



RF TEST REPORT

Report No.: 20240917G17987X-W6

Product Name: Beacon

Model No.: ZZ-H-2-001

FCC ID: 2AIDW-ZZ-H-2-001

Applicant: Shenzhen Zero Zero Infinity Technology Co., Ltd.

Address: 4th Floor, Qianhai E-metro Tower, Shenzhen-Hong Kong
Cooperation Zone, Shenzhen, China

Dates of Testing: 09/11/2024 - 09/24/2024

Issued by: CCIC Southern Testing Co., Ltd.

Lab Location: Electronic Testing Building, No.43, Shahe Road, Xili Street,
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Test Report

Product.....: Beacon
Trade Name: ZERO ZERO ROBOTICS
Applicant.....: Shenzhen Zero Zero Infinity Technology Co., Ltd.
Applicant Address.....: 4th Floor, Qianhai E-metro Tower, Shenzhen-Hong Kong
Cooperation Zone, Shenzhen, China
Manufacturer: Shenzhen Zero Zero Infinity Technology Co., Ltd.
Manufacturer Address: 4th Floor, Qianhai E-metro Tower, Shenzhen-Hong Kong
Cooperation Zone, Shenzhen, China
Test Standards: 47 CFR Part 15 Subpart E 15.407
ANSI C63.10-2020
Test Result.....: Pass

Tested by: Kim Li 2024.09.24
Kim Li, Test Engineer

Reviewed by: Sun Jiaohui 2024.09.24
Sun Jiaohui, Senior Engineer

Approved by: Chris You 2024.09.24
Chris You, Manager



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Change History		
Issue	Date	Reason for change
1.0	2024.09.24	First edition

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Beacon
Model No.	ZZ-H-2-001
Hardware Version	RC100_MB_V20
Software Version	0.0.3_20240923
EUT supports Radios application	WLAN5.0GHz 802.11a/n/ac
Product Type	Client devices
Modulation Type	802.11a/n: OFDM (BPSK/QPSK/16QAM/64QAM) 802.11ac: OFDM (BPSK/QPSK/16QAM/64QAM/256QAM)
Transfer Rate	802.11a: 54/48/36/24/18/12/9/6 Mbps 802.11n: up to 300 Mbps (2x2MIMO) 802.11ac: up to 866.666 Mbps (2x2MIMO)
Frequency Range	UNII-1: 5150 ~ 5250MHz UNII-3: 5725 ~ 5850MHz
Channel Bandwidth	802.11a: 5MHz/10MHz/20MHz 802.11n: 20MHz/40MHz 802.11ac: 20MHz/40MHz/80MHz
Channel Number	UNII-1: 4 for 802.11a, 802.11n(HT20), 802.11ac(VHT20) 2 for 802.11n(HT40), 802.11ac(VHT40) 1 for 802.11ac(VHT80) UNII-3: 5 for 802.11a, 802.11n(HT20), 802.11ac(VHT20) 2 for 802.11n(HT40), 802.11ac(VHT40) 1 for 802.11ac(VHT80)
Antenna Type	Internal Antenna
Antenna Gain	Antenna 1: 4.3dBi Antenna 2: 5.0dBi
Output Power (Max.)	UNII-1: 16.39dBm UNII-3: 14.74dBm
Test Control Software	QRCT 4.0
Power supply	Rechargeable Li-ion Polymer Battery DC3.85V/940mAh

Note 1: The information of antenna gain and cable loss is provided by the manufacturer and our lab is not responsible for the accuracy of the antenna gain and cable loss information.



1.2. Test Standards and Results

The purpose of the report is to conduct testing according to the following FCC certification standards:

No.	Identity	Document Title
1	47 CFR Part 15 Subpart E §15.407	Radio Frequency Devices
2	KDB789033 D02 General UNII Test Procedures New Rules v02r01	Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E
3	KDB 662911 D01 Multiple Transmitter Output v02r01	Emissions Testing of Transmitters with Multiple Outputs in the Same Band
4	ANSI C63.10-2020	American National Standard for Testing Unlicensed Wireless Devices

Test detailed items/section required by FCC rules and results are as below:

No.	FCC Rule	Description	Result
1	15.203 15.407(a)	Antenna Requirement	PASS
2	15.407(a)(1)(iv) 15.407 (a)(2) 15.407(a)(3)(i)	Maximum Conducted Output Power	PASS
3	15.407(a)(12)	26dB Emission Bandwidth 99% Occupied Bandwidth	PASS
4	15.407(e)	6dB Emission Bandwidth	PASS
5	15.407(a)(1)(iv) 15.407 (a)(2) 15.407(a)(3)(i)	Power spectral density (PSD)	PASS
6	15.207	AC Power Line Conducted Emission	PASS
7	15.205 15.209 15.407(b)(1) 15.407(b)(2) 15.407(b)(3) 15.407(b)(4)	Radiated Band Edges and Spurious Emission	PASS
8	15.407(g)	Frequency Stability	PASS

1.3. Channel List

Operated band in 5150 MHz ~ 5250MHz

4 channels are provided for 802.11a, 802.11n-HT20 and 802.11ac-VHT20.

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

2 channels are provided for 802.11n-HT40 and 802.11ac-VHT40.

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

1 channels are provided for 802.11ac-VHT80.

Channel	Frequency(MHz)	Channel	Frequency(MHz)
42	5210	/	/

Operated band in 5725 MHz ~ 5850MHz

5 channels are provided for 802.11a, 802.11n-HT20 and 802.11ac-VHT20.

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

2 channels are provided for 802.11n-HT40 and 802.11ac-VHT40.

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

1 channel are provided for 802.11ac-VHT80.

Channel	Frequency(MHz)	Channel	Frequency(MHz)
155	5775	/	/

4 channels are provided for 802.11a(5MHz).

Channel	Frequency(MHz)	Channel	Frequency(MHz)
/	5745.5	/	5805.5
/	5765.5	/	5825.5
/	5785.5	/	/

4 channels are provided for 802.11a(10MHz).

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

1.4. Test environment and mode

During the measurement, the environmental conditions were within the listed ranges:

Operating Environment	
Temperature	15°C - 35°C
Humidity	30% -60%
Atmospheric Pressure	86KPa-106KPa

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

For Frequency band 5150 ~ 5250 MHz				
Test Mode	Frequency(MHz)			Data rate
	LCH	MCH	HCH	
802.11a	5180	5220	5240	6 Mbps
802.11n-HT20/ac-VHT20				MCS 0
802.11n-HT40/ac-VHT40	5190	/	5230	MCS 0
802.11ac-VHT80	5210	/	/	MCS 0
Note: After scanning all modulation types and data rates for all test patterns, the above list was found to be the worst case.				

For Frequency band 5725 ~ 5850 MHz				
Test Mode	Frequency(MHz)			Data rate
	LCH	MCH	HCH	
802.11a(5MHz)	5745.5	5785.5	5825.5	6 Mbps
802.11a(10MHz)	5745	5785	5825	6 Mbps
802.11a	5745	5785	5825	6 Mbps
802.11n-HT20/ac-VHT20				MCS 0
802.11n-HT40/ac-VHT40	5755	/	5795	MCS 0
802.11ac-VHT80	5775	/	/	MCS 0
Note: After scanning all modulation types and data rates for all test patterns, the above list was found to be the worst case.				

1.5. Table for Supporting Units

No.	Equipment	Brand Name	Model Name	Manufacturer	Serial No.	Note
1	Laptop	HP	TPN-Q221	HP	5CD14347QB	FCC DOC



1.6. Laboratory Facilities

FCC-Registration No.: CN1283

CCIC Southern Testing Co., Ltd EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Designation Number: CN1283, valid time is until June 30, 2025.

ISED Registration: 11185A-1

CCIC Southern Testing Co., Ltd. EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 11185A-1 on Aug. 04, 2016, valid time is until June 30, 2025.

A2LA Code: 5721.01

CCIC-SET is a third party testing organization accredited by A2LA according to ISO/IEC 17025.

2. 47 CFR Part 15E Requirements

2.1. Antenna requirement

2.1.1. Applicable Standard

According to FCC 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.

According to FCC 15.407(a)(1): For client devices in the 5.15-5.25 GHz 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 FCC 15.407(a)(2): For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, 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 FCC 15.407(a)(3): For the band 5.725-5.850 GHz, 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.

2.1.2. Antenna Information

Antenna Category: Internal Antenna

A internal Antenna was soldered to the antenna port of EUT via an adaptor cable, can't be removed.

Operating frequency range	Ant. Type	Ant1 Antenna Gain	Ant2 Antenna Gain	Uncorrelated Chains Directional gain
UNII-1/ UNII-3	Internal	4.3dBi	5.0dBi	4.66dBi

Note 1: Uncorrelated directional gain = $10 \log[(10^{\text{Ant1}/10} + 10^{\text{Ant2}/10}) / N_{\text{ANT}}]$ dBi.

2.1.3. Result: comply

The EUT has two permanently and irreplaceable attached antenna. Please refer to the EUT internal photos.

2.2. Maximum Conducted Output Power

2.2.1. Limit of Maximum Conducted Output Power

FCC Part 15.407(a):

The maximum conducted output power should not exceed:

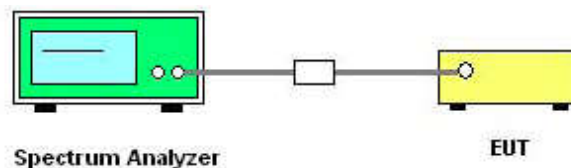
Band	EUT Category	Limit
U-NII-1	☐ Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p $\leq$ 125mW(21dBm) at any elevation angle above 30 degrees as measured from the horizon)
	☐ Fixed point-to-point Access device	1 Watt (30 dBm)
	☐ Indoor Access Point	1 Watt (30 dBm)
	☒ Mobile and portable client device	250mW (24 dBm)
U-NII-2A	☒	250mW (24 dBm) or 11dBm+10logB* Whichever is less.
U-NII-2C	☒	250mW (24 dBm) or 11dBm+10logB* Whichever is less.
U-NII-3	☒	1 Watt (30 dBm)

Note: B* is the 26 dB emission bandwidth in MHz.

2.2.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.2.3. Test Setup



2.2.4. Test Procedures

1. The testing follows the of KDB 789033 D02 v02r01 Section II.E.2.b and ANSI C63.10-2020 Section 12.3.2.2.
2. The RF output of EUT was connected to spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Power is calculated by integrating over the spectrum of the entire 99% OBW signal using the instrument's band power measurement feature.
4. Set span to encompass the entire 99% OBW of the signal.
5. Set RBW = 1MHz, VBW $\geq$ 3MHz, Sweep time = Auto, Detector = power averaging (RMS).

6. Number of points in sweep $\geq 2 \times \text{span} / \text{RBW}$.
7. Trace average at least 100 traces in power averaging (rms) mode.
8. Replace the EUT center frequency and repeat steps 3~7.

2.2.5. Test Results of Maximum Conducted Output Power

Please refer to APPENDIX A for detail

2.3. Power spectral density (PSD)

2.3.1. Limit of Power Spectral Density

FCC Part 15.407(a)

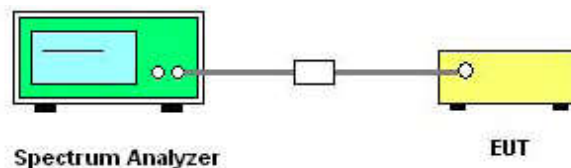
The maximum power spectral density should not exceed:

Band	EUT Category	Limit
U-NII-1	☐ Outdoor Access Point	17 dBm/MHz
	☐ Fixed point-to-point Access device	
	☐ Indoor Access Point	
	☒ Mobile and portable client device	11 dBm/MHz
U-NII-2A	☒	11 dBm/MHz
U-NII-2C	☒	11 dBm/MHz
U-NII-3	☒	30dBm/500kHz

2.3.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.3.3. Test Setup



2.3.4. Test Procedures

1. The testing follows the of KDB 789033 D02 v02r01 Section II.F and ANSI C63.10-2020 Section 12.5.
2. The RF output of EUT was connected to spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set span to encompass the entire 99% OBW of the signal.
4. For U-NII-1, U-NII-2a, U-NII-2c Band: Set RBW = 1MHz, VBW $\geq$ 3MHz, Sweep time = Auto, Detector = power averaging (RMS).
5. For U-NII-3 Band: Set RBW = 500kHz, VBW $\geq$ 2MHz, Sweep time = Auto, Detector = power averaging (RMS).
6. Number of points in sweep $\geq 2 \times \text{span} / \text{RBW}$.
7. Trace average at least 100 traces in power averaging (rms) mode.
8. Use the peak search function on the instrument to find the peak of the spectrum.



9. Replace the EUT center frequency and repeat steps 3~8.

2.3.5. Test Result of Power Spectral Density

Please refer to APPENDIX A for detail

2.4. 26dB Emission Bandwidth and 99% Occupied Bandwidth

2.4.1. Limit of 26dB Emission Bandwidth and 99% Occupied Bandwidth

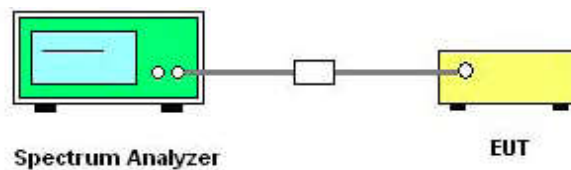
26dB Emission Bandwidth and 99% Occupied Bandwidth no Bandwidth limit.

The minimum 6dB bandwidth of U-NII-3 shall be at least 500 kHz.

2.4.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.4.3. Test Description



2.4.4. Test Procedures

1. The testing follows the of KDB 789033 D02 v02r01 Section II.C.D and ANSI C63.10-2020 Section 12.4.
2. The RF output of EUT was connected to spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Use the spectrum analyzer “Channel Bandwidth” function to easurement the 26dB EBW, 6dB EBW and 99% OBW.
4. Set center frequency to the nominal EUT channel center frequency.
5. Set span = 1.5 times to 5.0 times the OBW or EBW.
6. For 26dB EBW and 99% OBW Measurement:
Set RBW = approximately 1% EBW or 1.5 times to 5.0 times the OBW, $VBW \geq 3 \times RBW$.
7. For 6dB EBW Measurement:
Set RBW =100kHz, $VBW \geq 3 \times RBW$.
8. Set Detector = Peak, Trace mode = max hold and Sweep time = auto couple.
9. Allow the trace to stabilize.
10. Replace the EUT center frequency and repeat steps 3~9.



2.4.5. Test Results of 26dB Emission Bandwidth and 99% Occupied Bandwidth

Please refer to APPENDIX A for detail

2.5. Frequency Stability

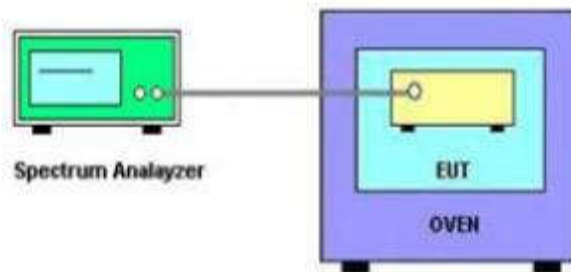
2.5.1. Limit of Frequency Stability

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.

2.5.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.5.3. Test Setup



2.5.4. Test Procedures

1. The testing follows the of KDB 789033 D02 v02r01 Section II.A.3 and ANSI C63.10-2020 Section 6.8.
2. The EUT is installed in an environment test chamber with external power source, was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set the chamber to operate at 50°C and external power source to output at nominal voltage of EUT.
5. A sufficient stabilization period at each temperatures in used prior to each frequency measurement.
6. The test shall be performed under -30°C to 50°C and 85% to 115% of the nominal voltage. Change setting of chamber and external power source to complete all conditions.
7. Replace the EUT center frequency and repeat steps 3~6.

2.5.5. Test Result of Frequency Stability

Please refer to APPENDIX A for detail

2.6. Radiated Band Edge and Spurious Emission

2.6.1. Limit of Radiated Band Edges and Spurious Emission

Radiated emission which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level ($\mu\text{V/m}$).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

Limits of unwanted emission out of the restricted bands

FCC Part 15.407(b)			
Frequency Band (MHz)	Frequency (MHz)	EIRP Limit (dBm)	Equivalent Field Strength @3m (dB $\mu\text{V/m}$)
5150 - 5250	Outside of the 5.15~5.35 GHz	-27	68.2
5725 - 5850	< 5650	-27	68.2
	5650~5700	-27~10	68.2~105.2
	5700~5720	10~15.6	105.2~110.8
	5720~5725	15.6~27	110.8~122.2
	5850~5855	27~15.6	122.2~110.8
	5855~5875	15.6~10	110.8~105.2
	5875~5925	10~-27	105.2~68.2
	> 5925	-27	68.2

Note:

- 1) $\text{EIRP}[\text{dBm}] = \text{E}[\text{dB}\mu\text{V/m}] + 20 \log(d[\text{m}]) - 104.77$, d is the measurement distance in m.
- 2) $\text{E}[\text{dB}\mu\text{V/m}] = \text{EIRP}[\text{dBm}] + 95.2 = 68.2 \text{ dB}\mu\text{V/m}$, for $\text{EIRP}[\text{dBm}] = -27\text{dBm}$.
 $\text{E}[\text{dB}\mu\text{V/m}] = \text{EIRP}[\text{dBm}] + 95.2 = 105.2 \text{ dB}\mu\text{V/m}$, for $\text{EIRP}[\text{dBm}] = 10\text{dBm}$.
 $\text{E}[\text{dB}\mu\text{V/m}] = \text{EIRP}[\text{dBm}] + 95.2 = 110.8 \text{ dB}\mu\text{V/m}$, for $\text{EIRP}[\text{dBm}] = 15.6\text{dBm}$.
 $\text{E}[\text{dB}\mu\text{V/m}] = \text{EIRP}[\text{dBm}] + 95.2 = 122.2 \text{ dB}\mu\text{V/m}$, for $\text{EIRP}[\text{dBm}] = 27\text{dBm}$.



Applicable To	Limit	
KDB 789033 D02 General UNII Test Procedures New Rules v02r01	Field Strength at 3m	
	PK: 68.2(dB μ V/m)	AV: 54 (dB μ V/m)

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part 15, must also comply with the radiated emission limits specified in Section 15.209(a).

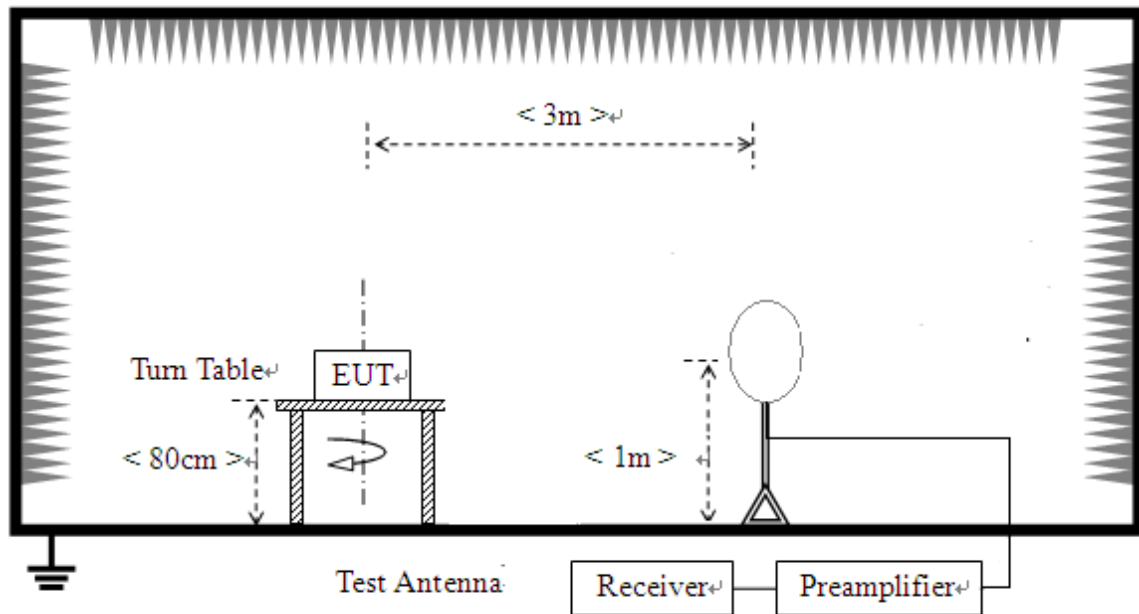
MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
¹ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(²)
13.36-13.41	/	/	/
Note: ¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz. ² Above 38.6.			

2.6.2. Measuring Instruments

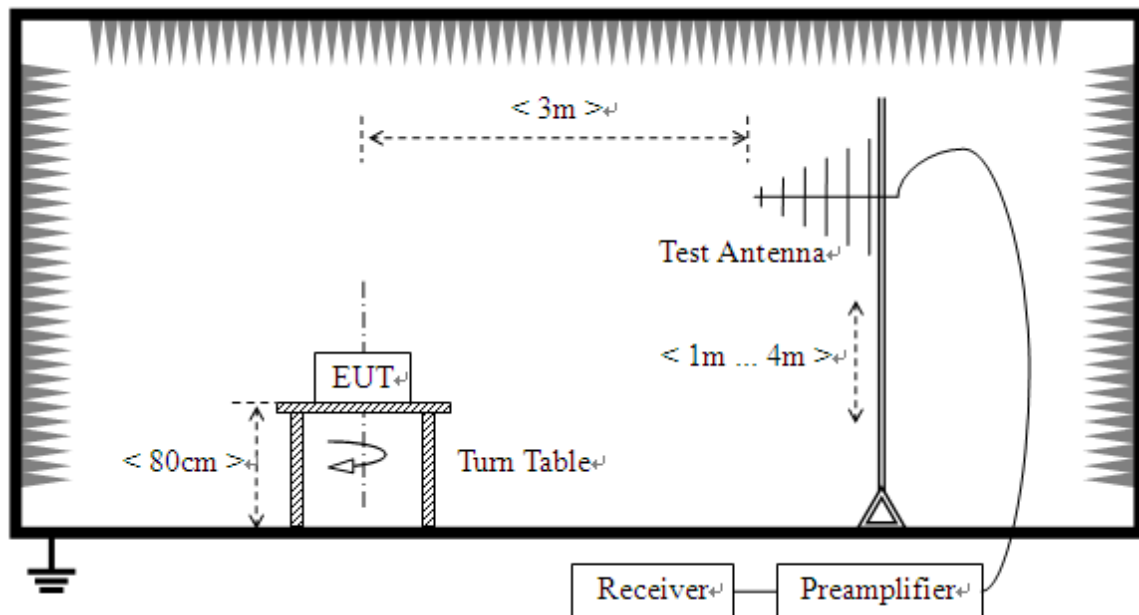
The measuring equipment is listed in the section 3 of this test report.

2.6.3. Test Setup

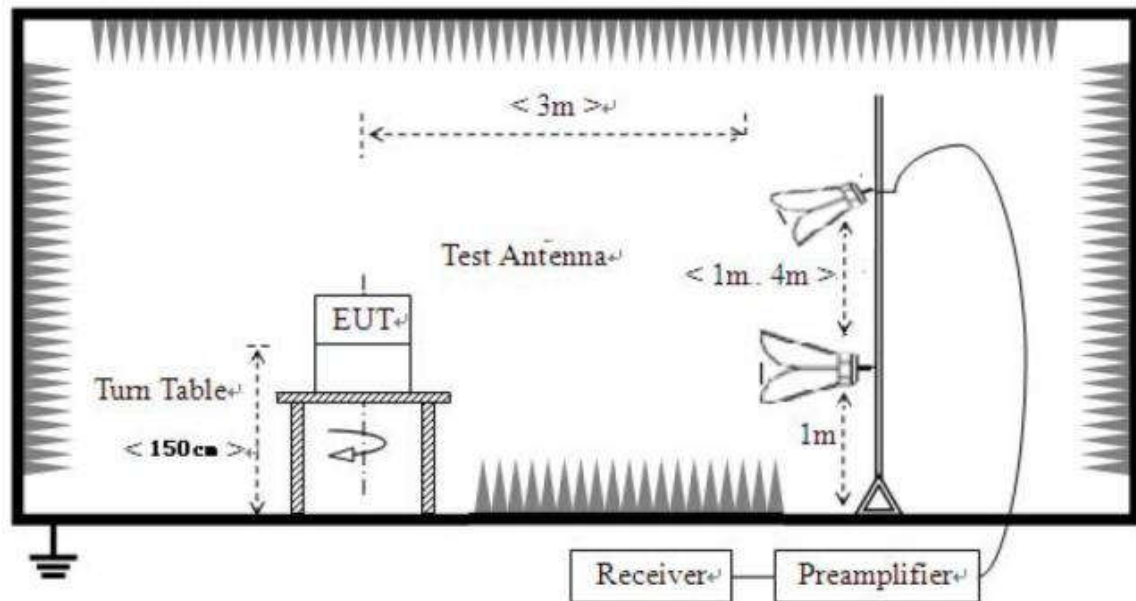
For radiated emissions from 9 kHz to 30 MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



2.6.4. Test Procedures

1. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
6. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for

Quasi-peak detection (QP) at frequency below 1 GHz.

2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (Duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor ($10 \log(1/\text{duty cycle})$).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
5. Only worst-Case mode data provide here, 802.11a (20MHz) 5745MHz for Below 1GHz.

2.6.5. Test Result of Radiated Band Edge and Spurious Emission

NOTE 1: For 9 kHz to 30MHz, The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

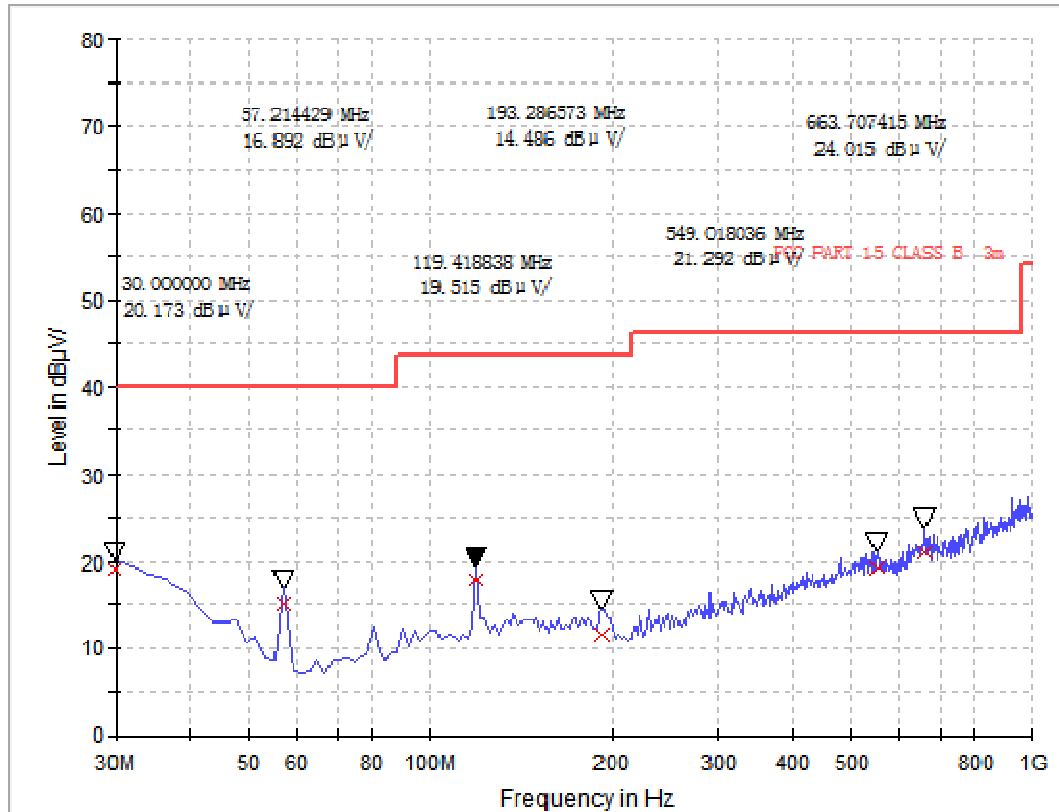
NOTE 2: For 30MHz to 1GHz, All of the EUT Configure mode were tested and found 802.11a 5745MHz (Ant2) channel is the worst mode, the worst case is recorded in this report.

NOTE 3: For 1GHz to 40GHz, All EUT configuration modes were tested, and this report only reflects the worst-case low channel and high channel of 20M bandwidth/40M bandwidth/80M bandwidth.

NOTE 4: Antenna height and turntable angle are the worst positions, the worst case is recorded in this report.

For 30MHz to 1000 MHz

Test site:	3M anechoic chamber	Environment:	Temp: 23℃; Humi:48%;101kPa
Operator:	Deng ShanFei	Test Date:	2024.09.13
Test Mode:	5745MHz - TX	Test Result:	Pass

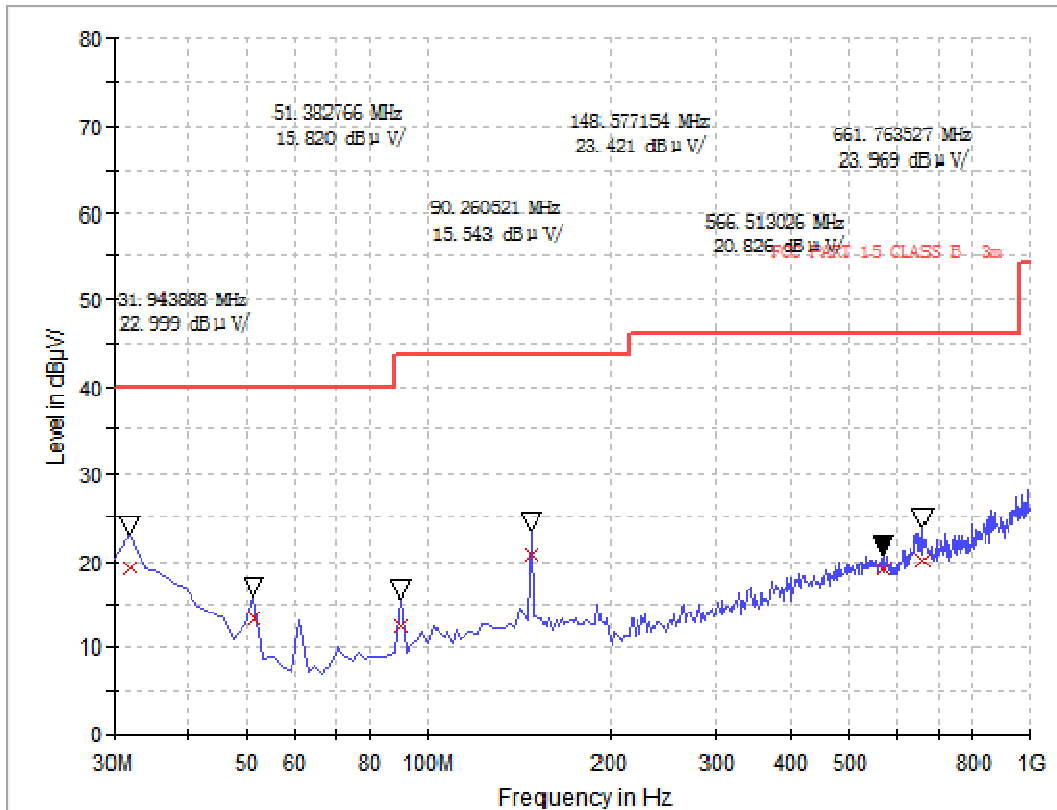


Frequency (MHz)	QuasiPeak (dBμV/m)	Bandwidth (kHz)	Height (cm)	Polarity	Corr. (dB/m)	Margin - QPK	Limit - QPK
30.000000	19.00	120.000	100.0	H	19.2	21.00	40.0
57.200000	14.90	120.000	100.0	H	6.4	25.10	40.0
119.40000	17.82	120.000	100.0	H	11.3	25.68	43.5
193.28000	11.72	120.000	100.0	H	11.7	31.78	43.5
549.00000	19.23	120.000	100.0	H	19.4	26.77	46.0
663.72000	21.01	120.000	100.0	H	21.4	24.99	46.0

Remark:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB).
3. Margin value = Limit value - Emission Level.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. Only the antenna height (from 1m to 4m) at maximum reading are recorded.

Test site:	3M anechoic chamber	Environment:	Temp: 23℃; Humi:48%;101kPa
Operator:	Deng ShanFei	Test Date:	2024.09.13
Test Mode:	5745MHz - TX	Test Result:	Pass



Frequency (MHz)	QuasiPeak (dBμV/m)	Bandwidth (kHz)	Height (cm)	Polarity	Corr. (dB/m)	Margin - QPK	Limit - QPK
31.960000	19.20	120.000	100.0	V	18.3	20.80	40.0
51.400000	13.43	120.000	100.0	V	8.4	26.57	40.0
90.280000	12.58	120.000	100.0	V	8.9	30.92	43.5
148.560000	20.72	120.000	100.0	V	12.1	22.78	43.5
566.520000	18.94	120.000	100.0	V	19.2	27.06	46.0
661.760000	20.03	120.000	100.0	V	21.4	25.97	46.0

Remark:

- Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
- Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB).
- Margin value = Limit value - Emission Level.
- The emission levels of other frequencies are very lower than the limit and not show in test report.
- Only the antenna height (from 1m to 4m) at maximum reading are recorded.

**For 1GHz to 40 GHz**

U-NII-1_802.11a_5180MHz-Ant2									
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)	Polarity	Detector
5150.00	46.61	68.20	-21.59	1.60	210	46.17	0.44	Horizontal	Peak
5150.00	38.14	54.00	-15.86	1.60	210	37.70	0.44	Horizontal	Average
10360.00	53.47	68.20	-14.73	1.60	210	43.01	10.46	Horizontal	Peak
10360.00	44.01	54.00	-9.99	1.60	210	33.55	10.46	Horizontal	Average
5150.00	46.31	68.20	-21.89	1.50	180	45.87	0.44	Vertical	Peak
5150.00	38.36	54.00	-15.64	1.50	180	37.92	0.44	Vertical	Average
10360.00	52.70	68.20	-15.50	1.50	180	42.24	10.46	Vertical	Peak
10360.00	44.39	54.00	-9.61	1.50	180	33.93	10.46	Vertical	Average
U-NII-1_802.11a_5240MHz-Ant2									
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)	Polarity	Detector
5350.00	45.39	68.20	-22.81	1.60	210	45.14	0.25	Horizontal	Peak
5350.00	37.32	54.00	-16.68	1.60	210	37.07	0.25	Horizontal	Average
10480.00	53.39	68.20	-14.81	1.60	210	42.39	11.00	Horizontal	Peak
10480.00	43.94	54.00	-10.06	1.60	210	32.94	11.00	Horizontal	Average
5350.00	45.62	68.20	-22.58	1.50	180	45.37	0.25	Vertical	Peak
5350.00	37.17	54.00	-16.83	1.50	180	36.92	0.25	Vertical	Average
10480.00	52.84	68.20	-15.36	1.50	180	41.84	11.00	Vertical	Peak
10480.00	44.41	54.00	-9.59	1.50	180	33.41	11.00	Vertical	Average
Remark: 1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m) 2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) - Pre-Amplifier Factor(dB) 3. Margin value = Emission Level – Limit value 4. The emission levels of other frequencies are very lower than the limit and not show in test report.									

**U-NII-1_802.11n-HT40_5190MHz-MIMO**

Frequency (MHz)	Emssion Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)	Polarity	Detector
5150.00	46.51	68.20	-21.69	1.60	210	46.07	0.44	Horizontal	Peak
5150.00	37.64	54.00	-16.36	1.60	210	37.20	0.44	Horizontal	Average
10380.00	53.69	68.20	-14.51	1.60	210	43.16	10.53	Horizontal	Peak
10380.00	44.33	54.00	-9.67	1.60	210	33.80	10.53	Horizontal	Average
5150.00	46.65	68.20	-21.55	1.50	180	46.21	0.44	Vertical	Peak
5150.00	38.21	54.00	-15.79	1.50	180	37.77	0.44	Vertical	Average
10380.00	52.74	68.20	-15.46	1.50	180	42.21	10.53	Vertical	Peak
10380.00	44.32	54.00	-9.68	1.50	180	33.79	10.53	Vertical	Average

U-NII-1_802.11n-HT40_5230MHz-MIMO

Frequency (MHz)	Emssion Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)	Polarity	Detector
5350.00	45.56	68.20	-22.64	1.60	210	45.31	0.25	Horizontal	Peak
5350.00	37.09	54.00	-16.91	1.60	210	36.84	0.25	Horizontal	Average
10460.00	53.87	68.20	-14.33	1.60	210	42.96	10.91	Horizontal	Peak
10460.00	44.43	54.00	-9.57	1.60	210	33.52	10.91	Horizontal	Average
5350.00	45.63	68.20	-22.57	1.50	180	45.38	0.25	Vertical	Peak
5350.00	36.67	54.00	-17.33	1.50	180	36.42	0.25	Vertical	Average
10460.00	53.30	68.20	-14.90	1.50	180	42.39	10.91	Vertical	Peak
10460.00	43.99	54.00	-10.01	1.50	180	33.08	10.91	Vertical	Average

Remark:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) - Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

**U-NII-1_802.11ac-VHT80_5210MHz-MIMO**

Frequency (MHz)	Emssion Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)	Polarity	Detector
5150.00	46.44	68.20	-21.76	1.60	210	46.00	0.44	Horizontal	Peak
5150.00	37.25	54.00	-16.75	1.60	210	36.81	0.44	Horizontal	Average
5350.00	45.59	68.20	-22.61	1.60	210	45.34	0.25	Horizontal	Peak
5350.00	37.41	54.00	-16.59	1.60	210	37.16	0.25	Horizontal	Average
10420.00	53.61	68.20	-14.59	1.60	210	42.90	10.71	Horizontal	Peak
10420.00	44.91	54.00	-9.09	1.60	210	34.20	10.71	Horizontal	Average
5150.00	46.59	68.20	-21.61	1.50	180	46.15	0.44	Vertical	Peak
5150.00	38.26	54.00	-15.74	1.50	180	37.82	0.44	Vertical	Average
5350.00	46.03	68.20	-22.17	1.50	180	45.78	0.25	Vertical	Peak
5350.00	36.78	54.00	-17.22	1.50	180	36.53	0.25	Vertical	Average
10420.00	53.61	68.20	-14.59	1.50	180	42.90	10.71	Vertical	Peak
10420.00	44.12	54.00	-9.88	1.50	180	33.41	10.71	Vertical	Average

Remark:

1. *Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)*
2. *Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) - Pre-Amplifier Factor(dB)*
3. *Margin value = Emission Level – Limit value*
4. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

**U-NII-3_802.11a_5745MHz-Ant2**

Frequency (MHz)	Emssion Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)	Polarity	Detector
5650.00	51.42	68.20	-16.78	1.40	230	50.62	0.80	Horizontal	Peak
5700.00	52.42	105.20	-52.78	1.40	230	51.18	1.24	Horizontal	Peak
5720.00	51.74	110.80	-59.06	1.40	230	50.46	1.28	Horizontal	Peak
5725.00	52.02	122.20	-70.18	1.40	230	50.72	1.30	Horizontal	Peak
11490.00	53.09	68.20	-15.11	1.40	230	41.54	11.55	Horizontal	Peak
11490.00	43.50	54.00	-10.50	1.40	230	31.95	11.55	Horizontal	Average
5650.00	50.37	68.20	-17.83	1.50	180	49.57	0.80	Vertical	Peak
5700.00	51.59	105.20	-53.61	1.50	180	50.35	1.24	Vertical	Peak
5720.00	53.09	110.80	-57.71	1.50	180	51.81	1.28	Vertical	Peak
5725.00	51.70	122.20	-70.50	1.50	180	50.40	1.30	Vertical	Peak
11490.00	53.93	68.20	-14.27	1.50	180	42.38	11.55	Vertical	Peak
11490.00	43.77	54.00	-10.23	1.50	180	32.22	11.55	Vertical	Average

U-NII-3_802.11a_5825MHz-Ant2

Frequency (MHz)	Emssion Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)	Polarity	Detector
5850.00	51.15	122.20	-71.05	1.40	230	49.33	1.82	Horizontal	Peak
5855.00	53.98	110.80	-56.82	1.40	230	52.13	1.85	Horizontal	Peak
5875.00	51.17	105.20	-54.03	1.40	230	49.19	1.98	Horizontal	Peak
5925.00	52.28	68.20	-15.92	1.40	230	50.16	2.12	Horizontal	Peak
11650.00	53.55	68.20	-14.65	1.40	230	41.91	11.64	Horizontal	Peak
11650.00	43.38	54.00	-10.62	1.40	230	31.74	11.64	Horizontal	Average
5850.00	51.50	122.20	-70.70	1.50	180	49.68	1.82	Vertical	Peak
5855.00	51.63	110.80	-59.17	1.50	180	49.78	1.85	Vertical	Peak
5875.00	52.42	105.20	-52.78	1.50	180	50.44	1.98	Vertical	Peak
5925.00	52.01	68.20	-16.19	1.50	180	49.89	2.12	Vertical	Peak
11650.00	53.89	68.20	-14.31	1.50	180	42.25	11.64	Vertical	Peak
11650.00	43.89	54.00	-10.11	1.50	180	32.25	11.64	Vertical	Average

Remark:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) - Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

**U-NII-3_802.11n-HT40_5755MHz-MIMO**

Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)	Polarity	Detector
5650.00	51.50	68.20	-16.70	1.40	230	50.70	0.80	Horizontal	Peak
5700.00	52.64	105.20	-52.56	1.40	230	51.40	1.24	Horizontal	Peak
5720.00	52.16	110.80	-58.64	1.40	230	50.88	1.28	Horizontal	Peak
5725.00	52.51	122.20	-69.69	1.40	230	51.21	1.30	Horizontal	Peak
11510.00	53.05	68.20	-15.15	1.40	230	41.49	11.56	Horizontal	Peak
11510.00	43.24	54.00	-10.76	1.40	230	31.68	11.56	Horizontal	Average
5650.00	50.07	68.20	-18.13	1.50	180	49.27	0.80	Vertical	Peak
5700.00	51.17	105.20	-54.03	1.50	180	49.93	1.24	Vertical	Peak
5720.00	53.28	110.80	-57.52	1.50	180	52.00	1.28	Vertical	Peak
5725.00	51.56	122.20	-70.64	1.50	180	50.26	1.30	Vertical	Peak
11510.00	53.49	68.20	-14.71	1.50	180	41.93	11.56	Vertical	Peak
11510.00	43.77	54.00	-10.23	1.50	180	32.21	11.56	Vertical	Average

U-NII-3_802.11n-HT40_5795MHz-MIMO

Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)	Polarity	Detector
5850.00	51.26	122.20	-70.94	1.40	230	49.44	1.82	Horizontal	Peak
5855.00	54.19	110.80	-56.61	1.40	230	52.34	1.85	Horizontal	Peak
5875.00	51.30	105.20	-53.90	1.40	230	49.32	1.98	Horizontal	Peak
5925.00	52.39	68.20	-15.81	1.40	230	50.27	2.12	Horizontal	Peak
11590.00	53.24	68.20	-14.96	1.40	230	41.73	11.51	Horizontal	Peak
11590.00	43.09	54.00	-10.91	1.40	230	31.58	11.51	Horizontal	Average
5850.00	51.87	122.20	-70.33	1.50	180	50.05	1.82	Vertical	Peak
5855.00	51.51	110.80	-59.29	1.50	180	49.66	1.85	Vertical	Peak
5875.00	52.75	105.20	-52.45	1.50	180	50.77	1.98	Vertical	Peak
5925.00	51.80	68.20	-16.40	1.50	180	49.68	2.12	Vertical	Peak
11590.00	54.30	68.20	-13.90	1.50	180	42.79	11.51	Vertical	Peak
11590.00	44.11	54.00	-9.89	1.50	180	32.60	11.51	Vertical	Average

Remark:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) - Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

U-NII-3_802.11ac-VHT80_5775MHz-MIMO

Frequency (MHz)	Emssion Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)	Polarity	Detector
5650.00	51.02	68.20	-17.18	1.40	230	50.22	0.80	Horizontal	Peak
5700.00	52.80	105.20	-52.40	1.40	230	51.56	1.24	Horizontal	Peak
5720.00	52.42	110.80	-58.38	1.40	230	51.14	1.28	Horizontal	Peak
5725.00	52.87	122.20	-69.33	1.40	230	51.57	1.30	Horizontal	Peak
5850.00	50.84	122.20	-71.36	1.40	230	49.02	1.82	Horizontal	Peak
5855.00	54.65	110.80	-56.15	1.40	230	52.80	1.85	Horizontal	Peak
5875.00	51.09	105.20	-54.11	1.40	230	49.11	1.98	Horizontal	Peak
5925.00	52.67	68.20	-15.53	1.40	230	50.55	2.12	Horizontal	Peak
11550.00	53.51	68.20	-14.69	1.40	230	41.97	11.54	Horizontal	Peak
11550.00	43.49	54.00	-10.51	1.40	230	31.95	11.54	Horizontal	Average
5650.00	50.00	68.20	-18.20	1.50	180	49.20	0.80	Vertical	Peak
5700.00	50.99	105.20	-54.21	1.50	180	49.75	1.24	Vertical	Peak
5720.00	52.85	110.80	-57.95	1.50	180	51.57	1.28	Vertical	Peak
5725.00	51.10	122.20	-71.10	1.50	180	49.80	1.30	Vertical	Peak
5850.00	52.33	122.20	-69.87	1.50	180	50.51	1.82	Vertical	Peak
5855.00	51.03	110.80	-59.77	1.50	180	49.18	1.85	Vertical	Peak
5875.00	53.10	105.20	-52.10	1.50	180	51.12	1.98	Vertical	Peak
5925.00	51.63	68.20	-16.57	1.50	180	49.51	2.12	Vertical	Peak
11550.00	54.69	68.20	-13.51	1.50	180	43.15	11.54	Vertical	Peak
11550.00	44.36	54.00	-9.64	1.50	180	32.82	11.54	Vertical	Average

Remark:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) - Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

2.7. AC Power Line Conducted Emission

2.7.1. Limit of AC Power Line Conducted Emission

FCC Part 15.207:

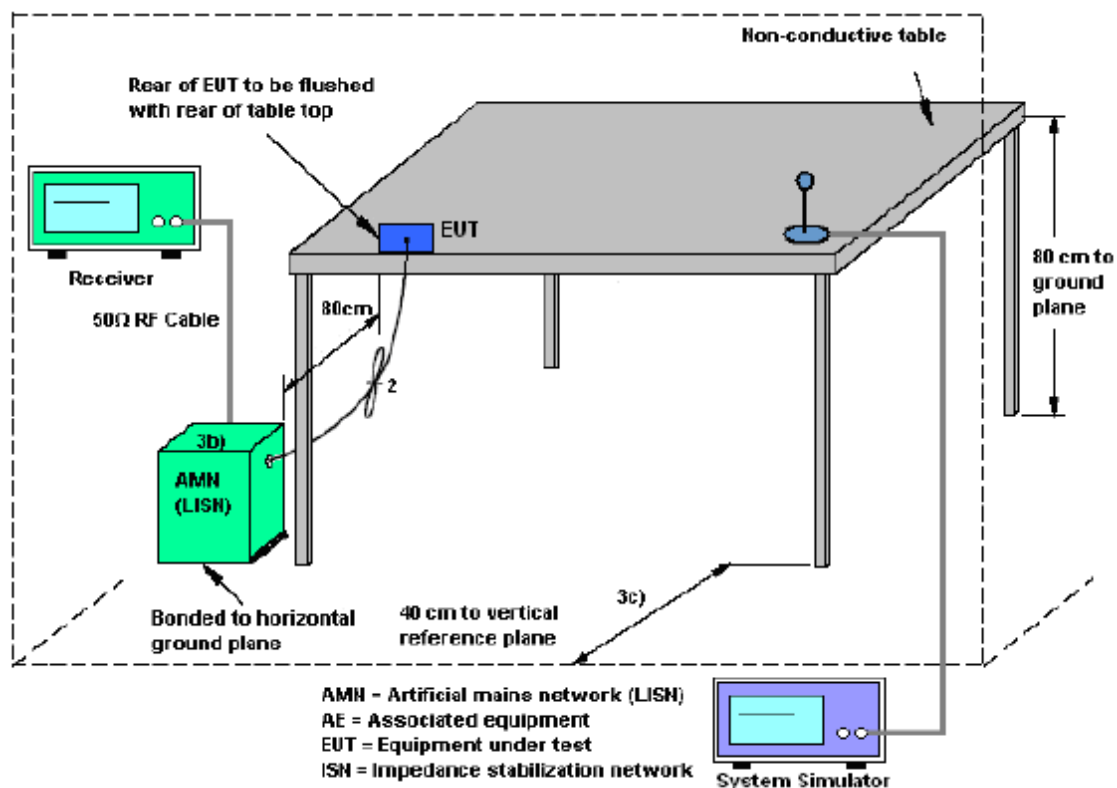
For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency range (MHz)	Conducted Limit (dB μ V)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

2.7.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.7.3. Test Setup



2.7.4. Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

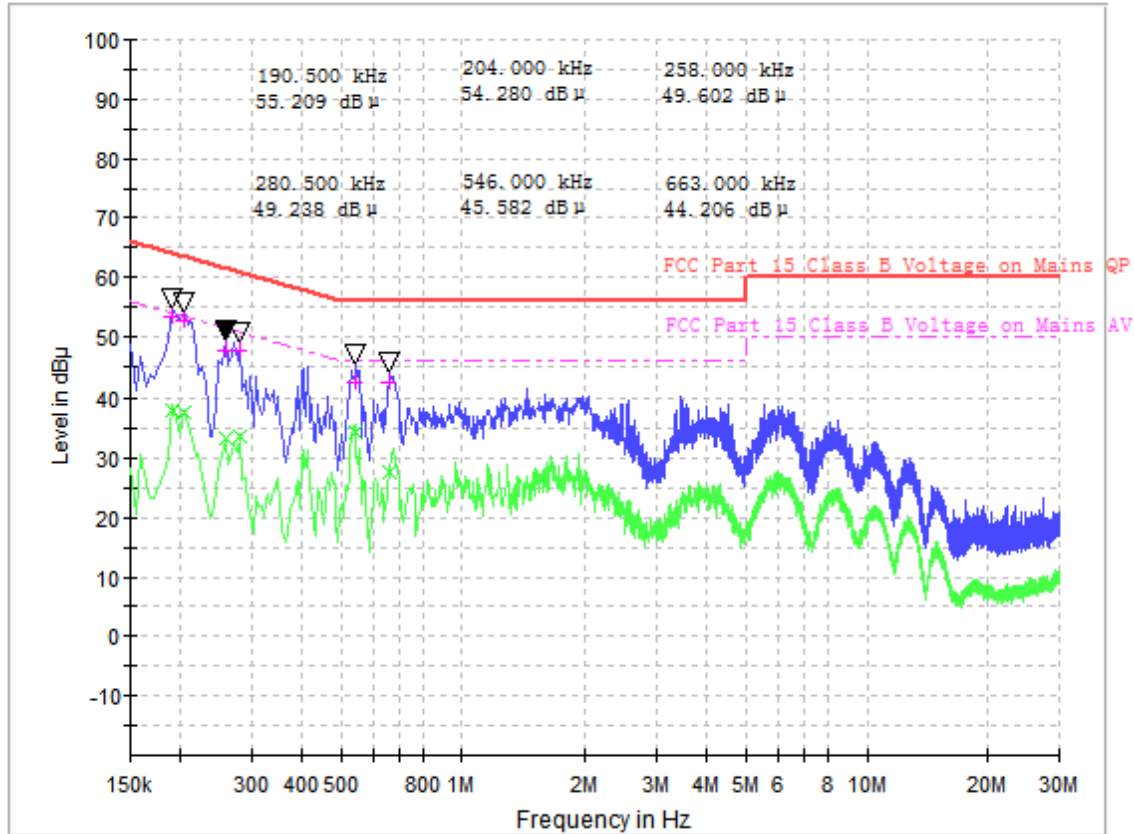
2.7.5. Test Result of AC Power Line Conducted Emission

NOTE 1: The EUT configuration of the emission tests is 5G WLAN Link + USB Cable (Charging from Adapter).

NOTE 2: All of the EUT Configure mode were tested and found 802.11a 5745MHz (Ant2) channel is the worst mode, the worst case is recorded in this report.

Project Information

Test site:	Shield ROOM 2	Environment:	Temp: 23°C; Humi:53%;101kPa
Operator:	LI QINGLONG	Test Date:	2024.09.14
Test Mode:	5G WIFI - TX	Test Part:	L



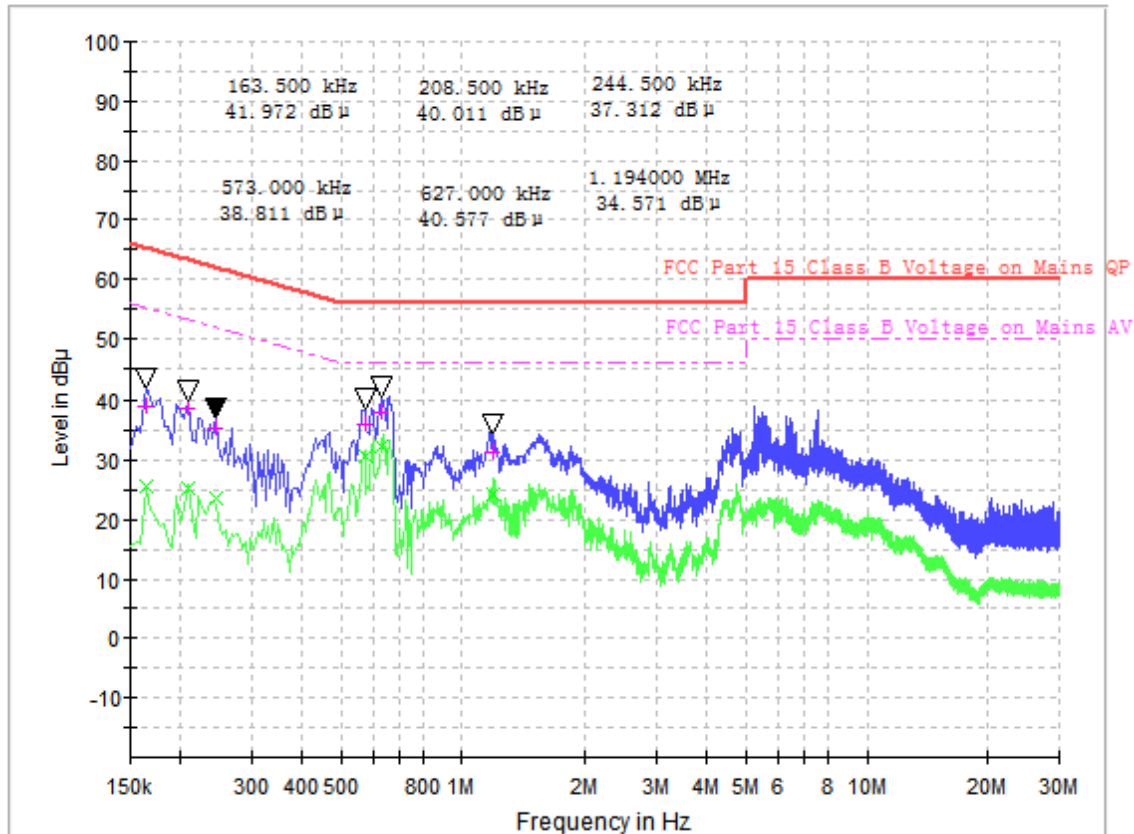
Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Corr.Factor (dB)	Margin - QPK	Limit - QPK (dBμV)	Margin - AV (dB)	Limit - AV (dBμV)
0.190500	53.37	37.83	10.5	10.64	64.0	16.18	54.0
0.204000	52.59	37.81	10.6	10.86	63.4	15.64	53.4
0.258000	47.57	33.40	10.6	13.93	61.5	18.10	51.5
0.280500	47.82	33.54	10.4	12.98	60.8	17.26	50.8
0.546000	42.26	34.18	10.4	13.74	56.0	11.82	46.0
0.663000	42.35	27.58	10.3	13.65	56.0	18.42	46.0

Test Result : Pass

Note: Final Level = Receiver Read level + Correction factor.

Project Information

Test site:	Shield ROOM 2	Environment:	Temp: 23℃; Humi:53%;101kPa
Operator:	LI QINGLONG	Test Date:	2024.09.14
Test Mode:	5G WIFI - TX	Test Part:	N



Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Corr.Factor (dB)	Margin - QPK	Limit - QPK (dBμV)	Margin - AV (dB)	Limit - AV (dBμV)
0.163500	39.11	25.43	10.7	26.17	65.3	29.85	55.3
0.208500	38.82	25.31	10.9	24.44	63.3	27.95	53.3
0.244500	35.28	23.55	11.0	26.66	61.9	28.39	51.9
0.573000	36.08	30.78	10.5	19.92	56.0	15.22	46.0
0.627000	37.99	32.33	10.5	18.01	56.0	13.67	46.0
1.194000	31.40	24.17	10.4	24.60	56.0	21.83	46.0

Test Result : Pass

Note: Final Level = Receiver Read level + Correction factor.

3. List of measuring equipment

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	5M Anechoic Chamber	Albatross	SAC-5MAC 12.8x6.8x6.4m	A0304210	2022.06.09	2025.06.08
2	EMI Test Receiver	ROHDE&SCHWARZ	ESW26	A180502935	2024.05.23	2025.05.22
3	Loop Antenna	Schwarz beck	HFH2-Z2	A0304220	2022.05.02	2025.05.01
4	Broadband antenna (30MHz~1GHz)	R&S	HL562	A0304224	2023.06.08	2026.06.07
5	EMI Horn Ant. (1-18G)	ETC	MCTD-1209	A150402241	2023.05.16	2026.05.15
6	Horn antenna (18GHz~26.5GHz)	AR	AT4510	A0804450	2023.06.01	2026.05.31
7	Amplifier 30M~1GHz	MILMEGA	80RF1000-10004	A140101634	2023.10.20	2024.10.19
8	Amplifier 1G~18GHz	MILMEGA	AS0104R-800/400	A160302517	2023.10.20	2024.10.19
9	Spectrum Analyzer	KEYSIGHT	N9030A	A160702554	2024.01.18	2025.01.17
10	Test Receiver	R&S	ESIB7	A0501375	2024.02.28	2025.02.27
11	Broadband Ant.	ETC	MCTD 2786	A150402240	2023.05.22	2026.05.21
12	3M Anechoic Chamber	Albatross	SAC-3MAC 9*6*6m	A0412375	2024.02.27	2027.02.26
13	Temperature chamber	ESPEC	SU-642	A150802409	2024.02.22	2025.02.21
14	Test Receiver	KEYSIGHT	N9038A	A141202036	2024.06.05	2025.06.04
15	LISN	ROHDE&SCHWARZ	ENV216	A140701847	2024.05.23	2025.05.22

4. Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2020. All the measurement uncertainty value were shown with a coverage $K=2$ to indicate 95% level of confidence . The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

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

Measuring Uncertainty for a level of confidence of 95%($U=2U_c(y)$)	2.8dB
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Uncertainty of Radiated Emission Measurement (9kHz~30MHz)

Measuring Uncertainty for a level of confidence of 95%($U=2U_c(y)$)	3.5dB
--	-------

Uncertainty of Radiated Emission Measurement (30MHz~1GHz)

Measuring Uncertainty for a level of confidence of 95%($U=2U_c(y)$)	3.91dB
--	--------

Uncertainty of Radiated Emission Measurement (1GHz~18GHz)

Measuring Uncertainty for a level of confidence of 95%($U=2U_c(y)$)	4.5dB
--	-------

Uncertainty of Radiated Emission Measurement (18GHz~40GHz)

Measuring Uncertainty for a level of confidence of 95%($U=2U_c(y)$)	4.9dB
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Uncertainty of RF Conducted Measurement (9kHz~40GHz)

Measuring Uncertainty for a level of confidence of 95%($U=2U_c(y)$)	1.2dB
--	-------



Appendix A

Duty Cycle Test Result and Data

U-NII-1						
Test Mode	Antenna	Frequency[MHz]	ON Time[ms]	Period[ms]	Duty Cycle[%]	DC Factor
11A	Ant1	5180	2.10	2.12	99.06	0.04
11N20SISO	Ant1	5180	5.42	5.45	99.45	0.02
11N40SISO	Ant1	5190	5.43	5.44	99.82	0.01
11AC20SISO	Ant1	5180	5.43	5.45	99.63	0.02
11AC40SISO	Ant1	5190	5.42	5.45	99.45	0.02
11AC80SISO	Ant1	5210	5.42	5.45	99.45	0.02

U-NII-3						
Test Mode	Antenna	Frequency[MHz]	ON Time[ms]	Period[ms]	Duty Cycle[%]	DC Factor
11A	Ant1	5745	2.09	2.11	99.05	0.04
11N20SISO	Ant1	5745	5.42	5.45	99.45	0.02
11N40SISO	Ant1	5755	5.42	5.44	99.63	0.02
11AC20SISO	Ant1	5745	5.42	5.45	99.45	0.02
11AC40SISO	Ant1	5755	5.43	5.45	99.63	0.02
11AC80SISO	Ant1	5775	5.43	5.45	99.63	0.02
11A(5MHZ)	Ant1	5745.5	8.38	8.44	99.29	0.03
11A(10MHZ)	Ant1	5745	4.19	4.22	99.29	0.03

Note: Duty cycle 2TX is the same as 1TX.

Output power Test Result and Data

U-NII-1 AVGSA Output Power							
Test Mode	Antenna	Frequency [MHz]	Average power [dBm]	DC Factor [dBm]	Result [dBm]	Limit [dBm]	Verdict
11A	Ant1	5180	14.52	0.04	14.56	≤23.98	PASS
11A	Ant2	5180	16.06	0.04	16.10	≤23.98	PASS
11A	Ant1	5200	14.45	0.04	14.49	≤23.98	PASS
11A	Ant2	5200	16.35	0.04	16.39	≤23.98	PASS
11A	Ant1	5240	14.38	0.04	14.42	≤23.98	PASS
11A	Ant2	5240	15.84	0.04	15.88	≤23.98	PASS
11N20MIMO	Ant1	5180	10.23	0.02	10.25	≤23.98	PASS
11N20MIMO	Ant2	5180	9.75	0.02	9.77	≤23.98	PASS
11N20MIMO	total	5180	13.01	0.02	13.03	≤23.98	PASS
11N20MIMO	Ant1	5200	10.18	0.02	10.20	≤23.98	PASS
11N20MIMO	Ant2	5200	9.55	0.02	9.57	≤23.98	PASS
11N20MIMO	total	5200	12.89	0.02	12.91	≤23.98	PASS
11N20MIMO	Ant1	5240	10.06	0.02	10.08	≤23.98	PASS
11N20MIMO	Ant2	5240	9.47	0.02	9.49	≤23.98	PASS
11N20MIMO	total	5240	12.79	0.02	12.81	≤23.98	PASS
11N40MIMO	Ant1	5190	10.89	0.01	10.90	≤23.98	PASS
11N40MIMO	Ant2	5190	10.21	0.01	10.22	≤23.98	PASS
11N40MIMO	total	5190	13.57	0.01	13.58	≤23.98	PASS
11N40MIMO	Ant1	5230	10.62	0.01	10.63	≤23.98	PASS
11N40MIMO	Ant2	5230	10.11	0.01	10.12	≤23.98	PASS
11N40MIMO	total	5230	13.38	0.01	13.39	≤23.98	PASS
11AC20MIMO	Ant1	5180	10.45	0.02	10.47	≤23.98	PASS
11AC20MIMO	Ant2	5180	9.69	0.02	9.71	≤23.98	PASS
11AC20MIMO	total	5180	13.10	0.02	13.12	≤23.98	PASS
11AC20MIMO	Ant1	5200	10.26	0.02	10.28	≤23.98	PASS
11AC20MIMO	Ant2	5200	9.63	0.02	9.65	≤23.98	PASS
11AC20MIMO	total	5200	12.97	0.02	12.99	≤23.98	PASS
11AC20MIMO	Ant1	5240	10.20	0.02	10.22	≤23.98	PASS
11AC20MIMO	Ant2	5240	9.52	0.02	9.54	≤23.98	PASS
11AC20MIMO	total	5240	12.88	0.02	12.90	≤23.98	PASS
11AC40MIMO	Ant1	5190	10.93	0.02	10.95	≤23.98	PASS
11AC40MIMO	Ant2	5190	10.23	0.02	10.25	≤23.98	PASS
11AC40MIMO	total	5190	13.60	0.02	13.62	≤23.98	PASS
11AC40MIMO	Ant1	5230	10.73	0.02	10.75	≤23.98	PASS
11AC40MIMO	Ant2	5230	10.12	0.02	10.14	≤23.98	PASS
11AC40MIMO	total	5230	13.45	0.02	13.47	≤23.98	PASS
11AC80MIMO	Ant1	5210	10.88	0.02	10.90	≤23.98	PASS



11AC80MIMO	Ant2	5210	10.14	0.02	10.16	≤23.98	PASS
11AC80MIMO	total	5210	13.54	0.02	13.56	≤23.98	PASS

U-NII-3 AVGSA Output Power

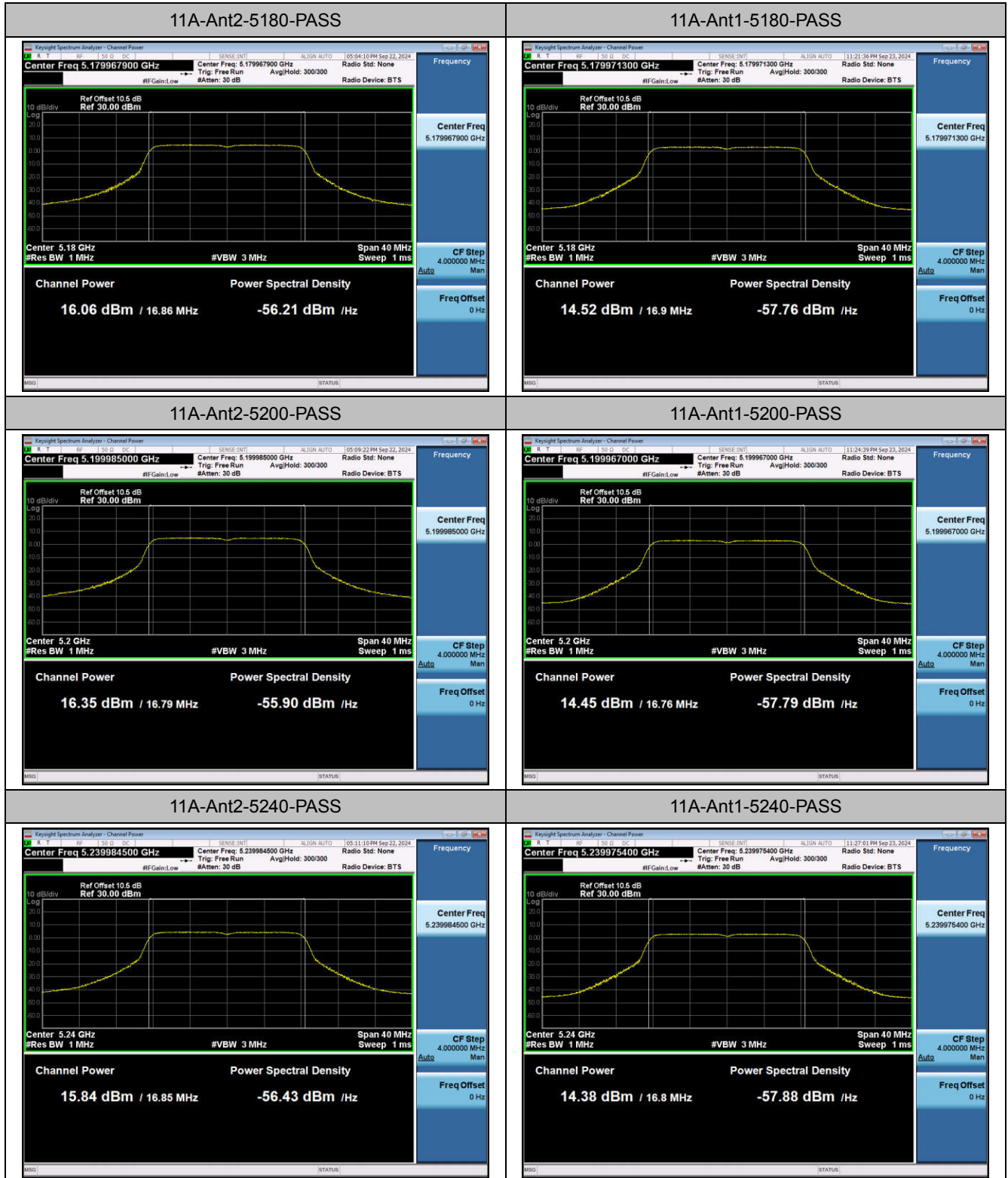
Test Mode	Antenna	Frequency [MHz]	Power [dBm]	DC Factor [dBm]	Result [dBm]	Power Limit [dBm]	Verdict
11A	Ant1	5745	14.67	0.04	14.71	≤30.0	PASS
11A	Ant2	5745	14.70	0.04	14.74	≤30.0	PASS
11A	Ant1	5785	14.14	0.04	14.18	≤30.0	PASS
11A	Ant2	5785	14.47	0.04	14.51	≤30.0	PASS
11A	Ant1	5825	14.33	0.04	14.37	≤30.0	PASS
11A	Ant2	5825	14.25	0.04	14.29	≤30.0	PASS
11N20MIMO	Ant1	5745	10.50	0.02	10.52	≤30.0	PASS
11N20MIMO	Ant2	5745	10.09	0.02	10.11	≤30.0	PASS
11N20MIMO	total	5745	13.31	0.02	13.33	≤30.0	PASS
11N20MIMO	Ant1	5785	10.39	0.02	10.41	≤30.0	PASS
11N20MIMO	Ant2	5785	9.85	0.02	9.87	≤30.0	PASS
11N20MIMO	total	5785	13.14	0.02	13.16	≤30.0	PASS
11N20MIMO	Ant1	5825	10.35	0.02	10.37	≤30.0	PASS
11N20MIMO	Ant2	5825	9.72	0.02	9.74	≤30.0	PASS
11N20MIMO	total	5825	13.06	0.02	13.08	≤30.0	PASS
11N40MIMO	Ant1	5755	11.13	0.02	11.15	≤30.0	PASS
11N40MIMO	Ant2	5755	10.56	0.02	10.58	≤30.0	PASS
11N40MIMO	total	5755	13.86	0.02	13.88	≤30.0	PASS
11N40MIMO	Ant1	5795	10.85	0.02	10.87	≤30.0	PASS
11N40MIMO	Ant2	5795	10.48	0.02	10.50	≤30.0	PASS
11N40MIMO	total	5795	13.68	0.02	13.70	≤30.0	PASS
11AC20MIMO	Ant1	5745	10.33	0.02	10.35	≤30.0	PASS
11AC20MIMO	Ant2	5745	10.00	0.02	10.02	≤30.0	PASS
11AC20MIMO	total	5745	13.18	0.02	13.20	≤30.0	PASS
11AC20MIMO	Ant1	5785	10.39	0.02	10.41	≤30.0	PASS
11AC20MIMO	Ant2	5785	9.86	0.02	9.88	≤30.0	PASS
11AC20MIMO	total	5785	13.14	0.02	13.16	≤30.0	PASS
11AC20MIMO	Ant1	5825	10.10	0.02	10.12	≤30.0	PASS
11AC20MIMO	Ant2	5825	9.70	0.02	9.72	≤30.0	PASS
11AC20MIMO	total	5825	12.91	0.02	12.93	≤30.0	PASS
11AC40MIMO	Ant1	5755	11.07	0.02	11.09	≤30.0	PASS
11AC40MIMO	Ant2	5755	10.65	0.02	10.67	≤30.0	PASS
11AC40MIMO	total	5755	13.88	0.02	13.90	≤30.0	PASS
11AC40MIMO	Ant1	5795	11.00	0.02	11.02	≤30.0	PASS
11AC40MIMO	Ant2	5795	10.50	0.02	10.52	≤30.0	PASS
11AC40MIMO	total	5795	13.77	0.02	13.79	≤30.0	PASS



11AC80MIMO	Ant1	5775	10.89	0.02	10.91	≤30.0	PASS
11AC80MIMO	Ant2	5775	10.53	0.02	10.55	≤30.0	PASS
11AC80MIMO	total	5775	13.72	0.02	13.74	≤30.0	PASS
11A(5MHZ)	Ant1	5745.5	14.45	0.03	14.48	≤30.00	PASS
11A(5MHZ)	Ant2	5745.5	14.59	0.03	14.62	≤30.00	PASS
11A(5MHZ)	Ant1	5785.5	13.60	0.03	13.63	≤30.00	PASS
11A(5MHZ)	Ant2	5785.5	14.01	0.03	14.04	≤30.00	PASS
11A(5MHZ)	Ant1	5825.5	14.19	0.03	14.22	≤30.00	PASS
11A(5MHZ)	Ant2	5825.5	14.23	0.03	14.26	≤30.00	PASS
11A(10MHZ)	Ant1	5745	14.30	0.03	14.33	≤30.00	PASS
11A(10MHZ)	Ant2	5745	14.60	0.03	14.63	≤30.00	PASS
11A(10MHZ)	Ant1	5785	14.29	0.03	14.32	≤30.00	PASS
11A(10MHZ)	Ant2	5785	14.07	0.03	14.10	≤30.00	PASS
11A(10MHZ)	Ant1	5825	14.23	0.03	14.26	≤30.00	PASS
11A(10MHZ)	Ant2	5825	14.44	0.03	14.47	≤30.00	PASS

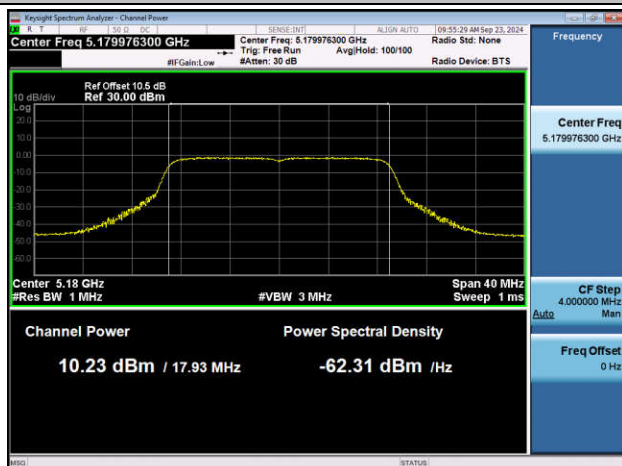
Test Graphs

U-NII-1:





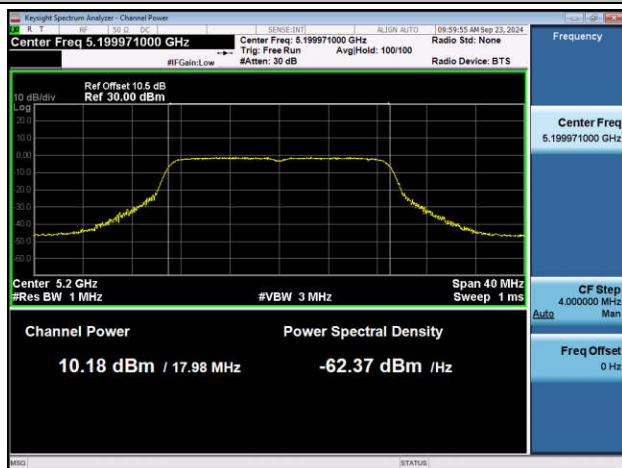
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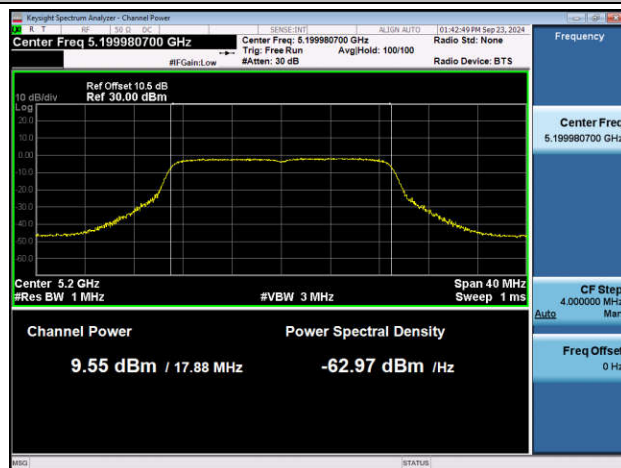
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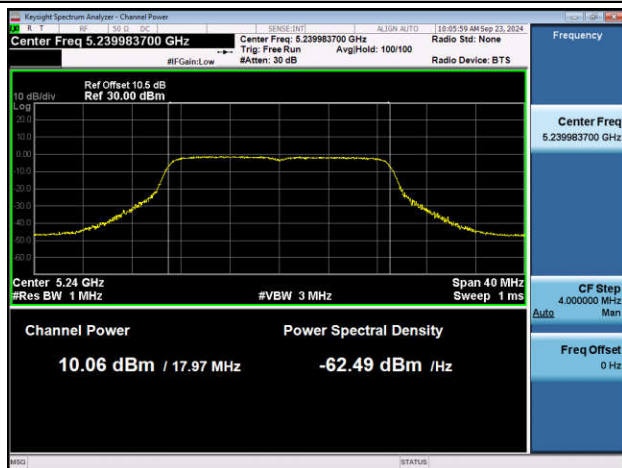
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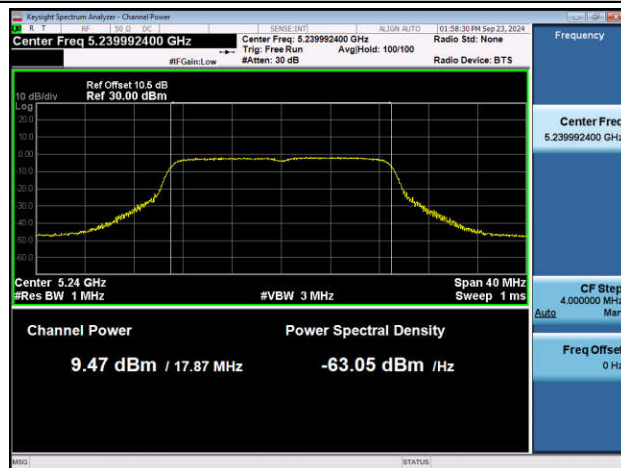
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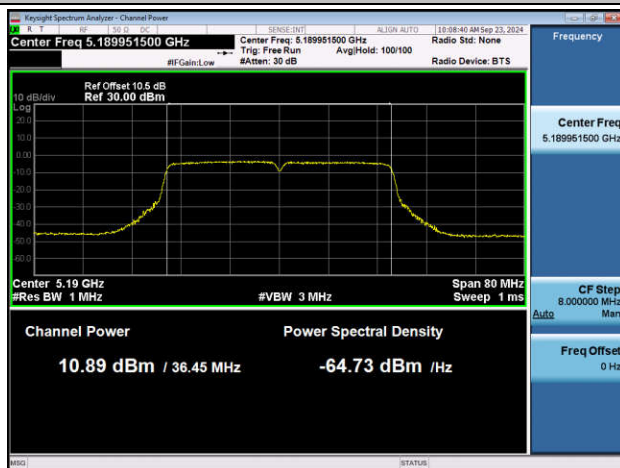
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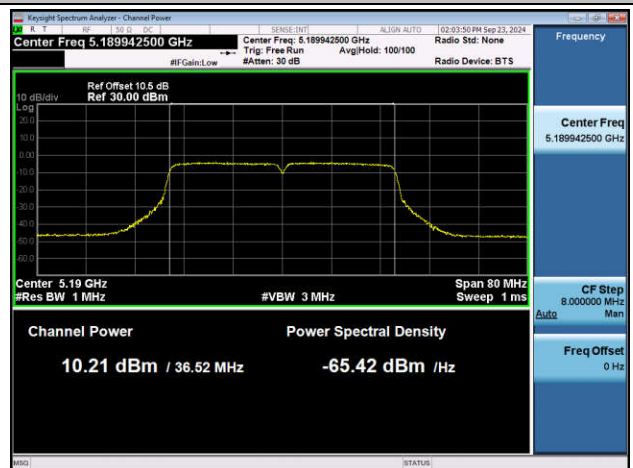
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11N40MIMO-Ant1-5190-PASS



11N40MIMO-Ant2-5190-PASS



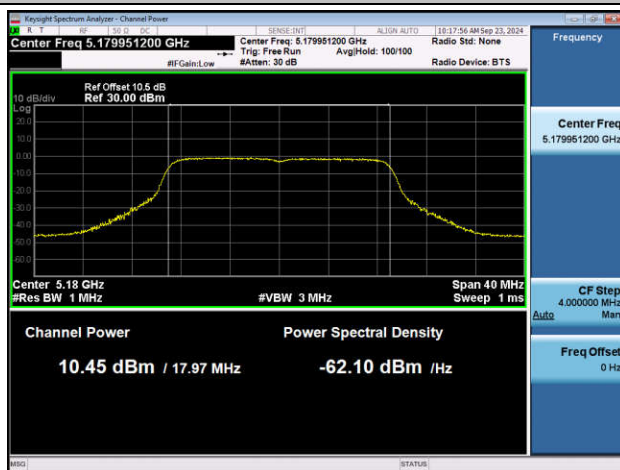
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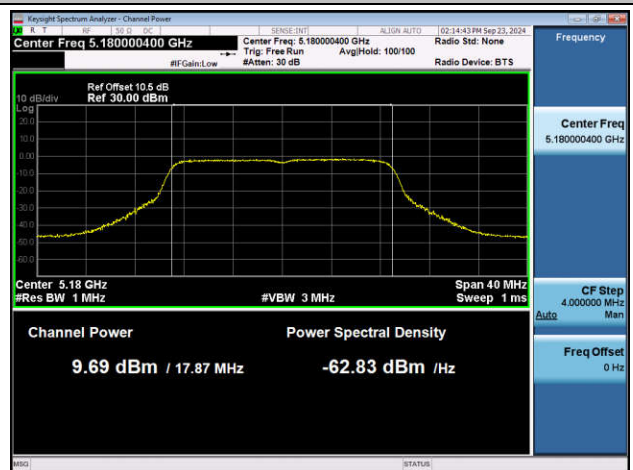
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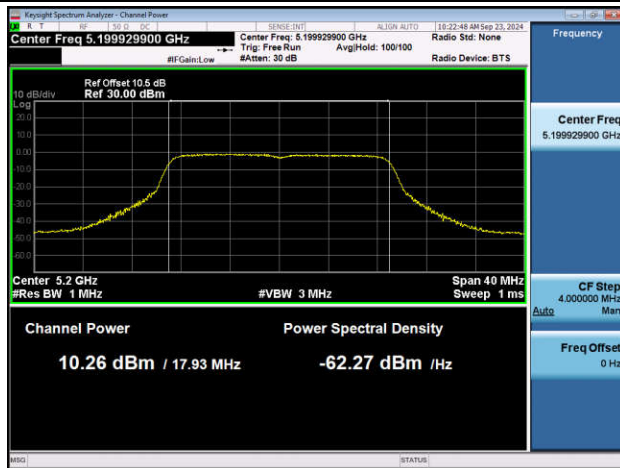
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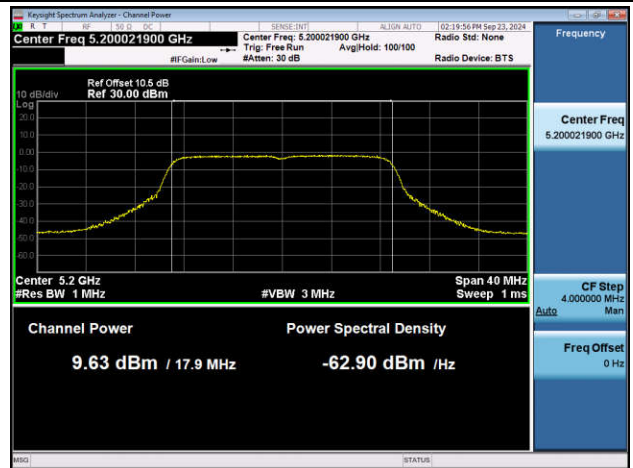
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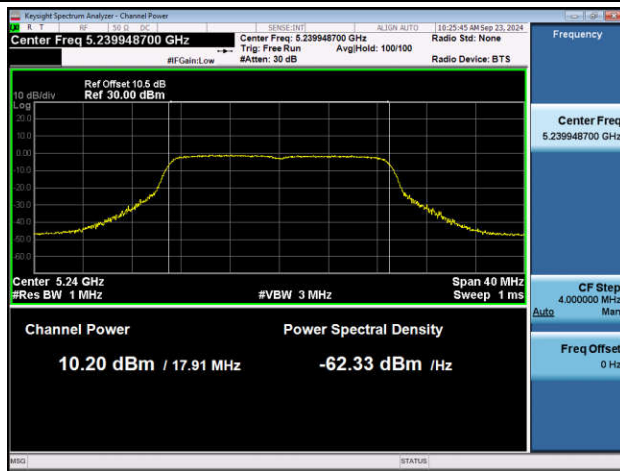
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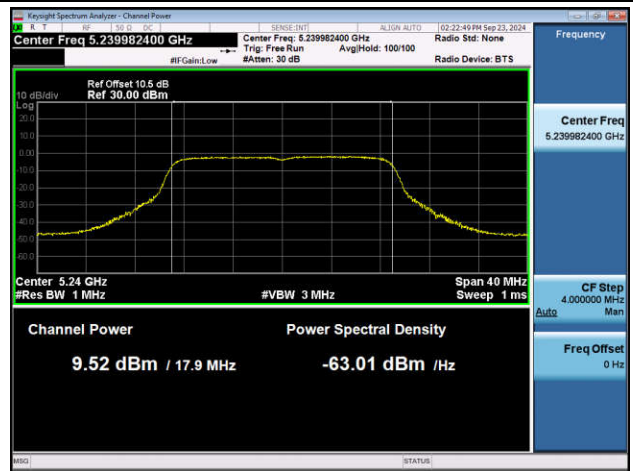
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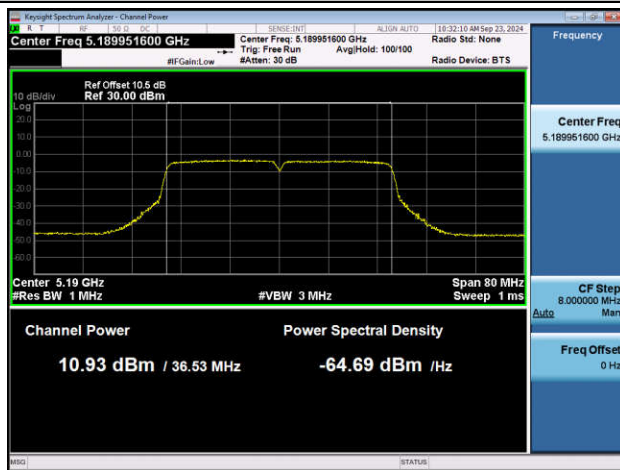
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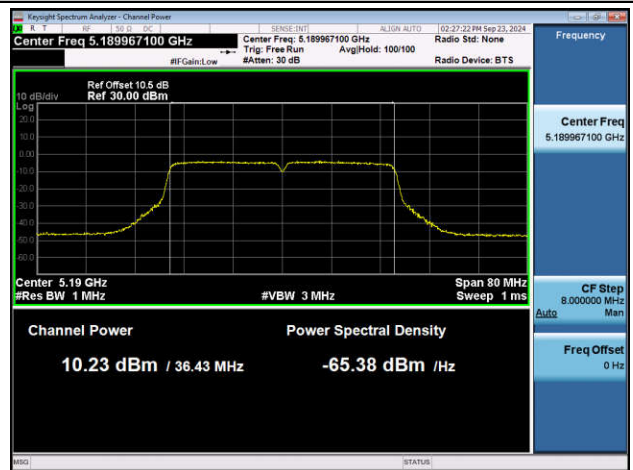
11AC20MIMO-Ant2-5240-PASS



11AC40MIMO-Ant1-5190-PASS

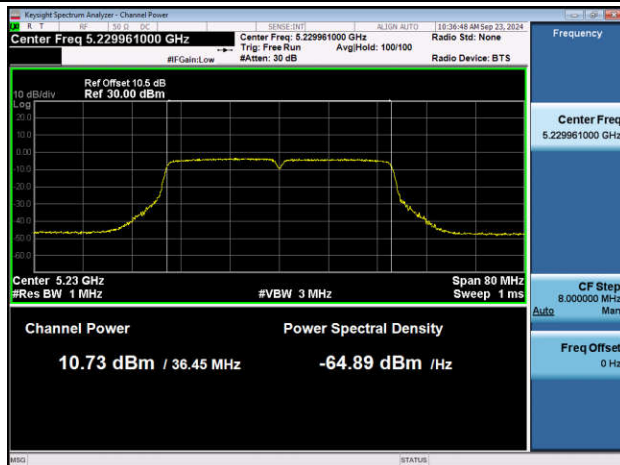


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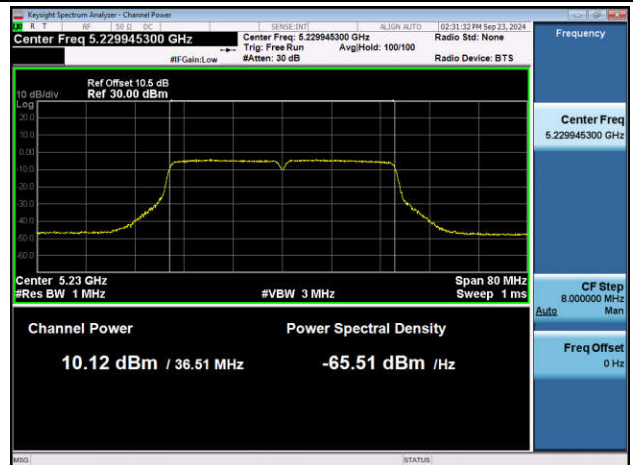




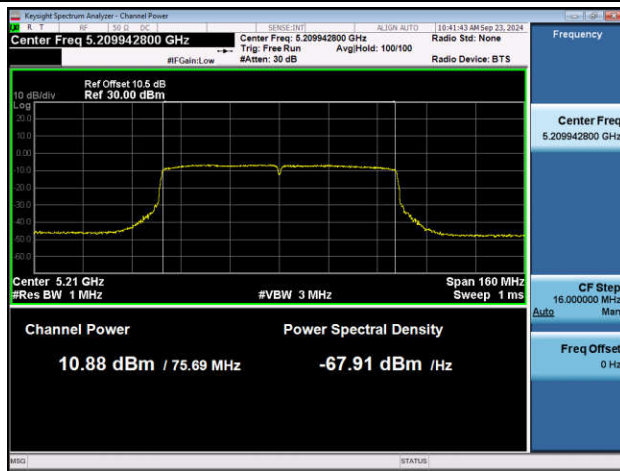
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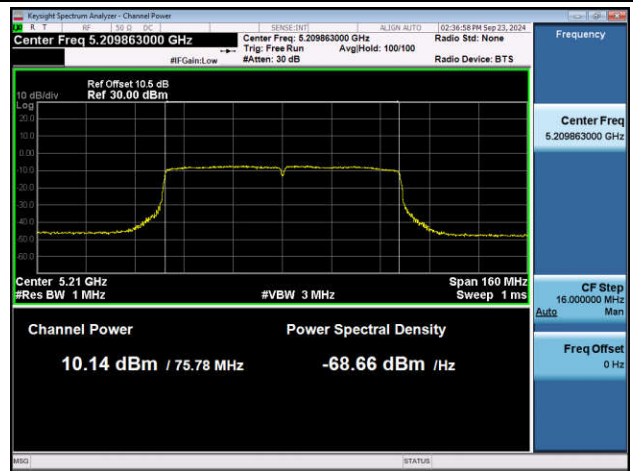
11AC40MIMO-Ant2-5230-PASS



11AC80MIMO-Ant1-5210-PASS



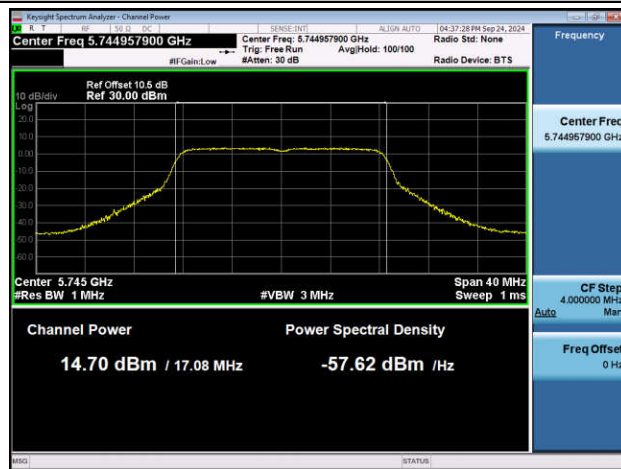
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U-NII-3:

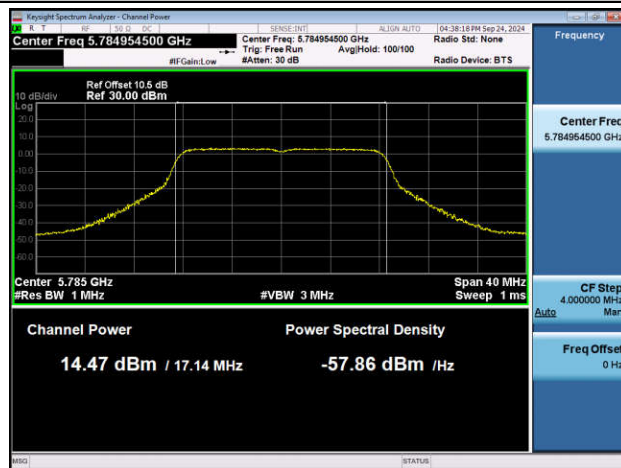
11A-Ant2-5745-PASS



11A-Ant1-5745-PASS



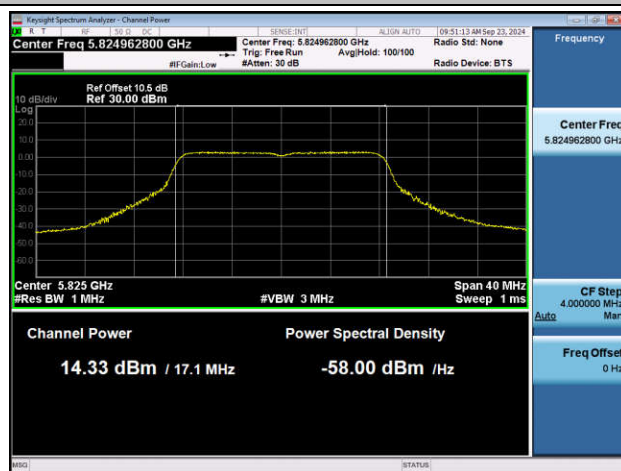
11A-Ant2-5785-PASS



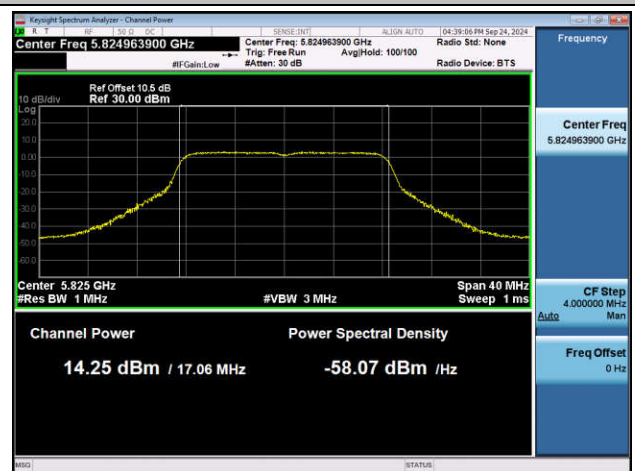
11A-Ant1-5785-PASS



11A-Ant1-5825-PASS

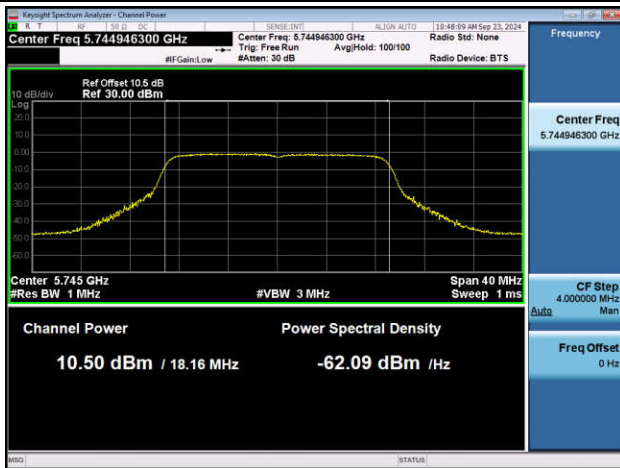


11A-Ant2-5825-PASS

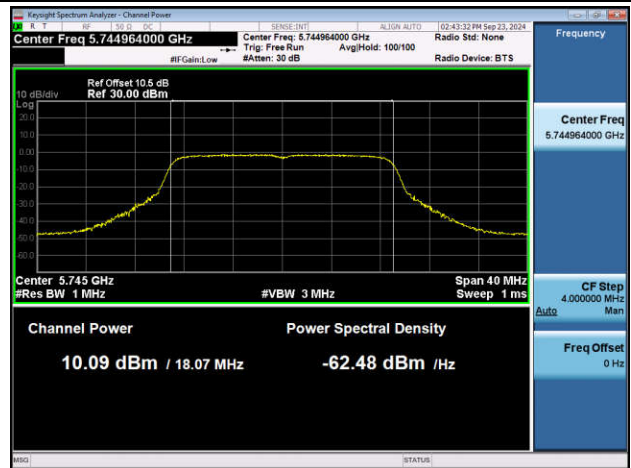




11N20MIMO-Ant1-5745-PASS



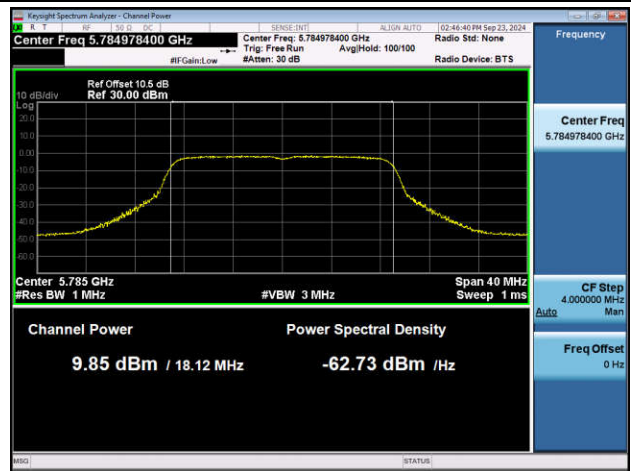
11N20MIMO-Ant2-5745-PASS



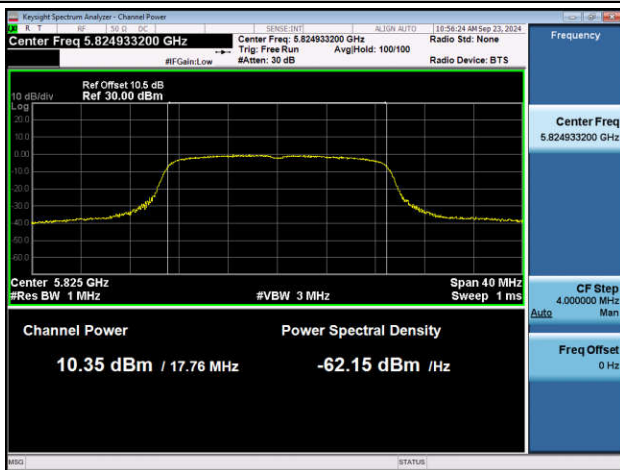
11N20MIMO-Ant1-5785-PASS



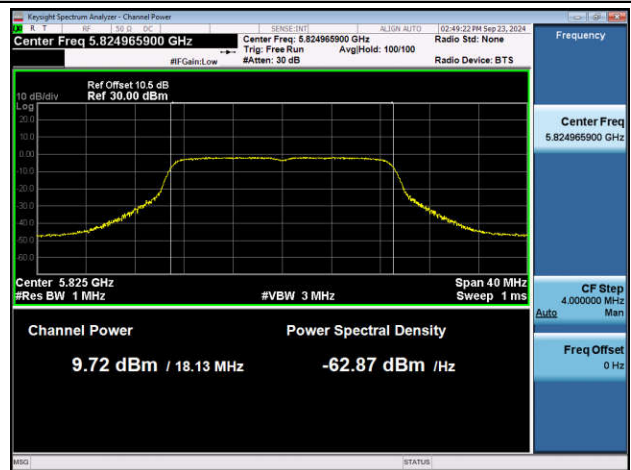
11N20MIMO-Ant2-5785-PASS



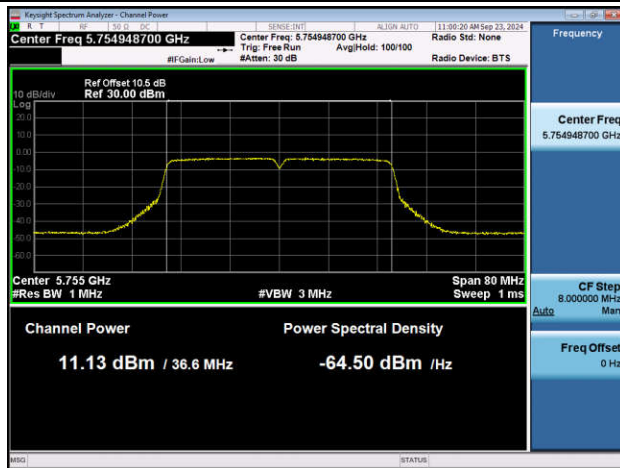
11N20MIMO-Ant1-5825-PASS



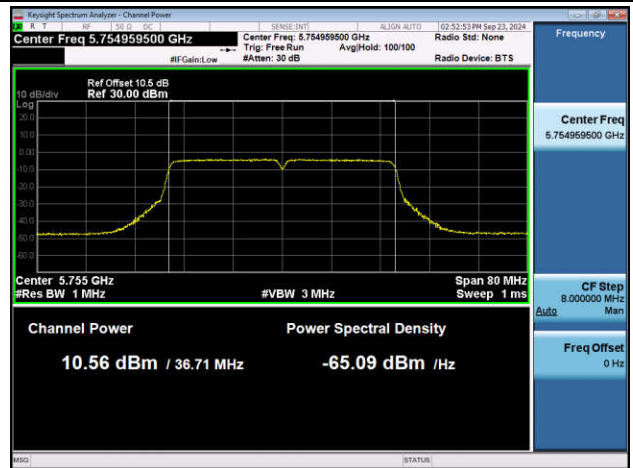
11N20MIMO-Ant2-5825-PASS



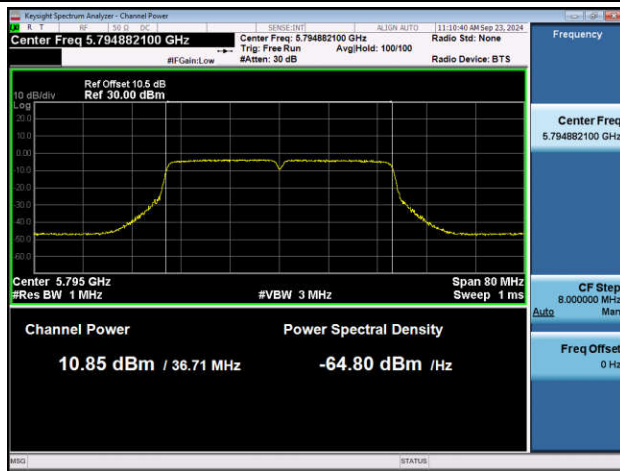
11N40MIMO-Ant1-5755-PASS



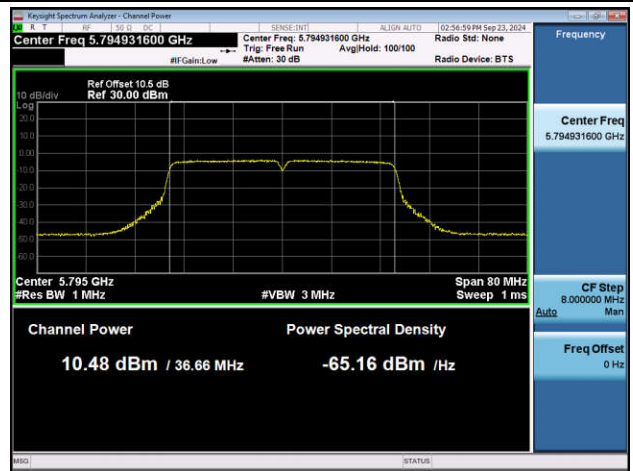
11N40MIMO-Ant2-5755-PASS



11N40MIMO-Ant1-5795-PASS



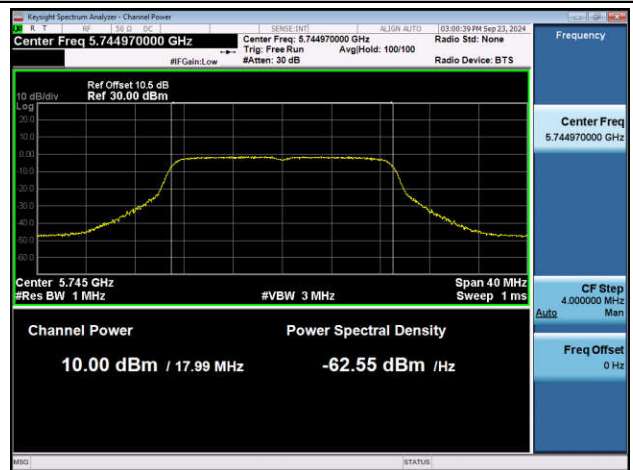
11N40MIMO-Ant2-5795-PASS



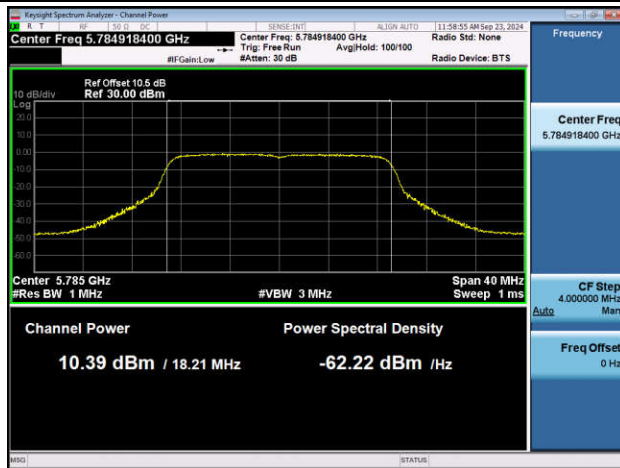
11AC20MIMO-Ant1-5745-PASS



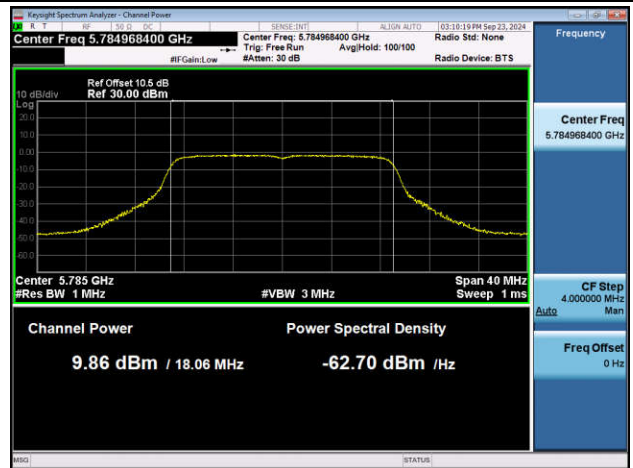
11AC20MIMO-Ant2-5745-PASS



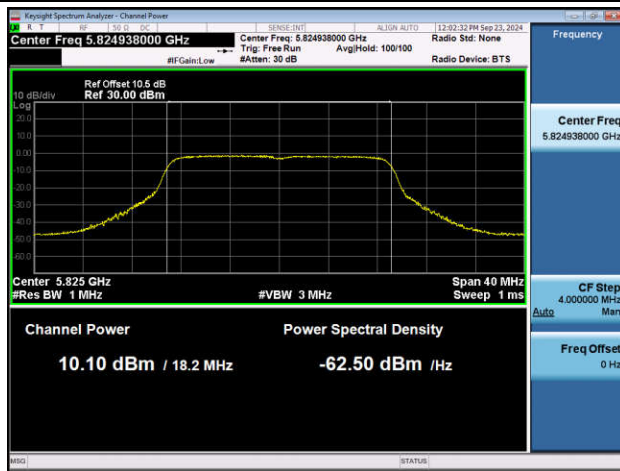
11AC20MIMO-Ant1-5785-PASS



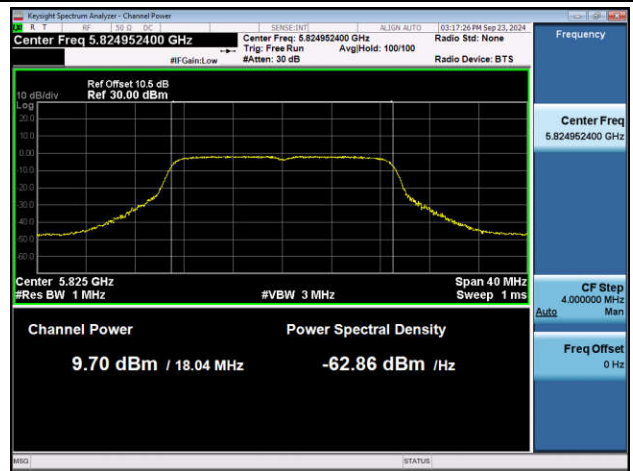
11AC20MIMO-Ant2-5785-PASS



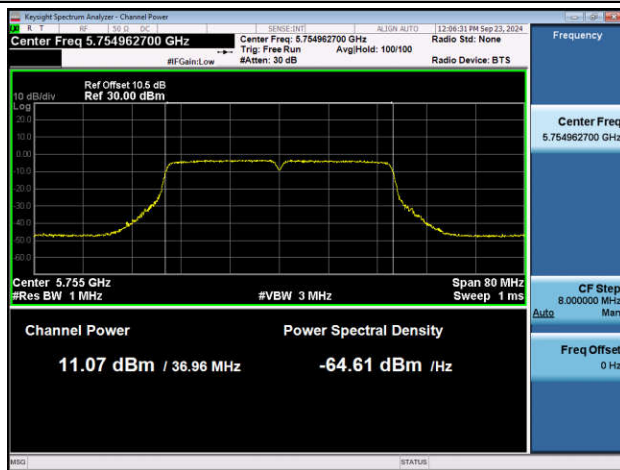
11AC20MIMO-Ant1-5825-PASS



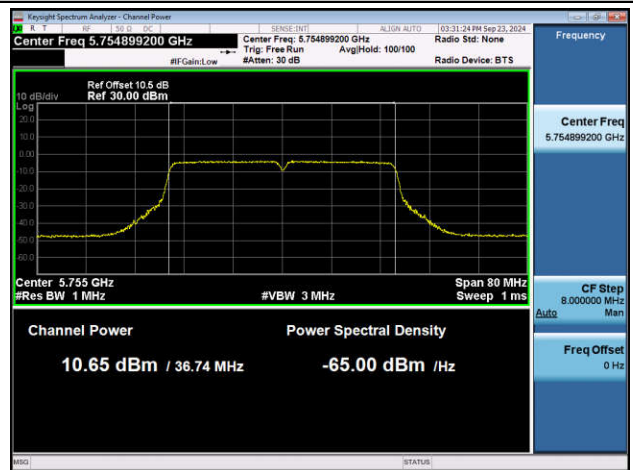
11AC20MIMO-Ant2-5825-PASS



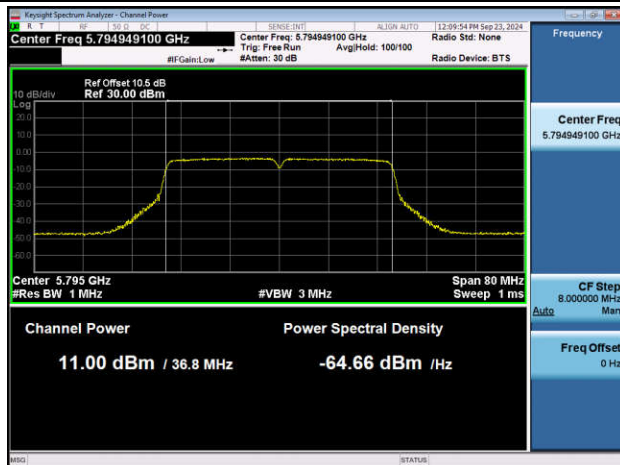
11AC40MIMO-Ant1-5755-PASS



11AC40MIMO-Ant2-5755-PASS



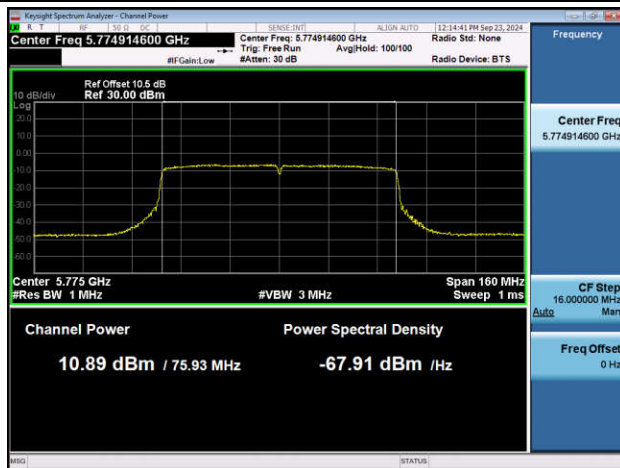
11AC40MIMO-Ant1-5795-PASS



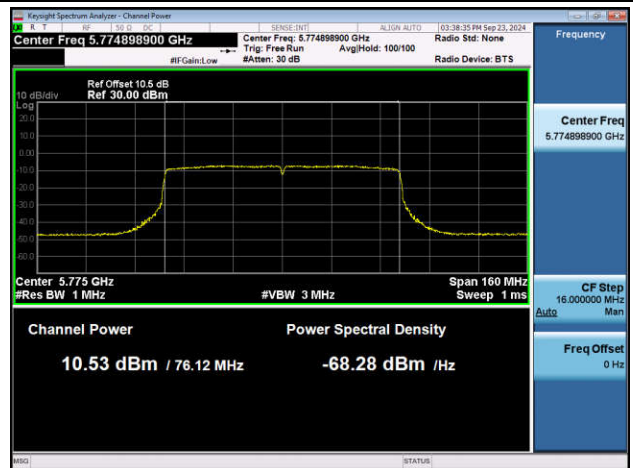
11AC40MIMO-Ant2-5795-PASS



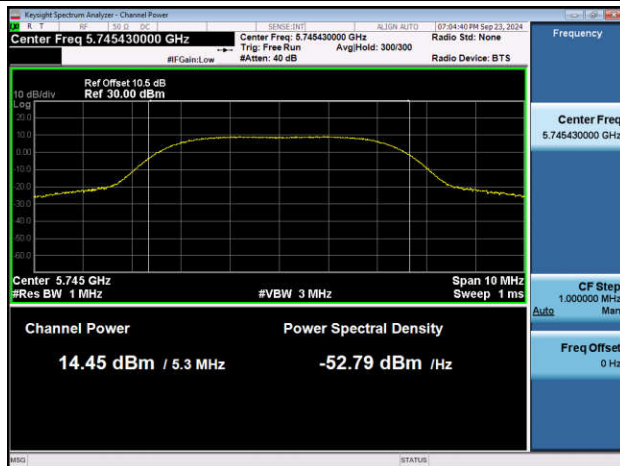
11AC80MIMO-Ant1-5775-PASS



11AC80MIMO-Ant2-5775-PASS



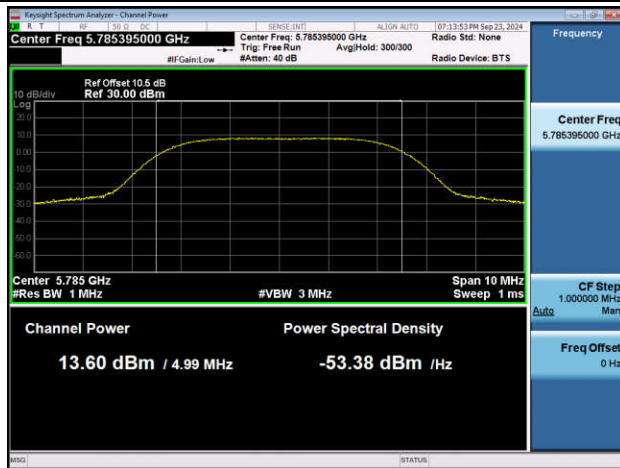
11A(5MHZ)-Ant1-5745.5-PASS



11A(5MHZ)-Ant2-5745.5-PASS



11A(5MHZ)-Ant1-5785.5-PASS



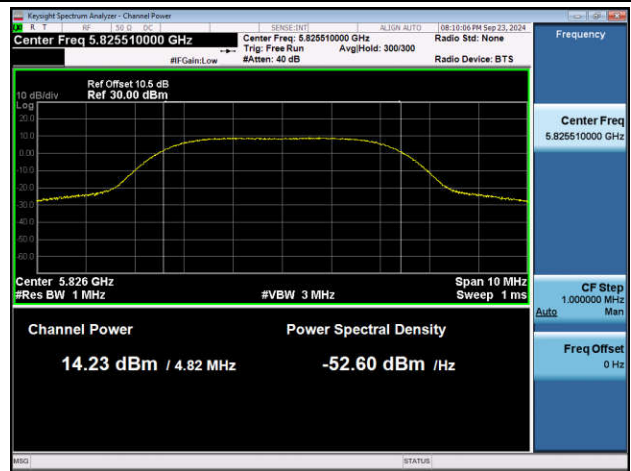
11A(5MHZ)-Ant2-5785.5-PASS



11A(5MHZ)-Ant1-5825.5-PASS



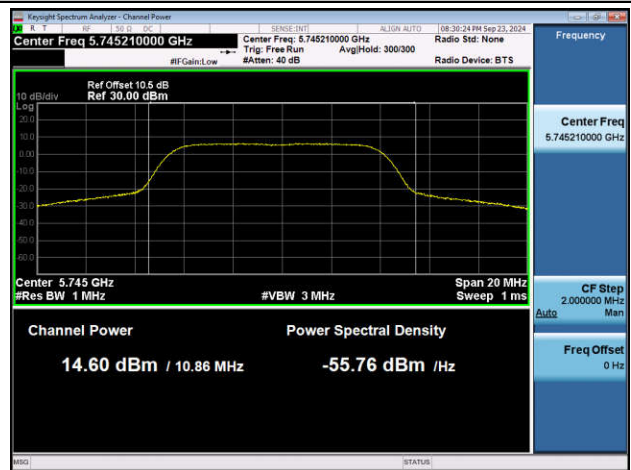
11A(5MHZ)-Ant2-5825.5-PASS



11A(10MHZ)-Ant1-5745-PASS

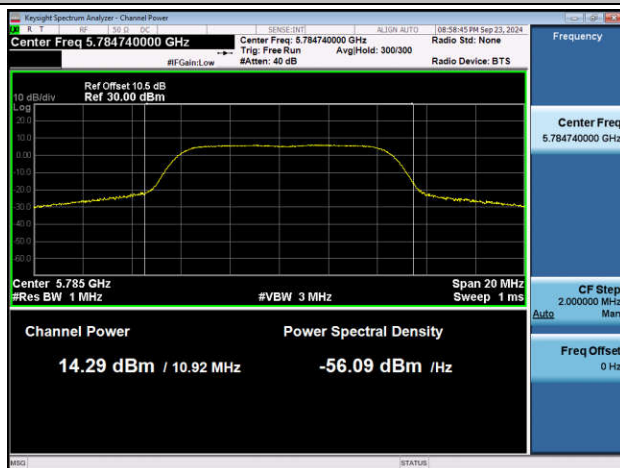


11A(10MHZ)-Ant2-5745-PASS

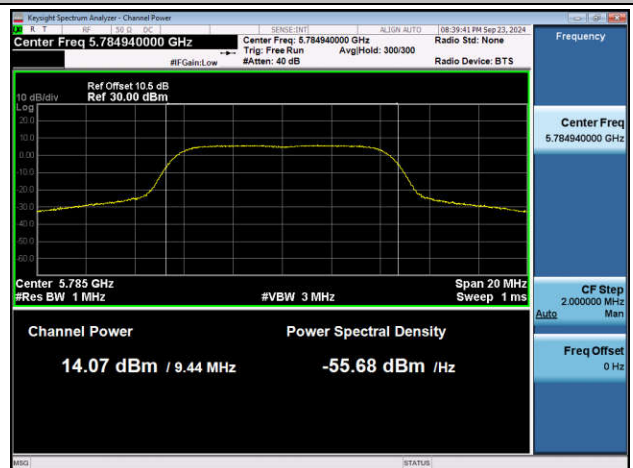




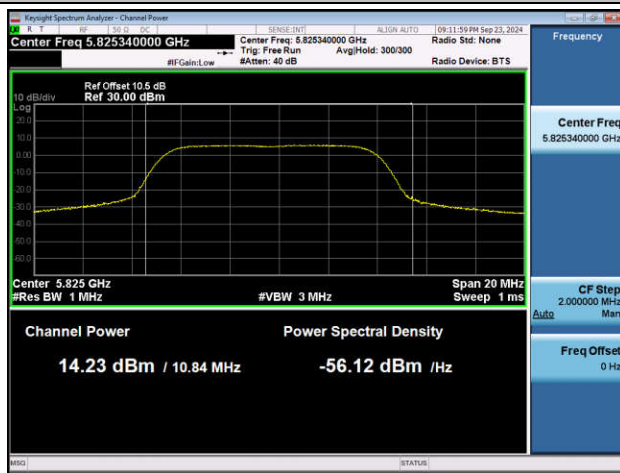
11A(10MHz)-Ant1-5785-PASS



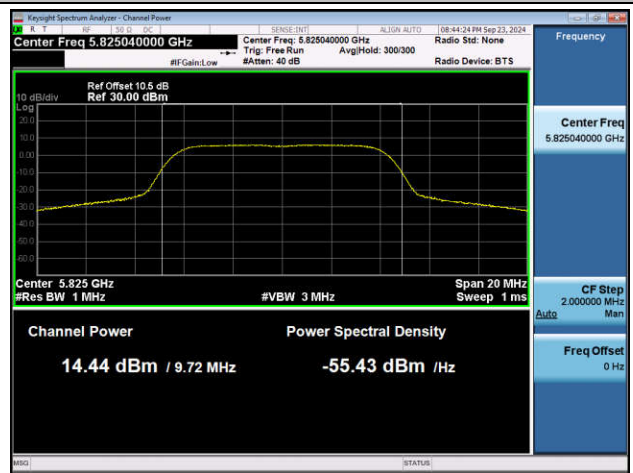
11A(10MHz)-Ant2-5785-PASS



11A(10MHz)-Ant1-5825-PASS



11A(10MHz)-Ant2-5825-PASS



AVGSA Power Spectral Density Test Result and Data

U-NII-1 AVGSA Power Spectral Density					
Test Mode	Antenna	Frequency [MHz]	Result [dBm/MHz]	Limit [dBm/MHz]	Verdict
11A	Ant2	5180	4.93	≤11.00	PASS
11A	Ant1	5180	3.42	≤11.00	PASS
11A	Ant2	5200	4.71	≤11.00	PASS
11A	Ant1	5200	3.38	≤11.00	PASS
11A	Ant2	5240	4.69	≤11.00	PASS
11A	Ant1	5240	3.24	≤11.00	PASS
11N20MIMO	Ant1	5180	-1.19	≤11.00	PASS
11N20MIMO	Ant2	5180	-1.41	≤11.00	PASS
11N20MIMO	Ant1	5200	-1.08	≤11.00	PASS
11N20MIMO	Ant2	5200	-1.59	≤11.00	PASS
11N20MIMO	Ant1	5240	-1.30	≤11.00	PASS
11N20MIMO	Ant2	5240	-1.76	≤11.00	PASS
11N40MIMO	Ant1	5190	-3.30	≤11.00	PASS
11N40MIMO	Ant2	5190	-4.01	≤11.00	PASS
11N40MIMO	Ant1	5230	-3.62	≤11.00	PASS
11N40MIMO	Ant2	5230	-4.24	≤11.00	PASS
11AC20MIMO	Ant1	5180	-0.80	≤11.00	PASS
11AC20MIMO	Ant2	5180	-1.57	≤11.00	PASS
11AC20MIMO	Ant1	5200	-0.49	≤11.00	PASS
11AC20MIMO	Ant2	5200	-1.64	≤11.00	PASS
11AC20MIMO	Ant1	5240	-0.89	≤11.00	PASS
11AC20MIMO	Ant2	5240	-1.59	≤11.00	PASS
11AC40MIMO	Ant1	5190	-3.29	≤11.00	PASS
11AC40MIMO	Ant2	5190	-4.12	≤11.00	PASS
11AC40MIMO	Ant1	5230	-3.56	≤11.00	PASS
11AC40MIMO	Ant2	5230	-4.23	≤11.00	PASS
11AC80MIMO	Ant1	5210	-6.68	≤11.00	PASS
11AC80MIMO	Ant2	5210	-7.17	≤11.00	PASS

Note: The Duty Cycle Factor and RBW Factor is compensated in the graph.



U-NII-3 AVGSA Power Spectral Density					
Test Mode	Antenna	Frequency[MHz]	Result[dBm/500kHz]	Limit[dBm/500kHz]	Verdict
11A	Ant2	5745	0.01	≤30.00	PASS
11A	Ant1	5745	0.66	≤30.00	PASS
11A	Ant2	5785	-0.07	≤30.00	PASS
11A	Ant1	5785	0.16	≤30.00	PASS
11A	Ant2	5825	-0.10	≤30.00	PASS
11A	Ant1	5825	0.56	≤30.00	PASS
11N20MIMO	Ant1	5745	-3.56	≤30.00	PASS
11N20MIMO	Ant2	5745	-4.18	≤30.00	PASS
11N20MIMO	Ant1	5785	-3.72	≤30.00	PASS
11N20MIMO	Ant2	5785	-4.34	≤30.00	PASS
11N20MIMO	Ant1	5825	-3.36	≤30.00	PASS
11N20MIMO	Ant2	5825	-4.57	≤30.00	PASS
11N40MIMO	Ant1	5755	-6.09	≤30.00	PASS
11N40MIMO	Ant2	5755	-6.86	≤30.00	PASS
11N40MIMO	Ant1	5795	-6.28	≤30.00	PASS
11N40MIMO	Ant2	5795	-6.80	≤30.00	PASS
11AC20MIMO	Ant1	5745	-3.50	≤30.00	PASS
11AC20MIMO	Ant2	5745	-3.89	≤30.00	PASS
11AC20MIMO	Ant1	5785	-3.85	≤30.00	PASS
11AC20MIMO	Ant2	5785	-4.28	≤30.00	PASS
11AC20MIMO	Ant1	5825	-3.79	≤30.00	PASS
11AC20MIMO	Ant2	5825	-4.51	≤30.00	PASS
11AC40MIMO	Ant1	5755	-6.19	≤30.00	PASS
11AC40MIMO	Ant2	5755	-6.72	≤30.00	PASS
11AC40MIMO	Ant1	5795	-6.10	≤30.00	PASS
11AC40MIMO	Ant2	5795	-6.80	≤30.00	PASS
11AC80MIMO	Ant1	5775	-9.28	≤30.00	PASS
11AC80MIMO	Ant2	5775	-9.94	≤30.00	PASS
11A(5MHZ)	Ant1	5745.5	4.06	≤30.00	PASS
11A(5MHZ)	Ant2	5745.5	4.84	≤30.00	PASS
11A(5MHZ)	Ant1	5785.5	3.33	≤30.00	PASS
11A(5MHZ)	Ant2	5785.5	2.98	≤30.00	PASS
11A(5MHZ)	Ant1	5825.5	3.78	≤30.00	PASS
11A(5MHZ)	Ant2	5825.5	2.23	≤30.00	PASS
11A(10MHZ)	Ant1	5745	1.35	≤30.00	PASS
11A(10MHZ)	Ant2	5745	1.37	≤30.00	PASS
11A(10MHZ)	Ant1	5785	1.36	≤30.00	PASS
11A(10MHZ)	Ant2	5785	-0.64	≤30.00	PASS
11A(10MHZ)	Ant1	5825	1.96	≤30.00	PASS



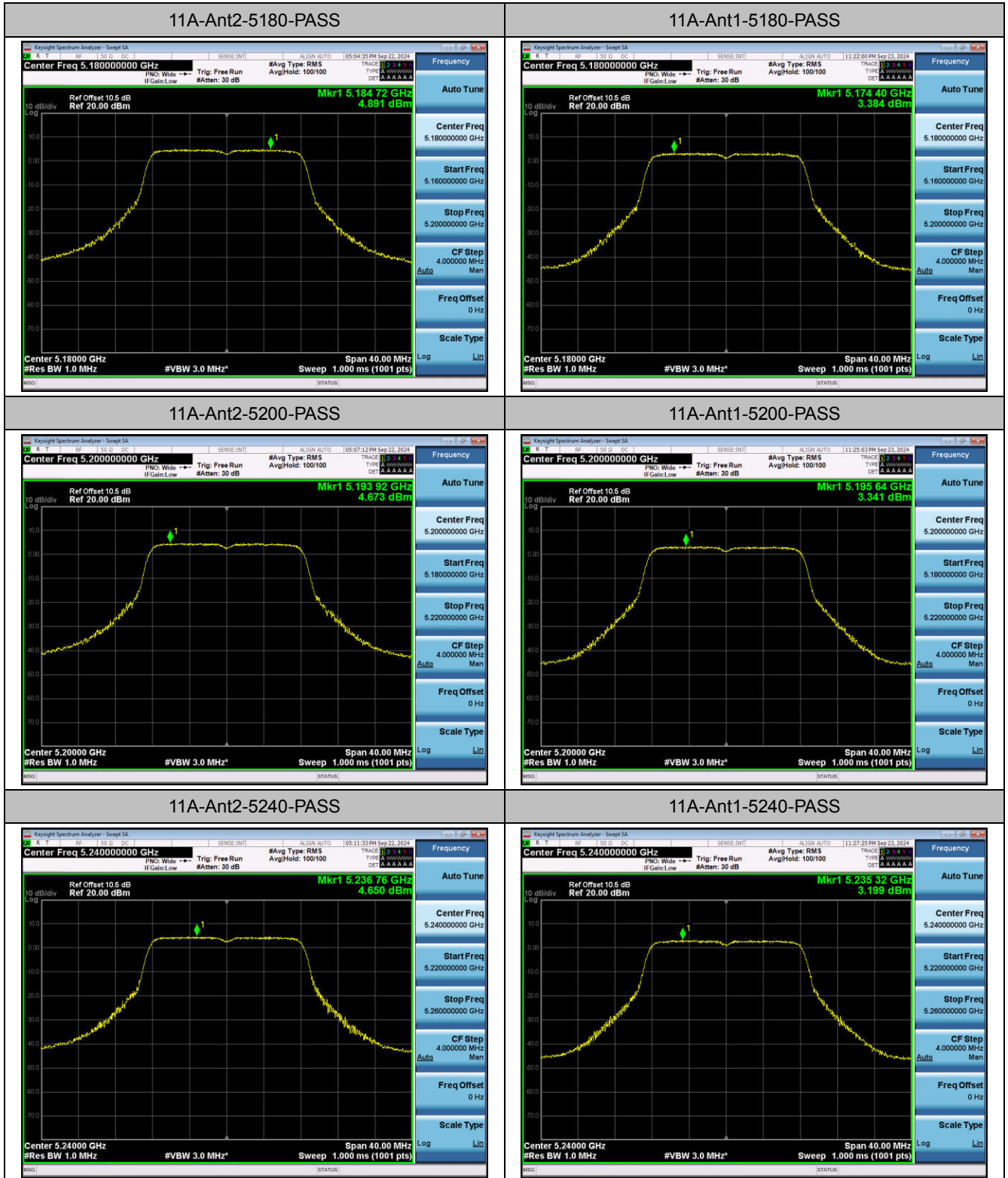
11A(10MHZ)	Ant2	5825	1.38	≤30.00	PASS
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Note: 1. The Result and Limit Unit is dBm/500 kHz in the band 5.725–5.85 GHz.

2. The Duty Cycle Factor and RBW Factor is compensated in the graph.

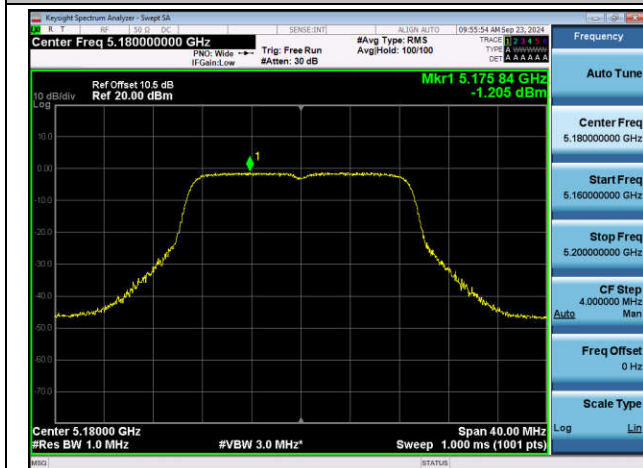
Test Graphs

U-NII-1:

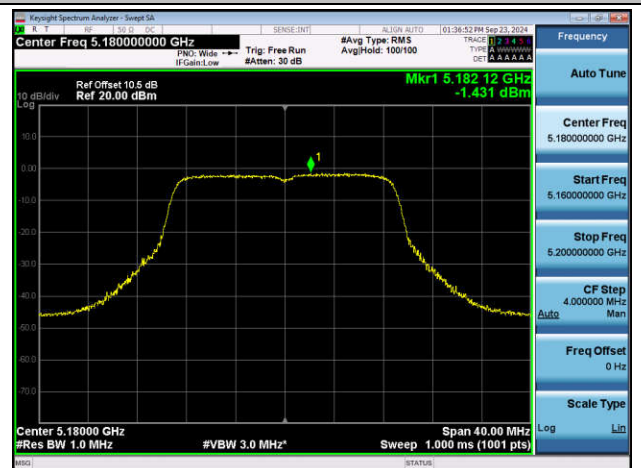




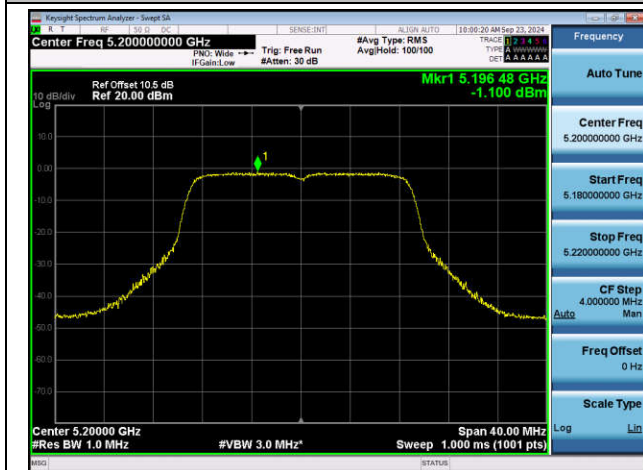
11N20MIMO-Ant1-5180-PASS



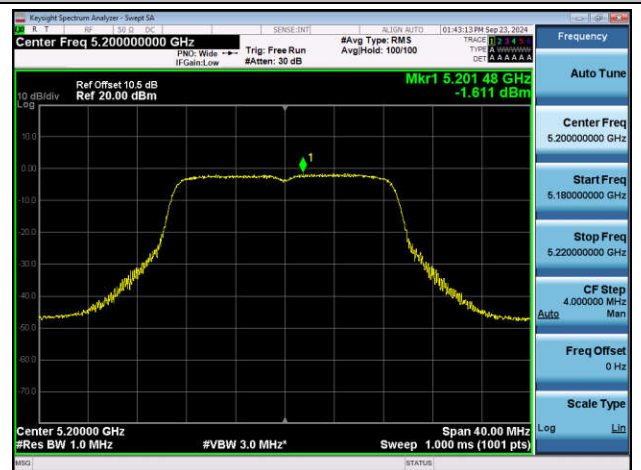
11N20MIMO-Ant2-5180-PASS



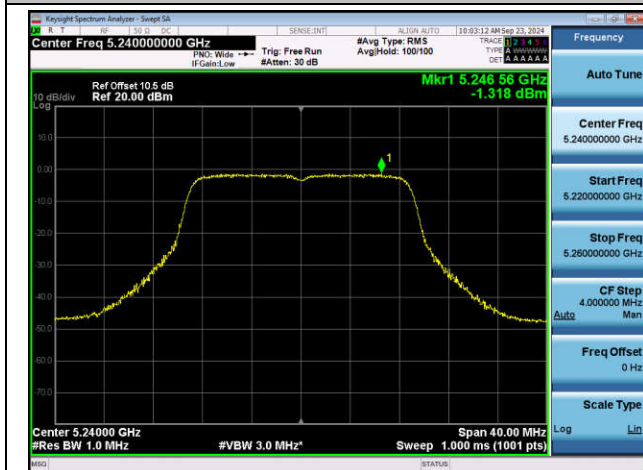
11N20MIMO-Ant1-5200-PASS



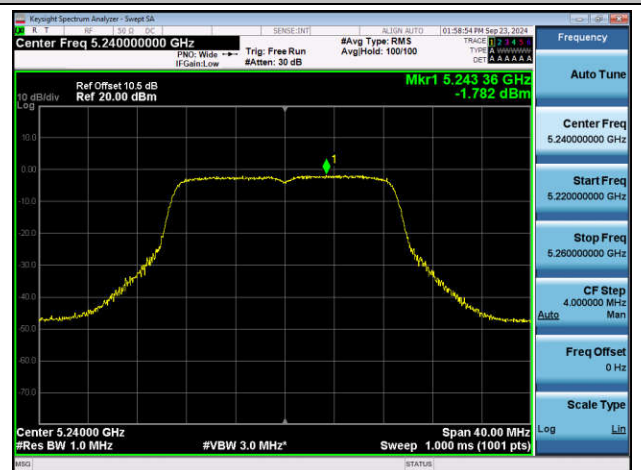
11N20MIMO-Ant2-5200-PASS



11N20MIMO-Ant1-5240-PASS

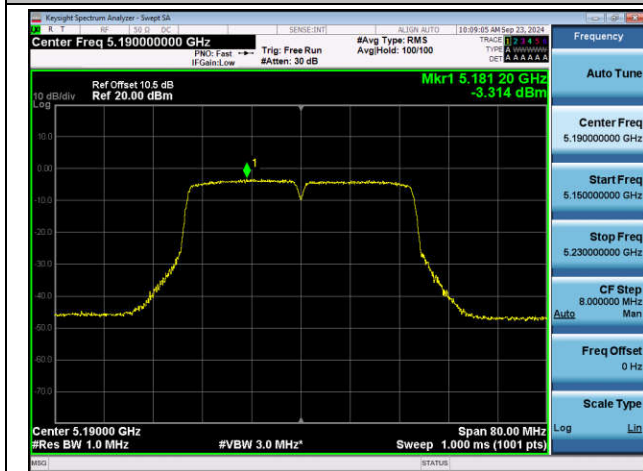


11N20MIMO-Ant2-5240-PASS

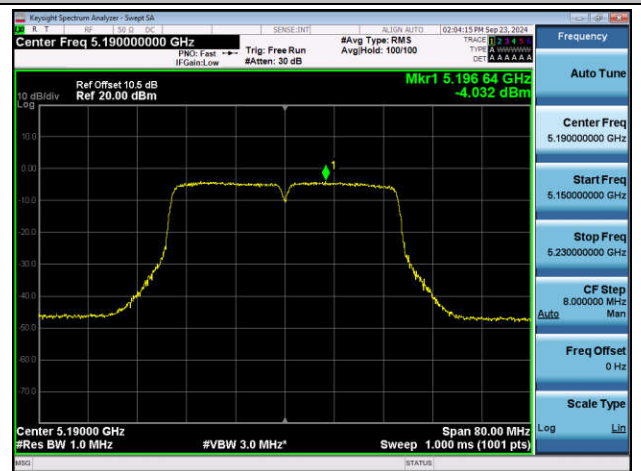




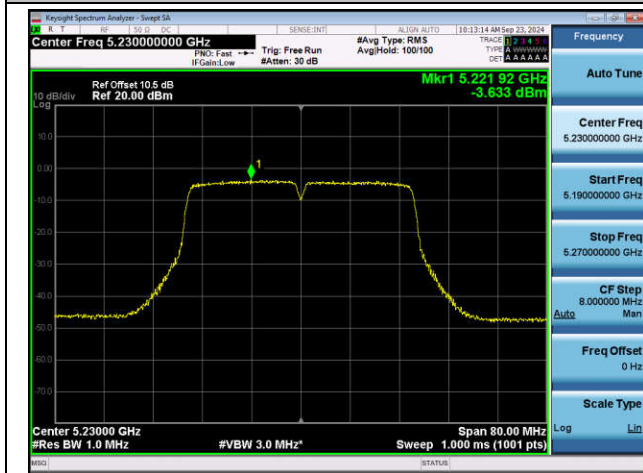
11N40MIMO-Ant1-5190-PASS



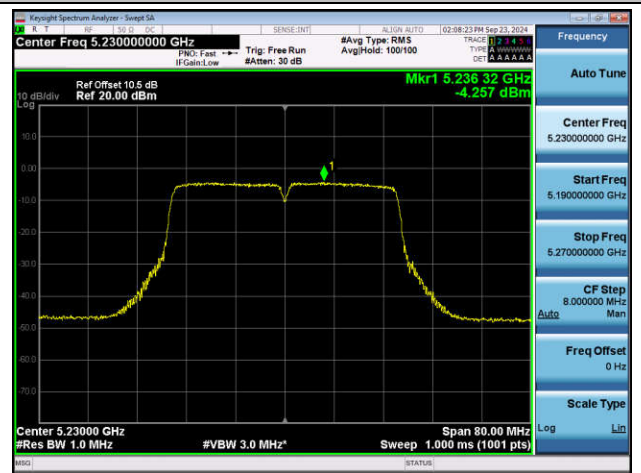
11N40MIMO-Ant2-5190-PASS



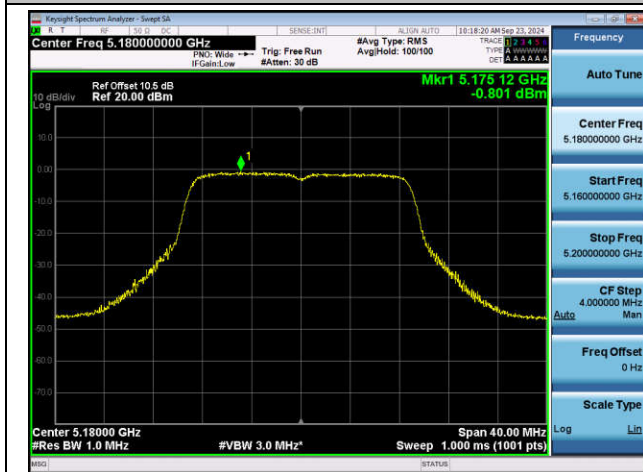
11N40MIMO-Ant1-5230-PASS



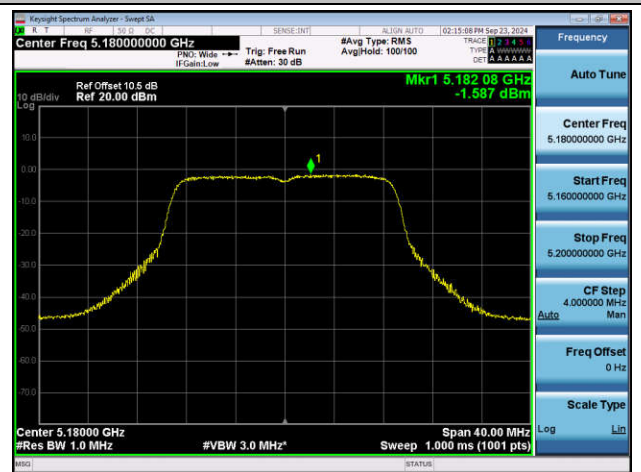
11N40MIMO-Ant2-5230-PASS



11AC20MIMO-Ant1-5180-PASS

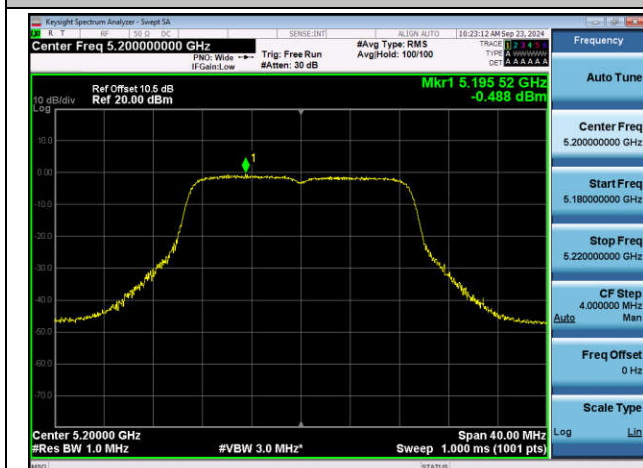


11AC20MIMO-Ant2-5180-PASS

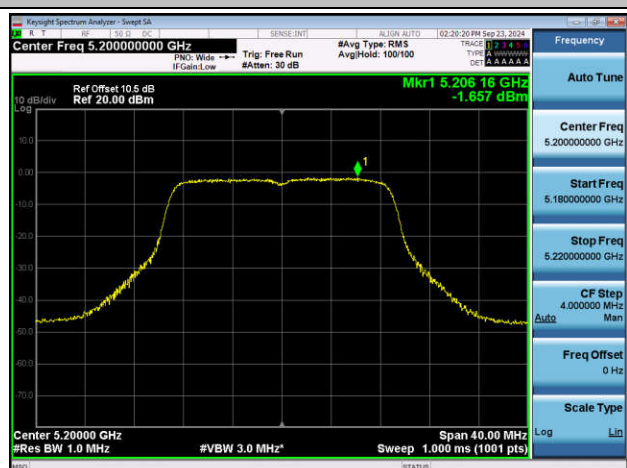




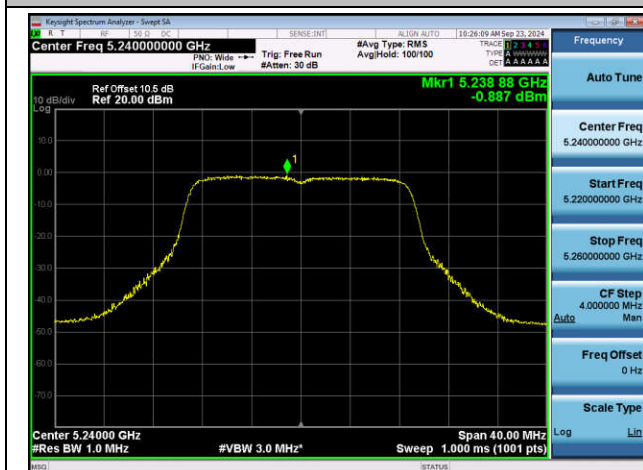
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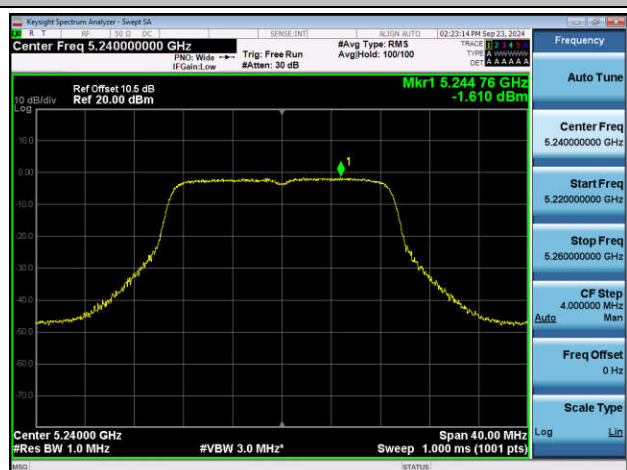
11AC20MIMO-Ant2-5200-PASS



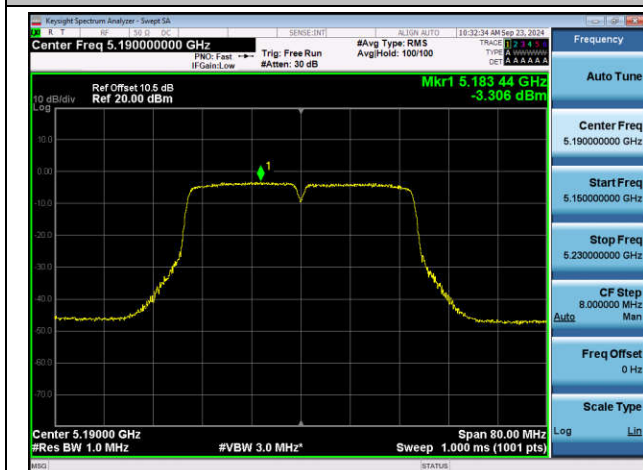
11AC20MIMO-Ant1-5240-PASS



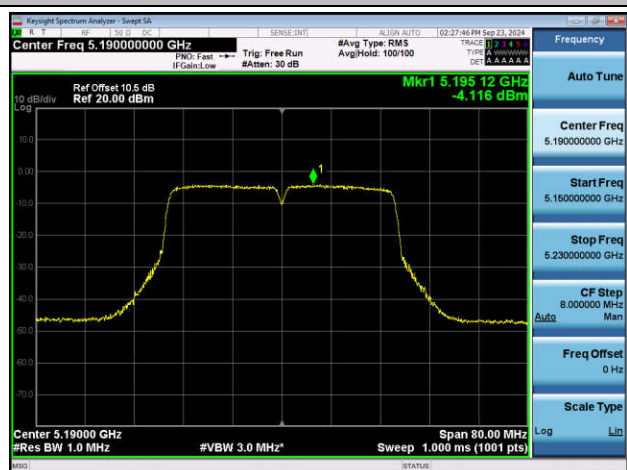
11AC20MIMO-Ant2-5240-PASS



11AC40MIMO-Ant1-5190-PASS

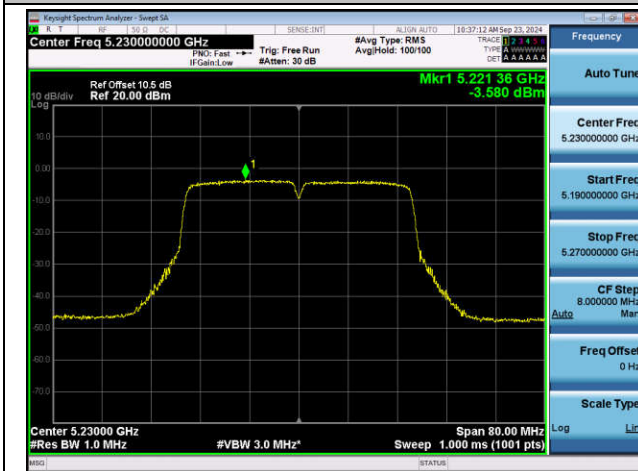


11AC40MIMO-Ant2-5190-PASS





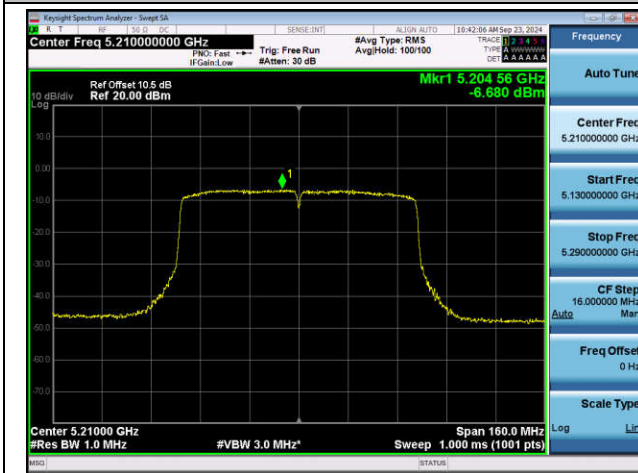
11AC40MIMO-Ant1-5230-PASS



11AC40MIMO-Ant2-5230-PASS



11AC80MIMO-Ant1-5210-PASS



11AC80MIMO-Ant2-5210-PASS

