

TEST REPORT

On behalf of

Mettler Toledo (Changzhou) Measurement Technology Co., Ltd.

Product Name: Weighing terminal

Model No.: IND256x

FCC ID: 2ALAI19MT103

Prepared For: Mettler Toledo (Changzhou) Measurement Technology Co., Ltd.
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Province, China.

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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 : Mettler Toledo (Changzhou) Measurement Technology Co., Ltd.
Manufacturer : Mettler Toledo (Changzhou) Measurement Technology Co., Ltd.
EUT Description : Weighing terminal
(A) Model No. : Refer to Sec.2.1
(B) Power Supply : 10VDC(12.6V Max),0.35A
(C) Test Voltage : DC 10V (Via Battery)

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 (M/N: Refer to Sec2.1), which was tested is technically compliance with the FCC limits.

This report applies to above tested Sample only. This report shall not be reproduced in part without written approval of Audix Technology (Shanghai) Co., Ltd.

Date of Test : 2019.12.09-2020.01.06 Date of Report : 2020.01.15

Producer :

JAREY LU / Supervisor

Reviewer :

BYRON WU / Deputy Assistant Manager

AUDIX[®] 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	N/A	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 : Weighing terminal

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

Model Number : IND256x

Radio Tech : IEEE 802.11 b/g/n

Note: : 802.11n-HT20 only.

Channel Freq. : 2412MHz-2462MHz;

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

Antenna Info. : Antenna Type: IPEX Antenna
Antenna Gain: 3 dBi
The Antenna uses a unique coupling to the intentional radiator that is comply with 15.203 requirement.

Test Mode : The EUT was set at continuous TX during all the test in the report.

Applicant : Mettler Toledo (Changzhou) Measurement Technology Co., Ltd.
No. 111 West Taihu Road, Changzhou City, Jiangsu Province, China.

Manufacturer : same as Applicant

Factory : same as Applicant

2.2 EUT Specifications Assessed in Current Report

Mode	Modulation	Data Rate(Mbps)
802.11b	DS (DQPSK, DBPSK, CCK)	Up to 11
802.11g	OFDM (64-QAM, 16-QAM, QPSK, BPSK)	Up to 54
802.11n-HT 20	OFDM (64-QAM, 16-QAM, QPSK, BPSK)	Up to 72.2

Channel List			
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437		

2.3 Test Information

The test software “SSComTool.exe” was used to control EUT work in TX mode, and select test channel.

Modulation	data rate (Mbps)	Test Channel		Frequency (MHz)
802.11b	1	Low:	1	2412
		Middle:	6	2437
		High:	11	2462
802.11g	6	Low:	1	2412
		Middle:	6	2437
		High:	11	2462
802.11n20	MCS0	Low:	1	2412
		Middle:	6	2437
		High:	11	2462

2.4 Supported equipment

Brand : METTLER TOLEDO
Model Name : NiMH BATTERY PAC
Model Number : 64060625

2.5 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

3 RADIATED EMISSION TEST

3.1 Test Equipment

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

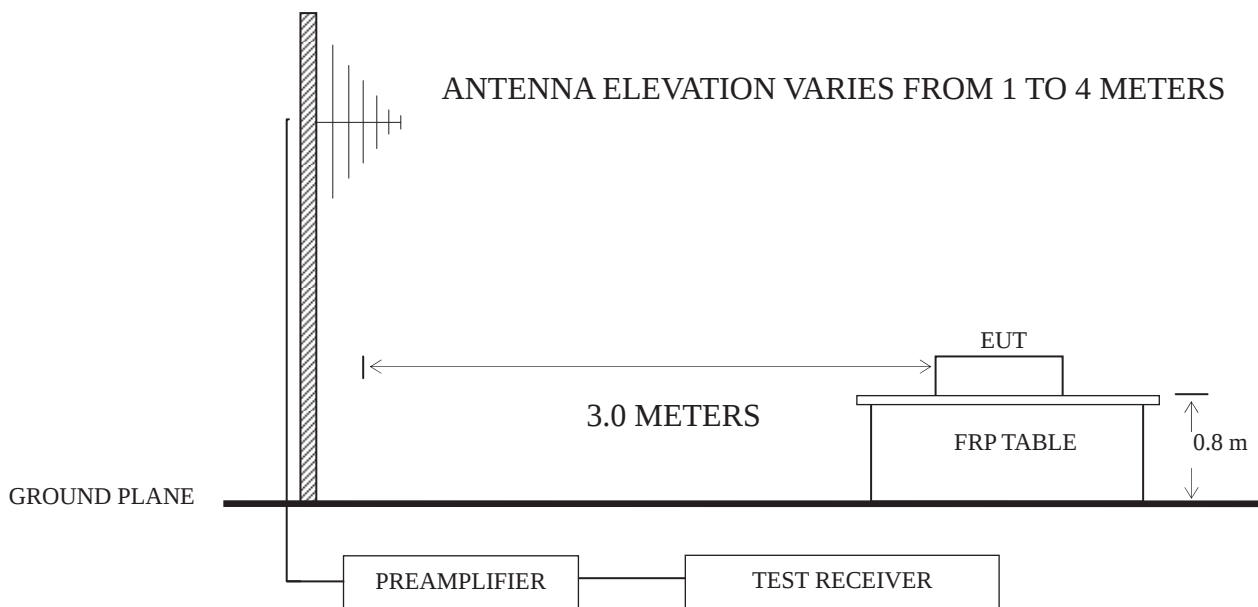
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Preamplifier	Agilent	8447D	2944A06664	Apr 27, 2019	Apr 26, 2020
2.	Preamplifier	HP	8449B	3008A00864	Mar 8, 2019	Mar 7, 2020
3.	Spectrum Analyzer	Agilent	N9010A	MY52221182	Sep 16, 2019	Sep 15, 2020
4.	Test Receiver	R&S	ESCI	101303	May 07, 2019	May 06, 2020
5.	Bi-log Antenna	Schwarz beck	VULB 9168	708	Jul 20, 2019	Jul 19, 2020
6.	Horn Antenna	EMCO	3115	9607-4878	Jun 02, 2019	Jun 01, 2020
7.	Horn Antenna	EMCO	3116	00062643	Sep 08, 2019	Sep 07, 2020
8.	Software	Audix	E3	SET00200 9912M295-2	--	--

3.2 Block Diagram of Test Setup

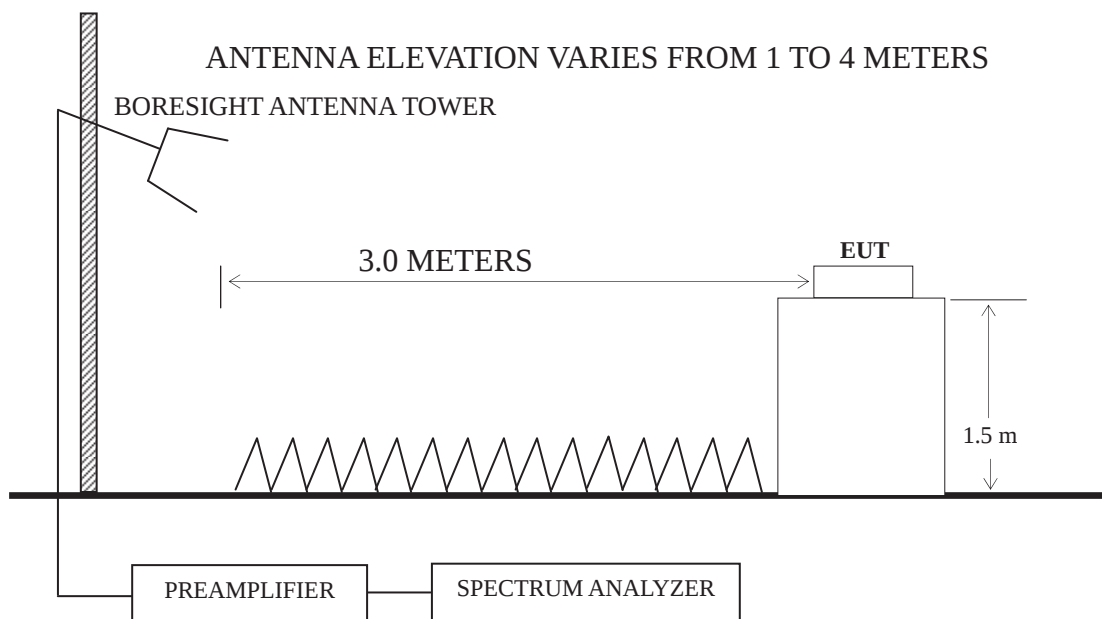
3.2.1 EUT & Peripherals



3.2.2 Below 1GHz



3.2.3 Above 1GHz



3.3 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

3.4 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.

3.5 Operating Condition of EUT

3.5.1 Setup the EUT as shown in Sec. 3.2.

3.5.2 Turn on the power of all equipment.

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

3.6 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.

All the test results are listed in Sec.3.7.

3.7 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 1G (Worst case emission)

No.	Operation	Modulation	Channel	Frequency	Data Page
1.	Transmitting	802.11b	1	2412 MHz	P13
2.	Receiving	802.11	1	2412 MHz	P14

Frequency range: above 1G

No.	Operation	Modulation	Channel	Frequency	Data Page
1.	Transmitting	802.11b	1	2412 MHz	P15
2.			6	2437 MHz	P15
3.			11	2462 MHz	P16
4.	Transmitting	802.11g	1	2412 MHz	P16
5.			6	2437 MHz	P17
6.			11	2462 MHz	P17
7.	Transmitting	802.11n20	1	2412 MHz	P18
8.			6	2437 MHz	P18
9.			11	2462 MHz	P19
10.	Receiving	802.11	1	2412 MHz	P20

Restricted bands:

No.	Operation	Modulation	Channel	Frequency	Data Page
1.	Transmitting	802.11b	Cabinet Emission		P21
2.		802.11g	Cabinet Emission		P22
3.		802.11n20	Cabinet Emission		P22

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 : Weighing terminal Temperature : 22°C

Model No. : IND256x Humidity : 51%RH

Test Mode : Transmitting Date of Test : 2020.01.05

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	40.276	26.64	18.52	0.74	27.61	18.29	40	21.71	QP
	63.536	27.13	17.7	0.91	27.6	18.14	40	21.86	QP
	143.33	28.92	19.8	1.34	27.29	22.77	43.5	20.73	QP
	174.42	26.62	19.69	1.47	27.12	20.66	43.5	22.84	QP
	383.93	30.56	21.73	2.2	27.39	27.1	46	18.9	QP
	845.09	27.81	28.3	3.14	27.7	31.55	46	14.45	QP
Vertical	39.299	26.89	18.55	0.73	27.61	18.56	40	21.44	QP
	63.536	27.08	17.7	0.91	27.6	18.09	40	21.91	QP
	143.33	29.82	19.8	1.34	27.29	23.67	43.5	19.83	QP
	170.2	26.62	20.21	1.46	27.14	21.15	43.5	22.35	QP
	454.31	26.67	23.1	2.36	27.78	24.35	46	21.65	QP
	869.13	27.48	28.35	3.18	27.63	31.38	46	14.62	QP

TEST ENGINEER: Jarey

EUT : Weighing terminal Temperature : 22°C

Model No. : IND256x Humidity : 51%RH

Test Mode : Receiving Date of Test : 2020.01.05

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	40.276	26.64	18.52	0.74	27.61	18.29	40	21.71	QP
	56.792	27.75	17.82	0.86	27.6	18.83	40	21.17	QP
	143.33	28.92	19.8	1.34	27.29	22.77	43.5	20.73	QP
	174.42	26.62	19.69	1.47	27.12	20.66	43.5	22.84	QP
	383.93	30.56	21.73	2.2	27.39	27.1	46	18.9	QP
	945.44	26.38	29.63	3.29	27.41	31.89	46	14.11	QP
Vertical	38.346	27.21	18.36	0.73	27.62	18.68	40	21.32	QP
	63.536	27.23	17.7	0.91	27.6	18.24	40	21.76	QP
	143.33	30.51	19.8	1.34	27.29	24.36	43.5	19.14	QP
	171.39	27.11	20.12	1.46	27.13	21.56	43.5	21.94	QP
	472.18	26.92	23.24	2.4	27.87	24.69	46	21.31	QP
	942.13	26.76	29.57	3.29	27.41	32.21	46	13.79	QP

TEST ENGINEER: Jarey

Radiated Emission > 1GHz

EUT : Weighing terminal Temperature : 22°C

Model No. : IND256x Humidity : 51%RH

Test Mode : Transmitting Date of Test : 2020.01.05

802.11b CH2412MHz

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	1657	45.66	26.6	4.4	37.22	39.44	74	34.56	Peak
	3430	44.82	31.14	6.33	36.55	45.74	74	28.26	Peak
	4780	41.85	33.1	7.56	36.5	46.01	74	27.99	Peak
	6229	41.09	35.19	9.05	36.76	48.57	74	25.43	Peak
	7669	41.13	36.17	10	37.03	50.27	74	23.73	Peak
	9370	40.56	37.02	10.75	35.22	53.11	74	20.89	Peak
Vertical	1594	47.75	26.28	4.31	37.26	41.08	74	32.92	Peak
	3862	42.96	32.39	6.74	36.51	45.58	74	28.42	Peak
	4798	42.13	33.14	7.56	36.5	46.33	74	27.67	Peak
	6391	40.33	35.31	9.23	36.88	47.99	74	26.01	Peak
	7651	41.12	36.16	10	37.04	50.24	74	23.76	Peak
	9019	41.01	36.82	10.45	35.29	52.99	74	21.01	Peak

802.11b CH2437MHz

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	1900	44.89	27.69	4.66	37.06	40.18	74	33.82	Peak
	3448	44.09	31.19	6.33	36.55	45.06	74	28.94	Peak
	4798	41.76	33.14	7.56	36.5	45.96	74	28.04	Peak
	6337	41.4	35.27	9.14	36.84	48.97	74	25.03	Peak
	7615	40.62	36.15	10	37.06	49.71	74	24.29	Peak
	8947	41.23	36.76	10.45	35.35	53.09	74	20.91	Peak
Vertical	1738	45.2	26.97	4.49	37.16	39.5	74	34.5	Peak
	3520	44.02	31.36	6.43	36.54	45.27	74	28.73	Peak
	4672	41.71	32.95	7.45	36.5	45.61	74	28.39	Peak
	5923	40.84	34.87	8.7	36.59	47.82	74	26.18	Peak
	7642	40.52	36.16	10	37.04	49.64	74	24.36	Peak
	9181	41.05	36.91	10.65	35.26	53.35	74	20.65	Peak

802.11b CH2462MHz

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	1882	45.4	27.62	4.63	37.07	40.58	74	33.42	Peak
	3358	44.75	30.98	6.23	36.56	45.4	74	28.6	Peak
	4654	42.5	32.93	7.45	36.5	46.38	74	27.62	Peak
	6346	41.08	35.27	9.14	36.85	48.64	74	25.36	Peak
	7507	40.75	36.1	9.96	37.1	49.71	74	24.29	Peak
	8956	41.05	36.76	10.45	35.35	52.91	74	21.09	Peak
Vertical	1891	44.56	27.64	4.66	37.07	39.79	74	34.21	Peak
	3772	43.79	32.13	6.64	36.52	46.04	74	27.96	Peak
	4978	41.35	33.36	7.67	36.5	45.88	74	28.12	Peak
	6418	41.13	35.33	9.23	36.9	48.79	74	25.21	Peak
	7912	40.86	36.27	10.08	36.94	50.27	74	23.73	Peak
	9010	41.24	36.82	10.45	35.29	53.22	74	20.78	Peak

802.11g CH2412MHz

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	1792	48.19	27.23	4.55	37.13	42.84	74	31.16	Peak
	3421	44.43	31.14	6.33	36.55	45.35	74	28.65	Peak
	5050	41.62	33.47	7.73	36.51	46.31	74	27.69	Peak
	6265	40.29	35.21	9.05	36.79	47.76	74	26.24	Peak
	7759	41.05	36.21	10.04	37	50.3	74	23.7	Peak
	9118	40.54	36.88	10.55	35.28	52.69	74	21.31	Peak
Vertical	1594	46.53	26.28	4.31	37.26	39.86	74	34.14	Peak
	3187	46.65	30.58	6.07	36.58	46.72	74	27.28	Peak
	4915	41.53	33.29	7.67	36.5	45.99	74	28.01	Peak
	6238	40.77	35.19	9.05	36.78	48.23	74	25.77	Peak
	7759	40.6	36.21	10.04	37	49.85	74	24.15	Peak
	9442	40.67	37.07	10.84	35.21	53.37	74	20.63	Peak

802.11g CH2437MHz

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	1846	44.93	27.46	4.6	37.09	39.9	74	34.1	Peak
	3403	43.92	31.1	6.28	36.56	44.74	74	29.26	Peak
	4906	41.57	33.27	7.62	36.5	45.96	74	28.04	Peak
	5887	40.7	34.81	8.7	36.59	47.62	74	26.38	Peak
	7174	41.37	35.91	9.84	37.23	49.89	74	24.11	Peak
	8875	41	36.7	10.41	35.48	52.63	74	21.37	Peak
Vertical	1756	46.1	27.07	4.52	37.15	40.54	74	33.46	Peak
	3862	43.12	32.39	6.74	36.51	45.74	74	28.26	Peak
	5095	41.78	33.55	7.82	36.51	46.64	74	27.36	Peak
	6319	40.93	35.26	9.14	36.84	48.49	74	25.51	Peak
	7732	40.78	36.2	10.04	37.01	50.01	74	23.99	Peak
	8866	41.37	36.7	10.41	35.48	53	74	21	Peak

802.11g CH2462MHz

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	1954	44.17	27.92	4.72	37.03	39.78	74	34.22	Peak
	3466	43.5	31.23	6.33	36.55	44.51	74	29.49	Peak
	4744	41.74	33.06	7.51	36.5	45.81	74	28.19	Peak
	5959	41.94	34.95	8.79	36.6	49.08	74	24.92	Peak
	7669	41.29	36.17	10	37.03	50.43	74	23.57	Peak
	8956	40.83	36.76	10.45	35.35	52.69	74	21.31	Peak
Vertical	1594	47.86	26.28	4.31	37.26	41.19	74	32.81	Peak
	3448	46.25	31.19	6.33	36.55	47.22	74	26.78	Peak
	5050	42.43	33.47	7.73	36.51	47.12	74	26.88	Peak
	6562	39.79	35.45	9.32	37	47.56	74	26.44	Peak
	7822	40.93	36.24	10.08	36.97	50.28	74	23.72	Peak
	9154	41.16	36.89	10.55	35.26	53.34	74	20.66	Peak

802.11n20 CH2412MHz

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	1837	45.25	27.41	4.6	37.1	40.16	74	33.84	Peak
	3358	44.04	30.98	6.23	36.56	44.69	74	29.31	Peak
	4915	40.73	33.29	7.67	36.5	45.19	74	28.81	Peak
	6184	40.39	35.14	8.97	36.73	47.77	74	26.23	Peak
	7993	40.72	36.3	10.12	36.91	50.23	74	23.77	Peak
	9361	40.84	37.02	10.75	35.23	53.38	74	20.62	Peak
Vertical	1864	44.94	27.52	4.63	37.08	40.01	74	33.99	Peak
	3790	43.32	32.19	6.69	36.52	45.68	74	28.32	Peak
	4780	43.29	33.1	7.56	36.5	47.45	74	26.55	Peak
	6274	41.24	35.21	9.05	36.79	48.71	74	25.29	Peak
	7678	41.45	36.17	10	37.03	50.59	74	23.41	Peak
	9226	40.63	36.94	10.65	35.25	52.97	74	21.03	Peak

802.11n20 CH2437MHz

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	1792	45.79	27.23	4.55	37.13	40.44	74	33.56	Peak
	3772	43.9	32.13	6.64	36.52	46.15	74	27.85	Peak
	4933	41.41	33.31	7.67	36.5	45.89	74	28.11	Peak
	6472	40.84	35.37	9.23	36.94	48.5	74	25.5	Peak
	7876	42.13	36.25	10.08	36.95	51.51	74	22.49	Peak
	9244	40.93	36.94	10.65	35.25	53.27	74	20.73	Peak
Vertical	1837	44.71	27.41	4.6	37.1	39.62	74	34.38	Peak
	3385	45.48	31.05	6.28	36.56	46.25	74	27.75	Peak
	4978	41.1	33.36	7.67	36.5	45.63	74	28.37	Peak
	6301	41.44	35.24	9.14	36.82	49	74	25	Peak
	7822	40.84	36.24	10.08	36.97	50.19	74	23.81	Peak
	9379	40.55	37.02	10.75	35.22	53.1	74	20.9	Peak

802.11n20 CH2462MHz

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	1792	45.8	27.23	4.55	37.13	40.45	74	33.55	Peak
	3817	43.25	32.26	6.69	36.52	45.68	74	28.32	Peak
	4969	41.6	33.36	7.67	36.5	46.13	74	27.87	Peak
	6391	40.56	35.31	9.23	36.88	48.22	74	25.78	Peak
	7714	41.72	36.19	10.04	37.02	50.93	74	23.07	Peak
	9334	40.38	37.01	10.75	35.23	52.91	74	21.09	Peak
Vertical	1900	46.67	27.69	4.66	37.06	41.96	74	32.04	Peak
	3817	43.14	32.26	6.69	36.52	45.57	74	28.43	Peak
	4690	41.69	32.98	7.45	36.5	45.62	74	28.38	Peak
	6859	40.72	35.69	9.67	37.21	48.87	74	25.13	Peak
	7948	40.65	36.28	10.12	36.92	50.13	74	23.87	Peak
	8974	41.1	36.78	10.45	35.3	53.03	74	20.97	Peak

TEST ENGINEER: Jarey

EUT : Weighing terminal Temperature : 22°C

Model No. : IND256x Humidity : 51%RH

Test Mode : Receiving Date of Test : 2020.01.05

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	1972	45.54	27.99	4.75	37.02	41.26	74	32.74	Peak
	3646	43.17	31.78	6.53	36.53	44.95	74	29.05	Peak
	4636	42.81	32.91	7.45	36.5	46.67	74	27.33	Peak
	6319	40.53	35.26	9.14	36.84	48.09	74	25.91	Peak
	7975	41.72	36.29	10.12	36.91	51.22	74	22.78	Peak
	9325	39.98	36.99	10.75	35.23	52.49	74	21.51	Peak
Vertical	1900	43.93	27.69	4.66	37.06	39.22	74	34.78	Peak
	3412	44.16	31.12	6.28	36.55	45.01	74	28.99	Peak
	4960	40.39	33.34	7.67	36.5	44.9	74	29.1	Peak
	6220	40.6	35.17	9.05	36.76	48.06	74	25.94	Peak
	7714	41.16	36.19	10.04	37.02	50.37	74	23.63	Peak
	9424	40.47	37.05	10.75	35.21	53.06	74	20.94	Peak

TEST ENGINEER: Jarey

Emissions in restricted frequency bands:

EUT : Weighing terminal Temperature : 22°C

Model No. : IND256x Humidity : 51%RH

Test Mode : Transmitting Date of Test : 2020.01.05

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	2334.2	51.36	29.13	5.17	36.85	48.81	74	25.19	Peak
	2334.2	39.24	29.13	5.17	36.85	36.69	54	17.31	Average
	2390	54.96	29.29	5.25	36.82	52.68	74	21.32	Peak
	2390	45.08	29.29	5.25	36.82	42.8	54	11.2	Average
	2483.5	52.61	29.56	5.32	36.79	50.7	74	23.3	Peak
	2483.5	43.78	29.56	5.32	36.79	41.87	54	12.13	Average
	2488	47.52	29.56	5.36	36.79	45.65	74	28.35	Peak
Vertical	2488	38.85	29.56	5.36	36.79	36.98	54	17.02	Average
	2353	53.69	29.19	5.21	36.84	51.25	74	22.75	Peak
	2353	39.37	29.19	5.21	36.84	36.93	54	17.07	Average
	2390	60.01	29.29	5.25	36.82	57.73	74	16.27	Peak
	2390	50.38	29.29	5.25	36.82	48.1	54	5.9	Average
	2483.5	54.37	29.56	5.32	36.79	52.46	74	21.54	Peak
	2483.5	48.29	29.56	5.32	36.79	46.38	54	7.62	Average
	2495.1	50.72	29.58	5.36	36.78	48.88	74	25.12	Peak
	2495.1	38.47	29.58	5.36	36.78	36.63	54	17.37	Average

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	2328.1	52.05	29.11	5.17	36.85	49.48	74	24.52	Peak
	2328.1	39.05	29.11	5.17	36.85	36.48	54	17.52	Average
	2390	68.51	29.29	5.25	36.82	66.23	74	7.77	Peak
	2390	49.42	29.29	5.25	36.82	47.14	54	6.86	Average
	2483.5	66.65	29.56	5.32	36.79	64.74	74	9.26	Peak
	2483.5	47.77	29.56	5.32	36.79	45.86	54	8.14	Average
	2492.6	50.88	29.58	5.36	36.78	49.04	74	24.96	Peak
	2492.6	38.54	29.58	5.36	36.78	36.7	54	17.3	Average
Vertical	2369.9	59.49	29.25	5.21	36.83	57.12	74	16.88	Peak
	2369.9	40.43	29.25	5.21	36.83	38.06	54	15.94	Average
	2390	73.56	29.29	5.25	36.82	71.28	74	2.72	Peak
	2390	53.09	29.29	5.25	36.82	50.81	54	3.19	Average
	2483.5	74.3	29.56	5.32	36.79	72.39	74	1.61	Peak
	2483.5	52.55	29.56	5.32	36.79	50.64	54	3.36	Average
	2492.4	57.25	29.58	5.36	36.78	55.41	74	18.59	Peak
	2492.4	39.53	29.58	5.36	36.78	37.69	54	16.31	Average

802.11n20

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	2369.9	56.49	29.25	5.21	36.83	54.12	74	19.88	Peak
	2369.9	39.34	29.25	5.21	36.83	36.97	54	17.03	Average
	2390	70.17	29.29	5.25	36.82	67.89	74	6.11	Peak
	2390	51.36	29.29	5.25	36.82	49.08	54	4.92	Average
	2483.5	68.34	29.56	5.32	36.79	66.43	74	7.57	Peak
	2483.5	48.9	29.56	5.32	36.79	46.99	54	7.01	Average
	2494.3	50.56	29.58	5.36	36.78	48.72	74	25.28	Peak
	2494.3	38.33	29.58	5.36	36.78	36.49	54	17.51	Average
Vertical	2369.9	60.23	29.25	5.21	36.83	57.86	74	16.14	Peak
	2369.9	40.12	29.25	5.21	36.83	37.75	54	16.25	Average
	2390	75.11	29.29	5.25	36.82	72.83	74	1.17	Peak
	2390	55.65	29.29	5.25	36.82	53.37	54	0.63	Average
	2483.5	70.4	29.56	5.32	36.79	68.49	74	5.51	Peak
	2483.5	54.18	29.56	5.32	36.79	52.27	54	1.73	Average
	2491.7	60.44	29.58	5.36	36.78	58.6	74	15.4	Peak
	2491.7	39.54	29.58	5.36	36.78	37.7	54	16.3	Average

TEST ENGINEER: Jarey

4 6 dB BANDWIDTH MEASUREMENT

4.1 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	N9010A	MY52221182	Sep 16, 2019	Sep 15, 2020

4.2 Block Diagram of Test Setup



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

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

4.4 Operating Condition of EUT

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

4.5 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).

4.6 Test Results

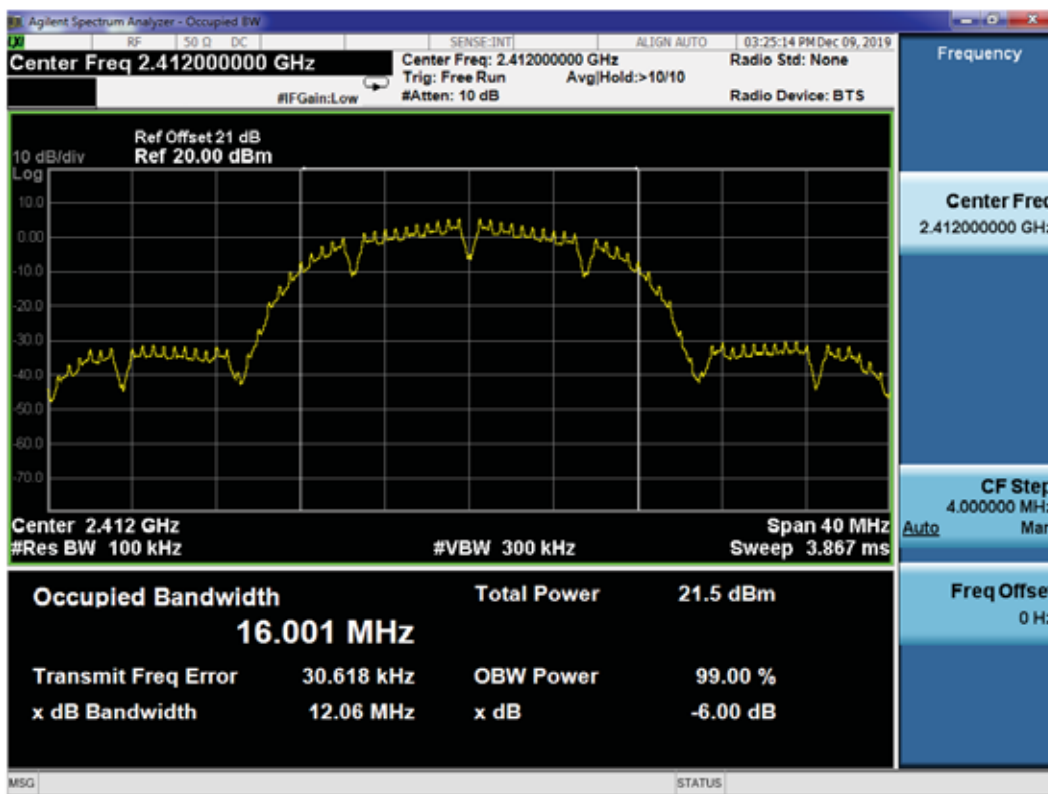
PASSED.

All the test results are attached in next pages.

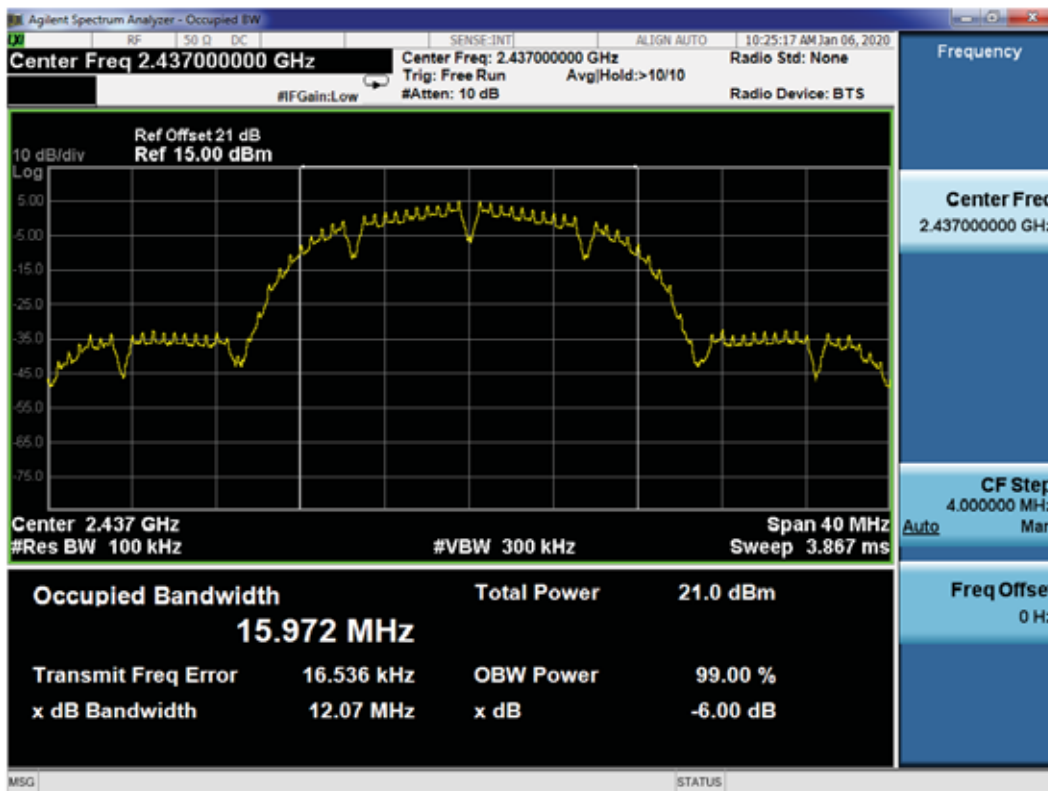
(Test Date: 2019.12.09-2020.01.06 Temperature: 23°C Humidity: 51 %)

Modulation	Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit
802.11b	1	2412	12.06	500 kHz
	6	2437	12.07	500 kHz
	11	2462	12.06	500 kHz
802.11g	1	2412	15.68	500 kHz
	6	2437	15.67	500 kHz
	11	2462	15.69	500 kHz
802.11n20	1	2412	15.79	500 kHz
	6	2437	15.69	500 kHz
	11	2462	15.5	500 kHz

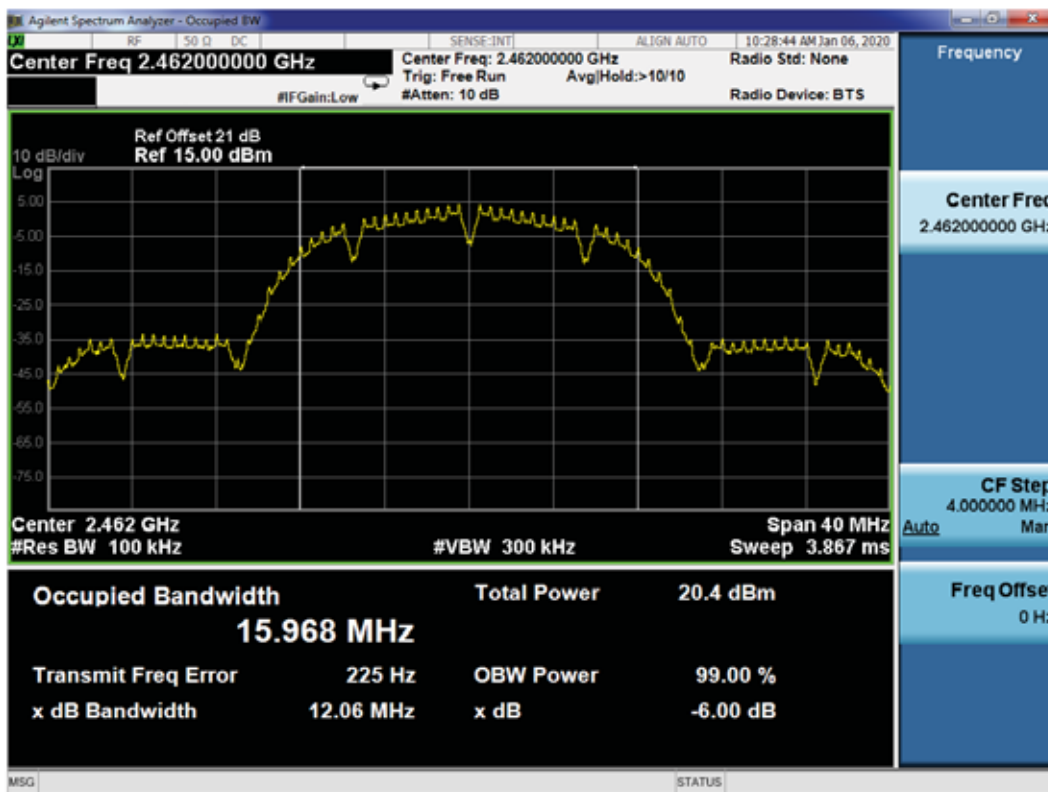
802.11b CH2412MHz



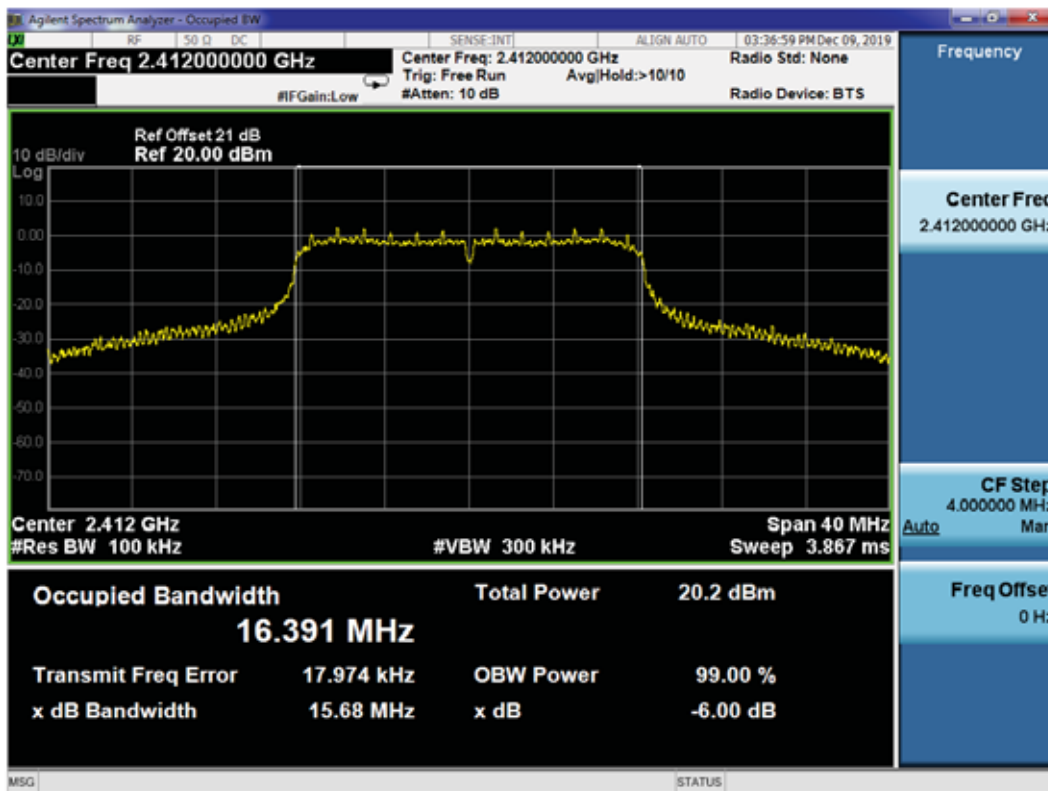
802.11b CH2437MHz



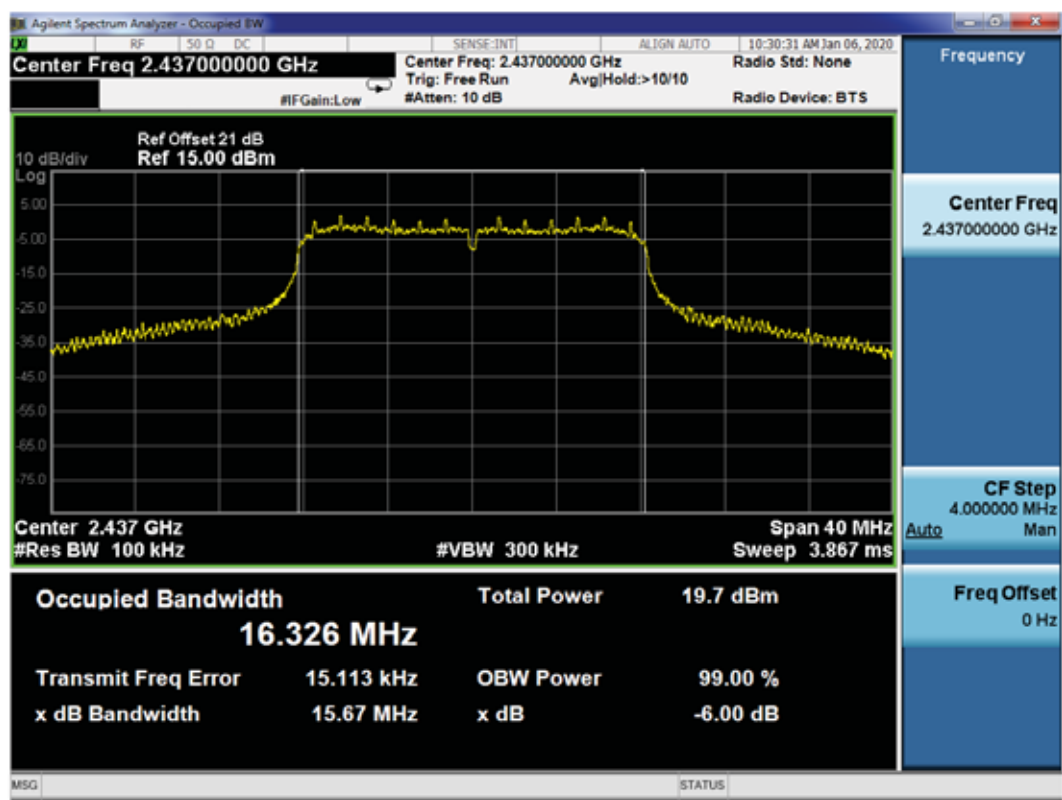
802.11b CH2462MHz



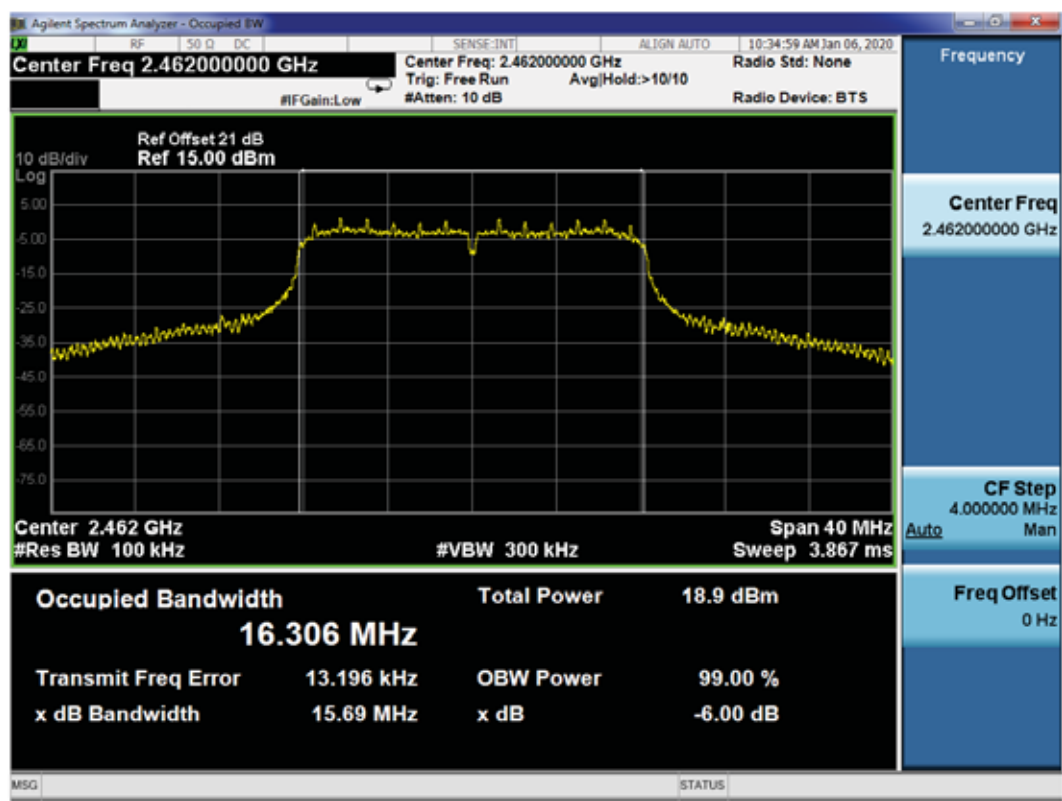
802.11g CH2412MHz



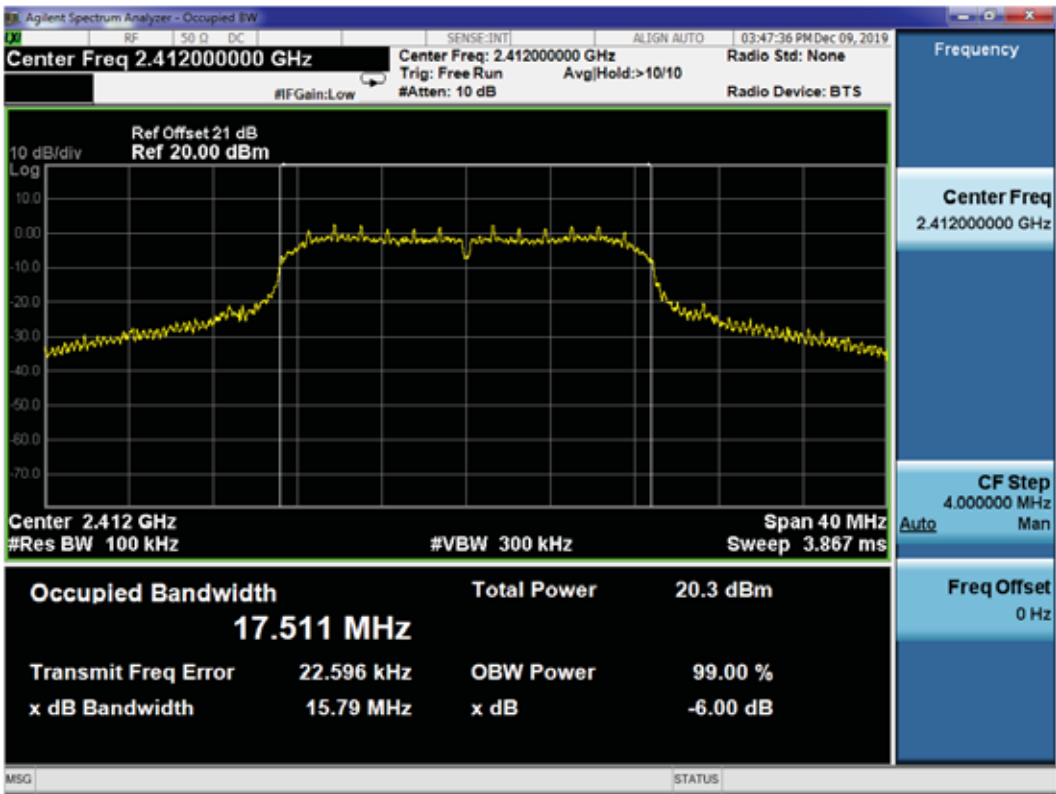
802.11g CH2437MHz



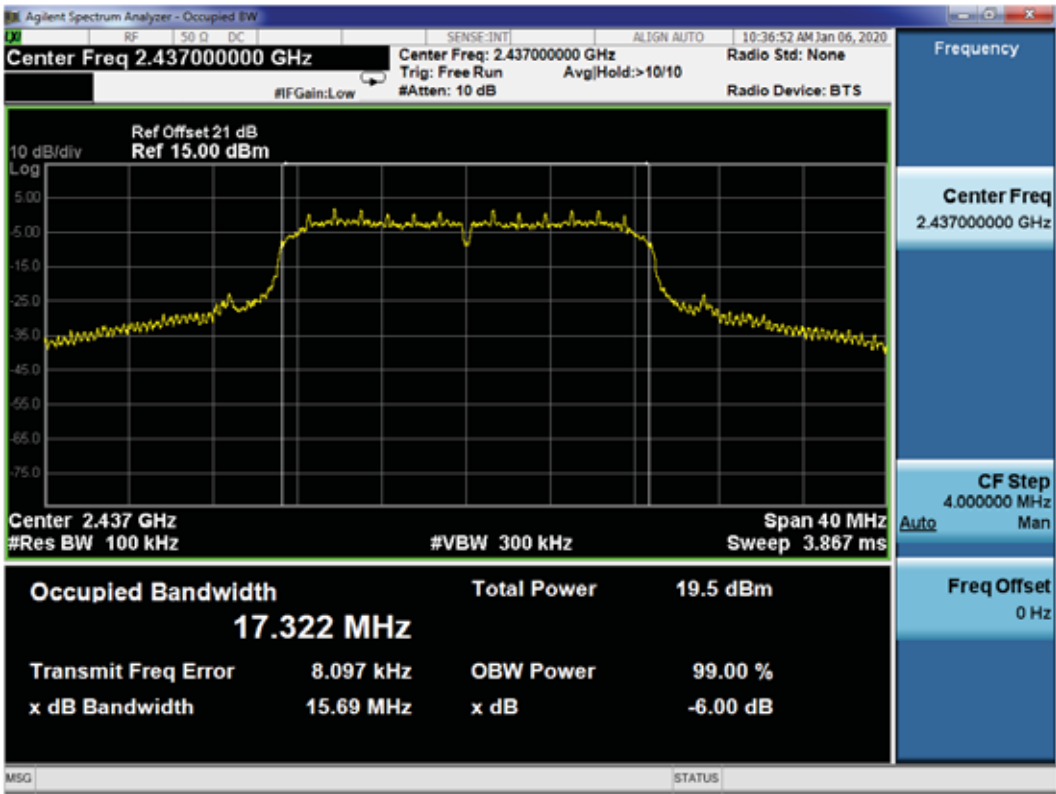
802.11g CH2462MHz



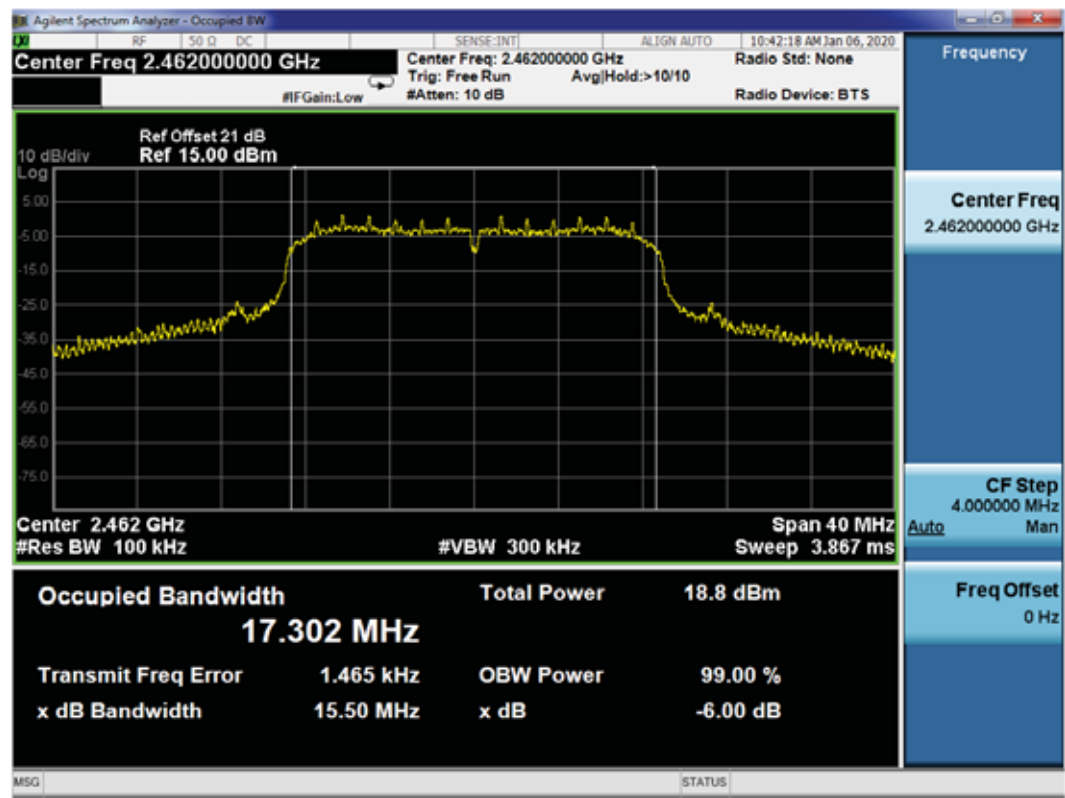
802.11n20 CH2412MHz



802.11n20 CH2437MHz



802.11n20 CH2462MHz



5 MAXIMUM PEAK OUTPUT POWER MEASUREMENT

5.1 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	N9010A	MY52221182	Sep 16, 2019	Sep 15, 2020

5.2 Block Diagram of Test Setup

The Same as Section. 4.2.

5.3 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)

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 following procedure can be used when the maximum available RBW of the instrument is less than the DTS bandwidth:

- Set the RBW = 1 MHz.
- Set the VBW $\geq$ [3 RBW].
- Set the span $\geq$ [1.5 DTS bandwidth].
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges (for some instruments, this may require a manual override to select the peak detector). If the instrument does not have a band power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the DTS channel bandwidth

The test procedure is defined in ANSI C63.10-2013 (11.9.1.2 Measurement Procedure “ Integrated band power method” was used).

5.6 Test Results

PASSED.

All the test results are listed below.

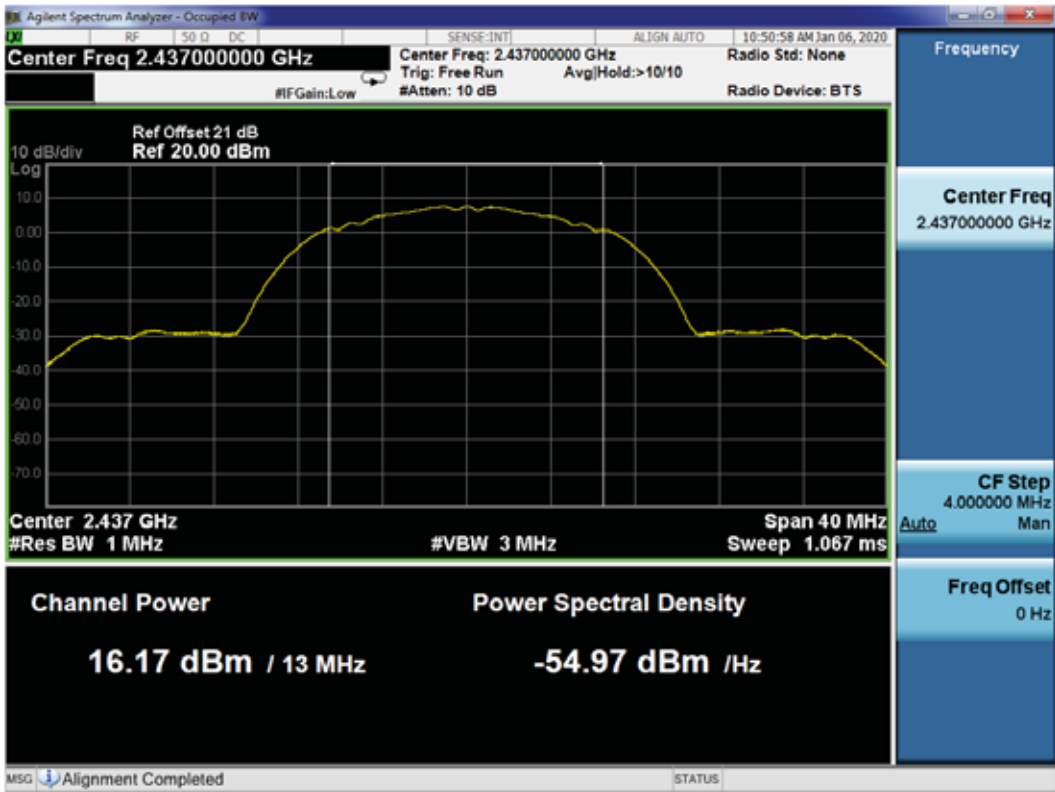
(Test Date: 2019.12.09-2020.01.06 Temperature: 23°C Humidity: 51 %)

Modulation	Channel	Frequency (MHz)	Peak Output Power (dBm)	Limit
802.11b	1	2412	16.47	30 dBm
	6	2437	16.17	30 dBm
	11	2462	15.45	30 dBm
802.11g	1	2412	20.93	30 dBm
	6	2437	20.11	30 dBm
	11	2462	20.17	30 dBm
802.11n20	1	2412	20.37	30 dBm
	6	2437	19.98	30 dBm
	11	2462	19.37	30 dBm

802.11b CH2412MHz



802.11b CH2437MHz



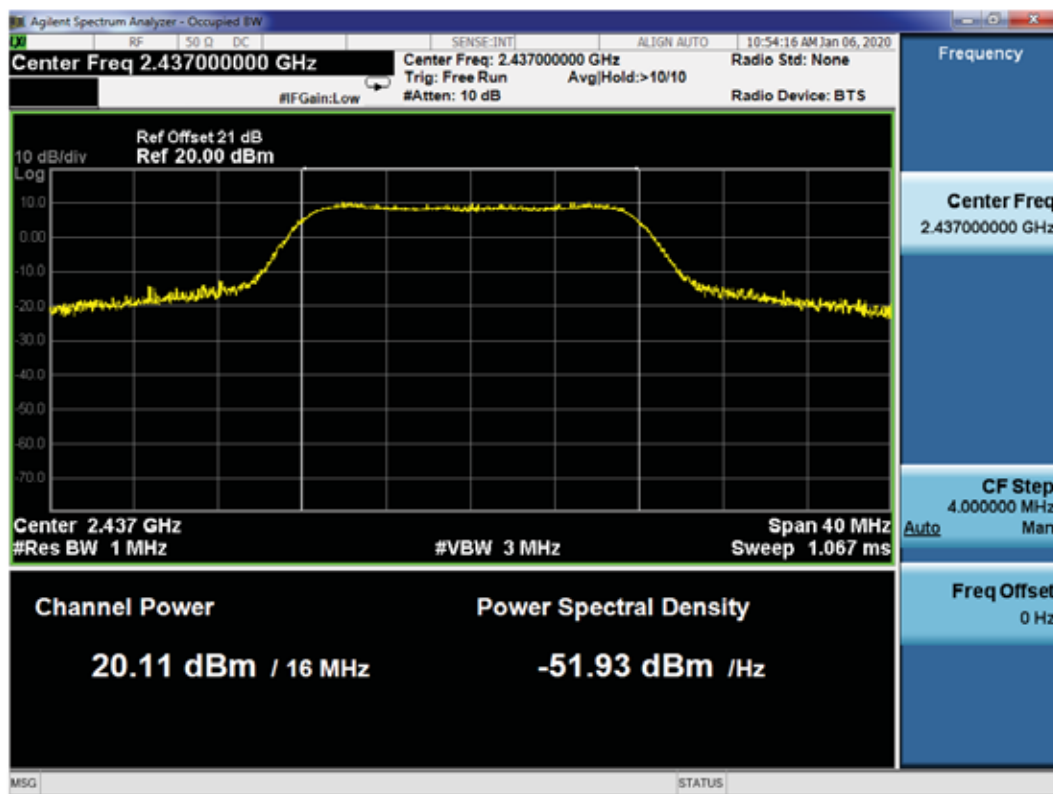
802.11b CH2462MHz



802.11g CH2412MHz



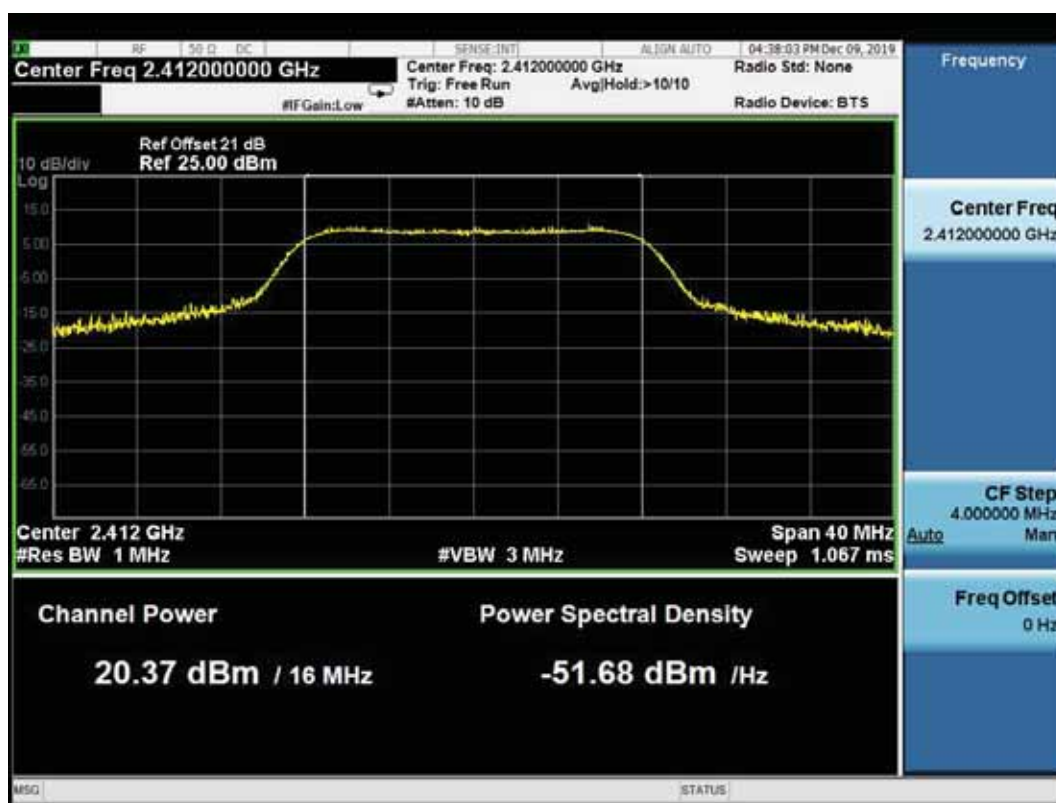
802.11g CH2437MHz



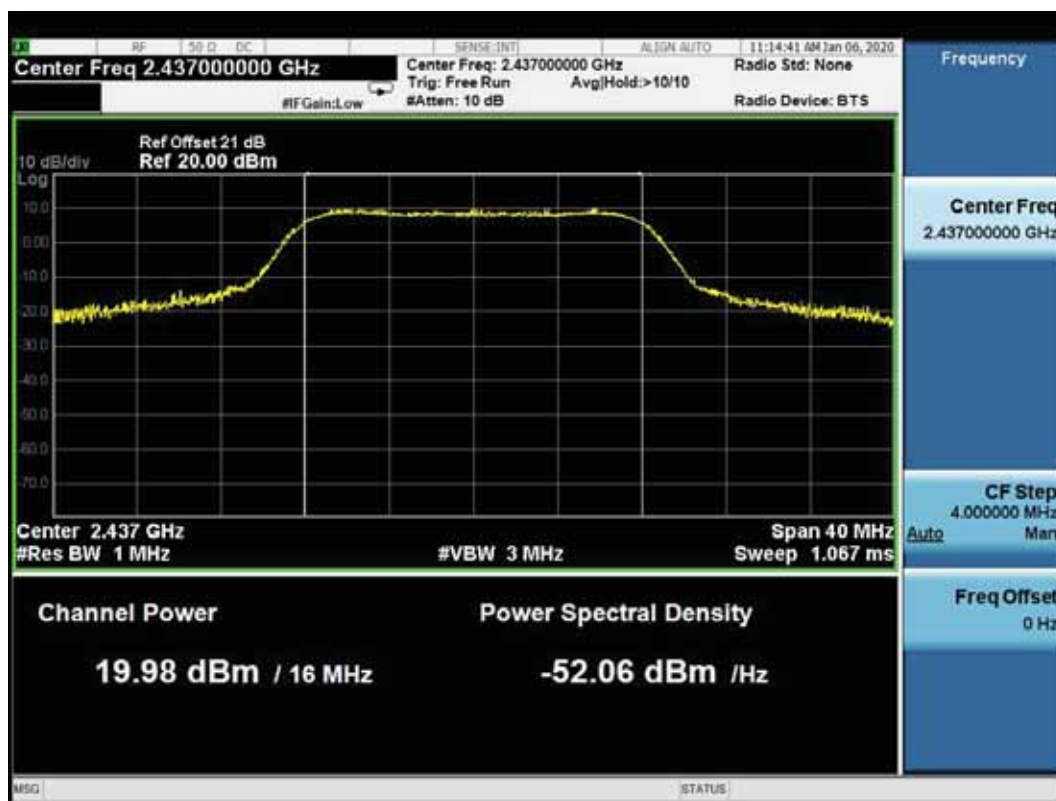
802.11g CH2462MHz



802.11n20 CH2412MHz



802.11n20 CH2437MHz



802.11n20 CH2462MHz



6 EMISSION LIMITATIONS MEASUREMENT

6.1 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	N9010A	MY52221182	Sep 16, 2019	Sep 15, 2020

6.2 Block Diagram of Test Setup

The Same as Section. 4.2.

6.3 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 the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)). (※This test result attaching to Section. 3.7)

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.

Establish a reference level by using the following procedure:

- Set instrument center frequency to DTS channel center frequency.
- Set the span to ≥ 1.5 times the DTS bandwidth.
- Set the RBW = 100 kHz.
- Set the VBW $\geq [3 \times \text{RBW}]$.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum PSD level.

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

Establish an emission level by using the following procedure:

- a) Set the center frequency and span to encompass frequency range to be measured.
 - b) Set the RBW = 100 kHz.
 - c) Set the VBW $\geq [3 \times \text{RBW}]$.
 - d) Detector = peak.
 - e) Sweep time = auto couple.
 - f) Trace mode = max hold.
 - g) Allow trace to fully stabilize.
 - h) Use the peak marker function to determine the maximum amplitude level.
- Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) is attenuated by at least the minimum requirements specified in 11.11. Report the three highest emissions relative to the limit.

Scan up through 10th harmonic.

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).

6.6 Test Results

PASSED.

The test data was attached in the next pages.

(Test Date: 2019.12.09-2020.01.06 Temperature: 23°C Humidity: 51 %)

Modulation	Channel	Frequency (MHz)	Data Page
802.11b	1	2412 MHz	P40-41
	6	2437 MHz	P42-43
	11	2462 MHz	P44-45
802.11g	1	2412 MHz	P46-47
	6	2437 MHz	P48-49
	11	2462 MHz	P50-51
802.11n20	1	2412 MHz	P52-53
	6	2437 MHz	P54-55
	11	2462 MHz	P56-57

802.11b CH2412MHz

Reference level



Emission level





802.11b CH2437MHz

Reference level



Emission level





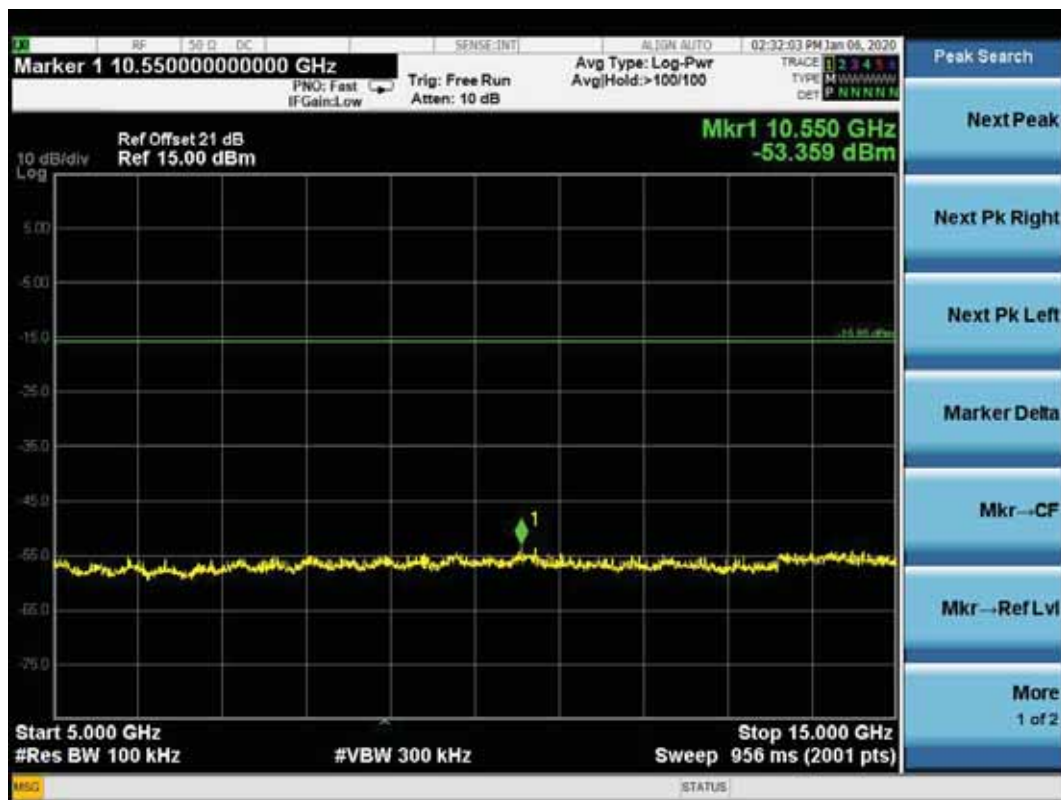
802.11b CH2462MHz

Reference level



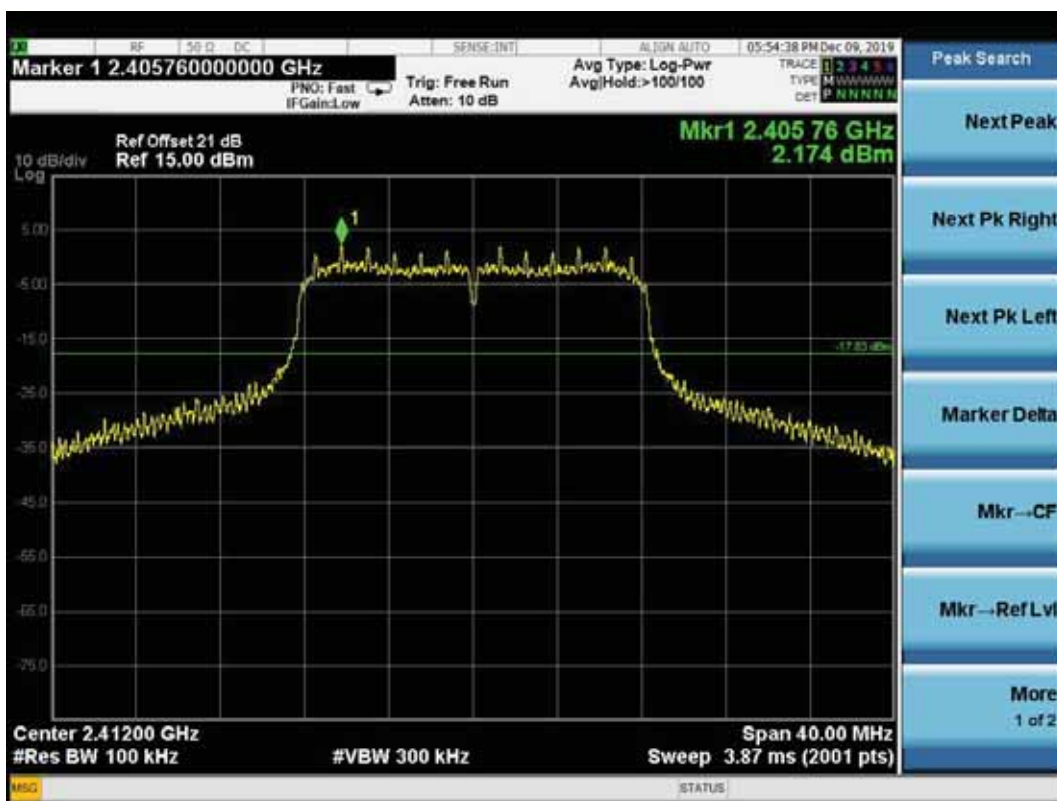
Emission level





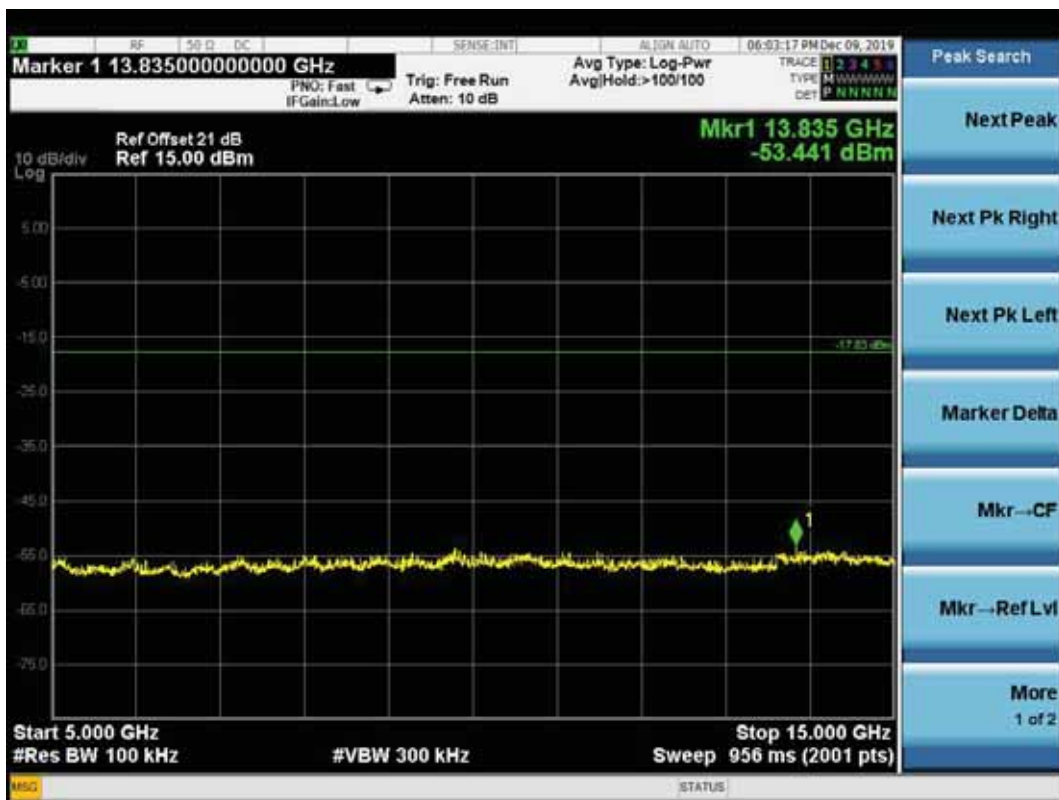
802.11g CH2412MHz

Reference level



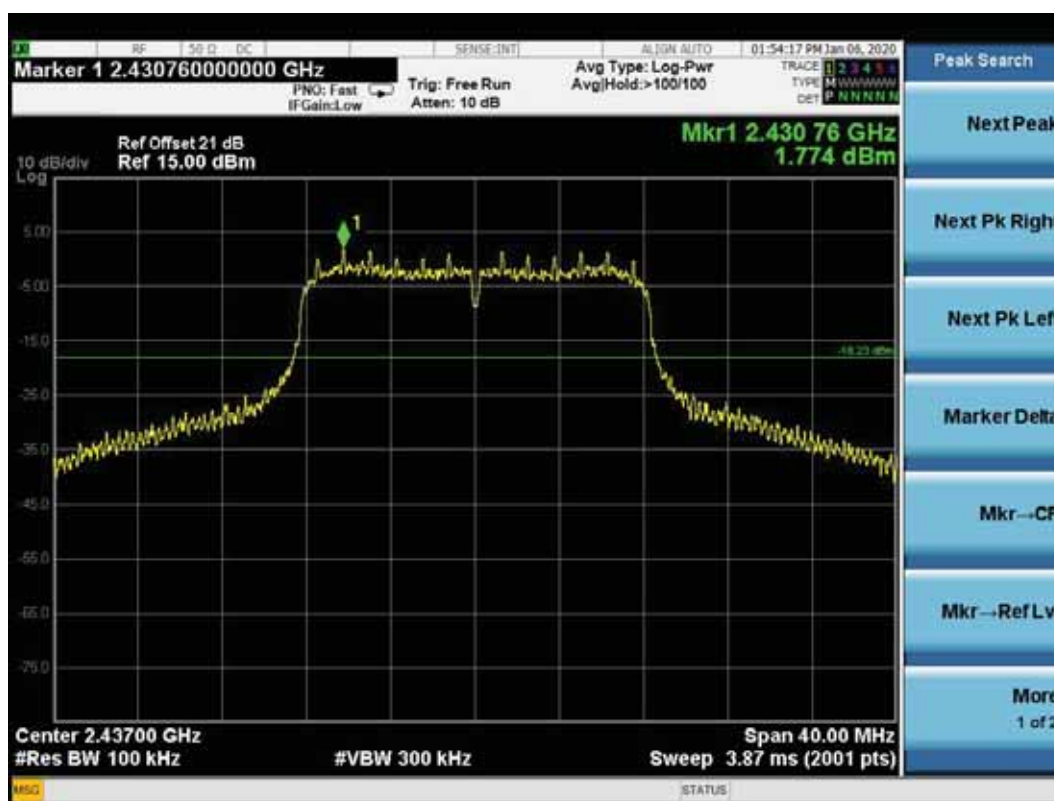
Emission level





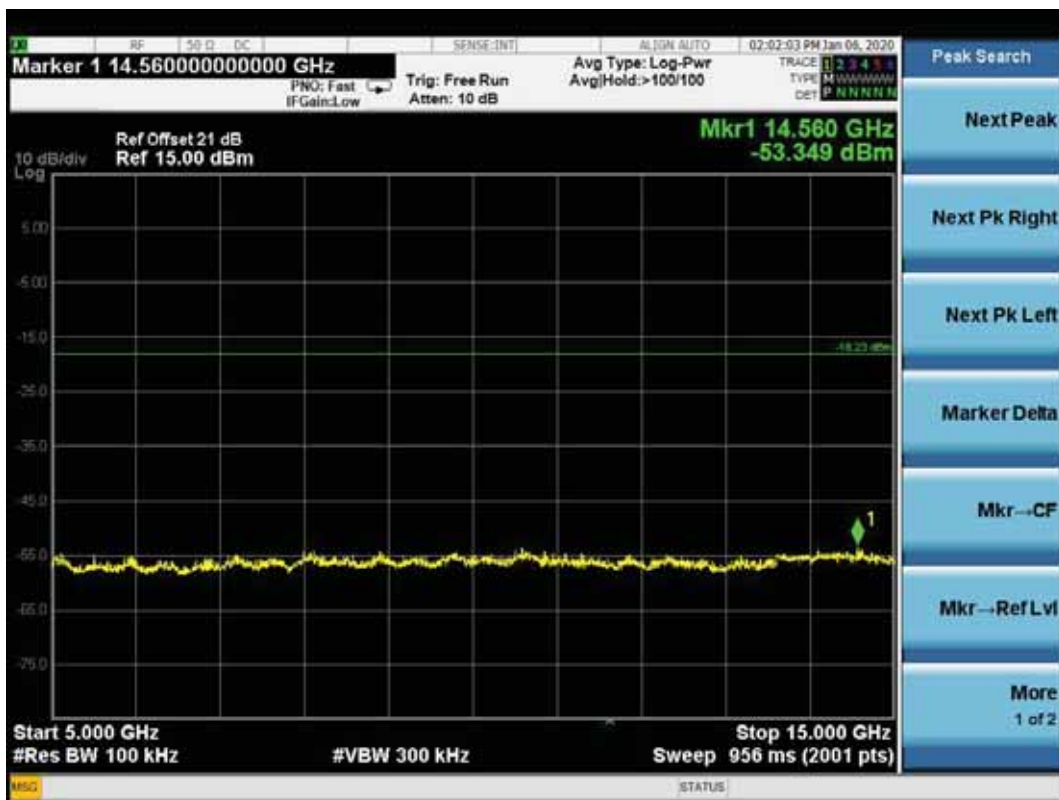
802.11g CH2437MHz

Reference level



Emission level





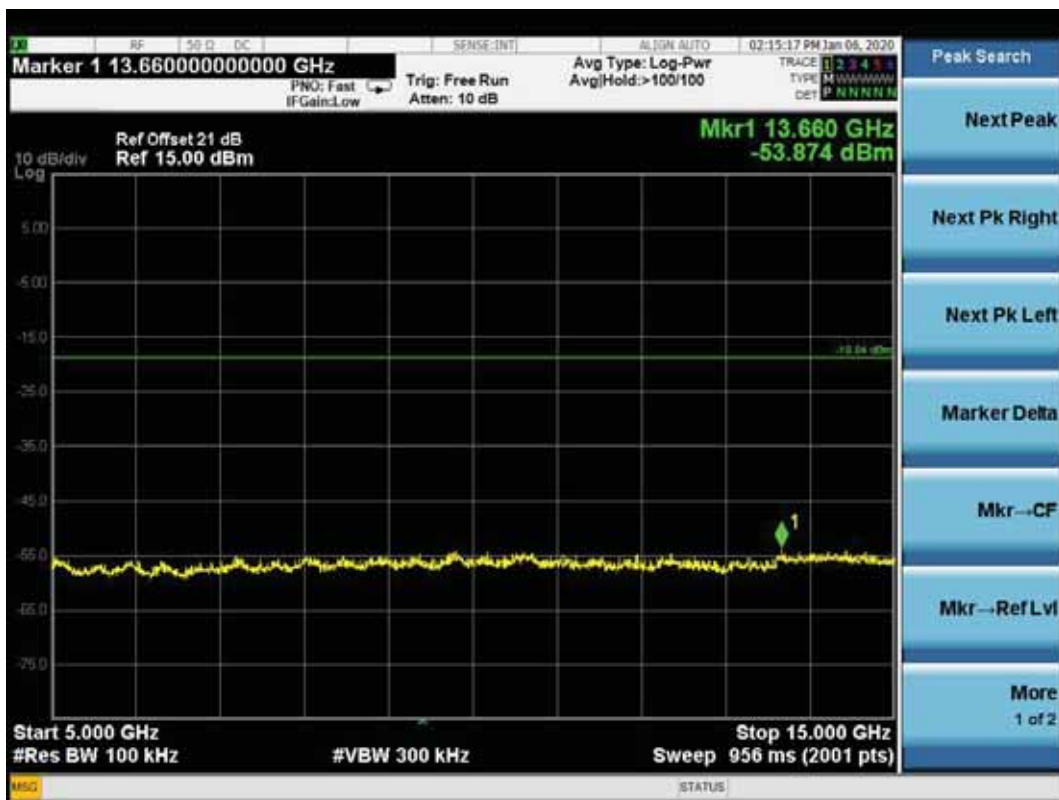
802.11g CH2462MHz

Reference level



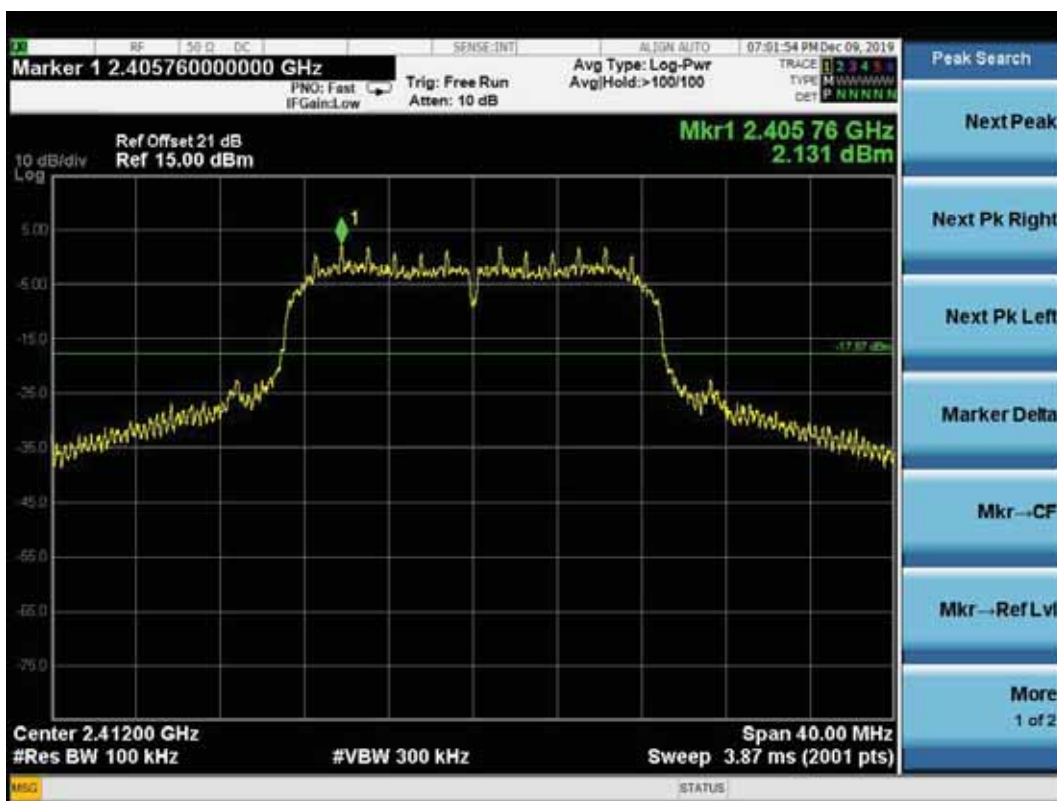
Emission level





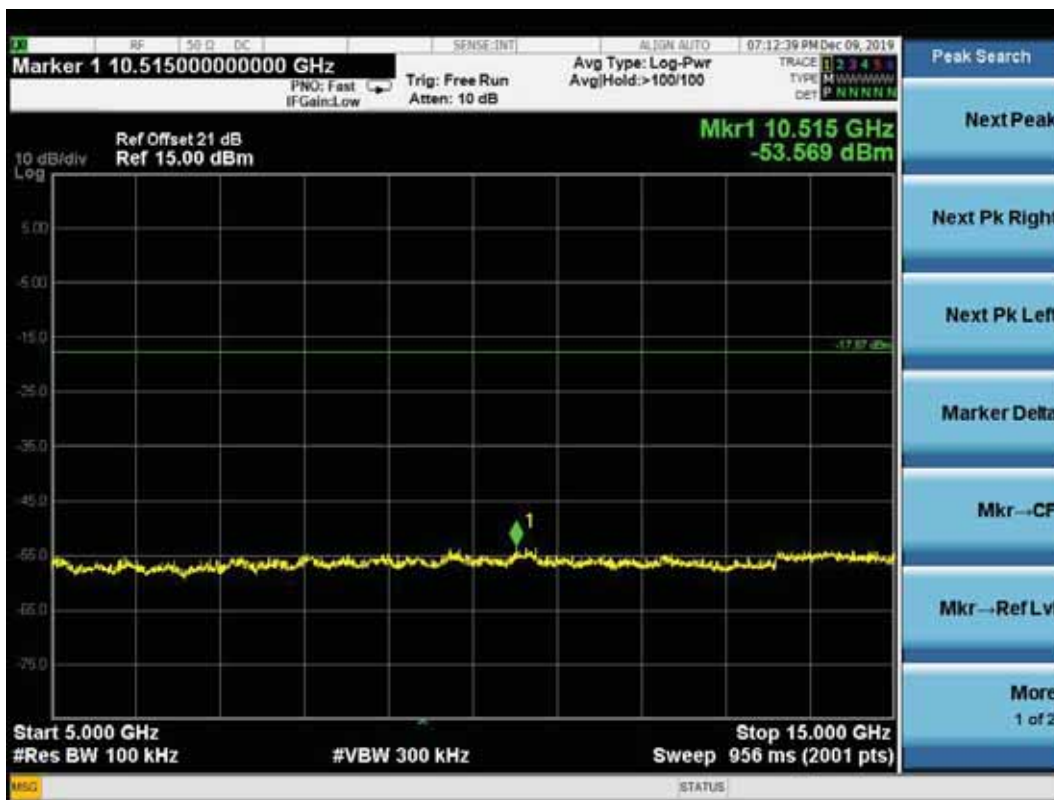
802.11n20 CH2412MHz

Reference level



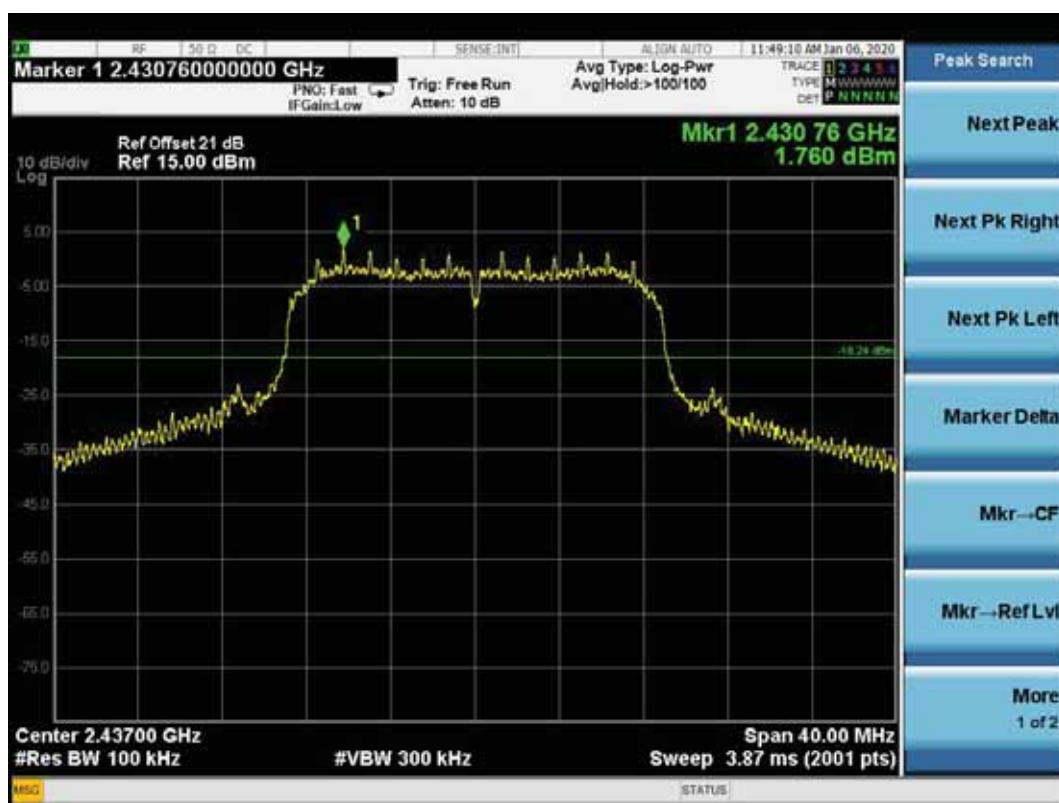
Emission level





802.11n20 CH2437MHz

Reference level



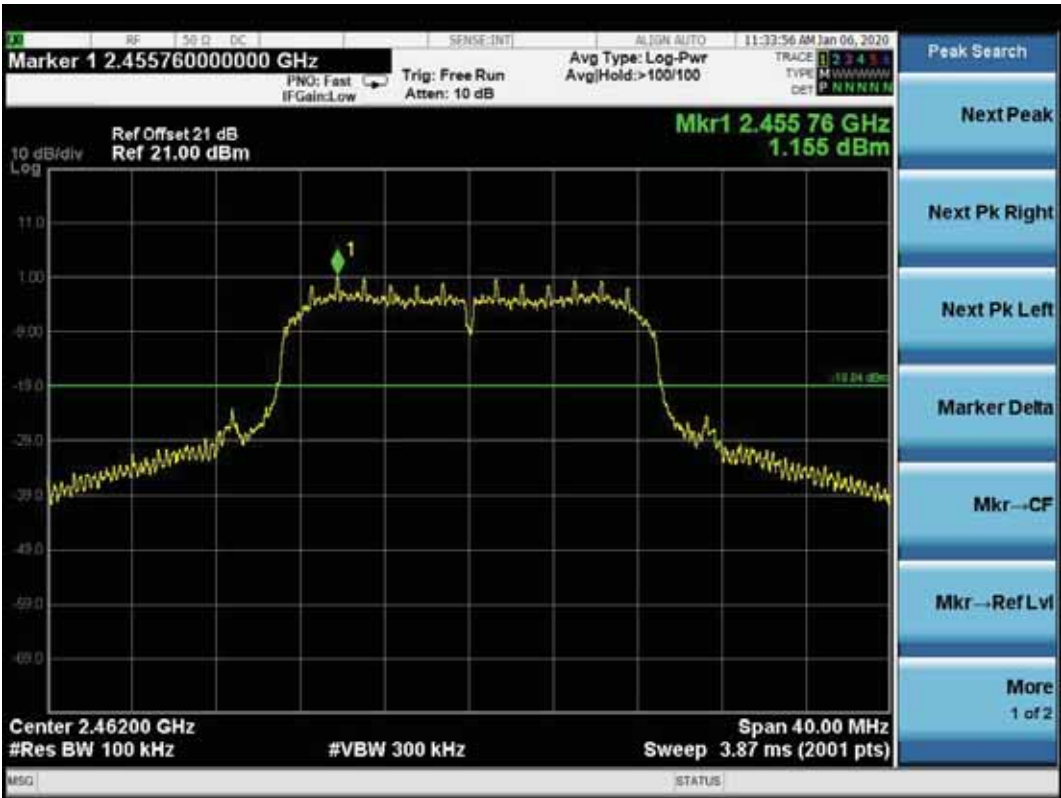
Emission level





802.11n20 CH2462MHz

Reference level



Emission level





7 BAND EDGES MEASUREMENT

7.1 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	N9010A	MY52221182	Sep 16, 2019	Sep 15, 2020

7.2 Block Diagram of Test Setup

The Same as section. 4.2.

7.3 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.

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. 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).

7.6 Test Results

PASSED.

All the test results are attached in next pages.

(Test Date: 2019.12.09-2020.01.06 Temperature: 23°C Humidity: 51 %)

Modulation	Location	Channel	Frequency (MHz)	Delta Marker (dB)	Result
802.11b	Below Band Edge	1	2412	54.053	More than 20 dB below the highest level of the desired power
	Upper Band Edge	11	2462	54.18	
802.11g	Below Band Edge	1	2412	43.98	More than 20 dB below the highest level of the desired power
	Upper Band Edge	11	2462	43.627	
802.11n20	Below Band Edge	1	2412	41.276	More than 20 dB below the highest level of the desired power
	Upper Band Edge	11	2462	44.136	

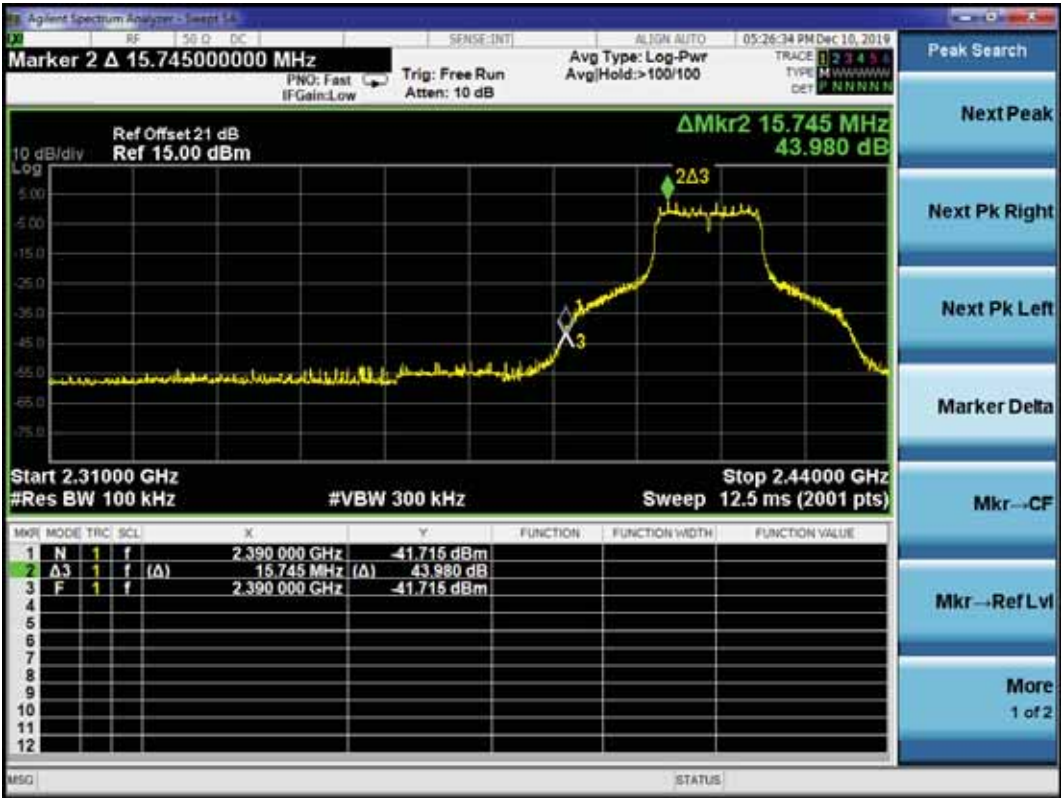
802.11b CH2412MHz (Below Edge 2390 MHz)



802.11b CH2462MHz (Upper Edge 2483.5 MHz)



802.11g CH2412MHz (Below Edge 2390 MHz)



802.11g CH2462MHz (Upper Edge 2483.5 MHz)



802.11n20 CH2412MHz (Below Edge 2390 MHz)



802.11n20 CH2462MHz (Upper Edge 2483.5 MHz)



8 POWER SPECTRAL DENSITY MEASUREMENT

8.1 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	N9010A	MY52221182	Sep 16, 2019	Sep 15, 2020

8.2 Block Diagram of Test Setup

The Same as section 4.2.

8.3 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.

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 analyzer center frequency to DTS channel center frequency.
- Set the span to 1.5 times the DTS bandwidth.
- Set the RBW to $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- Set the VBW $\geq [3 \times \text{RBW}]$.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level within the RBW.
- If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.

The test procedure is defined in ANSI C63.10-2013 (11.10.2 Measurement Procedure “Method PKPSD (peak PSD)” was used).

8.6 Test Results

PASSED.

All the test results are attached in next pages.

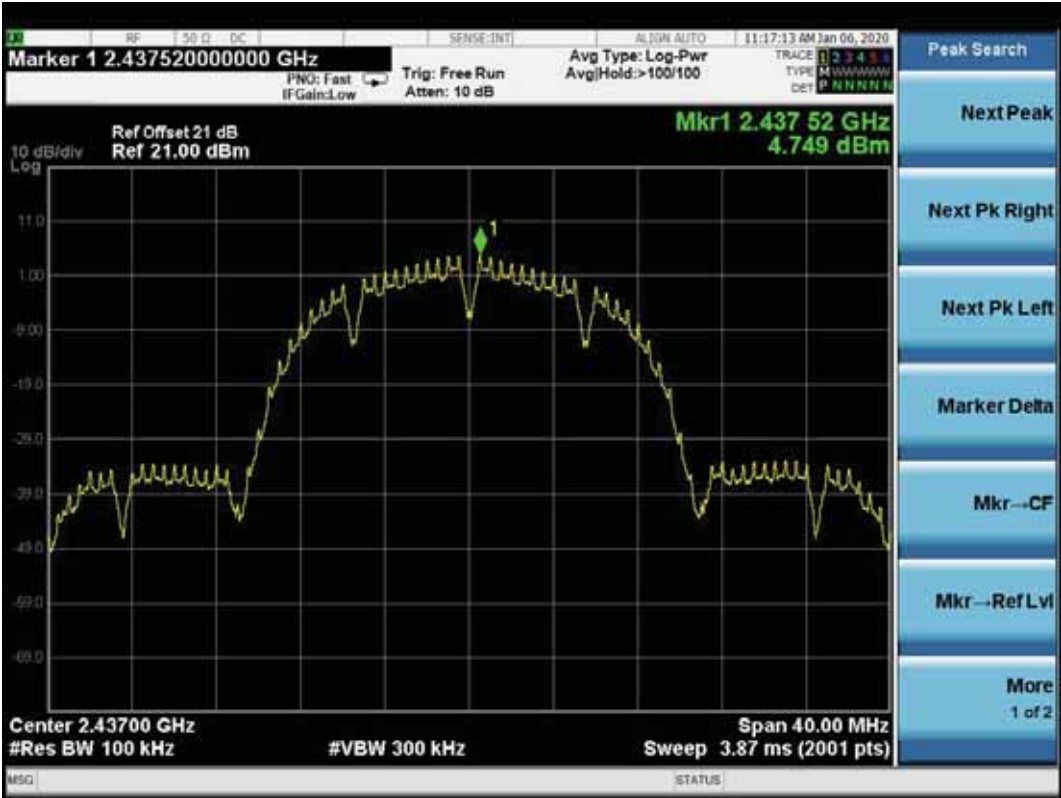
(Test Date: 2019.12.09-2020.01.06 Temperature: 23°C Humidity: 51 %)

Modulation	Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limit
802.11b	1	2412	5.135	8 dBm
	6	2437	4.749	8 dBm
	11	2462	4.099	8 dBm
802.11g	1	2412	2.302	8 dBm
	6	2437	1.765	8 dBm
	11	2462	1.147	8 dBm
802.11n20	1	2412	2.287	8 dBm
	6	2437	1.769	8 dBm
	11	2462	1.155	8 dBm

802.11b CH2412 MHz



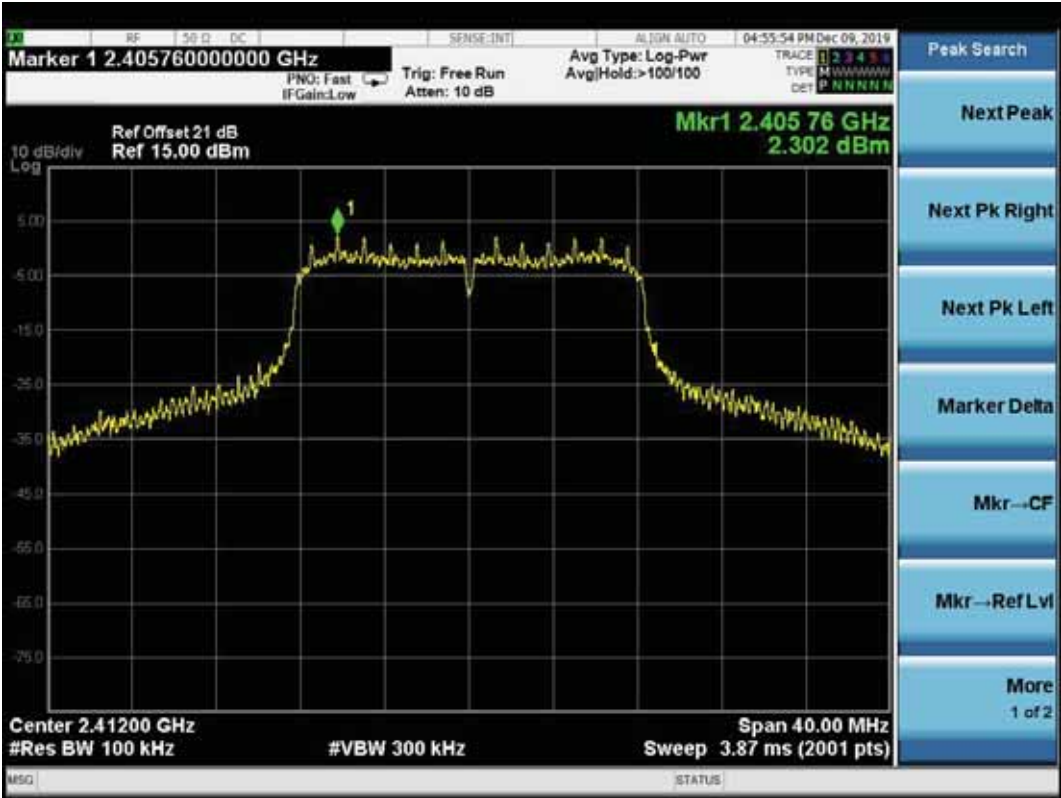
802.11b CH2437 MHz



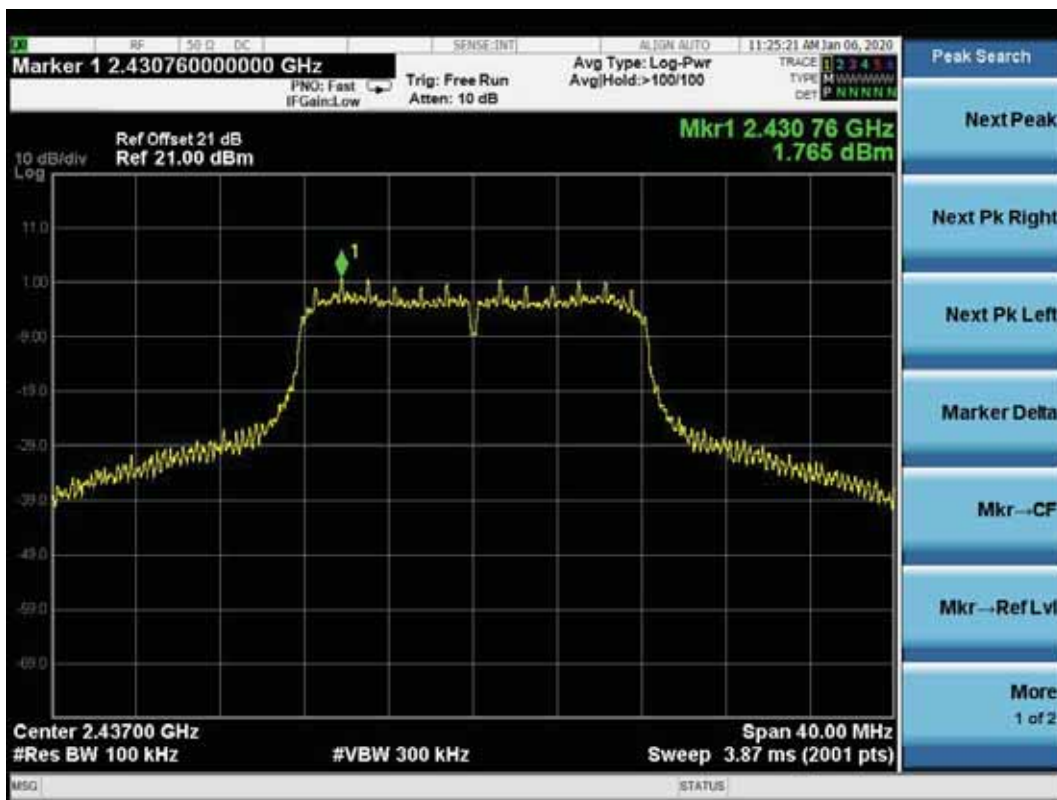
802.11b CH2462 MHz



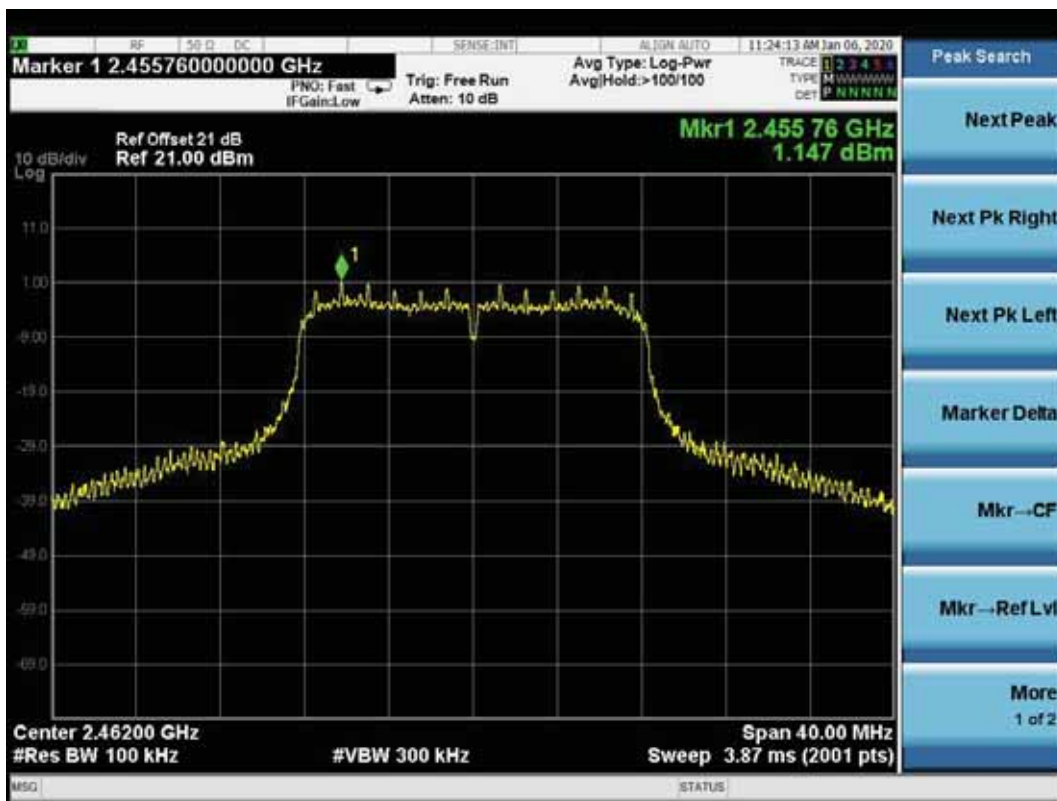
802.11g CH2412 MHz



802.11g CH2437 MHz



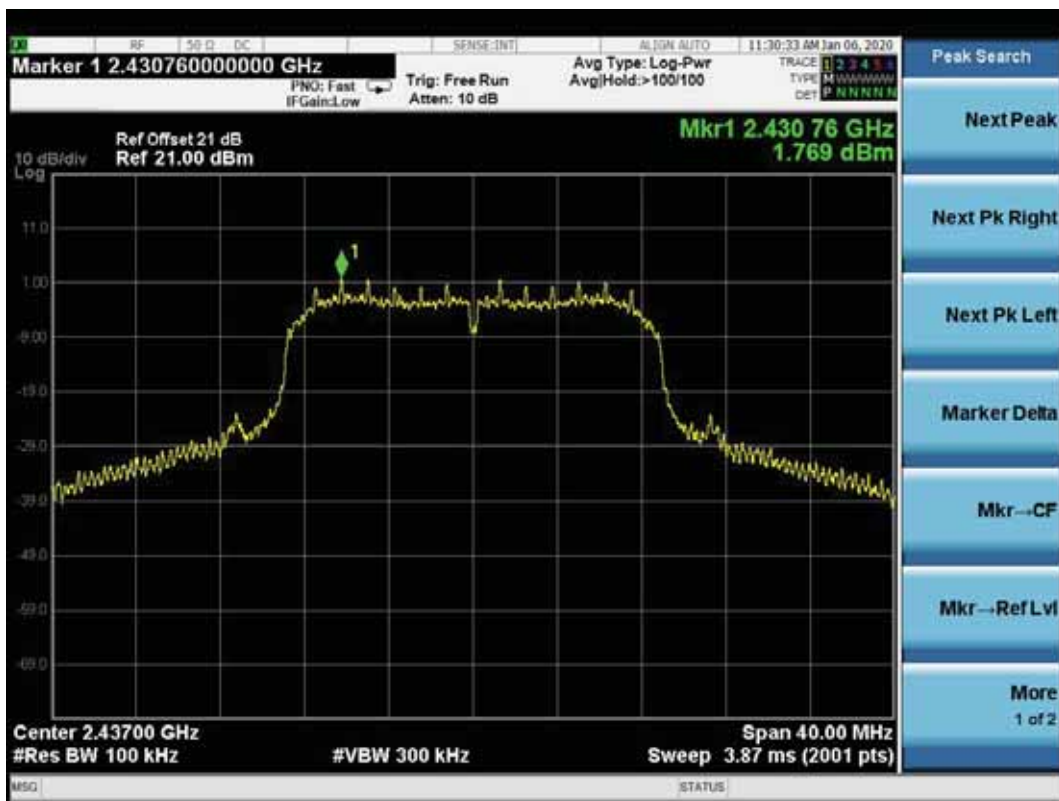
802.11g CH2462 MHz



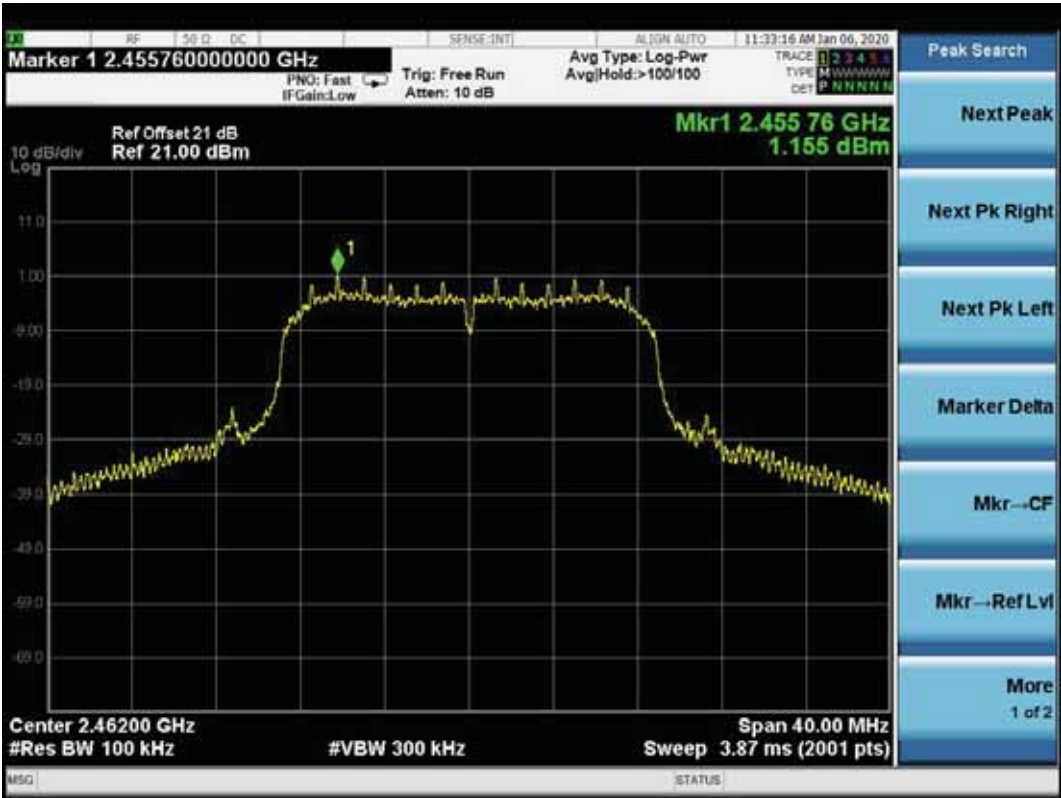
802.11n20 CH2412 MHz



802.11n20 CH2437 MHz



802.11n20 CH2462 MHz



9 DEVIATION TO TEST SPECIFICATIONS

None.

10 MEASUREMENT UNCERTAINTY LIST

The measurement uncertainty was estimated for test on the EUT according to CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage of K=2.
The uncertainties value is not used in determining the PASS/FAIL results.

Test Items/Facilities	Frequency/Equipment/Unit	Uncertainty
Conducted Emission No.1 Shielded Room	9kHz~150kHz	±3.8dB
	150kHz~30MHz	±3.4dB
Conducted Emission No.3 Shielded Room	150kHz~30MHz	±3.4dB
Radiated Emission	30MHz~200MHz, Horizontal	±4.5dB
	30MHz~200MHz, Vertical	±4.5dB
	200MHz~1000MHz, Horizontal	±4.6dB
	200MHz~1000MHz, Vertical	±5.7dB
	1GHz~6GHz	±6.0dB
	6GHz~18GHz	±5.7dB
Output Power Test	50MHz~18GHz	0.77dB
Power Density Test	9kHz~6GHz	1.08dB
RF Frequency Test	9kHz~40GHz	6×10^{-4}
Bandwidth Test	9kHz~6GHz	1.5×10^{-3}
RF Radiated Power Test	30MHz~1000MHz	3.06dB
Conducted Output Power Test	50MHz~18GHz	0.83dB
AC Voltage(<10kHz) Test	120V~230V	0.04%
DC Power Test	0V~30V	0.4%
Temperature	-40℃~+100℃	0.52℃
Humidity	30%~95%	2.6%