

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT



Applicant: FIH CO., LTD.
No.4, Minsheng St., Tu-Cheng Dist., New Taipei City 23679,
Taiwan

Manufacturer: FIH CO., LTD.
No.4, Minsheng St., Tu-Cheng Dist., New Taipei City 23679,
Taiwan

Product Name: Internet Gateway

Brand Name: FIH

Model No.: FSNO21VA

Model Difference: N/A

Report Number: E2/2022/30056

FCC ID RYQFSNO21VA

Date of EUT Received: March 30, 2022

Date of Test: April 22, 2022~May 23, 2022

Issue Date: June 07, 2022

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.

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
E2/2022/30056	00	Original.	June 01, 2022	Yami Kuo	*
E2/2022/30056	01	Revise the antenna type	June 07, 2022	Yami Kuo	*

Note:

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

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Table of Contents

1	GENERAL INFORMATION	4
2	SYSTEM TEST CONFIGURATION	7
3	SUMMARY OF TEST RESULTS	10
4	DESCRIPTION OF TEST MODES	11
5	MEASUREMENT UNCERTAINTY	15
6	MEASUREMENT EQUIPMENT USED	16
7	CONDUCTED EMISSION TEST	18
8	PEAK OUTPUT POWER MEASUREMENT	24
9	EMISSION BANDWIDTH MEASUREMENT	39
10	CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT	48
11	RADIATED BANDEDGE AND SPURIOUS EMISSION MEASUREMENT	69
12	POWER SPECTRAL DENSITY	177
13	ANTENNA REQUIREMENT	190

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1 GENERAL INFORMATION

1.1 Product Description

Product Name:	Internet Gateway
Brand Name:	FIH
Model No.:	FSNO21VA
Model Difference:	N/A
Hardware Version:	1.0
Firmware Version:	V0.15A_1KUS
EUT Series No.:	PJ223099050
Power Supply:	12Vdc from AC/DC Adapter
Test Software (Name/Version)	QSPR V5.0.00200

1.2 RF Specification

WLAN 2.4GHz

Wi-Fi	Frequency Range	Channels	Rated Power in dBm (Peak)	Modulation Technology
802.11b	2412~2462	11	28.99	DSSS
802.11g	2412~2462	11	29.34	OFDM
802.11n20	2412~2462	11	29.45	OFDM
802.11n40	2422~2452	7	29.56	OFDM
802.11ax20	2412~2462	11	29.60	OFDMA
802.11ax40	2422~2452	7	29.49	OFDMA
Modulation type:				
CCK, DQPSK, DBPSK for DSSS				
64QAM, 16QAM, QPSK, BPSK for OFDM				
1024 QAM, 256 QAM, 64QAM, 16QAM, QPSK, BPSK for OFDMA				
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				
802.11 n_40MHz: up to 300Mbps				
802.11 ax_20MHz: up to 286.8Mbps				
802.11 ax_40MHz: up to 573.6Mbps				

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1.3 Antenna Designation

Antenna Type	Freq. (MHz)	Peak Antenna Gain (dBi)	Directional Gain (dBi)
Dipole	2412-2462	0.77	3.61
	2412-2462	0.42	3.61

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

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 SAC 3 Conduction 1 Conducted 1 Conducted 2 Conducted 3 Conducted 4 Conducted 5 Conducted 6	TW0027	
	No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333	Conduction C SAC C SAC D SAC G Conducted A Conducted B Conducted C Conducted D Conducted E Conducted F Conducted G	TW3702 TW0028	

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 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*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:

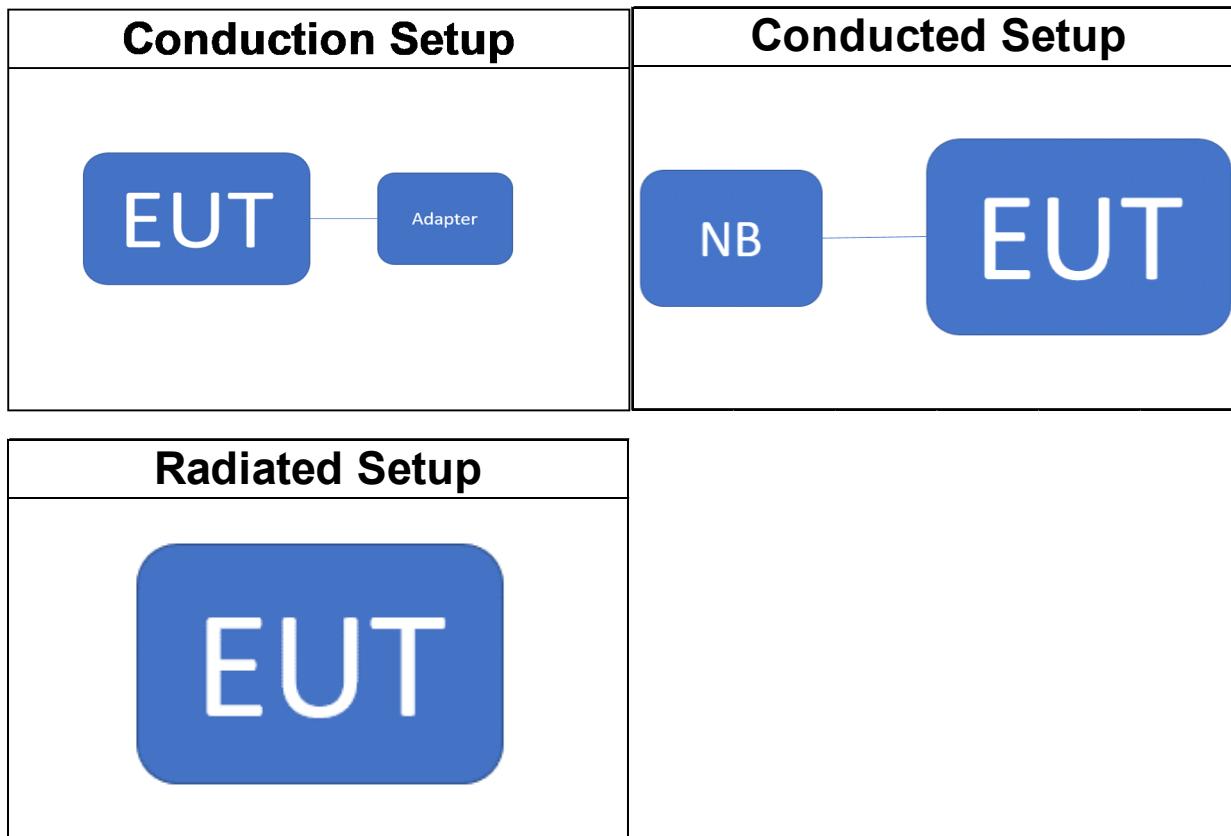
The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuation factor between EUT conducted port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly EUT RF output level.

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2.5 Test Configuration



2.6 Control Unit(s)

AC Power-Line Conducted Emission Test Site: Conduction C					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Adaptor	SWITCHING ADAPTER	A929-120300W-US1	N/A	N/A	N/A
Adaptor	SWITCHING ADAPTER	ADS-40FSI-12	N/A	N/A	N/A
Conducted Emission Test Site: Conducted D					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
RJ-45 Cable	AMP Netconnect	RJ-45	RF300	N/A	N/A
Notebook	Lenovo	L420	S0011721	N/A	N/A
Radiated Emission Test Site: SAC G					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Adaptor	SWITCHING ADAPTER	A929-120300W-US1	N/A	N/A	N/A
Notebook	DELL	Latitude 3440	N/A	N/A	N/A

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3 SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.207(a)	AC Power Line Conducted Emission	Compliant
§15.247(b) (3)	Peak Output Power	Compliant
§15.247(a)(2)	Emission Bandwidth	Compliant
§15.205 §15.209 §15.247(d)	Radiated & Conducted Band Edge and Spurious Emission	Compliant
§15.247(e)	Power Spectral Density	Compliant
§15.203	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

Modulation of 40MHz nominal bandwidth

CHANNEL	FREQUENCY (MHz)
3	2422
4	2427
5	2432
6	2437
7	2442
8	2447
9	2452

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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 given UE is pre-scanned among below modes.

Modulation	Transmission Chain					Single Transmission Spatial	Multiple Transmission Spatial
	<input checked="" type="checkbox"/> Ch0	<input checked="" type="checkbox"/> Ch1	<input type="checkbox"/> Ch2	<input type="checkbox"/> Ch3	<input type="checkbox"/> 1TX		
<input checked="" type="checkbox"/> 802.11 b	<input checked="" type="checkbox"/> Ch0	<input checked="" type="checkbox"/> Ch1	<input type="checkbox"/> Ch2	<input type="checkbox"/> Ch3	<input type="checkbox"/> 1TX	<input checked="" type="checkbox"/> 2TX	
<input checked="" type="checkbox"/> 802.11 g	<input checked="" type="checkbox"/> Ch0	<input checked="" type="checkbox"/> Ch1	<input type="checkbox"/> Ch2	<input type="checkbox"/> Ch3	<input type="checkbox"/> 1TX	<input checked="" type="checkbox"/> 2TX	
<input checked="" type="checkbox"/> 802.11 n	<input checked="" type="checkbox"/> Ch0	<input checked="" type="checkbox"/> Ch1	<input type="checkbox"/> Ch2	<input type="checkbox"/> Ch3	<input type="checkbox"/> SISO	<input checked="" type="checkbox"/> MIMO	
<input checked="" type="checkbox"/> 802.11 ax	<input checked="" type="checkbox"/> Ch0	<input checked="" type="checkbox"/> Ch1	<input type="checkbox"/> Ch2	<input type="checkbox"/> Ch3	<input type="checkbox"/> SISO	<input checked="" type="checkbox"/> 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.
5. Observations have been done for 802.11 ax available RU configurations below and found that the lowest, highest and Full RU results higher emissions.
Only one RU can be enabled at any given time.

Beamforming

Modulation	Transmission Chain					Single Transmission Spatial	Multiple Transmission Spatial
	<input checked="" type="checkbox"/> Ch0	<input checked="" type="checkbox"/> Ch1	<input type="checkbox"/> Ch2	<input type="checkbox"/> Ch3	<input type="checkbox"/> SISO		
<input checked="" type="checkbox"/> 802.11 ax	<input checked="" type="checkbox"/> Ch0	<input checked="" type="checkbox"/> Ch1	<input type="checkbox"/> Ch2	<input type="checkbox"/> Ch3	<input type="checkbox"/> SISO	<input checked="" type="checkbox"/> MIMO	

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802.11ax	20MHz				802.11ax	40MHz				
RU type	26-tone RU		52-tone RU		RU type	26-tone RU		52-tone RU		
RU index and subcarrier range	RU0	[-121: -96]	RU37	[-121: -70]	RU index and subcarrier range	RU0	[-243: -218]	RU37	[-243: -192]	
	RU1	[-95: -70]	RU38	[-68: -17]		RU1	[-217: -192]	RU38	[-189: -138]	
	RU2	[-68: -43]	RU39	[17: 68]		RU2	[-189: -164]	RU39	[-109: -58]	
	RU3	[-42: -17]	RU40	[70: 121]		RU3	[-163: -138]	RU40	[-55: -4]	
	RU4	[-16: -4, 4: 16]	RU41	N/A		RU4	[-136: -111]	RU41	[4: 55]	
	RU5	[17: 42]	RU42	N/A		RU5	[-109: -84]	RU42	[58: 109]	
	RU6	[43: 68]	RU43	N/A		RU6	[-83: -58]	RU43	[138: 189]	
	RU7	[70: 95]	RU44	N/A		RU7	[-55: -30]	RU44	[192: 243]	
	RU8	[96: 121]	RU45	N/A		RU8	[-29: -4]	RU45	N/A	
	RU9	N/A	RU46	N/A		RU9	[4: 29]	RU46	N/A	
	RU10	N/A	RU47	N/A		RU10	[30: 55]	RU47	N/A	
	RU11	N/A	RU48	N/A		RU11	[58: 83]	RU48	N/A	
	RU12	N/A	RU49	N/A		RU12	[84: 109]	RU49	N/A	
	RU13	N/A	RU50	N/A		RU13	[111: 136]	RU50	N/A	
	RU14	N/A	RU51	N/A		RU14	[138: 163]	RU51	N/A	
	RU15	N/A	RU52	N/A		RU15	[164: 189]	RU52	N/A	
	RU16	N/A				RU16	[192: 217]			
	RU17	N/A	106-tone RU			RU17	[218: 243]	106-tone RU		
	RU18	N/A	RU53	[-122: -17]		RU18	N/A	RU53	[-243: -138]	
	RU19	N/A	RU54	[17: 122]		RU19	N/A	RU54	[-109: -4]	
	RU20	N/A	RU55	N/A		RU20	N/A	RU55	[4: 109]	
	RU21	N/A	RU56	N/A		RU21	N/A	RU56	[138: 243]	
	RU22	N/A	RU57	N/A		RU22	N/A	RU57	N/A	
	RU23	N/A	RU58	N/A		RU23	N/A	RU58	N/A	
	RU24	N/A	RU59	N/A		RU24	N/A	RU59	N/A	
	RU25	N/A	RU60	N/A		RU25	N/A	RU60	N/A	
	RU26	N/A				RU26	N/A			
	RU27	N/A	242-tone RU			RU27	N/A	242-tone RU		
	RU28	N/A	RU61	[-122: -2, 2: 122]		RU28	N/A	RU61	[-244: -3]	
	RU29	N/A	RU62	N/A		RU29	N/A	RU62	[3: 244]	
	RU30	N/A	RU63	N/A		RU30	N/A	RU63	N/A	
	RU31	N/A	RU64	N/A		RU31	N/A	RU64	N/A	
	RU32	N/A				RU32	N/A			
	RU33	N/A				RU33	N/A	484-tone RU		
	RU34	N/A				RU34	N/A	RU65	[-244: -3, 3: 244]	
	RU35	N/A				RU35	N/A	RU66	N/A	
	RU36	N/A				RU36	N/A			

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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
802.11n (HT40)	3 to 9	3,6,9	OFDM	MCS8	MIMO
802.11ax (HE20)	1 to 11	1,6,11	OFDMA	MCS0	MIMO
802.11ax (HE40)	3 to 9	3,6,9	OFDMA	MCS0	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
802.11n (HT40)	3 to 9	3,6,9	OFDM	MCS8	MIMO
802.11ax (HE20)	1 to 11	1,6,11	OFDMA	MCS0	MIMO
802.11ax (HE40)	3 to 9	3,6,9	OFDMA	MCS0	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 C					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
LISN	SCHWARZBECK Mess-Elektronik	NSLK8127	973	04/13/2022	04/12/2023
EMI Test Receiver	R&S	ESCI	101342	04/25/2022	04/24/2023
Coaxial Cable	EC Lab	RF-HY-CAB-250	RF-HY-CAB-250-01	03/27/2022	03/26/2023
Coaxial Cable	EMC Instruments Corp	EMC5D-BM-BM-3000	1401004	03/27/2022	03/26/2023
Pulse Limiter	EC Lab	VTSD 9561F-N	485	03/27/2022	03/26/2023
Test Software	audix	e3	E3 20923 SGS Ver.9 (C)	N.C.R	N.C.R

6.2 Conduted Measurement

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	06/24/2022
Power Meter	Anritsu	ML2496A	2138002	11/12/2021	11/11/2022
Power Sensor	Anritsu	MA2411B	1911390	09/20/2021	09/19/2022
Power Sensor	Anritsu	MA2411B	1911398	09/22/2021	09/21/2022
Power Meter	Anritsu	ML2496A	2138005	11/12/2021	11/11/2022
Power Sensor	Anritsu	MA2411B	1911395	09/22/2021	09/21/2022
Power Sensor	Anritsu	MA2411B	1911396	09/20/2021	09/19/2022
Test Software	SGS Taiwan	Radio Test Software	Ver.21	N.C.R	N.C.R
Attenuator	Marvelous	WATT-218FS-10	RF15	11/18/2021	11/17/2022
Attenuator	Marvelous	WATT-218FS-10	RF16	11/18/2021	11/17/2022
Attenuator	Marvelous	WATT-218FS-10	RF18	11/18/2021	11/17/2022
Attenuator	Marvelous	WATT-218FS-10	RF19	11/18/2021	11/17/2022
DC Block	PASTERNACK	PE8210	RF158	11/18/2021	11/17/2022
RF Switch	E-INSTRUMENT TECH LTD	ETF-1801	EC2100175	09/10/2021	09/09/2022

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6.3 Radiated Measurement

Radiated Emission Test Site: SAC G					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Broadband Antenna	SCHWARZBECK	VULB 9168	1206	02/15/2022	02/14/2023
Horn Antenna	Schwarzbeck	BBHA9170	184	12/16/2021	12/15/2022
Horn Antenna	RF SPIN	DRH18-E	210105A18E	04/08/2022	04/07/2023
Loop Antenna	ETS.LINDGREN	6502	143303	05/06/2022	05/07/2023
3m Site NSA	SGS	966 chamber G	N/A	03/30/2022	03/29/2023
Spectrum Analyzer	KEYSIGHT	N9010A	MY51440113	07/13/2021	07/12/2022
Test Software	audix	e3	E3 20923 SGS Ver.9 (C)	N.C.R	N.C.R
Pre-Amplifier	EMC Instruments	EMC184045B	980135	10/27/2021	10/26/2022
Pre-Amplifier	EMC Instruments	EMC330N	980781	03/15/2022	03/14/2023
Pre-Amplifier	EMC Instruments	EMC118A45SE	980815	03/15/2022	03/14/2023
Attenuator	Marvelous	MVE2213-10	RF05	11/18/2021	11/17/2022
Coaxial Cable	EMC Instruments	EMCCFD400-NM-NM-8000-5000-2000	210216、210217、210218	03/15/2022	03/14/2023
Coaxial Cable	EMC Instruments	EMC104-SM-SM-8000-5000-5000	210219、210220、210221	03/15/2022	03/14/2023
Coaxial Cable	EMC Instruments	EMC105-NM-NM-5000-15000	210224、210306	03/15/2022	03/14/2023

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

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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

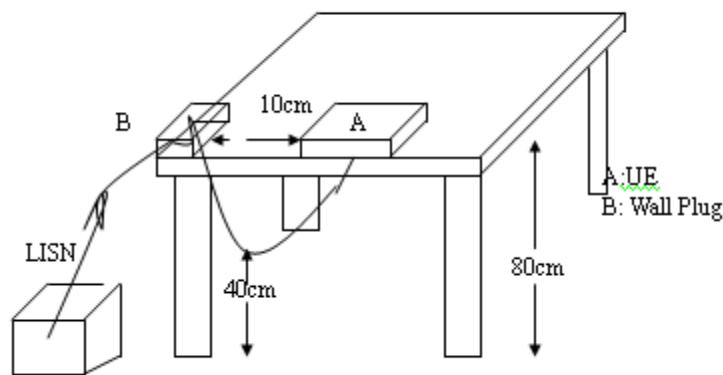
Note

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.

7.2 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.

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.

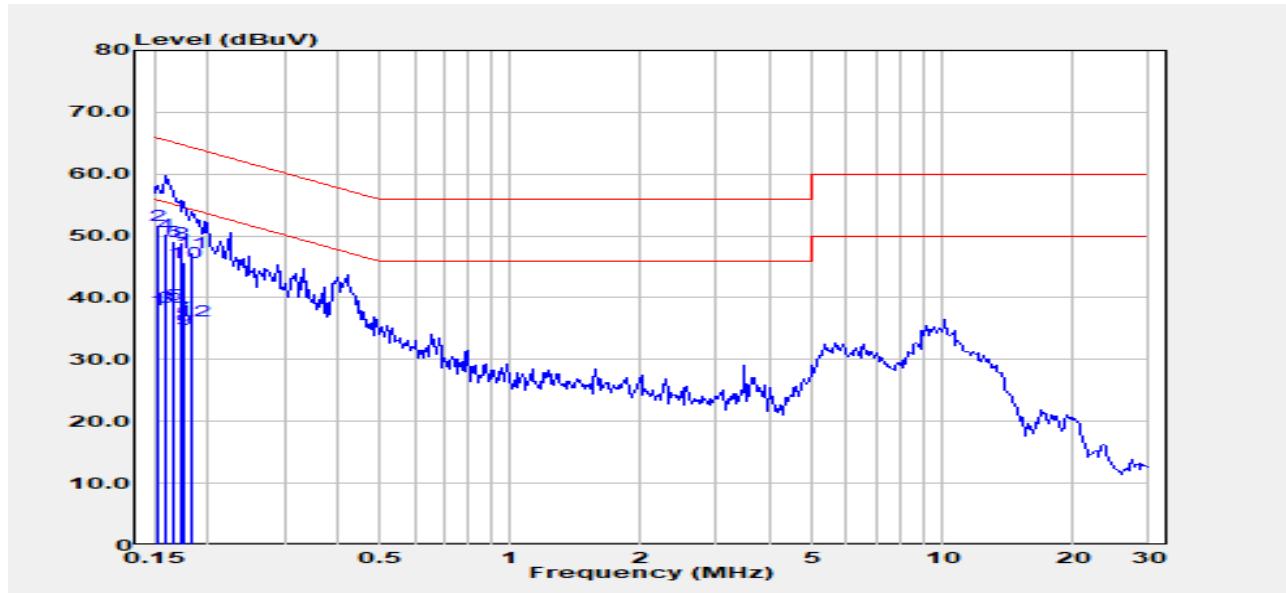
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AC POWER LINE CONDUCTED EMISSION TEST DATA

Report Number :E2-2022-30056 Test Site :Conduction C
Test Mode :2.4G Test Date :2022-04-21
Power :120V/60Hz Temp./Humi. :24.5/59
Probe :L1 Engineer :Quentin Liu
Note :Adapter:A929-120300W-US1



Freq. MHz	Detector Mode	Spectrum Reading	Factor	Actual	Limit	Margin
				FS		
PK/QP/AV	dB μ V	dB	dB μ V	dB μ V	dB	dB
0.153	Average	27.90	10.27	38.17	55.82	-17.65
0.153	QP	41.40	10.27	51.67	65.82	-14.15
0.160	Average	28.20	10.27	38.47	55.47	-17.00
0.160	QP	40.00	10.27	50.27	65.47	-15.20
0.167	Average	28.70	10.27	38.97	55.12	-16.15
0.167	QP	38.90	10.27	49.17	65.12	-15.95
0.172	Average	26.60	10.27	36.87	54.86	-17.99
0.172	QP	38.60	10.27	48.87	64.86	-15.99
0.176	Average	24.70	10.27	34.97	54.68	-19.71
0.176	QP	35.50	10.27	45.77	64.68	-18.91
0.183	Average	37.10	10.27	47.37	54.33	-6.96
0.183	QP	26.00	10.27	36.27	64.33	-28.06

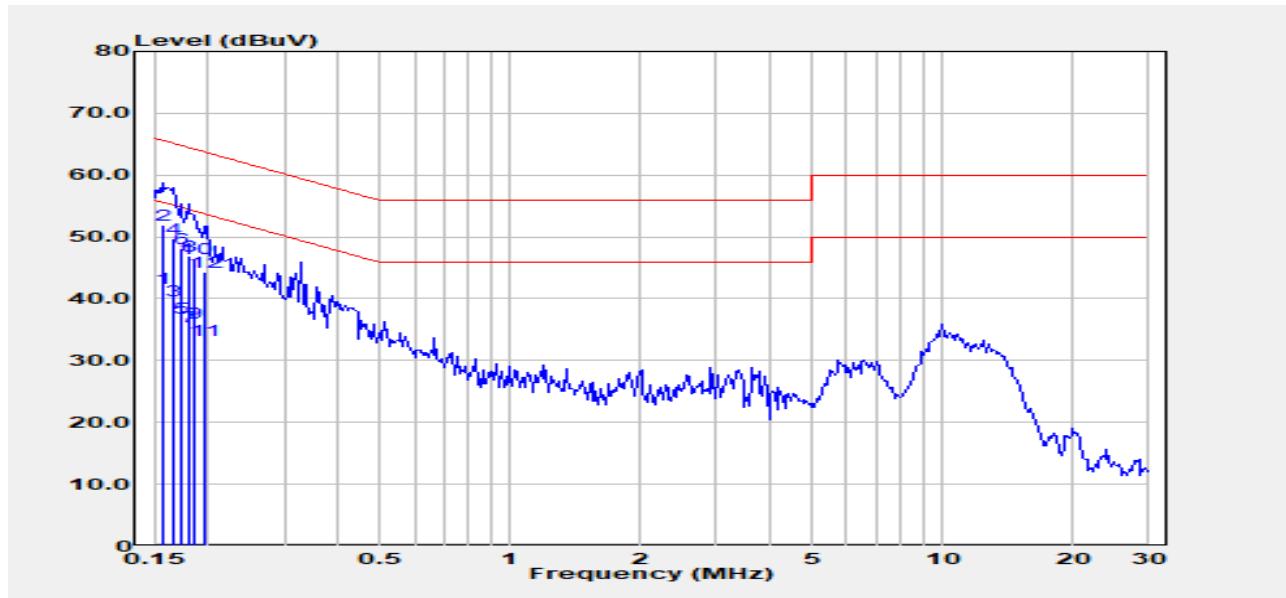
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Report Number :E2-2022-30056
Test Mode :2.4G
Power :120V/60Hz
Probe :N
Note :Adapter:A929-120300W-US1

Test Site :Conduction C
Test Date :2022-04-21
Temp./Humi. :24.5/59
Engineer :Quentin Liu



Freq. MHz	Detector Mode	Spectrum Reading Level dB μ V	Factor dB	Actual	Limit dB μ V	Margin dB
				FS dB μ V		
0.156	Average	31.49	10.28	41.77	55.65	-13.88
0.156	QP	41.69	10.28	51.97	65.65	-13.68
0.167	Average	29.49	10.28	39.77	55.12	-15.35
0.167	QP	39.49	10.28	49.77	65.12	-15.35
0.172	Average	26.59	10.28	36.87	54.86	-17.99
0.172	QP	37.89	10.28	48.17	64.86	-16.69
0.180	Average	25.20	10.27	35.47	54.50	-19.03
0.180	QP	36.70	10.27	46.97	64.50	-17.53
0.185	Average	25.90	10.27	36.17	54.24	-18.07
0.185	QP	36.20	10.27	46.47	64.24	-17.77
0.195	Average	23.10	10.27	33.37	53.80	-20.43
0.195	QP	34.00	10.27	44.27	63.80	-19.53

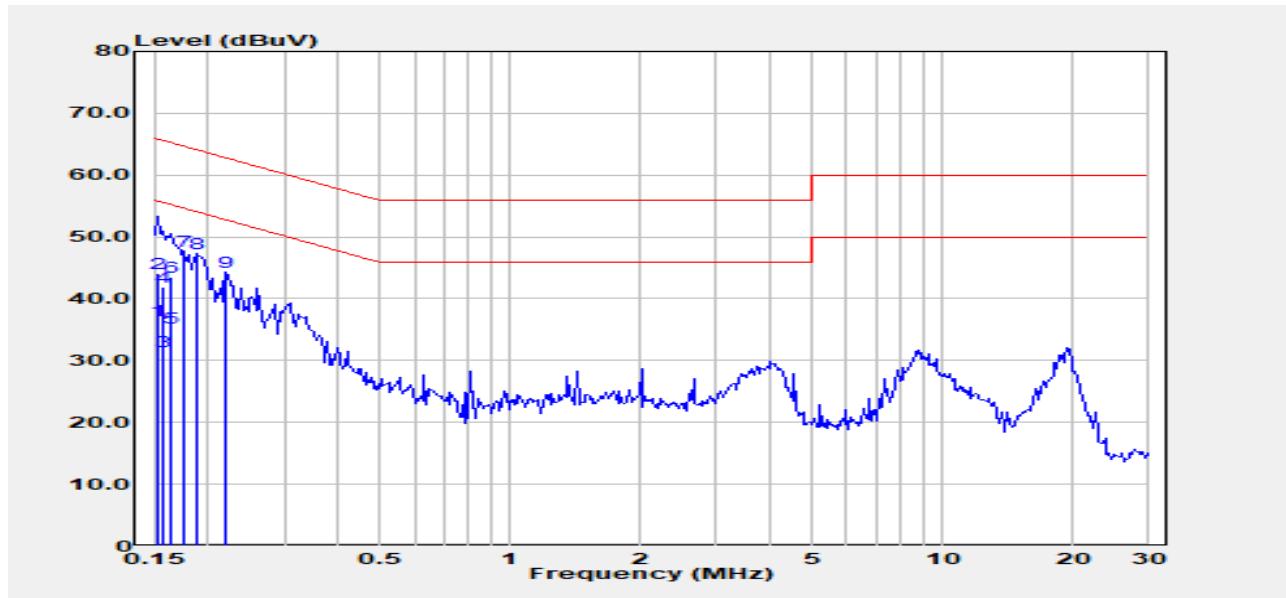
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Report Number :E2-2022-30056
 Test Mode :2.4G
 Power :120V/60Hz
 Probe :L1
 Note : Adapter:ADS-40FSI-12

Test Site :Conduction C
 Test Date :2022-04-21
 Temp./Humi. :24.5/59
 Engineer :Quentin Liu



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual	Limit dB μ V	Margin dB
				FS dB μ V		
0.153	Average	26.30	10.27	36.57	55.82	-19.25
0.153	QP	33.90	10.27	44.17	65.82	-21.65
0.158	Average	21.30	10.27	31.57	55.56	-23.99
0.158	QP	31.60	10.27	41.87	65.56	-23.69
0.163	Average	25.00	10.27	35.27	55.30	-20.03
0.163	QP	33.20	10.27	43.47	65.30	-21.83
0.176	Peak	37.42	10.27	47.69	64.68	-16.99
0.189	Peak	37.10	10.27	47.37	64.06	-16.69
0.220	Peak	33.97	10.27	44.24	62.83	-18.59

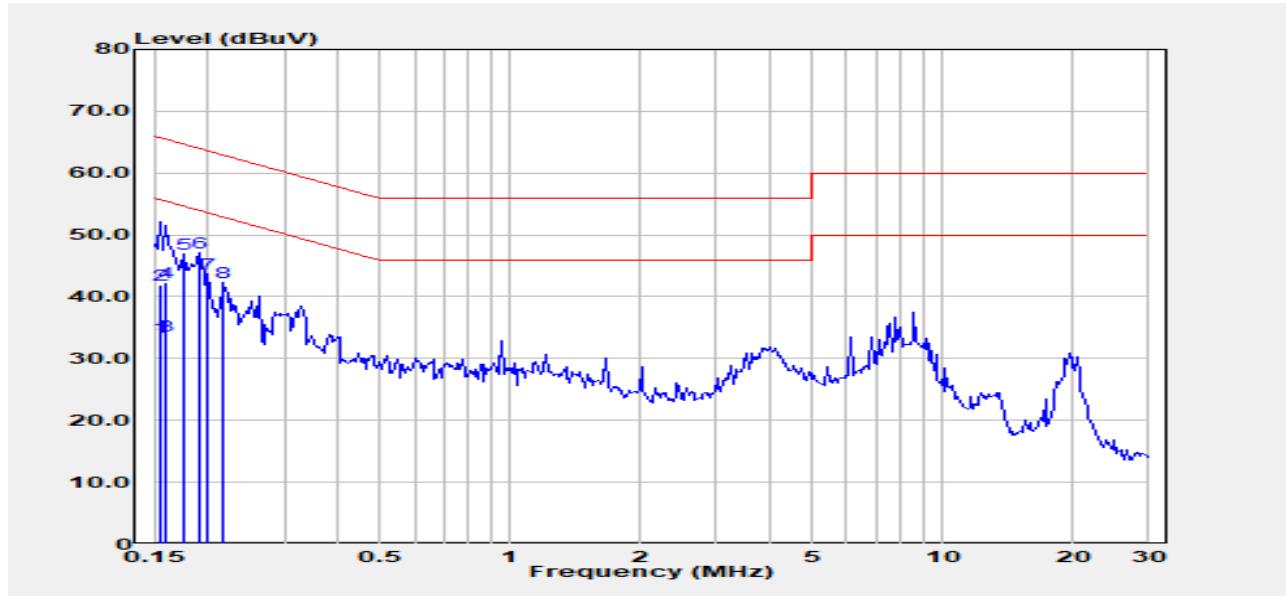
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Report Number :E2-2022-30056
 Test Mode :2.4G
 Power :120V/60Hz
 Probe :N
 Note : Adapter:ADS-40FSI-12

Test Site :Conduction C
 Test Date :2022-04-21
 Temp./Humi. :24.5/59
 Engineer :Quentin Liu



Freq. MHz	Detector Mode	Spectrum Reading Level dB μ V	Factor dB	Actual	Limit dB μ V	Margin dB
				FS dB μ V		
0.155	Average	23.30	10.28	33.58	55.74	-22.16
0.155	QP	31.60	10.28	41.88	65.74	-23.86
0.160	Average	23.50	10.28	33.78	55.47	-21.69
0.160	QP	32.00	10.28	42.28	65.47	-23.19
0.176	Peak	36.60	10.27	46.88	64.68	-17.80
0.191	Peak	36.79	10.27	47.06	63.98	-16.92
0.200	Peak	33.41	10.27	43.68	63.62	-19.95
0.217	Peak	32.08	10.27	42.36	62.92	-20.56

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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.

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.

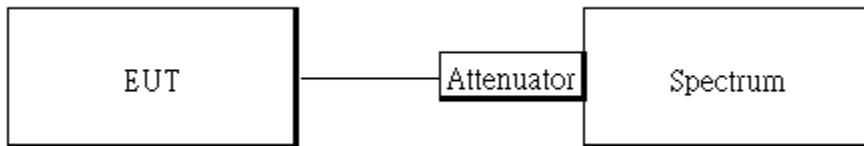
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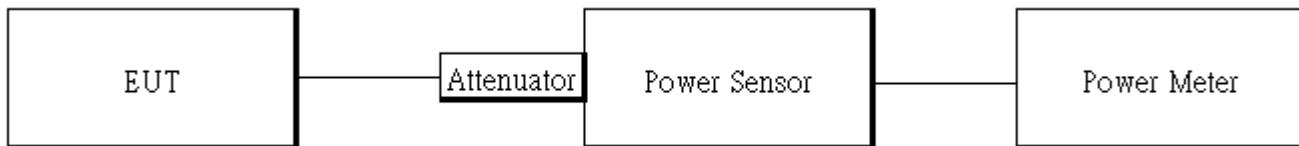
The antenna gain is not greater than 6 dBi. Therefore, reduction of power is not required.

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	98.01	0.09	1.45	0.01
802.11g	99.15	0.04	0.51	0.01
802.11n_20	99.71	0.01	0.18	0.01
802.11n_40	99.71	0.01	0.18	0.01
802.11ax_20	99.67	0.01	0.18	0.01
802.11ax_40	99.71	0.01	0.18	0.01

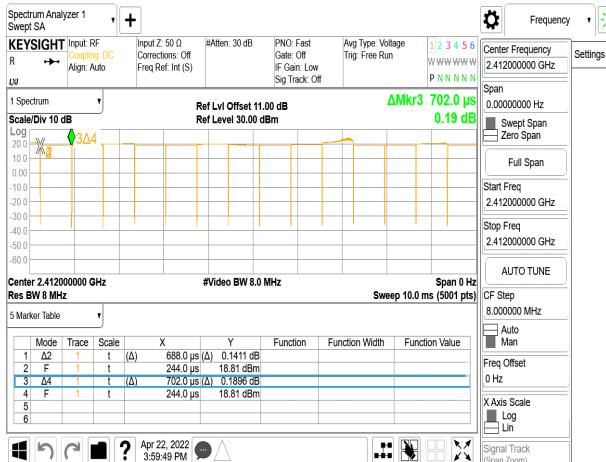
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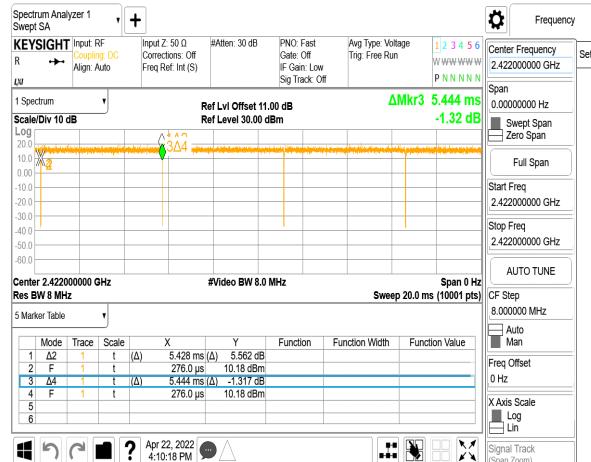
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8.6.2 Duty Cycle test plots

802.11b_20MHz_Chain0_2412MHz



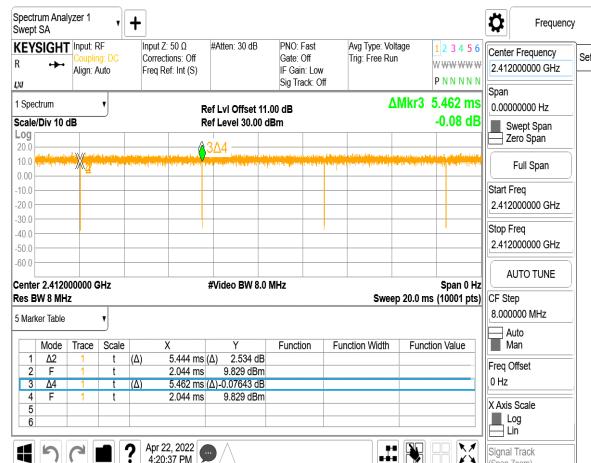
802.11n_40MHz_Chain0_2422MHz



802.11g_20MHz_Chain0_2412MHz



802.11ax_20MHz_Chain0_2412MHz



802.11n_20MHz_Chain0_2412MHz



802.11ax_40MHz_Chain0_2422MHz



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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	19	21.25	30.00	PASS
6	2437	1	23	25.30	30.00	PASS
11	2462	1	23	25.26	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	19	18.76	30.00	PASS
6	2437	1	23	22.84	30.00	PASS
11	2462	1	23	22.81	30.00	PASS
802.11b Ch1						
CH	Freq. (MHz)	Data Rate	Power set	Peak Output Power (dBm)	Limit (dBm)	RESULT
1	2412	1	19.5	21.13	30.00	PASS
6	2437	1	23.5	25.17	30.00	PASS
11	2462	1	23.5	25.16	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	19.5	18.64	30.00	PASS
6	2437	1	23.5	22.74	30.00	PASS
11	2462	1	23.5	22.69	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	19	22.08	21.67	24.89	30.00	PASS
6	2437	1	23	26.17	25.78	28.99	30.00	PASS
11	2462	1	23	26.10	25.72	28.92	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	19	18.88	18.65	21.87	30.00	PASS
6	2437	1	23	22.97	22.70	25.94	30.00	PASS
11	2462	1	23	22.94	22.66	25.90	30.00	PASS

802.11g Ch0

CH	Freq. (MHz)	Data Rate	Power set	Peak Output Power (dBm)	Limit (dBm)	RESULT
1	2412	6	21.5	27.03	30.00	PASS
6	2437	6	22	27.74	30.00	PASS
11	2462	6	21.5	27.12	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	21.5	21.24	30.00	PASS
6	2437	6	22	21.69	30.00	PASS
11	2462	6	21.5	21.28	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	22	26.85	30.00	PASS
6	2437	6	22.5	27.62	30.00	PASS
11	2462	6	22	26.92	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	22	21.18	30.00	PASS
6	2437	6	22.5	21.62	30.00	PASS
11	2462	6	22	21.23	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	21.5	26.12	25.75	28.95	30.00	PASS
6	2437	6	22	26.52	26.13	29.34	30.00	PASS
11	2462	6	21.5	26.23	25.83	29.04	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	21.5	21.42	21.15	24.34	30.00	PASS
6	2437	6	22	21.89	21.58	24.79	30.00	PASS
11	2462	6	21.5	21.44	21.19	24.37	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	21	26.24	30.00	PASS
6	2437	MCS0	21	26.21	30.00	PASS
11	2462	MCS0	20	25.23	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	21	20.63	30.00	PASS
6	2437	MCS0	21	20.59	30.00	PASS
11	2462	MCS0	20	19.68	30.00	PASS

802.11nHT_20M Ch1

CH	Freq. (MHz)	Data Rate	Power set	Peak Output Power (dBm)	Limit (dBm)	RESULT
1	2412	MCS0	21	26.10	30.00	PASS
6	2437	MCS0	21	26.08	30.00	PASS
11	2462	MCS0	20	25.11	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	21	20.57	30.00	PASS
6	2437	MCS0	21	20.54	30.00	PASS
11	2462	MCS0	20	19.61	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	21	26.61	26.26	29.45	30.00	PASS
6	2437	MCS8	21	26.47	26.13	29.31	30.00	PASS
11	2462	MCS8	20	25.40	25.15	28.29	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	21	20.82	20.67	23.77	30.00	PASS
6	2437	MCS8	21	20.77	20.64	23.73	30.00	PASS
11	2462	MCS8	20	19.79	19.65	22.74	30.00	PASS

802.11nHT_40M Ch0

CH	Freq. (MHz)	Data Rate	Power set	Peak Output Power (dBm)	Limit (dBm)	RESULT
3	2422	MCS0	19	25.24	30.00	PASS
6	2437	MCS0	20.5	26.83	30.00	PASS
9	2452	MCS0	20.5	26.73	30.00	PASS

802.11nHT_40M Ch0

CH	Freq. (MHz)	Data Rate	Power set	Max. Avg. Output include tune up tolerance Power (dBm)	Limit (dBm)	RESULT
3	2422	MCS0	19	19.14	30.00	PASS
6	2437	MCS0	20.5	20.72	30.00	PASS
9	2452	MCS0	20.5	20.66	30.00	PASS

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802.11nHT_40M Ch1

CH	Freq. (MHz)	Data Rate	Power set	Peak Output Power (dBm)	Limit (dBm)	RESULT
3	2422	MCS0	19	25.15	30.00	PASS
6	2437	MCS0	20.5	26.72	30.00	PASS
9	2452	MCS0	20.5	26.65	30.00	PASS

802.11nHT_40M Ch1

CH	Freq. (MHz)	Data Rate	Power set	Max. Avg. Output include tune up tolerance Power (dBm)	Limit (dBm)	RESULT
3	2422	MCS0	19	19.05	30.00	PASS
6	2437	MCS0	20.5	20.68	30.00	PASS
9	2452	MCS0	20.5	20.60	30.00	PASS

802.11n_HT40M MIMO

CH	Freq. (MHz)	Data Rate	Power set	Peak Output Power		Total Peak Output Power (dBm)	Limit (dBm)	RESULT
				CH 0	CH 1			
3	2422	MCS8	19.5	25.25	24.98	28.13	30.00	PASS
6	2437	MCS8	21	26.65	26.33	29.50	30.00	PASS
9	2452	MCS8	21	26.70	26.40	29.56	30.00	PASS

802.11n_HT40M 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			
3	2422	MCS8	19.5	19.27	19.11	22.21	30.00	PASS
6	2437	MCS8	21	20.90	20.71	23.83	30.00	PASS
9	2452	MCS8	21	20.81	20.58	23.72	30.00	PASS

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802.11ax_HE_20M Ch0

CH	Freq. (MHz)	Data Rate	RU Config	Power set	Peak Output Power (dBm)	Limit (dBm)	RESULT
1	2412	MCS0	full	19.5	26.14	30.00	PASS
			26/0	11	18.32	30.00	PASS
			52/37	17	24.30	30.00	PASS
			106/53	17	24.35	30.00	PASS
6	2437	MCS0	full	21	27.65	30.00	PASS
11	2462	MCS0	full	21	27.68	30.00	PASS
			26/8	15.5	23.10	30.00	PASS
			52/40	16.5	23.85	30.00	PASS
			106/54	16.5	23.80	30.00	PASS

802.11ax_HE_20M Ch0

CH	Freq. (MHz)	Data Rate	RU Config	Power set	Max. Avg. Output include tune up tolerance Power (dBm)	Limit (dBm)	RESULT
1	2412	MCS0	full	19.5	19.25	30.00	PASS
			26/0	11	11.70	30.00	PASS
			52/37	17	17.68	30.00	PASS
			106/53	17	17.72	30.00	PASS
6	2437	MCS0	full	21	20.76	30.00	PASS
11	2462	MCS0	full	21	20.77	30.00	PASS
			26/8	15.5	16.25	30.00	PASS
			52/40	16.5	17.27	30.00	PASS
			106/54	16.5	17.21	30.00	PASS

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802.11ax_HE_20M Ch1

CH	Freq. (MHz)	Data Rate	RU Config	Power set	Peak Output Power (dBm)	Limit (dBm)	RESULT
1	2412	MCS0	full	20	26.02	30.00	PASS
			26/0	11.5	18.20	30.00	PASS
			52/37	17.5	24.16	30.00	PASS
			106/53	17.5	24.19	30.00	PASS
6	2437	MCS0	full	21.5	27.57	30.00	PASS
11	2462	MCS0	full	21.5	27.58	30.00	PASS
			26/8	16	22.98	30.00	PASS
			52/40	17	23.73	30.00	PASS
			106/54	17	23.67	30.00	PASS

802.11ax_HE_20M Ch1

CH	Freq. (MHz)	Data Rate	RU Config	Power set	Max. Avg. Output include tune up tolerance Power (dBm)	Limit (dBm)	RESULT
1	2412	MCS0	full	20	19.14	30.00	PASS
			26/0	11.5	11.61	30.00	PASS
			52/37	17.5	17.60	30.00	PASS
			106/53	17.5	17.63	30.00	PASS
6	2437	MCS0	full	21.5	20.64	30.00	PASS
11	2462	MCS0	full	21.5	20.67	30.00	PASS
			26/8	16	16.13	30.00	PASS
			52/40	17	17.16	30.00	PASS
			106/54	17	17.12	30.00	PASS

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802.11ax_HE20M MIMO

CH	Freq. (MHz)	Data Rate	RU Config	Power set	Peak Output Power		Total Peak Output Power (dBm)	Limit (dBm)	RESULT
					CH 0	CH 1			
1	2412	MCS0	full	20	25.32	25.06	28.20	30.00	PASS
			26/0	11	17.89	17.17	20.56	30.00	PASS
			52/37	17.5	23.79	23.47	26.64	30.00	PASS
			106/53	17.5	23.83	23.52	26.69	30.00	PASS
6	2437	MCS0	full	21	26.75	26.43	29.60	30.00	PASS
11	2462	MCS0	full	21	26.70	26.37	29.55	30.00	PASS
			26/8	16	22.39	22.13	25.27	30.00	PASS
			52/40	17	23.35	23.09	26.23	30.00	PASS
			106/54	17	23.31	23.05	26.19	30.00	PASS

802.11ax_HE20M MIMO

CH	Freq. (MHz)	Data Rate	RU Config	Power set	Avg. Output Power (dBm)		Max. Avg. Output include tune up tolerance Power (dBm)	Limit (dBm)	RESULT
					CH 0	CH 1			
1	2412	MCS0	full	20	19.49	19.24	22.39	30.00	PASS
			26/0	11	11.86	11.63	14.77	30.00	PASS
			52/37	17.5	17.84	17.56	20.72	30.00	PASS
			106/53	17.5	17.90	17.62	20.78	30.00	PASS
6	2437	MCS0	full	21	20.99	20.75	23.89	30.00	PASS
11	2462	MCS0	full	21	20.93	20.68	23.83	30.00	PASS
			26/8	16	16.41	16.13	19.29	30.00	PASS
			52/40	17	17.42	17.23	20.35	30.00	PASS
			106/54	17	17.37	17.11	20.26	30.00	PASS

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802.11ax_HE_40M Ch0

CH	Freq. (MHz)	Data Rate	RU Config	Power set	Peak Output Power (dBm)	Limit (dBm)	RESULT
3	2422	MCS0	full	19	25.26	30.00	PASS
			242/61	17	23.57	30.00	PASS
6	2437	MCS0	full	21	27.26	30.00	PASS
9	2452	MCS0	full	20.5	26.73	30.00	PASS
			242/62	17	23.50	30.00	PASS

802.11ax_HE_40M Ch0

CH	Freq. (MHz)	Data Rate	RU Config	Power set	Max. Avg. Output include tune up tolerance Power (dBm)	Limit (dBm)	RESULT
3	2422	MCS0	full	19	18.76	30.00	PASS
			242/61	17	16.78	30.00	PASS
6	2437	MCS0	full	21	20.77	30.00	PASS
9	2452	MCS0	full	20.5	20.22	30.00	PASS
			242/62	17	16.73	30.00	PASS

802.11ax_HE_40M Ch1

CH	Freq. (MHz)	Data Rate	RU Config	Power set	Peak Output Power (dBm)	Limit (dBm)	RESULT
3	2422	MCS0	full	19.5	25.14	30.00	PASS
			242/61	17.5	23.43	30.00	PASS
6	2437	MCS0	full	21.5	27.17	30.00	PASS
9	2452	MCS0	full	21	26.59	30.00	PASS
			242/62	17.5	23.38	30.00	PASS

802.11ax_HE_40M Ch1

CH	Freq. (MHz)	Data Rate	RU Config	Power set	Max. Avg. Output include tune up tolerance Power (dBm)	Limit (dBm)	RESULT
3	2422	MCS0	full	19.5	18.68	30.00	PASS
			242/61	17.5	16.67	30.00	PASS
6	2437	MCS0	full	21.5	20.66	30.00	PASS
9	2452	MCS0	full	21	20.13	30.00	PASS
			242/62	17.5	16.64	30.00	PASS

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802.11ax_HE40M MIMO

CH	Freq. (MHz)	Data Rate	RU Config	Power set	Peak Output Power		Total Peak Output Power (dBm)	Limit (dBm)	RESULT
					CH 0	CH 1			
3	2422	MCS0	full	19.5	24.72	24.49	27.62	30.00	PASS
			242/6	17	23.18	22.97	26.09	30.00	PASS
6	2437	MCS0	full	21.5	26.62	26.34	29.49	30.00	PASS
9	2452	MCS0	full	21	26.20	25.93	29.08	30.00	PASS
			242/6	17	23.13	22.91	26.03	30.00	PASS

802.11ax_HE40M MIMO

CH	Freq. (MHz)	Data Rate	RU Config	Power set	Avg. Output Power (dBm)		Max. Avg. Output include tune up tolerance Power (dBm)	Limit (dBm)	RESULT
					CH 0	CH 1			
3	2422	MCS0	full	19.5	18.96	18.77	21.89	30.00	PASS
			242/6	17	16.97	16.75	19.88	30.00	PASS
6	2437	MCS0	full	21.5	20.97	20.76	23.89	30.00	PASS
9	2452	MCS0	full	21	20.42	20.21	23.34	30.00	PASS
			242/6	17	16.92	16.71	19.84	30.00	PASS

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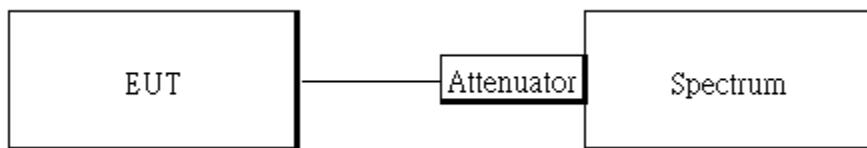
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9 EMISSION BANDWIDTH MEASUREMENT

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. 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	8563.00	≥ 500	PASS
2437	8558.00	≥ 500	PASS
2462	8023.00	≥ 500	PASS

802.11b Ch1

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	9085.00	≥ 500	PASS
2437	9054.00	≥ 500	PASS
2462	7564.00	≥ 500	PASS

802.11g Ch0

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	15100.00	≥ 500	PASS
2437	15110.00	≥ 500	PASS
2462	15110.00	≥ 500	PASS

802.11g Ch1

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	15110.00	≥ 500	PASS
2437	15090.00	≥ 500	PASS
2462	15120.00	≥ 500	PASS

802.11nHT_20M Ch0

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	15100.00	≥ 500	PASS
2437	15120.00	≥ 500	PASS
2462	15120.00	≥ 500	PASS

802.11nHT_20M Ch1

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	15130.00	≥ 500	PASS
2437	15110.00	≥ 500	PASS
2462	15120.00	≥ 500	PASS

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802.11nHT_40M Ch0

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2422	35070.00	≥ 500	PASS
2437	35100.00	≥ 500	PASS
2452	34990.00	≥ 500	PASS

802.11nHT_40M Ch1

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2422	35080.00	≥ 500	PASS
2437	35080.00	≥ 500	PASS
2452	35090.00	≥ 500	PASS

802.11ax_HE_20M Ch0

Freq. (MHz)	RU Config	6dB BW (kHz)	Limit (kHz)	Result
2412	full	13830.00	≥ 500	PASS
2437	full	15090.00	≥ 500	PASS
2462	full	15090.00	≥ 500	PASS

802.11ax_HE_20M Ch1

Freq. (MHz)	RU Config	6dB BW (kHz)	Limit (kHz)	Result
2412	full	15120.00	≥ 500	PASS
2437	full	15110.00	≥ 500	PASS
2462	full	15090.00	≥ 500	PASS

802.11ax_HE_40M Ch0

Freq. (MHz)	RU Config	6dB BW (kHz)	Limit (kHz)	Result
2422	full	32630.00	≥ 500	PASS
2437	full	35130.00	≥ 500	PASS
2452	full	3481.00	≥ 500	PASS

802.11ax_HE_40M Ch1

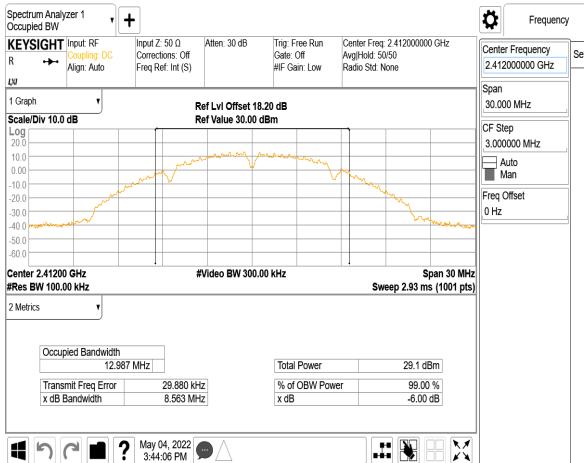
Freq. (MHz)	RU Config	6dB BW (kHz)	Limit (kHz)	Result
2422	full	35050.00	≥ 500	PASS
2437	full	35090.00	≥ 500	PASS
2452	full	33850.00	≥ 500	PASS

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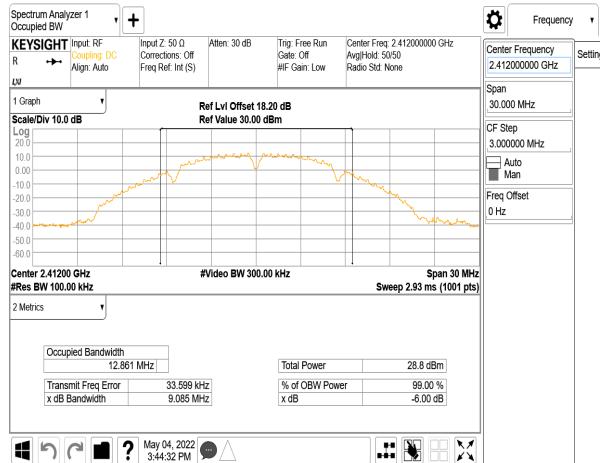
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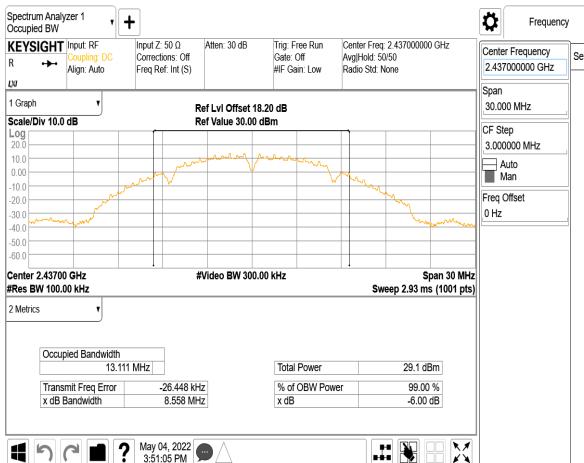
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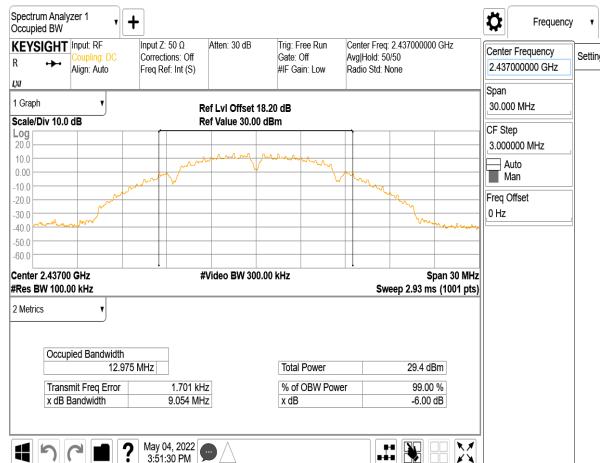
802.11b_20MHz_Chain1_2412MHz



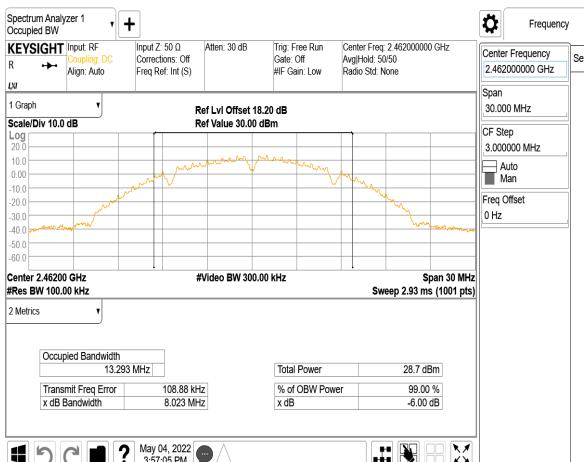
802.11b_20MHz_Chain0_2437MHz



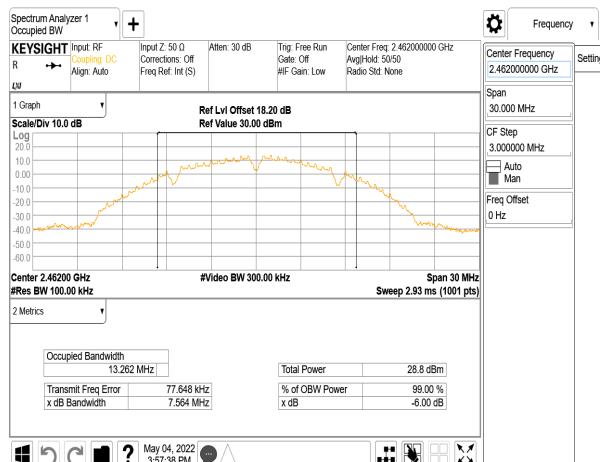
802.11b_20MHz_Chain1_2437MHz



802.11b 20MHz Chain0 2462MHz



802.11b 20MHz Chain1 2462MHz



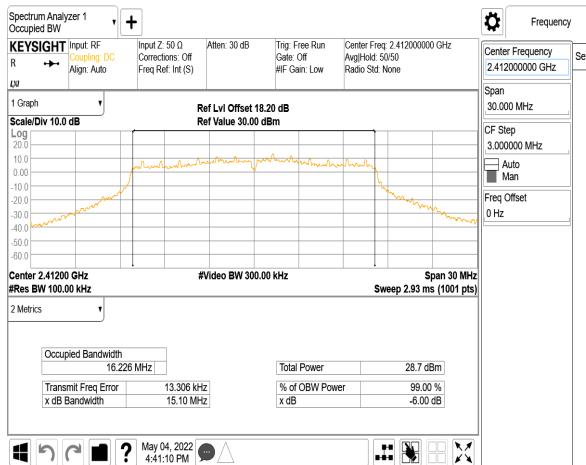
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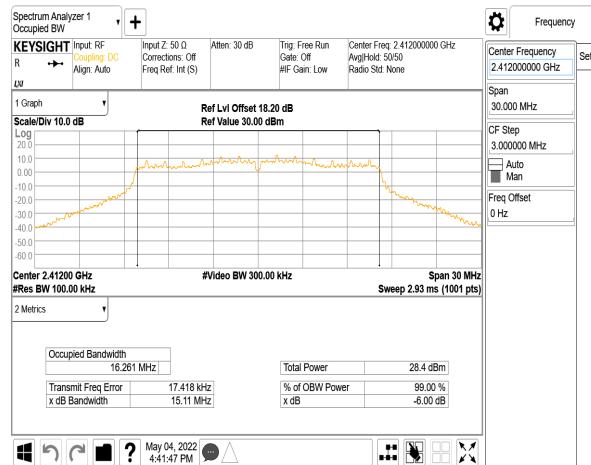
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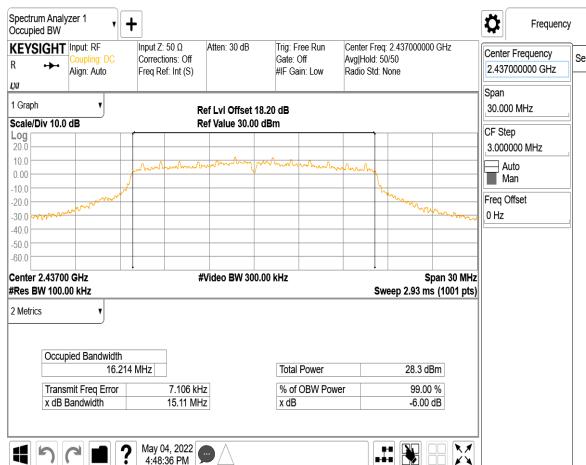
802.11g_20MHz_Chain0_2412MHz



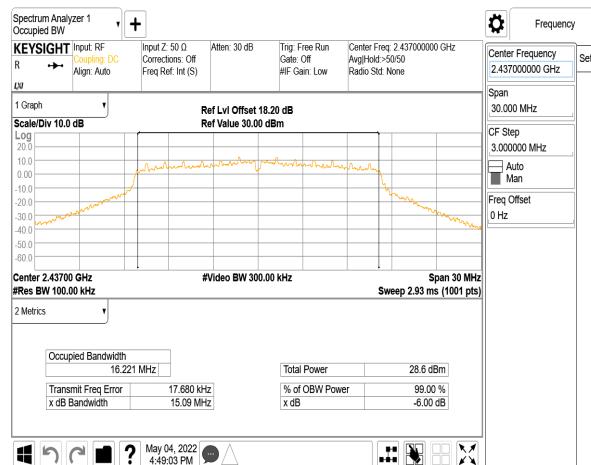
802.11g_20MHz_Chain1_2412MHz



802.11g_20MHz_Chain0_2437MHz



802.11g_20MHz_Chain1_2437MHz



802.11g_20MHz_Chain0_2462MHz



802.11g_20MHz_Chain1_2462MHz



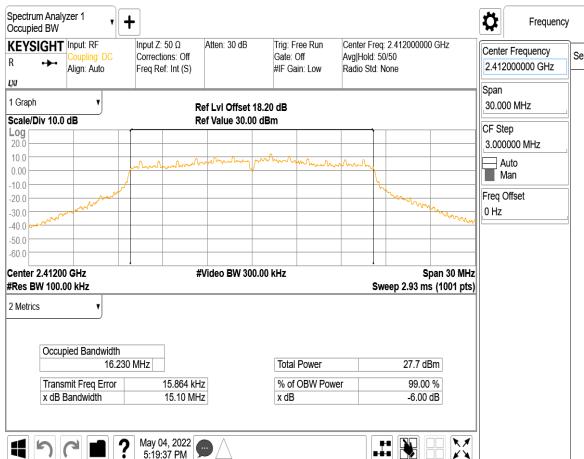
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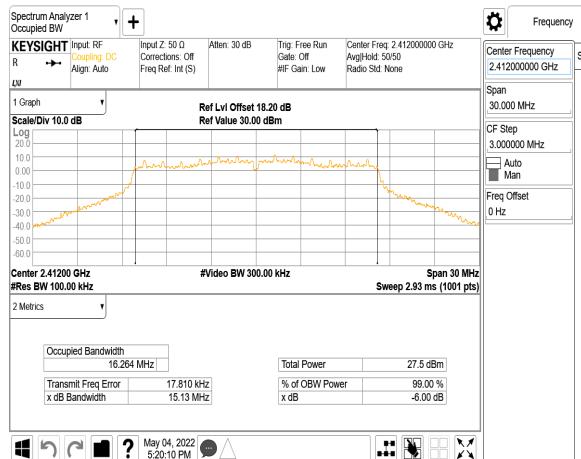
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802.11n_20MHz_Chain0_2412MHz



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



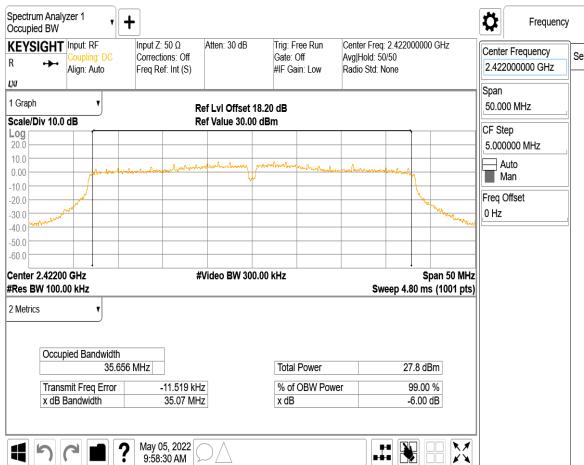
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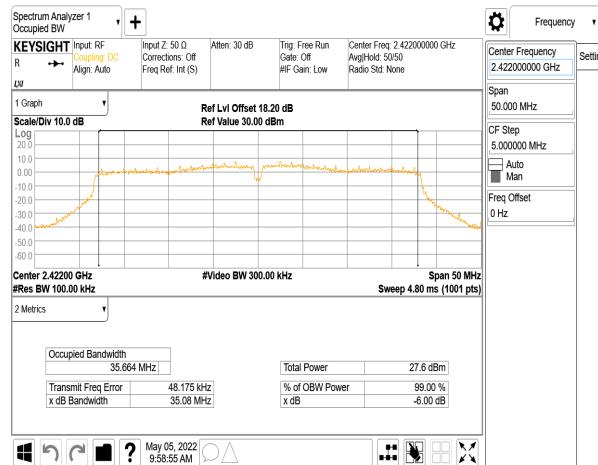
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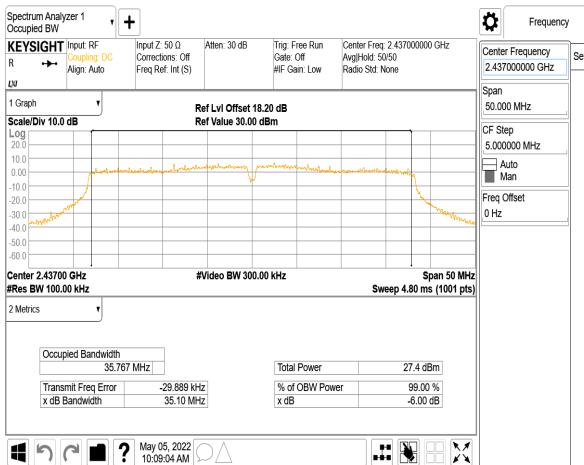
802.11n_40MHz_Chain0_2422MHz



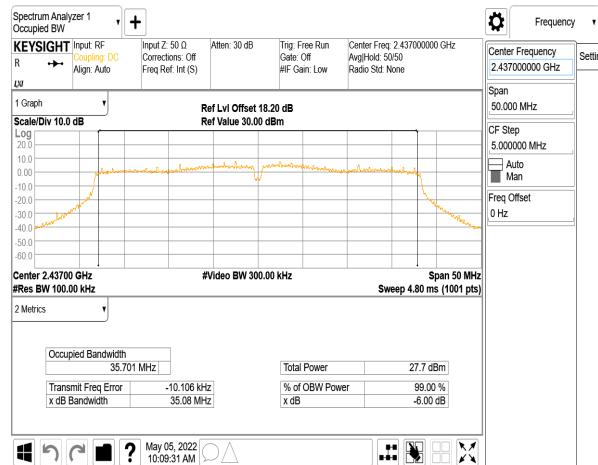
802.11n_40MHz_Chain1_2422MHz



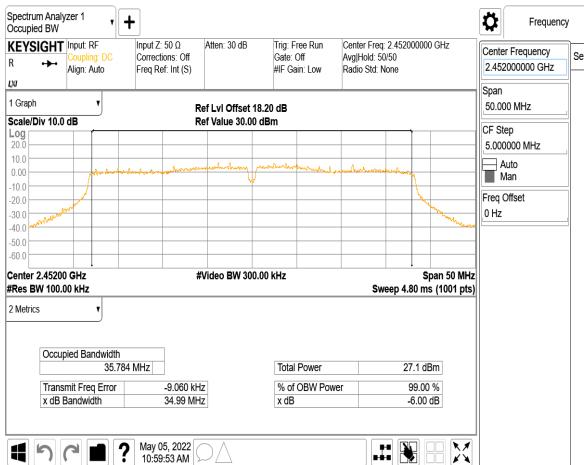
802.11n_40MHz_Chain0_2437MHz



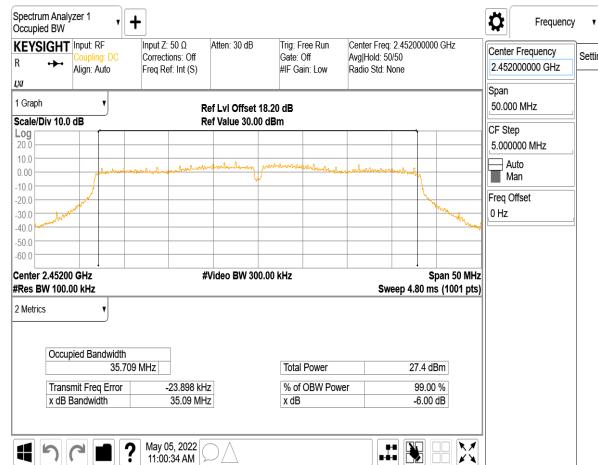
802.11n_40MHz_Chain1_2437MHz



802.11n_40MHz_Chain0_2452MHz



802.11n_40MHz_Chain1_2452MHz

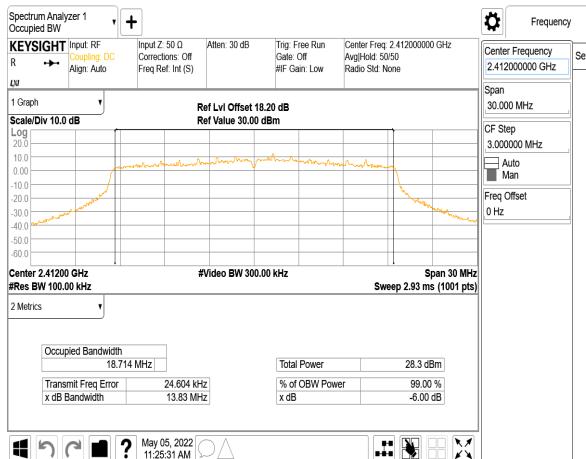


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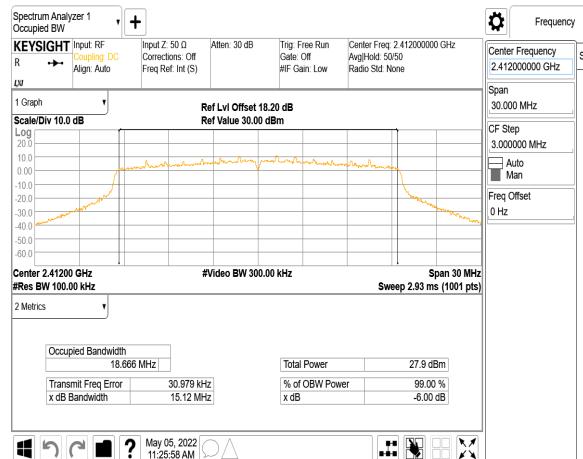
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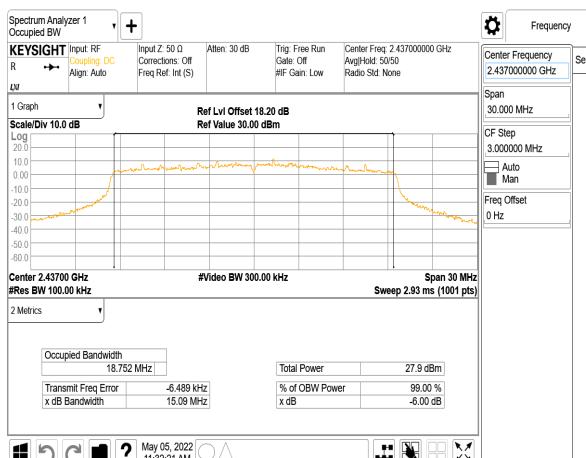
802.11ax_20MHz_Chain0_2412MHz



802.11ax_20MHz_Chain1_2412MHz



802.11ax_20MHz_Chain0_2437MHz



802.11ax_20MHz_Chain1_2437MHz



802.11ax_20MHz_Chain0_2462MHz



802.11ax_20MHz_Chain1_2462MHz

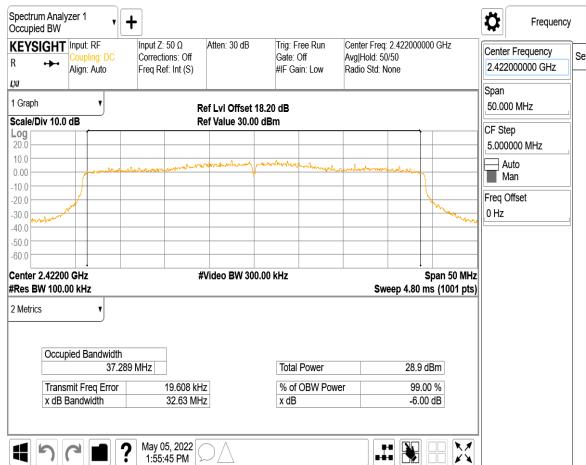


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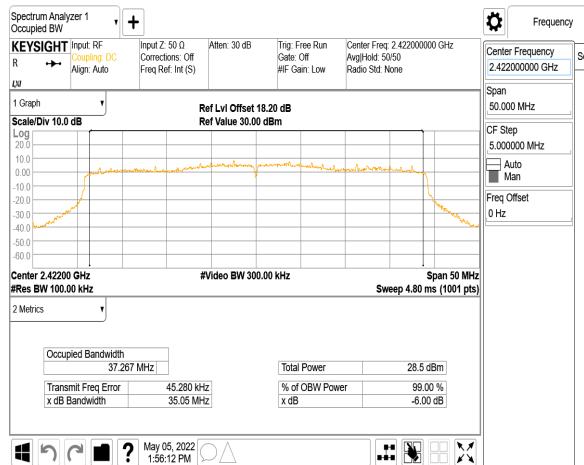
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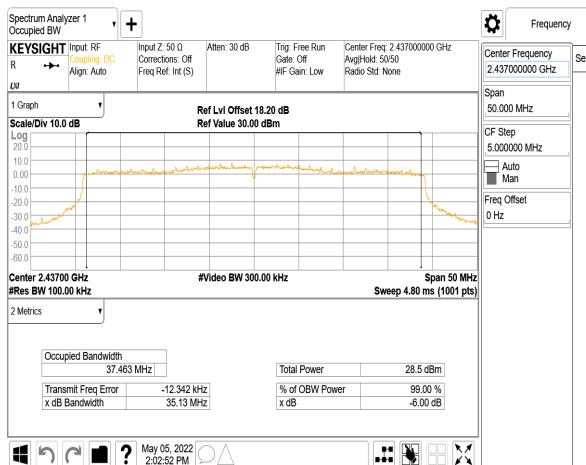
802.11ax_40MHz_Chain0_2422MHz



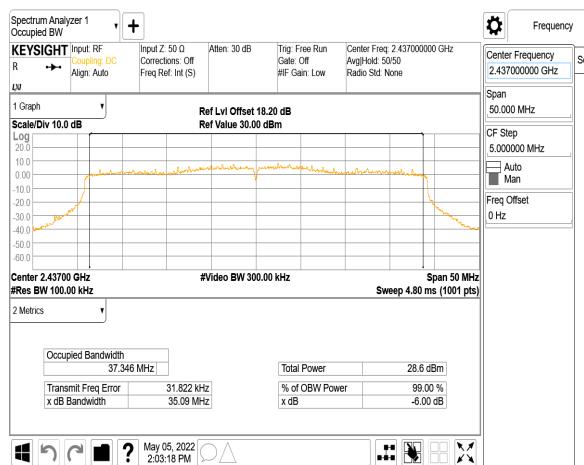
802.11ax_40MHz_Chain1_2422MHz



802.11ax_40MHz_Chain0_2437MHz



802.11ax_40MHz_Chain1_2437MHz



802.11ax_40MHz_Chain0_2452MHz



802.11ax_40MHz_Chain1_2452MHz



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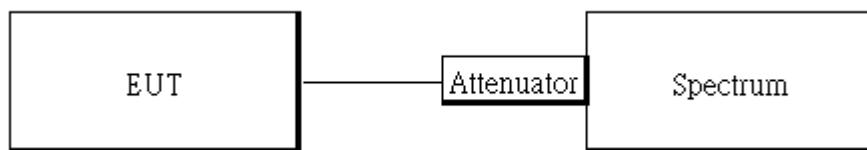
10 CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT

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), must also comply with the radiated emission limits specified in §15.209(a).

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	9.60	-10.40	2412	8.82	-11.18
2437	13.59	-6.41	2437	13.76	-6.24
2462	13.66	-6.34	2462	13.96	-6.04

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	13.37	-6.63	2412	12.42	-7.58
2437	12.13	-7.87	2437	12.40	-7.60
2462	11.87	-8.13	2462	12.17	-7.83

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	12.32	-7.68	2412	11.46	-8.54
2437	11.69	-8.31	2437	12.00	-8.00
2462	11.52	-8.48	2462	11.43	-8.57

802.11nHT_40M Ch0

Reference Level of Limit 802.11n40 MODE			Reference Level of Limit 802.11ac40 MODE		
Freq. (MHz)	PSD (dBm)	Reference Level of Limit (dBm)	Freq. (MHz)	PSD (dBm)	Reference Level of Limit (dBm)
2422	7.77	-12.23	2422	7.82	-12.18
2437	6.96	-13.04	2437	7.84	-12.16
2452	7	-13.00	2452	7.08	-12.92

802.11ax_HE_20M Ch0

Reference Level of Limit 802.11ax20 mode			Reference Level of Limit 802.11ax20 mode		
Freq. (MHz)	PSD (dBm)	Reference Level of Limit (dBm)	Freq. (MHz)	PSD (dBm)	Reference Level of Limit (dBm)
2412	12.15	-7.85	2412	10.97	-9.03
2437	11.73	-8.27	2437	10.90	-9.10
2462	10.76	-9.24	2462	11.72	-8.28

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802.11ax_HE_40M Ch0

802.11ax_HE_40M Ch1

Reference Level of Limit 802.11ax40 MODE			Reference Level of Limit 802.11ax40 MODE		
Freq. (MHz)	PSD (dBm)	Reference Level of Limit (dBm)	Freq. (MHz)	PSD (dBm)	Reference Level of Limit (dBm)
2422	8.43	-11.57	2422	8.58	-11.42
2437	8.12	-11.88	2437	8.12	-11.88
2452	7.58	-12.42	2452	7.7	-12.30

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台灣檢驗科技股份有限公司 t (886-2) 2299-3279

f (886-2) 2298-0488

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802.11b_20MHz_Chain0_2412MHz



802.11b_20MHz_Chain1_2412MHz



802.11b_20MHz_Chain0_2437MHz



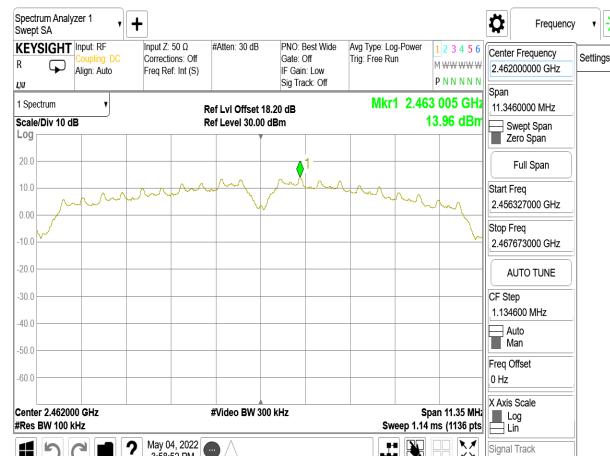
802.11b_20MHz_Chain1_2437MHz



802.11b_20MHz_Chain0_2462MHz



802.11b_20MHz_Chain1_2462MHz



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802.11g_20MHz_Chain0_2412MHz



802.11g_20MHz_Chain1_2412MHz



802.11g_20MHz_Chain0_2437MHz



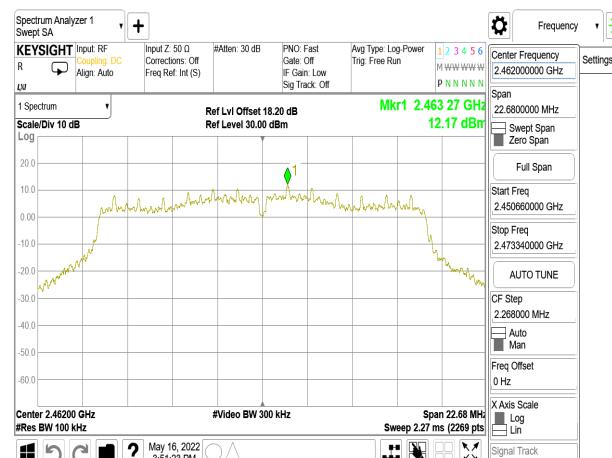
802.11g_20MHz_Chain1_2437MHz



802.11g_20MHz_Chain0_2462MHz



802.11g_20MHz_Chain1_2462MHz

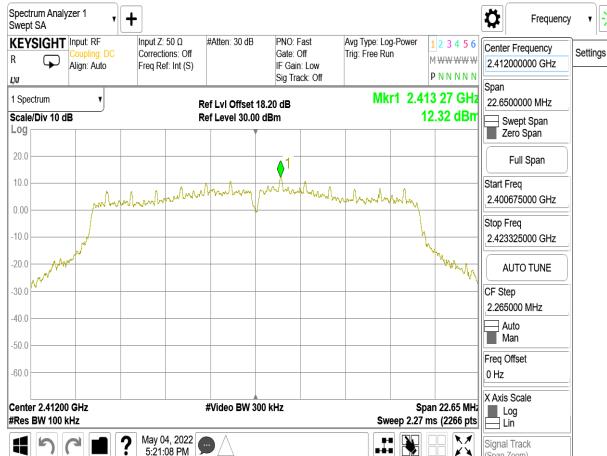


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802.11n_20MHz_Chain0_2412MHz



802.11n_20MHz_Chain1_2412MHz



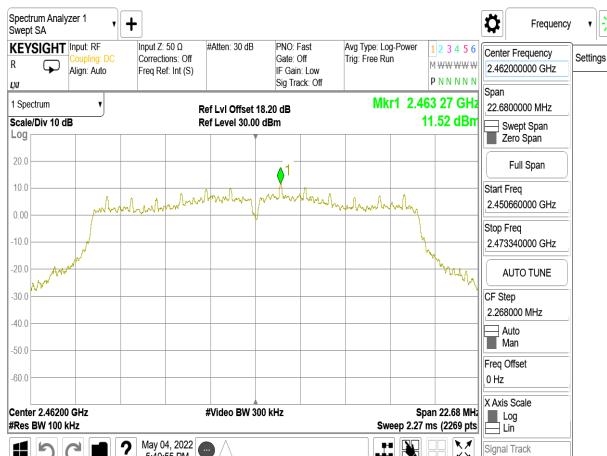
802.11n_20MHz_Chain0_2437MHz



802.11n_20MHz_Chain1_2437MHz



802.11n_20MHz_Chain0_2462MHz



802.11n_20MHz_Chain1_2462MHz



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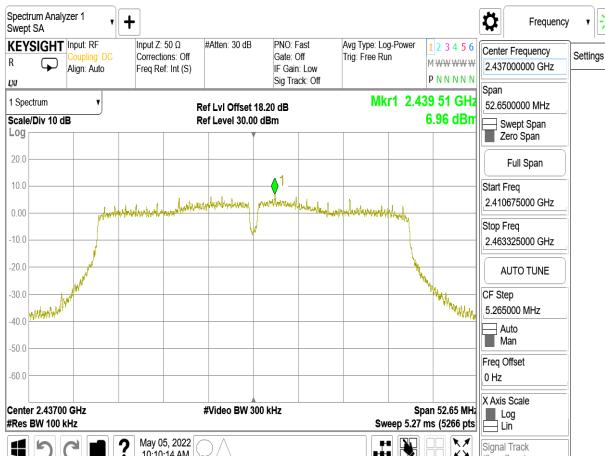
802.11n_40MHz_Chain0_2422MHz



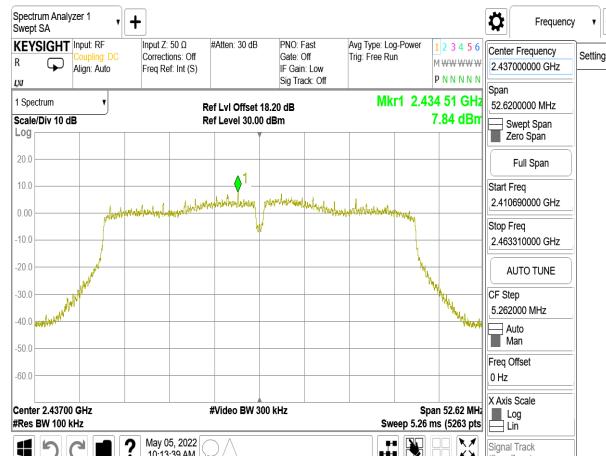
802.11n_40MHz_Chain1_2422MHz



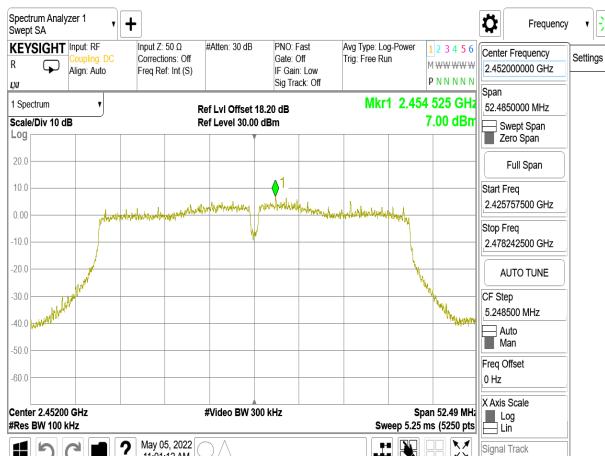
802.11n_40MHz_Chain0_2437MHz



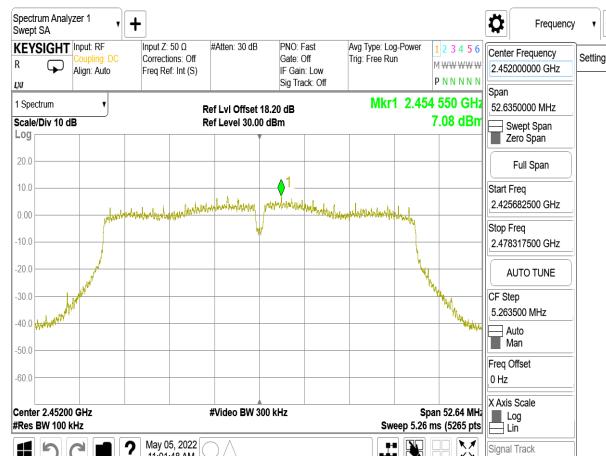
802.11n_40MHz_Chain1_2437MHz



802.11n_40MHz_Chain0_2452MHz



802.11n_40MHz_Chain1_2452MHz



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