FCC RADIO TEST REPORT

FCC ID	:	**UZ7KC50E15**
Equipment	:	**KC50E15 Kiosk Computer**
Brand Name	:	**Zebra**
Model Name	:	**KC50E15**
Applicant	:	**Zebra Technologies Corporation** **3 Overlook Point, Lincolnshire, IL 60069 USA**
Manufacturer	:	**Zebra Technologies Corporation** **3 Overlook Point, Lincolnshire, IL 60069 USA**
Standard	:	**FCC Part 15 Subpart E §15.407**

The product was received on Jul. 03, 2024 and testing was performed from Jul. 16, 2024 to Sep. 10, 2024. We, Sporton International Inc. Wensan Laboratory, 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 Inc. Wensan Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

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History of this test report

Report No.	Version	Description	Issue Date
FR470109G	01	Initial issue of report	Sep. 13, 2024
FR470109G	02	Revise Summary of Test Result This report is an updated version, replacing the report issued on Sep. 13, 2024.	Oct. 14, 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	Pass	-
3.2	15.407(a)(7)	Fundamental Maximum EIRP	Pass	-
3.3	15.407(a)(7)	Fundamental Power Spectral Density	Pass	-
3.4	15.407(b)(6)	In-Band Emissions (Channel Mask)	Pass	-
3.5	15.407(d)(6)	Contention Based Protocol	Pass	-
3.6	15.407 KDB 987594 D02 Section II. L.	Standard Client Proper Power Adjustment Measurement	Pass	-
3.7	15.407 KDB 987594 D02 Section II. K.	Dual Client Test, Demonstration of Proper Power Adjustment based on Associated AP	Pass	-
3.8	15.407(b)	Unwanted Emissions	Pass	1.15 dB under the limit at 5896.36 MHz
3.9	15.207	AC Conducted Emission	Pass	12.44 dB under the limit at 12.18 MHz
3.10	15.203 15.407(a)	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.

Reviewed by: Wei Chen

Report Producer: Rebecca Wu

1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature	
Equipment	KC50E15 Kiosk Computer
Brand Name	Zebra
Model Name	KC50E15
FCC ID	UZ7KC50E15
EUT supports Radios application	WLAN 11a/b/g/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80/VHT160 WLAN 11ax HE20/HE40/HE80/HE160 Bluetooth BR/EDR/LE
HW Version	EV
SW Version	13-30-27.00-TG-U01-STD-ATH-04
OS Version	Android 13
MFD	12JUN24
EUT Stage	Identical Prototype

Remark: The EUT's information above is declared by manufacturer.

Specification of Accessories				
AC Adapter	**Brand Name**	ZEBRA	**Model Name**	PS000088A01
USB C-C Cable	**Brand Name**	ZEBRA	**Part Number**	CBL-EC5X-USBC3A-01
Stand	**Brand Name**	ZEBRA	**Part Number**	3PTY-SC-2000-CF2-01
Printer	**Brand Name**	ZEBRA	**Model Name**	ZD230t
2nd display	**Brand Name**	ZEBRA	**Model Name**	TD50-15F00
Edge scanner	**Brand Name**	ZEBRA	**Part Number**	ZFLX-SCNR-E00
Edge LED Light Bar	**Brand Name**	ZEBRA	**Part Number**	ZFLX-LTBAR-200
USB Cable	**Brand Name**	ZEBRA	**Part Number**	300283-002

1.2 Product Specification of Equipment Under Test

Product Specification is subject to this standard	
Tx/Rx Channel Frequency Range	5925 MHz ~ 6425 MHz 6525 MHz ~ 6875 MHz
Maximum Output Power to Antenna	**MIMO <Ant. 1+2>:** **<5925 MHz ~ 6425 MHz>** 802.11a: 18.91 dBm / 0.0778 W 802.11ax: HE20: 18.71 dBm / 0.0743 W 802.11ax: HE40: 18.62 dBm / 0.0728 W 802.11ax: HE80: 18.76 dBm / 0.0752 W 802.11ax: HE160: 18.71 dBm / 0.0743 W **<6525 MHz ~ 6875 MHz>** 802.11a: 15.37 dBm / 0.0344 W 802.11ax: HE20: 15.41 dBm / 0.0348 W 802.11ax: HE40: 15.16 dBm / 0.0328 W 802.11ax: HE80: 15.36 dBm / 0.0344 W 802.11ax: HE160: 15.06 dBm / 0.0321 W
99% Occupied Bandwidth	**MIMO <Ant. 1>** 802.11a: 16.47 MHz 802.11ax: HE20: 18.96 MHz 802.11ax: HE40: 38.01 MHz 802.11ax: HE80: 77.30 MHz 802.11ax: HE160: 156.18 MHz **MIMO <Ant. 2>** 802.11a: 16.42 MHz 802.11ax: HE20: 18.98 MHz 802.11ax: HE40: 38.09 MHz 802.11ax: HE80: 77.31 MHz 802.11ax: HE160: 156.13 MHz
Antenna Type / Gain	**<5925 MHz ~ 6425 MHz>** <Ant. 1>: Coupling Antenna with gain 3.29 dBi <Ant. 2>: PIFA Antenna with gain 3.14 dBi **<6525 MHz ~ 6875 MHz>** <Ant. 1>: Coupling Antenna with gain 2.87 dBi <Ant. 2>: PIFA Antenna with gain 3.59 dBi
Type of Modulation	802.11a : OFDM (BPSK/QPSK/16QAM/64QAM) 802.11ax : OFDMA (BPSK/QPSK/16QAM/64QAM/256QAM/1024QAM)

Product Specification is subject to this standard			
Antenna Function Description		Ant. 1	Ant. 2
	802.11a/ax MIMO	V	V
	802.11ax TXBF	V	V

Remark:

1. MIMO Ant. 1+2 Directional Gain is a calculated result from MIMO Ant. 1 and MIMO Ant. 2. The formula used in calculation is documented in section 1.2.1.
2. Power of MIMO Ant. 1 + Ant. 2 is a calculated result from sum of the power MIMO Ant. 1 and MIMO Ant. 2.
3. 802.11ax Support Tx Beamforming mode, and the manufacturer declares that Tx Beamforming power/EIRP is less than CDD mode 3dbm, so CDD mode cover Tx Beamforming mode.
4. 802.11ax support full RU tone and partial RU tone, both full RU and partial RU-left (for low CH) and partial RU-right (for high CH) are tested for conducted power/PSD/Channel Mask in appendix A, all the other test case were performed with full RU with its maximum power/PSD.
5. The EUT does not support channel puncturing mode.
6. The EUT's information above is declared by manufacturer. Please refer to Disclaimer in report summary.

1.2.1 Antenna Directional Gain

Follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01 F)2)f)ii)

Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows:

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$.

G_{ANT} is set equal to the gain of the antenna having the highest gain.

For PSD measurements, the directional gain calculation.

$$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

where

Each antenna is driven by no more than one spatial stream;

N_{SS} = the number of independent spatial streams of data;

N_{ANT} = the total number of antennas

$g_{j,k} = 10^{G_k/20}$ if the kth antenna is being fed by spatial stream j, or zero if it is not;

G_k is the gain in dBi of the kth antenna.

As minimum N_{SS}=1 is supported by EUT, the formula can be simplified as:

Directional gain = $10*\log[(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}]$ dBi

Where G1, G2….GN denote single antenna gain.

The directional gain "DG" is calculated as following table.

	Ant 1 (dBi)	Ant 2 (dBi)	DG for Power (dBi)	DG for PSD (dBi)
5925 MHz ~ 6425 MHz	3.29	3.14	3.29	6.23
6525 MHz ~ 6875 MHz	2.87	3.59	3.59	6.25

Calculation example:

If a device has two antenna, G_{ANT1}= 3.29dBi; G_{ANT2}= 3.14dBi

Directional gain of power measurement = max(3.29, 3.14) + 0 = 3.29 dBi

Directional gain of PSD derived from formula which is

10 x log { { [10^ (3.29 dBi / 20) + 10^ (3.14 dBi / 20)] ^ 2 } / 2 }

= 6.23 dBi

<For TXBF Modes>

The EUT supports beamforming modes then

Follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01 F)2)e)ii)

$$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

where

Each antenna is driven by no more than one spatial stream;

N_{SS} = the number of independent spatial streams of data;

N_{ANT} = the total number of antennas

$g_{j,k} = 10^{G_k/20}$ if the kth antenna is being fed by spatial stream j, or zero if it is not;

G_k is the gain in dBi of the kth antenna.

The directional gain "DG" is calculated as following table.

				DG for Power (dBi)	DG for PSD (dBi)
		Ant 1 (dBi)	Ant 2 (dBi)		
5925 MHz ~ 6425 MHz		3.29	3.14	6.23	6.23
6525 MHz ~ 6875 MHz		2.87	3.59	6.25	6.25

Calculation example:

Directional gain is derived from formula which is

10 x log { { [10^ (3.29 dBi / 20) + 10^ (3.14 dBi / 20)] ^ 2 } / 2 } = 6.23 dBi

1.3 Modification of EUT

No modifications made to the EUT during the testing.

1.4 Testing Location

Test Site	Sporton International Inc. EMC & Wireless Communications Laboratory
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	**Sporton Site No.**
	DF02-HY (TAF Code: 1190)
Remark	The Contention Based Protocol, Standard Client Proper Power Adjustment Measurement, Dual Client Test and Demonstration of Proper Power Adjustment based on Associated AP test items subcontracted to Sporton International Inc. EMC & Wireless Communications Laboratory.

Test Site	Sporton International Inc. Wensan Laboratory
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	**Sporton Site No.**
	TH05-HY, CO07-HY, 03CH20-HY

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

FCC designation No.: TW1190 and TW3786

1.5 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:

1. All the test items were validated and recorded in accordance with the standards without any modification during the testing.
2. The TAF code is not including all the FCC KDB listed without accreditation.
3. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

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 antenna in three orthogonal axis (X: flat, Y: portrait, Z: landscape) and accessory (Adapter or Earphone), 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 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 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 20M	Channel	117	121	125
	Freq. (MHz)	6535	6555	6575
BW 40M	Channel	115	123	
	Freq. (MHz)	6525	6565	

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 20M	Channel	161	165	169	173	177	181
	Freq. (MHz)	6755	6775	6795	6815	6835	6855
BW 40M	Channel	163		171		179	
	Freq. (MHz)	6765		6805		6845	
BW 80M	Channel	167					
	Freq. (MHz)	6785					

2.2 Test Mode

This device support 26/52/106/242/484/996-tone RU.

The PSD of partial RU is reduced to be smaller than full RU according to TCB workshop interim guidance Oct. 2022.

The 802.11ax mode is investigated among different tones, full resource units (RU), partial resource units. The partial RU has no higher power than full RU's, thus the full RU is chosen as main test configuration.

The 242-tone RU is covered by 20MHz channel, 484-tone RU is covered by 40MHz channel and 996-tone RU is covered by 80MHz channel.

The SISO mode conducted power is covered by MIMO mode per chain, so only the MIMO mode is tested.

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
802.11ax HE20	MCS0
802.11ax HE40	MCS0
802.11ax HE80	MCS0
802.11ax HE160	MCS0

Remark: The conducted power level of each chain in MIMO mode is equal or higher than SISO mode.

Test Cases	
AC Conducted Emission	Mode 1 : WLAN (6GHz) Link + Bluetooth Link + Scan Bar Code + USB C-C Cable Display with 2nd display + USB Cable with Printer + AC Adapter + LAN Link with Notebook + Edge USB-C with (Edge scanner + (Data Link with USB Flash Drive (USB to SD Card)) + Edge LED Light Bar + Mouse) + Stand
Remark: Data Link with USB Flash Drive means data application transferred mode between EUT and USB Flash Drive.	

Ch. #		UNII-5 (5925-6425 MHz)	UNII-7 (6525-6875 MHz)
		802.11a	802.11a
L	Low	001	117
M	Middle	049	149
H	High	093	181

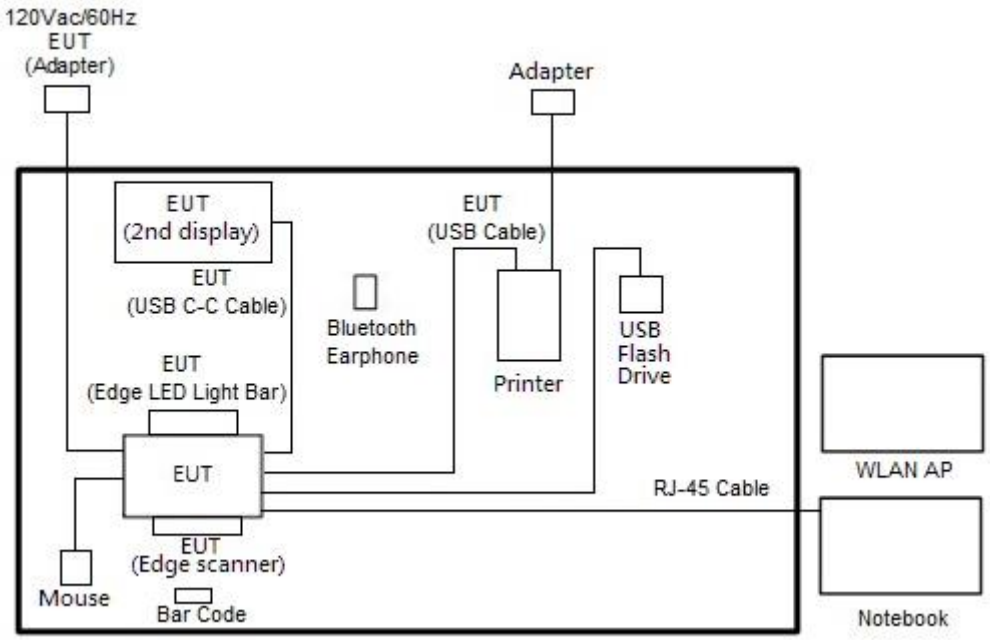
Ch. #		UNII-5 (5925-6425 MHz)			
		802.11ax HE20	802.11ax HE40	802.11ax HE80	802.11ax HE160
L	Low	001	003	007	015
M	Middle	049	051	055	047
H	High	093	091	087	079

Ch. #		UNII-7 (6525-6875 MHz)			
		802.11ax HE20	802.11ax HE40	802.11ax HE80	802.11ax HE160
L	Low	117	123	135	143
M	Middle	149	147	151	
H	High	181	179	167	

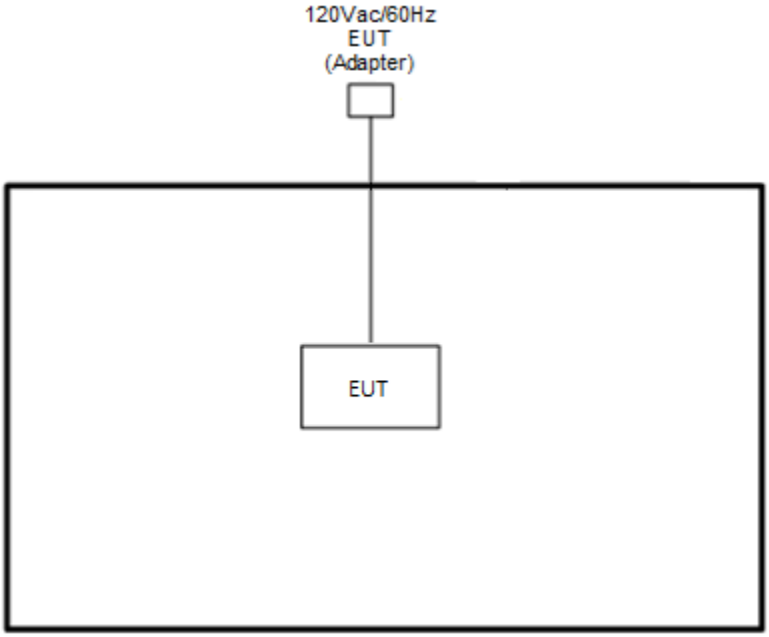
Remark: Based on ANSI C63.10 clause 5.6.2.2, b) Spurious emissions, measure the mode with the highest output power and the mode with highest output power spectral density for each modulation family.

2.3 Connection Diagram of Test System

<AC Conducted Emission Mode>



<WLAN Tx Mode>



2.4 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Bluetooth Earphone	Sony	SBH20	PY7-RD0010	N/A	N/A
2.	WLAN AP	Netgear	RAXE500	PY320300508	N/A	Unshielded,1.8m
3.	Notebook	DELL	Latitude 3400	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	Mouse	Lenovo	MOC9ULA	FCC DoC	Shielded, 1.7m	N/A
5.	Bar Code	N/A	N/A	N/A	N/A	N/A
6.	USB Flash Drive	SanDisk	E4BDC	FCC DoC	N/A	N/A
7.	SD Card	SanDisk	MicroSD HC	FCC DoC	N/A	N/A

2.5 EUT Operation Test Setup

The RF test items, utility “QRCT 4.0.211.0” 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.

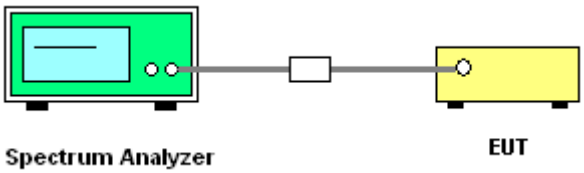
3.1.2 Measuring Instruments

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.

3.2 Fundamental Maximum EIRP Measurement

3.2.1 Limit of Fundamental Maximum EIRP

<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, and the maximum e.i.r.p. over the frequency band of operation must not exceed 30 dBm and the device must limit its power to no more than 6 dB below its associated standard power access point's authorized transmit power.

3.2.2 Measuring Instruments

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

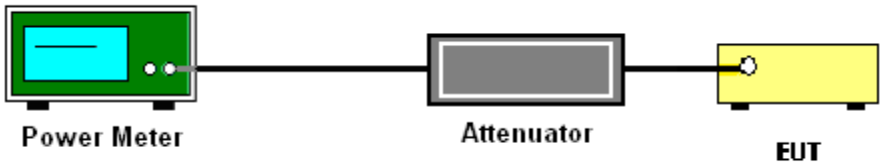
3.2.3 Test Procedures

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.

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-2 #

(trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction).

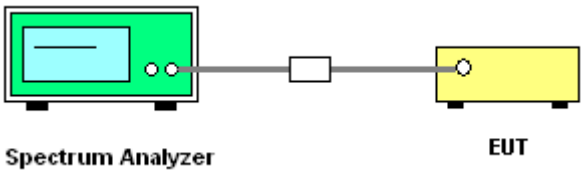
- Measure the duty cycle.
- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 1 MHz.
- Set VBW ≥ 3 MHz.
- Number of points in sweep ≥ 2 Span / RBW.
- Sweep time = auto.
- Detector = RMS
- Trace average at least 100 traces in power averaging mode.
- Add 10 log(1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add 10 log(1/0.25) = 6 dB if the duty cycle is 25 percent.

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.

3.4 In-Band Emissions (Channel Mask)

3.4.1 Limit of Unwanted Emissions

<FCC 14-30 CFR 15.407>

(a)(6) 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 v02r01.

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.

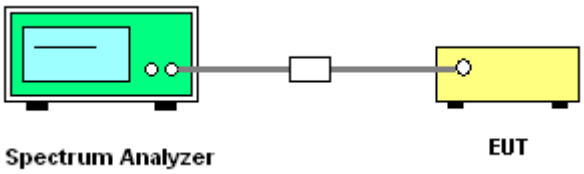
   h) Use the peak search function on the instrument to find the peak of the spectrum.
3. Using the measuring equipment limit line function, develop the emissions mask based on the following requirements. The emissions power spectral density must be reduced below the peak power spectral density (in dB)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

Please refer to Appendix A.

3.5 Contention Based Protocol

3.5.1 Limit of Contention Based Protocol

<FCC 14-30 CFR 15.407>

(d)(6) All U-NII transmitters, except for standard power access points and fixed client devices, operating in the 5.925-7.125 GHz band must employ a contention-based protocol.

FCC KDB 987594 D02 U-NII 6GHz EMC Measurement v01

Unlicensed low-power indoor devices must detect co-channel radio frequency power that is at least -62 dBm or lower. Upon detection of energy in the band, unlicensed low power indoor devices must vacate the channel and stay off the channel as long as detected radio frequency power is equal to or greater than the threshold (-62 dBm). The -62 dBm (or lower) threshold is referenced to a 0 dBi antenna gain. To ensure incumbent operations are reliably detected in the band, low power indoor devices must detect RF energy throughout their intended operating channel. For example, an 802.11 device that plans to transmit a 40 MHz- wide signal (on a primary 20 MHz channel and a secondary 20 MHz channel) must detect energy throughout the entire 40 MHz channel. Additionally, low-power indoor devices must detect co-channel energy with 90% or greater certainty.

Table 1. Criteria to determine number of times detection threshold test may be performed

If	Number of Tests	Placement of Incumbent Transmission
$BW_{EUT} \leq BW_{Inc}$	Once	Tune incumbent and EUT transmissions ($f_{c1} = f_{c2}$)
$BW_{Inc} < BW_{EUT} \leq 2BW_{Inc}$	Once	Incumbent transmission is contained within BW_{EUT}
$2BW_{Inc} < BW_{EUT} \leq 4BW_{Inc}$	Twice. Incumbent transmission is contained within BW_{EUT}	Incumbent transmission is located as closely as possible to the lower edge and upper edge, respectively, of the EUT channel
$BW_{EUT} > 4BW_{Inc}$	Three times	Incumbent transmission is located as closely as possible to the lower edge of the EUT channel, in the middle of EUT channel, and as closely as possible to the upper edge of the EUT channel

where:

$BWEUT$: Transmission bandwidth of EUT signal

$BWInc$: Transmission bandwidth of the simulated incumbent signal (10 MHz wide AWGN signal)

$fc1$: Center frequency of EUT transmission

$fc2$: Center frequency of simulated incumbent signal

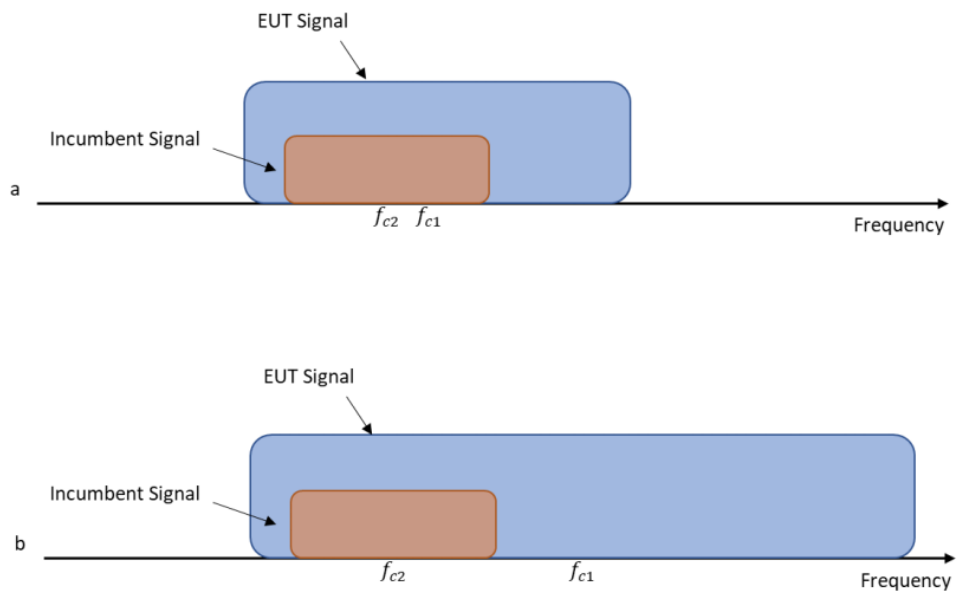


Figure 1. Two possible scenarios where a) center frequency of EUT transmission falls within incumbent's bandwidth, or b) outside of it

3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

The testing follows FCC KDB 987594 D02 U-NII 6GHz EMC Measurement v01.
Section I) Contention Based Protocol
Conducted method Step-by-Step Procedure, Conducted Setup

1. Configure the EUT to transmit with a constant duty cycle.
2. Set the operating parameters of the EUT including power level, operating frequency, modulation and bandwidth.
3. Set the signal analyzer center frequency to the nominal EUT channel center frequency. The span range of the signal analyzer shall be between two times and five times the OBW of the EUT.
4. Connect the output port of the EUT to the signal analyzer 2, as shown in test setup Figure 2. Ensure that the attenuator 2 provides enough attenuation to not overload the signal analyzer 2 receiver.
5. Monitoring the signal analyzer 2, verify the EUT is operating and transmitting with the parameters set at step two.
6. Using an AWGN signal source, generate (but do not transmit, i.e., RF OFF) a 10 MHz-wide AWGN signal. Use Table 1 to determine the center frequency of the 10 MHz AWGN signal relative to the EUT's channel bandwidth and center frequency.
7. Set the AWGN signal power to an extremely low level (more than 20 dB below the -62 dBm threshold). Connect the AWGN signal source, via a 3-dB splitter, to the signal analyzer 1 and the EUT as shown in test setup Figure 2.
8. Transmit the AWGN signal (RF ON) and verify its characteristics on the signal analyzer 1.

9. Monitor the signal analyzer 2 to verify if the AWGN signal has been detected and the EUT has ceased transmission. If the EUT continues to transmit, then incrementally increase the AWGN signal power level until the EUT stops transmitting.
10. (Including all losses in the RF paths) Determine and record the AWGN signal power level (at the EUT's antenna port) at which the EUT ceased transmission. Repeat the procedure at least 10 times to verify the EUT can detect an AWGN signal with 90% (or better) level of certainty.
11. Refer to Table 1 to determine number of times the detection threshold testing needs to be repeated. If testing is required more than once, then go back to step 5, choose a different center frequency for the AWGN signal and repeat the process.
12. For the contention-based protocol test where only one channel in each supported sub-band needs to be tested. The narrowest and widest bandwidth in each channel shall be measured EUT was driven in MIMO mode, the interferer level was injected to both chains to monitor the performance, while the interferer level is determined according the lowest antenna gain among both antennas (i.e, lower interferer level).

3.5.4 Test Setup

Conducted Setup

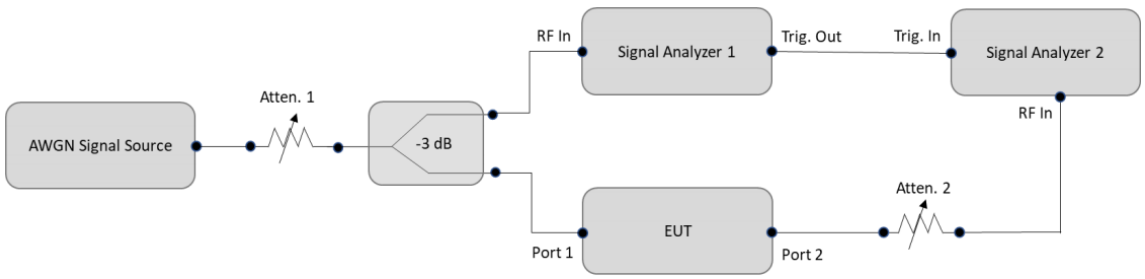


Figure 2. Contention-based protocol test setup, conducted method Step-by-Step Procedure, Conducted Setup

3.5.5 Support Unit used in test configuration and system

Instrument	Brand Name	Model No.	Characteristics
WLAN AP	Anritsu	6272445509	N/A
Notebook	Acer	N15C1	LAN

3.5.6 Minimum Antenna gain for Contention Based Protocol Test

CBP Antenna Gain	<UNII-5>: 2.40 dBi <UNII-7>: 2.02 dBi

3.5.7 Test Summary of Contention Based Protocol Test

Test Engineer :	Tommy Lee	Temperature :	21.8~23.5℃
		Relative Humidity :	46.7~51.2%

Band	Channel Freq. (MHz)	Channel BW (MHz)	Incumbent freq. (MHz)	Injected AWGN Level (dBm)	Detection Rate (%)	Regulated Threshold level (dBm)	Adjusted Power (dBm)	Margin (dB)
UNII Band 5	6135	20	6135	-67.07	100	-62	-69.47	7.47
					Result: Stop Transmission			
				-71.07	< 90	-62	-73.47	11.47
					Result: Minimal Operation			
				-72.07	0	-62	-74.47	12.47
					Result: Normal Operation			
	6185	160	6110	-65.84	100	-62	-68.24	6.24
					Result: Stop Transmission			
				-67.84	< 90	-62	-70.24	8.24
					Result: Minimal Operation			
				-68.84	0	-62	-71.24	9.24
					Result: Normal Operation			
			6185	-60.17	100	-62	-62.57	0.57
					Result: Stop Transmission			
				-63.17	< 90	-62	-65.57	3.57
					Result: Minimal Operation			
				-64.17	0	-62	-66.57	4.57
					Result: Normal Operation			
			6260	-66.15	100	-62	-68.55	6.55
					Result: Stop Transmission			
				-68.15	< 90	-62	-70.55	8.55
					Result: Minimal Operation			
				-69.15	0	-62	-71.55	9.55
					Result: Normal Operation			

Note 1: Adjusted Power = Injected AWGN Level - minimum antenna gain (2.4 dBi).

Note 2: The antenna gain has included the path loss between RF connector and antenna.

Note 3: Margin = Regulated Threshold level - Adjusted Power.

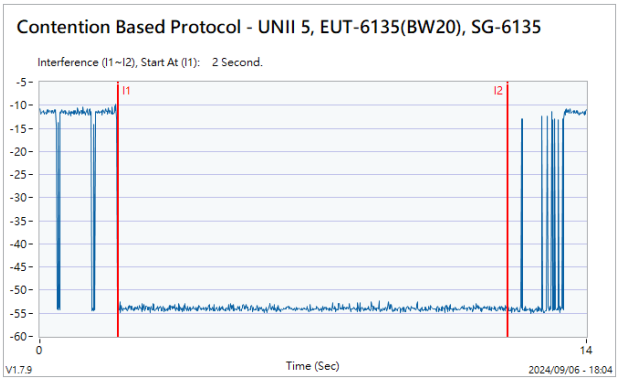
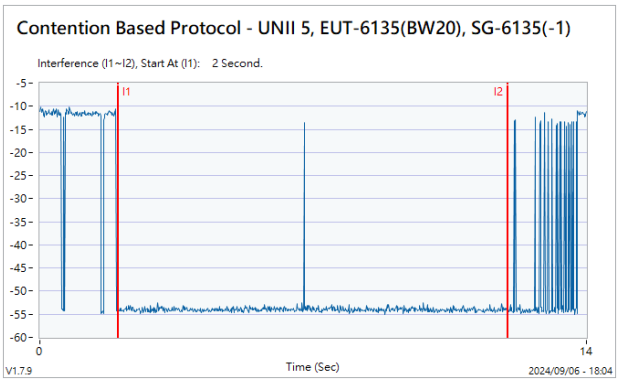
Band	Channel Freq. (MHz)	Channel BW (MHz)	Incumbent freq. (MHz)	Injected AWGN Level (dBm)	Detection Rate (%)	Regulated Threshold level (dBm)	Adjusted Power (dBm)	Margin (dB)
UNII Band 7	6695	20	6695	-69.10	100	-62	-71.12	9.12
					Result: Stop Transmission			
				-74.10	< 90	-62	-76.12	14.12
					Result: Minimal Operation			
				-75.10	0	-62	-77.12	15.12
					Result: Normal Operation			
	6665	160	6590	-66.98	100	-62	-69.0	7.0
					Result: Stop Transmission			
				-70.98	< 90	-62	-73.0	11.0
					Result: Minimal Operation			
				-71.98	0	-62	-74.0	12.0
					Result: Normal Operation			
			6665	-61.32	100	-62	-63.34	1.34
					Result: Stop Transmission			
				-66.32	< 90	-62	-68.34	6.34
					Result: Minimal Operation			
				-67.32	0	-62	-69.34	7.34
					Result: Normal Operation			
			6740	-67.43	100	-62	-69.45	7.45
					Result: Stop Transmission			
				-70.43	< 90	-62	-72.45	10.45
					Result: Minimal Operation			
				-71.43	0	-62	-73.45	11.45
					Result: Normal Operation			

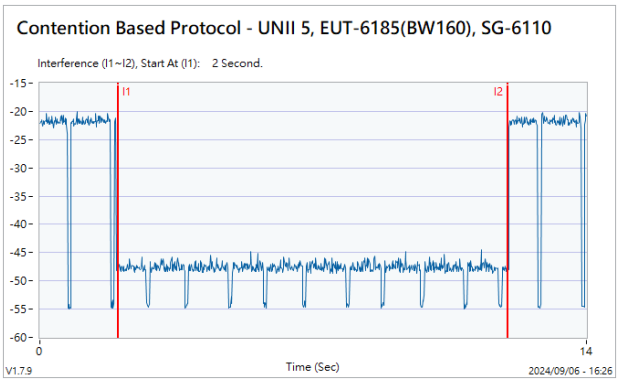
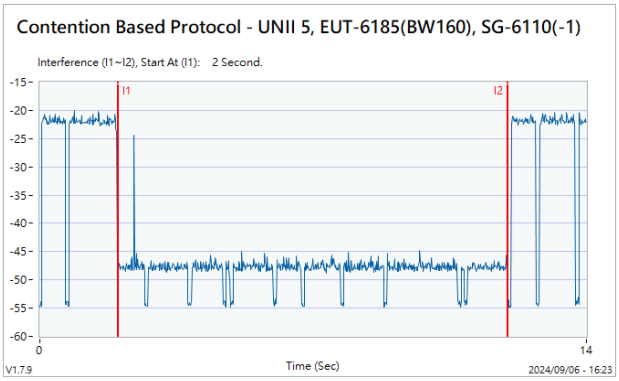
Note 1: Adjusted Power = Injected AWGN Level - minimum antenna gain (2.02 dBi).

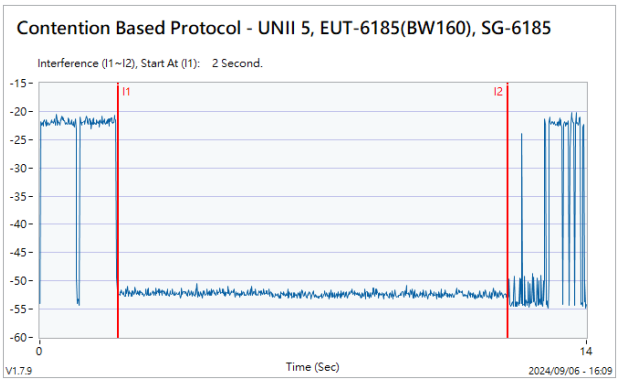
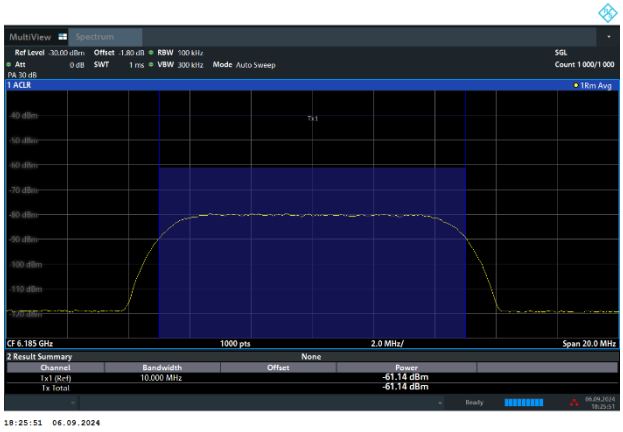
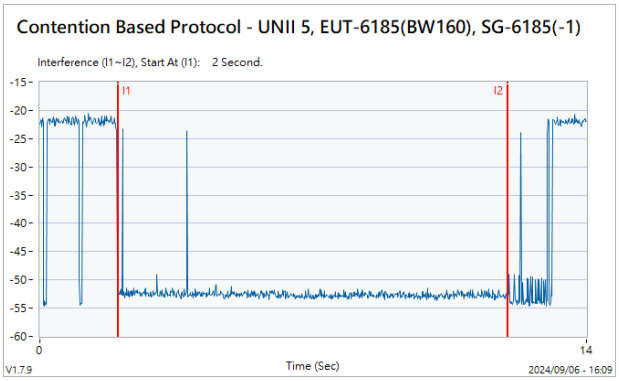
Note 2: The antenna gain has included the path loss between RF connector and antenna.

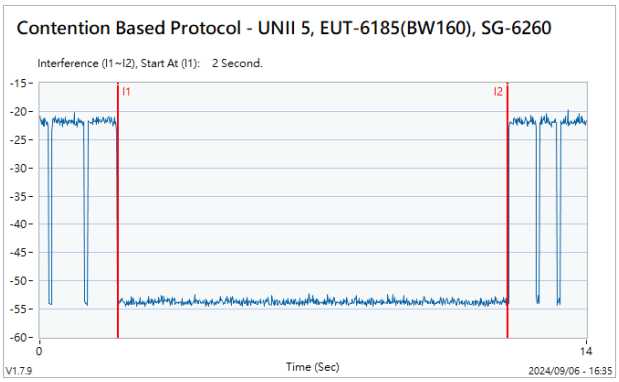
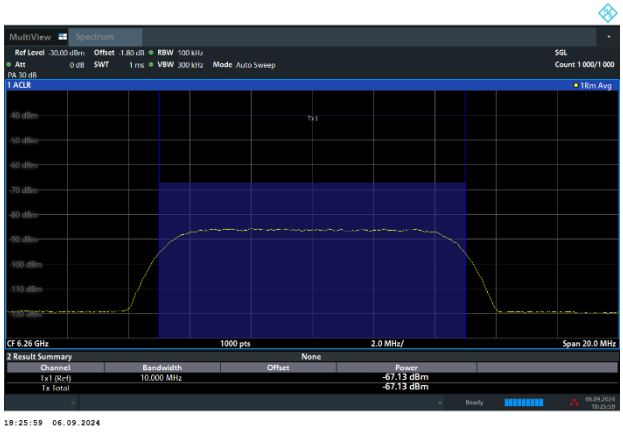
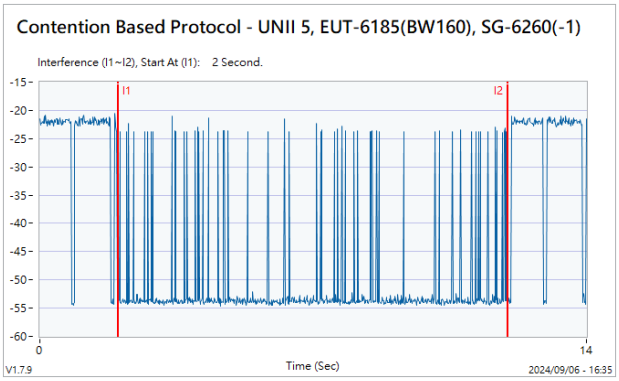
Note 3: Margin = Regulated Threshold level - Adjusted Power.

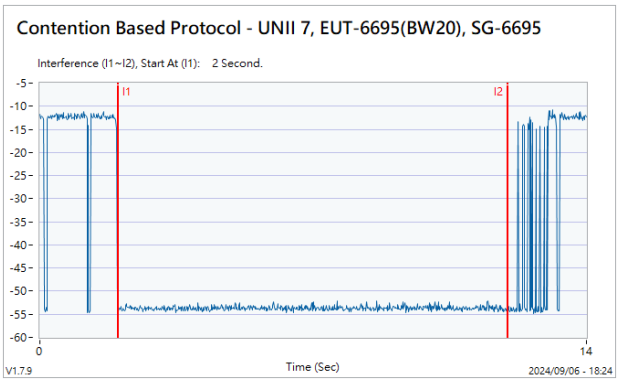
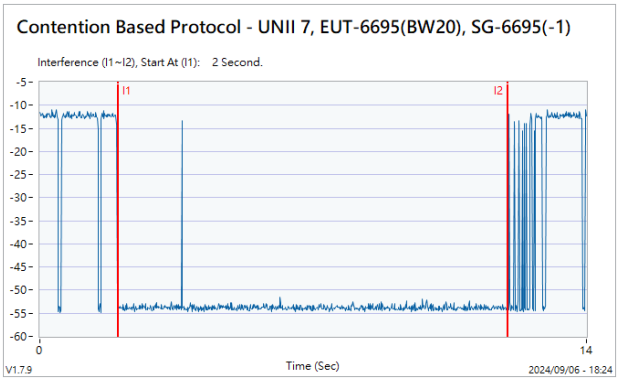
3.5.8 Test Plots of Contention Based Protocol Test

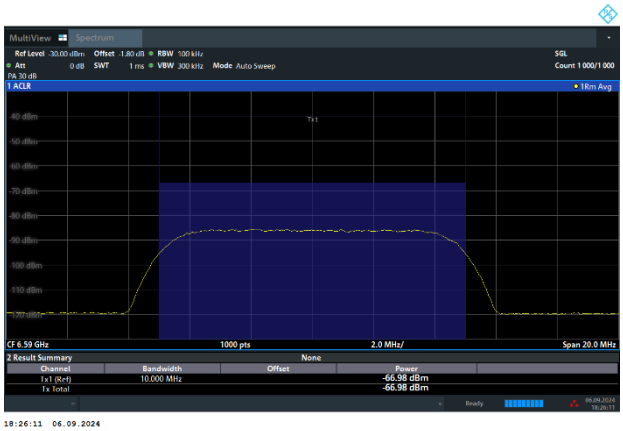
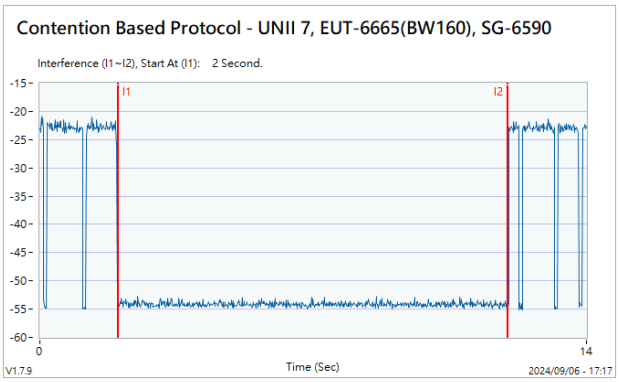
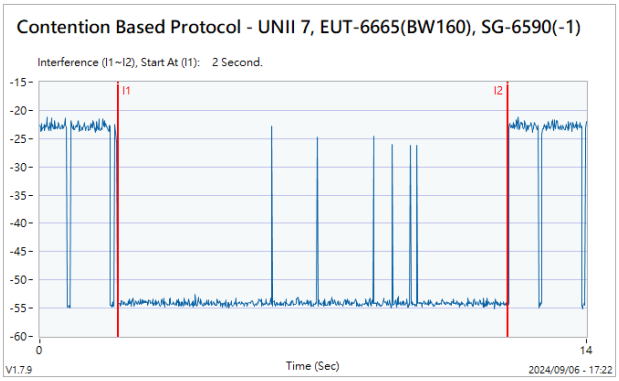
Contention Based Protocol Result Plots on U-NII 5 (AWGN Interference)	
802.11ax (HE20) / 6135MHz Threshold Level (TL) = -67.07dBm	802.11ax (HE20) / CH37 Test result is pass due to no transmission occur.
	
802.11ax (HE20) / 6135MHz Threshold Level (TL) = -67.92dBm	802.11ax (HE20) / CH37 Transmit when the interferer is 1dB lower.
	

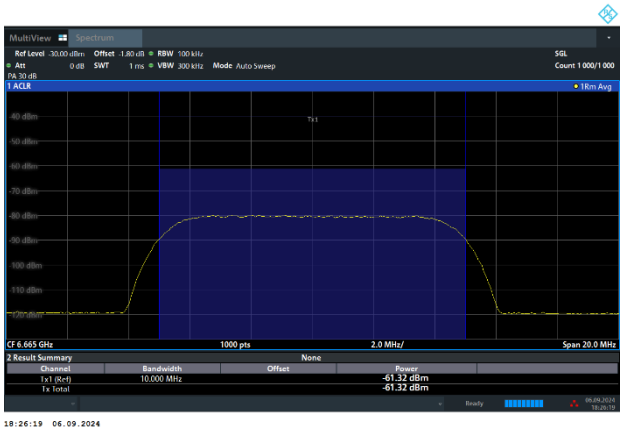
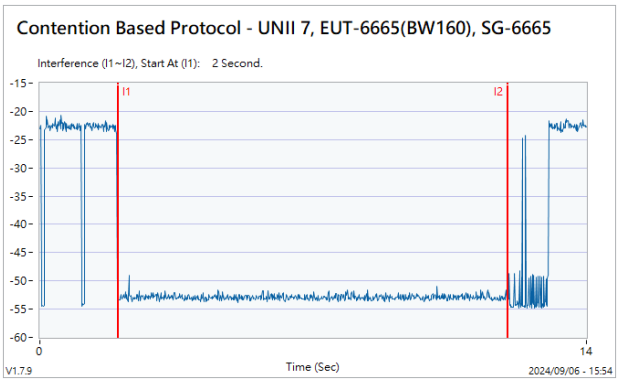
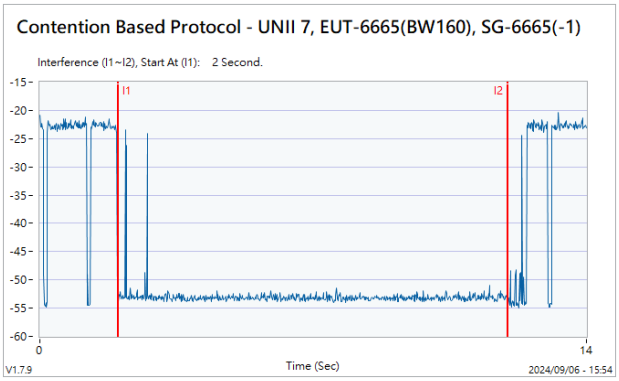
Contention Based Protocol Result Plots on U-NII 5 (AWGN Interference)	
802.11ax (HE160) / 6110MHz (Lower edge) Threshold Level (TL) = -65.84dBm	802.11ax (HE160) / CH47 (Lower edge) Test result is pass due to no transmission occur.
	
802.11ax (HE160) / 6110MHz (Lower edge) Threshold Level (TL) = -66.85dBm	802.11ax (HE160) / CH47 (Lower edge) Transmit when the interferer is 1dB lower.
	

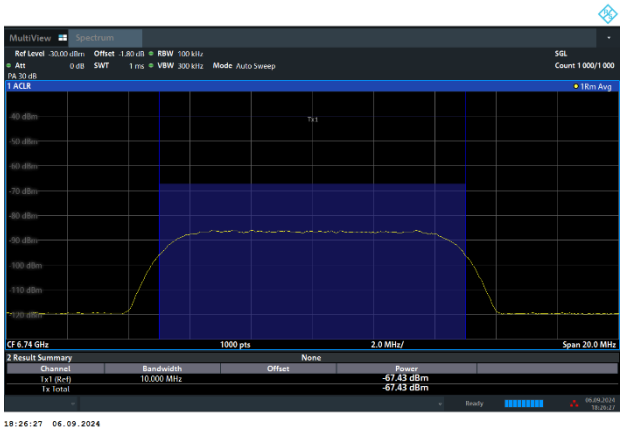
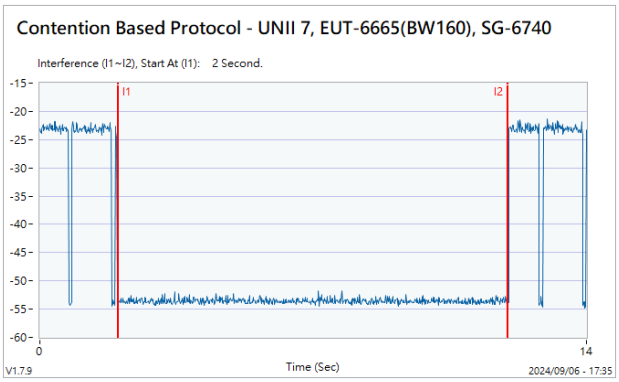
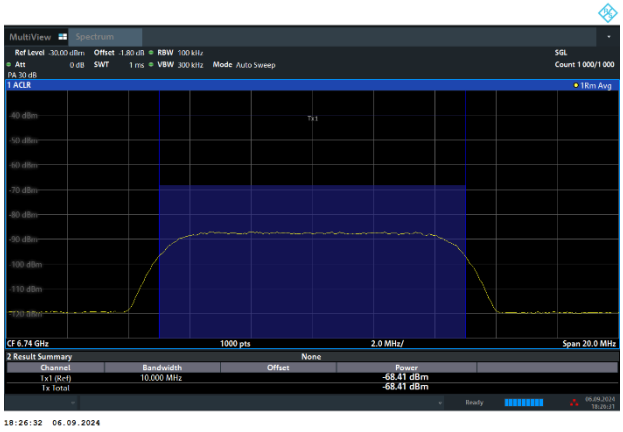
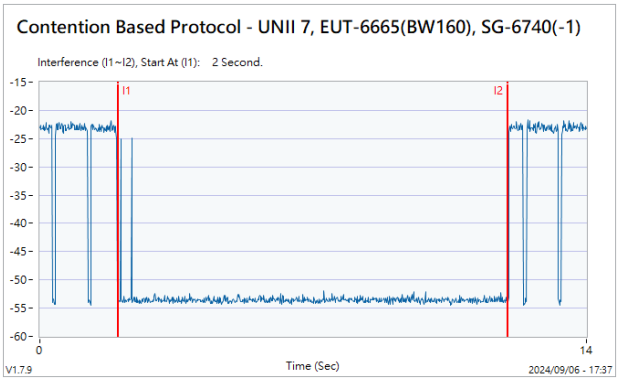
Contention Based Protocol Result Plots on U-NII 5 (AWGN Interference)	
802.11ax (HE160) / 6185MHz (Middle) Threshold Level (TL) = -60.17dBm	802.11ax (HE160) / CH47 (Middle) Test result is pass due to no transmission occur.
	
802.11ax (HE160) / 6185MHz (Middle) Threshold Level (TL) = -61.14dBm	802.11ax (HE160) / CH47 (Middle) Transmit when the interferer is 1dB lower.
	

Contention Based Protocol Result Plots on U-NII 5 (AWGN Interference)	
802.11ax (HE160) / 6260MHz (Upper edge) Threshold Level (TL) = -66.15dBm	802.11ax (HE160) / CH47 (Upper edge) Test result is pass due to no transmission occur.
	
802.11ax (HE160) / 6260MHz (Upper edge) Threshold Level (TL) = -67.13dBm	802.11ax (HE160) / CH47 (Upper edge) Transmit when the interferer is 1dB lower.
	

Contention Based Protocol Result Plots on U-NII 7 (AWGN Interference)	
802.11ax (HE20) / 6695MHz Threshold Level (TL) = -69.10dBm	802.11ax (HE20) / CH149 Test result is pass due to no transmission occur.
	
802.11ax (HE20) / 6695MHz Threshold Level (TL) = -70.18dBm	802.11ax (HE20) / CH149 Transmit when the interferer is 1dB lower.
	

Contention Based Protocol Result Plots on U-NII 7 (AWGN Interference)	
802.11ax (HE160) / 6590MHz (Lower edge) Threshold Level (TL) = -66.98dBm	802.11ax (HE160) / CH143 (Lower edge) Test result is pass due to no transmission occur.
	
802.11ax (HE160) / 6590MHz (Lower edge) Threshold Level (TL) = -67.95dBm	802.11ax (HE160) / CH143 (Lower edge) Transmit when the interferer is 1dB lower.
	

Contention Based Protocol Result Plots on U-NII 7 (AWGN Interference)	
802.11ax (HE160) / 6665MHz (Middle) Threshold Level (TL) = -61.32dBm	802.11ax (HE160) / CH143 (Middle) Test result is pass due to no transmission occur.
	
802.11ax (HE160) / 6665MHz (Middle) Threshold Level (TL) = -62.31dBm	802.11ax (HE160) / CH143 (Middle) Transmit when the interferer is 1dB lower.
	

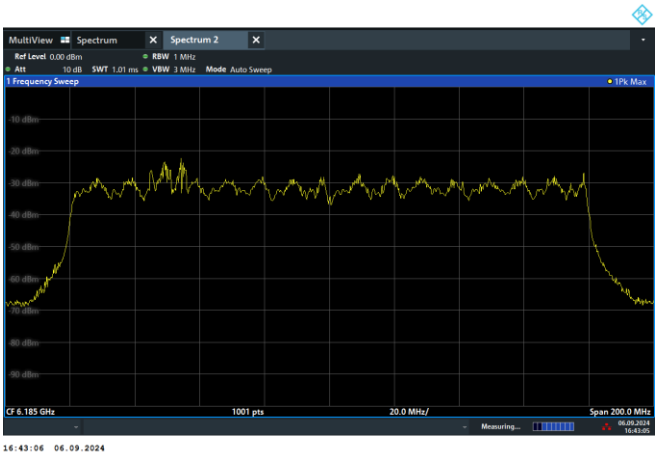
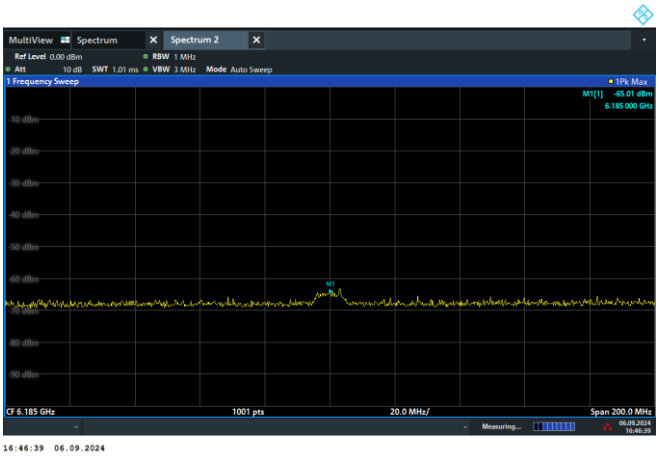
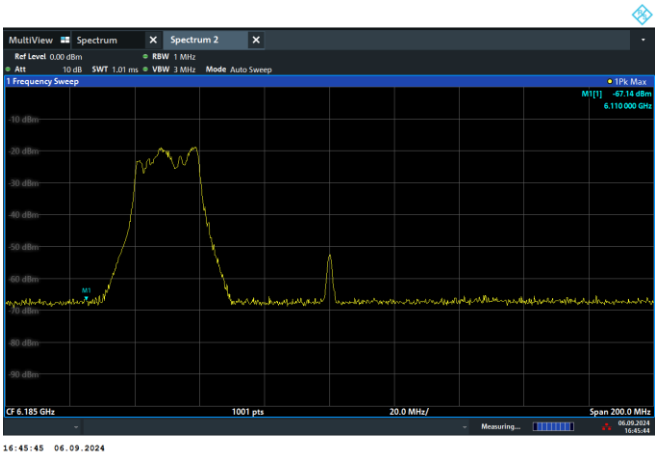
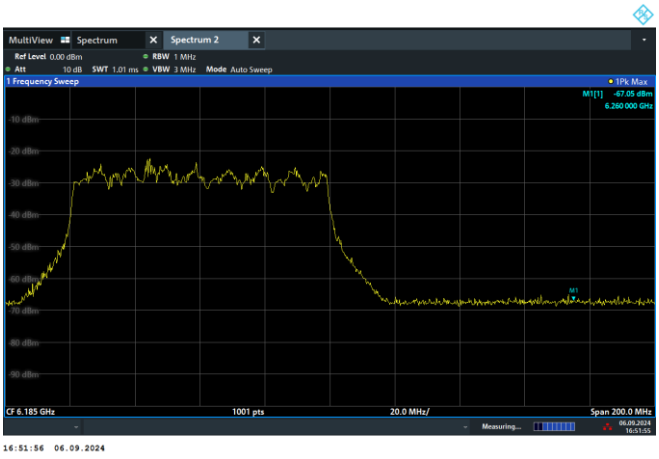
Contention Based Protocol Result Plots on U-NII 7 (AWGN Interference)	
802.11ax (HE160) / 6740MHz (Upper edge) Threshold Level (TL) = -67.43dBm	802.11ax (HE160) / CH143 (Upper edge) Test result is pass due to no transmission occur.
	
802.11ax (HE160) / 6740MHz (Upper edge) Threshold Level (TL) = -68.41dBm	802.11ax (HE160) / CH143 (Upper edge) Transmit when the interferer is 1dB lower.
	

CBP verify with frequency domain plots

The device does not support channel puncturing with regards to Contention Based Protocol.

The entire bandwidth 160MHz stops transmission after the incumbent signal appears.

Otherwise, the entire 160MHz bandwidth is reduced to 20MHz or 80MHz.

Before incumbent injected on 160MHz channel	After 10MHz incumbent injected on center of channel, the entire 160MHz bandwidth stops transmission.
	
After 10MHz incumbent injected on bottom of channel, the EUT bandwidth is reduced from 160MHz to 20MHz channel.	After 10MHz incumbent injected on top of channel, the EUT bandwidth is reduced from 160MHz to 80MHz channel.
	

3.6 Standard Client Proper Power Adjustment Measurement

3.6.1 Limit of Standard Client Proper Power Adjustment

15.407 KDB 987594 D02 Section II. L. Power limits for standard client devices

c) The maximum power limits shall remain at least 6 dB below the power levels authorized for the associated standard-power access point

3.6.2 Test Procedures of Standard Client Proper Power Adjustment

The testing follows FCC KDB 987594 D02 U-NII 6 GHz EMC Measurement v02r01.

Section L. Proper Power Adjustment

3.6.3 Proper Power Adjustment, Client Devices Connected to a Standard Power Access Point

A client device that connects to a Standard Power AP must limit its power to a minimum of 6 dB lower than its associated Standard Power access point's authorized transmit power. The term "authorized" means the AFC-approved power level for the AP to use on a particular channel.

Test procedure to show that the client device can lower its power accordingly.

3.6.4 Test Procedure:

1. Connect equipment as shown in Figure 7 below.
2. Adjust Atten 1 to Std Power AP so as to facilitate error free communication with the Client but protect the Client receiver from overload or damage.
3. Configure the Client and AP so that they associate and start sending data (stream data). The AP should be configured such that its registered power is 36 dBm EIRP.
4. Verify transmission between Client and Std Power AP. Additional attenuators may be required to protect measurement equipment. Measure the Client RF power using any of the methods in C63.10 for NII devices.
5. Use this power, along with its antenna gain, to calculate the Client EIRP.
6. The Client EIRP should be minimally 6 dB lower than that of the AP.
7. Repeat Steps 2 through 5 at two other selected measurement points – the first at the midpoint and the second at the lowest rated power of the client as declared by the manufacturer.

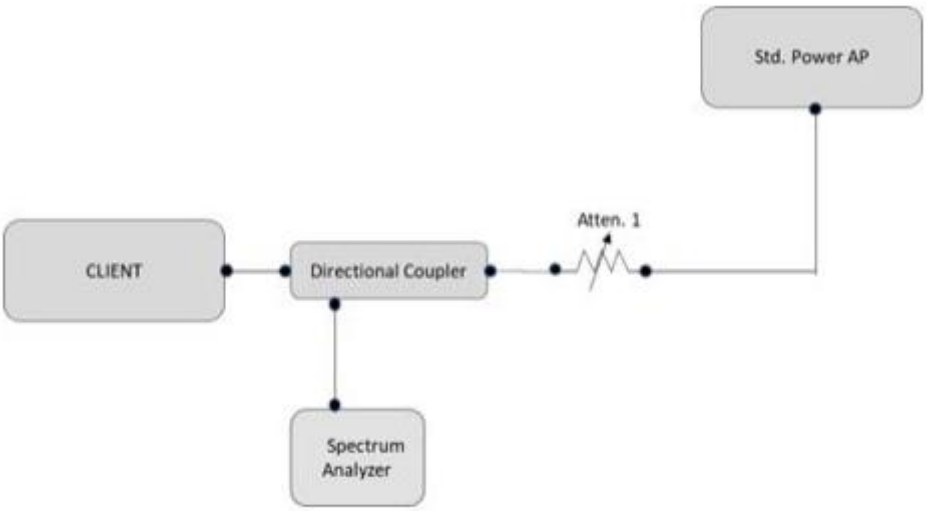


Figure 7. Test setup for conducted testing

3.6.5 Test Result Summary

Companion Standard Power AP: Brand name: Qualcomm, Model name: Wakiki

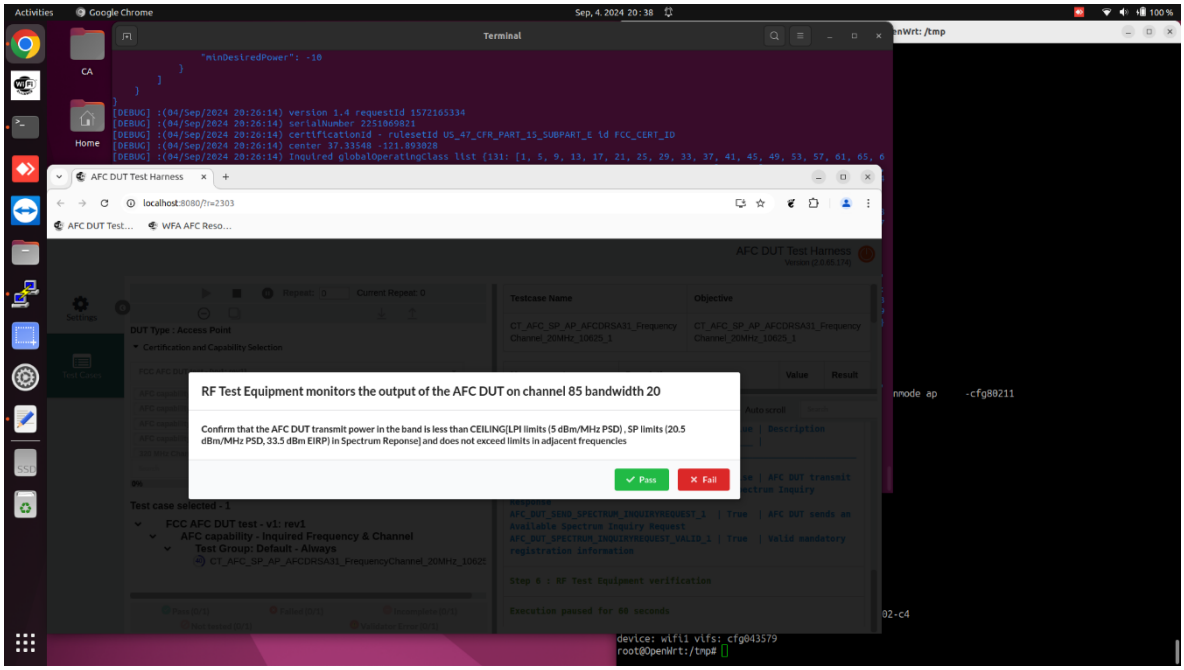
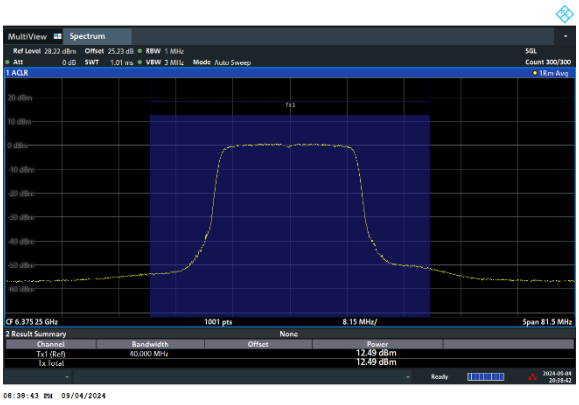
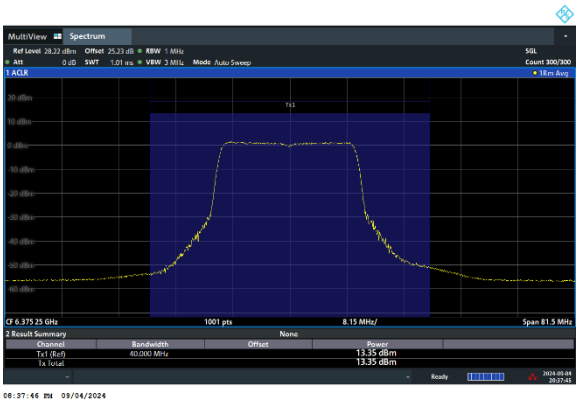
802.11ax 20MHz bandwidth

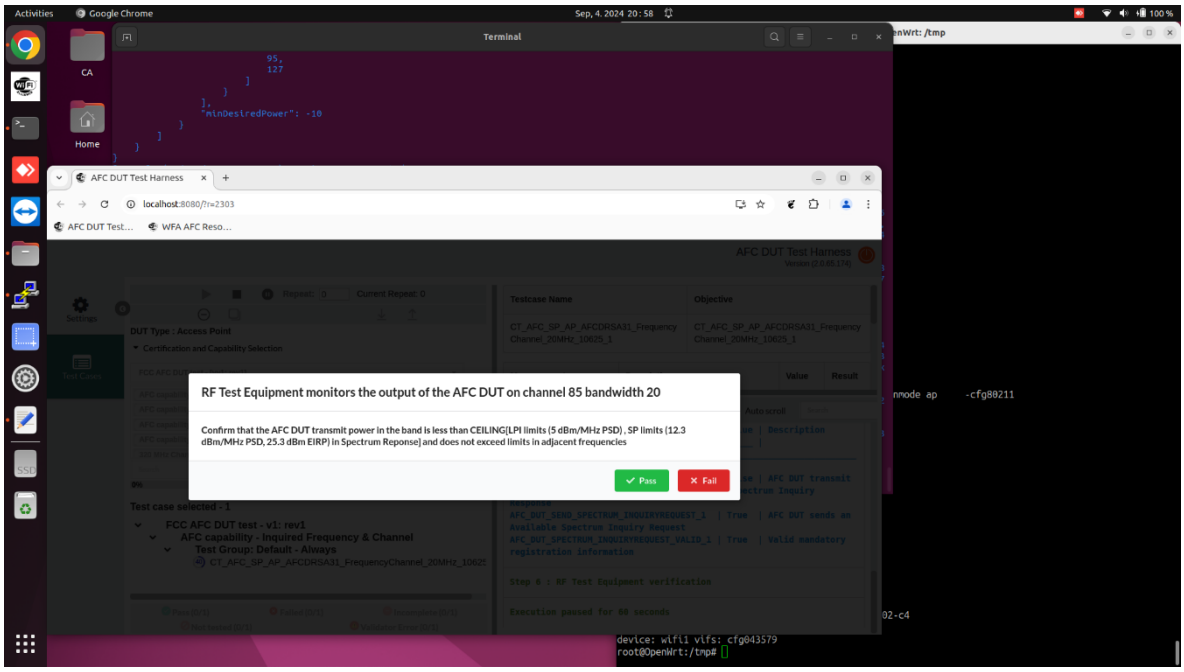
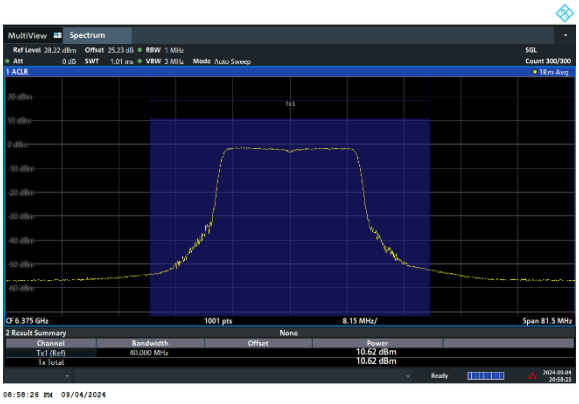
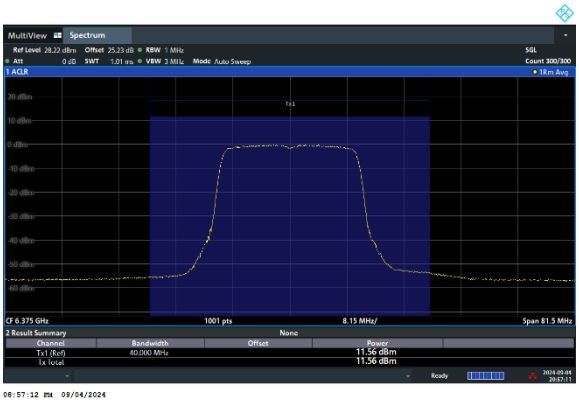
Test channel 85

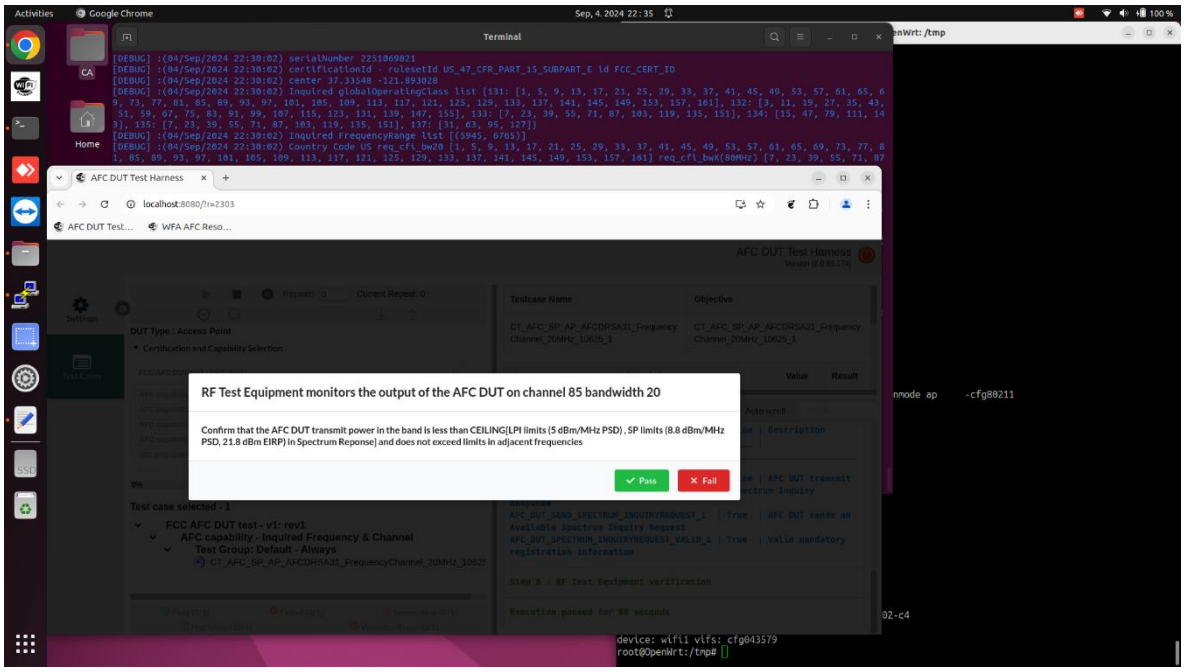
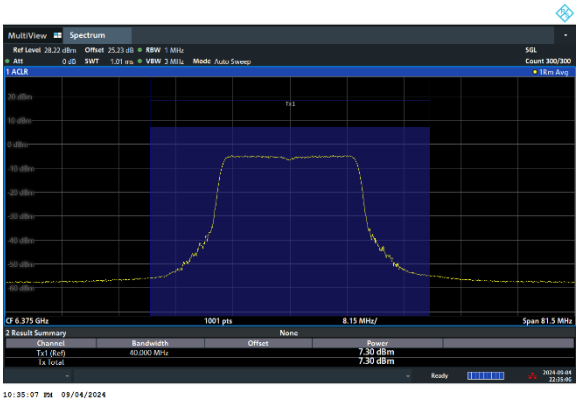
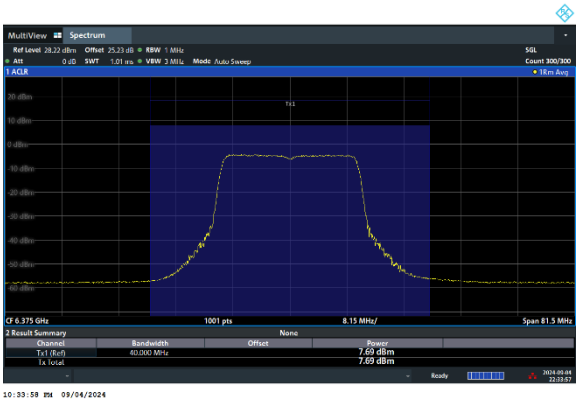
	Client Conducted Power (dBm)			Client EIRP (dBm)	AP EIRP (dBm)	AP to client EIRP Delta (dB)
	Ant0	Ant1	MIMO			
Maximum EIRP	12.49	13.35	15.95	19.24	33.50	14.26
Midpoint EIRP	10.62	11.56	14.13	17.42	25.30	7.88
Lowest EIRP	7.3	7.69	10.51	13.8	21.8	8.00
Requirement						At least 6 dB
Result						Pass

Note: Client EIRP = Client MIMO conducted power + antenna gain 3.29dBi

3.6.6 Test Result Plot

Measured highest power	
AP EIRP 33.5dBm	
	
Client conducted power	
Ant0 12.49dBm	Ant1 13.35dBm
	

Measured mid-point power	
AP EIRP 25.3dBm	
	
Client conducted power	
Ant0 10.62dBm	Ant1 11.56dBm
	

Measured lowest power		
AP EIRP 21.80dBm		
		
Client conducted power		
Ant0 7.30dBm	Ant1 7.69dBm	
		

3.7 Dual Client Test, Demonstration of Proper Power Adjustment based on Associated AP

3.7.1 Limit of Proper Power Adjustment

15.407 KDB 987594 D02 Section II. K. Power limits for standard client devices

A client device may connect to a Standard Power AP with a maximum power level of 30 dBm EIRP. A client may also connect to a Low Power indoor AP, but the power level is limited to a maximum of 24 dBm EIRP.

3.7.2 Test Procedures of Standard Client Proper Power Adjustment

The testing follows FCC KDB 987594 D02 U-NII 6 GHz EMC Measurement v02r01.

Section K. Dual Client Test, Demonstration of Proper Power Adjustment based on Associated AP

3.7.3 Test Procedure:

1. Connect equipment as shown in Figure 6 below..
2. Adjust Atten 2 to Std Power AP so as to facilitate error free communication with the Client (Atten 1 should be set to High on the RF path to the Low Power AP)
3. Configure the Client and APs so that they associate and start sending data (stream data). It is important that the client is configured to transmit at its highest power level. Initially, because the attenuation on Atten 1 is set high, the Client will only associate with the Std Power AP.
4. Verify transmission between Client and Std Power AP. Additional attenuators may be required to protect measurement equipment. Measure the Client RF power using any of the methods in C63.10 for NII devices.
5. Gradually increase Atten 2 while at the same time decreasing Atten 1. This simulates the Client moving from outdoors to indoors. At some level of attenuation the Client should associate with the Low Power indor AP.
6. Verify transmission between Client and Low Power AP.
7. Measure the RF power of the Client device using the same method as in step 4. Verify the power is no more than 24 dBm EIRP

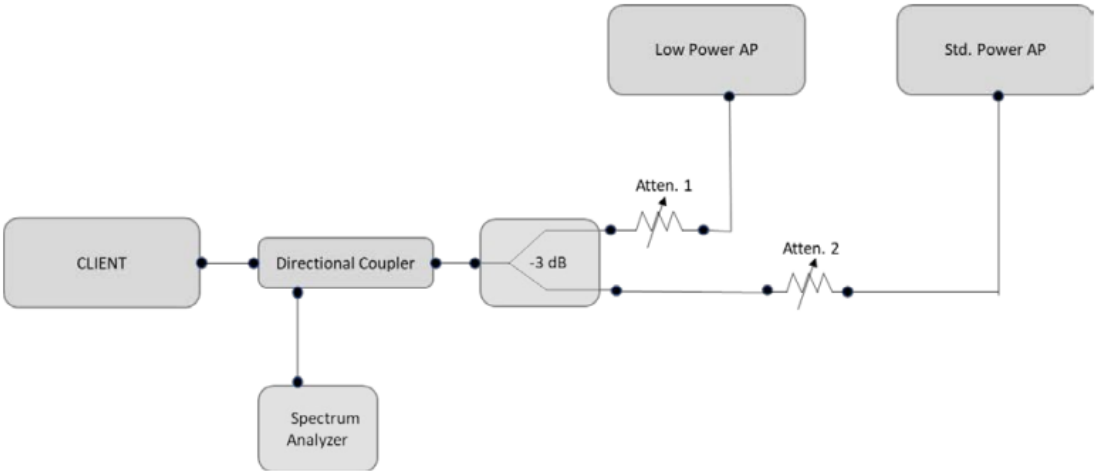


Figure 6. Test setup for conducted testing

3.7.4 Test Result Summary

Companion Standard Power AP: Brand name: Qualcomm, Model name: Wakiki

Companion Low Power indoor AP: Brand name: Qualcomm, Model name: Wakiki

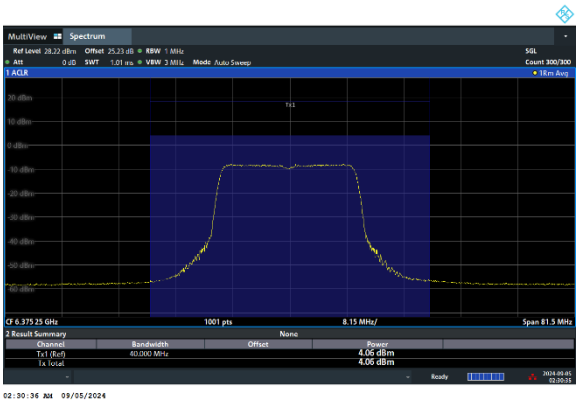
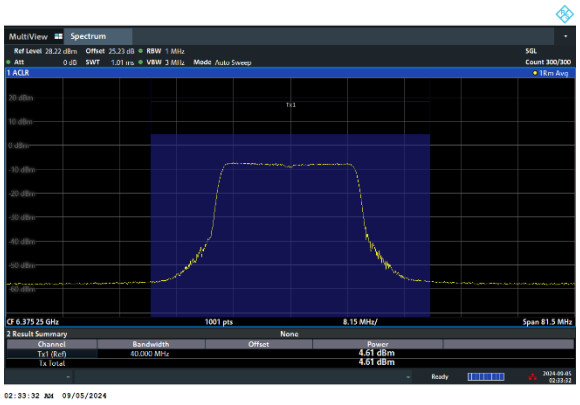
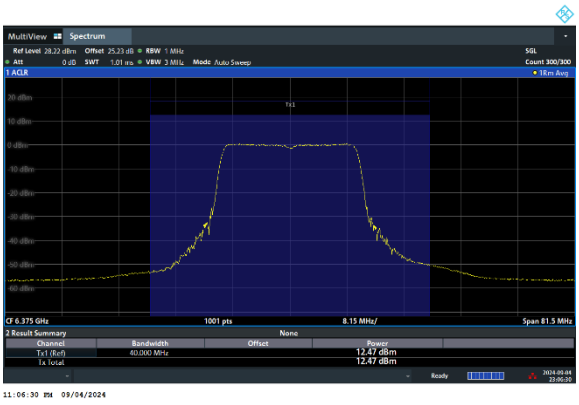
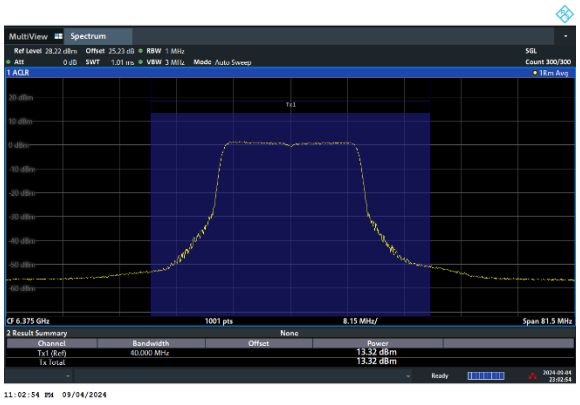
802.11ax 20MHz bandwidth

Test channel 85

	Client Conducted Power (dBm)			Client EIRP (dBm)	Limit EIRP (dBm)	Result
	Ant0	Ant1	MIMO			
Indoor EIRP	4.06	4.61	7.35	10.64	24	Pass
Standard EIRP	12.47	13.32	15.93	19.22	30	Pass

Note: Client EIRP = Client MIMO conducted power + antenna gain 3.29dBi

3.7.5 Test Result Plot

Measured Indoor power	
Ant0 **4.06dBm**	**Ant1** **4.61dBm**
	
Measured Standard power	
Ant0 **12.47dBm**	**Ant1** **13.32dBm**
	

3.8 Unwanted Emissions Measurement

This section is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement.

3.8.1 Limit of Unwanted Emissions

(1) For transmitters operating within the 5.925-7.125 GHz band: Any emissions outside of the 5.925-7.125 GHz band must not exceed an e.i.r.p. of −27 dBm/MHz.

EIRP (dBm)	Field Strength at 3m (dBμV/m)
- 27 (RMS)	68.3
- 7 (Peak)	88.3

According 987594 D02 U-NII 6GHz EMC Measurement v02r01 section G:
Unwanted emissions outside of restricted bands are measured with a RMS detector.
In addition, 15.35(b) applies where the peak emissions must be limited to no more than 20 dB above the average limit

(2) Unwanted spurious emissions fallen in restricted bands shall comply with the general field strength limits as below table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

Note: The following formula is used to convert the EIRP to field strength.

$$E=\frac{1000000\sqrt{30P}}{3}$$ μV/m, where P is the eirp (Watts)

3.8.2 Measuring Instruments

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

3.8.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section G) Unwanted emissions measurement.

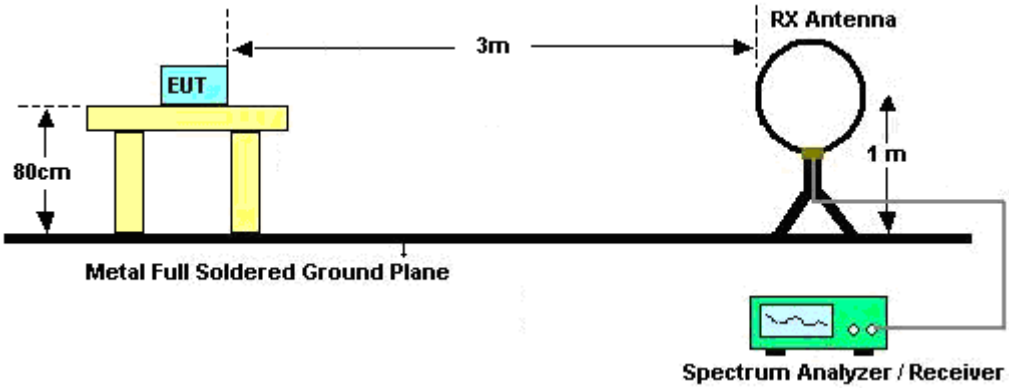
   (1) Procedure for Unwanted Emissions Measurements Below 1000MHz
   - RBW = 120 kHz
   - VBW = 300 kHz
   - Detector = Peak
   - Trace mode = max hold

   (2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz
   - RBW = 1 MHz
   - VBW ≥ 3 MHz
   - Detector = Peak
   - Sweep time = auto
   - Trace mode = max hold

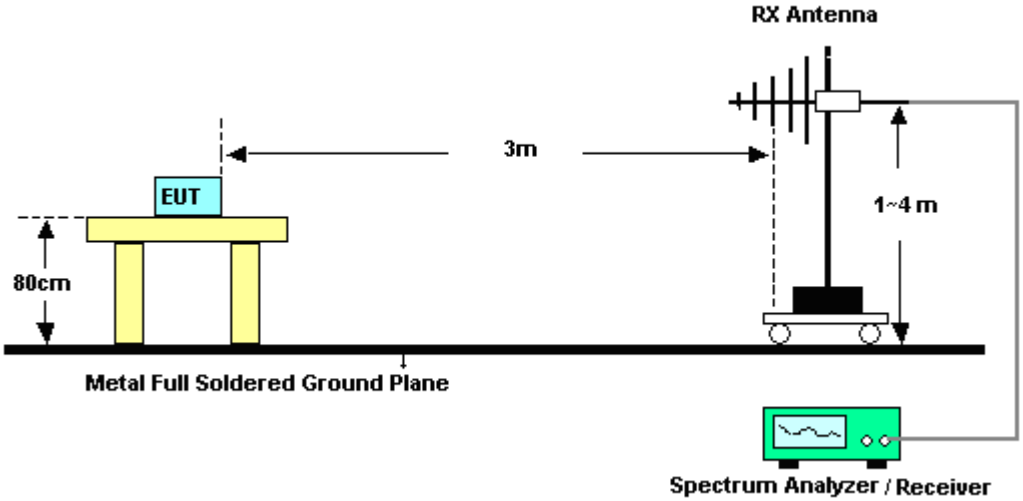
   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz
   - RBW = 1 MHz
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
2. The EUT is placed on a turntable with 0.8 meter for frequency below 1 GHz and 1.5 meter for frequency above 1 GHz respectively above ground.
3. The EUT is set 3 meters away from the receiving antenna which is mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT is arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. Radiated testing below 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading. When there is no suspected emission found and the emission level is with at least 6 dB margin against QP limit line, the position is marked as “-“.
7. Radiated testing above 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading for scanning all frequencies. When there is no suspected emission found and the harmonic emission level is with at least 6 dB margin against average limit line, the position is marked as “-“..

3.8.4 Test Setup

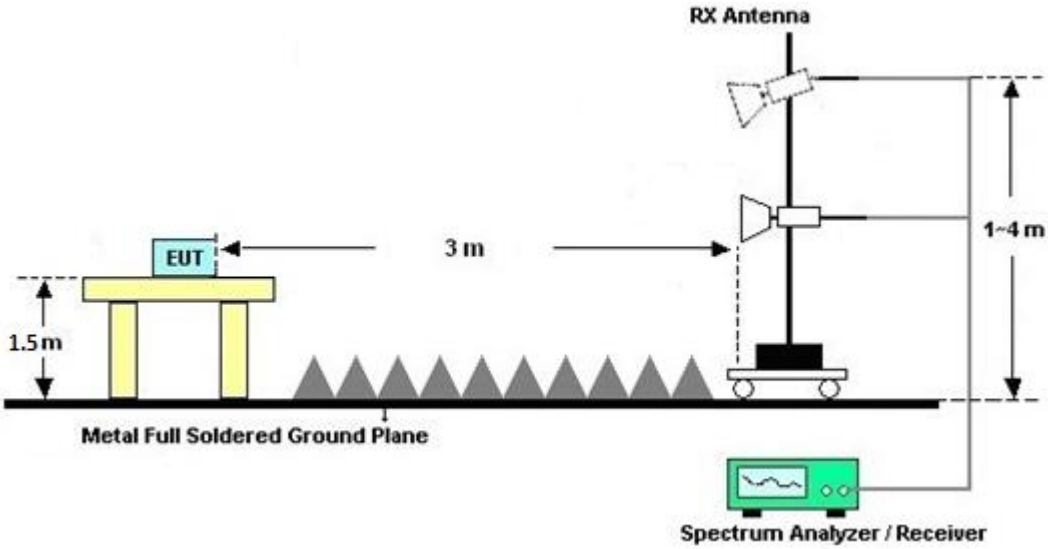
For radiated emissions below 30MHz



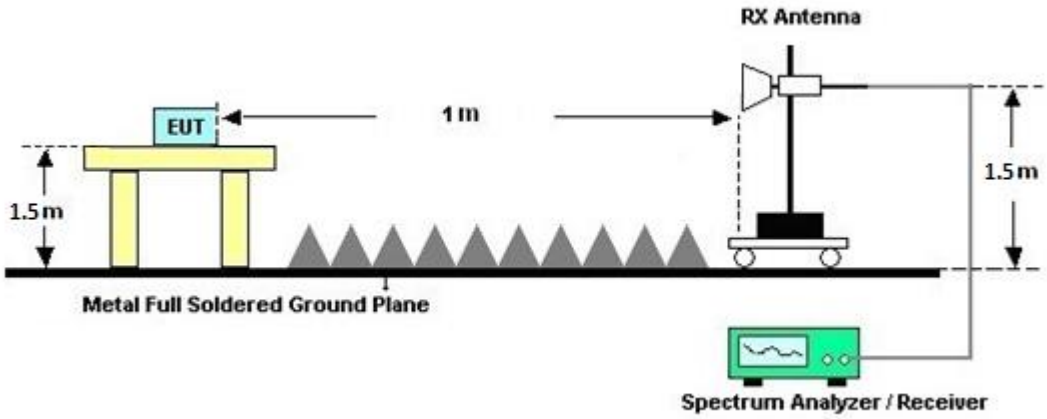
For radiated emissions from 30MHz to 1GHz



For radiated test from 1GHz to 18GHz



For radiated test above 18GHz



3.8.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which starts from 9 kHz to 30 MHz, is pre-scanned and the result which is 20 dB lower than the limit line is not reported.

There is adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

3.8.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C and D.

3.8.7 Duty Cycle

Please refer to Appendix E.

3.8.8 Test Result of Radiated Spurious Emissions (30MHz ~ 10th Harmonic)

Please refer to Appendix C and D.

3.9 AC Conducted Emission Measurement

3.9.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

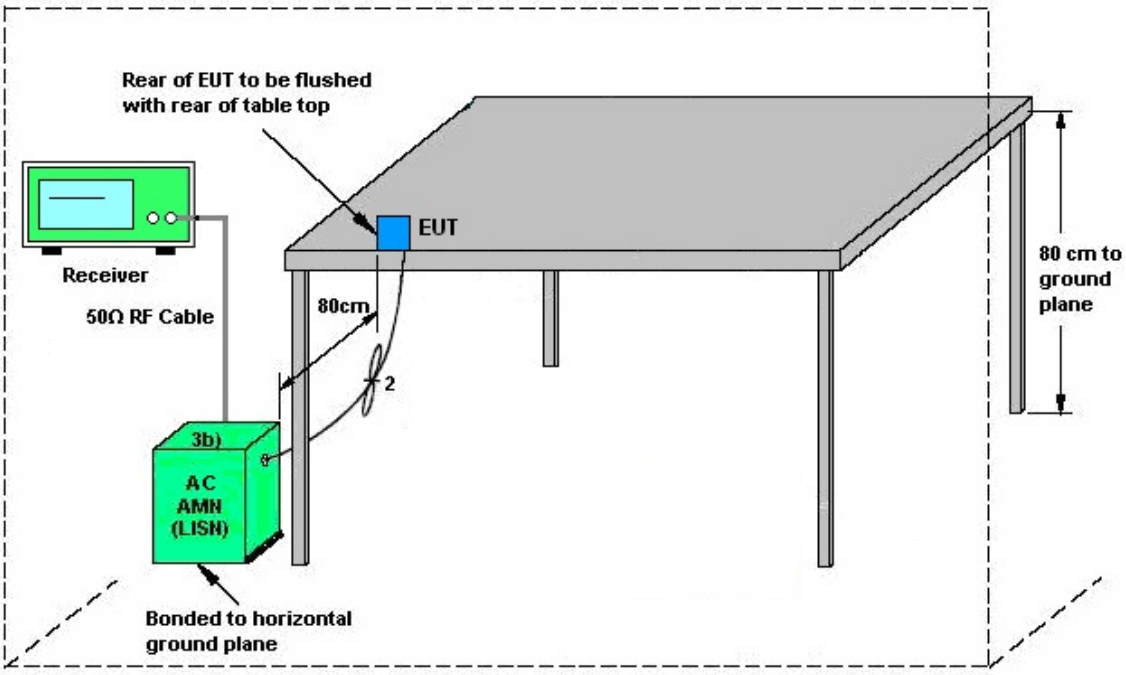
3.9.2 Measuring Instruments

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

3.9.3 Test Procedures

1. The EUT is placed 0.4 meter away from the conducting wall of the shielding room, and is kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both Line and Neutral shall be tested in order to find out the maximum conducted emission.
7. The frequency range from 150 kHz to 30 MHz is scanned.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

3.9.4 Test Setup



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

3.9.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

3.10 Antenna Requirements

3.10.1 Standard Applicable

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall 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 manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§ 15.211, 15.213, 15.217, 15.219, 15.221, or § 15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

3.10.2 Antenna Anti-Replacement Construction

Antenna permanently attached.

4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EMI Test Receiver	Keysight	N9038A(MXE)	MY54130085	N/A	Oct. 06, 2023	Aug. 29, 2024~ Sep. 09, 2024	Oct. 05, 2024	Radiation (03CH20-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Sep. 12, 2023	Aug. 29, 2024~ Sep. 09, 2024	Sep. 11, 2024	Radiation (03CH20-HY)
Preamplifier	EMEC	EM18G40G	060801	18GHz~40GHz	May 27, 2024	Aug. 29, 2024~ Sep. 09, 2024	May 26, 2025	Radiation (03CH20-HY)
Controller	ChainTek	3000-1	N/A	Control Turn table & Ant Mast	N/A	Aug. 29, 2024~ Sep. 09, 2024	N/A	Radiation (03CH20-HY)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Aug. 29, 2024~ Sep. 09, 2024	N/A	Radiation (03CH20-HY)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Aug. 29, 2024~ Sep. 09, 2024	N/A	Radiation (03CH20-HY)
Signal Analyzer	Keysight	N9010B	MY60240520	N/A	Dec. 12, 2023	Aug. 29, 2024~ Sep. 09, 2024	Dec. 11, 2024	Radiation (03CH20-HY)
Bilog Antenna	TESEQ	CBL 6111D&00802N 1D01N-06	55606 & 08	30MHz~1GHz	Oct. 20, 2023	Aug. 29, 2024~ Sep. 09, 2024	Oct. 19, 2024	Radiation (03CH20-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120 D	02360	1GHz-18GHz	Oct. 30, 2023	Aug. 29, 2024~ Sep. 09, 2024	Oct. 29, 2024	Radiation (03CH20-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA 9170	1223	18GHz-40GHz	Jun. 24, 2024	Aug. 29, 2024~ Sep. 09, 2024	Jun. 23, 2025	Radiation (03CH20-HY)
Preamplifier	COM-POWER	PAM-103	18020201	1MHz-1000MHz	Jan. 01, 2024	Aug. 29, 2024~ Sep. 09, 2024	Dec. 31, 2024	Radiation (03CH20-HY)
Amplifier	EMCI	EMC118A45SE	980792	N/A	Nov. 13, 2023	Aug. 29, 2024~ Sep. 09, 2024	Nov. 12, 2024	Radiation (03CH20-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	519229/2,8040 15/2,804027/2	N/A	Jan. 17, 2024	Aug. 29, 2024~ Sep. 09, 2024	Jan. 16, 2025	Radiation (03CH20-HY)
Hygrometer	TECPEL	DTM-303A	TP211382	N/A	Mar. 27, 2024	Aug. 29, 2024~ Sep. 09, 2024	Mar. 26, 2025	Radiation (03CH20-HY)
Software	Audix	N/A	RK-002156	N/A	N/A	Aug. 29, 2024~ Sep. 09, 2024	N/A	Radiation (03CH20-HY)
Hygrometer	TECPEL	DTM-303A	TP201996	N/A	Nov. 07, 2023	Sep. 04, 2024~ Sep. 10, 2024	Nov. 06, 2024	Conducted (TH05-HY)
Power Sensor	DARE	RPR3008W	RPR8W-23010 16 (NO:54)	10MHz~8GHz	Jul. 16, 2024	Sep. 04, 2024~ Sep. 10, 2024	Jul. 15, 2025	Conducted (TH05-HY)
Switch Control Mainframe	Burgeon	ETF-058	EC1300485 (BOX4)	N/A	Apr. 08, 2024	Sep. 04, 2024~ Sep. 10, 2024	Apr. 07, 2025	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101564	10Hz ~ 40GHz	Sep. 12, 2023	Sep. 04, 2024~ Sep. 10, 2024	Sep. 11, 2024	Conducted (TH05-HY)
Software	Sporton	BTWIFI_Final_v ersion_240411	N/A	Conducted Other Test Item	N/A	Sep. 04, 2024~ Sep. 10, 2024	N/A	Conducted (TH05-HY)
AC Power Source	ACPOWER	AFC-11003G	F317040033	N/A	N/A	Jul. 16, 2024	N/A	Conduction (CO07-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Jul. 16, 2024	N/A	Conduction (CO07-HY)
Pulse Limiter	SCHWARZBE CK	VTSD 9561-F N	9561-F N00373	9kHz-200MHz	Oct. 20, 2023	Jul. 16, 2024	Oct. 19, 2024	Conduction (CO07-HY)
RF Cable	HUBER + SUHNER	RG 214/U	1358175	9kHz~30MHz	Mar. 14, 2024	Jul. 16, 2024	Mar. 13, 2025	Conduction (CO07-HY)
Two-Line V-Network	TESEQ	NNB 51	45051	N/A	Mar. 10, 2024	Jul. 16, 2024	Mar. 09, 2025	Conduction (CO07-HY)
Four-Line V-Network	TESEQ	NNB 52	36122	N/A	Mar. 07, 2024	Jul. 16, 2024	Mar. 06, 2025	Conduction (CO07-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102317	9kHz~3.6GHz	Sep. 20, 2023	Jul. 16, 2024	Sep. 19, 2024	Conduction (CO07-HY)

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Signal Generator (Interferer)	Rohde & Schwarz	SMW200A	109425	100kHz~7.5GHz	Dec. 20, 2023	Sep. 06, 2024	Dec. 19, 2024	CBP (DF02-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV3013	101549	10Hz~13.6GHz	Jan. 30, 2024	Sep. 06, 2024	Jan. 29, 2025	CBP (DF02-HY)
Power Divider	MTJ	SMA 2Way Power Divider	MD10003	0.5GHz-6GHz	Calibration from System	Sep. 06, 2024	Calibration from System	CBP (DF02-HY)
Power Divider	MTJ	SMA 2Way Power Divider	MD10007	0.5GHz-6GHz	Calibration from System	Sep. 06, 2024	Calibration from System	CBP (DF02-HY)
Coupler	MVE	MVE4816	A800044	0.5-18GHz	Coupler	Sep. 06, 2024	Calibration from System	CBP (DF02-HY)
RF Cable	MTJ Cooperstion	SBF405-105FLEX	MTJ-30cm-01	30 kHz~18GHz	Calibration from System	Sep. 06, 2024	Calibration from System	CBP (DF02-HY)
RF Cable	EC	SS405	SS405-100cm-05	30 kHz~18GHz	Calibration from System	Sep. 06, 2024	Calibration from System	CBP (DF02-HY)
RF Cable	EC	SS405	SS405-100cm-06	30 kHz~18GHz	Calibration from System	Sep. 06, 2024	Calibration from System	CBP (DF02-HY)
RF Cable	EC	SLF405	EC-SFL405-100cm-#8	30 kHz~18GHz	Calibration from System	Sep. 06, 2024	Calibration from System	CBP (DF02-HY)
RF Cable	EST	SS405_150cm	#13	30kHz~18GHz	Calibration from System	Sep. 06, 2024	Calibration from System	CBP (DF02-HY)
RF Cable	MVE	SPF141	MVE-150cm-01	30 kHz~18GHz	Calibration from System	Sep. 06, 2024	Calibration from System	CBP (DF02-HY)
RF Cable	MVE	SPF141	MVE-150cm-02	30 kHz~18GHz	Calibration from System	Sep. 06, 2024	Calibration from System	CBP (DF02-HY)
Software 1	Sporton	Adaptivity Test Tools	N/A	Ver 1.7.7	NCR	Sep. 06, 2024	NCR	CBP (DF02-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV3013	101549	10Hz~13.6GHz	Jan. 30, 2024	Sep. 04, 2024	Jan. 29, 2025	AFC (DF02-HY)

5 Measurement Uncertainty

Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.44 dB

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	6.40 dB

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 6000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.50 dB

Uncertainty of Radiated Emission Measurement (6000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.60 dB

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.40 dB

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Kevin Xiao	Temperature:	21~25	°C
Test Date:	2024/09/04 ~ 2024/09/10	Relative Humidity:	51~54	%

TEST RESULTS DATA
26dB and 99% OBW

U-NII-5 MIMO										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)		26 dB Bandwidth (MHz)		Emission Bandwidth Limit (MHz)	Pass /Fail
					Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	2	001	5955	16.47	16.42	19.50	19.46	320.00	Pass
11a	6Mbps	2	049	6195	16.47	16.42	19.49	19.38	320.00	Pass
11a	6Mbps	2	093	6415	16.45	16.40	19.46	19.40	320.00	Pass

TEST RESULTS DATA
EIRP Power Table

U-NII-5 MIMO												
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Conducted Power (dBm)			DG (dBi)		EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	SUM		
11a	6Mbps	2	001	5955	15.90	15.40	18.67	3.29		21.96	30.00	Pass
11a	6Mbps	2	049	6195	14.90	15.70	18.33	3.29		21.62	30.00	Pass
11a	6Mbps	2	093	6415	15.90	15.90	18.91	3.29		22.20	30.00	Pass

TEST RESULTS DATA
EIRP Power Spectral Density

U-NII-5 MIMO														
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Conducted Power Density with Duty Factor (dBm/MHz)			DG (dBi)		EIRP Power Density (dBm/MHz)	EIRP Power Density Limit (dBm/MHz)	Pass /Fail
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	SUM		
11a	6Mbps	2	001	5955	0.03	0.03			6.85	6.23		13.08	17.00	Pass
11a	6Mbps	2	049	6195	0.03	0.03			6.02	6.23		12.25	17.00	Pass
11a	6Mbps	2	093	6415	0.03	0.03			7.20	6.23		13.42	17.00	Pass

TEST RESULTS DATA
26dB and 99% OBW

U-NII-7 MIMO										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)		26 dB Bandwidth (MHz)		Emission Bandwidth Limit (MHz)	Pass /Fail
					Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	2	117	6535	16.46	16.41	19.66	19.50	320.00	Pass
11a	6Mbps	2	149	6695	16.47	16.40	19.53	19.38	320.00	Pass
11a	6Mbps	2	181	6855	16.47	16.39	19.62	19.48	320.00	Pass

TEST RESULTS DATA
EIRP Power Table

U-NII-7 MIMO												
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Conducted Power (dBm)			DG (dBi)		EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	SUM		
11a	6Mbps	2	117	6535	12.10	12.20	15.16	3.59		18.75	30.00	Pass
11a	6Mbps	2	149	6695	12.50	11.80	15.17	3.59		18.76	30.00	Pass
11a	6Mbps	2	181	6855	12.10	12.60	15.37	3.59		18.96	30.00	Pass

TEST RESULTS DATA
EIRP Power Spectral Density

U-NII-7 MIMO														
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Conducted Power Density with Duty Factor (dBm/MHz)			DG (dBi)		EIRP Power Density (dBm/MHz)	EIRP Power Density Limit (dBm/MHz)	Pass /Fail
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	SUM		
11a	6Mbps	2	117	6535	0.03	0.03			3.06	6.25		9.31	17.00	Pass
11a	6Mbps	2	149	6695	0.03	0.03			3.10	6.25		9.35	17.00	Pass
11a	6Mbps	2	181	6855	0.03	0.03			2.75	6.25		9.00	17.00	Pass

TEST RESULTS DATA
26dB and 99% OBW

U-NII-5 MIMO											
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	RU Config.	99% Bandwidth (MHz)		26 dB Bandwidth (MHz)		Emission Bandwidth Limit (MHz)	Pass /Fail
						Ant 1	Ant 2	Ant 1	Ant 2		
HE20	MCS0	2	001	5955	Full	18.93	18.94	21.48	21.36	320.00	Pass
HE20	MCS0	2	049	6195	Full	18.94	18.95	21.54	21.40	320.00	Pass
HE20	MCS0	2	093	6415	Full	18.94	18.94	21.30	21.33	320.00	Pass
HE40	MCS0	2	003	5965	Full	37.93	37.92	41.68	41.70	320.00	Pass
HE40	MCS0	2	051	6205	Full	37.97	37.96	41.49	41.74	320.00	Pass
HE40	MCS0	2	091	6405	Full	37.92	37.98	41.58	41.63	320.00	Pass
HE80	MCS0	2	007	5985	Full	77.16	77.16	82.69	82.43	320.00	Pass
HE80	MCS0	2	055	6225	Full	77.15	77.19	82.66	82.85	320.00	Pass
HE80	MCS0	2	087	6385	Full	77.20	77.24	83.04	82.75	320.00	Pass
HE160	MCS0	2	015	6025	Full	155.94	156.01	165.26	165.02	320.00	Pass
HE160	MCS0	2	047	6185	Full	156.01	155.84	165.36	165.70	320.00	Pass
HE160	MCS0	2	079	6345	Full	155.89	156.03	165.26	165.60	320.00	Pass

TEST RESULTS DATA
EIRP Power Table

U-NII-5 MIMO													
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	RU Config.	Conducted Power (dBm)			DG (dBi)		EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
						Ant 1	Ant 2	SUM	Ant 1	Ant 2	SUM		
HE20	MCS0	2	001	5955	Full	15.90	15.50	18.71	3.29		22.00	30.00	Pass
HE20	MCS0	2	001	5955	26/0	6.10	6.10	9.11	3.29		12.40	30.00	Pass
HE20	MCS0	2	001	5955	52/37	9.40	8.80	12.12	3.29		15.41	30.00	Pass
HE20	MCS0	2	001	5955	106/53	12.40	11.80	15.12	3.29		18.41	30.00	Pass
HE20	MCS0	2	049	6195	Full	14.90	15.80	18.38	3.29		21.67	30.00	Pass
HE20	MCS0	2	049	6195	26/4	6.30	7.20	9.78	3.29		13.07	30.00	Pass
HE20	MCS0	2	049	6195	52/38	8.50	9.10	11.82	3.29		15.11	30.00	Pass
HE20	MCS0	2	049	6195	106/53	11.30	12.20	14.78	3.29		18.07	30.00	Pass
HE20	MCS0	2	093	6415	Full	15.50	15.60	18.56	3.29		21.85	30.00	Pass
HE20	MCS0	2	093	6415	26/8	5.90	1.80	7.33	3.29		10.62	30.00	Pass
HE20	MCS0	2	093	6415	52/40	8.40	8.60	11.51	3.29		14.80	30.00	Pass
HE20	MCS0	2	093	6415	106/54	11.50	11.80	14.66	3.29		17.95	30.00	Pass
HE40	MCS0	2	003	5965	Full	15.90	15.30	18.62	3.29		21.91	30.00	Pass
HE40	MCS0	2	003	5965	242/61	13.00	12.40	15.72	3.29		19.01	30.00	Pass
HE40	MCS0	2	051	6205	Full	15.00	15.70	18.37	3.29		21.66	30.00	Pass
HE40	MCS0	2	051	6205	242/61	11.90	12.80	15.38	3.29		18.67	30.00	Pass
HE40	MCS0	2	091	6405	Full	15.50	15.70	18.61	3.29		21.90	30.00	Pass
HE40	MCS0	2	091	6405	242/62	12.70	13.10	15.91	3.29		19.20	30.00	Pass
HE80	MCS0	2	007	5985	Full	15.90	15.10	18.53	3.29		21.82	30.00	Pass
HE80	MCS0	2	007	5985	484/65	13.40	12.60	16.03	3.29		19.32	30.00	Pass
HE80	MCS0	2	055	6225	Full	15.60	15.80	18.71	3.29		22.00	30.00	Pass
HE80	MCS0	2	055	6225	484/65	13.10	13.60	16.37	3.29		19.66	30.00	Pass
HE80	MCS0	2	087	6385	Full	15.60	15.90	18.76	3.29		22.05	30.00	Pass
HE80	MCS0	2	087	6385	484/66	12.70	13.00	15.86	3.29		19.15	30.00	Pass
HE160	MCS0	2	015	6025	Full	15.70	15.70	18.71	3.29		22.00	30.00	Pass
HE160	MCS0	2	015	6025	996/67	13.00	13.10	16.06	3.29		19.35	30.00	Pass
HE160	MCS0	2	047	6185	Full	15.30	15.80	18.57	3.29		21.86	30.00	Pass
HE160	MCS0	2	047	6185	996/67	12.60	13.30	15.97	3.29		19.26	30.00	Pass
HE160	MCS0	2	079	6345	Full	15.50	15.80	18.66	3.29		21.95	30.00	Pass
HE160	MCS0	2	079	6345	996/S67	12.50	12.80	15.66	3.29		18.95	30.00	Pass

TEST RESULTS DATA
EIRP Power Spectral Density

U-NII-5 MIMO															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	RU Config.	Duty Factor (dB)		Conducted Power Density with Duty Factor (dBm/MHz)			DG (dBi)		EIRP Power Density (dBm/MHz)	EIRP Power Density Limit (dBm/MHz)	Pass /Fail
						Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	SUM		
HE20	MCS0	2	001	5955	Full	0.00	0.00			6.26	6.23		12.49	17.00	Pass
HE20	MCS0	2	001	5955	26/0	0.00	0.00			6.11	6.23		12.33	17.00	Pass
HE20	MCS0	2	001	5955	52/37	0.00	0.00			6.07	6.23		12.30	17.00	Pass
HE20	MCS0	2	001	5955	106/53	0.00	0.00			6.02	6.23		12.25	17.00	Pass
HE20	MCS0	2	049	6195	Full	0.00	0.00			5.46	6.23		11.68	17.00	Pass
HE20	MCS0	2	049	6195	26/4	0.00	0.00			5.05	6.23		11.27	17.00	Pass
HE20	MCS0	2	049	6195	52/38	0.00	0.00			5.43	6.23		11.65	17.00	Pass
HE20	MCS0	2	049	6195	106/53	0.00	0.00			5.32	6.23		11.54	17.00	Pass
HE20	MCS0	2	093	6415	Full	0.00	0.00			6.37	6.23		12.60	17.00	Pass
HE20	MCS0	2	093	6415	26/8	0.00	0.00			6.25	6.23		12.47	17.00	Pass
HE20	MCS0	2	093	6415	52/40	0.00	0.00			6.30	6.23		12.52	17.00	Pass
HE20	MCS0	2	093	6415	106/54	0.00	0.00			6.18	6.23		12.40	17.00	Pass
HE40	MCS0	2	003	5965	Full	0.00	0.00			3.27	6.23		9.50	17.00	Pass
HE40	MCS0	2	003	5965	242/61	0.00	0.00			2.84	6.23		9.07	17.00	Pass
HE40	MCS0	2	051	6205	Full	0.00	0.00			2.68	6.23		8.90	17.00	Pass
HE40	MCS0	2	051	6205	242/61	0.00	0.00			2.22	6.23		8.44	17.00	Pass
HE40	MCS0	2	091	6405	Full	0.00	0.00			3.25	6.23		9.48	17.00	Pass
HE40	MCS0	2	091	6405	242/62	0.00	0.00			3.22	6.23		9.44	17.00	Pass
HE80	MCS0	2	007	5985	Full	0.03	0.03			0.23	6.23		6.45	17.00	Pass
HE80	MCS0	2	007	5985	484/65	0.03	0.03			0.04	6.23		6.26	17.00	Pass
HE80	MCS0	2	055	6225	Full	0.03	0.03			0.48	6.23		6.70	17.00	Pass
HE80	MCS0	2	055	6225	484/65	0.03	0.03			0.39	6.23		6.62	17.00	Pass
HE80	MCS0	2	087	6385	Full	0.03	0.03			0.66	6.23		6.89	17.00	Pass
HE80	MCS0	2	087	6385	484/66	0.03	0.03			0.59	6.23		6.82	17.00	Pass
HE160	MCS0	2	015	6025	Full	0.00	0.00			-2.05	6.23		4.17	17.00	Pass
HE160	MCS0	2	015	6025	996/67	0.00	0.00			-2.43	6.23		3.80	17.00	Pass
HE160	MCS0	2	047	6185	Full	0.00	0.00			-2.48	6.23		3.75	17.00	Pass
HE160	MCS0	2	047	6185	996/67	0.00	0.00			-2.64	6.23		3.59	17.00	Pass
HE160	MCS0	2	079	6345	Full	0.00	0.00			-2.05	6.23		4.18	17.00	Pass
HE160	MCS0	2	079	6345	996/S67	0.00	0.00			-2.16	6.23		4.07	17.00	Pass

TEST RESULTS DATA
26dB and 99% OBW

U-NII-7 single antenna											
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	RU Config.	99% Bandwidth (MHz)		26 dB Bandwidth (MHz)		Emission Bandwidth Limit (MHz)	Pass /Fail
						Ant 1	Ant 2	Ant 1	Ant 2		
HE20	MCS 0	1	117	6535	Full	18.94	18.97	21.44	21.27	320.00	Pass
HE20	MCS 0	1	149	6695	Full	18.95	16.98	21.17	21.52	320.00	Pass
HE20	MCS 0	1	181	6855	Full	18.96	18.98	21.32	21.51	320.00	Pass
HE40	MCS 0	1	123	6565	Full	37.96	38.02	41.58	41.78	320.00	Pass
HE40	MCS 0	1	147	6685	Full	37.97	38.06	41.63	41.74	320.00	Pass
HE40	MCS 0	1	179	6845	Full	38.01	38.09	41.63	42.02	320.00	Pass
HE80	MCS 0	1	135	6625	Full	77.25	77.24	82.53	82.78	320.00	Pass
HE80	MCS 0	1	151	6705	Full	77.30	77.31	82.59	82.24	320.00	Pass
HE80	MCS 0	1	167	6785	Full	77.22	77.27	82.37	82.69	320.00	Pass
HE160	MCS 0	1	143	6665	Full	156.18	156.13	165.17	165.61	320.00	Pass

TEST RESULTS DATA
EIRP Power Table

U-NII-7 MIMO													
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	RU Config.	Conducted Power (dBm)			DG (dBi)		EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
						Ant 1	Ant 2	SUM	Ant 1	Ant 2	SUM		
HE20	MCS0	2	117	6535	Full	12.40	12.40	15.41	3.59		19.00	30.00	Pass
HE20	MCS0	2	117	6535	26/0	2.80	3.20	6.01	3.59		9.60	30.00	Pass
HE20	MCS0	2	117	6535	52/37	5.80	6.40	9.12	3.59		12.71	30.00	Pass
HE20	MCS0	2	117	6535	106/53	9.00	9.30	12.16	3.59		15.75	30.00	Pass
HE20	MCS0	2	149	6695	Full	12.40	11.70	15.07	3.59		18.66	30.00	Pass
HE20	MCS0	2	149	6695	26/4	3.60	3.30	6.46	3.59		10.05	30.00	Pass
HE20	MCS0	2	149	6695	52/38	5.80	5.30	8.57	3.59		12.16	30.00	Pass
HE20	MCS0	2	149	6695	106/53	10.00	10.10	13.06	3.59		16.65	30.00	Pass
HE20	MCS0	2	181	6855	Full	12.10	12.40	15.26	3.59		18.85	30.00	Pass
HE20	MCS0	2	181	6855	26/8	4.40	3.30	6.90	3.59		10.49	30.00	Pass
HE20	MCS0	2	181	6855	52/40	5.60	6.50	9.08	3.59		12.67	30.00	Pass
HE20	MCS0	2	181	6855	106/54	8.10	8.80	11.47	3.59		15.06	30.00	Pass
HE40	MCS0	2	123	6565	Full	11.70	12.20	14.97	3.59		18.56	30.00	Pass
HE40	MCS0	2	123	6565	242/61	8.90	9.40	12.17	3.59		15.76	30.00	Pass
HE40	MCS0	2	147	6685	Full	12.40	11.80	15.12	3.59		18.71	30.00	Pass
HE40	MCS0	2	147	6685	242/61	9.30	9.20	12.26	3.59		15.85	30.00	Pass
HE40	MCS0	2	179	6845	Full	12.10	12.20	15.16	3.59		18.75	30.00	Pass
HE40	MCS0	2	179	6845	242/62	7.70	8.20	10.97	3.59		14.56	30.00	Pass
HE80	MCS0	2	135	6625	Full	12.30	12.40	15.36	3.59		18.95	30.00	Pass
HE80	MCS0	2	135	6625	484/65	9.40	9.70	12.56	3.59		16.15	30.00	Pass
HE80	MCS0	2	151	6705	Full	12.40	11.90	15.17	3.59		18.76	30.00	Pass
HE80	MCS0	2	151	6705	484/65	9.40	9.10	12.26	3.59		15.85	30.00	Pass
HE80	MCS0	2	167	6785	Full	12.40	12.30	15.36	3.59		18.95	30.00	Pass
HE80	MCS0	2	167	6785	484/66	9.40	9.20	12.31	3.59		15.90	30.00	Pass
HE160	MCS0	2	143	6665	Full	11.90	12.20	15.06	3.59		18.65	30.00	Pass
HE160	MCS0	2	143	6665	996/67	9.10	9.20	12.16	3.59		15.75	30.00	Pass

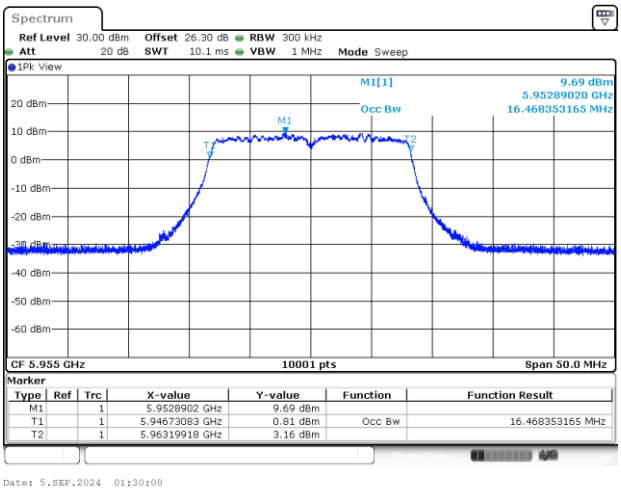
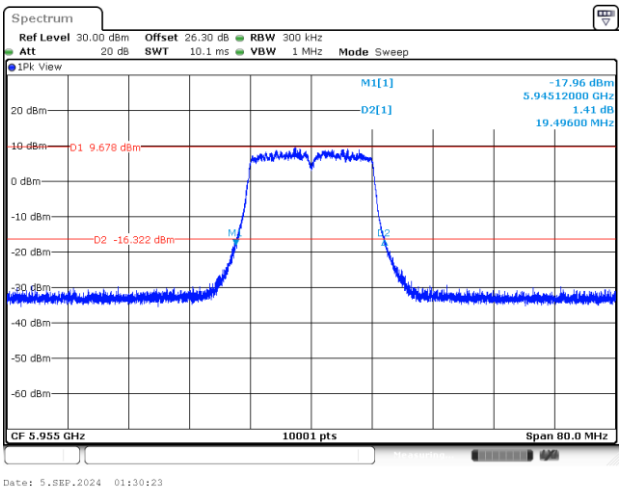
TEST RESULTS DATA
EIRP Power Spectral Density

U-NII-7 MIMO															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	RU Config.	Duty Factor (dB)		Conducted Power Density with Duty Factor (dBm/MHz)			DG (dBi)		EIRP Power Density (dBm/MHz)	EIRP Power Density Limit (dBm/MHz)	Pass /Fail
						Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	SUM		
HE20	MCS0	2	117	6535	Full	0.00	0.00			3.34	6.25		9.58	17.00	Pass
HE20	MCS0	2	117	6535	26/0	0.00	0.00			3.15	6.25		9.39	17.00	Pass
HE20	MCS0	2	117	6535	52/37	0.00	0.00			3.14	6.25		9.38	17.00	Pass
HE20	MCS0	2	117	6535	106/53	0.00	0.00			3.24	6.25		9.49	17.00	Pass
HE20	MCS0	2	149	6695	Full	0.00	0.00			2.55	6.25		8.79	17.00	Pass
HE20	MCS0	2	149	6695	26/4	0.00	0.00			2.40	6.25		8.65	17.00	Pass
HE20	MCS0	2	149	6695	52/38	0.00	0.00			2.31	6.25		8.56	17.00	Pass
HE20	MCS0	2	149	6695	106/53	0.00	0.00			2.45	6.25		8.70	17.00	Pass
HE20	MCS0	2	181	6855	Full	0.00	0.00			2.49	6.25		8.73	17.00	Pass
HE20	MCS0	2	181	6855	26/8	0.00	0.00			2.23	6.25		8.47	17.00	Pass
HE20	MCS0	2	181	6855	52/40	0.00	0.00			2.48	6.25		8.73	17.00	Pass
HE20	MCS0	2	181	6855	106/54	0.00	0.00			2.02	6.25		8.27	17.00	Pass
HE40	MCS0	2	123	6565	Full	0.00	0.00			-0.28	6.25		5.97	17.00	Pass
HE40	MCS0	2	123	6565	242/61	0.00	0.00			-0.40	6.25		5.85	17.00	Pass
HE40	MCS0	2	147	6685	Full	0.00	0.00			-0.27	6.25		5.98	17.00	Pass
HE40	MCS0	2	147	6685	242/61	0.00	0.00			-0.71	6.25		5.54	17.00	Pass
HE40	MCS0	2	179	6845	Full	0.00	0.00			-0.50	6.25		5.75	17.00	Pass
HE40	MCS0	2	179	6845	242/62	0.00	0.00			-0.58	6.25		5.66	17.00	Pass
HE80	MCS0	2	135	6625	Full	0.03	0.03			-2.52	6.25		3.73	17.00	Pass
HE80	MCS0	2	135	6625	484/65	0.03	0.03			-2.74	6.25		3.51	17.00	Pass
HE80	MCS0	2	151	6705	Full	0.03	0.03			-3.00	6.25		3.25	17.00	Pass
HE80	MCS0	2	151	6705	484/65	0.03	0.03			-3.09	6.25		3.16	17.00	Pass
HE80	MCS0	2	167	6785	Full	0.03	0.03			-2.76	6.25		3.49	17.00	Pass
HE80	MCS0	2	167	6785	484/66	0.03	0.03			-2.92	6.25		3.33	17.00	Pass
HE160	MCS0	2	143	6665	Full	0.00	0.00			-6.09	6.25		0.16	17.00	Pass
HE160	MCS0	2	143	6665	996/67	0.00	0.00			-6.45	6.25		-0.20	17.00	Pass

Test Result of 26dB & 99% Occupied Bandwidth

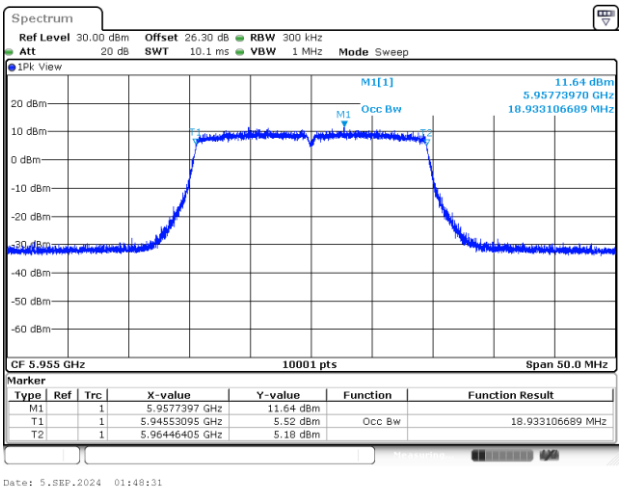
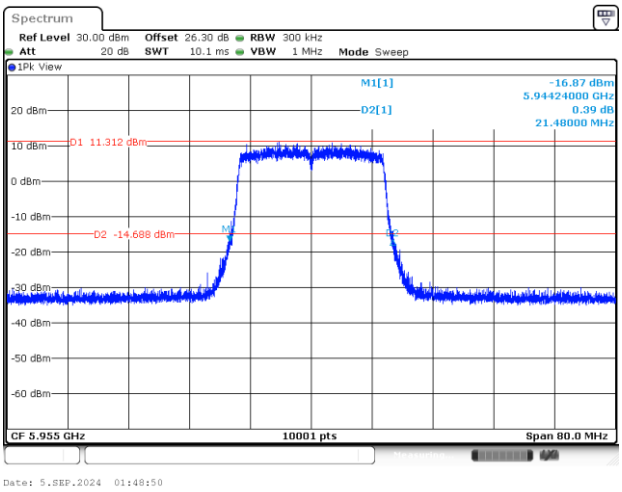
MIMO <Ant. 1+2>

<802.11a>

99% Occupied Bandwidth	26dB Bandwidth
	

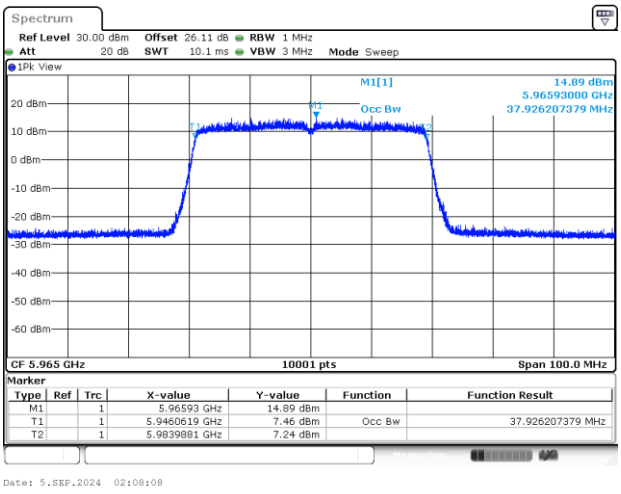
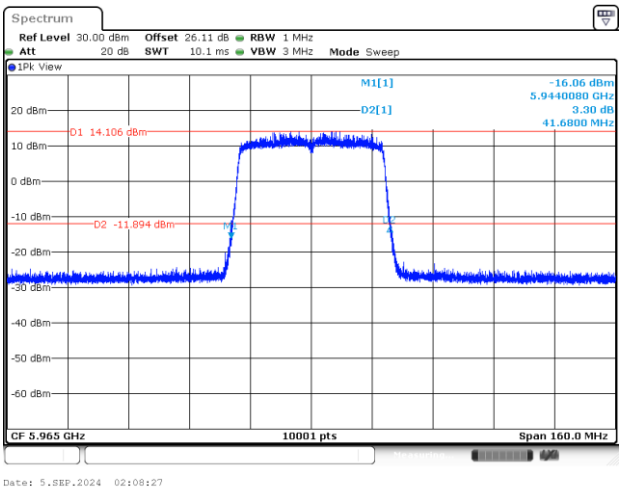
Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

<802.11ax HE20>

99% Occupied Bandwidth	26dB Bandwidth
	

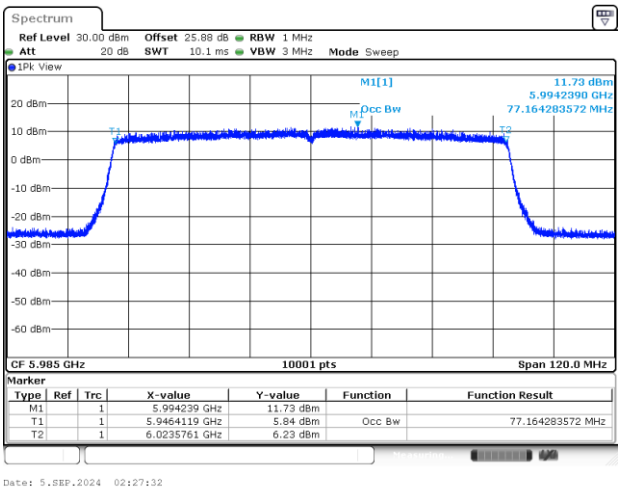
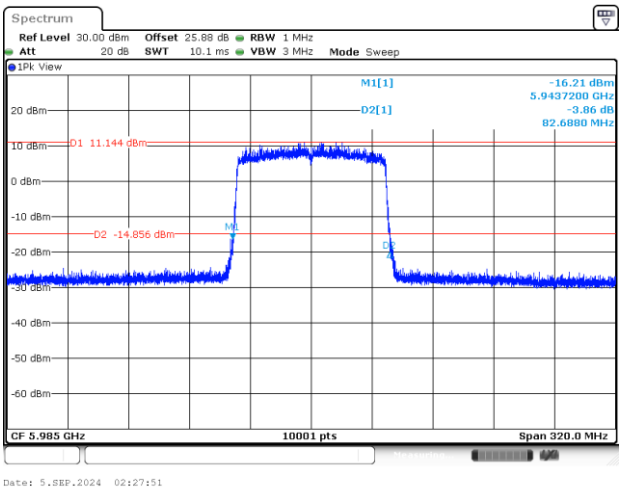
Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

<802.11ax HE40>

99% Occupied Bandwidth	26dB Bandwidth
	

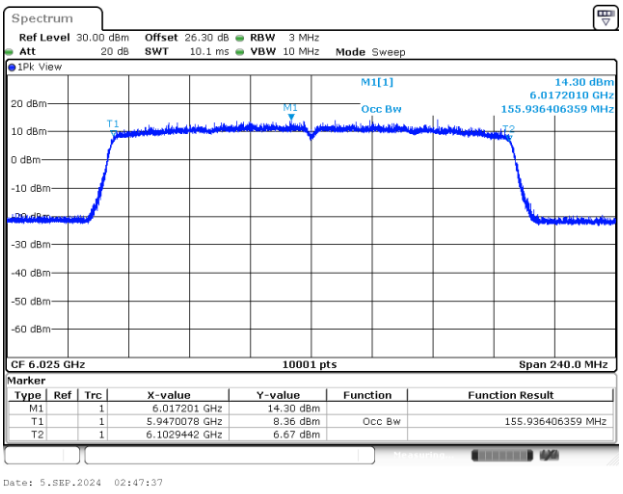
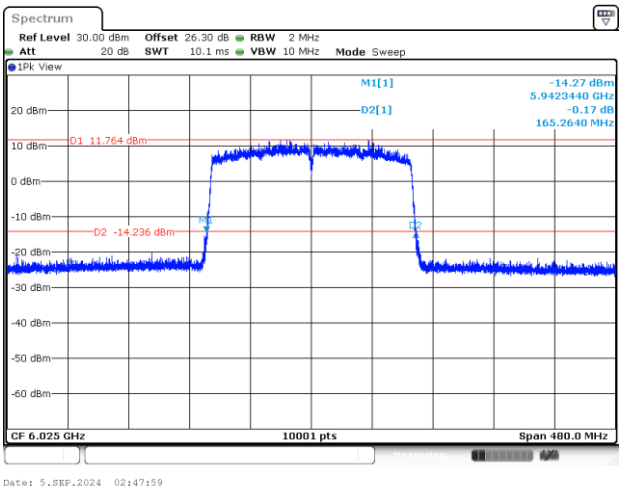
Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

<802.11ax HE80>

99% Occupied Bandwidth	26dB Bandwidth
	

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

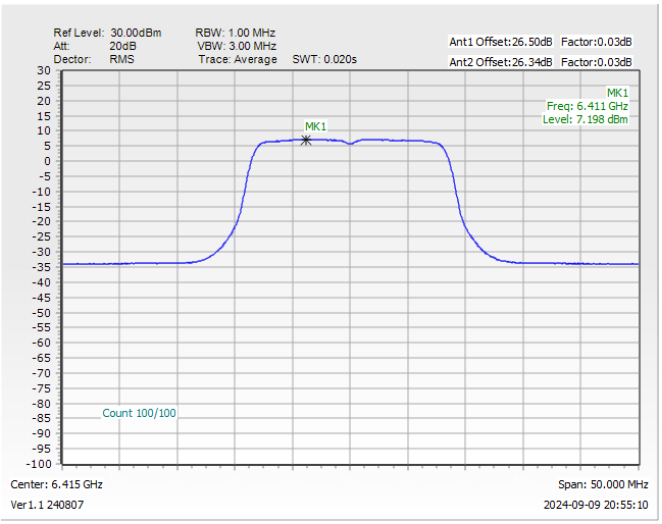
<802.11ax HE160>

99% Occupied Bandwidth	26dB Bandwidth
	

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

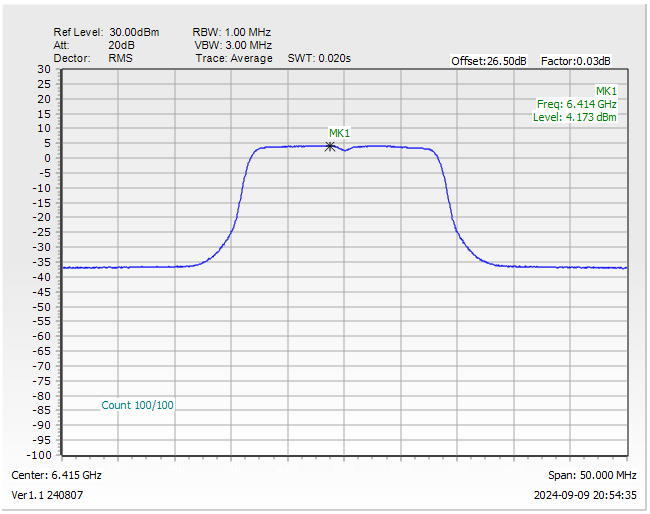
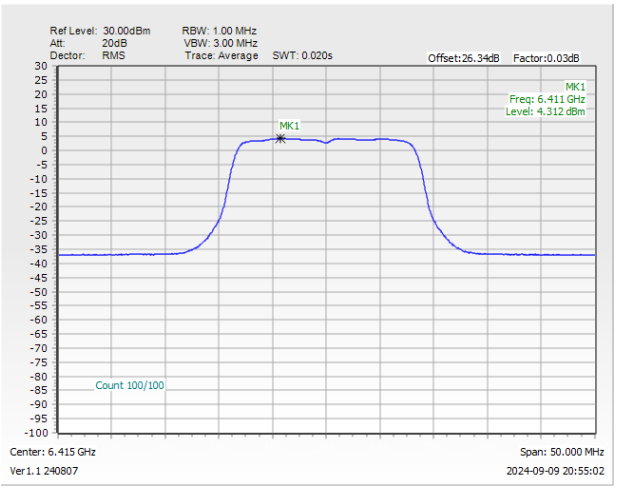
Test Result of Power Spectral Density

<802.11a>

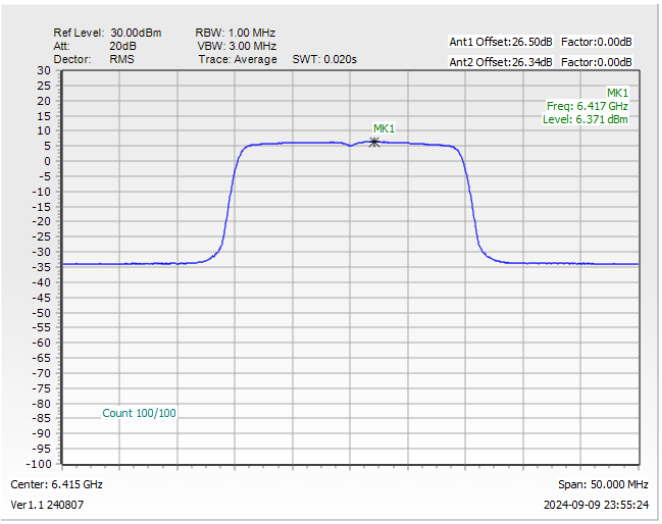
Maximum Power Density Plot (dBm/MHz)


Note:

1. EIRP Power Density (dBm/MHz) = Measured value+ Duty Factor + Directional Gain
2. The test plot is showing a bin by bin combined result mathematically adds two traces.

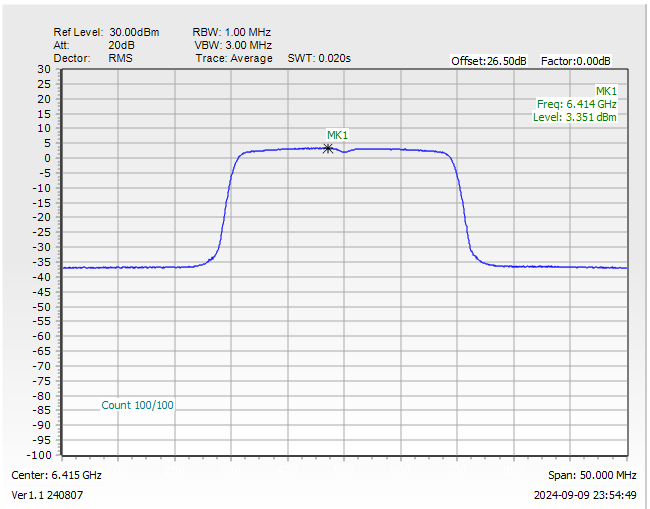
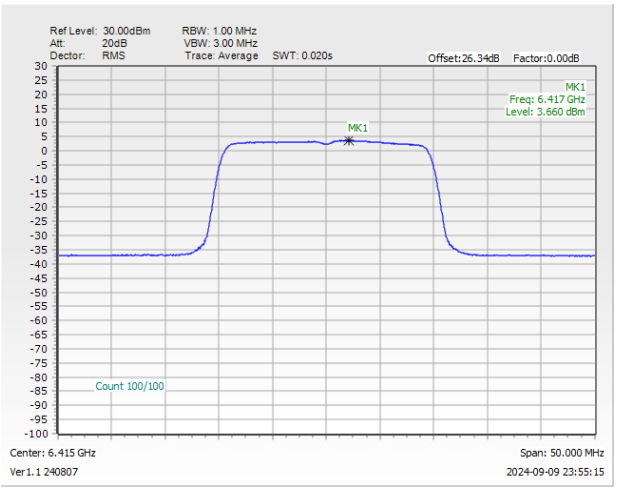
Power Density Plot Trace 1 (Ant 1)	Power Density Plot Trace 2 (Ant 2)
	

<802.11ax HE20>

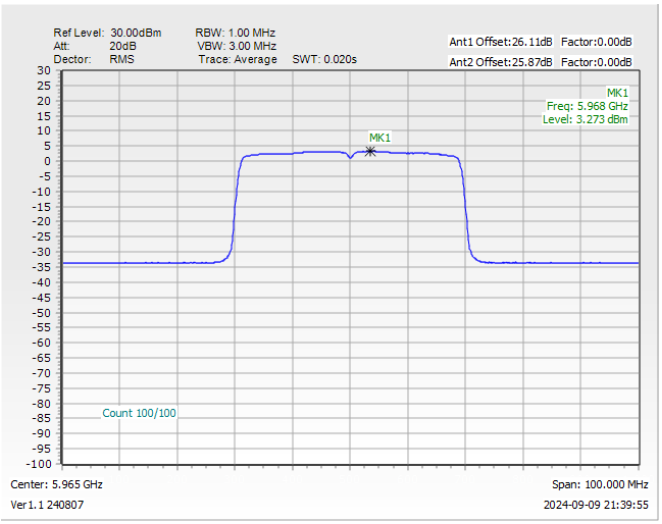
Maximum Power Density Plot (dBm/MHz)


Note:

1. EIRP Power Density (dBm/MHz) = Measured value+ Duty Factor + Directional Gain
2. The test plot is showing a bin by bin combined result mathematically adds two traces.

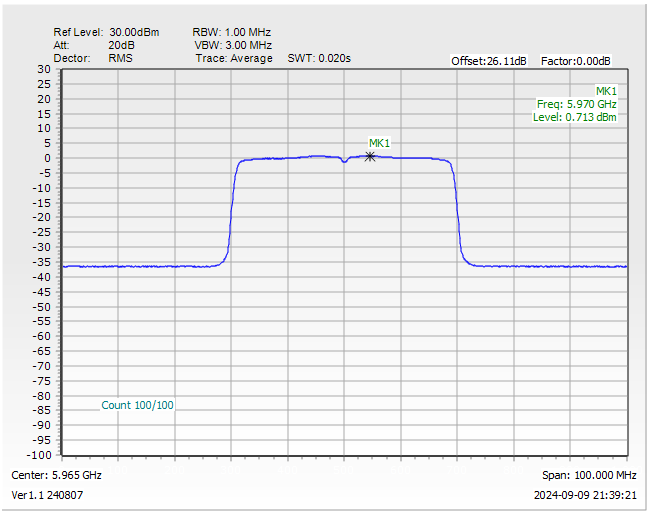
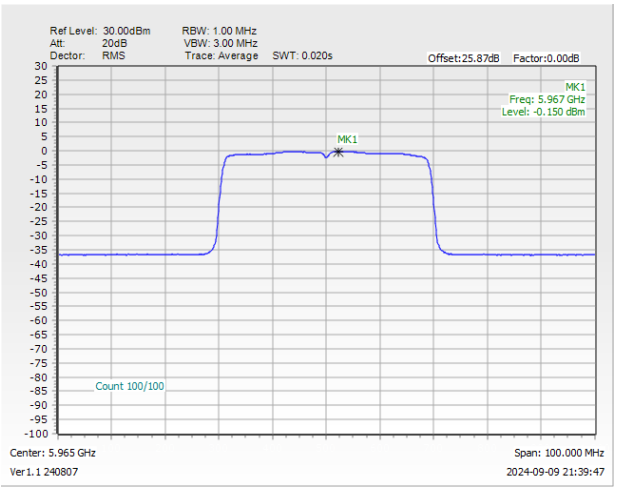
Power Density Plot Trace 1 (Ant 1)	Power Density Plot Trace 2 (Ant 2)
	

<802.11ax HE40>

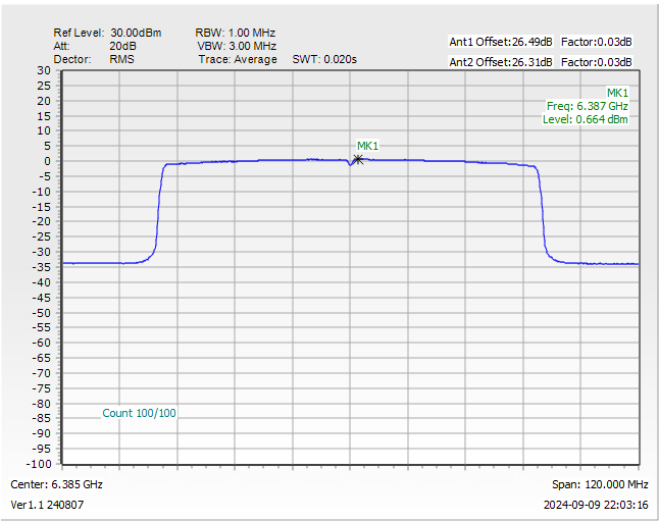
Maximum Power Density Plot (dBm/MHz)


Note:

1. EIRP Power Density (dBm/MHz) = Measured value+ Duty Factor + Directional Gain
2. The test plot is showing a bin by bin combined result mathematically adds two traces.

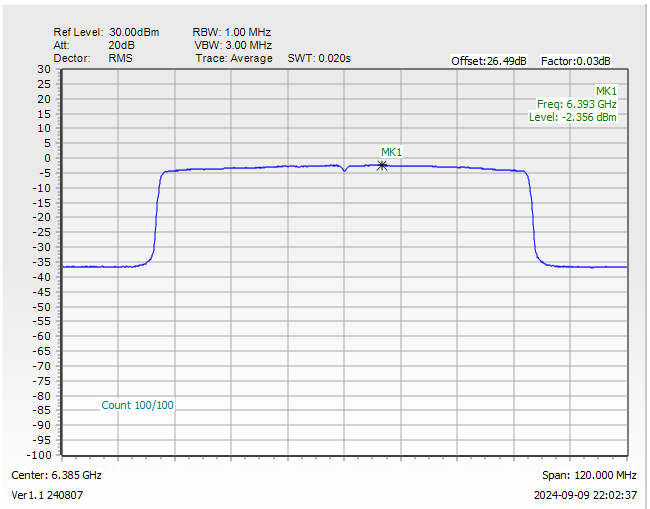
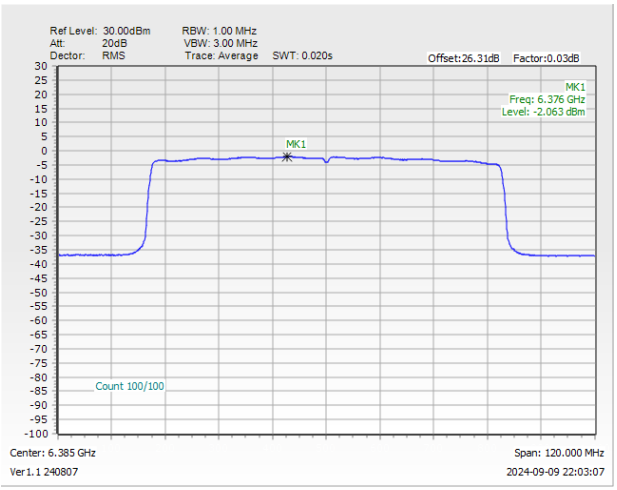
Power Density Plot Trace 1 (Ant 1)	Power Density Plot Trace 2 (Ant 2)
	

<802.11ax HE80>

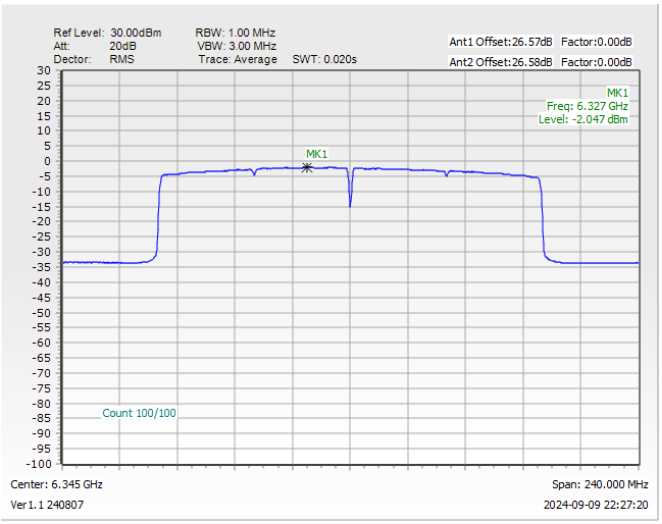
Maximum Power Density Plot (dBm/MHz)


Note:

1. EIRP Power Density (dBm/MHz) = Measured value+ Duty Factor + Directional Gain
2. The test plot is showing a bin by bin combined result mathematically adds two traces.

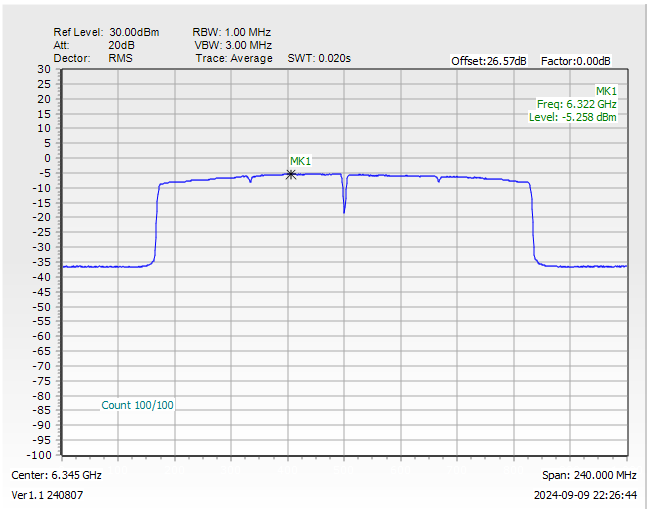
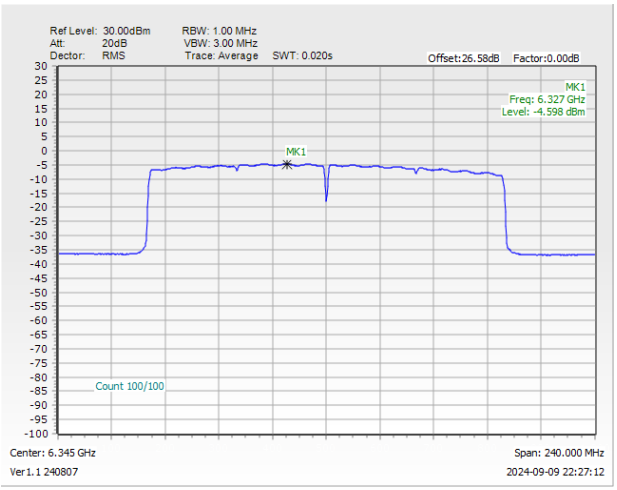
Power Density Plot Trace 1 (Ant 1)	Power Density Plot Trace 2 (Ant 2)
	

<802.11ax HE160>

Maximum Power Density Plot (dBm/MHz)


Note:

1. EIRP Power Density (dBm/MHz) = Measured value+ Duty Factor + Directional Gain
2. The test plot is showing a bin by bin combined result mathematically adds two traces.

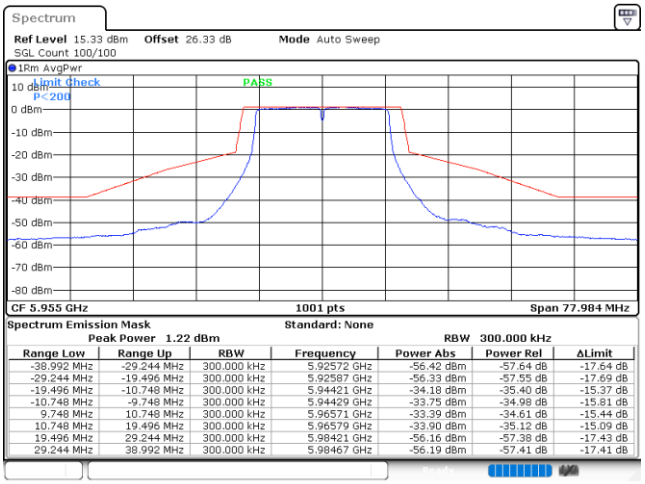
Power Density Plot Trace 1 (Ant 1)	Power Density Plot Trace 2 (Ant 2)
	

In-Band Emissions (Channel Mask)

MIMO <Ant. 1+2(1)>

EUT Mode	802.11a

Plot on Channel 5955 MHz

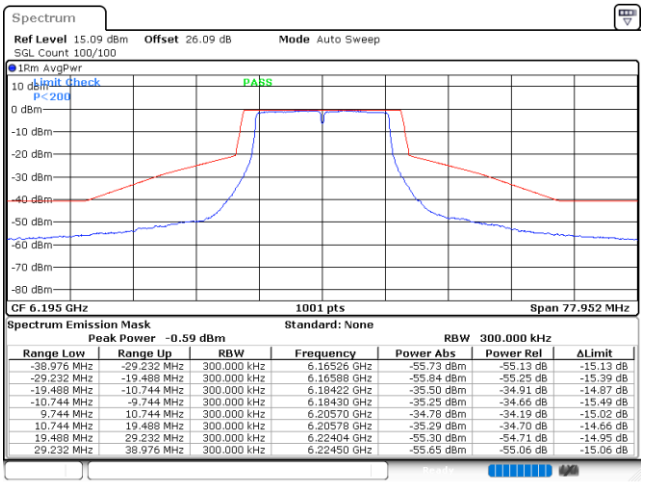


Spectrum Emission Mask Standard: None
Peak Power 1.22 dBm RBW 300.000 kHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-38.992 MHz	-29.244 MHz	300.000 kHz	5.92572 GHz	-56.42 dBm	-57.64 dB	-17.64 dB
-29.244 MHz	-19.496 MHz	300.000 kHz	5.92587 GHz	-56.33 dBm	-57.55 dB	-17.69 dB
-19.496 MHz	-10.748 MHz	300.000 kHz	5.94421 GHz	-34.18 dBm	-35.40 dB	-15.37 dB
-10.748 MHz	-9.748 MHz	300.000 kHz	5.94429 GHz	-33.75 dBm	-34.98 dB	-15.81 dB
9.748 MHz	10.748 MHz	300.000 kHz	5.96571 GHz	-33.39 dBm	-34.61 dB	-15.44 dB
10.748 MHz	19.496 MHz	300.000 kHz	5.96579 GHz	-33.90 dBm	-35.12 dB	-15.09 dB
19.496 MHz	29.244 MHz	300.000 kHz	5.98421 GHz	-56.16 dBm	-57.38 dB	-17.43 dB
29.244 MHz	38.992 MHz	300.000 kHz	5.98467 GHz	-56.19 dBm	-57.41 dB	-17.41 dB

Date: 5.SEP.2024 01:30:48

Plot on Channel 6195 MHz

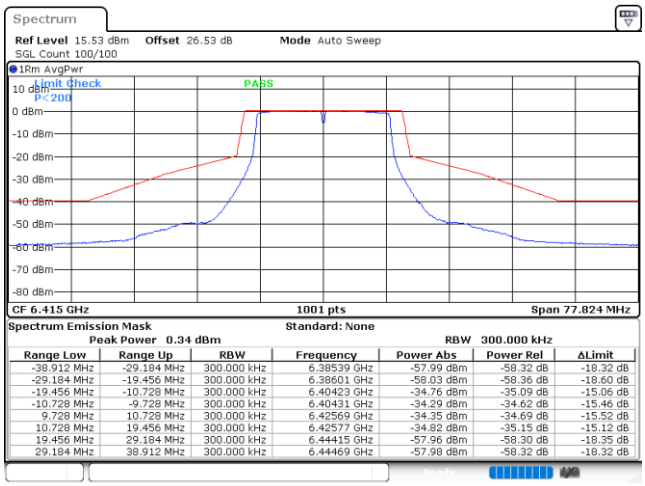


Spectrum Emission Mask Standard: None
Peak Power -0.59 dBm RBW 300.000 kHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-38.976 MHz	-29.232 MHz	300.000 kHz	6.16526 GHz	-55.73 dBm	-55.13 dB	-15.13 dB
-29.232 MHz	-19.488 MHz	300.000 kHz	6.16588 GHz	-55.84 dBm	-55.25 dB	-15.39 dB
-19.488 MHz	-10.744 MHz	300.000 kHz	6.18422 GHz	-35.50 dBm	-34.91 dB	-14.87 dB
-10.744 MHz	-9.744 MHz	300.000 kHz	6.18430 GHz	-35.25 dBm	-34.66 dB	-15.49 dB
9.744 MHz	10.744 MHz	300.000 kHz	6.20570 GHz	-34.78 dBm	-34.19 dB	-15.02 dB
10.744 MHz	19.488 MHz	300.000 kHz	6.20578 GHz	-35.29 dBm	-34.70 dB	-14.66 dB
19.488 MHz	29.232 MHz	300.000 kHz	6.22404 GHz	-55.30 dBm	-54.71 dB	-14.95 dB
29.232 MHz	38.976 MHz	300.000 kHz	6.22450 GHz	-55.65 dBm	-55.06 dB	-15.06 dB

Date: 5.SEP.2024 01:34:30

Plot on Channel 6415 MHz

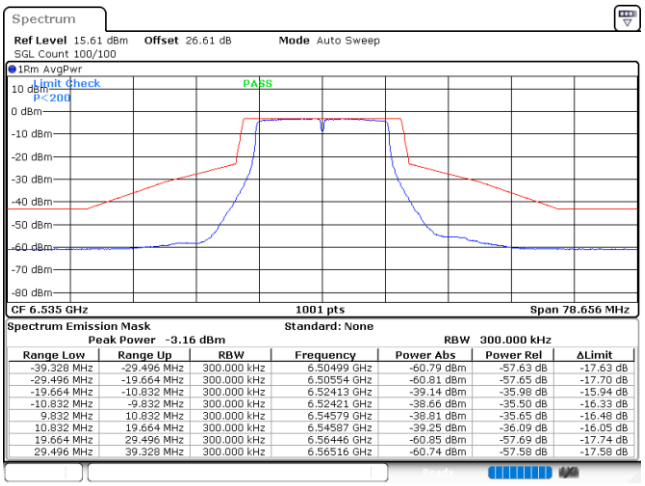


Spectrum Emission Mask Standard: None
Peak Power 0.34 dBm RBW 300.000 kHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-38.912 MHz	-29.184 MHz	300.000 kHz	6.38539 GHz	-57.99 dBm	-58.32 dB	-18.32 dB
-29.184 MHz	-19.456 MHz	300.000 kHz	6.38601 GHz	-58.03 dBm	-58.36 dB	-18.60 dB
-19.456 MHz	-10.728 MHz	300.000 kHz	6.40423 GHz	-34.76 dBm	-35.09 dB	-15.06 dB
-10.728 MHz	-9.728 MHz	300.000 kHz	6.40431 GHz	-34.29 dBm	-34.62 dB	-15.46 dB
9.728 MHz	10.728 MHz	300.000 kHz	6.42569 GHz	-34.35 dBm	-34.69 dB	-15.52 dB
10.728 MHz	19.456 MHz	300.000 kHz	6.42577 GHz	-34.82 dBm	-35.15 dB	-15.12 dB
19.456 MHz	29.184 MHz	300.000 kHz	6.44415 GHz	-57.96 dBm	-58.30 dB	-18.35 dB
29.184 MHz	38.912 MHz	300.000 kHz	6.44469 GHz	-57.98 dBm	-58.32 dB	-18.32 dB

Date: 5.SEP.2024 01:37:17

Plot on Channel 6535 MHz

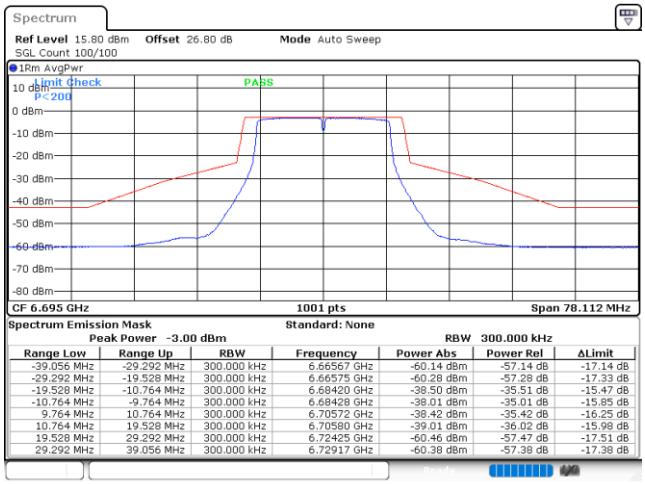


Spectrum Emission Mask Standard: None
Peak Power -3.16 dBm RBW 300.000 kHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-39.328 MHz	-29.496 MHz	300.000 kHz	6.50499 GHz	-60.79 dBm	-57.63 dB	-17.63 dB
-29.496 MHz	-19.664 MHz	300.000 kHz	6.50554 GHz	-60.81 dBm	-57.65 dB	-17.70 dB
-19.664 MHz	-10.832 MHz	300.000 kHz	6.52413 GHz	-39.14 dBm	-35.98 dB	-15.94 dB
-10.832 MHz	-9.832 MHz	300.000 kHz	6.52421 GHz	-38.66 dBm	-35.50 dB	-16.33 dB
9.832 MHz	10.832 MHz	300.000 kHz	6.54579 GHz	-38.81 dBm	-35.65 dB	-16.48 dB
10.832 MHz	19.664 MHz	300.000 kHz	6.54587 GHz	-39.25 dBm	-36.09 dB	-16.05 dB
19.664 MHz	29.496 MHz	300.000 kHz	6.56446 GHz	-60.85 dBm	-57.69 dB	-17.74 dB
29.496 MHz	39.328 MHz	300.000 kHz	6.56516 GHz	-60.74 dBm	-57.58 dB	-17.58 dB

Date: 5.SEP.2024 01:40:36

Plot on Channel 6695 MHz



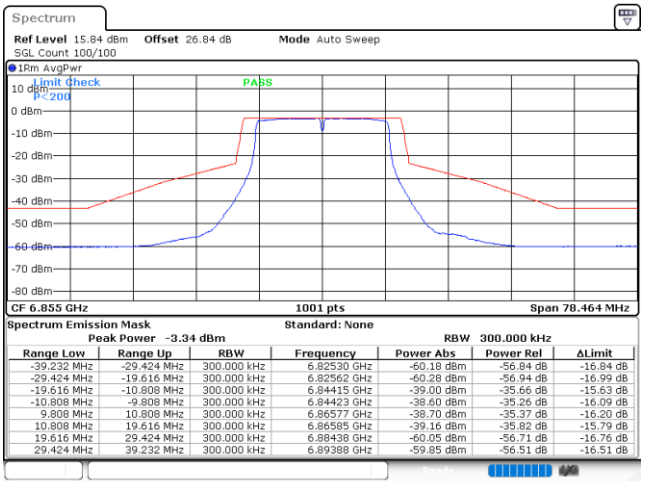
Spectrum Emission Mask Standard: None

Peak Power -3.00 dBm RBW 300.000 kHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-39.056 MHz	-29.292 MHz	300.000 kHz	6.66567 GHz	-60.14 dBm	-57.14 dB	-17.14 dB
-29.292 MHz	-19.528 MHz	300.000 kHz	6.66575 GHz	-60.28 dBm	-57.28 dB	-17.33 dB
-19.528 MHz	-10.764 MHz	300.000 kHz	6.68420 GHz	-38.50 dBm	-35.51 dB	-15.47 dB
-10.764 MHz	-9.764 MHz	300.000 kHz	6.68428 GHz	-38.01 dBm	-35.01 dB	-15.85 dB
9.764 MHz	10.764 MHz	300.000 kHz	6.70572 GHz	-38.42 dBm	-35.42 dB	-16.25 dB
10.764 MHz	19.528 MHz	300.000 kHz	6.70580 GHz	-39.01 dBm	-36.02 dB	-15.98 dB
19.528 MHz	29.292 MHz	300.000 kHz	6.72425 GHz	-60.46 dBm	-57.47 dB	-17.51 dB
29.292 MHz	39.056 MHz	300.000 kHz	6.72917 GHz	-60.38 dBm	-57.38 dB	-17.38 dB

Date: 5.SEP.2024 01:43:01

Plot on Channel 6855 MHz



Spectrum Emission Mask Standard: None

Peak Power -3.34 dBm RBW 300.000 kHz

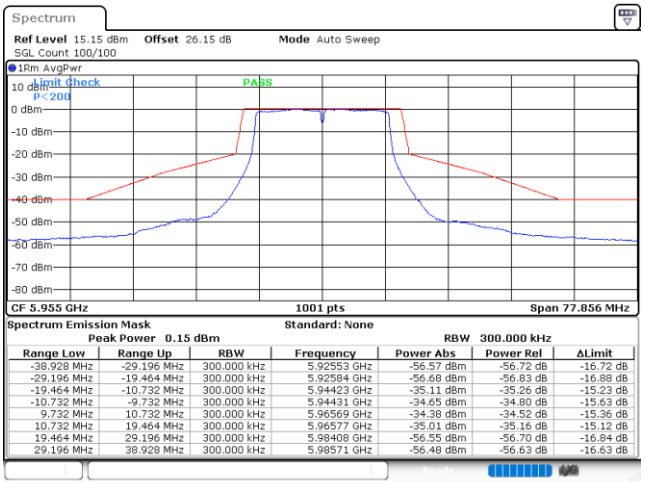
Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-39.232 MHz	-29.424 MHz	300.000 kHz	6.82530 GHz	-60.18 dBm	-56.84 dB	-16.84 dB
-29.424 MHz	-19.616 MHz	300.000 kHz	6.82562 GHz	-60.28 dBm	-56.94 dB	-16.99 dB
-19.616 MHz	-10.808 MHz	300.000 kHz	6.84415 GHz	-39.00 dBm	-35.66 dB	-15.63 dB
-10.808 MHz	-9.808 MHz	300.000 kHz	6.84423 GHz	-38.60 dBm	-35.26 dB	-16.09 dB
9.808 MHz	10.808 MHz	300.000 kHz	6.86577 GHz	-38.70 dBm	-35.37 dB	-16.20 dB
10.808 MHz	19.616 MHz	300.000 kHz	6.86585 GHz	-39.16 dBm	-35.82 dB	-15.79 dB
19.616 MHz	29.424 MHz	300.000 kHz	6.88438 GHz	-60.05 dBm	-56.71 dB	-16.76 dB
29.424 MHz	39.232 MHz	300.000 kHz	6.89388 GHz	-59.85 dBm	-56.51 dB	-16.51 dB

Date: 5.SEP.2024 01:45:41

MIMO <Ant. 1+2(2)>

EUT Mode	802.11a

Plot on Channel 5955 MHz



Spectrum Emission Mask Standard: None
Peak Power 0.15 dBm RBW 300.000 kHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-38.928 MHz	-29.196 MHz	300.000 kHz	5.92553 GHz	-56.57 dBm	-56.72 dB	-16.72 dB
-29.196 MHz	-19.464 MHz	300.000 kHz	5.92584 GHz	-56.68 dBm	-56.83 dB	-16.88 dB
-19.464 MHz	-10.732 MHz	300.000 kHz	5.94423 GHz	-35.11 dBm	-35.26 dB	-15.23 dB
-10.732 MHz	-9.732 MHz	300.000 kHz	5.94431 GHz	-34.65 dBm	-34.80 dB	-15.63 dB
9.732 MHz	10.732 MHz	300.000 kHz	5.96569 GHz	-34.38 dBm	-34.52 dB	-15.36 dB
10.732 MHz	19.464 MHz	300.000 kHz	5.96577 GHz	-35.01 dBm	-35.16 dB	-15.12 dB
19.464 MHz	29.196 MHz	300.000 kHz	5.98408 GHz	-56.55 dBm	-56.70 dB	-16.84 dB
29.196 MHz	38.928 MHz	300.000 kHz	5.98571 GHz	-56.48 dBm	-56.63 dB	-16.63 dB

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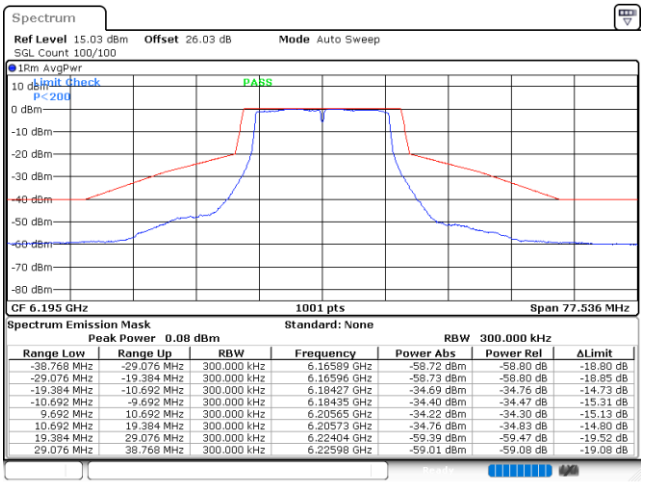
Plot on Channel 6195 MHz



Spectrum Emission Mask Standard: None
Peak Power 0.08 dBm RBW 300.000 kHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-38.768 MHz	-29.076 MHz	300.000 kHz	6.16589 GHz	-58.72 dBm	-58.80 dB	-18.80 dB
-29.076 MHz	-19.384 MHz	300.000 kHz	6.16596 GHz	-58.73 dBm	-58.80 dB	-18.85 dB
-19.384 MHz	-10.692 MHz	300.000 kHz	6.18427 GHz	-34.69 dBm	-34.76 dB	-14.73 dB
-10.692 MHz	-9.692 MHz	300.000 kHz	6.18435 GHz	-34.40 dBm	-34.47 dB	-15.31 dB
9.692 MHz	10.692 MHz	300.000 kHz	6.20565 GHz	-34.22 dBm	-34.30 dB	-15.13 dB
10.692 MHz	19.384 MHz	300.000 kHz	6.20573 GHz	-34.76 dBm	-34.83 dB	-14.80 dB
19.384 MHz	29.076 MHz	300.000 kHz	6.22404 GHz	-59.39 dBm	-59.47 dB	-19.52 dB
29.076 MHz	38.768 MHz	300.000 kHz	6.22598 GHz	-59.01 dBm	-59.08 dB	-19.08 dB

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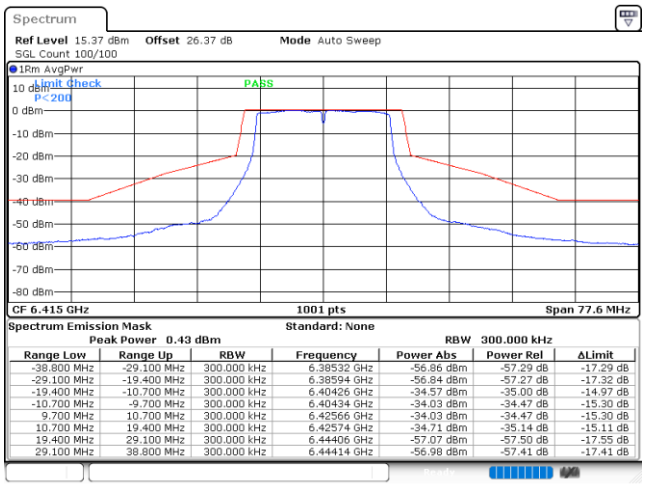
Plot on Channel 6415 MHz



Spectrum Emission Mask Standard: None
Peak Power 0.43 dBm RBW 300.000 kHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-38.800 MHz	-29.100 MHz	300.000 kHz	6.38532 GHz	-56.86 dBm	-57.29 dB	-17.29 dB
-29.100 MHz	-19.400 MHz	300.000 kHz	6.38594 GHz	-56.84 dBm	-57.27 dB	-17.32 dB
-19.400 MHz	-10.700 MHz	300.000 kHz	6.40426 GHz	-34.57 dBm	-35.00 dB	-14.97 dB
-10.700 MHz	-9.700 MHz	300.000 kHz	6.40434 GHz	-34.03 dBm	-34.47 dB	-15.30 dB
9.700 MHz	10.700 MHz	300.000 kHz	6.42566 GHz	-34.03 dBm	-34.47 dB	-15.30 dB
10.700 MHz	19.400 MHz	300.000 kHz	6.42574 GHz	-34.71 dBm	-35.14 dB	-15.11 dB
19.400 MHz	29.100 MHz	300.000 kHz	6.44406 GHz	-57.07 dBm	-57.50 dB	-17.55 dB
29.100 MHz	38.800 MHz	300.000 kHz	6.44414 GHz	-56.98 dBm	-57.41 dB	-17.41 dB

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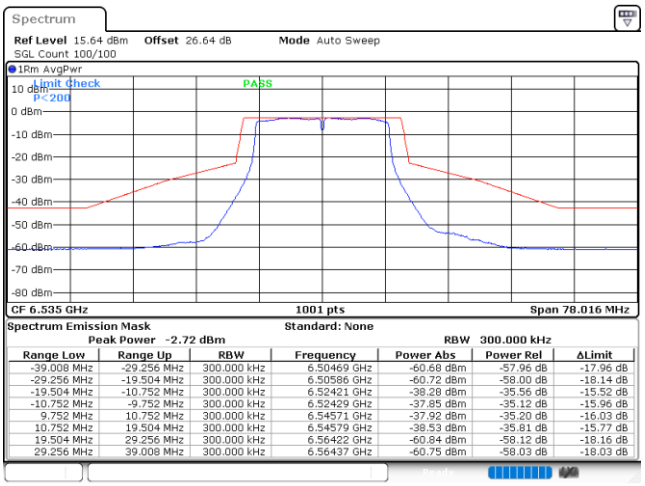
Plot on Channel 6535 MHz

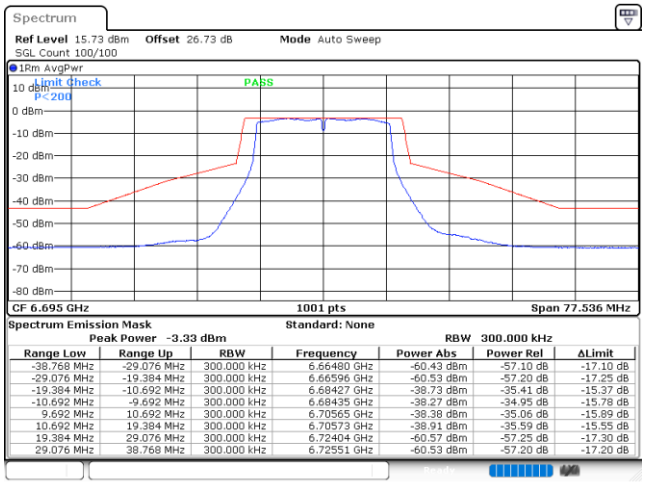


Spectrum Emission Mask Standard: None
Peak Power -2.72 dBm RBW 300.000 kHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-39.008 MHz	-29.256 MHz	300.000 kHz	6.50469 GHz	-60.68 dBm	-57.96 dB	-17.96 dB
-29.256 MHz	-19.504 MHz	300.000 kHz	6.50586 GHz	-60.72 dBm	-58.00 dB	-18.14 dB
-19.504 MHz	-10.752 MHz	300.000 kHz	6.52421 GHz	-38.28 dBm	-35.56 dB	-15.52 dB
-10.752 MHz	-9.752 MHz	300.000 kHz	6.52429 GHz	-37.85 dBm	-35.12 dB	-15.96 dB
9.752 MHz	10.752 MHz	300.000 kHz	6.54571 GHz	-37.92 dBm	-35.20 dB	-16.03 dB
10.752 MHz	19.504 MHz	300.000 kHz	6.54579 GHz	-38.53 dBm	-35.81 dB	-15.77 dB
19.504 MHz	29.256 MHz	300.000 kHz	6.56422 GHz	-60.84 dBm	-58.12 dB	-18.16 dB
29.256 MHz	39.008 MHz	300.000 kHz	6.56437 GHz	-60.75 dBm	-58.03 dB	-18.03 dB

Date: 5.SEP.2024 01:41:36

Plot on Channel 6695 MHz



Spectrum Emission Mask Standard: None

Peak Power -3.33 dBm RBW 300.000 kHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-38.768 MHz	-29.076 MHz	300.000 kHz	6.66480 GHz	-60.43 dBm	-57.10 dB	-17.10 dB
-29.076 MHz	-19.384 MHz	300.000 kHz	6.66596 GHz	-60.53 dBm	-57.20 dB	-17.25 dB
-19.384 MHz	-10.692 MHz	300.000 kHz	6.68427 GHz	-38.73 dBm	-35.41 dB	-15.37 dB
-10.692 MHz	-9.692 MHz	300.000 kHz	6.68435 GHz	-38.27 dBm	-34.95 dB	-15.78 dB
9.692 MHz	10.692 MHz	300.000 kHz	6.70565 GHz	-38.38 dBm	-35.06 dB	-15.89 dB
10.692 MHz	19.384 MHz	300.000 kHz	6.70573 GHz	-38.91 dBm	-35.59 dB	-15.55 dB
19.384 MHz	29.076 MHz	300.000 kHz	6.72404 GHz	-60.57 dBm	-57.25 dB	-17.30 dB
29.076 MHz	38.768 MHz	300.000 kHz	6.72551 GHz	-60.53 dBm	-57.20 dB	-17.20 dB

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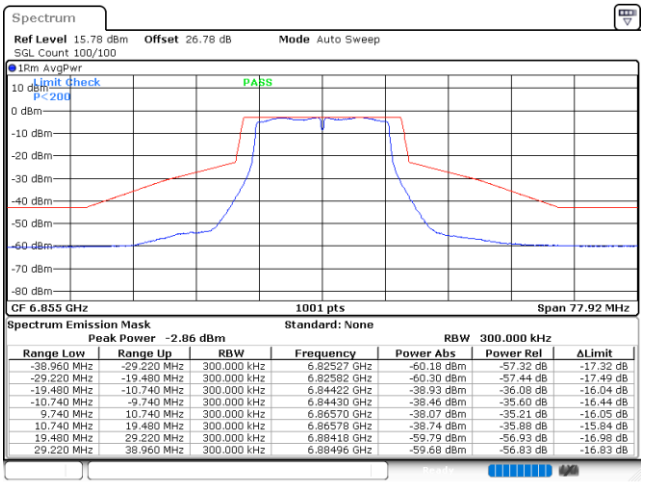
Plot on Channel 6855 MHz



Spectrum Emission Mask Standard: None

Peak Power -2.86 dBm RBW 300.000 kHz

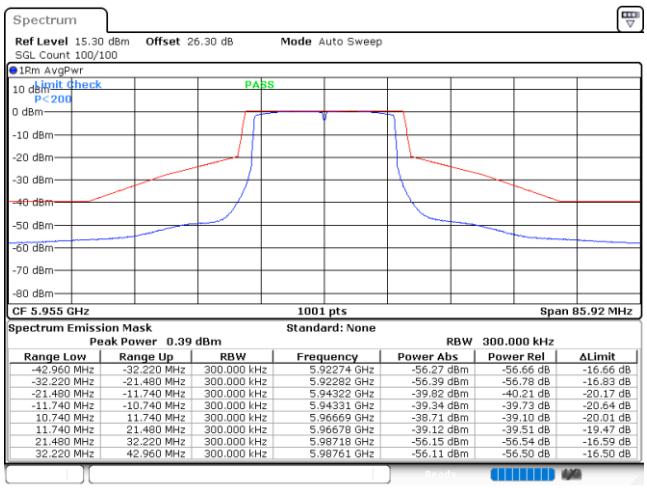
Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-38.960 MHz	-29.220 MHz	300.000 kHz	6.82527 GHz	-60.18 dBm	-57.32 dB	-17.32 dB
-29.220 MHz	-19.480 MHz	300.000 kHz	6.82582 GHz	-60.30 dBm	-57.44 dB	-17.49 dB
-19.480 MHz	-10.740 MHz	300.000 kHz	6.84422 GHz	-38.93 dBm	-36.08 dB	-16.04 dB
-10.740 MHz	-9.740 MHz	300.000 kHz	6.84430 GHz	-38.46 dBm	-35.60 dB	-16.44 dB
9.740 MHz	10.740 MHz	300.000 kHz	6.86570 GHz	-38.07 dBm	-35.21 dB	-16.05 dB
10.740 MHz	19.480 MHz	300.000 kHz	6.86578 GHz	-38.74 dBm	-35.88 dB	-15.84 dB
19.480 MHz	29.220 MHz	300.000 kHz	6.88418 GHz	-59.79 dBm	-56.93 dB	-16.98 dB
29.220 MHz	38.960 MHz	300.000 kHz	6.88496 GHz	-59.68 dBm	-56.83 dB	-16.83 dB

Date: 5.SEP.2024 01:47:00

MIMO <Ant. 1+2(1)>

EUT Mode	802.11ax HE20 Full RU

Plot on Channel 5955 MHz



Spectrum Emission Mask Standard: None
Peak Power 0.39 dBm RBW 300.000 kHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-42.960 MHz	-32.220 MHz	300.000 kHz	5.92274 GHz	-56.27 dBm	-56.66 dB	-16.66 dB
-32.220 MHz	-21.480 MHz	300.000 kHz	5.92282 GHz	-56.39 dBm	-56.78 dB	-16.83 dB
-21.480 MHz	-11.740 MHz	300.000 kHz	5.94322 GHz	-39.82 dBm	-40.21 dB	-20.17 dB
-11.740 MHz	-10.740 MHz	300.000 kHz	5.94331 GHz	-39.34 dBm	-39.73 dB	-20.64 dB
10.740 MHz	11.740 MHz	300.000 kHz	5.96669 GHz	-38.71 dBm	-39.10 dB	-20.01 dB
11.740 MHz	21.480 MHz	300.000 kHz	5.96678 GHz	-39.12 dBm	-39.51 dB	-19.47 dB
21.480 MHz	32.220 MHz	300.000 kHz	5.98718 GHz	-56.15 dBm	-56.54 dB	-16.59 dB
32.220 MHz	42.960 MHz	300.000 kHz	5.98761 GHz	-56.11 dBm	-56.50 dB	-16.50 dB

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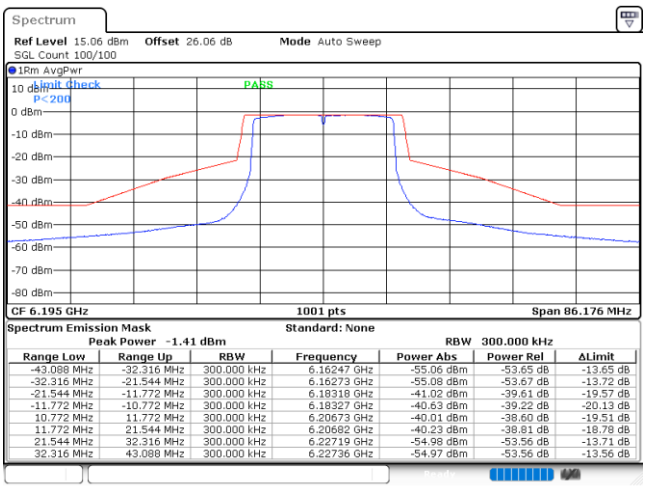
Plot on Channel 6195 MHz



Spectrum Emission Mask Standard: None
Peak Power -1.41 dBm RBW 300.000 kHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-43.088 MHz	-32.316 MHz	300.000 kHz	6.16247 GHz	-55.06 dBm	-53.65 dB	-13.65 dB
-32.316 MHz	-21.544 MHz	300.000 kHz	6.16273 GHz	-55.08 dBm	-53.67 dB	-13.72 dB
-21.544 MHz	-11.772 MHz	300.000 kHz	6.18318 GHz	-41.02 dBm	-39.61 dB	-19.57 dB
-11.772 MHz	-10.772 MHz	300.000 kHz	6.18327 GHz	-40.63 dBm	-39.22 dB	-20.13 dB
10.772 MHz	11.772 MHz	300.000 kHz	6.20673 GHz	-40.01 dBm	-38.60 dB	-19.51 dB
11.772 MHz	21.544 MHz	300.000 kHz	6.20682 GHz	-40.23 dBm	-38.81 dB	-18.78 dB
21.544 MHz	32.316 MHz	300.000 kHz	6.22719 GHz	-54.98 dBm	-53.56 dB	-13.71 dB
32.316 MHz	43.088 MHz	300.000 kHz	6.22736 GHz	-54.97 dBm	-53.56 dB	-13.56 dB

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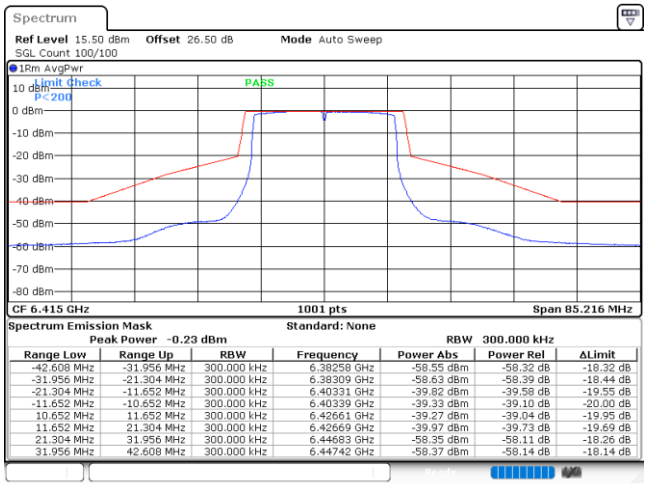
Plot on Channel 6415 MHz



Spectrum Emission Mask Standard: None
Peak Power -0.23 dBm RBW 300.000 kHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-42.608 MHz	-31.956 MHz	300.000 kHz	6.38258 GHz	-58.55 dBm	-58.32 dB	-18.32 dB
-31.956 MHz	-21.304 MHz	300.000 kHz	6.38309 GHz	-58.63 dBm	-58.39 dB	-18.44 dB
-21.304 MHz	-11.652 MHz	300.000 kHz	6.40331 GHz	-39.82 dBm	-39.58 dB	-19.55 dB
-11.652 MHz	-10.652 MHz	300.000 kHz	6.40339 GHz	-39.33 dBm	-39.10 dB	-20.00 dB
10.652 MHz	11.652 MHz	300.000 kHz	6.42661 GHz	-39.27 dBm	-39.04 dB	-19.95 dB
11.652 MHz	21.304 MHz	300.000 kHz	6.42669 GHz	-39.97 dBm	-39.73 dB	-19.69 dB
21.304 MHz	31.956 MHz	300.000 kHz	6.44683 GHz	-58.35 dBm	-58.11 dB	-18.26 dB
31.956 MHz	42.608 MHz	300.000 kHz	6.44742 GHz	-58.37 dBm	-58.14 dB	-18.14 dB

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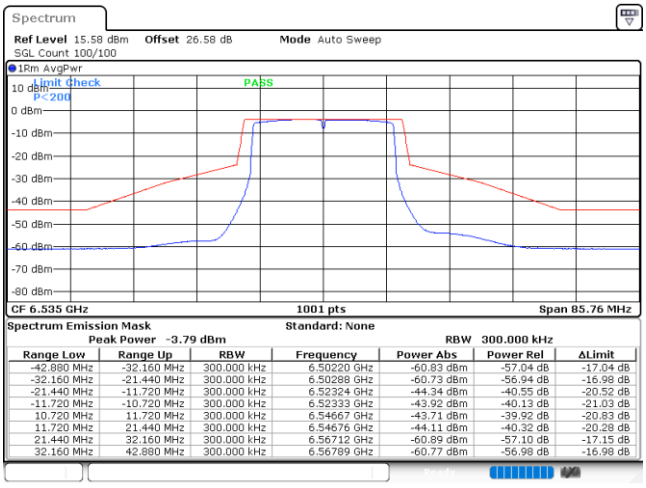
Plot on Channel 6535 MHz

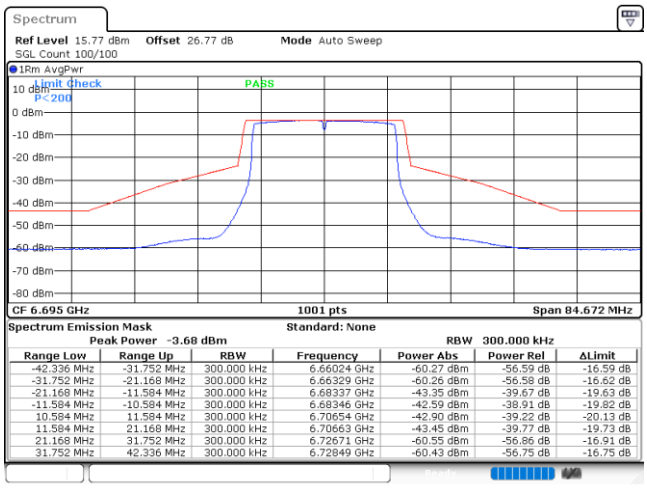


Spectrum Emission Mask Standard: None
Peak Power -3.79 dBm RBW 300.000 kHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-42.880 MHz	-32.160 MHz	300.000 kHz	6.50220 GHz	-60.83 dBm	-57.04 dB	-17.04 dB
-32.160 MHz	-21.440 MHz	300.000 kHz	6.50288 GHz	-60.73 dBm	-56.94 dB	-16.98 dB
-21.440 MHz	-11.720 MHz	300.000 kHz	6.52324 GHz	-44.34 dBm	-40.55 dB	-20.52 dB
-11.720 MHz	-10.720 MHz	300.000 kHz	6.52333 GHz	-43.92 dBm	-40.13 dB	-21.03 dB
10.720 MHz	11.720 MHz	300.000 kHz	6.54667 GHz	-43.71 dBm	-39.92 dB	-20.83 dB
11.720 MHz	21.440 MHz	300.000 kHz	6.54676 GHz	-44.11 dBm	-40.32 dB	-20.28 dB
21.440 MHz	32.160 MHz	300.000 kHz	6.56712 GHz	-60.89 dBm	-57.10 dB	-17.15 dB
32.160 MHz	42.880 MHz	300.000 kHz	6.56789 GHz	-60.77 dBm	-56.98 dB	-16.98 dB

Date: 5.SEP.2024 01:58:02

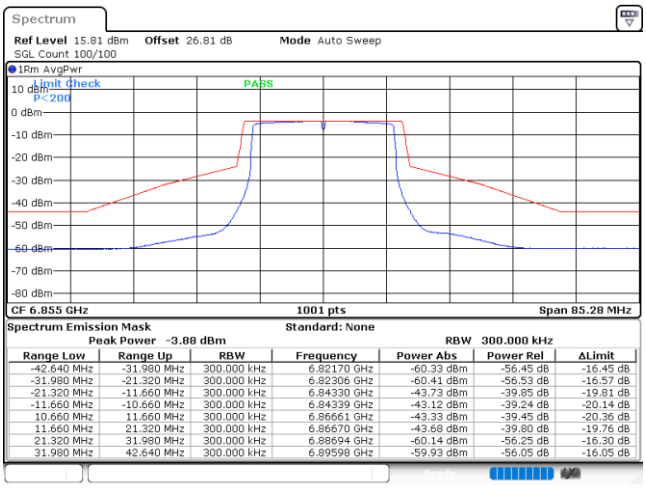
Plot on Channel 6695 MHz



Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-42.336 MHz	-31.752 MHz	300.000 kHz	6.66024 GHz	-60.27 dBm	-56.59 dB	-16.59 dB
-31.752 MHz	-21.168 MHz	300.000 kHz	6.66329 GHz	-60.26 dBm	-56.58 dB	-16.62 dB
-21.168 MHz	-11.584 MHz	300.000 kHz	6.68337 GHz	-43.35 dBm	-39.67 dB	-19.63 dB
-11.584 MHz	-10.584 MHz	300.000 kHz	6.68346 GHz	-42.59 dBm	-38.91 dB	-19.82 dB
10.584 MHz	11.584 MHz	300.000 kHz	6.70654 GHz	-42.90 dBm	-39.22 dB	-20.13 dB
11.584 MHz	21.168 MHz	300.000 kHz	6.70663 GHz	-43.45 dBm	-39.77 dB	-19.73 dB
21.168 MHz	31.752 MHz	300.000 kHz	6.72671 GHz	-60.55 dBm	-56.86 dB	-16.91 dB
31.752 MHz	42.336 MHz	300.000 kHz	6.72849 GHz	-60.43 dBm	-56.75 dB	-16.75 dB

Date: 5.SEP.2024 02:00:30

Plot on Channel 6855 MHz



Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-42.640 MHz	-31.980 MHz	300.000 kHz	6.82170 GHz	-60.33 dBm	-56.45 dB	-16.45 dB
-31.980 MHz	-21.320 MHz	300.000 kHz	6.82306 GHz	-60.41 dBm	-56.53 dB	-16.57 dB
-21.320 MHz	-11.660 MHz	300.000 kHz	6.84330 GHz	-43.73 dBm	-39.85 dB	-19.81 dB
-11.660 MHz	-10.660 MHz	300.000 kHz	6.84339 GHz	-43.12 dBm	-39.24 dB	-20.14 dB
10.660 MHz	11.660 MHz	300.000 kHz	6.86661 GHz	-43.33 dBm	-39.45 dB	-20.36 dB
11.660 MHz	21.320 MHz	300.000 kHz	6.86670 GHz	-43.68 dBm	-39.80 dB	-19.76 dB
21.320 MHz	31.980 MHz	300.000 kHz	6.88694 GHz	-60.14 dBm	-56.25 dB	-16.30 dB
31.980 MHz	42.640 MHz	300.000 kHz	6.89598 GHz	-59.93 dBm	-56.05 dB	-16.05 dB

Date: 5.SEP.2024 02:03:32