TEST REPORT

Report Number : R14932101-E7b

Applicant	:	Microsoft Corporation 1 Microsoft Way Redmond, WA 98052-8300, USA
MODEL	:	2037
FCC ID	:	C3K2037
IC	:	3048A-2037
EUT Description	:	Portable Computing Device
Test Standard(s)	:	FCC 47 CFR Part 15 Subpart E ISED RSS-247 Issue 3:2023 ISED RSS-GEN Issue 5 +A1+A2:2021

Date Of Issue:
2024-04-17

Prepared by:
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ACCREDITED
CERT #0751.06

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	2024-03-11	Initial Issue	B. Kiewra
V2	2024-03-21	Added note in each section in which data was leveraged stating from the report the data was leveraged from. Added note in section 7.1 clarifying data reuse of PSD.	B. Kiewra
V3	2024-04-17	Updated some power in section 10.5 to align with tuneups submitted by manufacturer.	B. Kiewra

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Microsoft Corporation
1 Microsoft Way
Redmond, WA 98052-8300, USA

EUT DESCRIPTION: Portable Computing Device

SERIAL NUMBER: 0F3B36H23383HJ, 0F3B36F23383HJ, A81245020002335A, 2399649100000116, A81235010007335S, 0F3B36H23383HJ

SAMPLE RECEIPT DATE: 2023-10-10

DATE TESTED: 2023-11-06 to 2024-03-11

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart E: 2023	Refer to Section 2
ISED RSS-247 Issue 3: 2023	Refer to Section 2
ISED RSS-GEN Issue 5+A1+A2: 2021	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:

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

Prepared By:

Brian Kiewra
Project Engineer
Consumer, Medical and IT Segment
UL LLC

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2. TEST RESULT SUMMARY

This report contains data/info provided by the customer 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/info provided by the customer:
1) Antenna gain and type (see section 6.3)
2) Worst-case data rates (see section 6.5)

FCC Clause	ISED Clause	Requirement	Result	Comment
See Comment		Duty Cycle	Reporting purposes only	Per ANSI C63.10, Section 12.2.
See Comment	RSS-GEN 6.7	26dB BW/99% OBW	Reporting purposes only	Per ANSI C63.10 Sections 6.9.2 and 6.9.3
15.407 (e)	RSS-247 6.2.4.1	6 dB BW	Compliant	None
15.407 (a) (1-3), (h) (1)	RSS-247 6.2	Output Power		
15.407 (a) (1-3)	RSS-247 6.2	PSD		
15.209, 15.205, 15.407 (b)	RSS-GEN 8.9, 8.10, RSS-247 6.2	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,
- FCC KDB 662911 D01 v02r01,
- FCC KDB 789033 D02 v02r01,
- FCC KDB 414788 D01 Radiated Test Site v01r01
- FCC KDB 291074 D02 EMC Measurement V01
- FCC KDB 484596 D01 Referencing Test Data v02r03
- ANSI C63.10-2013

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

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5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

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

5.2. DECISION RULES

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

5.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	U_{Lab}
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
Mains 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

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6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The EUT is a Portable Computing Device.

6.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

5.2 GHz BAND

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.2GHz Band, 2Tx			
5180-5240	802.11a	19.23	83.75
5180-5240	802.11n HT20	19.25	84.14
5190-5230	802.11n HT40	18.70	74.13
5210	802.11ac VHT80	16.25	42.17
5250	802.11ac VHT160	13.61	22.96
5180-5240	802.11be EHT20	19.16	82.41
5190-5230	802.11be EHT40	18.44	69.82
5210	802.11be EHT80	17.28	53.46
5250	802.11be EHT160	14.58	28.71

5.3 GHz BAND

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.3GHz Band, 2Tx			
5260-5320	802.11a	18.64	73.11
5260-5320	802.11n HT20	18.01	63.24
5270-5310	802.11n HT40	17.13	51.64
5290	802.11ac VHT80	16.79	47.75
5260-5320	802.11be EHT20	18.05	63.83
5270-5310	802.11be EHT40	16.98	49.89
5290	802.11be EHT80	16.45	44.16

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5.6 GHz BAND

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.6GHz Band, 2Tx			
5500-5720	802.11a	19.46	88.31
5500-5720	802.11n HT20	19.79	95.28
5510-5710	802.11n HT40	21.78	150.66
5530-5690	802.11ac VHT80	21.78	150.66
5570	802.11ac VHT160	17.35	54.33
5500-5720	802.11be EHT20	19.78	95.06
5510-5710	802.11be EHT40	22.00	158.49
5530-5690	802.11be EHT80	22.36	172.19
5570	802.11be EHT160	17.01	50.23

5.8 GHz BAND

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.8GHz Band, 2Tx			
5745-5825	802.11a	23.49	223.36
5745-5825	802.11n HT20	23.16	207.01
5755-5795	802.11n HT40	21.66	146.55
5775	802.11ac VHT80	19.65	92.26
5815	802.11ac VHT160	15.97	39.54
5745-5825	802.11be EHT20	23.28	212.81
5755-5795	802.11be EHT40	21.22	132.43
5775	802.11be EHT80	19.68	92.90
5815	802.11be EHT160	17.02	50.35

5.9 GHz BAND

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.9GHz Band, 2Tx			
5845-5885	802.11a	16.87	48.64
5845-5885	802.11n HT20	17.31	53.83
5835-5875	802.11n HT40	20.11	102.57
5855	802.11ac VHT80	19.58	90.78
5845-5885	802.11be EHT20	17.24	52.97
5835-5875	802.11be EHT40	20.32	107.65
5855	802.11be EHT80	19.78	95.06

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6.3. DESCRIPTION OF AVAILABLE ANTENNAS

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

Chain	Type	Frequency Range (MHz)	Maximum Gain (dBi)
0	PIFA	5150-5250	8.11
		5250-5350	8.11
		5470-5725	7.21
		5725-5850	6.00
		5850-5895	6.00
1	PIFA	5150-5250	5.35
		5250-5350	6.07
		5470-5725	5.36
		5725-5850	5.35
		5850-5895	5.35

6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was 1.0.3808.9500

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 with highest output power as worst-case scenario. Radiated emissions between 1GHz and 18GHz were performed with the EUT set to transmit at the highest power on low and high channels for bandedge and low, middle and high channels on modes with worst-case power/PSD per band for harmonics and spurious.

The EUT is intended to operate in only one orientation, therefore, all final radiated testing was performed with the EUT in this intended orientation of operation.

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

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

802.11a mode: 6 Mbps
802.11n HT20mode: MCS0
802.11n HT40mode: MCS0
802.11ac VHT80 mode: MCS0
802.11ac VHT160 mode: MCS0
802.11be EHT20mode: MCS0 (Nss = 1)
802.11be EHT40mode: MCS0 (Nss = 1)
802.11be EHT80mode: MCS0 (Nss = 1)
802.11be EHT160mode: MCS0 (Nss = 1)

For PSD testing lower bandwidth (20-80MHz) modes cover remaining upper bandwidth (160MHz) modes.

EUT has option of 2 displays, based on premeasurements the following displays were tested in each band:
UNII-1: Display 2
UNII-2A: Display 2
UNII-2C: Display 2
UNIII-3: Display 1

Note: only representative plots are included to reduce report size.
Note: Based on preliminary tests, the channel puncturing configurations are addressed by MRU tests for band edge measurements

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6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Power Supply	Orting	2062	OT3100650	NA
USB Drive	PNY	16GB	NA	NA
Headphones	Sony	NA	NA	NA
USB C to Ethernet	Tp-link	UE300C	2234082002838	NA
Switch	Linksys	EFAH05WVER.3	RA13048005308 EH1040 MA	NA
Support Laptop	Lenovo	ThinkPad	LR-0390B9	NA
Support Laptop	Lenovo	ThinkPad	LR-03N0JZ	NA
Support Laptop Charger	Lenovo	ThinkPad	38G337	NA
Support Laptop Charger	Lenovo	ThinkPad	38G337	NA
Support Laptop	Lenovo	ThinkPad	LR-0390B9	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	2	USB-C	Shielded	>3m	EUT to Power Supply
2	Aux	1	Aux	Shielded	<3m	Headphones
3	USB-A	1	USB-A	Shielded	<3m	EUT to USB Drive
4	USB-C	2	USB-C	Shielded	>3m	USB to Ethernet adapter Ethernet is unshielded

TEST SETUP

The EUT is setup as a standalone device.

SETUP DIAGRAM

Please refer to R14932101-EP1b for setup diagrams

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7. REUSE OF TEST DATA

7.1. INTRODUCTION

According to the manufacturer, models C3K2036 and C3K2037 unlicensed radios (WLAN/BT/BLE) are electrically identical. The C3K2036 test data shall remain representative of C3K2037 so, C3K2037 leverages test data from C3K2036.

The applicant takes full responsibility that the test data as referenced in this section represents compliance for this FCC ID.

Data being leveraged from C3K2036:
TPC power in the 5.3 band
ISED Power in the 5.2 band
PSD all bands *except* for 5.6
All BW measurements
All DC measurements
Note: Where PSD was leveraged from C3K2036, testing was run at higher power setting than power reported in this test report.

7.2. DEVICES DIFFERENCES

Difference between C3K2036 and C3K2037:

Microsoft Corporation hereby declares that the radio circuitry of WLAN 2.4GHz, WLAN 5GHz, Bluetooth, is identical among models C3K2036 and C3K2037. Therefore, the following report/data of C3K2036 may represent C3K2037. Refer to manufacturer's operational description for differences between C3K2036 and C3K2037.

7.3. REFERENCE DETAIL

Equipment Class	Reference FCC ID	Report Title/Section
NII	C3K2036	R14932101-E7a FCC ISED 5.2-5.9 WLAN REPORT 2036 / Section 9

7.4. SPOT CHECK VERIFICATION RESULTS SUMMARY

Spot check verification has been done on device 2037. The data from the application has been verified through appropriate spot checks to demonstrate compliance for this device as shown in the summary.

C3K2037 SPOT CHECK RESULTS					
Technology	**Test Item**	**Channel**	**C3K2036 Reading**	**C3K2037 Reading**	**Difference[1] ≤0.25**
NII	TPC Power	5290	17.40	15.38	0.12
	ISED Power	5230	16.73	13.81	0.17
	PSD	5250	-4.779	-5.398	0.13

Note 1: The ≤0.25 requirement can be found in KDB 484596.
Difference equation:

$$Difference = \frac{|spot\ check\ data - reference\ data|}{|reference\ data|}$$

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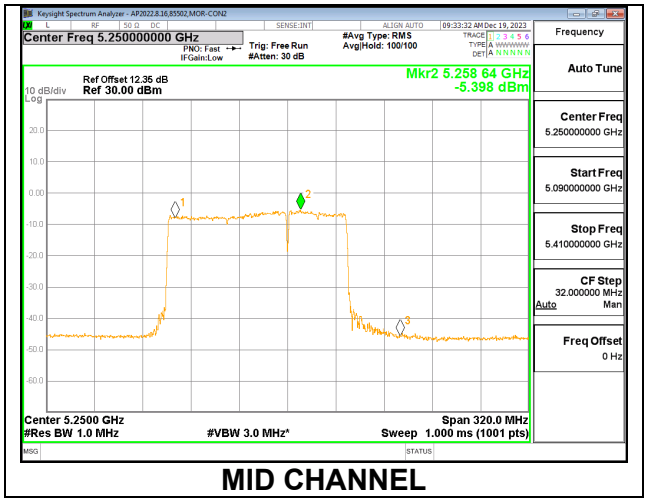
7.5. SPOT CHECK DATA

7.5.1. OUTPUT POWER

Tested By:	85502
Date:	2024-02-15

Test Item	Frequency (MHz)	Output Power (dBm)
TPC Power	5290	15.38
ISED Power	5230	13.81

7.5.2. POWER SPECTRAL DENSITY



MID CHANNEL

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8. MEASUREMENT METHOD

On Time and Duty Cycle: KDB 789033 D02 v02r01, Section B.

6 dB Emission BW: KDB 789033 D02 v02r01, Section C.2

26 dB Emission BW: KDB 789033 D02 v02r01, Section C.1

Conducted Output Power: KDB 789033 D02 v02r01, Section E.3.b (Method PM-G)

Power Spectral Density: KDB 789033 D02 v02r01, Section F

Unwanted emissions in restricted bands: KDB 789033 D02 v02r01, Sections G.3, G.4, G.5, and G.6.

Unwanted emissions in non-restricted bands: KDB 789033 D02 v02r01, Sections G.3, G.4, and G.5.

AC Power Line Conducted Emissions: ANSI C63.10-2013, Section 6.2.

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

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9. 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.
90418	Peak and Avg Power Sensor, 50MHz to 18GHz	Keysight Technologies	N1921A	2023-02-02	2024-02-02
90411	Spectrum Analyzer	Keysight Technologies	N9030A	2023-08-02	2024-08-02
90416	Spectrum Analyzer	Keysight Technologies	N9030A	2023-06-09	2024-06-30
179892	Environmental Meter	Fisher Scientific	15-077-963	2023-07-26	2024-07-31
134477	RF Power Meter	Keysight Technologies	N1912A	2023-08-04	2024-08-04
135124	Peak and Avg Power Sensor, 50MHz to 18GHz	Keysight Technologies	N1921A	2023-07-12	2024-07-31
PWM005	RF Power Meter	Keysight Technologies	N1912A	2022-09-02	2024-09-02
238710	Environmental Meter	Fisher Scientific	15-077-963	2023-06-27	2024-06-27
90410	Spectrum Analyzer	Keysight Technologies	N9030A	2023-06-14	2024-06-14
SOFTEMI	Antenna Port Software	UL	Version 2022.8.16	NA	NA
226563	SMA Coaxial 10dB Attenuator 25MHz-18GHz	CentricRF	C18S2-10	2023-02-16	2024-02-16
226552	SMA Coaxial 20dB Attenuator 25MHz-18GHz	CentricRF	C18S2-20	2023-02-16	2024-02-16
226551	SMA Coaxial 20dB Attenuator 25MHz-18GHz	CentricRF	C18S2-20	2023-02-16	2024-02-16
Pad A	SMA Coaxial 20dB Attenuator 25MHz-18GHz	CentricRF	C18S2-20	2023-02-16	2024-02-29
Pad B	SMA Coaxial 20dB Attenuator 25MHz-18GHz	CentricRF	C18S2-20	2023-02-16	2024-02-29
CBL105	Micro-Coax UTiFLEX Cable Assembly, Low Loss	Carlisle Interconnect Technologies	UFB-197C-0-0160-300300	2023-02-17	2024-02-17
CBL031	SMA Male to SMA Male Cable Using PE-P141 Coax - 12"	Pasternack	Sucoflex 104PEA	2023-06-27	2024-06-27
CBL030	SMA Male to SMA Male Cable Using PE-P141 Coax - 12"	Pasternack	Sucoflex 104PEA	2023-06-27	2024-06-27
CBL012	Micro-Coax UTiFLEX Cable Assembly, Low Loss	Carlisle Interconnect Technologies	UFB293C-0-2400-300300	2023-01-05	2024-01-05
CBL091	Micro-Coax UTiFLEX Cable Assembly, Low Loss,40Ghz	Carlisle Interconnect Technologies	UFA147A-2-0360-200200	2023-02-17	2024-02-17

Note: All equipment within calibration at time of use.

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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-826	2023-07-20	2025-07-20
204705	Horn Antenna, 26-40GHz	Com-Power	AH-640	2023-07-20	2025-07-20
	Gain-Loss Chains				
207638	Gain-loss string: 0.009-30MHz	Various	Various	2023-09-18	2024-09-18
207639	Gain-loss string: 25-1000MHz	Various	Various	2023-09-18	2024-09-18
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				
197955	Spectrum Analyzer	Rohde & Schwarz	ESW44	2023-04-10	2024-04-10
72823	Spectrum Analyzer	Agilent	E4446A	2023-06-27	2024-06-30
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
	Additional Equipment used				
241204	Environmental Meter	Fisher Scientific	15-077-963	2023-09-05	2025-09-05

Note: All equipment within calibration at time of use.

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

Equipment 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	2023-05-16	2024-05-16
Receiver & Software					
206496	Spectrum Analyzer	Rohde & Schwarz	ESW44	2023-03-24	2024-03-24
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
Additional Equipment used					
241205	Environmental Meter	Fisher Scientific	15-077-963	2023-09-05	2025-09-05
170112	10dB Pad, DC-18GHz, 5W	Mini-Circuits	BW-N10W5+	2023-11-09	2024-11-09

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

Equipment 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	2023-06-19	2025-06-19
Gain-Loss Chains					
91977	Gain-loss string: 1-18GHz	Various	Various	2023-06-06	2024-06-06
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					
200540	Environmental Meter	Fisher Scientific	15-077-963 s/n 181474409	2023-07-19	2025-07-19

Note: All equipment within calibration at time of use.

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Test Equipment Used - Line-Conducted Emissions – Voltage (Morrisville – Conducted 1)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
CBL087	Coax cable, RG223, N-male to BNC-male, 20-ft.	Pasternack	PE3W06143-240	2023-04-04	2024-04-04
179892	Environmental Meter	Fisher Scientific	15-077-963	2023-07-26	2024-06-31
80391	LISN, 50-ohm/50-uH, 250uH 2-conductor, 25A	Fischer Custom Com.	FCC-LISN-50/250-25-2-01	2023-07-31	2024-07-31
75141	EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESCI 7	2023-08-01	2024-08-01
52859	Transient Limiter, 0.009-100MHz	Electro-Metrics	EM-7600	2023-04-04	2024-04-04
PS214	AC Power Source	Elgar	CW2501M	NA	NA
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
91432	LISN, 50-ohm/50-uH, 2-conductor, 25A (For support gear only.)	Solar Electronics	8012-50-R-24-BNC	NA	NA

Note: All equipment within calibration at time of use.

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10. ANTENNA PORT TEST RESULTS

10.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 789033 D01 Zero-Span Spectrum Analyzer Method.

Note: This data leveraged from R14932101-E7a

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)
802.11a CDD	2.096	2.115	0.991	99.10	0.00	0.010
802.11n HT20 CDD	3.547	3.567	0.994	99.44	0.00	0.010
802.11n HT40 CDD	2.011	2.030	0.991	99.06	0.00	0.010
802.11ac VHT80 CDD	0.755	0.774	0.976	97.58	0.21	1.324
802.11ac VHT160 CDD	0.363	0.382	0.951	95.13	0.43	2.753
802.11be EHT20 26T	5.087	5.107	0.996	99.61	0.00	0.010
802.11be EHT20 52T	5.074	5.095	0.996	99.59	0.00	0.010
802.11be EHT20 52T+26T	5.059	5.079	0.996	99.61	0.00	0.010
802.11be EHT20 106T	4.768	4.787	0.996	99.60	0.00	0.010
802.11be EHT20 106T+26T	4.816	4.835	0.996	99.61	0.00	0.010
802.11be EHT20 242T	4.667	4.686	0.996	99.59	0.00	0.010
802.11be EHT40 484T	1.2600	1.2790	0.985	98.51	0.00	0.010
802.11be EHT80 484T+242T	1.2350	1.2540	0.985	98.48	0.00	0.010
802.11be EHT80 996T	5.4520	5.4690	0.997	99.69	0.00	0.010
802.11be EHT160 996T+484T	0.927	0.946	0.980	97.97	0.18	1.079
802.11be EHT160 2*996T	5.426	5.447	0.996	99.61	0.00	0.010

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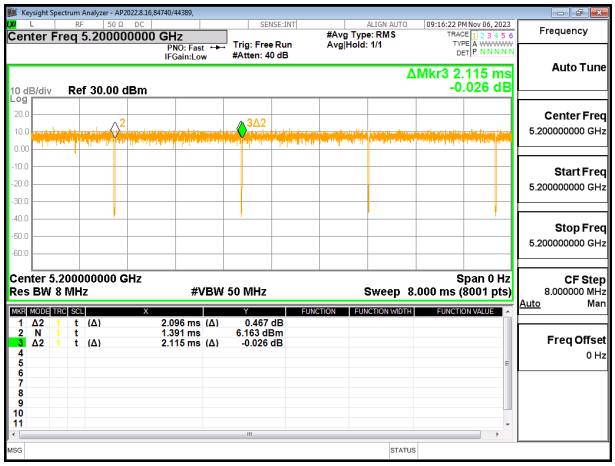
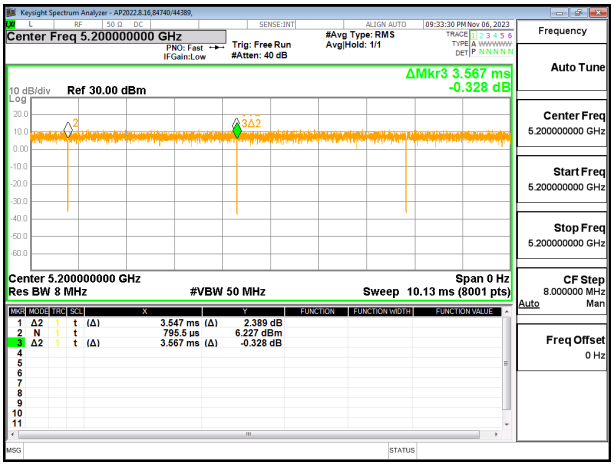
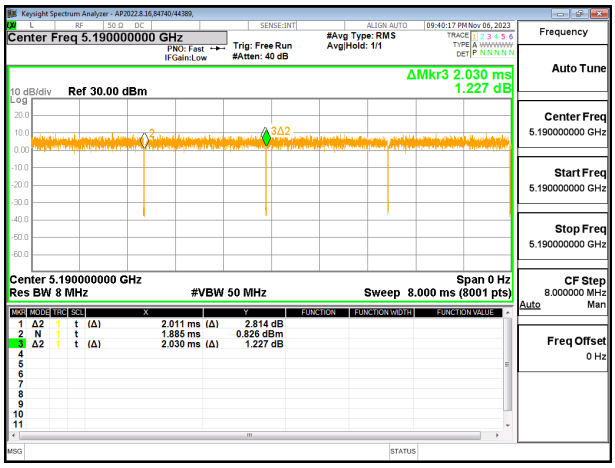


DUTY CYCLE 802.11a MODE



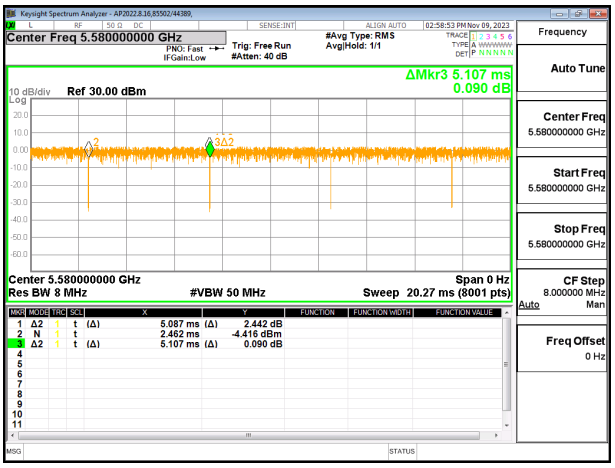
DUTY CYCLE 802.11n HT20 MODE



DUTY CYCLE 802.11n HT40 MODE

DUTY CYCLE 802.11ac VHT80 MODE

DUTY CYCLE 802.11ac VHT160 MODE



DUTY CYCLE 802.11be EHT20 26T MODE

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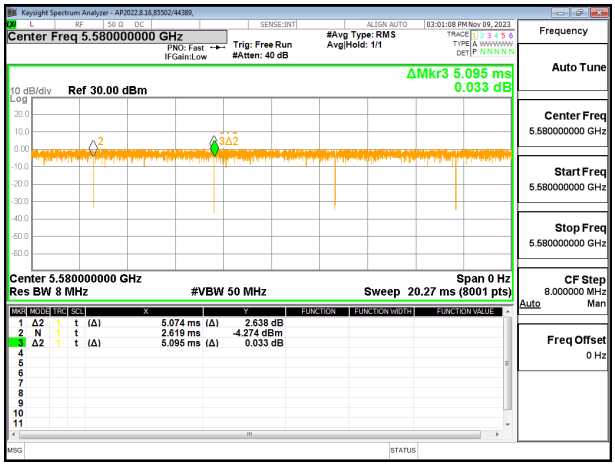
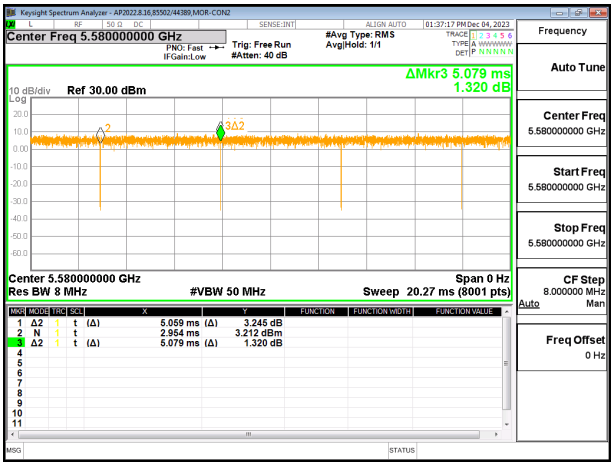
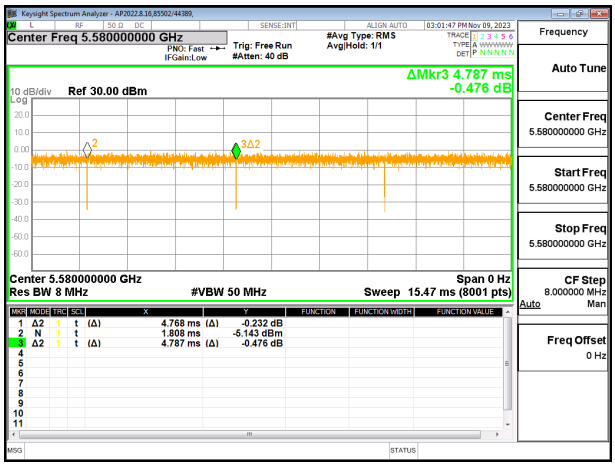


DUTY CYCLE 802.11be EHT20 52T MODE

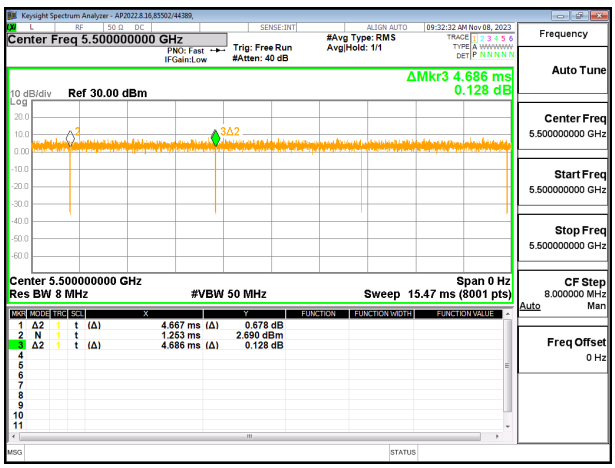


DUTY CYCLE 802.11be EHT20 52T+26T MODE



DUTY CYCLE 802.11be EHT20 106T MODE

DUTY CYCLE 802.11be EHT20 106T+26T MODE



DUTY CYCLE 802.11be EHT20 242T MODE

DUTY CYCLE 802.11be EHT40 484T MODE

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DUTY CYCLE 802.11be EHT80 484T+242T MODE

DUTY CYCLE 802.11be EHT80 996T MODE

DUTY CYCLE 802.11be EHT160 996T+484T MODE

DUTY CYCLE 802.11be EHT160 2*996T MODE

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10.2. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

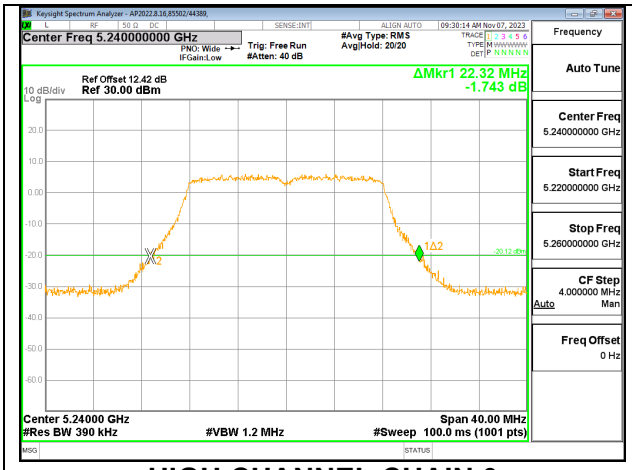
RESULTS

Note: This data leveraged from R14932101-E7a

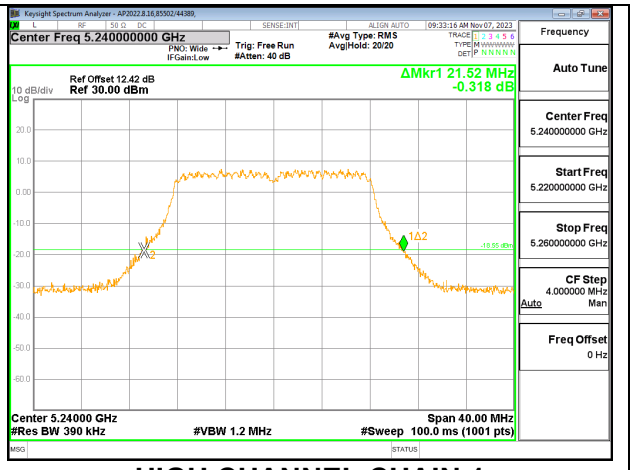
10.2.1. 802.11a MODE IN THE 5.2 GHz BAND

2TX Chain 0 + Chain 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5180	22.48	21.80
Mid	5200	22.20	21.72
High	5240	22.32	21.52



HIGH CHANNEL CHAIN 0



HIGH CHANNEL CHAIN 1

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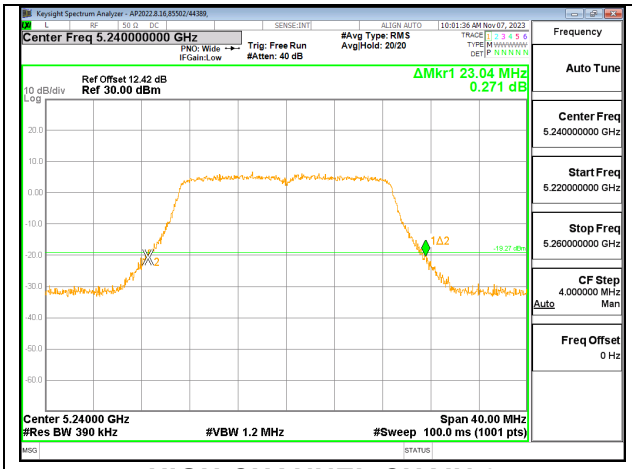
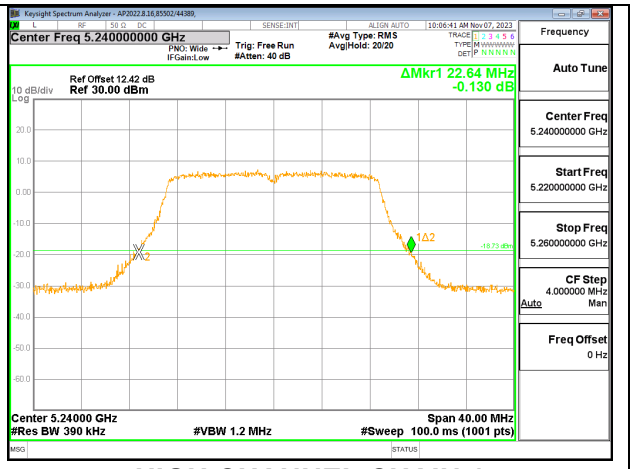
10.2.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

2TX Chain 0 + Chain 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5180	22.84	22.72
Mid	5200	22.92	22.88
High	5240	23.04	22.64



HIGH CHANNEL CHAIN 0

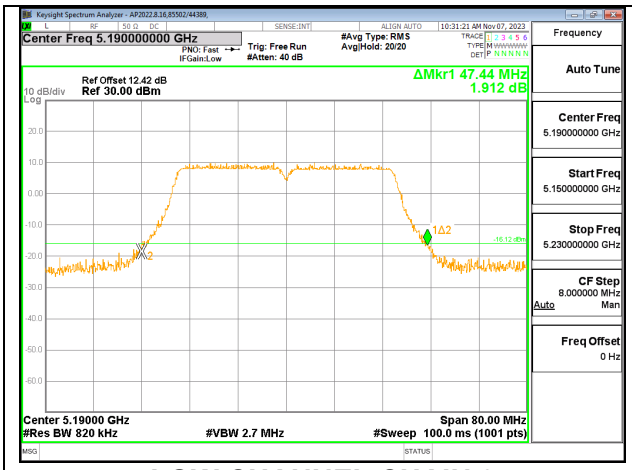


HIGH CHANNEL CHAIN 1

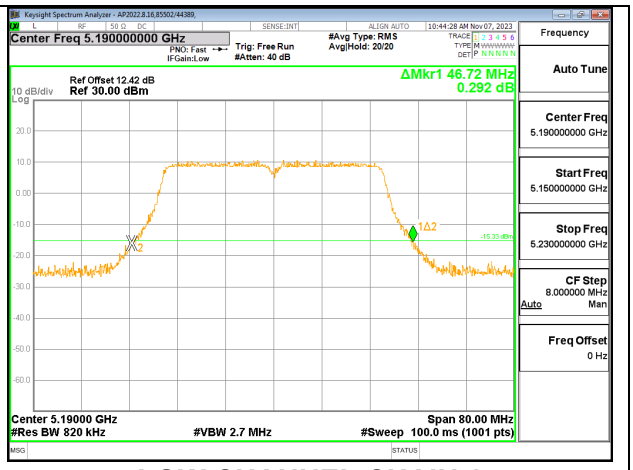
10.2.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND

2TX Chain 0 + Chain 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5190	47.44	46.72
High	5230	47.28	49.60



LOW CHANNEL CHAIN 0



LOW CHANNEL CHAIN 1

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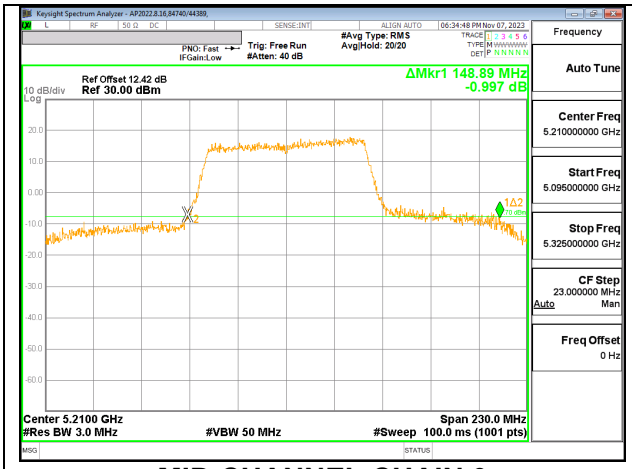
10.2.4. 802.11ac VHT80 MODE IN THE 5.2 GHz BAND

2TX Chain 0 + Chain 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Mid	5210	148.89	152.23



MID CHANNEL CHAIN 0

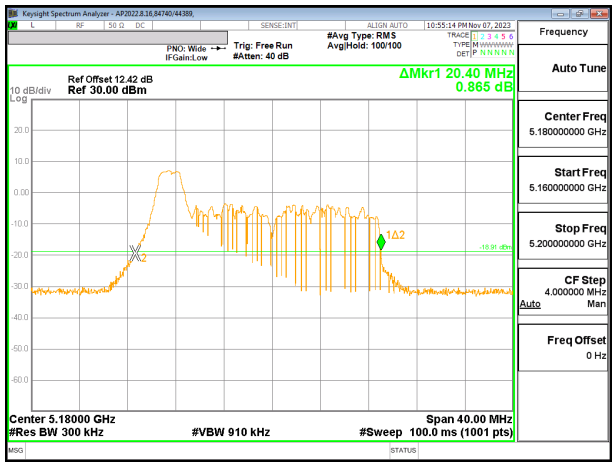
MID CHANNEL CHAIN 1

10.2.5. 802.11be EHT20 26T MODE IN THE 5.2 GHz BAND

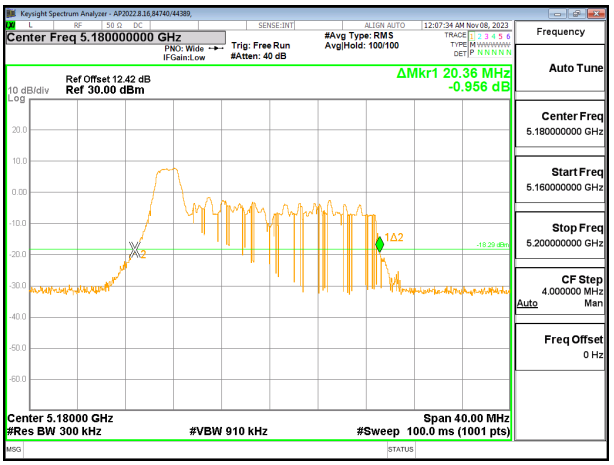
2TX Chain 0 + Chain 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5180	20.40	20.36
Mid	5200	20.48	20.40
High	5240	20.48	20.52

LOW CHANNEL



LOW CHANNEL CHAIN 0



LOW CHANNEL CHAIN 1

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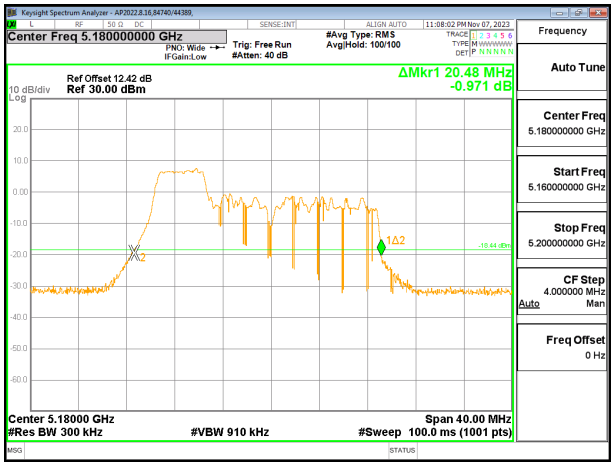
10.2.6. 802.11be EHT20 52T MODE IN THE 5.2 GHz BAND

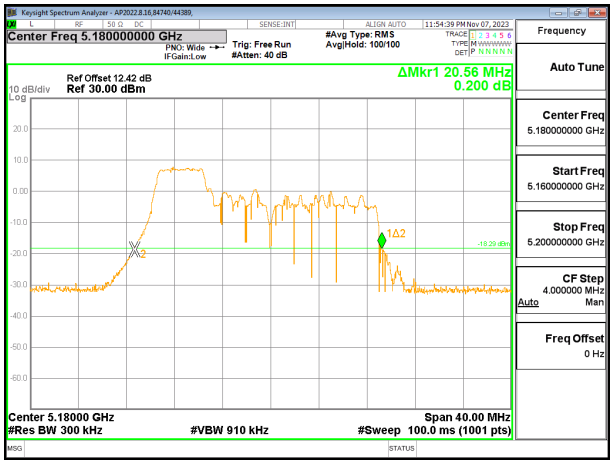
2TX Chain 0 + Chain 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5180	20.48	20.56
Mid	5200	20.60	20.68
High	5240	21.12	20.56

LOW CHANNEL



LOW CHANNEL CHAIN 0



LOW CHANNEL CHAIN 1

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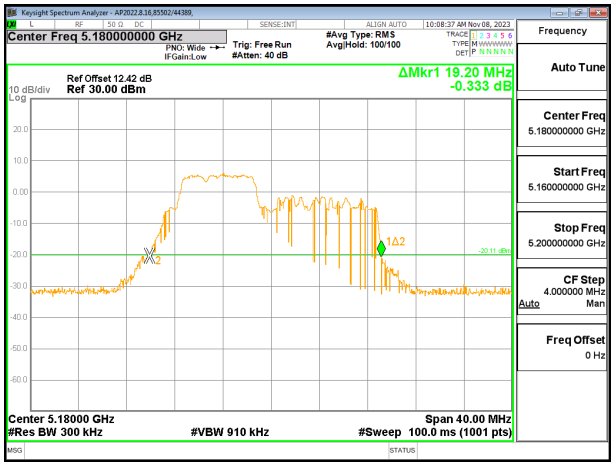
10.2.7. 802.11be EHT20 52T + 26T MODE IN THE 5.2 GHz BAND

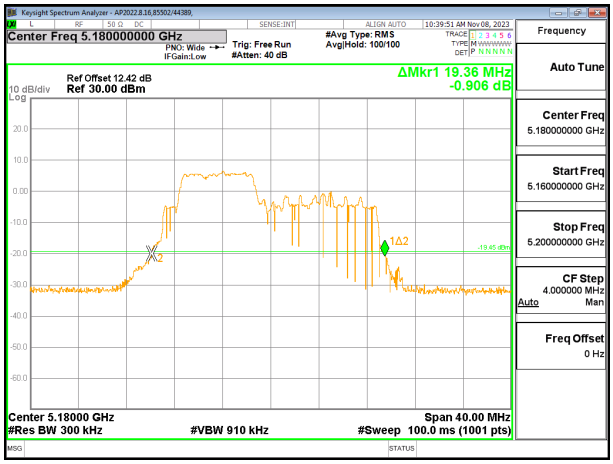
2TX Chain 0 + Chain 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5180	19.20	19.36
Mid	5200	19.20	19.32
High	5240	19.88	19.36

LOW CHANNEL



LOW CHANNEL CHAIN 0



LOW CHANNEL CHAIN 1

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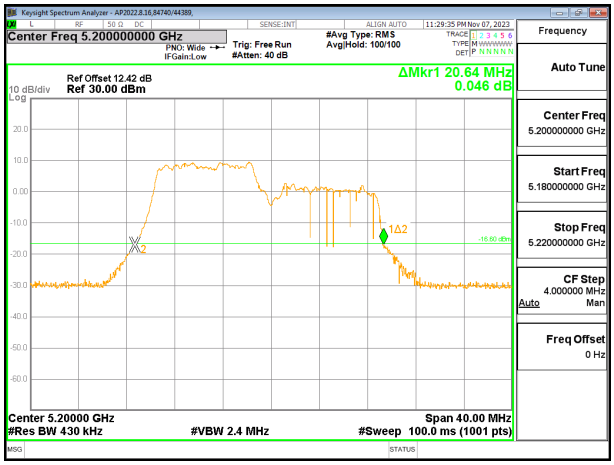
10.2.8. 802.11be EHT20 106T MODE IN THE 5.2 GHz BAND

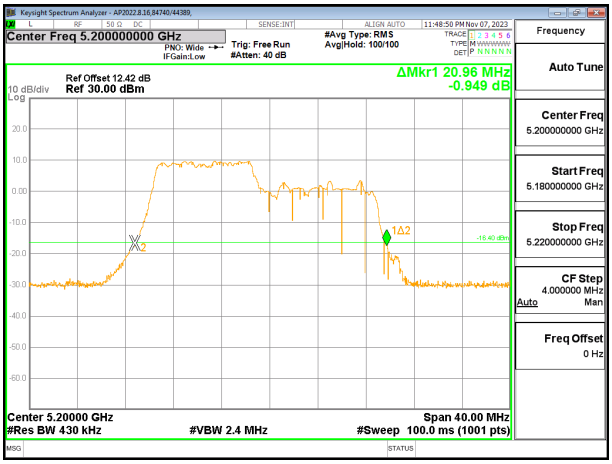
2TX Chain 0 + Chain 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5180	20.72	21.24
Mid	5200	20.64	20.96
High	5240	21.32	21.08

MID CHANNEL



MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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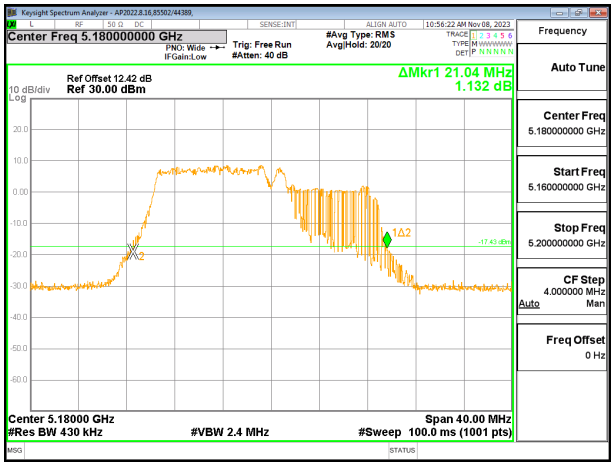
10.2.9. 802.11be EHT20 106T + 26T MODE IN THE 5.2 GHz BAND

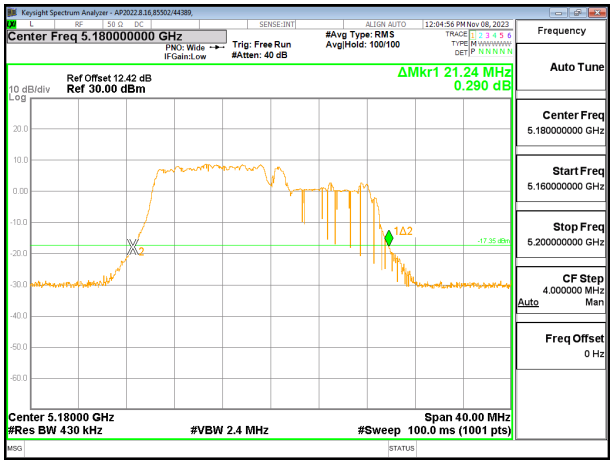
2TX Chain 0 + Chain 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5180	21.04	21.24
Mid	5200	21.12	21.24
High	5240	21.88	21.80

LOW CHANNEL



LOW CHANNEL CHAIN 0



LOW CHANNEL CHAIN 1

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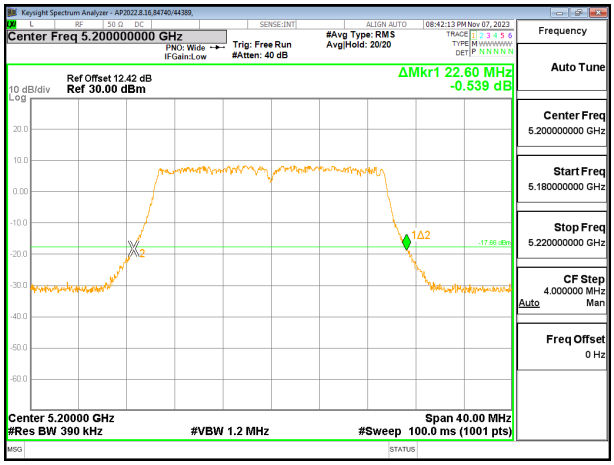
10.2.10. 802.11be EHT20 242T MODE IN THE 5.2 GHz BAND

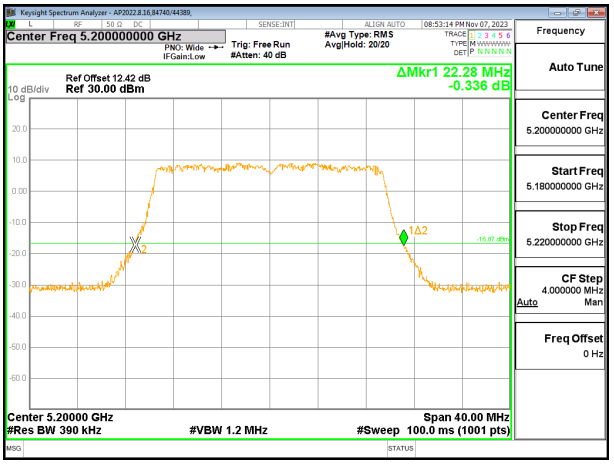
2TX Chain 0 + Chain 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5180	23.08	22.44
Mid	5200	22.60	22.28
High	5240	22.60	22.36

MID CHANNEL



MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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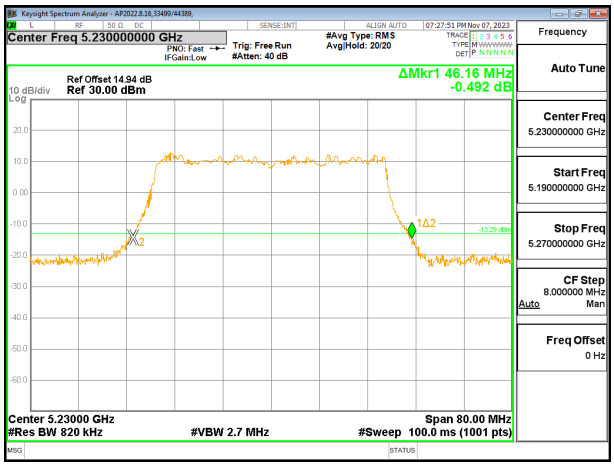
10.2.11. 802.11be EHT40 484T MODE IN THE 5.2 GHz BAND

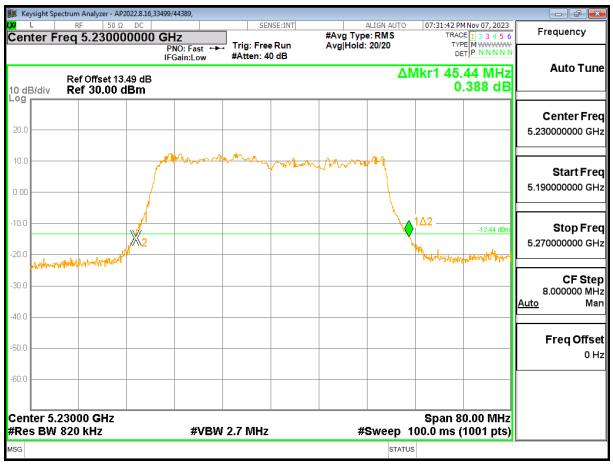
2TX Chain 0 + Chain 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5190	46.24	46.00
High	5230	46.16	45.44

HIGH CHANNEL



HIGH CHANNEL CHAIN 0



HIGH CHANNEL CHAIN 1

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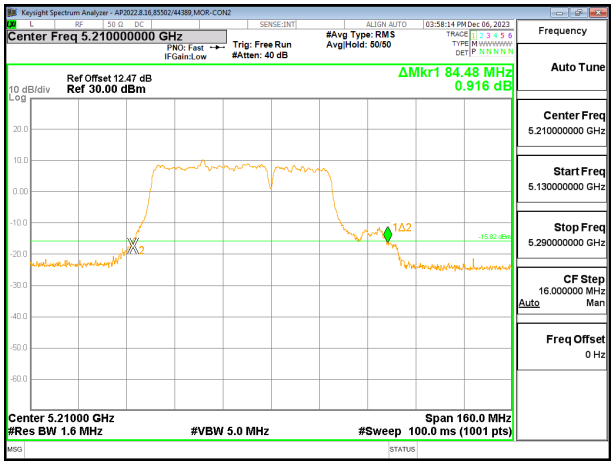
10.2.12. 802.11be EHT80 484T+242T MODE IN THE 5.2 GHz BAND

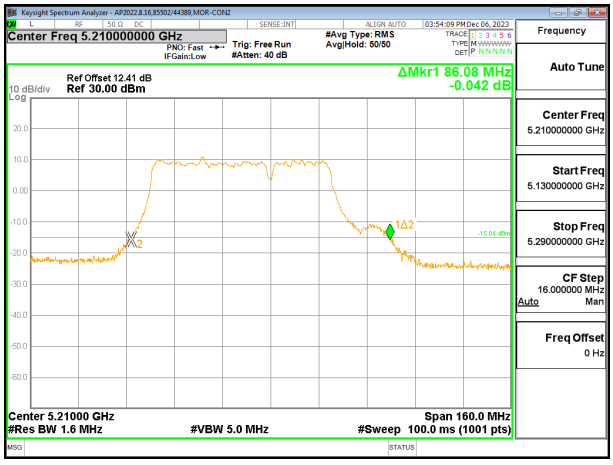
2TX Chain 0 + Chain 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5210	84.48	86.08

MID CHANNEL



MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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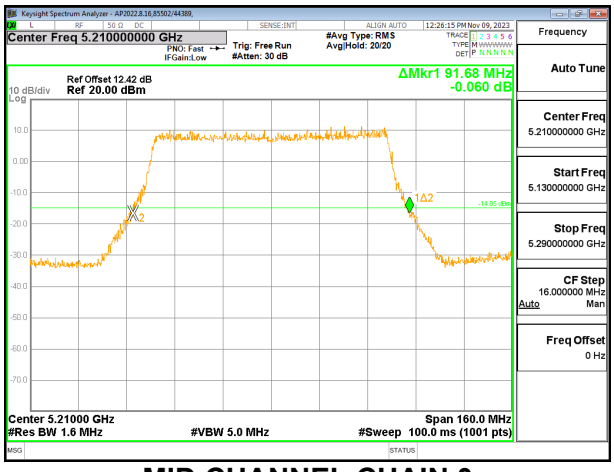
10.2.13. 802.11be EHT80 996T MODE IN THE 5.2 GHz BAND

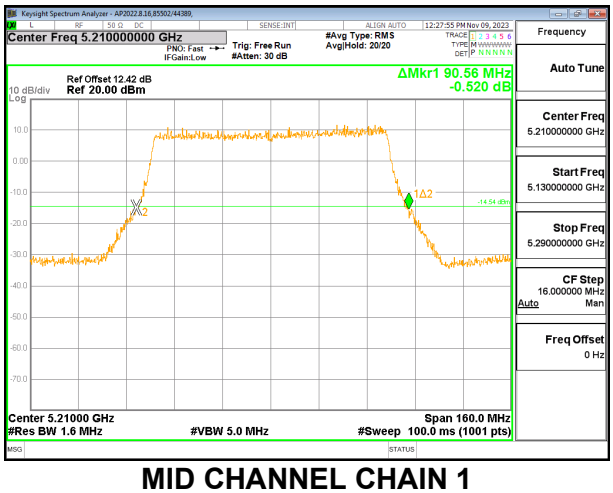
2TX Chain 0 + Chain 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Mid	5210	91.68	90.56

MID CHANNEL



MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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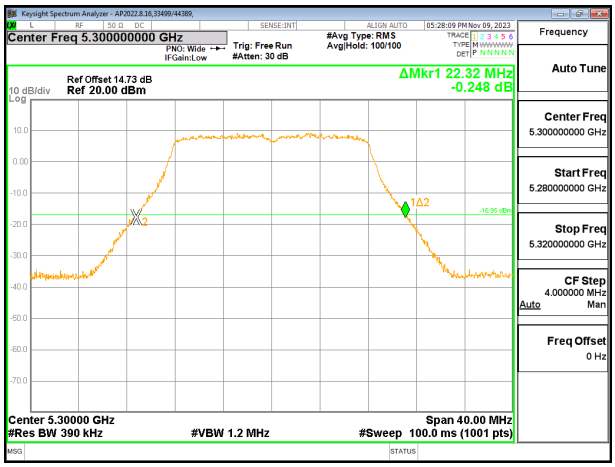
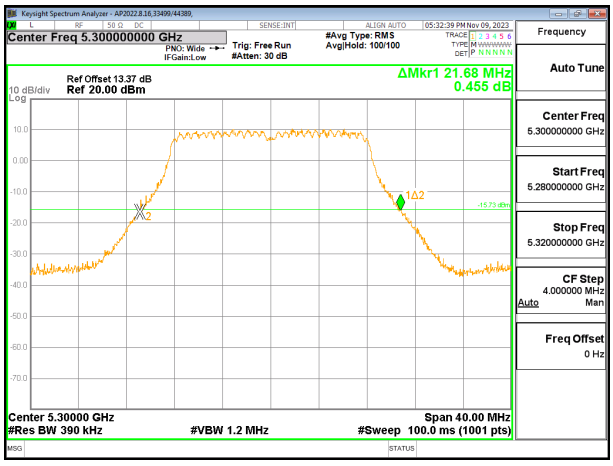
10.2.14. 802.11a MODE IN THE 5.3 GHz BAND

2TX CHAIN 0 + CHAIN 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth CHAIN 0 (MHz)	26 dB Bandwidth CHAIN 1 (MHz)
Low	5260	22.20	22.04
Mid	5300	22.32	21.68
High	5320	21.92	22.16



MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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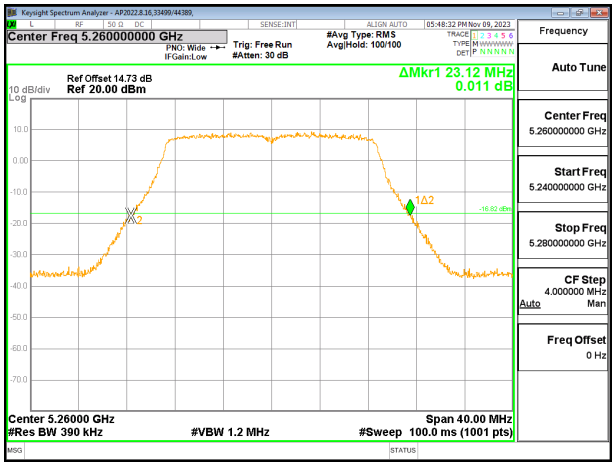
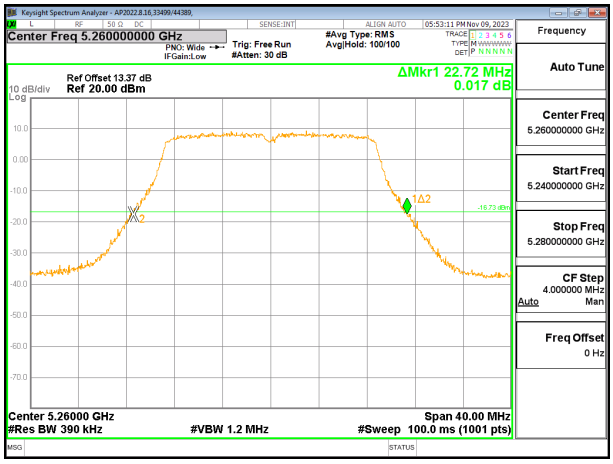
10.2.15. 802.11n HT20 MODE IN THE 5.3 GHz BAND

2TX CHAIN 0 + CHAIN 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth CHAIN 0 (MHz)	26 dB Bandwidth CHAIN 1 (MHz)
Low	5260	23.12	22.72
Mid	5300	22.84	22.92
High	5320	23.08	23.16



LOW CHANNEL CHAIN 0



LOW CHANNEL CHAIN 1

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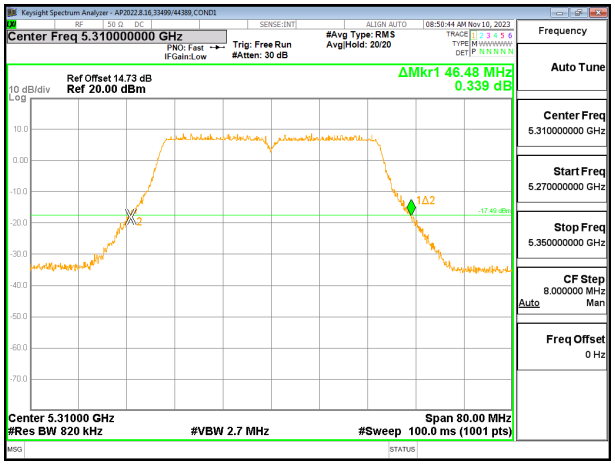
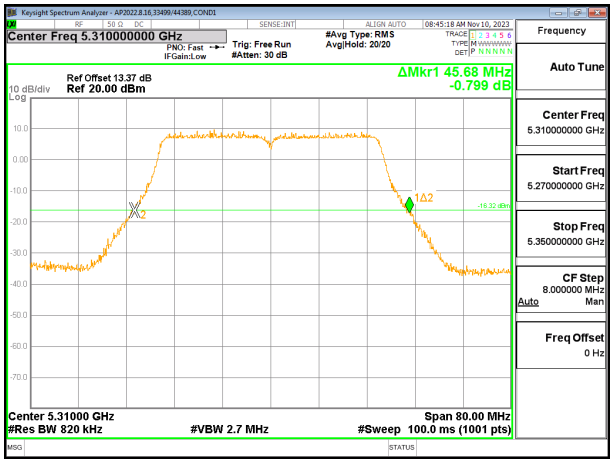
10.2.16. 802.11n HT40 MODE IN THE 5.3 GHz BAND

2TX CHAIN 0 + CHAIN 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth CHAIN 0 (MHz)	26 dB Bandwidth CHAIN 1 (MHz)
Low	5270	46.88	46.40
High	5310	46.48	45.68



HIGH CHANNEL CHAIN 0

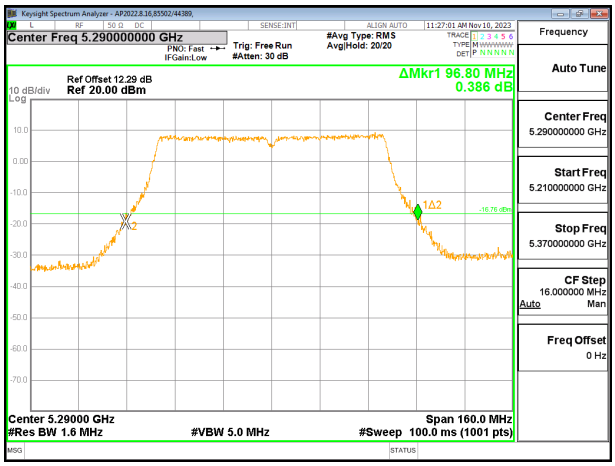


HIGH CHANNEL CHAIN 1

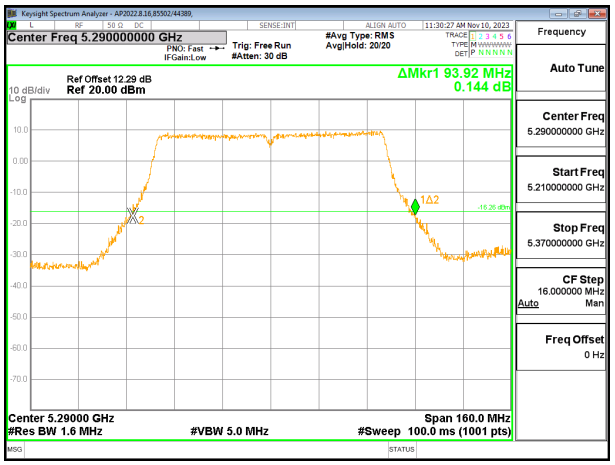
10.2.17. 802.11ac VHT80 MODE IN THE 5.3 GHz BAND

2TX CHAIN 0 + CHAIN 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth CHAIN 0 (MHz)	26 dB Bandwidth CHAIN 1 (MHz)
Mid	5290	96.80	93.92



MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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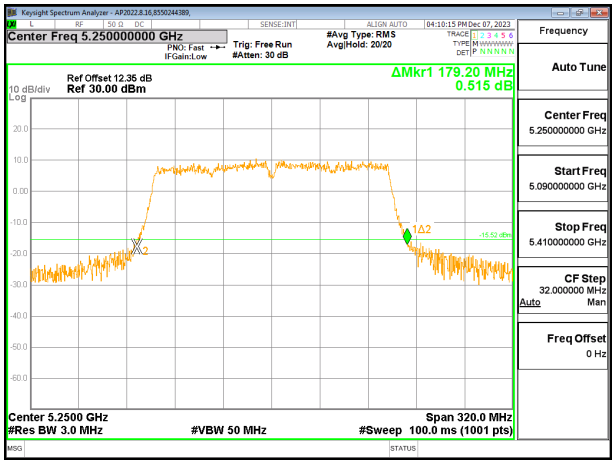
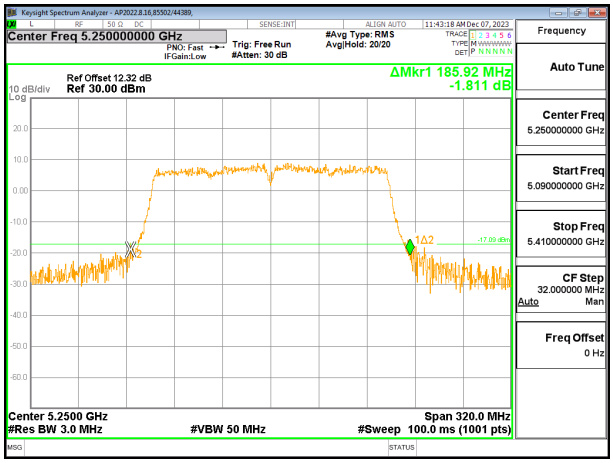
10.2.18. 802.11ac VHT160 MODE 2TX IN THE 5.2/5.3GHz BAND

2TX CHAIN 0 + CHAIN 1 CDD OFDMA MODE:

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Mid	5250	179.20	185.92



MID CHANNEL CHAIN 0

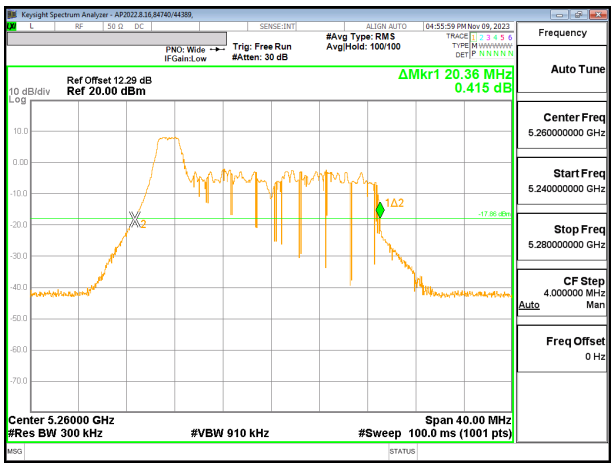


MID CHANNEL CHAIN 1

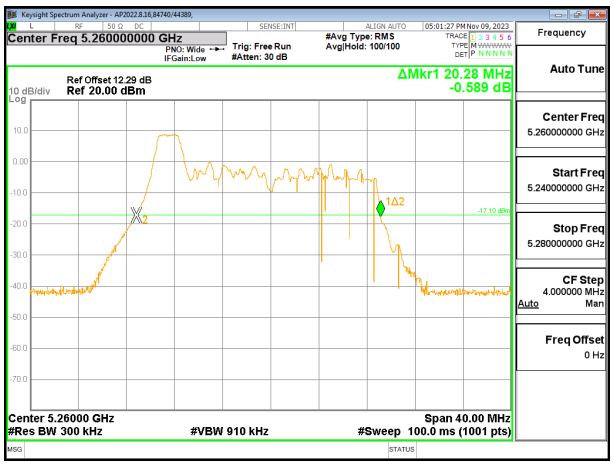
10.2.19. 802.11be EHT20 MODE 2TX IN THE 5.3GHz BAND

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

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5260	20.36	20.28
Mid	5300	20.40	20.28
High	5320	20.48	20.28



LOW CHANNEL CHAIN 0



LOW CHANNEL CHAIN 1

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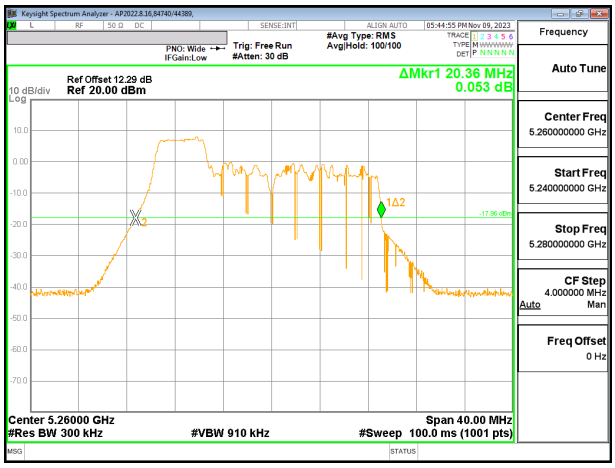
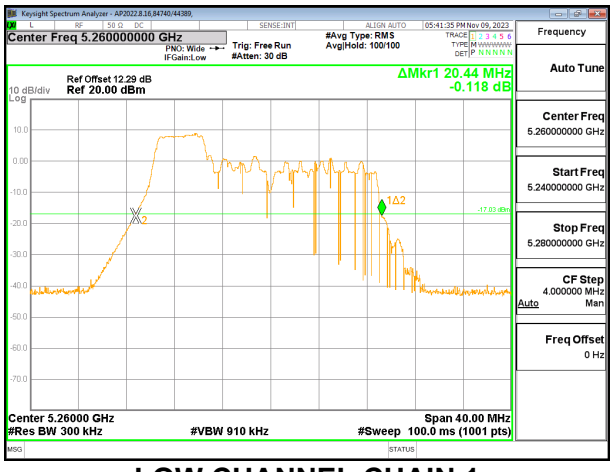
2TX CHAIN 0 + CHAIN 1 CDD OFDMA MODE: 52T

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5260	20.36	20.44
Mid	5300	20.48	20.60
High	5320	21.00	20.36



LOW CHANNEL CHAIN 0



LOW CHANNEL CHAIN 1

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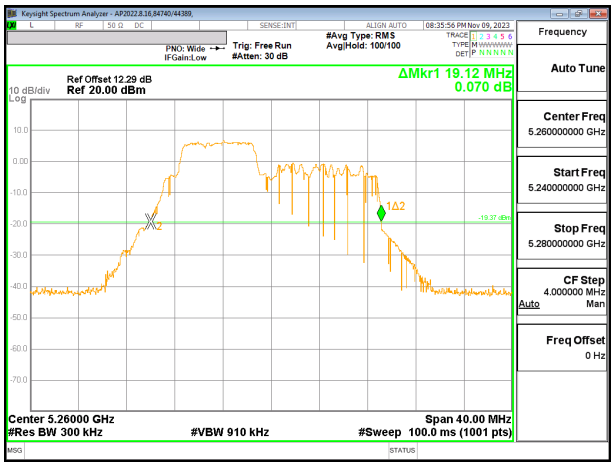
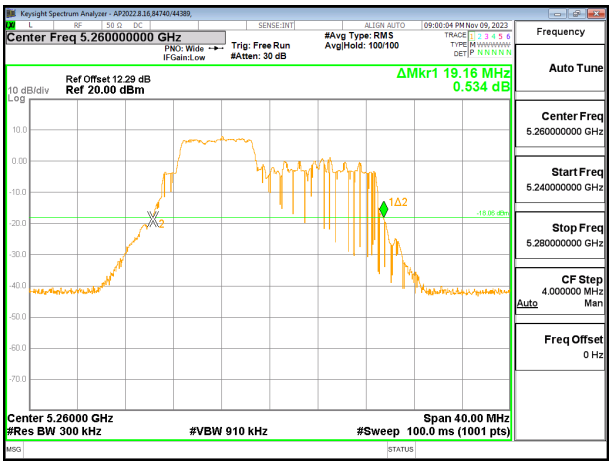
2TX CHAIN 0 + CHAIN 1 CDD OFDMA MODE: 52T+26T

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5260	19.12	19.16
Mid	5300	19.24	19.24
High	5320	20.04	19.36



LOW CHANNEL CHAIN 0



LOW CHANNEL CHAIN 1

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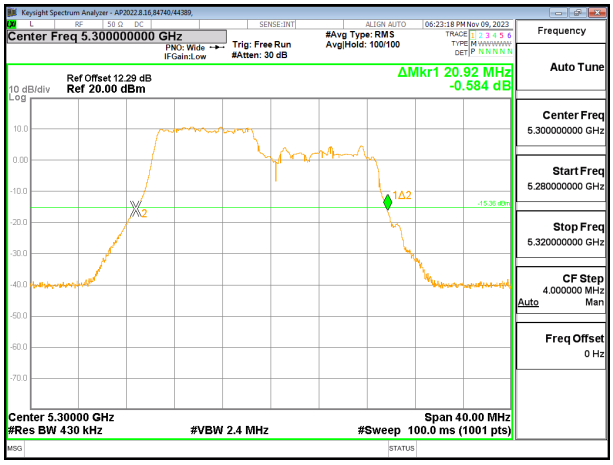
2TX CHAIN 0 + CHAIN 1 CDD OFDMA MODE: 106T

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5260	20.72	20.96
Mid	5300	20.92	20.92
High	5320	21.28	21.04

MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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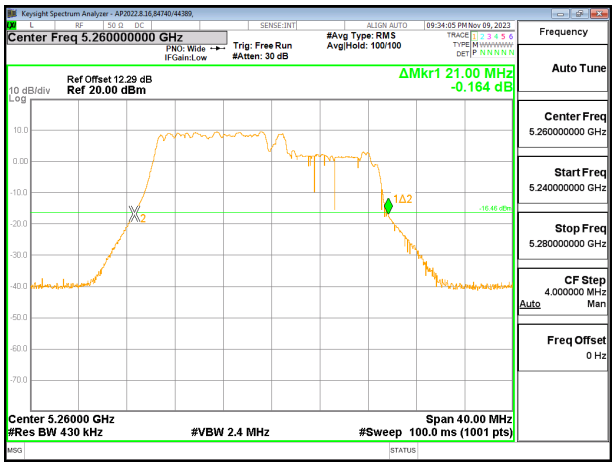
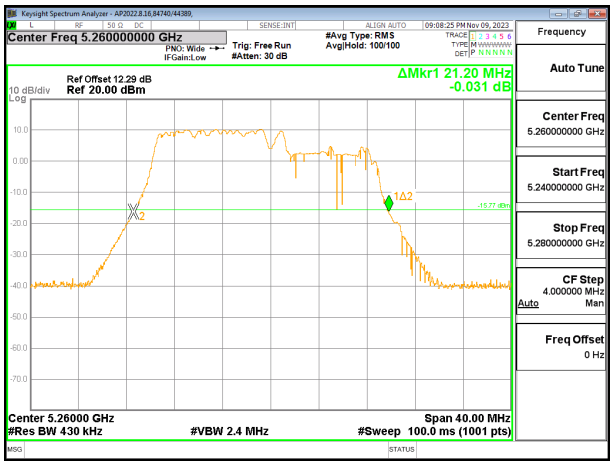
2TX CHAIN 0 + CHAIN 1 CDD OFDMA MODE: 106T+26T

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5260	21.00	21.20
Mid	5300	21.16	21.20
High	5320	21.48	21.28



LOW CHANNEL CHAIN 0



LOW CHANNEL CHAIN 1

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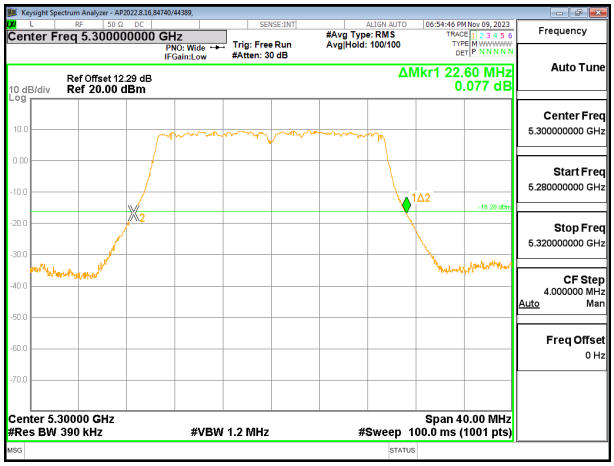
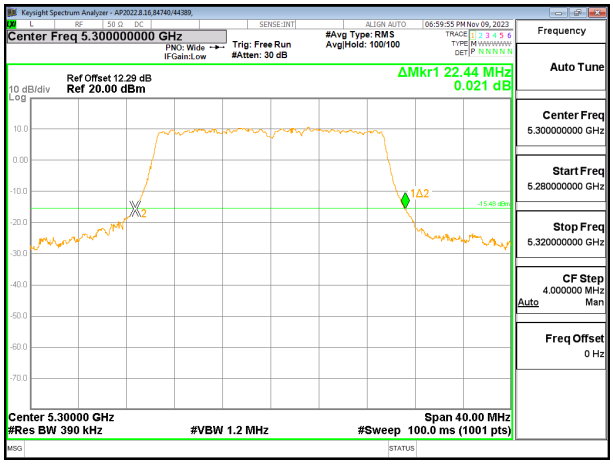
2TX CHAIN 0 + CHAIN 1 CDD OFDMA MODE: 242T

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5260	22.56	22.48
Mid	5300	22.60	22.44
High	5320	22.72	22.56



MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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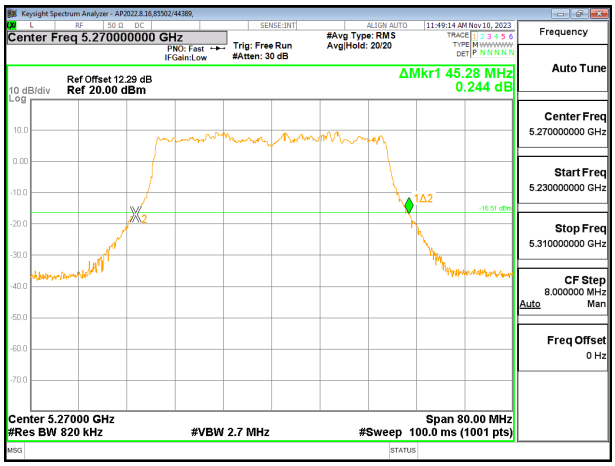
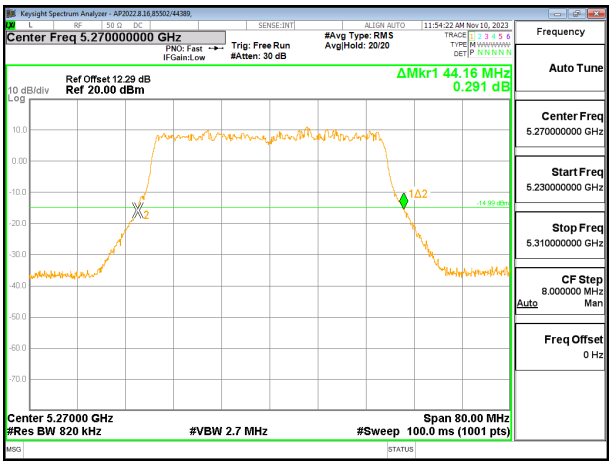
10.2.20. 802.11be EHT40 MODE 2TX IN THE 5.3GHz BAND

2TX CHAIN 0 + CHAIN 1 CDD OFDMA MODE: 484T

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5270	45.28	44.16
High	5310	44.64	44.48



LOW CHANNEL CHAIN 0



LOW CHANNEL CHAIN 1

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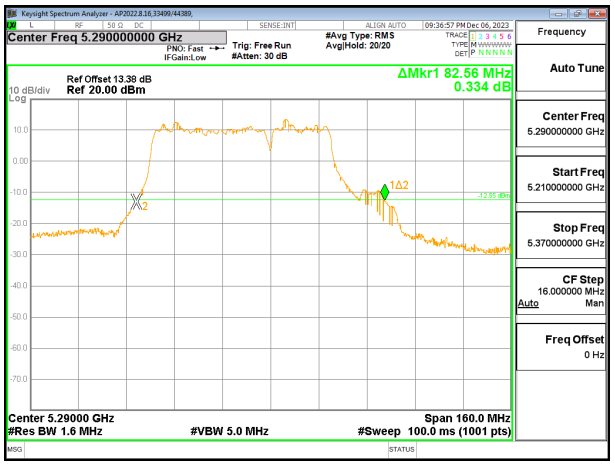
10.2.21. 802.11be EHT80 MODE 2TX IN THE 5.3GHz BAND

2TX CHAIN 0 + CHAIN 1 CDD OFDMA MODE: 484T+242T

	(MHz)	Chain 0 (MHz)	Chain 1 (MHz)
Mid	5290	85.44	82.56

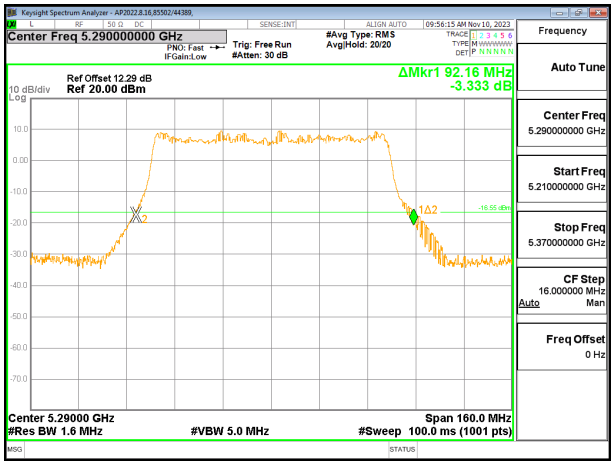
MID CHANNEL CHAIN 0



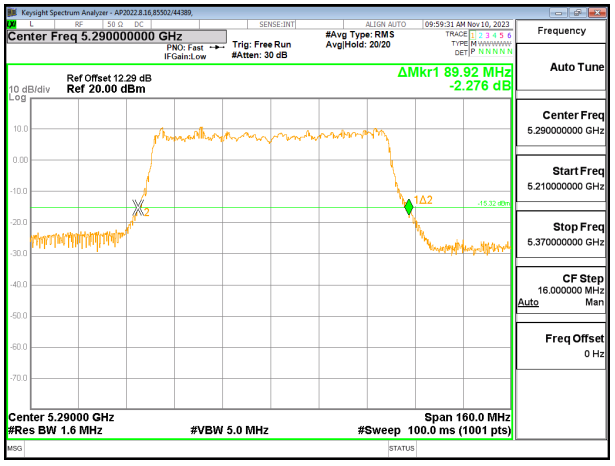
MID CHANNEL CHAIN 1

2TX CHAIN 0 + CHAIN 1 CDD OFDMA MODE: 996T

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Mid	5290	92.16	89.92



MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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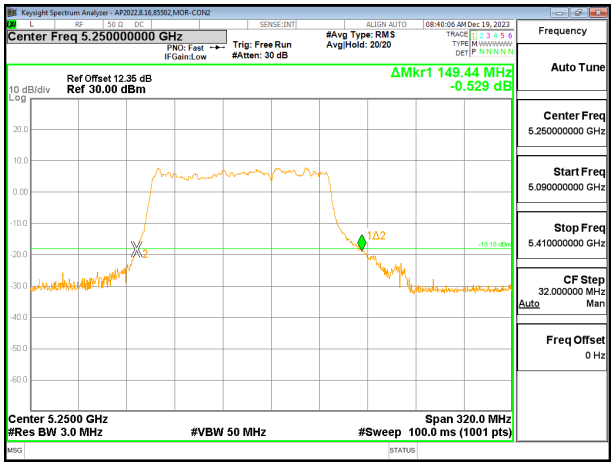
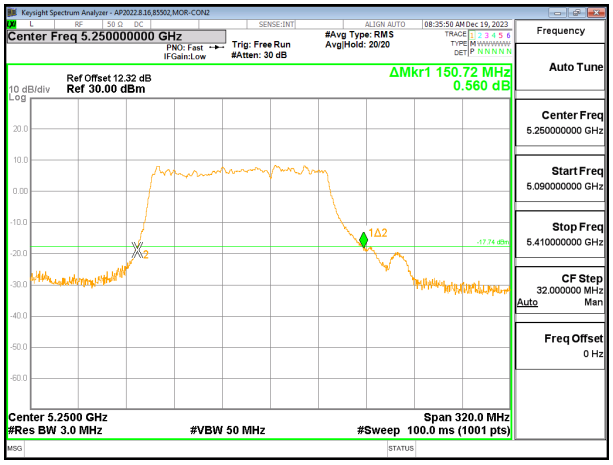
10.2.22. 802.11be EHT160 MODE 2TX IN THE 5.2/5.3GHz BAND

2TX CHAIN 0 + CHAIN 1 CDD OFDMA MODE: 996T+484T

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Mid	5250	149.44	150.72



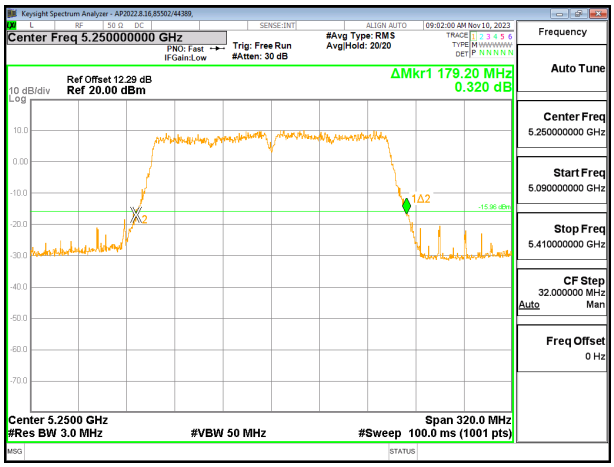
MID CHANNEL CHAIN 0



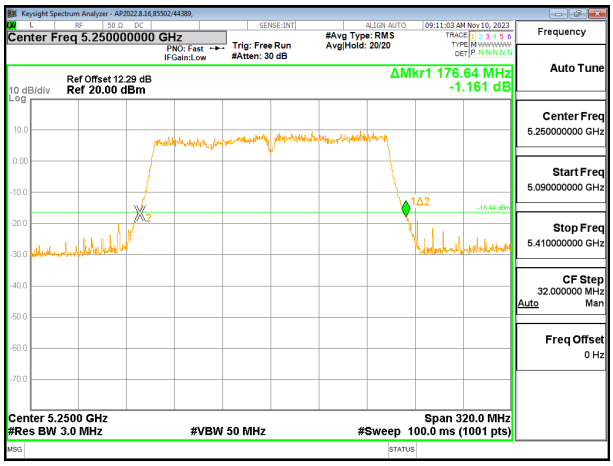
MID CHANNEL CHAIN 1

2TX CHAIN 0 + CHAIN 1 CDD OFDMA MODE: 2x996T

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Mid	5250	179.20	176.64



MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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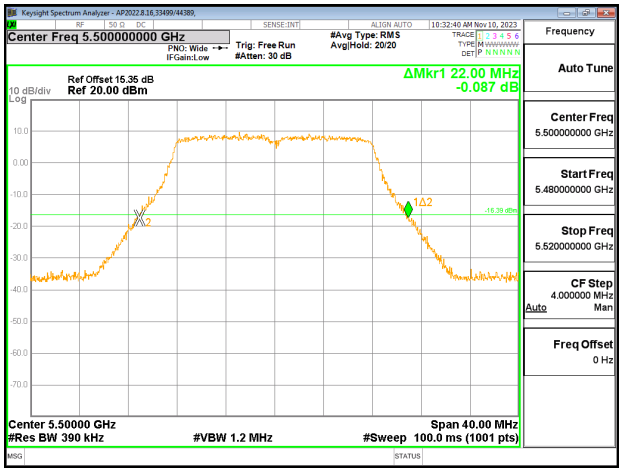
10.2.23. 802.11a MODE IN THE 5.6 GHz BAND

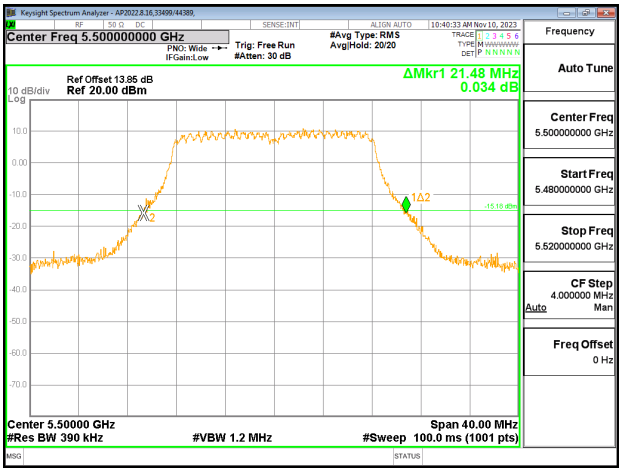
2TX CHAIN 0 + CHAIN 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth CHAIN 0 (MHz)	26 dB Bandwidth CHAIN 1 (MHz)
Low	5500	22.00	21.48
Mid	5580	22.28	21.72
High	5700	22.28	21.68
144	5720	16.48	15.92

LOW CHANNEL

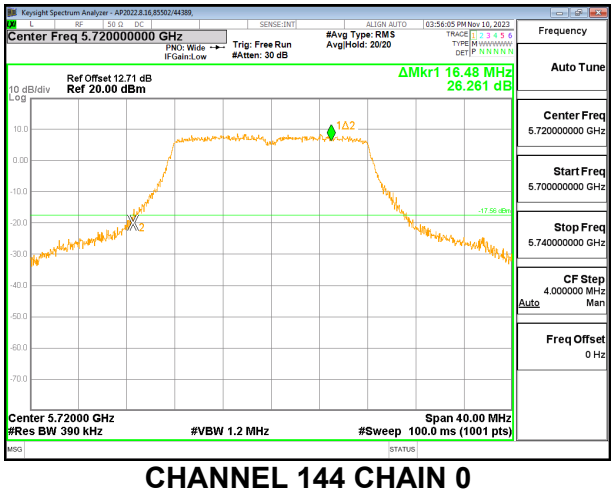


LOW CHANNEL CHAIN 0

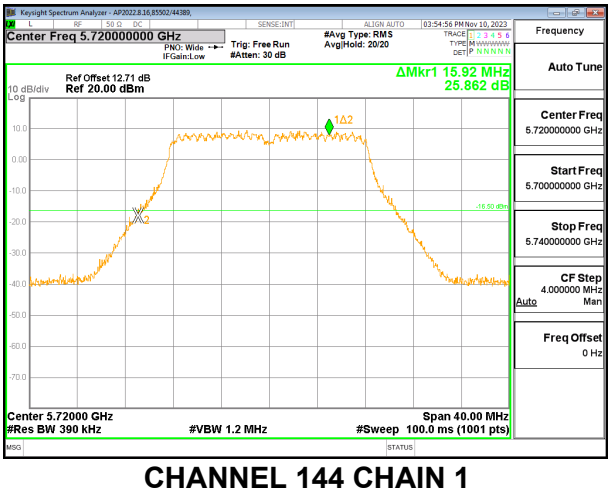


LOW CHANNEL CHAIN 1

CHANNEL 144



CHANNEL 144 CHAIN 0



CHANNEL 144 CHAIN 1

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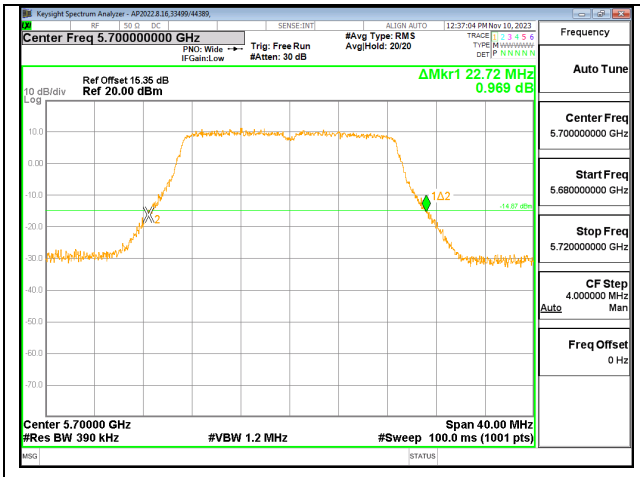
10.2.24. 802.11n HT20 MODE IN THE 5.6 GHz BAND

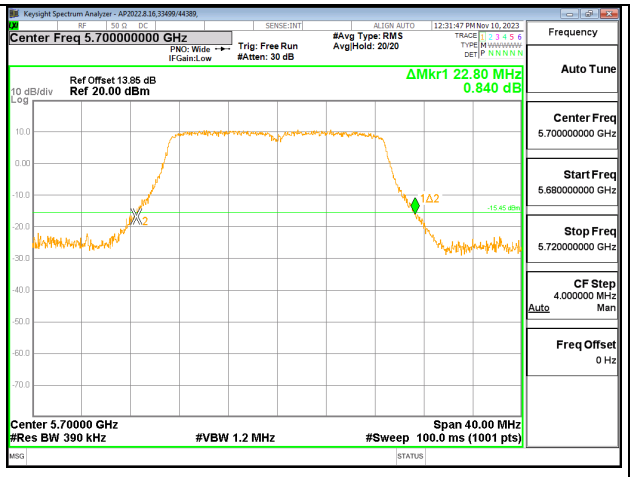
2TX CHAIN 0 + CHAIN 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth CHAIN 0 (MHz)	26 dB Bandwidth CHAIN 1 (MHz)
Low	5500	23.12	22.88
Mid	5580	22.92	23.24
High	5700	22.72	22.80
144	5720	16.56	16.44

HIGH CHANNEL

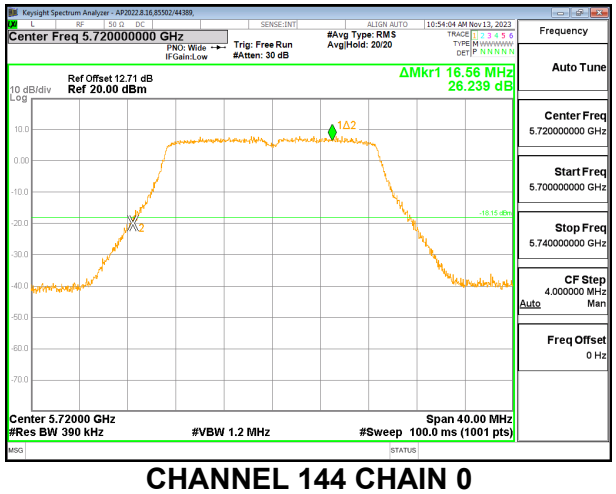


HIGH CHANNEL CHAIN 0

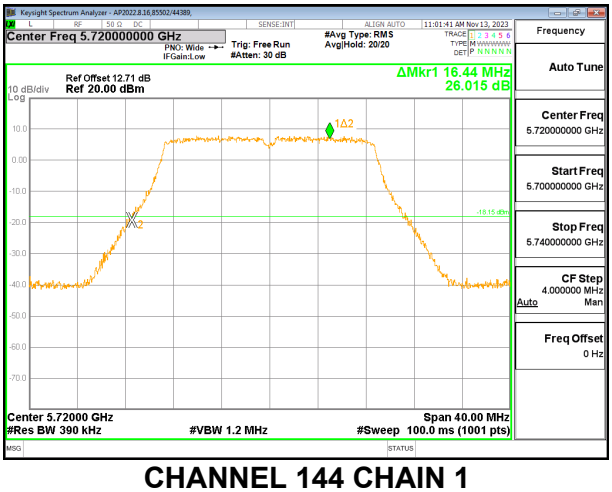


HIGH CHANNEL CHAIN 1

CHANNEL 144



CHANNEL 144 CHAIN 0



CHANNEL 144 CHAIN 1

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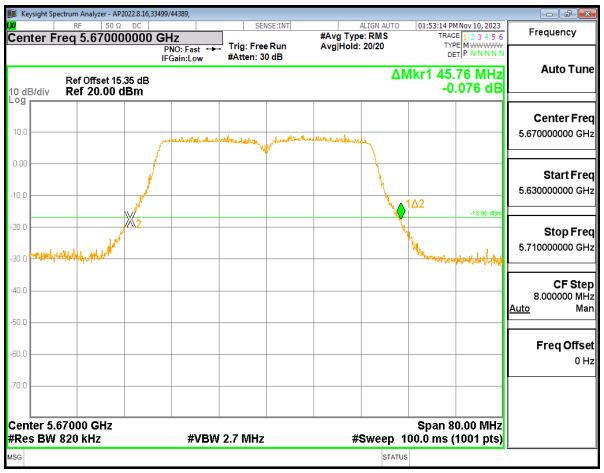
10.2.25. 802.11n HT40 MODE IN THE 5.6 GHz BAND

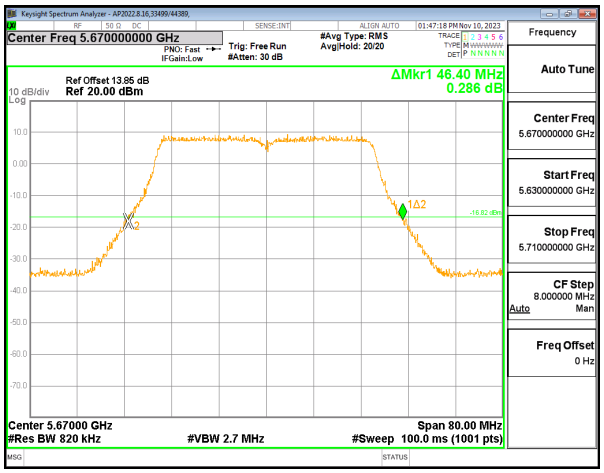
2TX CHAIN 0 + CHAIN 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth CHAIN 0 (MHz)	26 dB Bandwidth CHAIN 1 (MHz)
Low	5510	47.12	46.08
Mid	5550	46.72	45.92
High	5670	45.76	46.40
142	5710	39.24	38.20

HIGH CHANNEL

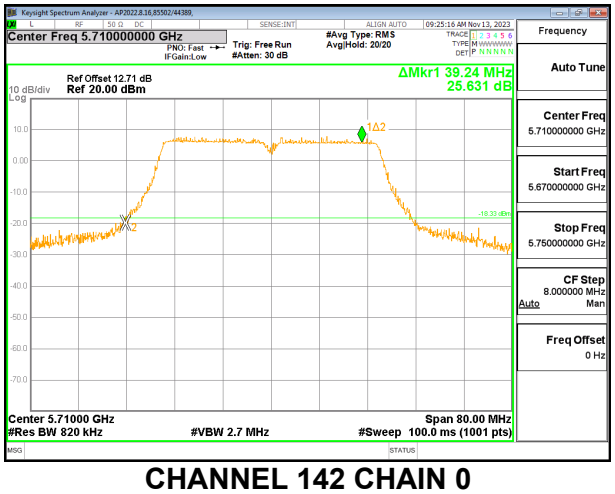


HIGH CHANNEL CHAIN 0

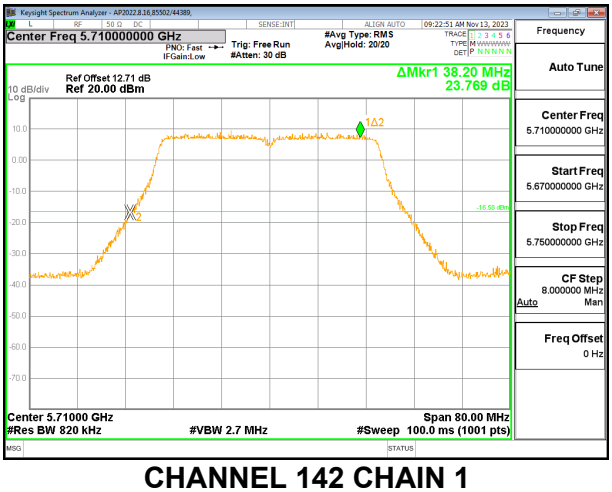


HIGH CHANNEL CHAIN 1

CHANNEL 142



CHANNEL 142 CHAIN 0



CHANNEL 142 CHAIN 1

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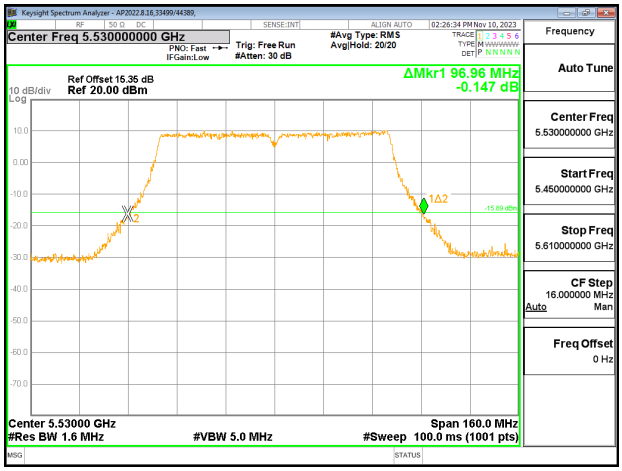
10.2.26. 802.11ac VHT80 MODE IN THE 5.6 GHz BAND

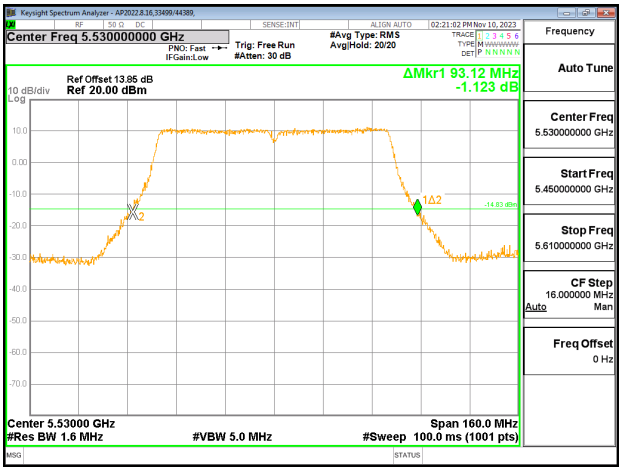
2TX CHAIN 0 + CHAIN 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth CHAIN 0 (MHz)	26 dB Bandwidth CHAIN 1 (MHz)
Low	5530	96.96	93.12
High	5610	94.88	93.76
138	5690	83.16	81.88

LOW CHANNEL

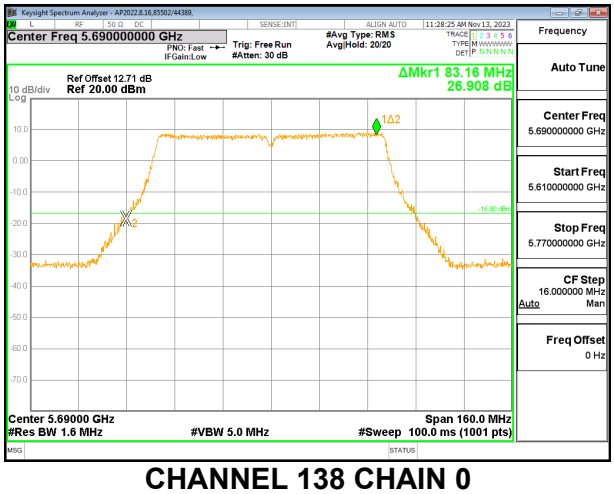


LOW CHANNEL CHAIN 0

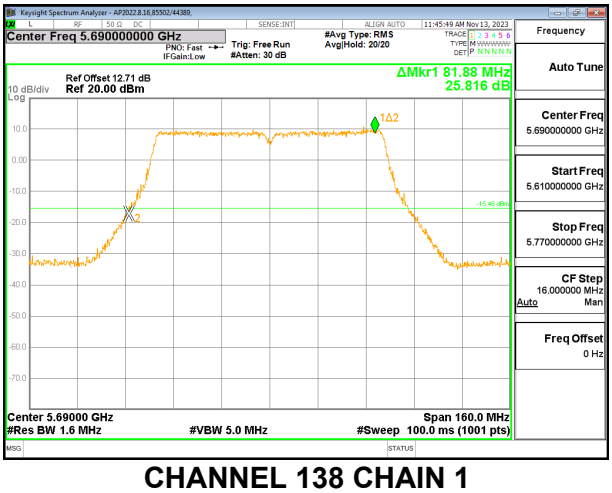


LOW CHANNEL CHAIN 1

CHANNEL 138



CHANNEL 138 CHAIN 0



CHANNEL 138 CHAIN 1

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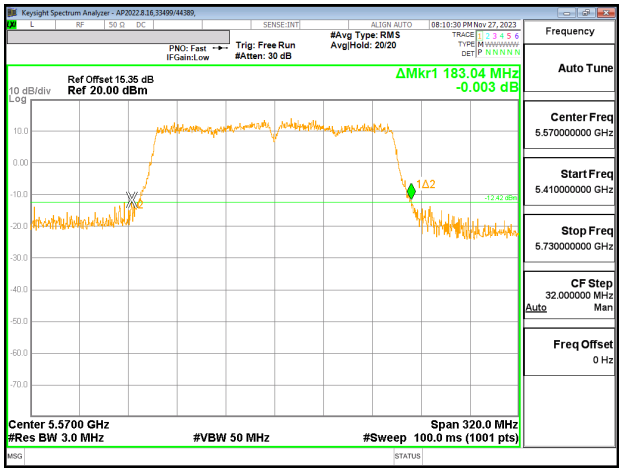
10.2.27. 802.11ac VHT160 MODE IN THE 5.6 GHz BAND

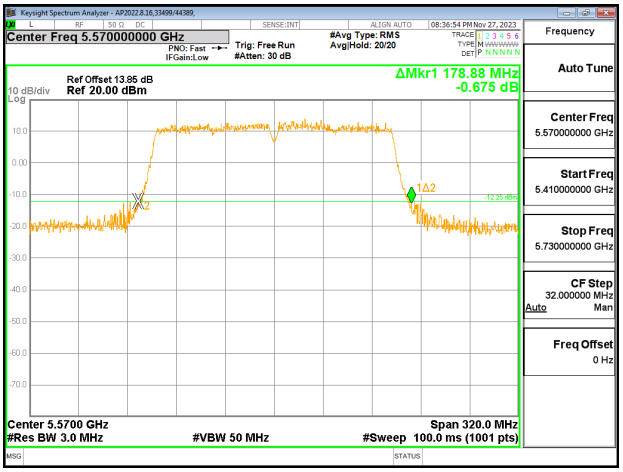
2TX CHAIN 0 + CHAIN 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth CHAIN 0 (MHz)	26 dB Bandwidth CHAIN 1 (MHz)
Mid	5570	183.04	178.88

MID CHANNEL



HIGH CHANNEL CHAIN 0



HIGH CHANNEL CHAIN 1

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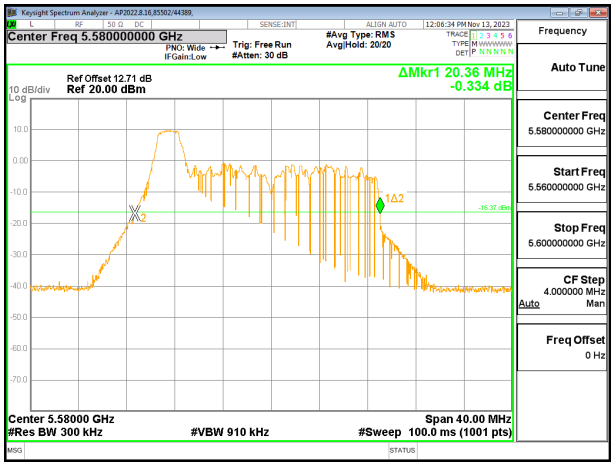
10.2.28. 802.11be EHT20 MODE IN THE 5.6 GHz BAND

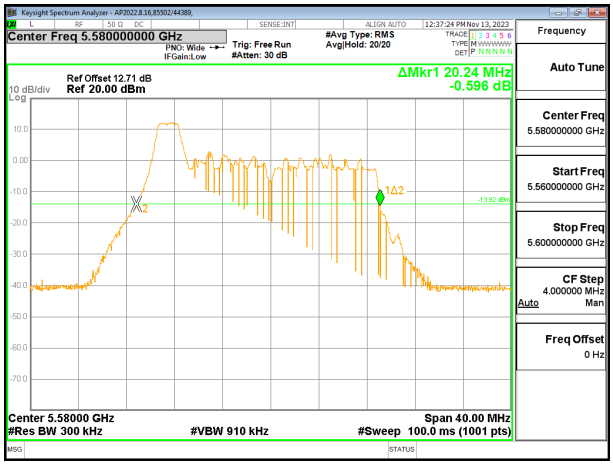
2TX CHAIN 0 + CHAIN 1 CDD MODE – 26T

Channel	Frequency (MHz)	26 dB Bandwidth CHAIN 0 (MHz)	26 dB Bandwidth CHAIN 1 (MHz)
Low	5500	20.36	20.24
Mid	5580	20.36	20.24
High	5700	20.64	20.40
144	5720	16.32	16.20

MID CHANNEL

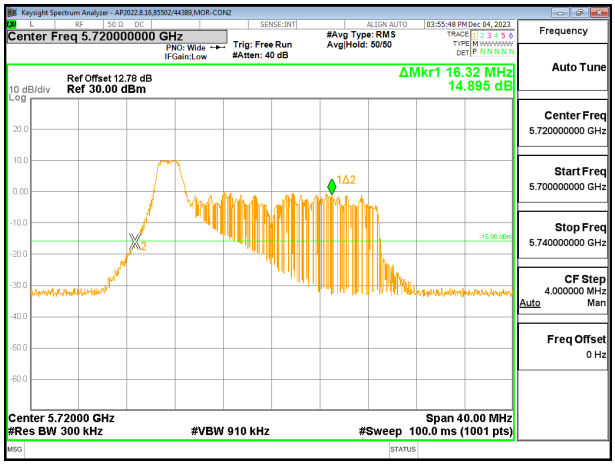


MID CHANNEL CHAIN 0

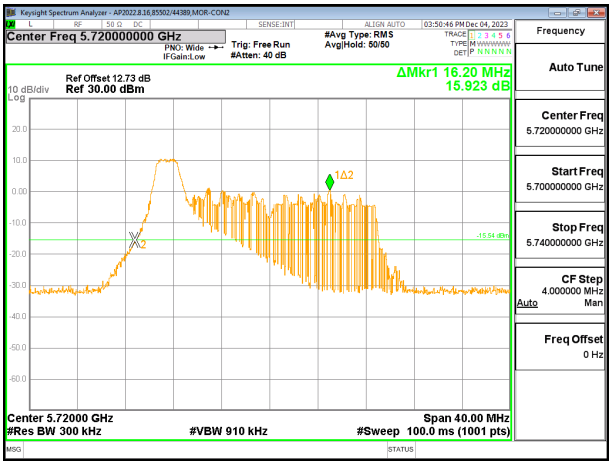


MID CHANNEL CHAIN 1

CHANNEL 144



CHANNEL 144 CHAIN 0



CHANNEL 144 CHAIN 1

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