CERTIFICATION TEST REPORT

Report Number. : 4790976580-E8V2

Applicant	:	SAMSUNG ELECTRONICS CO., LTD. 129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI, GYEONGGI-DO, 16677, KOREA
Model	:	SC-51E, SCG25
FCC ID	:	A3LSMS921JPN
EUT Description	:	GSM/WCDMA/LTE 5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, NFC and WPT
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART E

Date Of Issue:
2024-01-31

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IAS ACCREDITED Testing Laboratory

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2024-01-25	Initial issue	Dexter(Hyunsik) Yun
V2	2024-01-31	Updated to address TCB's question	Dexter(Hyunsik) Yun

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION:	GSM/WCDMA/LTE 5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, NFC and WPT
MODEL NUMBER:	SC-51E, SCG25
SERIAL NUMBER:	R3CW90BXLKA, R3CW90BXLGJ (CONDUCTED, Original); R3CW90BXLCD, R3CW90BXLFV (RADIATED, Original); R3CWB0FGX5Z, R3CWB0FGXEX (RADIATED, Spot-check);
DATE TESTED:	2023-09-27 ~ 2023-10-30 (Original); 2023-12-12 ~ 2024-01-24 (Spot-check);

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

UL KOREA LTD. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL KOREA LTD. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL KOREA LTD. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL KOREA LTD. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by IAS, any agency of the Federal Government, or any agency of any government.

Approved & Released For
UL KOREA LTD. By:

Seokhwan Hong
Suwon Lab Engineer
UL KOREA LTD.

Tested By:

Dexter(Hyunsik) Yun
Suwon Lab Engineer
UL KOREA LTD.

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1.1. INTRODUCTION OF TEST DATA REUSE

This report referenced from the FCC ID: A3LSMS921U NII WLAN(FCC CFR 47 Part 15C). And the applicant takes full responsibility that the test data as referenced in this report represent compliance for this FCC ID.

1.2. DIFFERENCE

The A3LSMS921JPN model shares the same enclosure and circuit board except WWAN bands as A3LSMS921U. The WLAN antennas and surrounding circuitry and layout are identical between these two units.

After confirming through preliminary radiated emissions that the performance of the A3LSMS921JPN remains representative of A3LSMS921U. The test data of A3LSMS921U being submitted for this application to cover WLAN features.

1.3. SPOT CHECK VERIFICATION DATA

(Worst case of the radiated band-edge and radiated spurious emissions)

Band	Test Item	Mode	Frequency	Test Limit	Original model	Spot check model	Deviation	Remark
					SM-S921U Results	SC-51E Results		
					FCC ID : A3LSMS921U	FCC ID : A3LSMS921JPN		
NII-1	Band-edge	802.11ac VHT80_5210 MIMO	5210 MHz	54.0 dBuV/m	51.56 dBuV/m	51.80 dBuV/m	0.24 dB	
	Spurious	802.11a_5180 MIMO	6215 MHz	68.20 dBuV/m	51.18 dBuV/m	51.33 dBuV/m	0.15 dB	
NII-2A	Band-edge	802.11a_5320 MIMO	5320 MHz	54.00 dBuV/m	51.52 dBuV/m	51.81 dBuV/m	0.29 dB	
	Spurious	802.11a_5320 MIMO	10640 MHz	54.00 dBuV/m	49.90 dBuV/m	38.59 dBuV/m	-11.31 dB	
NII-2C	Band-edge	802.11ac_VHT80_5530 MIMO	5530 MHz	54.00 dBuV/m	50.79 dBuV/m	50.33 dBuV/m	-0.46 dB	
	Spurious	802.11a_5500 MIMO	11000 MHz	54.00 dBuV/m	49.79 dBuV/m	42.43 dBuV/m	-7.36 dB	
NII-3	Band-edge	802.11ac_VHT160_5815 MIMO	5815 MHz	-27.00 dBm	-29.58 dBm	-29.67 dBm	-0.09 dB	
	Spurious	802.11a_5785 MIMO	11570 MHz	54.00 dBuV/m	45.49 dBuV/m	41.20 dBuV/m	-4.29 dB	
NII-4	Band-edge	802.11n_HT20_5885 MIMO	5885 MHz	89.94 dBuV/m	75.62 dBuV/m	74.74 dBuV/m	-0.88 dB	
	Spurious	802.11a_5845 MIMO	11690 MHz	54.00 dBuV/m	43.51 dBuV/m	41.78 dBuV/m	-1.73 dB	
NII-1 (11ax)	Band-edge	802.11ax_HE80_5210_SU MIMO	5210 MHz	54.00 dBuV/m	51.88 dBuV/m	51.86 dBuV/m	-0.02 dB	
	Spurious	802.11ax_HE20_5200_26T_RU8 MIMO	6239 MHz	68.20 dBuV/m	49.70 dBuV/m	48.27 dBuV/m	-1.43 dB	
NII-2A (11ax)	Band-edge	802.11ax_HE40_5310_SU MIMO	5310 MHz	54.00 dBuV/m	51.59 dBuV/m	50.86 dBuV/m	-0.73 dB	
	Spurious	802.11ax_HE20_5260_26T_RU8 MIMO	7890 MHz	54.00 dBuV/m	40.98 dBuV/m	35.88 dBuV/m	-5.10 dB	
NII-2C (11ax)	Band-edge	802.11ax_HE40_5510_SU MIMO	5510 MHz	68.20 dBuV/m	65.89 dBuV/m	64.29 dBuV/m	-1.60 dB	
	Spurious	802.11ax_HE20_5720_26T_RU0 MIMO	11440 MHz	54.00 dBuV/m	42.72 dBuV/m	39.61 dBuV/m	-3.11 dB	
NII-3 (11ax)	Band-edge	802.11ax_HE160_5815_SU MIMO	5815 MHz	-27.00 dBm	-29.69 dBm	-30.63 dBm	-0.94 dB	
	Spurious	802.11ax_HE20_5825_26T_RU0 MIMO	11650 MHz	54.00 dBuV/m	43.24 dBuV/m	40.02 dBuV/m	-3.22 dB	
NII-4 (11ax)	Band-edge	802.11ax_HE20_5885_SU MIMO	5885 MHz	89.97 dBuV/m	85.51 dBuV/m	87.16 dBuV/m	1.65 dB	
	Spurious	802.11ax_HE20_5845_26T_RU0 MIMO	11690 MHz	54.00 dBuV/m	43.73 dBuV/m	40.40 dBuV/m	-3.33 dB	

Comparison of two models, upper deviation is within 3 dB range and all test results are under FCC Technical Limits.

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1.4. REFERENCE DETAIL

Reference application that contains the reused reference data in the individual test reports:

Equipment Class	Reference FCC ID (Parent)	Application Type	Reference Test report number	Exhibit Type	Variant Test Report Number	Data Re-used
DTS	A3LSMS921U	Original Grant	4790976523-E7 (802.11b/g/n/ax)	Test Report	4790976580-E5 (802.11b/g/n/ax)	All
NII	A3LSMS921U	Original Grant	4790976523-E10 (802.11a/n/ac/ax)	Test Report	4790976580-E8 (802.11a/n/ac/ax)	Partial (Note)
6CD	A3LSMS921U	Original Grant	4790976523-E11 (802.11a/ax)	Test Report	4790976580-E9 (802.11a/ax)	All

Note. At the customer's request, the target power was reduced at some points, so only those points were retested and the rest were spot-checked. Please refer to the below.
- UNII 2A Band(802.11ax HE80 SU mode, 15.5 to 14.5 dBm in single antenna)
- UNII 2C Band(802.11ac VHT160 mode, 16.0 to 14.5 dBm in single antenna)
- DFS was fully tested.

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with following methods.

1. FCC CFR 47 Part 2.
2. FCC CFR 47 Part 15.
3. KDB 789033 D02 General UNII Test Procedures New Rules v02r01
4. KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02
5. KDB 905462 D03 UNII Clients Without Radar Detection New Rules v01r02
6. KDB 662911 D01 v02r01
7. KDB 291074 D02 v01
8. KDB 484596 D01 Referencing Test Data v02r02
9. ANSI C63.10-2013.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea. Line conducted emissions are measured only at the 218 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

218 Maeyeong-ro
☒ Chamber 1(3m semi-anechoic chamber)
☒ Chamber 2(3m semi-anechoic chamber)
☒ Chamber 3(3m semi-anechoic chamber)
☐ Chamber 4(3m Full-anechoic chamber)
☐ Chamber 5(3m Full-anechoic chamber)

UL KOREA LTD. is accredited by IAS, Laboratory Code TL-637. The full scope of accreditation can be viewed at https://www.iasonline.org/wp-content/uploads/2017/05/TL-637-cert-New.pdf.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

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

AC Corrected Reading (dBuV) = Measured Voltage (dBuV) + Extension Cord Loss (dB) + Cable Loss (dB)
44.72 dBuV = 34.72 dBuV + 9.9 dB + 0.1 dB

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4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	2.80 dB
Radiated Disturbance, 9 kHz to 30 MHz	1.69 dB
Radiated Disturbance, 30 MHz to 1 GHz	3.92 dB
Radiated Disturbance, 1 GHz to 18 GHz	5.06 dB
Radiated Disturbance, Above 18 GHz	6.02 dB

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

4.4. DECISION RULE

Decision rule for statement(s) of conformity is based on Procedure 2, Clause 4.4.3 in IEC Guide 115:2021.

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE 5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, NFC and WPT. This test report addresses the NII (WLAN) operational mode.

Representative model	Difference	Derivative model
		SCG25
SC-51E	Hardware	Same as SC-51E
	Software	Different UI

The model SC-51E was used for final testing and is representative of the test results in this report.

WiFi operating mode

Frequency rage	Mode	ANT1	ANT2
5GHz (5180 MHz ~ 5885 MHz)	802.11a MIMO	TX/RX	TX/RX
	802.11n MIMO	TX/RX	TX/RX
	802.11ac MIMO	TX/RX	TX/RX
	802.11ax MIMO	TX/RX	TX/RX

Simultaneous TX Condition

Simultaneous Tx Condition - RSDB

Mode	# of TX	5GHz WLAN		2.4GHz WLAN		Test Case
		ANT1	ANT2	ANT1	ANT2	
2.4GHz MIMO + 5GHz MIMO	**4**	**O**	**O**	**O**	**O**	**O**
2.4GHz MIMO + 6GHz MIMO	**4**	**O**	**O**	**O**	**O**	**O**

Note. Simultaneous transmission with the Bluetooth and Wi-Fi were investigated, and no noticeable emission was found

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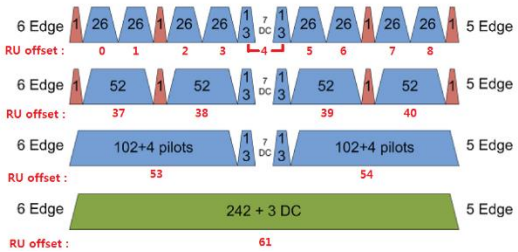
802.11ax RU allocations

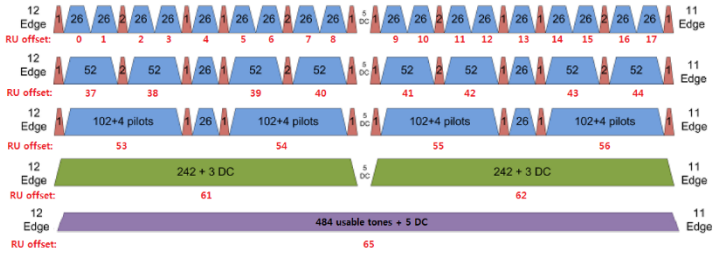
- HE 20 Mode -

20 MHz

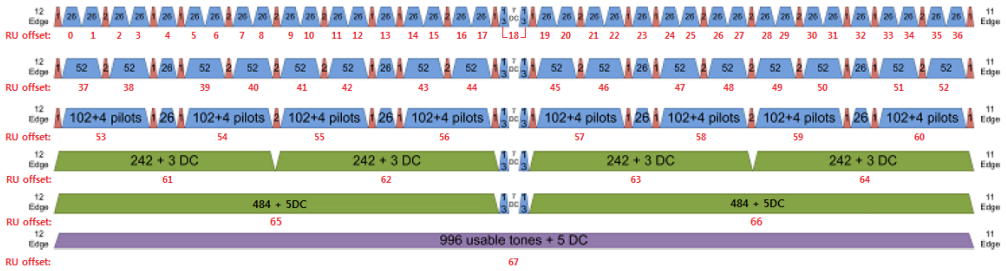


- HE 40 Mode -

40 MHz



- HE 80(996T) & 160 Mode(996T + 996T) -



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Test RU offset for tones in each modes

Mode	Tones	RU offset
HE20	26T	0
		4
		8
	52T	37
		38
		40
	106T	53
		54
	242T / SU Note	61 / -
HE40	26T	0
		9
		17
	52T	37
		41
		44
	106T	53
		54
		56
	242T	61
		62
	484T / SU Note	63 / -
HE80	26T	0
		18
		36
	52T	37
		45
		52
	106T	53
		57
		60
	242T	61
		62
		64
	484T	65
		66
	996T / SU Note	67 / -

Note: Full RU(Resource Unit) mode and SU(Single Unit) mode have no difference in physical waveform. This report has been reported the SU mode with highest output power in MIMO.

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Mode	80 + 80 MHz	Tones	RU offset
HE160	Lower 80 MHz	26T	0
			18
			36
	Upper 80 MHz		0
			18
			36
	Lower 80 MHz	52T	37
			45
			52
	Upper 80 MHz		37
			45
			52
	Lower 80 MHz	106T	53
			57
			60
	Upper 80 MHz		53
			57
			60
	Lower 80 MHz	242T	61
			62
			64
	Upper 80 MHz		61
			62
			64
	Lower 80 MHz	484T	65
			66
	Upper 80 MHz		65
			66
	Lower 80 MHz	996T	67
	Upper 80 MHz		67
	-	SU Note	-

Note: Full RU(Resource Unit) 996T + 996T mode and SU(Single Unit) mode have no difference in physical waveform. This report has been reported the SU mode with highest output power in MIMO.

Band portion of RU allocation about straddle channels

Mode	Channel	Tones	RU offset	Portion
HE20	Straddle 5720 MHz	26T	6	UNII 2C & UNII 3
		242T / SU	61 / -	
HE40	Straddle 5710 MHz	26T	15	UNII 2C & UNII 3
		484T / SU	65 / -	
HE80	Straddle 5690 MHz	26T	34	UNII 2C & UNII 3
		996T / SU	67 / -	

Note: In case of RU straddle channel, test was performed overlapping RU position.

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MAXIMUM OUTPUT POWER

The transmitter has a maximum total conducted average output power as follows except UNII-4 listed is based on EIRP as noted:

Band	Frequency Range [MHz]	Mode	Output Power [dBm]	Output Power [mW]
UNII-1	5180 - 5240	802.11a MIMO	20.41	109.90
		802.11n(HT20) MIMO	20.72	118.03
		802.11ax(HE20) MIMO	20.52	112.72
	5190 - 5230	802.11n(HT40) MIMO	20.53	112.98
		802.11ax(HE40) MIMO	20.56	113.76
	5210	802.11ac(VHT80) MIMO	18.43	69.66
		802.11ax(HE80) MIMO	18.56	71.78
UNII-2A	5260 - 5320	802.11a MIMO	20.66	116.41
		802.11n(HT20) MIMO	20.66	116.41
		802.11ax(HE20) MIMO	20.54	113.24
	5190 - 5230	802.11n(HT40) MIMO	20.40	109.65
		802.11ax(HE40) MIMO	20.51	112.46
	5270 - 5310	802.11ac(VHT80) MIMO	17.41	55.08
		802.11ax(HE80) MIMO	17.75	59.57
	5250[Note1]	802.11ac(VHT160) MIMO	17.66	58.34
		802.11ax(HE160) MIMO	18.22	66.37
UNII-2C	5500 - 5720	802.11a MIMO	20.76	119.12
		802.11n(HT20) MIMO	20.26	106.17
		802.11ax(HE20) MIMO	20.36	108.64
	5510 - 5710	802.11n(HT40) MIMO	20.42	110.15
		802.11ax(HE40) MIMO	20.37	108.89
	5530 - 5690	802.11ac(VHT80) MIMO	20.14	103.28
		802.11ax(HE80) MIMO	19.88	97.27
	5570	802.11ac(VHT160) MIMO	17.41	55.08
		802.11ax(HE160) MIMO	17.41	55.08
UNII-3	5745 - 5825	802.11a MIMO	20.74	118.58
		802.11n(HT20) MIMO	20.64	115.88
		802.11ax(HE20) MIMO	20.31	107.40
	5755 - 5795	802.11n(HT40) MIMO	20.32	107.65
		802.11ax(HE40) MIMO	20.38	109.14
	5775	802.11ac(VHT80) MIMO	20.04	100.93
		802.11ax(HE80) MIMO	20.05	101.16
UNII-4	5845 - 5885	802.11a MIMO	20.31	107.40
		802.11n(HT20) MIMO	20.24	105.68
		802.11ax(HE20) MIMO	19.81	95.72
	5835 - 5875	802.11n(HT40) MIMO	19.93	98.40
		802.11ax(HE40) MIMO	19.88	97.27
	5855	802.11ac(VHT80) MIMO	19.63	91.83
		802.11ax(HE80) MIMO	19.75	94.41
	5815[Note2]	802.11ac(VHT160) MIMO	19.34	85.90
		802.11ax(HE160) MIMO	19.60	91.20

Note1. Overlap channel(UNII-1 & 2A)
Note2. Overlap channel(UNII-3 & 4)

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5.2. DESCRIPTION OF AVAILABLE ANTENNAS

An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

The internal antenna was Permanently attached.
Therefore this E.U.T Complies with the requirement of §15.203.

The radio utilizes a internal antenna, with a maximum gain of:

UNII Band	Frequency Range[MHz]	ANT1 Gain [dBi]	ANT2 Gain [dBi]	Correlated Chains Directional Gain[dBi]
UNII 1	5150 - 5250	-3.93	-5.51	-1.67
UNII 2A	5250 - 5350	-3.30	-5.50	-1.32
UNII 2C	5470 - 5725	-2.90	-4.22	-0.52
UNII 3	5725 - 5850	-3.37	-4.23	-0.78
UNII 4	5850 - 5925	-2.70	-4.57	-0.57

Directional gain for the MIMO operations is determined using KDB 662911 D01 Multiple Transmitter Output section F (2)(d)(1) for *Unequal antenna gains, with equal transmit powers*. The gain is calculated using the formula for correlated transmissions across the two transmit antennas.
Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}$] dBi.
Sample calculation for this device with $N_{ANT} = 2$
Directional gain = 10 log[$(10^{-3.5/20} + 10^{-7.1/20})^2 / 2$] = -2.1 dBi

“WIFI #1_5/6GHz (SUB4_Ant H)” and “WIFI #2_5/6GHz (SUB1_Ant E)” as indicated in antenna specification are written as ANT1 and ANT2 in this report.

5.3. List of test reduction and modes covering other modes:

The output power on covered modes is equal to or less than one referenced.

Authorized Frequency Band			
Mode	**Antenna Stream**	**Mode**	**Covered by**
802.11a	MIMO	802.11a 2TX	
802.11n HT20		802.11n HT20 2TX	
802.11ac VHT20		802.11ac VHT20 2TX	802.11n HT20 2TX
802.11ax HE20(SU)		802.11ax HE20 RU(242T) 2TX	802.11ax HE20 SU 2TX
802.11n HT40		802.11n HT40 2TX	
802.11ac VHT40		802.11ac VHT40 2TX	802.11n HT40 2TX
802.11ax HE40(SU)		802.11ax HE40 RU(484T) 2TX	802.11ax HE40 SU 2TX
802.11ac VHT80		802.11ac VHT80 2TX	
802.11ax HE80(SU)		802.11ax HE80 RU(996T) 2TX	802.11ax HE80 SU 2TX
802.11ac VHT160		802.11ac VHT160 2TX	
802.11ax HE160(SU)		802.11ax HE160 RU(996T*2) 2TX	802.11ax HE160 SU 2TX

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5.4. WORST-CASE CONFIGURATION AND MODE

Both SISO and MIMO have been investigated and confirmed MIMO was the worst case set for radiated band edge and spurious emission tests.

The fundamentals of the EUT were investigated in three orthogonal orientations X, Y and Z on 2TX MIMO mode. It was determined that Y orientation was the worst-case orientation for 2TX MIMO mode.

Radiated and power line conducted tests were performed with EUT connected to AC power adapter as the worst-case configuration. Radiated harmonics spurious 1~18 GHz Low/Mid/High channels,18-40GHz were performed with the EUT set at the 2TX MIMO mode. Radiated emission below 1GHz and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

For Radiated spurious test, 802.11a 2TX mode has equal or higher output power and PSD results than other modes and therefore, it was set for full test. Spot-check was performed in 802.11n 2TX, 802.11ac 2TX or 802.11ax 2TX.

For Radiated band-edge test, 802.11a 2TX, 802.11n 2TX, 802.11ac 2TX, 802.11ax 2TX SU mode were fully tested except 802.11ax 2TX partial RU modes. 802.11ax SU mode resulted in radiated band-edge test is worse than partial RU modes; therefore, only SU mode was reported.

Simultaneous transmission with the Bluetooth and Wi-Fi were investigated, and no noticeable emission was found.

For 802.11ax mode, output power and PSD tests were investigated between all different tones and found that SU mode had the highest output power and RU 26T has the highest PSD readings; and therefore, conducted tests were performed on SU mode and RU 26T mode.

In case of 6dB Bandwidth, it was tested at the RU allocation with lowest tones number, RU 26Tones as the worst-case scenario.

Based on the baseline scan, the worst-case data rates were:
802.11a mode: 6 Mbps 2Tx
802.11n HT20 mode: MCS0 2Tx
802.11n HT40 mode: MCS0 2Tx
802.11ac VHT80 mode: MCS0 2Tx
802.11ac VHT160 mode: MCS0 2Tx
802.11ax HE20 mode: MCS0 2Tx
802.11ax HE40 mode: MCS0 2Tx
802.11ax HE80 mode: MCS0 2Tx
802.11ax HE160 mode: MCS0 2Tx

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5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Charger	SAMSUNG	EP-TA800	R37W61WENTASEA	N/A
Data Cable	SAMSUNG	EP-DN980	GH39-02117A	N/A

I/O CABLE

I/O Cable List						
Cable No.	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	DC Power	1	C Type	Shielded	1.0 m	N/A

TEST SETUP

The EUT is a stand-alone unit during the tests.
Test software exercised the EUT to enable NII mode.

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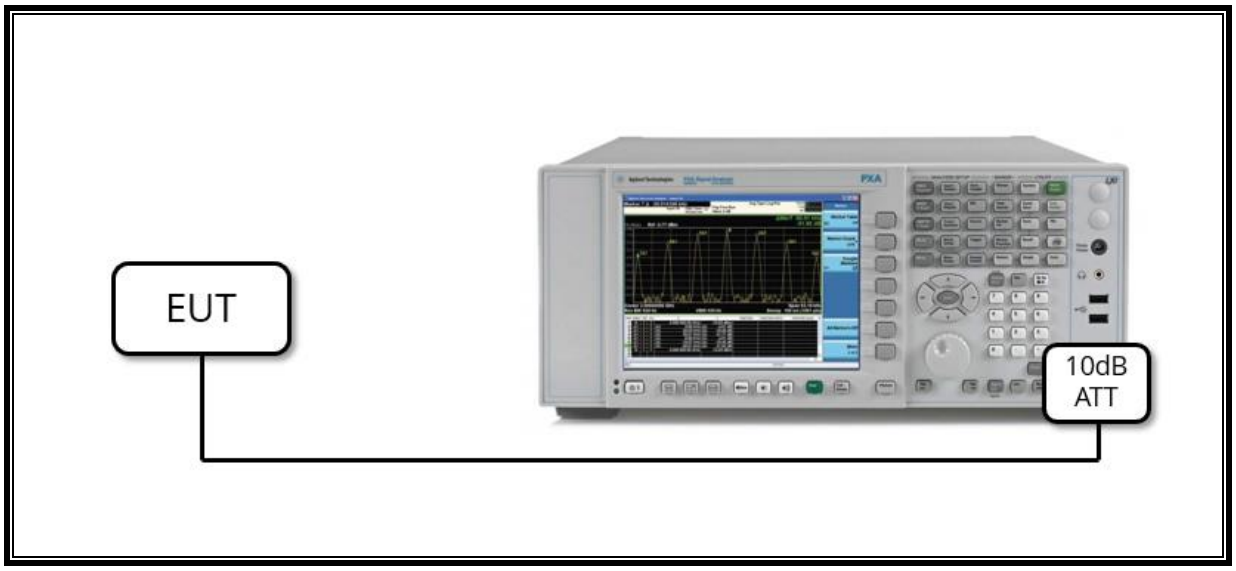
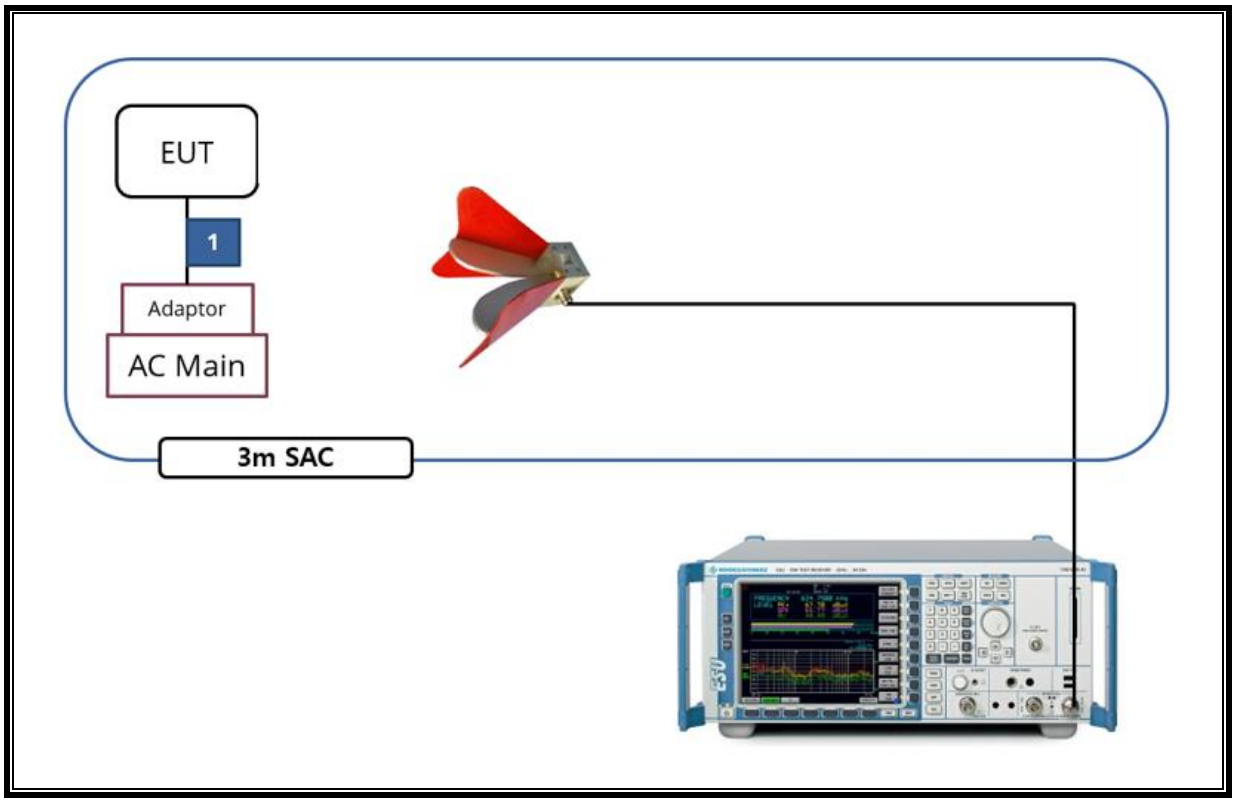
SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



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6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List				
Description	**Manufacturer**	**Model**	**S/N**	**Cal Due**
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	2024-08-15
Antenna, Horn, 18 GHz	ETS	3117	00168717	2024-08-21
Antenna, Horn, 18 GHz	ETS	3117	00218957	2025-01-08
Antenna, Horn, 40 GHz	ETS	3116C	00166155	2024-08-02
Preamplifier	ETS	3115-PA	00167475	2024-07-25
Preamplifier	ETS	3116C-PA	00168841	2024-07-25
Preamplifier, 1000 MHz	Sonoma	310N	341282	2024-07-24
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	2024-07-25
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029169	2024-07-24
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	2024-07-25
Spectrum Analyzer, 44 GHz	KEYSIGHT	N9040B	MY60080268	2025-01-03
Average Power Sensor	Agilent / HP	U2000	MY54270007	2024-07-23
Average Power Sensor	Agilent / HP	U2000	MY54260010	2024-07-24
Attenuator	PASTERNACK	PE7087-10	A001	2024-07-23
Attenuator	PASTERNACK	PE7087-10	A008	2024-07-27
Attenuator	PASTERNACK	PE7004-10	2	2024-07-23
Attenuator	PASTERNACK	PE7087-10	A009	2024-07-24
EMI Test Receive, 40 GHz	R&S	ESU40	100439	2024-07-23
EMI Test Receive, 40 GHz	R&S	ESU40	100457	2024-07-24
EMI Test Receive, 3 GHz	R&S	ESR3	101832	2024-07-23
Notch Filter	Micro-Tronics	BRM50702-02	G037	2024-07-24
Notch Filter	Micro-Tronics	BRM50716-2	006	2024-07-24
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	020	2024-07-24
High Pass Filter 3GHz	Micro-Tronics	HPM17543	020	2024-07-24
High Pass Filter 6GHz	Micro-Tronics	HPS17542	009	2024-07-23
LISN	R&S	ENV-216	101836	2024-07-23
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	2025-09-06
Termination	WEINSCHEL	M1406A	T09	2024-07-23
Attenuator	WEINSCHEL	WA76-30-21	A015	2024-07-24
UL Software				
Description	**Manufacturer**	**Model**	**Version**	
Radiated software	UL	UL EMC	Ver 9.5	
AC Line Conducted software	UL	UL EMC	Ver 9.5	

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7. SUMMARY TABLE

FCC Part Section	Test Description	Test Limit	Test Condition	Test Result
15.407(e)	6dB Band width (5.8GHz)	> 500kHz	Conducted	Complies
15.407 (a)(1)(iv)	TX Cond. Power (5.150-5.250)	< 24dBm		Complies
15.407 (a)(2)	TX Cond. Power (5.250-5.350 & 5.470-5.725)	< 24dBm or 11+10Log(26dB BW)		Complies
15.407 (a)(3)(i)	TX Cond. Power (5.725-5.850)	< 30dBm		Complies
15.407 (a)(3)(iii)	TX Cond. Power (5.850-5.895)	< 30dBm e.i.r.p.		Complies
15.407 (a)(1)(iv) & (a)(2)	PSD (5.150-5.250 5.250-5.350 & 5.470-5.725)	< 11dBm/MHz		Complies
15.407 (a)(3)	PSD (5.725-5.850)	< 30dBm/500kHz		Complies
15.407 (a)(3)(iii)	PSD (5.850-5.895)	< 14dBm/MHz e.i.r.p.		Complies
15.207 (a)	AC Power Line conducted emissions	Section 13	Radiated	Complies
15.407 (b) & 15.209	Radiated Spurious Emission	< 74dBuV/m PK < 54dBuV/m AV		Complies
15.407 (h)(2)	Dynamic Frequency Selection	N/A	Condcuted	Complies[Note]

Note. This EUT does not support channel puncturing.

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8. MEASUREMENT METHODS

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

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

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

99% Occupied BW : KDB 789033 D02 v02r01, Section II.D.

Conducted Output Power : KDB 789033 D02 v02r01, Section II.E.3.a(Method PM)

Conducted Output Power for Straddle Channel (ch144/142/138 for 20/40/80MHz BW):

KDB 789033 D02 v02r01, Section II.E.2.b(Method SA-1)

Power Spectral Density : KDB 789033 D02 v02r01, Section II.F.

Unwanted emissions in restricted bands : KDB 789033 D02 v02r01, Section II.G.3 – II.G.6.

Unwanted emissions in non-restricted bands : KDB 789033 D02 v02r01, Section II.G.3 – II.G.6.

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

UL KOREA LTD. Suwon Laboratory FORM ID: FCC_15E(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
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9. REFERENCE MEASUREMENTS RESULTS

9.1. ON TIME AND DUTY CYCLE RESULTS

Mode	On Time [ms]	Period [ms]	Duty Cycle X [Linear]	Duty Cycle X [%]	Duty Cycle Correction Factor[dB]
802.11a MIMO	2.828	2.927	0.966	96.618	0.15
802.11n(HT20) MIMO	5.031	5.131	0.981	98.051	-
802.11n(HT40) MIMO	5.347	5.446	0.982	98.182	-
802.11ac(VHT80) MIMO	1.680	1.778	0.945	94.488	0.25
802.11ac(VHT160) MIMO	1.752	1.850	0.947	94.703	0.24

Mode	ANT.	Tone	On Time [ms]	Period [ms]	Duty Cycle X [Linear]	Duty Cycle X [%]	Duty Cycle Correction Factor[dB]
802.11ax HE20	MIMO	26T	2.596	2.615	0.993	99.273	-
		SU	5.452	5.471	0.997	99.653	-
802.11ax HE40	MIMO	26T	2.595	2.613	0.993	99.311	-
		SU	5.452	5.470	0.997	99.671	-
802.11ax HE80	MIMO	26T	2.595	2.614	0.993	99.273	-
		SU	5.451	5.470	0.997	99.653	-
802.11ax HE160	MIMO	26T	2.595	2.614	0.993	99.273	-
		SU	5.452	5.469	0.997	99.689	-

Note. If the duty cycle is over 98%, compensation is not included in average measurement.

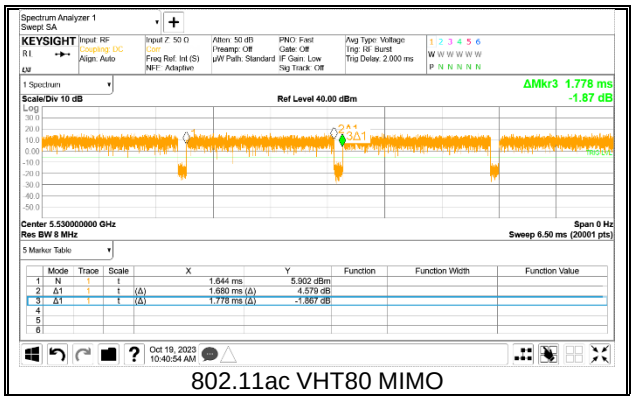
LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 789033 D02 v02r01 Zero-Span Spectrum Analyzer Method.

DUTY CYCLE SAMPLE PLOTS



802.11ac VHT80 MIMO

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9.2. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

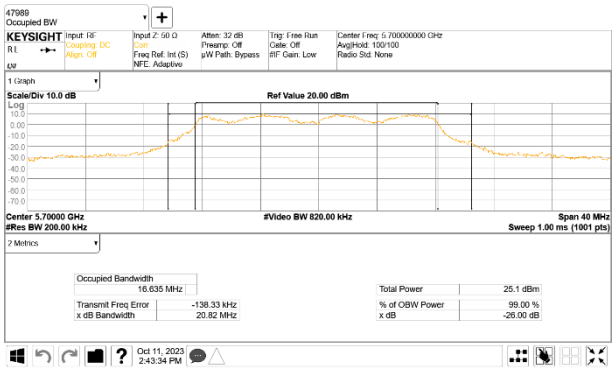
Reference to 789033 D02 General UNII Test Procedures New Rules v02r01: The transmitter output is connected to a spectrum analyzer with the RBW set to approximately 1% of EBW, the VBW > RBW, peak detector and max hold.

RESULTS

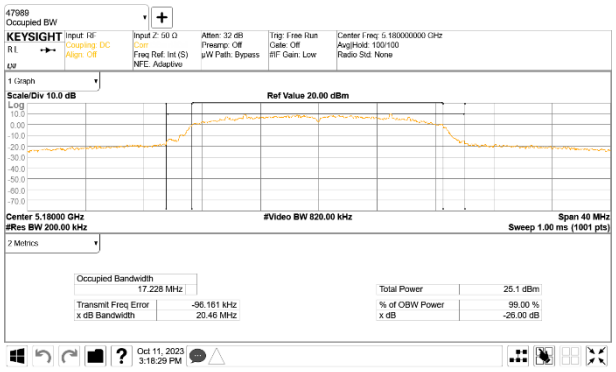
- Please refer to the next page

WORST CASE TEST PLOTS

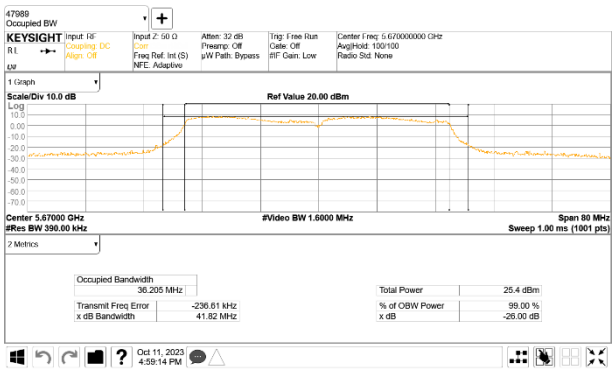
802.11a / ANT1 / 5700 MHz



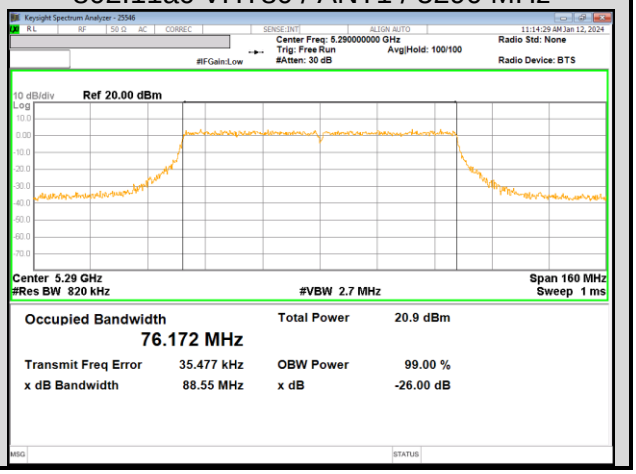
802.11n HT20 / ANT1 / 5180 MHz



802.11n HT40 / ANT1 / 5670 MHz



802.11ac VHT80 / ANT1 / 5290 MHz



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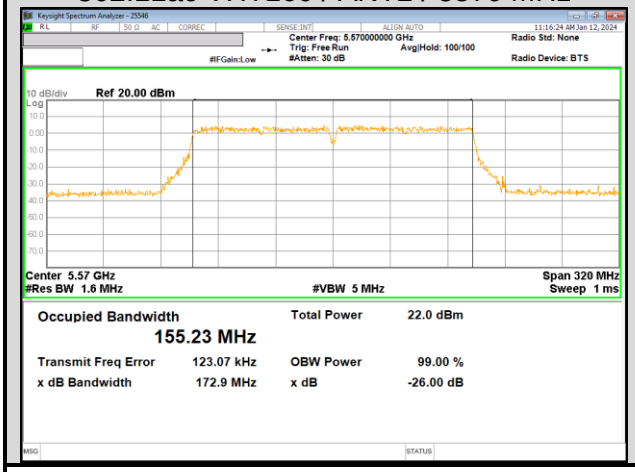
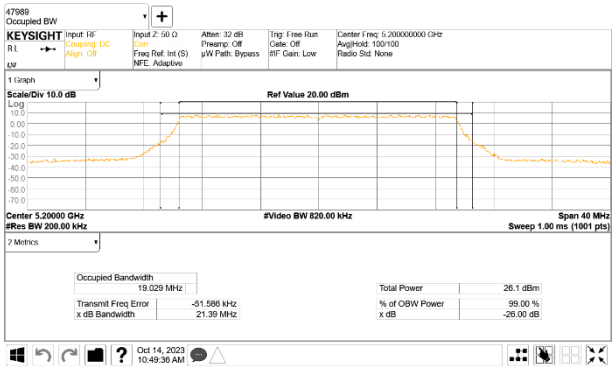
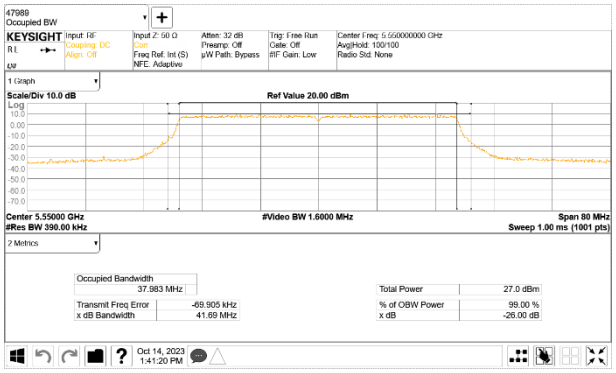
802.11ac VHT160 / ANT2 / 5570 MHz



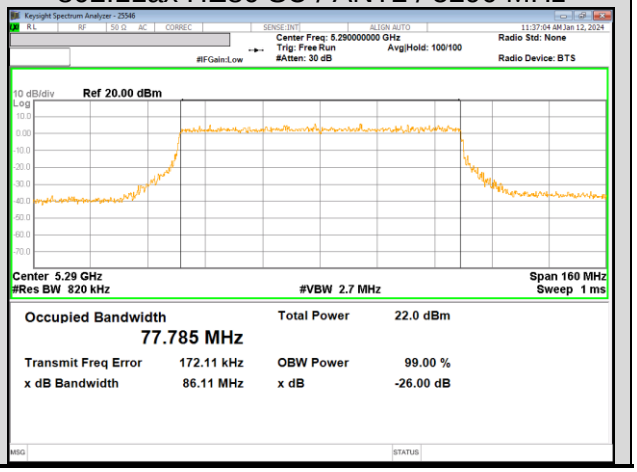
802.11ax HE20 SU / ANT2 / 5200 MHz



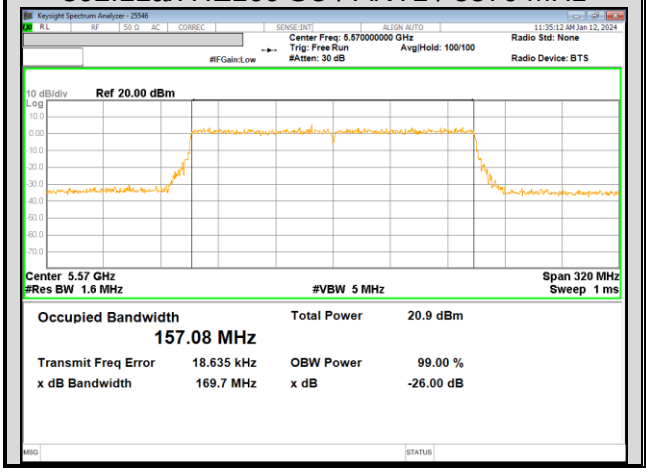
802.11ax HE40 SU / ANT2 / 5550 MHz



802.11ax HE80 SU / ANT2 / 5290 MHz



802.11ax HE160 SU / ANT1 / 5570 MHz



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9.2.1. 802.11a

Band	Channel	Center Freq. [MHz]	26 dB BW [MHz]		Worst	99% BW [MHz]	
			ANT1	ANT2		ANT1	ANT2
UNII-1Note	36	5180	21.46	20.84	20.82	16.63	16.60
	40	5200	21.39	20.82		16.66	16.59
	48	5240	21.51	21.16		16.68	16.58
UNII-2A Note	52	5260	24.94	21.13	20.88	16.87	16.60
	60	5300	20.88	21.12		16.58	16.61
	64	5320	27.87	21.14		16.92	16.58
UNII-2C	100	5500	20.92	21.13	20.82		
	116	5580	21.40	21.31			
	140	5700	20.82	21.12			

Note. As a result of 99% bandwidth test, the bandwidth of UNII-1 does not interfere with UNII-2A.

9.2.2. 802.11n HT20

Band	Channel	Center Freq. [MHz]	26 dB BW [MHz]		Worst	99% BW [MHz]	
			ANT1	ANT2		ANT1	ANT2
UNII-1 Note	36	5180	20.46	21.21	20.46	17.23	17.69
	40	5200	21.63	21.16		17.39	17.69
	48	5240	20.58	21.15		17.26	17.69
UNII-2A Note	52	5260	22.58	21.23	21.23	17.42	17.71
	60	5300	21.39	21.58		17.52	17.71
	64	5320	21.30	21.25		17.61	17.72
UNII-2C	100	5500	21.03	21.29	20.94		
	116	5580	20.94	21.50			
	140	5700	21.06	21.18			

Note. As a result of 99% bandwidth test, the bandwidth of UNII-1 does not interfere with UNII-2A.

9.2.3. 802.11n HT40

Band	Channel	Center Freq. [MHz]	26 dB BW [MHz]		Worst	99% BW [MHz]	
			ANT1	ANT2		ANT1	ANT2
UNII-1 Note	38	5190	42.66	42.09	42.09	36.75	36.38
	46	5230	51.33	42.54		37.05	36.40
UNII-2A Note	54	5270	48.77	42.46	42.46	37.01	36.38
	62	5310	46.54	42.51		36.82	36.33
UNII-2C	102	5510	41.92	41.95	41.82		
	110	5550	42.92	42.97			
	134	5670	41.82	42.15			

Note. As a result of 99% bandwidth test, the bandwidth of UNII-1 does not interfere with UNII-2A.

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9.2.4. 802.11ac VHT80

Band	Channel	Center Freq. [MHz]	26 dB BW [MHz]		Worst	99% BW [MHz]	
			ANT1	ANT2		ANT1	ANT2
UNII-1 Note	42	5210	98.60	90.48	90.48	76.69	76.13
UNII-2A Note	58	5290	88.55	89.20	88.55	76.17	76.17
UNII-2C	106	5530	92.73	89.12	88.71		
	122	5610	93.01	88.71			

Note. As a result of 99% bandwidth test, the bandwidth of UNII-1 does not interfere with UNII-2A.

9.2.5. 802.11ac VHT160

Band	Channel	Center Freq. [MHz]	26 dB BW [MHz]		Worst	99% BW [MHz]	
			ANT1	ANT2		ANT1	ANT2
UNII-1&2A	50	5250	175.10	175.70	175.10		
UNII-2C	114	5570	178.00	172.90	172.90		

9.2.6. 802.11ax HE20

Band	Channel	Center Freq. [MHz]	26 dB BW [MHz]		Worst	99% BW [MHz](Note)	
			ANT1	ANT2		ANT1	ANT2
UNII-1 Note	36	5180	21.59	21.55	21.39	19.06	19.06
	40	5200	22.12	21.39		19.10	19.03
	48	5240	22.11	21.69		19.15	19.05
UNII-2A Note	52	5260	21.80	21.67	21.55	19.09	19.06
	60	5300	22.16	21.55		19.09	19.06
	64	5320	21.68	21.58		19.11	19.07
UNII-2C	100	5500	21.65	21.39	21.39		
	116	5580	21.54	21.75			
	140	5700	21.44	21.48			

Note. As a result of 99% bandwidth test, the bandwidth of UNII-1 does not interfere with UNII-2A.

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9.2.7. 802.11ax HE40

Band	Channel	Center Freq. [MHz]	26 dB BW [MHz]		Worst	99% BW [MHz](Note)	
			ANT1	ANT2		ANT1	ANT2
UNII-1 Note	38	5190	42.57	41.97	41.97	38.04	37.98
	46	5230	60.30	42.17		38.19	37.97
UNII-2A Note	54	5270	57.19	41.93	41.93	38.17	37.99
	62	5310	42.27	41.99		38.00	37.97
UNII-2C	102	5510	42.70	42.86	41.69		
	110	5550	43.98	41.69			
	134	5670	42.33	42.22			

Note. As a result of 99% bandwidth test, the bandwidth of UNII-1 does not interfere with UNII-2A.

9.2.8. 802.11ax HE80

Band	Channel	Center Freq. [MHz]	26 dB BW [MHz]		Worst	99% BW [MHz](Note)	
			ANT1	ANT2		ANT1	ANT2
UNII-1 Note	42	5210	88.72	87.31	87.31	77.81	77.76
UNII-2A Note	58	5290	86.37	86.11	86.11	77.72	77.79
UNII-2C	106	5530	87.94	87.92	87.56		
	122	5610	88.25	87.56			

Note. As a result of 99% bandwidth test, the bandwidth of UNII-1 does not interfere with UNII-2A.

9.2.9. 802.11ax HE160

Band	Channel	Center Freq. [MHz]	26 dB BW [MHz]		Worst	99% BW [MHz](Note)	
			ANT1	ANT2		ANT1	ANT2
UNII-1&2A	50	5250	175.90	171.50	171.50		
UNII-2C	114	5570	169.70	170.20	169.70		

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9.2.10. STRADDLE CHANNEL

Mode	Channel	Center Freq. [MHz]	26 dB BW [MHz]			
			ANT1		ANT2	
			UNII-2C	UNII-3	UNII-2C	UNII-3
802.11a	Straddle	5720	15.43	5.46	15.62	5.48
802.11n HT20	Straddle	5720	15.68	5.72	15.61	5.58
802.11n HT40	Straddle	5710	36.18	5.68	36.12	5.87
802.11ac VHT80	Straddle	5690	81.01	10.42	79.54	9.53
802.11ax HE20(SU)	Straddle	5720	16.09	5.91	15.72	5.58
802.11ax HE40(SU)	Straddle	5710	36.06	6.16	35.85	5.94
802.11ax HE80(SU)	Straddle	5690	79.70	9.37	78.93	8.73

9.2.11. 802.11ax HE20(RU)

Band Mode	Center Freq. [MHz]	Tones	RU offset	26 dB BW [MHz]		99% BW [MHz]	
				ANT1	ANT2	ANT1	ANT2
UNII-1 Note	5180	26T	0	19.86	19.67	18.34	18.23
			4	18.42	18.21	17.18	17.10
			8	19.59	19.65	18.20	18.26
	5200		0	19.82	19.69	18.33	18.24
			4	18.37	18.18	17.20	17.06
			8	19.68	19.64	18.25	18.23
	5240		0	19.82	19.58	18.30	18.26
			4	18.39	18.22	17.21	17.08
			8	19.55	19.65	18.25	18.24
UNII-2A Note	5260	26T	0	19.78	19.61	18.15	18.29
			4	18.36	18.21	17.13	17.07
			8	19.57	19.64	18.30	18.23
	5300		0	19.76	19.62	17.98	18.24
			4	18.32	18.22	17.02	17.07
			8	19.52	19.65	18.34	18.21
	5320		0	19.79	19.71	18.12	18.24
			4	18.36	18.22	17.12	17.07
			8	19.68	19.66	18.38	18.23
UNII-2C	5500	26T	0	19.82	19.65		
			4	18.33	18.21		
			8	19.73	19.70		
	5580		0	19.73	19.57		
			4	18.33	18.21		
			8	19.75	19.69		
	5700		0	19.78	19.70		
			4	18.39	18.19		
			8	19.85	19.67		

Note. As a result of 99% bandwidth test, the bandwidth of UNII-1 does not interfere with UNII-2A.

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9.2.12. 802.11ax HE40(RU)

Band	Center Freq. [MHz]	Tones	RU offset	26 dB BW [MHz]		99% BW [MHz]	
				ANT1	ANT2	ANT1	ANT2
UNII-1 Note	5190	26T	0	19.99	19.92	18.32	18.21
			9	22.23	21.27	19.82	19.11
			17	20.10	20.09	18.54	18.37
	5230		0	20.05	19.81	18.29	18.20
			9	22.18	21.31	19.77	19.23
			17	20.33	20.08	18.61	18.37
UNII-2A Note	5270	26T	0	20.11	19.79	18.41	18.20
			9	22.66	21.39	20.46	19.25
			17	20.20	20.19	18.61	18.34
	5310		0	20.19	19.80	18.35	18.19
			9	22.41	21.39	19.96	19.19
			17	20.66	20.21	18.87	18.39
UNII-2C	5510	26T	0	20.15	19.84		
			9	22.11	21.23		
			17	20.97	20.16		
	5550		0	20.06	19.84		
			9	22.31	21.58		
			17	21.09	20.22		
	5670		0	20.15	19.79		
			9	21.41	21.25		
			17	20.48	20.21		

Note. As a result of 99% bandwidth test, the bandwidth of UNII-1 does not interfere with UNII-2A.

9.2.13. 802.11ax HE80(RU)

Band	Center Freq. [MHz]	Tones	RU offset	26 dB BW [MHz]		99% BW [MHz]	
				ANT1	ANT2	ANT1	ANT2
UNII-1 Note	5210	26T	0	23.12	22.17	20.49	19.65
			18	78.48	78.24	73.76	74.70
			36	23.65	22.33	21.81	19.99
UNII-2A Note	5290	26T	0	23.74	21.54	20.88	19.27
			18	78.57	78.23	74.11	74.74
			36	23.45	22.15	21.77	19.54
UNII-2C	5530	26T	0	23.46	21.84		
			18	78.80	78.24		
			36	24.63	22.59		
	5610	26T	0	23.65	21.41		
			18	78.90	78.22		
			36	25.07	22.11		

Note. As a result of 99% bandwidth test, the bandwidth of UNII-1 does not interfere with UNII-2A.

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9.2.14. 802.11ax HE160(RU)

Band	Center Freq. [MHz]	Tones	RU offset	26 dB BW [MHz]		99% BW [MHz]	
				ANT1	ANT2	ANT1	ANT2
UNII-1&2A	5250	26T	0 L	27.73	25.58	30.48	22.09
			0 U	30.37	26.07	28.91	24.08
			36 U	27.50	25.99	28.56	22.06
UNII-2C	5570	26T	0 L	26.92	25.46		
			0 U	28.47	26.45		
			36 U	29.57	25.52		

9.2.15. 802.11ax STRADDLE CHANNEL(RU)

Band	Mode	Center Freq. [MHz]	Tones	RU offset	26 dB BW [MHz]			
					ANT1		ANT2	
					UNII-2C	UNII-3	UNII-2C	UNII-3
Straddle Channel	HE20	5720	26T	6	14.22	4.14	14.07	3.98
	HE40	5710		15	14.78	4.00	14.25	4.03
	HE80	5690		34	15.66	4.86	14.70	4.38

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10. ANTENNA PORT TEST RESULTS

10.1. 6 dB BANDWIDTH

LIMITS

FCC §15.407
The minimum 6 dB bandwidth shall be at least 500 kHz.

TEST PROCEDURE

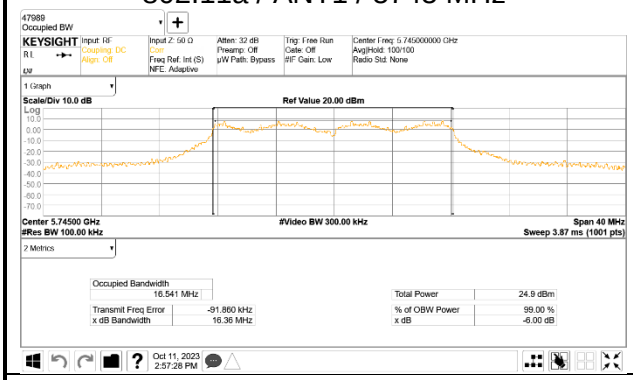
Reference to 789033 D02 General UNII Test Procedures New Rules v02r01: The transmitter output is connected to a spectrum analyzer with the RBW set to100KHz, the VBW >= 3 x RBW, peak detector and max hold.

RESULTS

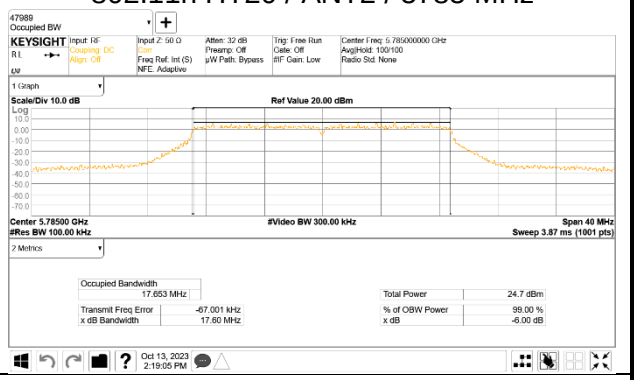
- Please refer to the next page

WORST CASE TEST PLOTS

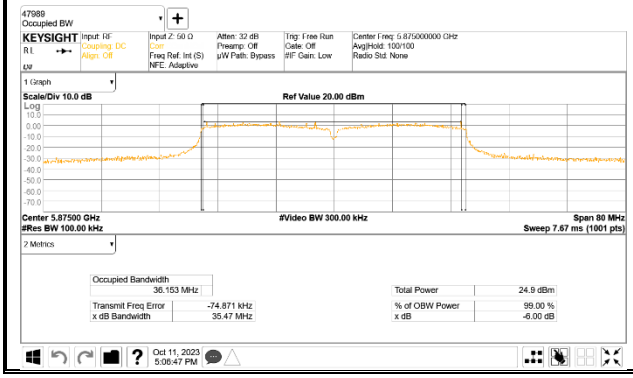
802.11a / ANT1 / 5745 MHz



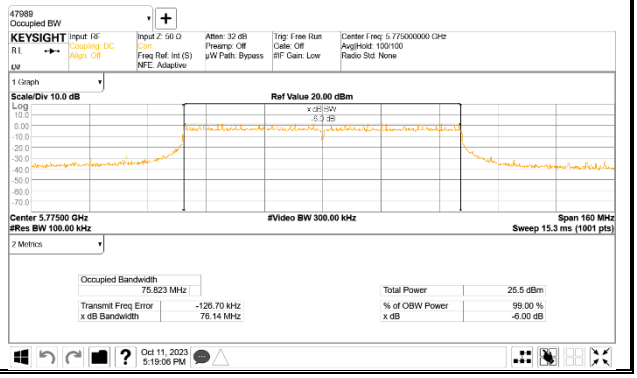
802.11n HT20 / ANT2 / 5785 MHz



802.11n HT40 / ANT1 / 5875 MHz



802.11ac VHT80 / ANT1 / 5775 MHz



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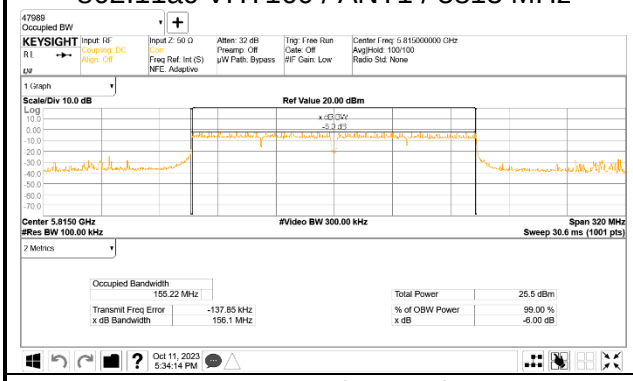
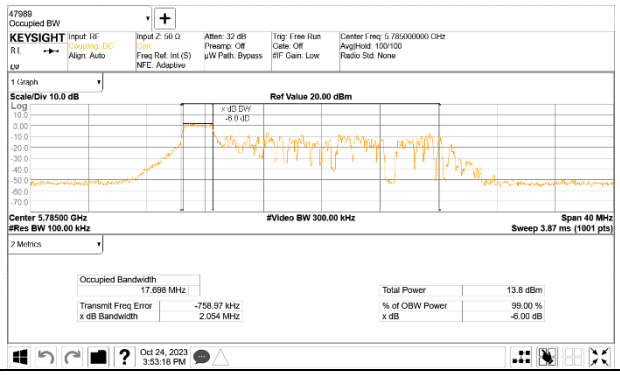
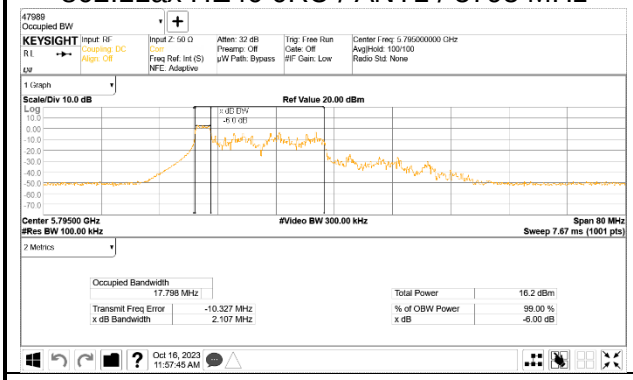
802.11ac VHT160 / ANT1 / 5815 MHz



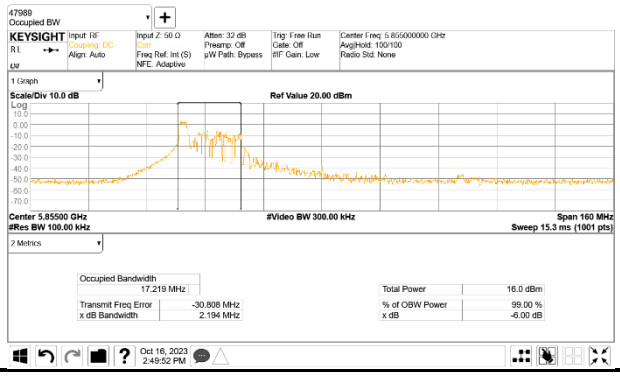
802.11ax HE20 0RU / ANT1 / 5785 MHz



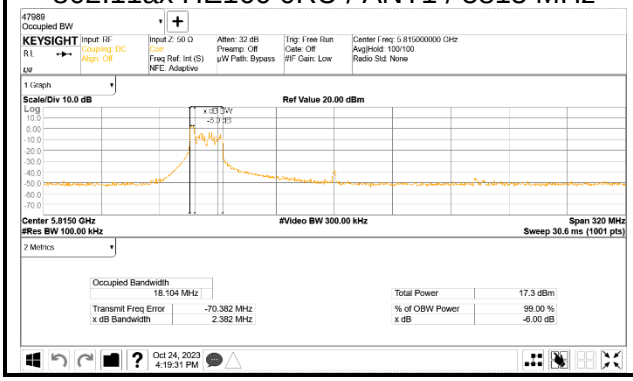
802.11ax HE40 0RU / ANT1 / 5795 MHz



802.11ax HE80 0RU / ANT1 / 5855 MHz



802.11ax HE160 0RU / ANT1 / 5815 MHz



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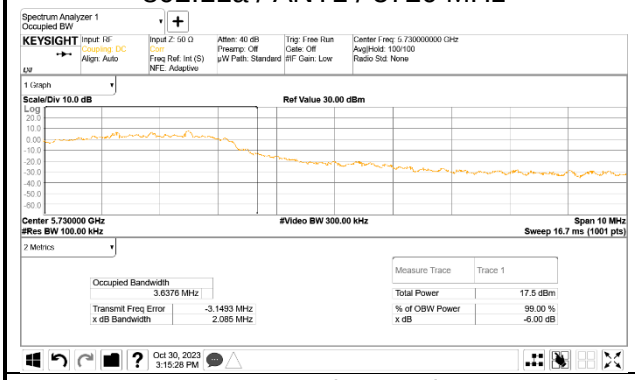
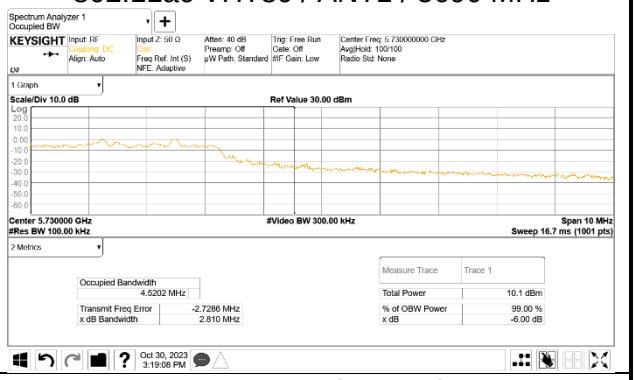
WORST CASE TEST PLOTS(STRADDLE CHANNELS)

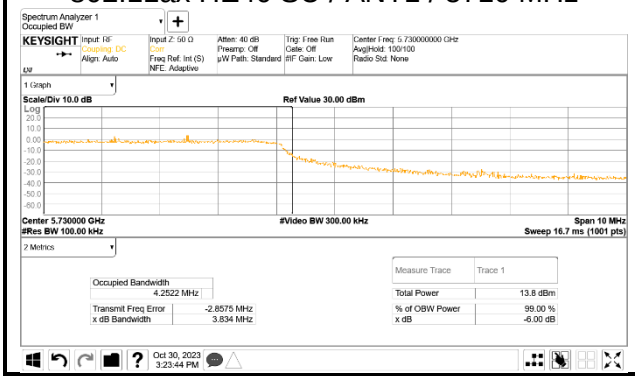
802.11a / ANT1 / 5720 MHz



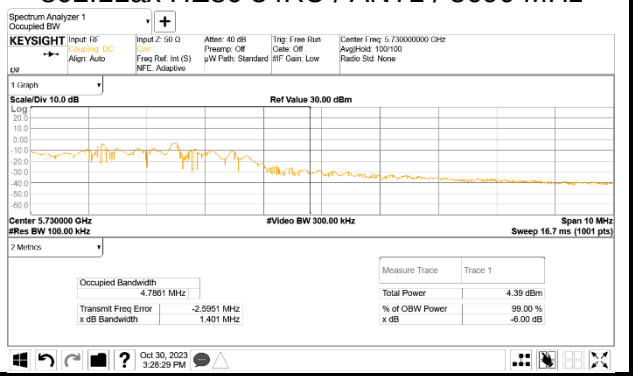
802.11ac VHT80 / ANT1 / 5690 MHz



802.11ax HE40 SU / ANT1 / 5710 MHz



802.11ax HE80 34RU / ANT1 / 5690 MHz



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10.1.1. STRADDLE CHANNEL

Mode	Channel	Center Freq. [MHz]	6 dB BW [MHz]	
			UNII-3	
			ANT1	ANT1
802.11a	Straddle	5720	**2.09**	3.15
802.11n HT20	Straddle	5720	3.77	3.78
802.11n HT40	Straddle	5710	3.14	3.15
802.11ac VHT80	Straddle	5690	**2.81**	3.15
802.11ax HE20(SU)	Straddle	5720	4.46	4.45
802.11ax HE40(SU)	Straddle	5710	**3.83**	4.12
802.11ax HE80(SU)	Straddle	5690	3.87	4.12

Band	Mode	Center Freq. [MHz]	Tones	RU offset	6 dB BW [MHz]	
					UNII-3	
					ANT1	ANT2
Straddle Channel	**HE20**	5720	26T	6	2.52	2.48
	HE40	5710		15	1.43	3.49
	HE80	5690		34	**1.40**	3.52

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10.1.2. UNII-3 & 4 BAND

Mode	Channel	Center Freq. [MHz]	6 dB BW [MHz]		Worst	Minimum Limit [MHz]
			ANT1	ANT2		
802.11a	149	5745	16.36	16.38	16.36	0.5
	157	5785	16.36	16.38		
	165	5825	16.39	16.37		
	169	5845	16.38	16.38		
	173	5865	16.38	16.41		
	177	5885	16.38	16.39		
802.11n HT20	149	5745	17.62	17.62	17.60	
	157	5785	17.62	17.60		
	165	5825	17.63	17.62		
	169	5845	17.63	17.61		
	173	5865	17.63	17.62		
	177	5885	17.62	17.62		
802.11n HT40	151	5755	35.82	36.42	35.47	
	159	5795	35.81	36.46		
	167	5835	35.74	36.44		
	175	5875	35.47	36.44		
802.11ac VHT80	155	5775	76.14	76.51	76.14	
	171	5855	76.32	76.49		
802.11ac VHT160	163	5815	156.10	156.40	156.10	
802.11ax HE20(SU)	149	5745	18.96	18.99	18.47	
	157	5785	18.88	19.00		
	165	5825	18.87	18.99		
	169	5845	18.66	19.01		
	173	5865	18.83	18.89		
	177	5885	18.47	19.01		
802.11ax HE40(SU)	151	5755	38.11	38.19	37.89	
	159	5795	38.08	38.34		
	167	5835	38.02	38.15		
	175	5875	38.04	37.89		
802.11ax HE80(SU)	155	5775	77.92	78.22	77.92	
	171	5855	78.00	78.01		
802.11ax HE160(SU)	163	5815	158.00	158.10	158.00	

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10.1.3. UNII-3 & 4 BAND(RU)

Mode	Channel	Center Freq. [MHz]	Tones	RU offset	6 dB BW [MHz]		Minimum Limit [MHz]
					ANT1	ANT2	
HE20	149	5745	26T	0	2.08	2.12	0.5
	157	5785			2.05	2.13	
	165	5825			2.09	2.12	
	169	5845			2.06	2.07	
	173	5865			2.07	2.06	
	177	5885			2.09	2.08	
	Minimum 6dB Bandwidth				2.05		
HE40	151	5755	26T	0	2.15	2.17	
	159	5795			2.11	2.18	
	167	5835			2.18	2.15	
	175	5875			2.13	2.17	
	Minimum 6dB Bandwidth				2.11		
HE80	155	5775	26T	0	2.24	2.26	
	171	5855			2.19	2.21	
	Minimum 6dB Bandwidth				2.19		
HE160	163	5815	26T	0	2.38	2.40	
	Minimum 6dB Bandwidth				2.38		

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10.2. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a)(1)(iv), (a)(2), (a)(3)(i), (a)(3)(iii)

FCC

For 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.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, 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.

For the band 5.725-5.850 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz 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.

For client devices operating under the control of an indoor access point in the 5.850-5.895 GHz band, the maximum power spectral density must not exceed 14 dBm e.i.r.p. in any 1-megahertz band, and the maximum e.i.r.p. over the frequency band of operation must not exceed 30 dBm. Client devices operating on a channel that spans the 5.725-5.850 GHz and 5.850-5.895 GHz bands must not exceed an e.i.r.p. of 30 dBm.

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TEST PROCEDURE

KDB 789033 Method PM is used for output power. Duty correction factor has already been applied to the power meter and the average power value is measured.

KDB 789033 Method SA-2 is used for PSD. RBW set to 1MHz(500kHz for the band 5.725-5.85 GHz, the VBW >= 3 x RBW, RMS detector and trace averaging).

Straddle Channel(UNII-2C&3)

KDB 789033 Method SA-2 is used for only power of straddle Ch. and PSD. RBW set to 1MHz(500kHz for the band 5.725-5.85 GHz, the VBW >= 3 x RBW, RMS detector and trace averaging). Band power function used for power and peak marker value of the spectrum is used for PSD.

Straddle Channel(UNII-3&4)

KDB 789033 Method PM is used for total power of straddle Ch.
(verification that both limit of UNII-3 and UNII-4 power & e.i.r.p. are satisfied)
KDB 789033 Method SA-2 is used for only PSD of straddle Ch. RBW set to 1MHz(500kHz for the band 5.725-5.925 GHz, the VBW >= 3 x RBW, RMS detector and trace averaging).
Peak marker value of the spectrum is used for PSD. For the band 5.850-5.925 GHz, The correlated gain is added to the result to convert e.i.r.p.

DIRECTIONAL ANTENNA GAIN

For OUTPUT POWER and PSD: The TX chains are correlated and the antenna gains are unequal among the chains. The directional gain is:

Frequency Band [MHz]	ANT1 Gain [dBi]	ANT2 Gain [dBi]	Correlated Chains Directional Gain [dBi]
UNII 1 5150 - 5250	-3.93	-5.51	-1.67
UNII 2A 5250 - 5350	-3.30	-5.50	-1.32
UNII 2C 5470 - 5725	-2.90	-4.22	-0.52
UNII 3 5725 - 5850	-3.37	-4.23	-0.78
UNII 4 5850 - 5925	-2.70	-4.57	-0.57

Note. Since the correrated gain does not exceed 6dBi, bands except for UNII-4 do not consider the antenna gain.

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10.2.1. 802.11a MODE

Output Power Results

Band	Channel	Center Freq. [MHz]	Average Power [dBm]		Direct. Gain [dBi]	Corr'd Power [dBm]	Limit [dBm]
			ANT1	ANT2			
UNII-1	36	5180	17.00	17.48		20.26	23.98
	40	5200	17.35	17.44		20.41	
	48	5240	17.47	17.15		20.32	
UNII-2A	52	5260	17.85	17.45		20.66	23.98
	60	5300	17.53	17.25		20.40	
	64	5320	17.62	16.91		20.29	
UNII-2C	100	5500	17.93	17.44		20.70	23.98
	116	5580	17.94	17.38		20.68	
	140	5700	17.87	17.62		20.76	
UNII-3	149	5745	17.84	17.55		20.71	30.00
	157	5785	17.73	17.52		20.64	
	165	5825	17.92	17.53		20.74	
UNII-3&4	169	5845	17.78	17.75		20.78	30.00
		5845	17.78	17.75	-0.57	20.21	30.00(e.i.r.p)
UNII-4	173	5865	17.95	17.78	-0.57	20.31	30.00(e.i.r.p)
	177	5885	17.68	17.86	-0.57	20.21	

* Calculation of Output Power : Average Power = Meas Power + Duty CF[dB]
Corr'd Power = Ant1 Average Power + Ant2 Average Power(in case of UNII-4: added directional gain)

PSD Results

Band	Channel	Center Freq. [MHz]	Meas PSD [dBm/MHz]		DCCF.	Direct. Gain [dBi]	Corr'd PSD [dBm]	Limit [dBm/ MHz]
			ANT1	ANT2				
UNII-1	36	5180	7.73	6.49	0.15		10.31	11.00
	40	5200	7.58	6.24	0.15		10.12	
	48	5240	7.62	6.10	0.15		10.09	
UNII-2A	52	5260	8.14	6.43	0.15		10.53	11.00
	60	5300	**8.61**	**6.51**	**0.15**		**10.85**	
	64	5320	8.71	6.31	0.15		10.83	
UNII-2C	100	5500	7.30	6.78	0.15		10.21	11.00
	116	5580	7.68	6.01	0.15		10.09	
	140	5700	8.78	5.60	0.15		10.64	
UNII-3	149	5745	5.59	3.14	0.15		7.70	30.00/500kHz
	157	5785	5.33	3.22	0.15		7.56	
	165	5825	5.48	3.29	0.15		7.68	
UNII-3&4	169	5845	5.61	3.93	0.15		8.01	30.00/500kHz
		5845	8.25	6.51	0.15	-0.57	10.06	14.00(e.i.r.p.)
UNII-4	173	5865	8.39	7.51	0.15	-0.57	10.56	14.00(e.i.r.p.)
	177	5885	7.94	7.40	0.15	-0.57	10.27	

* Calculation of PSD: Corr'd PSD = Ant1 PSD + Ant2 PSD + Duty CF [dB] (in case of UNII-4: added directional gain)

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10.2.2. 802.11n HT20 MODE

Output Power Results

Band	Channel	Center Freq. [MHz]	Average Power [dBm]		Direct. Gain [dBi]	Corr'd Power [dBm]	Limit [dBm]
			ANT1	ANT2			
UNII-1	36	5180	17.51	17.61		20.57	23.98
	40	5200	17.80	17.62		20.72	
	48	5240	17.44	16.87		20.17	
UNII-2A	52	5260	17.75	17.03		20.42	23.98
	60	5300	17.93	17.36		20.66	
	64	5320	17.90	16.98		20.47	
UNII-2C	100	5500	17.49	17.00		20.26	23.98
	116	5580	17.29	17.10		20.21	
	140	5700	17.05	17.27		20.17	
UNII-3	149	5745	17.51	17.75		20.64	30.00
	157	5785	17.36	17.77		20.58	
	165	5825	17.52	17.72		20.63	
UNII-3&4	169	5845	17.58	17.90		20.75	30.00
		5845	17.58	17.90	-0.57	20.18	30.00(e.i.r.p)
UNII-4	173	5865	17.76	17.84	-0.57	20.24	30.00(e.i.r.p)
	177	5885	17.33	17.92	-0.57	20.08	

* Calculation of Output Power : Average Power = Meas Power + Duty CF[dB]
Corr'd Power = Ant1 Average Power + Ant2 Average Power(in case of UNII-4: added directional gain)

PSD Results

Band	Channel	Center Freq. [MHz]	Meas PSD [dBm/MHz]		DCCF.	Direct. Gain [dBi]	Corr'd PSD [dBm]	Limit [dBm/ MHz]
			ANT1	ANT2				
UNII-1	36	5180	8.14	5.85	0.00		10.15	11.00
	40	5200	8.35	5.82	0.00		10.28	
	48	5240	8.22	5.25	0.00		9.99	
UNII-2A	52	5260	8.39	5.53	0.00		10.20	11.00
	60	5300	**8.75**	**6.01**	**0.00**		**10.60**	
	64	5320	8.59	5.79	0.00		10.42	
UNII-2C	100	5500	7.07	5.58	0.00		9.40	11.00
	116	5580	7.73	5.74	0.00		9.86	
	140	5700	7.70	5.83	0.00		9.88	
UNII-3	149	5745	3.98	3.30	0.00		6.66	30.00/500kHz
	157	5785	4.09	3.43	0.00		6.78	
	165	5825	4.35	3.46	0.00		6.94	
UNII-3&4	169	5845	4.66	3.56	0.00		7.16	30.00/500kHz
		5845	7.92	6.21	0.00	-0.57	9.59	14.00(e.i.r.p.)
UNII-4	173	5865	8.07	6.48	0.00	-0.57	9.79	14.00(e.i.r.p.)
	177	5885	7.75	6.48	0.00	-0.57	9.60	

* Calculation of PSD: Corr'd PSD = Ant1 PSD + Ant2 PSD + Duty CF [dB] (in case of UNII-4: added directional gain)

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10.2.3. 802.11n HT40 MODE

Output Power Results

Band	Channel	Center Freq. [MHz]	Average Power [dBm]		Direct. Gain [dBi]	Corr'd Power [dBm]	Limit [dBm]
			ANT1	ANT2			
UNII-1	38	5190	15.48	15.56		18.53	23.98
	46	5230	17.53	17.50		20.53	
UNII-2A	54	5270	17.44	17.34		20.40	23.98
	62	5310	16.02	15.78		18.91	
UNII-2C	102	5510	14.98	14.48		17.75	23.98
	110	5550	17.49	17.33		20.42	
	134	5670	17.37	17.25		20.32	
UNII-3	151	5755	17.33	17.22		20.29	30.00
	159	5795	17.35	17.27		20.32	
UNII-3&4	167	5835	17.48	17.28		20.39	30.00
		5835	17.48	17.28	-0.57	19.82	30.00(e.i.r.p)
UNII-4	175	5875	17.41	17.56	-0.57	19.93	30.00(e.i.r.p)

* Calculation of Output Power : Average Power = Meas Power + Duty CF[dB]
Corr'd Power = Ant1 Average Power + Ant2 Average Power(in case of UNII-4: added directional gain)

PSD Results

Band	Channel	Center Freq. [MHz]	Meas PSD [dBm/MHz]		DCCF.	Direct. Gain [dBi]	Corr'd PSD [dBm]	Limit [dBm/ MHz]
			ANT1	ANT2				
UNII-1	38	5190	3.32	1.24	0.00		5.41	11.00
	46	5230	5.21	2.87	0.00		7.21	
UNII-2A	54	5270	**5.34**	**2.82**	**0.00**		**7.27**	11.00
	62	5310	5.33	1.66	0.00		6.88	
UNII-2C	102	5510	2.82	0.21	0.00		4.72	11.00
	110	5550	5.09	3.02	0.00		7.19	
	134	5670	4.99	3.00	0.00		7.12	
UNII-3	151	5755	1.45	0.13	0.00		3.85	30.00/500kHz
	159	5795	1.47	-0.08	0.00		3.77	
UNII-3&4	167	5835	1.57	0.06	0.00		3.89	30.00/500kHz
		5835	2.42	2.86	0.00	-0.57	5.09	14.00(e.i.r.p.)
UNII-4	175	5875	4.49	3.28	0.00	-0.57	6.37	14.00(e.i.r.p.)

* Calculation of PSD: Corr'd PSD = Ant1 PSD + Ant2 PSD + Duty CF [dB] (in case of UNII-4: added directional gain)

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10.2.4. 802.11ac VHT80 MODE

Output Power Results

Band	Channel	Center Freq. [MHz]	Average Power [dBm]		Direct. Gain [dBi]	Corr'd Power [dBm]	Limit [dBm]
			ANT1	ANT2			
UNII-1	42	5210	15.78	15.02		18.43	23.98
UNII-2A	58	5290	14.44	14.36		17.41	23.98
UNII-2C	106	5530	16.01	15.44		18.74	23.98
	122	5610	17.25	17.01		20.14	
UNII-3	155	5775	17.08	16.98		20.04	30.00
UNII-3&4	171	5855	17.32	17.05		20.20	30.00
		5855	17.32	17.05	-0.57	19.63	30.00(e.i.r.p)

* Calculation of Output Power : Average Power = Meas Power + Duty CF[dB]
Corr'd Power = Ant1 Average Power + Ant2 Average Power(in case of UNII-4: added directional gain)

PSD Results

Band	Channel	Center Freq. [MHz]	Meas PSD [dBm/MHz]		DCCF.	Direct. Gain [dBi]	Corr'd PSD [dBm]	Limit [dBm/ MHz]
			ANT1	ANT2				
UNII-1	42	5210	-0.28	-2.31	0.25		2.08	11.00
UNII-2A	58	5290	-3.46	-3.47	0.25		-0.20	11.00
UNII-2C	106	5530	-1.38	-1.79	0.25		1.68	11.00
	122	5610	**-0.09**	**-0.60**	**0.25**		**2.92**	
UNII-3	155	5775	-3.39	-3.84	0.25		-0.35	30.00/500kHz
UNII-3&4	171	5855	-3.23	-3.43	0.25		-0.07	30.00/500kHz
		5855	-0.08	-0.23	0.25	-0.57	2.54	14.00(e.i.r.p.)

* Calculation of PSD: Corr'd PSD = Ant1 PSD + Ant2 PSD + Duty CF [dB] (in case of UNII-4: added directional gain)

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10.2.5. 802.11ac VHT160 MODE

Output Power Results

Band	Channel	Center Freq. [MHz]	Average Power [dBm]		Direct. Gain [dBi]	Corr'd Power [dBm]	Limit [dBm]
			ANT1	ANT2			
UNII-1&2A	50	5250	14.85	14.43		17.66	23.98
UNII-2C	114	5570	14.44	14.36		17.41	23.98
UNII-3&4	163	5815	16.92	16.88		19.91	30.00
	163	5815	16.92	16.88	-0.57	19.34	30.00(e.i.r.p)

* Calculation of Output Power : Average Power = Meas Power + Duty CF[dB]
Corr'd Power = Ant1 Average Power + Ant2 Average Power(in case of UNII-4: added directional gain)

PSD Results

Band	Channel	Center Freq. [MHz]	Meas PSD [dBm/MHz]		DCCF.	Direct. Gain [dBi]	Corr'd PSD [dBm]	Limit [dBm/ MHz]
			ANT1	ANT2				
UNII-1&2A	50	5250	-4.92	-6.11	0.24		-2.22	11.00
UNII-2C	114	5570	-6.35	-6.57	0.24		-3.21	11.00
UNII-3&4	163	5815	-6.13	-6.79	0.24		-3.20	30.00/500kHz
	163	5815	-3.92	-3.84	0.24	-0.57	-1.20	14.00(e.i.r.p.)

* Calculation of PSD: Corr'd PSD = Ant1 PSD + Ant2 PSD + Duty CF [dB] (in case of UNII-4: added directional gain)

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10.2.6. STRADDLE CHANNEL

Output Power Results

Mode	Band	Center Freq. [MHz]	Meas Power [dBm]				DCCF.	Corr'd Power [dBm]	Limit [dBm]
			ANT1	Total	ANT2	Total			
802.11a	UNII-2C	5720	16.83	17.99	16.51	17.46	0.15	19.83	22.88
	UNII-3		11.70		10.42		0.15	14.27	30.00
802.11n HT20	UNII-2C	5720	15.58	17.38	16.06	17.10	0.00	18.84	22.93
	UNII-3		12.71		10.39		0.00	14.71	30.00
802.11n HT40	UNII-2C	5710	17.30	17.50	16.77	17.19	0.00	20.05	23.98
	UNII-3		3.94		6.86		0.00	8.65	30.00
802.11ac VHT80	UNII-2C	5690	16.28	16.47	16.67	16.86	0.25	19.74	23.98
	UNII-3		2.69		3.30		0.25	6.27	30.00

* Calculation of Output Power : Corr'd Power = Ant1 meas. Power + Ant2 meas. Power + Duty CF [dB]

PSD Results

Mode	Band	Center Freq. [MHz]	Meas PSD [dBm/MHz]		DCCF.	Corr'd PSD [dBm]	Limit [dBm/ MHz]
			ANT1	ANT2			
802.11a	UNII-2C	5720	8.40	6.80	0.15	10.83	11.00
	UNII-3		5.36	3.52	0.15	7.70	30.00/500kHz
802.11n HT20	UNII-2C	5720	7.23	5.89	0.00	9.62	11.00
	UNII-3		4.96	2.76	0.00	7.01	30.00/500kHz
802.11n HT40	UNII-2C	5710	4.77	3.02	0.00	6.99	11.00
	UNII-3		-2.44	-0.06	0.00	1.92	30.00/500kHz
802.11ac VHT80	UNII-2C	5690	-0.87	-0.65	0.25	2.50	11.00
	UNII-3		-4.20	-3.71	0.25	-0.69	30.00/500kHz

* Calculation of PSD: Corr'd PSD = Ant1 PSD + Ant2 PSD + Duty CF [dB]

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10.2.7. 802.11ax HE20 MODE

Output Power Results

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Average Power [dBm]		Corr'd Power [dBm]	Limit [dBm]
					ANT1	ANT2		
UNII-1	36	5180	26T	0	7.33	7.30	10.33	23.98
				4	7.36	7.45	10.42	
				8	7.46	7.32	10.40	
			SU	-	17.32	17.30	20.32	
	40	5200	26T	0	7.61	7.34	10.49	
				4	7.21	6.97	10.10	
				8	7.81	7.40	10.62	
			SU	-	17.68	17.33	20.52	
	48	5240	26T	0	7.83	7.22	10.55	
				4	7.35	6.81	10.10	
				8	7.90	7.24	10.59	
			SU	-	17.73	17.12	20.45	
UNII-2A	52	5260	26T	0	7.68	6.60	10.18	23.60
				4	7.20	6.22	9.75	
				8	7.78	6.56	10.22	
			SU	-	17.63	16.86	20.27	
	60	5300	26T	0	7.86	7.42	10.66	
				4	7.42	7.02	10.23	
				8	7.95	7.40	10.69	
			SU	-	17.80	17.24	20.54	
	64	5320	26T	0	7.85	6.53	10.25	
				4	7.43	6.11	9.83	
				8	7.88	6.50	10.25	
			SU	-	17.05	17.08	20.08	

* Calculation of Output Power : Average Power = Meas Power + Duty CF[dB]

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Band	Channel	Center Freq. [MHz]	Tones	RU offset	Average Power [dBm]		Corr'd Power [dBm]	Limit [dBm]
					ANT1	ANT2		
UNII-2C	100	5500	26T	0	7.70	6.67	10.23	23.60
				4	7.25	6.30	9.81	
				8	7.68	6.70	10.23	
			SU	-	17.60	17.08	20.36	
	116	5580	26T	0	7.55	6.81	10.21	
				4	7.10	6.41	9.78	
				8	7.53	6.85	10.21	
			SU	-	17.45	17.15	20.31	
	140	5700	26T	0	7.63	7.03	10.35	
				4	7.19	6.64	9.93	
				8	7.58	7.04	10.33	
			SU	-	17.29	17.24	20.28	
UNII-3	149	5745	26T	0	7.50	6.93	10.23	30.00
				4	7.08	6.58	9.85	
				8	7.36	6.96	10.17	
			SU	-	17.18	17.14	20.17	
	157	5785	26T	0	7.45	6.97	10.23	
				4	7.08	6.55	9.83	
				8	7.48	6.94	10.23	
			SU	-	17.26	17.11	20.20	
	165	5825	26T	0	7.61	7.05	10.35	
				4	7.22	6.60	9.93	
				8	7.55	6.96	10.28	
			SU	-	17.42	17.18	20.31	

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Average Power [dBm]		Direct. Gain [dBi]	Corr'd Power [dBm]	Limit [dBm]
					ANT1	ANT2			
UNII-3&4	169 Overlap	5845	26T	0	7.64	7.12		10.40	30.00
				4	7.22	6.65		9.95	or
				8	7.56	7.02		10.31	
			SU	-	17.41	17.29		20.36	30.00 e.i.r.p[Note]
UNII-4	173	5865	26T	0	7.63	7.04	-0.57	9.79	30.00 e.i.r.p.
				4	7.28	6.60	-0.57	9.39	
				8	7.68	6.95	-0.57	9.77	
			SU	-	17.54	17.19	-0.57	19.81	
	177	5885	26T	0	7.35	7.03	-0.57	9.63	
				4	6.98	6.58	-0.57	9.22	
				8	7.35	6.90	-0.57	9.57	
			SU	-	17.29	17.20	-0.57	19.69	

* Calculation of Output Power : Average Power = Meas Power + Duty CF[dB]
Corr'd Power = Ant1 Average Power + Ant2 Average Power(in case of UNII-4: added directional gain)

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PSD Results

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Meas PSD [dBm/MHz]		Corr'd PSD [dBm/MHz]	PSD Limit [dBm/MHz]
					ANT1	ANT2		
UNII-1	36	5180	26T	0	4.98	5.12	8.06	11.00
				4	3.73	4.34	7.06	
				8	4.71	5.00	7.87	
			SU	-	5.67	5.93	8.81	
	40	5200	26T	0	4.72	5.04	7.89	
				4	3.16	3.75	6.47	
				8	4.69	5.32	8.02	
			SU	-	5.75	6.03	8.91	
	48	5240	26T	0	4.97	4.98	7.98	
				4	3.37	3.46	6.42	
				8	4.83	5.03	7.94	
			SU	-	5.67	5.74	8.71	
UNII-2A	52	5260	26T	0	4.75	4.29	7.54	11.00
				4	3.29	2.80	6.06	
				8	5.01	4.18	7.62	
			SU	-	5.80	5.45	8.64	
	60	5300	26T	0	4.91	5.18	8.06	
				4	3.77	3.70	6.75	
				8	5.02	5.00	8.02	
			SU	-	5.99	5.93	8.97	
	64	5320	26T	0	5.16	4.14	7.69	
				4	3.74	2.81	6.31	
				8	5.26	4.52	7.92	
			SU	-	5.77	5.05	8.44	
UNII-2C	100	5500	26T	0	4.62	4.27	7.46	11.00
				4	3.18	2.77	5.99	
				8	4.53	4.35	7.45	
			SU	-	5.55	5.61	8.59	
	116	5580	26T	0	4.29	4.58	7.45	
				4	3.27	3.51	6.40	
				8	4.68	4.82	7.76	
			SU	-	5.33	5.98	8.68	
	140	5700	26T	0	4.52	4.75	7.64	
				4	3.05	3.39	6.23	
				8	4.49	4.56	7.54	
			SU	-	5.10	6.09	8.63	

* Calculation of PSD: Corr'd PSD = Ant1 PSD + Ant2 PSD + Duty CF [dB]

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Band	Channel	Center Freq. [MHz]	Tones	RU offset	Meas PSD [dBm]		Direct. Gain [dBi]	Corr'd PSD [dBm]	PSD Limit [dBm]
					ANT1	ANT2			
UNII-3	149	5745	26T	0	1.48	1.98		4.75	30.00 /500kHz
				4	1.11	1.22		4.18	
				8	1.54	2.00		4.79	
			SU	-	2.14	2.91		5.55	
	157	5785	26T	0	1.58	1.79		4.70	
				4	1.05	1.34		4.20	
				8	1.70	1.78		4.75	
			SU	-	2.12	2.90		5.54	
	165	5825	26T	0	1.79	2.10		4.96	
				4	1.17	1.69		4.45	
				8	1.76	2.25		5.02	
			SU	-	2.53	3.07		5.82	
UNII-3&4	169	5845	26T	0	2.14	2.37		5.27	30.00 /500kHz
				4	1.78	1.79		4.79	
				8	4.96	5.28	-0.57	7.56	14.00 /MHz e.i.r.p.
			SU(L)	-	2.71	3.52		6.14	30.00 /500kHz
			SU(U)	-	5.24	6.28	-0.57	8.23	14.00 /MHz e.i.r.p
UNII-4	173	5865	26T	0	5.02	5.31	-0.57	7.60	14.00 /MHz e.i.r.p
				4	3.62	3.67	-0.57	6.09	
				8	4.92	5.14	-0.57	7.47	
			SU	-	5.95	6.43	-0.57	8.64	
	177	5885	26T	0	4.83	5.23	-0.57	7.48	
				4	3.31	3.61	-0.57	5.90	
				8	4.58	5.17	-0.57	7.32	
			SU	-	5.11	6.31	-0.57	8.19	

* Calculation of PSD: Corr'd PSD = Ant1 PSD + Ant2 PSD + Duty CF [dB] (in case of UNII-4: added directional gain)

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10.2.8. 802.11ax HE40 MODE

Output Power Results

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Average Power [dBm]		Corr'd Power [dBm]	Limit [dBm]
					ANT1	ANT2		
UNII-1	38	5190	26T	0	7.77	7.73	10.76	23.98
				9	7.64	7.50	10.58	
				17	7.97	7.71	10.85	
			SU	-	15.92	16.34	19.15	
	46	5230	26T	0	7.73	7.04	10.41	
				9	7.54	6.85	10.22	
				17	7.90	6.95	10.46	
			SU	-	17.83	17.24	20.56	
UNII-2A	54	5270	26T	0	7.52	6.40	10.01	23.96
				9	7.33	6.27	9.84	
				17	7.62	6.44	10.08	
			SU	-	17.84	17.14	20.51	
	62	5310	26T	0	7.74	6.99	10.39	
				9	7.50	6.84	10.19	
				17	7.78	7.01	10.42	
			SU	-	16.13	16.10	19.13	
UNII-2C	102	5510	26T	0	7.47	6.30	9.93	23.96
				9	7.82	6.57	10.25	
				17	7.97	6.79	10.43	
			SU	-	15.14	15.02	18.09	
	110	5550	26T	0	7.45	6.40	9.97	
				9	7.23	6.21	9.76	
				17	7.39	6.37	9.92	
			SU	-	17.71	16.98	20.37	
	134	5670	26T	0	7.63	6.29	10.02	
				9	7.40	6.07	9.8	
				17	7.52	6.25	9.94	
			SU	-	17.67	16.77	20.25	

* Calculation of Output Power : Average Power = Meas Power + Duty CF[dB]
Corr'd Power = Ant1 Average Power + Ant2 Average Power

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Band	Channel	Center Freq. [MHz]	Tones	RU offset	Average Power [dBm]		Corr'd Power [dBm]	Limit [dBm]
					ANT1	ANT2		
UNII-3	151	5755	26T	0	7.37	6.36	9.90	30.00
				9	7.68	6.72	10.24	
				17	7.77	6.89	10.36	
			SU	-	17.48	17.00	20.26	
	159	5795	26T	0	7.41	6.49	9.98	
				9	7.69	6.81	10.28	
				17	7.76	6.96	10.39	
			SU	-	17.62	17.11	20.38	

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Average Power [dBm]		Direct. Gain [dBi]	Corr'd Power [dBm]	Limit [dBm]
					ANT1	ANT2			
UNII-3&4	167 Overlap	5835	26T	0	7.53	6.64		10.12	30.00 or 30.00 e.i.r.p[Note]
				9	7.81	6.93		10.40	
				17	7.94	6.99		10.50	
			SU	-	17.72	17.12		20.44	
UNII-4	175	5875	26T	0	7.80	7.36	-0.57	10.03	30.00 e.i.r.p.
				9	7.62	7.14	-0.57	9.83	
				17	7.76	7.23	-0.57	9.94	
			SU	-	17.41	17.46	-0.57	19.88	

* Calculation of Output Power : Average Power = Meas Power + Duty CF[dB]
Corr'd Power = Ant1 Average Power + Ant2 Average Power(in case of UNII-4: added directional gain)

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PSD Results

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Meas PSD [dBm/MHz]		Corr'd PSD [dBm/MHz]	PSD Limit [dBm/MHz]
					ANT1	ANT2		
UNII-1	38	5190	26T	0	5.10	4.83	7.97	11.00
				9	4.49	4.28	7.40	
				17	5.42	4.84	8.15	
			SU	-	1.30	0.98	4.15	
	46	5230	26T	0	4.91	4.43	7.69	
				9	4.95	4.43	7.71	
				17	5.14	4.12	7.67	
			SU	-	3.00	2.51	5.77	
UNII-2A	54	5270	26T	0	4.96	3.63	7.36	11.00
				9	4.85	3.56	7.26	
				17	4.78	3.84	7.34	
			SU	-	2.95	2.59	5.79	
	62	5310	26T	0	4.79	4.42	7.62	
				9	4.85	4.29	7.59	
				17	5.08	4.32	7.73	
			SU	-	0.92	0.72	3.83	
UNII-2C	102	5510	26T	0	4.39	4.24	7.33	11.00
				9	4.08	4.19	7.15	
				17	4.10	4.49	7.31	
			SU	-	1.20	0.99	4.11	
	118	5590	26T	0	4.17	4.18	7.19	
				9	4.45	3.88	7.19	
				17	4.07	4.76	7.44	
			SU	-	2.61	3.04	5.84	
	134	5670	26T	0	4.44	4.47	7.47	
				9	4.61	4.19	7.41	
				17	4.20	4.38	7.30	
			SU	-	2.53	2.82	5.69	

* Calculation of PSD: Corr'd PSD = Ant1 PSD + Ant2 PSD + Duty CF [dB]

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Band	Channel	Center Freq. [MHz]	Tones	RU offset	Meas PSD [dBm]		Direct. Gain [dBi]	Corr'd PSD [dBm]	PSD Limit [dBm]
					ANT1	ANT2			
UNII-3	151	5755	26T	0	1.73	1.42		4.59	30.00 /500kHz
				9	1.52	1.43		4.49	
				17	1.45	1.46		4.47	
			SU	-	-0.58	-0.09		2.68	
	159	5795	26T	0	1.70	1.42		4.57	
				9	2.39	2.01		5.21	
				17	2.13	1.95		5.05	
			SU	-	-0.48	-0.14		2.70	
UNII-3&4	167	5835	26T	0	2.49	1.78		5.16	30.00 /500kHz
				9	2.27	2.46		5.37	
				17	5.69	5.16	-0.57	7.87	14.00 /MHz e.i.r.p.
			SU(L)	-	0.36	0.33		3.36	30.00 /500kHz
			SU(U)	-	2.64	3.02	-0.57	5.27	14.00 /MHz e.i.r.p
UNII-4	175	5875	26T	0	5.61	5.46	-0.57	7.97	14.00 /MHz e.i.r.p
				9	5.07	5.13	-0.57	7.54	
				17	4.94	5.63	-0.57	7.74	
			SU	-	3.05	3.47	-0.57	5.71	

* Calculation of PSD: Corr'd PSD = Ant1 PSD + Ant2 PSD + Duty CF [dB] (in case of UNII-4: added directional gain)

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10.2.9. 802.11ax HE80 MODE

Output Power Results

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Average Power [dBm]		Corr'd Power [dBm]	Limit [dBm]
					ANT1	ANT2		
UNII-1	42	5210	26T	0	7.77	7.41	10.60	23.98
				18	7.74	7.36	10.56	
				36	7.55	6.87	10.23	
			SU	-	15.59	15.50	18.56	
UNII-2A	58	5290	26T	0	7.78	7.59	10.70	23.98
				18	7.73	7.54	10.65	
				36	7.87	7.54	10.72	
			SU	-	14.82	14.66	17.75	
UNII-2C	106	5530	26T	0	7.79	6.72	10.30	23.98
				18	7.72	6.60	10.21	
				36	7.73	6.54	10.19	
			SU	-	15.69	15.89	18.80	
	122	5610	26T	0	7.68	6.07	9.96	
				18	7.63	5.81	9.82	
				36	7.60	5.84	9.82	
			SU	-	17.44	16.21	19.88	
UNII-3	155	5775	26T	0	7.75	6.50	10.18	30.00
				18	7.65	6.50	10.12	
				36	7.49	6.52	10.04	
			SU	-	17.32	16.73	20.05	
UNII-3&4	171	5855	26T	0	7.83	7.01	10.45	30.00 or 30.00 e.i.r.p[Note]
				18	7.75	6.87	10.34	
				36	7.64	6.72	10.21	
			SU	-	17.59	17.00	20.32	

* Calculation of Output Power : Average Power = Meas Power + Duty CF[dB]
Corr'd Power = Ant1 Average Power + Ant2 Average Power(in case of UNII-4: added directional gain)

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PSD Results

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Meas PSD [dBm/MHz]		Corr'd PSD [dBm/MHz]	PSD Limit [dBm/MHz]
					ANT1	ANT2		
UNII-1	42	5210	26T	0	5.12	4.65	7.90	11.00
				18	3.92	3.51	6.73	
				36	4.70	4.27	7.50	
			SU	-	-2.05	-2.87	0.57	
UNII-2A	58	5290	26T	0	5.14	4.89	8.03	11.00
				18	4.16	3.63	6.91	
				36	5.23	4.87	8.06	
			SU	-	-2.89	-3.37	-0.11	
UNII-2C	106	5530	26T	0	5.11	4.29	7.73	11.00
				18	3.84	3.35	6.61	
				36	4.57	4.40	7.49	
			SU	-	-2.22	-0.28	1.87	
	122	5610	26T	0	4.81	4.55	7.69	
				18	3.78	3.89	6.85	
				36	4.45	4.45	7.46	
			SU	-	-1.49	0.26	2.48	

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Meas PSD [dBm]		Direct. Gain [dBi]	Corr'd PSD [dBm]	PSD Limit [dBm]
					ANT1	ANT2			
UNII-3	155	5775	26T	0	1.88	1.83		4.86	30.00 /500kHz
				18	1.67	1.65		4.67	
				36	1.49	1.60		4.55	
			SU	-	-3.59	-3.42		-0.49	
UNII-3&4	171	5855	26T	0	2.36	2.56		5.47	30.00 /500kHz
				18	4.00	4.56	-0.57	6.73	14.00 /MHz e.i.r.p.
				36	4.63	4.77	-0.57	7.14	
			SU(L)	-	-2.94	-2.80		0.14	30.00 /500kHz
			SU(U)	-	-0.41	0.02	-0.57	2.25	14.00 /MHz e.i.r.p

* Calculation of PSD: Corr'd PSD = Ant1 PSD + Ant2 PSD + Duty CF [dB] (in case of UNII-4: added directional gain)

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10.2.10. 802.11ax HE160 MODE

Output Power Results

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Average Power [dBm]		Corr'd Power [dBm]	Limit [dBm]
					ANT1	ANT2		
UNII-1&2A	50	5250	26T	0(LB)	7.30	7.13	10.23	23.98
				0(UB)	7.69	7.14	10.43	
				36(BU)	7.61	7.03	10.34	
			SU	-	15.00	15.41	18.22	
UNII-2C	114	5570	26T	0(LB)	7.54	6.48	10.05	23.98
				0(UB)	7.74	6.36	10.11	
				36(UB)	7.50	6.00	9.82	
			SU	-	13.80	14.92	17.41	
UNII-3&4	163	5815	26T	0(LB)	7.72	6.66	10.23	30.00 or 30.00 e.i.r.p[Note]
				0(UB)	7.62	6.79	10.24	
				36(UB)	7.38	6.49	9.97	
			SU	-	16.88	17.43	20.17	

* Calculation of Output Power : Average Power = Meas Power + Duty CF[dB]
Corr'd Power = Ant1 Average Power + Ant2 Average Power(in case of UNII-4: added directional gain)

PSD Results

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Meas PSD [dBm/MHz]		Corr'd PSD [dBm/MHz]	PSD Limit [dBm/MHz]
					ANT1	ANT2		
UNII-1&2A	50	5250	26T	0(LB)	4.10	4.43	7.28	11.00
				0(UB)	4.72	4.76	7.75	
				36(UB)	5.09	4.55	7.84	
			SU	-	-5.10	-5.52	-2.30	
UNII-2C	114	5570	26T	0(LB)	4.42	3.77	7.11	11.00
				0(UB)	4.59	3.98	7.31	
				36(UB)	4.89	3.63	7.32	
			SU	-	-5.84	-5.68	-2.75	

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Meas PSD [dBm]		Direct. Gain [dBi]	Corr'd PSD [dBm]	PSD Limit [dBm]
					ANT1	ANT2			
UNII-3&4	171	5815	26T	0(LB)	2.11	2.47		5.31	30.00 /500kHz
				0(UB)	2.37	2.25		5.32	
				36(U)	4.38	4.85	-0.57	7.06	14.00 /MHz e.i.r.p
			SU(L)	-	-5.71	-5.10		-2.38	30.00 /500kHz
			SU(U)	-	-3.15	-3.01	-0.57	-0.64	14.00 /MHz e.i.r.p

* Calculation of PSD: Corr'd PSD = Ant1 PSD + Ant2 PSD + Duty CF [dB] (in case of UNII-4: added directional gain)
Note. LB=Lower band(Lower 996T),UB=Upper band(Upper 996T), L=Lower side, U=Upper side

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10.2.11. STRADDLE CHANNEL(802.11ax)

Output Power Results(SU)

Mode	Band	Center Freq. [MHz]	Meas Power [dBm]				DCCF.	Corr'd Power [dBm]	Limit [dBm]
			ANT1	Total	ANT2	Total			
HE20	UNII-2C	5720	15.71	16.89	15.88	17.10	0.00	18.81	23.98
	UNII-3		10.64		10.97		0.00	13.82	30.00
HE40	UNII-2C	5710	16.67	17.16	16.95	17.44	0.00	19.82	23.98
	UNII-3		7.46		7.80		0.00	10.64	30.00
HE80	UNII-2C	5690	16.63	16.86	17.32	17.55	0.00	20.00	23.98
	UNII-3		3.82		4.70		0.00	7.29	30.00

* Calculation of Output Power : Corr'd Power = Ant1 meas. Power + Ant2 meas. Power + Duty CF [dB]

PSD Results(SU)

Mode	Band	Center Freq. [MHz]	Meas PSD [dBm/MHz]		DCCF.	Corr'd PSD [dBm]	Limit [dBm/ MHz]
			ANT1	ANT2			
HE20	UNII-2C	5720	5.51	5.49	0.00	8.51	11.00
	UNII-3		2.33	2.62	0.00	5.49	30.00/500kHz
HE40	UNII-2C	5710	2.78	2.91	0.00	5.86	11.00
	UNII-3		-0.30	-0.16	0.00	2.78	30.00/500kHz
HE80	UNII-2C	5690	-0.43	-0.14	0.00	2.73	11.00
	UNII-3		-3.99	-3.26	0.00	-0.60	30.00/500kHz

* Calculation of PSD: Corr'd PSD = Ant1 PSD + Ant2 PSD + Duty CF [dB]

Output Power Results(RU)

Mode	Band	Center Freq. [MHz]	Meas Power [dBm]				DCCF.	Corr'd Power [dBm]	Limit [dBm]
			ANT1	Total	ANT2	Total			
HE20	UNII-2C	5720	5.13	6.00	5.56	6.51	0.00	8.36	22.48
	UNII-3	(6RU)	-1.42		-0.57		0.00	2.04	30.00
HE40	UNII-2C	5710	6.45	6.64	7.31	7.50	0.00	9.91	22.54
	UNII-3	(15RU)	-7.13		-6.15		0.00	-3.60	30.00
HE80	UNII-2C	5690	6.24	6.42	7.19	7.37	0.00	9.75	23.98
	UNII-3	(34RU)	-7.47		-6.52		0.00	-3.96	30.00

* Calculation of Output Power : Corr'd Power = Ant1 meas. Power + Ant2 meas. Power + Duty CF [dB]

PSD Results(RU)

Mode	Band	Center Freq. [MHz]	Meas PSD [dBm/MHz]		DCCF.	Corr'd PSD [dBm]	Limit [dBm/ MHz]
			ANT1	ANT2			
HE20	UNII-2C	5720	4.46	4.22	0.00	7.35	11.00
	UNII-3	(6RU)	1.37	0.99	0.00	4.19	30.00/500kHz
HE40	UNII-2C	5710	4.99	5.03	0.00	8.02	11.00
	UNII-3	(15RU)	-5.89	-5.80	0.00	-2.83	30.00/500kHz
HE80	UNII-2C	5690	4.36	4.89	0.00	7.64	11.00
	UNII-3	(34RU)	-6.46	-5.68	0.00	-3.04	30.00/500kHz

* Calculation of PSD: Corr'd PSD = Ant1 PSD + Ant2 PSD + Duty CF [dB]

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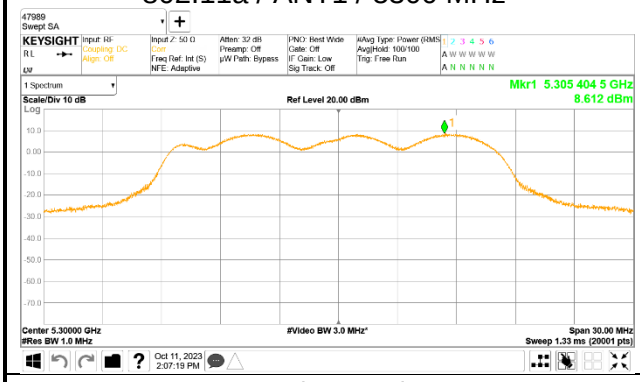
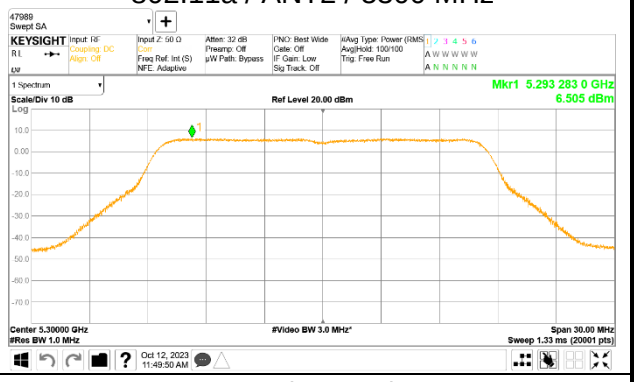
10.2.12. OUTPUT POWER AND PPSD PLOTS(WORST CASE)

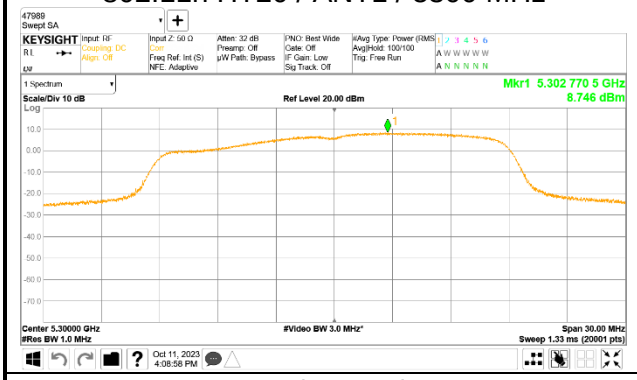
802.11a / ANT1 / 5300 MHz



802.11a / ANT2 / 5300 MHz

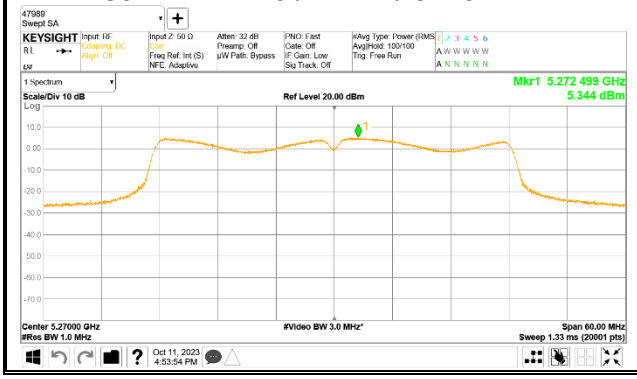


802.11n HT20 / ANT1 / 5300 MHz



802.11n HT20 / ANT2 / 5300 MHz

802.11n HT40 / ANT1 / 5270 MHz



802.11n HT40 / ANT2 / 5270 MHz

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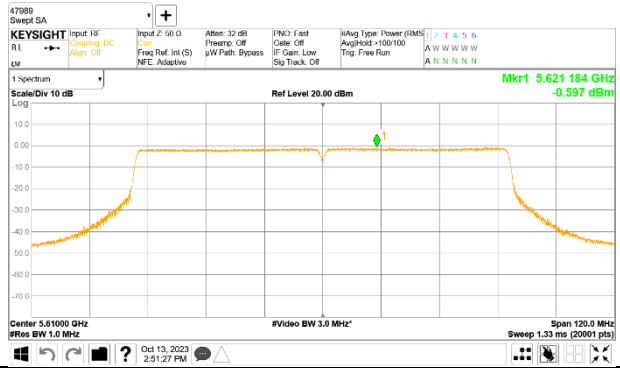
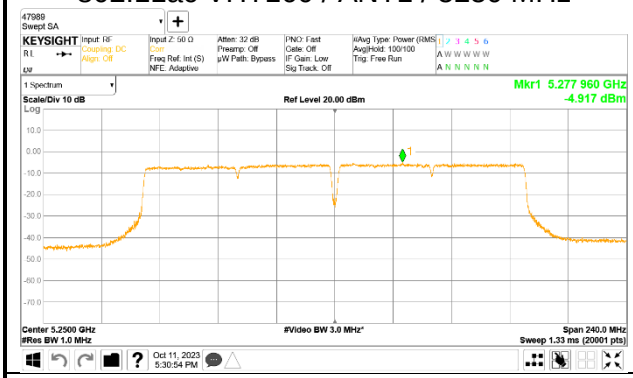
802.11ac VHT80 / ANT1 / 5610 MHz

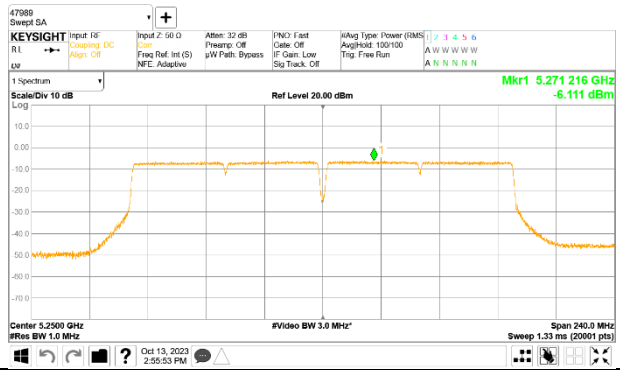
802.11ac VHT80 / ANT2 / 5610 MHz



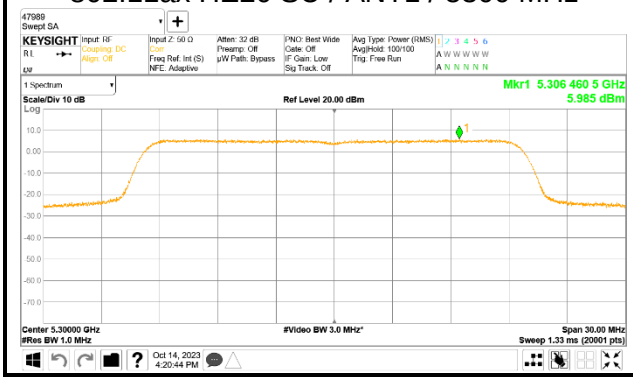
802.11ac VHT160 / ANT1 / 5250 MHz



802.11ac VHT160 / ANT2 / 5250 MHz



802.11ax HE20 SU / ANT1 / 5300 MHz



802.11ax HE20 SU / ANT2 / 5300 MHz

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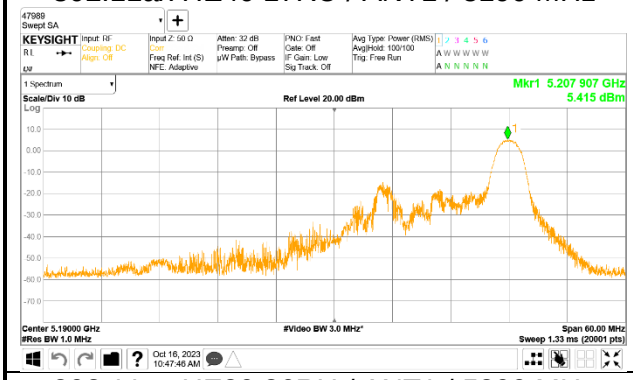
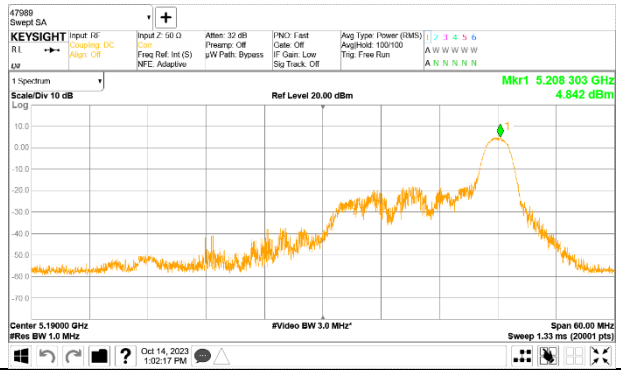
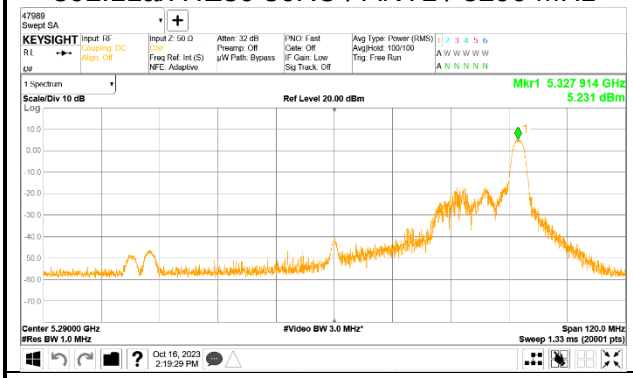
802.11ax HE40 17RU / ANT1 / 5190 MHz



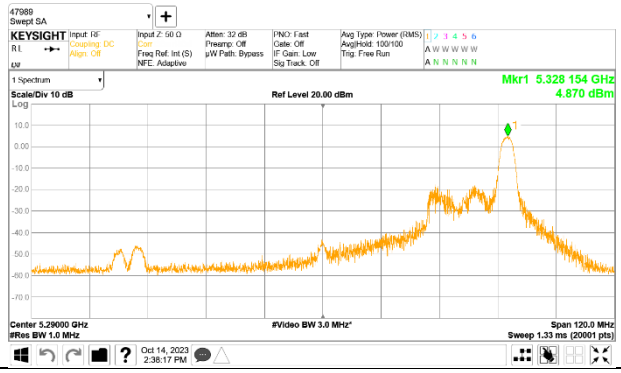
802.11ax HE40 17RU / ANT2 / 5190 MHz



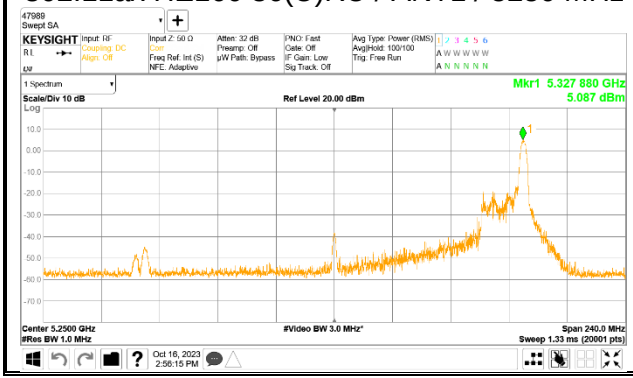
802.11ax HE80 36RU / ANT1 / 5290 MHz



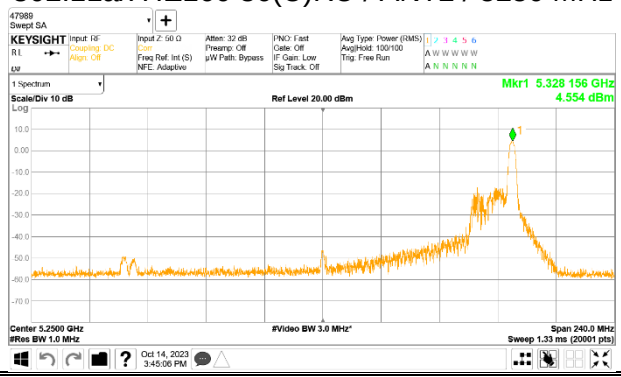
802.11ax HE80 36RU / ANT2 / 5290 MHz



802.11ax HE160 36(U)RU / ANT1 / 5250 MHz



802.11ax HE160 36(U)RU / ANT2 / 5250 MHz



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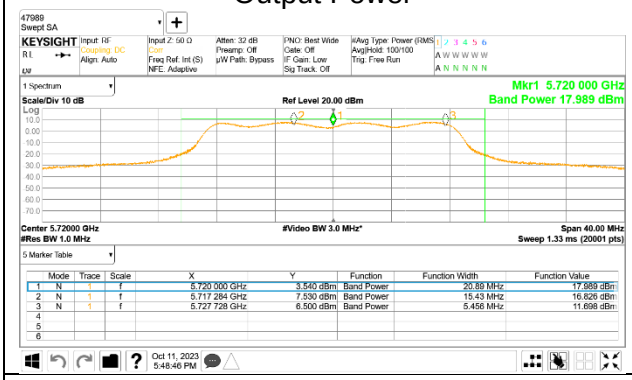
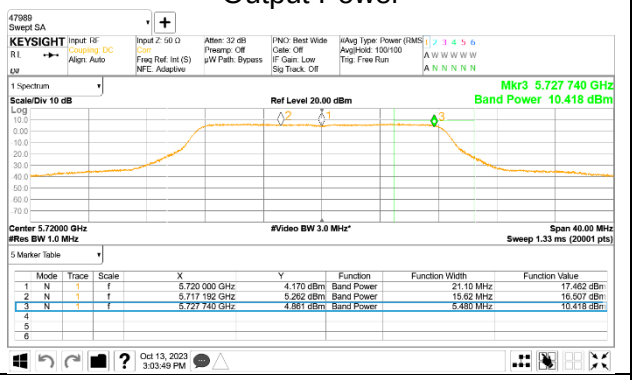
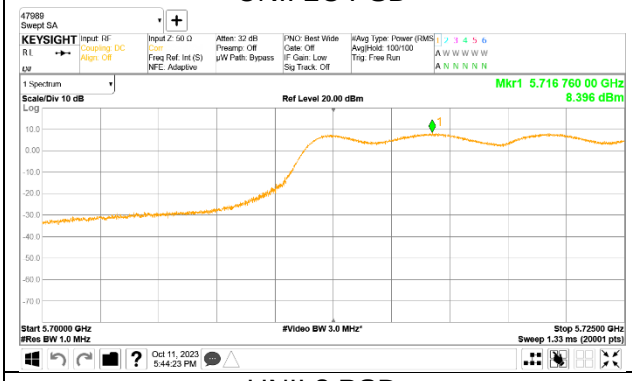
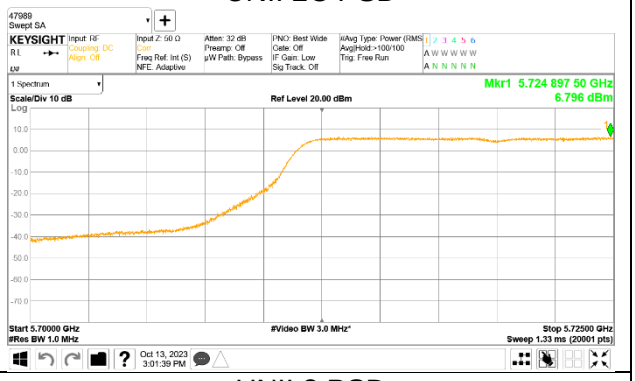
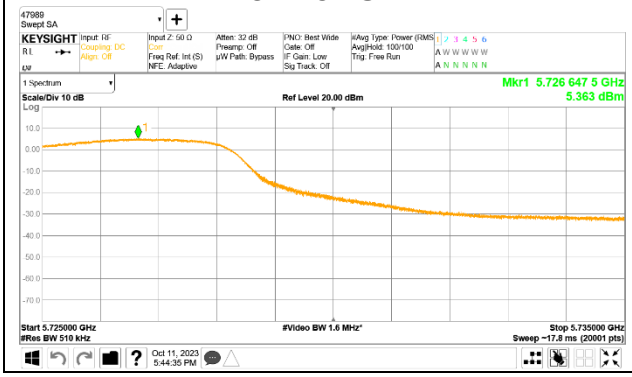
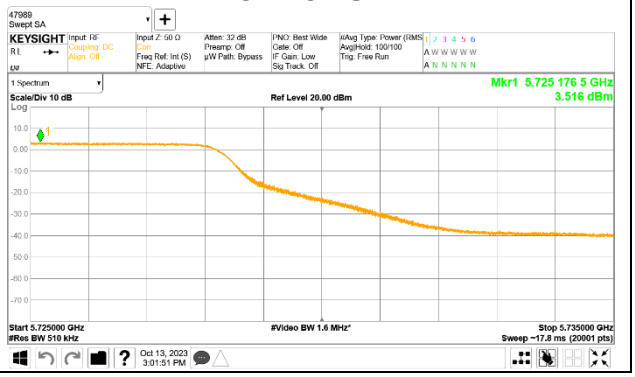
UNII Straddle Ch. IEEE 802.11a mode Output Power and PSD

ANT1	ANT2
Output Power	Output Power
	
UNII 2C PSD	UNII 2C PSD
	
UNII 3 PSD	UNII 3 PSD
	

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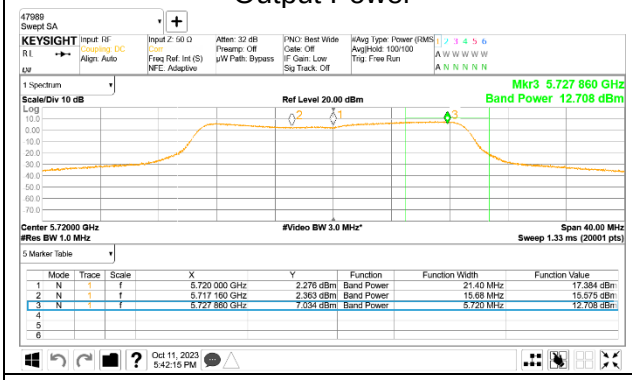
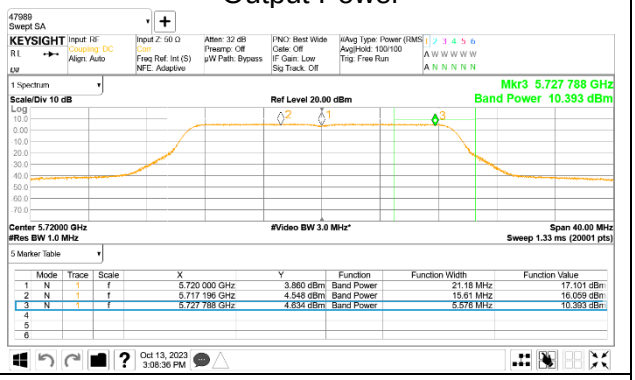
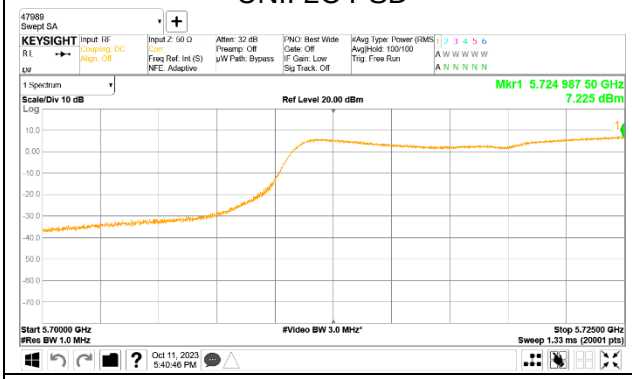
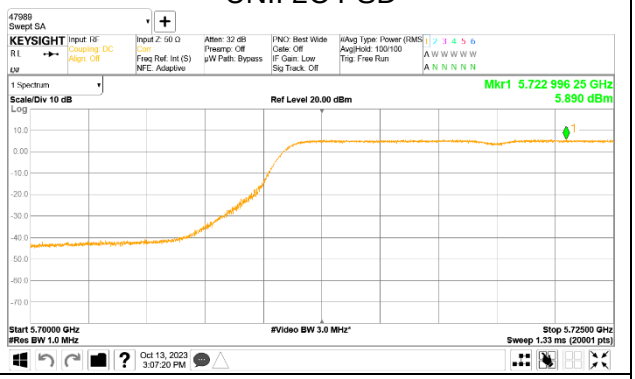
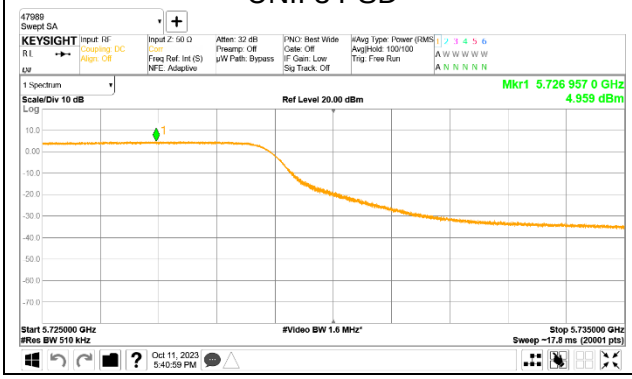
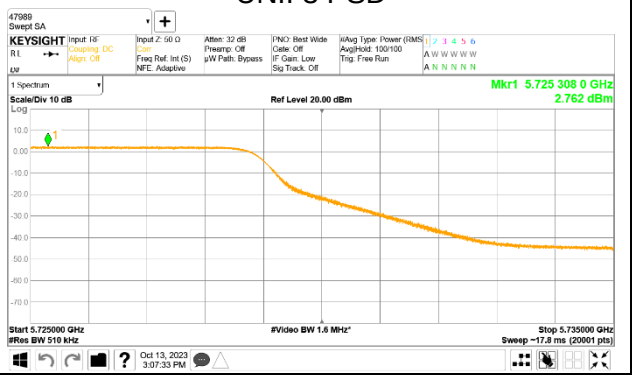
UNII Straddle Ch. IEEE 802.11n HT20 mode Output Power and PSD

ANT1	ANT2
Output Power	Output Power
	
UNII 2C PSD	UNII 2C PSD
	
UNII 3 PSD	UNII 3 PSD
	

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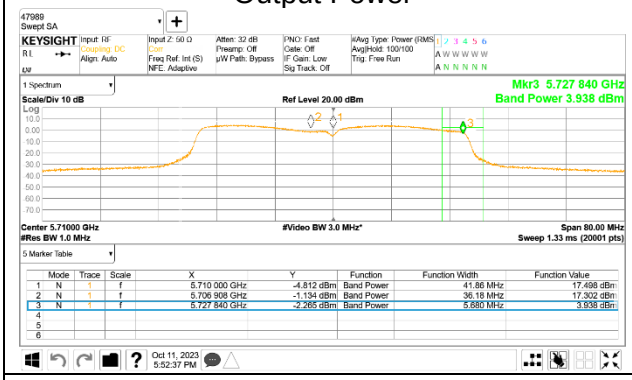
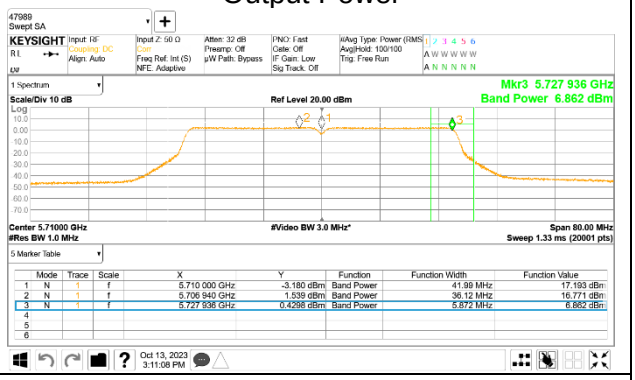
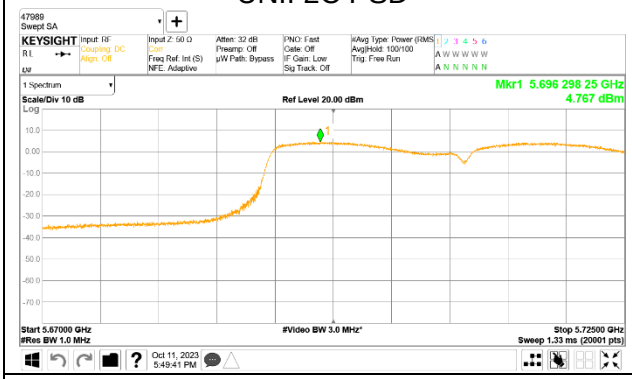
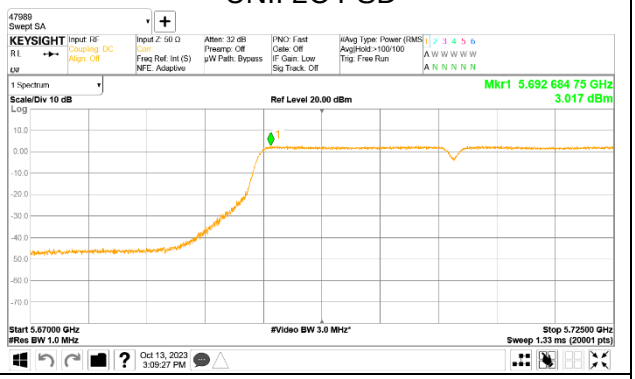
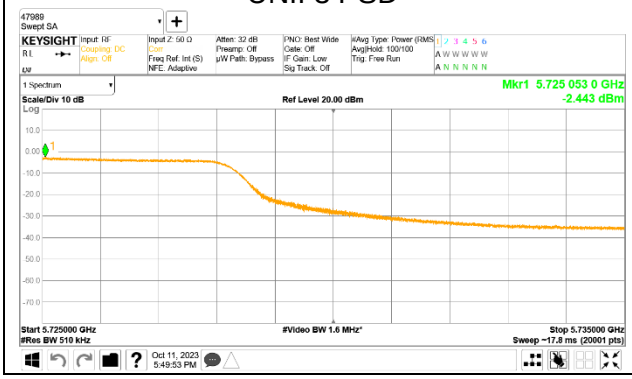
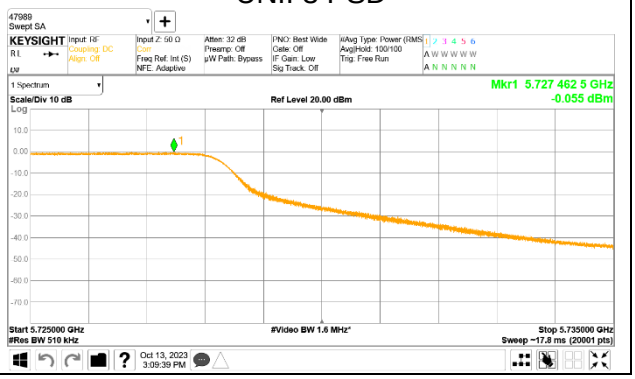
UNII Straddle Ch. IEEE 802.11n HT40 mode Output Power and PSD

ANT1	ANT2
Output Power	Output Power
	
UNII 2C PSD	UNII 2C PSD
	
UNII 3 PSD	UNII 3 PSD
	

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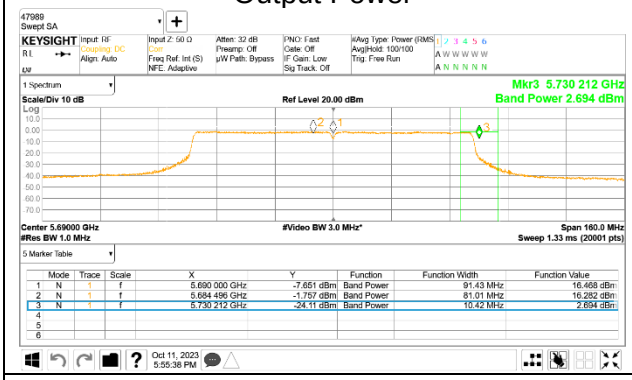
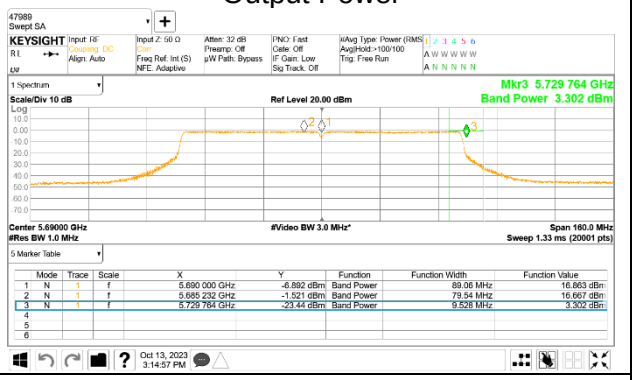
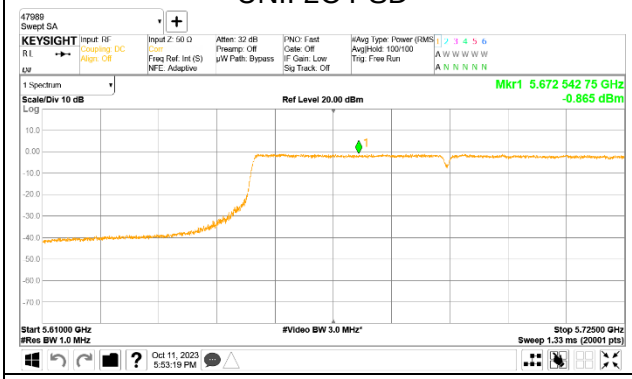
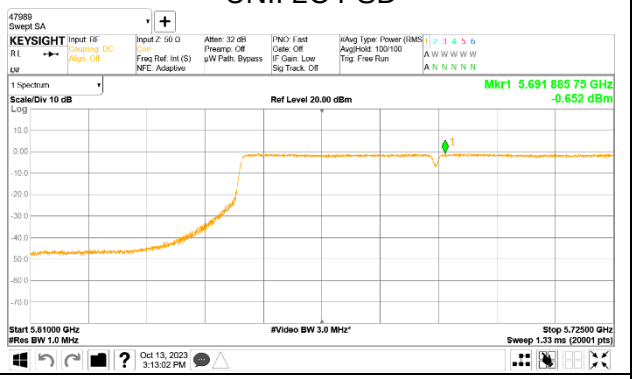
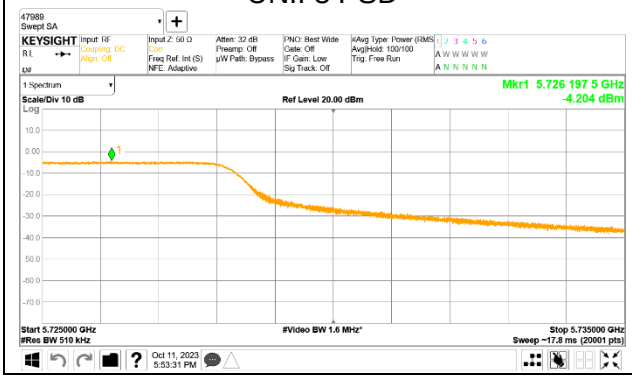
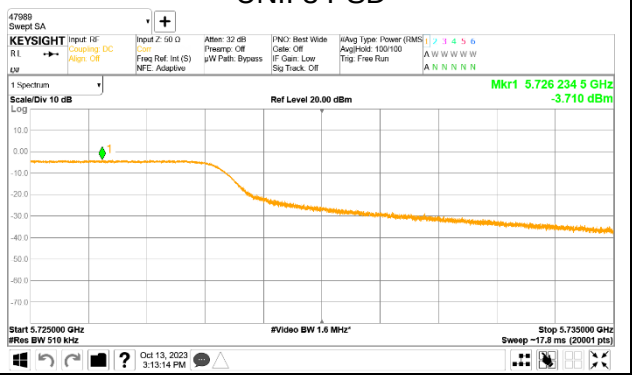
UNII Straddle Ch. IEEE 802.11ac VHT80 mode Output Power and PSD

ANT1	ANT2
Output Power	Output Power
	
UNII 2C PSD	UNII 2C PSD
	
UNII 3 PSD	UNII 3 PSD
	

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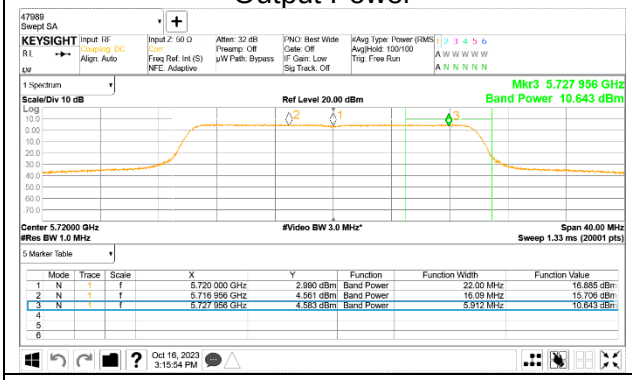
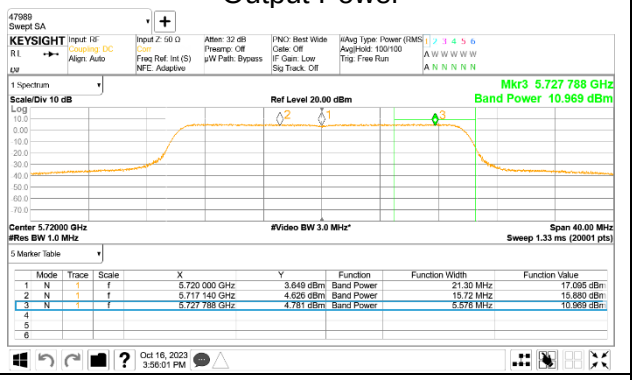
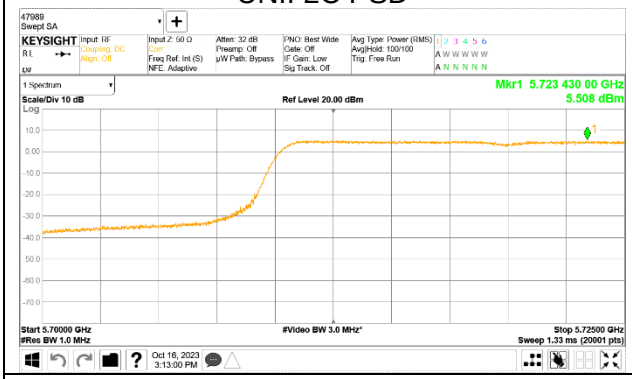
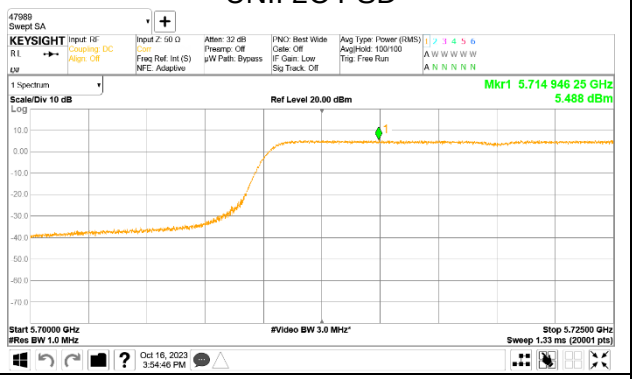
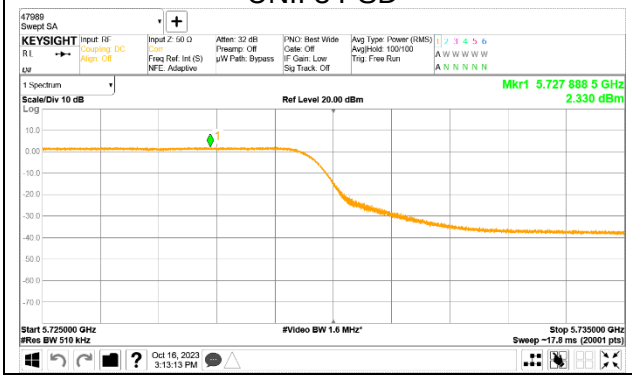
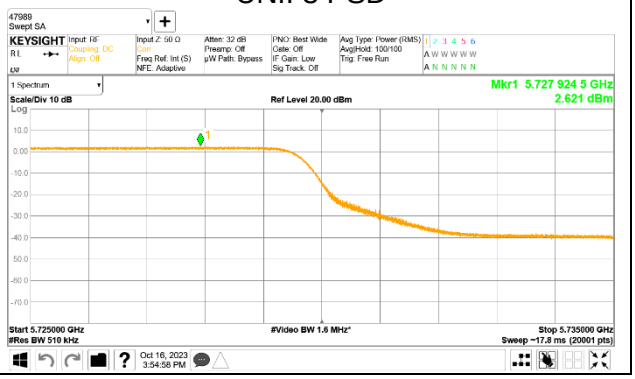
UNII Straddle Ch. IEEE 802.11ax HE20(SU) mode Output Power and PSD

ANT1	ANT2
Output Power	Output Power
	
UNII 2C PSD	UNII 2C PSD
	
UNII 3 PSD	UNII 3 PSD
	

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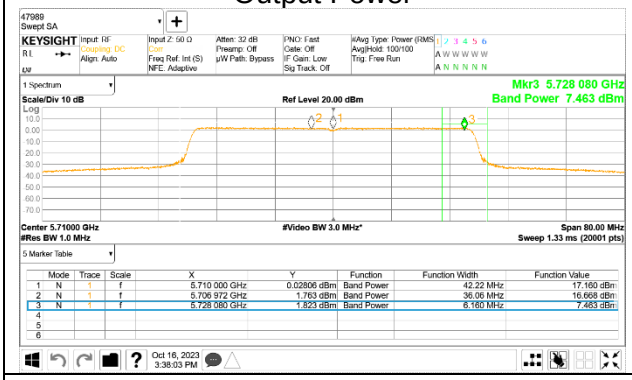
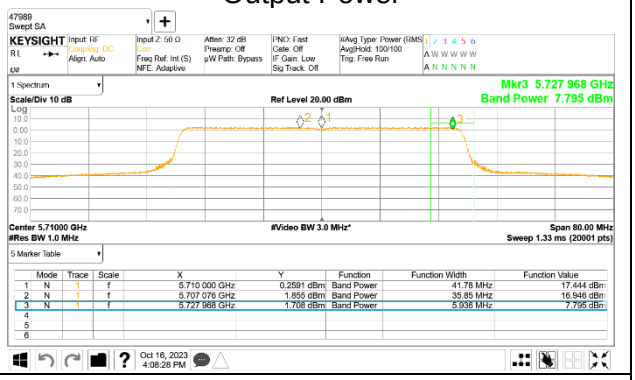
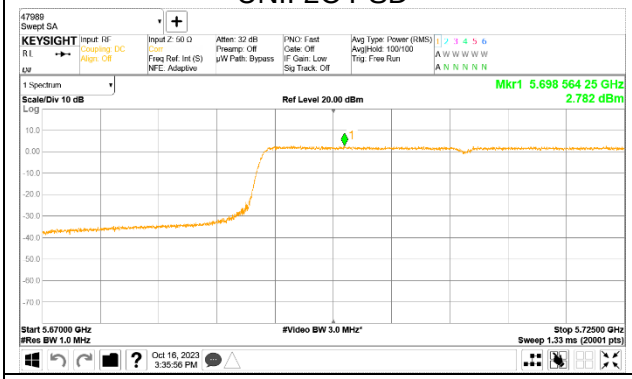
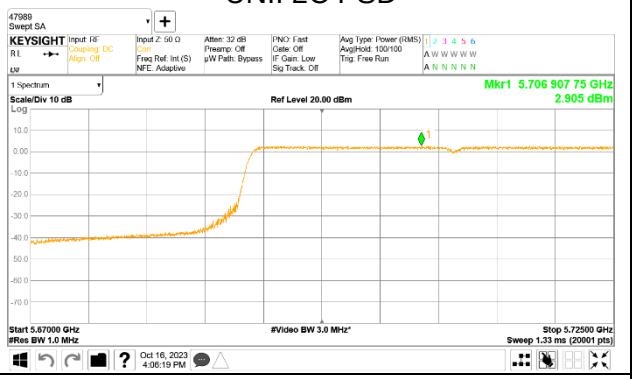
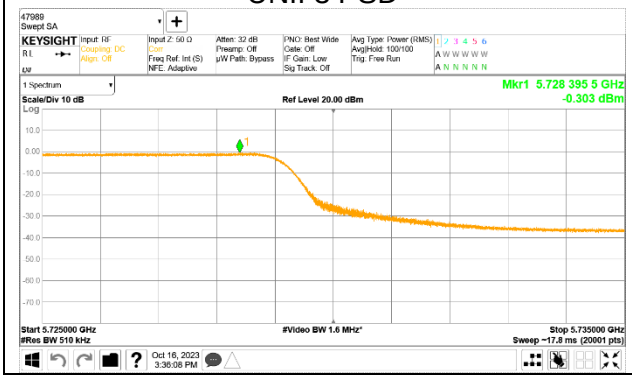
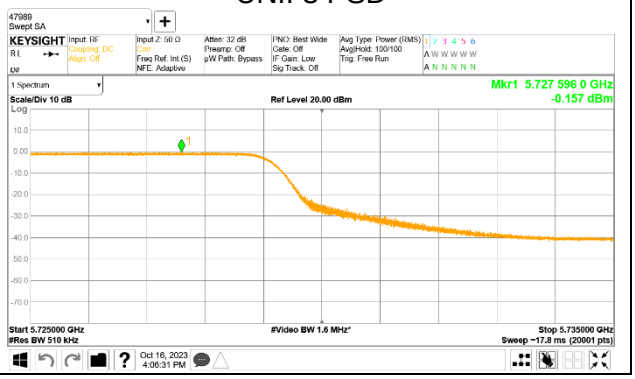
UNII Straddle Ch. IEEE 802.11ax HE40(SU) mode Output Power and PSD

ANT1	ANT2
Output Power	Output Power
	
UNII 2C PSD	UNII 2C PSD
	
UNII 3 PSD	UNII 3 PSD
	

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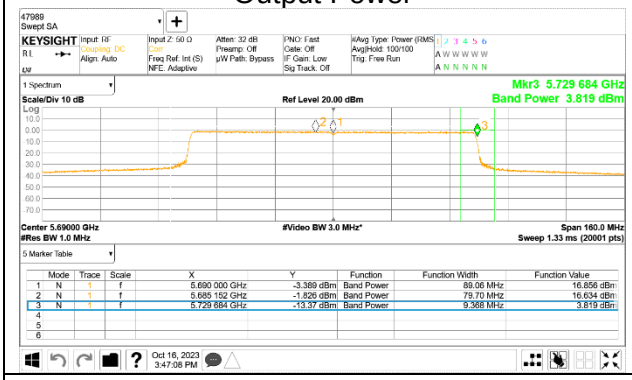
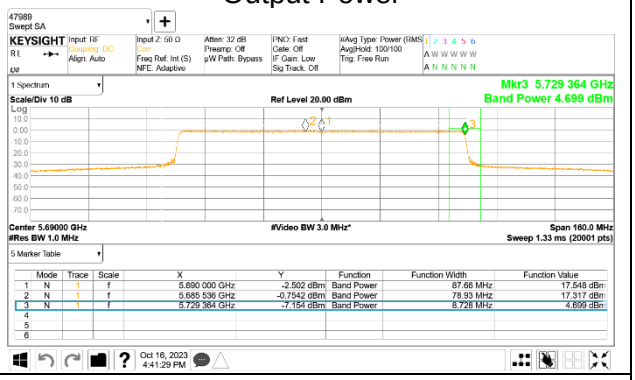
UNII Straddle Ch. IEEE 802.11ax HE80(SU) mode Output Power and PSD

ANT1	ANT2
Output Power	Output Power
	
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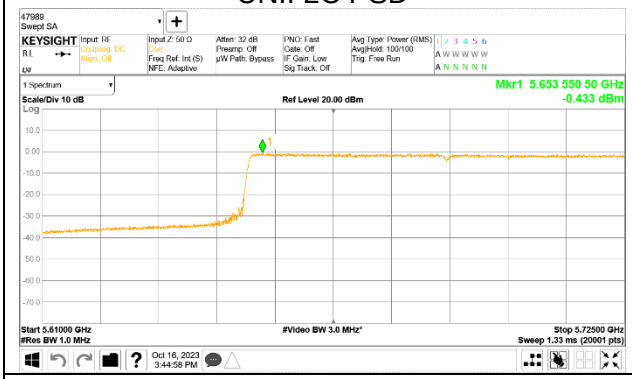	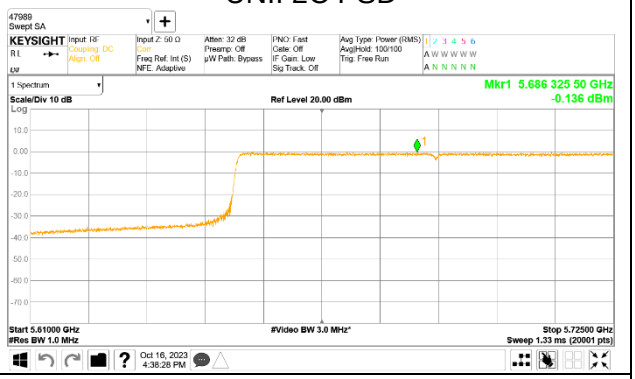
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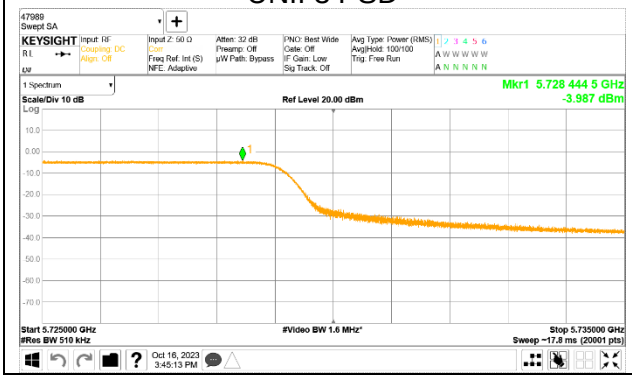	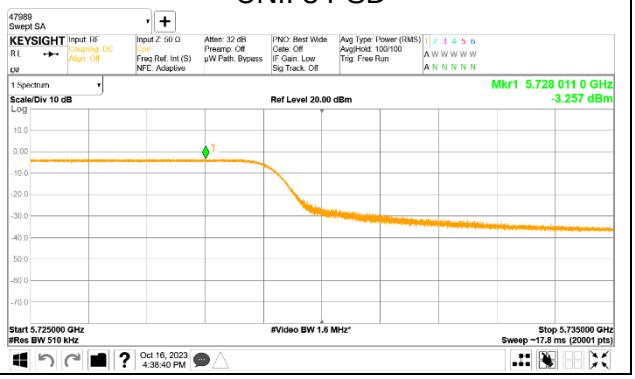

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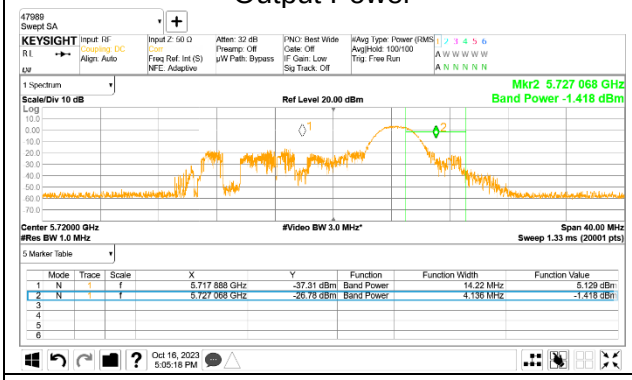
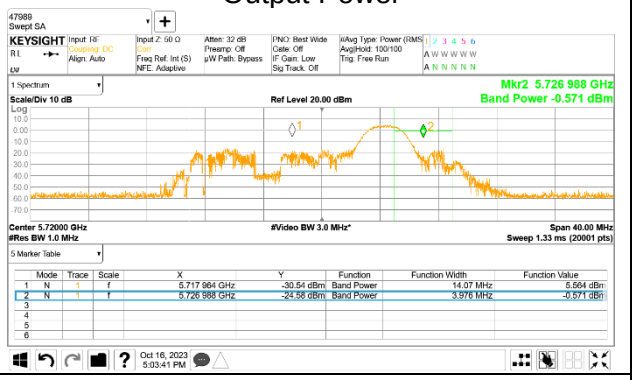
UNII Straddle Ch. IEEE 802.11ax HE20(6RU) mode Output Power and PSD

ANT1	ANT2
Output Power	Output Power
	
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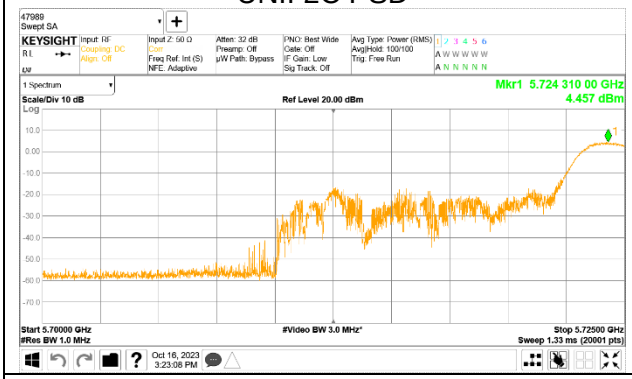	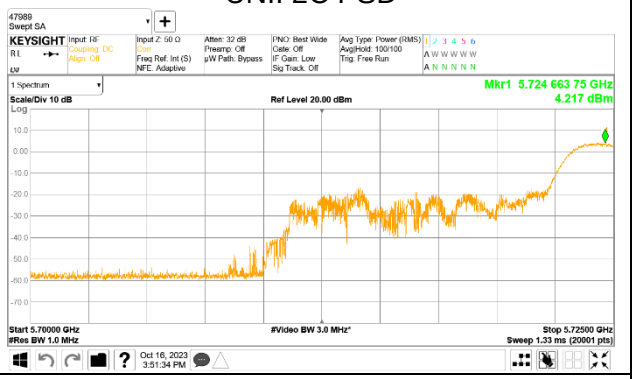
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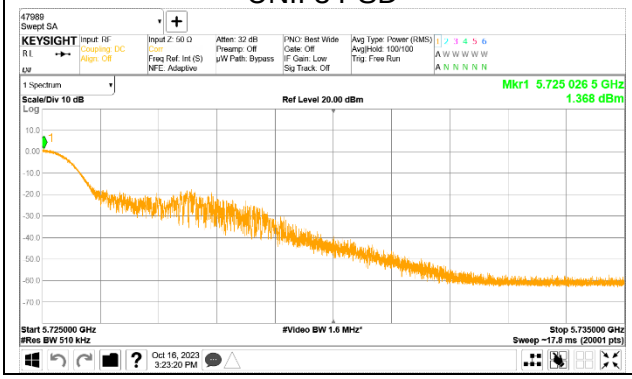	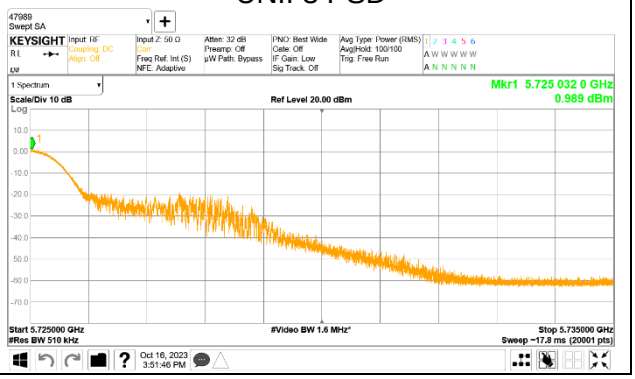

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