TEST REPORT

Report Number. : R14720550-E1b

Applicant	:	Samsung Electronics Co., Ltd. 129 Samsung-Ro, Yeongtong-Gu Suwon-Si, Gyeonggi-Do, 16677, Korea
Model	:	SM-X716B
FCC ID	:	A3LSMX716B
EUT Description	:	GSM/WCDMA/LTE/5G NR Tablet + BT/BLE, DTS/UNII a/b/g/n/ac/ax and WPT
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART C: 2023 ISED RSS-247 ISSUE 2: 2017 ISED RSS-GEN ISSUE 5 + A2: 2021

Date Of Issue:
2023-06-09

Prepared by:
UL LLC
12 Laboratory Dr.
Research Triangle Park, NC 27709 U.S.A.
TEL: (919) 549-1400

ACCREDITED
CERT #0751.06

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	2023-05-15	Initial Issue	Charles Moody
V2	2023-05-31	Revised standard versions. Revised antenna nomenclature. Extended calibration dates to end of the due month. Revised some power measurements.	B. Kiewra
V3	2023-06-05	Added gain calculation	B. Kiewra
V4	2023-06-09	Added additional information regarding gain calculation	B. Kiewra

UL LLC
2800 Suite Perimeter Park Dr. Suite B, Morrisville, NC 27560; USA TEL: (919) 549-1400

TABLE OF CONTENTS

UL LLC
2800 Suite Perimeter Park Dr. Suite B, Morrisville, NC 27560; USA TEL: (919) 549-1400

UL LLC
2800 Suite Perimeter Park Dr. Suite B, Morrisville, NC 27560; USA TEL: (919) 549-1400

1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	Samsung Electronics Co., Ltd. 129 Samsung-Ro Yeongtong-Gu Suwon-Si, Gyeonggi-Do, 16677, Korea
EUT DESCRIPTION:	GSM/WCDMA/LTE/5G NR Tablet + BT/BLE, DTS/UNII a/b/g/n/ac/ax and WPT
MODEL:	SM-X716B
SERIAL NUMBER:	5918385, R32W3004BTT, 5918394, 5918392, R32W300404N
SAMPLE RECEIPT DATE:	2023-03-24
DATE TESTED:	2023-04-07 TO 2023-05-12

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
47 CFR Part 15 Subpart C: 2023	Complies
ISED RSS-247 Issue 2: 2017	Complies
ISED RSS-GEN Issue 5 + A2: 2021	Complies

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.

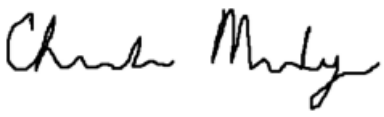
The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. 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:

Michael Antola
Staff Engineer
Consumer, Medical, and IT Segment
UL LLC

Prepared By:



Charles Moody
Electrical 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 section 9.6)

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	Compliant	None.
15.247 (b) (3)	RSS-247 5.4 (d)	Output Power		
15.247 (e)	RSS-247 5.2 (b)	PSD	Compliant	None.
15.247 (d)	RSS-247 5.5	Conducted Spurious Emissions		
15.209, 15.205	RSS-GEN 8.9, 8.10	Radiated Emissions		
15.207	RSS-Gen 8.8	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, RSS-GEN Issue 5 + A2, and RSS-247 Issue 2.

The scope of this report covers the 802.11ax modes in the 2.4GHz band of Model SM-X716B.

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
☒	Building 2800 Suite Perimeter Park Dr. Suite B Morrisville, NC 27560, U.S.A	US0067	27265	825374
☐	Building 12 Laboratory Dr RTP, NC 27709, U.S.A.		2180C	

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:
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

6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The EUT is a GSM/WCDMA/LTE/5G NR tablet + BT/BLE, DTS/UNII a/b/g/n/ac/ax and WPT. This report covers the emissions from the 2.4 WLAN radio.

6.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted average output power as follows:

2.4GHz BAND 802.11 ax MODE 2TX

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2TX			
2412 - 2472	802.11ax HE20 RU size 242T	20.89	122.74
2412 - 2472	802.11ax HE20 RU size 106T	19.27	84.53
2412 - 2472	802.11ax HE20 RU size 52T	18.97	78.89
2412 - 2472	802.11ax HE20 RU size 26T	15.95	39.36

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	Maximum Gain (dBi)
0	BT/WiFi 1 Antenna	Metal	0.43
1	BT/WiFi 2 Antenna	Metal	0.64

6.4. SOFTWARE AND FIRMWARE

The EUT hardware installed during testing was REV0.1.

The software version used during testing was X716B.001.

6.5. WORST-CASE CONFIGURATION AND MODE

WORST-CASE CONFIGURATION AND MODE FOR FINAL TEST

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 average output power/PSD as worst-case scenario. This was found to be a non-ax mode and can be located in UL Report number: R14720550-E1a.

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.

Band edge was performed with the EUT set to transmit at the measured power on low, high, and all power stepped channels. Radiated spurious emissions between 1GHz and 18GHz was performed with the EUT set to transmit at the highest power on low, middle, and high channels. Radiated emissions are performed with the EUT set to transmit on the worst-case mode/channel based on average power. For the CCK modulation scheme, this was found to be 11b and for OFDM/OFDMA modulation schemes, this was found to be 11g. This data can be found in UL Report number: R14720550-E1a. Radiated band edge for Ax modes, was performed on the mode with the highest average output power. This was found to be HE20, 242T/RU6.

Conducted spurious emissions between 1GHz and 18GHz were performed on low, middle, and high channels with the EUT set to transmit at the highest power.

For MIMO, 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.

The EUT was pre-tested in its two configurations; with and without the keyboard attached. As determined through pretesting, without the keyboard was found to be the worst-case configuration. Therefore, all final testing was performed without the keyboard attached.

Worst-case data rates as determined through pretesting was found to be:

802.11ax HE20 mode: MCS0

Preliminary investigation scans were completed to compare Full RU Tone modes and Single User Tone modes. It was found that Full RU Tone modes were worst case over Single User in every instance. Therefore, only full tone was tested as it is representitive of SU worst case scenario.

802.11ax modes were determined by the following :

802.11ax HE20 26T, 52T, 106T, and 242T modes tested.

6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
AC Adapter	Samsung	EP-TA800	R37TCCJ49LASEA	-

I/O CABLES

I/O Cable List						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	Charging	1	USB C to USB A	Shielded	<3m	Used to charge the device

TEST SETUP

The EUT is configured to the desired settings prior to testing, using the built-in application on the EUT.

SETUP DIAGRAMS

Please refer to R14720550-EP1 for setup diagrams

UL LLC
2800 Suite Perimeter Park Dr. Suite B, Morrisville, NC 27560; USA TEL: (919) 549-1400

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

Occupied BW (99%): ANSI C63.10-2013 Section 6.9.3

Output Power: 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)

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

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

UL LLC
2800 Suite Perimeter Park Dr. Suite B, Morrisville, NC 27560; USA TEL: (919) 549-1400

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.
	Common Equipment				
	Conducted Room 1				
SA0027	Spectrum Analyzer	Keysight Technologies	N9030A	2022-05-24	2023-05-24
PWM001 (PRE0136343)	RF Power Meter	Keysight Technologies	N1912A	2022-08-30	2023-08-30
90418	Peak and Avg Power Sensor, 50MHz to 18GHz	Keysight Technologies	N1921A	02/02/2023	2024-02-02
PWS002	Peak and Avg Power Sensor, 50MHz to 18GHz	Keysight Technologies	N1921A	2022-09-27	2023-09-27
HI0091	Environmental Meter	Fisher Scientific	15-077-963	2022-07-20	2023-07-20
SOFTEMI	Antenna Port Software	UL	Version 2022.8.16		
	Conducted Room 2				
**SA0025	Spectrum Analyzer	Keysight Technologies	N9030A	2022-05-02	2023-05-02
HI0090	Environmental Meter	Fisher Scientific	15-077-963	2022-07-20	2023-07-20
PWM005	RF Power Meter	Keysight Technologies	N1912A	2022-09-02	2024-09-02
PWS005	Peak and Avg Power Sensor, 50MHz to 18GHz	Keysight Technologies	N1921A	2022-06-15	2023-06-15
SOFTEMI	Antenna Port Software	UL	Version 2022.8.16		
	Additional Equipment used				
EMC4366	Bluetooth Tester	Rhode & Schwarz	1153.900.35	-	-
226563	SMA Coaxial 10dB Attenuator 25MHz-18GHz	CentricRF	C18S2-10	2023-02-16	2024-02-16
CBL098	Micro-Coax UTiFLEX Cable Assembly, Low Loss,40Ghz, 39.3", Connectors 2	Carlisle Interconnect Technologies	UFA147A-0-0180-200200	2023-02-17	2024-02-17
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
CPL001	Ultra-Wideband Directional Coupler 0.5-18GHz	Mini-Circuits	ZUDC10-183+	2023-02-17	2024-02-17
PWM001 (PRE0136343)	RF Power Meter	Keysight Technologies	N1912A	2022-08-30	2023-08-30
PWS002	Peak and Avg Power Sensor, 50MHz to 18GHz	Keysight Technologies	N1921A	2022-09-27	2023-09-27
90418	Peak and Avg Power Sensor, 50MHz to 18GHz	Keysight Technologies	N1921A	2023-02-02	2024-02-02

**NOTE: Testing on this analyzer was performed prior to 2023-05-02, thus while the analyzer was still in calibration.

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville – Chamber 2)

Equip. ID	Description	Manufacturer/Brand	Model Number	Last Cal.	Next Cal.
	1-18 GHz				
88761	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2022-09-13	2023-09-13
	Gain-Loss Chains				
91977	Gain-loss string: 1-18GHz	Various	Various	2022-05-10	2023-05-10
	Receiver & Software				
SA0026	Spectrum Analyzer	Keysight	N9030A	2022-08-02	2023-08-23
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
	Additional Equipment used				
200540	Environmental Meter	Fisher Scientific	15-077-963 s/n 181474409	2022-10-05	2023-10-05
A45	10dB, DC-18GHz, 5W	Mini-Circuits	BW-N10W5	2022-10-21	2023-10-21

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville – Chamber 1)

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	1-18 GHz				
206211	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2023-04-06	2024-04-06
	Gain-Loss Chains				
91979	Gain-loss string: 1-18GHz	Various	Various	2022-12-02	2023-12-02
	Receiver & Software				
197954	Spectrum Analyzer	Rohde & Schwarz	ESW44	2023-02-02	2024-02-02
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
	Additional Equipment used				
200539	Environmental Meter	Fisher Scientific	15-077-963 s/n 18474341	2022-10-05	2023-10-05

UL LLC
2800 Suite Perimeter Park Dr. Suite B, Morrisville, NC 27560; USA TEL: (919) 549-1400

9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

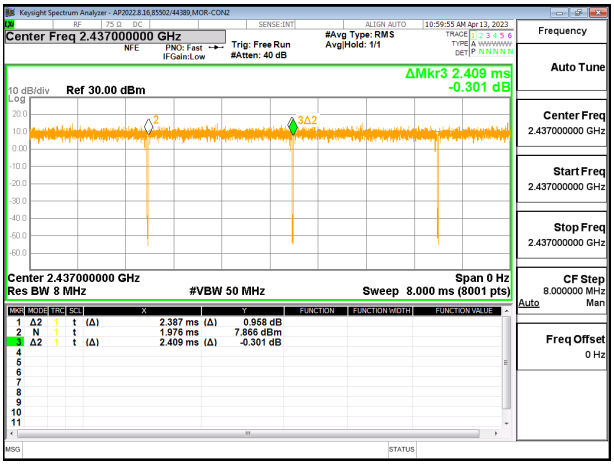
PROCEDURE

KDB 558074 D01 Zero-Span Spectrum Analyzer Method.

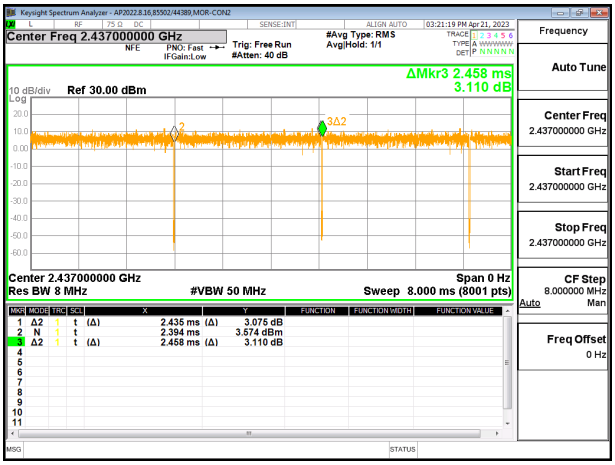
ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
2.4GHz Band						
802.11ax HE20 OFDMA, RU size 242T	2.387	2.409	0.991	99.09%	0.00	0.010
802.11ax HE20 OFDMA, RU size 106T	2.435	2.458	0.991	99.06%	0.00	0.010
802.11ax HE20 OFDMA, RU size 52T	2.590	2.613	0.991	99.12%	0.00	0.010
802.11ax HE20 OFDMA, RU size 26T	2.595	2.618	0.991	99.12%	0.00	0.010

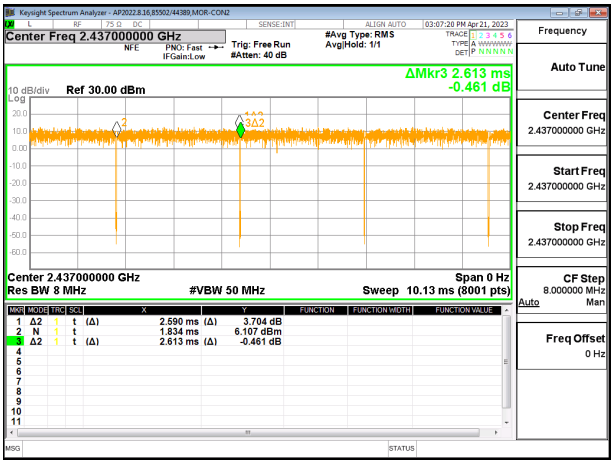
DUTY CYCLE PLOTS



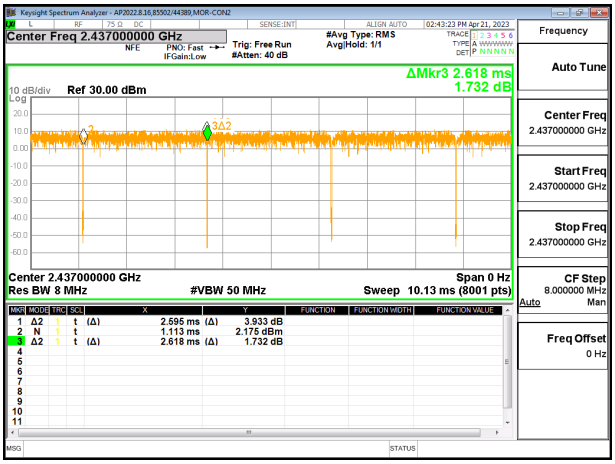
802.11ax HE20 OFDMA, RU index 242T MODE



802.11ax HE20 OFDMA, RU index 106T MODE



802.11ax HE20 OFDMA, RU index 52T MODE



802.11ax HE20 OFDMA, RU index 26T MODE

9.2. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)
RSS-247 5.2 (a)

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

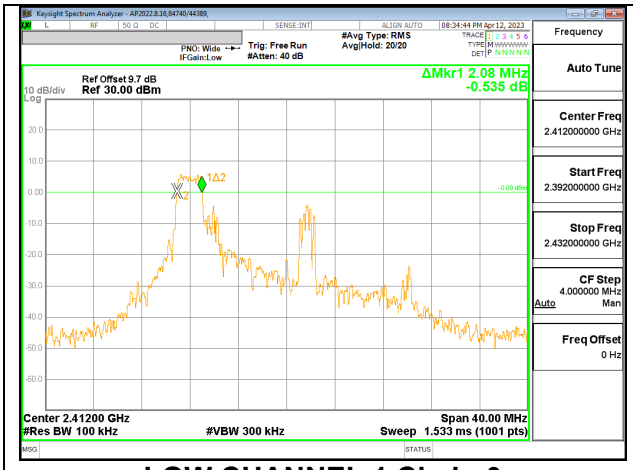
RESULTS

9.2.1. 802.11ax HE20 MODE 2TX

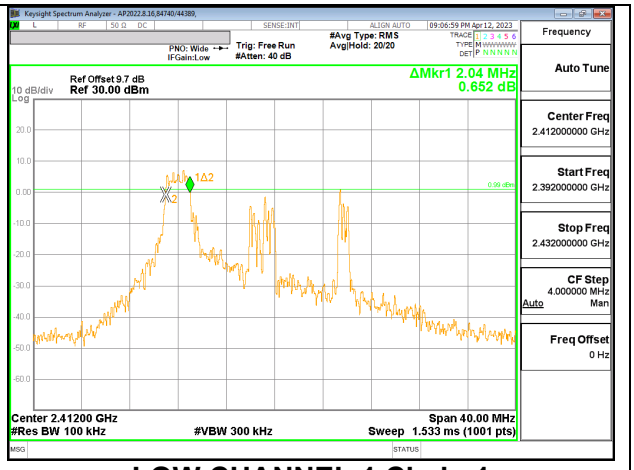
2TX Chain 0 + Chain 1 CDD OFDMA MODE: 26-Tones, RU Index 0

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low 1	2412	2.08	2.04	0.5

LOW CHANNEL 1



LOW CHANNEL 1 Chain 0



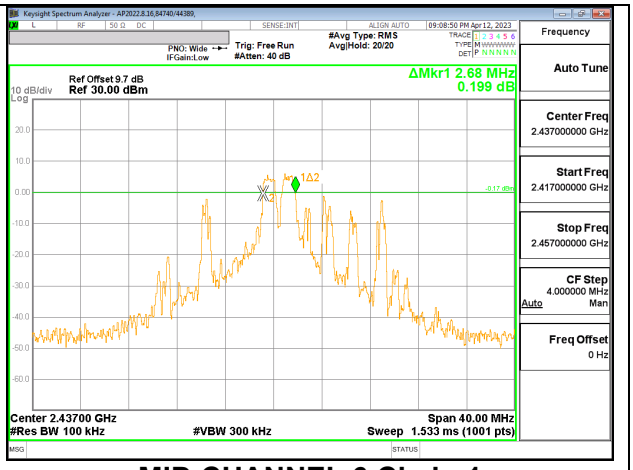
LOW CHANNEL 1 Chain 1

2TX Chain 0 + Chain 1 CDD OFDMA MODE: 26-Tones, RU Index 4

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Mid 6	2437	2.64	2.68	0.5

MID CHANNEL 6

MID CHANNEL 6 Chain 0



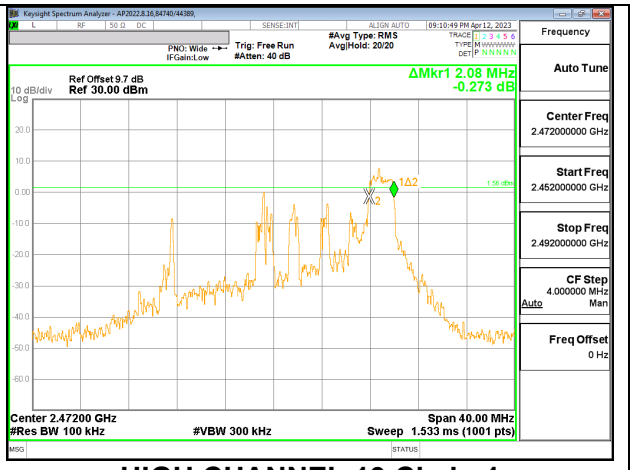
MID CHANNEL 6 Chain 1

2TX Chain 0 + Chain 1 CDD OFDMA MODE: 26-Tones, RU Index 8

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
High 13	2472	2.16	2.08	0.5

HIGH CHANNEL 13

HIGH CHANNEL 13 Chain 0



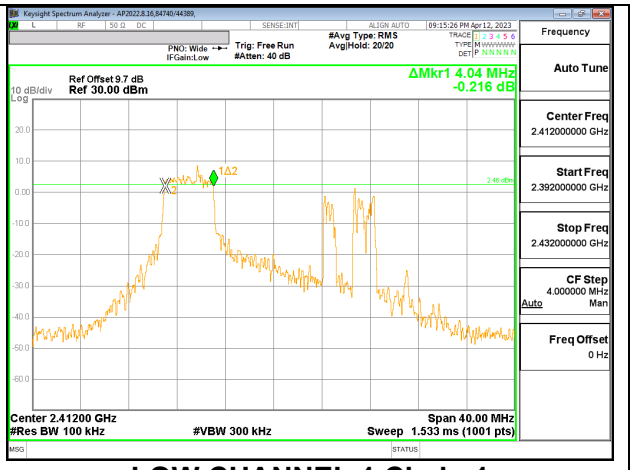
HIGH CHANNEL 13 Chain 1

2TX Chain 0 + Chain 1 CDD OFDMA MODE: 52-Tones, RU Index 37

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low 1	2412	4.08	4.04	0.5

LOW CHANNEL 1

LOW CHANNEL 1 Chain 0



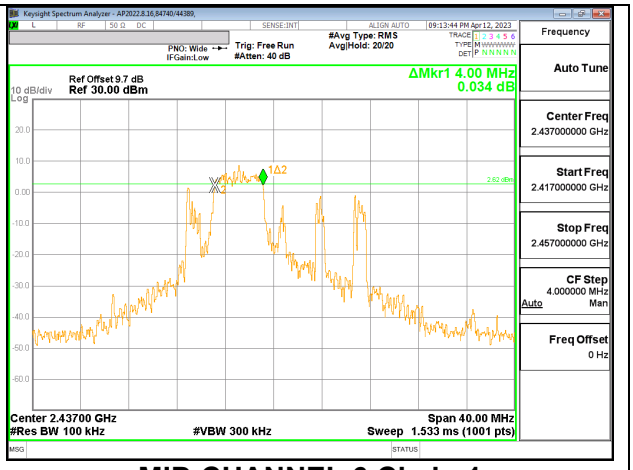
LOW CHANNEL 1 Chain 1

2TX Chain 0 + Chain 1 CDD OFDMA MODE: 52-Tones, RU Index 38

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Mid 6	2437	4.12	4.00	0.5

MID CHANNEL 6

MID CHANNEL 6 Chain 0



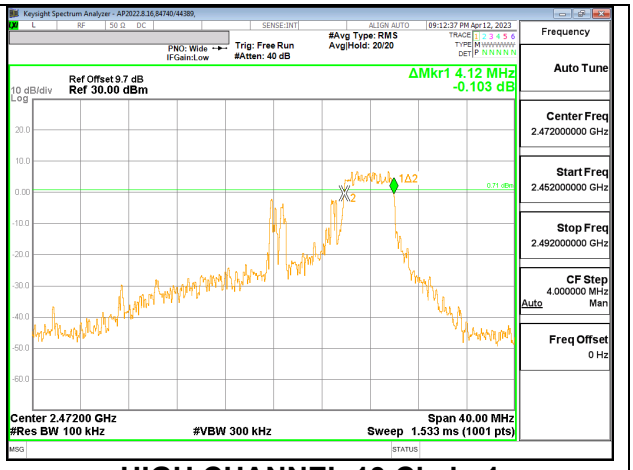
MID CHANNEL 6 Chain 1

2TX Chain 0 + Chain 1 CDD OFDMA MODE: 52-Tones, RU Index 40

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
High 13	2472	4.12	4.12	0.5

HIGH CHANNEL 13

HIGH CHANNEL 13 Chain 0

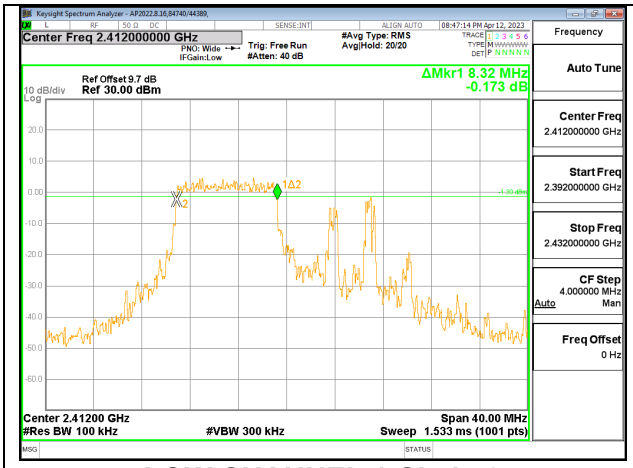


HIGH CHANNEL 13 Chain 1

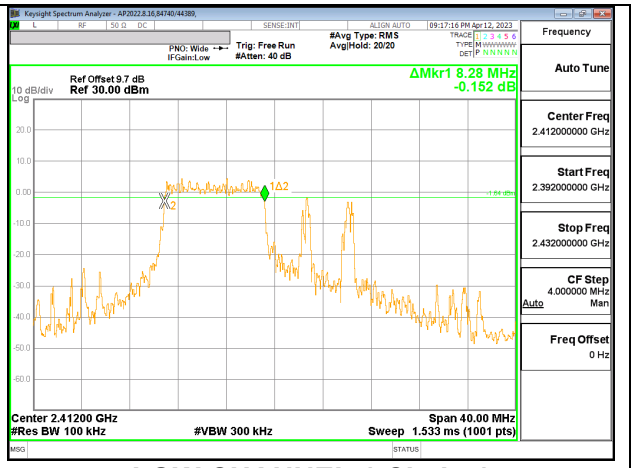
2TX Chain 0 + Chain 1 CDD OFDMA MODE: 106-Tones, RU Index 53

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low 1	2412	8.32	8.28	0.5
Mid 6	2437	8.28	8.16	0.5

LOW CHANNEL 1

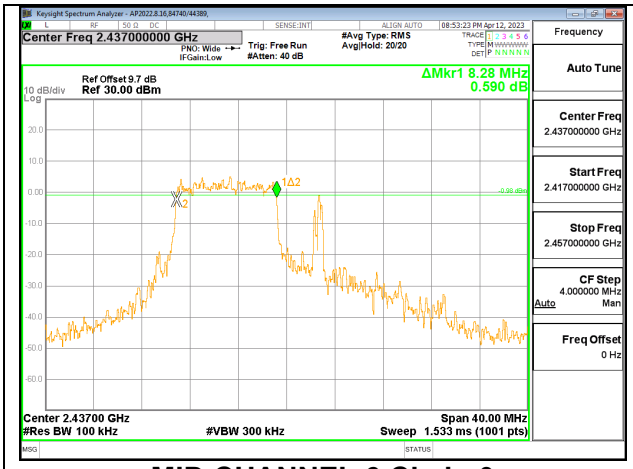


LOW CHANNEL 1 Chain 0

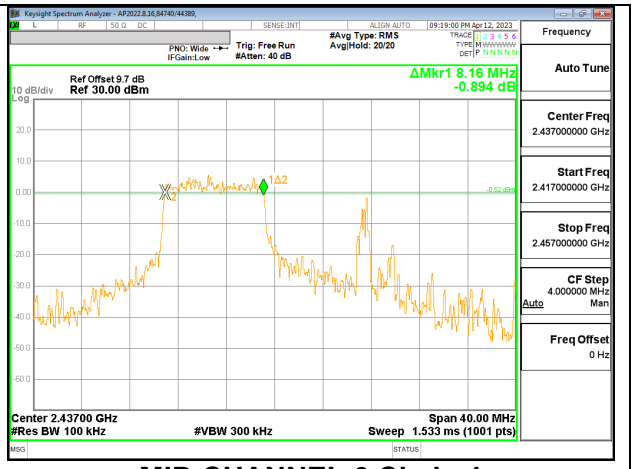


LOW CHANNEL 1 Chain 1

MID CHANNEL 6



MID CHANNEL 6 Chain 0

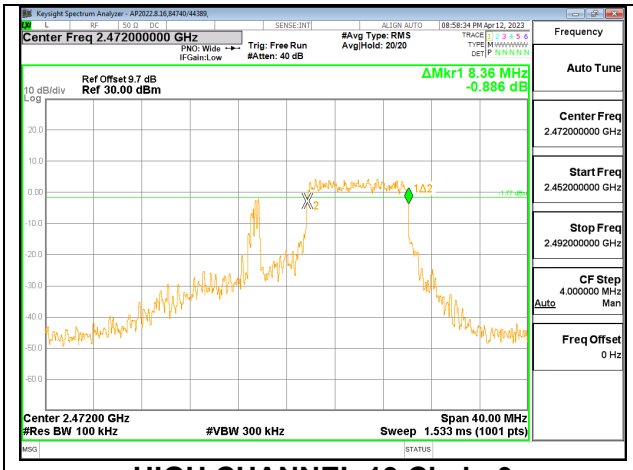


MID CHANNEL 6 Chain 1

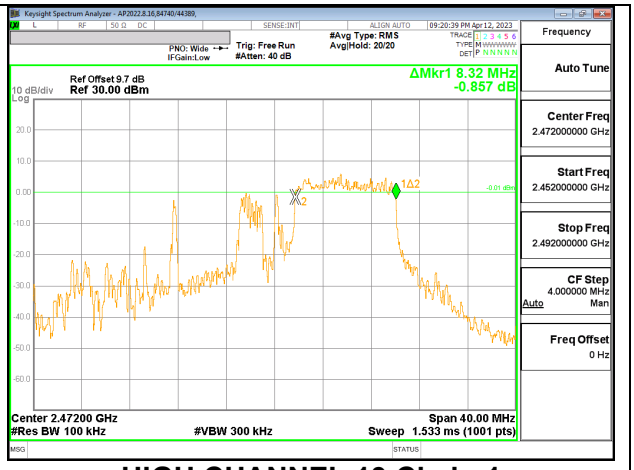
2TX Chain 0 + Chain 1 CDD OFDMA MODE: 106-Tones, RU Index 54

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
High 13	2472	8.36	8.32	0.5

HIGH CHANNEL 13



HIGH CHANNEL 13 Chain 0

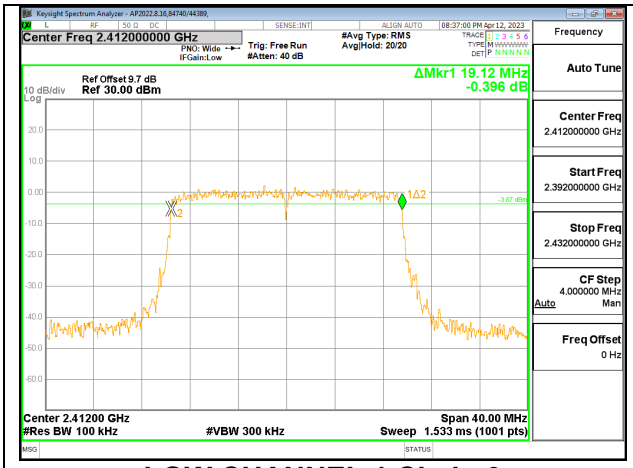


HIGH CHANNEL 13 Chain 1

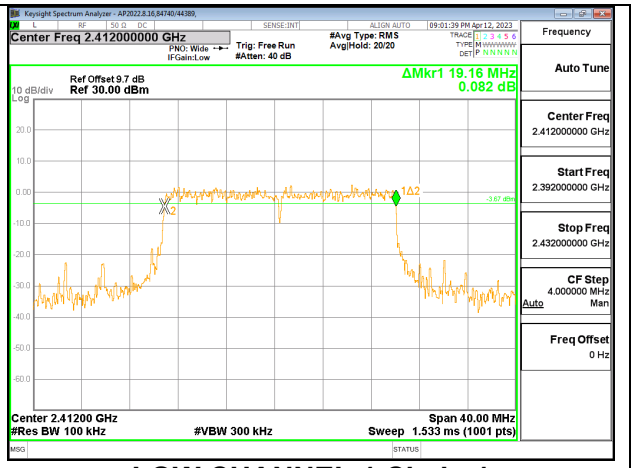
2TX Chain 0 + Chain 1 CDD OFDMA MODE: 242-Tones, RU Index 61

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low 1	2412	19.12	19.16	0.5
Mid 6	2437	18.76	18.96	0.5
High 13	2472	17.52	18.76	0.5

LOW CHANNEL 1

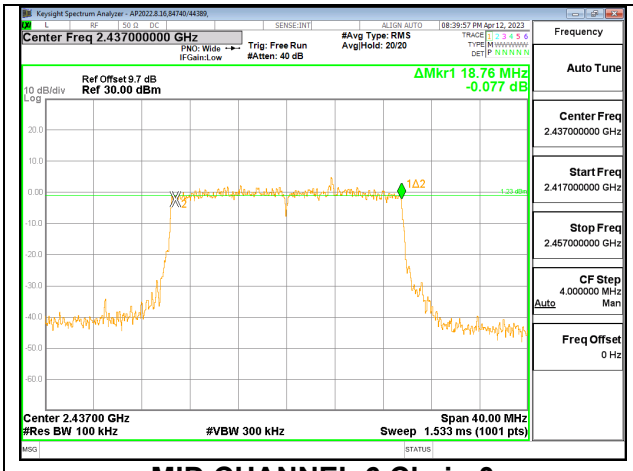


LOW CHANNEL 1 Chain 0

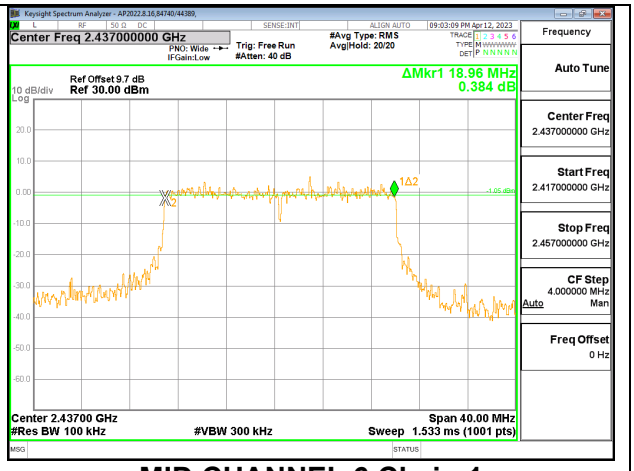


LOW CHANNEL 1 Chain 1

MID CHANNEL 6

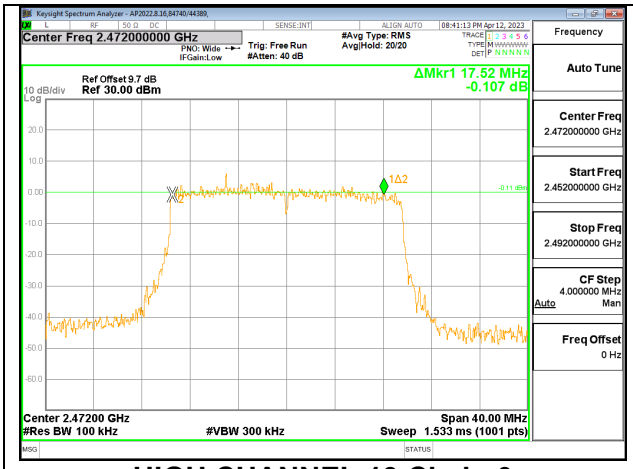


MID CHANNEL 6 Chain 0

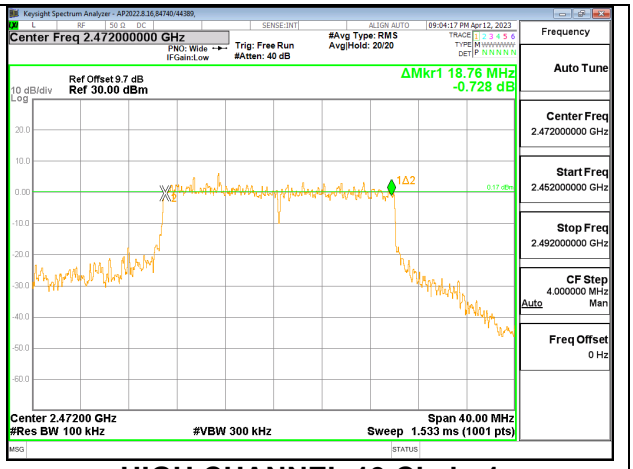


MID CHANNEL 6 Chain 1

HIGH CHANNEL 13



HIGH CHANNEL 13 Chain 0



HIGH CHANNEL 13 Chain 1

9.3. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

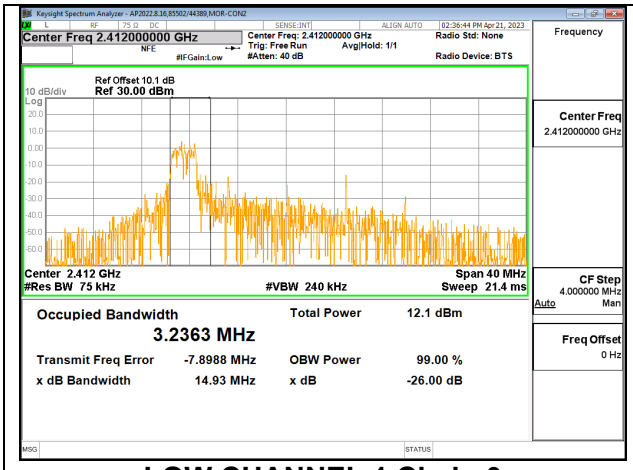
RESULTS

9.3.1. 802.11ax HE20 MODE 2TX

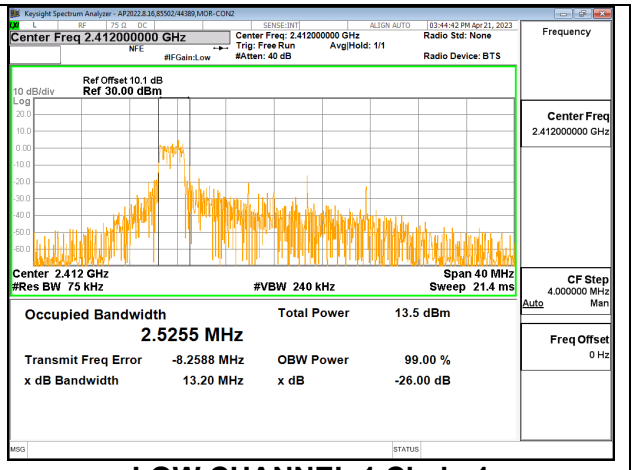
2TX Chain 0 + Chain 1 CDD OFDMA MODE: 26-Tones, RU Index 0

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)
Low 1	2412	3.2363	2.5255

LOW CHANNEL 1



LOW CHANNEL 1 Chain 0

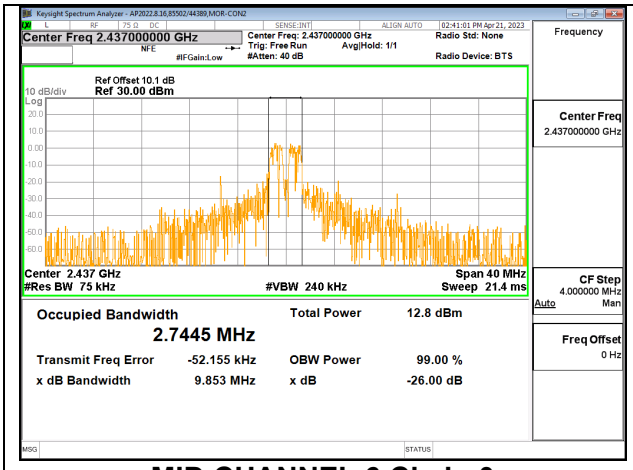


LOW CHANNEL 1 Chain 1

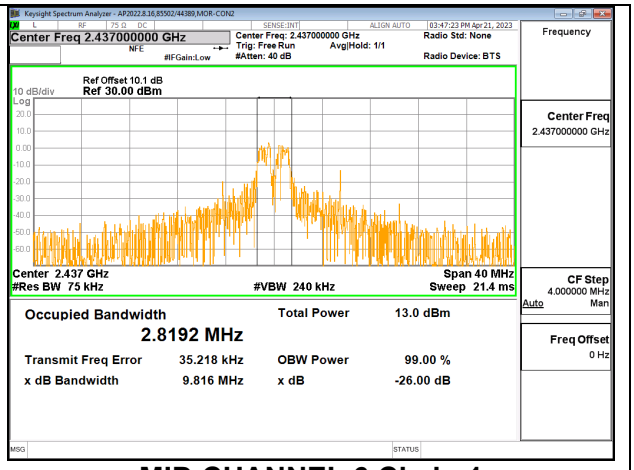
2TX Chain 0 + Chain 1 CDD OFDMA MODE: 26-Tones, RU Index 4

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)
Mid 6	2437	2.7445	2.8192

MID CHANNEL 6



MID CHANNEL 6 Chain 0

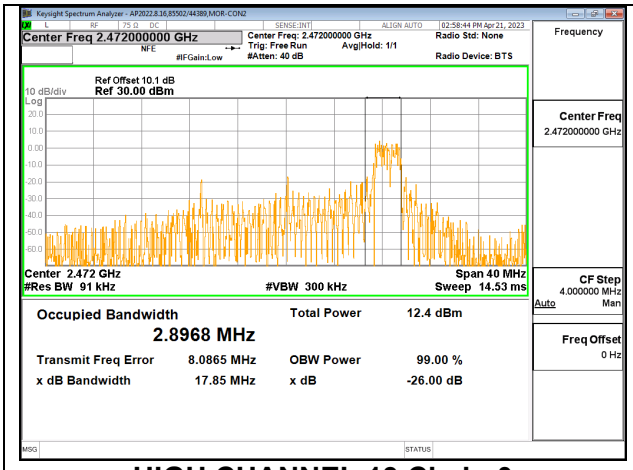


MID CHANNEL 6 Chain 1

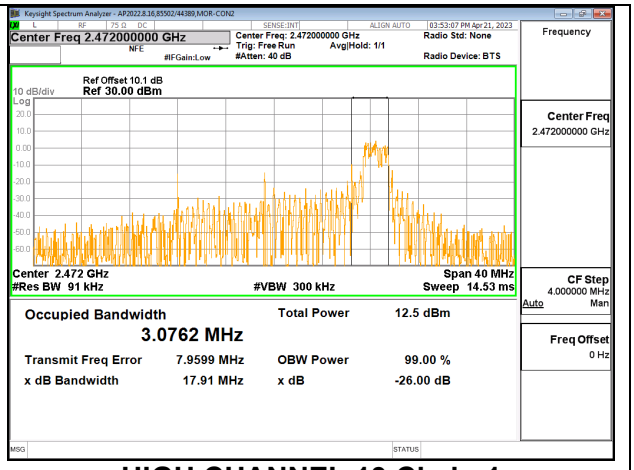
2TX Chain 0 + Chain 1 CDD OFDMA MODE: 26-Tones, RU Index 8

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)
High 13	2472	2.8968	3.0762

HIGH CHANNEL 13



HIGH CHANNEL 13 Chain 0

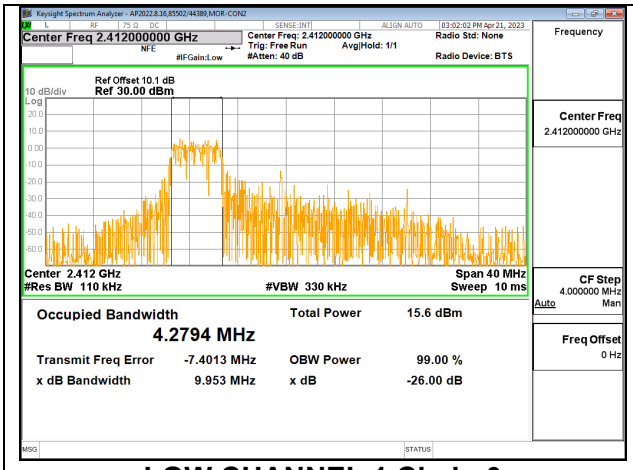


HIGH CHANNEL 13 Chain 1

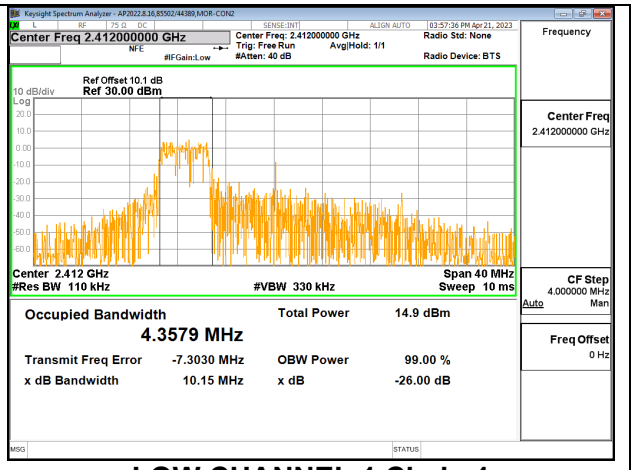
2TX Chain 0 + Chain 1 CDD OFDMA MODE: 52-Tones, RU Index 37

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)
Low 1	2412	4.2794	4.3579

LOW CHANNEL 1



LOW CHANNEL 1 Chain 0

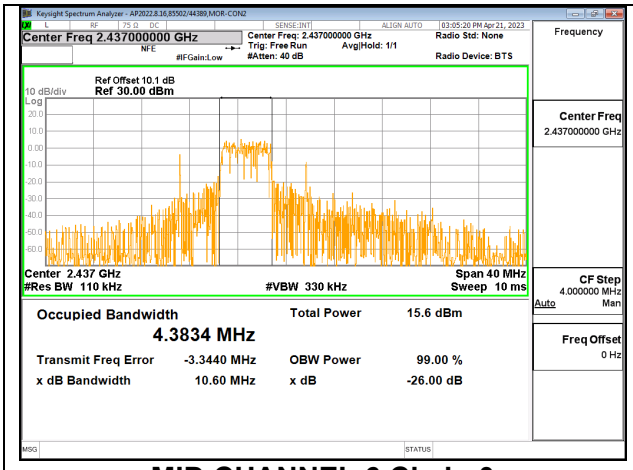


LOW CHANNEL 1 Chain 1

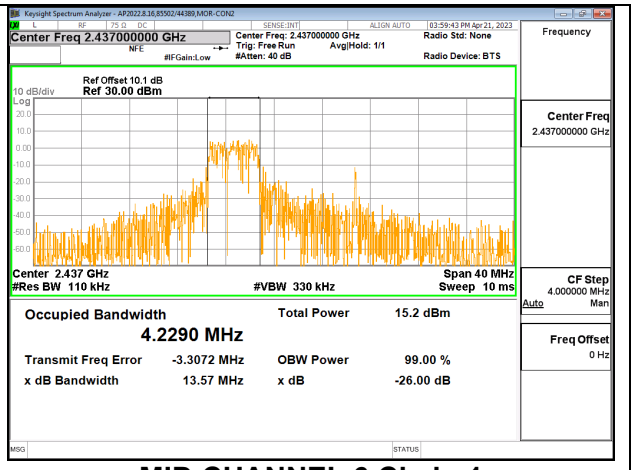
2TX Chain 0 + Chain 1 CDD OFDMA MODE: 52-Tones, RU Index 38

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)
Mid 6	2437	4.3834	4.2290

MID CHANNEL 6



MID CHANNEL 6 Chain 0

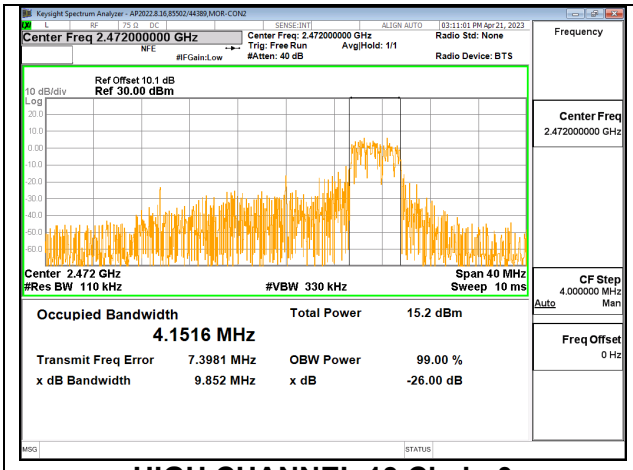


MID CHANNEL 6 Chain 1

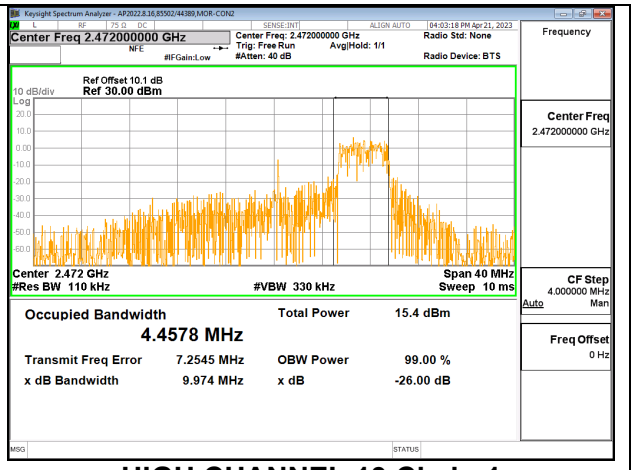
2TX Chain 0 + Chain 1 CDD OFDMA MODE: 52-Tones, RU Index 40

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)
High 13	2472	4.1516	4.4578

HIGH CHANNEL 13



HIGH CHANNEL 13 Chain 0

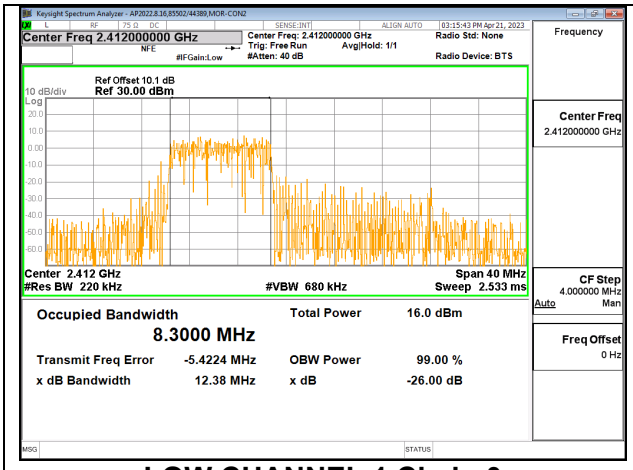


HIGH CHANNEL 13 Chain 1

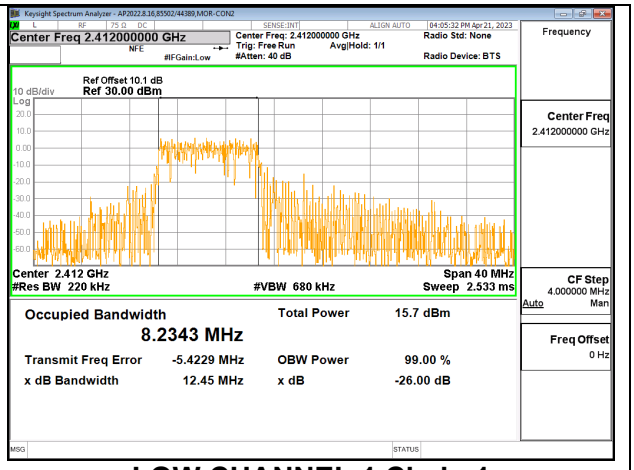
2TX Chain 0 + Chain 1 CDD OFDMA MODE: 106-Tones, RU Index 53

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)
Low 1	2412	8.3000	8.2343
Mid 6	2437	8.2564	8.2121

LOW CHANNEL 1

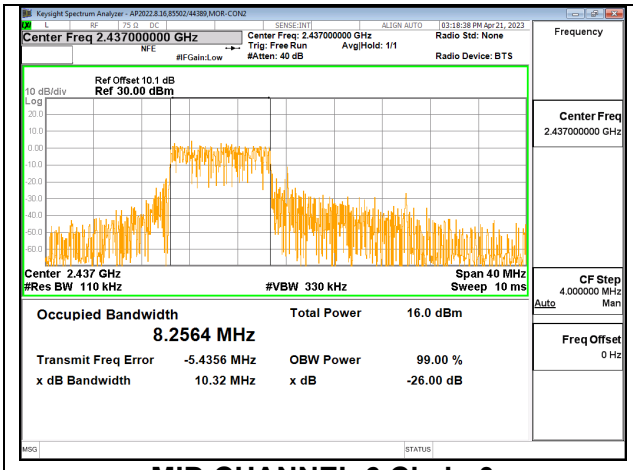


LOW CHANNEL 1 Chain 0

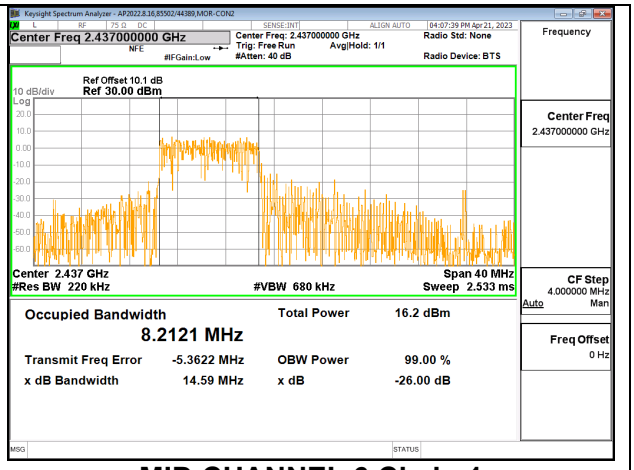


LOW CHANNEL 1 Chain 1

MID CHANNEL 6



MID CHANNEL 6 Chain 0

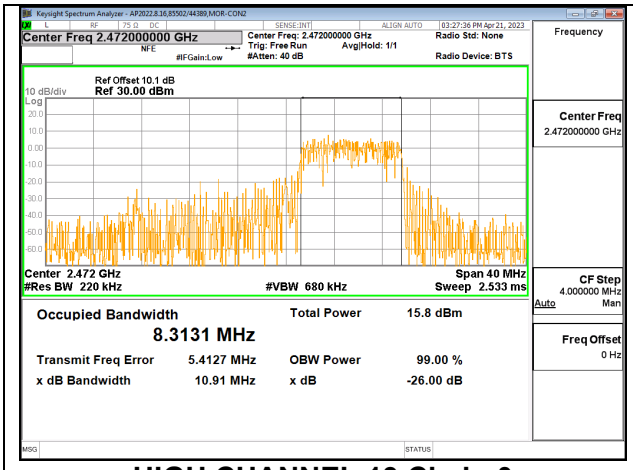


MID CHANNEL 6 Chain 1

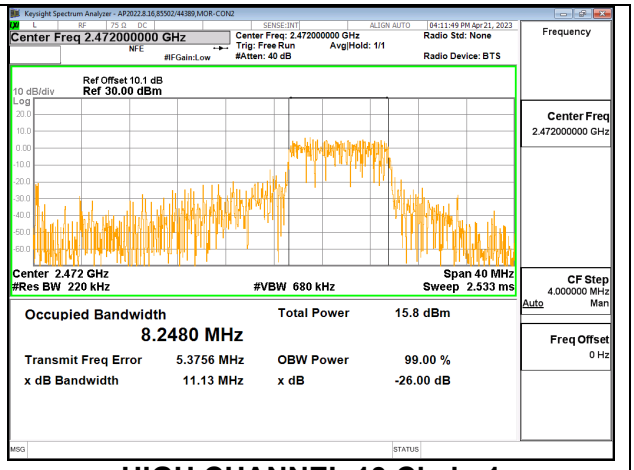
2TX Chain 0 + Chain 1 CDD OFDMA MODE: 106-Tones, RU Index 54

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)
High 13	2472	8.3131	8.2480

HIGH CHANNEL 13



HIGH CHANNEL 13 Chain 0

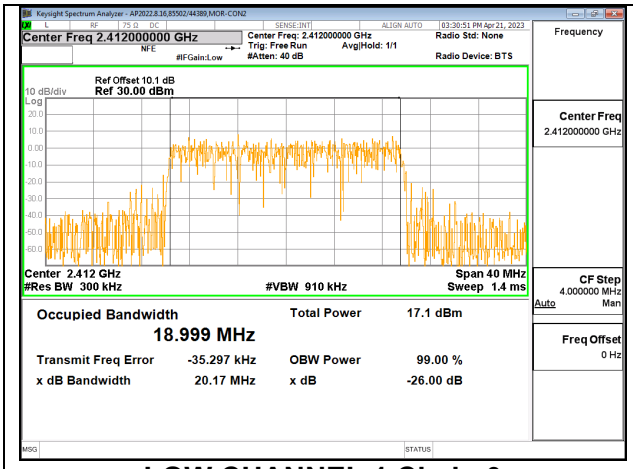


HIGH CHANNEL 13 Chain 1

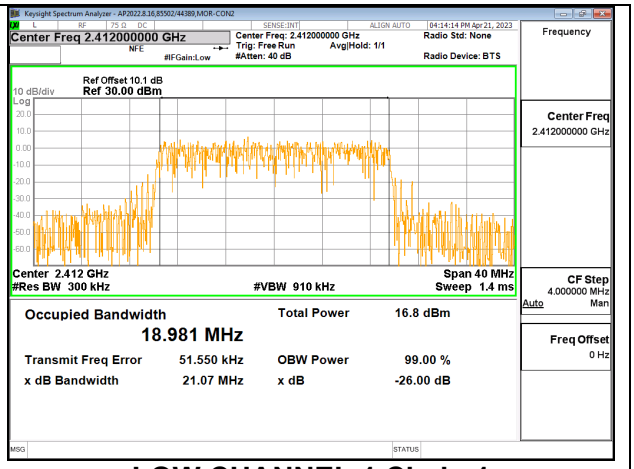
2TX Chain 0 + Chain 1 CDD OFDMA MODE: 242-Tones, RU Index 61

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)
Low 1	2412	18.9990	18.9810
Mid 6	2437	18.9800	18.9380
High 13	2472	19.0380	18.9730

LOW CHANNEL 1

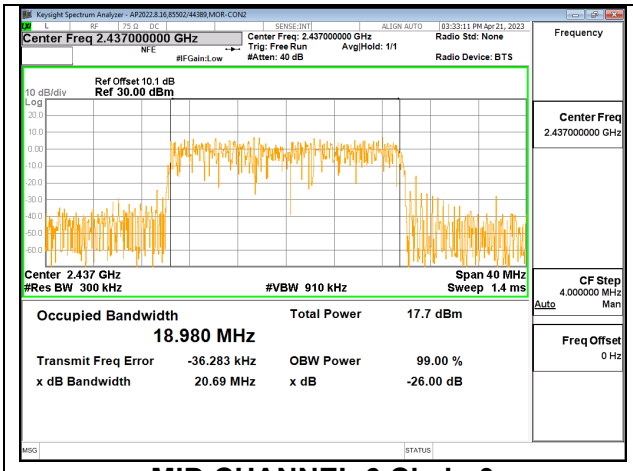


LOW CHANNEL 1 Chain 0

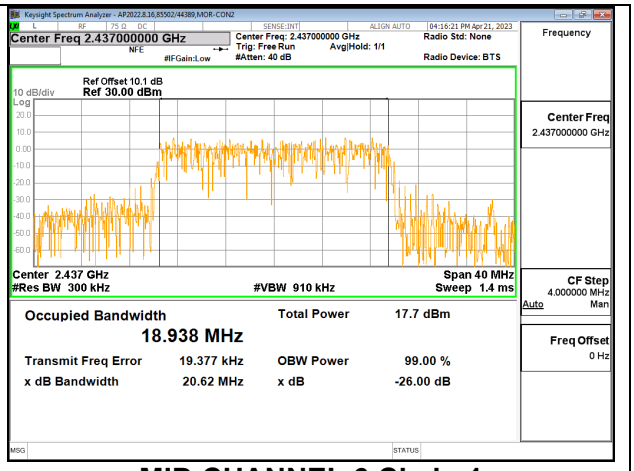


LOW CHANNEL 1 Chain 1

MID CHANNEL 6

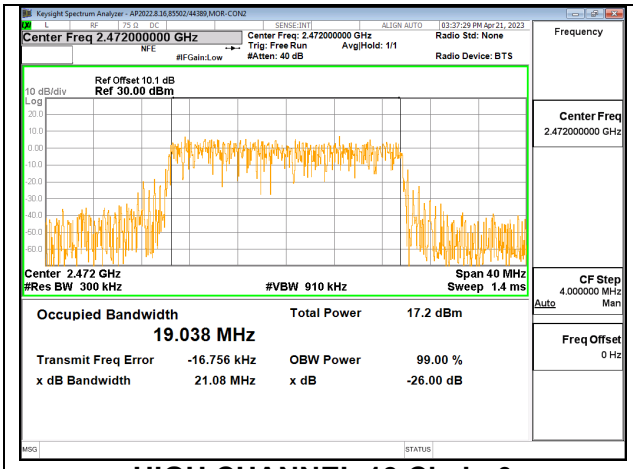


MID CHANNEL 6 Chain 0

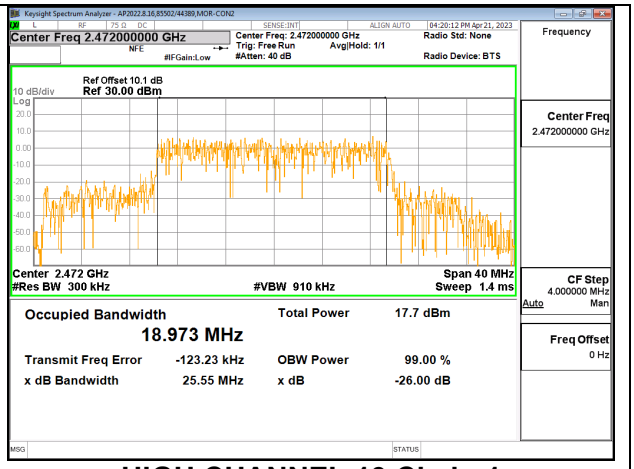


MID CHANNEL 6 Chain 1

HIGH CHANNEL 13



HIGH CHANNEL 13 Chain 0



HIGH CHANNEL 13 Chain 1

9.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (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.

NOTE: All PSD was done at the mid channel power.

RESULTS

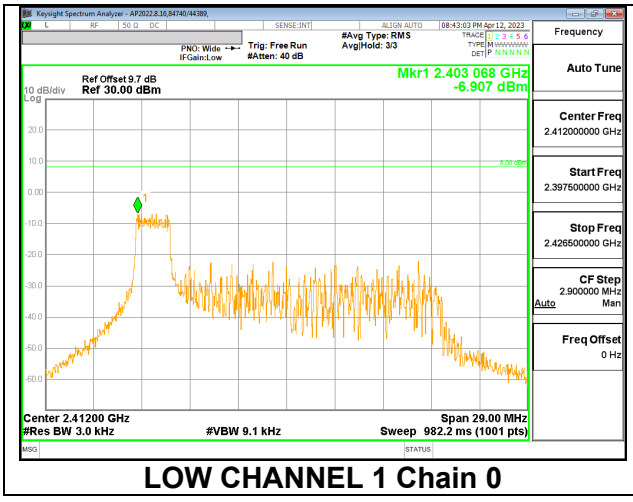
9.4.1. 802.11ax HE20 MODE 2TX

2TX Chain 0 + Chain 1 CDD OFDMA MODE: 26-Tones, RU Index 0

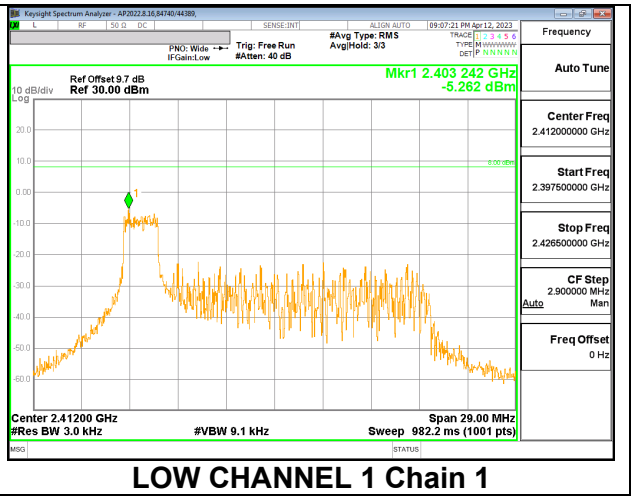
PSD Results

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	-6.907	-5.262	-3.00	8.0	-11.0

LOW CHANNEL 1



LOW CHANNEL 1 Chain 0



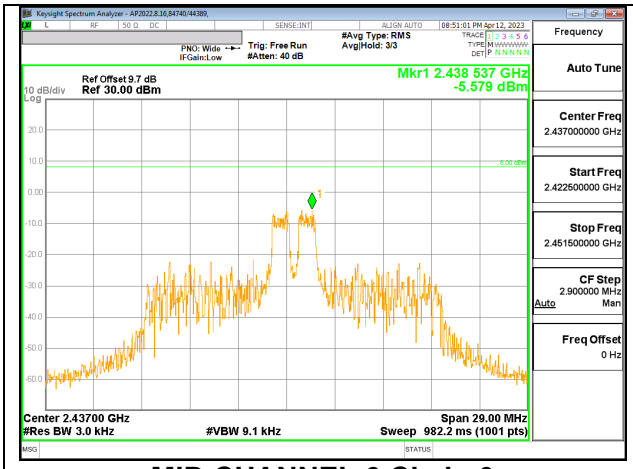
LOW CHANNEL 1 Chain 1

2TX Chain 0 + Chain 1 CDD OFDMA MODE: 26-Tones, RU Index 4

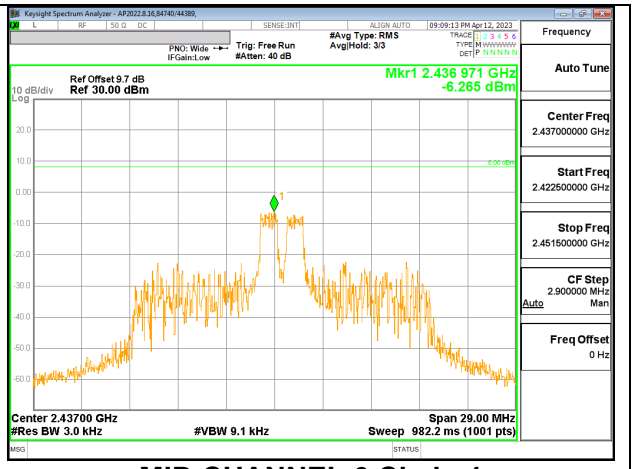
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm/ 3kHz)	Chain 1 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Mid 6	2437	-5.579	-6.265	-2.90	8.0	-10.9

MID CHANNEL 6



MID CHANNEL 6 Chain 0



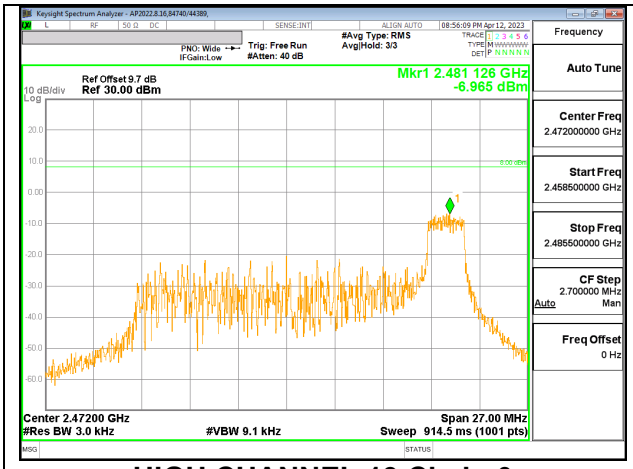
MID CHANNEL 6 Chain 1

2TX Chain 0 + Chain 1 CDD OFDMA MODE: 26-Tones, RU Index 8

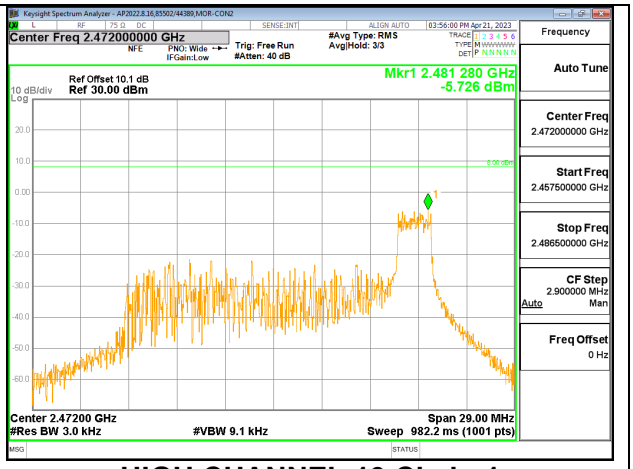
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm/ 3kHz)	Chain 1 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
High 13	2472	-6.965	-5.726	-3.29	8.0	-11.3

HIGH CHANNEL 13



HIGH CHANNEL 13 Chain 0



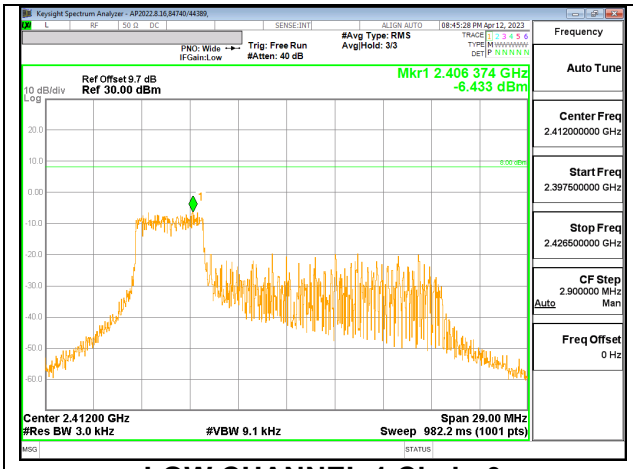
HIGH CHANNEL 13 Chain 1

2TX Chain 0 + Chain 1 CDD OFDMA MODE: 52-Tones, RU Index 37

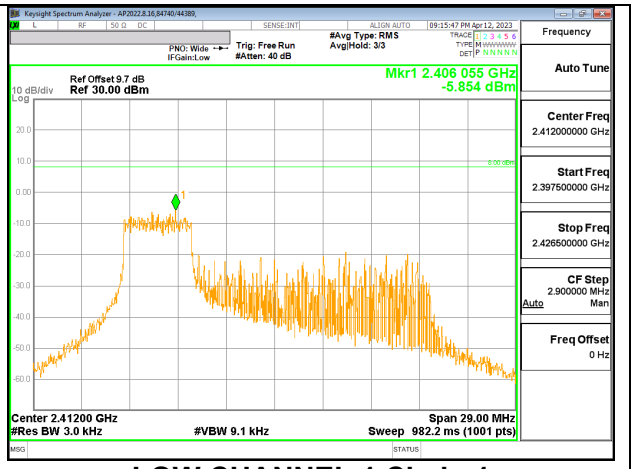
PSD Results

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	-6.433	-5.854	-3.12	8.0	-11.1

LOW CHANNEL 1



LOW CHANNEL 1 Chain 0



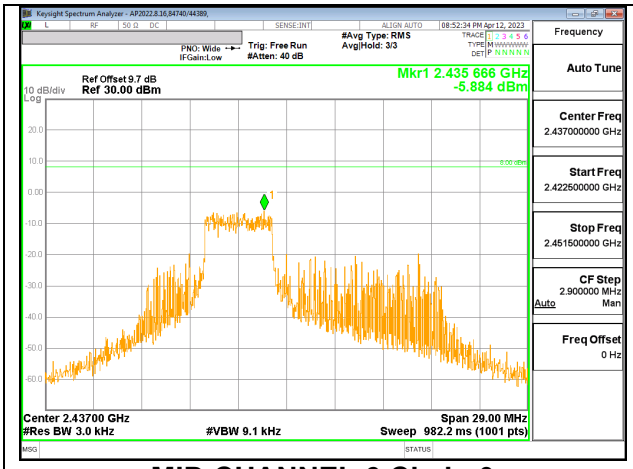
LOW CHANNEL 1 Chain 1

2TX Chain 0 + Chain 1 CDD OFDMA MODE: 52-Tones, RU Index 38

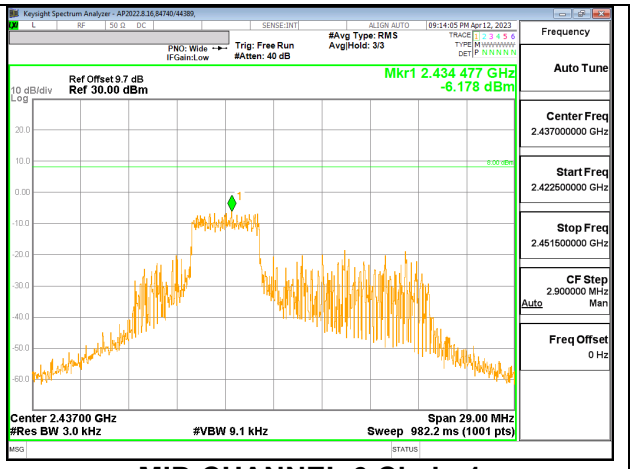
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm/ 3kHz)	Chain 1 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Mid 6	2437	-5.884	-6.178	-3.02	8.0	-11.0

MID CHANNEL 6



MID CHANNEL 6 Chain 0



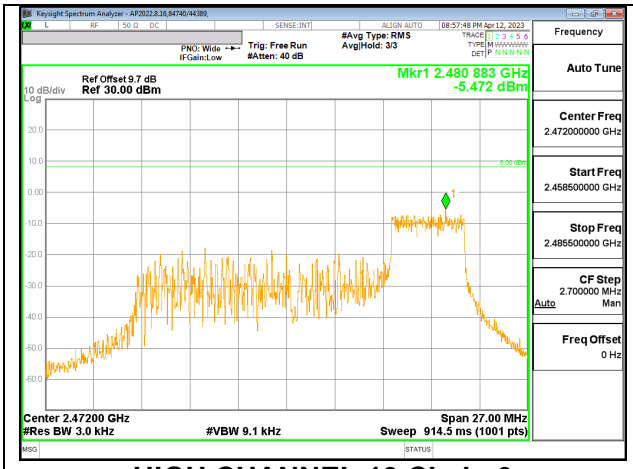
MID CHANNEL 6 Chain 1

2TX Chain 0 + Chain 1 CDD OFDMA MODE: 52-Tones, RU Index 40

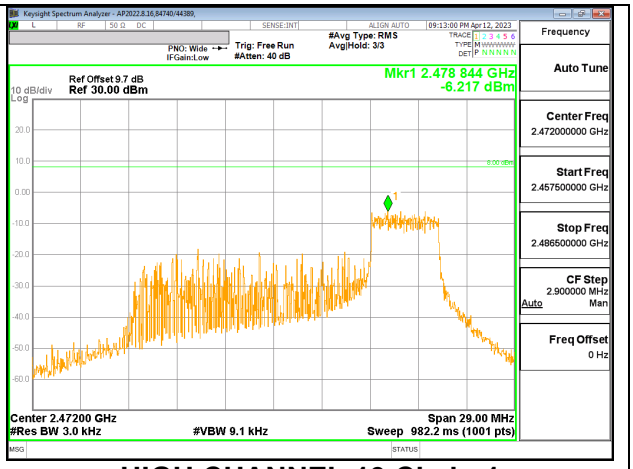
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm/ 3kHz)	Chain 1 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
High 13	2472	-5.472	-6.217	-2.82	8.0	-10.8

HIGH CHANNEL 13



HIGH CHANNEL 13 Chain 0



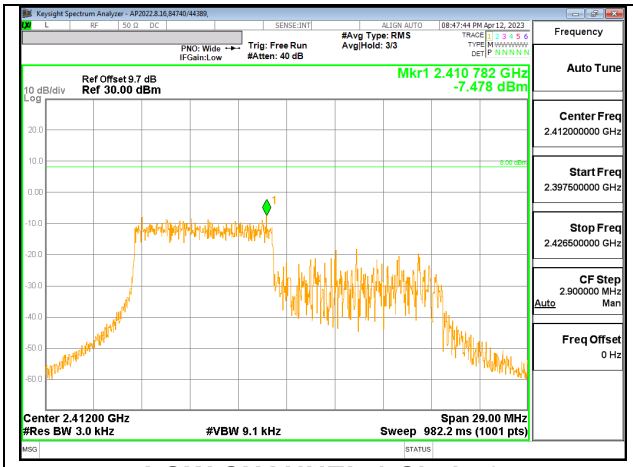
HIGH CHANNEL 13 Chain 1

2TX Chain 0 + Chain 1 CDD OFDMA MODE: 106-Tones, RU Index 53

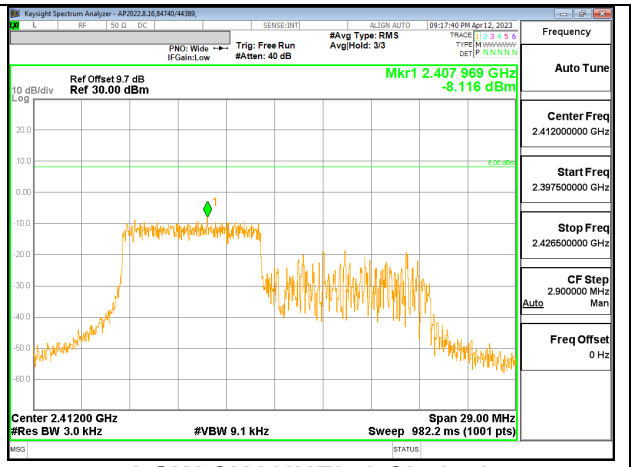
PSD Results

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	-7.478	-8.116	-4.77	8.0	-12.8
Mid 6	2437	-6.665	-7.291	-3.96	8.0	-12.0

LOW CHANNEL 1

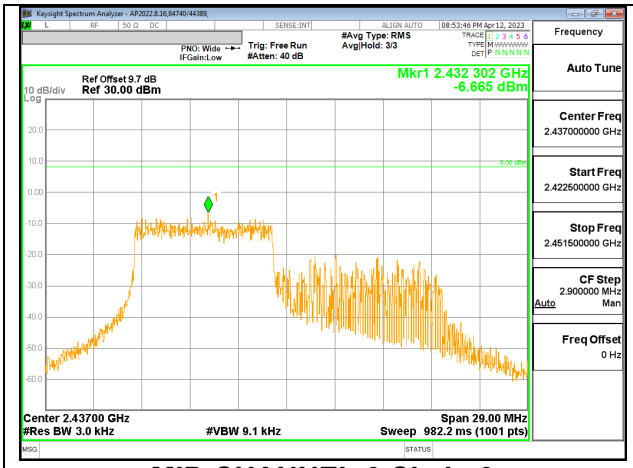


LOW CHANNEL 1 Chain 0

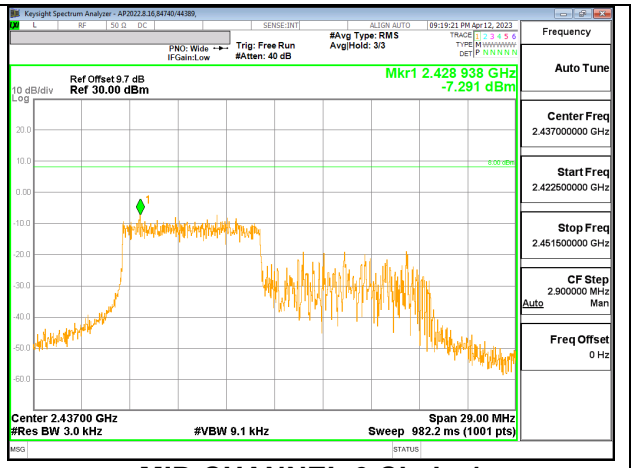


LOW CHANNEL 1 Chain 1

MID CHANNEL 6



MID CHANNEL 6 Chain 0



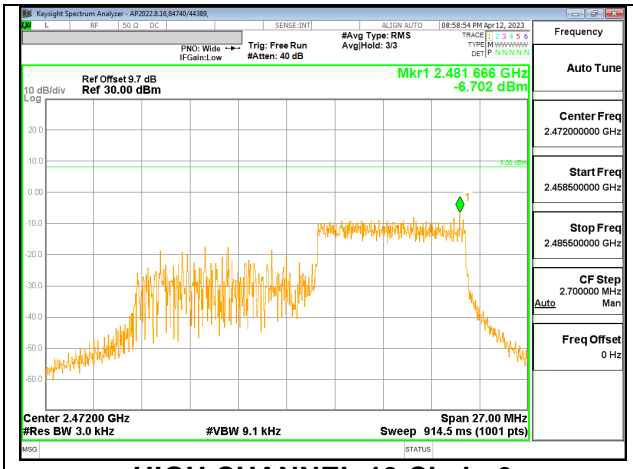
MID CHANNEL 6 Chain 1

2TX Chain 0 + Chain 1 CDD OFDMA MODE: 106-Tones, RU Index 54

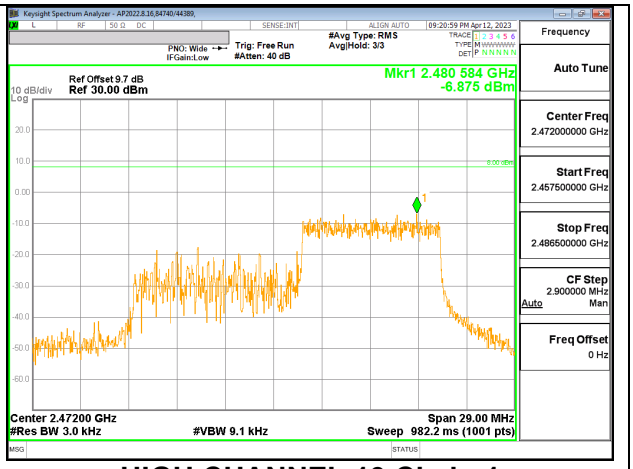
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm/ 3kHz)	Chain 1 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
High 13	2472	-6.702	-6.875	-3.78	8.0	-11.8

HIGH CHANNEL 13



HIGH CHANNEL 13 Chain 0



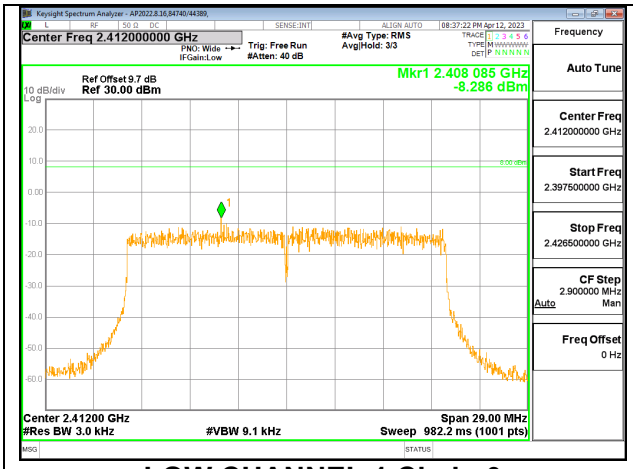
HIGH CHANNEL 13 Chain 1

2TX Chain 0 + Chain 1 CDD OFDMA MODE: 242-Tones, RU Index 61

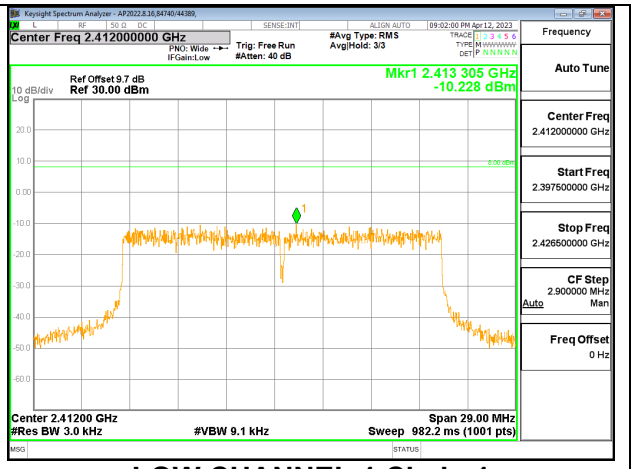
PSD Results

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	-8.286	-10.228	-6.14	8.0	-14.1
Mid 6	2437	-7.628	-10.112	-5.68	8.0	-13.7
High 13	2472	-9.556	-8.915	-6.21	8.0	-14.2

LOW CHANNEL 1

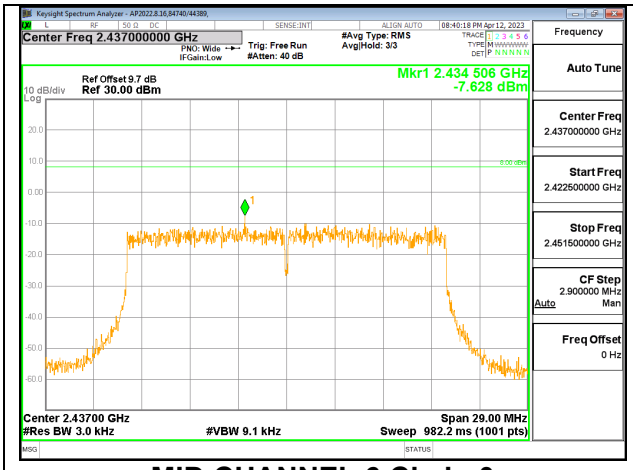


LOW CHANNEL 1 Chain 0

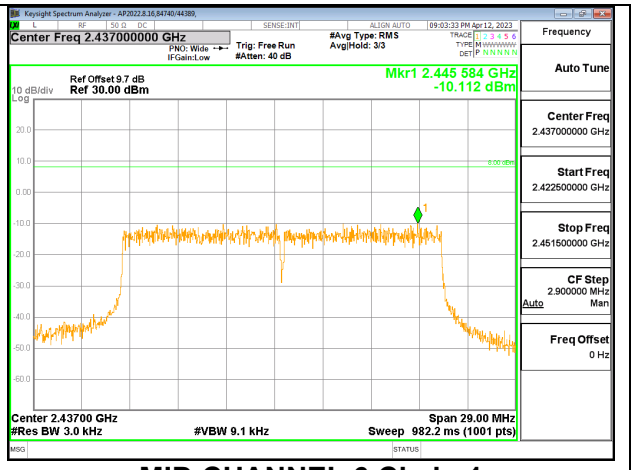


LOW CHANNEL 1 Chain 1

MID CHANNEL 6

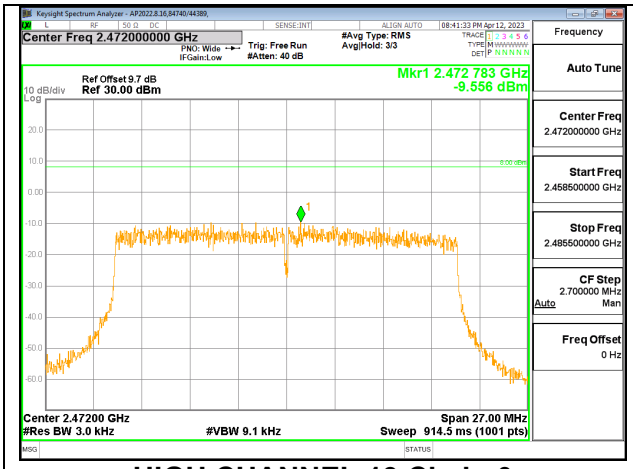


MID CHANNEL 6 Chain 0

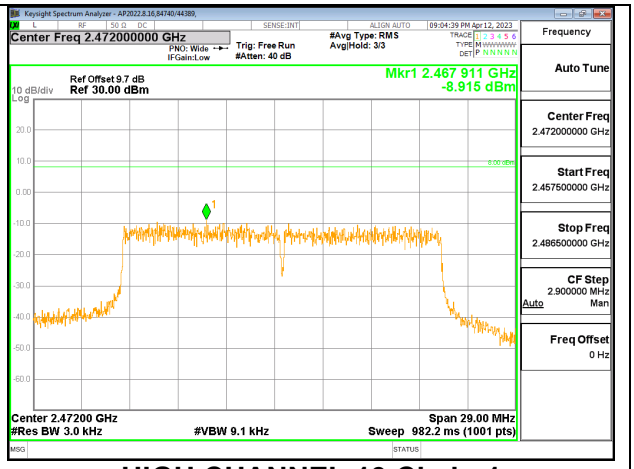


MID CHANNEL 6 Chain 1

HIGH CHANNEL 13



HIGH CHANNEL 13 Chain 0



HIGH CHANNEL 13 Chain 1

9.5. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.407 (d)
RSS-247 5.5

(d) 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.

PROCEDURE

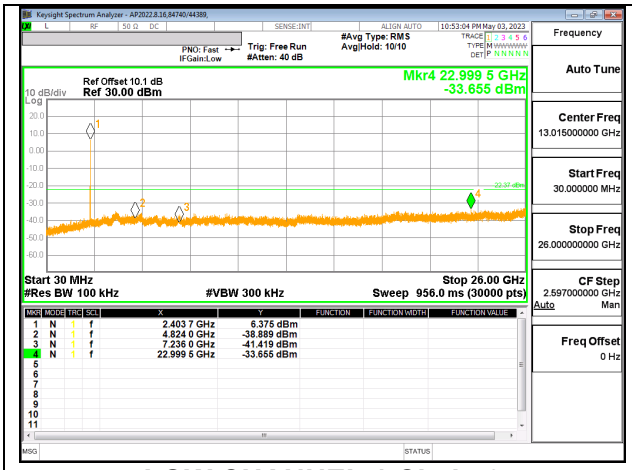
Output power was measured based on the use of average measurement; therefore, the required attenuation is -30 dBc.

RESULTS

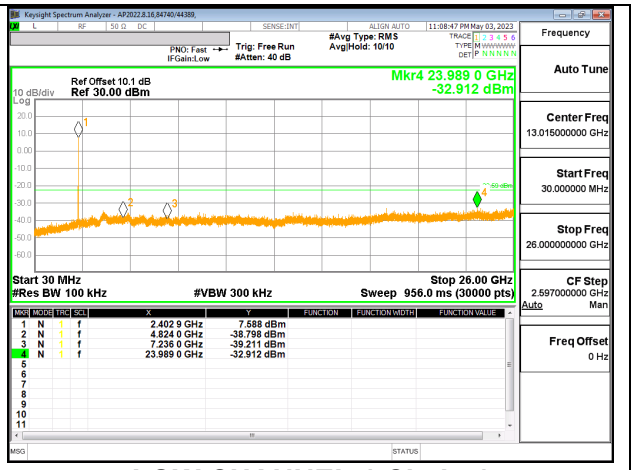
9.5.1. 802.11ax HE20 MODE 2TX

2TX Chain 0 + Chain 1 CDD OFDMA MODE: 26-Tones, RU Index 0

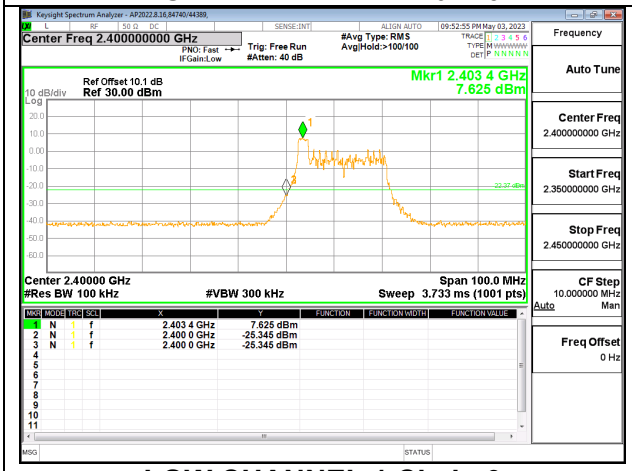
LOW CHANNEL 1



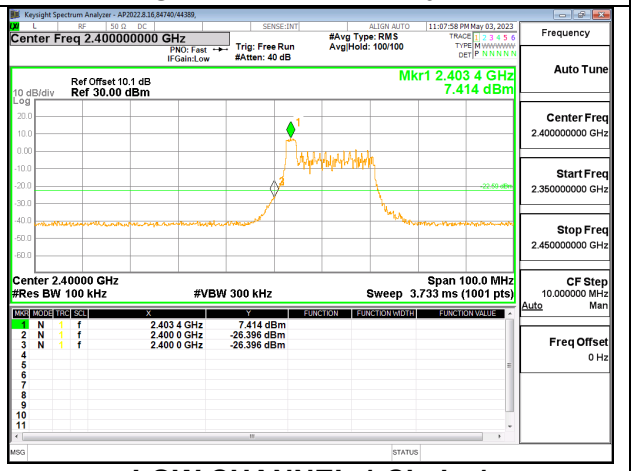
LOW CHANNEL 1 Chain 0



LOW CHANNEL 1 Chain 1



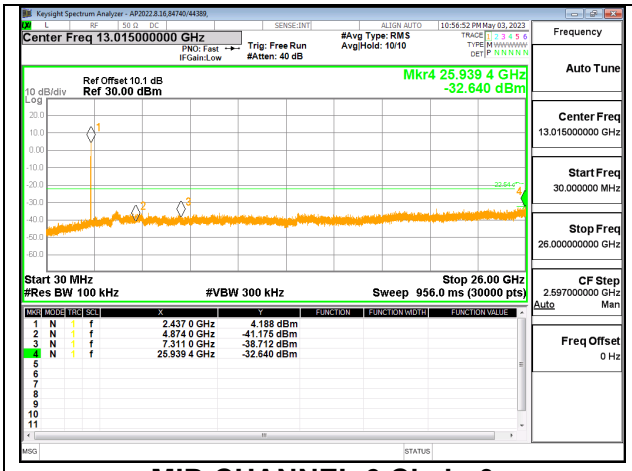
LOW CHANNEL 1 Chain 0



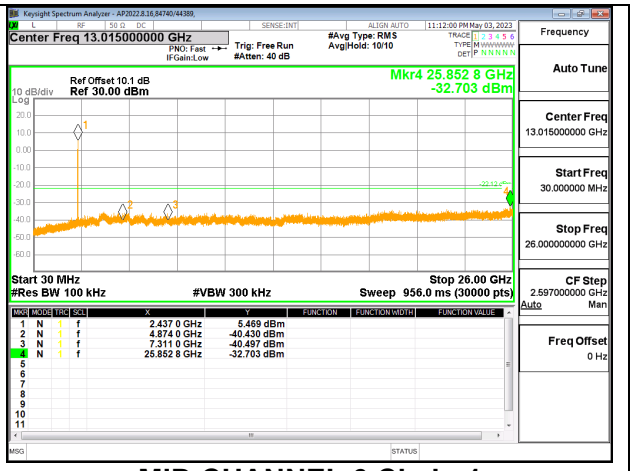
LOW CHANNEL 1 Chain 1

2TX Chain 0 + Chain 1 CDD OFDMA MODE: 26-Tones, RU Index 4

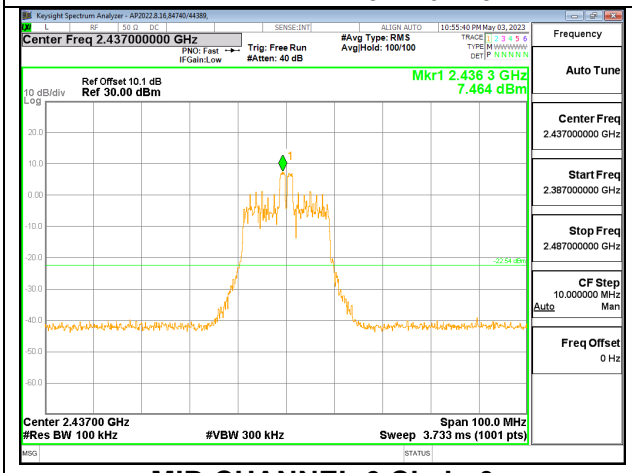
MID CHANNEL 6



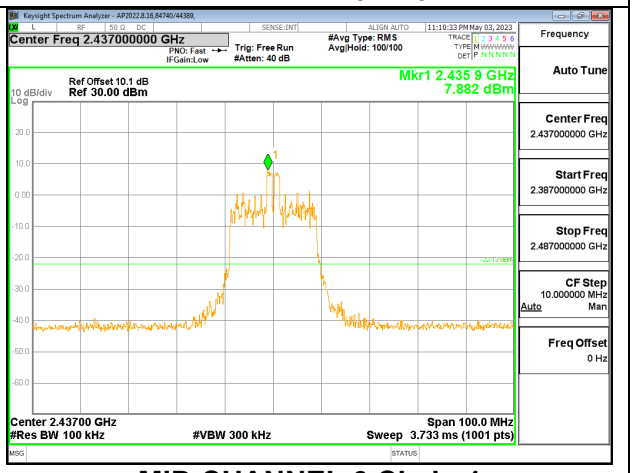
MID CHANNEL 6 Chain 0



MID CHANNEL 6 Chain 1



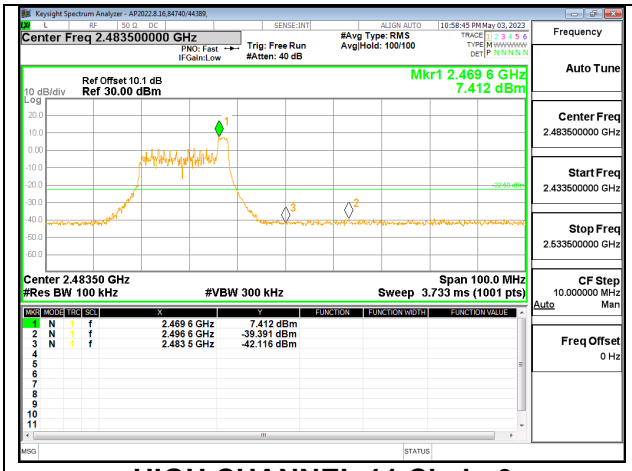
MID CHANNEL 6 Chain 0



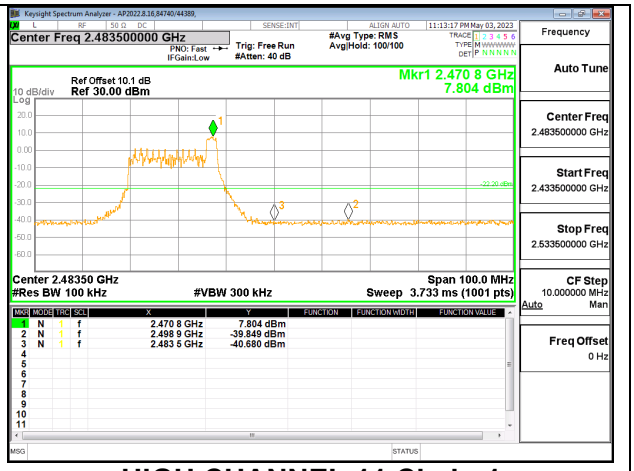
MID CHANNEL 6 Chain 1

2TX Chain 0 + Chain 1 CDD OFDMA MODE: 26-Tones, RU Index 8

HIGH CHANNEL 11

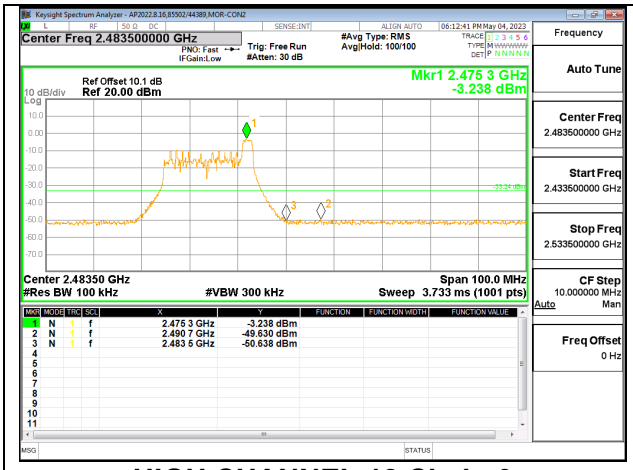


HIGH CHANNEL 11 Chain 0

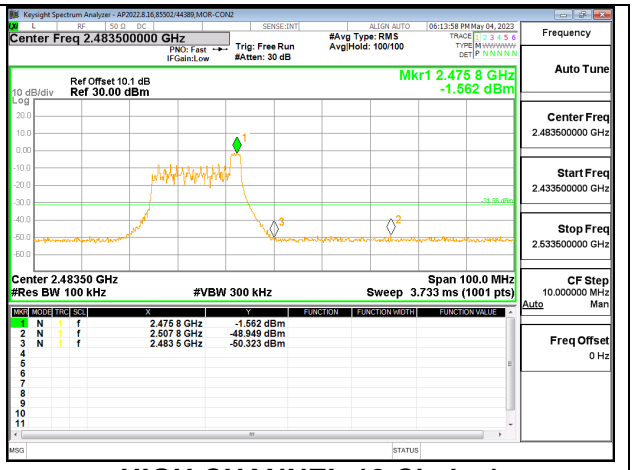


HIGH CHANNEL 11 Chain 1

HIGH CHANNEL 12

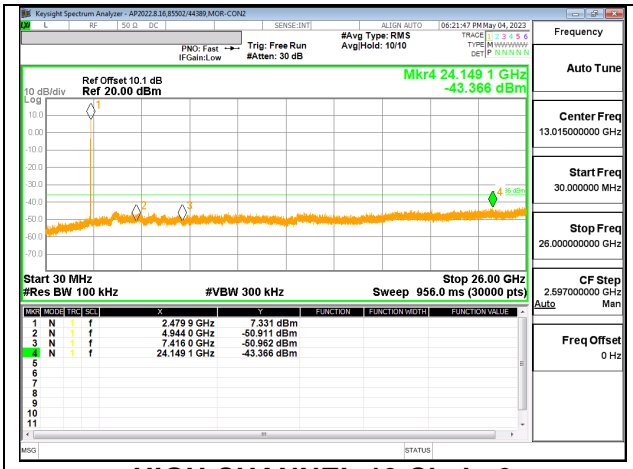


HIGH CHANNEL 12 Chain 0

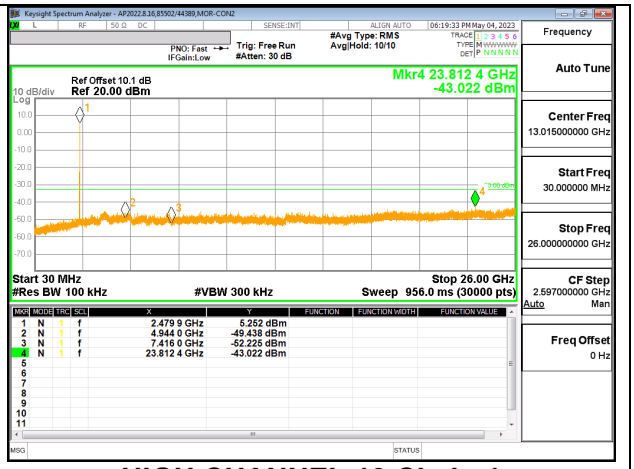


HIGH CHANNEL 12 Chain 1

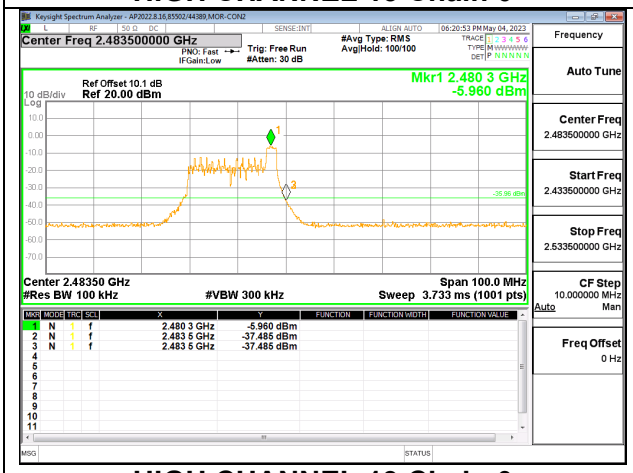
HIGH CHANNEL 13



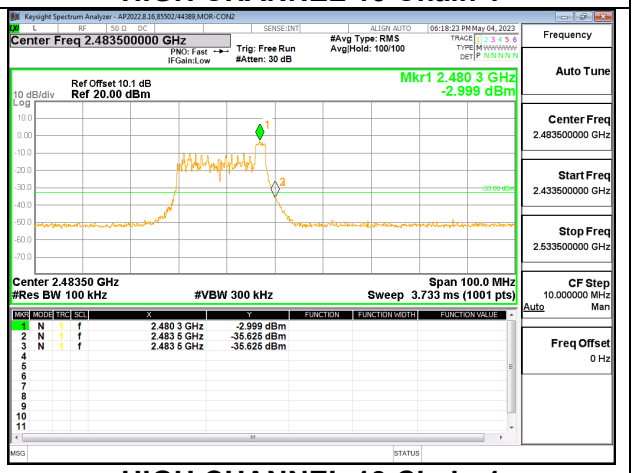
HIGH CHANNEL 13 Chain 0



HIGH CHANNEL 13 Chain 1



HIGH CHANNEL 13 Chain 0



HIGH CHANNEL 13 Chain 1