

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT



EUT Description: COREXOM
Applicant: Coretronic Reality Inc.
15F., No 225, Sec.3, Beixin Rd., Xindian Dist. New Taipei
City, Taiwan 231
Manufacturer: Coretronic Reality Inc.
No. 5, Wenhua Rd., Fengshan Vil., Hukou Township,
Hsinchu County 303035, Taiwan (R.O.C.)
Brand Name: Coretronic Reality Inc.
Model No. R6490WGQ
Family Model No. R6490Q, R5430WGQ, R5430Q
Model Difference: Refer to section 1.2
Report Number: TERF2506002020E2
FCC ID 2BPQQ-R6490WGQ
Date of EUT Received: June 17, 2025
Date of Test: June 20, 2025 ~ September 03, 2025
Issue Date: November 25, 2025

Arno Hsieh

Approved By

Arno Hsieh

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 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
TERF2506002020E2	00	Original	October 29, 2025	Yuri Tsai	
TERF2506002020E2	01	Update applicant information	November 25, 2025	Yuri Tsai	*

Note:

- 1、The remark "*" indicates modification of the report upon requests from certification body.
- 2、Variant information of model numbers is provided by the applicant, test results of this report are applicable to the sample EUT(s) received.
And are assessed as electrically identical in RF characteristics, therefore, no further assessment required for the variant(s).

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7.7	AC Power Line Conducted Emission	185
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1 GENERAL INFORMATION

1.1 Product Description

EUT Description	COREXOM
Brand Name	Coretronic Reality Inc.
Model No.	R6490WGQ
Family Model No.	R6490Q, R5430WGQ, R5430Q
Hardware Version	N/A
Firmware Version	Android13
EUT Series No.	a607e351
Power Supply	3.8 Vdc
Test Software (Name/Version)	QRCT Version 4.0.00204.0

1.2 Model Difference

Model	Difference
R6490WGQ	With BT+Wi-Fi/GPS, Memory : uMCP 8GB LPDDR4X+128GB UFS
R6490Q	Without BT+Wi-Fi/GPS, Memory : uMCP 8GB LPDDR4X+128GB UFS
R5430WGQ	With BT+Wi-Fi/GPS, Memory : uMCP 4GB LPDDR4X+64GB UFS
R5430Q	Without BT+Wi-Fi/GPS, , Memory : uMCP 4GB LPDDR4X+64GB UFS

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1.3 RF Specification

WLAN 2.4GHz

Mode	Frequency Range	Channels	Rated Power (dBm)		Modulation Technology
			Peak	Avg.	
802.11b	2412~2462	11	22.61	20.36	DSSS
802.11g	2412~2462	11	21.84	16.32	OFDM
802.11n_HT20	2412~2462	11	24.06	18.46	OFDM
802.11n_HT40	2422~2452	7	21.71	15.94	OFDM
802.11ax_HE20	2412~2462	11	27.95	20.71	OFDMA
802.11ax_HE40	2422~2452	7	25.68	17.10	OFDMA
Modulation type:		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 144.4Mbps			
		802.11n_HT40: up to 300Mbps			
		802.11ax_HE20: up to 286.8Mbps			
		802.11ax_HE40: up to 573.6Mbps			

1.4 Antenna Designation

Antenna Type	Ch0 / Ch1	Freq. (MHz)	Peak Gain(dBi)
Dipole	Ch0	2400~2483.5	4
Dipole	Ch1	2400~2483.5	4

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. The antenna information is provided by the applicant. The laboratory does not verify the accuracy of this information, and all test results related to antenna characteristics are based solely on the data supplied. Responsibility for the authenticity and accuracy of these specifications rests entirely with the party who provided the information.
3. The antenna complies with part 15.203 requirement and no consideration of replacement. Please see EUT photo for details.
4. The directional gain is calculated according to section F. 2). e). (ii) of FCC KDB 662911 D01.

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1.5 Operating Frequencies

2400~2483.5 MHz

20MHz		40MHz	
CH	Freq. (MHz)	CH	Freq. (MHz)
1	2412	3	2422
2	2417	4	2427
3	2422	5	2432
4	2427	6	2437
5	2432	7	2442
6	2437	8	2447
7	2442	9	2452
8	2447		
9	2452		
10	2457		
11	2462		

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1.6 EUT Availability and The Worst Test Modes

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. 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.
4. Investigation has been done on all the possible configurations for searching the worst case.

Mode		Transmission Chain								Single Transmission Spatial		Multi Transmission Spatial	
V	802.11 b	V	Ch0	V	Ch1		Ch2		Ch3	V	1TX		2TX
V	802.11 g	V	Ch0	V	Ch1		Ch2		Ch3	V	1TX		2TX
V	802.11 n	V	Ch0	V	Ch1		Ch2		Ch3		1TX	V	2TX
V	802.11 ac	V	Ch0	V	Ch1		Ch2		Ch3		1TX	V	2TX
V	802.11 ax	V	Ch0	V	Ch1		Ch2		Ch3		1TX	V	2TX
	802.11 be		Ch0		Ch1		Ch2		Ch3		1TX		2TX

5. 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	1,6,11	OFDM	6	Ch0
802.11n_HT20	1 to 11	1,6,10,11	OFDM	MCS0	2TX
802.11n_HT40	3 to 9	3,6,9	OFDM	MCS0	2TX

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CONDUCTED TEST						
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	RU CONFIGURATION	DATA RATE (Mbps)	ANTENNA PORT
802.11ax_HE20	1 to 11	1,6,11	OFDMA	FULL RU 26/0,26/8 52/37,52/40 106/53,106/54	MCS0	2TX
802.11ax_HE40	3 to 9	3,6,9	OFDMA	FULL RU 242/61,242/62	MCS0	2TX

TRANSMIT 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	Ch0

TRANSMIT 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	CCK	1	Ch0
802.11g	1 to 11	1,6,11	OFDM	6	Ch0
802.11n20	1 to 11	1,6,10,11	OFDM	MCS0	2TX
802.11n40	3 to 9	3,6,9	OFDM	MCS0	2TX
802.11ax20	1 to 11	1,6,11	OFDMA	MCS0	2TX
802.11ax40	3 to 9	3,6,9	OFDMA	MCS0	2TX

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2 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)	Out of Band Emission	Compliant
§15.205 §15.209 §15.247(d)	Unwanted Emission	Compliant
§15.247(e)	Power Spectral Density	Compliant
§15.203	Antenna Requirement	Compliant

2.1 Test Methodology of Applied Standards

1. FCC Part 15, Subpart C §15.247
2. FCC KDB 558074 D01 15.247 Meas Guidance v05r02
3. FCC KDB 662911 D01 Multiple Transmitter Output v02r01
4. ANSI C63.10:2020

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2.2 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	+/- 0.60 °C
Humidity	+/- 3.00 %
DC / AC Power Source	+/- 1.00 %

Radiated Spurious Emission Measurement Uncertainty		
Polarization: Vertical	+/- 1.89 dB	9kHz - 30MHz
	+/- 4.10 dB	30MHz - 1000MHz
	+/- 3.37 dB	1GHz - 18GHz
	+/- 3.83 dB	18GHz - 40GHz
Polarization: Horizontal	+/- 1.89 dB	9kHz - 30MHz
	+/- 4.10 dB	30MHz - 1000MHz
	+/- 3.37 dB	1GHz - 18GHz
	+/- 3.83 dB	18GHz - 40GHz
Radiated Spurious Emission	+/- 2.00 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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2.3 Test Facility

Laboratory	Test Site Address	Test Site Name	FCC Designation number / Registration 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 24803	SAC 1 / SAC 2 / SAC 3 Conduction 1 / Conducted 1 Conducted 2 / Conducted 3 Conducted 4 / Conducted 5 Conducted 6	TW0027 / 891563	TW3702
SGS Taiwan Ltd. Central RF Lab. (TAF code 3702)	No.2, Keji 1st Rd, Guishan District, Taoyuan City, Taiwan 333	SAC C / SAC D / SAC G Conduction C / Conducted A Conducted B / Conducted C Conducted D / Conducted E Conducted F / Conducted G	TW0028 / 200037	TW3702

Test Condition	Test Site name	Test Engineer	Test Environment (T&H)	Test Date
Conducted	Conducted D	Charlie	20~25°C / 60~66%	2025/07/30 ~ 2025/09/03

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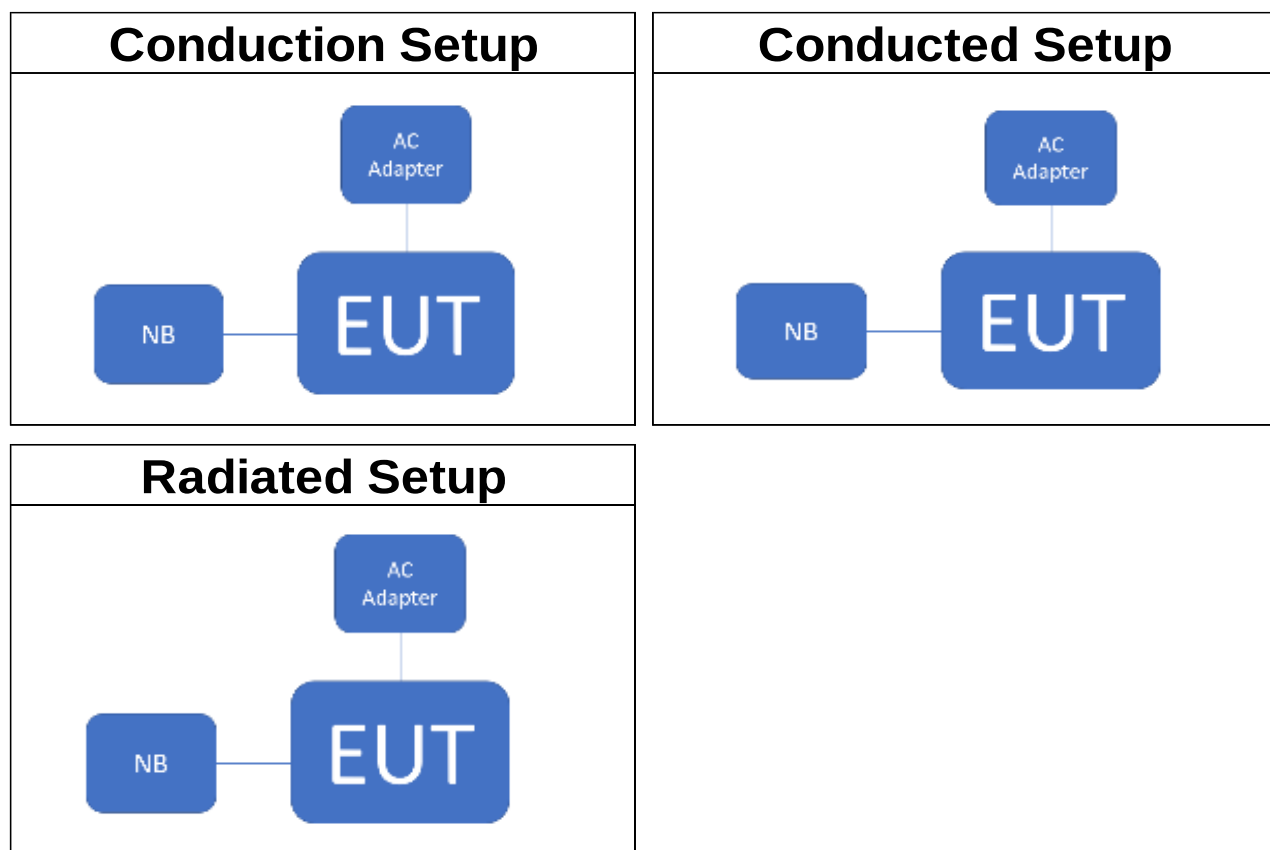
3 CONTROL UNIT(S) AND PERIPHERAL(S)

3.1 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.

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.

3.2 Diagrams



3.3 List

3.3.1 Conduction Setup

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)
Adapter	LYD	LYD1202500B	N/A	N/A	N/A
USB Cable	Yungkang	80.00095.001	N/A	N/A	N/A
Notebook	HP	HSN-Q35C-4	P0004691	N/A	N/A

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3.3.2 Conducted Setup

Conducted Emission Test Site: Conducted D					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL. (mm/dd/yyyy)	CAL DUE. (mm/dd/yyyy)
Notebook	Lenovo	T14	P0003332	N/A	N/A
AC Adapter	LYD	LYD1202500B	N/A	N/A	N/A
Type C	YUNGKANG	80.00095.001	N/A	N/A	N/A

3.3.3 Radiated Setup

Radiated Emission Test Site: SAC C					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL. (mm/dd/yyyy)	CAL DUE. (mm/dd/yyyy)
Adapter	LYD	LYD1202500B	N/A	N/A	N/A
USB Cable	Yungkang	80.00095.001	N/A	N/A	N/A
Notebook	HP	HSN-Q35C-4	P0004691	N/A	N/A

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4 TEST INSTRUMENT

4.1 Conducted Measurement

Conducted Emission Test Site: Conducted D					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL. (mm/dd/yyyy)	CAL DUE. (mm/dd/yyyy)
Attenuator	Marvelous	MVE2213-10	RF08	11/14/2024	11/13/2025
Attenuator	Woken	WATT-218FS-10	RF17	11/14/2024	11/13/2025
DC Block	Marvelous	MVE6114	RF39	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	N9010A	MY51440113	09/18/2024	09/17/2025
Test Software	SGS Taiwan	Radio Test Software	Ver.21	N.C.R	N.C.R

4.2 Radiated Measurement

Radiated Emission Test Site: SAC C					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL. (mm/dd/yyyy)	CAL DUE. (mm/dd/yyyy)
3m Site NSA	SGS	966 chamber C	N/A	03/02/2025	03/01/2026
Active Loop Antenna	COM-POWER	AL-130R	10160105	12/11/2024	12/10/2025
Attenuator	Woken	WATT-218FS-10	RF17	11/14/2024	11/13/2025
Broadband Antenna	SCHWARZBECK	VULB 9168	9168-300	11/06/2024	11/05/2025
Coaxial Cable	EMCI+Huber Suhner	RG 214/U+EMC104-SM-SM-6000+EMC105-SM-SM-12000+15	W13.01+150813+2310002+15	11/14/2024	11/13/2025
EMI Test Receiver	R&S	ESU 40	100363	05/06/2025	05/05/2026
Highpass Filter	R&S	F13 HPF 3GHz	RF167	11/14/2024	11/13/2025
Horn Antenna	Schwarzbeck	BBHA9120D	1187	02/05/2025	02/04/2026
Horn Antenna	Schwarzbeck	BBHA9170	184	12/20/2024	12/19/2025
Lowpass Filter	Woken	EWI-56-0019	RF163	11/14/2024	11/13/2025
Notch Filter	Micro-Tronics	BRM50701-02	RF208	11/14/2024	11/13/2025
Pre-Amplifier	EMC Instruments	EMC118A45SE	980789	11/14/2024	11/13/2025
Pre-Amplifier	EMC Instruments	EMC184045SEE	980881	11/14/2024	11/13/2025
Pre-Amplifier	EMC Instruments	EMC330	980091	11/14/2024	11/13/2025
Spectrum Analyzer	KEYSIGHT	N9010B	MY63440390	02/13/2025	02/12/2026
Test Software	audix	e3	E3 20923 SGS Ver.9 (C)	N.C.R	N.C.R

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4.3 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	R&S	ESCI	101342	04/23/2025	04/22/2026
LISN	SCHWARZBECK Mess-Elektronik	NSLK8127	974	06/30/2025	06/29/2026
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

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

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5 REGULATORY REQUIREMENTS

5.1 Emission Bandwidth

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

5.2 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.

5.3 Maximum Output Power

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 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.

5.4 Maximum Power Spectral Density

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

The power spectral density shall be determined using the same method as is used to determine the maximum conducted output power.

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5.5 Out of Band Emission

For emissions in non-restricted frequency bands, in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

5.6 Unwanted Emissions

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

In addition, radiated emissions which fall in the restricted bands must also comply with the applicable radiated emission limits as defined in the general emission limit tables.

Moreover, for an intentional radiator operating below 10 GHz, the frequency range of measurements shall extend up to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

Frequency (MHz)	Field strength (microvolts/meter)	Distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3
Note: The lower limit shall apply at the transition frequencies.		

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5.7 AC Power Line Conducted Emission

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		

5.8 Antenna Requirement

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

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6 TEST CONFIGURATION

6.1 Emission Bandwidth



Place the EUT on the table and set it in transmitting mode.

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

6dB BW measurements

The testing is performed in accordance with the applicable regulatory measurement procedure.

Set the spectrum analyzer as

RBW= 1% to 5% of the OBW but not less than 100 kHz,

VBW $\geq 3 \times$ RBW,

Span= 2 to 5 times of the OBW,

Sweep=Auto, Detector = Peak, and Trace mode = Max Hold.

Use the X dB bandwidth mode function of the spectrum analyzer and set to 6dB.

Repeat above procedures until all test default channel is completed.

99% BW measurements

The testing is performed in accordance with the applicable regulatory measurement procedure.

Set the spectrum analyzer as

RBW= 1 % to 5% of 99% without going below 10kHz,

VBW $\geq 3 \times$ RBW,

Span= 1.5 to 5 times of the OBW,

Sweep=Auto, Detector = Peak, and Trace mode = Max Hold.

Use the 99% power bandwidth function of the spectrum analyzer.

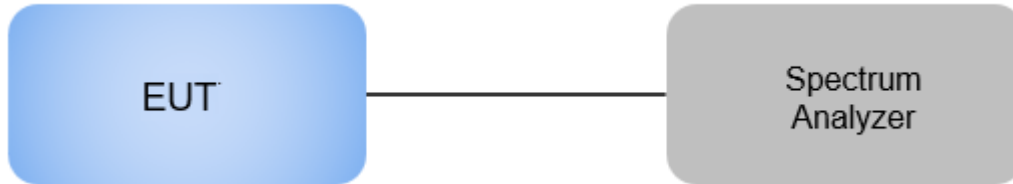
Repeat above procedures until all test default channel is completed.

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6.2 Maximum Output Power

6.2.1 Duty Cycle



Place the EUT on the table and set it in transmitting mode.

Set the spectrum analyzer as

Center Frequency = fundamental frequency

Span = Zero,

RBW = 8 MHz,

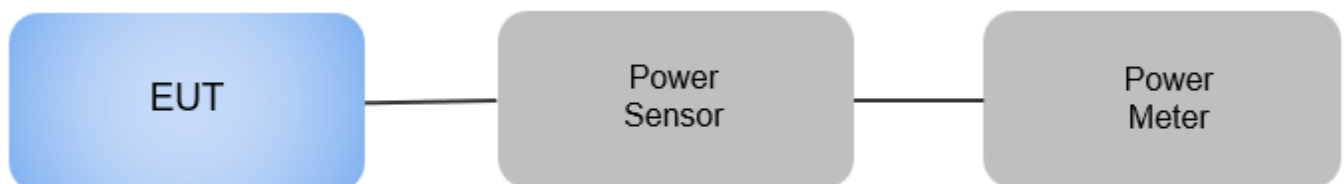
VBW = 8 MHz,

Detector = Peak,

Allow trace to fully stabilize.

Use the delta marker function to determine the ON and OFF times.

6.2.2 Maximum Output Power



The testing is performed in accordance with the applicable output power measurement procedure.

Place the EUT on the table and set it to transmit mode.

Remove the antenna from the EUT and connect a low-loss RF cable from the antenna port to the power meter.

The power meter is used as auxiliary test equipment to conduct the output power measurement. Record the maximum reading as observed from the spectrum analyzer or power meter.

When testing for multiple output ports in simultaneous transmission mode, the measured values of each individual output port are tested separately and then linearly summed.

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The directional gain is calculated using the formula

$$DirectionalGain = 10 \times \log_{10} \left(\frac{(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_n/20})^2}{N_{ant}} \right)$$

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

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

6.3 Maximum Power Spectral Density



The test is conducted in accordance with the applicable regulatory measurement procedure.

Set spectrum analyzer center frequency to DTS channel center frequency.

Set the span > 1.5 times the DTS channel bandwidth.

Set the RBW = 3 kHz and VBW = 10 kHz.

Detector = Peak

Sweep time = Auto Couple.

Trace mode = Max Hold.

Allow trace to fully stabilize.

Use the peak marker function to determine the maximum amplitude level.

When testing for multiple output ports in simultaneous transmission mode, the measured values of each individual output port are tested separately and then linearly summed.

The directional gain is calculated using the formula

$$DirectionalGain = 10 \times \log_{10} \left(\frac{(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_n/20})^2}{N_{ant}} \right)$$

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6.4 Out of Band Emission



6.4.1 Reference Level of Emission Limit

The testing is performed in accordance with the applicable measurement procedure.

Set the analyzer center frequency to the DTS channel center frequency.

Set the span to 1.5 times the DTS channel bandwidth.

Set RBW = 100 kHz and VBW = 300 kHz.

Detector = peak

Sweep time = Auto Couple.

Trace mode = Max Hold.

Allow the trace to fully stabilize.

Use the peak marker function to determine the maximum amplitude level.

6.4.2 Conducted Band Edge

The testing is performed in accordance with the applicable measurement procedure.

Connect the antenna port of the EUT to the spectrum analyzer.

Remove the antenna from the EUT and connect a low-loss RF cable from the antenna port to the spectrum analyzer.

Set the start frequency and stop frequency of the spectrum analyzer to encompass the spectrum to be examined.

Configure the spectrum analyzer as follows:

RBW = 100 kHz

VBW = 300 kHz

Detector = Peak

Sweep = Auto

Mark the highest reading of the emission as the reference level.

Set the display limit as: reference level marker reading -20 dBm.

Mark the highest emissions observed outside of the 2400 MHz to 2483.5 MHz band.

Repeat the above procedure for each default test channel (low, middle, and high).

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6.4.3 Conducted Spurious Emission

The testing is performed in accordance with the applicable measurement procedure.

Connect the antenna port of the EUT to the spectrum analyzer.

Configure the spectrum analyzer as follows:

RBW = 100 kHz

VBW = 300 kHz

Detector = Peak

Sweep = Auto.

Allow the trace to fully stabilize.

Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental emission bandwidth (EBW).

Repeat the above procedures until all default test channels (low, middle, and high) have been measured.

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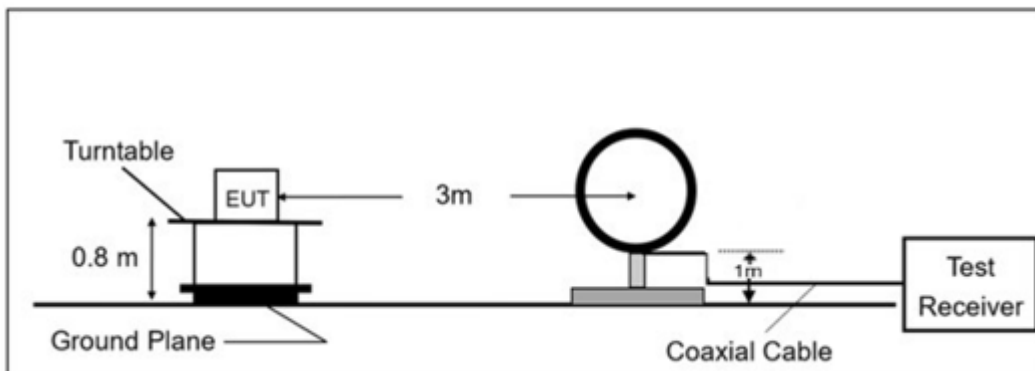
6.5 Unwanted Emissions

For Measurements From 9 kHz To 30 MHz

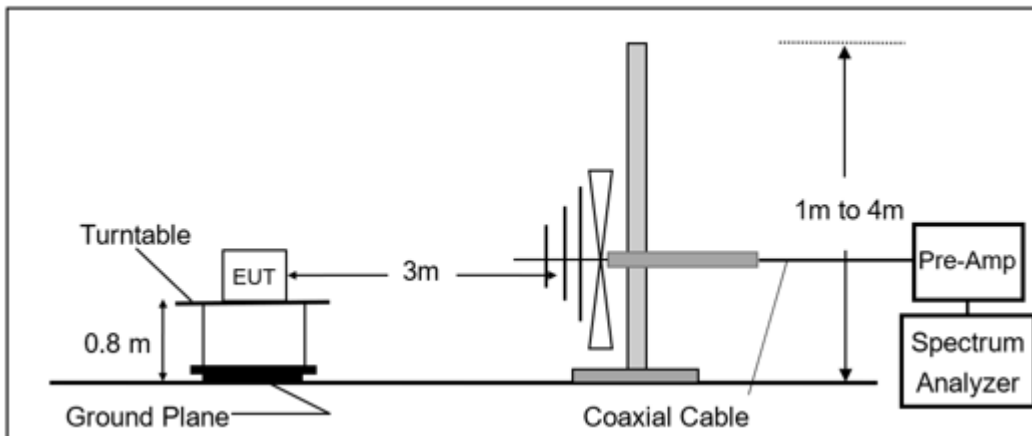
Radiated emission below 30MHz is measured in a 9m*6m*6m semi-anechoic chamber, the measurements correspond to those obtained at an open-field test site.

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

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



Radiated Emission Test Set-Up, Frequency From 30MHz to 1000MHz.



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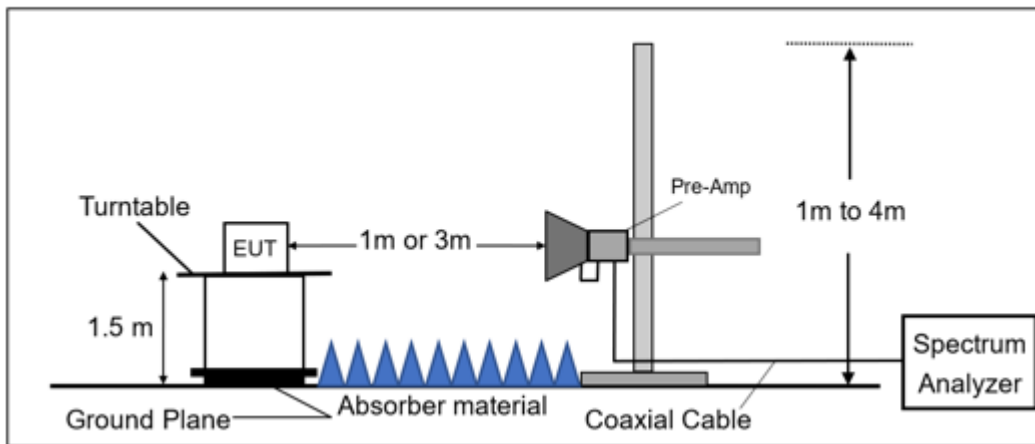
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Radiated Emission Test Set-Up, Frequency Above 1GHz.



1. The testing was performed in accordance with the applicable radiated emission measurement procedure.
2. The EUT was placed on a turntable at a height of 0.8 m for frequencies below 1 GHz and 1.5 m for frequencies above 1 GHz.
3. The turntable was rotated 360 degrees to determine the position of the maximum emission level.
4. The EUT was positioned 3 meters away from the receiving antenna, which was varied in height from 1 m to 4 m to locate the highest emissions.
5. For measurements below 30MHz, set the spectrum analyzer as
 - ☒ For Peak measurement
 - RBW=10 kHz
 - VBW=30 kHz
 - Detector = peak
 - Trace mode = max-hold
 - ☒ For Quasi-peak measurement in receiver mode
 - RBW=10 kHz
 - Detector = Quasi-Peak
 - Peak detection is used unless otherwise noted as quasi-peak.
6. For measurements in 30MHz to 1GHz, set the spectrum analyzer as
 - ☒ For Peak measurement
 - RBW=100 kHz
 - VBW=300 kHz
 - Detector = peak
 - Trace mode = max-hold
 - ☒ For Quasi-peak measurement in receiver mode
 - RBW=120 kHz

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Detector = Quasi-Peak

Peak detection is used unless otherwise noted as quasi-peak.

7. For measurements above 1GHz, set the spectrum analyzer as

☒ For Peak measurement:

RBW=1 MHz

VBW=3 MHz

Detector = peak

Trace mode = max-hold

☒ For Average measurement:

☐ Duty cycle $\geq 98\%$:

RBW=1 MHz

VBW=3 MHz

Detector = Power averaging (rms)

trace average was performed over at least 100 traces

☒ Duty cycle $< 98\%$

RBW=1 MHz

VBW $\geq 1/T$

Detector = peak

Trace mode = max-hold

☐ Duty cycle $< 98\%$

RBW=1 MHz

VBW ≥ 3 MHz

Detector = Power averaging (rms)

trace average was performed over at least 100 traces

add Duty cycle factor(dB)

☐ Duty cycle factor (DCF)

the average value of pulsed emissions with duty cycle correction factor $20 \log$ (Ton/100ms) from the peak measurement

8. When measuring radiated emissions above 1 GHz, the receiving antenna was maintained within the "cone of radiation" and pointed at the emission source in both azimuth and elevation, with polarization oriented for maximum response, ensuring it remained within the 3 dB illumination beamwidth of the measurement antenna.

9. The six highest emissions were fully maximized using the above procedures to ensure EUT compliance.

10. Each emission was further maximized by changing the receiving antenna polarization between horizontal and vertical.

11. Repeat the above procedures until all default test channels (low, middle, and high) are measured.

Note: Emissions from 9 kHz to 30 MHz were pre-scanned and found to be at least 20 dB below the applicable limits, and are therefore not reported.

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6.5.1 Field Strength Calculation

The field strength is calculated by adding the antenna factor and cable loss, then subtracting the amplifier gain and any applicable duty cycle correction factor from the measured reading. The basic equation and an example calculation are as follows:

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

Where:

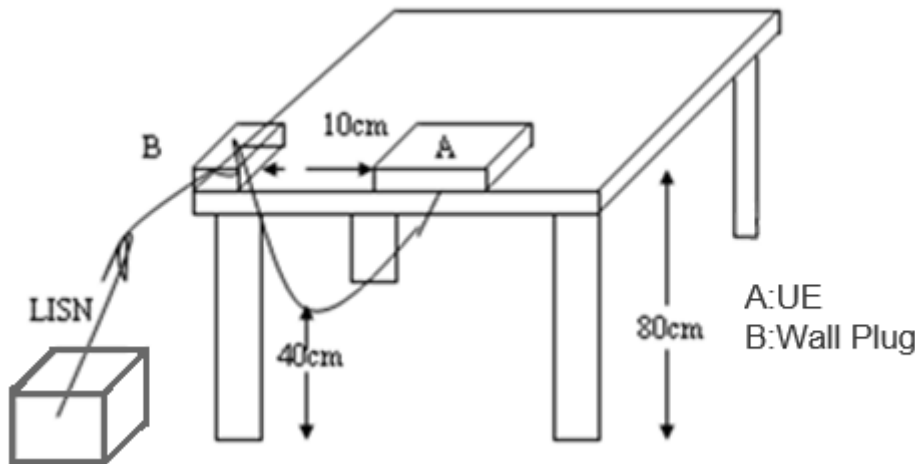
FS = Field Strength (dB μ V/m)
RA = Reading Amplitude (dB μ V)
AF = Antenna Factor (dB/m)
CL = Cable Loss (dB)
AG = Amplifier Gain (dB)

The emission limit is expressed in dB μ V/m, which corresponds to the logarithmic conversion of $20 \times \log_{10} (\mu\text{V/m})$.

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6.6 AC Power Line Conducted Emission



The conducted emission tests were performed at the designated test site using a setup in accordance with the applicable version of ANSI C63.10.

1. The EUT was placed on a non-conductive table that is 0.8 meters above the ground plane. Conducted emissions were measured in the frequency range from 0.15 MHz to 30 MHz using CISPR Quasi-Peak and Average detector modes. Two LISNs were used to provide 50 μ H / 50 ohm coupling impedance to the measuring instrument. Both lines of the AC power mains connected to the EUT were evaluated to identify the maximum conducted interference.
2. The AC/DC power adapter of the EUT was connected to the LISN. The EUT was positioned flush with the rear edge of the table, maintaining at least 0.4 meters of separation from the shielding wall.
3. The LISNs were connected to the power source and configured in accordance with the test requirements.
4. The maximum emission levels were investigated for each operating mode. The six highest emissions were further maximized to ensure compliance.
5. The above procedures were repeated for all applicable power supply configurations of the EUT.

Calculation Formula:

Level = Read Level + Factor

Factor = LISN/ISN/Current Probe Factor + Cable Loss + Attenuator

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7 TEST RESULTS

7.1 Emission Bandwidth

7.1.1 6dB BW measurements

802.11b Ch0

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	8121	≥ 500	PASS
2437	8115	≥ 500	PASS
2462	8136	≥ 500	PASS

802.11g Ch0

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	16340	≥ 500	PASS
2437	16370	≥ 500	PASS
2462	16070	≥ 500	PASS

802.11n_HT_20M Ch0

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	16980	≥ 500	PASS
2437	17180	≥ 500	PASS
2462	16110	≥ 500	PASS

802.11n_HT_20M Ch1

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	17310	≥ 500	PASS
2437	17300	≥ 500	PASS
2462	17200	≥ 500	PASS

802.11n_HT_40M Ch0

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2422	35790	≥ 500	PASS
2437	35950	≥ 500	PASS
2452	35760	≥ 500	PASS

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802.11n_HT_40M Ch1

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2422	35770	≥ 500	PASS
2437	36330	≥ 500	PASS
2452	35740	≥ 500	PASS

802.11ax_HE_20M Ch0

Freq. (MHz)	RU Config	6dB BW (kHz)	Limit (kHz)	Result
2412	full	18750	≥ 500	PASS
2412	26/0	2079	≥ 500	PASS
2437	full	18660	≥ 500	PASS
2462	full	17190	≥ 500	PASS

802.11ax_HE_20M Ch1

Freq. (MHz)	RU Config	6dB BW (kHz)	Limit (kHz)	Result
2412	full	18650	≥ 500	PASS
2412	26/0	2113	≥ 500	PASS
2437	full	18800	≥ 500	PASS
2462	full	18590	≥ 500	PASS

802.11ax_HE_40M Ch0

Freq. (MHz)	RU Config	6dB BW (kHz)	Limit (kHz)	Result
2422	full	37990	≥ 500	PASS
2437	full	36830	≥ 500	PASS
2452	full	36840	≥ 500	PASS

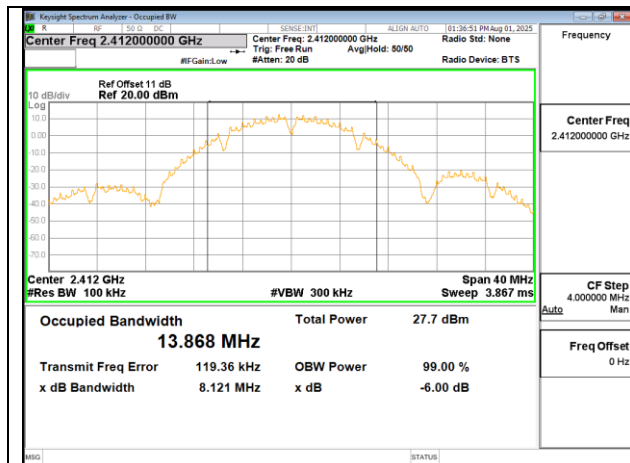
802.11ax_HE_40M Ch1

Freq. (MHz)	RU Config	6dB BW (kHz)	Limit (kHz)	Result
2422	full	37370	≥ 500	PASS
2437	full	37920	≥ 500	PASS
2452	full	37250	≥ 500	PASS

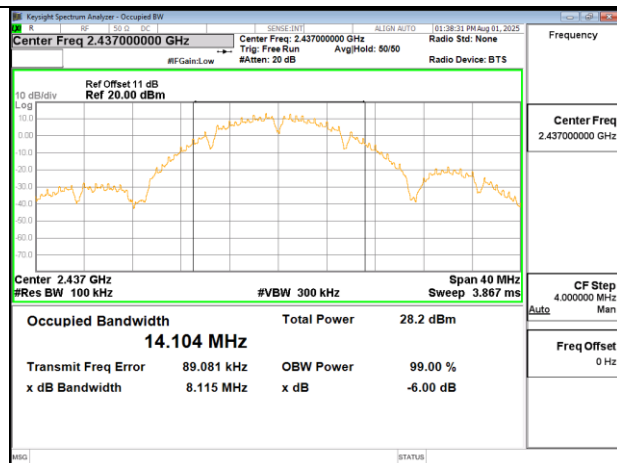
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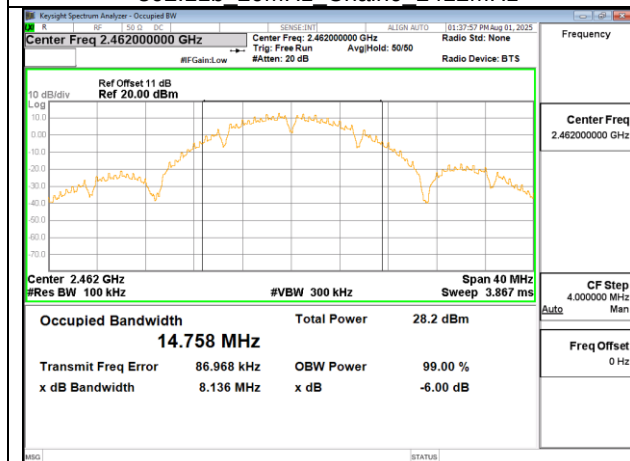
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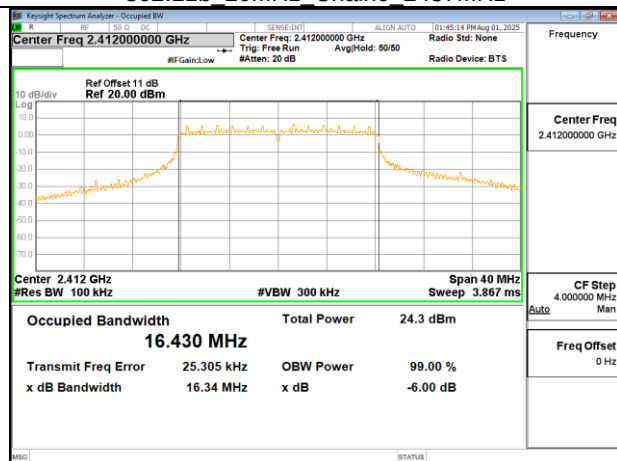
802.11b 20MHz Chain0 2412MHz



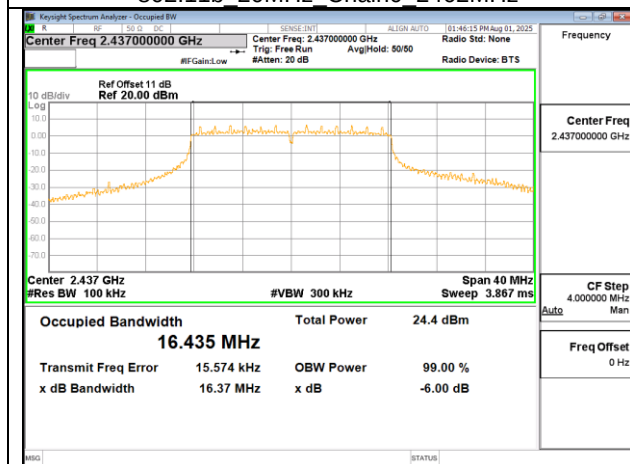
802.11b 20MHz Chain0 2437MHz



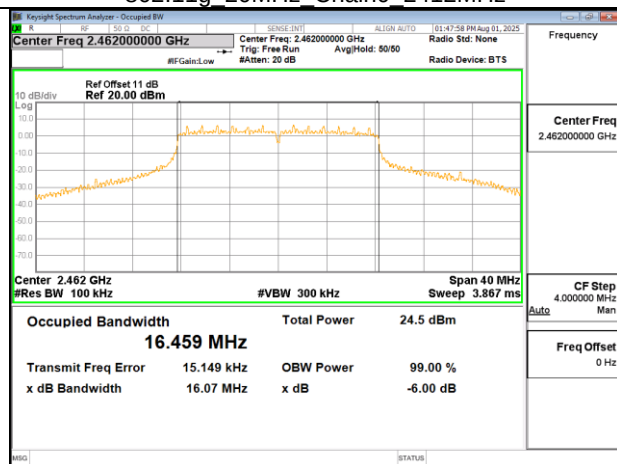
802.11b 20MHz Chain0 2462MHz



802.11g 20MHz Chain0 2412MHz



802.11g 20MHz Chain0 2437MHz



802.11g 20MHz Chain0 2462MHz

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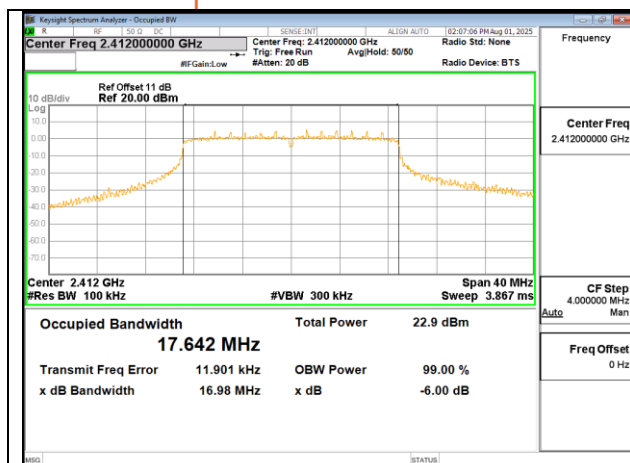
台灣檢驗科技股份有限公司

t (886-2) 2299-3279

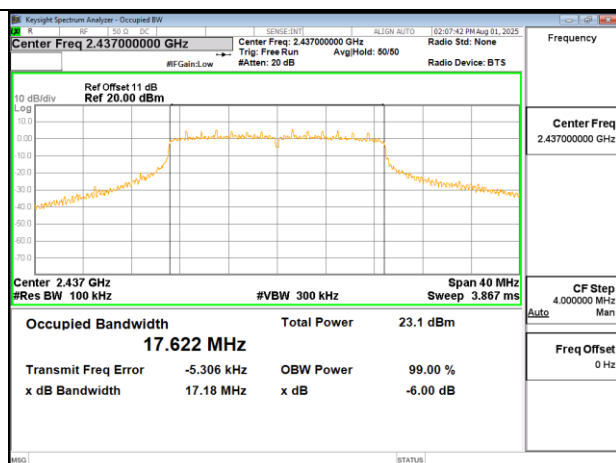
f (886-2) 2298-0488

www.sgs.com.tw

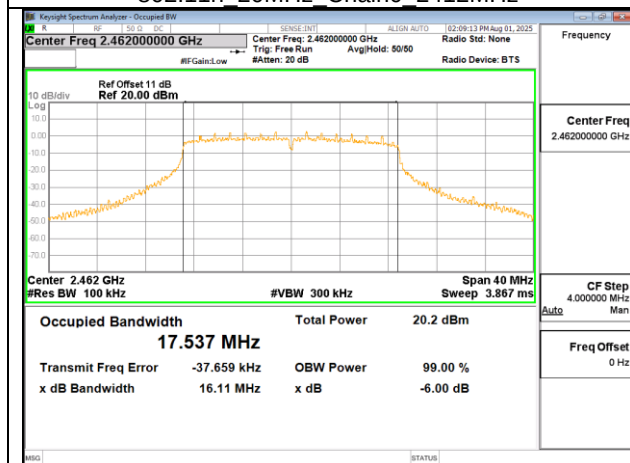
Member of SGS Group



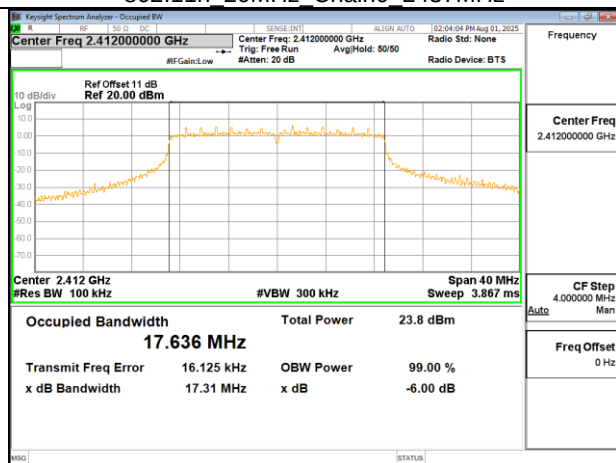
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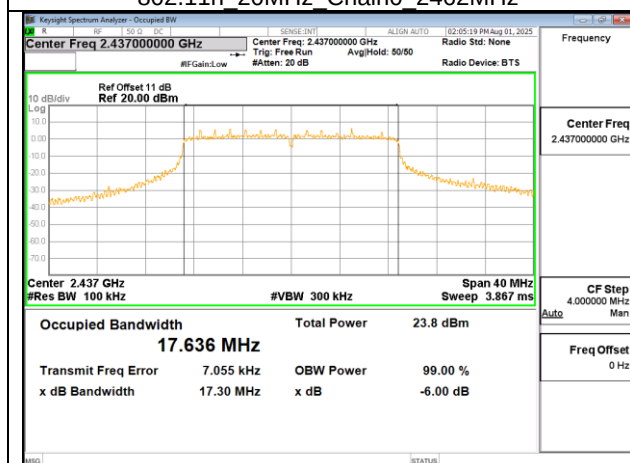
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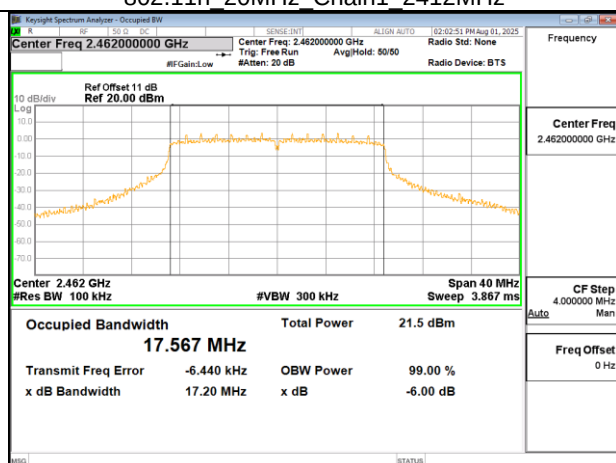
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802.11n 20MHz Chain1 2412MHz



802.11n 20MHz Chain1 2437MHz

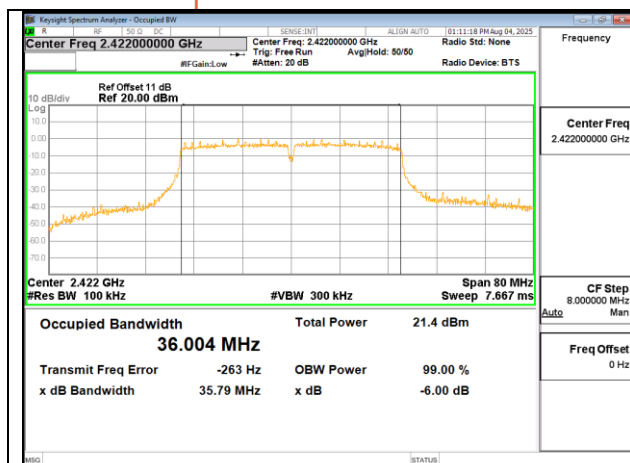


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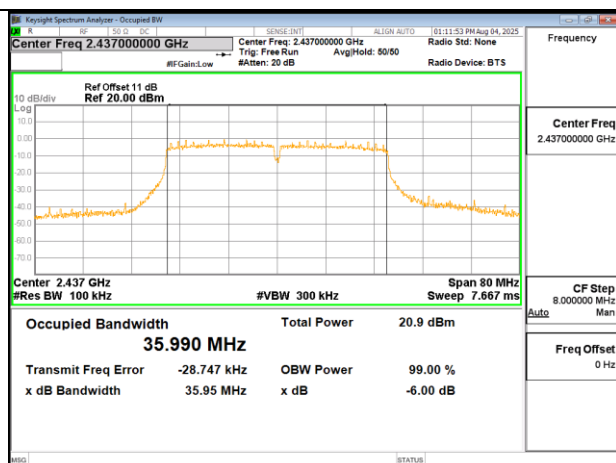
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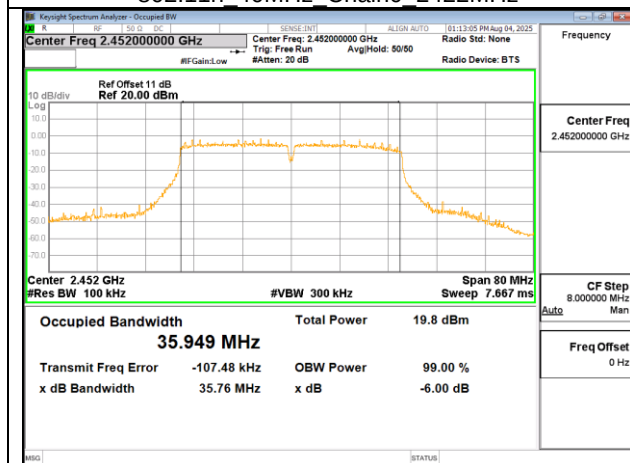
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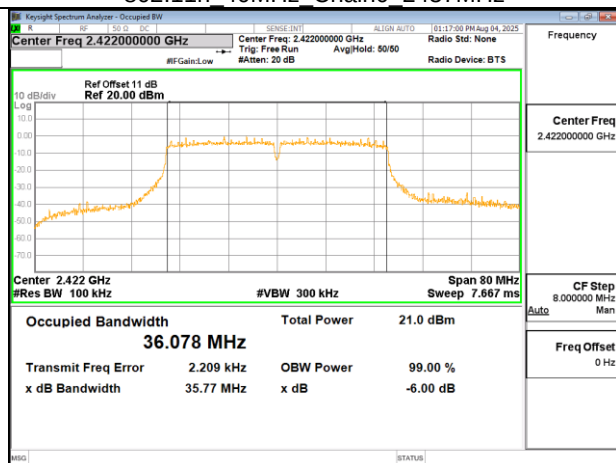
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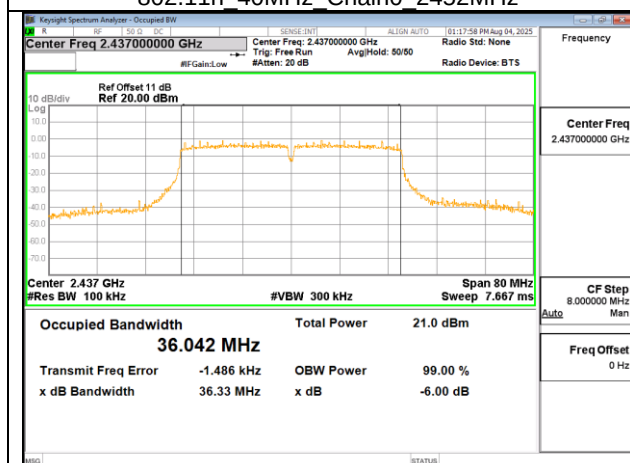
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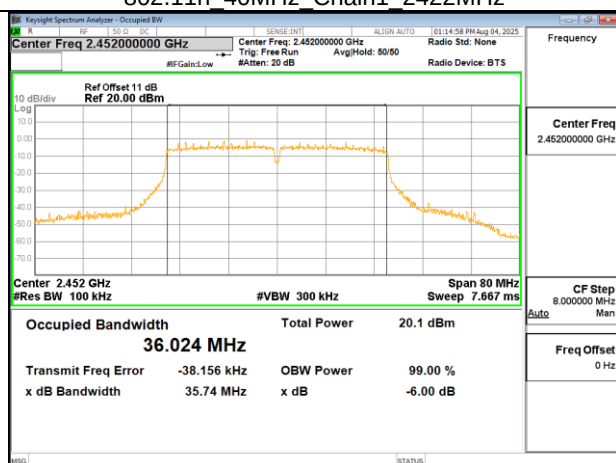
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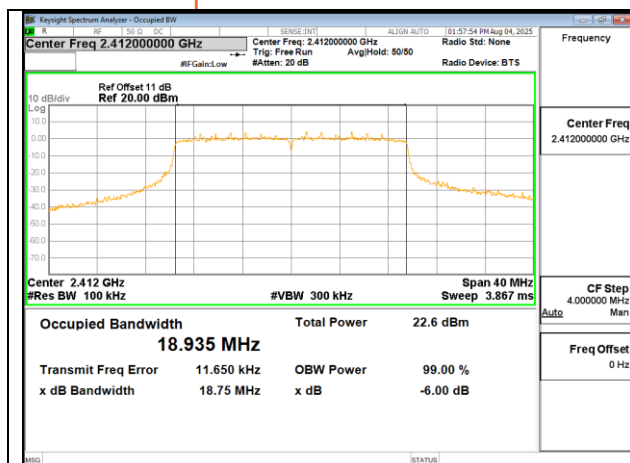


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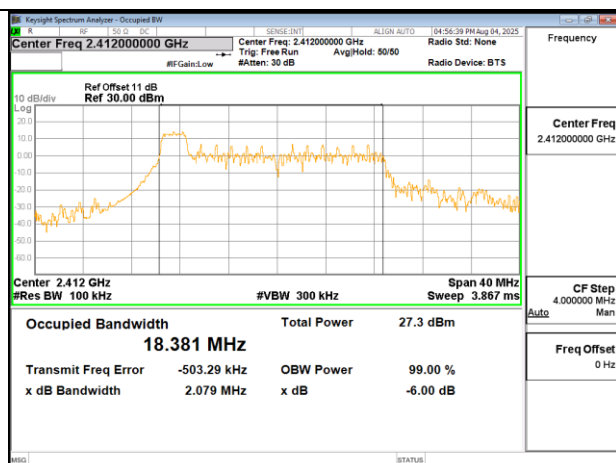
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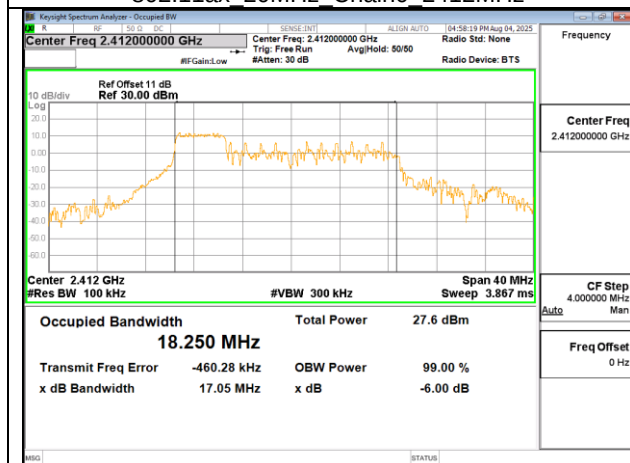
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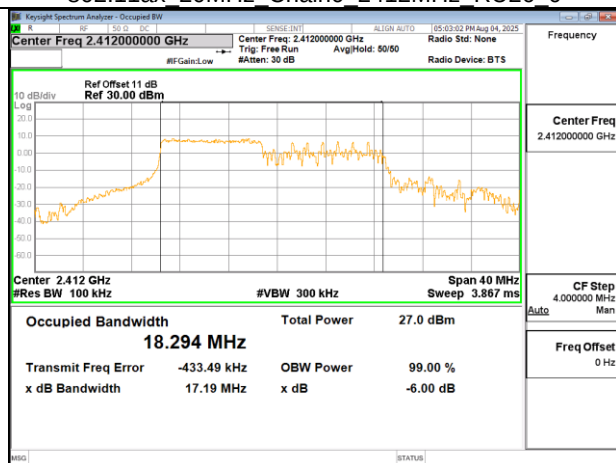
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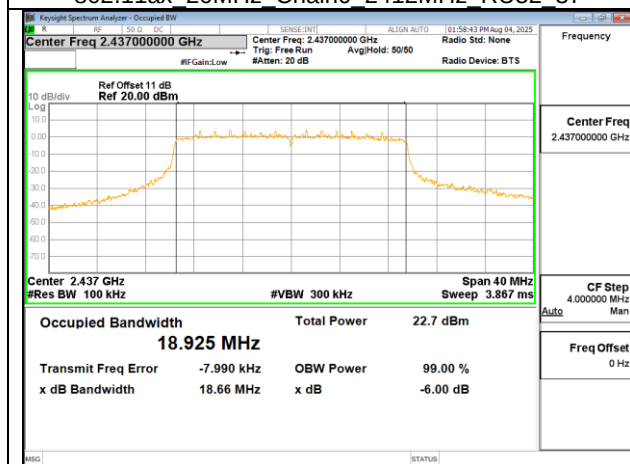
802.11ax 20MHz Chain0 2412MHz RU26 0



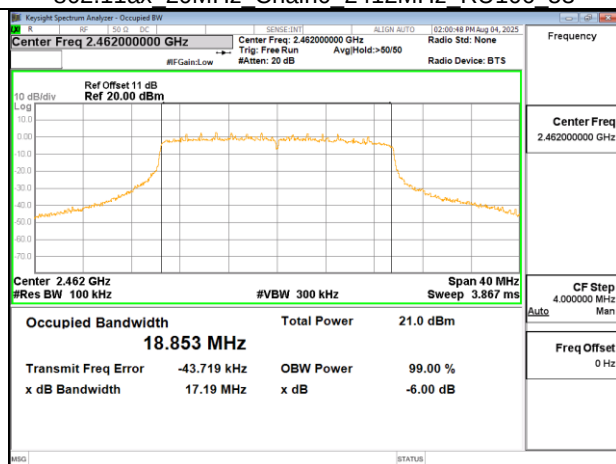
802.11ax 20MHz Chain0 2412MHz RU52 37



802.11ax 20MHz Chain0 2412MHz RU106 53



802.11ax 20MHz Chain0 2437MHz

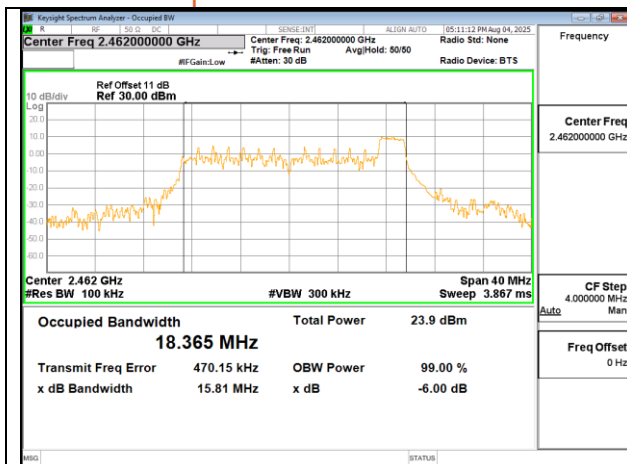


802.11ax 20MHz Chain0 2462MHz

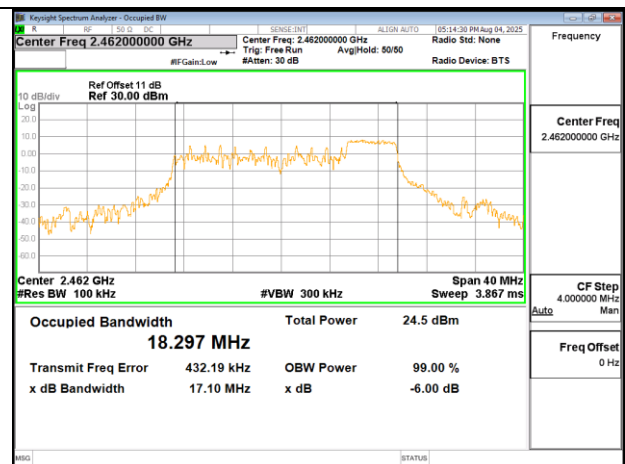
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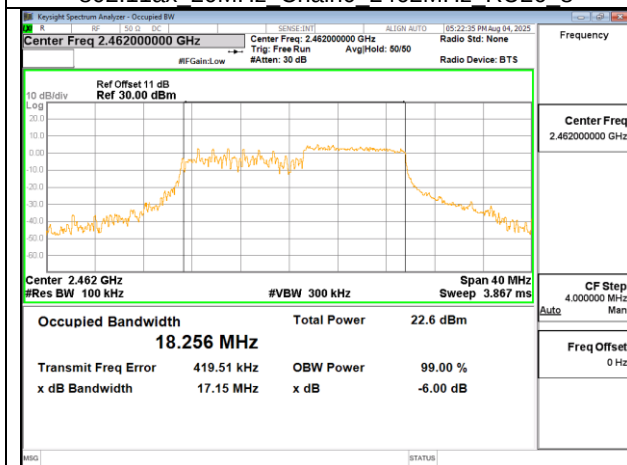
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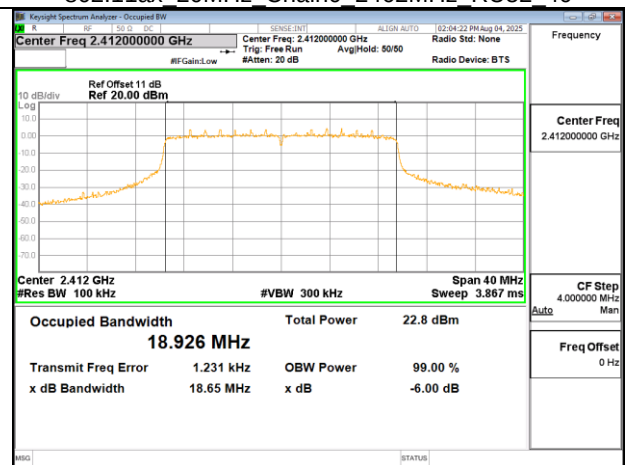
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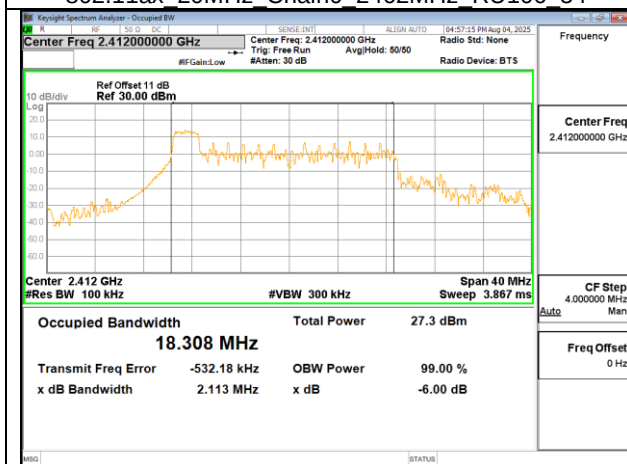
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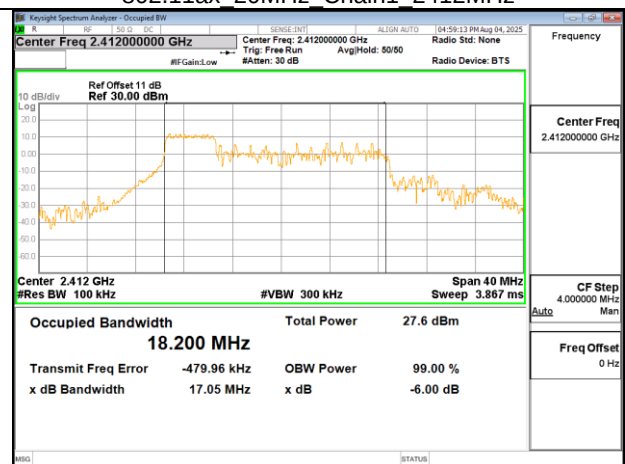
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802.11ax 20MHz Chain1 2412MHz



802.11ax 20MHz Chain1 2412MHz RU26 0

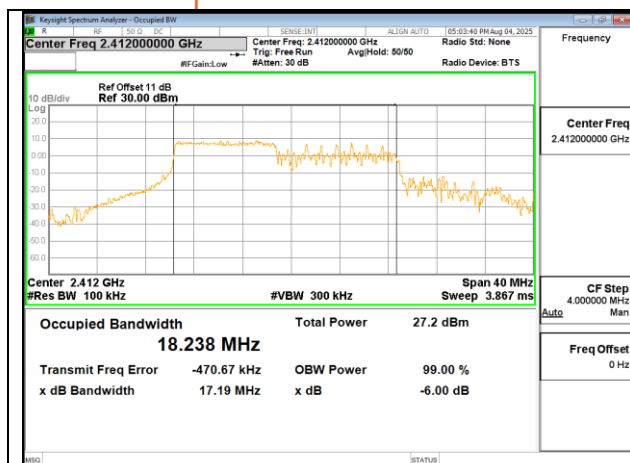


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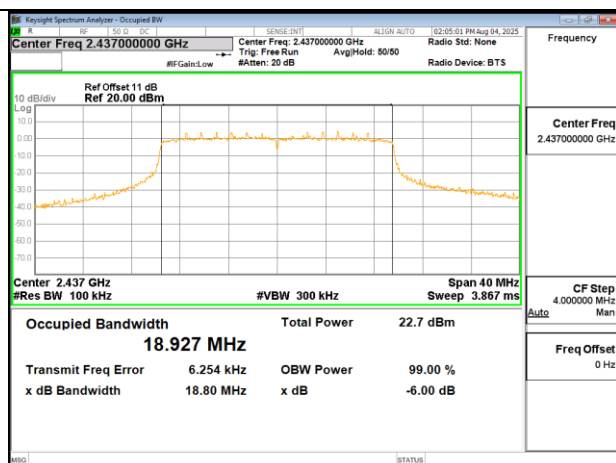
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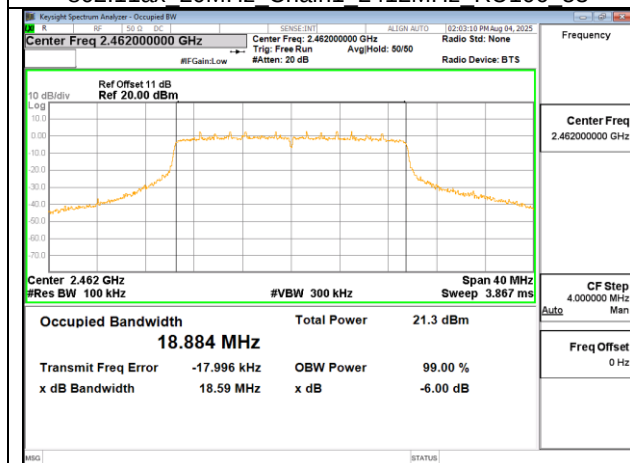
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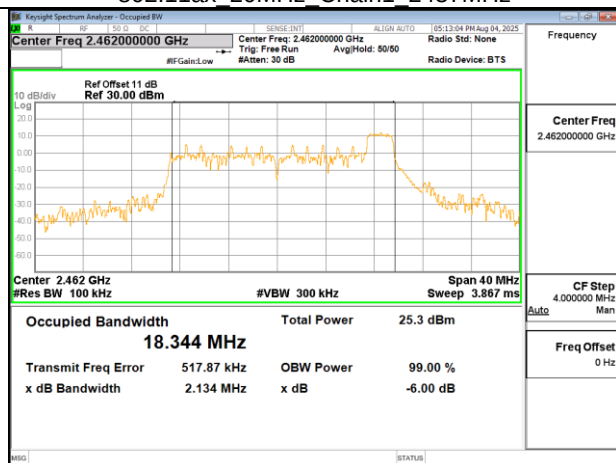
802.11ax 20MHz Chain1 2412MHz RU106 53



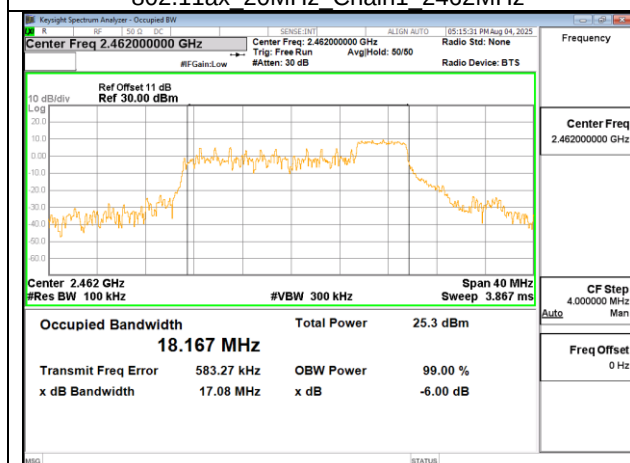
802.11ax 20MHz Chain1 2437MHz



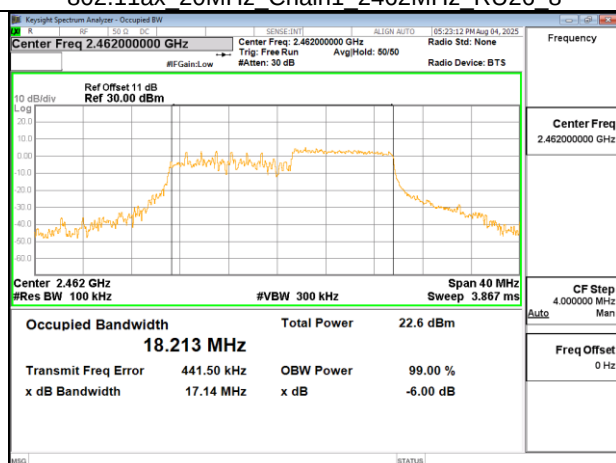
802.11ax 20MHz Chain1 2462MHz



802.11ax 20MHz Chain1 2462MHz RU26 8



802.11ax 20MHz Chain1 2462MHz RU52 40

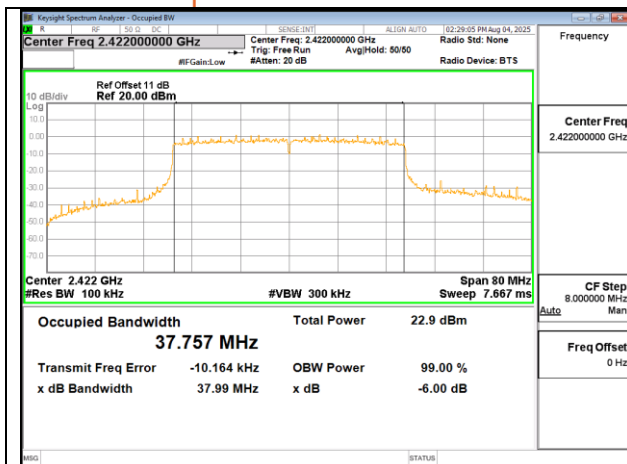


802.11ax 20MHz Chain1 2462MHz RU106 54

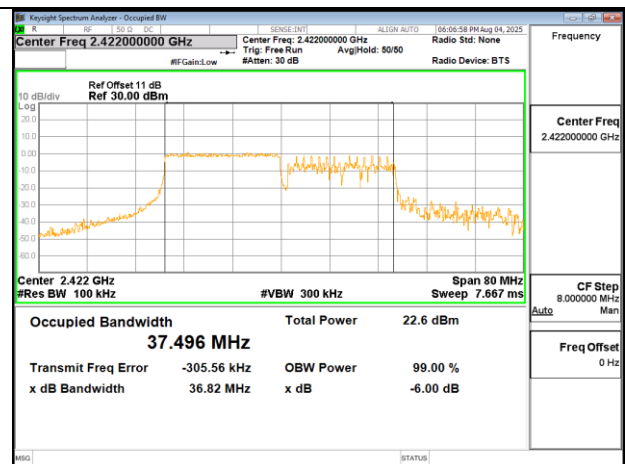
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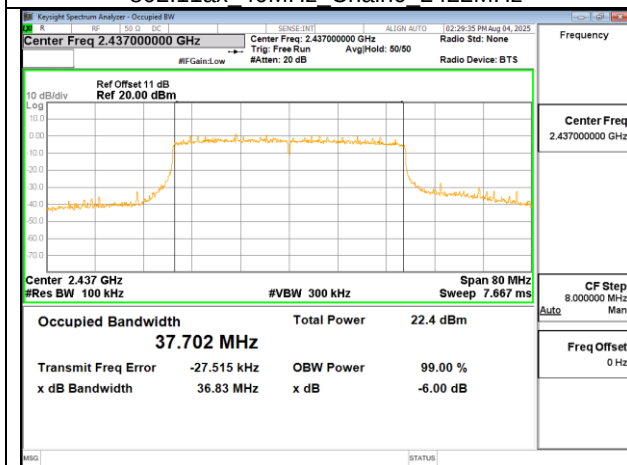
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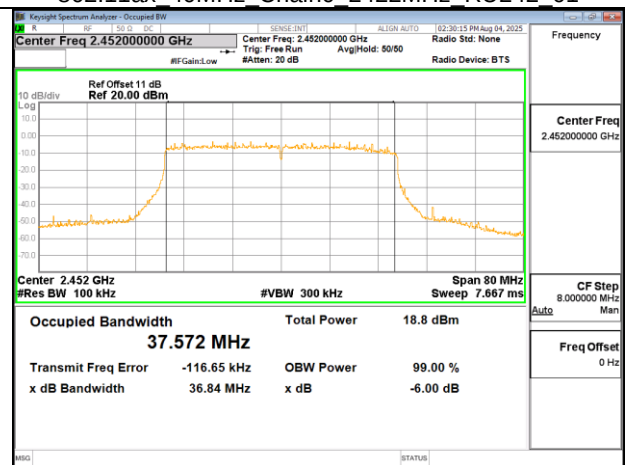
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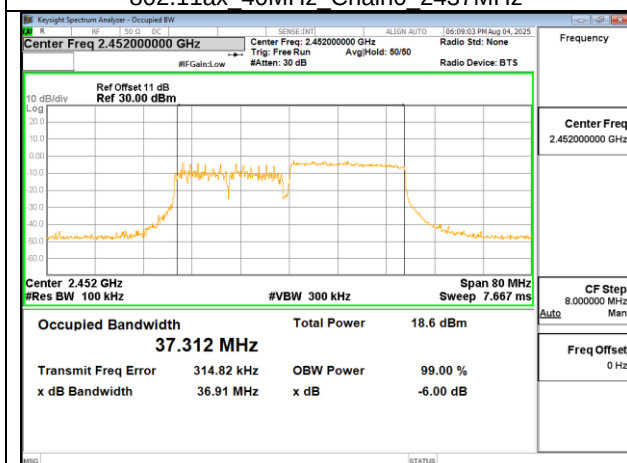
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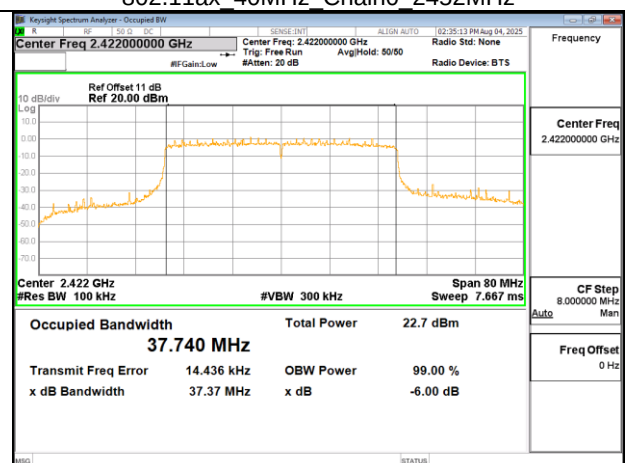
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802.11ax 40MHz Chain0 2452MHz



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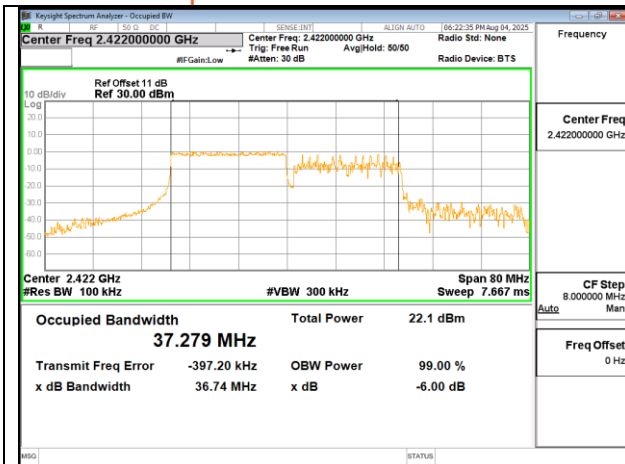


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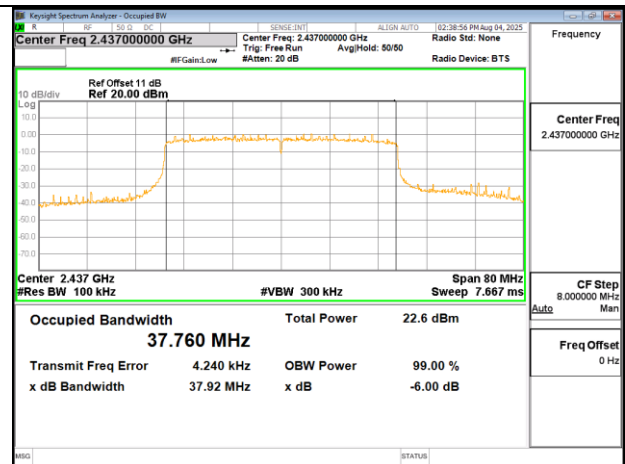
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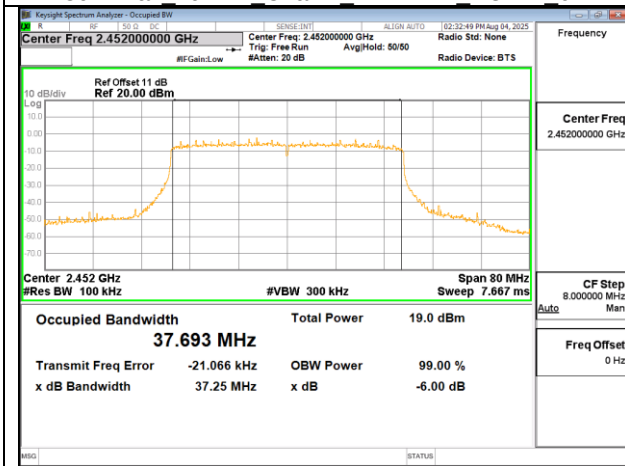
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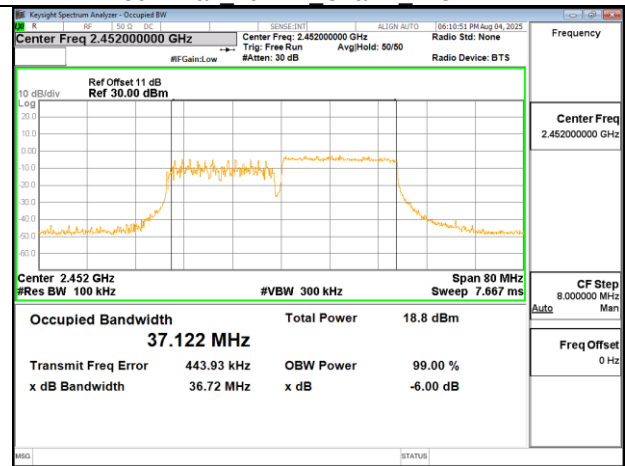
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802.11ax 40MHz Chain1 2437MHz



802.11ax 40MHz Chain1 2452MHz



802.11ax 40MHz Chain1 2452MHz RU242 62

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7.1.2 99% Bandwidth

802.11b Ch0

Freq. (MHz)	99% BW (MHz)
2412	13.902
2437	14.72
2462	14.693

802.11g Ch0

Freq. (MHz)	99% BW (MHz)
2412	16.622
2437	16.607
2462	16.535

802.11n_HT20M Ch0

Freq. (MHz)	99% BW (MHz)
2412	17.729
2437	17.695
2462	17.581

802.11n_HT20M Ch1

Freq. (MHz)	99% BW (MHz)
2412	17.716
2437	17.697
2462	17.615

802.11n_HT40M Ch0

Freq. (MHz)	99% BW (MHz)
2422	36.08
2437	36.082
2452	36.008

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802.11n_HT40M Ch1

Freq. (MHz)	99% BW (MHz)
2422	36.079
2437	36.09
2452	36.056

802.11ax_HE20M Ch0

Freq. (MHz)	RU Config	99% BW (MHz)
2412	full	18.987
2437	full	18.973
2462	full	18.912

802.11ax_HE20M Ch1

Freq. (MHz)	RU Config	99% BW (MHz)
2412	full	18.986
2437	full	18.958
2462	full	18.942

802.11ax_HE40M Ch0

Freq. (MHz)	RU Config	99% BW (MHz)
2422	full	37.728
2437	full	37.764
2452	full	37.657

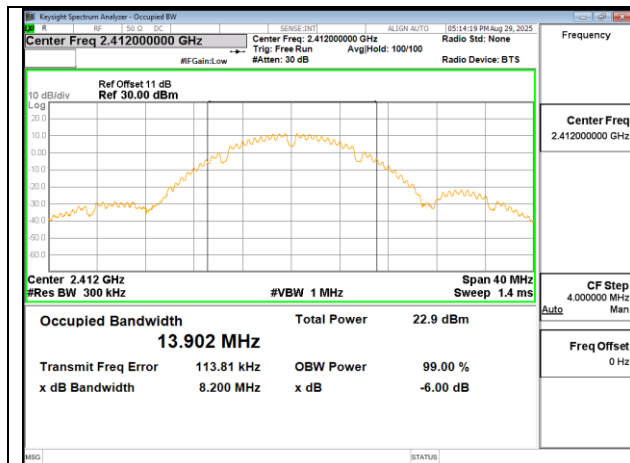
802.11ax_HE40M Ch1

Freq. (MHz)	RU Config	99% BW (MHz)
2422	full	37.767
2437	full	37.718
2452	full	37.719

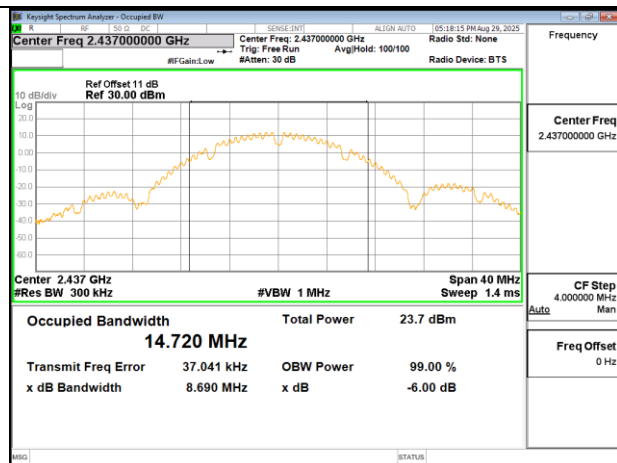
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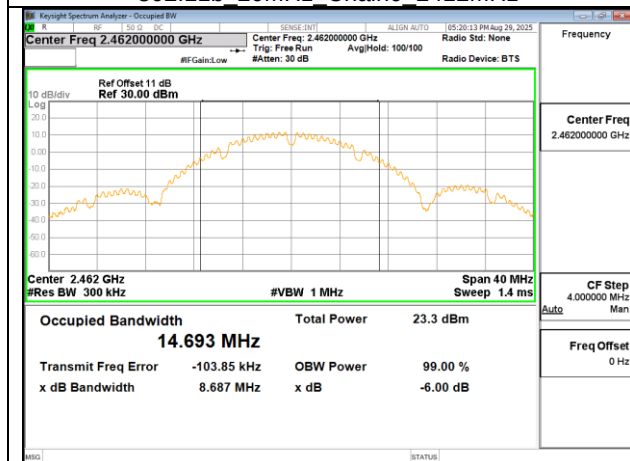
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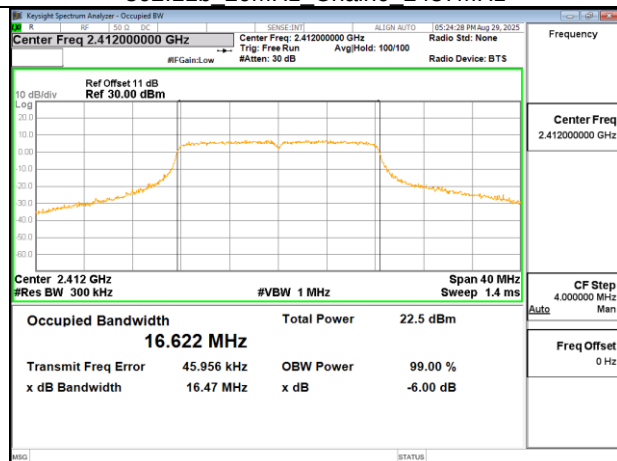
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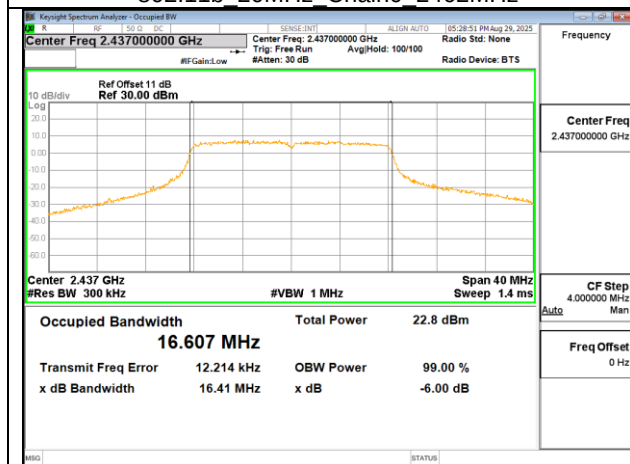
802.11b 20MHz Chain0 2437MHz



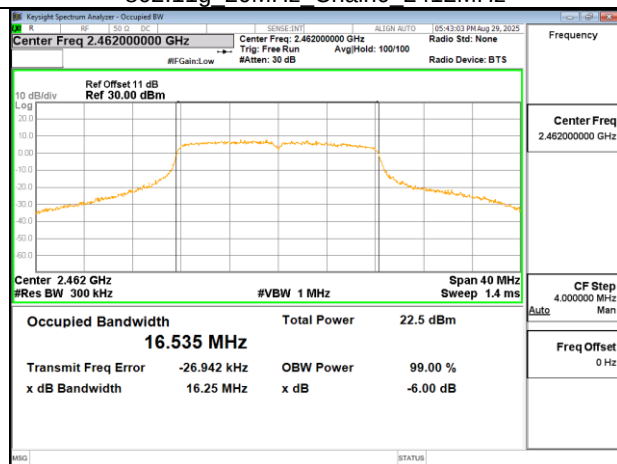
802.11b 20MHz Chain0 2462MHz



802.11g 20MHz Chain0 2412MHz



802.11g 20MHz Chain0 2437MHz



802.11g 20MHz Chain0 2462MHz

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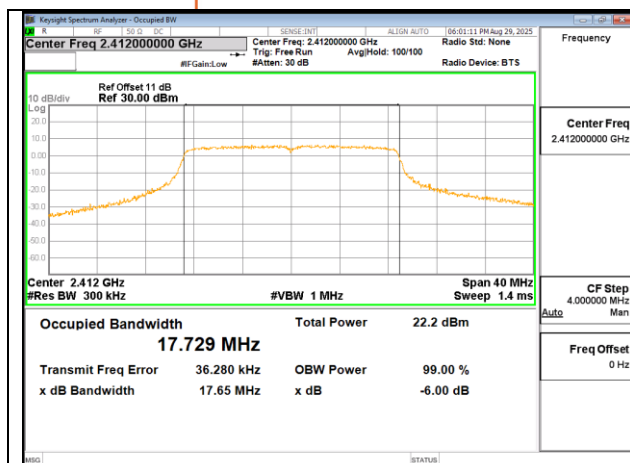
台灣檢驗科技股份有限公司

t (886-2) 2299-3279

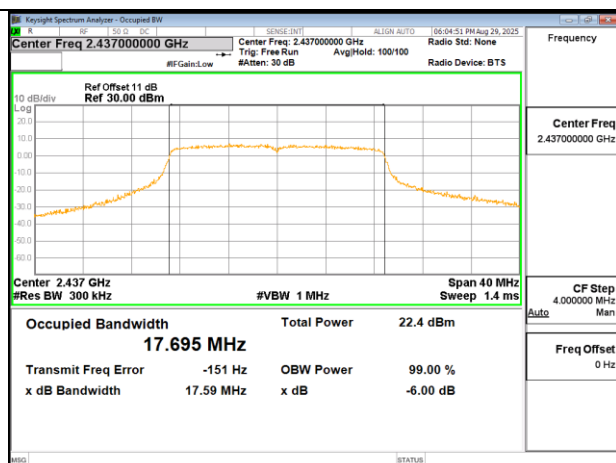
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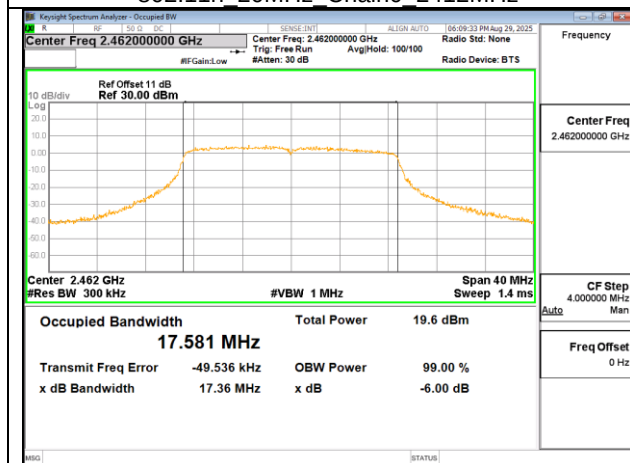
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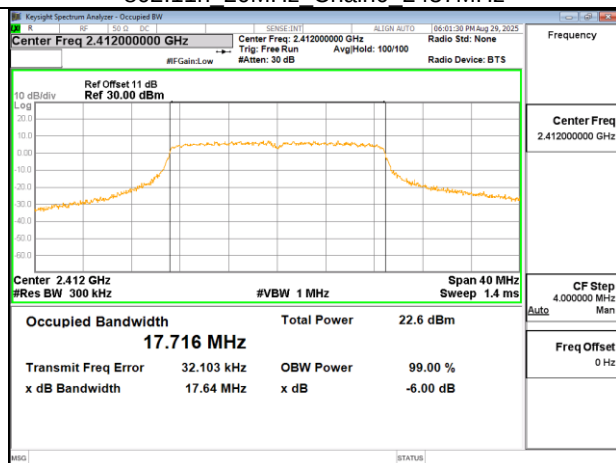
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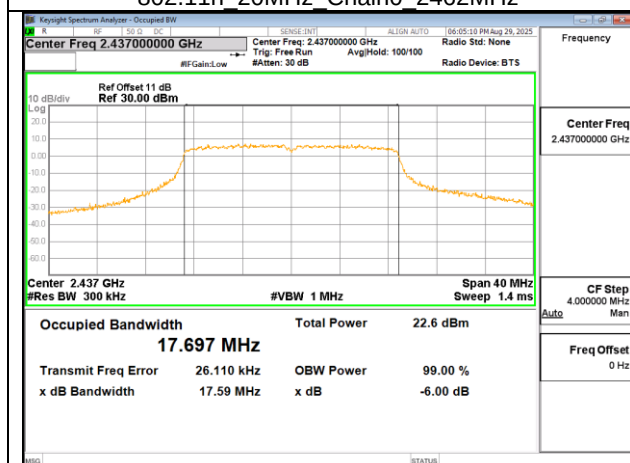
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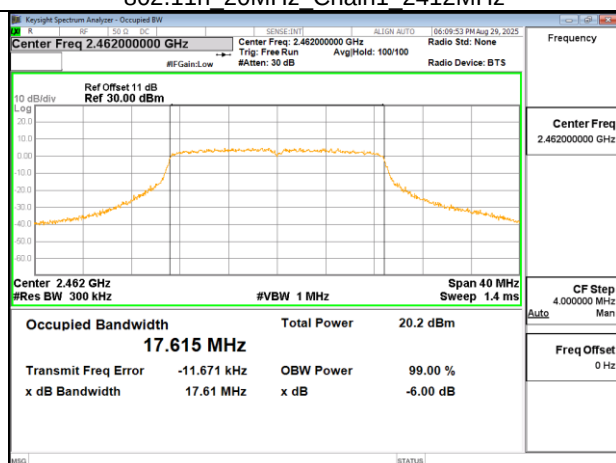
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802.11n 20MHz Chain1 2437MHz



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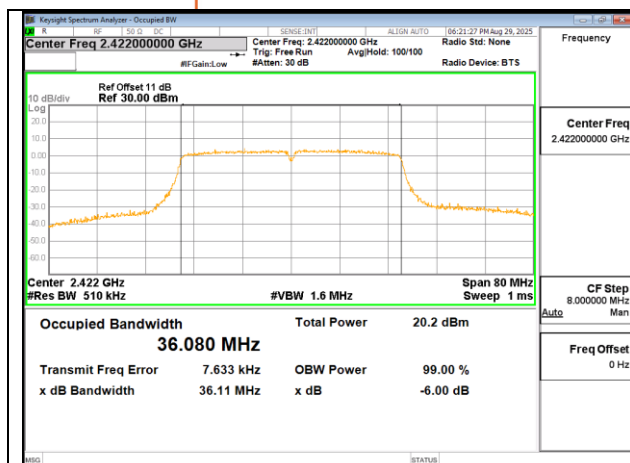
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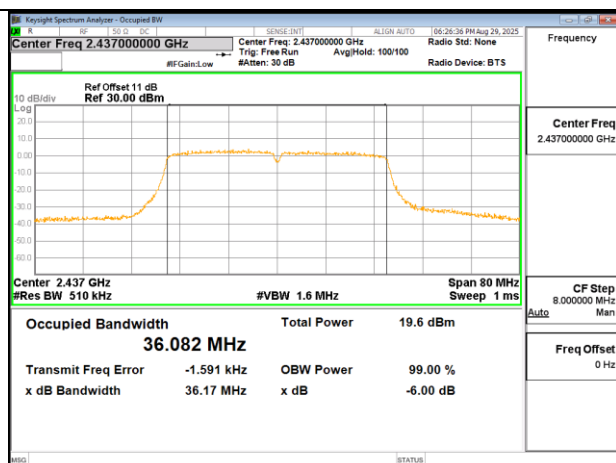
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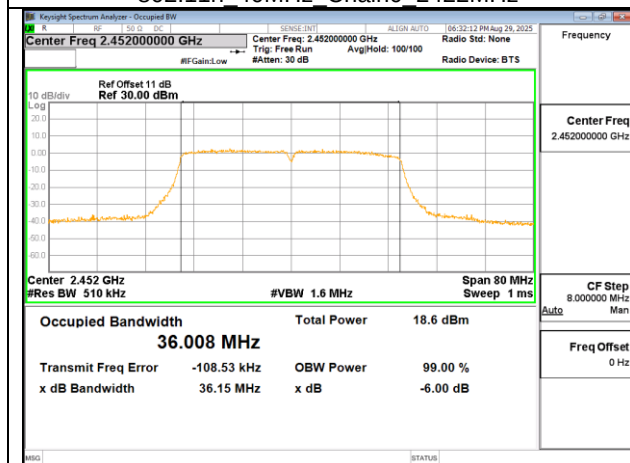
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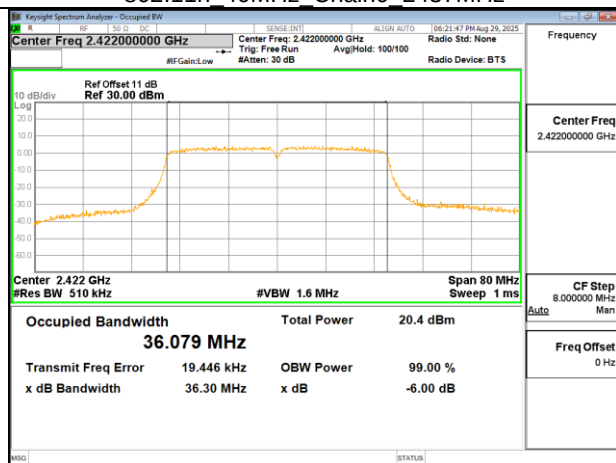
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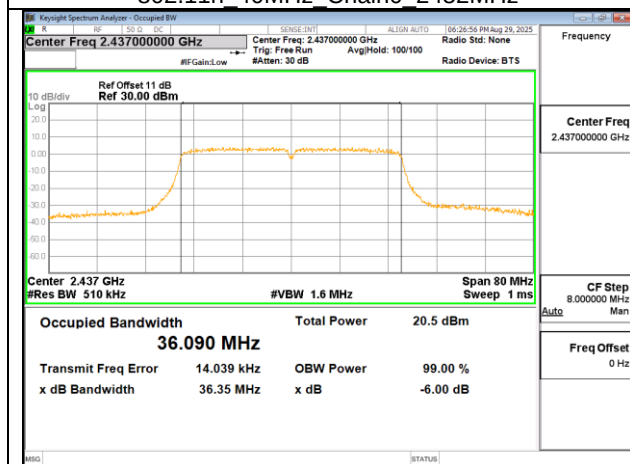
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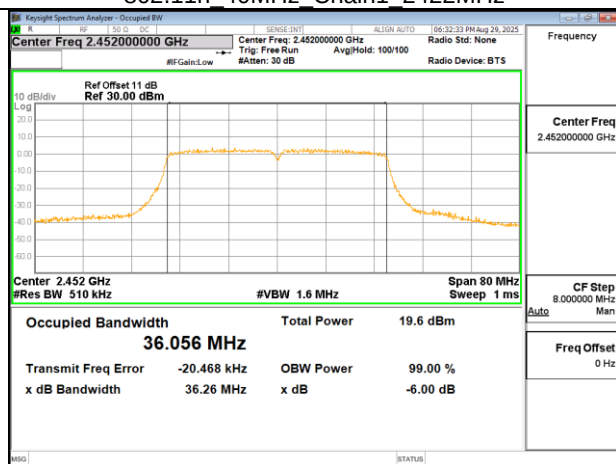
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802.11n 40MHz Chain1 2422MHz



802.11n 40MHz Chain1 2437MHz

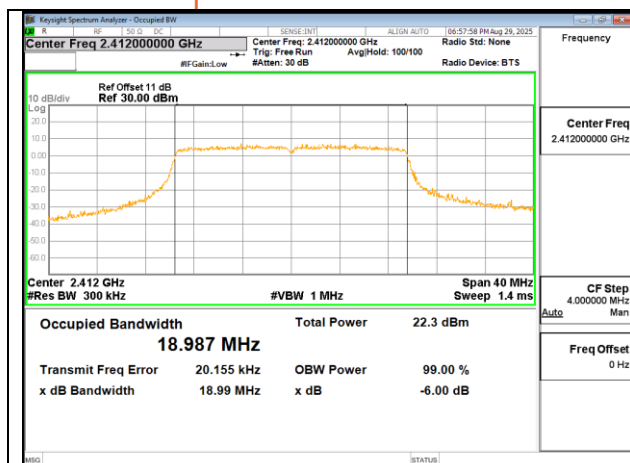


802.11n 40MHz Chain1 2452MHz

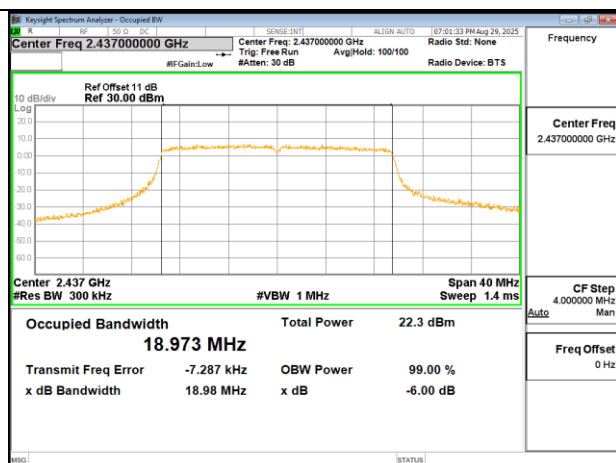
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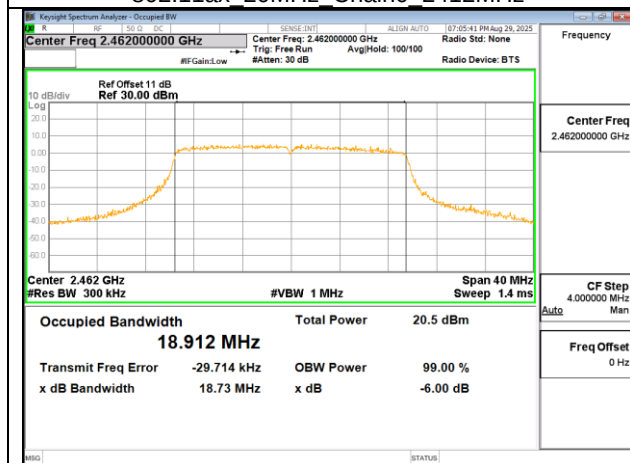
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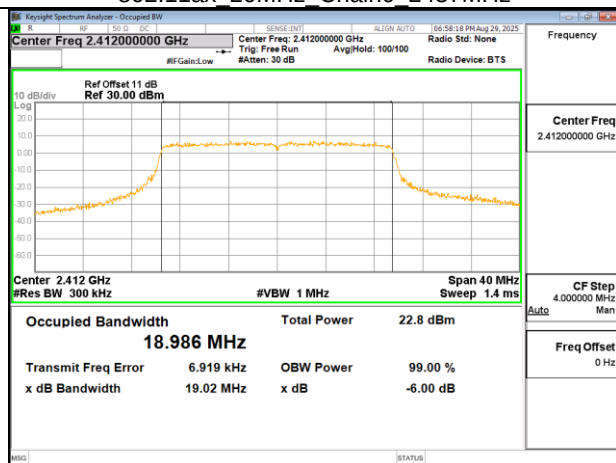
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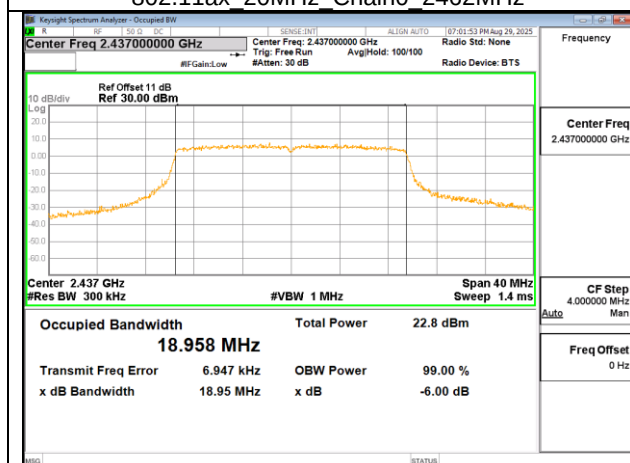
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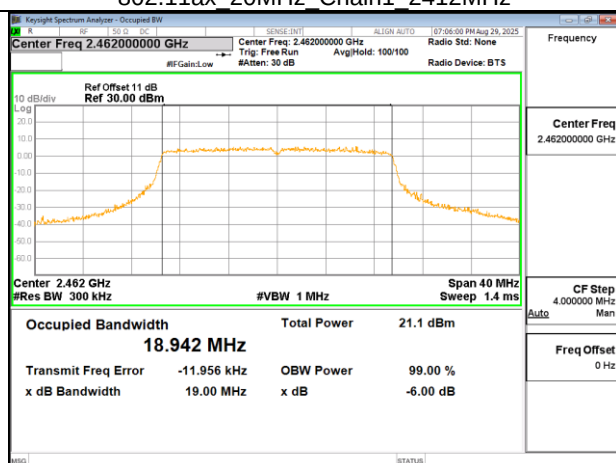
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802.11ax 20MHz Chain1 2412MHz



802.11ax 20MHz Chain1 2437MHz



802.11ax 20MHz Chain1 2462MHz

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