

TEST REPORT  
On behalf of

Savant Technologies LLC, dba GE Lighting, a Savant company

Product Name: Cync Dual Mode Full Color Light Strip

Model No.: CLEDSTR20CD1

FCC ID: PUU-STRIP-DMFC-II

Prepared For: Savant Technologies LLC, dba GE Lighting, a Savant company  
1975 Noble Road, Cleveland, OH 44112

Prepared By: Audix Technology (Shanghai) Co., Ltd.  
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File No. : C1D2012094  
Report No. : ACI-F21023  
Date of Test : 2021.01.09 – 19  
Date of Report : 2021.02.07

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 : Savant Technologies LLC, dba GE Lighting, a Savant company  
 EUT Description : Cync Dual Mode Full Color Light Strip  
 (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*

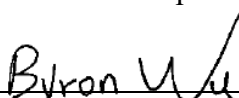
The device described above is tested by Audix Technology (Shanghai) Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits.


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 : 2021.01.09 – 19 Date of Report : 2021.02.07

1 Producer :   
 JAREY LU / Supervisor

Reviewer :   
 BYRON WU / Deputy Assistant Manager

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

Signatory :   
 Authorized Signature(s) BYRON KWO/Assistant General Manager

## 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
<b>EMISSION</b>			
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 : Cync Dual Mode Full Color Light Strip

Type of EUT :  Production  Pre-product  Pro-type

Model Number : CLEDSTR20CD1

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: -0.12 dBi  
WIFI ANT:  
Antenna Type: PCB Antenna  
Antenna Gain: 1.85 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 : Savant Technologies LLC, dba GE Lighting, a Savant company  
1975 Noble Road, Cleveland, OH 44112

Manufacturer : same as Applicant

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 “UI\_mptool.exe” was used to control EUT work in TX mode, and select test channel.

Modulation	data rate (Mbps)	TX Power Index A	Test Channel		Frequency (MHz)
802.11b	1	40	Low:	1	2412
		39	Middle:	6	2437
		39	High:	11	2462
802.11g	6	53	Low:	1	2412
		53	Middle:	6	2437
		52	High:	11	2462
802.11n20	MCS0	51	Low:	1	2412
		50	Middle:	6	2437
		49	High:	11	2462

## 2.4 Supported equipment

Brand : Acer  
 Product Name: : Notebook  
 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

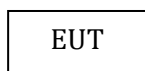
#### 3.1 Test Equipment

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

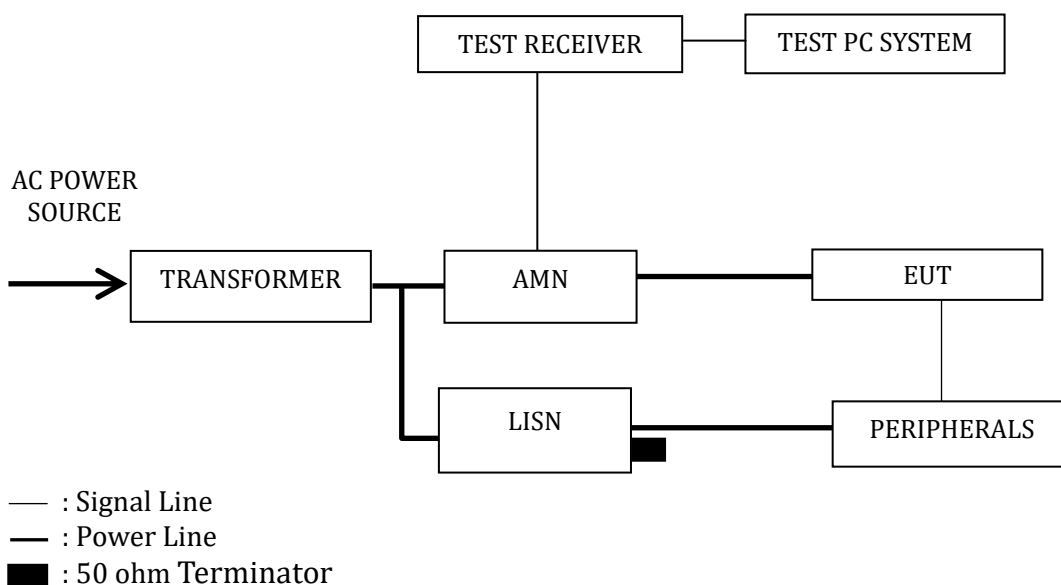
Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Test Receiver	R&S	ESCI	101302	2020.03.26	1 Year
2.	Artificial Mains Network (AMN)	R&S	ENV4200	100125	2020.06.24	1 Year
3.	Software	Audix	E3	6.2009-1-15	--	--

#### 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(uV)	
	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
3.	Lighting	--	--	--	P14

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 : Cync Dual Mode Full Color Light Strip Temperature : 22°C

Model No. : CLEDSTR20CD1 Humidity : 51%RH

Test Mode : Transmitting Date of Test : 2021.01.19

Polarization	Frequency (MHz)	Meter Reading dB ( V)	AMN Factor (dB/m)	Cable Loss (dB)	Emission Level dB ( V/m)	Limits dB ( V/m)	Margin (dB)	Remark
Line	0.15	40.32	10.54	0.03	50.89	66	15.11	QP
	0.15	28.63	10.54	0.03	39.2	56	16.8	Average
	0.3712	39.77	10.41	0.04	50.22	58.47	8.25	QP
	0.3712	27.58	10.41	0.04	38.03	48.47	10.44	Average
	0.5854	36.87	10.35	0.04	47.26	56	8.74	QP
	0.5854	24.38	10.35	0.04	34.77	46	11.23	Average
	1.172	34.09	10.33	0.05	44.47	56	11.53	QP
	1.172	21.54	10.33	0.05	31.92	46	14.08	Average
	3.207	33.24	10.35	0.09	43.68	56	12.32	QP
	3.207	20.22	10.35	0.09	30.66	46	15.34	Average
	8.822	33.19	10.34	0.17	43.7	60	16.3	QP
	8.822	20.32	10.34	0.17	30.83	50	19.17	Average
Neutral	0.15	46.68	10.72	0.03	57.43	66	8.57	QP
	0.15	32.33	10.72	0.03	43.08	56	12.92	Average
	0.3712	38.67	10.56	0.04	49.27	58.47	9.2	QP
	0.3712	26.55	10.56	0.04	37.15	48.47	11.32	Average
	0.5885	33.34	10.47	0.04	43.85	56	12.15	QP
	0.5885	21.03	10.47	0.04	31.54	46	14.46	Average
	1.464	33.61	10.46	0.06	44.13	56	11.87	QP
	1.464	20.36	10.46	0.06	30.88	46	15.12	Average
	3.509	31.88	10.47	0.09	42.44	56	13.56	QP
	3.509	18.29	10.47	0.09	28.85	46	17.15	Average
	8.592	31.84	10.46	0.17	42.47	60	17.53	QP
	8.592	19.18	10.46	0.17	29.81	50	20.19	Average

TEST ENGINEER: Jarey

EUT : Cync Dual Mode Full Color Light Strip Temperature : 22°C

Model No. : CLEDSTR20CD1 Humidity : 51%RH

Test Mode : Receiving Date of Test : 2021.01.19

Polarization	Frequency (MHz)	Meter Reading dB ( V)	AMN Factor (dB/m)	Cable Loss (dB)	Emission Level dB ( V/m)	Limits dB ( V/m)	Margin (dB)	Remark
Line	0.15	40.13	10.54	0.03	50.7	66	15.3	QP
	0.15	28.23	10.54	0.03	38.8	56	17.2	Average
	<b>0.3751</b>	<b>40.41</b>	<b>10.4</b>	<b>0.04</b>	<b>50.85</b>	<b>58.39</b>	<b>7.54</b>	<b>QP</b>
	0.3751	26.24	10.4	0.04	36.68	48.39	11.71	Average
	0.5885	36.88	10.35	0.04	47.27	56	8.73	QP
	0.5885	24.38	10.35	0.04	34.77	46	11.23	Average
	1.236	33.89	10.33	0.06	44.28	56	11.72	QP
	1.236	20.69	10.33	0.06	31.08	46	14.92	Average
	2.9	32.81	10.35	0.09	43.25	56	12.75	QP
	2.9	19.58	10.35	0.09	30.02	46	15.98	Average
	7.025	33.08	10.34	0.15	43.57	60	16.43	QP
7.025	20.41	10.34	0.15	30.9	50	19.1	Average	
Neutral	0.15	46.68	10.72	0.03	57.43	66	8.57	QP
	0.15	32.25	10.72	0.03	43	56	13	Average
	0.3791	39.29	10.54	0.04	49.87	58.3	8.43	QP
	0.3791	26.23	10.54	0.04	36.81	48.3	11.49	Average
	0.5823	33.75	10.47	0.04	44.26	56	11.74	QP
	0.5823	21.58	10.47	0.04	32.09	46	13.91	Average
	1.68	33.88	10.46	0.06	44.4	56	11.6	QP
	1.68	20.39	10.46	0.06	30.91	46	15.09	Average
	3.72	31.73	10.47	0.1	42.3	56	13.7	QP
	3.72	18.17	10.47	0.1	28.74	46	17.26	Average
	11.08	31.7	10.47	0.19	42.36	60	17.64	QP
11.08	18.67	10.47	0.19	29.33	50	20.67	Average	

TEST ENGINEER: Jarey

EUT : Cync Dual Mode Full Color Light Strip      Temperature : 22°C

Model No. : CLEDSTR20CD1      Humidity : 51%RH

Test Mode : Lighting      Date of Test : 2021.01.19

Polarization	Frequency (MHz)	Meter Reading dB ( V)	AMN Factor (dB/m)	Cable Loss (dB)	Emission Level dB ( V/m)	Limits dB ( V/m)	Margin (dB)	Remark
Line	0.15	40.32	10.54	0.03	50.89	66	15.11	QP
	0.15	28.63	10.54	0.03	39.2	56	16.8	Average
	0.3712	39.77	10.41	0.04	50.22	58.47	8.25	QP
	0.3712	27.58	10.41	0.04	38.03	48.47	10.44	Average
	0.5854	36.87	10.35	0.04	47.26	56	8.74	QP
	0.5854	24.38	10.35	0.04	34.77	46	11.23	Average
	1.172	34.09	10.33	0.05	44.47	56	11.53	QP
	1.172	21.54	10.33	0.05	31.92	46	14.08	Average
	3.207	33.24	10.35	0.09	43.68	56	12.32	QP
	3.207	20.22	10.35	0.09	30.66	46	15.34	Average
	8.822	33.19	10.34	0.17	43.7	60	16.3	QP
8.822	20.32	10.34	0.17	30.83	50	19.17	Average	
Neutral	0.15	46.68	10.72	0.03	57.43	66	8.57	QP
	0.15	32.33	10.72	0.03	43.08	56	12.92	Average
	0.3712	38.67	10.56	0.04	49.27	58.47	9.2	QP
	0.3712	26.55	10.56	0.04	37.15	48.47	11.32	Average
	0.5885	33.34	10.47	0.04	43.85	56	12.15	QP
	0.5885	21.03	10.47	0.04	31.54	46	14.46	Average
	1.464	33.61	10.46	0.06	44.13	56	11.87	QP
	1.464	20.36	10.46	0.06	30.88	46	15.12	Average
	3.509	31.88	10.47	0.09	42.44	56	13.56	QP
	3.509	18.29	10.47	0.09	28.85	46	17.15	Average
	8.592	31.84	10.46	0.17	42.47	60	17.53	QP
8.592	19.18	10.46	0.17	29.81	50	20.19	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:

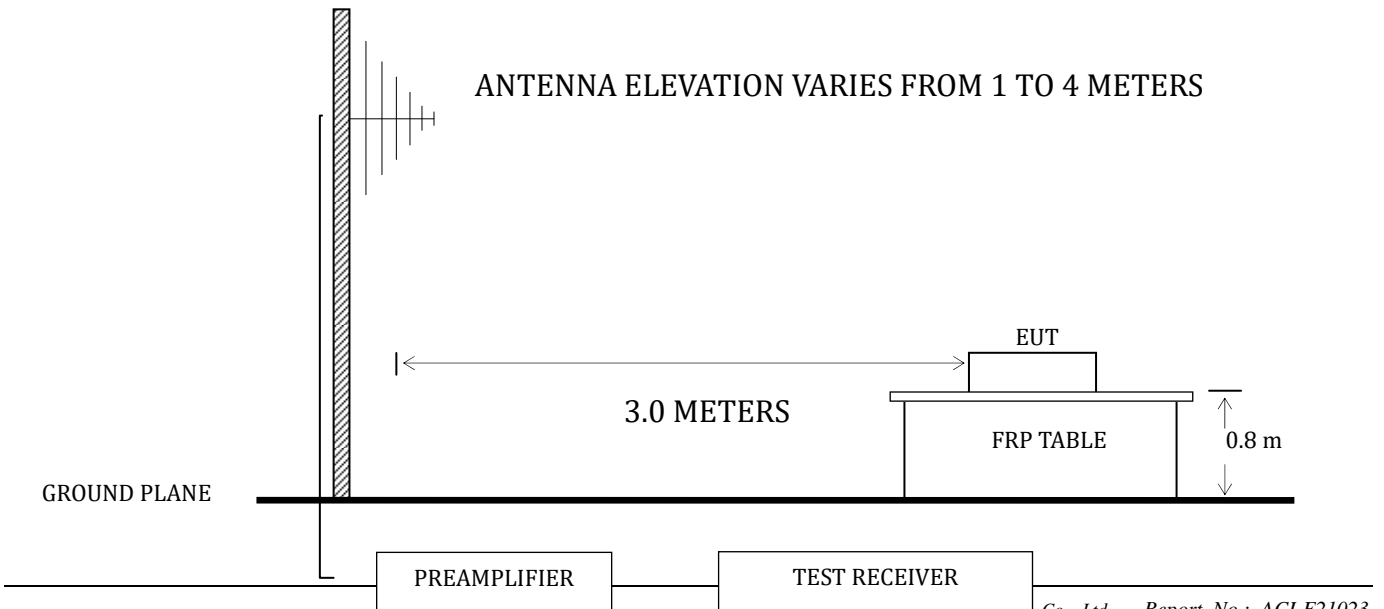
Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Preamplifier	Agilent	8447D	2944A10548	2020.04.26	1 Year
2.	Preamplifier	HP	8449B	3008A00864	2021.01.05	1 Year
3.	Spectrum Analyzer	Agilent	N9010A	MY52221182	2020.09.16	1 Year
4.	Test Receiver	R&S	ESCI	101303	2020.04.26	1 Year
5.	Bi-log Antenna	Schwarz beck	VULB 9168	708	2020.05.17	1 Year
6.	Horn Antenna	EMCO	3115	9607-4878	2020.07.13	1 Year
7.	Horn Antenna	EMCO	3116	00062643	2020.09.08	1 Year
8.	Cavity Band Rejection Filter	Microwave	WT-A3882 -R10	WT200312-1 -1	2020.07.07	1 Year
9.	Software	Audix	E3	SET00200 9912M295-2	--	--

### 4.2 Block Diagram of Test Setup

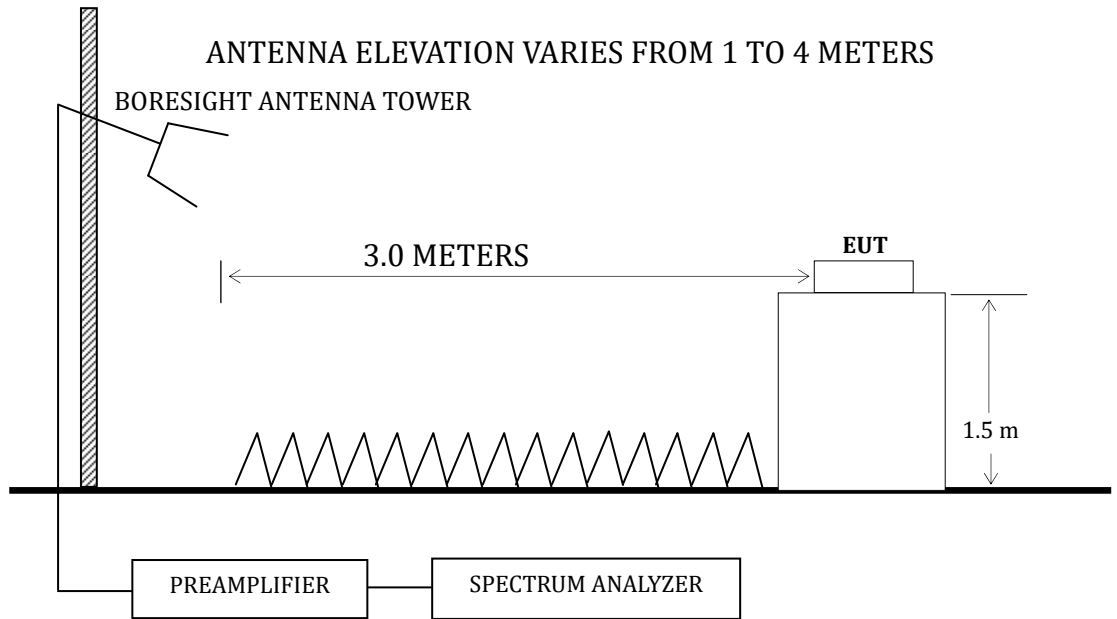
#### 4.2.1 EUT & Peripherals



#### 4.2.2 Below 1GHz



4.2.3 Above 1GHz



4.3 Radiated Emission Limit (§15.209)

Frequency (MHz)	Distance (m)	Field strength limits (uV/m)	
		(uV/m)	dB(uV/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 ( V/m) = 20 log Emission Level ( V/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 10<sup>th</sup> 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 1GHz (Worst case emission)

No.	Operation	Modulation	Channel	Frequency	Data Page
1.	Transmitting	802.11b	1	2412 MHz	P20
2.	Receiving	802.11b/g/n	1	2412 MHz	P21
3.	Lighting	--	--	--	P22

Frequency range: above 1GHz

No.	Operation	Modulation	Channel	Frequency	Data Page
1.	Transmitting	802.11b	1	2412 MHz	P23
2.			6	2437 MHz	P23
3.			11	2462 MHz	P24
4.	Transmitting	802.11g	11	2462 MHz	P24
5.	Transmitting	802.11n20	11	2462 MHz	P25
6.	Receiving	802.11b/g/n	1	2412 MHz	P26
7.	Lighting	--	--	--	P27

Restricted bands:

No.	Operation	Modulation	Channel	Frequency	Data Page
1.	Transmitting	802.11b	Cabinet Emission		P28
2.		802.11g	Cabinet Emission		P29
3.		802.11n20	Cabinet Emission		P30

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

No.	Operation	Modulation	Channel	Frequency	Data Page
1.	Transmitting	BLE	39	2480 MHz	P31
		IEEE 802.11b	1	2412 MHz	

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

No.	Operation	Modulation	Channel	Frequency	Data Page
1.	Transmitting	BLE	39	2480 MHz	P31
		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 : Cync Dual Mode Full Color Light Strip      Temperature : 22°C

Model No. : CLEDSTR20CD1      Humidity : 51%RH

Test Mode : Transmitting      Date of Test : 2021.01.10 - 18

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	47.326	26.53	19.85	0.43	28.37	18.44	40	21.56	QP
	61.562	29.19	18.64	0.48	28.28	20.03	40	19.97	QP
	88.033	38.93	13.68	0.56	28.13	25.04	43.5	18.46	QP
	102.72	39.36	15	0.58	28.06	26.88	43.5	16.62	QP
	191.75	28.81	16.46	0.59	27.53	18.33	43.5	25.17	QP
	492.47	26.46	23.21	1.23	27.16	23.74	46	22.26	QP
Vertical	32.634	43.57	18.12	0.36	28.35	33.7	40	6.3	QP
	41.422	40.71	19.41	0.4	28.36	32.16	40	7.84	QP
	59.649	38.05	18.86	0.48	28.29	29.1	40	10.9	QP
	116.13	36.56	16.31	0.58	27.95	25.5	43.5	18	QP
	128.56	36.63	17.41	0.58	27.87	26.75	43.5	16.75	QP
	387.99	24.32	21.01	1.06	27.25	19.14	46	26.86	QP

TEST ENGINEER: Jarey

EUT : Cync Dual Mode Full Color Light Strip      Temperature : 22°C

Model No. : CLEDSTR20CD1      Humidity : 51%RH

Test Mode : Receiving      Date of Test : 2021.01.10 - 18

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	47.326	26.53	19.85	0.43	28.37	18.44	40	21.56	QP
	61.562	29.19	18.64	0.48	28.28	20.03	40	19.97	QP
	88.033	38.93	13.68	0.56	28.13	25.04	43.5	18.46	QP
	102.72	39.36	15	0.58	28.06	26.88	43.5	16.62	QP
	191.75	28.81	16.46	0.59	27.53	18.33	43.5	25.17	QP
	492.47	26.46	23.21	1.23	27.16	23.74	46	22.26	QP
Vertical	32.324	43.41	18.09	0.36	28.35	33.51	40	6.49	QP
	40.559	40.68	19.28	0.4	28.36	32	40	8	QP
	60.28	38.43	18.78	0.48	28.29	29.4	40	10.6	QP
	119.02	35.18	16.58	0.58	27.93	24.41	43.5	19.09	QP
	131.3	35.72	17.64	0.58	27.85	26.09	43.5	17.41	QP
	419.11	23.27	21.81	1.12	27.23	18.97	46	27.03	QP

TEST ENGINEER: Jarey

EUT : Cync Dual Mode Full Color Light Strip Temperature : 22°C

Model No. : CLEDSTR20CD1 Humidity : 51%RH

Test Mode : Lighting Date of Test : 2021.01.10 - 18

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	47.492	28.63	18.95	0.43	28.37	19.64	40	20.36	QP
	60.069	29.63	19.5	0.48	28.29	21.32	40	18.68	QP
	88.342	40.41	13.66	0.56	28.13	26.5	43.5	17	QP
	101.64	39.57	15.16	0.58	28.06	27.25	43.5	16.25	QP
	188.41	28.8	16.92	0.59	27.55	18.76	43.5	24.74	QP
	265.68	26.35	18.1	0.79	27.39	17.85	46	28.15	QP
Vertical	32.41	44.79	17.6	0.36	28.35	34.4	40	5.6	QP
	42.6	43.1	18.13	0.41	28.36	33.28	40	6.72	QP
	60.492	38.12	19.45	0.48	28.29	29.76	40	10.24	QP
	116.95	36.67	16.41	0.58	27.94	25.72	43.5	17.78	QP
	129.47	36.8	17.4	0.58	27.87	26.91	43.5	16.59	QP
	195.82	28.1	16.19	0.59	27.52	17.36	43.5	26.14	QP

TEST ENGINEER: Jarey

**Radiated Emission > 1GHz**

EUT : Cync Dual Mode Full Color Light Strip Temperature : 22°C

Model No. : CLEDSTR20CD1 Humidity : 51%RH

Test Mode : Transmitting Date of Test : 2021.01.10 - 18

**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	1711	47.02	26.37	3.25	37.36	39.28	74	34.72	Peak
	3988	41.17	32.57	4.78	37.07	41.45	74	32.55	Peak
	5500	39.36	34.2	5.8	37.05	42.31	74	31.69	Peak
	7084	38.27	35.65	6.21	37.01	43.12	74	30.88	Peak
	8146	37.43	37.83	6.49	36.99	44.76	74	29.24	Peak
	9379	36.45	38.37	7.07	36.97	44.92	74	29.08	Peak
Vertical	1801	46.21	26.72	3.33	37.28	38.98	74	35.02	Peak
	3565	42.17	31.41	4.57	37.08	41.07	74	32.93	Peak
	4672	39.47	32.72	5.37	37.06	40.5	74	33.5	Peak
	6004	38.56	34.2	5.95	37.03	41.68	74	32.32	Peak
	7534	36.65	36.95	6.33	37	42.93	74	31.07	Peak
	8470	36.51	38.45	6.62	36.98	44.6	74	29.4	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	1990	44.87	27.36	3.53	37.13	38.63	74	35.37	Peak
	3799	41.76	32.06	4.7	37.08	41.44	74	32.56	Peak
	5509	39.29	34.2	5.83	37.05	42.27	74	31.73	Peak
	6661	37.74	34.79	6.12	37.02	41.63	74	32.37	Peak
	7507	38.71	36.9	6.31	37	44.92	74	29.08	Peak
	8956	36.66	38.32	6.88	36.98	44.88	74	29.12	Peak
Vertical	1792	46.13	26.68	3.33	37.29	38.85	74	35.15	Peak
	3655	41.57	31.65	4.62	37.08	40.76	74	33.24	Peak
	5032	39.35	33.35	5.66	37.06	41.3	74	32.7	Peak
	5959	37.94	34.2	5.95	37.03	41.06	74	32.94	Peak
	7120	37.1	35.78	6.24	37.01	42.11	74	31.89	Peak
	8470	36.78	38.45	6.62	36.98	44.87	74	29.13	Peak

**802.11b CH2462MHz**

Polarization	Frequency (MHz)	Meter Reading dB ( $\mu$ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB ( $\mu$ V/m)	Limits dB ( $\mu$ V/m)	Margin (dB)	Remark
Horizontal	2035	45.43	27.49	3.59	37.12	39.39	74	34.61	Peak
	3547	42.42	31.35	4.57	37.08	41.26	74	32.74	Peak
	4366	40.54	32.45	5.13	37.07	41.05	74	32.95	Peak
	6220	39.04	34.33	6.02	37.03	42.36	74	31.64	Peak
	8083	38.33	37.69	6.43	36.99	45.46	74	28.54	Peak
	9442	36.12	38.39	7.13	36.97	44.67	74	29.33	Peak
Vertical	1891	45.8	27.02	3.45	37.21	39.06	74	34.94	Peak
	3898	41.58	32.33	4.73	37.08	41.56	74	32.44	Peak
	4798	39.95	32.96	5.48	37.06	41.33	74	32.67	Peak
	5905	38.94	34.2	5.92	37.04	42.02	74	31.98	Peak
	7381	37.22	36.59	6.29	37	43.1	74	30.9	Peak
	8398	36.88	38.31	6.62	36.99	44.82	74	29.18	Peak

**802.11g CH2412MHz**

Polarization	Frequency (MHz)	Meter Reading dB ( $\mu$ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB ( $\mu$ V/m)	Limits dB ( $\mu$ V/m)	Margin (dB)	Remark
Horizontal	1846	45.6	26.87	3.39	37.24	38.62	74	35.38	Peak
	3232	43.27	30.64	4.41	37.09	41.23	74	32.77	Peak
	4663	39.6	32.72	5.37	37.06	40.63	74	33.37	Peak
	6094	38.92	34.25	5.97	37.03	42.11	74	31.89	Peak
	7651	37.86	37.09	6.36	37	44.31	74	29.69	Peak
	8866	37.05	38.35	6.81	36.98	45.23	74	28.77	Peak
Vertical	2080	45.41	27.59	3.61	37.12	39.49	74	34.51	Peak
	3664	42.46	31.68	4.62	37.08	41.68	74	32.32	Peak
	4564	41.87	32.52	5.31	37.07	42.63	74	31.37	Peak
	5896	37.95	34.2	5.92	37.04	41.03	74	32.97	Peak
	7129	37.82	35.84	6.24	37.01	42.89	74	31.11	Peak
	8209	37.21	37.93	6.49	36.99	44.64	74	29.36	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	1846	46.32	26.87	3.39	37.24	39.34	74	34.66	Peak
	3520	42.13	31.26	4.54	37.08	40.85	74	33.15	Peak
	4888	38.9	33.11	5.6	37.06	40.55	74	33.45	Peak
	5950	38.29	34.2	5.95	37.03	41.41	74	32.59	Peak
	7282	36.65	36.28	6.26	37.01	42.18	74	31.82	Peak
	8614	35.78	38.45	6.75	36.98	44	74	30	Peak
Vertical	2080	45	27.59	3.61	37.12	39.08	74	34.92	Peak
	3088	43.64	30.31	4.33	37.09	41.19	74	32.81	Peak
	4240	40.64	32.5	5.01	37.07	41.08	74	32.92	Peak
	5518	39.22	34.2	5.83	37.05	42.2	74	31.8	Peak
	7120	37.9	35.78	6.24	37.01	42.91	74	31.09	Peak
	8578	36.36	38.46	6.69	36.98	44.53	74	29.47	Peak

TEST ENGINEER: Jarey

EUT : Cync Dual Mode Full Color Light Strip      Temperature : 22°C

Model No. : CLEDSTR20CD1      Humidity : 51%RH

Test Mode : Receiving      Date of Test : 2021.01.10 - 18

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	2710	43.95	29.21	4.09	37.1	40.15	74	33.85	Peak
	3907	40.65	32.33	4.73	37.08	40.63	74	33.37	Peak
	5140	38.93	33.55	5.71	37.06	41.13	74	32.87	Peak
	6193	38.2	34.32	6	37.03	41.49	74	32.51	Peak
	7669	37.78	37.12	6.36	37	44.26	74	29.74	Peak
	8542	36.3	38.48	6.69	36.98	44.49	74	29.51	Peak
Vertical	2080	44.75	27.59	3.61	37.12	38.83	74	35.17	Peak
	2953	43.4	29.97	4.25	37.09	40.53	74	33.47	Peak
	4465	39.67	32.41	5.19	37.07	40.2	74	33.8	Peak
	5653	38.29	34.2	5.85	37.04	41.3	74	32.7	Peak
	7021	36.82	35.46	6.21	37.01	41.48	74	32.52	Peak
	8371	37.28	38.26	6.62	36.99	45.17	74	28.83	Peak

TEST ENGINEER: Jarey

EUT : Cync Dual Mode Full Color Light Strip Temperature : 22°C

Model No. : CLEDSTR20CD1 Humidity : 51%RH

Test Mode : Lighting Date of Test : 2021.01.10 - 18

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	1744	42.53	26.49	3.28	37.33	34.97	74	39.03	Peak
	3112	42.58	30.37	4.33	37.09	40.19	74	33.81	Peak
	4948	41.96	33.2	5.6	37.06	43.7	74	30.3	Peak
	7288	42.82	36.28	6.26	37.01	48.35	74	25.65	Peak
	9688	39.18	38.4	7.2	36.96	47.82	74	26.18	Peak
	11740	38.02	38.94	10.05	36.62	50.39	74	23.61	Peak
Vertical	2020	43.27	27.44	3.56	37.12	37.15	74	36.85	Peak
	3412	42.17	31.03	4.49	37.08	40.61	74	33.39	Peak
	5284	38.48	33.82	5.76	37.05	41.01	74	32.99	Peak
	7156	39.56	35.9	6.24	37.01	44.69	74	29.31	Peak
	8836	38.95	38.36	6.81	36.98	47.14	74	26.86	Peak
	11128	39.26	38.65	9.25	36.74	50.42	74	23.58	Peak

TEST ENGINEER: Jarey

**Emissions in restricted frequency bands:**

EUT : Cync Dual Mode Full Color Light Strip Temperature : 22°C

Model No. : CLEDSTR20CD1 Humidity : 51%RH

Test Mode : Transmitting Date of Test : 2021.01.10 - 18

**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	52.22	28.16	3.83	37.11	47.1	74	-26.9	Peak
	2334	41.12	28.16	3.83	37.11	36	54	18	Average
	2356.3	51.39	28.21	3.85	37.11	46.34	74	27.66	Peak
	2356.3	39.35	28.21	3.85	37.11	34.3	54	19.7	Average
	2389.9	61.13	28.27	3.85	37.11	56.14	74	17.86	Peak
	2389.9	40.52	28.27	3.85	37.11	35.53	54	18.47	Average
	2483.9	53.42	28.47	3.93	37.11	48.71	74	25.29	Peak
	2483.9	44.35	28.47	3.93	37.11	39.64	54	14.36	Average
	2490	52.52	28.49	3.93	37.11	47.83	74	26.17	Peak
	2490	42.25	28.49	3.93	37.11	37.56	54	16.44	Average
	2496	51.84	28.49	3.93	37.11	47.15	74	26.85	Peak
2496	41.19	28.49	3.93	37.11	36.5	54	17.5	Average	
Vertical	2344.4	53.62	28.19	3.83	37.11	48.53	74	25.47	Peak
	2344.4	40.25	28.19	3.83	37.11	35.16	54	18.84	Average
	2371.8	55.29	28.24	3.85	37.11	50.27	74	23.73	Peak
	2371.8	42.63	28.24	3.85	37.11	37.61	54	16.39	Average
	2389.4	59.25	28.27	3.85	37.11	54.26	74	19.74	Peak
	2389.4	43.53	28.27	3.85	37.11	38.54	54	15.46	Average
	2481.6	53.65	28.46	3.93	37.11	48.93	74	25.07	Peak
	2481.6	42.47	28.46	3.93	37.11	37.75	54	16.25	Average
	2488.1	53.31	28.47	3.93	37.11	48.6	74	25.4	Peak
	2488.1	43.24	28.47	3.93	37.11	38.53	54	15.47	Average
	2494.3	52.3	28.49	3.93	37.11	47.61	74	26.39	Peak
2494.3	40.13	28.49	3.93	37.11	35.44	54	18.56	Average	

**802.11g**

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	2334.3	54.98	28.16	3.83	37.11	49.86	74	24.14	Peak
	2334.3	40.39	28.16	3.83	37.11	35.27	54	18.73	Average
	2370.4	54.09	28.24	3.85	37.11	49.07	74	24.93	Peak
	2370.4	40.51	28.24	3.85	37.11	35.49	54	18.51	Average
	2390.1	73.12	28.27	3.85	37.11	68.13	74	5.87	Peak
	2390.1	53.87	28.27	3.85	37.11	48.88	54	5.12	Average
	2483.6	73.41	28.47	3.93	37.11	68.7	74	5.3	Peak
	2483.6	54.69	28.47	3.93	37.11	49.98	54	4.02	Average
	2489.8	61.68	28.49	3.93	37.11	56.99	74	17.01	Peak
	2489.8	43.47	28.49	3.93	37.11	38.78	54	15.22	Average
	2494.6	58.15	28.49	3.93	37.11	53.46	74	20.54	Peak
2494.6	41.31	28.49	3.93	37.11	36.62	54	17.38	Average	
Vertical	2343.5	52.83	28.19	3.83	37.11	47.74	74	26.26	Peak
	2343.5	40.48	28.19	3.83	37.11	35.39	54	18.61	Average
	2365.2	52.72	28.23	3.85	37.11	47.69	74	26.31	Peak
	2365.2	41.37	28.23	3.85	37.11	36.34	54	17.66	Average
	2390	63.52	28.27	3.85	37.11	58.53	74	15.47	Peak
	2390	48.26	28.27	3.85	37.11	43.27	54	10.73	Average
	2483.7	66.3	28.47	3.93	37.11	61.59	74	12.41	Peak
	2483.7	48.54	28.47	3.93	37.11	43.83	54	10.17	Average
	2488.9	58	28.47	3.93	37.11	53.29	74	20.71	Peak
	2488.9	43.41	28.47	3.93	37.11	38.7	54	15.3	Average
	2494.6	54.83	28.49	3.93	37.11	50.14	74	23.86	Peak
2494.6	42.48	28.49	3.93	37.11	37.79	54	16.21	Average	

**802.11n20**

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	2333.1	52.93	28.16	3.83	37.11	47.81	74	26.19	Peak
	2333.1	41.29	28.16	3.83	37.11	36.17	54	17.83	Average
	2367	52.12	28.23	3.85	37.11	47.09	74	26.91	Peak
	2367	41.51	28.23	3.85	37.11	36.48	54	17.52	Average
	2390.1	73.9	28.27	3.85	37.11	68.91	74	5.09	Peak
	2390.1	50.01	28.27	3.85	37.11	45.02	54	8.98	Average
	<b>2483.5</b>	<b>75.27</b>	<b>28.47</b>	<b>3.93</b>	<b>37.11</b>	<b>70.56</b>	<b>74</b>	<b>3.44</b>	<b>Peak</b>
	2483.5	55.15	28.47	3.93	37.11	50.44	54	3.56	Average
	2489.9	62.69	28.49	3.93	37.11	58	74	16	Peak
	2489.9	45.37	28.49	3.93	37.11	40.68	54	13.32	Average
	2493.7	62.13	28.49	3.93	37.11	57.44	74	16.56	Peak
	2493.7	45.51	28.49	3.93	37.11	40.82	54	13.18	Average
Vertical	2342.7	51.46	28.19	3.83	37.11	46.37	74	27.63	Peak
	2342.7	40.54	28.19	3.83	37.11	35.45	54	18.55	Average
	2368.5	56.5	28.23	3.85	37.11	51.47	74	22.53	Peak
	2368.5	40.35	28.23	3.85	37.11	35.32	54	18.68	Average
	2389.5	69.35	28.27	3.85	37.11	64.36	74	9.64	Peak
	2389.5	48.24	28.27	3.85	37.11	43.25	54	10.75	Average
	2483.5	66.39	28.47	3.93	37.11	61.68	74	12.32	Peak
	2483.5	49.55	28.47	3.93	37.11	44.84	54	9.16	Average
	2490	57.91	28.49	3.93	37.11	53.22	74	20.78	Peak
	2490	43.49	28.49	3.93	37.11	38.8	54	15.2	Average
	2494.1	57.26	28.49	3.93	37.11	52.57	74	21.43	Peak
	2494.1	42.53	28.49	3.93	37.11	37.84	54	16.16	Average

TEST ENGINEER: Jarey

**Additional Radiated emission (Mixed worst modulation):**

EUT : Cync Dual Mode Full Color Light Strip Temperature : 22°C

Model No. : CLEDSTR20CD1 Humidity : 51%RH

Test Mode : Transmitting Date of Test : 2021.01.10 - 18

**Below 1G**

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	47.826	27.15	19.84	0.43	28.37	19.05	40	20.95	QP
	62.651	28.17	18.53	0.49	28.27	18.92	40	21.08	QP
	87.112	38.19	13.71	0.55	28.14	24.31	40	15.69	QP
	110.96	36.85	15.82	0.58	27.99	25.26	43.5	18.24	QP
	190.41	28.5	16.58	0.59	27.54	18.13	43.5	25.37	QP
	467.24	26.46	22.94	1.2	27.18	23.42	46	22.58	QP
Vertical	32.634	43.84	18.12	0.36	28.35	33.97	40	6.03	QP
	42.154	40.59	19.51	0.41	28.36	32.15	40	7.85	QP
	60.069	38.05	18.8	0.48	28.29	29.04	40	10.96	QP
	117.36	35.37	16.42	0.58	27.94	24.43	43.5	19.07	QP
	131.76	34.87	17.68	0.58	27.85	25.28	43.5	18.22	QP
	629.48	23.21	25.79	1.58	27.31	23.27	46	22.73	QP

**Above 1G**

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	1702	46.52	26.34	3.25	37.37	38.74	74	35.26	Peak
	3565	42.39	31.41	4.57	37.08	41.29	74	32.71	Peak
	5077	39.61	33.44	5.68	37.06	41.67	74	32.33	Peak
	6319	37.81	34.39	6.05	37.03	41.22	74	32.78	Peak
	7354	37.38	36.46	6.29	37	43.13	74	30.87	Peak
	8461	37.06	38.45	6.62	36.98	45.15	74	28.85	Peak
Vertical	1900	46.53	27.06	3.45	37.2	39.84	74	34.16	Peak
	3619	42.96	31.56	4.59	37.08	42.03	74	31.97	Peak
	4798	40.33	32.96	5.48	37.06	41.71	74	32.29	Peak
	5932	38.5	34.2	5.95	37.04	41.61	74	32.39	Peak
	7642	37.32	37.09	6.36	37	43.77	74	30.23	Peak
	8776	36.47	38.39	6.81	36.98	44.69	74	29.31	Peak

TEST ENGINEER: Jarey

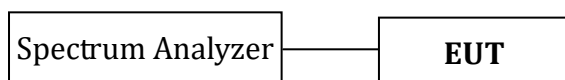
## 5 6 dB BANDWIDTH MEASUREMENT

### 5.1 Test Equipment

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

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	2020.09.16	1 Year
2.	Coaxial Cable	WOKEN	SFL402-10 5FLEX	F02-150819-0 45	2020.03.08	1 Year
3.	20 dB Attenuator	Mini-Circuits	VAT-20+	001	2020.08.06	1 Year

### 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

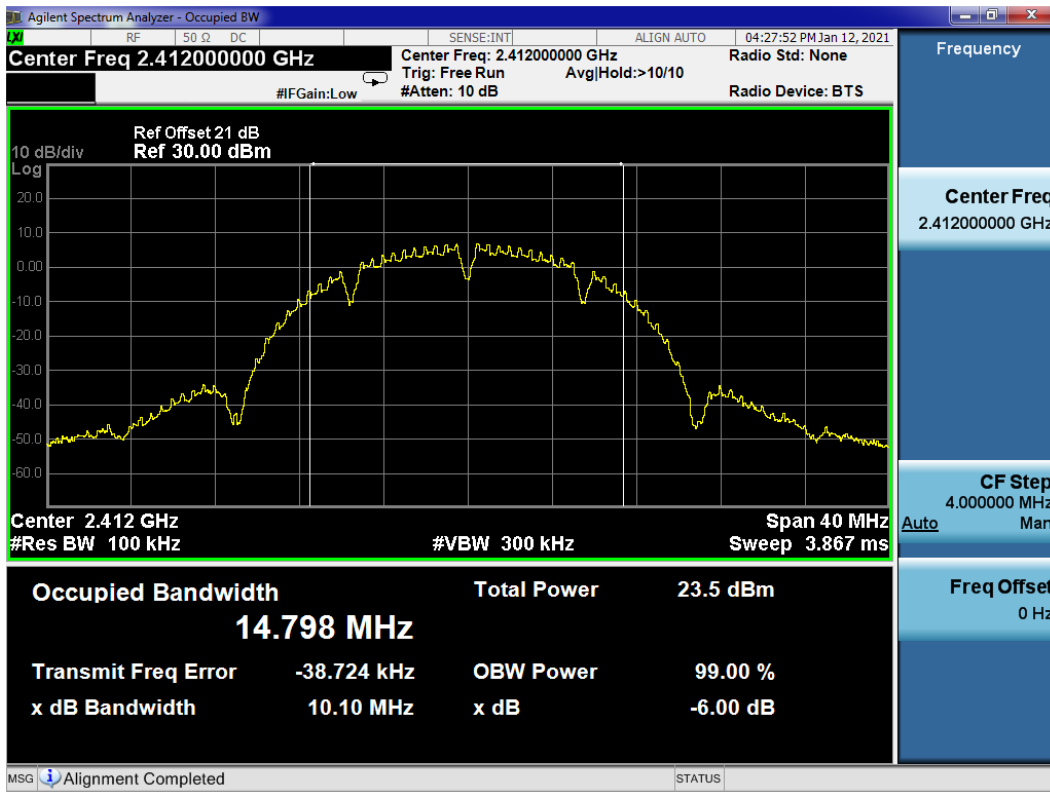
### **PASSED.**

All the test results are attached in next pages.

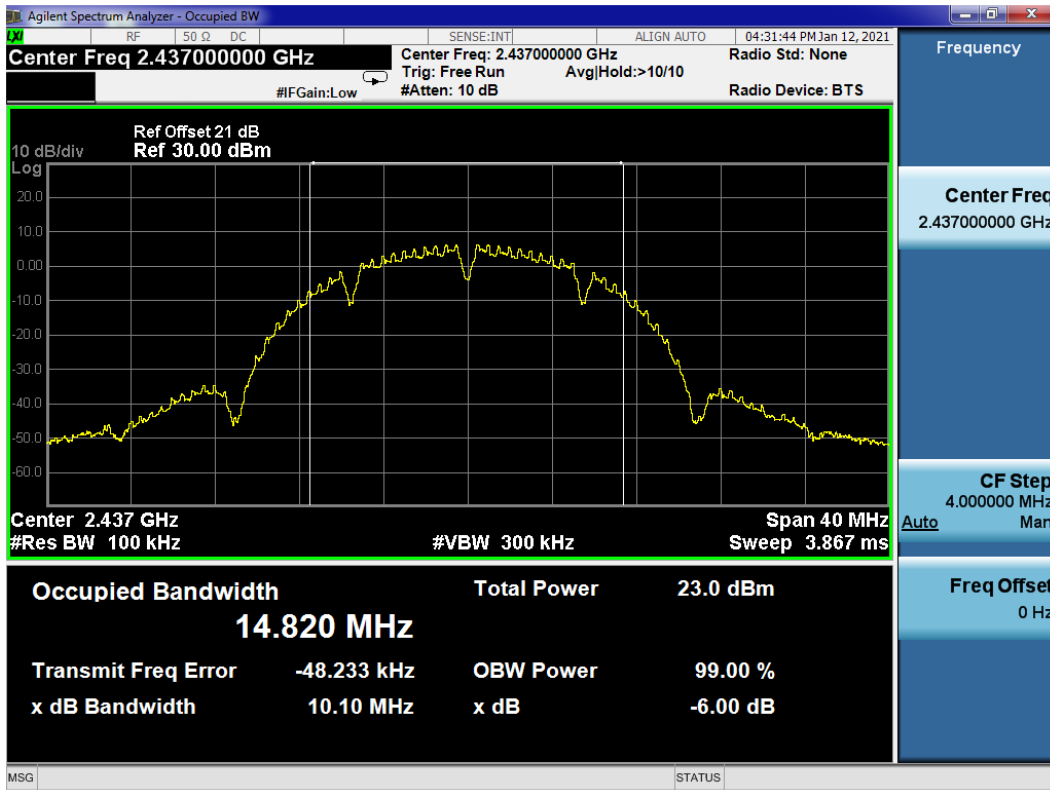
(Test Date: 2021.01.12 Temperature: 23°C Humidity: 51 %)

Modulation	Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit
802.11b	1	2412	<b>10.10</b>	500 kHz
	6	2437	<b>10.10</b>	500 kHz
	11	2462	<b>10.10</b>	500 kHz
802.11g	1	2412	<b>16.57</b>	500 kHz
	6	2437	<b>16.57</b>	500 kHz
	11	2462	<b>16.57</b>	500 kHz
802.11n20	1	2412	<b>17.74</b>	500 kHz
	6	2437	<b>17.76</b>	500 kHz
	11	2462	<b>17.75</b>	500 kHz

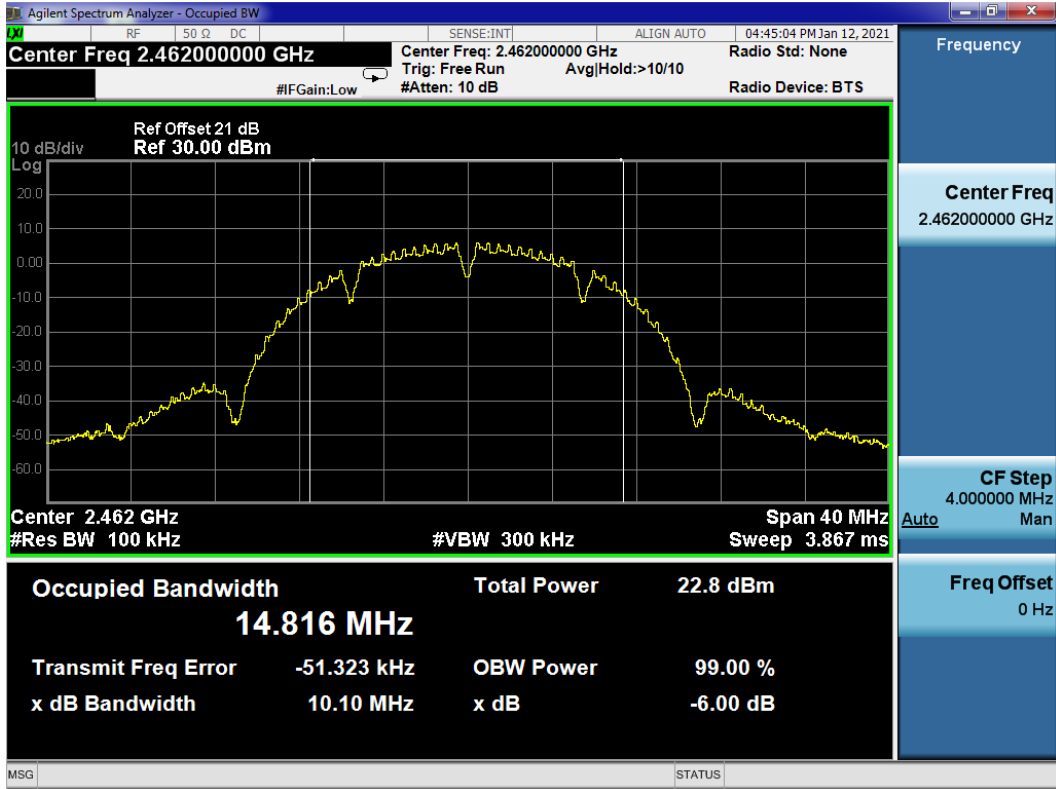
802.11b CH2412MHz



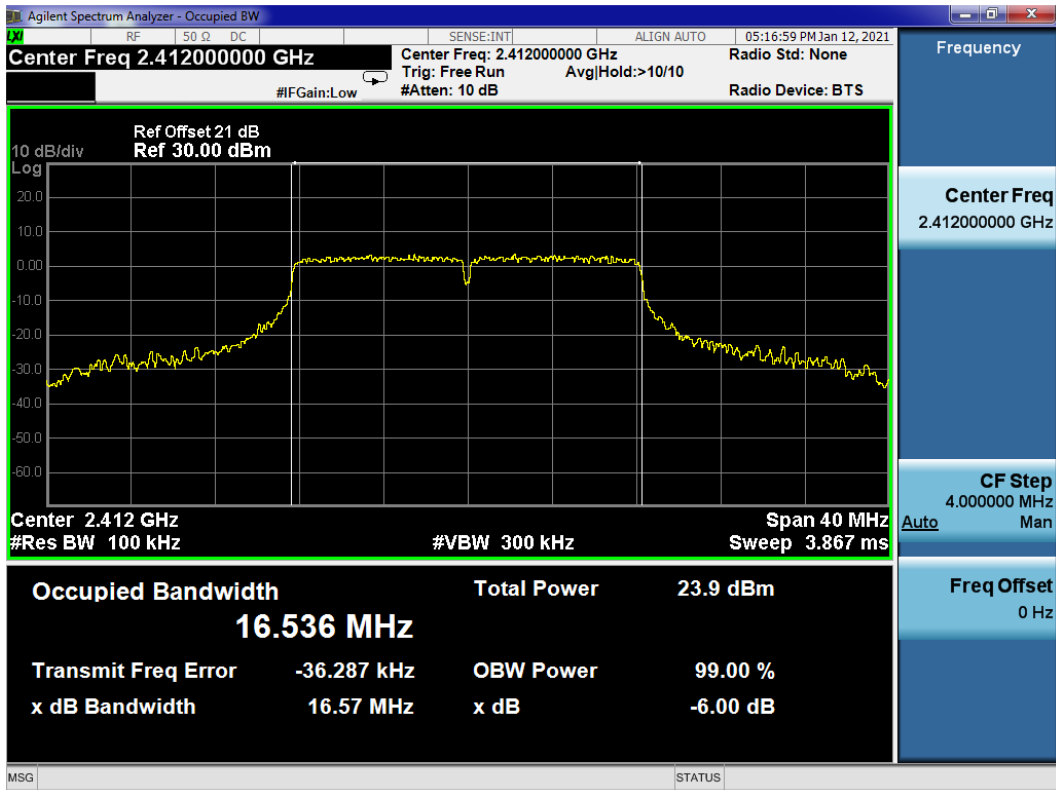
802.11b CH2437MHz



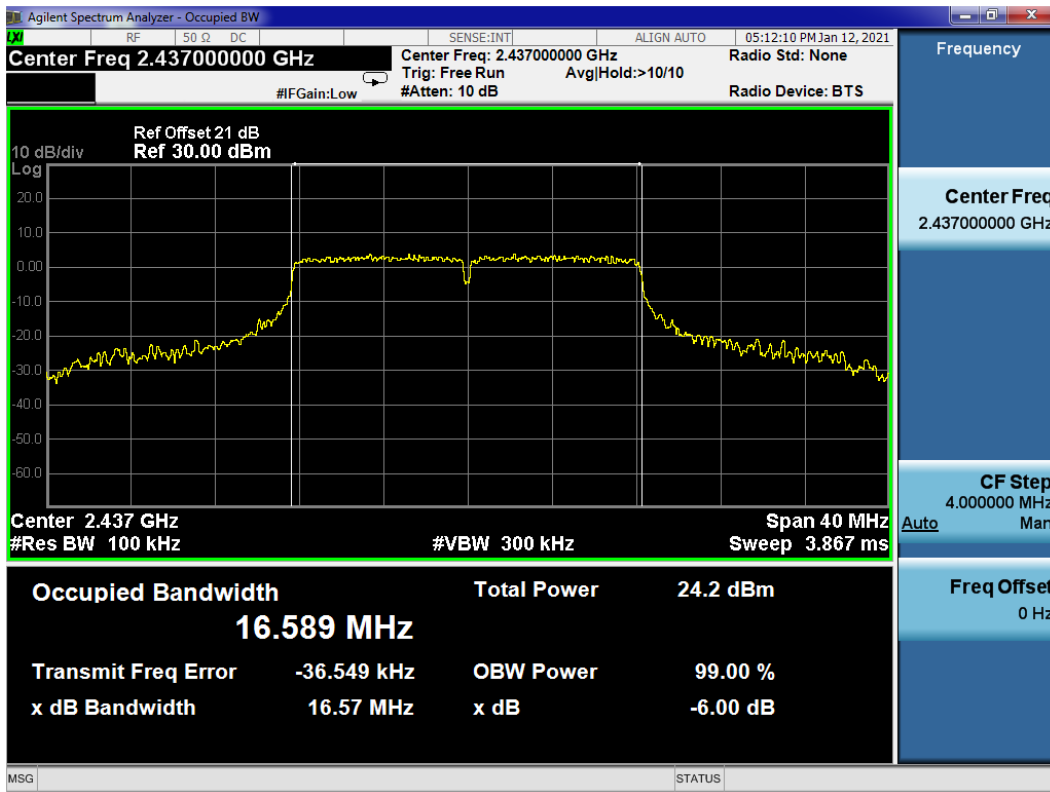
802.11b CH2462MHz



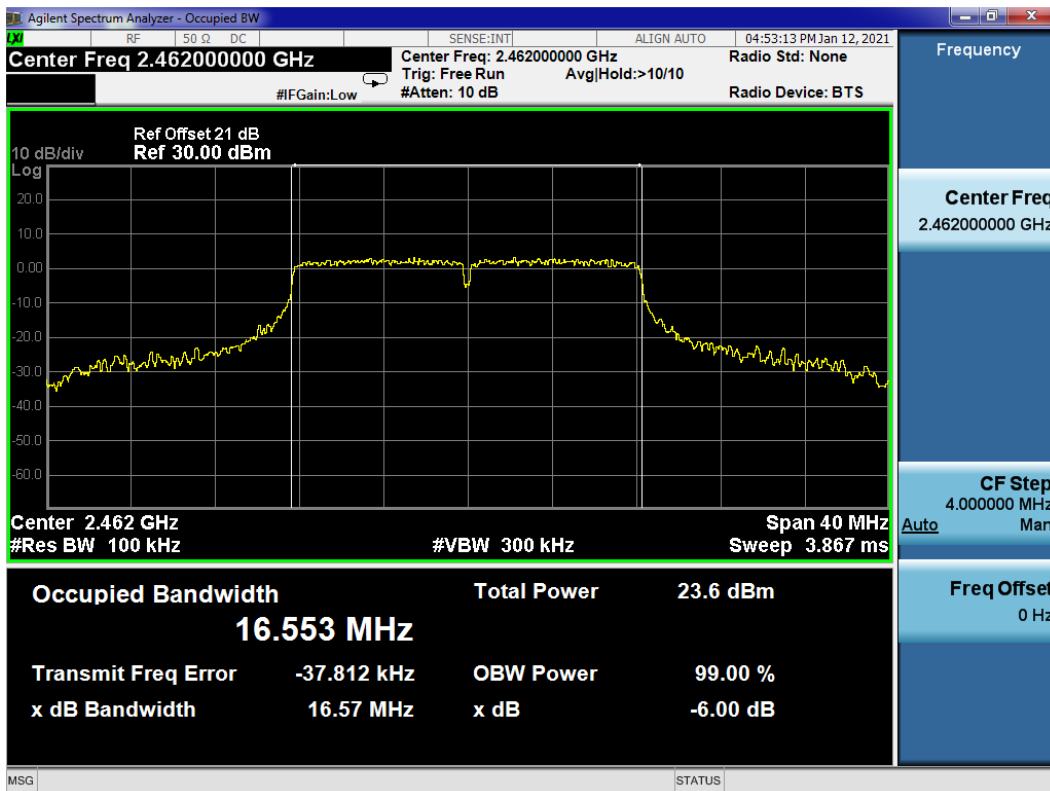
802.11g CH2412MHz



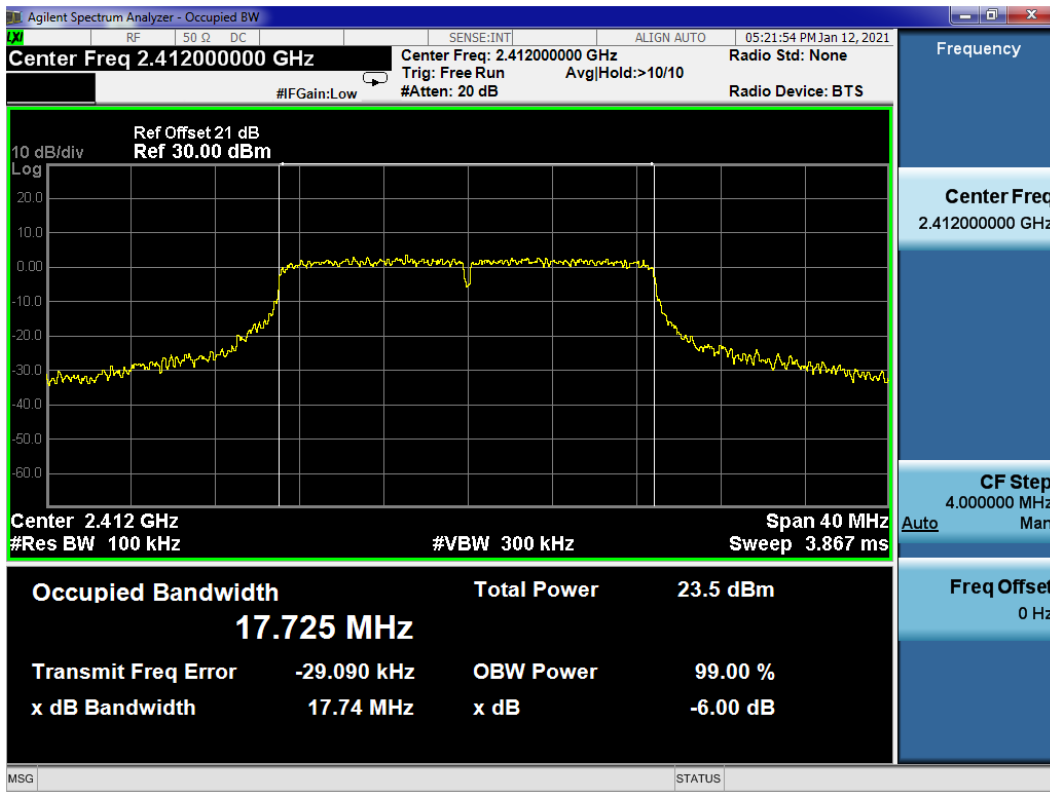
802.11g CH2437MHz



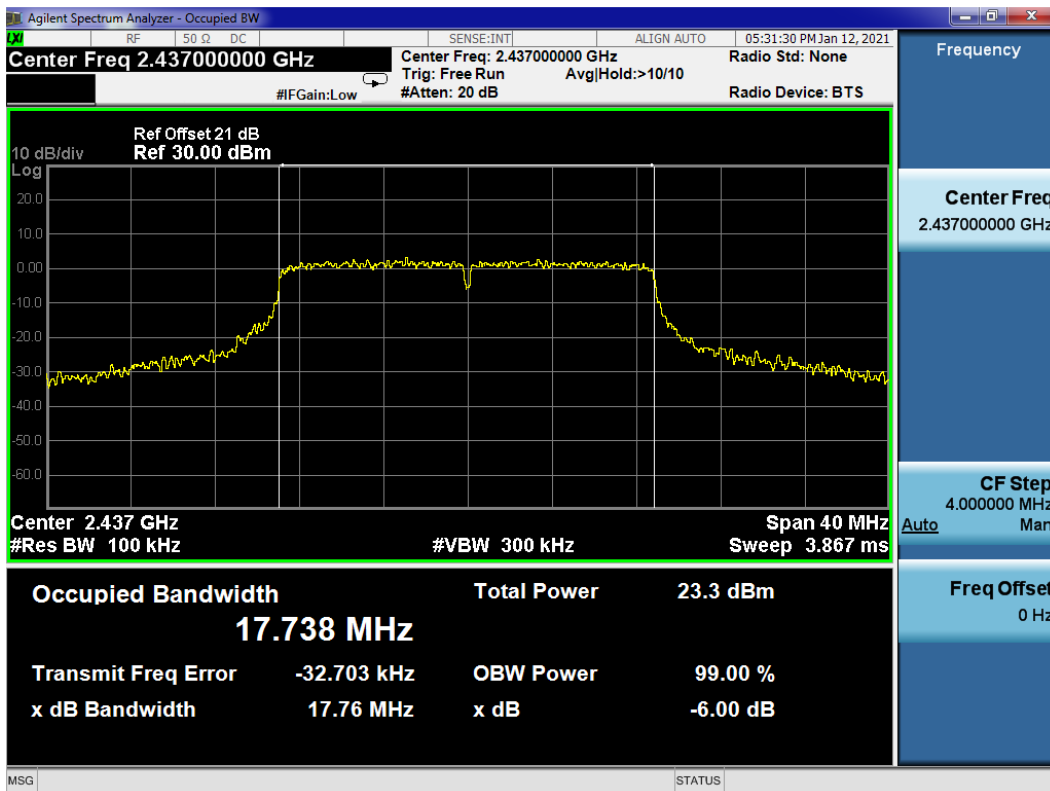
802.11g CH2462MHz



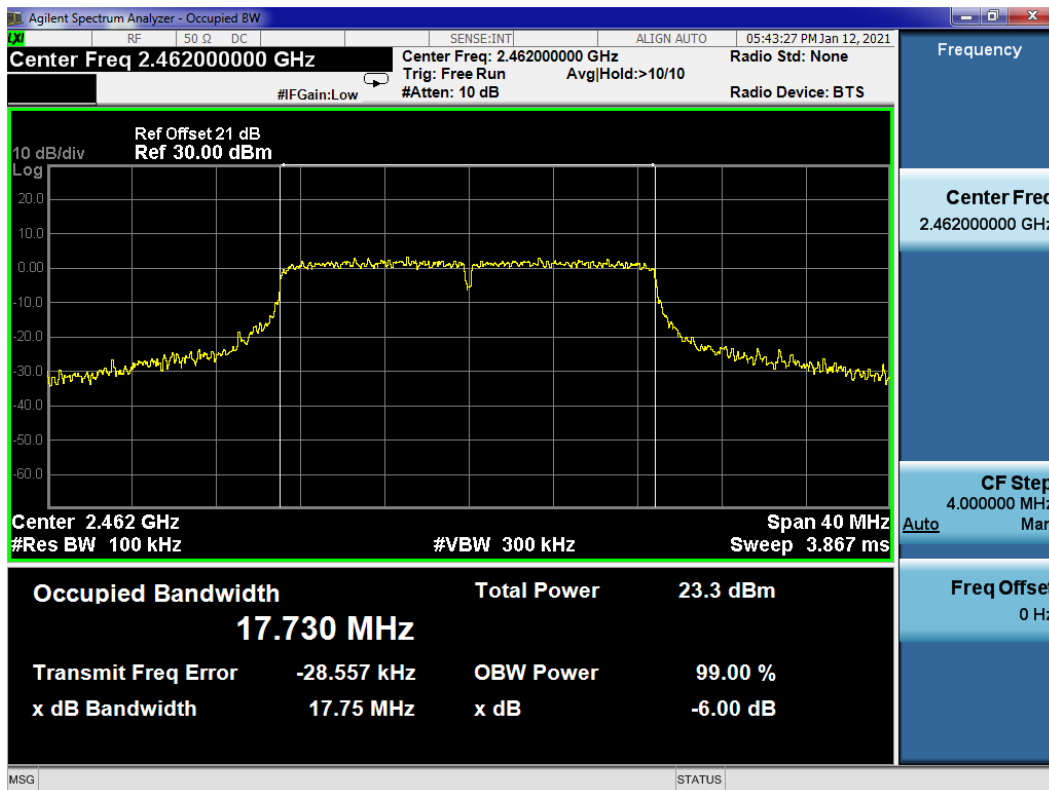
802.11n20 CH2412MHz



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.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	2020.09.16	1 Year
2.	Coaxial Cable	WOKEN	SFL402-10 5FLEX	F02-150819-0 45	2020.03.08	1 Year
3.	20 dB Attenuator	Mini-Circuits	VAT-20+	001	2020.08.06	1 Year

### 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 [3 RBW].
- c) Set the span [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.**

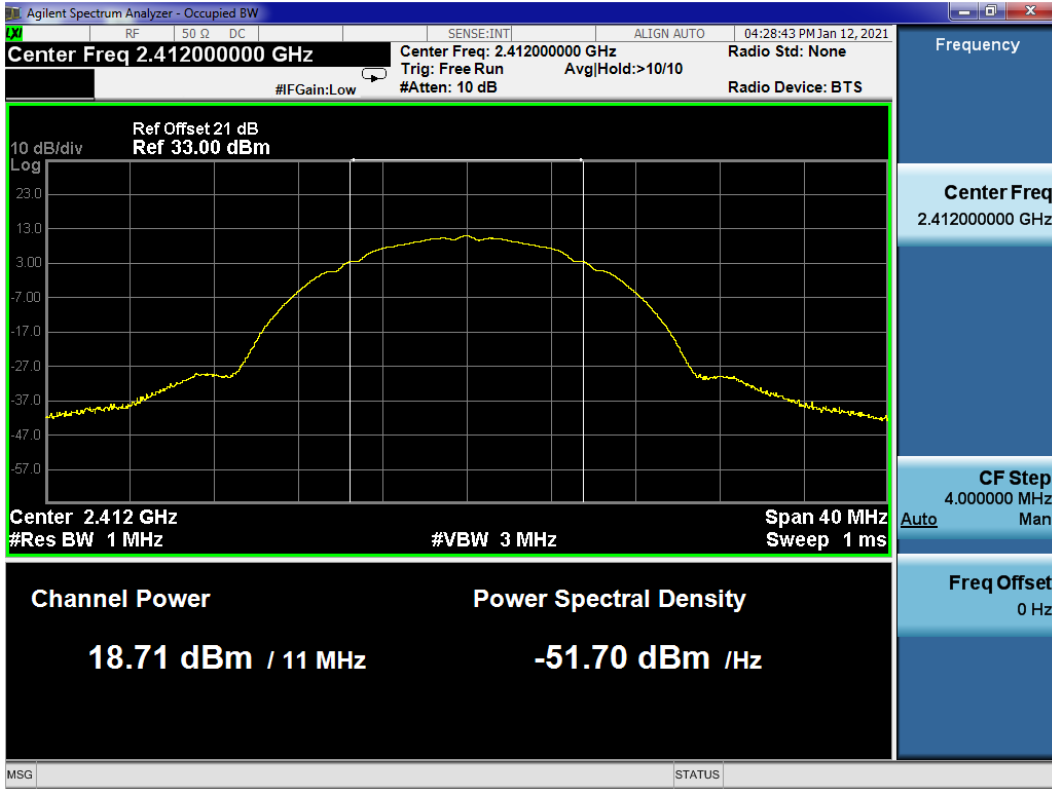
All the test results are listed below.

(Test Date: 2021.01.12 Temperature: 23°C Humidity: 51 %)

Modulation	Channel	Frequency (MHz)	Peak Output Power (dBm)	Limit
802.11b	1	2412	<b>18.71</b>	30 dBm
	6	2437	<b>18.48</b>	30 dBm
	11	2462	<b>18.48</b>	30 dBm
802.11g	1	2412	<b>24.94</b>	30 dBm
	6	2437	<b>25.10</b>	30 dBm
	11	2462	<b>24.90</b>	30 dBm
802.11n20	1	2412	<b>24.53</b>	30 dBm
	6	2437	<b>24.28</b>	30 dBm
	11	2462	<b>23.84</b>	30 dBm



### 802.11b CH2412MHz



### 802.11b CH2437MHz



### 802.11b CH2462MHz



### 802.11g CH2412MHz



### 802.11g CH2437MHz



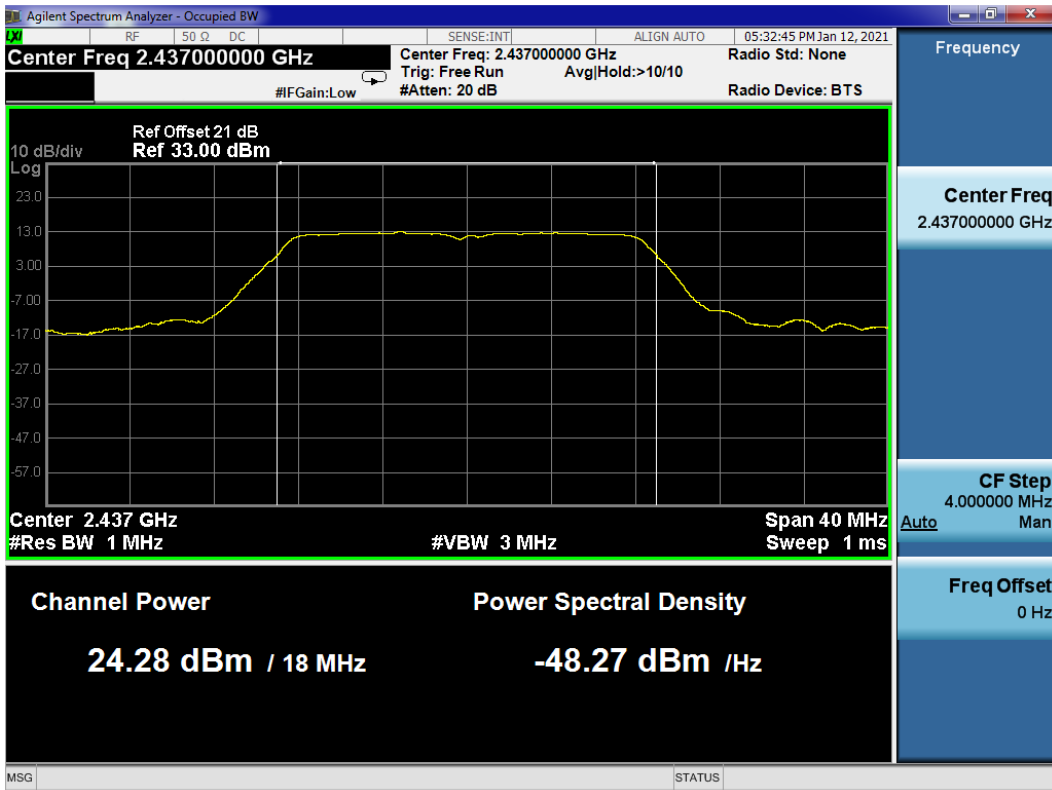
### 802.11g CH2462MHz



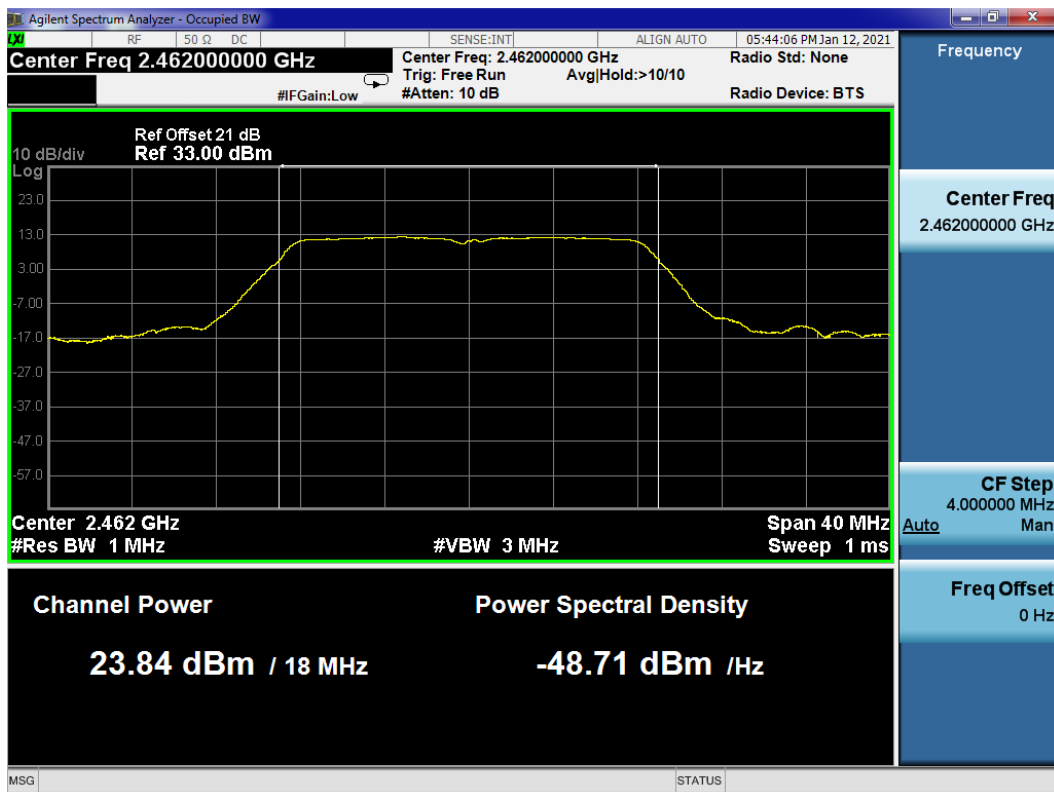
### 802.11n20 CH2412MHz



### 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.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	2020.09.16	1 Year
2.	Coaxial Cable	WOKEN	SFL402-10 5FLEX	F02-150819-0 45	2020.03.08	1 Year
3.	20 dB Attenuator	Mini-Circuits	VAT-20+	001	2020.08.06	1 Year

### 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 [3 RBW].
- e) Detector = peak.
- f) Sweep time = auto couple.
- g) Trace mode = max hold.
- h) Allow trace to fully stabilize.
- i) Use the peak marker function to determine the maximum 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 [3 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 10<sup>th</sup> 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.

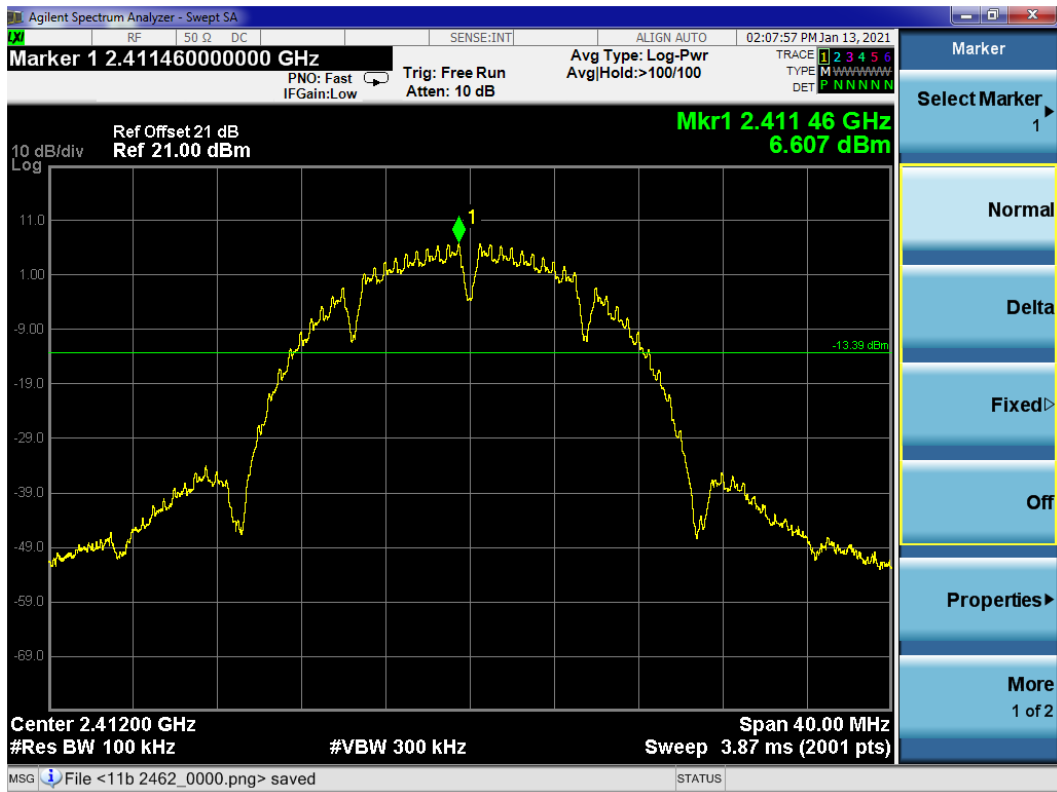
(Test Date: 2021.01.12 Temperature: 23°C Humidity: 51 %)

Modulation	Channel	Frequency (MHz)	Data Page
802.11b	1	2412 MHz	P49-50
	6	2437 MHz	P51-52
	11	2462 MHz	P53-54
802.11g	1	2412 MHz	P55-56
	6	2437 MHz	P57-58
	11	2462 MHz	P59-60
802.11n20	1	2412 MHz	P61-62
	6	2437 MHz	P63-64
	11	2462 MHz	P65-66

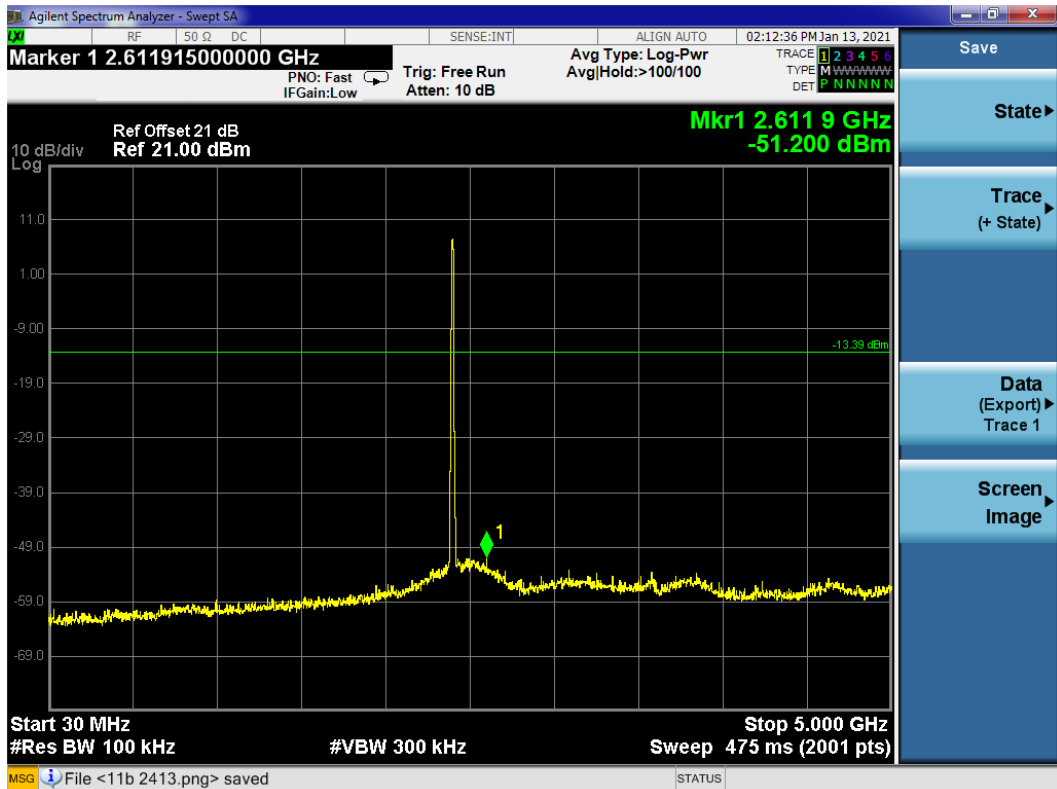


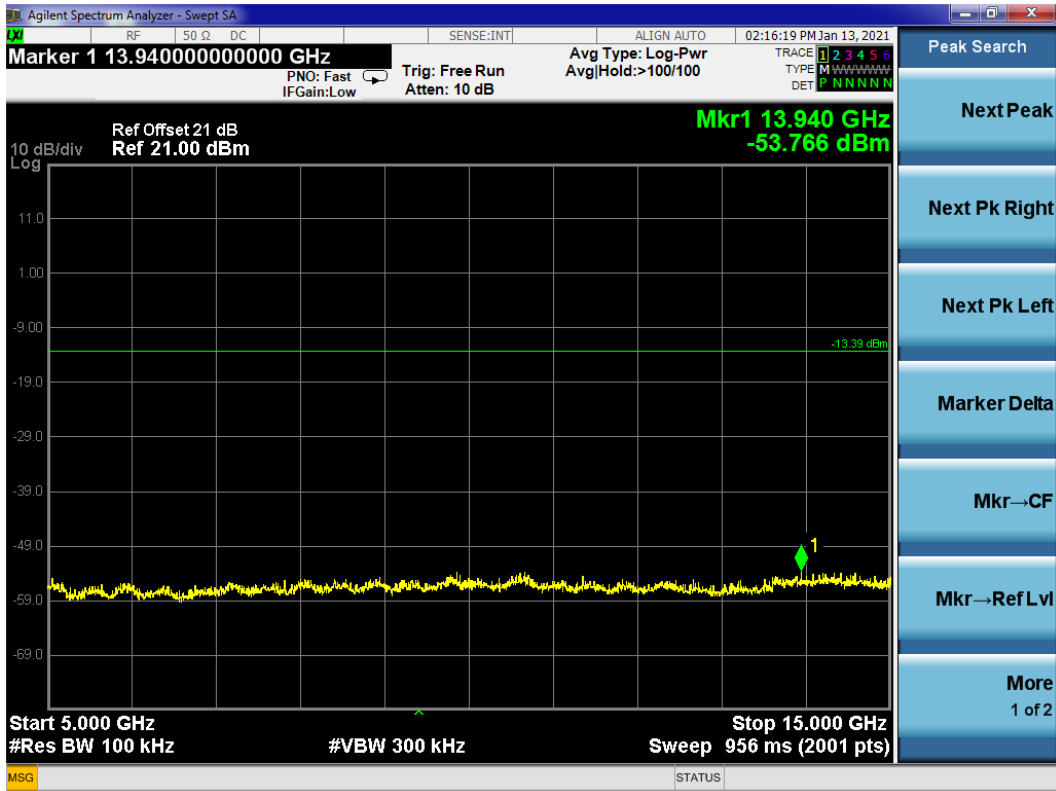
### 802.11b CH2412MHz

#### Reference level



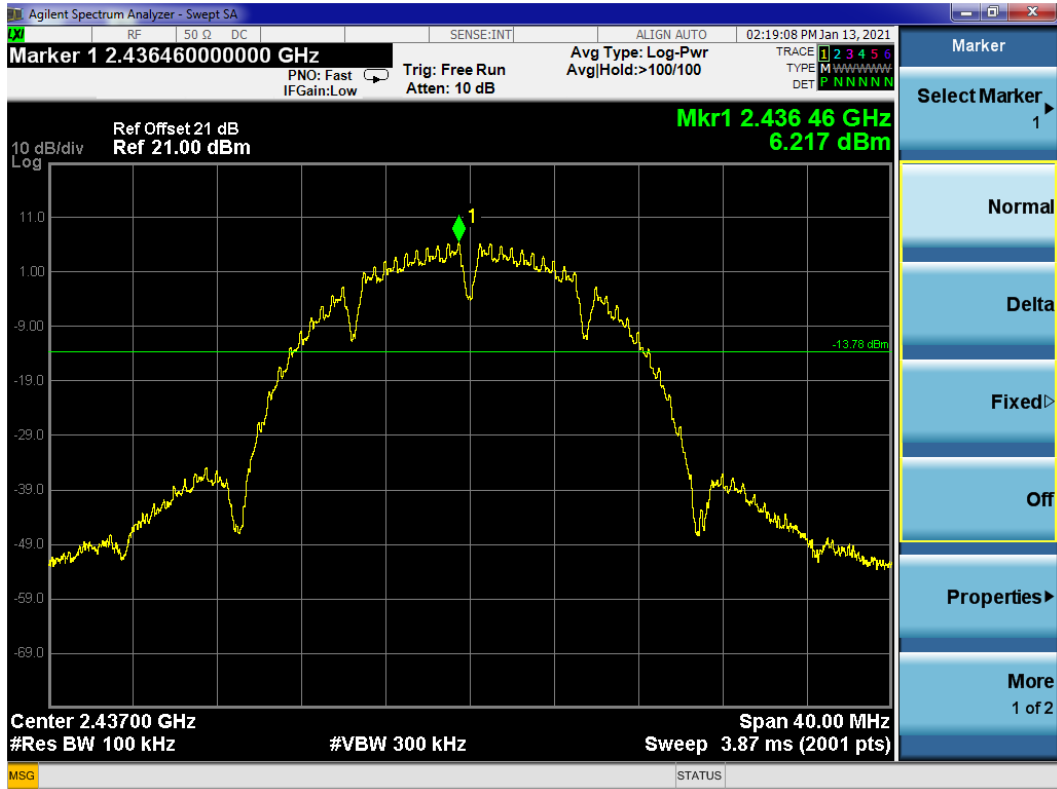
#### Emission level



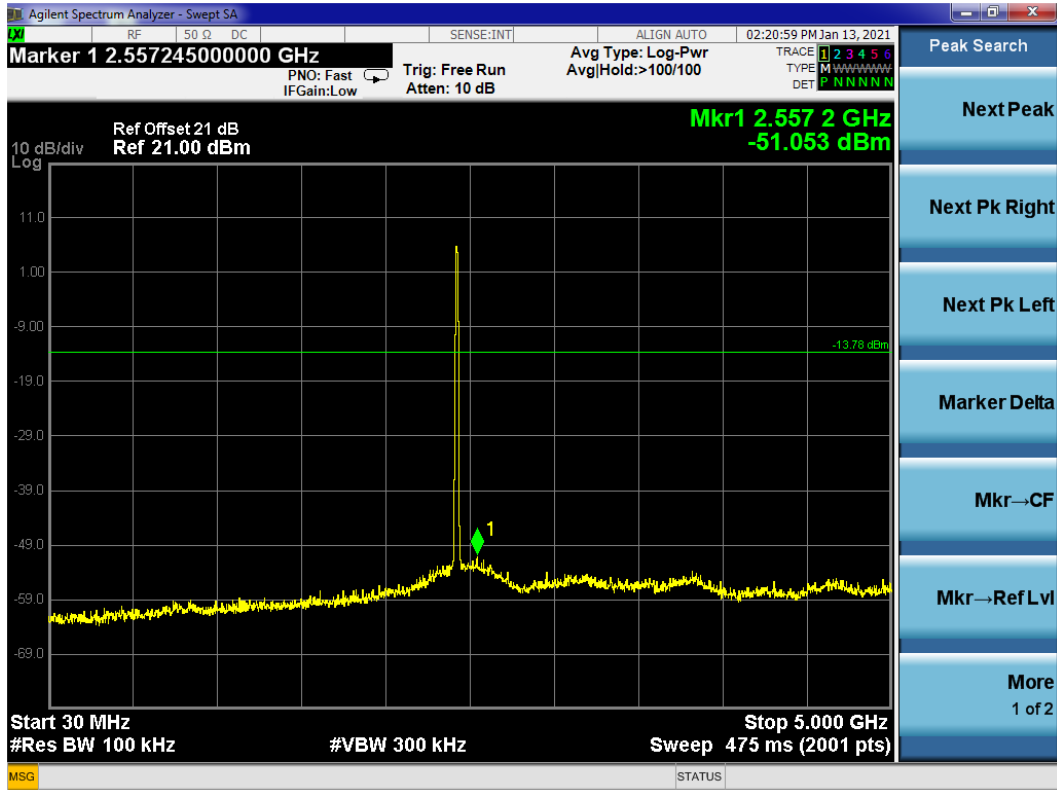


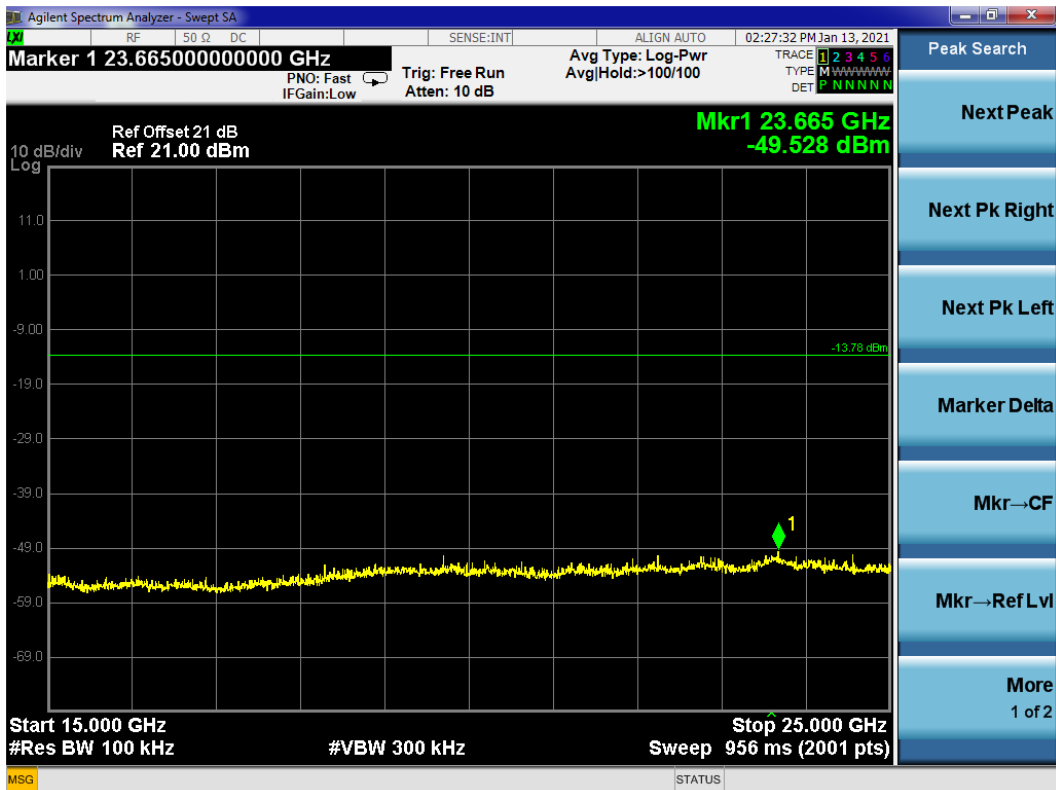
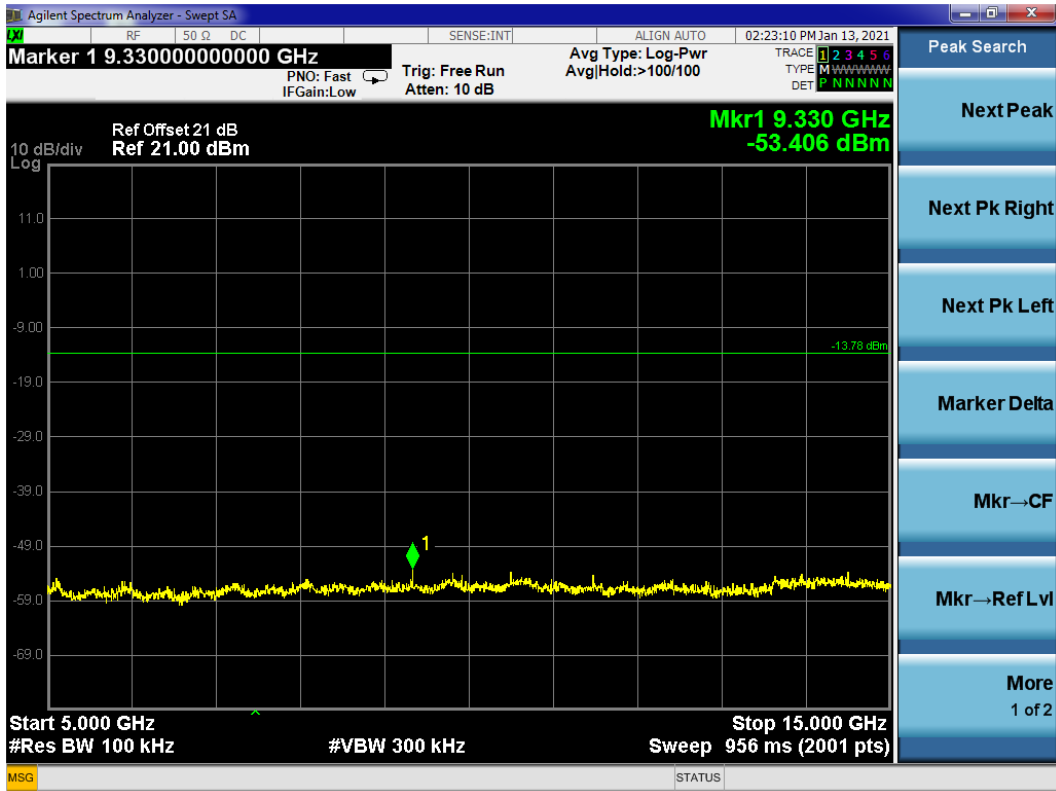
### 802.11b CH2437MHz

#### Reference level



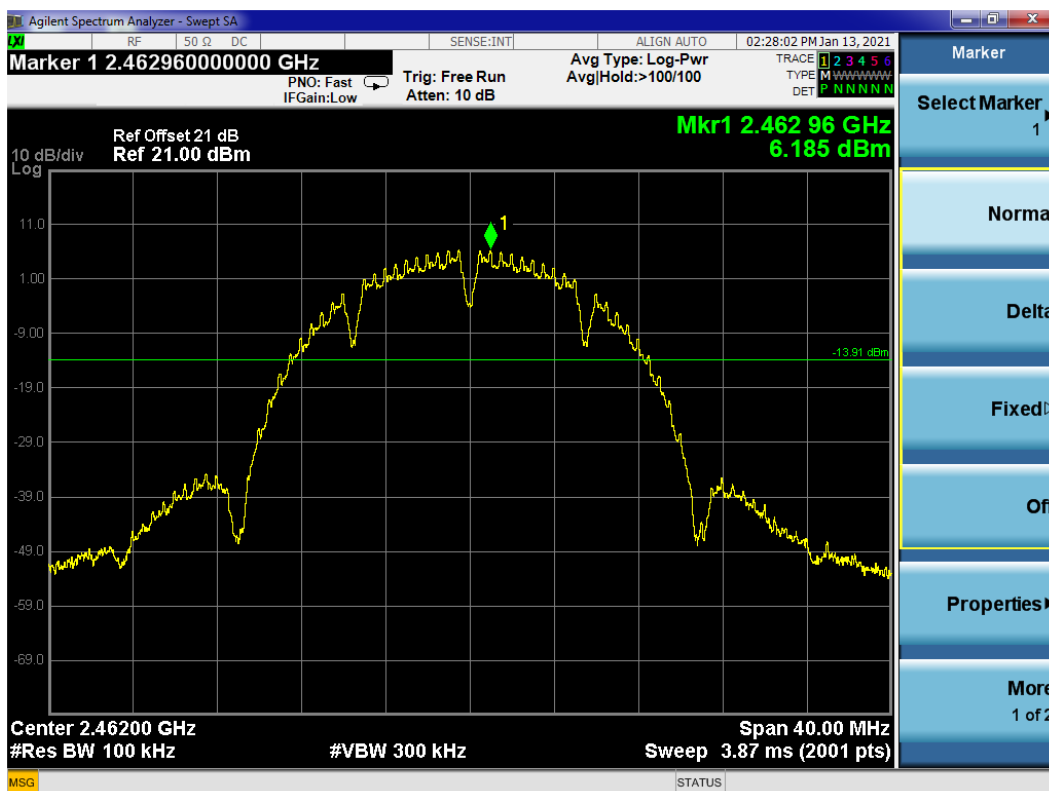
#### Emission level



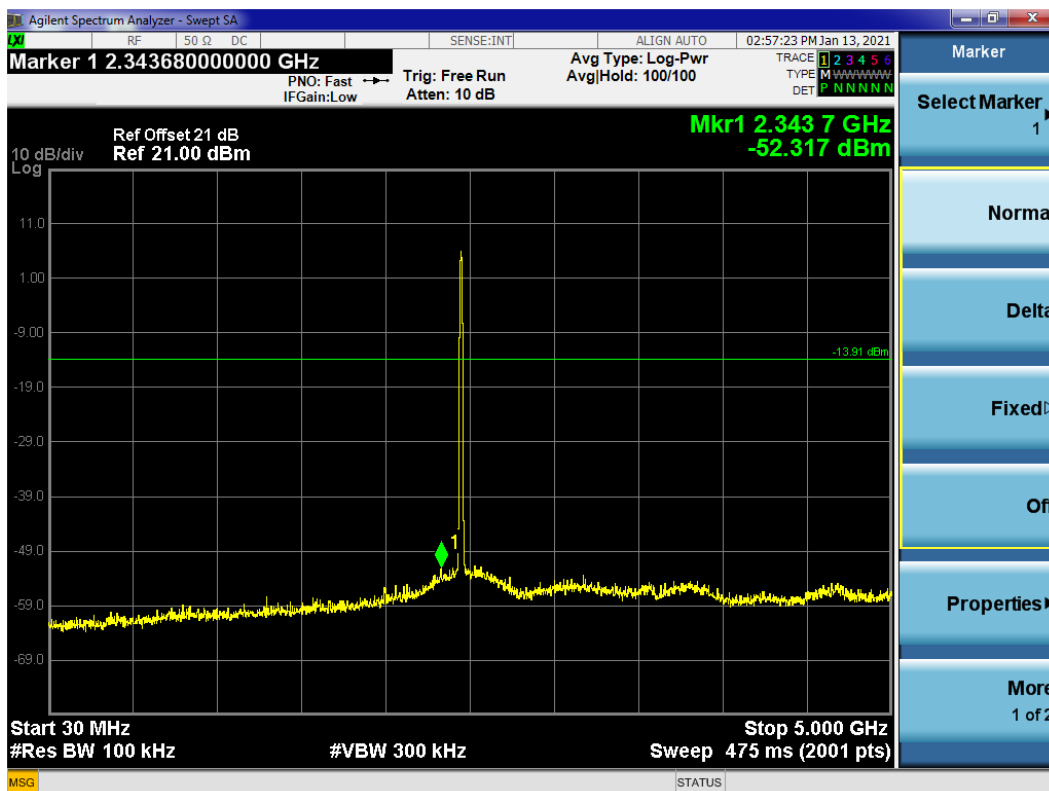


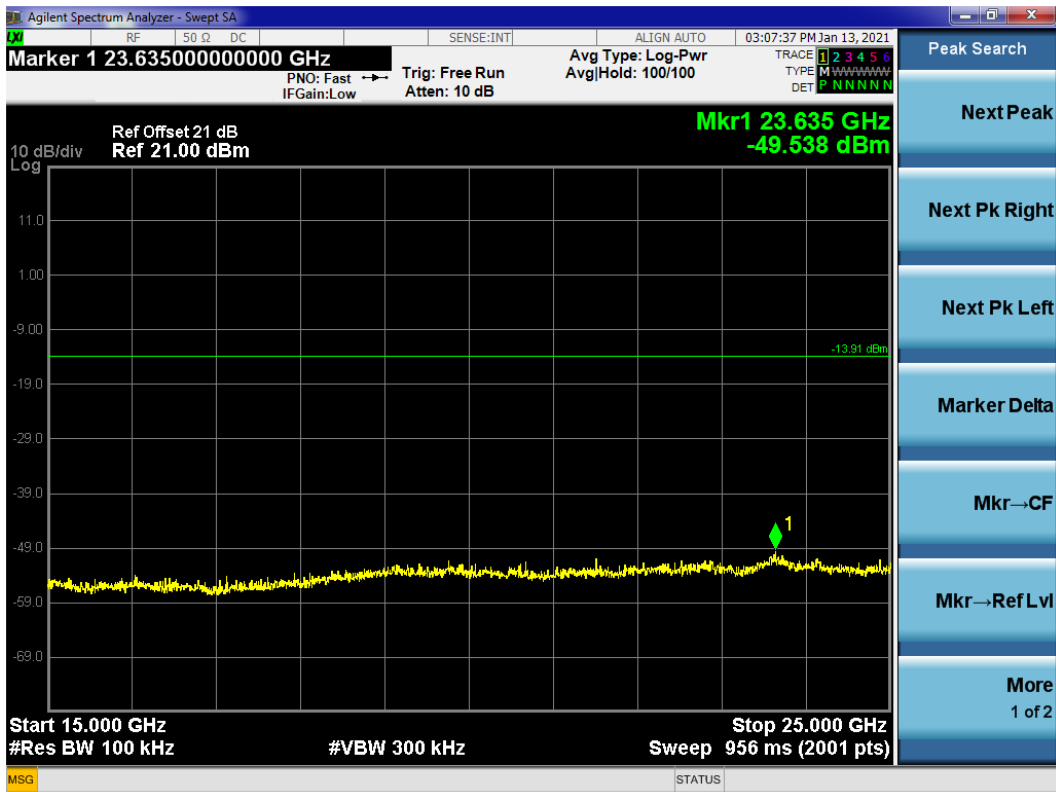
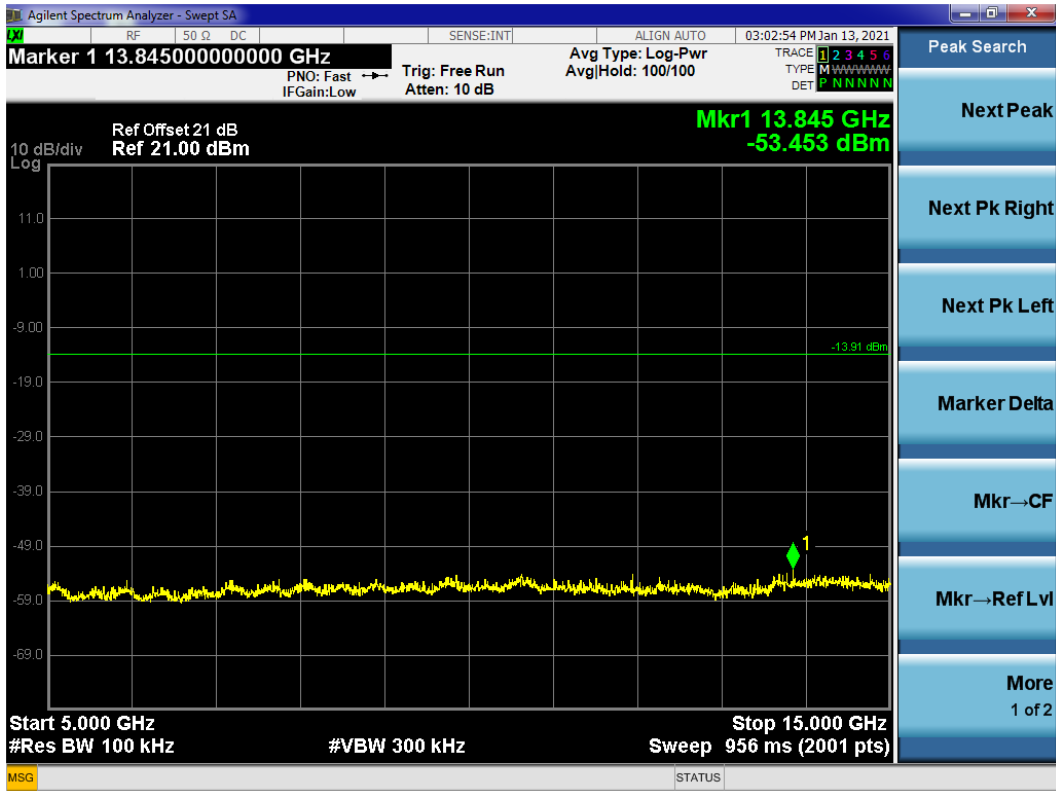
### 802.11b CH2462MHz

#### Reference level



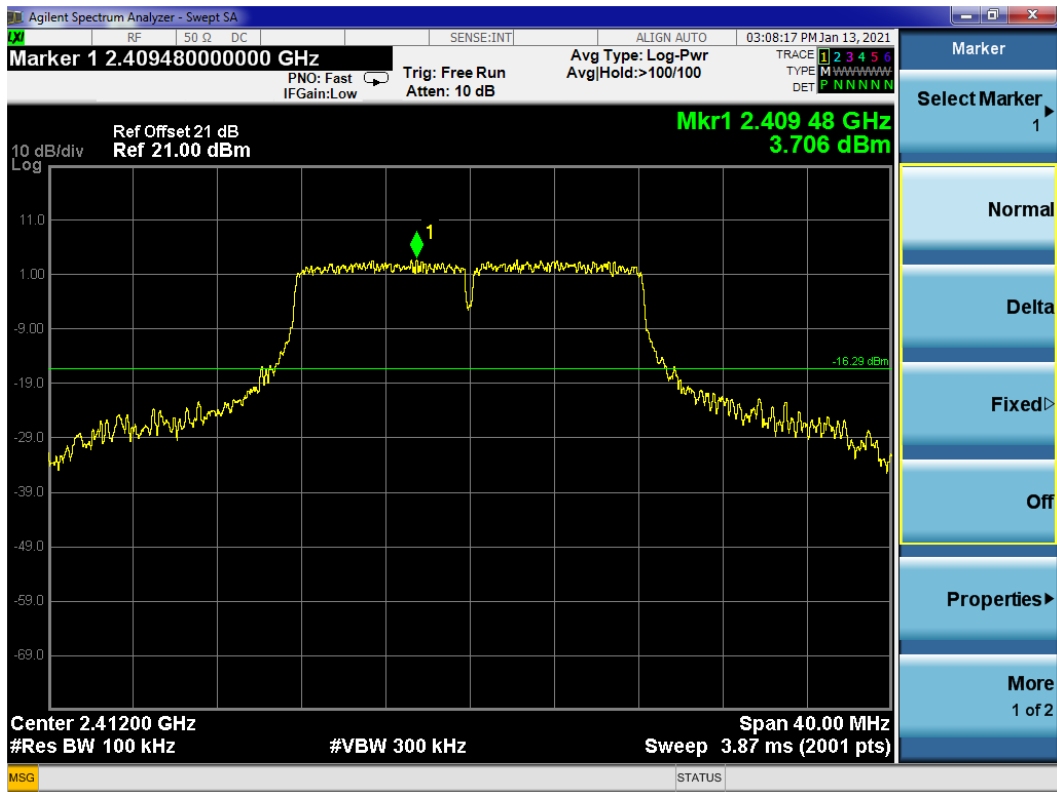
#### Emission level



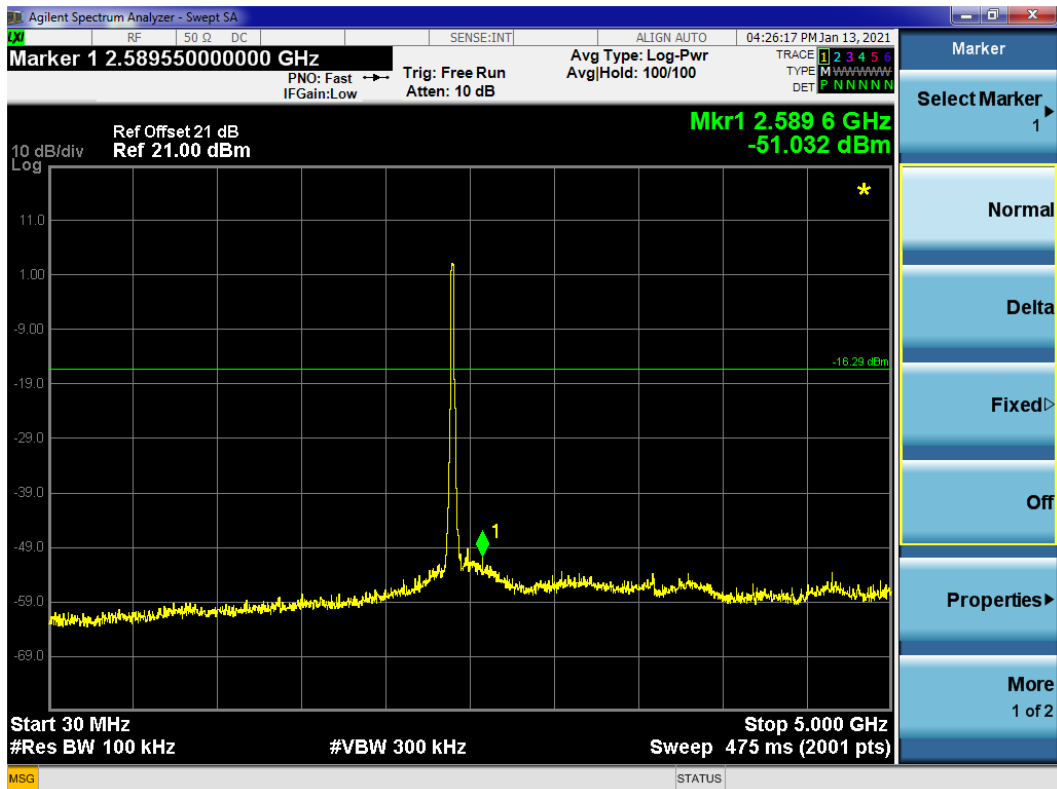


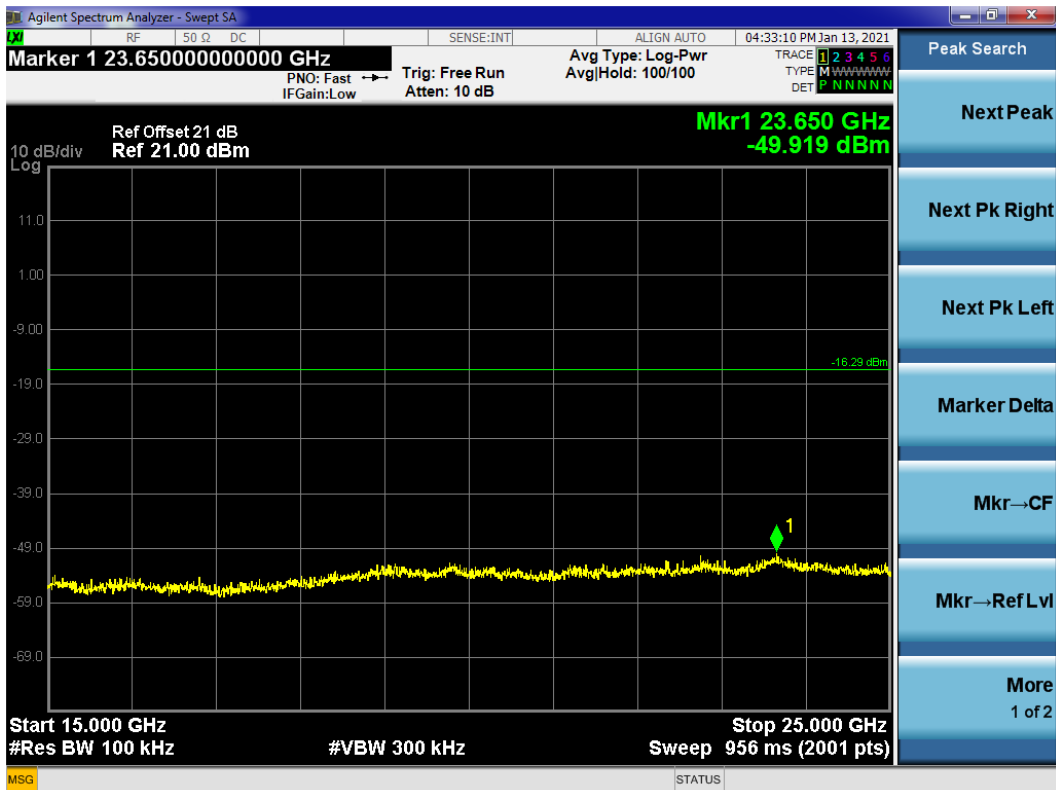
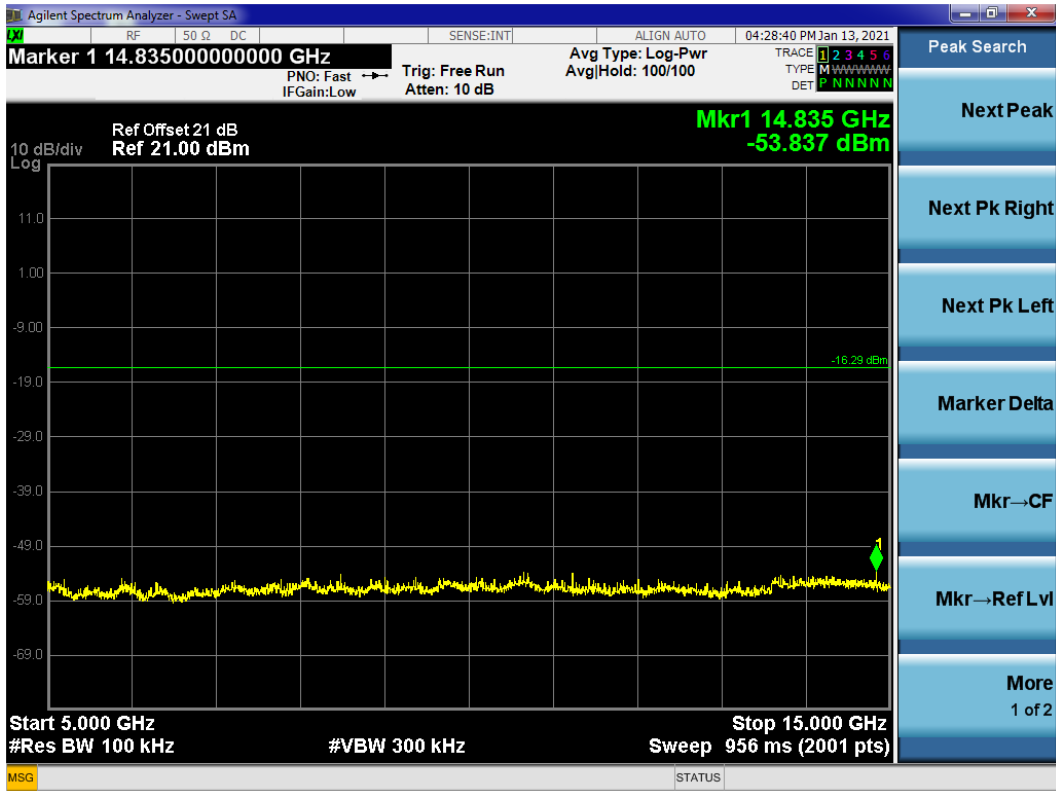
### 802.11g CH2412MHz

#### Reference level



#### Emission level

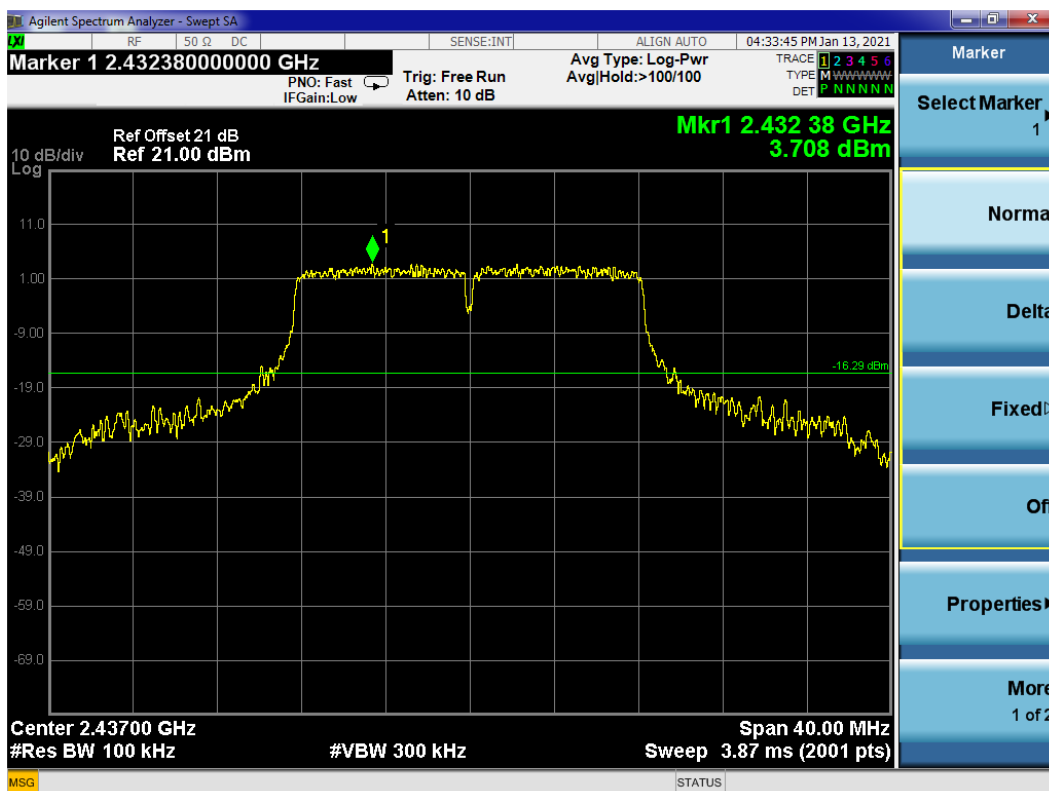




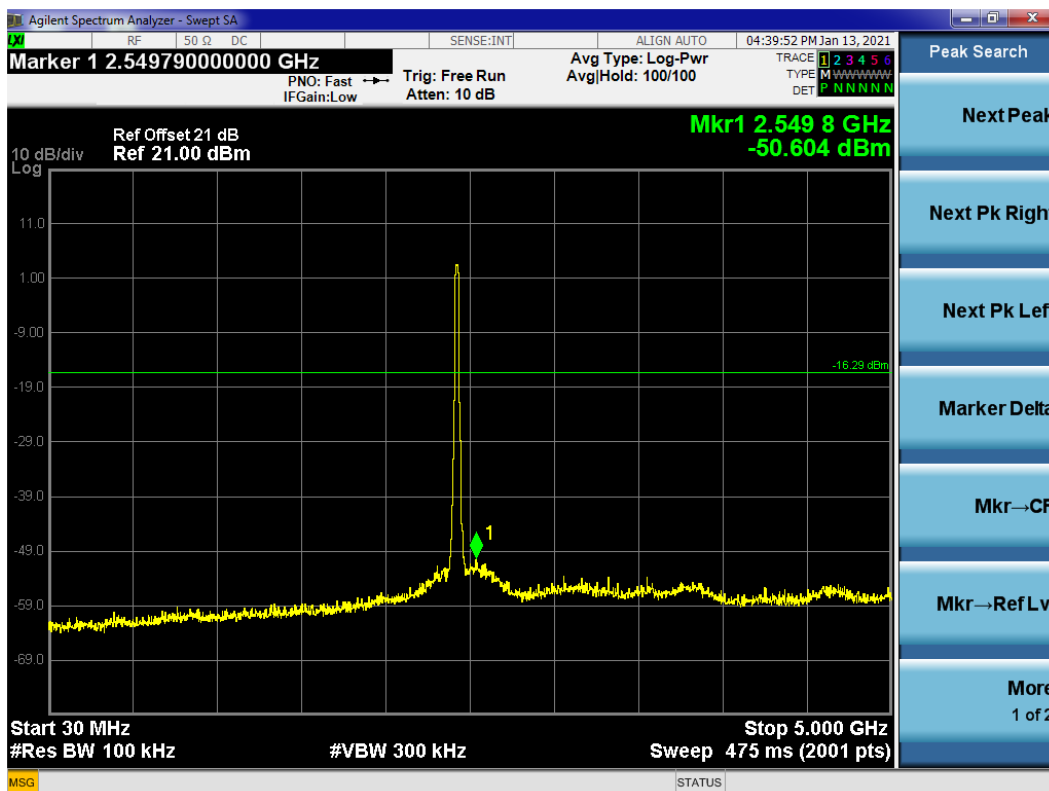


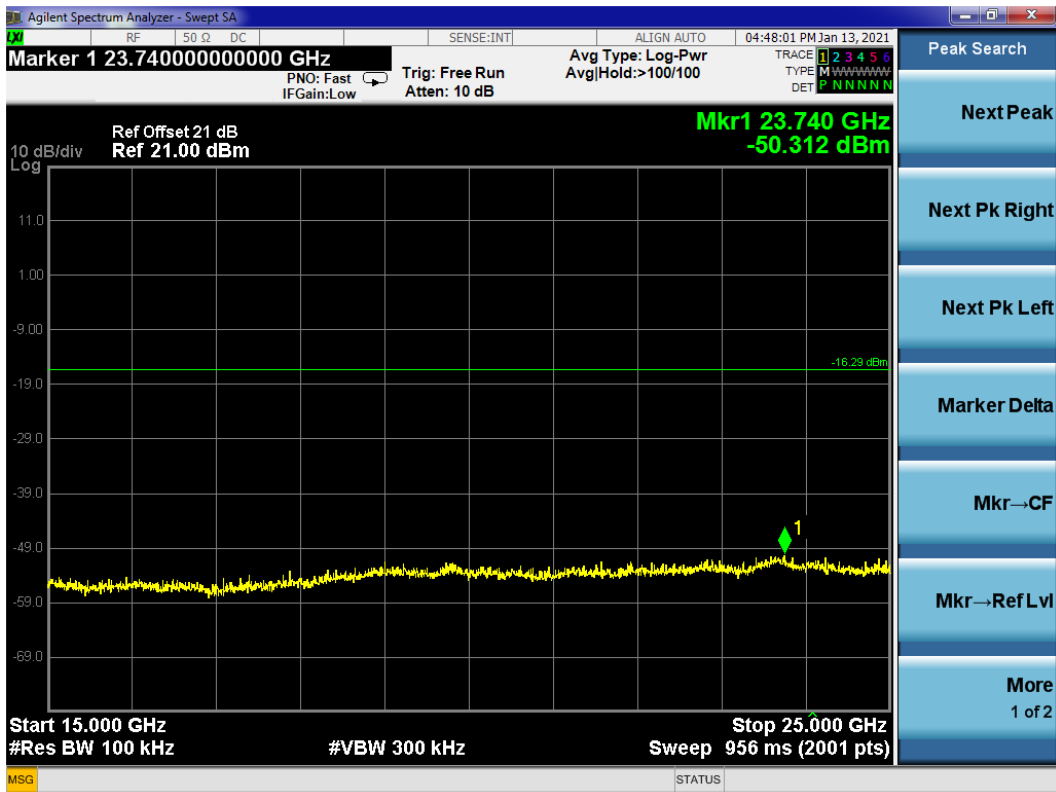
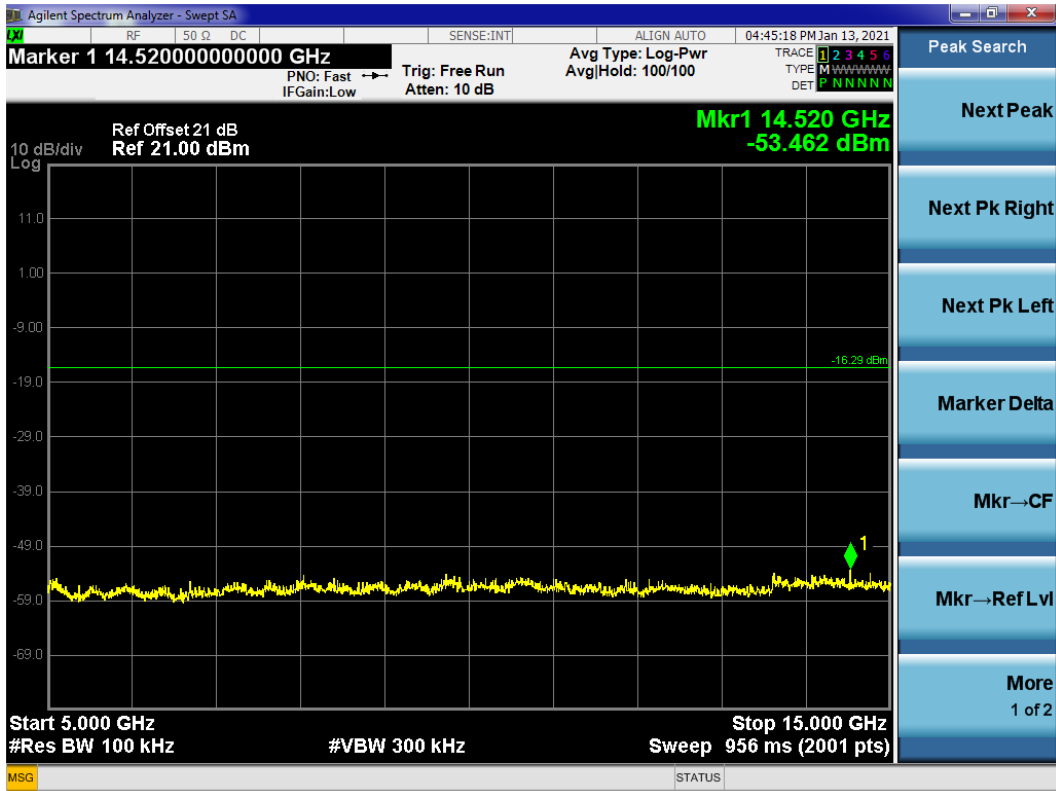
### 802.11g CH2437MHz

#### Reference level



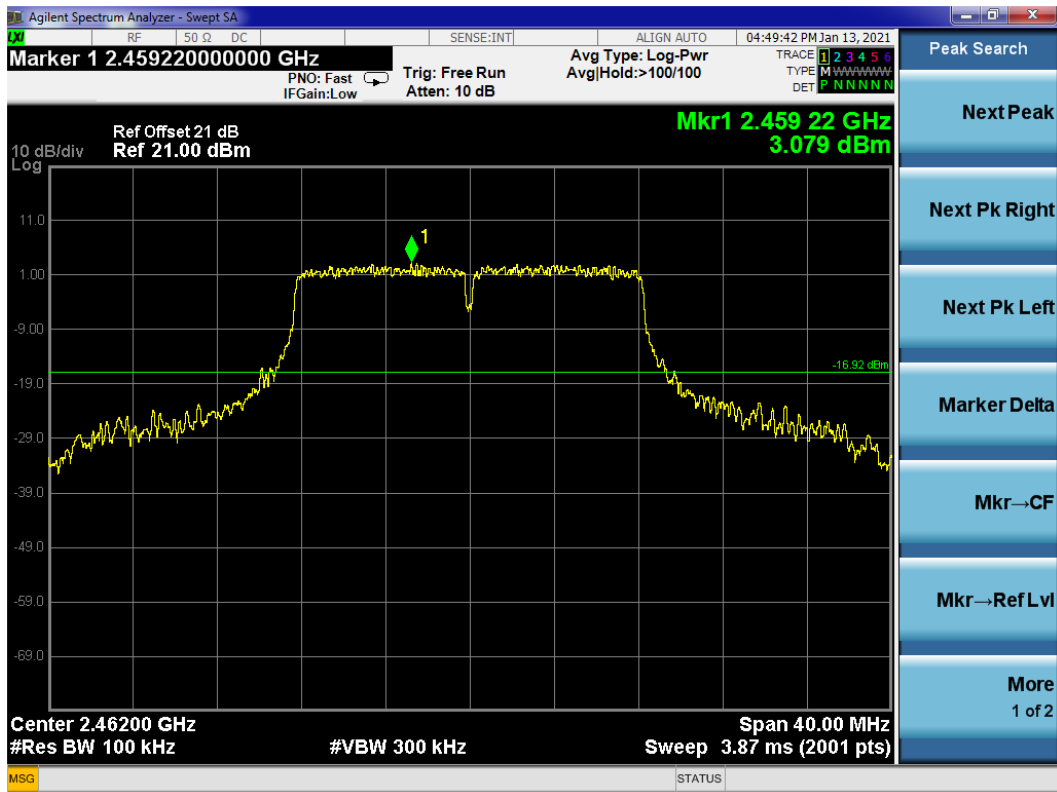
#### Emission level



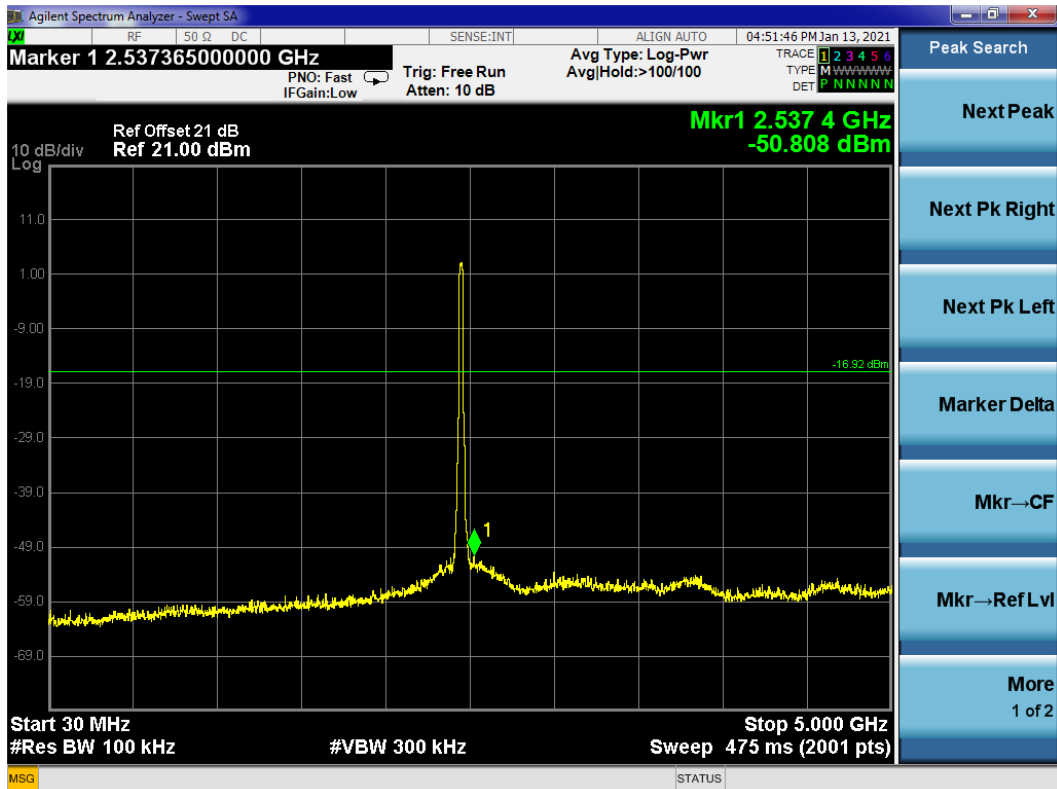


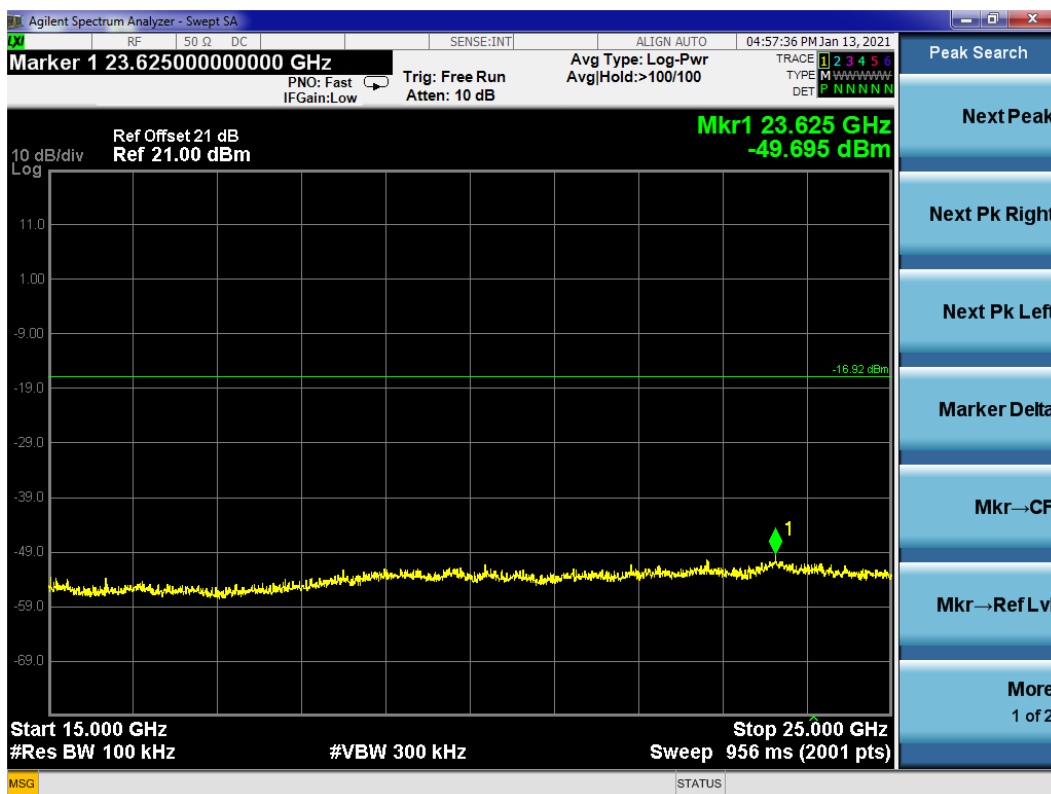
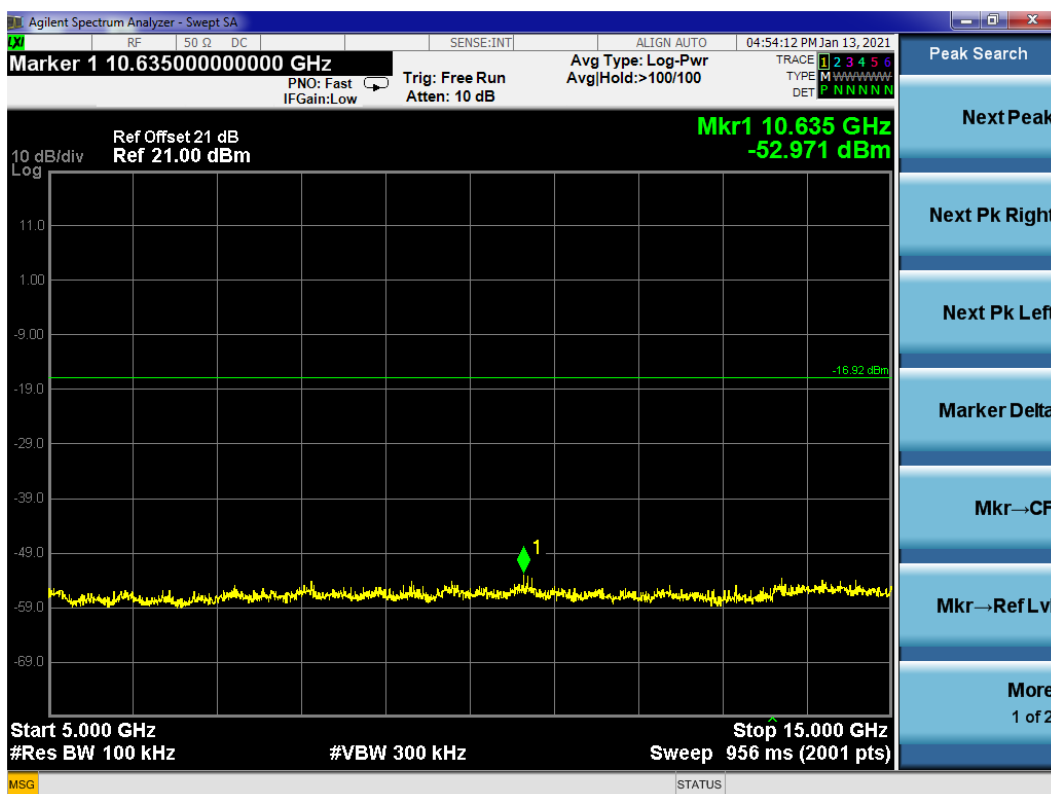
### 802.11g CH2462MHz

#### Reference level



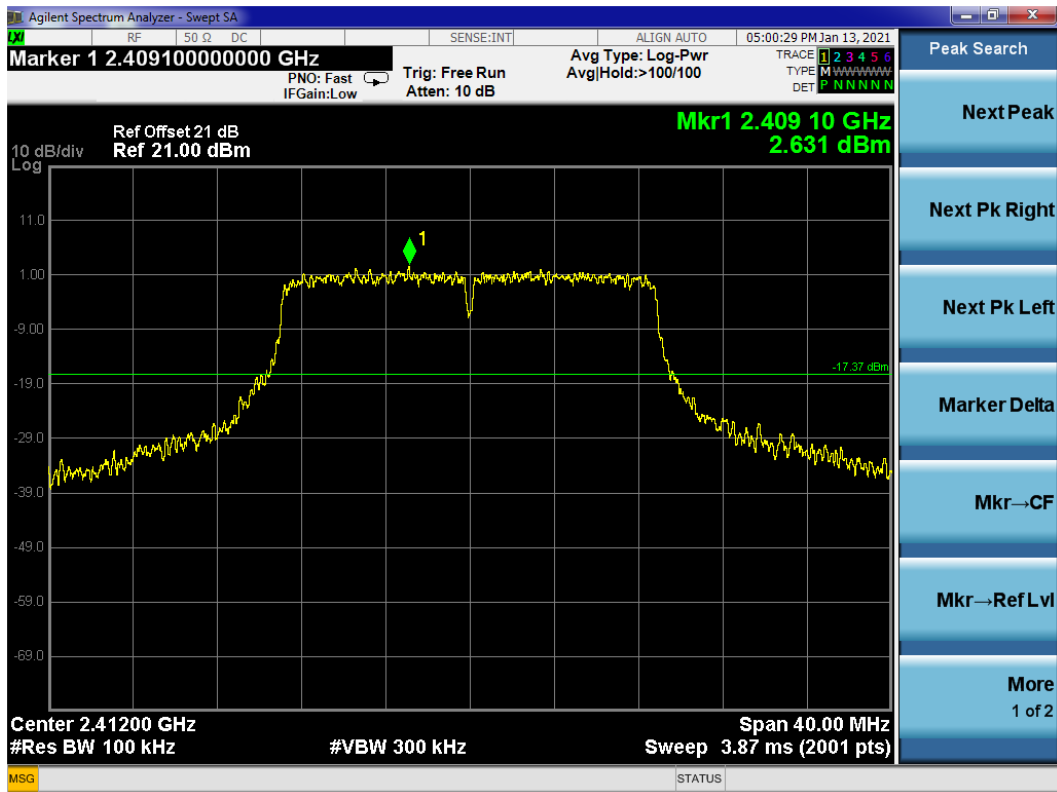
#### Emission level



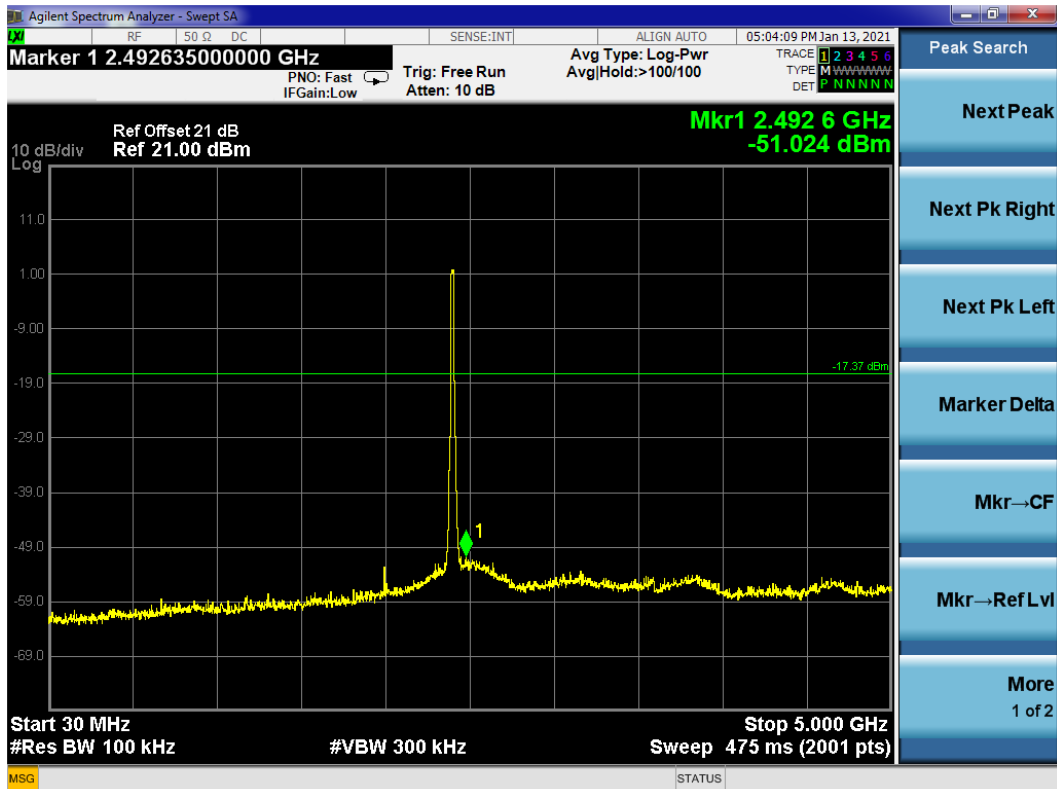


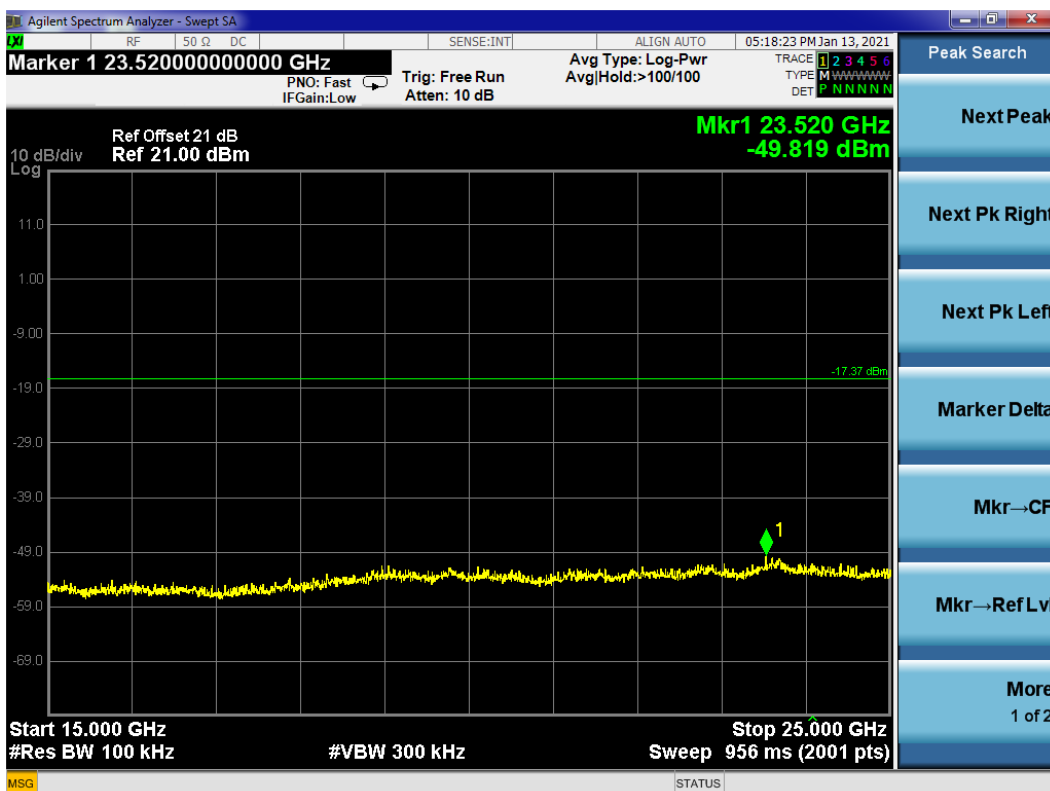
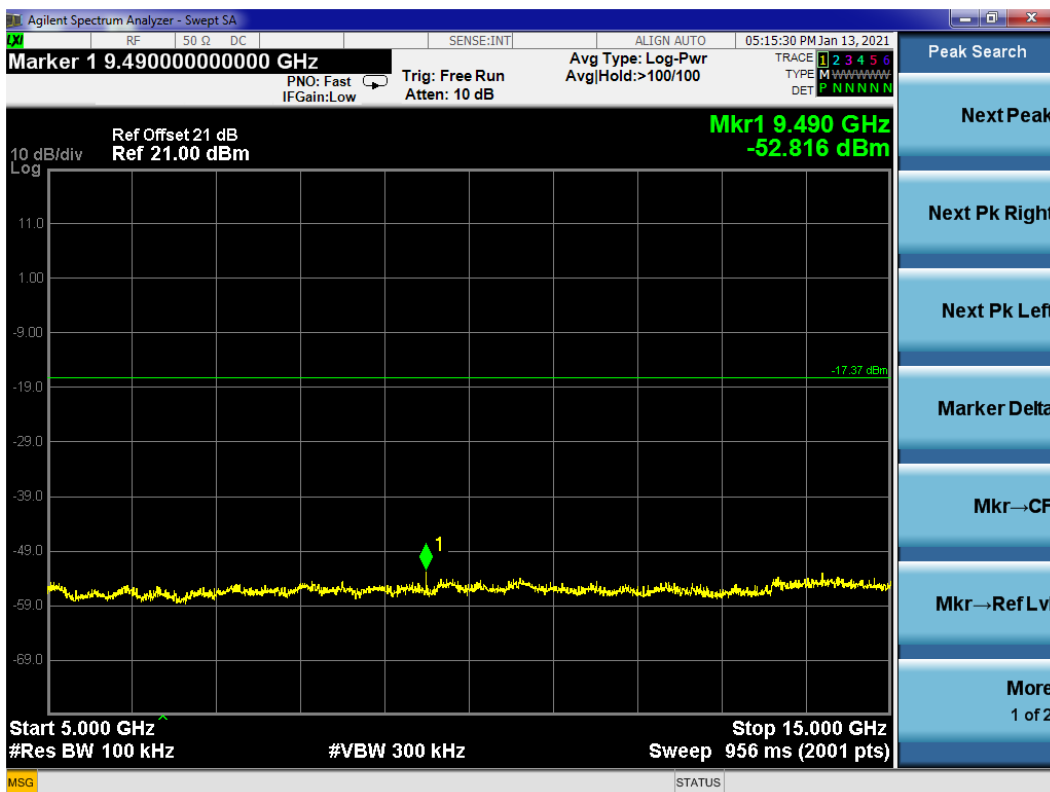
### 802.11n20 CH2412MHz

#### Reference level



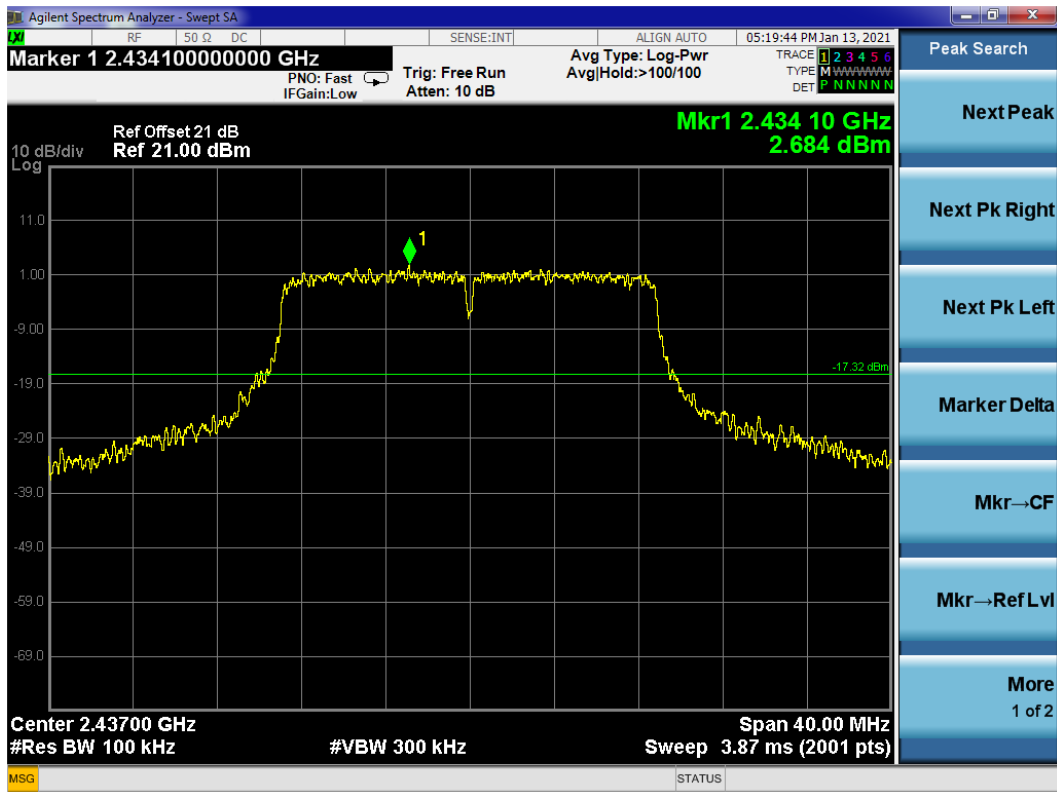
#### Emission level



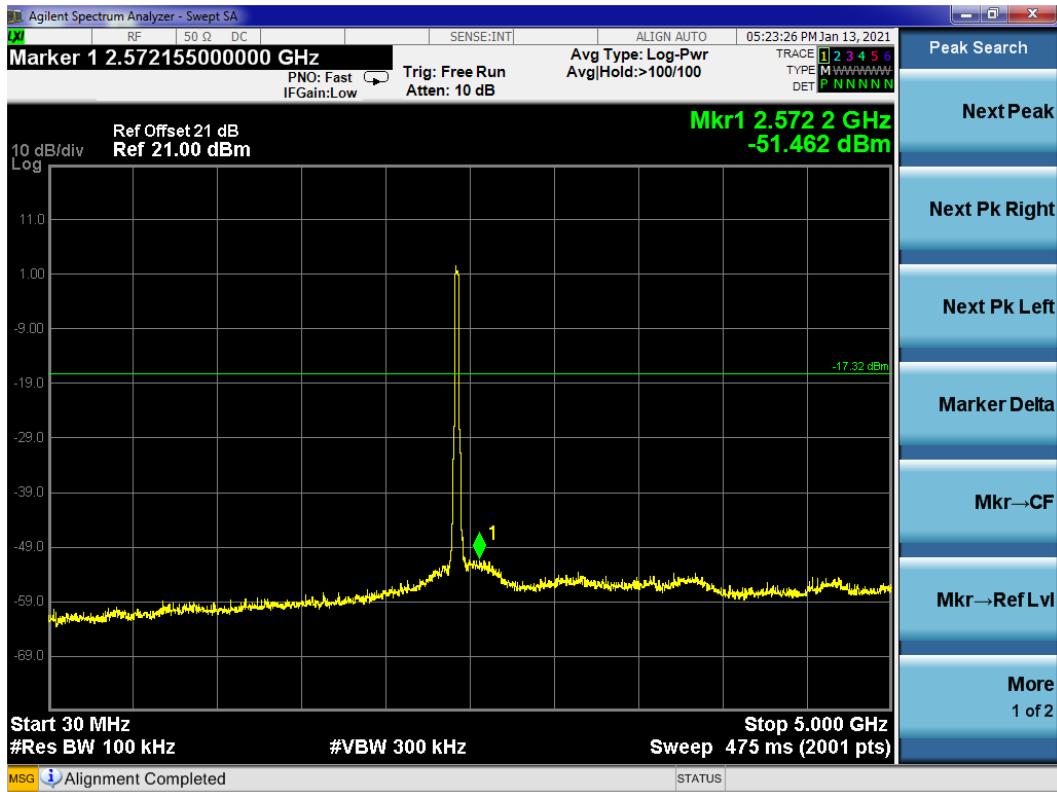


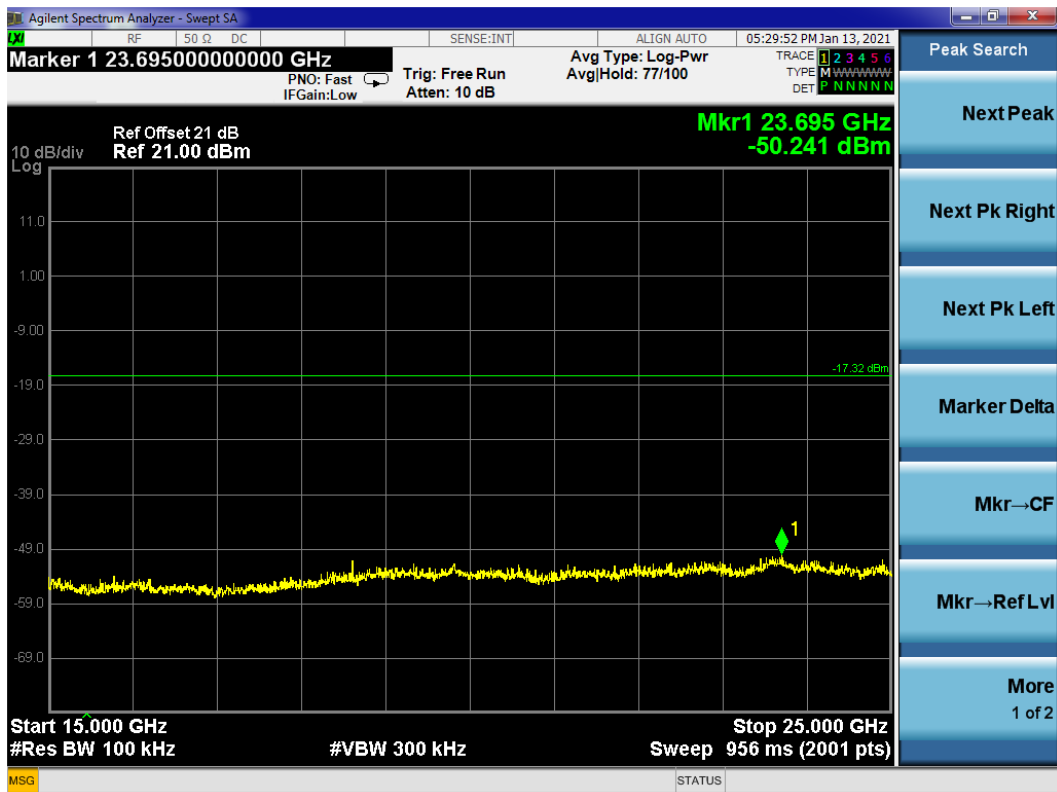
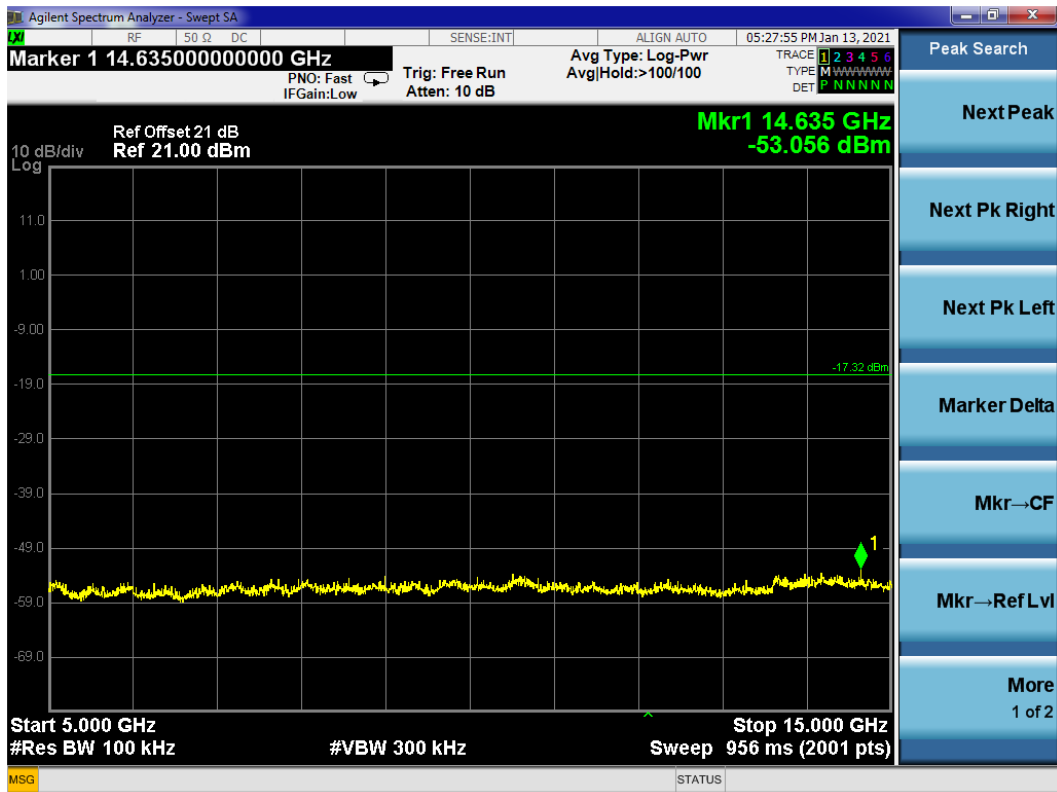
### 802.11n20 CH2437MHz

#### Reference level



#### Emission level

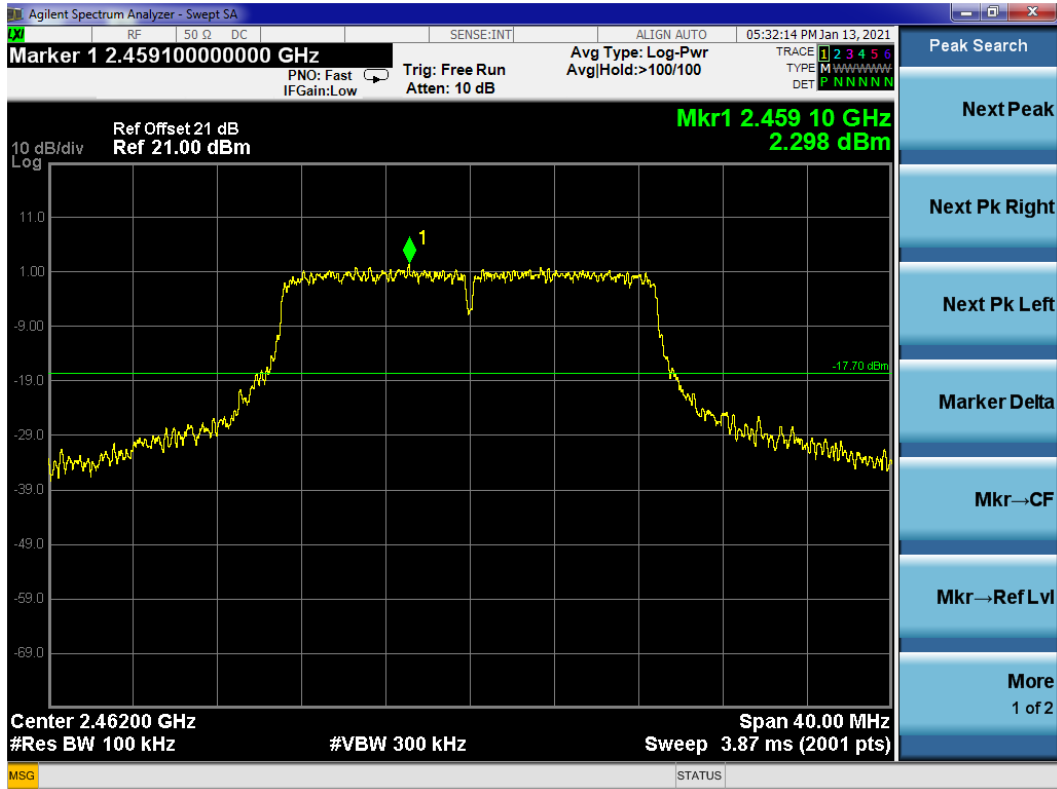




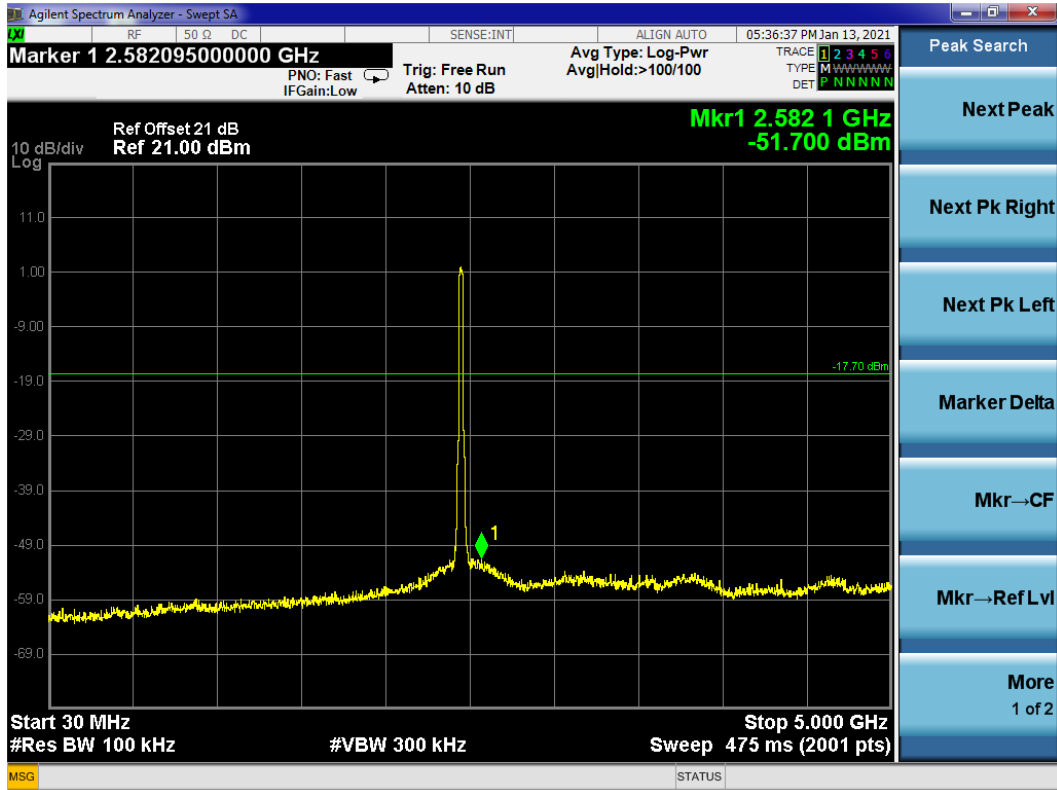


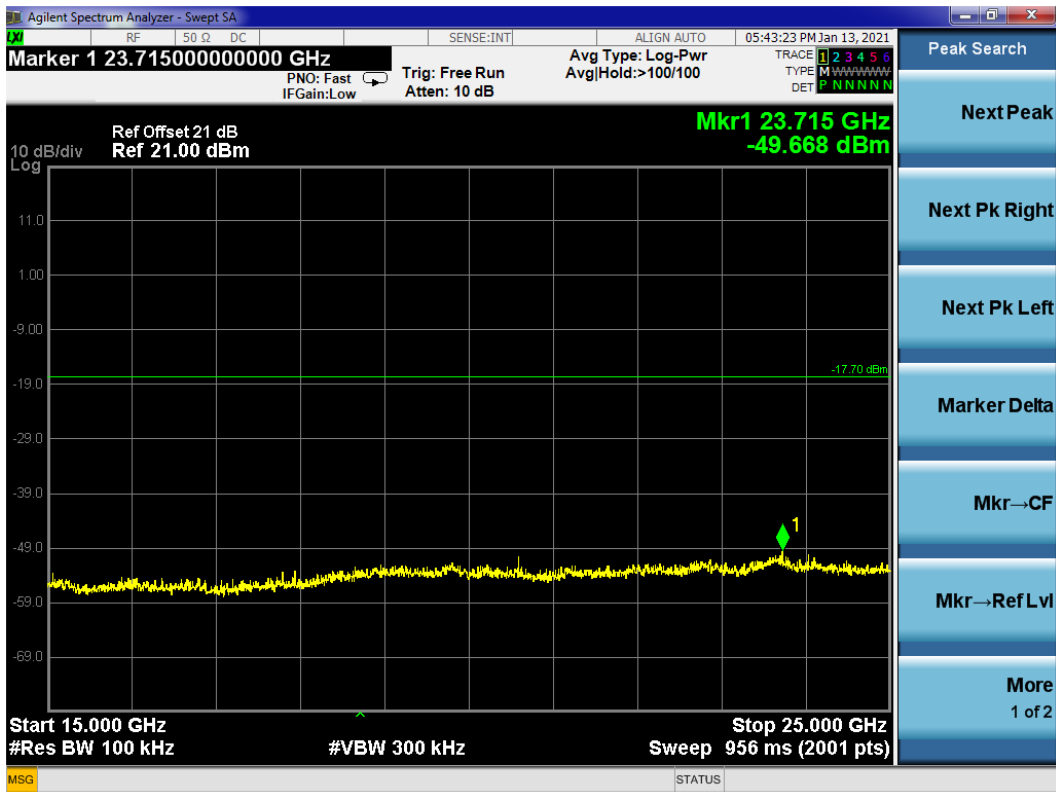
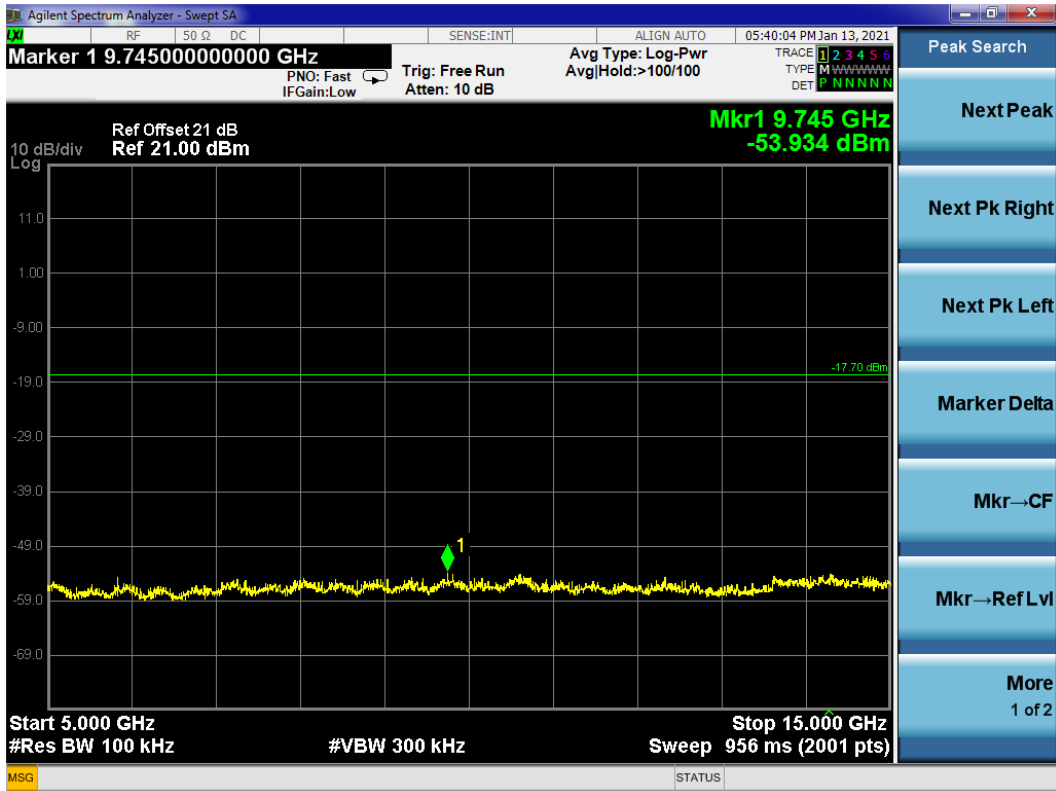
802.11n20 CH2462MHz

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.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	2020.09.16	1 Year
2.	Coaxial Cable	WOKEN	SFL402-10 5FLEX	F02-150819-0 45	2020.03.08	1 Year
3.	20 dB Attenuator	Mini-Circuits	VAT-20+	001	2020.08.06	1 Year

### 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

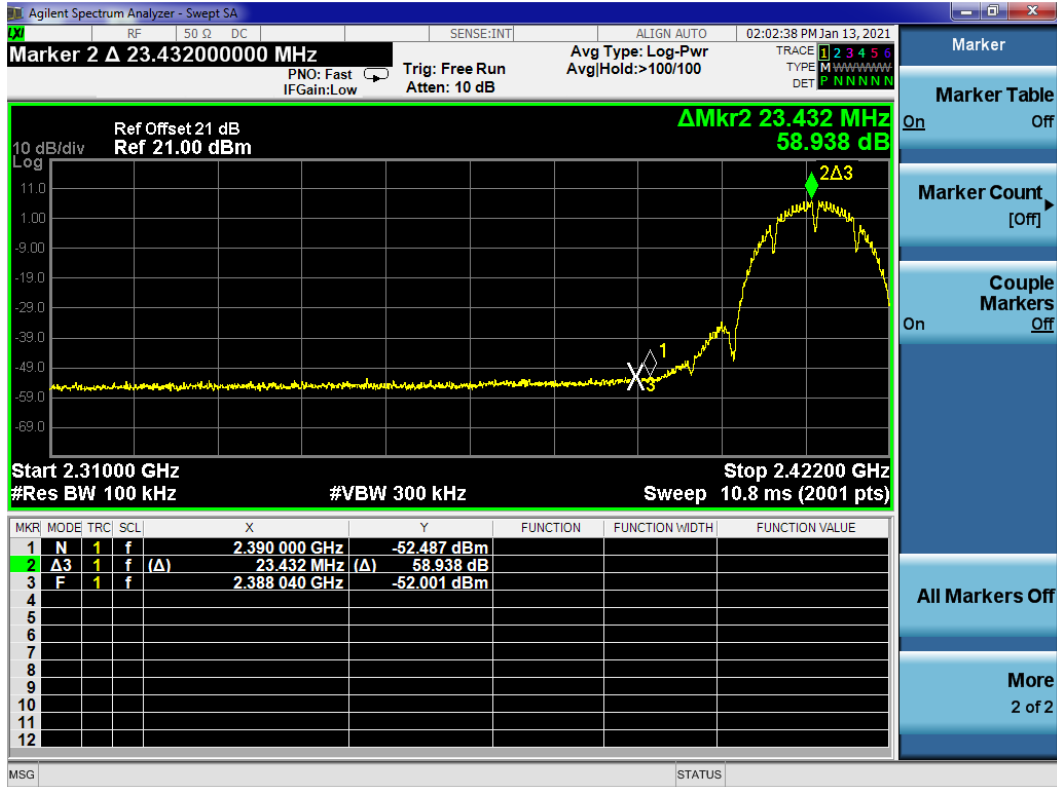
**PASSED.**

All the test results are attached in next pages.

(Test Date: 2021.01.12 Temperature: 23°C Humidity: 51 %)

Modulation	Location	Channel	Frequency (MHz)	Delta Marker (dB)	Result
802.11b	Below Band Edge	1	2412	<b>58.938</b>	More than <b>20 dB</b> below the highest level of the desired power
	Upper Band Edge	11	2462	<b>57.812</b>	
802.11g	Below Band Edge	1	2412	<b>39.177</b>	More than <b>20 dB</b> below the highest level of the desired power
	Upper Band Edge	11	2462	<b>38.267</b>	
802.11n20	Below Band Edge	1	2412	<b>36.949</b>	More than <b>20 dB</b> below the highest level of the desired power
	Upper Band Edge	11	2462	<b>37.855</b>	

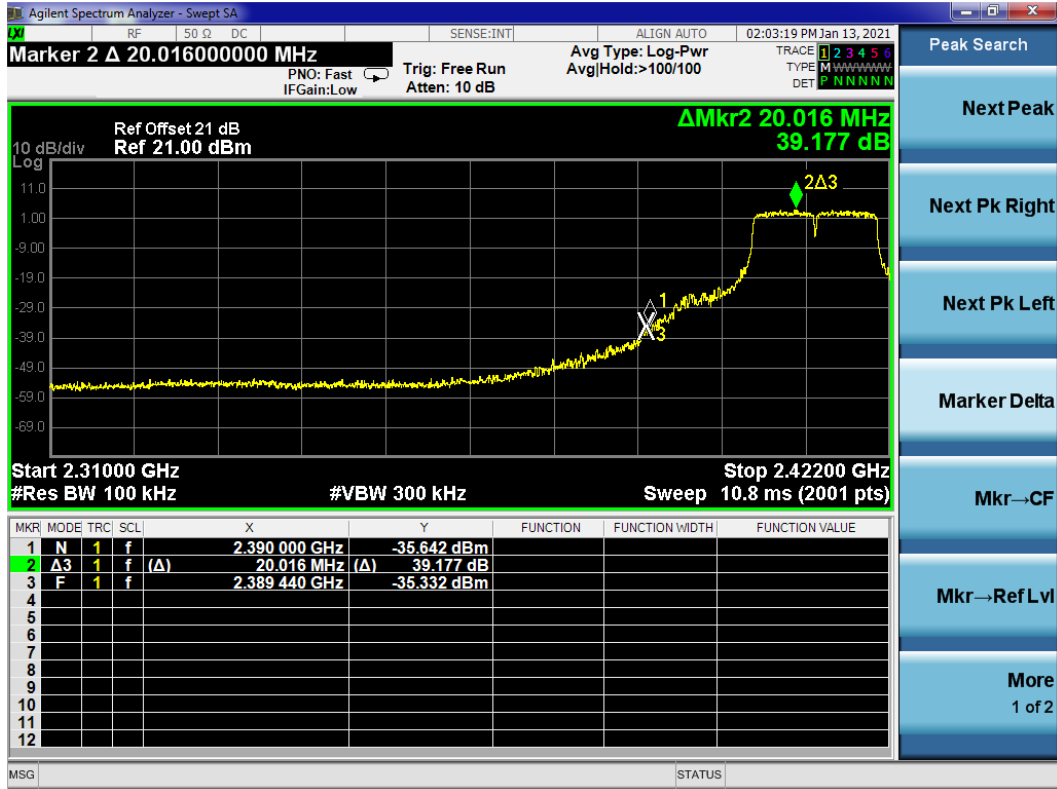
### 802.11b CH2412MHz (Below Edge 2390 MHz)



### 802.11b CH2462MHz (Upper Edge 2483.5 MHz)



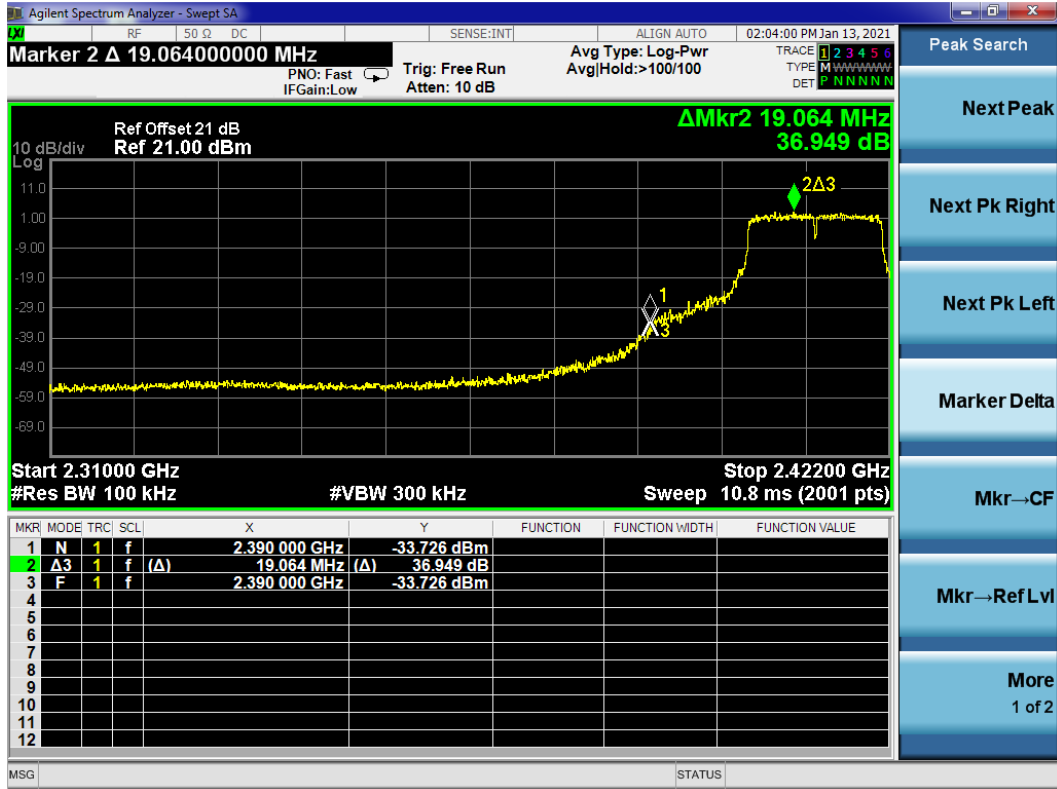
### 802.11g CH2412MHz (Below Edge 2390 MHz)



### 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.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	2020.09.16	1 Year
2.	Coaxial Cable	WOKEN	SFL402-10 5FLEX	F02-150819-0 45	2020.03.08	1 Year
3.	20 dB Attenuator	Mini-Circuits	VAT-20+	001	2020.08.06	1 Year

### 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 [3 RBW].
- e) Detector = peak.
- f) Sweep time = auto couple.
- g) Trace mode = max hold.
- h) Allow trace to fully stabilize.
- i) Use the peak marker function to determine the maximum amplitude level within the RBW.
- j) If measured value exceeds 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

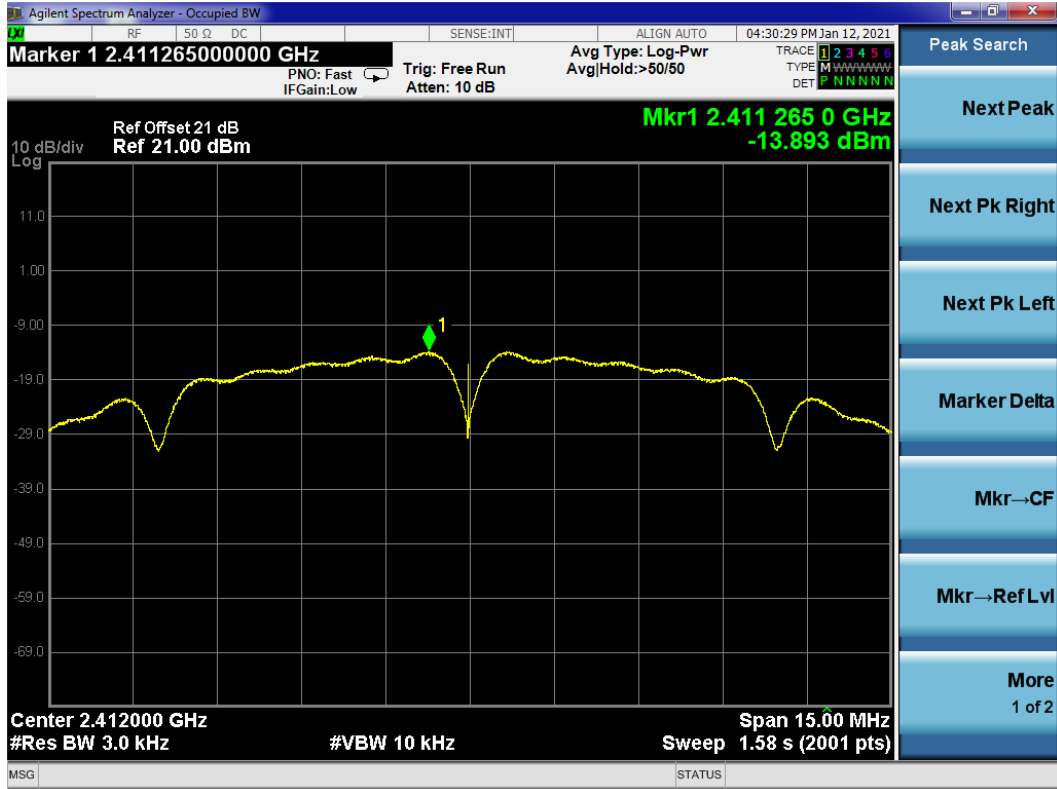
### **PASSED.**

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	<b>-13.893</b>	8 dBm
	6	2437	<b>-14.069</b>	8 dBm
	11	2462	<b>-13.93</b>	8 dBm
802.11g	1	2412	<b>-10.585</b>	8 dBm
	6	2437	<b>-10.869</b>	8 dBm
	11	2462	<b>-11.46</b>	8 dBm
802.11n20	1	2412	<b>-11.216</b>	8 dBm
	6	2437	<b>-11.581</b>	8 dBm
	11	2462	<b>-12.084</b>	8 dBm

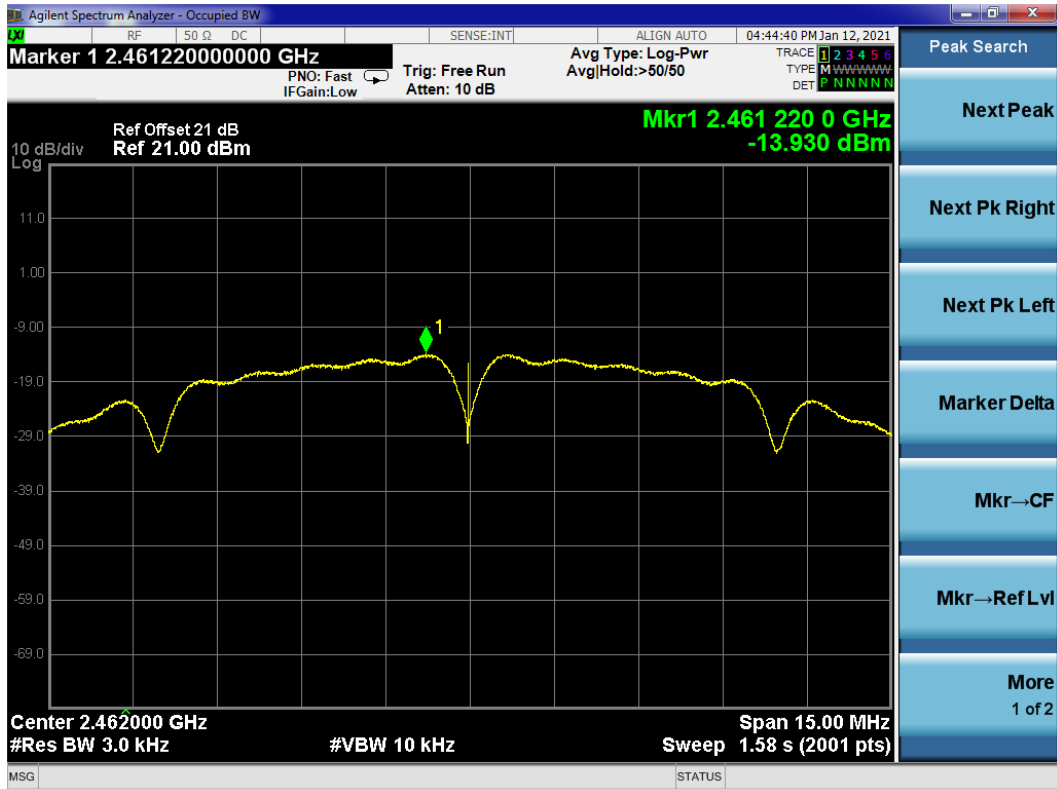
### 802.11b CH2412 MHz



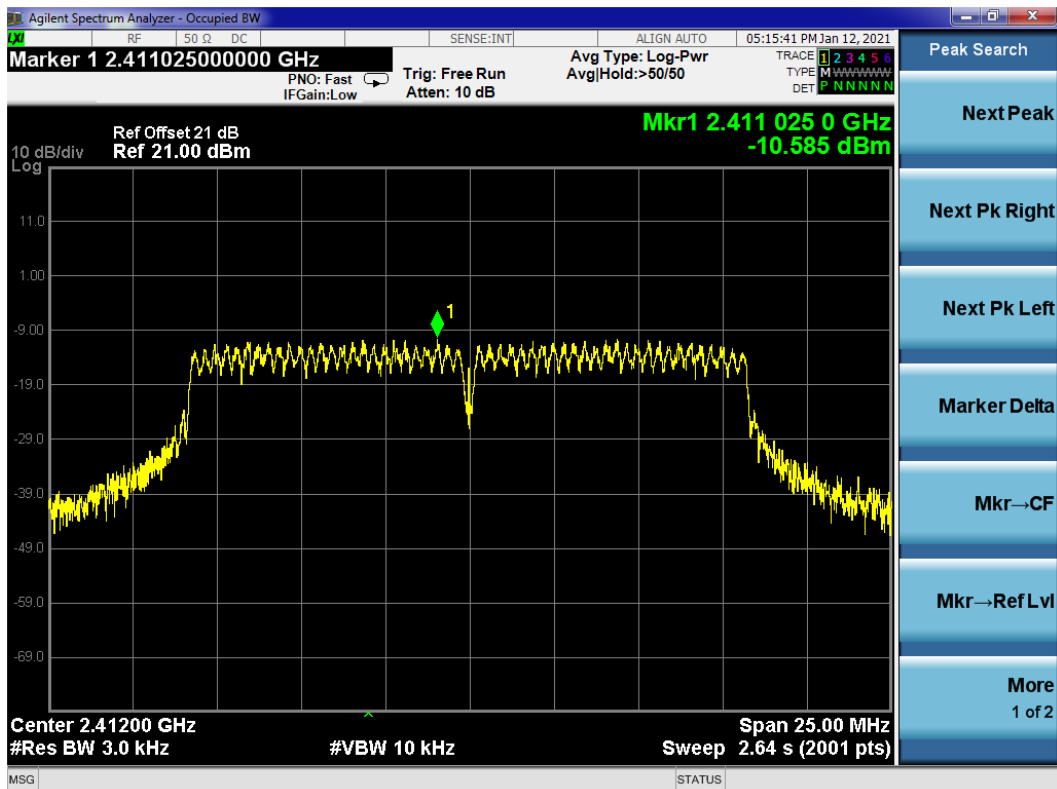
### 802.11b CH2437 MHz



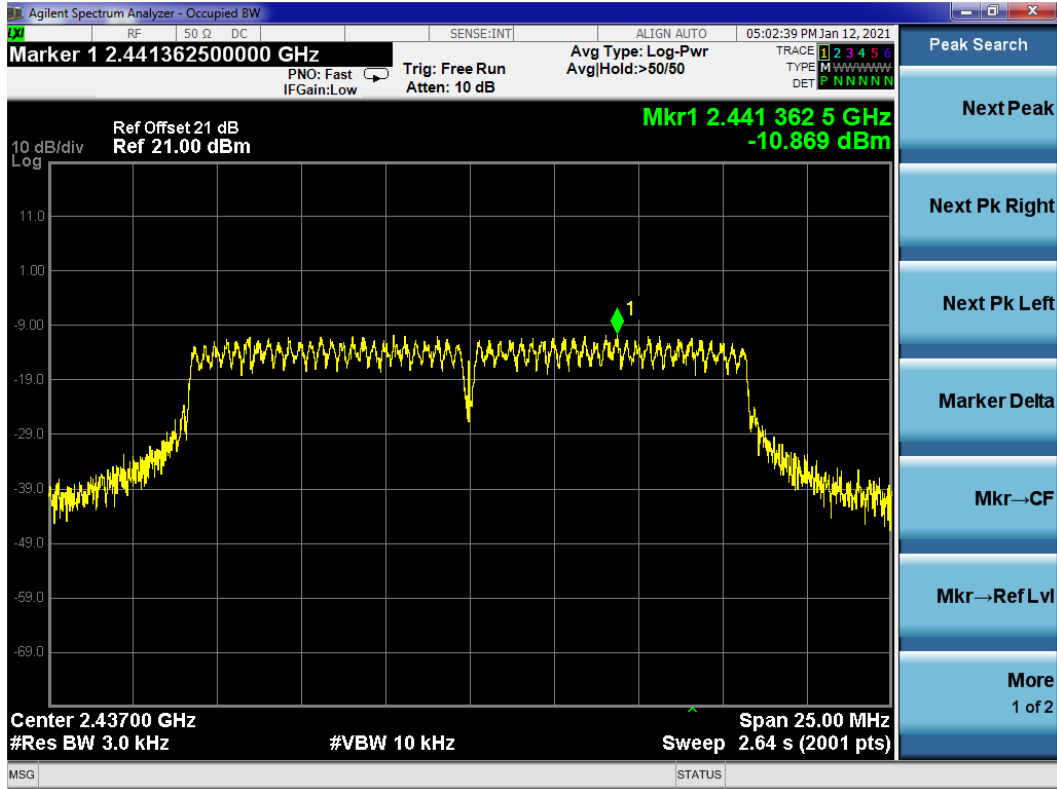
### 802.11b CH2462 MHz



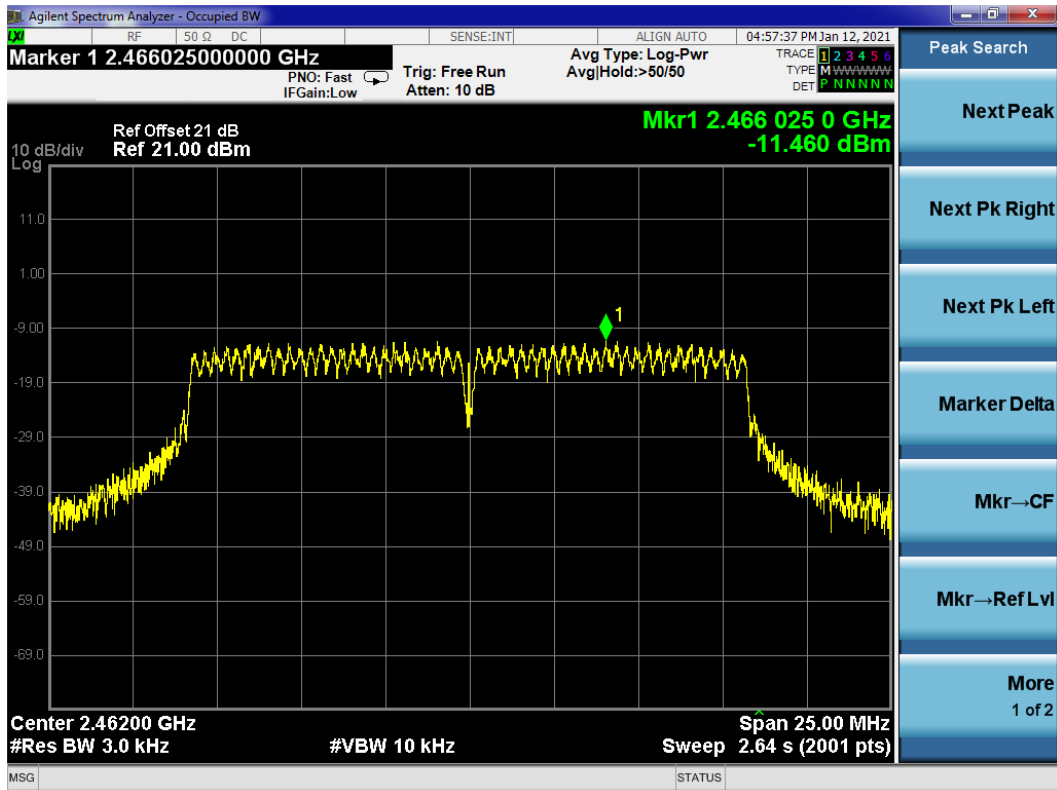
### 802.11g CH2412 MHz



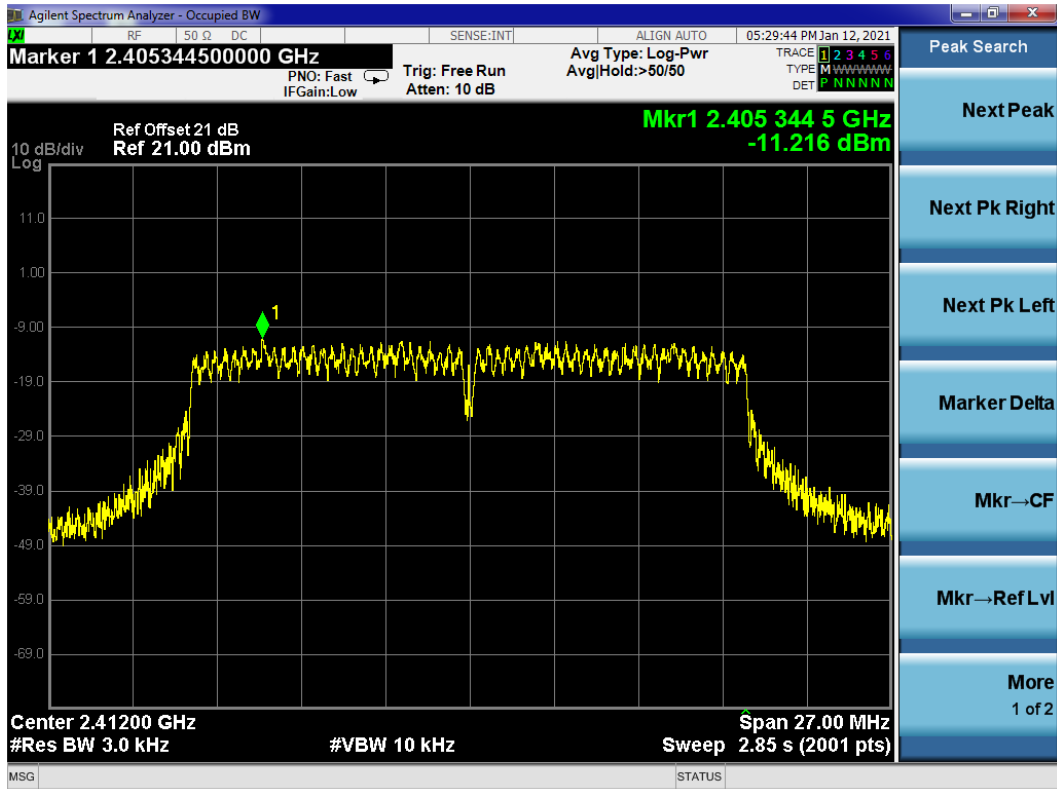
### 802.11g CH2437 MHz



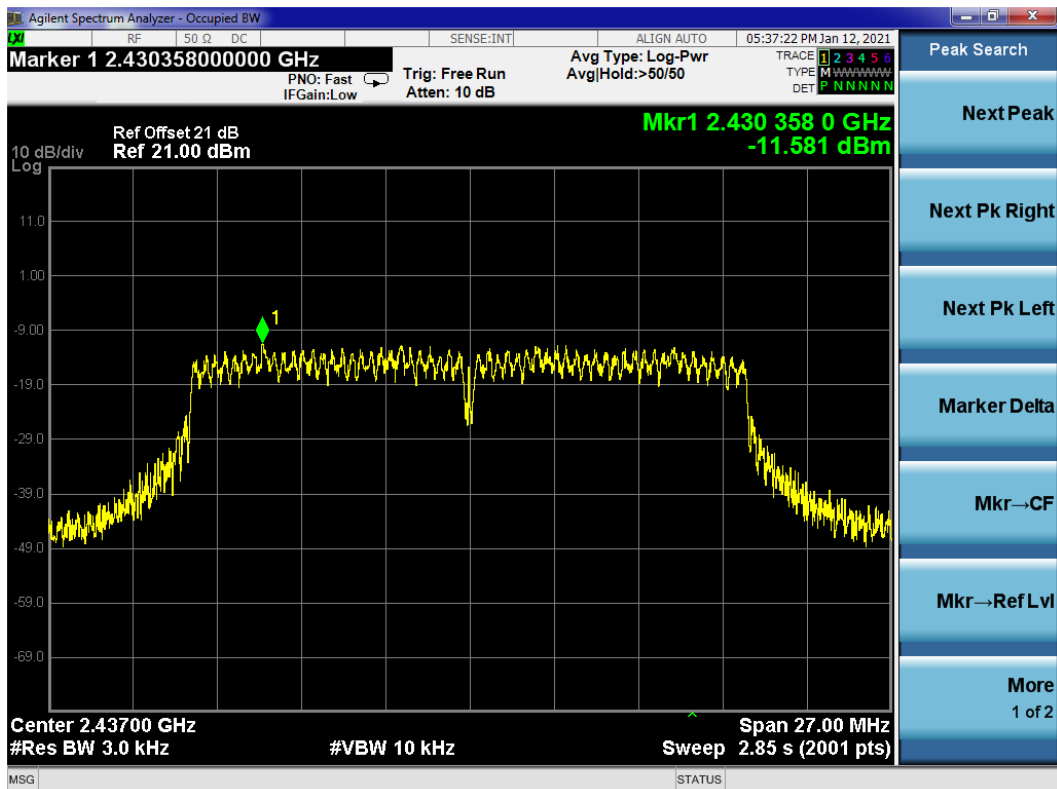
### 802.11g CH2462 MHz



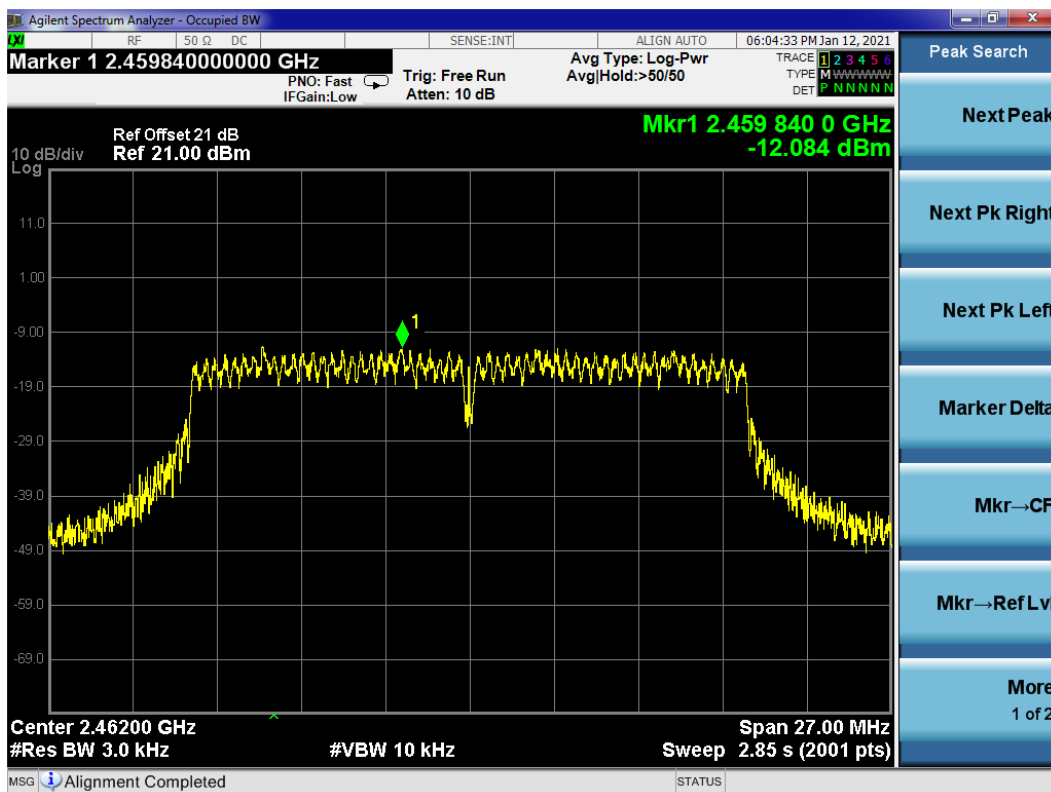
### 802.11n20 CH2412 MHz



### 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	±3.2 dB
	150kHz~30MHz	±3.1 dB
Conducted Emission No.3 Shielded Room	150kHz~30MHz	±3.1 dB
Radiated Emission	30MHz~200MHz, Horizontal	±3.4 dB
	30MHz~200MHz, Vertical	±4.0 dB
	200MHz~1000MHz, Horizontal	±3.7 dB
	200MHz~1000MHz, Vertical	±5.1 dB
	1GHz~6GHz	±5.7 dB
	6GHz~18GHz	±4.7 dB
Output Power Test	50MHz~18GHz	0.77 dB
Power Density Test	9kHz~6GHz	1.08 dB
RF Frequency Test	9kHz~40GHz	$6 \times 10^{-4}$
Bandwidth Test	9kHz~6GHz	$1.5 \times 10^{-3}$
RF Radiated Power Test	30MHz~1000MHz	3.06 dB
Conducted Output Power Test	50MHz~18GHz	0.83 dB
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 %