FCC PART 15.407

TEST REPORT

For

Heilongjiang Huida Technology Co., Ltd

Building 1, Science and Technology Innovation Headquarters, Shenzhen (Harbin) Industrial Park,
No. 288 Zhigu Street, Songbei District, Harbin, China

FCC ID: 2BBNT-3WWDZ-U70A

Report Type:	**Product Name:**
Original Report	HD580 Agricultural Drone

Report Number:	RSHA240816001-00A
Report Date:	2025-03-04
3Reviewed By:	Jenny Yang
Approved By:	Kyle Xu
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Kunshan) No.248 Chenghu Road, Kunshan, Jiangsu province, China Tel: +86-512-86175000 Fax: +86-512-88934268 www.baclcorp.com.cn

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REPORT REVISION HISTORY

Number of Revisions	Report No.	Version	Issue Date	Description
0	RSHA240816001-00A	R1V1	2025-03-04	Initial Release

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant:	Heilongjiang Huida Technology Co., Ltd		
Product Name:	HD580 Agricultural Drone		
Tested Model:	3WWDZ-U70A		
Power Supply:	DC 32V		
Operating Frequency:	B1: 5150-5250 MHz, B4: 5725-5850 MHz		
Maximum Average Output Power:	Mode:	5G Wi-Fi Band 1:	Band 4:
	802.11a:	9.05 dBm	8.01 dBm
	802.11ac20:	9.38 dBm	8.03 dBm
	802.11ac40:	9.95 dBm	8.43 dBm
	802.11ac80:	8.85 dBm	7.96 dBm
Channel Number:	B1: 7; B4: 8		
Channel Separation:	802.11a/ac/n20: 20 MHz; 802.11ac/n40: 40 MHz; 802.11ac80: 80 MHz		
Modulation Type:	OFDM		
Antenna Type:	PCB Antenna		
★Maximum Antenna Gain:	Band 1: 3.04 dBi; Band 4: 4.64 dBi		

Note: The maximum antenna gain was provided by the applicant.

All measurement and test data in this report was gathered from production sample serial number: RSHA240816001-1 (Assigned by the BACL (Kunshan). The EUT supplied by the applicant was received on 2024-08-16.)

Objective

This type approval report is prepared for *Heilongjiang Huida Technology Co., Ltd* 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, 15.209 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.

Measurement Uncertainty

Item		Uncertainty
AC Power Lines Conducted Emissions		3.19 dB
RF conducted test with spectrum		0.9dB
RF Output Power with Power meter		0.5dB
Radiated emission	9 kHz~150 kHz	3.8dB
	150 kHz~30 MHz	3.4dB
	30MHz~1GHz	6.11dB
	1GHz~6GHz	4.45dB
	6GHz~18GHz	5.23dB
	18GHz~40GHz	5.65dB
Occupied Bandwidth		0.5kHz
Temperature		1.0℃
Humidity		6%

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu Province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) is accredited in accordance with ISO/IEC 17025:2017 by NVLAP (Lab code: 600338-0), and the lab has been recognized as the FCC accredited lab under the KDB 974614 D01, the FCC Designation No.: CN5055.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The EUT was configured for testing in an engineering mode which was provided by the 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 **5150~5250 MHz** band, test channel list is as below,

802.11a/ac 20 mode Channel 36, 40, 48 were tested.
802.11ac40 mode Channel 38, 46 were tested.
802.11ac80 mode Channel 42 were tested.

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

For **5725~5850 MHz** band,

802.11a/ac20 mode Channel 149, 157, 165 were tested.
802.11ac40 mode Channel 151, 159 were tested.
802.11ac80 mode Channel 155 were tested.

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

EUT Exercise Software

RF test tool: Xshell 4

The worst case was performed under:

5150-5250MHz:

Mode	Data Rate	Channel	★Power Level
802.11a	6 Mbps	5180	45
		5200	45
		5240	45
802.11ac20	MCS0	5180	45
		5200	45
		5240	45
802.11ac40	MCS0	5190	45
		5230	45
802.11ac80	MCS0	5210	43

5725-5850MHz:

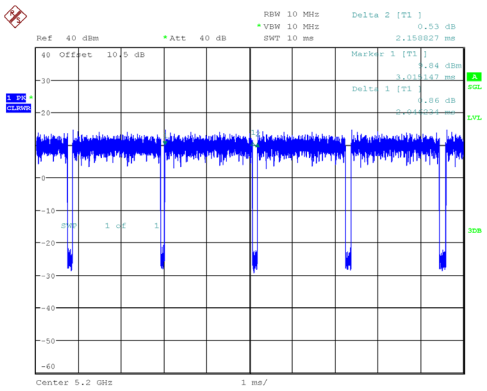
Mode	Data Rate	Channel	★Power Level
802.11a	6 Mbps	5745	45
		5785	45
		5825	45
802.11ac20	MCS0	5745	45
		5785	45
		5825	45
802.11ac40	MCS0	5755	45
		5795	45
802.11ac80	MCS0	5775	45

Note: The power level was declared by the applicant.

Duty Cycle

5150MHz-5250MHz Band:

802.11a mode



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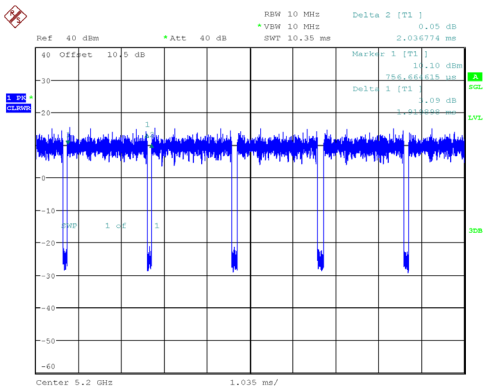
802.11ac20 mode



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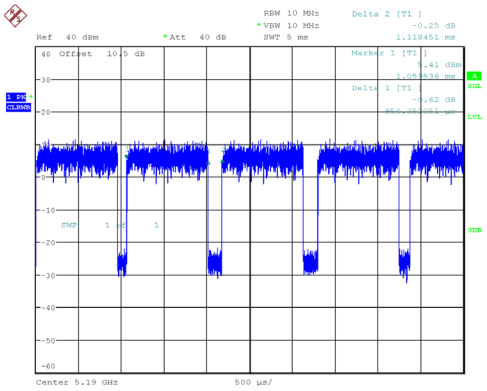
802.11ac40 mode



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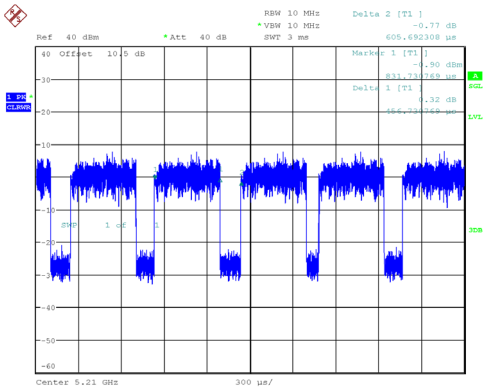
802.11ac80 mode



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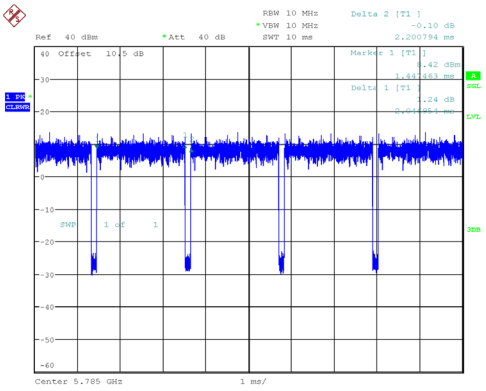
5725MHz-5850MHz Band:

802.11a mode



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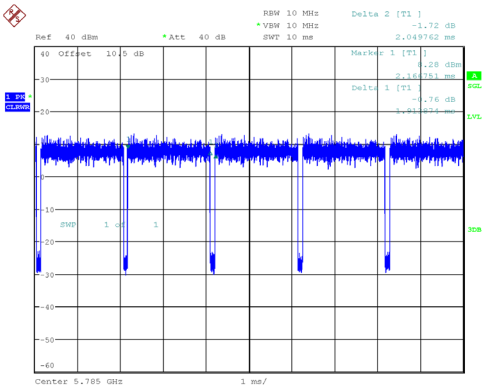
802.11ac20 mode



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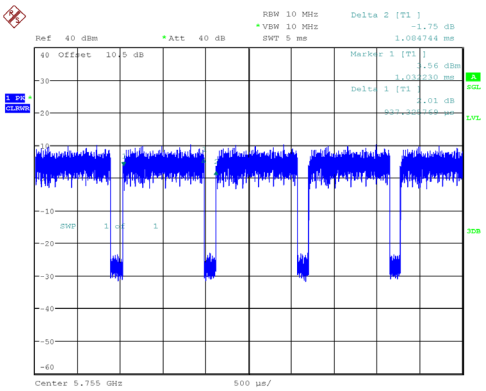
802.11ac40 mode



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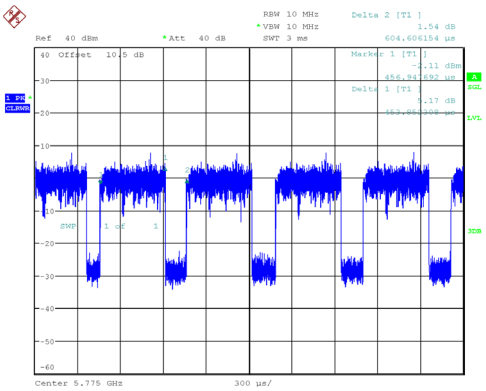
802.11ac80 mode



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5.2G

Mode	Ton (ms)	Ton+Toff (ms)	Duty Cycle (%)	Duty Cycle Factor (dB)
a_5200MHz_Chain 0	2.046	2.159	94.77	0.23
ac20_5200MHz_Chain 0	1.920	2.037	94.26	0.26
ac40_5190MHz_Chain 0	0.950	1.118	84.97	0.71
ac80_5210MHz_Chain 0	0.457	0.606	75.41	1.23

5.8G

Mode	Ton (ms)	Ton+Toff (ms)	Duty Cycle (%)	Duty Cycle Factor (dB)
a_5785MHz_Chain 0	2.047	2.201	93.00	0.32
ac20_5785MHz_Chain 0	1.914	2.050	93.37	0.30
ac40_5755MHz_Chain 0	0.937	1.085	86.36	0.64
ac80_5775MHz_Chain 0	0.454	0.605	75.04	1.25

Note: Offset (10.5dB) = Attenuator (10dB)+cable loss (0.5dB)

Equipment Modifications

No modification was made to the EUT.

Support Equipment List and Details

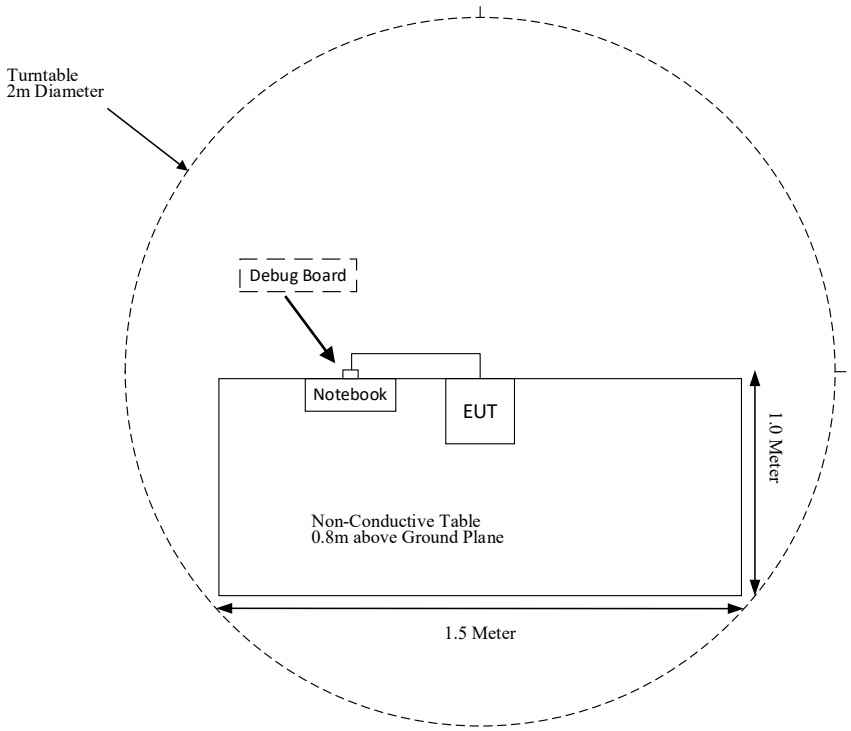
Manufacturer	Description	Model	Serial Number
Lenovo	Notebook	Y700P	PF2B7PL5
/	Debug Board	/	/

External I/O Cable

Cable Description	Length (m)	From Port	To
Data Cable	1.5	EUT	Debug Board

Block Diagram of Test Setup

For Radiated Emissions (Below 1GHz & Above 1GHz):



TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test (Chamber #1)					
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2024-04-23	2025-04-22
Sunol Sciences	Hybrid Antenna	JB3	A090314-1	2023-11-11	2024-11-10
Sunol Sciences	Hybrid Antenna	JB3	A090314-1	2024-11-08	2027-11-07
ETS-LINDGREN	Loop Antenna	6512	108100	2023-11-09	2024-11-08
ETS-LINDGREN	Loop Antenna	6512	108100	2024-11-03	2027-11-02
Sonoma Instrument	Amplifier	310N	171205	2024-04-23	2025-04-22
Rohde & Schwarz	Auto test Software	EMC32	100361	N/A	N/A
MICRO-COAX	Coaxial Cable	Cable-8	008	2024-04-23	2025-04-22
MICRO-COAX	Coaxial Cable	Cable-9	009	2024-04-23	2025-04-22
MICRO-COAX	Coaxial Cable	Cable-10	010	2024-04-23	2025-04-22
Narda	6dB Attenuator	773-6	10690812-2-1	2023-11-11	2024-11-10
Narda	6dB Attenuator	773-6	10690812-2-1	2024-11-08	2027-11-07
Radiated Emission Test (Chamber #2)					
Rohde & Schwarz	EMI Test Receiver	ESU40	100207/040	2024-04-25	2025-04-24
ETS-LINDGREN	Horn Antenna	3115	9207-3900	2024-11-03	2027-11-02
ETS-LINDGREN	Horn Antenna	3116	84159	2023-12-07	2026-12-06
A.H.Systems,inc	Amplifier	PAM-0118P	512	2024-04-25	2025-04-24
EM Electronics Corporation	Amplifier	EM18G40G	060726	2024-04-25	2025-04-24
MICRO-TRONICS	Band Reject Filter	BRC50703	G094	2024-04-23	2025-04-22
MICRO-TRONICS	Band Reject Filter	BRC50705	G085	2024-04-23	2025-04-22
Narda	Attenuator	10dB	010	2024-04-23	2025-04-22
Rohde & Schwarz	Auto test Software	EMC32	100361	N/A	N/A
MICRO-COAX	Coaxial Cable	Cable-6	006	2024-04-23	2025-04-22
MICRO-COAX	Coaxial Cable	Cable-11	011	2024-04-25	2025-04-24
MICRO-COAX	Coaxial Cable	Cable-12	012	2024-04-25	2025-04-24
RF Conducted Test					
Rohde & Schwarz	Spectrum Analyzer	FSU26	100147	2024-04-01	2025-03-31
Anritsu	Power Sensor	MA24418A	12621	2024-04-23	2025-04-22
N/A	Attenuator	10 dB	N/A	2024-04-23	2025-04-22
XHFDZ	RG316 Coaxial Cable	SMA-316	XHF-1175	Each time	N/A

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

SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1310 & §2.1091	Maximum Permissible Exposure (MPE)	Compliant
§15.203	Antenna Requirement	Compliant
§15.207 & §15.407(b) (9)	AC Power Line Conducted Emissions	Not Applicable (See Note)
§ 15.205 & §15.209 & §15.407(b)	Undesirable Emission & Restricted Bands	Compliant
§§15.407(a) &§15.407(e)	Emission Bandwidth	Compliant
§15.407(a)	Conducted Transmitter Output Power	Compliant
§15.407(a)	Power Spectral Density	Compliant

Note: The EUT powered by battery.

FCC §1.1310 & §2.1091 - MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart §2.1091 and subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

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

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

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

Calculated Formulary

Predication of MPE limit at a given distance
$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm^2);
P = power input to the antenna (in appropriate units, e.g., mW);
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

Calculated Data:

Mode	Frequency Range (MHz)	Antenna Gain		★Tune-up Output Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)	MPE ratio
		(dBi)	(numeric)	(dBm)	(mW)				
2.4G SRD	2411-2466	3.34	2.16	25.0	316.23	20	0.1359	1.0	0.1359
5G SRD	5180-5240	3.27	2.12	18.0	63.10	20	0.0266	1.0	0.0266
	5735-5805	2.90	1.95	22.5	177.83	20	0.0690	1.0	0.0690
5G Wi-Fi	5150-5250	3.04	2.01	10.0	10	20	0.0040	1.0	0.0040
	5725-5850	4.64	2.91	8.5	7.08	20	0.0041	1.0	0.0041

Note:
1. For the above tune up power were declared by the manufacturer.
2. SRD and Wi-Fi can transmit simultaneously, but 2.4G SRD and 5G SRD cannot transmit simultaneously.

$$\sum_i \frac{S_i}{S_{Limit,i}}$$

$= S_{5G\ Wi\text{-}Fi}/S_{limit\text{-}\ 5G\ Wi\text{-}Fi} + S_{2.4G\ SRD}/S_{limit\text{-}\ 2.4G\ SRD}$

$=0.0041+0.1359$

$=0.14$

< 1.0

Result: The device meet FCC MPE at 20 cm distance.

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, if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

Antenna permanently attached to the unit. fulfill the requirement of this section. Please refer to the EUT photos.

Antenna Type	Frequency Range	Max. Antenna Gain	Input impedance
PCB antenna	5150~5250 MHz	3.04 dBi	50Ω
	5725~5850 MHz	4.64 dBi	50Ω

Result: Compliant.

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

Applicable Standard

FCC §15.407 (b); §15.209; §15.205;

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

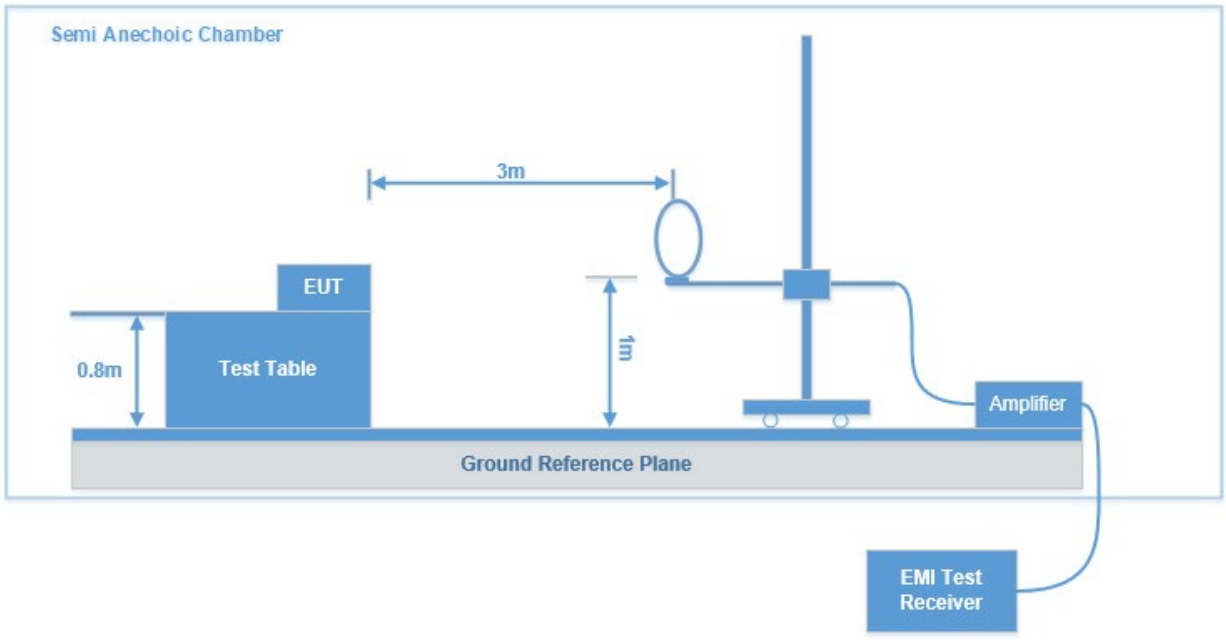
For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of –27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

As per FCC §15.35(d):Unless otherwise specified, on any frenquency or frequencies above 1000MHz,the radiated emission limits are based on the use of measurement instrunmentation employing an average detector function. Unless otherwise specified, measurements above 1000MHz shall be performed using a minimum resolution bandwidth of 1MHz.

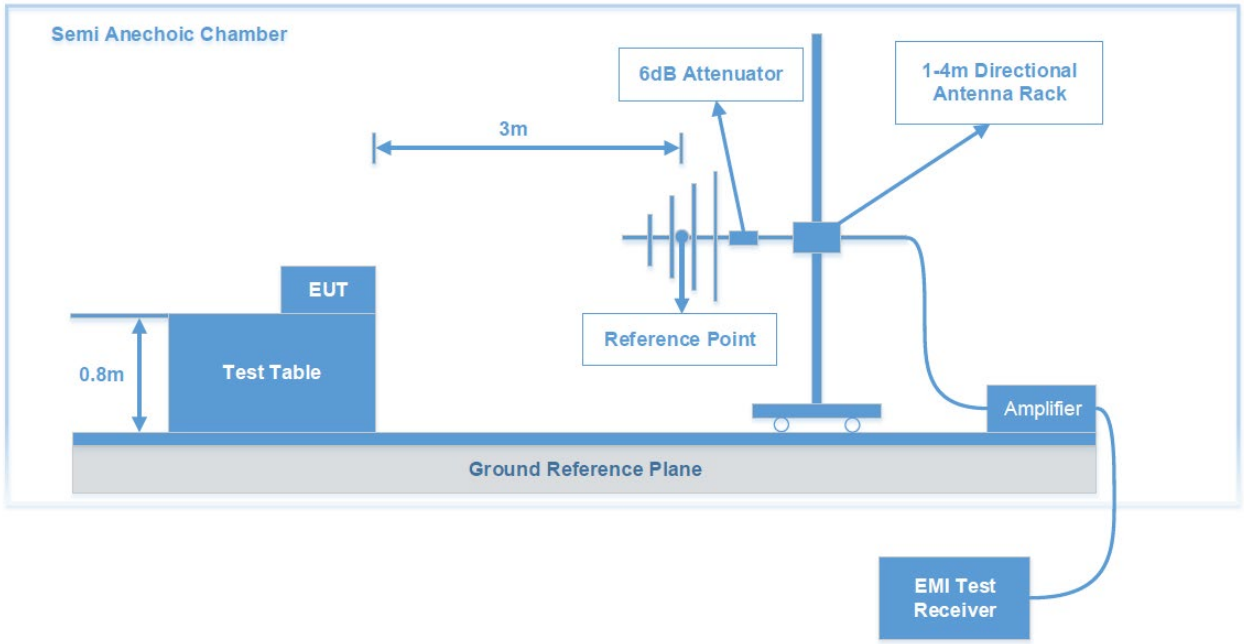
According to 789033 D02 General UNII Test Procedures New Rules v02r01, emission shall be computed as: E [dBμV/m] = EIRP [dBm] + 95.2, for d = 3 meters.

Test System Setup

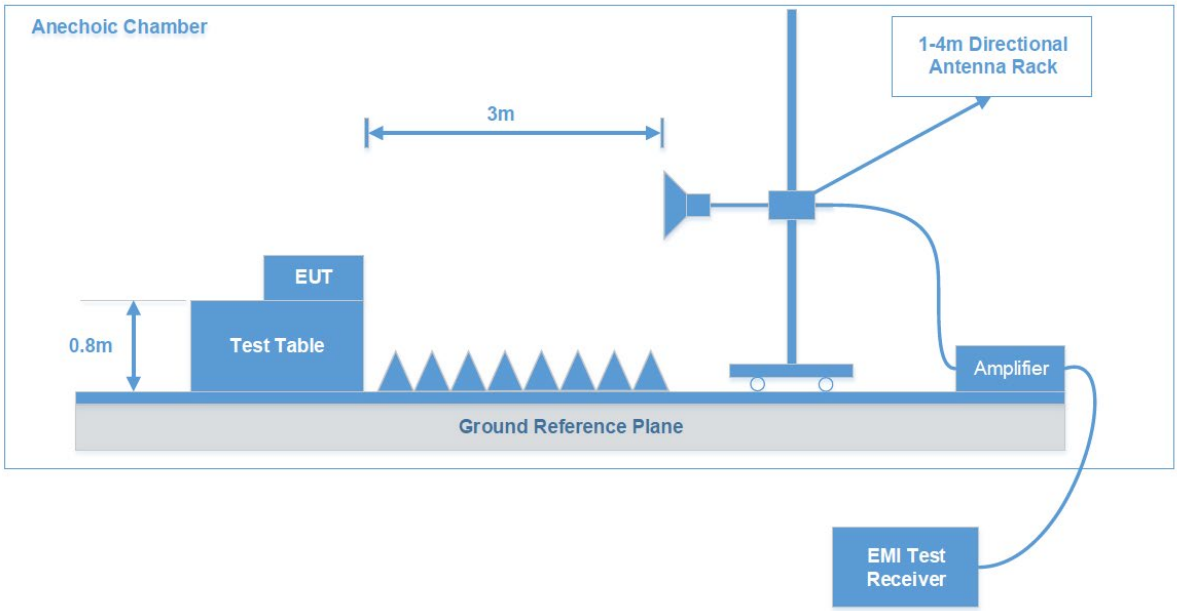
9 kHz - 30 MHz:



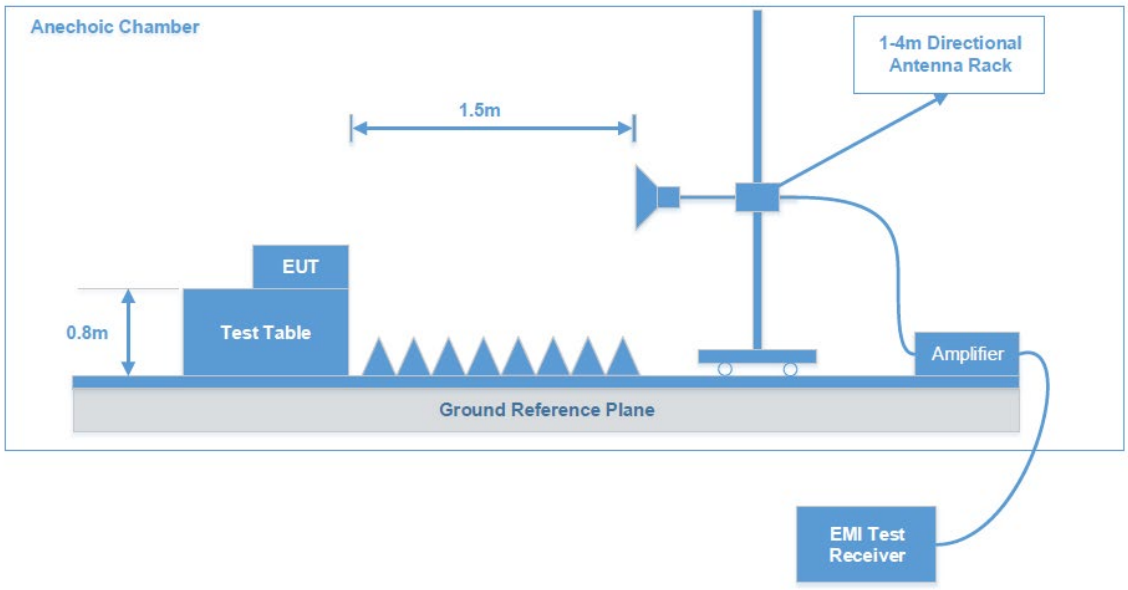
30 MHz - 1 GHz:



1 GHz - 18 GHz:



18 GHz - 40 GHz:



The radiated emission tests were performed in the 3 meters test site for below 18GHz and 1.5m for 18-40 GHz, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209 and FCC 15.407 limits. The limit at 1.5m for 18-40 GHz is 80dBμV/m（Peak）and 60dBμV/m（Average）

The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.10-2013. The specification used was 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.

The spacing between the peripherals was 10 cm.

EMI Test Receiver & Spectrum Analyzer Setup

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

Frequency Range	RBW	VBW	IF B/W	Measurement
9 kHz – 150 kHz	200 Hz	1 kHz	200 Hz	QP/Average
150 kHz – 30 MHz	9 kHz	30 kHz	9 kHz	QP/ Average
30 MHz – 1000 MHz	100 kHz	300 kHz	/	Peak
	/	/	120 kHz	QP
Above 1GHz	1MHz	3 MHz	/	Peak
	1MHz	3 MHz	/	Average

For 9 kHz-30MHz test, the lowest height of the magnetic antenna shall be 1 m above the ground and three antenna orientations (parallel, perpendicular, and ground-parallel) shall be measured.

Test Procedure

During the radiated emission test, the adapter was connected to AC floor outlet. Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

If the measured peak level of the emissions that the measuring receiver reading level plus corrected factor is at least 6 dB below the QP emission limit, there's no need to record the measured QP level of the emissions in the report.

Corrected Amplitude & Margin Calculation

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

Corrected Amplitude (dBμV/m) = Meter Reading (dBμV) + Corrected factor（dB/m）
Corrected factor（dB/m）= Antenna Factor (dB/m) + Cable Loss (dB) - Amplifier Gain (dB)

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

Margin (dB) = Limit (dBμV/m) – Corrected Amplitude (dBμV/m)

Note: The QuasiPeak (dBμV/m), MaxPeak (dBμV/m), Average (dBμV/m) which shown in the data table are all Corrected Amplitude.

Test Data: See Appendix

FCC §15.407(a) &§15.407(e)–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 band is 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

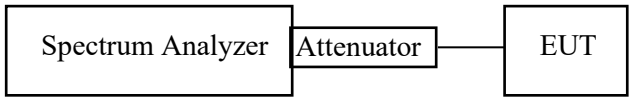
1. Emission Bandwidth (EBW)
a) Set RBW = approximately 1% of the emission bandwidth.
b) Set the VBW > RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer.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

3. Occupied bandwidth
The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. The following procedure shall be used for measuring 99% power bandwidth:
a) The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW.
b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be approximately three times the RBW, unless otherwise specified by the applicable requirement.
c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2.
d) Step a) through step c) might require iteration to adjust within the specified range.

e) Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
f) Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth.
g) If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies.
h) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).



Note: Offset (10.5dB) = Attenuator (10dB)+cable loss (0.5dB)

Test Data: See Appendix

FCC §15.407(a) – CONDUCTED TRANSMITTER OUTPUT POWER

Applicable Standard

According to §15.407(a)(1)

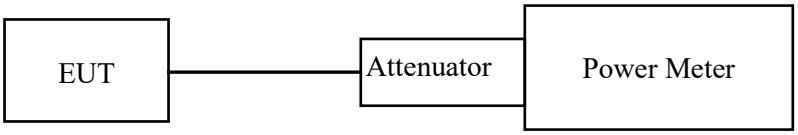
(iv) For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. 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.

According to §15.407(a) (3)

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

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to one test equipment.
3. Add a correction factor to the display.



Note: Offset (10.5dB) = Attenuator (10dB)+cable loss (0.5dB)

Test Data: See Appendix

FCC §15.407(a) - POWER SPECTRAL DENSITY

Applicable Standard

According to §15.407(a) (1)

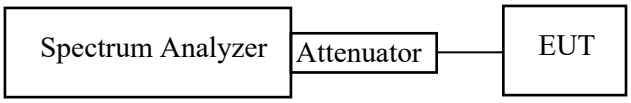
(iv) For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. 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.

According to §15.407(a) (3)

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 C63.10:2013 11.10 method SA-2 used



Note： Offset（10.5dB）= Attenuator(10dB)+Cable loss(0.5dB)

Test Data: See Appendix

EUT PHOTOGRAPHS

Please refer to the attachment EXHIBIT A - EUT EXTERNAL PHOTOGRAPHS and EXHIBIT B - EUT EXTERNAL PHOTOGRAPHS.

TEST SETUP PHOTOGRAPHS

Please refer to the attachment EXHIBIT D - TEST SETUP PHOTOGRAPHS.

APPENDIX - TEST DATA

Environmental Conditions & Test Information

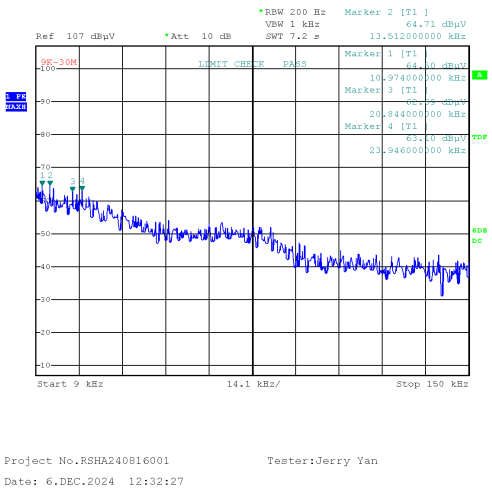
Test Item:	UNWANTED EMISSIONS & RESTRICTED FREQUENCY BANDS			Duty Cycle
	9 kHz - 1GHz	1 GHz – 18 GHz	18 GHz - 40 GHz	
Test Date:	2024-10-18 to 2024-12-06	2024-11-06	2024-12-09	2024-11-26
Temperature:	23.2 ℃ - 26.2 ℃	23.8 ℃	25.5 ℃	24.8 ℃
Relative Humidity:	52 % - 67 %	53 %	52 %	59 %
ATM Pressure:	100.7 kPa – 102.8 kPa	102.8kPa	102.9kPa	102.7kPa
Test Result:	Pass	Pass	Pass	Pass
Test Engineer:	Jerry Yan & Richard Wen	Destine Hu	Hugh Wu	Neil Zhou

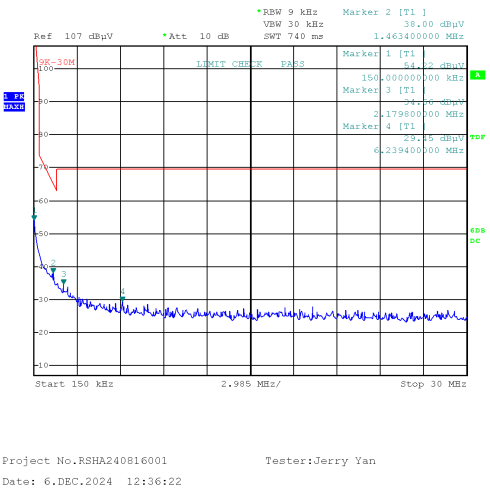
Test Item:	EMISSION BANDWIDTH	CONDUCTED TRANSMITTER OUTPUT POWER	POWER SPECTRAL DENSITY
Test Date:	2024-11-26	2024-11-26	2024-11-26
Temperature:	24.8 ℃	24.8 ℃	24.8 ℃
Relative Humidity:	59 %	59 %	59 %
ATM Pressure:	102.7kPa	102.7kPa	102.7kPa
Test Result:	Pass	Pass	Pass
Test Engineer:	Neil Zhou	Neil Zhou	Neil Zhou

Transmitter Unwanted Emissions & Restricted frequency bands

EUT operation mode: Transmitting

9 kHz - 30 MHz: *(maximum output power 5150-5250 802.11ac40 high channel)(Parallel worst)*





9 kHz - 150 kHz

Frequency (MHz)	Corrected Amplitude (dBµV/m) @3m	Detector PK/QP/Ave.	Corrected Factor (dB/m)	Limit (dBµV/m) @3m	Margin (dB)
0.010974	64.50	PK	55.74	126.80	62.30
0.013512	64.71	PK	54.13	124.99	60.28
0.020844	62.69	PK	49.76	121.23	58.54
0.023946	63.10	PK	48.90	120.02	56.92

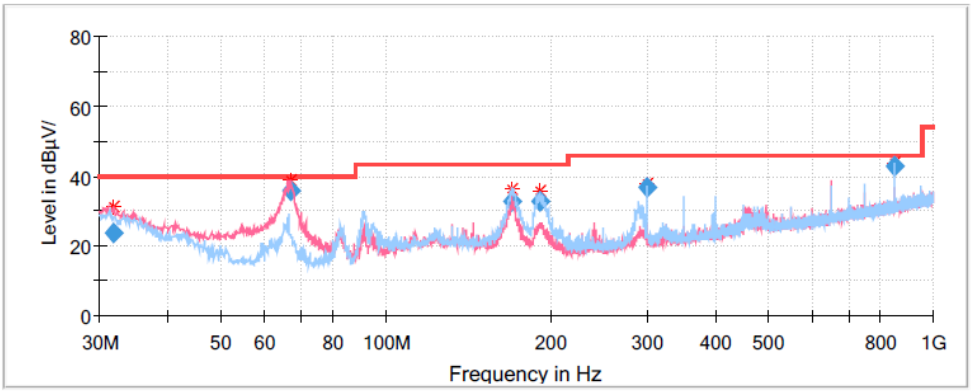
150 kHz - 30 MHz

Frequency (MHz)	Corrected Amplitude (dBµV/m) @3m	Detector PK/QP/Ave.	Corrected Factor (dB/m)	Limit (dBµV/m) @3m	Margin (dB)
0.15000	54.22	PK	50.90	104.08	49.86
1.46340	38.00	PK	7.42	64.30	26.30
2.17980	34.66	PK	13.65	69.54	34.88
6.23940	29.45	PK	7.10	69.54	40.09

30MHz-1GHz(5150-5250MHz Band): *(Transmitting in maximum output power mode 802.11ac40)*
Low Channel: 5190 MHz

Common Information

Project No:	RSHA240816001
EUT Model:	3WWDZ-U70A
Test Mode:	5G WIFI
Standard:	FCC Part 15.205 &FCC Part 15.209&FCC Part 15.407
Test Equipment:	ESCI, JB3, 310N
Temperature:	26.2℃
Humidity:	67%
Barometric Pressure:	101.9kPa
Test Engineer:	Richard Wen
Test Date:	2024/10/18



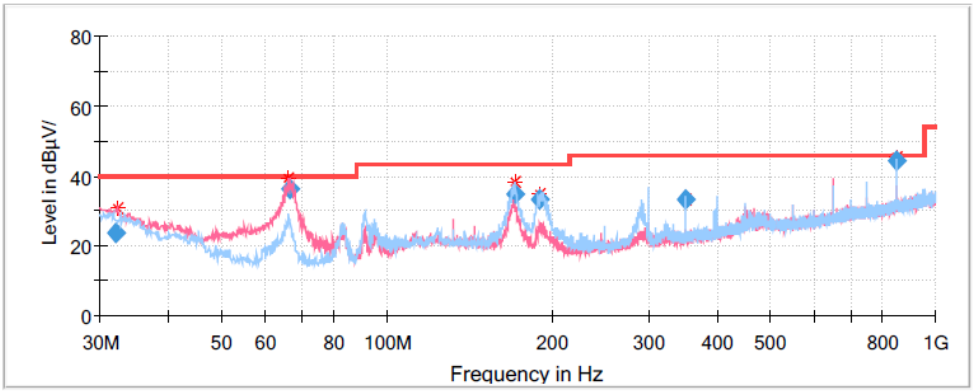
Final_Result

Frequency (MHz)	QuasiPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Pol	Corr. (dB/m)
31.797900	23.89	40.00	16.11	V	-5.3
66.980250	35.93	40.00	4.07	V	-17.2
170.276130	32.69	43.50	10.81	H	-12.6
191.987500	32.60	43.50	10.90	H	-12.5
299.990750	36.73	46.00	9.27	H	-10.5
849.981350	42.71	46.00	3.29	H	0.1

High Channel: 5230 MHz

Common Information

Project No:	RSHA240816001
EUT Model:	3WWDZ-U70A
Test Mode:	5G WIFI
Standard:	FCC Part 15.205 &FCC Part 15.209&FCC Part 15.407
Test Equipment:	ESCI, JB3, 310N
Temperature:	26.2℃
Humidity:	67%
Barometric Pressure:	101.9kPa
Test Engineer:	Richard Wen
Test Date:	2024/10/18



Final_Result

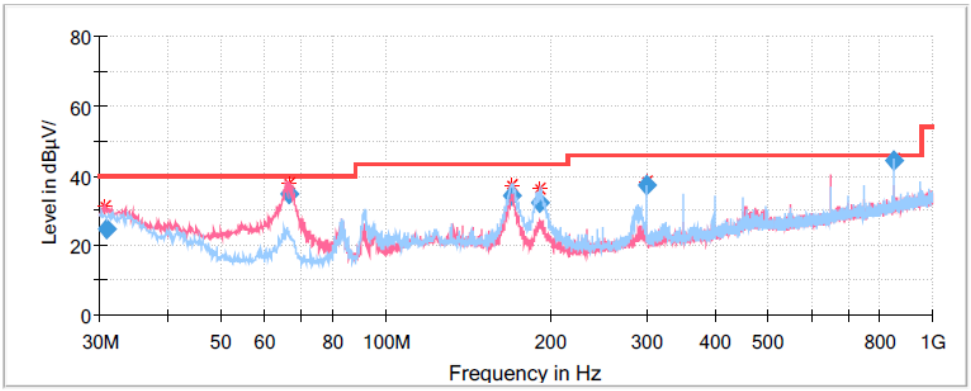
Frequency (MHz)	QuasiPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Pol	Corr. (dB/m)
32.167605	23.43	40.00	16.57	V	-5.2
66.619750	36.23	40.00	3.77	V	-17.2
171.272950	34.88	43.50	8.62	H	-12.6
190.642450	33.08	43.50	10.42	H	-12.6
349.987150	32.99	46.00	13.01	H	-9.3
849.987950	44.24	46.00	1.76	H	0.1

30MHz-1GHz(5725-5850MHz Band): *(Transmitting in maximum output power mode 802.11ac40)*

Low Channel: 5755 MHz

Common Information

Project No:	RSHA240816001
EUT Model:	3WWDZ-U70A
Test Mode:	5G WIFI
Standard:	FCC Part 15.205 &FCC Part 15.209&FCC Part 15.407
Test Equipment:	ESCI, JB3, 310N
Temperature:	26.2℃
Humidity:	67%
Barometric Pressure:	101.9kPa
Test Engineer:	Richard Wen
Test Date:	2024/10/18



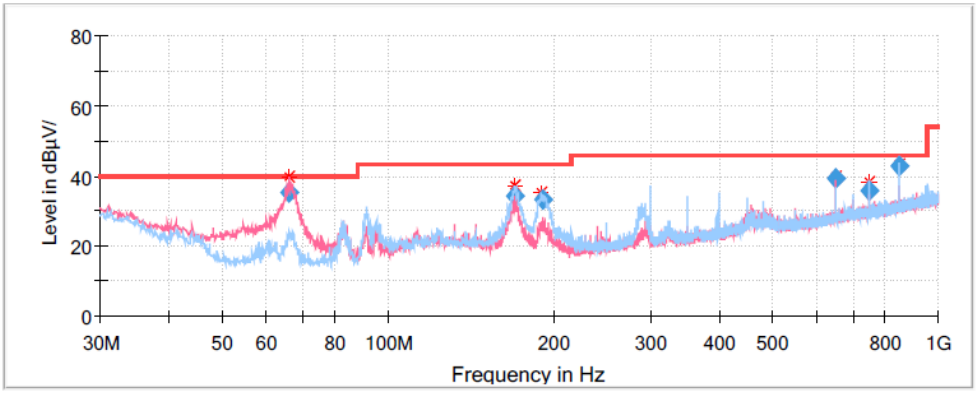
Final_Result

Frequency (MHz)	QuasiPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Pol	Corr. (dB/m)
30.910503	24.85	40.00	15.15	V	-5.3
66.615400	34.69	40.00	5.31	V	-17.2
169.418050	34.03	43.50	9.47	H	-12.6
191.423350	32.44	43.50	11.06	H	-12.6
299.996750	37.20	46.00	8.80	H	-10.5
849.992750	44.14	46.00	1.86	H	0.1

High Channel: 5795 MHz

Common Information

Project No:	RSHA240816001
EUT Model:	3WWDZ-U70A
Test Mode:	5G WIFI
Standard:	FCC Part 15.205 &FCC Part 15.209&FCC Part 15.407
Test Equipment:	ESCI, JB3, 310N
Temperature:	26.2℃
Humidity:	67%
Barometric Pressure:	101.9kPa
Test Engineer:	Richard Wen
Test Date:	2024/10/18



Final_Result

Frequency (MHz)	QuasiPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Pol	Corr. (dB/m)
66.176300	35.24	40.00	4.76	V	-17.2
170.288050	34.31	43.50	9.19	H	-12.6
190.787750	33.11	43.50	10.39	H	-12.6
649.987850	39.23	46.00	6.77	V	-3.1
750.008650	35.96	46.00	10.04	H	-1.5
849.995150	42.79	46.00	3.21	H	0.1

1GHz - 18GHz(5150-5250MHz Band):

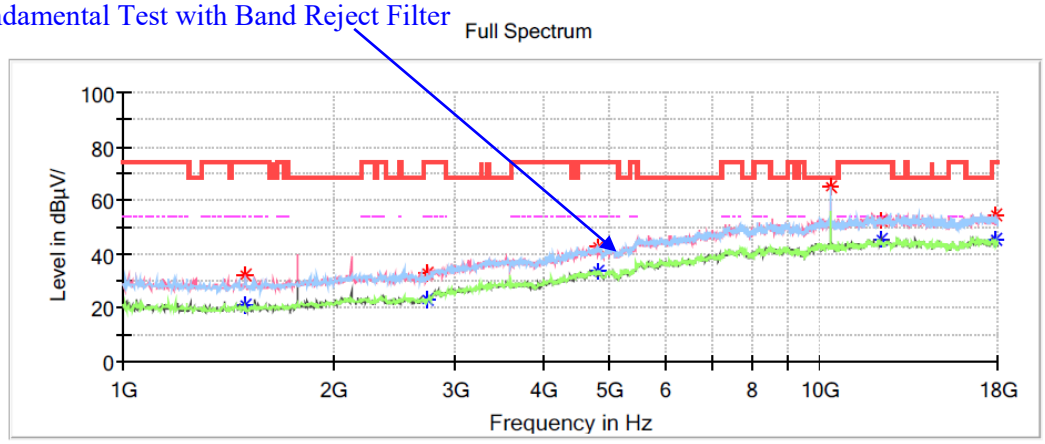
802.11a Mode:

Low Channel: 5180MHz

Common Information

Project No.:	RSHA240816001
Test Mode:	5G WIFI 802.11a low channel
Standard:	FCC Part 15.407& FCC Part 15.205& FCC Part 15.209
Test Engineer:	Destine Hu

Fundamental Test with Band Reject Filter



Critical_Freqs

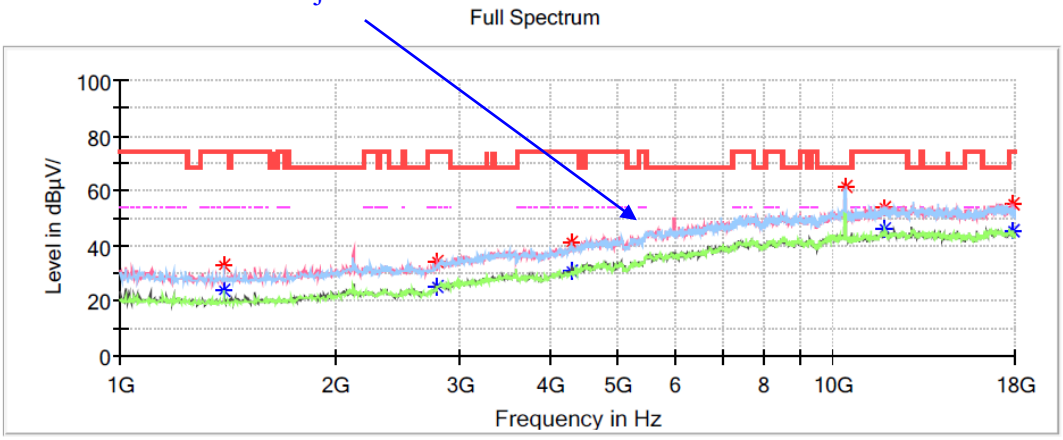
Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1496.400000	---	20.84	54.00	33.16	V	-14.7
1496.400000	31.92	---	74.00	42.08	V	-14.7
2730.600000	---	23.00	54.00	31.00	H	-9.4
2730.600000	33.13	---	74.00	40.87	H	-9.4
4814.800000	---	33.29	54.00	20.71	H	-3.1
4814.800000	42.99	---	74.00	31.01	H	-3.1
10360.200000	65.16	---	68.20	3.04	H	7.1
12216.600000	52.53	---	74.00	21.47	V	9.3
12216.600000	---	45.70	54.00	8.30	V	9.3
17887.800000	---	45.65	54.00	8.35	H	11.9
17887.800000	54.36	---	74.00	19.64	H	11.9

Middle Channel: 5200MHz

Common Information

Project No.:	RSHA240816001
Test Mode:	5G WIFI 802.11a middle channel
Standard:	FCC Part 15.407& FCC Part 15.205& FCC Part 15.209
Test Engineer:	Destine Hu

Fundamental Test with Band Reject Filter



Critical_Freqs

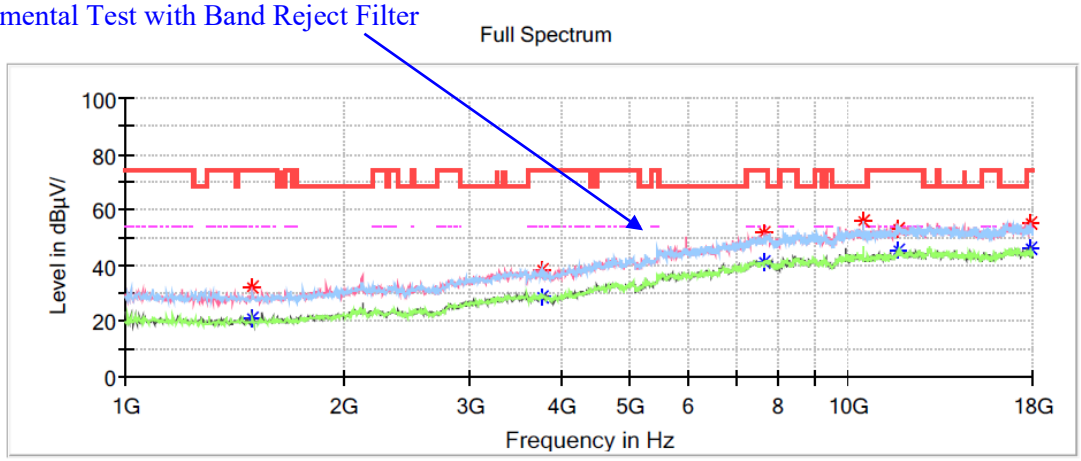
Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1397.800000	---	24.03	54.00	29.97	H	-14.9
1397.800000	32.82	---	74.00	41.18	H	-14.9
2788.400000	---	25.09	54.00	28.91	V	-9.2
2788.400000	34.34	---	74.00	39.66	V	-9.2
4298.000000	---	30.50	54.00	23.50	V	-4.9
4298.000000	41.36	---	74.00	32.64	V	-4.9
10404.400000	61.27	---	68.20	6.93	H	7.1
11839.200000	53.96	---	74.00	20.04	H	8.9
11839.200000	---	45.92	54.00	8.08	H	8.9
17881.000000	---	45.52	54.00	8.48	V	11.9
17881.000000	55.29	---	74.00	18.71	V	11.9

High Channel: 5240MHz

Common Information

Project No.:	RSHA240816001
Test Mode:	5G WIFI 802.11a high channel
Standard:	FCC Part 15.407& FCC Part 15.205& FCC Part 15.209
Test Engineer:	Destine Hu

Fundamental Test with Band Reject Filter



Critical_Freqs

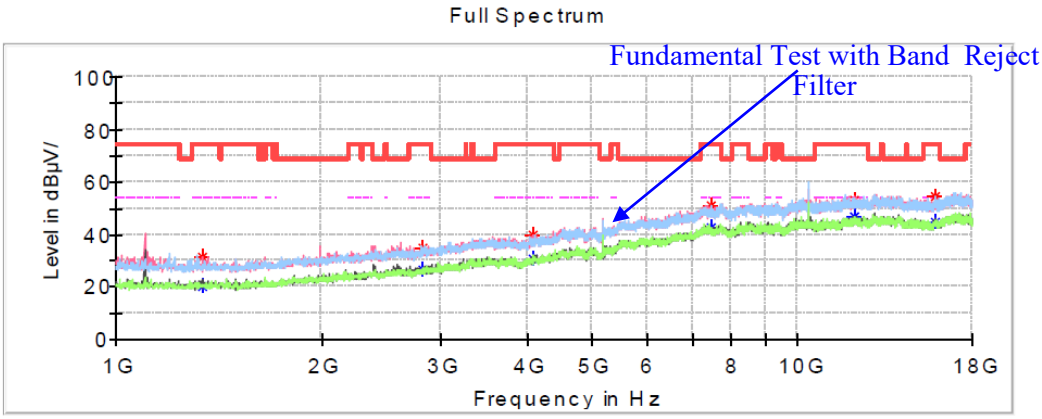
Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1496.400000	---	21.01	54.00	32.99	V	-14.7
1496.400000	31.91	---	74.00	42.09	V	-14.7
3760.800000	---	28.92	54.00	25.08	H	-6.1
3760.800000	38.71	---	74.00	35.29	H	-6.1
7664.000000	---	41.41	54.00	12.59	V	3.9
7664.000000	51.45	---	74.00	22.55	V	3.9
10482.600000	55.61	---	68.20	12.59	H	7.1
11750.800000	---	45.72	54.00	8.28	H	8.9
11750.800000	53.32	---	74.00	20.68	H	8.9
17887.800000	---	46.07	54.00	7.93	H	11.9
17887.800000	55.03	---	74.00	18.97	H	11.9

802.11ac20 Mode:

Low Channel: 5180MHz

Common Information

Project No.:	RSHA240816001
Test Mode:	5G WIFI 802.11ac20 low channel
Standard:	FCC Part 15.407& FCC Part 15.205& FCC Part 15.209
Test Engineer:	Destine Hu



Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1340.000000	---	20.40	54.00	33.60	V	-15.0
1340.000000	31.68	---	74.00	42.32	V	-15.0
2824.100000	---	26.41	54.00	27.59	V	-9.0
2824.100000	35.31	---	74.00	38.69	V	-9.0
4082.100000	---	30.84	54.00	23.16	V	-5.6
4082.100000	39.80	---	74.00	34.20	V	-5.6
7471.900000	---	42.69	54.00	11.31	H	3.8
7471.900000	50.84	---	74.00	23.16	H	3.8
12138.400000	53.37	---	74.00	20.63	V	9.2
12138.400000	---	46.95	54.00	7.05	V	9.2
15880.100000	---	44.46	54.00	9.54	H	9.5
15880.100000	54.47	---	74.00	19.53	H	9.5

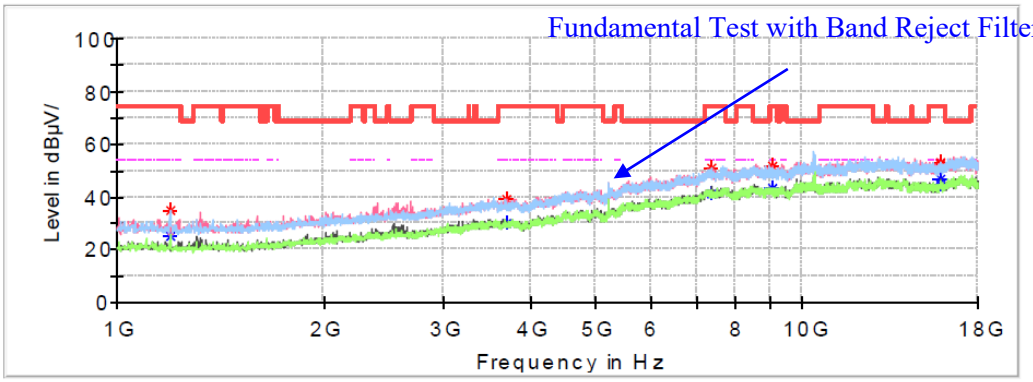
802.11ac20 Mode:

Middle Channel: 5200MHz

Common Information

Project No.:	RSHA240816001
Test Mode:	5G WIFI 802.11ac20 middle channel
Standard:	FCC Part 15.407& FCC Part 15.205& FCC Part 15.209
Test Engineer:	Destine Hu

Full Spectrum



Critical_Freqs

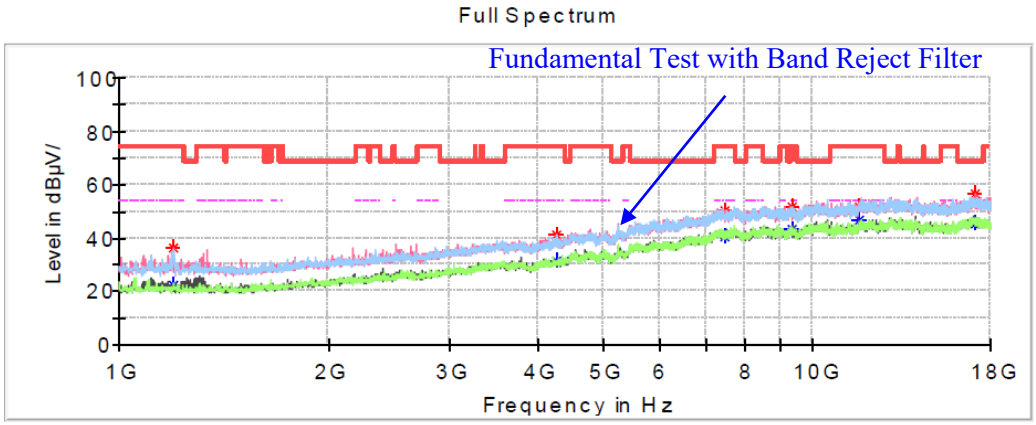
Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1193.800000	---	25.02	54.00	28.98	H	-15.2
1193.800000	35.24	---	74.00	38.76	H	-15.2
3711.500000	---	30.01	54.00	23.99	V	-6.2
3711.500000	38.88	---	74.00	35.12	V	-6.2
7388.600000	---	41.60	54.00	12.40	H	3.6
7388.600000	50.84	---	74.00	23.16	H	3.6
9046.100000	---	43.28	54.00	10.72	V	5.4
9046.100000	52.08	---	74.00	21.92	V	5.4
15903.900000	52.49	---	74.00	21.51	V	9.5
15903.900000	---	47.00	54.00	7.00	V	9.5
15936.200000	---	45.09	54.00	8.91	H	9.5
15936.200000	53.45	---	74.00	20.55	H	9.5

802.11ac20 Mode:

High Channel: 5240MHz

Common Information

Project No.:	RSHA240816001
Test Mode:	5G WIFI 802.11ac20 high channel
Standard:	FCC Part 15.407& FCC Part 15.205& FCC Part 15.209
Test Engineer:	Destine Hu



Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1197.200000	---	22.06	54.00	31.94	V	-15.2
1197.200000	36.64	---	74.00	37.36	V	-15.2
4281.000000	---	31.71	54.00	22.29	H	-5.0
4281.000000	41.10	---	74.00	32.90	H	-5.0
7451.500000	---	40.38	54.00	13.62	V	3.8
7451.500000	50.01	---	74.00	23.99	V	3.8
9306.200000	---	43.10	54.00	10.90	V	5.4
9306.200000	51.81	---	74.00	22.19	V	5.4
11691.300000	51.72	---	74.00	22.28	H	8.9
11691.300000	---	47.03	54.00	6.97	H	8.9
17112.600000	56.45	---	68.20	11.75	V	12.1
17112.600000	---	45.58	---	---	V	12.1

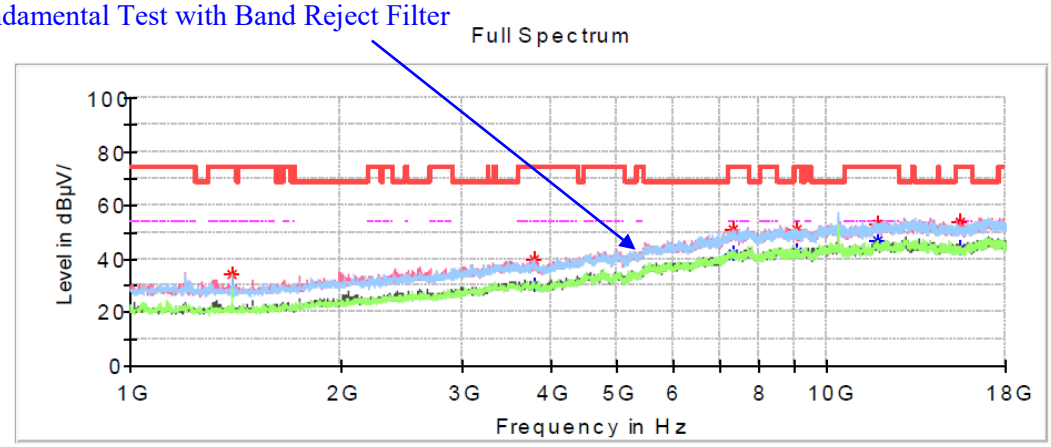
802.11ac40 Mode:

Low Channel: 5190MHz

Common Information

Project No.:	RSHA240816001
Test Mode:	5G WIFI 802.11ac40 low channel
Standard:	FCC Part 15.407& FCC Part 15.205& FCC Part 15.209
Test Engineer:	Destine Hu

Fundamental Test with Band Reject Filter



Critical_Freqs

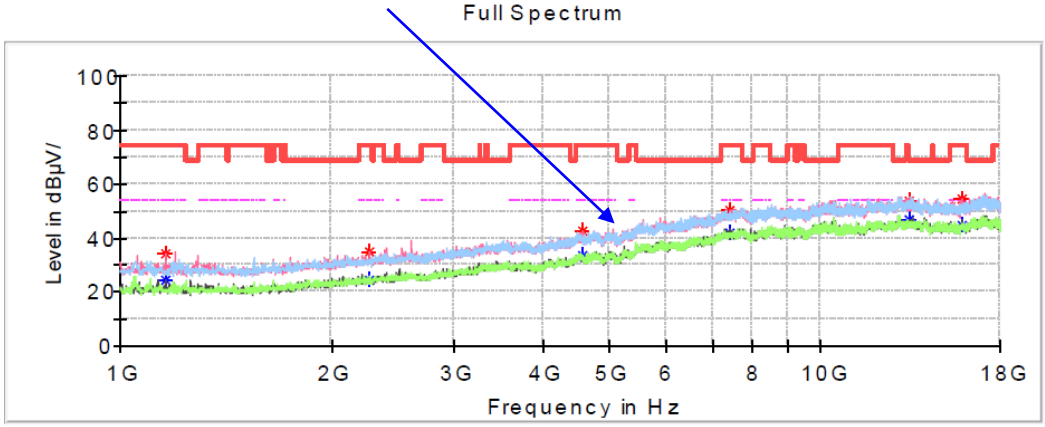
Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1399.500000	34.37	---	74.00	39.63	H	-14.9
1399.500000	---	28.33	54.00	25.67	H	-14.9
3799.900000	---	30.22	54.00	23.78	H	-6.1
3799.900000	39.53	---	74.00	34.47	H	-6.1
7320.600000	---	41.86	54.00	12.14	V	3.4
7320.600000	51.13	---	74.00	22.87	V	3.4
9030.800000	---	42.59	54.00	11.41	V	5.4
9030.800000	51.32	---	74.00	22.68	V	5.4
11798.400000	52.80	---	74.00	21.20	H	8.9
11798.400000	---	47.13	54.00	6.87	H	8.9
15467.000000	---	44.17	54.00	9.83	V	9.8
15467.000000	53.71	---	74.00	20.29	V	9.8

High Channel: 5230 MHz

Common Information

Project No.:	RSHA240816001
Test Mode:	5G WIFI 802.11ac40 high channel
Standard:	FCC Part 15.407& FCC Part 15.205& FCC Part 15.209
Test Engineer:	Destine Hu

Fundamental Test with Band Reject Filter



Critical_Freqs

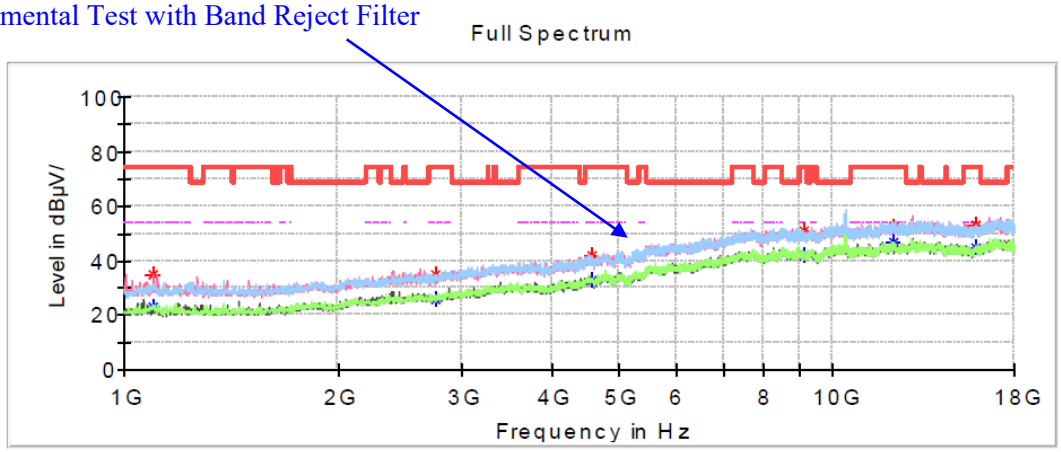
Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1161.500000	---	24.20	54.00	29.80	V	-15.2
1161.500000	33.96	---	74.00	40.04	V	-15.2
2263.100000	---	24.31	54.00	29.69	V	-10.9
2263.100000	34.71	---	74.00	39.29	V	-10.9
4581.900000	---	33.45	54.00	20.55	V	-4.0
4581.900000	42.88	---	74.00	31.12	V	-4.0
7427.700000	---	41.72	54.00	12.28	H	3.7
7427.700000	50.41	---	74.00	23.59	H	3.7
13343.700000	53.54	---	74.00	20.46	V	9.6
13343.700000	---	47.10	54.00	6.90	V	9.6
15939.600000	---	45.01	54.00	8.99	H	9.5
15939.600000	54.53	---	74.00	19.47	H	9.5

802.11ac80 Mode:

Common Information

Project No.:	RSHA240816001
Test Mode:	5G WIFI 802.11ac80 middle channel
Standard:	FCC Part 15.407& FCC Part 15.205& FCC Part 15.209
Test Engineer:	Destine Hu

Fundamental Test with Band Reject Filter



Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1100.300000	---	22.95	54.00	31.05	V	-15.3
1100.300000	35.12	---	74.00	38.88	V	-15.3
2740.800000	---	26.21	54.00	27.79	H	-9.3
2740.800000	35.17	---	74.00	38.83	H	-9.3
4566.600000	---	33.09	54.00	20.91	V	-4.0
4566.600000	41.84	---	74.00	32.16	V	-4.0
9120.900000	---	41.87	54.00	12.13	H	5.4
9120.900000	51.31	---	74.00	22.69	H	5.4
12180.900000	52.27	---	74.00	21.73	V	9.2
12180.900000	---	46.85	54.00	7.15	V	9.2
15871.600000	---	44.81	54.00	9.19	H	9.5
15871.600000	53.23	---	74.00	20.77	H	9.5

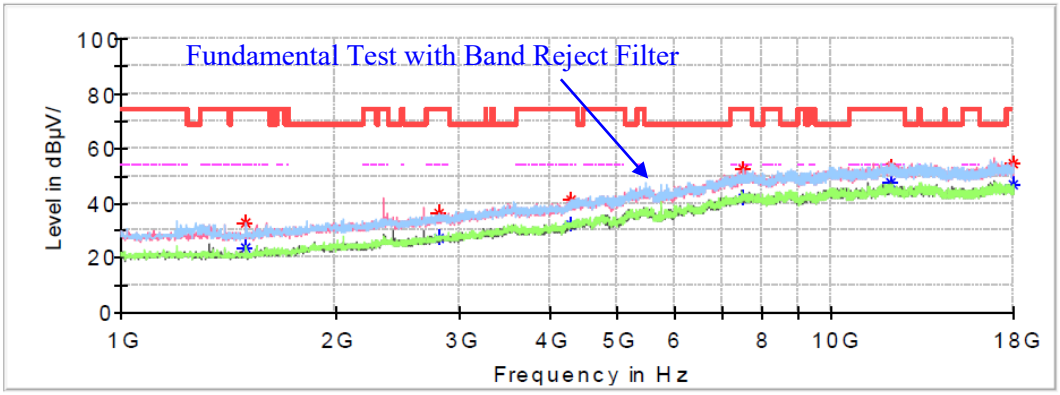
1GHz-18GHz(5725-5850MHz Band):
802.11a Mode:

Low Channel: 5745MHz

Common Information

Project No.:	RSHA240816001
Test Mode:	5G WIFI 802.11a low channel
Standard:	FCC Part 15.407& FCC Part 15.205& FCC Part 15.209
Test Engineer:	Destine Hu

Full Spectrum



Critical_Freqs

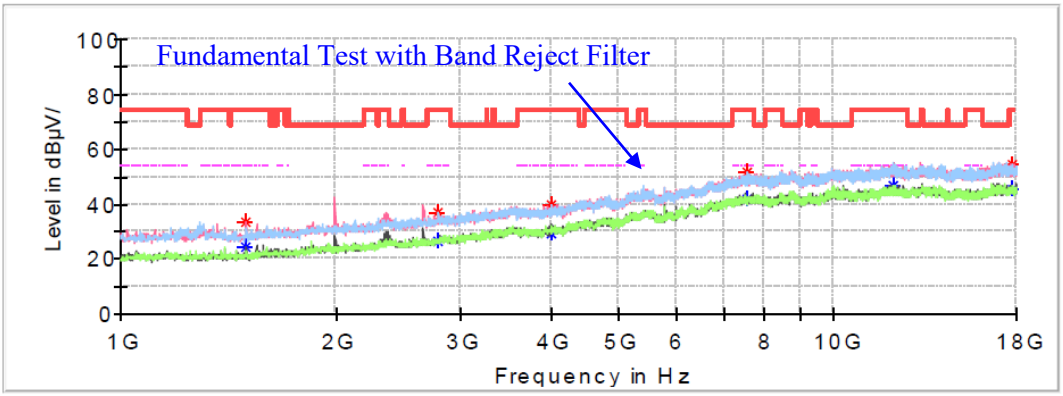
Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1499.800000	---	23.65	54.00	30.35	H	-14.7
1499.800000	32.77	---	74.00	41.23	H	-14.7
2800.300000	---	27.00	54.00	27.00	H	-9.1
2800.300000	36.51	---	74.00	37.49	H	-9.1
4299.700000	---	31.99	54.00	22.01	H	-4.9
4299.700000	41.38	---	74.00	32.62	H	-4.9
7497.400000	---	41.98	54.00	12.02	H	3.9
7497.400000	52.35	---	74.00	21.65	H	3.9
12095.900000	53.27	---	74.00	20.73	V	9.1
12095.900000	---	47.57	54.00	6.43	V	9.1
17977.900000	---	46.56	54.00	7.44	V	11.9
17977.900000	54.57	---	74.00	19.43	V	11.9

Middle Channel: 5785MHz

Common Information

Project No.:	RSHA240816001
Test Mode:	5G WIFI 802.11a middle channel
Standard:	FCC Part 15.407& FCC Part 15.205& FCC Part 15.209
Test Engineer:	Destine Hu

Full Spectrum



Critical_Freqs

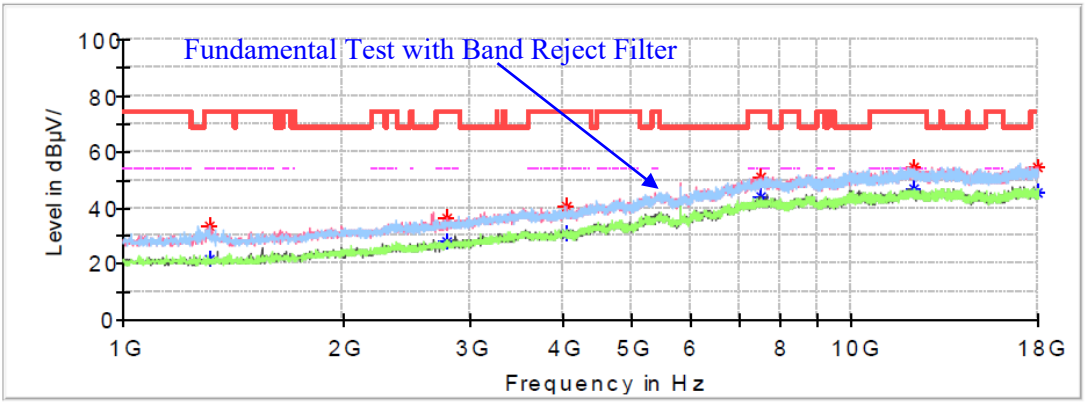
Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1498.100000	---	24.39	54.00	29.61	V	-14.7
1498.100000	33.73	---	74.00	40.27	V	-14.7
2790.100000	---	26.83	54.00	27.17	H	-9.2
2790.100000	36.76	---	74.00	37.24	H	-9.2
4019.200000	---	29.70	54.00	24.30	H	-5.8
4019.200000	39.69	---	74.00	34.31	H	-5.8
7565.400000	---	42.00	54.00	12.00	H	3.9
7565.400000	51.54	---	74.00	22.46	H	3.9
12080.600000	52.49	---	74.00	21.51	V	9.1
12080.600000	---	47.09	54.00	6.91	V	9.1
17770.500000	---	45.65	54.00	8.35	V	11.8
17770.500000	54.25	---	74.00	19.75	V	11.8

High Channel: 5825MHz

Common Information

Project No.:	RSHA240816001
Test Mode:	5G WIFI 802.11a high channel
Standard:	FCC Part 15.407& FCC Part 15.205& FCC Part 15.209
Test Engineer:	Destine Hu

Full Spectrum



Critical_Freqs

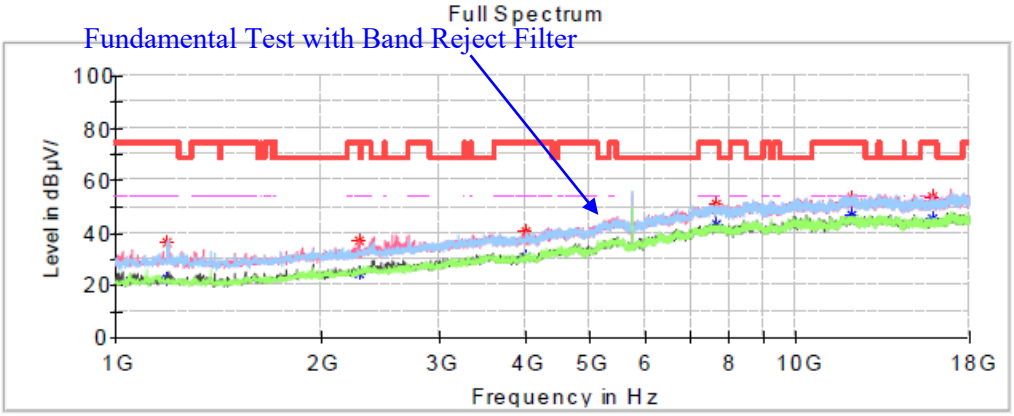
Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1314.500000	---	21.53	54.00	32.47	H	-15.0
1314.500000	33.33	---	74.00	40.67	H	-15.0
2781.600000	---	28.15	54.00	25.85	V	-9.2
2781.600000	36.21	---	74.00	37.79	V	-9.2
4058.300000	---	30.86	54.00	23.14	H	-5.7
4058.300000	40.29	---	74.00	33.71	H	-5.7
7500.800000	---	43.71	54.00	10.29	V	3.9
7500.800000	51.27	---	74.00	22.73	V	3.9
12155.400000	54.44	---	74.00	19.56	H	9.2
12155.400000	---	47.15	54.00	6.85	H	9.2
17976.200000	---	45.62	54.00	8.38	V	11.9
17976.200000	54.73	---	74.00	19.27	V	11.9

802.11ac20 Mode:

Low Channel: 5745MHz

Common Information

Project No.:	RSHA240816001
Test Mode:	5G WIFI 802.11ac20 low channel
Standard:	FCC Part 15.407& FCC Part 15.205& FCC Part 15.209
Test Engineer:	Destine Hu



Critical_Freqs

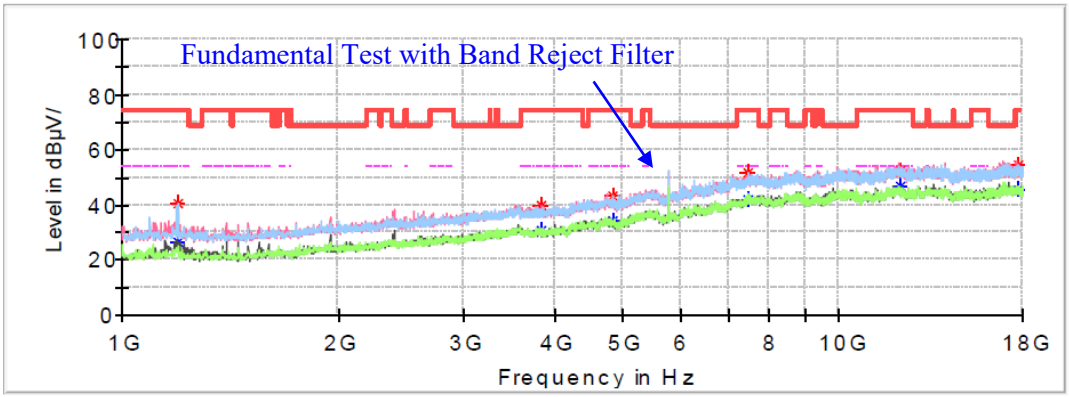
Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1192.100000	---	22.20	54.00	31.80	H	-15.2
1192.100000	36.48	---	74.00	37.52	H	-15.2
2275.000000	---	24.68	54.00	29.32	V	-10.9
2275.000000	36.79	---	74.00	37.21	V	-10.9
4022.600000	---	31.07	54.00	22.93	V	-5.8
4022.600000	40.86	---	74.00	33.14	V	-5.8
7633.400000	---	43.19	54.00	10.81	V	3.9
7633.400000	50.72	---	74.00	23.28	V	3.9
12094.200000	53.02	---	74.00	20.98	H	9.1
12094.200000	---	47.10	54.00	6.90	H	9.1
15912.400000	---	45.71	54.00	8.29	H	9.5
15912.400000	53.57	---	74.00	20.43	H	9.5

Middle Channel: 5785MHz

Common Information

Project No.:	RSHA240816001
Test Mode:	5G WIFI 802.11ac20 middle channel
Standard:	FCC Part 15.407& FCC Part 15.205& FCC Part 15.209
Test Engineer:	Destine Hu

Full Spectrum



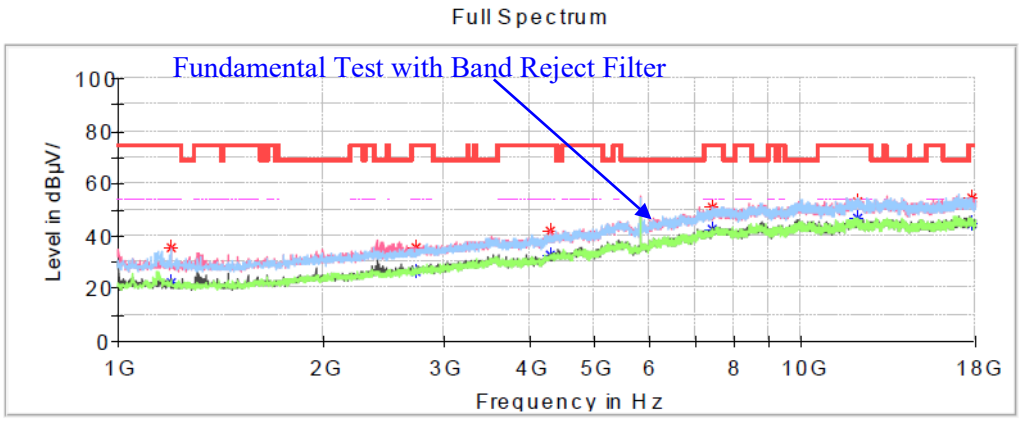
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1197.200000	---	26.45	54.00	27.55	V	-15.2
1197.200000	40.26	---	74.00	33.74	V	-15.2
3852.600000	---	30.86	54.00	23.14	V	-6.0
3852.600000	39.64	---	74.00	34.36	V	-6.0
4845.400000	---	34.60	54.00	19.40	H	-3.0
4845.400000	43.38	---	74.00	30.62	H	-3.0
7480.400000	---	41.90	54.00	12.10	H	3.8
7480.400000	51.85	---	74.00	22.15	H	3.8
12172.400000	52.64	---	74.00	21.36	V	9.2
12172.400000	---	47.06	54.00	6.94	V	9.2
17785.800000	---	45.47	54.00	8.53	H	11.8
17785.800000	54.44	---	74.00	19.56	H	11.8

High Channel: 5825MHz

Common Information

Project No.:	RSHA240816001
Test Mode:	5G WIFI 802.11ac20 high channel
Standard:	FCC Part 15.407& FCC Part 15.205& FCC Part 15.209
Test Engineer:	Destine Hu



Critical_Freqs

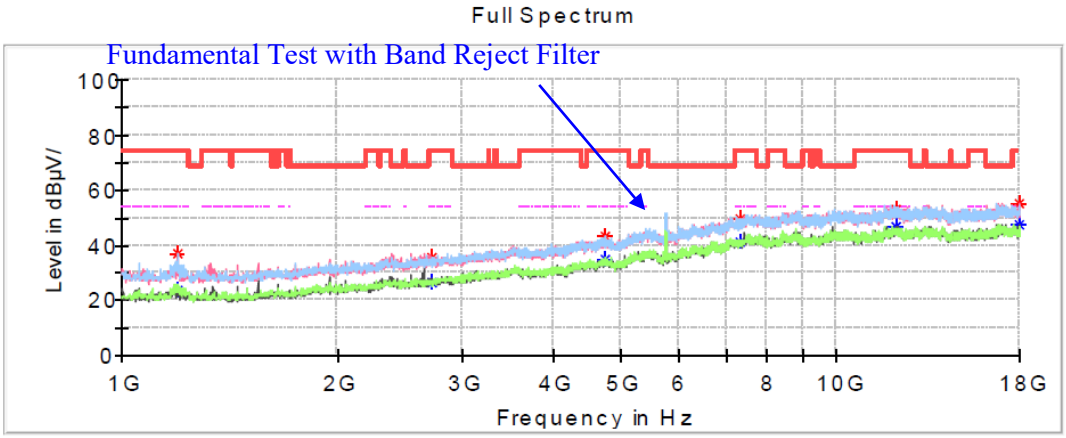
Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1197.200000	---	22.42	54.00	31.58	V	-15.2
1197.200000	35.96	---	74.00	38.04	V	-15.2
2728.900000	---	26.57	54.00	27.43	V	-9.4
2728.900000	36.00	---	74.00	38.00	V	-9.4
4296.300000	---	32.98	54.00	21.02	V	-4.9
4296.300000	41.81	---	74.00	32.19	V	-4.9
7419.200000	---	42.64	54.00	11.36	H	3.7
7419.200000	51.10	---	74.00	22.90	H	3.7
12087.400000	53.24	---	74.00	20.76	H	9.1
12087.400000	---	47.16	54.00	6.84	H	9.1
17734.800000	---	44.83	54.00	9.17	V	11.7
17734.800000	54.74	---	74.00	19.26	V	11.7

802.11ac40 Mode:

Low Channel: 5755MHz

Common Information

Project No.:	RSHA240816001
Test Mode:	5G WIFI 802.11ac40 low channel
Standard:	FCC Part 15.407& FCC Part 15.205& FCC Part 15.209
Test Engineer:	Destine Hu



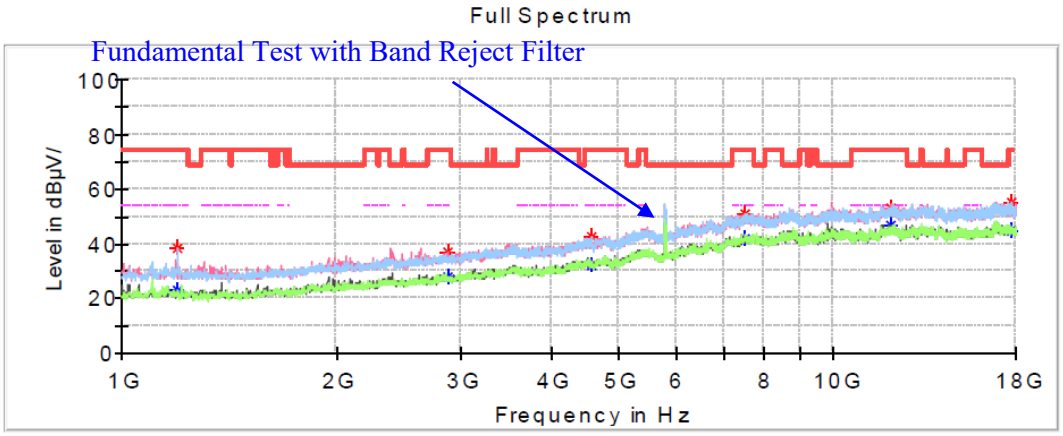
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1195.500000	---	23.87	54.00	30.13	H	-15.2
1195.500000	37.29	---	74.00	36.71	H	-15.2
2718.700000	---	26.78	54.00	27.22	V	-9.4
2718.700000	35.88	---	74.00	38.12	V	-9.4
4745.100000	---	35.24	54.00	18.76	H	-3.4
4745.100000	43.10	---	74.00	30.90	H	-3.4
7303.600000	---	41.09	54.00	12.91	H	3.4
7303.600000	49.84	---	74.00	24.16	H	3.4
12119.700000	52.99	---	74.00	21.01	V	9.1
12119.700000	---	47.09	54.00	6.91	V	9.1
17988.100000	---	47.31	54.00	6.69	V	11.9
17988.100000	55.12	---	74.00	18.88	V	11.9

High Channel: 5795MHz

Common Information

Project No.:	RSHA240816001
Test Mode:	5G WIFI 802.11ac40 high channel
Standard:	FCC Part 15.407& FCC Part 15.205& FCC Part 15.209
Test Engineer:	Destine Hu



Critical_Freqs

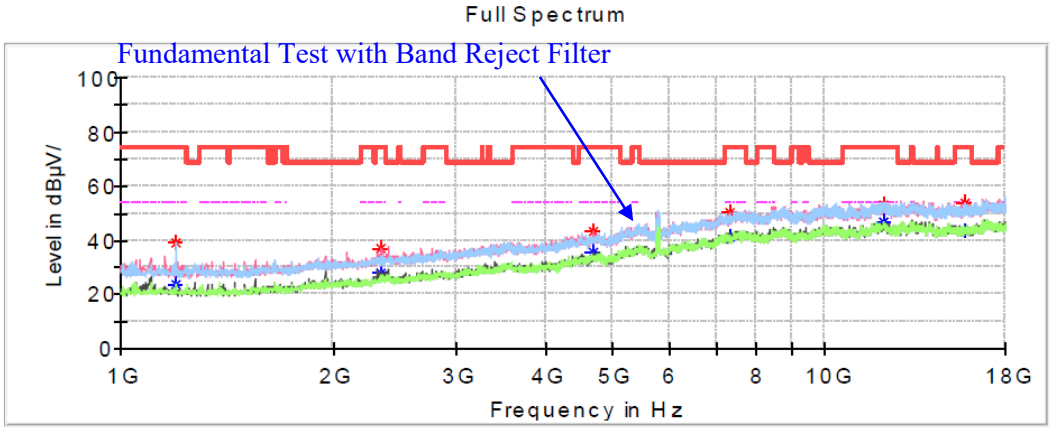
Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1195.500000	---	22.74	54.00	31.26	H	-15.2
1195.500000	38.62	---	74.00	35.38	H	-15.2
2863.200000	---	27.73	54.00	26.27	V	-8.9
2863.200000	37.13	---	74.00	36.87	V	-8.9
4578.500000	---	32.06	54.00	21.94	V	-4.0
4578.500000	42.84	---	74.00	31.16	V	-4.0
7487.200000	---	41.88	54.00	12.12	H	3.9
7487.200000	51.01	---	74.00	22.99	H	3.9
12005.800000	52.96	---	74.00	21.04	V	9.0
12005.800000	---	47.09	54.00	6.91	V	9.0
17748.400000	---	44.74	54.00	9.26	H	11.7
17748.400000	55.34	---	74.00	18.66	H	11.7

802.11ac80 Mode:

Middle Channel: 5775MHz

Common Information

Project No.:	RSHA240816001
Test Mode:	5G WIFI 802.11ac80 middle channel
Standard:	FCC Part 15.407& FCC Part 15.205& FCC Part 15.209
Test Engineer:	Destine Hu



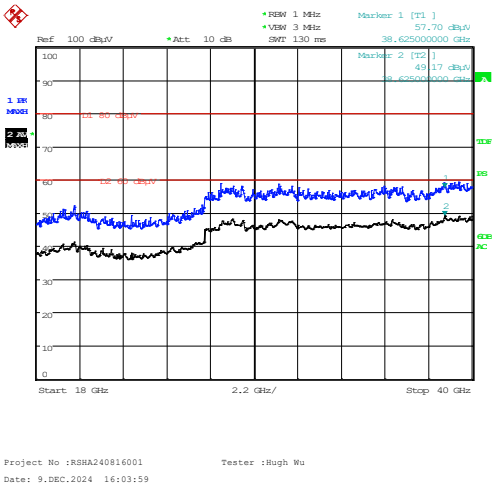
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1195.500000	---	23.79	54.00	30.21	H	-15.2
1195.500000	38.98	---	74.00	35.02	H	-15.2
2339.600000	---	27.72	54.00	26.28	V	-10.7
2339.600000	36.92	---	74.00	37.08	V	-10.7
4680.500000	43.55	---	74.00	30.45	V	-3.6
4680.500000	---	35.78	54.00	18.22	V	-3.6
7322.300000	---	41.12	54.00	12.88	V	3.4
7322.300000	50.47	---	74.00	23.53	V	3.4
12090.800000	53.15	---	74.00	20.85	H	9.1
12090.800000	---	46.86	54.00	7.14	H	9.1
15827.400000	---	43.26	54.00	10.74	H	9.6
15827.400000	53.68	---	74.00	20.32	H	9.6

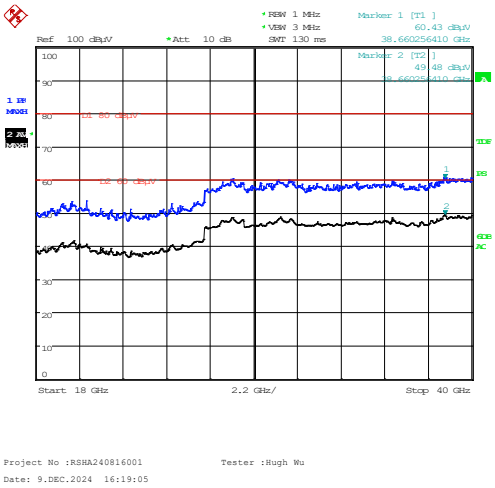
18GHz-40GHz:

*Pre-scan with 802.11a, 802.11ac20, 802.11ac40, 802.11 ac80 modes of operation in the X,Y and Z axes of orientation, the worst case **802.11ac40 mode (5230MHz)** was recorded*

Horizontal



Vertical



Note: The test distance is 1.5m. The limit is 80dBµV/m (Peak) and 60dBµV/m (Average).

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
38660.26	---	49.48	60	10.52	V	17.45
38660.26	60.43	---	80	19.57	V	17.45
38625.00	---	49.17	60	10.83	H	17.36
38625.00	57.70	---	80	22.3	H	17.36

Restricted Bands Emissions Test (5150-5250MHz Band):

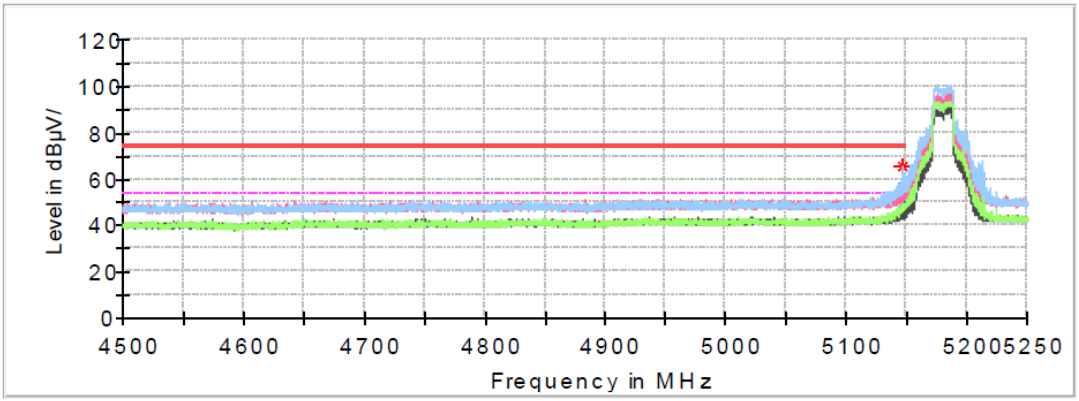
Note:
1. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
2. Corrected Amplitude = Corrected Factor + Reading
3. Margin = Limit - Corrected. Amplitude

802.11a Mode:

Common Information

Project No.:	RSHA240816001
Test Mode:	5G WIFI 802.11a low channel
Standard:	FCC Part 15.407& FCC Part 15.205& FCC Part 15.209
Test Engineer:	Destine Hu

Full Spectrum



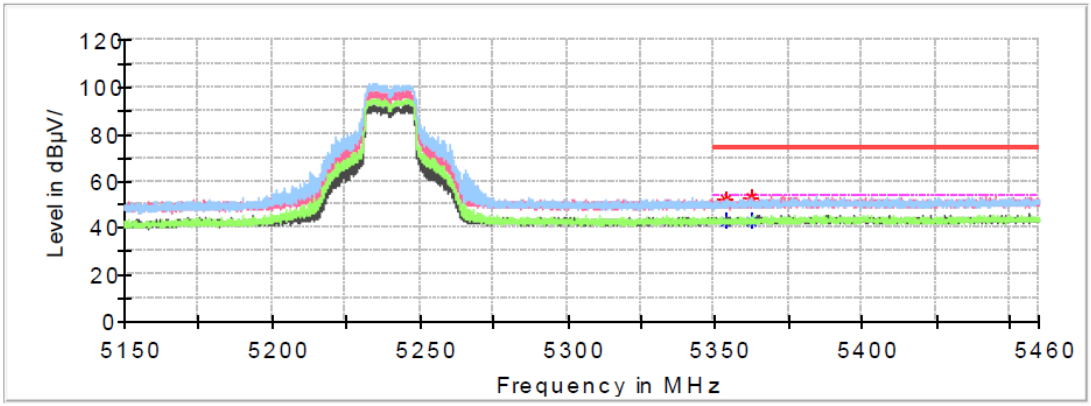
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
5147.250000	---	49.26	54.00	4.74	H	4.2
5147.250000	65.21	---	74.00	8.79	H	4.2
5149.950000	---	51.27	54.00	2.73	H	4.2
5149.950000	58.30	---	74.00	15.70	H	4.2

Common Information

Project No.:	RSHA240816001
Test Mode:	5G WIFI 802.11a high channel
Standard:	FCC Part 15.407& FCC Part 15.205& FCC Part 15.209
Test Engineer:	Destine Hu

Full Spectrum



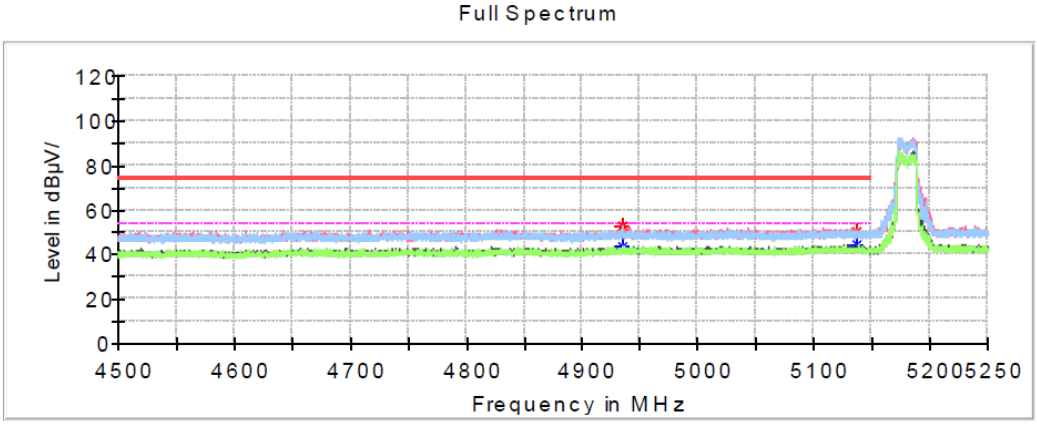
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
5353.980000	---	43.12	54.00	10.88	H	4.7
5353.980000	51.94	---	74.00	22.06	H	4.7
5362.629000	---	43.17	54.00	10.83	H	4.8
5362.629000	52.92	---	74.00	21.08	H	4.8

802.11ac20 Mode:

Common Information

Project No.:	RSHA240816001
Test Mode:	5G WIFI 802.11ac20 low channel
Standard:	FCC Part 15.407& FCC Part 15.205& FCC Part 15.209
Test Engineer:	Destine Hu



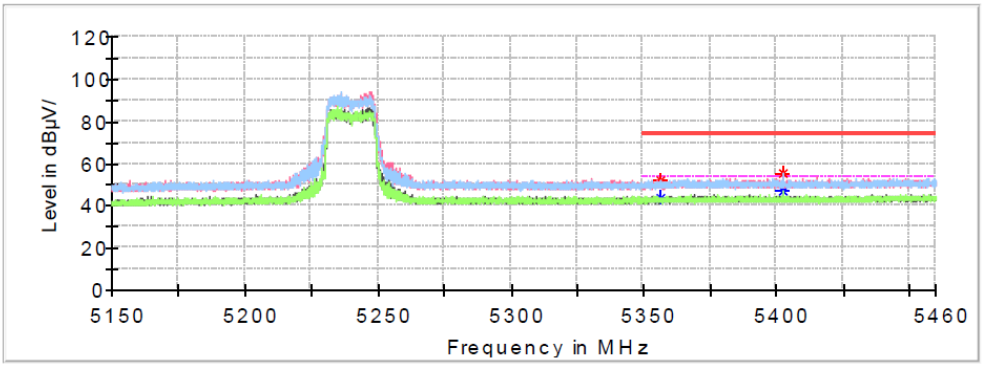
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
4935.300000	52.50	---	74.00	21.50	H	3.6
4935.300000	---	43.26	54.00	10.74	H	3.6
5136.750000	50.01	---	74.00	23.99	V	4.2
5136.750000	---	44.75	54.00	9.25	V	4.2

Common Information

Project No.:	RSHA240816001
Test Mode:	5G WIFI 802.11ac20 high channel
Standard:	FCC Part 15.407& FCC Part 15.205& FCC Part 15.209
Test Engineer:	Destine Hu

Full Spectrum



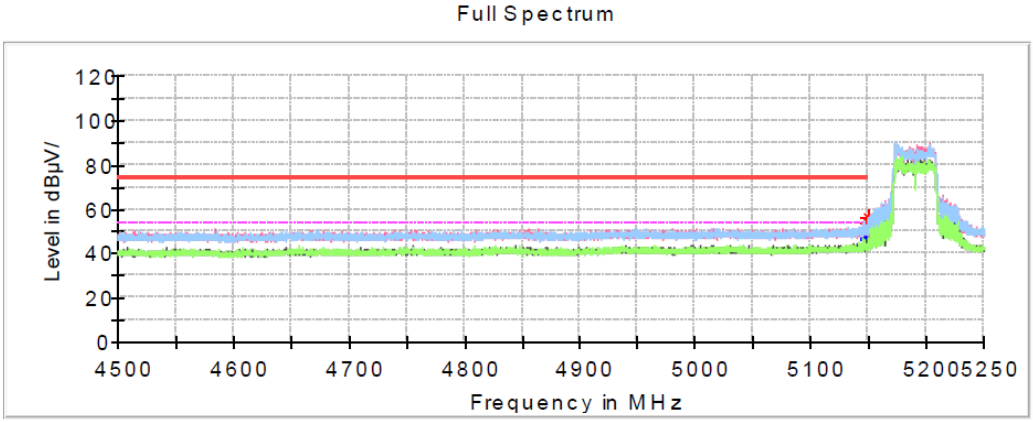
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
5356.677000	---	43.26	54.00	10.74	H	4.7
5356.677000	51.94	---	74.00	22.06	H	4.7
5402.495000	55.10	---	74.00	18.90	H	4.9
5402.495000	---	46.64	54.00	7.36	H	4.9

802.11ac40 Mode:

Common Information

Project No.:	RSHA240816001
Test Mode:	5G WIFI 802.11ac40 low channel
Standard:	FCC Part 15.407& FCC Part 15.205& FCC Part 15.209
Test Engineer:	Destine Hu

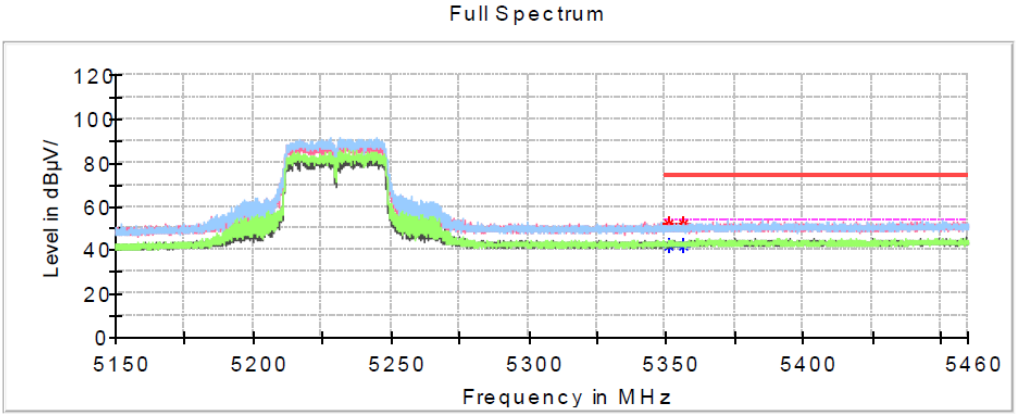


Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
5149.200000	---	46.85	54.00	7.15	V	4.2
5149.200000	53.39	---	74.00	20.61	V	4.2
5149.425000	---	46.34	54.00	7.66	H	4.2
5149.425000	56.25	---	74.00	17.75	H	4.2

Common Information

Project No.:	RSHA240816001
Test Mode:	5G WIFI 802.11ac40 high channel
Standard:	FCC Part 15.407& FCC Part 15.205& FCC Part 15.209
Test Engineer:	Destine Hu



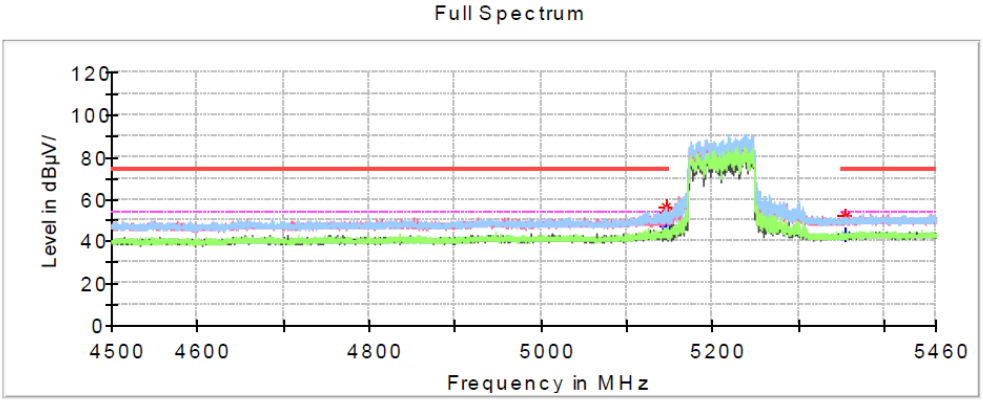
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
5351.066000	---	42.15	54.00	11.85	V	4.7
5351.066000	51.91	---	74.00	22.09	V	4.7
5356.460000	---	41.93	54.00	12.07	H	4.7
5356.460000	52.40	---	74.00	21.60	H	4.7

802.11ac80 Mode:

Common Information

Project No.:	RSHA240816001
Test Mode:	5G WIFI 802.11ac80 middle channel
Standard:	FCC Part 15.407& FCC Part 15.205& FCC Part 15.209
Test Engineer:	Destine Hu



Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
5144.544000	56.41	---	74.00	17.59	V	4.2
5144.544000	---	44.49	54.00	9.51	V	4.2
5148.096000	53.54	---	74.00	20.46	H	4.2
5148.096000	---	46.74	54.00	7.26	H	4.2
5354.592000	---	42.97	54.00	11.03	V	4.7
5354.592000	52.22	---	74.00	21.78	V	4.7

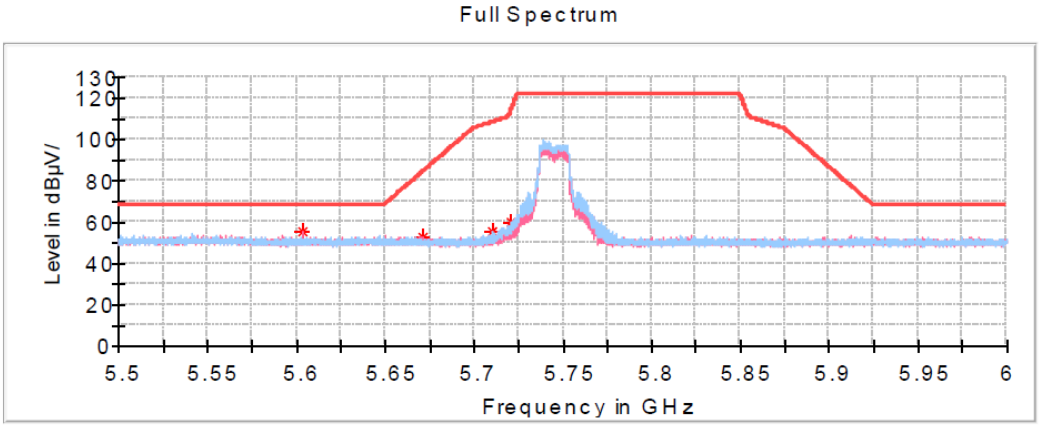
Restricted Bands Emissions Test (5725-5850MHz Band):

Note:
1. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
2. Corrected Amplitude = Corrected Factor + Reading
3. Margin = Limit - Corrected. Amplitude

802.11a Mode:

Common Information

Project No.:	RSHA240816001
Test Mode:	5G WIFI 802.11a low channel
Standard:	FCC Part 15.407& FCC Part 15.205& FCC Part 15.209
Test Engineer:	Destine Hu



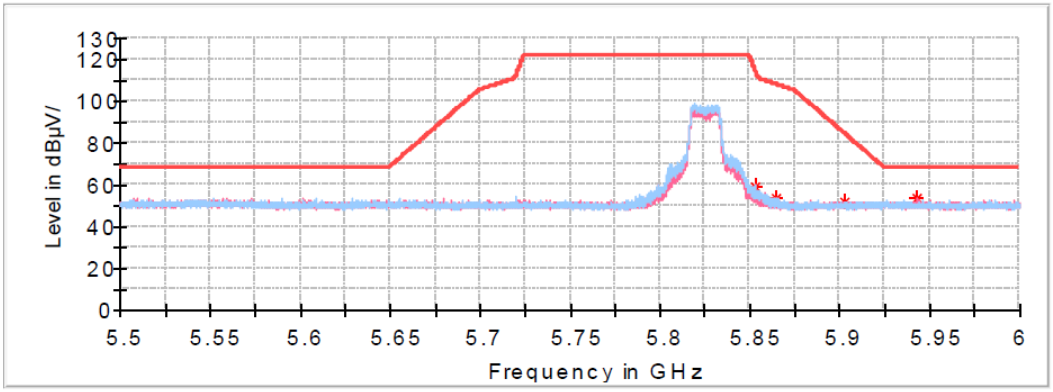
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
5603.600000	55.75	---	68.20	12.45	V	5.0
5671.450000	52.75	---	84.07	31.32	V	4.9
5710.350000	55.38	---	108.10	52.72	H	4.9
5721.100000	60.43	---	113.31	52.88	H	4.9

Common Information

Project No.:	RSHA240816001
Test Mode:	5G WIFI 802.11a high channel
Standard:	FCC Part 15.407& FCC Part 15.205& FCC Part 15.209
Test Engineer:	Destine Hu

Full Spectrum



Critical_Freqs

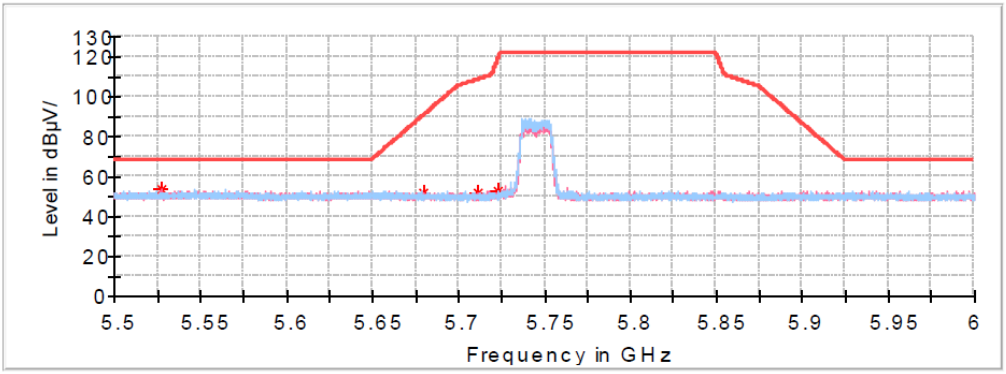
Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
5852.600000	59.54	---	116.27	56.73	H	4.7
5865.100000	53.90	---	107.97	54.07	H	4.7
5903.050000	52.14	---	84.44	32.31	V	4.7
5943.200000	53.45	---	68.20	14.75	V	4.6

802.11ac20 Mode:

Common Information

Project No.:	RSHA240816001
Test Mode:	5G WIFI 802.11ac20 low channel
Standard:	FCC Part 15.407& FCC Part 15.205& FCC Part 15.209
Test Engineer:	Destine Hu

Full Spectrum



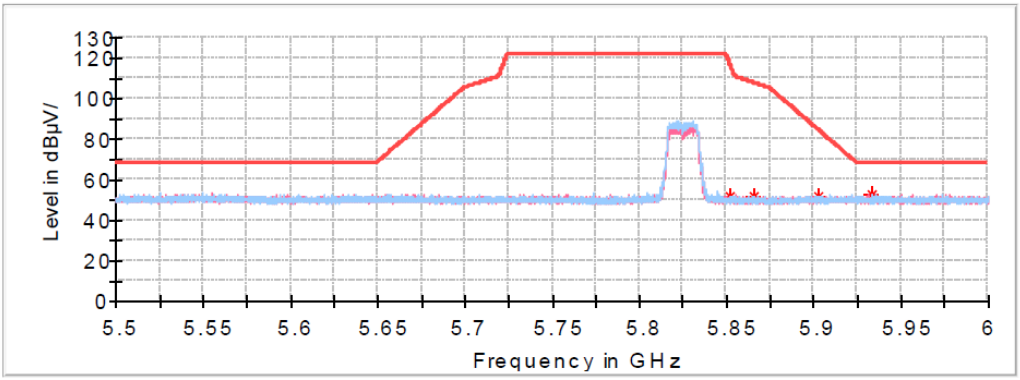
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
5527.700000	53.56	---	68.20	14.64	V	5.1
5679.700000	52.05	---	90.18	38.13	V	4.9
5711.500000	51.76	---	108.42	56.66	V	4.9
5722.600000	52.85	---	116.73	63.88	H	4.9

Common Information

Project No.:	RSHA240816001
Test Mode:	5G WIFI 802.11ac20 high channel
Standard:	FCC Part 15.407& FCC Part 15.205& FCC Part 15.209
Test Engineer:	Destine Hu

Full Spectrum



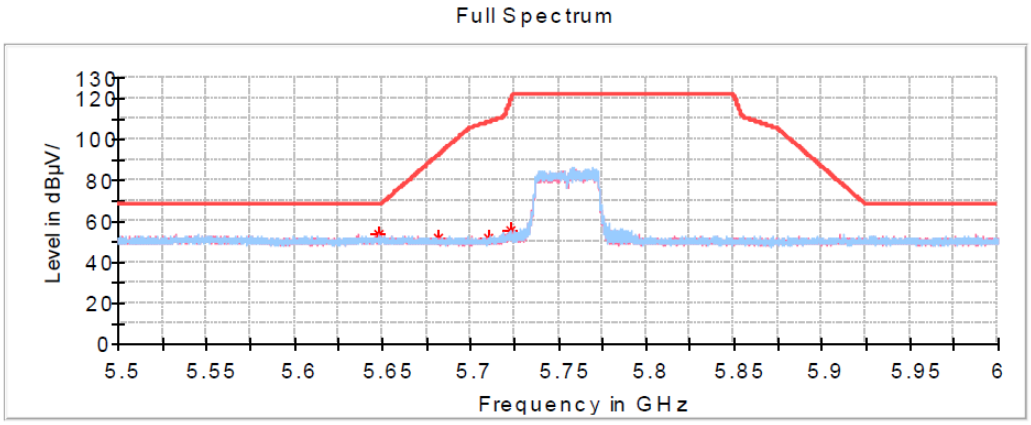
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
5851.900000	52.14	---	117.87	65.73	H	4.7
5866.200000	51.45	---	107.66	56.21	H	4.7
5902.450000	52.05	---	84.89	32.84	V	4.7
5933.700000	52.68	---	68.20	15.52	V	4.7

802.11ac40 Mode:

Common Information

Project No.:	RSHA240816001
Test Mode:	5G WIFI 802.11ac40 low channel
Standard:	FCC Part 15.407& FCC Part 15.205& FCC Part 15.209
Test Engineer:	Destine Hu



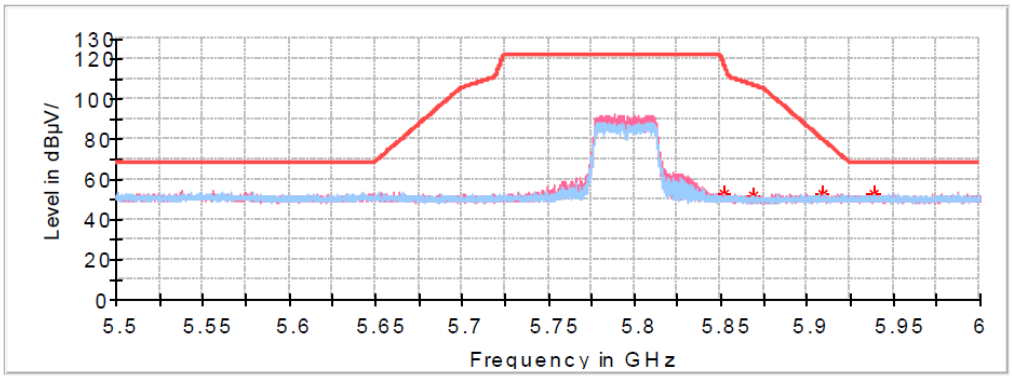
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
5647.800000	53.68	---	68.20	14.52	V	5.0
5681.450000	52.07	---	91.47	39.40	V	4.9
5710.150000	52.26	---	108.04	55.79	H	4.9
5722.550000	55.04	---	116.61	61.58	H	4.9

Common Information

Project No.:	RSHA240816001
Test Mode:	5G WIFI 802.11ac40 high channel
Standard:	FCC Part 15.407& FCC Part 15.205& FCC Part 15.209
Receiver Setting:	RBW: 1MHz, VBW: 3MHz, Sweep Time: Auto
Test Engineer:	Destine Hu

Full Spectrum



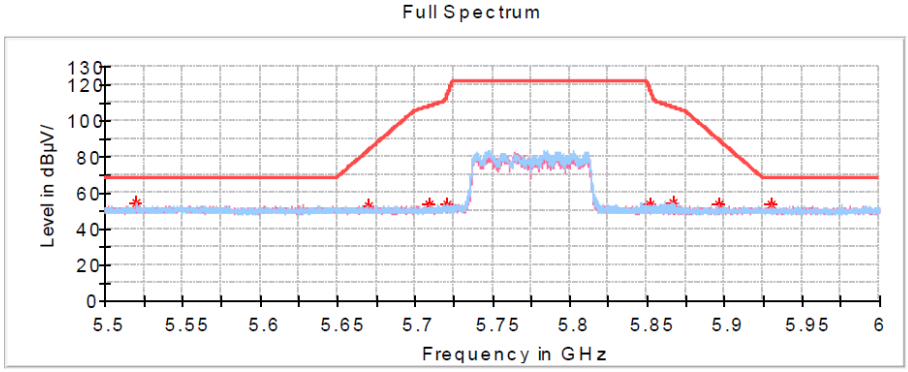
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
5852.150000	52.49	---	117.30	64.81	H	4.7
5869.350000	51.58	---	106.78	55.20	V	4.7
5909.300000	52.66	---	79.82	27.16	V	4.7
5939.150000	53.04	---	68.20	15.16	H	4.6

802.11ac80 Mode:

Common Information

Project No.:	RSHA240816001
Test Mode:	5G WIFI 802.11ac80 middle channel
Standard:	FCC Part 15.407& FCC Part 15.205& FCC Part 15.209
Test Engineer:	Destine Hu



Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
5520.600000	54.15	---	68.20	14.05	H	5.1
5670.600000	52.36	---	83.44	31.08	V	4.9
5709.050000	53.30	---	107.73	54.44	V	4.9
5721.150000	53.64	---	113.42	59.79	V	4.9
5852.350000	53.67	---	116.84	63.17	V	4.7
5866.350000	54.20	---	107.62	53.42	H	4.7
5896.000000	53.43	---	89.66	36.23	V	4.7
5929.850000	53.18	---	68.20	15.02	V	4.7

EMISSION BANDWIDTH

Test Result: Compliant

5150-5250 MHz:

Test mode	Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
802.11 a	Low	5180	22.417	16.750
	Middle	5200	21.984	16.850
	High	5240	21.728	16.750
802.11 ac20	Low	5180	22.612	17.850
	Middle	5200	23.005	17.800
	High	5240	21.981	17.700
802.11 ac40	Low	5190	45.200	36.700
	High	5230	44.700	36.800
802.11 ac80	Middle	5210	87.200	76

Note: the 99% Occupied Bandwidth have not fall into the band 5250-5350MHz.

5725-5850MHz:

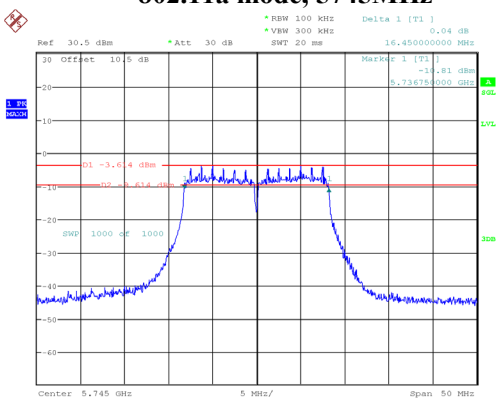
Test mode	Channel	Frequency (MHz)	99% Bandwidth (MHz)
802.11 a	Low	5745	16.800
	Middle	5785	16.700
	High	5825	16.800
802.11 ac20	Low	5745	17.700
	Middle	5785	17.850
	High	5825	17.750
802.11 ac40	Low	5755	36.600
	High	5795	36.500
802.11 ac80	Middle	5775	76.400

Note: the 99% Occupied Bandwidth have not fall into the band 5470-5725MHz.

Test mode	Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
802.11 a	Low	5745	16.450	0.5
	Middle	5785	16.450	
	High	5825	16.400	
802.11 ac20	Low	5745	17.350	
	Middle	5785	17.150	
	High	5825	17.400	
802.11 ac40	Low	5755	35.900	
	High	5795	35.800	
802.11 ac80	Middle	5775	75.600	

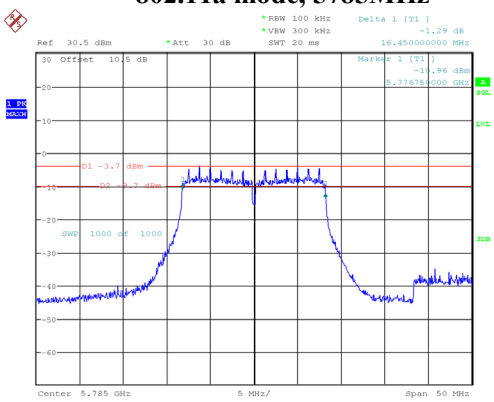
6dB Bandwidth
5725-5850 MHz Band

802.11a mode, 5745MHz



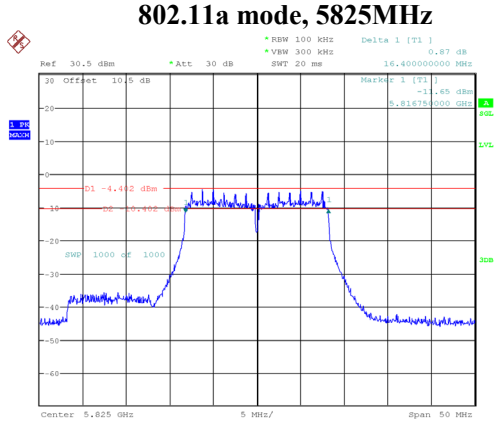
ProjectNo.:RSHA240816001 Tester:Neil Zhou
Date: 26.NOV.2024 15:57:55

802.11a mode, 5785MHz



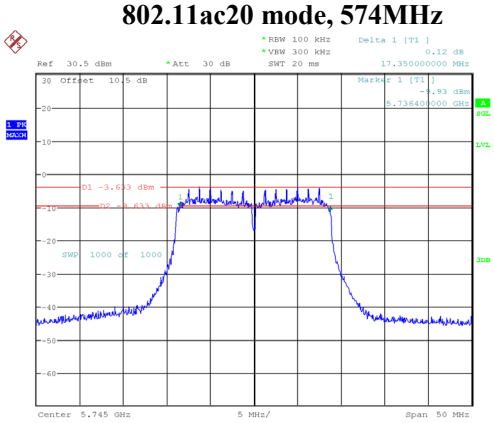
ProjectNo.:RSHA240816001 Tester:Neil Zhou
Date: 26.NOV.2024 16:03:12

802.11a mode, 5825MHz



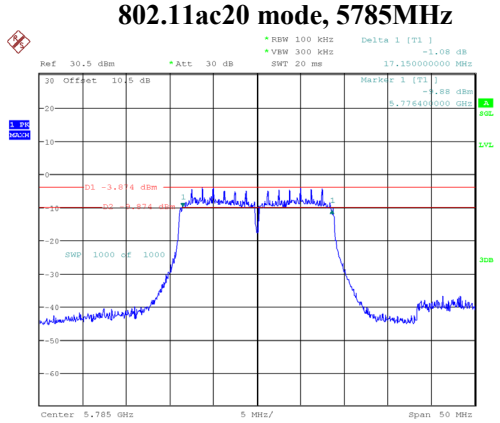
ProjectNo.:RSHA240816001 Tester:Neil Zhou
Date: 26.NOV.2024 16:06:25

802.11ac20 mode, 574MHz



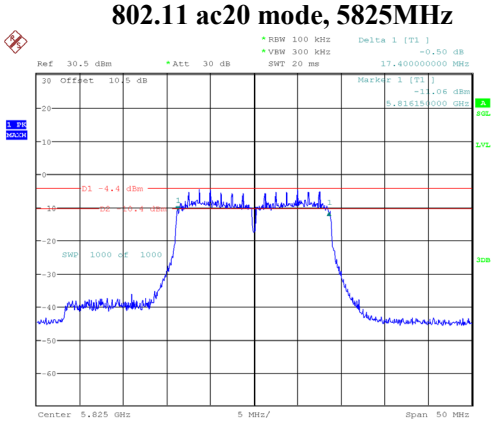
ProjectNo.:RSHA240816001 Tester:Neil Zhou
Date: 26.NOV.2024 16:09:41

802.11ac20 mode, 5785MHz



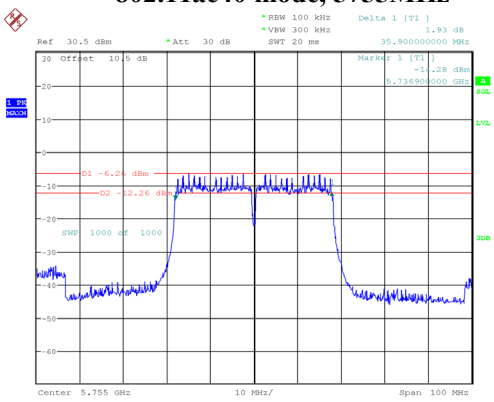
ProjectNo.:RSHA240816001 Tester:Neil Zhou
Date: 26.NOV.2024 16:13:08

802.11 ac20 mode, 5825MHz



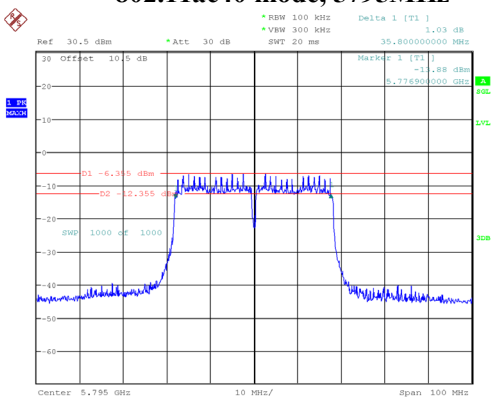
ProjectNo.:RSHA240816001 Tester:Neil Zhou
Date: 26.NOV.2024 16:16:20

802.11ac40 mode, 5755MHz



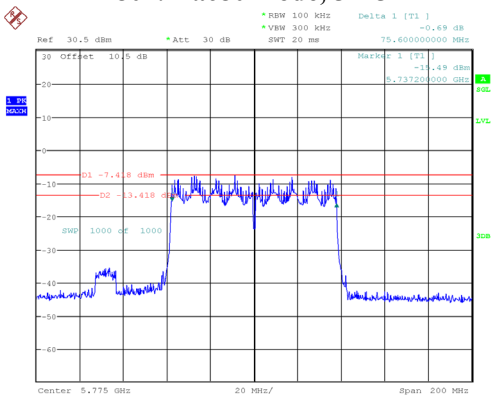
ProjectNo.:RSHA240816001 Tester:Neil Zhou
Date: 26.NOV.2024 16:20:51

802.11ac40 mode, 5795MHz



ProjectNo.:RSHA240816001 Tester:Neil Zhou
Date: 26.NOV.2024 16:26:28

802.11ac80 mode, 5775MHz



ProjectNo.:RSHA240816001 Tester:Neil Zhou
Date: 26.NOV.2024 16:31:31