TEST REPORT

Applicant Name:	Shenzhen Feima Robotics Co., Ltd.
Address:	13th Floor, Building A4, Nanshan Zhiyuan, No. 1001 Xueyuan Avenue, Taoyuan Street, Nanshan District, Shenzhen, China
Report Number:	SZ4231220-76923E-RF-00B
FCC ID:	2A7JA-SLAM2000

Test Standard (s)

FCC PART 15.407

Sample Description

Product Type:	HANDHELD LASER SCANNER
Model No.:	SLAM2000
Multiple Model(s) No.:	X70GO
Trade Mark:	FEIMA ROBOTICS / STONEX
Date Received:	2024/01/19
Issue Date:	2024/03/29

Test Result:	Pass▲

▲ In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

April Zhang

April Zhang
RF Engineer

Approved By:

Nancy Wang

Nancy Wang
RF Supervisor

Note: The information marked# is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report. Customer model name, addresses, names, trademarks etc. are included.
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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	SZ4231220-76923E-RF-00B	Original Report	2024/03/29

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	HANDHELD LASER SCANNER
Tested Model	SLAM2000
Multiple Model(s)	X70^{GO}
Frequency Range	5G Wi-Fi: 5150-5250MHz; 5725-5850MHz
Mode	802.11a/n20/n40/ac20/ac40/ac80
Maximum Conducted Average Output Power	5150-5250MHz: 14.77dBm 5725-5850MHz: 17.30dBm
Modulation Technique	OFDM
Antenna Specification#	ANT0: 2.3dBi; ANT1: 2.3dBi (It is provided by the manufacturer)
Voltage Range	DC 5-20V from Type-C Port or DC 10.8V from battery
Sample serial number	2FJI-2 for Conducted and Radiated Emissions Test 2FJI-1 for RF Conducted Test (Assigned by BACL, Shenzhen)
Sample/EUT Status	Good condition
Adapter Information	N/A
Note: The Multiple models are electrically identical with the test model except for model number. Please refer to the declaration letter# for more detail, which was provided by manufacturer.	

Objective

This test report is in accordance with Part 2-Subpart J, Part 15-Subparts A and E of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart E, section 15.203, 15.205, 15.207, 15.209 and 15.407 rules.

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. And KDB789033 D02 General U-NII Test Procedures New Rules v02r01.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Each test item follows test standards and with no deviation.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		±5%
RF Frequency		213.55 Hz(k=2, 95% level of confidence)
RF output power, conducted		0.72 dB(k=2, 95% level of confidence)
Unwanted Emission, conducted		1.75 dB(k=2, 95% level of confidence)
AC Power Lines Conducted Emissions	9kHz-150kHz	3.94dB(k=2, 95% level of confidence)
	150kHz-30MHz	3.84dB(k=2, 95% level of confidence)
Radiated Emissions	9kHz - 30MHz	3.30dB(k=2, 95% level of confidence)
	30MHz~200MHz (Horizontal)	4.48dB(k=2, 95% level of confidence)
	30MHz~200MHz (Vertical)	4.55dB(k=2, 95% level of confidence)
	200MHz~1000MHz (Horizontal)	4.85dB(k=2, 95% level of confidence)
	200MHz~1000MHz (Vertical)	5.05dB(k=2, 95% level of confidence)
	1GHz - 6GHz	5.35dB(k=2, 95% level of confidence)
	6GHz - 18GHz	5.44dB(k=2, 95% level of confidence)
	18GHz - 40GHz	5.16dB(k=2, 95% level of confidence)
Temperature		±1℃
Humidity		±1%
Supply voltages		±0.4%

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.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 5F(B-West) , 6F, 7F, the 3rd Phase of Wan Li Industrial Building D, Shihua Rd, FuTian Free Trade Zone, Shenzhen, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 715558, the FCC Designation No. : CN5045.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

The system support 802.11a/n ht20/n ht40/ac vht20/ac vht40/ac vht80, the 802.11 n ht20/n ht40 were reduced since the identical parameters with 802.11ac vht20 and vht40.

For 5150-5250MHz Band, 7 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	44	5220
38	5190	46	5230
40	5200	48	5240
42	5210	/	/

For 802.11a/ac20 mode: channel 36, 40, 48 were tested;
For 802.11ac40 mode: channel 38, 46 were tested;
For 802.11ac80 mode, channel 42 was tested.

For 5725-5850MHz Band, 8 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	157	5785
151	5755	159	5795
153	5765	161	5805
155	5775	165	5825

For 802.11a/ac20 mode: channel 149, 157, 165 were tested;
For 802.11ac40 mode: channel 151, 159 were tested;
For 802.11ac80 mode, channel 155 was tested.

EUT Exercise Software

"cmd.exe"[#] software was used and power level as below. The software and power level was provided by the applicant. The device was tested with the worst case was performed as below:

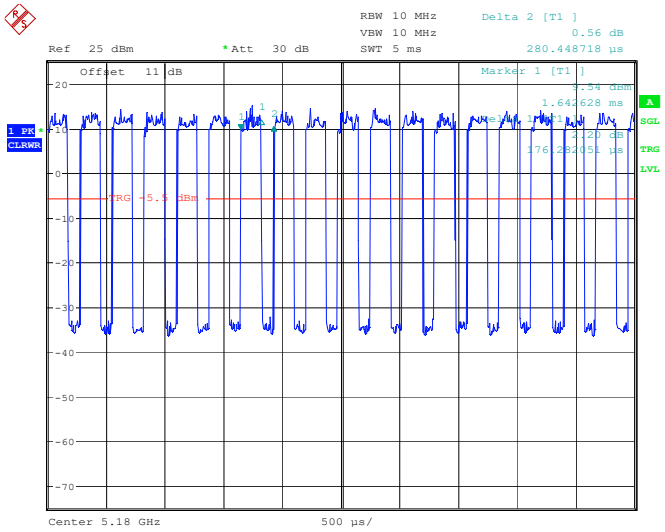
5150-5250 MHz Band:					
Test Modes	**Test Channels**	**Test Frequency**	**Data rate**	**Power Level Setting[#]**	
				ANT 0	**ANT 1**
802.11a	Lowest	5180	6Mbps	12	12
	Middle	5200	6Mbps	12	12
	Highest	5240	6Mbps	12	12
802.11ac vht20	Lowest	5180	MCS0	12	12
	Middle	5200	MCS0	12	12
	Highest	5240	MCS0	12	12
802.11ac vht40	Lowest	5190	MCS0	12	12
	Highest	5230	MCS0	12	12
802.11ac vht80	Middle	5210	MCS0	12	12
5725-5850 MHz Band:					
Test Modes	**Test Channels**	**Test Frequency**	**Data rate**	**Power Level Setting[#]**	
				ANT 0	**ANT 1**
802.11a	Lowest	5260	6Mbps	12	12
	Middle	5280	6Mbps	12	12
	Highest	5320	6Mbps	12	12
802.11ac vht20	Lowest	5260	MCS0	12	12
	Middle	5280	MCS0	12	12
	Highest	5320	MCS0	12	12
802.11ac vht40	Lowest	5270	MCS0	12	12
	Highest	5310	MCS0	12	12
802.11ac vht80	Middle	5290	MCS0	12	12

1. The above are the worst-case data rates, which are determined for each mode based upon investigations by measuring the average power and PSD across all data rates, bandwidths, and modulations.
2. For 802.11 a mode, the device only support SISO mode.
3. For 802.11n/ac modes, the device supports SISO and MIMO in all modes, per pretest, the MIMO mode was the worst mode for all the modes.

Duty cycle

Test Modes	Ton (ms)	Ton+off (ms)	Duty cycle (%)	Duty Cycle Factor (dB)	1/T (Hz)	VBW Setting (kHz)
802.11a	0.176	0.280	62.86	2.02	5682	10
802.11ac vht20	0.144	0.248	58.06	2.36	6944	10
802.11ac vht40	0.091	0.191	47.64	3.22	10989	20
802.11ac vht80	0.067	0.167	40.12	3.97	14925	20
Note: Test only was performed at ANT 0.						

802.11a



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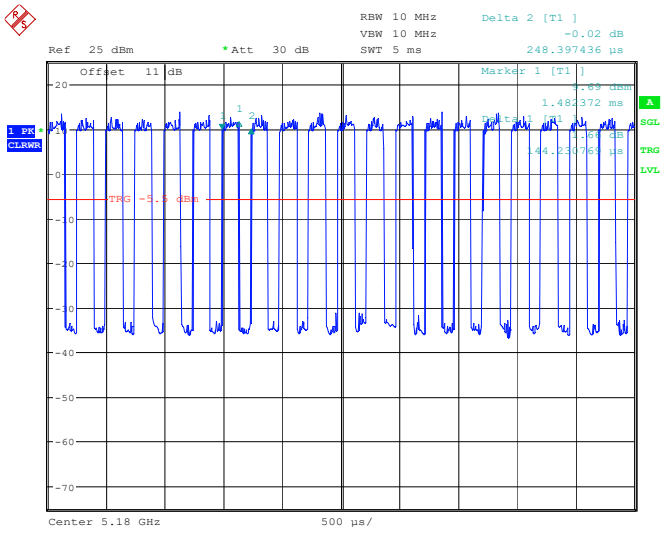
Date: 20.MAR.2024 00:27:18

802.11ac 20



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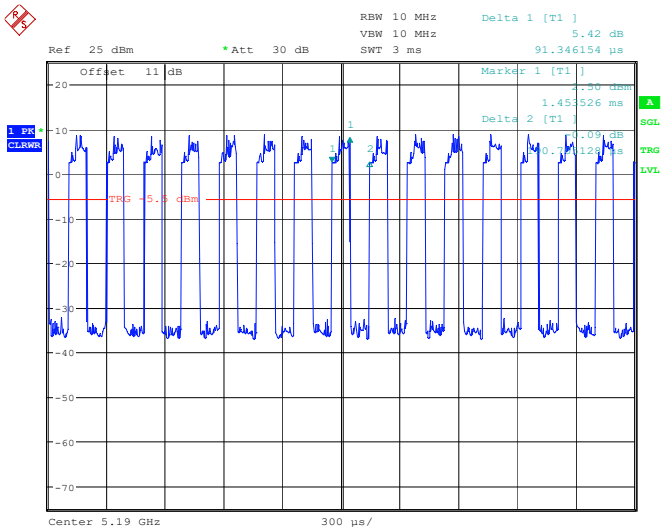
Date: 20.MAR.2024 00:34:40

802.11ac 40



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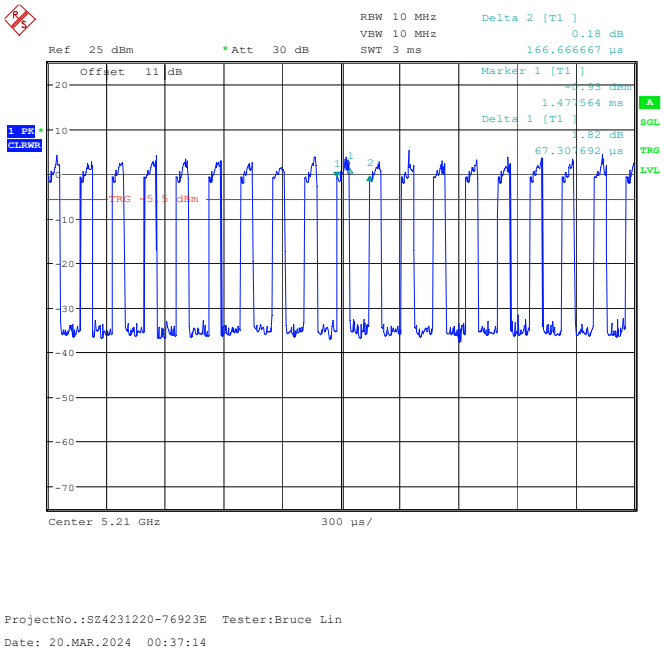
Date: 20.MAR.2024 00:36:11

802.11ac 80



Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

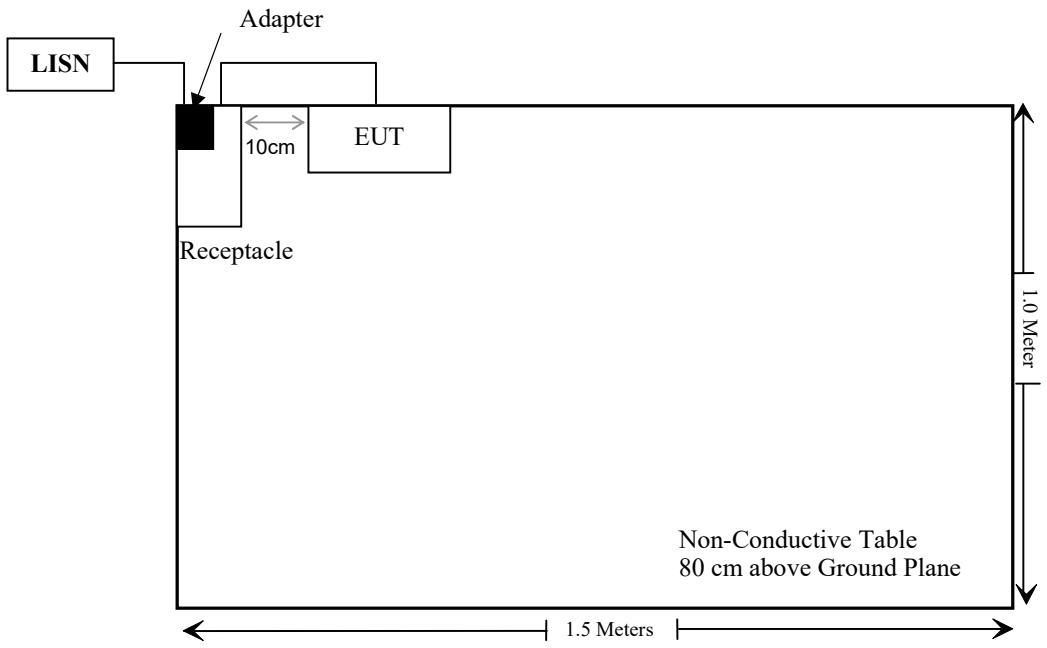
Manufacturer	Description	Model	Serial Number
Huntkey	Adapter	HKA06520033	A65D2N233X000203

External I/O Cable

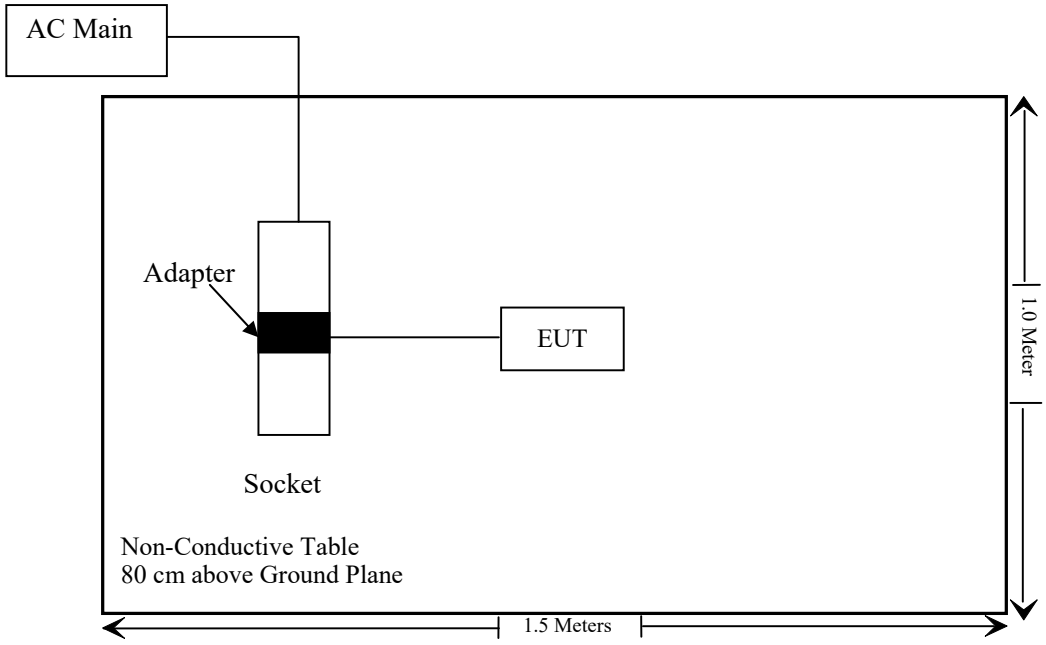
Cable Description	Length (m)	From Port	To
Un-shielding Detachable USB Cable	1.0	EUT	Adapter

Block Diagram of Test Setup

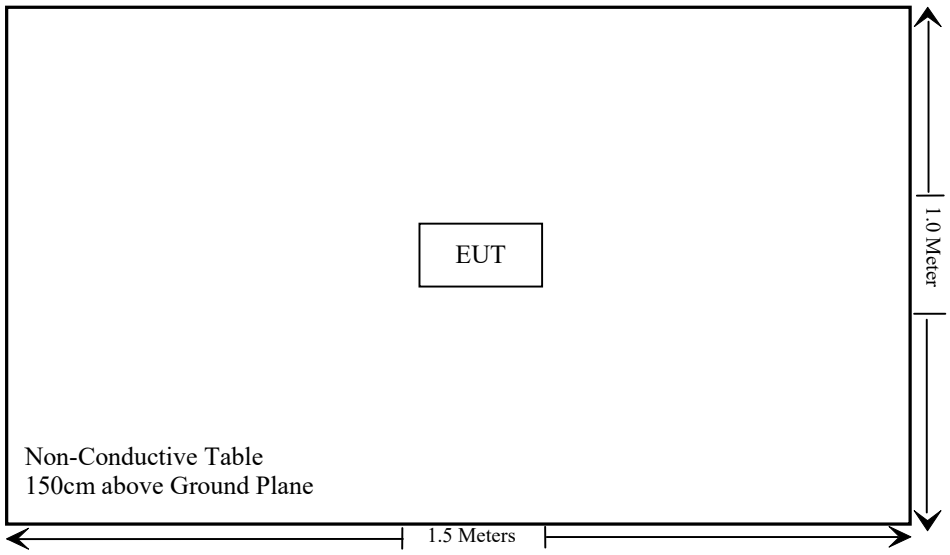
For Conducted Emissions:



For Radiated Emissions below 1GHz:



For Radiated Emissions above 1GHz:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307 (b) (1) &§2.1093	RF Exposure	Compliant
§15.203	Antenna Requirement	Compliant
§15.407(b)(9)& §15.207(a)	Conducted Emissions	Compliant
§15.205& §15.209 &§15.407(b)	Undesirable Emission& Restricted Bands	Compliant
§15.407(a) (e)	26 dB Emission Bandwidth & 6dB Bandwidth	Compliant
§15.407(a)	Conducted Transmitter Output Power	Compliant
§15.407 (a)	Power Spectral Density	Compliant
§15.407 (h)	Transmit Power Control (TPC)	Not Applicable
§15.407 (h)	Dynamic Frequency Selection (DFS)	Not Applicable

Not Applicable: the EUT only support the 5150-5250MHz and 5725-5850MHz.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2024/01/16	2025/01/15
Rohde & Schwarz	LISN	ENV216	101613	2024/01/16	2025/01/15
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2023/08/03	2024/08/02
Unknown	CE Cable	CE Cable	UF A210B-1-0720-504504	2023/08/03	2024/08/02
Audix	EMI Test software	E3	191218	NCR	NCR
Radiated Emissions Test					
R&S	EMI Test Receiver	ESR3	102455	2024/01/16	2025/01/15
Sonoma instrument	Pre-amplifier	310 N	186238	2023/06/08	2024/06/07
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2023/07/20	2024/07/19
ETS	Passive Loop Antenna	6512	29604	2023/07/07	2024/07/06
Unknown	Cable	Chamber Cable 1	F-03-EM236	2023/08/03	2024/08/02
Unknown	Cable	Chamber Cable 4	EC-007	2023/08/03	2024/08/02
Audix	EMI Test software	E3	19821b(V9)	NCR	NCR
Rohde & Schwarz	Spectrum Analyzer	FSV40	101605	2023/04/18	2024/04/17
COM-POWER	Pre-amplifier	PA-122	181919	2023/06/29	2024/06/28
A.H.System	Pre-amplifier	PAM-1840VH	190	2023/08/03	2024/08/02
Schwarzbeck	Horn Antenna	BBHA9120D (1201)	1143	2023/07/26	2024/07/25
Electro-Mechanics Co	Horn Antenna	3116	9510-2270	2023/09/18	2026/09/17
SNSD	5G Band Reject filter	BSF5150-5850MN-0899-004	5G filter	2023/08/03	2024/08/02
Unknown	RF Cable	KMSE	0735	2023/10/08	2024/10/07
Unknown	RF Cable	UFA147	219661	2023/10/08	2024/10/07
Unknown	RF Cable	XH750A-N	J-10M	2023/10/08	2024/10/07
UTIFLEX	RF Cable	NO. 13	232308-001	2023/08/03	2024/08/02
Audix	EMI Test software	E3	191218(V9)	NCR	NCR
RF Conducted Test					
Agilent	USB wideband power sensor	U2021XA	MY52350001	2023/06/08	2024/06/07
Rohde & Schwarz	SPECTRUM ANALYZER	FSU26	200982	2023/12/18	2024/12/17
Unknown	10dB Attenuator	Unknown	F-03-EM190	2023/07/04	2024/07/03

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC§1.1307 (b) (1) &§2.1093 – RF EXPOSURE

Applicable Standard

According to FCC §2.1093 and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D01 General RF Exposure Guidance

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where
1. f(GHz) is the RF channel transmit frequency in GHz.
2. Power and distance are rounded to the nearest mW and mm before calculation.
3. The result is rounded to one decimal place for comparison.
4. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test Exclusion.

Measurement Result

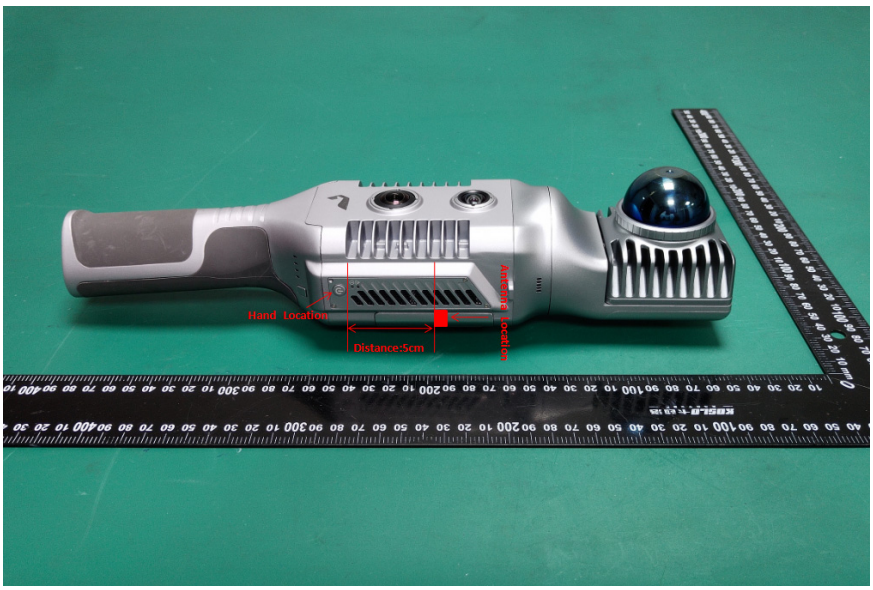
For worst case:

Mode	Frequency (MHz)	Max tune-up conducted power# (dBm)	Max tune-up conducted power# (mW)	Distance (mm)	Calculated value	Threshold (10-g SAR)	SAR Test Exclusion
5.2G Wi-Fi	5180-5240	15.0	31.62	50	1.4	7.5	Yes
5.8G Wi-Fi	5745-5825	17.5	56.23	50	2.7	7.5	Yes

Note: This device is a handheld device.

Result: Compliant.

Antennas Location:



FCC §15.203 – ANTENNA REQUIREMENT

Applicable Standard

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 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 user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.
c. Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.407 (a), if the transmitting antennas of directional gain greater than 6dBi are used, the transmit power and power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT has two internal antennas which were permanently attached, and the maximum antenna gain[#] is 2.3dBi, fulfill the requirement of this section. Please refer to the EUT photos.

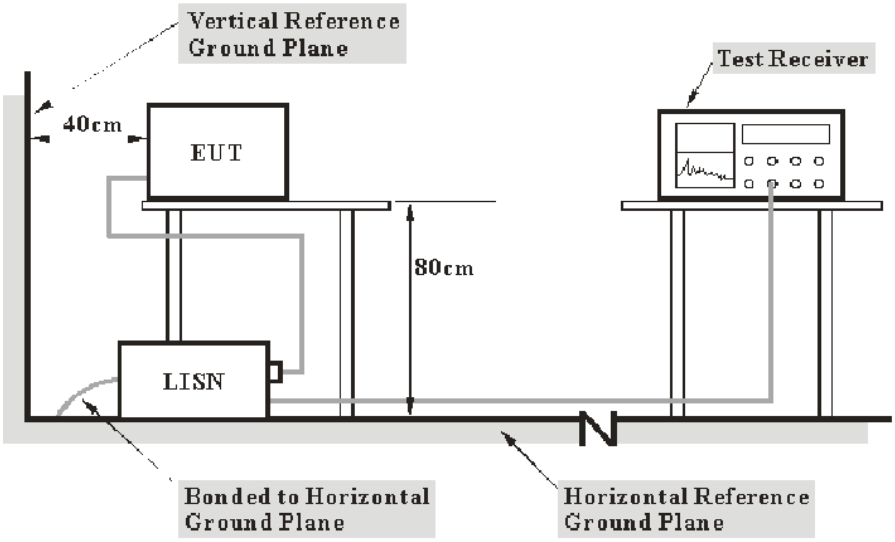
Result: Compliant

FCC §15.407 (b) (6) §15.207 (a) – CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207, §15.407(b) (6)

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

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

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

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

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

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

Test Procedure

During the conducted emission test, the adapter was connected to 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.

Factor & Over Limit Calculation

The factor is calculated by adding LISN VDF (Voltage Division Factor) and Cable Loss. The basic equation is as follows:

Factor = LISN VDF + Cable Loss

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 calculation is as follows:

Over Limit = Level – Limit
Level = Read Level + Factor

Note: The term "cable loss" refers to the combination of a cable and a 10dB transient limiter (attenuator).

Test Data

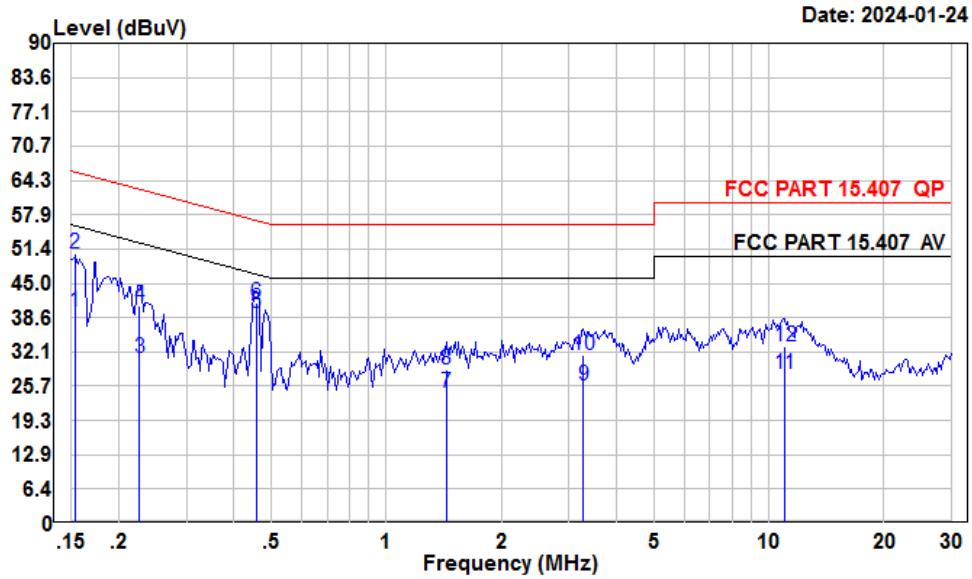
Environmental Conditions

Temperature:	25 °C
Relative Humidity:	45 %
ATM Pressure:	101 kPa

The testing was performed by Macy Shi on 2024-01-24.

EUT operation mode: Transmitting (Maximum output power mode, 802.11 ac 20, 5745MHz MIMO)

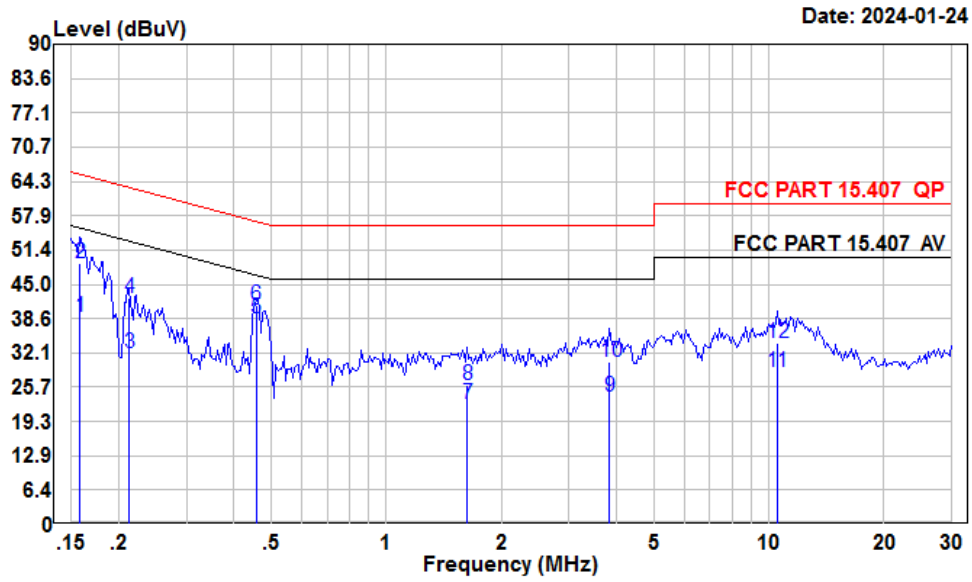
AC 120V/60 Hz, Line



Condition: Line
Project : SZ4231220-76923E-RF
Tester : Macy shi
Note : 5G WIFI

	Freq	Read Level	LISN Level	Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.15	19.03	39.78	10.60	10.15	55.82	-16.04	Average
2	0.15	29.95	50.70	10.60	10.15	65.82	-15.12	QP
3	0.23	10.17	30.93	10.61	10.15	52.57	-21.64	Average
4	0.23	19.96	40.72	10.61	10.15	62.57	-21.85	QP
5	0.46	18.44	39.31	10.69	10.18	46.76	-7.45	Average
6	0.46	20.42	41.29	10.69	10.18	56.76	-15.47	QP
7	1.43	3.58	24.39	10.75	10.06	46.00	-21.61	Average
8	1.43	8.00	28.81	10.75	10.06	56.00	-27.19	QP
9	3.28	4.91	25.84	10.66	10.27	46.00	-20.16	Average
10	3.28	10.67	31.60	10.66	10.27	56.00	-24.40	QP
11	10.96	7.23	28.01	10.55	10.23	50.00	-21.99	Average
12	10.96	12.41	33.19	10.55	10.23	60.00	-26.81	QP

AC 120V/60 Hz, Neutral



Condition: Neutral
Project : SZ4231220-76923E-RF
Tester : Macy shi
Note : 5G WIFI

	Freq	Read Level	LISN Level	Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.16	18.21	38.90	10.54	10.15	55.56	-16.66	Average
2	0.16	28.24	48.93	10.54	10.15	65.56	-16.63	QP
3	0.21	11.38	32.21	10.71	10.12	53.10	-20.89	Average
4	0.21	21.70	42.53	10.71	10.12	63.10	-20.57	QP
5	0.46	17.67	38.64	10.79	10.18	46.76	-8.12	Average
6	0.46	19.98	40.95	10.79	10.18	56.76	-15.81	QP
7	1.63	1.89	22.65	10.67	10.09	46.00	-23.35	Average
8	1.63	5.42	26.18	10.67	10.09	56.00	-29.82	QP
9	3.84	2.99	23.95	10.70	10.26	46.00	-22.05	Average
10	3.84	9.43	30.39	10.70	10.26	56.00	-25.61	QP
11	10.51	7.66	28.66	10.76	10.24	50.00	-21.34	Average
12	10.51	12.96	33.96	10.76	10.24	60.00	-26.04	QP

§15.205 & §15.209 & §15.407(B)– UNDESIRABLE EMISSION

Applicable Standard

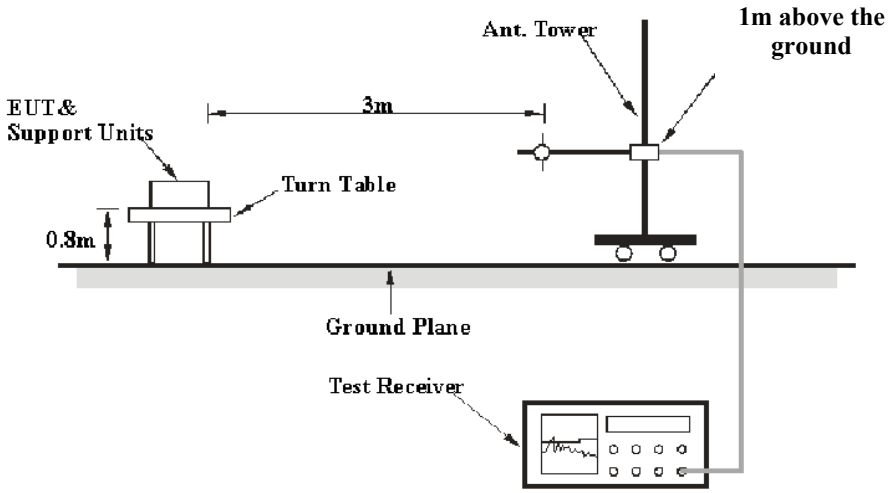
FCC §15.407 (b); §15.209; §15.205;

(b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:
(1) 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.
(2) 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.
(3) 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.
(4) For transmitters operating in the 5.725-5.85 GHz band:
(i) 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.

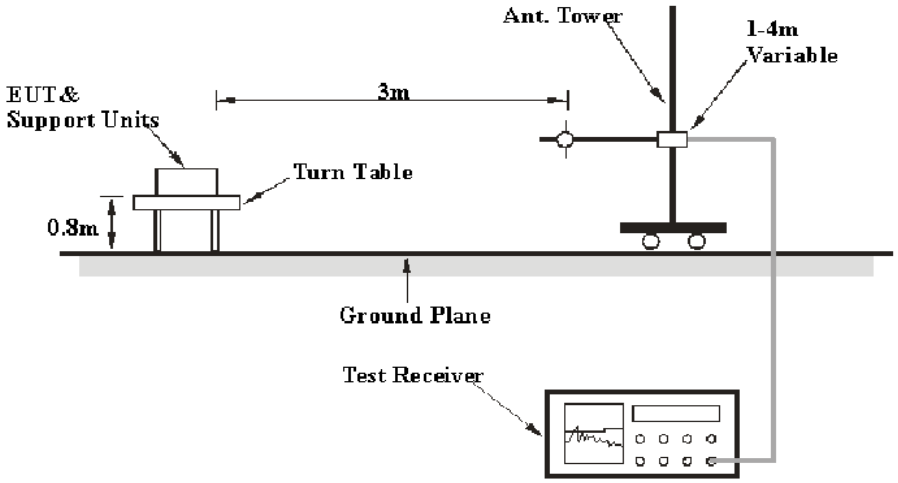
Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

EUT Setup

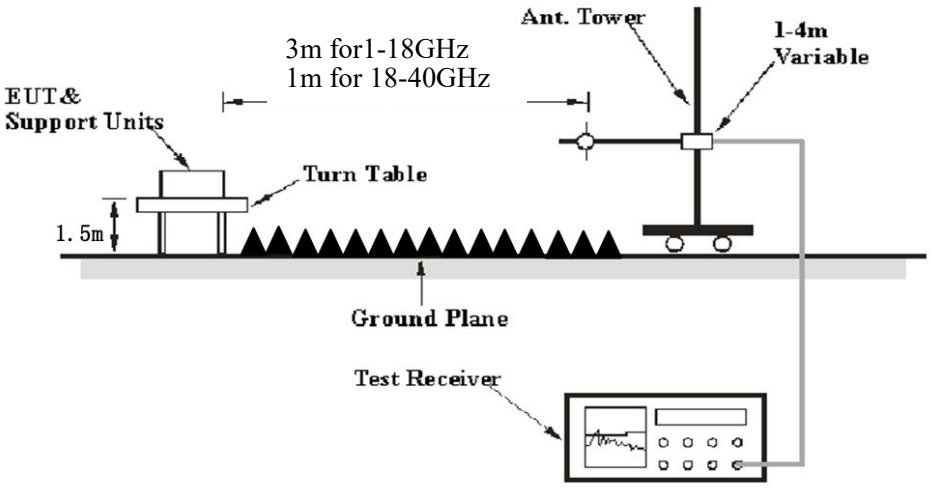
9 kHz-30MHz:



30MHz-1GHz:



Above 1 GHz:



The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC 15.209 and FCC 15.407 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

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 & Spectrum Analyzer Setup were set with the following configurations:

9 kHz-1GHz:

Frequency Range	RBW	Video B/W	IF B/W	Measurement
9 kHz – 150 kHz	/	/	200 Hz	QP
	300 Hz	1 kHz	/	PK
150 kHz – 30 MHz	/	/	9 kHz	QP
	10 kHz	30 kHz	/	PK
30 MHz – 1000 MHz	/	/	120 kHz	QP
	100 kHz	300 kHz	/	PK

1-40GHz:

Measurement	Duty cycle	RBW	Video B/W
PK	Any	1MHz	3 MHz
AV	>98%	1MHz	10 Hz
	<98%	1MHz	≥1/T

Note: T 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.

Test Procedure

Radiated Spurious Emission

During the radiated emission test, the adapter was connected to the AC floor outlet.

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

All final data was recorded in Quasi-peak detection mode except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz, average detection modes for frequency bands 9–90 kHz and 110–490 kHz, peak and average detection modes for frequencies above 1 GHz.

For 9 kHz-30MHz, the report shall list the six emissions with the smallest margin relative to the limit, for each of the three antenna orientations (parallel, perpendicular, and ground-parallel) unless the margin is greater than 20 dB.

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

According to ANSI C63.10-2013,9.4: For field strength measurements made at other than the distance at which the applicable limit is specified, extrapolate the measured field strength to the field strength at the distance specified by the limit using an inverse distance correction factor (20 dB/decade of distance). In some cases, a different distance correction factor may be required;

$$E_{\mathrm{SpecLimit}} = E_{\mathrm{Meas}} + 20\log\left(\frac{d_{\mathrm{Meas}}}{d_{\mathrm{SpecLimit}}}\right)$$

where

$E_{\mathrm{SpecLimit}}$	is the field strength of the emission at the distance specified by the limit, in dBμV/m
E_{Meas}	is the field strength of the emission at the measurement distance, in dBμV/m
d_{Meas}	is the measurement distance, in m
$d_{\mathrm{SpecLimit}}$	is the distance specified by the limit, in m

So the extrapolation factor of 1m is 20*log(1/3)= -9.5 dB, for 18-40GHz range, the limit of 1m distance was added by 9.5dB from limit of 3m to compared with the result measurement at 1m distance.

Factor & Over Limit/Margin Calculation

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

Factor = Antenna Factor + Cable Loss - Amplifier Gain

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

Over Limit = Level – Limit; Margin = Limit–Corrected Amplitude
Level / Corrected Amplitude = Read Level + Factor

Test Data

Environmental Conditions

Temperature:	22~24 ℃
Relative Humidity:	50~55 %
ATM Pressure:	101 kPa

The testing was performed by Warren Huang on 2024-01-24 and 2024-03-15 for below 1GHz and Zenos Qiao from 2024-02-23 to 2024-02-24 and Dylan Zhang from 2024-02-02 to 2024-03-29 for above 1GHz.

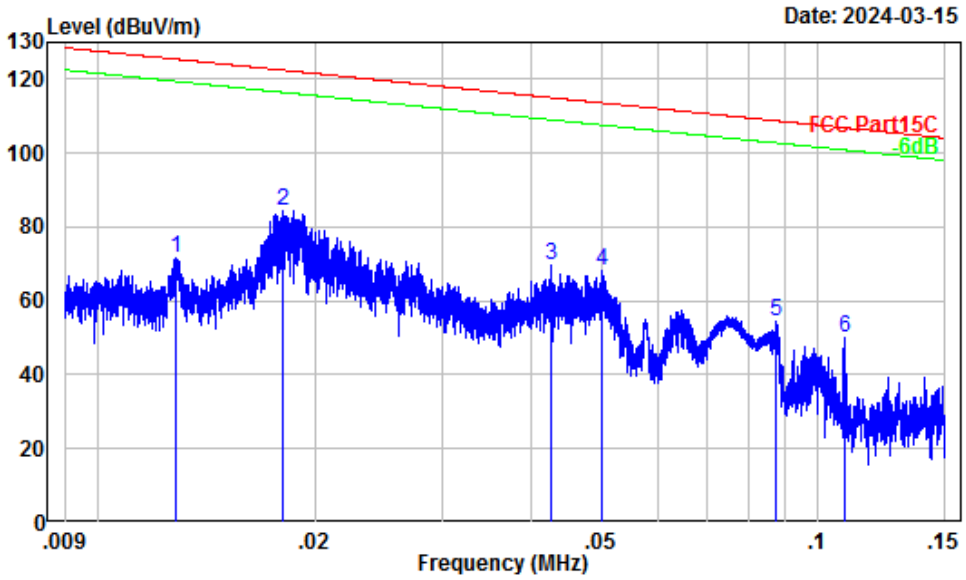
EUT operation mode: Transmitting

Note: Pre-scan in the X, Y and Z axes of orientation, the worst case z-axis of orientation was recorded.

9 kHz-30MHz: *(Maximum output power mode, 802.11 ac 20, 5745MHz MIMO)*

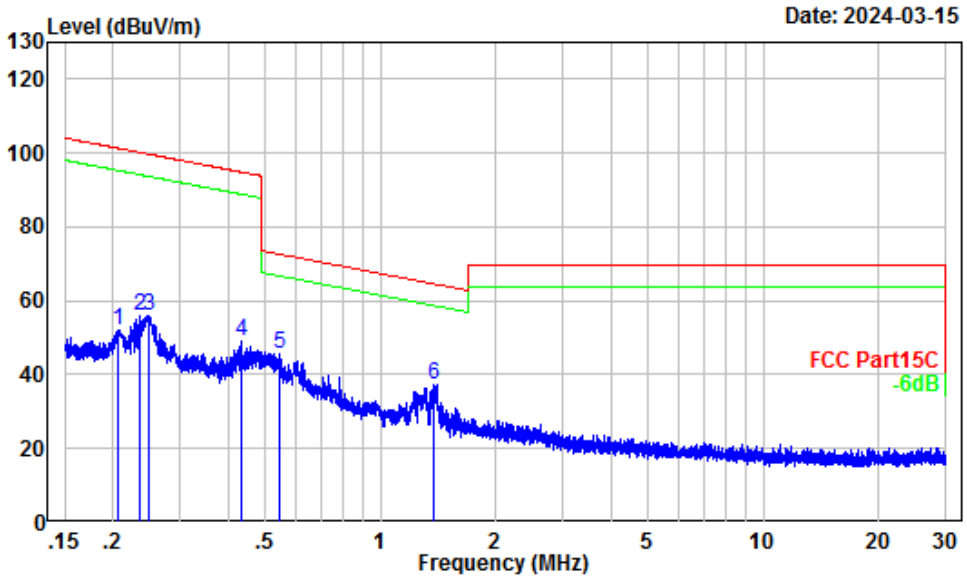
Note: When the test result of peak was less than the limit of QP more than 6dB, just peak value were recorded.

Parallel (worst case)



Site : Chamber A
Condition : 3m
Project Number: SZ4231220-76923E-RF
Note : 5G WIFI
Tester : Warren Huang

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.01	52.43	19.42	71.85	125.43	-53.58	Peak
2	0.02	50.81	33.63	84.44	122.45	-38.01	Peak
3	0.04	43.25	26.47	69.72	115.00	-45.28	Peak
4	0.05	41.00	26.98	67.98	113.62	-45.64	Peak
5	0.09	35.88	18.52	54.40	108.78	-54.38	Peak
6	0.11	33.69	16.35	50.04	106.88	-56.84	Peak



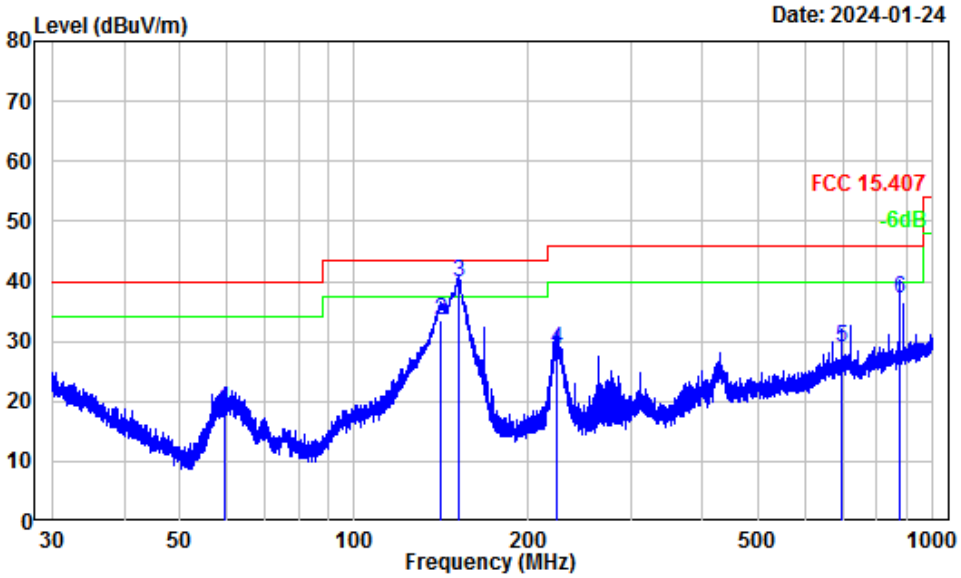
Site : Chamber A
Condition : 3m
Project Number: SZ4231220-76923E-RF
Note : 5G WIFI
Tester : Warren Huang

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.21	28.79	23.41	52.20	101.34	-49.14	Peak
2	0.24	27.73	28.36	56.09	100.18	-44.09	Peak
3	0.25	27.25	28.80	56.05	99.68	-43.63	Peak
4	0.43	21.89	27.16	49.05	94.88	-45.83	Peak
5	0.54	20.39	25.38	45.77	72.86	-27.09	Peak
6	1.38	13.54	23.83	37.37	64.59	-27.22	Peak

30 MHz–1 GHz:

5150-5250 MHz *(Maximum output power mode, 802.11 ac 20, 5240MHz MIMO)*

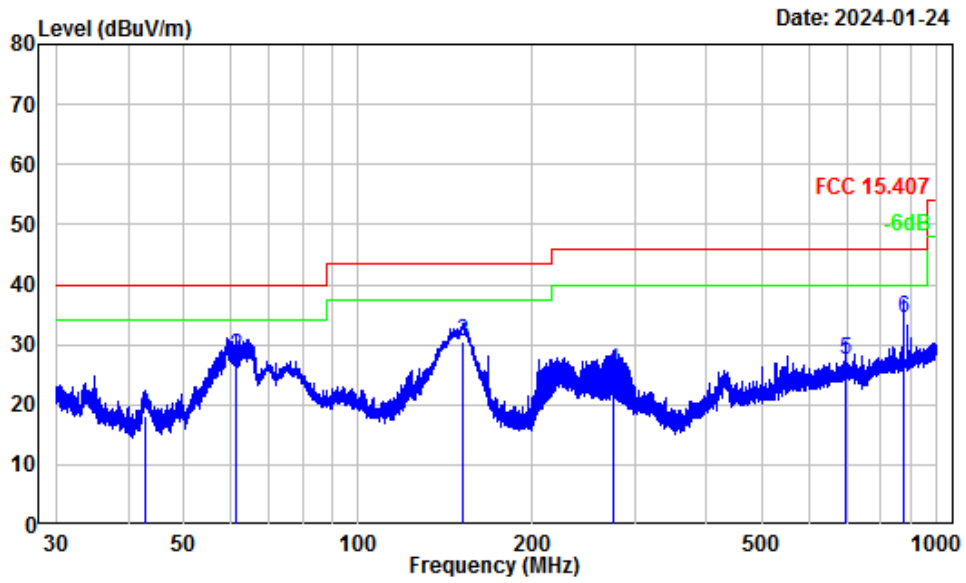
Horizontal



Site : chamber
Condition : 3m Horizontal
Project Number: SZ4231220-76923E-RF
Note : 5G WIFI
Tester : Warren Huang

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	59.81	-16.49	35.21	18.72	40.00	-21.28	QP
2	141.21	-10.81	44.21	33.40	43.50	-10.10	QP
3	151.13	-11.41	51.30	39.89	43.50	-3.61	QP
4	224.03	-11.42	40.17	28.75	46.00	-17.25	QP
5	696.25	-1.58	30.67	29.09	46.00	-16.91	QP
6	875.25	0.60	36.61	37.21	46.00	-8.79	QP

Vertical

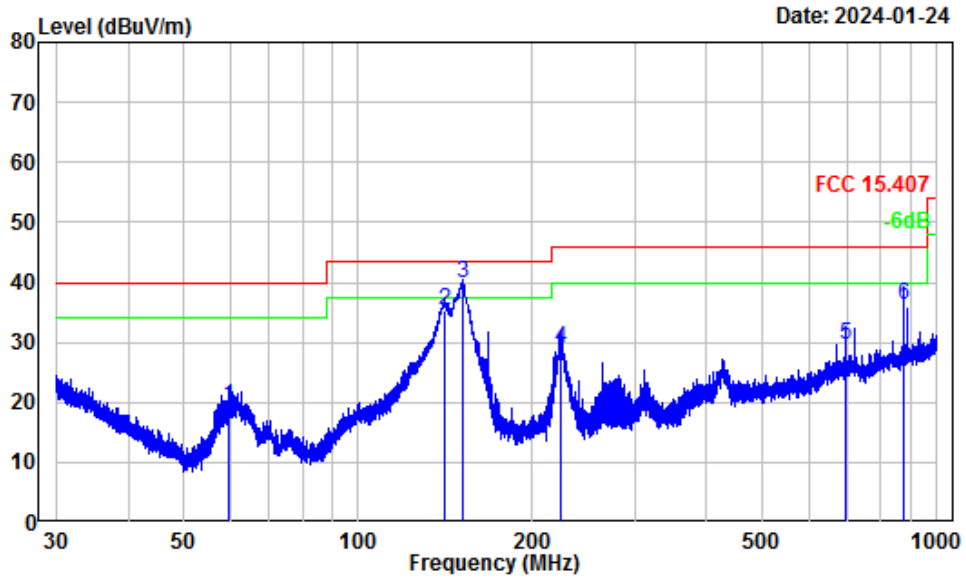


Site : chamber
Condition : 3m Vertical
Project Number: SZ4231220-76923E-RF
Note : 5G WIFI
Tester : Warren Huang

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	42.94	-13.55	31.73	18.18	40.00	-21.82	QP
2	61.35	-17.55	45.66	28.11	40.00	-11.89	QP
3	151.20	-11.71	42.05	30.34	43.50	-13.16	QP
4	275.52	-11.28	37.07	25.79	46.00	-20.21	QP
5	696.25	-1.98	29.47	27.49	46.00	-18.51	QP
6	875.25	0.25	34.12	34.37	46.00	-11.63	QP

5725-5850 MHz *(Maximum output power mode, 802.11 ac 20, 5745MHz MIMO)*

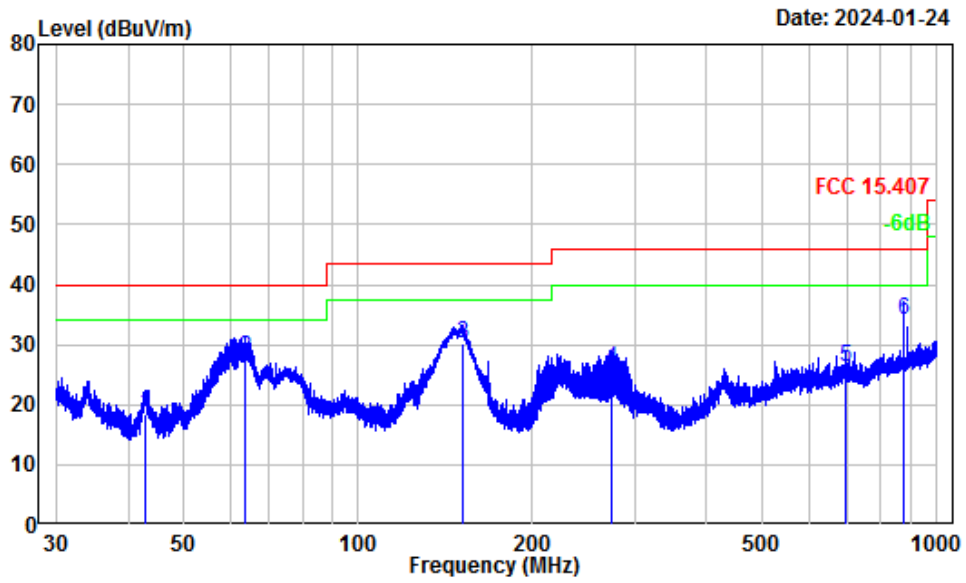
Horizontal



Site : chamber
Condition : 3m Horizontal
Project Number: SZ4231220-76923E-RF
Note : 5G WIFI
Tester : Warren Huang

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	59.89	-16.49	35.72	19.23	40.00	-20.77	QP
2	140.96	-10.79	46.20	35.41	43.50	-8.09	QP
3	151.20	-11.42	51.31	39.89	43.50	-3.61	QP
4	224.03	-11.42	40.33	28.91	46.00	-17.09	QP
5	696.25	-1.58	31.31	29.73	46.00	-16.27	QP
6	875.25	0.60	35.53	36.13	46.00	-9.87	QP

Vertical



Site : chamber
Condition : 3m Vertical
Project Number: SZ4231220-76923E-RF
Note : 5G WIFI
Tester : Warren Huang

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	42.92	-13.54	31.99	18.45	40.00	-21.55	QP
2	63.81	-17.48	45.14	27.66	40.00	-12.34	QP
3	151.27	-11.71	41.84	30.13	43.50	-13.37	QP
4	274.07	-11.34	37.18	25.84	46.00	-20.16	QP
5	696.25	-1.98	28.20	26.22	46.00	-19.78	QP
6	875.25	0.25	33.77	34.02	46.00	-11.98	QP

Above 1GHz:

5150-5250 MHz:

Frequency (MHz)	Receiver		Rx Antenna	Factor (dB/m)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	PK/Ave	Polar (H/V)				
802.11a (ANT 0)							
5180MHz							
10360.00	45.01	PK	H	13.07	58.08	68.2	-10.12
10360.00	44.64	PK	V	13.07	57.71	68.2	-10.49
5200MHz							
10400.00	45.54	PK	H	13.12	58.66	68.2	-9.54
10400.00	45.23	PK	V	13.12	58.35	68.2	-9.85
5240MHz							
10480.00	46.17	PK	H	13.07	59.24	68.2	-8.96
10480.00	45.86	PK	V	13.07	58.93	68.2	-9.27
802.11a (ANT 1)							
5180MHz							
10360.00	44.64	PK	H	13.07	57.71	68.2	-10.49
10360.00	44.45	PK	V	13.07	57.52	68.2	-10.68
5200MHz							
10400.00	45.08	PK	H	13.12	58.20	68.2	-10.00
10400.00	44.81	PK	V	13.12	57.93	68.2	-10.27
5240MHz							
10480.00	45.52	PK	H	13.07	58.59	68.2	-9.61
10480.00	45.28	PK	V	13.07	58.35	68.2	-9.85
802.11ac20							
5180MHz							
10360.00	44.87	PK	H	13.07	57.94	68.2	-10.26
10360.00	44.64	PK	V	13.07	57.71	68.2	-10.49
5200MHz							
10400.00	45.11	PK	H	13.12	58.23	68.2	-9.97
10400.00	44.86	PK	V	13.12	57.98	68.2	-10.22
5240MHz							
10480.00	45.32	PK	H	13.07	58.39	68.2	-9.81
10480.00	45.07	PK	V	13.07	58.14	68.2	-10.06

Frequency (MHz)	Receiver		Rx Antenna	Factor (dB/m)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	PK/Ave	Polar (H/V)				
802.11ac40							
5190MHz							
10380.00	44.82	PK	H	13.09	57.91	68.2	-10.29
10380.00	44.57	PK	V	13.09	57.66	68.2	-10.54
5230MHz							
10460.00	45.53	PK	H	13.09	58.62	68.2	-9.58
10460.00	45.34	PK	V	13.09	58.43	68.2	-9.77
802.11AC80							
5210MHz							
10420.00	44.96	PK	H	13.12	58.08	68.2	-10.12
10420.00	44.73	PK	V	13.12	57.85	68.2	-10.35

5725-5850 MHz:

Frequency (MHz)	Receiver		Rx Antenna	Factor (dB/m)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	PK/Ave	Polar (H/V)				
802.11a (ANT 0)							
5745MHz							
11490.00	44.65	PK	H	14.31	58.96	74	-15.04
11490.00	32.38	AV	H	14.31	46.69	54	-7.31
11490.00	44.52	PK	V	14.31	58.83	74	-15.17
11490.00	32.27	AV	V	14.31	46.58	54	-7.42
5785MHz							
11570.00	45.02	PK	H	14.05	59.07	74	-14.93
11570.00	32.69	AV	H	14.05	46.74	54	-7.26
11570.00	44.86	PK	V	14.05	58.91	74	-15.09
11570.00	32.50	AV	V	14.05	46.55	54	-7.45
5825MHz							
11650.00	45.43	PK	H	13.83	59.26	74	-14.74
11650.00	32.97	AV	H	13.83	46.80	54	-7.20
11650.00	45.25	PK	V	13.83	59.08	74	-14.92
11650.00	32.81	AV	V	13.83	46.64	54	-7.36
802.11a (ANT 1)							
5745MHz							
11490.00	44.42	PK	H	14.31	58.73	74	-15.27
11490.00	32.17	AV	H	14.31	46.48	54	-7.52
11490.00	44.61	PK	V	14.31	58.92	74	-15.08
11490.00	32.33	AV	V	14.31	46.64	54	-7.36
5785MHz							
11570.00	44.75	PK	H	14.05	58.80	74	-15.20
11570.00	32.36	AV	H	14.05	46.41	54	-7.59
11570.00	44.92	PK	V	14.05	58.97	74	-15.03
11570.00	32.57	AV	V	14.05	46.62	54	-7.38
5825MHz							
11650.00	45.13	PK	H	13.83	58.96	74	-15.04
11650.00	32.68	AV	H	13.83	46.51	54	-7.49
11650.00	45.35	PK	V	13.83	59.18	74	-14.82
11650.00	32.84	AV	V	13.83	46.67	54	-7.33

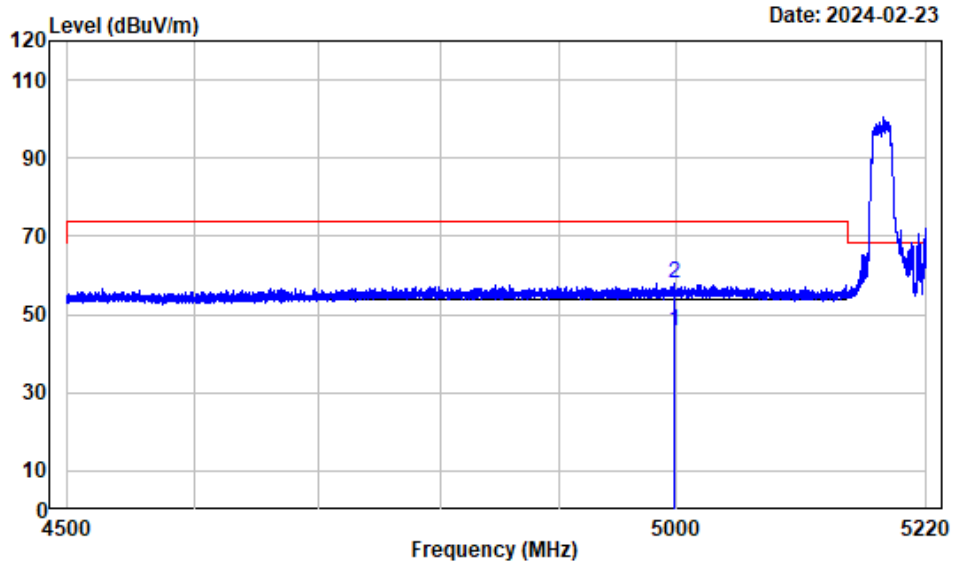
Frequency (MHz)	Receiver		Rx Antenna	Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/Ave	Polar (H/V)				
802.11ac20							
5745MHz							
11490.00	44.48	PK	H	14.31	58.79	74	-15.21
11490.00	32.37	AV	H	14.31	46.68	54	-7.32
11490.00	44.72	PK	V	14.31	59.03	74	-14.97
11490.00	32.51	AV	V	14.31	46.82	54	-7.18
5785MHz							
11570.00	45.06	PK	H	14.05	59.11	74	-14.89
11570.00	32.64	AV	H	14.05	46.69	54	-7.31
11570.00	45.27	PK	V	14.05	59.32	74	-14.68
11570.00	32.81	AV	V	14.05	46.86	54	-7.14
5825MHz							
11650.00	45.53	PK	H	13.83	59.36	74	-14.64
11650.00	33.05	AV	H	13.83	46.88	54	-7.12
11650.00	45.68	PK	V	13.83	59.51	74	-14.49
11650.00	33.19	AV	V	13.83	47.02	54	-6.98
802.11ac40							
5755MHz							
11510.00	45.22	PK	H	14.29	59.51	74	-14.49
11510.00	33.69	AV	H	14.29	47.98	54	-6.02
11510.00	45.45	PK	V	14.29	59.74	74	-14.26
11510.00	33.84	AV	V	14.29	48.13	54	-5.87
5795MHz							
11590.00	45.54	PK	H	13.97	59.51	74	-14.49
11590.00	33.85	AV	H	13.97	47.82	54	-6.18
11590.00	45.79	PK	V	13.97	59.76	74	-14.24
11590.00	34.03	AV	V	13.97	48.00	54	-6.00
802.11AC80							
5775MHz							
11550.00	45.54	PK	H	14.13	59.67	74	-14.33
11550.00	35.39	AV	H	14.13	49.52	54	-4.48
11550.00	45.87	PK	V	14.13	60.00	74	-14.00
11550.00	35.61	AV	V	14.13	49.74	54	-4.26

Note:
Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Factor + Reading
Margin = Corrected. Amplitude - Limit
The other spurious emission which is in the noise floor level was not recorded.

Test plots for Band Edge Measurements (Radiated)

5150-5250MHz:

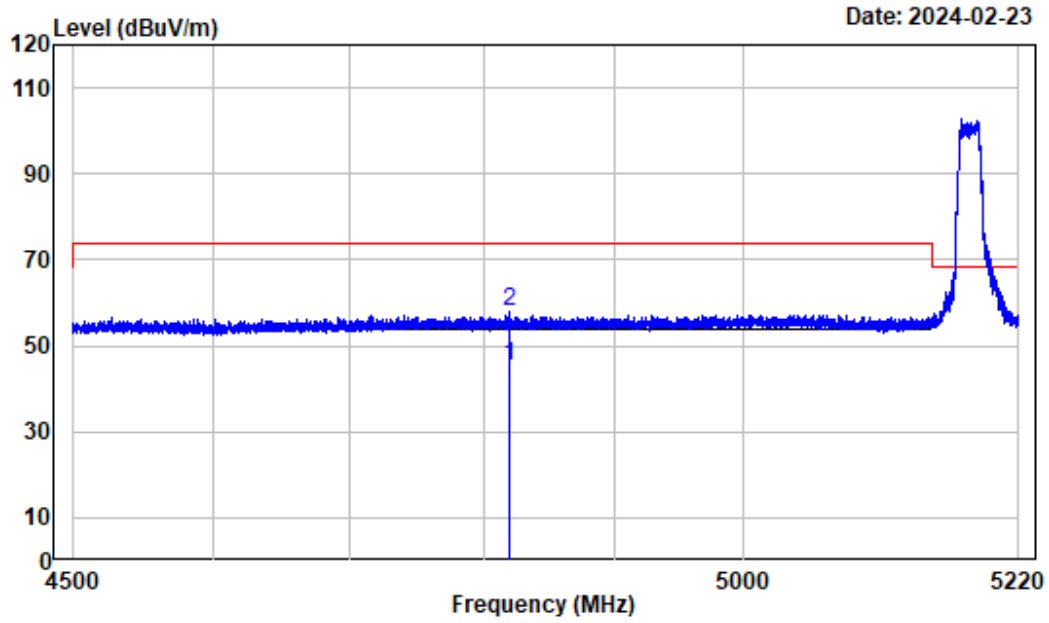
802.11a_ ANT 0			
Test Channel:	**5180MHz**	**Ant. Polar. :**	**Horizontal**



Condition : Horizontal
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-ANT0-B1-A-5180

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	4998.190	2.96	42.75	45.71	54.00	Average	-8.29
2	4998.190	2.96	55.11	58.07	74.00	Peak	-15.93

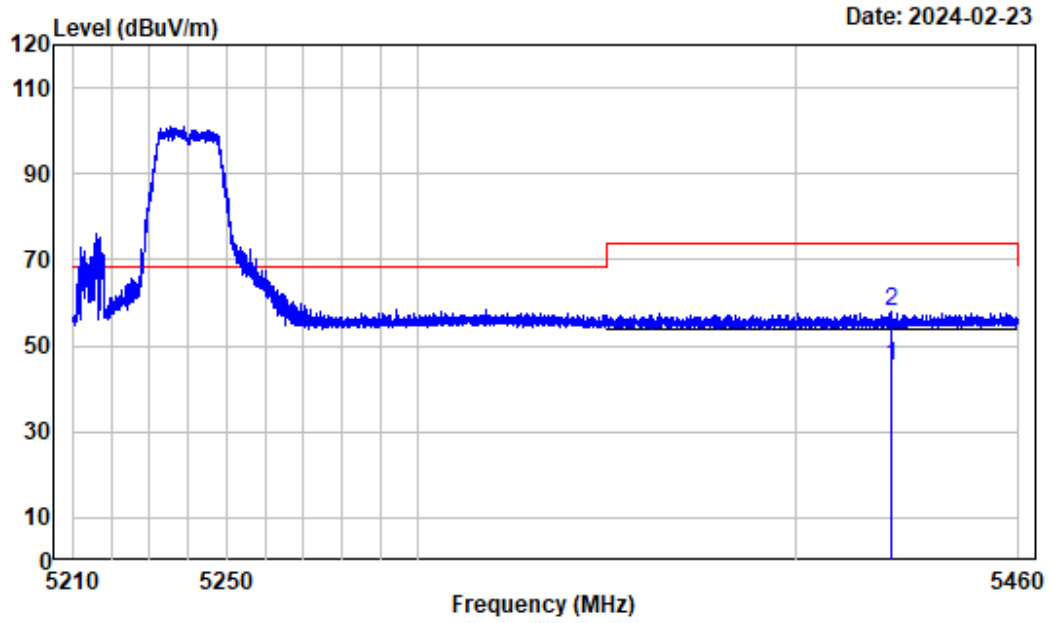
802.11a_ ANT 0			
Test Channel:	**5180MHz**	**Ant. Polar. :**	**Vertical**



Condition : Vertical
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-ANT0-B1-A-5180

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	4819.590	2.44	42.89	45.33	54.00	Average	-8.67
2	4819.590	2.44	55.52	57.96	74.00	Peak	-16.04

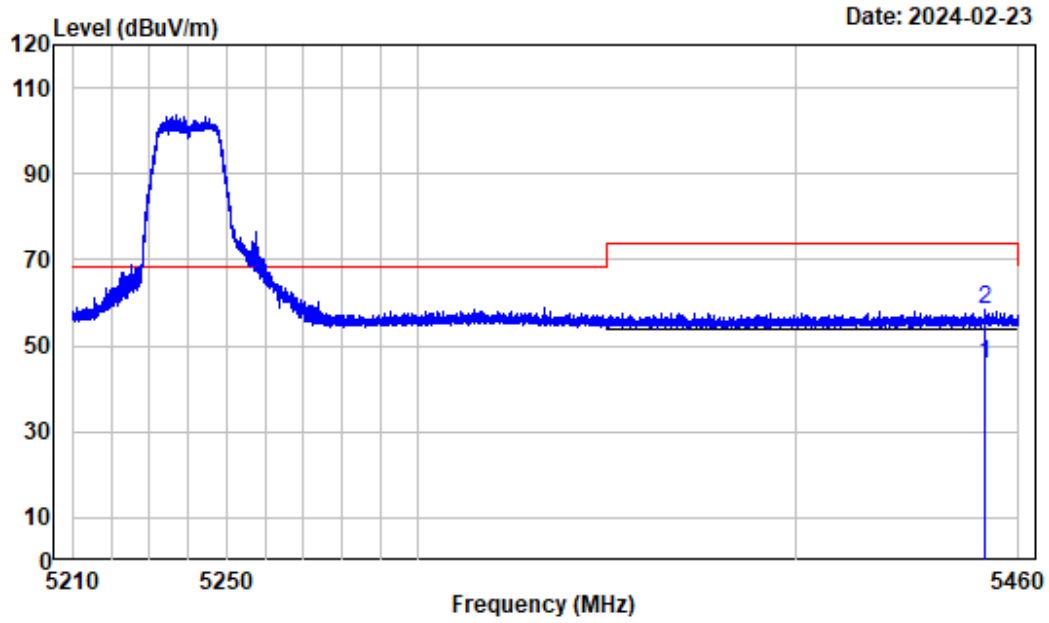
802.11a_ ANT 0			
Test Channel:	**5240MHz**	**Ant. Polar. :**	**Horizontal**



Condition : Horizontal
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-ANT0-B1-A-5240

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5425.563	3.02	42.44	45.46	54.00	Average	-8.54
2	5425.563	3.02	54.75	57.77	74.00	Peak	-16.23

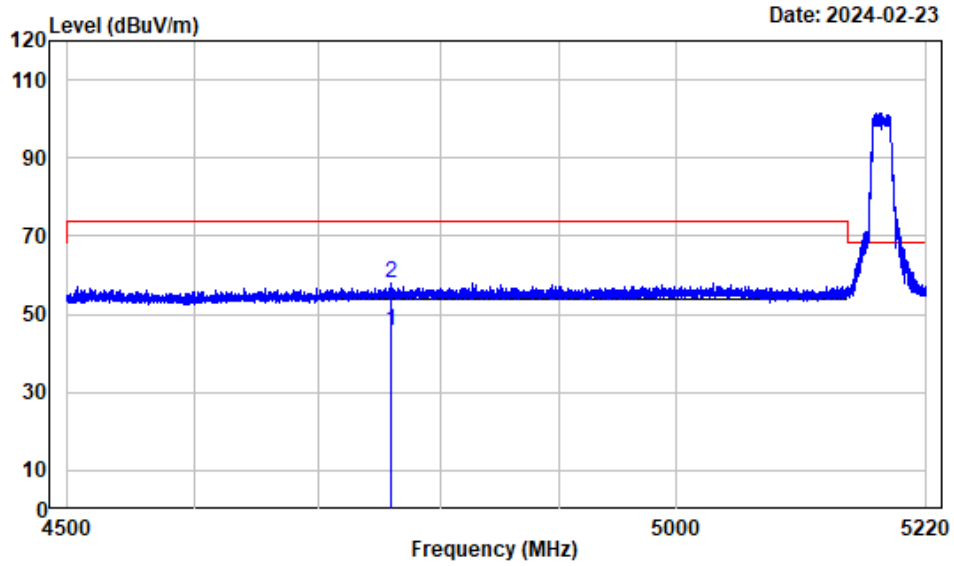
802.11a_ ANT 0			
Test Channel:	**5240MHz**	**Ant. Polar. :**	**Vertical**



Condition : Vertical
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-ANT0-B1-A-5240

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5450.781	3.06	42.64	45.70	54.00	Average	-8.30
2	5450.781	3.06	55.34	58.40	74.00	Peak	-15.60

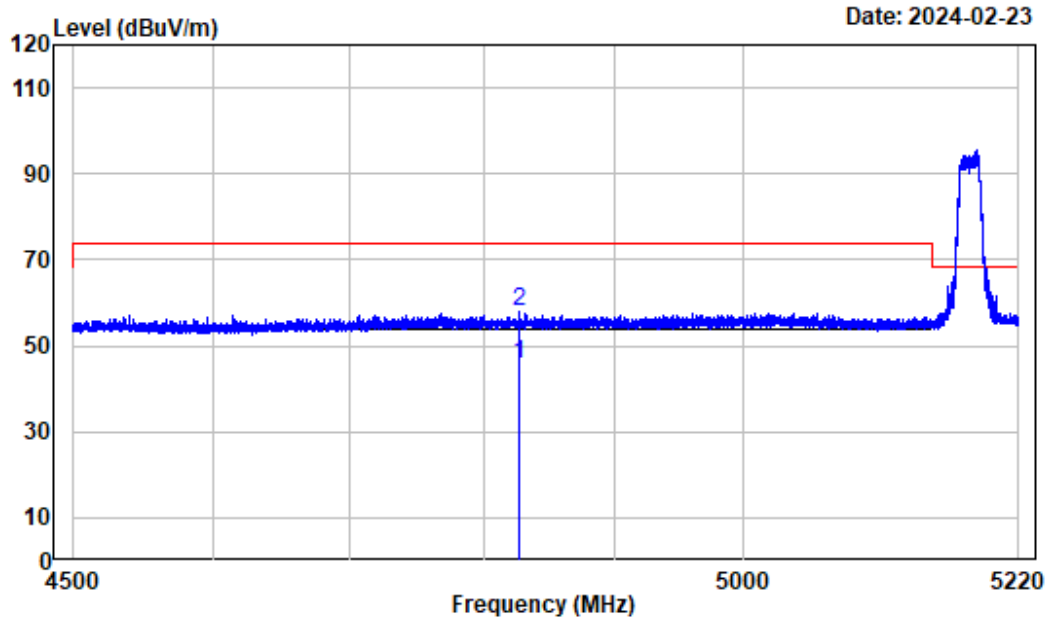
802.11a_ ANT 1			
Test Channel:	**5180MHz**	**Ant. Polar. :**	**Horizontal**



Condition : Horizontal
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-ANT1-B1-A-5180

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	4759.830	2.45	43.39	45.84	54.00	Average	-8.16
2	4759.830	2.45	55.37	57.82	74.00	Peak	-16.18

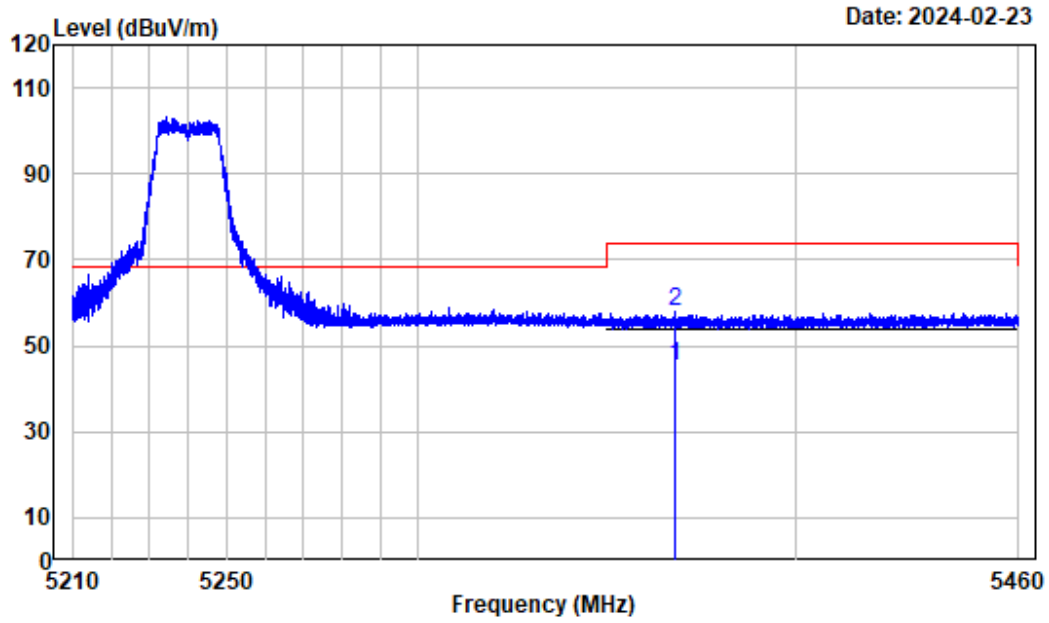
802.11a_ ANT 1			
Test Channel:	**5180MHz**	**Ant. Polar. :**	**Vertical**



Condition : Vertical
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-ANT1-B1-A-5180

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	4826.700	2.45	43.12	45.57	54.00	Average	-8.43
2	4826.700	2.45	55.31	57.76	74.00	Peak	-16.24

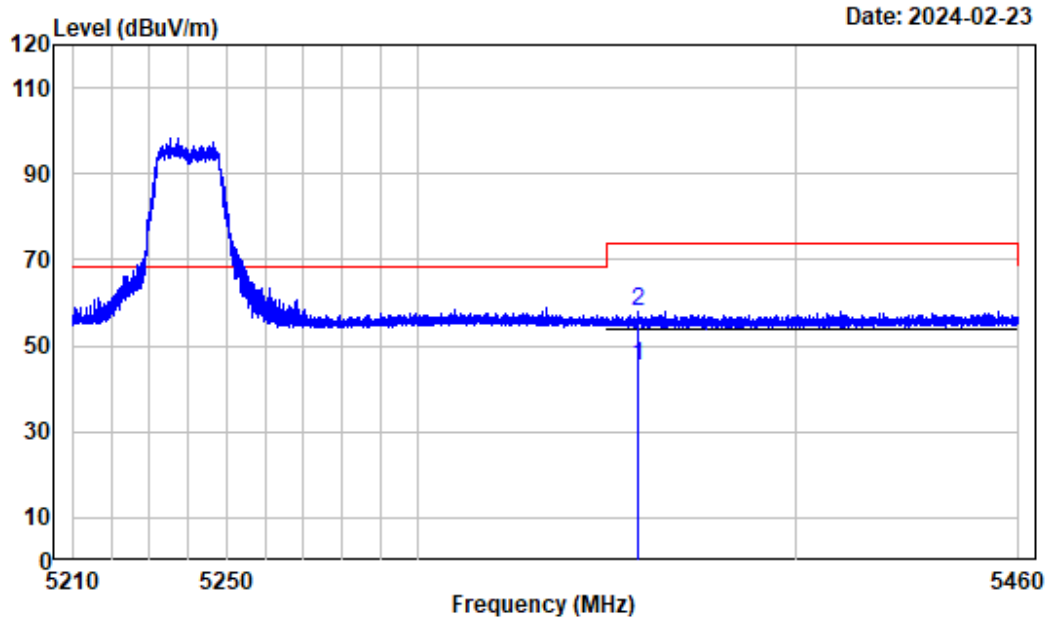
802.11a_ ANT 1			
Test Channel:	**5240MHz**	**Ant. Polar. :**	**Horizontal**



Condition : Horizontal
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-ANT1-B1-A-5240

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5368.125	2.95	42.40	45.35	54.00	Average	-8.65
2	5368.125	2.95	54.90	57.85	74.00	Peak	-16.15

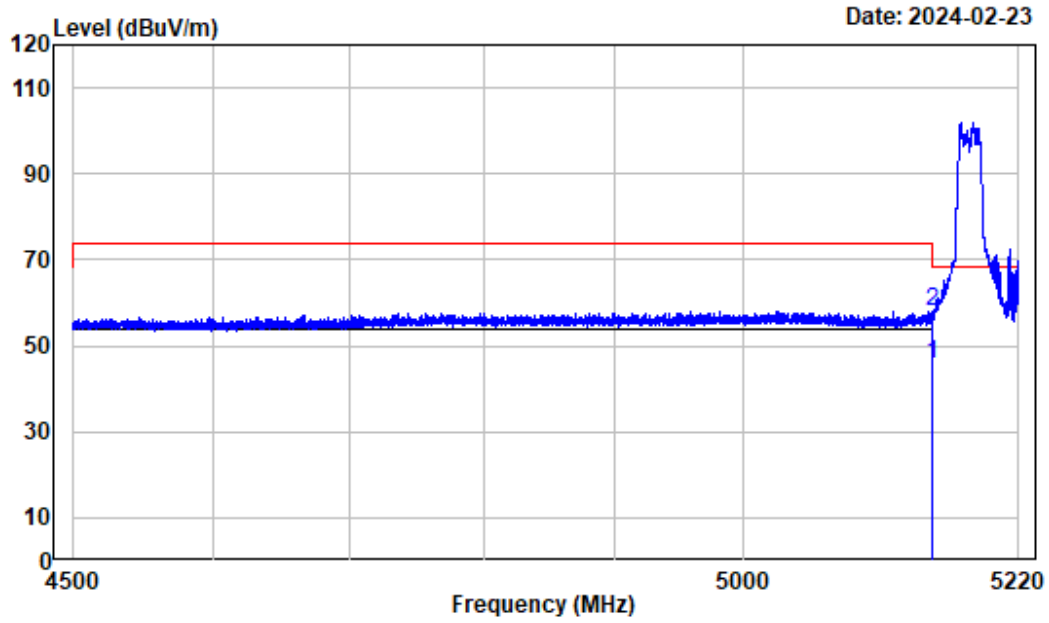
802.11a_ ANT 1			
Test Channel:	**5240MHz**	**Ant. Polar. :**	**Vertical**



Condition : Vertical
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-ANT1-B1-A-5240

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5357.875	2.93	42.56	45.49	54.00	Average	-8.51
2	5357.875	2.93	55.18	58.11	74.00	Peak	-15.89

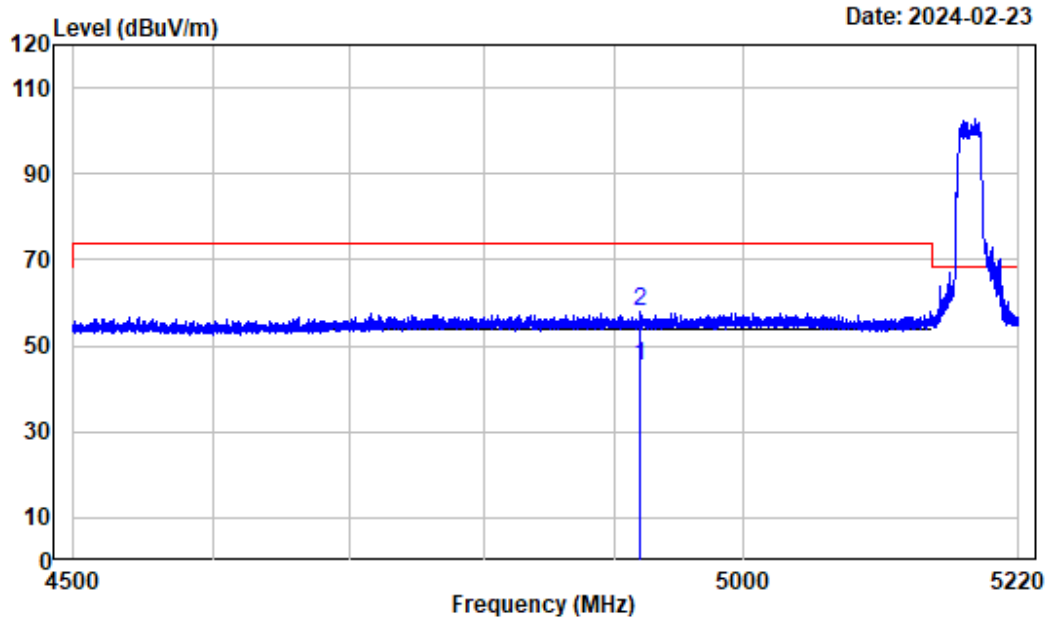
802.11ac20			
Test Channel:	**5180MHz**	**Ant. Polar. :**	**Horizontal**



Condition : Horizontal
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-B1-AC20-5180

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5149.980	2.71	43.06	45.77	54.00	Average	-8.23
2	5149.980	2.71	55.25	57.96	74.00	Peak	-16.04

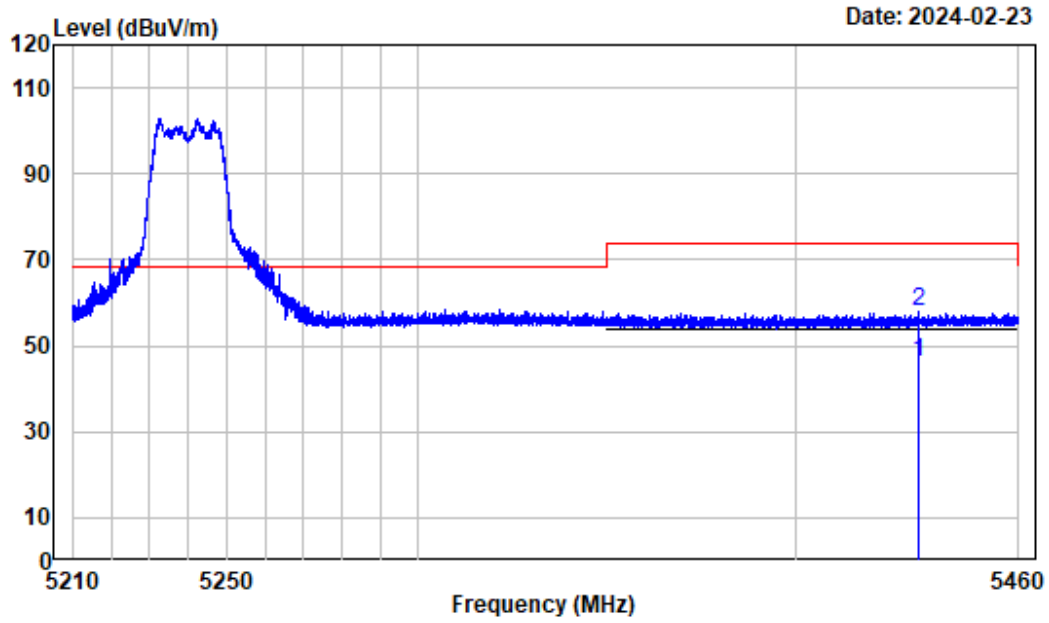
802.11ac20			
Test Channel:	**5180MHz**	**Ant. Polar. :**	**Vertical**



Condition : Vertical
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-B1-AC20-5180

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	4919.130	2.62	42.86	45.48	54.00	Average	-8.52
2	4919.130	2.62	55.34	57.96	74.00	Peak	-16.04

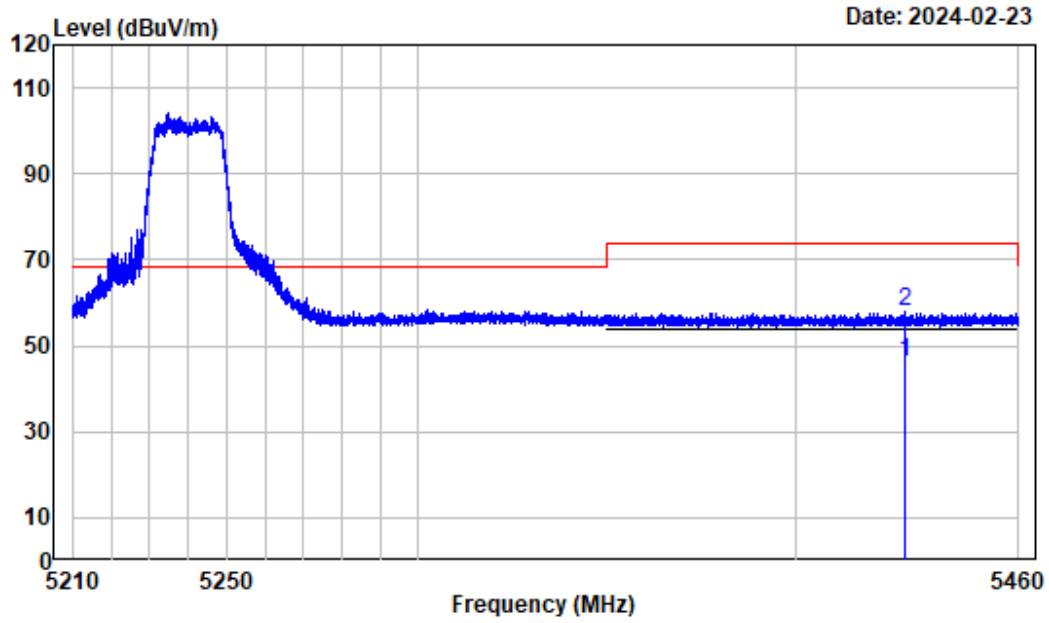
802.11ac20			
Test Channel:	**5240MHz**	**Ant. Polar. :**	**Horizontal**



Condition : Horizontal
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-B1-AC20-5240

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5432.906	3.04	43.25	46.29	54.00	Average	-7.71
2	5432.906	3.04	54.93	57.97	74.00	Peak	-16.03

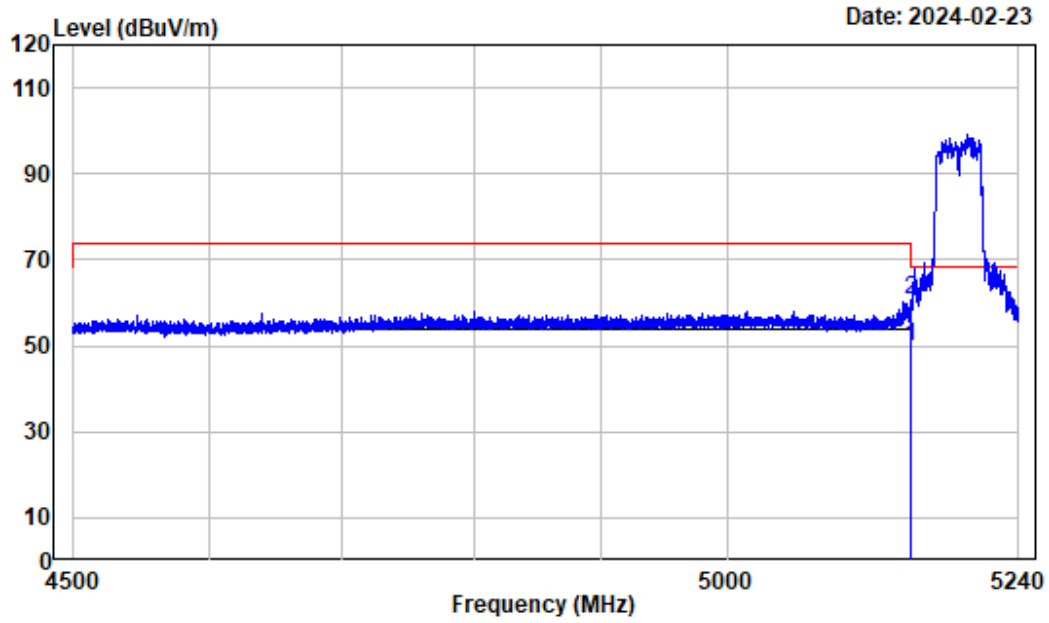
802.11ac20			
Test Channel:	**5240MHz**	**Ant. Polar. :**	**Vertical**



Condition : Vertical
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-B1-AC20-5240

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5429.594	3.03	43.36	46.39	54.00	Average	-7.61
2	5429.594	3.03	54.79	57.82	74.00	Peak	-16.18

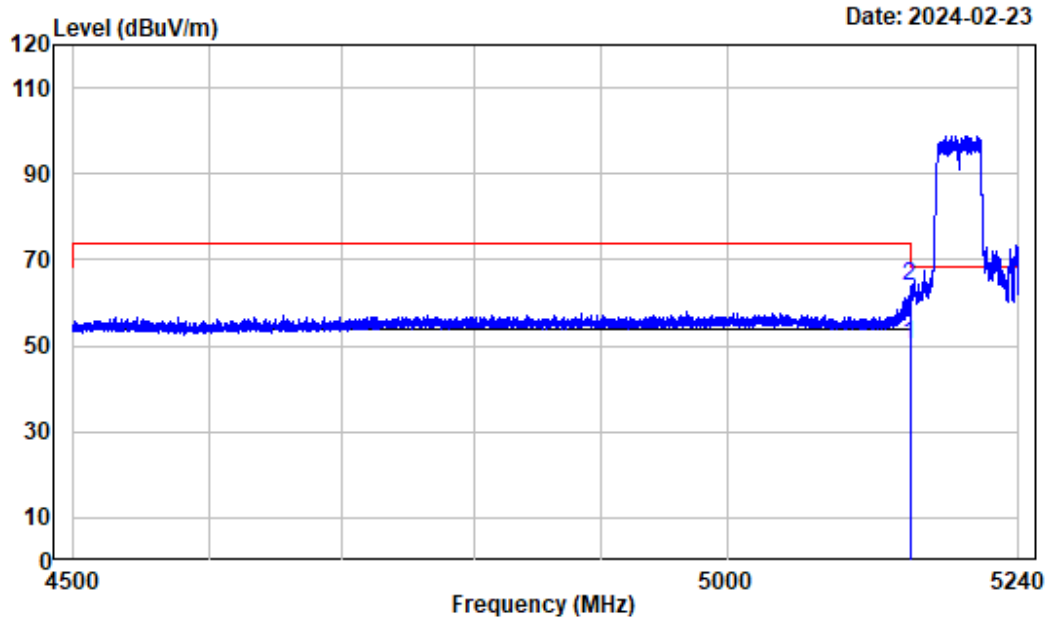
802.11ac40			
Test Channel:	**5190MHz**	**Ant. Polar. :**	**Horizontal**



Condition : Horizontal
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-B1-AC40-5190

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5149.998	2.71	46.95	49.66	54.00	Average	-4.34
2	5149.998	2.71	58.18	60.89	74.00	Peak	-13.11

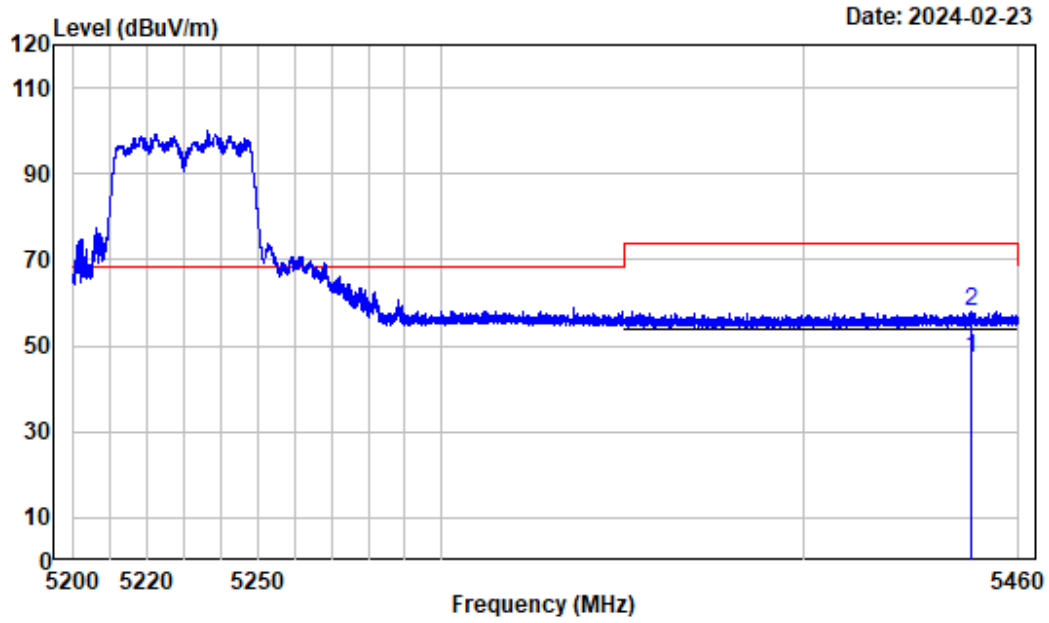
802.11ac40			
Test Channel:	**5190MHz**	**Ant. Polar. :**	**Vertical**



Condition : Vertical
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-B1-AC40-5190

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5149.165	2.71	47.77	50.48	54.00	Average	-3.52
2	5149.165	2.71	61.19	63.90	74.00	Peak	-10.10

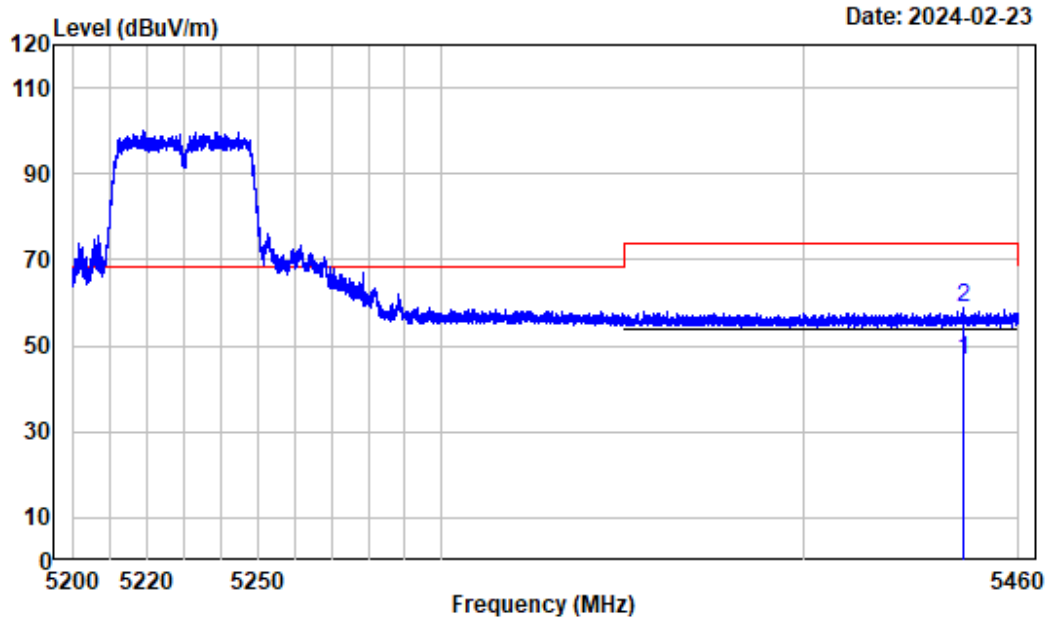
802.11ac40			
Test Channel:	**5230MHz**	**Ant. Polar. :**	**Horizontal**



Condition : Horizontal
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-B1-AC40-5230

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5446.902	3.06	43.99	47.05	54.00	Average	-6.95
2	5446.902	3.06	55.07	58.13	74.00	Peak	-15.87

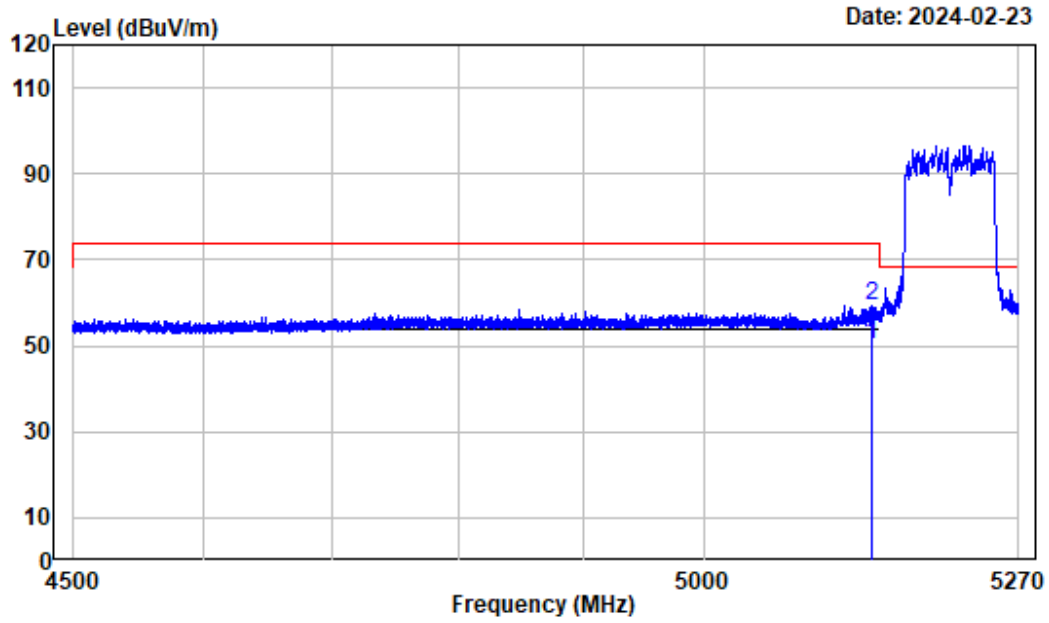
802.11ac40			
Test Channel:	**5230MHz**	**Ant. Polar. :**	**Vertical**



Condition : Vertical
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-B1-AC40-5230

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5444.660	3.05	43.57	46.62	54.00	Average	-7.38
2	5444.660	3.05	55.59	58.64	74.00	Peak	-15.36

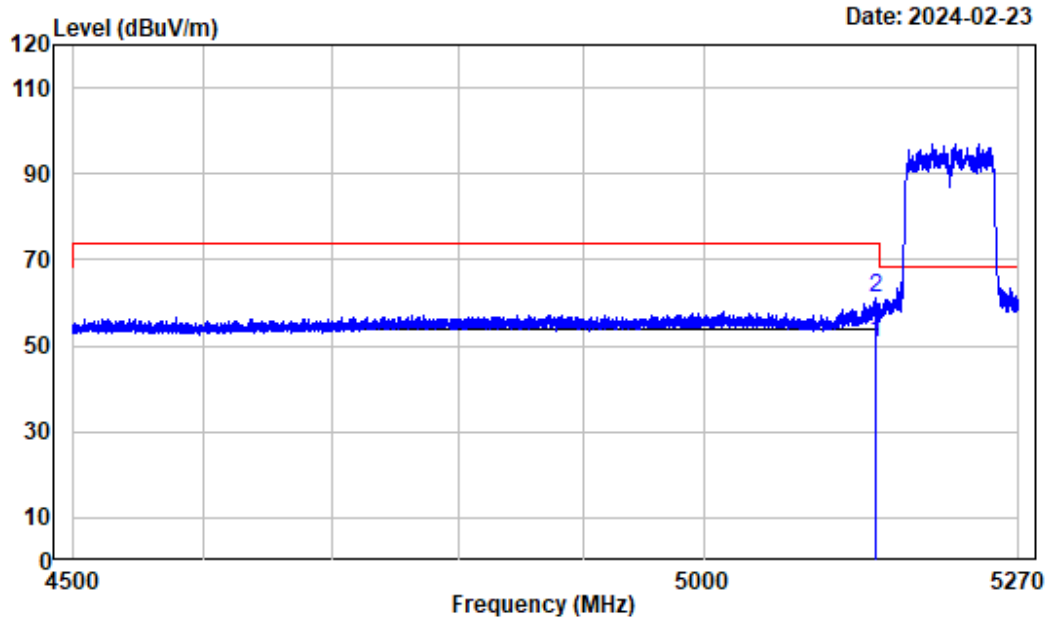
802.11ac80			
Test Channel:	**5210MHz**	**Ant. Polar. :**	**Horizontal**



Condition : Horizontal
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-B1-AC80-5210

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5142.854	2.70	47.45	50.15	54.00	Average	-3.85
2	5142.854	2.70	56.57	59.27	74.00	Peak	-14.73

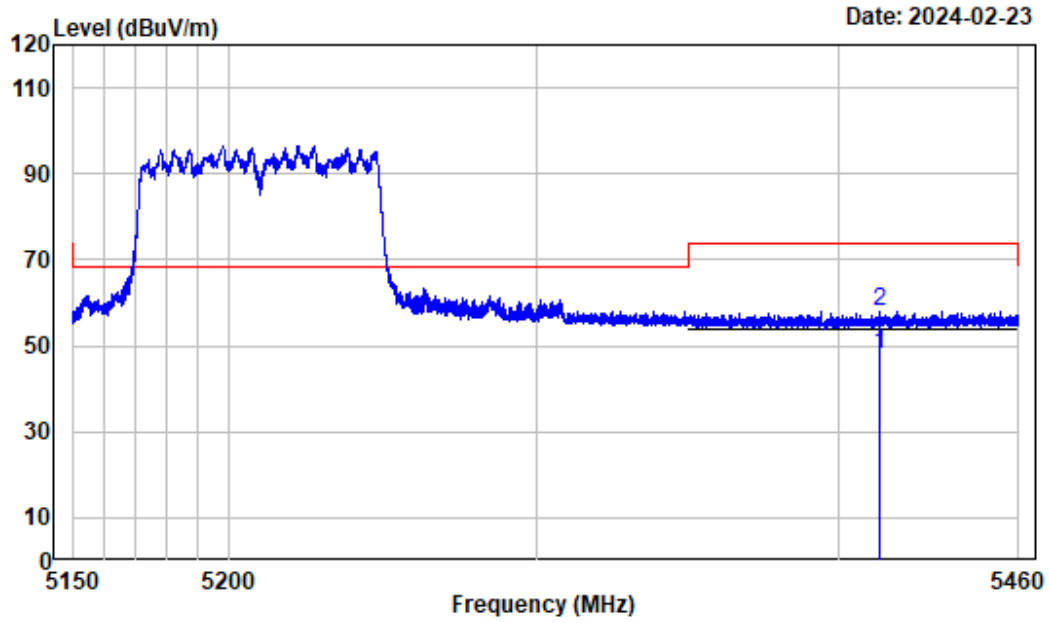
802.11ac80			
Test Channel:	**5210MHz**	**Ant. Polar. :**	**Vertical**



Condition : Vertical
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-B1-AC80-5210

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5145.549	2.70	48.19	50.89	54.00	Average	-3.11
2	5145.549	2.70	58.24	60.94	74.00	Peak	-13.06

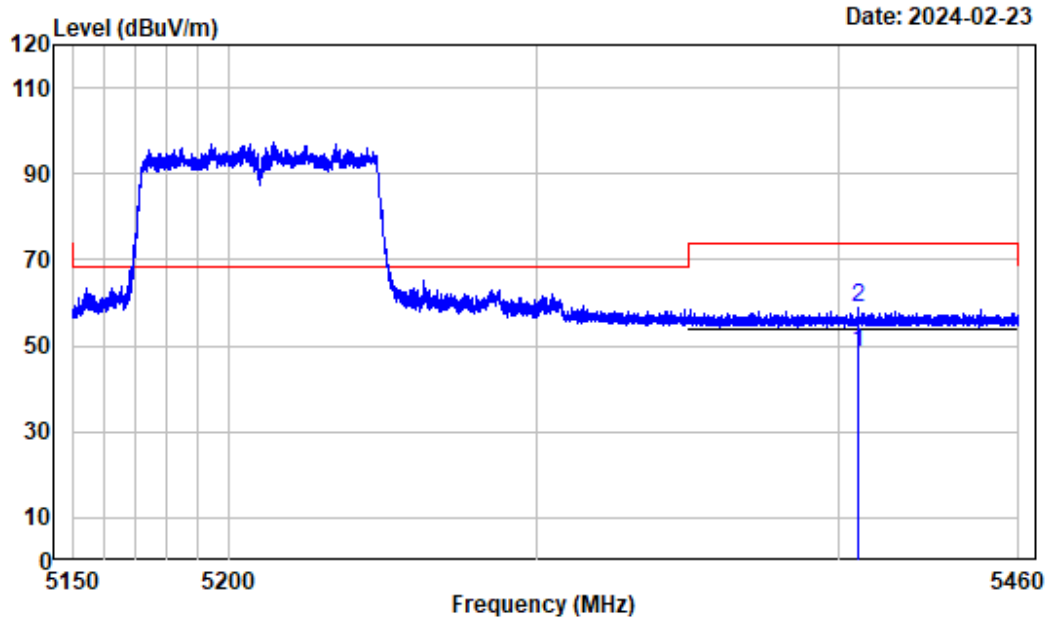
802.11ac80			
Test Channel:	**5210MHz**	**Ant. Polar. :**	**Horizontal**



Condition : Horizontal
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-B1-AC80-5210

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5413.616	3.01	45.01	48.02	54.00	Average	-5.98
2	5413.616	3.01	55.08	58.09	74.00	Peak	-15.91

802.11ac80			
Test Channel:	**5210MHz**	**Ant. Polar. :**	**Vertical**

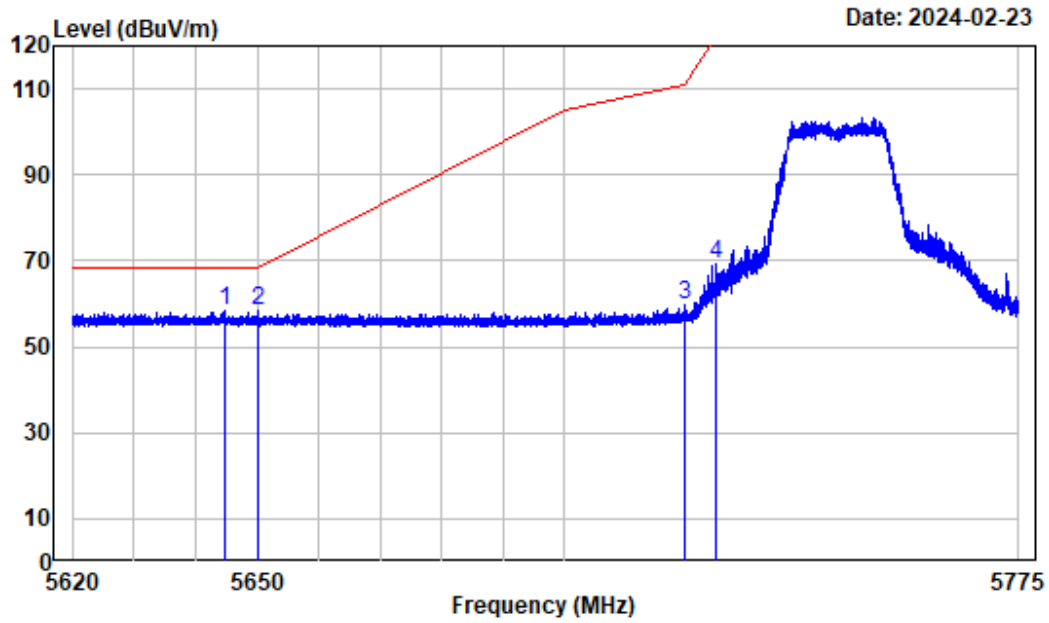


Condition : Vertical
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-B1-AC80-5210

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5405.944	2.99	45.40	48.39	54.00	Average	-5.61
2	5405.944	2.99	56.10	59.09	74.00	Peak	-14.91

5725-5850MHz:

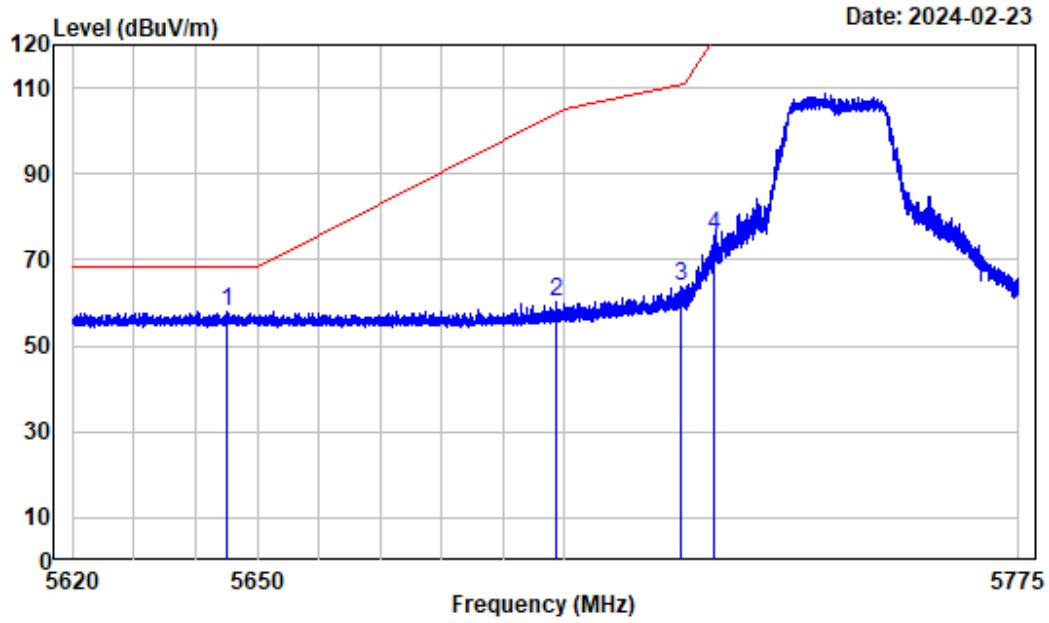
802.11a_ ANT 0			
Test Channel:	**5745MHz**	**Ant. Polar. :**	**Horizontal**



Condition : Horizontal
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-ANT0-B4-A-5745

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5644.625	3.23	55.14	58.37	68.20	Peak	-9.83
2	5650.051	3.27	54.99	58.26	68.24	Peak	-9.98
3	5719.801	3.48	56.24	59.72	110.74	Peak	-51.02
4	5724.838	3.48	65.89	69.37	121.83	Peak	-52.46

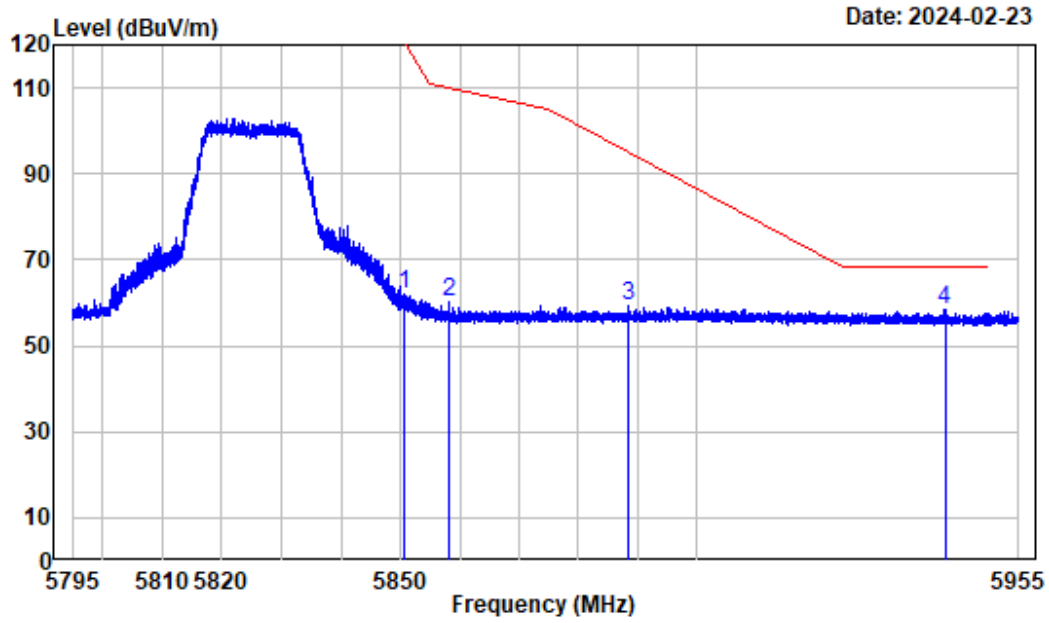
802.11a_ ANT 0			
Test Channel:	**5745MHz**	**Ant. Polar. :**	**Vertical**



Condition : Vertical
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-ANT0-B4-A-5745

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5644.975	3.23	54.91	58.14	68.20	Peak	-10.06
2	5698.585	3.44	56.86	60.30	104.16	Peak	-43.86
3	5719.142	3.48	60.44	63.92	110.56	Peak	-46.64
4	5724.586	3.48	72.16	75.64	121.26	Peak	-45.62

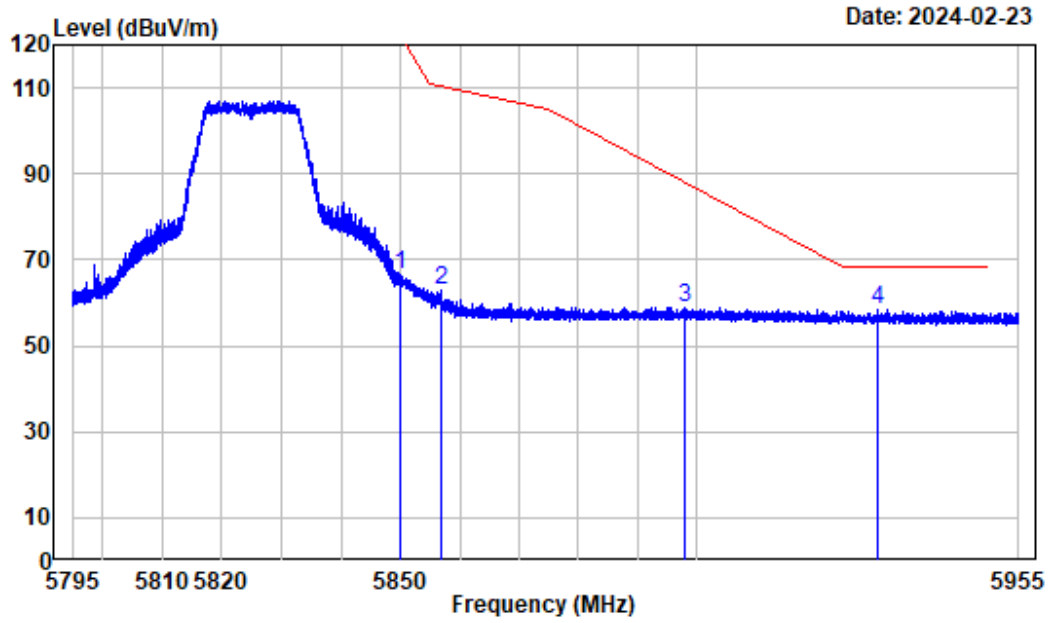
802.11a_ ANT 0			
Test Channel:	**5825MHz**	**Ant. Polar. :**	**Horizontal**



Condition : Horizontal
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-ANT0-B4-A-5825

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5850.620	3.67	58.22	61.89	120.79	Peak	-58.90
2	5858.220	3.71	56.65	60.36	109.90	Peak	-49.54
3	5888.520	3.81	55.29	59.10	95.16	Peak	-36.06
4	5942.400	3.75	54.69	58.44	68.20	Peak	-9.76

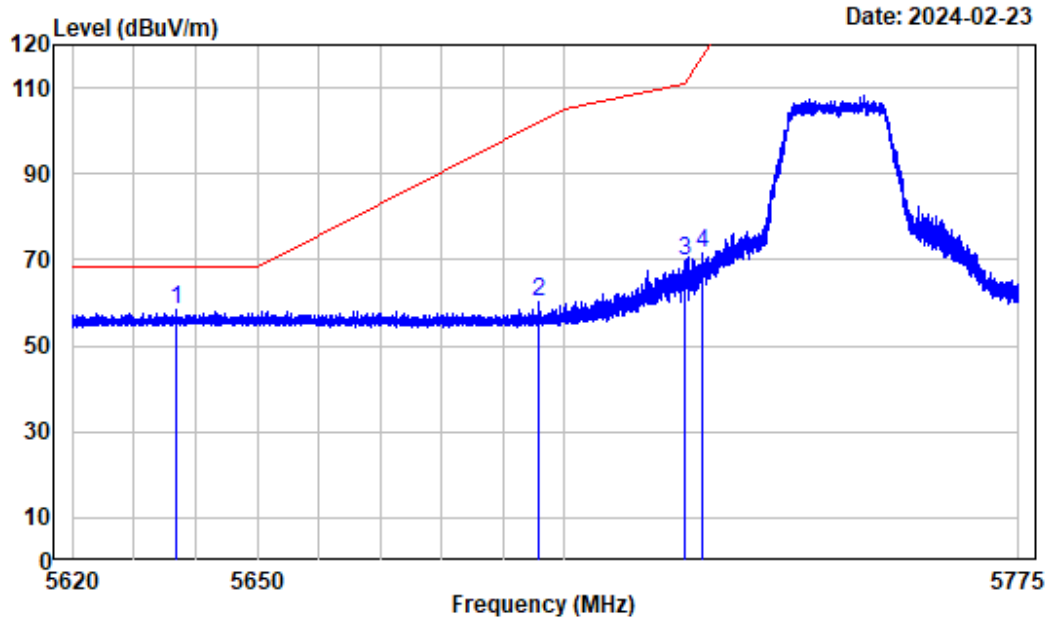
802.11a_ ANT 0			
Test Channel:	**5825MHz**	**Ant. Polar. :**	**Vertical**



Condition : Vertical
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-ANT0-B4-A-5825

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5850.060	3.67	62.94	66.61	122.06	Peak	-55.45
2	5856.920	3.71	59.03	62.74	110.26	Peak	-47.52
3	5897.920	3.84	55.25	59.09	88.20	Peak	-29.11
4	5930.880	3.79	54.71	58.50	68.20	Peak	-9.70

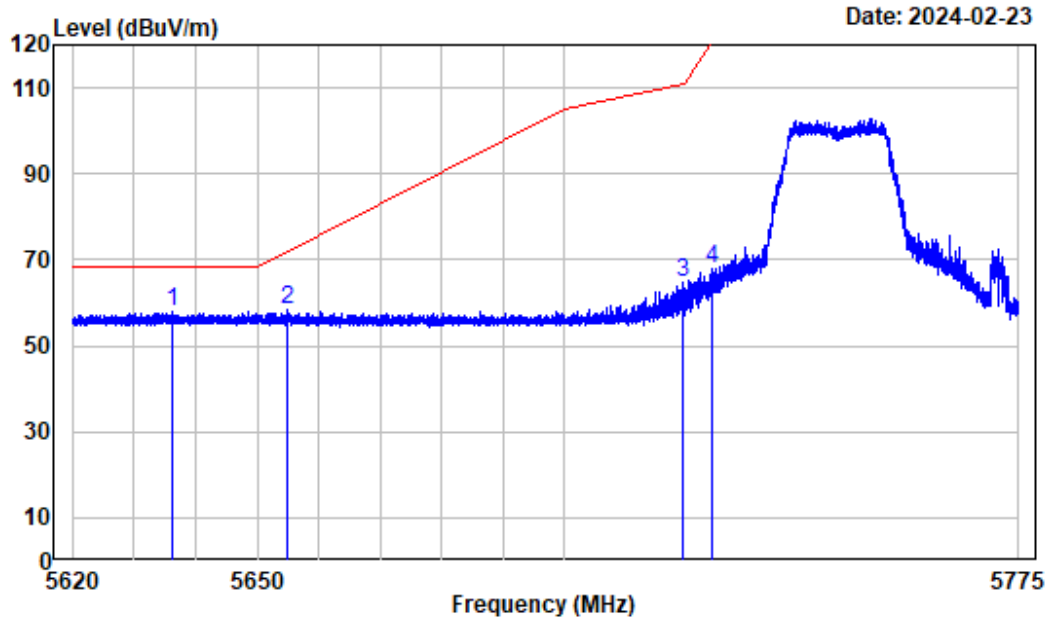
802.11a_ ANT 1			
Test Channel:	**5745MHz**	**Ant. Polar. :**	**Horizontal**



Condition : Horizontal
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-ANT1-B4-A-5745

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5636.740	3.17	55.39	58.56	68.20	Peak	-9.64
2	5695.969	3.43	56.85	60.28	102.23	Peak	-41.95
3	5719.994	3.48	66.12	69.60	110.80	Peak	-41.20
4	5722.726	3.48	68.25	71.73	117.02	Peak	-45.29

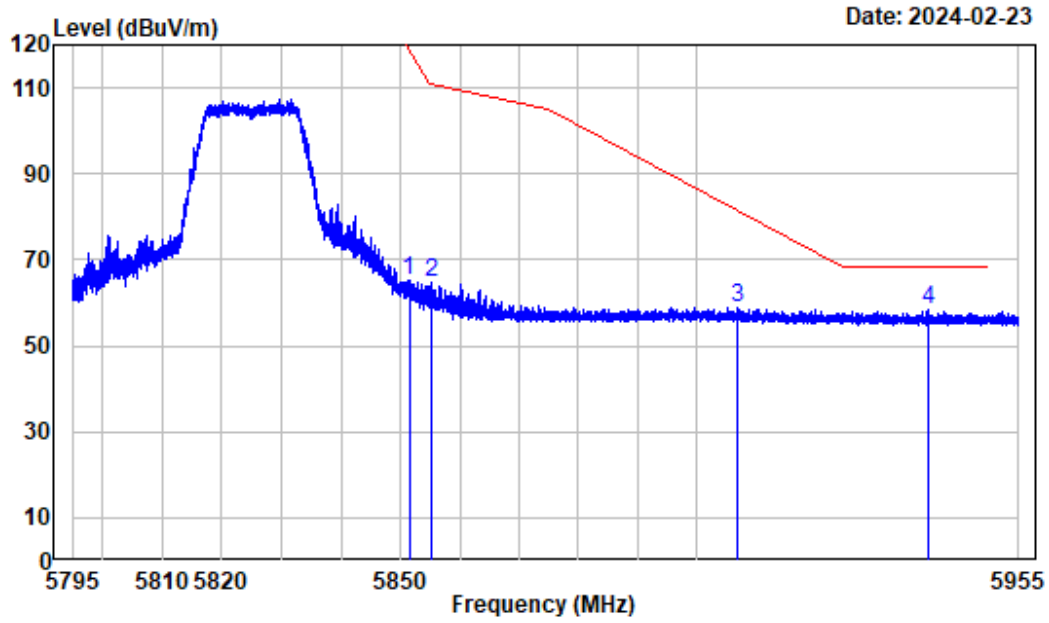
802.11a_ ANT 1			
Test Channel:	**5745MHz**	**Ant. Polar. :**	**Vertical**



Condition : Vertical
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-ANT1-B4-A-5745

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5636.101	3.17	54.84	58.01	68.20	Peak	-10.19
2	5654.778	3.29	55.24	58.53	71.75	Peak	-13.22
3	5719.413	3.48	61.19	64.67	110.64	Peak	-45.97
4	5724.412	3.48	64.41	67.89	120.86	Peak	-52.97

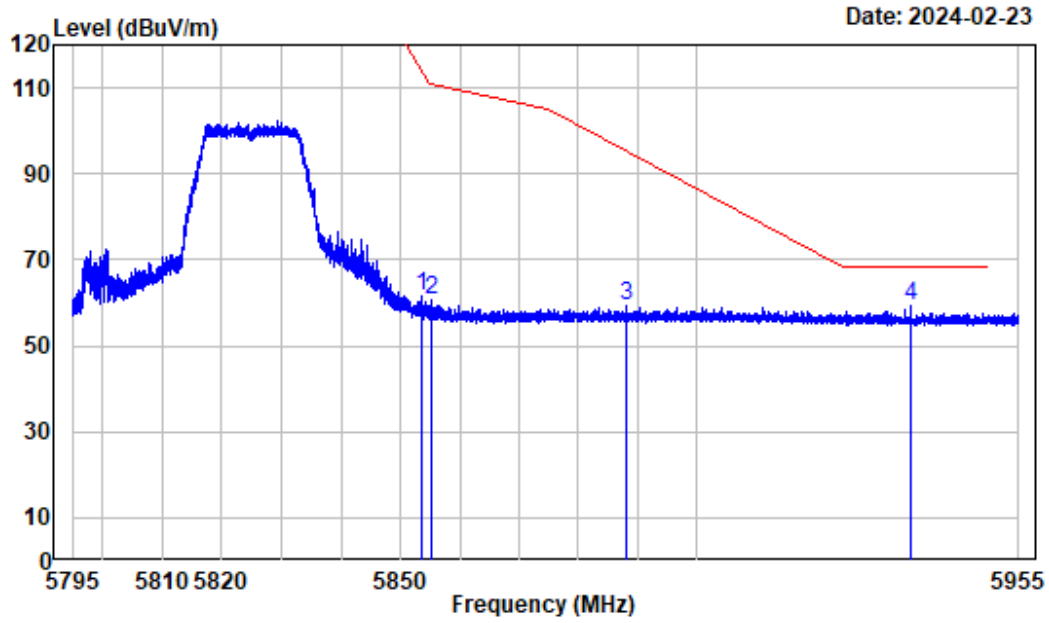
802.11a_ ANT 1			
Test Channel:	**5825MHz**	**Ant. Polar. :**	**Horizontal**



Condition : Horizontal
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-ANT1-B4-A-5825

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5851.440	3.68	61.36	65.04	118.92	Peak	-53.88
2	5855.080	3.70	61.10	64.80	110.78	Peak	-45.98
3	5906.860	3.84	55.01	58.85	81.59	Peak	-22.74
4	5939.680	3.76	54.50	58.26	68.20	Peak	-9.94

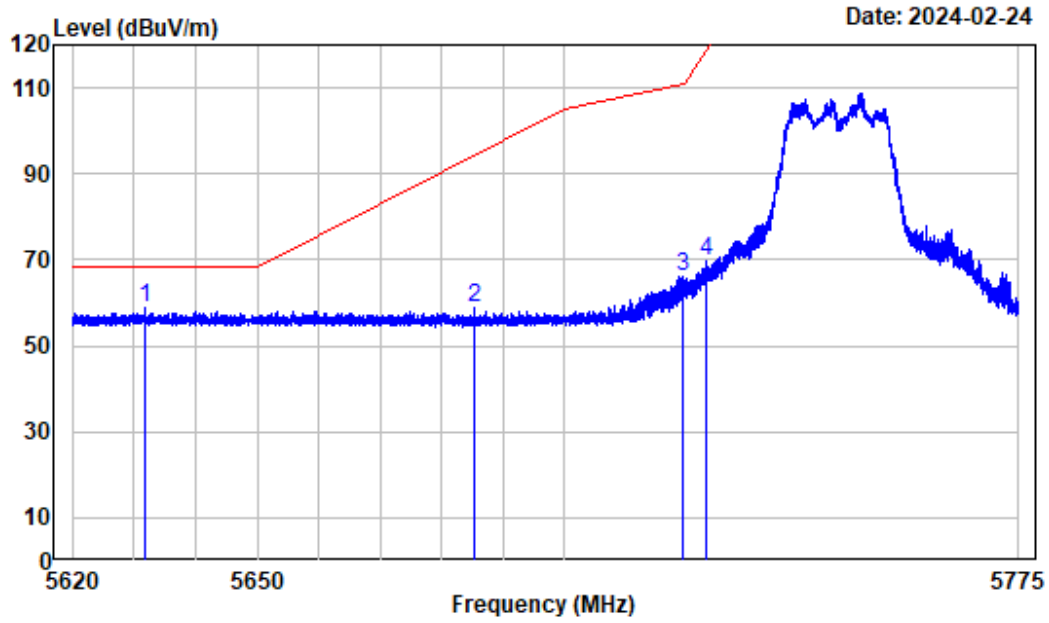
802.11a_ ANT 1			
Test Channel:	**5825MHz**	**Ant. Polar. :**	**Vertical**



Condition : Vertical
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-ANT1-B4-A-5825

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5853.460	3.69	58.07	61.76	114.31	Peak	-52.55
2	5855.320	3.70	56.77	60.47	110.71	Peak	-50.24
3	5888.100	3.81	55.39	59.20	95.48	Peak	-36.28
4	5936.640	3.77	55.37	59.14	68.20	Peak	-9.06

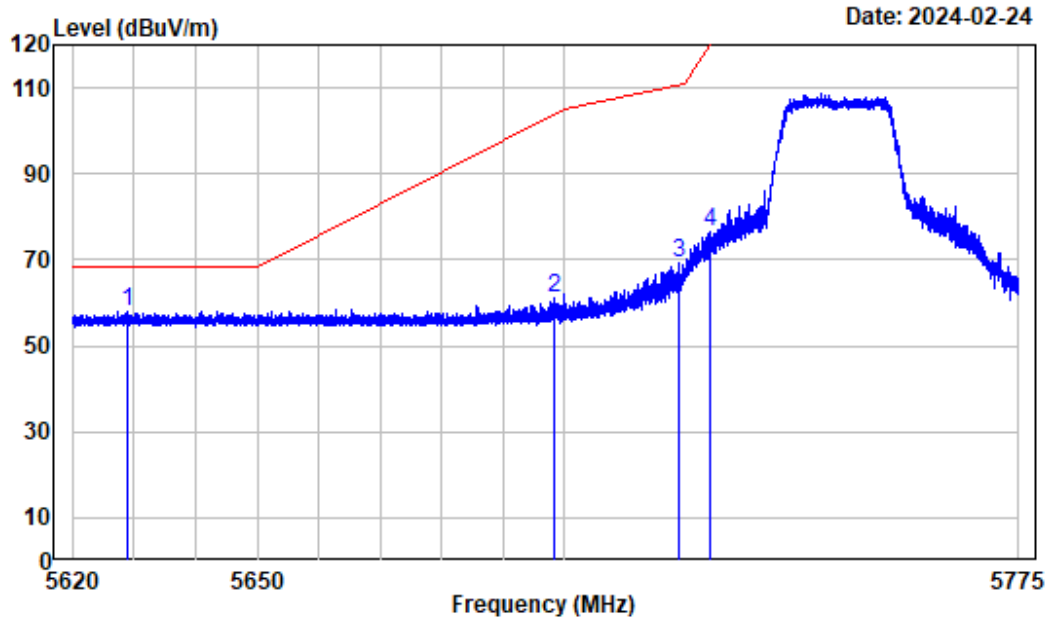
802.11ac20			
Test Channel:	**5745MHz**	**Ant. Polar. :**	**Horizontal**



Condition : Horizontal
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-B4-AC20-5745

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5631.741	3.13	55.77	58.90	68.20	Peak	-9.30
2	5685.371	3.40	55.38	58.78	94.41	Peak	-35.63
3	5719.413	3.48	62.57	66.05	110.64	Peak	-44.59
4	5723.288	3.48	66.06	69.54	118.30	Peak	-48.76

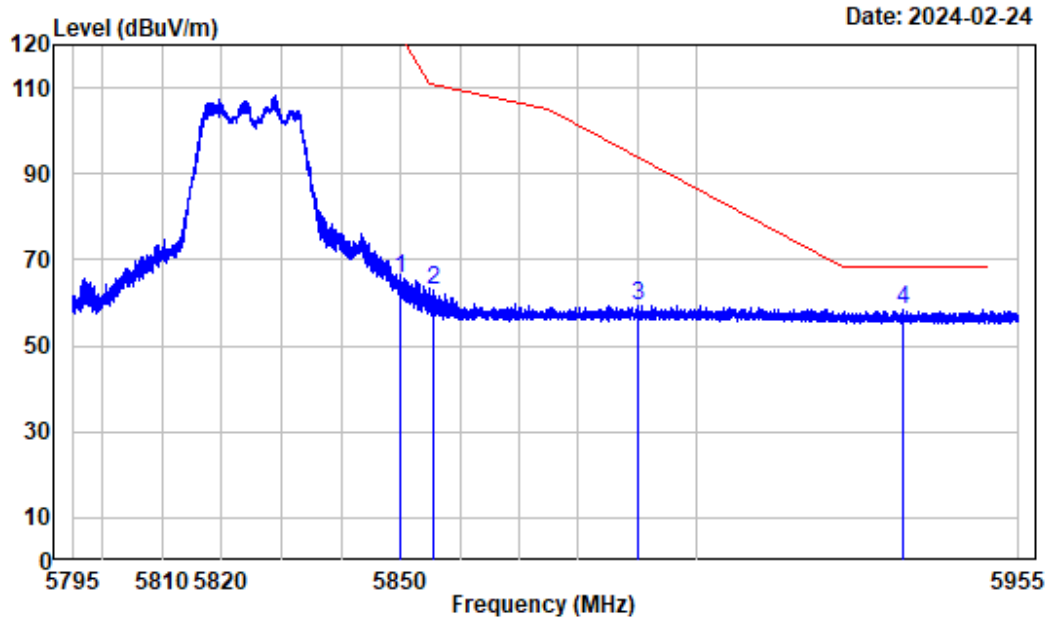
802.11ac20			
Test Channel:	**5745MHz**	**Ant. Polar. :**	**Vertical**



Condition : Vertical
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-B4-AC20-5745

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5629.048	3.11	54.89	58.00	68.20	Peak	-10.20
2	5698.294	3.44	57.50	60.94	103.94	Peak	-43.00
3	5718.871	3.48	65.91	69.39	110.48	Peak	-41.09
4	5724.005	3.48	73.21	76.69	119.93	Peak	-43.24

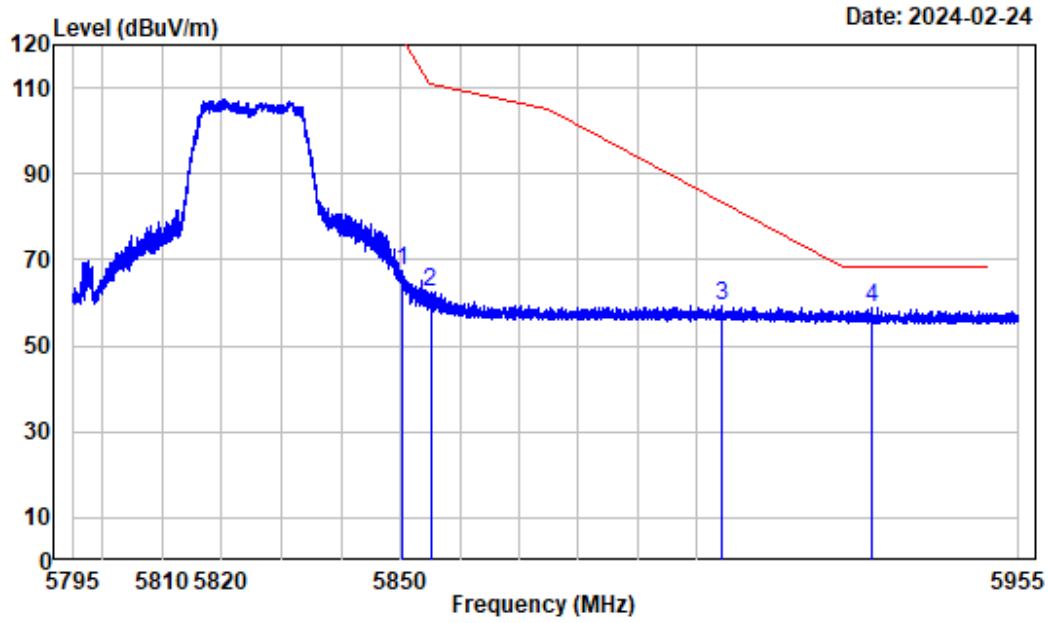
802.11ac20			
Test Channel:	**5825MHz**	**Ant. Polar. :**	**Horizontal**



Condition : Horizontal
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-B4-AC20-5825

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5850.040	3.67	61.97	65.64	122.11	Peak	-56.47
2	5855.680	3.70	59.43	63.13	110.61	Peak	-47.48
3	5889.980	3.82	55.63	59.45	94.08	Peak	-34.63
4	5935.160	3.77	54.84	58.61	68.20	Peak	-9.59

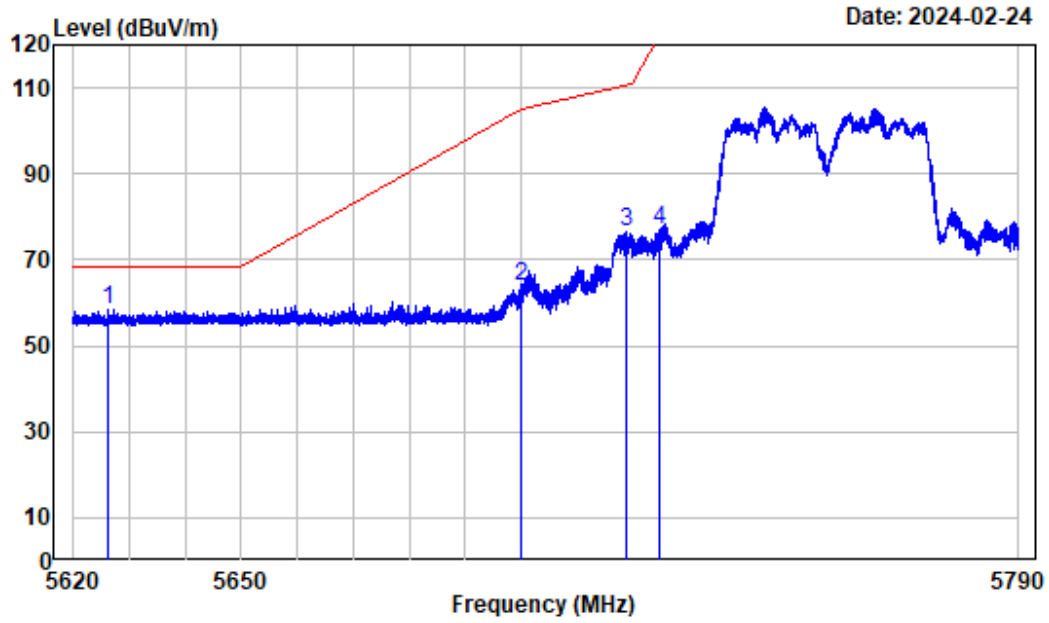
802.11ac20			
Test Channel:	**5825MHz**	**Ant. Polar. :**	**Vertical**



Condition : Vertical
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-B4-AC20-5825

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5850.280	3.67	63.84	67.51	121.56	Peak	-54.05
2	5855.060	3.70	58.74	62.44	110.78	Peak	-48.34
3	5904.240	3.85	55.65	59.50	83.52	Peak	-24.02
4	5929.980	3.79	55.08	58.87	68.20	Peak	-9.33

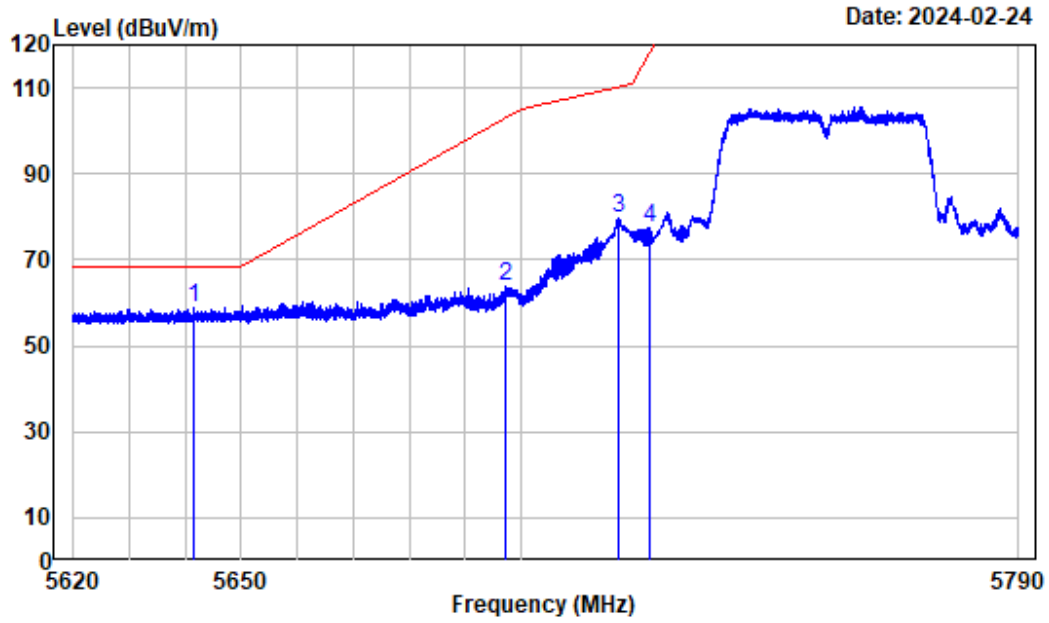
802.11ac40			
Test Channel:	**5755MHz**	**Ant. Polar. :**	**Horizontal**



Condition : Horizontal
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-B4-AC40-5755

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5626.163	3.09	55.36	58.45	68.20	Peak	-9.75
2	5700.006	3.45	60.48	63.93	105.20	Peak	-41.27
3	5718.961	3.48	73.17	76.65	110.51	Peak	-33.86
4	5724.954	3.48	73.33	76.81	122.09	Peak	-45.28

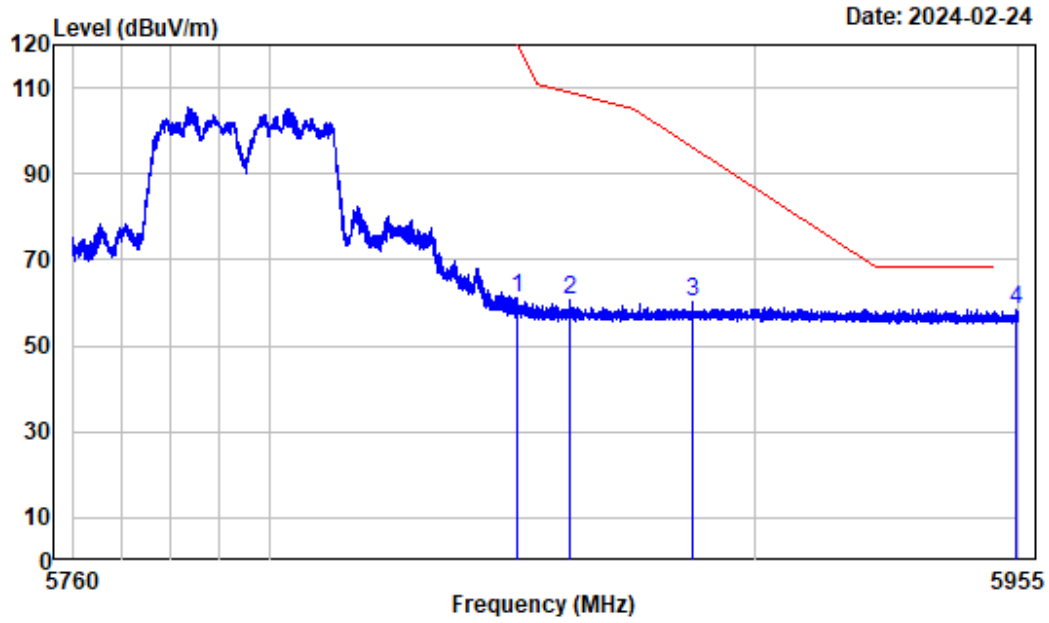
802.11ac40			
Test Channel:	**5755MHz**	**Ant. Polar. :**	**Vertical**



Condition : Vertical
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-B4-AC40-5755

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5641.632	3.20	55.78	58.98	68.20	Peak	-9.22
2	5697.244	3.44	60.40	63.84	103.17	Peak	-39.33
3	5717.665	3.48	76.20	79.68	110.15	Peak	-30.47
4	5723.084	3.48	73.99	77.47	117.83	Peak	-40.36

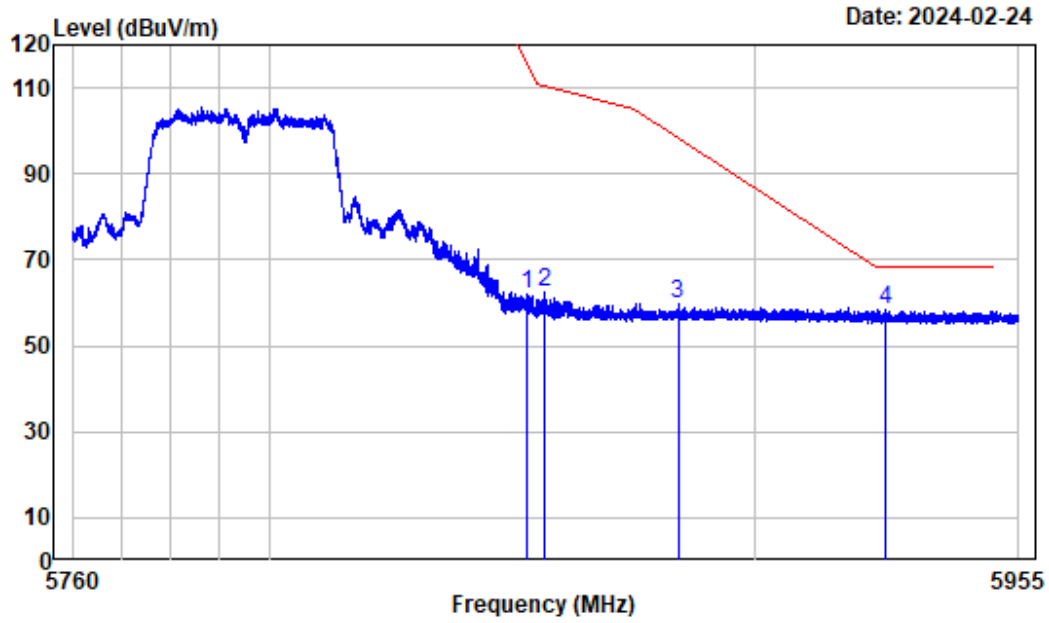
802.11ac40			
Test Channel:	**5795MHz**	**Ant. Polar. :**	**Horizontal**



Condition : Horizontal
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-B4-AC40-5795

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5850.724	3.67	57.67	61.34	120.55	Peak	-59.21
2	5861.717	3.72	57.02	60.74	108.92	Peak	-48.18
3	5887.262	3.81	56.33	60.14	96.10	Peak	-35.96
4	5954.659	3.72	54.72	58.44	------	Peak	------

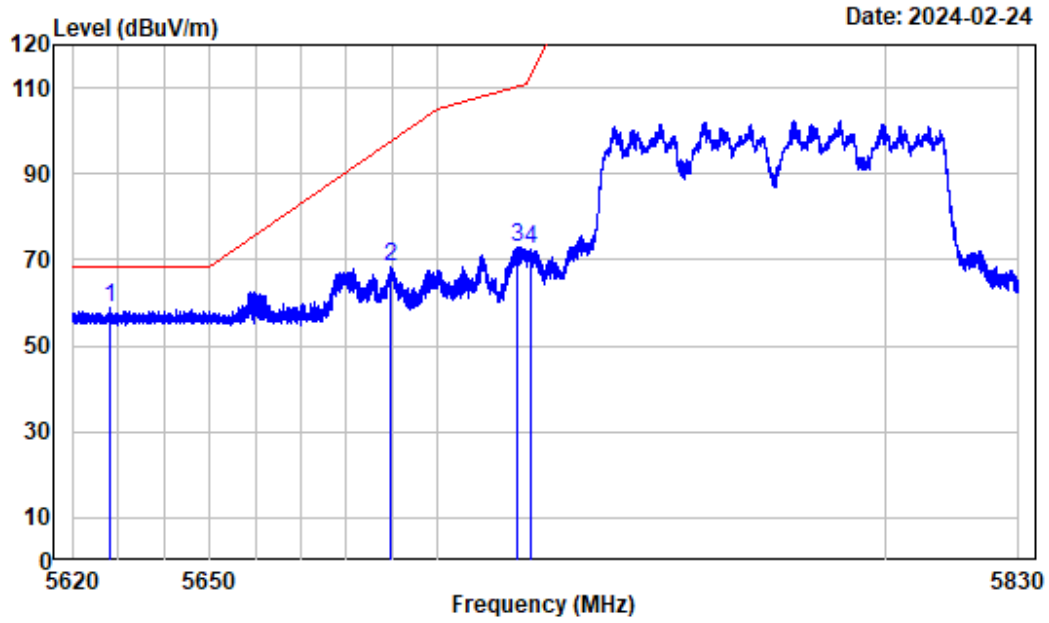
802.11ac40			
Test Channel:	**5795MHz**	**Ant. Polar. :**	**Vertical**



Condition : Vertical
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-B4-AC40-5795

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5852.869	3.69	58.26	61.95	115.66	Peak	-53.71
2	5856.306	3.71	58.98	62.69	110.43	Peak	-47.74
3	5884.069	3.81	55.91	59.72	98.47	Peak	-38.75
4	5927.115	3.79	54.75	58.54	68.20	Peak	-9.66

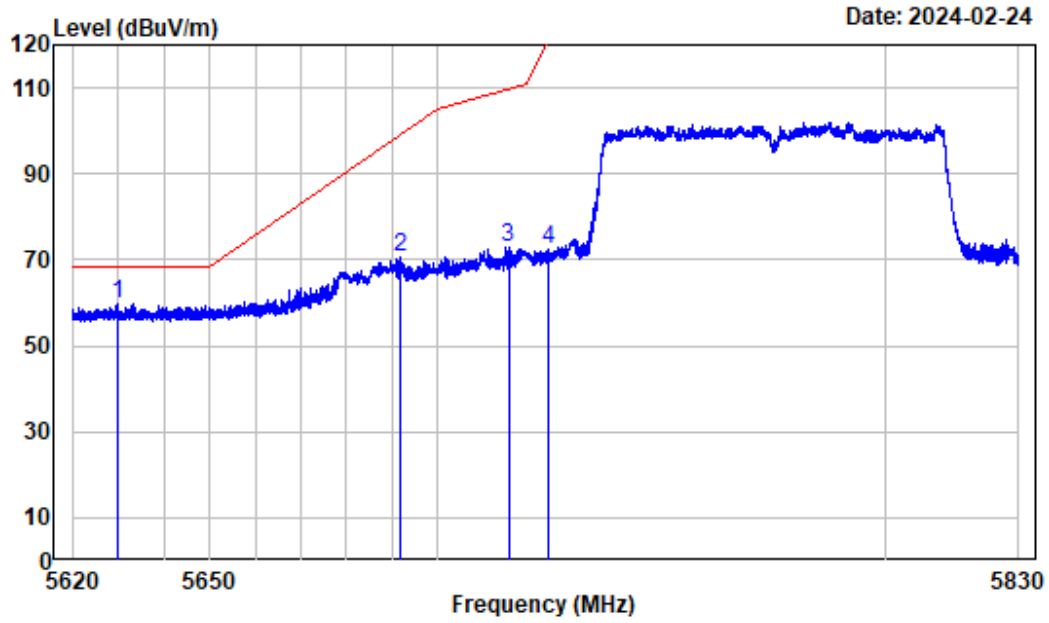
802.11ac80			
Test Channel:	**5775MHz**	**Ant. Polar. :**	**Horizontal**



Condition : Horizontal
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-B4-AC80-5775

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5628.216	3.11	55.87	58.98	68.20	Peak	-9.22
2	5689.746	3.41	64.74	68.15	97.64	Peak	-29.49
3	5717.913	3.48	69.58	73.06	110.22	Peak	-37.16
4	5720.800	3.48	68.76	72.24	112.62	Peak	-40.38

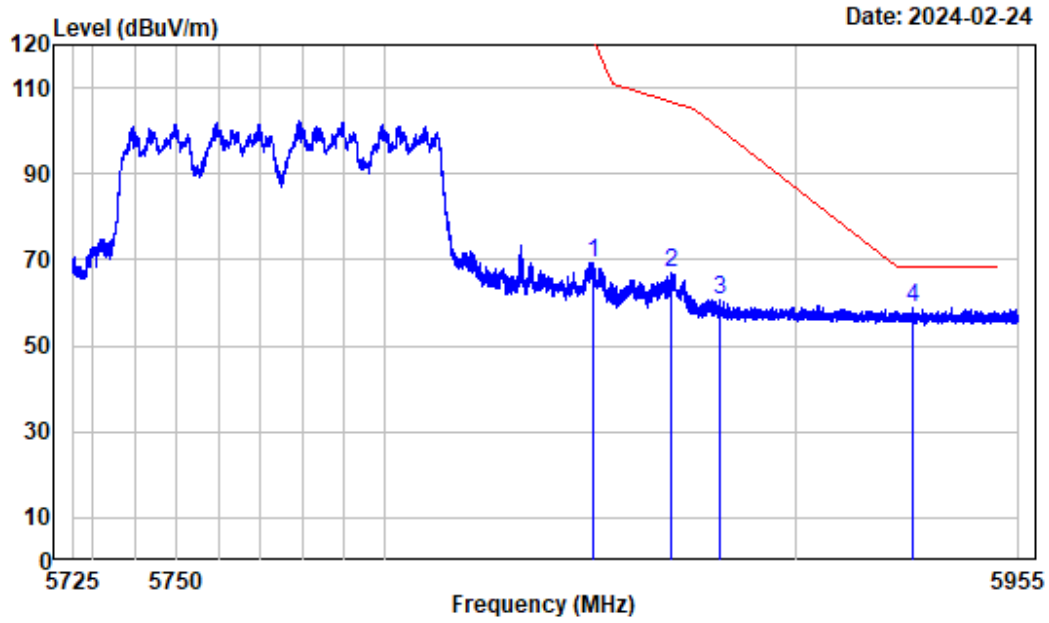
802.11ac80			
Test Channel:	**5775MHz**	**Ant. Polar. :**	**Vertical**



Condition : Vertical
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-B4-AC80-5775

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5630.054	3.12	56.48	59.60	68.20	Peak	-8.60
2	5691.978	3.42	67.06	70.48	99.29	Peak	-28.81
3	5715.839	3.47	69.60	73.07	109.64	Peak	-36.57
4	5724.842	3.48	68.84	72.32	121.84	Peak	-49.52

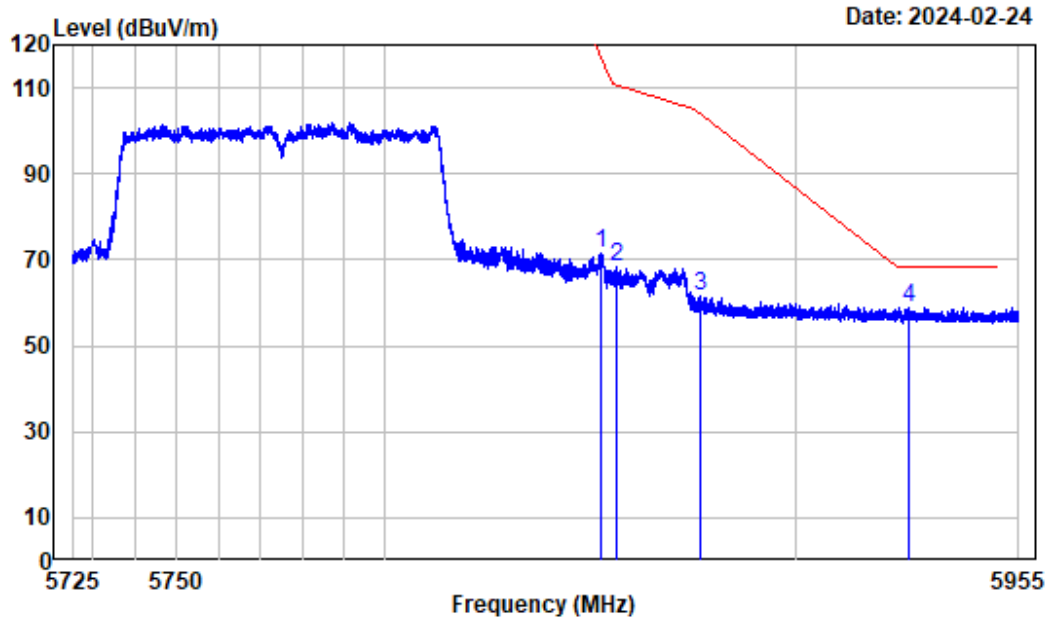
802.11ac80			
Test Channel:	**5775MHz**	**Ant. Polar. :**	**Horizontal**



Condition : Horizontal
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-B4-AC80-5775

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5850.638	3.67	65.62	69.29	120.75	Peak	-51.46
2	5869.670	3.75	63.08	66.83	106.69	Peak	-39.86
3	5881.458	3.79	56.85	60.64	100.40	Peak	-39.76
4	5928.981	3.78	55.10	58.88	68.20	Peak	-9.32

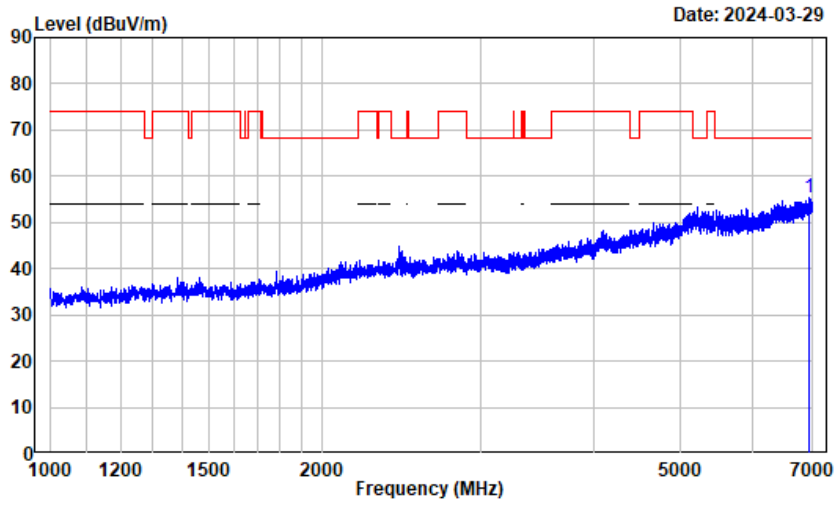
802.11ac80			
Test Channel:	**5775MHz**	**Ant. Polar. :**	**Vertical**



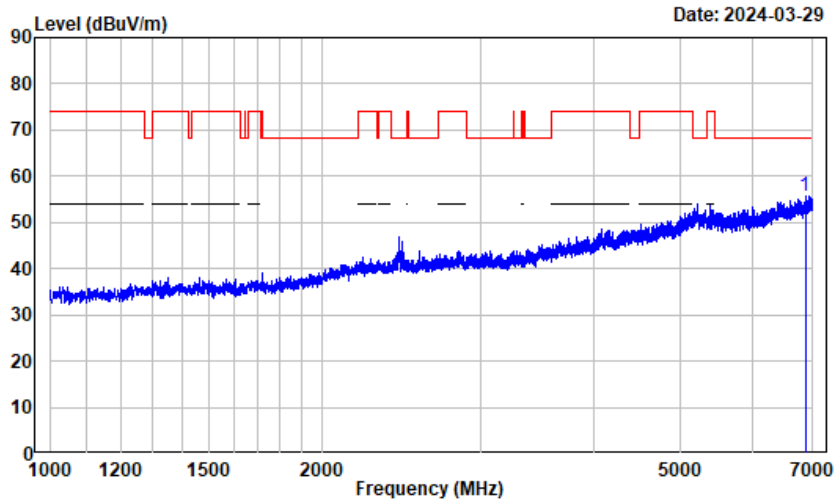
Condition : Vertical
Project No.: SZ4231220-76923E-RF
Tester : Zenos Qiao
Note : 5GWiFi-B4-AC80-5775

	Freq	Factor	Read Level	Level	Limit Line	Remark	Over Limit
	MHz	dB/m	dBuV	dBuV/m	dBuV/m		dB
1	5852.592	3.69	67.70	71.39	116.29	Peak	-44.90
2	5856.301	3.71	64.70	68.41	110.44	Peak	-42.03
3	5876.599	3.78	57.71	61.49	104.01	Peak	-42.52
4	5927.659	3.78	55.10	58.88	68.20	Peak	-9.32

Listed with the worst harmonic margin test plot (802.11ac80, 5775MHz)

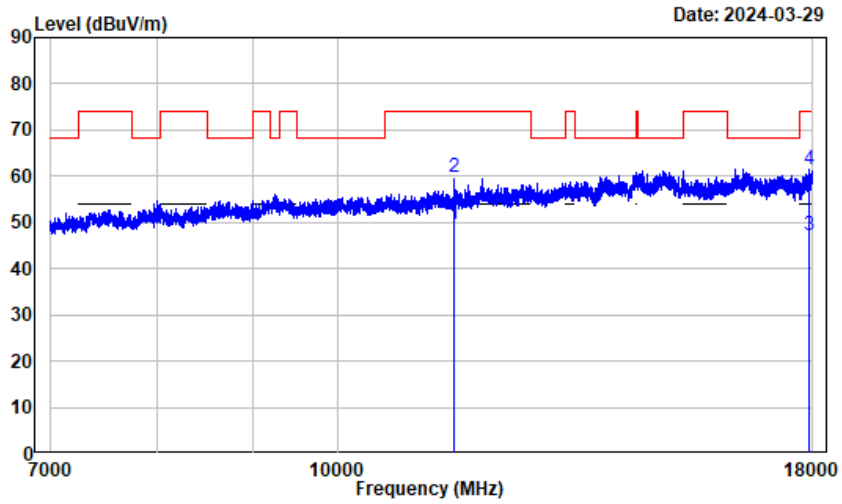
Horizontal	
1-7GHz	 Condition : Horizontal Project No.: SZ4231220-76923E Tester : Dylan Note : 5G_Band4_5775

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	6937.750	8.55	46.91	55.46	68.20	-12.74	Peak

Vertical	
1-7GHz	 Condition : Vertical Project No.: SZ4231220-76923E Tester : Dylan Note : 5G_Band4_5775 Freq / Factor / Read Level / Limit Level / Limit Line / Over Limit / Remark MHz / dB/m / dBuV / dBuV/m / dBuV/m / dB 1 6868.000 7.96 47.84 55.80 68.20 -12.40 Peak

Horizontal

7-18GHz

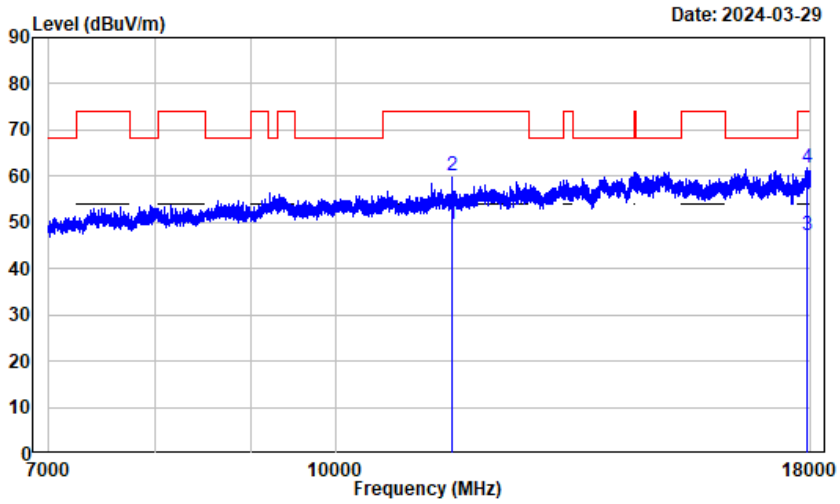


Condition : Horizontal
Project No.: SZ4231220-76923E
Tester : Dylan
Note : 5G_Band4_5775

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	11550.000	14.13	35.39	49.52	54.00	-4.48	Average
2	11550.000	14.13	45.54	59.67	74.00	-14.33	Peak
3	17909.250	23.97	23.09	47.06	54.00	-6.94	Average
4	17909.250	23.97	37.64	61.61	74.00	-12.39	Peak

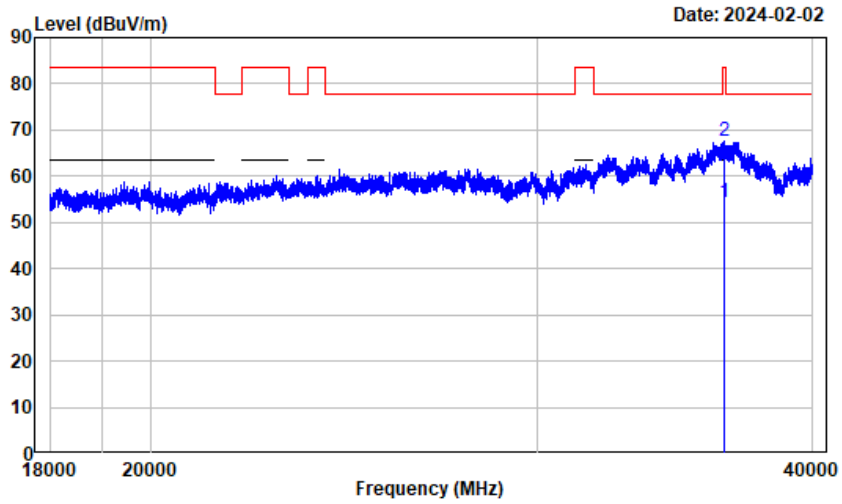
Vertical

7-18GHz

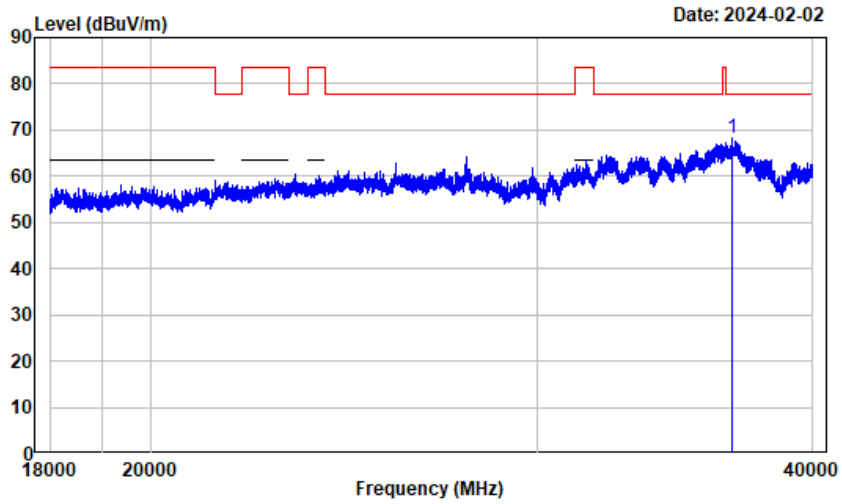


Condition : Vertical
Project No.: SZ4231220-76923E
Tester : Dylan
Note : 5G_Band4_5775

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	11550.000	14.13	35.61	49.74	54.00	-4.26	Average
2	11550.000	14.13	45.87	60.00	74.00	-14.00	Peak
3	17916.130	24.02	23.24	47.26	54.00	-6.74	Average
4	17916.130	24.02	37.87	61.89	74.00	-12.11	Peak

Horizontal	
18-40GHz	 Condition : Horizontal Project No.: SZ4231220-76923E Tester : Dylan Note : 5G_Band4_5775

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	36488.250	25.35	29.04	54.39	63.50	-9.11	Average
2	36488.250	25.35	42.15	67.50	83.50	-16.00	Peak

Vertical	
18-40GHz	 Condition : Vertical Project No.: SZ4231220-76923E Tester : Dylan Note : 5G_Band4_5775 Freq / Factor / Read Level / Level / Limit Line / Over Limit / Remark MHz / dB/m / dBuV / dBuV/m / dBuV/m / dB 1 36790.750 25.11 43.00 68.11 77.70 -9.59 Peak

FCC §15.407(a), (e) – 26 dB & 6dB EMISSION BANDWIDTH

Applicable Standard

The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

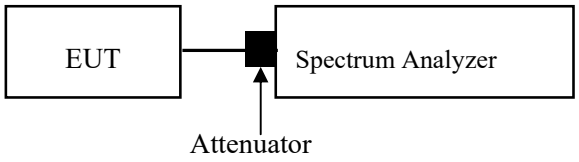
Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Test Procedure

According to KDB789033 D02 section II.C and section II.D

1. Emission Bandwidth (EBW)
a) Set RBW = approximately 1% of the emission bandwidth.
b) Set the VBW > RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Measure the maximum width of the emission that is 26 dB down from the maximum 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%.

2. **Minimum Emission Bandwidth for the band 5.725-5.85 GHz**
Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.725-5.85 GHz. The following procedure shall be used for measuring this bandwidth:
a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 × RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.



Test Data

Environmental Conditions

Temperature:	26.3 ℃
Relative Humidity:	48 %
ATM Pressure:	101 kPa

The testing was performed by Bruce Lin on 2024-01-31.

EUT operation mode: Transmitting

Test Result: Compliant.

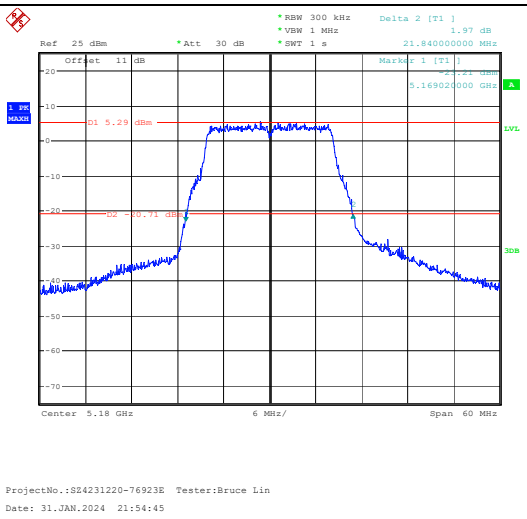
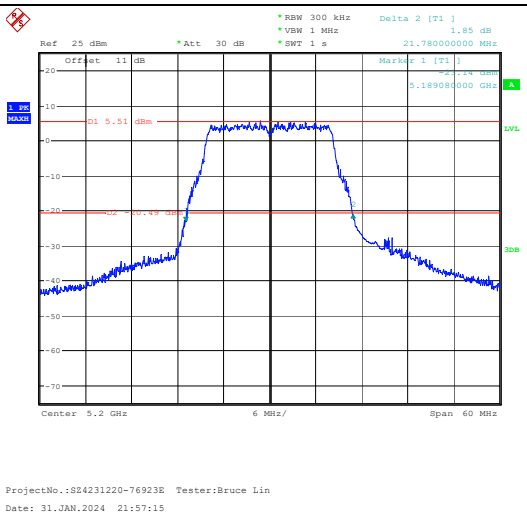
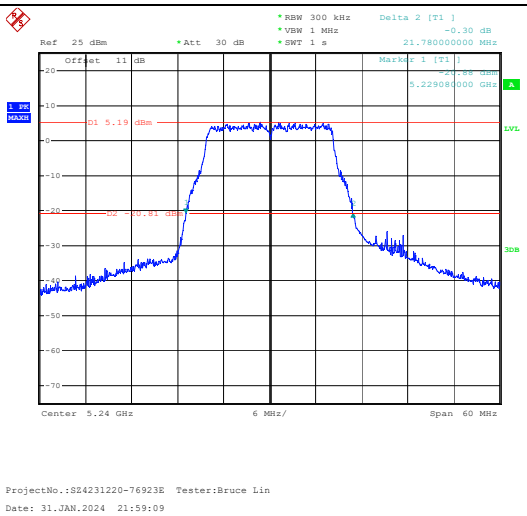
5150-5250MHz:

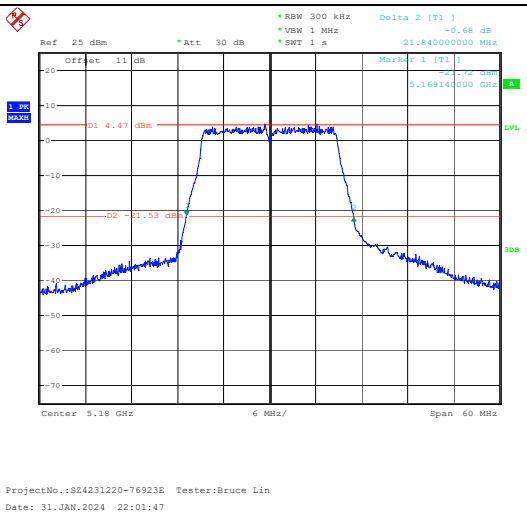
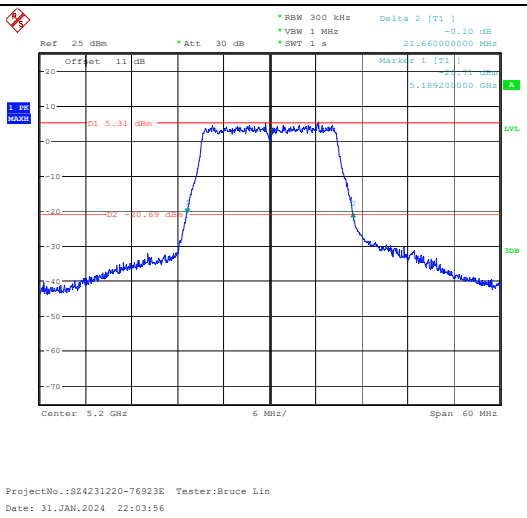
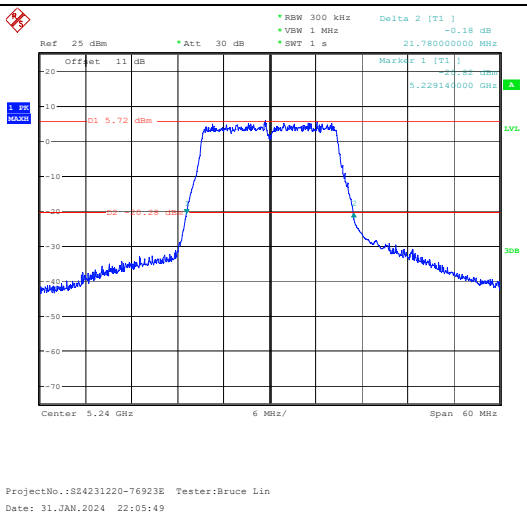
Test Modes	Test Frequency (MHz)	26 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5180	21.84	17.28
	5200	21.78	17.28
	5240	21.78	17.24
802.11ac vht20	5180	21.84	18.12
	5200	21.66	18.12
	5240	21.78	18.12
802.11ac vht40	5190	40.80	36.64
	5230	40.72	36.64
802.11ac vht80	5210	82.88	76.16
Note: Test only was performed at ANT 0. The 99% Occupied Bandwidth have not fall into the band 5250-5350MHz, please refer to the test plots of 99% Occupied Bandwidth			

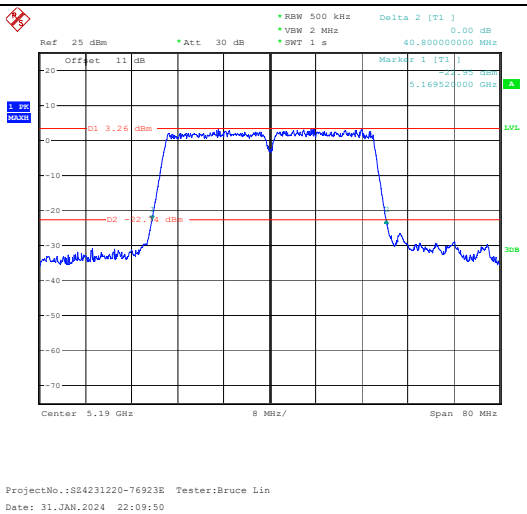
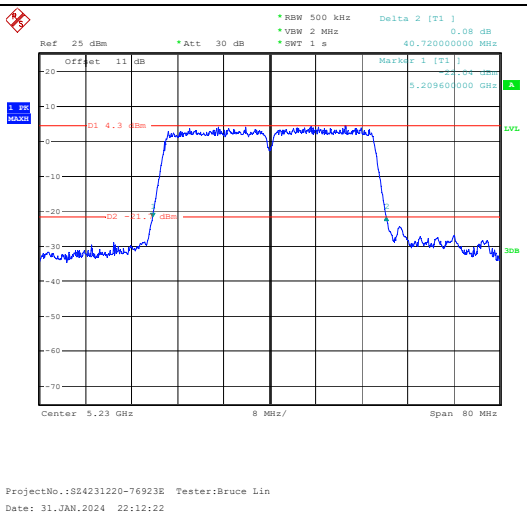
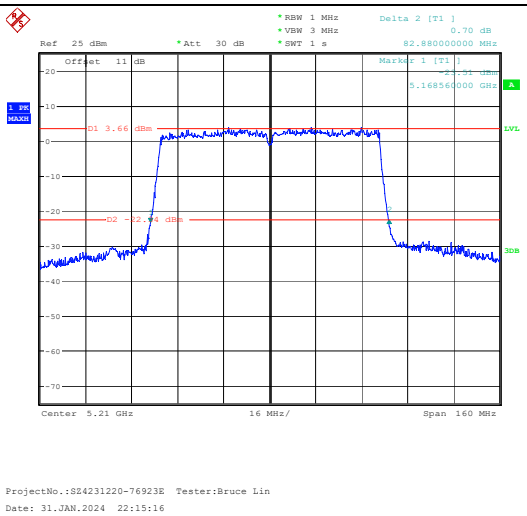
5725-5850MHz:

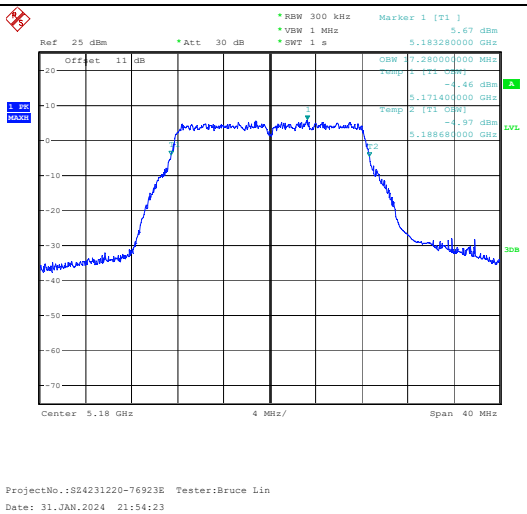
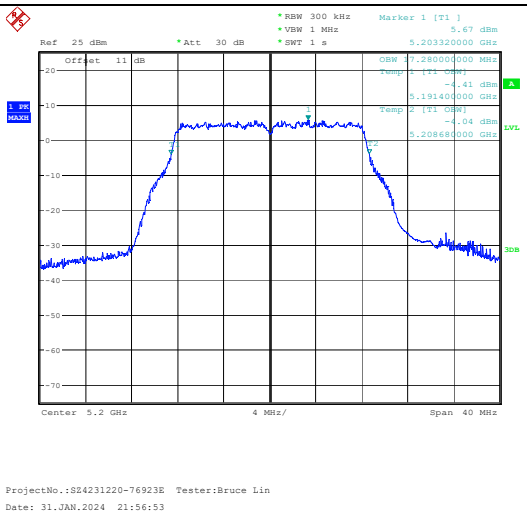
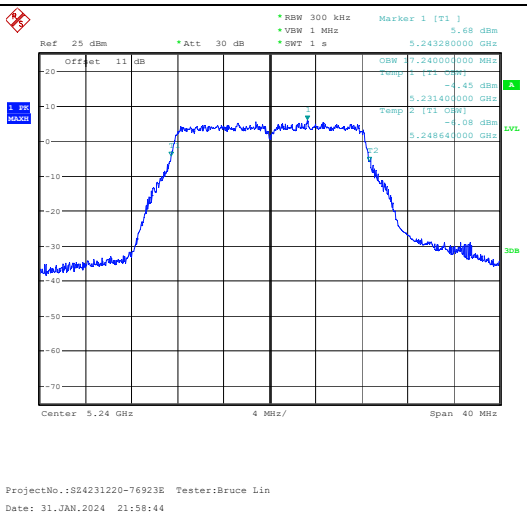
Test Modes	Test Frequency (MHz)	6 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5745	16.60	17.44
	5785	16.60	17.36
	5825	16.60	17.36
802.11ac vht20	5745	17.80	18.20
	5785	17.80	18.16
	5825	17.80	18.12
802.11ac vht40	5755	36.64	36.72
	5795	36.64	36.72
802.11ac vht80	5775	76.68	76.32
Note: Test only was performed at ANT 0. 6dB Emission Bandwidth Limit: ≥0.5 MHz The 99% Occupied Bandwidth have not fall into the band 5470-5725MHz, please refer to the test plots of 99% Occupied Bandwidth.			

5150-5250MHz:

26dB Emission Bandwidth	
802.11a Lowest Channel	
802.11a Middle Channel	
802.11a Highest Channel	

26dB Emission Bandwidth	
802.11ac vht20 Lowest Channel	 ProjectNo.:SZ4231220-76923E Tester:Bruce Lin Date: 31.JAN.2024 22:01:47
802.11ac vht20 Middle Channel	 ProjectNo.:SZ4231220-76923E Tester:Bruce Lin Date: 31.JAN.2024 22:03:56
802.11ac vht20 Highest Channel	 ProjectNo.:SZ4231220-76923E Tester:Bruce Lin Date: 31.JAN.2024 22:05:49

26dB Emission Bandwidth	
802.11ac vht40 Lowest Channel	
802.11ac vht40 Highest Channel	
802.11ac vht80 Middle Channel	

99% Emission Bandwidth	
802.11a Lowest Channel	
802.11a Middle Channel	
802.11a Highest Channel	

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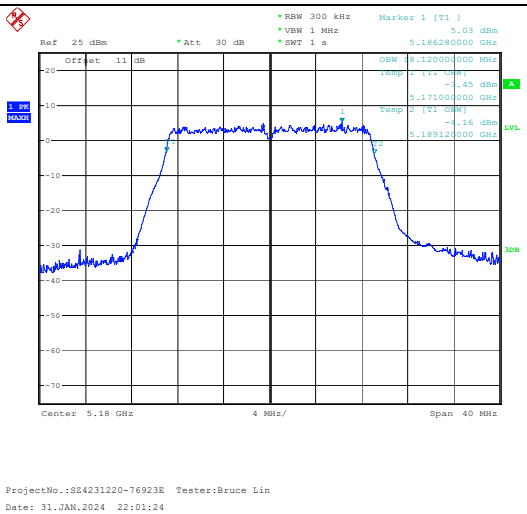
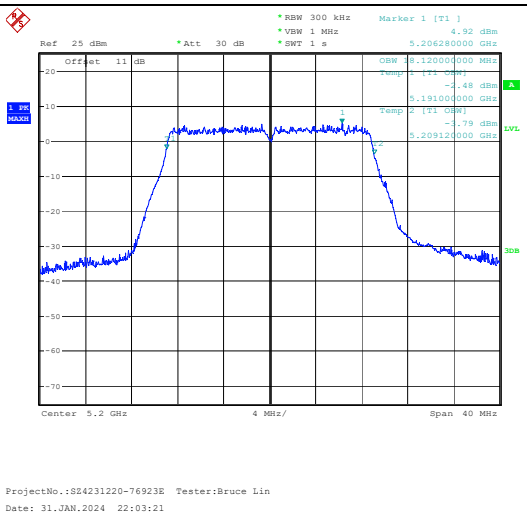
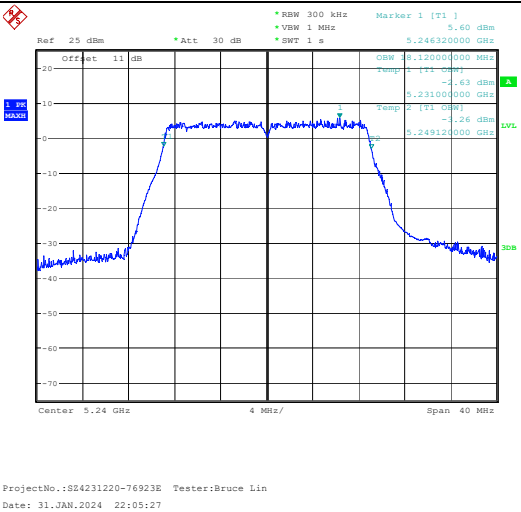
802.11ac vht20 Lowest Channel	
802.11ac vht20 Middle Channel	
802.11ac vht20 Highest Channel	

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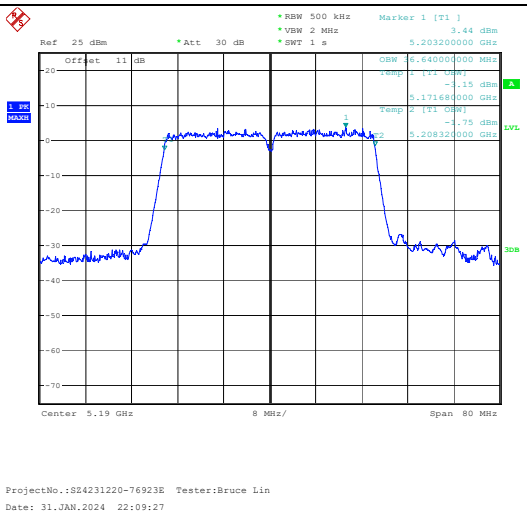
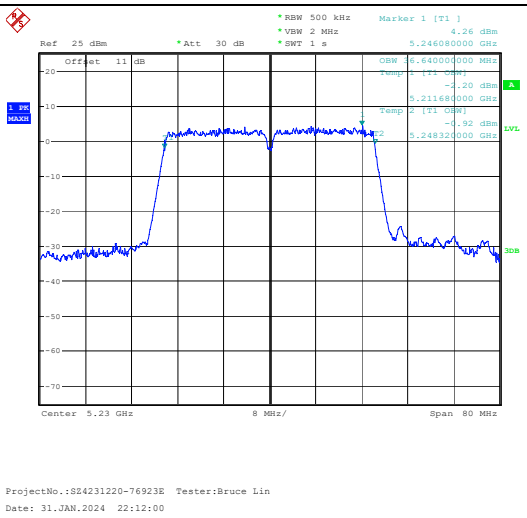
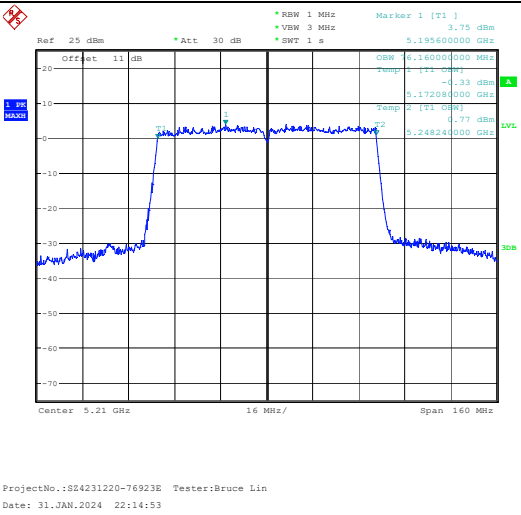
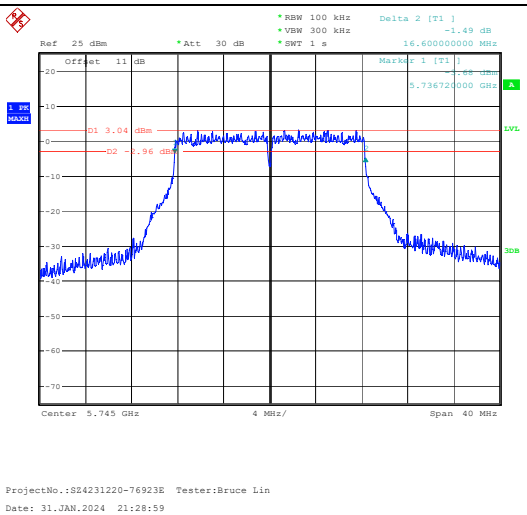
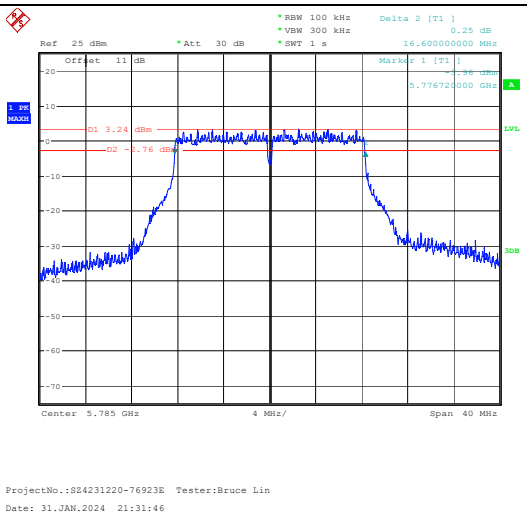
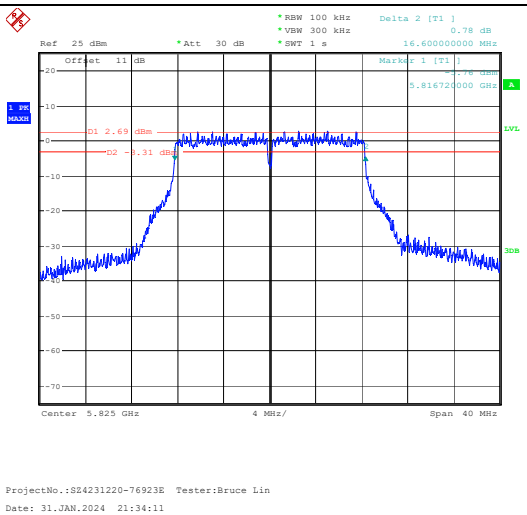
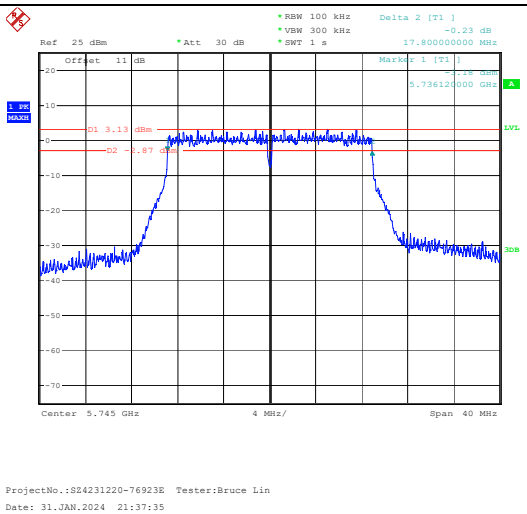
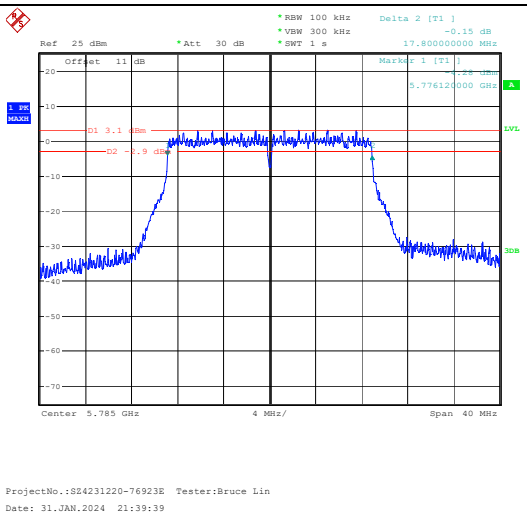
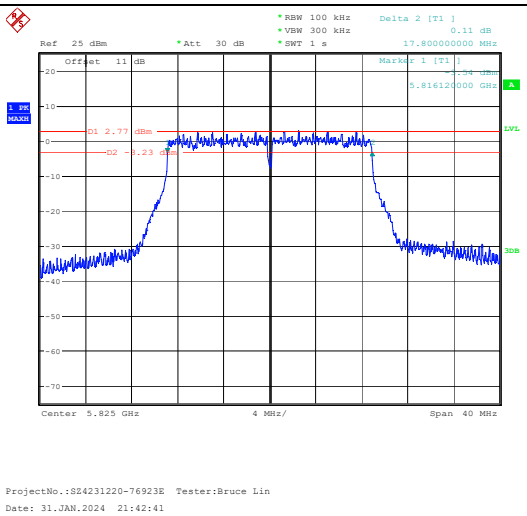
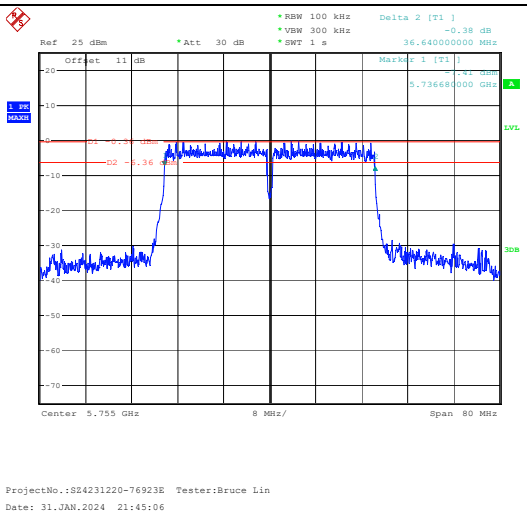
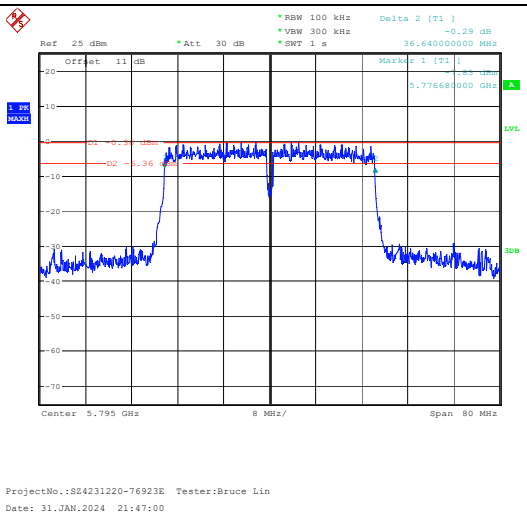
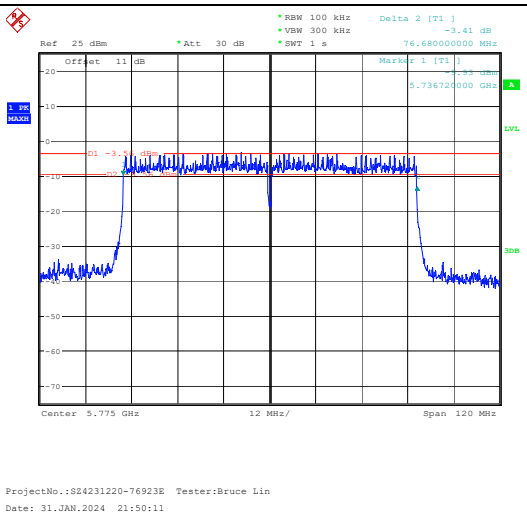
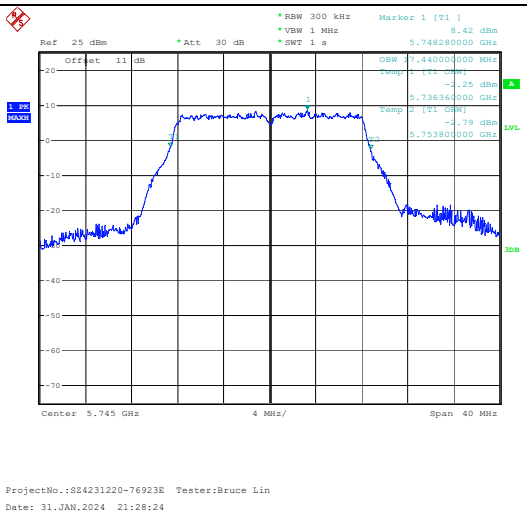
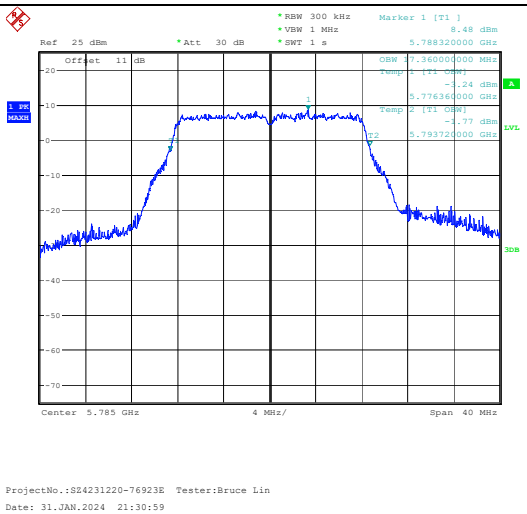
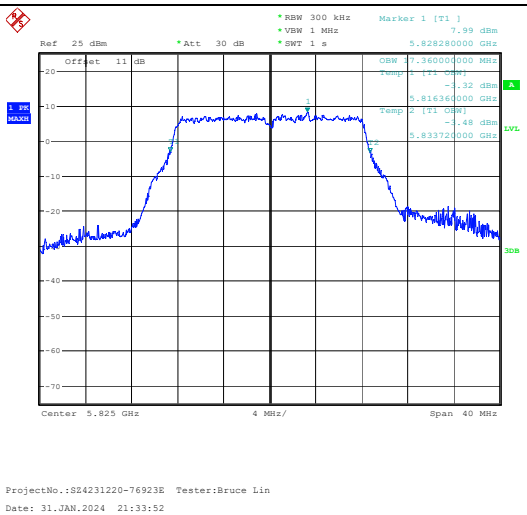
802.11ac vht40 Lowest Channel	
802.11ac vht40 Highest Channel	
802.11ac vht80 Middle Channel	

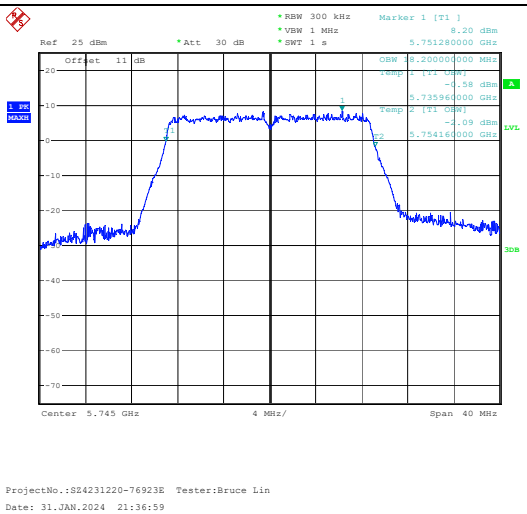
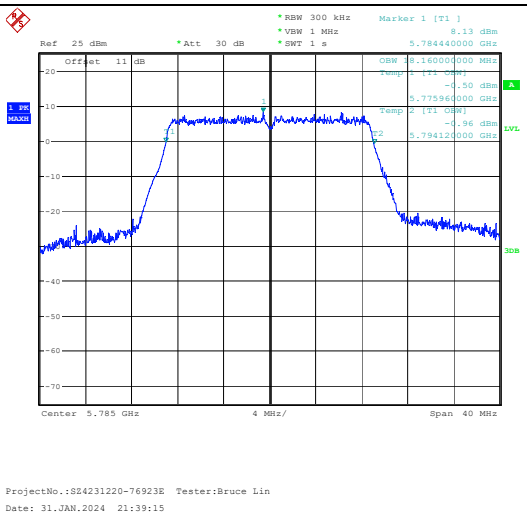
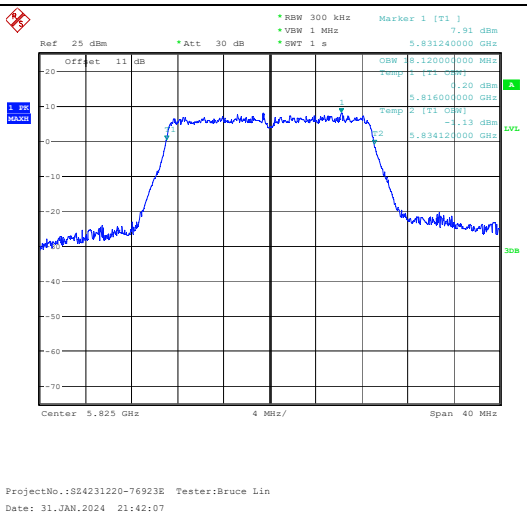
5725-5850MHz:

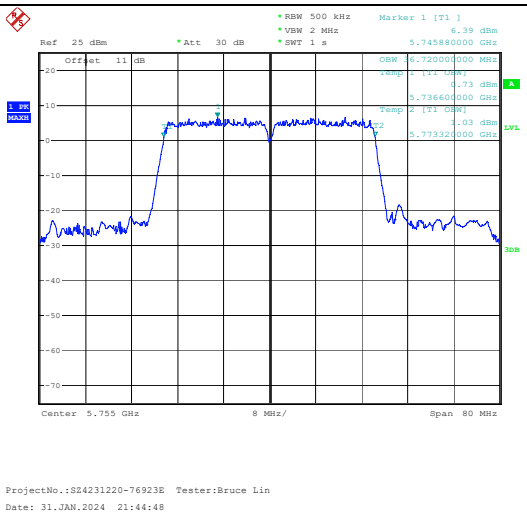
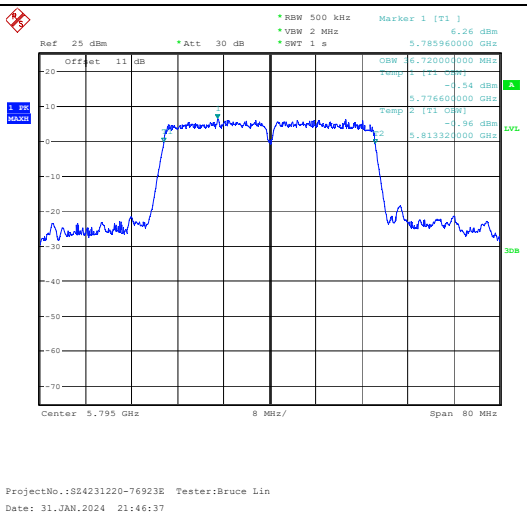
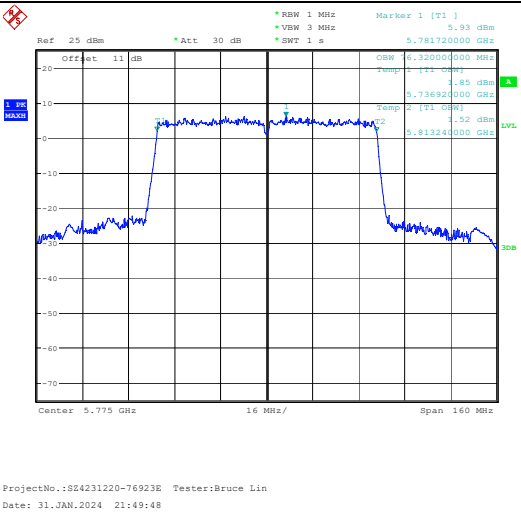
6dB Emission Bandwidth	
802.11a Lowest Channel	
802.11a Middle Channel	
802.11a Highest Channel	

6dB Emission Bandwidth	
802.11ac vht20 Lowest Channel	
802.11ac vht20 Middle Channel	
802.11ac vht20 Highest Channel	

6dB Emission Bandwidth	
802.11ac vht40 Lowest Channel	
802.11ac vht40 Highest Channel	
802.11ac vht80 Middle Channel	

99% Emission Bandwidth	
802.11a Lowest Channel	
802.11a Middle Channel	
802.11a Highest Channel	

99% Emission Bandwidth	
802.11ac vht20 Lowest Channel	
802.11ac vht20 Middle Channel	
802.11ac vht20 Highest Channel	

99% Emission Bandwidth	
802.11ac vht40 Lowest Channel	 ProjectNo.:SZ4231220-76923E Tester:Bruce Lin Date: 31.JAN.2024 21:44:48
802.11ac vht40 Highest Channel	 ProjectNo.:SZ4231220-76923E Tester:Bruce Lin Date: 31.JAN.2024 21:46:37
802.11ac vht80 Middle Channel	 ProjectNo.:SZ4231220-76923E Tester:Bruce Lin Date: 31.JAN.2024 21:49:48

FCC §15.407(a) – CONDUCTED TRANSMITTER OUTPUT POWER

Applicable Standard

For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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

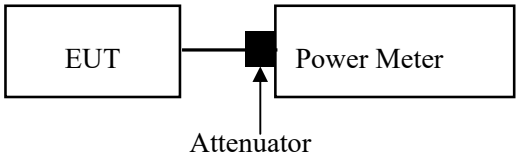
For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11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

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Test Procedure

According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Method PM-G should be applied

a. Place the EUT on a bench and set it in transmitting mode.
b. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to one test equipment.



Test Data

Environmental Conditions

Temperature:	26.3 ℃
Relative Humidity:	48 %
ATM Pressure:	101 kPa

The testing was performed by Bruce Lin on 2024-01-31.

EUT operation mode: Transmitting

Test Result: Compliant.

5150-5250 MHz:

Test Modes	Test Frequency (MHz)	Max. Conducted Average Output Power (dBm)			
		ANT 0	ANT 1	Total	Limit
802.11a	5180	11.83	10.68	/	24
	5200	12.07	10.89	/	24
	5240	11.86	11.24	/	24
802.11ac vht20	5180	11.28	10.62	13.97	24
	5200	11.49	10.93	14.23	24
	5240	12.22	11.25	**14.77**	24
802.11ac vht40	5190	10.94	9.93	13.47	24
	5230	11.83	10.31	14.15	24
802.11ac vht80	5210	11.37	9.85	13.69	24
Note: The device is a client unit. The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power measurements on IEEE 802.11 devices: Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$					
Antenna Gain:	2.3	dBi	Directional gain:	2.30	dBi

5725-5850 MHz:

Test Modes	Test Frequency (MHz)	Max. Conducted Average Output Power (dBm)			
		ANT 0	ANT 1	Total	Limit
802.11a	5745	13.96	14.52	/	30
	5785	12.82	14.43	/	30
	5825	13.40	14.15	/	30
802.11ac vht20	5745	13.96	14.59	**17.30**	30
	5785	13.84	14.42	17.15	30
	5825	13.36	14.25	16.84	30
802.11ac vht40	5755	13.56	14.06	16.83	30
	5795	13.35	13.84	16.61	30
802.11ac vht80	5775	13.24	13.68	16.48	30
Note: The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power measurements on IEEE 802.11 devices: Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$					
Antenna Gain:	2.3	dBi	Directional gain:	2.30	dBi

FCC §15.407(a) - POWER SPECTRAL DENSITY

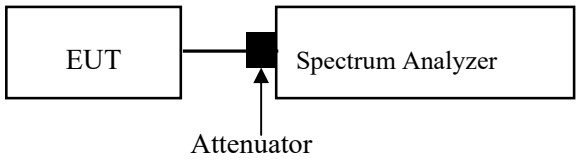
For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting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

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

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Test Procedure

According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Method SA-2 should be applied
a) Set span to encompass the entire EBW(or, alternatively, the entire 99% occupied Bandwidth) of the signal.
b) Set sweep trigger to “free run.”.
c) Set RBW=1MHz or 500kHz Set VBW>3 MHz or 2MHz.
d) Number of points in sweep>2 x span/RBW.(This ensures that bin-to-bin spacing is <RBW/2. so that narrowband signals are not lost between frequency bins.)
e) Sweep time = auto.
f) Detector = power averaging (rms), if available. Otherwise, use sample detector mode.
g) Trace mode = max hold.
h) Do not use sweep triggering. Allow the sweep to “free run.”
i) Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed to ensure that the average accurately represents the true average over the on and off periods of the transmitter.
j) 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 (because the measurement represents an average over both the on and off times of the transmission).



Test Data

Environmental Conditions

Temperature:	25~27 ℃
Relative Humidity:	43~48 %
ATM Pressure:	101 kPa

The testing was performed by Bruce Lin from 2024-03-15 to 2024-03-22.

EUT operation mode: Transmitting

Test Result: Compliant.

5150-5250 MHz:

Test Modes	Test Frequency (MHz)	Reading (dBm/MHz)		Duty cycle factor (dB)	Maximum Power Spectral Density (dBm/MHz)	
		ANT 0	ANT 1		Result	Limit
802.11a	5180	-1.21	-2.42	2.02	0.81	11
	5200	-1.63	-2.09	2.02	0.39	11
	5240	-1.12	-2.14	2.02	0.90	11
802.11ac vht20	5180	-1.95	-2.91	2.36	2.97	11
	5200	-2.20	-2.58	2.36	2.98	11
	5240	-1.94	-2.64	2.36	3.09	11
802.11ac vht40	5190	-6.50	-7.19	3.22	-0.60	11
	5230	-6.25	-7.19	3.22	-0.46	11
802.11ac vht80	5210	-10.27	-11.38	3.97	-3.81	11

Note:
The device is a client unit.
Method SA-2 in KDB 789033 D02 General UNII Test Procedures New Rules v02r01was used for PSD test, and the duty cycle factor was added into the result.
The maximum Power Spectral Density was calculated the result of the maximum chain for SISO mode, and Total chains for MIMO mode.
The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power spectral density (PSD) measurements on the devices:
Array Gain = 10 $\log(N_{ANT}/N_{SS})$ dB

Antenna Gain:	2.3	dBi	Directional gain:	5.30	dBi

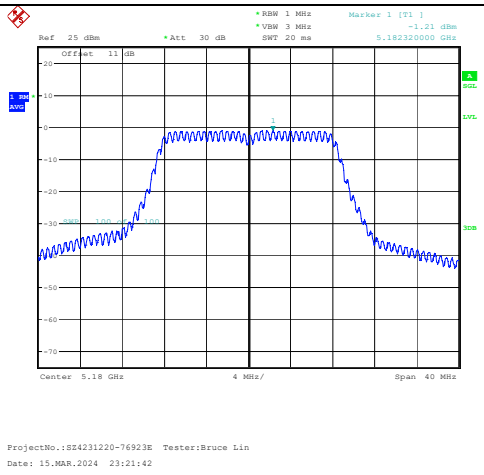
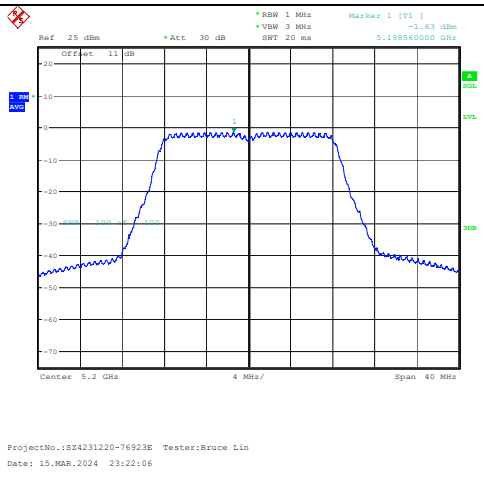
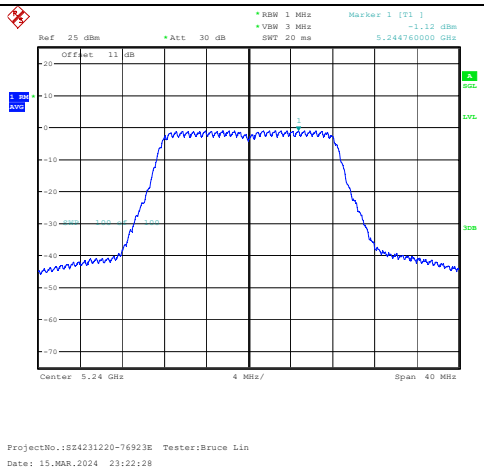
5725-5850 MHz:

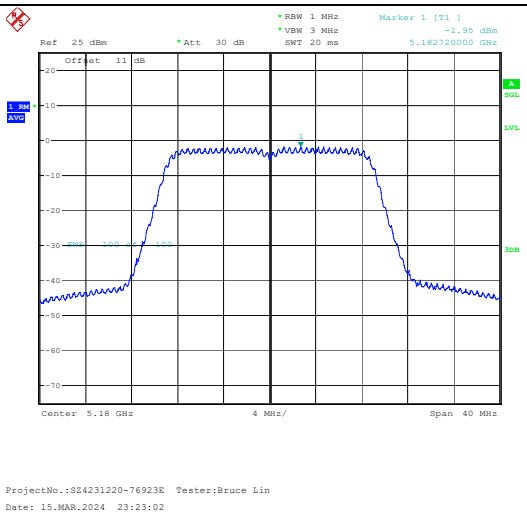
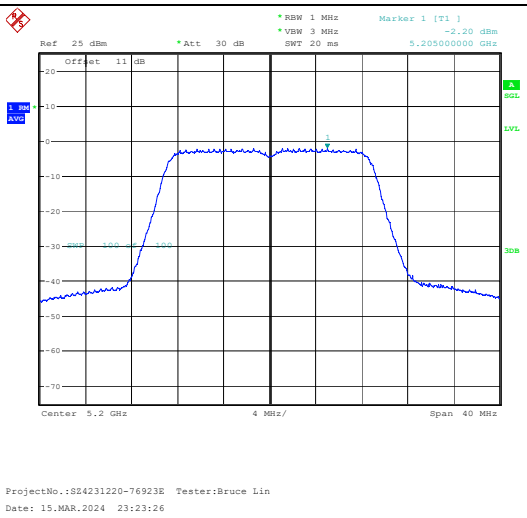
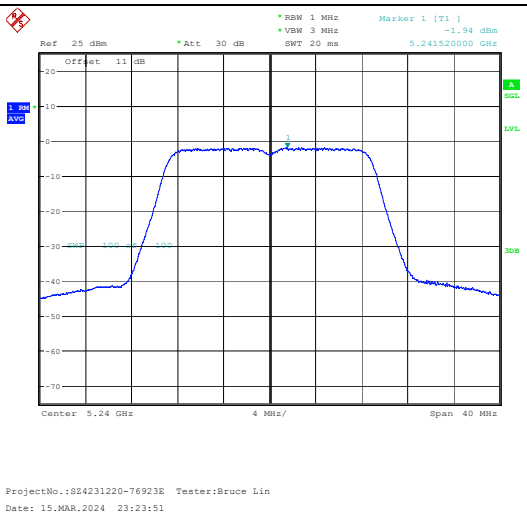
Test Modes	Test Frequency (MHz)	Reading (dBm/500kHz)		Duty cycle factor (dB)	Maximum Power Spectral Density (dBm/500kHz)	
		ANT 0	ANT 1		Result	Limit
802.11a	5745	-2.72	-1.78	2.02	0.24	30
	5785	-2.70	-1.68	2.02	0.34	30
	5825	-2.93	-1.83	2.02	0.19	30
802.11ac vht20	5745	-2.29	-1.08	2.36	3.73	30
	5785	-2.13	-1.10	2.36	3.79	30
	5825	-2.09	-0.91	2.36	3.91	30
802.11ac vht40	5755	-6.24	-5.26	3.22	0.51	30
	5795	-5.81	-4.88	3.22	0.91	30
802.11ac vht80	5775	-9.65	-8.86	3.97	-2.26	30

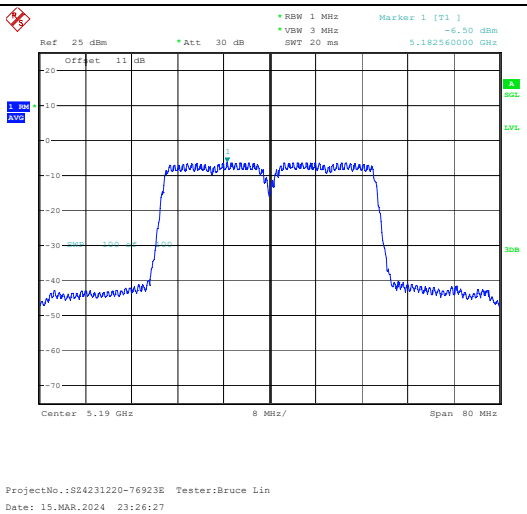
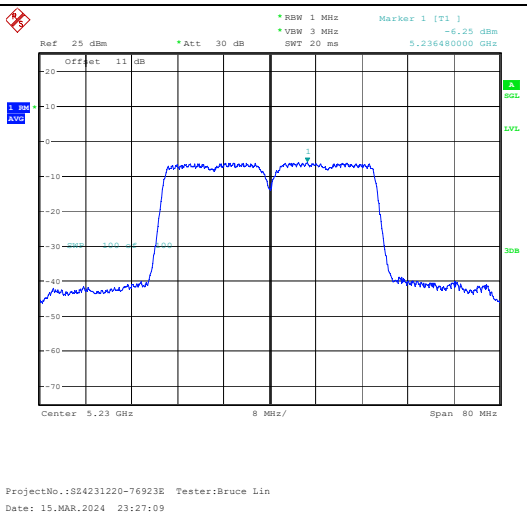
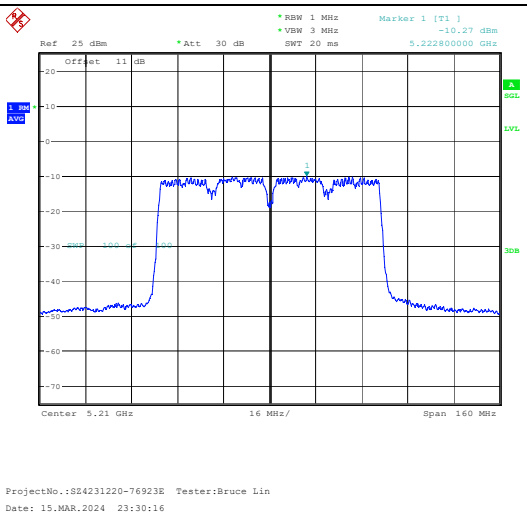
Note:
Method SA-2 in KDB 789033 D02 General UNII Test Procedures New Rules v02r01was used for PSD test, and the duty cycle factor was added into the result.
The maximum Power Spectral Density was calculated the result of the maximum chain for SISO mode, and Total chains for MIMO mode.
The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power spectral density (PSD) measurements on the devices:
Array Gain = 10 $\log(N_{ANT}/N_{SS})$ dB

Antenna Gain:	2.3	dBi	Directional gain:	5.30	dBi

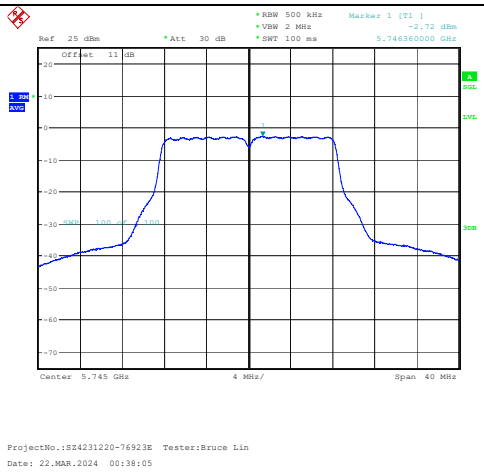
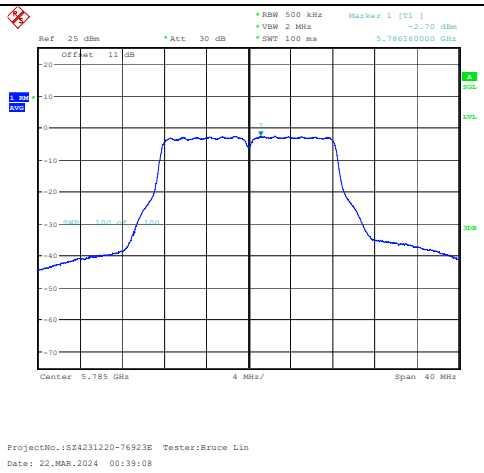
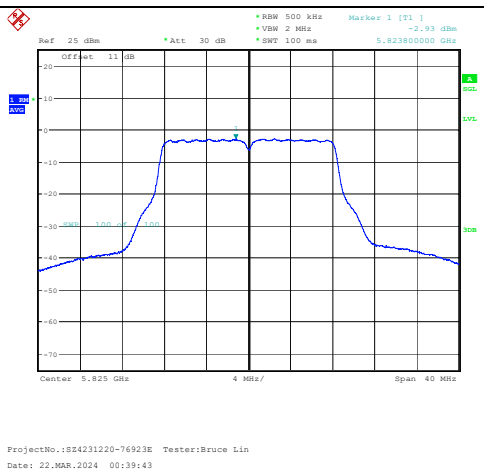
ANT 0
5150-5250MHz:

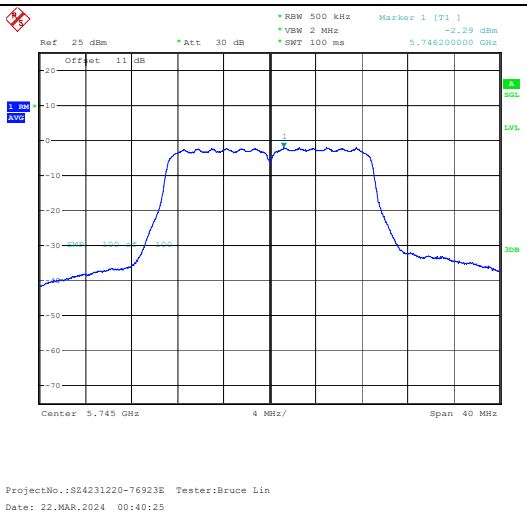
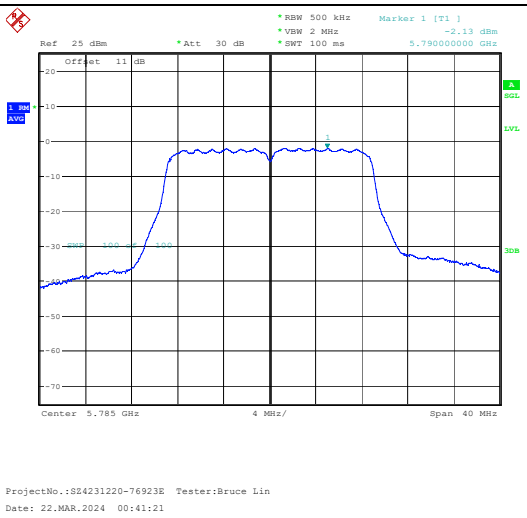
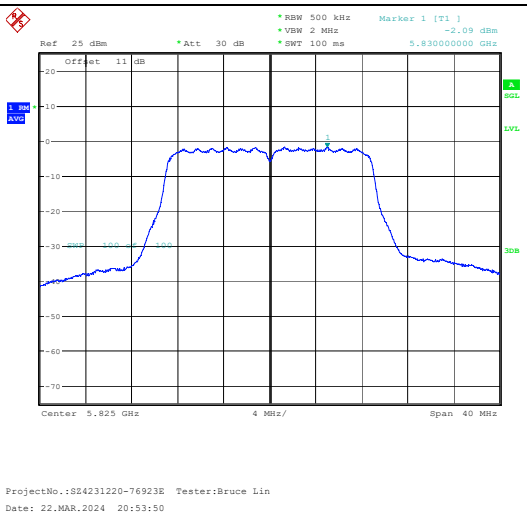
Maximum power spectral density	
802.11a Lowest Channel	
802.11a Middle Channel	
802.11a Highest Channel	

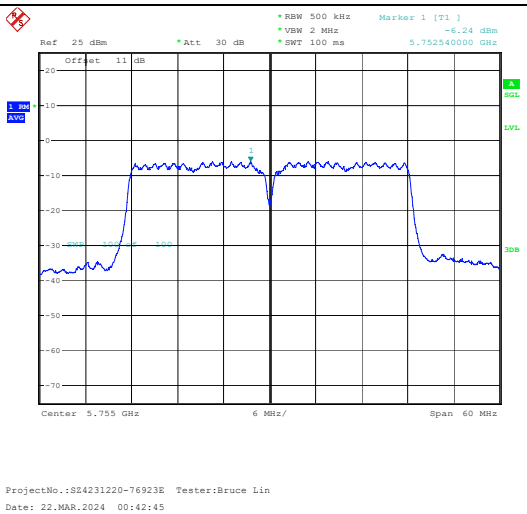
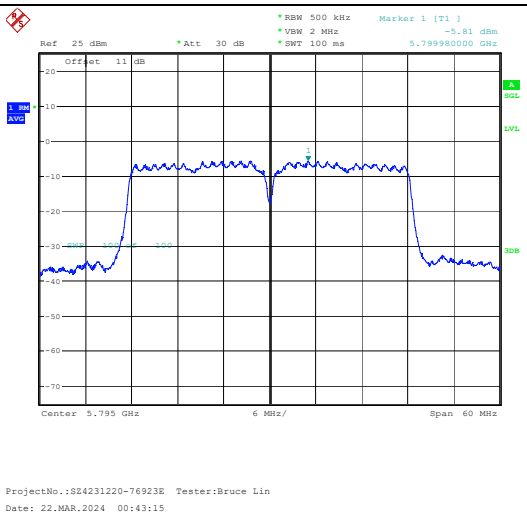
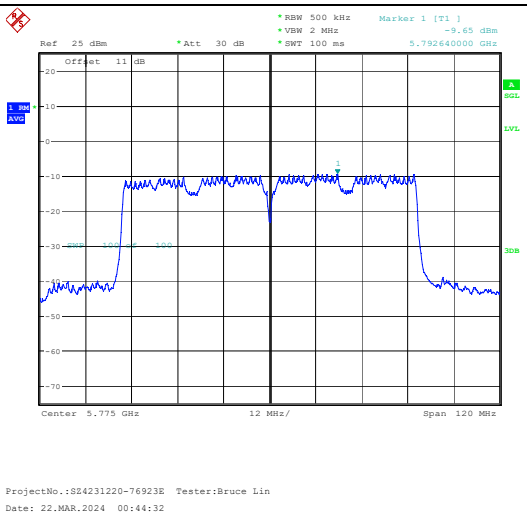
Maximum power spectral density	
802.11ac vht20 Lowest Channel	
802.11ac vht20 Middle Channel	
802.11ac vht20 Highest Channel	

Maximum power spectral density	
802.11ac vht40 Lowest Channel	
802.11ac vht40 Highest Channel	
802.11ac vht80 Middle Channel	

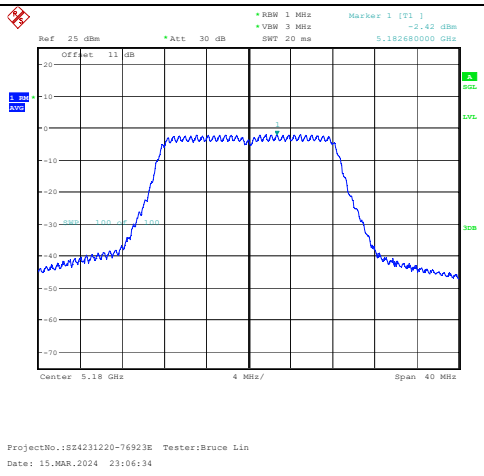
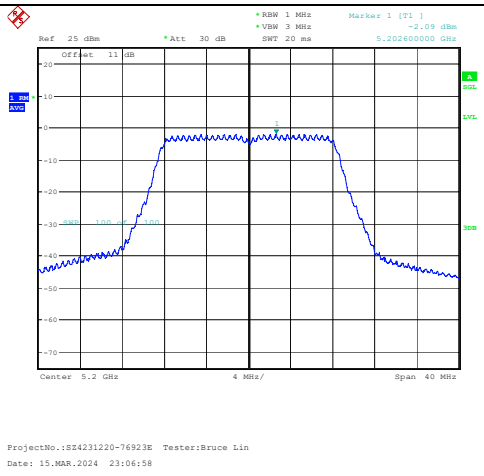
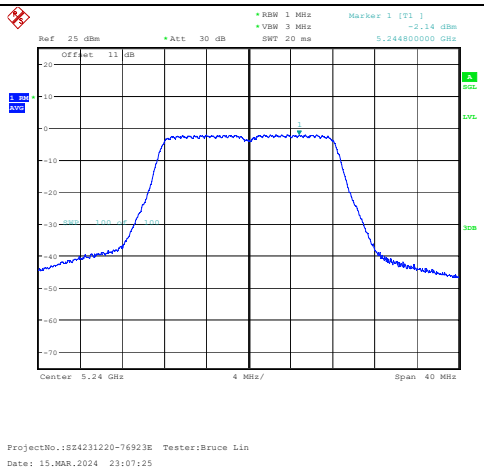
5725-5850MHz:

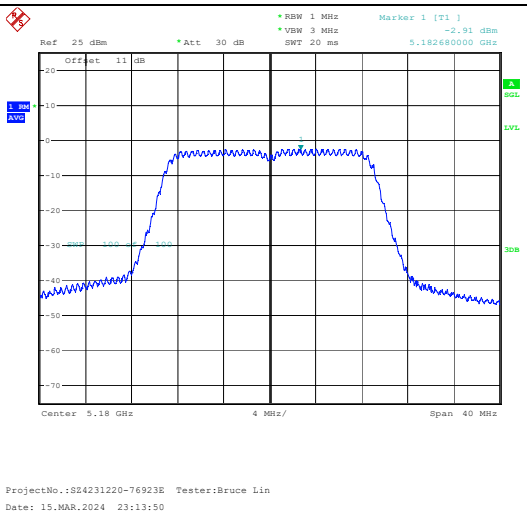
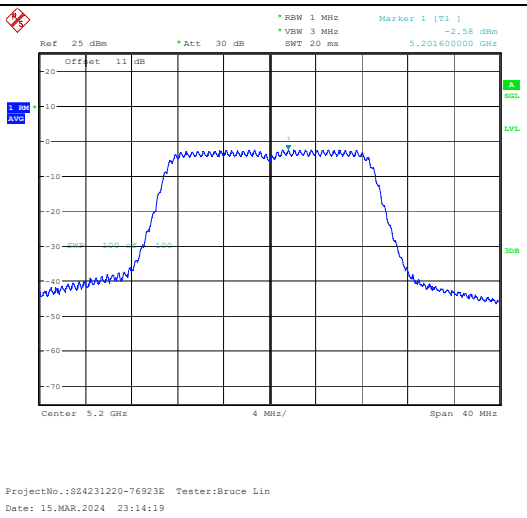
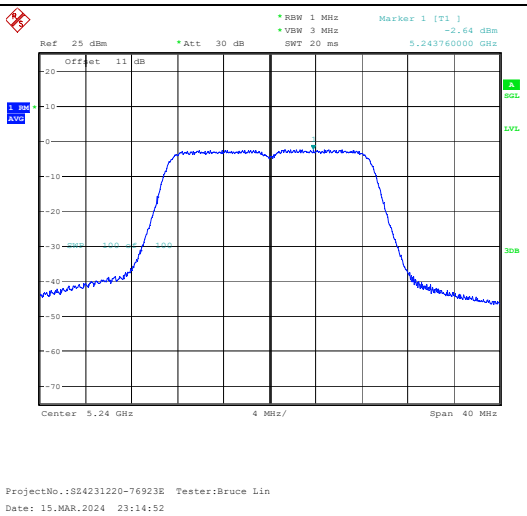
Maximum power spectral density	
802.11a Lowest Channel	
802.11a Middle Channel	
802.11a Highest Channel	

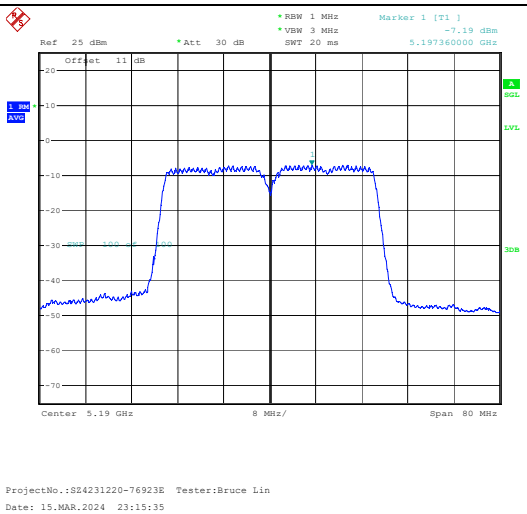
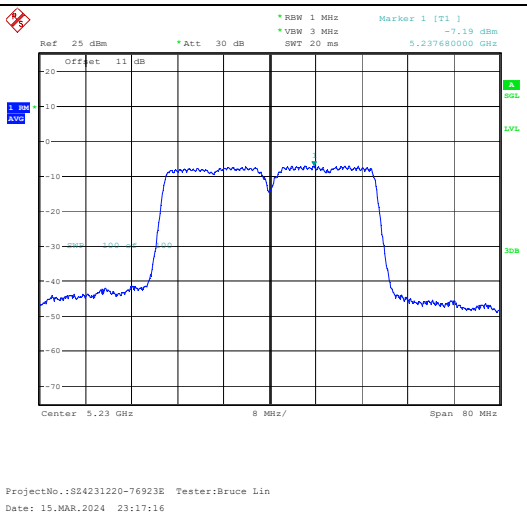
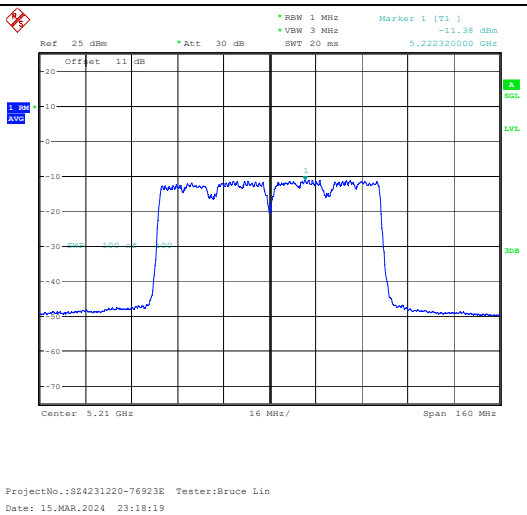
Maximum power spectral density	
802.11ac vht20 Lowest Channel	
802.11ac vht20 Middle Channel	
802.11ac vht20 Highest Channel	

Maximum power spectral density	
802.11ac vht40 Lowest Channel	
802.11ac vht40 Highest Channel	
802.11ac vht80 Middle Channel	

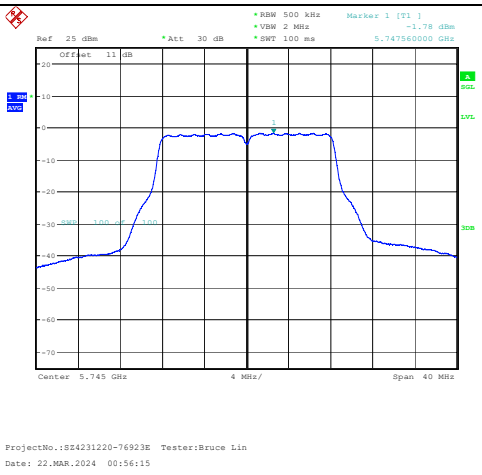
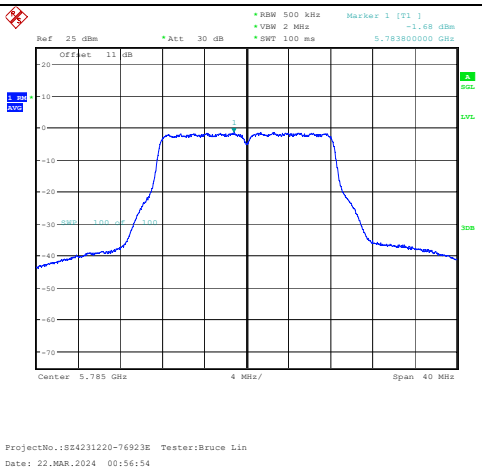
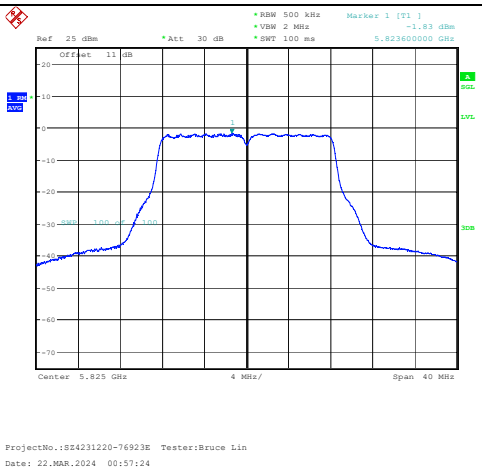
ANT 1
5150-5250MHz:

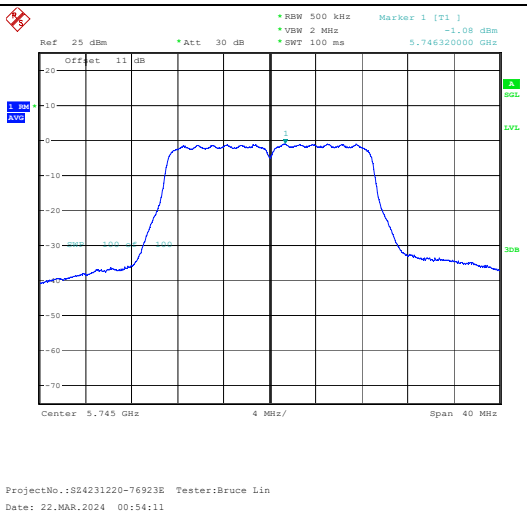
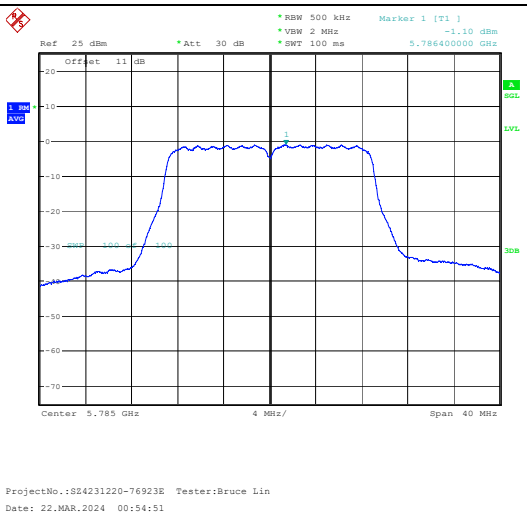
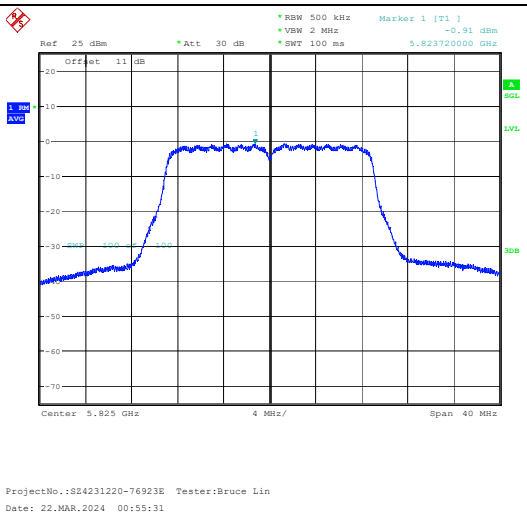
Maximum power spectral density	
802.11a Lowest Channel	
802.11a Middle Channel	
802.11a Highest Channel	

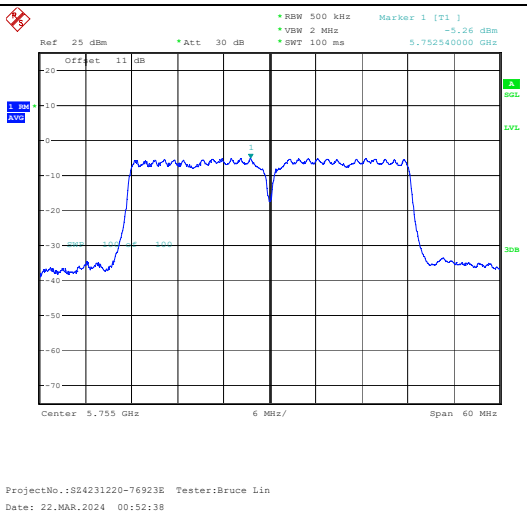
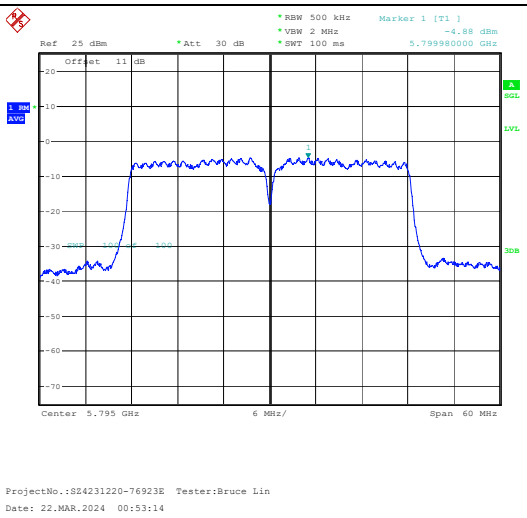
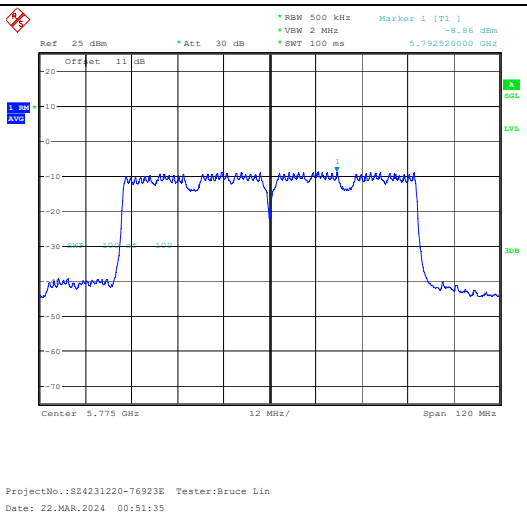
Maximum power spectral density	
802.11ac vht20 Lowest Channel	
802.11ac vht20 Middle Channel	
802.11ac vht20 Highest Channel	

Maximum power spectral density	
802.11ac vht40 Lowest Channel	
802.11ac vht40 Highest Channel	
802.11ac vht80 Middle Channel	

5725-5850MHz:

Maximum power spectral density	
802.11a Lowest Channel	
802.11a Middle Channel	
802.11a Highest Channel	

Maximum power spectral density	
802.11ac vht20 Lowest Channel	
802.11ac vht20 Middle Channel	
802.11ac vht20 Highest Channel	

Maximum power spectral density	
802.11ac vht40 Lowest Channel	
802.11ac vht40 Highest Channel	
802.11ac vht80 Middle Channel	

EUT PHOTOGRAPHS

Please refer to the attachment SZ4231220-76923E-RF External photo and SZ4231220-76923E-RF Internal photo.

TEST SETUP PHOTOGRAPHS

Please refer to the attachment SZ4231220-76923E-RF Test Setup photo.

******* END OF REPORT *******