

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT



Applicant: FUJIFILM Corporation
7-3, Akasaka 9-Chome, Minato-ku, Tokyo 107-0052 Japan

Manufacturer: FUJIFILM Corporation
7-3, Akasaka 9-Chome, Minato-ku, Tokyo 107-0052 Japan

Product Name: FILE TRANSMITTER

Brand Name: FUJIFILM

Model No.: FF210004

Model Difference: N/A

Report Number: ER/2022/20001

FCC ID W2Z-02000006

IC: 7736B-02000006

Date of EUT Received: Feb. 07, 2022

Date of Test: Apr. 01, 2022~Apr. 20, 2022

Issue Date: Jun. 08, 2022

Approved By _____

Jim Chang

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Central RF Lab The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10:2013 and the energy emitted by the sample EUT comply with FCC rule part §15.247, ISED RSS-247.

The results of this report relate only to the sample identified in this report.

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Revision History

Report Number	Revision	Description	Issue Date	Revised By	Remark
ER/2022/20001	00	Original.	Jun. 08, 2022	Yi-Shan Tsai	

Note:

- 1、The remark "*" indicates modification of the report upon requests from certification body.

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1 GENERAL INFORMATION

1.1 Product Description

Product Name:	FILE TRANSMITTER
Brand Name:	FUJIFILM
Model No.:	FF210004
Model Difference:	N/A
Hardware Version:	N/A
Firmware Version:	N/A
EUT Series No.:	FT000034 (Conducted) FT000033 (Conduction & Radiated)
Power Supply:	Battery 7.2Vdc
	Model No.: NP-W235, Supplier: FUJIFILM Corporation
Test Software (Name/Version)	Rlogin / 2.23.9

1.2 RF Specification

WLAN 2.4GHz

Wi-Fi	Frequency Range	Channels	Rated Power in dBm (Peak)	Modulation Technology
802.11b	2412~2462	11	16.36	DSSS
802.11g	2412~2462	11	20.60	OFDM
802.11n20	2412~2462	11	20.98	OFDM
Modulation type:		CCK, DQPSK, DBPSK for DSSS		
		64QAM, 16QAM, QPSK, BPSK for OFDM		
Data Rate:		802.11 b: 1/2/5.5/11 Mbps		
		802.11 g: 6/9/12/18/24/36/48/54 Mbps		
		802.11 n_20MHz: up to - 144.4Mbps		

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WLAN 2.4GHz for IC

Wi-Fi	Frequency Range	Channels	Rated Power in dBm (Peak)	Rated Power in dBm (EIRP)	Modulation Technology
802.11b	2412~2462	11	16.36	18.98	DSSS
802.11g	2412~2462	11	20.60	19.13	OFDM
802.11n20	2412~2462	11	20.98	19.06	OFDM
Modulation type:		CCK, DQPSK, DBPSK for DSSS			
		64QAM, 16QAM, QPSK, BPSK for OFDM			
Data Rate:		802.11 b: 1/2/5.5/11 Mbps			
		802.11 g: 6/9/12/18/24/36/48/54 Mbps			
		802.11 n_20MHz:up to - 144.4Mbps			

1.3 Antenna Designation

Antenna Type	ANT0 / ANT1	Freq. (MHz)	Peak Antenna Gain (dBi)	Directional Gain (dBi)
Patern	ANT0	2412-2462	2.2	5.16
	ANT1	2412-2462	2.1	5.16

Note:

1. Pre-scanned was done on the above antennas, measurements were demonstrated by using the antenna with the highest gain as the worst case scenarios.
2. Antenna information is provided by the applicant.

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1.4 Test Methodology of Applied Standards

FCC Part 15, Subpart C §15.247
 FCC KDB 558074 D01 15.247 Meas Guidance v05r02
 FCC KDB 662911 D01 Multiple Transmitter Output v02r01
 RSS-247 issue 2 Feb. 2017
 RSS-Gen, Issue 5 (Amendment 2, February 2021)
 ANSI C63.10:2013

1.5 Test Facility

Laboratory	Test Site Address	Test Site Name	FCC Designation number	IC CAB identifier
SGS Taiwan Ltd. Central RF Lab. (TAF code 3702)	No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan.	SAC 1	TW0027	TW3702
		SAC 3		
		Conduction 1		
		Conducted 1		
		Conducted 2		
		Conducted 3		
		Conducted 4		
		Conducted 5		
		Conducted 6		
		Conduction C		
	SAC C			
	SAC D			
	SAC G			
	Conducted A			
	Conducted B			
	Conducted C			
	Conducted D			
	Conducted E			
	Conducted F			
	Conducted G			
Note: Test site name is remarked on the equipment list in each section of this report as an indication where measurements occurred in specific test site and address.				

1.6 Special Accessories

There are no special accessories used while test was conducted.

1.7 Equipment Modifications

There was no modification incorporated into the EUT.

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2 SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

An engineering test mode (software/firmware) that applicant provided was utilized to manipulate the EUT into transmit, selection of the test channel, and modulation scheme.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on a table which is 0.8 m above ground plane. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz. The CISPR Quasi-Peak and Average detector mode is employed. The two LISNs provide 50uH/50 ohm of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

2.3.2 Conducted Test (RF)

The active antenna port of the unlicensed wireless device is connected to the spectrum analyzer with attenuator to protect the instrumentation. If a second antenna port is available, it is tested at one operating frequency, with other port(s) appropriately terminated, to verify it has similar output characteristics as the fully tested port.

2.3.3 Radiated Emissions

The EUT is a placed on a turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.

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2.4 Measurement Results Explanation Example

2.4.1 Radiated Emission Test Sites For Measurements From 9 kHz To 30 MHz

Radiated emission below 30MHz is measured in a 9m*6m*6m semi-anechoic chamber, the measurements correspond to those obtained at an open-field test site.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

2.4.2 For all conducted test items:

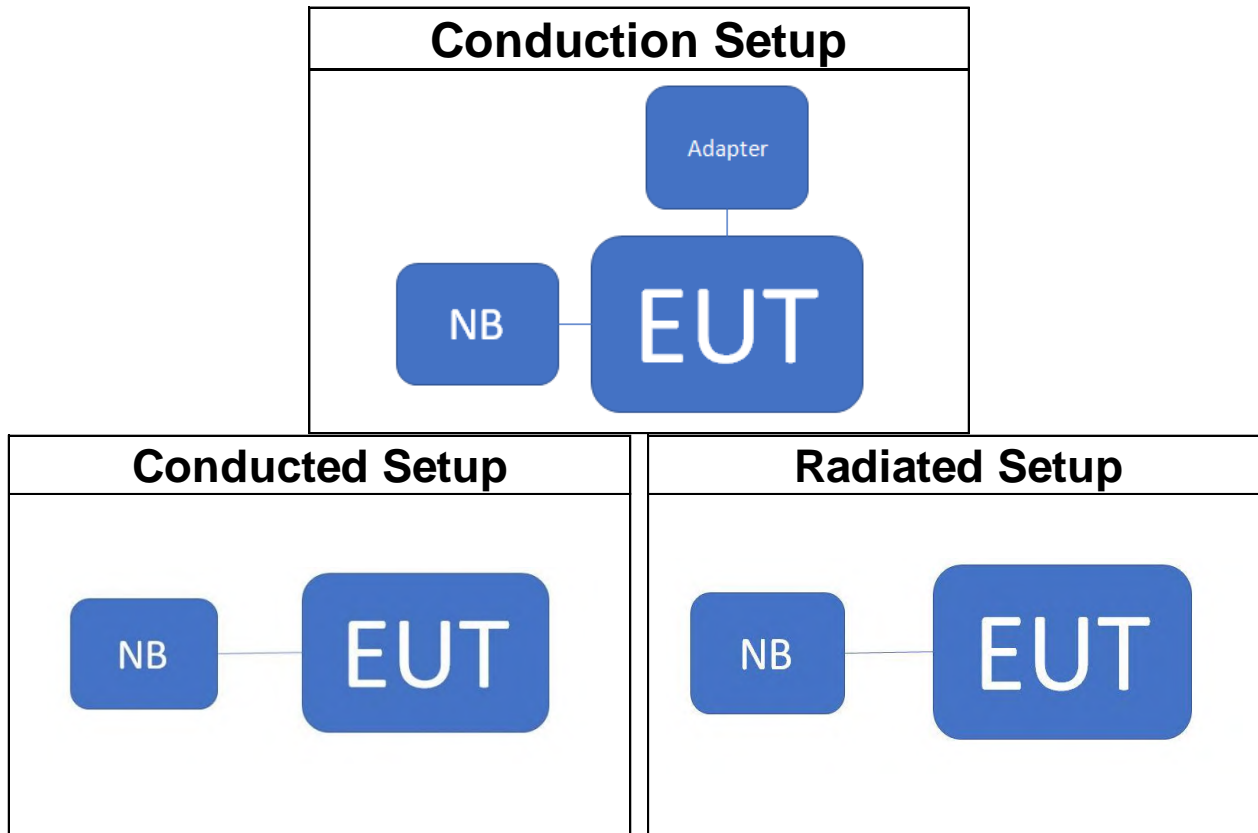
The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuation factor between EUT conducted port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly EUT RF output level.

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2.5 Test Configuration



2.6 Control Unit(s)

AC Power-Line Conducted Emission Test Site: Conduction 1					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Test Software	Audix	e3	Ver. 9.210322	N.C.R	N.C.R
LAN Cable	HOSIWELL	CAT5	N/A	N/A	N/A
Notebook	Lenovo	L430	R9-WGNK5	N/A	N/A
Conducted Emission Test Site: Conducted 3					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Test Software	SGS	Radio Test Software	Ver. 21	N.C.R	N.C.R
Notebook	Lenovo	L430	R9-WGNK5	N/A	N/A
LAN Cable	HOSIWELL	CAT5	N/A	N/A	N/A
Radiated Emission Test Site: SAC 1					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Test Software	Audix	e3	Ver. 9.210322	N.C.R	N.C.R
LAN Cable	HOSIWELL	CAT5	N/A	N/A	N/A
Notebook	Lenovo	L430	R9-WGNK5	N/A	N/A

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3 SUMMARY OF TEST RESULTS

FCC Rules	ISED Rules	Description Of Test	Result
§15.207(a)	RSS-Gen §8.8	AC Power Line Conducted Emission	Compliant
§15.247(b) (3)	RSS-247 §5.4 d	Peak Output Power	Compliant
§15.247(a)(2)	RSS-247 §5.2 a RSS-Gen §6.7	Emission Bandwidth	Compliant
§15.205 §15.209 §15.247(d)	RSS-247 §5.5 RSS-Gen §8.9 RSS-Gen §8.10 RSS-Gen §6.13	Radiated & Conducted Band Edge and Spurious Emission	Compliant
§15.247(e)	RSS-247 §5.2 b	Power Spectral Density	Compliant
§15.203	N/A	Antenna Requirement	Compliant

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4 DESCRIPTION OF TEST MODES

4.1 Operatin Frequencies

Modulation of 20MHz nominal bandwidth

CHANNEL	FREQUENCY (MHz)
1	2412
2	2417
3	2422
4	2427
5	2432
6	2437
7	2442
8	2447
9	2452
10	2457
11	2462

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4.2 The Worst Test Modes and Channel Details

1. The EUT has been tested under operating condition.
2. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.
3. Investigation has been done on all the possible configurations for searching the worst case.

The gevin UE is pre-scanned among below modes.

Modulation		Transmission Chain							Single Transmission Spatial	Multi Transmission Spatial			
v	802.11 b	v	Ch0	v	Ch1		Ch2		Ch3		1TX	v	2TX
v	802.11 g	v	Ch0	v	Ch1		Ch2		Ch3		1TX	v	2TX
v	802.11 n	v	Ch0	v	Ch1		Ch2		Ch3		SISO	v	MIMO
	802.11 ax		Ch0		Ch1		Ch2		Ch3		SISO		MIMO

4. Therefore, below summary is the modes of test configuration that yield the highest reading and generate the highest emission chosen to carry out the relevantly mandatory test items.

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Conducted					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11b	1 to 11	1,6,11	DSSS	1	2TX
802.11g	1 to 11	1,6,11	OFDM	6	2TX
802.11n (HT20)	1 to 11	1,6,11	OFDM	MCS8	MIMO

RADIATED EMISSION TEST (BELOW 1 GHz)					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11g	1 to 11	6	OFDM	6	2TX

RADIATED EMISSION TEST (ABOVE 1 GHz)					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11b	1 to 11	1,6,11	DSSS	1	2TX
802.11g	1 to 11	1,6,11	OFDM	6	2TX
802.11n (HT20)	1 to 11	1,6,11	OFDM	MCS8	MIMO

Note:

The field strength of radiated emission was measured as the EUT positioned in different orthogonal planes (E1/E2/H) based on actual usage of the EUT to pre-scan the emissions for determining the worst case scenario.

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5 MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.34 dB
Output Power measurement	+/- 1 dB
Emission Bandwidth	+/- 1.53 Hz
Undesignable radiated emission measurement	+/- 1.68 dB
Peak Power Density	+/- 1.62 dB
Temperature	+/- 0.4 °C
Humidity	+/- 3.5 %
DC / AC Power Source	+/- 1 %

Radiated Spurious Emission Measurement Uncertainty			
Polarization: Vertical	+/-	2.57 dB	9kHz~30MHz
	+/-	4.85 dB	30MHz - 1000MHz
	+/-	4.45 dB	1GHz - 18GHz
	+/-	4.24 dB	18GHz - 40GHz
Polarization: Horizontal	+/-	2.57 dB	9kHz~30MHz
	+/-	4.37 dB	30MHz - 1000MHz
	+/-	4.45 dB	1GHz - 18GHz
	+/-	4.24 dB	18GHz - 40GHz

Note:

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The conformity assessment statement in this report is based solely on the test results, measurement uncertainty is excluded.

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6 MEASUREMENT EQUIPMENT USED

6.1 Emission from AC power line

AC Power-Line Conducted Emission Test Site: Conduction 1					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
LISN	SCHWARZBECK	NSLK 8127	1040	08/10/2021	08/09/2022
Coaxial Cables	N/A	Coaxial Cable	161207	12/07/2021	12/06/2022
EMI Test Receiver	R&S	ESCI 7	100759	08/26/2021	08/25/2022

6.2 Conducted Measurement

Conducted Emission Test Site: Conducted 3					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
PXA Spectrum Analyzer	Agilent	N9030A	MY53120760	04/27/2021	04/26/2022
Power Meter	Anritsu	ML2496A	2132007	11/12/2021	11/11/2022
Power Sensor	Anritsu	MA2411B	1911391	09/21/2021	09/20/2022
Power Sensor	Anritsu	MA2411B	1911392	09/21/2021	09/20/2022
Attenuator	Mini-Circuit	BW-S10W2+	4	12/14/2021	12/13/2022
DC Block	Mini-Circuits	BLK-18-S+	1	12/14/2021	12/13/2022

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6.3 Radiated Measurement

Radiated Emission Test Site: SAC 1					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Horn Antenna	SCHWARZBECK	BBHA9120D	D803	12/20/2021	12/19/2022
Bi-log Antenna	TESEO	CBL 6112D	35242 & AT-N0555	01/03/2022	01/02/2023
Horn Antenna	SCHWARZBECK	BBHA9170	184	12/16/2021	12/15/2022
Loop Antenna	ETS.LINDGREN	6502	148045	09/29/2021	09/28/2022
Site Cal	SGS	SAC I chamber	N/A	01/01/2022	12/31/2022
EXA Spectrum Analyzer	Agilent	N9010A	MY50420195	05/12/2021	05/11/2022
EMI Test Receiver	R&S	ESCI 7	100759	08/26/2021	08/25/2022
Pre-Amplifier	EMC Instruments	EMC184045B	980135	10/27/2021	10/26/2022
Pre-Amplifier	HP	8449B	3008A01973	12/16/2021	12/15/2022
Pre-Amplifier	HP	8447D	2944A09469	12/16/2021	12/15/2022
Attenuator	Mini-Circuit	BW-S10W2+	4	12/14/2021	12/13/2022
Bandreject Filter 2400-2483.5	EWT	EWT-14-0166	M1	12/14/2021	12/13/2022
3.2GHz High Pass Filter	WI	WHKX10-2624-80SS	3	12/14/2021	12/13/2022
Coaxial Cable	Huber Suhner	succoflex 102	MY2622/2	12/16/2021	12/15/2022
Coaxial Cable	Huber Suhner	succoflex 104A	800086/4a	12/16/2021	12/15/2022
Coaxial Cable	Huber Suhner	EMC 104-SM-SM-2000	160123	12/16/2021	12/15/2022
Coaxial Cable	Huber Suhner	SUCOFLEX 102	MY2630/2	12/16/2021	12/15/2022
Coaxial Cable	Huber Suhner	SUCOFLEX 102	MY22962/2	12/16/2021	12/15/2022

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7 CONDUCTED EMISSION TEST

7.1 Standard Applicable

Frequency range within 150kHz to 30MHz shall not exceed the Limit table as below.

Frequency range MHz	Limits (dBuV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

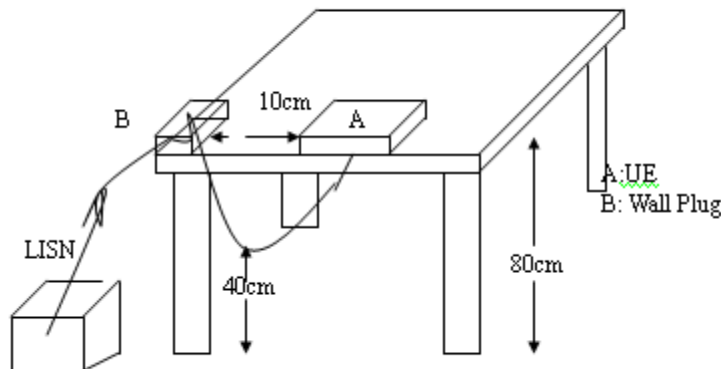
Note

- The lower limit shall apply at the transition frequencies
- The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

7.2 EUT Setup

- The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.10:2013.
- The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
- The LISN was connected with 120Vac/60Hz power source.

7.3 Test Setup



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7.4 Measurement Procedure

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all phases of power being supplied by given UE are completed

7.5 Measurement Result

Note: Refer to next page for measurement data and plots.

Note2: The * reveals the worst-case results that closet to the limit.

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AC POWER LINE CONDUCTED EMISSION TEST DATA

Report Number :ER/2022/20001

Test Site :Conduction 1

Test Mode :WIFI 2.4G

Test Date :2022-04-20

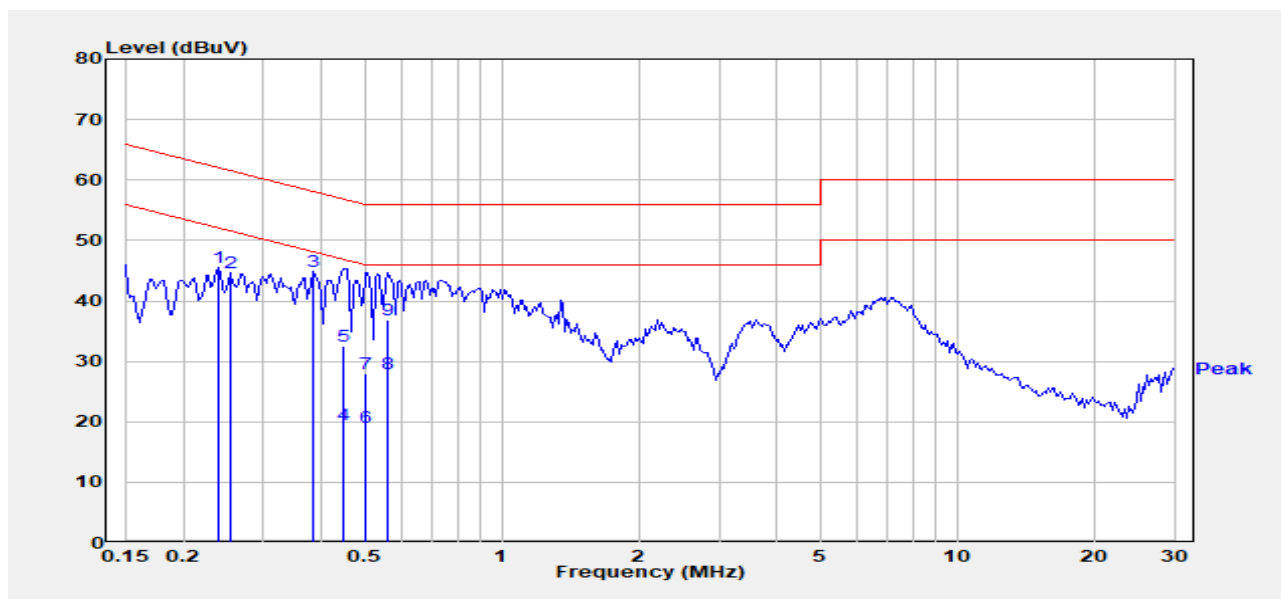
Power :120V/60Hz

Temp./Humi. :23.7/64

Probe :L

Engineer :GN Lin

Note :



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV	Limit dBμV	Margin dB
0.239	Peak	43.32	2.12	45.44	62.13	-16.68
0.255	Peak	42.57	2.12	44.69	61.60	-16.91
0.385	Peak	42.83	2.12	44.95	58.17	-13.22
0.447	Average	17.35	2.12	19.47	46.93	-27.46
0.447	QP	30.32	2.12	32.44	56.93	-24.49
0.502	Average	16.92	2.12	19.04	46.00	-26.96
0.502	QP	25.78	2.12	27.90	56.00	-28.10
0.564	Average	25.84	2.12	27.96	46.00	-18.04
0.564	QP	34.72	2.12	36.84	56.00	-19.16

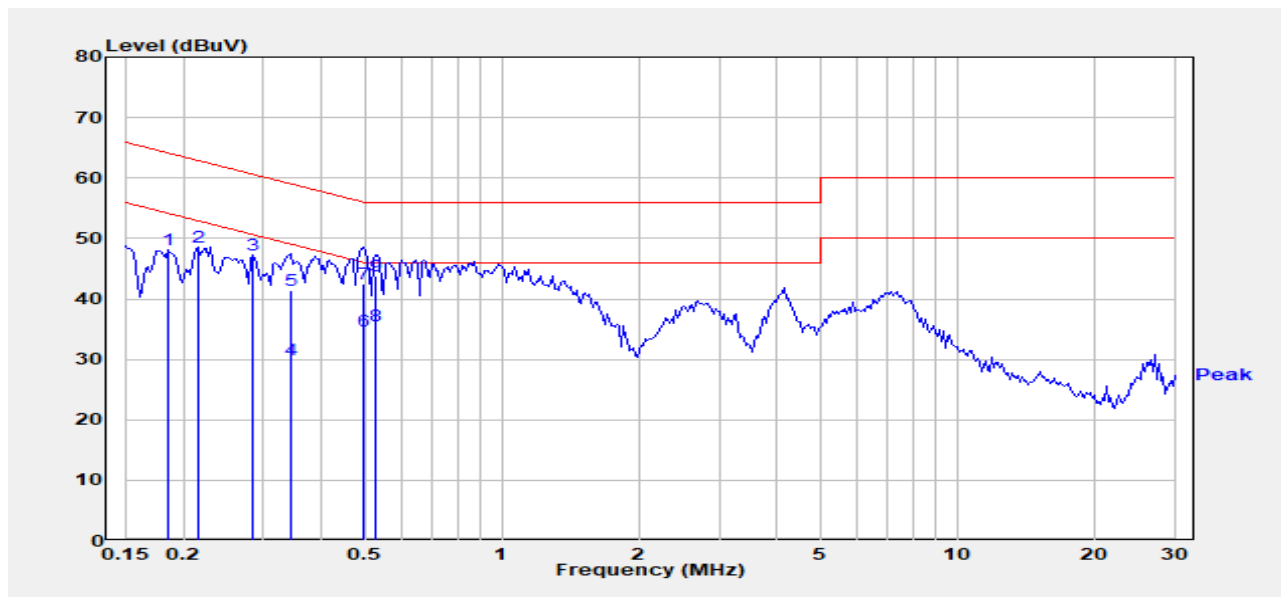
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Report Number :ER/2022/20001
 Test Mode :WIFI 2.4G
 Power :120V/60Hz
 Probe :N
 Note: :

Test Site :Conduction 1
 Test Date :2022-04-20
 Temp./Humi. :23.7/64
 Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V	Limit dB μ V	Margin dB
0.185	Peak	45.91	2.25	48.17	64.24	-16.07
0.215	Peak	46.34	2.28	48.62	63.01	-14.38
0.283	Peak	45.01	2.21	47.22	60.72	-13.50
0.343	Average	27.78	2.16	29.94	49.13	-19.19
0.343	QP	39.26	2.16	41.42	59.13	-17.71
0.497	Average	32.48	2.12	34.60	46.05	-11.45
0.497	QP	40.33	2.12	42.45	56.05	-13.60
0.529	Average	33.41	2.12	35.53	46.00	-10.47
0.529	QP	41.75	2.12	43.87	56.00	-12.13

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8 PEAK OUTPUT POWER MEASUREMENT

8.1 Standard Applicable

8.2 Duty Cycle

Pre-analysis Check: While conducting average power measurement, duty cycle of each mode shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle.

All duty cycle is pre-scanned, and result as obtained below shows only the most representative ones where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage.

8.3 Output Power

For systems using digital modulation in the 2400-2483.5 MHz bands, the limit for peak output power is 1Watt and the e.i.r.p. shall not exceed 4 W.

If the transmitting antenna of directional gain greater than 6dBi are used the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the Antenna exceeds 6dBi.

In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of Antenna exceeds 6dBi.

Note:

As per section F. 2). e). (ii) of FCC KDB 662911 D01

If antenna gains are not equal and each transmit antenna is driven by only one spatial stream, directional gain may be calculated by either of the following formulas.

$$\bullet \quad \text{DirectionalGain} = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

where

Each antenna is driven by no more than one spatial stream;

NSS = the number of independent spatial streams of data;

NANT = the total number of antennas

$g_{j,k} = 10^{G_k/20}$ if the kth antenna is being fed by spatial stream j, or zero if it is not;

G_k is the gain in dBi of the kth antenna.

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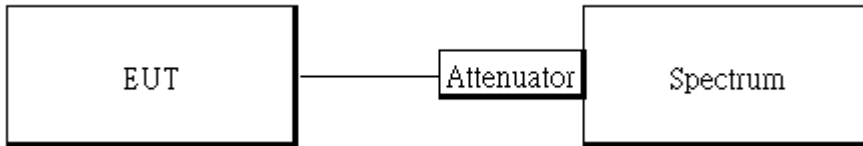
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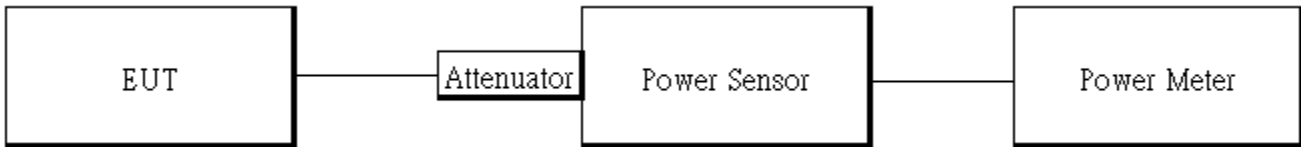
The antenna gain is not greater than 6 dBi. Therefore, reduction of power is not required.

8.4 Test Setup

8.4.1 Duty Cycle



8.4.2 Output Power:



8.5 Measurement Procedure

8.5.1 Duty Cycle:

1. Set span = Zero
2. RBW = 8MHz
3. VBW = 8MHz,
4. Detector = Peak

8.5.2 Output Power

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance .
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter.

Power Meter:

It is used as the auxiliary test equipment to conduct the output power measurement.

4. Record the max. Reading as observed from Spectrum or Power Meter.
5. MIMO mode: offset is set with “measure and add 10 Log (N)” to measurement for MIMO mode. Offset = cable loss + 10 log (N), where N is number of transmitting antenna, cable loss is specified below.

*** Note: The duty cycle factor and below is compensated to obtain the maximum value of measurement in average.**

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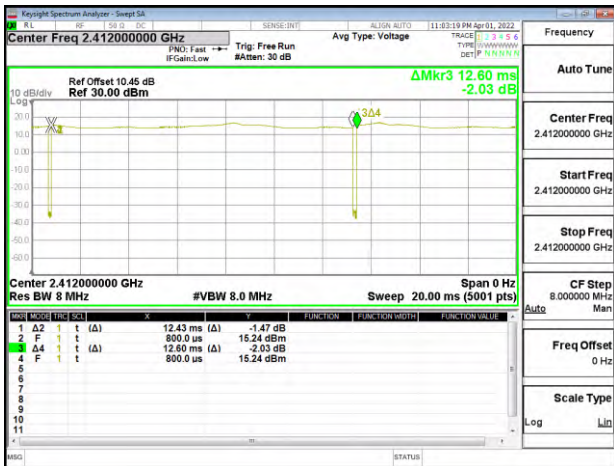
8.6 Measurement Result

8.6.1 Duty Cycle:

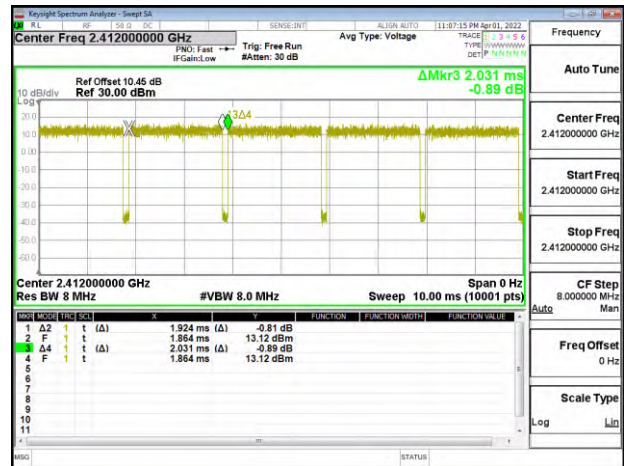
	Duty Cycle (%) = Ton / (Ton+Toff)	Duty Factor (dB) =10*log (1/Duty Cycle)	1/T (kHz)	VBW setting (kHz)
802.11b	98.70	0.06	0.08	0.01
802.11g	94.72	0.24	0.48	1.00
802.11n_20	94.73	0.24	0.52	1.00

8.6.2 Duty Cycle test plots

802.11b_20MHz_Chain0_2412MHz



802.11n_20MHz_Chain0_2412MHz



802.11g_20MHz_Chain0_2412MHz



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8.6.3 Output Power

802.11b Ch0						
CH	Freq. (MHz)	Data Rate	Power set	Peak Output Power (dBm)	Limit (dBm)	RESULT
1	2412	1	11	13.62	30.00	PASS
6	2437	1	11	14.10	30.00	PASS
11	2462	1	11	14.15	30.00	PASS

802.11b Ch0						
CH	Freq. (MHz)	Data Rate	Power set	Max. Avg. Output include tune up tolerance Power (dBm)	Limit (dBm)	RESULT
1	2412	1	11	11.16	30.00	PASS
6	2437	1	11	11.14	30.00	PASS
11	2462	1	11	11.07	30.00	PASS

802.11b Ch1						
CH	Freq. (MHz)	Data Rate	Power set	Peak Output Power (dBm)	Limit (dBm)	RESULT
1	2412	1	10	12.48	30.00	PASS
6	2437	1	10	12.71	30.00	PASS
11	2462	1	10	12.86	30.00	PASS

802.11b Ch1						
CH	Freq. (MHz)	Data Rate	Power set	Max. Avg. Output include tune up tolerance Power (dBm)	Limit (dBm)	RESULT
1	2412	1	10	9.98	30.00	PASS
6	2437	1	10	9.90	30.00	PASS
11	2462	1	10	9.92	30.00	PASS

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802.11b_2TX								
CH	Freq. (MHz)	Data Rate	Power set	Peak Output Power		Total Peak Output Power (dBm)	Limit (dBm)	RESULT
				CH 0	CH 1			
1	2412	1	11	13.77	12.89	16.36	30.00	PASS
6	2437	1	10	13.55	12.60	16.11	30.00	PASS
11	2462	1	10	13.22	12.78	16.02	30.00	PASS

802.11b_2TX								
CH	Freq. (MHz)	Data Rate	Power set	Avg. Output Power (dBm)		Max. Avg. Output include tune up tolerance Power (dBm)	Limit (dBm)	RESULT
				CH 0	CH 1			
1	2412	1	11	11.37	10.03	13.82	30.00	PASS
6	2437	1	10	11.18	9.97	13.69	30.00	PASS
11	2462	1	10	11.08	10.01	13.65	30.00	PASS

802.11g Ch0						
CH	Freq. (MHz)	Data Rate	Power set	Peak Output Power (dBm)	Limit (dBm)	RESULT
1	2412	6	12	18.82	30.00	PASS
6	2437	6	11	18.12	30.00	PASS
11	2462	6	11	18.31	30.00	PASS

802.11g Ch0						
CH	Freq. (MHz)	Data Rate	Power set	Max. Avg. Output include tune up tolerance Power (dBm)	Limit (dBm)	RESULT
1	2412	6	12	11.35	30.00	PASS
6	2437	6	11	11.33	30.00	PASS
11	2462	6	11	11.31	30.00	PASS

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802.11g Ch1						
CH	Freq. (MHz)	Data Rate	Power set	Peak Output Power (dBm)	Limit (dBm)	RESULT
1	2412	6	10	16.85	30.00	PASS
6	2437	6	10	16.04	30.00	PASS
11	2462	6	10	15.95	30.00	PASS
802.11g Ch1						
CH	Freq. (MHz)	Data Rate	Power set	Max. Avg. Output include tune up tolerance Power (dBm)	Limit (dBm)	RESULT
1	2412	6	10	9.91	30.00	PASS
6	2437	6	10	9.96	30.00	PASS
11	2462	6	10	9.90	30.00	PASS

802.11g_2TX								
CH	Freq. (MHz)	Data Rate	Power set	Peak Output Power		Total Peak Output Power (dBm)	Limit (dBm)	RESULT
				CH 0	CH 1			
1	2412	6	11	17.66	17.13	20.41	30.00	PASS
6	2437	6	11	17.80	17.36	20.60	30.00	PASS
11	2462	6	11	17.88	17.12	20.53	30.00	PASS
802.11g_2TX								
CH	Freq. (MHz)	Data Rate	Power set	Avg. Output Power (dBm)		Max. Avg. Output include tune up tolerance Power (dBm)	Limit (dBm)	RESULT
				CH 0	CH 1			
1	2412	6	11	11.21	10.02	13.91	30.00	PASS
6	2437	6	11	11.28	10.03	13.95	30.00	PASS
11	2462	6	11	11.34	9.99	13.97	30.00	PASS

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802.11nHT_20M Ch0						
CH	Freq. (MHz)	Data Rate	Power set	Peak Output Power (dBm)	Limit (dBm)	RESULT
1	2412	MCS0	11	18.34	30.00	PASS
6	2437	MCS0	11	18.16	30.00	PASS
11	2462	MCS0	11	17.94	30.00	PASS
802.11nHT_20M Ch0						
CH	Freq. (MHz)	Data Rate	Power set	Max. Avg. Output include tune up tolerance Power (dBm)	Limit (dBm)	RESULT
1	2412	MCS0	11	11.24	30.00	PASS
6	2437	MCS0	11	11.37	30.00	PASS
11	2462	MCS0	11	11.32	30.00	PASS

802.11nHT_20M Ch1						
CH	Freq. (MHz)	Data Rate	Power set	Peak Output Power (dBm)	Limit (dBm)	RESULT
1	2412	MCS0	11	16.98	30.00	PASS
6	2437	MCS0	10	16.40	30.00	PASS
11	2462	MCS0	10	16.37	30.00	PASS
802.11nHT_20M Ch1						
CH	Freq. (MHz)	Data Rate	Power set	Max. Avg. Output include tune up tolerance Power (dBm)	Limit (dBm)	RESULT
1	2412	MCS0	11	10.01	30.00	PASS
6	2437	MCS0	10	9.83	30.00	PASS
11	2462	MCS0	10	9.74	30.00	PASS

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802.11n_HT20M MIMO								
CH	Freq. (MHz)	Data Rate	Power set	Peak Output Power		Total Peak Output Power (dBm)	Limit (dBm)	RESULT
				CH 0	CH 1			
1	2412	MCS8	11	18.56	17.28	20.98	30.00	PASS
6	2437	MCS8	11	18.18	17.32	20.78	30.00	PASS
11	2462	MCS8	11	18.20	17.13	20.71	30.00	PASS
802.11n_HT20M MIMO								
CH	Freq. (MHz)	Data Rate	Power set	Avg. Output Power (dBm)		Max. Avg. Output include tune up tolerance Power (dBm)	Limit (dBm)	RESULT
				CH 0	CH 1			
1	2412	MCS8	11	11.01	9.79	13.69	30.00	PASS
6	2437	MCS8	11	11.15	9.94	13.84	30.00	PASS
11	2462	MCS8	11	11.20	10.03	13.90	30.00	PASS

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802.11b Ch0							
CH	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	RESULT
1	2412	1	11.16	2.20	13.36	36	PASS
6	2437	1	11.14	2.20	13.34	36	PASS
11	2462	1	11.07	2.20	13.27	36	PASS

802.11b Ch1							
CH	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	RESULT
1	2412	1	9.98	2.10	12.08	36	PASS
6	2437	1	9.90	2.10	12.00	36	PASS
11	2462	1	9.92	2.10	12.02	36	PASS

802.11b_2TX									
CH	Freq. (MHz)	Data Rate	Avg. Output Power		Total Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	RESULT
			CH 0	CH 1					
1	2412	1	11.37	10.03	13.82	5.16	18.98	36	PASS
6	2437	1	11.18	9.97	13.69	5.16	18.85	36	PASS
11	2462	1	11.08	10.01	13.65	5.16	18.81	36	PASS

802.11g Ch0							
CH	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	RESULT
1	2412	6	11.35	2.20	13.55	36	PASS
6	2437	6	11.33	2.20	13.53	36	PASS
11	2462	6	11.31	2.20	13.51	36	PASS

802.11g Ch1							
CH	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	RESULT
1	2412	6	9.91	2.10	12.01	36	PASS
6	2437	6	9.96	2.10	12.06	36	PASS
11	2462	6	9.90	2.10	12.00	36	PASS

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802.11g_2TX									
CH	Freq. (MHz)	Data Rate	Avg. Output Power		Total Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	RESULT
			CH 0	CH 1					
1	2412	6	11.21	10.02	13.91	5.16	19.07	36	PASS
6	2437	6	11.28	10.03	13.95	5.16	19.11	36	PASS
11	2462	6	11.34	9.99	13.97	5.16	19.13	36	PASS

802.11nHT_20M Ch0								
CH	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	RESULT	
1	2412	MCS0	11.24	2.20	13.44	36	PASS	
6	2437	MCS0	11.37	2.20	13.57	36	PASS	
11	2462	MCS0	11.32	2.20	13.52	36	PASS	

802.11nHT_20M Ch1								
CH	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	RESULT	
1	2412	MCS0	10.01	2.10	12.11	36	PASS	
6	2437	MCS0	9.83	2.10	11.93	36	PASS	
11	2462	MCS0	9.74	2.10	11.84	36	PASS	

802.11n_HT20M MIMO									
CH	Freq. (MHz)	Data Rate	Avg. Output Power		Total Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	RESULT
			CH 0	CH 1					
1	2412	MCS8	11.01	9.79	13.69	5.16	18.85	36	PASS
6	2437	MCS8	11.15	9.94	13.84	5.16	19.00	36	PASS
11	2462	MCS8	11.20	10.03	13.90	5.16	19.06	36	PASS

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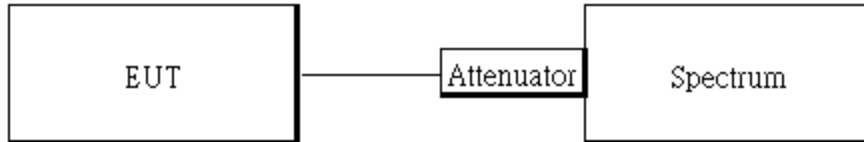
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9 EMISSION BANDWIDTH MEASUREMENT

9.1 Standard Applicable

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

9.2 Test Setup



9.3 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance .
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
4. Set the spectrum analyzer as
RBW= 100kHz ,
VBW = 3 X RBW,
Span= 2 to 5 times of the OBW,
Sweep=auto,
Detector = Peak, and Max hold for -6dB Bandwidth test.
5. Set the spectrum analyzer as
RBW= 1 % to 5% of 99% Bandwidth ,
VBW \geq 3 X RBW,
Span= large enough to capture all products of the modulation process,
Sweep=auto,
Detector = Peak, and Max hold for 99% Bandwidth test.
6. Turn on the 99% bandwidth function, max reading.
7. Repeat above procedures until all test default channel is completed

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9.4 6dB Bandwidth

802.11b Ch0

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	8087.00	≥ 500	PASS
2437	8089.00	≥ 500	PASS
2462	8089.00	≥ 500	PASS

802.11b Ch1

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	8090.00	≥ 500	PASS
2437	8091.00	≥ 500	PASS
2462	8091.00	≥ 500	PASS

802.11g Ch0

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	16070.00	≥ 500	PASS
2437	16300.00	≥ 500	PASS
2462	16330.00	≥ 500	PASS

802.11g Ch1

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	16300.00	≥ 500	PASS
2437	16310.00	≥ 500	PASS
2462	16300.00	≥ 500	PASS

802.11nHT_20M Ch0

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	16680.00	≥ 500	PASS
2437	16580.00	≥ 500	PASS
2462	16930.00	≥ 500	PASS

802.11nHT_20M Ch1

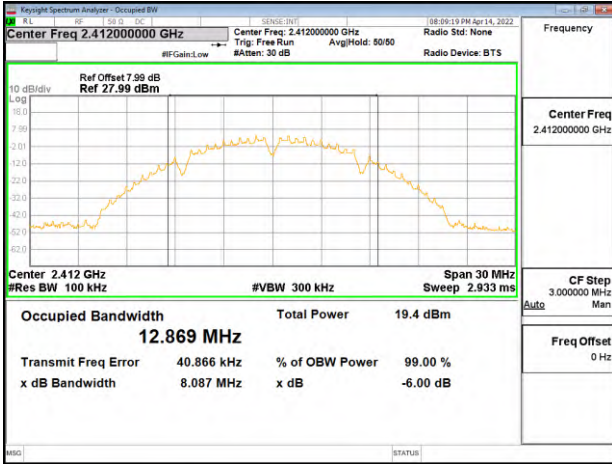
Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	17160.00	≥ 500	PASS
2437	16810.00	≥ 500	PASS
2462	17320.00	≥ 500	PASS

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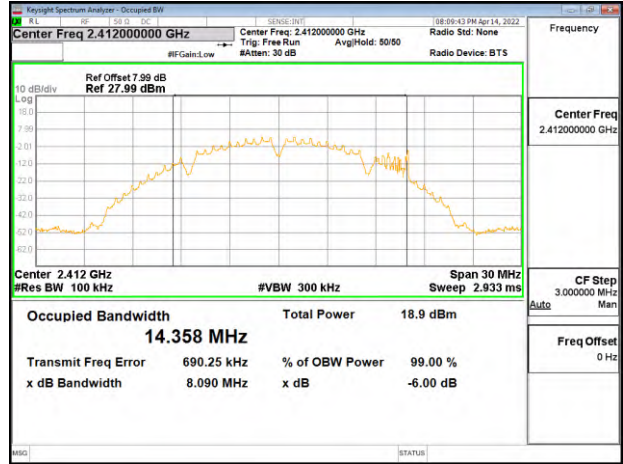
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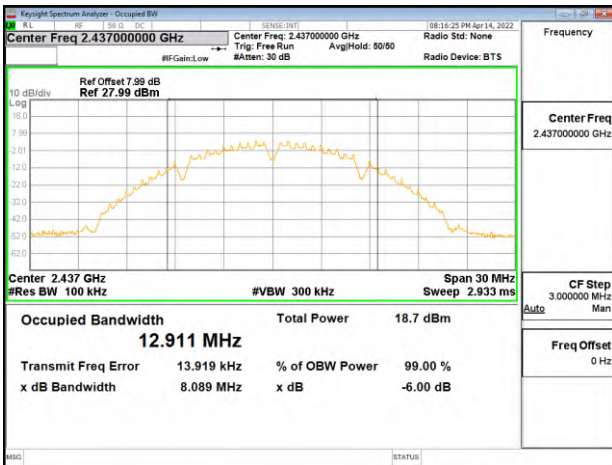
802.11b_20MHz_Chain0_2412MHz



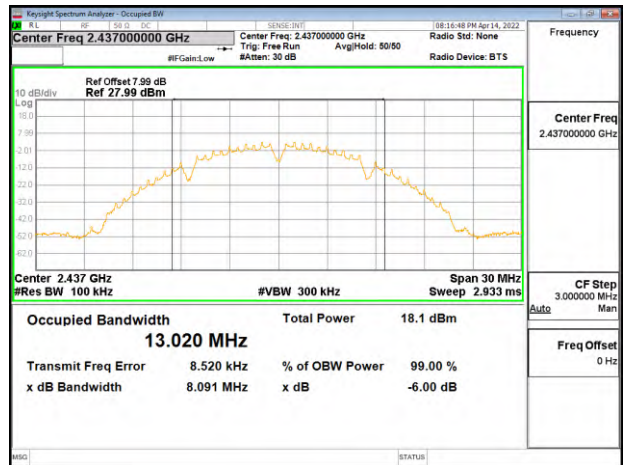
802.11b_20MHz_Chain1_2412MHz



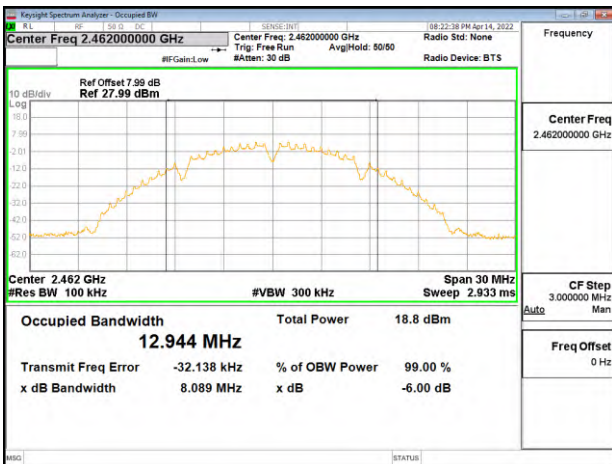
802.11b_20MHz_Chain0_2437MHz



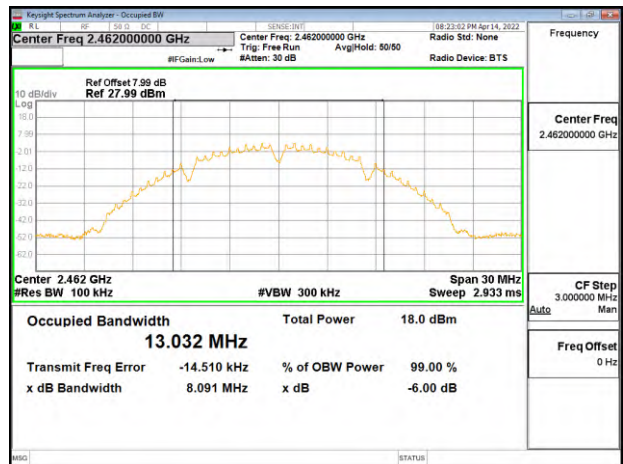
802.11b_20MHz_Chain1_2437MHz



802.11b_20MHz_Chain0_2462MHz



802.11b_20MHz_Chain1_2462MHz

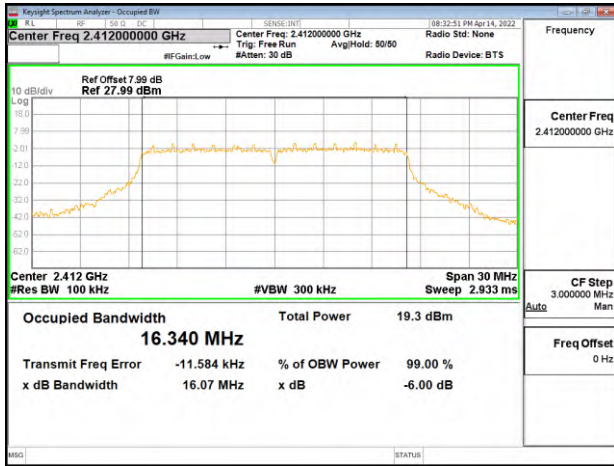


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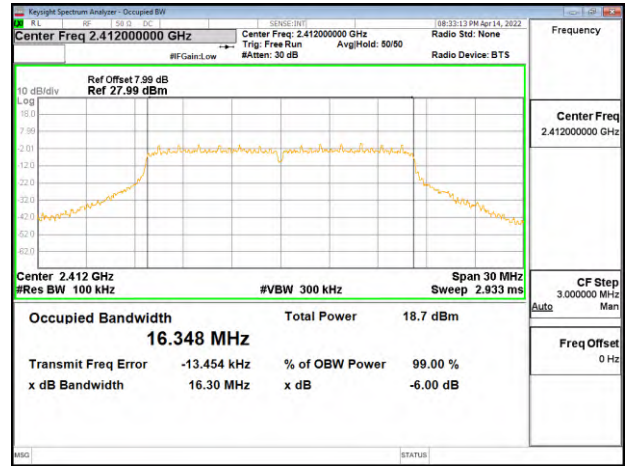
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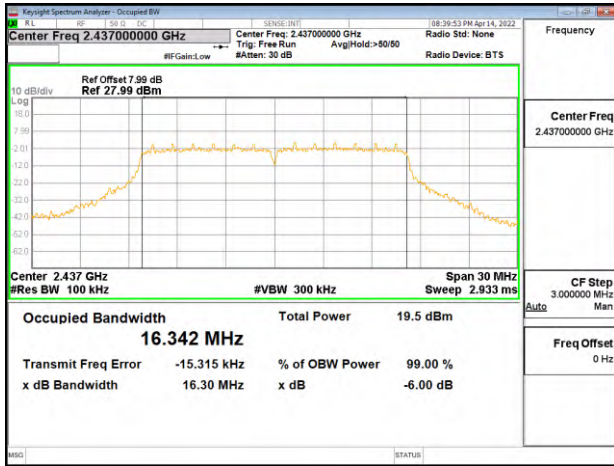
802.11g_20MHz_Chain0_2412MHz



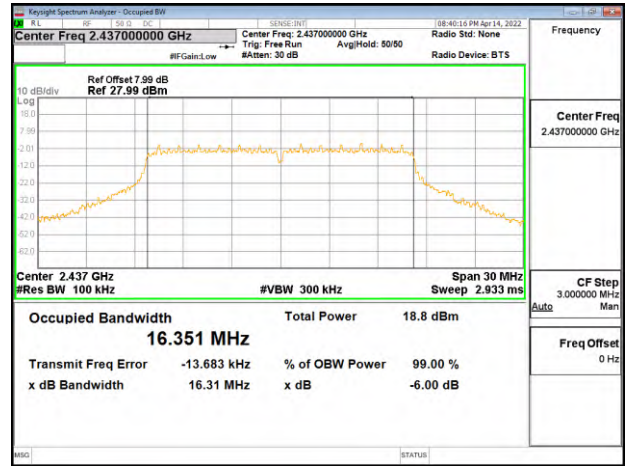
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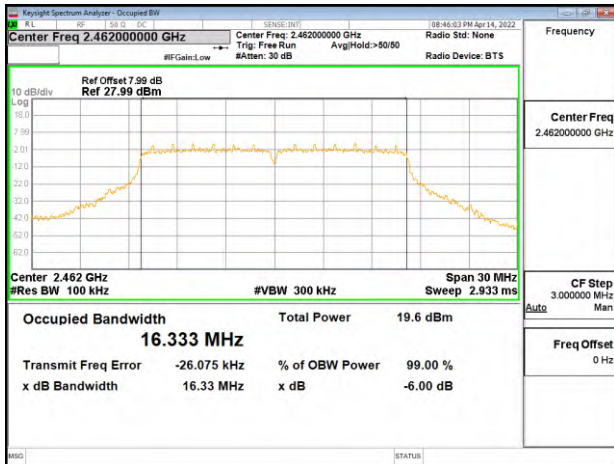
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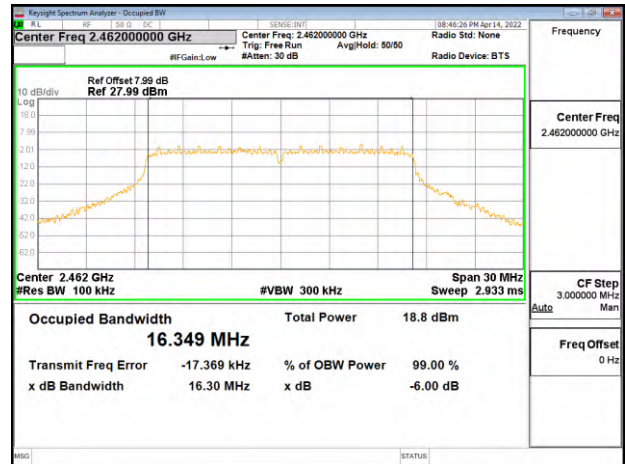
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802.11g_20MHz_Chain0_2462MHz



802.11g_20MHz_Chain1_2462MHz

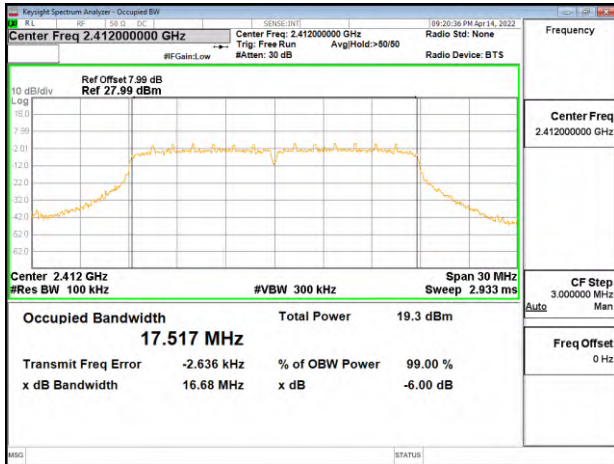


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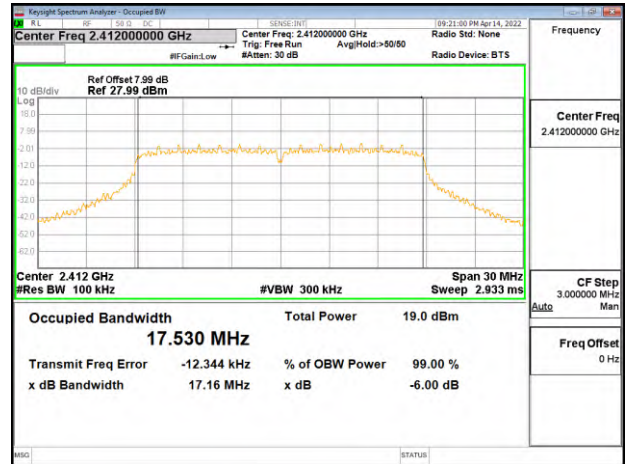
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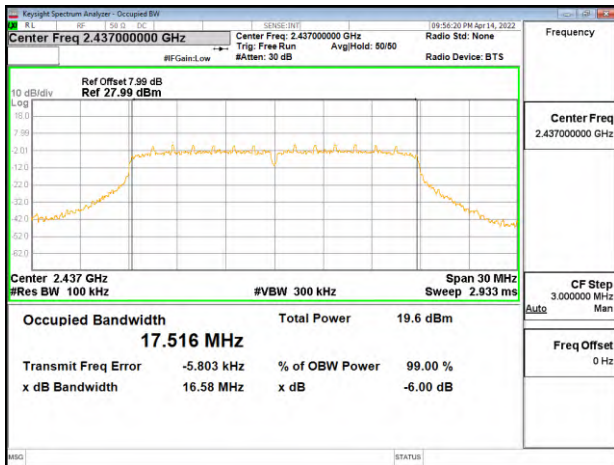
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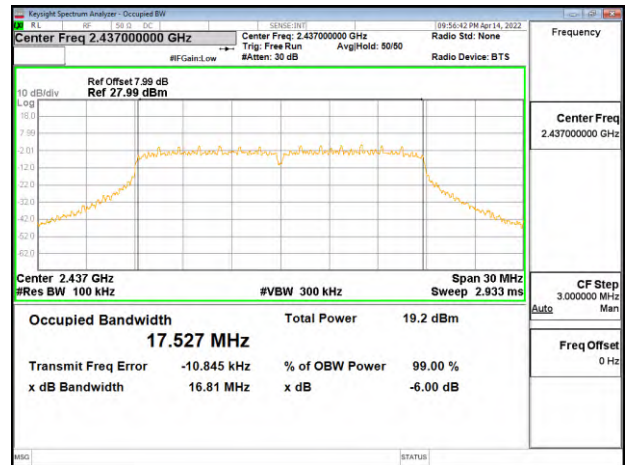
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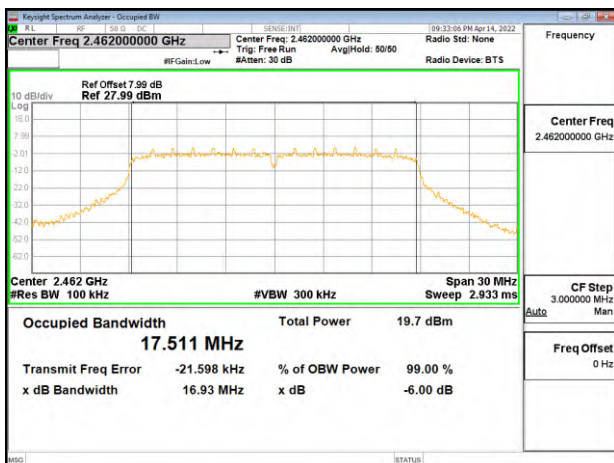
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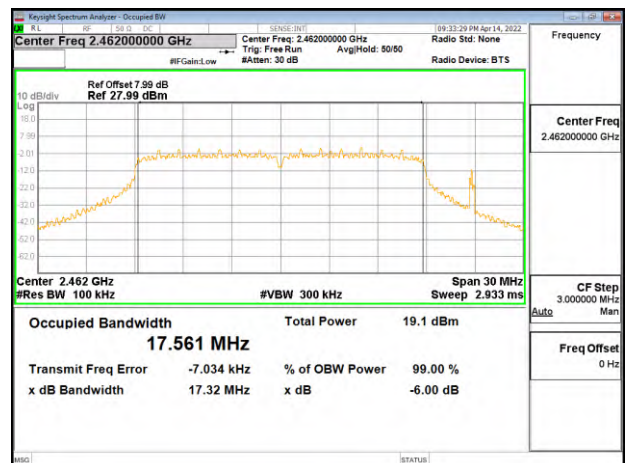
802.11n_20MHz_Chain1_2437MHz



802.11n_20MHz_Chain0_2462MHz



802.11n_20MHz_Chain1_2462MHz



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9.5 99% Bandwidth

802.11b Ch0

Freq. (MHz)	99% BW (MHz)
2412	12.895
2437	12.947
2462	12.96

802.11g Ch1

Freq. (MHz)	99% BW (MHz)
2412	16.42
2437	16.416
2462	16.414

802.11b Ch1

Freq. (MHz)	99% BW (MHz)
2412	13.029
2437	13.046
2462	13.038

802.11n_HT20M Ch0

Freq. (MHz)	99% BW (MHz)
2412	17.595
2437	17.593
2462	17.59

802.11g Ch0

Freq. (MHz)	99% BW (MHz)
2412	16.457
2437	16.459
2462	16.456

802.11n_HT20M Ch1

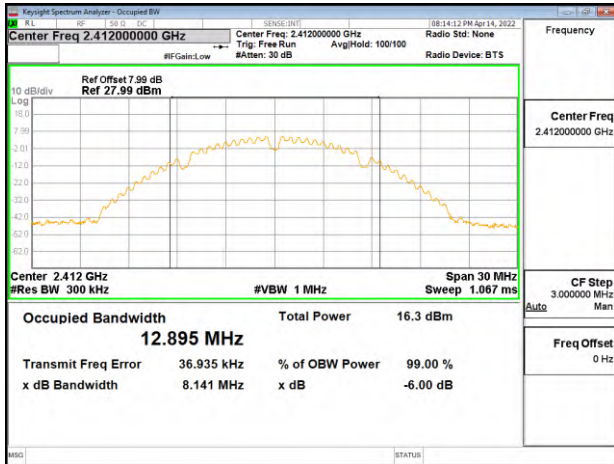
Freq. (MHz)	99% BW (MHz)
2412	17.588
2437	17.592
2462	17.583

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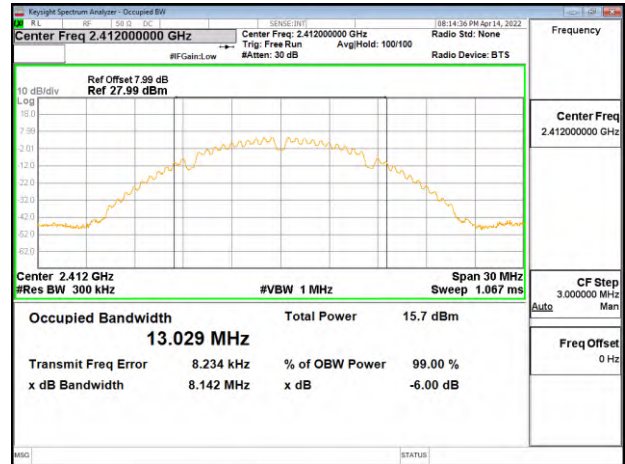
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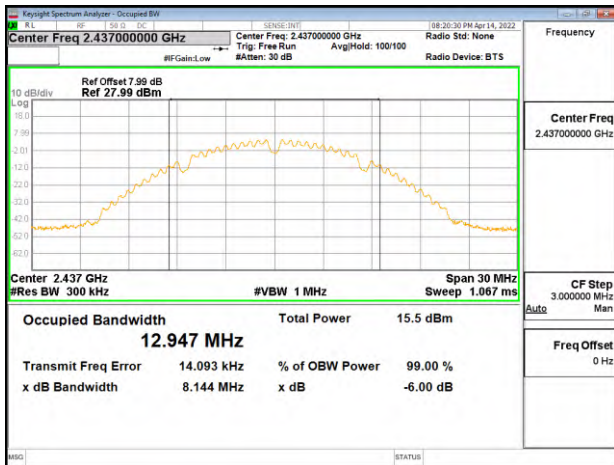
802.11b_20MHz_Chain0_2412MHz



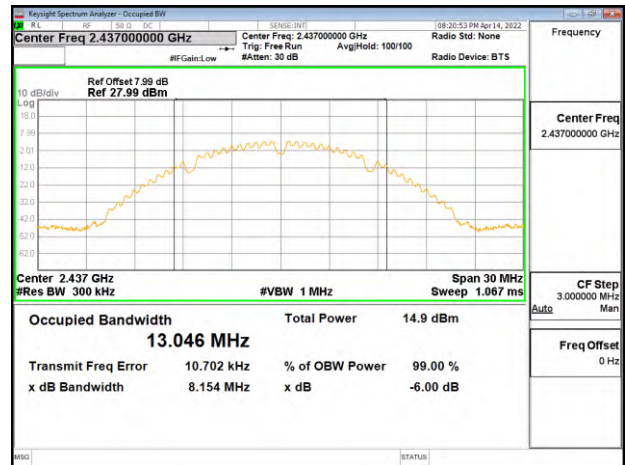
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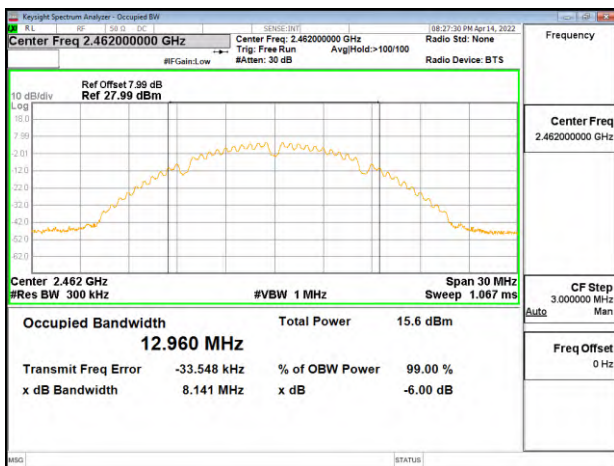
802.11b_20MHz_Chain0_2437MHz



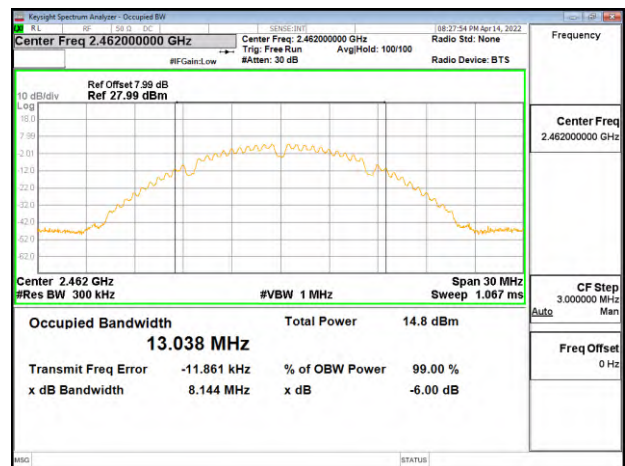
802.11b_20MHz_Chain1_2437MHz



802.11b_20MHz_Chain0_2462MHz



802.11b_20MHz_Chain1_2462MHz

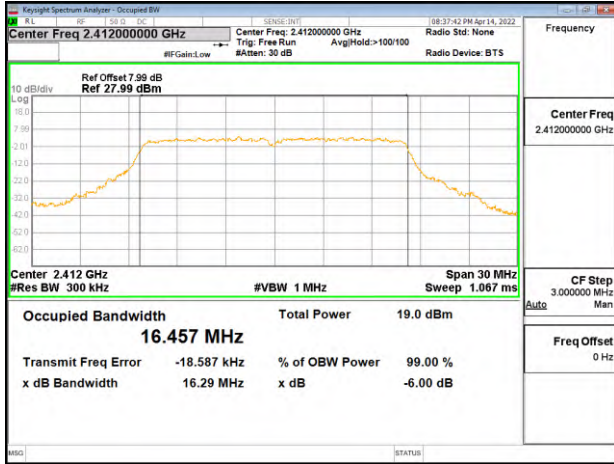


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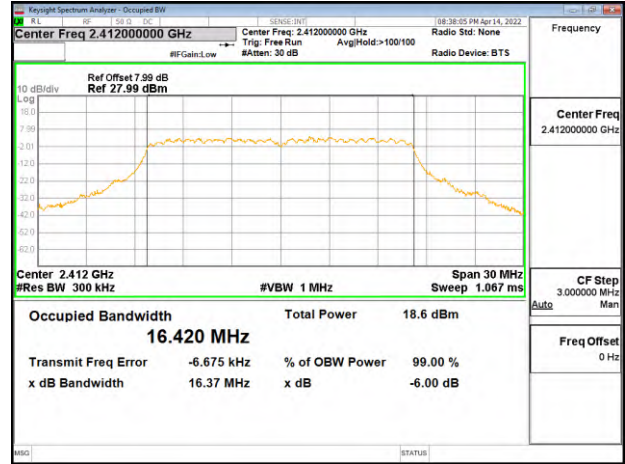
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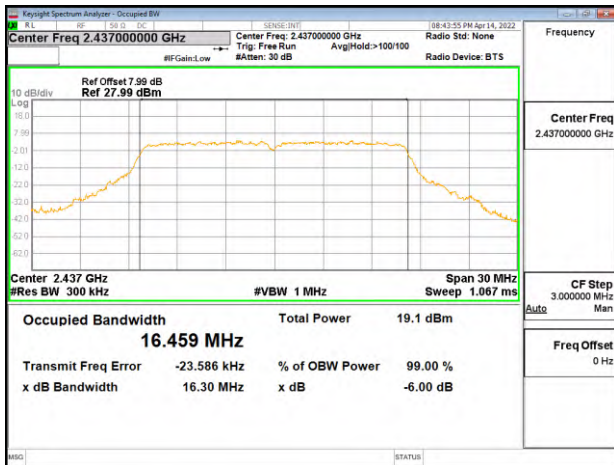
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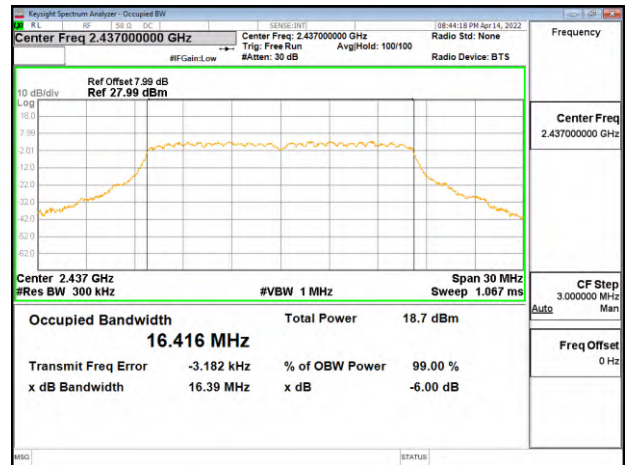
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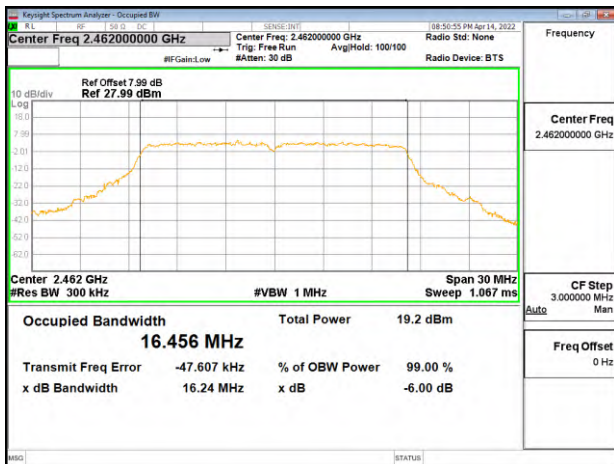
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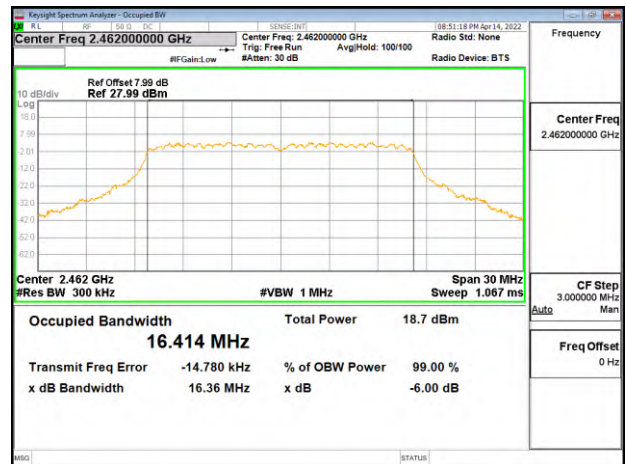
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802.11g_20MHz_Chain0_2462MHz



802.11g_20MHz_Chain1_2462MHz

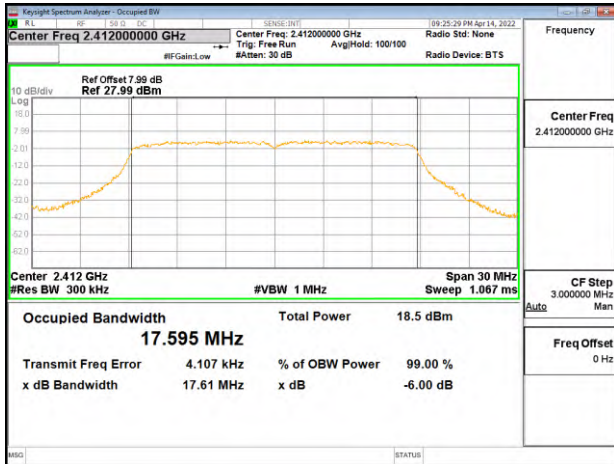


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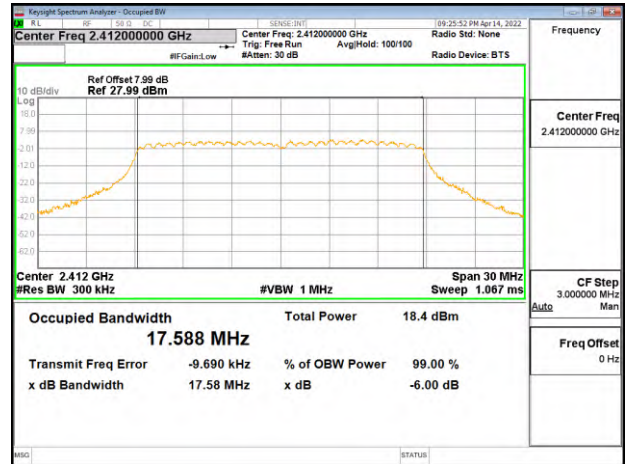
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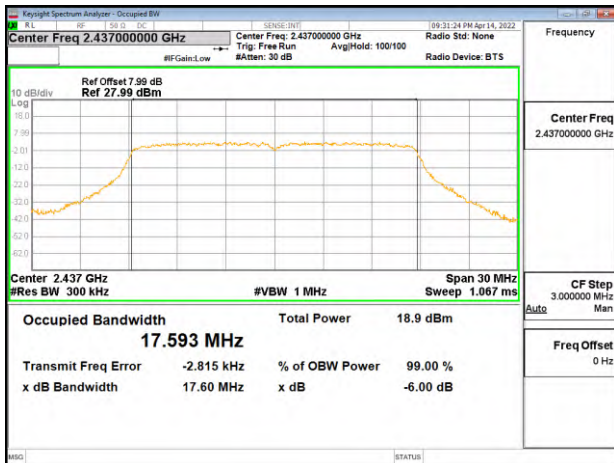
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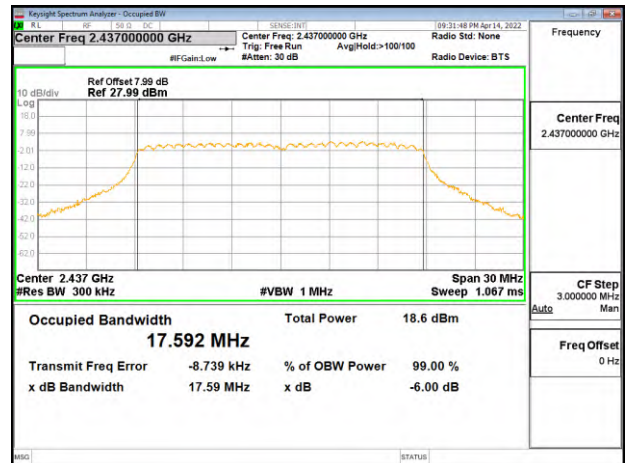
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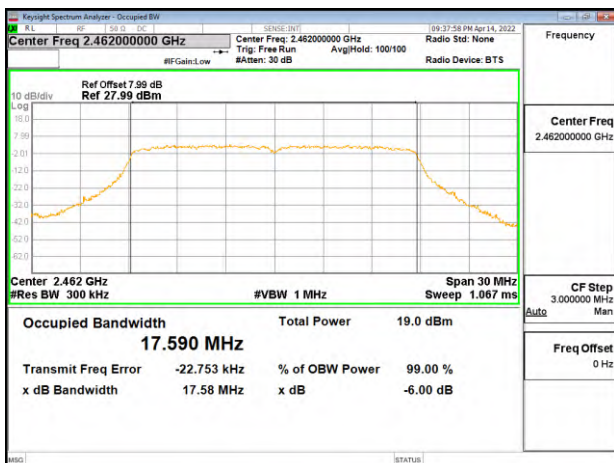
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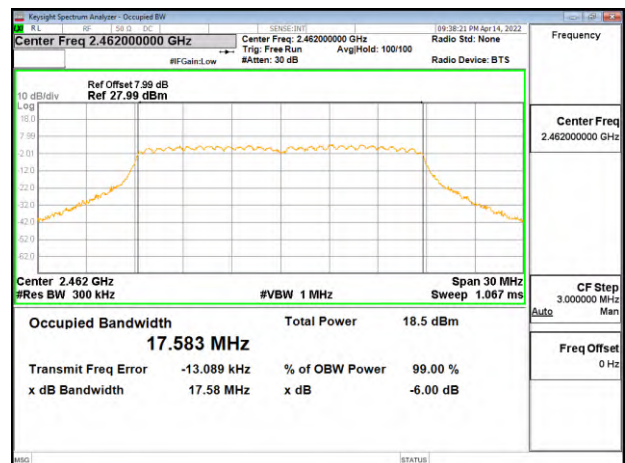
802.11n_20MHz_Chain1_2437MHz



802.11n_20MHz_Chain0_2462MHz



802.11n_20MHz_Chain1_2462MHz



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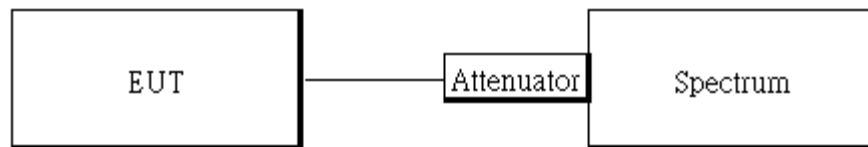
10 CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT

10.1 Standard Applicable

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.

In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a) & RSS-Gen §8.10, must also comply with the radiated emission limits specified in §15.209(a) & RSS-Gen §8.9.

10.2 Test Setup



10.3 Measurement Procedure

10.3.1 Reference Level of Emission Limit:

1. Set analyzer center frequency to DTS channel center frequency.
2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance .
3. Set the span to 1.5 times the DTS channel bandwidth.
4. Set the RBW = 100kHz & VBW = 300 kHz.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. MIMO mode: offset is set following “measure and add 10 Log (N)” on spectrum to measure for MIMO mode. Offset = cable loss + 10 log (N), where N is number of transmitting antenna.

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10.3.2 Conducted Band Edge:

1. To connect Antenna Port of EUT to Spectrum.
2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance .
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
4. Set start to edge frequency, and stop frequency of spectrum analyzer so as to encompass the spectrum to be examined.
5. Set the spectrum analyzer as RBW=100 kHz, VBW=300 kHz, Detector = Peak, Sweep = auto
6. Mark the highest reading of the emission as the reference level measurement.
7. Set DL as the limit = reading on marker of reference level measurement – 20dBm
8. Mark the highest readings of the emissions outside of 2400MHz~2483.5MHz.
9. Repeat above procedures until all default test channel (low, middle, and high) was complete.
10. MIMO mode: offset is set following “measure and add 10 Log (N)” on spectrum to measure for MIMO mode. Offset = cable loss + 10 log (N), where N is number of transmitting antenna.

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Conducted Spurious Emission:

1. To connect Antenna Port of EUT to Spectrum
2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance .
3. Set RBW = 100 kHz & VBW= 300 kHz, Detector =Peak, Sweep = Auto.
4. Allow trace to fully stabilize.
5. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
6. Repeat above procedures until all default test channel measured were complete.
7. MIMO mode: offset is set following “measure and add 10 Log (N)” on spectrum to measure for MIMO mode. Offset = cable loss + 10 log (N), where N is number of transmitting antenna.

Note:

For test of MIMO mode, the highest emission of worst case employing Measure and add 10 log (N) technical is reported on this report after the comparison between Main Antenna at single transmitting mode and Aux that yields the higher value. The MIMO transmitting mode produces higher value of outcome.

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10.4 Measurement Result

802.11b Ch0

Reference Level of Limit			Reference Level of Limit		
Freq. (MHz)	PSD (dBm)	Reference Level of Limit (dBm)	Freq. (MHz)	PSD (dBm)	Reference Level of Limit (dBm)
2412	4.61	-15.39	2412	3.869	-16.13
2437	3.80	-16.20	2437	2.913	-17.09
2462	3.882	-16.12	2462	3.254	-16.75

802.11b Ch1

802.11g Ch0

Reference Level of Limit 802.11g mode			Reference Level of Limit 802.11g mode		
Freq. (MHz)	PSD (dBm)	Reference Level of Limit (dBm)	Freq. (MHz)	PSD (dBm)	Reference Level of Limit (dBm)
2412	0.96	-19.04	2412	1.11	-18.89
2437	1.43	-18.57	2437	1.032	-18.97
2462	1.57	-18.43	2462	0.89	-19.11

802.11g Ch1

802.11nHT_20M Ch0

Reference Level of Limit 802.11n20 MODE			Reference Level of Limit 802.11ac20 MODE		
Freq. (MHz)	PSD (dBm)	Reference Level of Limit (dBm)	Freq. (MHz)	PSD (dBm)	Reference Level of Limit (dBm)
2412	0.84	-19.16	2412	0.700	-19.30
2437	1.32	-18.68	2437	1.499	-18.50
2462	1.43	-18.57	2462	0.82	-19.18

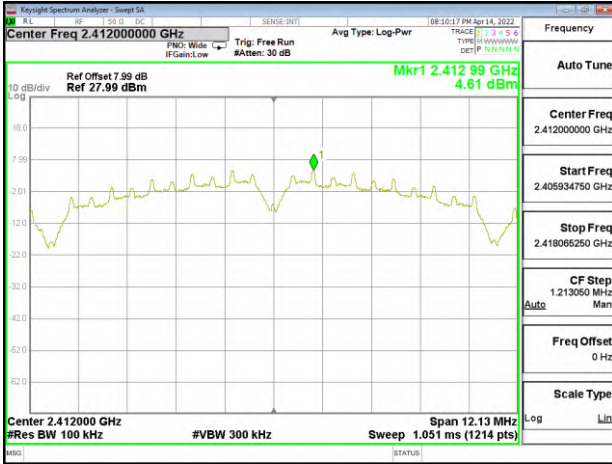
802.11nHT_20M Ch1

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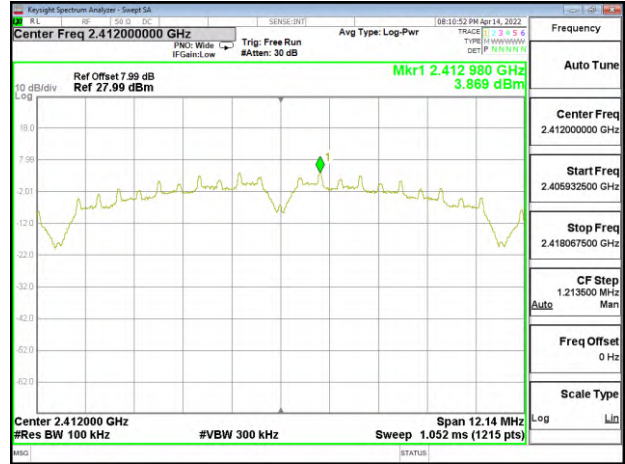
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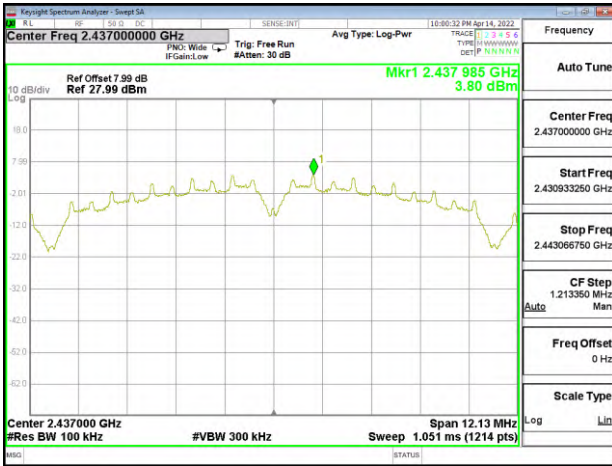
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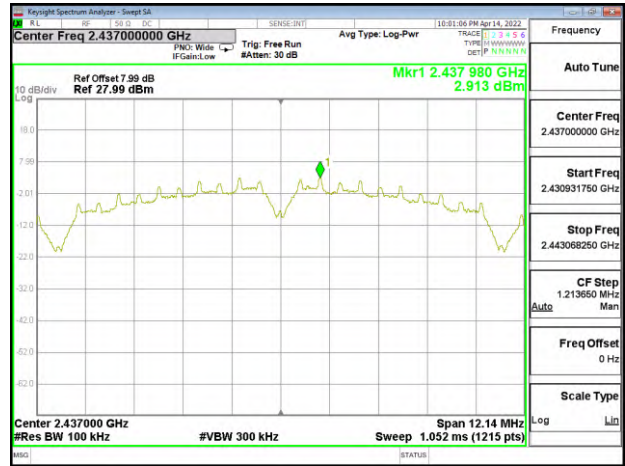
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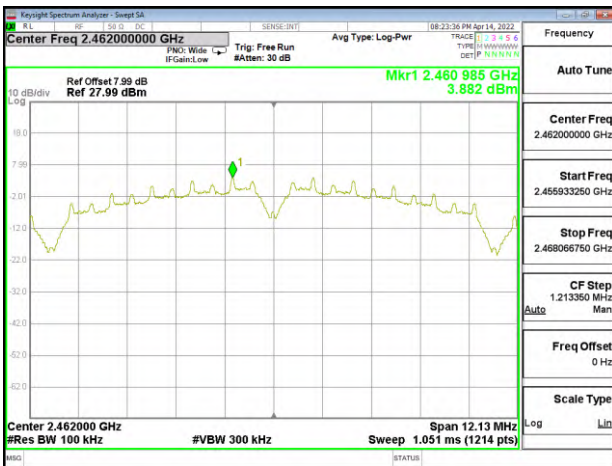
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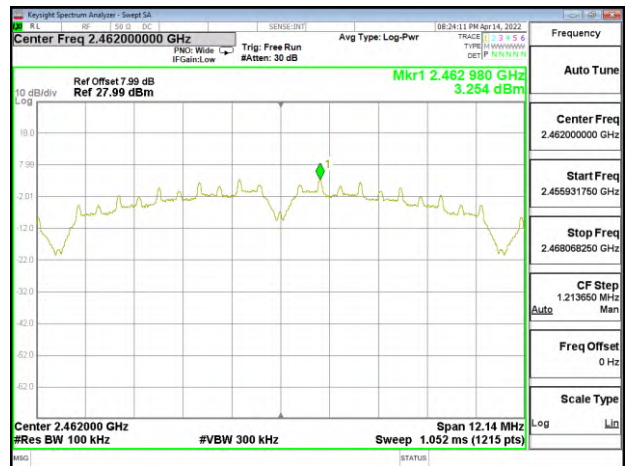
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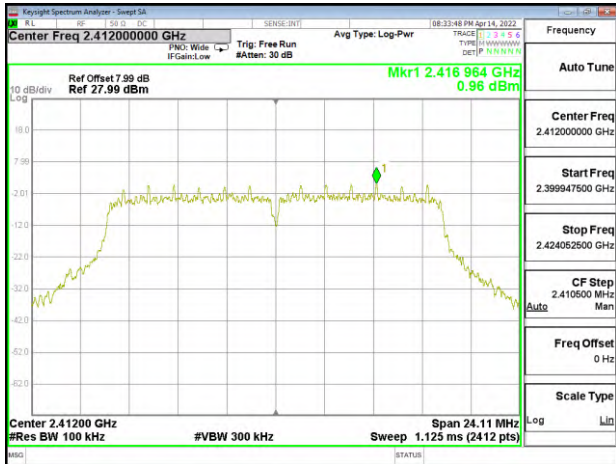


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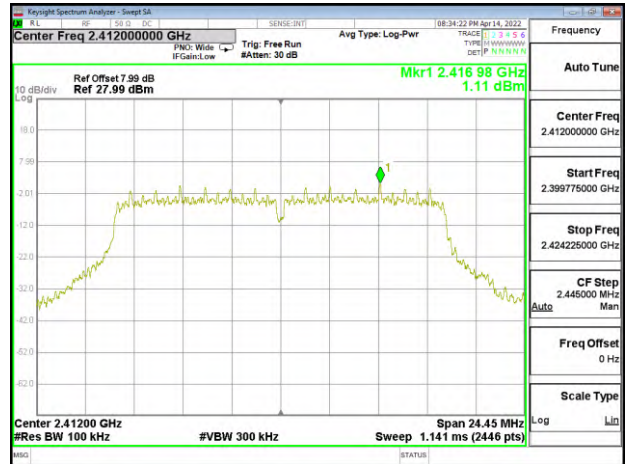
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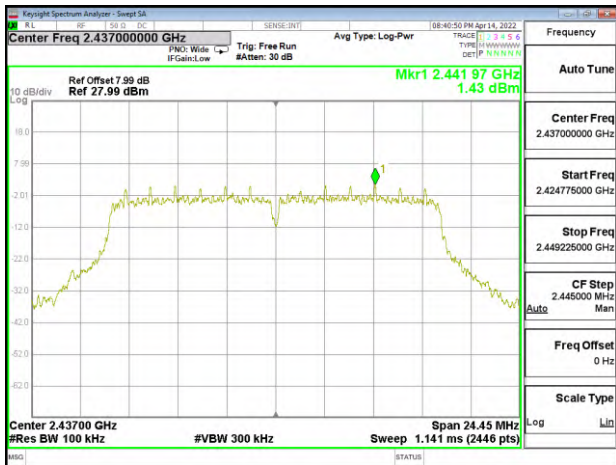
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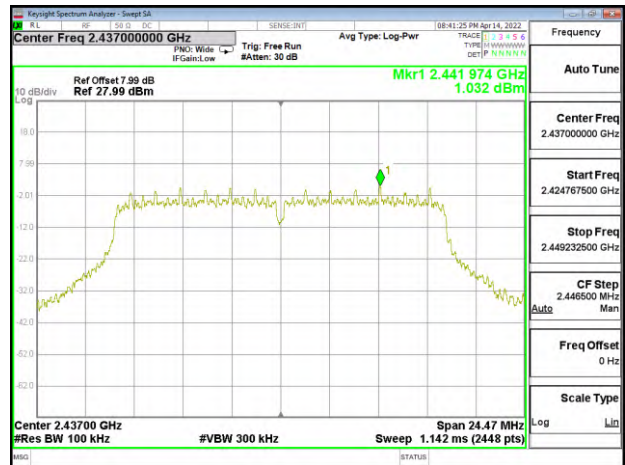
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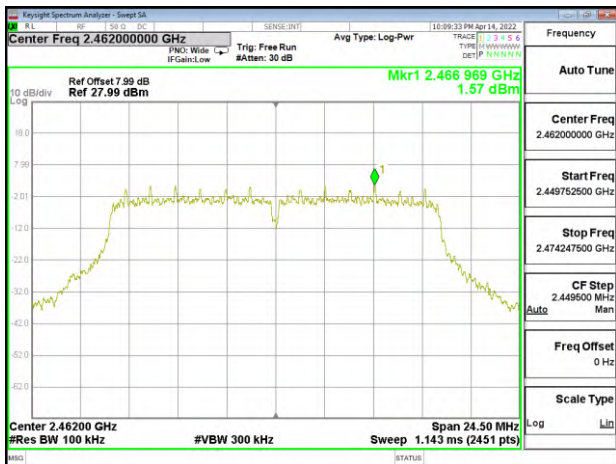
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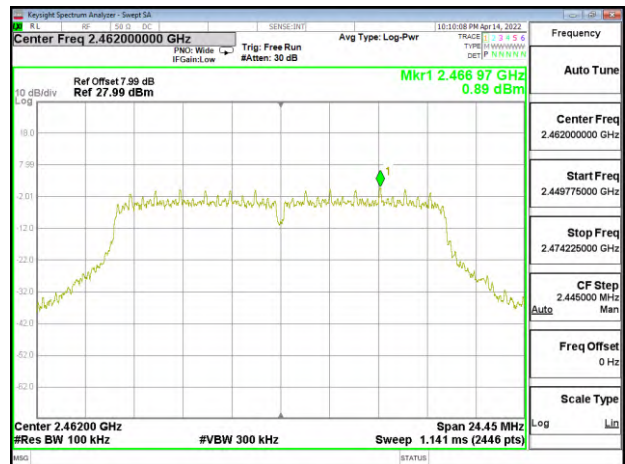
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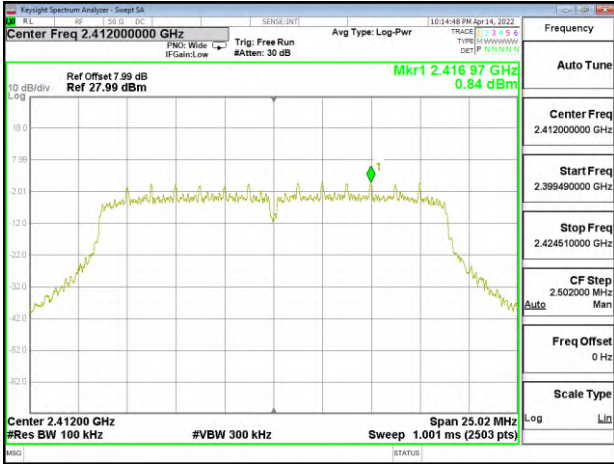


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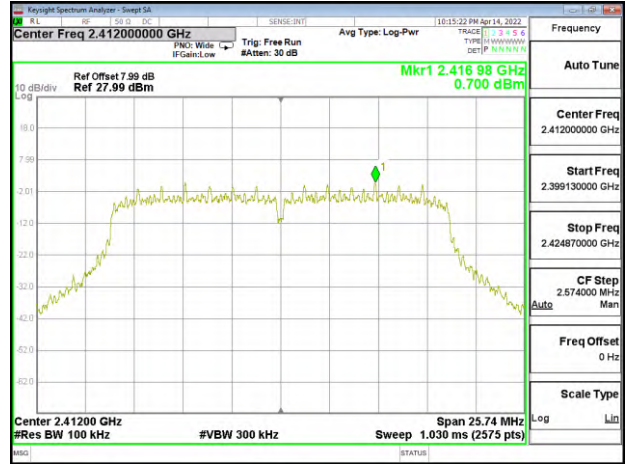
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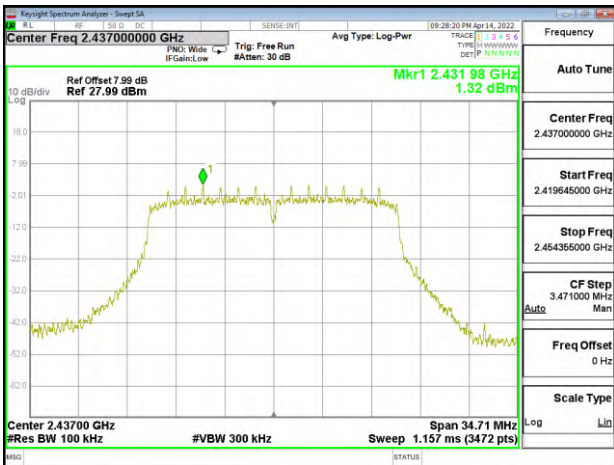
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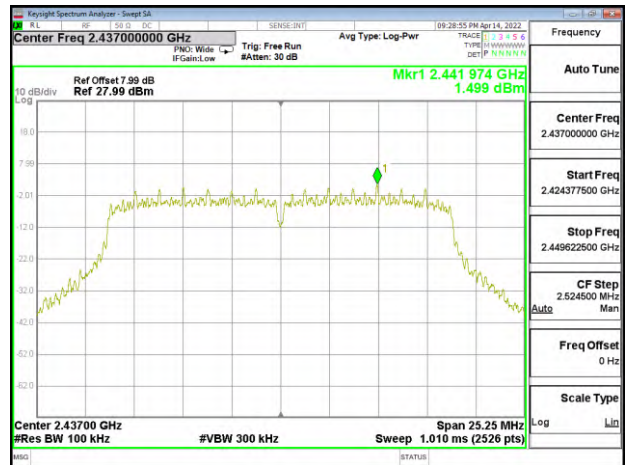
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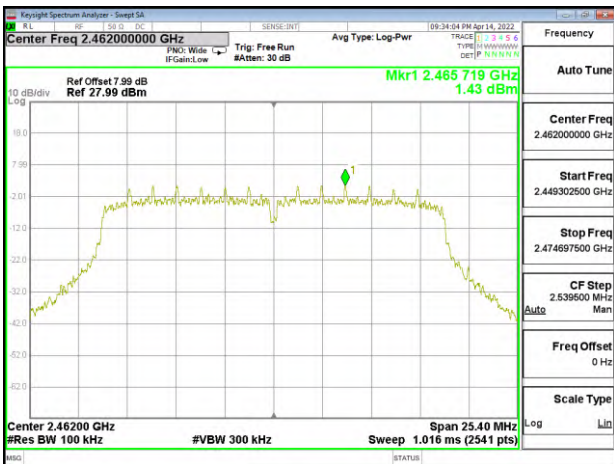
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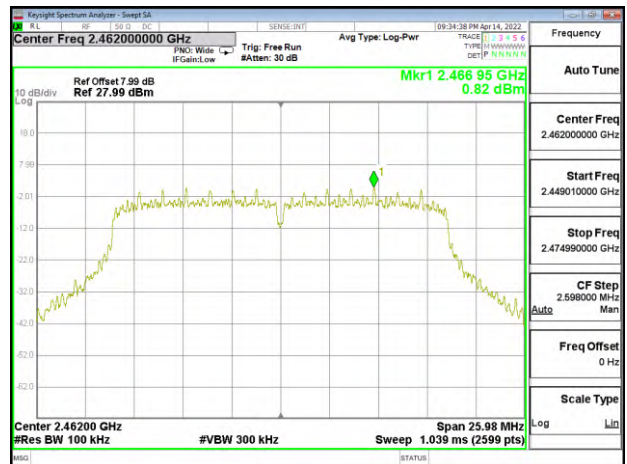
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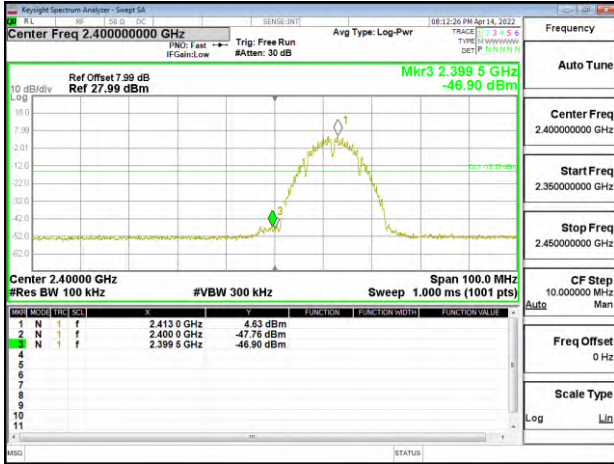


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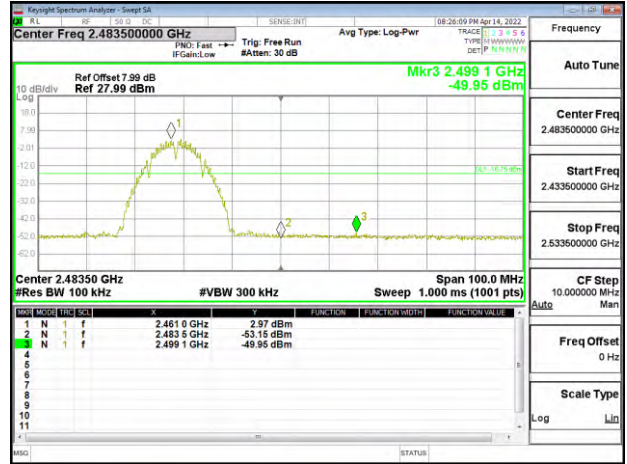
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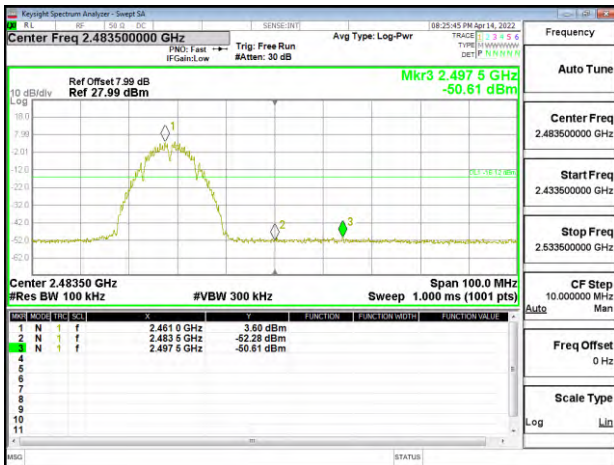
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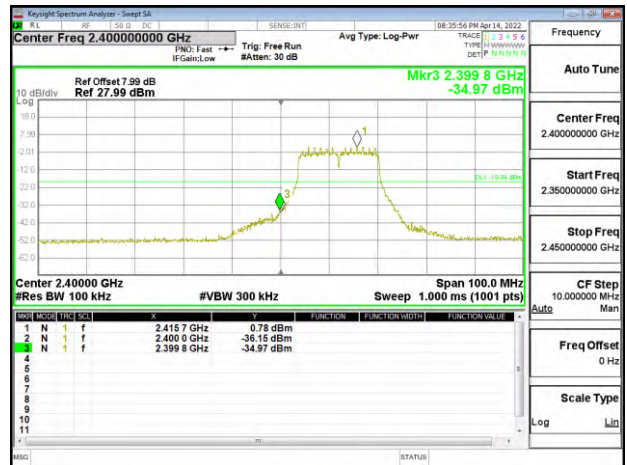
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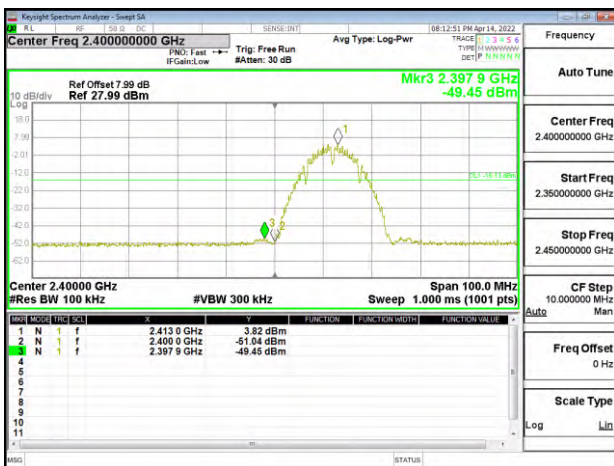
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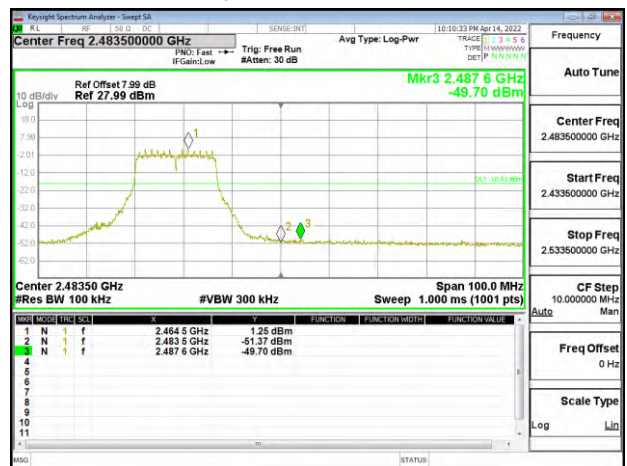
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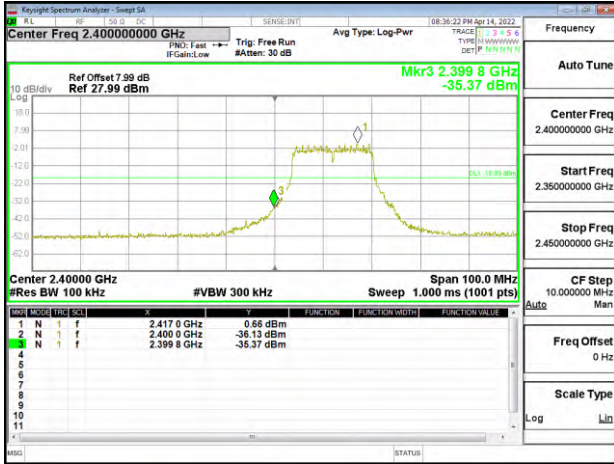


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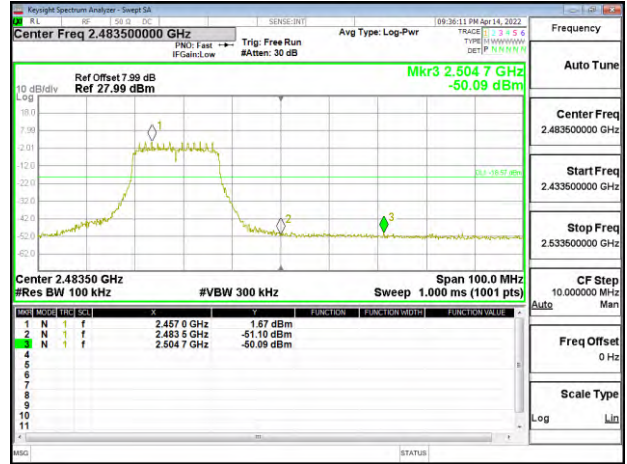
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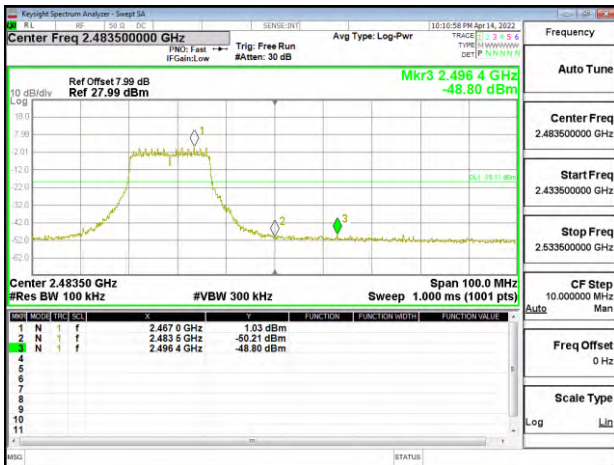
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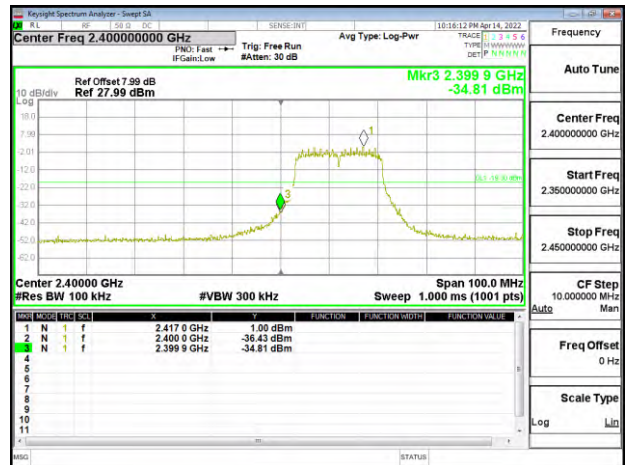
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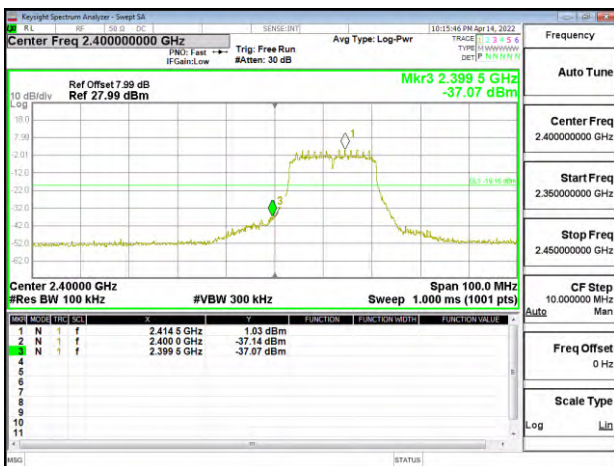
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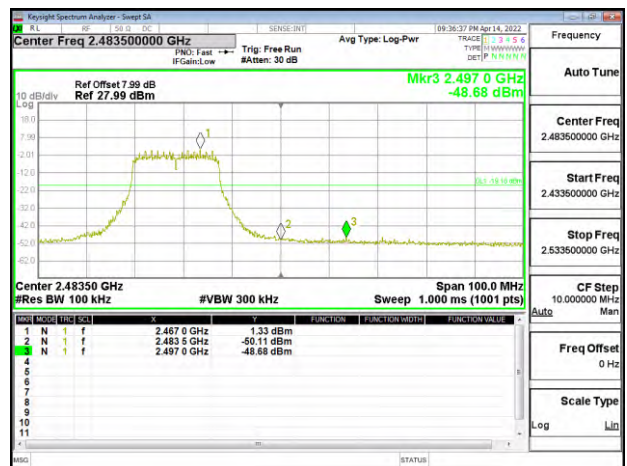
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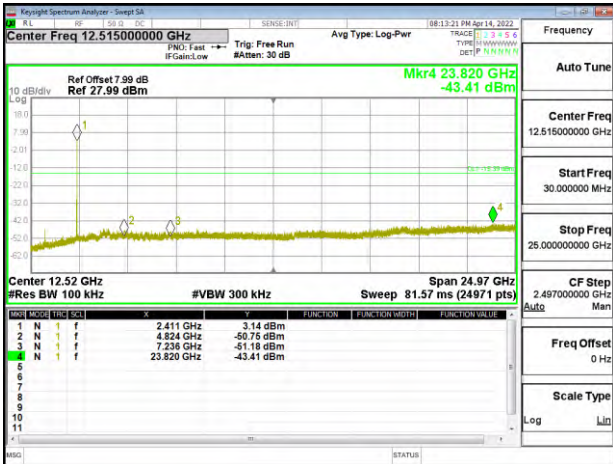


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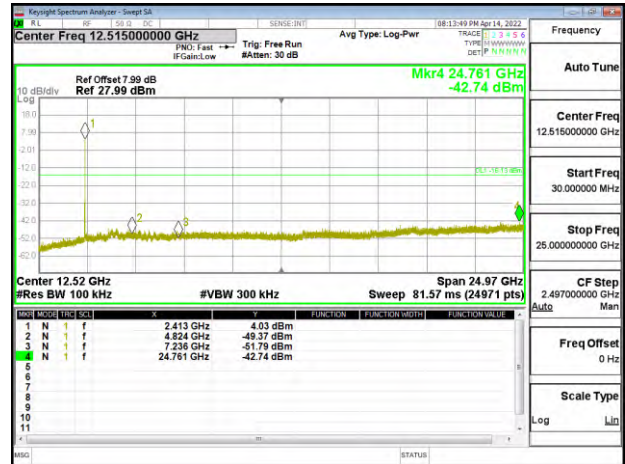
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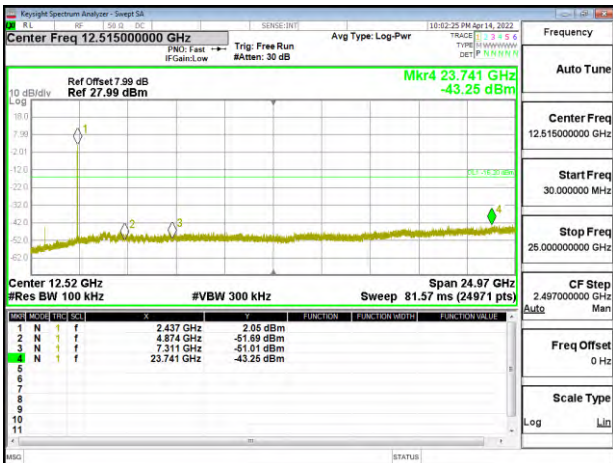
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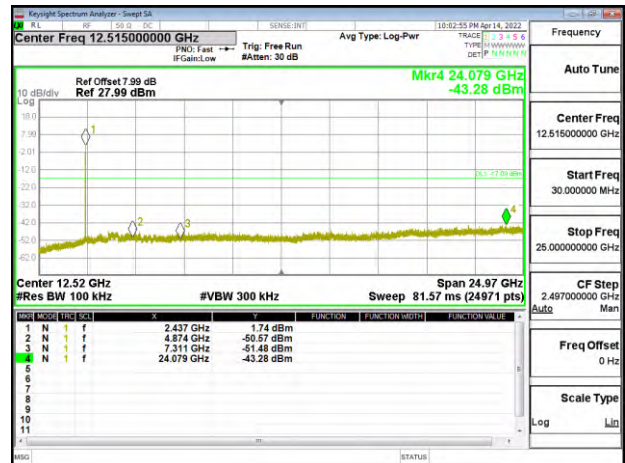
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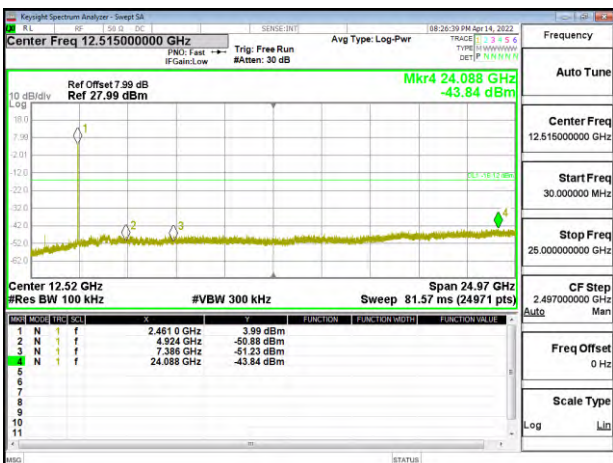
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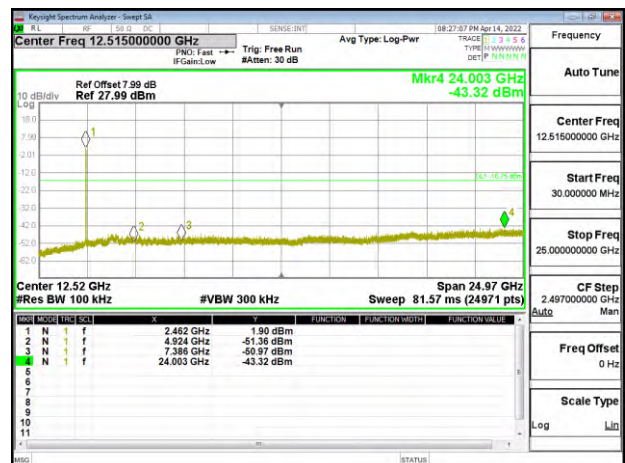
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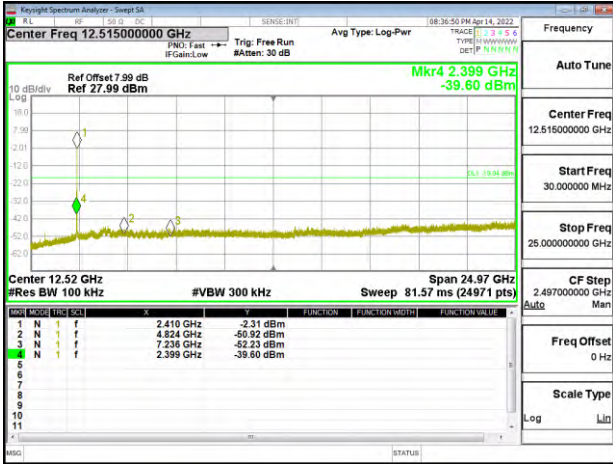


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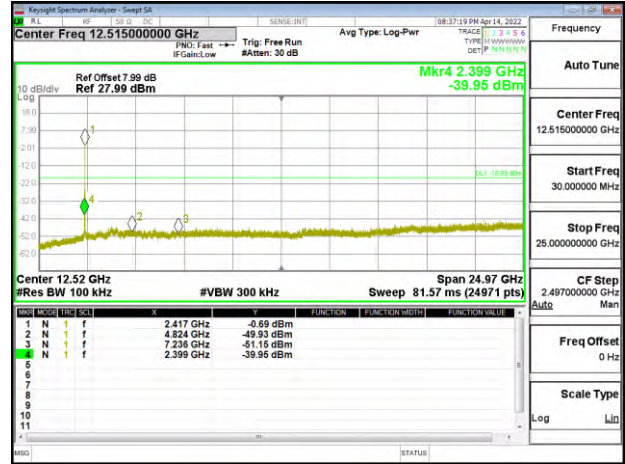


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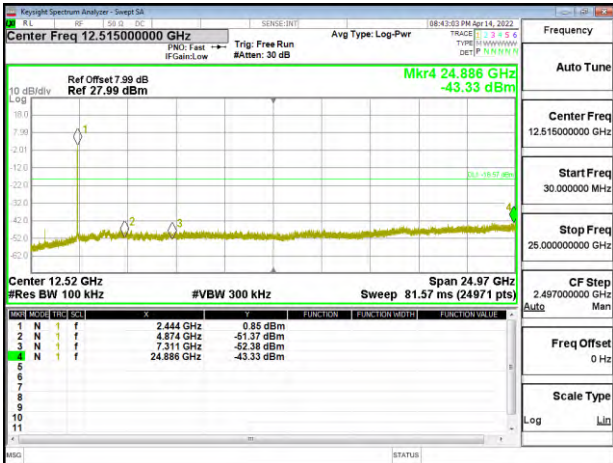
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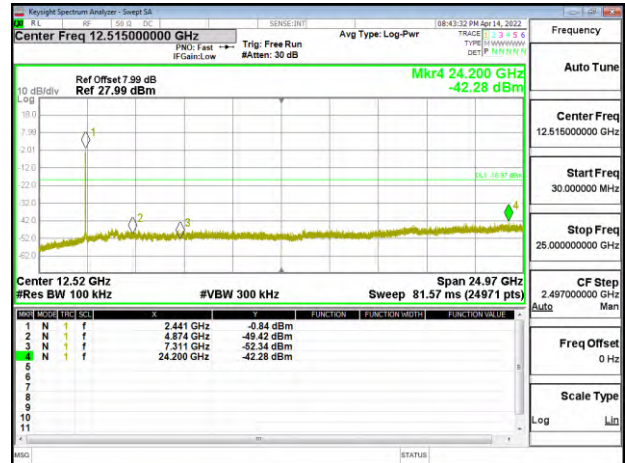
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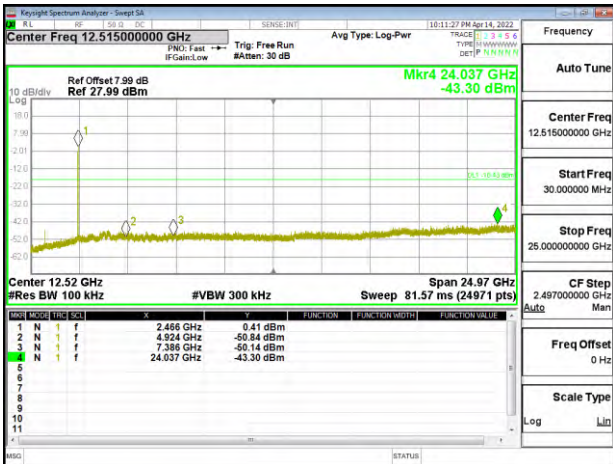
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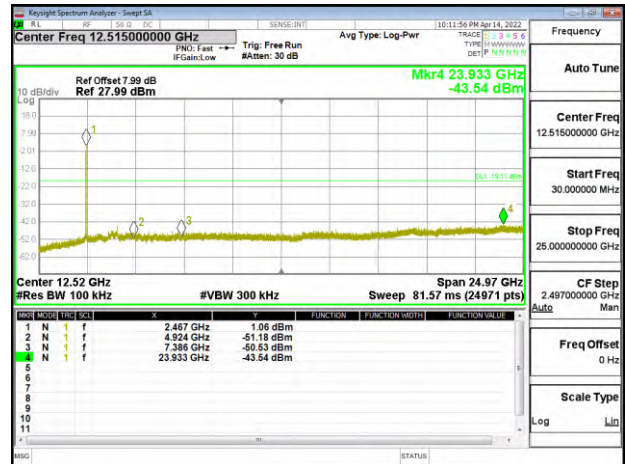
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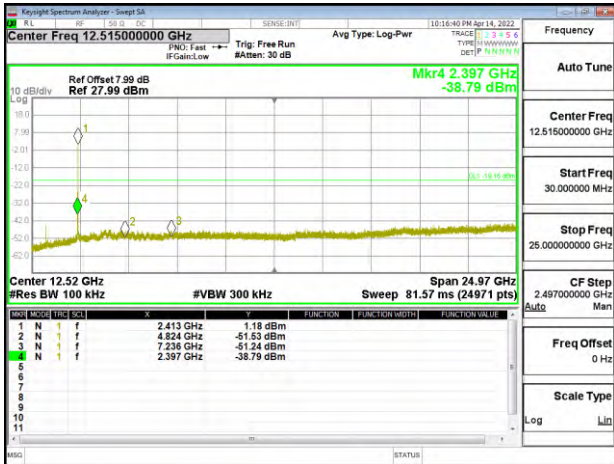


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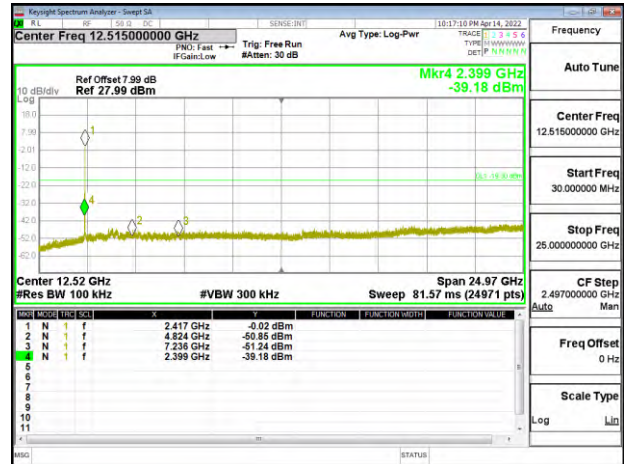
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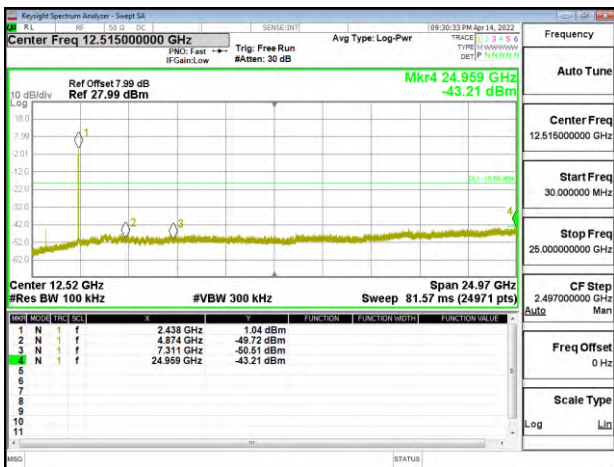
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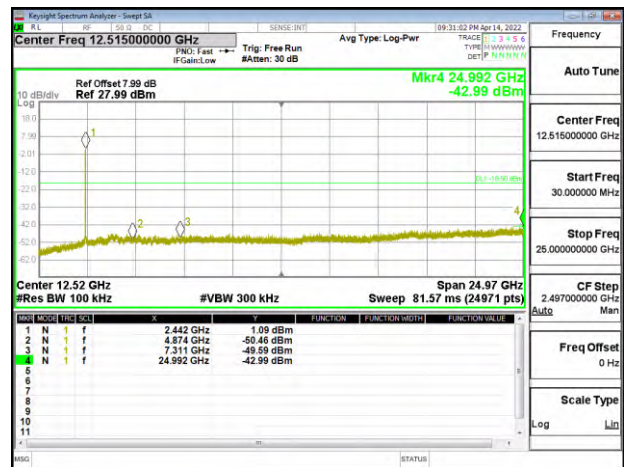
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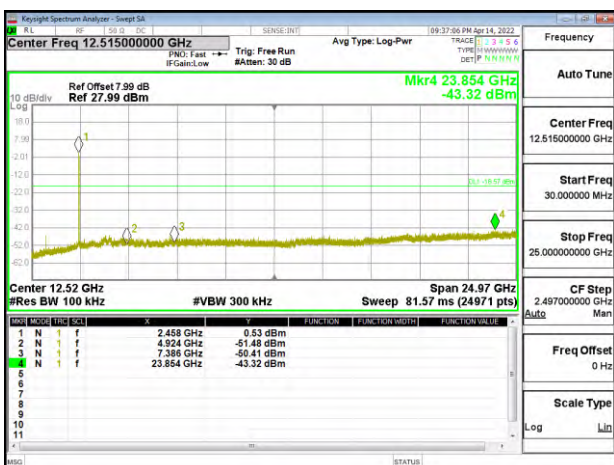
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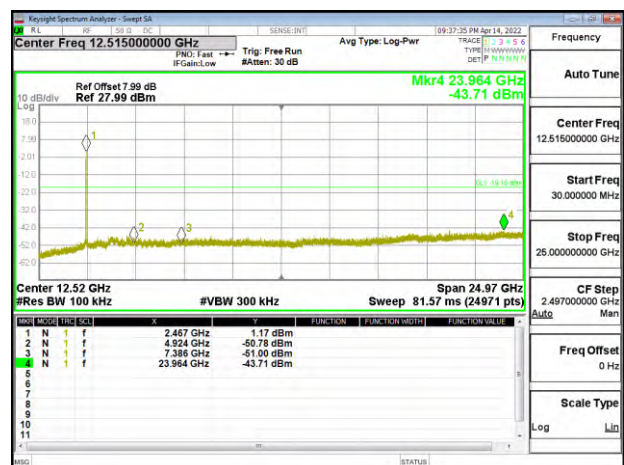
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11 RADIATED BANDEDGE AND SPURIOUS EMISSION MEASUREMENT

11.1 Standard Applicable

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. In addition, radiated emissions which fall in the restricted bands must also comply with the §15.209 and RSS-Gen §8.9 Table 5 and 6 limit as below.

And according to §15.33(a) (1) & RSS-Gen §6.13.2.a, for an intentional radiator operates below 10GHz, the frequency range of measurements: to the tenth harmonic of the highest fundamental frequency or to 40GHz, whichever is lower.

Frequency (MHz)	Field strength (microvolts/meter)	Distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Note:

1. The lower limit shall apply at the transition frequencies.

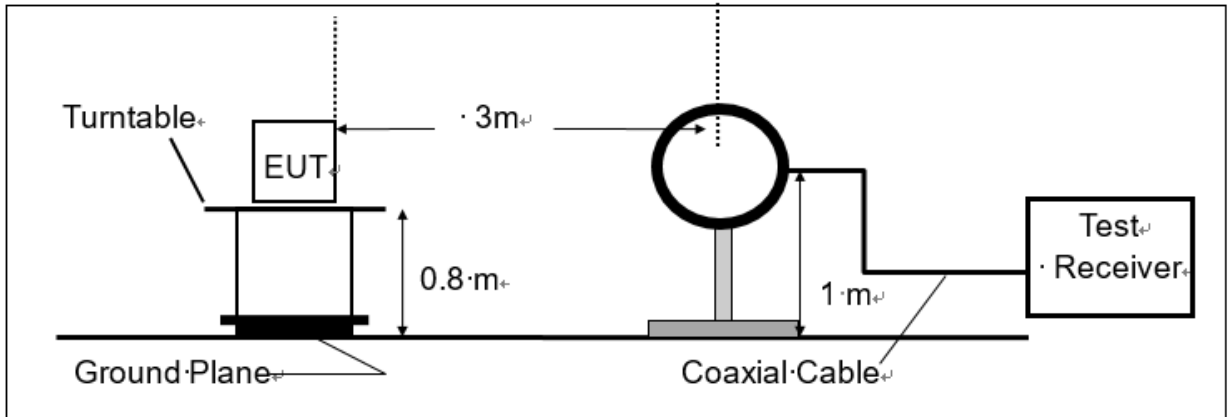
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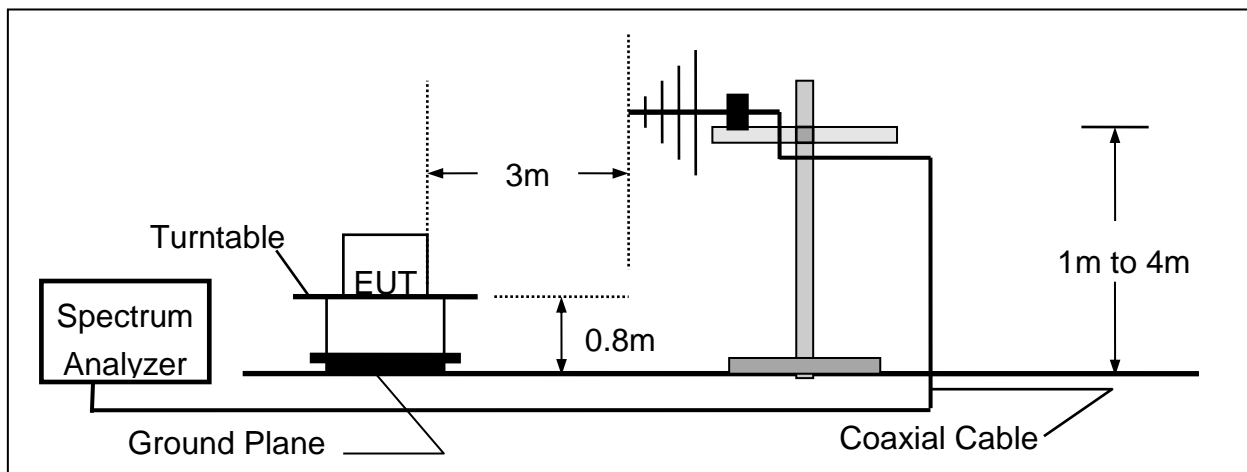
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11.2 Test Setup

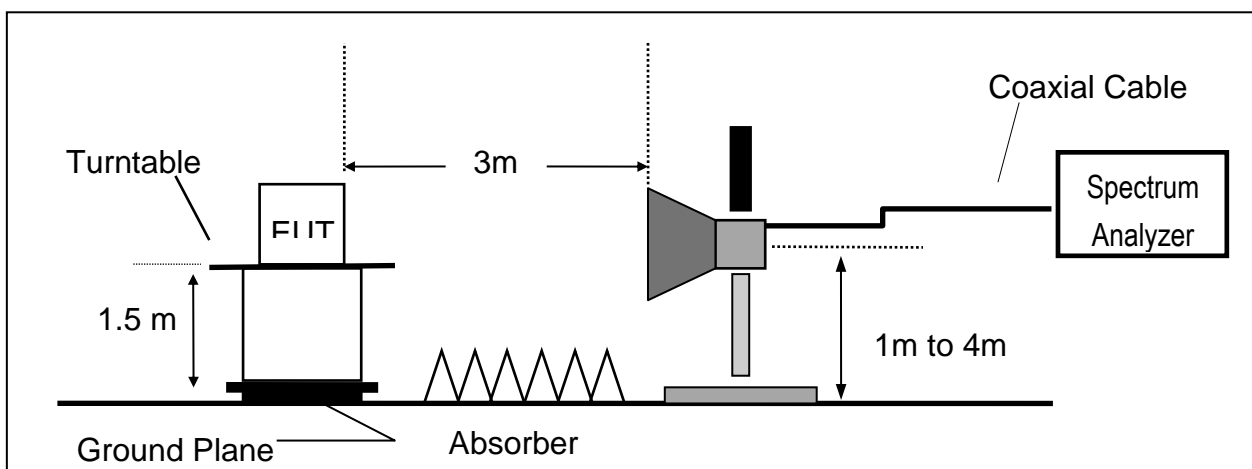
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz.



(B) Radiated Emission Test Set-Up, Frequency From 30MHz to 1000MHz



(C) Radiated Emission Test Set-Up, Frequency Above 1GHz



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11.3 Measurement Procedure

1. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance .
2. The EUT was placed on a turn table with 0.8m for frequency< 1GHz and 1.5m for frequency> 1GHz above ground plane.
3. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
4. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
5. Set the spectrum analyzer as RBW=100 kHz and VBW=300 kHz for Peak Detector (PK) at frequency between 30MHz and 1 GHz.
6. Use receiver mode as RBW=120 kHz for Quasi-peak (QP) at frequency between 30MHz and 1 GHz.
7. Set the spectrum analyzer as RBW=1 MHz, VBW=3 MHz for Maximum Emission Measurements at frequency above 1 GHz.
8. Set the spectrum analyzer as RBW=1 MHz, VBW=10 Hz (Duty cycle > 98%) or VBW ≥ 1/T (Duty cycle < 98%) for Average Emission Measurements at frequency above 1 GHz.
9. When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna.
10. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
11. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
12. Repeat above procedures until all default test channel measured were complete.

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11.4 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where *FS = Field Strength*

CL = Cable Attenuation Factor (Cable Loss)

RA = Reading Amplitude

AG = Amplifier Gain

AF = Antenna Factor

The limit of the emission level is expressed in dBuV/m, which converts $20 \cdot \log(uV/m)$

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

11.5 Test Results of Radiated Spurious Emissions from 9 kHz to 30 MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit per 15.31(o) & RSS-GEN §6.13.2 was not reported.

11.6 Measurement Result

Note:

1. *Refer to next page spectrum analyzer data chart and tabular data sheets.*
2. *Measurements are completed at peak and average level, the mark of average is the highest emission in restricted bands*

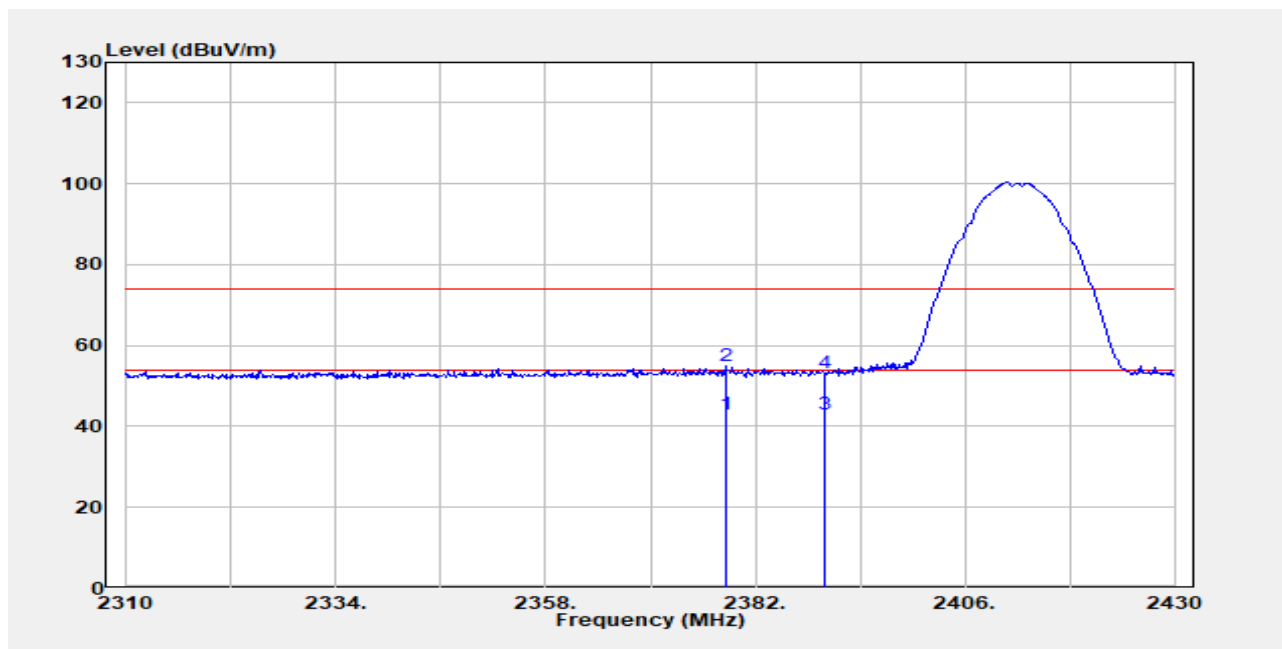
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11.6.1 Radiated Band Edge Measurement Result

Report Number	:ER/2022/20001	Test Site	:SAC 1
Operation Mode	:802.11b	Test Date	:2022-04-13
Test Frequency	:2412 MHz	Temp./Humi.	:25.3/67
Test Mode	:Bandedge CH Low	Antenna Pol.	:Vertical
EUT Pol	:E1 Plane	Engineer	:GN Lin



Freq. MHz	Detector Mode	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
2378.64	Average	42.35	0.58	42.93	54.00	-11.07
2378.64	Peak	54.21	0.58	54.79	74.00	-19.21
2390.00	Average	42.40	0.60	43.00	54.00	-11.00
2390.00	Peak	52.45	0.60	53.05	74.00	-20.95

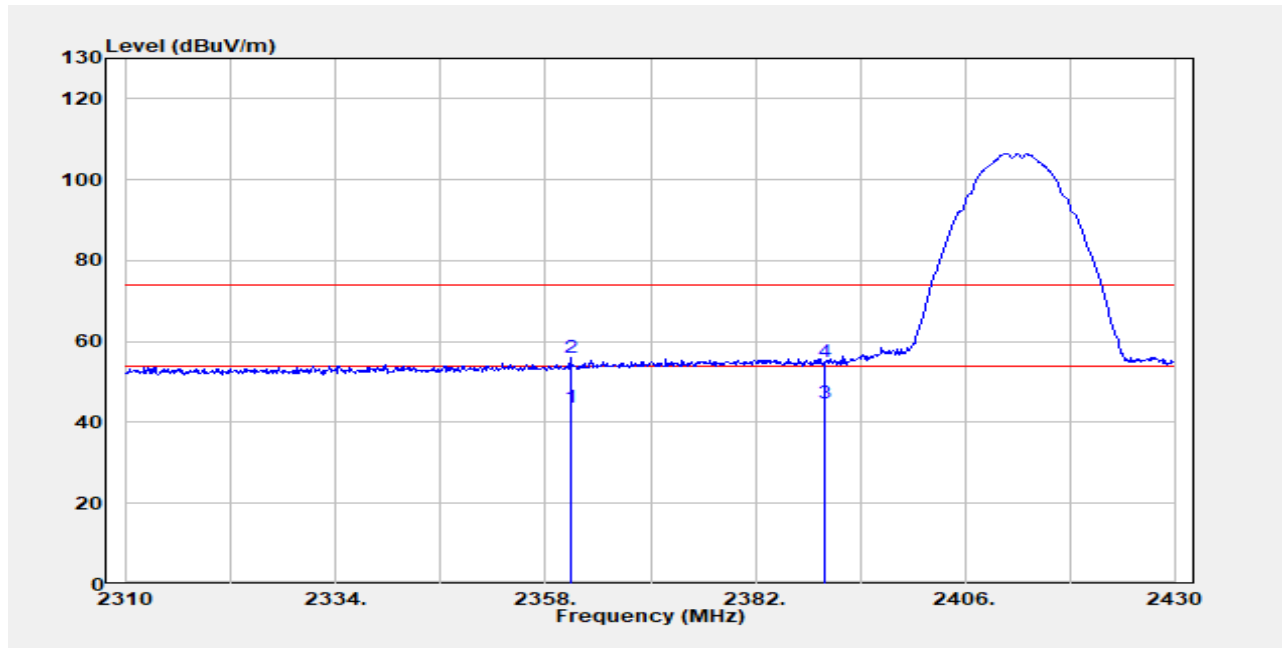
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Report Number :ER/2022/20001
 Operation Mode :802.11b
 Test Frequency :2412 MHz
 Test Mode :Bandedge CH Low
 EUT Pol :E1 Plane

Test Site :SAC 1
 Test Date :2022-04-13
 Temp./Humi. :25.3/67
 Antenna Pol. :Horizontal
 Engineer :GN Lin



Freq. MHz	Detector Mode	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
2360.88	Average	42.96	0.55	43.51	54.00	-10.49
2360.88	Peak	55.48	0.55	56.03	74.00	-17.97
2390.00	Average	44.10	0.60	44.70	54.00	-9.30
2390.00	Peak	54.51	0.60	55.11	74.00	-18.89

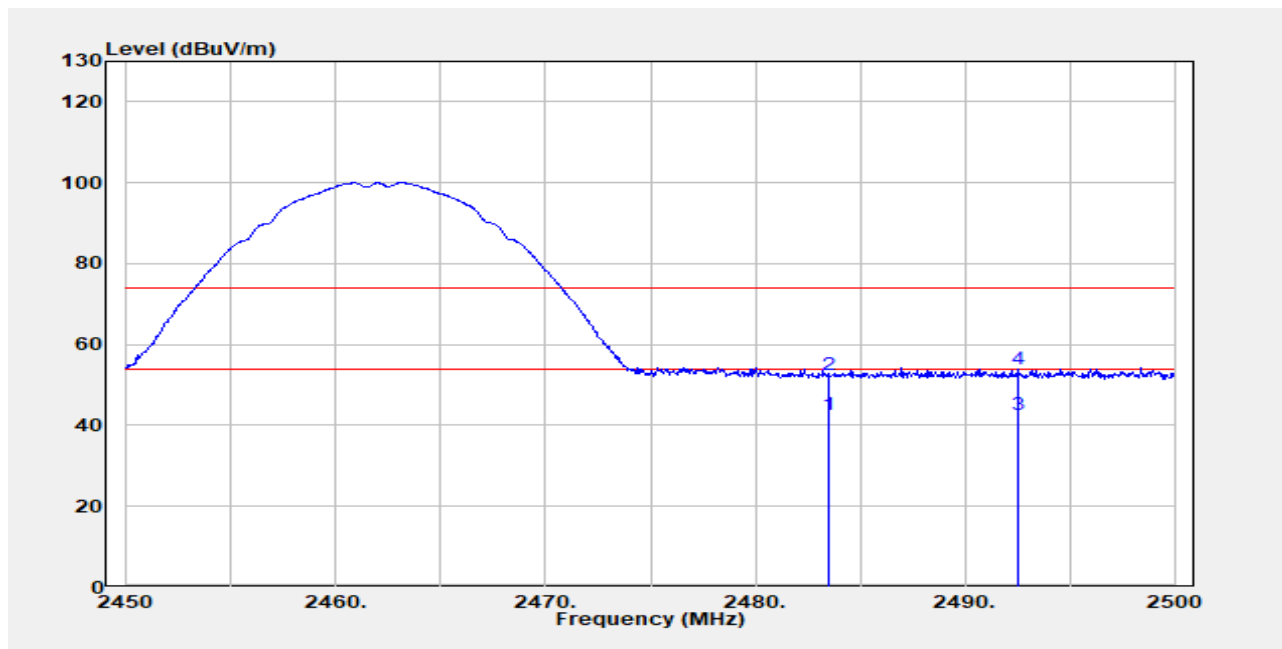
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Report Number :ER/2022/20001
 Operation Mode :802.11b
 Test Frequency :2462 MHz
 Test Mode :Bandedge CH High
 EUT Pol :E1 Plane

Test Site :SAC 1
 Test Date :2022-04-13
 Temp./Humi. :25.3/67
 Antenna Pol. :Vertical
 Engineer :GN Lin



Freq. MHz	Detector Mode	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
2483.50	Average	42.22	0.43	42.65	54.00	-11.35
2483.50	Peak	52.14	0.43	52.56	74.00	-21.44
2492.50	Average	42.24	0.48	42.72	54.00	-11.28
2492.50	Peak	53.55	0.48	54.03	74.00	-19.97

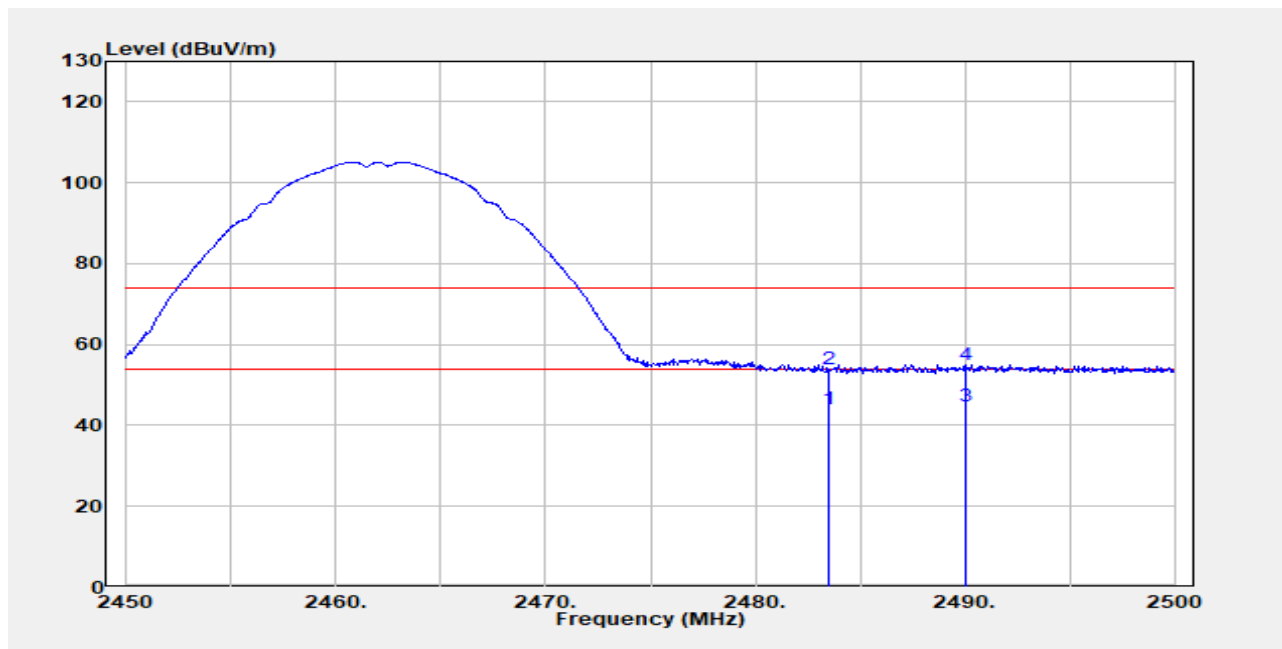
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Report Number :ER/2022/20001
 Operation Mode :802.11b
 Test Frequency :2462 MHz
 Test Mode :Bandedge CH High
 EUT Pol :E1 Plane

Test Site :SAC 1
 Test Date :2022-04-13
 Temp./Humi. :25.3/67
 Antenna Pol. :Horizontal
 Engineer :GN Lin



Freq. MHz	Detector Mode	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
2483.50	Average	43.52	0.43	43.95	54.00	-10.05
2483.50	Peak	53.39	0.43	53.82	74.00	-20.18
2490.00	Average	44.24	0.46	44.70	54.00	-9.30
2490.00	Peak	54.55	0.46	55.01	74.00	-18.99

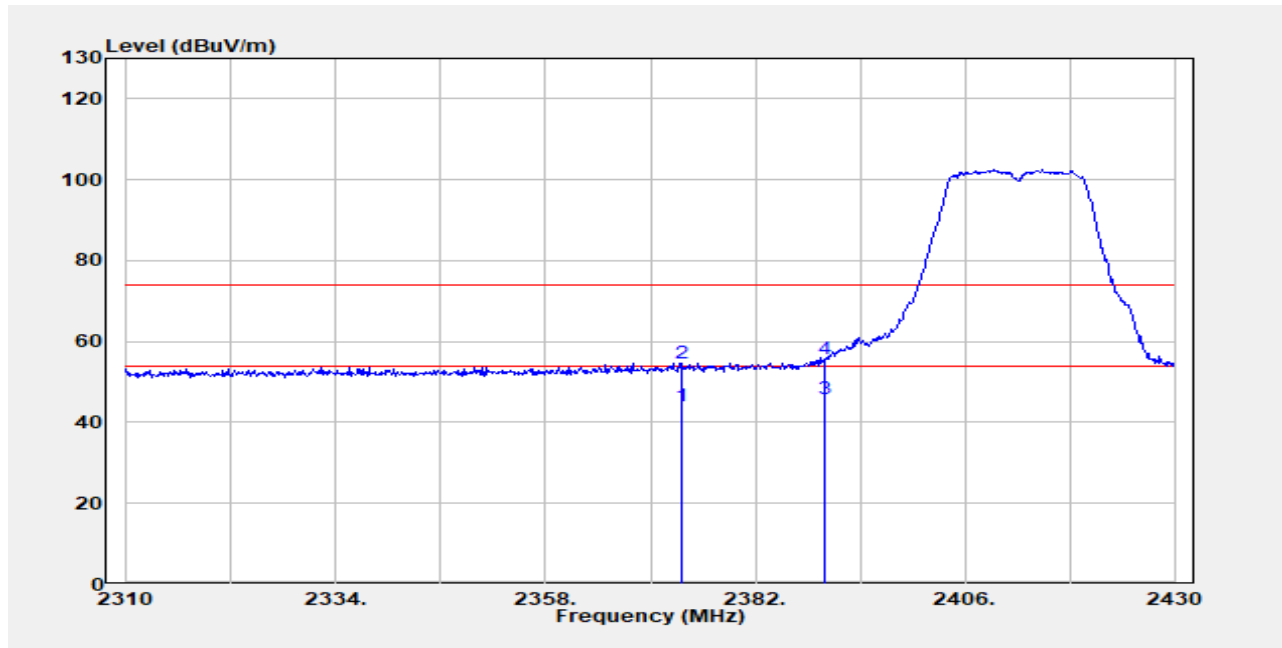
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Report Number :ER/2022/20001
 Operation Mode :802.11g
 Test Frequency :2412 MHz
 Test Mode :Bandedge CH Low
 EUT Pol :E1 Plane

Test Site :SAC 1
 Test Date :2022-04-13
 Temp./Humi. :25.3/67
 Antenna Pol. :Vertical
 Engineer :GN Lin



Freq. MHz	Detector Mode	Spectrum Reading Level d μ V	Factor dB	Actual FS d μ V/m	Limit @3m d μ V/m	Margin dB
2373.48	Average	43.35	0.57	43.92	54.00	-10.08
2373.48	Peak	54.12	0.57	54.69	74.00	-19.31
2390.00	Average	45.24	0.60	45.84	54.00	-8.16
2390.00	Peak	55.22	0.60	55.82	74.00	-18.18

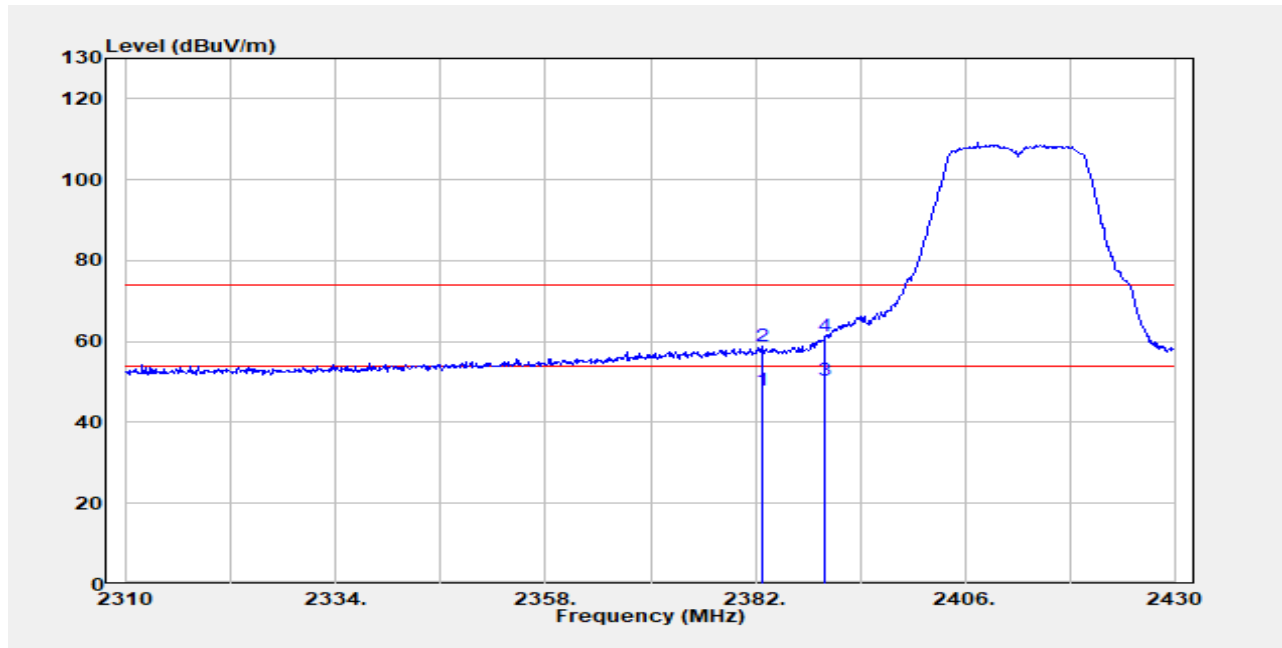
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Report Number :ER/2022/20001
 Operation Mode :802.11g
 Test Frequency :2412 MHz
 Test Mode :Bandedge CH Low
 EUT Pol :E1 Plane

Test Site :SAC 1
 Test Date :2022-04-13
 Temp./Humi. :25.3/67
 Antenna Pol. :Horizontal
 Engineer :GN Lin



Freq. MHz	Detector Mode	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
2382.72	Average	47.26	0.59	47.85	54.00	-6.15
2382.72	Peak	58.40	0.59	58.99	74.00	-15.01
2390.00	Average	49.75	0.60	50.35	54.00	-3.65
2390.00	Peak	60.77	0.60	61.37	74.00	-12.63

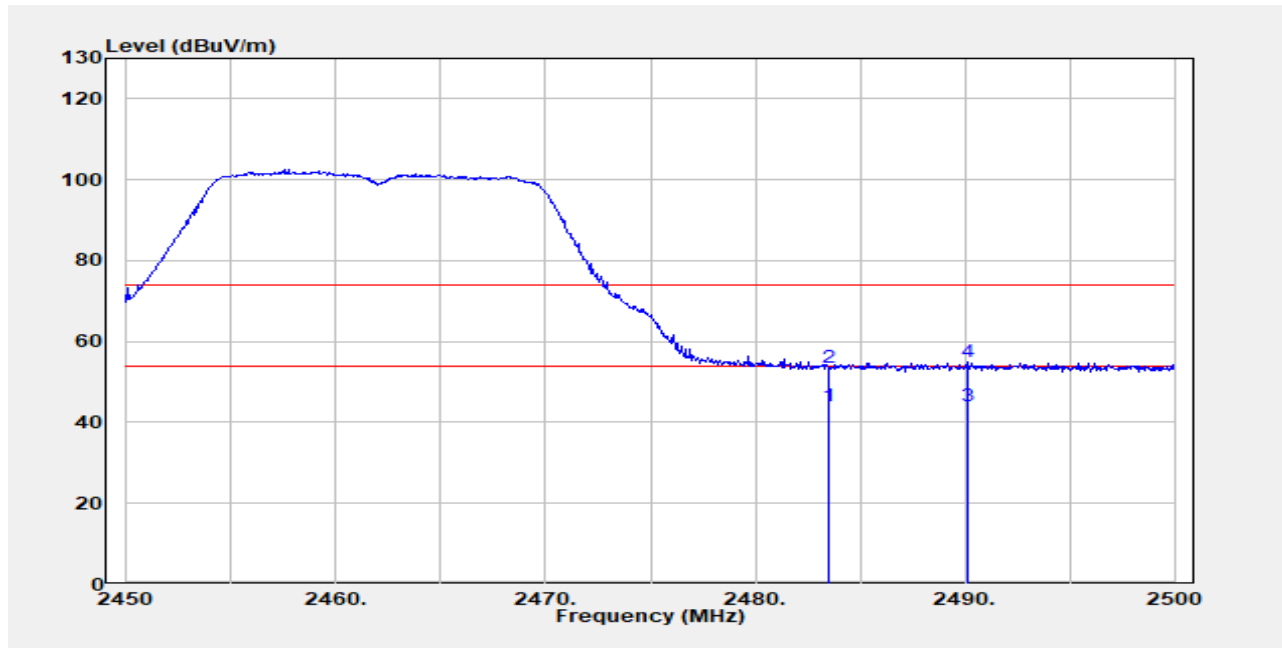
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 Test Frequency :2462 MHz
 Test Mode :Bandedge CH High
 EUT Pol :E1 Plane

Test Site :SAC 1
 Test Date :2022-04-13
 Temp./Humi. :25.3/67
 Antenna Pol. :Vertical
 Engineer :GN Lin



Freq. MHz	Detector Mode	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
2483.50	Average	43.68	0.43	44.11	54.00	-9.89
2483.50	Peak	53.11	0.43	53.54	74.00	-20.46
2490.10	Average	43.52	0.46	43.98	54.00	-10.02
2490.10	Peak	54.62	0.46	55.08	74.00	-18.92

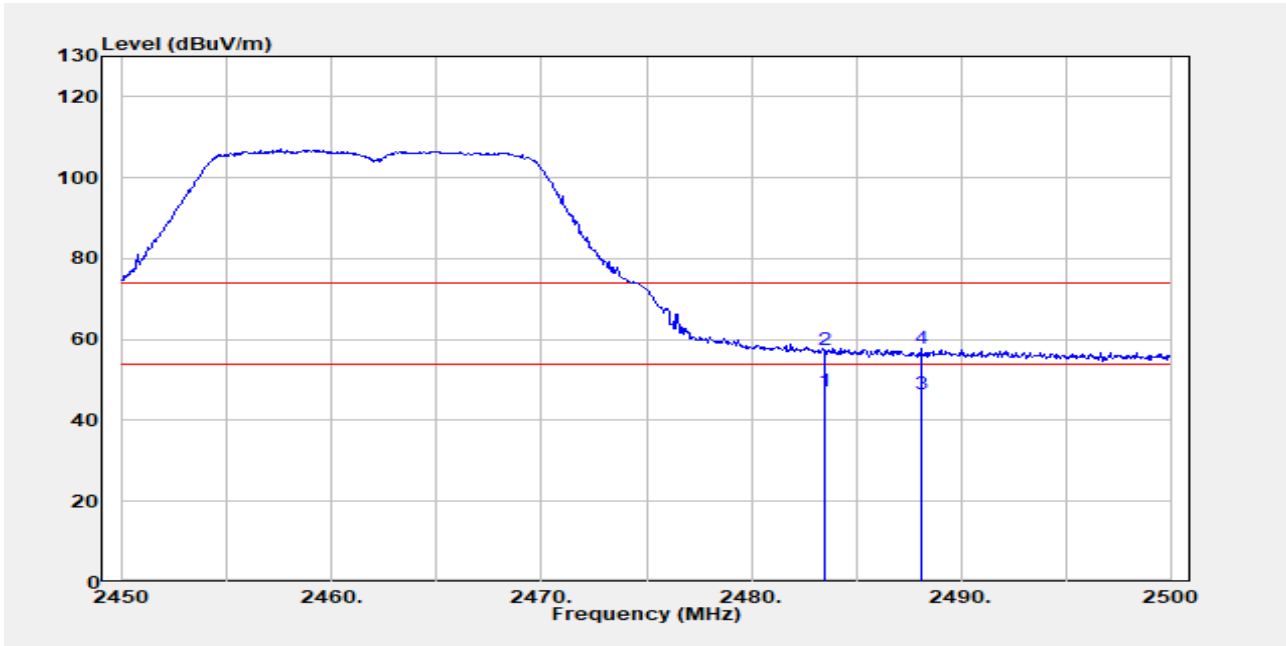
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Report Number :ER/2022/20001
 Operation Mode :802.11g
 Test Frequency :2462 MHz
 Test Mode :Bandedge CH High
 EUT Pol :E1 Plane

Test Site :SAC 1
 Test Date :2022-04-13
 Temp./Humi. :25.3/67
 Antenna Pol. :Horizontal
 Engineer :GN Lin



Freq. MHz	Detector Mode	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
2483.50	Average	46.74	0.43	47.17	54.00	-6.83
2483.50	Peak	56.91	0.43	57.34	74.00	-16.66
2488.10	Average	46.09	0.45	46.54	54.00	-7.46
2488.10	Peak	57.22	0.45	57.67	74.00	-16.33

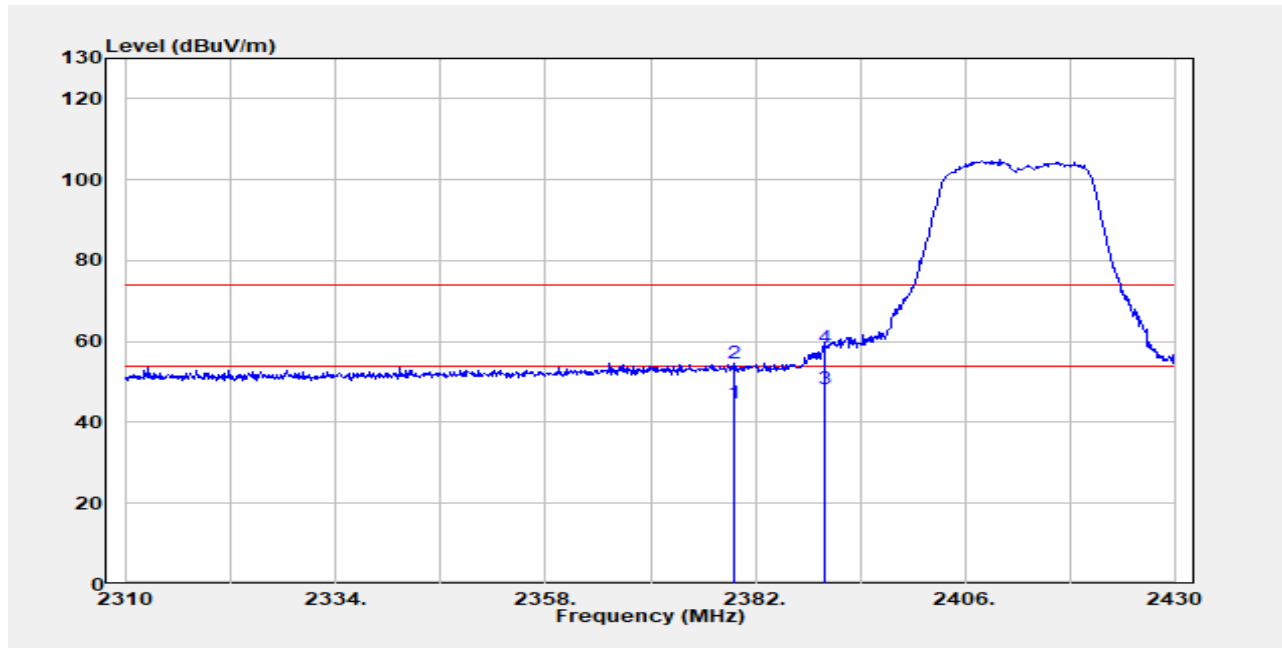
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Report Number :ER/2022/20001
 Operation Mode :802.11n20
 Test Frequency :2412 MHz
 Test Mode :Bandedge CH Low
 EUT Pol :E1 Plane

Test Site :SAC 1
 Test Date :2022-04-13
 Temp./Humi. :25.3/67
 Antenna Pol. :Vertical
 Engineer :GN Lin



Freq. MHz	Detector Mode	Spectrum Reading Level d μ V	Factor dB	Actual FS d μ V/m	Limit @3m d μ V/m	Margin dB
2379.48	Average	44.20	0.58	44.78	54.00	-9.22
2379.48	Peak	54.06	0.58	54.64	74.00	-19.36
2390.00	Average	47.77	0.60	48.37	54.00	-5.63
2390.00	Peak	57.82	0.60	58.42	74.00	-15.58

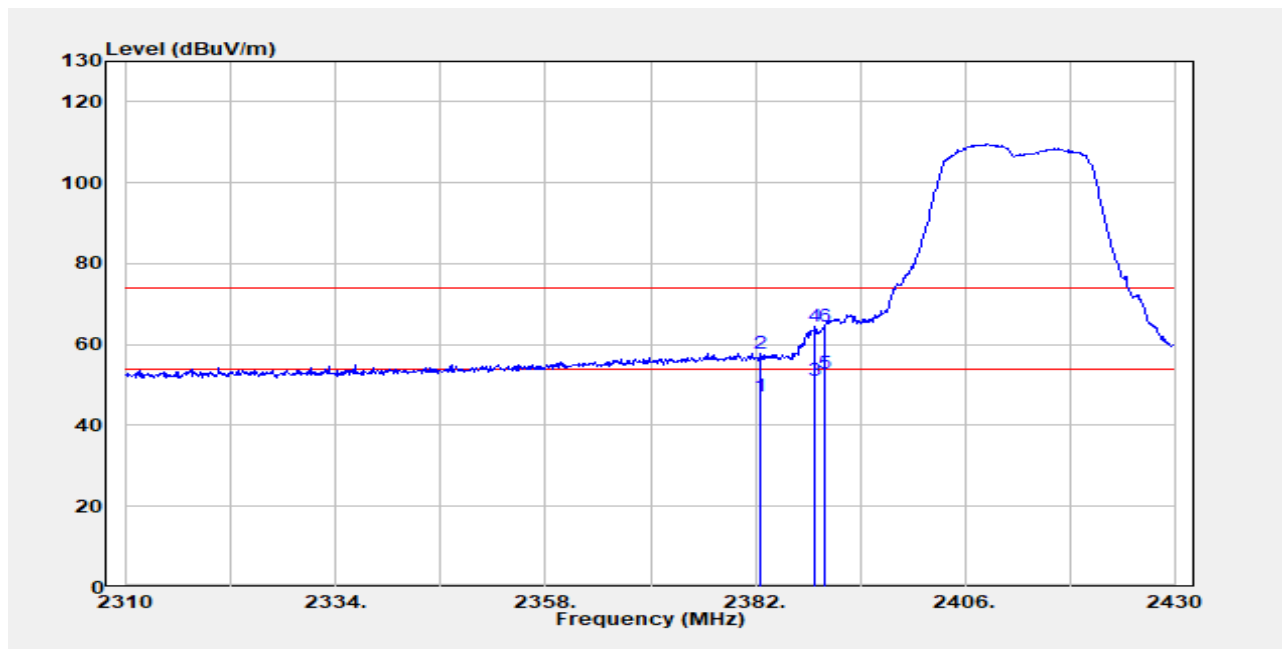
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Report Number :ER/2022/20001
 Operation Mode :802.11n20
 Test Frequency :2412 MHz
 Test Mode :Bandedge CH Low
 EUT Pol :E1 Plane

Test Site :SAC 1
 Test Date :2022-04-13
 Temp./Humi. :25.3/67
 Antenna Pol. :Horizontal
 Engineer :GN Lin



Freq. MHz	Detector Mode	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
2382.60	Average	46.72	0.59	47.31	54.00	-6.69
2382.60	Peak	57.19	0.59	57.78	74.00	-16.22
2388.84	Average	50.46	0.60	51.06	54.00	-2.94
2388.84	Peak	63.86	0.60	64.45	74.00	-9.55
2390.00	Average	52.32	0.60	52.92	54.00	-1.08
2390.00	Peak	63.80	0.60	64.40	74.00	-9.60

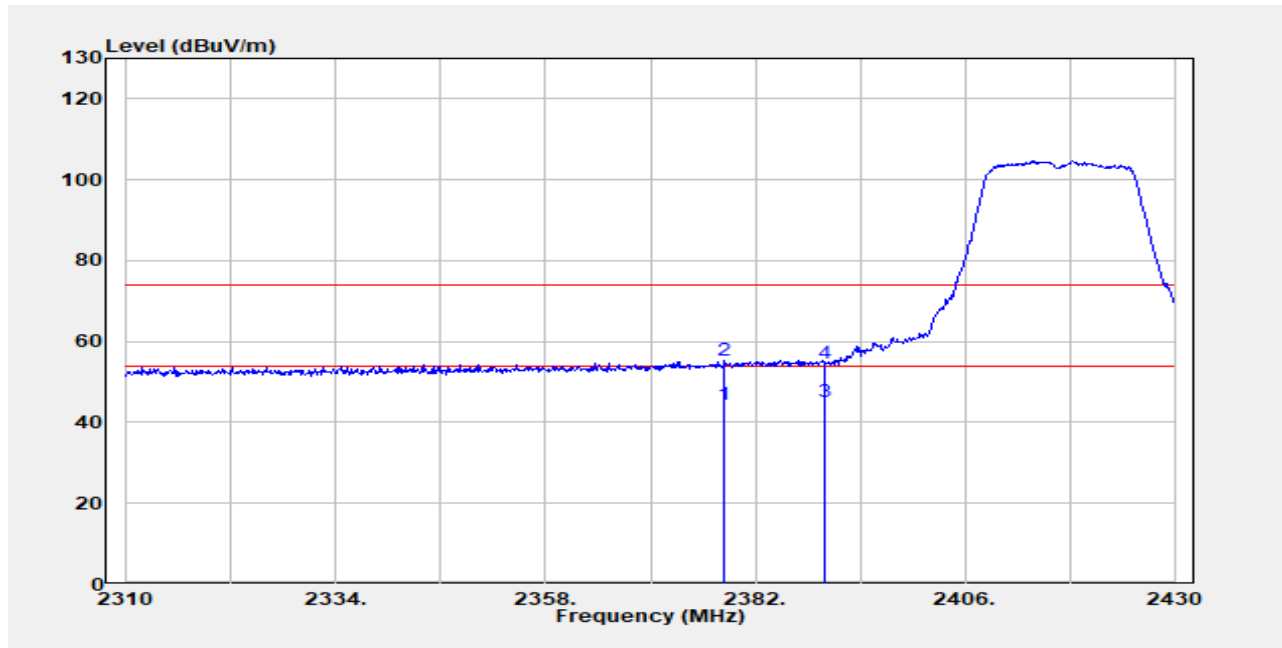
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Report Number :ER/2022/20001
 Operation Mode :802.11n20
 Test Frequency :2417 MHz
 Test Mode :Bandedge CH Low
 EUT Pol :E1 Plane

Test Site :SAC 1
 Test Date :2022-04-13
 Temp./Humi. :25.3/67
 Antenna Pol. :Vertical
 Engineer :GN Lin



Freq. MHz	Detector Mode	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
2378.52	Average	43.85	0.58	44.43	54.00	-9.57
2378.52	Peak	54.76	0.58	55.34	74.00	-18.66
2390.00	Average	44.48	0.60	45.08	54.00	-8.92
2390.00	Peak	54.13	0.60	54.73	74.00	-19.27

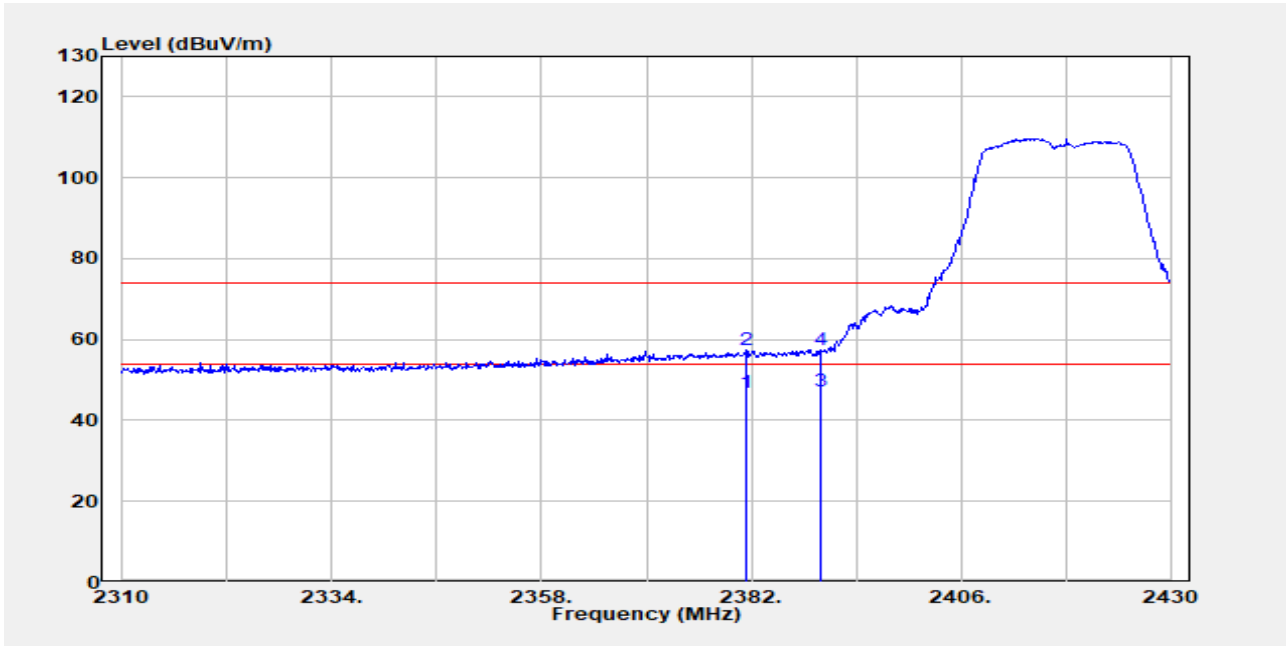
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Report Number :ER/2022/20001
 Operation Mode :802.11n20
 Test Frequency :2417 MHz
 Test Mode :Bandedge CH Low
 EUT Pol :E1 Plane

Test Site :SAC 1
 Test Date :2022-04-13
 Temp./Humi. :25.3/67
 Antenna Pol. :Horizontal
 Engineer :GN Lin



Freq. MHz	Detector Mode	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
2381.52	Average	46.29	0.59	46.88	54.00	-7.12
2381.52	Peak	56.71	0.59	57.29	74.00	-16.71
2390.00	Average	46.74	0.60	47.34	54.00	-6.66
2390.00	Peak	56.84	0.60	57.44	74.00	-16.56

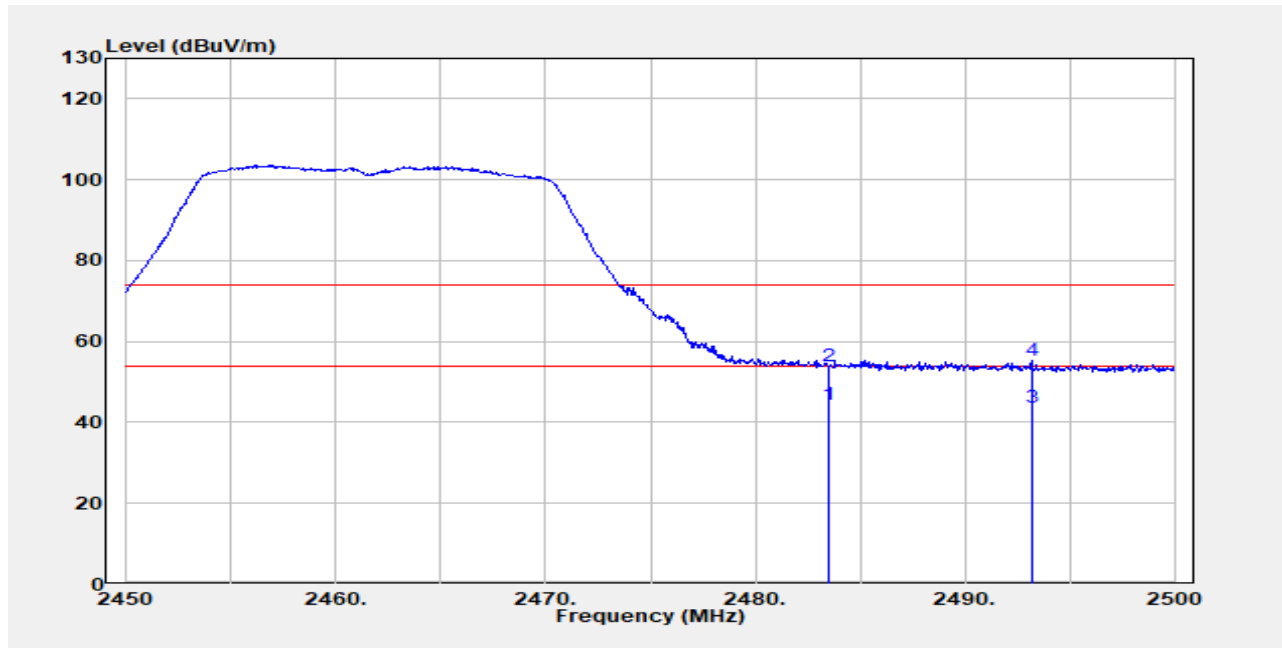
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Report Number :ER/2022/20001
 Operation Mode :802.11n20
 Test Frequency :2462 MHz
 Test Mode :Bandedge CH High
 EUT Pol :E1 Plane

Test Site :SAC 1
 Test Date :2022-04-13
 Temp./Humi. :25.3/67
 Antenna Pol. :Vertical
 Engineer :GN Lin



Freq. MHz	Detector Mode	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
2483.50	Average	44.03	0.43	44.46	54.00	-9.54
2483.50	Peak	53.63	0.43	54.06	74.00	-19.94
2493.20	Average	43.37	0.48	43.85	54.00	-10.15
2493.20	Peak	54.72	0.48	55.21	74.00	-18.79

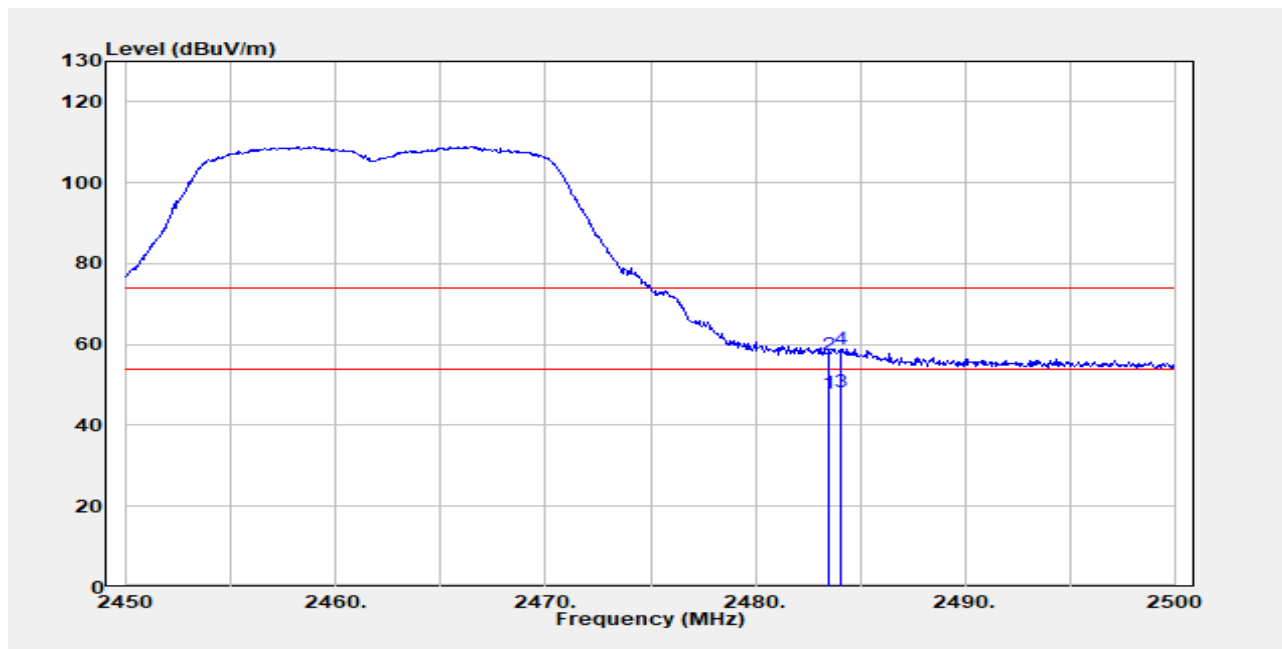
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Report Number :ER/2022/20001
 Operation Mode :802.11n20
 Test Frequency :2462 MHz
 Test Mode :Bandedge CH High
 EUT Pol :E1 Plane

Test Site :SAC 1
 Test Date :2022-04-13
 Temp./Humi. :25.3/67
 Antenna Pol. :Horizontal
 Engineer :GN Lin



Freq. MHz	Detector Mode	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
2483.50	Average	47.63	0.43	48.06	54.00	-5.94
2483.50	Peak	56.95	0.43	57.38	74.00	-16.62
2484.05	Average	47.75	0.43	48.18	54.00	-5.82
2484.05	Peak	58.51	0.43	58.94	74.00	-15.06

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

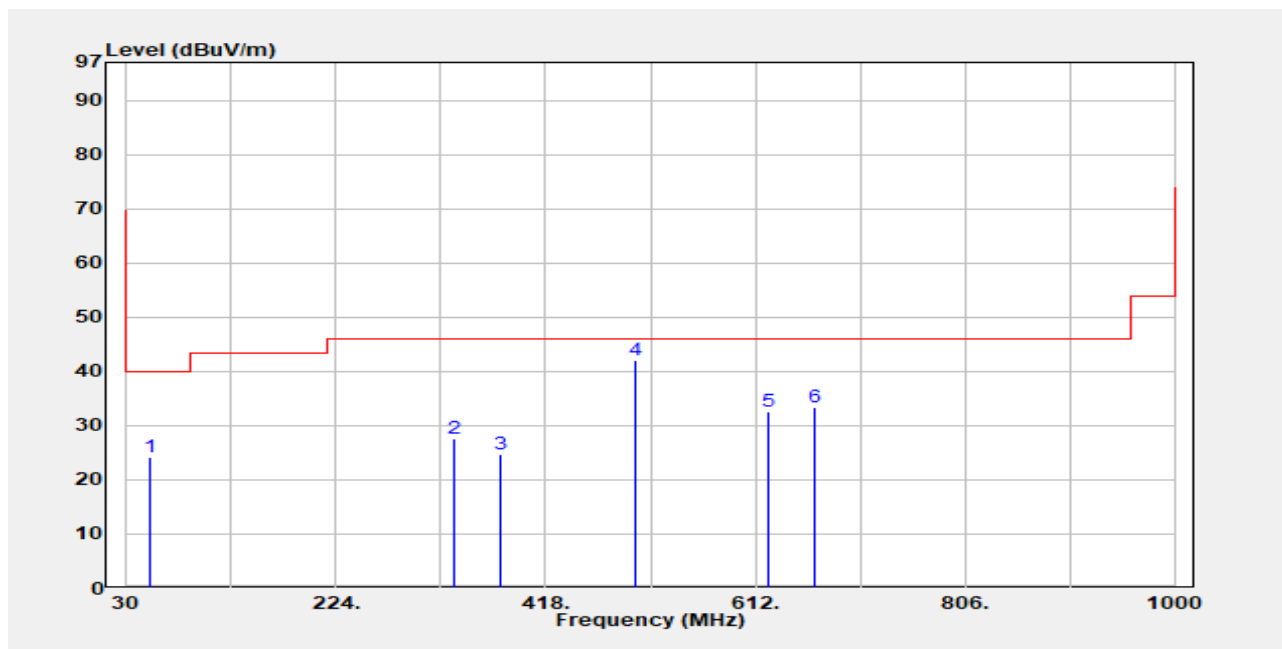
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11.6.2 Spurious Emission:

Report Number :ER/2022/20001
 Operation Mode :802.11g
 Test Frequency :2437 Mhz
 Test Mode :Tx CH Mid
 EUT Pol :E1 Plane

Test Site :SAC 1
 Test Date :2022-04-13
 Temp./Humi. :25.3/67
 Antenna Pol. :VERTICAL
 Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
52.31	Peak	41.02	-16.73	24.29	40.00	-15.71
333.61	Peak	36.13	-8.54	27.60	46.00	-18.40
375.32	Peak	32.72	-7.97	24.75	46.00	-21.25
500.45	Peak	47.99	-5.86	42.13	46.00	-3.87
624.61	Peak	36.12	-3.54	32.57	46.00	-13.43
666.32	Peak	36.78	-3.35	33.43	46.00	-12.57

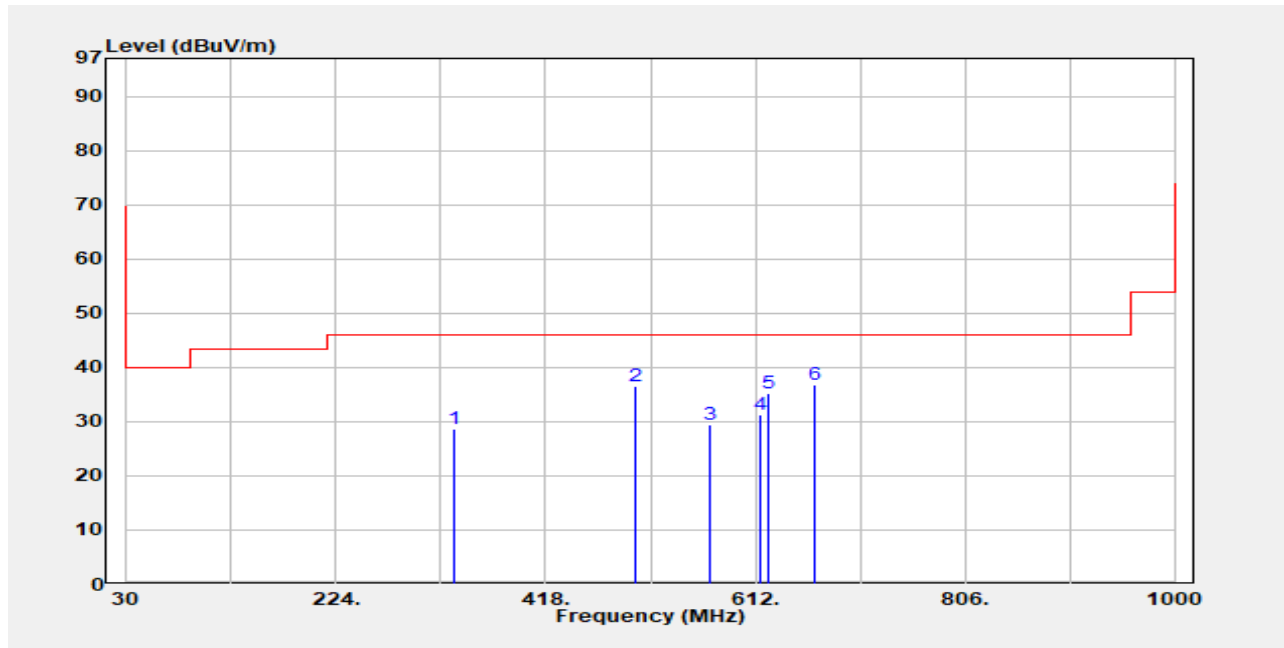
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Report Number :ER/2022/20001
 Operation Mode :802.11g
 Test Frequency :2437 Mhz
 Test Mode :Tx CH Mid
 EUT Pol :E1 Plane

Test Site :SAC 1
 Test Date :2022-04-13
 Temp./Humi. :25.3/67
 Antenna Pol. :HORIZONTAL
 Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
333.61	Peak	37.14	-8.54	28.61	46.00	-17.39
500.45	Peak	42.43	-5.86	36.58	46.00	-9.42
569.32	Peak	34.06	-4.70	29.36	46.00	-16.64
615.88	Peak	35.40	-4.04	31.37	46.00	-14.63
624.61	Peak	38.83	-3.54	35.29	46.00	-10.71
666.32	Peak	40.20	-3.35	36.84	46.00	-9.16

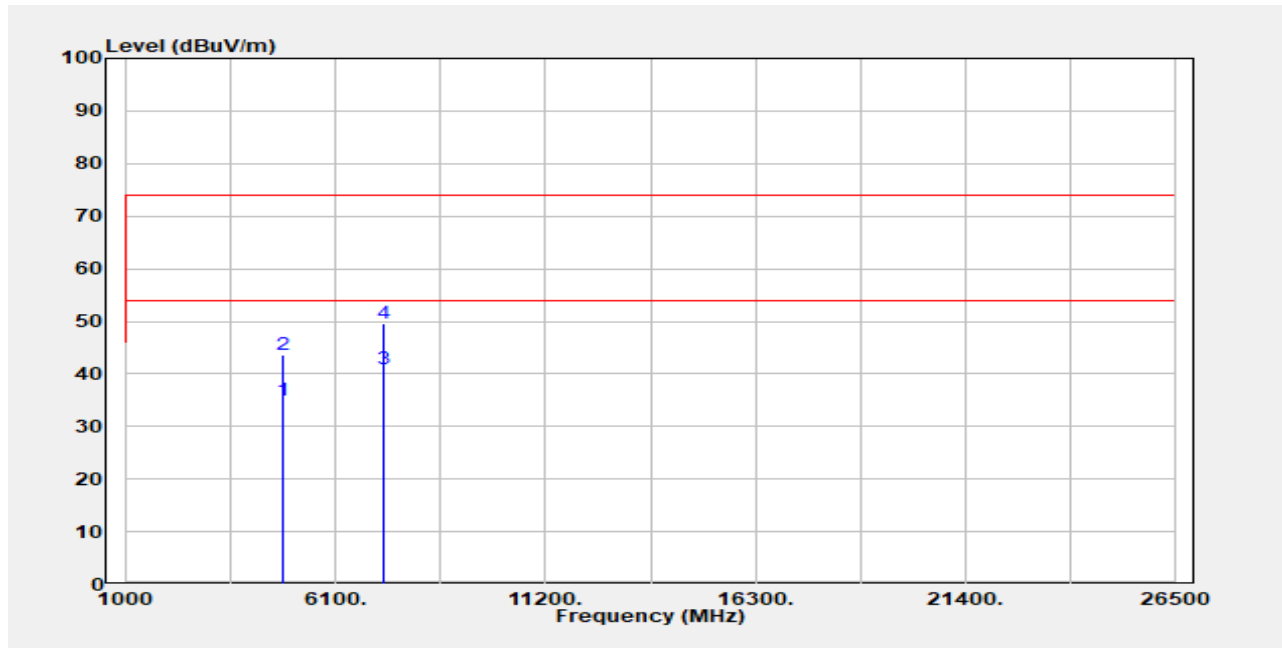
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Report Number :ER/2022/20001
 Operation Mode :802.11b
 Test Frequency :2412 Mhz
 Test Mode :Tx CH Low
 EUT Pol :E1 Plane

Test Site :SAC 1
 Test Date :2022-04-13
 Temp./Humi. :25.3/67
 Antenna Pol. :Vertical
 Engineer :GN Lin



Freq. MHz	Detector Mode	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
4824.00	Average	27.33	7.52	34.85	54.00	-19.15
4824.00	Peak	36.08	7.52	43.60	74.00	-30.40
7236.00	Average	25.99	14.82	40.81	54.00	-13.19
7236.00	Peak	34.67	14.82	49.49	74.00	-24.51

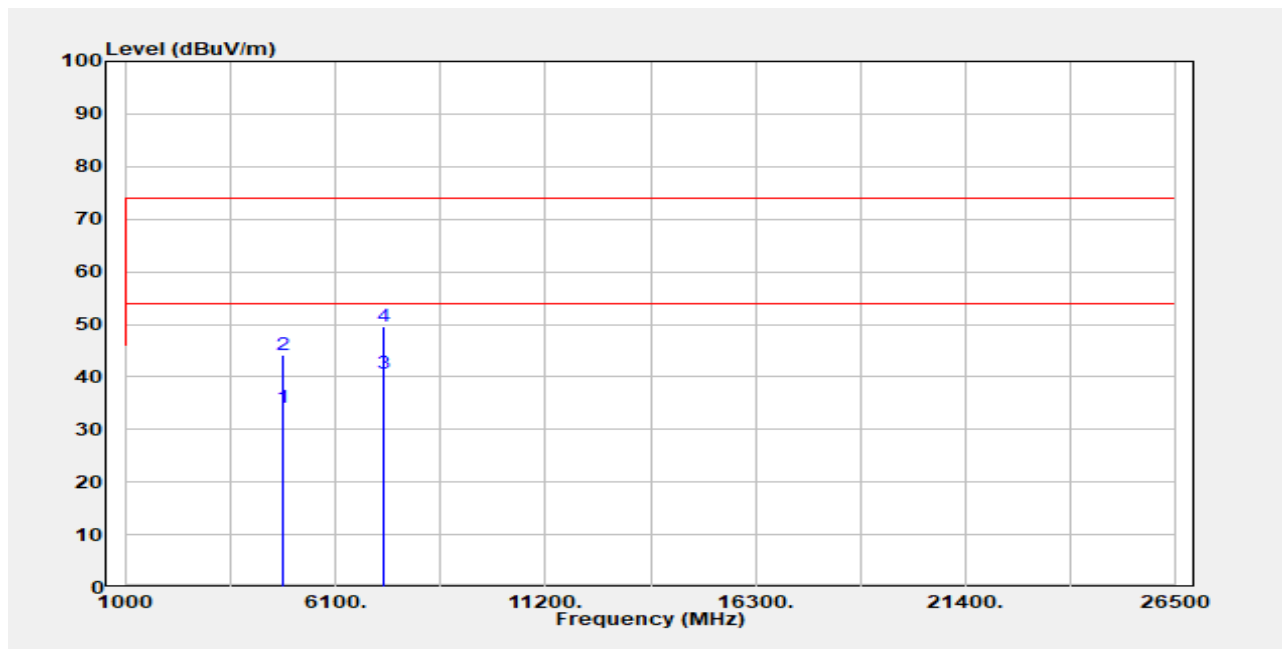
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Report Number :ER/2022/20001
 Operation Mode :802.11b
 Test Frequency :2412 Mhz
 Test Mode :Tx CH Low
 EUT Pol :E1 Plane

Test Site :SAC 1
 Test Date :2022-04-13
 Temp./Humi. :25.3/67
 Antenna Pol. :Horizontal
 Engineer :GN Lin



Freq. MHz	Detector Mode	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
4824.00	Average	26.62	7.52	34.14	54.00	-19.86
4824.00	Peak	36.67	7.52	44.19	74.00	-29.81
7236.00	Average	25.82	14.82	40.64	54.00	-13.36
7236.00	Peak	34.86	14.82	49.67	74.00	-24.33

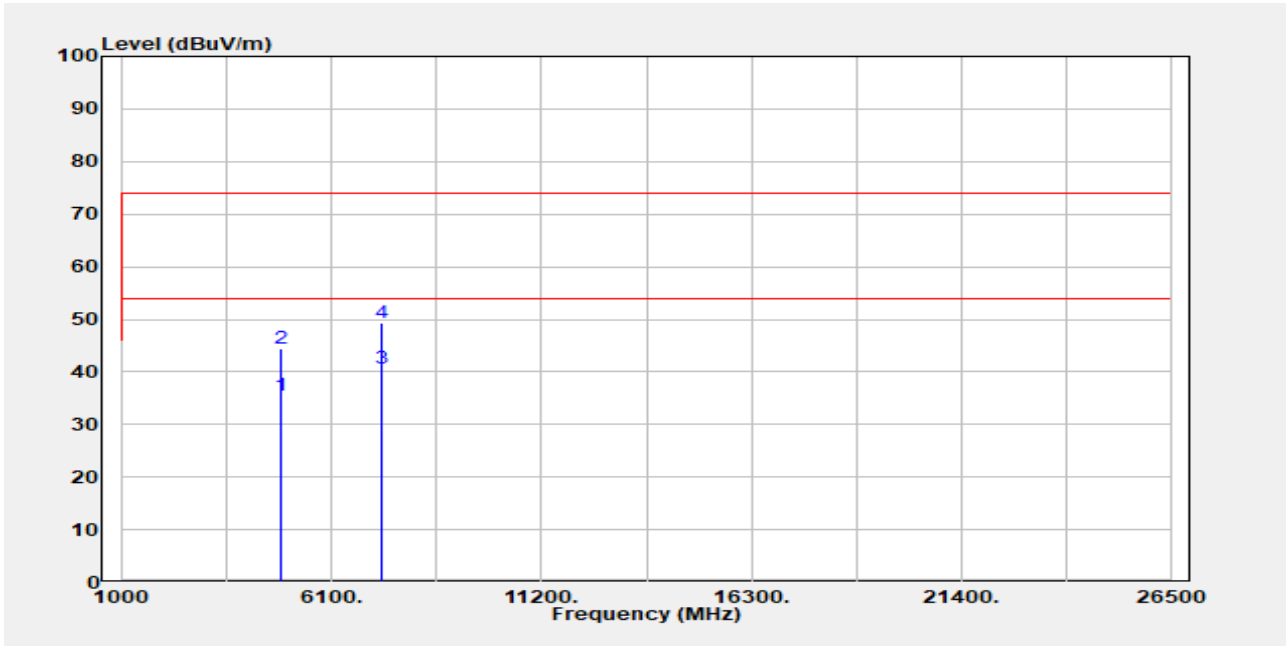
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Report Number :ER/2022/20001
 Operation Mode :802.11b
 Test Frequency :2437 Mhz
 Test Mode :Tx CH Mid
 EUT Pol :E1 Plane

Test Site :SAC 1
 Test Date :2022-04-13
 Temp./Humi. :25.3/67
 Antenna Pol. :Vertical
 Engineer :GN Lin



Freq. MHz	Detector Mode	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
4874.00	Average	28.17	7.42	35.59	54.00	-18.41
4874.00	Peak	37.09	7.42	44.50	74.00	-29.50
7311.00	Average	25.85	14.87	40.72	54.00	-13.28
7311.00	Peak	34.58	14.87	49.45	74.00	-24.55

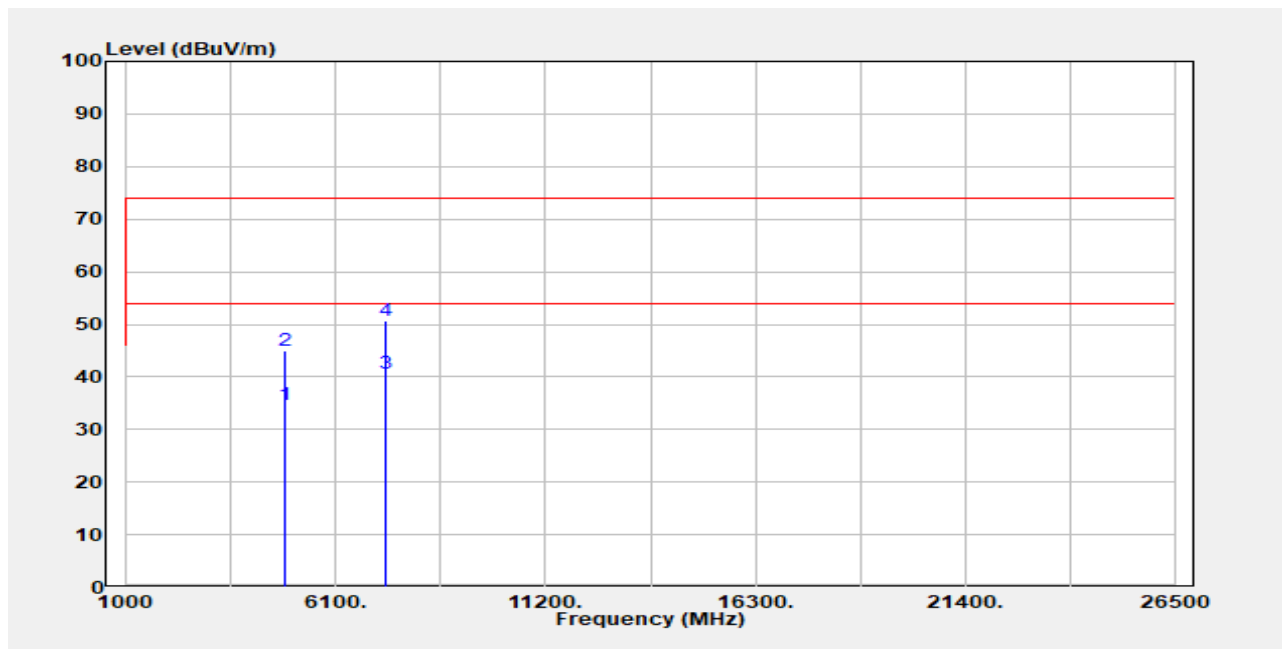
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Report Number :ER/2022/20001
 Operation Mode :802.11b
 Test Frequency :2437 Mhz
 Test Mode :Tx CH Mid
 EUT Pol :E1 Plane

Test Site :SAC 1
 Test Date :2022-04-13
 Temp./Humi. :25.3/67
 Antenna Pol. :Horizontal
 Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
4874.00	Average	27.19	7.42	34.61	54.00	-19.39
4874.00	Peak	37.61	7.42	45.03	74.00	-28.97
7311.00	Average	25.81	14.87	40.68	54.00	-13.32
7311.00	Peak	35.75	14.87	50.62	74.00	-23.38

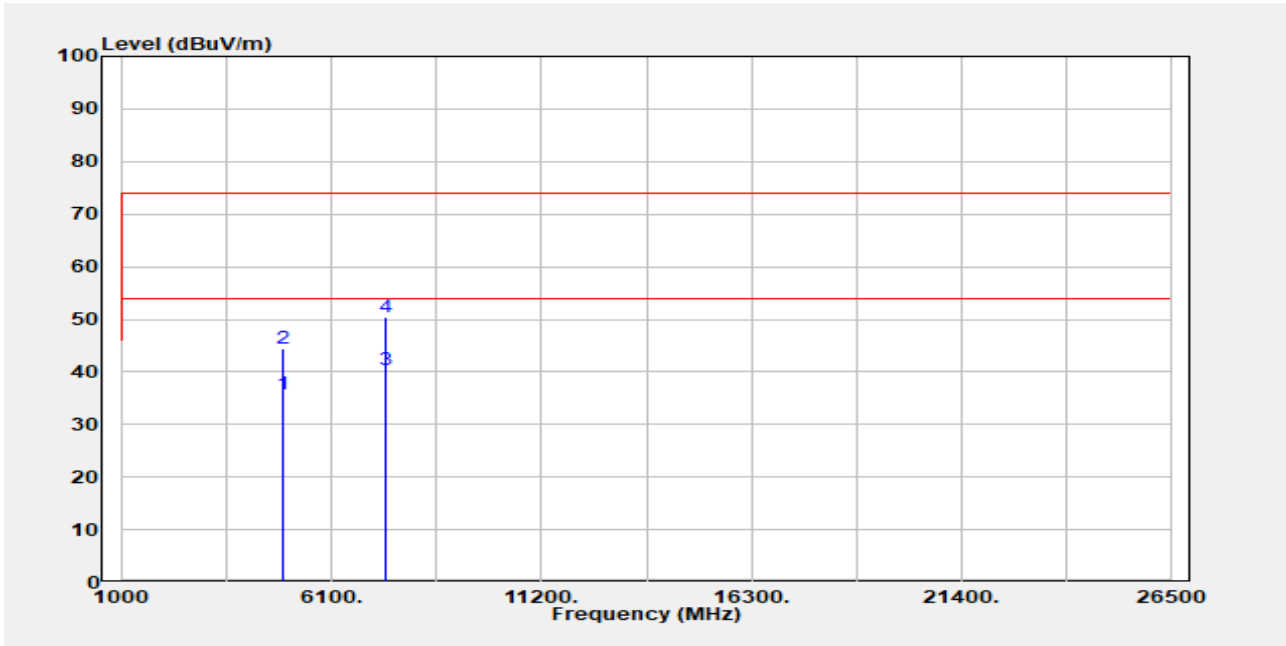
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Report Number :ER/2022/20001
 Operation Mode :802.11b
 Test Frequency :2462 Mhz
 Test Mode :Tx CH High
 EUT Pol :E1 Plane

Test Site :SAC 1
 Test Date :2022-04-13
 Temp./Humi. :25.3/67
 Antenna Pol. :Vertical
 Engineer :GN Lin



Freq. MHz	Detector Mode	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
4924.00	Average	28.19	7.48	35.67	54.00	-18.33
4924.00	Peak	36.96	7.48	44.44	74.00	-29.56
7386.00	Average	25.65	14.83	40.48	54.00	-13.52
7386.00	Peak	35.46	14.83	50.29	74.00	-23.71

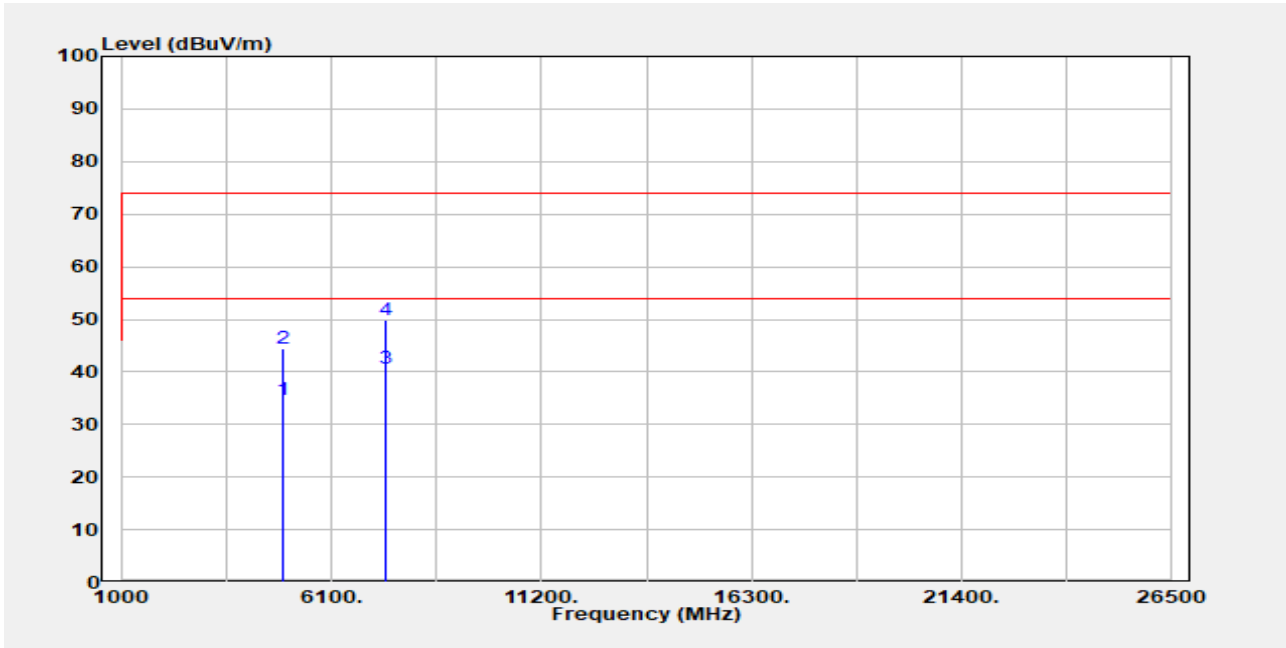
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Report Number :ER/2022/20001
 Operation Mode :802.11b
 Test Frequency :2462 Mhz
 Test Mode :Tx CH High
 EUT Pol :E1 Plane

Test Site :SAC 1
 Test Date :2022-04-13
 Temp./Humi. :25.3/67
 Antenna Pol. :Horizontal
 Engineer :GN Lin



Freq. MHz	Detector Mode	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
4924.00	Average	27.32	7.48	34.80	54.00	-19.20
4924.00	Peak	36.91	7.48	44.39	74.00	-29.61
7386.00	Average	25.88	14.83	40.71	54.00	-13.29
7386.00	Peak	35.09	14.83	49.92	74.00	-24.08

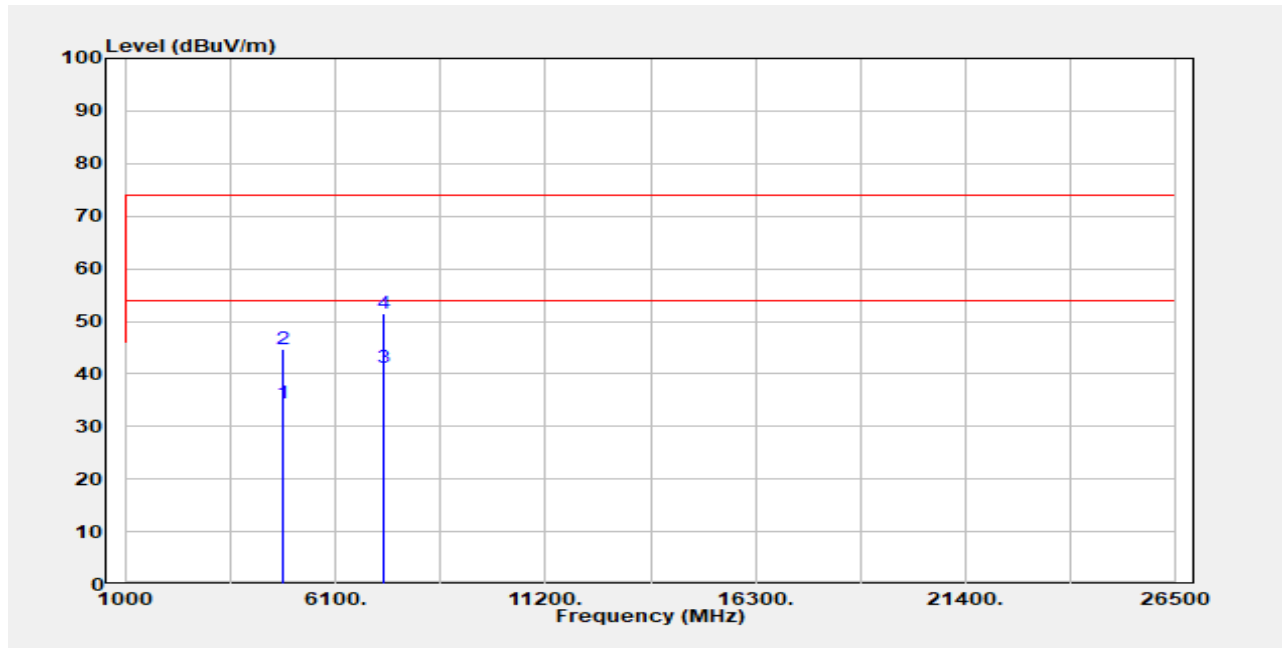
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Report Number :ER/2022/20001
 Operation Mode :802.11g
 Test Frequency :2412 Mhz
 Test Mode :Tx CH Low
 EUT Pol :E1 Plane

Test Site :SAC 1
 Test Date :2022-04-13
 Temp./Humi. :25.3/67
 Antenna Pol. :Vertical
 Engineer :GN Lin



Freq. MHz	Detector Mode	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
4824.00	Average	26.97	7.52	34.49	54.00	-19.51
4824.00	Peak	37.26	7.52	44.78	74.00	-29.22
7236.00	Average	26.32	14.82	41.14	54.00	-12.86
7236.00	Peak	36.70	14.82	51.52	74.00	-22.48

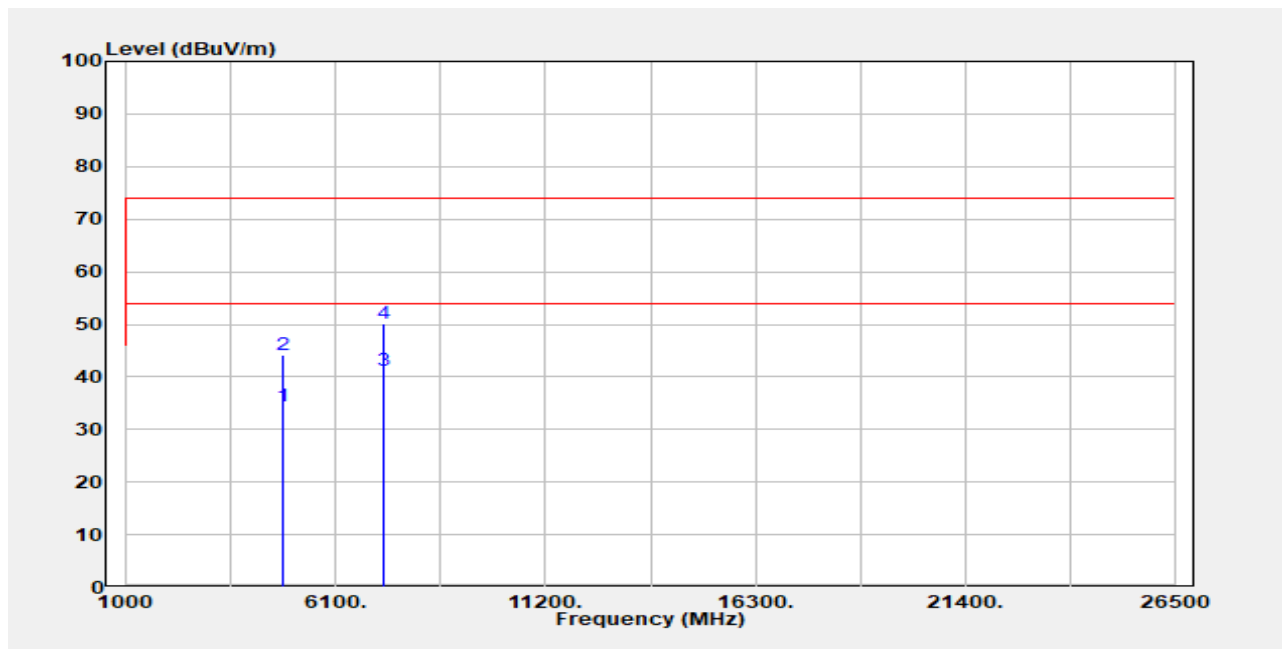
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Report Number :ER/2022/20001
 Operation Mode :802.11g
 Test Frequency :2412 Mhz
 Test Mode :Tx CH Low
 EUT Pol :E1 Plane

Test Site :SAC 1
 Test Date :2022-04-13
 Temp./Humi. :25.3/67
 Antenna Pol. :Horizontal
 Engineer :GN Lin



Freq. MHz	Detector Mode	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
4824.00	Average	26.80	7.52	34.32	54.00	-19.68
4824.00	Peak	36.76	7.52	44.28	74.00	-29.72
7236.00	Average	26.26	14.82	41.08	54.00	-12.92
7236.00	Peak	35.38	14.82	50.20	74.00	-23.80

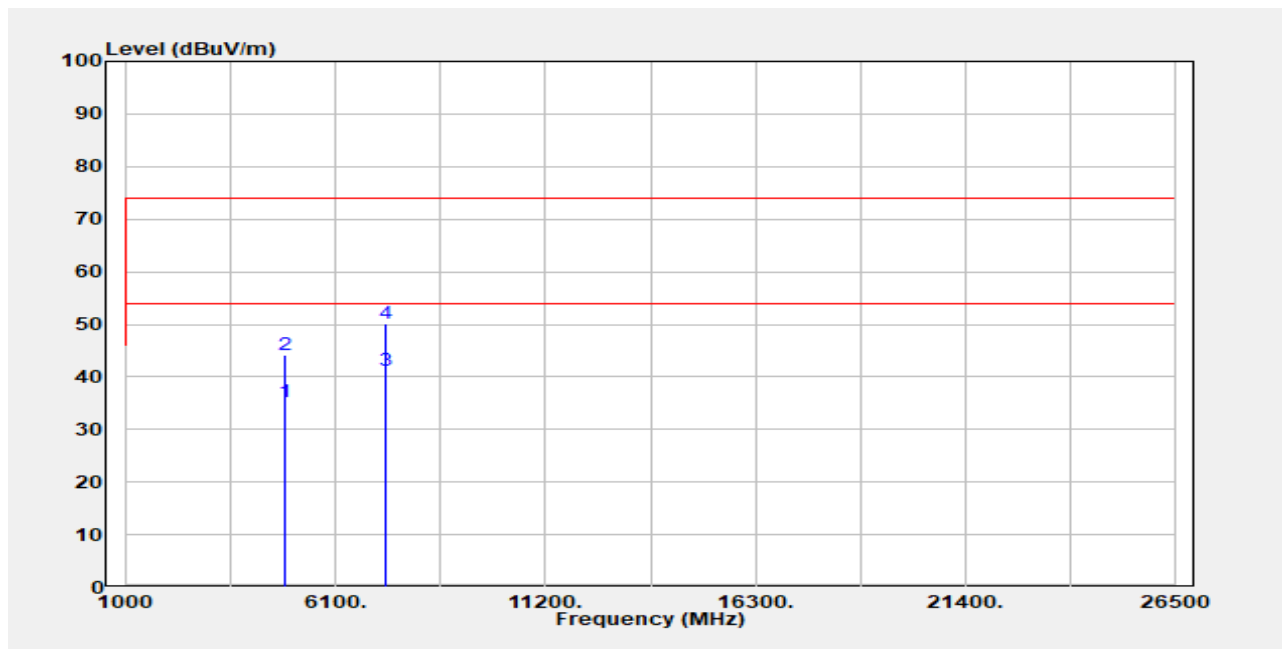
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Report Number :ER/2022/20001
 Operation Mode :802.11g
 Test Frequency :2437 Mhz
 Test Mode :Tx CH Mid
 EUT Pol :E1 Plane

Test Site :SAC 1
 Test Date :2022-04-13
 Temp./Humi. :25.3/67
 Antenna Pol. :Vertical
 Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
4874.00	Average	27.94	7.42	35.36	54.00	-18.64
4874.00	Peak	36.74	7.42	44.16	74.00	-29.84
7311.00	Average	26.35	14.87	41.22	54.00	-12.78
7311.00	Peak	35.24	14.87	50.11	74.00	-23.89

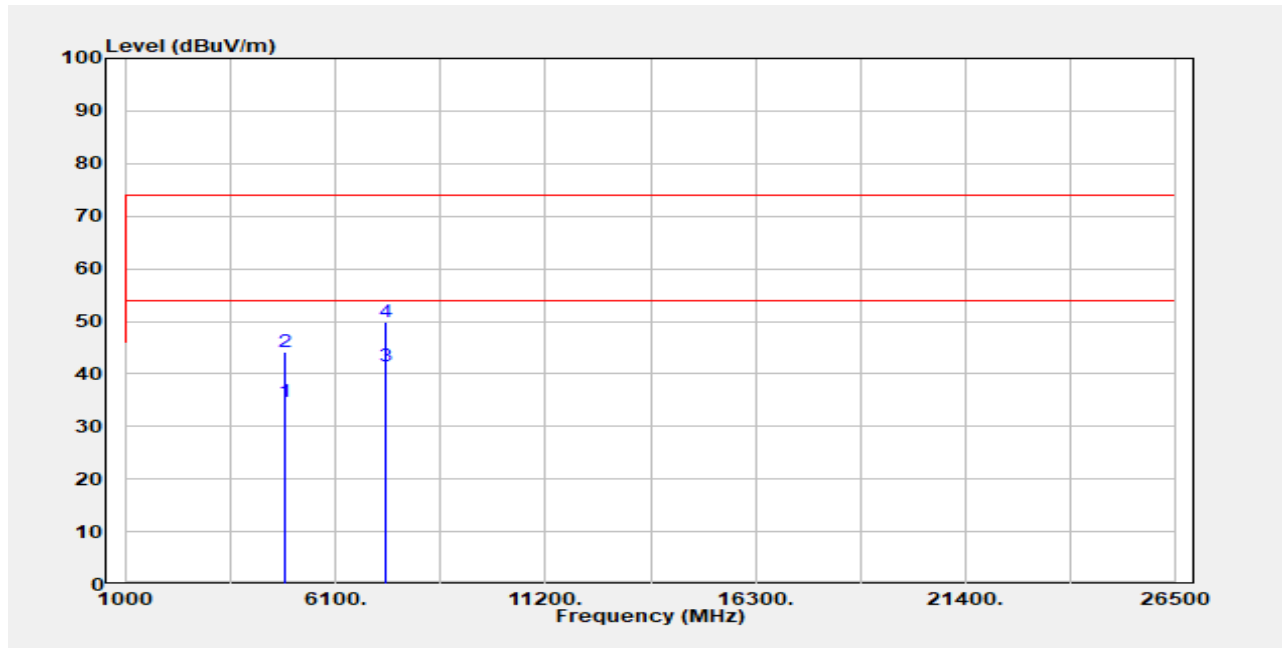
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Report Number :ER/2022/20001
 Operation Mode :802.11g
 Test Frequency :2437 Mhz
 Test Mode :Tx CH Mid
 EUT Pol :E1 Plane

Test Site :SAC 1
 Test Date :2022-04-13
 Temp./Humi. :25.3/67
 Antenna Pol. :Horizontal
 Engineer :GN Lin



Freq. MHz	Detector Mode	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
4874.00	Average	27.33	7.42	34.75	54.00	-19.25
4874.00	Peak	36.69	7.42	44.11	74.00	-29.89
7311.00	Average	26.46	14.87	41.33	54.00	-12.67
7311.00	Peak	34.98	14.87	49.85	74.00	-24.15

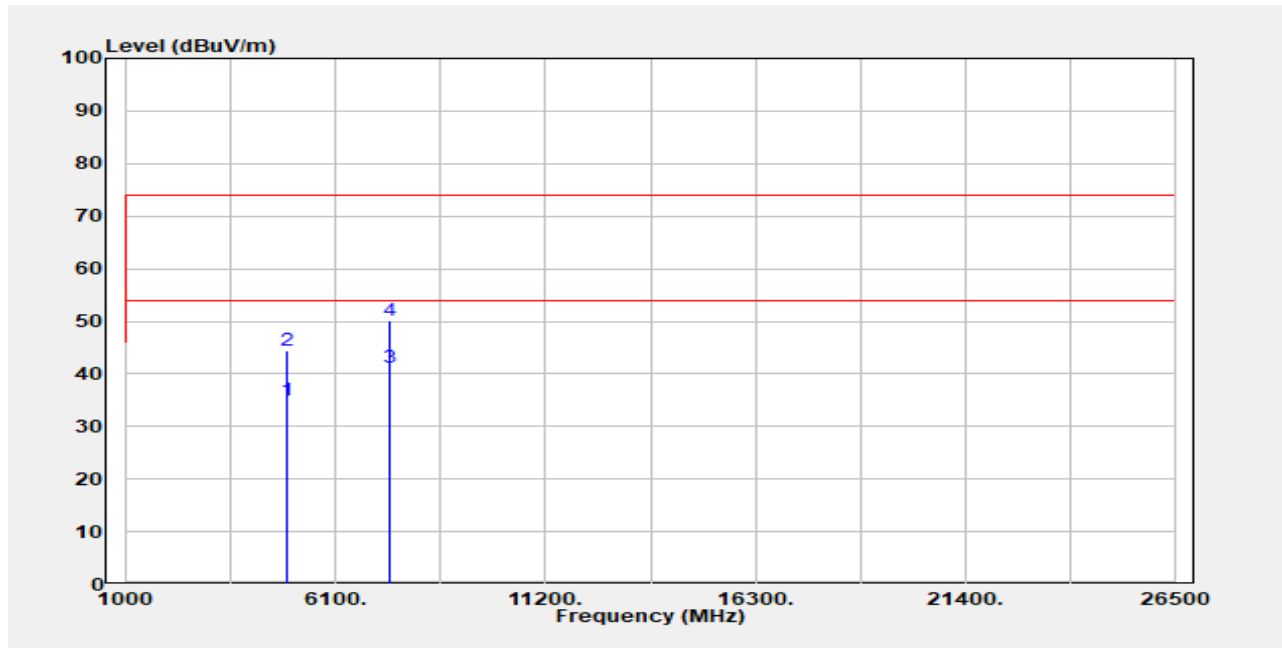
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Report Number :ER/2022/20001
 Operation Mode :802.11g
 Test Frequency :2462 Mhz
 Test Mode :Tx CH High
 EUT Pol :E1 Plane

Test Site :SAC 1
 Test Date :2022-04-13
 Temp./Humi. :25.3/67
 Antenna Pol. :Vertical
 Engineer :GN Lin



Freq. MHz	Detector Mode	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
4924.00	Average	27.35	7.48	34.83	54.00	-19.17
4924.00	Peak	37.02	7.48	44.50	74.00	-29.50
7386.00	Average	26.30	14.83	41.13	54.00	-12.87
7386.00	Peak	35.35	14.83	50.19	74.00	-23.81

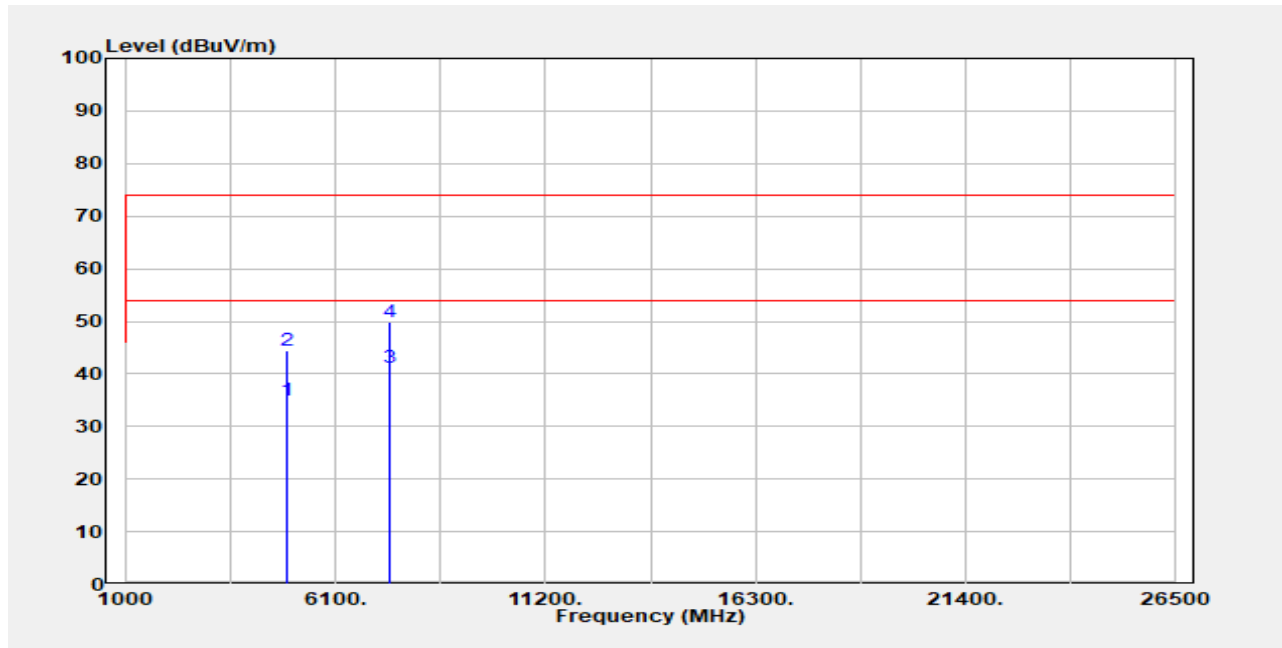
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Report Number :ER/2022/20001
 Operation Mode :802.11g
 Test Frequency :2462 Mhz
 Test Mode :Tx CH High
 EUT Pol :E1 Plane

Test Site :SAC 1
 Test Date :2022-04-13
 Temp./Humi. :25.3/67
 Antenna Pol. :Horizontal
 Engineer :GN Lin



Freq. MHz	Detector Mode	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
4924.00	Average	27.39	7.48	34.87	54.00	-19.13
4924.00	Peak	36.84	7.48	44.32	74.00	-29.68
7386.00	Average	26.34	14.83	41.17	54.00	-12.83
7386.00	Peak	35.07	14.83	49.91	74.00	-24.09

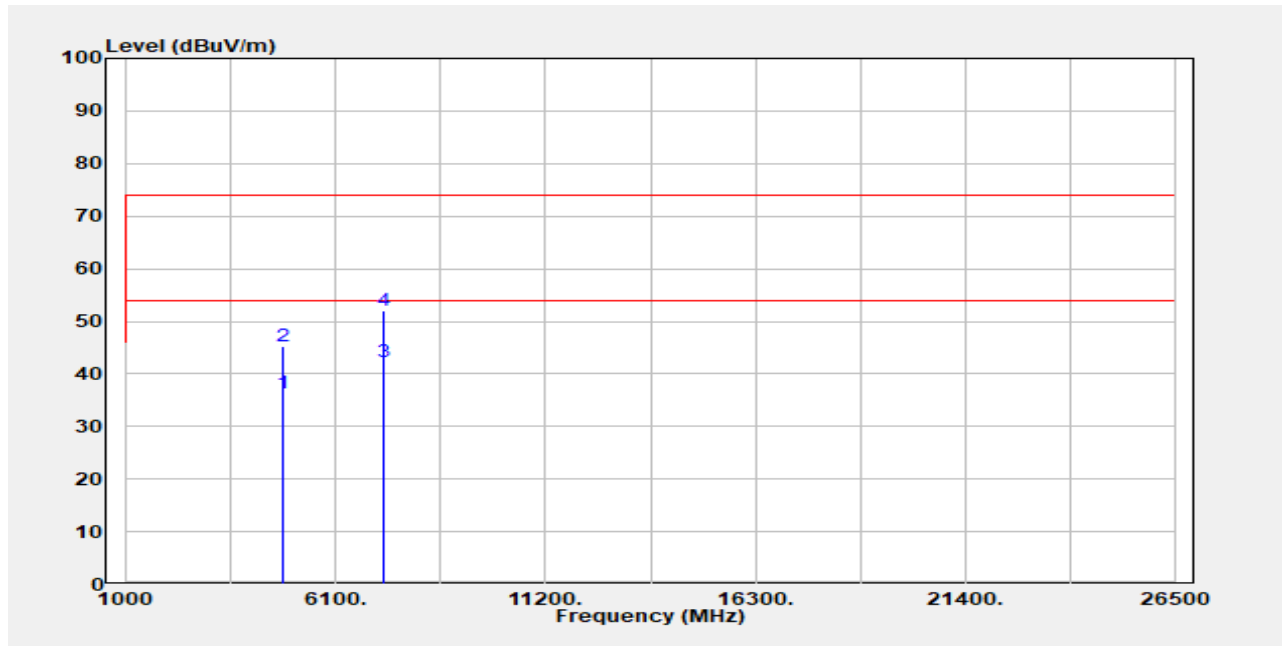
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Report Number :ER/2022/20001
 Operation Mode :802.11n20
 Test Frequency :2412 Mhz
 Test Mode :Tx CH Low
 EUT Pol :E1 Plane

Test Site :SAC 1
 Test Date :2022-04-13
 Temp./Humi. :25.3/67
 Antenna Pol. :Vertical
 Engineer :GN Lin



Freq. MHz	Detector Mode	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
4824.00	Average	28.69	7.52	36.21	54.00	-17.79
4824.00	Peak	37.70	7.52	45.22	74.00	-28.78
7236.00	Average	27.42	14.82	42.24	54.00	-11.76
7236.00	Peak	37.10	14.82	51.91	74.00	-22.09

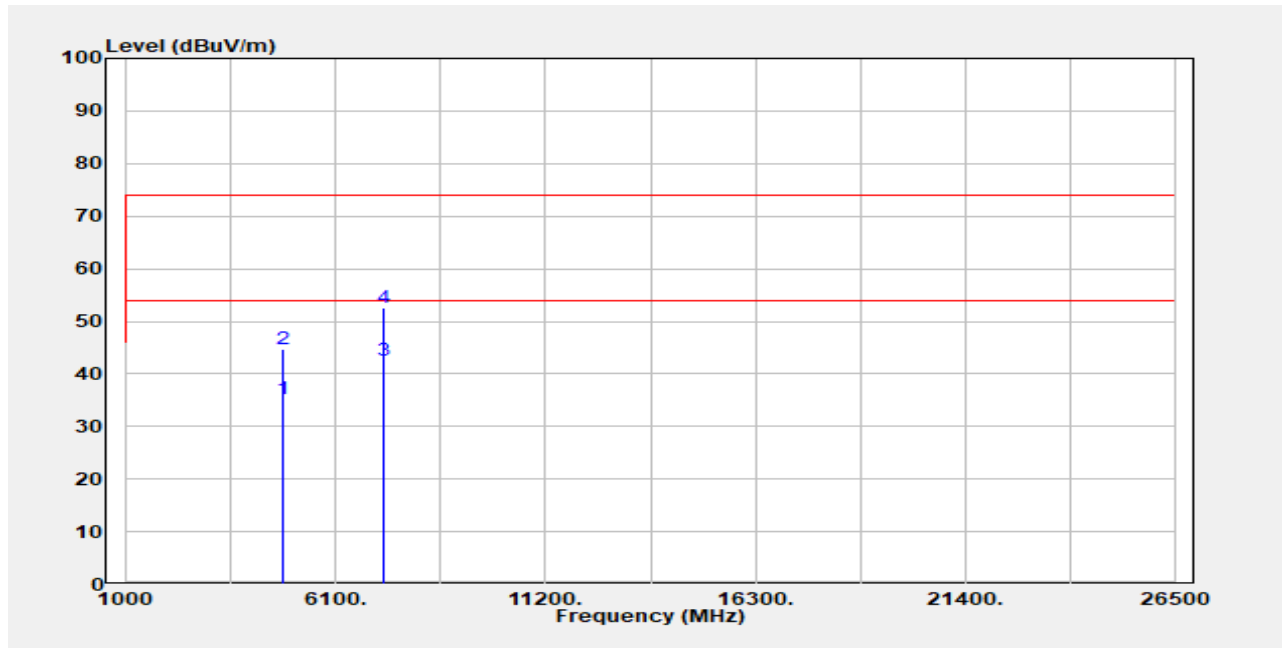
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Report Number :ER/2022/20001
 Operation Mode :802.11n20
 Test Frequency :2412 Mhz
 Test Mode :Tx CH Low
 EUT Pol :E1 Plane

Test Site :SAC 1
 Test Date :2022-04-13
 Temp./Humi. :25.3/67
 Antenna Pol. :Horizontal
 Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
4824.00	Average	27.83	7.52	35.35	54.00	-18.65
4824.00	Peak	37.11	7.52	44.63	74.00	-29.37
7236.00	Average	27.81	14.82	42.63	54.00	-11.37
7236.00	Peak	37.80	14.82	52.62	74.00	-21.38

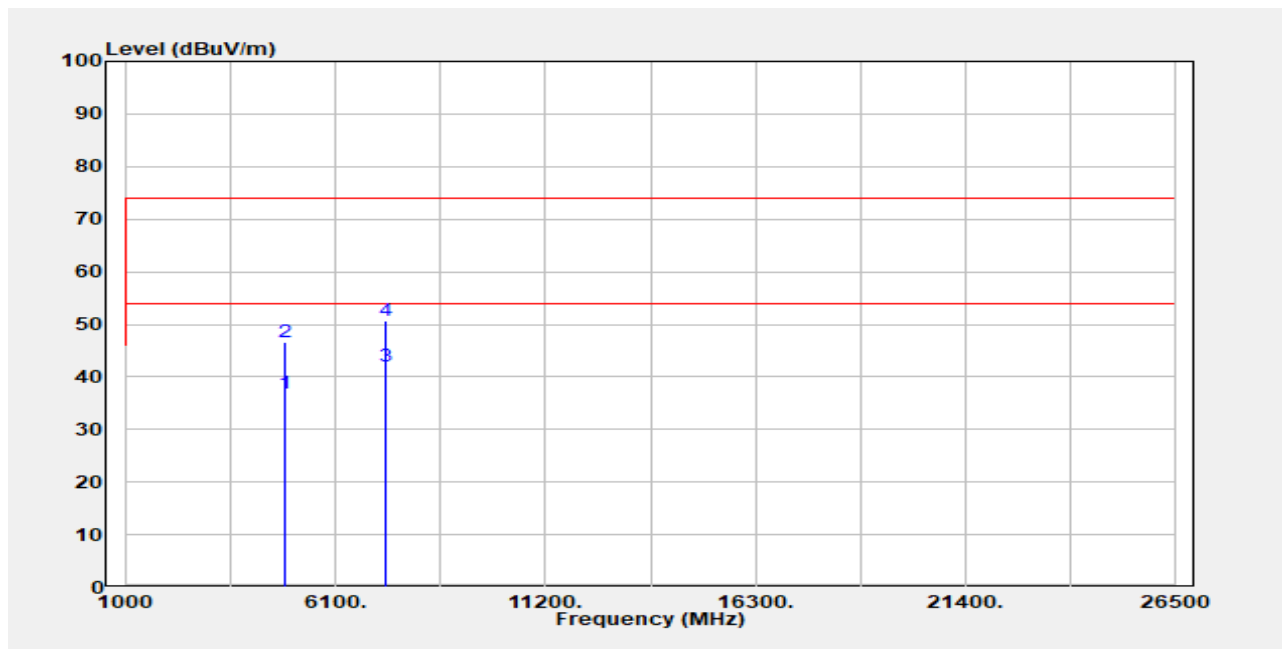
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Report Number :ER/2022/20001
 Operation Mode :802.11n20
 Test Frequency :2437 Mhz
 Test Mode :Tx CH Mid
 EUT Pol :E1 Plane

Test Site :SAC 1
 Test Date :2022-04-13
 Temp./Humi. :25.3/67
 Antenna Pol. :Vertical
 Engineer :GN Lin



Freq. MHz	Detector Mode	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
4874.00	Average	29.34	7.42	36.76	54.00	-17.24
4874.00	Peak	39.14	7.42	46.56	74.00	-27.44
7311.00	Average	27.10	14.87	41.97	54.00	-12.03
7311.00	Peak	35.85	14.87	50.71	74.00	-23.29

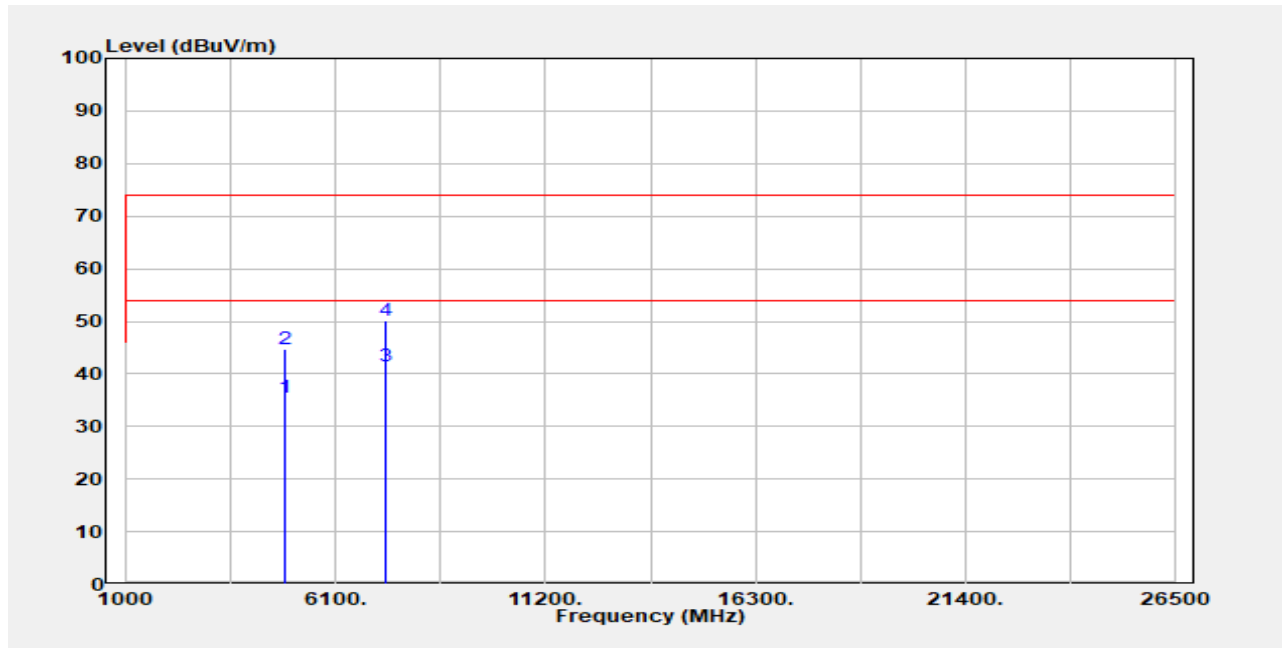
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Report Number :ER/2022/20001
 Operation Mode :802.11n20
 Test Frequency :2437 Mhz
 Test Mode :Tx CH Mid
 EUT Pol :E1 Plane

Test Site :SAC 1
 Test Date :2022-04-13
 Temp./Humi. :25.3/67
 Antenna Pol. :Horizontal
 Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
4874.00	Average	28.02	7.42	35.44	54.00	-18.56
4874.00	Peak	37.38	7.42	44.80	74.00	-29.20
7311.00	Average	26.72	14.87	41.59	54.00	-12.41
7311.00	Peak	35.37	14.87	50.24	74.00	-23.76

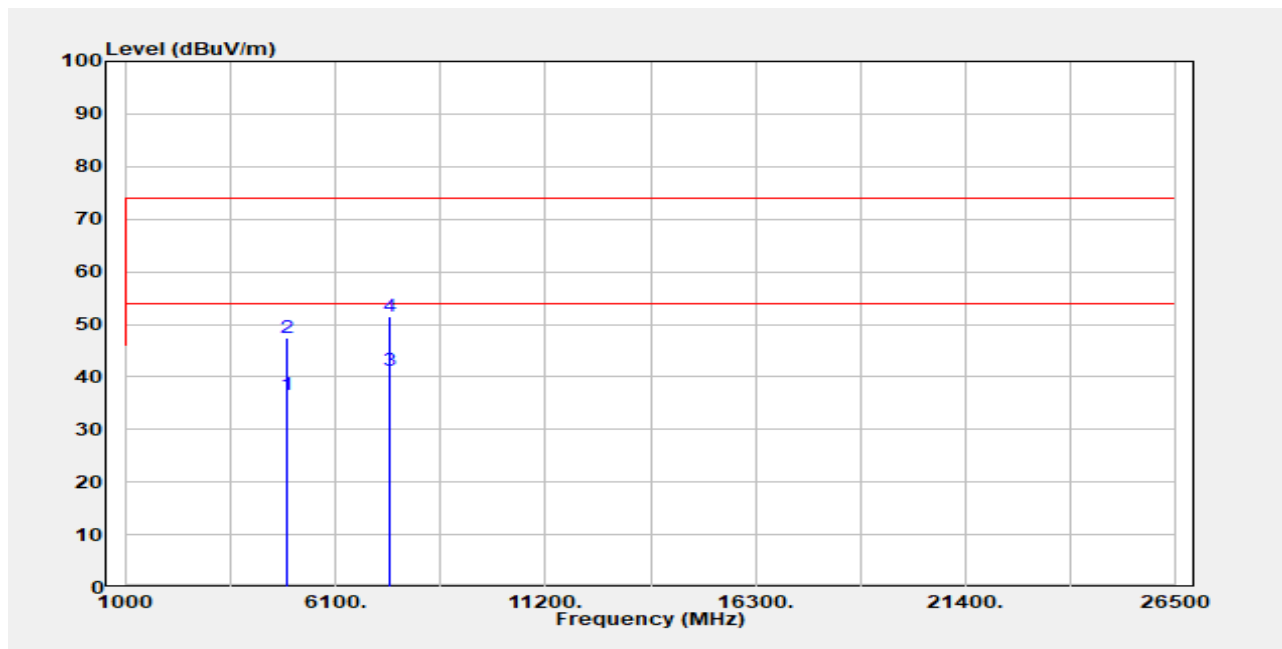
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Report Number :ER/2022/20001
 Operation Mode :802.11n20
 Test Frequency :2462 Mhz
 Test Mode :Tx CH High
 EUT Pol :E1 Plane

Test Site :SAC 1
 Test Date :2022-04-13
 Temp./Humi. :25.3/67
 Antenna Pol. :Vertical
 Engineer :GN Lin



Freq. MHz	Detector Mode	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
4924.00	Average	29.10	7.48	36.58	54.00	-17.42
4924.00	Peak	40.03	7.48	47.52	74.00	-26.48
7386.00	Average	26.46	14.83	41.29	54.00	-12.71
7386.00	Peak	36.54	14.83	51.37	74.00	-22.63

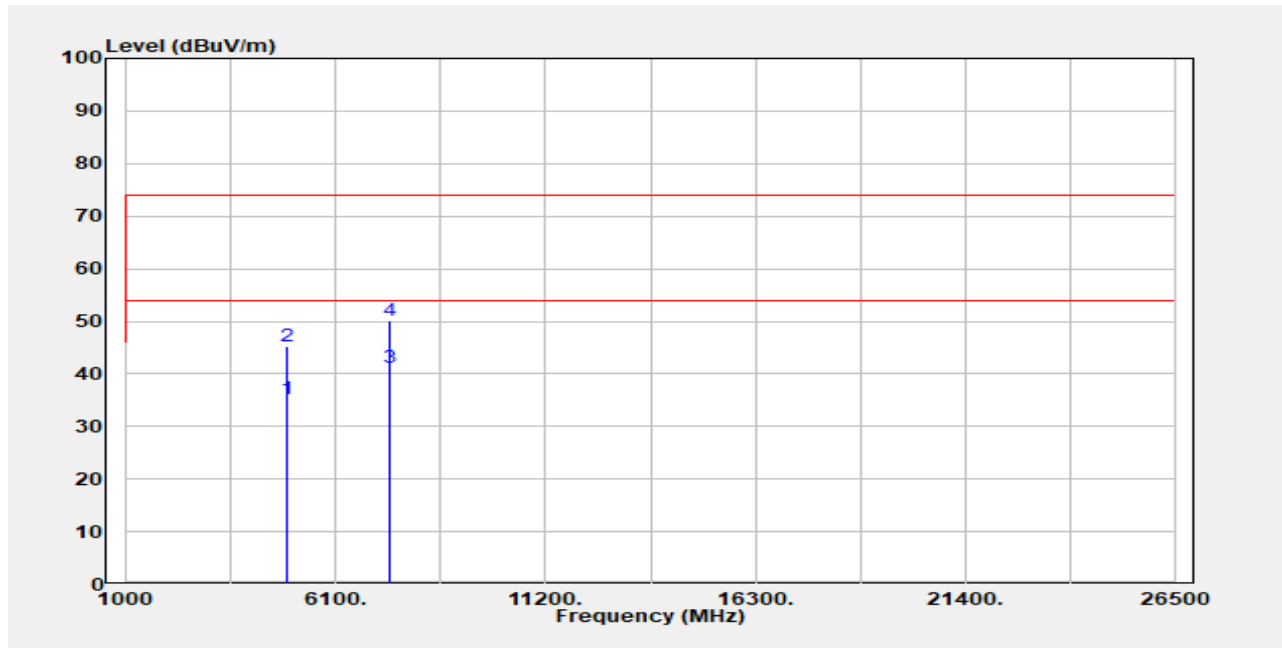
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Report Number :ER/2022/20001
 Operation Mode :802.11n20
 Test Frequency :2462 Mhz
 Test Mode :Tx CH High
 EUT Pol :E1 Plane

Test Site :SAC 1
 Test Date :2022-04-13
 Temp./Humi. :25.3/67
 Antenna Pol. :Horizontal
 Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
4924.00	Average	27.87	7.48	35.35	54.00	-18.65
4924.00	Peak	37.86	7.48	45.34	74.00	-28.66
7386.00	Average	26.43	14.83	41.26	54.00	-12.74
7386.00	Peak	35.17	14.83	50.01	74.00	-23.99

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12 POWER SPECTRAL DENSITY

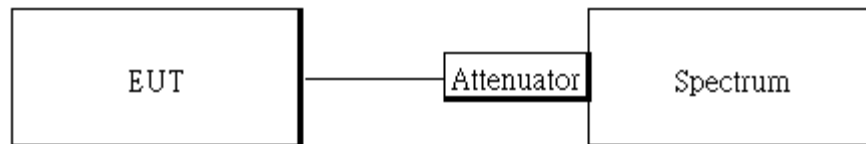
12.1 Standard Applicable

Per Part 15.247 (e)

The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

12.2 Test Setup



12.3 Measurement Procedure

1. Set analyzer center frequency to DTS channel center frequency.
2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance .
3. Set the span to 1.5 times the DTS channel bandwidth.
4. Set the RBW = 3 kHz & VBW = 10 kHz.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. MIMO mode: offset is set with “measure and add 10 Log (N)” to measurement for MIMO mode. Offset = cable loss + 10 log (N), where N is number of transmitting antenna, cable loss is specified below.

Note:

For the test of MIMO mode, the highest emission of worst case employing Measure and add 10 log (N) technical is reported on this report after the comparison between Main Antenna at single transmitting mode and Aux that yields the higher value. The MIMO transmitting mode produces higher value of outcome.

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12.4 As per FCC KDB 662911 D01

As per section F. 2). e). (ii) of FCC KDB 662911 D01

If antenna gains are not equal and each transmit antenna is driven by only one spatial stream, directional gain may be calculated by either of the following formulas.

$$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

where

Each antenna is driven by no more than one spatial stream;

NSS = the number of independent spatial streams of data;

NANT = the total number of antennas

$g_{j,k} = \sqrt{20 \log G_k}$ if the kth antenna is being fed by spatial stream j, or zero if it is not;

G_k is the gain in dBi of the kth antenna.

The antenna gain is not greater than 6 dBi. Therefore, reduction of power is not required.

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12.5 Power spectral density

POWER DENSITY 802.11b					
Freq. (MHz)	Ch0 PSD	Ch1 PSD	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
2412	-12.76	-14.85	-10.67	8.00	PASS
2437	-12.87	-15.87	-11.11	8.00	PASS
2462	-13.62	-13.23	-10.41	8.00	PASS

POWER DENSITY 802.11g					
Freq. (MHz)	Ch0 PSD	Ch1 PSD	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
2412	-15.32	-15.72	-12.51	8.00	PASS
2437	-15.47	-15.28	-12.36	8.00	PASS
2462	-15.68	-16.28	-12.96	8.00	PASS

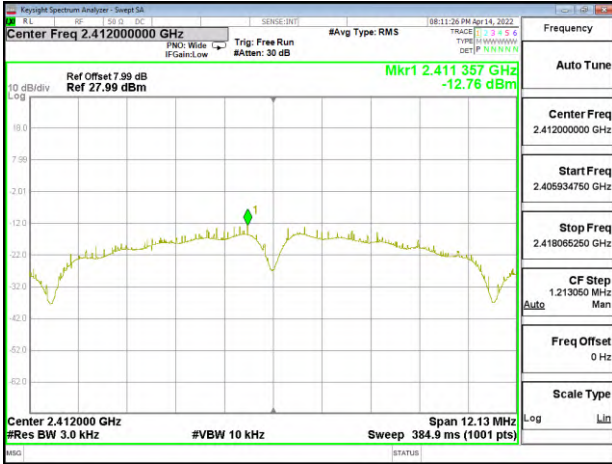
POWER DENSITY 802.11n HT20					
Freq. (MHz)	Ch0 PSD	Ch1 PSD	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
2412	-15.01	-15.346	-12.16	8.00	PASS
2437	-14.95	-16.20	-12.52	8.00	PASS
2462	-15.58	-15.06	-12.30	8.00	PASS

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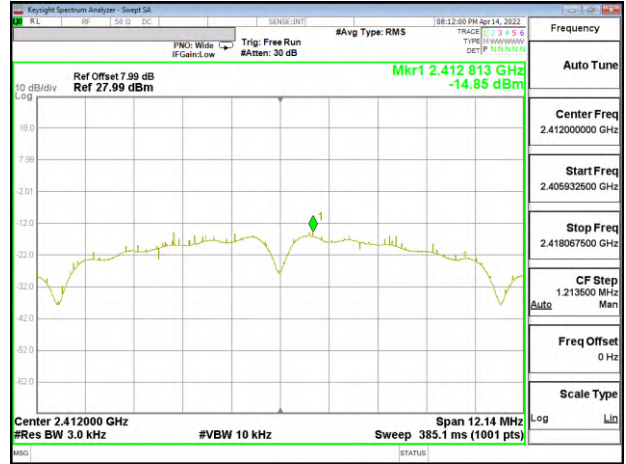
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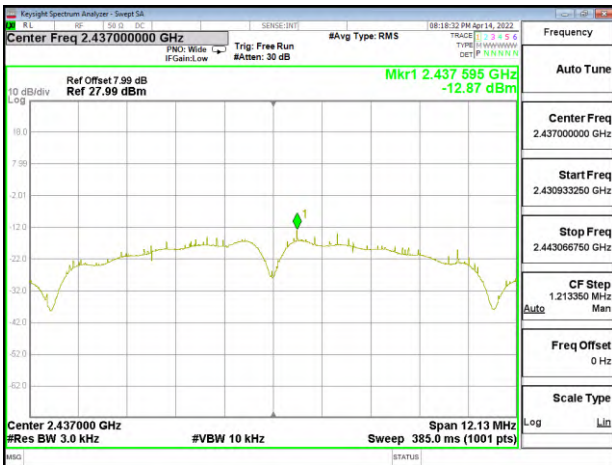
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802.11b_20MHz_Chain1_2412MHz



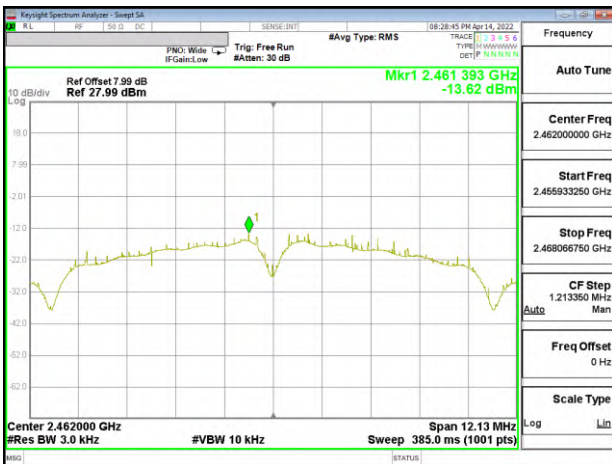
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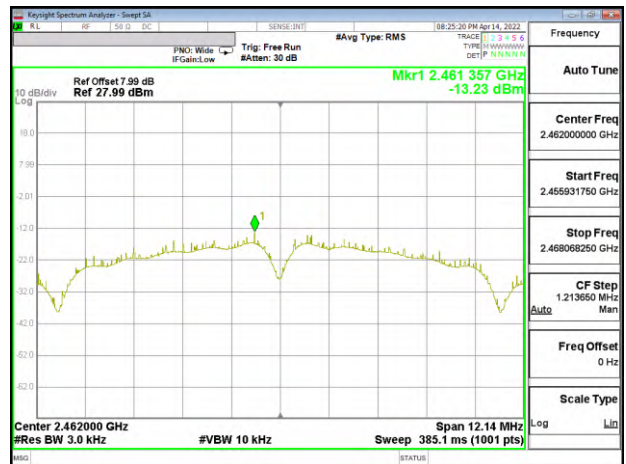
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802.11b_20MHz_Chain0_2462MHz



802.11b_20MHz_Chain1_2462MHz

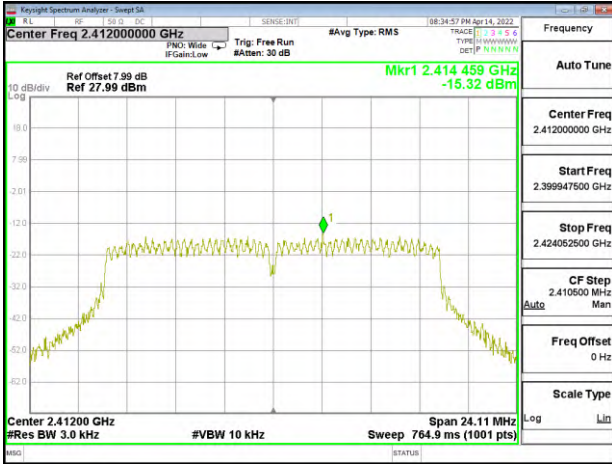


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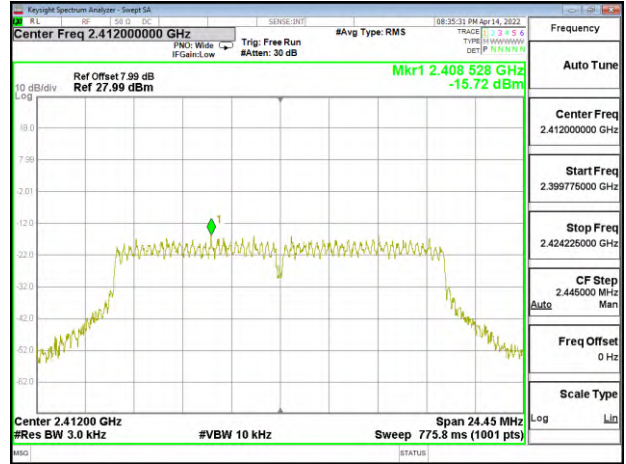
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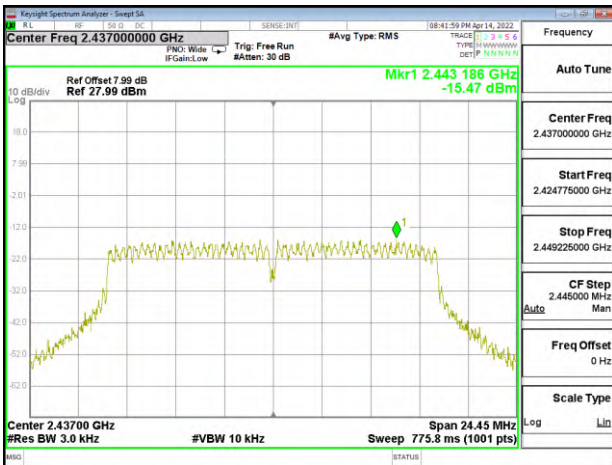
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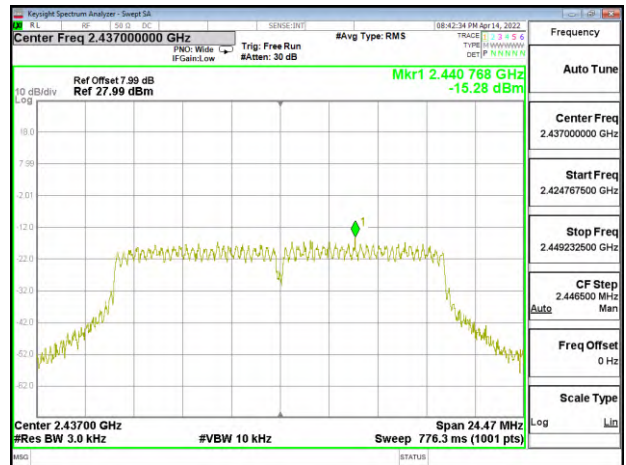
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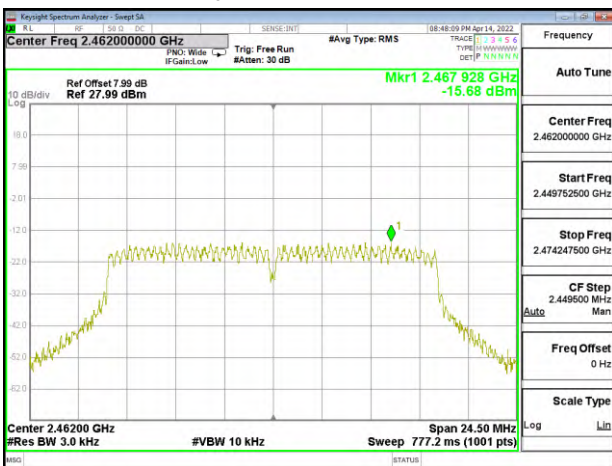
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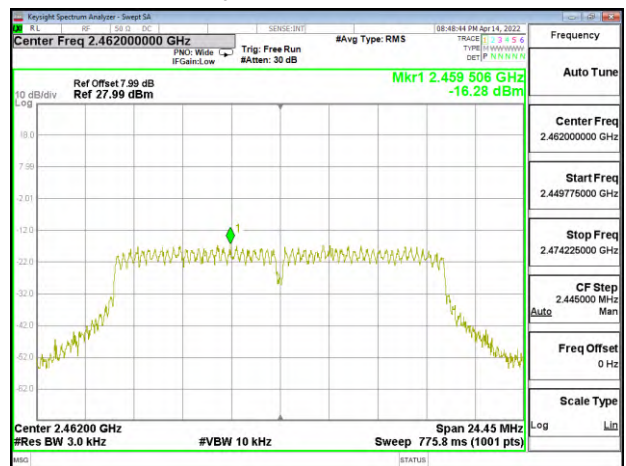
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802.11g_20MHz_Chain0_2462MHz



802.11g_20MHz_Chain1_2462MHz

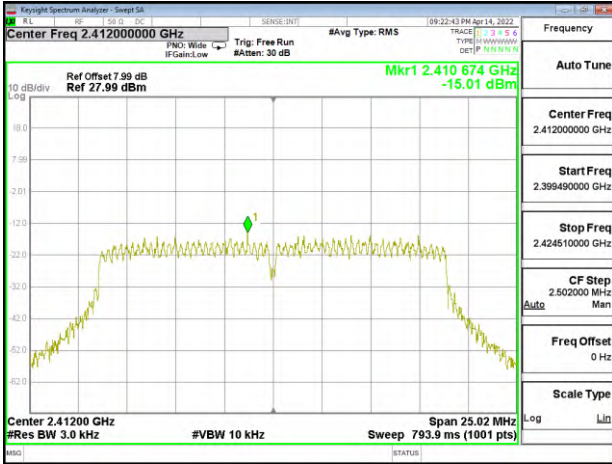


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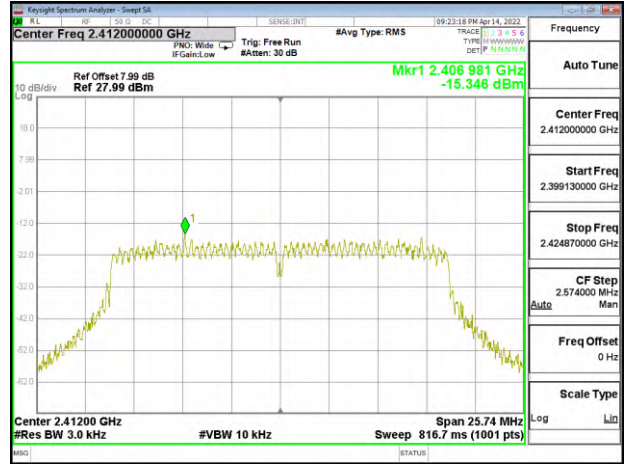
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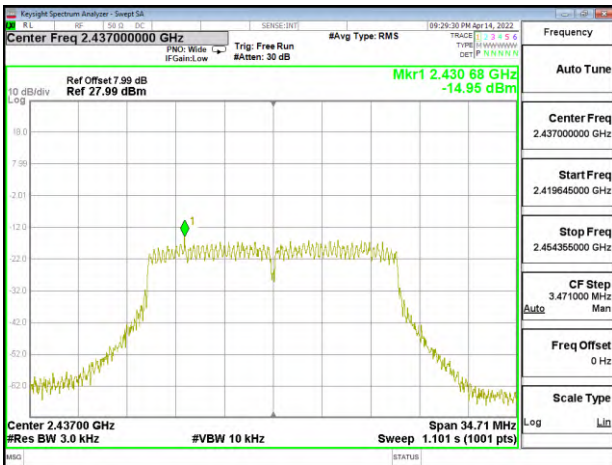
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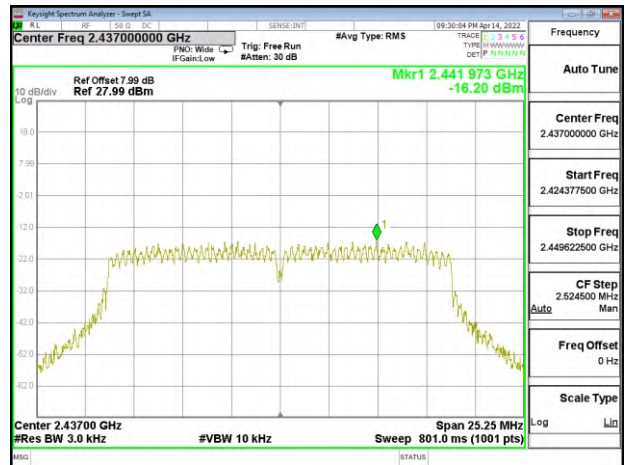
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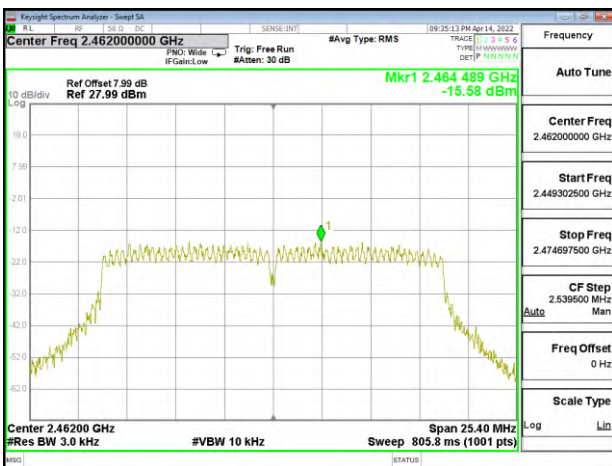
802.11n_20MHz_Chain0_2437MHz



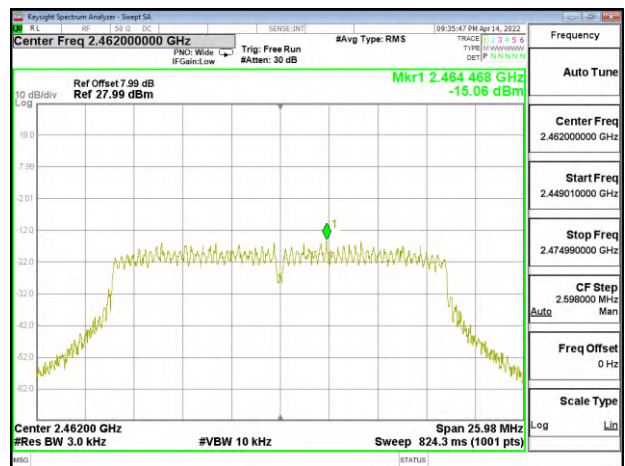
802.11n_20MHz_Chain1_2437MHz



802.11n_20MHz_Chain0_2462MHz



802.11n_20MHz_Chain1_2462MHz



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13 ANTENNA REQUIREMENT

13.1 Standard Applicable

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§ 15.211, 15.213, 15.217, 15.219, 15.221, or § 15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

13.2 Antenna Connected Construction

The antenna is designed as permanently attached and no consideration of replacement. Please see EUT photo for details.

~ End of Report ~

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