



# FCC Part 15.407

## **TEST REPORT**

For

## **MERCURY** Corporation

90, Gajaeul-ro, Seo-Gu, Incheon, 22830, Republic of Korea

## FCC ID: 2AVW5-MCR-AP8400

Report Type:	Product Type:			
Original Report	Wireless Access Point			
Report Producer :				
<b>Report Number :</b>	RXZ241119045RF02			
<b>Report Date :</b>	2025-01-24			
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## **Revision History**

Revision	No.	Report Number	Issue Date	Description	Author/ Revised by
0.0	RXZ241119045	RXZ241119045RF02	2025-01-24	Original Report	Coco Lin

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## **1** General Information

Annlicont	MERCURY Corporation
Applicant	90, Gajaeul-ro, Seo-Gu, Incheon, 22830, Republic of Korea
Brand(Trade) Name	MERCURY
Product (Equipment)	Wireless Access Point
Main Model Name	MCR-AP8400
Series Model Name	N/A
r n	5150 MHz ~ 5250 MHz , 5250 MHz ~ 5350 MHz
Frequency Range	5470 MHz ~ 5725 MHz , 5725 MHz ~ 5850 MHz
	5150-5250 MHz: 19.79 dBm
Maximum Conducted	5250-5350 MHz: 19.99 dBm
Average Output Power	5470-5725 MHz: 21.18 dBm
	5725-5850 MHz: 21.35 dBm
Modulation Technique	OFDM / OFDMA
Power Operation	
(Voltage Range)	12Vdc from Adapter
Received Date	2024/11/21

## **1.1 Product Description for Equipment under Test (EUT)**

\*All measurement and test data in this report was gathered from production sample serial number:

RXZ241119045-1 (Assigned by BACL, New Taipei Laboratory).

### 1.2 Objective

This report is prepared on behalf of *MERCURY Corporation* in accordance with Part 2, Subpart J, Part 15, Subparts A, and E of the Federal Communication Commission's rules.

### 1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices. KDB 789033 D02 General UNII Test Procedures New Rules v02r01

### 1.4 Statement

Decision Rule: No, (The test results do not include MU judgment)

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Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

The determination of the test results does not require consideration of the uncertainty of the measurement, unless the assessment is required by customer agreement, regulation or standard document specification.

Bay Area Compliance Laboratories Corp. (New Taipei Laboratory) is not responsible for the authenticity of the information provided by the applicant that affects the test results.

## **1.5** Measurement Uncertainty

Parameter		Uncertainty
AC Mains		+/- 2.53 dB
RF output power, conducted	ed	+/- 3.74 dB
Power Spectral Density, co	onducted	+/- 0.58 dB
Occupied Bandwidth		+/- 0.09 %
Unwanted Emissions, conducted		+/- 1.13 dB
	9 kHz~30 MHz	+/- 3.54 dB
Emissions, radiated	30 MHz~1 GHz	+/- 4.99 dB
Emissions, radiated	1 GHz~18 GHz	+/- 7.56 dB
	18 GHz~40 GHz	+/- 5.06 dB
Temperature		+/- 0.79 °C
Humidity		+/- 0.44 %

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

## **1.6 Environmental Conditions**

Test Site	Test Date	Temperature (°C)	Relative Humidity (%)	ATM Pressure (hPa)	Test Engineer
AC Line Conducted Emissions	2024/12/23	19	58	1020.9	Wayne Pan
Radiation Spurious Emissions	2024/11/30~2024/12/18	20.8~23.4	41.9~67	1017.4~1023.8	Aaron Pan
Duty Cycle	2025/1/6	22.2	57	1020.6	Wayne Pan
Emission Bandwidth And Occupied Bandwidth	2024/11/27~2024/12/9	23.7~25.1	52~56	1015.8~1020.5	Wayne Pan
Maximum Output Power	2024/11/27~2025/1/14	23.7~25.1	49~57	1015.8~1020.5	Wayne Pan
Power Spectral Density	2024/11/27~2025/1/14	22.2~25.1	49~57	1015.8~1020.6	Wayne Pan

## 1.7 Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (New Taipei Laboratory) to collect test data is located on

70, Lane 169, Sec. 2, Datong Road, Xizhi Dist., New Taipei City 221, Taiwan, R.O.C.

Bay Area Compliance Laboratories Corp. (New Taipei Laboratory) is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 3732) and the FCC designation No.TW3732 under the Mutual Recognition Agreement (MRA) in FCC Test.

## 2 System Test Configuration

## 2.1 Description of Test Configuration

The system supports 802.11a/n ht20/n ht40/ac vht20/ac vht40/ac vht80/ax he20/ax he40/ax he80 mode. Since the 802.11n ht20/n ht40 parameters are the same as 802.11ac vht20 and ac vht40, 802.11n ht20/n ht40 is reduced.

## For 5150 ~ 5250MHz

4 channels are provided for 802.11a, 802.11n HT20, 802.11ac VHT20, 802.11ax HE20:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	44	5220
40	5200	48	5240

2 channels are provided for 802.11n HT40, 802.11ac VHT40, 802.11ax HE40:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
38	5190	46	5230

1 channel is provided for 802.11ac VHT80, 802.11ax HE80:

Channel	Frequency (MHz)
42	5210

802.11a/ac20/ax20 mode Channel 36, 40, 48 were tested.

802.11ac40/ax40 mode Channel 38, 46 were tested.

802.11ac80/ax80 mode Channel 42 was tested.

## For 5250 ~ 5350MHz

4 channels are provided for 802.11a, 802.11n HT20, 802.11ac VHT20, 802.11ax HE20:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
52	5260	60	5300
56	5280	64	5320

2 channels are provided for 802.11n HT40, 802.11ac VHT40, 802.11ax HE40:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
54	5270	62	5310

1 channel is provided for 802.11ac VHT80, 802.11ax HE80:

Channel	Frequency (MHz)
58	5290

802.11a/ac20/ax20 mode Channel 52, 60, 64 were tested.

802.11ac40/ax40 mode Channel 54, 62 were tested.

802.11ac80/ax80 mode Channel 58 was tested.

### For 5470 ~ 5725MHz

11 channels are provided for 802.11a, 802.11n HT20, 802.11ac VHT20, 802.11ax HE20:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
100	5500	124	5620
104	5520	128	5640
108	5540	132	5660
112	5560	136	5680
116	5580	140	5700
120	5600	/	/

5 channels are provided for 802.11n HT40, 802.11ac VHT40, 802.11ax HE40:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
102	5510	126	5630
110	5550	134	5670
118	5590	/	/

2 channels are provided for 802.11ac VHT80, 802.11ax HE80:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
106	5530	122	5610

802.11a/ac20/ax20 mode Channel 100, 116, 140 were tested.

802.11ac40/ax40 mode Channel 102, 110, 134 were tested.

802.11ac80/ax80 mode Channel 106, 122 was tested.

### For 5725 ~ 5825MHz:

5 channels are provided for 802.11a, 802.11n HT20, 802.11ac VHT20, 802.11ax HE20:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	161	5805
153	5765	165	5825
157	5785	/	/

2 channels are provided for 802.11n HT40, 802.11ac VHT40, 802.11ax HE40:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
151	5755	159	5795

1 channel is provided for 802.11ac VHT80, 802.11ax HE80:

Channel	Frequency (MHz)
155	5775

802.11a/ac20/ax20 mode Channel 149, 157, 165 were tested.

802.11ac40/ax40 mode Channel 151, 159 were tested.

802.11ac80/ax80 mode Channel 155 was tested.

## 2.2 EUT Exercise Software

The software was used "QATool v0.0.2.73".

The system was configured for testing in an engineering mode, which is provided by Applicant.

UNII	Mode	Channel	Frequency	Power setting MIMO(CDD)			
Band	MIMO(CDD)		(MHz)	Chain 0	Chain 1	Chain 2	Chain 3
		36	5180	6	6	6	6
UNII-1		40	5200	6	6	6	6
		48	5240	6	6	6	6
		52	5260	6	6	6	6
UNII-2A		60	5300	6	6	6	6
	<b>202</b> 11a	64	5320	6	6	6	6
	802.11a	100	5500	6	6	6	6
UNII-2C		116	5580	6	6	6	6
		140	5700	6	6	6	6
		149	5745	6	6	6	6
UNII-3		157	5785	6	6	6	6
		165	5825	6	6	6	6
		36	5180	6	6	6	6
UNII-1		40	5200	6	6	6	6
		48	5240	6	6	6	6
		52	5260	6	6	6	6
UNII-2A		60	5300	6	6	6	6
	802.11n HT20	64	5320	6	6	6	6
	802.11ac VHT20	100	5500	6	6	6	6
UNII-2C	002.11ac v11120	116	5580	6	6	6	6
		140	5700	6	6	6	6
		149	5745	6	6	6	6
UNII-3		157	5785	6	6	6	6
		165	5825	6	6	6	6
UNII-1		38	5190	9	9	9	9
0111-1		46	5230	9	9	9	9
UNII-2A		54	5270	9	9	9	9
0111-2A	802.11n HT40	62	5310	9	9	9	9
	/	102	5510	9	9	9	9
UNII-2C	802.11ac VHT40	110	5550	9	9	9	9
		134	5670	9	9	9	9
UNII-3		151	5755	9	9	9	9
0111-3		159	5795	9	9	9	9
UNII-1		42	5210	8	8	8	8
UNII-2A		58	5290	8	8	8	8
UNII-2C	802.11ac VHT80	106	5530	11	11	11	11
0111-20		122	5610	11	11	11	11
UNII-3		155	5775	11	11	11	11

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No.: RXZ241119045RF02

		36	5180	7	7	7	7
UNII-1		40	5200	7	7	7	7
		48	5240	7	7	7	7
		52	5260	7	7	7	7
UNII-2A		60	5300	6	6	6	6
	802.11ax HE20	64	5320	6	6	6	6
	802.11ax HE20	100	5500	6	6	6	6
UNII-2C		116	5580	6	6	6	6
		140	5700	6	6	6	6
		149	5745	6	6	6	6
UNII-3		157	5785	6	6	6	6
		165	5825	6	6	6	6
UNIL 1		38	5190	9	9	9	9
UNII-1		46	5230	9	9	9	9
UNII-2A		54	5270	9	9	9	9
UNII-2A		62	5310	9	9	9	9
	802.11ax HE40	102	5510	8	8	8	8
UNII-2C		110	5550	8	8	8	8
		134	5670	8	8	8	8
UNII-3		151	5755	8	8	8	8
UNII-5		159	5795	8	8	8	8
UNII-1		42	5210	8	8	8	8
UNII-2A		58	5290	8	8	8	8
UNII-2C	802.11ax HE80	106	5530	9.5	9.5	9.5	9.5
UNII-2C		122	5610	9.5	9.5	9.5	9.5
UNII-3		155	5775	9.5	9.5	9.5	9.5

The device support SISO and MIMO(CDD).

SISO mode and MIMO mode have the same power level setting and base on output power testing, MIMO mode power large than SISO mode, MIMO mode was selected for full testing.

The worst case data rates are as follows:

802.11a Mode :6Mbps

802.11ac VHT20 Mode: MCS0

802.11ac VHT40 Mode: MCS0

802.11ac VHT80 Mode: MCS0

802.11ax HE20 Mode: MCS0

802.11ax HE40 Mode: MCS0

802.11ax HE80 Mode: MCS0

### 2.3 Equipment Modifications

No modification was made to the EUT.

## 2.4 Test Mode

Full System(model: MCR-AP8400) for all test item.

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, thus the full RU is chosen as main test configuration. partial RU test Output Power and Power Spectral Density.

1	-		
Description	Manufacturer	Model Number	S/N
NB	DELL	E6410	1CKD0M1
NB	NB DELL		70DSQM1
NB	DELL	E6410	8N7PXN1
NB	DELL	E6410	C88PXN1
Adapter	Shenzhen Keyu Power Supply Technology Co., Ltd	KA4801A-1204000US	N/A

### 2.5 Support Equipment List and Details

### 2.6 External Cable List and Details

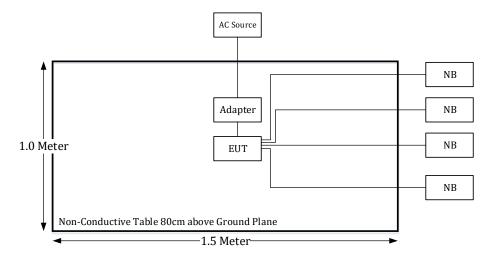
Description	Manufacturer	Cable length
RJ-45 Cable*4	BACL	8m

## 2.7 Block Diagram of Test Setup

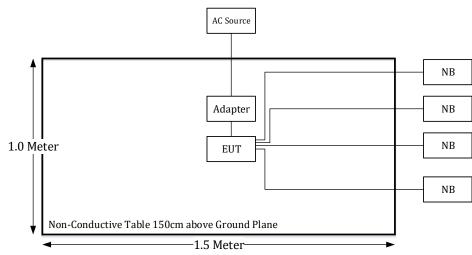
See test photographs attached in setup photos for the actual connections between EUT and support equipment.

### **Radiation:**

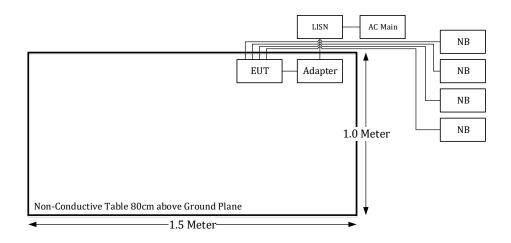
Below 1GHz



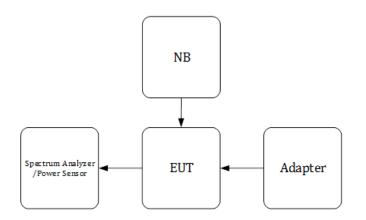




## **Conduction:**



**Conducted:** 



No.: RXZ241119045RF02

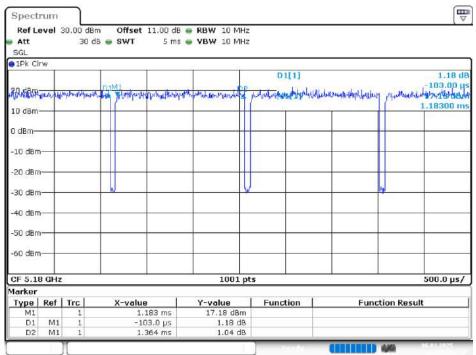
## 2.8 Duty Cycle

The duty cycle as below:

Radio Mode	On Time (ms)	Off Time (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/T (kHz)	VBW Setting (kHz)
802.11a	1.364	0.103	93	0.32	0.73	1
802.11ac 20	1.285	0.100	93	0.32	0.78	1
802.11ac 40	0.648	0.073	90	0.46	1.54	2
802.11ac 80	0.319	0.064	84	0.76	3.13	5
802.11ax 20	0.990	0.078	93	0.32	1.01	2
802.11ax 40	0.527	0.066	89	0.51	1.90	2
802.11ax 80	0.277	0.061	82	0.86	3.61	5

Note: Duty Cycle Correction Factor =  $10*\log(1/duty cycle)$ 

Please refer to the following plots.



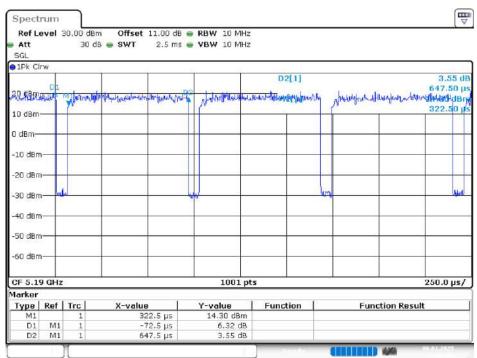
802.11a Mode

Date: 6.JAN.2025 11:28:23

Att	evel	30.00 dB 30 c	m Offset 1 iB <b>e SWT</b>		<ul> <li>RBW 10 MH</li> <li>VBW 10 MH</li> </ul>					
SGL 1Pk Cl										
	4104-48	a the second	history and an and the	yourst	n Al John Mithim of A		1[1] Helgula	position	unumulum	16.74 dB 1.96500 n 40000000000000000000000000000000000
) dBm—					200					
10 dBm	-		_							
20 dBm	-								_	
30 dBm	-+-	h.			<b>V</b>			M		A
40 dBrr	-									
50 dBm	-+					-				
60 dBm	+		-							
CF 5.10	B GHz	8			1001	pts			-	500.0 µs,
larker				- T		1				
Type M1	Ref	1	X-value 1.965 ms		Y-value 16.74 dBn	Func	tion		Function R	esuit
D1	M1	1	-1.36		0.14 d8					
D2	M1	1	-1.26	a state of the second se	0.73 de	7				

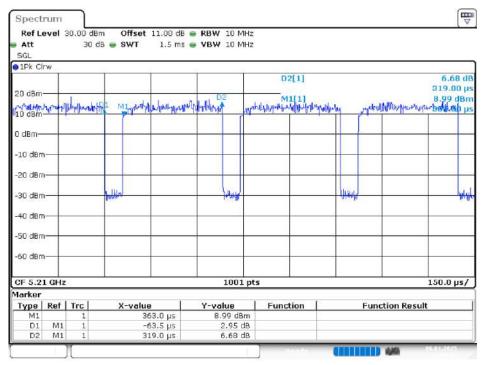
#### 802.11ac VHT20 Mode

Date: 6.JAN.2025 11:14:47



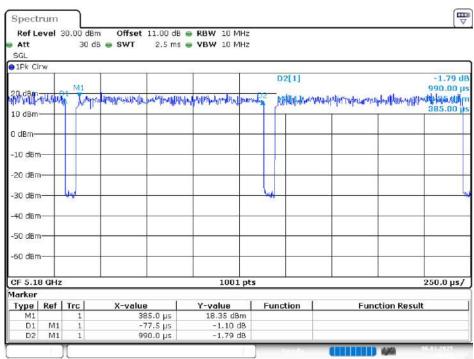
#### 802.11ac VHT40 Mode

Date: 6.JAN.2025 11:21:06



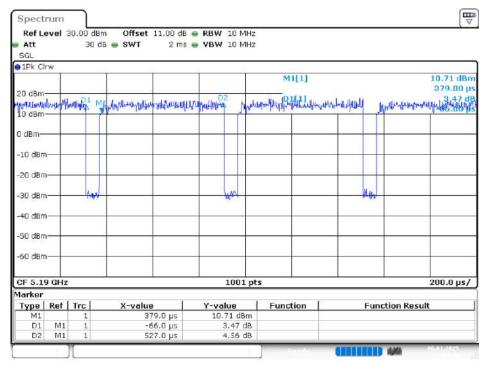
802.11ac VHT80 Mode

Date: 6.JAN.2025 11:25:42



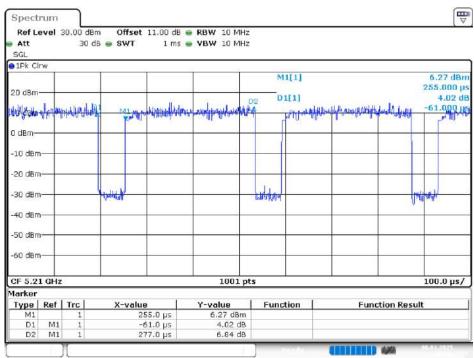
### 802.11ax HE20 Mode

Date: 6.JAN.2025 11:48:24



802.11ax HE40 Mode

Date: 6.JAN.2025 11:34:49



802.11ax HE80 Mode

Date: 6.JAN.2025 11:37:28

## 3 Summary of Test Results

Standard(s) Section	Description of Test	Results
§15.407(f), §2.1091	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.407(b)(9) & §15.207(a)	AC Line Conducted Emissions	Compliance
§15.205 & §15.209 & §15.407(b)	Unwanted Emission	Compliance
§15.407(a)(e)	Emission Bandwidth	Compliance
§15.407(a)	Conducted Transmitter Output Power	Compliance
§15.407(a)	Power Spectral Density	Compliance

## 4 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
	AC	Line Conduction Roo	m (CON-A)		
LISN	Rohde & Schwarz	ENV216	101612	2024/2/16	2025/2/16
EMI Test Receiver	Rohde & Schwarz	ESW8	100947	2024/5/24	2025/5/24
RF Cable	EMEC	EM-CB5D	1	2024/6/5	2025/6/5
Software	AUDIX	E3	V9.150826k	N.C.R	N.C.R
		Radiation 3M Room	(966-A)		
Active Loop Antenna	ETS-Lindgren	6502	35796	2024/3/27	2025/3/27
Bilog Antenna with 6 dB Attenuator	SUNOL SCIENCES & MINI-CIRCUITS	JB6/UNAT-6+	A050115/1554 2_01	2024/1/19	2025/1/19
Double Ridged Guide Horn Antenna	A.H. system	SAS-571	1020	2024/5/21	2025/5/21
Horn Antenna	ETS-Lindgren	3116	62638	2024/8/30	2025/8/30
Preamplifier	Sonoma	310N	130601	2024/1/29	2025/1/29
Preamplifier	Channel	ERA-100M-18G- 01D1748	EC2300051	2024/3/29	2025/3/29
Microware Preamplifier	EM Electronics Corporation	EM18G40G	60656	2024/1/8	2025/1/8
Spectrum Analyzer	Rohde & Schwarz	FSV40	101939	2024/3/27	2025/3/27
EMI Test Receiver	Rohde & Schwarz(R&S)	ESR3	102099	2024/6/24	2025/6/24
Microflex Cable	UTIFLEX	UFB197C-1- 2362-70U-70U	225757-001	2024/1/23	2025/1/23
Coaxial Cable	UTIFLEX	UFB311A-Q- 1440-300300	220490-006	2024/1/23	2025/1/23
Coaxial Cable	COMMATE	PEWC	8Dr	2023/12/23	2024/12/23
Cable	EMC	EMC105-SM- SM-10000	201003	2024/1/23	2025/1/23
Coaxial Cable	JUNFLON	J12J102248-00- B-5	AUG-07-15- 044	2023/12/23	2024/12/23
Coaxial Cable	ROSNOL	K1K50-UP0264- K1K50-450CM	160309-1	2024/1/23	2025/1/23
Microflex Cable	ROSNOL	K1K50-UP0264- K1K50-80CM	160309-2	2024/1/23	2025/1/23
Band-stop filter	SinoSciTe	BSF5150-5850 MN-0899-002	001	2024/10/19	2025/10/19
High-pass filter	XINGBOKEJI	XBLBQ-GTA29	200121-3-26	2024/10/19	2025/10/19
Software	AUDIX	E3	18621a	N.C.R	N.C.R
		Conducted Roo			
Spectrum Analyzer	Rohde & Schwarz(R&S)	FSV40	101204	2024/5/30	2025/5/30
Cable	UTIFLEX	UFA210A	9435	2024/10/1	2025/10/1
Power Sensor	Agilent	U2021XA	MY54080018	2024/1/30	2025/1/28
Attenuator	MCL	BW-S10W5+	1419	2024/2/23	2025/2/23

\*Statement of Traceability: BACL Corp. attests that all of the calibrations on the equipment items listed above were traceable to the SI System of Units via the R.O.C. Center for Measurement Standards of the Electronics Testing Center, Taiwan (ETC) or to another internationally recognized National Metrology Institute (NMI), and were compliant with the current Taiwan Accreditation Foundation (TAF) requirements.

Note: It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (New Taipei Laboratory) Page 20 of 907

## 5 FCC §15.407(f), §1.1310, §2.1091 – Maximum Permissible Exposure (MPE)

## 5.1 Applicable Standard

According to subpart 15.407(f)and subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

	(B) Limits for General Population/Uncontrolled Exposure									
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (minutes)						
0.3–1.34	614	1.63	*(100)	30						
1.34–30	824/f	2.19/f	*(180/f <sup>2</sup> )	30						
30–300	27.5	0.073	0.2	30						
300-1500	/	/	f/1500	30						
1500-100,000	/	/	1.0	30						

f = frequency in MHz; \* = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculated Formulary:

Predication of MPE limit at a given distance

 $S = PG/4\pi R^2$  = power density (in appropriate units, e.g. mW/cm2);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

## 5.2 **RF Exposure Evaluation Result**

MPE evaluation:

	Frequency	Antenna Gain		Tune-up Power		Evaluation	Power	MPE
Mode	Range (MHz)	(dBi)	(numeric)	(dBm)	( <b>mW</b> )	Distance (cm)	Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
WIFI 5G Band 1	5150-5250	4.4	2.754	19.8	95.499	20	0.0523	1
WIFI 5G Band 2	5250-5350	4.4	2.754	20.0	100.000	20	0.0548	1
WIFI 5G Band 3	5470-5725	4.38	2.742	21.2	131.826	20	0.0719	1
WIFI 5G Band 4	5725-5850	4.92	3.105	21.4	138.038	20	0.0853	1
WIFI 2.4G	2412-2462	4.42	2.767	29.5	891.25	20	0.4906	1
BLE	2402-2480	6.08	4.055	1.5	1.413	20	0.0011	1

Mode	Frequency Range		ing Tune-up rance	Evaluation Distance	Power Density	MPE Limit	
	(MHz)	(dBm)	( <b>mW</b> )	( <b>cm</b> )	$(\mathbf{mW/cm^2})$	(mW/cm <sup>2</sup> )	
WIFI 6E	5925-6425	18.5	70.79	20	0.014	1	
WIFI 6E	6425-6525	18.5	70.79	20	0.014	1	
WIFI 6E	6525-6875	19.0	79.43	20	0.016	1	
WIFI 6E	6875-7125	18.5	70.79	20	0.014	1	

Note: The Tune-up output power was declared by the Applicant. Wi-Fi and BLE can't transmit simultaneously.

Result: The device compliant RF Exposure at 20cm distances.

## 6 FCC §15.203 – Antenna Requirements

## 6.1 Applicable Standard

For intentional device, according to \$15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used.

## 6.2 Antenna Information

Manufacturer	Model	Antenna Type	Antenna Gain (dBi)		
K-Maru	DW2050DEC50180P2	РСВ	Chain 0	5150-5250MHz: 4.25 5250-5350MHz: 4.25 5470-5725MHz: 3.34 5725-5850MHz: 3.08	
K-Maru	KI-DW2050DEC80180P3	РСВ	Chain 1	5150-5250MHz: 3.65 5250-5350MHz: 3.65 5470-5725MHz: 3.65 5725-5850MHz: 3.39	
K-Maru	KI-DW5020DEC50180P5	РСВ	Chain 2	5150-5250MHz: 4.40 5250-5350MHz: 4.40 5470-5725MHz: 3.71 5725-5850MHz: 3.51	
K-Maru	KI-DW2050DEC18080P4	РСВ	Chain 3	5150-5250MHz: 4.31 5250-5350MHz: 4.31 5470-5725MHz: 4.38 5725-5850MHz: 4.92	

The antenna uses non-standard connectors and meets the requirements of this section. Please refer to EUT photos.

## **Result:** Compliance

## 7 FCC §15.407(b)(9), §15.207(a) – AC Line Conducted Emissions

## 7.1 Applicable Standard

As per FCC §15.407(b) (9)

Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207

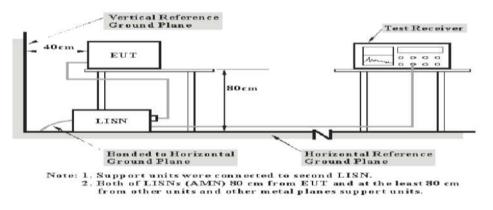
For an EUT that connects to the AC power lines indirectly, through another device, the requirement for compliance with the limits in table 4 shall apply at the terminals of the AC power-line mains cable of a representative support device, while it provides power to the EUT. The lower limit applies at the boundary between the frequency ranges. The device used to power the EUT shall be representative of typical applications.

Frequency of Emission	Conducted Limit (dBuV)				
(MHz)	Quasi-Peak	Average			
0.15-0.5	66 to 56 <sup>Note 1</sup>	56 to 46 Note 1			
0.5-5	56	46			
5-30	60	50			

The lower limit applies at the boundary between the frequencies ranges.

Note 1: Decreases with the logarithm of the frequency.

## 7.2 EUT Setup



The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 imits.

### 7.3 EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150kHz to 30MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations

Frequency Range	IF B/W			
150kHz – 30MHz	9kHz			

### 7.4 Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the LISN. Maximizing procedure was performed on the six (6) highest emissions of the EUT. All data was recorded in the Quasi-peak and average detection mode.

## 7.5 Corrected Factor & Over Limit Calculation

The factor is calculated by adding LISN/ISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

Factor = LISN VDF + Cable Loss + Transient Limiter Attenuation

The "Over Limit" column of the following data tables indicates the degree of compliance with the applicable limit. For example, an over limit of -7 dB means the emission is 7 dB below the limit. The equation for Over Limit calculation is as follows:

Over Limit = Result – Limit Line

#### No.: RXZ241119045RF02

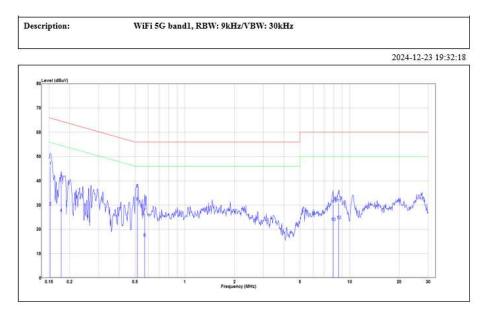
### 7.6 Test Results

Test Mode: Transmitting

#### Main: AC120 V, 60 Hz

(Worst case is 802.11ax HE40 mode, 5190 MHz)

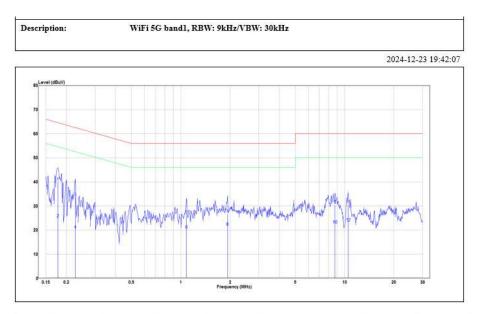
#### Band 1: Line



No.	Frequency	Reading	Correct	Result	Limit	Over limit	Remark	Phase
	(MHz)	dBuV	Factor(dB)	dBuV	dBuV	(dB)		
1	0.152	36.08	9.83	45.91	65.87	-19.96	QP	Line
2	0.152	19.55	9.83	29.38	55.87	-26.49	Average	Line
3	0.178	30.72	9.94	40.65	64.59	-23.94	QP	Line
4	0.178	16.72	9.94	26.66	54.59	-27.93	Average	Line
5	0.516	26.46	10.26	36.72	56.00	-19.28	QP	Line
6	0.516	21.22	10.26	31.48	46.00	-14.52	Average	Line
7	0.570	16.52	10.27	26.79	56.00	-29.21	QP	Line
8	0.570	6.23	10.27	16.50	46.00	-29.50	Average	Line
9	7.935	19.90	10.43	30.33	60.00	-29.67	QP	Line
10	7.935	12.59	10.43	23.02	50.00	-26.98	Average	Line
11	8.592	20.48	10.44	30.92	60.00	-29.08	QP	Line
12	8.592	13.40	10.44	23.84	50.00	-26.16	Average	Line

#### No.: RXZ241119045RF02

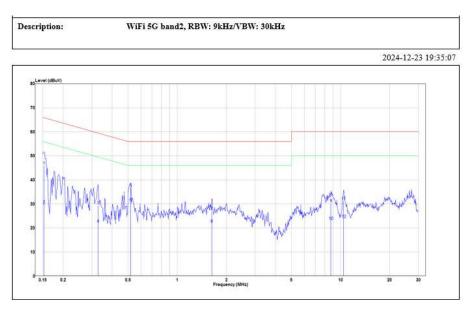
#### Band 1: Neutral



No.	Frequency	Reading	Correct	Result	Limit	Over limit	Remark	Phase
	(MHz)	dBuV	Factor(dB)	dBuV	dBuV	(dB)		
1	0.178	30.11	9.95	40.06	64.59	-24.54	QP	Neutral
2	0.178	14.92	9.95	24.86	54.59	-29.73	Average	Neutral
3	0.227	23.65	10.06	33.71	62.57	-28.85	QP	Neutral
4	0.227	10.18	10.06	20.24	52.57	-32.33	Average	Neutral
5	1.082	16.02	10.35	26.37	56.00	-29.63	QP	Neutral
6	1.082	9.89	10.35	20.24	46.00	-25.76	Average	Neutral
7	1.928	16.37	10.35	26.72	56.00	-29.28	QP	Neutral
8	1.928	11.07	10.35	21.42	46.00	-24.58	Average	Neutral
9	8.729	20.10	10.45	30.55	60.00	-29.45	QP	Neutral
10	8.729	11.81	10.45	22.26	50.00	-27.74	Average	Neutral
11	10.508	20.34	10.48	30.83	60.00	-29.17	QP	Neutral
12	10.508	12.68	10.48	23.17	50.00	-26.83	Average	Neutra

### (Worst case is 802.11ax HE40 mode, 5270 MHz)

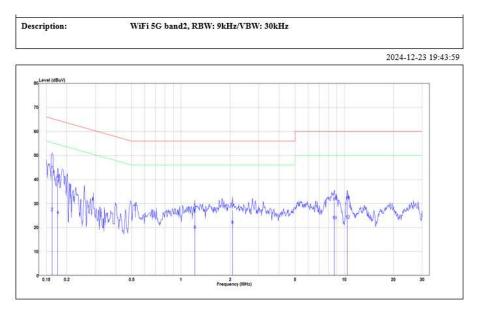
#### Band 2: Line



No.	Frequency	Reading	Correct	Result	Limit	Over limit	Remark	Phase
	(MHz)	dBuV	Factor(dB)	dBuV	dBuV	(dB)		
1	0.152	36.04	9.83	45.87	65.87	-20.00	QP	Line
2	0.152	19.77	9.83	29.60	55.87	-26.27	Average	Line
3	0.327	19.26	10.13	29.39	59.53	-30.14	QP	Line
4	0.327	11.57	10.13	21.70	49.53	-27.83	Average	Line
5	0.518	26.53	10.26	36.79	56.00	-19.21	QP	Line
6	0.518	20.40	10.26	30.66	46.00	-15.34	Average	Line
7	1.628	16.64	10.34	26.98	56.00	-29.02	QP	Line
8	1.628	11.45	10.34	21.79	46.00	-24.21	Average	Line
9	8.729	19.78	10.44	30.22	60.00	-29.78	QP	Line
10	8.729	12.43	10.44	22.87	50.00	-27.13	Average	Line
11	10.452	20.80	10.46	31.26	60.00	-28.74	QP	Line
12	10.452	13.18	10.46	23.64	50.00	-26.36	Average	Line

#### No.: RXZ241119045RF02

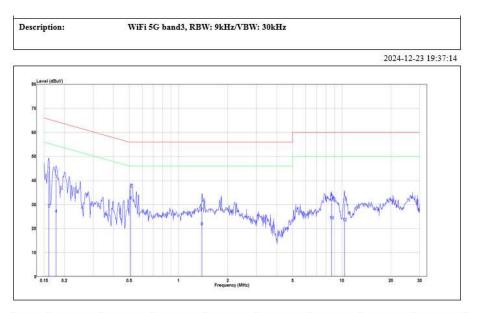
#### Band 2: Neutral



No.	Frequency	Reading	Correct	Result	Limit	Over limit	Remark	Phase
	(MHz)	dBuV	Factor(dB)	dBuV	dBuV	(dB)		
1	0.162	34.01	9.88	43.90	65.34	-21.44	QP	Neutral
2	0.162	16.63	9.88	26.51	55.34	-28.83	Average	Neutra
3	0.176	30.20	9.94	40.14	64.68	-24.54	QP	Neutra
4	0.176	15.19	9.94	25.13	54.68	-29.55	Average	Neutra
5	1.216	15.39	10.35	25.74	56.00	-30.26	QP	Neutra
6	1.216	8.72	10.35	19.07	46.00	-26.93	Average	Neutra
7	2.066	16.99	10.35	27.34	56.00	-28.66	QP	Neutra
8	2.066	10.78	10.35	21.14	46.00	-24.86	Average	Neutra
9	8.683	20.38	10.45	30.83	60.00	-29.17	QP	Neutra
10	8.683	12.63	10.45	23.08	50.00	-26.92	Average	Neutra
11	10.452	20.73	10.48	31.21	60.00	-28.79	QP	Neutra
12	10.452	12.77	10.48	23.25	50.00	-26.75	Average	Neutra

### (Worst case is 802.11ac VHT80 mode, 5530 MHz)

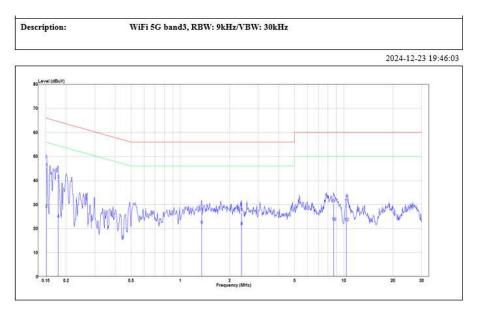
#### Band 3: Line



No.	Frequency	Reading	Correct	Result	Limit	Over limit	Remark	Phase
	(MHz)	dBuV	Factor(dB)	dBuV	dBuV	(dB)		
1	0.161	34.13	9.86	43.99	65.43	-21.43	QP	Line
2	0.161	18.50	9.86	28.37	55.43	-27.06	Average	Line
3	0.178	30.60	9.94	40.53	64.59	-24.06	QP	Line
4	0.178	16.25	9.94	26.19	54.59	-28.40	Average	Line
5	0.510	26.15	10.26	36.41	56.00	-19.59	QP	Line
6	0.510	21.39	10.26	31.65	46.00	-14.35	Average	Line
7	1.388	16.49	10.34	26.83	56.00	-29.17	QP	Line
8	1.388	10.47	10.34	20.81	46.00	-25.19	Average	Line
9	8.637	20.39	10.44	30.83	60.00	-29.17	QP	Line
10	8.637	12.98	10.44	23.42	50.00	-26.58	Average	Line
11	10.397	20.33	10.46	30.79	60.00	-29.21	QP	Line
12	10.397	12.16	10.46	22.62	50.00	-27.38	Average	Line

#### No.: RXZ241119045RF02

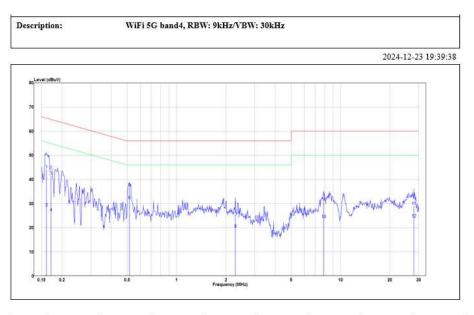
#### Band 3: Neutral



No.	Frequency	Reading	Correct	Result	Limit	Over limit	Remark	Phase
	(MHz)	dBuV	Factor(dB)	dBuV	dBuV	(dB)		
1	0.152	35.54	9.84	45.37	65.91	-20.54	QP	Neutral
2	0.152	18.44	9.84	28.27	55.91	-27.64	Average	Neutral
3	0.179	30.36	9.95	40.31	64.55	-24.23	QP	Neutral
4	0.179	14.11	9.95	24.06	54.55	-30.48	Average	Neutral
5	1.352	16.78	10.35	27.13	56.00	-28.87	QP	Neutral
6	1.352	11.13	10.35	21.48	46.00	-24.52	Average	Neutral
7	2.371	16.27	10.36	26.63	56.00	-29.37	QP	Neutral
8	2.371	10.60	10.36	20.96	46.00	-25.04	Average	Neutral
9	8.683	19.99	10.45	30.44	60.00	-29.56	QP	Neutral
10	8.683	12.33	10.45	22.78	50.00	-27.22	Average	Neutral
11	10.397	20.08	10.48	30.56	60.00	-29.44	QP	Neutral
12	10.397	12.22	10.48	22.70	50.00	-27.30	Average	Neutral

### (Worst case is 802.11ac VHT80 mode, 5775 MHz)

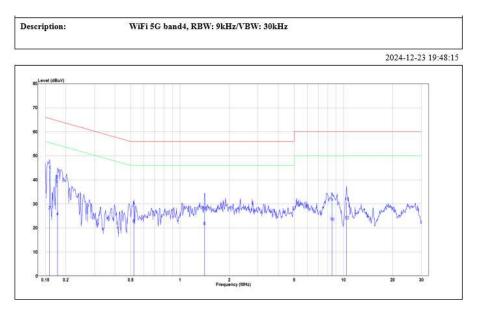
#### Band 4: Line



No.	Frequency	Reading	Correct	Result	Limit	Over limit	Remark	Phase
	(MHz)	dBuV	Factor(dB)	dBuV	dBuV	(dB)		
1	0.161	34.33	9.86	44.20	65.43	-21.23	QP	Line
2	0.161	18.56	9.86	28.43	55.43	-27.00	Average	Line
3	0.171	31.56	9.91	41.47	64.90	-23.43	QP	Line
4	0.171	16.44	9.91	26.34	54.90	-28.56	Average	Line
5	0.516	26.50	10.26	36.76	56.00	-19.24	QP	Line
6	0.516	21.20	10.26	31.47	46.00	-14.53	Average	Line
7	2.285	15.21	10.35	25.56	56.00	-30.44	QP	Line
8	2.285	9.21	10.35	19.56	46.00	-26.44	Average	Line
9	7.893	20.19	10.43	30.62	60.00	-29.38	QP	Line
10	7.893	13.17	10.43	23.60	50.00	-26.40	Average	Line
11	28.003	18.39	10.56	28.94	60.00	-31.06	QP	Line
12	28.003	13.25	10.56	23.80	50.00	-26.20	Average	Line

#### No.: RXZ241119045RF02

#### Band 4: Neutral



No.	Frequency	Reading	Correct	Result	Limit	Over limit	Remark	Phase
	(MHz)	dBuV	Factor(dB)	dBuV	dBuV	(dB)		
1	0.159	34.00	9.87	43.87	65.52	-21.65	QP	Neutral
2	0.159	17.43	9.87	27.29	55.52	-28.22	Average	Neutral
3	0.178	30.08	9.95	40.02	64.59	-24.57	QP	Neutral
4	0.178	14.88	9.95	24.83	54.59	-29.76	Average	Neutral
5	0.521	18.84	10.27	29.12	56.00	-26.88	QP	Neutral
6	0.521	11.43	10.27	21.70	46.00	-24.30	Average	Neutral
7	1.411	16.36	10.35	26.71	56.00	-29.29	QP	Neutral
8	1.411	10.37	10.35	20.72	46.00	-25.28	Average	Neutral
9	8.501	20.23	10.45	30.69	60.00	-29.31	QP	Neutral
10	8.501	12.13	10.45	22.58	50.00	-27.42	Average	Neutral
11	10.452	20.43	10.48	30.91	60.00	-29.09	QP	Neutral
12	10.452	12.71	10.48	23.20	50.00	-26.80	Average	Neutral

Note:

Result = Reading + Factor

Over Limit = Result – Limit Line

Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss + Attenuator

## 8 FCC §15.209, §15.205, §15.407(b) – Spurious Emissions

### 8.1 Applicable Standard

As Per FCC §15.205(a) except as show in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	608 - 614	4.5 - 5.15
0.495 - 0.505	16.69475 - 16.69525	960 - 1240	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	1300 - 1427	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1435 - 1626.5	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1645.5 - 1646.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1660 - 1710	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1718.8 - 1722.2	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	2200 - 2300	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2310 - 2390	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2483.5 - 2500	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2690 - 2900	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	3260 - 3267	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3.332 - 3.339	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	$3\ 3458 - 3\ 358$	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3.600 - 4.400	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4		Above 38.6
13.36 - 13.41	399.9 - 410		

As per FCC §15.209(a): Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (micro volts/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 1: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

#### As per FCC Part 15.407 (b)

For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.25–5.35 GHz band: All emissions outside of the 5.15–5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.47–5.725 GHz band: All emissions outside of the 5.47–5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

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- For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
- Devices certified before March 2, 2017 with antenna gain greater than 10 dBi may demonstrate compliance with the emission limits in § 15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease by March 2, 2018. Devices certified before March 2, 2018 with antenna gain of 10 dBi or less may demonstrate compliance with the emission limits in §15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease before March 2, 2020.
- The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.

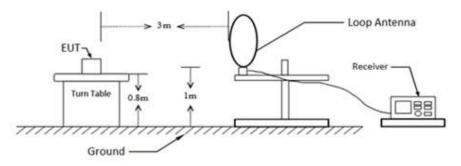
'Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

According to ANSI C63.10-2013, section 5.3.3

Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field, and the emissions to be measured can be detected by the measurement equipment (see 4.3.4). Measurements shall not be performed at a distance greater than 30 m for frequencies above 30 MHz, unless it can be further demonstrated that measurements at a distance of 30 m or less are impractical. Measurements from 18 GHz to 40 GHz are typically made at distances significantly less than 3 m from the EUT. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade of distance (inverse of linear distance for field-strength measurements or inverse of linear distance-squared for power-density measurements).

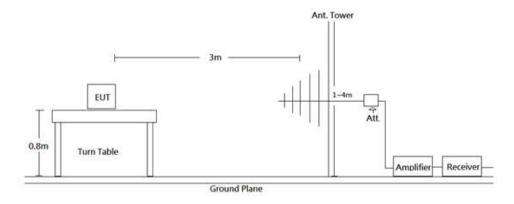
#### 8.2 EUT Setup

9kHz-30MHz:

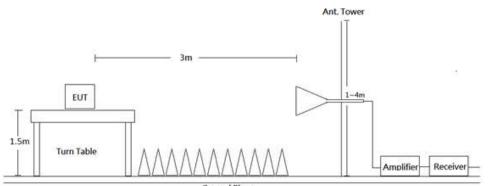


#### No.: RXZ241119045RF02

#### 30MHz-1GHz:

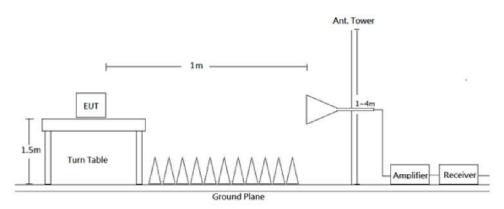


1-18 GHz:



Ground Plane

18-40 GHz:



Radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC Part 15.209, FCC 15.407 Limits.

#### 8.3 EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 9 kHz to 40 GHz. During the radiated emission test, the EMI test receiver was set with the following configurations measurement method 6.3 in ANSI C63.10.

Frequency Range	RBW	VBW	Duty cycle	Measurement method	Detector
9 kHz - 150 kHz	300 Hz	1 kHz	/	QP/AV	QP/AV
150 kHz - 30 MHz	10 kHz	30 kHz	/	QP/AV	QP/AV
30-1000 MHz	120 kHz	300 kHz	/	QP	QP
Above 1 GHz	Pre-scan :				
	1 MHz	3 MHz	/	РК	РК
	1 MHz	1 kHz	>98%	Ave	PK
	1 MHz	$\geq$ 1/Ton, not less than 1 kHz	<98%	Ave	PK
	Final measurement for emission identified during pre-scan :				
	1 MHz	3 MHz	/	РК	РК
	1 MHz	10 Hz	>98%	Ave	РК
	1 MHz	$\geq 1/Ton$	<98%	Ave	РК

Note: Ton is minimum transmission duration

If the maximized peak measured value complies with under the QP/Average limit more than 6dB, then it is unnecessary to perform an QP/Average measurement.

#### 8.4 Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in Quasi-peak and average detector mode from 9 kHz to 30 MHz, Quasi-peak detector mode from 30 MHz to 1 GHz and PK and average detector modes for frequencies above 1 GHz. According to C63.10, emission shall be computed as:  $E [dB\mu V/m] = EIRP[dBm] + 95.2$ , for d = 3 meters.

All emissions under the average limit and under the noise floor have not recorded in the report

#### 8.5 Corrected Factor & Margin Calculation

The Correct Factor is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain

The "Margin" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

Margin = Level – Limit

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## 8.6 Test Results

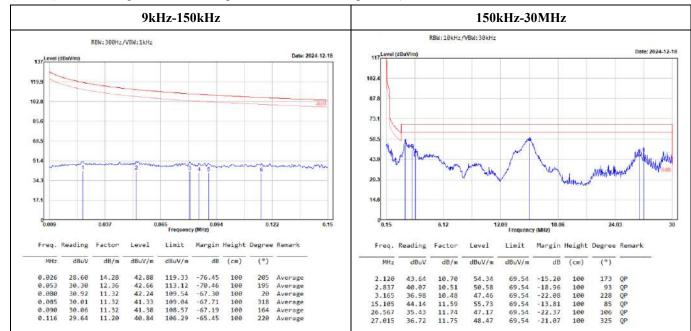
Test Mode: Transmitting

(Test for Y axis)

## 9kHz-30MHz:

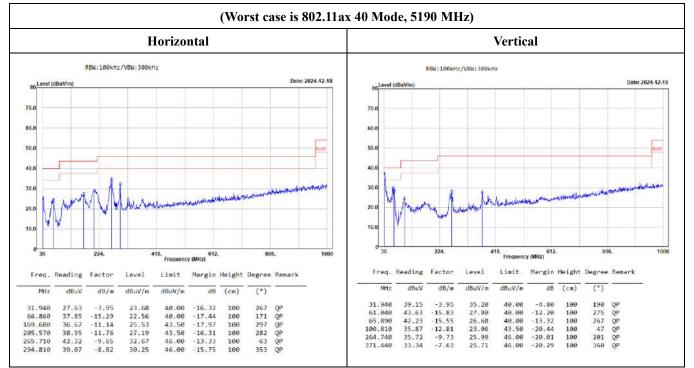
## (Worst case is 802.11ac80 Mode, 5775MHz)

(Pre-scan using three directional polarities, worst case as parallel.)



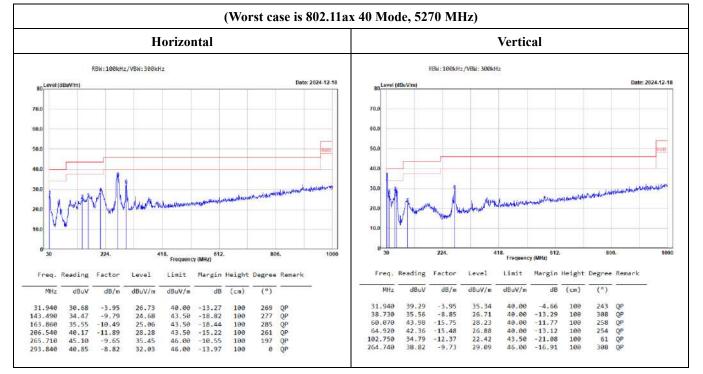
# 30MHz-1GHz:

## 5150~5250 MHz

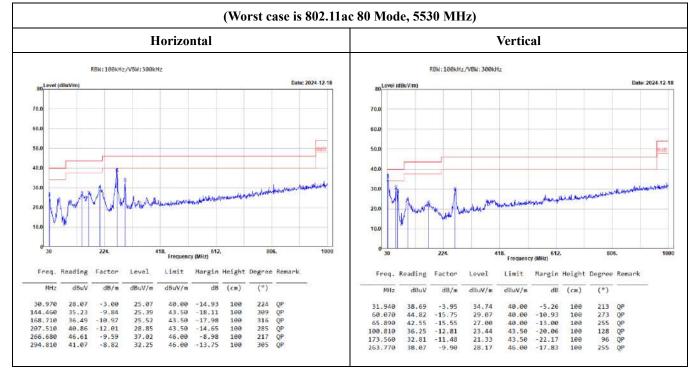


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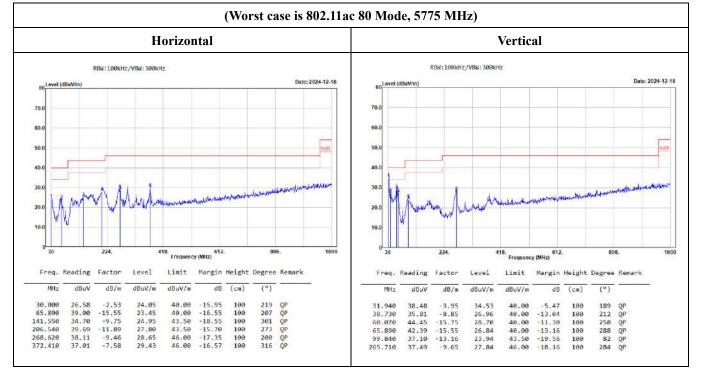
## 5250~5350 MHz



## 5470~5725 MHz



#### 5725~5850 MHz



Level = Reading + Factor.

Margin = Level - Limit.

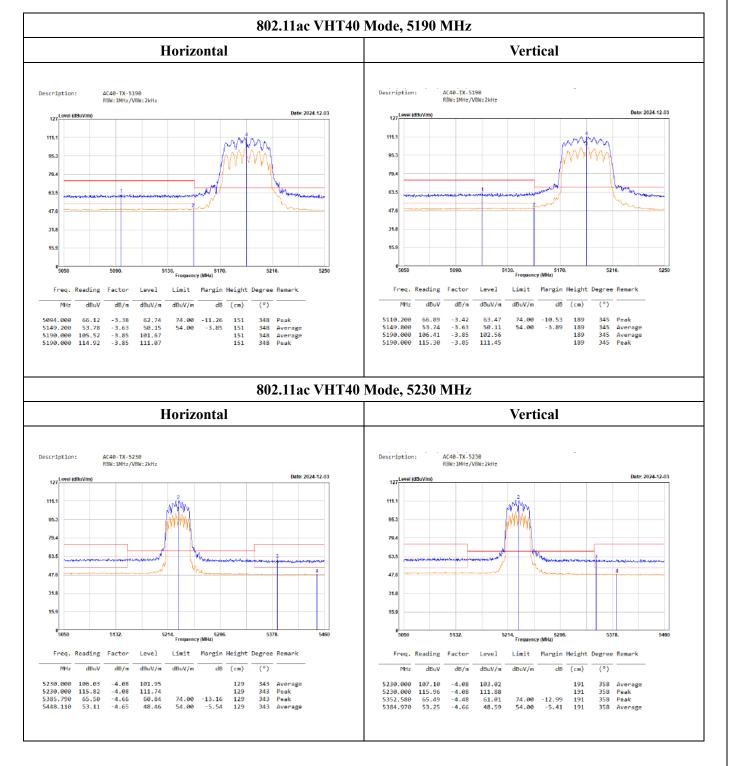
 $Factor = Antenna \; Factor + Cable \; Loss - Amplifier \; Gain.$ 

# **Band-Edge**

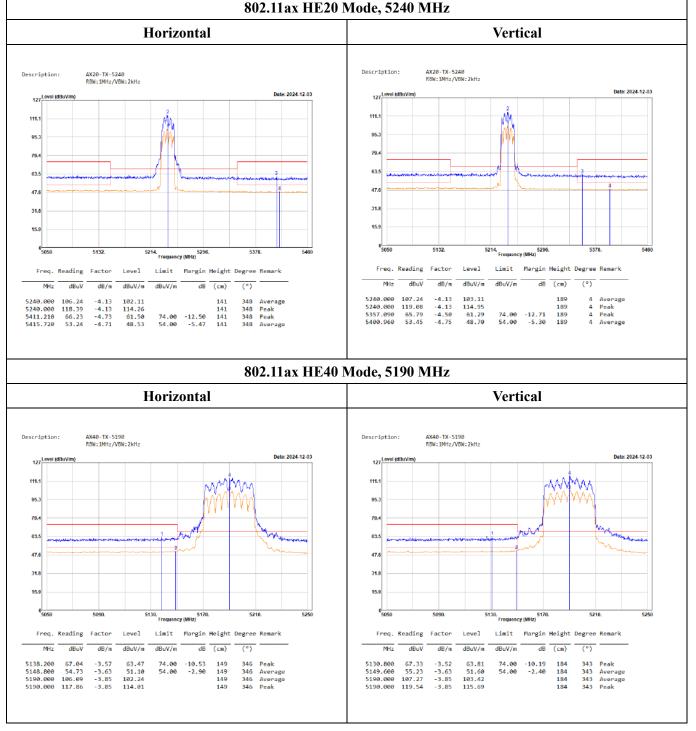
#### 5150-5250 MHz

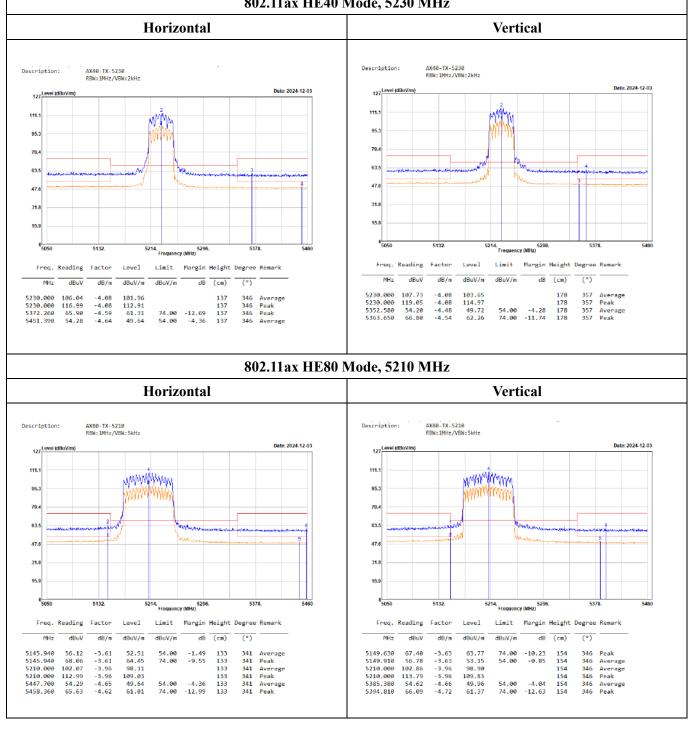








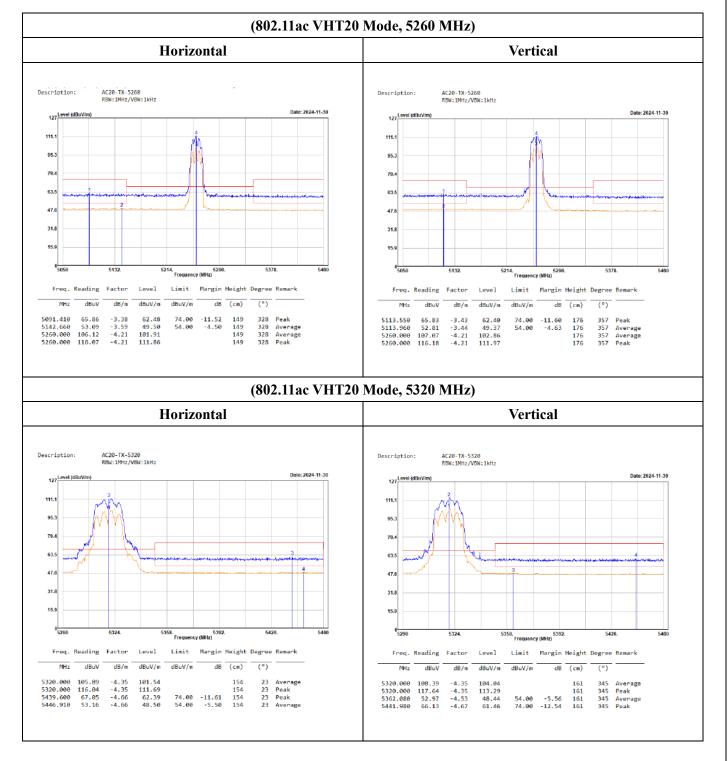


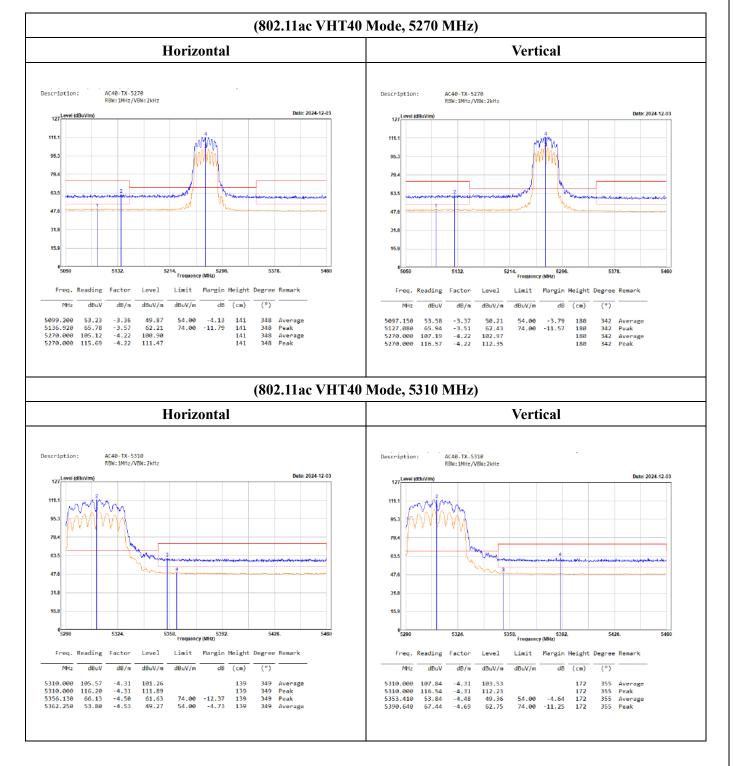


#### 802.11ax HE40 Mode, 5230 MHz

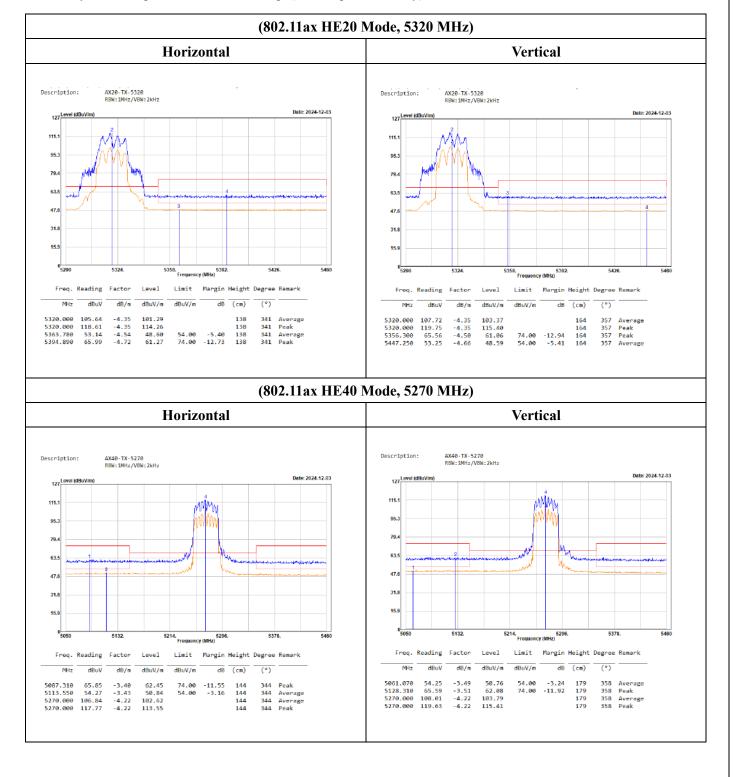
#### 5250-5350 MHz

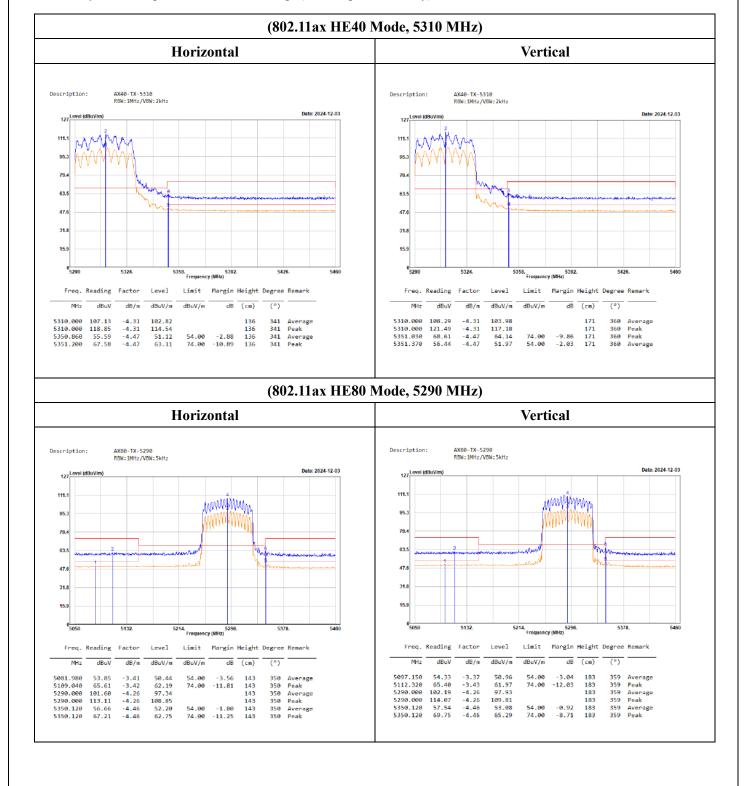








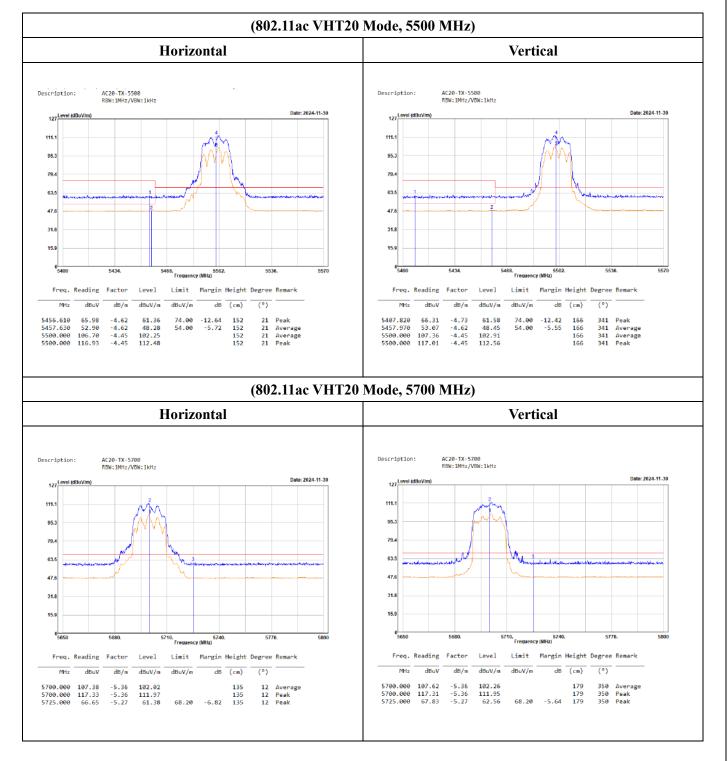


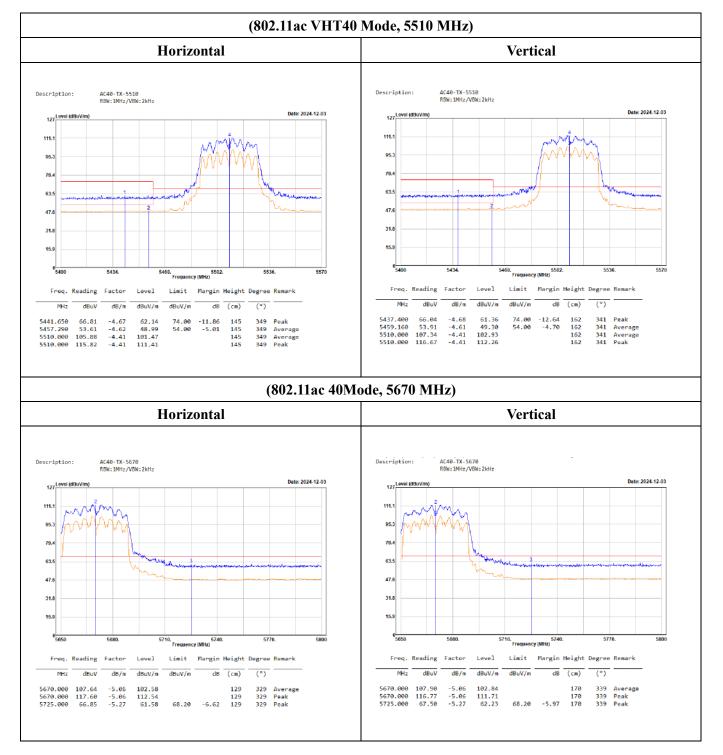


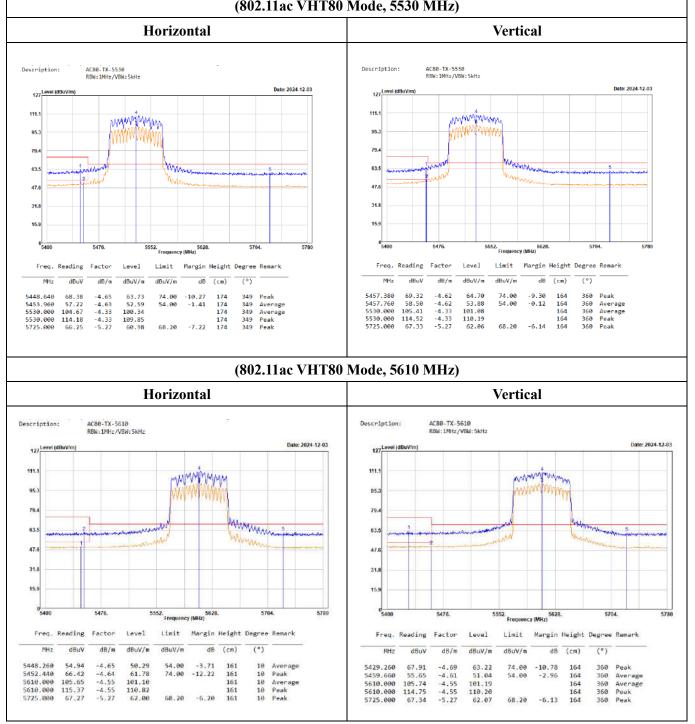
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## 5470-5725 MHz

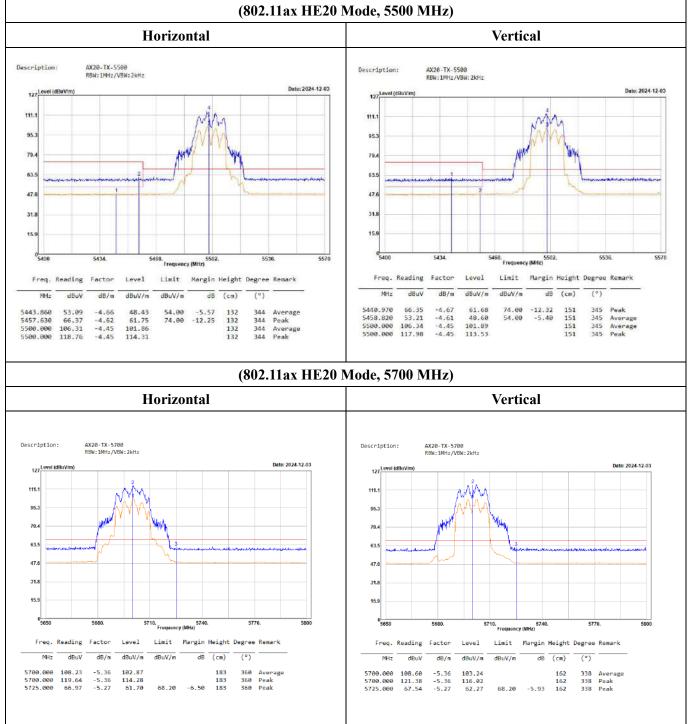


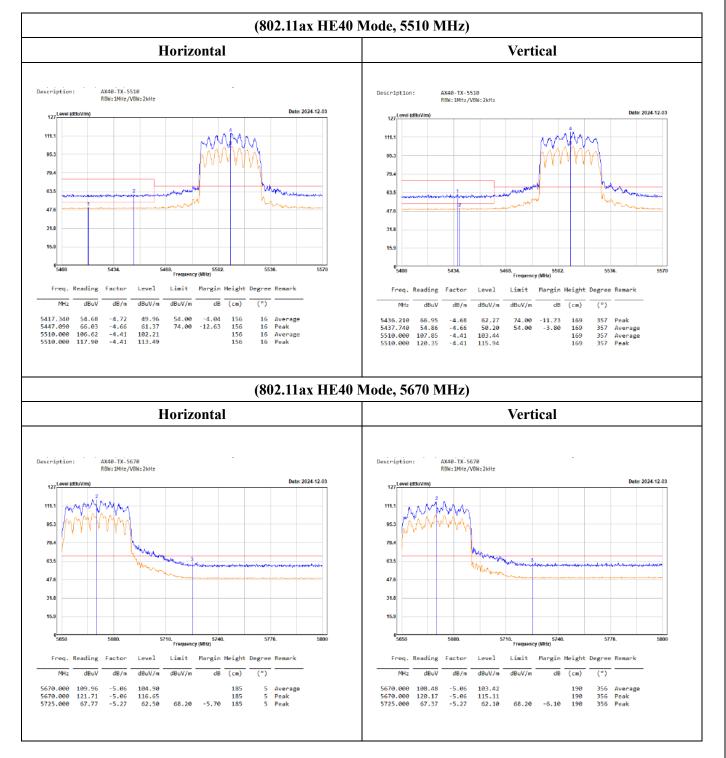


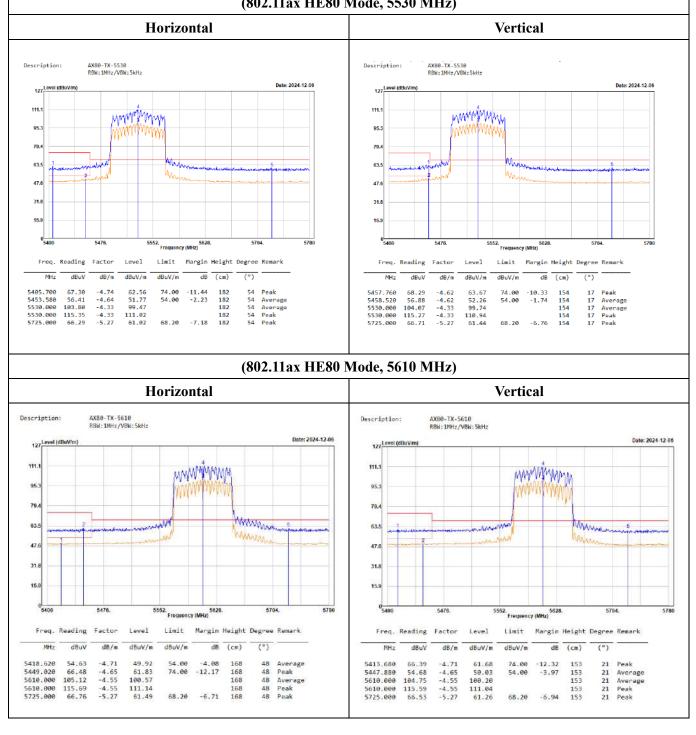




#### (802.11ac VHT80 Mode, 5530 MHz)

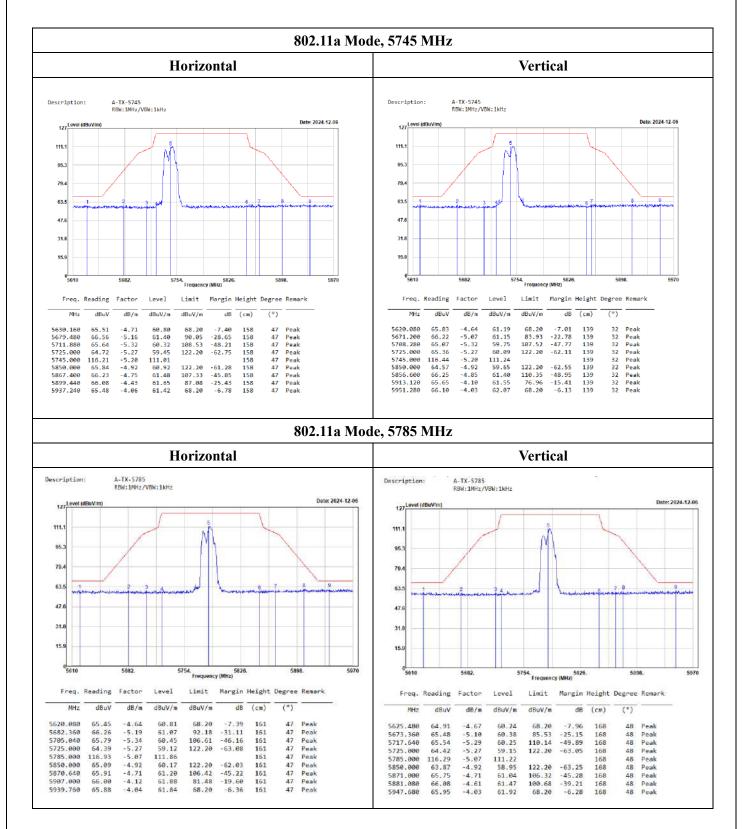


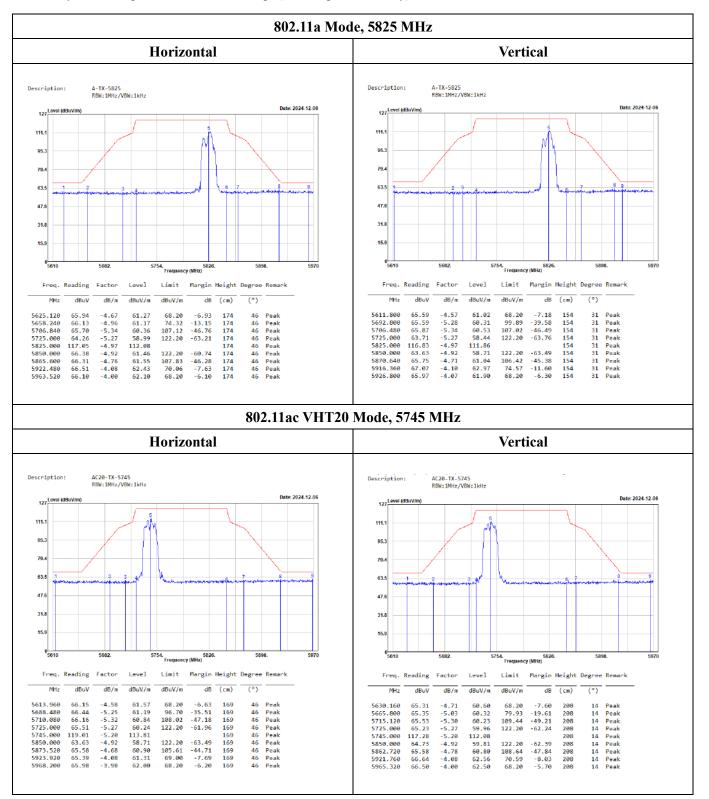


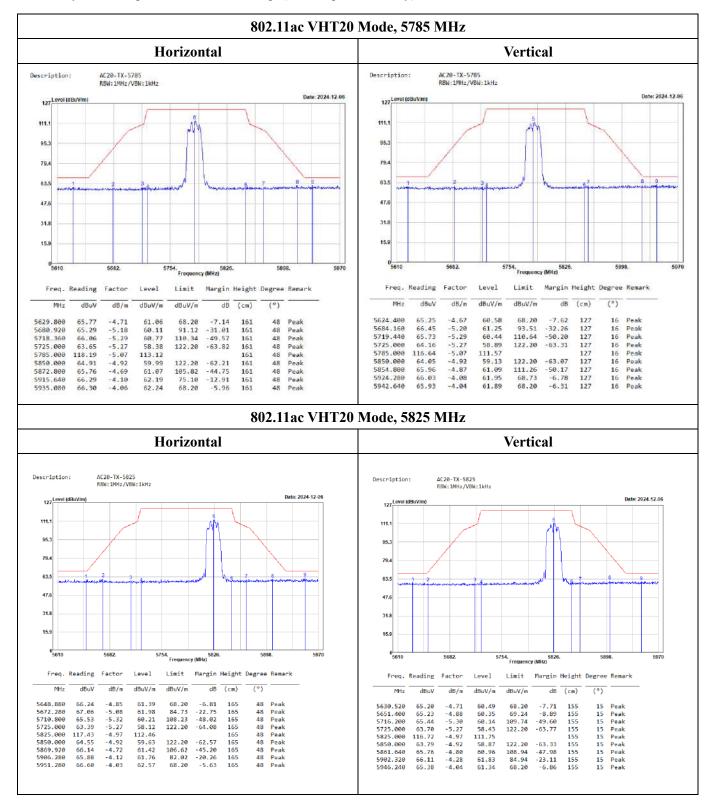


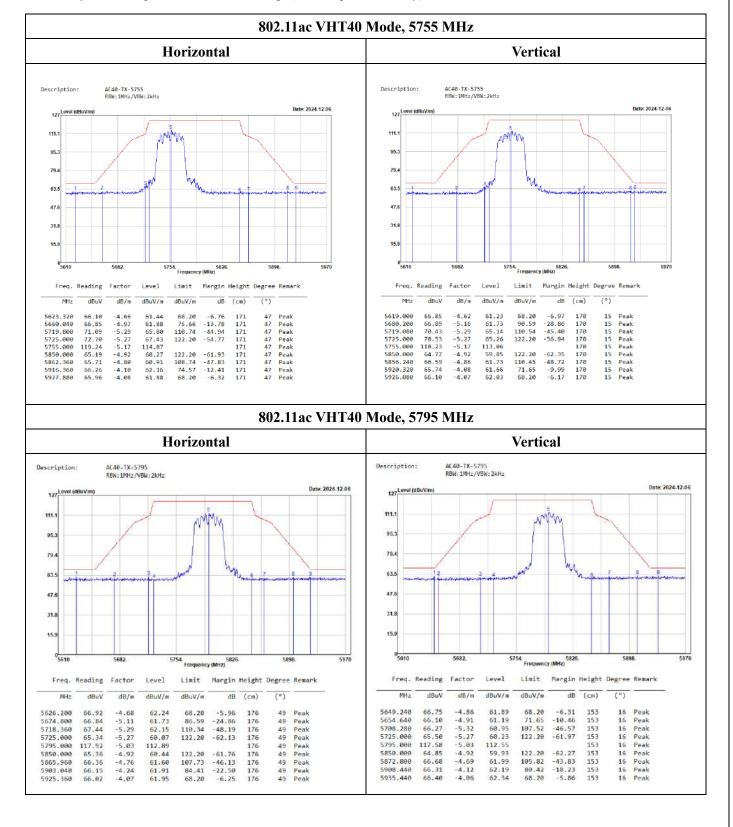
#### (802.11ax HE80 Mode, 5530 MHz)

#### 5725-5850 MHz

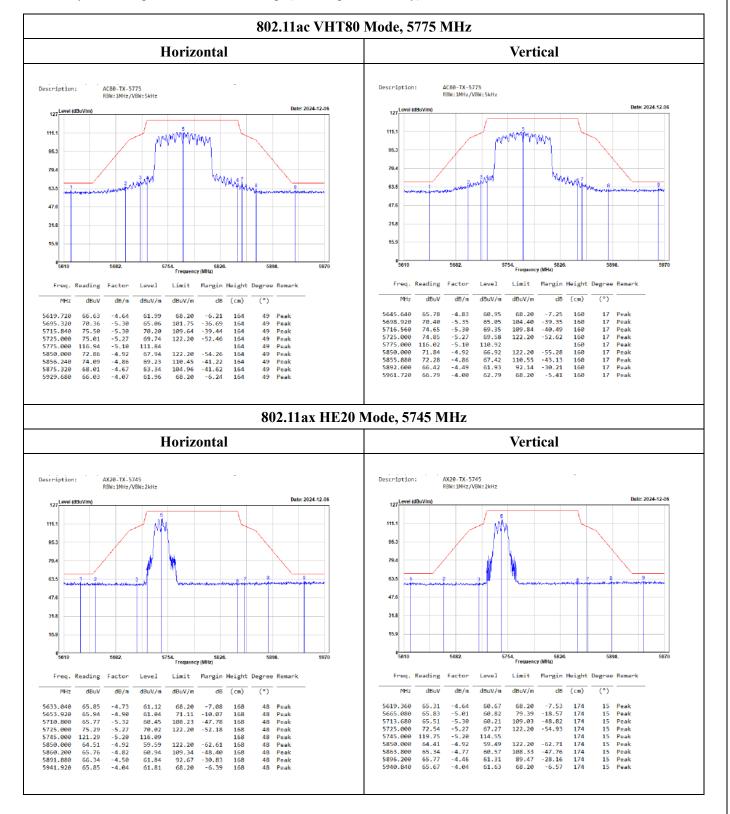


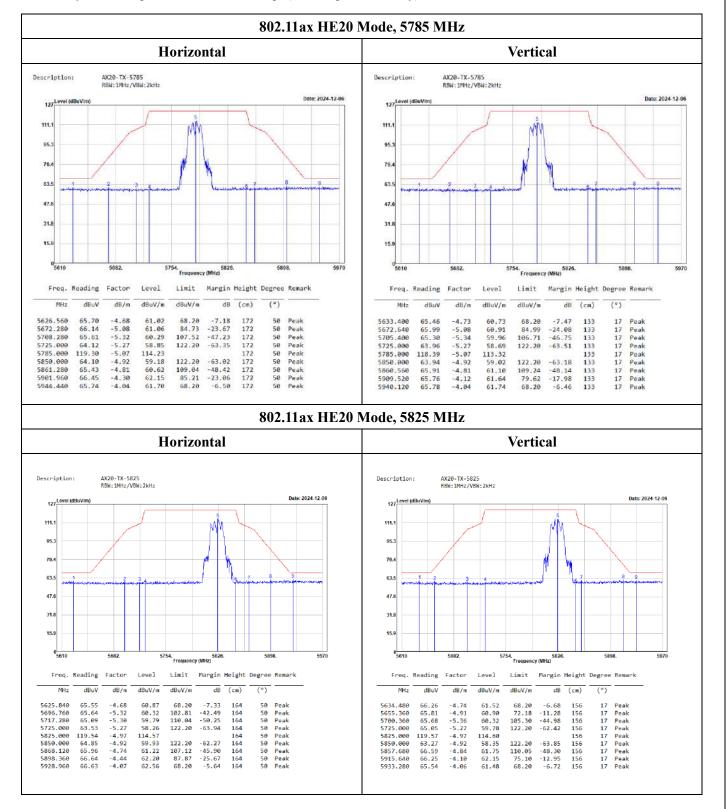




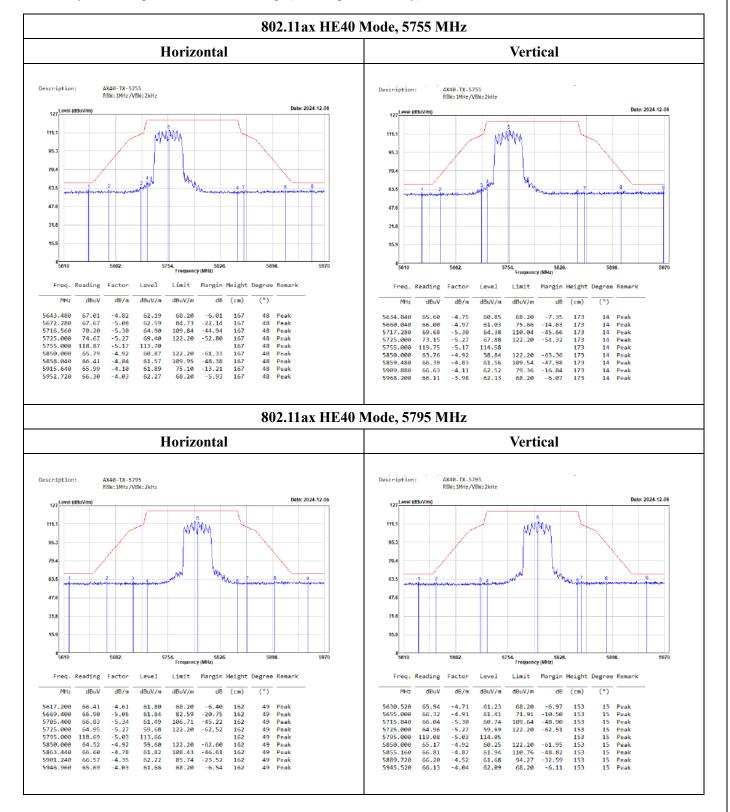


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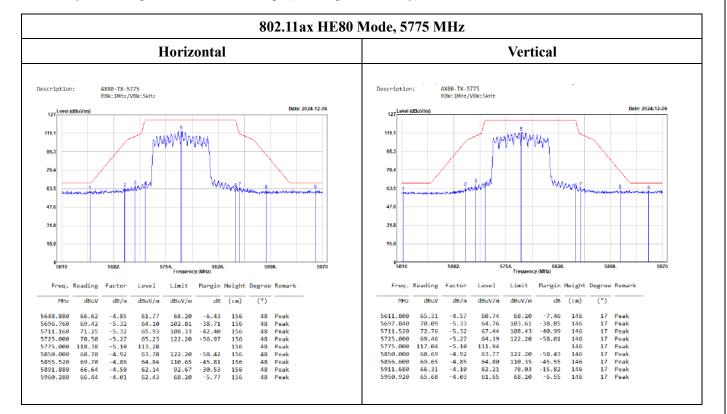




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Level = Reading + Factor.

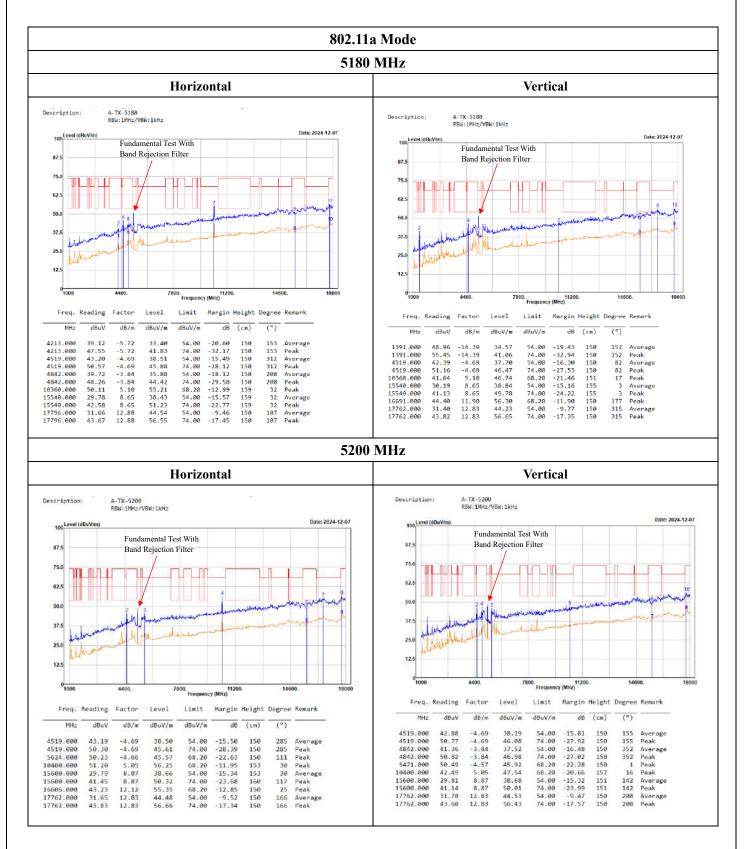
Margin = Level - Limit.

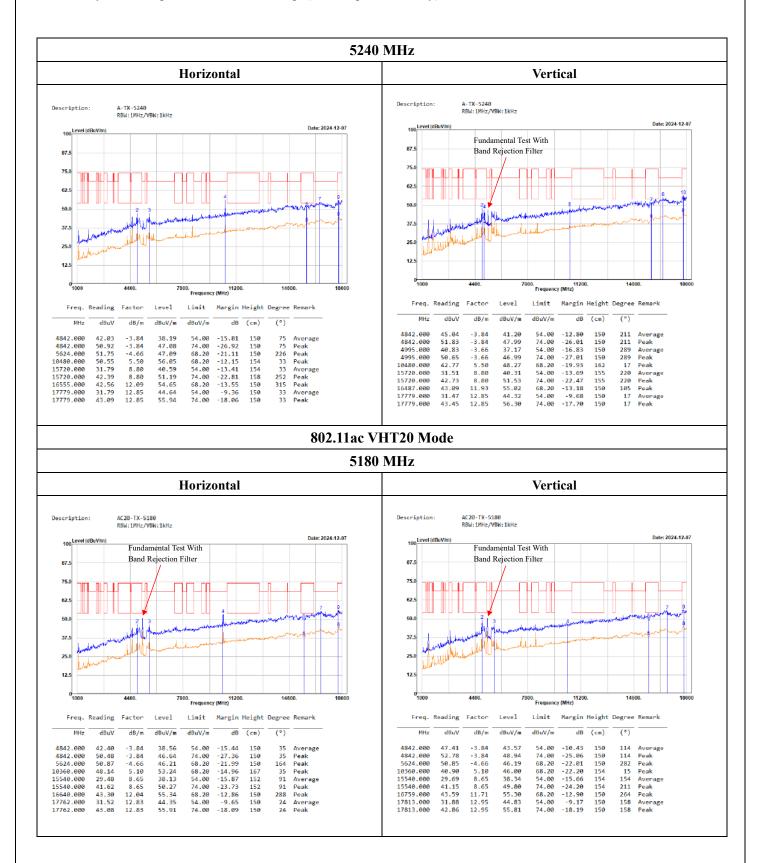
Factor = Antenna Factor + Cable Loss - Amplifier Gain.

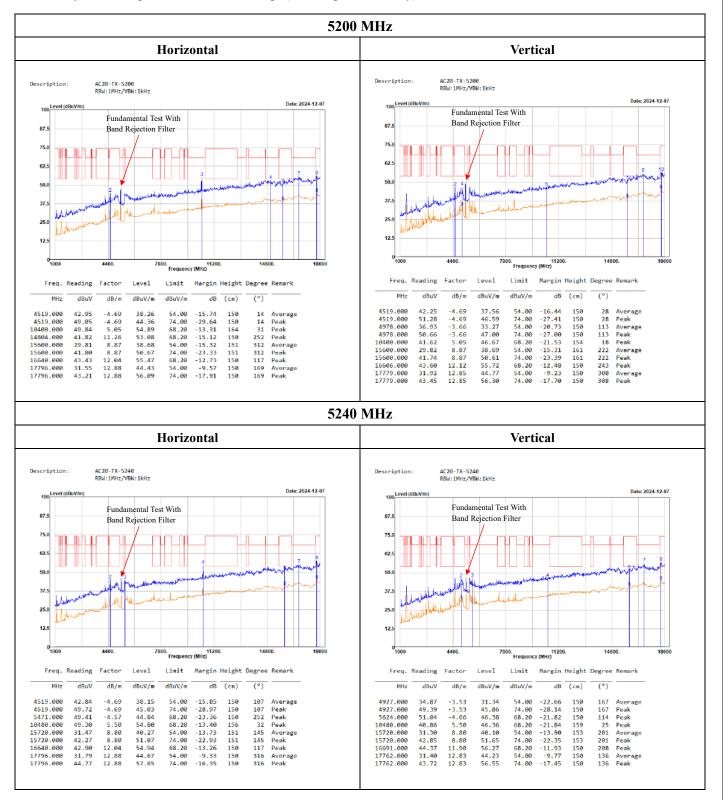
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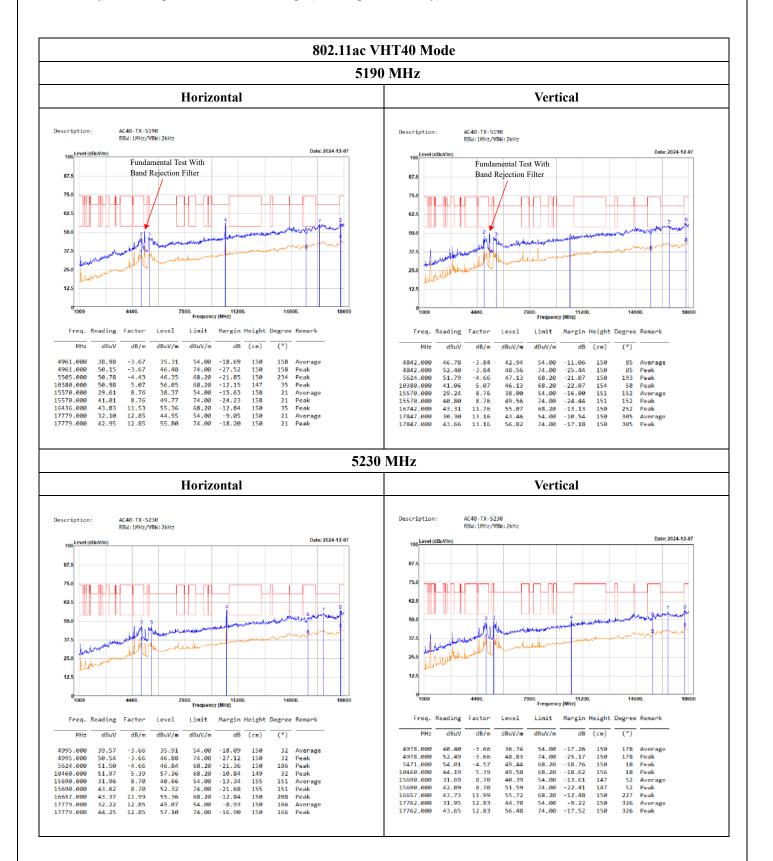
## 1GHz-18GHz:

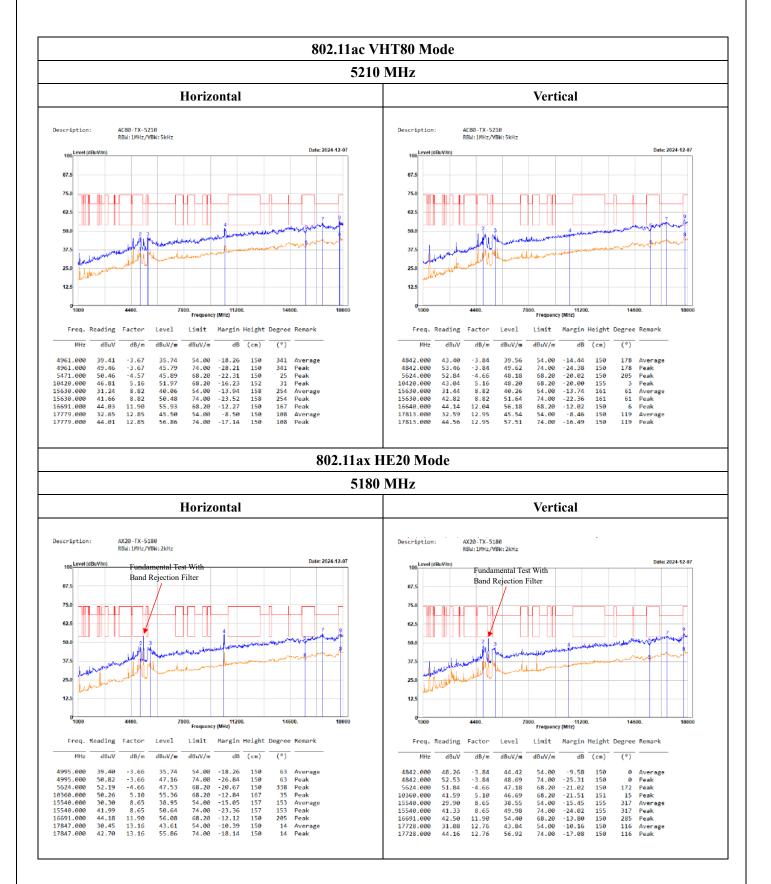
## 5150-5250 MHz

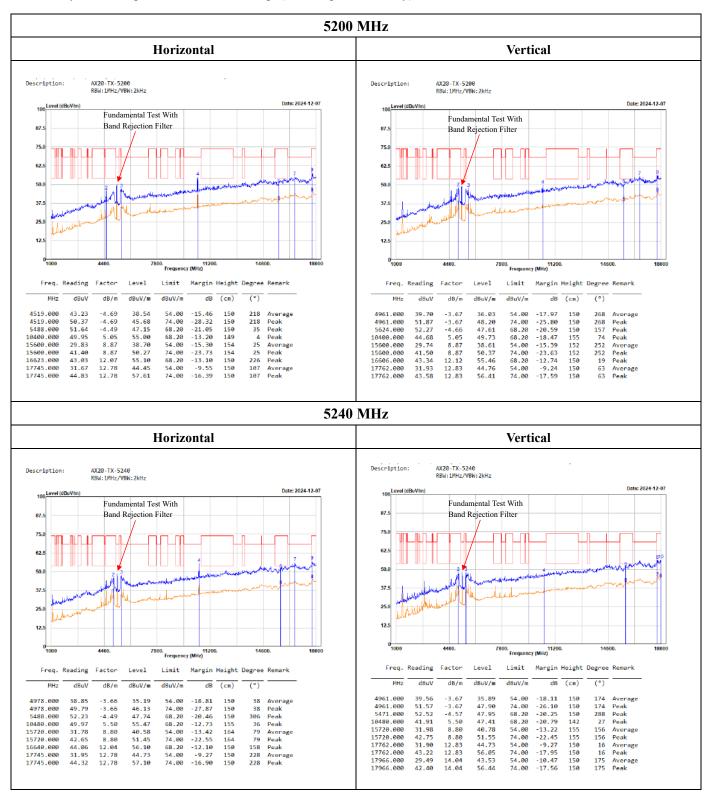


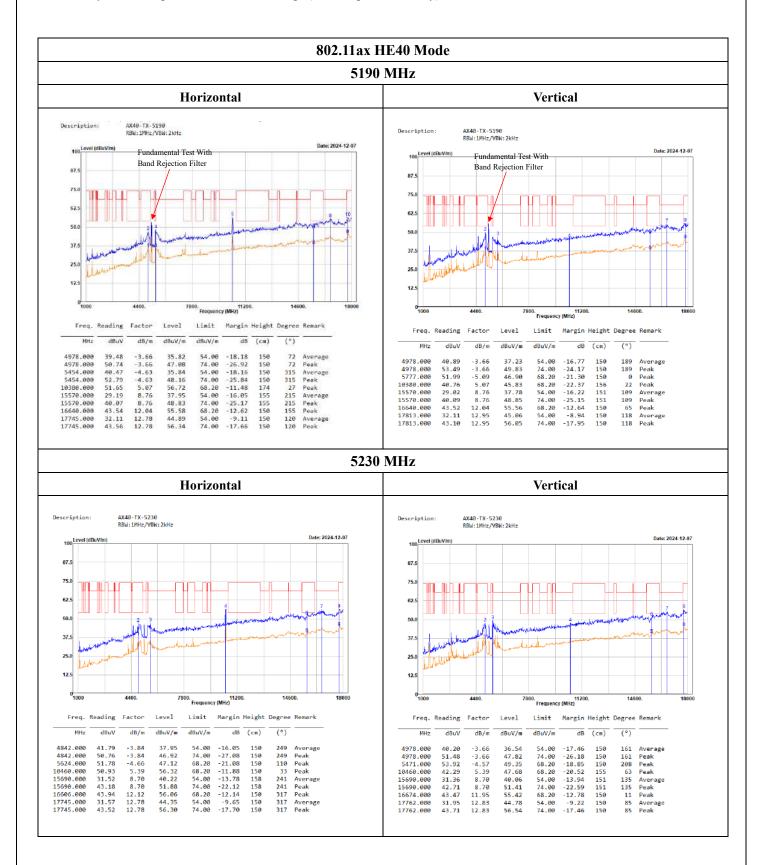


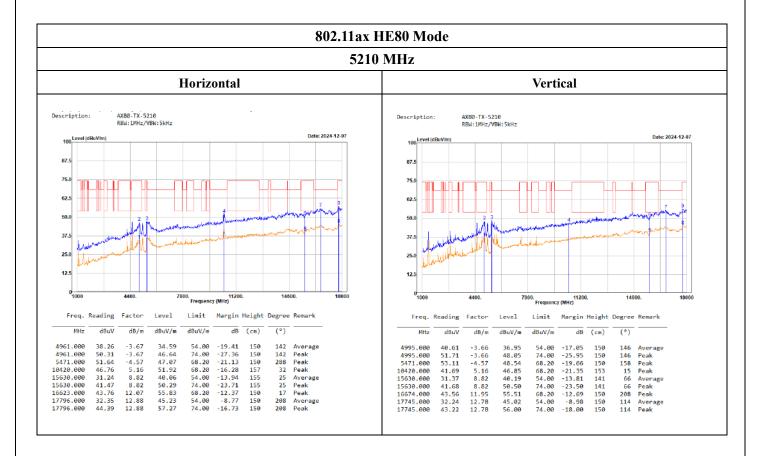




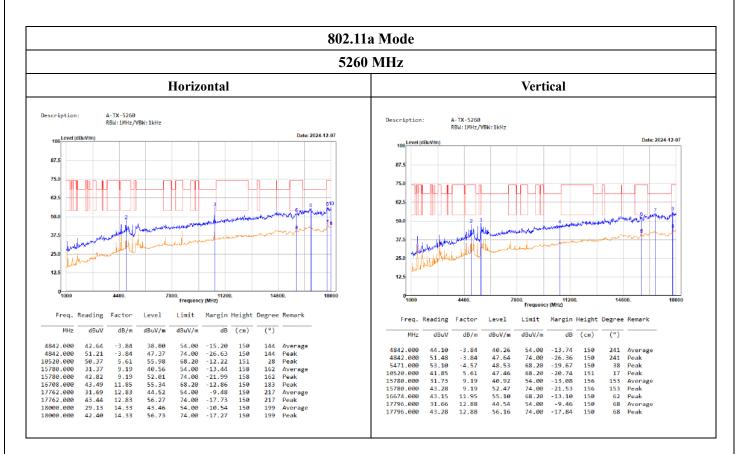




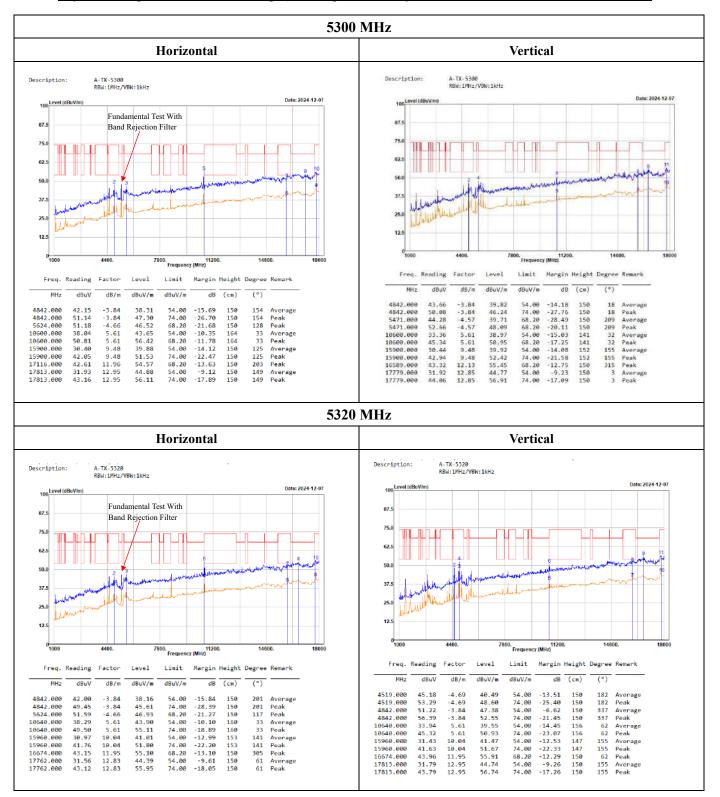


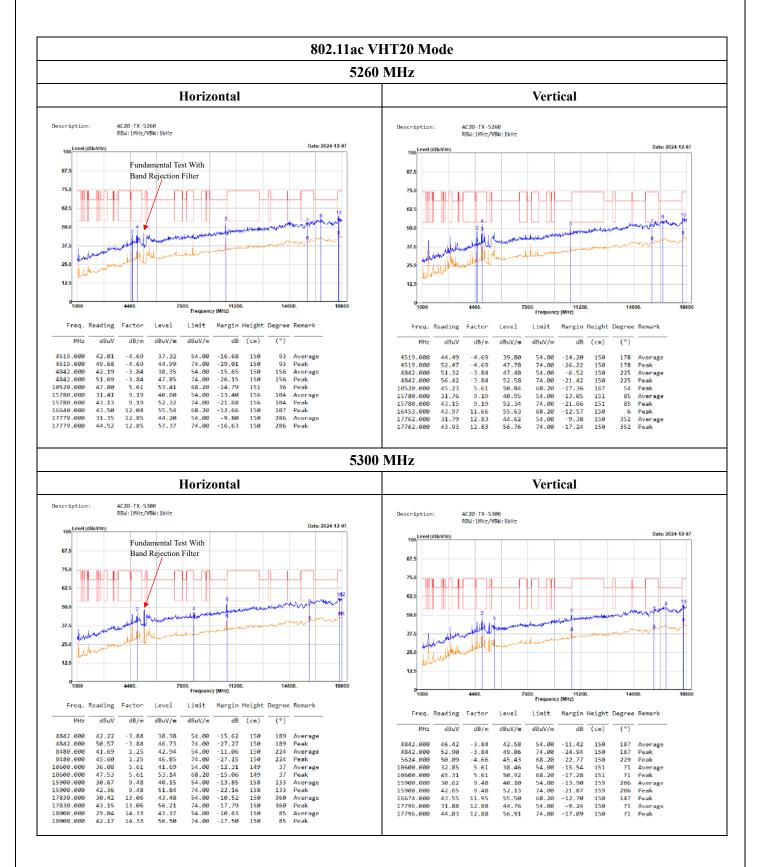


#### 5250-5350 MHz

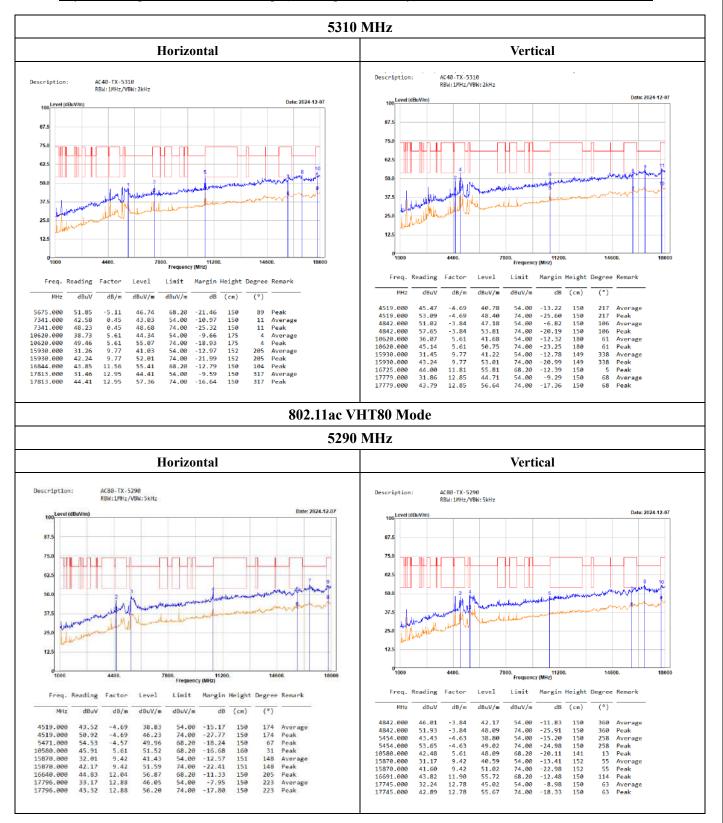


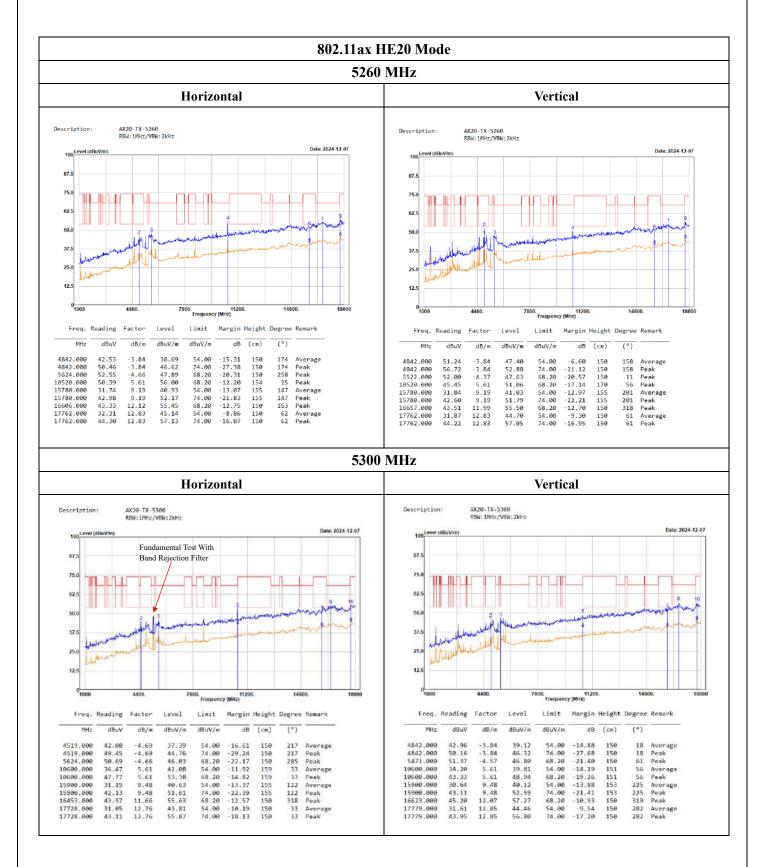
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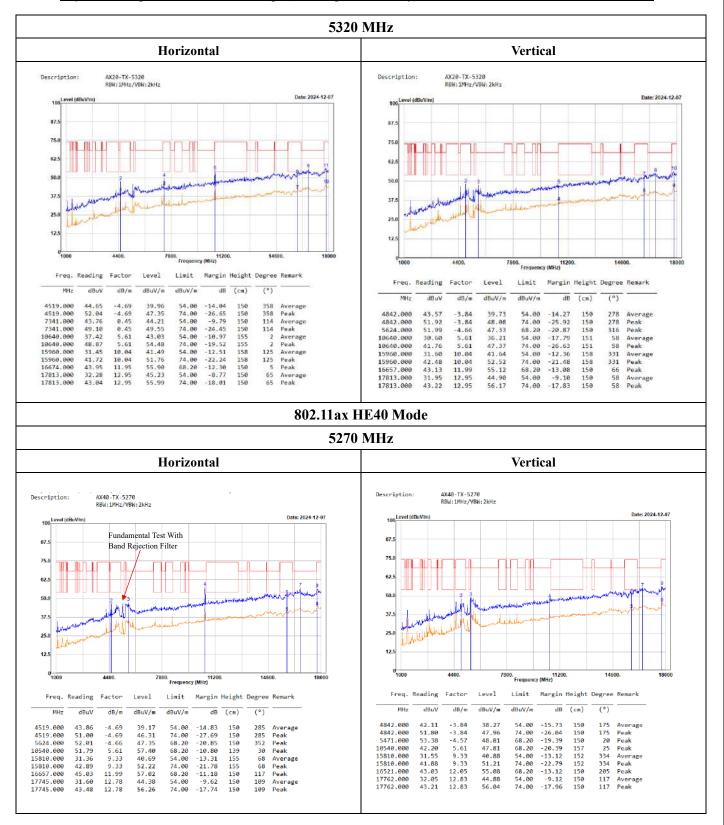


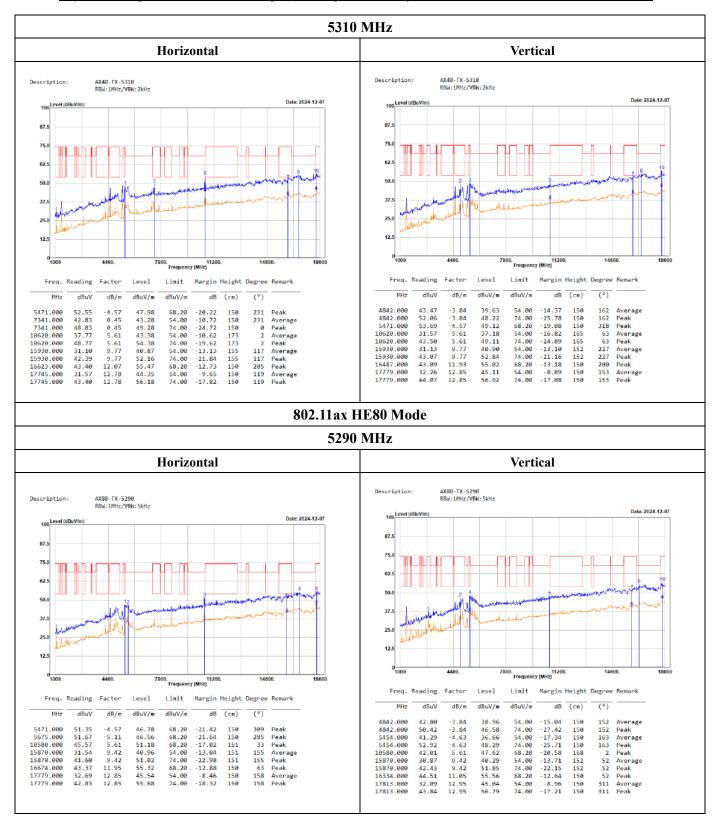












#### 5470-5725 MHz

