

TEST REPORT

Report Number: 15941282-E4V4

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

Model : A3575 (Parent)
A3634, A3635 (Variants)

Brand : APPLE

FCC ID : BCG-E9145A (Parent)
BCG-E9147A, BCG-E9148A (Variants)

IC : 579C-E9145A (Parent)
579C-E9147A, 579C-E9148A (Variants)

Test Standard(s) : FCC 47 CFR PART 15 SUBPART C
ISED RSS-247 ISSUE 4
ISED RSS-GEN ISSUE 5 + A1 + A2

Date Of Issue:
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REPORT REVISION HISTORY

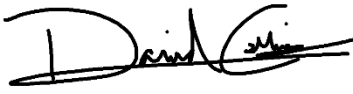
Rev.	Issue Date	Revisions	Revised By
V1	2025-12-11	Initial Issue	David Collins
V2	2025-12-23	Added AC Line, Addressed TCB Comments on Section 6.5, 9.2, 9.4.4, 9.5.4, 9.5.5, 10, and 13	David C./Alice Y.
V3	2026-01-06	Addressed TCB comment on page 157	Tony Li
V4	2026-01-07	Addressed TCB comment in sections 9.5 and 10	David Collins

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1. ATTESTATION OF TEST RESULTS

Applicant Name and Address	APPLE INC. 1 APPLE PARK WAY CUPERTINO, CA 95014, U.S.A.	
Model	A3575 (Parent) A3634, A3635 (Variants)	
Brand	APPLE	
FCC ID	BCG-E9145A (Parent) BCG-E9147A, BCG-E9148A (Variants)	
IC	579C-E9145A (Parent) 579C-E9147A, 579C-E9148A (Variants)	
EUT Description	SMARTPHONE	
Serial Number (Parent)	C07HJ80002C00016LY (Conducted) FK4KVKD7K2, LCQJWYHQKN (Radiated)	
Serial Number (Variant, A3634)	C07HJ00000M00016M2 (Conducted) GF4Y1XCGWP (Radiated)	
Serial Number (Variant, A3635)	C07HM3000UL00016M1 (Conducted) L2FXLNQQ44 (Radiated)	
Sample Receipt Date	2025-08-13	
Date Tested	2025-08-20 to 2026-01-06	
Applicable Standards	CFR 47 Part 15 Subpart C ISED RSS-247 Issue 4 ISED RSS-GEN Issue 5 + A1 + A2	
Test Results	COMPLIES	
UL Verification Services Inc. 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 ensure 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 Services Inc., and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document.		
Approved & Released By:	Reviewed By:	Prepared By:
		
Richard Lee Staff Engineer UL Verification Services, Inc.	David Collins Senior Test Engineer UL Verification Services, Inc.	Alice Yu Laboratory Engineer UL Verification Services, Inc.

2. TEST RESULTS SUMMARY

This report contains data provided by the customer, which can impact the validity of the results. UL Verification Services Inc. is only responsible for correctly integrating customer-provided data with measurements performed by UL Verification Services Inc.

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

1. Antenna gain and type (see section 6.2)
2. Cable loss (see section 6.2)

Requirement Description	Requirement Clause Number (FCC)	Result	Comment
Duty Cycle	See Comment	Reporting purposes only	ANSI C63.10 Section 11.6.
99% OBW	-	Reporting purposes only	ANSI C63.10 Section 6.9.3.
6dB BW	15.247 (a) (2)	Complies	None.
Output Power (Average)	15.247 (b) (3)	Complies	Per ANSI C63.10, Section 11.9.2.3.2.
PSD	15.247 (e)	Complies	None.
Conducted Spurious Emissions	15.247 (d)	Complies	None.
Radiated Emissions	15.209, 15.205	Complies	None.
AC Mains Conducted Emissions	15.207	Complies	None.

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

3. TEST METHODOLOGY

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

- ANSI C63.10-2020 (FCC)
- FCC 47 CFR Part 2
- FCC 47 CFR Part 15C
- KDB 558074 D01 15.247 Meas Guidance
- KDB 414788 D01 Radiated Test Site
- KDB 662911 D01 Multiple Transmitter Output
- KDB 484596 D01 Referencing Test Data
- RSS-GEN Issue 5 + A1 + A2
- RSS-247 Issue 4
- ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024+ Errata to C63.10a-2024 (ISED)

4. FACILITIES AND ACCREDITATION

UL Verification Services 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			

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 regularly, with a maximum time between calibrations of one year or the manufacturer's 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	1.94 dB
Power Spectral Density	2.466 dB
Time Domain Measurements Using SA	3.39 %
RF Power Measurement Direct Method Using a Power Meter	0.45 dB (Ave), 1.30 dB Peak)
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%.

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)
 $36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} = 28.9 \text{ dBuV/m}$

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.
 $36.5 \text{ dBuV} + 0 \text{ dB} + 10.1 \text{ dB} + 0 \text{ dB} = 46.6 \text{ dBuV}$

6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The Apple iPhone is a smartphone with GSM, GPRS, EGPRS, WCDMA, LTE, 5G NR1, 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	21.98	157.76
	802.11g	Covered by 802.11n HT20 1TX	
	802.11n HT20	21.96	157.04
	802.11ax HE20	21.97	157.40
2Tx			
2412 - 2472	802.11n HT20 CDD	24.98	314.77
	802.11g SDM/STBC	Covered by 802.11n HT20 2TX CDD	
	802.11ax HE20 CDD	24.97	314.05

6.3. DESCRIPTION OF AVAILABLE ANTENNAS AND CABLE LOSS

The antenna(s) gain and cable loss, as provided by the manufacturer, are as follows:

Frequency Range (GHz)	Antenna Type	Antenna Peak Gain				Cable Loss	
		ANT 4 (dBi)	ANT 3 (dBi)	Uncorrelated Chains (dBi)	Correlated Chains (dBi)	ANT 4 (dB)	ANT 3 (dB)
2.4	IFA	-3.70	-0.80	-2.01	0.88	1.70	1.80

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

6.4. SOFTWARE AND FIRMWARE

The EUT firmware and software installed during testing were LuckD23D90.

6.5. WORST-CASE CONFIGURATION AND MODE

EUT was investigated in three orthogonal orientations: X (Flatbed), Y (Landscape), and Z (Portrait). The following table exhibits the worst-case orientation. The full tests of the EUT have been made upon the orientations shown in the table below.

Band	ANT4	ANT3	ANT4+3
2.4GHz	X-Flatbed	X-Flatbed	X-Flatbed

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

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

Radiated emissions below 1GHz, 18-26GHz, and power line conducted emissions were performed with the EUT transmitting at the channel with the highest output power as a 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 CDD mode with power setting equal to or higher than SISO modes as a worst-case scenario. G mode is covered by HT20 mode since it has equal or lower tune up power than HT20.

Below 30MHz, 30-1000MHz emissions spurious tests were performed with EUT connected to an AC power adapter and set at 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, the test was conducted with an AC power adapter and a laptop.

For 99% Bandwidth, both SISO and MIMO modes have been investigated. And the results are similar between these modes. The SISO mode data represents the MIMO mode and is reported.

The output power and PSD for the 802.11ax mode were investigated across all different tones, and we found that the SU mode had the highest output power and RU26 had the highest PSD readings. After investigation, antenna port conducted tests were performed on both SU and the lowest tones. Radiated spurious emission and radiated band edge tests were also performed on SU and the lowest tones. Please see the worst-case summary table below.

WIFI DTS 2.4GHz - 802.11ax								
BW (MHz)	Tone (T)	RU Index	RU Index from Chipset support	Test RU Index based on the Chipset support			Worst Case Tone	
				Low	Mid	High	Power	PSD
20	26	0 ~ 8	0 ~ 8	0	4	8	X	X
	52	37 ~ 40	37 ~ 40	37	38	40		
	52 + 26	70 ~ 81	70, 71, 72	70	71	72		
	106	53 ~ 54	53 ~ 54	53	--	54		
	106 + 26	82 ~ 89	82, 83	82	--	83		
	242	61	61	--	61	--		
	SU	--	--	--	--	--	X	X

A low data rate was used to test the antenna port, conduct tests, and radiated spurious emissions, as it has the highest maximum power. For radiated bandedge, the following are the worst-case data rates set for the test:

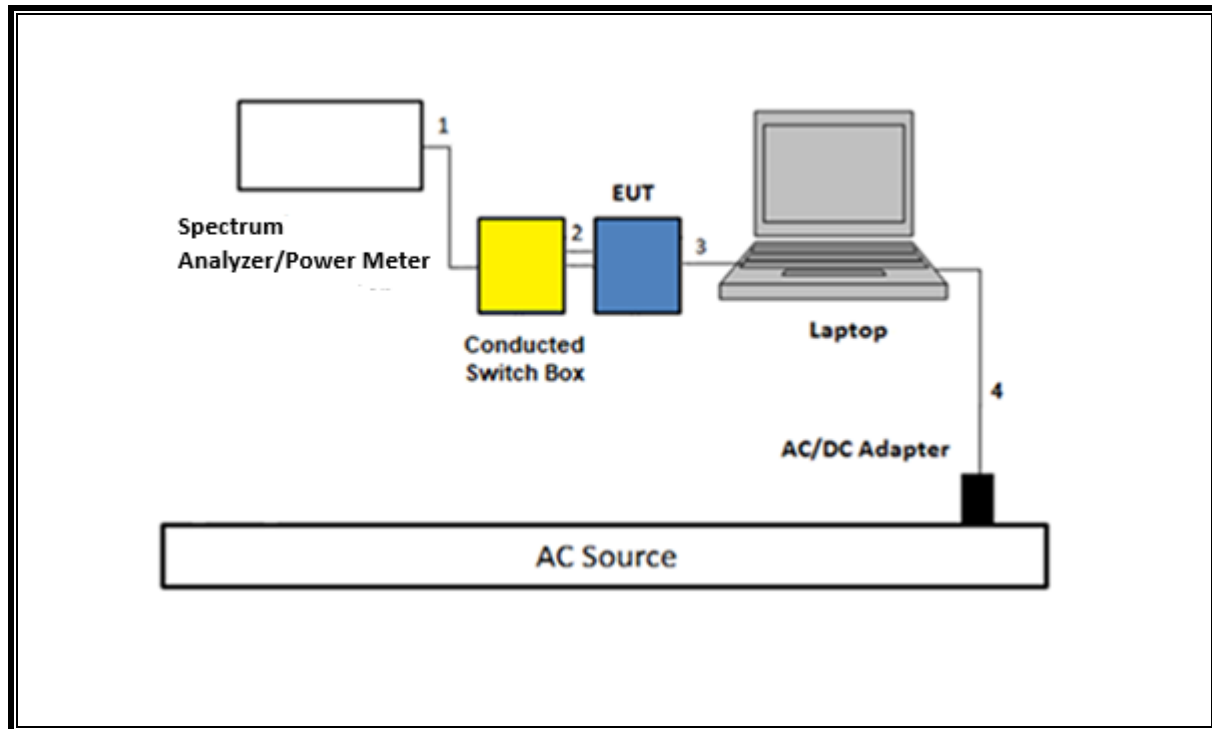
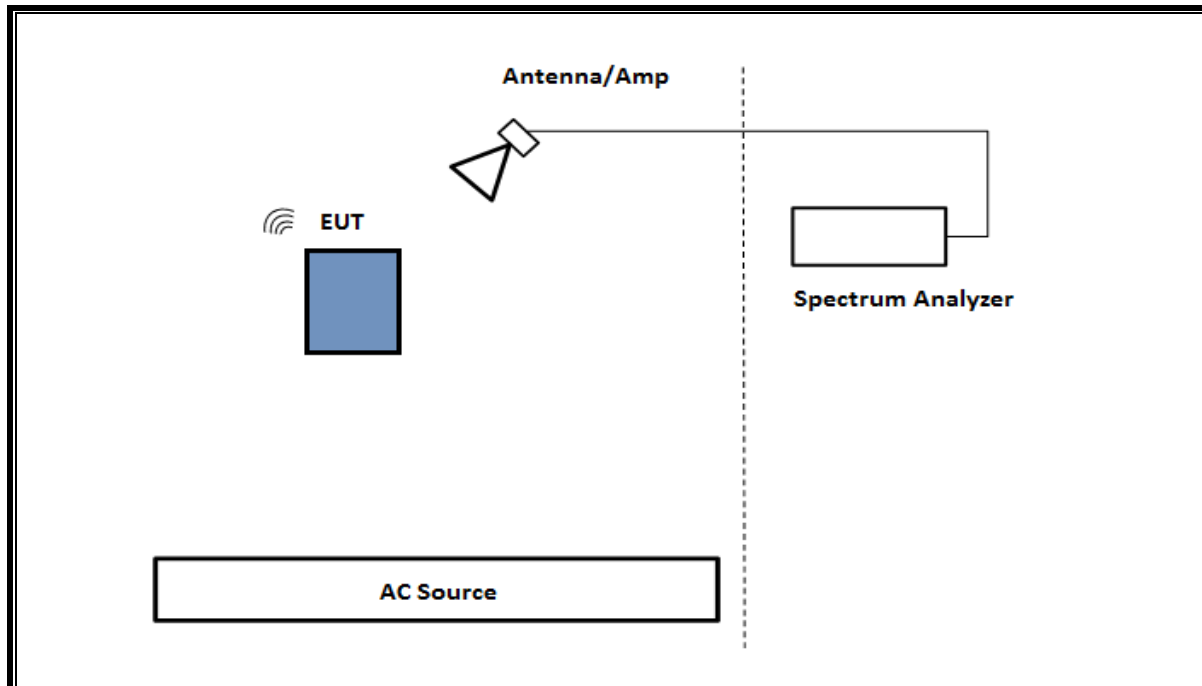
802.11b mode: 1 Mbps
 802.11n HT20 mode : MCS7
 802.11ax HE20 RU26 and SU, MCS9

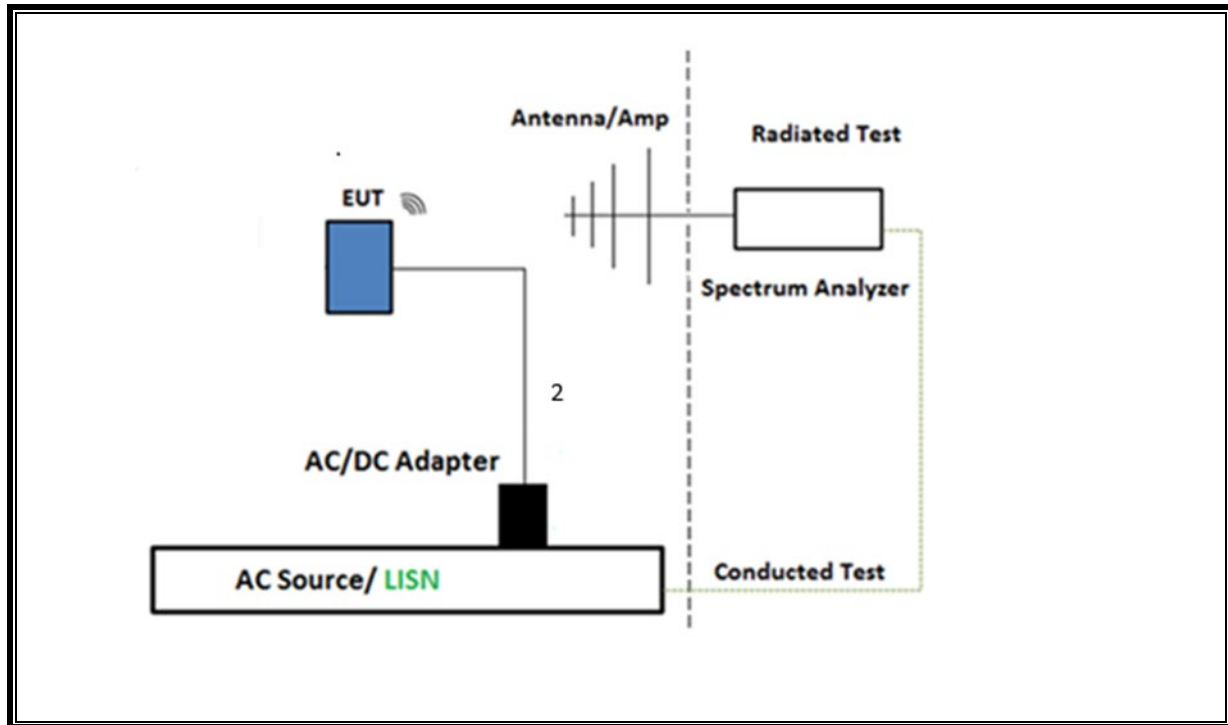
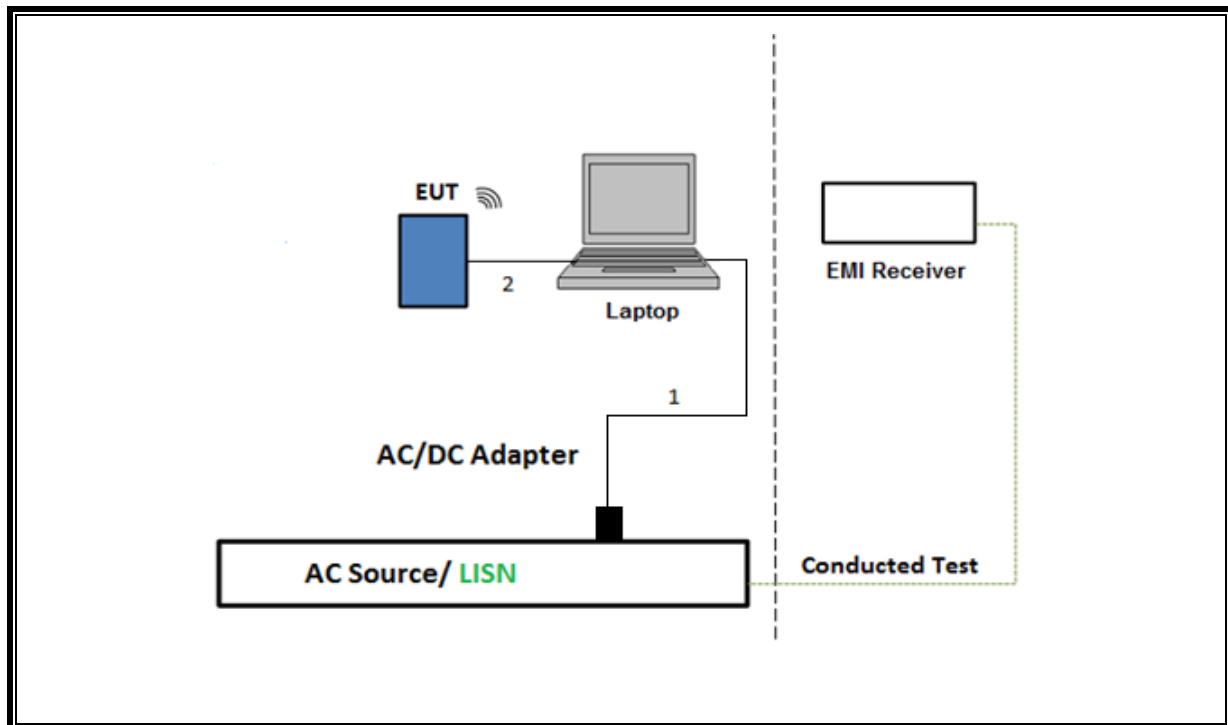
6.6. DESCRIPTION OF TEST SETUP

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	220322		N/A
I/O CABLES (RF CONDUCTED TEST)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	SMA	1	SMA	Shielded	0.2	To the spectrum Analyzer
2	Antenna	1	SMA	Shielded	0.2	EUT to Switchbox
3	USB	1	USB-C	Shield	1.0	N/A
4	DC	1	DC	Shield	2.0	N/A
I/O CABLES (RF RADIATED AND AC LINE CONDUCTED 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-C	Un-Shielded	1	N/A

TEST SETUP

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

SETUP DIAGRAM FOR CONDUCTED TESTS**SETUP DIAGRAM FOR RADIATED TESTS Above 1 GHz (1 to 26GHz)**

SETUP DIAGRAM FOR 30-1000MHz and AC LINE CONDUCTED TEST**TEST SETUP- AC LINE CONDUCTED: LAPTOP CONFIGURATION**

7. 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	3117	226674	2027-03-31
RF Filter Box, 1-18GHz	UL-FR1	RATS 1.0	250156	2026-10-30
EMI Test Receiver	Rohde & Schwarz	ESW44	225683	2026-02-28
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	84797	2026-10-31
RF Filter Box, 1-18GHz	UL-FR1	RATS 2.0	225079	2026-05-31
EMI Test Receiver	Rohde & Schwarz	ESW44	235670	2026-02-28
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	206806	2026-02-28
RF Filter Box, 1-18GHz	UL-FR1	RATS 1.0	173233	2026-04-29
EMI Test Receiver	Rohde & Schwarz	ESW44	235266	2026-02-28
Antenna, Passive Loop, 30Hz - 1MHz	Electro-Metrics	EM-6871	219909	2026-08-31
Antenna, Passive Loop, 100kHz to 30MHz	Electro-Metrics	EM-6872	219911	2026-08-31
Antenna, Broadband Hybrid 30 MHz - 2 or 3 GHz	Sunol Sciences Corp.	JB3	203090	2027-04-30
Amplifier, 10KHz to 1GHz, 32dB	Sonoma Instrument Co.	310N	89831	2027-04-30
Antenna, Horn 18-26.5GHz	A.R.A	MWH-1826/B	81140	2027-05-31
Link File, RF Amplifier Assembly, 18-26.5GHz, 60dB Gain	Ampical	AMP18G26.5-60	236106	2026-05-31
Antenna, Horn 1-18GHz	ETS-Lindgren (Cedar Park, Texas)	3117	200896	2026-04-30
Filter Box	UL-FR1	Frankenstein, 1 Amp, 12 Port	216812	2026-01-31
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	230548	2026-02-28
Spectrum Analyzer, PXA, 3Hz to 44GHz	N9030A	Keysight Technologies Inc	80400	2026-01-31
Conducted Switch Box	UL-FR1	CSB	220322	2026-10-31
Power Meter, P-series single channel	Keysight Technologies Inc	N1911A	90718	2026-01-31
Power Sensor, P-series, 50MHz to 18GHz, Wideband	Keysight Technologies Inc	N1921A	90419	2026-07-31

AC Line Conducted				
Description	Manufacturer	Model	ID Num	Cal Due
EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESR	171646	2026-02-28
LISN for Conducted Emissions CISPR-16	Fischer Custom Communications	FCC-LISN-50/250- 25-2-01-480V	175765	2026-01-31
Transient Limiter	TE	TBFL1	207996	2026-09-30
UL AUTOMATION SOFTWARE				
Radiated Software	UL	UL EMC	Ver 9.5	
Conducted Software	UL	Antenna Port	Ver 2.23	
Conducted Software	UL	Station Tool	Ver 3.0, 7.1, 9.0, 10.2, 11.1	
AC Line Conducted Software	UL	UL EMC	Ver 9.5	

*Testing is completed before equipment expiration date.

8. MEASUREMENT METHOD

Test Item	Test Method
On Time and Duty Cycle	ANSI C63.10 Section 11.6
6 dB BW	ANSI C63.10 Subclause -11.8.1 RBW $\geq$ DTS BW
99% BW	ANSI C63.10, Subclause 6.9.3.
Conducted Output Power	ANSI C63.10 Subclause -11.9.2.3.2 Method AVGPM G (Measurement using an RF average-reading power meter)
Power Spectral Density	ANSI C63.10 Subclause -11.10.3 Method AVGPSD-1
Radiated emissions non-restricted frequency bands	ANSI C63.10 Subclause -11.11 & Clause 13
Radiated emissions restricted frequency bands	ANSI C63.10 Subclause -11.12.1 & Clause 13
Conducted emissions in restricted frequency bands	ANSI C63.10 Subclause -11.12.2
Band-edge	ANSI C63.10 Subclause -11.13.3.2 & Clause 13: Integration method -Peak detection
Band-edge	ANSI C63.10 Subclause -11.13.3.3 & Clause 13: Integration method - Trace averaging with continuous transmission at full power
Radiated Spurious Emissions Below 30MHz	ANSI C63.10 Subclause 6.4 & Clause 13
AC Power Line Conducted Emissions	ANSI C63.10, Subclause 6.2

9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

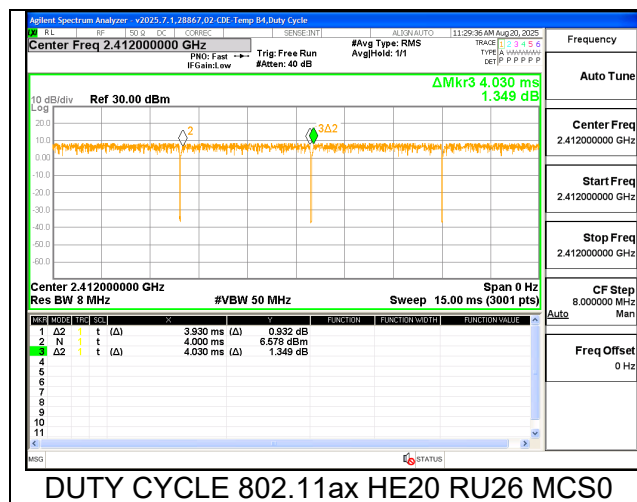
ANSI C63.10, Section 11.6: Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

Mode	Tone	Data Rate (Mbps)	ON Time T (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/T Minimum VBW (kHz)
b	--	1Mbps	12.41	12.430	0.9984	99.84	0.00	0.010
HT20	--	MCS0	3.765	3.790	0.9934	99.34	0.00	0.010
	--	MCS7	0.413	0.434	0.9516	95.16	0.22	2.424
HE20	SU	MCS0	1.487	1.508	0.9861	98.61	0.00	0.010
		MCS9	0.168	0.190	0.8842	88.42	0.53	5.952
	26	MCS0	3.930	4.030	0.9752	97.52	0.11	0.254
		MCS9	0.351	0.394	0.8896	88.96	0.51	2.853

Note: The duty cycle of 2TX is the same as that of 1TX.

DUTY CYCLE PLOTS



9.2. 99% BANDWIDTH LIMITS

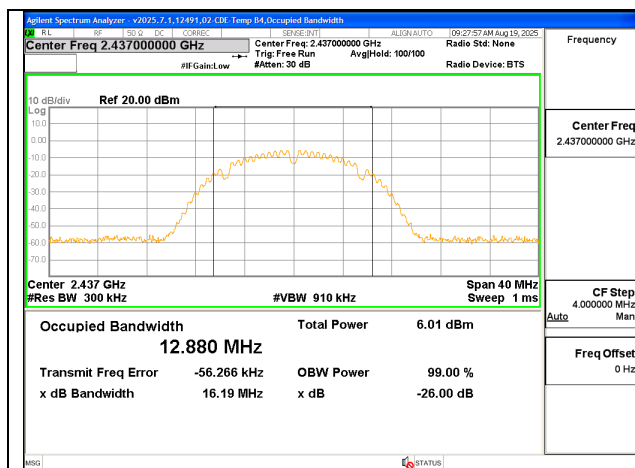
None; for reporting purposes only.

RESULTS

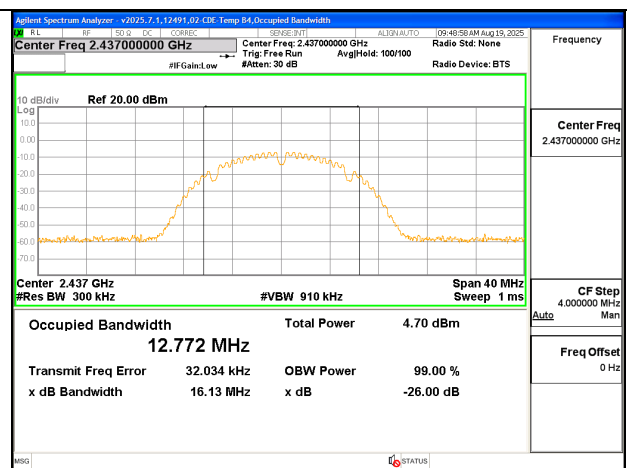
Both SISO and MIMO modes have been investigated. And the results are similar between these modes. The SISO mode data represents the MIMO mode and is reported as below.

SISO MODE

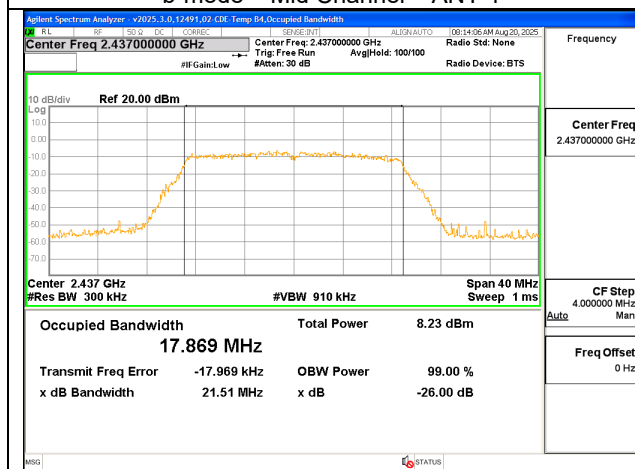
Mode	Frequency (MHz)	Channel Number	Tone	RU Index	99% Bandwidth (MHz)	
					ANT 4	ANT 3
b	2412	1	--	--	12.847	12.825
	2437	6	--	--	12.880	12.772
	2472	13	--	--	12.985	12.646
HT20	2412	1	--	--	17.897	17.856
	2437	6	--	--	17.869	17.869
	2472	13	--	--	17.870	17.687
HE20	2412	1	SU	--	18.840	18.959
			26	0	18.180	18.143
				4	16.926	16.876
				8	18.277	18.379
	2437	6	SU	--	18.990	18.931
			26	0	18.349	18.498
				4	16.973	16.757
				8	18.415	18.404
	2472	13	SU	--	19.000	18.896
			26	0	17.888	17.953
				4	16.906	16.472
				8	18.472	18.343



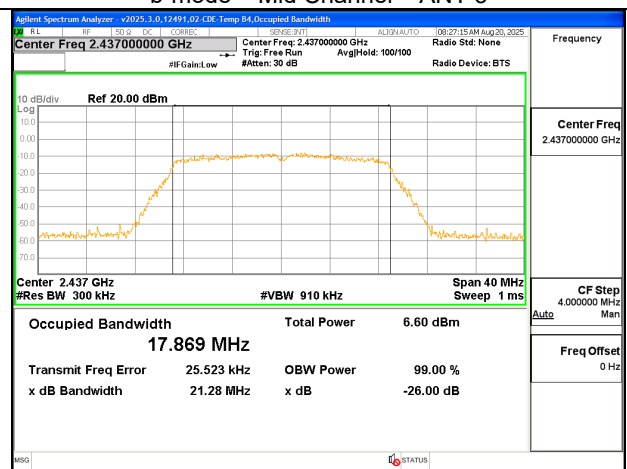
b-mode – Mid Channel – ANT 4



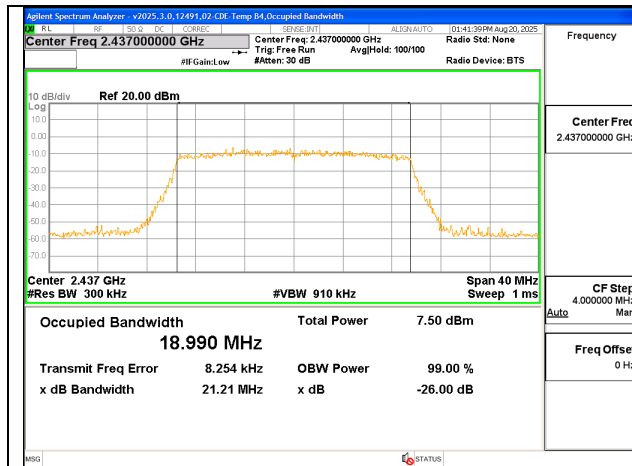
b-mode – Mid Channel – ANT 3



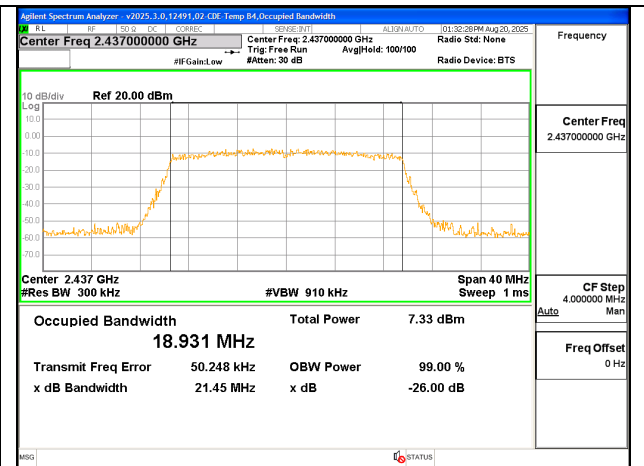
HT20-mode – Mid Channel – ANT 4



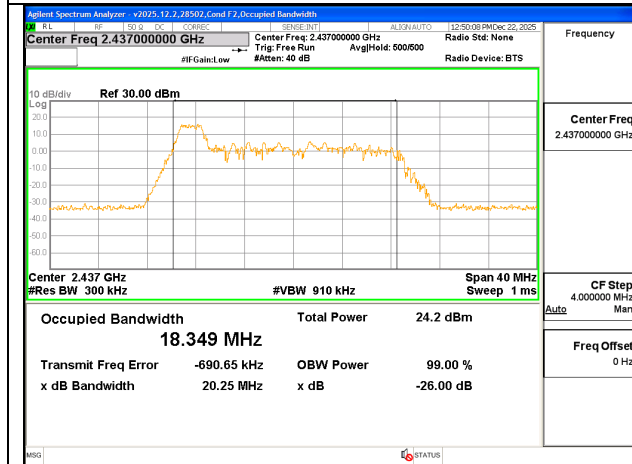
HT20-mode – Mid Channel – ANT 3



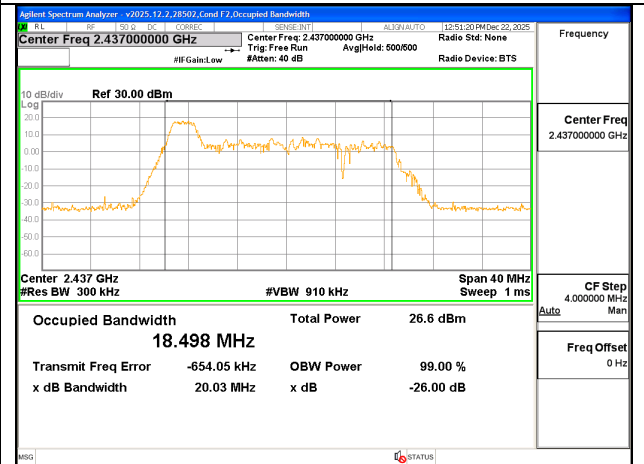
HE20-mode – Mid Channel – SU – ANT 4



HE20-mode – Mid Channel – SU – ANT 3



HE20-mode – Mid Channel – Partial RU0 – ANT 4



HE20-mode – Mid Channel – Partial RU0 – ANT 3

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.

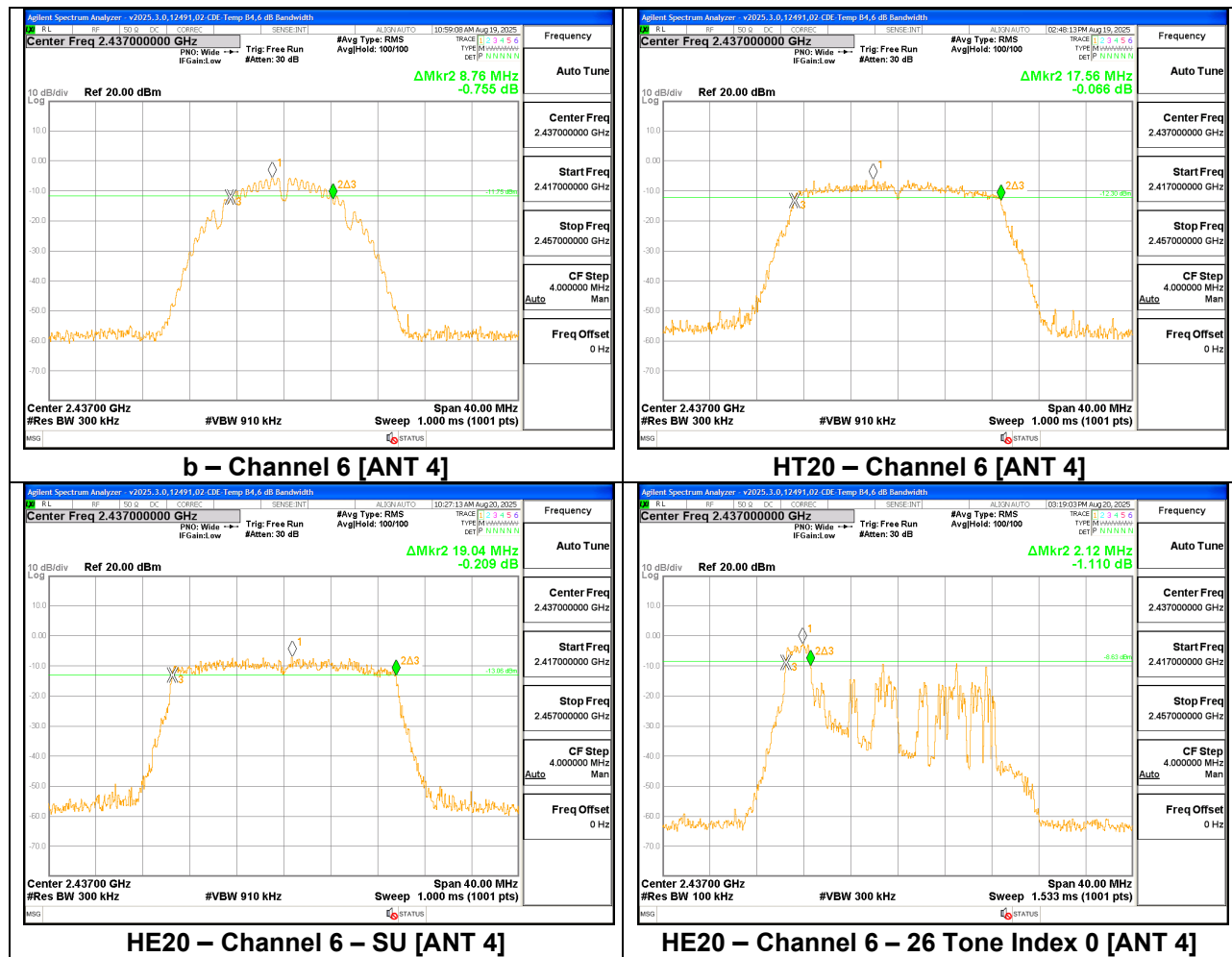
RESULTS

The 6dB bandwidth was measured for the narrowest bandwidth mode, b-Mode and 11ax-Mode 26-Tones, as the worst case to demonstrate compliance with the minimum required bandwidth of 500 kHz to cover all OFDMA modes.

Only the mid-channel plot is reported to show that the setting parameter complies with the testing method/procedure.

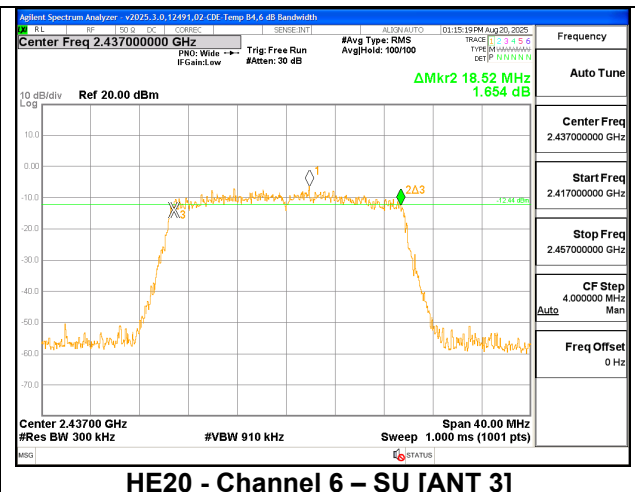
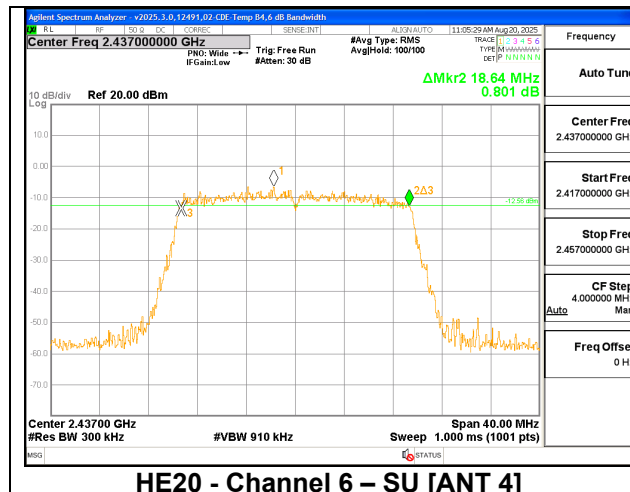
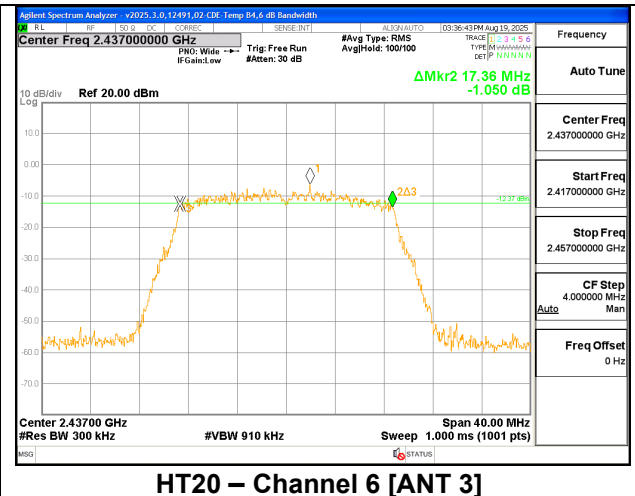
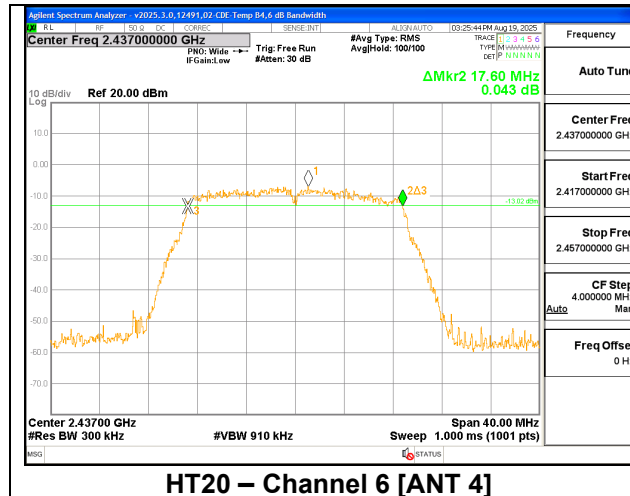
9.3.1. 802.11b/n/ax SISO MODE

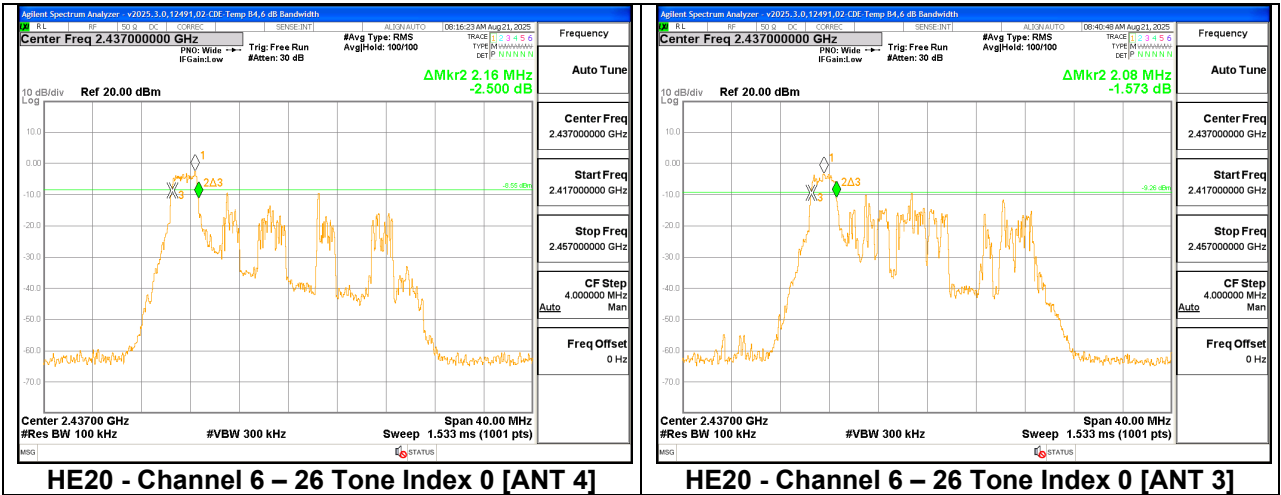
Mode (SISO)	Frequency (MHz)	Channel Number	Tone	RU Index	6dB Bandwidth (MHz)	
					ANT 4	ANT 3
b	2412	1	--	--	8.72	8.72
	2437	6	--	--	8.76	8.28
	2472	13	--	--	9.20	8.72
HT20	2412	1	--	--	17.68	17.64
	2437	6	--	--	17.56	17.32
	2472	13	--	--	17.64	17.24
HE20	2412	1	SU	--	18.84	18.88
			26	0	2.08	2.12
				4	2.68	2.68
				8	2.12	2.12
	2437	6	SU	--	19.04	18.76
			26	0	2.12	2.12
				4	2.64	2.60
				8	2.16	2.08
	2472	13	SU	--	19.00	18.76
			26	0	2.12	2.08
				4	2.64	2.72
				8	2.04	2.12



9.3.2. 802.11b/n/ax MIMO CDD MODE

Mode (MIMO)	Frequency (MHz)	Channel Number	Tone	RU Index	6dB Bandwidth (MHz)	
					ANT 4	ANT 3
HT20	2412	1	--	--	17.40	17.44
	2437	6	--	--	17.60	17.36
	2472	13	--	--	17.28	17.48
HE20	2412	1	SU	--	19.04	18.92
				0	2.08	2.20
				4	2.76	2.68
				8	2.16	2.08
	2437	6	SU	--	18.64	18.52
				0	2.16	2.08
				4	2.64	2.60
				8	2.16	2.08
	2472	13	SU	--	18.72	18.36
				0	2.08	2.12
				4	2.68	2.68
				8	2.12	2.08





9.4. OUTPUT POWER AND POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (b) (3) & (e)

RSS-247 5.4 (d) & 5.2 (b)

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.

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 are performed using a wideband RF power meter.

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

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 Gain (dBi)	ANT 3 Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)	Correlated Chains Directional Gain (dBi)
2.40	-3.70	-0.80	-2.01	0.88

DIRECTIONAL GAIN CALCULATION:

ANSI C63.10 section 14.6.3

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

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

Sample Calculation:

ANT 4 = -3.70 dB

ANT 3 = -0.80 dB

$$\text{Uncorrelated Directional Gain} = 10 * \text{LOG} \left[\frac{10^{\frac{-3.70}{10}} + 10^{\frac{-0.80}{10}}}{2} \right] = -2.01 \text{ dBi}$$

$$\text{Correlated Directional Gain} = 10 * \text{LOG} \left[\frac{\left(10^{\frac{-3.70}{20}} + 10^{\frac{-0.80}{20}} \right)^2}{2} \right] = 0.88 \text{ dBi}$$

RESULTS

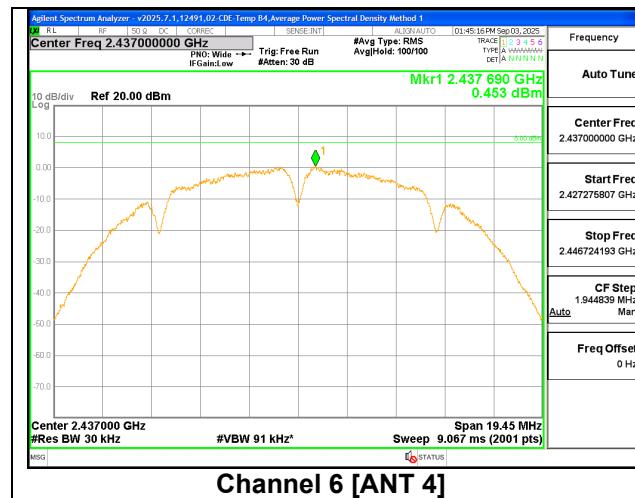
Only the mid-channel plot is reported to show that the setting parameters comply with the testing method/procedure.

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

9.4.1. 802.11b SISO MODE

DCCF (dB)	0.00
ANT 4 (dBi)	-3.70
ANT 3 (dBi)	-0.80

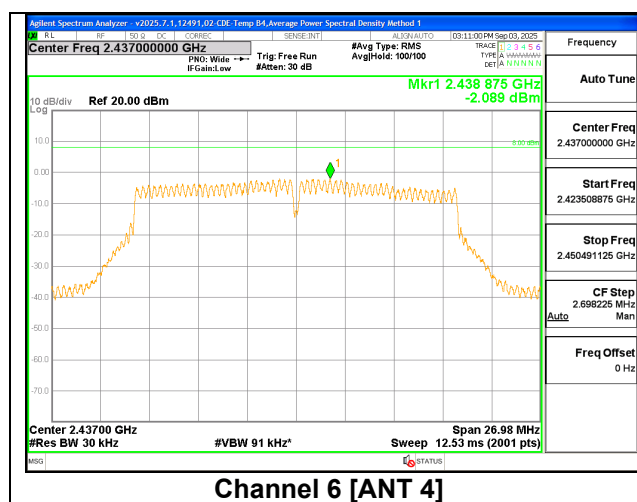
Mode (SISO)	Freq (MHz)	Ch. #	Power Limit (dBm)		Output Power (Gated) (dBm)		Total Corrected Power (dBm)		PSD Limit (dBm/3kHz)		PSD (dBm/kHz)		Total Corrected PSD (dBm/kHz)	
			ANT 4	ANT 3	ANT 4	ANT 3	ANT 4	ANT 3	ANT 4	ANT 3	ANT 4	ANT 3	ANT 4	ANT 3
b	2412	1	30	30	20.37	20.49	20.37	20.49	8.0	8.0	-1.111	-1.160	-1.111	-1.160
	2437	6			21.98	21.97	21.98	21.97			0.453	0.498	0.453	0.498
	2462	11			21.47	21.42	21.47	21.50			0.209	0.149	0.209	0.149
	2467	12			20.45	20.42	20.45	20.42			-0.896	-1.097	-0.896	-1.097
	2472	13			17.95	17.98	17.95	17.98			-3.732	-3.113	-3.732	-3.113



9.4.2. 802.11n HT20 SISO MODE

DCCF (MCS0) (dB)	0.00
ANT 4 (dBi)	-3.70
ANT 3 (dBi)	-0.80

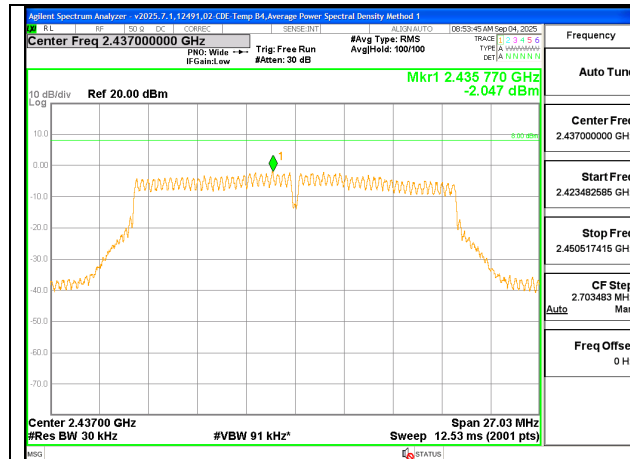
Mode (SISO)	Freq (MHz)	Ch. #	Power Limit (dBm)		Output Power (Gated) (dBm)		Total Corrected Power (dBm)		PSD Limit (dBm/3kHz)		PSD (dBm/kHz)		Total Corrected PSD (dBm/kHz)	
			ANT 4	ANT 3	ANT 4	ANT 3	ANT 4	ANT 3	ANT 4	ANT 3	ANT 4	ANT 3	ANT 4	ANT 3
HT20	2412	1	30	30	18.48	18.46	18.48	18.46	8.0	8.0	-5.666	-5.692	-5.666	-5.692
	2417	2			19.98	19.93	19.98	19.93			-4.538	-4.207	-4.538	-4.207
	2422	3			21.47	21.49	21.47	21.49			-3.276	-3.248	-3.276	-3.248
	2437	6			21.96	21.95	21.96	21.95			-2.089	-1.830	-2.089	-1.830
	2452	9			21.44	21.45	21.44	21.45			-3.246	-2.906	-3.246	-2.906
	2457	10			19.48	19.48	19.48	19.48			-4.078	-4.173	-4.078	-4.173
	2462	11			17.75	17.90	17.75	17.90			-5.852	-6.141	-5.852	-6.141
	2467	12			15.45	15.42	15.45	15.42			-8.777	-8.956	-8.777	-8.956
	2472	13			12.92	12.80	12.92	12.80			-10.347	-10.494	-10.347	-10.494



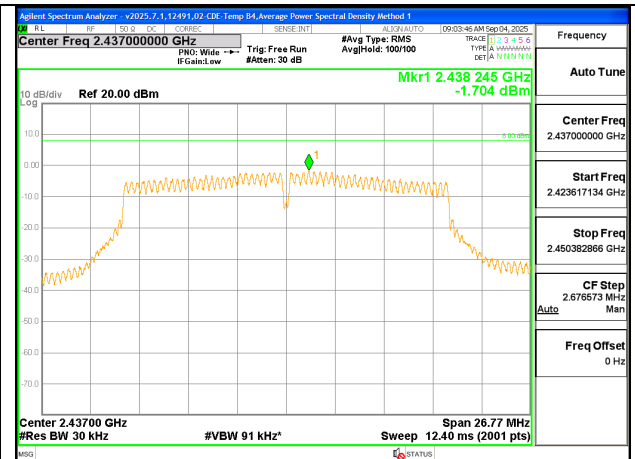
9.4.3. 802.11n HT20 MIMO MODE

DCCF (MCS0) (dB)	0.00
Uncorrelated Gain	-2.01
Correlated Gain	0.88

Mode (SISO)	Freq (MHz)	Ch. #	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	30	17.46	17.45	20.47	8	-6.625	-6.862	-3.732
	2417	2		18.92	18.89	21.92		-4.611	-4.864	-1.725
	2422	3		19.94	19.90	22.93		-4.116	-4.223	-1.159
	2427	4		21.80	21.96	24.89		-2.093	-1.971	0.979
	2437	6		21.96	21.98	24.98		-2.047	-1.704	1.138
	2447	8		21.98	21.93	24.97		-2.100	-1.941	0.991
	2452	9		19.96	19.97	22.98		-4.425	-4.173	-1.287
	2457	10		18.95	18.88	21.93		-4.773	-4.873	-1.812
	2462	11		17.47	17.44	20.47		-6.253	-6.730	-3.475
	2467	12		14.96	14.95	17.97		-8.739	-8.946	-5.831
	2472	13		11.91	11.93	14.93		-11.618	-11.481	-8.539



Channel 6 [ANT 4]

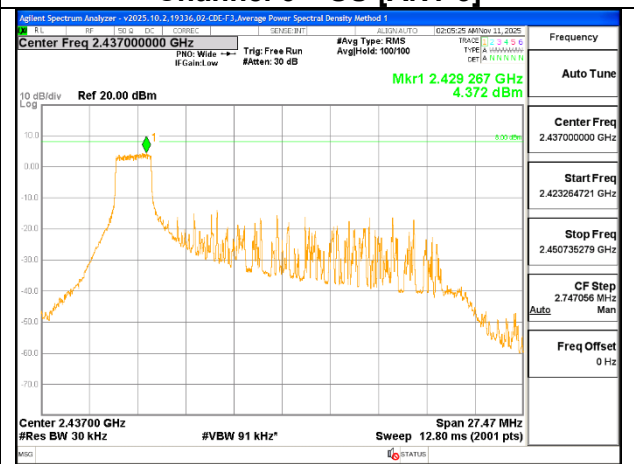
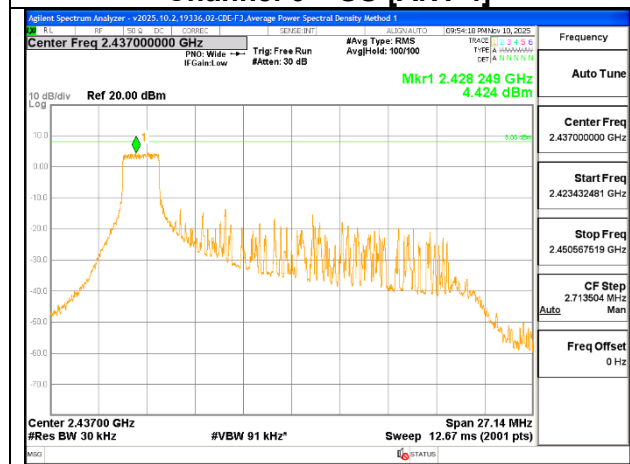
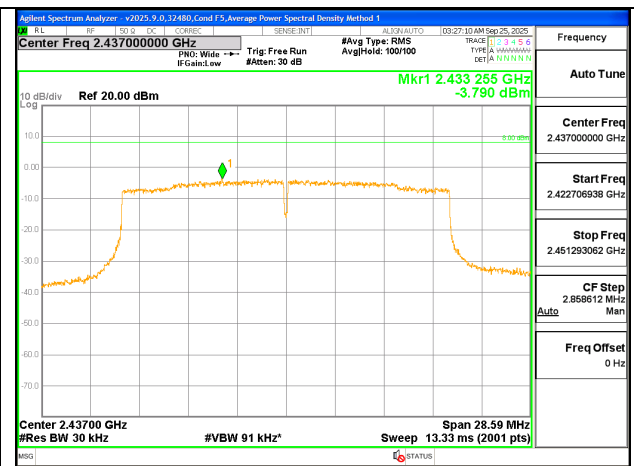
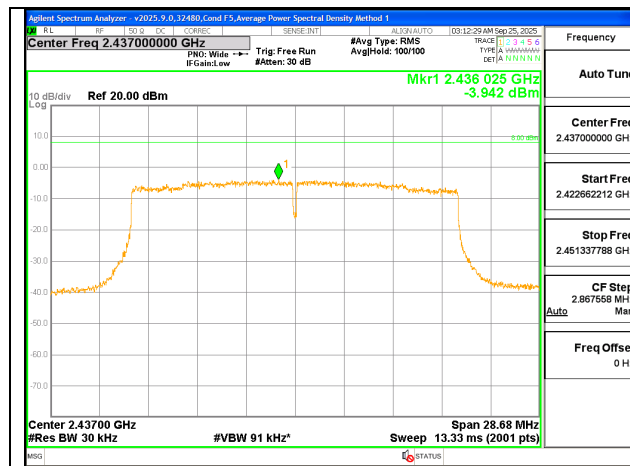


Channel 6 [ANT 3]

9.4.4. 802.11ax HE20 SISO MODE

	SU	26T
DCCF (MCS0) (dB)	0.00	0.11
ANT 4 (dBi)	-3.70	
ANT 3 (dBi)	-0.80	

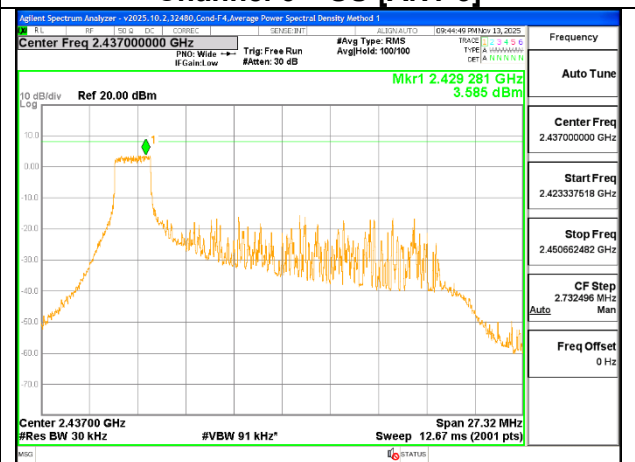
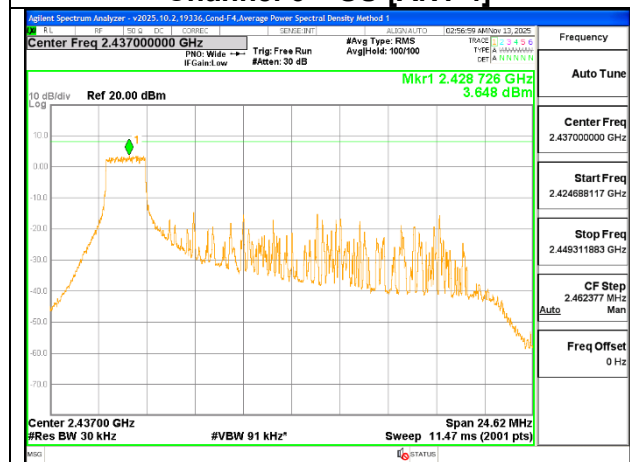
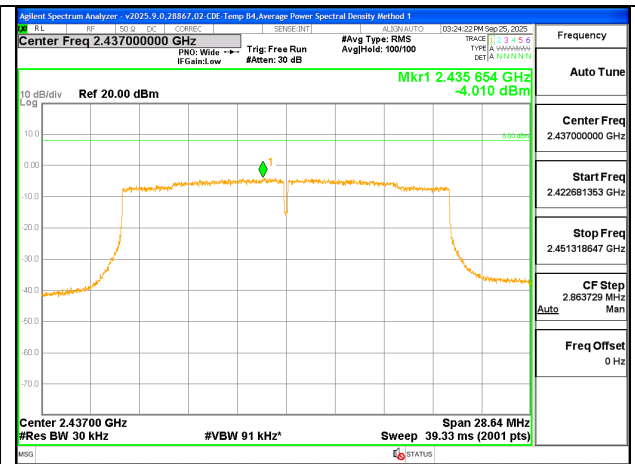
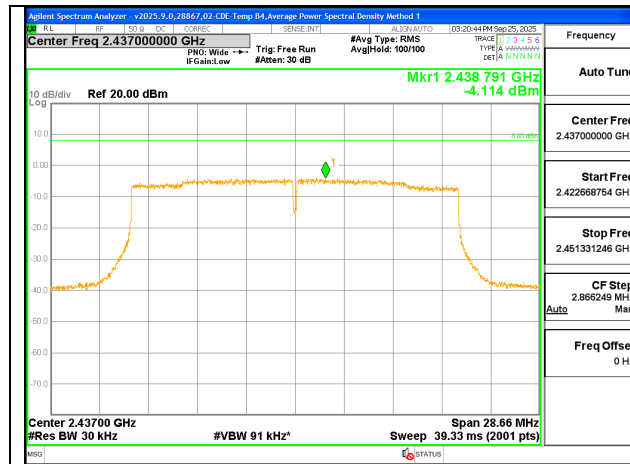
Mode (SISO)	Freq (MHz)	Ch. #	Tone	RU Index	Power Limit (dBm)		Output Power (Gated) (dBm)		Total Corrected Power (dBm)		PSD Limit (dBm/3kHz)		PSD (dBm/kHz)		Total Corrected PSD (dBm/kHz)	
					ANT 4	ANT 3	ANT 4	ANT 3	ANT 4	ANT 3	ANT 4	ANT 3	ANT 4	ANT 3	ANT 4	ANT 3
HE20	2412	1	SU	--	30	30	17.49	17.47	17.49	17.47	8	8	-7.794	-7.770	-7.794	-7.770
				0			15.95	15.97	15.95	15.97			-1.128	-0.911	-1.018	-0.801
			26	4			15.97	15.96	15.97	15.96			-0.954	-1.014	-0.844	-0.904
				8			15.97	15.98	15.97	15.98			-0.905	-0.880	-0.795	-0.770
	2417	2	SU	--			18.71	18.72	18.71	18.72			-6.997	-7.038	-6.997	-7.038
				0			17.91	17.93	17.91	17.93			0.941	1.011	1.051	1.121
			26	4			17.91	17.95	17.91	17.95			0.914	1.123	1.024	1.233
				8			17.93	17.95	17.93	17.95			1.026	1.160	1.136	1.270
	2422	3	SU	--			20.97	20.98	20.97	20.98			-4.607	-4.736	-4.607	-4.736
				0			20.42	20.47	20.42	20.47			3.435	3.408	3.545	3.518
			26	4			20.44	20.46	20.44	20.46			3.219	3.416	3.329	3.526
				8			20.42	20.41	20.42	20.41			3.361	3.291	3.471	3.401
	2427	4	SU	--			21.99	21.80	21.99	21.80			-4.390	-4.103	-4.390	-4.103
				0			21.92	21.91	21.92	21.91			4.495	4.429	4.605	4.539
			26	4			21.94	21.94	21.94	21.94			4.596	4.560	4.706	4.670
				8			21.93	21.91	21.93	21.91			4.526	4.431	4.636	4.541
	2437	6	SU	--			21.95	21.97	21.95	21.97			-3.942	-3.790	-3.942	-3.790
				0			21.91	21.90	21.91	21.90			4.424	4.372	4.534	4.482
			26	4			21.92	21.92	21.92	21.92			4.478	4.477	4.588	4.587
				8			21.92	21.92	21.92	21.92			4.467	4.497	4.577	4.607
	2452	9	SU	--			20.74	20.70	20.74	20.70			-5.190	-4.894	-5.190	-4.894
				0			20.44	20.47	20.44	20.47			3.097	3.242	3.207	3.352
			26	4			20.48	20.47	20.48	20.47			3.410	3.441	3.520	3.551
				8			20.47	20.44	20.47	20.44			3.342	3.400	3.452	3.510
	2457	10	SU	--			18.94	18.98	18.94	18.98			-5.883	-6.702	-5.883	-6.702
				0			17.99	17.89	17.99	17.89			0.753	1.059	0.863	1.169
			26	4			17.92	17.87	17.92	17.87			0.511	1.073	0.621	1.183
				8			17.95	17.94	17.95	17.94			1.313	1.063	1.423	1.173
	2462	11	SU	--			17.49	17.48	17.49	17.48			-7.612	-7.928	-7.612	-7.928
				0			16.17	16.16	16.17	16.16			-0.759	-0.798	-0.649	-0.688
			26	4			16.20	16.17	16.20	16.17			-0.723	-0.776	-0.613	-0.666
				8			16.19	16.20	16.19	16.20			-0.739	-0.720	-0.629	-0.610
	2467	12	SU	--			14.91	14.93	14.91	14.93			-9.800	-9.817	-9.800	-9.817
				0			14.18	14.21	14.18	14.21			-2.379	-2.236	-2.269	-2.126
			26	4			14.20	14.20	14.20	14.20			-2.262	-2.307	-2.152	-2.197
				8			14.16	14.18	14.16	14.18			-2.458	-2.398	-2.348	-2.288
	2472	13	SU	--			8.99	8.98	8.99	8.98			-16.413	-16.301	-16.413	-16.301
				0			-0.23	-0.10	-0.23	-0.10			-16.920	-17.063	-16.810	-16.953
			26	4			-0.22	-0.17	-0.22	-0.17			-17.157	-17.004	-17.047	-16.894
				8			-0.25	-0.20	-0.25	-0.20			-17.436	-17.079	-17.326	-16.969



9.4.5. 802.11ax HE20 MIMO MODE

	SU	26T
DCCF (MCS0) (dB)	0.00	0.11
Uncorrelated Gain	-2.01	-2.01
Correlated Gain	0.88	0.88

Mode (MIMO)	Freq (MHz)	Ch. #	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	SU	--	30.00	15.96	15.94	18.96	8.0	-9.317	-9.668	-6.479
				0		14.96	14.95	17.97		-1.498	-1.562	1.590
			26	4		14.94	14.93	17.95		-1.625	-1.660	1.478
				8		14.94	14.94	17.95		-1.600	-1.613	1.514
	2417	2	SU	--		17.73	17.72	20.74		-7.696	-7.086	-4.370
				0		16.92	16.90	19.92		0.330	0.214	3.393
			26	4		16.92	16.92	19.93		0.283	0.307	3.415
				8		16.91	16.93	19.93		0.241	0.395	3.439
	2422	3	SU	--		18.99	18.92	21.97		-6.693	-6.948	-3.808
				0		18.40	18.40	21.41		1.393	1.363	4.498
			26	4		18.40	18.41	21.42		1.277	1.406	4.462
				8		18.42	18.40	21.42		1.445	1.318	4.502
	2427	4	SU	--		21.97	21.92	24.96		-4.084	-4.289	-1.175
				0		21.20	21.17	24.20		3.769	3.648	6.829
			26	4		21.20	21.17	24.20		3.792	3.647	6.840
				8		21.18	21.20	24.20		3.681	3.746	6.834
	2437	6	SU	--		21.95	21.96	24.97		-4.114	-4.010	-1.051
				0		21.18	21.15	24.18		3.648	3.585	6.737
			26	4		21.19	21.16	24.19		3.712	3.612	6.783
				8		21.15	21.15	24.16		3.590	3.561	6.696
	2447	8	SU	--		21.94	21.90	24.93		-3.969	-3.968	-0.958
				0		21.42	21.44	24.44		4.078	4.265	7.293
			26	4		21.44	21.43	24.45		4.261	4.169	7.336
				8		21.41	21.44	24.44		4.031	4.243	7.259
	2452	9	SU	--		18.97	18.88	21.94		-6.772	-7.029	-3.888
				0		18.40	18.40	21.41		1.346	1.326	4.456
			26	4		18.40	18.40	21.41		1.278	1.266	4.392
				8		18.40	18.41	21.42		1.286	1.379	4.453
	2457	10	SU	--		17.72	17.57	20.66		-8.077	-8.018	-5.037
				0		17.44	17.45	20.46		0.790	0.831	3.931
			26	4		17.43	17.40	20.43		0.755	0.686	3.841
				8		17.45	17.46	20.47		0.813	0.852	3.953
	2462	11	SU	--		16.42	16.45	19.45		-8.749	-8.876	-5.802
				0		15.48	15.48	18.49		-1.295	-1.280	1.833
			26	4		15.47	15.47	18.48		-1.357	-1.346	1.769
				8		15.47	15.48	18.49		-1.380	-1.278	1.792
	2467	12	SU	--		13.92	13.96	16.95		-11.290	-11.385	-8.327
				0		13.18	13.17	16.19		-3.224	-3.298	-0.141
			26	4		13.16	13.16	16.17		-3.325	-3.361	-0.223
				8		13.18	13.18	16.19		-3.240	-3.213	-0.106
	2472	13	SU	--		8.93	8.92	11.94		-17.072	-17.019	-14.035
				0		-1.20	-1.25	1.79		-18.328	-18.470	-15.278
			26	4		-1.20	-1.18	1.82		-18.347	-18.631	-15.366
				8		-1.15	-1.20	1.84		-18.201	-18.308	-15.134



9.5. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

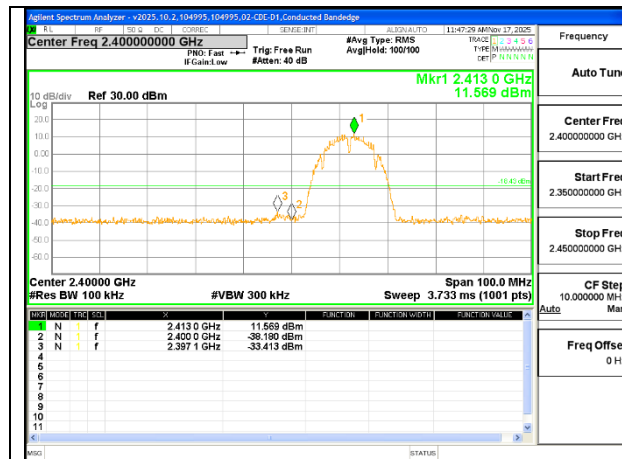
RSS-247 5.5

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)).

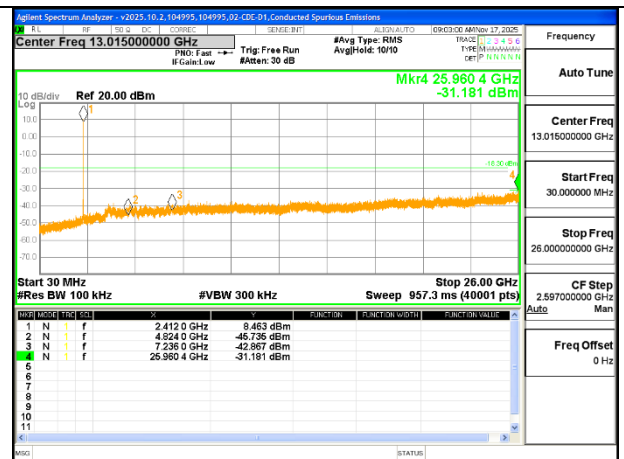
RESULTS

9.5.1. 802.11b MODE 1TX

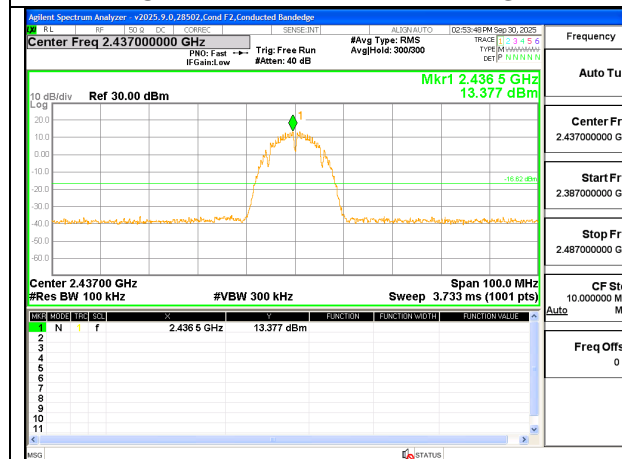
1TX ANT 4 MODE



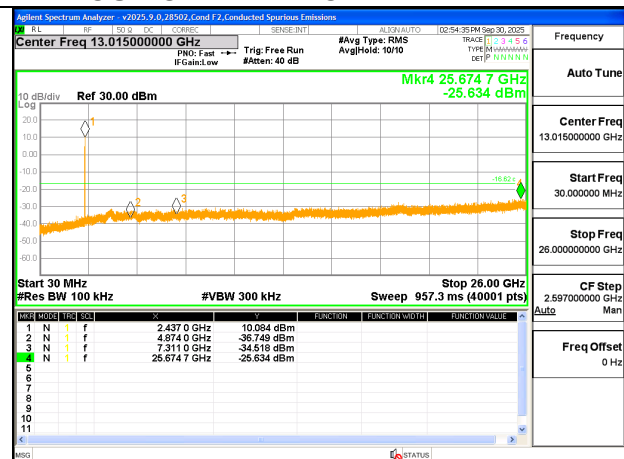
LOW CHANNEL 1 BANDEDGE



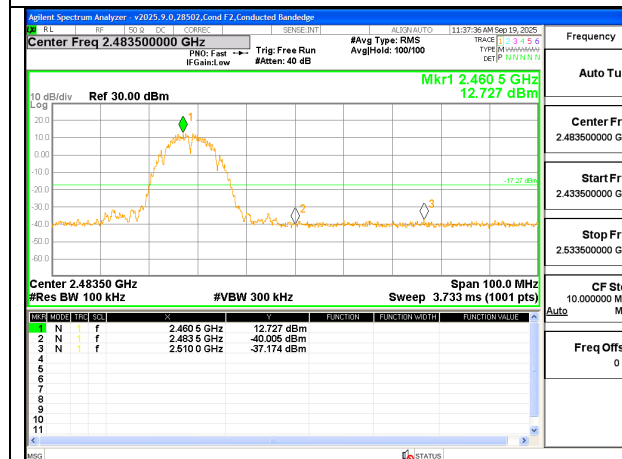
OUT-OF-BAND LOW CHANNEL 1



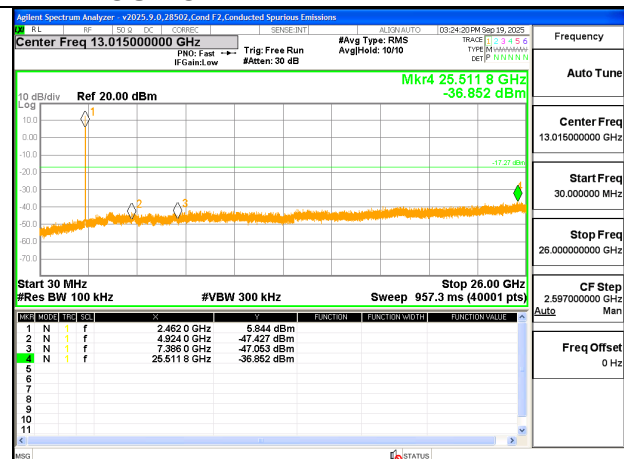
IN-BAND REFERENCE LEVEL



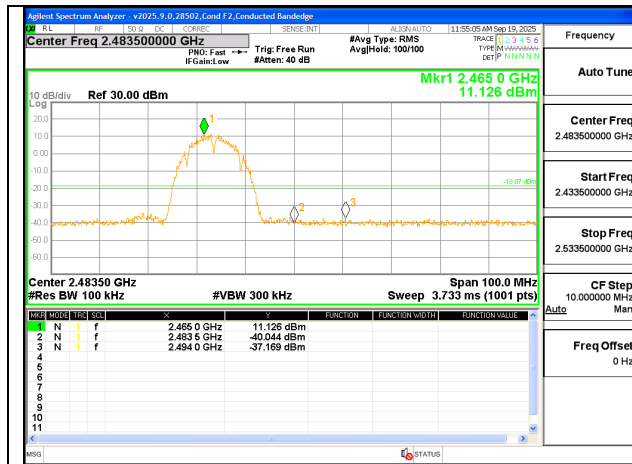
OUT-OF-BAND MID CHANNEL



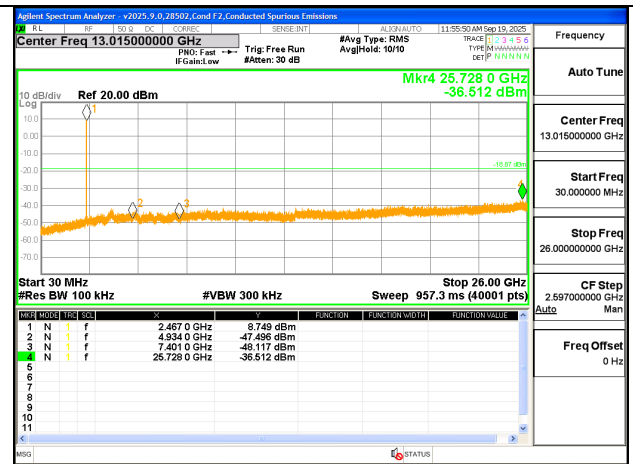
HIGH CHANNEL 11 BANDEDGE



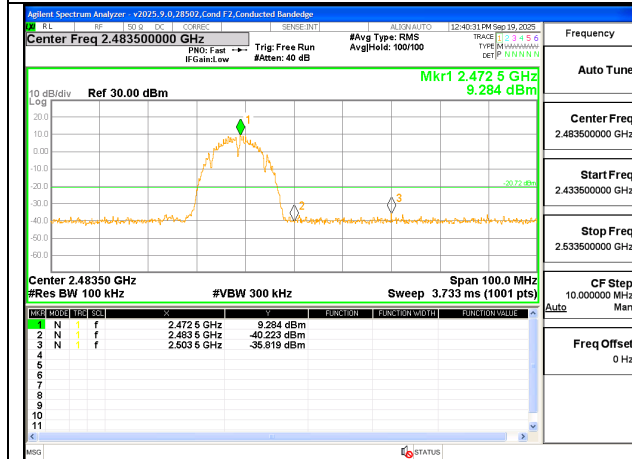
OUT-OF-BAND HIGH CHANNEL 11



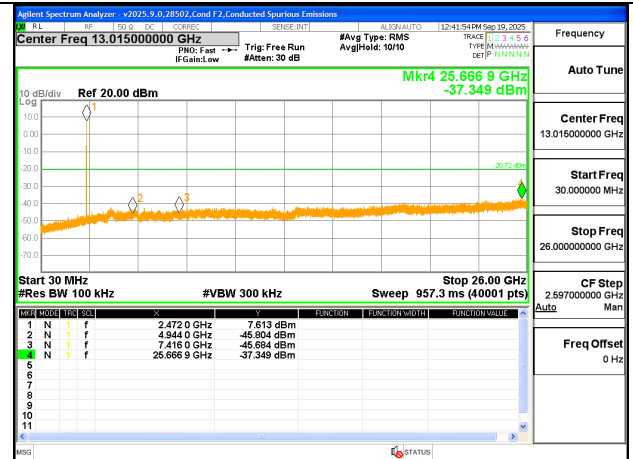
HIGH CHANNEL 12 BANDEGE



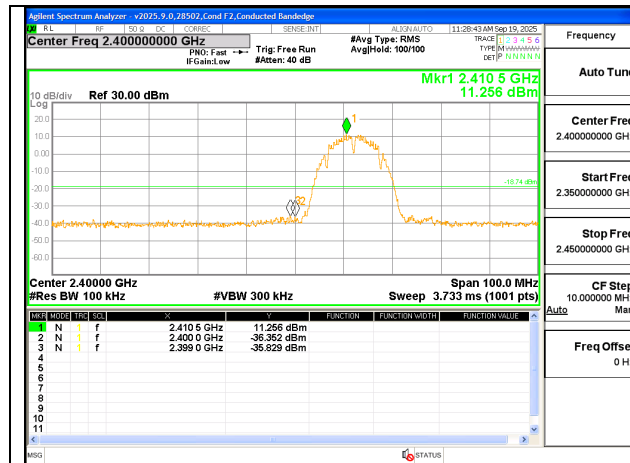
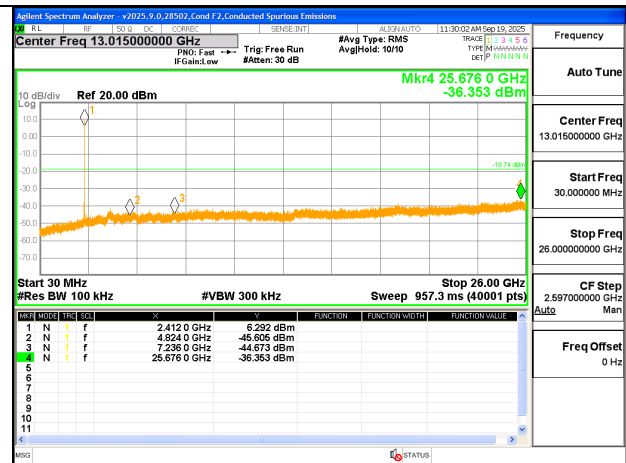
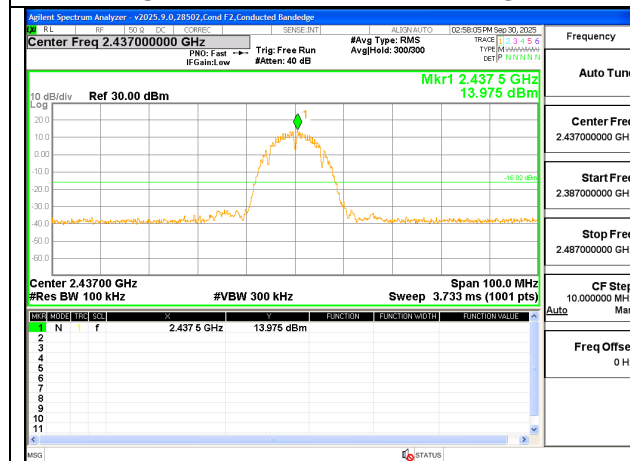
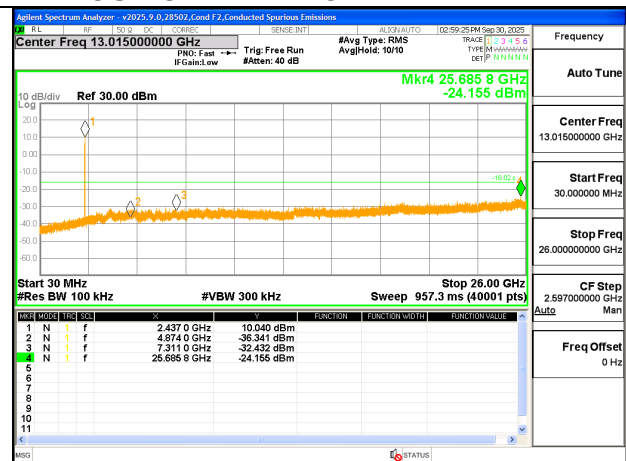
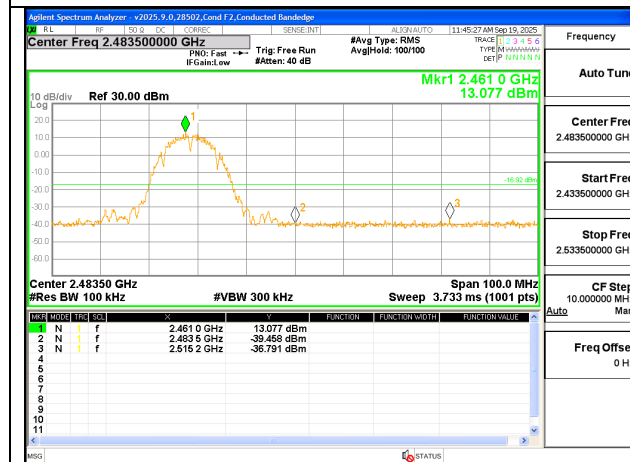
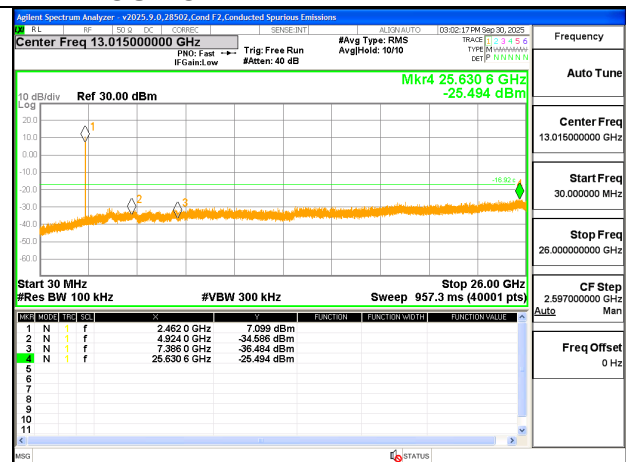
OUT-OF-BAND HIGH CHANNEL 12

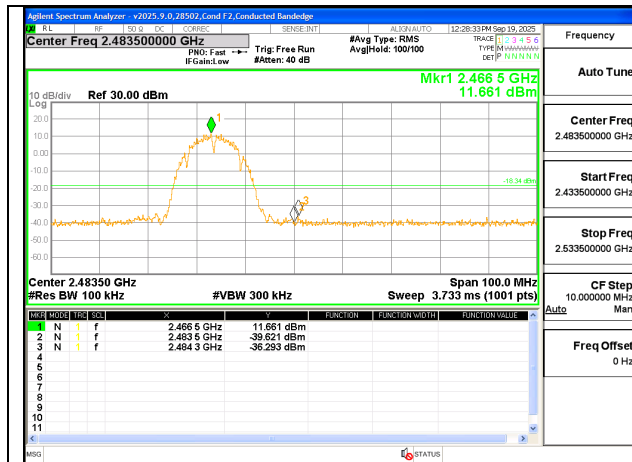


HIGH CHANNEL 13 BANDEGE

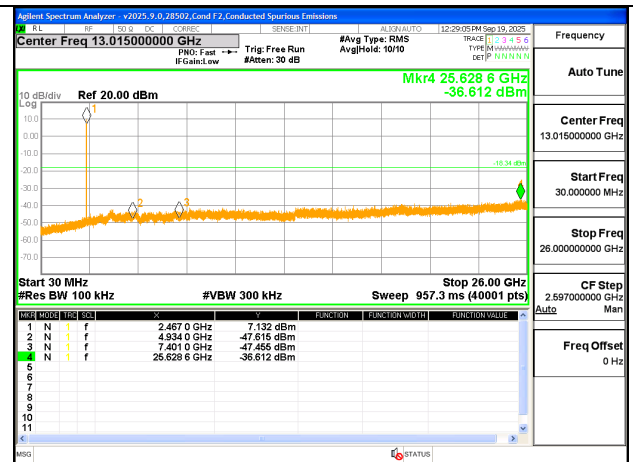


OUT-OF-BAND HIGH CHANNEL 13

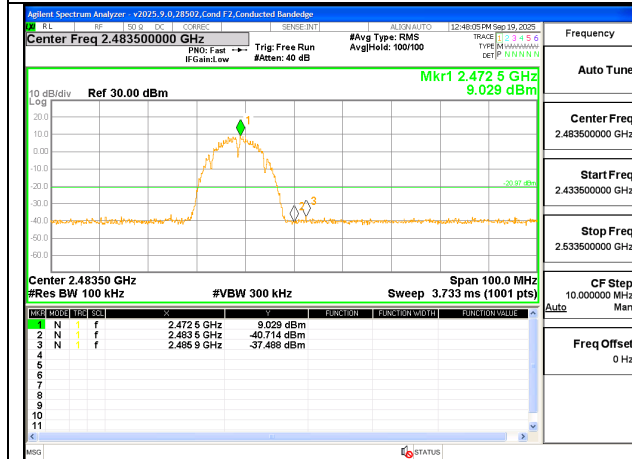
1TX ANT 3 MODE**LOW CHANNEL 1 BANDEDGE****OUT-OF-BAND LOW CHANNEL 1****IN-BAND REFERENCE LEVEL****OUT-OF-BAND MID CHANNEL****HIGH CHANNEL 11 BANDEDGE****OUT-OF-BAND HIGH CHANNEL 11**



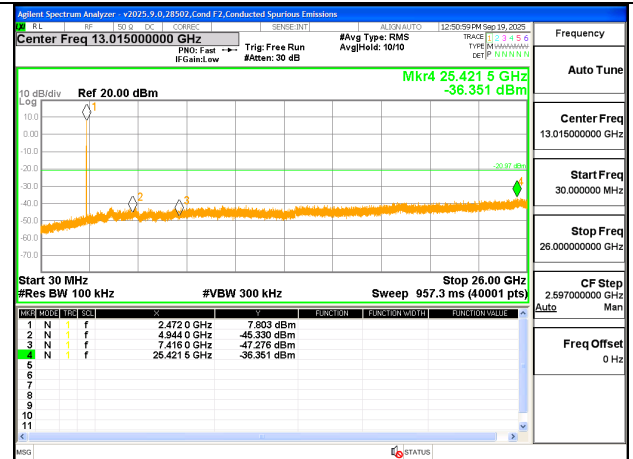
HIGH CHANNEL 12 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 12



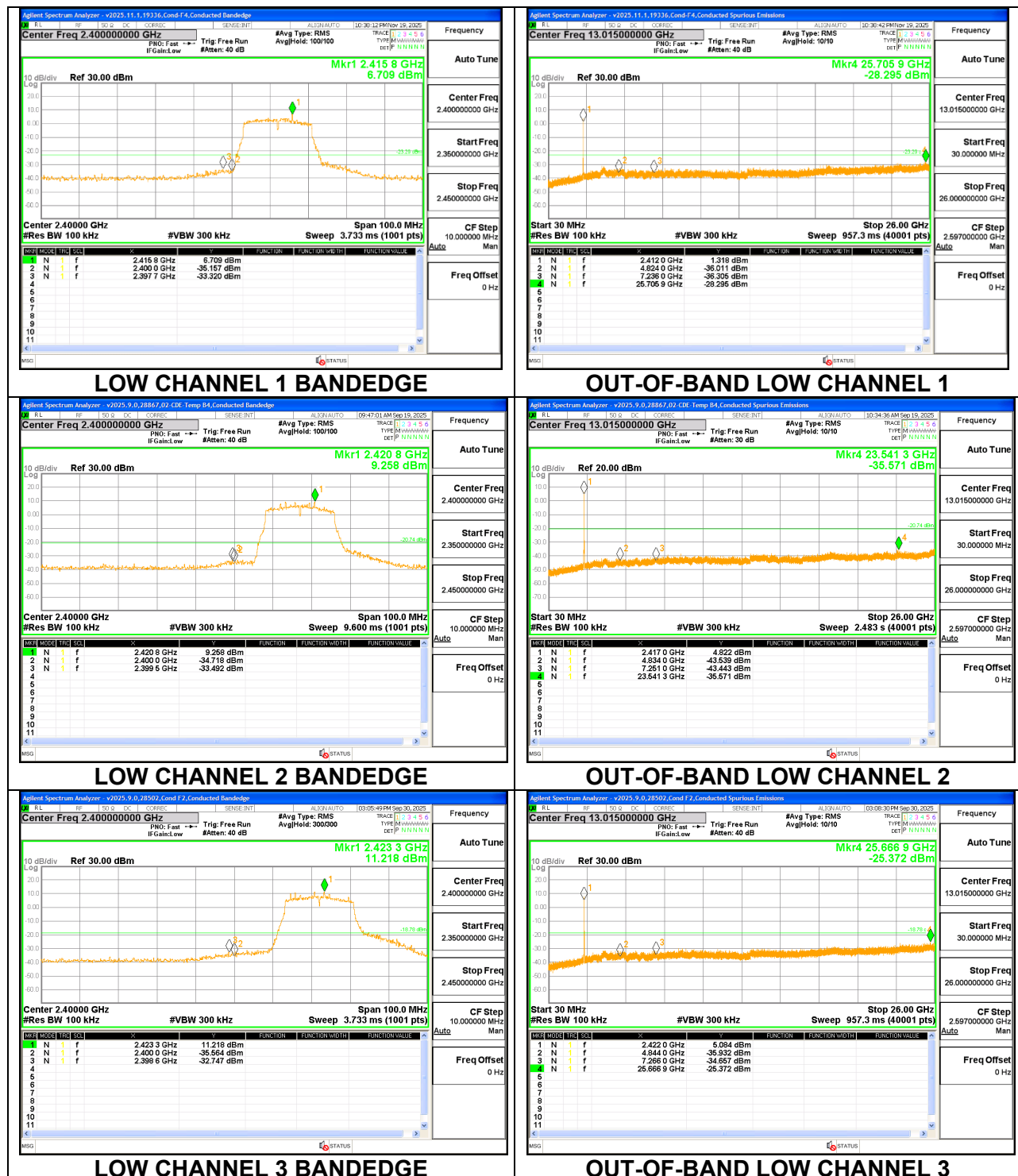
HIGH CHANNEL 13 BANDEDGE

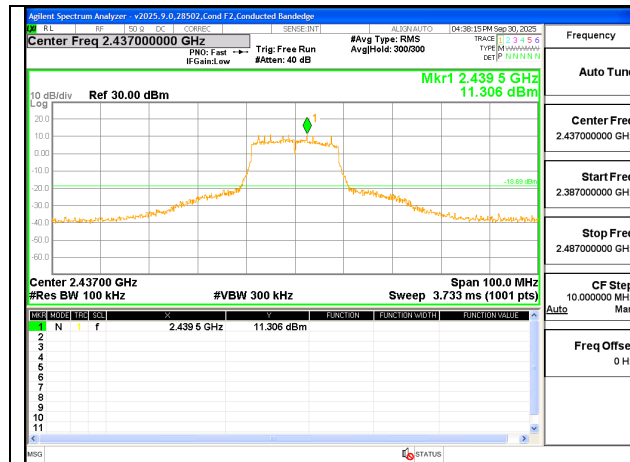


OUT-OF-BAND HIGH CHANNEL 13

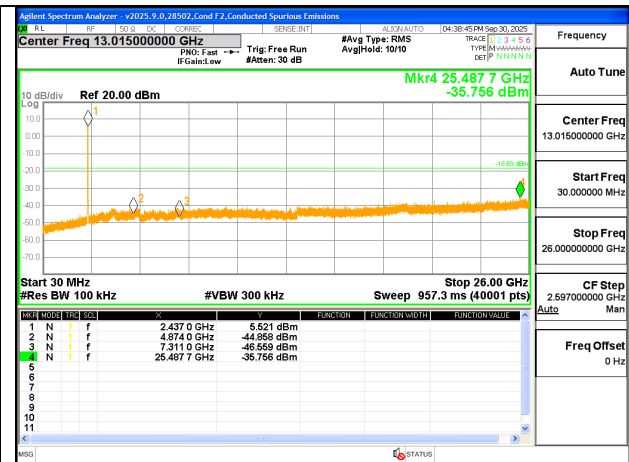
9.5.2. 802.11n HT20 SISO MODE

1TX ANT 4 MODE

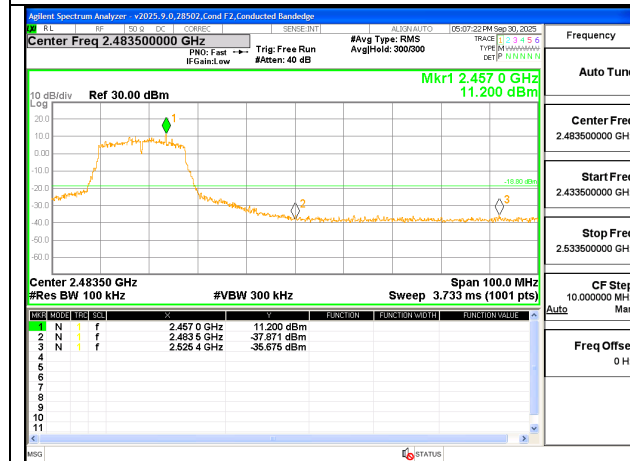




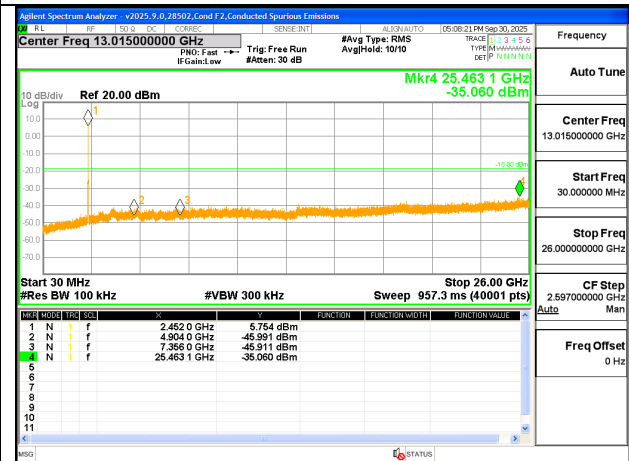
IN-BAND REFERENCE LEVEL



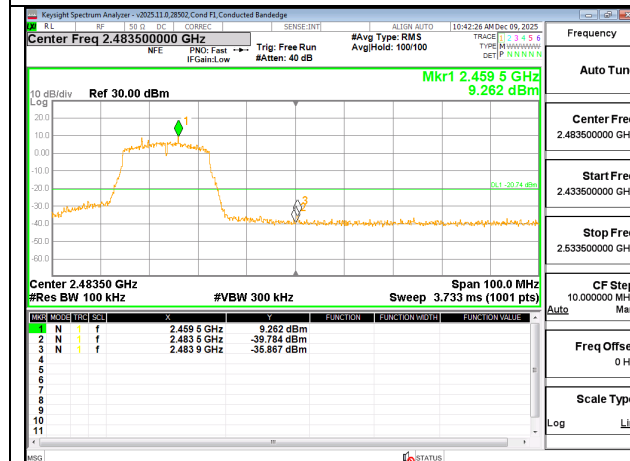
OUT-OF-BAND MID CHANNEL



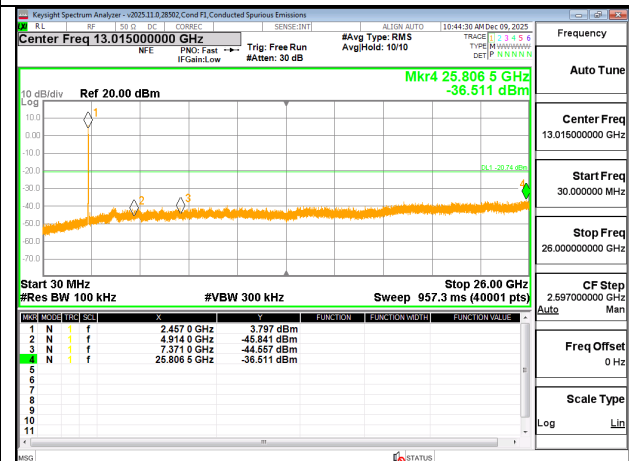
HIGH CHANNEL 9 BANDEDGE



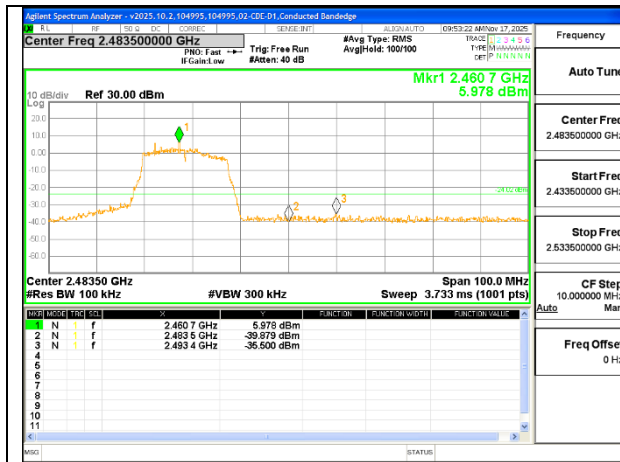
OUT-OF-BAND HIGH CHANNEL 9



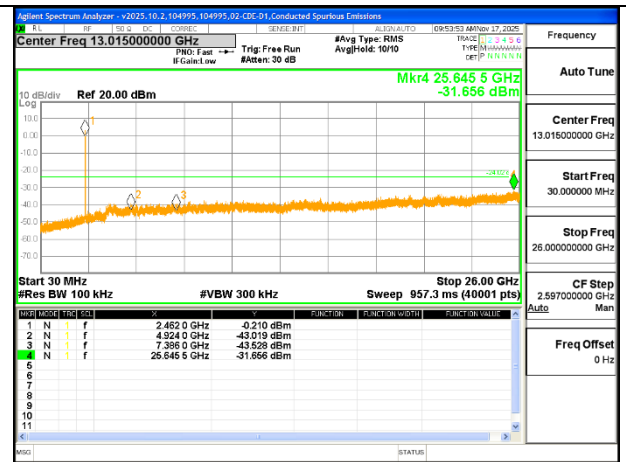
HIGH CHANNEL 10 BANDEDGE



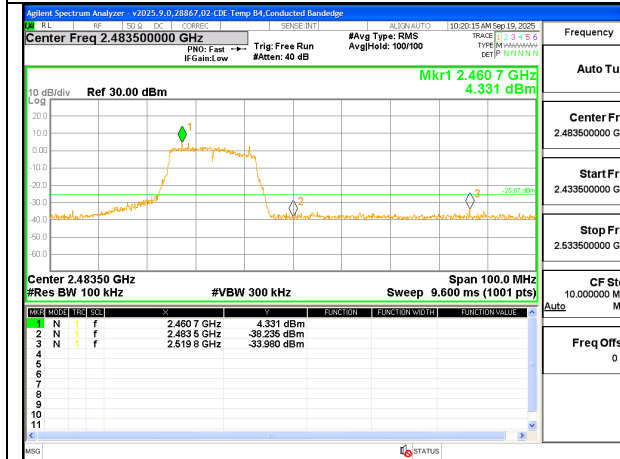
OUT-OF-BAND HIGH CHANNEL 10



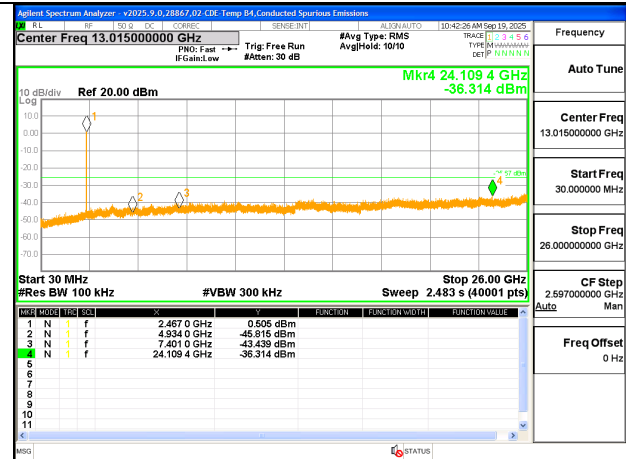
HIGH CHANNEL 11 BANDEDGE



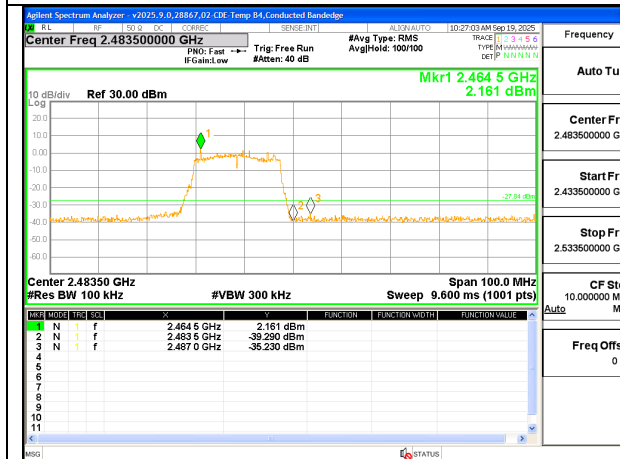
OUT-OF-BAND HIGH CHANNEL 11



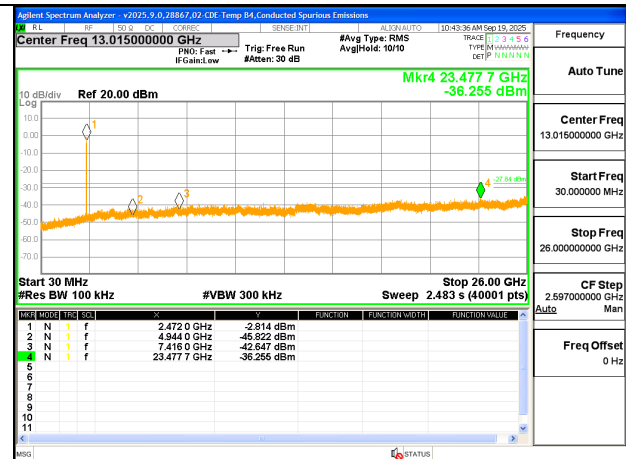
HIGH CHANNEL 12 BANDEDGE



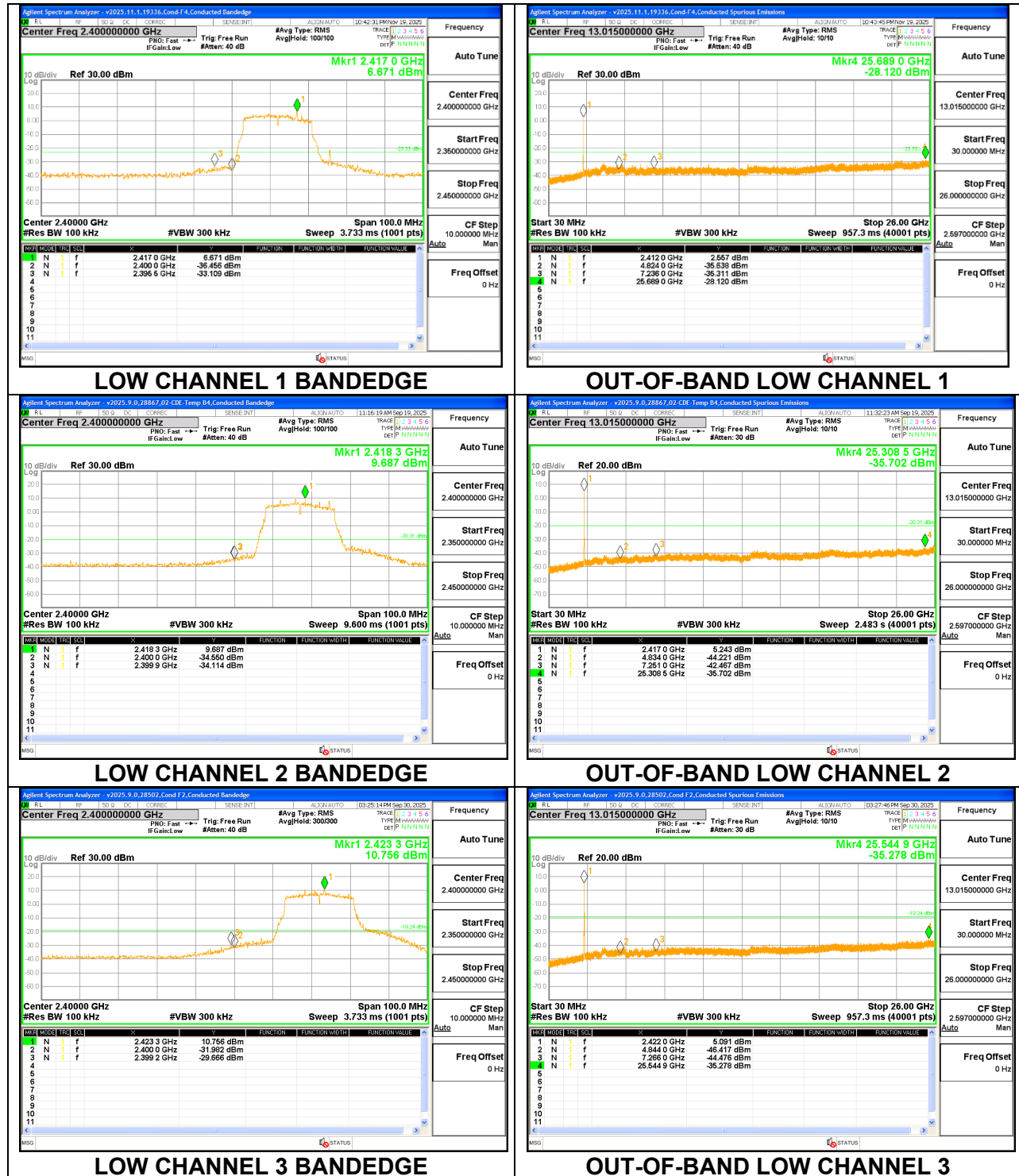
OUT-OF-BAND HIGH CHANNEL 12



HIGH CHANNEL 13 BANDEDGE



OUT OF-BAND HIGH CHANNEL 13

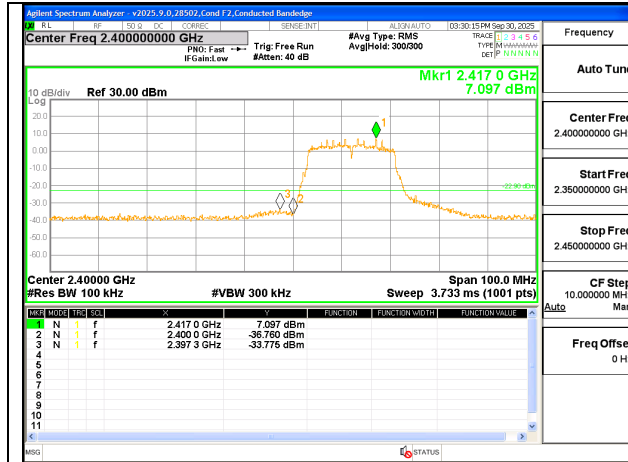
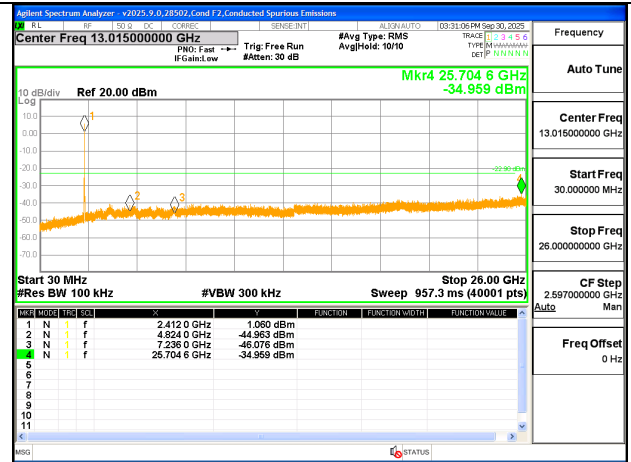
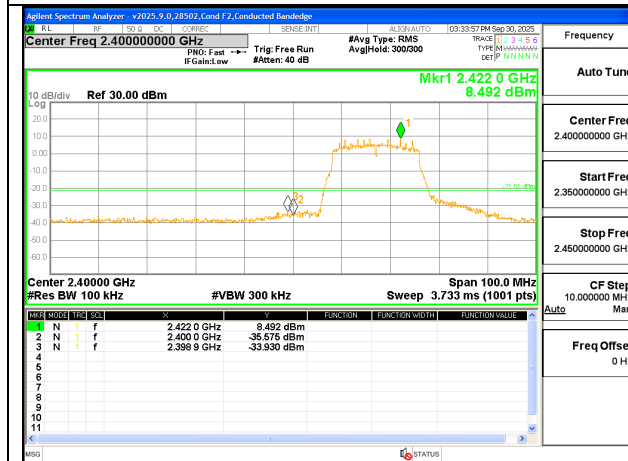
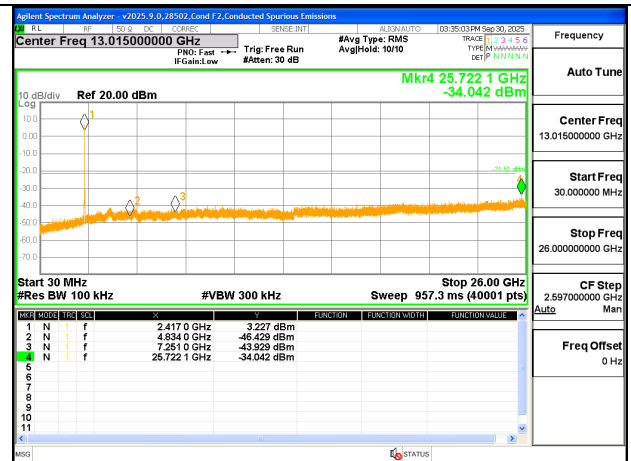
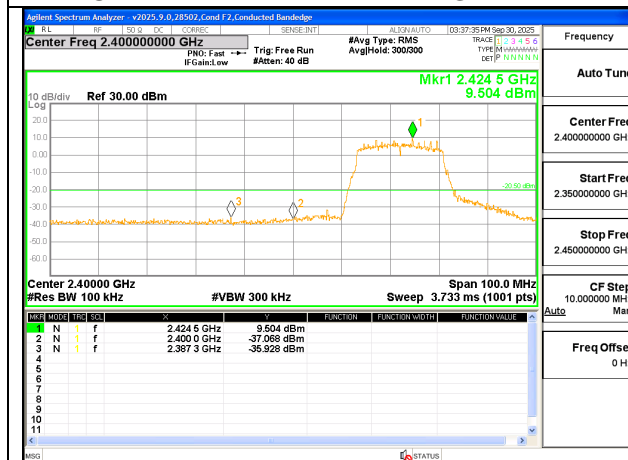
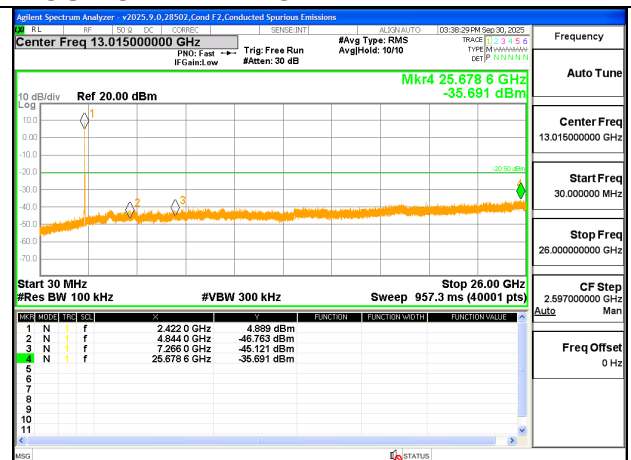
1TX ANT 3 MODE





9.5.3. 802.11n HT20 CDD MODE 2TX

ANT 4 + ANT 3 2TX MODE

**LOW CHANNEL 1 BANDEDGE ANT 4****OUT-OF-BAND LOW CHANNEL 1 ANT 4****LOW CHANNEL 2 BANDEDGE ANT 4****OUT-OF-BAND LOW CHANNEL 2 ANT 4****LOW CHANNEL 3 BANDEDGE ANT 4****OUT-OF-BAND LOW CHANNEL 3 ANT 4**

