

TEST REPORT

On behalf of

GE Lighting

Product Name: Smart Plug

Model No.: CPLGSTDBLW1

FCC ID: PUU-CPLGSTDBLW1C

Prepared For: GE Lighting
1975 Noble Road, Cleveland, OH 44112

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TESTING
NVLAP LAB CODE 200371-0

File No. : C1D2004076
Report No. : ACI-F20134
Date of Test : 2020.04.24 – 05.14
Date of Report : 2020.05.15

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.

TABLE OF CONTENTS

	Page
1 SUMMARY OF STANDARDS AND RESULTS.....	5
1.1 Description of Standards and Results.....	5
2 GENERAL INFORMATION.....	6
2.1 Description of Equipment Under Test.....	6
2.2 EUT Specifications Assessed in Current Report.....	7
2.3 Test Information.....	7
2.4 Description of Test Facility.....	7
3 CONDUCTED EMISSION TEST.....	9
3.1 Test Equipment.....	9
3.2 Block Diagram of Test Setup.....	9
3.3 Conducted Emission Limits (§15.207).....	10
3.4 Test Configuration.....	10
3.5 Operating Condition of EUT.....	10
3.6 Test Procedures.....	10
3.7 Test Results.....	11
4 RADIATED EMISSION TEST.....	14
4.1 Test Equipment.....	14
4.2 Block Diagram of Test Setup.....	14
4.3 Radiated Emission Limit (§15.209).....	15
4.4 Test Configuration.....	15
4.5 Operating Condition of EUT.....	16
4.6 Test Procedures.....	16
4.7 Test Results.....	17
5 6 DB BANDWIDTH MEASUREMENT.....	31
5.1 Test Equipment.....	31
5.2 Block Diagram of Test Setup.....	31
5.3 Specification Limits (§15.247(a)(2)).....	31
5.4 Operating Condition of EUT.....	31
5.5 Test Procedure.....	31
5.6 Test Results.....	32
6 MAXIMUM PEAK OUTPUT POWER MEASUREMENT.....	38
6.1 Test Equipment.....	38
6.2 Block Diagram of Test Setup.....	38
6.3 Specification Limits ((§15.247(b)(3)).....	38
6.4 Operating Condition of EUT.....	38
6.5 Test Procedure.....	38
6.6 Test Results.....	39
7 EMISSION LIMITATIONS MEASUREMENT.....	45
7.1 Test Equipment.....	45
7.2 Block Diagram of Test Setup.....	45
7.3 Specification Limits (§15.247(d)).....	45
7.4 Operating Condition of EUT.....	45
7.5 Test Procedure.....	45
7.6 Test Results.....	47

8 BAND EDGES MEASUREMENT 66

8.1 Test Equipment..... 66

8.2 Block Diagram of Test Setup 66

8.3 Specification Limits (§15.247(d)) 66

8.4 Operating Condition of EUT 66

8.5 Test Procedure 66

8.6 Test Results 67

9 POWER SPECTRAL DENSITY MEASUREMENT 71

9.1 Test Equipment..... 71

9.2 Block Diagram of Test Setup 71

9.3 Specification Limits (§15.247(e)) 71

9.4 Operating Condition of EUT 71

9.5 Test Procedure 71

9.6 Test Results 72

10 DEVIATION TO TEST SPECIFICATIONS 78

11 MEASUREMENT UNCERTAINTY LIST 79

TEST REPORT

Applicant : GE Lighting
 EUT Description : Smart Plug
 (A) Model No. : Refer to Sec.2.1
 (B) Power Supply : 120V AC 60Hz
 (C) Test Voltage : 120V/60Hz

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 : 2020.04.24 – 05.14 Date of Report : 2020.05.15

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	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	:	Smart Plug
Type of EUT	:	<input checked="" type="checkbox"/> Production <input type="checkbox"/> Pre-product <input type="checkbox"/> Pro-type
Model Number	:	CPLGSTDBLW1
Radio Tech	:	BLE 4.2; IEEE 802.11 b/g/n.
Note:	:	802.11n-HT20 only.
Channel Freq.	:	BLE: 2402MHz-2480MHz; IEEE 802.11: 2412MHz-2462MHz;
Modulation	:	BLE: GFSK; 802.11b: DSSS (CCK, DQPSK, DBPSK); 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK).
Antenna Info.	:	BT ANT: Antenna Type: PCB Antenna Antenna Gain: 1.83 dBi WLAN ANT: Antenna Type: PCB Antenna Antenna Gain: 0.76 dBi The Antenna was a permanently attached antenna that is comply with 15.203 requirement.
Test Mode	:	The EUT was set at continuous TX during all the test in the report.
Applicant	:	GE Lighting 1975 Noble Road, Cleveland, OH 44112
Manufacturer	:	same as Applicant
Factory #1	:	Sichuan Hongrui Electric Co., Ltd Mianyan Export Processing Zone, Mianyan, Sichuan, China
Factory #1	:	VIETNAM CHANGHONG ELECTRIC COMPANY LIMITED Workshop W4 (Leased by WWWHP), Land plot 4.2B, Dinh Vu Industrial Zone, Dong Hai 2 Ward, Hai An District, Haiphong City, VN.

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 : Acer
 Product Name: : Netbook
 Model Name : TravelMate P238 series
 Model Number : N15W8

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 CONDUCTED EMISSION TEST

3.1 Test Equipment

The following test equipments are used during the conducted emission test in a shielded room:

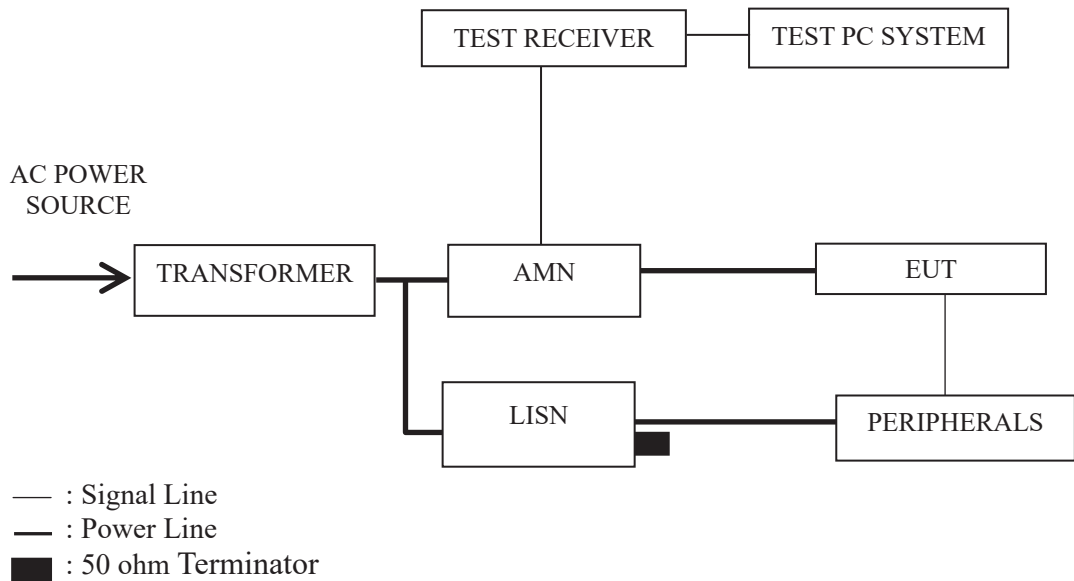
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	R&S	ESCI	101302	Apr 26, 2020	Apr 25, 2021
2.	Artificial Mains Network (AMN)	R&S	ENV4200	100125	Jun 24, 2019	Jun 23, 2020
3.	Software	Audix	E3	6.2009-1-15	--	--

3.2 Block Diagram of Test Setup

3.2.1 EUT & Peripherals



3.2.2 Conducted Disturbance Test Setup



3.3 Conducted Emission Limits (§15.207)

Frequency Range (MHz)	Limits dB(μ V)	
	Quasi-peak	Average
0.15 ~ 0.5	66~56	56~46
0.5 ~ 5	56	46
5 ~ 30	60	50

NOTE 1 – The lower limit shall apply at the transition frequencies.
NOTE 2 – The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz~0.50 MHz

3.4 Test Configuration

The EUT (listed in Sec.2.1) was installed as shown on Sec.3.2 to meet FCC requirement and operating in a manner which 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

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)

The test modes were done on conducted disturbance test and all the test results are listed in Sec. 3.7

3.7 Test Results

< PASS >

The frequency and amplitude of the highest conducted 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 (MHz)	Data Page
1.	Transmitting	802.11b	1	2412	P12
2.	Receiving	802.11b/g/n	1	2412	P13

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 : Smart Plug Temperature : 22°C
 Model No. : CPLGSTDBLW1 Humidity : 51%RH
 Test Mode : Transmitting Date of Test : 2020.05.08

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	0.3852	24.75	10.34	0.04	35.13	58.17	23.04	QP
	0.3852	10.68	10.34	0.04	21.06	48.17	27.11	Average
	0.5581	24.46	10.33	0.04	34.83	56	21.17	QP
	0.5581	10.35	10.33	0.04	20.72	46	25.28	Average
	1.282	24.17	10.31	0.05	34.53	56	21.47	QP
	1.282	10.62	10.31	0.05	20.98	46	25.02	Average
	2.178	23.18	10.3	0.06	33.54	56	22.46	QP
	2.178	10.32	10.3	0.06	20.68	46	25.32	Average
	3.074	24.42	10.3	0.06	34.78	56	21.22	QP
	3.074	14.24	10.3	0.06	24.6	46	21.4	Average
	7.526	23.03	10.3	0.07	33.4	60	26.6	QP
	7.526	12.1	10.3	0.07	22.47	50	27.53	Average
Neutral	0.4468	28.29	10.34	0.04	38.67	56.93	18.26	QP
	0.4468	15.13	10.34	0.04	25.51	46.93	21.42	Average
	0.5916	26.41	10.32	0.05	36.78	56	19.22	QP
	0.5916	15.34	10.32	0.05	25.71	46	20.29	Average
	1.403	28.67	10.32	0.05	39.04	56	16.96	QP
	1.403	17.47	10.32	0.05	27.84	46	18.16	Average
	2.201	26.03	10.32	0.06	36.41	56	19.59	QP
	2.201	15.4	10.32	0.06	25.78	46	20.22	Average
	3.074	27.5	10.33	0.06	37.89	56	18.11	QP
	3.074	18.15	10.33	0.06	28.54	46	17.46	Average
	6.488	23.97	10.33	0.06	34.36	60	25.64	QP
	6.488	16.4	10.33	0.06	26.79	50	23.21	Average

TEST ENGINEER: Jarey

EUT : Smart Plug Temperature : 22°C
 Model No. : CPLGSTDBLW1 Humidity : 51%RH
 Test Mode : Receiving Date of Test : 2020.05.08

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	0.4564	25.24	10.33	0.04	35.61	56.76	21.15	QP
	0.4564	10.53	10.33	0.04	20.9	46.76	25.86	Average
	0.5979	23.83	10.32	0.05	34.2	56	21.8	QP
	0.5979	9.18	10.32	0.05	19.55	46	26.45	Average
	1.31	24.7	10.31	0.05	35.06	56	20.94	QP
	1.31	11.37	10.31	0.05	21.73	46	24.27	Average
	2.11	24.41	10.3	0.06	34.77	56	21.23	QP
	2.11	11.24	10.3	0.06	21.6	46	24.4	Average
	4.07	24.18	10.3	0.06	34.54	56	21.46	QP
	4.07	13.52	10.3	0.06	23.88	46	22.12	Average
	7.606	22.82	10.3	0.07	33.19	60	26.81	QP
	7.606	11.57	10.3	0.07	21.94	50	28.06	Average
Neutral	0.3852	27.86	10.36	0.04	38.26	58.17	19.91	QP
	0.3852	15.18	10.36	0.04	25.58	48.17	22.59	Average
	0.5047	27.82	10.32	0.04	38.18	56	17.82	QP
	0.5047	16.29	10.32	0.04	26.65	46	19.35	Average
	1.31	27.15	10.32	0.05	37.52	56	18.48	QP
	1.31	17.42	10.32	0.05	27.79	46	18.21	Average
	2.066	27.37	10.32	0.06	37.75	56	18.25	QP
	2.066	16.54	10.32	0.06	26.92	46	19.08	Average
	3.025	26.09	10.33	0.06	36.48	56	19.52	QP
	3.025	19.21	10.33	0.06	29.6	46	16.4	Average
	6.42	23.6	10.33	0.06	33.99	60	26.01	QP
	6.42	16.37	10.33	0.06	26.76	50	23.24	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:

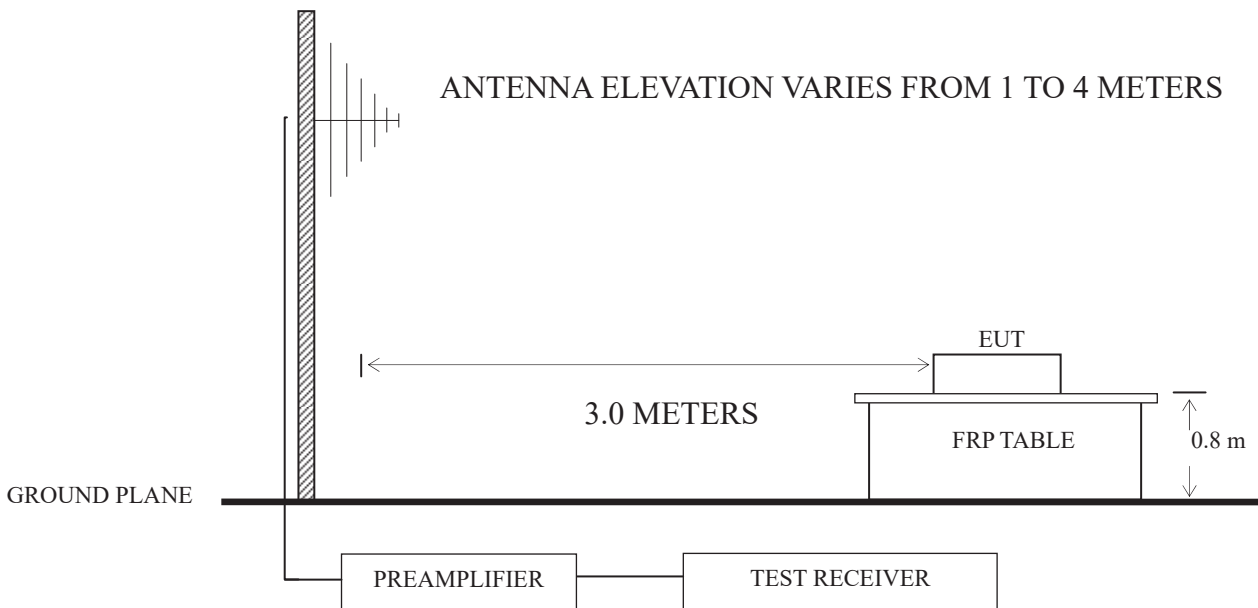
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Preamplifier	Agilent	8447D	2944A10548	Apr 26, 2020	Apr 27, 2021
2.	Preamplifier	HP	8449B	3008A00864	Mar 8, 2020	Mar 7, 2021
3.	Spectrum Analyzer	Agilent	N9010A	MY52221182	Sep 16, 2019	Sep 15, 2020
4.	Test Receiver	R&S	ESCI	101303	Apr 26, 2020	May 25, 2021
5.	Bi-log Antenna	Schwarz beck	VULB 9168+EMC I-N-6-06	708+AT-N06 38	May 17, 2019	May 16, 2020
6.	Horn Antenna	EMCO	3115	9607-4878	Jul 13, 2019	Jul 12, 2020
7.	Horn Antenna	EMCO	3116	00062643	Oct 10, 2019	Oct 09, 2020
8.	Software	Audix	E3	SET00200 9912M295-2	--	--

4.2 Block Diagram of Test Setup

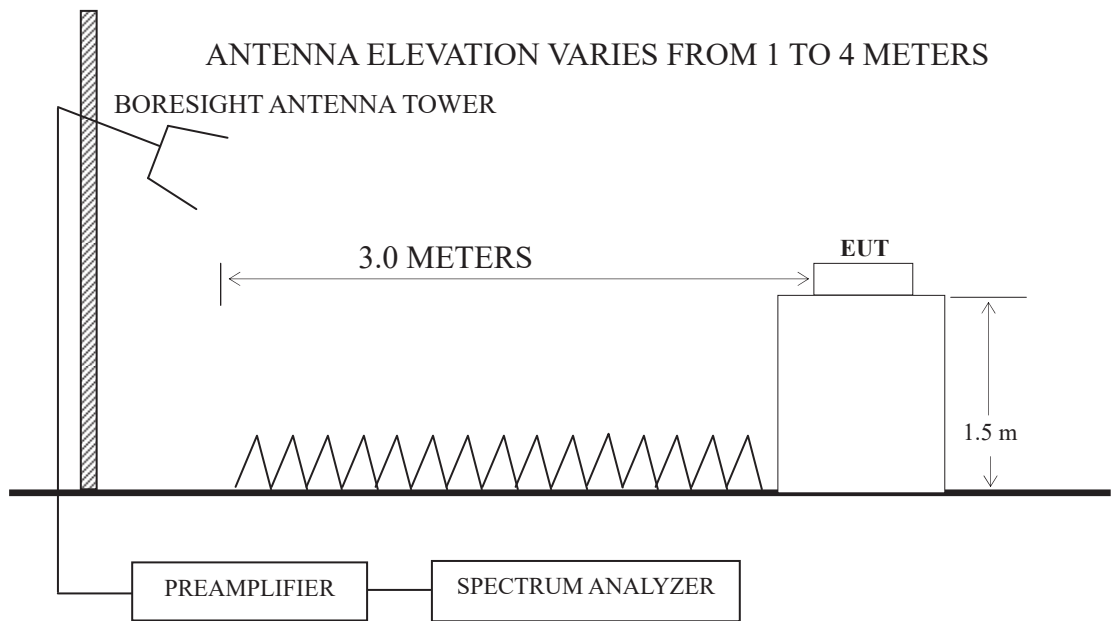
4.2.1 EUT & Peripherals



4.2.2 Below 1GHz



4.2.3 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 Agilent N9010A was set at 1MHz for above 1GHz.

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.4.7.

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 1G (Worst case emission)

No.	Operation	Modulation	Channel	Frequency	Data Page
1.	Transmitting	802.11b	1	2412 MHz	P19
2.	Receiving	802.11b/g/n	1	2412 MHz	P20

Frequency range: above 1G

No.	Operation	Modulation	Channel	Frequency	Data Page
1.	Transmitting	802.11b	1	2412 MHz	P21
2.			6	2437 MHz	P21
3.			11	2462 MHz	P22
4.	Transmitting	802.11g	1	2412 MHz	P22
5.			6	2437 MHz	P23
6.			11	2462 MHz	P23
7.	Transmitting	802.11n20	1	2412 MHz	P24
8.			6	2437 MHz	P24
9.			11	2462 MHz	P25
10.	Receiving	802.11b/g/n	1	2412 MHz	P26

Restricted bands:

No.	Operation	Modulation	Channel	Frequency	Data Page
1.	Transmitting	802.11b	Cabinet Emission		P27
2.		802.11g	Cabinet Emission		P28
3.		802.11n20	Cabinet Emission		P29

Additional Radiated emission (Mixed worst modulation): below 1G

No.	Operation	Modulation	Channel	Frequency	Data Page
1.	Transmitting	BLE	39	2480 MHz	P30
		IEEE 802.11b	1	2412 MHz	

Additional Radiated emission (Mixed worst modulation): above 1G

No.	Operation	Modulation	Channel	Frequency	Data Page
1.	Transmitting	BLE	39	2480 MHz	P30
		IEEE 802.11b	1	2412 MHz	

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 : Smart Plug Temperature : 22°C
 Model No. : CPLGSTDBLW1 Humidity : 51%RH
 Test Mode : Transmitting Date of Test : 2020.04.24 – 05.14

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	35.875	26.74	18.5	0.71	27.62	18.33	40	21.67	QP
	63.983	25.56	18	0.91	27.6	16.87	40	23.13	QP
	124.57	26.9	17.41	1.25	27.41	18.15	43.5	25.35	QP
	191.75	30.02	17.4	1.53	27.03	21.92	43.5	21.58	QP
	340.78	28.8	21.1	2.09	27.12	24.87	46	21.13	QP
	734.49	24.28	27.79	2.97	28.03	27.01	46	18.99	QP
Vertical	34.037	44.88	18.4	0.69	27.62	36.35	40	3.65	QP
	55.609	36.38	18.37	0.85	27.6	28	40	12	QP
	134.09	35.48	18.48	1.3	27.35	27.91	43.5	15.59	QP
	307.83	24.12	20.64	1.99	26.87	19.88	46	26.12	QP
	519.07	23.3	24.2	2.52	28	22.02	46	23.98	QP
	845.09	23.13	28.3	3.14	27.7	26.87	46	19.13	QP

TEST ENGINEER: Jarey

EUT : Smart Plug Temperature : 22°C
 Model No. : CPLGSTDBLW1 Humidity : 51%RH
 Test Mode : Receiving Date of Test : 2020.04.24 – 05.14

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	34.276	26.27	18.41	0.69	27.62	17.75	40	22.25	QP
	63.983	25.36	18	0.91	27.6	16.67	40	23.33	QP
	124.57	26.9	17.41	1.25	27.41	18.15	43.5	25.35	QP
	159.78	25.21	20.39	1.41	27.19	19.82	43.5	23.68	QP
	302.48	25.56	20.26	1.96	26.82	20.96	46	25.04	QP
	647.39	25.75	26.74	2.8	28.05	27.24	46	18.76	QP
Vertical	33.85	45.1	18.4	0.69	27.62	36.57	40	3.43	QP
	55.805	35.5	18.5	0.85	27.6	27.25	40	12.75	QP
	136.94	34.27	18.94	1.32	27.33	27.2	43.5	16.3	QP
	344.39	23.4	21.06	2.09	27.14	19.41	46	26.59	QP
	562.66	23.43	24.67	2.61	28	22.71	46	23.29	QP
	771.45	23.34	28.13	3.03	27.96	26.54	46	19.46	QP

TEST ENGINEER: Jarey

Radiated Emission > 1GHz

EUT : Smart Plug Temperature : 22°C
 Model No. : CPLGSTDBLW1 Humidity : 51%RH
 Test Mode : Transmitting Date of Test : 2020.04.24 – 05.14

802.11b CH2412MHz

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	1999	50.77	28.1	4.78	37	46.65	74	27.35	Peak
	3745	45.25	32.07	6.64	36.52	47.44	74	26.56	Peak
	4824	46.17	33.15	7.56	36.5	50.38	74	23.62	Peak
	4824	43.63	33.15	7.56	36.5	47.84	54	6.16	Average
	6031	43.69	35.03	8.88	36.61	50.99	74	23.01	Peak
	7237	44.19	35.95	9.84	37.2	52.78	74	21.22	Peak
Vertical	8560	42.28	36.46	10.33	35.99	53.08	74	20.92	Peak
	1837	49.06	27.41	4.6	37.1	43.97	74	30.03	Peak
	3853	45.5	32.39	6.74	36.51	48.12	74	25.88	Peak
	4824	47.29	33.15	7.56	36.5	51.5	74	22.5	Peak
	4824	45.92	33.15	7.56	36.5	50.13	54	3.87	Average
	6040	43.55	35.03	8.88	36.63	50.83	74	23.17	Peak
	7210	43.95	35.92	9.84	37.21	52.5	74	21.5	Peak
8623	42.52	36.5	10.33	35.89	53.46	74	20.54	Peak	

802.11b CH2437MHz

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	2026	46.88	28.18	4.78	36.99	42.85	74	31.15	Peak
	3853	45.3	32.39	6.74	36.51	47.92	74	26.08	Peak
	4874	45.64	33.23	7.62	36.5	49.99	74	24.01	Peak
	4874	43.32	33.23	7.62	36.5	47.67	54	6.33	Average
	5950	43.47	34.92	8.79	36.59	50.59	74	23.41	Peak
	7327	43.8	36	9.88	37.16	52.52	74	21.48	Peak
	8722	41.85	36.58	10.37	35.71	53.09	74	20.91	Peak
Vertical	1837	48.49	27.41	4.6	37.1	43.4	74	30.6	Peak
	3799	45.5	32.23	6.69	36.52	47.9	74	26.1	Peak
	4874	46.51	33.23	7.62	36.5	50.86	74	23.14	Peak
	4874	45.51	33.23	7.62	36.5	49.86	54	4.14	Average
	5923	44.13	34.87	8.7	36.59	51.11	74	22.89	Peak
	7228	43.68	35.94	9.84	37.2	52.26	74	21.74	Peak
8479	42.88	36.4	10.28	36.12	53.44	74	20.56	Peak	

802.11b 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	1810	48.09	27.3	4.57	37.12	42.84	74	31.16	Peak
	3826	45.57	32.29	6.69	36.52	48.03	74	25.97	Peak
	4924	45.73	33.31	7.67	36.5	50.21	74	23.79	Peak
	4924	43.28	33.31	7.67	36.5	47.76	54	6.24	Average
	6220	43.41	35.17	9.05	36.76	50.87	74	23.13	Peak
	7588	42.87	36.14	9.96	37.07	51.9	74	22.1	Peak
	8659	42.67	36.54	10.37	35.8	53.78	74	20.22	Peak
Vertical	1765	50.52	27.11	4.52	37.15	45	74	29	Peak
	3529	47.21	31.4	6.43	36.54	48.5	74	25.5	Peak
	4924	46.9	33.31	7.67	36.5	51.38	74	22.62	Peak
	4924	45.43	33.31	7.67	36.5	49.91	54	4.09	Average
	5878	44.36	34.81	8.7	36.59	51.28	74	22.72	Peak
	7327	43.2	36	9.88	37.16	51.92	74	22.08	Peak
	8677	42.24	36.56	10.37	35.8	53.37	74	20.63	Peak

802.11g CH2412MHz

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	1981	47.11	28.03	4.75	37.01	42.88	74	31.12	Peak
	3376	47.79	31.03	6.28	36.56	48.54	74	25.46	Peak
	4824	43.84	33.15	7.56	36.5	48.05	74	25.95	Peak
	4824	39.88	33.15	7.56	36.5	44.09	54	9.91	Average
	5968	44.24	34.95	8.79	36.6	51.38	74	22.62	Peak
	7318	43.71	36	9.88	37.17	52.42	74	21.58	Peak
	8191	42.97	36.34	10.2	36.58	52.93	74	21.07	Peak
Vertical	1774	48.13	27.13	4.52	37.14	42.64	74	31.36	Peak
	3763	46.21	32.1	6.64	36.52	48.43	74	25.57	Peak
	4824	45.97	33.15	7.56	36.5	50.18	74	23.82	Peak
	4824	43.63	33.15	7.56	36.5	47.84	54	6.16	Average
	5923	44.04	34.87	8.7	36.59	51.02	74	22.98	Peak
	7156	43.78	35.9	9.8	37.23	52.25	74	21.75	Peak
	8722	41.53	36.58	10.37	35.71	52.77	74	21.23	Peak

802.11g CH2437MHz

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	1927	50.88	27.8	4.69	37.05	46.32	74	27.68	Peak
	3871	45.74	32.42	6.74	36.51	48.39	74	25.61	Peak
	4874	44.35	33.23	7.62	36.5	48.7	74	25.3	Peak
	4874	39.67	33.23	7.62	36.5	44.02	54	9.98	Average
	6076	44.69	35.06	8.88	36.66	51.97	74	22.03	Peak
	7237	44.16	35.95	9.84	37.2	52.75	74	21.25	Peak
	8677	42.14	36.56	10.37	35.8	53.27	74	20.73	Peak
Vertical	1828	48.85	27.39	4.57	37.11	43.7	74	30.3	Peak
	3844	45.03	32.35	6.74	36.51	47.61	74	26.39	Peak
	4874	45.53	33.23	7.62	36.5	49.88	74	24.12	Peak
	4874	43.27	33.23	7.62	36.5	47.62	54	6.38	Average
	5950	43.82	34.92	8.79	36.59	50.94	74	23.06	Peak
	7237	43.71	35.95	9.84	37.2	52.3	74	21.7	Peak
	8533	42.61	36.44	10.33	36.03	53.35	74	20.65	Peak

802.11g 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	1953.1	50.12	27.92	4.72	37.03	45.73	74	28.27	Peak
	3582.1	46.02	31.56	6.48	36.54	47.52	74	26.48	Peak
	4924	43.14	33.31	7.67	36.5	47.62	74	26.38	Peak
	4924	39.41	33.31	7.67	36.5	43.89	54	10.11	Average
	6390.1	43.48	35.31	9.23	36.88	51.14	74	22.86	Peak
	7515.1	43.09	36.11	9.96	37.1	52.06	74	21.94	Peak
	8856.1	41.85	36.7	10.41	35.48	53.48	74	20.52	Peak
Vertical	1855	48.73	27.5	4.6	37.09	43.74	74	30.26	Peak
	3754	45.97	32.1	6.64	36.52	48.19	74	25.81	Peak
	4924	44.85	33.31	7.67	36.5	49.33	74	24.67	Peak
	4924	43.32	33.31	7.67	36.5	47.8	54	6.2	Average
	5887	43.46	34.81	8.7	36.59	50.38	74	23.62	Peak
	7174	43.98	35.91	9.84	37.23	52.5	74	21.5	Peak
	8605	42.83	36.5	10.33	35.89	53.77	74	20.23	Peak

802.11n20 CH2412MHz

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	2062	47.69	28.29	4.86	36.97	43.87	74	30.13	Peak
	3862	45.29	32.39	6.74	36.51	47.91	74	26.09	Peak
	4824	43.59	33.15	7.56	36.5	47.8	74	26.2	Peak
	4824	39.76	33.15	7.56	36.5	43.97	54	10.03	Average
	5896	44.44	34.84	8.7	36.59	51.39	74	22.61	Peak
	7156	43.02	35.9	9.8	37.23	51.49	74	22.51	Peak
	8596	42.24	36.48	10.33	35.94	53.11	74	20.89	Peak
Vertical	1990	50.61	28.05	4.75	37.01	46.4	74	27.6	Peak
	3853	46.04	32.39	6.74	36.51	48.66	74	25.34	Peak
	4824	45.77	33.15	7.56	36.5	49.98	74	24.02	Peak
	4824	43.79	33.15	7.56	36.5	48	54	6	Average
	5941	43.46	34.89	8.79	36.59	50.55	74	23.45	Peak
	7219	43.42	35.94	9.84	37.21	51.99	74	22.01	Peak
	8713	41.55	36.58	10.37	35.71	52.79	74	21.21	Peak

802.11n20 CH2437MHz

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	1774	51.66	27.13	4.52	37.14	46.17	74	27.83	Peak
	3781	45.86	32.16	6.64	36.52	48.14	74	25.86	Peak
	4874	44.04	33.23	7.62	36.5	48.39	74	25.61	Peak
	4874	39.42	33.23	7.62	36.5	43.77	54	10.23	Average
	5950	43.63	34.92	8.79	36.59	50.75	74	23.25	Peak
	7210	43.38	35.92	9.84	37.21	51.93	74	22.07	Peak
	8650	42.11	36.52	10.33	35.85	53.11	74	20.89	Peak
Vertical	1801	47.41	27.27	4.55	37.12	42.11	74	31.89	Peak
	3781	45.51	32.16	6.64	36.52	47.79	74	26.21	Peak
	4874	45.43	33.23	7.62	36.5	49.78	74	24.22	Peak
	4874	43.39	33.23	7.62	36.5	47.74	54	6.26	Average
	6004	43.74	35	8.79	36.6	50.93	74	23.07	Peak
	7237	43.72	35.95	9.84	37.2	52.31	74	21.69	Peak
	8479	42.99	36.4	10.28	36.12	53.55	74	20.45	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	1837	49.03	27.41	4.6	37.1	43.94	74	30.06	Peak
	3853	45.43	32.39	6.74	36.51	48.05	74	25.95	Peak
	4924	43.27	33.31	7.67	36.5	47.75	74	26.25	Peak
	4924	39.25	33.31	7.67	36.5	43.73	54	10.27	Average
	6337	43.13	35.27	9.14	36.84	50.7	74	23.3	Peak
	7462	42.99	36.07	9.92	37.11	51.87	74	22.13	Peak
	8605	42.66	36.5	10.33	35.89	53.6	74	20.4	Peak
Vertical	1774	51.88	27.13	4.52	37.14	46.39	74	27.61	Peak
	3862	47.04	32.39	6.74	36.51	49.66	74	24.34	Peak
	4924	45.16	33.31	7.67	36.5	49.64	74	24.36	Peak
	4924	43.37	33.31	7.67	36.5	47.85	54	6.15	Average
	6292	43.81	35.23	9.14	36.81	51.37	74	22.63	Peak
	7660	42.96	36.16	10	37.04	52.08	74	21.92	Peak
	8542	42.63	36.44	10.33	35.99	53.41	74	20.59	Peak

TEST ENGINEER: Jarey

EUT : Smart Plug Temperature : 22°C

Model No. : CPLGSTDBLW1 Humidity : 51%RH

Test Mode : Receiving Date of Test : 2020.04.24 – 05.14

Polarization	Frequency (MHz)	Meter Reading dB (μ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μ V/m)	Limits dB (μ V/m)	Margin (dB)	Remark
Horizontal	1927	48.07	27.8	4.69	37.05	43.51	74	30.49	Peak
	3772	45.61	32.13	6.64	36.52	47.86	74	26.14	Peak
	5122	43.7	33.59	7.82	36.51	48.6	74	25.4	Peak
	6373	44.33	35.3	9.14	36.87	51.9	74	22.1	Peak
	7687	43.44	36.18	10	37.03	52.59	74	21.41	Peak
	8623	42.05	36.5	10.33	35.89	52.99	74	21.01	Peak
Vertical	1765	50.54	27.11	4.52	37.15	45.02	74	28.98	Peak
	3187	48.46	30.58	6.07	36.58	48.53	74	25.47	Peak
	4609	44.11	32.87	7.4	36.5	47.88	74	26.12	Peak
	6337	43.91	35.27	9.14	36.84	51.48	74	22.52	Peak
	7705	43.05	36.18	10.04	37.02	52.25	74	21.75	Peak
	8758	42	36.62	10.37	35.67	53.32	74	20.68	Peak

TEST ENGINEER: Jarey

Emissions in restricted frequency bands:

EUT : Smart Plug Temperature : 22°C
 Model No. : CPLGSTDBLW1 Humidity : 51%RH
 Test Mode : Transmitting Date of Test : 2020.04.24 – 05.14

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	2334.1	48.73	29.13	5.17	36.85	46.18	74	27.82	Peak
	2334.1	35.43	29.13	5.17	36.85	32.88	54	21.12	Average
	2374	47.6	29.25	5.21	36.83	45.23	74	28.77	Peak
	2374	36.32	29.25	5.21	36.83	33.95	54	20.05	Average
	2390	58.11	29.29	5.25	36.82	55.83	74	18.17	Peak
	2390	45.37	29.29	5.25	36.82	43.09	54	10.91	Average
	2483.5	45.73	29.56	5.32	36.79	43.82	74	30.18	Peak
	2483.5	39.58	29.56	5.32	36.79	37.67	54	16.33	Average
	2489.4	49.76	29.58	5.36	36.79	47.91	74	26.09	Peak
	2489.4	38.44	29.58	5.36	36.79	36.59	54	17.41	Average
	2495	47.18	29.58	5.36	36.78	45.34	74	28.66	Peak
2495	39.37	29.58	5.36	36.78	37.53	54	16.47	Average	
Vertical	2330.2	49.49	29.13	5.17	36.85	46.94	74	27.06	Peak
	2330.2	35.12	29.13	5.17	36.85	32.57	54	21.43	Average
	2367.9	50.75	29.23	5.21	36.83	48.36	74	25.64	Peak
	2367.9	36.42	29.23	5.21	36.83	34.03	54	19.97	Average
	2390	57.16	29.29	5.25	36.82	54.88	74	19.12	Peak
	2390	44.25	29.29	5.25	36.82	41.97	54	12.03	Average
	2483.5	50.71	29.56	5.32	36.79	48.8	74	25.2	Peak
	2483.5	42.05	29.56	5.32	36.79	40.14	54	13.86	Average
	2489.7	50.18	29.58	5.36	36.79	48.33	74	25.67	Peak
	2489.7	37.33	29.58	5.36	36.79	35.48	54	18.52	Average
	2496.2	50.16	29.58	5.36	36.78	48.32	74	25.68	Peak
2496.2	38.22	29.58	5.36	36.78	36.38	54	17.62	Average	

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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	2334.5	49.83	29.13	5.17	36.85	47.28	74	26.72	Peak
	2334.5	36.69	29.13	5.17	36.85	34.14	54	19.86	Average
	2361.5	48.11	29.21	5.21	36.84	45.69	74	28.31	Peak
	2361.5	37.24	29.21	5.21	36.84	34.82	54	19.18	Average
	2390	58.07	29.29	5.25	36.82	55.79	74	18.21	Peak
	2390	45.53	29.29	5.25	36.82	43.25	54	10.75	Average
	2483.5	48.49	29.56	5.32	36.79	46.58	74	27.42	Peak
	2483.5	38.25	29.56	5.32	36.79	36.34	54	17.66	Average
	2490	49.57	29.58	5.36	36.79	47.72	74	26.28	Peak
	2490	36.27	29.58	5.36	36.79	34.42	54	19.58	Average
	2494.5	45.83	29.58	5.36	36.78	43.99	74	30.01	Peak
	2494.5	37.4	29.58	5.36	36.78	35.56	54	18.44	Average
Vertical	2333.4	51.61	29.13	5.17	36.85	49.06	74	24.94	Peak
	2333.4	37.47	29.13	5.17	36.85	34.92	54	19.08	Average
	2368.1	53.37	29.23	5.21	36.83	50.98	74	23.02	Peak
	2368.1	39.23	29.23	5.21	36.83	36.84	54	17.16	Average
	2389.3	59.47	29.29	5.25	36.82	57.19	74	16.81	Peak
	2389.3	44.22	29.29	5.25	36.82	41.94	54	12.06	Average
	2483.5	51.66	29.56	5.32	36.79	49.75	74	24.25	Peak
	2483.5	42.97	29.56	5.32	36.79	41.06	54	12.94	Average
	2489.4	50.36	29.58	5.36	36.79	48.51	74	25.49	Peak
	2489.4	37.14	29.58	5.36	36.79	35.29	54	18.71	Average
	2495.9	50.02	29.58	5.36	36.78	48.18	74	25.82	Peak
	2495.9	38.23	29.58	5.36	36.78	36.39	54	17.61	Average

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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	2334.4	51.56	29.13	5.17	36.85	49.01	74	24.99	Peak
	2334.4	38.26	29.13	5.17	36.85	35.71	54	18.29	Average
	2365.7	48.89	29.23	5.21	36.83	46.5	74	27.5	Peak
	2365.7	36.68	29.23	5.21	36.83	34.29	54	19.71	Average
	2390	57.28	29.29	5.25	36.82	55	74	19	Peak
	2390	45.69	29.29	5.25	36.82	43.41	54	10.59	Average
	2483.5	51.41	29.56	5.32	36.79	49.5	74	24.5	Peak
	2483.5	38.25	29.56	5.32	36.79	36.34	54	17.66	Average
	2489.2	48.01	29.58	5.36	36.79	46.16	74	27.84	Peak
	2489.2	37.15	29.58	5.36	36.79	35.3	54	18.7	Average
	2495.8	47.92	29.58	5.36	36.78	46.08	74	27.92	Peak
	2495.8	38.04	29.58	5.36	36.78	36.2	54	17.8	Average
Vertical	2334.2	50.86	29.13	5.17	36.85	48.31	74	25.69	Peak
	2334.2	36.49	29.13	5.17	36.85	33.94	54	20.06	Average
	2363.9	52.98	29.23	5.21	36.83	50.59	74	23.41	Peak
	2363.9	37.69	29.23	5.21	36.83	35.3	54	18.7	Average
	2389.3	57.85	29.29	5.25	36.82	55.57	74	18.43	Peak
	2389.3	44.49	29.29	5.25	36.82	42.21	54	11.79	Average
	2483.5	55.03	29.56	5.32	36.79	53.12	74	20.88	Peak
	2483.5	42.43	29.56	5.32	36.79	40.52	54	13.48	Average
	2488.4	51.19	29.56	5.36	36.79	49.32	74	24.68	Peak
	2488.4	36.33	29.56	5.36	36.79	34.46	54	19.54	Average
	2495.3	50.45	29.58	5.36	36.78	48.61	74	25.39	Peak
	2495.3	35.15	29.58	5.36	36.78	33.31	54	20.69	Average

TEST ENGINEER: Jarey

Additional Radiated emission (Mixed worst modulation):

EUT : Smart Plug Temperature : 22°C
 Model No. : CPLGSTDBLW1 Humidity : 51%RH
 Test Mode : Transmitting Date of Test : 2020.04.24 – 05.14

Below 1G

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	36.381	25.75	18.46	0.71	27.62	17.3	40	22.7	QP
	65.573	25	17.47	0.92	27.6	15.79	40	24.21	QP
	123.7	27.65	17.42	1.25	27.41	18.91	43.5	24.59	QP
	187.1	28.33	17.64	1.51	27.06	20.42	43.5	23.08	QP
	410.38	24.75	22.23	2.26	27.54	21.7	46	24.3	QP
	750.11	22.94	28.13	2.99	28	26.06	46	19.94	QP
Vertical	33.917	45.16	18.4	0.69	27.62	36.63	40	3.37	QP
	55.609	35.31	18.37	0.85	27.6	26.93	40	13.07	QP
	142.32	33.57	19.73	1.34	27.3	27.34	43.5	16.16	QP
	289	24.16	19.75	1.92	26.82	19.01	46	26.99	QP
	457.51	24.22	23.1	2.37	27.8	21.89	46	24.11	QP
	739.66	24.57	27.9	2.97	28.03	27.41	46	18.59	QP

Above 1G

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	4824	46.32	33.15	7.56	36.5	50.53	74	23.47	Peak
	4824	43.37	33.15	7.56	36.5	47.58	54	6.42	Average
	1828	49.76	27.39	4.57	37.11	44.61	74	29.39	Peak
	3916	45.42	32.54	6.79	36.51	48.24	74	25.76	Peak
	5914	43.83	34.87	8.7	36.59	50.81	74	23.19	Peak
	7408	43.91	36.05	9.92	37.13	52.75	74	21.25	Peak
	8668	42.61	36.54	10.37	35.8	53.72	74	20.28	Peak
Vertical	4824	47.04	33.15	7.56	36.5	51.25	74	22.75	Peak
	4824	45.7	33.15	7.56	36.5	49.91	54	4.09	Average
	1954	48.26	27.92	4.72	37.03	43.87	74	30.13	Peak
	4042	44.44	32.79	6.9	36.5	47.63	74	26.37	Peak
	5887	43.67	34.81	8.7	36.59	50.59	74	23.41	Peak
	7156	43.68	35.9	9.8	37.23	52.15	74	21.85	Peak
	8533	42.51	36.44	10.33	36.03	53.25	74	20.75	Peak

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	N9010A	MY52221182	Sep 16, 2019	Sep 15, 2020

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 ≥ 3 × 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

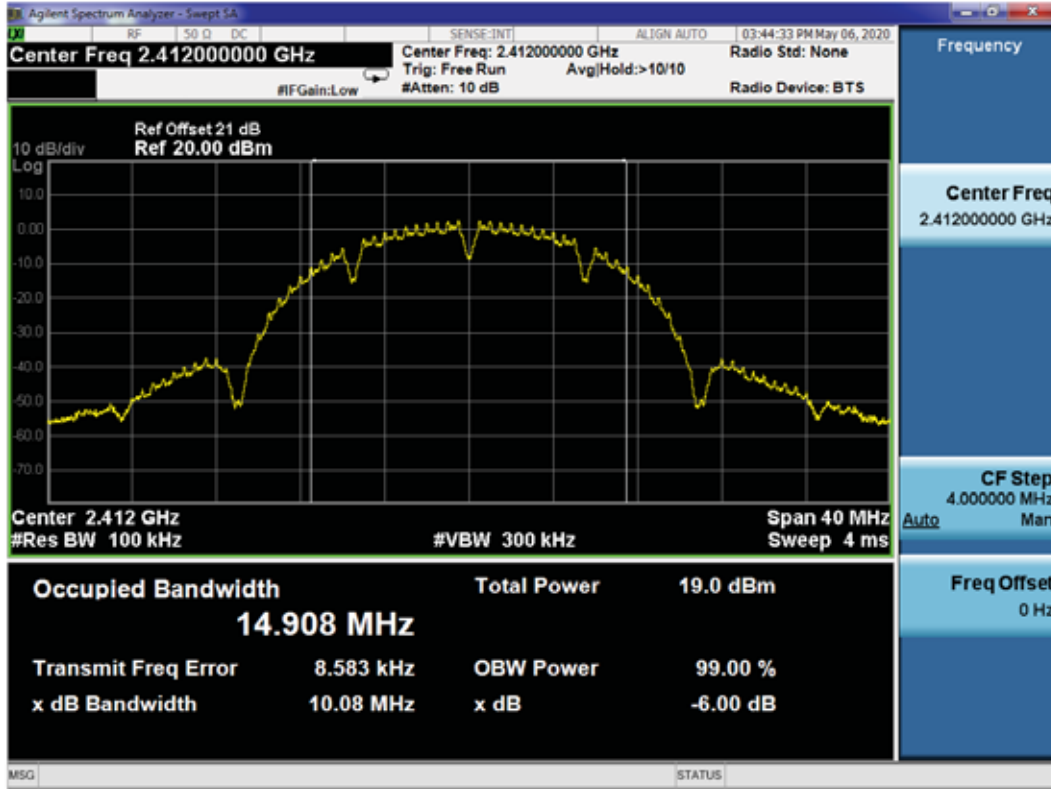
PASSED.

All the test results are attached in next pages.

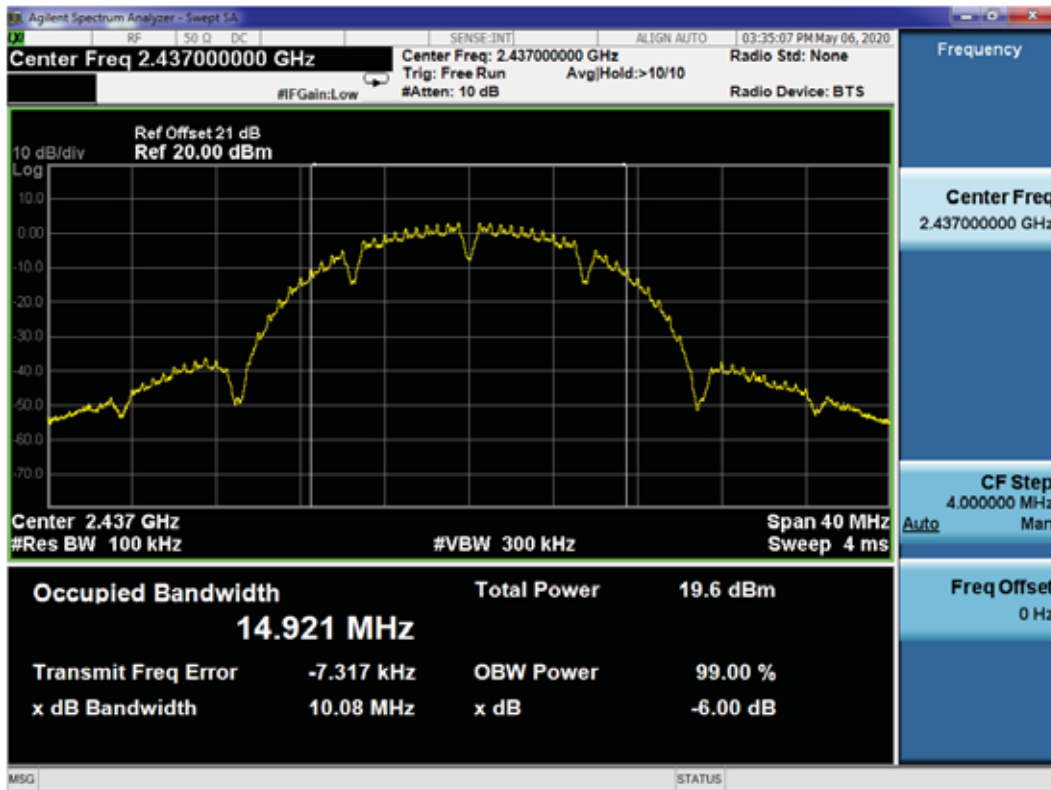
(Test Date: 2020.05.06 Temperature: 23°C Humidity: 51 %)

Modulation	Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit
802.11b	1	2412	10.08	500 kHz
	6	2437	10.08	500 kHz
	11	2462	10.07	500 kHz
802.11g	1	2412	16.56	500 kHz
	6	2437	16.56	500 kHz
	11	2462	16.56	500 kHz
802.11n20	1	2412	17.75	500 kHz
	6	2437	17.74	500 kHz
	11	2462	17.74	500 kHz

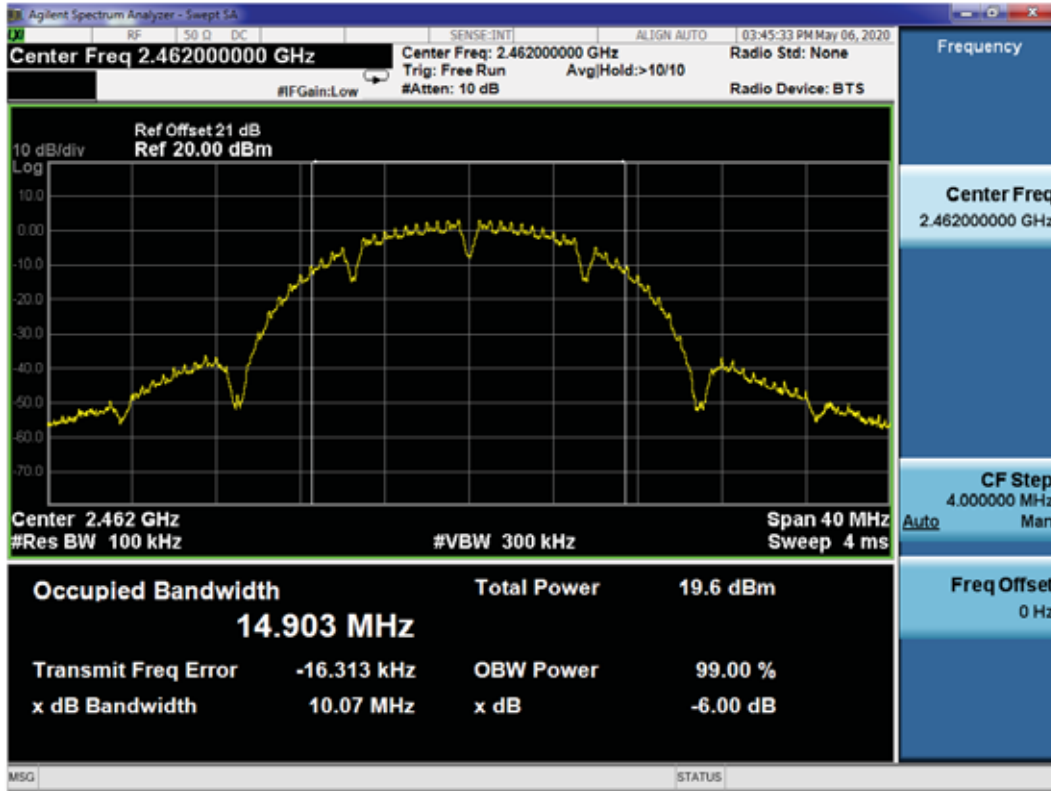
802.11b CH2412MHz



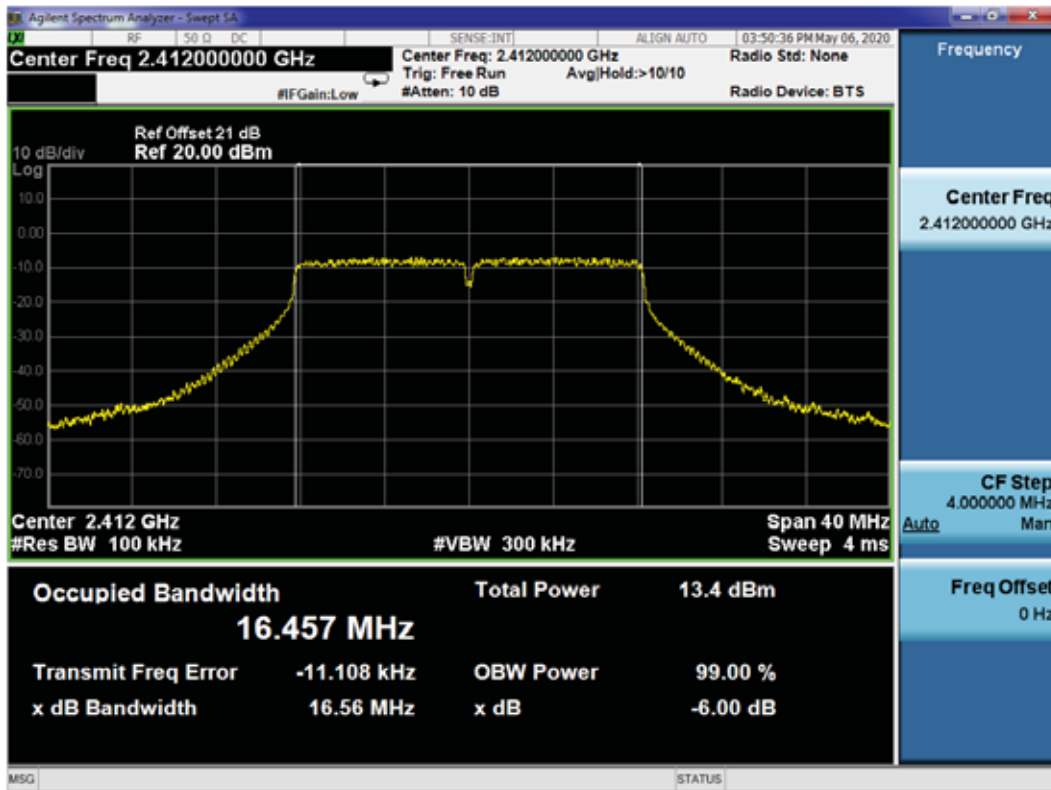
802.11b CH2437MHz



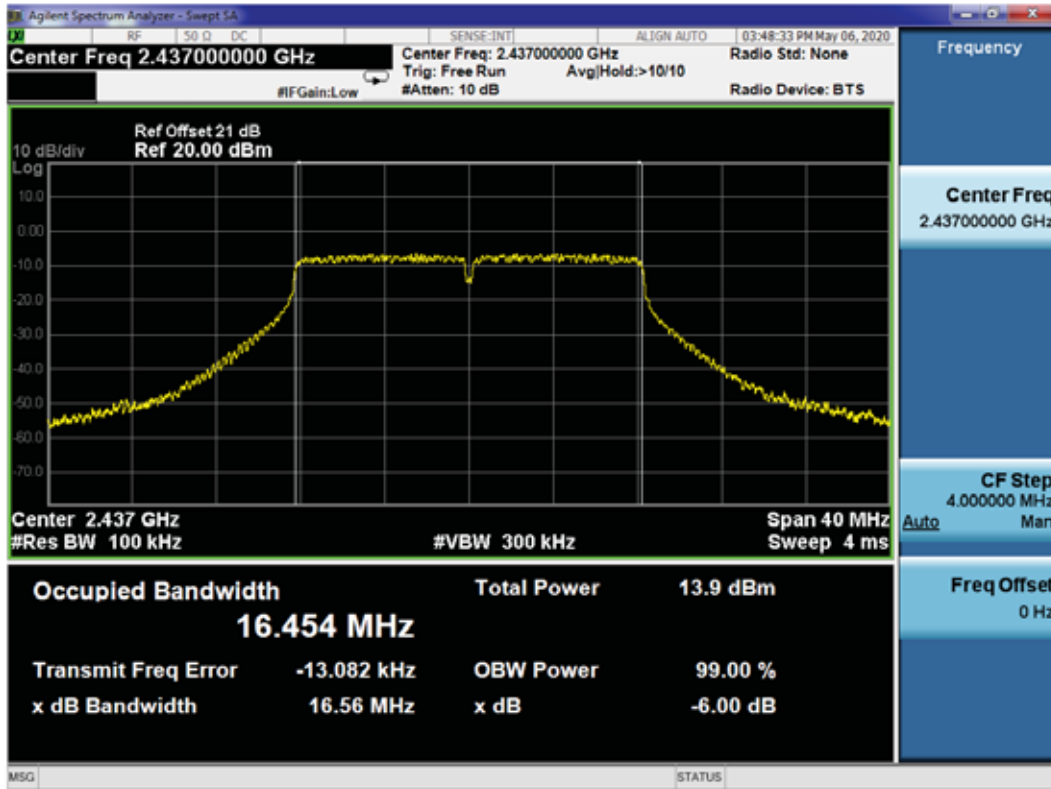
802.11b CH2462MHz



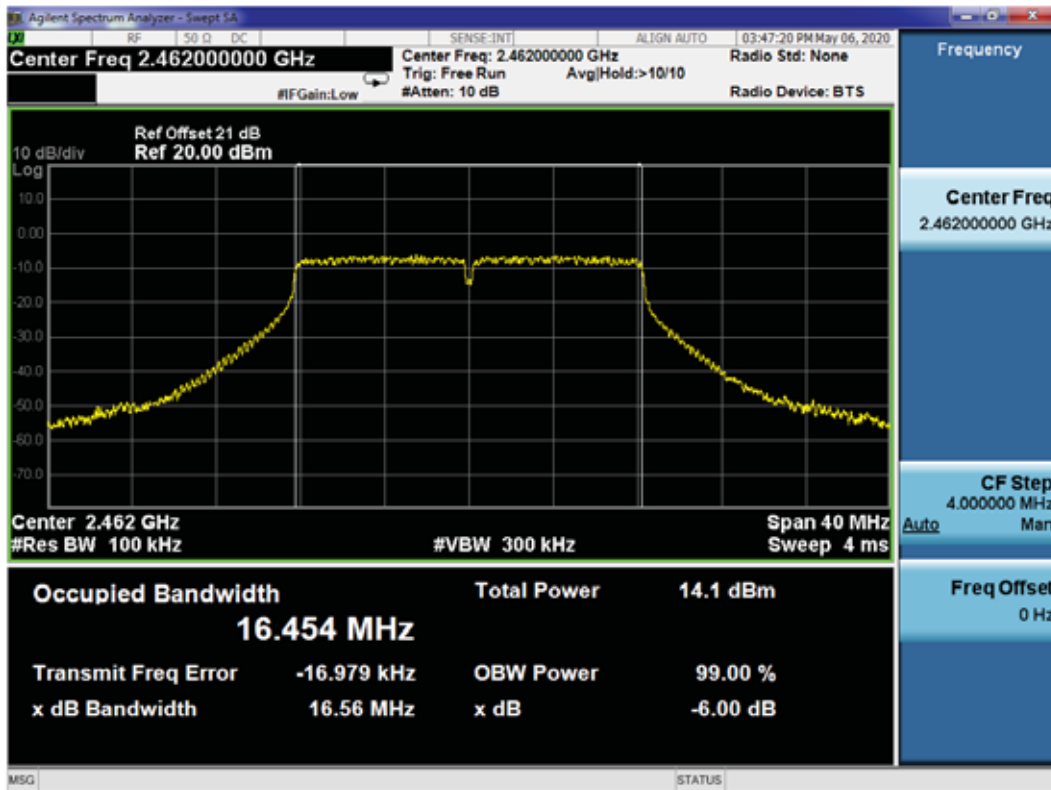
802.11g CH2412MHz



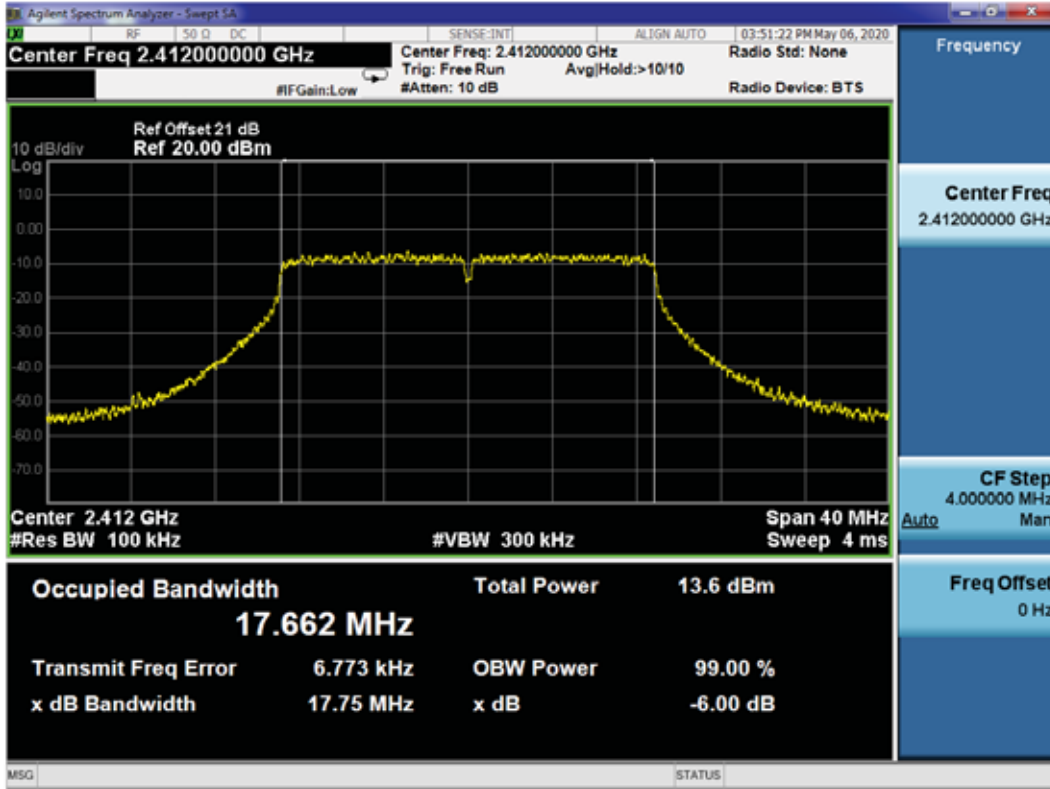
802.11g CH2437MHz



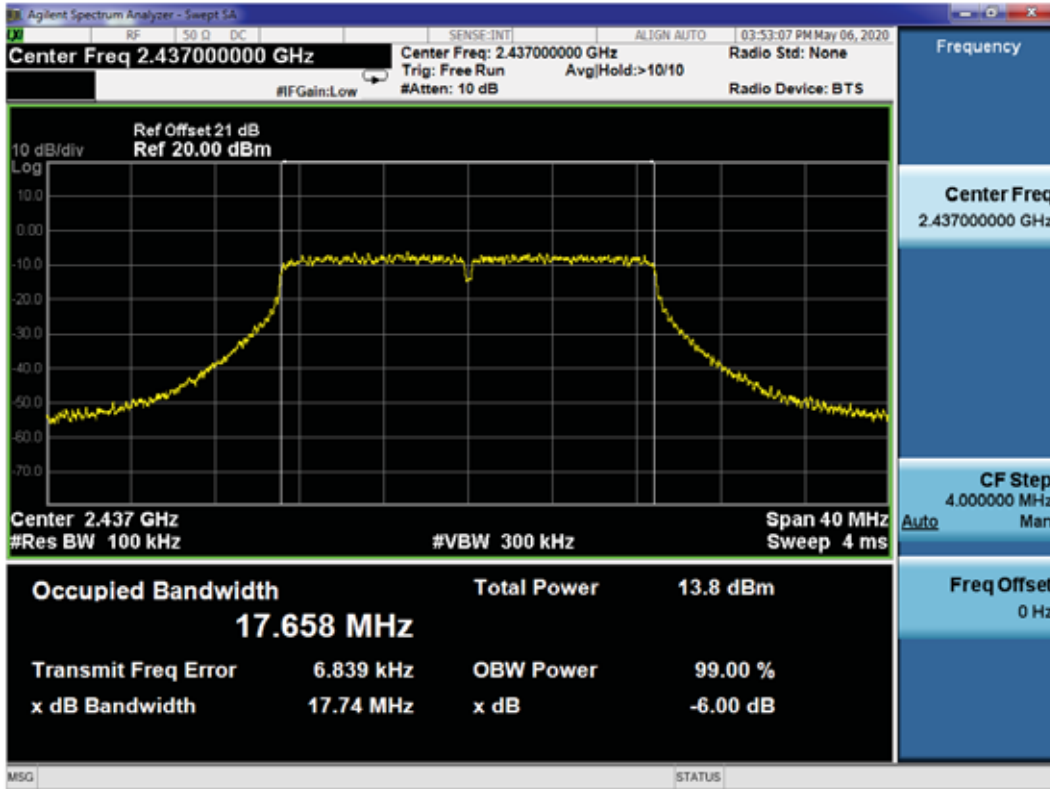
802.11g CH2462MHz



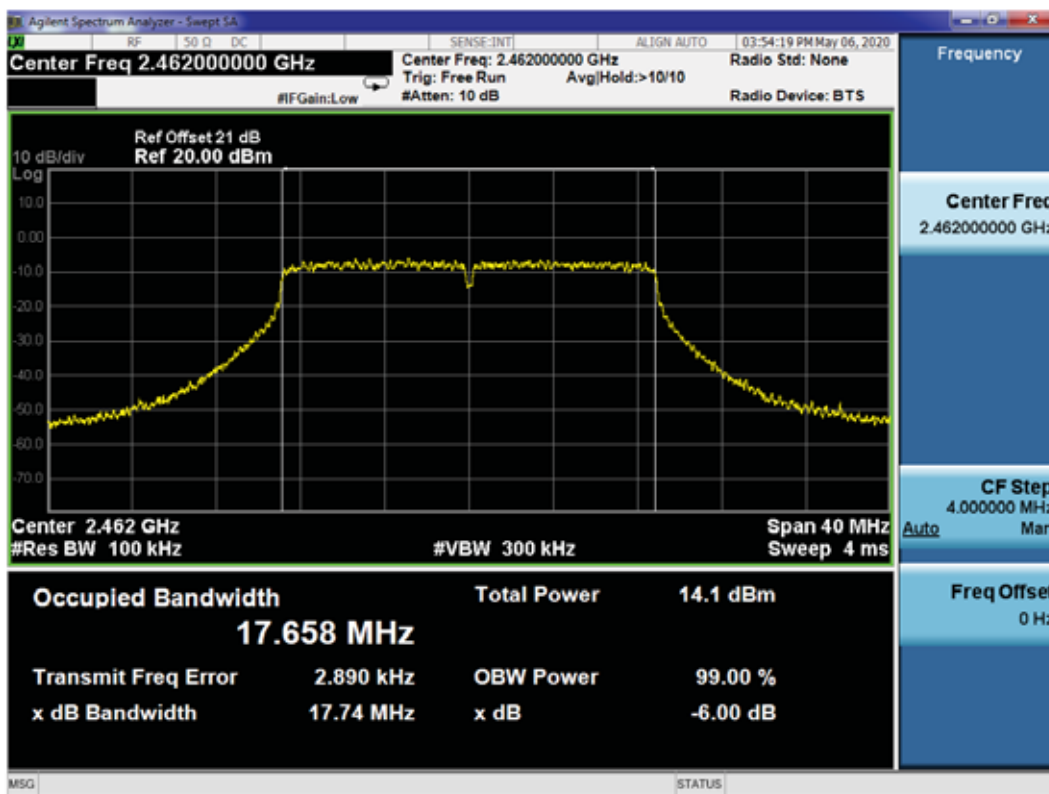
802.11n20 CH2412MHz



802.11n20 CH2437MHz



802.11n20 CH2462MHz



6 MAXIMUM PEAK OUTPUT POWER MEASUREMENT

6.1 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

6.2 Block Diagram of Test Setup

The Same as Section. 5.2.

6.3 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)

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

- a) Set the RBW = 1 MHz.
- b) Set the VBW \geq [3 RBW].
- c) Set the span \geq [1.5 DTS bandwidth].
- d) Detector = peak.
- e) Sweep time = auto couple.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) 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).

6.6 Test Results

PASSED.

All the test results are listed below.

(Test Date: 2020.05.06 Temperature: 23°C Humidity: 51 %)

Modulation	Channel	Frequency (MHz)	Peak Output Power (dBm)	Limit
802.11b	1	2412	14.28	30 dBm
	6	2437	14.88	30 dBm
	11	2462	14.67	30 dBm
802.11g	1	2412	14.32	30 dBm
	6	2437	14.82	30 dBm
	11	2462	14.99	30 dBm
802.11n20	1	2412	14.45	30 dBm
	6	2437	14.87	30 dBm
	11	2462	14.94	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



7 EMISSION LIMITATIONS MEASUREMENT

7.1 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

7.2 Block Diagram of Test Setup

The Same as Section. 5.2.

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.

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)

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.

Establish a reference level by using the following procedure:

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

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

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).

7.6 Test Results

PASSED.

The test data was attached in the next pages.

(Test Date: 2020.05.06 Temperature: 23°C Humidity: 51 %)

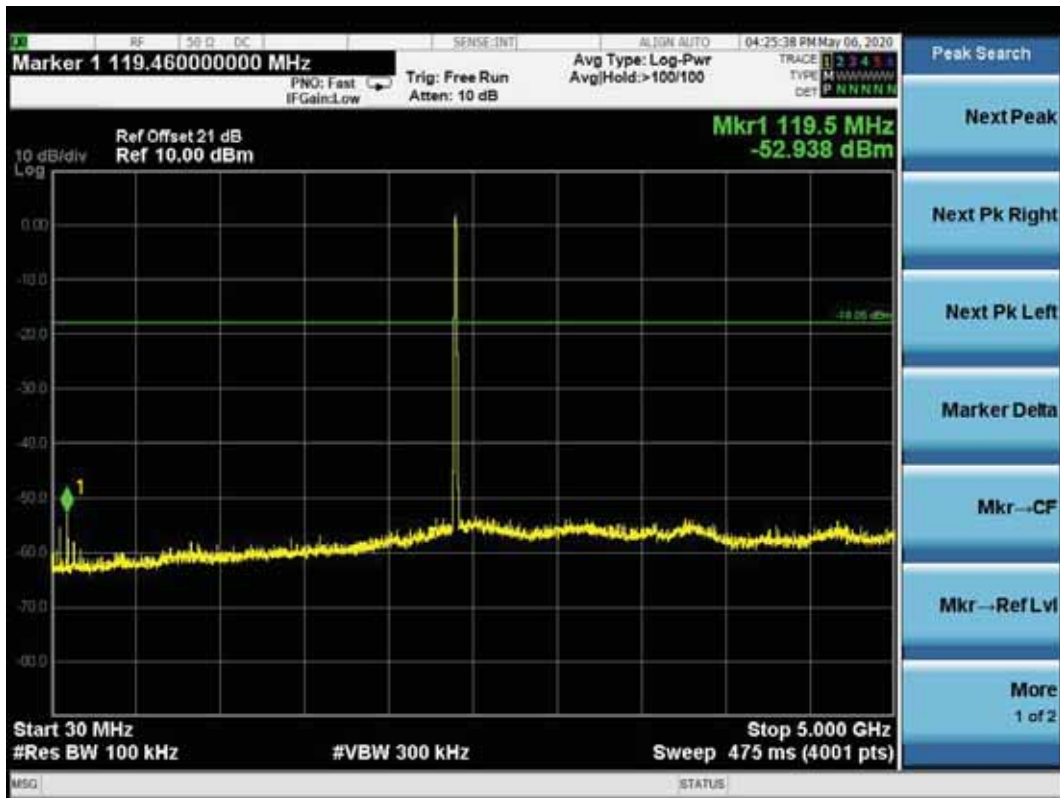
Modulation	Channel	Frequency (MHz)	Data Page
802.11b	1	2412 MHz	P48-49
	6	2437 MHz	P50-51
	11	2462 MHz	P52-53
802.11g	1	2412 MHz	P54-55
	6	2437 MHz	P56-57
	11	2462 MHz	P58-59
802.11n20	1	2412 MHz	P60-61
	6	2437 MHz	P62-63
	11	2462 MHz	P64-65

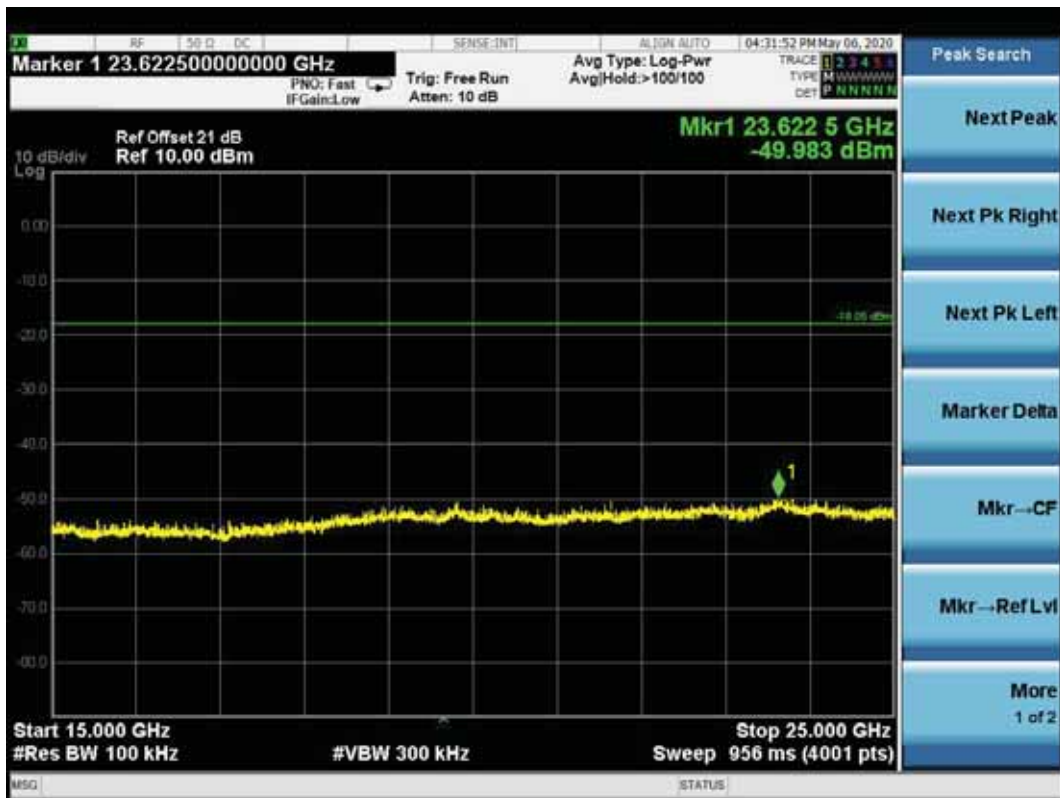
802.11b CH2412MHz

Reference level



Emission level





802.11b CH2437MHz

Reference level



Emission level



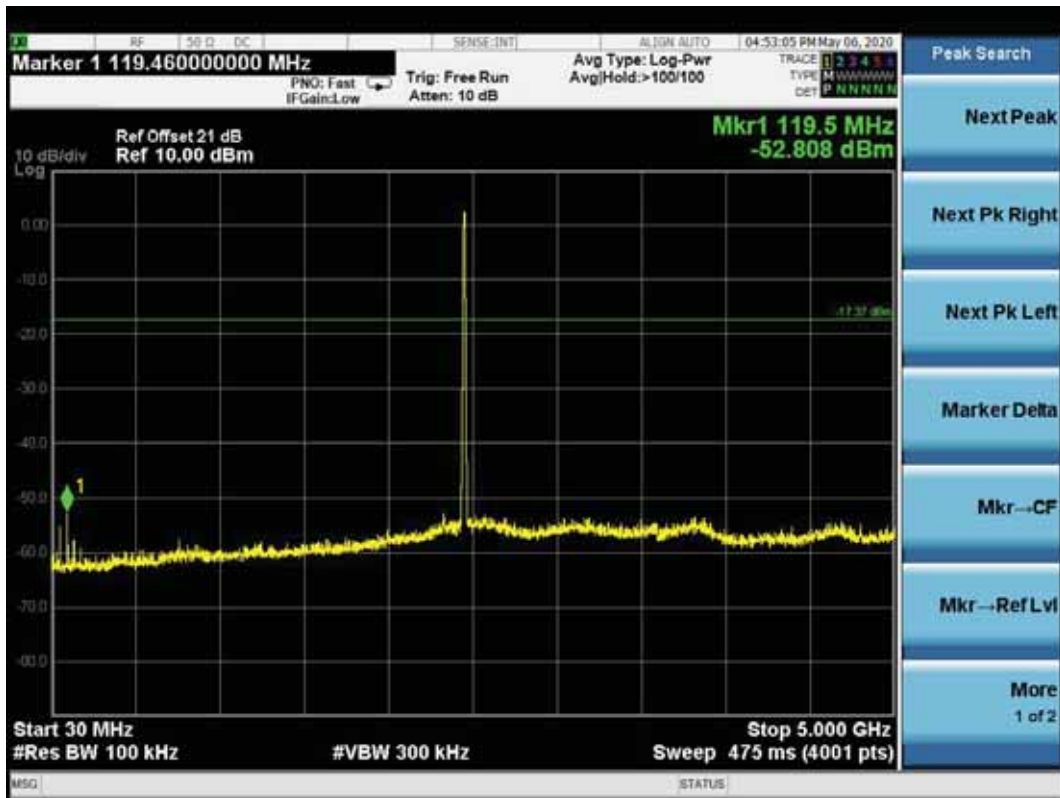


802.11b CH2462MHz

Reference level



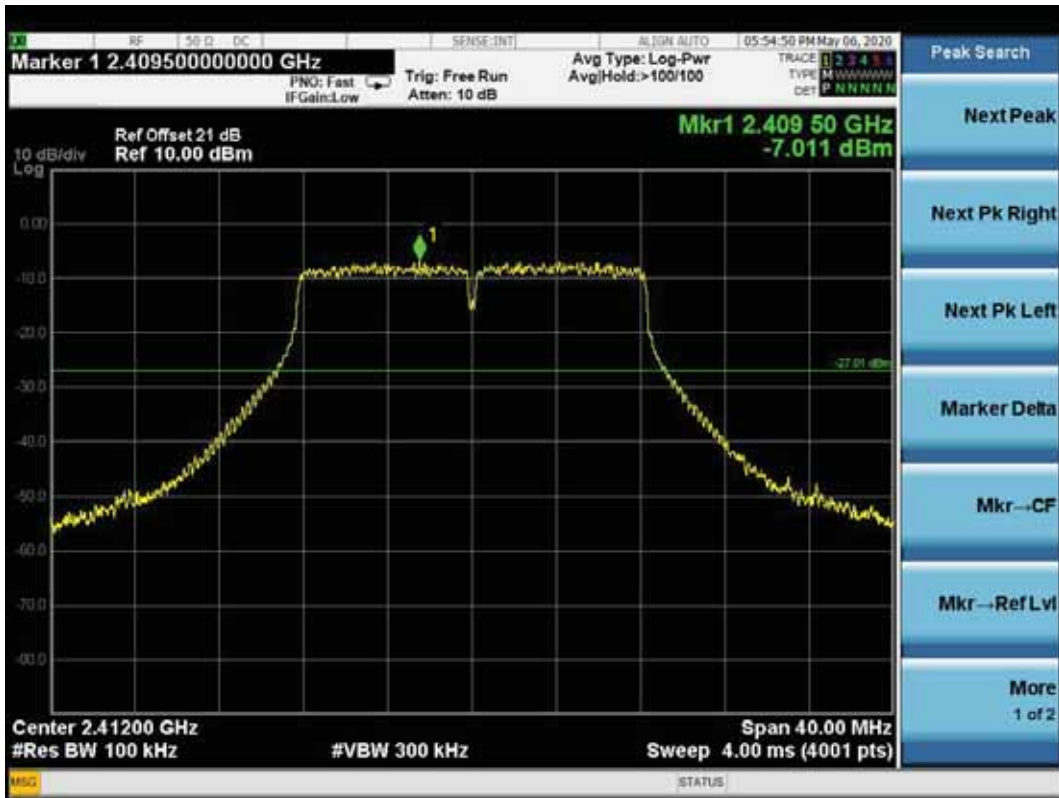
Emission level



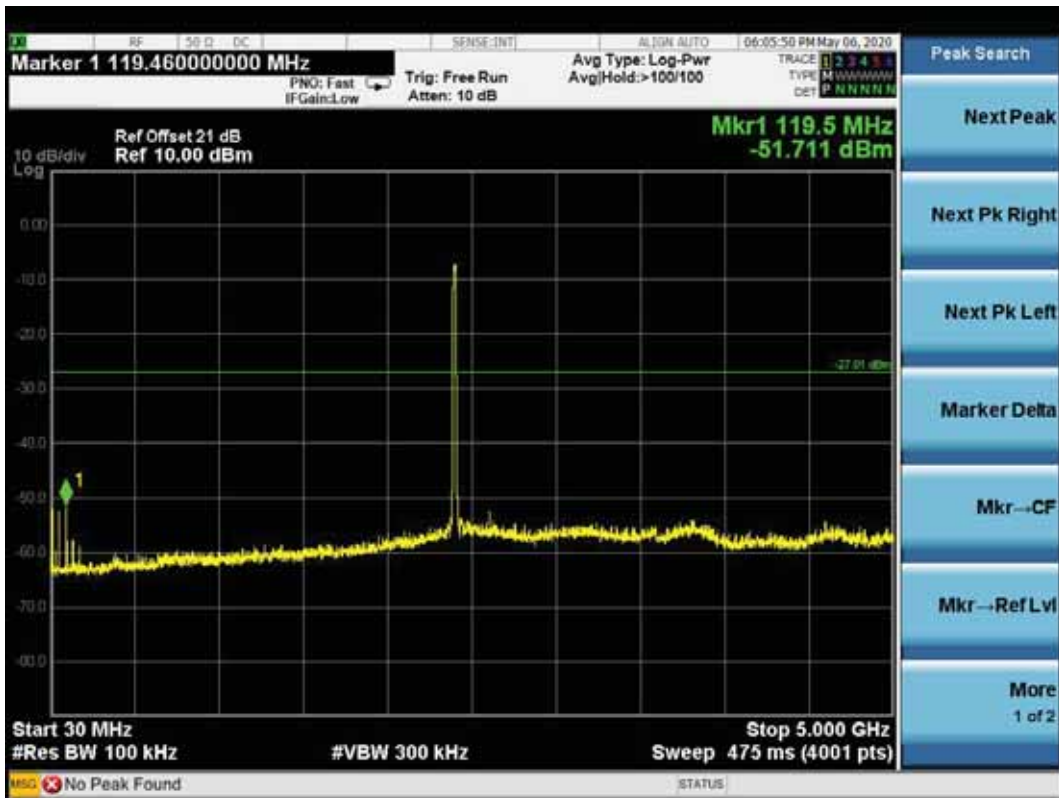


802.11g CH2412MHz

Reference level



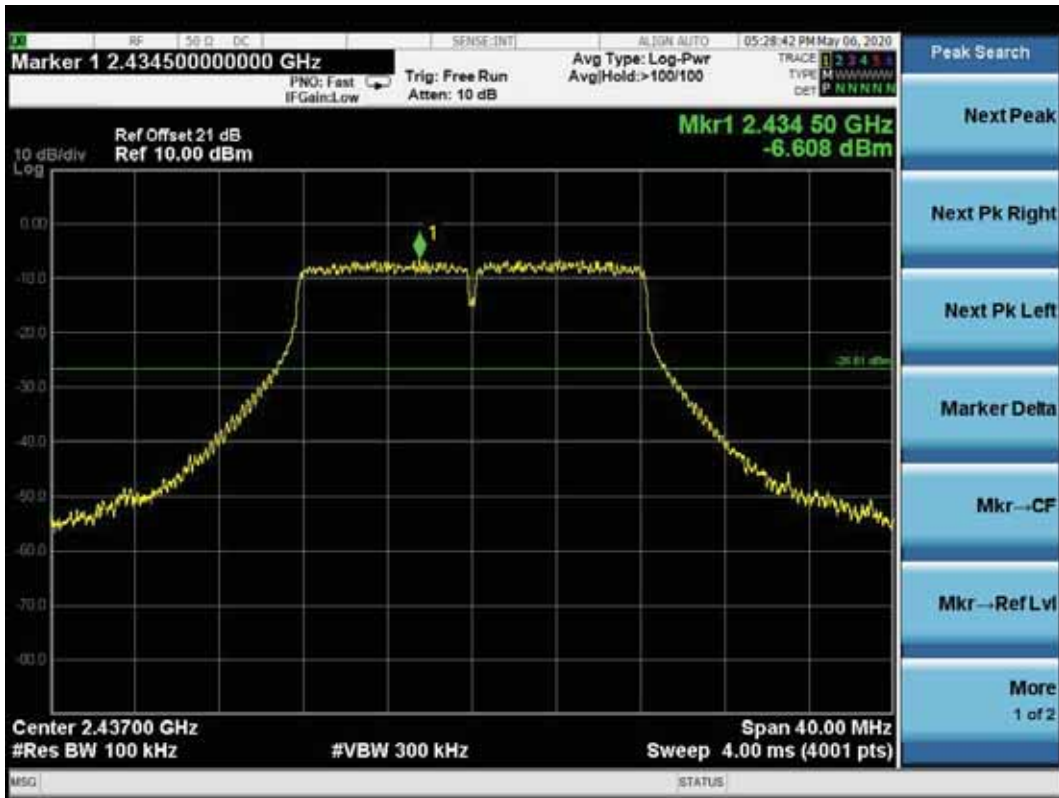
Emission level





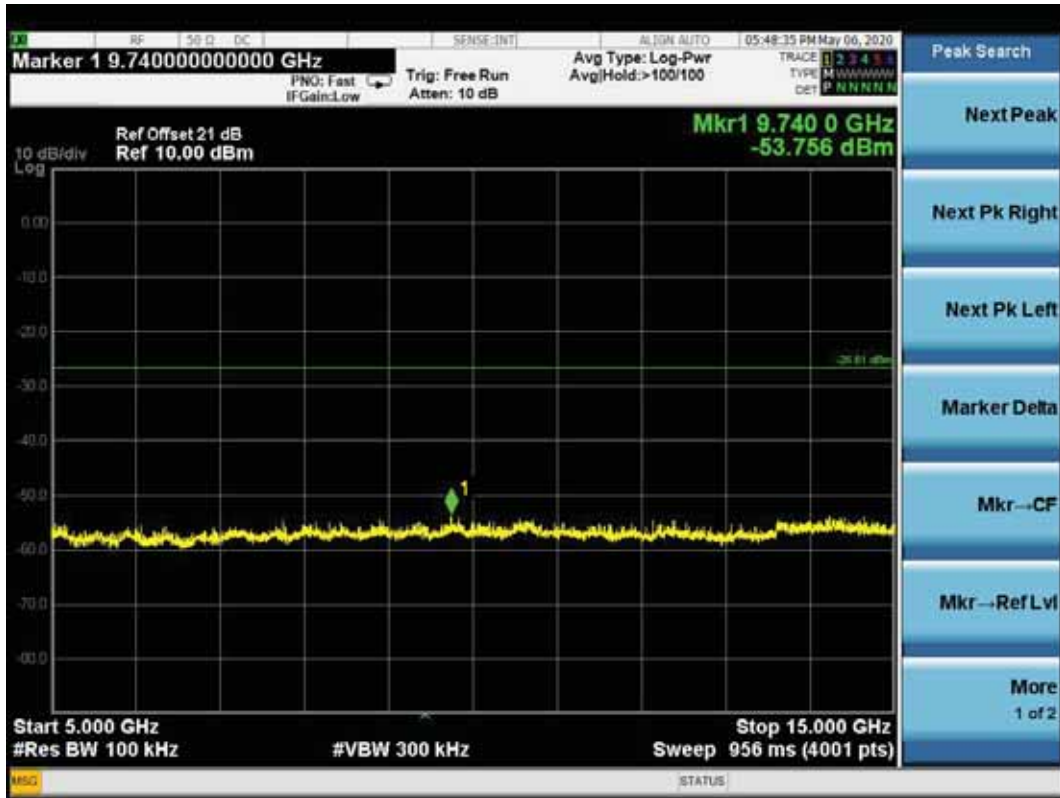
802.11g CH2437MHz

Reference level



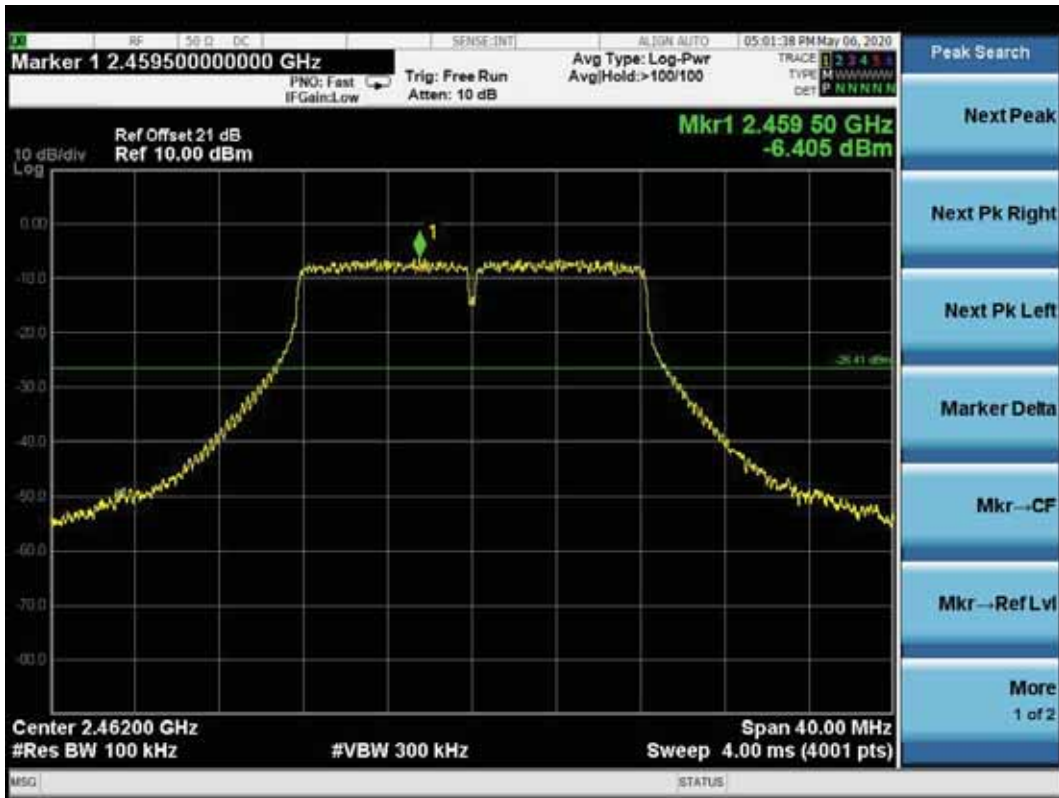
Emission level



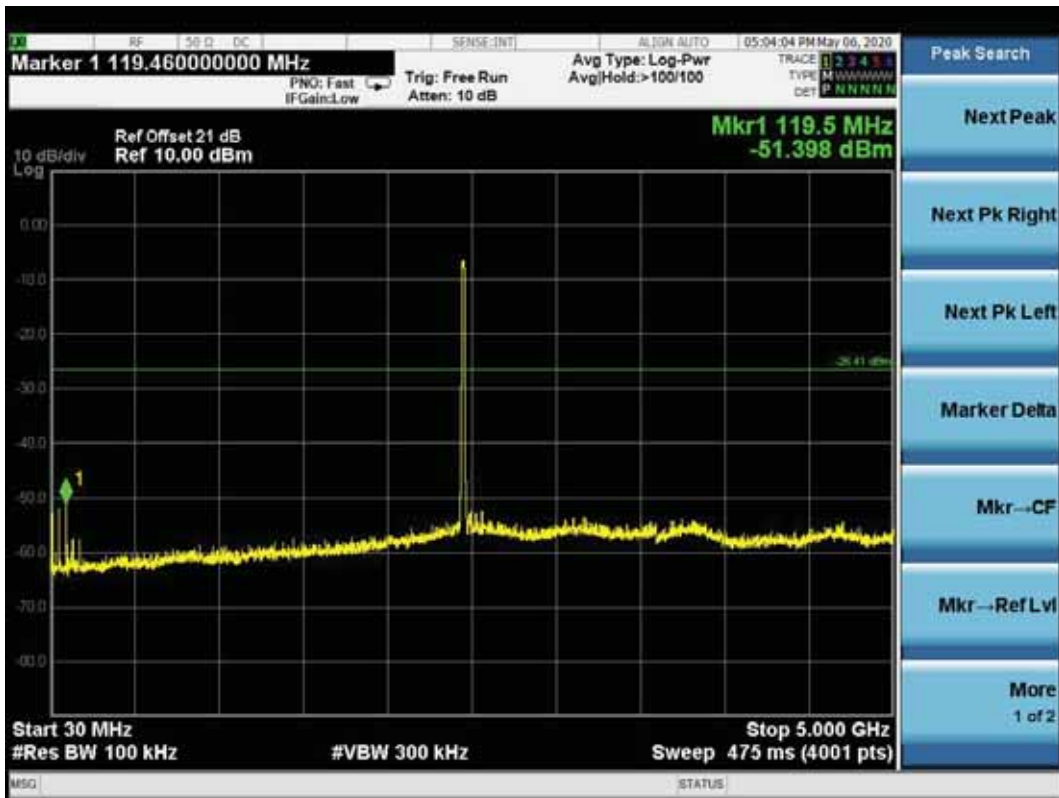


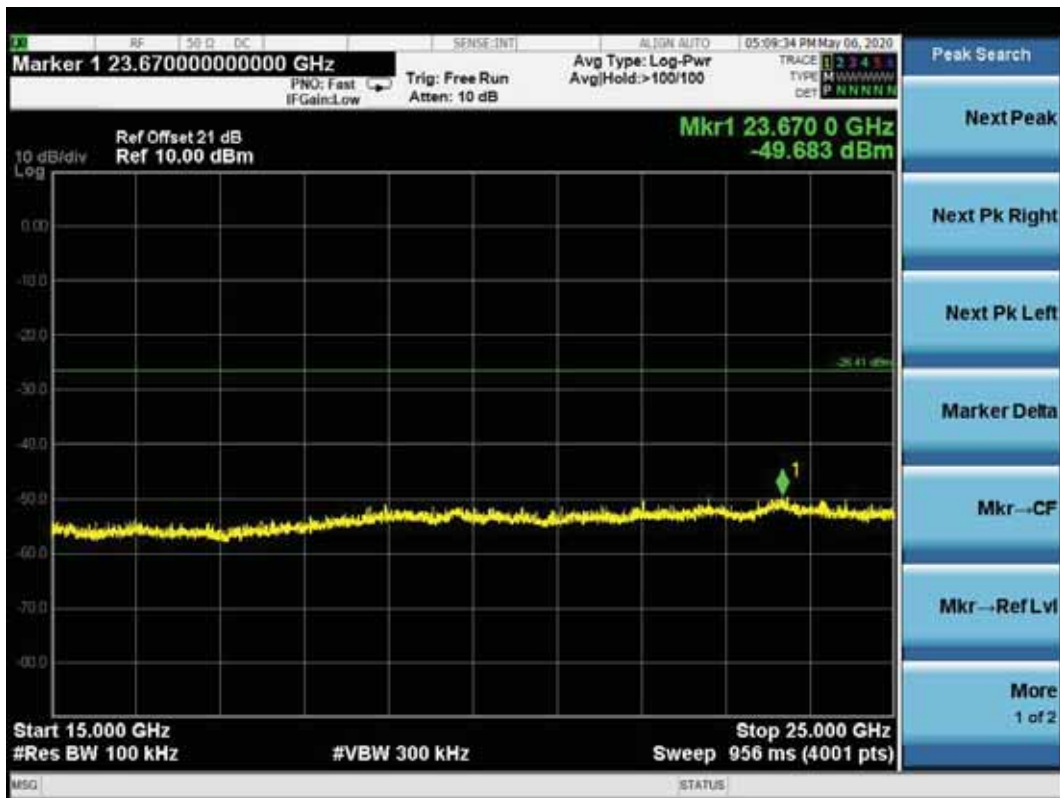
802.11g CH2462MHz

Reference level



Emission level



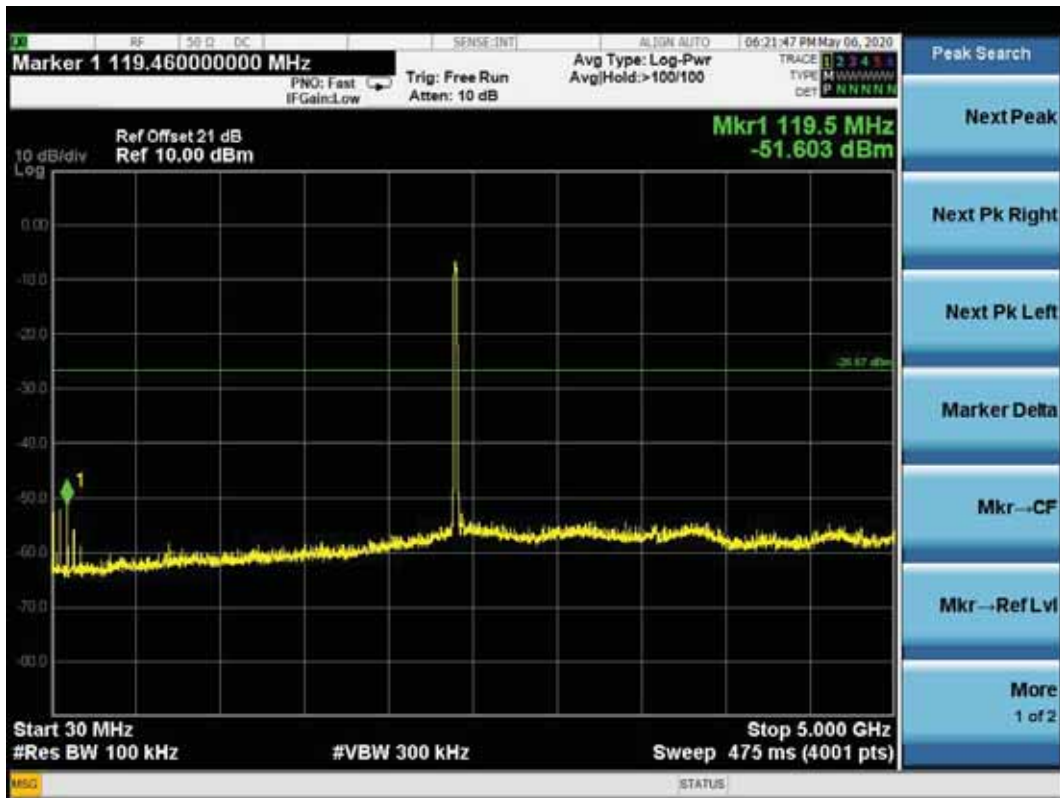


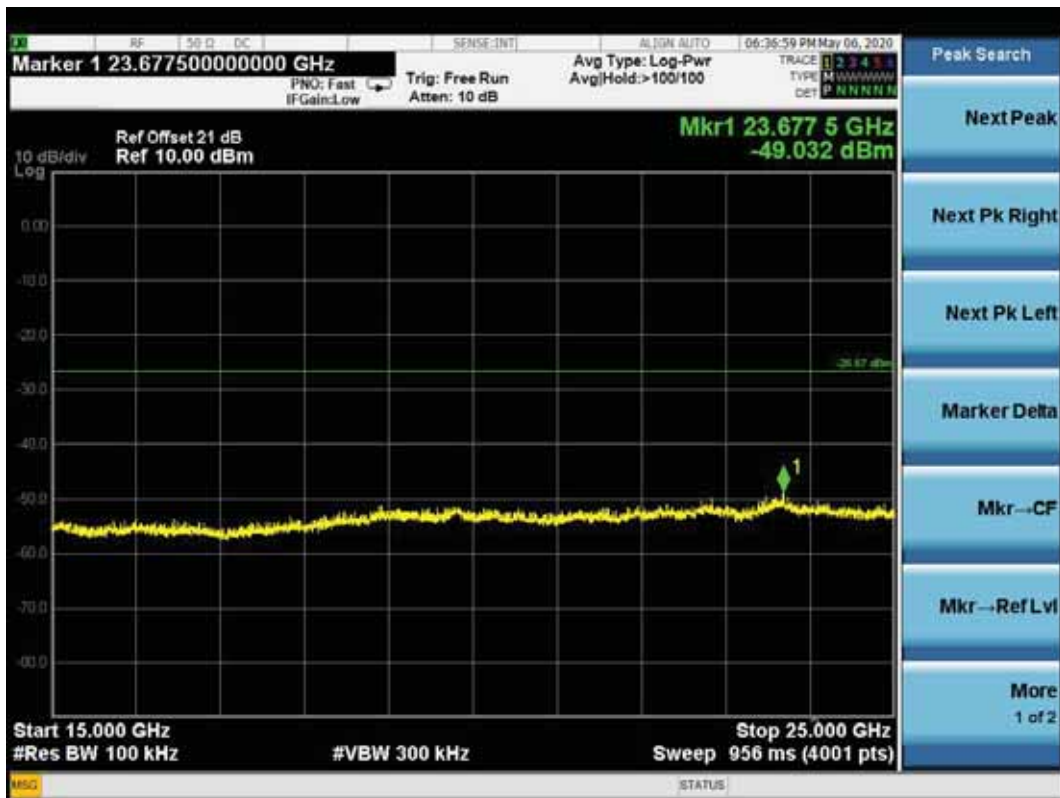
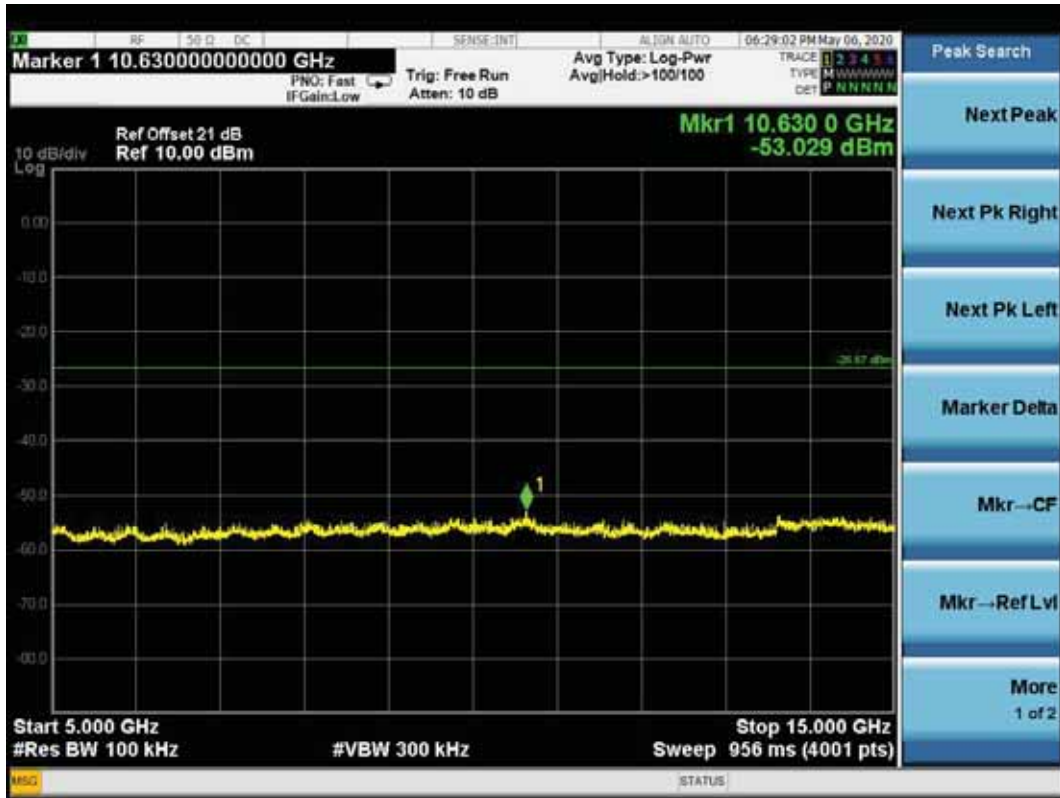
802.11n20 CH2412MHz

Reference level



Emission level



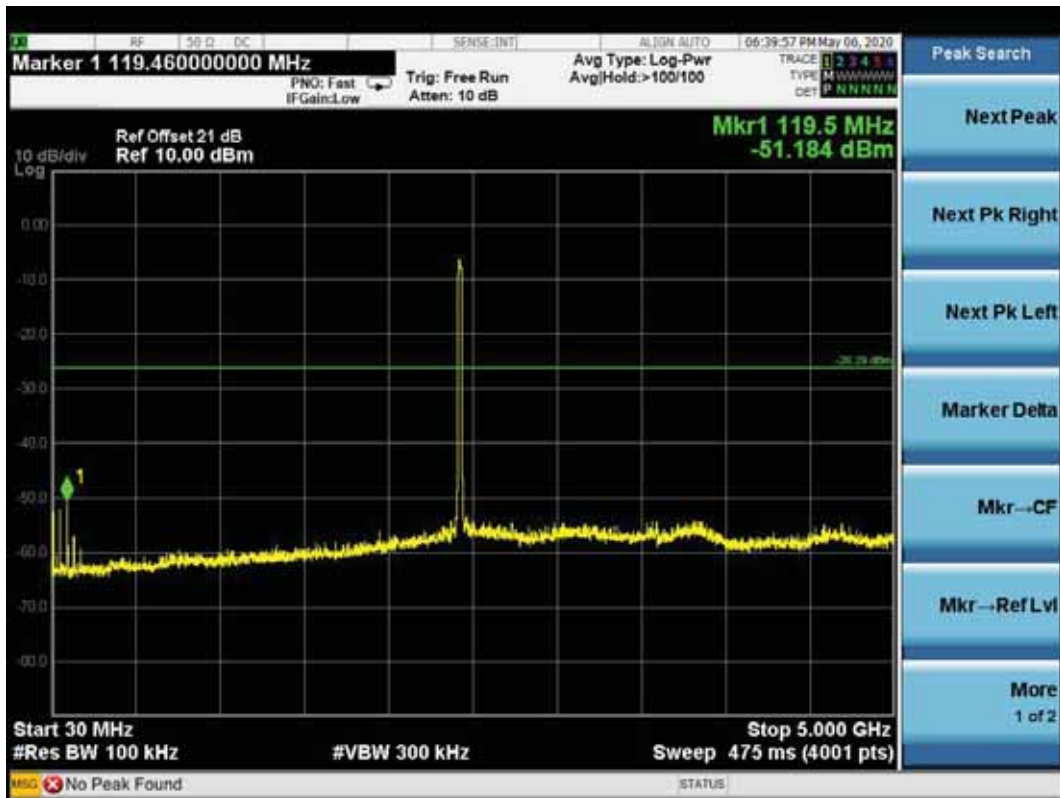


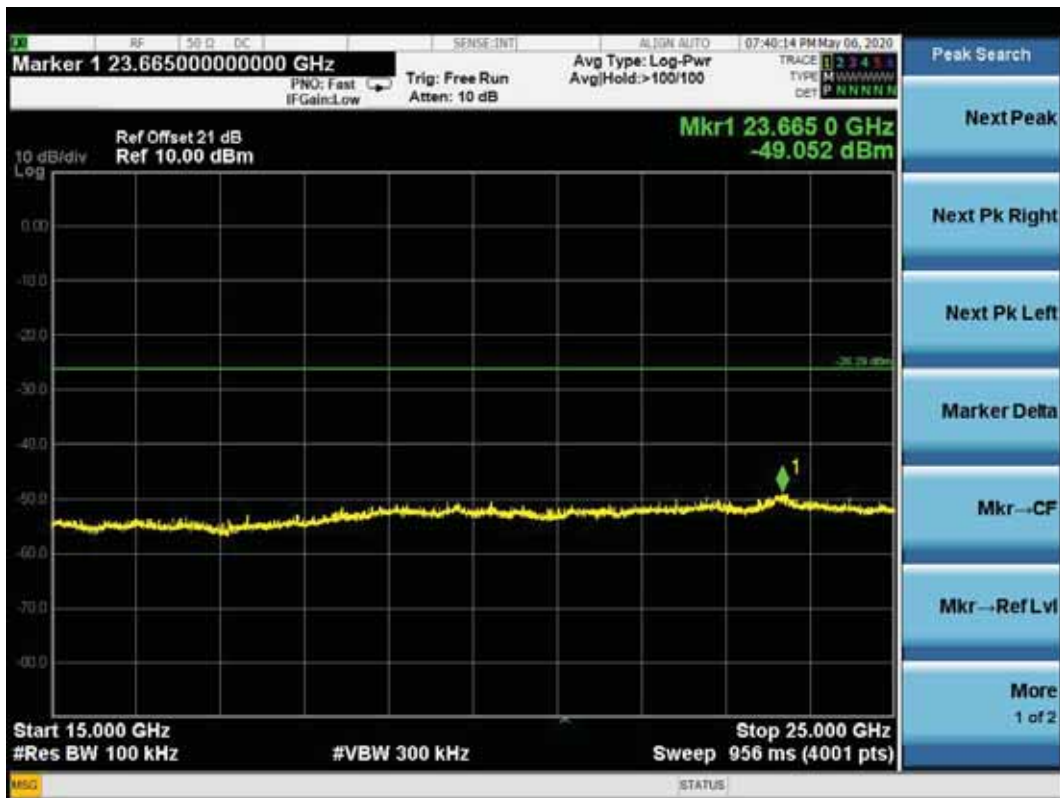
802.11n20 CH2437MHz

Reference level



Emission level



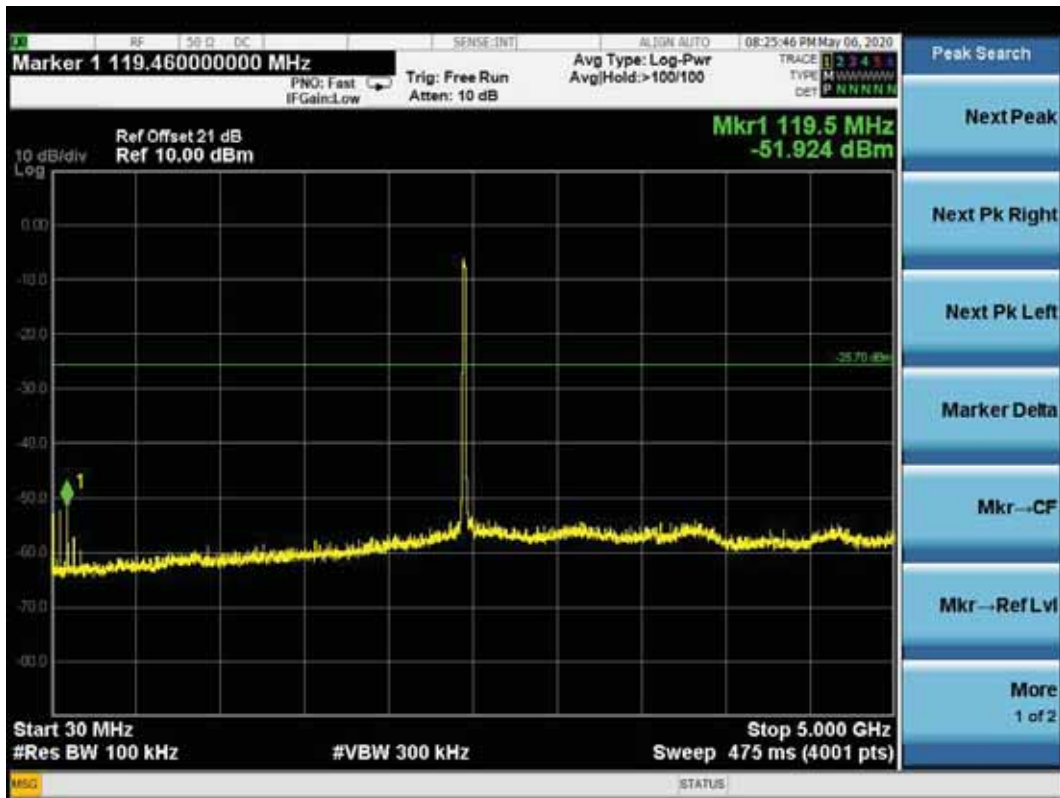


802.11n20 CH2462MHz

Reference level



Emission level





8 BAND EDGES MEASUREMENT

8.1 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

8.2 Block Diagram of Test Setup

The Same as section. 5.2.

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.

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 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).

8.6 Test Results

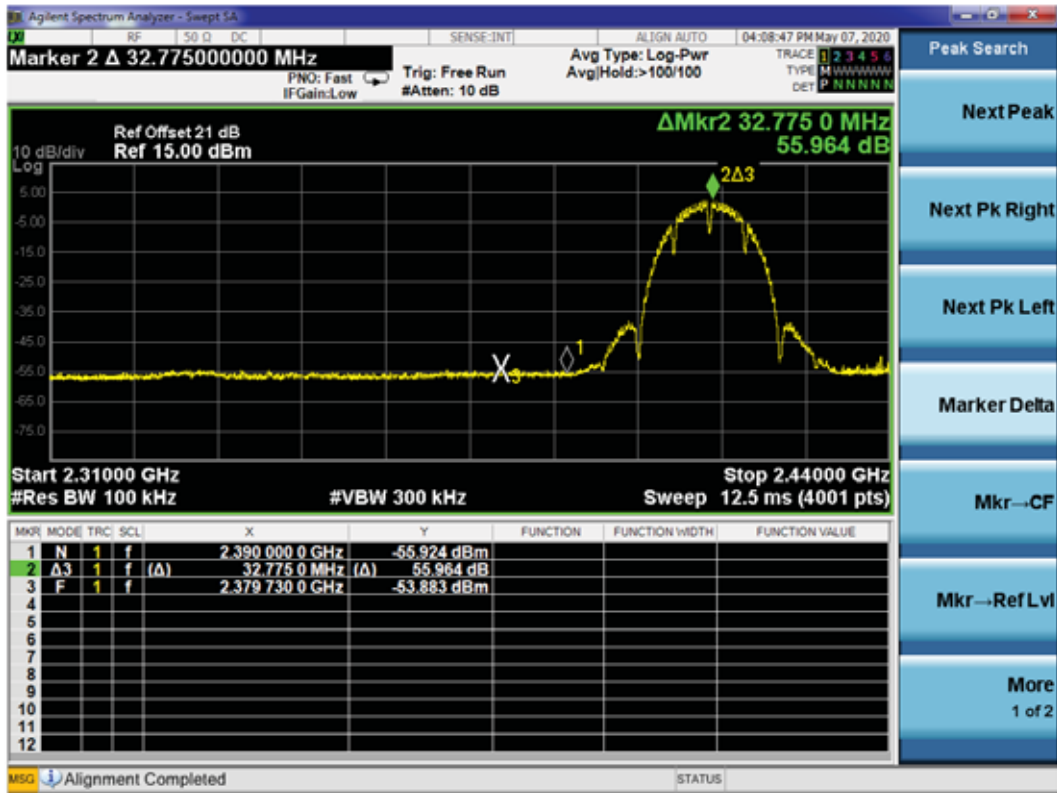
PASSED.

All the test results are attached in next pages.

(Test Date: 2020.05.07 Temperature: 23°C Humidity: 51 %)

Modulation	Location	Channel	Frequency (MHz)	Delta Marker (dB)	Result
802.11b	Below Band Edge	1	2412	55.964	More than 20 dB below the highest level of the desired power
	Upper Band Edge	11	2462	56.595	
802.11g	Below Band Edge	1	2412	48.159	More than 20 dB below the highest level of the desired power
	Upper Band Edge	11	2462	47.441	
802.11n20	Below Band Edge	1	2412	49.081	More than 20 dB below the highest level of the desired power
	Upper Band Edge	11	2462	47.403	

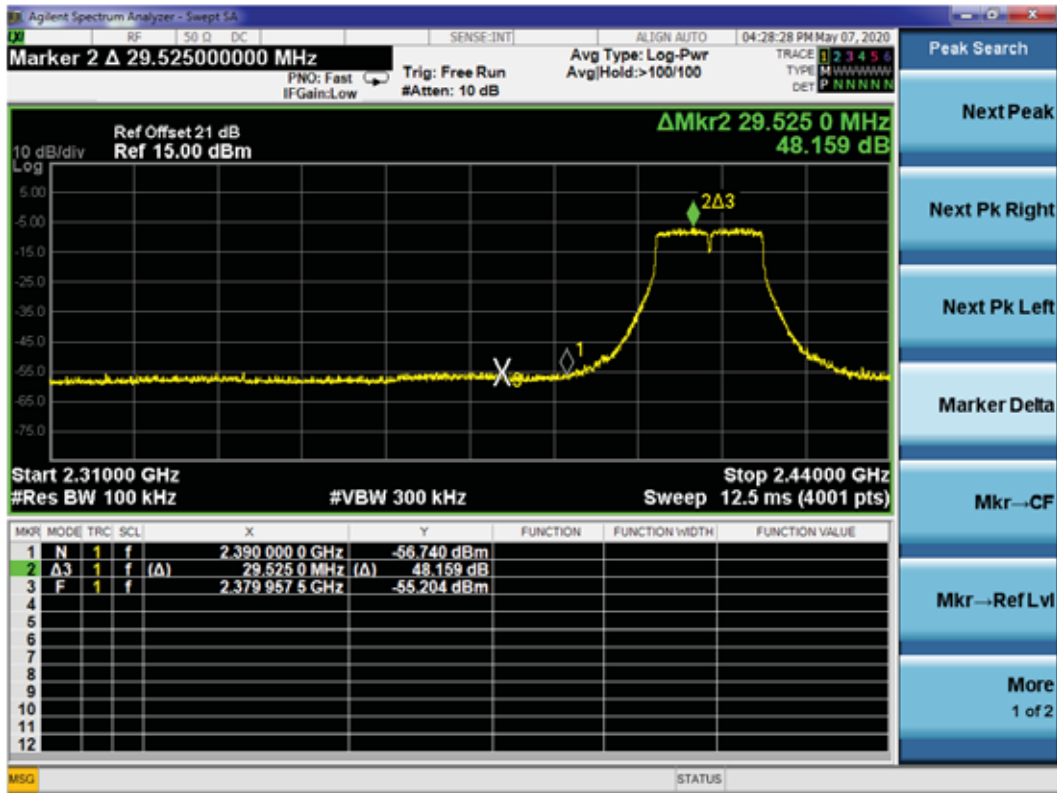
802.11b CH2412MHz (Below Edge 2390 MHz)



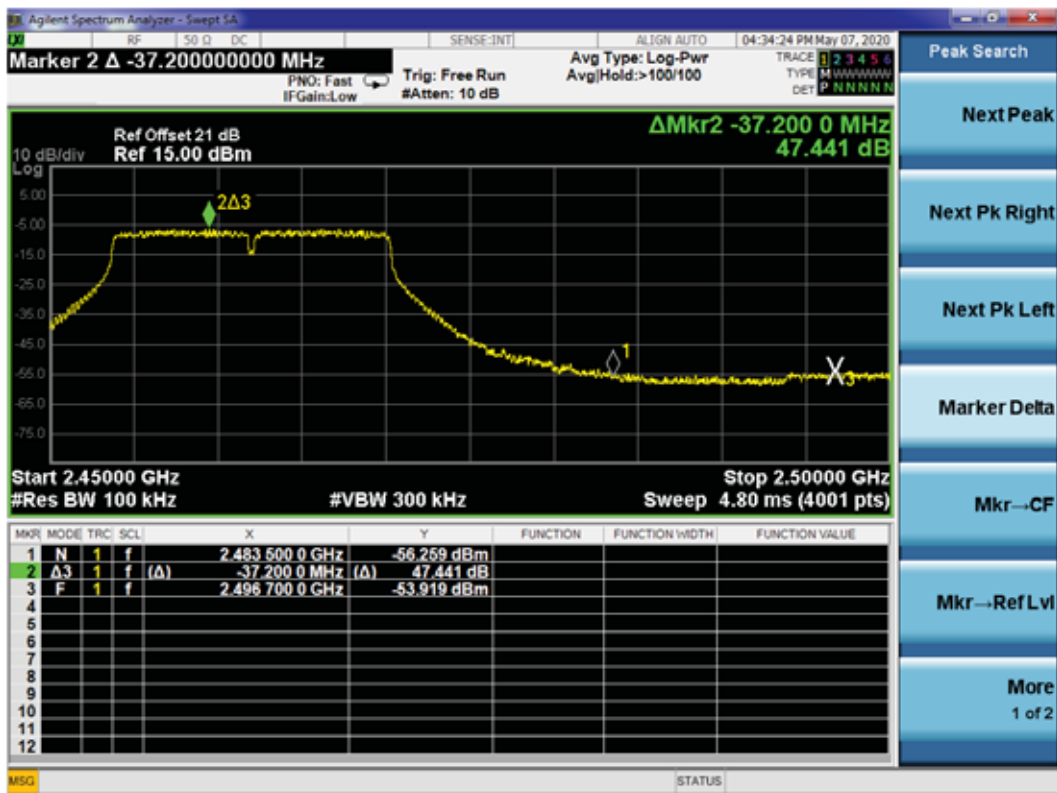
802.11b CH2462MHz (Upper Edge 2483.5 MHz)



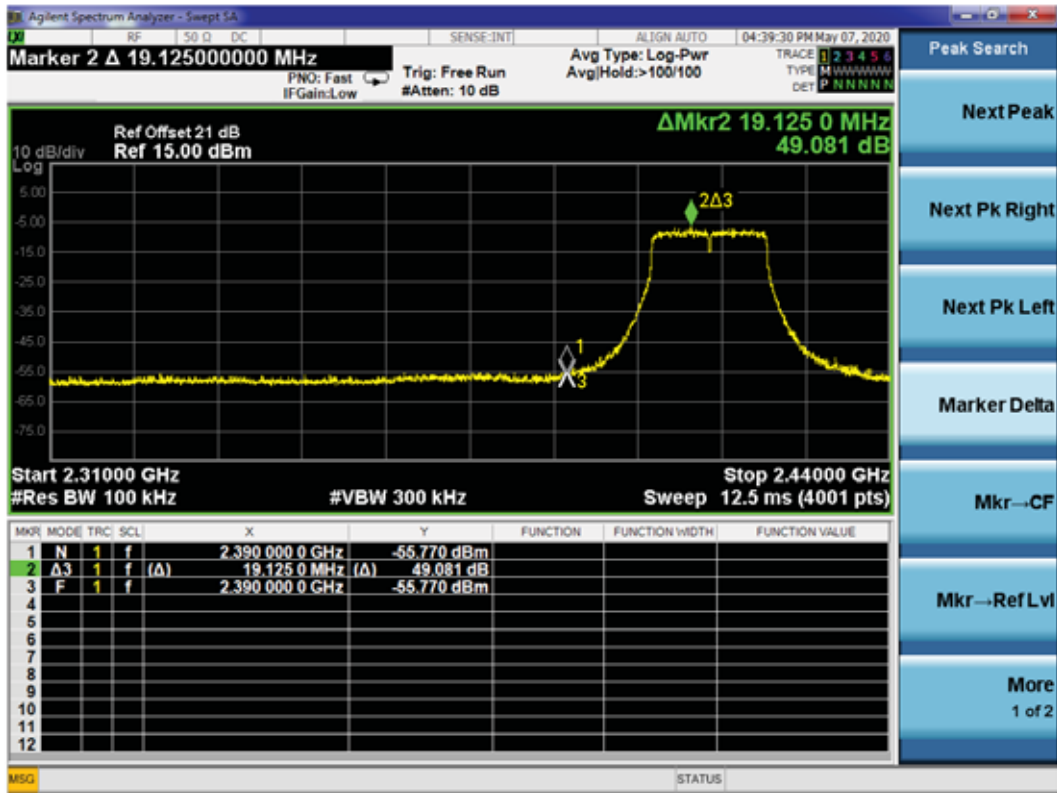
802.11g CH2412MHz (Below Edge 2390 MHz)



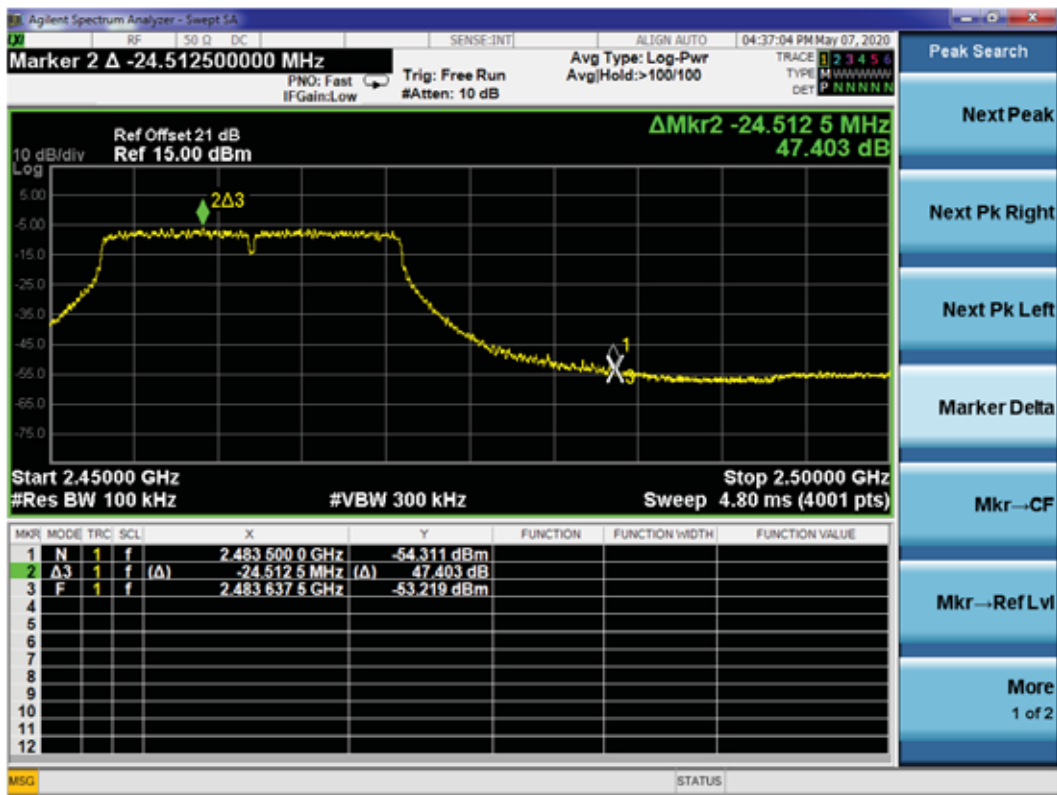
802.11g CH2462MHz (Upper Edge 2483.5 MHz)



802.11n20 CH2412MHz (Below Edge 2390 MHz)



802.11n20 CH2462MHz (Upper Edge 2483.5 MHz)



9 POWER SPECTRAL DENSITY MEASUREMENT

9.1 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

9.2 Block Diagram of Test Setup

The Same as section 5.2.

9.3 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.

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.

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

9.6 Test Results

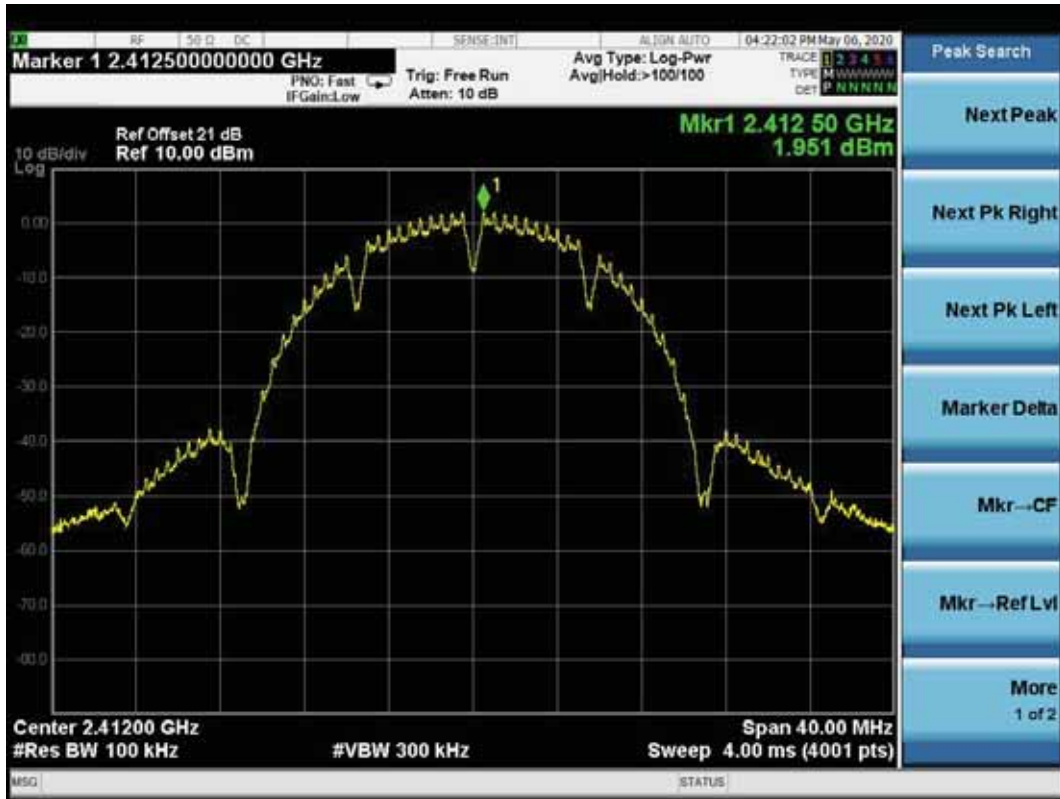
PASSED.

All the test results are attached in next pages.

(Test Date: 2020.05.06 Temperature: 23°C Humidity: 51 %)

Modulation	Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limit
802.11b	1	2412	1.951	8 dBm
	6	2437	2.43	8 dBm
	11	2462	2.625	8 dBm
802.11g	1	2412	-7.011	8 dBm
	6	2437	-6.608	8 dBm
	11	2462	-6.405	8 dBm
802.11n20	1	2412	-6.668	8 dBm
	6	2437	-6.29	8 dBm
	11	2462	-5.703	8 dBm

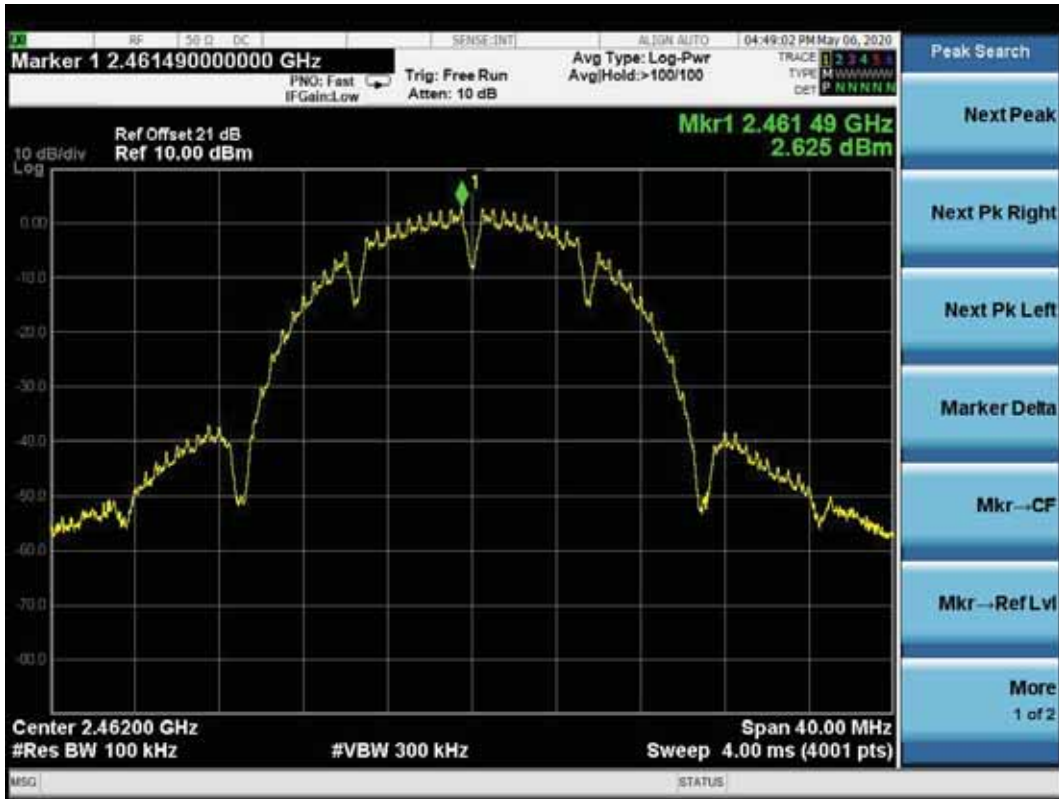
802.11b CH2412 MHz



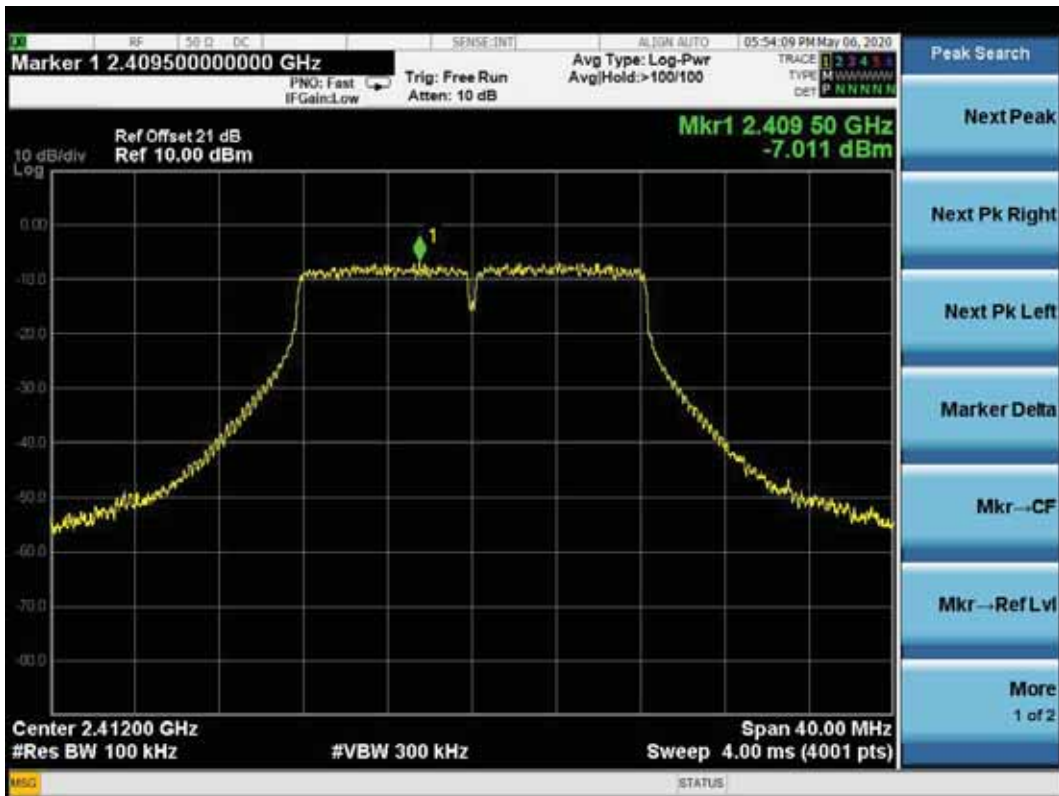
802.11b CH2437 MHz



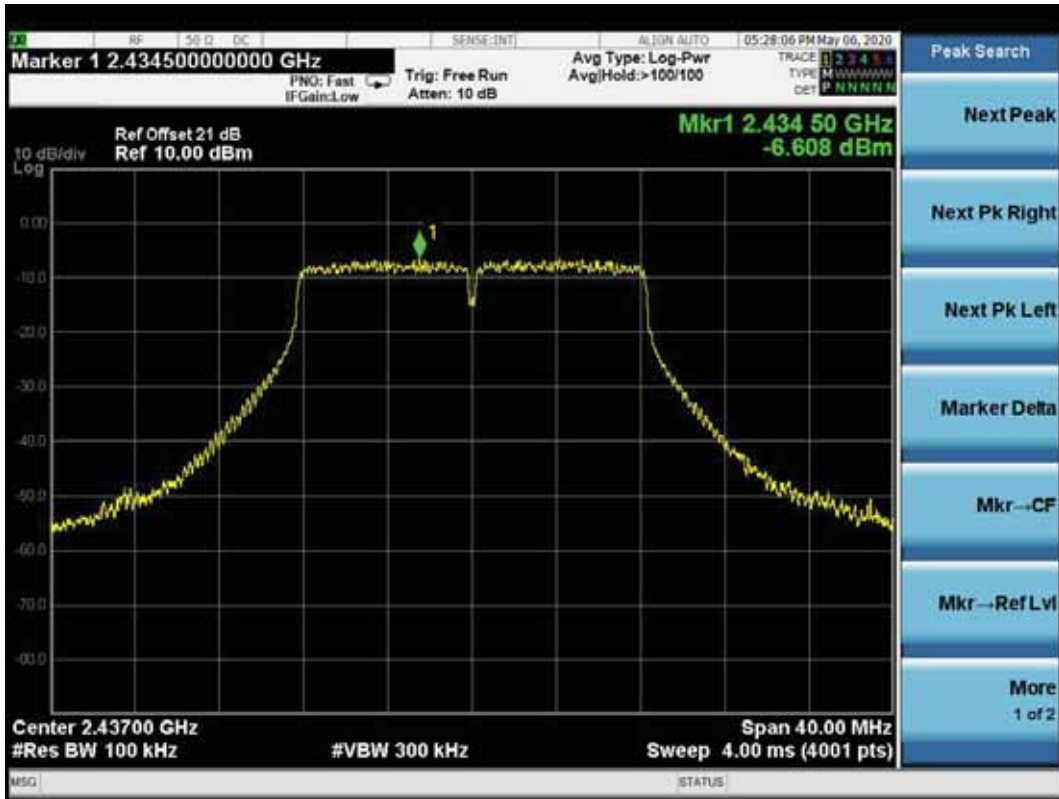
802.11b CH2462 MHz



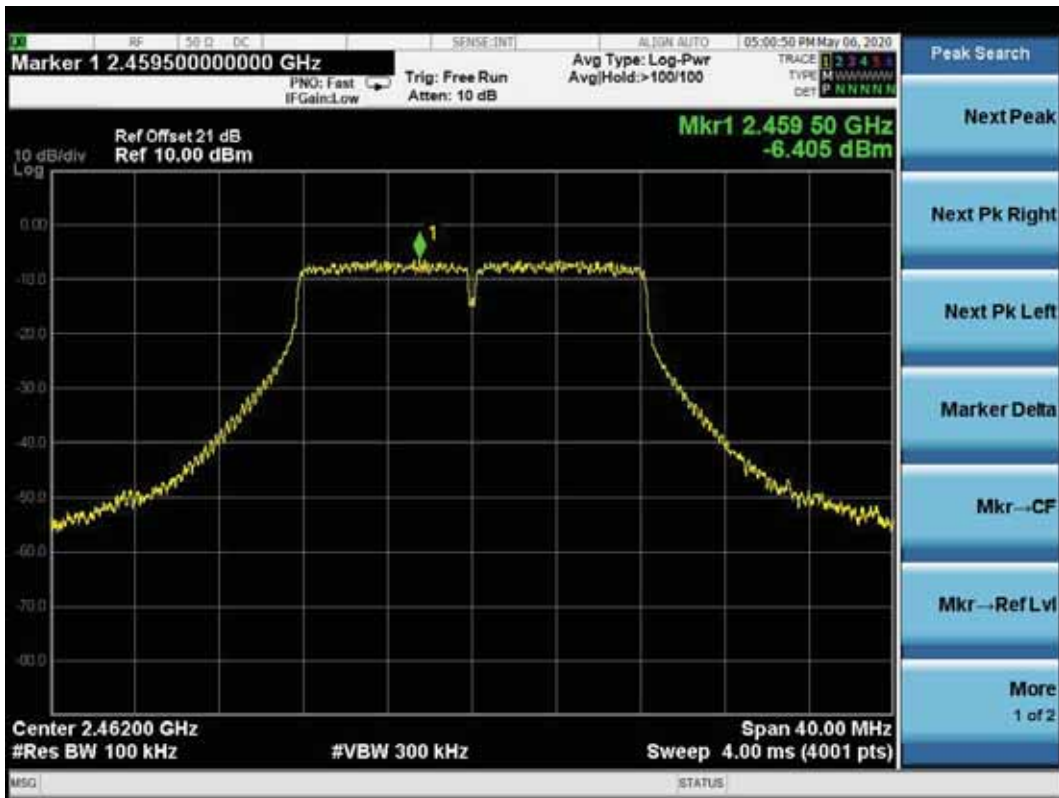
802.11g CH2412 MHz



802.11g CH2437 MHz



802.11g CH2462 MHz



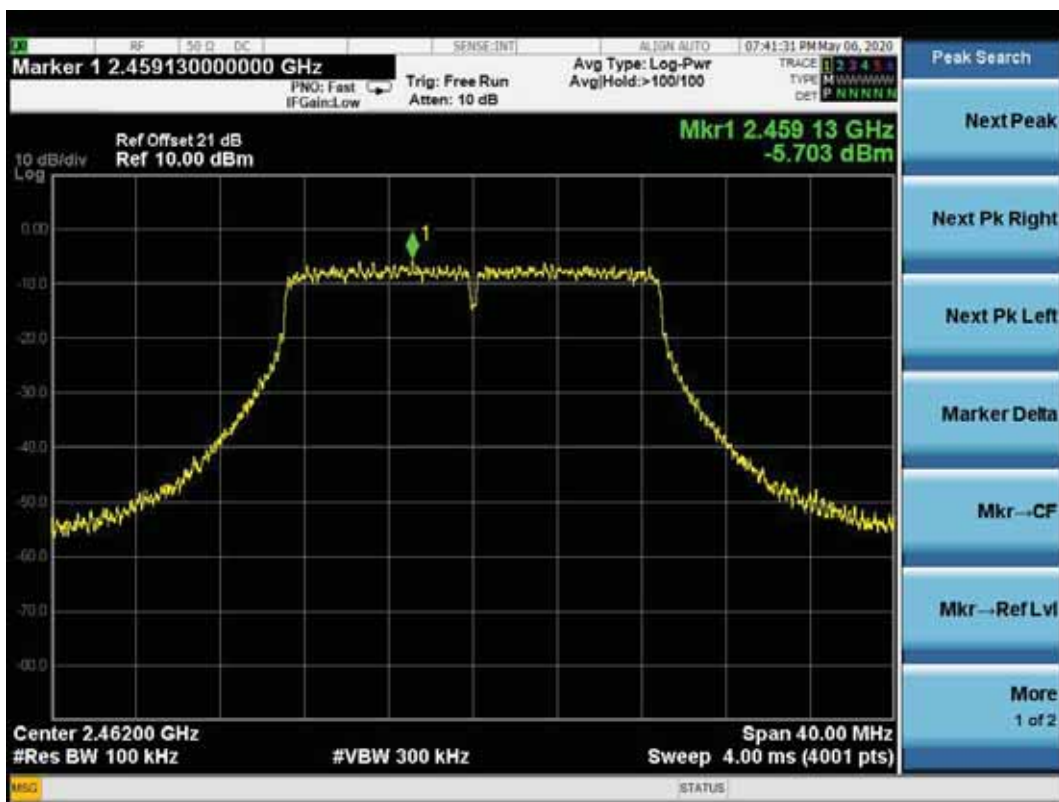
802.11n20 CH2412 MHz



802.11n20 CH2437 MHz



802.11n20 CH2462 MHz



10 DEVIATION TO TEST SPECIFICATIONS

None.

11 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°C~+100°C	0.52°C
Humidity	30%~95%	2.6%