TEST REPORT

Report Number : R14896020-E7

Applicant	:	Sonos 301 Coromar Dr Goleta, CA 93117 USA
MODEL	:	S45
FCC ID	:	SBVRM045
IC	:	5373A-RM045
EUT Description	:	Wireless Smart Speaker
Test Standard(s)	:	FCC 47 CFR Part 15 Subpart E:2024 ISED RSS-247 Issue 3:2023 ISED RSS-GEN Issue 5 +A1+A2:2021

Date Of Issue:
2024-05-28

Prepared by:
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CERT #0751.06

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	2024-05-03	Initial Issue	B. Kiewra
V2	2024-05-28	Revised UNII-2C gain in section 6.3 Revised DCCF in section 10.1.2 Additional editorial revisions	B. Kiewra

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Sonos
301 Coromar Dr
Goleta, CA 93117 USA

EUT DESCRIPTION: Wireless Smart Speaker

MODEL: S45

BRAND: Sonos

SERIAL NUMBER: 000E5828D66C8, 000E58E7E7FB2, 000E58A36F038

SAMPLE RECEIPT DATE: 2024-02-12

DATE TESTED: 2024-02-12 to 2024-05-02

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:

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Project Engineer
Consumer, Medical and IT Segment
UL LLC

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 0)

FCC Clause	ISED Clause	Requirement	Result	Comment
See 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
- ANSI C63.10-2020

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	

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 Wireless Smart Speaker that contains Radio0 and Radio1. Radio0 transmits BT, BLE, 2.4GHz WLAN, 5GHz WLAN, 6GHz WLAN. Radio1 transmits 5GHz and 6GHz WLAN. This report covers testing on Radio0 5GHz WLAN.

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	14.08	25.59
5180-5240	802.11n HT20	14.03	25.29
5190-5230	802.11n HT40	16.89	48.87
5210	802.11ac VHT80	15.13	32.58
5180-5240	802.11be EHT20	14.26	26.67
5190-5230	802.11be EHT40	17.28	53.46
5210	802.11be EHT80	15.65	36.73

5.3 GHz BAND

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.3GHz Band, 2Tx			
5260-5320	802.11a	20.84	121.34
5260-5320	802.11n HT20	20.99	125.60
5270-5310	802.11n HT40	20.27	106.41
5290	802.11ac VHT80	14.83	30.41
5260-5320	802.11be EHT20	21.15	130.32
5270-5310	802.11be EHT40	21.07	127.94
5290	802.11be EHT80	15.71	37.24

5.6 GHz BAND

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.6GHz Band, 2Tx			
5500-5720	802.11a	21.41	138.36
5500-5720	802.11n HT20	21.47	140.28
5510-5710	802.11n HT40	21.47	140.28
5530-5690	802.11ac VHT80	17.93	62.09
5500-5720	802.11be EHT20	22.92	195.88
5510-5710	802.11be EHT40	24.17	261.22
5530-5690	802.11be EHT80	18.23	66.53

5.8 GHz BAND

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.8GHz Band, 2Tx			
5745-5825	802.11a	22.66	184.50
5745-5825	802.11n HT20	22.79	190.11
5755-5795	802.11n HT40	22.61	182.39
5775	802.11ac VHT80	18.34	68.23
5745-5825	802.11be EHT20	22.97	198.15
5755-5795	802.11be EHT40	22.50	177.83
5775	802.11be EHT80	18.47	70.31

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes 4 antennas for diversity, chain 0 connects ANT 1 and ANT2, chain 1 connects to ANT3 and ANT 4. Manufacturer has declared that antenna 2 and antenna 3 are worst-case combination and result in worst-case antenna gains as declared below.

Mode	Type	Declared Correlated Gain (dBi)	Declared Uncorrelated Gain (dBi)
UNII-1	Triband Monopole	6.1	3.2
UNII-2a		6.8	3.9
UNII-2c		7.8	5.0
UNII-3		7.5	4.7

6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was 78.1-45200-diag-lasso-rel-202312282317.

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. Additional scans taken as well on varying modes/channels to ensure harmonics are compliant.

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
802.11ax HE20mode: MCS0 (Nss = 1)
802.11ax HE40mode: MCS0 (Nss = 1)
802.11ax HE80mode: MCS0 (Nss = 1)

Note: Where appropriate only representative plots are included to reduce report size.

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6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop	Lenovo	T450s	NA	NA
Laptop	Lenovo	T470s	NA	NA
Ethernet Switch	Netgear	GS305v3	5U81385JA2EE6	NA
Switch PSU	Netgear	AD2015F20	332-10727-02	NA

I/O CABLES

I/O Cable List						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	Mains	1	Hardwired	Non-Shielded	>3m	Connects to AC Mains
2	Ethernet	1	Ethernet	Non-Shielded	>3m	Connects to ENET switch

TEST SETUP

The EUT is connected to a test laptop during the tests.

SETUP DIAGRAM

Please refer to R14896020-EP1 for setup diagrams

7. 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 C63.10-2020, Section 6.2.

Radiated Spurious Emissions: ANSI C63.10-2020 Section 6.3 to 6.6

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8. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment Used - Wireless Conducted Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
90410	Spectrum Analyzer	Keysight Technologies	N9030A	2023-06-14	2024-06-14
90416	Spectrum Analyzer	Keysight Technologies	N9030A	2023-06-09	2024-06-30
238710	Environmental Meter	Fisher Scientific	15-077-963	2023-06-27	2024-06-27
SOFTEMI	Antenna Port Software	UL	Version 2021.5.28	NA	NA
SOFTEMI	Antenna Port Software	UL	Version 2022.8.16	NA	NA
SOFTEMI	Antenna Port Software	UL	Version 2023.2.16	NA	NA
SOFTEMI	Antenna Port Software	UL	Version 2024.2.23	NA	NA
Power Software	Boonton Power Analyzer	Boonton	Version 3.0.13.0	NA	NA
245262	Conducted Switch Box	UL	CSB	2024-02-20	2025-02-20
211056	Real-Time Peak Power Sensor 50MHz to 8GHz	Boonton	RTP5000	2023-08-01	2024-08-01
211055	Real-Time Peak Power Sensor 50MHz to 8GHz	Boonton	RTP5000	2023-08-01	2024-08-01
211057	Real-Time Peak Power Sensor 50MHz to 8GHz	Boonton	RTP5000	2023-08-01	2024-08-01
211058	Real-Time Peak Power Sensor 50MHz to 8GHz	Boonton	RTP5000	2023-08-01	2024-08-01
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

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	2024-04-04	2025-04-04
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	2024-04-04	2025-04-04
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

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

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
1-18 GHz					
135143	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2024-02-07	2026-02-07
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	2023-07-19	2024-07-19
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 4)

Equipment ID	Description	Manufacturer/Brand	Model Number	Last Cal.	Next Cal.
0.009-30MHz					
135144	Active Loop Antenna	ETS-Lindgren	6502	2024-01-24	2025-01-24
30-1000 MHz					
90628	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2024-01-02	2026-01-02
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	2024-04-16	2025-04-16
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

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	2024-03-05	2025-03-05
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

9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 789033 D01 Zero-Span Spectrum Analyzer Method.

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	RMS AV DCCF (dB)
802.11a CDD	2.756	3.421	0.806	80.56	0.94
802.11n HT20 CDD	5.084	5.832	0.872	87.17	0.60
802.11n HT40 CDD	2.467	3.205	0.770	76.97	1.14
802.11ac VHT80 CDD	1.163	1.919	0.606	60.60	2.17
802.11be EHT20 26T	0.578	1.164	0.497	49.66	3.04
802.11be EHT20 52T	0.496	0.630	0.787	78.70	1.04
802.11be EHT20 106T	0.436	1.038	0.420	41.98	3.77
802.11be EHT20 242T	0.376	0.978	0.384	38.43	4.15
802.11be EHT20 SU	4.0970	4.8530	0.844	84.42	0.74
802.11be EHT40 484T	0.3675	0.9791	0.375	37.53	4.26
802.11be EHT40 SU	2.0790	2.8150	0.739	73.85	1.32
802.11be EHT80 996T	0.3435	0.9731	0.353	35.30	4.52
802.11be EHT80 SU	1.025	1.770	0.579	57.91	2.37

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 802.11ax HE20 26T MODE

DUTY CYCLE 802.11ax HE20 52T MODE

DUTY CYCLE 802.11ax HE20 106T MODE

DUTY CYCLE 802.11ax HE20 242T MODE

DUTY CYCLE 802.11ax HE20 SU MODE

DUTY CYCLE 802.11ax HE40 484T MODE

DUTY CYCLE 802.11ax HE40 SU

DUTY CYCLE 802.11ax HE80 996T MODE

DUTY CYCLE 802.11ax HE80 SU MODE

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9.2. 26 dB BANDWIDTH

LIMITS

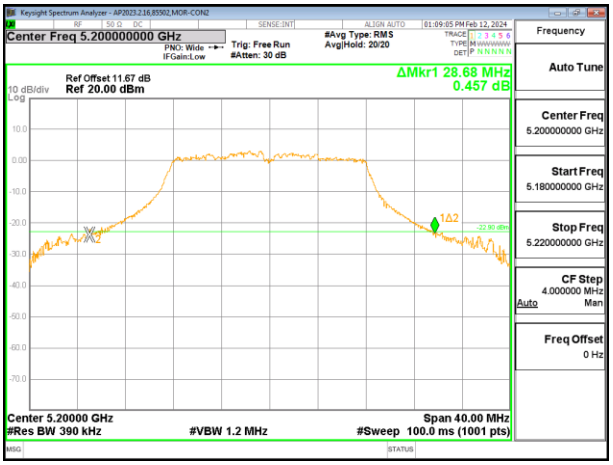
None; for reporting purposes only.

RESULTS

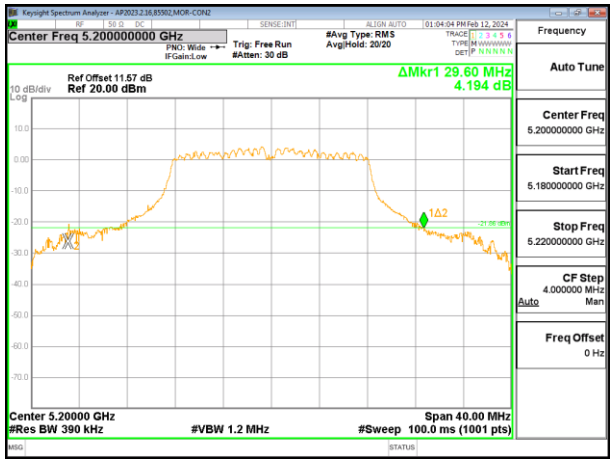
9.2.31. 802.11a MODE IN THE 5.2 GHz BAND

2TX CHAIN 0 + CHAIN 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5180	28.24	25.36
Mid	5200	28.68	29.60
High	5240	27.72	25.60



MID CHANNEL CHAIN 0

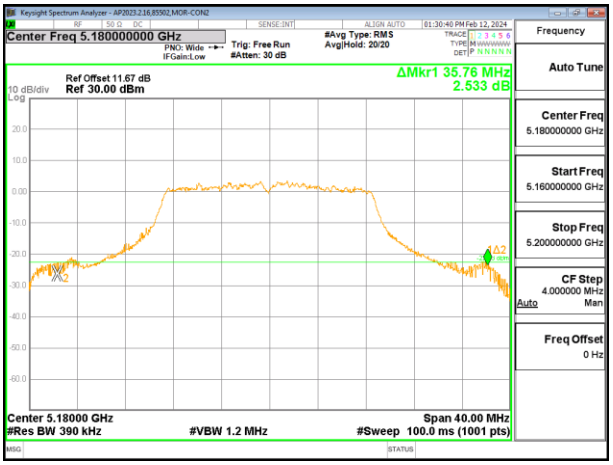


MID CHANNEL CHAIN 1

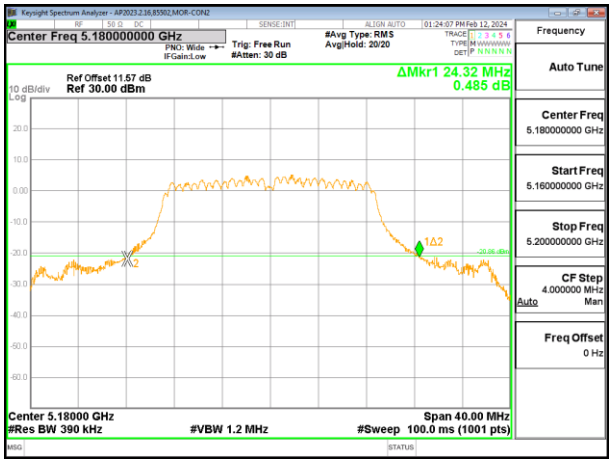
9.2.32. 802.11n HT20 MODE IN THE 5.2 GHz BAND

2TX CHAIN 0 + CHAIN 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5180	35.76	24.32
Mid	5200	38.16	24.42
High	5240	29.92	24.20



LOW CHANNEL CHAIN 0

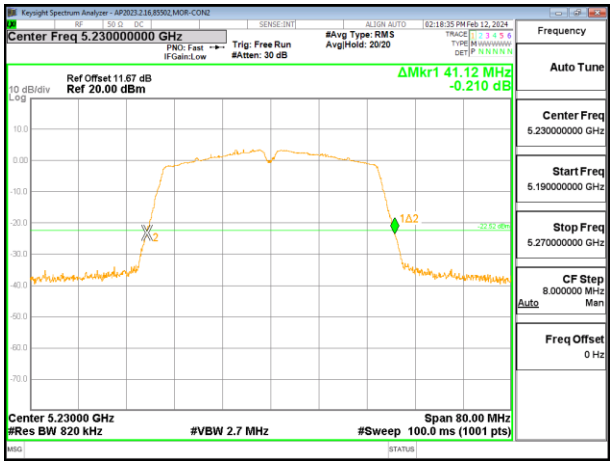


LOW CHANNEL CHAIN 1

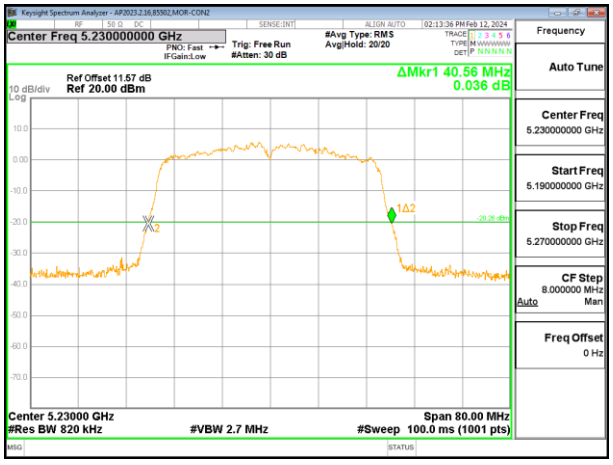
9.2.33. 802.11n HT40 MODE IN THE 5.2 GHz BAND

2TX CHAIN 0 + CHAIN 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5190	41.12	40.48
High	5230	41.12	40.56



HIGH CHANNEL CHAIN 0

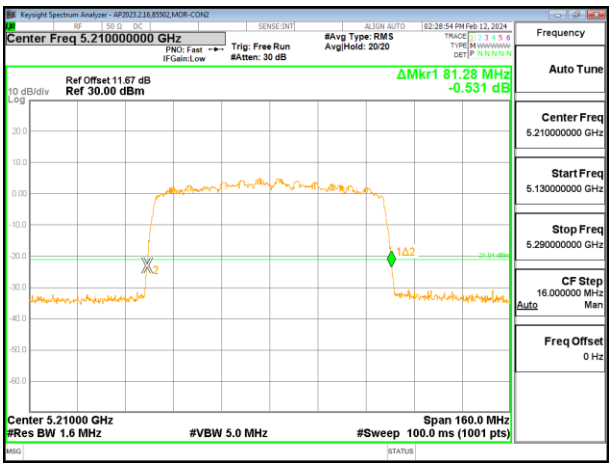


HIGH CHANNEL CHAIN 1

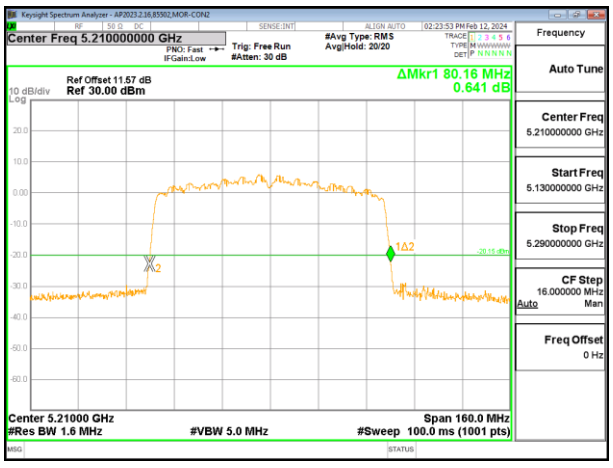
9.2.34. 802.11ac VHT80 MODE IN THE 5.2 GHz BAND

2TX CHAIN 0 + CHAIN 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Mid	5210	81.28	80.16



MID CHANNEL CHAIN 0

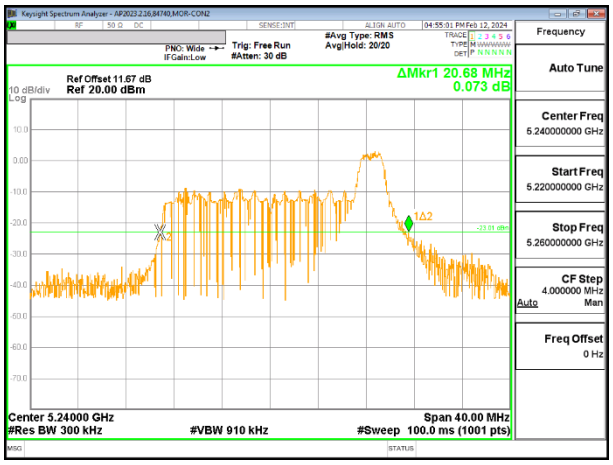


MID CHANNEL CHAIN 1

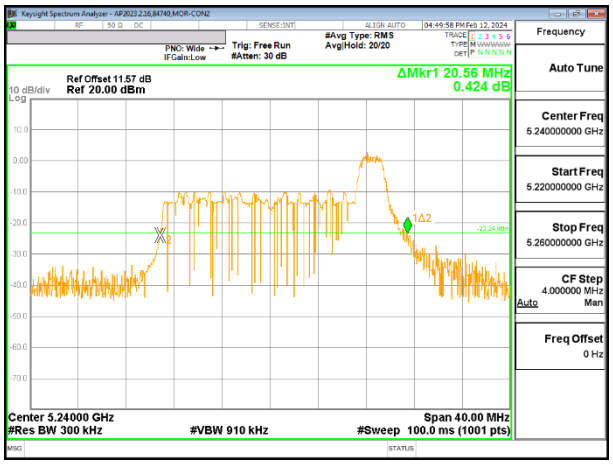
9.2.35. 802.11ax HE20 MODE IN THE 5.2 GHz BAND

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

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5180	20.56	20.36
Mid	5200	18.28	18.12
High	5240	20.68	20.56



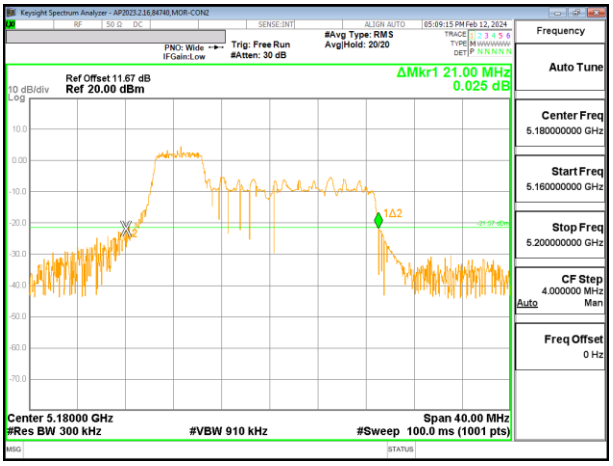
HIGH CHANNEL CHAIN 0



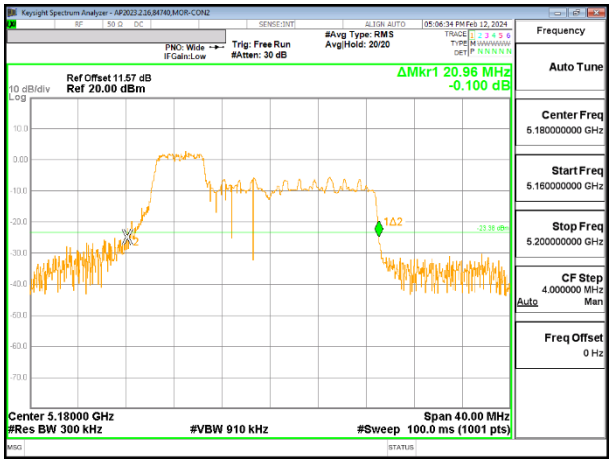
HIGH CHANNEL CHAIN 1

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

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5180	21.00	20.96
Mid	5200	18.88	18.40
High	5240	20.68	20.52



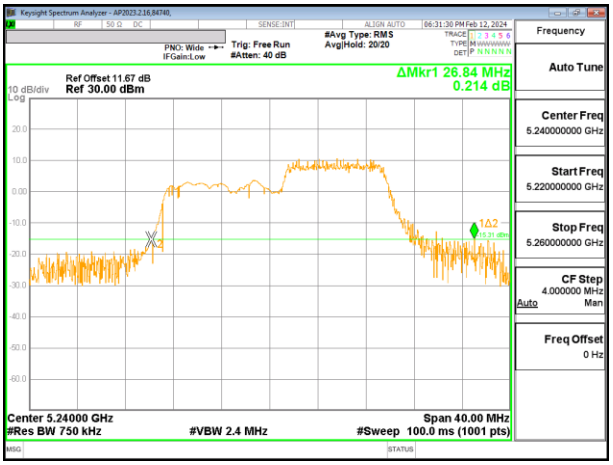
LOW CHANNEL CHAIN 0



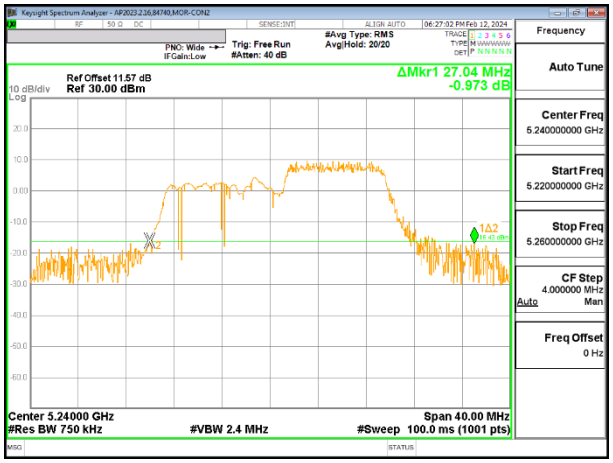
LOW CHANNEL CHAIN 1

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

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5180	24.40	23.88
Mid	5200	25.92	26.28
High	5240	26.84	27.04



HIGH CHANNEL CHAIN 0

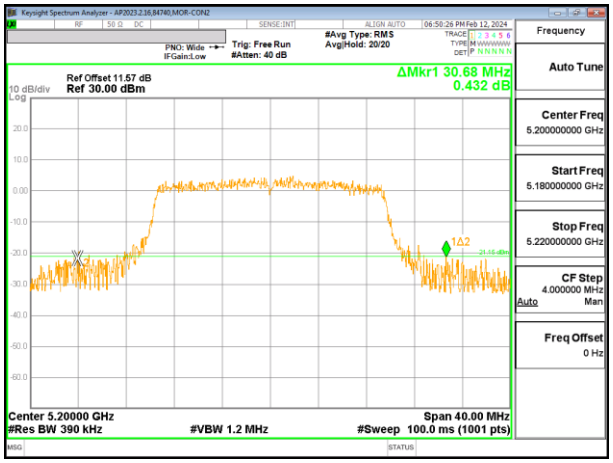


HIGH CHANNEL CHAIN 1

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

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5180	31.72	27.04
Mid	5200	35.52	30.68
High	5240	33.68	29.56

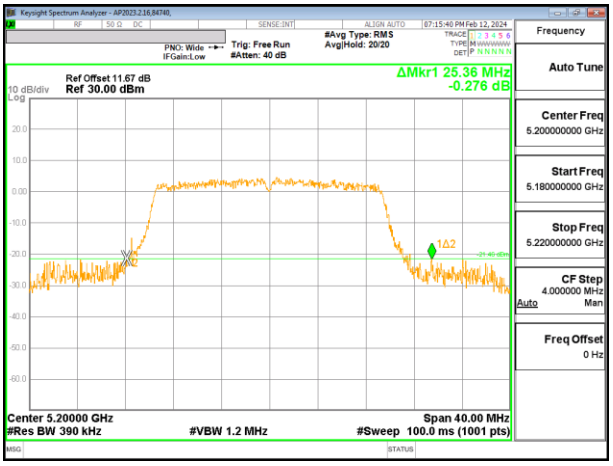
MID CHANNEL CHAIN 0



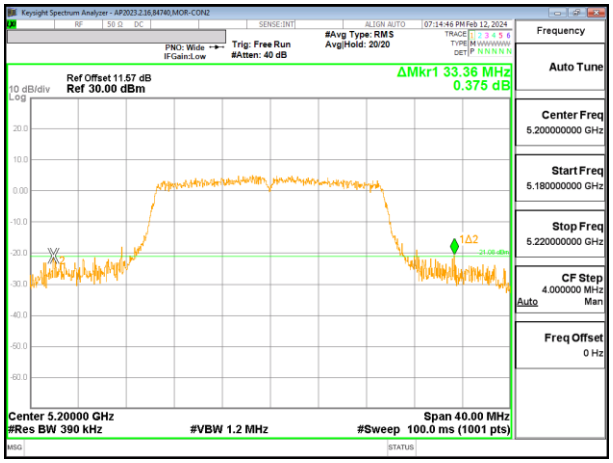
MID CHANNEL CHAIN 1

2TX CHAIN 0 + CHAIN 1 CDD MODE: SU

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5180	30.04	24.64
Mid	5200	25.36	33.36
High	5240	26.88	25.24



MID CHANNEL CHAIN 0

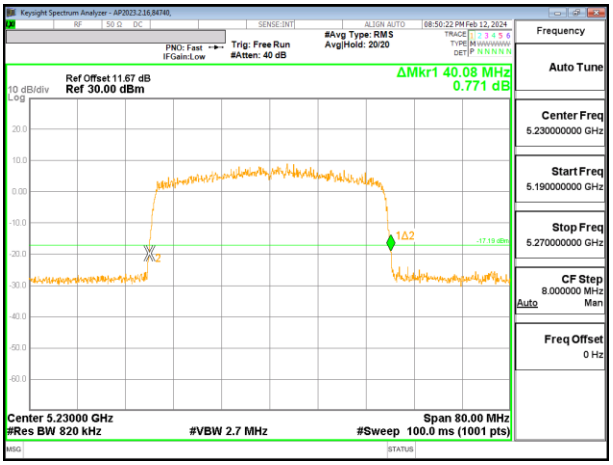


MID CHANNEL CHAIN 1

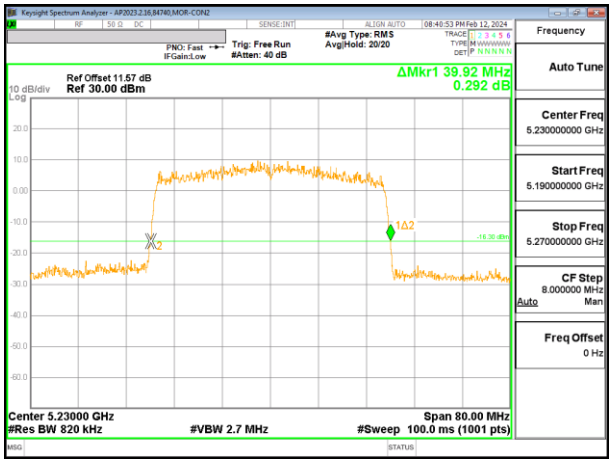
9.2.6. 802.11ax HE40 MODE IN THE 5.2 GHz BAND

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

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5190	39.92	40.00
High	5230	40.08	39.92



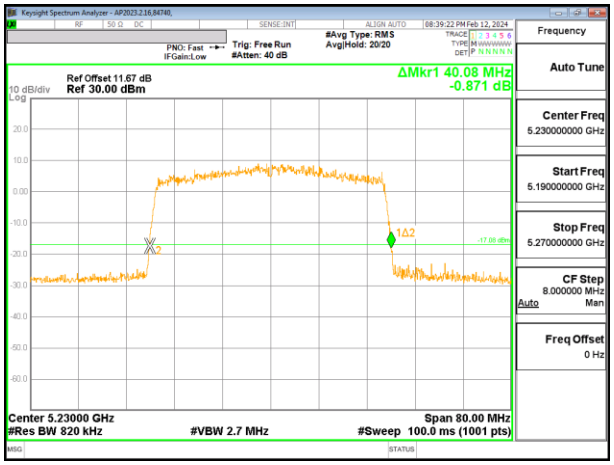
HIGH CHANNEL CHAIN 0



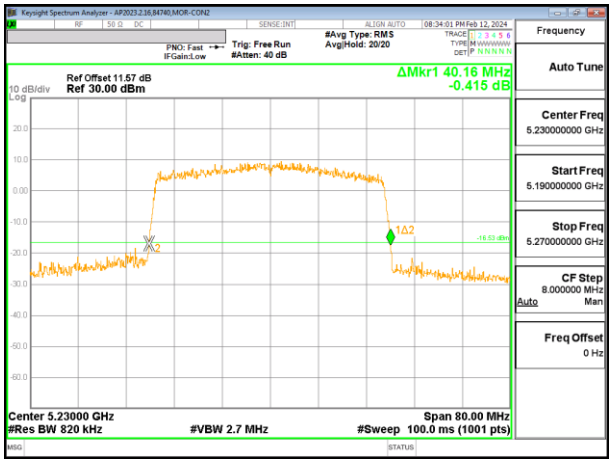
HIGH CHANNEL CHAIN 1

2TX CHAIN 0 + CHAIN 1 CDD MODE: SU

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5190	40.16	40.08
High	5230	40.08	40.16



HIGH CHANNEL CHAIN 0

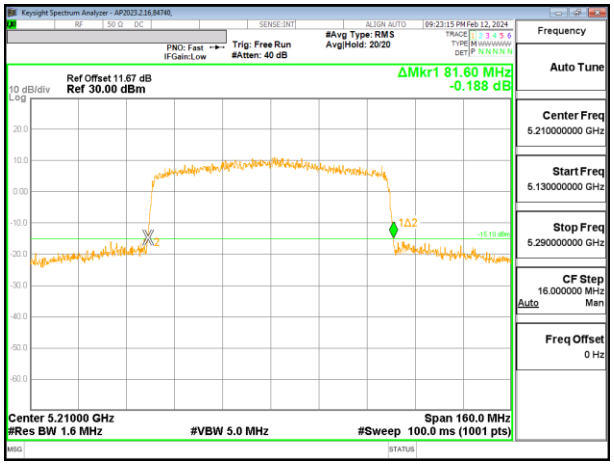


HIGH CHANNEL CHAIN 1

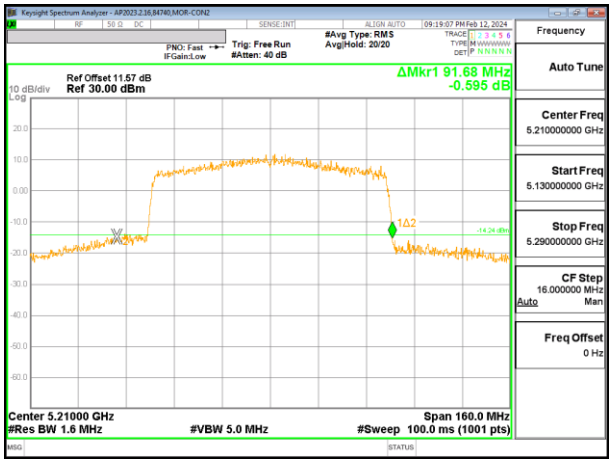
9.2.7. 802.11ax HE80 MODE IN THE 5.2 GHz BAND

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

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Mid	5210	81.60	91.68



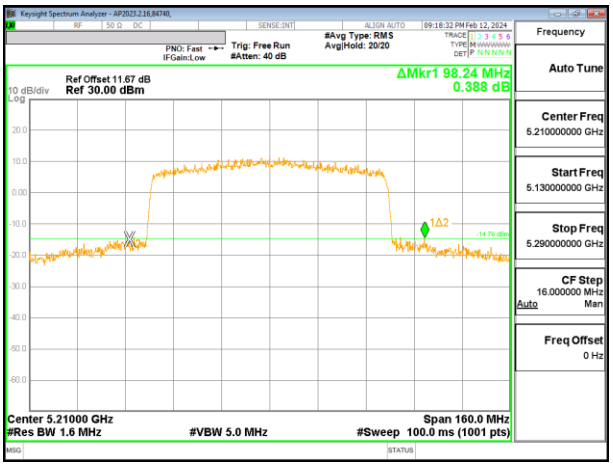
MID CHANNEL CHAIN 0



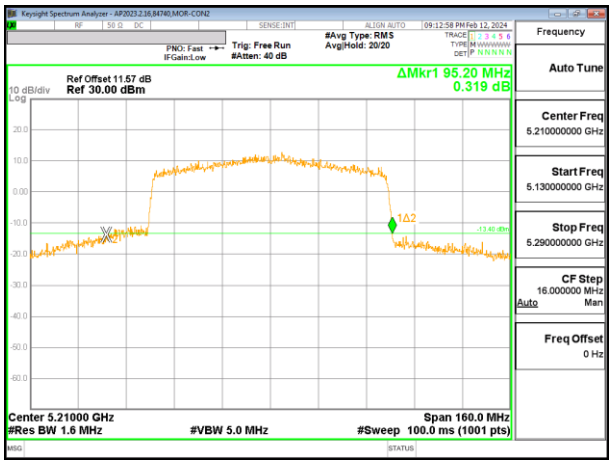
MID CHANNEL CHAIN 1

2TX CHAIN 0 + CHAIN 1 CDD MODE: SU

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Mid	5210	98.24	95.20



MID CHANNEL CHAIN 0

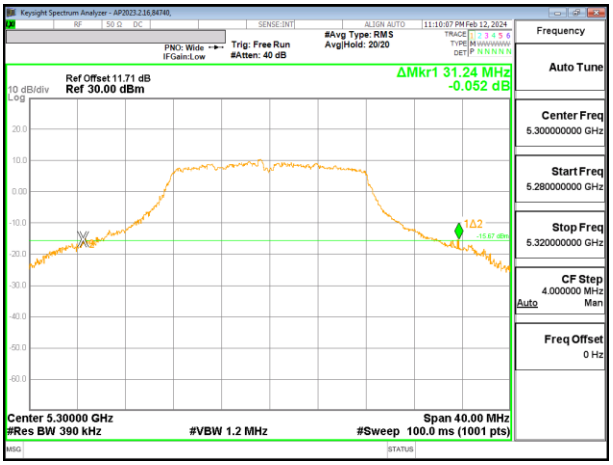


MID CHANNEL CHAIN 1

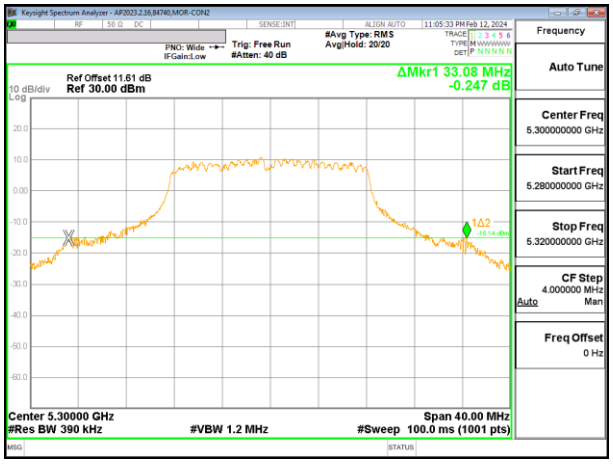
9.2.8. 802.11a MODE IN THE 5.3 GHz BAND

2TX CHAIN 0 + CHAIN 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth CHAIN 0 (MHz)	26 dB Bandwidth CHAIN 1 (MHz)
Low	5260	29.84	29.88
Mid	5300	31.24	33.08
High	5320	30.76	30.64



MID CHANNEL CHAIN 0

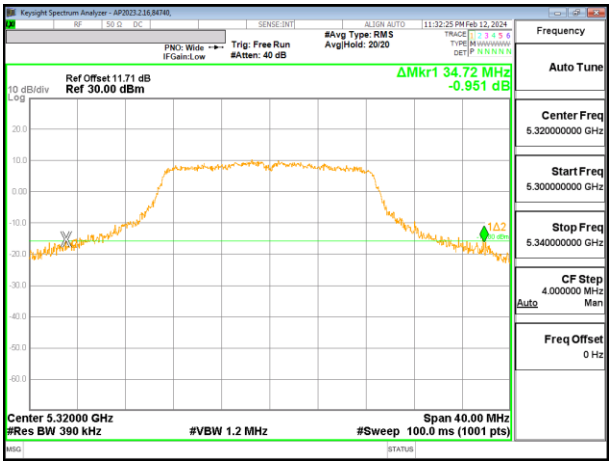


MID CHANNEL CHAIN 1

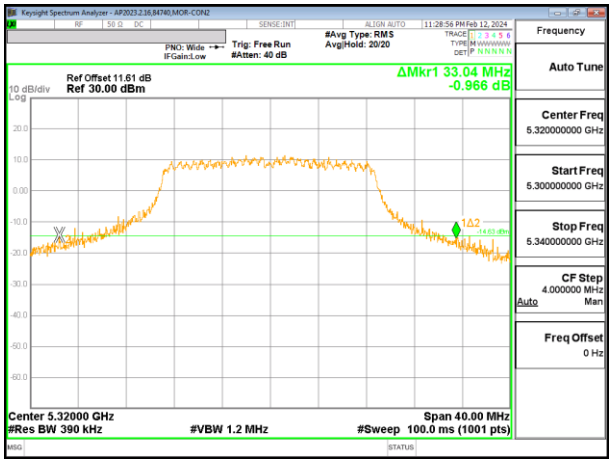
9.2.9. 802.11n HT20 MODE IN THE 5.3 GHz BAND

2TX CHAIN 0 + CHAIN 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth CHAIN 0 (MHz)	26 dB Bandwidth CHAIN 1 (MHz)
Low	5260	32.88	30.40
Mid	5300	32.76	31.72
High	5320	34.72	33.04



HIGH CHANNEL CHAIN 0

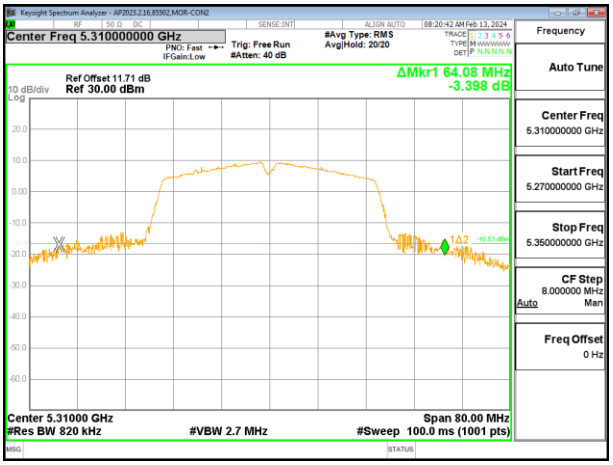


HIGH CHANNEL CHAIN 1

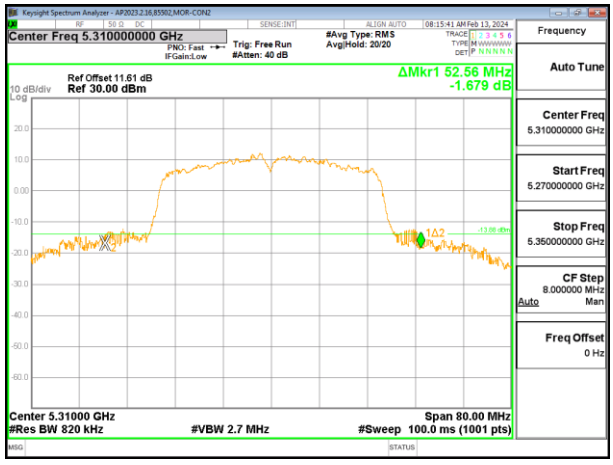
9.2.10. 802.11n HT40 MODE IN THE 5.3 GHz BAND

2TX CHAIN 0 + CHAIN 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth CHAIN 0 (MHz)	26 dB Bandwidth CHAIN 1 (MHz)
Low	5270	53.84	46.16
High	5310	64.08	52.56



HIGH CHANNEL CHAIN 0

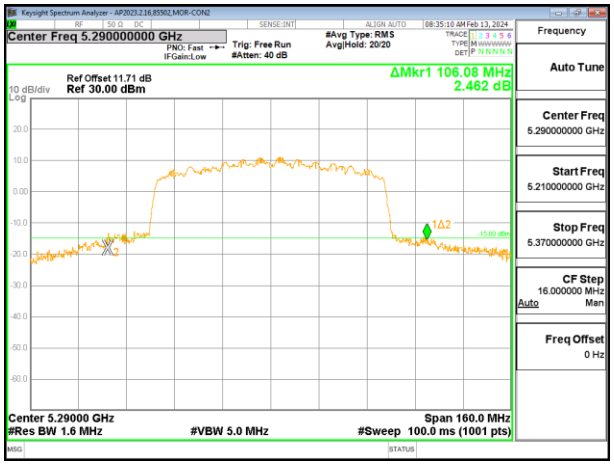


HIGH CHANNEL CHAIN 1

9.2.11. 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	106.08	117.44



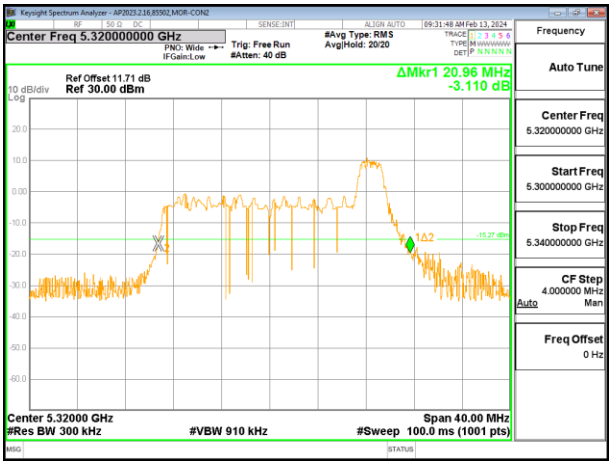
MID CHANNEL CHAIN 0

MID CHANNEL CHAIN 1

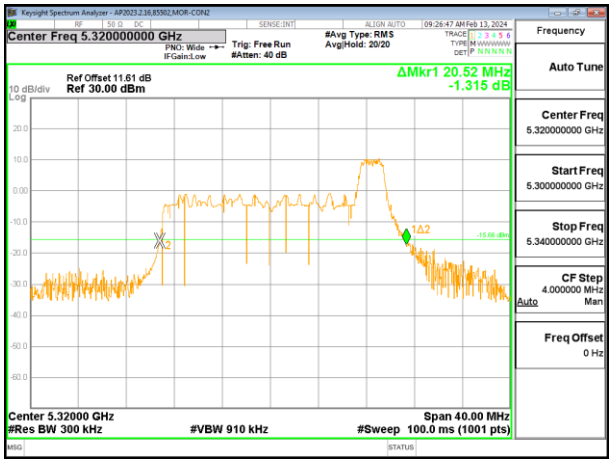
9.2.12. 802.11ax HE20 MODE 2TX IN THE 5.3GHz BAND

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	20.92	20.48
Mid	5300	18.24	18.12
High	5320	20.96	20.52



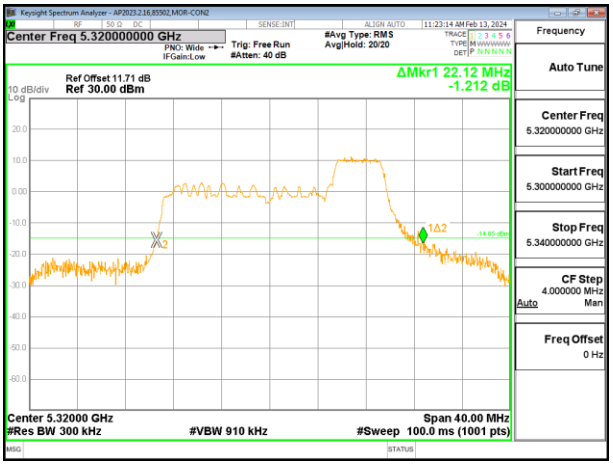
HIGH CHANNEL CHAIN 0



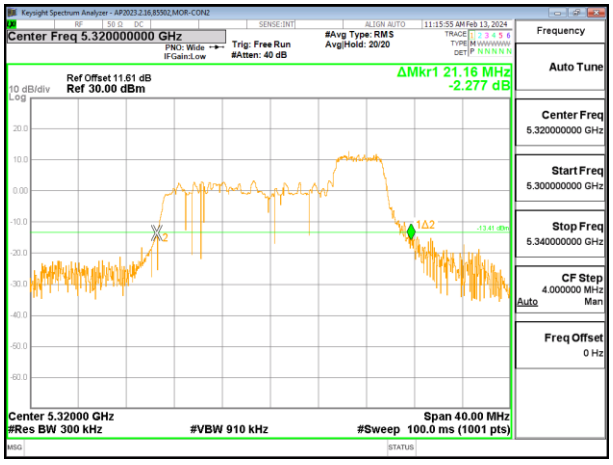
HIGH CHANNEL CHAIN 1

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	20.88	20.88
Mid	5300	18.76	18.48
High	5320	22.12	21.16



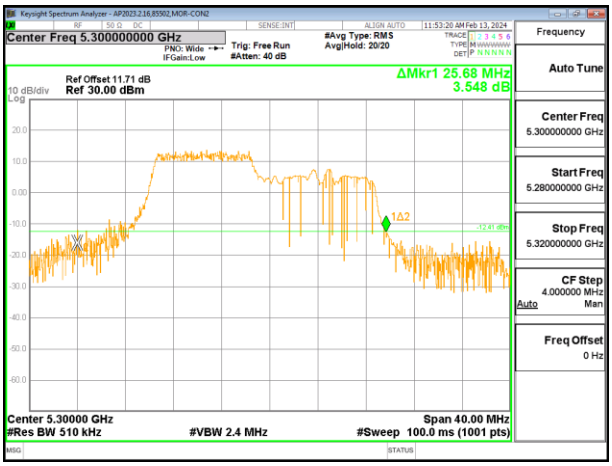
HIGH CHANNEL CHAIN 0



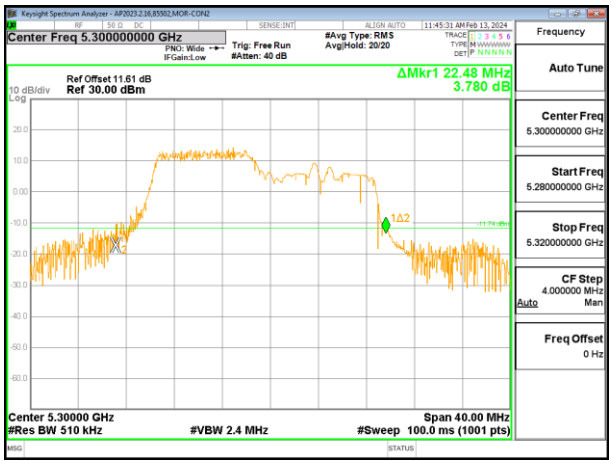
HIGH CHANNEL CHAIN 1

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	23.84	23.88
Mid	5300	25.68	22.48
High	5320	22.32	22.16



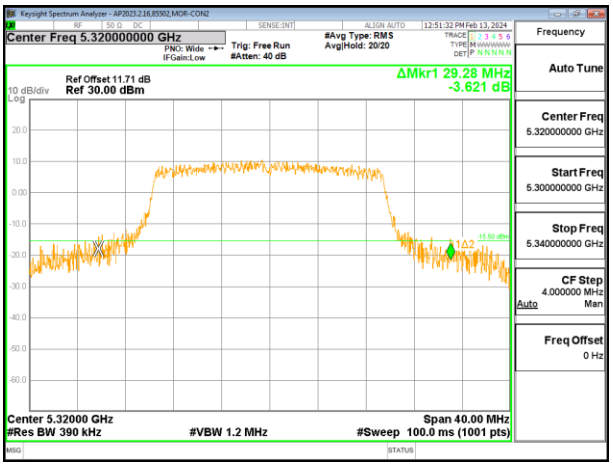
MID CHANNEL CHAIN 0



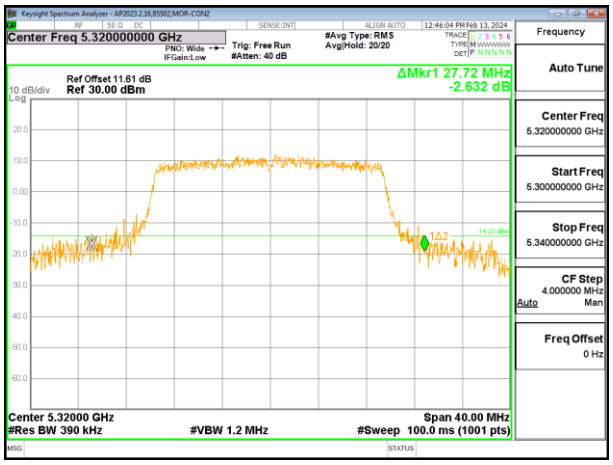
MID CHANNEL CHAIN 1

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	25.60	26.20
Mid	5300	29.28	27.20
High	5320	29.28	27.72



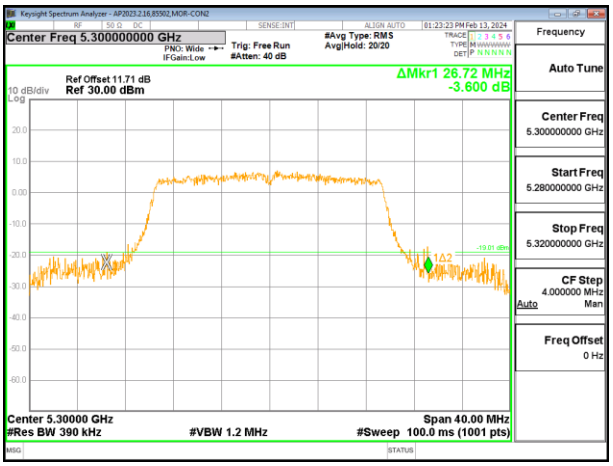
HIGH CHANNEL CHAIN 0



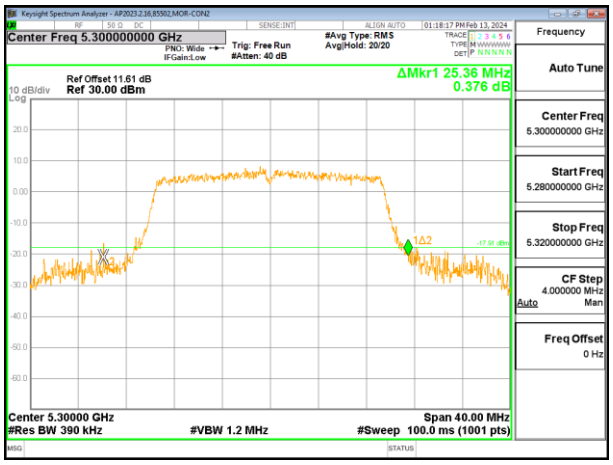
HIGH CHANNEL CHAIN 1

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

Channel	Frequency (MHz)	26 dB Bandwidth CHAIN 0 (MHz)	26 dB Bandwidth CHAIN 1 (MHz)
Low	5260	24.80	23.48
Mid	5300	26.72	25.36
High	5320	25.56	25.48



MID CHANNEL CHAIN 0

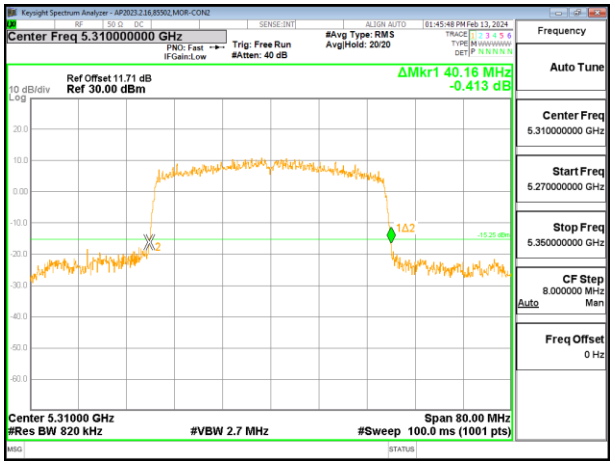


MID CHANNEL CHAIN 1

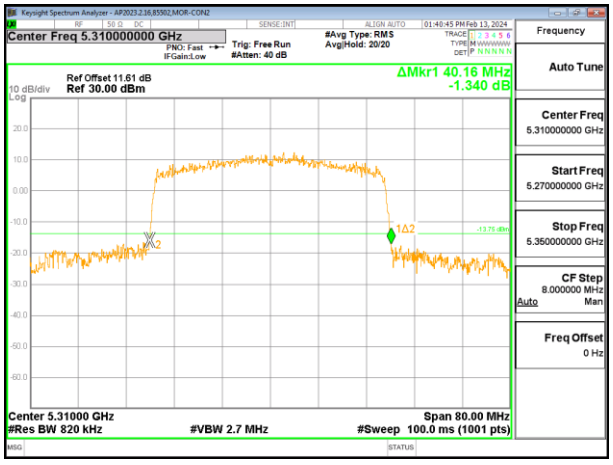
9.2.13. 802.11ax HE40 MODE 2TX IN THE 5.3GHz BAND

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	40.08	40.08
High	5310	40.16	40.16



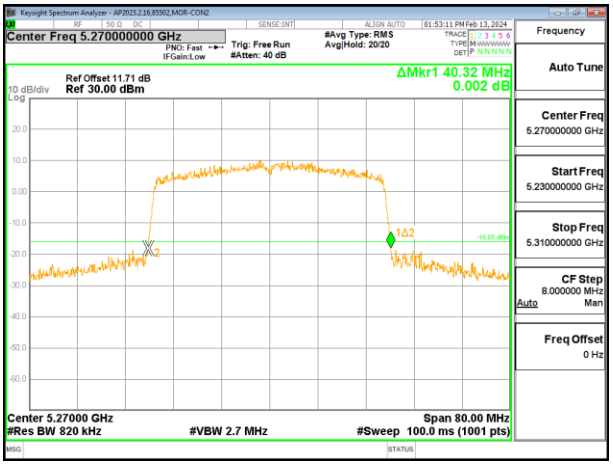
HIGH CHANNEL CHAIN 0



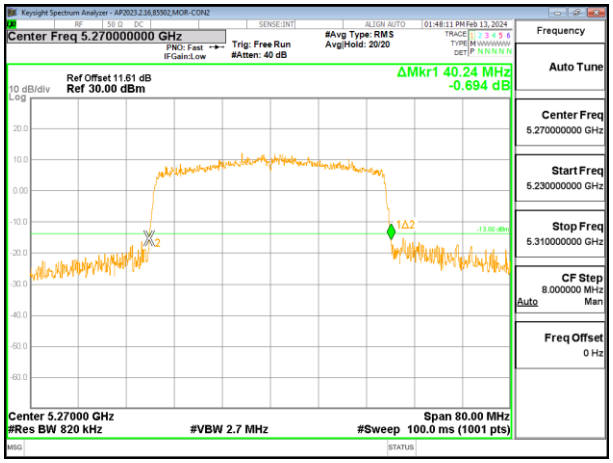
HIGH CHANNEL CHAIN 1

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

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5270	40.32	40.24
High	5310	40.24	40.08



LOW CHANNEL CHAIN 0

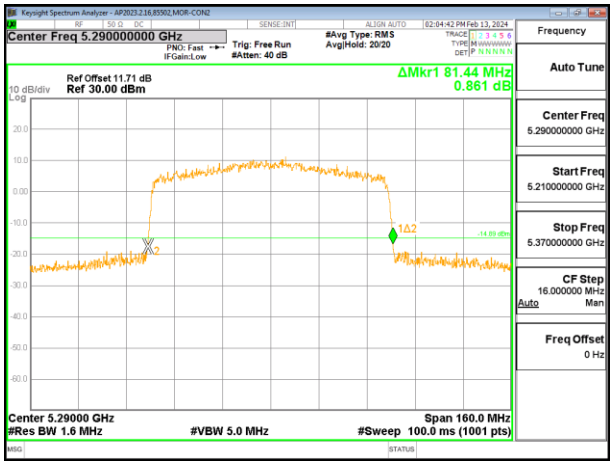


LOW CHANNEL CHAIN 1

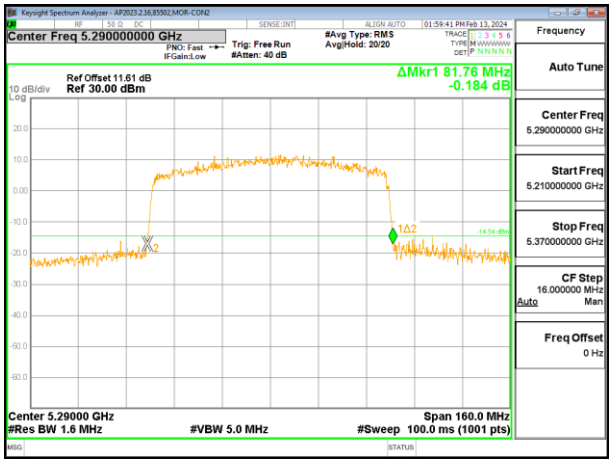
9.2.14. 802.11ax HE80 MODE 2TX IN THE 5.3GHz BAND

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	81.44	81.76



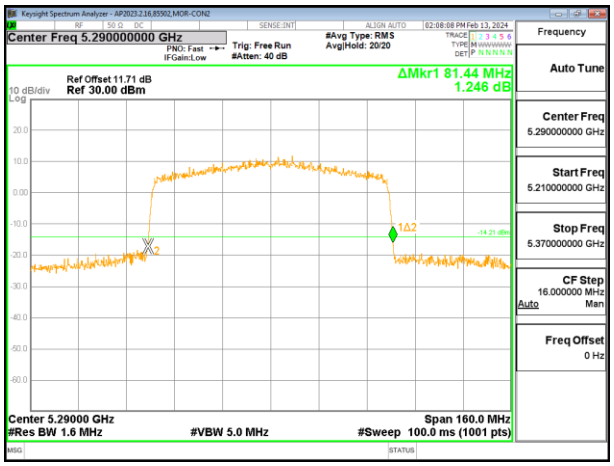
MID CHANNEL CHAIN 0



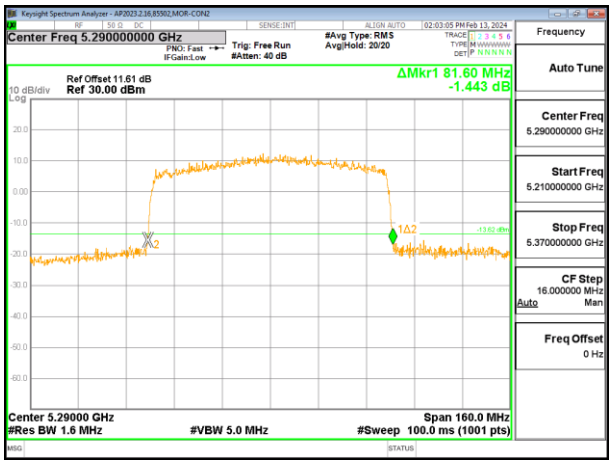
MID CHANNEL CHAIN 1

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

Channel	Frequency (MHz)	26 dB Bandwidth CHAIN 0 (MHz)	26 dB Bandwidth CHAIN 1 (MHz)
Mid	5290	81.44	81.60



MID CHANNEL CHAIN 0

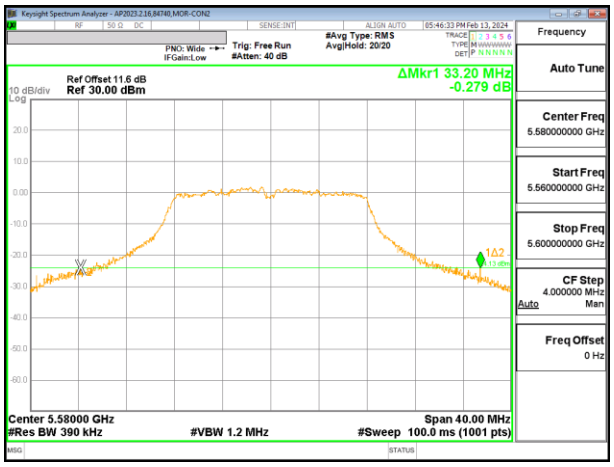


MID CHANNEL CHAIN 1

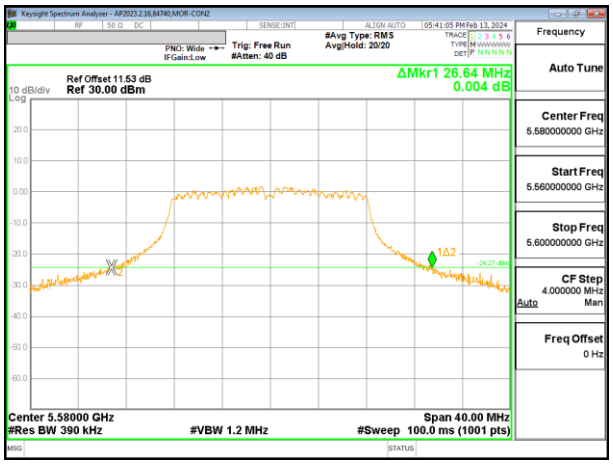
9.2.15. 802.11a MODE IN THE 5.6 GHz BAND

2TX CHAIN 0 + CHAIN 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth CHAIN 0 (MHz)	26 dB Bandwidth CHAIN 1 (MHz)
Low	5500	32.24	31.00
Mid	5580	33.20	26.64
High	5700	31.64	33.40



MID CHANNEL CHAIN 0

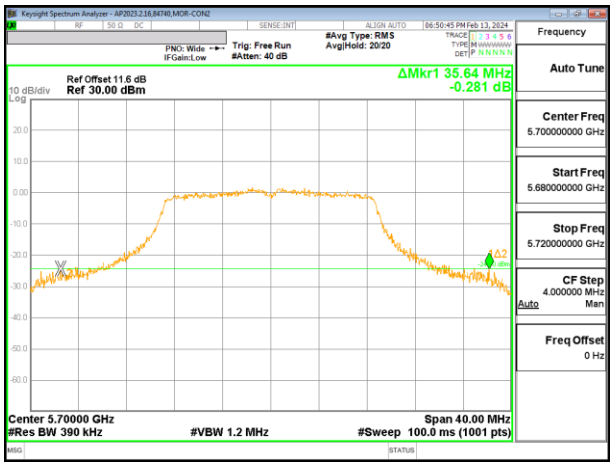


MID CHANNEL CHAIN 1

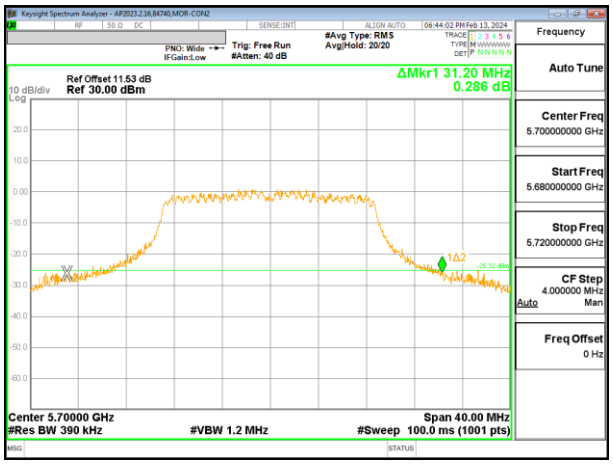
9.2.16. 802.11n HT20 MODE IN THE 5.6 GHz BAND

2TX CHAIN 0 + CHAIN 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth CHAIN 0 (MHz)	26 dB Bandwidth CHAIN 1 (MHz)
Low	5500	33.04	27.60
Mid	5580	29.48	26.84
High	5700	35.64	31.20



HIGH CHANNEL CHAIN 0

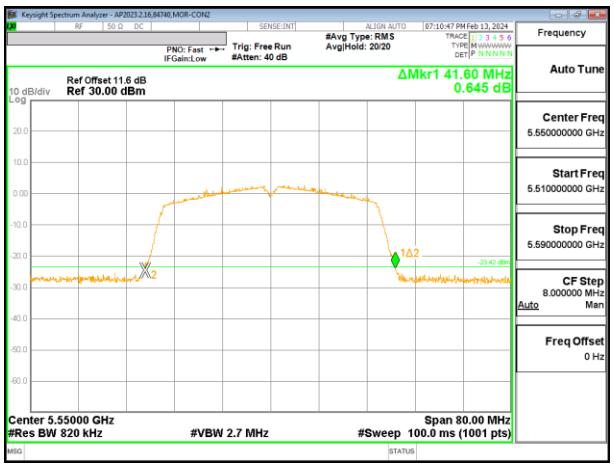


HIGH CHANNEL CHAIN 1

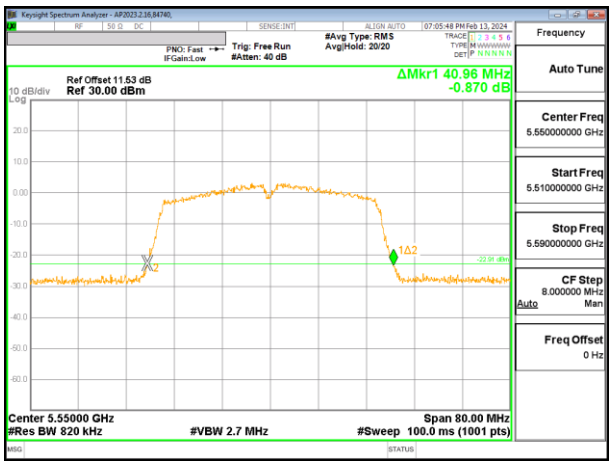
9.2.17. 802.11n HT40 MODE IN THE 5.6 GHz BAND

2TX CHAIN 0 + CHAIN 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth CHAIN 0 (MHz)	26 dB Bandwidth CHAIN 1 (MHz)
Low	5510	41.52	41.04
Mid	5550	41.60	40.96
High	5670	41.44	41.52



MID CHANNEL CHAIN 0

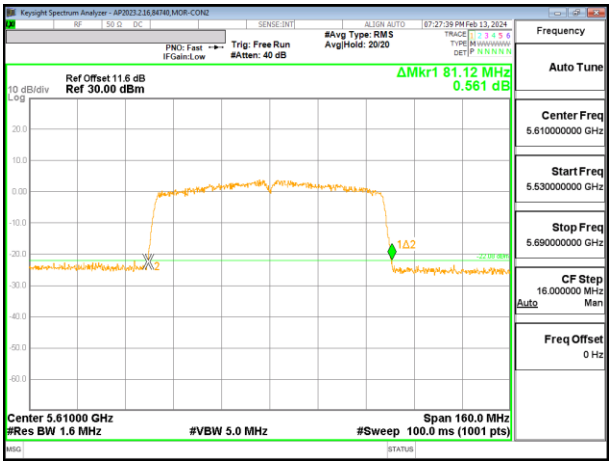


MID CHANNEL CHAIN 1

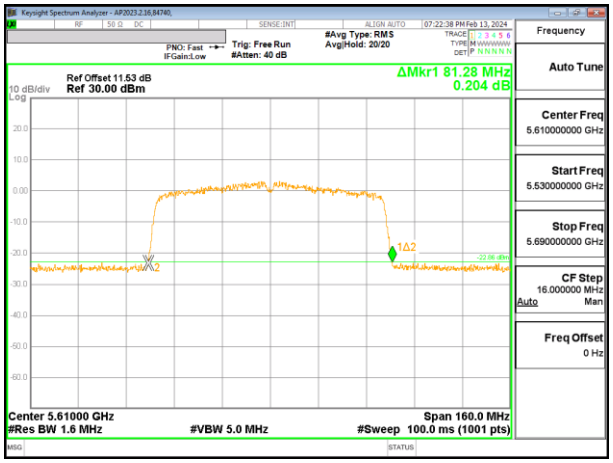
9.2.18. 802.11ac VHT80 MODE IN THE 5.6 GHz BAND

2TX CHAIN 0 + CHAIN 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth CHAIN 0 (MHz)	26 dB Bandwidth CHAIN 1 (MHz)
Low	5530	80.80	80.96
High	5610	81.12	81.28



HIGH CHANNEL CHAIN 0



HIGH CHANNEL CHAIN 1