

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT



Applicant: Peloton Interactive Inc.
125 W 25th Street, 11 FL, New York, NY, 10001, USA

Product Name: Peloton Console

Brand Name: Peloton

Model No.: PLTN-RB1VQ-2

Model Difference: N/A

Report Number: E2/2021/70054

FCC ID 2AA3N-RB1VQ2

IC: 21377-RB1VQ2

Issue Date: August 27, 2021

Date of Test: July 26, 2021 ~ August 20, 2021

Date of EUT Received: July 13, 2021

Approved By

Jay Lin

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, ISSED 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
E2/2021/70054	00	Original	August 27, 2021	Yuri Tsai

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1 GENERAL INFORMATION

1.1 Product Description

Product Name:	Peloton Console
Brand Name:	Peloton
Model No.:	PLTN-RB1VQ-2
Model Difference:	N/A
Hardware Version:	N/A
Firmware Version:	N/A
EUT Series No.:	Conducted: QAPLBK2104190030, Radiated: QAPLBK2104190019
Power Supply:	12Vdc from power cord

1.2 RF Specification

FCC:

Wi-Fi	Frequency Range	Channels	Rated Power in dBm (Peak)	Modulation Technology
802.11b	2412~2462	11	23.14	DSSS
802.11g	2412~2462	11	28.22	OFDM
802.11n20	2412~2462	11	28.10	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:6.5 - 144.4Mbps		

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IC:

Wi-Fi	Frequency Range	Channels	Rated Power in dBm (Peak)	Rated Power in dBm (EIRP)	Modulation Technology
802.11b	2412~2462	11	23.14	24.72	DSSS
802.11g	2412~2462	11	28.22	22.86	OFDM
802.11n20	2412~2462	11	28.10	22.86	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:6.5 - 144.4Mbps			

1.3 Antenna Designation

Antenna Type	Supplier	Antenna Part No.	Freq. (MHz)	Peak Antenna Gain (dBi)	Directional Gain (dBi)
PIFA	ACON	APP8P-100003	2.4GHz	1.58	4.57
		APP8P-100004	2.4GHz	1.54	4.57

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 Feb. 2021

ANSI C63.10:2013

1.5 Test Facility

Laboratory	Test Site Address	Test Site Name	FCC Designa- tion 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			
	No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333	Conduction C	TW0028	
		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 indica- tion 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 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 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*9m*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

Fig. 2-1 Conducted (Antenna Port) Emission Configuration



Fig 2-2 Radiated Emission

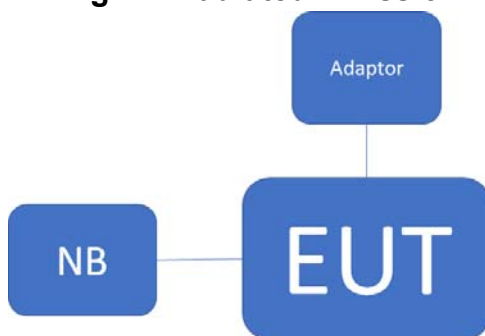
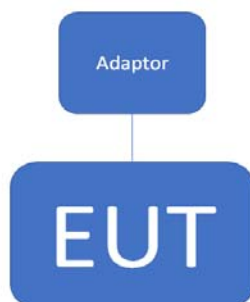


Fig 2-3 Conduction (AC Power Line) Radiated Emission



2.6 Control Unit(s)

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.
1	Bluetooth Test Software	N/A	N/A	N/A
2	Notebook	Lenovo	L440	P0000367

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3 SUMMARY OF TEST RESULTS

FCC Rules	IC 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 §15.247(b)	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	Multiple Transmission Spatial
☒ 802.11 b	☒ Ch0	☒ Ch1	☐ Ch2	☐ Ch3	☐ 1TX	☒ 2TX
☒ 802.11 g	☒ Ch0	☒ Ch1	☐ Ch2	☐ Ch3	☐ 1TX	☒ 2TX
☒ 802.11 n	☒ Ch0	☒ Ch1	☐ Ch2	☐ Ch3	☐ SISO	☒ 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.

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

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RADIATED EMISSION TEST (BELOW 1 GHz)					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11g	1 to 11	1,6,11	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 radiation emission was measured as EUT three orthogonal planes, E1 / E2 / H, are positioned to pre-scan the emission generating the highest one. The worst position is tested and recorded.

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5 MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.34 dB
Emission Bandwidth	+/- 1.53 Hz
The Maximum Output Power Measurement	+/- 1 dB
Peak Power Spectral Density Measurement	+/- 1.53 dB
Frequency Stability	+/- 1.53 Hz
Temperature	+/- 0.4 °C
Humidity	+/- 3.5 %
DC / AC Power Source	+/- 1 %

Radiated Spurious Emission Measurement Uncertainty			
Polarization: Vertical	+/-	2.64 dB	9kHz~30MHz
	+/-	4.93 dB	30MHz - 1000MHz
	+/-	4.81 dB	1GHz - 18GHz
	+/-	4.52 dB	18GHz - 40GHz
Polarization: Horizontal	+/-	2.64 dB	9kHz~30MHz
	+/-	4.45 dB	30MHz - 1000MHz
	+/-	4.81 dB	1GHz - 18GHz
	+/-	4.52 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 CONDUCTED EMISSION TEST

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

6.2 Measurement Equipment Used

Radiated Emission Test Site: Conduction C					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Test Software	audix	e3	Ver. 6.11-20180419c	N.C.R	N.C.R
LISN	SCHWARZBECK Mess-Elektronik	NSLK8127	973	03/25/2021	03/24/2022
EMI Test Receiver	R&S	ESCI	101342	04/28/2021	04/27/2022
Coaxial Cable	EC Lab	RF-HY-CAB-250	RF-HY-CAB-250-01	03/27/2021	03/26/2022
Pulse Limiter	EC Lab	VTSD 9561F-N	485	03/27/2021	03/26/2022

Note: N.C.R refers to Not Calibrated Required

6.3 EUT Setup

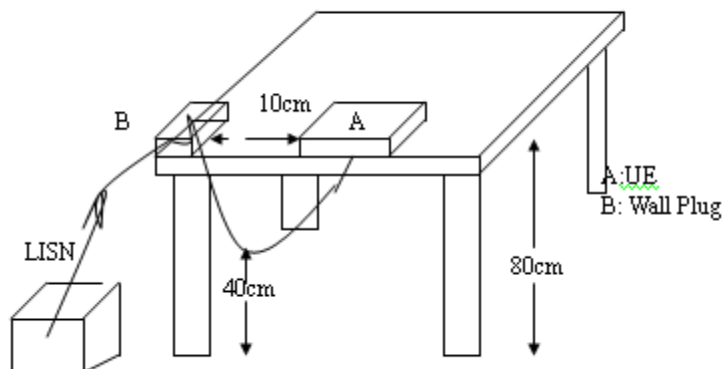
1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.10:2013.
2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
3. The LISN was connected with 120Vac/60Hz power source.

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6.4 Test SET-UP (Block Diagram of Configuration)



6.5 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

6.6 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 :E2/2021/70054

Test Site :Conduction C

Test Mode :WLAN 2.4G

Test Date :2021-08-02

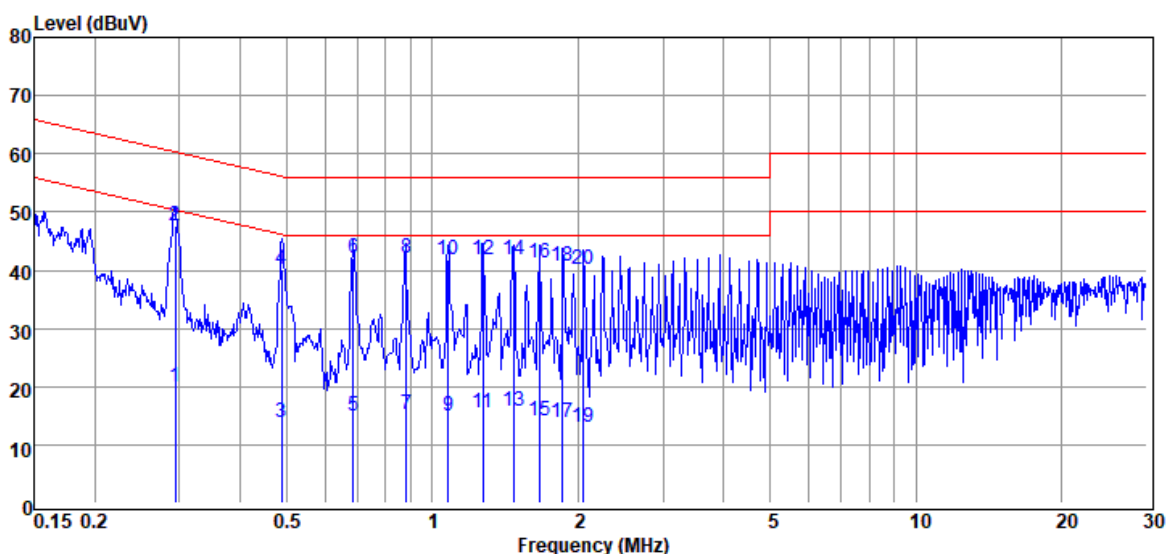
Power :120V/60Hz

Temp./Humi. :24.8/57

Probe :L1

Engineer :Ashton Chiu

Note: : Adapter:FSP05-AHCN3



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
Mode	Reading Level	FS				
MHz	PK/QP/AV	dBμV	dB	dBμV	dBμV	dB
0.29	Average	9.60	10.31	19.91	50.42	-30.51
0.29	QP	37.18	10.31	47.49	60.42	-12.93
0.49	Average	3.49	10.31	13.80	46.22	-32.42
0.49	QP	29.88	10.31	40.19	56.22	-16.03
0.69	Average	4.61	10.33	14.94	46.00	-31.06
0.69	QP	31.79	10.33	42.12	56.00	-13.88
0.88	Average	4.79	10.34	15.13	46.00	-30.87
0.88	QP	31.79	10.34	42.13	56.00	-13.87
1.08	Average	4.56	10.42	14.98	46.00	-31.02
1.08	QP	31.51	10.42	41.93	56.00	-14.07
1.27	Average	4.83	10.63	15.46	46.00	-30.54

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1.27	QP	31.23	10.63	41.86	56.00	-14.14
1.47	Average	5.08	10.80	15.88	46.00	-30.12
1.47	QP	30.90	10.80	41.70	56.00	-14.30
1.67	Average	3.27	10.95	14.22	46.00	-31.78

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Report Number :E2/2021/70054

Test Site :Conduction C

Test Mode :WLAN 2.4G

Test Date :2021-08-02

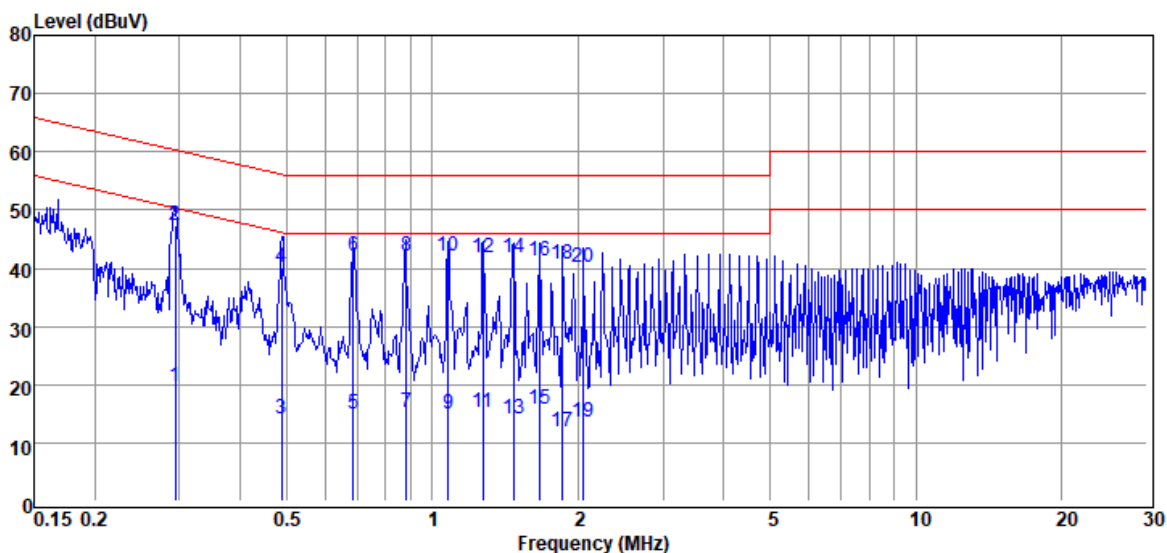
Power :120V/60Hz

Temp./Humi. :24.8/57

Probe :N

Engineer :Ashton Chiu

Note: : Adapter:FSP05-AHCN3



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
Mode		Reading Level		FS		
MHz	PK/QP/AV	dBμV	dB	dBμV	dBμV	dB
0.29	Average	9.27	10.32	19.59	50.42	-30.83
0.29	QP	37.03	10.32	47.35	60.42	-13.07
0.49	Average	3.79	10.32	14.11	46.22	-32.11
0.49	QP	29.69	10.32	40.01	56.22	-16.21
0.69	Average	4.63	10.34	14.97	46.00	-31.03
0.69	QP	31.60	10.34	41.94	56.00	-14.06
0.88	Average	4.83	10.35	15.18	46.00	-30.82
0.88	QP	31.75	10.35	42.10	56.00	-13.90
1.08	Average	4.47	10.43	14.90	46.00	-31.10
1.08	QP	31.65	10.43	42.08	56.00	-13.92
1.27	Average	4.54	10.64	15.18	46.00	-30.82
1.27	QP	31.25	10.64	41.89	56.00	-14.11
1.47	Average	3.36	10.81	14.17	46.00	-31.83

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1.47	QP	30.89	10.81	41.70	56.00	-14.30
1.67	Average	4.75	10.96	15.71	46.00	-30.29

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7 DUTY CYCLE OF TEST SIGNAL

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.

7.1 Measurement Procedure:

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

7.2 Duty Cycle:

	Duty Cycle (%) = Ton / (Ton+Toff)	Duty Factor (dB) =10*log (1/Duty Cycle)	1/T (kHz)	VBW setting (kHz)
802.11b	98.87	0.05	0.12	0.01
802.11g	93.31	0.30	0.72	1.00
802.11n_20	92.89	0.32	0.77	1.00

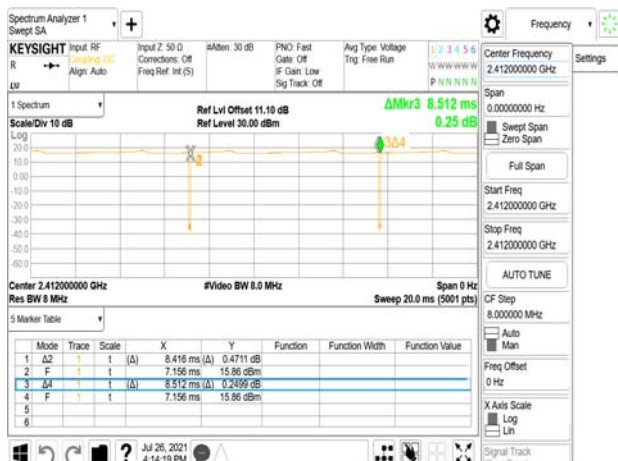
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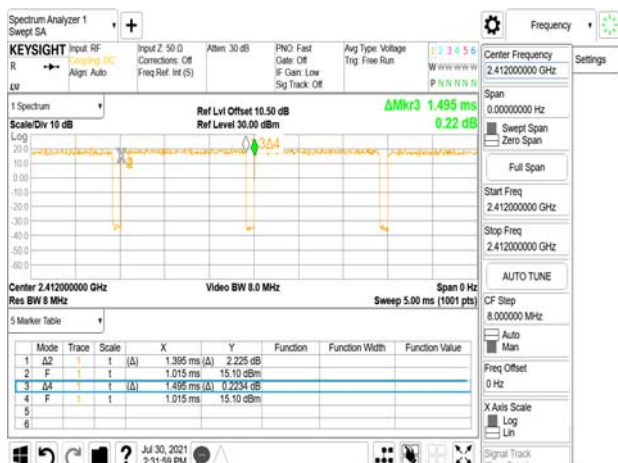
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7.3 Duty Cycle test plots

802.11b_20MHz_Chain0_2412MHz



802.11g_20MHz_Chain0_2412MHz



802.11n_20MHz_Chain0_2412MHz



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8 PEAK OUTPUT POWER MEASUREMENT

8.1 Standard Applicable

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.

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

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.

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

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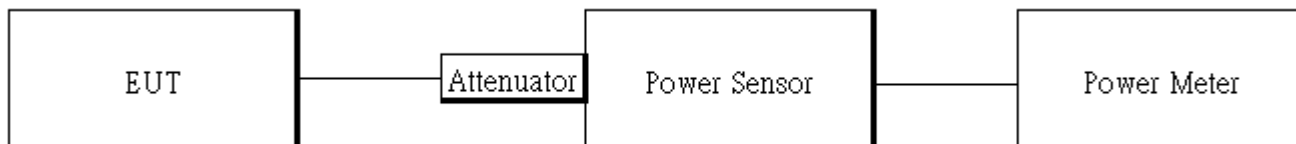
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8.2 Measurement Equipment Used

Conducted Emission Test Site: Conducted D					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	KEYSIGHT	N9010B	MY59071574	06/25/2021	06/25/2022
Power Meter	Anritsu	ML2496A	1804002	04/14/2021	04/13/2022
Power Sensor	Anritsu	MA2411B	1726105	04/14/2021	04/13/2022
Power Sensor	Anritsu	MA2411B	1726106	04/14/2021	04/13/2022
Attenuator	Marvelous	MVE2213-10	RF12	11/19/2020	11/18/2021
Attenuator	Marvelous	WATT-218FS-10	RF16	11/19/2020	11/18/2021
DC Block	PASTERNAK	PE8210	RF158	11/19/2020	11/18/2021
Coaxial Cables	Woken	00100A1F2A196C	RF57	11/19/2020	11/18/2021
Test Software	SGS	Radio Test Software	V21.07.28	N/A	N/A

8.3 Test Set-up

Power Meter:



8.4 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 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.

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

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8.5 Measurement Result

802.11b Ch0						
CH	Freq. (MHz)	Data Rate	Power set	Peak Output Power (dBm)	Limit (dBm)	RESULT
1	2412	1	17	21.12	30.00	PASS
6	2437	1	17	20.97	30.00	PASS
11	2462	1	17	20.83	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	17	17.37	30.00	PASS
6	2437	1	17	17.29	30.00	PASS
11	2462	1	17	17.17	30.00	PASS

802.11b Ch1						
CH	Freq. (MHz)	Data Rate	Power set	Peak Output Power (dBm)	Limit (dBm)	RESULT
1	2412	1	18	20.97	30.00	PASS
6	2437	1	18	20.87	30.00	PASS
11	2462	1	18	20.80	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	18	17.26	30.00	PASS
6	2437	1	18	17.17	30.00	PASS
11	2462	1	18	17.10	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	17	20.64	19.56	23.14	30.00	PASS
6	2437	1	17	20.51	19.49	23.04	30.00	PASS
11	2462	1	17	20.35	19.61	23.01	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	17	17.41	16.75	20.15	30.00	PASS
6	2437	1	17	17.37	16.66	20.09	30.00	PASS
11	2462	1	17	17.42	16.69	20.13	30.00	PASS

802.11g Ch0

CH	Freq. (MHz)	Data Rate	Power set	Peak Output Power (dBm)	Limit (dBm)	RESULT
1	2412	6	14	25.87	30.00	PASS
6	2437	6	14	25.78	30.00	PASS
11	2462	6	14	25.64	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	14	15.45	30.00	PASS
6	2437	6	14	15.40	30.00	PASS
11	2462	6	14	15.35	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	15	25.20	30.00	PASS
6	2437	6	15	25.15	30.00	PASS
11	2462	6	15	25.21	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	15	15.06	30.00	PASS
6	2437	6	15	15.11	30.00	PASS
11	2462	6	15	15.14	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	14	25.75	24.59	28.22	30.00	PASS
6	2437	6	14	25.64	24.41	28.08	30.00	PASS
11	2462	6	14	25.59	24.34	28.02	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	14	15.16	14.68	18.24	30.00	PASS
6	2437	6	14	15.11	14.61	18.18	30.00	PASS
11	2462	6	14	15.21	14.73	18.29	30.00	PASS

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802.11n_HT20M Ch0						
CH	Freq. (MHz)	Data Rate	Power set	Peak Output Power (dBm)	Limit (dBm)	RESULT
1	2412	MCS0	14	25.71	30.00	PASS
6	2437	MCS0	14	25.63	30.00	PASS
11	2462	MCS0	14	25.53	30.00	PASS
802.11n_HT20M Ch0						
CH	Freq. (MHz)	Data Rate	Power set	Max. Avg. Output include tune up tolerance Power (dBm)	Limit (dBm)	RESULT
1	2412	MCS0	14	15.37	30.00	PASS
6	2437	MCS0	14	15.29	30.00	PASS
11	2462	MCS0	14	15.25	30.00	PASS

802.11n_HT20M Ch1						
CH	Freq. (MHz)	Data Rate	Power set	Peak Output Power (dBm)	Limit (dBm)	RESULT
1	2412	MCS0	15	25.01	30.00	PASS
6	2437	MCS0	15	25.05	30.00	PASS
11	2462	MCS0	15	25.04	30.00	PASS
802.11n_HT20M Ch1						
CH	Freq. (MHz)	Data Rate	Power set	Max. Avg. Output include tune up tolerance Power (dBm)	Limit (dBm)	RESULT
1	2412	MCS0	15	15.29	30.00	PASS
6	2437	MCS0	15	15.19	30.00	PASS
11	2462	MCS0	15	15.20	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	15	25.67	24.43	28.10	30.00	PASS
6	2437	MCS8	15	25.46	24.32	27.94	30.00	PASS
11	2462	MCS8	15	25.35	24.21	27.83	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	15	15.27	14.62	18.29	30.00	PASS
6	2437	MCS8	15	15.14	14.55	18.19	30.00	PASS
11	2462	MCS8	15	15.05	14.42	18.08	30.00	PASS

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EIRP

802.11b Ch0							
CH	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	RESULT
1	2412	1	17.37	1.58	18.95	36	PASS
6	2437	1	17.29	1.58	18.87	36	PASS
11	2462	1	17.17	1.58	18.75	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	17.26	1.54	18.80	36	PASS
6	2437	1	17.17	1.54	18.71	36	PASS
11	2462	1	17.10	1.54	18.64	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	17.41	16.75	20.15	4.57	24.72	36	PASS
6	2437	1	17.37	16.66	20.09	4.57	24.66	36	PASS
11	2462	1	17.42	16.69	20.13	4.57	24.70	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	15.45	1.58	17.03	36	PASS
6	2437	6	15.40	1.58	16.98	36	PASS
11	2462	6	15.35	1.58	16.93	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	15.06	1.54	16.60	36	PASS
6	2437	6	15.11	1.54	16.65	36	PASS
11	2462	6	15.14	1.54	16.68	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	15.16	14.68	18.24	4.57	22.81	36	PASS
6	2437	6	15.11	14.61	18.18	4.57	22.75	36	PASS
11	2462	6	15.21	14.73	18.29	4.57	22.86	36	PASS

802.11n_HT20M Ch0							
CH	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	RESULT
1	2412	MCS0	15.37	1.58	16.95	36	PASS
6	2437	MCS0	15.29	1.58	16.87	36	PASS
11	2462	MCS0	15.25	1.58	16.83	36	PASS

802.11n_HT20M Ch1							
CH	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	RESULT
1	2412	MCS0	15.29	1.54	16.83	36	PASS
6	2437	MCS0	15.19	1.54	16.73	36	PASS
11	2462	MCS0	15.20	1.54	16.74	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	25.67	24.43	18.29	4.57	22.86	36	PASS
6	2437	MCS8	25.46	24.32	18.19	4.57	22.76	36	PASS
11	2462	MCS8	25.35	24.21	18.08	4.57	22.65	36	PASS

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9 EMISSION BANDWIDTH MEASUREMENT

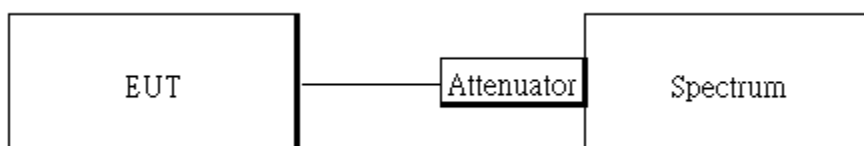
9.1 Standard Applicable

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

9.2 Measurement Equipment Used

Conducted Emission Test Site: Conducted D					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	KEYSIGHT	N9010B	MY59071574	06/25/2021	06/25/2022
Power Meter	Anritsu	ML2496A	1804002	04/14/2021	04/13/2022
Power Sensor	Anritsu	MA2411B	1726105	04/14/2021	04/13/2022
Power Sensor	Anritsu	MA2411B	1726106	04/14/2021	04/13/2022
Attenuator	Marvelous	MVE2213-10	RF12	11/19/2020	11/18/2021
Attenuator	Marvelous	WATT-218FS-10	RF16	11/19/2020	11/18/2021
DC Block	PASTERNAK	PE8210	RF158	11/19/2020	11/18/2021
Coaxial Cables	Woken	00100A1F2 A196C	RF57	11/19/2020	11/18/2021
Test Software	SGS	Radio Test Software	V21.07.28	N/A	N/A

9.3 Test Set-up



9.4 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,

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Detector = Peak, and Max hold for -6dB Bandwidth test.

5. Set the spectrum analyzer as
RBW= 1 % to 5% of 99% Bandwidth ,
VBW $\geq 3 \times$ 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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9.5 6dB Bandwidth

802.11b Ch0

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	8053.00	≥ 500	PASS
2437	8050.00	≥ 500	PASS
2462	8027.00	≥ 500	PASS

802.11g Ch0

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	16360.00	≥ 500	PASS
2437	16360.00	≥ 500	PASS
2462	16360.00	≥ 500	PASS

802.11_n_HT20 Ch0

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	17570.00	≥ 500	PASS
2437	17580.00	≥ 500	PASS
2462	17570.00	≥ 500	PASS

802.11b Ch1

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	7116.00	≥ 500	PASS
2437	7586.00	≥ 500	PASS
2462	7580.00	≥ 500	PASS

802.11g Ch1

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	16420.00	≥ 500	PASS
2437	16390.00	≥ 500	PASS
2462	16410.00	≥ 500	PASS

802.11_n_HT20 Ch1

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	17620.00	≥ 500	PASS
2437	17630.00	≥ 500	PASS
2462	17630.00	≥ 500	PASS

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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

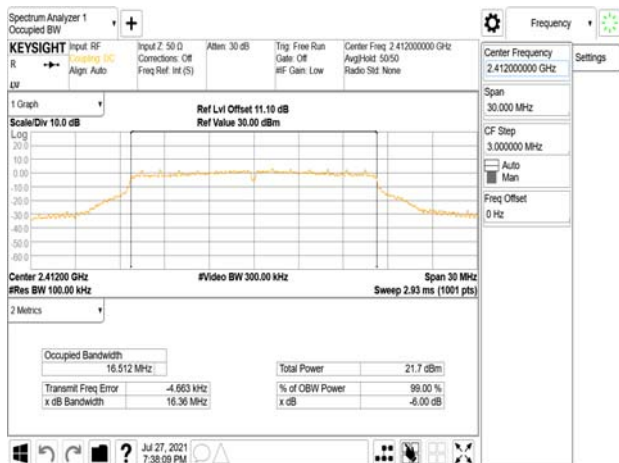


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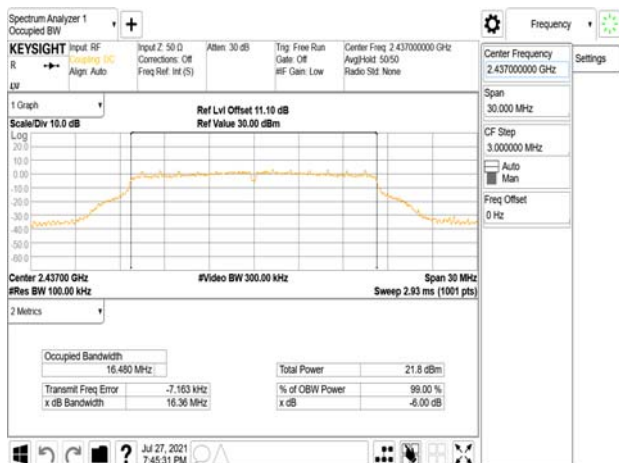
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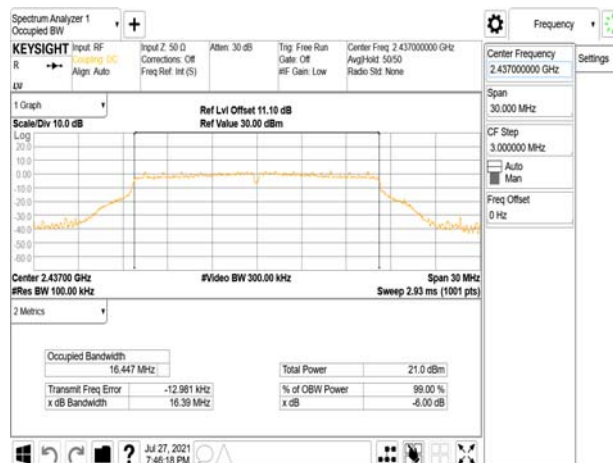
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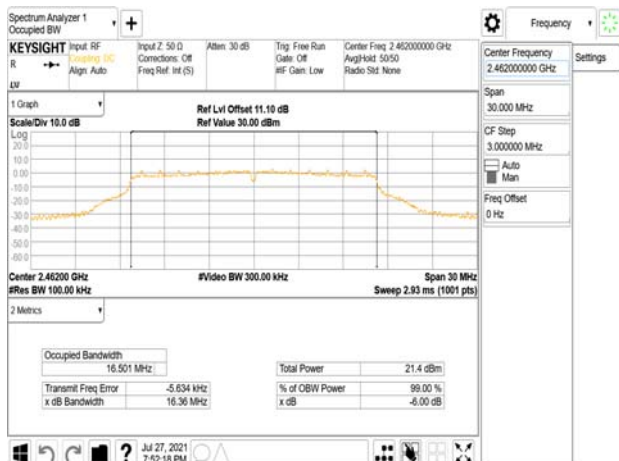
802.11g_20MHz_Chain0_2437MHz



802.11g_20MHz_Chain1_2437MHz



802.11g_20MHz_Chain0_2462MHz



802.11g_20MHz_Chain1_2462MHz

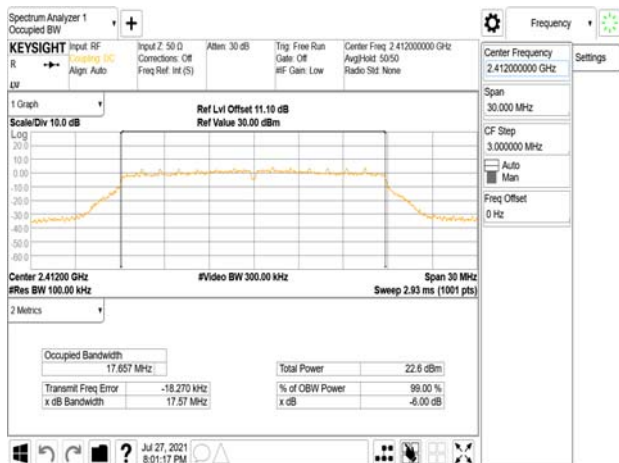


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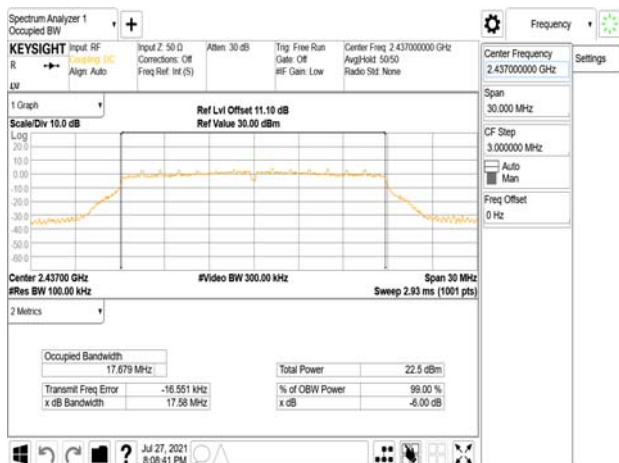
802.11n_20MHz_Chain0_2412MHz



802.11n_20MHz_Chain1_2412MHz



802.11n_20MHz_Chain0_2437MHz



802.11n_20MHz_Chain1_2437MHz



802.11n_20MHz_Chain0_2462MHz



802.11n_20MHz_Chain1_2462MHz



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9.6 99% Bandwidth

802.11b Ch0

Freq. (MHz)	99% BW (MHz)
2412	11.847
2437	12.043
2462	12.122

802.11b Ch1

Freq. (MHz)	99% BW (MHz)
2412	10.64
2437	11.463
2462	11.546

802.11g Ch0

Freq. (MHz)	99% BW (MHz)
2412	16.968
2437	16.932
2462	16.994

802.11g Ch1

Freq. (MHz)	99% BW (MHz)
2412	16.79
2437	16.762
2462	16.772

802.11n_HT20M Ch0

Freq. (MHz)	99% BW (MHz)
2412	18.021
2437	18.015
2462	18.022

802.11n_HT20M Ch1

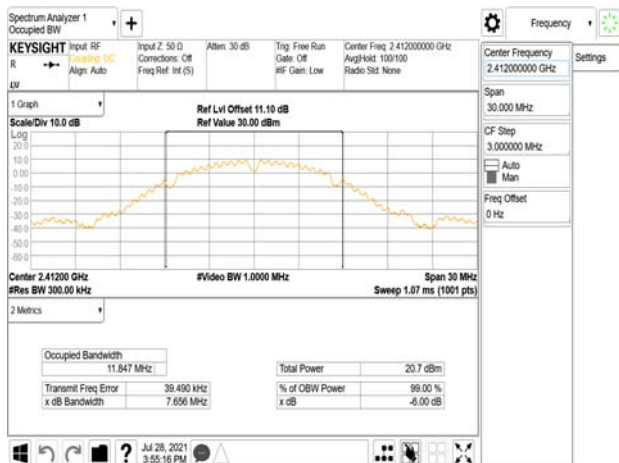
Freq. (MHz)	99% BW (MHz)
2412	17.821
2437	17.818
2462	17.836

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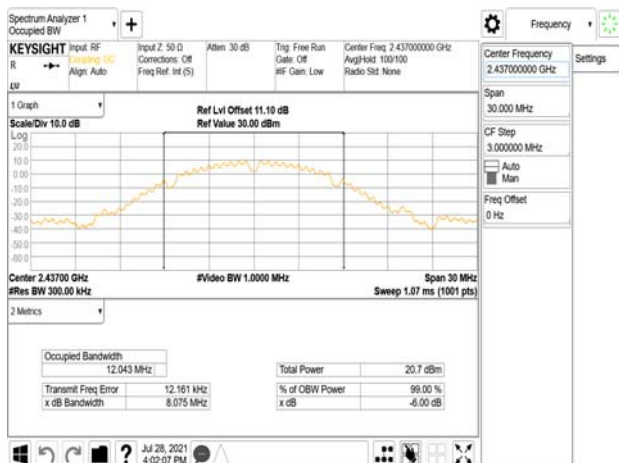
802.11b_20MHz_Chain0_2412MHz



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

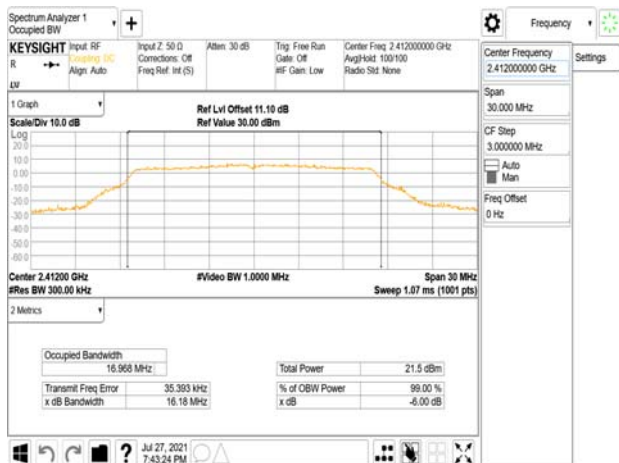


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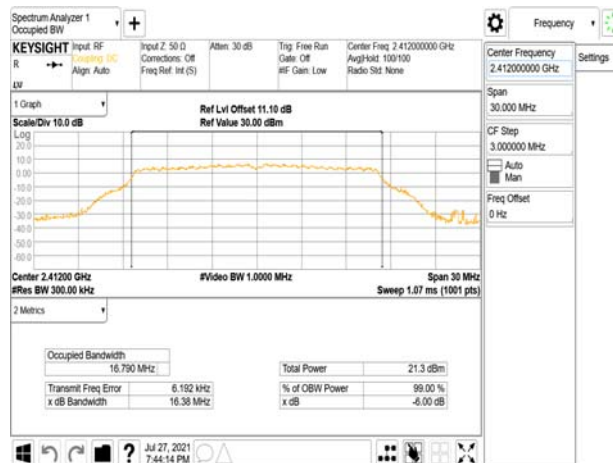
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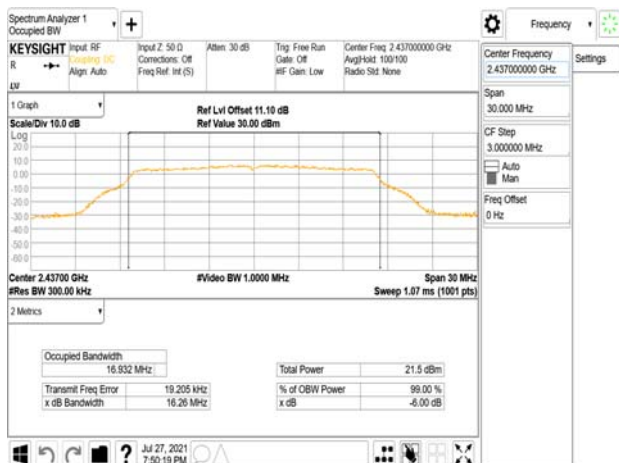
802.11g_20MHz_Chain0_2412MHz



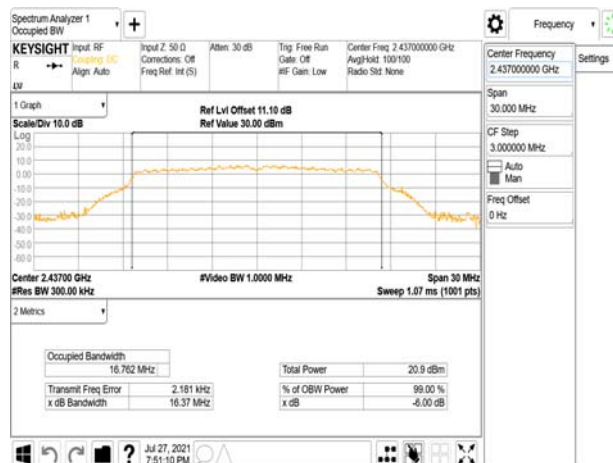
802.11g_20MHz_Chain1_2412MHz



802.11g_20MHz_Chain0_2437MHz



802.11g_20MHz_Chain1_2437MHz



802.11g_20MHz_Chain0_2462MHz



802.11g_20MHz_Chain1_2462MHz

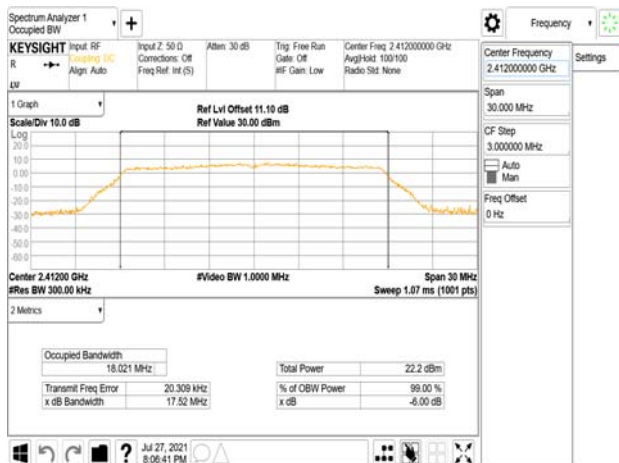


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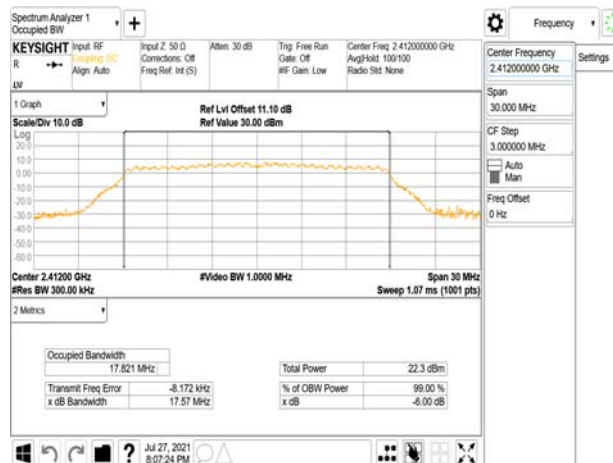
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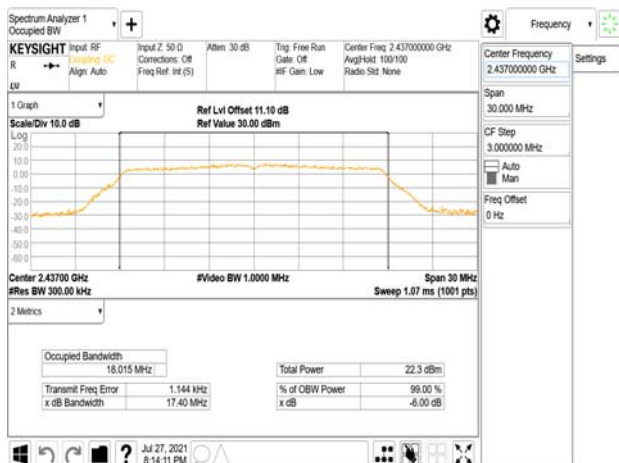
802.11n_20MHz_Chain0_2412MHz



802.11n_20MHz_Chain1_2412MHz



802.11n_20MHz_Chain0_2437MHz



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

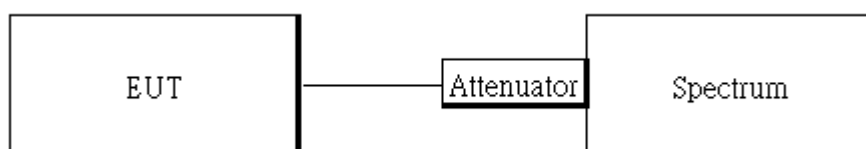
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the 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 Measurement Equipment Used

Conducted Emission Test Site: Conducted D					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	KEYSIGHT	N9010B	MY59071574	06/25/2021	06/25/2022
Power Meter	Anritsu	ML2496A	1804002	04/14/2021	04/13/2022
Power Sensor	Anritsu	MA2411B	1726105	04/14/2021	04/13/2022
Power Sensor	Anritsu	MA2411B	1726106	04/14/2021	04/13/2022
Attenuator	Marvelous	MVE2213-10	RF12	11/19/2020	11/18/2021
Attenuator	Marvelous	WATT-218FS-10	RF16	11/19/2020	11/18/2021
DC Block	PASTERNAK	PE8210	RF158	11/19/2020	11/18/2021
Coaxial Cables	Woken	00100A1F2 A196C	RF57	11/19/2020	11/18/2021
Test Software	SGS	Radio Test Software	V21.07.28	N/A	N/A

10.3 Test SET-UP



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10.4 Measurement Procedure

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.

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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10.5 Measurement Result

Reference Level of Limit 802.11b mode		
Freq. (MHz)	PSD (dBm)	Reference Level of Limit (dBm)
2412	12.53	-7.47
2437	12.49	-7.51
2462	12.10	-7.90

Reference Level of Limit 802.11g mode		
Freq. (MHz)	PSD (dBm)	Reference Level of Limit (dBm)
2412	6.27	-13.73
2437	5.86	-14.14
2462	5.62	-14.38

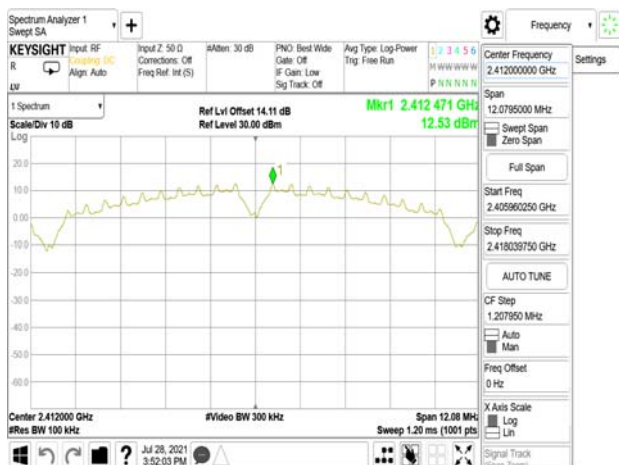
Reference Level of Limit 802.11n20 MODE		
Freq. (MHz)	PSD (dBm)	Reference Level of Limit (dBm)
2412	6.96	-13.04
2437	6.61	-13.39
2462	6.55	-13.45

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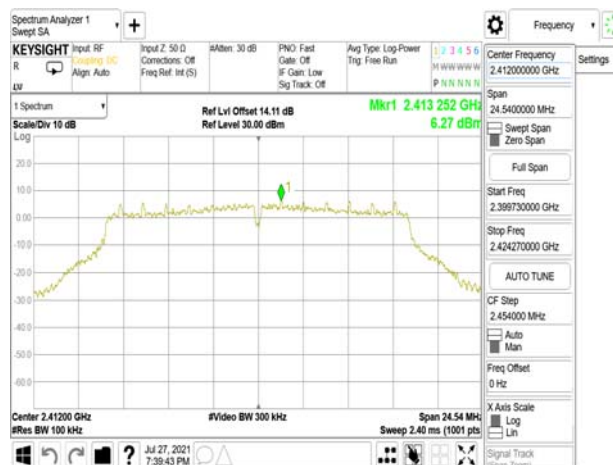
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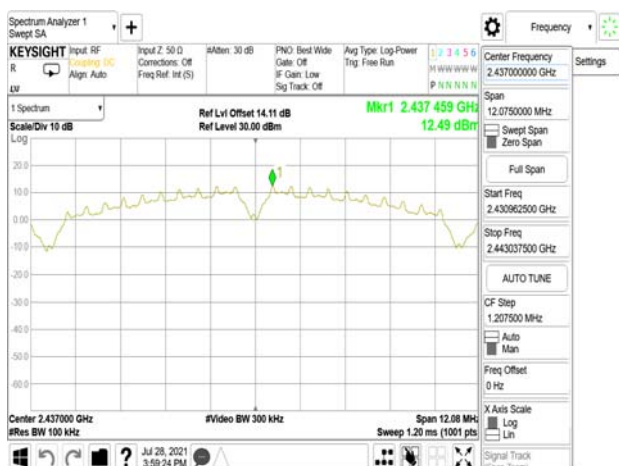
802.11b_20MHz_Chain0_2412MHz



802.11g_20MHz_Chain0_2412MHz



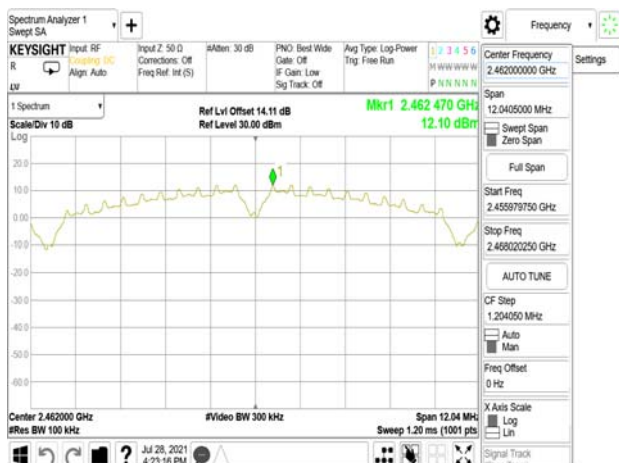
802.11b_20MHz_Chain0_2437MHz



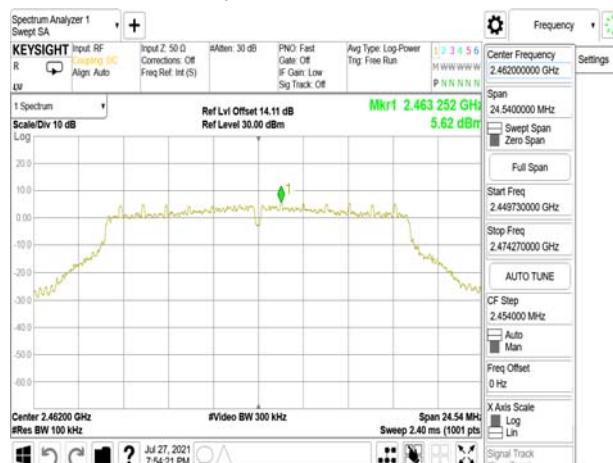
802.11g_20MHz_Chain0_2437MHz



802.11b_20MHz_Chain0_2462MHz



802.11g_20MHz_Chain0_2462MHz

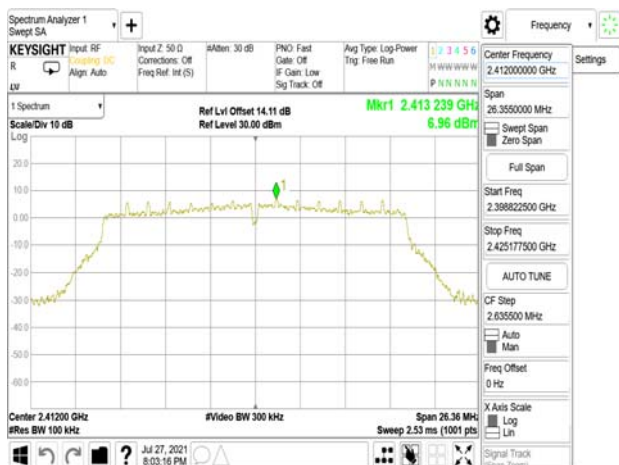


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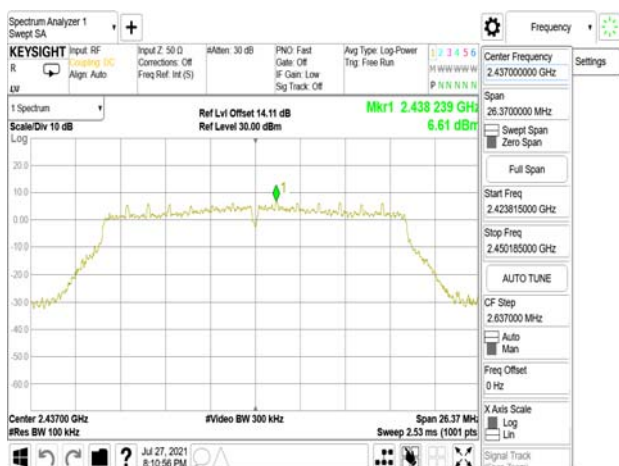
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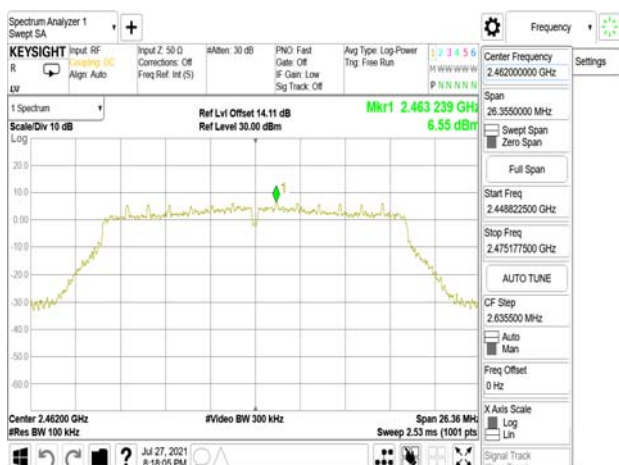
802.11n_20MHz_Chain0_2412MHz



802.11n_20MHz_Chain0_2437MHz



802.11n_20MHz_Chain0_2462MHz



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802.11b_20MHz_Chain0_2412MHz



802.11g_20MHz_Chain0_2462MHz



802.11b_20MHz_Chain0_2462MHz



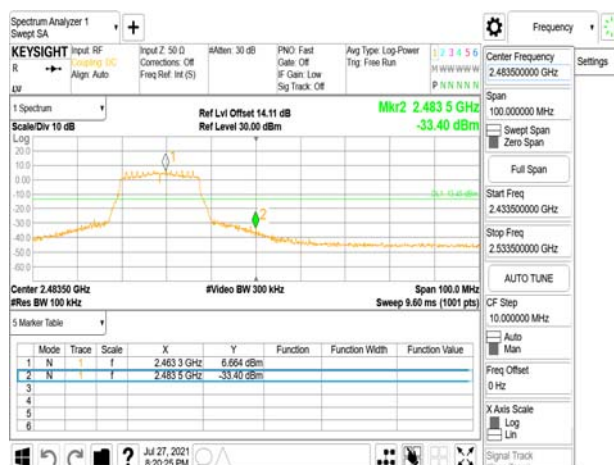
802.11n_20MHz_Chain0_2412MHz



802.11g_20MHz_Chain0_2412MHz



802.11n_20MHz_Chain0_2462MHz

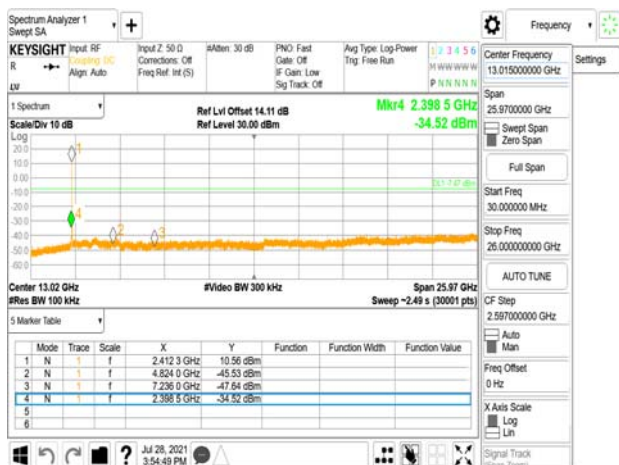


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802.11b_20MHz_Chain0_2412MHz



802.11g_20MHz_Chain0_2412MHz



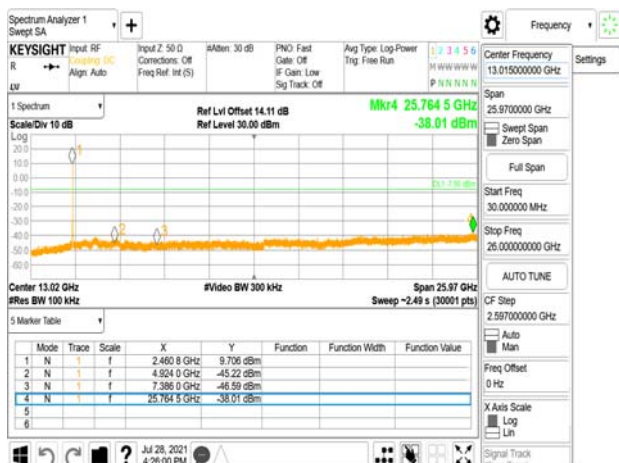
802.11b_20MHz_Chain0_2437MHz



802.11g_20MHz_Chain0_2437MHz



802.11b_20MHz_Chain0_2462MHz



802.11g_20MHz_Chain0_2462MHz

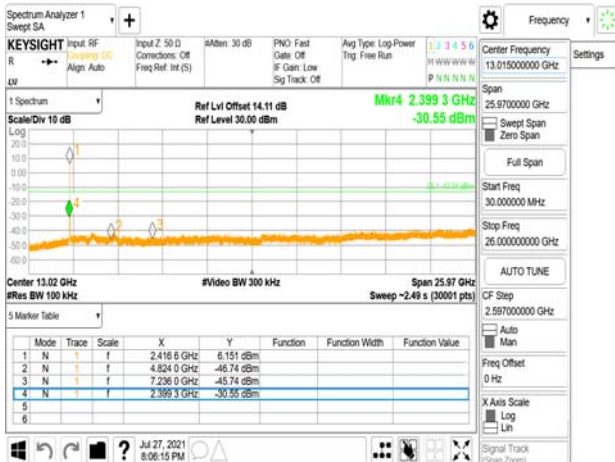


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802.11n_20MHz_Chain0_2412MHz



802.11n_20MHz_Chain0_2437MHz



802.11n_20MHz_Chain0_2462MHz



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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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11.2 Measurement Equipment Used:

Radiated Emission Test Site: SAC C					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Broadband Antenna	TESEQ	CBL 6112D	35240	09/08/2020	09/07/2021
Horn Antenna	Schwarzbeck	BBHA9170	184	12/11/2020	12/10/2021
Horn Antenna	Schwarzbeck	BBHA9120D	1187	01/11/2021	01/10/2022
Loop Antenna	ETS.LINDGR EN	6502	143303	05/07/2021	05/06/2022
EMI Test Receiver	R&S	ESU 40	100363	04/28/2021	04/27/2022
Pre-Amplifier	EMC Instruments	EMC330	980096	11/19/2020	11/18/2021
Pre-Amplifier	EMC Instruments	EMC0011830	980199	11/19/2020	11/18/2021
Pre-Amplifier	EMC Instruments	EMC184045B	980135	10/27/2020	10/26/2021
Attenuator	Marvelous	WATT-218FS- 10	RF20	11/19/2020	11/18/2021
Band Rejection Filter	Micro-Tronics	BRM50701-01	RF201	11/19/2020	11/18/2021
Coaxial Cable	Huber Suhner	SUCOFLEX 104	MY17388/4	11/19/2020	11/18/2021
Coaxial Cable	Huber Suhner	RG 214/U	W22.03	11/19/2020	11/18/2021
Test Software	audix	e3	20923 sgs Ver.9	N.C.R	N.C.R
Notebook	Lenovo	L440	P0000367	N/A	N/A

NOTE: N.C.R refers to Not Calibrated Required.

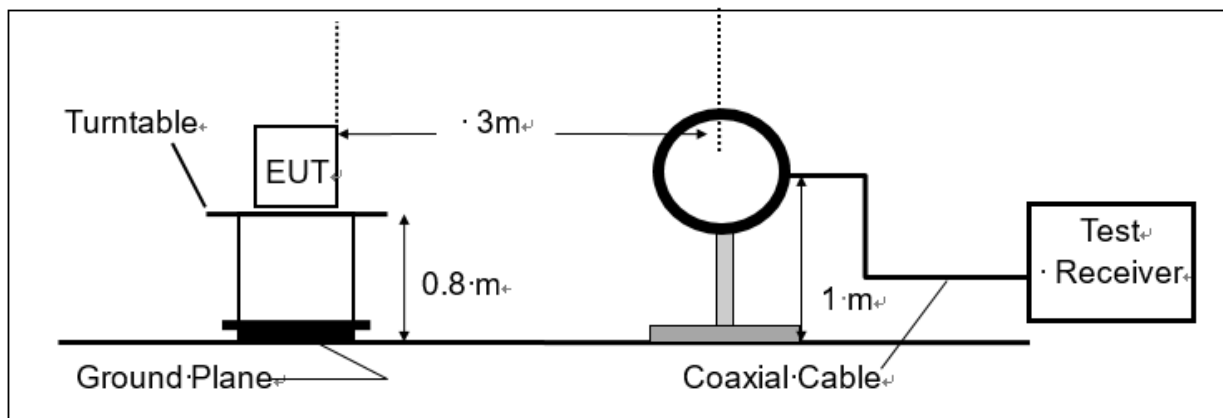
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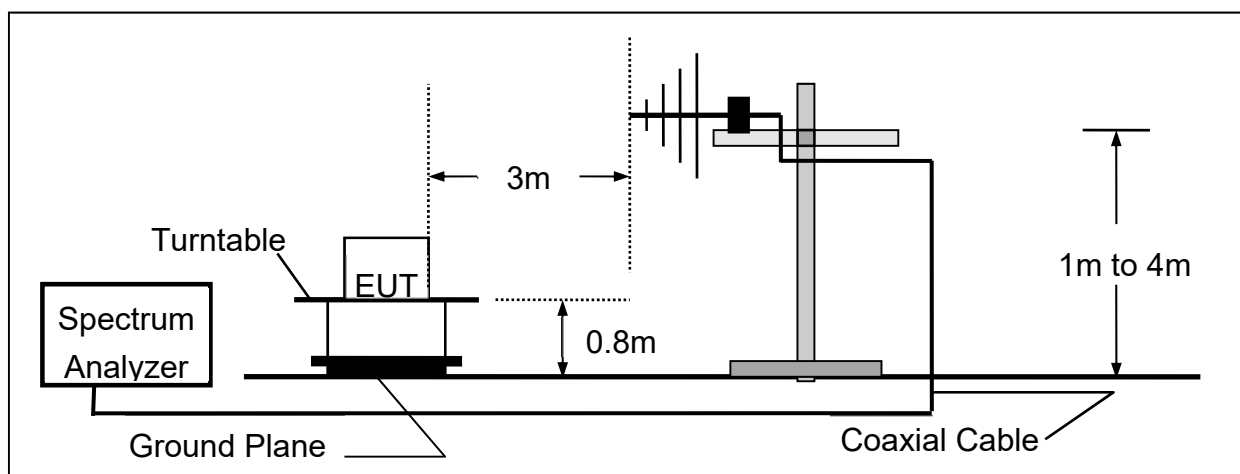
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11.3 Test SET-UP

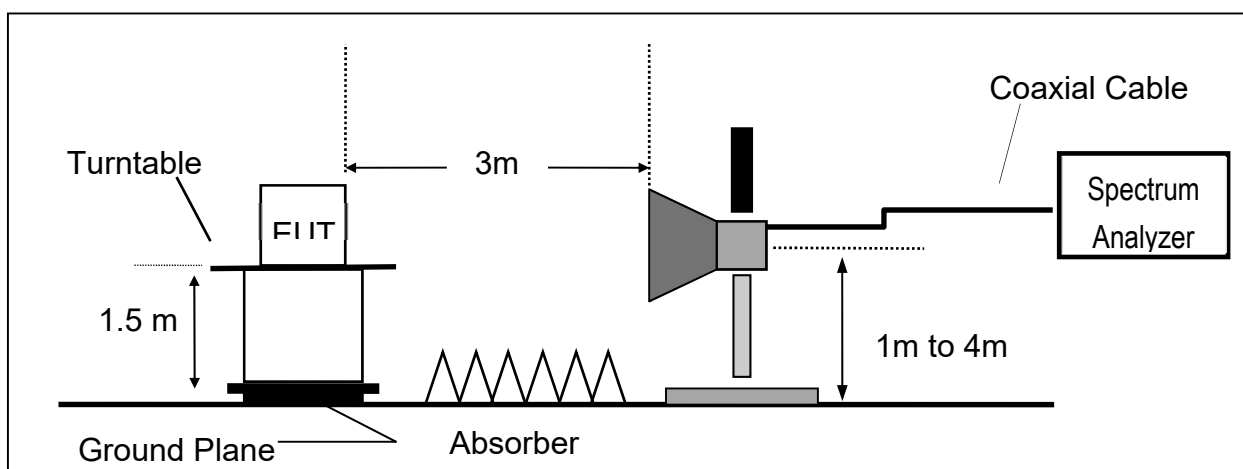
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz.



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



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



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11.4 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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11.5 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 $20 \cdot \log(\mu V/m)$

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

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

11.6 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.

11.7 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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11.7.1 Radiated Band Edge Measurement Result

Report Number :E2/2021/70054

Test Site :SAC C

Operation Mode :802.11b

Test Date :2021-07-30

Test Frequency :2412 MHz

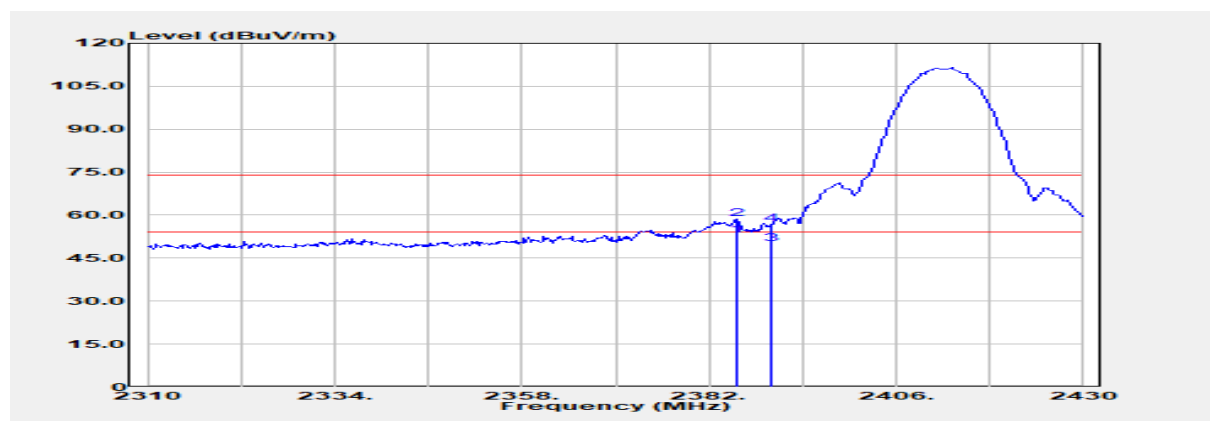
Temp./Humi. :24.1/53

Test Mode :BE CH LOW

Antenna Pol. :Vertical

EUT Pol :E2 Plane

Engineer :Enzo Chang



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2385.577	Average	47.91	4.99	52.90	54.00	-1.10
2385.577	Peak	53.52	4.99	58.51	74.00	-15.49
2390.000	Average	44.64	5.18	49.82	54.00	-4.18
2390.000	Peak	51.52	5.18	56.70	74.00	-17.30

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Report Number :E2/2021/70054

Operation Mode :802.11b

Test Frequency :2412 MHz

Test Mode :BE CH LOW

EUT Pol :E2 Plane

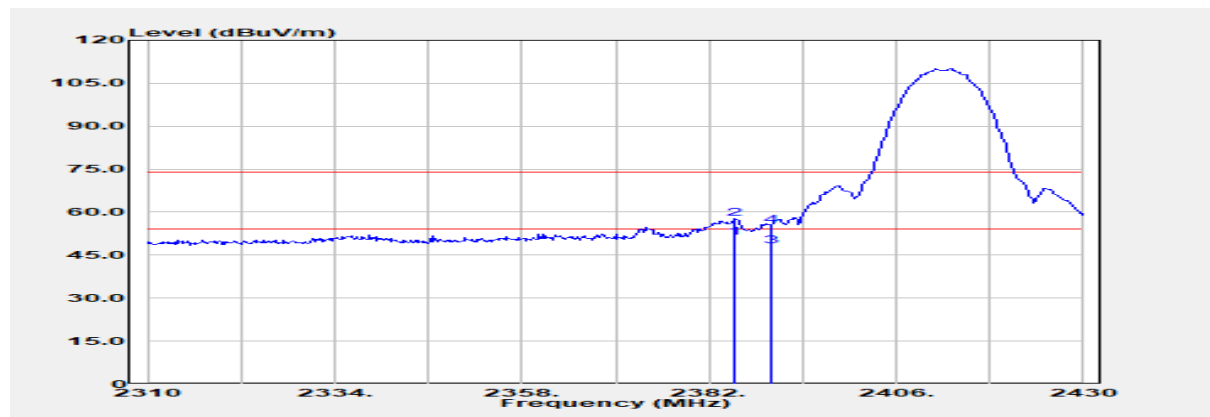
Test Site :SAC C

Test Date :2021-07-30

Temp./Humi. :24.1/53

Antenna Pol. :Horizontal

Engineer :Enzo Chang



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2385.192	Average	46.08	4.97	51.05	54.00	-2.95
2385.192	Peak	52.70	4.97	57.67	74.00	-16.33
2390.000	Average	42.97	5.18	48.15	54.00	-5.85
2390.000	Peak	50.13	5.18	55.31	74.00	-18.69

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Report Number :E2/2021/70054

Test Site :SAC C

Operation Mode :802.11b

Test Date :2021-07-30

Test Frequency :2462 MHz

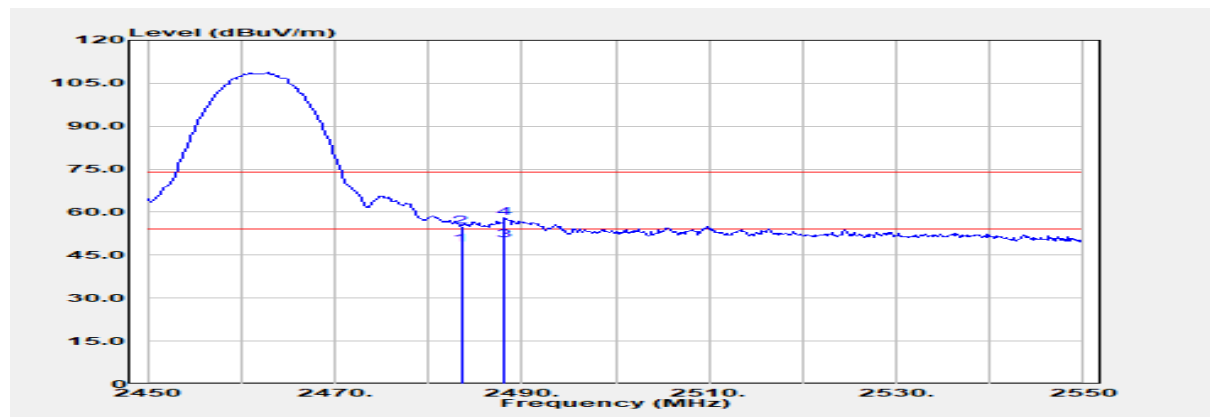
Temp./Humi. :24.1/53

Test Mode :BE CH HIGH

Antenna Pol. :Vertical

EUT Pol :E2 Plane

Engineer :Enzo Chang



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2483.500	Average	44.56	4.04	48.60	54.00	-5.40
2483.500	Peak	51.06	4.04	55.10	74.00	-18.90
2488.141	Average	46.17	3.99	50.16	54.00	-3.84
2488.141	Peak	53.95	3.99	57.94	74.00	-16.06

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Report Number :E2/2021/70054

Test Site :SAC C

Operation Mode :802.11b

Test Date :2021-07-30

Test Frequency :2462 MHz

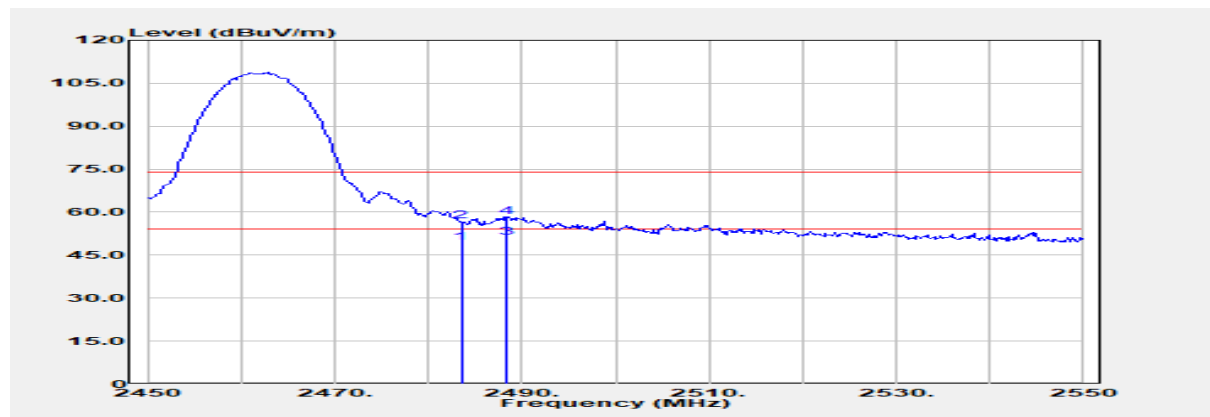
Temp./Humi. :24.1/53

Test Mode :BE CH HIGH

Antenna Pol. :Horizontal

EUT Pol :E2 Plane

Engineer :Enzo Chang



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2483.500	Average	45.18	4.04	49.22	54.00	-4.78
2483.500	Peak	52.83	4.04	56.87	74.00	-17.13
2488.301	Average	47.12	3.99	51.11	54.00	-2.89
2488.301	Peak	54.44	3.99	58.43	74.00	-15.57

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Report Number :E2/2021/70054

Operation Mode :802.11g

Test Frequency :2412 MHz

Test Mode :BE CH LOW

EUT Pol :E2 Plane

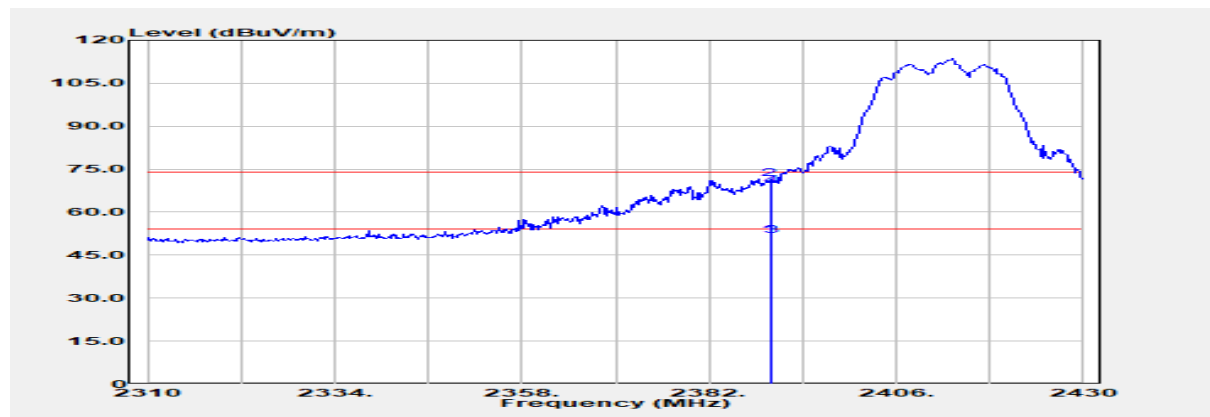
Test Site :SAC C

Test Date :2021-07-30

Temp./Humi. :24.2/62

Antenna Pol. :Vertical

Engineer :Enzo Chang



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2389.808	Average	46.59	5.17	51.76	54.00	-2.24
2389.808	Peak	66.51	5.17	71.69	74.00	-2.31
2390.000	Average	46.55	5.18	51.73	54.00	-2.27
2390.000	Peak	64.05	5.18	69.23	74.00	-4.77

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Report Number :E2/2021/70054

Operation Mode :802.11g

Test Frequency :2412 MHz

Test Mode :BE CH LOW

EUT Pol :E2 Plane

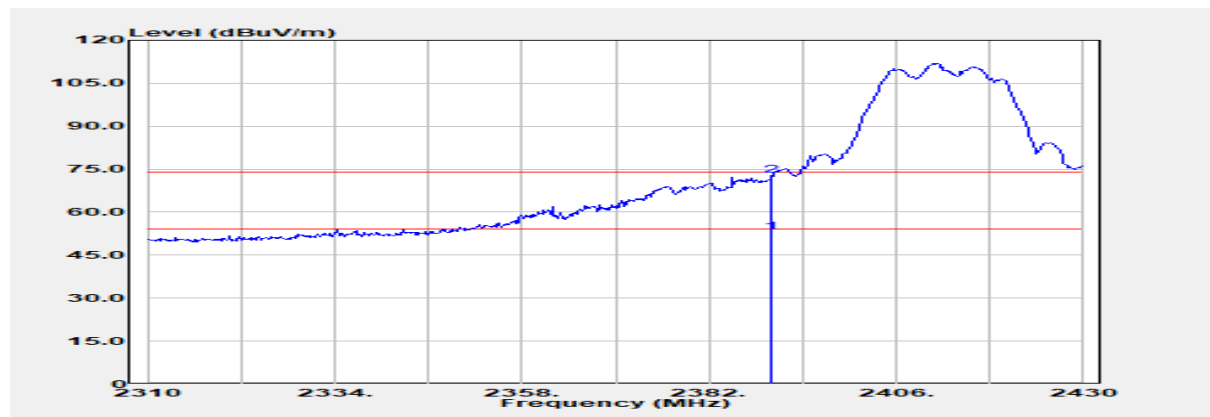
Test Site :SAC C

Test Date :2021-07-30

Temp./Humi. :24.2/62

Antenna Pol. :Horizontal

Engineer :Enzo Chang



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2390.000	Average	47.79	5.18	52.97	54.00	-1.03
2390.000	Peak	67.52	5.18	72.70	74.00	-1.30

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Report Number :E2/2021/70054

Test Site :SAC C

Operation Mode :802.11g

Test Date :2021-07-30

Test Frequency :2462 MHz

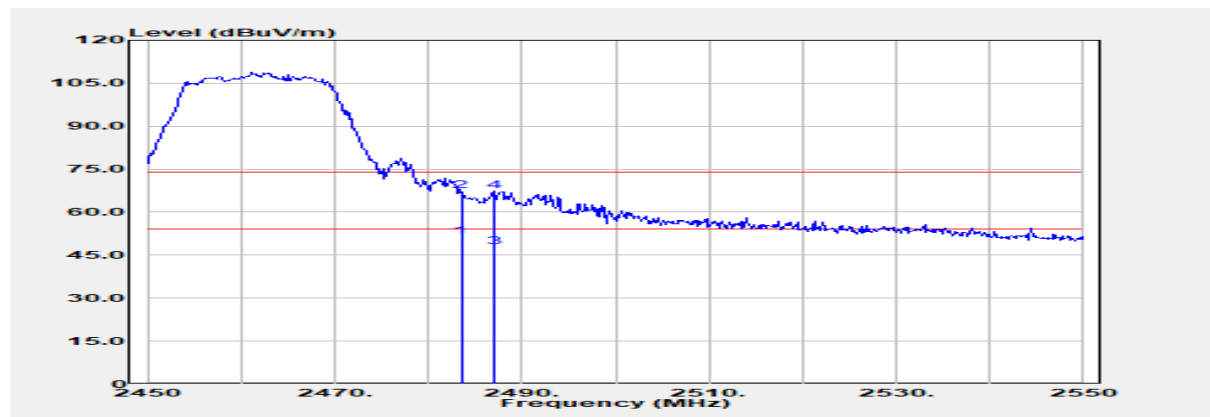
Temp./Humi. :24.2/62

Test Mode :BE CH HIGH

Antenna Pol. :Vertical

EUT Pol :E2 Plane

Engineer :Enzo Chang



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dB μ V	dB	dB μ V/m	dB μ V/m	dB
2483.500	Average	47.41	4.04	51.45	54.00	-2.55
2483.500	Peak	63.19	4.04	67.23	74.00	-6.77
2487.019	Average	43.87	4.00	47.87	54.00	-6.13
2487.019	Peak	63.44	4.00	67.44	74.00	-6.56

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Report Number :E2/2021/70054

Test Site :SAC C

Operation Mode :802.11g

Test Date :2021-07-30

Test Frequency :2462 MHz

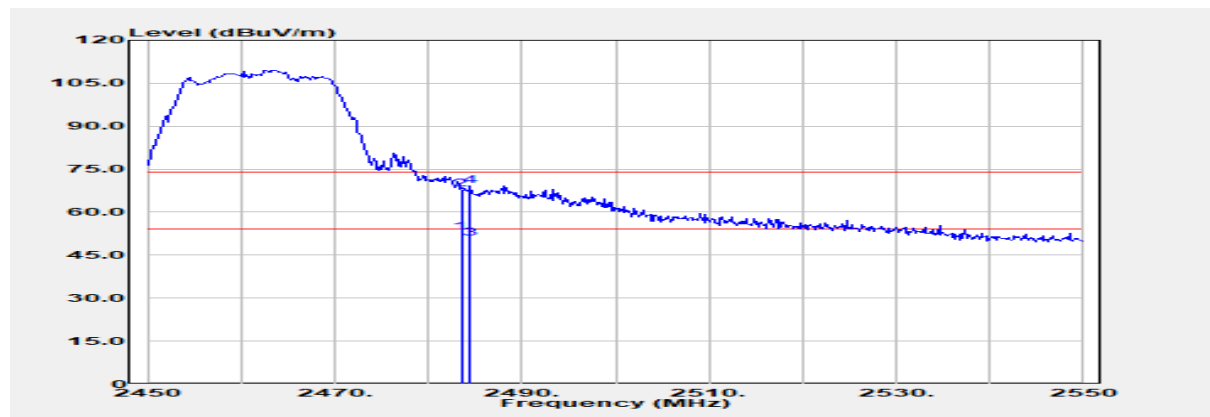
Temp./Humi. :24.2/62

Test Mode :BE CH HIGH

Antenna Pol. :Horizontal

EUT Pol :E2 Plane

Engineer :Enzo Chang



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2483.500	Average	48.79	4.04	52.83	54.00	-1.17
2483.500	Peak	63.88	4.04	67.92	74.00	-6.08
2484.455	Average	46.77	4.03	50.80	54.00	-3.20
2484.455	Peak	65.18	4.03	69.21	74.00	-4.79

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Report Number :E2/2021/70054

Operation Mode :802.11n20

Test Frequency :2412 MHz

Test Mode :BE CH LOW

EUT Pol :E2 Plane

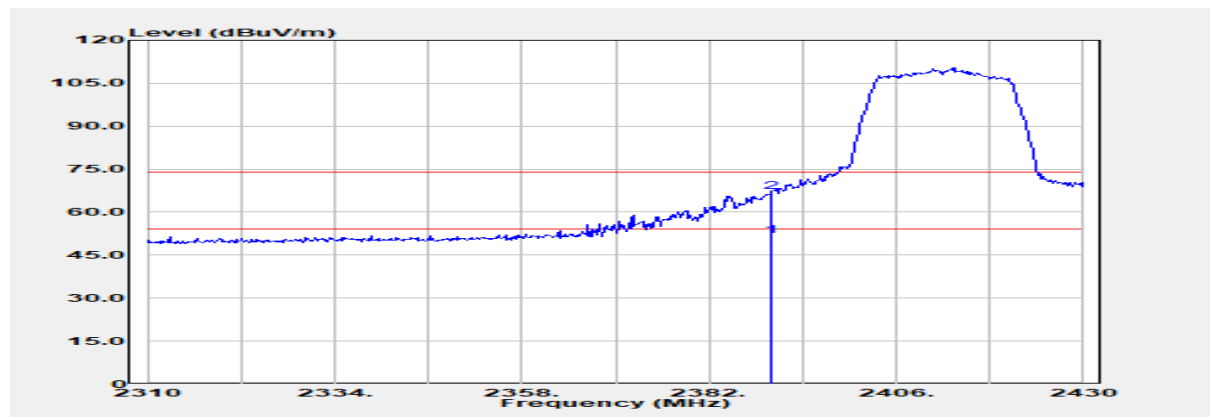
Test Site :SAC C

Test Date :2021-07-30

Temp./Humi. :24.8/55

Antenna Pol. :Vertical

Engineer :Enzo Chang



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dB μ V	dB	dB μ V/m	dB μ V/m	dB
2390.000	Average	46.42	5.18	51.60	54.00	-2.40
2390.000	Peak	61.77	5.18	66.95	74.00	-7.05

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Report Number :E2/2021/70054

Operation Mode :802.11n20

Test Frequency :2412 MHz

Test Mode :BE CH LOW

EUT Pol :E2 Plane

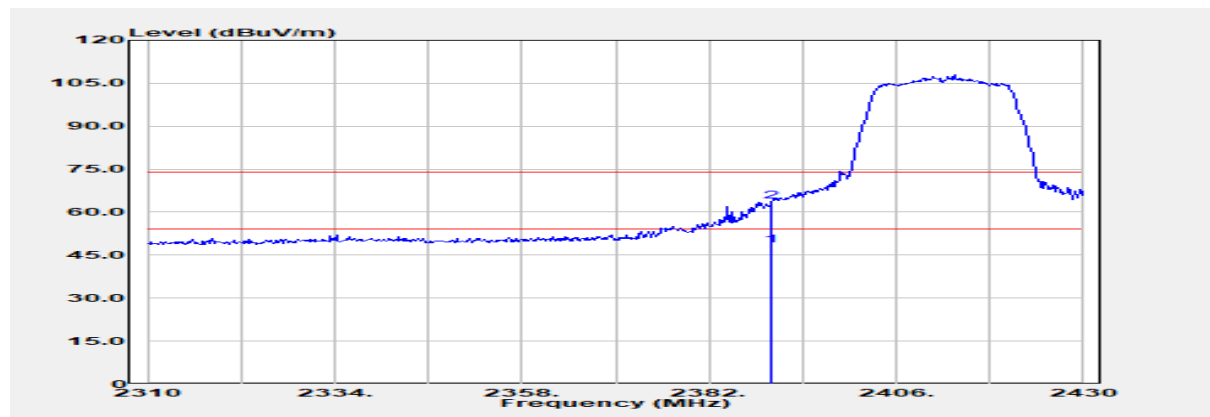
Test Site :SAC C

Test Date :2021-07-30

Temp./Humi. :24.8/55

Antenna Pol. :Horizontal

Engineer :Enzo Chang



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2390.000	Average	43.21	5.18	48.39	54.00	-5.61
2390.000	Peak	58.70	5.18	63.88	74.00	-10.12

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Report Number :E2/2021/70054

Test Site :SAC C

Operation Mode :802.11n20

Test Date :2021-07-30

Test Frequency :2462 MHz

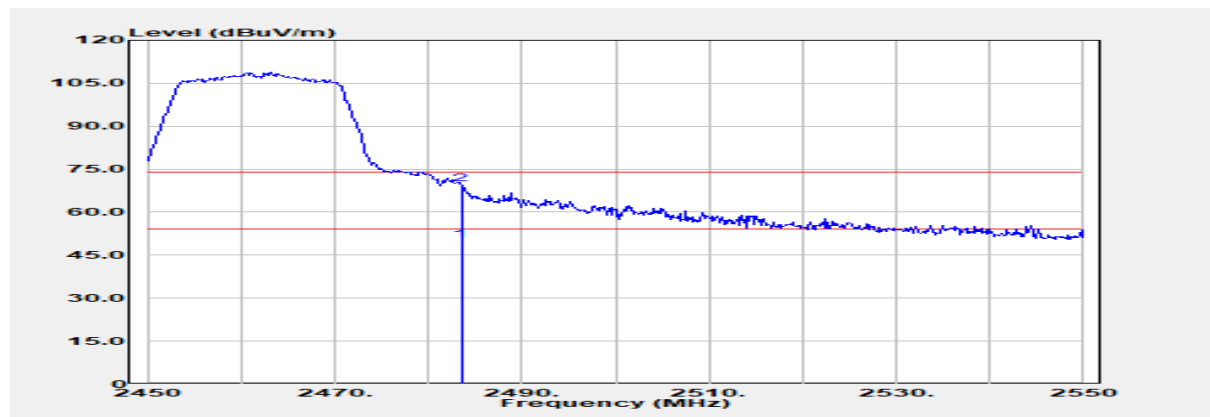
Temp./Humi. :24.8/55

Test Mode :BE CH HIGH

Antenna Pol. :Vertical

EUT Pol :E2 Plane

Engineer :Enzo Chang



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2483.500	Average	46.21	4.04	50.25	54.00	-3.75
2483.500	Peak	65.73	4.04	69.77	74.00	-4.23

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Report Number :E2/2021/70054

Test Site :SAC C

Operation Mode :802.11n20

Test Date :2021-07-30

Test Frequency :2462 MHz

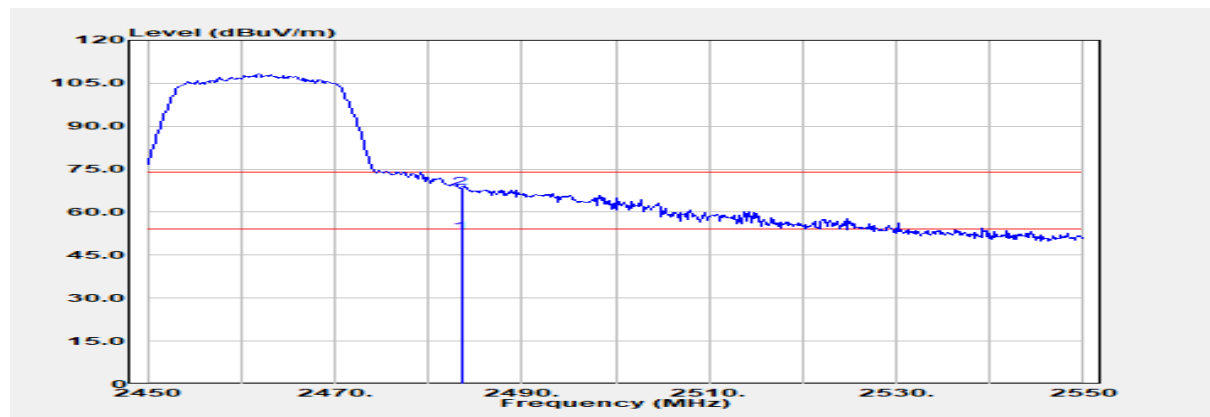
Temp./Humi. :24.8/55

Test Mode :BE CH HIGH

Antenna Pol. :Horizontal

EUT Pol :E2 Plane

Engineer :Enzo Chang



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2483.500	Average	48.90	4.04	52.94	54.00	-1.06
2483.500	Peak	64.39	4.04	68.43	74.00	-5.57

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11.7.2 Spurious Emission:

Report Number :E2/2021/70054

Test Site :SAC C

Operation Mode :802.11g

Test Date :2021-08-02

Test Frequency :2437 MHz

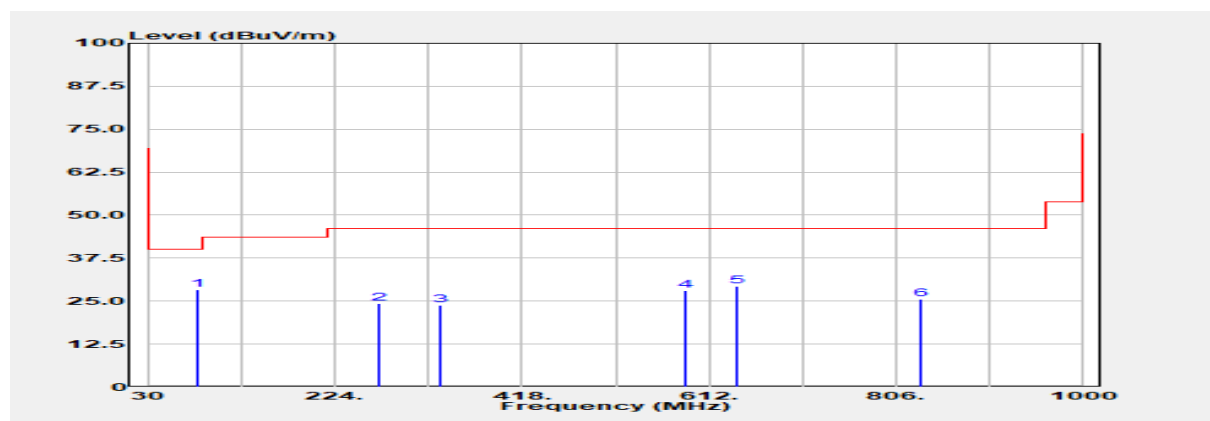
Temp./Humi. :24.3/61

Test Mode :TX CH MID

Antenna Pol. :VERTICAL

EUT Pol :E2 Plane

Engineer :Enzo Chang



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
81.298	Peak	49.98	-21.66	28.32	40.00	-11.68
270.946	Peak	40.25	-15.90	24.34	46.00	-21.66
333.125	Peak	38.51	-14.67	23.84	46.00	-22.16
586.506	Peak	36.95	-8.99	27.96	46.00	-18.04
640.914	Peak	37.44	-8.19	29.25	46.00	-16.75
832.115	Peak	32.43	-6.86	25.57	46.00	-20.43

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Report Number :E2/2021/70054

Test Site :SAC C

Operation Mode :802.11g

Test Date :2021-08-02

Test Frequency :2437 MHz

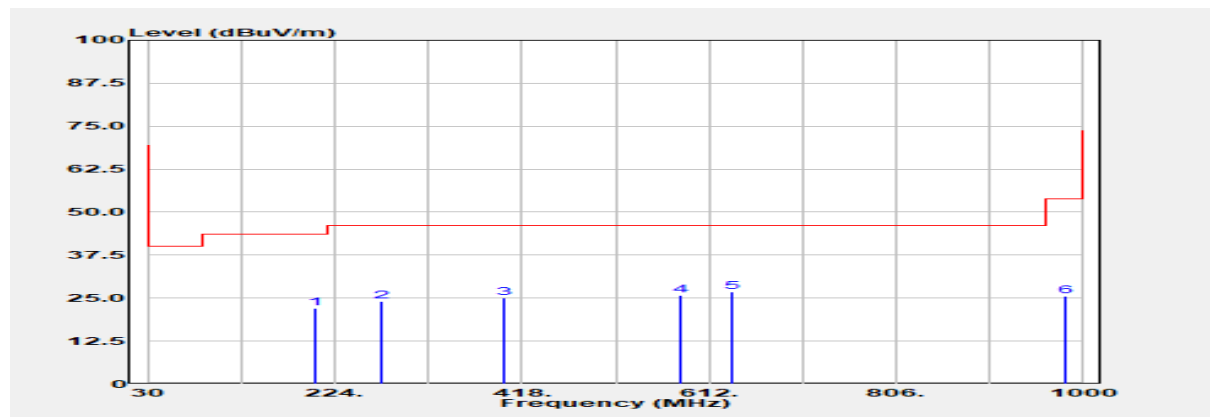
Temp./Humi. :24.3/61

Test Mode :TX CH MID

Antenna Pol. :HORIZONTAL

EUT Pol :E2 Plane

Engineer :Enzo Chang



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
204.103	Peak	41.41	-19.34	22.07	43.50	-21.43
272.500	Peak	39.83	-15.83	23.99	46.00	-22.01
399.968	Peak	37.40	-12.33	25.07	46.00	-20.93
581.843	Peak	34.61	-8.75	25.86	46.00	-20.14
634.696	Peak	35.04	-8.23	26.81	46.00	-19.19
981.346	Peak	30.48	-4.87	25.61	54.00	-28.39

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Report Number :E2/2021/70054

Operation Mode :802.11n20

Test Frequency :2437 MHz

Test Mode :TX CH MID

EUT Pol :E2 Plane

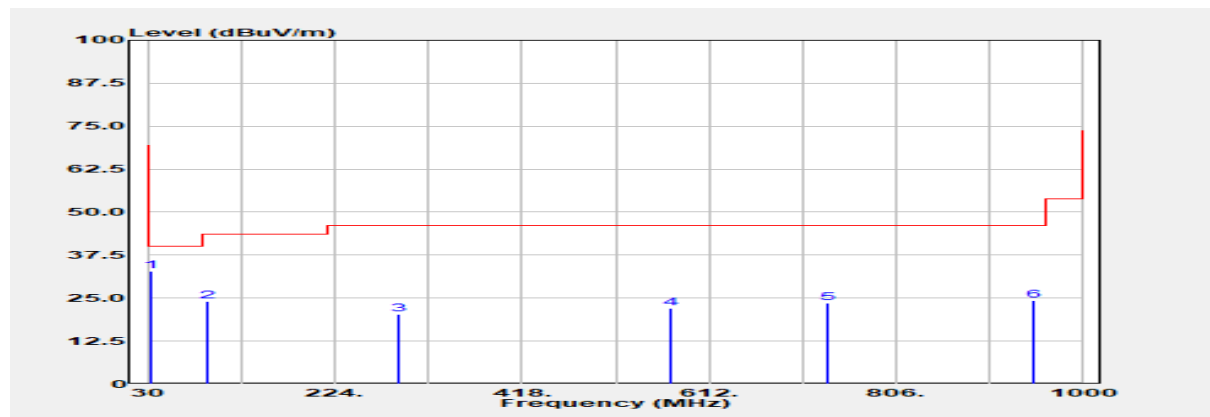
Test Site :SAC C

Test Date :2021-08-02

Temp./Humi. :24.3/61

Antenna Pol. :VERTICAL

Engineer :Enzo Chang



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
33.109	Peak	41.23	-8.39	32.83	40.00	-7.17
92.179	Peak	45.11	-21.00	24.11	43.50	-19.39
291.154	Peak	35.84	-15.50	20.33	46.00	-25.67
572.516	Peak	31.16	-9.00	22.16	46.00	-23.84
735.737	Peak	30.92	-7.35	23.57	46.00	-22.43
948.702	Peak	29.70	-5.30	24.40	46.00	-21.60

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Report Number :E2/2021/70054

Operation Mode :802.11n20

Test Frequency :2437 MHz

Test Mode :TX CH MID

EUT Pol :E2 Plane

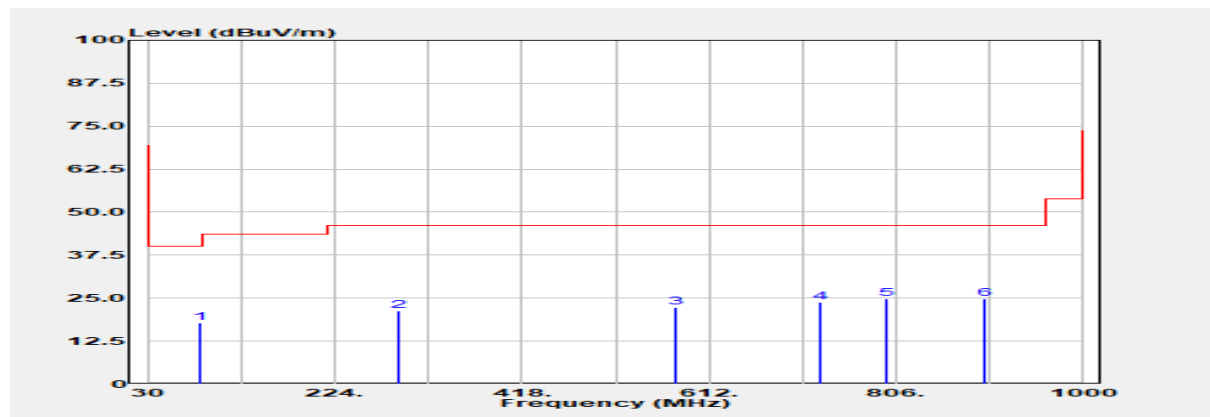
Test Site :SAC C

Test Date :2021-08-02

Temp./Humi. :24.3/61

Antenna Pol. :HORIZONTAL

Engineer :Enzo Chang



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
84.407	Peak	39.26	-21.59	17.67	40.00	-22.33
291.154	Peak	36.69	-15.50	21.18	46.00	-24.82
577.180	Peak	31.06	-8.75	22.30	46.00	-23.70
726.410	Peak	31.57	-7.72	23.85	46.00	-22.15
794.808	Peak	31.45	-6.73	24.72	46.00	-21.28
897.404	Peak	30.48	-5.70	24.79	46.00	-21.21

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Report Number :E2/2021/70054

Operation Mode :802.11b

Test Frequency :2412 MHz

Test Mode :TX CH LOW

EUT Pol :E2 Plane

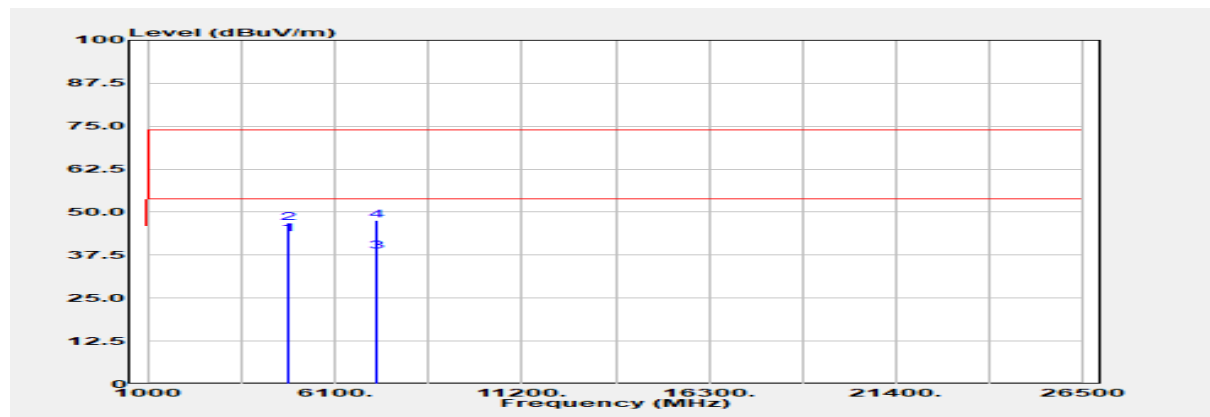
Test Site :SAC C

Test Date :2021-07-31

Temp./Humi. :23.5/62

Antenna Pol. :Vertical

Engineer :Ashton Chiu



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
4824.000	Average	32.97	10.61	43.58	54.00	-10.42
4824.000	Peak	36.20	10.61	46.81	74.00	-27.19
7236.000	Average	20.91	17.62	38.53	54.00	-15.47
7236.000	Peak	29.99	17.62	47.61	74.00	-26.39

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Report Number :E2/2021/70054

Operation Mode :802.11b

Test Frequency :2412 MHz

Test Mode :TX CH LOW

EUT Pol :E2 Plane

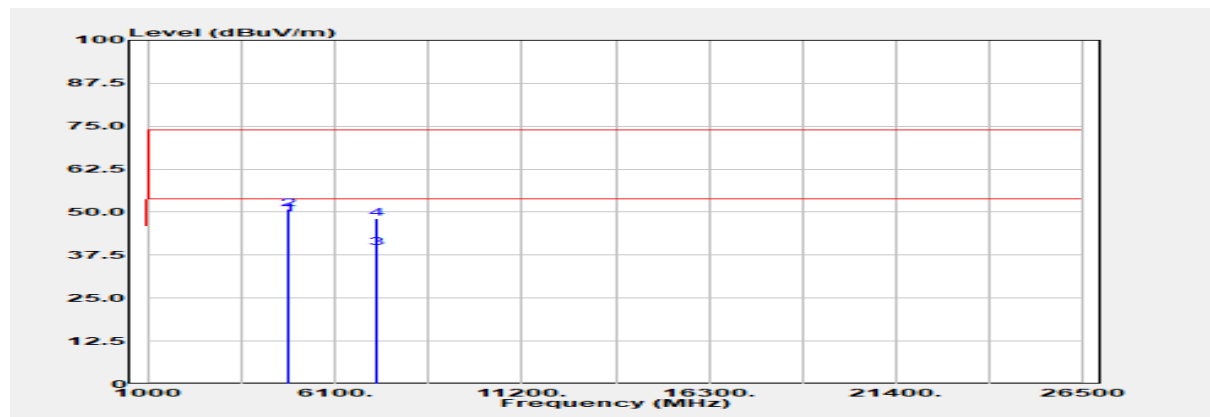
Test Site :SAC C

Test Date :2021-07-31

Temp./Humi. :23.5/62

Antenna Pol. :Horizontal

Engineer :Ashton Chiu



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dB μ V	dB	dB μ V/m	dB μ V/m	dB
4824.000	Average	38.66	10.61	49.27	54.00	-4.73
4824.000	Peak	40.33	10.61	50.93	74.00	-23.07
7236.000	Average	21.86	17.62	39.48	54.00	-14.52
7236.000	Peak	30.60	17.62	48.22	74.00	-25.78

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Report Number :E2/2021/70054

Test Site :SAC C

Operation Mode :802.11b

Test Date :2021-07-31

Test Frequency :2437 MHz

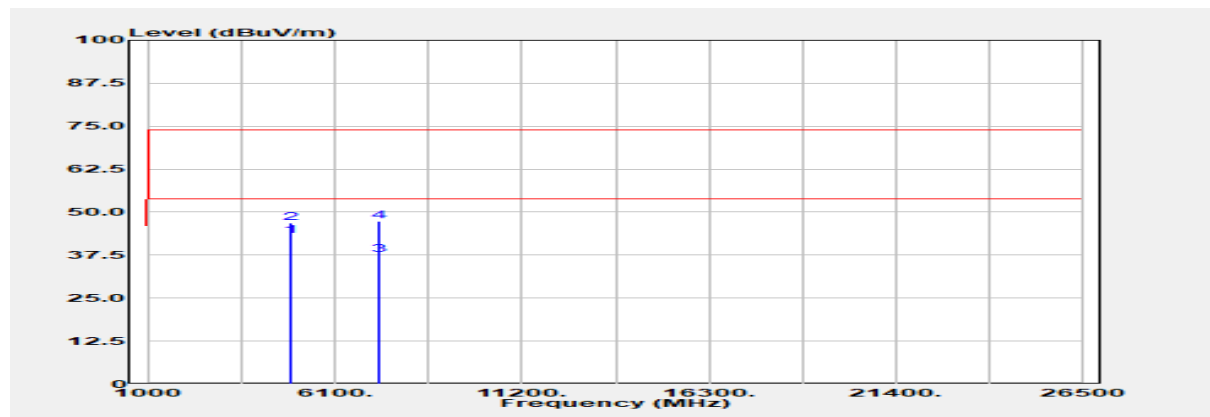
Temp./Humi. :23.5/62

Test Mode :TX CH MID

Antenna Pol. :Vertical

EUT Pol :E2 Plane

Engineer :Ashton Chiu



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dB μ V	dB	dB μ V/m	dB μ V/m	dB
4874.000	Average	32.77	10.38	43.15	54.00	-10.85
4874.000	Peak	36.52	10.38	46.90	74.00	-27.10
7311.000	Average	19.55	17.97	37.52	54.00	-16.48
7311.000	Peak	29.40	17.97	47.37	74.00	-26.63

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Report Number :E2/2021/70054

Test Site :SAC C

Operation Mode :802.11b

Test Date :2021-07-31

Test Frequency :2437 MHz

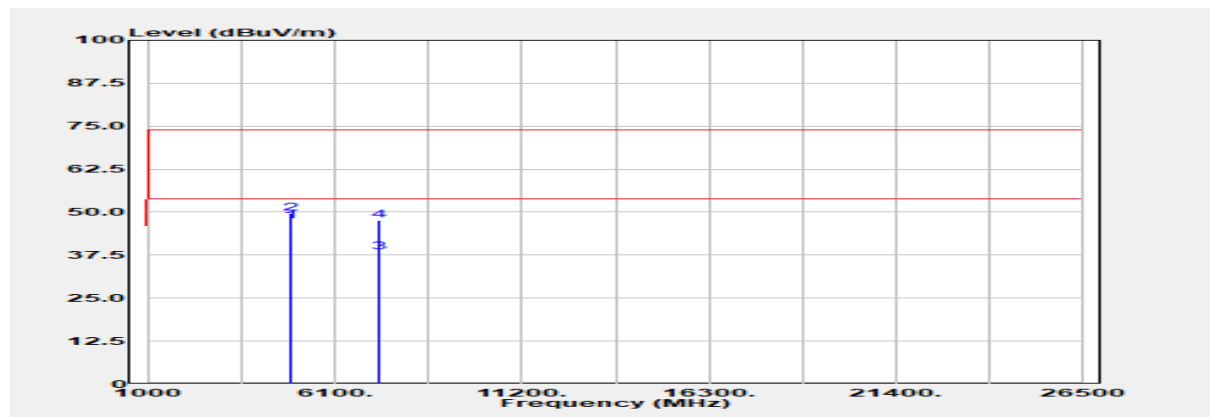
Temp./Humi. :23.5/62

Test Mode :TX CH MID

Antenna Pol. :Horizontal

EUT Pol :E2 Plane

Engineer :Ashton Chiu



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dB μ V	dB	dB μ V/m	dB μ V/m	dB
4874.000	Average	36.92	10.38	47.30	54.00	-6.70
4874.000	Peak	39.30	10.38	49.68	74.00	-24.32
7311.000	Average	20.38	17.97	38.35	54.00	-15.65
7311.000	Peak	29.65	17.97	47.62	74.00	-26.38

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Report Number :E2/2021/70054

Operation Mode :802.11b

Test Frequency :2462 MHz

Test Mode :TX CH HIGH

EUT Pol :E2 Plane

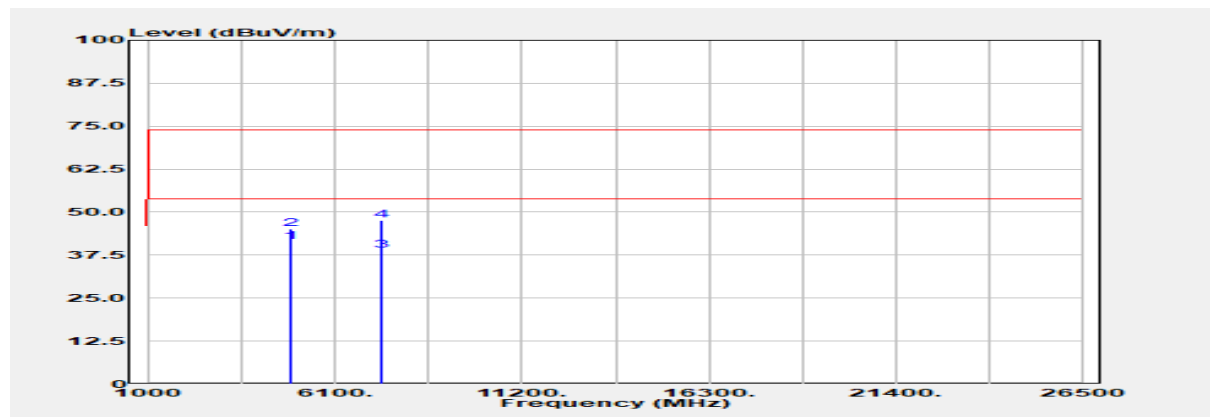
Test Site :SAC C

Test Date :2021-07-31

Temp./Humi. :23.5/62

Antenna Pol. :Vertical

Engineer :Ashton Chiu



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dB μ V	dB	dB μ V/m	dB μ V/m	dB
4924.000	Average	31.29	10.12	41.41	54.00	-12.59
4924.000	Peak	34.97	10.12	45.09	74.00	-28.91
7386.000	Average	20.63	18.22	38.85	54.00	-15.15
7386.000	Peak	29.43	18.22	47.65	74.00	-26.35

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Report Number :E2/2021/70054

Operation Mode :802.11b

Test Frequency :2462 MHz

Test Mode :TX CH HIGH

EUT Pol :E2 Plane

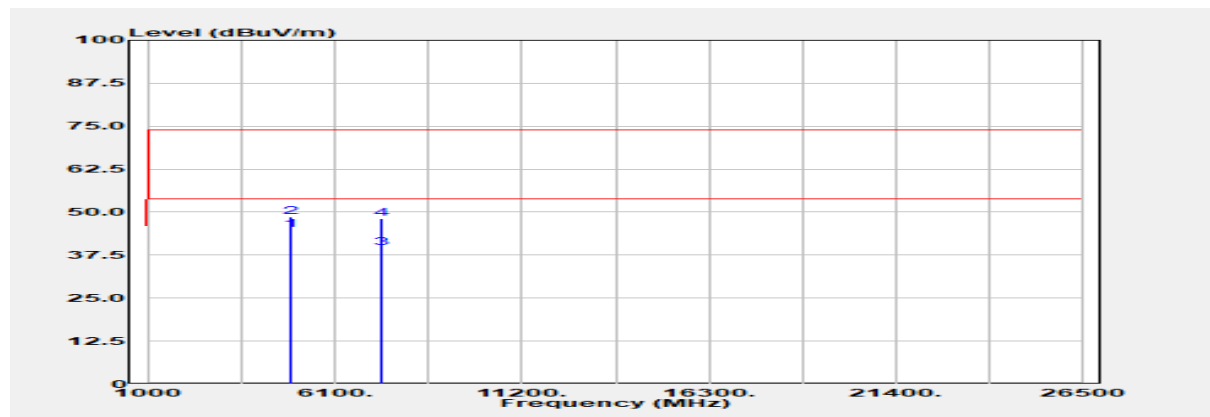
Test Site :SAC C

Test Date :2021-07-31

Temp./Humi. :23.5/62

Antenna Pol. :Horizontal

Engineer :Ashton Chiu



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dB μ V	dB	dB μ V/m	dB μ V/m	dB
4924.000	Average	34.79	10.12	44.91	54.00	-9.09
4924.000	Peak	38.53	10.12	48.65	74.00	-25.35
7386.000	Average	21.44	18.22	39.66	54.00	-14.34
7386.000	Peak	30.02	18.22	48.24	74.00	-25.76

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Report Number :E2/2021/70054

Test Site :SAC C

Operation Mode :802.11g

Test Date :2021-07-31

Test Frequency :2412 MHz

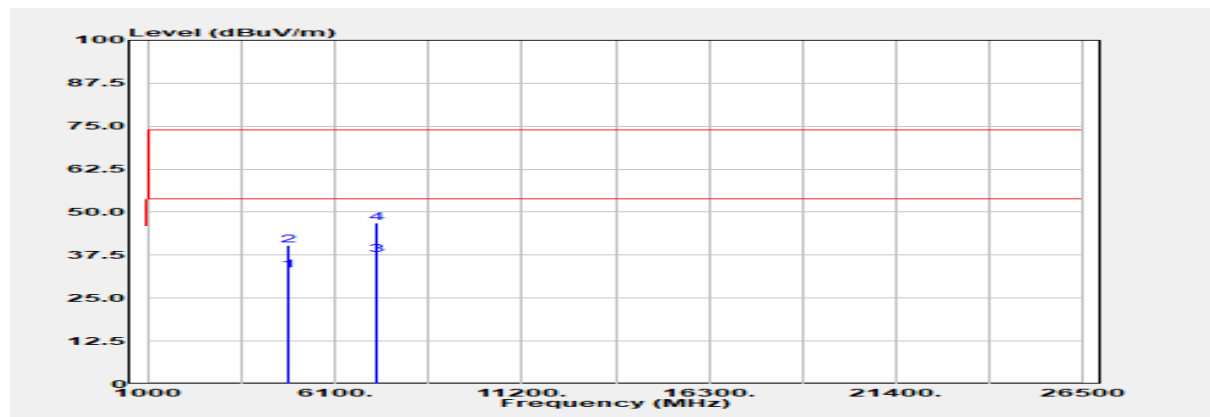
Temp./Humi. :24.3/57

Test Mode :TX CH LOW

Antenna Pol. :Vertical

EUT Pol :E2 Plane

Engineer :Ashton Chiu



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
4824.000	Average	22.36	10.61	32.97	54.00	-21.03
4824.000	Peak	29.72	10.61	40.32	74.00	-33.68
7236.000	Average	19.96	17.62	37.58	54.00	-16.42
7236.000	Peak	29.22	17.62	46.84	74.00	-27.16

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Report Number :E2/2021/70054

Test Site :SAC C

Operation Mode :802.11g

Test Date :2021-07-31

Test Frequency :2412 MHz

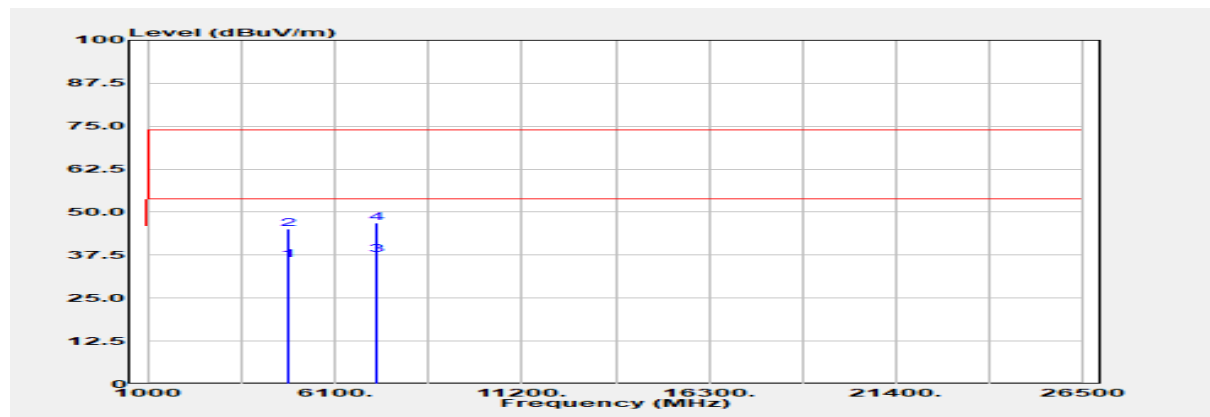
Temp./Humi. :24.3/57

Test Mode :TX CH LOW

Antenna Pol. :Horizontal

EUT Pol :E2 Plane

Engineer :Ashton Chiu



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
4824.000	Average	25.38	10.61	35.99	54.00	-18.01
4824.000	Peak	34.44	10.61	45.05	74.00	-28.95
7236.000	Average	19.97	17.62	37.59	54.00	-16.41
7236.000	Peak	29.14	17.62	46.76	74.00	-27.24

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Report Number :E2/2021/70054

Test Site :SAC C

Operation Mode :802.11g

Test Date :2021-07-31

Test Frequency :2437 MHz

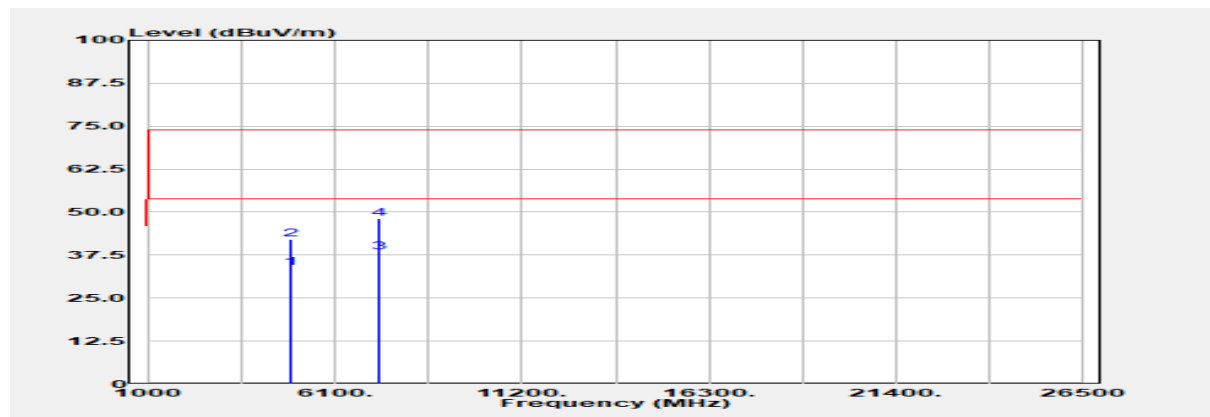
Temp./Humi. :24.3/57

Test Mode :TX CH MID

Antenna Pol. :Vertical

EUT Pol :E2 Plane

Engineer :Ashton Chiu



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
4874.000	Average	23.34	10.38	33.72	54.00	-20.28
4874.000	Peak	31.76	10.38	42.14	74.00	-31.86
7311.000	Average	20.28	17.97	38.25	54.00	-15.75
7311.000	Peak	30.16	17.97	48.14	74.00	-25.86

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Report Number :E2/2021/70054

Operation Mode :802.11g

Test Frequency :2437 MHz

Test Mode :TX CH MID

EUT Pol :E2 Plane

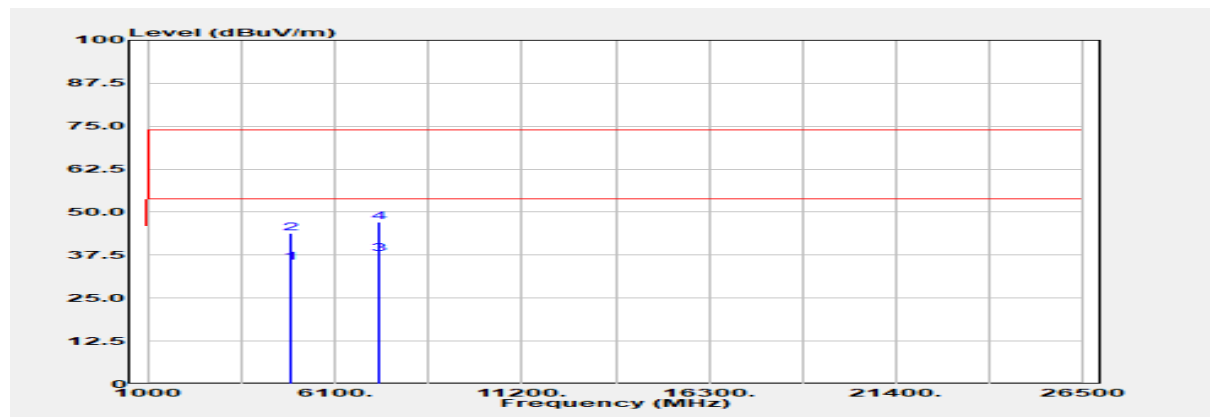
Test Site :SAC C

Test Date :2021-07-31

Temp./Humi. :24.3/57

Antenna Pol. :Horizontal

Engineer :Ashton Chiu



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dB μ V	dB	dB μ V/m	dB μ V/m	dB
4874.000	Average	25.01	10.38	35.39	54.00	-18.61
4874.000	Peak	33.44	10.38	43.81	74.00	-30.19
7311.000	Average	19.87	17.97	37.84	54.00	-16.16
7311.000	Peak	29.18	17.97	47.16	74.00	-26.84

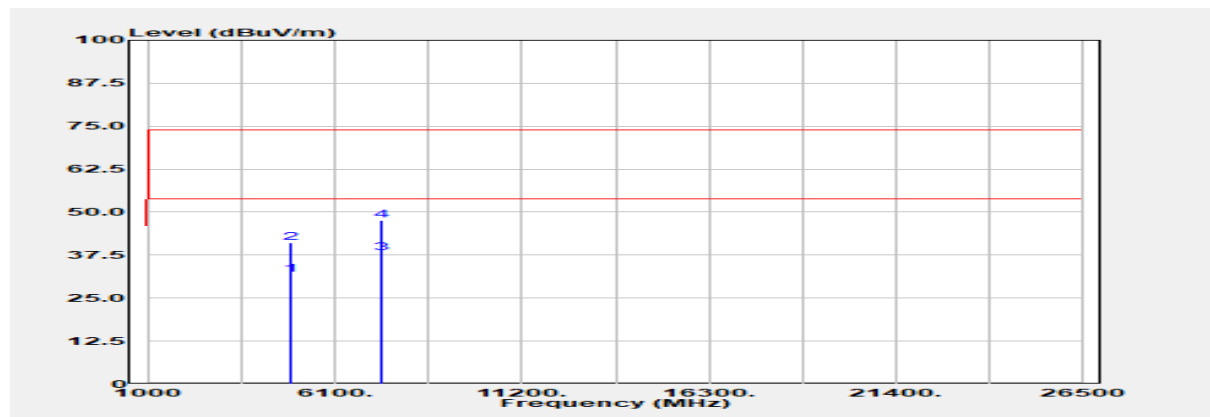
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Report Number :E2/2021/70054
 Operation Mode :802.11g
 Test Frequency :2462 MHz
 Test Mode :TX CH HIGH
 EUT Pol :E2 Plane

Test Site :SAC C
 Test Date :2021-07-31
 Temp./Humi. :24.3/57
 Antenna Pol. :Vertical
 Engineer :Ashton Chiu



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dB μ V	dB	dB μ V/m	dB μ V/m	dB
4924.000	Average	21.71	10.12	31.83	54.00	-22.17
4924.000	Peak	31.09	10.12	41.21	74.00	-32.79
7386.000	Average	19.93	18.22	38.15	54.00	-15.85
7386.000	Peak	29.31	18.22	47.52	74.00	-26.48

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Report Number :E2/2021/70054

Operation Mode :802.11g

Test Frequency :2462 MHz

Test Mode :TX CH HIGH

EUT Pol :E2 Plane

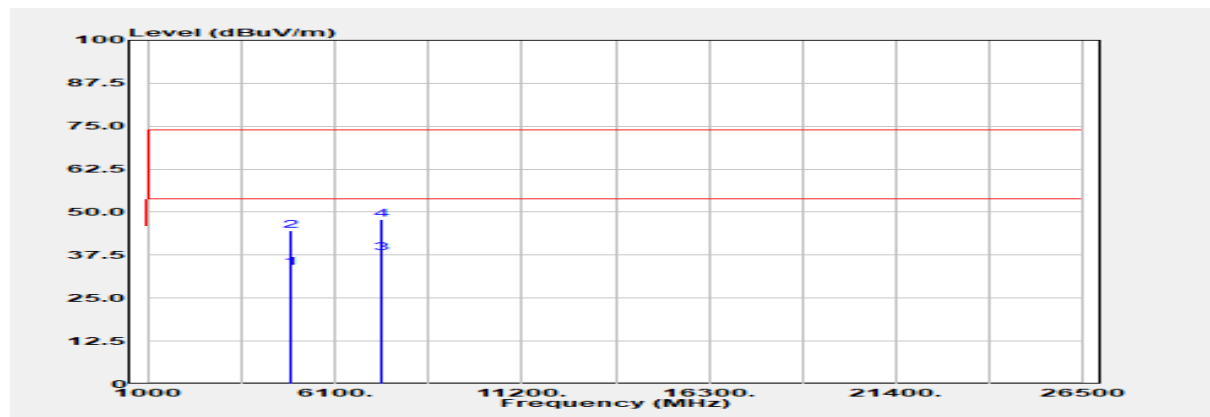
Test Site :SAC C

Test Date :2021-07-31

Temp./Humi. :24.3/57

Antenna Pol. :Horizontal

Engineer :Ashton Chiu



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dB μ V	dB	dB μ V/m	dB μ V/m	dB
4924.000	Average	23.82	10.12	33.94	54.00	-20.06
4924.000	Peak	34.57	10.12	44.69	74.00	-29.31
7386.000	Average	19.82	18.22	38.04	54.00	-15.96
7386.000	Peak	29.54	18.22	47.76	74.00	-26.24

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Report Number :E2/2021/70054

Operation Mode :802.11n20

Test Frequency :2412 MHz

Test Mode :TX CH LOW

EUT Pol :E2 Plane

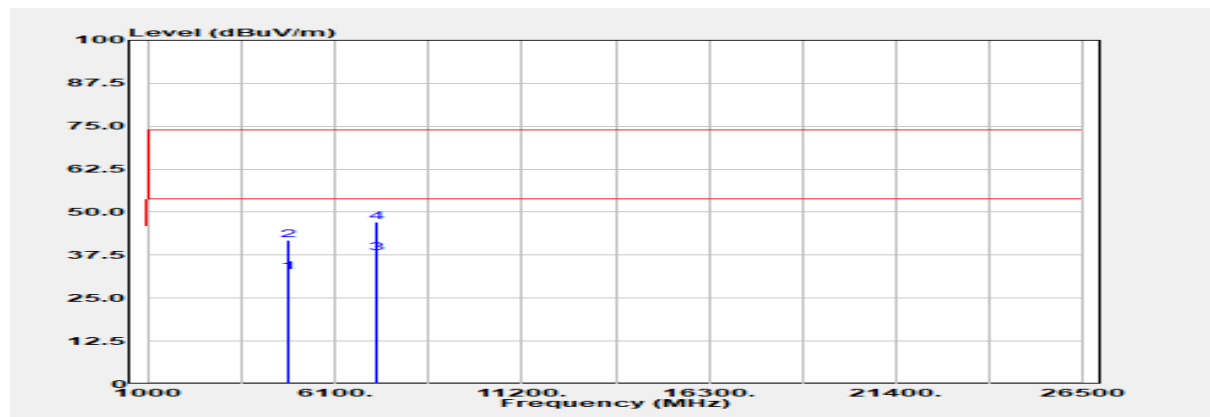
Test Site :SAC C

Test Date :2021-07-31

Temp./Humi. :24.5/55

Antenna Pol. :Vertical

Engineer :Ashton Chiu



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dB μ V	dB	dB μ V/m	dB μ V/m	dB
4824.000	Average	22.08	10.61	32.69	54.00	-21.31
4824.000	Peak	31.27	10.61	41.87	74.00	-32.13
7236.000	Average	20.42	17.62	38.04	54.00	-15.96
7236.000	Peak	29.47	17.62	47.09	74.00	-26.91

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Report Number :E2/2021/70054

Test Site :SAC C

Operation Mode :802.11n20

Test Date :2021-07-31

Test Frequency :2412 MHz

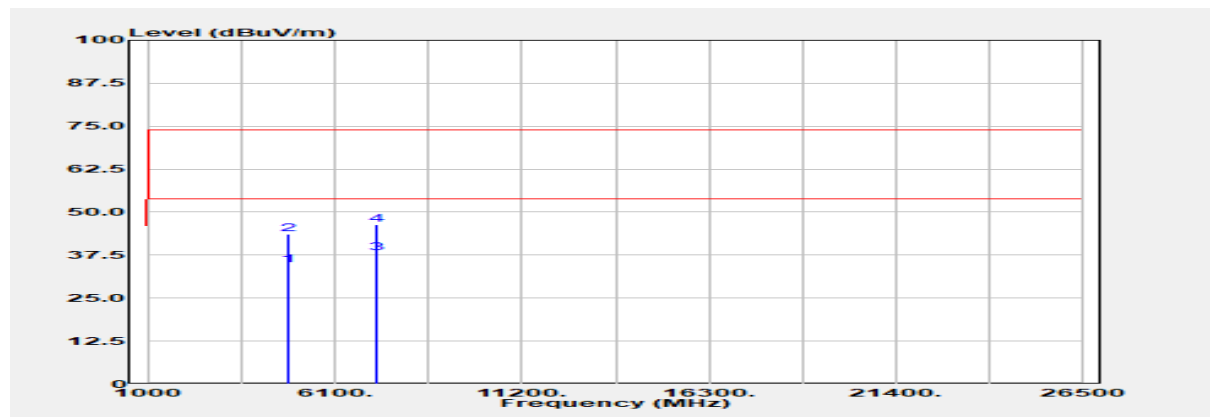
Temp./Humi. :24.5/55

Test Mode :TX CH LOW

Antenna Pol. :Horizontal

EUT Pol :E2 Plane

Engineer :Ashton Chiu



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dB μ V	dB	dB μ V/m	dB μ V/m	dB
4824.000	Average	24.09	10.61	34.70	54.00	-19.30
4824.000	Peak	32.97	10.61	43.57	74.00	-30.43
7236.000	Average	20.42	17.62	38.04	54.00	-15.96
7236.000	Peak	28.85	17.62	46.47	74.00	-27.53

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Report Number :E2/2021/70054

Test Site :SAC C

Operation Mode :802.11n20

Test Date :2021-07-31

Test Frequency :2437 MHz

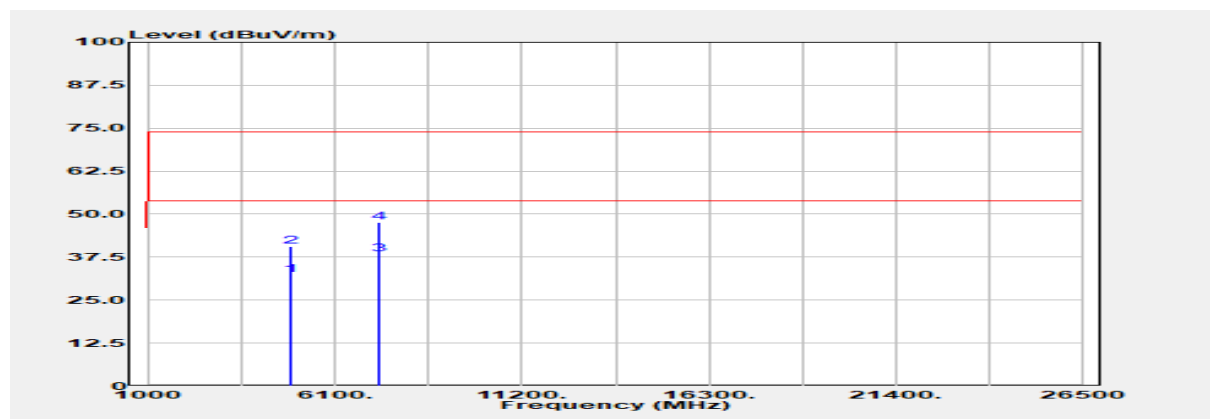
Temp./Humi. :24.5/55

Test Mode :TX CH MID

Antenna Pol. :Vertical

EUT Pol :E2 Plane

Engineer :Ashton Chiu



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
4874.000	Average	21.95	10.38	32.33	54.00	-21.67
4874.000	Peak	30.26	10.38	40.63	74.00	-33.37
7311.000	Average	20.49	17.97	38.46	54.00	-15.54
7311.000	Peak	29.73	17.97	47.70	74.00	-26.30

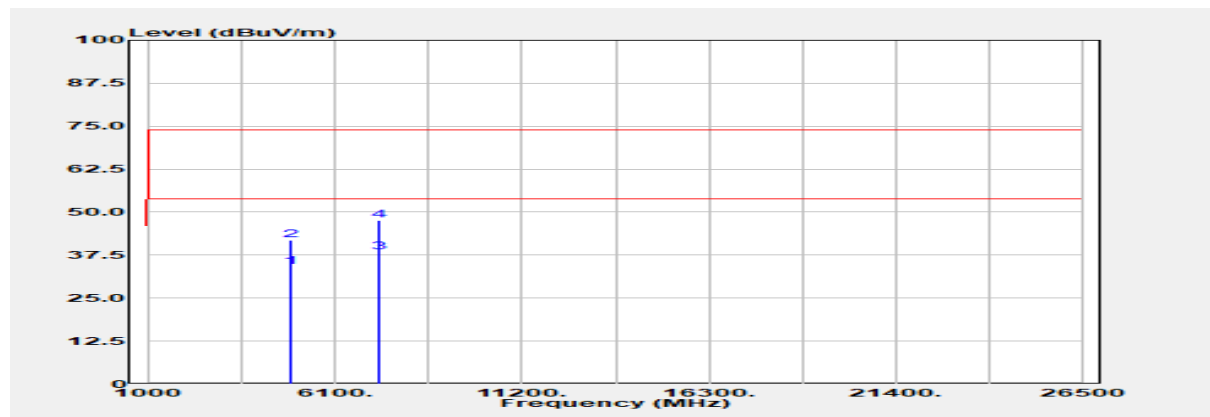
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Report Number :E2/2021/70054
 Operation Mode :802.11n20
 Test Frequency :2437 MHz
 Test Mode :TX CH MID
 EUT Pol :E2 Plane

Test Site :SAC C
 Test Date :2021-07-31
 Temp./Humi. :24.5/55
 Antenna Pol. :Horizontal
 Engineer :Ashton Chiu



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dB μ V	dB	dB μ V/m	dB μ V/m	dB
4874.000	Average	23.75	10.38	34.13	54.00	-19.87
4874.000	Peak	31.50	10.38	41.88	74.00	-32.12
7311.000	Average	20.33	17.97	38.30	54.00	-15.70
7311.000	Peak	29.65	17.97	47.62	74.00	-26.38

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Report Number :E2/2021/70054

Operation Mode :802.11n20

Test Frequency :2462 MHz

Test Mode :TX CH HIGH

EUT Pol :E2 Plane

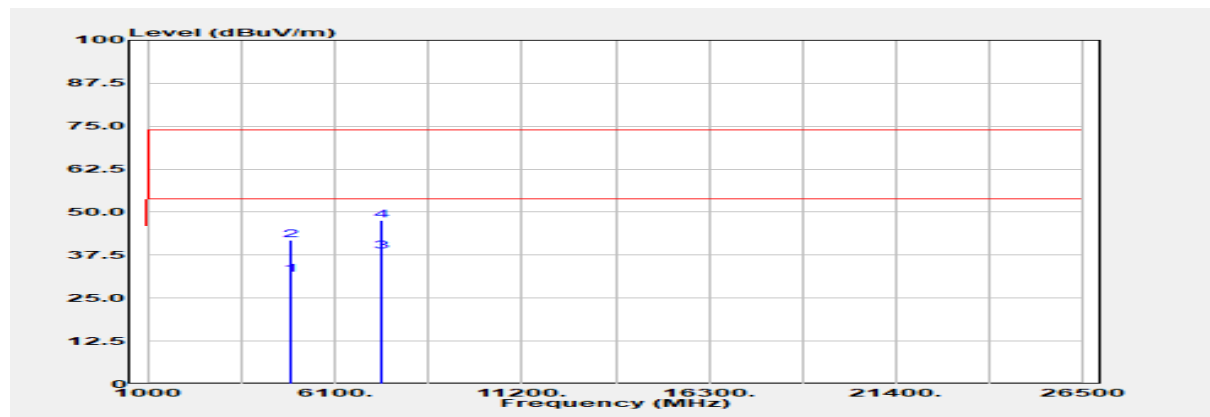
Test Site :SAC C

Test Date :2021-07-31

Temp./Humi. :24.5/55

Antenna Pol. :Vertical

Engineer :Ashton Chiu



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
4924.000	Average	21.62	10.12	31.74	54.00	-22.26
4924.000	Peak	31.73	10.12	41.85	74.00	-32.15
7386.000	Average	20.49	18.22	38.71	54.00	-15.29
7386.000	Peak	29.49	18.22	47.71	74.00	-26.29

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Report Number :E2/2021/70054

Test Site :SAC C

Operation Mode :802.11n20

Test Date :2021-07-31

Test Frequency :2462 MHz

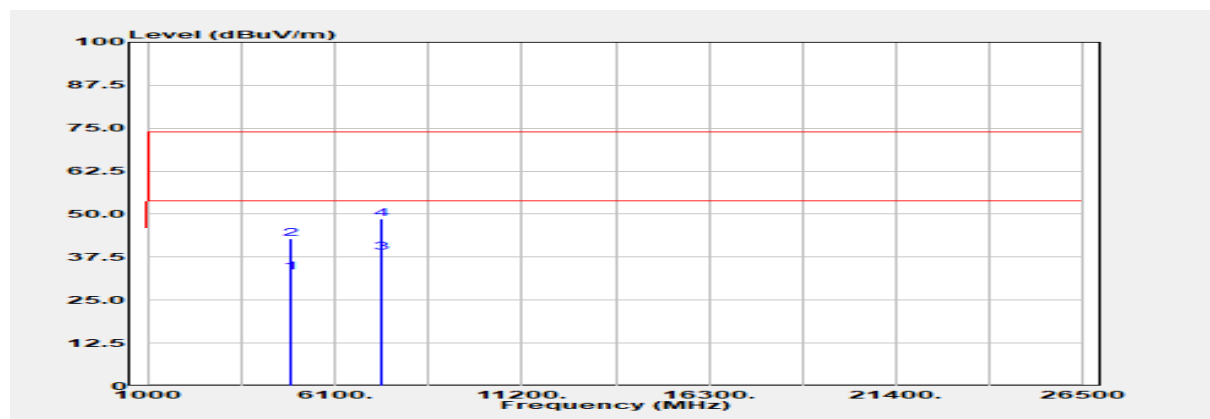
Temp./Humi. :24.5/55

Test Mode :TX CH HIGH

Antenna Pol. :Horizontal

EUT Pol :E2 Plane

Engineer :Ashton Chiu



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
4924.000	Average	23.06	10.12	33.18	54.00	-20.82
4924.000	Peak	32.68	10.12	42.80	74.00	-31.20
7386.000	Average	20.60	18.22	38.82	54.00	-15.18
7386.000	Peak	30.43	18.22	48.65	74.00	-25.35

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12 POWER SPECTRAL DENSITY

12.1 Standard Applicable

Per Part 15.247 (e)

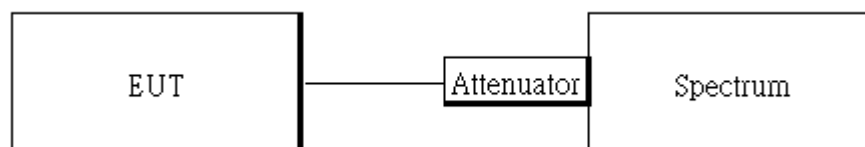
The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

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 Measurement Equipment Used

Conducted Emission Test Site: Conducted D					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	KEYSIGHT	N9010B	MY59071574	06/25/2021	06/25/2022
Power Meter	Anritsu	ML2496A	1804002	04/14/2021	04/13/2022
Power Sensor	Anritsu	MA2411B	1726105	04/14/2021	04/13/2022
Power Sensor	Anritsu	MA2411B	1726106	04/14/2021	04/13/2022
Attenuator	Marvelous	MVE2213-10	RF12	11/19/2020	11/18/2021
Attenuator	Marvelous	WATT-218FS-10	RF16	11/19/2020	11/18/2021
DC Block	PASTERNAK	PE8210	RF158	11/19/2020	11/18/2021
Coaxial Cables	Woken	00100A1F2 A196C	RF57	11/19/2020	11/18/2021
Test Software	SGS	Radio Test Software	V21.07.28	N/A	N/A

12.3 Test Set-up



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12.4 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 following “measure and add 10 Log (N)” on spectrum to measure the PSD for MIMO mode. Offset = cable loss + 10 log (N), where N is number of transmitting antenna.

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.

12.5 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.

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

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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

$g_{j,k} = 1/20 \cdot 10G_k$ 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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12.6 Power spectral density

POWER DENSITY 802.11b					
Freq. (MHz)	Ch0 PSD	Ch1 PSD	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
2412	-4.53	-4.91	-1.71	8.00	PASS
2437	-4.67	-5.52	-2.06	8.00	PASS
2462	-5.13	-5.32	-2.21	8.00	PASS

POWER DENSITY 802.11g					
Freq. (MHz)	Ch0 PSD	Ch1 PSD	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
2412	-9.72	-10.45	-7.06	8.00	PASS
2437	-9.98	-10.44	-7.19	8.00	PASS
2462	-10.02	-11.27	-7.59	8.00	PASS

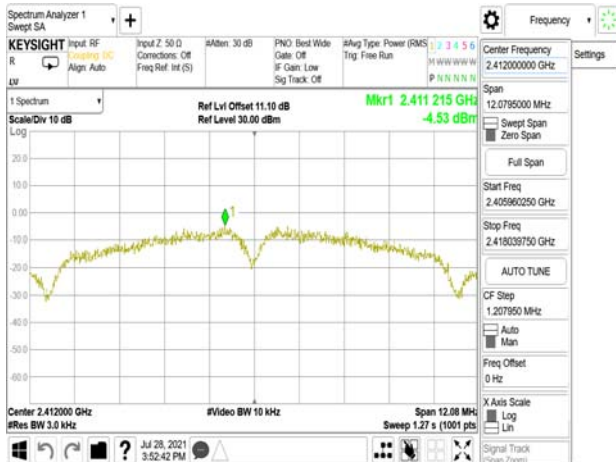
POWER DENSITY 802.11n HT20					
Freq. (MHz)	Ch0 PSD	Ch1 PSD	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
2412	-9.24	-9.43	-6.32	8.00	PASS
2437	-9.87	-10.52	-7.17	8.00	PASS
2462	-9.78	-10.63	-7.17	8.00	PASS

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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

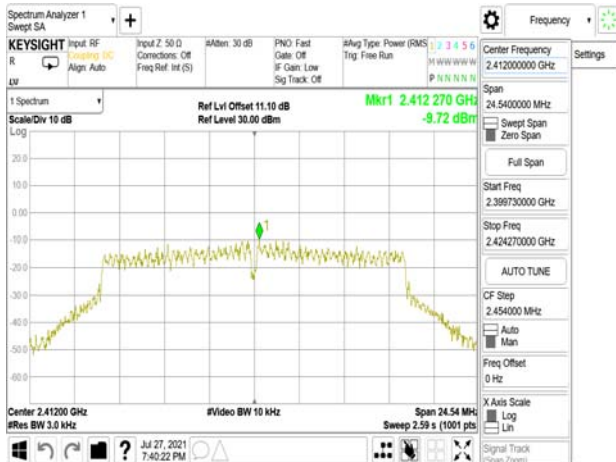


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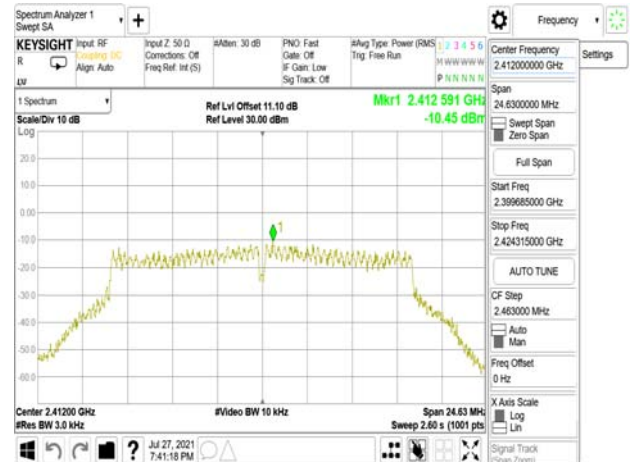
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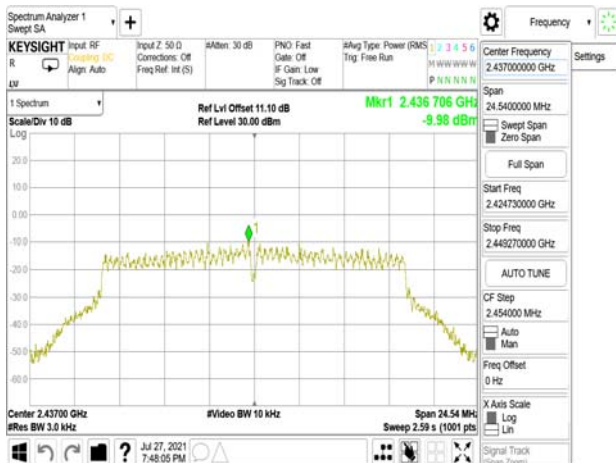
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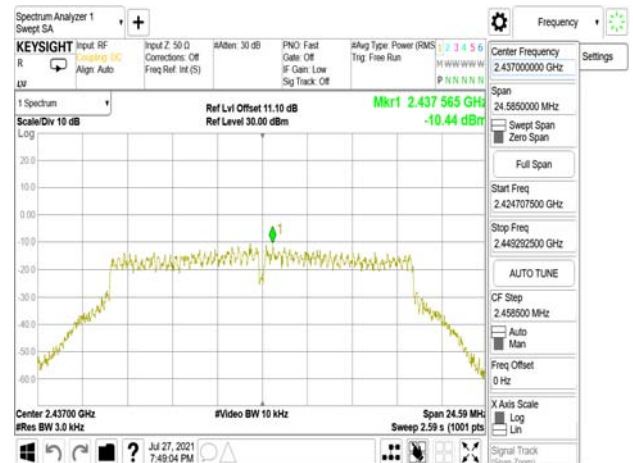
802.11g_20MHz_Chain1_2412MHz



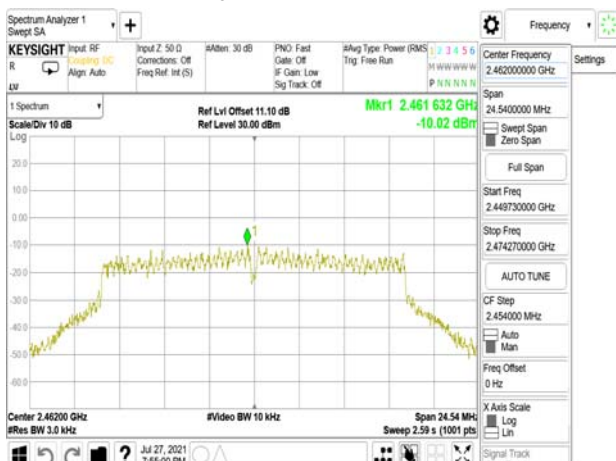
802.11g_20MHz_Chain0_2437MHz



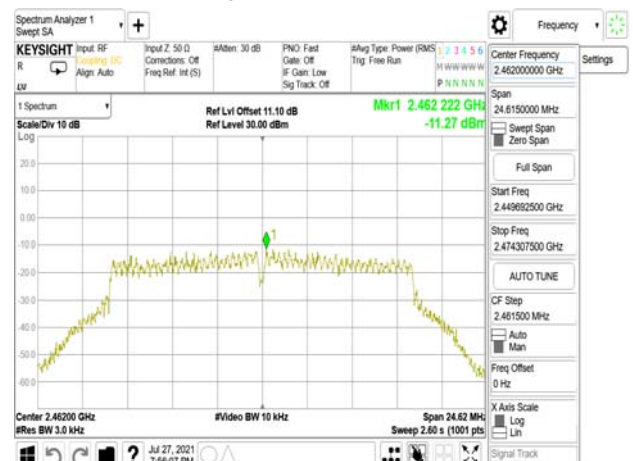
802.11g_20MHz_Chain1_2437MHz



802.11g_20MHz_Chain0_2462MHz



802.11g_20MHz_Chain1_2462MHz

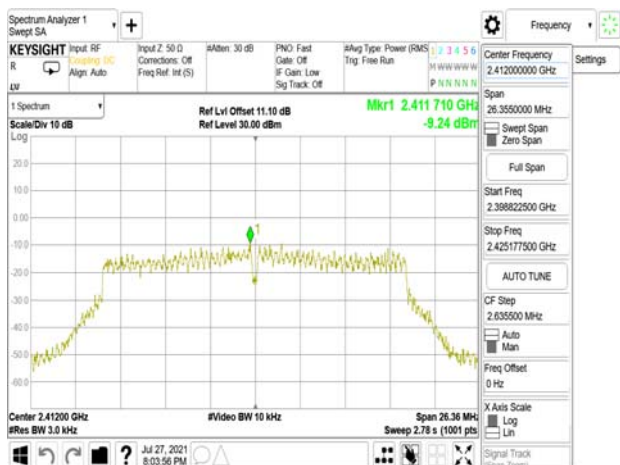


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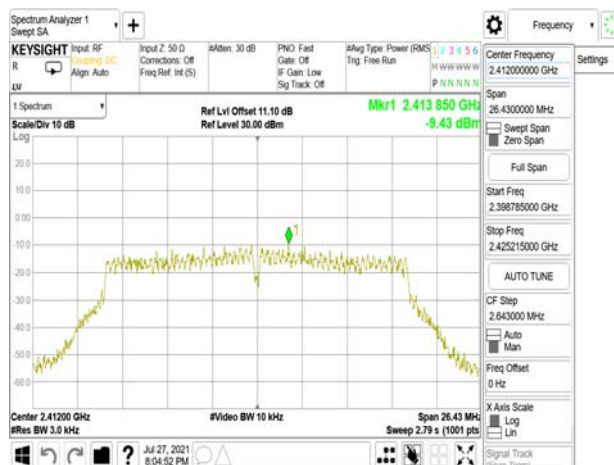
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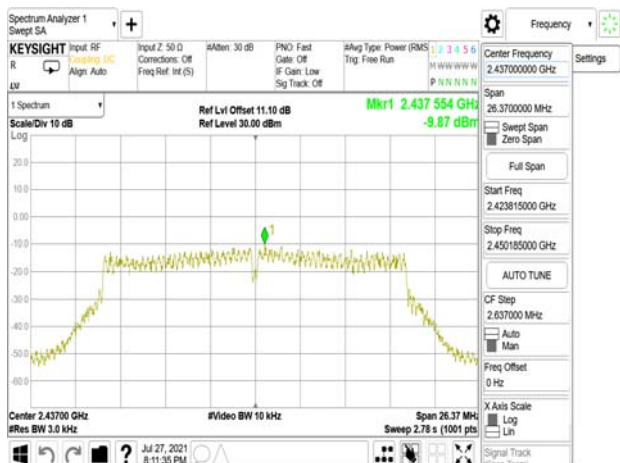
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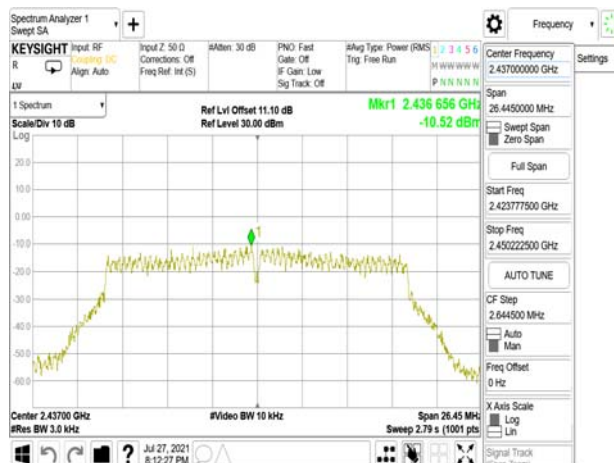
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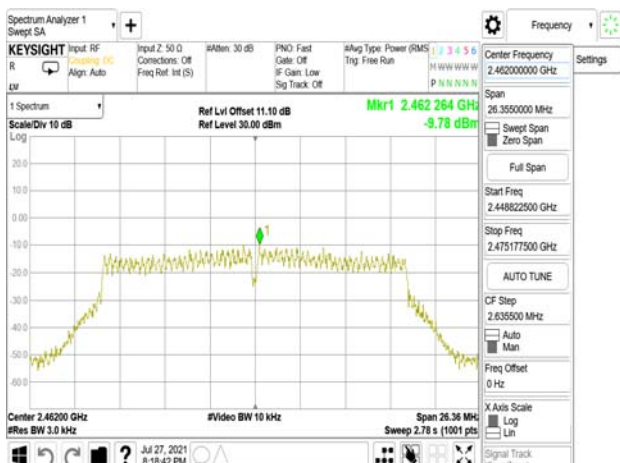
802.11n_20MHz_Chain0_2437MHz



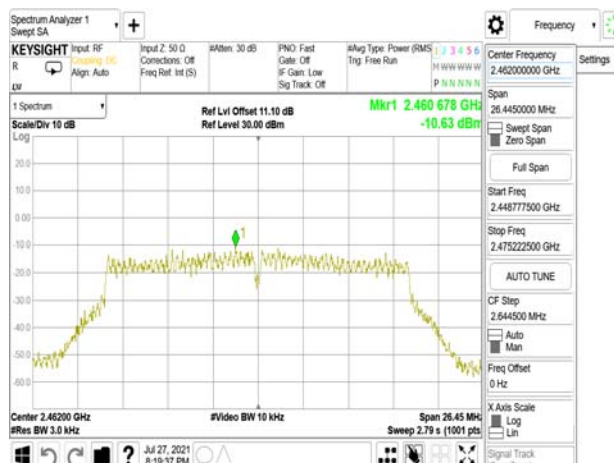
802.11n_20MHz_Chain1_2437MHz



802.11n_20MHz_Chain0_2462MHz



802.11n_20MHz_Chain1_2462MHz



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13 ANTENNA REQUIREMENT

13.1 Standard Applicable

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than furnished by the responsible party shall be used with the device.

If the transmitting antenna is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi.

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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