TEST REPORT

Report Number: R14634918-E5b

Applicant	:	Sony Corporation 1-7-1 Konan Minato-ku Tokyo, 108-0075, Japan
FCC ID	:	PY7-12907W
EUT Description	:	GSM/WCDMA/LTE/5G Phone with BT, DTS/UNII a/b/g/n/ac/ax, GPS, WPT & NFC
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART E

Date Of Issue:
2023-03-16

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

ACCREDITED
CERT #0751.06

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	2023-02-24	Initial Issue	Brian Kiewra
V2	2023-03-09	Corrected typos corrected throughout report. Added Sim Tx data to section 10.3.2	Brian Kiewra
V3	2023-03-16	Added clarification to the 2Tx covering 1Tx note in section 6.5	Brian Kiewra

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1. ATTESTATION OF TEST RESULTS

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

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

SERIAL NUMBERS: QV7700E1FN, QV7700FRFN, QV70015FA

SAMPLE RECEIPT DATE: 2022-12-12

DATE TESTED: 2023-02-02 to 2023-03-09

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart E	Complies

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

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document.

Approved & Released
For UL LLC By:

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

Prepared By:

Brian Kiewra
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 6.5)

Note - This report covers the 802.11ax mode in the 5.2 and 5.3GHz bands testing requirements of the EUT.

FCC Clause	Requirement	Result	Comment
See Comment	Duty Cycle	Reporting purposes only	Per ANSI C63.10, Section 12.2.
See Comment	26dB BW	Reporting purposes only	Per ANSI C63.10 Sections 6.9.2
15.407 (a) (1-2), (h) (1)	Output Power	Compliant	None
15.407 (a) (1-2)	PSD		
15.209, 15.205, 15.407 (b)	Radiated Emissions		
15.207	AC Mains Conducted Emissions		

3. TEST METHODOLOGY

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

- FCC 47 CFR Part 2
- FCC 47 CFR Part 15
- FCC KDB 662911 D01 v02r01
- FCC KDB 905462 D06 v02
- FCC KDB 789033 D02 v02r01
- KDB 414788 D01 Radiated Test Site v01r01
- 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	

5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

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

5.2. DECISION RULES

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

5.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	U_{Lab}
Radio Frequency (Spectrum Analyzer)	141.2 Hz
Occupied Channel Bandwidth	1.22%
RF output power, conducted	1.3 dB (PK) 0.45 dB (AV)
Power Spectral Density, conducted	2.47 dB
Unwanted Emissions, conducted	1.94 dB
All emissions, radiated	6.01 dB
Conducted Emissions (0.150-30MHz) - LISN	3.40 dB

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

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 GSM/WCDMA/LTE/5G Phone with BT, DTS/UNII a/b/g/n/ac/ax, GPS, WPT & NFC. This report covers the 802.11ax mode in the 5.2 and 5.3GHz bands testing requirements of the EUT.

6.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

5.2GHz BAND 802.11 ax MODE 2TX

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.2 GHz band, 2TX			
5180-5240	802.11ax HE20 242T	14.27	26.73
	802.11ax HE20 106T	14.34	27.16
	802.11ax HE20 52T	14.38	27.42
	802.11ax HE20 26T	11.81	15.17
5190-5230	802.11ax HE40 484T	14.14	25.94
5210	802.11ax HE80 996T	14.06	25.47

5.3GHz BAND 802.11 ax MODE 2TX

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.3 GHz band, 2TX			
5260-5320	802.11ax HE20 242T	13.76	23.77
	802.11ax HE20 106T	13.91	24.60
	802.11ax HE20 52T	14.06	25.47
	802.11ax HE20 26T	11.59	14.42
5270-5310	802.11ax HE40 484T	13.65	23.17
5290	802.11ax HE80 996T	13.33	21.53
5250	802.11ax HE160 2x996T	11.55	14.29

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

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

Chain	Designation in Documentatoin	Type	Frequency Range (MHz)	Maximum Gain (dBi)
0	WiFi Main	Loop	5180-5320	-0.29
1	WiFi Sub	Monopole	5180-5320	0.61

6.4. SOFTWARE AND FIRMWARE

The firmware version used during testing was 0.81.

6.5. WORST-CASE CONFIGURATION AND MODE

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

Band edge was performed with the EUT set to transmit on low and high channels. Radiated spurious and harmonic emissions between 1GHz and 18GHz were performed with the EUT set to transmit at the worst-case mode based on power and PSD.

For this report, the worst-case Radiated Emissions from 1-18 GHz was found to be HE20 26T and 52T in the 5.2 band and 52T in the 5.3 band.

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

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

- 802.11ax HE20mode: MCS0 (Nss = 1)
- 802.11ax HE40mode: MCS0 (Nss = 1)
- 802.11ax HE80mode: MCS0 (Nss = 1)
- 802.11ax HE160mode: MCS0 (Nss = 1)

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.

802.11ax modes were determined by the following:

- 802.11ax HE20 26T, 52T, 106T, and 242T modes tested.
- 802.11ax HE40 484T mode tested. 26T, 52T, 106T, and 242T modes are covered by the HE 20MHz modes.
- 802.11ax HE80 996T mode tested. 26T, 52T, 106T, 242T, and 484T modes are covered by the HE20 HE40 modes.
- 802.11ax HE160 2x996T mode tested. 26T, 52T, 106T, 242T, 484T, and 996T modes are covered by the HE 20MHz, 40MHz, and 80MHz modes.

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

Wort case modes for simultaneous transmission for unlicensed radios:

802.11ax HE20 5240MHz 52T/RU40 2Tx and BT GFSK 1Tx C0
802.11ax HE20 5240MHz 52T/RU40 2Tx and BT GFSK 1Tx C1
802.11n HT20 5240MHz and 802.11n HT20 2437MHz

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6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

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

I/O CABLES

I/O Cable List						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	USB-C	1	USB-C	Shielded	<3m	XQZ-UB1
2	Aux	1	AUX	Shielded	<3m	Headphones

TEST SETUP

The EUT is connected to a host laptop computer and configured via test software before the tests. Test software exercised the radio card.

SETUP DIAGRAMS

Please refer to R14634918-EP5 for setup diagrams

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7. MEASUREMENT METHOD

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

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.5, and G.6.

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

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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.
SA0025	Spectrum Analyzer	Keysight Technologies	N9030A	2022-05-02	2023-05-02
PWM005	RF Power Meter	Keysight Technologies	N1912A	2022-09-02	2024-09-02
PWM001 (PRE0136343)	RF Power Meter	Keysight Technologies	N1912A	2022-08-30	2023-08-30
PWS001 (PRE0137347)	Peak and Avg Power Sensor, 50MHz to 18GHz	Keysight Technologies	N1921A	2022-07-07	2023-07-07
PWS002	Peak and Avg Power Sensor, 50MHz to 18GHz	Keysight Technologies	N1921A	2022-09-27	2023-09-27
PWS005	Peak and Avg Power Sensor, 50MHz to 18GHz	Keysight Technologies	N1921A	2022-06-15	2023-06-15
HI0090	Environmental Meter	Fisher Scientific	15-077-963	2022-07-20	2023-07-20
76021	DC Regulated Power Supply	CircuitSpecialists.Com	CSI3005X5	NA	NA
SOFTEMI	Antenna Port Software	UL	Version 2022.8.16	NA	NA
MM0167 (PRE0126458)	True RMS Multimeter	Agilent	U1232A	2021-08-17	2023-08-17
CBL091	Micro-Coax UTiFLEX Cable Assembly, Low Loss,40Ghz	Carlisle Interconnect Technologies	UFA147A-2-0360-200200	2022-02-15	2023-02-15
CBL092	Micro-Coax UTiFLEX Cable Assembly, Low Loss,40Ghz	Carlisle Interconnect Technologies	UFA147A-2-0360-200200	2022-02-15	2023-02-15
226561	SMA Coaxial 10dB Attenuator 25MHz-18GHz	CentricRF	C18S2-10	2022-05-03	2023-05-03
226563	SMA Coaxial 10dB Attenuator 25MHz-18GHz	CentricRF	C18S2-10	2022-05-03	2023-05-03

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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					
AT0072	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2022-05-11	2023-05-11
18-40 GHz					
204704	Horn Antenna, 18-26.5GHz	Com-Power	AH-626	2022-07-11	2023-07-11
204705	Horn Antenna, 26-40GHz	Com-Power	AH-640	2022-07-11	2023-07-11
Gain-Loss Chains					
C1-SAC03	Gain-loss string: 1-18GHz	Various	Various	2022-12-02	2023-12-02
C1-SAC04	Gain-loss string: 18-40GHz	Various	Various	2022-05-05	2023-05-05
Receiver & Software					
206496	Spectrum Analyzer	Rohde & Schwarz	ESW44	2022-02-15	2023-02-15
SA0020	Spectrum Analyzer	Agilent	E4446A	2022-06-08	2023-06-08
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
Additional Equipment used					
200539	Environmental Meter	Fisher Scientific	15-077-963 s/n 181474341	2022-10-05	2023-10-05

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

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					
AT0074	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2022-09-07	2023-09-07
1-18 GHz					
206211	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2022-03-21	2023-03-21
Gain-Loss Chains					
C2-SAC01	Gain-loss string: 0.009-30MHz	Various	Various	2022-05-10	2023-05-10
C2-SAC02	Gain-loss string: 25-1000MHz	Various	Various	2022-05-10	2023-05-10
C2-SAC03	Gain-loss string: 1-18GHz	Various	Various	2022-05-10	2023-05-10
Receiver & Software					
197955	Spectrum Analyzer	Rohde & Schwarz	ESW44	2022-03-08	2023-03-08
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
Additional Equipment used					
200540	Environmental Meter	Fisher Scientific	15-077-963 s/n 181474409	2022-10-05	2023-10-05
210642	Environmental Meter	Fisher Scientific	15-077-963 s/n 210701942	2021-08-16	2023-08-16

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	2022-04-05	2023-04-05
HI0091	Environmental Meter	Fisher Scientific	15-077-963	2022-07-20	2023-07-20
LISN003	LISN, 50-ohm/50-uH, 250uH 2-conductor, 25A	Fischer Custom Com.	FCC-LISN-50/250-25-2-01	2022-08-01	2023-08-01
75141	EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESCI 7	2022-08-03	2023-08-03
ATA222	Transient Limiter, 0.009-100MHz	Electro-Metrics	EM-7600	2022-04-05	2023-04-05
PS214	AC Power Source	Elgar	CW2501M (s/n 1523A02396)	NA	NA
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
CDECABLE001	ANSI C63.4 1m extension cable.	UL	Per Annex B of ANSI C63.4	2022-09-12	2023-09-12

9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

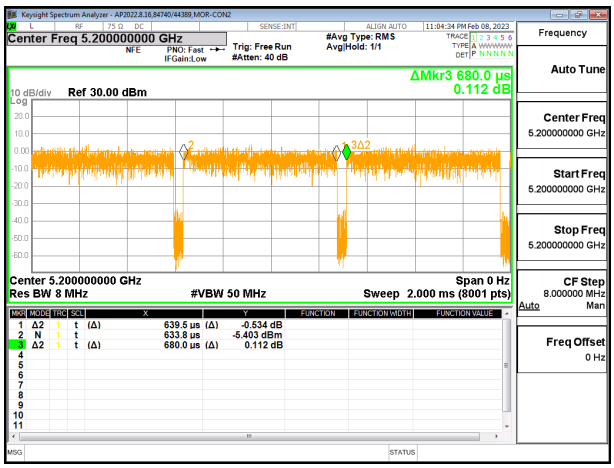
PROCEDURE

KDB 558074 D01 Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
802.11ax HE20 242T	0.924	0.980	0.943	94.29%	0.51	1.083
802.11ax HE20 106T	0.640	0.680	0.940	94.04%	0.53	1.564
802.11ax HE20 52T	1.269	1.343	0.945	94.49%	0.49	0.788
802.11ax HE20 26T	2.328	2.457	0.947	94.75%	0.47	0.430
802.11ax HE40 484T	0.507	0.542	0.935	93.55%	0.58	1.971
802.11ax HE80 996T	0.387	0.424	0.912	91.20%	0.80	2.587
802.11ax HE160 2x996T	0.381	0.420	0.906	90.60%	0.86	2.626

802.11ax HE20 242T



802.11ax HE20 106T

802.11ax HE20 52T

802.11ax HE20 26T

802.11ax HE40 484T

802.11ax HE80 996T

802.11ax HE160 2x996T

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9.2. 26 dB BANDWIDTH

LIMITS

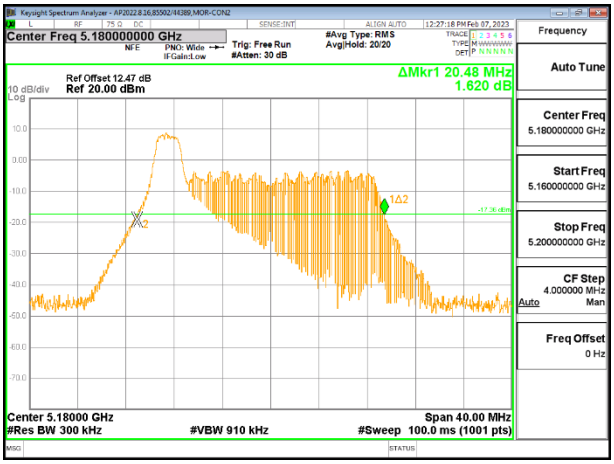
None; for reporting purposes only.

RESULTS

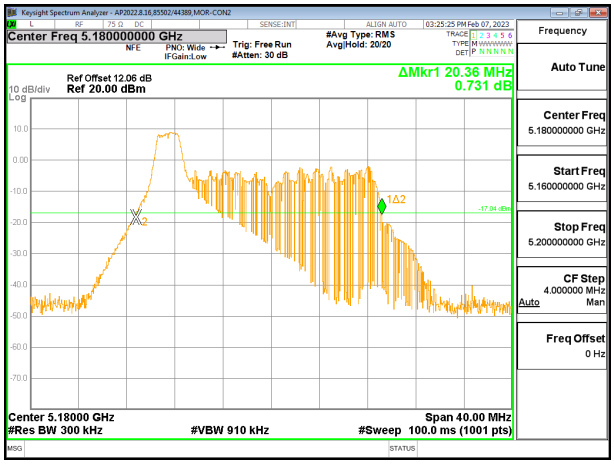
9.2.1. 802.11ax HE20 MODE 2TX IN THE 5.2GHz BAND

2TX 26T MODE

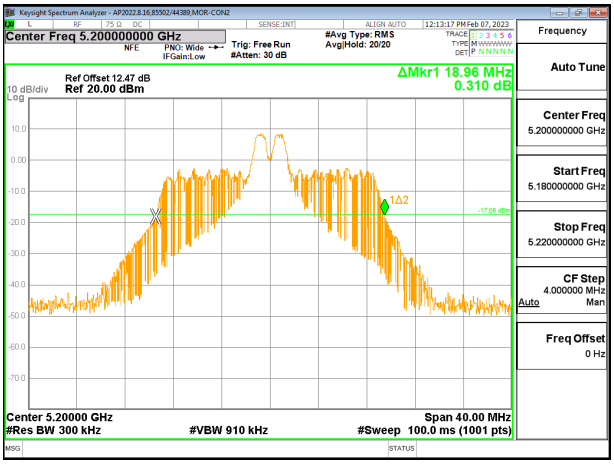
Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5180	20.48	20.36
Mid	5200	18.96	18.32
High	5240	20.32	20.24



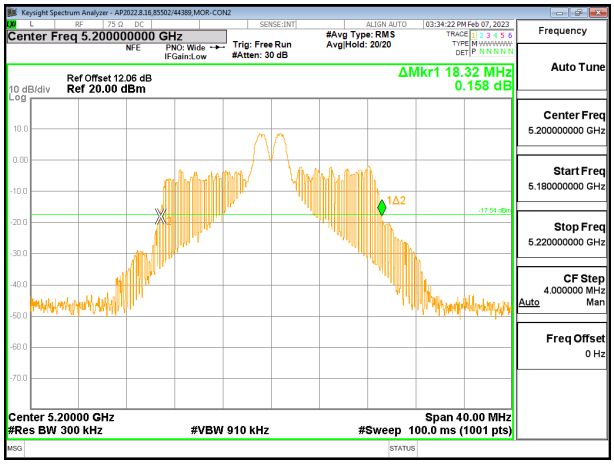
LOW CHANNEL RU 0 Chain 0



LOW CHANNEL RU 0 Chain 1



MID CHANNEL RU 4 Chain 0



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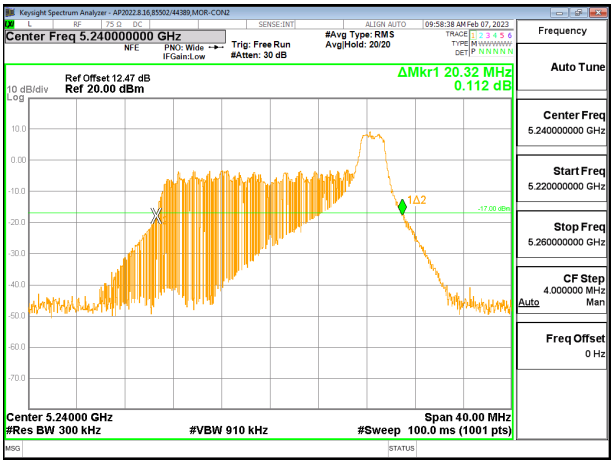
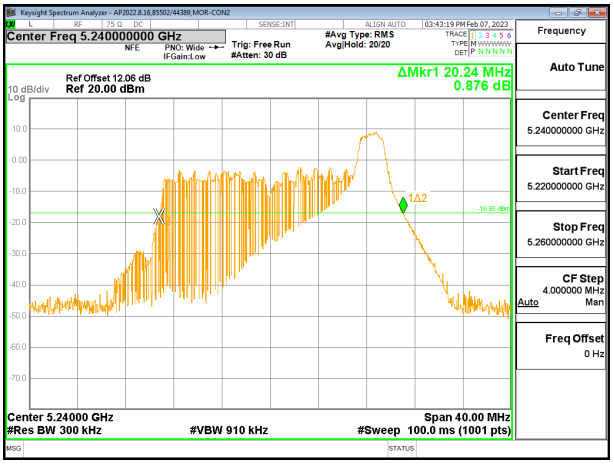


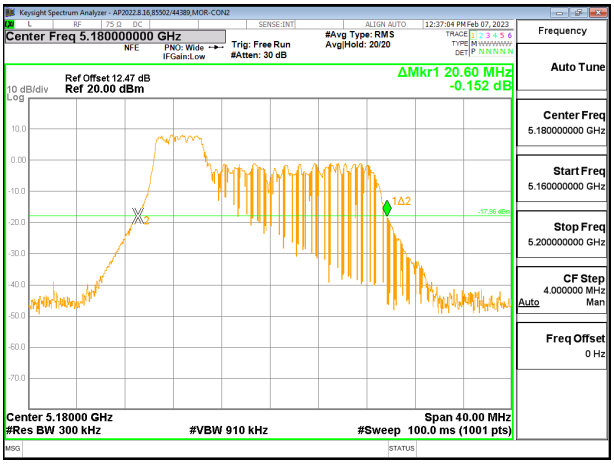
HIGH CHANNEL RU 8 Chain 0



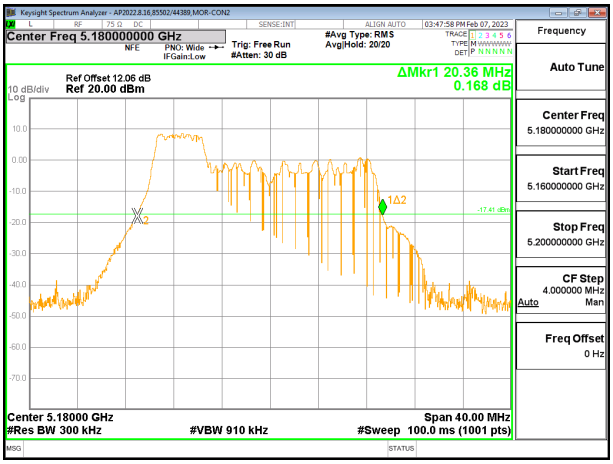
HIGH CHANNEL RU 8 Chain 1

2TX 52T MODE

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5180	20.60	20.36
Mid	5200	19.40	18.80
High	5240	20.68	20.48



LOW CHANNEL RU 37 Chain 0



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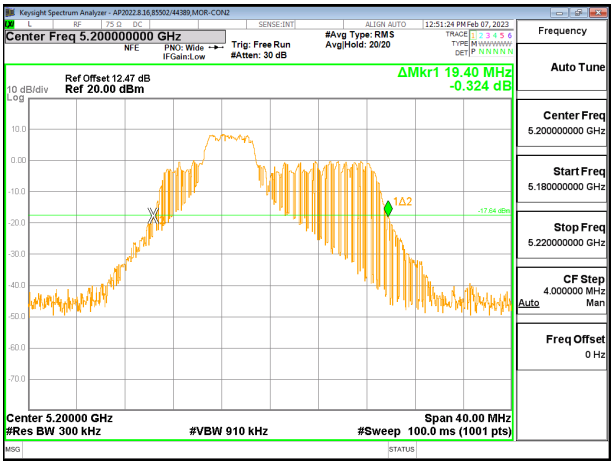

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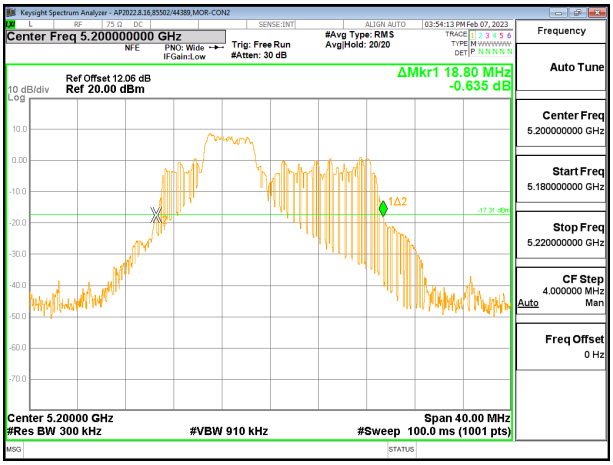

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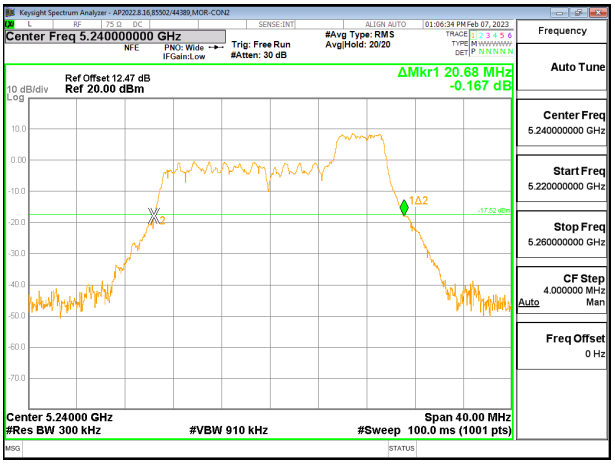
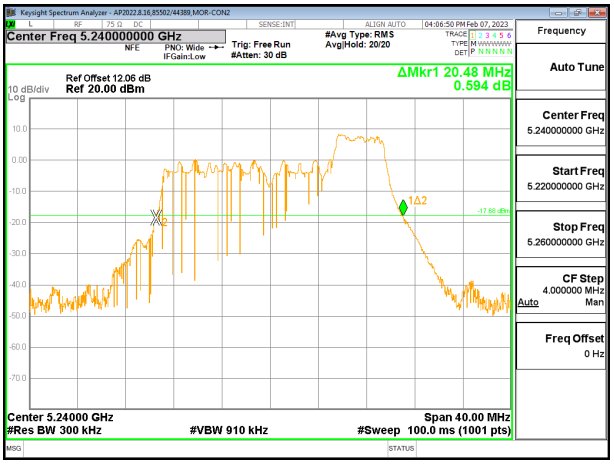


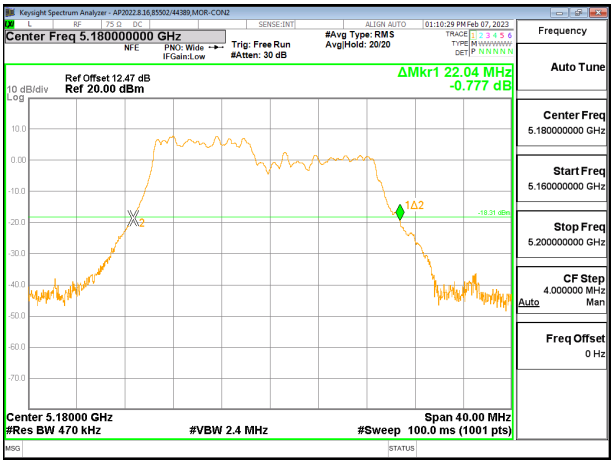
HIGH CHANNEL RU 40 Chain 0



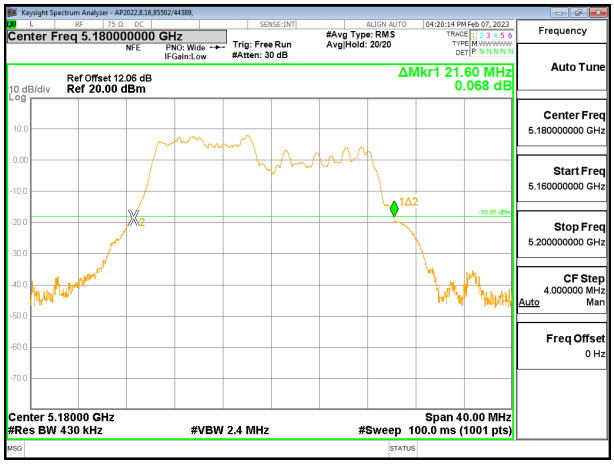
HIGH CHANNEL RU 40 Chain 1

2TX 106T MODE

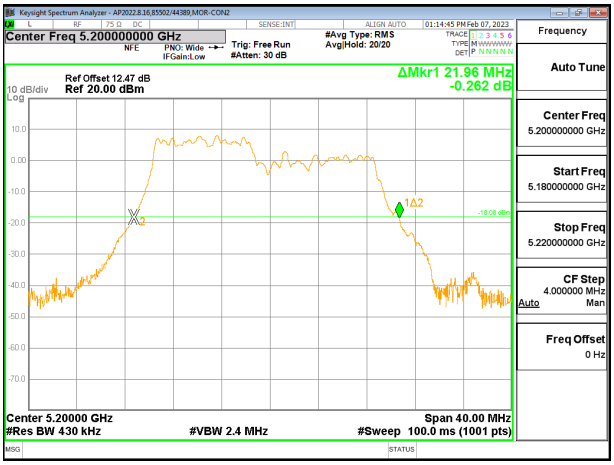
Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5180	22.04	21.60
Mid	5200	21.96	21.60
High	5230	21.72	21.16



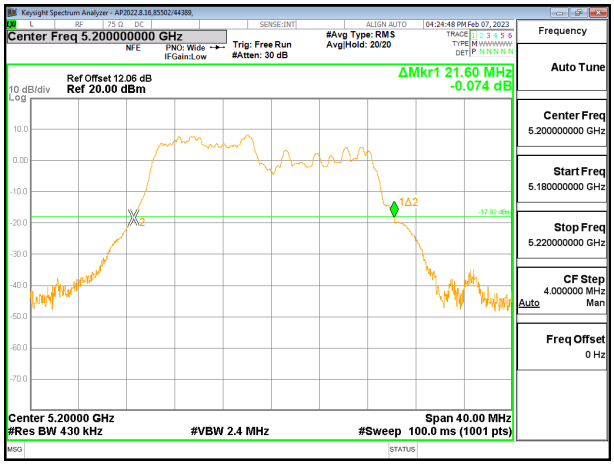
LOW CHANNEL RU 53 Chain 0



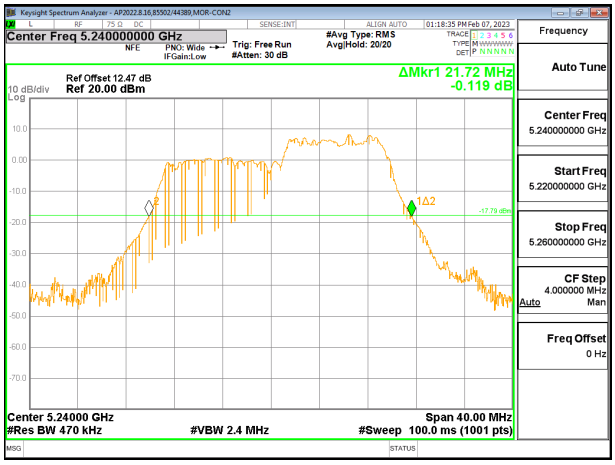
LOW CHANNEL RU 53 Chain 1



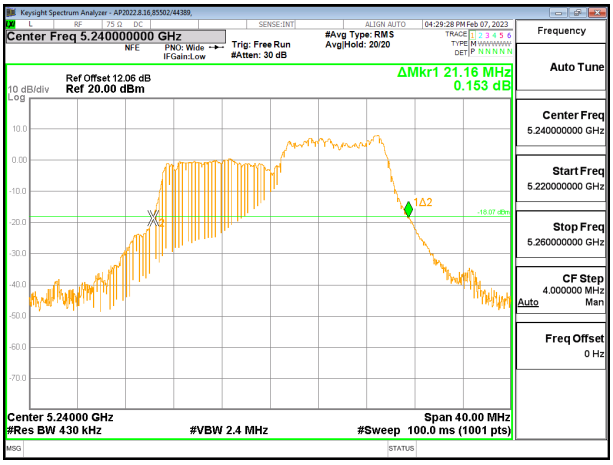
MID CHANNEL RU 53 Chain 0



MID CHANNEL RU 53 Chain 1



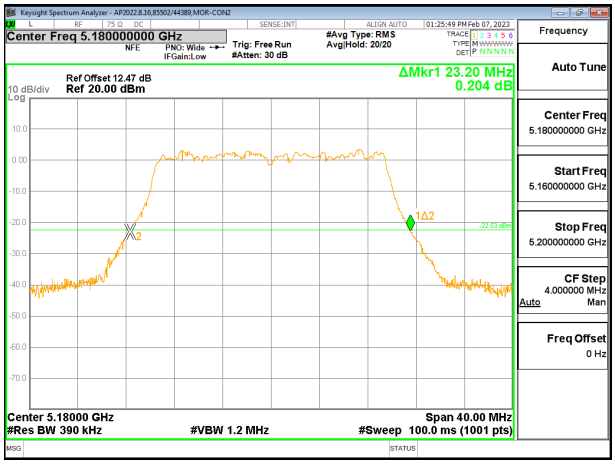
HIGH CHANNEL RU 54 Chain 0



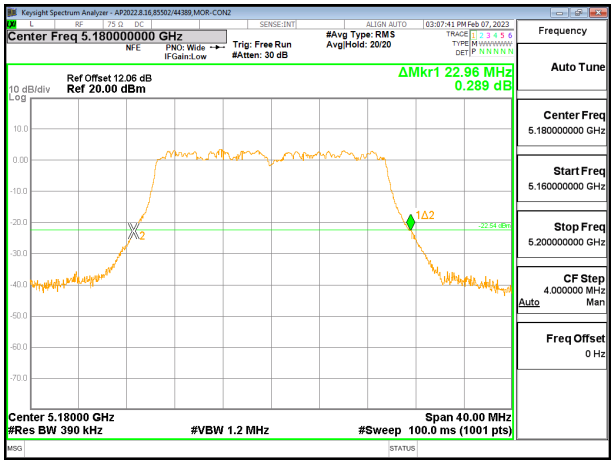
HIGH CHANNEL RU 54 Chain 1

2TX 242T MODE

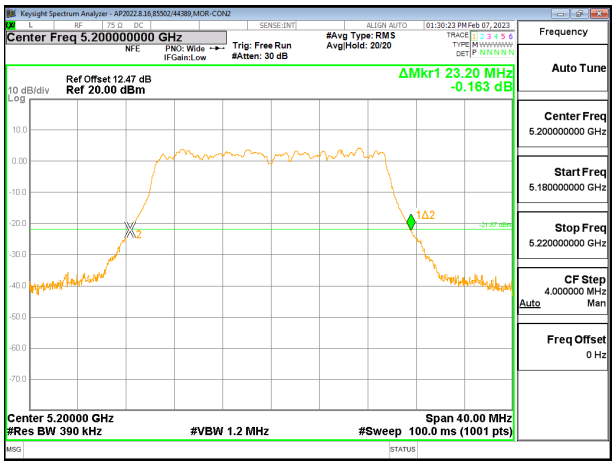
Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5180	23.20	22.96
Mid	5200	23.20	22.96
High	5240	23.16	23.24



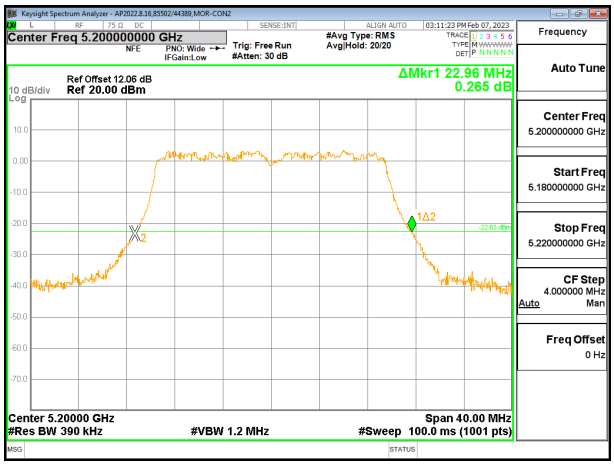
LOW CHANNEL RU 61 Chain 0



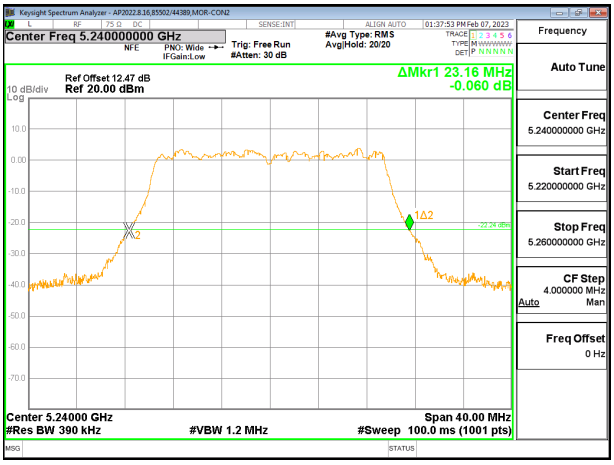
LOW CHANNEL RU 61 Chain 1



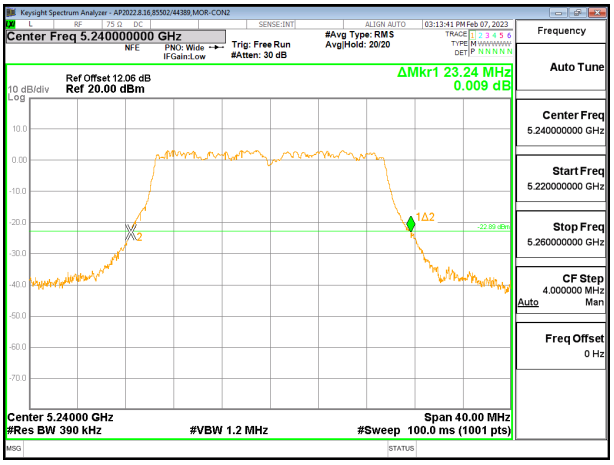
MID CHANNEL RU 61 Chain 0



MID CHANNEL RU 61 Chain 1



HIGH CHANNEL RU 61 Chain 0

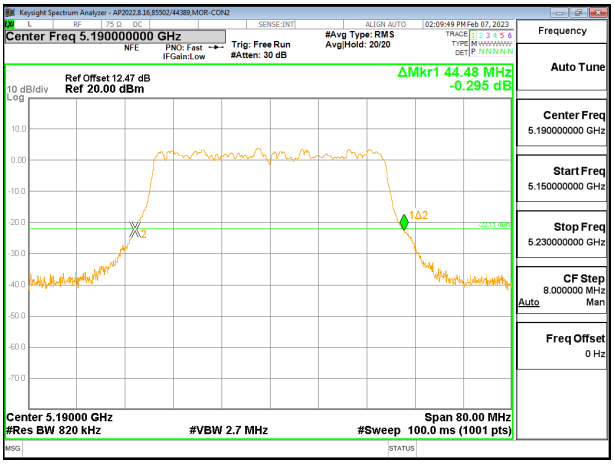


HIGH CHANNEL RU 61 Chain 1

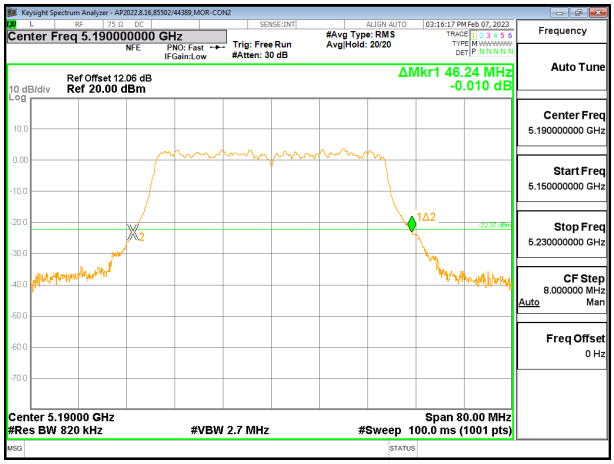
9.2.2. 802.11ax HE40 MODE 2TX IN THE 5.2GHz BAND

2TX 484T MODE

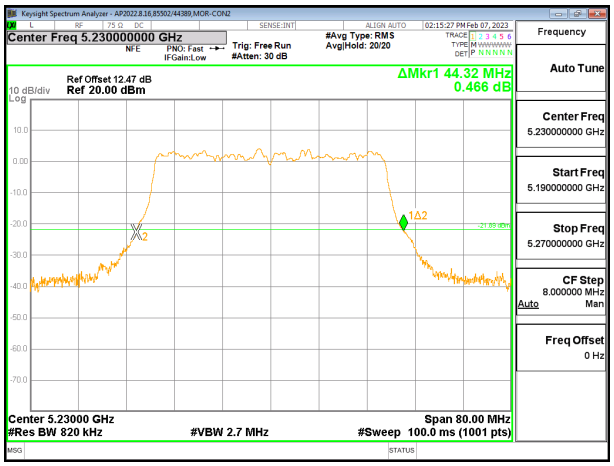
Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5190	44.88	46.24
High	5230	44.32	46.16



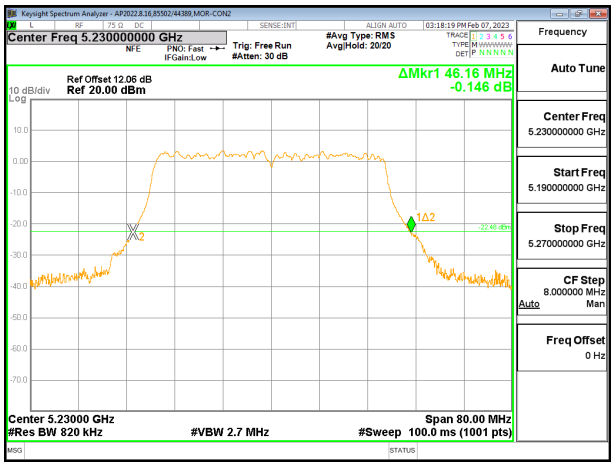
LOW CHANNEL RU 65 Chain 0



LOW CHANNEL RU 65 Chain 1



HIGH CHANNEL RU 65 Chain 0

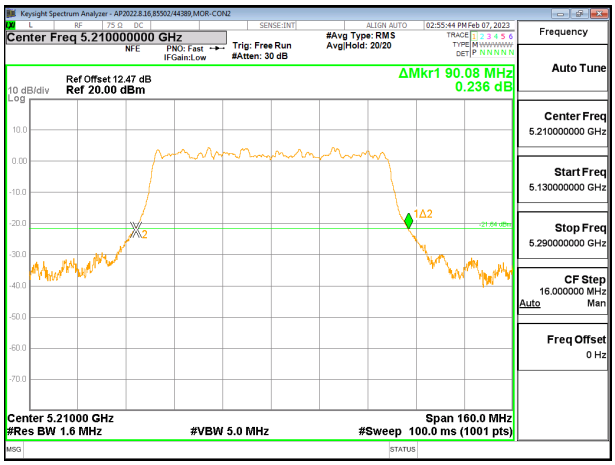


HIGH CHANNEL RU 65 Chain 1

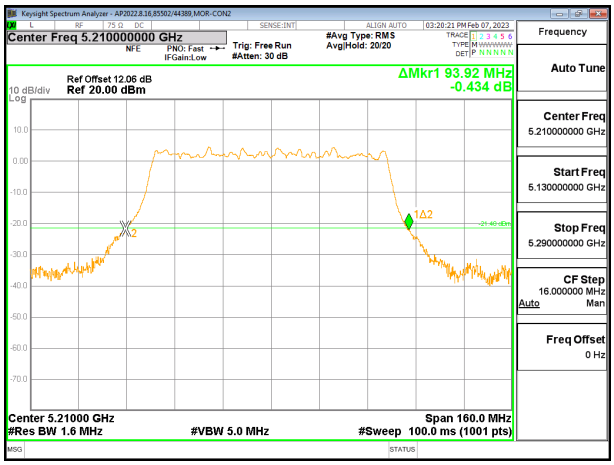
9.2.3. 802.11ax HE80 MODE 2TX IN THE 5.2GHz BAND

2TX 996T MODE

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Mid	5290	90.08	93.92



MID CHANNEL RU 67 Chain 0

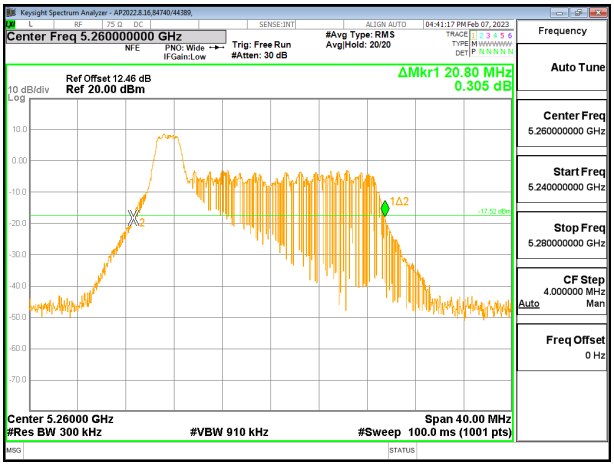


MID CHANNEL RU 67 Chain 1

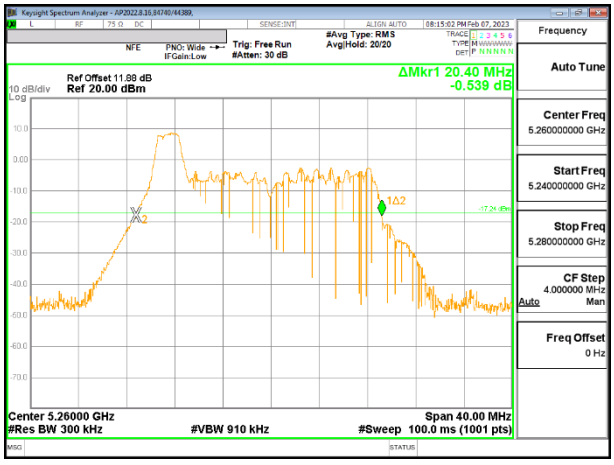
9.2.4. 802.11ax HE20 MODE 2TX IN THE 5.3GHz BAND

2TX 26T MODE

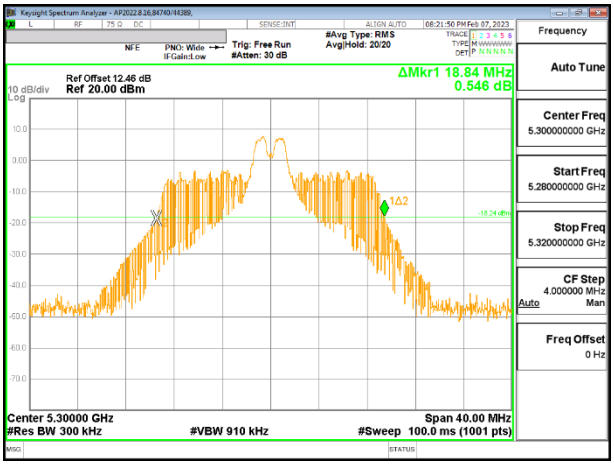
Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5260	20.80	20.40
Mid	5300	18.84	18.40
High	5320	20.64	20.16



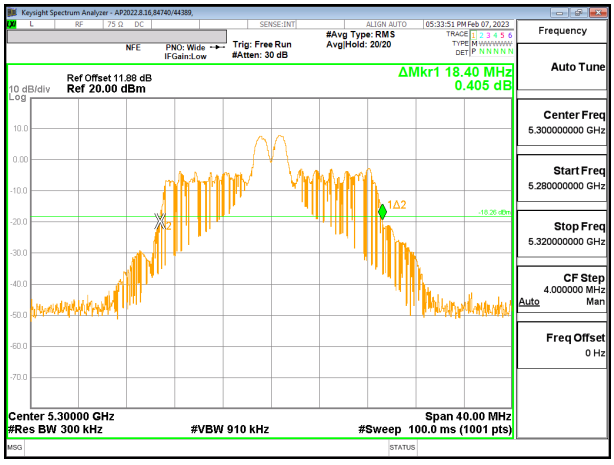
LOW CHANNEL RU 0 Chain 0



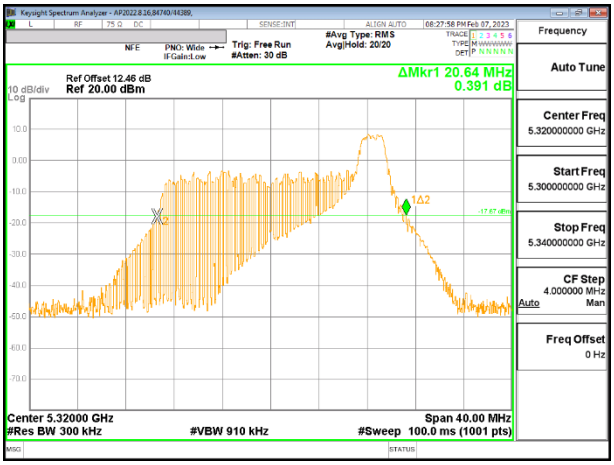
LOW CHANNEL RU 0Chain 1



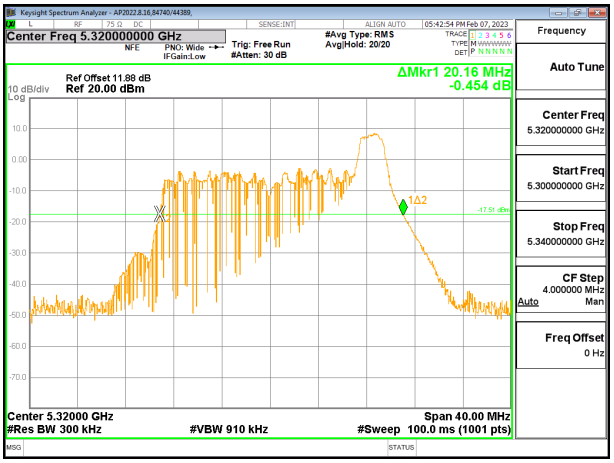
MID CHANNEL RU 4 Chain 0



MID CHANNEL RU 4 Chain 1



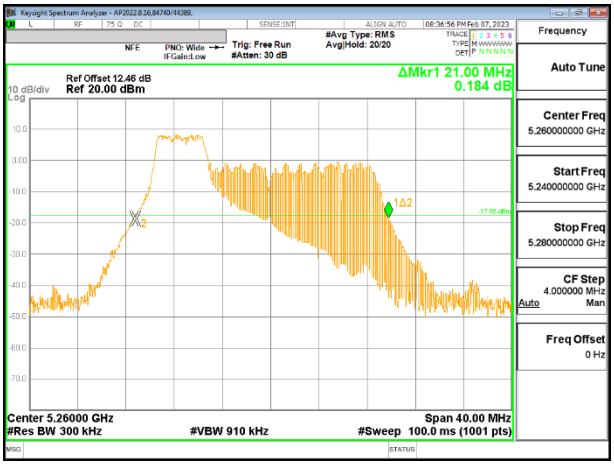
HIGH CHANNEL RU 8 Chain 0



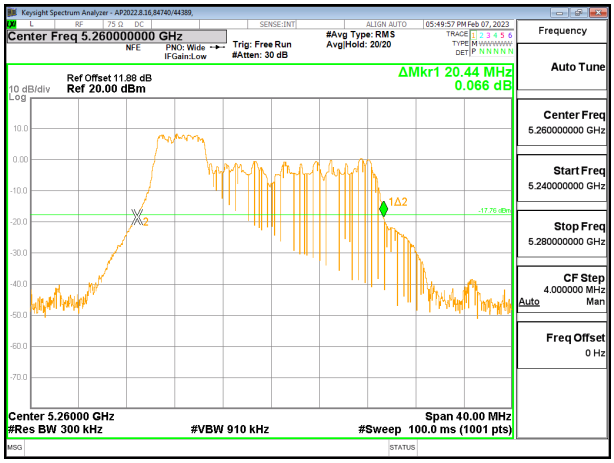
HIGH CHANNEL RU 8 Chain 1

2TX 52T MODE

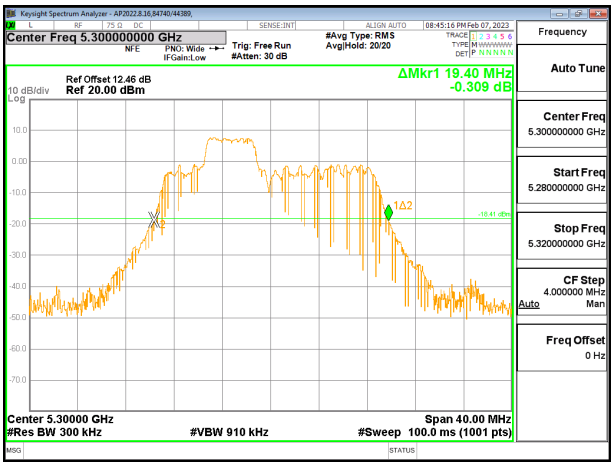
Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5260	21.00	20.44
Mid	5300	19.40	18.76
High	5320	20.76	20.52



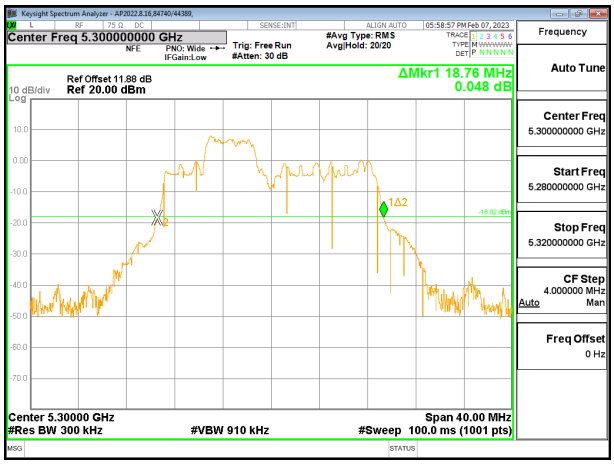
LOW CHANNEL RU 37 Chain 0



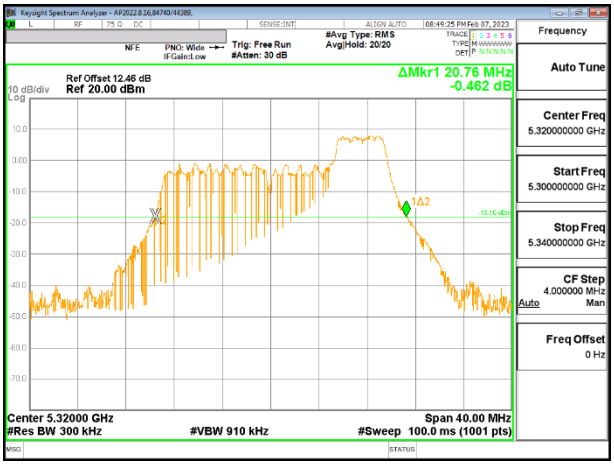
LOW CHANNEL RU 37 Chain 1



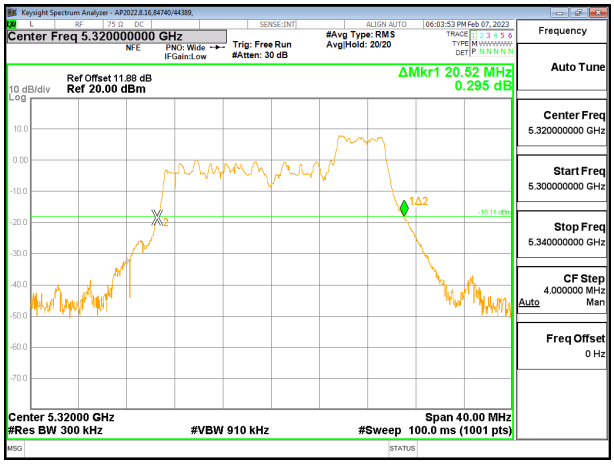
MID CHANNEL RU 38 Chain 0



MID CHANNEL RU 38 Chain 1



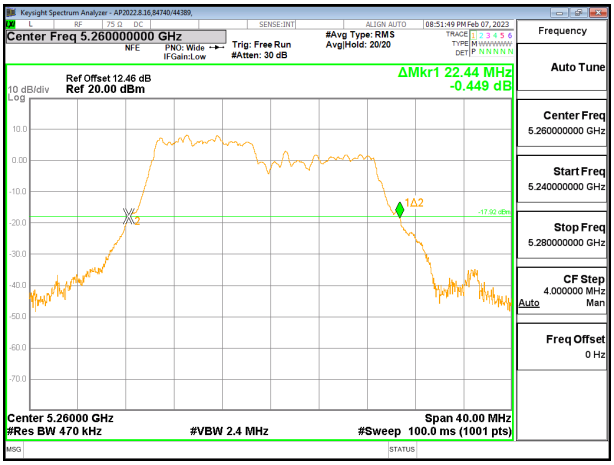
HIGH CHANNEL RU 40 Chain 0



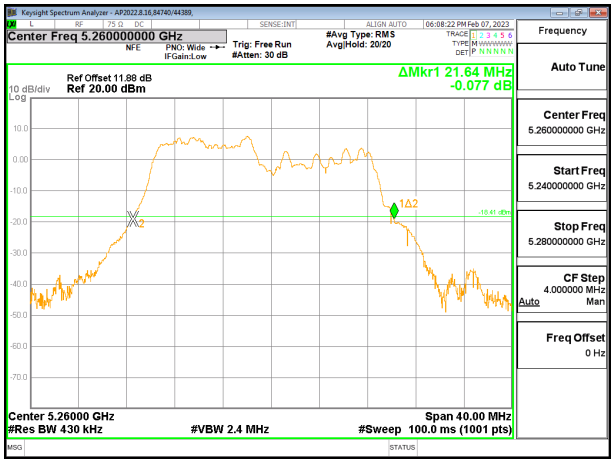
HIGH CHANNEL RU 40 Chain 1

2TX 106T MODE

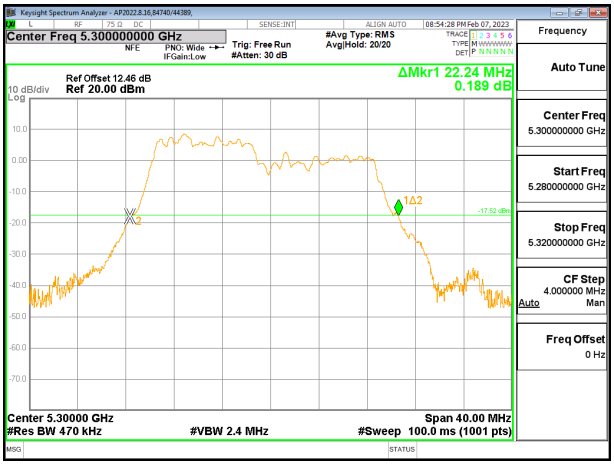
Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5260	22.44	21.64
Mid	5300	22.24	21.60
High	5320	21.32	21.20



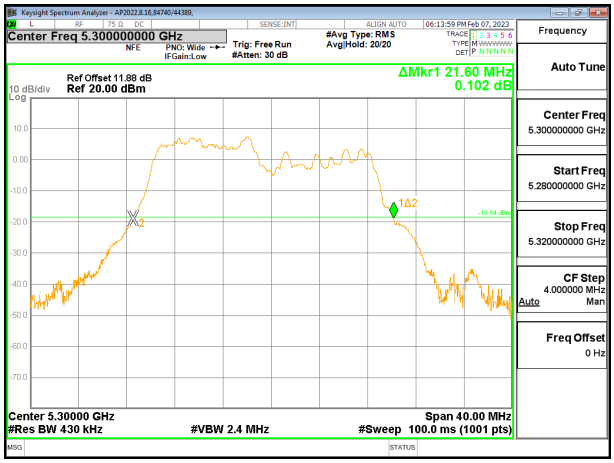
LOW CHANNEL RU 53 Chain 0



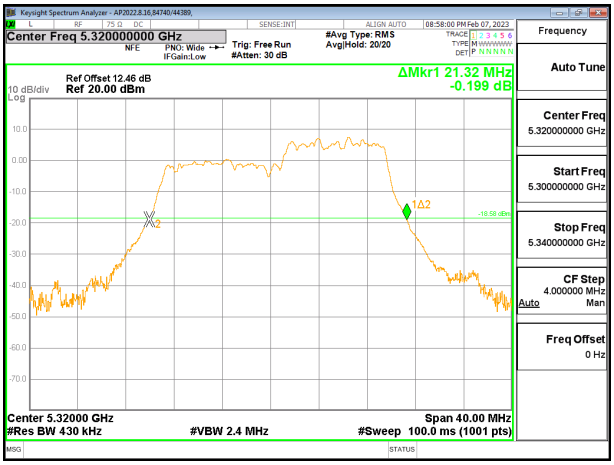
LOW CHANNEL RU 53 Chain 1



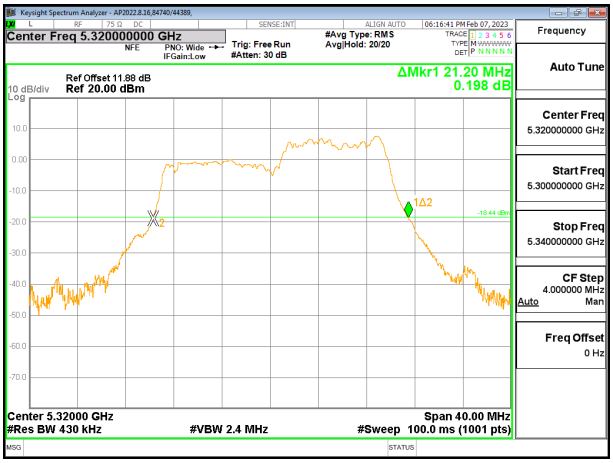
MID CHANNEL RU 53 Chain 0



MID CHANNEL RU 53 Chain 1



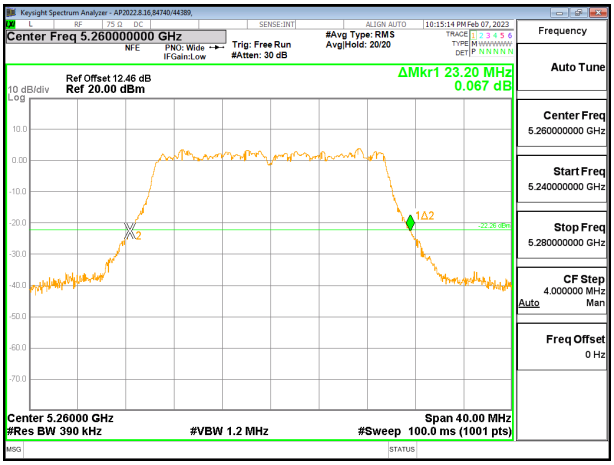
HIGH CHANNEL RU 54 Chain 0



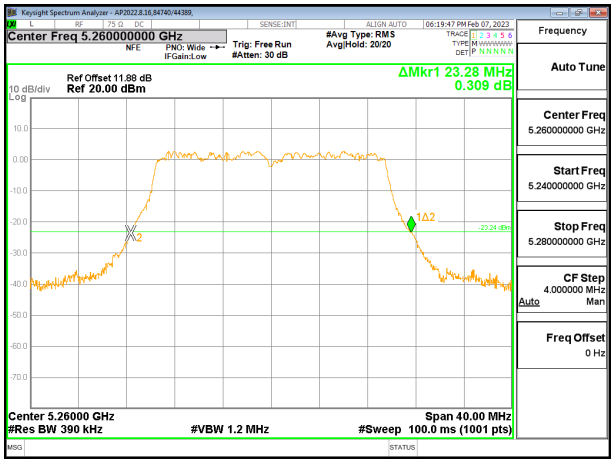
HIGH CHANNEL RU 54 Chain 1

2TX 242T MODE

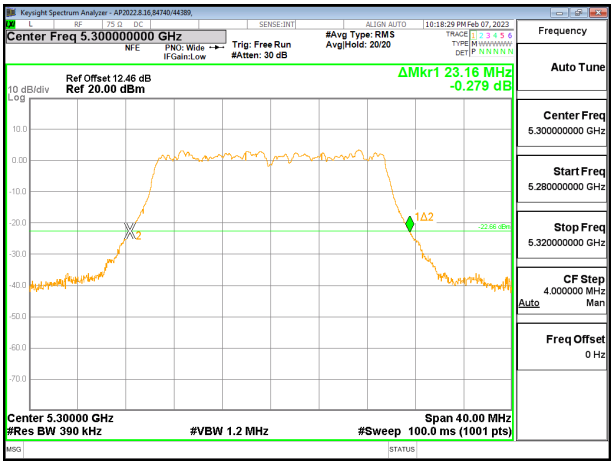
Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5260	23.20	23.28
Mid	5300	23.16	23.36
High	5320	23.16	23.36



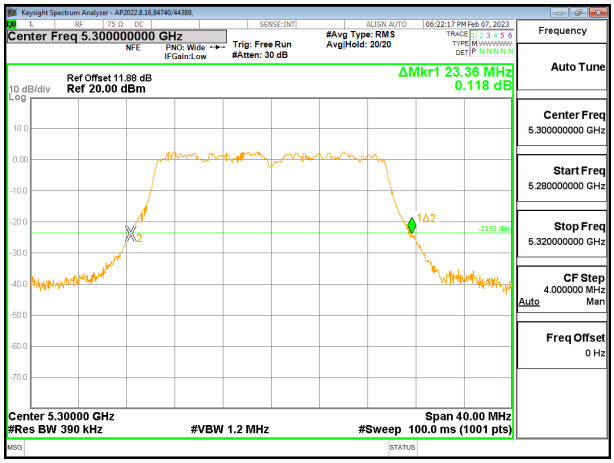
LOW CHANNEL RU 61 Chain 0



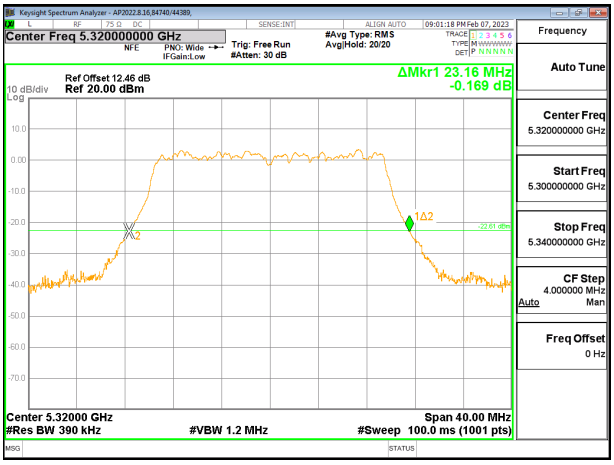
LOW CHANNEL RU 61 Chain 1



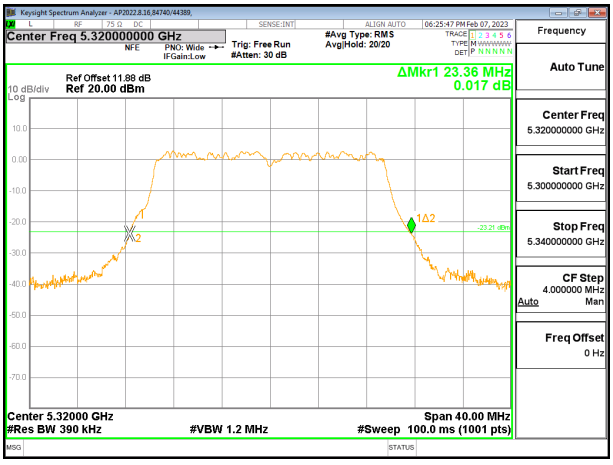
MID CHANNEL RU 61 Chain 0



MID CHANNEL RU 61 Chain 1



HIGH CHANNEL RU 61 Chain 0

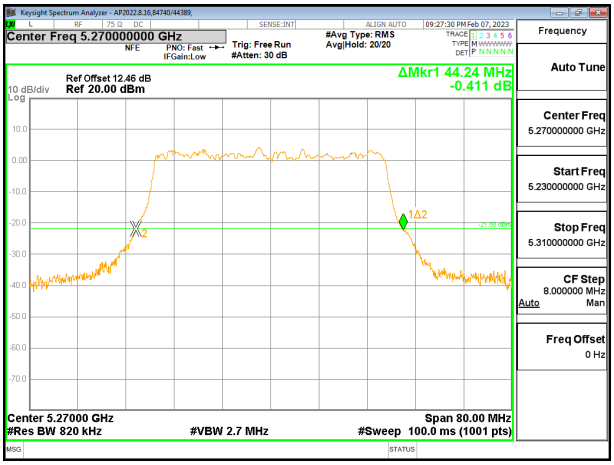


HIGH CHANNEL RU 61 Chain 1

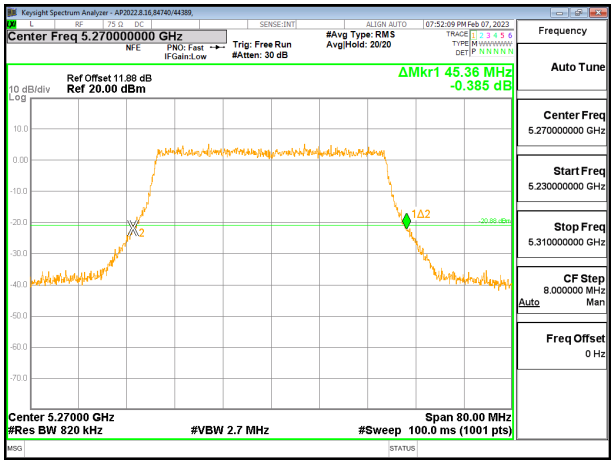
9.2.5. 802.11ax HE40 MODE 2TX IN THE 5.3GHz BAND

2TX 484T MODE

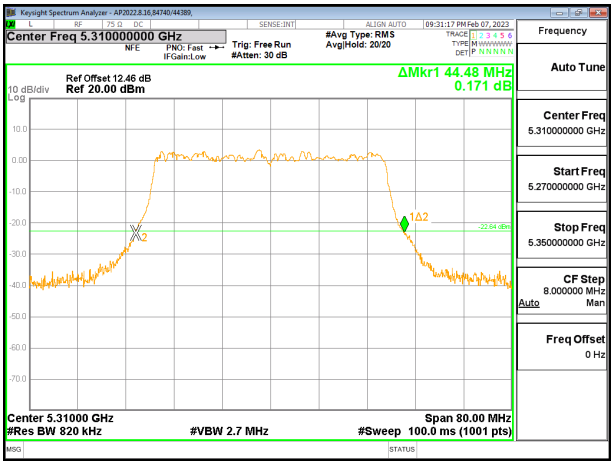
Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5270	44.24	45.36
High	5310	44.48	45.76



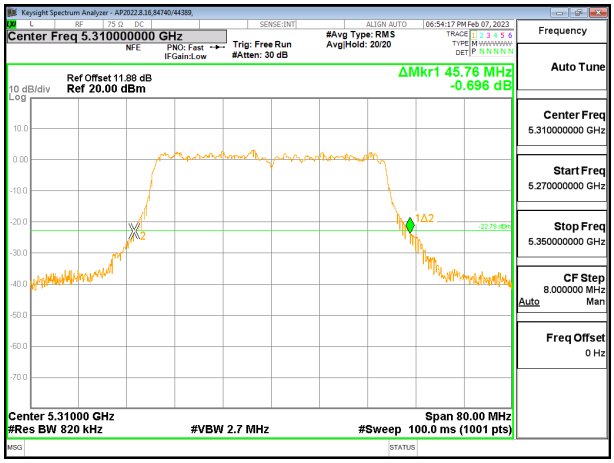
LOW CHANNEL RU 65 Chain 0



LOW CHANNEL RU 65 Chain 1



HIGH CHANNEL RU 65 Chain 0

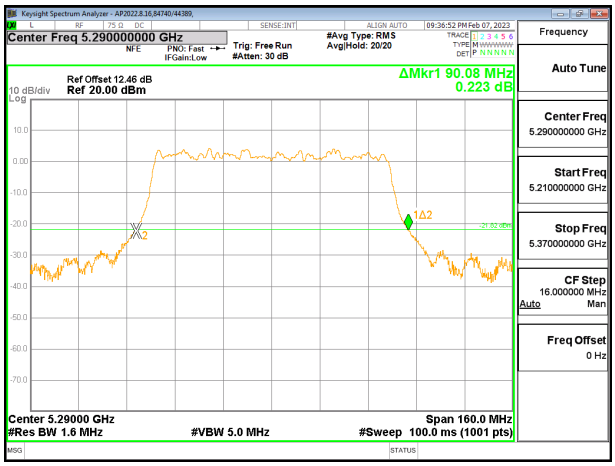


HIGH CHANNEL RU 65 Chain 1

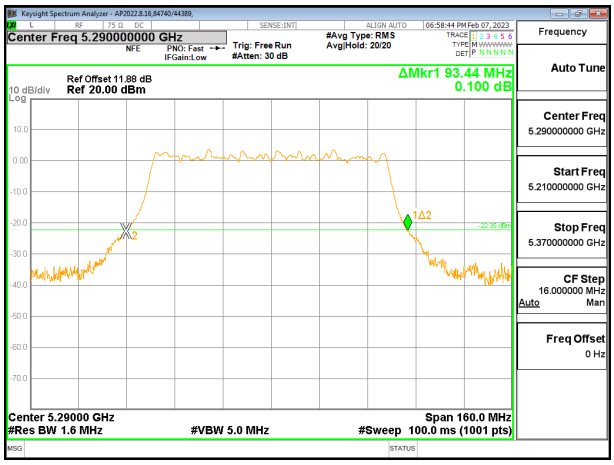
9.2.6. 802.11ax HE80 MODE 2TX IN THE 5.3GHz BAND

2TX 996T MODE

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Mid	5290	90.08	93.44



MID CHANNEL RU 67 Chain 0

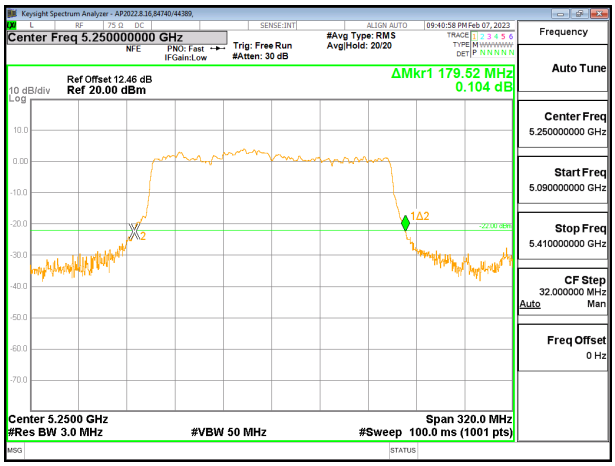


MID CHANNEL RU 67 Chain 1

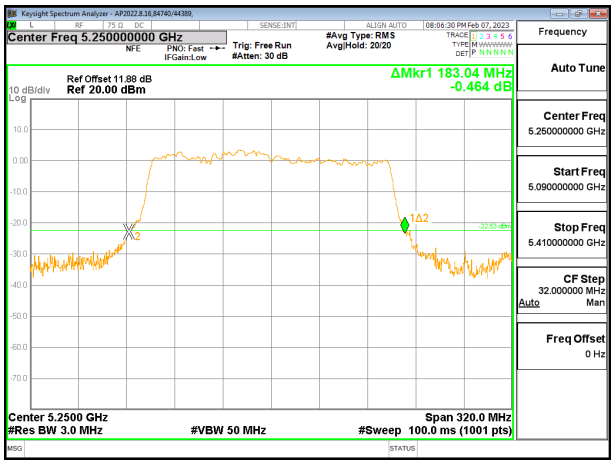
9.2.7. 802.11ax HE160 MODE 2TX IN THE 5.2GHz & 5.3GHz BAND

2TX 2x996T MODE

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Mid	5250	179.52	183.04



MID CHANNEL RU 68 Chain 0



MID CHANNEL RU 68 Chain 1

9.3. OUTPUT POWER AND PSD

LIMITS

FCC §15.407

Band 5.15–5.25 GHz
(a)(1)(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Bands 5.25-5.35 GHz and 5.47-5.725 GHz
(a)(2)The maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The measurement method used for output power is KDB 789033 D02 v02r01, Section E.3.b (Method PM-G).

The measurement method used for power spectral density is KDB 789033 D02 v02r01, Section F

DIRECTIONAL ANTENNA GAIN

For 2 TX:

Tx chains are uncorrelated for power and correlated for PSD due to the device supporting CDD in all MIMO modes. The directional gains are as follows:

Band (MHz)	Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)	Correlated Chains Directional Gain (dBi)
5180-5320	-0.29	0.61	0.18	3.18

9.3.1. 802.11ax HE20 MODE 2TX IN THE 5.2GHz BAND

2TX 26T MODE

Test Engineer:	84740/44389, 85502/44389
Test Date:	2023-02-02 to 2023-02-07

Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Low	5180	0.18	3.18	24.00	11.00
Mid	5200	0.18	3.18	24.00	11.00
High	5240	0.18	3.18	24.00	11.00

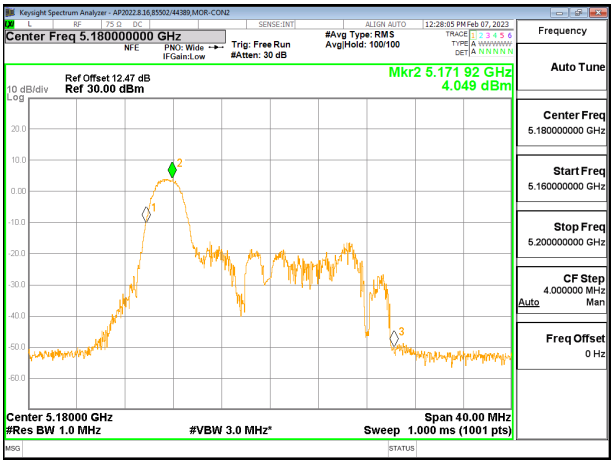
Duty Cycle CF (dB)	0.47	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	8.18	8.64	11.43	24.00	-12.57
Mid	5200	8.57	8.44	11.52	24.00	-12.48
High	5240	8.91	8.69	11.81	24.00	-12.19

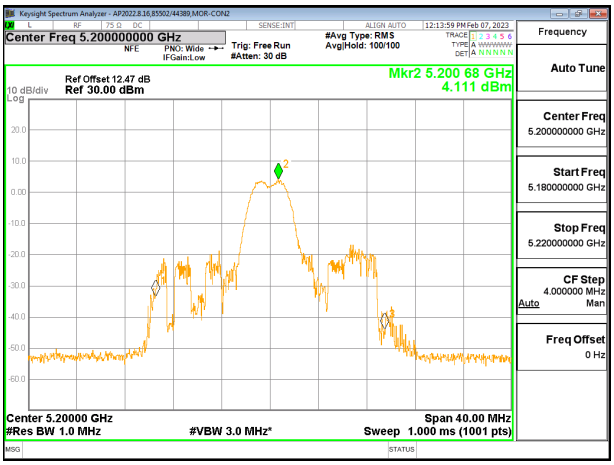
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm/1MHz)	Chain 1 Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Low	5180	4.05	4.73	7.89	11.00	-3.11
Mid	5200	4.11	3.71	7.39	11.00	-3.61
High	5240	4.96	4.80	8.36	11.00	-2.64

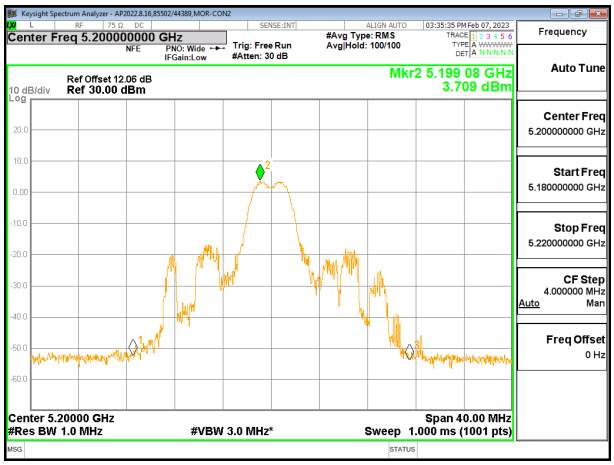


LOW CHANNEL Chain 0

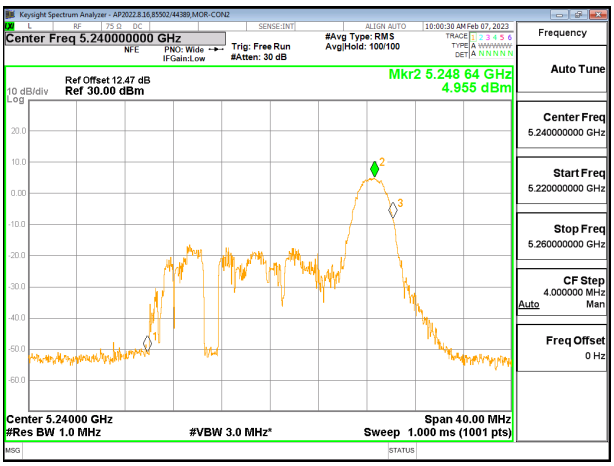
LOW CHANNEL Chain 1



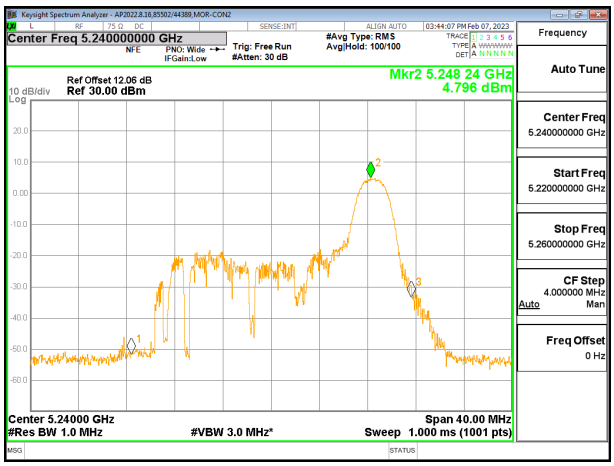
MID CHANNEL 26T RU 4 Chain 0



MID CHANNEL 26T RU 4 Chain 1



HIGH CHANNEL 26T RU 8 Chain 0



HIGH CHANNEL 26T RU 8 Chain 1

2TX 52T MODE

Test Engineer:	84740/44389, 85502/44389
Test Date:	2023-02-02 to 2023-02-07

Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Low	5180	0.18	3.18	24.00	11.00
Mid	5200	0.18	3.18	24.00	11.00
High	5240	0.18	3.18	24.00	11.00

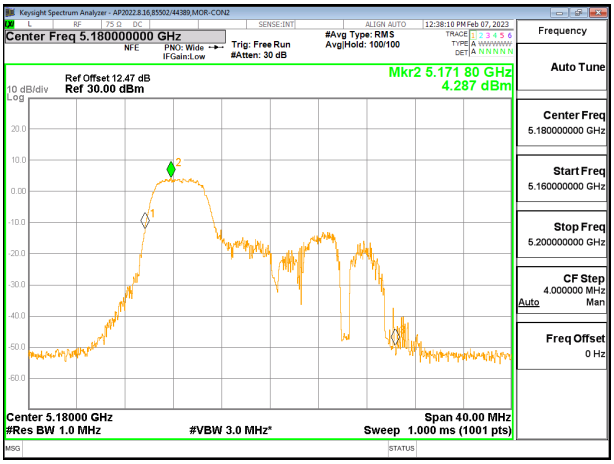
Duty Cycle CF (dB)	0.49	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	10.87	11.20	14.05	24.00	-9.95
Mid	5200	11.37	11.28	14.34	24.00	-9.66
High	5240	11.43	11.31	14.38	24.00	-9.62

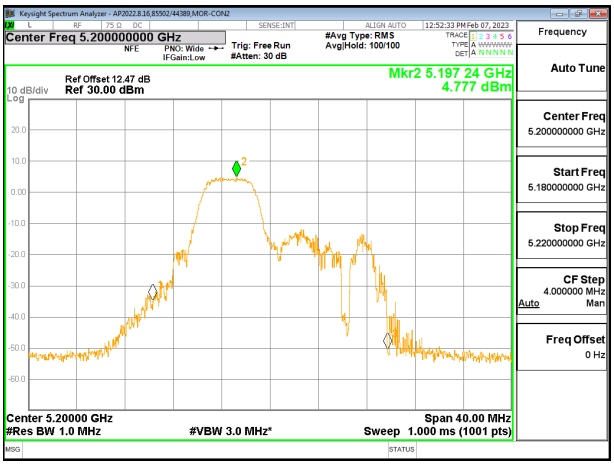
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm/1MHz)	Chain 1 Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Low	5180	4.29	4.68	7.99	11.00	-3.01
Mid	5200	4.78	4.62	8.20	11.00	-2.80
High	5240	4.74	4.55	8.15	11.00	-2.85

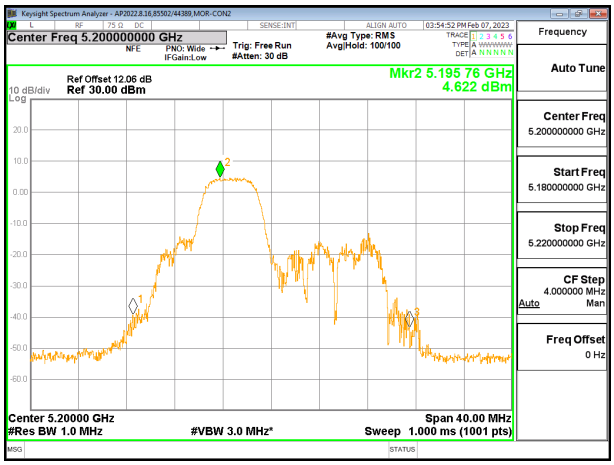


LOW CHANNEL RU 37 Chain 0

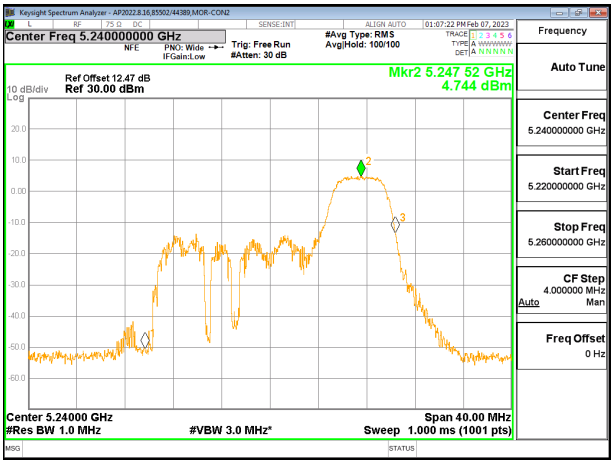
LOW CHANNEL RU 37 Chain 1



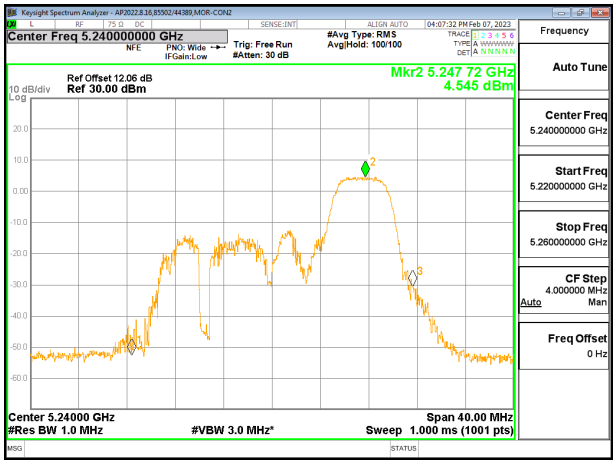
MID CHANNEL RU 38 Chain 0



MID CHANNEL RU 38 Chain 1



HIGH CHANNEL RU 40 Chain 0



HIGH CHANNEL RU 40 Chain 1

2TX 106T MODE

Test Engineer:	84740/44389, 85502/44389
Test Date:	2023-02-02 to 2023-02-07

Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Low	5180	0.18	3.18	24.00	11.00
Mid	5200	0.18	3.18	24.00	11.00
High	5240	0.18	3.18	24.00	11.00

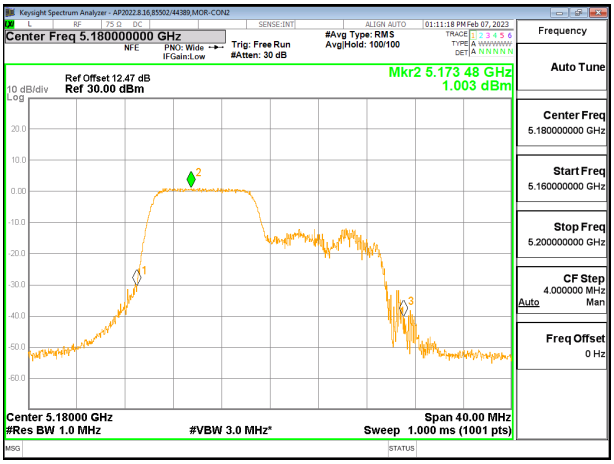
Duty Cycle CF (dB)	0.53	**Included in Calculations of Corr'd PSD**

Output Power Results

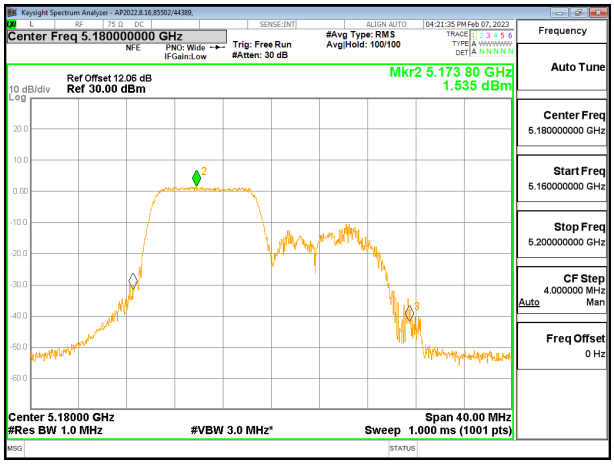
Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	10.73	11.11	13.93	24.00	-10.07
Mid	5200	11.32	11.34	14.34	24.00	-9.66
High	5240	11.38	11.19	14.30	24.00	-9.70

PSD Results

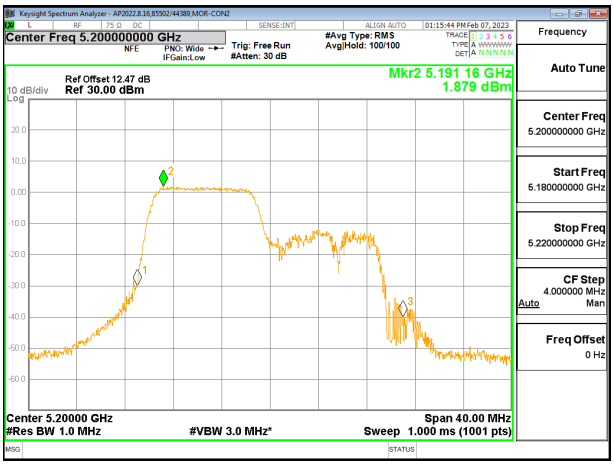
Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm/1MHz)	Chain 1 Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Low	5180	1.00	1.54	4.82	11.00	-6.18
Mid	5200	1.88	1.58	5.27	11.00	-5.73
High	5240	1.76	1.43	5.14	11.00	-5.86



LOW CHANNEL RU 53 Chain 0



LOW CHANNEL RU 53 Chain 1



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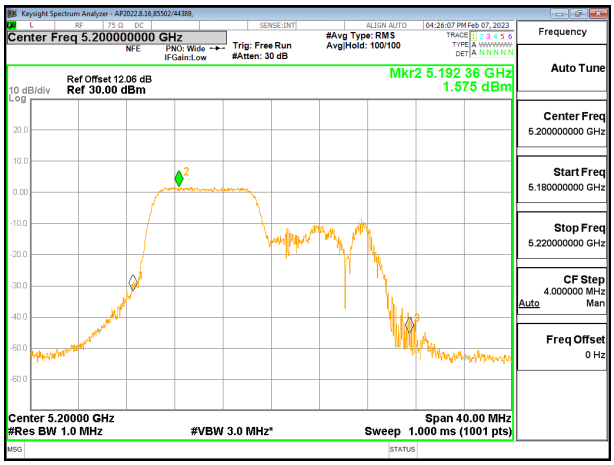

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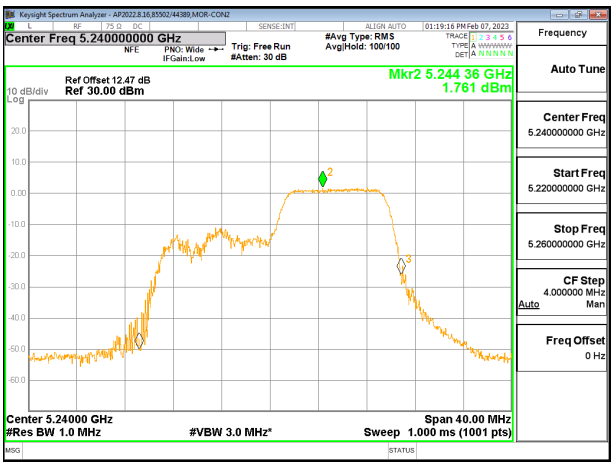
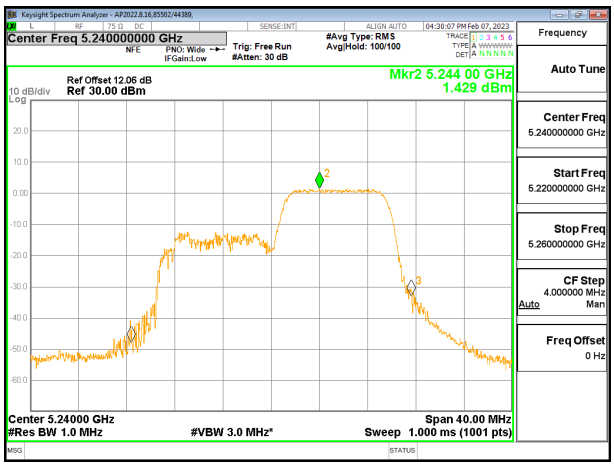


HIGH CHANNEL RU 54 Chain 0



HIGH CHANNEL RU 54 Chain 1

2TX 242T MODE

Test Engineer:	84740/44389, 85502/44389
Test Date:	2023-02-02 to 2023-02-07

Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Low	5180	0.18	3.18	24.00	11.00
Mid	5200	0.18	3.18	24.00	11.00
High	5240	0.18	3.18	24.00	11.00

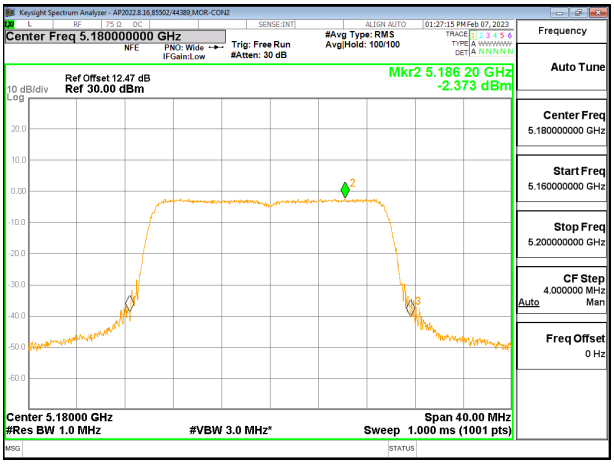
Duty Cycle CF (dB)	0.51	**Included in Calculations of Corr'd PSD**

Output Power Results

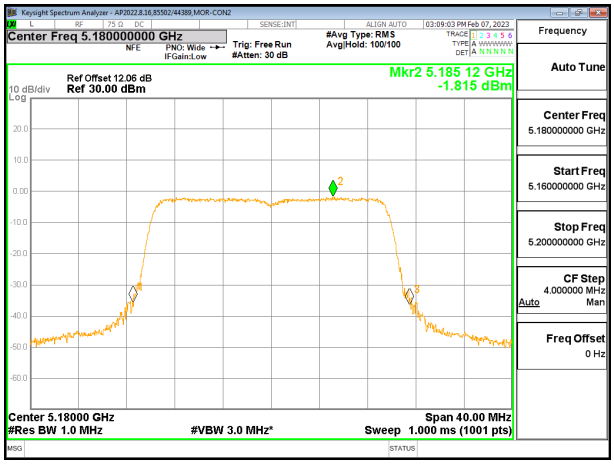
Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	10.61	10.86	13.75	24.00	-10.25
Mid	5200	11.40	11.12	14.27	24.00	-9.73
High	5240	11.17	11.07	14.13	24.00	-9.87

PSD Results

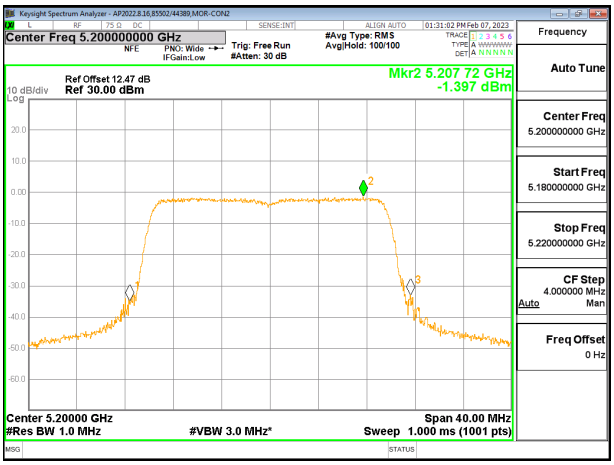
Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm/1MHz)	Chain 1 Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Low	5180	-2.37	-1.82	1.44	11.00	-9.56
Mid	5200	-1.40	-1.71	1.97	11.00	-9.03
High	5240	-1.91	-1.98	1.58	11.00	-9.42



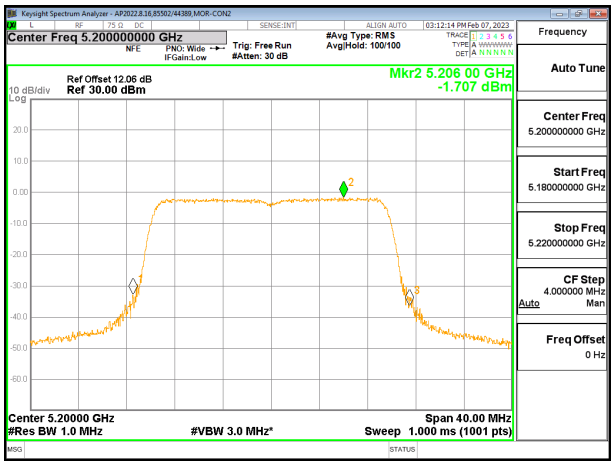
LOW CHANNEL RU 61 Chain 0



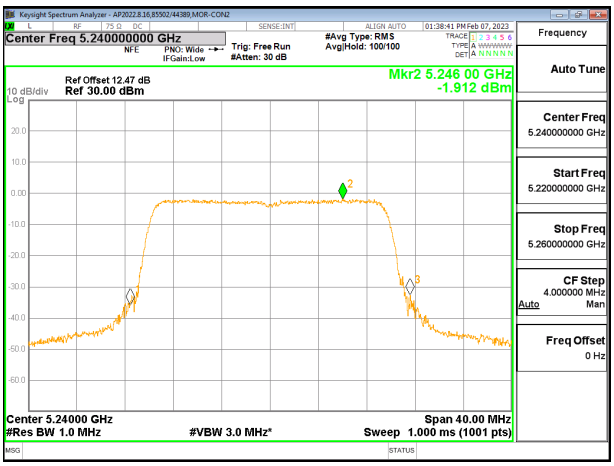
LOW CHANNEL RU 61 Chain 1



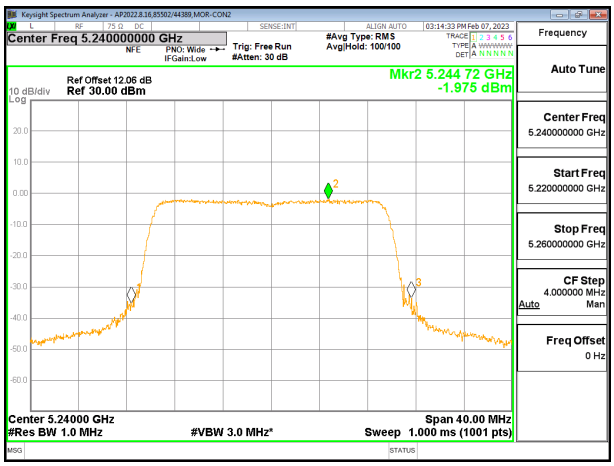
MID CHANNEL RU 61 Chain 0



MID CHANNEL RU 61 Chain 1



HIGH CHANNEL RU 61 Chain 0



HIGH CHANNEL RU 61 Chain 1

9.3.2. 802.11ax HE40 MODE 2TX IN THE 5.2GHz BAND

2TX 484T MODE

Test Engineer:	84740/44389, 85502/44389
Test Date:	2023-02-02 to 2023-02-07

Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Low	5190	0.18	3.18	24.00	11.00
High	5230	0.18	3.18	24.00	11.00

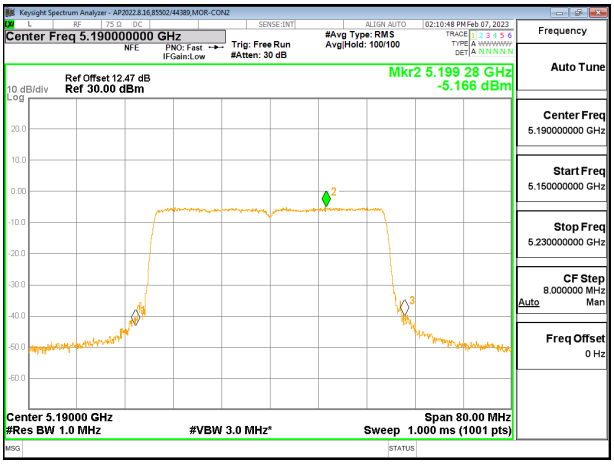
Duty Cycle CF (dB)	0.58	**Included in Calculations of Corr'd Power & PSD**

Output Power Results

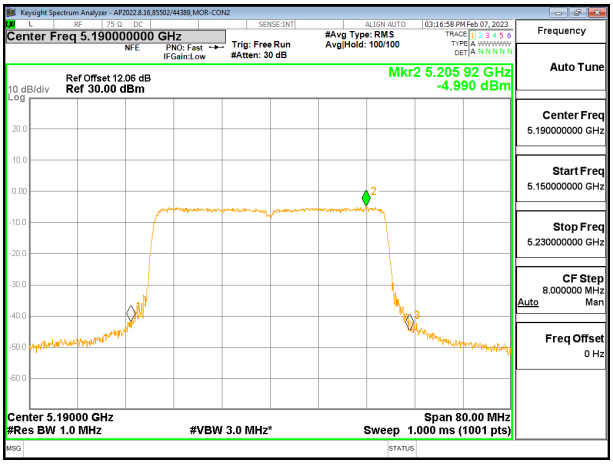
Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5190	10.90	10.93	13.93	24.00	-10.07
High	5230	11.24	11.01	14.14	24.00	-9.86

PSD Results

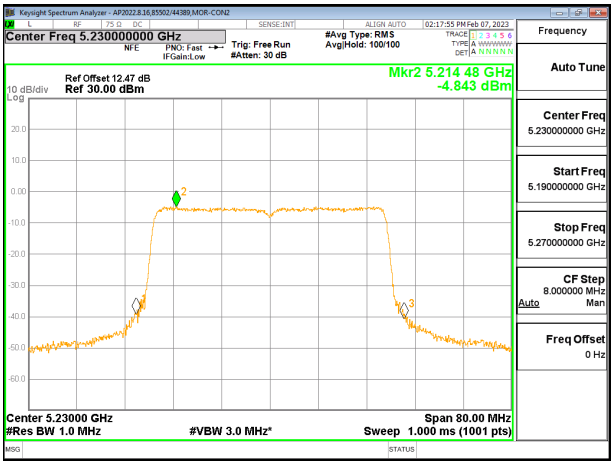
Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm/ 1MHz)	Chain 1 Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5190	-5.17	-4.99	-1.49	11.00	-12.49
High	5230	-4.84	-4.98	-1.32	11.00	-12.32



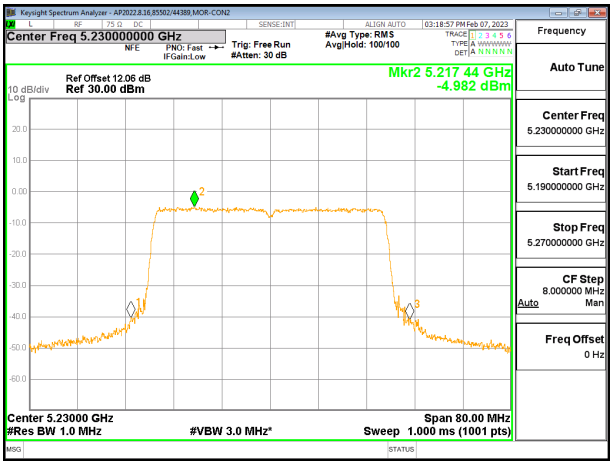
LOW CHANNEL RU 65 Chain 0



LOW CHANNEL RU 65 Chain 1



HIGH CHANNEL RU 65 Chain 0



HIGH CHANNEL RU 65 Chain 1