FCC RADIO TEST REPORT

FCC ID	**:**	**S9GR670**
Equipment	**:**	**R670 Access Point**
Brand Name	**:**	**RUCKUS**
Model Name	**:**	**R670**
Applicant	**:**	**Ruckus Wireless LLC** **350 W. Java Dr., Sunnyvale CA 94089 USA**
Manufacturer	**:**	**Ruckus Wireless LLC** **350 W. Java Dr., Sunnyvale CA 94089 USA**
Standard	**:**	**FCC Part 15 Subpart E §15.407**

The product was received on Nov. 02, 2023 and testing was performed from Nov. 24, 2023 to Jul. 10, 2024. We, Sporton International (USA) Inc, would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval from Sporton International (USA) Inc, the test report shall not be reproduced except in full.

Neil Kao

Approved by: Neil Kao

Sporton International (USA) Inc.
1175 Montague Expressway, Milpitas, CA 95035

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History of this test report

Report No.	Version	Description	Issue Date
FR240104006F	01	Initial issue of report	Jul. 12, 2024

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.407(a)(10)	26dB Emission Bandwidth	Pass	-
3.1	2.1049	99% Occupied Bandwidth	Reporting only	-
3.2	15.407(a)(5)	Fundamental Maximum EIRP	Pass	-
3.3	15.407(a)(5)	Fundamental Power Spectral Density	Pass	-
3.4	15.407(b)(7)	In-Band Emissions (Channel Mask)	Pass	-
3.5	15.407(d)(6)	Contention Based Protocol	Pass	
3.6	15.407(b)	Unwanted Emissions	Pass	0.10 dB under the limit at 7250.24 MHz
3.7	15.207	AC Conducted Emission	Pass	8.03 dB under the limit at 0.39 MHz
3.8	15.203	Antenna Requirement	Pass	-

Conformity Assessment Condition:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the section “Measurement Uncertainty”.

Disclaimer:

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature
General Specs Bluetooth - LE, Wi-Fi 2.4GHz 802.11b/g/n/ac/ax/be, Wi-Fi 5GHz 802.11a/n/ac/ax/be, Wi-Fi 6GHz 802.11a/n/ac/ax/be, and ZigBee. **Antenna Type** Bluetooth – LE: Omni-Directional Antenna WLAN: **<Ant. 1>**: Omni-Directional Antenna **<Ant. 2>**: Omni-Directional Antenna **<Ant. 3>**: Omni-Directional Antenna **<Ant. 4>**: Omni-Directional Antenna ZigBee: Omni-Directional Antenna

Antenna information			
5925 MHz ~ 6425 MHz	Peak Gain (dBi)	Horizontal	**<Ant. 2>:** 3.3
		Vertical	**<Ant. 4>:** 3.5
6425 MHz ~ 6525 MHz	Peak Gain (dBi)	Horizontal	**<Ant. 2>:** 3.9
		Vertical	**<Ant. 4>:** 4.4
6525 MHz ~ 6875 MHz	Peak Gain (dBi)	Horizontal	**<Ant. 2>:** 3.9
		Vertical	**<Ant. 4>:** 3.4
6875 MHz ~ 7125 MHz	Peak Gain (dBi)	Horizontal	**<Ant. 2>:** 4.3
		Vertical	**<Ant. 4>:** 2.9

Remark:

1. The device is a special case of MIMO system with two outputs driving a cross-polarized pair of linearly polarized antennas which are vertically/horizontally mounted on the PCB board as indicated in equipment photo exhibits.
2. Horizontal and vertical antennas are cross-polarized antennas and the transmitting outputs are a 90-degree phase-shifted replica against the other and the phase centers of the two antennas' orientation are co-located.
3. Directional gain of EHT320 is determined by maximum gain of each occupied frequency band.
4. Channel puncturing is not implemented.
5. The EUT information mentioned or listed above is declared by the manufacturer.

1.1.1 Antenna Directional Gain

Follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01 F)2)c)i)
Cross-polarized antennas. For a system in which the antennas have fixed orientations relative to one another that ensure that the antennas are cross-polarized regardless of any user actions, the directional gain is computed as follows.

(i) Cross-polarized antennas with NANT = 2. In the case of a transmitter with only two outputs driving a pair of antennas that are cross-polarized (e.g., vertical and horizontal or left-circular and right-circular), directional gain is the gain of an individual antenna. If the two antennas have different gains, the larger gain applies.

The directional gain “DG” is calculated as following table.

	Vertical Ant 4 (dBi)	Horizontal Ant 2 (dBi)	DG for Power (dBi)	DG for PSD (dBi)
5925 MHz ~ 6425 MHz	3.50	3.30	3.50	3.50
6425 MHz ~ 6525 MHz	4.40	3.90	4.40	4.40
6525 MHz ~ 6875 MHz	3.40	3.90	3.90	3.90
6875 MHz ~ 7125 MHz	2.90	4.30	4.30	4.30

Calculation example:
If a device has two cross-polarized antenna, G_{ANT4}= 3.50dBi; G_{ANT2}=3.30dBi
Directional gain of power measurement = max(3.50, 3.30) = 3.50 dBi
Directional gain of PSD measurement = max(3.50, 3.30) = 3.50 dBi
Power and PSD limit reduction = Directional gain – 6dBi, (min = 0)

1.2 Modification of EUT

No modifications made to the EUT during the testing.

1.3 Testing Location

Test Site	Sporton International (USA) Inc.
Test Site Location	1175 Montague Expressway, Milpitas, CA 95035 TEL : 408 9043300
Test Site No.	**Sporton Site No.**
	TH01-CA, CO01-CA, 03CH02-CA

Note: The test site complies with ANSI C63.4 2014 requirement.

FCC Designation No.: US1250

1.4 Applicable Standards

According to the specifications declared by the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart E
- FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- FCC KDB 987594 D02 U-NII 6 GHz EMC Measurement v02r01
- FCC KDB 414788 D01 Radiated Test Site v01r01.
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ANSI C63.10-2013

Remark: All the test items were validated and recorded in accordance with the standards without any modification during the testing.

2 Test Configuration of Equipment Under Test

a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, , the measured emission level of the EUT was maximized by rotating the EUT on a turntable, adjusting the orientation of the EUT and EUT antenna in three orthogonal axis (X: flat, Y: portrait, Z: landscape), and adjusting the measurement antenna orientation, following C63.10 exploratory test procedures and only the worst case emissions were reported in this report.

b. AC power line Conducted Emission was tested under maximum output power.

2.1 Carrier Frequency and Channel

BW 20M	**Channel**	1	5	9	13	17	21	25	29
	Freq. (MHz)	5955	5975	5995	6015	6035	6055	6075	6095
BW 40M	**Channel**	3		11		19		27	
	Freq. (MHz)	5965		6005		6045		6085	
BW 80M	**Channel**	7				23			
	Freq. (MHz)	5985				6065			
BW 160M	**Channel**	15							
	Freq. (MHz)	6025							
BW 320M	**Channel**	31							
	Freq. (MHz)	6105							

BW 20M	**Channel**	33	37	41	45	49	53	57	61
	Freq. (MHz)	6115	6135	6155	6175	6195	6215	6235	6255
BW 40M	**Channel**	35		43		51		59	
	Freq. (MHz)	6125		6165		6205		6245	
BW 80M	**Channel**	39				55			
	Freq. (MHz)	6145				6225			
BW 160M	**Channel**	47							
	Freq. (MHz)	6185							
BW 320M	**Channel**	63							
	Freq. (MHz)	6265							

BW 20M	Channel	65	69	73	77	81	85	89	93
	Freq. (MHz)	6275	6295	6315	6335	6355	6375	6395	6415
BW 40M	Channel	67		75		83		91	
	Freq. (MHz)	6285		6325		6365		6405	
BW 80M	Channel	71				87			
	Freq. (MHz)	6305				6385			
BW 160M	Channel	79							
	Freq. (MHz)	6345							
BW 320M	Channel	95							
	Freq. (MHz)	6425							

BW 20M	Channel	97	101	105	109	113	117	121	125
	Freq. (MHz)	6435	6455	6475	6495	6515	6535	6555	6575
BW 40M	Channel	99		107		115		123	
	Freq. (MHz)	6445		6485		6525		6565	
BW 80M	Channel	103				119			
	Freq. (MHz)	6465				6545			
BW 160M	Channel	111							
	Freq. (MHz)	6505							

BW 20M	Channel	129	133	137	141	145	149	153	157
	Freq. (MHz)	6595	6615	6635	6655	6675	6695	6715	6735
BW 40M	Channel	131		139		147		155	
	Freq. (MHz)	6605		6645		6685		6725	
BW 80M	Channel	135				151			
	Freq. (MHz)	6625				6705			
BW 160M	Channel	143							
	Freq. (MHz)	6665							
BW 320M	Channel	127							
	Freq. (MHz)	6585							

BW 20M	Channel	161	165	169	173	177	181	185	189
	Freq. (MHz)	6755	6775	6795	6815	6835	6855	6875	6895
BW 40M	Channel	163		171		179		187	
	Freq. (MHz)	6765		6805		6845		6885	
BW 80M	Channel	167				183			
	Freq. (MHz)	6785				6865			
BW 160M	Channel	175							
	Freq. (MHz)	6825							
BW 320M	Channel	159							
	Freq. (MHz)	6725							

BW 20M	Channel	193	197	201	205	209	213	217	221
	Freq. (MHz)	6915	6935	6955	6975	6995	7015	7035	7055
BW 40M	Channel	195		203		211		219	
	Freq. (MHz)	6925		6965		7005		7045	
BW 80M	Channel	199				215			
	Freq. (MHz)	6945				7025			
BW 160M	Channel	207							
	Freq. (MHz)	6985							
BW 320M	Channel	191							
	Freq. (MHz)	6905							

BW 20M	Channel	225	229
	Freq. (MHz)	7075	7095
BW 40M	Channel	227	
	Freq. (MHz)	7085	

BW 20M	Channel	233
	Freq. (MHz)	7115

2.2 Test Mode

The final test modes include the worst data rates for each modulation shown in the table below.

MIMO Mode

Modulation	Data Rate
802.11a	6 Mbps
802.11n HT20 (Covered by EHT20)	MCS0
802.11n HT40 (Covered by EHT40)	MCS0
802.11ac VHT20 (Covered by EHT20)	MCS0
802.11ac VHT40 (Covered by EHT40)	MCS0
802.11ac VHT80 (Covered by EHT80)	MCS0
802.11ac VHT160 (Covered by EHT160)	MCS0
802.11ax HE20 (Covered by EHT20)	MCS0
802.11ax HE40 (Covered by EHT40)	MCS0
802.11ax HE80 (Covered by EHT80)	MCS0
802.11ax HE160 (Covered by EHT160)	MCS0
802.11be EHT20	MCS0
802.11be EHT40	MCS0
802.11be EHT80	MCS0
802.11be EHT160	MCS0
802.11be EHT320	MCS0

Remark:

1 Based on the manufacturer's declaration, 802.11be covers the 802.11n, 11ac and 11ax due to the same modulation family scheme. For 802.11be, only full resource unit assignment mode is tested since the EUT does not support partial resource unit assignment mode.

2 Based on the manufacturer's declaration, RF power on each chain in MIMO mode is parameterized to be greater than the power in SISO mode, giving the condition that the SISO Mode is covered by MIMO Mode which is deemed the worst case selected for testing.

3 The EUT information mentioned or listed above is declared by the manufacturer.

Test Cases	
AC Conducted Emission	Mode 1: WLAN (6GHz) Link + USB Load + LAN 1 + LAN 2 + Adapter

MIMO <Ant. 4+2>

Ch. #		UNII-5 (5925-6425 MHz)	UNII-6 (6425-6525 MHz)	UNII-7 (6525-6875 MHz)	UNII-8 (6875-7125 MHz)
		802.11a	802.11a	802.11a	802.11a
L	Low	001	097	117	189
M	Middle	045	105	149	209
H	High	093	113	181	229
Straddle		-	-	-	-

Ch. #		UNII-5 (5925-6425 MHz)	UNII-6 (6425-6525 MHz)	UNII-7 (6525-6875 MHz)	UNII-8 (6875-7125 MHz)
		802.11be EHT20	802.11be EHT20	802.11be EHT20	802.11be EHT20
L	Low	001	097	117	189
M	Middle	045	105	149	209
H	High	093	113	181	229
Straddle		-	-	-	-

Ch. #		UNII-5 (5925-6425 MHz)	UNII-6 (6425-6525 MHz)	UNII-7 (6525-6875 MHz)	UNII-8 (6875-7125 MHz)
		802.11be EHT40	802.11be EHT40	802.11be EHT40	802.11be EHT40
L	Low	003	099	123	195
M	Middle	043	-	147	211
H	High	091	107	179	227
Straddle		-	115	187	-

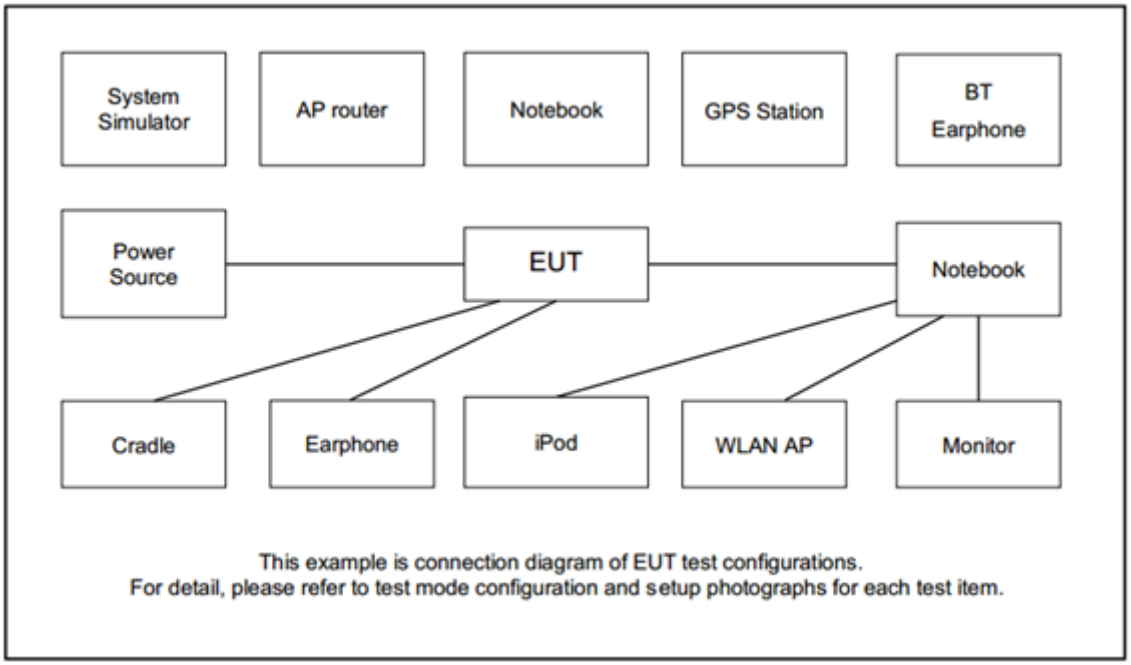
Ch. #		UNII-5 (5925-6425 MHz)	UNII-6 (6425-6525 MHz)	UNII-7 (6525-6875 MHz)	UNII-8 (6875-7125 MHz)
		802.11be EHT80	802.11be EHT80	802.11be EHT80	802.11be EHT80
L	Low	007	103	135	199
M	Middle	039		151	-
H	High	087		167	215
Straddle		-	119	-	-

Ch. #		UNII-5 (5925-6425 MHz)	UNII-6 (6425-6525 MHz)	UNII-7 (6525-6875 MHz)	UNII-8 (6875-7125 MHz)
		802.11be EHT160	802.11be EHT160	802.11be EHT160	802.11be EHT160
L	Low	015	-	143	207
M	Middle	047			
H	High	079			
Straddle		-	111	-	-

Ch. #		UNII-5 (5925-6425 MHz)	UNII-6 (6425-6525 MHz)	UNII-7 (6525-6875 MHz)	UNII-8 (6875-7125 MHz)
		802.11be EHT320	802.11be EHT320	802.11be EHT320	802.11be EHT320
L	Low	031	-	-	-
M	Middle	-			
H	High	-			
Straddle		063	95	127	191
				159	

Remark: Based on ANSI C63.10 clause 5.6.2.2, b) Spurious emissions, measure the mode with the highest output power and the mode with highest output power spectral density for each modulation family.

2.3 Connection Diagram of Test System



2.4 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Laptop	Dell	Latitude 5440	NA	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
2.	Laptop	Acer	N18Q13	NA	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
3.	Laptop	Dell	Latitue E7470	NA	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	Adapter	Ruckus	740-64277-001	NA	NA	Unshielded, 1.0m
5.	USB Flash drive	SanDisk	N/A	N/A	N/A	USB Flash drive
6.	POE Adapter	Ruckus	740-64310-001	NA	N/A	N/A

2.5 EUT Operation Test Setup

The RF test items, utility “Tera Term 4.106” and “QSPR V5.14.00227.1” was installed in Notebook which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.

2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example :

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 4.2 dB and 10dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 4.2 + 10 = 14.2 (dB)

3 Test Result

3.1 26dB & 99% Occupied Bandwidth Measurement

3.1.1 Limit of 26dB & 99% Occupied Bandwidth

<FCC 14-30 CFR 15.407>

(a)(10) The maximum transmitter channel bandwidth for U-NII devices in the 5.925-7.125 GHz band is 320 megahertz.

For channels with a nominal bandwidth less than 320 Mhz, (e.g., 20, 40, 80, and 160 MHz), compliance is demonstrated by way of the 26 dB EBW.

For channels with a nominal bandwidth less than 320 Mhz, compliance is demonstrated by way of the 99% BW.

3.1.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.1.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section C) Emission bandwidth
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
7. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1-5% of the emission bandwidth and set the Video bandwidth (VBW) ≥ 3 * RBW.
8. Measure and record the results in the test report.

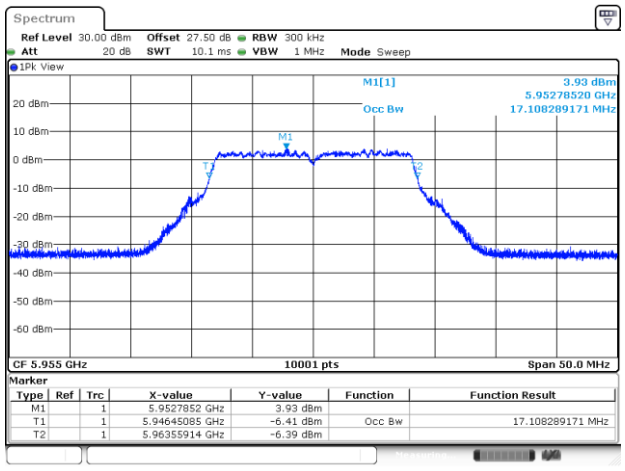
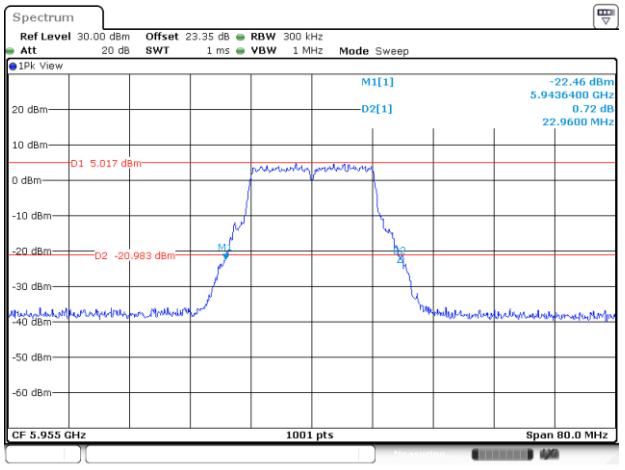
3.1.4 Test Setup

3.1.5 Test Result of 26dB & 99% Occupied Bandwidth

Please refer to Appendix A.

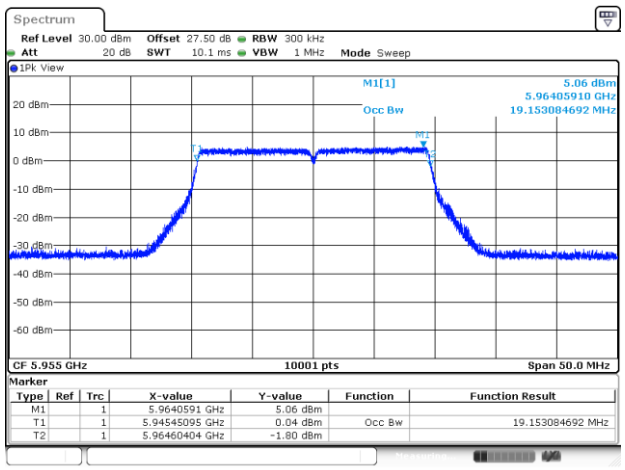
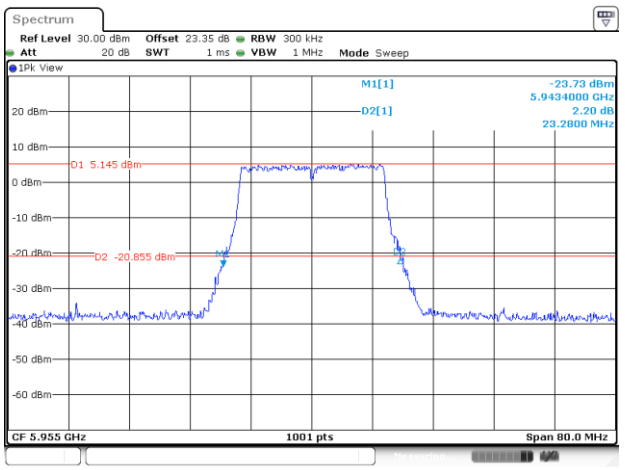
MIMO <Ant. 4+2>

<802.11a>

99% Occupied Bandwidth	26dB Bandwidth
	

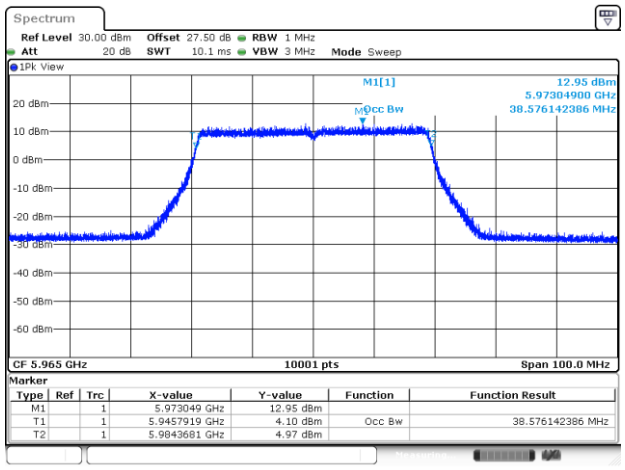
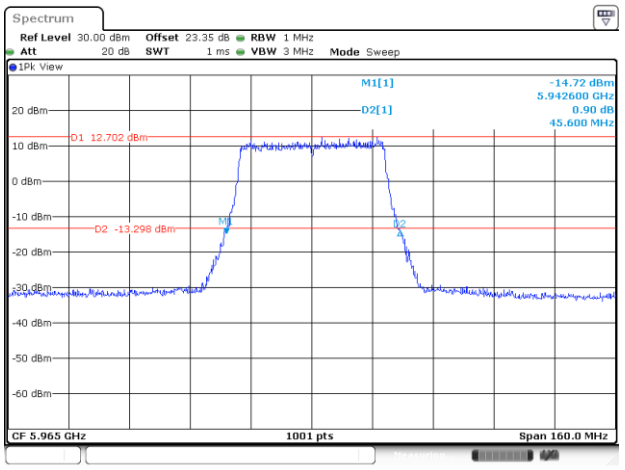
Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

<802.11be EHT20>

99% Occupied Bandwidth	26dB Bandwidth
	

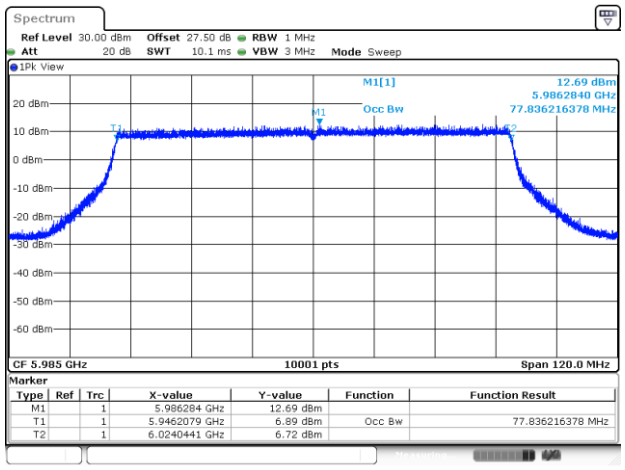
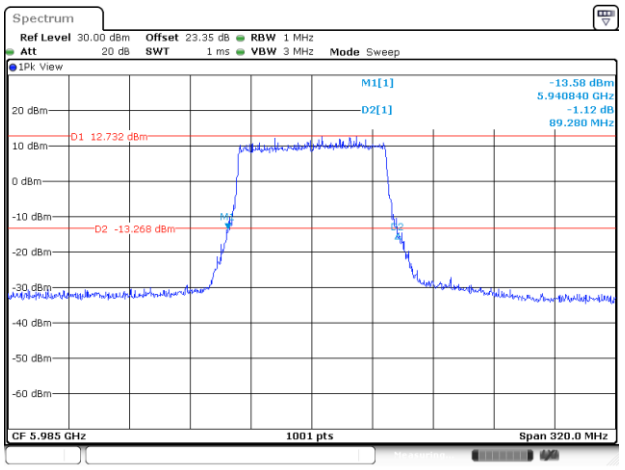
Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

<802.11be EHT40>

99% Occupied Bandwidth	26dB Bandwidth
	

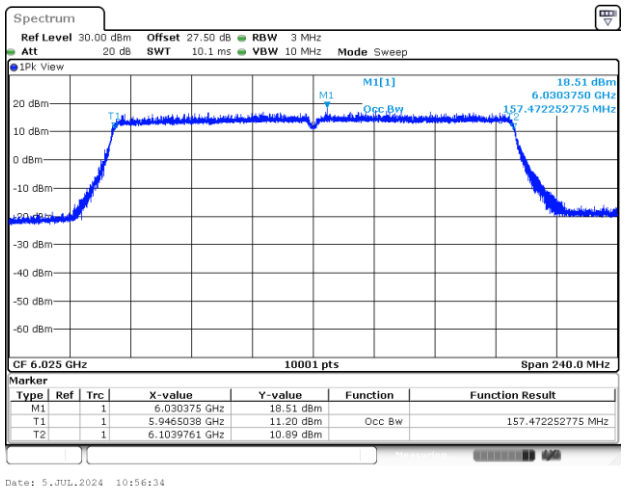
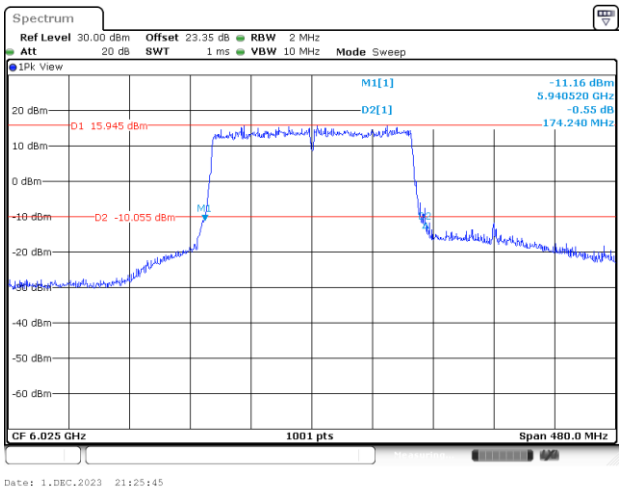
Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

<802.11be EHT80>

99% Occupied Bandwidth	26dB Bandwidth
	

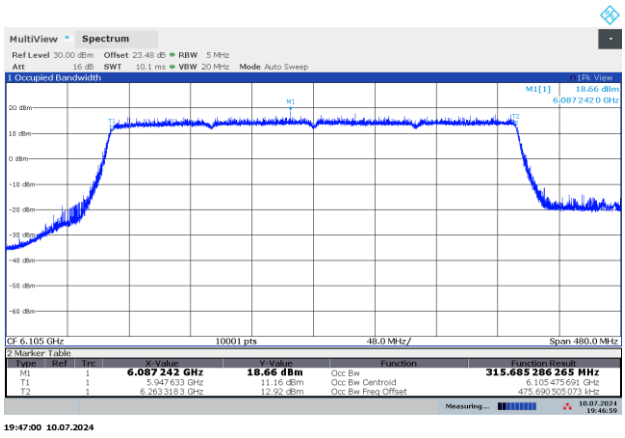
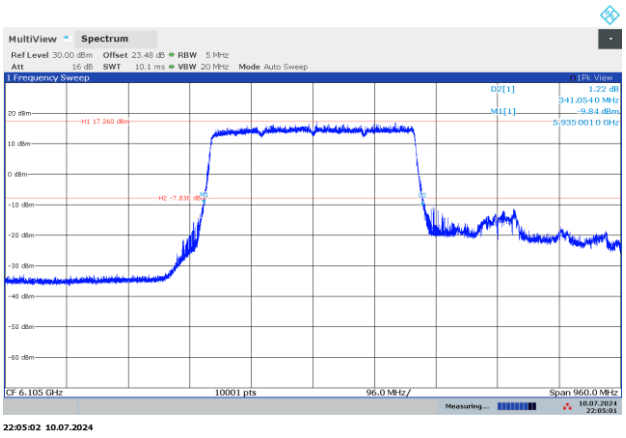
Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

<802.11be EHT160>

99% Occupied Bandwidth	26dB Bandwidth
	

Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

<802.11be EHT320>

99% Occupied Bandwidth	26dB Bandwidth
	

Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

3.2 Fundamental Maximum EIRP Measurement

3.2.1 Limit of Fundamental Maximum EIRP

<FCC 14-30 CFR 15.407>

For an indoor access point operating in the 5.925–7.125 GHz band, the maximum power spectral density must not exceed 5 dBm e.i.r.p. in any 1-megahertz band. In addition, the maximum e.i.r.p. over the frequency band of operation must not exceed 30 dBm.

3.2.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

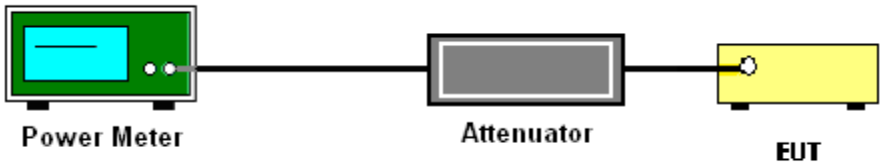
3.2.3 Test Procedures

The testing follows Method PM-G of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

Method PM-G (Measurement using a gated RF average power meter):

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit at its maximum power control level.
3. Measure the average power of the transmitter.
4. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.
5. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

3.2.4 Test Setup



3.2.5 Test Result of Fundamental Maximum EIRP

Please refer to Appendix A.

3.3 Fundamental Power Spectral Density Measurement

3.3.1 Limit of Fundamental Power Spectral Density

<FCC 14-30 CFR 15.407>

(a)(7) For client devices, except for fixed client devices as defined in this subpart, operating under the control of a standard power access point in 5.925-6.425 GHz and 6.525-6.875 GHz bands, the maximum power spectral density must not exceed 17 dBm e.i.r.p. in any 1-megahertz band,

(a)(8) For client devices operating under the control of an indoor access point in the 5.925-7.125 GHz bands, the maximum power spectral density must not exceed −1 dBm e.i.r.p. in any 1-megahertz band.

(a)(5) For an indoor access point operating in the 5.925-7.125 GHz band, the maximum power spectral density must not exceed 5 dBm e.i.r.p. in any 1-megahertz band. In addition, the maximum e.i.r.p. over the frequency band of operation must not exceed 30 dBm.

3.3.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.3.3 Test Procedures

The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

Section F) Maximum power spectral density.

 # Method SA-1 #

(trace averaging with the EUT transmitting at full power throughout each sweep).

- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 1 MHz.
- Set VBW ≥ 3 MHz.
- Number of points in sweep ≥ 2 Span / RBW.
- Sweep time = auto.
- Detector = RMS
- Trace average at least 100 traces in power averaging mode.
- The EUT transmits continuously (duty cycle ≥ 98%).

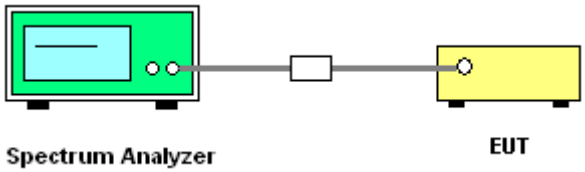
1. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
2. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.

3. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

   Method (a): Measure and sum the spectra across the outputs.

   The total final Power Spectral Density is from a device with 2 transmitter outputs. The spectrum measurements of the individual outputs are all performed with the same span and number of points; the spectrum value in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 to obtain the value for the first frequency bin of the summed spectrum.

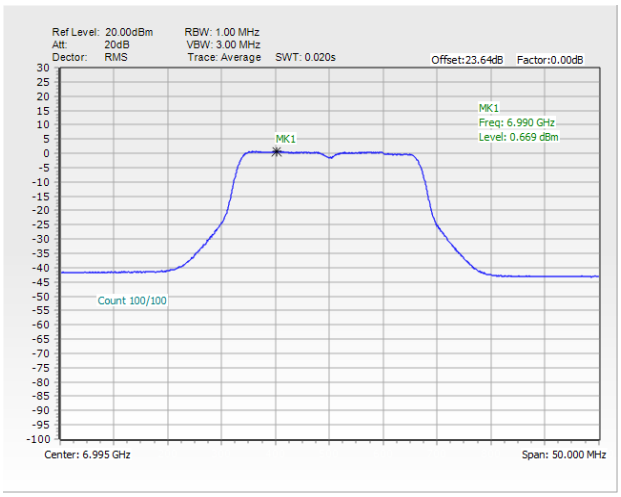
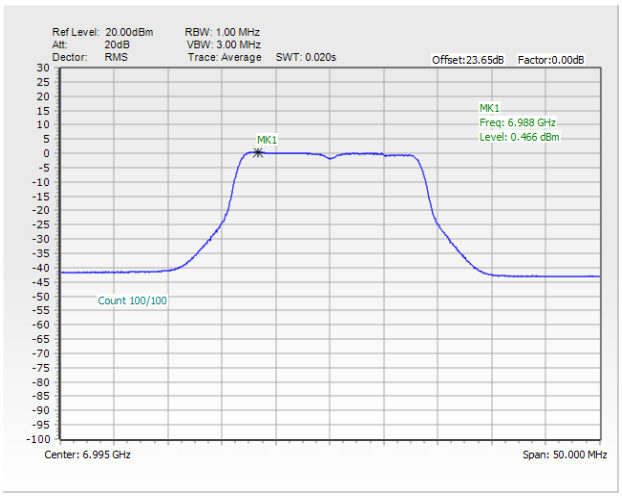
3.3.4 Test Setup



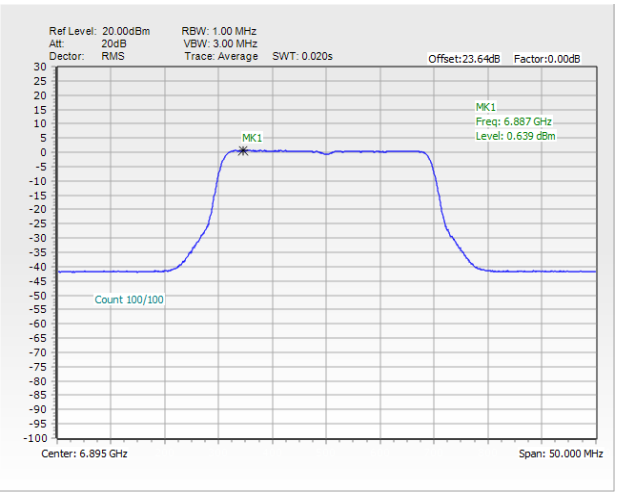
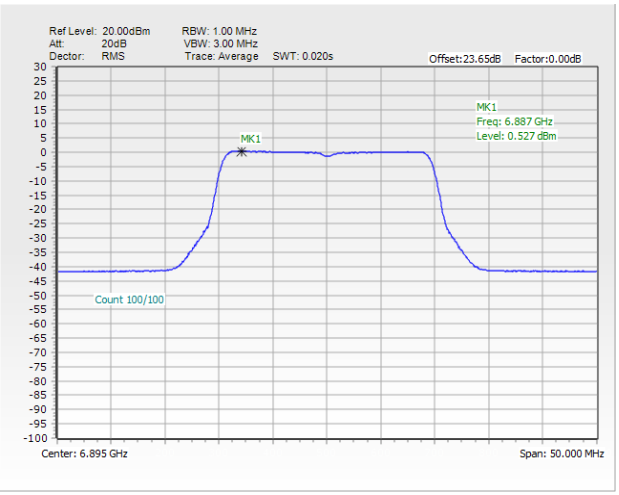
3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

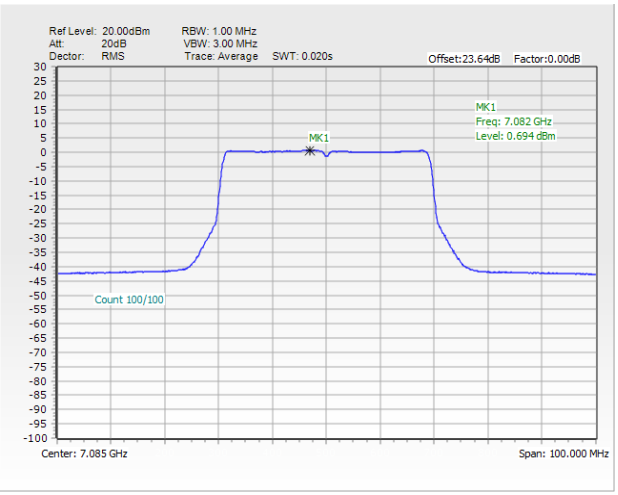
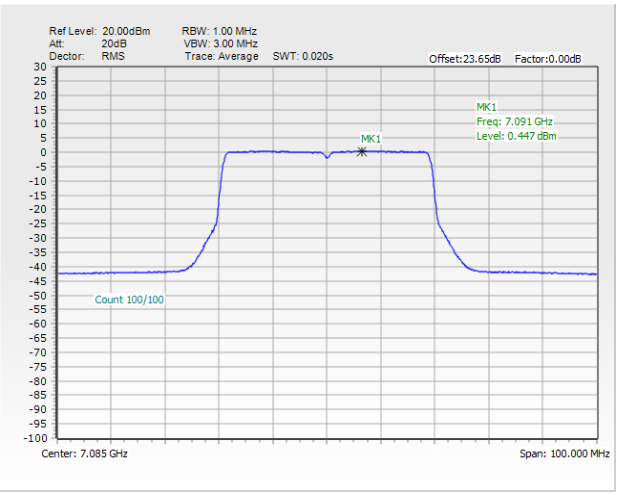
<802.11a>

Maximum Power Density Plot (dBm/MHz)	
MIMO Ant. 4	**MIMO Ant. 2**
	

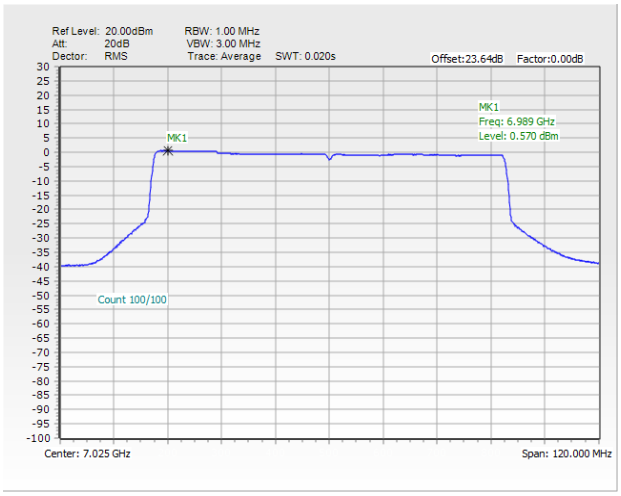
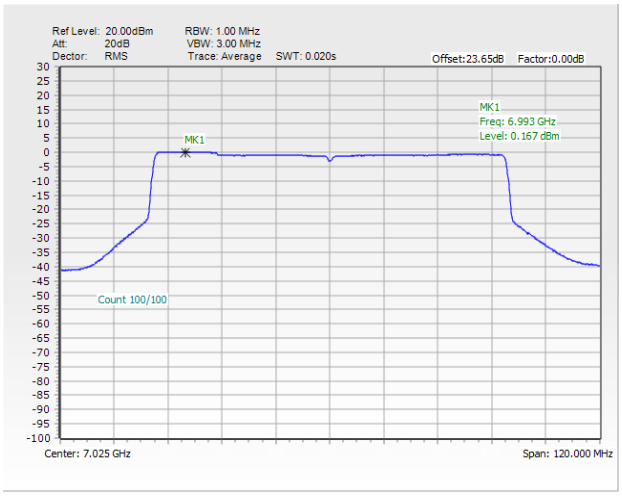
<802.11be EHT20>

Maximum Power Density Plot (dBm/MHz)	
MIMO Ant. 4	**MIMO Ant. 2**
	

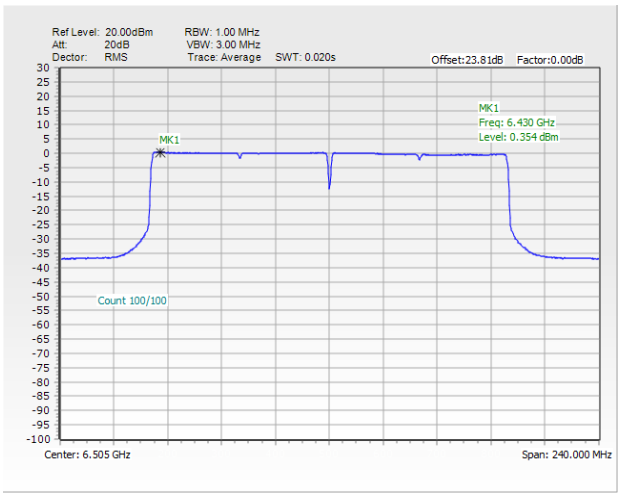
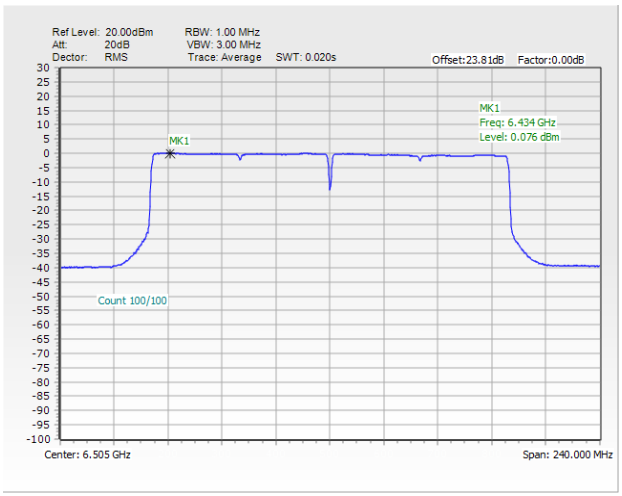
<802.11be EHT40>

Maximum Power Density Plot (dBm/MHz)	
MIMO Ant. 4	**MIMO Ant. 2**
	

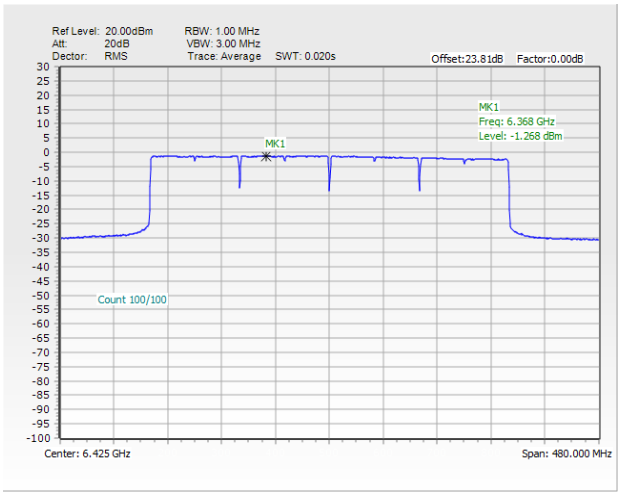
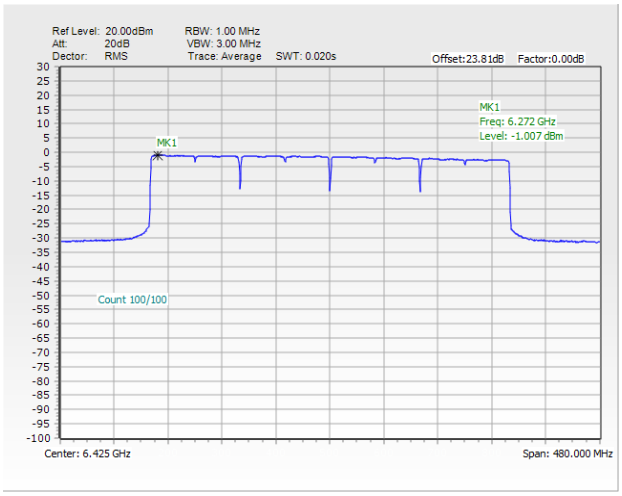
<802.11be EHT80>

Maximum Power Density Plot (dBm/MHz)	
MIMO Ant. 4	**MIMO Ant. 2**
	

<802.11be EHT160>

Maximum Power Density Plot (dBm/MHz)	
MIMO Ant. 4	**MIMO Ant. 2**
	

<802.11be EHT320>

Maximum Power Density Plot (dBm/MHz)	
MIMO Ant. 4	**MIMO Ant. 2**
	

3.4 In-Band Emissions (Channel Mask)

3.4.1 Limit of Unwanted Emissions

<FCC 14-30 CFR 15.407>

(b)(7) For transmitters operating within the 5.925-7.125 GHz bands: Power spectral density must be suppressed by 20 dB at 1 MHz outside of channel edge, by 28 dB at one channel bandwidth from the channel center, and by 40 dB at one- and one-half times the channel bandwidth away from channel center. At frequencies between one megahertz outside an unlicensed device's channel edge and one channel bandwidth from the center of the channel, the limits must be linearly interpolated between 20 dB and 28 dB suppression, and at frequencies between one and one- and one-half times an unlicensed device's channel bandwidth, the limits must be linearly interpolated between 28 dB and 40 dB suppression. Emissions removed from the channel center by more than one- and one-half times the channel bandwidth must be suppressed by at least 40 dB.

3.4.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.4.3 Test Procedures

The testing follows FCC KDB 987594 D02 U-NII 6GHz EMC Measurement v01.

Section J) In-Band Emissions.

1. Take nominal bandwidth as reference channel bandwidth provided that 26 dB emission bandwidth is always larger than nominal bandwidth
2. Measure the power spectral density (which will be used for emissions mask reference) using the following procedure:

   a) Set the span to encompass the entire 26 dB EBW of the signal.

   b) Set RBW = same RBW used for 26 dB EBW measurement.

   c) Set VBW ≥ 3 X RBW

   d) Number of points in sweep ≥ [2 X span / RBW].

   e) Sweep time = auto.

   f) Detector = RMS (i.e., power averaging)

   g) Trace average at least 100 traces in power averaging (rms) mode.

   h) Use the peak search function on the instrument to find the peak of the spectrum.
3. Using the measuring equipment limit line function, develop the emissions mask based on the following requirements. The emissions power spectral density must be reduced below the peak power spectral density (in dB) as follows:

   a. Suppressed by 20 dB at 1 MHz outside of the channel edge.

   b. Suppressed by 28 dB at one channel bandwidth from the channel center.

   c. Suppressed by 40 dB at one- and one-half times the channel bandwidth from the channel center.

4. Adjust the span to encompass the entire mask as necessary.
5. Clear trace.
6. Trace average at least 100 traces in power averaging (rms) mode.
7. Adjust the reference level as necessary so that the crest of the channel touches the top of the emission mask.

3.4.4 Test Setup

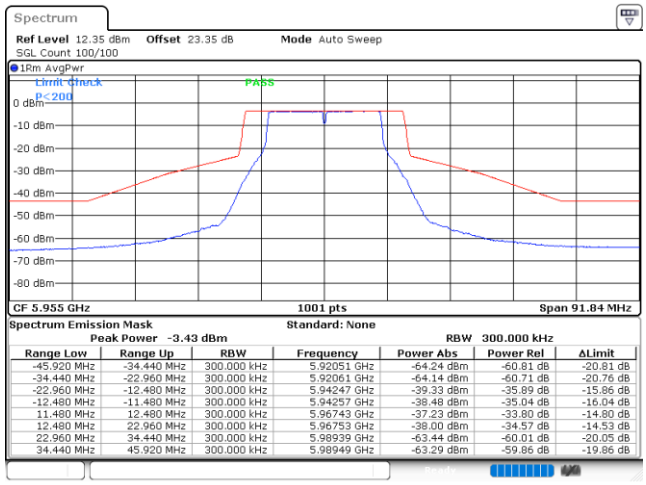
3.4.5 Test Result

Please refer to Appendix A.

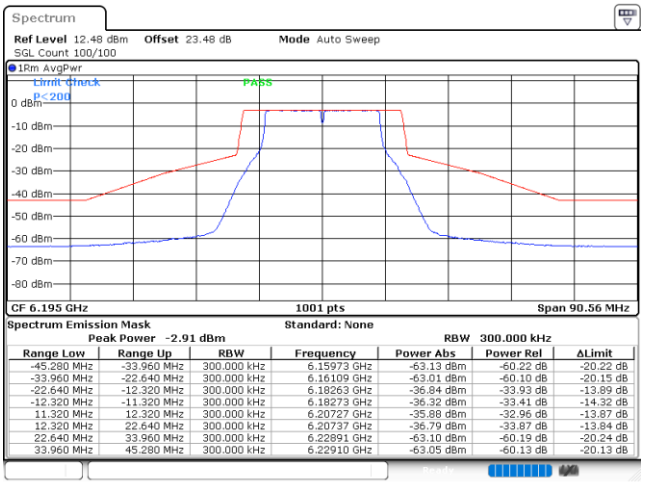
MIMO <Ant. 4+2(4)>

EUT Mode	802.11a

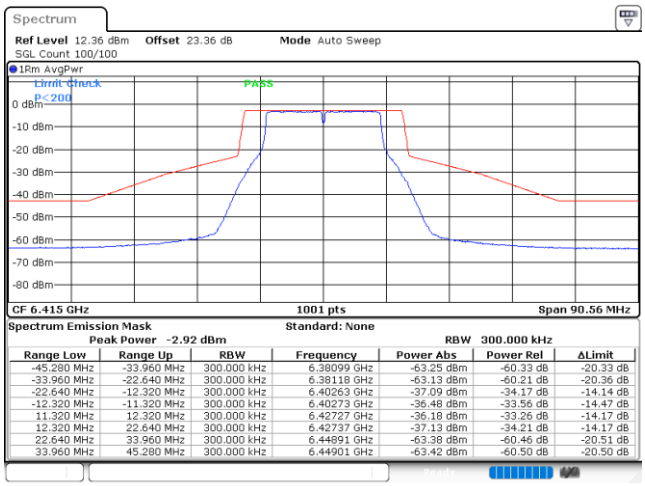
Plot on Channel 5955 MHz



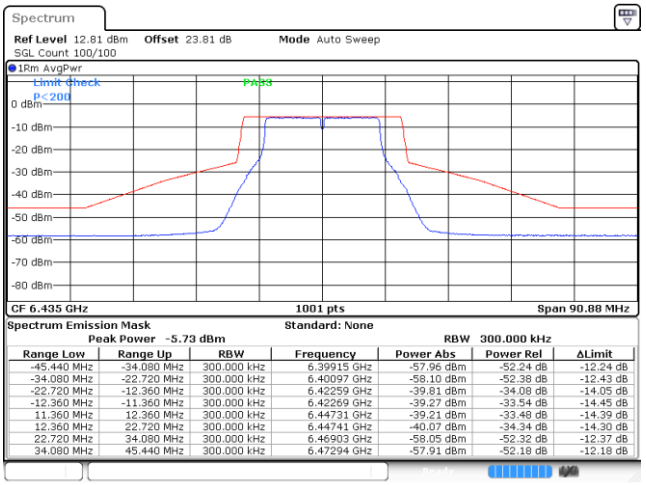
Plot on Channel 6195 MHz



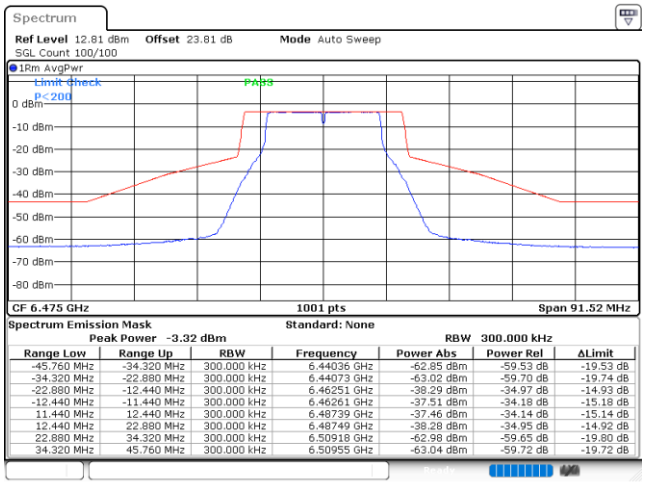
Plot on Channel 6415 MHz



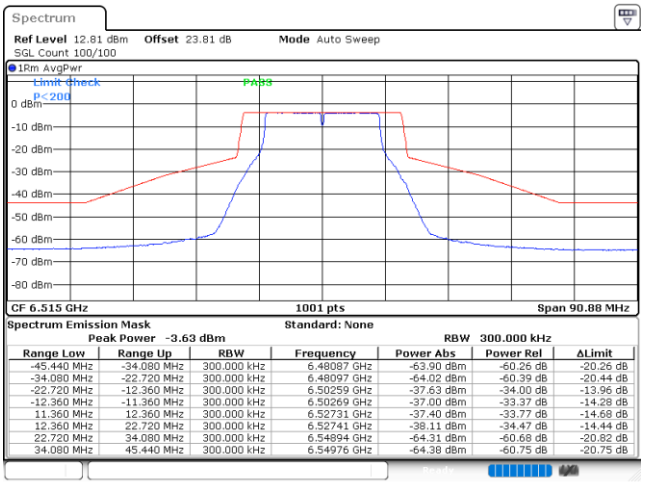
Plot on Channel 6435 MHz



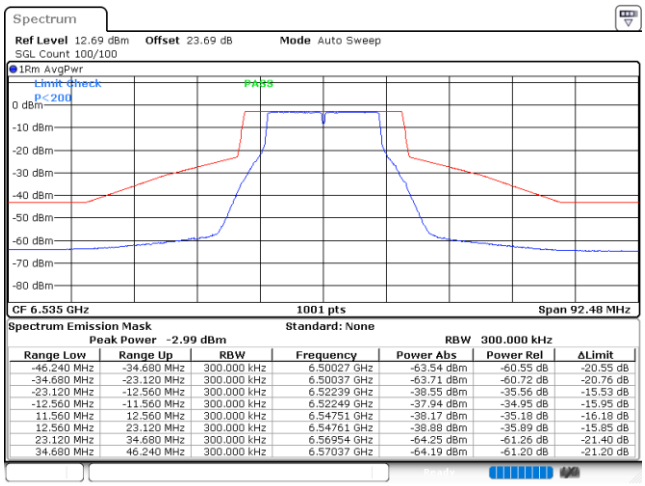
Plot on Channel 6475 MHz



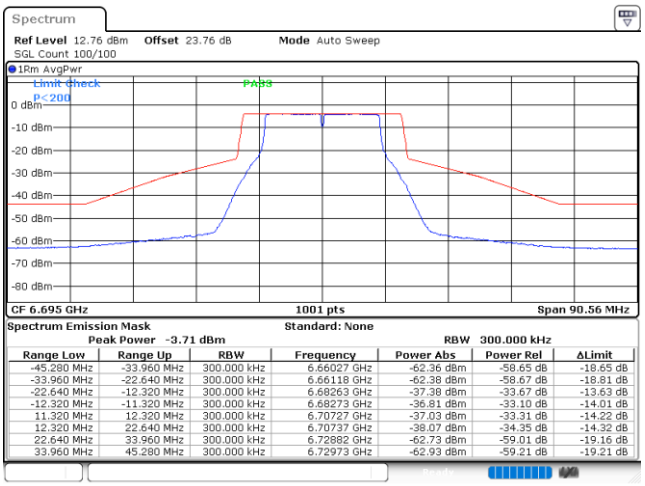
Plot on Channel 6515 MHz



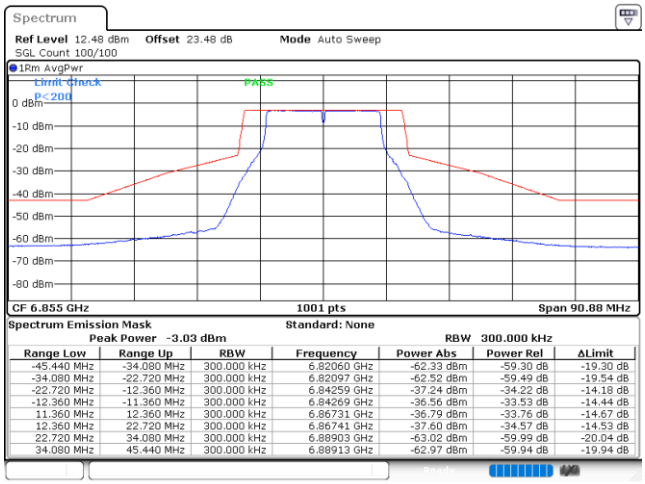
Plot on Channel 6535 MHz



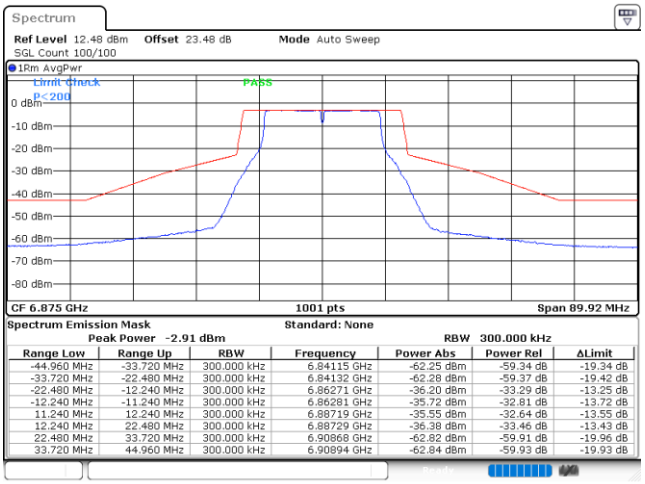
Plot on Channel 6695 MHz



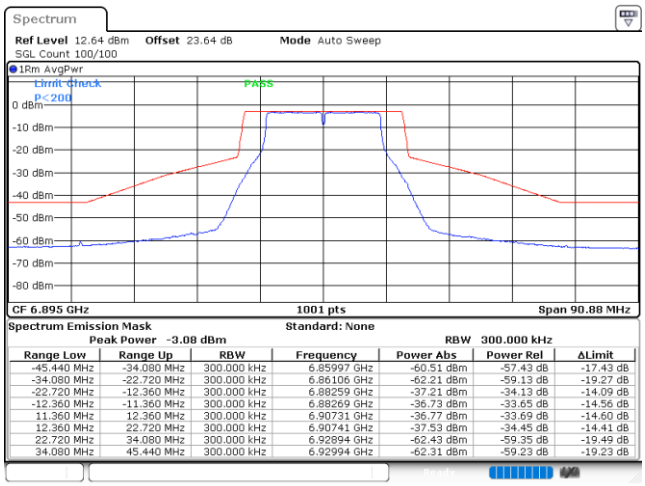
Plot on Channel 6855 MHz



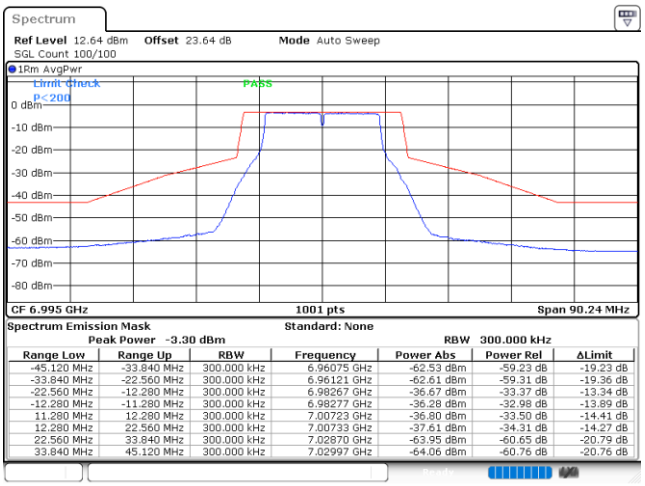
Plot on Channel 6875 MHz



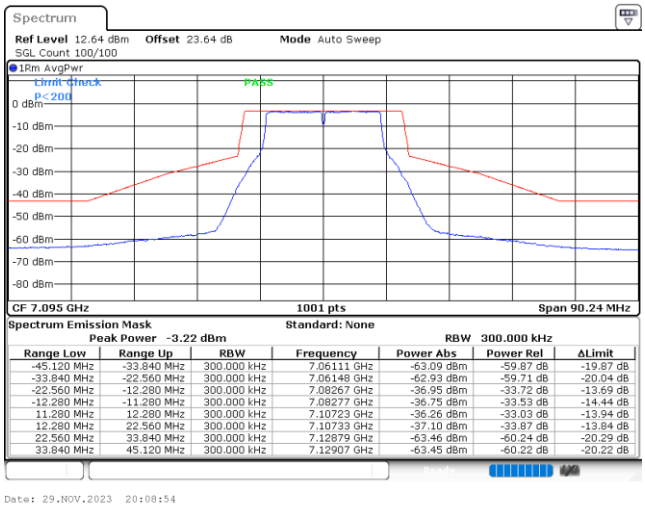
Plot on Channel 6895 MHz



Plot on Channel 6995 MHz

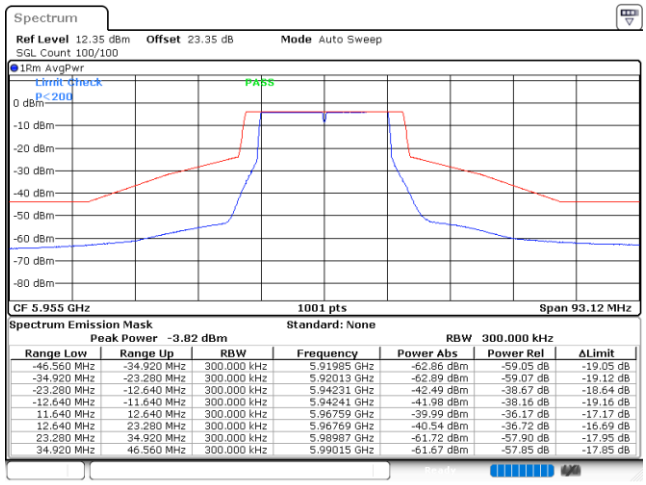


Plot on Channel 7095 MHz

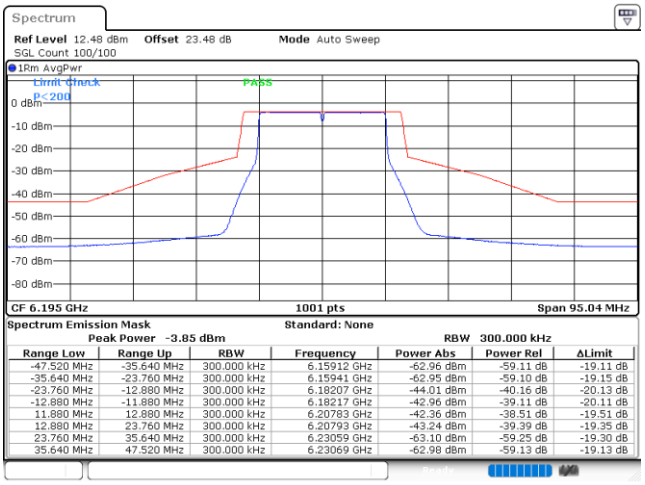


EUT Mode	802.11be EHT20 Full RU

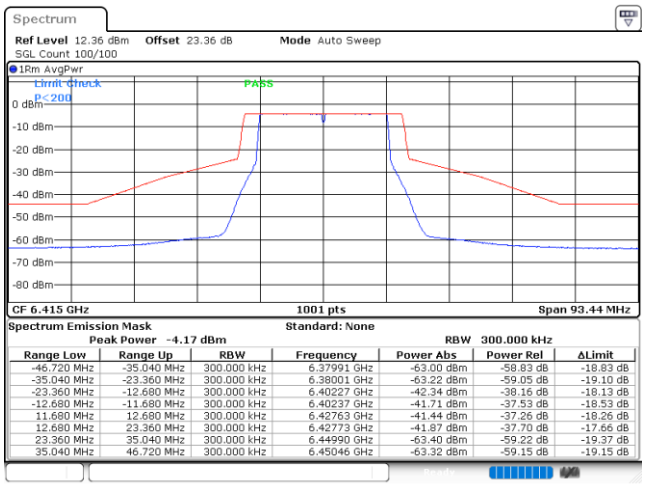
Plot on Channel 5955 MHz



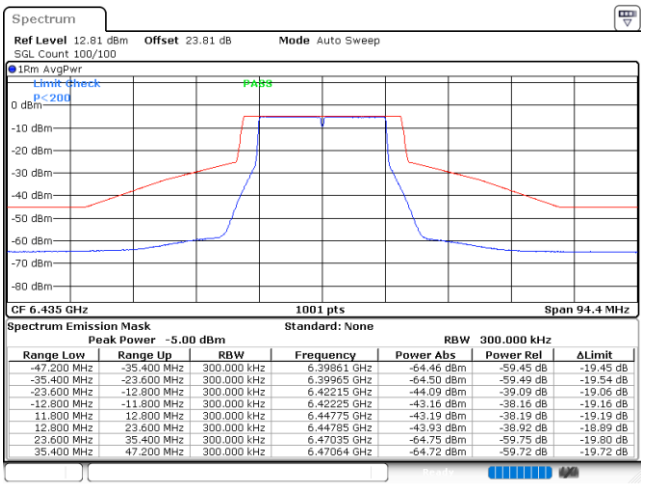
Plot on Channel 6195 MHz



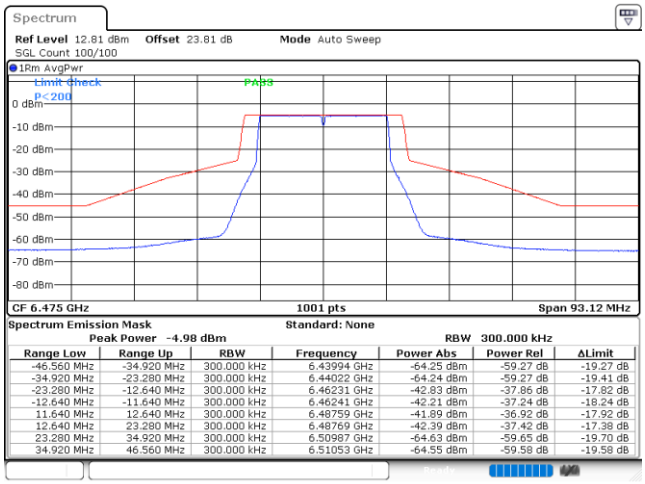
Plot on Channel 6415 MHz



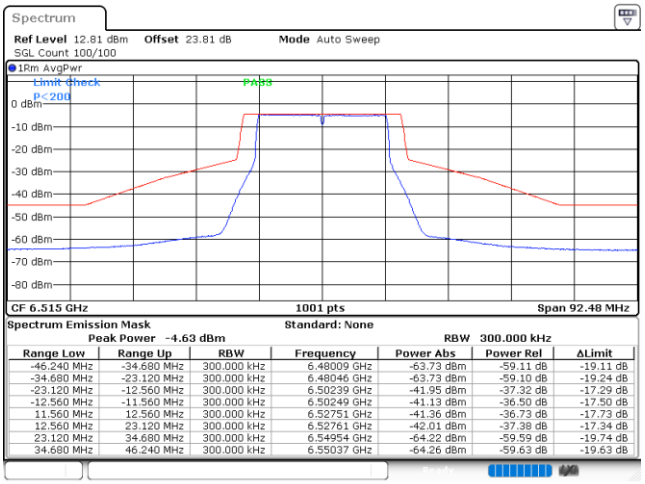
Plot on Channel 6435 MHz



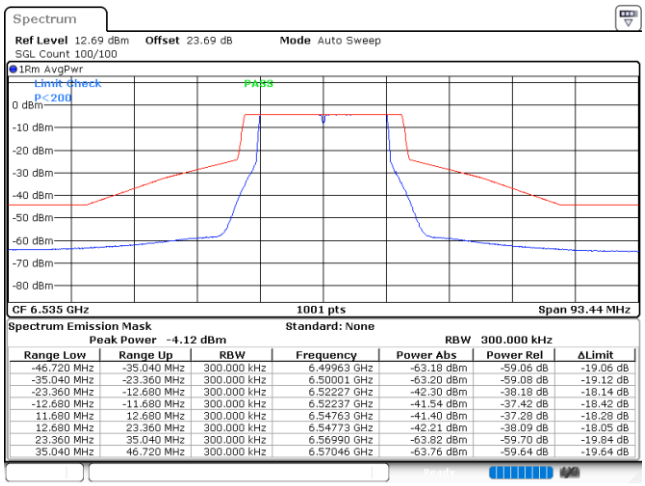
Plot on Channel 6475 MHz



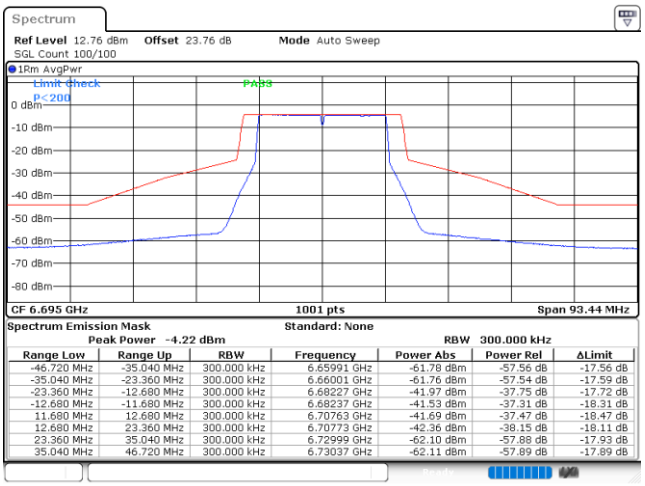
Plot on Channel 6515 MHz



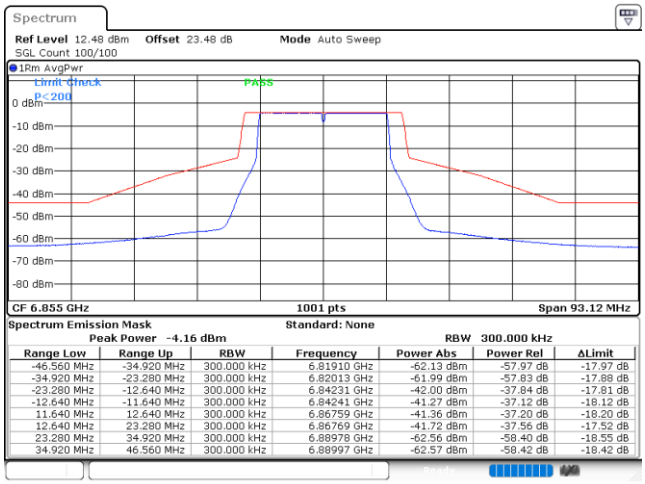
Plot on Channel 6535 MHz



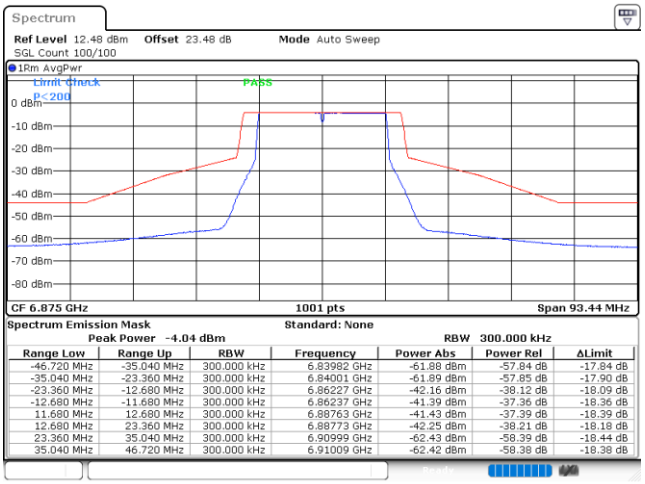
Plot on Channel 6695 MHz



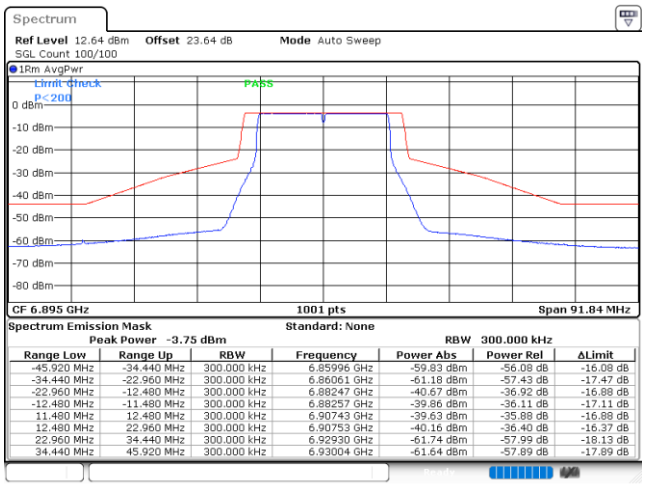
Plot on Channel 6855 MHz



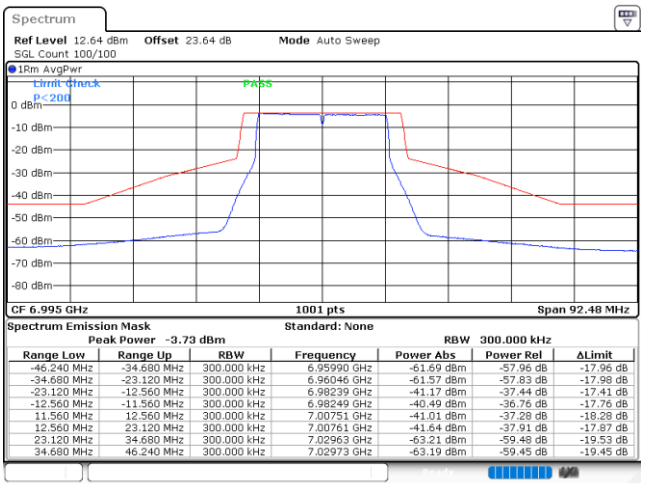
Plot on Channel 6875 MHz



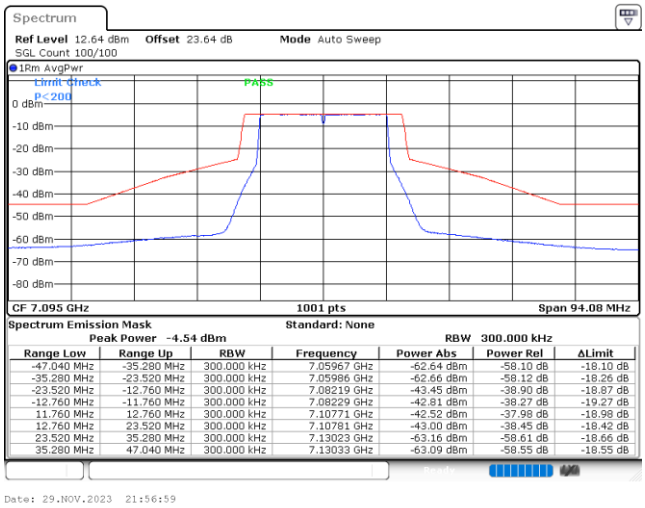
Plot on Channel 6895 MHz



Plot on Channel 6995 MHz

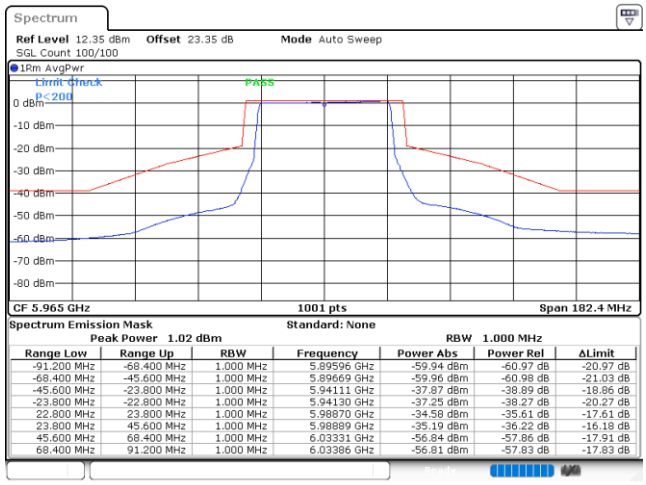


Plot on Channel 7095 MHz

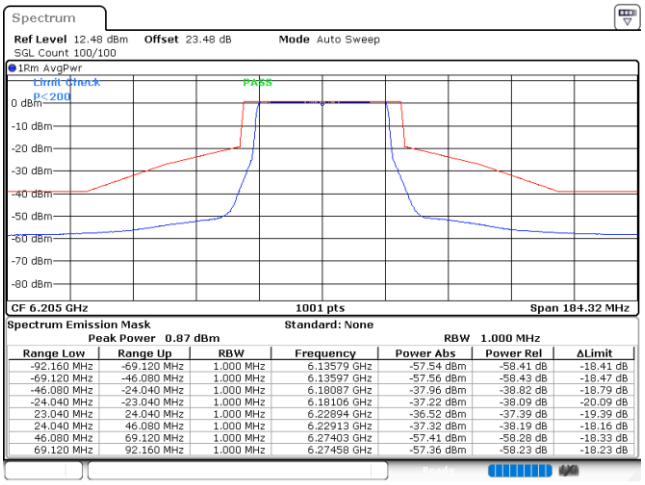


EUT Mode	802.11be EHT40 Full RU

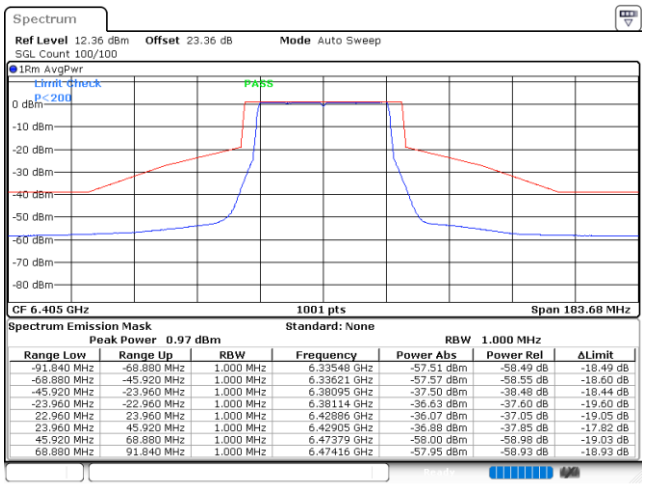
Plot on Channel 5965 MHz



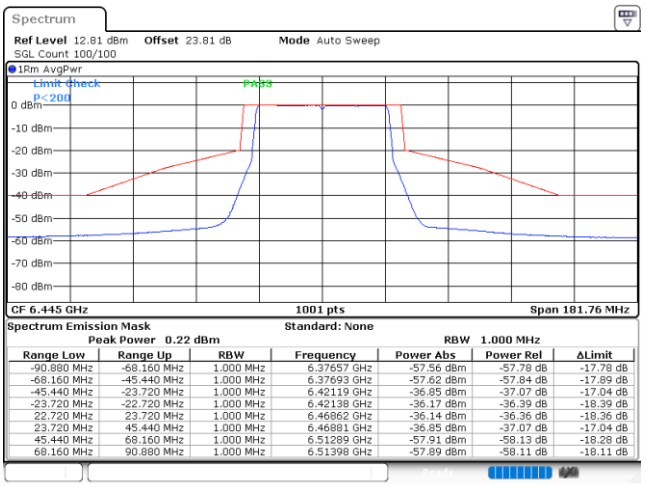
Plot on Channel 6205 MHz



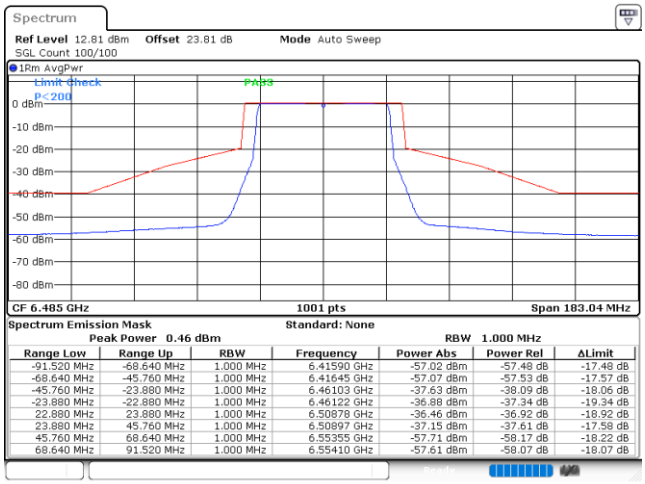
Plot on Channel 6405 MHz



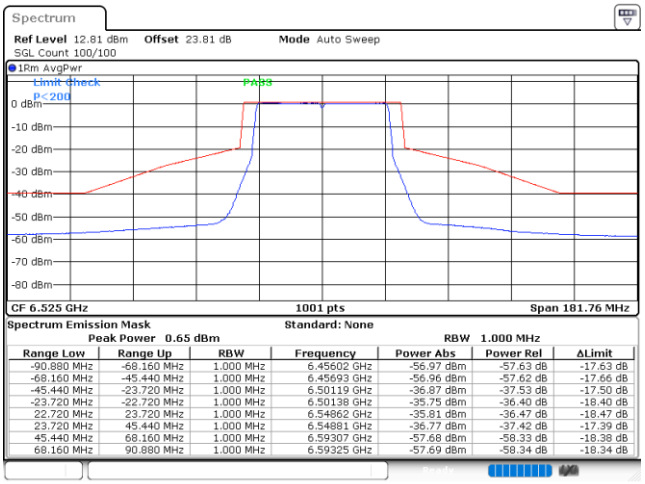
Plot on Channel 6445 MHz



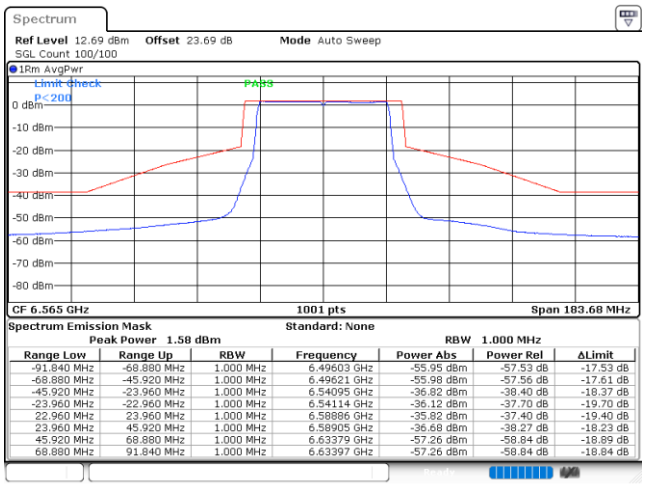
Plot on Channel 6485 MHz



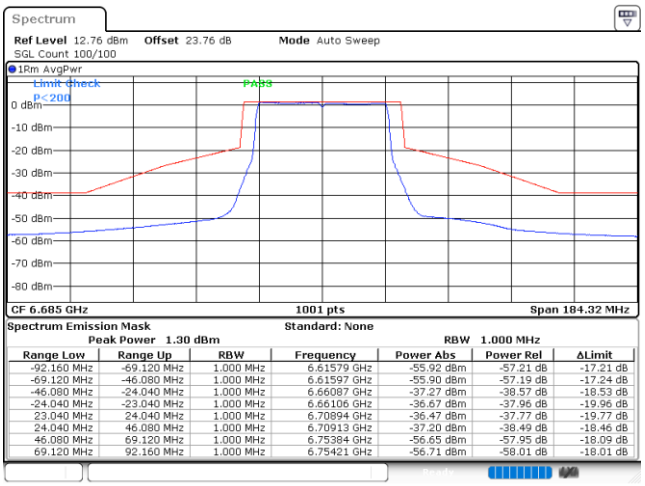
Plot on Channel 6525 MHz



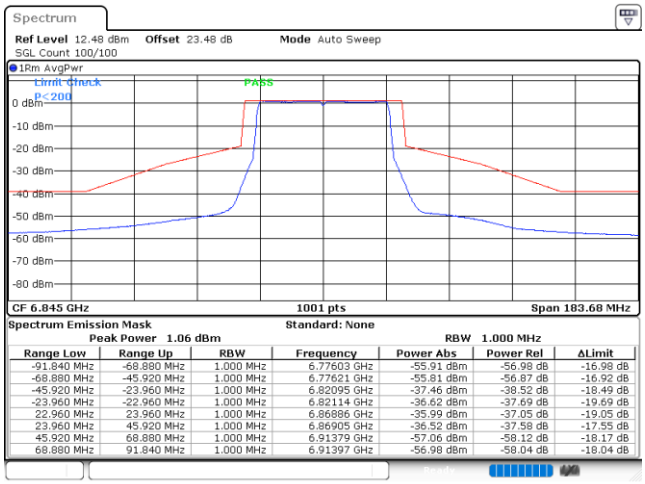
Plot on Channel 6565 MHz



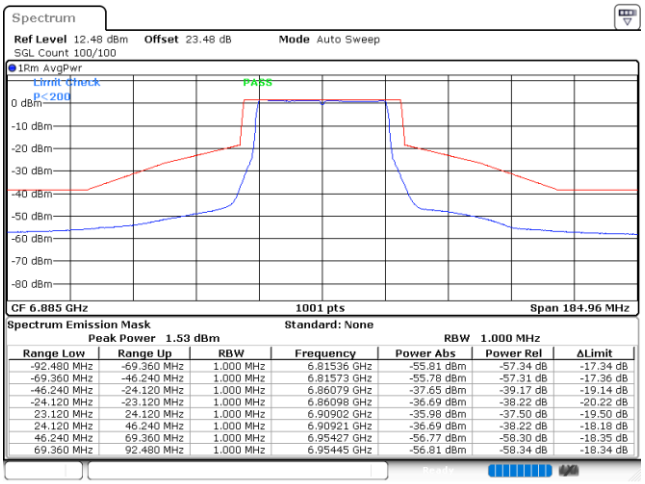
Plot on Channel 6685 MHz



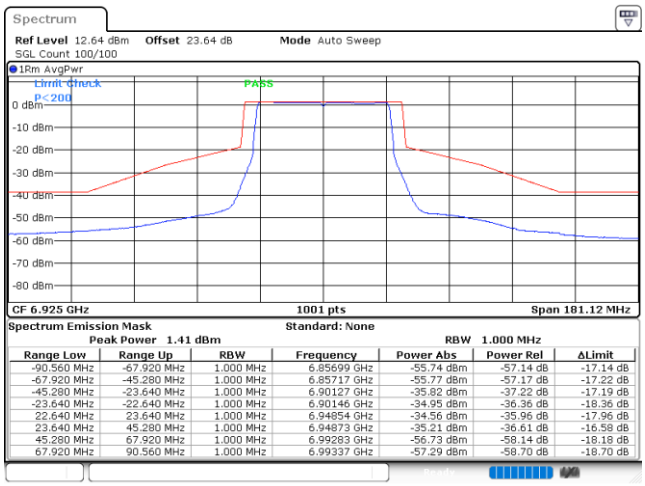
Plot on Channel 6845 MHz



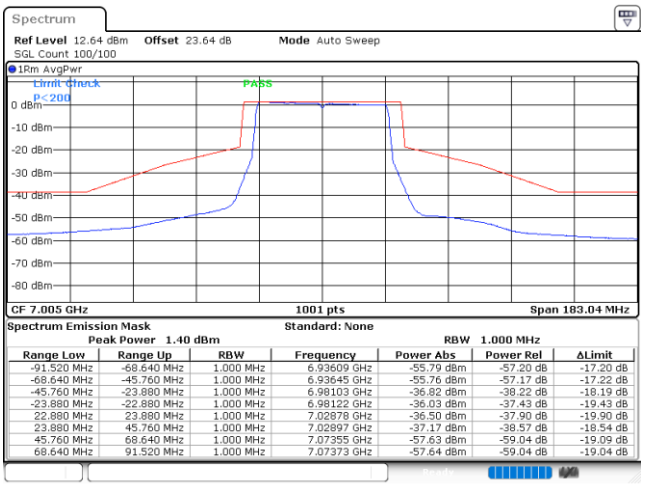
Plot on Channel 6885 MHz



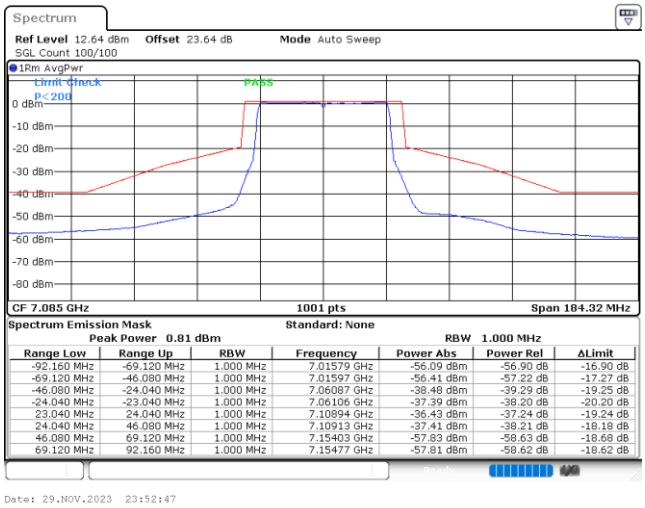
Plot on Channel 6925 MHz



Plot on Channel 7005 MHz

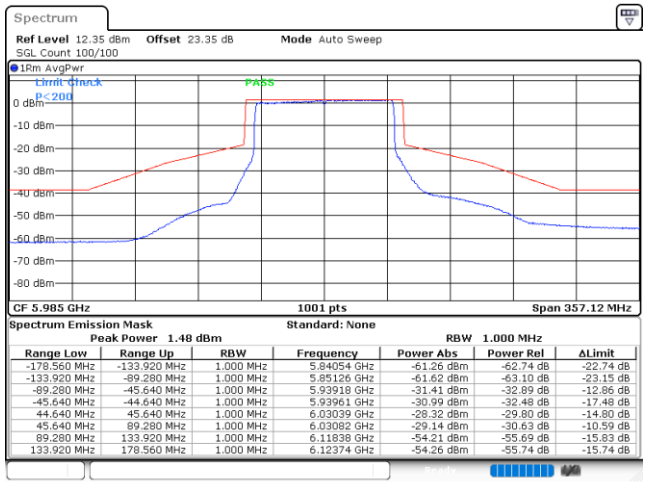


Plot on Channel 7085 MHz

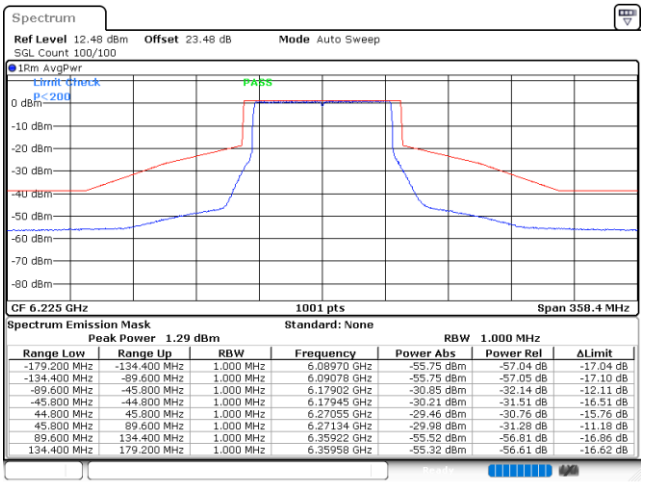


EUT Mode	802.11be EHT80 Full RU

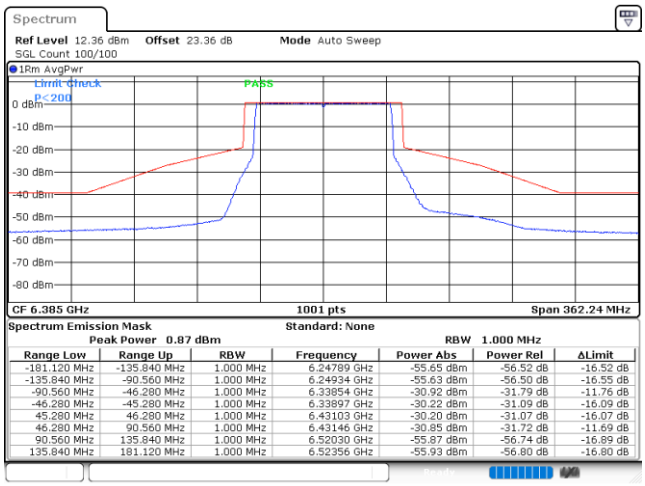
Plot on Channel 5985 MHz



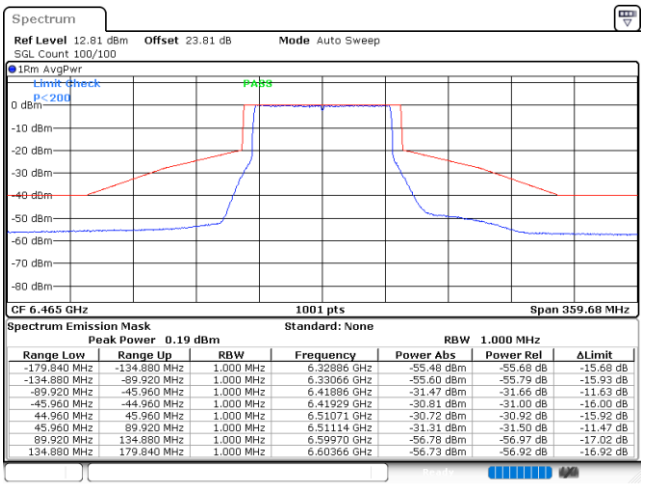
Plot on Channel 6225 MHz



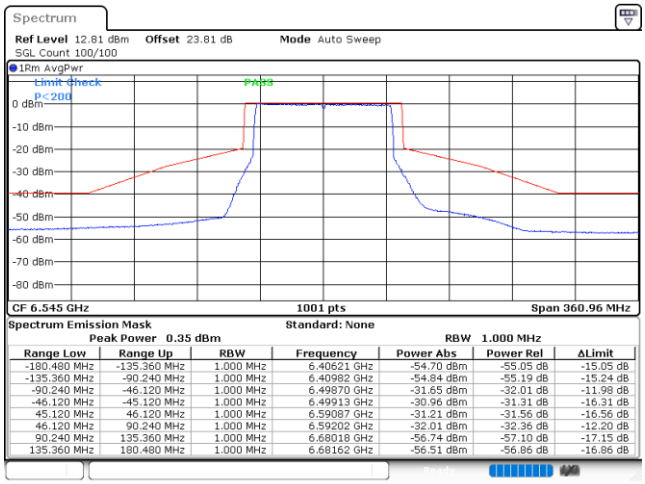
Plot on Channel 6385 MHz



Plot on Channel 6465 MHz



Plot on Channel 6545 MHz



Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-180.480 MHz	-135.360 MHz	1.000 MHz	6.40621 GHz	-54.70 dBm	-55.05 dB	-15.05 dB
-135.360 MHz	-90.240 MHz	1.000 MHz	6.40982 GHz	-54.84 dBm	-55.19 dB	-15.24 dB
-90.240 MHz	-46.120 MHz	1.000 MHz	6.49870 GHz	-31.65 dBm	-32.01 dB	-11.98 dB
-46.120 MHz	-45.120 MHz	1.000 MHz	6.49913 GHz	-30.96 dBm	-31.31 dB	-16.31 dB
45.120 MHz	46.120 MHz	1.000 MHz	6.59087 GHz	-31.21 dBm	-31.56 dB	-16.56 dB
46.120 MHz	90.240 MHz	1.000 MHz	6.59202 GHz	-32.01 dBm	-32.36 dB	-12.20 dB
90.240 MHz	135.360 MHz	1.000 MHz	6.68018 GHz	-56.74 dBm	-57.10 dB	-17.15 dB
135.360 MHz	180.480 MHz	1.000 MHz	6.68162 GHz	-56.51 dBm	-56.86 dB	-16.86 dB

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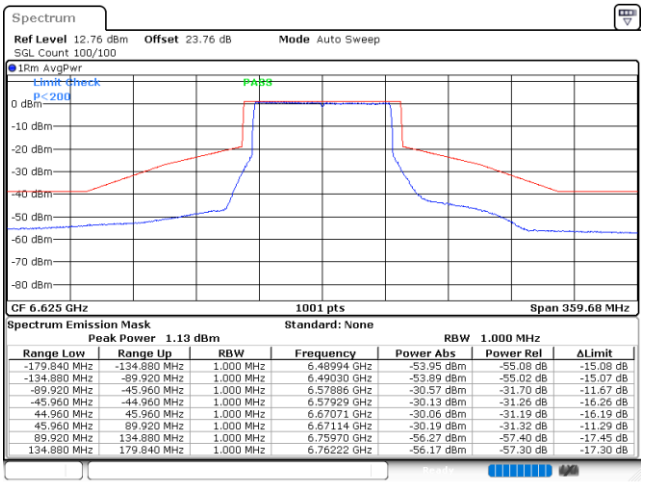
Plot on Channel 6625 MHz



Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-179.840 MHz	-134.880 MHz	1.000 MHz	6.48994 GHz	-53.95 dBm	-55.08 dB	-15.08 dB
-134.880 MHz	-89.920 MHz	1.000 MHz	6.49030 GHz	-53.89 dBm	-55.02 dB	-15.07 dB
-89.920 MHz	-45.960 MHz	1.000 MHz	6.57886 GHz	-30.57 dBm	-31.70 dB	-11.67 dB
-45.960 MHz	-44.960 MHz	1.000 MHz	6.57929 GHz	-30.13 dBm	-31.26 dB	-16.26 dB
44.960 MHz	45.960 MHz	1.000 MHz	6.67071 GHz	-30.06 dBm	-31.19 dB	-16.19 dB
45.960 MHz	89.920 MHz	1.000 MHz	6.67114 GHz	-30.19 dBm	-31.32 dB	-11.29 dB
89.920 MHz	134.880 MHz	1.000 MHz	6.75970 GHz	-56.27 dBm	-57.40 dB	-17.45 dB
134.880 MHz	179.840 MHz	1.000 MHz	6.76222 GHz	-56.17 dBm	-57.30 dB	-17.30 dB

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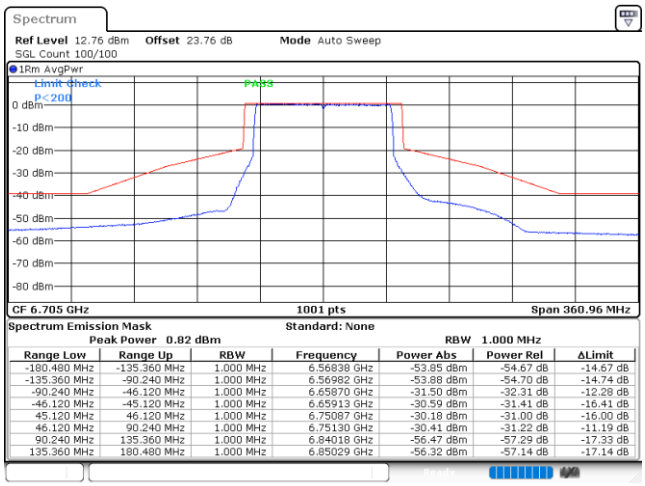
Plot on Channel 6705 MHz



Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-180.480 MHz	-135.360 MHz	1.000 MHz	6.56838 GHz	-53.85 dBm	-54.67 dB	-14.67 dB
-135.360 MHz	-90.240 MHz	1.000 MHz	6.56982 GHz	-53.88 dBm	-54.70 dB	-14.74 dB
-90.240 MHz	-46.120 MHz	1.000 MHz	6.65870 GHz	-31.50 dBm	-32.31 dB	-12.28 dB
-46.120 MHz	-45.120 MHz	1.000 MHz	6.65913 GHz	-30.59 dBm	-31.41 dB	-16.41 dB
45.120 MHz	46.120 MHz	1.000 MHz	6.75087 GHz	-30.18 dBm	-31.00 dB	-16.00 dB
46.120 MHz	90.240 MHz	1.000 MHz	6.75130 GHz	-30.41 dBm	-31.22 dB	-11.19 dB
90.240 MHz	135.360 MHz	1.000 MHz	6.84018 GHz	-56.47 dBm	-57.29 dB	-17.33 dB
135.360 MHz	180.480 MHz	1.000 MHz	6.85029 GHz	-56.32 dBm	-57.14 dB	-17.14 dB

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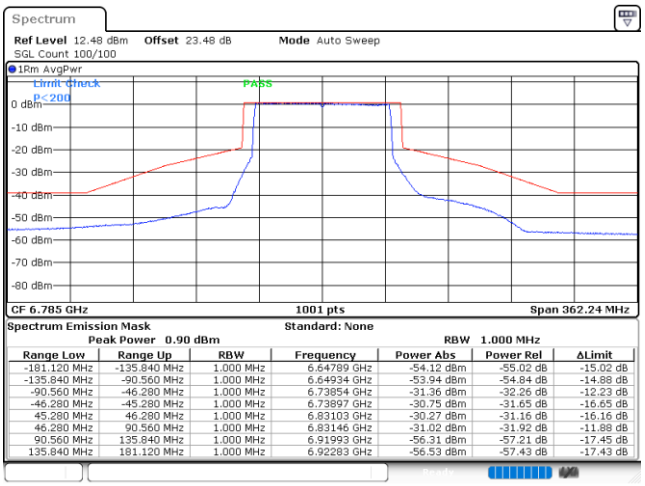
Plot on Channel 6785 MHz



Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-181.120 MHz	-135.840 MHz	1.000 MHz	6.64789 GHz	-54.12 dBm	-55.02 dB	-15.02 dB
-135.840 MHz	-90.560 MHz	1.000 MHz	6.64934 GHz	-53.94 dBm	-54.84 dB	-14.88 dB
-90.560 MHz	-46.280 MHz	1.000 MHz	6.73854 GHz	-31.36 dBm	-32.26 dB	-12.23 dB
-46.280 MHz	-45.280 MHz	1.000 MHz	6.73897 GHz	-30.75 dBm	-31.65 dB	-16.65 dB
45.280 MHz	46.280 MHz	1.000 MHz	6.83103 GHz	-30.27 dBm	-31.16 dB	-16.16 dB
46.280 MHz	90.560 MHz	1.000 MHz	6.83146 GHz	-31.02 dBm	-31.92 dB	-11.88 dB
90.560 MHz	135.840 MHz	1.000 MHz	6.91993 GHz	-56.31 dBm	-57.21 dB	-17.45 dB
135.840 MHz	181.120 MHz	1.000 MHz	6.92283 GHz	-56.53 dBm	-57.43 dB	-17.43 dB

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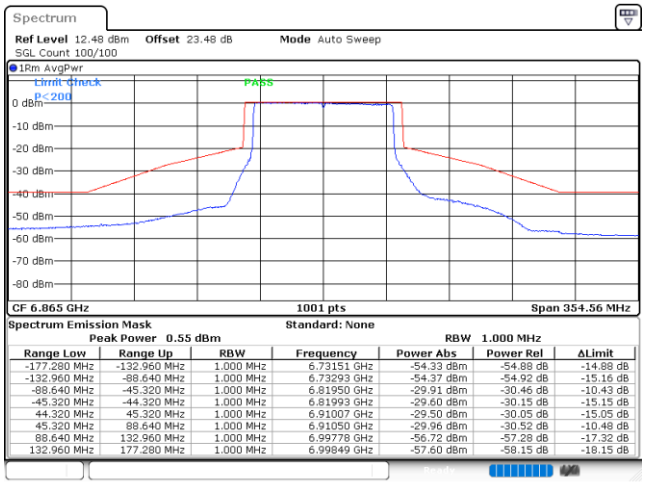
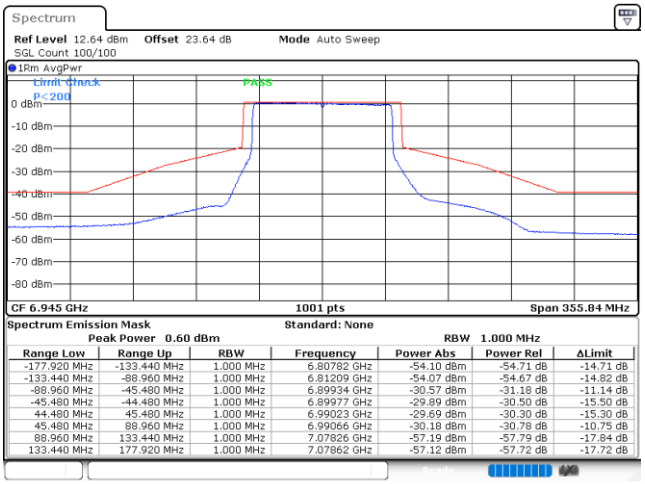
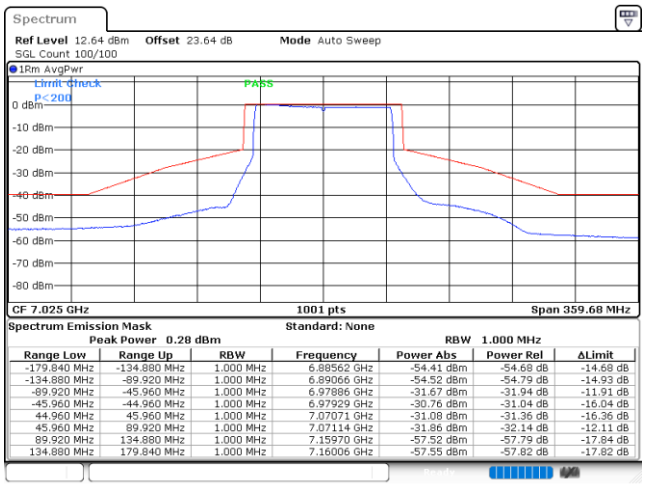
Plot on Channel 6865 MHz



Plot on Channel 6945 MHz

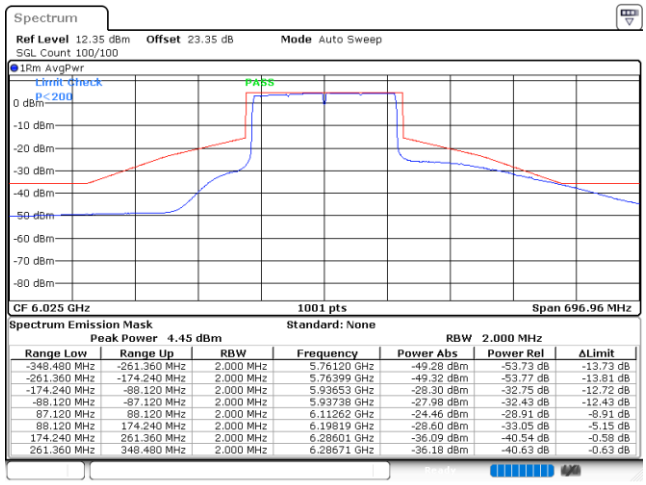


Plot on Channel 7025 MHz

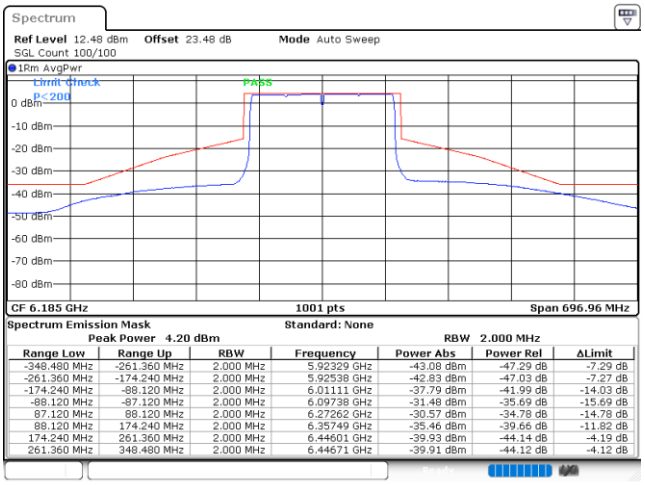


EUT Mode	802.11be EHT160 Full RU

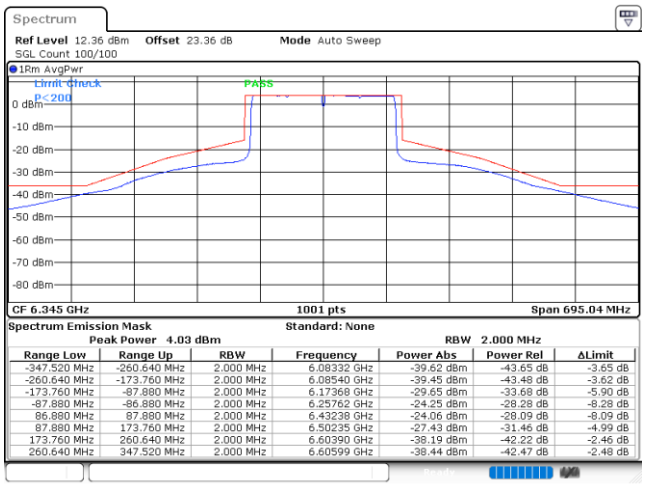
Plot on Channel 6025 MHz



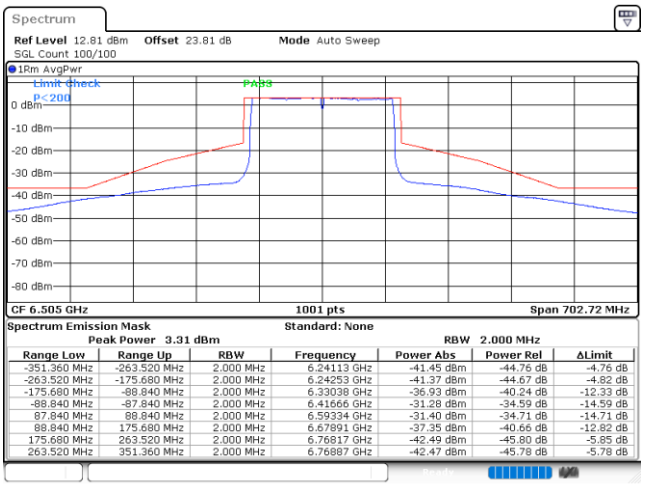
Plot on Channel 6185 MHz



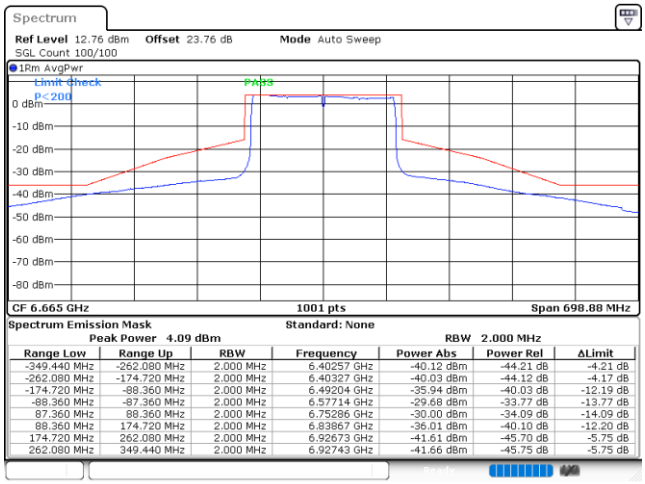
Plot on Channel 6345 MHz



Plot on Channel 6505 MHz



Plot on Channel 6665 MHz



Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-349.440 MHz	-262.080 MHz	2.000 MHz	6.40257 GHz	-40.12 dBm	-44.21 dB	-4.21 dB
-262.080 MHz	-174.720 MHz	2.000 MHz	6.40327 GHz	-40.03 dBm	-44.12 dB	-4.17 dB
-174.720 MHz	-88.360 MHz	2.000 MHz	6.49204 GHz	-35.94 dBm	-40.03 dB	-12.19 dB
-88.360 MHz	-87.360 MHz	2.000 MHz	6.57714 GHz	-29.68 dBm	-33.77 dB	-13.77 dB
87.360 MHz	88.360 MHz	2.000 MHz	6.75286 GHz	-30.00 dBm	-34.09 dB	-14.09 dB
88.360 MHz	174.720 MHz	2.000 MHz	6.83867 GHz	-36.01 dBm	-40.10 dB	-12.20 dB
174.720 MHz	262.080 MHz	2.000 MHz	6.92673 GHz	-41.61 dBm	-45.70 dB	-5.75 dB
262.080 MHz	349.440 MHz	2.000 MHz	6.92743 GHz	-41.66 dBm	-45.75 dB	-5.75 dB

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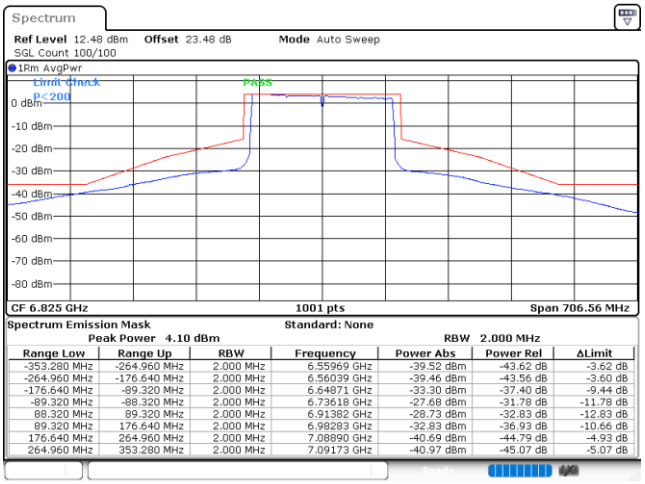
Plot on Channel 6825 MHz



Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-353.280 MHz	-264.960 MHz	2.000 MHz	6.55969 GHz	-39.52 dBm	-43.62 dB	-3.62 dB
-264.960 MHz	-176.640 MHz	2.000 MHz	6.56039 GHz	-39.46 dBm	-43.56 dB	-3.60 dB
-176.640 MHz	-89.320 MHz	2.000 MHz	6.64871 GHz	-33.30 dBm	-37.40 dB	-9.44 dB
-89.320 MHz	-88.320 MHz	2.000 MHz	6.73618 GHz	-27.68 dBm	-31.78 dB	-11.78 dB
88.320 MHz	89.320 MHz	2.000 MHz	6.91382 GHz	-28.73 dBm	-32.83 dB	-12.83 dB
89.320 MHz	176.640 MHz	2.000 MHz	6.98283 GHz	-32.83 dBm	-36.93 dB	-10.66 dB
176.640 MHz	264.960 MHz	2.000 MHz	7.08890 GHz	-40.69 dBm	-44.79 dB	-4.93 dB
264.960 MHz	353.280 MHz	2.000 MHz	7.09173 GHz	-40.97 dBm	-45.07 dB	-5.07 dB

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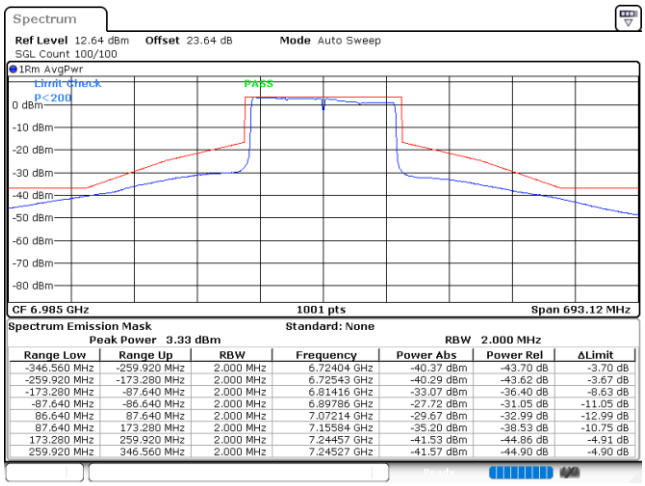
Plot on Channel 6985 MHz



Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-346.560 MHz	-259.920 MHz	2.000 MHz	6.72404 GHz	-40.37 dBm	-43.70 dB	-3.70 dB
-259.920 MHz	-173.280 MHz	2.000 MHz	6.72543 GHz	-40.29 dBm	-43.62 dB	-3.67 dB
-173.280 MHz	-87.640 MHz	2.000 MHz	6.81416 GHz	-33.07 dBm	-36.40 dB	-8.63 dB
-87.640 MHz	-86.640 MHz	2.000 MHz	6.89786 GHz	-27.72 dBm	-31.05 dB	-11.05 dB
86.640 MHz	87.640 MHz	2.000 MHz	7.07214 GHz	-29.67 dBm	-32.99 dB	-12.99 dB
87.640 MHz	173.280 MHz	2.000 MHz	7.15584 GHz	-35.20 dBm	-38.53 dB	-10.75 dB
173.280 MHz	259.920 MHz	2.000 MHz	7.24457 GHz	-41.53 dBm	-44.86 dB	-4.91 dB
259.920 MHz	346.560 MHz	2.000 MHz	7.24527 GHz	-41.57 dBm	-44.90 dB	-4.90 dB

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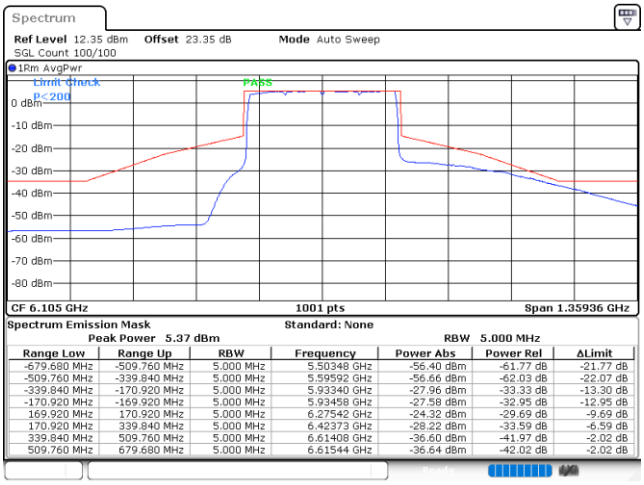
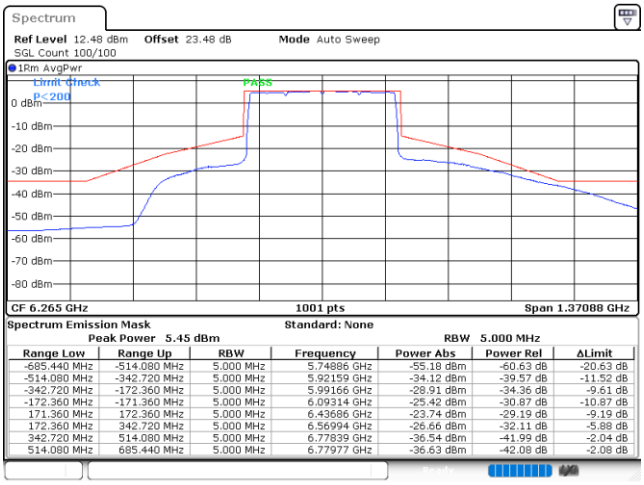
EUT Mode	802.11be EHT320 Full RU

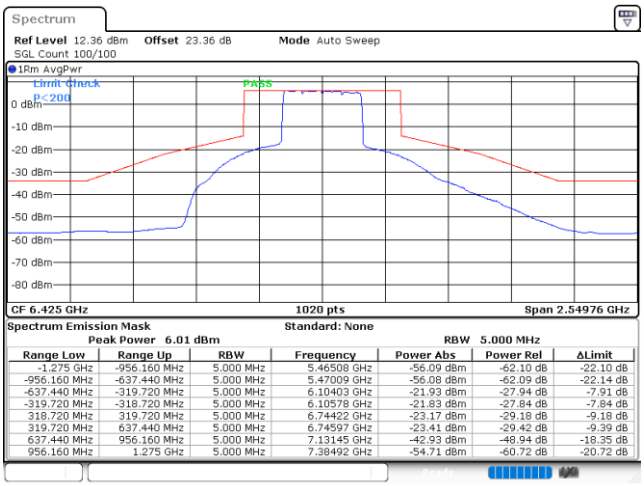
Plot on Channel 6105 MHz



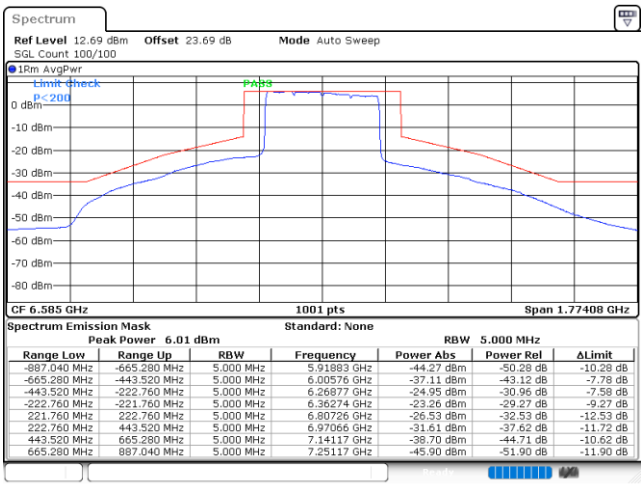
Plot on Channel 6265 MHz



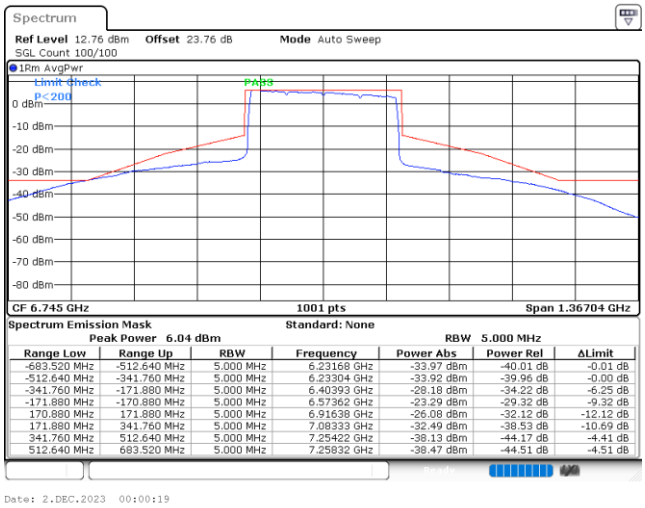
Plot on Channel 6425 MHz



Plot on Channel 6585 MHz



Plot on Channel 6745 MHz



Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-683.520 MHz	-512.640 MHz	5.000 MHz	6.23168 GHz	-33.97 dBm	-40.01 dB	-0.01 dB
-512.640 MHz	-341.760 MHz	5.000 MHz	6.23304 GHz	-33.92 dBm	-39.96 dB	-0.00 dB
-341.760 MHz	-171.880 MHz	5.000 MHz	6.40393 GHz	-28.18 dBm	-34.22 dB	-5.25 dB
-171.880 MHz	-170.880 MHz	5.000 MHz	6.57362 GHz	-23.29 dBm	-29.32 dB	-9.32 dB
170.880 MHz	171.880 MHz	5.000 MHz	6.91638 GHz	-26.08 dBm	-32.12 dB	-12.12 dB
171.880 MHz	341.760 MHz	5.000 MHz	7.08333 GHz	-32.49 dBm	-38.53 dB	-10.69 dB
341.760 MHz	512.640 MHz	5.000 MHz	7.25422 GHz	-38.13 dBm	-44.17 dB	-4.41 dB
512.640 MHz	683.520 MHz	5.000 MHz	7.25832 GHz	-38.47 dBm	-44.51 dB	-4.51 dB

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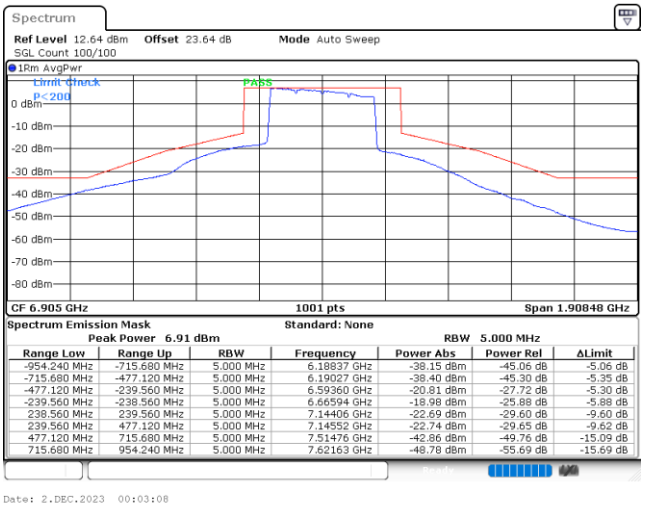
Plot on Channel 6905 MHz



Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-954.240 MHz	-715.680 MHz	5.000 MHz	6.18837 GHz	-38.15 dBm	-45.06 dB	-5.06 dB
-715.680 MHz	-477.120 MHz	5.000 MHz	6.19027 GHz	-38.40 dBm	-45.30 dB	-5.35 dB
-477.120 MHz	-239.560 MHz	5.000 MHz	6.59360 GHz	-20.81 dBm	-27.72 dB	-5.30 dB
-239.560 MHz	-238.560 MHz	5.000 MHz	6.66594 GHz	-18.98 dBm	-25.88 dB	-5.88 dB
238.560 MHz	239.560 MHz	5.000 MHz	7.14406 GHz	-22.69 dBm	-29.60 dB	-9.60 dB
239.560 MHz	477.120 MHz	5.000 MHz	7.14552 GHz	-22.74 dBm	-29.65 dB	-9.62 dB
477.120 MHz	715.680 MHz	5.000 MHz	7.51476 GHz	-42.86 dBm	-49.76 dB	-15.09 dB
715.680 MHz	954.240 MHz	5.000 MHz	7.62163 GHz	-48.78 dBm	-55.69 dB	-15.69 dB

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