dB (μV)	AMN Factor (dB/m)	Cable Loss (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Line	0.17584	43.37	10.53	0.04	53.94	64.68	10.74	QP
	0.17584	26.31	10.53	0.04	36.88	54.68	17.8	Average
	0.21967	36.5	10.47	0.05	47.02	62.83	15.81	QP
	0.21967	19.12	10.47	0.05	29.64	52.83	23.19	Average
	0.39974	29.96	10.36	0.05	40.37	57.86	17.49	QP
	0.39974	15.33	10.36	0.05	25.74	47.86	22.12	Average
	4.114	25.83	10.33	0.12	36.28	56	19.72	QP
	4.114	12.43	10.33	0.12	22.88	46	23.12	Average
	5.713	28.55	10.33	0.14	39.02	60	20.98	QP
	5.713	12.16	10.33	0.14	22.63	50	27.37	Average
	11.996	30.56	10.26	0.21	41.03	60	18.97	QP
	11.996	19.36	10.26	0.21	29.83	50	20.17	Average
Neutral	0.17307	42.58	10.47	0.04	53.09	64.81	11.72	QP
	0.17307	26.25	10.47	0.04	36.76	54.81	18.05	Average
	0.26164	35.22	10.39	0.05	45.66	61.38	15.72	QP
	0.26164	16.63	10.39	0.05	27.07	51.38	24.31	Average
	0.42149	28.01	10.34	0.05	38.4	57.42	19.02	QP
	0.42149	18.02	10.34	0.05	28.41	47.42	19.01	Average
	4.092	24.8	10.34	0.12	35.26	56	20.74	QP
	4.092	6.85	10.34	0.12	17.31	46	28.69	Average
	5.993	26.87	10.34	0.15	37.36	60	22.64	QP
	5.993	10.28	10.34	0.15	20.77	50	29.23	Average
	11.745	27.13	10.29	0.21	37.63	60	22.37	QP
	11.745	16.42	10.29	0.21	26.92	50	23.08	Average

TEST ENGINEER: Jarey

EUT : Wireless Ethernet Bridge Temperature : 22°C

Model No. : WB-10 Humidity : 51%RH

Test Mode : Receiving Date of Test : 2018.12.21

IEEE 802.11 b/g/n:

Polarization	Frequency (MHz)	Meter Reading dB (μV)	AMN Factor (dB/m)	Cable Loss (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Line	0.17584	43.37	10.53	0.04	53.94	64.68	10.74	QP
	0.17584	26.32	10.53	0.04	36.89	54.68	17.79	Average
	0.21851	36.53	10.47	0.05	47.05	62.88	15.83	QP
	0.21851	19.21	10.47	0.05	29.73	52.88	23.15	Average
	0.39974	29.96	10.36	0.05	40.37	57.86	17.49	QP
	0.39974	16.6	10.36	0.05	27.01	47.86	20.85	Average
	4.006	25.76	10.33	0.12	36.21	56	19.79	QP
	4.006	13.37	10.33	0.12	23.82	46	22.18	Average
	5.774	28.36	10.33	0.14	38.83	60	21.17	QP
	5.774	12.33	10.33	0.14	22.8	50	27.2	Average
	12.188	29.67	10.26	0.21	40.14	60	19.86	QP
	12.188	20.13	10.26	0.21	30.6	50	19.4	Average
Neutral	0.16944	42.87	10.47	0.04	53.38	64.99	11.61	QP
	0.16944	26.82	10.47	0.04	37.33	54.99	17.66	Average
	0.21167	36.56	10.43	0.05	47.04	63.14	16.1	QP
	0.21167	19.16	10.43	0.05	29.64	53.14	23.5	Average
	0.42149	28.01	10.34	0.05	38.4	57.42	19.02	QP
	0.42149	19.23	10.34	0.05	29.62	47.42	17.8	Average
	4.07	25.24	10.34	0.12	35.7	56	20.3	QP
	4.07	7.21	10.34	0.12	17.67	46	28.33	Average
	6.024	26.87	10.34	0.15	37.36	60	22.64	QP
	6.024	11.21	10.34	0.15	21.7	50	28.3	Average
	12.06	26.24	10.29	0.21	36.74	60	23.26	QP
	12.06	17.26	10.29	0.21	27.76	50	22.24	Average

TEST ENGINEER: Jarey

4 RADIATED EMISSION TEST

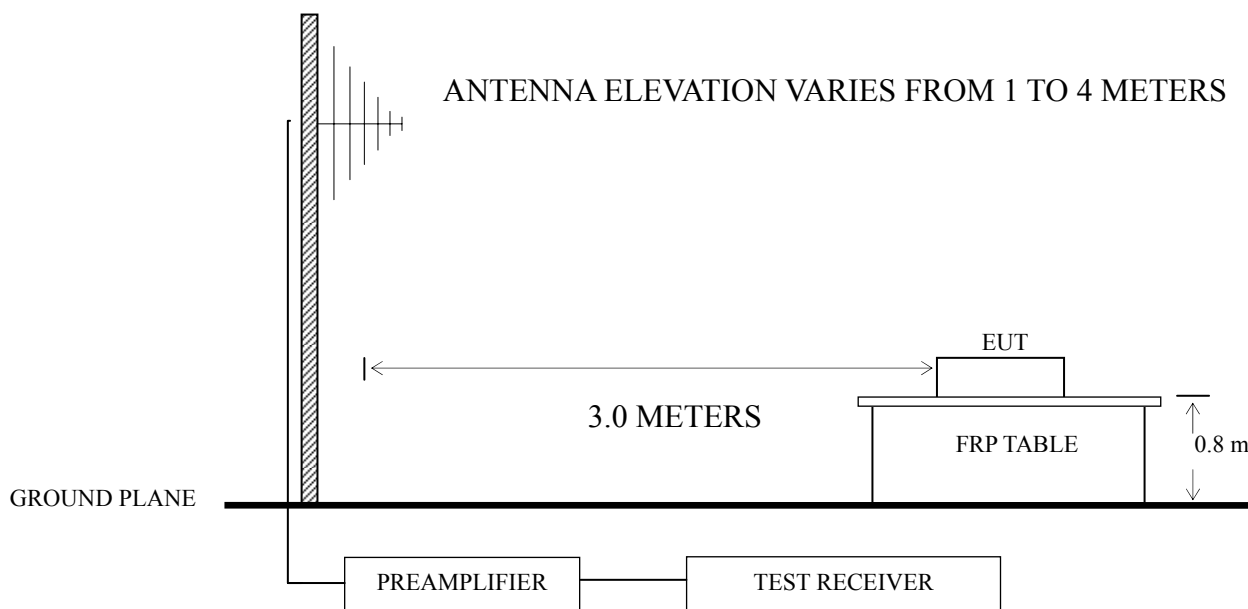
4.1 Test Equipment

The following test equipment are used during the radiated emission test in a semi-anechoic chamber:

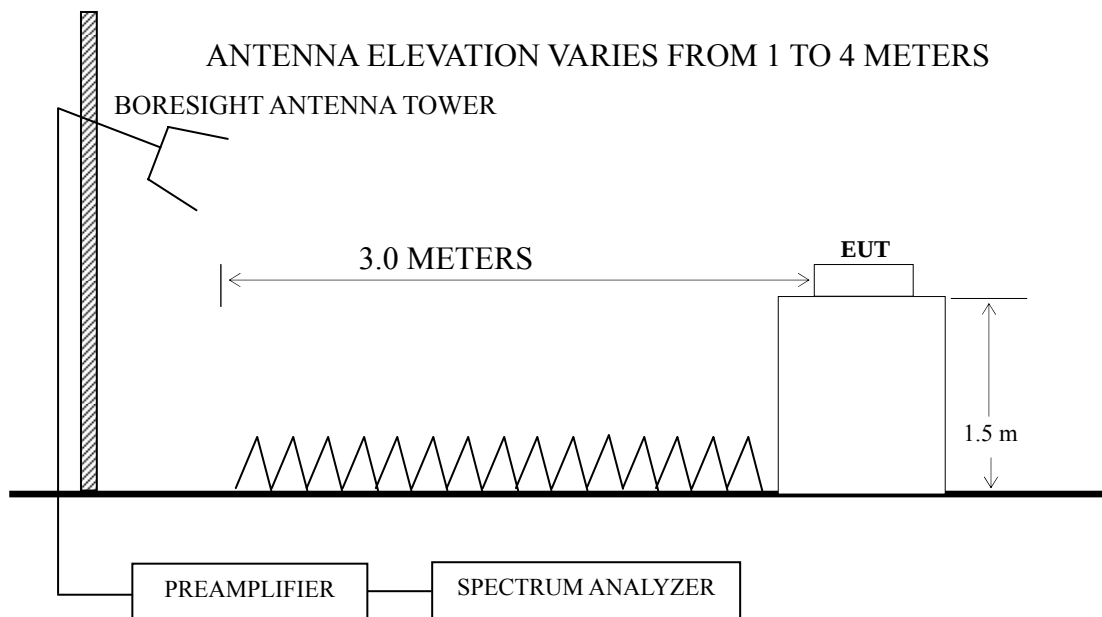
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Preamplifier	Agilent	8447D	2944A06664	Apr 27, 2018	Apr 26, 2019
2.	Preamplifier	HP	8449B	3008A00864	Mar 8, 2018	Mar 7, 2019
3.	Spectrum Analyzer	Agilent	N9030A	MY53120367	Jun 23, 2018	Jun 22, 2019
4.	Test Receiver	R&S	ESCI	101303	Apr 26, 2018	Apr 25, 2019
5.	Bi-log Antenna	Schwarz beck	VULB 9168	708	Jul 20, 2018	Jul 19, 2019
6.	Horn Antenna	EMCO	3115	9607-4878	Jun 02, 2018	Jun 01, 2019
7.	Horn Antenna	EMCO	3116	00062643	Sep 08, 2018	Sep 08, 2019
8.	Software	Audix	E3	SET00200 9912M295-2	--	--

4.2 Block Diagram of Test Setup

4.2.1 Below 1GHz



4.2.2 Above 1GHz



4.3 Radiated Emission Limit (§15.209)

Frequency (MHz)	Distance (m)	Field strength limits (μV/m)	
		(μV/m)	dB(μV/m)
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
Above 960	3	500	54.0

NOTE 1 - Emission Level dB (μV/m) = 20 log Emission Level (μV/m)

NOTE 2 - The tighter limit applies at the band edges.

NOTE 3 - Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

NOTE 4 - The limits shown are based on Quasi-peak value detector below or equal to 1GHz and Average value detector above 1GHz.

NOTE 5 - Above 1 GHz, the limit on peak emission is 20 dB above the maximum permitted average emission limit applicable to the EUT

4.4 Test Configuration

The EUT (listed in Sec.2.1) and the simulators (listed in Sec.2.2) were installed as shown on Sec.4.2 to meet FCC requirements and operating in a manner that tends to maximize its emission level in a normal application.

4.5 Operating Condition of EUT

4.5.1 Setup the EUT as shown in Sec. 4.2.

4.5.2 Turn on the power of all equipment.

4.5.3 Turn the EUT on the test mode, and then test.

4.6 Test Procedures

Radiated emission test applies to harmonics/spurs that fall in the restricted bands listed in Section 15.205. The maximum permitted average field strength is listed in Section 15.209. A pre-amp is necessary for this measurement. For measurement above 1 GHz, set RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation.

The EUT was placed on a turntable. Below 1 GHz, the table height is 80 cm above the reference ground plane. Above 1 GHz, the table height is 1.5 m. The turntable rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna, which was mounted on an antenna tower. The antenna moved up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (Calibrated Bilog Antenna) or Horn antenna was used as receiving antenna. Both horizontal and vertical polarizations of the antenna were set on measurement. In order to find the maximum emission, all of the interference cables were manipulated according to ANSI C63.10: 2013 requirements during radiated emission test.

The bandwidth of Test Receiver R&S ESCI was set at 120 kHz from 30MHz to 1000MHz.

The bandwidth of the VBW was set at 1MHz and RBW was set at 1MHz for peak emission measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emission above 1GHz for Spectrum Agilent N9010A.

The frequency range from 30 MHz to 25 GHz (Up to 10th harmonics from fundamental frequency) was checked.

4.7 Test Results

<PASS>

The frequency and amplitude of the highest radiated emission relative the limit is reported. All the emissions not reported below are too low against the FCC limit.

Frequency range: below 1GHz (Worst case emission)

No.	Operation	Modulation	Channel	Frequency	Data Page
1.	Transmitting	IEEE 802.11b	1	2412 MHz	P16
2.		IEEE 802.11g	1	2412 MHz	P16
3.		IEEE 802.11n HT20	1	2412 MHz	P17
4.		IEEE 802.11n HT40	1	2412MHz	P17
5.	Receiving	IEEE 802.11b/g/n	--	-	P18

Frequency range: above 1GHz

No.	Operation	Modulation	Channel	Frequency	Data Page
1.	Transmitting	IEEE 802.11b	1	2412 MHz	P19
2.			6	2437 MHz	P19
3.			11	2462 MHz	P20
4.		IEEE 802.11g	1	2412 MHz	P20
5.			6	2437 MHz	P21
6.			11	2462 MHz	P21
7.		IEEE 802.11n HT20	1	2412 MHz	P22
8.			6	2437 MHz	P22
9.			11	2462 MHz	P23
10.		IEEE 802.11n HT40	3	2422 MHz	P23
11.			9	2452 MHz	P24
12.	Receiving	IEEE 802.11b/g/n	--	--	P25

Restricted bands:

No.	Operation	Modulation	Channel	Frequency	Data Page
1.	Transmitting	IEEE 802.11b	Cabinet Emission		P26
2.		IEEE 802.11g	Cabinet Emission		P27
3.		IEEE 802.11n HT20	Cabinet Emission		P27
4.		IEEE 802.11n HT40	Cabinet Emission		P28

NOTE 1 – Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor

NOTE 2 – “QP” means “Quasi-Peak” values

NOTE 3 – 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

NOTE 4 – The emission levels which not reported are too low against the official limit.

NOTE 5 – The emission levels recorded below is data of EUT configured in Lying direction, for Lying direction was the maximum emission direction during the test. The data of Side & Standing direction are too low against the official limit to be reported.

NOTE 6 – All reading are Quasi-Peak values below or equal to 1GHz, Peak and Average values above 1GHz.

For above 1GHz test, if the peak measured value complies with the average limit, it is unnecessary to perform an average measurement.

NOTE 7 – The frequency range 2310-2390MHz & 2483.5-2500MHz were tested for Restricted bands.

Worst case emission < 1GHz

EUT : Wireless Ethernet Bridge Temperature : 22°C

Model No. : WB-10 Humidity : 51%RH

Test Mode : Transmitting Date of Test : 2018.12.27

IEEE 802.11b:

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	52.391	28.14	19.46	0.78	28.13	20.25	40	19.75	QP
	98.487	46.62	14.12	1.05	27.95	33.84	43.5	9.66	QP
	144.842	43.06	20	1.34	27.63	36.77	43.5	6.73	QP
	293.084	37.93	19.96	1.85	27.05	32.69	46	13.31	QP
	580.703	30.54	25.2	2.61	27.8	30.55	46	15.45	QP
	872.183	29.46	28.5	3.2	27.08	34.08	46	11.92	QP
Vertical	53.693	34.02	19.64	0.79	28.13	26.32	40	13.68	QP
	98.487	50.6	14.12	1.05	27.95	37.82	43.5	5.68	QP
	101.644	50.34	14.58	1.07	27.92	38.07	43.5	5.43	QP
	144.842	42.32	20	1.34	27.63	36.03	43.5	7.47	QP
	580.703	33.25	25.2	2.61	27.8	33.26	46	12.74	QP
	884.503	28.03	28.5	3.22	27.05	32.7	46	13.3	QP

IEEE 802.11g:

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	53.505	27.88	19.64	0.79	28.13	20.18	40	19.82	QP
	94.098	45.97	14.7	1.03	27.97	33.73	43.5	9.77	QP
	144.842	43.12	20	1.34	27.63	36.83	43.5	6.67	QP
	295.147	37.79	20	1.86	27.05	32.6	46	13.4	QP
	570.61	30.82	25	2.59	27.82	30.59	46	15.41	QP
	872.183	29.21	28.5	3.2	27.08	33.83	46	12.17	QP
Vertical	53.505	33.98	19.64	0.79	28.13	26.28	40	13.72	QP
	98.142	50.31	14.1	1.05	27.95	37.51	43.5	5.99	QP
	101.614	50.08	14.51	1.07	27.92	37.74	43.5	5.76	QP
	146.374	41.63	20.04	1.34	27.63	35.38	43.5	8.12	QP
	578.67	32.63	25.16	2.61	27.8	32.6	46	13.4	QP
	863.056	28.35	28.5	3.2	27.11	32.94	46	13.06	QP

IEEE 802.11n HT20:

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	52.025	28.57	19.4	0.78	28.13	20.62	40	19.38	QP
	98.142	46.96	14.1	1.05	27.95	34.16	43.5	9.34	QP
	142.824	43.3	19.64	1.33	27.64	36.63	43.5	6.87	QP
	294.114	37.36	19.98	1.85	27.05	32.14	46	13.86	QP
	578.67	30.67	25.16	2.61	27.8	30.64	46	15.36	QP
	854.025	29.25	28.37	3.17	27.14	33.65	46	12.35	QP
Vertical	53.318	33.95	19.61	0.79	28.13	26.22	40	13.78	QP
	94.098	49.73	14.7	1.03	27.97	37.49	43.5	6.01	QP
	98.142	50.31	14.1	1.05	27.95	37.51	43.5	5.99	QP
	144.335	41.65	19.91	1.33	27.63	35.26	43.5	8.24	QP
	580.703	33.25	25.2	2.61	27.8	33.26	46	12.74	QP
	872.183	27.97	28.5	3.2	27.08	32.59	46	13.41	QP

IEEE 802.11n HT40:

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	53.318	27.91	19.61	0.79	28.13	20.18	40	19.82	QP
	94.76	45.71	14.47	1.03	27.97	33.24	43.5	10.26	QP
	145.861	42.18	20.04	1.34	27.63	35.93	43.5	7.57	QP
	290.017	37.26	19.9	1.84	27.05	31.95	46	14.05	QP
	574.626	31.04	25.08	2.61	27.81	30.92	46	15.08	QP
	875.247	29.19	28.5	3.22	27.08	33.83	46	12.17	QP
Vertical	53.693	34.02	19.64	0.79	28.13	26.32	40	13.68	QP
	93.768	48.93	14.7	1.03	27.98	36.68	43.5	6.82	QP
	102.001	49.15	14.58	1.07	27.92	36.88	43.5	6.62	QP
	142.824	41.93	19.64	1.33	27.64	35.26	43.5	8.24	QP
	572.614	31.61	25.04	2.59	27.82	31.42	46	14.58	QP
	857.025	28.44	28.43	3.17	27.14	32.9	46	13.1	QP

TEST ENGINEER: Jarey

EUT : Wireless Ethernet Bridge Temperature : 22°C

Model No. : WB-10 Humidity : 51%RH

Test Mode : Receiving Date of Test : 2018.12.27

IEEE 802.11b/g/n:

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	53.882	27.57	19.67	0.79	28.13	19.9	40	20.1	QP
	93.768	45.41	14.7	1.03	27.98	33.16	43.5	10.34	QP
	140.835	42.71	19.29	1.32	27.66	35.66	43.5	7.84	QP
	292.058	36.92	19.94	1.85	27.05	31.66	46	14.34	QP
	552.883	32.08	24.56	2.56	27.86	31.34	46	14.66	QP
	890.728	28.59	28.5	3.25	27.02	33.32	46	12.68	QP
Vertical	54.071	33.31	19.7	0.79	28.13	25.67	40	14.33	QP
	94.76	49.75	14.47	1.03	27.97	37.28	43.5	6.22	QP
	99.878	50.2	14.2	1.06	27.94	37.52	43.5	5.98	QP
	146.374	41.63	20.04	1.34	27.63	35.38	43.5	8.12	QP
	576.644	31.45	25.12	2.61	27.81	31.37	46	14.63	QP
	798.98	29.65	28.1	3.04	27.34	33.45	46	12.55	QP

TEST ENGINEER: Jarey

Radiated Emission > 1GHz

EUT : Wireless Ethernet Bridge Temperature : 22°C

Model No. : WB-10 Humidity : 51%RH

Test Mode : Transmitting Date of Test : 2018.12.27

IEEE 802.11b CH1 (2412 MHz):

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	1348.812	49.77	25.56	3.81	37.93	41.21	74	32.79	Peak
	1666.376	48.47	27	4.25	37.43	42.29	74	31.71	Peak
	2118.583	49.69	28.57	4.8	36.88	46.18	74	27.82	Peak
	3705.344	49.37	31.93	6.46	36.06	51.7	74	22.3	Peak
	4230.695	48.72	32.73	6.99	35.91	52.53	74	21.47	Peak
	5427.187	46.08	34.63	8.06	36.69	52.08	74	21.92	Peak
Vertical	1320.12	49.85	25.37	3.95	37.97	41.2	74	32.8	Peak
	1593.38	50.58	26.72	4.29	37.56	44.03	74	29.97	Peak
	2088.431	49.33	28.52	4.83	36.89	45.79	74	28.21	Peak
	2898.824	50.12	30.3	5.73	36.77	49.38	74	24.62	Peak
	3959.316	48.66	32.34	6.84	35.81	52.03	74	21.97	Peak
	5407.773	46.5	34.62	8.14	36.68	52.58	74	21.42	Peak

IEEE 802.11b CH6 (2437 MHz):

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	1415.668	49.71	25.83	4.08	37.84	41.78	74	32.22	Peak
	1745.842	49.65	27.35	4.45	37.31	44.14	74	29.86	Peak
	2118.583	49.41	28.57	4.87	36.88	45.97	74	28.03	Peak
	2983.131	49.39	30.55	5.81	36.76	48.99	74	25.01	Peak
	3987.794	48.63	32.4	6.84	35.78	52.09	74	21.91	Peak
	5466.224	46.52	34.67	8.23	36.71	52.71	74	21.29	Peak
Vertical	1504.591	49.17	26.37	4.19	37.68	42.05	74	31.95	Peak
	1708.706	49.31	27.21	4.42	37.35	43.59	74	30.41	Peak
	1965.002	49.16	28.26	4.66	36.94	45.14	74	28.86	Peak
	2977.79	49.29	30.5	5.81	36.76	48.84	74	25.16	Peak
	4200.482	48.35	32.68	7.05	35.9	52.18	74	21.82	Peak
	5575.028	46.41	34.77	8.32	36.78	52.72	74	21.28	Peak

IEEE 802.11b CH11 (2462 MHz):

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	1370.739	48.99	25.65	3.87	37.88	40.63	74	33.37	Peak
	1610.602	49.04	26.79	4.19	37.52	42.5	74	31.5	Peak
	2103.453	48.52	28.54	4.76	36.89	44.93	74	29.07	Peak
	3745.394	49.39	31.99	6.52	36.01	51.89	74	22.11	Peak
	4488.392	47.64	33.08	7.26	36.08	51.9	74	22.1	Peak
	5585.026	46.13	34.79	8.16	36.79	52.29	74	21.71	Peak
Vertical	1346.397	49.34	25.46	3.98	37.93	40.85	74	33.15	Peak
	1599.1	50.29	26.72	4.29	37.56	43.74	74	30.26	Peak
	2036.695	48.7	28.45	4.75	36.89	45.01	74	28.99	Peak
	2977.79	49.25	30.5	5.81	36.76	48.8	74	25.2	Peak
	3765.58	49.57	32.04	6.63	36.01	52.23	74	21.77	Peak
	5051.83	46.36	34.34	7.69	36.45	51.94	74	22.06	Peak

IEEE 802.11g CH1 (2412 MHz):

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	1469.95	49.02	26.21	4.14	37.76	41.61	74	32.39	Peak
	1681.372	48.31	27.07	4.4	37.39	42.39	74	31.61	Peak
	2103.453	49.1	28.54	4.83	36.89	45.58	74	28.42	Peak
	2914.448	50.09	30.35	5.77	36.77	49.44	74	24.56	Peak
	3698.711	49.61	31.93	6.58	36.06	52.06	74	21.94	Peak
	5645.392	46.29	34.84	8.41	36.82	52.72	74	21.28	Peak
Vertical	1413.134	49.34	25.83	4.08	37.84	41.41	74	32.59	Peak
	1663.393	47.51	27	4.37	37.43	41.45	74	32.55	Peak
	2149.169	48.66	28.62	4.91	36.88	45.31	74	28.69	Peak
	2888.455	49.54	30.25	5.73	36.77	48.75	74	25.25	Peak
	3692.09	49.87	31.9	6.58	36.06	52.29	74	21.71	Peak
	4778.879	47.51	33.76	7.53	36.27	52.53	74	21.47	Peak

IEEE 802.11g CH6 (2437 MHz):

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	1336.782	49.19	25.46	3.81	37.97	40.49	74	33.51	Peak
	1630.93	48.03	26.86	4.19	37.47	41.61	74	32.39	Peak
	2080.961	48.33	28.52	4.72	36.89	44.68	74	29.32	Peak
	3455.26	48.41	31.5	6.21	36.31	49.81	74	24.19	Peak
	3959.316	49.25	32.34	6.72	35.81	52.5	74	21.5	Peak
	5655.516	46.72	34.86	8.22	36.84	52.96	74	21.04	Peak
Vertical	1423.298	48.94	25.93	4.08	37.8	41.15	74	32.85	Peak
	1711.77	49.37	27.21	4.42	37.35	43.65	74	30.35	Peak
	1989.803	49.22	28.33	4.68	36.9	45.33	74	28.67	Peak
	3181.894	47.77	30.94	6.06	36.56	48.21	74	25.79	Peak
	3731.996	50.03	31.99	6.63	36.03	52.62	74	21.38	Peak
	4448.361	47.54	33.03	7.27	36.05	51.79	74	22.21	Peak

IEEE 802.11g CH11 (2462 MHz):

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	1334.389	50.34	25.46	3.98	37.97	41.81	74	32.19	Peak
	1816.036	48.22	27.63	4.53	37.19	43.19	74	30.81	Peak
	2025.777	49.04	28.42	4.71	36.9	45.27	74	28.73	Peak
	3449.074	48.35	31.5	6.32	36.31	49.86	74	24.14	Peak
	4215.562	48.06	32.7	7.05	35.9	51.91	74	22.09	Peak
	5505.541	46.81	34.7	8.23	36.74	53	74	21	Peak
Vertical	1443.846	48.94	26.02	4.11	37.8	41.27	74	32.73	Peak
	1724.082	48.44	27.28	4.42	37.35	42.79	74	31.21	Peak
	2073.517	48.64	28.5	4.79	36.89	45.04	74	28.96	Peak
	2827.012	49.33	30.05	5.65	36.78	48.25	74	25.75	Peak
	3952.228	48.61	32.34	6.84	35.81	51.98	74	22.02	Peak
	5495.685	46.73	34.69	8.23	36.73	52.92	74	21.08	Peak

IEEE 802.11n HT20 CH1 (2412 MHz):

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	1385.554	48.46	25.74	3.87	37.88	40.19	74	33.81	Peak
	1565.085	48.79	26.58	4.13	37.6	41.9	74	32.1	Peak
	1950.969	48.41	28.19	4.58	36.98	44.2	74	29.8	Peak
	2972.46	49.63	30.5	5.71	36.76	49.08	74	24.92	Peak
	4148.127	48.07	32.61	6.92	35.84	51.76	74	22.24	Peak
	5545.141	46.73	34.73	8.16	36.76	52.86	74	21.14	Peak
Vertical	1388.039	48.54	25.74	4.03	37.88	40.43	74	33.57	Peak
	1663.393	48.85	27	4.37	37.43	42.79	74	31.21	Peak
	2118.583	48.86	28.57	4.87	36.88	45.42	74	28.58	Peak
	3369.664	47.97	31.32	6.27	36.38	49.18	74	24.82	Peak
	4215.562	48.42	32.7	7.05	35.9	52.27	74	21.73	Peak
	5505.541	46.36	34.7	8.23	36.74	52.55	74	21.45	Peak

IEEE 802.11n HT20 CH6 (2437 MHz):

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	1395.52	49.02	25.74	4.06	37.84	40.98	74	33.02	Peak
	1720.996	48.3	27.21	4.42	37.35	42.58	74	31.42	Peak
	2084.693	48.42	28.52	4.79	36.89	44.84	74	29.16	Peak
	3412.193	48.37	31.43	6.27	36.33	49.74	74	24.26	Peak
	4192.963	47.96	32.68	7.05	35.88	51.81	74	22.19	Peak
	5585.026	46.12	34.79	8.32	36.79	52.44	74	21.56	Peak
Vertical	1467.318	48.4	26.11	4.14	37.76	40.89	74	33.11	Peak
	1745.842	48.08	27.35	4.45	37.31	42.57	74	31.43	Peak
	1982.685	48.93	28.33	4.68	36.9	45.04	74	28.96	Peak
	2924.911	49.66	30.35	5.77	36.77	49.01	74	24.99	Peak
	3725.315	49.08	31.96	6.58	36.03	51.59	74	22.41	Peak
	5625.198	46.45	34.82	8.41	36.81	52.87	74	21.13	Peak

IEEE 802.11n HT20 CH11 (2462 MHz):

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	1363.39	48.88	25.56	3.84	37.93	40.35	74	33.65	Peak
	1579.169	47.7	26.65	4.13	37.56	40.92	74	33.08	Peak
	1993.371	47.96	28.33	4.61	36.9	44	74	30	Peak
	2924.911	49.71	30.35	5.67	36.77	48.96	74	25.04	Peak
	3785.876	48.1	32.07	6.57	35.98	50.76	74	23.24	Peak
	5485.847	45.46	34.69	8.11	36.73	51.53	74	22.47	Peak
Vertical	1370.739	48.24	25.65	4.03	37.88	40.04	74	33.96	Peak
	1761.553	48.41	27.42	4.48	37.27	43.04	74	30.96	Peak
	2069.805	48.22	28.5	4.79	36.89	44.62	74	29.38	Peak
	2967.138	48.57	30.5	5.81	36.76	48.12	74	25.88	Peak
	4002.11	47.72	32.42	6.84	35.76	51.22	74	22.78	Peak
	5466.224	46.45	34.67	8.23	36.71	52.64	74	21.36	Peak

IEEE 802.11n HT40 CH3 (2422 MHz):

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	1449.03	48.51	26.02	4.11	37.76	40.88	74	33.12	Peak
	1793.401	48.04	27.56	4.5	37.23	42.87	74	31.13	Peak
	2051.345	48.44	28.47	4.75	36.89	44.77	74	29.23	Peak
	3639.545	47.45	31.82	6.53	36.11	49.69	74	24.31	Peak
	4456.338	48.36	33.03	7.27	36.06	52.6	74	21.4	Peak
	5427.187	46.34	34.63	8.14	36.69	52.42	74	21.58	Peak
Vertical	1529.051	47.8	26.44	4.21	37.64	40.81	74	33.19	Peak
	1829.098	48.93	27.7	4.53	37.15	44.01	74	29.99	Peak
	2099.687	48.37	28.54	4.83	36.89	44.85	74	29.15	Peak
	3424.443	48.12	31.46	6.32	36.33	49.57	74	24.43	Peak
	4059.89	48.01	32.49	6.89	35.79	51.6	74	22.4	Peak
	5398.093	45.91	34.62	8.14	36.66	52.01	74	21.99	Peak

IEEE 802.11n HT40 CH9 (2462 MHz):

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	1400.53	48.78	25.83	3.9	37.84	40.67	74	33.33	Peak
	1648.558	48.28	26.93	4.22	37.47	41.96	74	32.04	Peak
	2044.007	48.59	28.45	4.68	36.89	44.83	74	29.17	Peak
	3442.9	48.15	31.5	6.21	36.31	49.55	74	24.45	Peak
	4208.015	48.01	32.7	6.99	35.9	51.8	74	22.2	Peak
	5505.541	46.11	34.7	8.11	36.74	52.18	74	21.82	Peak
Vertical	1405.558	48.24	25.83	4.06	37.84	40.29	74	33.71	Peak
	1799.839	48.77	27.56	4.5	37.23	43.6	74	30.4	Peak
	2007.709	48.56	28.4	4.71	36.9	44.77	74	29.23	Peak
	2924.911	49.07	30.35	5.77	36.77	48.42	74	25.58	Peak
	3980.656	48.41	32.37	6.84	35.78	51.84	74	22.16	Peak
	5585.026	45.82	34.79	8.32	36.79	52.14	74	21.86	Peak

TEST ENGINEER: Jarey

EUT : Wireless Ethernet Bridge Temperature : 22°C

Model No. : WB-10 Humidity : 51%RH

Test Mode : Receiving Date of Test : 2018.12.27

IEEE 802.11b/g/n:

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	1436.106	48.52	26.02	4.11	37.8	40.85	74	33.15	Peak
	1708.706	48.1	27.21	4.42	37.35	42.38	74	31.62	Peak
	2184.107	48.6	28.67	4.95	36.87	45.35	74	28.65	Peak
	2878.122	48.77	30.2	5.73	36.77	47.93	74	26.07	Peak
	3772.333	49.19	32.04	6.63	35.98	51.88	74	22.12	Peak
	5359.542	45.71	34.58	8.05	36.65	51.69	74	22.31	Peak
Vertical	1565.085	48.26	26.58	4.27	37.6	41.51	74	32.49	Peak
	1793.401	48.05	27.56	4.5	37.23	42.88	74	31.12	Peak
	2055.023	48.16	28.47	4.75	36.89	44.49	74	29.51	Peak
	3442.9	47.49	31.5	6.32	36.31	49	74	25	Peak
	3980.656	47.52	32.37	6.84	35.78	50.95	74	23.05	Peak
	5283.267	45.48	34.53	8.05	36.6	51.46	74	22.54	Peak

TEST ENGINEER: Jarey

Emissions in restricted frequency bands:

EUT : Wireless Ethernet Bridge Temperature : 22°C

Model No. : WB-10 Humidity : 51%RH

Test Mode : Transmitting Date of Test : 2018.12.27

IEEE 802.11b:

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	2327.977	45.88	28.48	5.04	35.26	44.14	74	29.86	Peak
	2327.977	31.66	28.48	5.04	35.26	29.92	54	24.08	Average
	2379.592	45.9	28.58	5.12	35.26	44.34	74	29.66	Peak
	2379.592	31.32	28.58	5.12	35.26	29.76	54	24.24	Average
	2487.524	45.93	28.77	5.23	35.25	44.68	74	29.32	Peak
	2487.524	31.17	28.77	5.23	35.25	29.92	54	24.08	Average
	2498.541	46.16	28.8	5.23	35.25	44.94	74	29.06	Peak
	2498.541	32.22	28.8	5.23	35.25	31	54	23	Average
Vertical	2320.031	46.56	28.46	5.04	35.26	44.8	74	29.2	Peak
	2320.031	31.35	28.46	5.04	35.26	29.59	54	24.41	Average
	2356.49	46.28	28.54	5.08	35.26	44.64	74	29.36	Peak
	2356.49	31.62	28.54	5.08	35.26	29.98	54	24.02	Average
	2486.487	46.44	28.77	5.23	35.25	45.19	74	28.81	Peak
	2486.487	31.56	28.77	5.23	35.25	30.31	54	23.69	Average
	2495.418	46.18	28.79	5.23	35.25	44.95	74	29.05	Peak
	2495.418	31.26	28.79	5.23	35.25	30.03	54	23.97	Average

IEEE 802.11g:

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	2335.559	46.62	28.49	5.04	35.26	44.89	74	29.11	Peak
	2335.559	31.36	28.49	5.04	35.26	29.63	54	24.37	Average
	2369.099	45.9	28.55	5.08	35.26	44.27	74	29.73	Peak
	2369.099	31.49	28.55	5.08	35.26	29.86	54	24.14	Average
	2490.014	47.22	28.79	5.23	35.25	45.99	74	28.01	Peak
	2490.014	31.58	28.79	5.23	35.25	30.35	54	23.65	Average
	2496.042	47.29	28.79	5.23	35.25	46.06	74	27.94	Peak
	2496.042	31.43	28.79	5.23	35.25	30.2	54	23.8	Average
Vertical	2322.935	45.9	28.48	5.04	35.26	44.16	74	29.84	Peak
	2322.935	31.61	28.48	5.04	35.26	29.87	54	24.13	Average
	2360.029	46.05	28.54	5.08	35.26	44.41	74	29.59	Peak
	2360.029	31.2	28.54	5.08	35.26	29.56	54	24.44	Average
	2489.807	46.99	28.79	5.23	35.25	45.76	74	28.24	Peak
	2489.807	31.4	28.79	5.23	35.25	30.17	54	23.83	Average
	2497.916	46.44	28.8	5.23	35.25	45.22	74	28.78	Peak
	2497.916	31.15	28.8	5.23	35.25	29.93	54	24.07	Average

IEEE 802.11n20:

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	2332.64	46.79	28.49	5.04	35.26	45.06	74	28.94	Peak
	2332.64	31.2	28.49	5.04	35.26	29.47	54	24.53	Average
	2375.23	46.42	28.57	5.08	35.26	44.81	74	29.19	Peak
	2375.23	32.06	28.57	5.08	35.26	30.45	54	23.55	Average
	2488.769	45.9	28.77	5.23	35.25	44.65	74	29.35	Peak
	2488.769	30.38	28.77	5.23	35.25	29.13	54	24.87	Average
	2499.375	46.08	28.8	5.23	35.24	44.87	74	29.13	Peak
	2499.375	30.84	28.8	5.23	35.24	29.63	54	24.37	Average
Vertical	2327.588	47.15	28.48	5.04	35.26	45.41	74	28.59	Peak
	2327.588	31.41	28.48	5.04	35.26	29.67	54	24.33	Average
	2357.472	47.06	28.54	5.08	35.26	45.42	74	28.58	Peak
	2357.472	31.44	28.54	5.08	35.26	29.8	54	24.2	Average
	2490.222	46.43	28.79	5.23	35.25	45.2	74	28.8	Peak
	2490.222	31.22	28.79	5.23	35.25	29.99	54	24.01	Average
	2496.459	46.8	28.8	5.23	35.25	45.58	74	28.42	Peak
	2496.459	31.54	28.8	5.23	35.25	30.32	54	23.68	Average

IEEE 802.11n40:

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	2330.307	46.72	28.49	5.04	35.26	44.99	74	29.01	Peak
	2330.307	31.21	28.49	5.04	35.26	29.48	54	24.52	Average
	2377.806	46.73	28.58	5.08	35.26	45.13	74	28.87	Peak
	2377.806	31.51	28.58	5.08	35.26	29.91	54	24.09	Average
	2487.317	46.61	28.77	5.23	35.25	45.36	74	28.64	Peak
	2487.317	30.47	28.77	5.23	35.25	29.22	54	24.78	Average
	2498.125	46.44	28.8	5.23	35.25	45.22	74	28.78	Peak
	2498.125	31.05	28.8	5.23	35.25	29.83	54	24.17	Average
Vertical	2326.036	46.89	28.48	5.04	35.26	45.15	74	28.85	Peak
	2326.036	31.58	28.48	5.04	35.26	29.84	54	24.16	Average
	2350.015	47.83	28.53	5.08	35.26	46.18	74	27.82	Peak
	2350.015	32.13	28.53	5.08	35.26	30.48	54	23.52	Average
	2488.146	46.5	28.77	5.23	35.25	45.25	74	28.75	Peak
	2488.146	31.26	28.77	5.23	35.25	30.01	54	23.99	Average
	2499.166	46.93	28.8	5.23	35.25	45.71	74	28.29	Peak
	2499.166	31.68	28.8	5.23	35.25	30.46	54	23.54	Average

TEST ENGINEER: Jarey

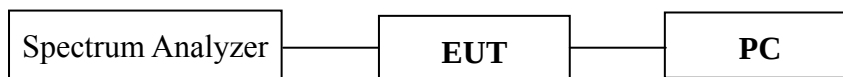
5 6 dB BANDWIDTH MEASUREMENT

5.1 Test Equipment

The following test equipment was used during the Emission Bandwidth measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9030A	MY53120367	Jun 23, 2018	Jun 22, 2019

5.2 Block Diagram of Test Setup



5.3 Specification Limits (§15.247(a)(2))

The minimum 6 dB bandwidth shall be at least 500 kHz.

5.4 Operating Condition of EUT

The switch ON/OFF was used to enable the EUT to change the channel one by one.

5.5 Test Procedure

The transmitter output was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measure by spectrum analyzer with settings: RBW = 100kHz, VBW $\geq 3 \times$ RBW.

The 6 dB bandwidth is defined as the total spectrum the power of which is lower than peak power minus 6 dB .

The test procedure is defined in ANSI C63.10-2013 (the 11.8.2 Measurement Procedure “Option 2” was used).

5.6 Test Results

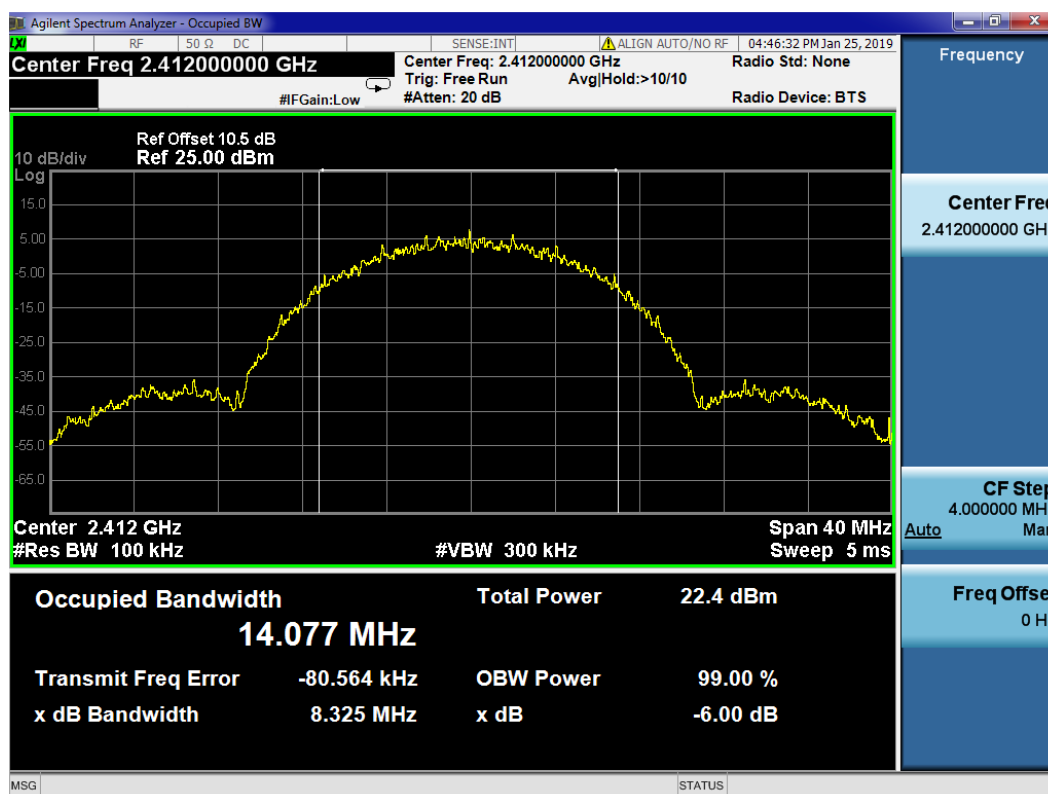
PASSED.

All the test results are attached in next pages.

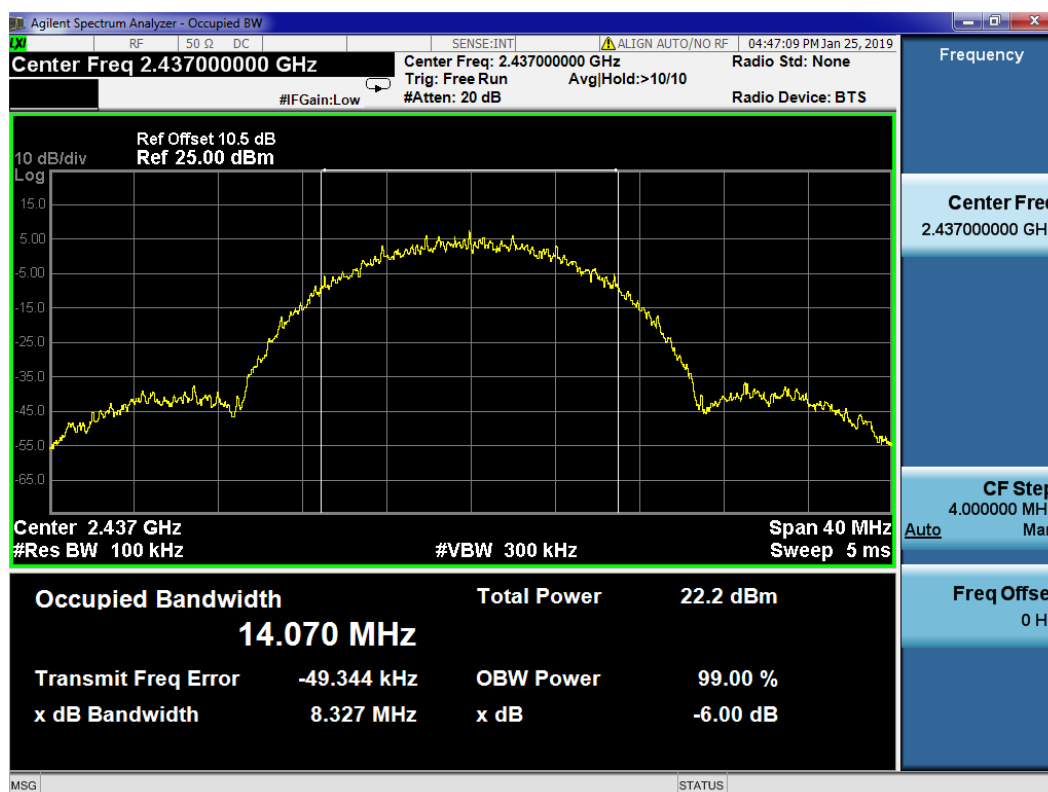
(Test Date: 2018.12.18; 2019.01.25 Temperature: 23℃ Humidity: 51 %)

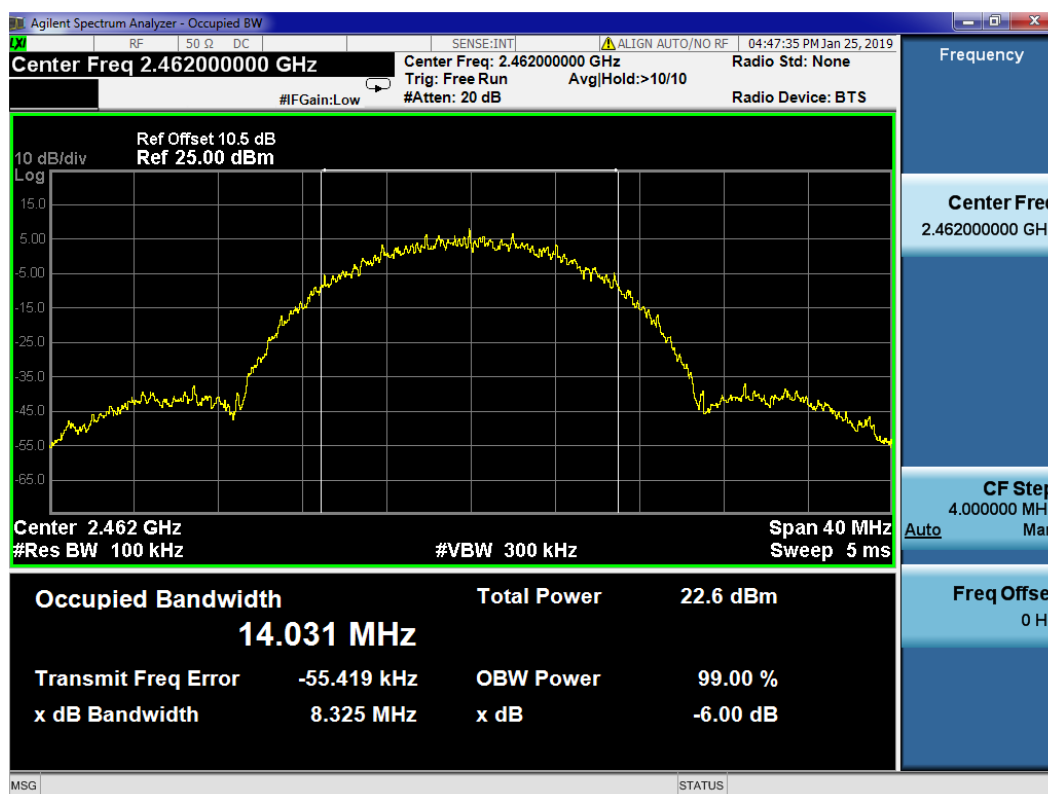
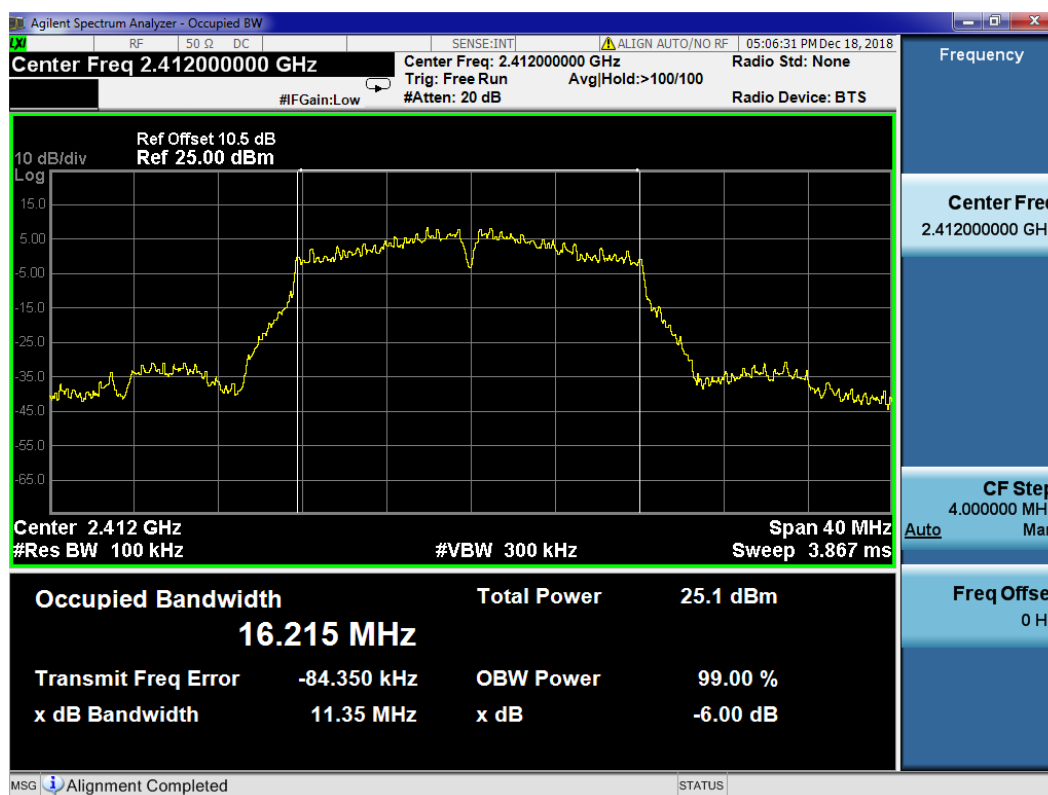
Modulation	Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit
IEEE 802.11b	1	2412	8.325	500 kHz
	6	2437	8.327	500 kHz
	11	2462	8.325	500 kHz
IEEE 802.11g	1	2412	11.35	500 kHz
	6	2437	11.33	500 kHz
	11	2462	12.60	500 kHz
IEEE 802.11n HT20	1	2412	11.31	500 kHz
	6	2437	12.55	500 kHz
	11	2462	12.60	500 kHz
IEEE 802.11n HT40	3	2422	21.61	500 kHz
	9	2452	20.26	500 kHz

IEEE 802.11b: CH1 (2412 MHz)



IEEE 802.11b: CH6 (2437 MHz)



IEEE 802.11b: CH11 (2462 MHz)**IEEE 802.11g: CH1 (2412 MHz)**

Agilent Spectrum Analyzer - Occupied BW

RF 50 Ω DC SENSE:INT ALIGN AUTO/NO RF 05:07:00 PM Dec 18, 2018

Center Freq 2.437000000 GHz Radio Std: None
Trig: Free Run Avg|Hold:>100/100
#IFGain:Low #Atten: 20 dB Radio Device: BTS

Ref Offset 10.5 dB
Ref 25.00 dBm

10 dB/div
Log

The spectrum plot shows a yellow trace of the signal's power spectral density. The signal is centered at 2.437 GHz with a bandwidth of approximately 16 MHz. The power level is around -10 dBm. The plot includes a grid and a logarithmic scale.

Center 2.437 GHz Span 40 MHz
#Res BW 100 kHz #VBW 300 kHz Sweep 3.867 ms

Occupied Bandwidth	Total Power
16.217 MHz	24.8 dBm

Transmit Freq Error	OBW Power
-94.155 kHz	99.00 %

x dB Bandwidth	x dB
11.33 MHz	-6.00 dB

MSG STATUS

Frequency

Center Freq
2.437000000 GHz

CF Step
4.000000 MHz
Auto Mar

Freq Offset
0 Hz

Agilent Spectrum Analyzer - Occupied BW

RF 50 Ω DC SENSE:INT Δ ALIGN AUTO/NO RF 05:07:47 PM Dec 18, 2018

Center Freq 2.462000000 GHz Center Freq: 2.462000000 GHz Radio Std: None
Trig: Free Run Avg|Hold: >100/100
#IFGain:Low #Atten: 20 dB Radio Device: BTS

Ref Offset 10.5 dB
Ref 25.00 dBm

10 dB/div
Log

Center 2.462 GHz Span 40 MHz
#Res BW 100 kHz #VBW 300 kHz Sweep 3.867 ms

Occupied Bandwidth	Total Power	25.7 dBm
16.256 MHz		
Transmit Freq Error	-71.628 kHz	OBW Power 99.00 %
x dB Bandwidth	12.60 MHz	x dB -6.00 dB

MSG STATUS

Frequency

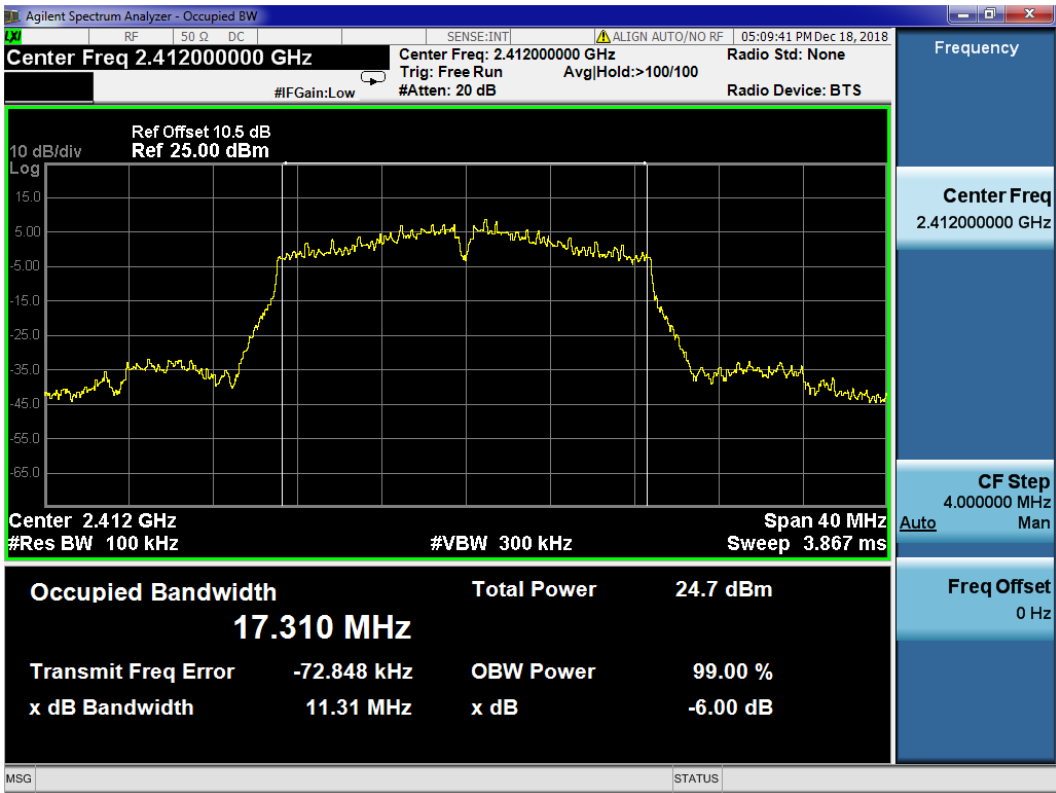
Center Freq
2.462000000 GHz

CF Step
4.000000 MHz
Man

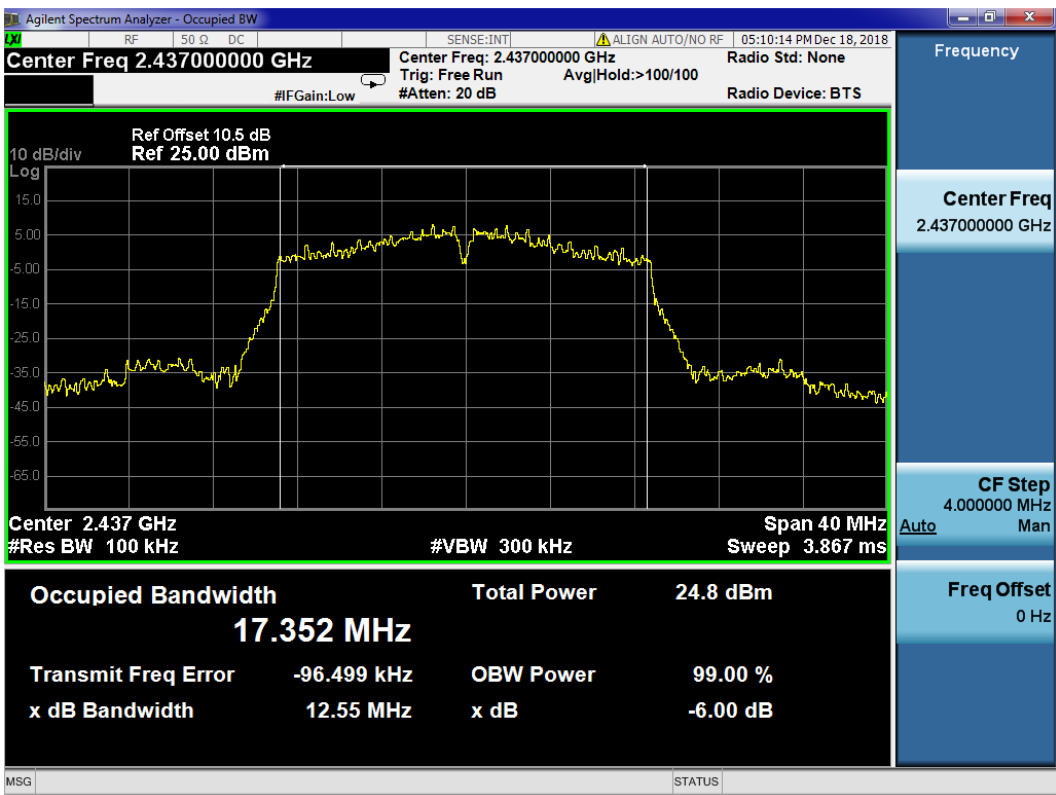
Auto

Freq Offset
0 Hz

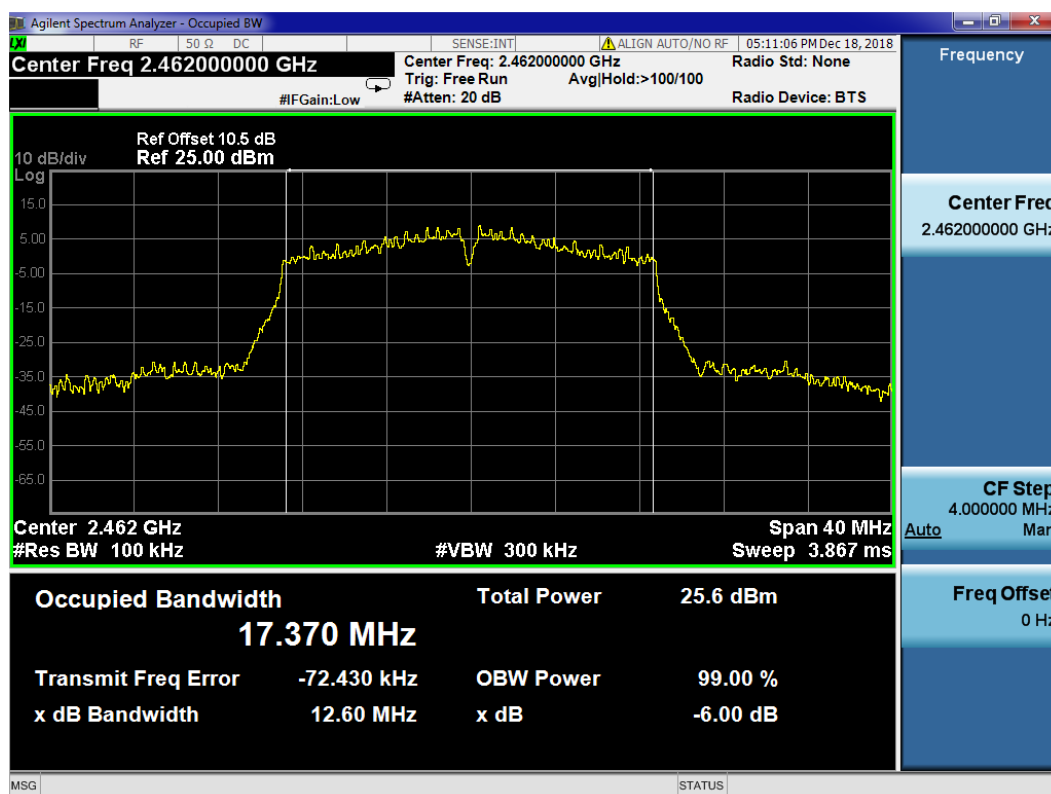
IEEE 802.11n20: CH1 (2412 MHz)



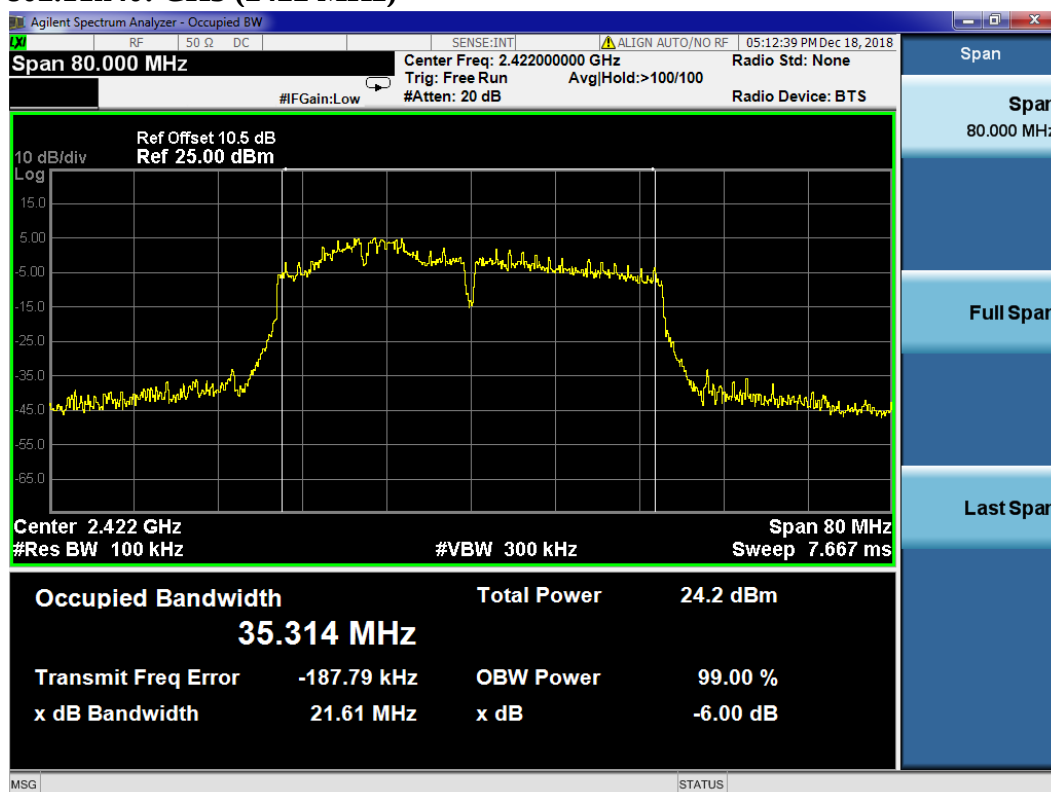
IEEE 802.11n20: CH6 (2437 MHz)



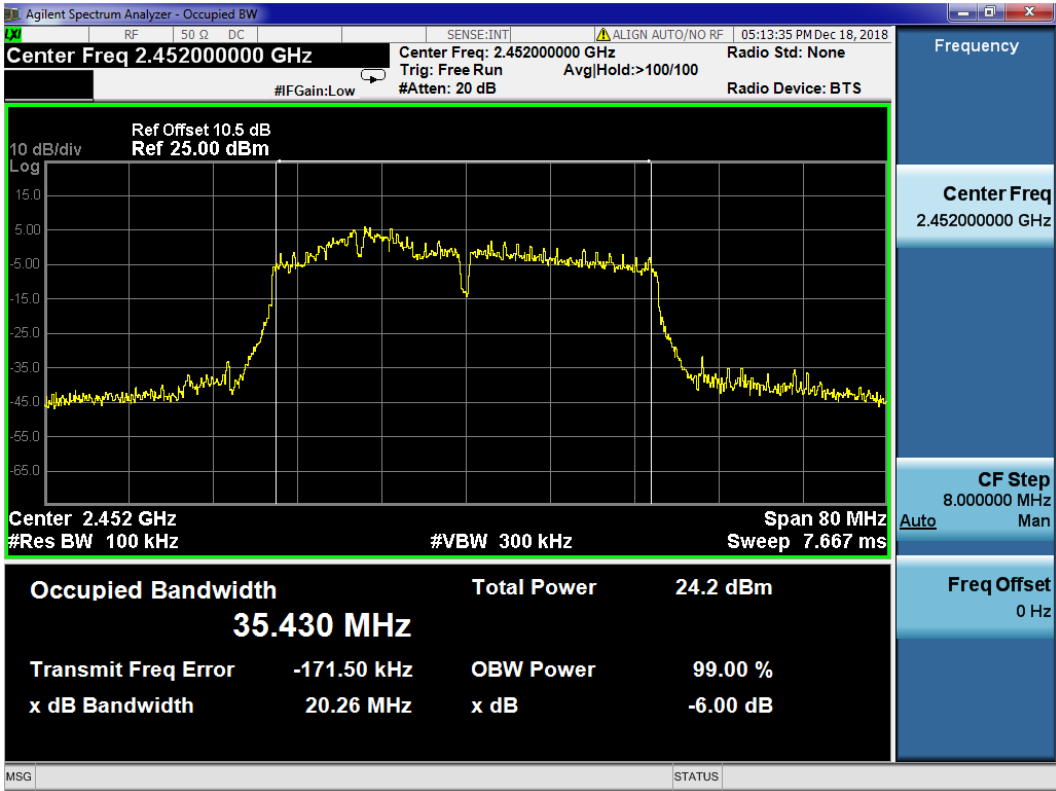
IEEE 802.11n20: CH11 (2462 MHz)



IEEE 802.11n40: CH3 (2422 MHz)



IEEE 802.11n40: CH9 (2452 MHz)



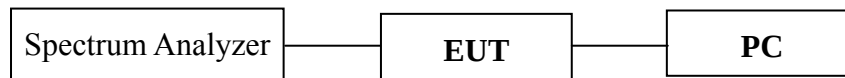
6 OCCUPIED BANDWIDTH MEASUREMENT

6.1 Test Equipment

The following test equipment was used during the Emission Bandwidth measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9030A	MY53120367	Jun 23, 2018	Jun 22, 2019

6.2 Block Diagram of Test Setup



6.3 Specification Limits

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission.

Section 15.247 permits the maximum conducted (average) output power to be measured as an alternative to the maximum peak conducted output power for demonstrating compliance to the limit. When this option is exercised, the measured power is to be referenced to the OBW rather than the DTS bandwidth.

6.4 Operating Condition of EUT

The switch ON/OFF was used to enable the EUT to change the channel one by one.

6.5 Test Procedure

The transmitter output was connected to the spectrum analyzer. The bandwidth of 99% power bandwidth was measure by spectrum analyzer with settings: Span = between 1.5 times and 5.0 times of the OBW, RBW = 1% to 5% of the OBW, VBW $\geq 3 \times$ RBW, Detector = Peak, Trace = Max Hold.

Use the 99% bandwidth function of the instrument and report the measured bandwidth.

The test procedure is defined in ANSI C63.10-2013 (the 6.9.3 Measurement Procedure “Occupied bandwidth—power bandwidth (99%) measurement procedure” was used).

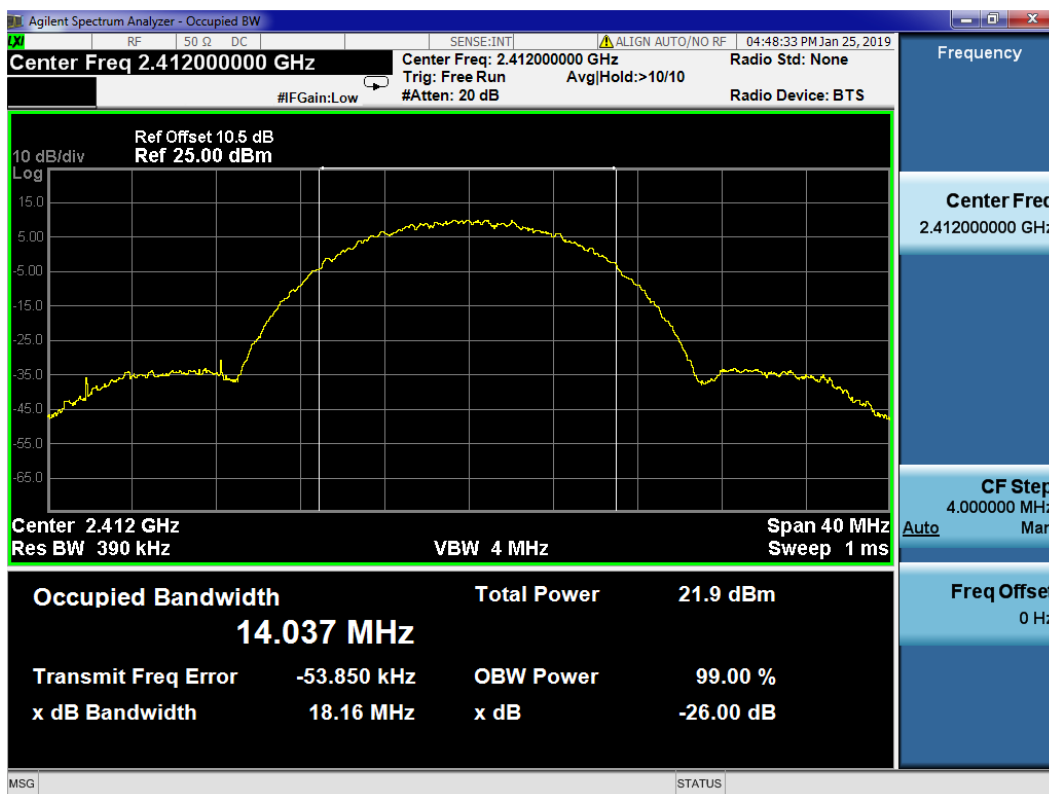
6.6 Test Results

All the test results are attached in next pages.

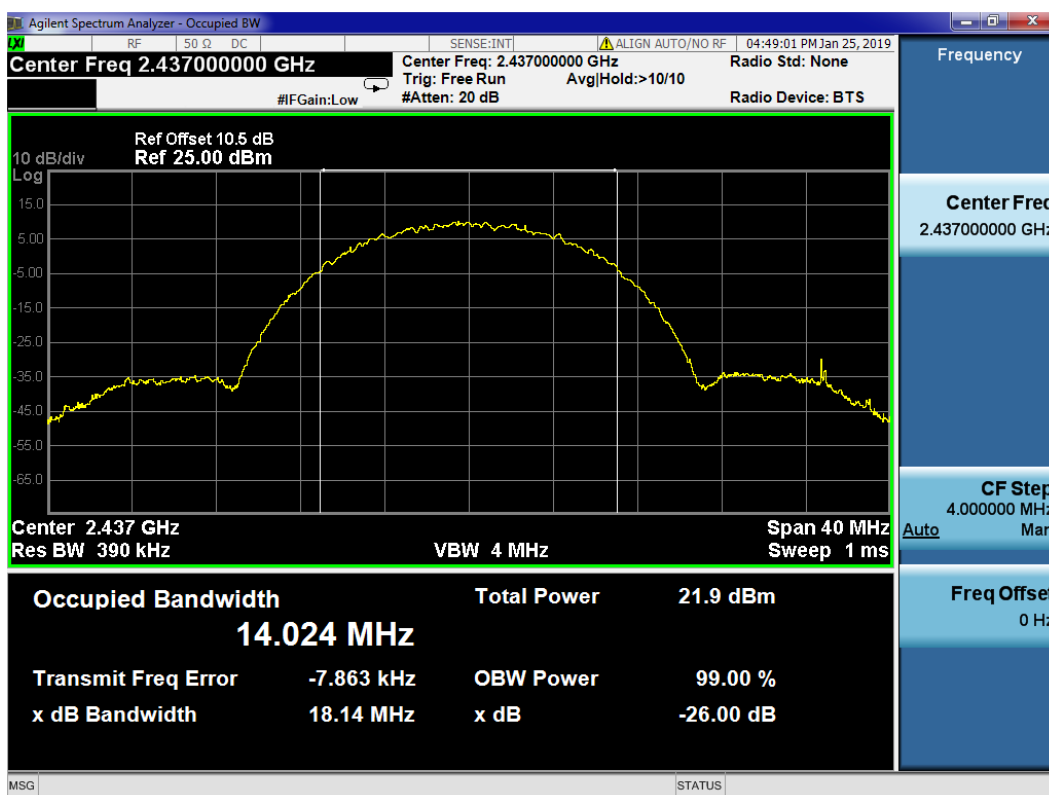
(Test Date: 2018.12.18; 2019.01.25 Temperature: 23℃ Humidity: 51 %)

Modulation	Channel	Frequency (MHz)	99% Bandwidth (MHz)
IEEE 802.11b	1	2412	14.037
	6	2437	14.024
	11	2462	14.016
IEEE 802.11g	1	2412	16.565
	6	2437	16.636
	11	2462	16.617
IEEE 802.11n HT20	1	2412	17.647
	6	2437	17.669
	11	2462	17.695
IEEE 802.11n HT40	3	2422	35.878
	9	2452	35.972

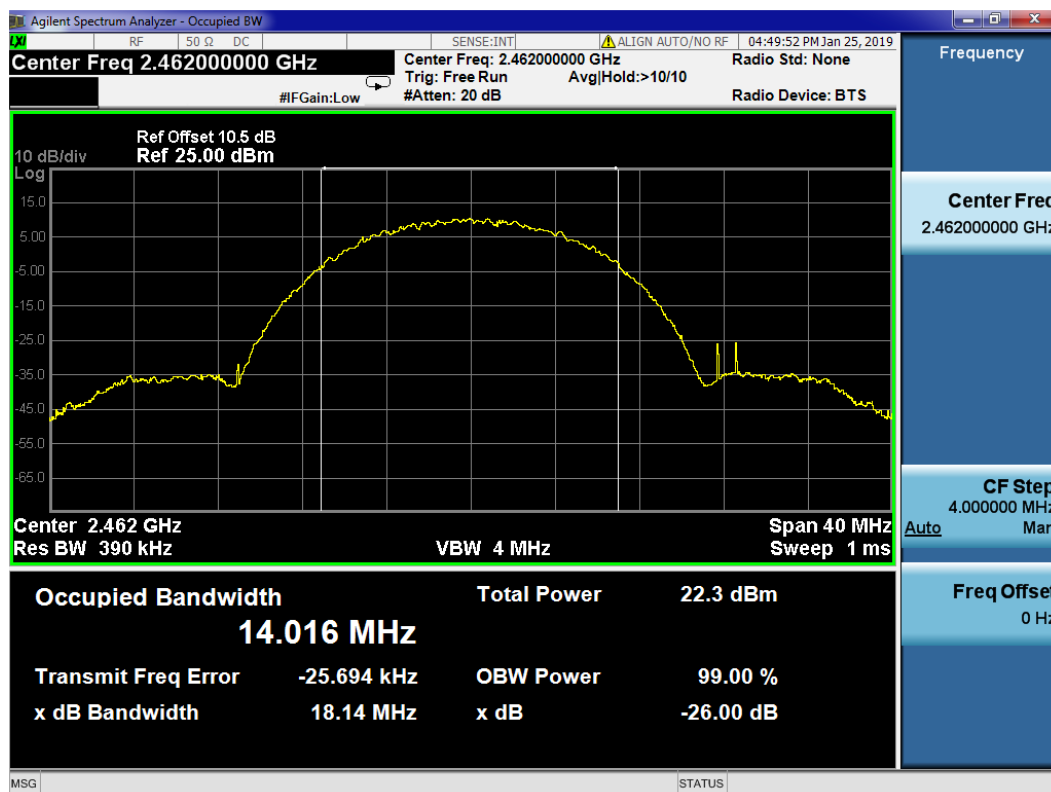
IEEE 802.11b: CH1 (2412 MHz)



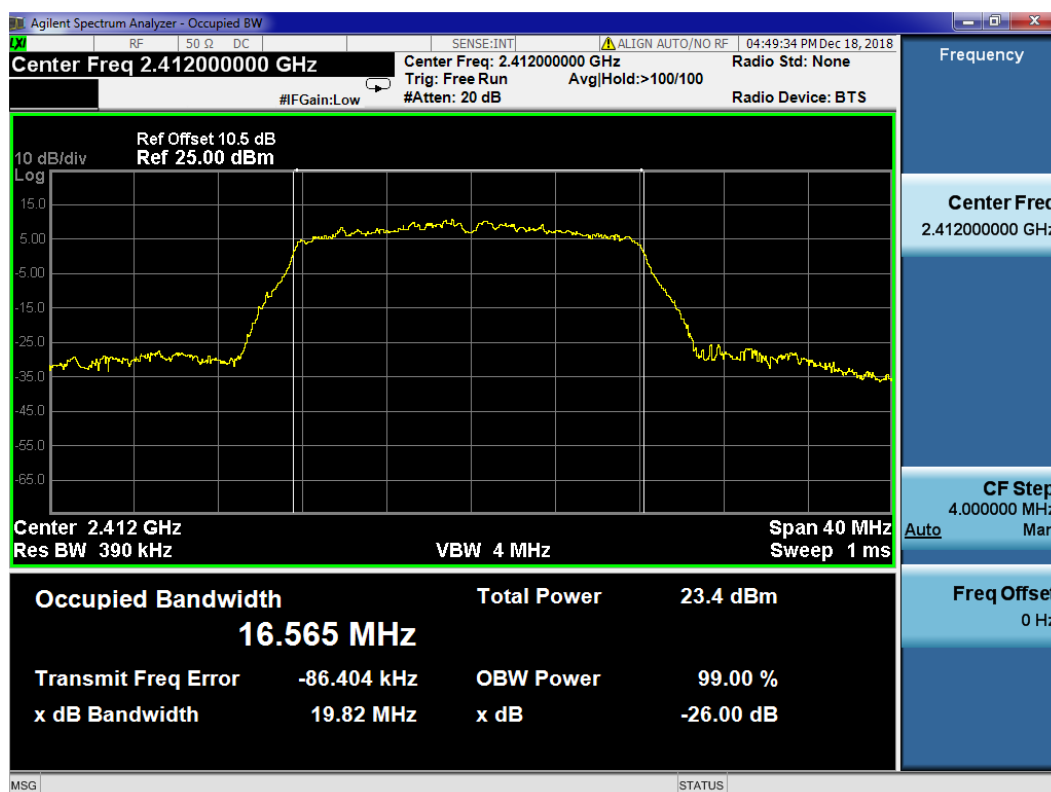
IEEE 802.11b: CH6 (2437 MHz)



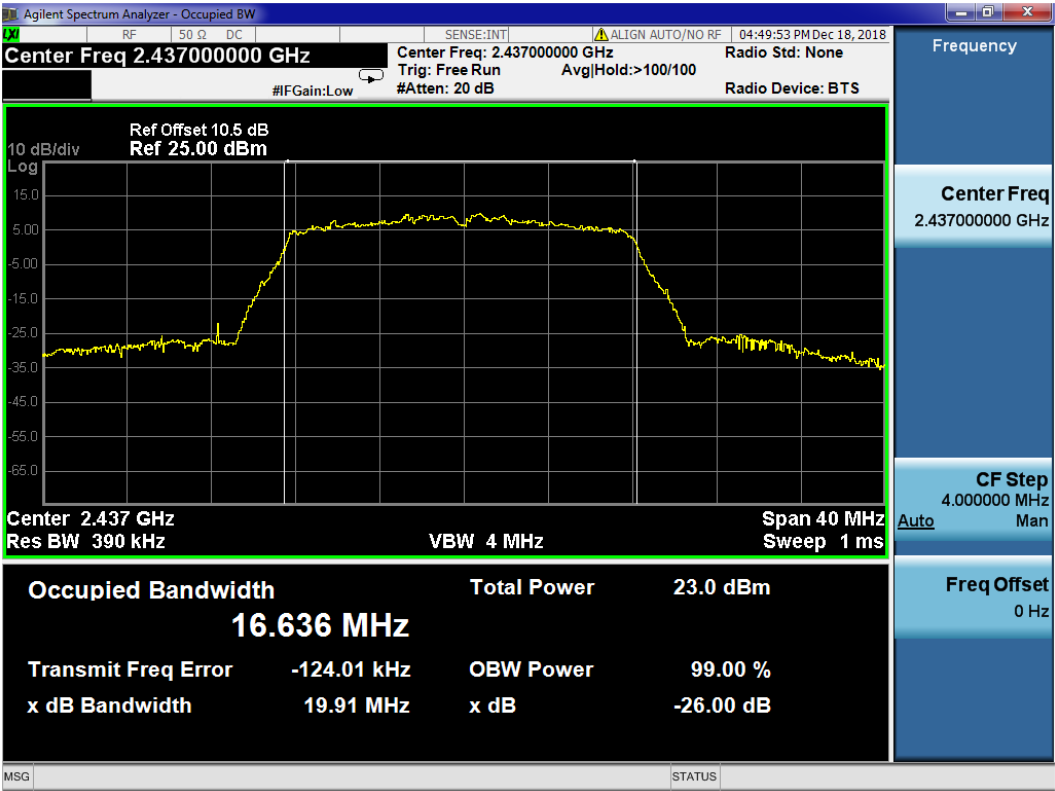
IEEE 802.11b: CH11 (2462 MHz)



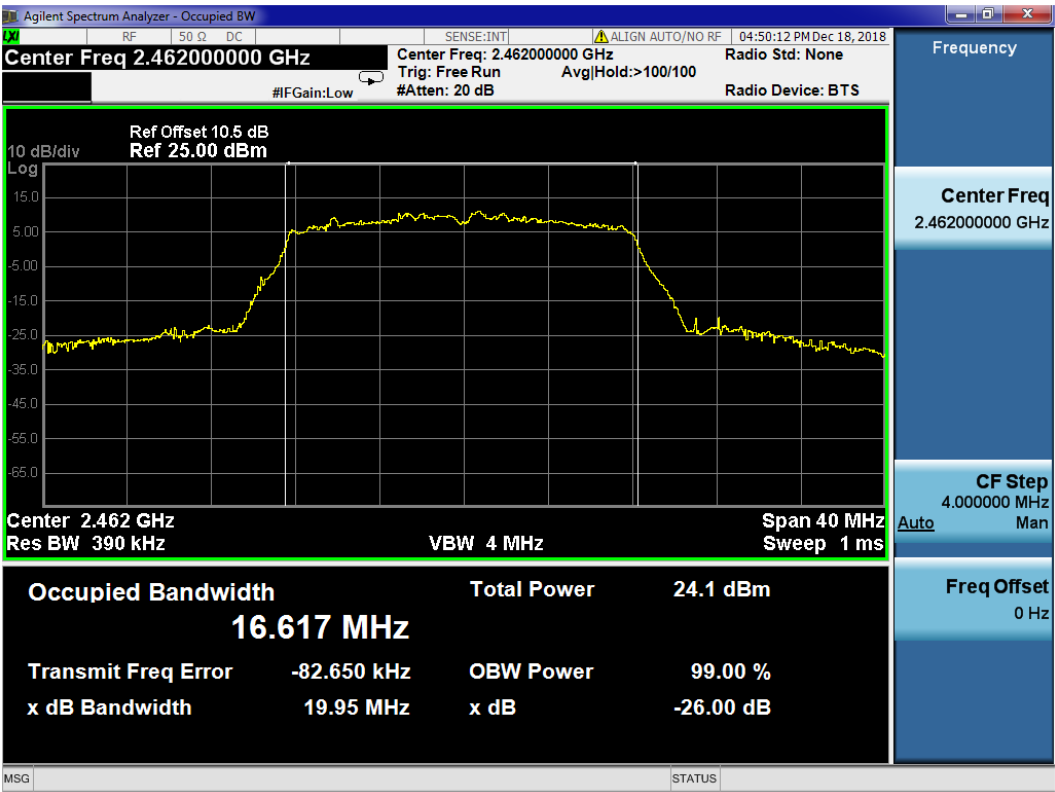
IEEE 802.11g: CH1 (2412 MHz)



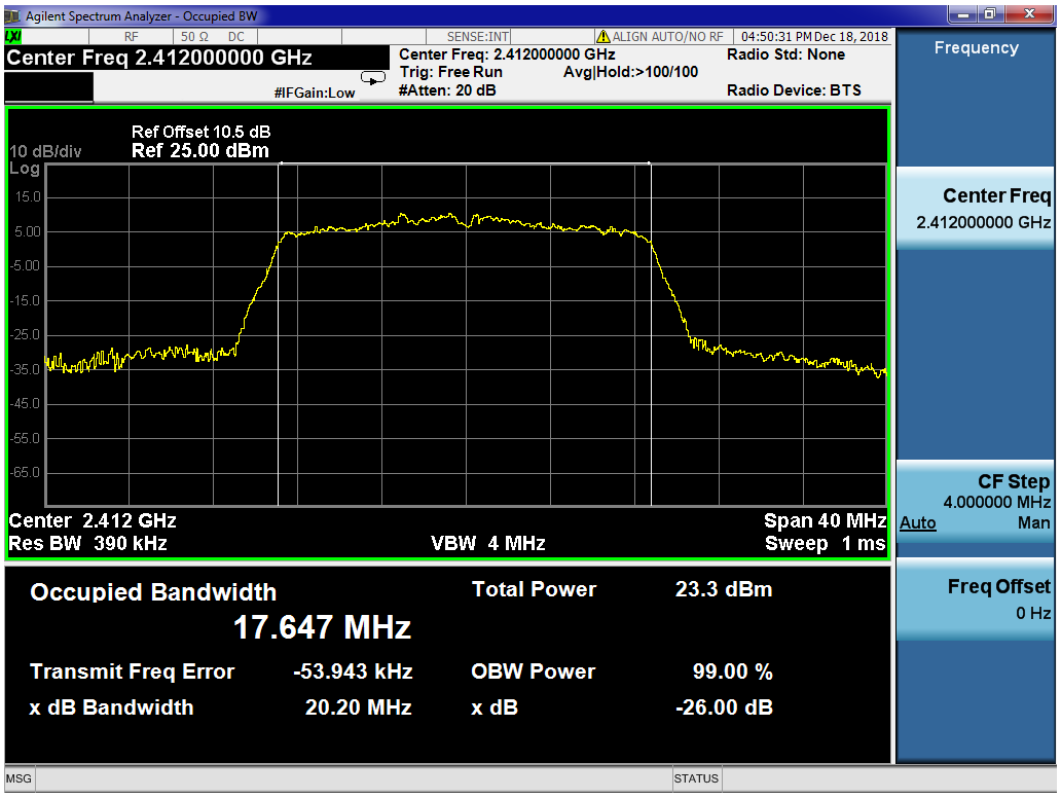
IEEE 802.11g: CH6 (2437 MHz)



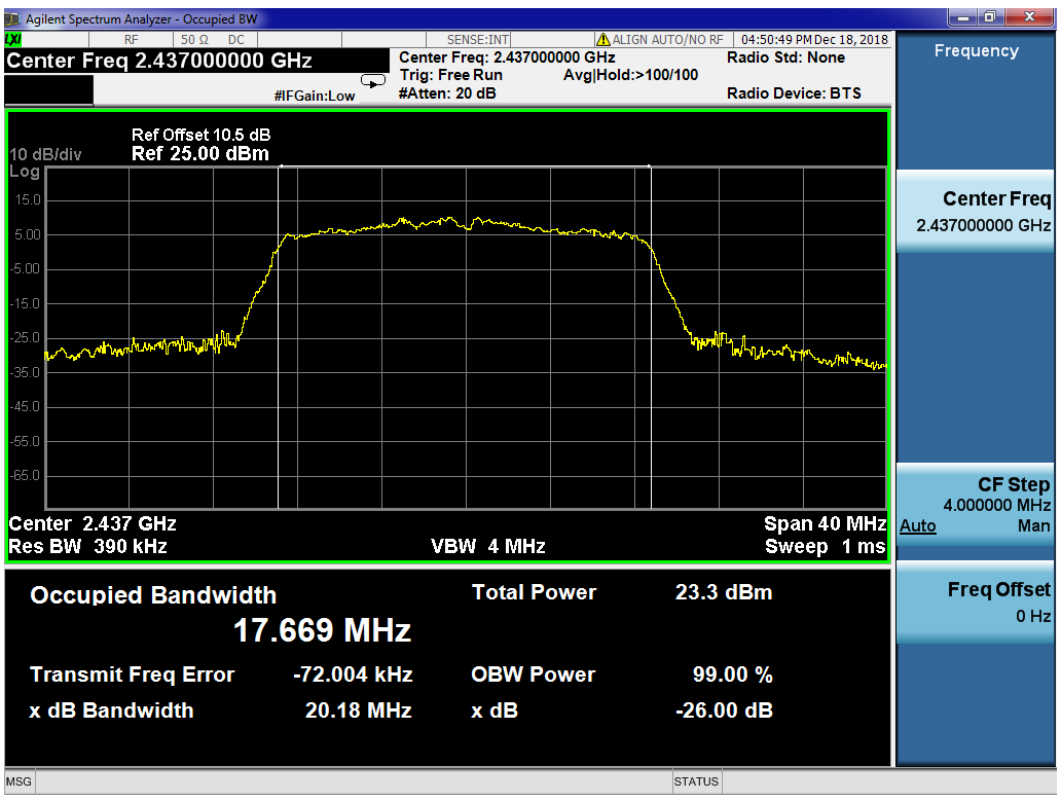
IEEE 802.11g: CH11 (2462 MHz)



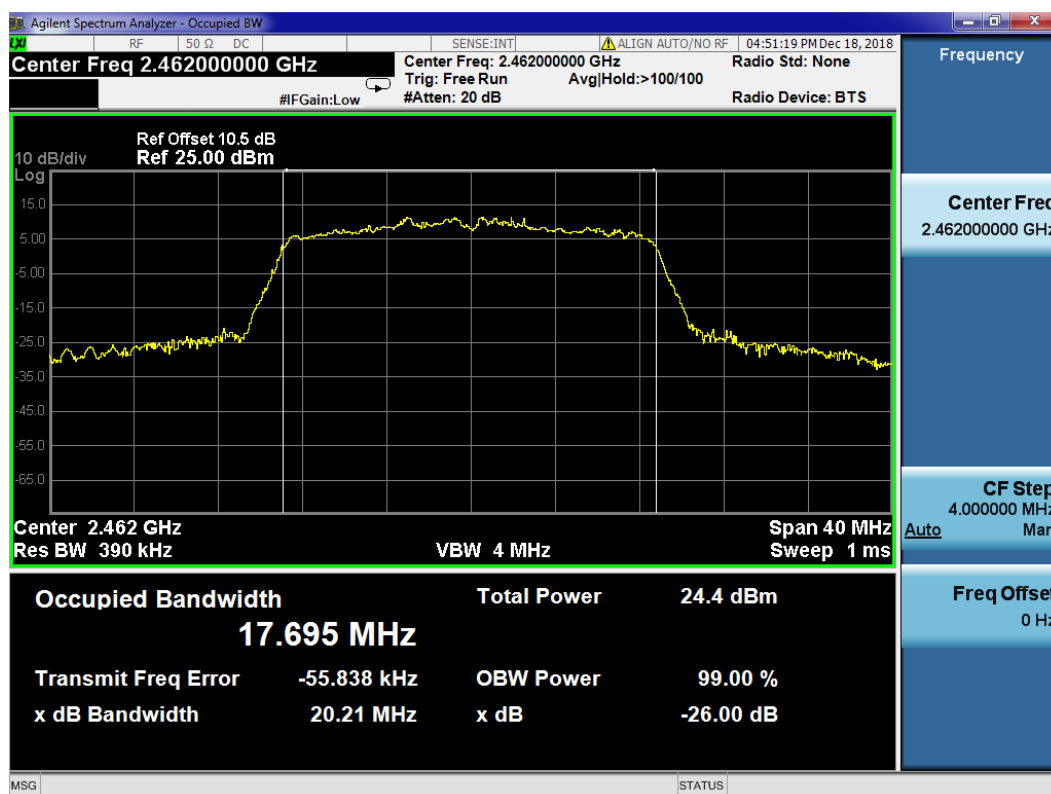
IEEE 802.11n20: CH1 (2412 MHz)



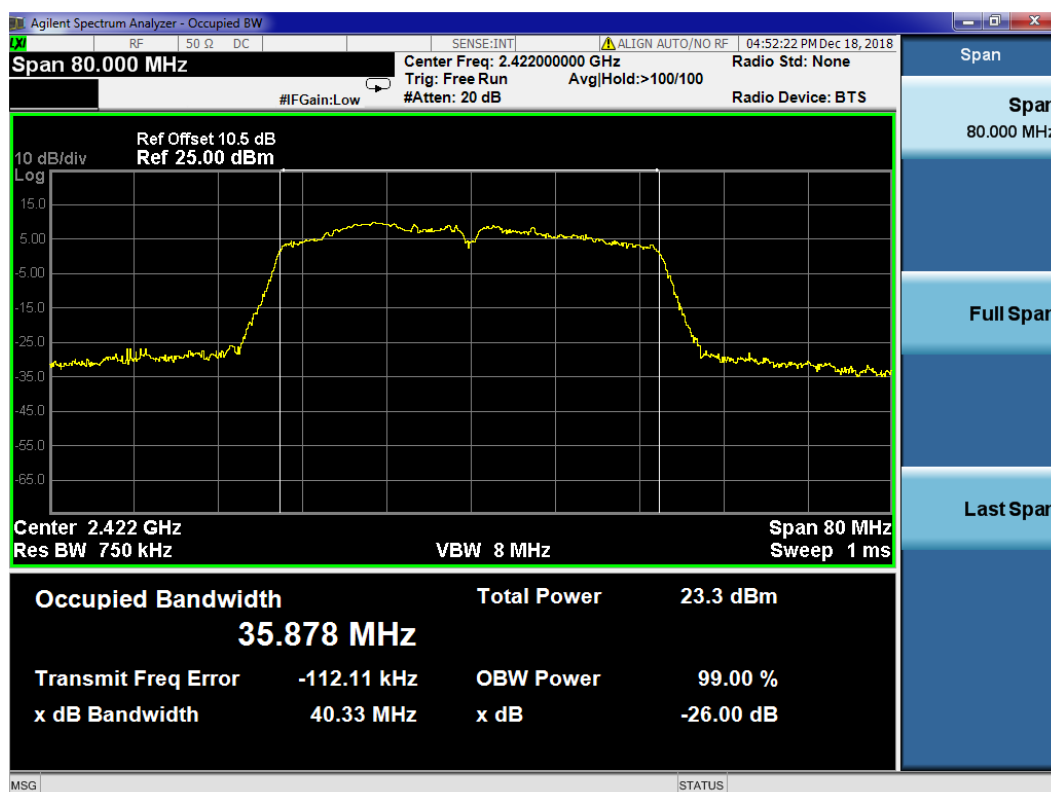
IEEE 802.11n20: CH6 (2437 MHz)



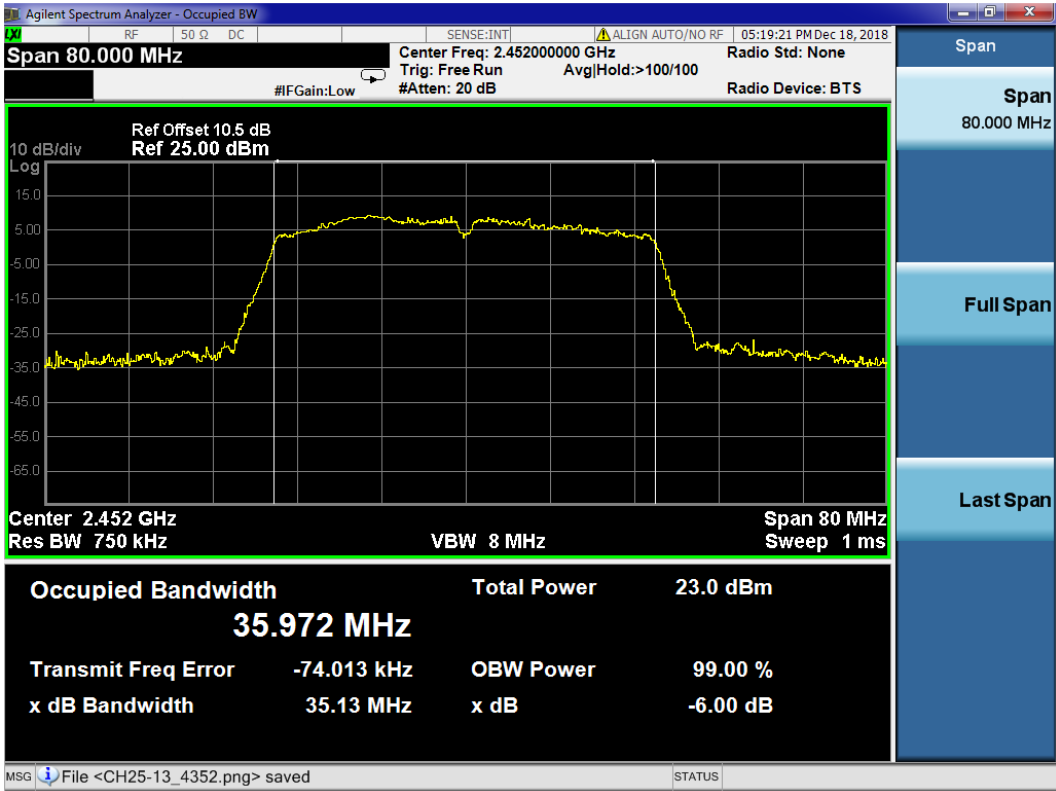
IEEE 802.11n20: CH11 (2462 MHz)



IEEE 802.11n40: CH3 (2422 MHz)



IEEE 802.11n40: CH9 (2452 MHz)



7 MAXIMUM PEAK OUTPUT POWER MEASUREMENT

7.1 Test Equipment

The following test equipment was used during the maximum peak output power measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9030A	MY53120367	Jun 23, 2018	Jun 22, 2019

7.2 Block Diagram of Test Setup

The Same as Section. 4.2.

7.3 Specification Limits ((§15.247(b)(3))

The Limits of maximum Peak Output Power for digital modulation in 2400-2483.5 MHz is: 1 Watt. (30 dBm)

7.4 Operating Condition of EUT

The switch ON/OFF was used to enable the EUT to change the channel one by one.

7.5 Test Procedure

The transmitter output was connected to the spectrum analyzer.

- a) Set span to at least 1.5 times the OBW.
- b) Set RBW = 1% to 5% of the OBW, not to exceed 1 MHz.
- c) Set VBW $\geq [3 \times \text{RBW}]$.
- d) Number of points in sweep $\geq [2 \times \text{span} / \text{RBW}]$. (This gives bin-to-bin spacing $\leq \text{RBW} / 2$, 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 the 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 $\geq 98\%$, 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 (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.

The test procedure is defined in ANSI C63.10-2013 (11.9.2.2.2 Measurement Procedure “ Method AVGPS-1” was used).

7.6 Test Results

PASSED. All the test results are listed below.

(Test Date: 2018.12.18; 2019.01.25 Temperature: 23°C Humidity: 51 %)

Modulation	Channel	Frequency (MHz)	Peak Output Power (dBm)	Limit
IEEE 802.11b	1	2412	14.50	30 dBm
	6	2437	14.33	30 dBm
	11	2462	14.96	30 dBm
IEEE 802.11g	1	2412	12.40	30 dBm
	6	2437	12.04	30 dBm
	11	2462	13.37	30 dBm
IEEE 802.11n HT20	1	2412	12.33	30 dBm
	6	2437	12.02	30 dBm
	11	2462	13.07	30 dBm
IEEE 802.11n HT40	3	2422	9.55	30 dBm
	9	2452	9.56	30 dBm

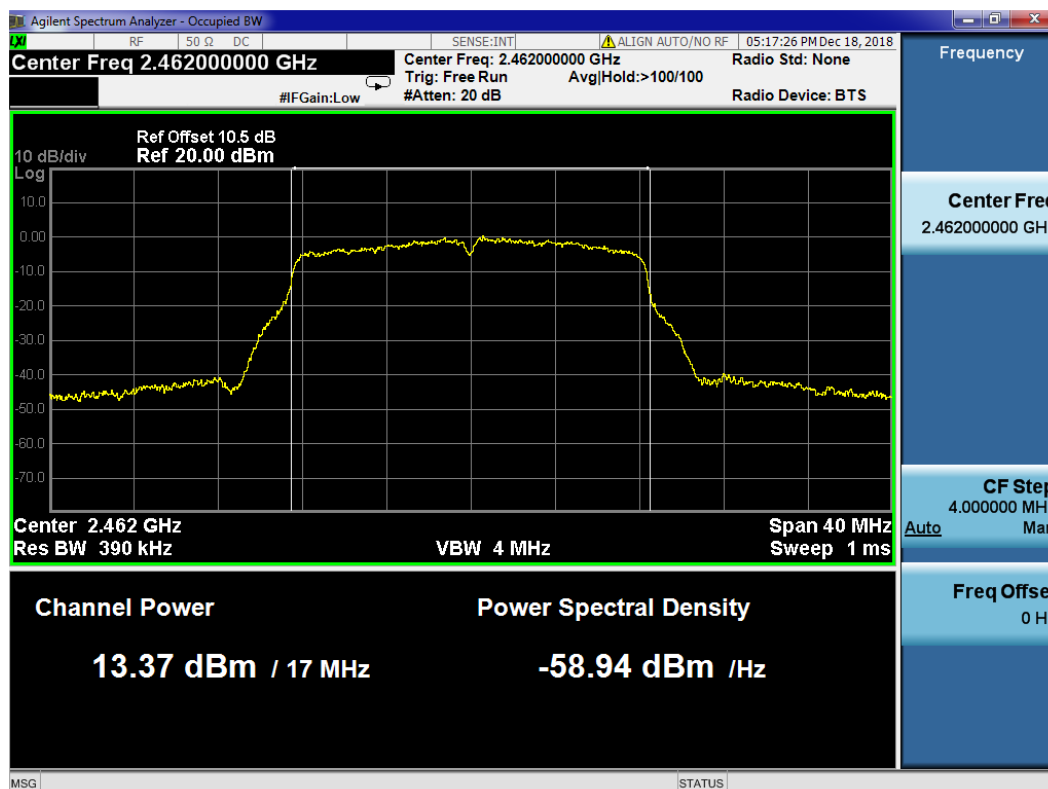
IEEE 802.11b: CH1 (2412 MHz)**IEEE 802.11b: CH6 (2437 MHz)**

IEEE 802.11b: CH11 (2462 MHz)**IEEE 802.11g: CH1 (2412 MHz)**

IEEE 802.11g: CH6 (2437 MHz)



IEEE 802.11g: CH11 (2462 MHz)

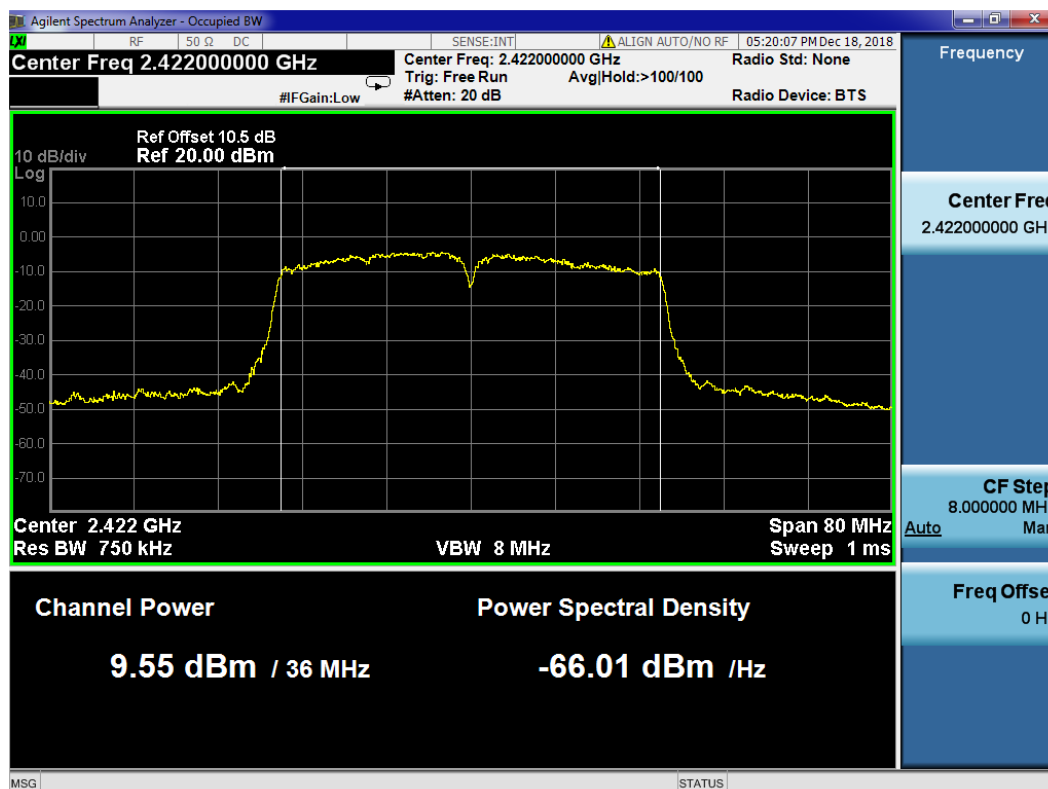


IEEE 802.11n HT20: CH1 (2412 MHz)



IEEE 802.11n HT20: CH6 (2437 MHz)



IEEE 802.11n HT20: CH11 (2462 MHz)**IEEE 802.11n HT40: CH3 (2422 MHz)**

IEEE 802.11n HT40: CH9 (2452 MHz)



8 EMISSION LIMITATIONS MEASUREMENT

8.1 Test Equipment

The following test equipment was used during the emission limitations test :

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9030A	MY53120367	Jun 23, 2018	Jun 22, 2019

8.2 Block Diagram of Test Setup

The Same as Section. 4.2.

8.3 Specification Limits (§15.247(d))

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

In addition, radiated emissions which fall in 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)).(※This test result attaching to Section. 4.7)

8.4 Operating Condition of EUT

The switch ON/OFF was used to enable the EUT to change the channel one by one.

8.5 Test Procedure

The transmitter output was connected to the spectrum analyzer. Set RBW = 100 kHz, VBW $\geq$ 300 kHz, scan up through 10th harmonic.

When maximum conducted (average) output power was used to determine compliance as described in 11.9.2, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz.

The test procedure is defined in ANSI C63.10-2013 (11.11.2 Reference level measurement and 11.11.3 Emission level measurement was used).

8.6 Test Results

PASSED.

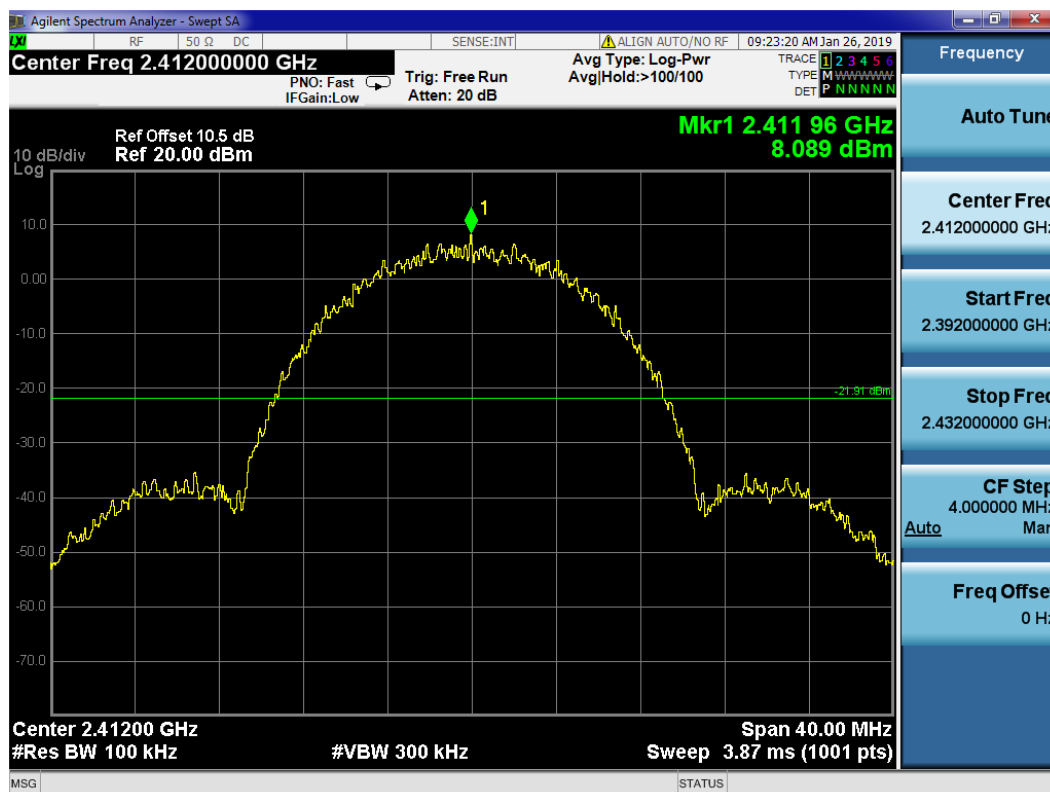
The test data was attached in the next pages.

(Test Date: 2018.12.18-19; 2019.01.26 Temperature: 23°C Humidity: 51 %)

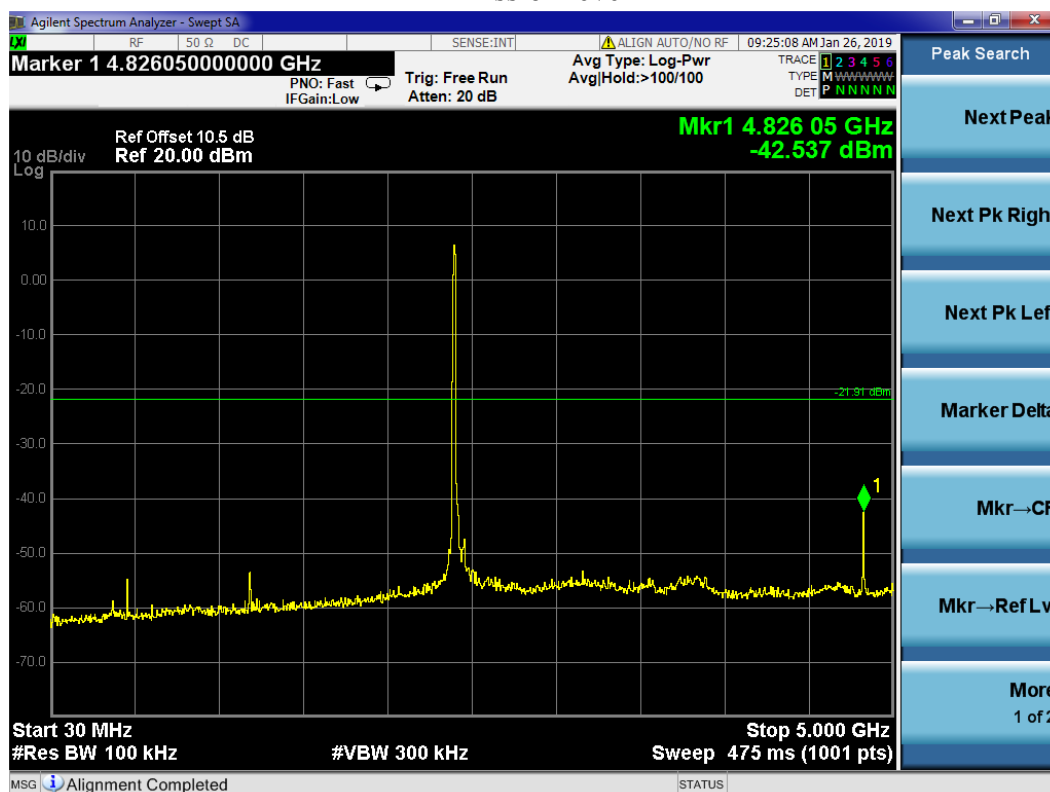
Modulation	Channel	Frequency (MHz)	Data Page
IEEE 802.11b	1	2412	P55-56
	6	2437	P57-58
	11	2462	P59-60
IEEE 802.11g	1	2412	P61-62
	6	2437	P63-64
	11	2462	P65-66
IEEE 802.11n HT20	1	2412	P67-68
	6	2437	P69-70
	11	2462	P71-72
IEEE 802.11n HT40	3	2422	P73-74
	9	2452	P75-76

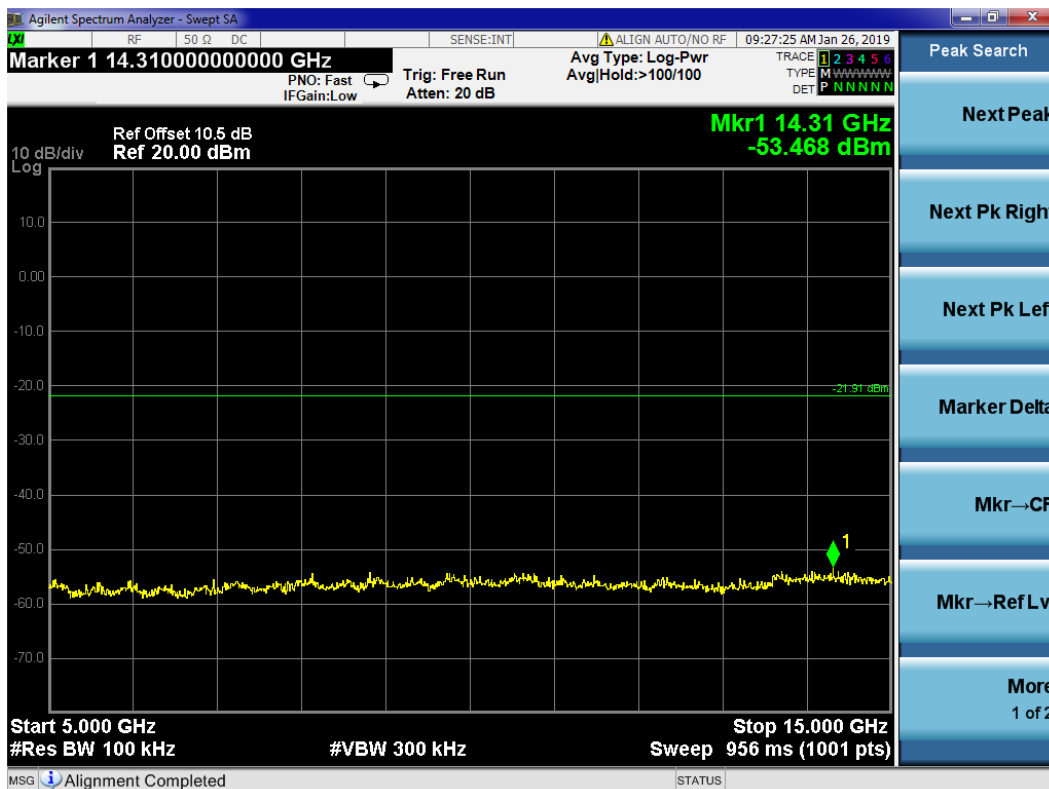
IEEE 802.11b: CH1 (2412 MHz)

Reference level



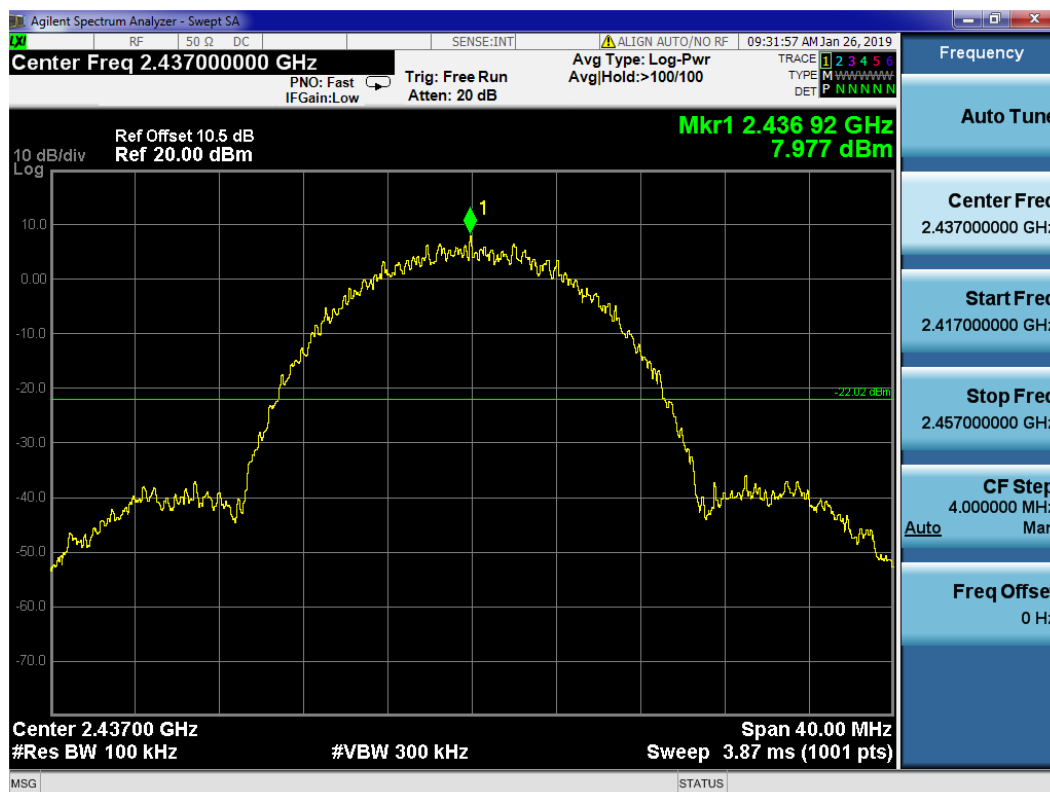
Emission level



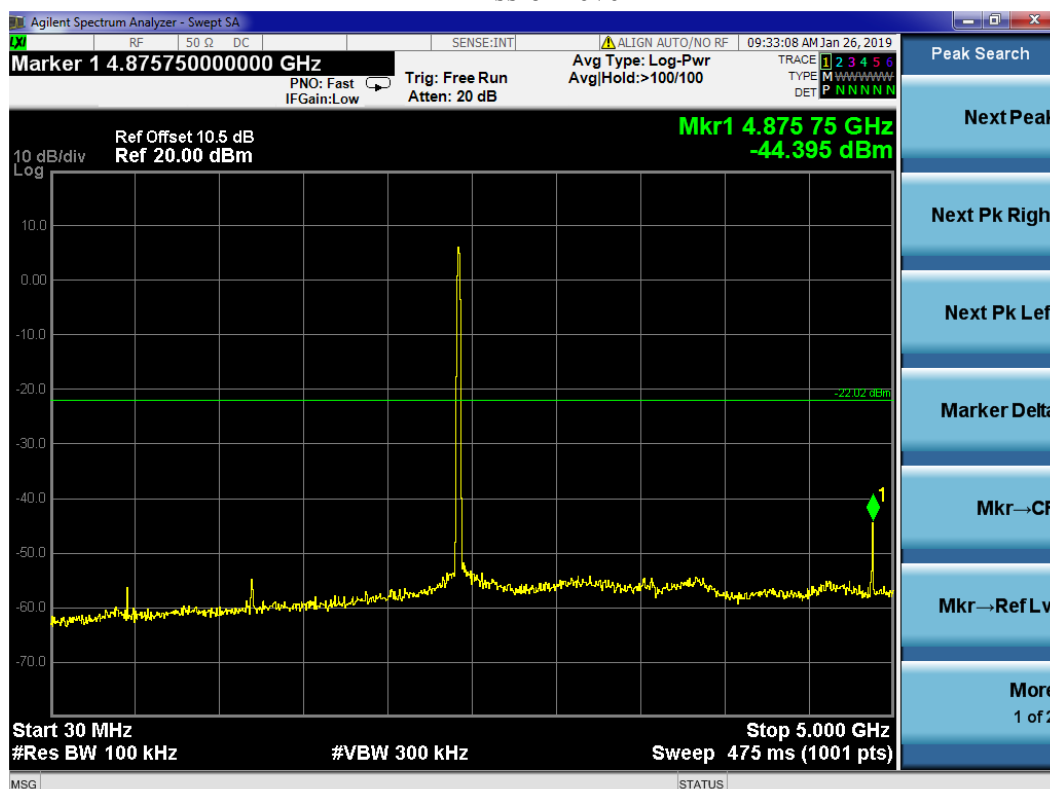


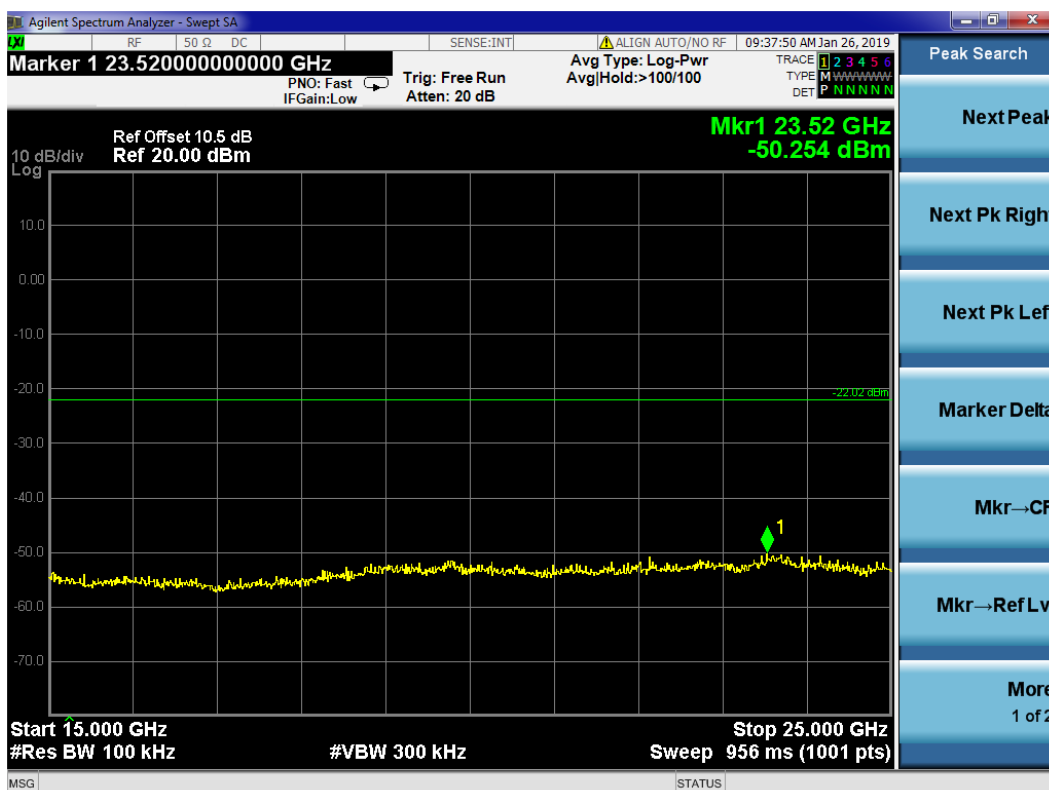
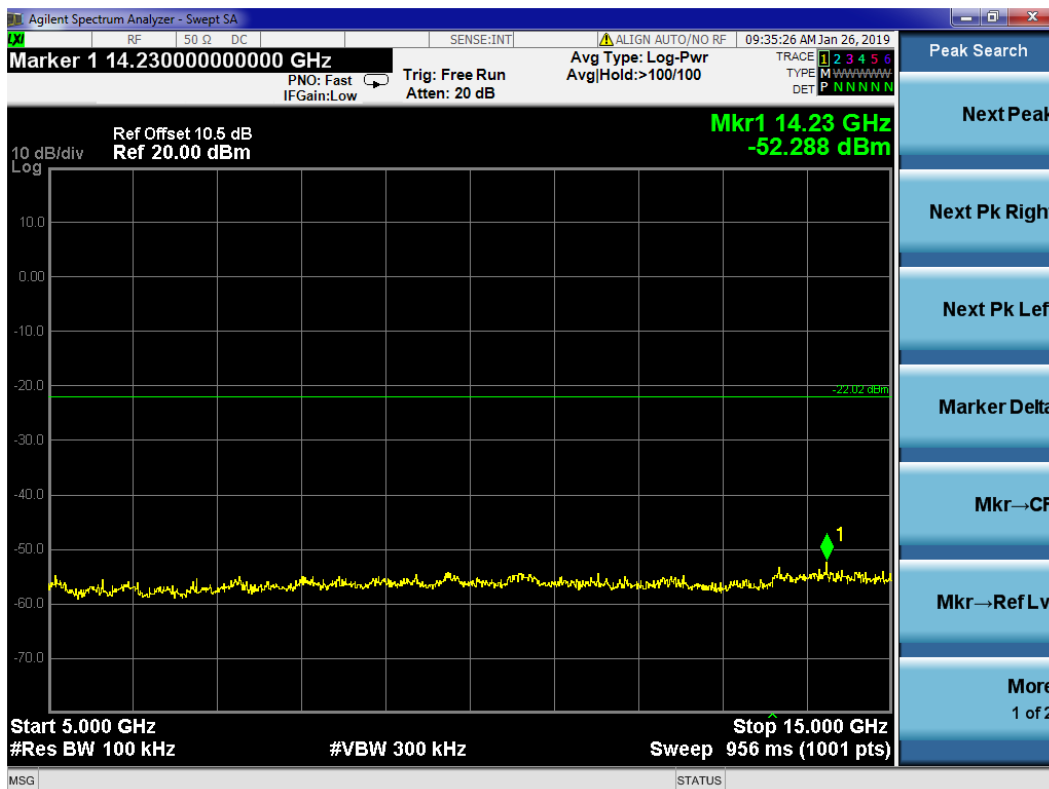
IEEE 802.11b: CH6 (2437 MHz)

Reference level



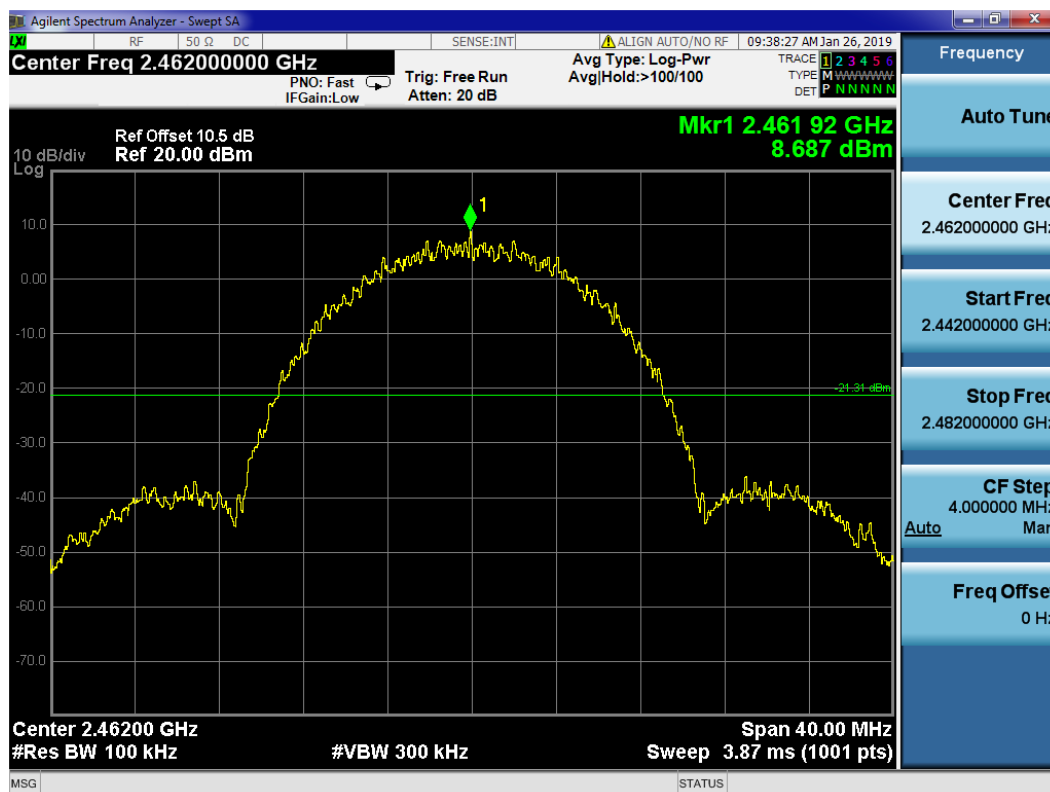
Emission level



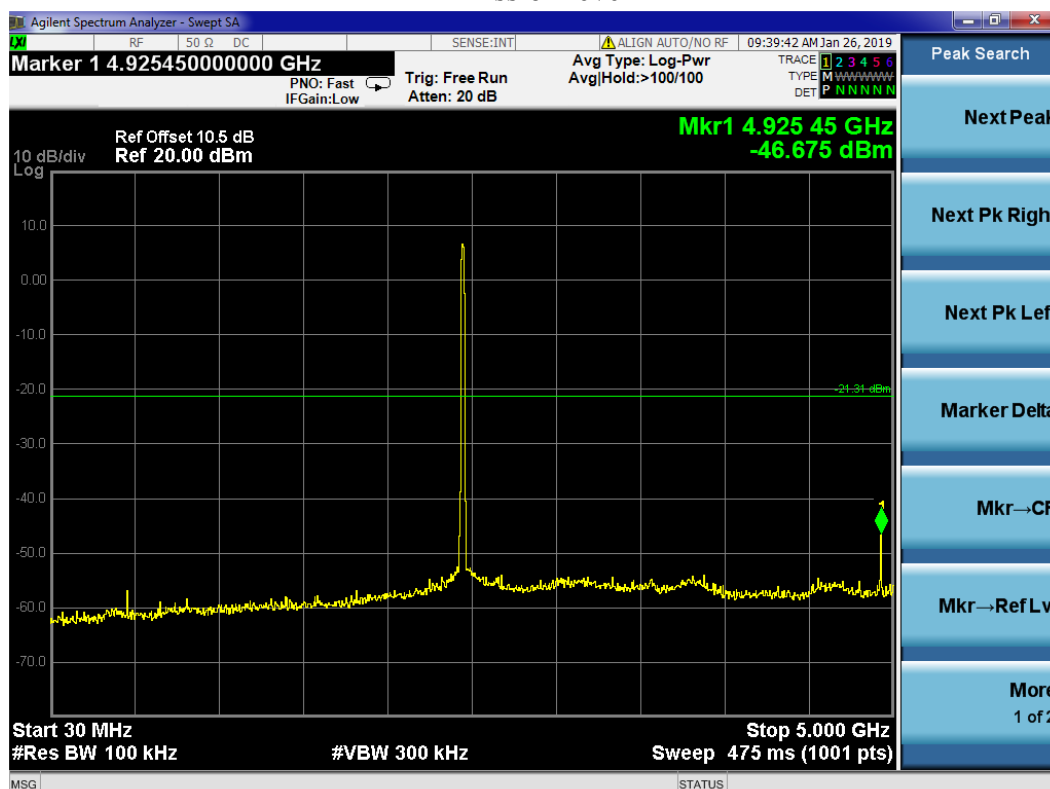


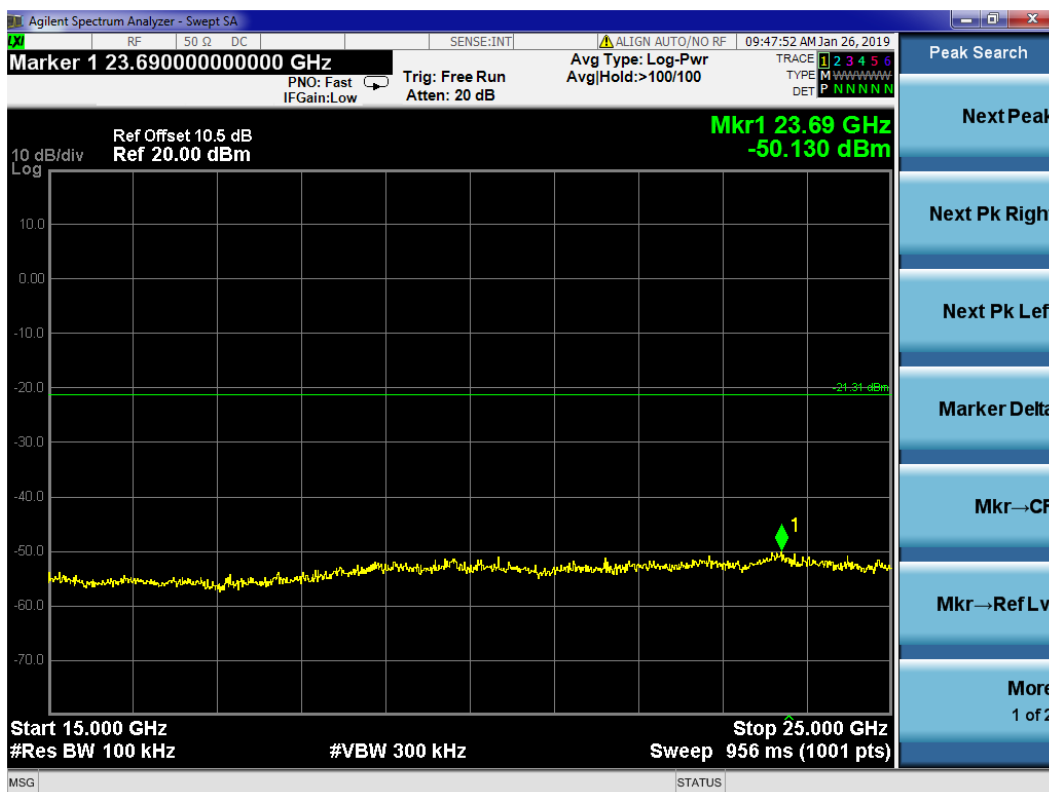
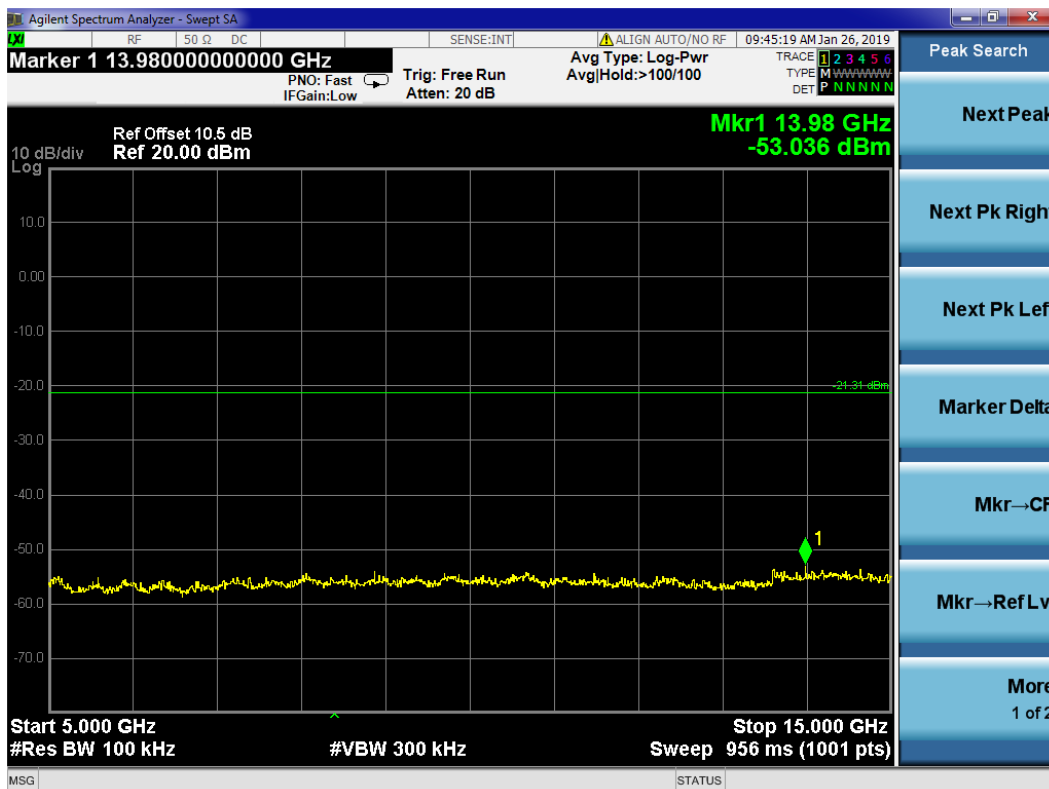
IEEE 802.11b: CH11 (2462 MHz)

Reference level



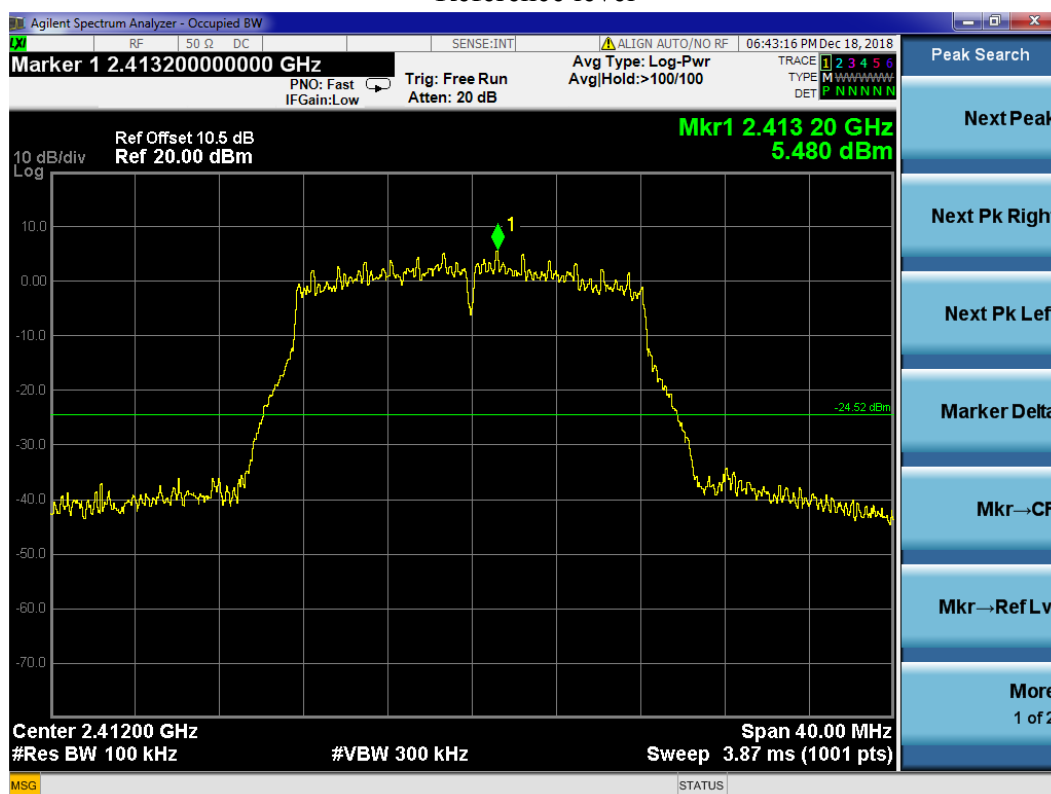
Emission level



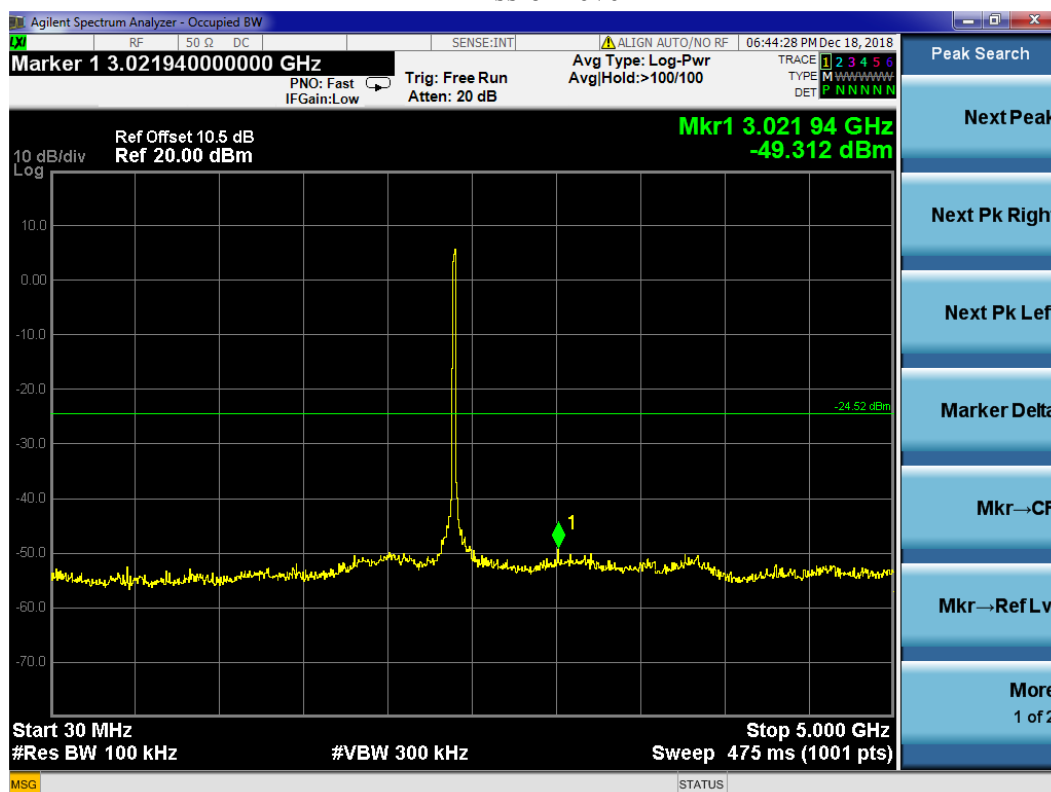


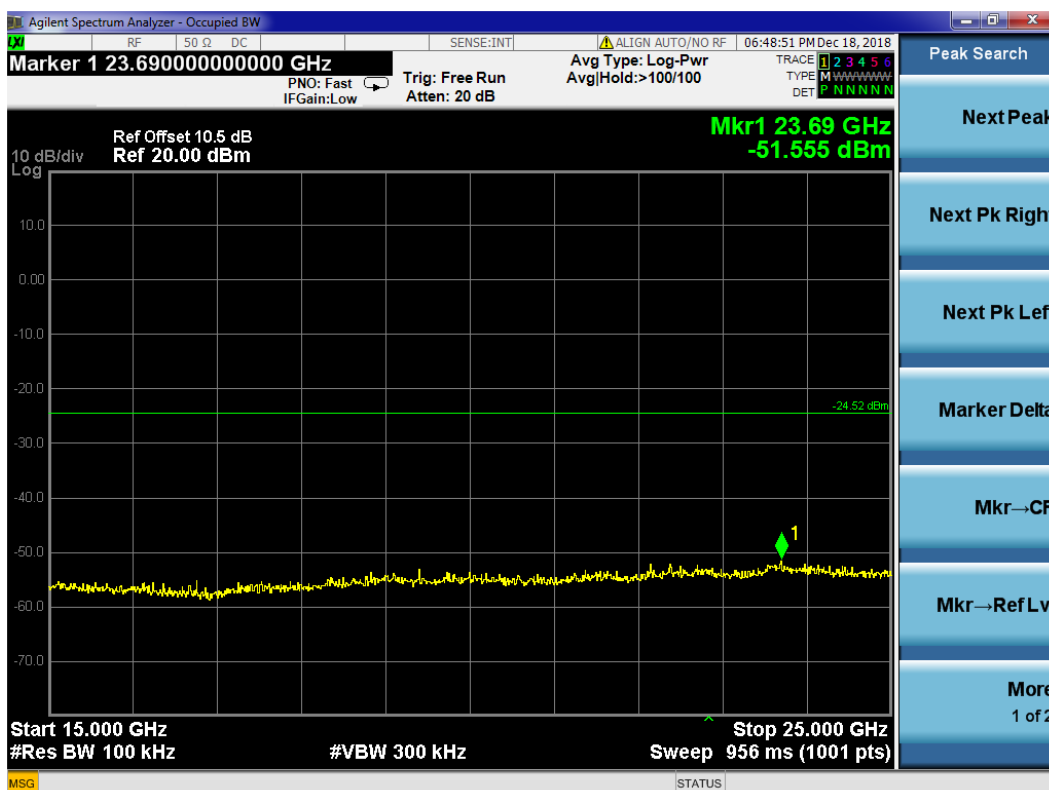
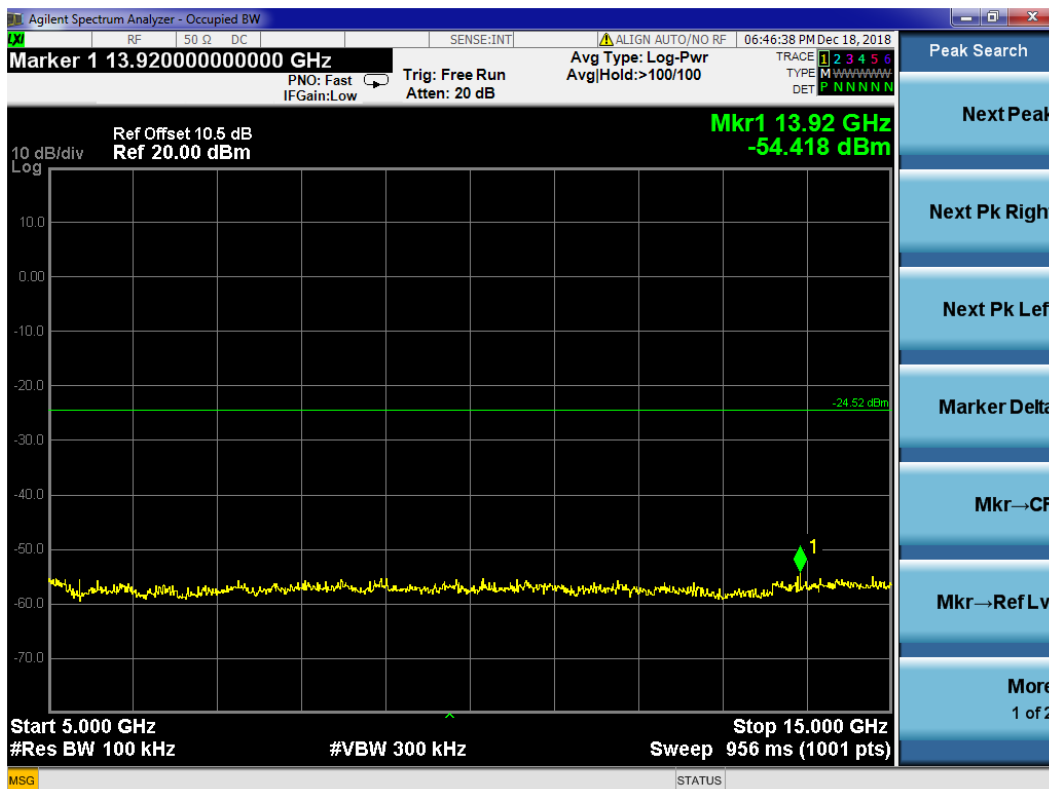
IEEE 802.11g: CH1 (2412 MHz)

Reference level



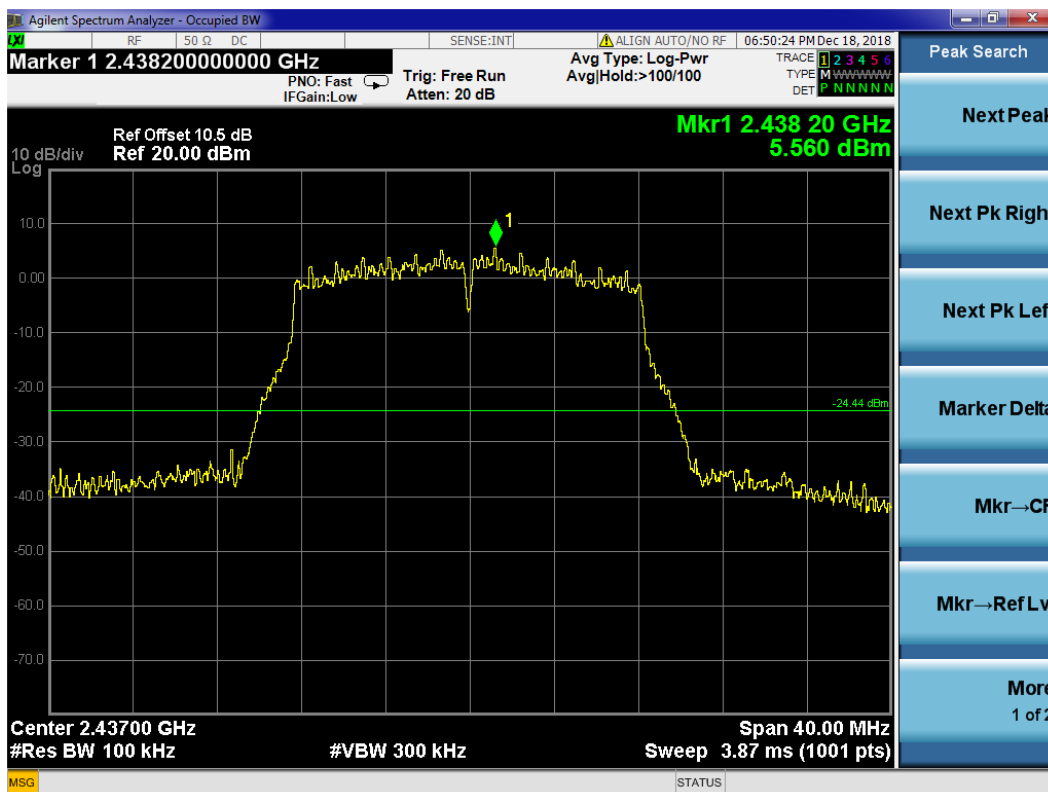
Emission level



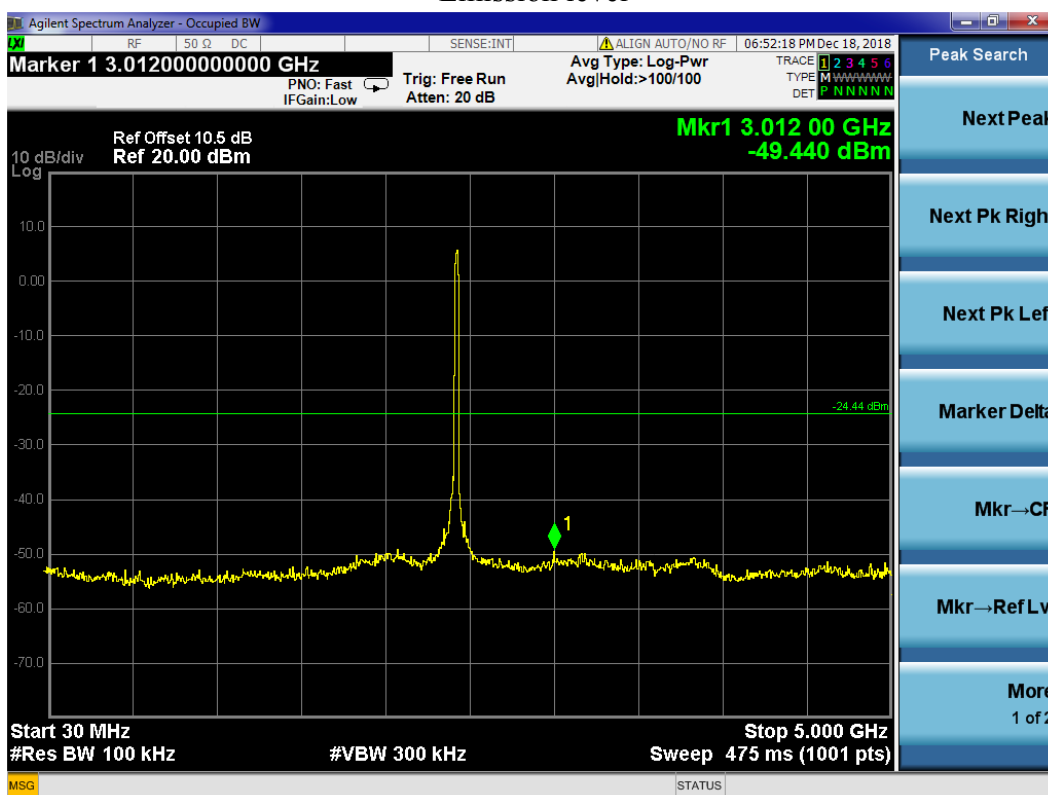


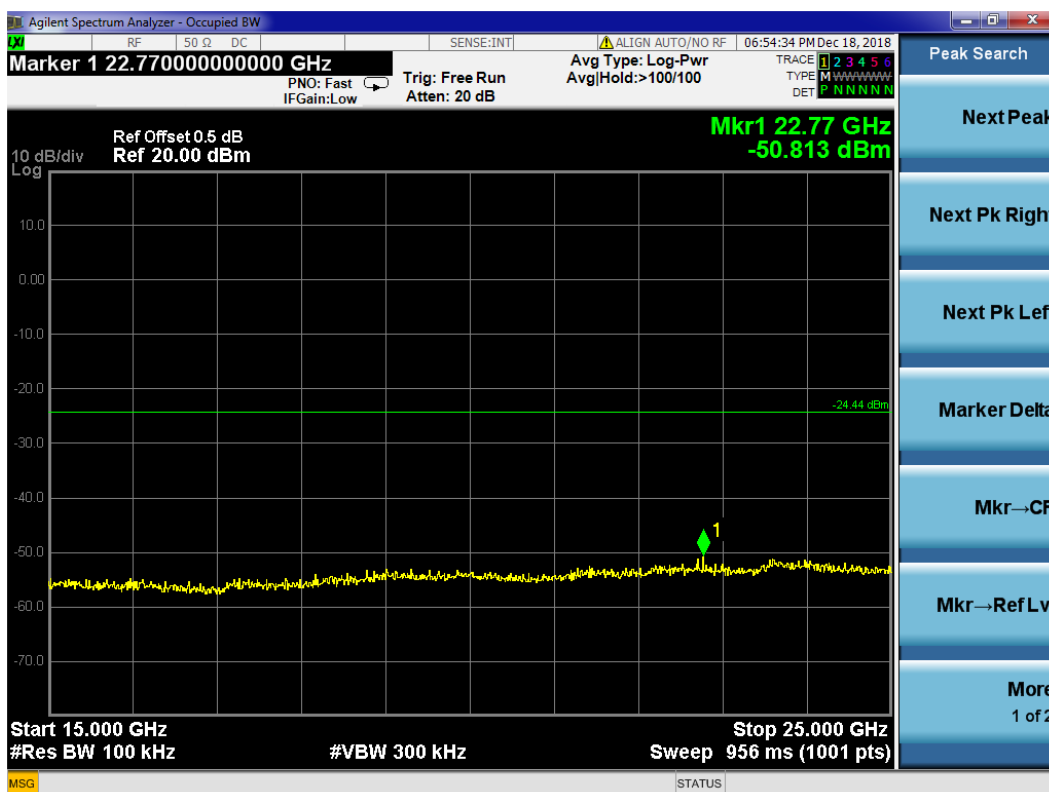
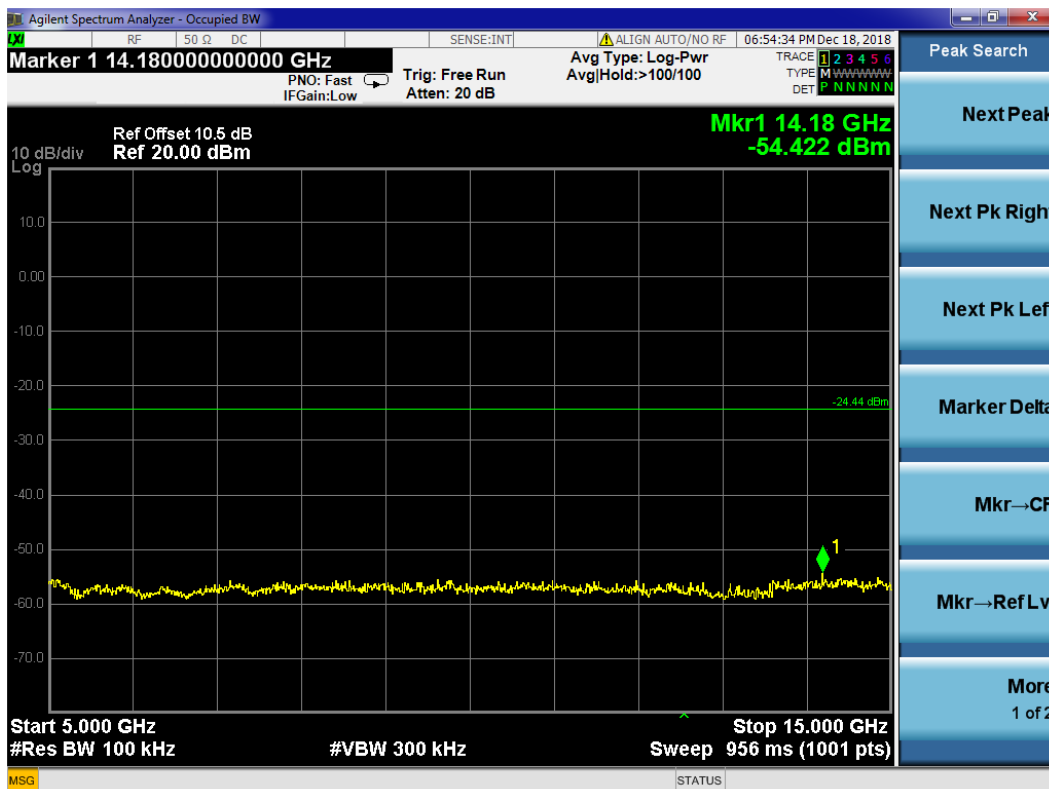
IEEE 802.11g: CH6 (2437 MHz)

Reference level



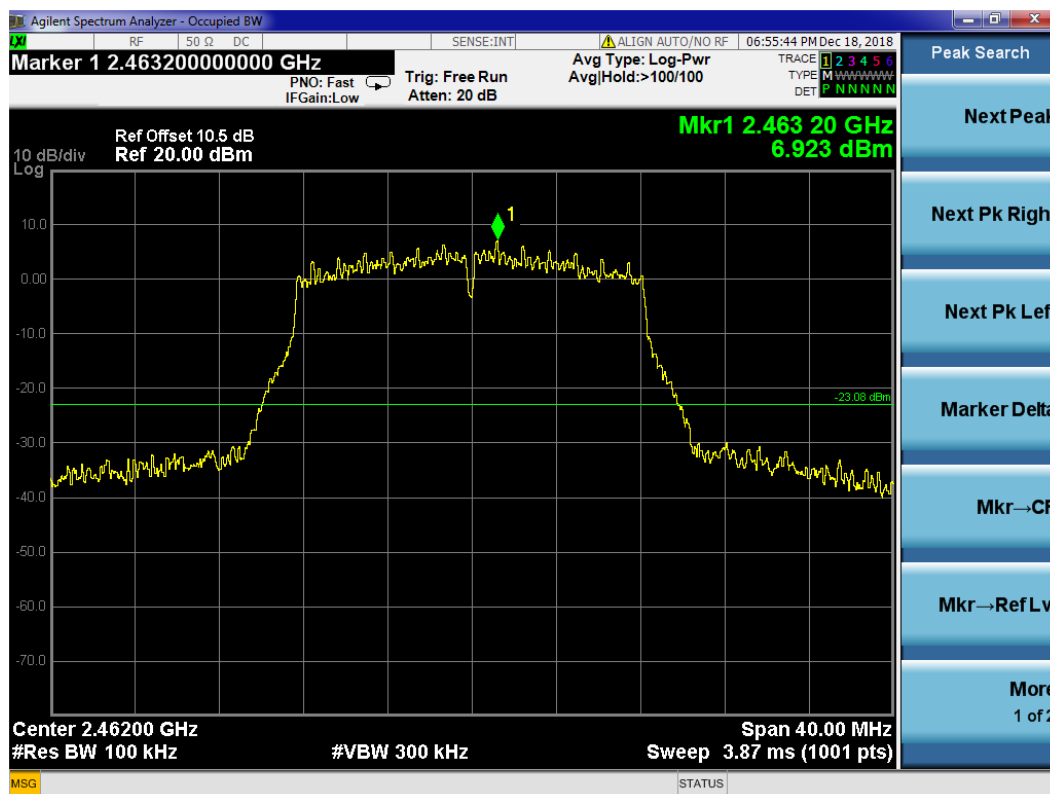
Emission level



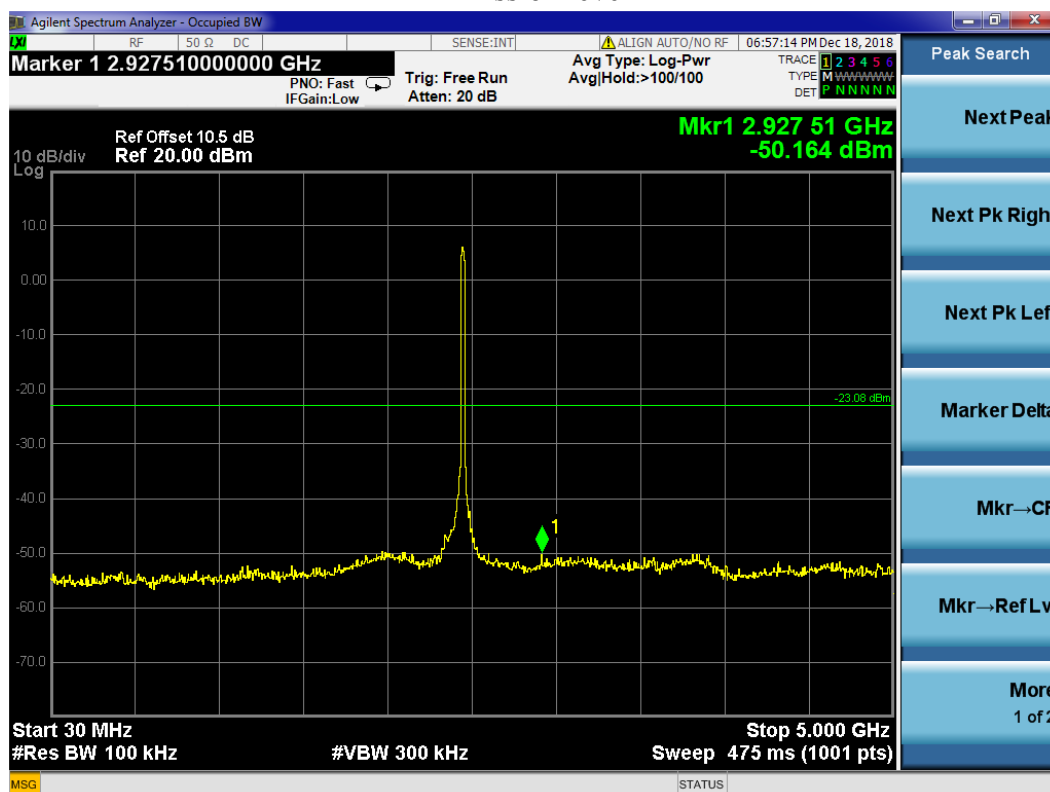


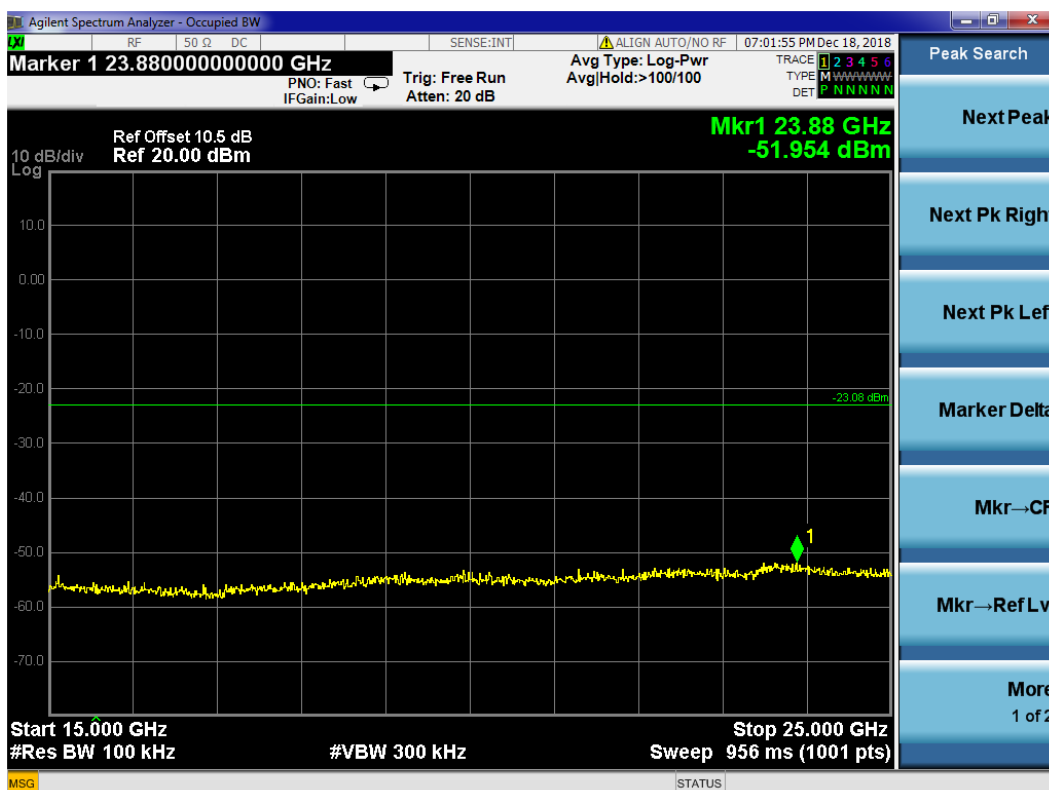
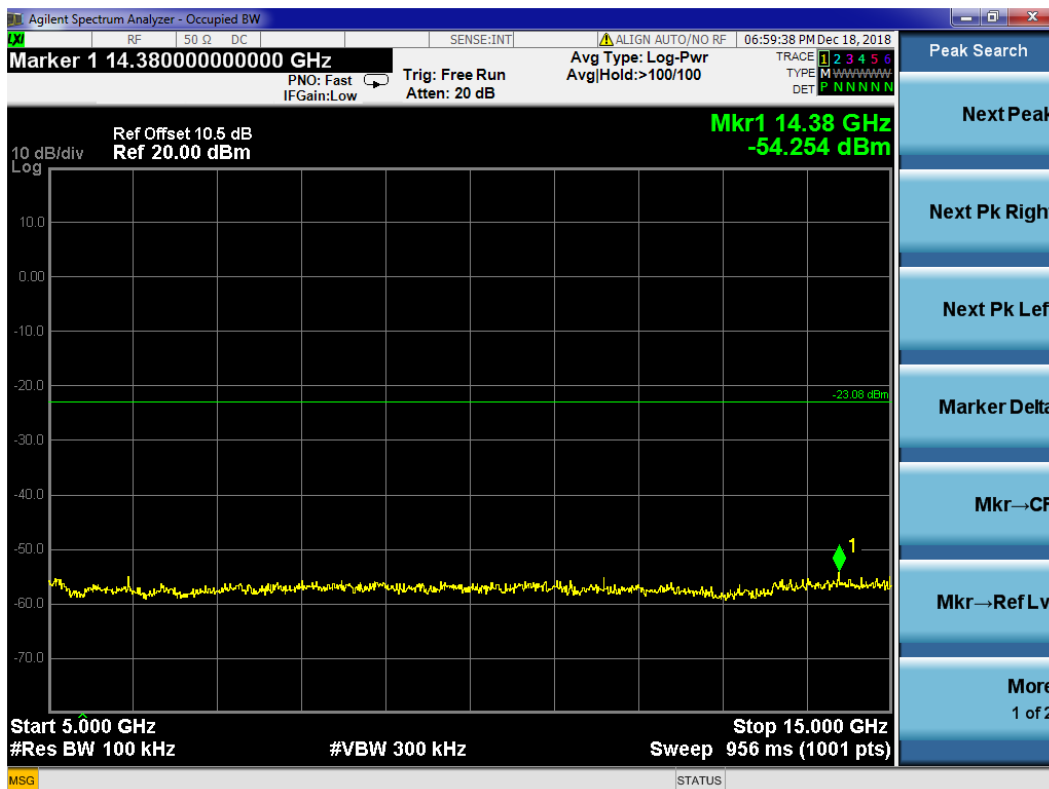
IEEE 802.11g: CH11 (2462 MHz)

Reference level



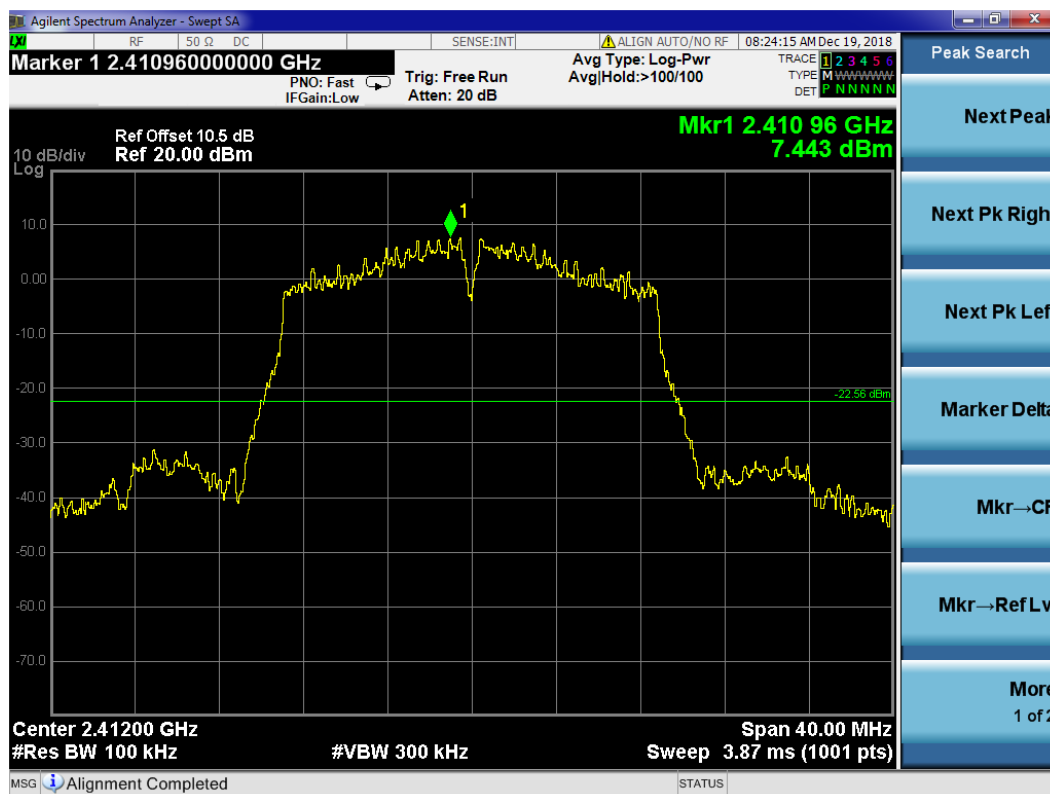
Emission level



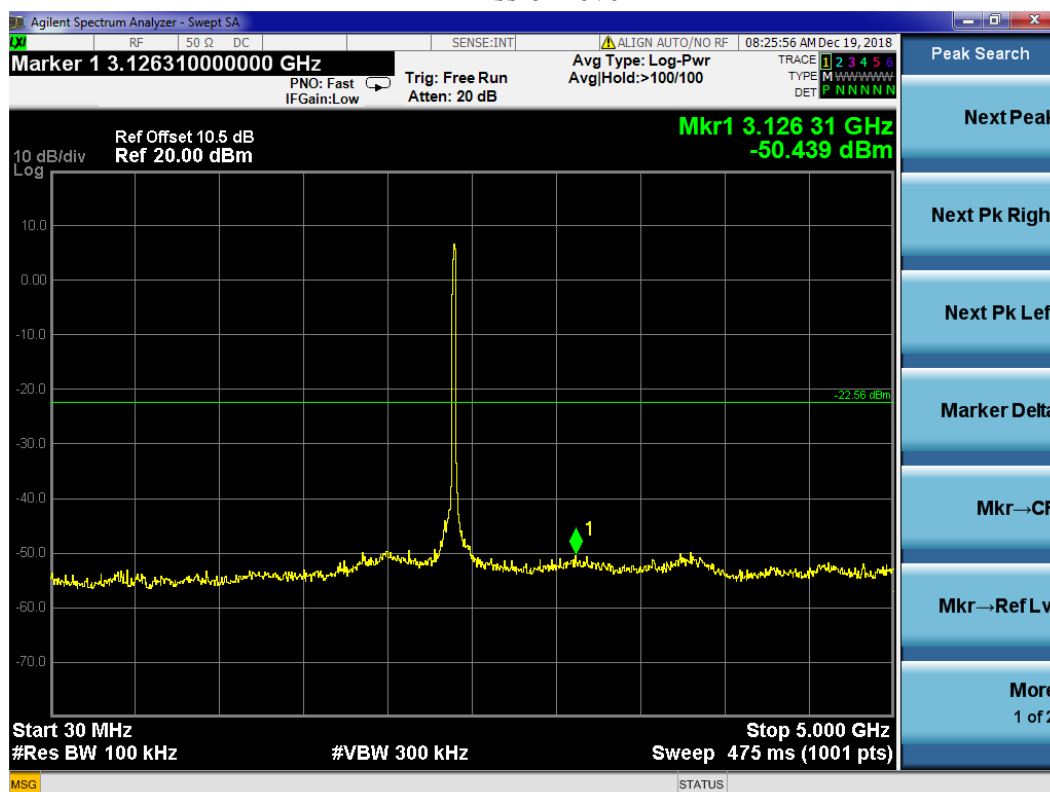


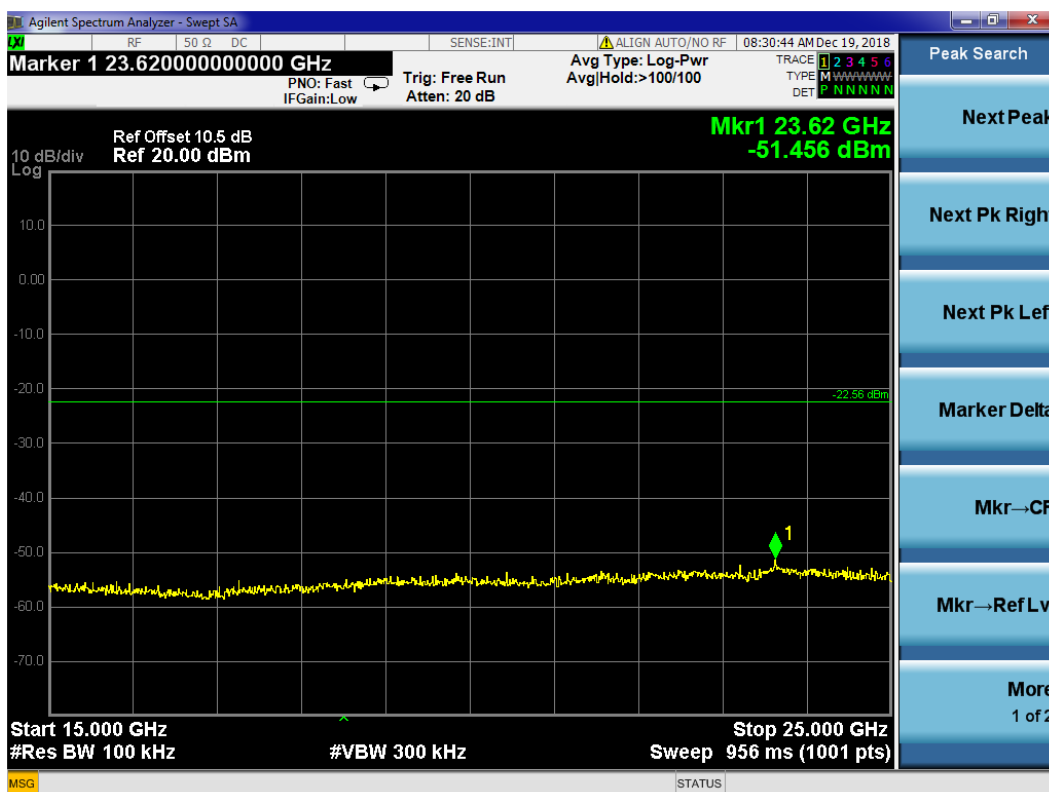
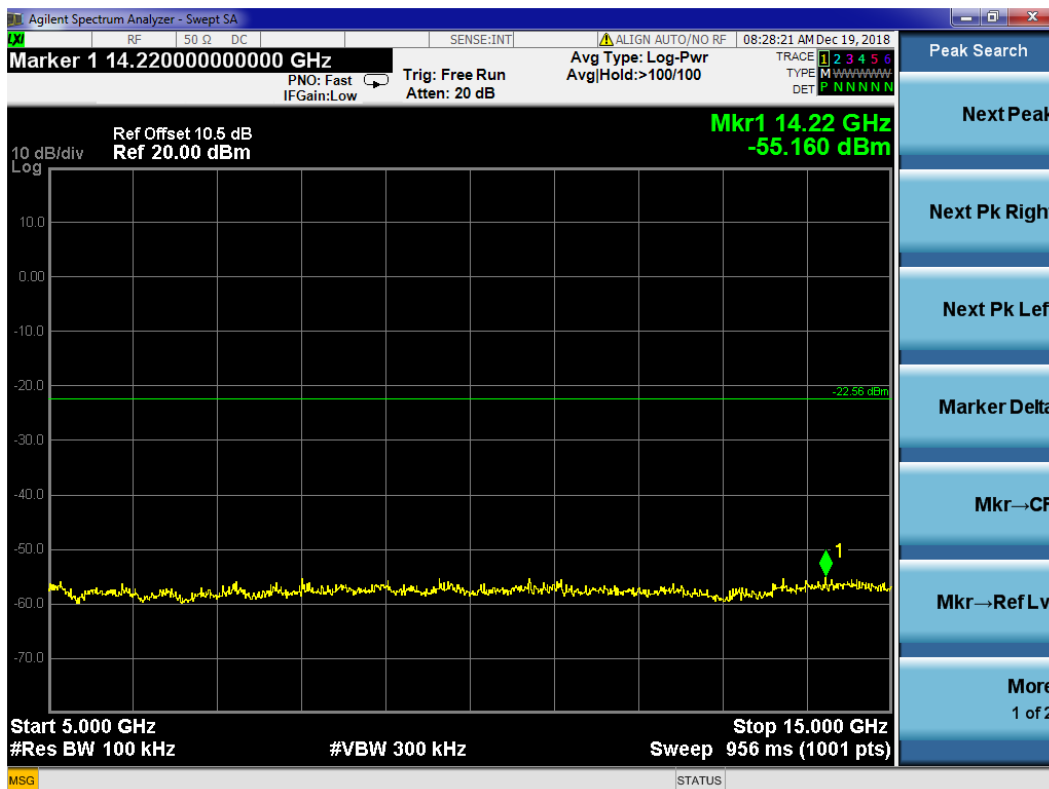
IEEE 802.11n HT20: CH1 (2412 MHz)

Reference level



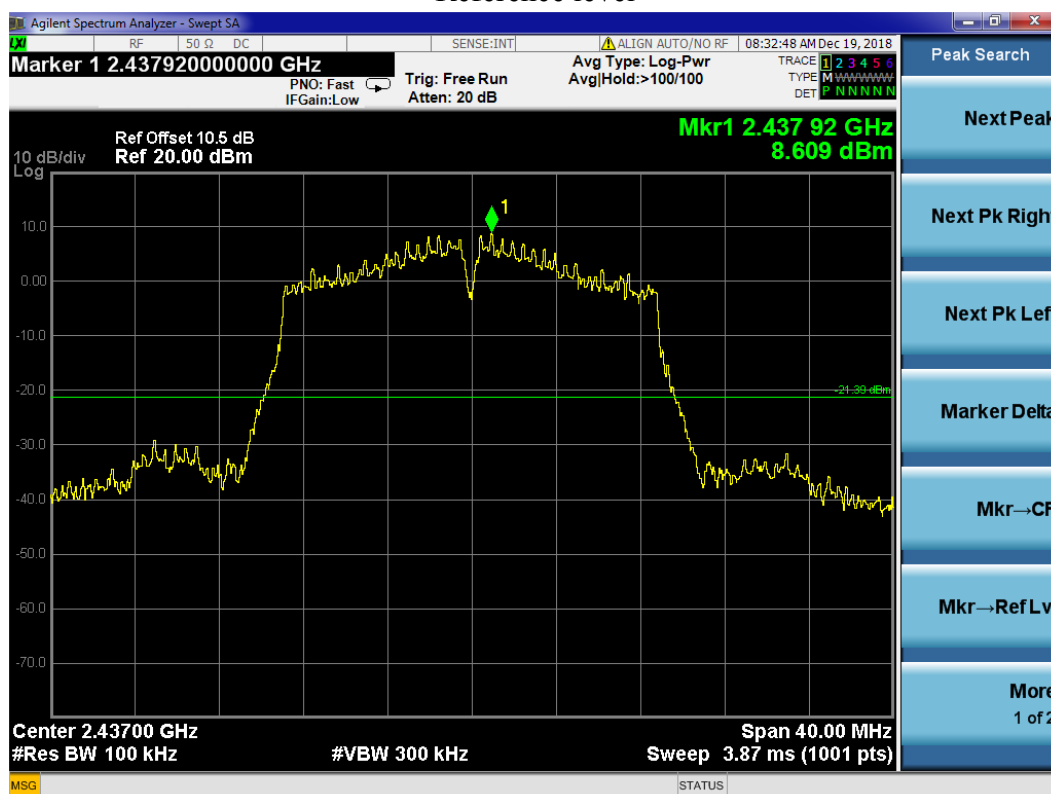
Emission level



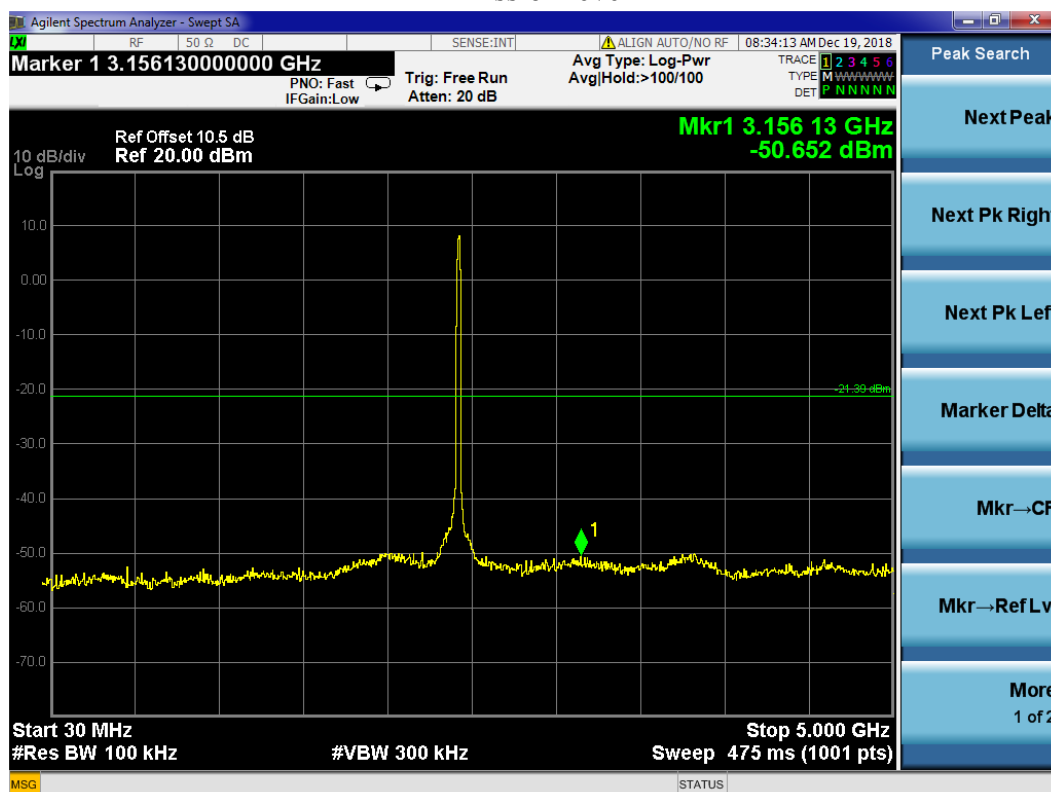


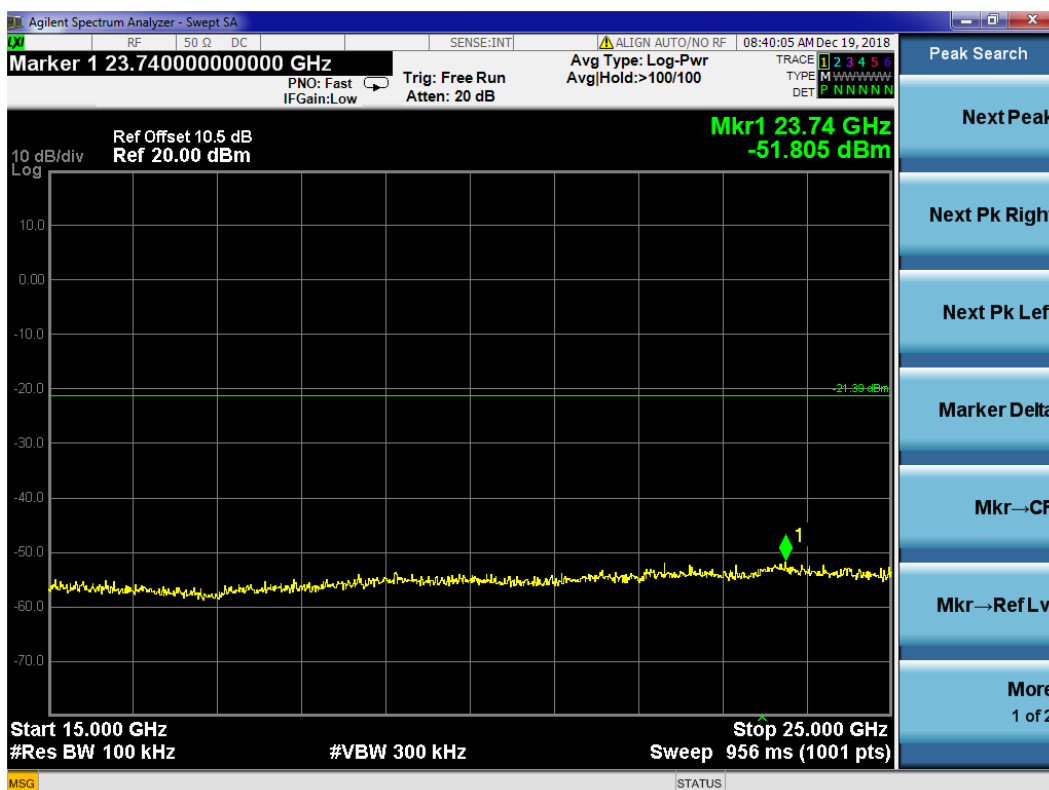
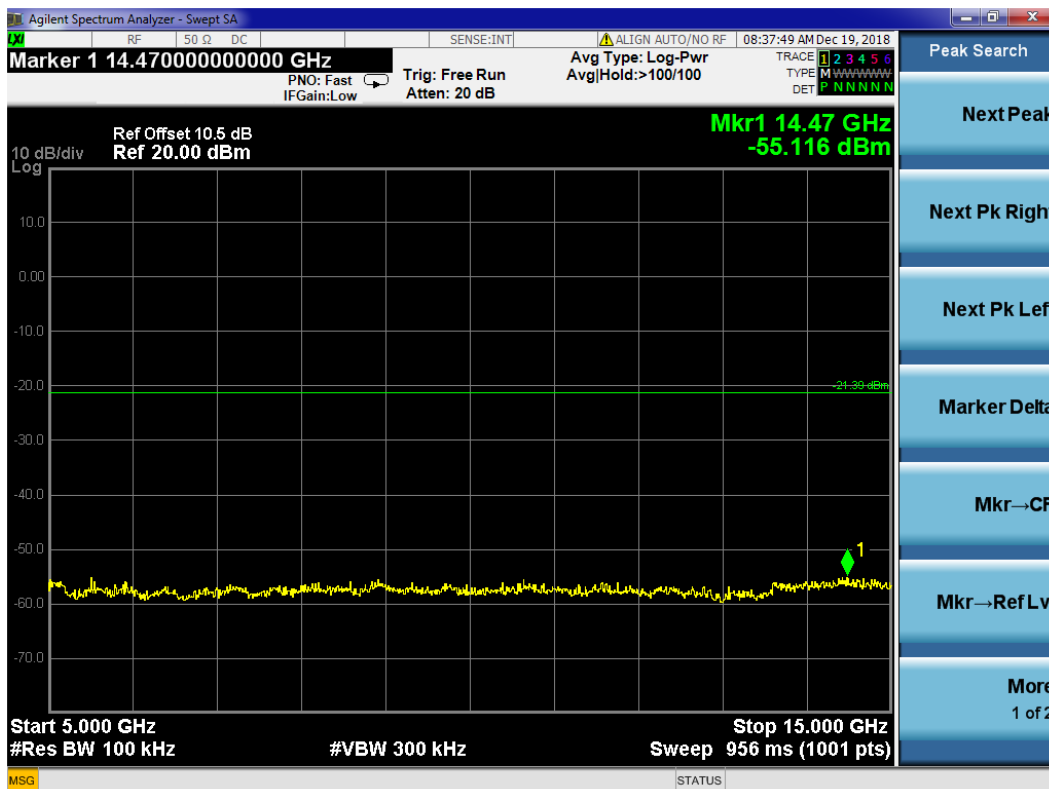
IEEE 802.11n HT20: CH6 (2437 MHz)

Reference level



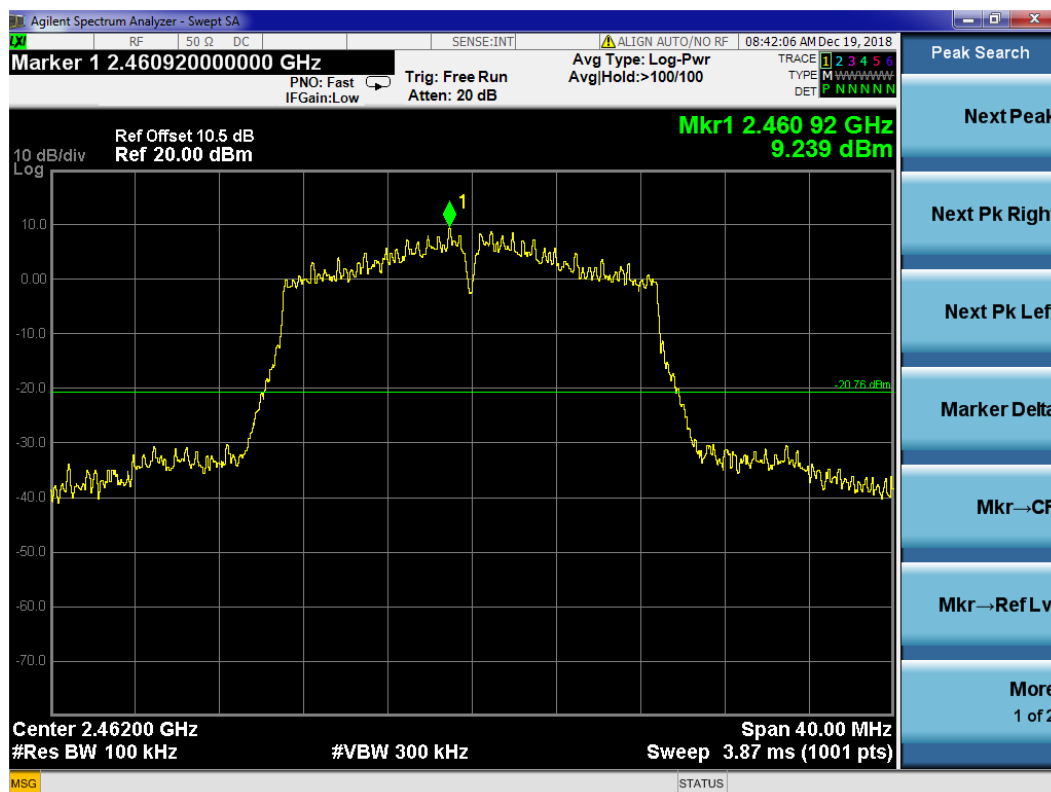
Emission level



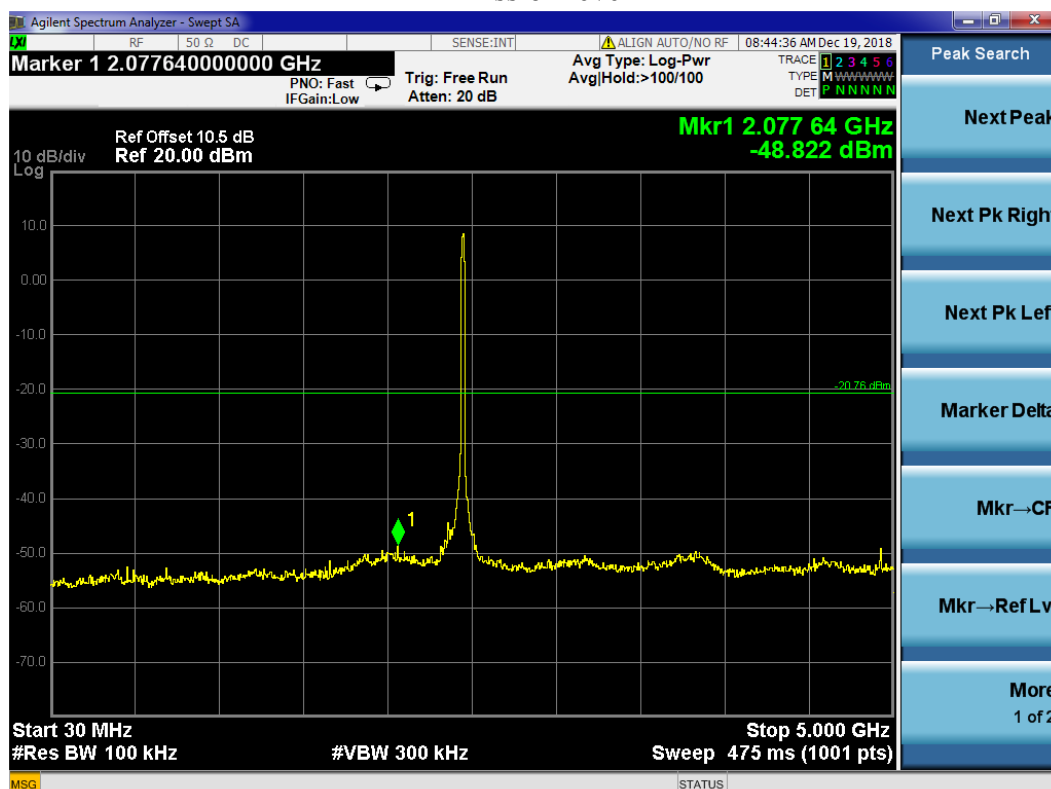


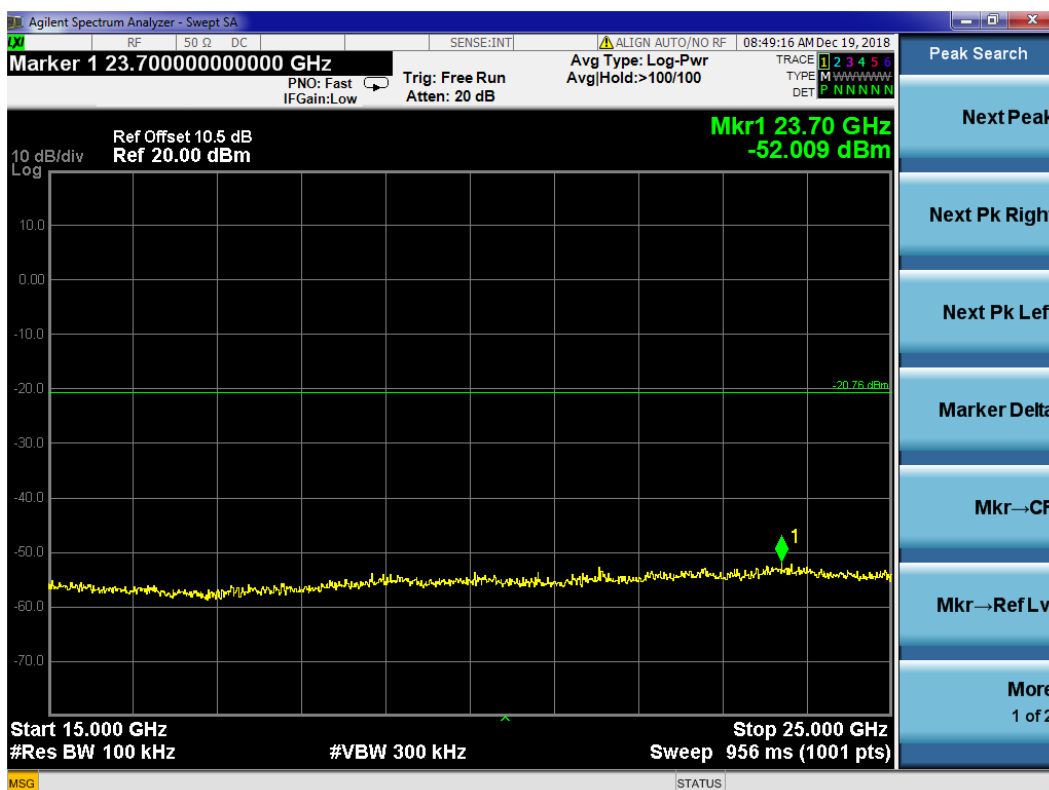
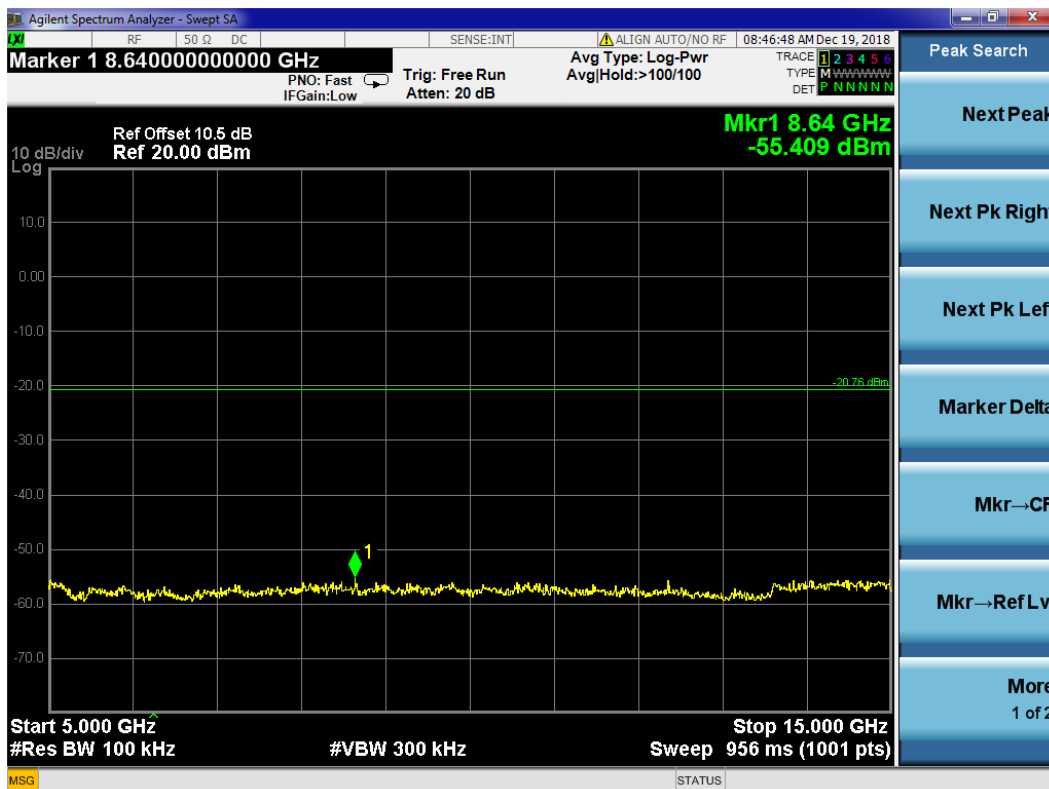
IEEE 802.11n HT20: CH11 (2462 MHz)

Reference level



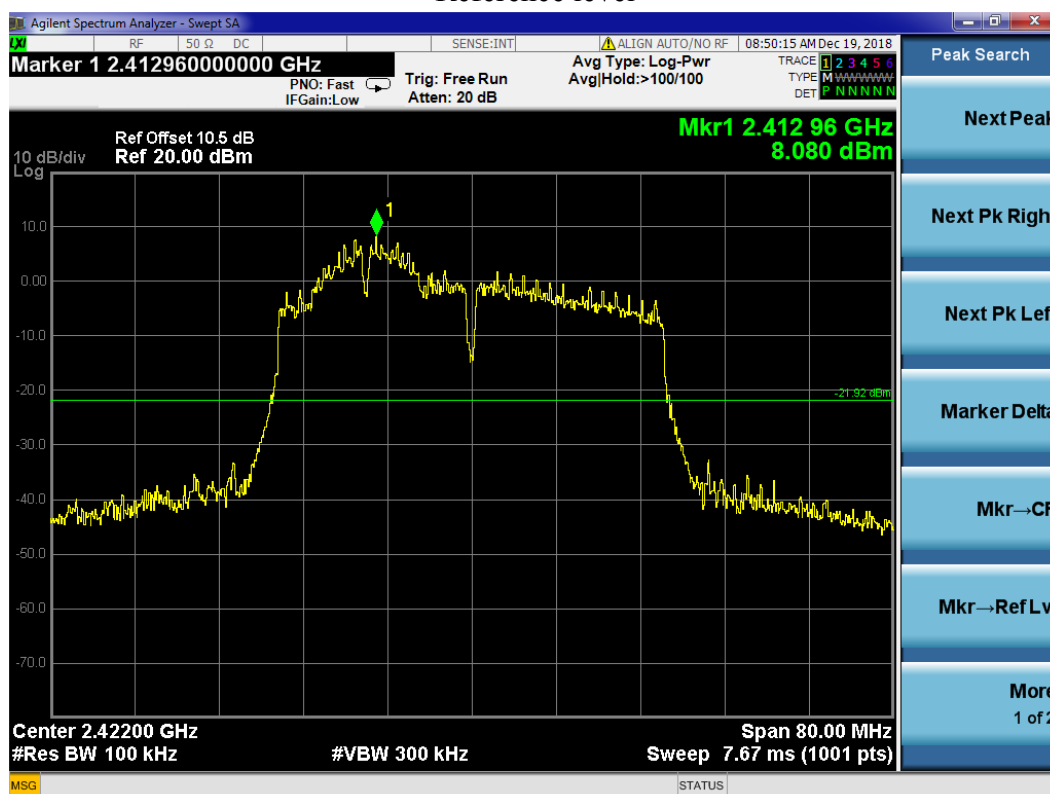
Emission level



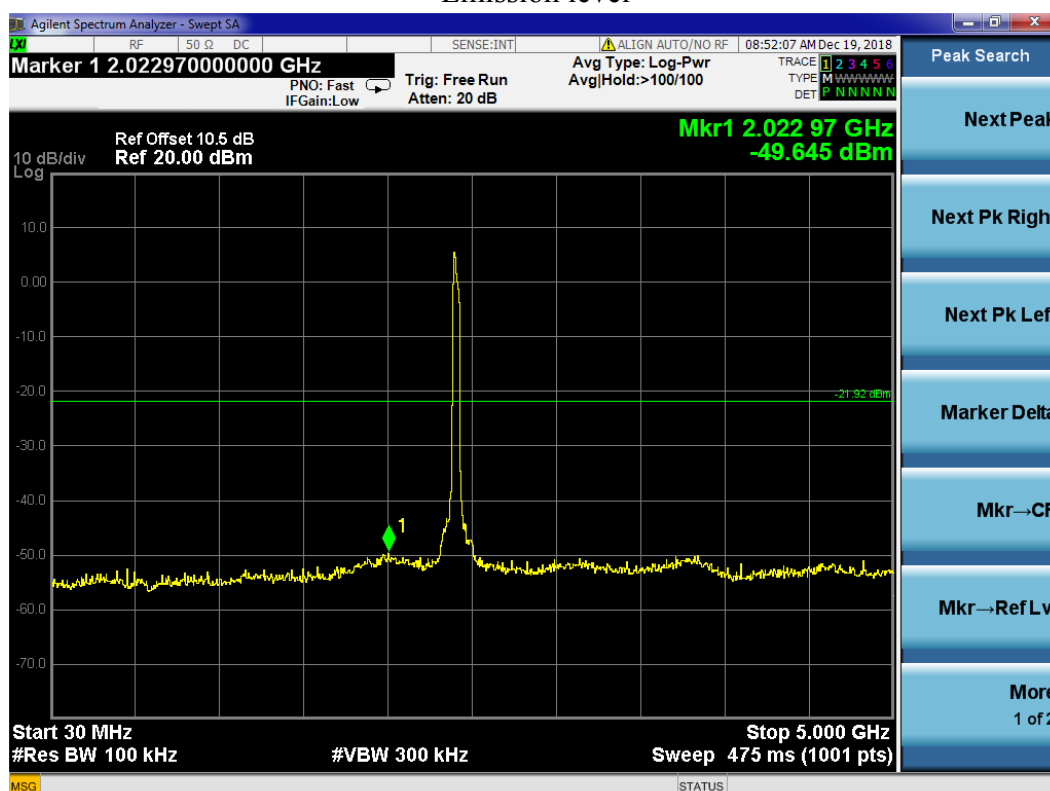


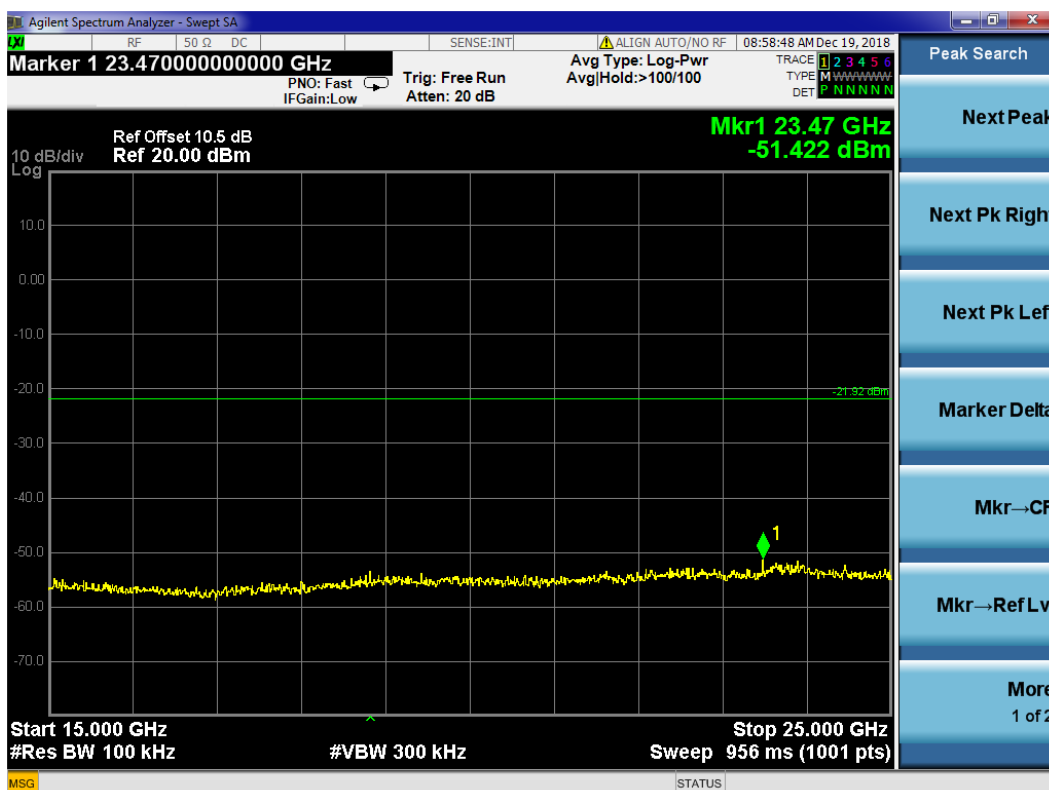
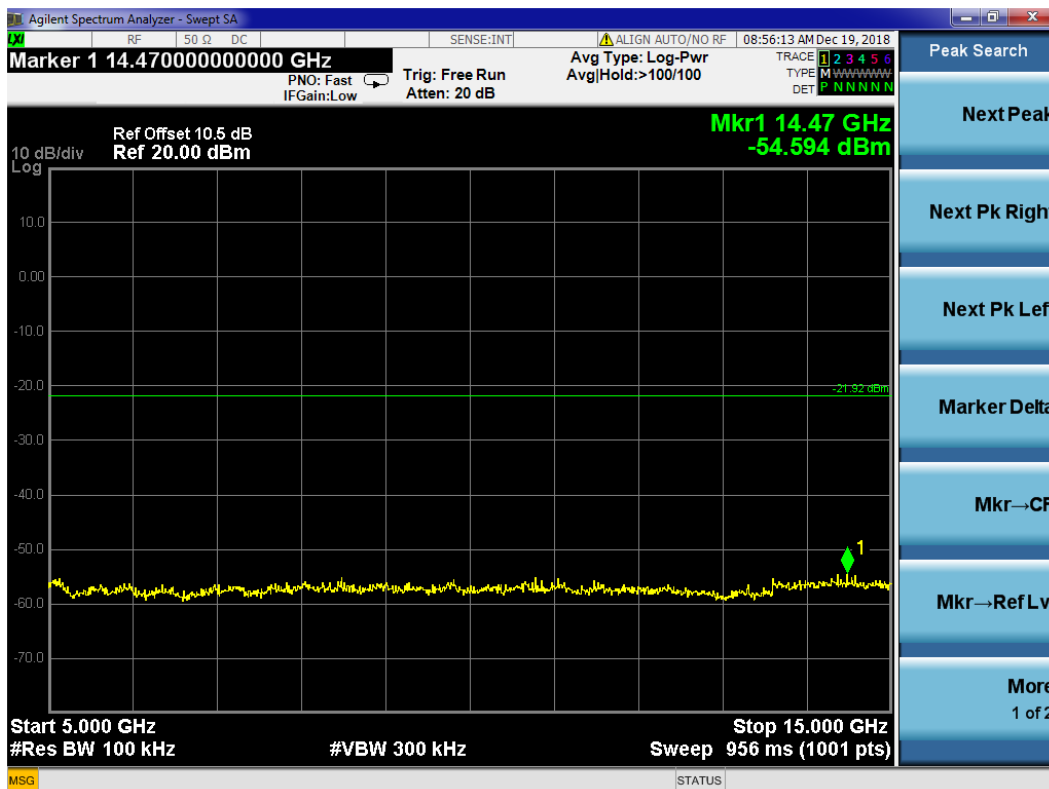
IEEE 802.11n HT40: CH3 (2422 MHz)

Reference level



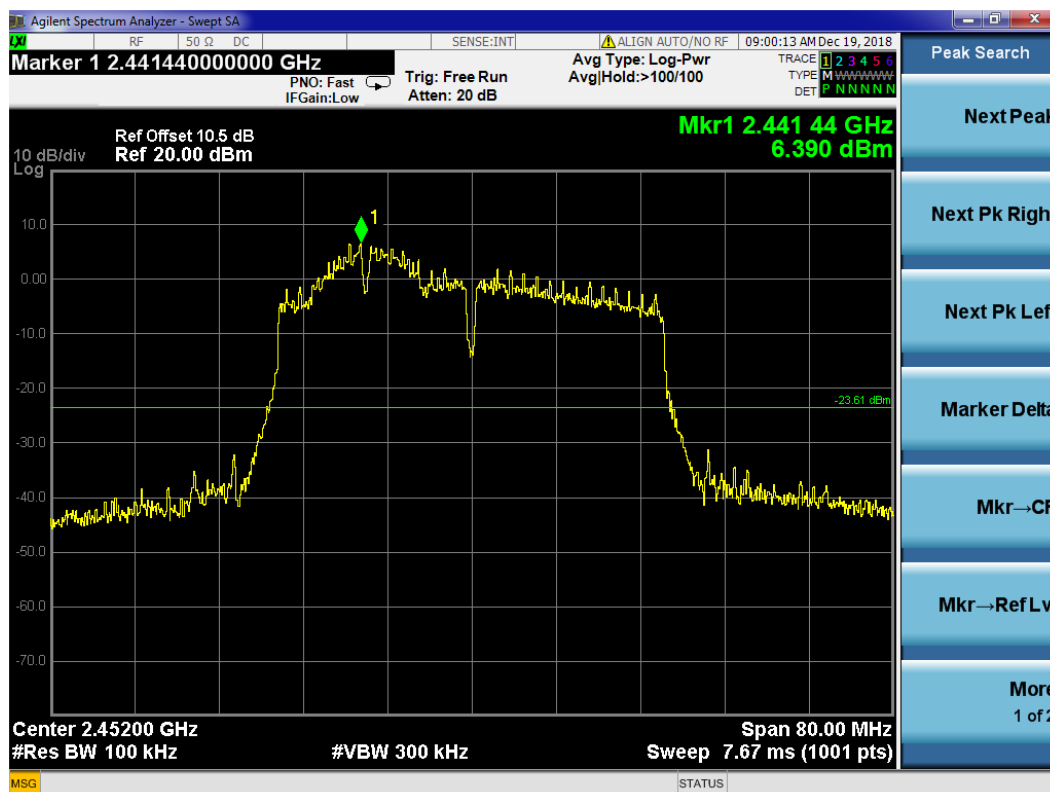
Emission level



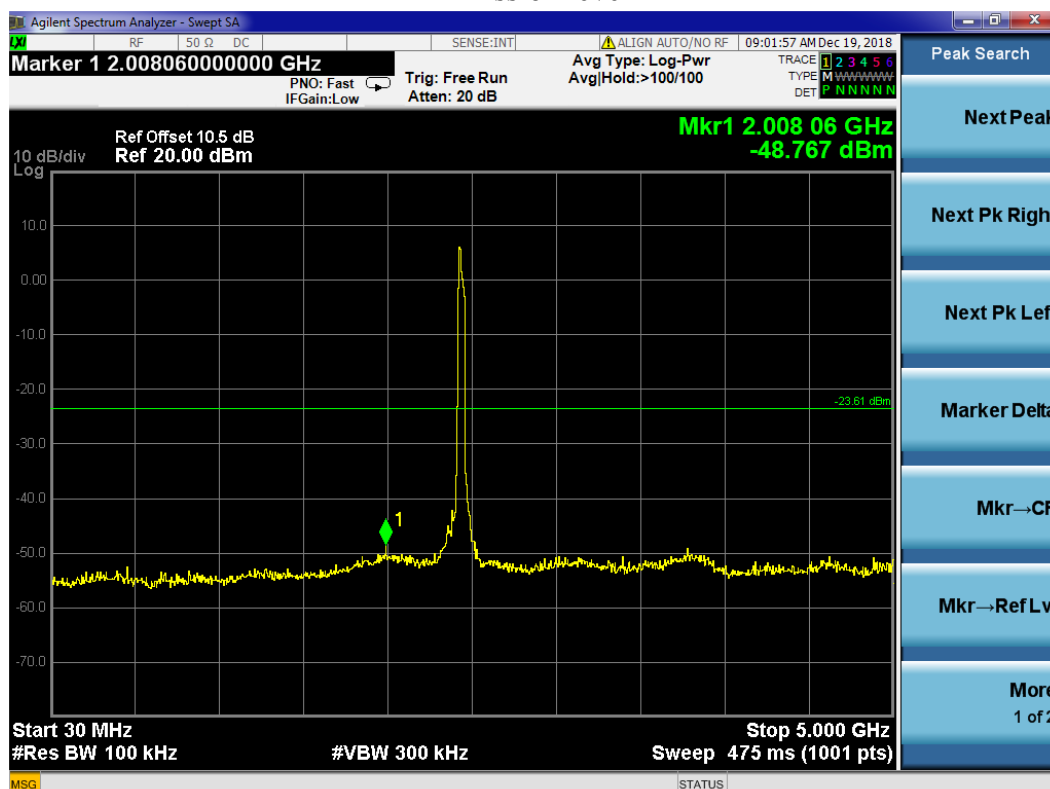


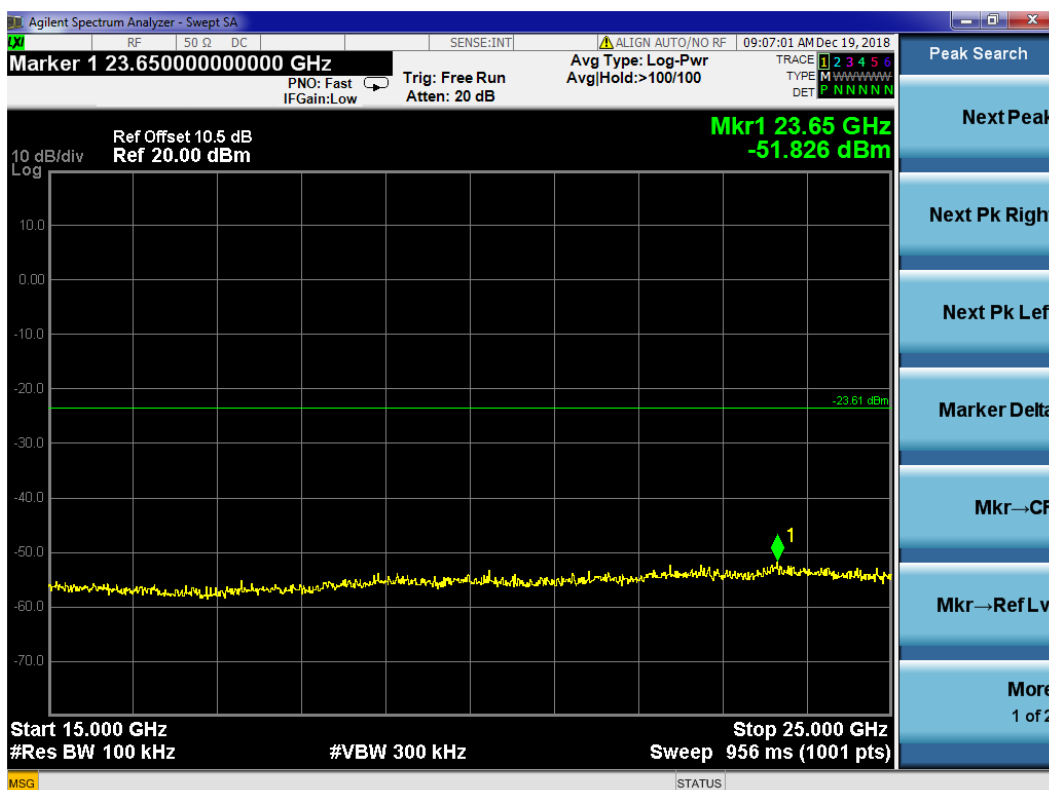
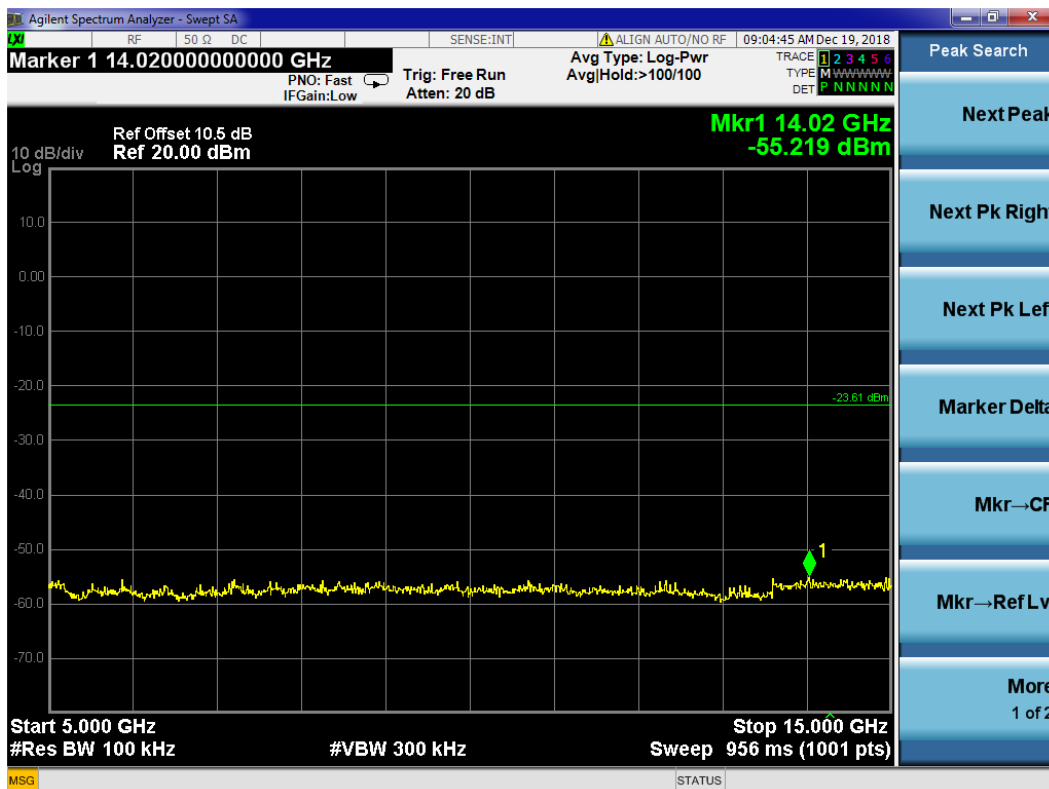
IEEE 802.11n HT40: CH9 (2452 MHz)

Reference level



Emission level





9 BAND EDGES MEASUREMENT

9.1 Test Equipment

The following test equipment was used during the band edges measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9030A	MY53120367	Jun 23, 2018	Jun 22, 2019

9.2 Block Diagram of Test Setup

The Same as section.4.2.

9.3 Specification Limits (§15.247(d))

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

9.4 Operating Condition of EUT

The switch ON/OFF was used to enable the EUT to change the channel one by one.

9.5 Test Procedure

The transmitter output was connected to the spectrum analyzer. Set RBW of Test Receiver to 100kHz and VBW to 300kHz with suitable frequency span including 100kHz bandwidth from band edge.

The test procedure is defined in ANSI C63.10-2013 (11.11.3 Emission level measurement was used).

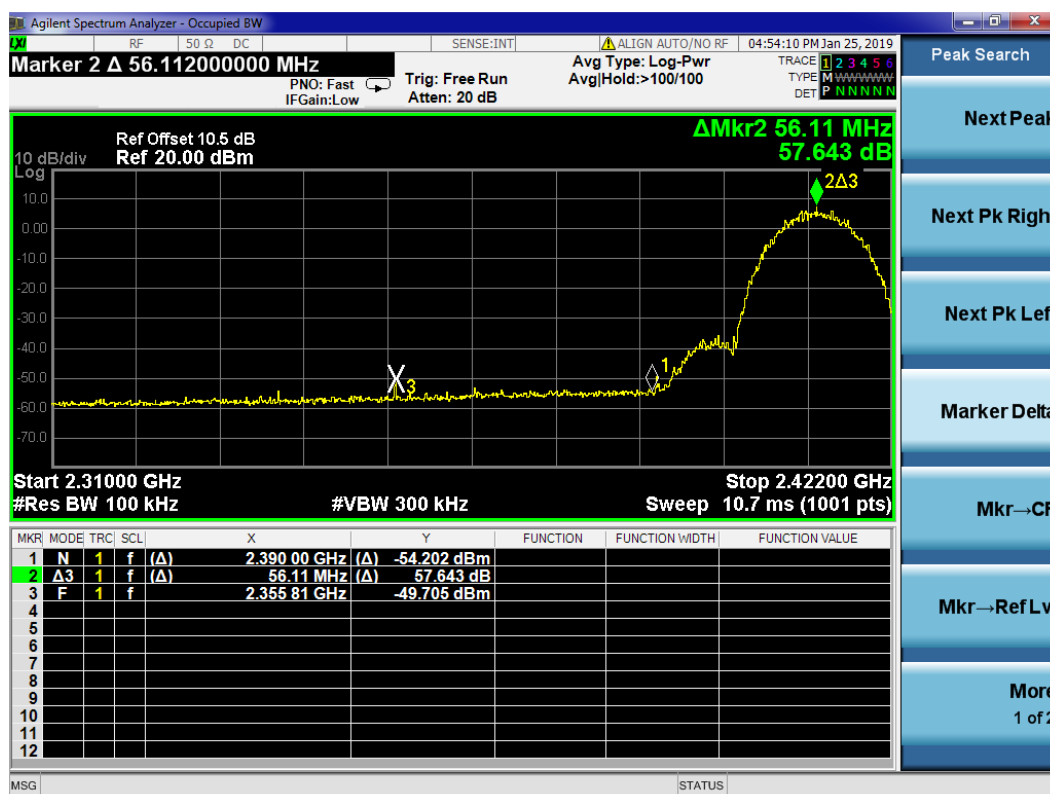
9.6 Test Results

PASSED. All the test results are attached in next pages.

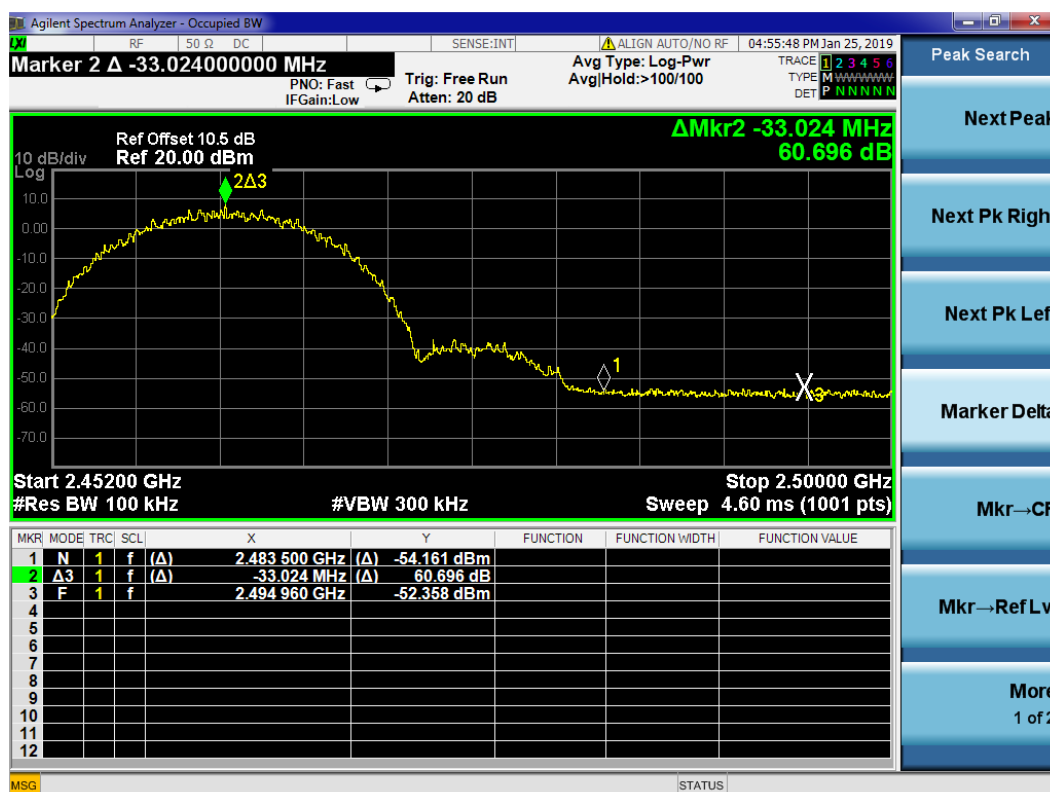
(Test Date: 2018.12.18; 2019.01.25 Temperature: 23°C Humidity: 51 %)

Modulation	Location	Channel	Frequency (MHz)	Delta Marker (dB)	Result
IEEE 802.11b	Below Band Edge	1	2412	57.643	More than 30 dB below the highest level of the desired power
	Upper Band Edge	11	2462	60.696	
IEEE 802.11g	Below Band Edge	1	2412	48.687	More than 30 dB below the highest level of the desired power
	Upper Band Edge	11	2462	48.328	
IEEE 802.11n HT20	Below Band Edge	1	2412	48.681	More than 30 dB below the highest level of the desired power
	Upper Band Edge	11	2462	46.722	
IEEE 802.11n HT40	Below Band Edge	3	2422	47.735	More than 30 dB below the highest level of the desired power
	Upper Band Edge	9	2452	38.182	

IEEE 802.11b: CH1 2412MHz (Below Edge 2390 MHz)



IEEE 802.11b: CH11 2462MHz (Upper Edge 2483.5 MHz)



IEEE 802.11g: CH1 2412MHz (Below Edge 2390 MHz)



IEEE 802.11g: CH11 2462MHz (Upper Edge 2483.5 MHz)



IEEE 802.11n HT20: CH1 2412MHz (Below Edge 2390 MHz)



IEEE 802.11 n HT20: CH11 2462MHz (Upper Edge 2483.5 MHz)



IEEE 802.11n HT40: CH3 2422MHz (Below Edge 2390 MHz)



IEEE 802.11 n HT40: CH9 2452MHz (Upper Edge 2483.5 MHz)



10 POWER SPECTRAL DENSITY MEASUREMENT

10.1 Test Equipment

The following test equipment was used during the power spectral density measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9030A	MY53120367	Jun 23, 2018	Jun 22, 2019

10.2 Block Diagram of Test Setup

The Same as section 4.2.

10.3 Specification Limits (§15.247(e))

The peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band.

10.4 Operating Condition of EUT

The switch ON/OFF was used to enable the EUT to change the channel one by one.

10.5 Test Procedure

The following procedure may be used when the maximum (average) conducted output power was used to determine compliance to the fundamental output power limit.

- a) Set instrument center frequency to DTS channel center frequency.
- b) Set span to at least 1.5 times the OBW.
- c) Set RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- d) Set VBW $\geq [3 \times \text{RBW}]$.
- e) Detector = power averaging (rms) or sample detector (when rms not available).
- f) Ensure that the number of measurement points in the sweep $\geq [2 \times \text{span} / \text{RBW}]$.
- g) Sweep time = auto couple.
- h) Employ trace averaging (rms) mode over a minimum of 100 traces.
- i) Use the peak marker function to determine the maximum amplitude level.
- j) If the measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span to meet the minimum measurement point requirement as the RBW is reduced).

The test procedure is defined in ANSI C63.10-2013 (11.10.3 Measurement Procedure “ Method AVGPSD-1” was used).

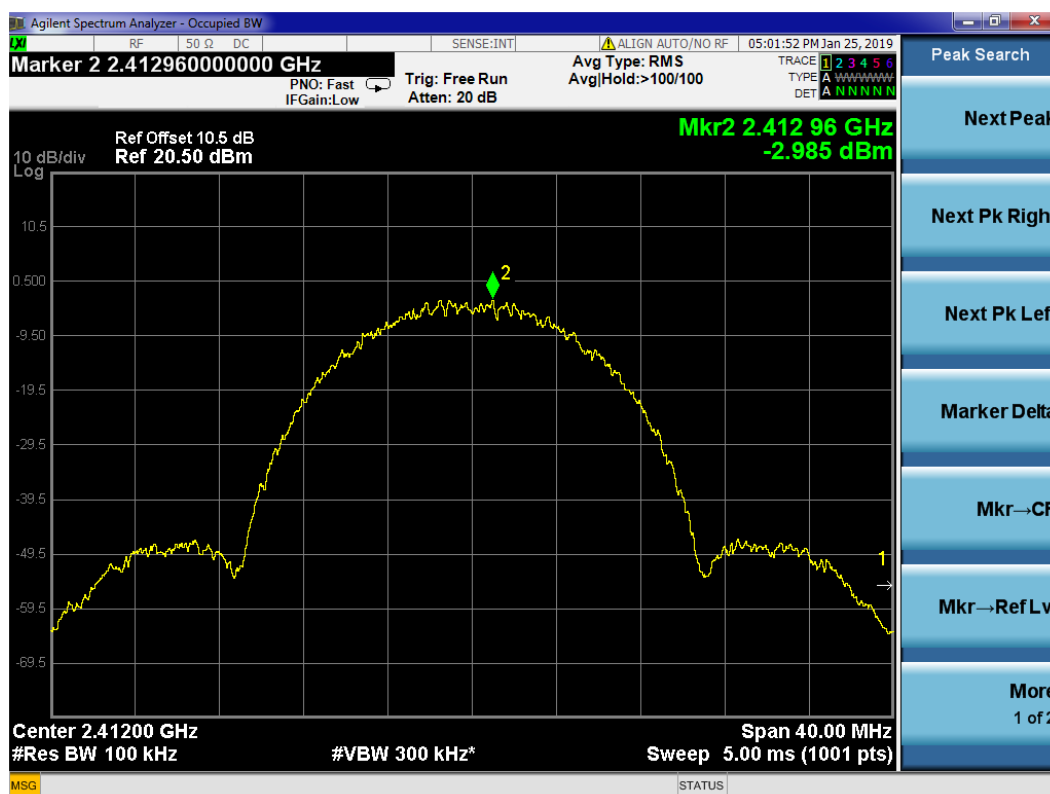
10.6 Test Results

PASSED. All the test results are attached in next pages.

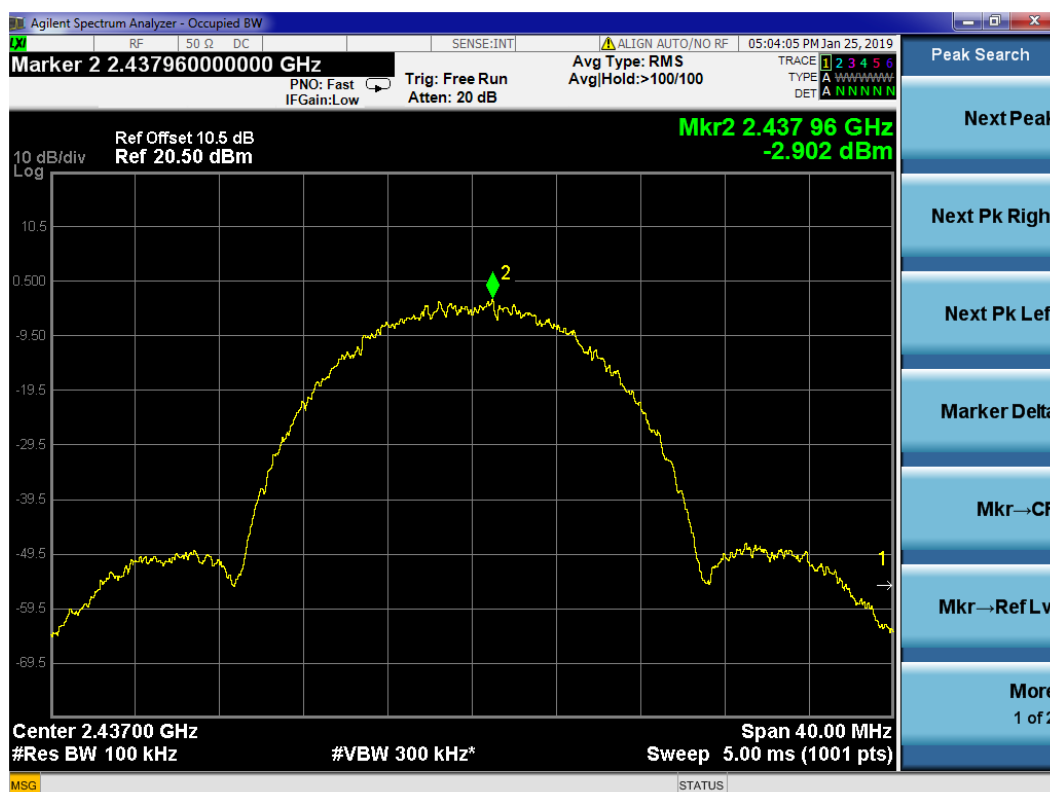
(Test Date: 2018.12.18; 2019.01.25 Temperature: 23°C Humidity: 51 %)

Modulation	Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limit
IEEE 802.11b	1	2412	-2.985	8 dBm
	6	2437	-2.902	8 dBm
	11	2462	-2.000	8 dBm
IEEE 802.11g	1	2412	-5.354	8 dBm
	6	2437	-6.101	8 dBm
	11	2462	-5.445	8 dBm
IEEE 802.11n HT20	1	2412	-5.483	8 dBm
	6	2437	-5.971	8 dBm
	11	2462	-4.917	8 dBm
IEEE 802.11n HT40	3	2422	-10.568	8 dBm
	9	2452	-10.123	8 dBm

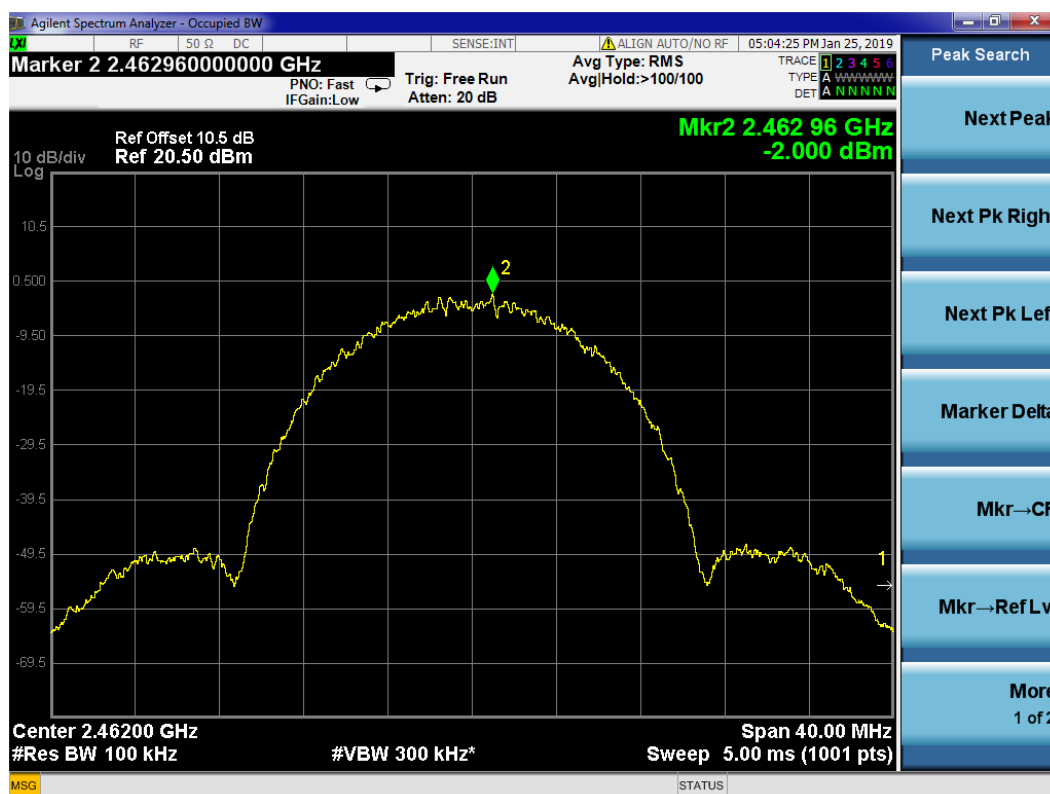
IEEE 802.11b: CH1 2412 MHz



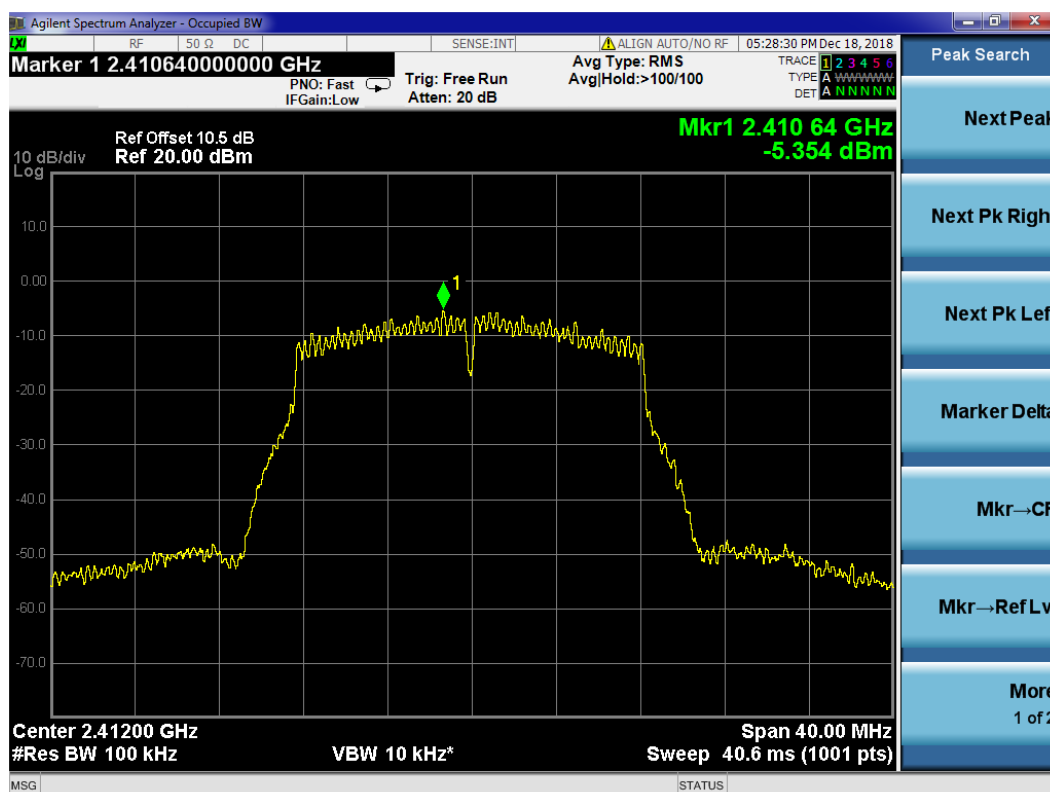
IEEE 802.11b: CH6 2437 MHz



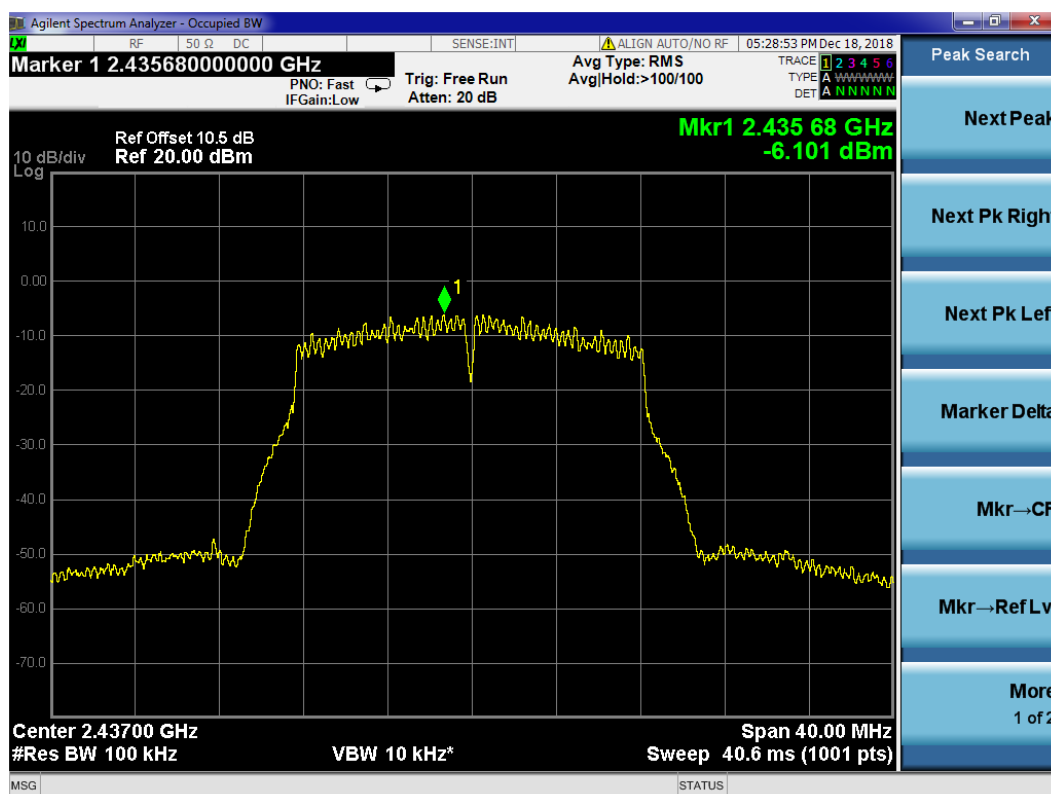
IEEE 802.11b: CH11 2462 MHz



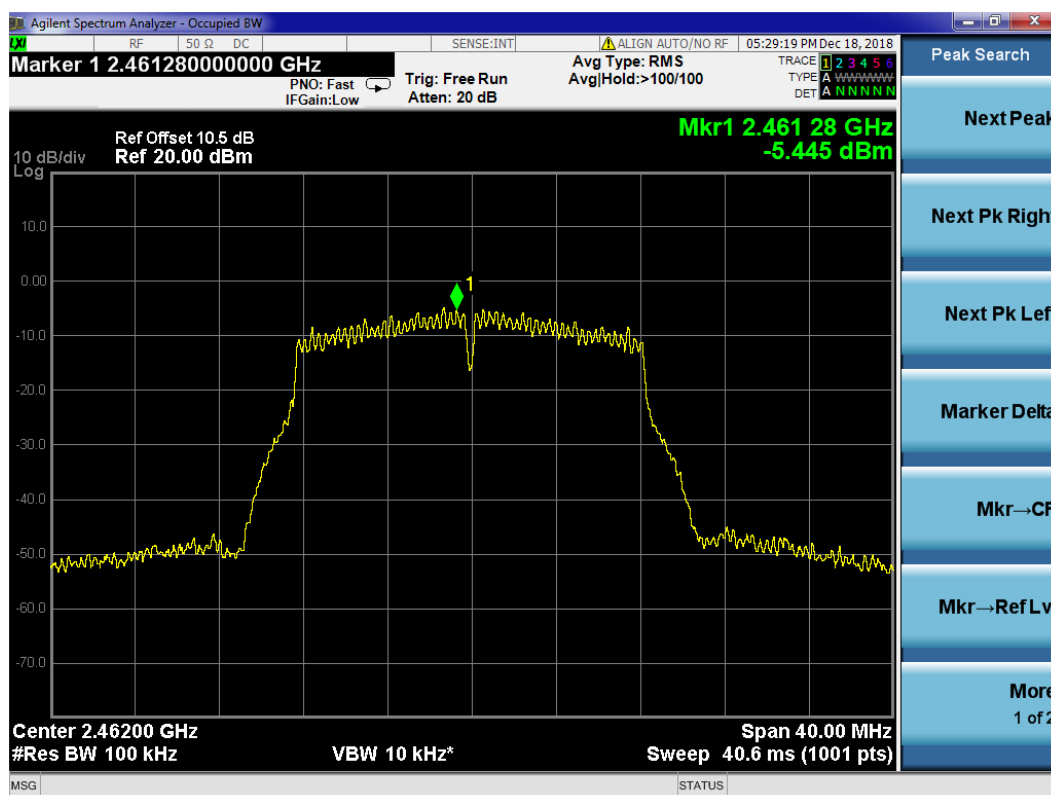
IEEE 802.11g: CH1 2412 MHz



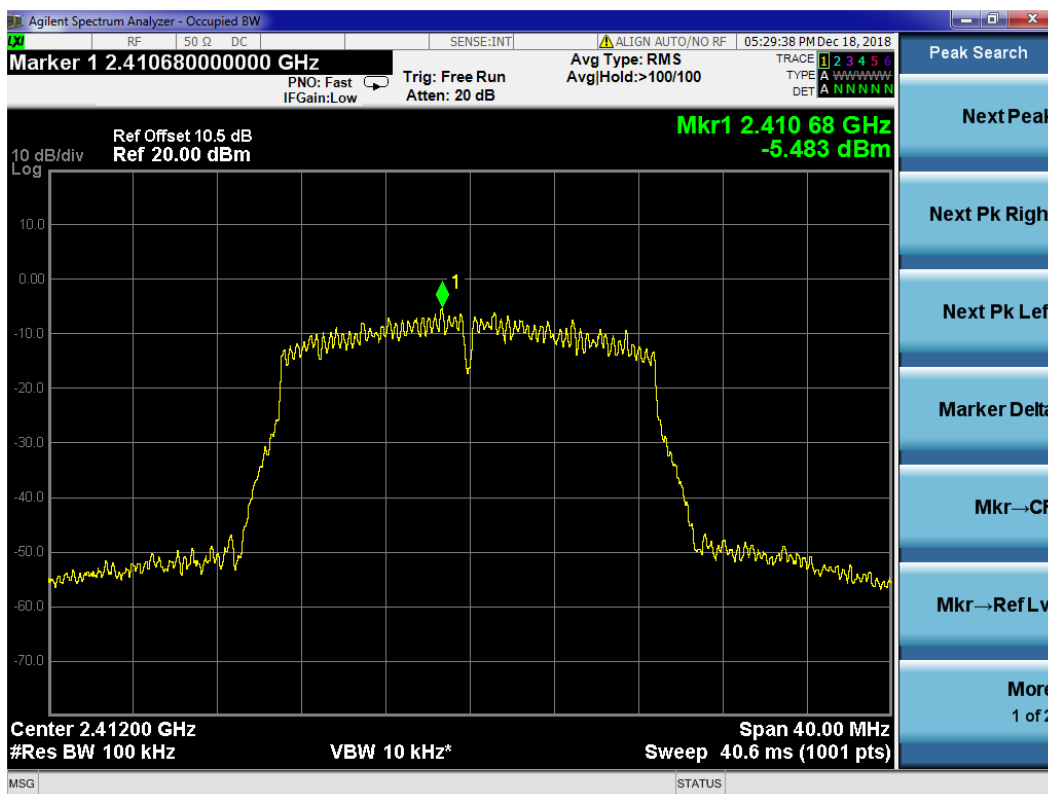
IEEE 802.11g: CH6 2437 MHz



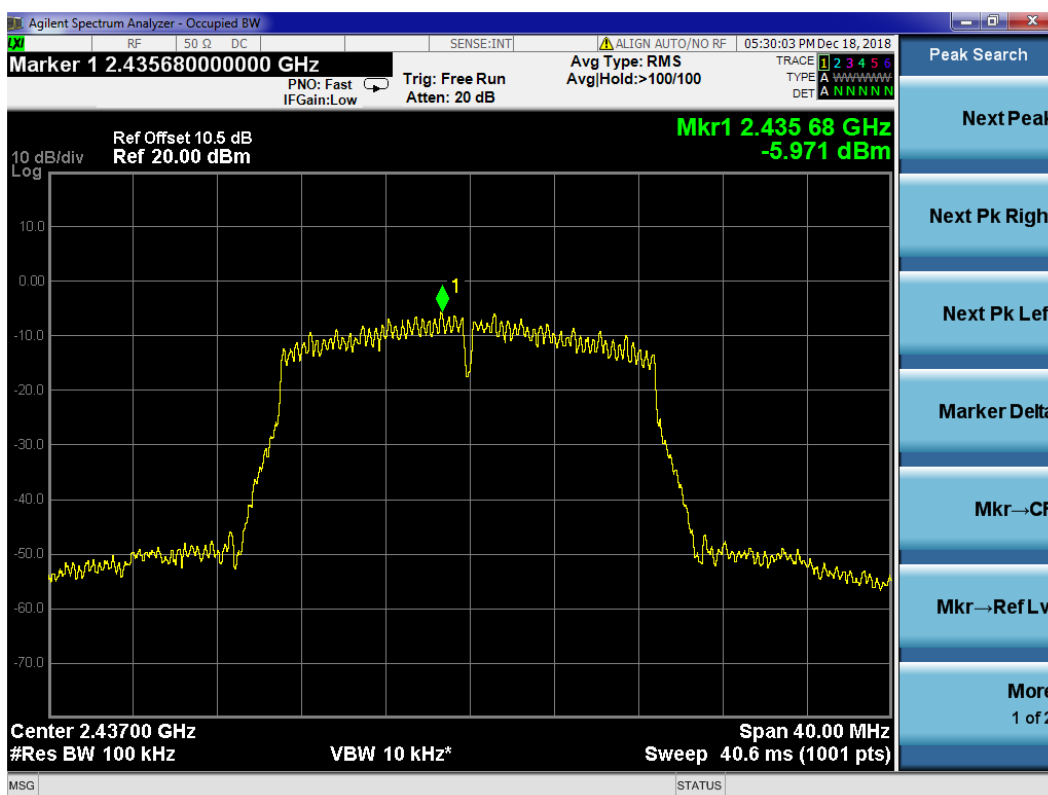
IEEE 802.11g: CH11 2462 MHz



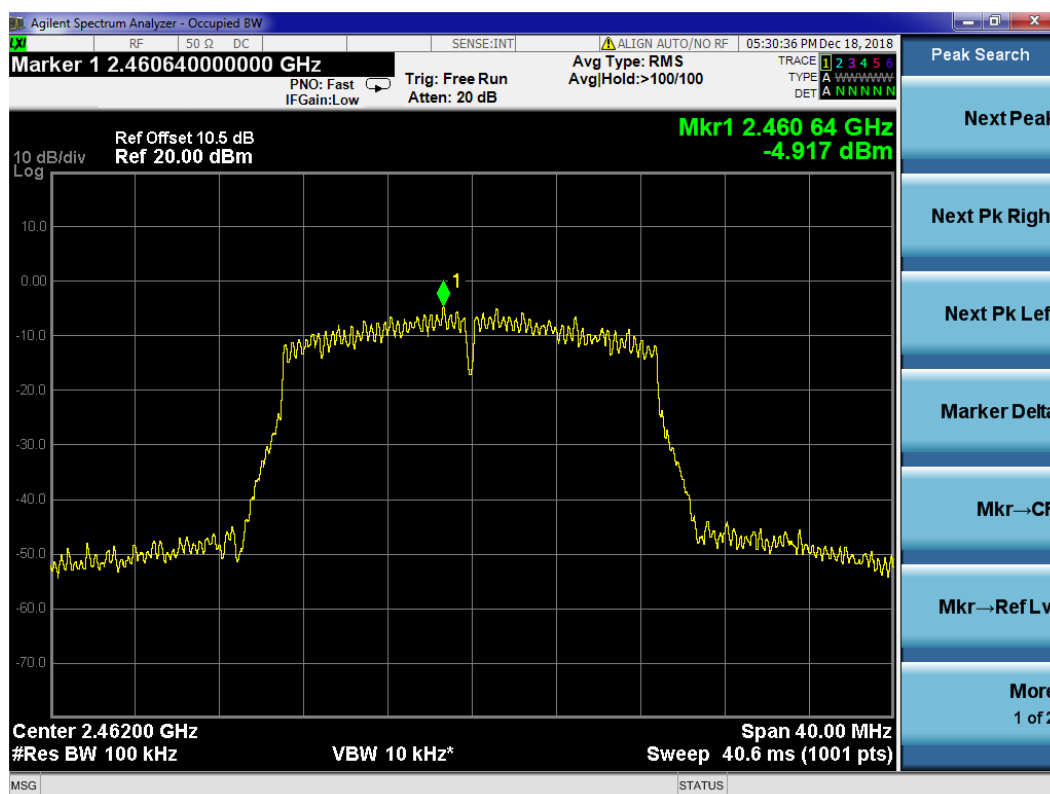
IEEE 802.11n HT20: CH1 2412 MHz



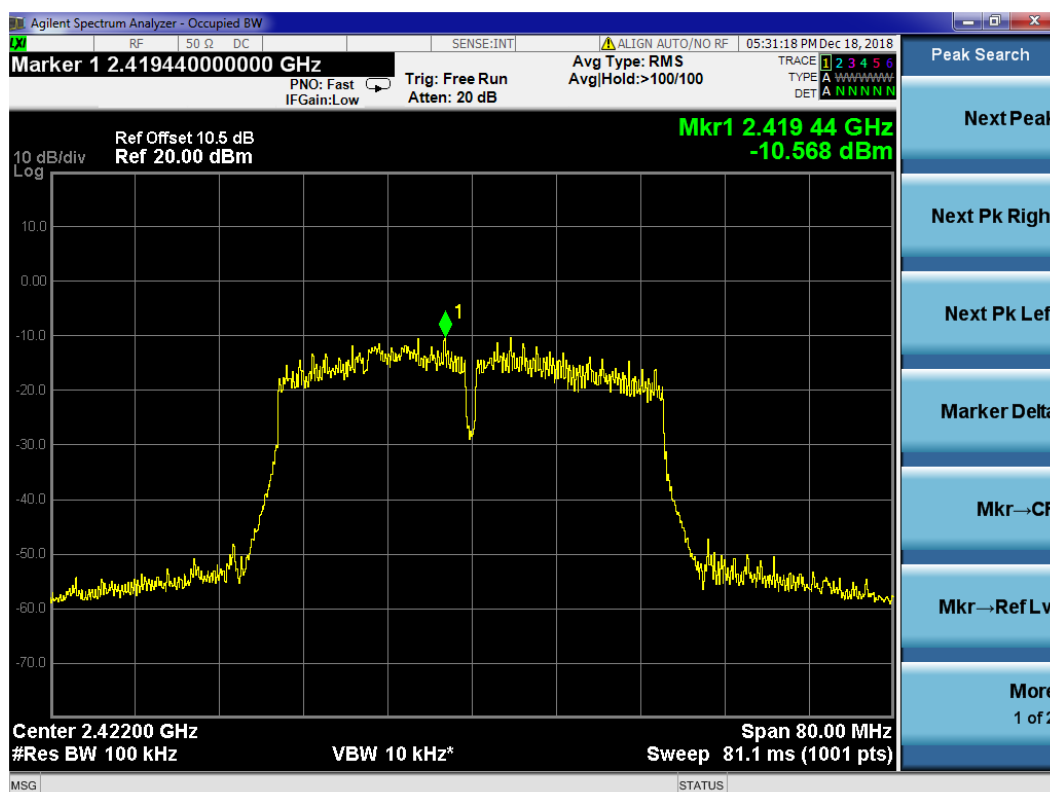
IEEE 802.11n HT20: CH6 2437 MHz



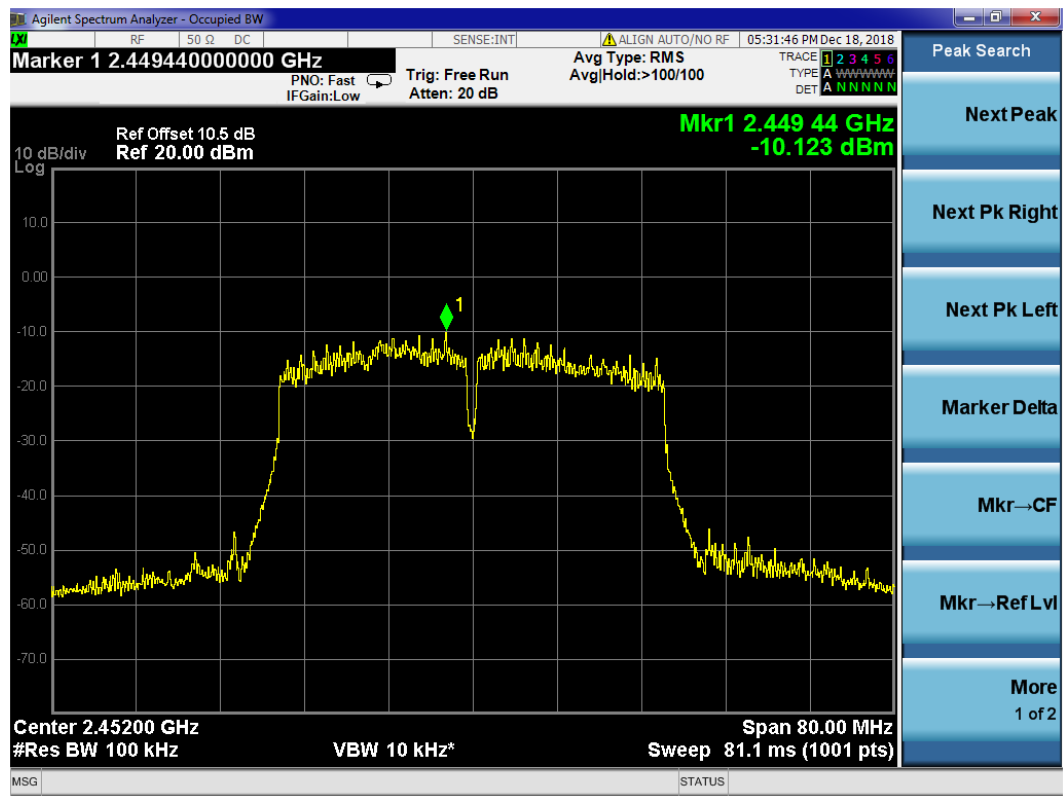
IEEE 802.11n HT20: CH11 2462 MHz



IEEE 802.11n HT40: CH3 2422 MHz



IEEE 802.11n HT40: CH9 2452 MHz



11 DEVIATION TO TEST SPECIFICATIONS

None.