

TEST REPORT

Report Number : R14777340-E4

Applicant : Sony Corporation
1-7-1 Konan Minato-Ku
Tokyo, 108-0075, Japan

FCC ID : PY7-76732V

EUT Description : GSM/WCDMA/LTE/5G Phone with BT, DTS/UNII a/b/g/n/ac/ax,
GPS, WPT & NFC

Test Standard(s) : FCC 47 CFR PART 15 SUBPART C

Date Of Issue:
2023-06-22

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REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	2023-06-22	Initial Issue	B. Kiewra

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Sony Corporation
1-7-1 Konan Minato-Ku
Tokyo, 108-0075, Japan

EUT DESCRIPTION: GSM/WCDMA/LTE/5G Phone with BT, DTS/UNII a/b/g/n/ac/ax,
GPS, WPT & NFC

SERIAL NUMBER: QV7700F8G9, QV7700GSHJ, QV7700AFHJ

SAMPLE RECEIPT DATE: 2023-05-03

DATE TESTED: 2023-05-26 to 2023-06-09

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Refer to Section 2

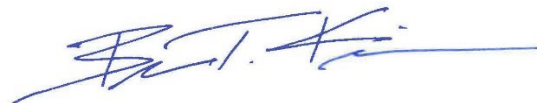
UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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 LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document.

Approved & Released
For UL LLC By:

Prepared By:



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Staff Engineer
Consumer, Medical and IT Segment
UL LLC

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Project Engineer
Consumer, Medical and IT Segment
UL LLC

2. TEST RESULTS SUMMARY

This report contains data provided by the applicant which can impact the validity of results. UL LLC 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 sections 9.3 and 9.4)

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

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC 47 CFR Part 2, FCC 47 CFR Part 15, ANSI C63.10-2013, KDB 558074 D01 15.247 Meas Guidance v05r02, KDB 414788 D01 Radiated Test Site v01r01.

4. FACILITIES AND ACCREDITATION

UL LLC is accredited by A2LA, certification # 0751.06, 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
<input type="checkbox"/>	Building: 12 Laboratory Dr RTP, NC 27709, U.S.A	US0067	2180C	825374
<input checked="" type="checkbox"/>	Building: 2800 Perimeter Park Dr. Suite B Morrisville, NC 27560, U.S.A		27265	

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}
Radio Frequency (Spectrum Analyzer)	141.2 Hz
Occupied Channel Bandwidth	1.22%
RF output power, conducted	1.3 dB (PK) 0.45 dB (AV)
Power Spectral Density, conducted	2.47 dB
Unwanted Emissions, conducted	1.94 dB
All emissions, radiated	6.01 dB
Conducted Emissions (0.150-30MHz) - LISN	3.40 dB
Temperature	0.57°C
Humidity	3.39%
DC Supply voltages	1.70%

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

5.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

$$\text{Field Strength (dBuV/m)} = \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \text{Cable Loss (dB)} - \text{Preamp Gain (dB)}$$

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

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:

$$\text{Final Voltage (dBuV)} = \text{Measured Voltage (dBuV)} + \text{Cable Loss (dB)} + \text{Limiter Factor (dB)} + \text{LISN Insertion Loss}$$

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

6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The EUT is a GSM/WCDMA/LTE/5G Phone with BT, DTS, UNII a/b/g/n/ac/ax, GPS, WPT & NFC. This report covers testing for 2.4 GHz WLAN.

6.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

2.4GHz BAND – Chain 0 + Chain 1

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2Tx			
2412 - 2462	802.11b	18.92	77.98
2412 - 2462	802.11g	21.70	147.91
2412 - 2462	802.11n HT20	21.88	154.17
2412 - 2462	802.11ax HE20 26T	19.35	86.10
2412 - 2462	802.11ax HE20 52T	21.76	149.97
2412 - 2462	802.11ax HE20 106T	24.58	287.08
2412 - 2462	802.11ax HE20 242T	24.64	291.07

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

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

The radio utilizes two antennas for diversity, with the following types and maximum gains:

Chain	Designation in Documentation	Type	Frequency Range (MHz)	Maximum Gain (dBi)
0	WLAN Main/Bluetooth#1	Loop	2402-2480	-0.16
1	WLAN Sub/Bluetooth#2	Monopole	2402-2480	-3.78

6.4. SOFTWARE AND FIRMWARE

The software version used during testing was 2.127.

6.5. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 1GHz, above 18GHz, and power line conducted emission were performed with the EUT set to transmit at the channel/mode with highest output power/PSD as worst-case scenario.

Band edge was performed with the EUT set to transmit at the highest power on low and high channels. Radiated spurious and harmonic emissions between 1GHz and 18GHz were performed with the EUT set to transmit on low, mid, and high channels at the worst-case modes based on average power and PSD, which was 802.11g and 802.11ax HE20 26T. Since both of these are OFDMA modulation, radiated emissions was also performed on 802.11b since it uses CCK modulation.

The fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z, it was determined that Y orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y orientation.

Worst-case data rates as provided by the client were:

802.11b mode: 1 Mbps
802.11g mode: 6 Mbps
802.11n HT20mode: MCS0 (Nss=1)

Based on pretesting, all testing performed in 2Tx mode (NSS=1), where power per chain is equivalent to the 1Tx power on each chain. This allows 2Tx testing to cover all 1Tx testing.

Also based on pretesting, full tone was worst-case over SU mode.

6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Dell	Inspiron 15 3000	5KPQJP3	NA
AC Adaptor	Sony	XQZ-UC1	1821W34209742	NA
USB-C	Sony	XQZ-UB1	NA	NA
Headphones	Sony	MDR-EX15AP	NA	NA

I/O CABLES

I/O Cable List						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	USB-C	1	USB-C	Non-Shielded	<3m	Connected to power supply
2	3.5mm	1	AUX	Non-Shielded	<3m	Connected to headphones

TEST SETUP

Test software exercised the radio card.

SETUP DIAGRAM

Please refer to R14777340-EP2 for setup diagrams

7. MEASUREMENT METHOD

On Time and Duty Cycle: ANSI C63.10, Section 11.6 : Zero-Span Spectrum Analyzer Method.

6 dB BW: ANSI C63.10 Subclause -11.8.1

Output Power: ANSI C63.10 Subclause -11.9.2.3.1 Method PKPM1 Peak-reading power meter
ANSI C63.10 Subclause -11.9.2.3.2 Method AVGPM-G (Measurement using a gated RF average-reading power meter)

PSD: ANSI C63.10 Subclause -11.10.2 Method PKPSD (peak PSD)

Radiated emissions non-restricted frequency bands: ANSI C63.10 Subclause -11.11 and 6.10.4

Radiated emissions restricted frequency bands: ANSI C63.10 Subclause -11.12.1 and 6.10.5

General Radiated Spurious Emissions: ANSI C63.10-2013 Section 6.3 to 6.6

AC Power-line conducted emissions: ANSI C63.10-2013, Section 6.2.

8. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment Used - Wireless Conducted Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
SA0026	Spectrum Analyzer	Keysight Technologies	N9030A	2022-08-02	2023-08-02
HI0090	Environmental Meter	Fisher Scientific	15-077-963	2022-07-20	2023-07-20
134477	RF Power Meter	Keysight Technologies	N1912A	2022-08-30	2023-08-30
135121	RF Power Meter	Keysight Technologies	N1911A	2022-07-02	2023-07-02
135124	Peak and Avg Power Sensor, 50MHz to 18GHz	Keysight Technologies	N1921A	2022-07-07	2023-07-07
135125	Peak and Avg Power Sensor, 50MHz to 18GHz	Keysight Technologies	N1921A	2022-09-27	2023-09-27
MM0167 (PRE0126458)	True RMS Multimeter	Agilent	U1232A	2021-08-17	2023-08-17
MY61466084	DC Regulated Power Supply	Keysight Technologies	E3633A	NA	NA
SOFTEMI	Antenna Port Software	UL	Version 2022.8.16		

Test Equipment Used - Wireless Conducted Attenuators, Cables, and Couplers

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
Attenuators					
226559	SMA Coaxial 10dB Attenuator 25MHz-18GHz	CentricRF	C18S2-10	2023-02-16	2024-02-16
226561	SMA Coaxial 10dB Attenuator 25MHz-18GHz	CentricRF	C18S2-10	2023-02-16	2024-02-16
Cables					
CBL101	Micro-Coax UTiFLEX Cable Assembly, Low Loss,40Ghz, 39.3", Connectors 2	Carlisle Interconnect Technologies	UFA147A-0-0180-200200	2023-01-24	2024-01-24

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville – Chamber 4)

Equipment ID	Description	Manufacturer/Brand	Model Number	Last Cal.	Next Cal.
0.009-30MHz					
135144	Active Loop Antenna	ETS-Lindgren	6502	2023-01-17	2024-01-17
30-1000 MHz					
90629	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2023-01-06	2024-01-06
1-18 GHz					
89509	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2023-05-23	2025-05-23
18-40 GHz					
204704	Horn Antenna, 18-26.5GHz	Com-Power	AH-626	2022-07-11	2023-07-11
204705	Horn Antenna, 26-40GHz	Com-Power	AH-640	2022-07-11	2023-07-11
Gain-Loss Chains					
207638	Gain-loss string: 0.009-30MHz	Various	Various	2023-05-17	2024-05-17
207639	Gain-loss string: 25-1000MHz	Various	Various	2023-05-17	2024-05-17
207640	Gain-loss string: 1-18GHz	Various	Various	2023-05-17	2024-05-17
225795	Gain-loss string: 18-40GHz	Various	Various	2023-05-17	2024-05-17
Receiver & Software					
72823	Spectrum Analyzer	Agilent	E4446A	2022-06-08	2023-06-08
197955	Spectrum Analyzer	Rohde & Schwarz	ESW44	2023-04-10	2024-04-10
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
Additional Equipment used					
21642	Environmental Meter	Fisher Scientific	15-077-963 (s/n 210701692)	2021-08-16	2023-08-16

9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

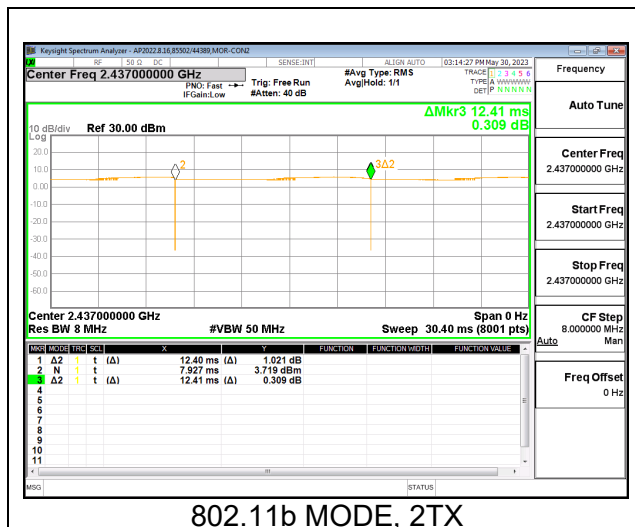
PROCEDURE

ANSI C63.10 Section 11.6

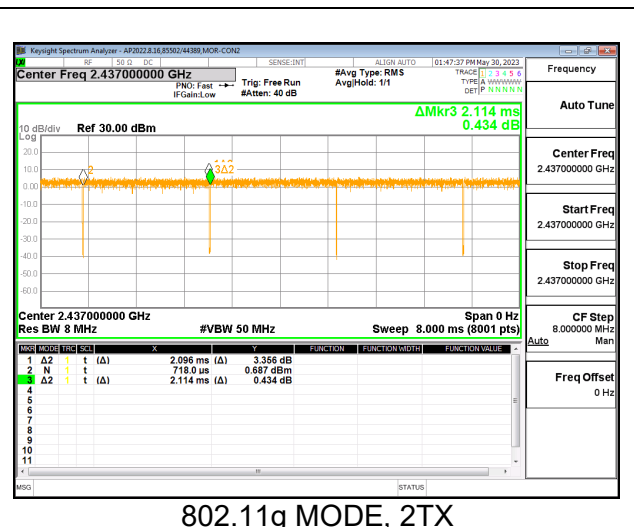
KDB 558074 Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

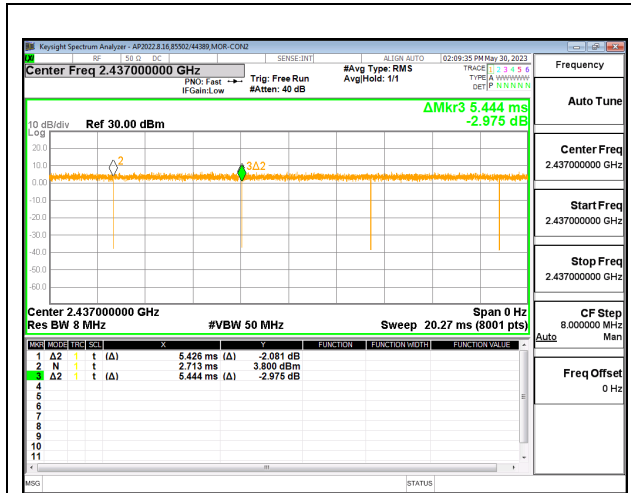
Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
2.4 GHz Band					
802.11b 2TX	12.400	12.410	0.999	99.92	0.00
802.11g 2TX	2.096	2.114	0.991	99.15	0.00
802.11n HT20 2TX	5.426	5.444	0.997	99.67	0.00
802.11ax HE20 26T	2.328	2.464	0.945	94.48	0.49
802.11ax HE20 52T	1.269	1.349	0.941	94.07	0.53
802.11ax HE20 106T	0.640	0.687	0.930	93.05	0.63
802.11ax HE20 242T	0.924	0.986	0.937	93.68	0.57



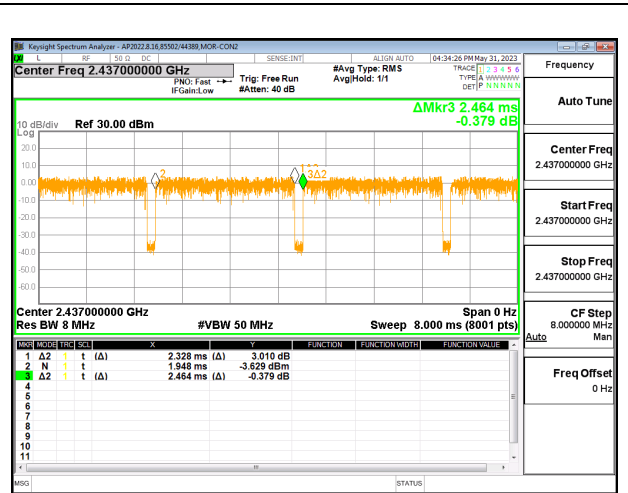
802.11b MODE, 2TX



802.11g MODE, 2TX



802.11n HT20 MODE, 2TX



802.11ax HE20 26T MODE, 2TX



802.11ax HE20 52T MODE, 2TX



802.11ax HE20 106T MODE, 2TX



802.11ax HE20 242T MODE, 2TX

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9.2. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

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

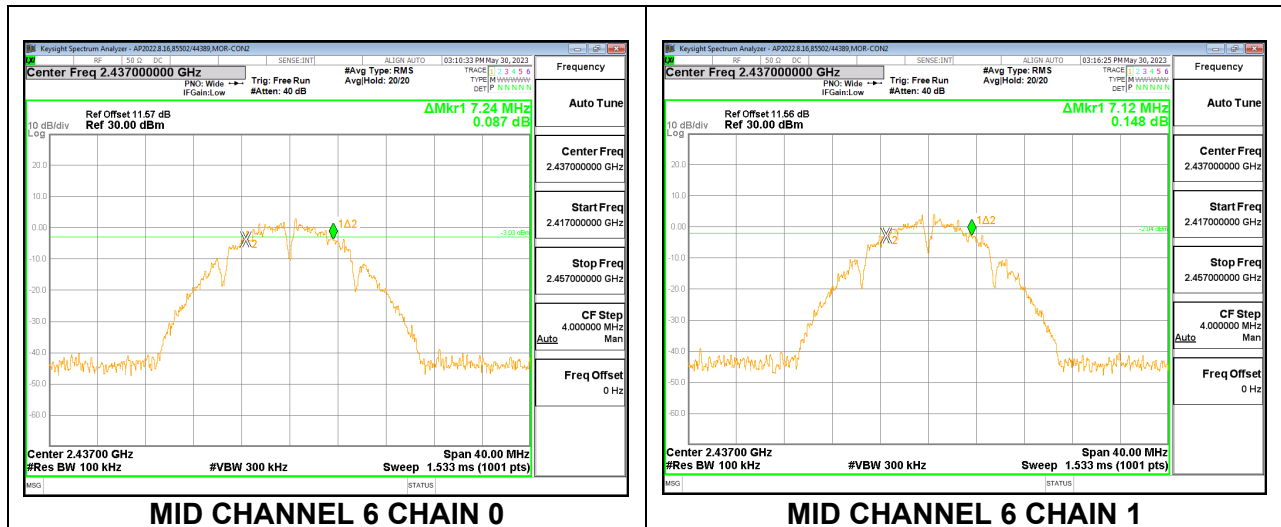
RESULTS

9.2.1. 802.11b MODE

2TX CHAIN 0 + CHAIN 1 MODE

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low 1	2412	7.24	7.64	0.5
Mid 6	2437	7.24	7.12	0.5
High 11	2462	7.64	7.64	0.5

MID CHANNEL 6

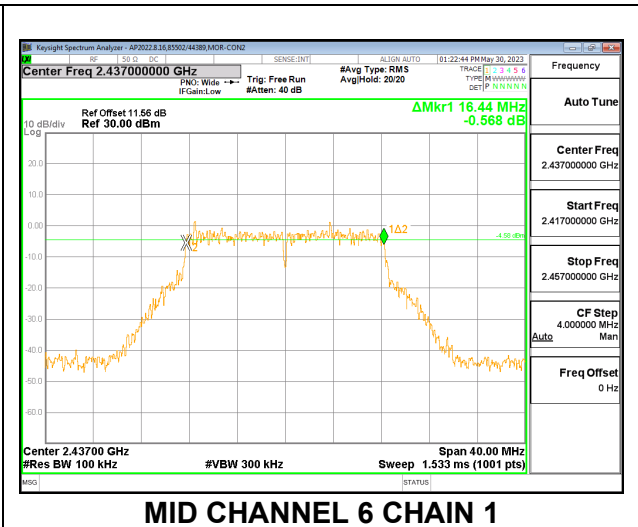
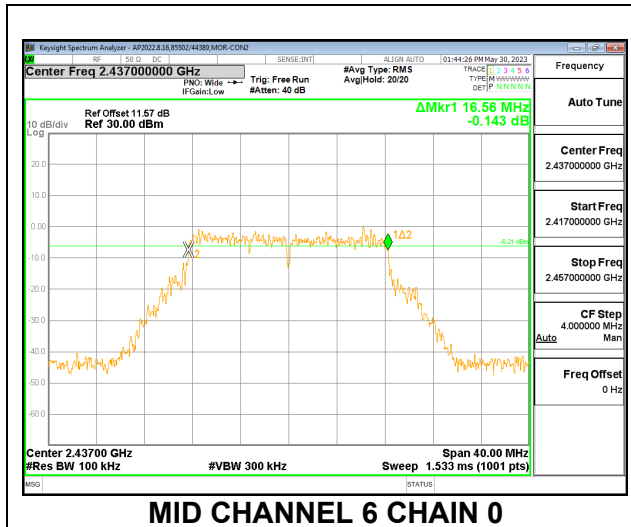


9.2.2. 802.11g MODE

2TX CHAIN 0 + CHAIN 1 MODE

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low 1	2412	16.52	16.48	0.5
Mid 6	2437	16.56	16.44	0.5
High 11	2462	16.52	16.68	0.5

MID CHANNEL 6

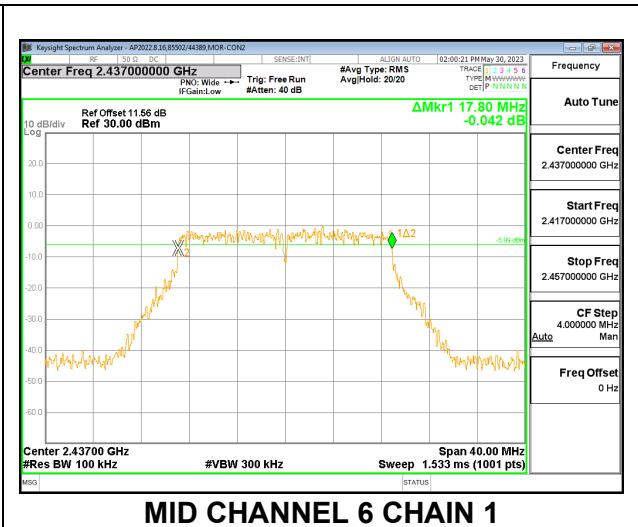
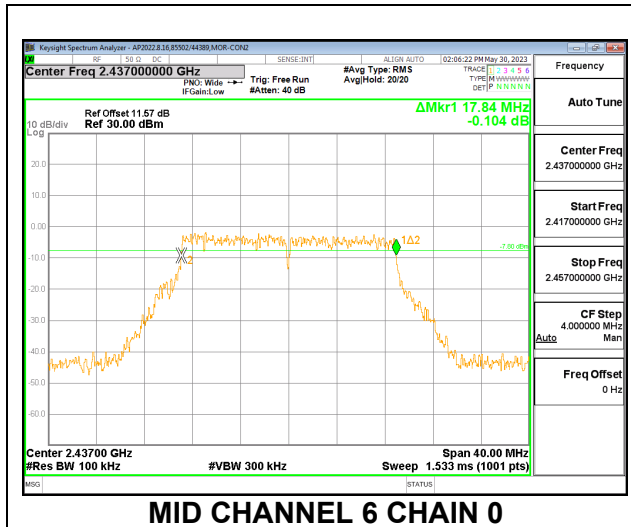


9.2.3. 802.11n HT20 MODE

2TX CHAIN 0 + CHAIN 1 MODE

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low 1	2412	17.84	17.68	0.5
Mid 6	2437	17.84	17.80	0.5
High 11	2462	17.88	17.80	0.5

MID CHANNEL 6

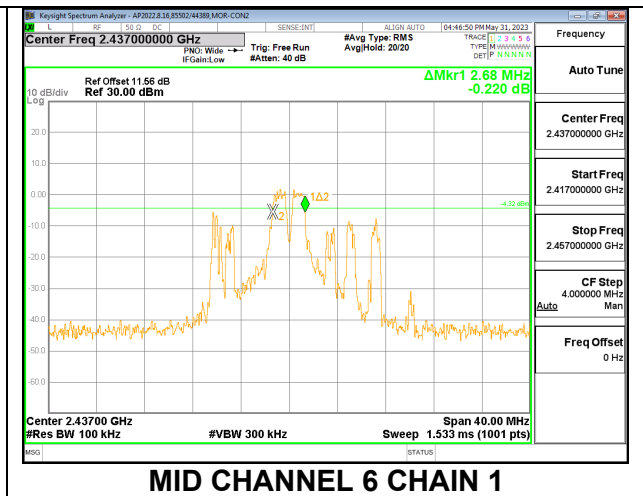
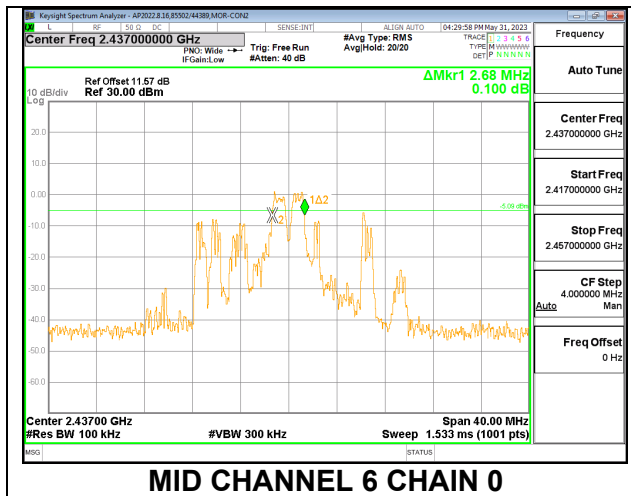


9.2.4. 802.11ax HE20 MODE 2TX

2TX CHAIN 0 + CHAIN 1 CDD OFDMA MODE: 26T

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low 1 (RU0)	2412	2.12	2.16	0.5
Mid 6 (RU4)	2437	2.68	2.68	0.5
High 11 (RU8)	2462	2.08	2.16	0.5

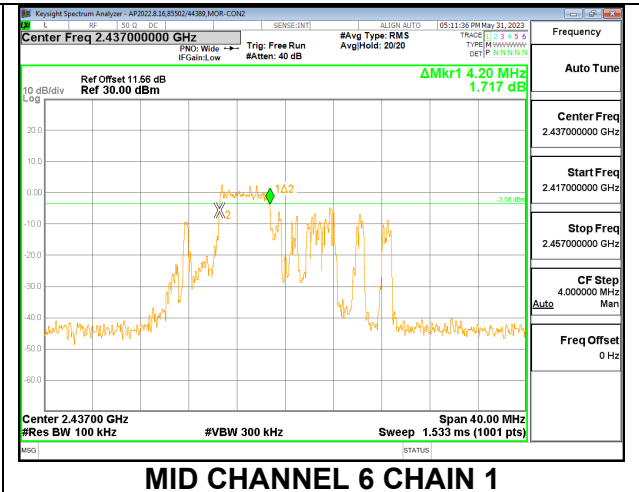
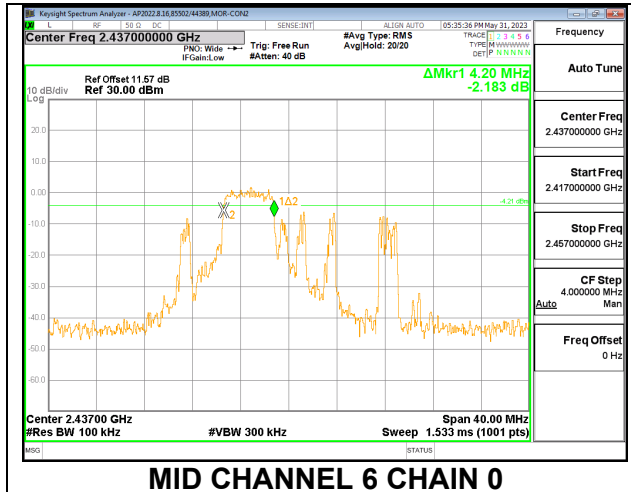
MID CHANNEL 6



2TX CHAIN 0 + CHAIN 1 CDD OFDMA MODE: 52T

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low 1 (RU37)	2412	4.08	4.20	0.5
Mid 6 (RU38)	2437	4.20	4.20	0.5
High 11 (RU40)	2462	4.08	4.12	0.5

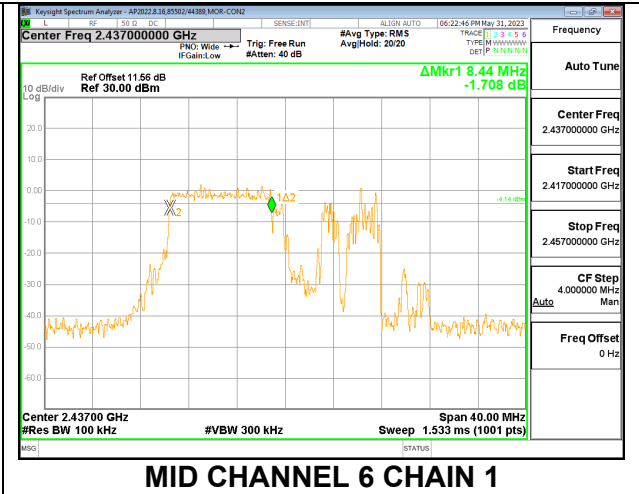
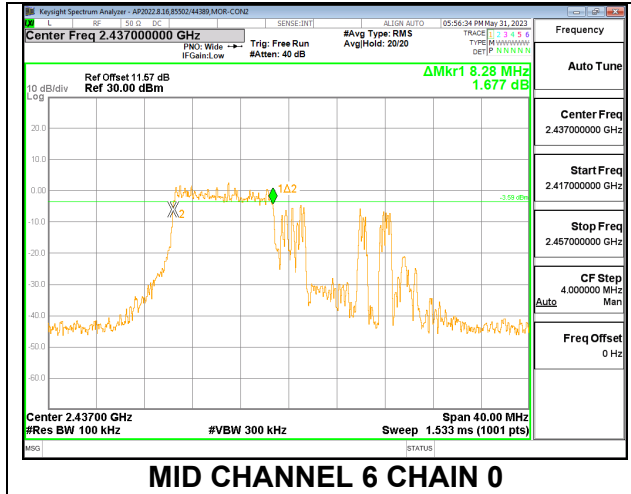
MID CHANNEL 6



2TX CHAIN 0 + CHAIN 1 CDD OFDMA MODE: 106T

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low 1 (RU53)	2412	8.24	8.32	0.5
Mid 6 (RU53)	2437	8.28	8.44	0.5
High 11 (RU54)	2462	8.28	8.24	0.5

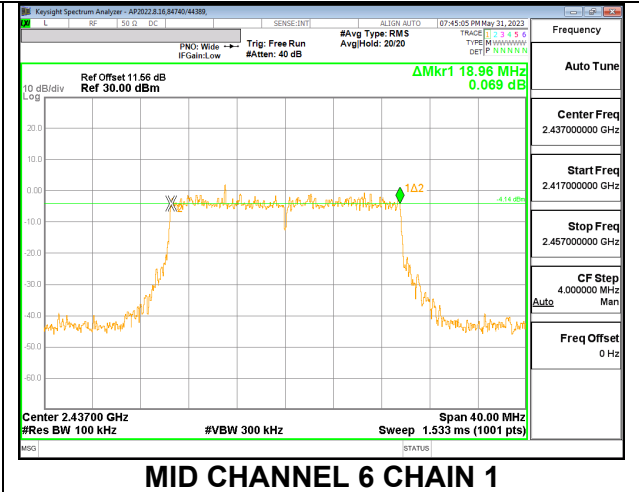
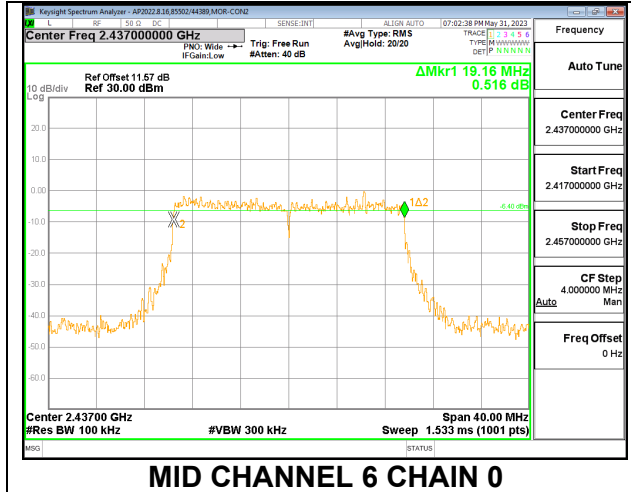
MID CHANNEL 6



2TX CHAIN 0 + CHAIN 1 CDD OFDMA MODE: 242T

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low 1 (RU61)	2412	18.96	19.12	0.5
Mid 6 (RU61)	2437	19.16	18.96	0.5
High 11 (RU61)	2462	19.12	19.00	0.5

MID CHANNEL 6



9.3. OUTPUT POWER

LIMITS

FCC §15.247 (b) (3)

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.

TEST PROCEDURE

The transmitter output is connected to a peak power meter.

The cable assembly insertion loss for testing of 11.57 dB (including 9.72dB pad and 1.85dB cable) for Chain 0 and 11.56dB (including 9.72dB pad and 1.84 dB cable) for Chain 1 was entered as an offset in the power meter.

DIRECTIONAL ANTENNA GAIN

Tx chains are uncorrelated for power. The directional gains are as follows:

Band (GHz)	Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)	Correlated Chains Directional Gain (dBi)
2.4	-0.16	-3.78	-1.60	1.23

Directional gains for MIMO operations were determined using KDB662911 D01 Section F (2)(d)(i) and (ii) for unequal antenna gains, with equal transmit powers. The directional gains are calculated using the formulas for uncorrelated and correlated transmissions across the two transmit antennas.

- (i) Correlated gain = $10\log((10^{G1/20} + 10^{G2/20})^2 / N_{Ant})$
- (ii) Uncorrelated gain = $10\log((10^{G1/10} + 10^{G2/10}) / N_{Ant})$

Sample calculation, using 2 antennas:

$$\text{Correlated gain} = 10\log(10^{-0.16/20} + 10^{-3.78/20})^2 / 2) = 1.23\text{dBi}$$

$$\text{Uncorrelated gain} = 10\log(10^{-0.16/10} + 10^{-3.78/10}) / 2) = -1.60\text{dBi}$$

RESULTS

9.3.1. 802.11b MODE

2TX CHAIN 0 + CHAIN 1 CDD MODE

Test Engineer:	85502/44389
Test Date:	2023-05-26

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	Max Power (dBm)
Low 1	2412	-1.60	30.00	30.00
Mid 6	2437	-1.60	30.00	30.00
High 11	2462	-1.60	30.00	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	16.62	15.05	18.92	30.00	-11.08
Mid 6	2437	15.99	14.86	18.47	30.00	-11.53
High 11	2462	16.33	14.54	18.54	30.00	-11.46

9.3.2. 802.11g MODE

2TX CHAIN 0 + CHAIN 1 CDD MODE

Test Engineer:	85502/44389
Test Date:	2023-05-26

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	Max Power (dBm)
Low 1	2412	-1.60	30.00	30.00
Mid 6	2437	-1.60	30.00	30.00
High 11	2462	-1.60	30.00	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	18.03	18.29	21.17	30.00	-8.83
Mid 6	2437	18.00	19.08	21.58	30.00	-8.42
High 11	2462	18.63	18.74	21.70	30.00	-8.30

9.3.3. 802.11n HT20 MODE

2TX CHAIN 0 + CHAIN 1 CDD MODE

Test Engineer:	85502/44389
Test Date:	2023-05-26

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	Max Power (dBm)
Low 1	2412	-1.60	30.00	30.00
Mid 6	2437	-1.60	30.00	30.00
High 11	2462	-1.60	30.00	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	18.63	19.10	21.88	30.00	-8.12
Mid 6	2437	18.02	19.15	21.63	30.00	-8.37
High 11	2462	18.19	19.09	21.67	30.00	-8.33

9.3.4. 802.11ax HE20 MODE 2TX

2TX CHAIN 0 + CHAIN 1 CDD OFDMA MODE: 26T

Test Engineer:	85502/44389
Test Date:	2023-05-26

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	Max Power (dBm)
Low 1 (RU0)	2412	-1.60	30.00	30.00
Mid 6 (RU4)	2437	-1.60	30.00	30.00
High 11 (RU8)	2462	-1.60	30.00	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1 (RU0)	2412	15.31	16.57	19.00	30.00	-11.00
Mid 6 (RU4)	2437	15.90	16.73	19.35	30.00	-10.65
High 11 (RU8)	2462	15.31	16.35	18.87	30.00	-11.13

2TX CHAIN 0 + CHAIN 1 CDD OFDMA MODE: 52T

Test Engineer:	85502/44389
Test Date:	2023-05-26

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	Max Power (dBm)
Low 1 (RU37)	2412	-1.60	30.00	30.00
Mid 6 (RU38)	2437	-1.60	30.00	30.00
High 11 (RU40)	2462	-1.60	30.00	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1 (RU37)	2412	18.18	19.26	21.76	30.00	-8.24
Mid 6 (RU38)	2437	18.49	18.99	21.76	30.00	-8.24
High 11 (RU40)	2462	17.51	19.11	21.39	30.00	-8.61

2TX CHAIN 0 + CHAIN 1 CDD OFDMA MODE: 106T

Test Engineer:	85502/44389
Test Date:	2023-05-26

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	Max Power (dBm)
Low 1 (RU53)	2412	-1.60	30.00	30.00
Low 1 (RU53)	2437	-1.60	30.00	30.00
High 11 (RU54)	2462	-1.60	30.00	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1 (RU53)	2412	21.24	21.88	24.58	30.00	-5.42
Low 1 (RU53)	2437	21.01	21.41	24.22	30.00	-5.78
High 11 (RU54)	2462	20.96	21.69	24.35	30.00	-5.65

2TX CHAIN 0 + CHAIN 1 CDD OFDMA MODE: 242T

Test Engineer:	85502/44389
Test Date:	2023-05-26

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	Max Power (dBm)
Low 1 (RU61)	2412	-1.60	30.00	30.00
Low 1 (RU61)	2437	-1.60	30.00	30.00
High 11 (RU61)	2462	-1.60	30.00	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1 (RU61)	2412	21.16	21.48	24.33	30.00	-5.67
Low 1 (RU61)	2437	21.04	21.78	24.44	30.00	-5.56
High 11 (RU61)	2462	21.52	21.73	24.64	30.00	-5.36

9.4. AVERAGE POWER

LIMITS

None; for reporting purposes only

TEST PROCEDURE

The transmitter output is connected to a gated average power meter.

The cable assembly insertion loss for testing of 11.57 dB (including 9.72dB pad and 1.85dB cable) for Chain 0 and 11.56dB (including 9.72dB pad and 1.84 dB cable) for Chain 1 was entered as an offset in the power meter.

9.4.1. 802.11b MODE

2TX CHAIN 0 + CHAIN 1 CDD MODE

Test Engineer:	85502/44389
Test Date:	2023-05-26

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
Low 1	2412	13.78	12.14	16.05
Mid 6	2437	13.13	11.98	15.60
High 11	2462	13.43	11.68	15.65

9.4.2. 802.11g MODE

2TX CHAIN 0 + CHAIN 1 CDD MODE

Test Engineer:	85502/44389
Test Date:	2023-05-26

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
Low 1	2412	12.55	13.29	15.95
Mid 6	2437	13.18	13.97	16.60
High 11	2462	13.36	13.82	16.61

9.4.3. 802.11n HT20 MODE

2TX CHAIN 0 + CHAIN 1 CDD MODE

Test Engineer:	85502/44389
Test Date:	2023-05-26

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
Low 1	2412	13.26	13.76	16.53
Mid 6	2437	13.03	13.98	16.54
High 11	2462	13.02	13.86	16.47

9.4.4. 802.11ax HE20 MODE

2TX CHAIN 0 + CHAIN 1 CDD OFDMA MODE: 26T

Test Engineer:	85502/44389
Test Date:	2023-05-26

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
Low 1 (RU0)	2412	7.89	8.91	11.44
Mid 6 (RU4)	2437	7.56	8.55	11.09
High 11 (RU8)	2462	7.40	8.76	11.14

2TX CHAIN 0 + CHAIN 1 CDD OFDMA MODE: 52T

Test Engineer:	85502/44389
Test Date:	2023-05-26

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
Low 1 (RU0)	2412	10.52	11.40	13.99
Mid 6 (RU4)	2437	10.60	11.25	13.95
High 11 (RU8)	2462	9.85	11.37	13.69

2TX CHAIN 0 + CHAIN 1 CDD OFDMA MODE: 106T

Test Engineer:	85502/44389
Test Date:	2023-05-26

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
Low 1 (RU0)	2412	12.82	13.74	16.31
Mid 6 (RU4)	2437	12.81	13.40	16.13
High 11 (RU8)	2462	12.74	13.56	16.18

2TX CHAIN 0 + CHAIN 1 CDD OFDMA MODE: 242T

Test Engineer:	85502/44389
Test Date:	2023-05-26

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
Low 1 (RU0)	2412	13.35	13.42	16.40
Mid 6 (RU4)	2437	13.11	13.84	16.50
High 11 (RU8)	2462	13.21	13.45	16.34

9.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

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.

RESULTS

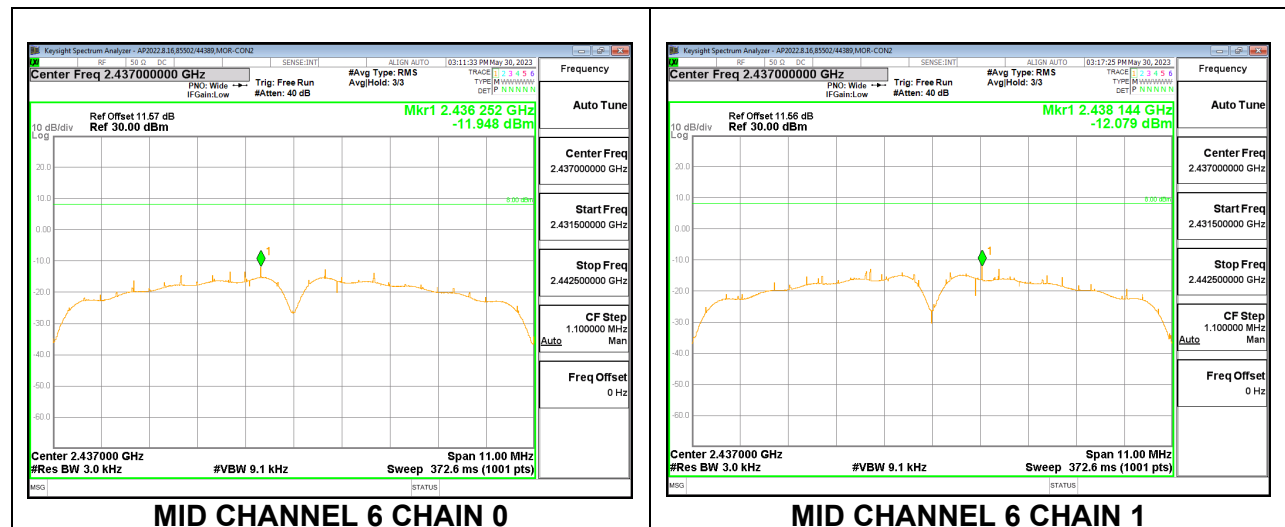
9.5.1. 802.11b MODE

2TX CHAIN 0 + CHAIN 1 CDD MODE

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD
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Channel	Frequency (MHz)	Chain 0 Meas (dBm/3kHz)	Chain 1 Meas (dBm/3kHz)	Total Corr'd PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low 1	2412	-11.765	-11.945	-8.844	8.0	-16.8
Mid 6	2437	-11.948	-12.079	-9.003	8.0	-17.0
High 11	2462	-11.800	-13.581	-9.590	8.0	-17.6

MID CHANNEL 6



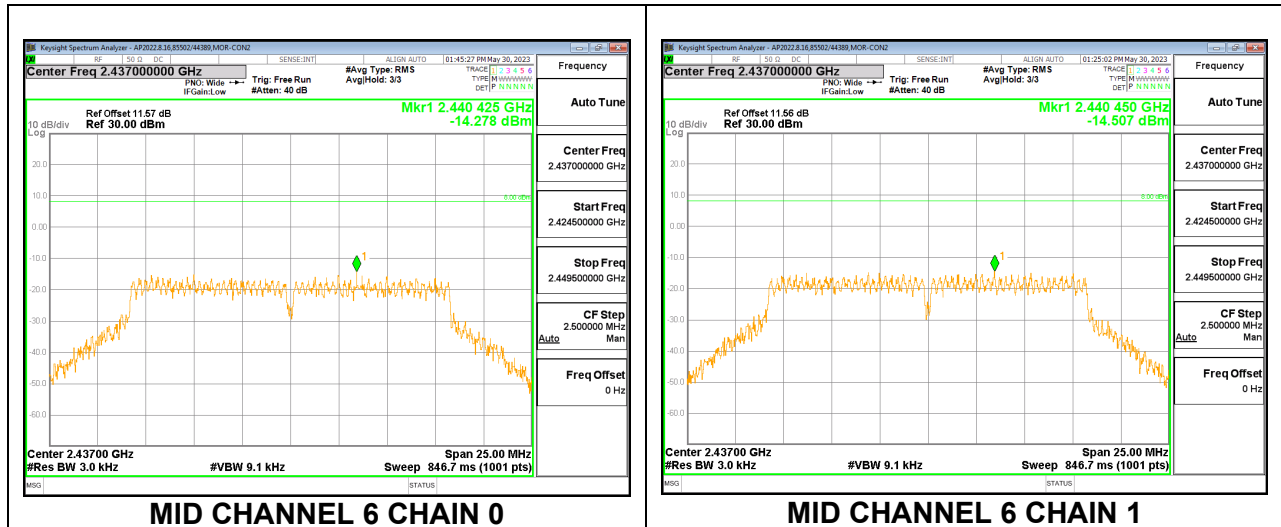
9.5.2. 802.11g MODE

2TX CHAIN 0 + CHAIN 1 CDD MODE

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD
--------------------	------	--

Channel	Frequency (MHz)	Chain 0 Meas (dBm/3kHz)	Chain 1 Meas (dBm/3kHz)	Total Corr'd PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low 1	2412	-14.985	-13.967	-11.436	8.0	-19.4
Mid 6	2437	-14.278	-14.507	-11.381	8.0	-19.4
High 11	2462	-13.864	-13.913	-10.878	8.0	-18.9

MID CHANNEL 6



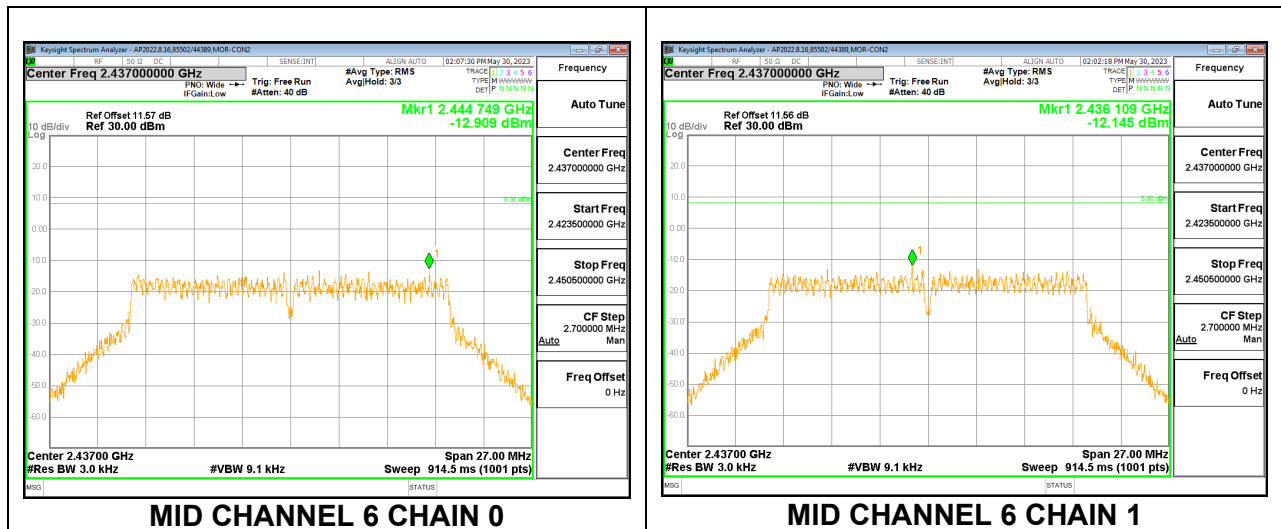
9.5.3. 802.11n HT20 MODE

2TX CHAIN 0 + CHAIN 1 CDD MODE

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD
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Channel	Frequency (MHz)	Chain 0 Meas (dBm/3kHz)	Chain 1 Meas (dBm/3kHz)	Total Corr'd PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low 1	2412	-13.670	-13.270	-10.455	8.0	-18.5
Mid 6	2437	-12.909	-12.145	-9.500	8.0	-17.5
High 11	2462	-12.522	-13.358	-9.910	8.0	-17.9

MID CHANNEL 6



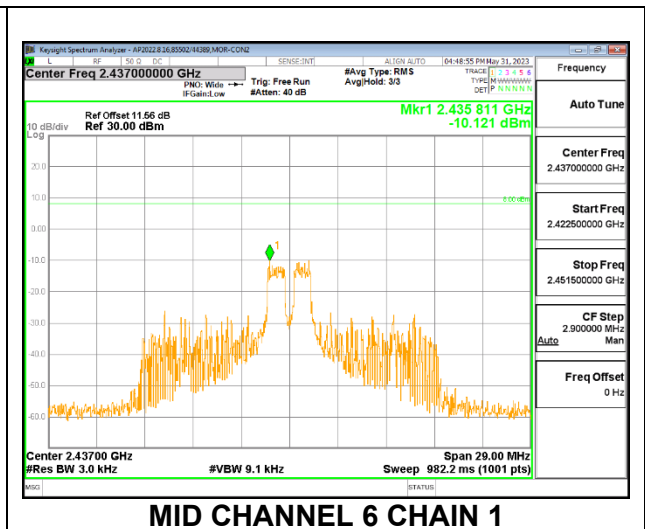
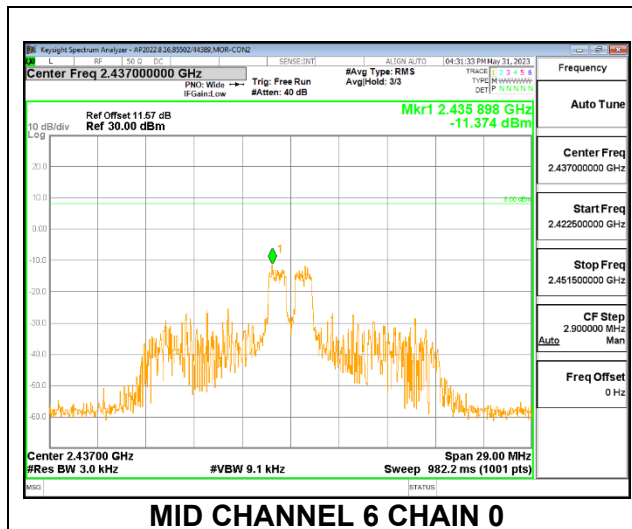
9.5.4. 802.11ax HE20 MODE 2TX

2TX CHAIN 0 + CHAIN 1 CDD OFDMA MODE: 26T

Duty Cycle CF (dB)	0.49	Included in Calculations of Corr'd PSD
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Channel	Frequency (MHz)	Chain 0 Meas (dBm/3kHz)	Chain 1 Meas (dBm/3kHz)	Total Corr'd PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low 1 (RU0)	2412	-10.626	-8.453	-5.905	8.0	-13.9
Mid 6 (RU4)	2437	-11.374	-10.121	-7.202	8.0	-15.2
High 11 (RU8)	2462	-10.958	-11.864	-7.887	8.0	-15.9

MID CHANNEL 6

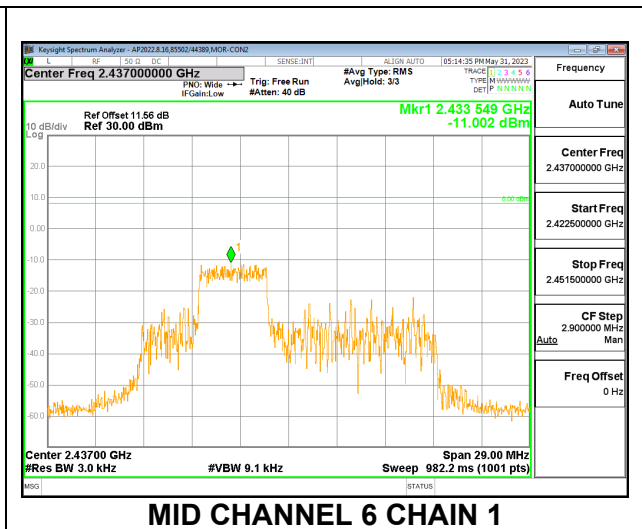
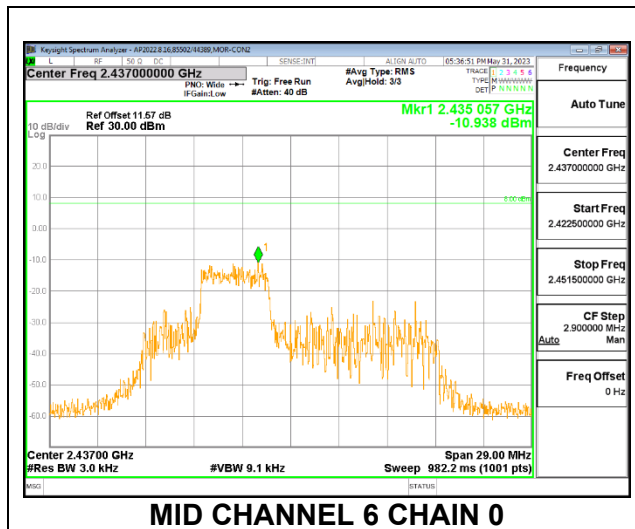


2TX CHAIN 0 + CHAIN 1 CDD OFDMA MODE: 52T

Duty Cycle CF (dB)	0.53	Included in Calculations of Corr'd PSD
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Channel	Frequency (MHz)	Chain 0 Meas (dBm/3kHz)	Chain 1 Meas (dBm/3kHz)	Total Corr'd PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low 1 (RU37)	2412	-10.982	-10.686	-7.291	8.0	-15.3
Mid 6 (RU38)	2437	-10.938	-11.002	-7.430	8.0	-15.4
High 11 (RU40)	2462	-10.649	-10.853	-7.210	8.0	-15.2

MID CHANNEL 6

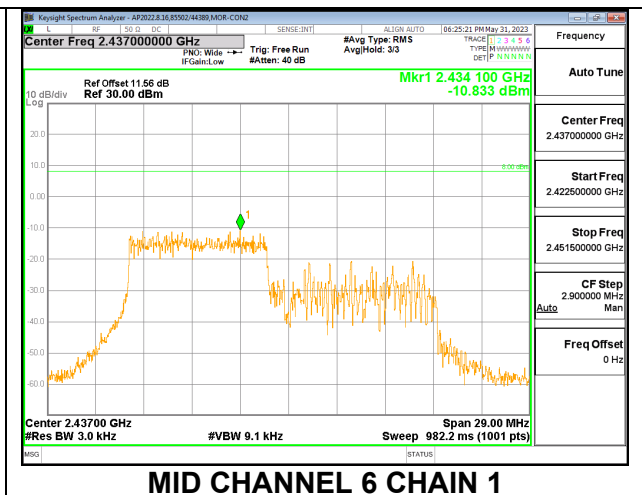
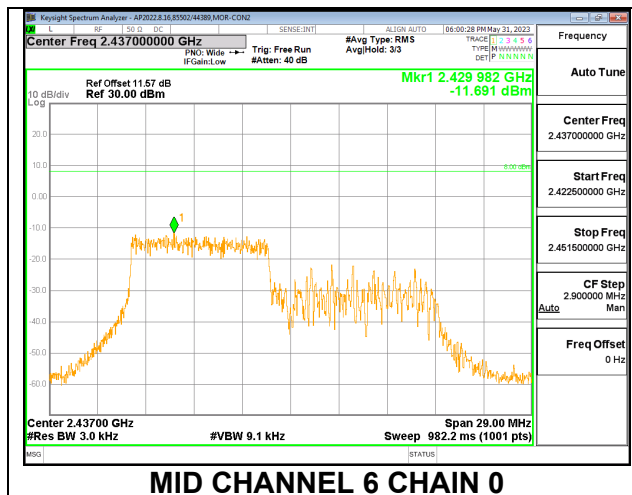


2TX CHAIN 0 + CHAIN 1 CDD OFDMA MODE: 106T

Duty Cycle CF (dB)	0.63	Included in Calculations of Corr'd PSD
--------------------	------	--

Channel	Frequency (MHz)	Chain 0 Meas (dBm/3kHz)	Chain 1 Meas (dBm/3kHz)	Total Corr'd PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low 1 (RU53)	2412	-11.752	-9.907	-7.092	8.0	-15.1
Mid 6 (RU53)	2437	-11.691	-10.833	-7.601	8.0	-15.6
High 11 (RU54)	2462	-11.085	-10.243	-7.003	8.0	-15.0

MID CHANNEL 6

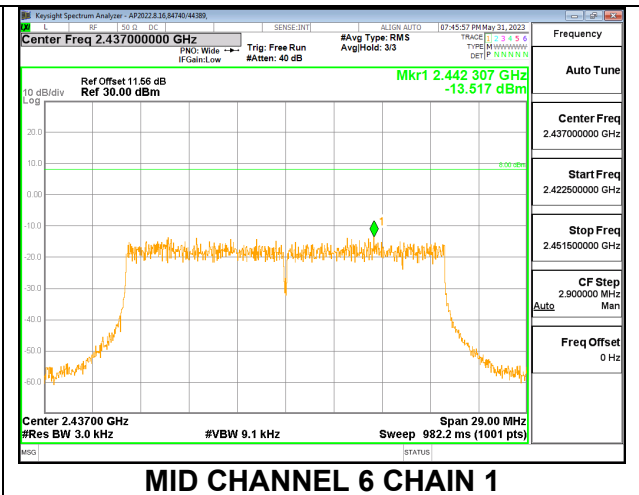
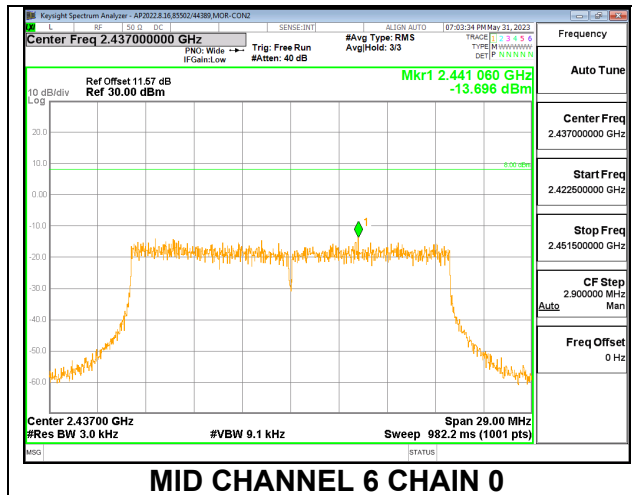


2TX CHAIN 0 + CHAIN 1 CDD OFDMA MODE: 242T

Duty Cycle CF (dB)	0.57	Included in Calculations of Corr'd PSD
--------------------	------	--

Channel	Frequency (MHz)	Chain 0 Meas (dBm/3kHz)	Chain 1 Meas (dBm/3kHz)	Total Corr'd PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low 1 (RU61)	2412	-13.792	-13.913	-10.272	8.0	-18.3
Mid 6 (RU61)	2437	-13.696	-13.517	-10.025	8.0	-18.0
High 11 (RU61)	2462	-13.610	-12.739	-9.572	8.0	-17.6

MID CHANNEL 6



9.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

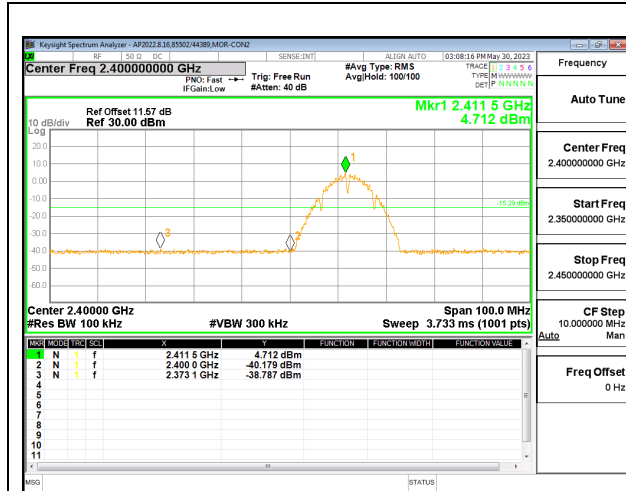
FCC §15.247 (d)

Output power was measured based on the use of peak measurement, therefore the required attenuation is -20 dBc.

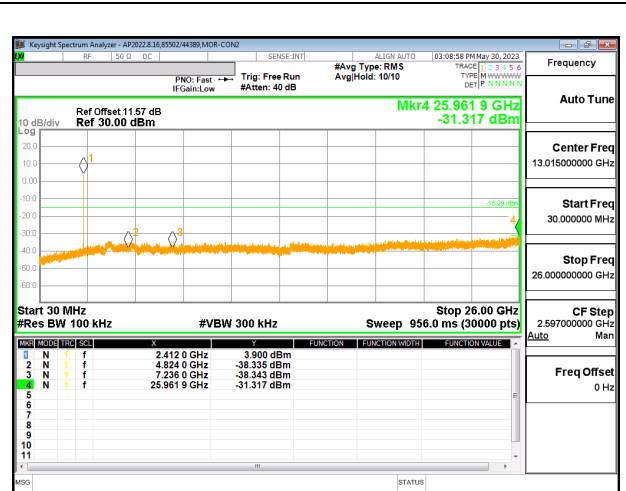
RESULTS

9.6.1. 802.11b MODE

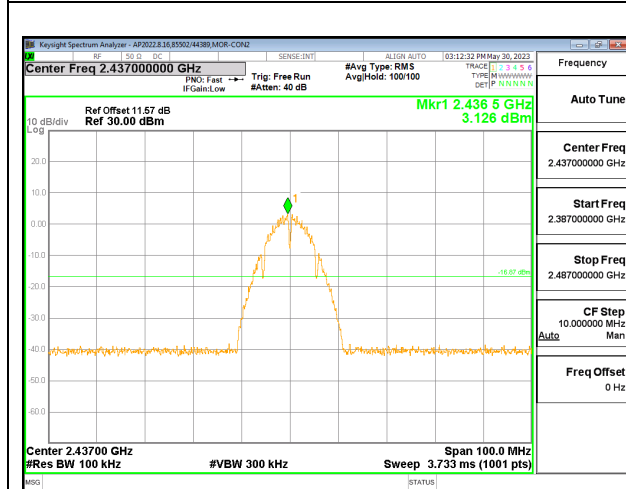
2TX CHAIN 0 + CHAIN 1 CDD MODE



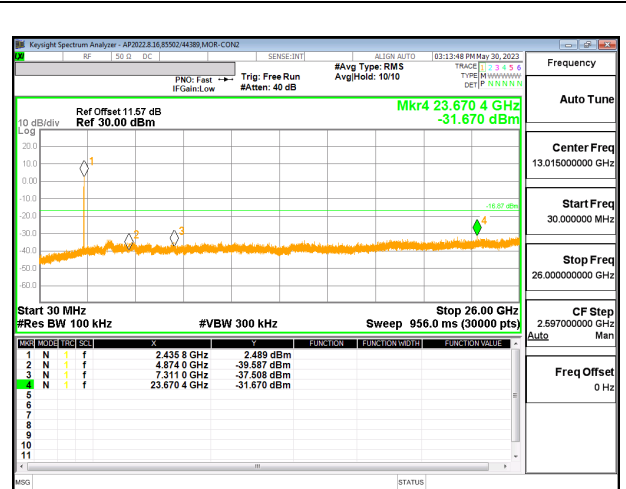
LOW CHANNEL 1 BANDEDGE CHAIN 0



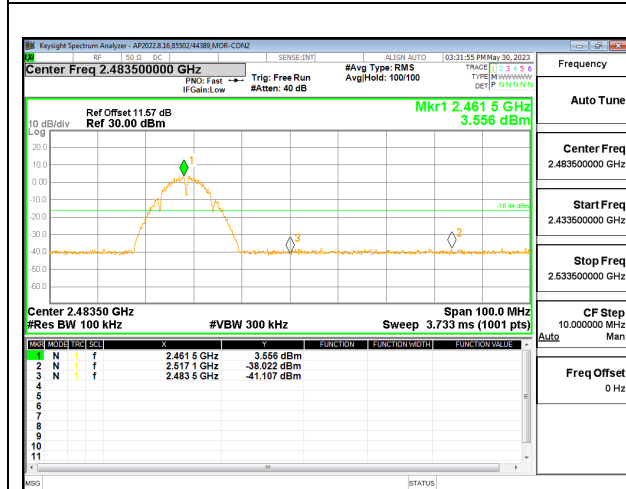
OUT-OF-BAND LOW CHANNEL 1 CHAIN 0



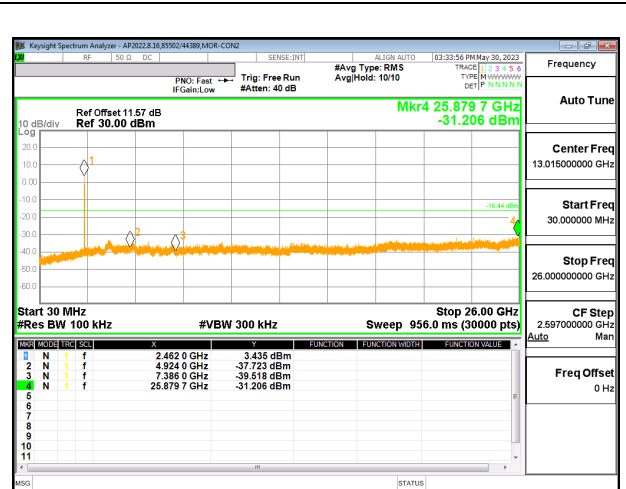
IN-BAND REFERENCE LEVEL CHAIN 0



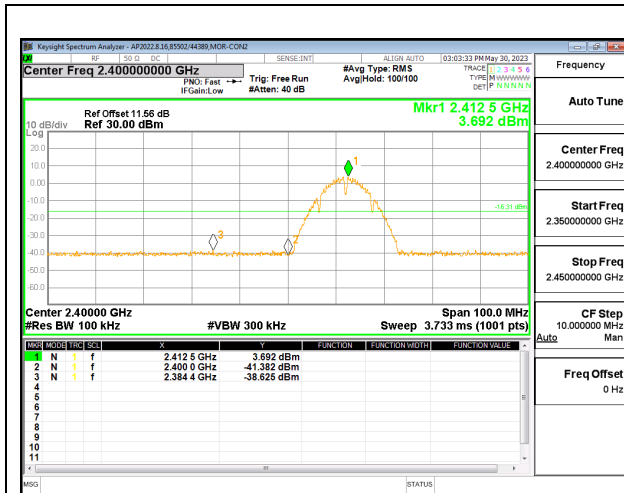
OUT-OF-BAND MID CHANNEL CHAIN 0



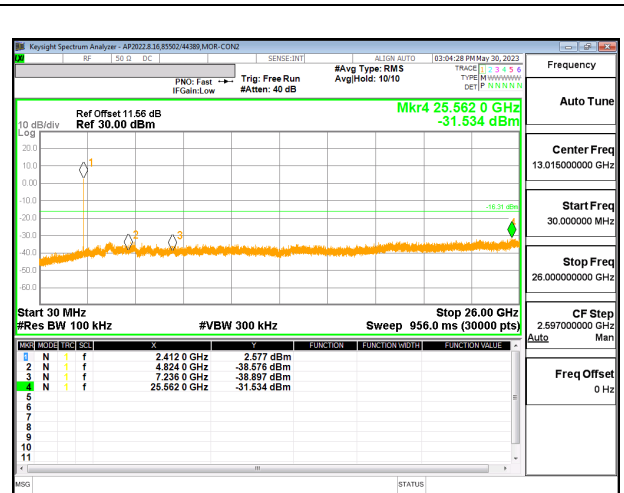
HIGH CHANNEL 11 BANDEDGE CHAIN 0



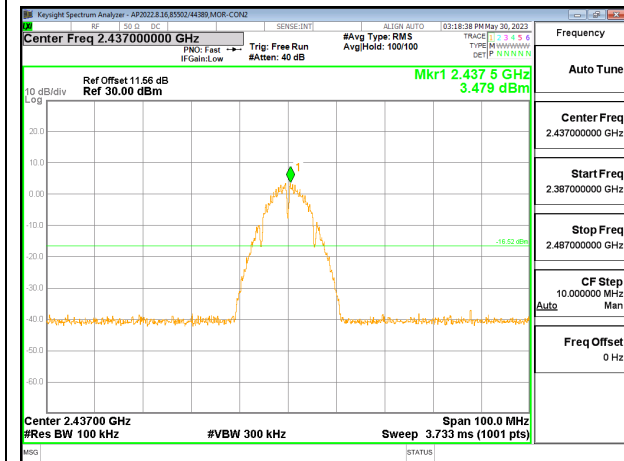
OUT-OF-BAND HIGH CHANNEL 11 CHAIN 0



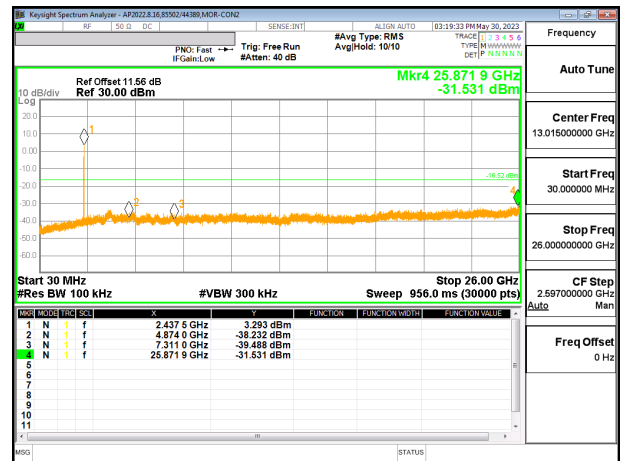
LOW CHANNEL 1 BANDEDGE CHAIN 1



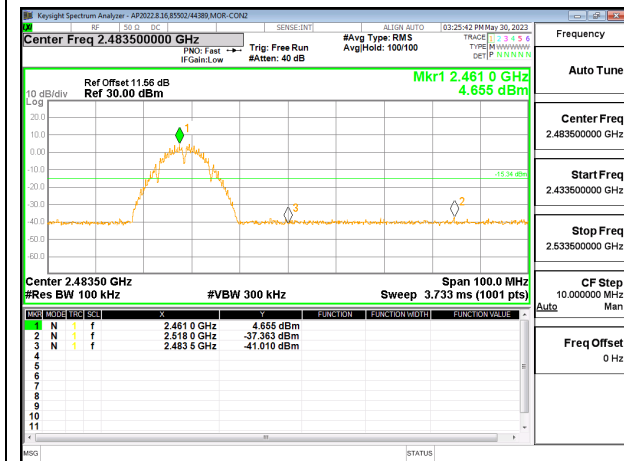
OUT-OF-BAND LOW CHANNEL 1 CHAIN 1



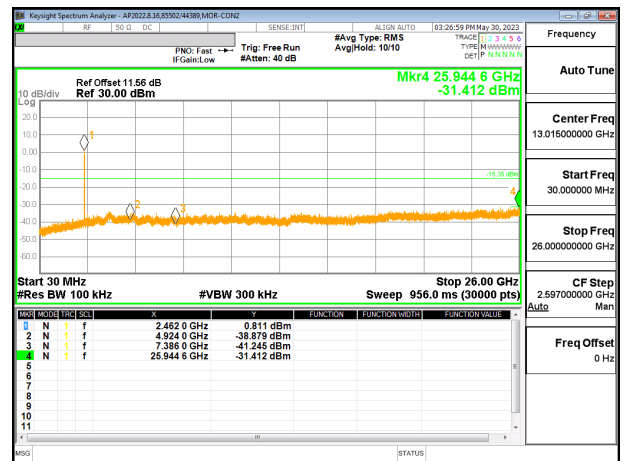
IN-BAND REFERENCE LEVEL CHAIN 1



OUT-OF-BAND MID CHANNEL 1 CHAIN 1



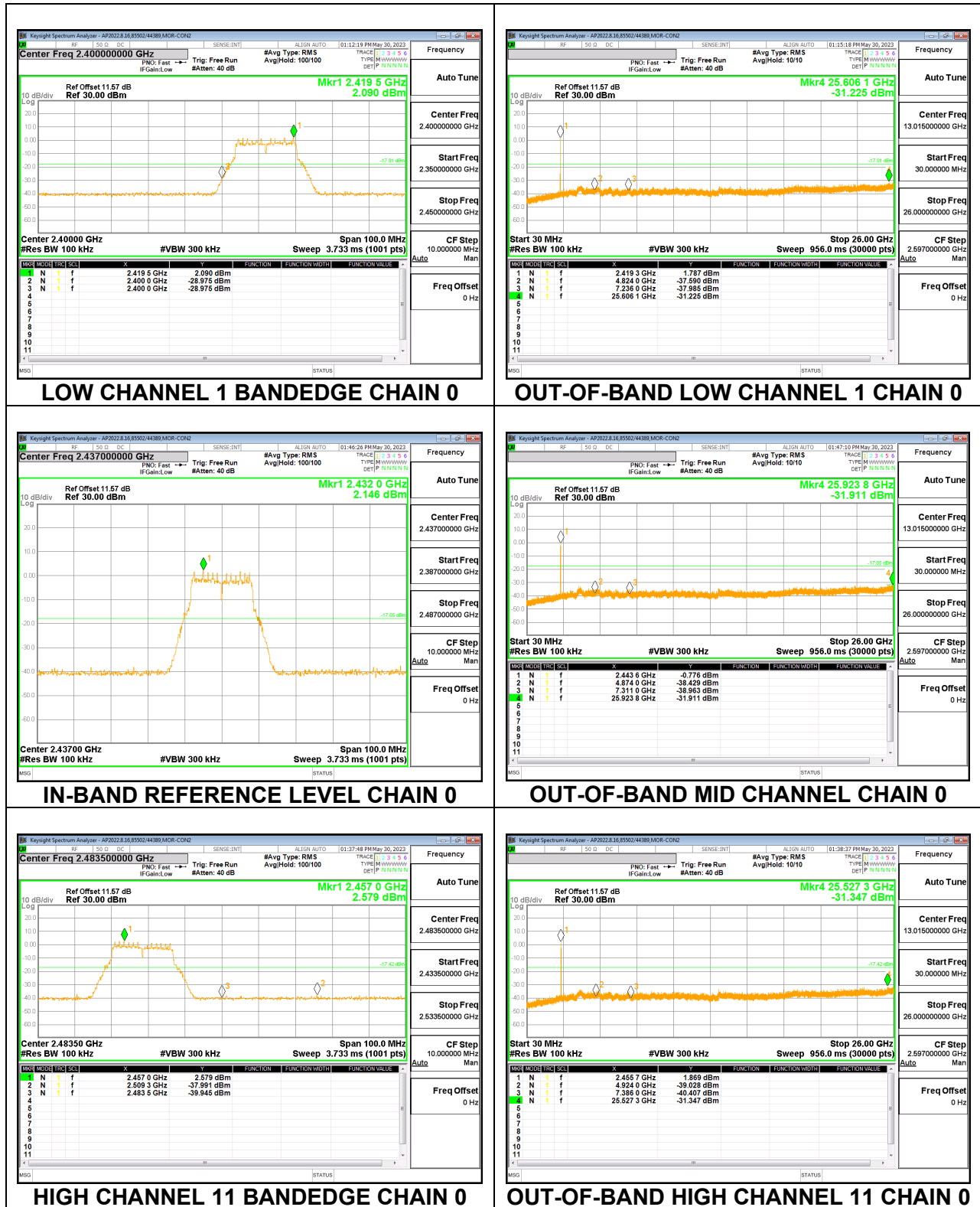
HIGH CHANNEL 11 BANDEDGE CHAIN 1

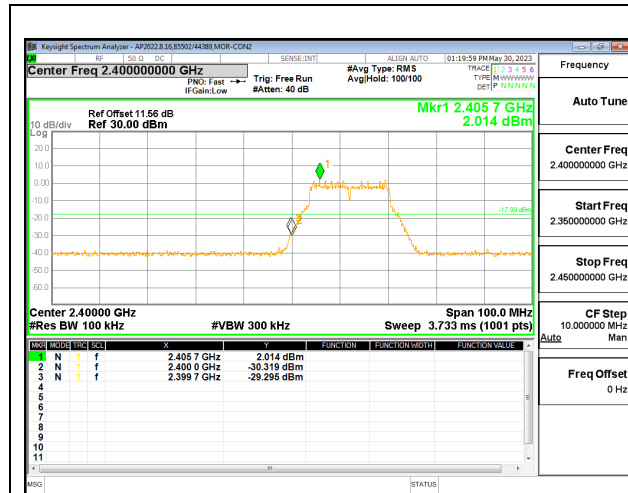


OUT-OF-BAND HIGH CHANNEL 11 CHAIN 1

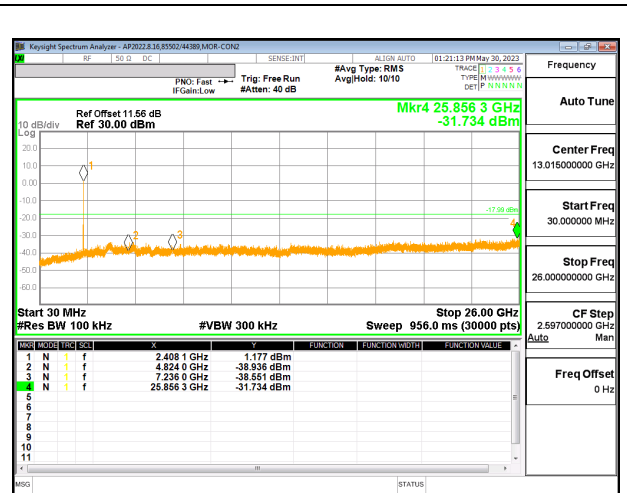
9.6.2. 802.11g MODE

2TX CHAIN 0 + CHAIN 1 CDD MODE

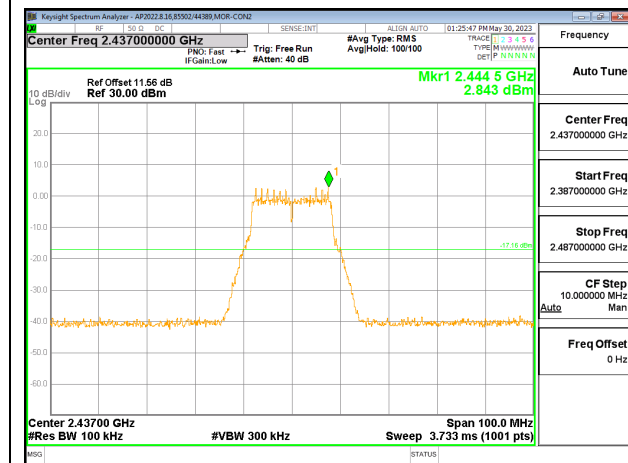




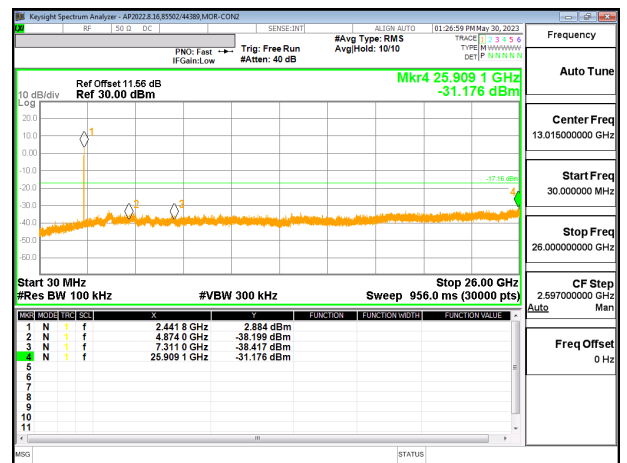
LOW CHANNEL 1 BANDEDGE CHAIN 1



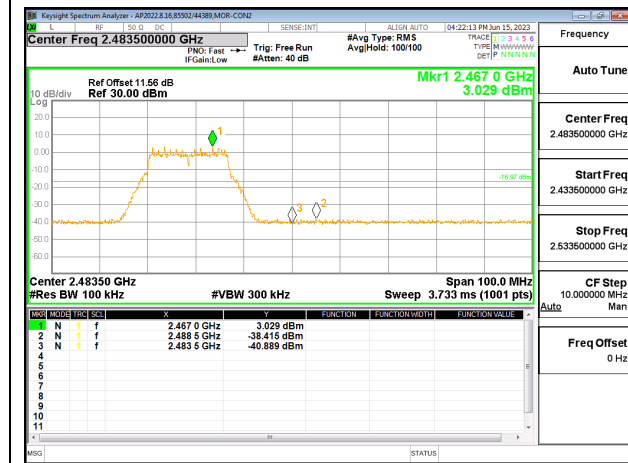
OUT-OF-BAND LOW CHANNEL 1 CHAIN 1



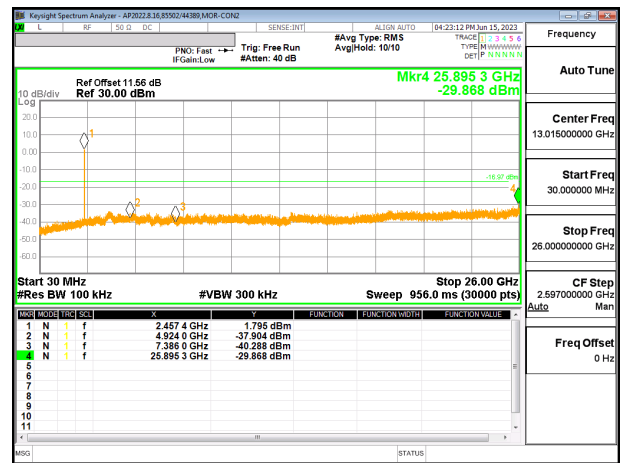
IN-BAND REFERENCE LEVEL CHAIN 1



OUT-OF-BAND MID CHANNEL 1 CHAIN 1



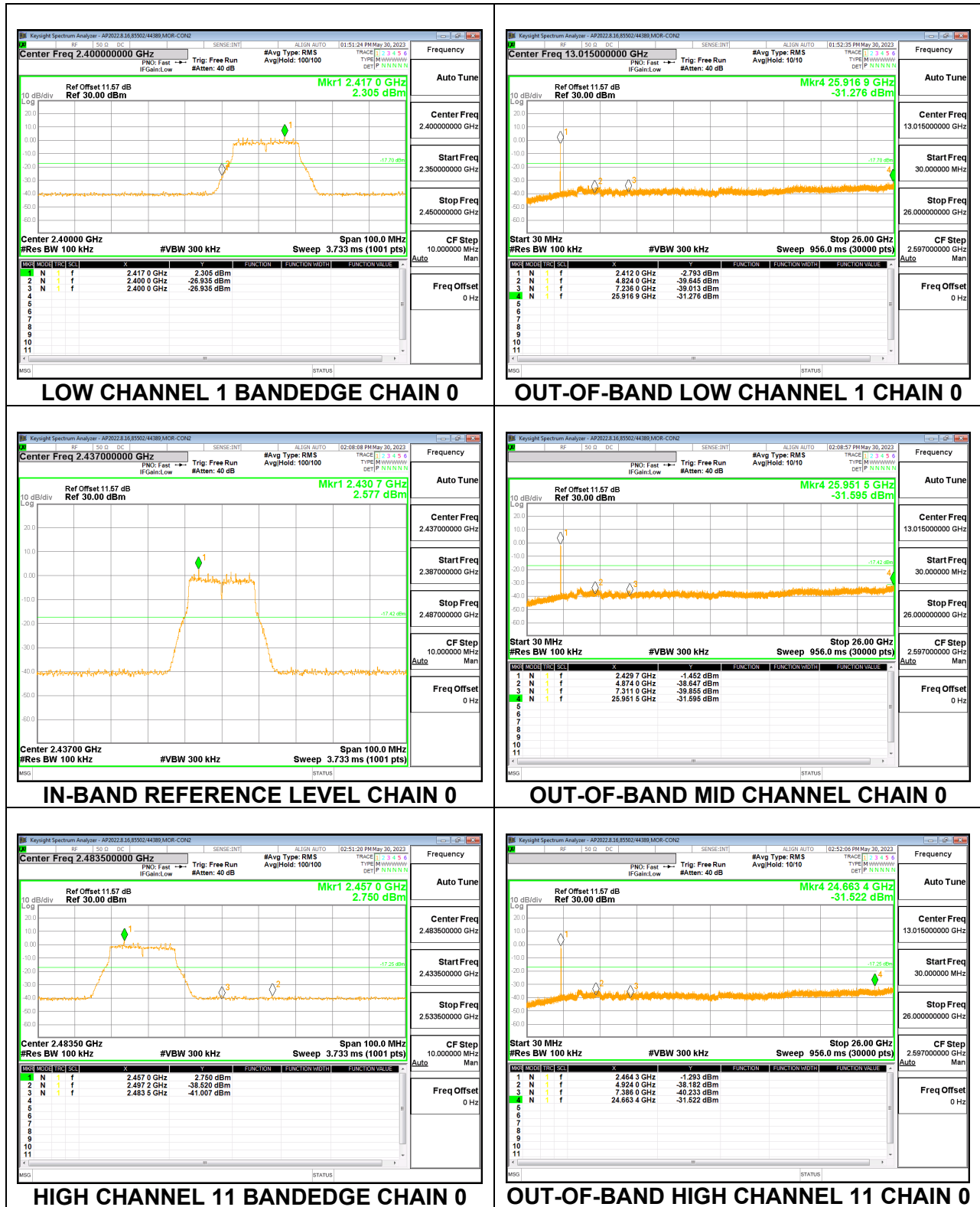
HIGH CHANNEL 11 BANDEDGE CHAIN 1

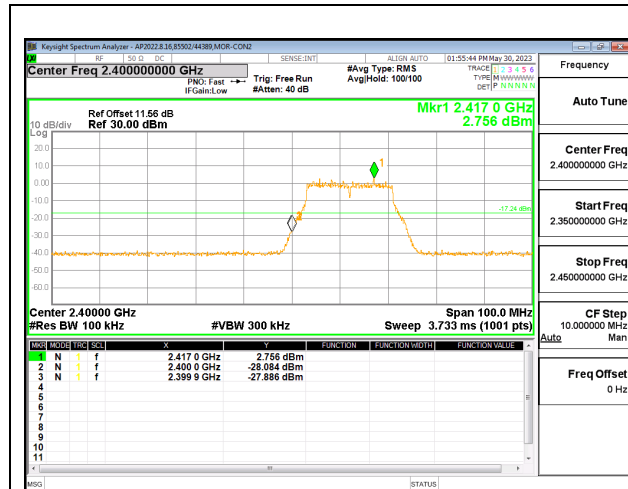


OUT-OF-BAND HIGH CHANNEL 11 CHAIN 1

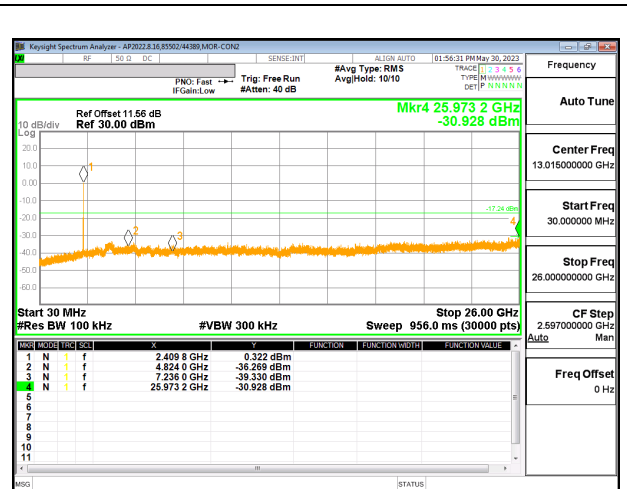
9.6.3. 802.11n HT20 MODE

2TX CHAIN 0 + CHAIN 1 CDD MODE

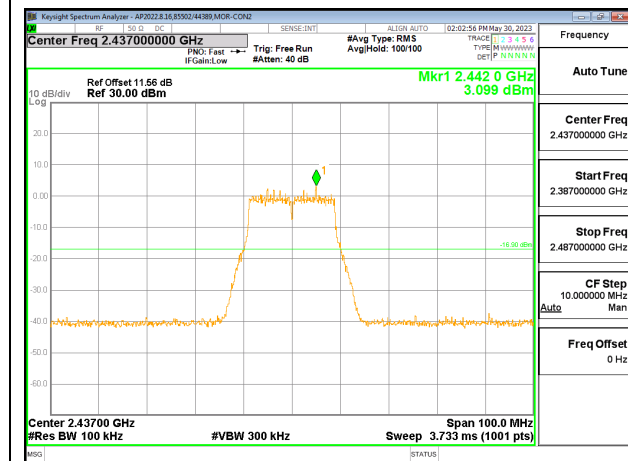




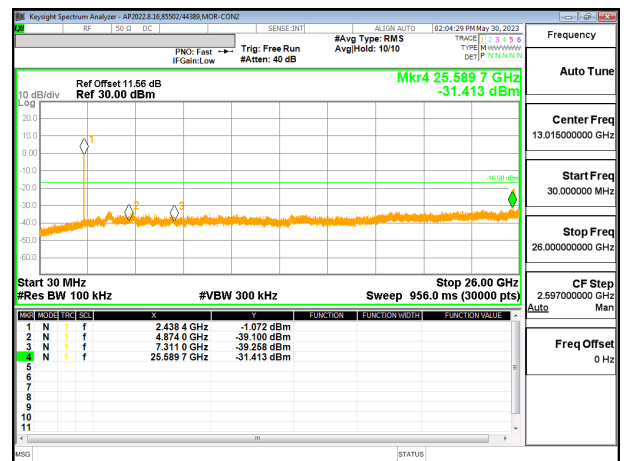
LOW CHANNEL 1 BANDEDGE CHAIN 1



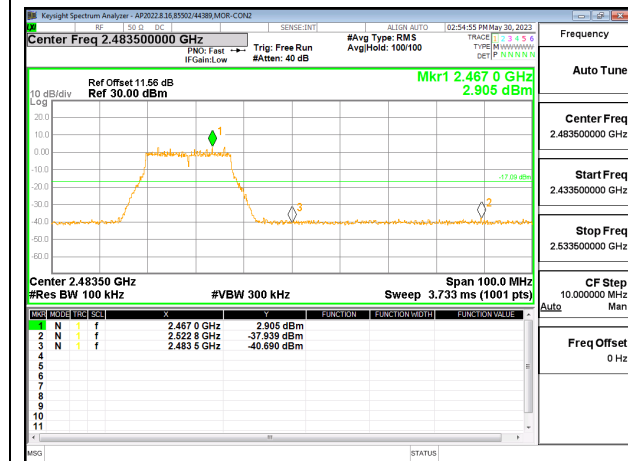
OUT-OF-BAND LOW CHANNEL 1 CHAIN 1



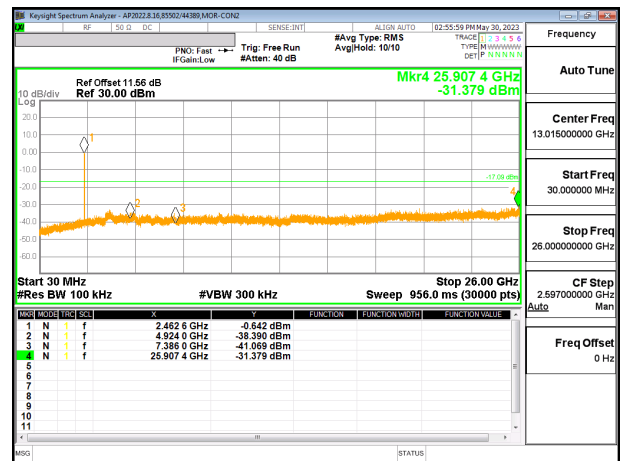
IN-BAND REFERENCE LEVEL CHAIN 1



OUT-OF-BAND MID CHANNEL 1 CHAIN 1



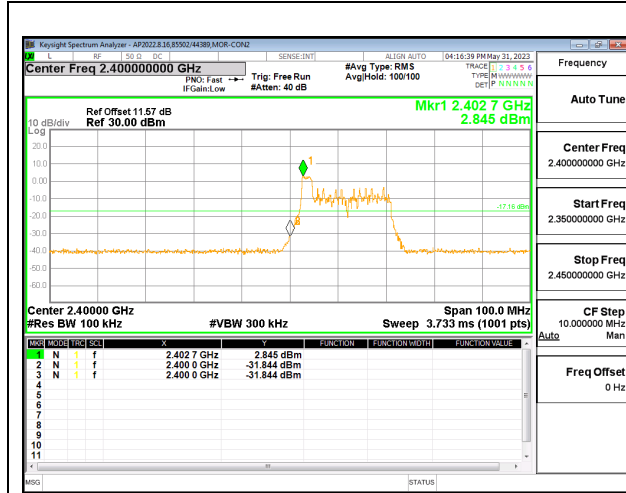
HIGH CHANNEL 11 BANDEDGE CHAIN 1



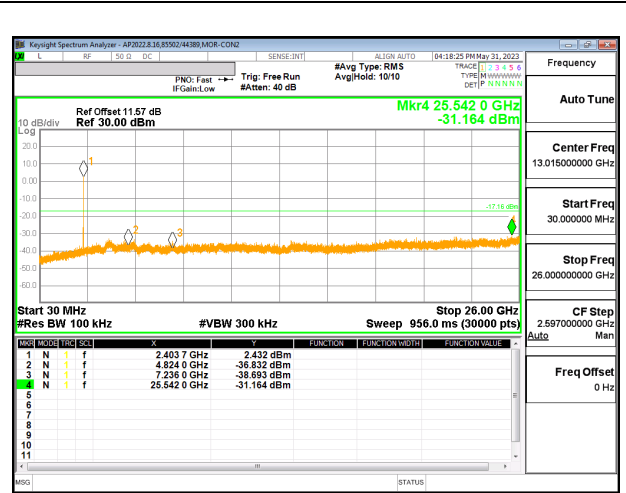
OUT-OF-BAND HIGH CHANNEL 11 CHAIN 1

9.6.4. 802.11ax HE20 MODE 2TX

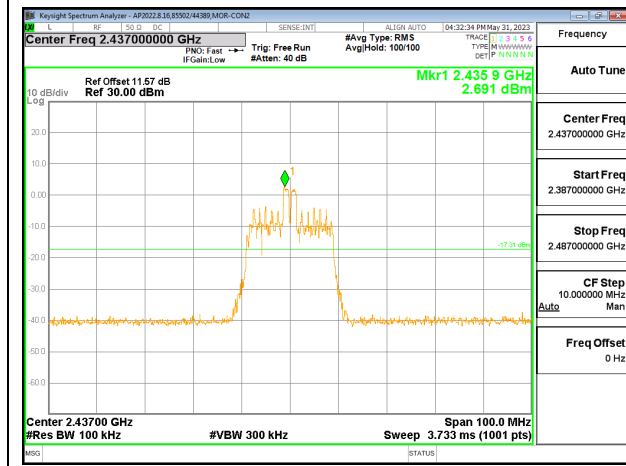
2TX CHAIN 0 + CHAIN 1 CDD OFDMA MODE: 26T



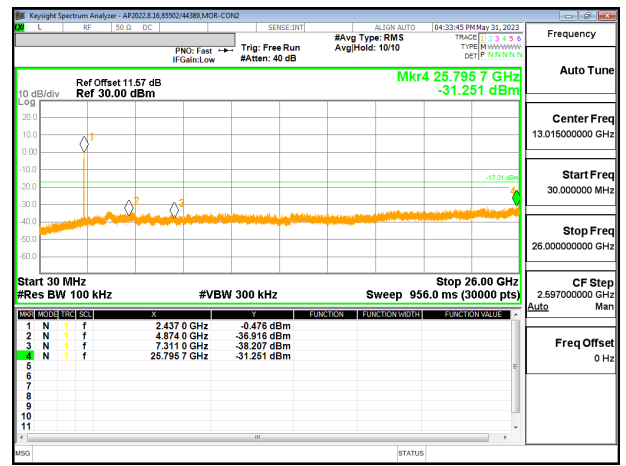
LOW CHANNEL 1 BANDEDGE CHAIN 0



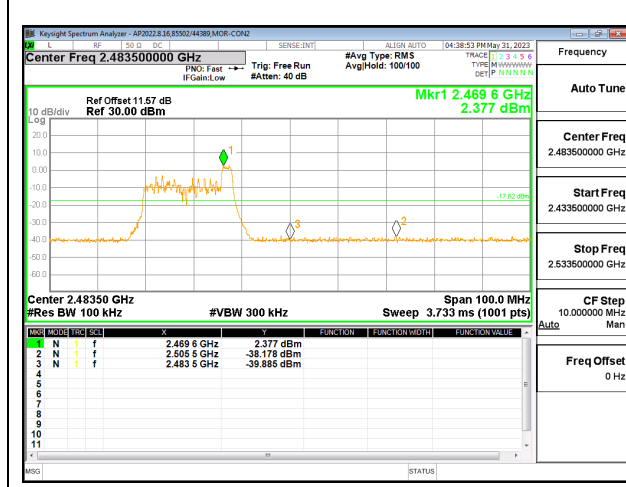
OUT-OF-BAND LOW CHANNEL 1 CHAIN 0



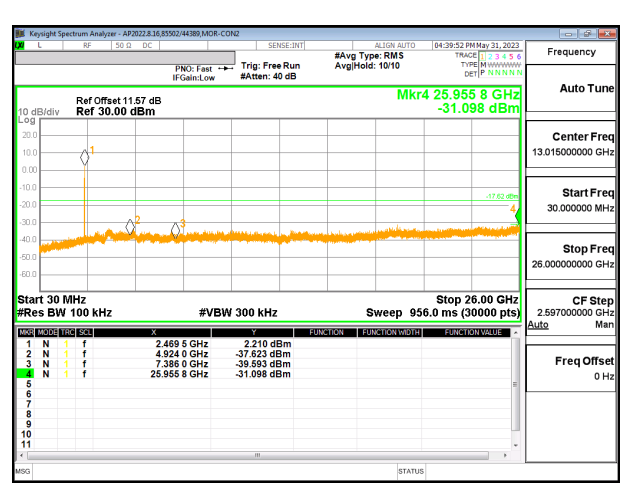
IN-BAND REFERENCE LEVEL CHAIN 0



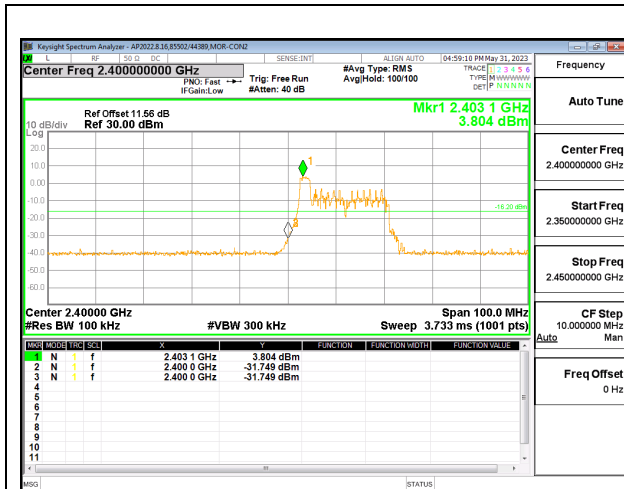
OUT-OF-BAND MID CHANNEL CHAIN 0



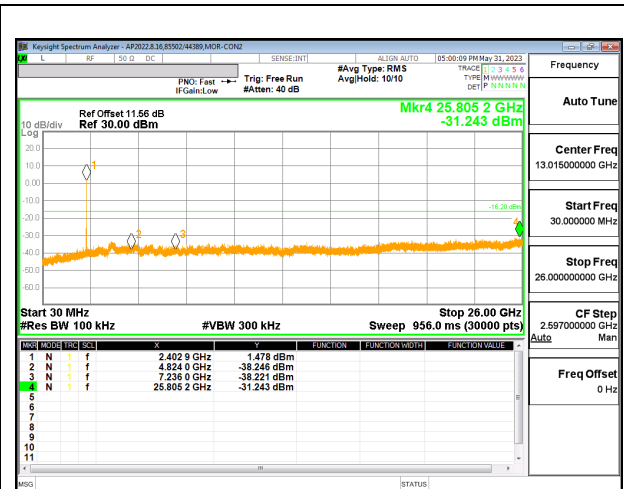
HIGH CHANNEL 11 BANDEDGE CHAIN 0



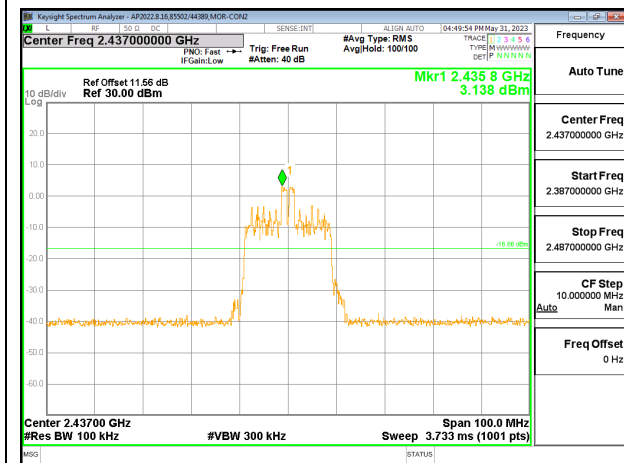
OUT-OF-BAND HIGH CHANNEL 11 CHAIN 0



LOW CHANNEL 1 BANDEDGE CHAIN 1



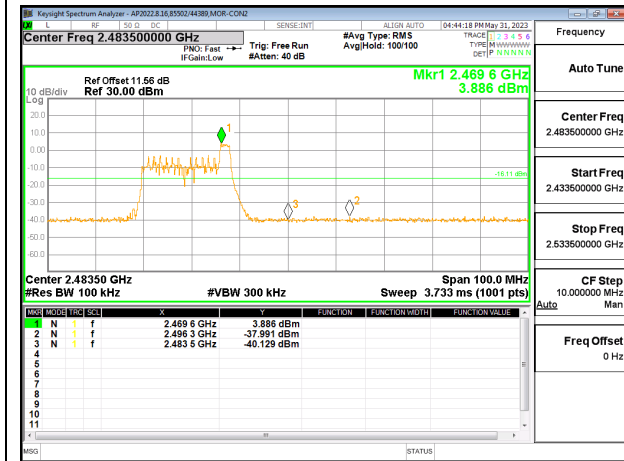
OUT-OF-BAND LOW CHANNEL 1 CHAIN 1



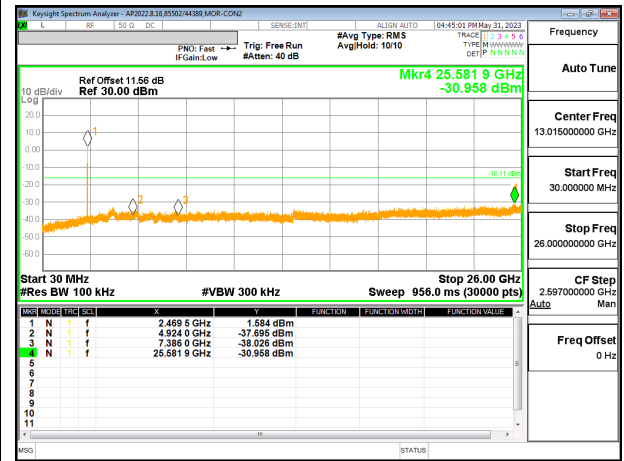
IN-BAND REFERENCE LEVEL CHAIN 1



OUT-OF-BAND MID CHANNEL 1 CHAIN 1

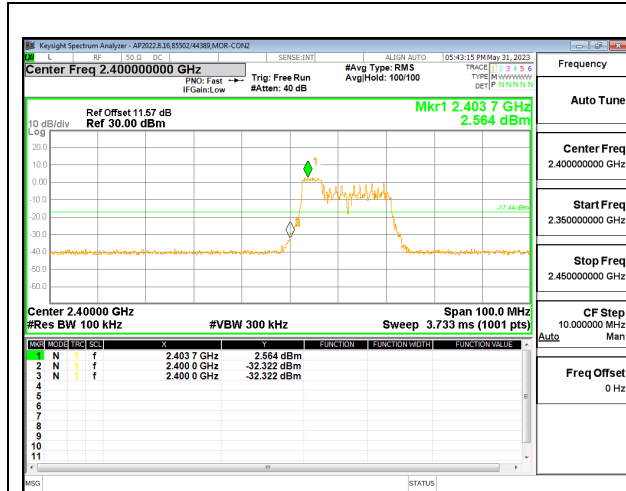


HIGH CHANNEL 11 BANDEDGE CHAIN 1

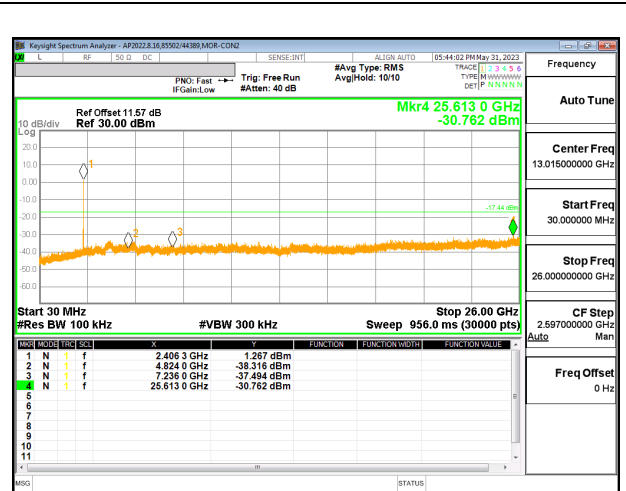


OUT-OF-BAND HIGH CHANNEL 11 CHAIN 1

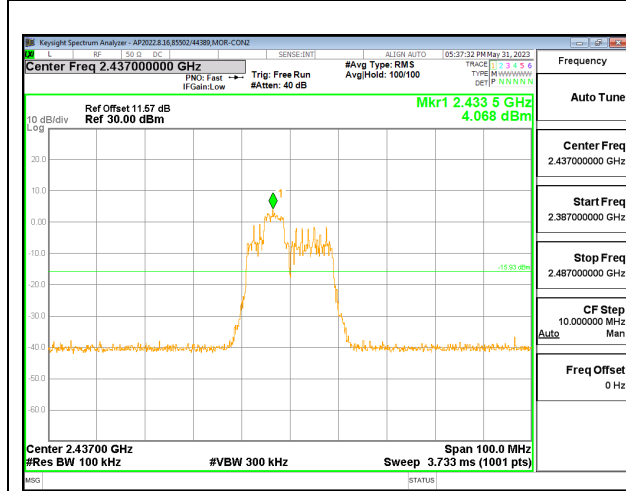
2TX CHAIN 0 + CHAIN 1 CDD OFDMA MODE: 52T



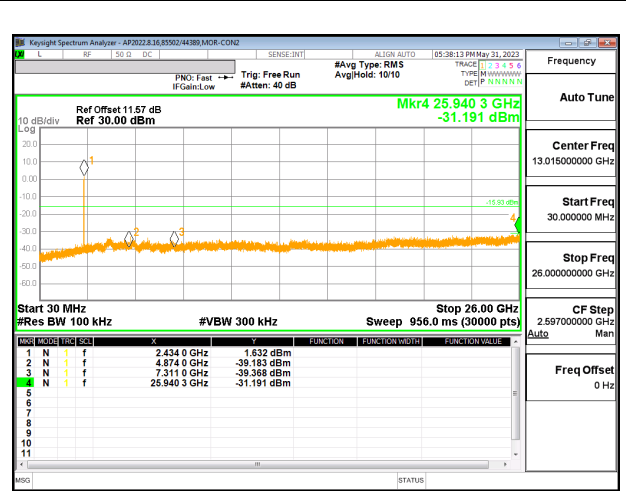
LOW CHANNEL 1 BANDEDGE CHAIN 0



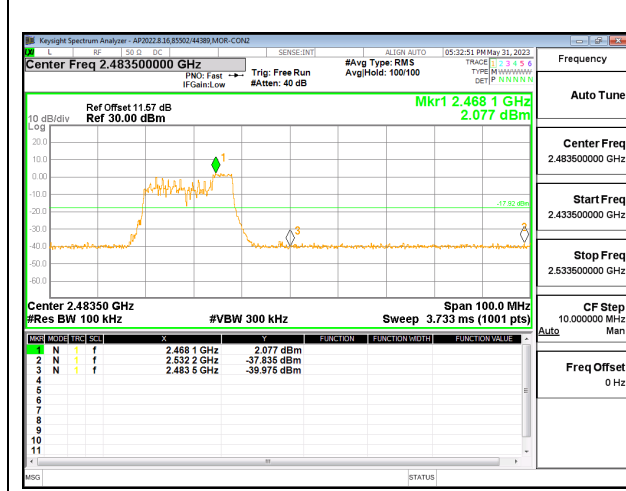
OUT-OF-BAND LOW CHANNEL 1 CHAIN 0



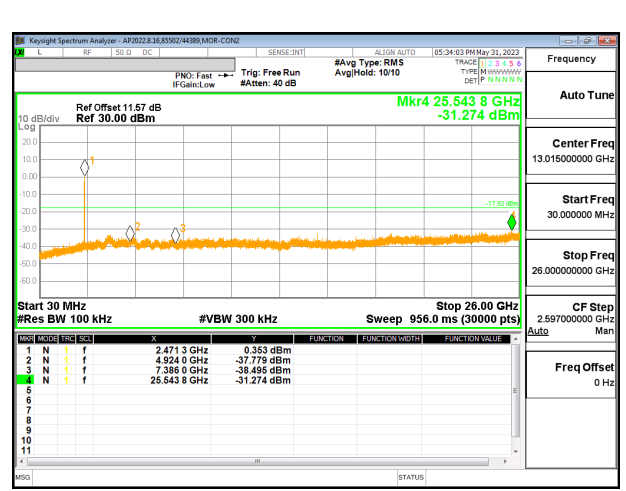
IN-BAND REFERENCE LEVEL CHAIN 0



OUT-OF-BAND MID CHANNEL CHAIN 0



HIGH CHANNEL 11 BANDEDGE CHAIN 0



OUT-OF-BAND HIGH CHANNEL 11 CHAIN 0