TEST REPORT

Report Number:		15175342-E4V4
Applicant	:	APPLE, INC. 1 APPLE PARK WAY CUPERTINO, CA 95014, U.S.A.
Model	:	A3212 (PARENT MODEL) A3408, A3409, A3410 (VARIANT MODELS)
Brand	:	APPLE
FCC ID	:	BCG-E8725A (PARENT MODEL) BCG-E8726A, BCG-E8727A, BCG-E8728A (VARIANT MODELS)
IC	:	579C-E8725A (PARENT MODEL) 579C-E8726A, 579C-E8727A, 579C-E8728A (VARIANT MODELS)
EUT Description	:	SMARTPHONE
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART C ISED RSS-247 ISSUE 3 ISED RSS-GEN ISSUE 5 + A1 + A2

Date Of Issue:
2024/12/17

Prepared by:
UL Verification Services Inc.
47173 Benicia Street
Fremont, CA 94538 U.S.A.
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ACCREDITED
CERT #0751.05

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	2024/11/07	Initial Issue	Tony Li
V2	2024/11/14	Addressed TCB Feedback on Section 6.5 and add section 12	Tony Li
V3	2024/12/12	Updated Section 9.3 to be compliant to ANSI 63.10-2020	Tony Li
V4	2014/12/17	Updated page 34 per TCB feedback	Tony Li

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: APPLE INC.
1 APPLE PARK WAY
CUPERTINO, CA 95014, U.S.A

EUT DESCRIPTION: SMARTPHONE

MODEL: A3212 (PARENT MODEL)
A3408, A3409, A3410 (VARIANT MODELS)

BRAND: APPLE

SERIAL NUMBER: Parent Model: KQFN75JXKL, JRY1Q7C9QQ (CONDUCTED)
FK6XJ3G2YN, FYTW9G7YHY, JL2GY6CXGT (RADIATED)

Variant Model Conducted**:** J970CHYF9P (A3408), LHXH14D1WF (A3409) KYFJV03QL6 (A3410)
Variant Model Radiated**:** LKQVT2W2YG (A3408), QV6H6WR6YR (A3409), R0QQVMMXH7 (A3410)

SAMPLE RECEIPT DATE: 2024/07/16, 2024/11/13

DATE TESTED: 2024/08/22 – 2024/11/19

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Complies
ISED RSS-247 Issue 3	Complies
ISED RSS-GEN Issue 5 + A1 + A2	Complies

UL Verification Inc.is tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL Verification Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by A2LA, NIST, any agency of the Federal Government, or any agency of the U.S. government.

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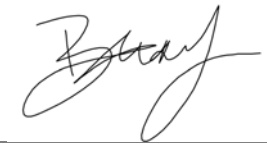
Approved & Released By:	Reviewed By:	Prepared By:
		
Chin Pang Senior Lab Engineer UL Verification Services Inc.	David Collins Senior Test Engineer UL Verification Services Inc.	Becky Yu Laboratory Engineer UL Verification Services Inc.

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2. TEST RESULTS SUMMARY

This report contains data provided by the customer which can impact the validity of results. UL Verification Services Inc. is only responsible for the validity of results after the integration of the data provided by the customer.

Below is a list of the data provided by the customer:

1. Antenna gain and type (see section 6.3)
2. Cable loss (see section 6.3)

FCC Clause	ISED Clause	Requirement	Result	Comment
See Comment		Duty Cycle	Reporting purposes only	ANSI C63.10 Section 11.6
-	RSS-GEN 6.7	99% OBW	Reporting purposes only	ANSI C63.10 Section 6.9.3
15.247 (a) (2)	RSS-247 5.2 (a)	6dB BW	Complies	None
15.247 (b) (3)	RSS-247 5.4 (d)	Output Power (Average)	Complies	Per ANSI C63.10 Section 11.9.2.3.2
15.247 (e)	RSS-247 5.2 (b)	PSD	Complies	None
15.247 (d)	RSS-247 5.5	Conducted Spurious Emissions	Complies	None
15.209, 15.205	RSS-GEN 8.9, 8.10	Radiated Emissions	Complies	None
15.207	RSS-Gen 8.8	AC Mains Conducted Emissions	Complies	None

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with.

- FCC CFR 47 Part 2
- FCC CFR 47 Part 15
- FCC KDB 558074 D01 v05r02 15.247 Meas Guidance
- KDB 484596 D01 V02r03
- ANSI C63.10-2020
- RSS-GEN Issue 5 + A1 + A2
- KDB 414788 D01 Radiated Test Site v01r01
- RSS-247 Issue 3

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4. FACILITIES AND ACCREDITATION

UL Verification Inc. is accredited by A2LA, certification #0751.05, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
☐	Building 1: 47173 Benicia Street, Fremont, CA 94538, USA	US0104	2324A	550739
☒	Building 2: 47266 Benicia Street, Fremont, CA 94538, USA			
☒	Building 3: 843 Auburn Court, Fremont, CA 94538 USA			
☒	Building 4: 47658 Kato Rd, Fremont, CA 94538 USA			
☒	Building 5: 47670 Kato Rd, Fremont, CA 94538 USA			

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5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

5.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

5.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	U_{LAB}
Conducted Antenna Port Emission Measurement	1.94dB
Power Spectral Density	2.466dB
Time Domain Measurements Using SA	3.39dB
RF Power Measurement Direct Method Using Power Meter	1.30 dB (Peak) 0.45 dB (Ave)
Radio Frequency (Spectrum Analyzer)	141.16 Hz
Occupied Bandwidth	1.22%
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.78 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.40 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	2.87 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	6.01 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.73 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.51 dB

Uncertainty figures are valid to a confidence level of 95%.

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5.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:
Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:
Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss
36.5 dBuV + 0 dB +10.1 dB+ 0 dB = 46.6 dBuV

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6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The Apple iPhone is a smartphone with GSM, GPRS, EGPRS, WCDMA, LTE, 5GNR1, IEEE 802.11a/b/g/n/ac/ax, Bluetooth (BT), Global Positioning System (GPS), Near-Field Communication (NFC), and Mobile Satellite Service (MSS) technologies. The rechargeable battery is not user accessible. This device is not user-serviceable and requires special tools to disassemble.

6.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
1TX			
2412 - 2472	802.11b 1Mbps	21.48	140.60
	802.11b 11Mbps	21.48	140.60
	802.11g	Covered by 802.11n HT20 1TX	
	802.11n HT20 MCS0	21.47	140.28
	802.11n HT20 MCS7	21.43	139.00
	802.11ax HE20 MCS0	21.48	140.60
	802.11ax HE20 MCS9	21.49	140.93

2TX			
2412 - 2472	802.11g SDM/STBC	Covered by 802.11n HT20 CDD	
	802.11n HT20 CDD MCS0	24.49	281.19
	802.11n HT20 CDD MCS7	24.49	281.19
	802.11ax HE20 OFDMA MCS0	24.49	281.19
	802.11ax HE20 OFDMA MCS9	24.50	281.84

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

Antenna Type is IFA.
The antennas' gains, as provided by the manufacturer, are as follows:

Frequency Range (GHz)	ANT 4 (dBi)	ANT 3 (dBi)
2400 – 2483.5	-1.90	-1.20

The SMA Cable losses used for RF antenna port tests are as follow:

Frequency Range (GHz)	ANT 4 (dB)	ANT 3 (dB)
2400 – 2483.5	-1.7	-1.8

The cables were used for RF antenna port tests that had been offset to the test equipment during testing.

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6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was 20_10_1127.

6.5. WORST-CASE CONFIGURATION AND MODE

The EUT was investigated in three orthogonal orientations: X (Flatbed), Y (Landscape) and Z (Portrait) on ANT 4, ANT 3, and 2TX. It was determined that X (Flatbed) orientation was the worst-case orientation for ANT 3, ANT 4 and 2TX.

With same power on Full RU and SU higher data rate, investigation was performed on both band edge to determine the worst case. SU mode was determined to be the worst case.

Radiated band edge, harmonic, and spurious emissions from 1GHz to 18GHz were performed with the EUT set to transmit at highest power on Low/Middle/High channels.

Radiated emissions below 1GHz, 18-26GHz and power line conducted emissions were performed with the EUT transmits at the channel with the highest output power as worst-case scenario. There were no emissions found below 30MHz within 20dB of the limit.

For radiated harmonics spurious below 1GHz, 1-18GHz L/M/H channels, 18-26GHz, and power line conducted emissions were performed with the EUT set at the 2TX OFDMA mode among the CDD/SDM modes and 2TX HE mode with power setting equal or higher than SISO modes as worst-case scenario. G mode covered by HT20 mode since it has the same power as HT20.

Below 30MHz, 30-1000MHz emission spurious test were performed with EUT connected to AC power adapter and set EUT on X orientation as the worst case; and for above 1GHz tests, the worst-case configuration reported was with EUT only. For AC line conducted emission, test was investigated with AC power adapter and with laptop.

The output power and psd for the 802.11ax mode were investigated between all different tones and we found that SU mode had the highest output power and Partial RU had the highest PSD readings. After investigation, antenna port conducted tests were performed on both SU and lowest tones; radiated spurious emission and radiated band edge tests were performed on SU and lowest tones. Please see worst case summary table below.

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WIFI DTS 2.4GHz - 802.11ax					
BW (MHz)	Tone (T)	RU Index	RU Index (Chipset support)	Worst Case Tone	
				Power	PSD
20	26	0 ~ 8	0 ~ 8		X
	52	37 ~ 40	37 ~ 40		
	106	53 ~ 54	53 ~ 54		
	242	61	61		
	SU	--	--	X	

For antenna port conducted tests, the following are the worst-case data rates set for test:
802.11b mode : 1Mbps & 11 Mbps
802.11n HT20 mode : MCS0 & MCS7
802.11ax HE SU mode: MCS0 & MCS9
802.11ax HE RU26 mode: MCS0

For radiated band-edge, the following are the worst-case data rates set for test:
802.11b mode : 1 Mbps
802.11n HT20 mode : MCS7
802.11ax HE SU mode: MCS9
802.11ax HE RU26 mode: MCS9

Low data rate was used to test radiated spurious emissions since it has the highest maximum power.

Note: In the Radiated Plots and emissions data, ANT1=ANT4 and ANT2=ANT 3.

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6.6. DESCRIPTION OF TEST SETUP

SUPPORT TEST EQUIPMENT						
Description		**Manufacturer**	**Model**	**Serial Number**		**FCC ID/ DoC**
Laptop		Apple	Macbook Pro	C02VD7SAHV22		BCGA1708
Laptop AC/DC adapter		Liteon Technology	A1424	NSW25679		DoC
EUT AC/DC adapter		Apple	A1720	C3D8417A7R93KVPA8		DoC
Conducted Switch Box		UL	n/a	208281		N/A
I/O CABLES (RF CONDUCTED TEST)						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	Antenna	1	SMA	Un-shielded	0.2	To spectrum Analyzer
2	USB	1	USB	Shielded	1.0	N/A
3	AC	1	AC	Un-shielded	2	N/A
I/O CABLES (RF RADIATED TEST)						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	AC	1	AC	Un-shielded	2	N/A
2	USB	1	USB	Un-shielded	1	N/A

TEST SETUP

The EUT setup is shown as below. Test software exercised the radio card.

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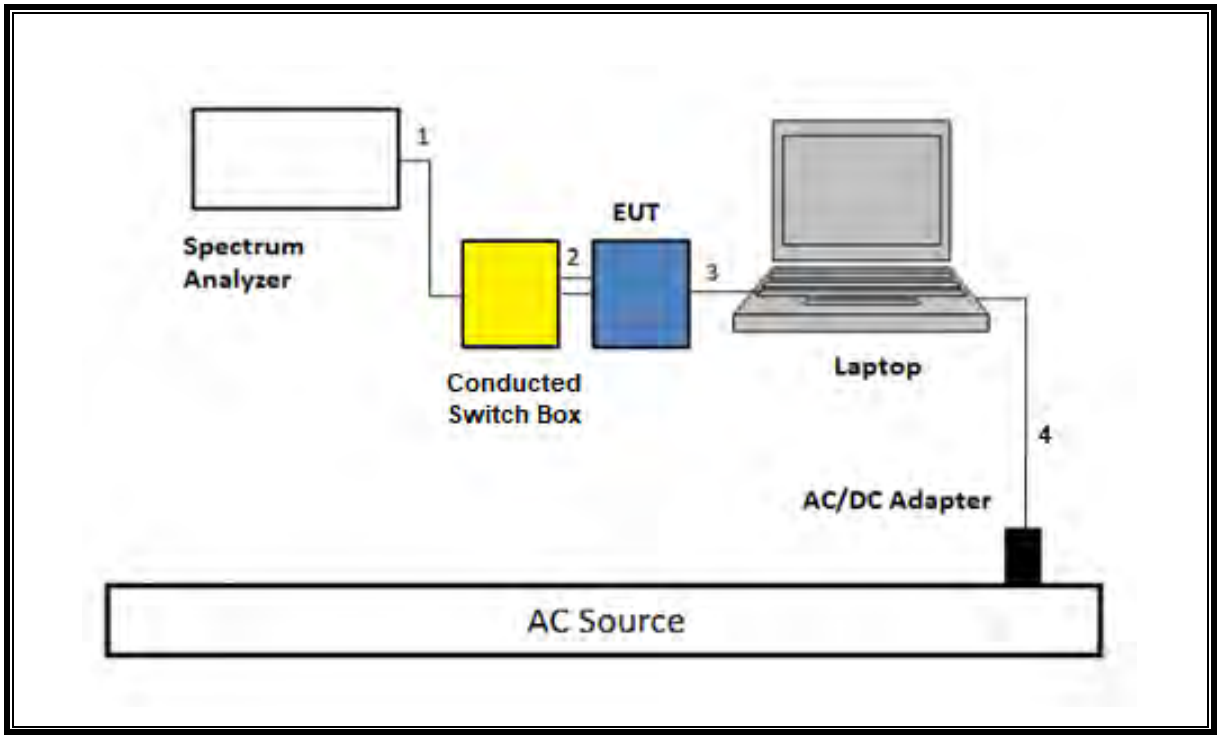
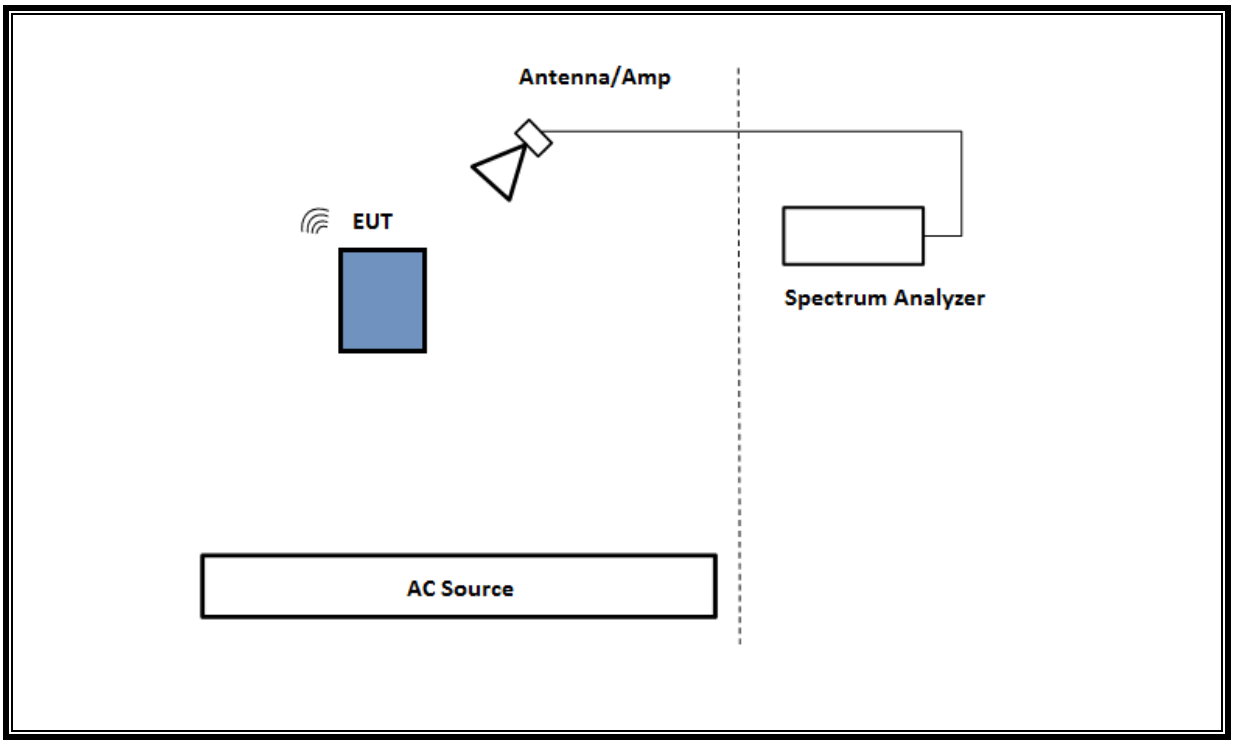
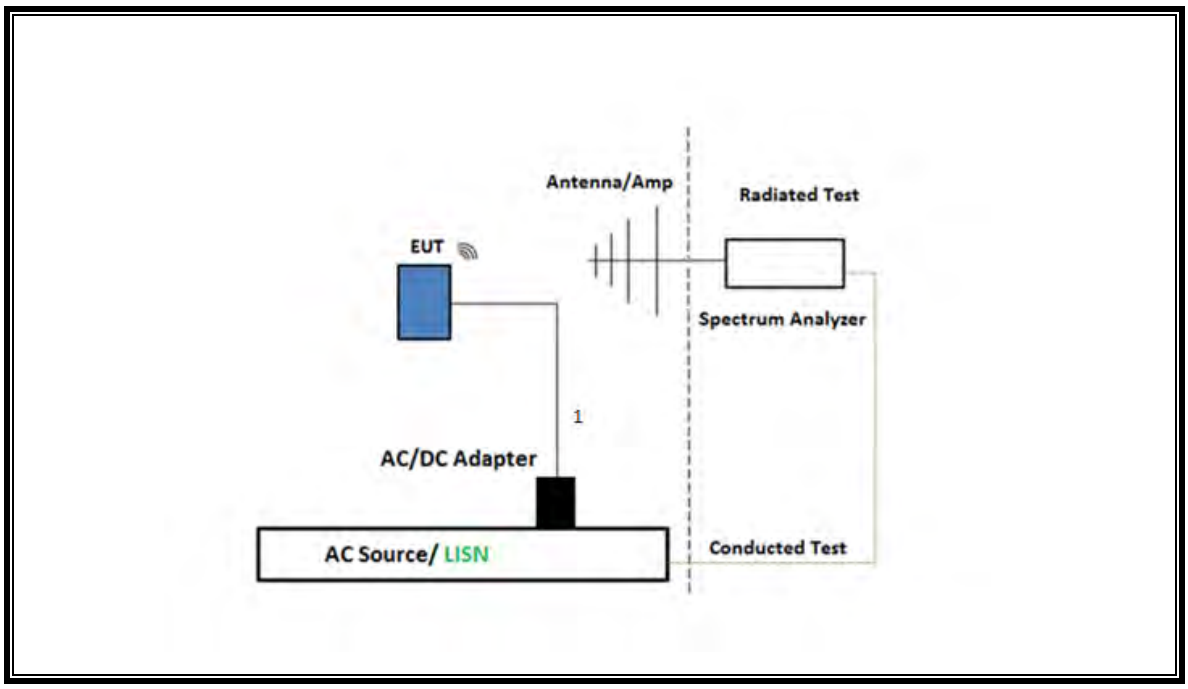
SETUP DIAGRAM FOR CONDUCTED TESTS



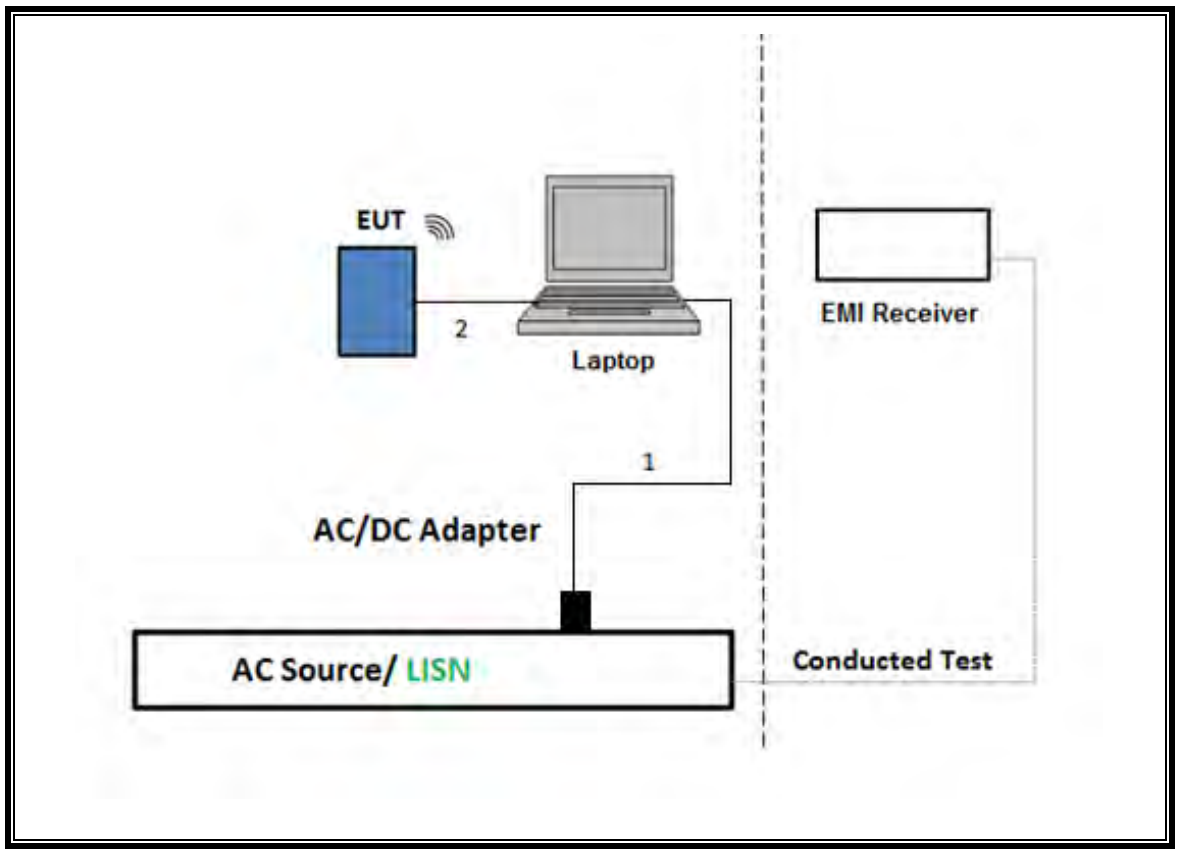
SETUP DIAGRAM FOR RADIATED TESTS Above 1 GHz (1 to 26.5GHz)



SETUP DIAGRAM FOR below 1GHz and AC LINE CONDUCTED TEST



TEST SETUP- AC LINE CONDUCTED: LAPTOP CONFIGURATION



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7. MEASUREMENT METHOD

TEST ITEM	TEST METHOD
6 dB Bandwidth	ANSI C63.10 Subclause - 11.8.1
99% Bandwidth	ANSI C63.10 Subclause 6.9.3
Output Power	ANSI C63.10 Subclause - 11.9.2.3.2 Method AVGPM G (Measurement using an RF average-reading power meter)
Peak Spectral Density (PSD)	ANSI C63.10 Subclause - 11.10.3 Method AVGPSD-1
Radiated Emissions Non-Restricted Frequency Bands	ANSI C63.10 Subclause - 11.11
Radiated Emissions Restricted Frequency Bands	ANSI C63.10 Subclause - 11.12.1
Conducted Emissions in Restricted Frequency Bands	ANSI C63.10 Subclause - 11.12.2
Band-edge	ANSI C63.10 Subclause - 11.12.2.4 Peak Measurement
Band-edge	ANSI C63.10 Subclause - 11.12.2.5 Average Measurement
Radiated Spurious Emissions Below 30MHz	ANSI C63.10 Subclause 6.4
AC Power Line Conducted Emissions	ANSI C63.10 Subclause 6.2

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8. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**ID Num**	**Cal Due**
Antenna, Horn 1-18GHz	ETS-Lindgren (Cedar Park, Texas)	3117	226673	2025/02/28
RF Filter Box, 1-18GHz, 12 Ports	UL-FR1	Frankenstein	231874	2025/07/31
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	PRE0179372	2025/02/28
*Antenna, Horn 1-18GHz	ETS-Lindgren (Cedar Park, Texas)	3117	41112	2024/10/31
RF Filter Box, 1-18GHz, 12 Ports	UL-FR1	F2A	224478	2025/01/31
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	201499	2025/02/28
Antenna, Horn 1-18GHz	ETS-Lindgren (Cedar Park, Texas)	3117	200784	2025/01/31
RF Filter Box, 1-18GHz, 17 Ports	UL-FR1	RATS 2	225474	2025/04/30
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	201500	2025/02/28
Antenna, Horn 1-18GHz	ETS-Lindgren (Cedar Park, Texas)	3117	80402	2025/07/31
RF Filter Box, 1-18GHz, 12 Port	UL-FR1	Frankenstein	216812	2025/01/30
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	230548	2025/02/28
*Antenna, Horn 1-18GHz	ETS-Lindgren (Cedar Park, Texas)	3117	223083	2024/10/31
RF Filter Box, 1-18GHz, 7 port Simplified	UL-FR1	F3A	243707	2025/02/22
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	169927	2025/02/28
Antenna, Broadband Hybrid, 30MHz to 3GHz	Sunol Sciences Corp.	JB3	232075	2025/04/30
Link File, @3m, 9kHz-1000MHz Hybrid Path Loss	UL-FR1	Port 0 Factors	211062	2025/03/31
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	235670	2025/02/28
*Antenna, Horn 18 to 26.5GHz	A.R.A.	MWH-1826/B	172354	2024/10/31
RF Amplifier Assembly, 18-26.5GHz, 60dB Gain	AMPLICAL	AMP18G26.5-60	221832	2025/03/31
Antenna, Passive Loop 30Hz - 1MHz	ELECTRO-METRICS	EM-6871	170013	2025/07/31
Antenna, Passive Loop 100KHz - 30MHz	ELECTRO-METRICS	EM-6872	170015	2025/07/31
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight Technologies Inc	N9030A	81188	2025/01/31
Conducted Switch Box	N/A	CSB	245774	2025/05/31
10dB Fixed Attenuator	Pasternack Enterprises	PE7087-10	178557	Verified Before Use
10dB Fixed Attenuator	Pasternack Enterprises	PE7087-10	178558	Verified Before Use
Power Meter, P-series single channel	Keysight Technologies Inc	N1911A	90733	2025/01/31
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Keysight Technologies Inc	N1921A	90419	2025/03/31

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AC Line Conducted				
Description	**Manufacturer**	**Model**	**ID Num**	**Cal Due**
EMI TEST RECEIVER 9kHz - 3.6GHz	Rohde & Schwarz	ESR3	171646	2025/02/28
LISN for Conducted Emissions CISPR-16	FISCHER CUSTOM COMMUNICATIONS	FCC-LISN-50/250-25-2-01-480V	175765	2025/01/31
*Transient Limiter	TE	TBFL1	207996	2024/08/31

UL AUTOMATION SOFTWARE			
Radiated Software	UL	UL EMC	Ver 9.5, 2023, May 1
Conducted Software	UL	UL EMC	2020.8.16
AC Line Conducted Software	UL	UL EMC	Ver 9.5, 2023, Mar 3

*Testing is completed before equipment expiration date.

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9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

Test Engineer:	12491
Test Date:	2024/09/09

Mode	Tone (T)	Data Rate	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
b	--	1Mbps	49.6950	49.7200	0.9995	99.95%	0.00	0.010
	--	11Mbps	1.2070	1.2210	0.9885	98.85%	0.00	0.010
HT20	--	MCS0	1.9200	1.9420	0.9887	98.87%	0.00	0.010
	--	MCS7	0.2280	0.2490	0.9157	91.57%	0.38	4.386
HE20	SU	MCS0	1.4880	1.5090	0.9861	98.61%	0.00	0.010
		MCS9	0.1680	0.1900	0.8842	88.42%	0.53	5.952
	26	MCS0	3.9940	4.0390	0.9889	98.89%	0.00	0.010
		MCS9	0.3500	0.3950	0.8861	88.61%	0.53	2.857

Note: Duty cycle 2TX is the same as 1TX.

DUTY CYCLE PLOTS

DUTY CYCLE 802.11ax HE20 SU MODE MCS0

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9.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Only Mid channel plot is reported to show setting parameter complies with testing method/procedure.

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9.2.1. 802.11b/n/ax SISO MODE

Test Engineer:	12491
Test Date:	2024/09/10

Mode (SISO)	Frequency (MHz)	Channel Number	Data Rate	Tone	RU Index	99% Bandwidth (MHz)	
						ANT 4	ANT 3
b	2412	1	1 Mbps	--	--	12.748	12.875
	2437	6		--	--	12.799	12.862
	2472	13		--	--	12.922	12.702
	2412	1	11 Mbps	--	--	12.614	12.777
	2437	6		--	--	12.712	12.668
	2472	13		--	--	12.730	12.519
HT20	2412	1	MCS0	--	--	17.790	17.688
	2437	6		--	--	17.744	17.759
	2472	13		--	--	17.823	17.671
	2412	1	MCS7	--	--	17.742	17.756
	2437	6		--	--	17.901	17.880
	2472	13		--	--	17.807	17.648
HE20	2412	1	MCS0	SU	--	18.911	18.925
			MCS9		--	18.891	18.831
			MCS0	26T	0	18.405	18.251
					4	16.815	16.736
					8	18.568	18.545
	2437	6	MCS0	SU	--	18.929	18.944
			MCS9		--	18.976	19.037
			MCS0	26T	0	18.358	18.401
					4	17.075	16.939
					8	18.691	18.503
	2472	13	MCS0	SU	--	18.921	18.888
			MCS9		--	18.876	18.908
			MCS0	26T	0	18.149	18.213
					4	17.211	17.124
					8	18.730	18.830

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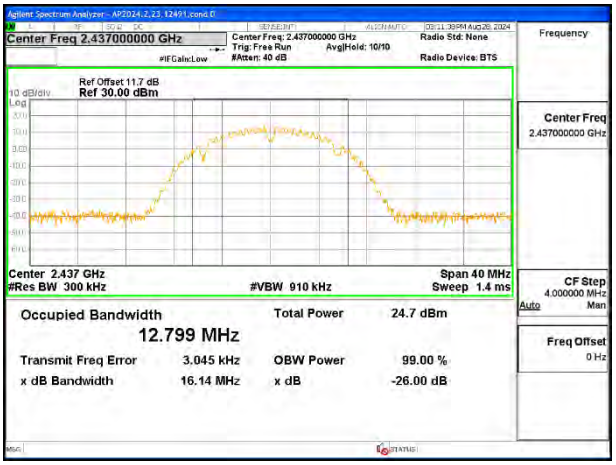
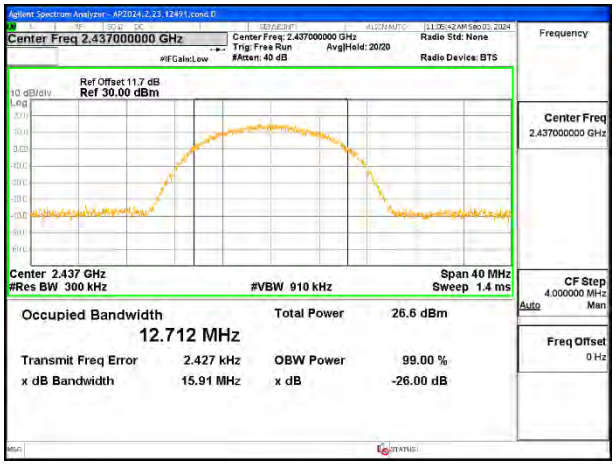
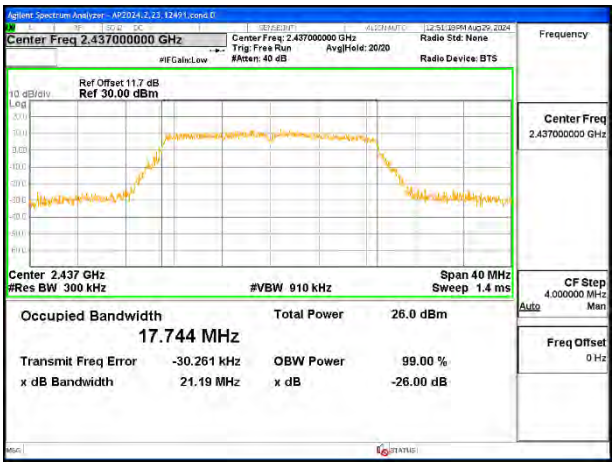


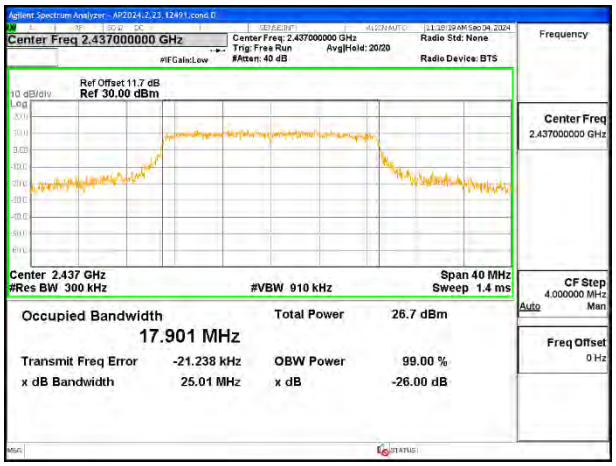
b - Channel 6 [ANT 4] – 1 Mbps



b - Channel 6 [ANT 4] – 11 Mbps



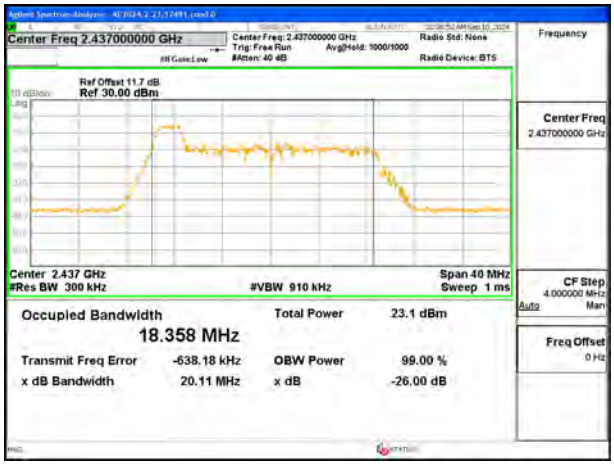
HT20 - Channel 6 [ANT 4] – MCS0



HT20 - Channel 6 [ANT 4] – MCS7

HE20 - Channel 6 – SU [ANT 4] – MCS0

HE20 - Channel 6 – SU [ANT 4] – MCS9



HE20 - Channel 6 – 26T Index 0 [ANT 4] – MCS0

Intentionally Blank

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9.2.2. 802.11n/ax MIMO CDD MODE

Mode (MIMO)	Frequency (MHz)	Channel Number	Data Rate	Tone	RU Index	99% Bandwidth (MHz)	
						ANT 4	ANT 3
HT20	2412	1	MCS0	--	--	17.814	17.804
	2437	6		--	--	17.798	17.784
	2472	13		--	--	17.779	17.616
	2412	1	MCS7	--	--	17.735	17.761
	2437	6		--	--	17.836	17.804
	2472	13		--	--	17.729	17.645
HE20	2412	1	MCS0	SU	--	18.944	18.939
			MCS9		--	18.902	18.921
			MCS0	26T	0	18.479	18.327
					4	16.849	16.706
					8	18.670	18.429
	2437	6	MCS0	SU	--	18.955	18.930
			MCS9		--	18.981	18.947
			MCS0	26T	0	18.370	18.343
					4	16.882	16.590
					8	18.637	18.301
	2472	13	MCS0	SU	--	18.888	18.877
			MCS9		--	18.904	18.810
			MCS0	26T	0	18.277	18.185
					4	16.995	16.715
					8	18.803	18.530

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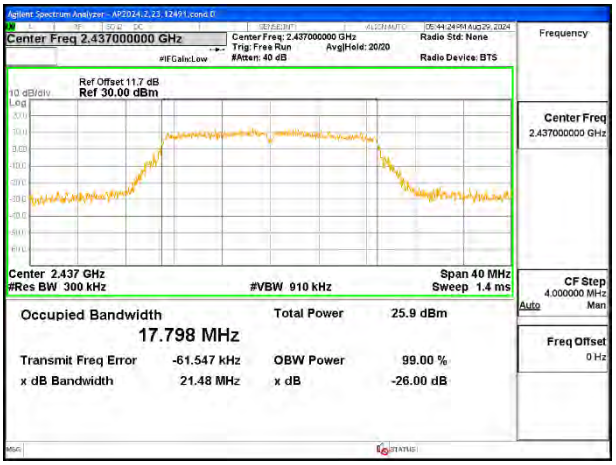
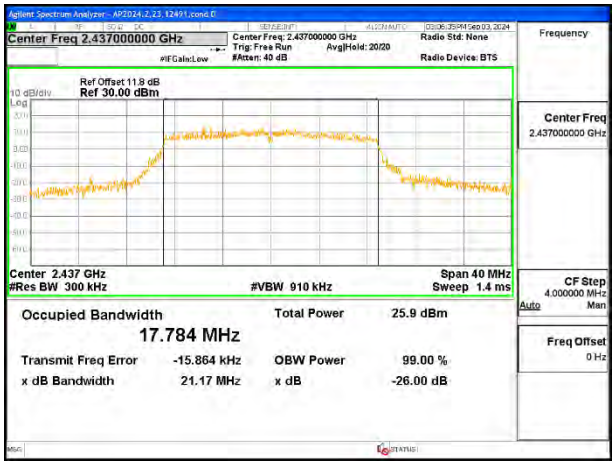
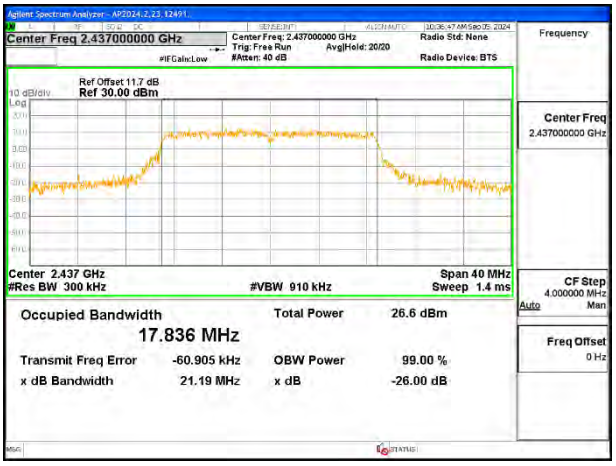


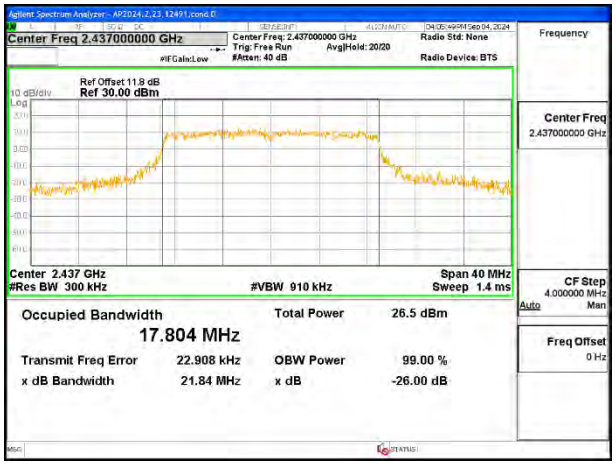
HT20 - Channel 6 [ANT 4] – MCS0



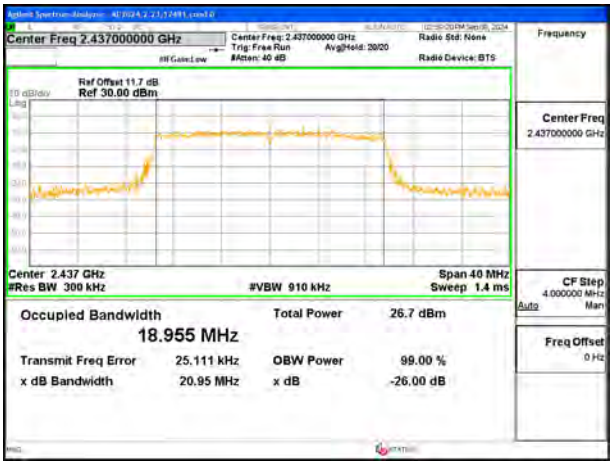
HT20 - Channel 6 [ANT 3] – MCS0



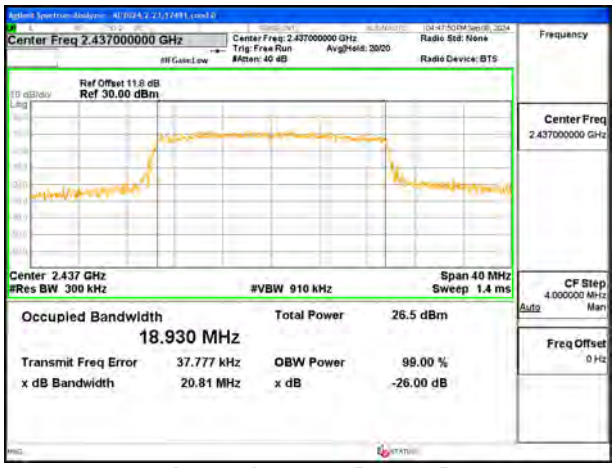
HT20 - Channel 6 [ANT 4] – MCS7



HT20 - Channel 6 [ANT 3] – MCS7

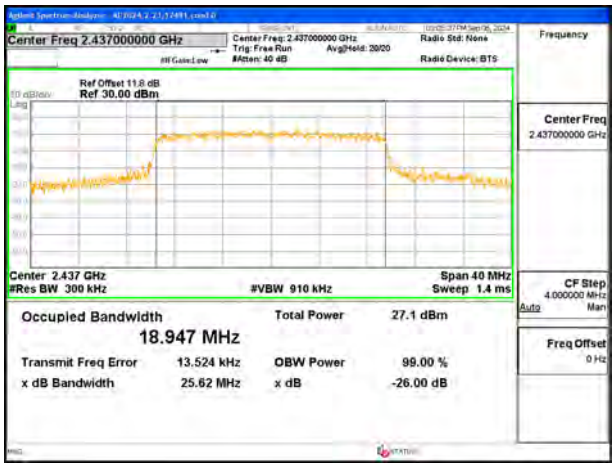


HE20 - Channel 6 – SU [ANT 4] – MCS0

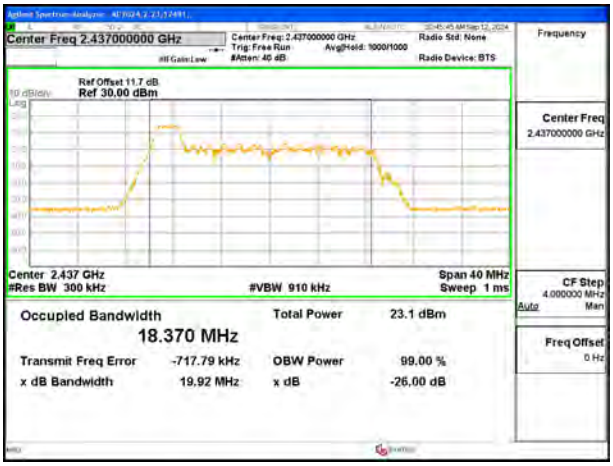


HE20 - Channel 6 – SU [ANT 3] – MCS0

HE20 - Channel 6 – SU [ANT 4] – MCS9



HE20 - Channel 6 – SU [ANT 3] – MCS9



HE20 - Channel 6 – 26T Index 0 [ANT 4] – MCS0

HE20 - Channel 6 – 26T Index 0 [ANT 3] – MCS0

9.3. 6dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

RSS-247 5.2 (a)

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

RESULTS

The 6dB bandwidth was measured for the narrowest bandwidth mode, b Mode and ax HE20 Mode 26-Tone as worst case to demonstrate compliance with the minimum required bandwidth of 500 kHz to cover all OFDMA/CDD modes.

Only MID channel plot is reported to show setting parameter compliance with testing method/procedure.

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9.3.1. 802.11b/ax SISO MODE

Test Engineer:	12491
Test Date:	2024/11/07

Mode (SISO)	Frequency (MHz)	Channel Number	Data Rate	Tone	RU Index	6dB Bandwidth (MHz)	
						ANT 4	ANT 3
b	2412	1	1 Mbps	--	--	8.76	8.72
	2437	6		--	--	8.80	8.76
	2472	13		--	--	8.80	8.68
	2412	1	11 Mbps	--	--	8.08	8.80
	2437	6		--	--	8.36	8.88
	2472	13		--	--	8.64	8.48
HE20	2412	1	MCS0	26T	0	2.12	2.16
					4	2.64	2.64
					8	2.40	2.12
	2437	6	MCS0	26T	0	2.08	2.08
					4	2.64	2.64
					8	2.12	2.16
	2472	13	MCS0	26T	0	2.24	2.16
					4	2.80	2.72
					8	2.12	2.08

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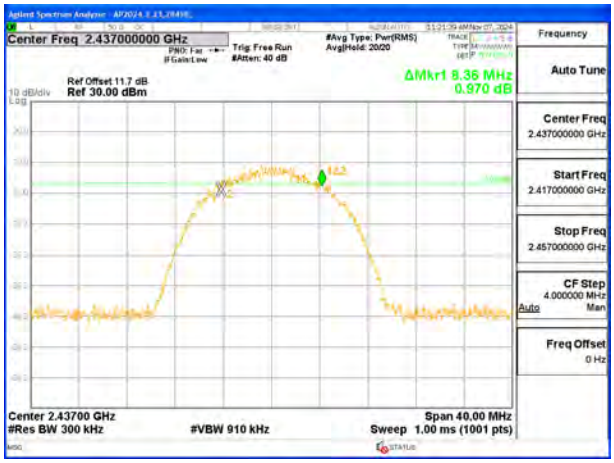
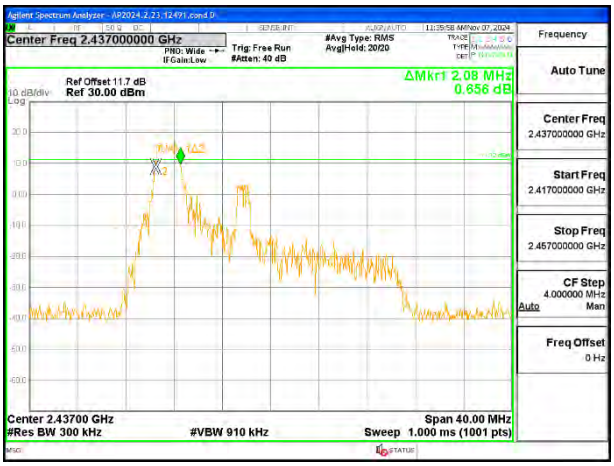
b - Channel 6 [ANT 4] – 1 Mbps



b - Channel 6 [ANT 4] – 11 Mbps



HE20 - Channel 6 – 26T Index 0 [ANT 4] – MCS0

Intentionally Blank

9.3.2. 802.11ax MIMO CDD MODE

Test Engineer:	12491
Test Date:	2024/11/07

Mode (MIMO)	Frequency (MHz)	Channel Number	Data Rate	Tone	RU Index	6dB Bandwidth (MHz)	
						ANT 4	ANT 3
HE20	2412	1	MCS0	26T	0	2.08	2.12
					4	2.68	2.68
					8	2.24	2.28
	2437	6	MCS0	26T	0	2.08	2.24
					4	2.64	2.64
					8	2.16	2.08
	2472	13	MCS0	26T	0	2.20	2.20
					4	2.68	2.68
					8	2.08	2.16

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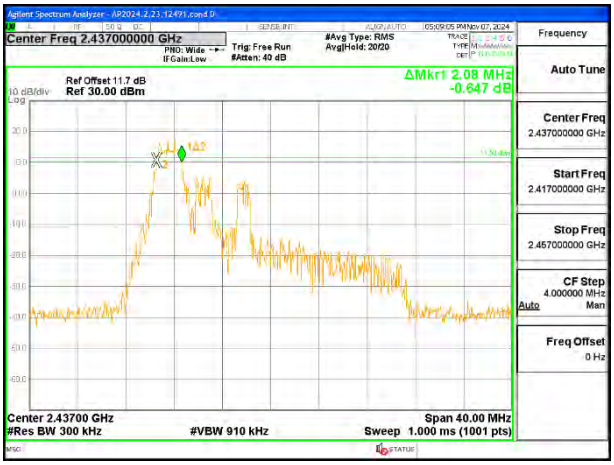
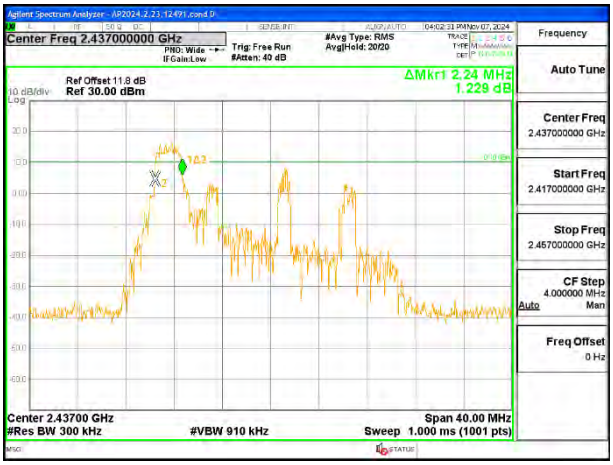


HE20 - Channel 6 – 26T Index 0 [ANT 4] – MCS0



HE20 - Channel 6 – 26T Index 0 [ANT 3] – MCS0

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9.4. OUTPUT POWER AND POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (b) (3)

RSS-247 5.4 (d)

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

FCC §15.247 (e)

RSS-247 (5.2) (b)

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

TEST PROCEDURE

Measurements perform using a wideband RF power meter.

The power output was measured on the EUT antenna port using SMA cable with 10dB attenuator connected to a power meter via wideband power sensor. Average output power was read directly from the power meter.

Only MID channel plot is reported to show setting parameter compliance with testing method/procedure.

Note: RBW setting greater than 3kHz is used on PSD measurement

DIRECTIONAL ANTENNA GAIN

For 1 TX:
There is only one transmitter output therefore the directional gain is equal to the antenna gain.

For 2 TX:
Tx chains are uncorrelated for Power and correlated for PSD due to the device supporting CDD in all MIMO modes. The directional gains are as follows:

Band (GHz)	ANT 4 Antenna Gain (dBi)	ANT 3 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)	Correlated Chains Directional Gain (dBi)
2.4	-1.90	-1.20	-1.54	1.47

Note: RBW setting is used greater than 3KHz on PSD measurement

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DIRECTIONAL GAIN CALCULATION:

ANSI C63.10-2020 section 14.6.3

Uncorrelated Directional Gain $= 10 * \mathrm{LOG}\left[\frac{10^{\frac{\mathrm{ANT4}}{10}} + 10^{\frac{\mathrm{ANT3}}{10}}}{2}\right]$

Correlated Directional Gain $= 10 * \mathrm{LOG}\left[\frac{\left(10^{\frac{\mathrm{ANT4}}{20}} + 10^{\frac{\mathrm{ANT3}}{20}}\right)^2}{2}\right]$

Sample Calculation:

ANT 4 = -1.90 dB
ANT 3 = -1.20 dB

Uncorrelated Directional Gain $= 10 * \mathrm{LOG}\left[\frac{10^{\frac{-1.90}{10}} + 10^{\frac{-1.20}{10}}}{2}\right] = -1.54\ \mathrm{dBi}$

Correlated Directional Gain $= 10 * \mathrm{LOG}\left[\frac{\left(10^{\frac{-1.90}{20}} + 10^{\frac{-1.20}{20}}\right)^2}{2}\right] = 1.47\ \mathrm{dBi}$

RESULTS

UL VERIFICATION SERVICES INC.
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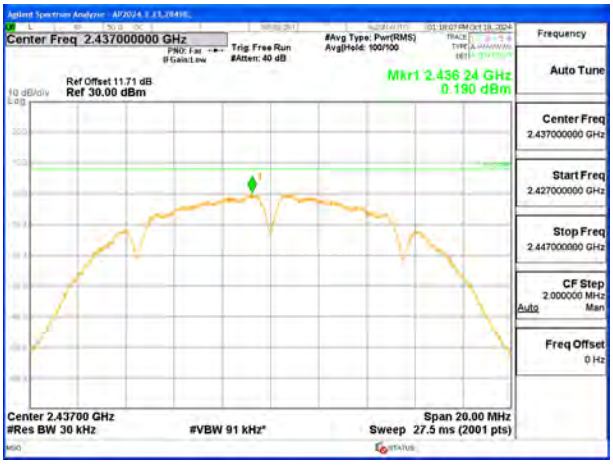
9.4.1. 802.11b SISO MODE

Test Engineer:	12491
Test Date:	2024/09/30

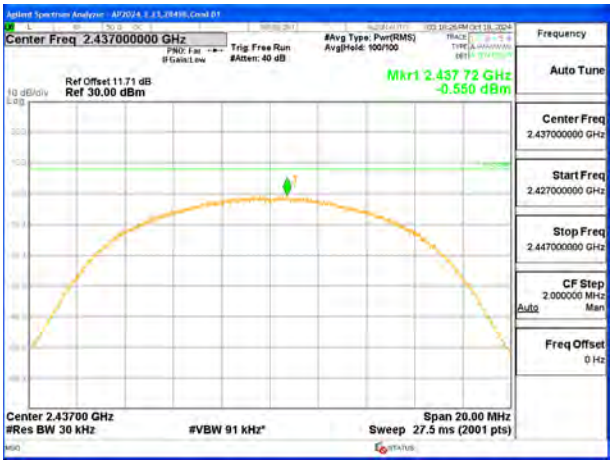
DCCF (1Mbps) (dB)	0.00
DCCF (11Mbps) (dB)	0.00

Antenna Gain (dBi)	
ANT 4	-1.90
ANT 3	-1.20

Mode (SISO)	Freq (MHz)	Ch. #	Data Rate	Power Limit (dBm)		Output Power (Gated) (dBm)		Total Corrected Power (dBm)		PSD Limit (dBm/3kHz)		PSD (dBm/kHz)		Total Corrected PSD (dBm/kHz)	
				ANT 4	ANT 3	ANT 4	ANT 3	ANT 4	ANT 3	ANT 4	ANT 3	ANT 4	ANT 3	ANT 4	ANT 3
b	2412	1	1Mbps	30.00	30.00	20.38	20.43	20.38	20.43	8.00	8.00	-1.138	-0.984	-1.138	-0.984
	2437	6				21.47	21.48	21.47	21.48			0.190	0.218	0.190	0.218
	2462	11				21.46	21.45	21.46	21.45			0.165	0.089	0.165	0.089
	2467	12				20.44	20.42	20.44	20.42			-0.975	-1.040	-0.975	-1.040
	2472	13				17.98	17.96	17.98	17.96			-3.357	-3.484	-3.357	-3.484
	2412	1	11Mbps	30.00	30.00	20.46	20.47	20.46	20.47	8.00	8.00	-1.975	-1.936	-1.975	-1.936
	2437	6				21.48	21.48	21.48	21.48			-0.550	-0.580	-0.550	-0.580
	2462	11				21.44	21.43	21.44	21.43			-0.653	-0.697	-0.653	-0.697
	2467	12				20.48	20.47	20.48	20.47			-1.917	-1.949	-1.917	-1.949
	2472	13				17.97	17.94	17.97	17.94			-3.853	-4.060	-3.853	-4.060



Channel 6 [ANT 4] – 1Mbps



Channel 6 [ANT 4] – 11Mbps

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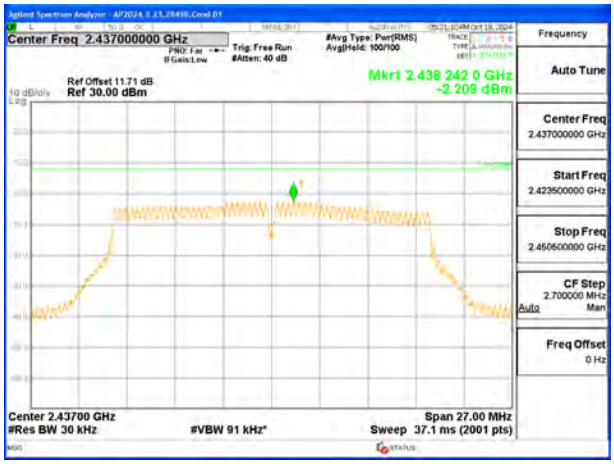
9.4.2. 802.11n HT20 SISO MODE

Test Engineer:	12491
Test Date:	2024/10/01

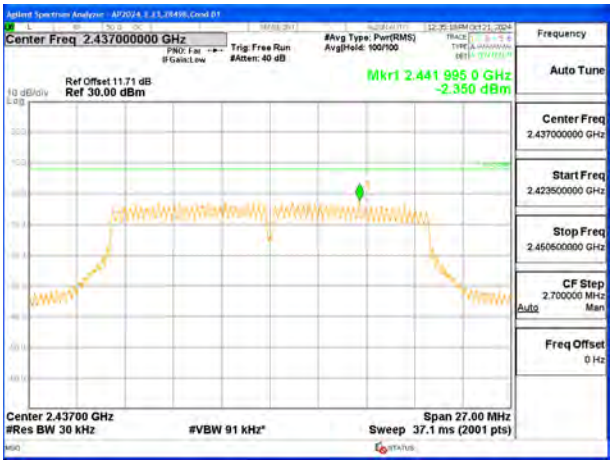
DCCF (MCS0) (dB)	0.00
DCCF (MCS7) (dB)	0.38

Antenna Gain (dBi)	
ANT 4	-1.90
ANT 3	-1.20

Mode (SISO)	Freq (MHz)	Ch. #	Data Rate	Power Limit (dBm)		Output Power (Gated) (dBm)		Total Corrected Power (dBm)		PSD Limit (dBm/3kHz)		PSD (dBm/kHz)		Total Corrected PSD (dBm/kHz)	
				ANT 4	ANT 3	ANT 4	ANT 3	ANT 4	ANT 3	ANT 4	ANT 3	ANT 4	ANT 3	ANT 4	ANT 3
HT20	2412	1	MCS0	30.00	30.00	17.98	17.93	17.98	17.93	8.00	8.00	-6.082	-6.164	-6.082	-6.164
	2417	2				19.47	19.48	19.47	19.48			-4.123	-4.112	-4.123	-4.112
	2422	3				21.42	21.42	21.42	21.42			-2.317	-2.384	-2.317	-2.384
	2437	6				21.46	21.47	21.46	21.47			-2.209	-2.250	-2.209	-2.250
	2452	9				20.98	20.95	20.98	20.95			-2.733	-2.873	-2.733	-2.873
	2457	10				19.46	19.41	19.46	19.41			-4.225	-4.576	-4.225	-4.576
	2462	11				18.48	18.42	18.48	18.42			-5.579	-5.705	-5.579	-5.705
	2467	12				15.97	15.92	15.97	15.92			-7.948	-8.044	-7.948	-8.044
	2472	13				12.94	12.96	12.94	12.96			-10.943	-10.685	-10.943	-10.685
	2412	1	MCS7	30.00	30.00	16.43	16.47	16.43	16.47	8.00	8.00	-7.756	-7.868	-7.376	-7.488
	2417	2				19.45	19.46	19.45	19.46			-2.498	-2.526	-2.118	-2.146
	2422	3				19.99	19.97	19.99	19.97			-3.421	-3.631	-3.041	-3.251
	2437	6				21.43	21.39	21.43	21.39			-2.350	-2.519	-1.970	-2.139
	2452	9				19.98	19.95	19.98	19.95			-3.555	-3.627	-3.175	-3.247
	2457	10				19.48	19.44	19.48	19.44			-2.354	-2.575	-1.974	-2.195
	2462	11				17.45	17.45	17.45	17.45			-5.126	-5.036	-4.746	-4.656
	2467	12				15.44	15.46	15.44	15.46			-7.229	-7.063	-6.849	-6.683
	2472	13				11.94	11.92	11.94	11.92			-10.582	-10.892	-10.202	-10.512



Channel 6 [ANT 4] – MCS0



Channel 6 [ANT 4] – MCS7

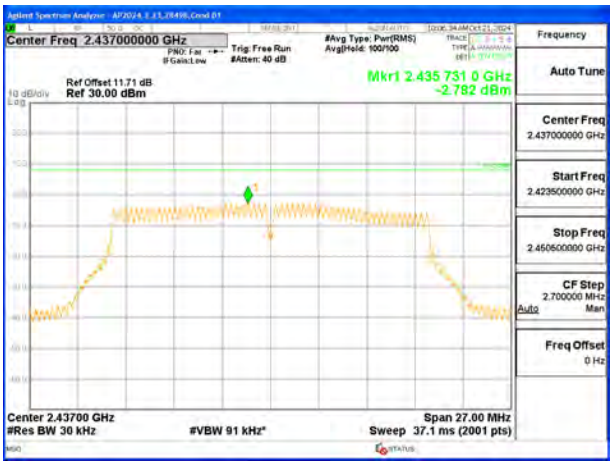
9.4.3. 802.11n HT20 MIMO MODE

Test Engineer:	12491
Test Date:	2024/10/01

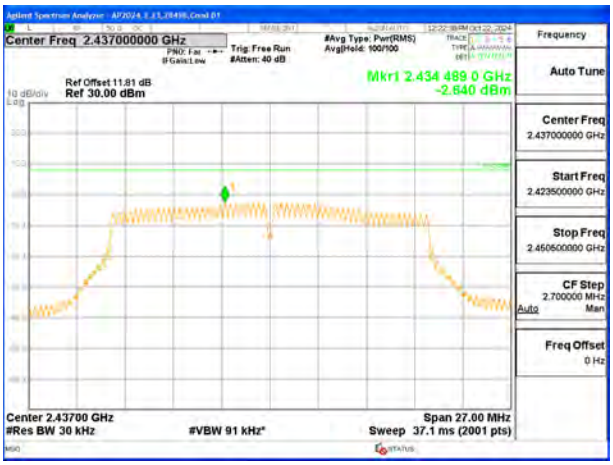
DCCF (MCS0) (dB)	0.00
DCCF (MCS7) (dB)	0.38

Uncorrelated Gain (dBi)	-1.54
Correlated Gain (dBi)	1.47

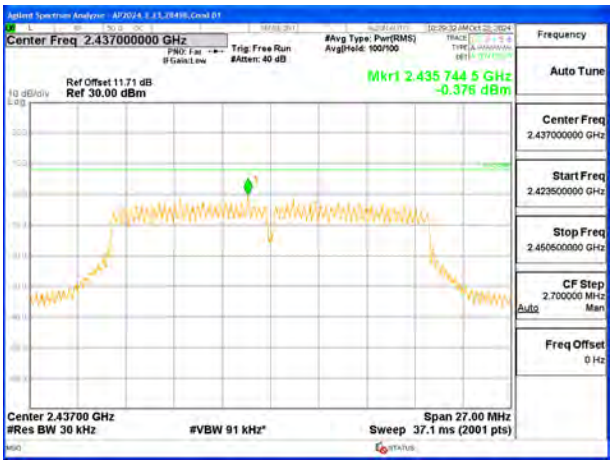
Mode (SISO)	Freq (MHz)	Ch. #	Data Rate	Power Limit (dBm)	Output Power (Gated) (dBm)		Total MIMO Corrected Power (dBm)	PSD Limit (dBm/3kHz)	PSD (dBm/kHz)		Total Corrected PSD (dBm/kHz)
					ANT 4	ANT 3			ANT 4	ANT 3	
HT20	2412	1	MCS0	30.00	17.45	17.45	20.46	8.000	-7.062	-6.973	-4.007
	2417	2			18.48	18.48	21.49		-5.349	-5.345	-2.337
	2422	3			19.95	19.92	22.95		-3.782	-4.122	-0.938
	2437	6			21.46	21.48	24.48		-2.782	-2.640	0.300
	2447	8			21.47	21.48	24.49		-2.734	-2.636	0.326
	2452	9			19.47	19.43	22.46		-4.476	-4.356	-1.405
	2457	10			18.40	18.46	21.44		-5.550	-5.406	-2.467
	2462	11			17.46	17.45	20.47		-6.735	-6.943	-3.827
	2467	12			14.91	14.94	17.94		-8.909	-9.090	-5.988
	2472	13			11.92	11.93	14.94		-10.740	-10.721	-7.720
HT20	2412	1	MCS7	30.00	15.95	15.98	18.98	8.000	-6.474	-6.299	-2.995
	2417	2			18.43	18.46	21.46		-3.745	-3.909	-0.436
	2422	3			19.95	19.91	22.94		-1.866	-1.708	1.604
	2437	6			21.46	21.47	24.48		-0.376	-0.303	3.051
	2447	8			21.48	21.47	24.49		-0.322	-0.316	3.071
	2452	9			19.41	19.46	22.45		-2.690	-2.570	0.761
	2457	10			18.48	18.43	21.47		-3.734	-3.865	-0.409
	2462	11			16.45	16.48	19.48		-5.980	-5.998	-2.599
	2467	12			13.92	13.94	16.94		-8.220	-8.411	-4.924
	2472	13			11.40	11.44	14.43		-10.661	-10.320	-7.097



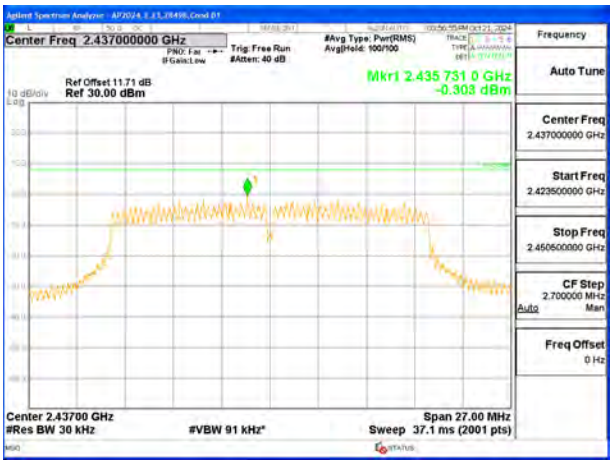
Channel 6 [ANT 4] – MCS0



Channel 6 [ANT 3] – MCS0



Channel 6 [ANT 4] – MCS7



Channel 6 [ANT 3] – MCS7

9.4.4. 802.11ax HE20 SISO MODE

Test Engineer:	12491
Test Date:	2024/09/25

	SU	26T
DCCF (MCS0) (dB)	0.00	0.00
DCCF (MCS9) (dB)	0.53	--

Antenna Gain (dBi)	
ANT 4	-1.90
ANT 3	-1.20

Mode (SISO)	Freq (MHz)	Ch. #	Data Rate	Tone	RU Index	Power Limit (dBm)		Output Power (Gated) (dBm)		Total Corrected Power (dBm)		PSD Limit (dBm/3kHz)		PSD (dBm/kHz)		Total Corrected PSD (dBm/kHz)	
						ANT 4	ANT 3	ANT 4	ANT 3	ANT 4	ANT 3	ANT 4	ANT 3	ANT 4	ANT 3	ANT 4	ANT 3
HE20	2412	1	MCS0	SU	--	30.00	30.00	16.93	16.92	16.93	16.92	8.000	8.000	-8.401	-8.589	-8.401	-8.589
			MCS9		--			15.48	15.43	15.48	15.43			-6.787	-6.510	-6.257	-5.980
			MCS0	26T	0			11.67	11.69	11.67	11.69			-5.304	-5.141	-5.304	-5.141
					4			11.72	11.71	11.72	11.71			-5.416	-5.493	-5.416	-5.493
					8			11.74	11.68	11.74	11.68			-5.263	-5.147	-5.263	-5.147
	2417	2	MCS0	SU	--			17.97	17.91	17.97	17.91			-7.467	-7.649	-7.467	-7.649
			MCS9		--			17.99	17.91	17.99	17.91			-3.775	-4.138	-3.245	-3.608
	2422	3	MCS0	SU	--			21.48	21.48	21.48	21.48			-3.828	-3.790	-3.828	-3.790
			MCS9		--			21.47	21.36	21.47	21.36			-0.370	-0.657	0.160	-0.127
	2437	6	MCS0	SU	--			21.48	21.45	21.48	21.45			-3.989	-3.868	-3.989	-3.868
			MCS9		--			21.49	21.47	21.49	21.47			-0.280	-0.273	0.250	0.257
			MCS0	26T	0			11.72	11.65	11.72	11.65			-5.369	-5.494	-5.369	-5.494
					4			11.70	11.74	11.70	11.74			-5.225	-5.203	-5.225	-5.203
					8			11.74	11.71	11.74	11.71			-5.286	-5.293	-5.286	-5.293
	2452	9	MCS0	SU	--			21.47	21.47	21.47	21.47			-3.875	-3.896	-3.875	-3.896
			MCS9		--			21.46	21.36	21.46	21.36			-0.423	-0.585	0.107	-0.055
	2457	10	MCS0	SU	--			17.94	17.97	17.94	17.97			-7.581	-7.441	-7.581	-7.441
			MCS9		--			17.98	17.93	17.98	17.93			-3.769	-3.925	-3.239	-3.395
	2462	11	MCS0	SU	--			16.91	16.92	16.91	16.92			-8.320	-8.575	-8.320	-8.575
			MCS9		--			15.96	15.97	15.96	15.97			-6.082	-5.980	-5.552	-5.450
			MCS0	26T	0			11.73	11.67	11.73	11.67			-5.117	-5.149	-5.117	-5.149
					4			11.74	11.72	11.74	11.72			-5.102	-5.393	-5.102	-5.393
					8			11.71	11.71	11.71	11.71			-5.264	-5.302	-5.264	-5.302
	2467	12	MCS0	SU	--			14.98	14.92	14.98	14.92			-10.239	-10.439	-10.239	-10.439
			MCS9		--			13.91	13.95	13.91	13.95			-8.348	-8.109	-7.818	-7.579
			MCS0	26T	0			11.72	11.72	11.72	11.72			-5.435	-5.290	-5.435	-5.290
					4			11.69	11.70	11.69	11.70			-5.319	-5.332	-5.319	-5.332
					8			11.74	11.73	11.74	11.73			-5.344	-5.387	-5.344	-5.387
	2472	13	MCS0	SU	--			8.98	8.95	8.98	8.95			-16.064	-16.174	-16.064	-16.174
			MCS9		--			8.42	8.48	8.42	8.48			-13.668	-13.343	-13.138	-12.813
			MCS0	26T	0			-0.05	-0.01	-0.05	-0.01			-16.966	-16.884	-16.966	-16.884
					4			-0.03	-0.06	-0.03	-0.06			-16.851	-17.167	-16.851	-17.167
					8			-0.05	-0.04	-0.05	-0.04			-16.923	-16.780	-16.923	-16.780

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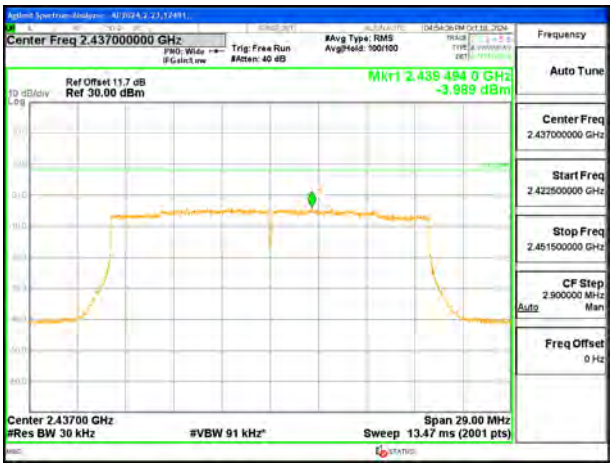
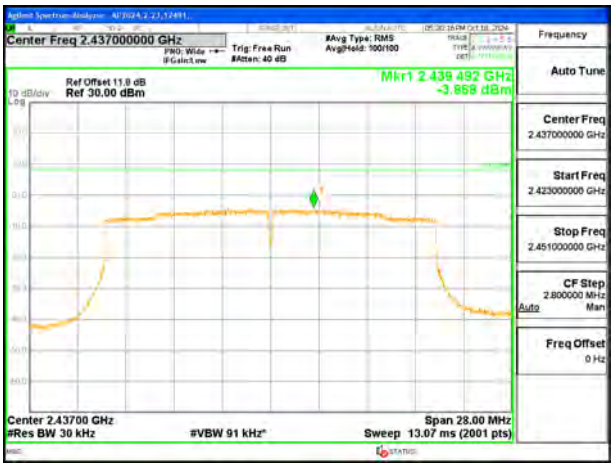
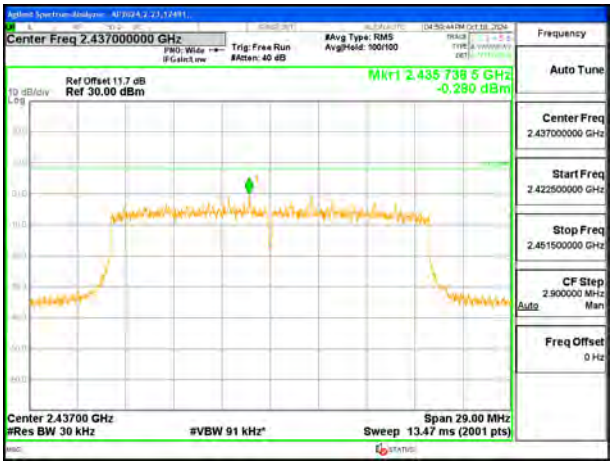


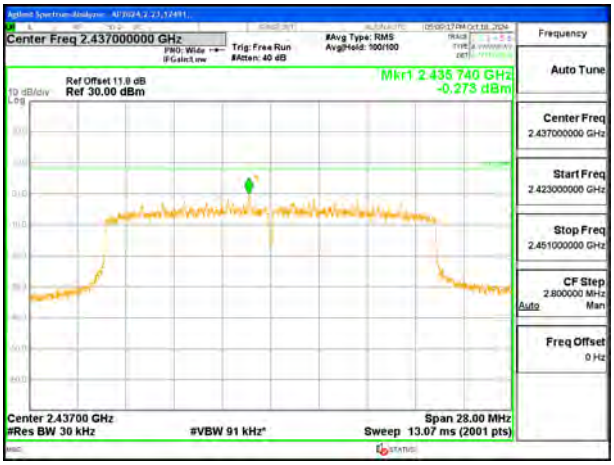
Channel 6 – SU [ANT 4] – MCS0



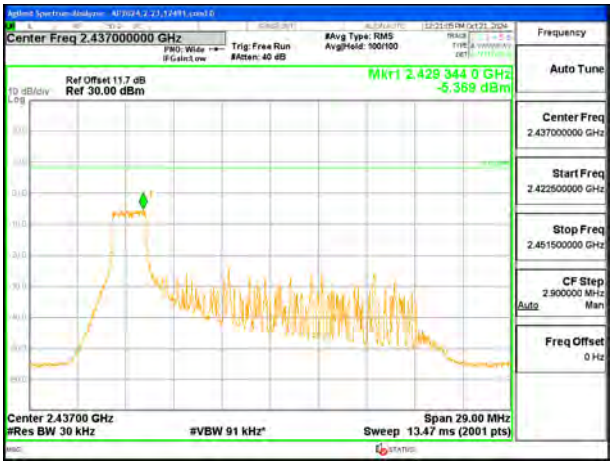
Channel 6 – SU [ANT 3] – MCS0



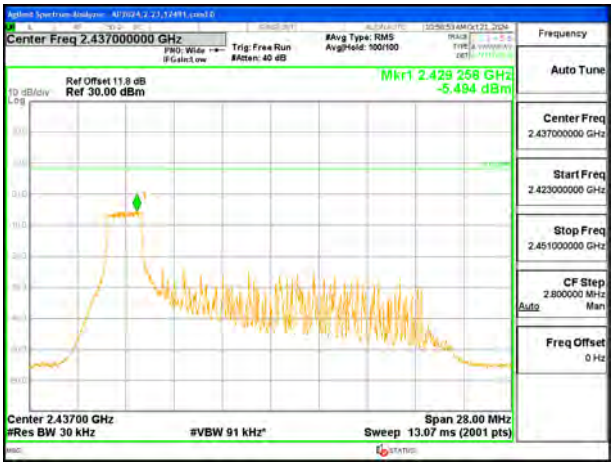
Channel 6 – SU [ANT 4] – MCS9



Channel 6 – SU [ANT 3] – MCS9



Channel 6 – 26 Tone Index 0 [ANT 4] – MCS0



Channel 6 – 26 Tone Index 0 [ANT 3] – MCS0

9.4.5. 802.11ax HE20 MIMO MODE

Test Engineer:	12491
Test Date:	2024/09/27

	SU	26T
DCCF (MCS0) (dB)	0.00	0.00
DCCF (MCS9) (dB)	0.53	--

Uncorrelated Gain (dBi)	-1.54
Correlated Gain (dBi)	1.47

Mode (MIMO)	Freq (MHz)	Ch. #	Data Rate	Tone	RU Index	Power Limit (dBm)	Output Power (Gated) (dBm)		Total MIMO Corrected Power (dBm)	PSD Limit (dBm/3kHz)	PSD (dBm/kHz)		Total Corrected PSD (dBm/kHz)
							ANT 4	ANT 3			ANT 4	ANT 3	
HE20	2412	1	MCS0	SU	--	30.00	15.96	15.92	18.95	8.000	-9.312	-9.547	-6.418
			MCS9		--		14.97	14.95	17.97		-7.205	-7.348	-3.736
			MCS0	26T	0		11.70	11.71	14.72		-5.248	-5.216	-2.222
					4		11.68	11.74	14.72		-5.168	-5.088	-2.118
					8		11.72	11.74	14.74		-5.240	-5.060	-2.139
	2417	2	MCS0	SU	--		16.94	16.93	19.95		-8.486	-8.439	-5.452
			MCS9		--		16.98	16.93	19.97		-5.844	-6.226	-2.491
	2422	3	MCS0	SU	--		18.99	18.95	21.98		-6.474	-6.837	-3.641
			MCS9		--		18.98	18.96	21.98		-2.991	-3.221	0.436
	2427	4	MCS0	SU	--		21.49	21.45	24.48		-4.264	-4.194	-1.219
			MCS9		--		21.45	21.46	24.47		-1.186	-1.071	2.412
	2437	6	MCS0	SU	--		21.46	21.49	24.49		-4.100	-4.229	-1.154
			MCS9		--		21.49	21.43	24.47		-1.077	-1.161	2.422
			MCS0	26T	0		11.71	11.72	14.73		-5.195	-5.329	-2.251
					4		11.69	11.69	14.70		-5.333	-5.386	-2.349
					8		11.70	11.71	14.72		-5.220	-5.180	-2.190
	2447	8	MCS0	SU	--		21.47	21.47	24.48		-4.107	-4.179	-1.133
			MCS9		--		21.48	21.49	24.50		-1.174	-1.190	2.358
	2452	9	MCS0	SU	--		18.48	18.47	21.49		-7.138	-7.223	-4.170
			MCS9		--		18.49	18.40	21.46		-3.920	-4.179	-0.507
	2457	10	MCS0	SU	--		16.95	16.95	19.96		-8.527	-8.422	-5.464
			MCS9		--		16.95	16.93	19.95		-5.930	-6.225	-2.535
	2462	11	MCS0	SU	--		15.98	15.94	18.97		-9.279	-9.429	-6.343
			MCS9		--		14.99	14.94	17.98		-6.901	-7.263	-3.538
			MCS0	26T	0		11.73	11.71	14.73		-5.064	-5.280	-2.160
					4		11.71	11.69	14.71		-5.065	-5.207	-2.125
					8		11.72	11.71	14.73		-5.191	-5.241	-2.206
	2467	12	MCS0	SU	--		13.97	13.94	16.97		-11.398	-11.480	-8.429
			MCS9		--		12.97	12.95	15.97		-10.282	-10.409	-6.805
			MCS0	26T	0		11.74	11.67	14.72		-5.232	-5.357	-2.284
					4		11.68	11.73	14.72		-5.222	-5.354	-2.277
					8		11.72	11.70	14.72		-5.385	-5.241	-2.302
	2472	13	MCS0	SU	--		8.42	8.47	11.46		-17.546	-17.144	-14.330
			MCS9		--		7.96	7.98	10.98		-14.722	-14.564	-11.102
			MCS0	26T	0		-1.09	-1.05	1.94		-18.479	-18.213	-15.334
					4		-1.02	-1.12	1.94		-18.243	-18.508	-15.363
					8		-1.01	-1.08	1.97		-18.349	-18.343	-15.336

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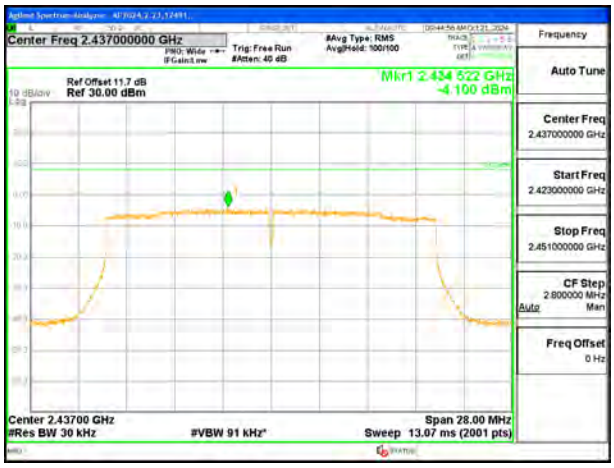
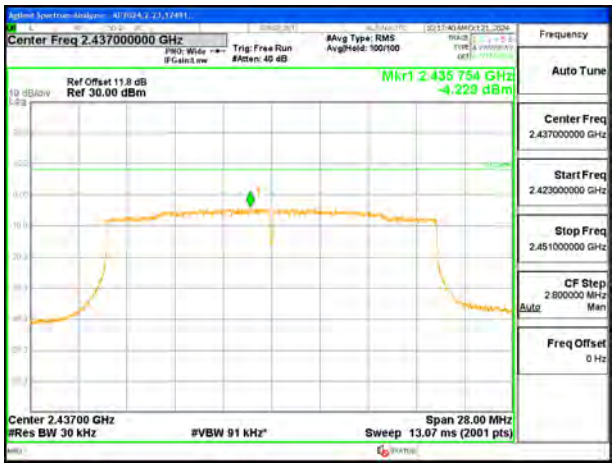
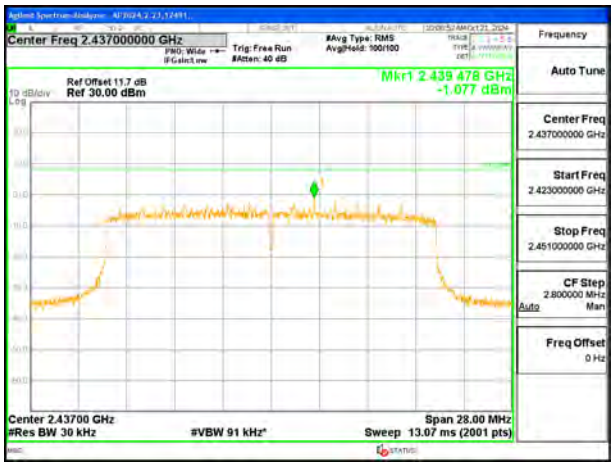


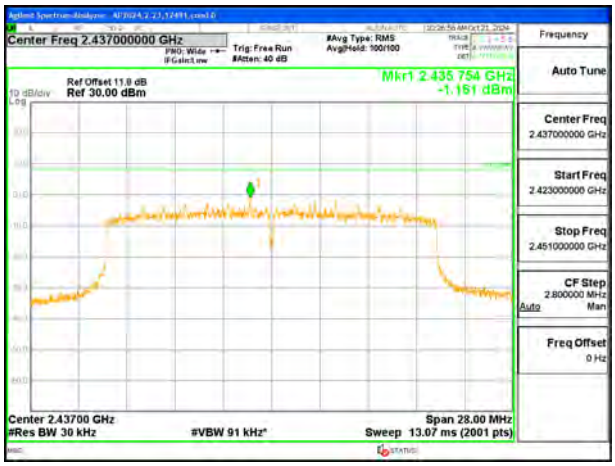
Channel 6 – SU [ANT 4] – MCS0



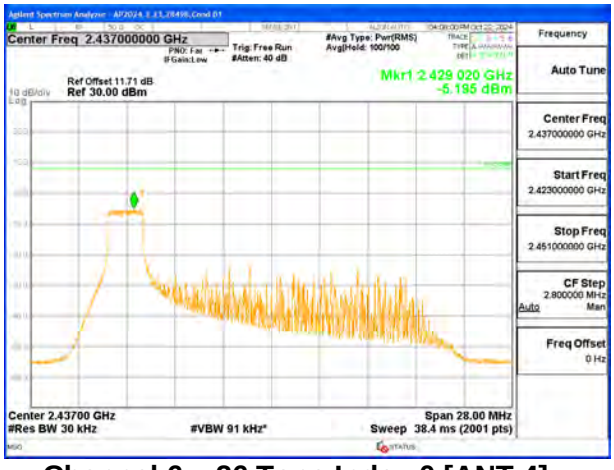
Channel 6 – SU [ANT 3] – MCS0



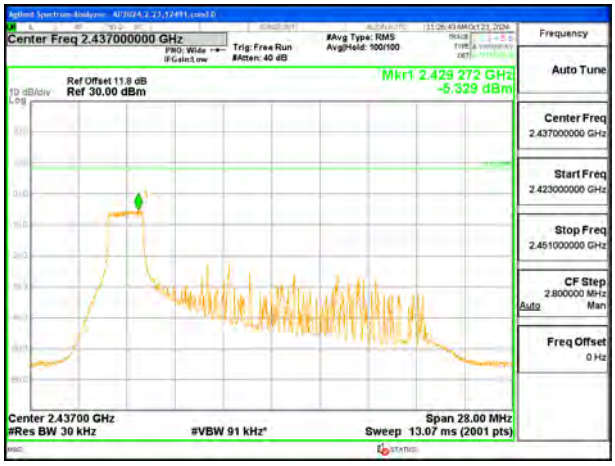
Channel 6 – SU [ANT 4] – MCS9



Channel 6 – SU [ANT 3] – MCS9



Channel 6 – 26 Tone Index 0 [ANT 4] – MCS0



Channel 6 – 26 Tone Index 0 [ANT 3] – MCS0

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9.5. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

RSS-247 5.5

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, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

RESULTS

UL VERIFICATION SERVICES INC.
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9.5.1. 802.11b SISO MODE

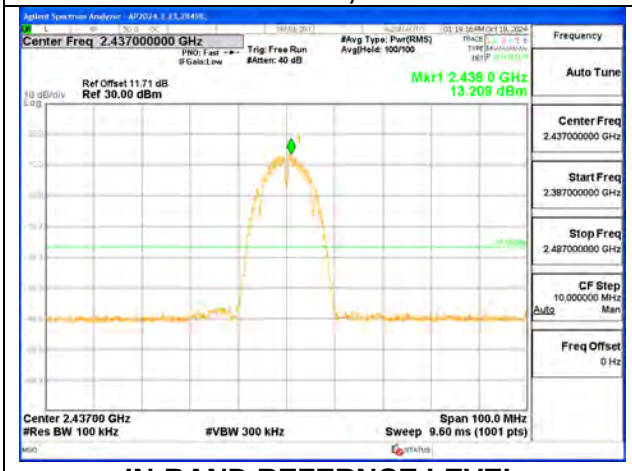
Test Engineer:	12491
Test Date:	2024/10/01

1Mbps

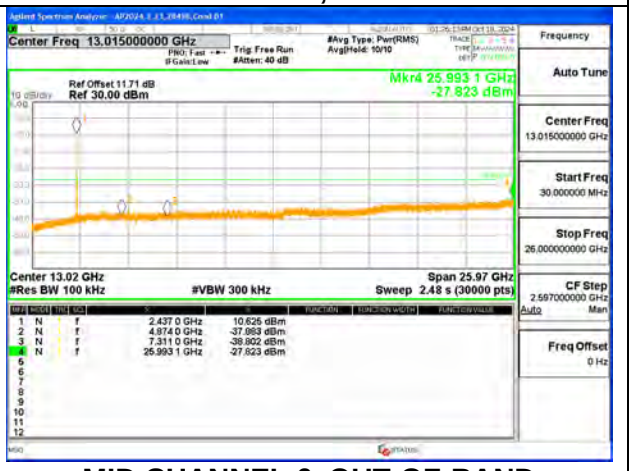
ANT 4

LOW CHANNEL 1, BAND-EDGE

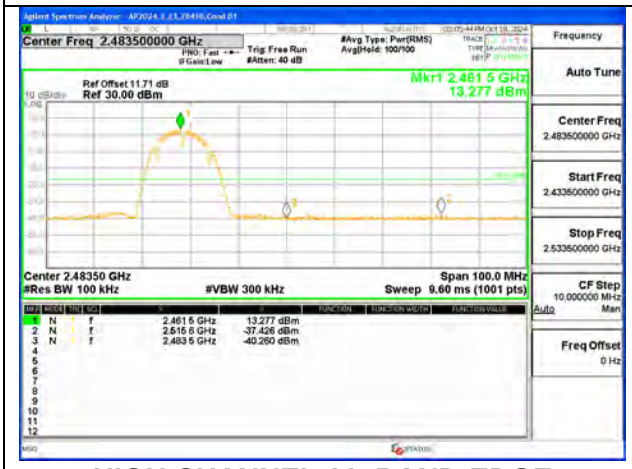
LOW CHANNEL 1, OUT-OF-BAND



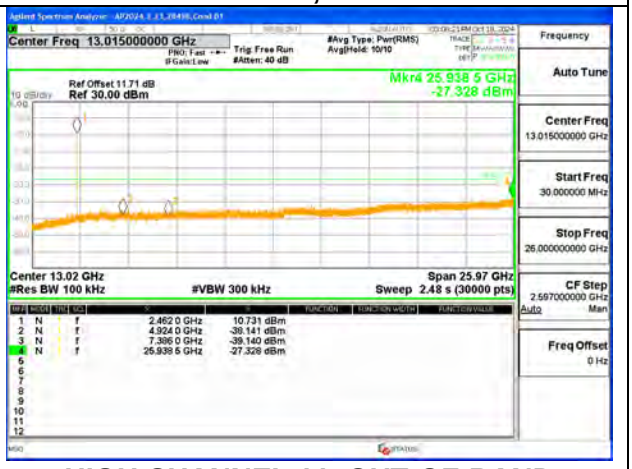
IN-BAND REFERNCE LEVEL



MID CHANNEL 6, OUT-OF-BAND



HIGH CHANNEL 11, BAND-EDGE



HIGH CHANNEL 11, OUT-OF-BAND

HIGH CHANNEL 12, BAND-EDGE

HIGH CHANNEL 12, OUT-OF-BAND

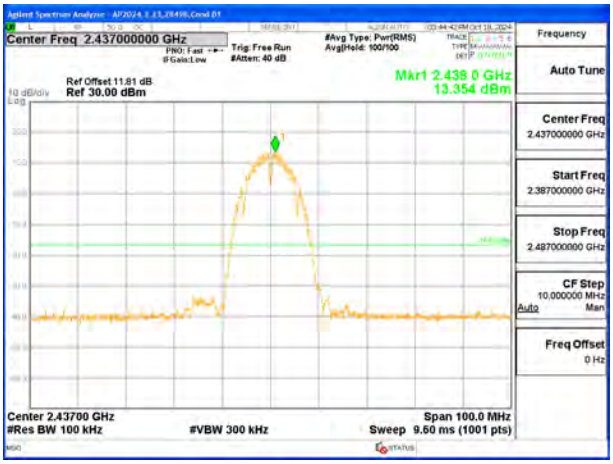
HIGH CHANNEL 13, BAND-EDGE

HIGH CHANNEL 13, OUT-OF-BAND

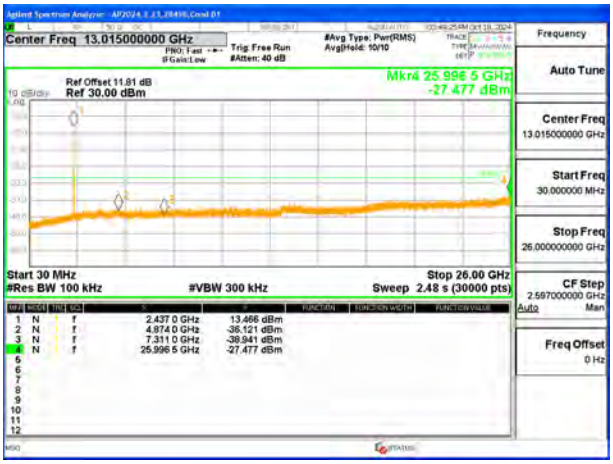
ANT 3

LOW CHANNEL 1, BAND-EDGE

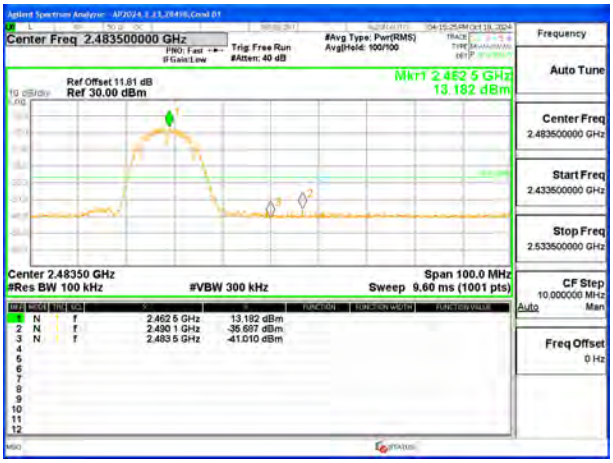
LOW CHANNEL 1, OUT-OF-BAND



IN-BAND REFERNCE LEVEL



MID CHANNEL 6, OUT-OF-BAND



HIGH CHANNEL 11, BAND-EDGE

HIGH CHANNEL 11, OUT-OF-BAND

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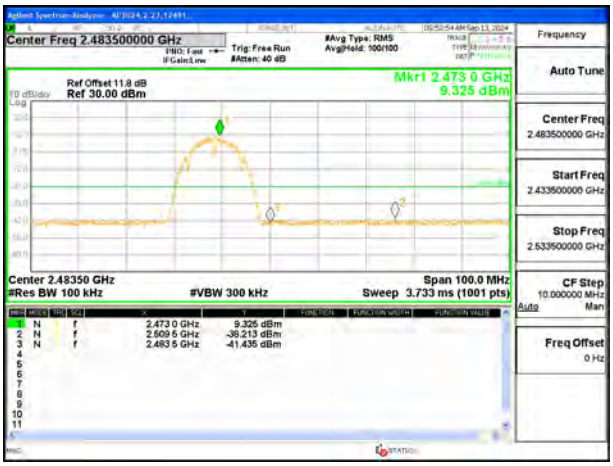
HIGH CHANNEL 12, BAND-EDGE

HIGH CHANNEL 12, OUT-OF-BAND



HIGH CHANNEL 13, BAND-EDGE

HIGH CHANNEL 13, OUT-OF-BAND

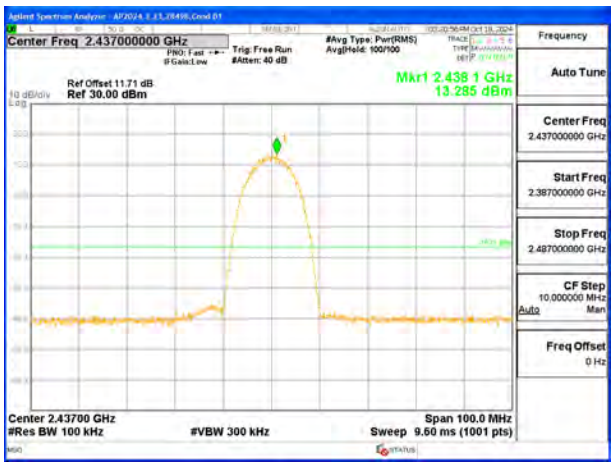
UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

11Mbps

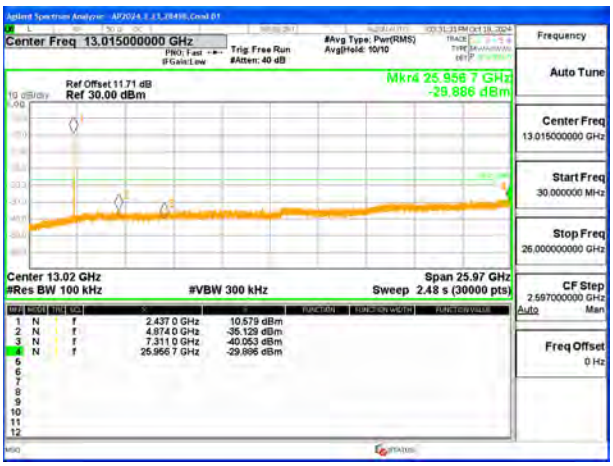
ANT 4

LOW CHANNEL 1, BAND-EDGE

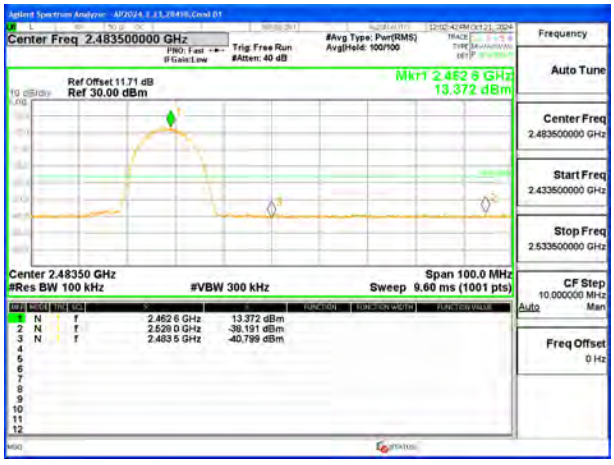
LOW CHANNEL 1, OUT-OF-BAND



IN-BAND REFERNCE LEVEL



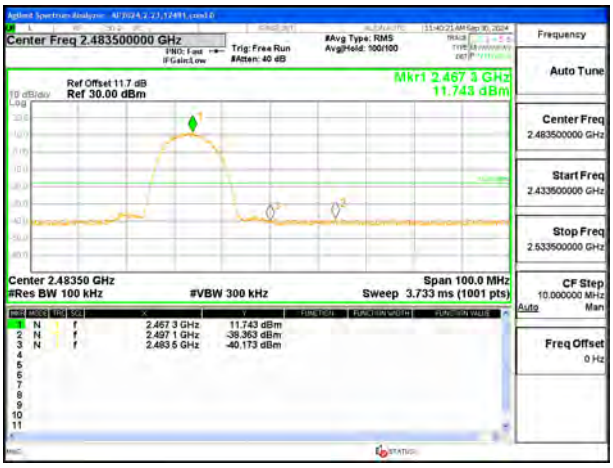
MID CHANNEL 6, OUT-OF-BAND



HIGH CHANNEL 11, BAND-EDGE

HIGH CHANNEL 11, OUT-OF-BAND

UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888



HIGH CHANNEL 12, BAND-EDGE

HIGH CHANNEL 12, OUT-OF-BAND

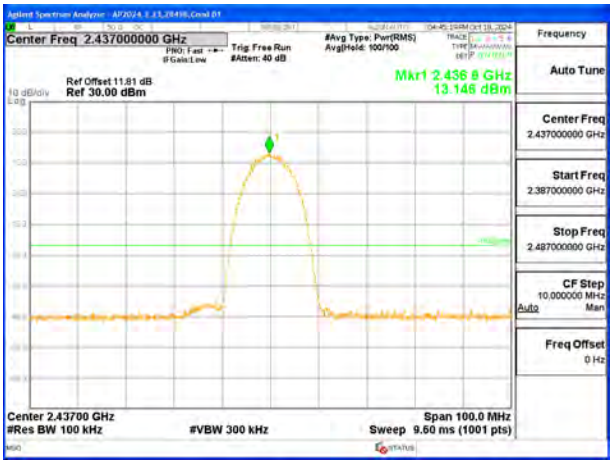
HIGH CHANNEL 13, BAND-EDGE

HIGH CHANNEL 13, OUT-OF-BAND

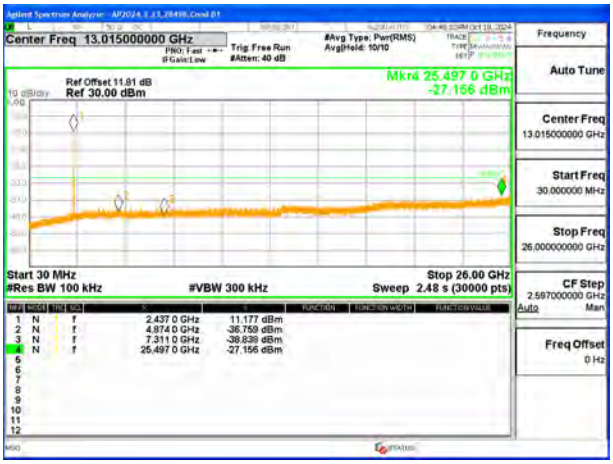
ANT 3

LOW CHANNEL 1, BAND-EDGE

LOW CHANNEL 1, OUT-OF-BAND

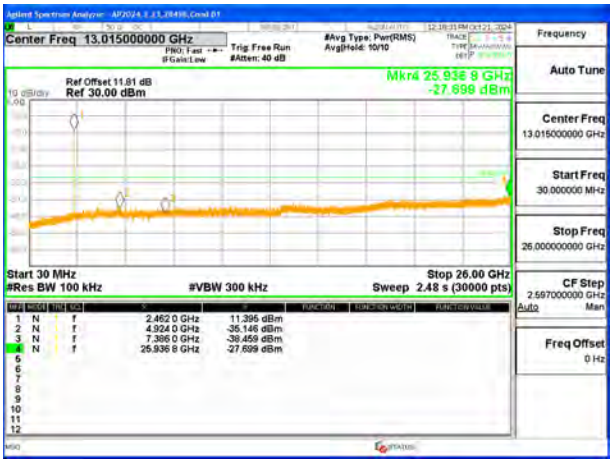


IN-BAND REFERNCE LEVEL



MID CHANNEL 6, OUT-OF-BAND

HIGH CHANNEL 11, BAND-EDGE



HIGH CHANNEL 11, OUT-OF-BAND

UL VERIFICATION SERVICES INC.
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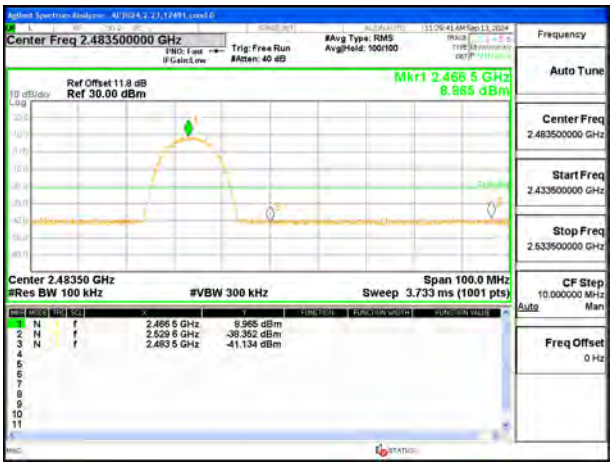
HIGH CHANNEL 12, BAND-EDGE

HIGH CHANNEL 12, OUT-OF-BAND



HIGH CHANNEL 13, BAND-EDGE

HIGH CHANNEL 13, OUT-OF-BAND

9.5.2. 802.11n HT20 SISO MODE

Test Engineer:	12491
Test Date:	2024/10/01

MCS0

ANT 4

LOW CHANNEL 1, BAND-EDGE

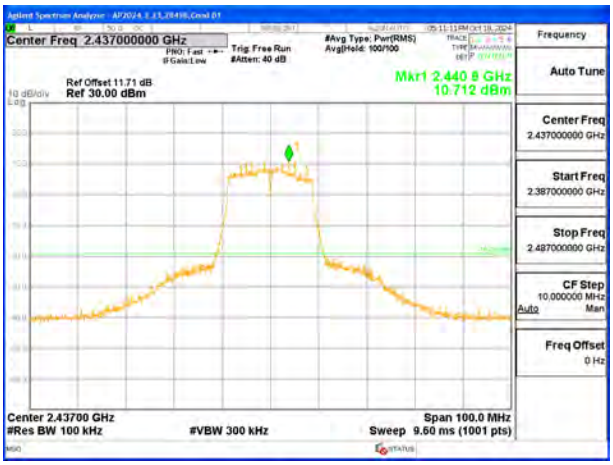
LOW CHANNEL 1, OUT-OF-BAND

LOW CHANNEL 2, BAND-EDGE

LOW CHANNEL 2, OUT-OF-BAND

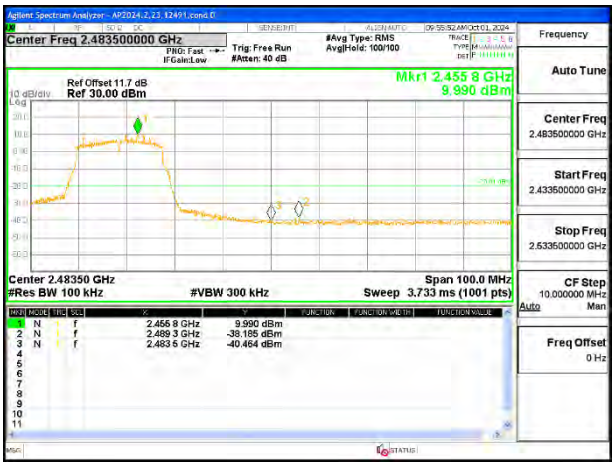
LOW CHANNEL 3, BAND-EDGE

LOW CHANNEL 3, OUT-OF-BAND



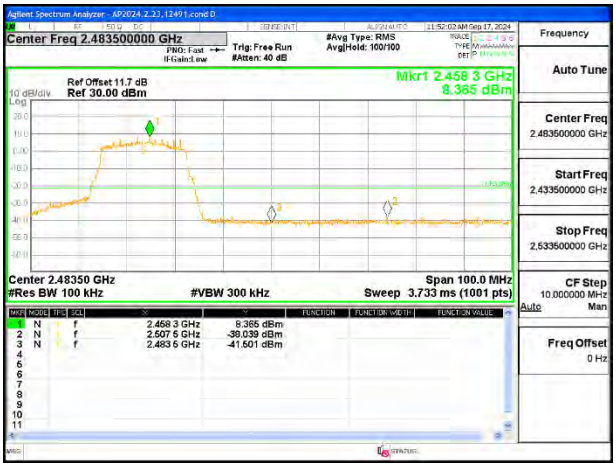
IN-BAND REFERNCE LEVEL

MID CHANNEL 6, OUT-OF-BAND



HIGH CHANNEL 9, BAND-EDGE

HIGH CHANNEL 9, OUT-OF-BAND



HIGH CHANNEL 10, BAND-EDGE

HIGH CHANNEL 10, OUT-OF-BAND

UL VERIFICATION SERVICES INC.
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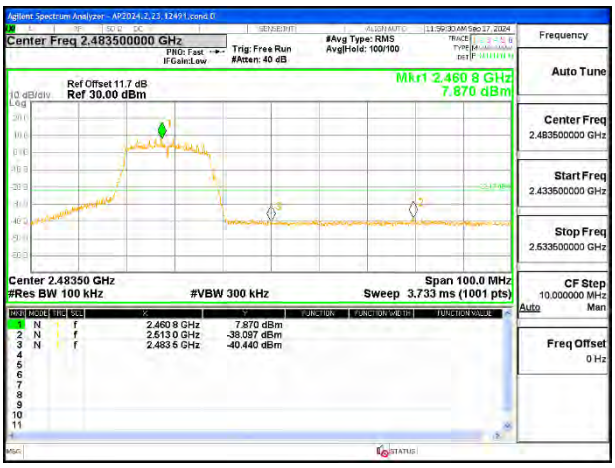
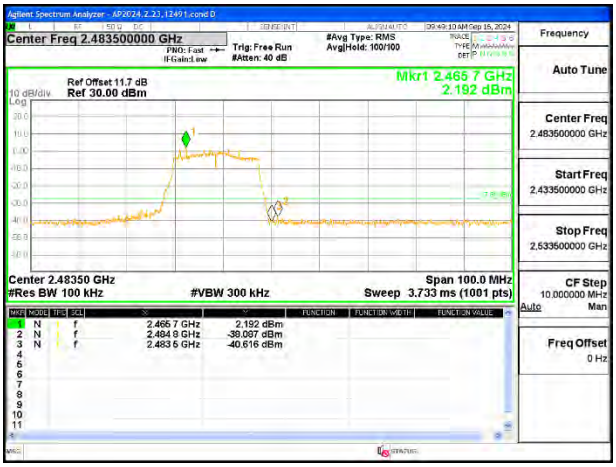


IN HIGH CHANNEL 11, BAND-EDGE

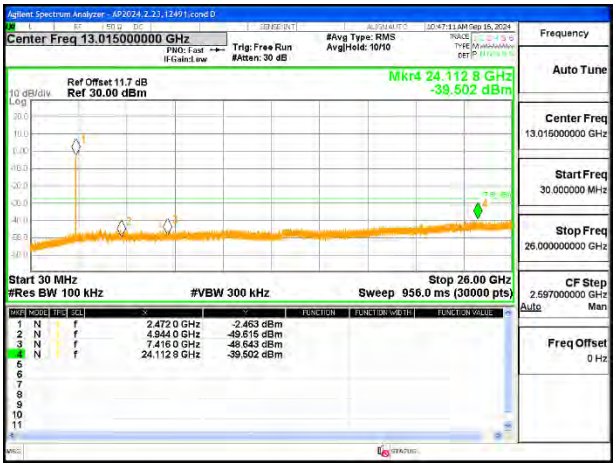
HIGH CHANNEL 11, OUT-OF-BAND

HIGH CHANNEL 12, BAND-EDGE

HIGH CHANNEL 12, OUT-OF-BAND



HIGH CHANNEL 13, BAND-EDGE



HIGH CHANNEL 13, OUT-OF-BAND

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ANT 3

LOW CHANNEL 1, BAND-EDGE

LOW CHANNEL 1, OUT-OF-BAND

LOW CHANNEL 2, BAND-EDGE

LOW CHANNEL 2, OUT-OF-BAND

LOW CHANNEL 3, BAND-EDGE

LOW CHANNEL 3, OUT-OF-BAND

UL VERIFICATION SERVICES INC.
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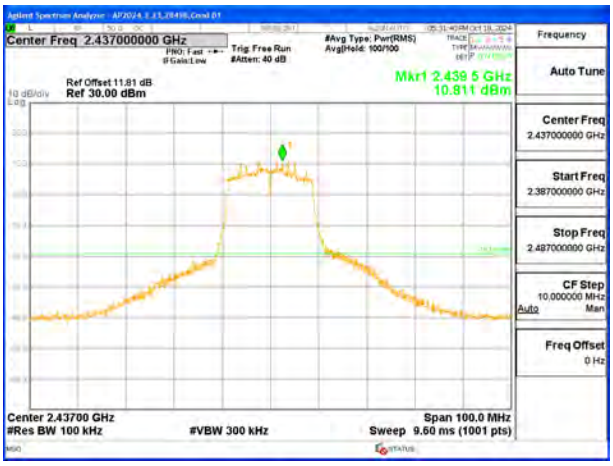
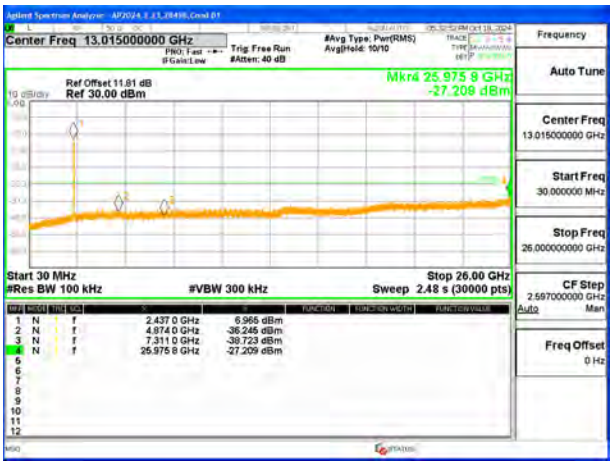


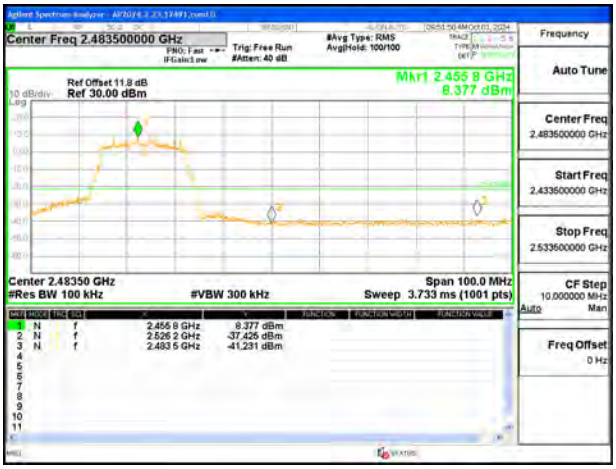
IN-BAND REFERNCE LEVEL



MID CHANNEL 6, OUT-OF-BAND

HIGH CHANNEL 9, BAND-EDGE

HIGH CHANNEL 9, OUT-OF-BAND



HIGH CHANNEL 10, BAND-EDGE

HIGH CHANNEL 10, OUT-OF-BAND

UL VERIFICATION SERVICES INC.
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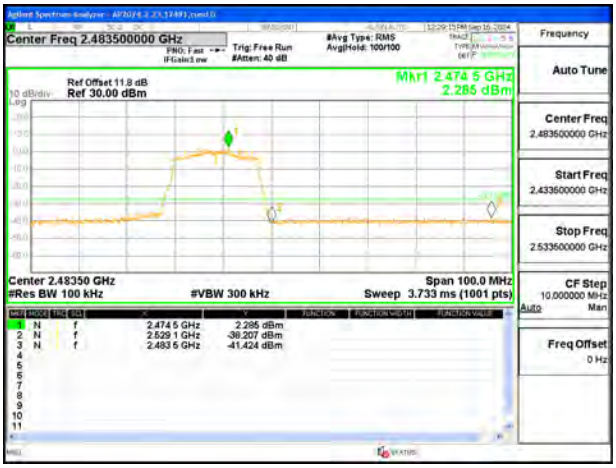
HIGH CHANNEL 11, BAND-EDGE

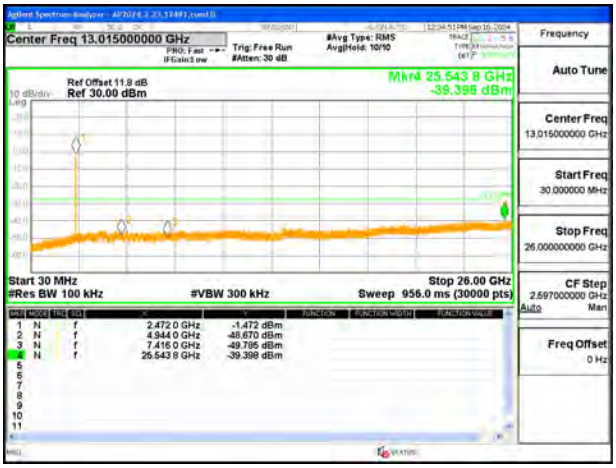
HIGH CHANNEL 11, OUT-OF-BAND

HIGH CHANNEL 12, BAND-EDGE

HIGH CHANNEL 12, OUT-OF-BAND



HIGH CHANNEL 13, BAND-EDGE

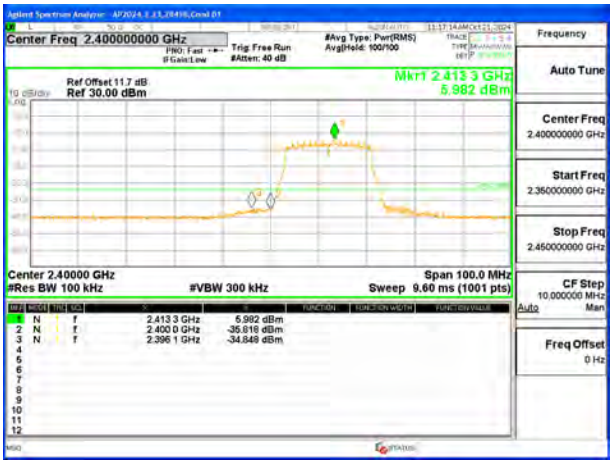


HIGH CHANNEL 13, OUT-OF-BAND

UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

MCS7

ANT 4

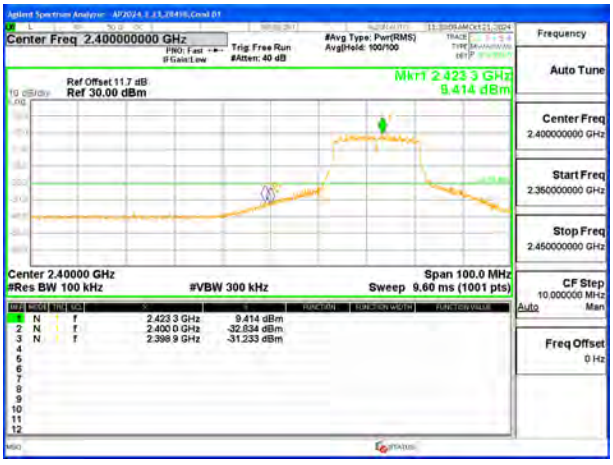


LOW CHANNEL 1, BAND-EDGE

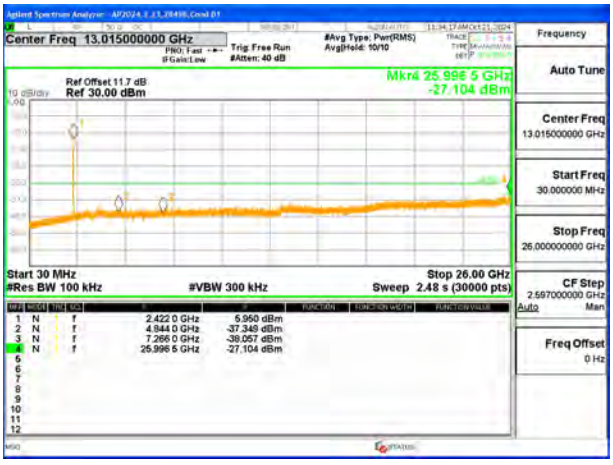
LOW CHANNEL 1, OUT-OF-BAND

LOW CHANNEL 2, BAND-EDGE

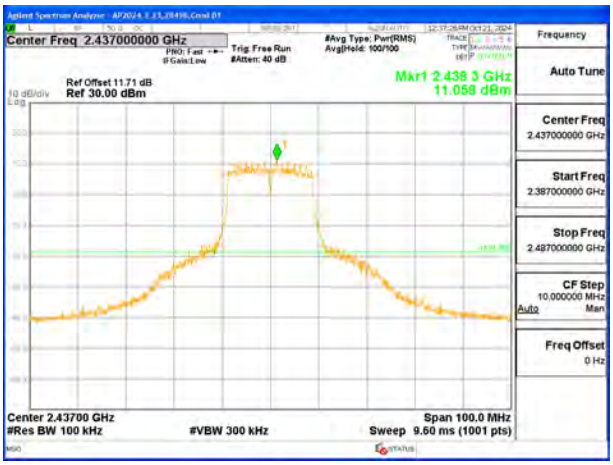
LOW CHANNEL 2, OUT-OF-BAND



LOW CHANNEL 3, BAND-EDGE

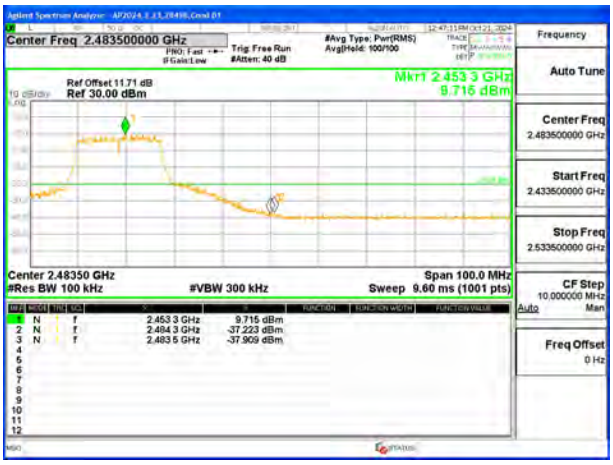


LOW CHANNEL 3, OUT-OF-BAND

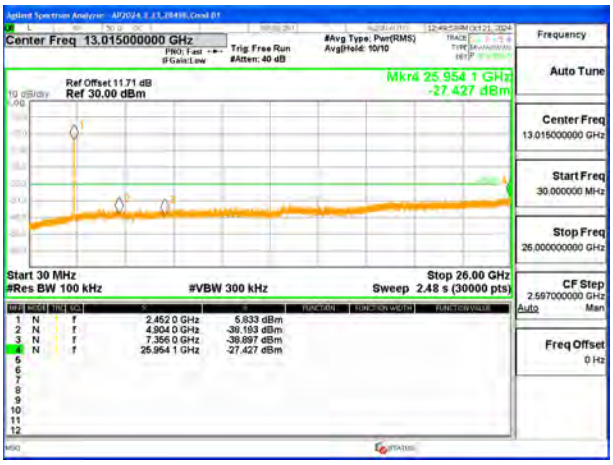


IN-BAND REFERNCE LEVEL

MID CHANNEL 6, OUT-OF-BAND

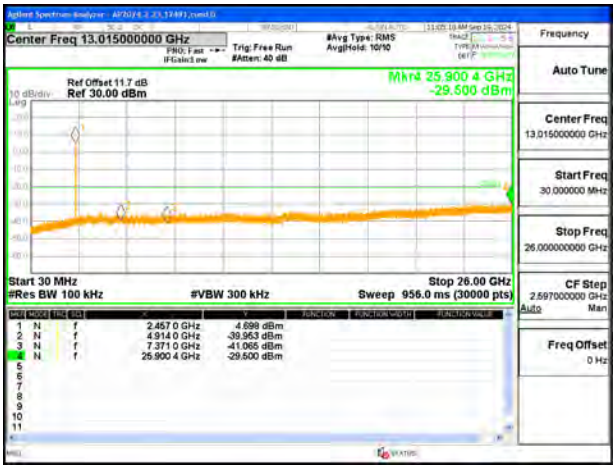


HIGH CHANNEL 9, BAND-EDGE



HIGH CHANNEL 9, OUT-OF-BAND

HIGH CHANNEL 10, BAND-EDGE



HIGH CHANNEL 10, OUT-OF-BAND

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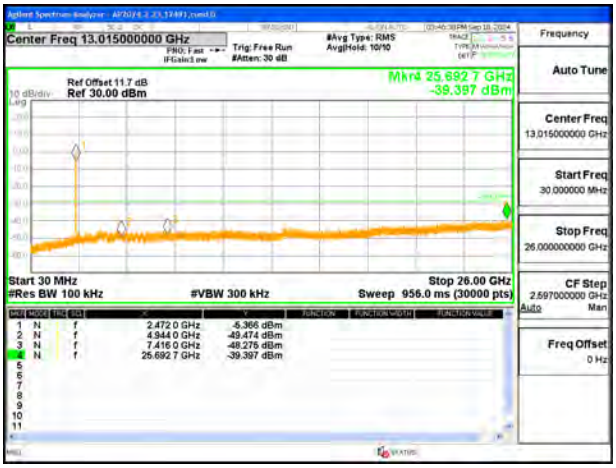
IN HIGH CHANNEL 11, BAND-EDGE

HIGH CHANNEL 11, OUT-OF-BAND

HIGH CHANNEL 12, BAND-EDGE

HIGH CHANNEL 12, OUT-OF-BAND

HIGH CHANNEL 13, BAND-EDGE



HIGH CHANNEL 13, OUT-OF-BAND

UL VERIFICATION SERVICES INC.
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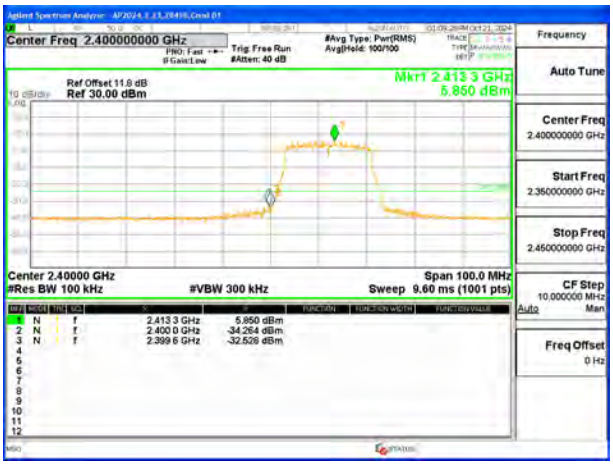
ANT 3

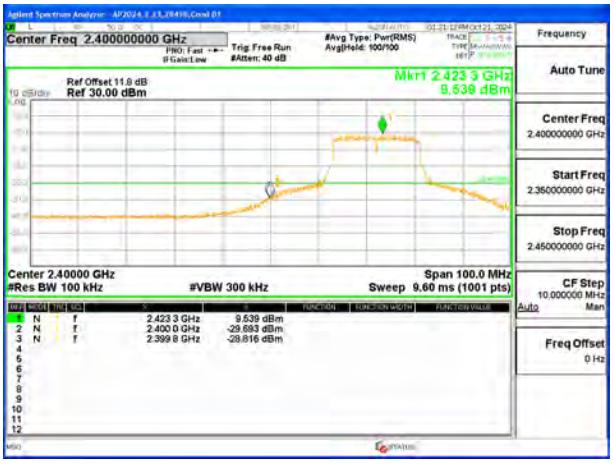


LOW CHANNEL 1, BAND-EDGE

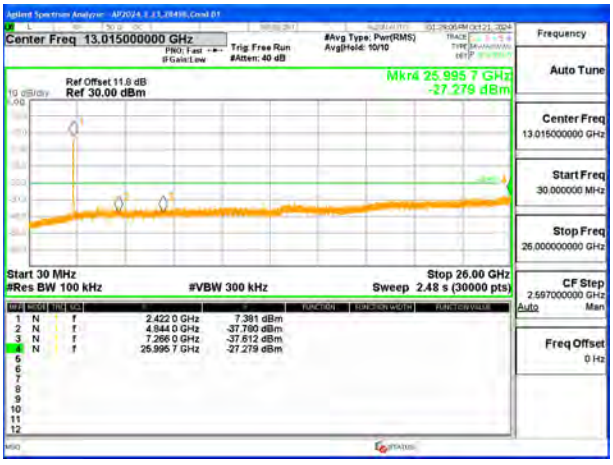
LOW CHANNEL 1, OUT-OF-BAND

LOW CHANNEL 2, BAND-EDGE

LOW CHANNEL 2, OUT-OF-BAND

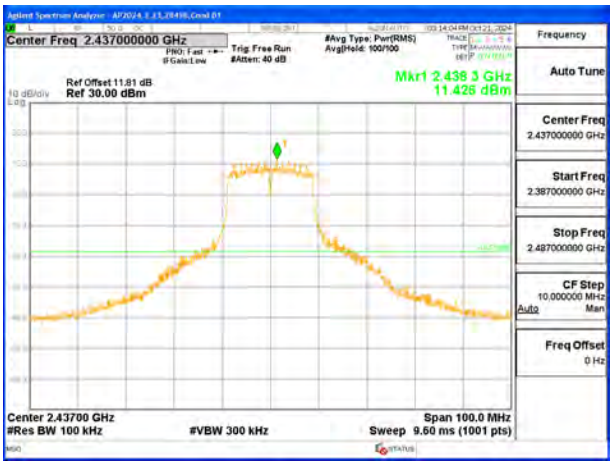


LOW CHANNEL 3, BAND-EDGE

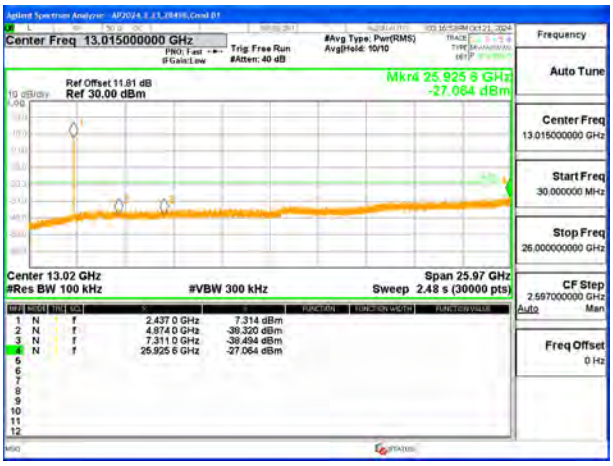


LOW CHANNEL 3, OUT-OF-BAND

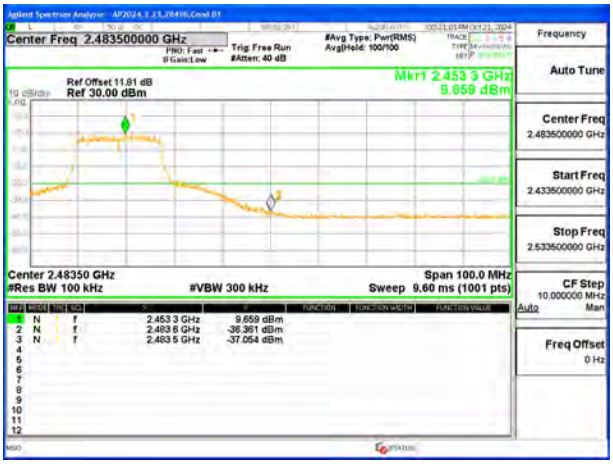
UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888



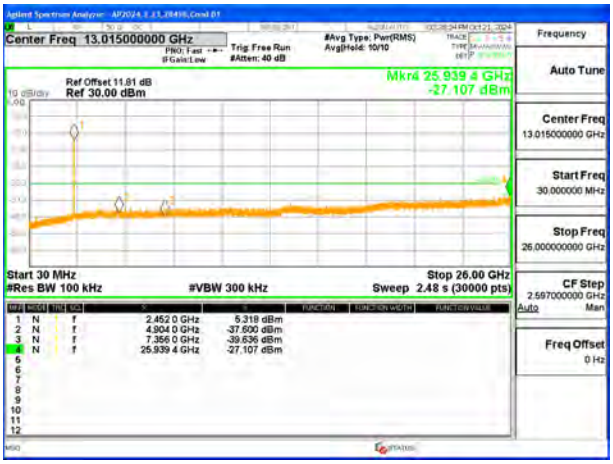
IN-BAND REFERNCE LEVEL



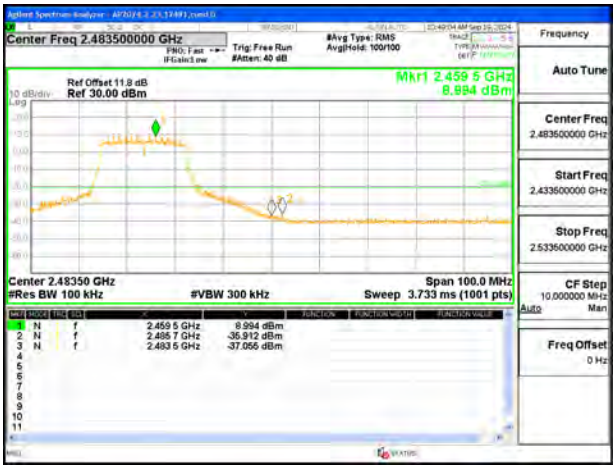
MID CHANNEL 6, OUT-OF-BAND



HIGH CHANNEL 9, BAND-EDGE



HIGH CHANNEL 9, OUT-OF-BAND



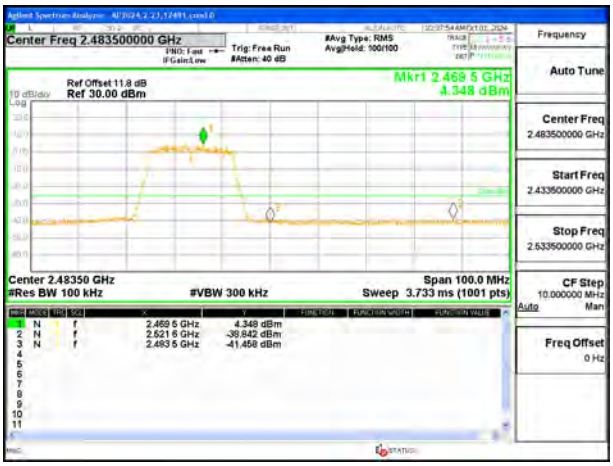
HIGH CHANNEL 10, BAND-EDGE

HIGH CHANNEL 10, OUT-OF-BAND

UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

HIGH CHANNEL 11, BAND-EDGE

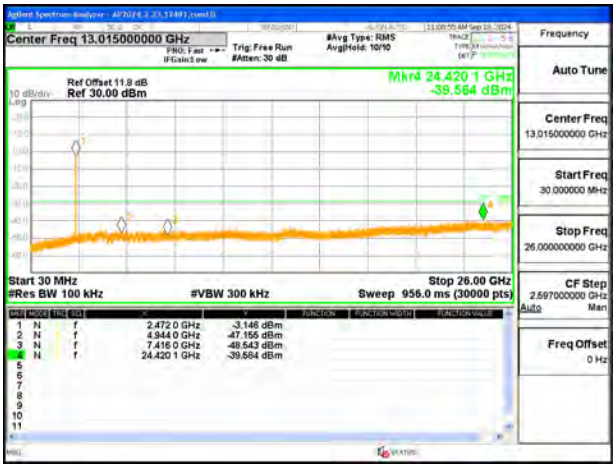
HIGH CHANNEL 11, OUT-OF-BAND



HIGH CHANNEL 12, BAND-EDGE

HIGH CHANNEL 12, OUT-OF-BAND

HIGH CHANNEL 13, BAND-EDGE



HIGH CHANNEL 13, OUT-OF-BAND

UL VERIFICATION SERVICES INC.
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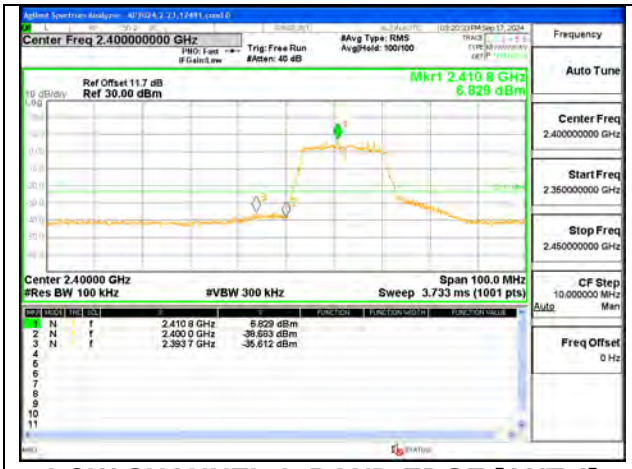
9.5.3. 802.11n HT20 MIMO MODE

Test Engineer:	12491
Test Date:	2024/10/04

MCS0

ANT 4 + ANT 3



LOW CHANNEL 1, BAND-EDGE [ANT 4]

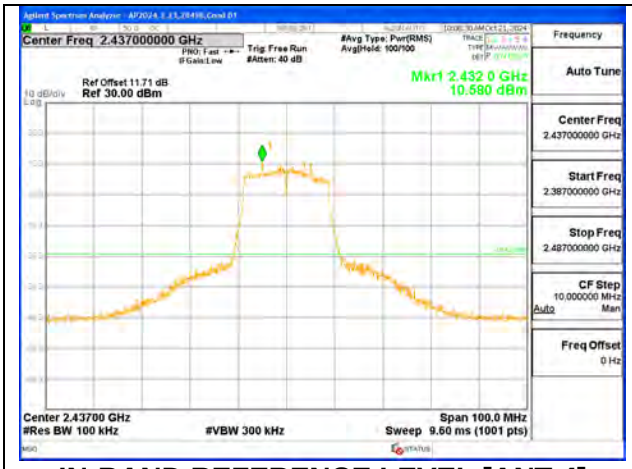
LOW CHANNEL 1, OUT-OF-BAND [ANT 4]

LOW CHANNEL 2, BAND-EDGE [ANT 4]

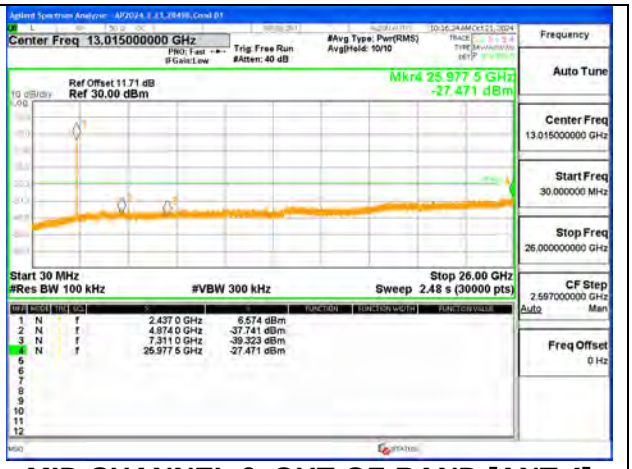
LOW CHANNEL 2, OUT-OF-BAND [ANT 4]

LOW CHANNEL 3, BAND-EDGE [ANT 4]

LOW CHANNEL 3, OUT-OF-BAND [ANT 4]

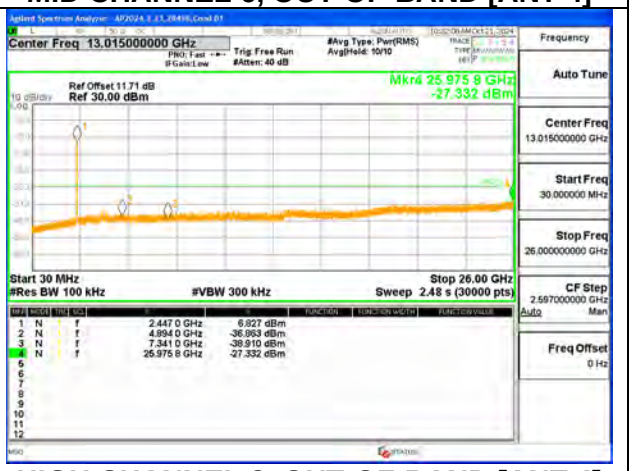


IN-BAND REFERENCE LEVEL [ANT 4]



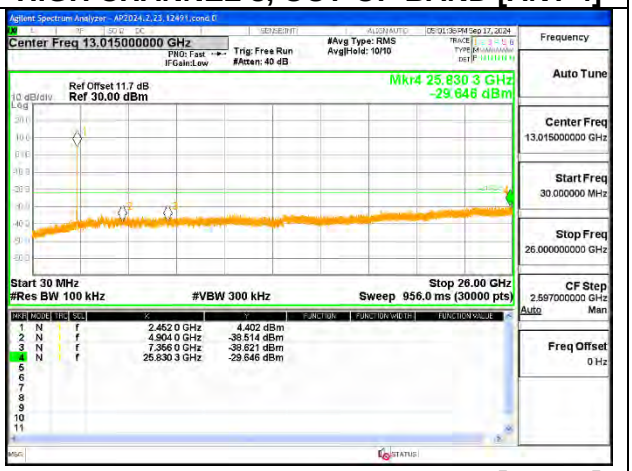
MID CHANNEL 6, OUT-OF-BAND [ANT 4]

HIGH CHANNEL 8, BAND-EDGE [ANT 4]



HIGH CHANNEL 8, OUT-OF-BAND [ANT 4]

HIGH CHANNEL 9, BAND-EDGE [ANT 4]



HIGH CHANNEL 9, OUT-OF-BAND [ANT 4]

UL VERIFICATION SERVICES INC.
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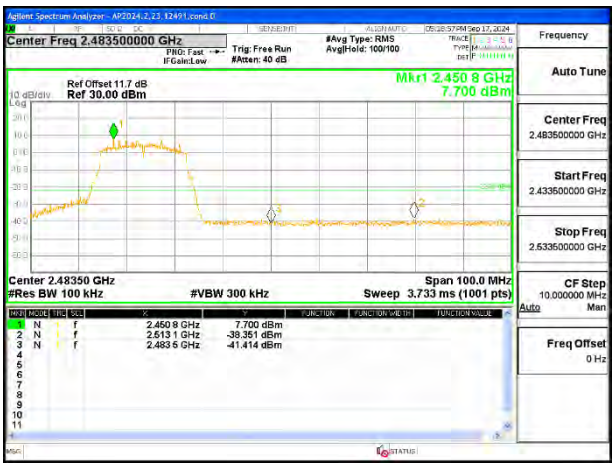

HIGH CHANNEL 10, BAND-EDGE [ANT 4]

HIGH CHANNEL 10, OUT-OF-BAND [ANT 4]

HIGH CHANNEL 11, BAND-EDGE [ANT 4]

HIGH CHANNEL 11, OUT-OF-BAND [ANT 4]

HIGH CHANNEL 12, BAND-EDGE [ANT 4]

HIGH CHANNEL 12, OUT-OF-BAND [ANT 4]

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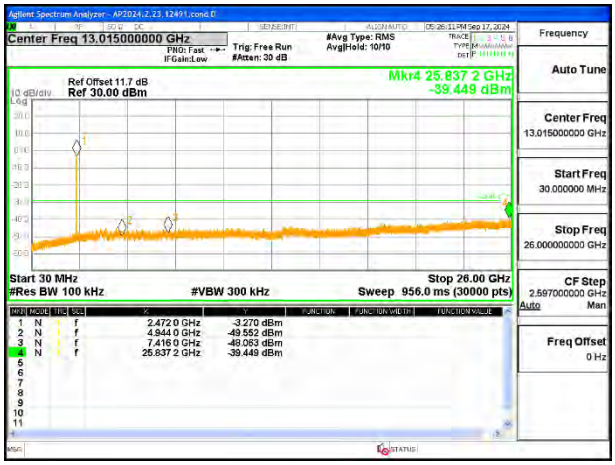
HIGH CHANNEL 13, BAND-EDGE [ANT 4]



HIGH CHANNEL 13, OUT-OF-BAND [ANT 4]

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LOW CHANNEL 1, BAND-EDGE [ANT 3]

LOW CHANNEL 1, OUT-OF-BAND [ANT 3]

LOW CHANNEL 2, BAND-EDGE [ANT 3]

LOW CHANNEL 2, OUT-OF-BAND [ANT 3]

LOW CHANNEL 3, BAND-EDGE [ANT 3]

LOW CHANNEL 3, OUT-OF-BAND [ANT 3]

UL VERIFICATION SERVICES INC.
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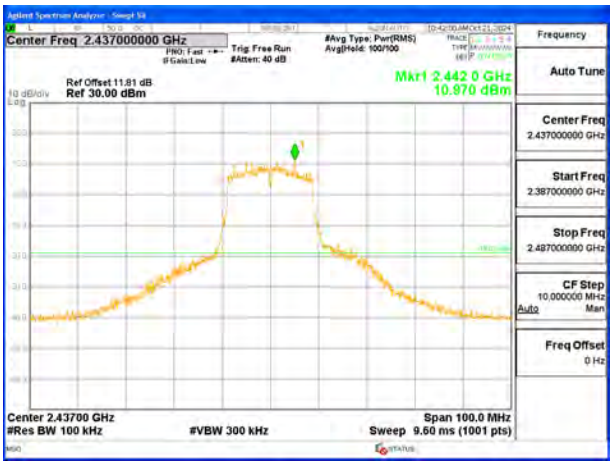
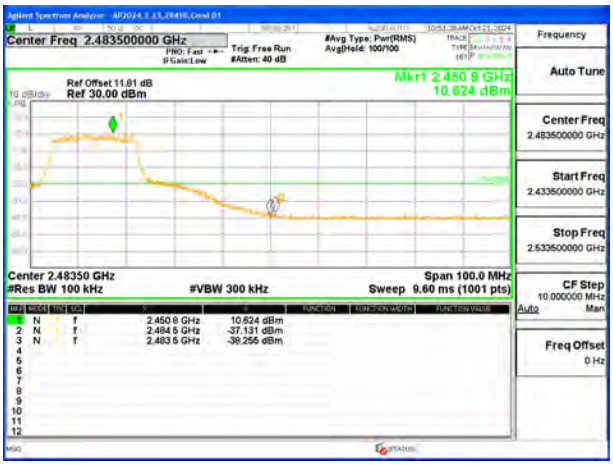


IN-BAND REFERENCE LEVEL [ANT 3]

MID CHANNEL 6, OUT-OF-BAND [ANT 3]



HIGH CHANNEL 8, BAND-EDGE [ANT 3]

HIGH CHANNEL 8, OUT-OF-BAND [ANT 3]

HIGH CHANNEL 9, BAND-EDGE [ANT 3]

HIGH CHANNEL 9, OUT-OF-BAND [ANT 3]

UL VERIFICATION SERVICES INC.
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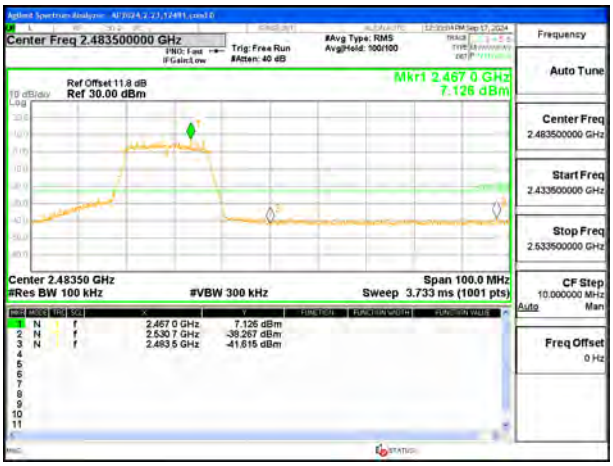
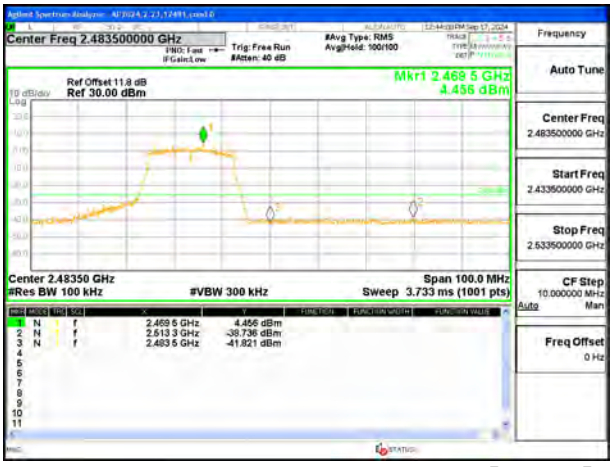
HIGH CHANNEL 10, BAND-EDGE [ANT 3]

HIGH CHANNEL 10, OUT-OF-BAND [ANT 3]



HIGH CHANNEL 11, BAND-EDGE [ANT 3]

HIGH CHANNEL 11, OUT-OF-BAND [ANT 3]



HIGH CHANNEL 12, BAND-EDGE [ANT 3]

HIGH CHANNEL 12, OUT-OF-BAND [ANT 3]

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HIGH CHANNEL 13, BAND-EDGE [ANT 3]

HIGH CHANNEL 13, OUT-OF-BAND [ANT 3]

UL VERIFICATION SERVICES INC.
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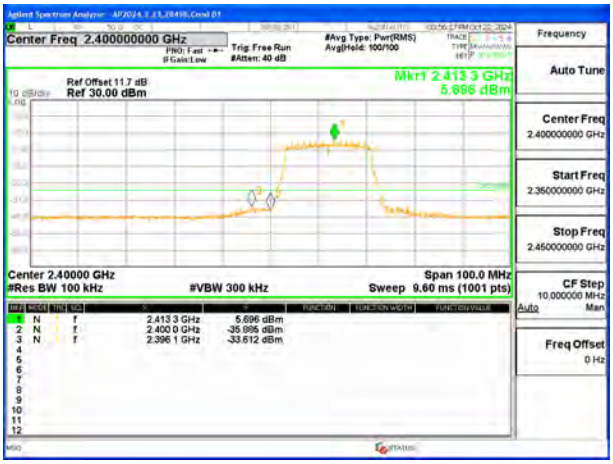
MCS7

ANT 4 + ANT 3



LOW CHANNEL 1, BAND-EDGE [ANT 4]

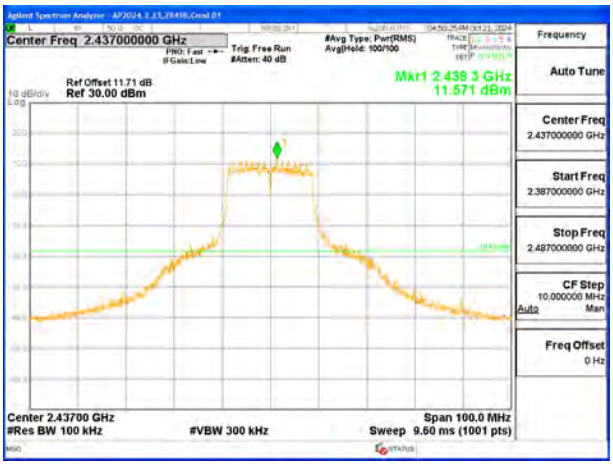
LOW CHANNEL 1, OUT-OF-BAND [ANT 4]

LOW CHANNEL 2, BAND-EDGE [ANT 4]

LOW CHANNEL 2, OUT-OF-BAND [ANT 4]

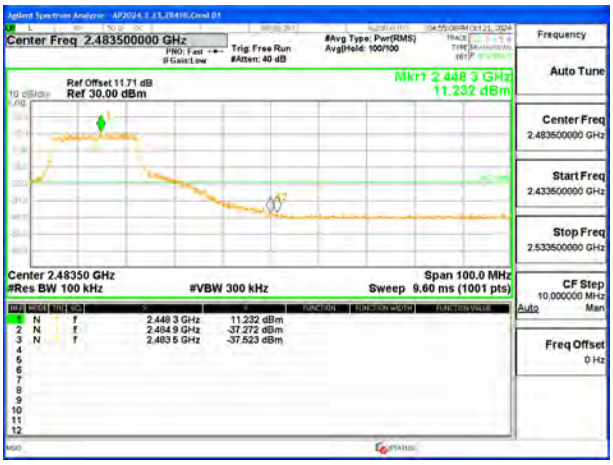
LOW CHANNEL 3, BAND-EDGE [ANT 4]

LOW CHANNEL 3, OUT-OF-BAND [ANT 4]



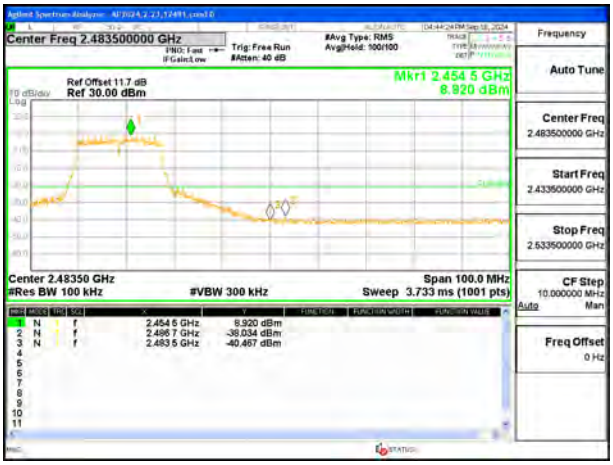
IN-BAND REFERENCE LEVEL [ANT 4]

MID CHANNEL 6, OUT-OF-BAND [ANT 4]



HIGH CHANNEL 8, BAND-EDGE [ANT 4]

HIGH CHANNEL 8, OUT-OF-BAND [ANT 4]



HIGH CHANNEL 9, BAND-EDGE [ANT 4]

HIGH CHANNEL 9, OUT-OF-BAND [ANT 4]

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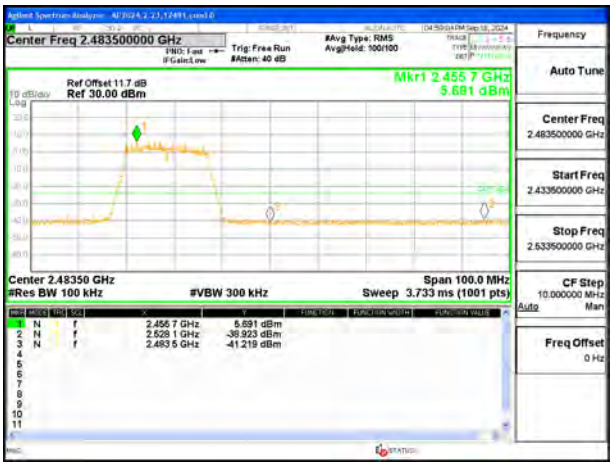
HIGH CHANNEL 10, BAND-EDGE [ANT 4]

HIGH CHANNEL 10, OUT-OF-BAND [ANT 4]



HIGH CHANNEL 11, BAND-EDGE [ANT 4]

HIGH CHANNEL 11, OUT-OF-BAND [ANT 4]

HIGH CHANNEL 12, BAND-EDGE [ANT 4]

HIGH CHANNEL 12, OUT-OF-BAND [ANT 4]

HIGH CHANNEL 13, BAND-EDGE [ANT 4]

HIGH CHANNEL 13, OUT-OF-BAND [ANT 4]

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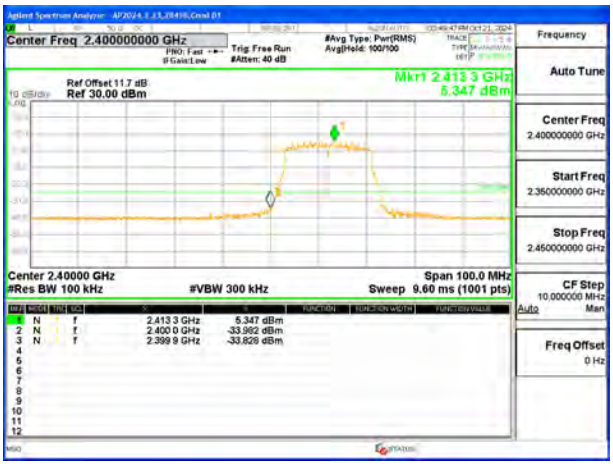

LOW CHANNEL 1, BAND-EDGE [ANT 3]

LOW CHANNEL 1, OUT-OF-BAND [ANT 3]

LOW CHANNEL 2, BAND-EDGE [ANT 3]

LOW CHANNEL 2, OUT-OF-BAND [ANT 3]

LOW CHANNEL 3, BAND-EDGE [ANT 3]

LOW CHANNEL 3, OUT-OF-BAND [ANT 3]

UL VERIFICATION SERVICES INC.
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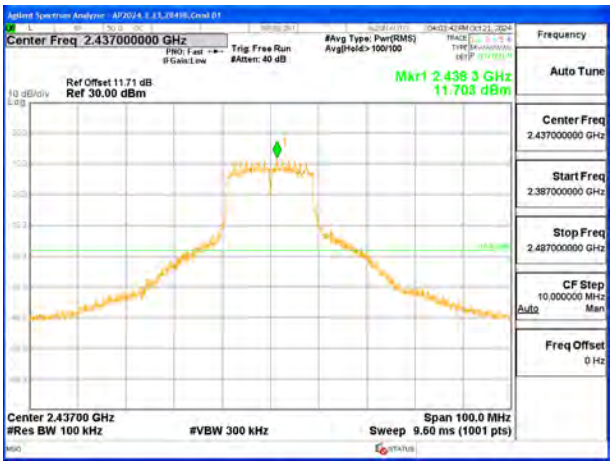
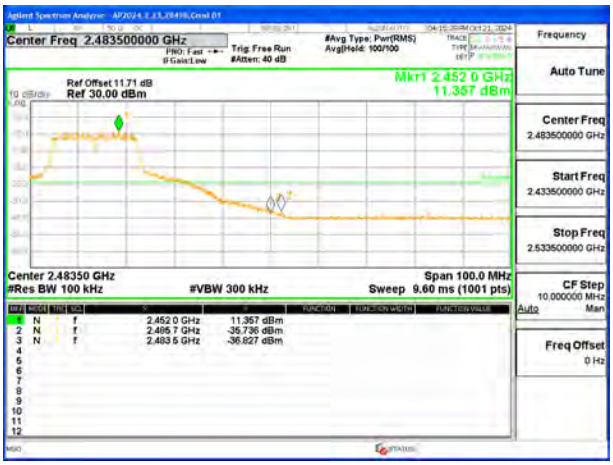


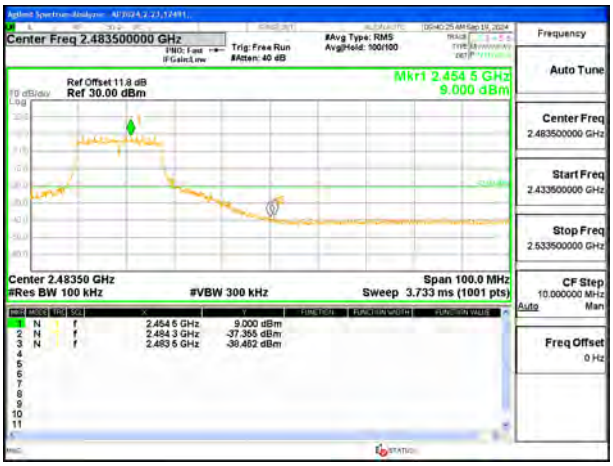
IN-BAND REFERENCE LEVEL [ANT 3]

MID CHANNEL 6, OUT-OF-BAND [ANT 3]



HIGH CHANNEL 8, BAND-EDGE [ANT 3]

HIGH CHANNEL 8, OUT-OF-BAND [ANT 3]



HIGH CHANNEL 9, BAND-EDGE [ANT 3]

HIGH CHANNEL 9, OUT-OF-BAND [ANT 3]

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HIGH CHANNEL 10, BAND-EDGE [ANT 3]

HIGH CHANNEL 10, OUT-OF-BAND [ANT 3]

HIGH CHANNEL 11, BAND-EDGE [ANT 3]

HIGH CHANNEL 11, OUT-OF-BAND [ANT 3]

HIGH CHANNEL 12, BAND-EDGE [ANT 3]

HIGH CHANNEL 12, OUT-OF-BAND [ANT 3]

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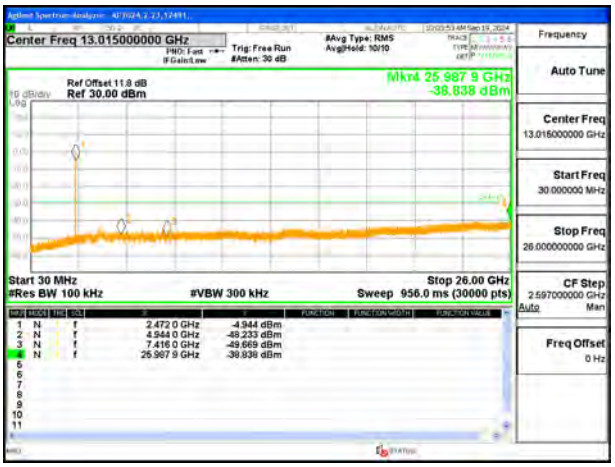
HIGH CHANNEL 13, BAND-EDGE [ANT 3]



HIGH CHANNEL 13, OUT-OF-BAND [ANT 3]

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9.5.4. 802.11ax HE20 SISO MODE

Test Engineer:	12491
Test Date:	2024/10/04

ANT 4: SU – MCS0

LOW CHANNEL 1, BAND-EDGE

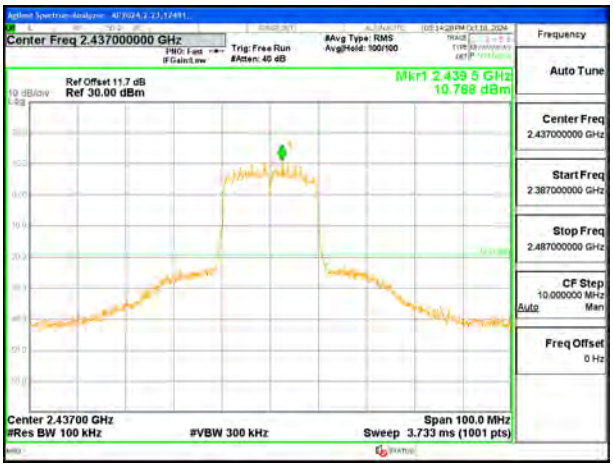
LOW CHANNEL 1, OUT-OF-BAND

LOW CHANNEL 2, BAND-EDGE

LOW CHANNEL 2, OUT-OF-BAND

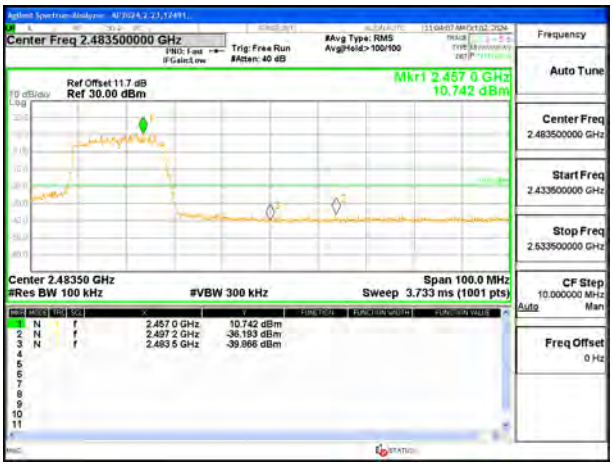
LOW CHANNEL 3, BAND-EDGE

LOW CHANNEL 3, OUT-OF-BAND



IN-BAND REFERNCE LEVEL

MID CHANNEL 6, OUT-OF-BAND



HIGH CHANNEL 9, BAND-EDGE

HIGH CHANNEL 9, OUT-OF-BAND

HIGH CHANNEL 10, BAND-EDGE

HIGH CHANNEL 10, OUT-OF-BAND

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HIGH CHANNEL 11, BAND-EDGE

HIGH CHANNEL 11, OUT-OF-BAND

HIGH CHANNEL 12, BAND-EDGE

HIGH CHANNEL 12, OUT-OF-BAND

HIGH CHANNEL 13, BAND-EDGE

HIGH CHANNEL 13, OUT-OF-BAND

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ANT 4: SU – MCS9

LOW CHANNEL 1, BAND-EDGE

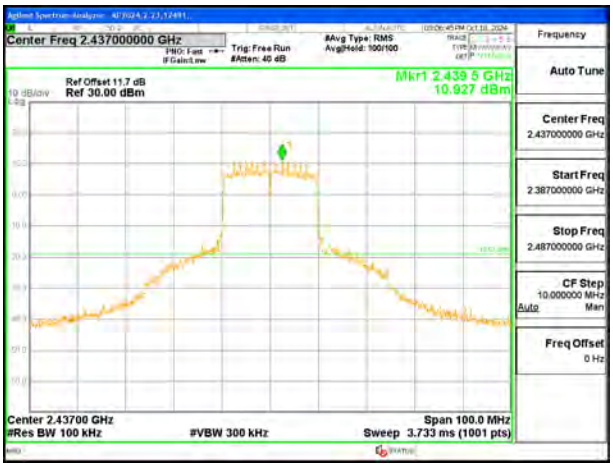
LOW CHANNEL 1, OUT-OF-BAND

LOW CHANNEL 2, BAND-EDGE

LOW CHANNEL 2, OUT-OF-BAND

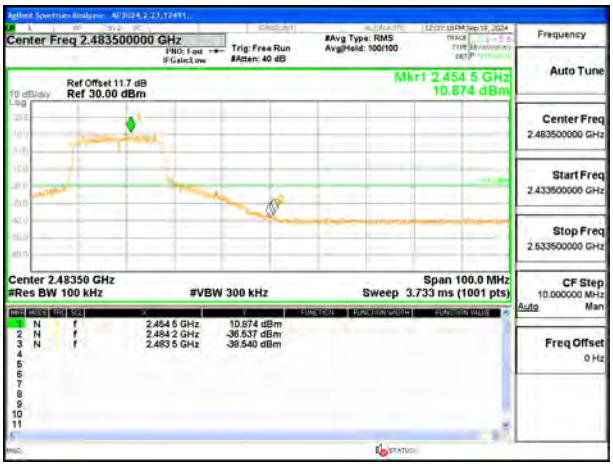
LOW CHANNEL 3, BAND-EDGE

LOW CHANNEL 3, OUT-OF-BAND



IN-BAND REFERNCE LEVEL

MID CHANNEL 6, OUT-OF-BAND



HIGH CHANNEL 9, BAND-EDGE

HIGH CHANNEL 9, OUT-OF-BAND

HIGH CHANNEL 10, BAND-EDGE

HIGH CHANNEL 10, OUT-OF-BAND

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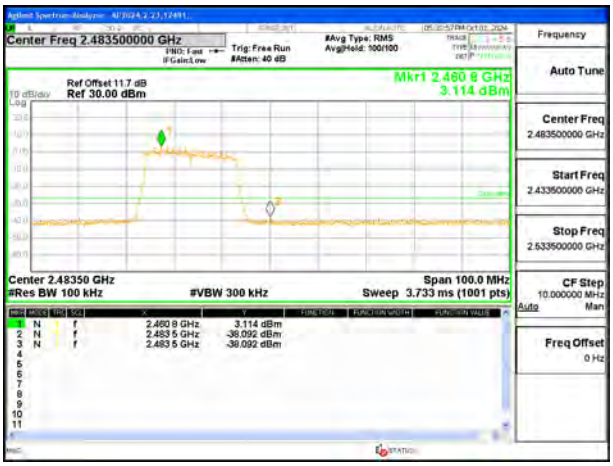
HIGH CHANNEL 11, BAND-EDGE

HIGH CHANNEL 11, OUT-OF-BAND



HIGH CHANNEL 12, BAND-EDGE

HIGH CHANNEL 12, OUT-OF-BAND

HIGH CHANNEL 13, BAND-EDGE

HIGH CHANNEL 13, OUT-OF-BAND

UL VERIFICATION SERVICES INC.
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ANT 4: 26-Tone RU Index 0 – MCS0

LOW CHANNEL 1, BAND-EDGE

LOW CHANNEL 1, OUT-OF-BAND

IN-BAND REFERNCE LEVEL

MID CHANNEL 6, OUT-OF-BAND

HIGH CHANNEL 11, BAND-EDGE

HIGH CHANNEL 11, OUT-OF-BAND

HIGH CHANNEL 12, BAND-EDGE

HIGH CHANNEL 12, OUT-OF-BAND

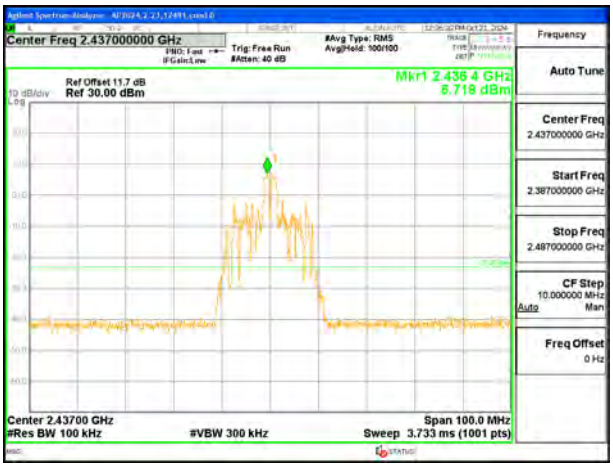
HIGH CHANNEL 13, BAND-EDGE

HIGH CHANNEL 13, OUT-OF-BAND

ANT 4: 26-Tone RU Index 4 – MCS0

LOW CHANNEL 1, BAND-EDGE

LOW CHANNEL 1, OUT-OF-BAND



IN-BAND REFERNCE LEVEL

MID CHANNEL 6, OUT-OF-BAND

HIGH CHANNEL 11, BAND-EDGE

HIGH CHANNEL 11, OUT-OF-BAND

UL VERIFICATION SERVICES INC.
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HIGH CHANNEL 12, BAND-EDGE

HIGH CHANNEL 12, OUT-OF-BAND

HIGH CHANNEL 13, BAND-EDGE

HIGH CHANNEL 13, OUT-OF-BAND

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ANT 4: 26-Tone RU Index 8 – MCS0

LOW CHANNEL 1, BAND-EDGE

LOW CHANNEL 1, OUT-OF-BAND

IN-BAND REFERNCE LEVEL

MID CHANNEL 6, OUT-OF-BAND

HIGH CHANNEL 11, BAND-EDGE

HIGH CHANNEL 11, OUT-OF-BAND