ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

EUT Description	Bridge
Applicant:	Ring LLC 12515 Cerise Ave, Hawthorne, CA90250 United States
Manufacturer:	Ring LLC 12515 Cerise Ave, Hawthorne, CA90250 United States
Brand Name:	ring
Model No./ISED HVIN:	7RCEAB
ISED PMN:	7RCEAB
Report Number:	TERF2501000110E2
FCC ID	2AEUP-7RCEAB
IC:	20271-7RCEAB
Date of EUT Received:	January 6, 2025
Date of Test:	January 8, 2025 ～ April 28, 2025
Issue Date:	June 12, 2025

Approved By Aken Huang

Aken Huang

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

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

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Revision History

Report Number	Revision	Description	Issue Date	Revised By	Remark
TERF2501000110E2	00	Original	June 12, 2025	Yuri Tsai	

Note:

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

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1 GENERAL INFORMATION

1.1 Product Description

EUT Description	Bridge
Brand Name:	ring
Model No./ISED HVIN:	7RCEAB
Hardware Version:	N/A
Firmware Version:	N/A
EUT Series No.:	L2F11LE3C037109
Power Supply:	100-240V
Test Software (Name/Version)	Tera Term V4.106

1.2 RF Specification

WLAN 2.4GHz

Mode	Frequency Range	Channels	Rated Power (dBm)		Modulation Technology
			Peak	Avg.	
802.11b	2412~2462	11	20.84	17.99	DSSS
802.11g	2412~2462	11	23.59	17.67	OFDM
802.11n_HT20	2412~2462	11	23.66	17.64	OFDM
802.11ax_HE20	2412~2462	11	25.21	18.60	OFDMA
Modulation type:		CCK, DQPSK, DBPSK for DSSS in 802.11b			
		64QAM, 16QAM, QPSK, BPSK for OFDM in 802.11g,11n			
		1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDMA in 802.11ax			
Data Rate:		802.11b: 1/2/5.5/11 Mbps			
		802.11g: 6/9/12/18/24/36/48/54 Mbps			
		802.11n_HT20:up to 72.2Mbps			
		802.11ax_HE20:up to 143.4Mbps			

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WLAN 2.4GHz for IC

Mode	Frequency Range	Channels	Rated Power (dBm)		Rated Power in dBm (EIRP)	Modulation Technology
			Peak	Avg.		
802.11b	2412~2462	11	20.84	17.99	21.79	DSSS
802.11g	2412~2462	11	23.59	17.67	21.47	OFDM
802.11n_HT20	2412~2462	11	23.66	17.64	21.44	OFDM
802.11ax_HE20	2412~2462	11	25.21	18.60	22.40	OFDMA
Modulation type:	CCK, DQPSK, DBPSK for DSSS in 802.11b					
	64QAM, 16QAM, QPSK, BPSK for OFDM in 802.11g,11n					
	1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDMA in 802.11ax					
Data Rate:	802.11b: 1/2/5.5/11 Mbps					
	802.11g: 6/9/12/18/24/36/48/54 Mbps					
	802.11n_HT20:up to 72.2Mbps					
	802.11ax_HE20:up to 143.4Mbps					

1.3 Antenna Designation

Antenna Type	Freq. (MHz)	Peak Antenna Gain (dBi)
PIFA	2412-2462	3.8

Note: 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
RSS-247 issue 3 Aug. 2023
RSS-Gen, Issue 5 April 2018, Amendment 2 (February 2021)
ANSI C63.10:2013

1.5 Test Facility

Laboratory	Test Site Address	Test Site Name	FCC Designation number	IC CAB identifier
SGS Taiwan Ltd. Central RF Lab. (TAF code 3702)	No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan.	SAC 1	TW0027	TW3702
		SAC 2		
		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 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.

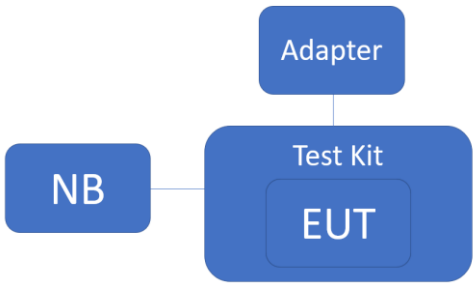
2.4.2 For all conducted test items:

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.

2.5 Test Configuration

Conduction Setup

Conducted Setup



Radiated Setup

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2.6 Control Unit(s)

Conducted Emission Test Site: Conducted C					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL. (mm/dd/yyyy)	CAL DUE. (mm/dd/yyyy)
USB Cable	N/A	N/A	N/A	N/A	N/A
Test Kit	N/A	N/A	N/A	N/A	N/A
Adapter	DEE VAN ENTERPRISE CO,LTD.	DAS-12PFU-05 FUS 050200	N/A	N/A	N/A
Notebook	Lenovo	T14	P0003332	N/A	N/A

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3 SUMMARY OF TEST RESULTS

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

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4 DESCRIPTION OF TEST MODES

4.1 Operating Frequencies

2400~2483.5 MHz

20MHz	
CH	Freq. (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 given UE is pre-scanned among below modes.

Mode		Transmission Chain								Single Transmission Spatial		Multi Transmission Spatial	
V	802.11 b	V	Ch0		Ch1		Ch2		Ch3	V	1TX		1TX
V	802.11 g	V	Ch0		Ch1		Ch2		Ch3	V	1TX		1TX
V	802.11 n	V	Ch0		Ch1		Ch2		Ch3	V	1TX		1TX
	802.11 ac		Ch0		Ch1		Ch2		Ch3		1TX		1TX
V	802.11 ax	V	Ch0		Ch1		Ch2		Ch3	V	1TX		1TX
	802.11 be		Ch0		Ch1		Ch2		Ch3		1TX		1TX

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 TEST					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11b	1 to 11	1,6,11	DSSS	1	Ch0
802.11g	1 to 11	1,2,6,9,10,11	OFDM	6	Ch0
802.11n_HT20	1 to 11	1,2,6,9,10,11	OFDM	MCS0	Ch0

CONDUCTED TEST						
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	RU CONFIGURATION	DATA RATE (Mbps)	ANTENNA PORT
802.11ax_HE20	1 to 11	1,2,3,4,6,7,8,9,10,11	OFDMA	FULL RU 26/0,26/8 52/37,52/40 106/53,106/54	MCS0	Ch0

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TRANSMIT RADIATED EMISSION TEST (BELOW 1 GHz)						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11g	2412~2462	1 to 11	6	OFDM	6	Ch0

TRANSMIT RADIATED EMISSION TEST (ABOVE 1 GHz)						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11b	2412~2462	1 to 11	1,6,11	DSSS	1	Ch0
802.11g	2412~2462	1 to 11	1,2,6,9,10,11	OFDM	6	Ch0
802.11n20	2412~2462	1 to 11	1,2,6,9,10,11	OFDM	MCS0	Ch0
802.11ax20	2412~2462	1 to 11	1,2,3,4,6,7,8,9,10,11	OFDMA	MCS0	Ch0

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	+/-	1.54	dB
Output Power measurement	+/-	0.97	dB
Emission Bandwidth	+/-	1.38	Hz
Conducted emission measurement	+/-	0.77	dB
Peak Power Density	+/-	0.61	dB
Temperature	+/-	0.6	°C
Humidity	+/-	3	%
DC / AC Power Source	+/-	1	%

Radiated Spurious Emission Measurement Uncertainty				
Polarization: Vertical	**+/-**	**1.89**	**dB**	9kHz~30MHz
	+/-	**4.1**	**dB**	30MHz - 1000MHz
	+/-	**3.37**	**dB**	1GHz - 18GHz
	+/-	**3.83**	**dB**	18GHz - 40GHz
Polarization: Horizontal	**+/-**	**1.89**	**dB**	9kHz~30MHz
	+/-	**4.1**	**dB**	30MHz - 1000MHz
	+/-	**3.37**	**dB**	1GHz - 18GHz
	+/-	**3.83**	**dB**	18GHz - 40GHz
Radiated Spurious Emission	**+/-**	**2**	**dB**	33GHz-50GHz
	+/-	**1.59**	**dB**	50GHz-60GHz
	+/-	**1.71**	**dB**	60GHz-90GHz
	+/-	**1.64**	**dB**	90GHz-140GHz
	+/-	**3.84**	**dB**	140GHz-220GHz

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. (mm/dd/yyyy)	CAL DUE. (mm/dd/yyyy)
Coaxial Cable	EC Lab	RF-HY-CAB-250	RF-HY-CAB-250-01	03/27/2025	03/26/2026
EMI Test Receiver	Anritsu	N9038A	MY52260216	11/20/2024	11/19/2025
EMI Test Receiver	R&S	ESCI	101342	04/29/2024	04/28/2025
LISN	SCHWARZBECK Mess-Elektronik	NSLK8127	974	06/26/2024	06/25/2025
Pulse Limiter	EC Lab	VTSD 9561F-N	485	03/27/2025	03/26/2026
Test Software	audix	e3	E3 20923 SGS Ver.9 (C)	N.C.R	N.C.R

6.2 Conducted Measurement

Conducted Emission Test Site: Conducted C					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL. (mm/dd/yyyy)	CAL DUE. (mm/dd/yyyy)
Attenuator	Woken	WATT-218FS-10	RF18	11/14/2024	11/13/2025
Attenuator	Woken	WATT-218FS-10	RF19	11/14/2024	11/13/2025
DC Block	PASTERNACK	PE8210	RF35	11/14/2024	11/13/2025
Power Meter	Anritsu	ML2496A	2138005	09/25/2024	09/24/2025
Power Sensor	Anritsu	MA2411B	1911395	09/25/2024	09/24/2025
Power Sensor	Anritsu	MA2411B	1911396	09/25/2024	09/24/2025
Spectrum Analyzer	KEYSIGHT	N9010B	MY59071573	05/24/2024	05/23/2025
Test Software	SGS Taiwan	Radio Test Software	Ver.21	N.C.R	N.C.R

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6.3 Radiated Measurement

Radiated Emission Test Site: SAC D					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL. (mm/dd/yyyy)	CAL DUE. (mm/dd/yyyy)
3m Site NSA	SGS	966 chamber D	N/A	04/30/2024	04/29/2025
Attenuator	Woken	WATT-218FS-10	RF17	11/14/2024	11/13/2025
Broadband Antenna	SCHWARZBECK	VULB 9168	9168-617	12/17/2024	12/16/2025
Coaxial Cable	EMCI+Huber Suhner	RG 214/U+EMC104-SM-SM-500+SUCOFLEX 104+16+EMC105-SM-SM-11000+EMC106-SM-SM-2300	W22.01+W21.01+150707+MY969/4+16+190825+150702	11/14/2024	11/13/2025
High Pass Filter	Titan Microwave	T04H30001800070S01	RF188	11/14/2024	11/13/2025
Horn Antenna	Schwarzbeck	BBHA9120D	1341	05/30/2024	05/29/2025
Horn Antenna	Schwarzbeck	BBHA9170	184	12/20/2024	12/19/2025
Pre-Amplifier	EMC Instruments	EMC12630SE	980273	11/14/2024	11/13/2025
Pre-Amplifier	EMC Instruments	EMC184045SEE	980881	11/14/2024	11/13/2025
Pre-Amplifier	EMC Instruments	EMC9135	980234	11/14/2024	11/13/2025
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	10/16/2024	10/15/2025
H-Loop Near Field Antenna	LANGER EMV-Technik	LF-R 400	02-1597	N.C.R	N.C.R
Test Software	audix	e3	E3 20923 SGS Ver.9 (C)	N.C.R	N.C.R

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

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7 CONDUCTED EMISSION TEST

7.1 Standard Applicable

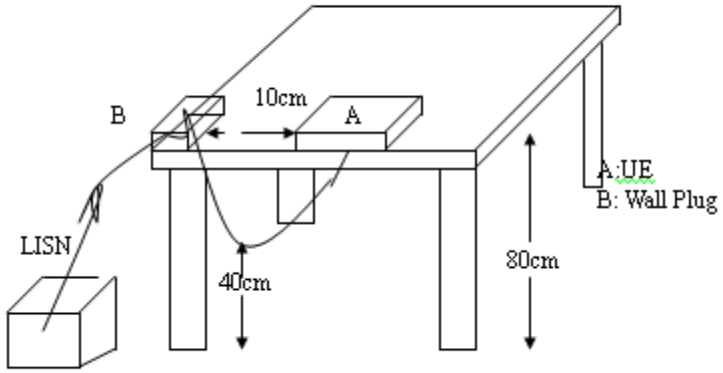
Frequency range within 150kHz to 30MHz shall not exceed the Limit table as below.

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 closest to the limit.

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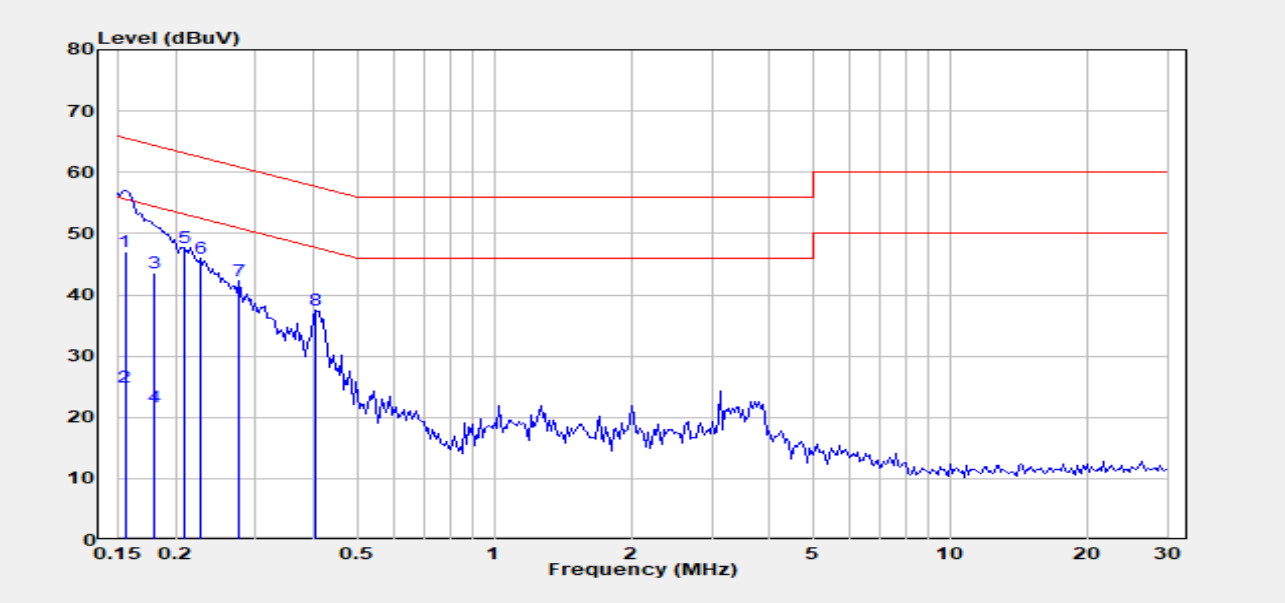
AC POWER LINE CONDUCTED EMISSION TEST DATA

Report Number	:TERF2501000110E2	Test Site	:Conduction C
Test Mode	:2.4G	Test Date	:2025-04-25
Power	:120V	Temp./Humi.	:25.2/57
Probe	:L1	Engineer	:Temo Chen



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV	Limit dBμV	Margin dB
0.155	QP	36.30	10.69	46.99	65.74	-18.75
0.155	Average	14.20	10.69	24.89	55.74	-30.85
0.180	QP	32.80	10.68	43.48	64.50	-21.02
0.180	Average	11.10	10.68	21.78	54.50	-32.72
0.208	Peak	37.13	10.68	47.80	63.27	-15.47
0.227	Peak	35.39	10.67	46.07	62.57	-16.50
0.274	Peak	31.63	10.66	42.29	60.98	-18.69
0.406	Peak	26.86	10.64	37.50	57.73	-20.22

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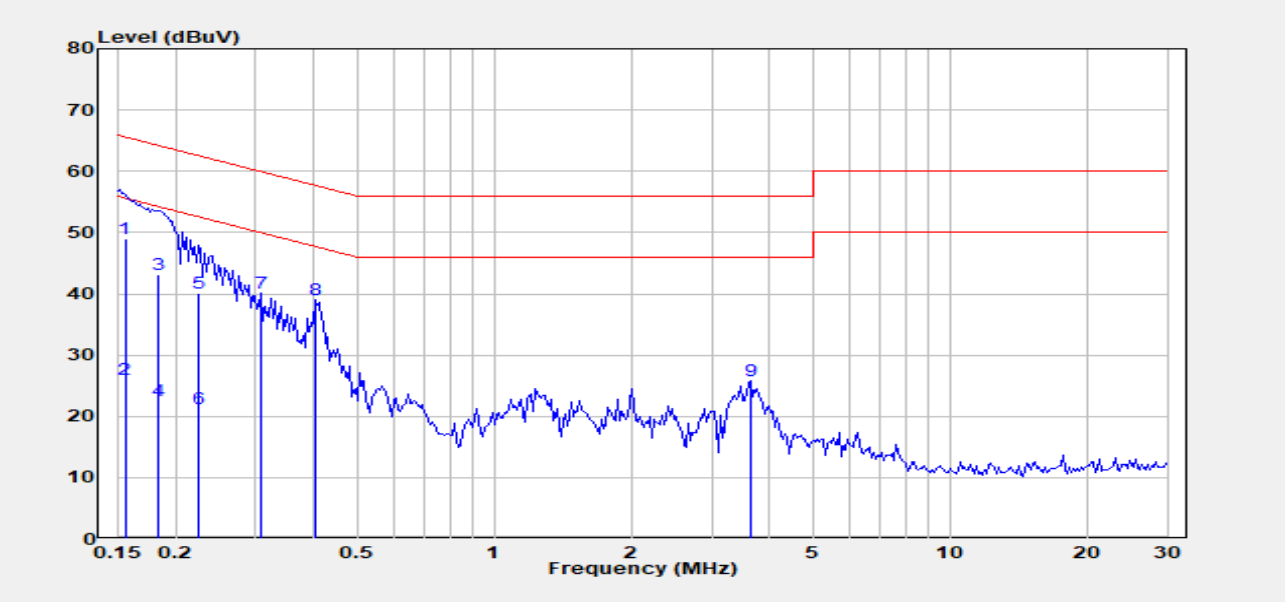
Report Number	:TERF2501000110E2	Test Site	:Conduction C
Test Mode	:2.4G	Test Date	:2025-04-25
Power	:120V	Temp./Humi.	:25.2/57
Probe	:N	Engineer	:Temo Chen



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV	Limit dBμV	Margin dB
0.155	QP	38.30	10.67	48.97	65.74	-16.77
0.155	Average	15.40	10.67	26.07	55.74	-29.67
0.183	QP	32.50	10.67	43.17	64.33	-21.16
0.183	Average	11.80	10.67	22.47	54.33	-31.86
0.224	QP	29.40	10.66	40.06	62.66	-22.59
0.224	Average	10.60	10.66	21.26	52.66	-31.39
0.308	Peak	29.40	10.64	40.04	60.02	-19.97
0.406	Peak	28.33	10.62	38.95	57.73	-18.78
3.642	Peak	14.88	10.89	25.77	56.00	-30.23

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8 PEAK OUTPUT POWER MEASUREMENT

8.1 Standard Applicable

8.1.1 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.

8.1.2 FCC

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 form 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.

8.1.3 ISED

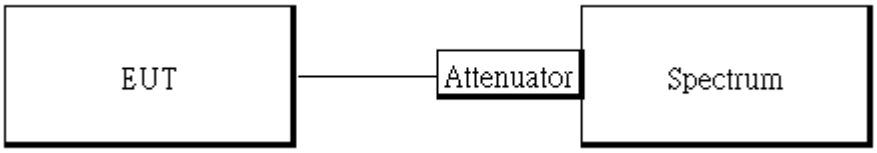
For systems using digital modulation in the 2400-2483.5 MHz bands, the limit for peak output power is 1Watt and the e.i.r.p. shall not exceed 4 W.

Note:

When the antenna gain is greater than 6 dBi, the power limit attenuated accordingly.

8.2 Test Setup

8.2.1 Duty Cycle



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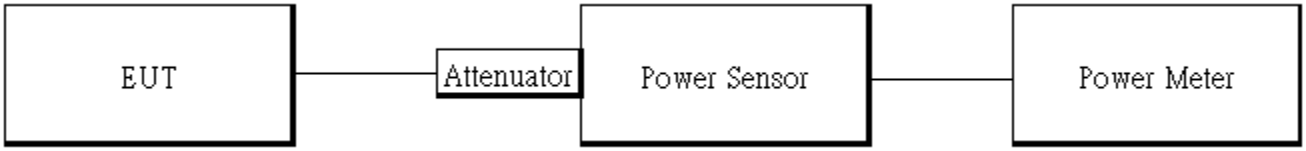
8.2.2 Output Power:



8.3 Measurement Procedure

8.3.1 Duty Cycle:

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

8.3.2 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.

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

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8.4 Measurement Result

8.4.1 Duty Cycle:

Mode		Duty Cycle (%) = Ton / (Ton+Toff)	Duty Factor (dB) =10*log (1/Duty Cycle)	1/T (kHz)	VBW setting (kHz)
802.11b		89.41	0.49	0.12	1.00
802.11g		58.85	2.30	0.70	1.00
802.11n_20		57.08	2.44	0.75	1.00
Mode	**RU Config**	**Duty Cycle (%) = Ton / (Ton+Toff)**	**Duty Factor (dB) =10*log (1/Duty Cycle)**	**1/T (kHz)**	**VBW setting (kHz)**
802.11ax_20	Full	20.47	6.89	3.85	4.00
	26 RU	66.44	1.78	0.51	1.00
	52 RU	50.50	2.97	0.98	1.00
	106 RU	34.21	4.66	1.92	2.00

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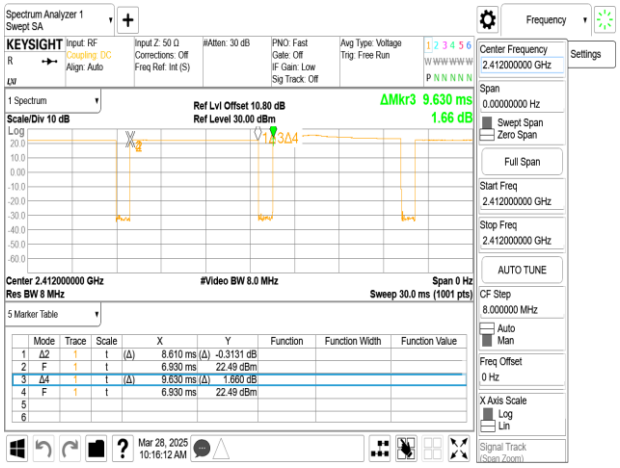
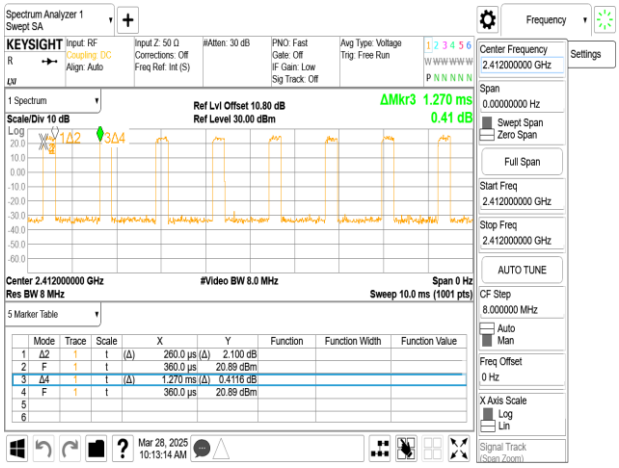
8.4.2 Duty Cycle test plots

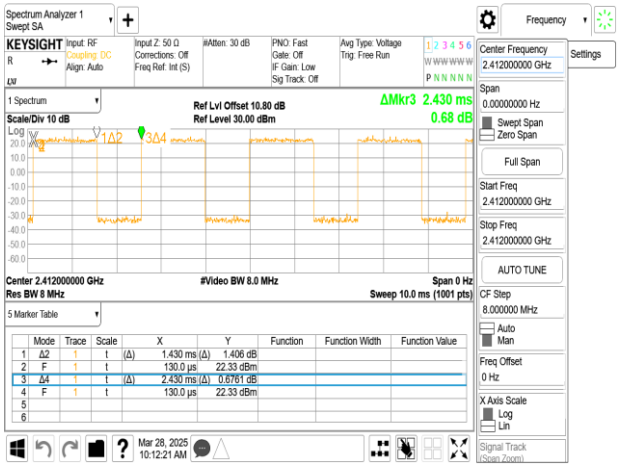
802.11b_20MHz_Chain0_2412MHz



802.11ax_20MHz_Chain0_2412MHz



802.11g_20MHz_Chain0_2412MHz



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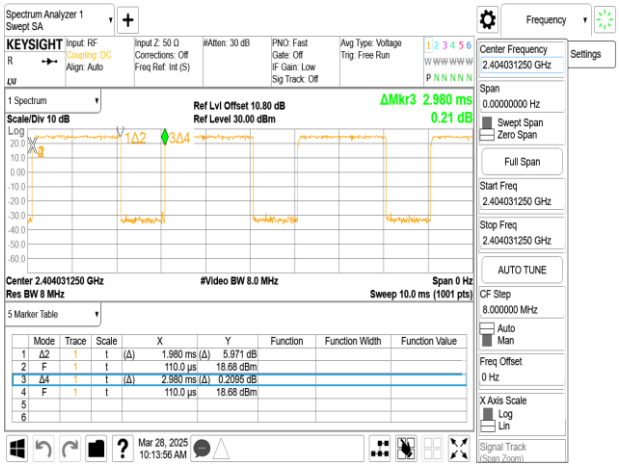
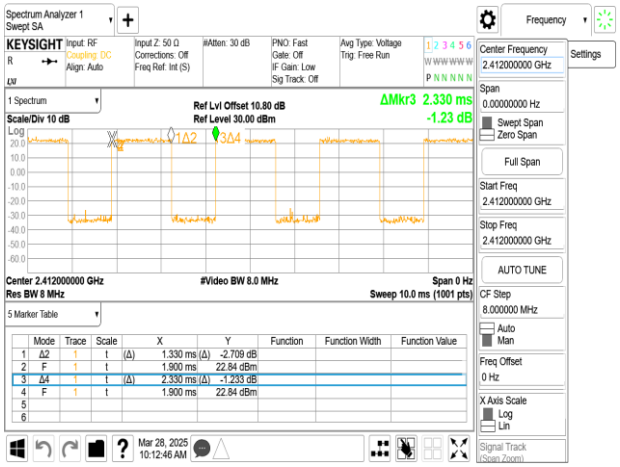
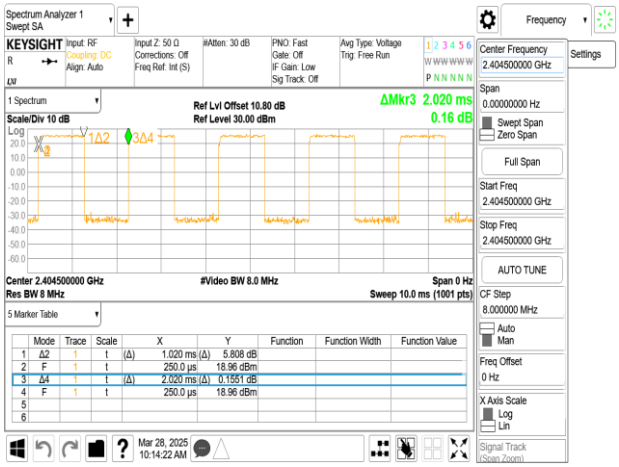


802.11n_20MHz_Chain0_2412MHz



802.11ax_20MHz_Chain0_2412MHz_RU52_37



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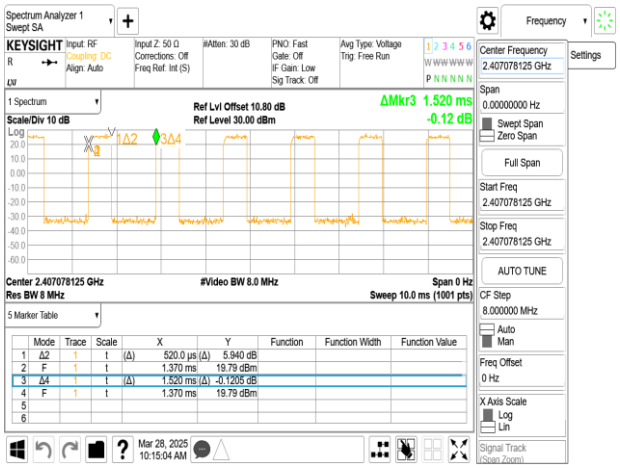
802.11ax_20MHz_Chain0_2412MHz_RU106_53



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8.4.3 Output Power

802.11b Ch0							
CH	Freq. (MHz)	Data Rate	Power Setting	Peak Output Power (mW)	Peak Output Power (dBm)	Limit (dBm)	RESULT
1	2412	1	80	116.95	20.68	30.00	PASS
6	2437	1	80	121.34	**20.84**	30.00	PASS
11	2462	1	80	115.08	20.61	30.00	PASS
802.11b Ch0							
CH	Freq. (MHz)	Data Rate	Power Setting	Avg. Output Power (mW)	Avg. Output Power (dBm)	Limit (dBm)	RESULT
1	2412	1	80	62.17	17.94	30.00	PASS
6	2437	1	80	62.89	**17.99**	30.00	PASS
11	2462	1	80	61.75	17.91	30.00	PASS

802.11g Ch0							
CH	Freq. (MHz)	Data Rate	Power Setting	Peak Output Power (mW)	Peak Output Power (dBm)	Limit (dBm)	RESULT
1	2412	6	73	186.64	22.71	30.00	PASS
2	2417	6	77	212.81	23.28	30.00	PASS
6	2437	6	80	221.31	23.45	30.00	PASS
9	2452	6	76	228.56	**23.59**	30.00	PASS
10	2457	6	71	185.78	22.69	30.00	PASS
11	2462	6	68	158.85	22.01	30.00	PASS
802.11g Ch0							
CH	Freq. (MHz)	Data Rate	Power Setting	Avg. Output Power (mW)	Avg. Output Power (dBm)	Limit (dBm)	RESULT
1	2412	6	73	40.86	16.11	30.00	PASS
2	2417	6	77	49.46	16.94	30.00	PASS
6	2437	6	80	58.51	**17.67**	30.00	PASS
9	2452	6	76	55.75	17.46	30.00	PASS
10	2457	6	71	40.76	16.10	30.00	PASS
11	2462	6	68	34.06	15.32	30.00	PASS

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802.11n_HT_20M Ch0							
CH	Freq. (MHz)	Data Rate	Power Setting	Peak Output Power (mW)	Peak Output Power (dBm)	Limit (dBm)	RESULT
1	2412	MCS0	69	163.68	22.14	30.00	PASS
2	2417	MCS0	76	226.46	23.55	30.00	PASS
6	2437	MCS0	80	232.27	**23.66**	30.00	PASS
9	2452	MCS0	75	224.39	23.51	30.00	PASS
10	2457	MCS0	70	189.23	22.77	30.00	PASS
11	2462	MCS0	69	180.72	22.57	30.00	PASS
802.11n_HT_20M Ch0							
CH	Freq. (MHz)	Data Rate	Power Setting	Avg. Output Power (mW)	Avg. Output Power (dBm)	Limit (dBm)	RESULT
1	2412	MCS0	69	32.70	15.15	30.00	PASS
2	2417	MCS0	76	53.15	17.26	30.00	PASS
6	2437	MCS0	80	58.01	**17.64**	30.00	PASS
9	2452	MCS0	75	51.94	17.16	30.00	PASS
10	2457	MCS0	70	37.72	15.77	30.00	PASS
11	2462	MCS0	69	34.24	15.35	30.00	PASS

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802.11ax_HE_20M Ch0								
CH	Freq. (MHz)	Data Rate	RU Config	Power Setting	Peak Output Power (mW)	Peak Output Power (dBm)	Limit (dBm)	RESULT
1	2412	MCS0	full	58	220.29	23.43	30.00	PASS
			26/0	70	279.25	24.46	30.00	PASS
			52/37	69	282.49	24.51	30.00	PASS
			106/53	69	280.54	24.48	30.00	PASS
2	2417	MCS0	full	67	266.69	24.26	30.00	PASS
3	2422	MCS0	full	72	285.76	24.56	30.00	PASS
4	2427	MCS0	full	76	302.00	24.80	30.00	PASS
6	2437	MCS0	full	80	331.89	**25.21**	30.00	PASS
7	2442	MCS0	full	76	293.76	24.68	30.00	PASS
8	2447	MCS0	full	71	276.06	24.41	30.00	PASS
9	2452	MCS0	full	68	270.40	24.32	30.00	PASS
10	2457	MCS0	full	60	247.74	23.94	30.00	PASS
11	2462	MCS0	full	57	209.89	23.22	30.00	PASS
			26/8	58	225.42	23.53	30.00	PASS
			52/40	64	264.85	24.23	30.00	PASS
			106/54	63	260.02	24.15	30.00	PASS

802.11ax_HE_20M Ch0								
CH	Freq. (MHz)	Data Rate	RU Config	Power Setting	Avg. Output Power (mW)	Avg. Output Power (dBm)	Limit (dBm)	RESULT
1	2412	MCS0	full	58	22.43	13.51	30.00	PASS
			26/0	70	39.86	16.01	30.00	PASS
			52/37	69	38.52	15.86	30.00	PASS
			106/53	69	41.39	16.17	30.00	PASS
2	2417	MCS0	full	67	36.47	15.62	30.00	PASS
3	2422	MCS0	full	72	49.87	16.98	30.00	PASS
4	2427	MCS0	full	76	60.10	17.79	30.00	PASS
6	2437	MCS0	full	80	72.42	**18.60**	30.00	PASS
7	2442	MCS0	full	76	57.66	17.61	30.00	PASS
8	2447	MCS0	full	71	46.12	16.64	30.00	PASS
9	2452	MCS0	full	68	39.44	15.96	30.00	PASS
10	2457	MCS0	full	60	25.34	14.04	30.00	PASS
11	2462	MCS0	full	57	21.08	13.24	30.00	PASS
			26/8	58	21.11	13.25	30.00	PASS
			52/40	64	31.53	14.99	30.00	PASS
			106/54	63	29.30	14.67	30.00	PASS

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8.4.4 EIRP

802.11b Ch0							
CH	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	RESULT
1	2412	1	17.94	3.80	21.74	36	PASS
6	2437	1	17.99	3.80	**21.79**	36	PASS
11	2462	1	17.91	3.80	21.71	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	16.11	3.80	19.91	36	PASS
2	2417	6	16.94	3.80	20.74	36	PASS
6	2437	6	17.67	3.80	**21.47**	36	PASS
9	2452	6	17.46	3.80	21.26	36	PASS
10	2457	6	16.10	3.80	19.90	36	PASS
11	2462	6	15.32	3.80	19.12	36	PASS

802.11n_HT_20M Ch0							
CH	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	RESULT
1	2412	MCS0	15.15	3.80	18.95	36	PASS
2	2417	MCS0	17.26	3.80	21.06	36	PASS
6	2437	MCS0	17.64	3.80	**21.44**	36	PASS
9	2452	MCS0	17.16	3.80	20.96	36	PASS
10	2457	MCS0	15.77	3.80	19.57	36	PASS
11	2462	MCS0	15.35	3.80	19.15	36	PASS

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802.11ax_HE_20M Ch0								
CH	Freq. (MHz)	Data Rate	RU Config	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit	RESULT
1	2412	MCS0	full	13.51	3.80	17.31	36	PASS
			26/0	16.01	3.80	19.81	36	PASS
			52/37	15.86	3.80	19.66	36	PASS
			106/53	16.17	3.80	19.97	36	PASS
2	2417	MCS0	full	15.62	3.80	19.42	36	PASS
3	2422	MCS0	full	16.98	3.80	20.78	36	PASS
4	2427	MCS0	full	17.79	3.80	21.59	36	PASS
6	2437	MCS0	full	18.60	3.80	**22.40**	36	PASS
7	2442	MCS0	full	17.61	3.80	21.41	36	PASS
8	2447	MCS0	full	16.64	3.80	20.44	36	PASS
9	2452	MCS0	full	15.96	3.80	19.76	36	PASS
10	2457	MCS0	full	14.04	3.80	17.84	36	PASS
11	2462	MCS0	full	13.24	3.80	17.04	36	PASS
			26/8	13.25	3.80	17.05	36	PASS
			52/40	14.99	3.80	18.79	36	PASS
			106/54	14.67	3.80	18.47	36	PASS

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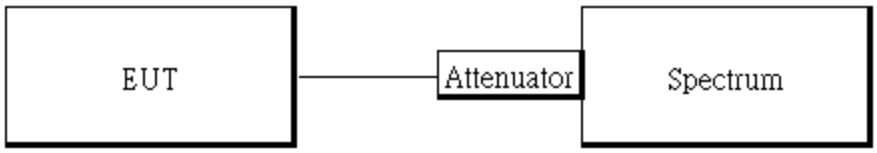
9 EMISSION BANDWIDTH MEASUREMENT

9.1 Standard Applicable

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

9.2 Test Setup



9.3 Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

9.3.1 6dB BW measurements

1. The testing follows the Measurement Procedure of the KDB 558074 D01.
2. Set the spectrum analyzer as
   RBW= 100 kHz ,
   VBW = 3 X RBW,
   Span= 2 to 5 times of the OBW,
   Sweep=auto, Detector = Peak, and Max hold.
3. Mark the upper and lower frequencies of -6dB.
4. Repeat above procedures until all test default channel is completed.

9.3.2 99% BW measurements

1. The testing follows the Measurement Procedure of the RSS-Gen section 6.7.
2. Set the spectrum analyzer as
   RBW= 1 % to 5% of 99%,
   VBW ≥ 3 X RBW,
   Span= large enough to capture all products of the modulation process
   Sweep=auto, Detector = Peak, and Max hold.
3. Mark the upper and lower frequencies of 99%.
4. Repeat above procedures until all test default channel is completed.

9.4 Measurement Result:

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9.4.1 6dB BW measurements

802.11b Ch0

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	8060	≧ 500	PASS
2437	7577	≧ 500	PASS
2462	7585	≧ 500	PASS

802.11g Ch0

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	15200	≧ 500	PASS
2437	15200	≧ 500	PASS
2462	15190	≧ 500	PASS

802.11n_HT_20M Ch0

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	15200	≧ 500	PASS
2437	15210	≧ 500	PASS
2462	15200	≧ 500	PASS

802.11ax_HE_20M Ch0

Freq. (MHz)	RU Config	6dB BW (kHz)	Limit (kHz)	Result
2412	full	18840	≧ 500	PASS
2437	full	18310	≧ 500	PASS
2462	full	18750	≧ 500	PASS

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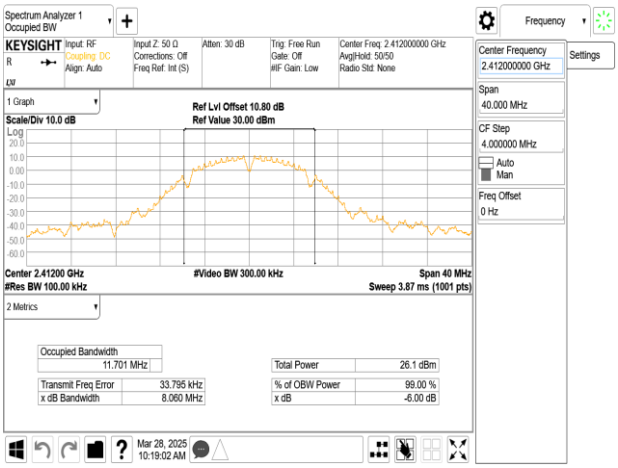
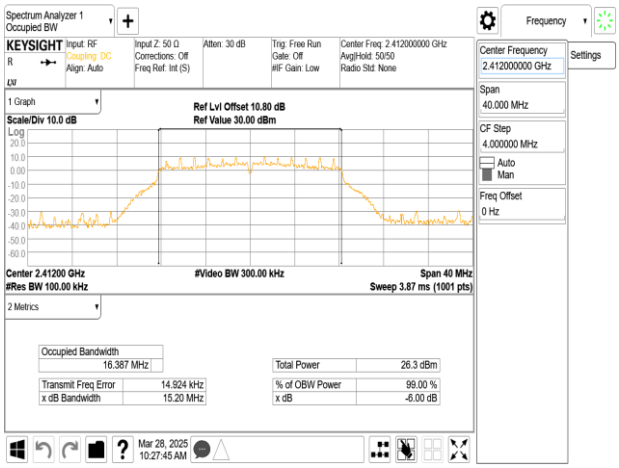
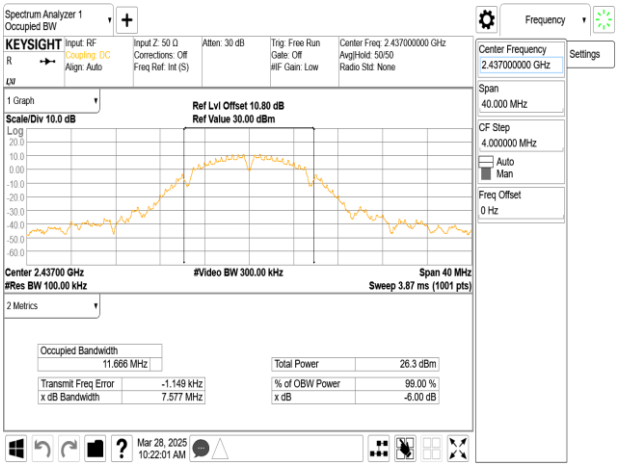
802.11b_20MHz_Chain0_2412MHz



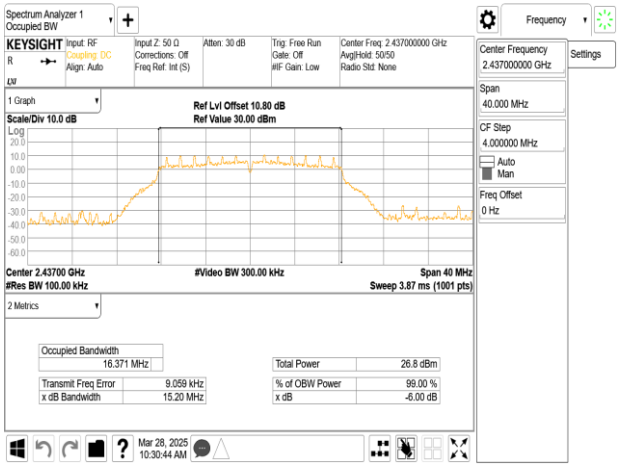
802.11g_20MHz_Chain0_2412MHz



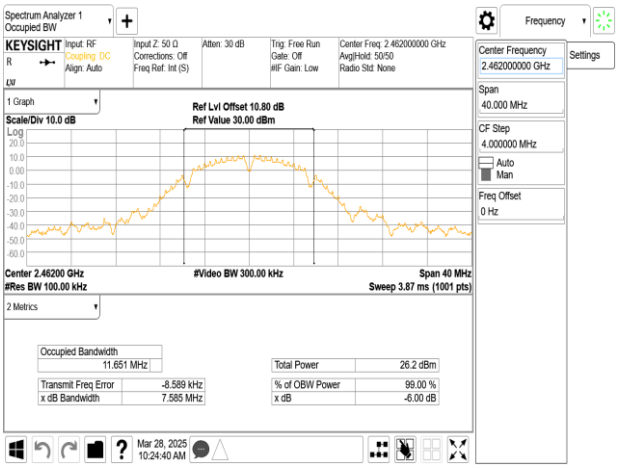
802.11b_20MHz_Chain0_2437MHz



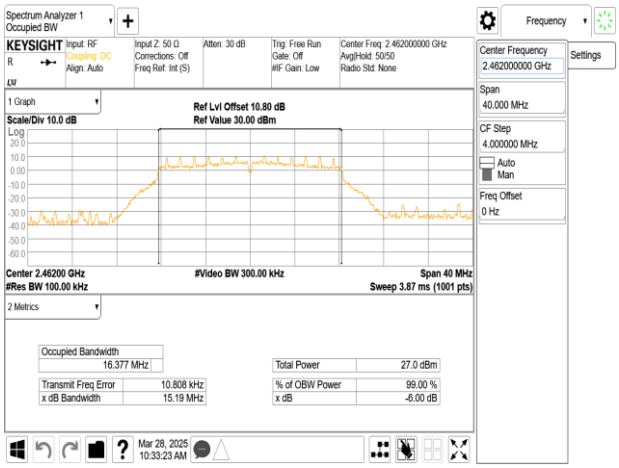
802.11g_20MHz_Chain0_2437MHz



802.11b_20MHz_Chain0_2462MHz



802.11g_20MHz_Chain0_2462MHz



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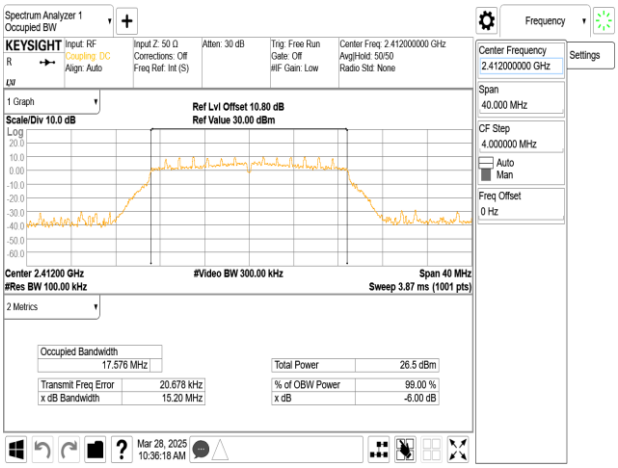
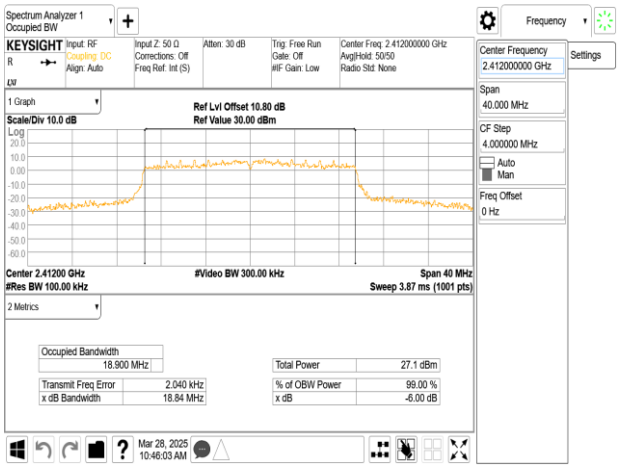
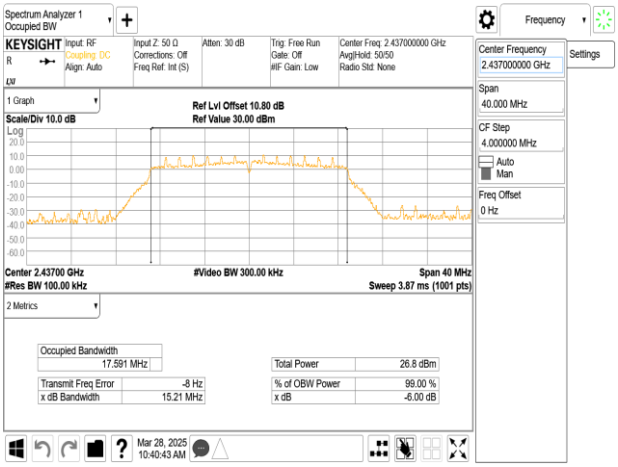
802.11n_20MHz_Chain0_2412MHz



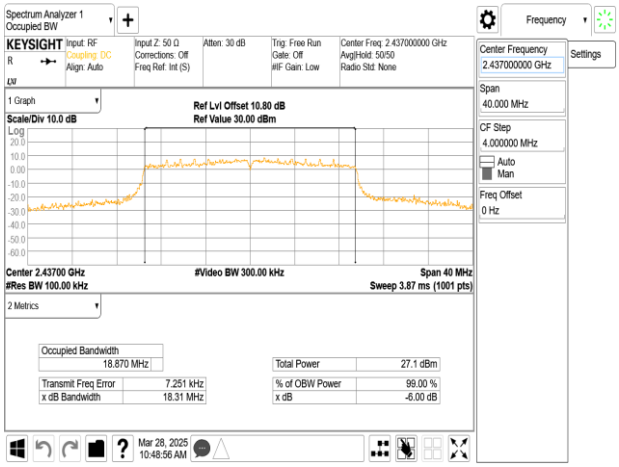
802.11ax_20MHz_Chain0_2412MHz



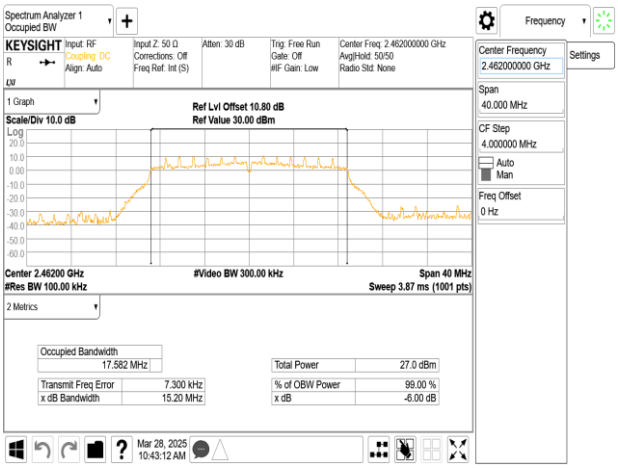
802.11n_20MHz_Chain0_2437MHz



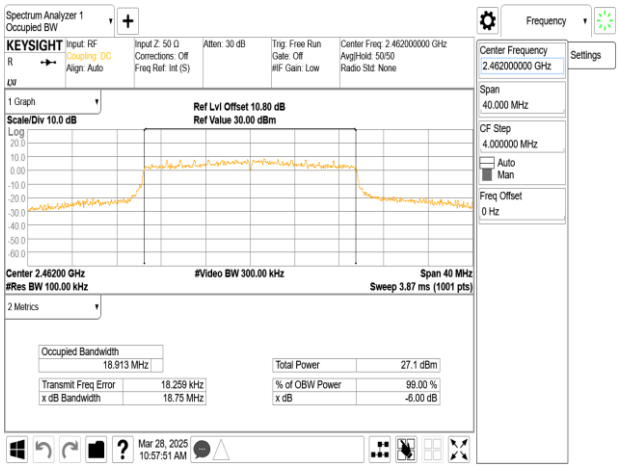
802.11ax_20MHz_Chain0_2437MHz



802.11n_20MHz_Chain0_2462MHz



802.11ax_20MHz_Chain0_2462MHz



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9.4.2 99% Bandwidth

802.11b Ch0

Freq. (MHz)	99% BW (MHz)
2412	11.76
2437	11.715
2462	11.72

802.11g Ch0

Freq. (MHz)	99% BW (MHz)
2412	16.825
2437	16.773
2462	16.829

802.11n_HT20M Ch0

Freq. (MHz)	99% BW (MHz)
2412	17.882
2437	17.885
2462	17.912

802.11ax_HE20M Ch0

Freq. (MHz)	RU Config	99% BW (MHz)
2412	full	18.995
2437	full	18.985
2462	full	19.001

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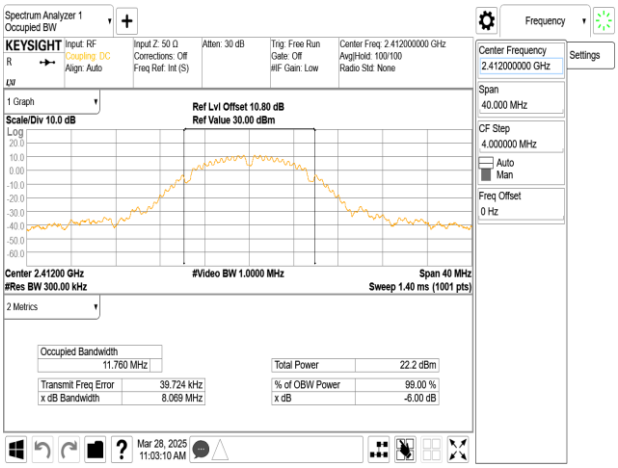
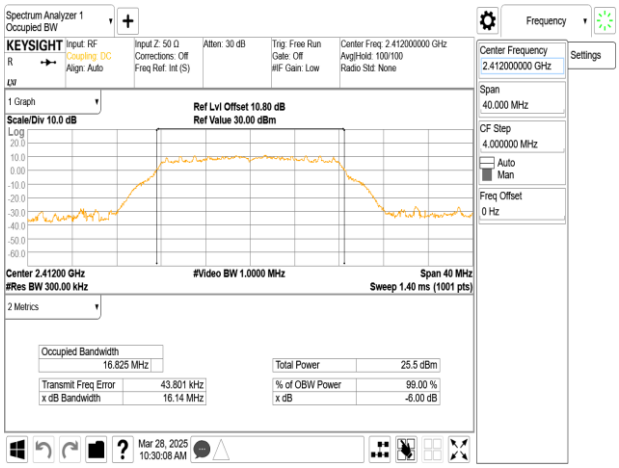
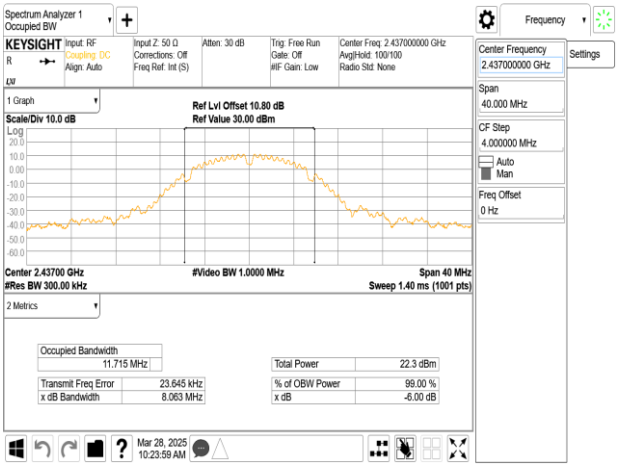
802.11b_20MHz_Chain0_2412MHz



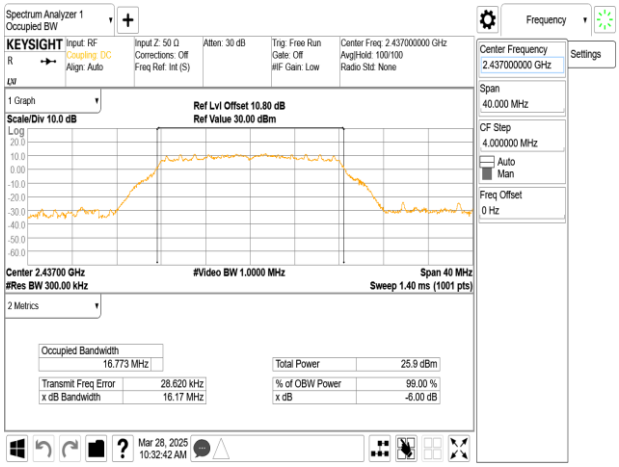
802.11g_20MHz_Chain0_2412MHz



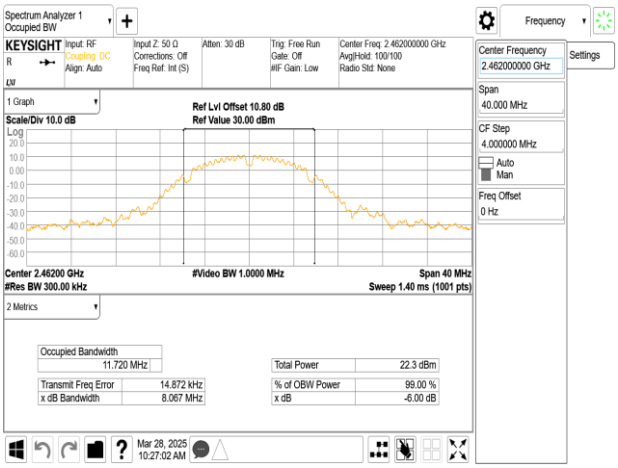
802.11b_20MHz_Chain0_2437MHz



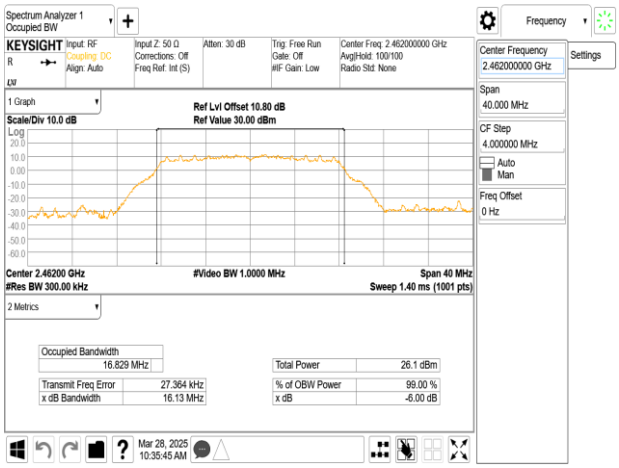
802.11g_20MHz_Chain0_2437MHz



802.11b_20MHz_Chain0_2462MHz



802.11g_20MHz_Chain0_2462MHz



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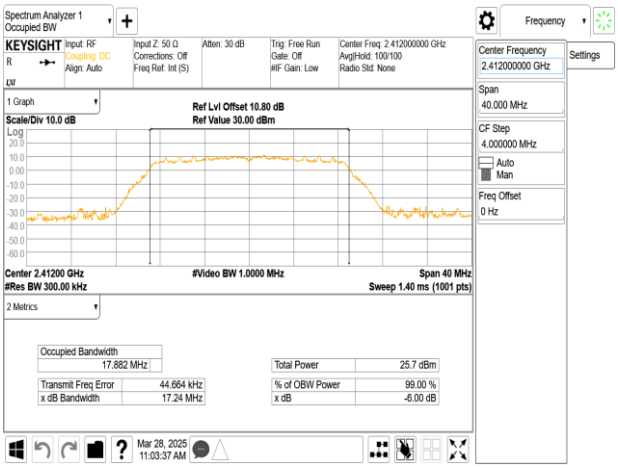
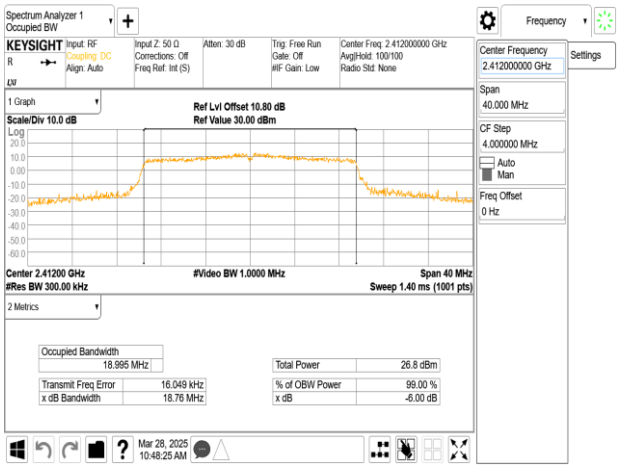
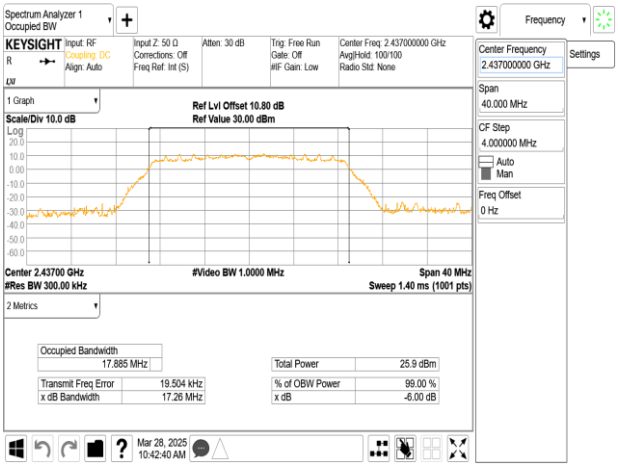
802.11n_20MHz_Chain0_2412MHz



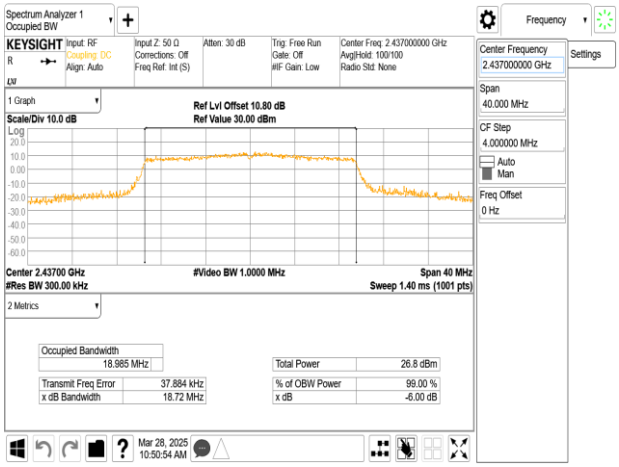
802.11ax_20MHz_Chain0_2412MHz



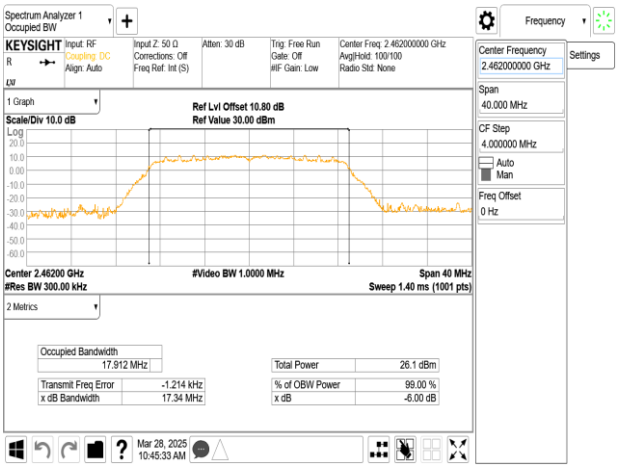
802.11n_20MHz_Chain0_2437MHz



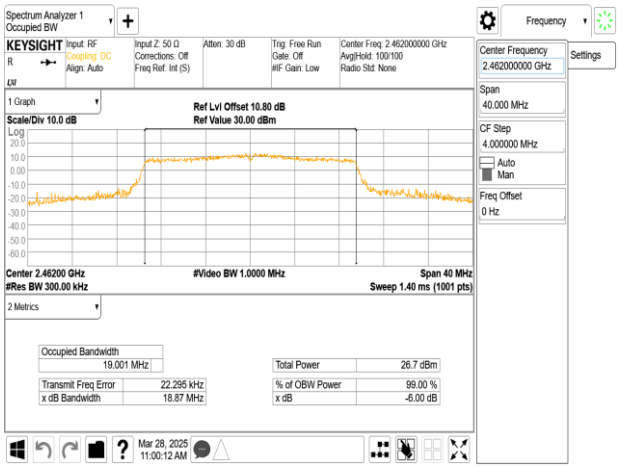
802.11ax_20MHz_Chain0_2437MHz



802.11n_20MHz_Chain0_2462MHz



802.11ax_20MHz_Chain0_2462MHz



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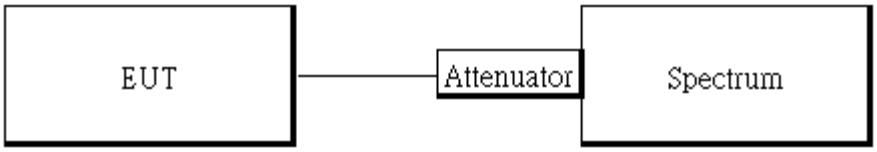
10 CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT

10.1 Standard Applicable

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a) & RSS-Gen §8.10, must also comply with the radiated emission limits specified in §15.209(a) & RSS-Gen §8.9.

10.2 Test Setup



10.3 Measurement Procedure

10.3.1 Reference Level of Emission Limit:

1. Set analyzer center frequency to DTS channel center frequency.
2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance .
3. Set the span to 1.5 times the DTS channel bandwidth.
4. Set the RBW = 100kHz & VBW = 300 kHz.
5. Detector = peak
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.

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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 -20
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.

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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.

10.4 Measurement Result

802.11b Ch0

Reference Level of Limit		
Freq. (MHz)	PSD (dBm)	Reference Level of Limit (dBm)
2412	10.84	-9.16
2437	10.94	-9.06
2462	10.85	-9.15

802.11g Ch0

Reference Level of Limit		
Freq. (MHz)	PSD (dBm)	Reference Level of Limit (dBm)
2412	9.77	-10.23
2437	10.61	-9.39
2462	8.67	-11.33

802.11n_HT_20M Ch0

Reference Level of Limit		
Freq. (MHz)	PSD (dBm)	Reference Level of Limit (dBm)
2412	8.62	-11.38
2437	10.59	-9.41
2462	8.87	-11.13

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802.11ax_HE_20M Ch0

Reference Level of Limit		
Freq. (MHz)	PSD (dBm)	Reference Level of Limit (dBm)
2412	3.76	-16.24
2437	8.54	-11.46
2462	3.40	-16.60

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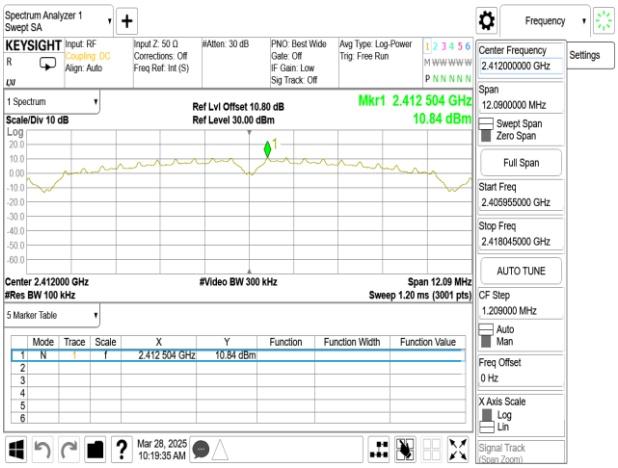
802.11b_20MHz_Chain0_2412MHz



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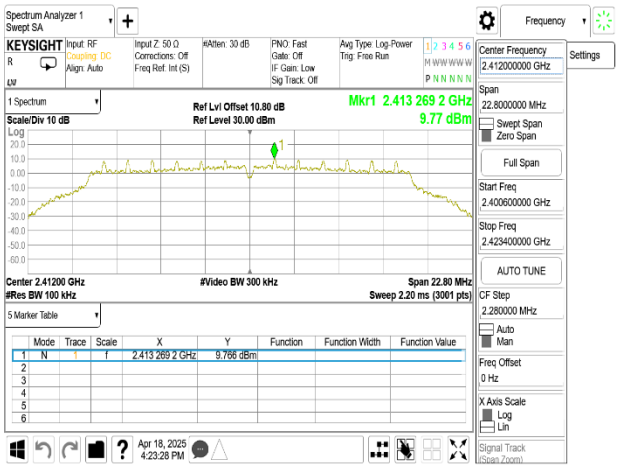
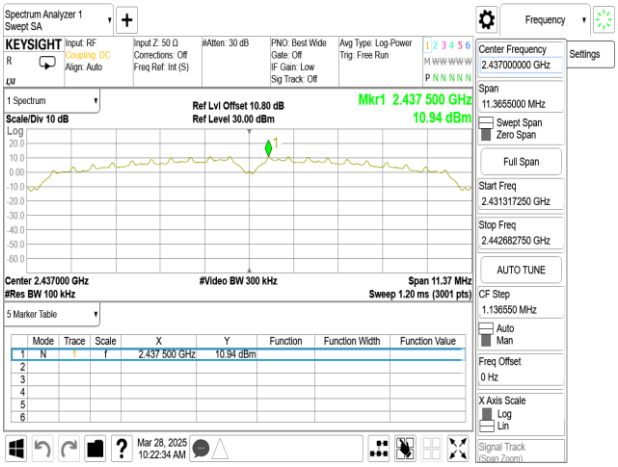


802.11b_20MHz_Chain0_2437MHz



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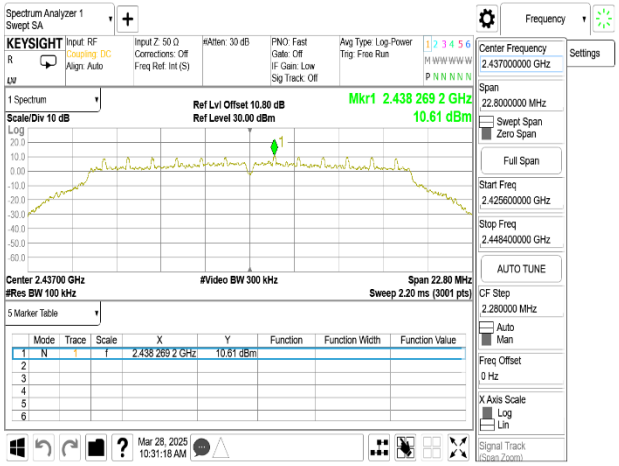
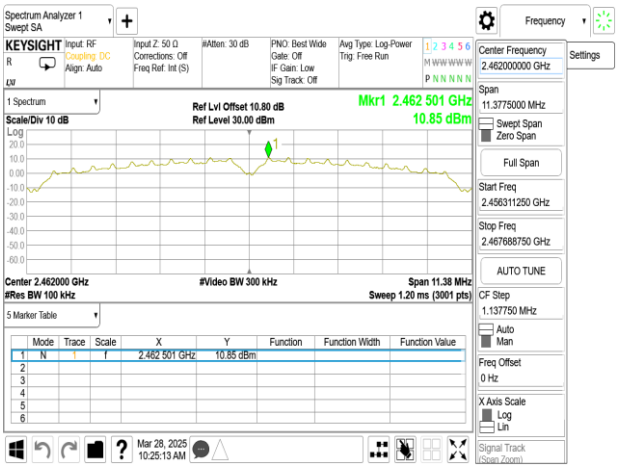


802.11b_20MHz_Chain0_2462MHz



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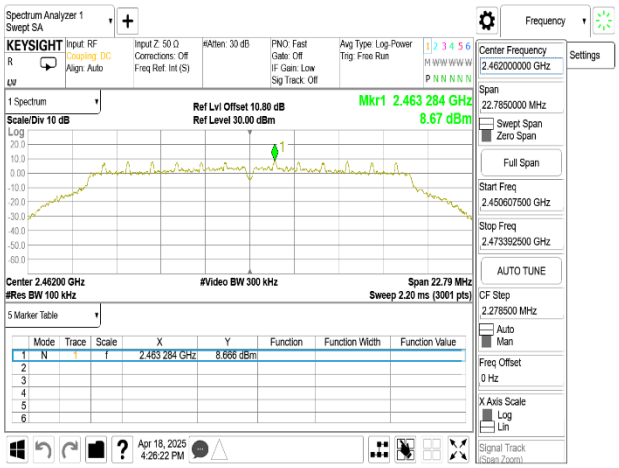

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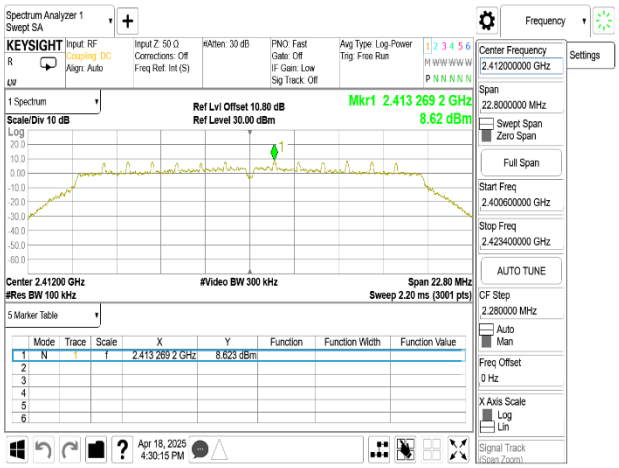
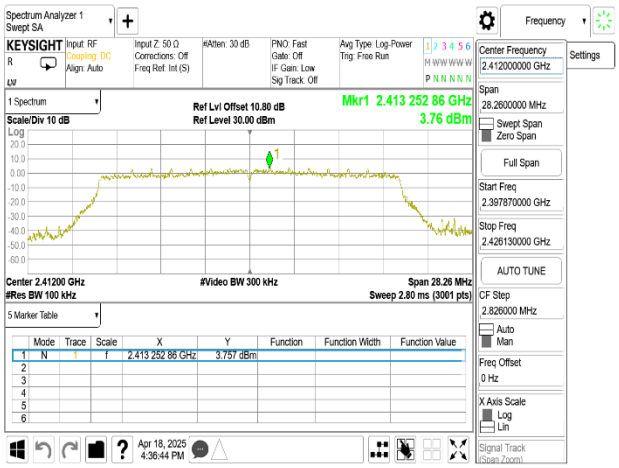
802.11n_20MHz_Chain0_2412MHz



802.11ax_20MHz_Chain0_2412MHz



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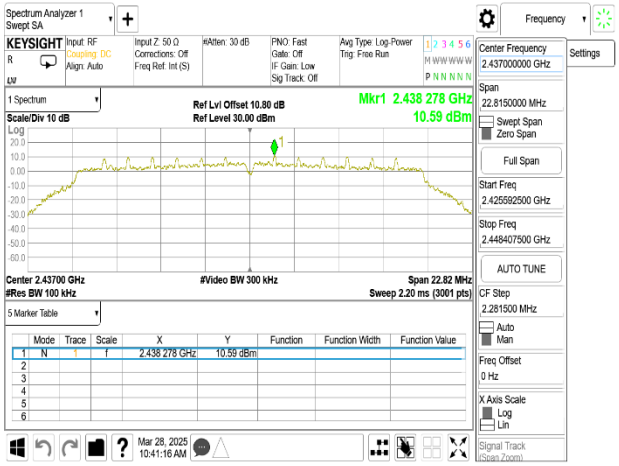

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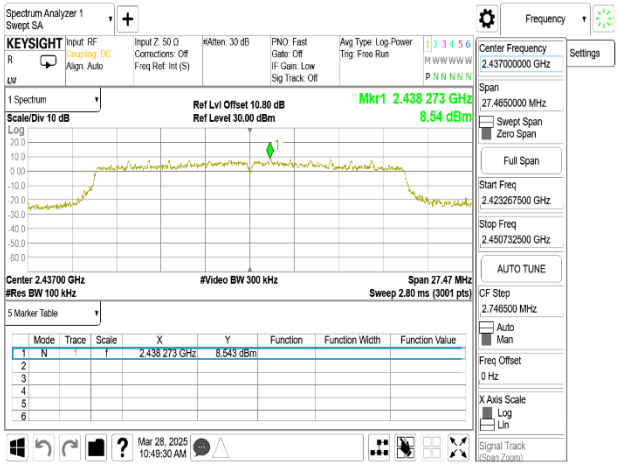

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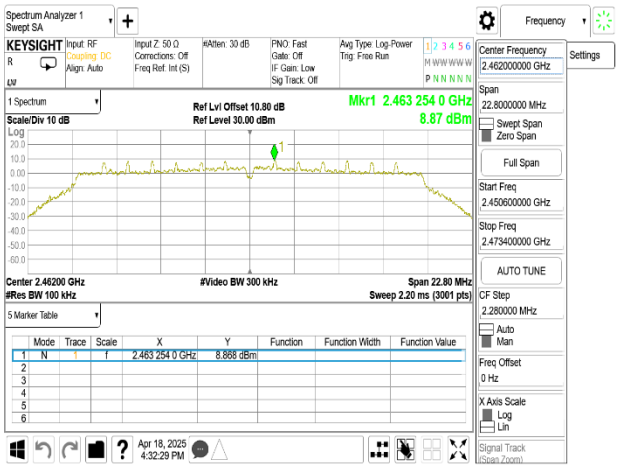
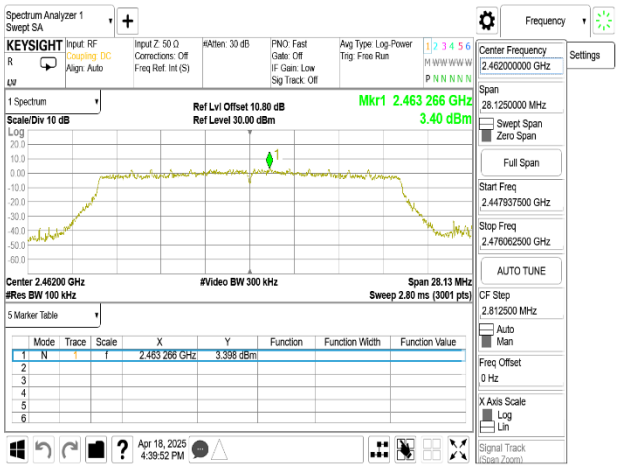


802.11ax_20MHz_Chain0_2462MHz



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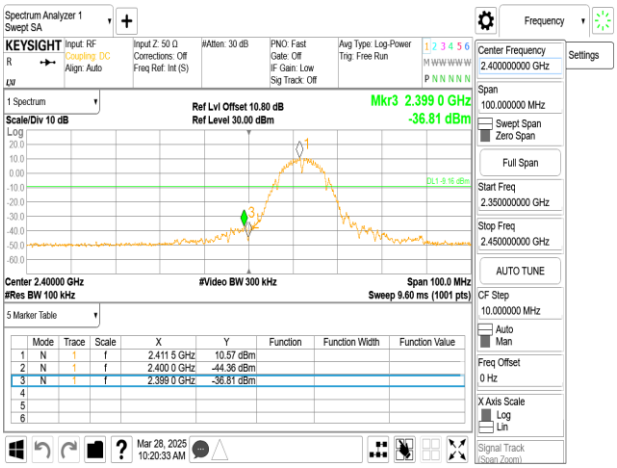
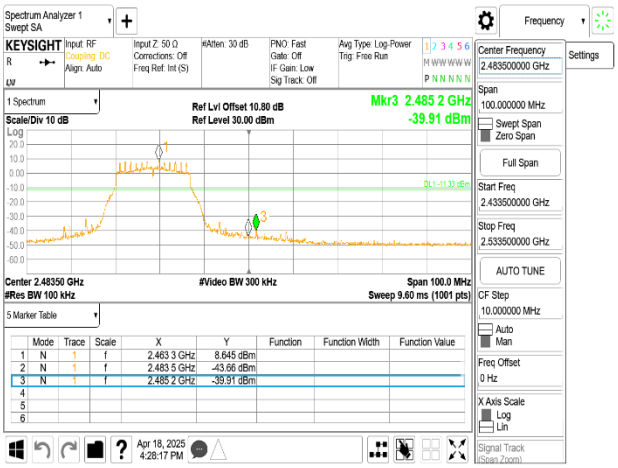
802.11b_20MHz_Chain0_2412MHz



802.11g_20MHz_Chain0_2462MHz



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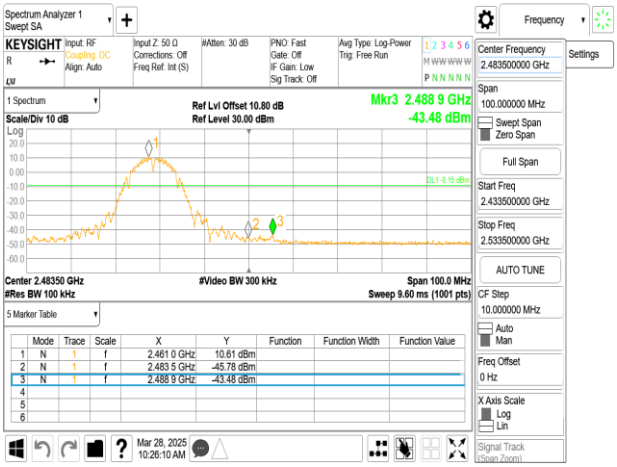

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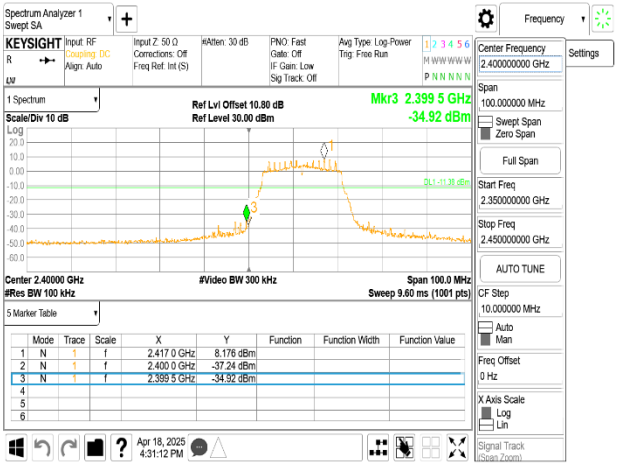
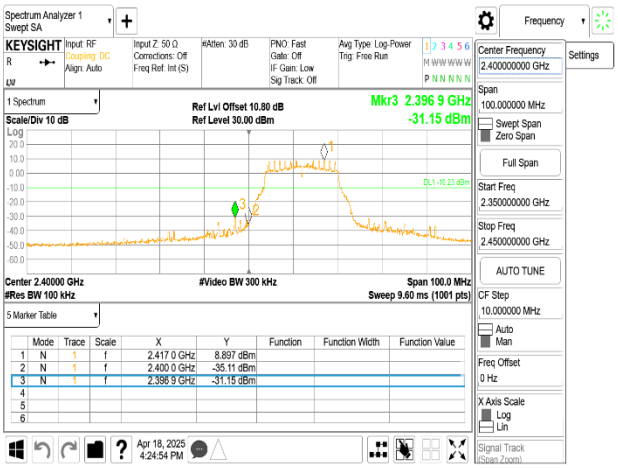


802.11g_20MHz_Chain0_2412MHz



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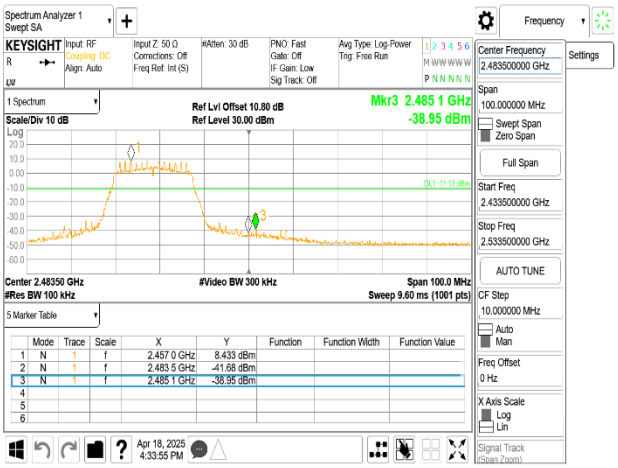

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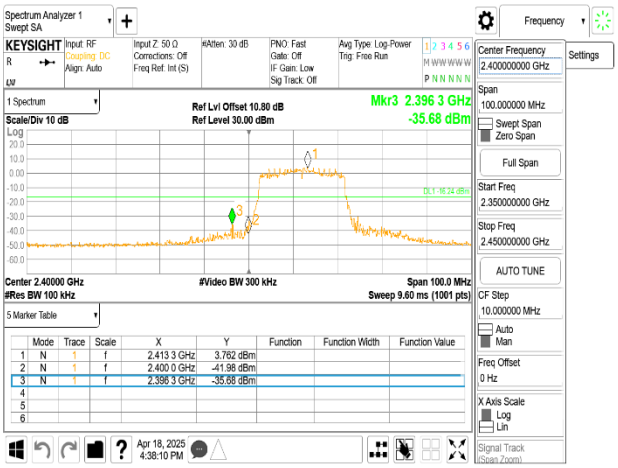
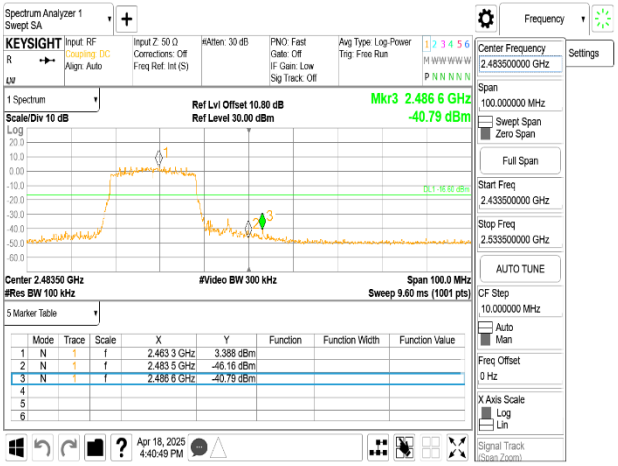
802.11ax_20MHz_Chain0_2412MHz



802.11ax_20MHz_Chain0_2462MHz



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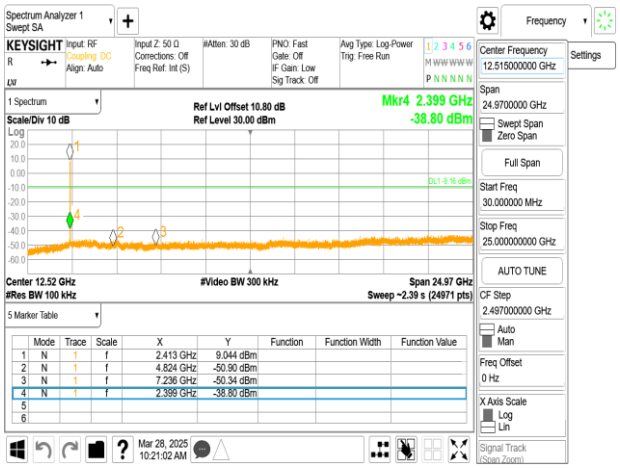
802.11b_20MHz_Chain0_2412MHz



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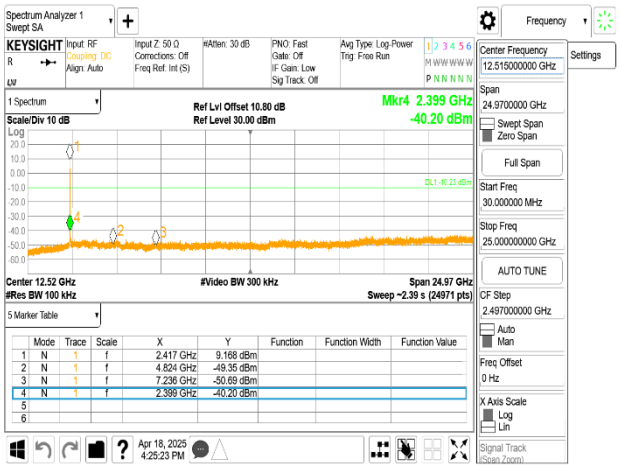
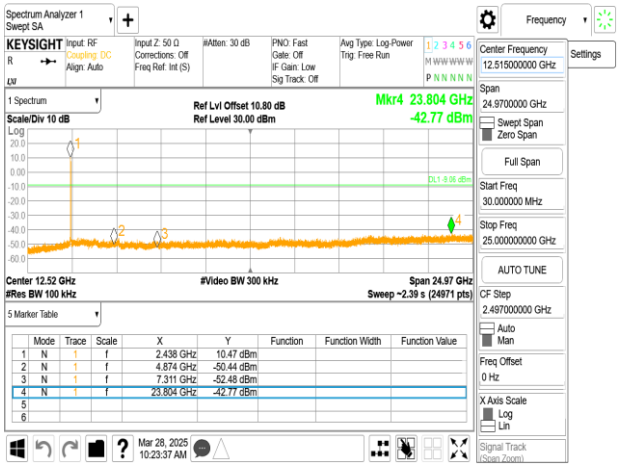


802.11b_20MHz_Chain0_2437MHz



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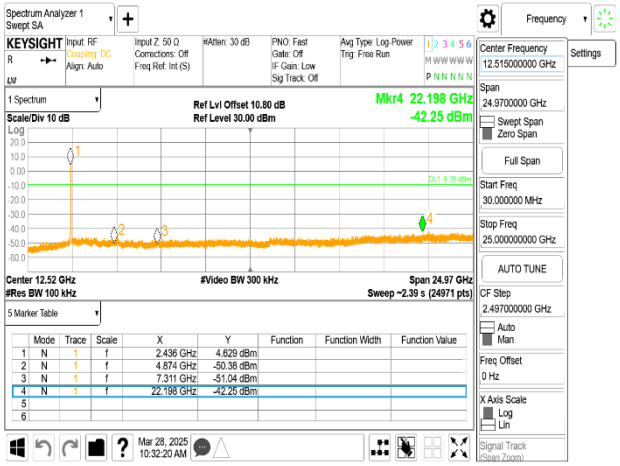

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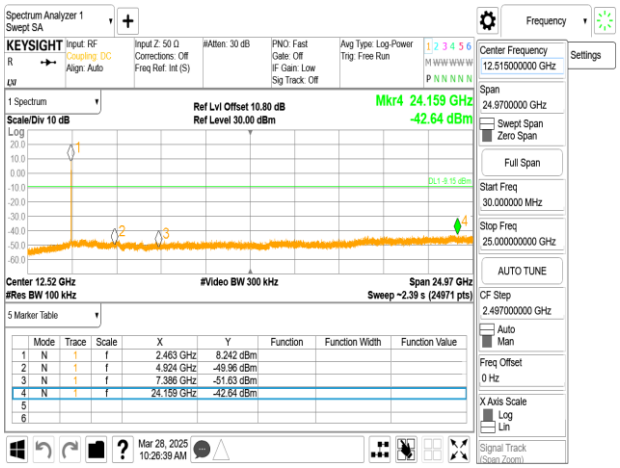

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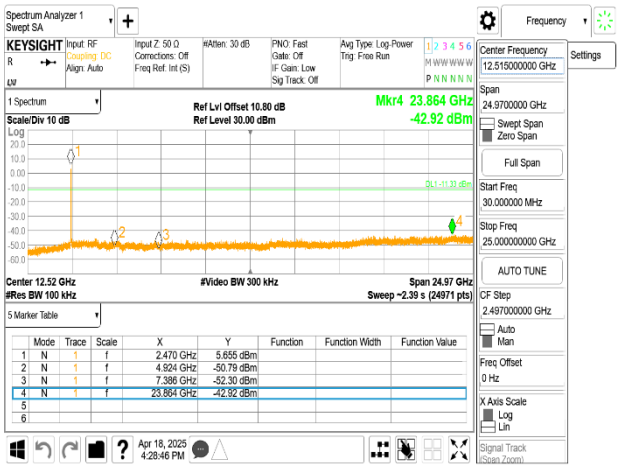

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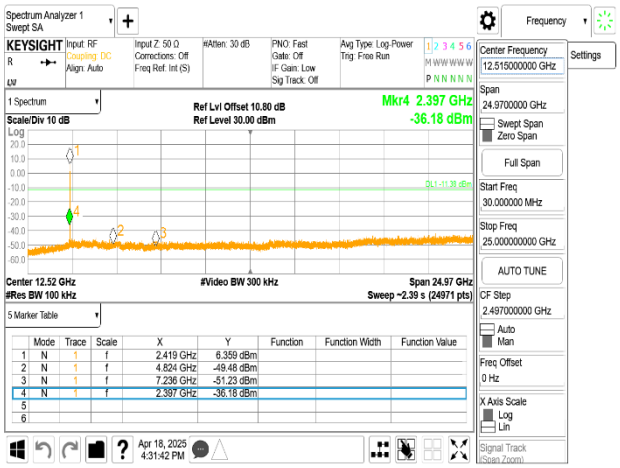
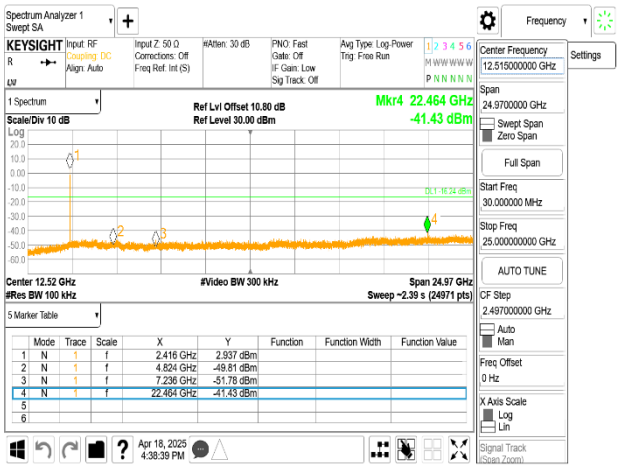
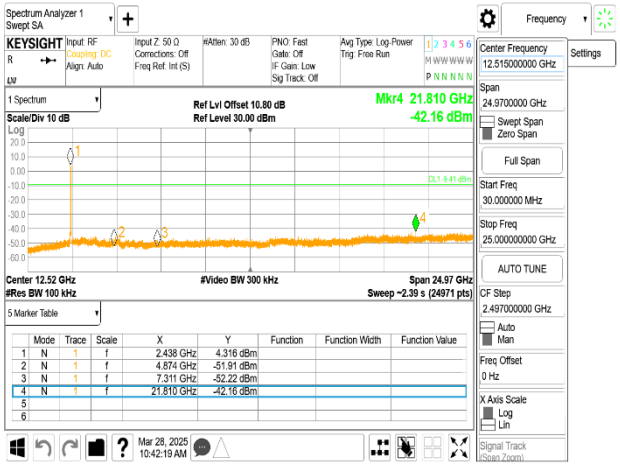
802.11n_20MHz_Chain0_2412MHz



802.11ax_20MHz_Chain0_2412MHz



802.11n_20MHz_Chain0_2437MHz



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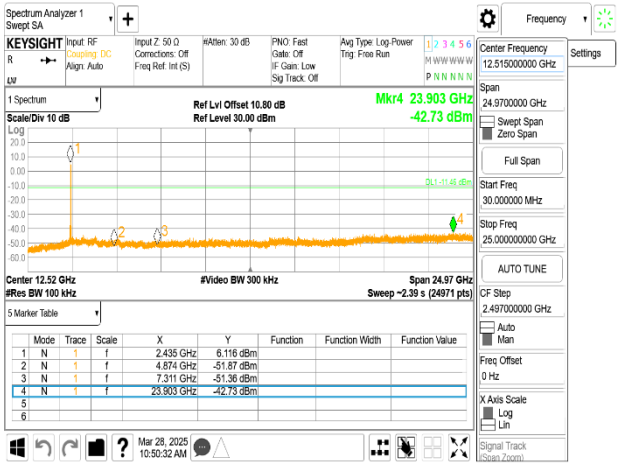

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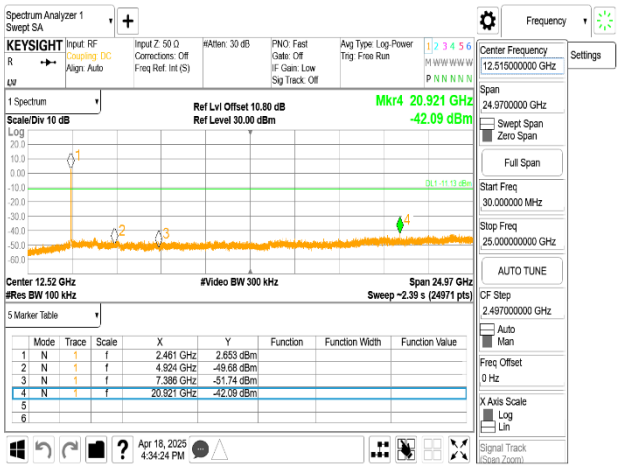

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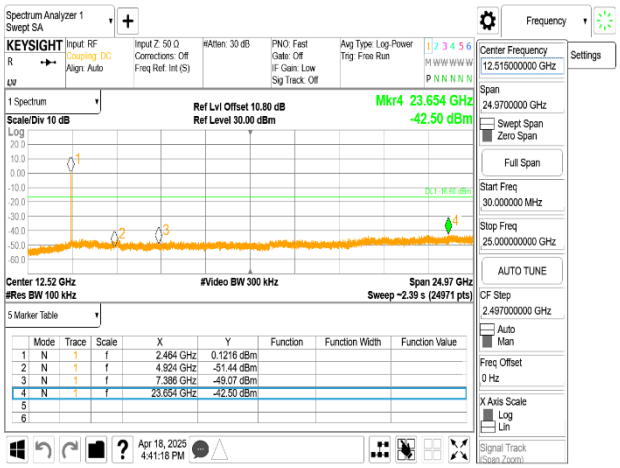

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