

TEST REPORT

Reference No...... : WTX23X05115369W003
FCC ID : 2A96I-UA80
Applicant : Shanghai UniOne Science&Technology CO., Ltd.
Address : Building 4, No.651 Wanfang Road, Pujiang Town, Minhang District, Shanghai
Manufacturer : The same as Applicant
Address : The same as Applicant
Product Name : Rugged Android Tablet
Model No...... : UA80
Standards : FCC Part 15.407
Date of Receipt sample : 2023-05-26
Date of Test..... : 2023-05-26 to 2023-07-06
Date of Issue : 2023-07-06
Test Report Form No. : WTX_Part 15_407W
Test Result..... : **Pass**

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of approver.

Prepared By:

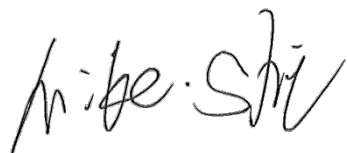
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Report version

Version No.	Date of issue	Description
Rev.00	2023-07-06	Original
/	/	/

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

General Description of EUT	
Product Name:	Rugged Android Tablet
Trade Name:	/
Model No.:	UA80
Adding Model(s):	/
Rated Voltage:	DC3.8V
Battery:	8200mAh
Adapter Model:	/
<i>Note: The test data is gathered from a production sample, provided by the manufacturer.</i>	

Technical Characteristics of EUT	
Support Standards:	802.11a, 802.11n-HT20, 802.11n-HT40, 802.11ac-VHT20, 802.11ac-VHT40, 802.11ac-VHT80
Frequency Range:	5150-5250MHz, 5725-5850MHz
RF Output Power:	15.03dBm (Conducted)
Type of Modulation:	QPSK, 16QAM, 64QAM, 256QAM
Type of Antenna:	FPC Antenna
Antenna Gain:	5150-5250MHz: 1.99dBi 5725-5850MHz: 1.22dBi
<i>Note: The Antenna Gain is provided by the customer and can affect the validity of results.</i>	

1.2 Test Standards

The tests were performed according to following standards:

FCC Rules Part 15.407: General technical requirements.

ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.

KDB789033 D02 v02r01: Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-Nii) Devices Part 15, Subparte.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, KDB789033 D02 v02r01. The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted accordingly in reference to the Operating Instructions.

1.4 Table for parameters of Test Software setting

Enter "3646631+=" into the calculator to enter the engineer mode, you can start to test. During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Mode	Test Frequency (MHz)												
	NCB: 20MHz												
	5180	5200	5240	5260	5300	5320	5500	5580	5700	5720	5745	5785	5825
802.11a 6Mbps	19	19	19	/	/	/	/	/	/	19	19	19	19
802.11n-HT20 MCS0	18	18	18	/	/	/	/	/	/	18	18	18	18
802.11ac-VHT2 0 MCS0	18	18	18	/	/	/	/	/	/	18	18	18	18
Mode	NCB: 40MHz												
	5190	5230	5270	5310	5510	5550	5670	5710	5755	5795			
802.11n-HT40 MCS0	18	18	/	/	/	/	/	/	18	18			
802.11ac-VHT4 0 MCS0	18	18	/	/	/	/	/	/	18	18			

Mode	NCB: 80MHz					
	5210	5290	5530	5610	5690	5775
802.11ac-VHT8 0 MCS0	17	/	/	/	/	17

1.5 EUT Operating during test

EUT was programmed to be in continuously transmitting mode. During the test, EUT operation to normal function and programs under Android were executed.

1.6 Test Facility

Address of the test laboratory

Laboratory: Waltek Testing Group (Shenzhen) Co., Ltd.

Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road, Block 70 Bao'an District, Shenzhen, Guangdong, China

FCC – Registration No.: 125990

Waltek Testing Group (Shenzhen) 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. The Designation Number is CN5010, and Test Firm Registration Number is 125990.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Waltek Testing Group (Shenzhen) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A and the CAB identifier is CN0057.

1.7 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, with a duty cycle equal to 100%, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	802.11a	5180MHz,5200MHz,5240MHz,5745MHz, 5785MHz,5825MHz
TM2	802.11n-HT20	5180MHz,5200MHz,5240MHz,5745MHz, 5785MHz,5825MHz
TM3	802.11ac-VHT20	5180MHz,5200MHz,5240MHz,5745MHz, 5785MHz,5825MHz
TM4	802.11n-HT40	5190MHz,5230MHz, 5755MHz,5795MHz
TM5	802.11ac-VHT40	5190MHz,5230MHz, 5755MHz,5795MHz
TM6	802.11ac-VHT80	5210MHz, 5775MHz
Note: 802.11ac-VHT20, 802.11ac-VHT40 covered by 802.11n-HT20 and 802.11n-HT40.		

Test Conditions	
Temperature:	22~25 °C
Relative Humidity:	45~55 %.
ATM Pressure:	1019 mbar

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
Type-C Cable	1.0	Shielded	With Ferrite

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
Computer	Lenovo	L13 Yoga	/
Adapter	AQUIL	ASUC71w-050912300	/

1.8 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
RF Output Power	Conducted	$\pm 0.42\text{dB}$
Occupied Bandwidth	Conducted	$\pm 1.5\%$
Power Spectral Density	Conducted	$\pm 1.8\text{dB}$
Conducted Spurious Emission	Conducted	$\pm 2.17\text{dB}$
Conducted Emissions	Conducted	9-150kHz $\pm 3.74\text{dB}$
		0.15-30MHz $\pm 3.34\text{dB}$
Transmitter Spurious Emissions	Radiated	30-200MHz $\pm 4.52\text{dB}$
		0.2-1GHz $\pm 5.56\text{dB}$
		1-6GHz $\pm 3.84\text{dB}$
		6-18GHz $\pm 3.92\text{dB}$

1.9 Test Equipment List and Details

Fixed asset Number	Description	Manufacturer	Model	Serial No.	Cal Date	Due. Date
WTXE1041A 1001	Communication Tester	Rohde & Schwarz	CMW500	148650	2023-02-25	2024-02-24
WTXE1022A 1002	GSM Tester	Rohde & Schwarz	CMU200	114403	2023-02-25	2024-02-24
WTXE1005A 1005	Spectrum Analyzer	Agilent	N9020A	US471401 02	2023-02-25	2024-02-24
WTXE1084A 1001	Spectrum Analyzer	Agilent	N9020A	MY543205 48	2023-02-25	2024-02-24
WTXE1044A 1001	Signal Generator	Agilent	83752A	3610A014 53	2023-02-25	2024-02-24
WTXE1045A 1001	Vector Signal Generator	Agilent	N5182A	MY470702 02	2023-02-25	2024-02-24
WTXE1018A 1001	Power Divider	Weinschel	1506A	PM204	2023-02-25	2024-02-24
WTXE1045A 1001	Power Divider	RF-Lambda	RFLT4W5M18G	14110400 027	2023-02-25	2024-02-24
☒ Chamber A: Below 1GHz						
WTXE1005A 1003	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/03 5	2023-02-25	2024-02-24
WTXE1007A 1001	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/00 5	2023-02-25	2024-02-24
WTXE1007A 1001	Amplifier	HP	8447F	2805A034 75	2023-02-25	2024-02-24
WTXE1010A 1007	Loop Antenna	Schwarz beck	FMZB 1516	9773	2021-03-20	2024-03-19
WTXE1010A 1006	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2023-03-20	2026-03-19
☒ Chamber A: Above 1GHz						
WTXE1005A 1003	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/03 5	2023-02-25	2024-02-24
WTXE1007A 1001	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/00 5	2023-02-25	2024-02-24
WTXE1065A 1001	Amplifier	C&D	PAP-1G18	14918	2023-02-25	2024-02-24
WTXE1010A 1005	Horn Antenna	ETS	3117	00086197	2021-03-19	2024-03-18
WTXE1010A 1010	DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2021-03-19	2024-03-18

WTXE1003A 1001	Pre-amplifier	Schwarzbeck	BBV 9721	9721-031	2023-02-25	2024-02-24
☐ Chamber B:Below 1GHz						
WTXE1010A 1006	Trilog Broadband Antenna	Schwarz beck	VULB9163(B)	9163-635	2021-04-09	2024-04-08
WTXE1038A 1001	Amplifier	Agilent	8447D	2944A101 79	2023-02-25	2024-02-24
WTXE1001A 1002	EMI Test Receiver	Rohde & Schwarz	ESPI	101391	2023-02-25	2024-02-24
☐ Chamber C:Below 1GHz						
WTXE1093A 1001	EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2023-02-25	2024-02-24
WTXE1010A 1013-1	Trilog Broadband Antenna	Schwarz beck	VULB 9168	1194	2021-05-28	2024-05-27
WTXE1010A 1007	Loop Antenna	Schwarz beck	FMZB 1516	9773	2021-03-20	2024-03-19
WTXE1007A 1002	Amplifier	HP	8447F	2944A038 69	2023-02-25	2024-02-24
☐ Chamber C: Above 1GHz						
WTXE1093A 1001	EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2023-02-25	2024-02-24
WTXE1103A 1005	Horn Antenna	POAM	RTF-11A	LP228060 221	2023-03-10	2026-03-09
WTXE1103A 1006	Amplifier	Tonscend	TAP01018050	AP22E806 235	2023-02-25	2024-02-24
☒ Conducted Room 1#						
WTXE1001A 1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2023-02-25	2024-02-24
WTXE1002A 1001	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2023-02-25	2024-02-24
WTXE1003A 1001	AC LISN	Schwarz beck	NSLK8126	8126-224	2023-02-25	2024-02-24
☐ Conducted Room 2#						
WTXE1001A 1004	EMI Test Receiver	Rohde & Schwarz	ESPI	101259	2023-02-25	2024-02-24
WTXE1003A 1003	LISN	Rohde & Schwarz	ENV 216	100097	2023-02-25	2024-02-24

Software List			
Description	Manufacturer	Model	Version
EMI Test Software (Radiated Emission)*	Farad	EZ-EMC	RA-03A1
EMI Test Software (Conducted Emission)*	Farad	EZ-EMC	RA-03A1

*Remark: indicates software version used in the compliance certification testing.

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§15.203; §15.405	Antenna Requirement	Compliant
15.407 (c)	Automatically Discontinue Transmission	Compliant
§15.207; §15.407(b)(6)	Conducted Emission	N/A
§15.407(a)(1),(2)	Power Spectral Density	Compliant
§15.407(e)	Emission Bandwidth and Occupied Bandwidth	Compliant
§15.407(a)(1),(2)	Maximum Conducted Output Power	Compliant
§15.407(b)(1),(2),(3),(4)	Undesirable emission	Compliant
§15.205; §15.407(b)(1),(2),(3)	Radiated Emission	Compliant
§15.407(g)	Frequency Stability	Compliant
§15.407(h)	Dynamic Frequency Selection (DFS)	Compliant

N/A: Not applicable.

3. Antenna Requirement

3.1 Standard Applicable

According to FCC Part 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.

3.2 Evaluation Information

This product has an FPC Antenna, fulfill the requirement of this section.

4. Automatically Discontinue Transmission

4.1 Standard Applicable

According to FCC Part 15.407(c), the device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.

4.2 Summary of Test Results

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.

5. Power Spectral Density

5.1 Standard Applicable

Section 15.407(a) Power limits:

(1) For the band 5.15-5.25GHz.

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

(2) For the 5.25-5.35GHz and 5.47-5.725GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250mW or $11 \text{ dBm} + 10 \log B$, where B is the 26dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6dBi 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 6dBi.

(3) For the band 5.725-5.85GHz, 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 30dBm in any 500kHz band. If transmitting antennas of directional gain greater than 6dBi 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 6dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6dBi 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.

5.2 Test Procedure

According to 789033 D02 v02r01 General UNII Test Procedures New Rules v02, the following is the measurement procedure.

For devices operating in the bands 5.15-5.25GHz, 5.25-5.35GHz, and 5.47-5.725GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85GHz, the rules specify a measurement bandwidth of 500kHz. Many spectrum analyzers do not have 500kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500kHz, "provided that the measured power is integrated over the full

reference bandwidth” to show the total power over the specified measurement bandwidth (i.e., 1MHz, or 500kHz). If measurements are performed using a reduced resolution bandwidth ($< 1\text{MHz}$, or $< 500\text{kHz}$) and integrated over 1 MHz, or 500kHz bandwidth, the following adjustments to the procedures apply:

- a) Set $\text{RBW} \geq 1/T$, where T is defined in section II.B.I.a).
- b) Set $\text{VBW} \geq 3 \text{ RBW}$.
- c) If measurement bandwidth of Maximum PSD is specified in 500kHz, add $10\log(500\text{kHz}/\text{RBW})$ to the measured result, whereas $\text{RBW} (< 500\text{kHz})$ is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
- d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add $10\log(1\text{MHz}/\text{RBW})$ to the measured result, whereas $\text{RBW} (< 1\text{MHz})$ is the reduced resolution bandwidth of spectrum analyzer set during measurement.
- e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Note: As a practical matter, it is recommended to use reduced RBW of 100kHz for the sections 5.c) and 5.d) above, since $\text{RBW}=100\text{kHz}$ is available on nearly all spectrum analyzers.

5.3 Summary of Test Results/Plots

Please refer to Appendix A

6. Emission Bandwidth and Occupied Bandwidth

6.1 Standard Applicable

According to 15.407(a) and (e):

(1) For the band 5.15-5.25GHz.

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

(2) For the 5.25-5.35GHz and 5.47-5.725GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250mW or $11\text{dBm} + 10 \log B$, where B is the 26dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6dBi 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 6dBi.

(3) For the band 5.725-5.85GHz, 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 30dBm in any 500kHz band. If transmitting antennas of directional gain greater than 6dBi 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 6dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6dBi 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.

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

6.2 Test Procedure

According to 789033 D02 v02r0r section C&D, the following is the measurement 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 26dB 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 5.725-5.85GHz Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500KHz for the band 5.715-5.85 GHz. The following procedure shall be used for measuring this bandwidth:

- a) Set RBW = 100kHz.
- b) Set the video bandwidth (VBW) $\geq 3 \times$ 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 6dB relative to the maximum level measured in the fundamental emission.

Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described above.

D. 99 Percent Occupied Bandwidth

The 99-percent 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. Measurement of the 99-percent occupied bandwidth is required only as a condition for using the optional band-edge measurement techniques described in section II.G.3.d). Measurements of 99-percent occupied bandwidth may also optionally be used in lieu of the EBW to 789033 D02 v02r01 General UNII Test Procedures New Rules v01 define the minimum frequency range over which the spectrum is integrated when measuring maximum conducted output power as described in section II.E. However, the EBW must be measured to determine bandwidth dependent limits on maximum conducted output power in accordance with 15.407(a).

The following procedure shall be used for measuring (99 %) power bandwidth:

- 1. Set center frequency to the nominal EUT channel center frequency.
- 2. Set span = 1.5 times to 5.0 times the OBW.
- 3. Set RBW = 1 % to 5 % of the OBW
- 4. Set VBW $\geq 3 \times$ RBW
- 5. 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.
- 6. Use the 99 % power bandwidth function of the instrument (if available).
- 7. If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. 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.

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The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

6.3 Summary of Test Results/Plots

Please refer to Appendix B

7. Maximum Conducted Output Power

7.1 Standard Applicable

Section 15.407(a) Power limits:

(1) For the band 5.15-5.25GHz.

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

(2) For the 5.25-5.35GHz and 5.47-5.725GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250mW or $11\text{dBm} + 10 \log B$, where B is the 26dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6dBi 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 6dBi.

(3) For the band 5.725-5.85GHz, 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 30dBm in any 500kHz band. If transmitting antennas of directional gain greater than 6dBi 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 6dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6dBi 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.

7.2 Test Procedure

According to KDB789033 D02 v02r01 section E, the following is the measurement procedure.

- (i) Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.
- (ii) Set RBW = 1MHz.
- (iii) Set VBW $\geq$ 3MHz.
- (iv) Number of points in sweep $\geq$ 2 Span / RBW. (This ensures that bin-to-bin spacing is $\leq$ RBW/2, so that

narrowband signals are not lost between frequency bins.)

(v) Sweep time = auto.

(vi) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.

(vii) If transmit duty cycle < 98 percent, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle $\geq$ 98 percent, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run".

(viii) Trace average at least 100 traces in power averaging (i.e., RMS) mode.

(ix) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

7.3 Summary of Test Results/Plots

Please refer to Appendix C

8. Radiated Spurious Emissions

8.1 Standard Applicable

According to §15.407(b), undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

- (1) For transmitters operating in the 5.15-5.25GHz band: All emissions outside of the 5.15-5.35GHz band shall not exceed an e.i.r.p. of -27dBm/MHz.
- (2) For transmitters operating in the 5.25-5.35GHz band: All emissions outside of the 5.15-5.35GHz band shall not exceed an e.i.r.p. of -27dBm/MHz.
- (3) For transmitters operating in the 5.47-5.725GHz band: All emissions outside of the 5.47-5.725GHz band shall not exceed an e.i.r.p. of -27dBm/MHz.
- (4) For transmitters operating in the 5.725-5.85GHz band:
 - (i) All emissions shall be limited to a level of -27dBm/MHz at 75MHz or more above or below the band edge increasing linearly to 10dBm/MHz at 25MHz above or below the band edge, and from 25MHz above or below the band edge increasing linearly to a level of 15.6dBm/MHz at 5MHz above or below the band edge, and from 5MHz above or below the band edge increasing linearly to a level of 27dBm/MHz at the band edge.

According to §15.407(b)(6), Unwanted emissions below 1GHz must comply with the general field strength limits set forth in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.

According to §15.407(b)(7), The provisions of §15.205 apply to intentional radiators operating under this section.

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If radiated measurements are performed, field strength is then converted to EIRP as follows:

$$\text{EIRP} = ((E \cdot d)^2) / 30$$

where:

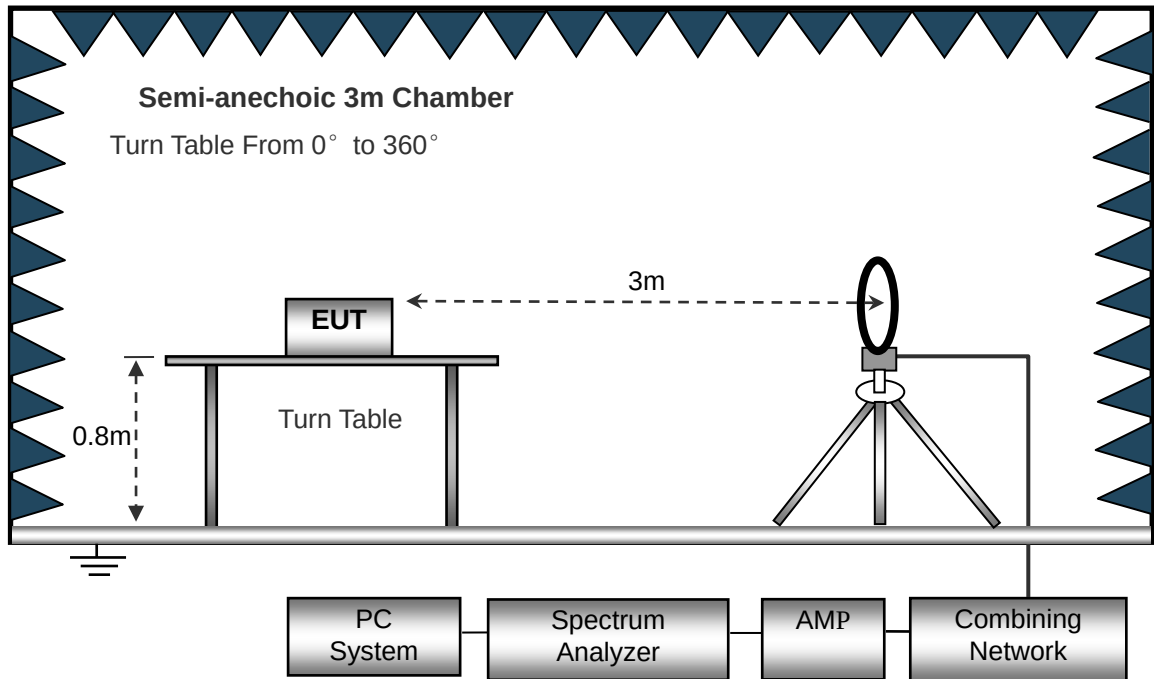
- E is the field strength in V/m;
- d is the measurement distance in meters;
- EIRP is the equivalent isotropically radiated power in watts.

8.2 Test Procedure

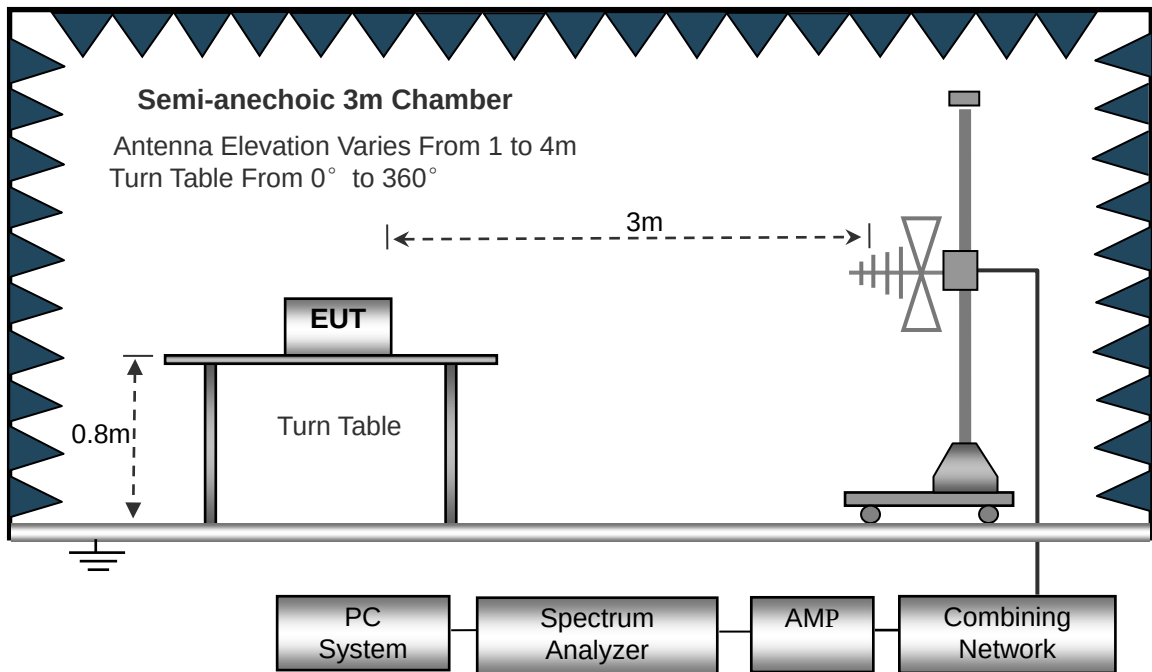
The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.205 15.407(b)(6) and FCC Part 15.209 Limit..

The external I/O cables were draped along the test table and formed a bundle 30 to 40cm long in the middle. The spacing between the peripherals was 10cm.

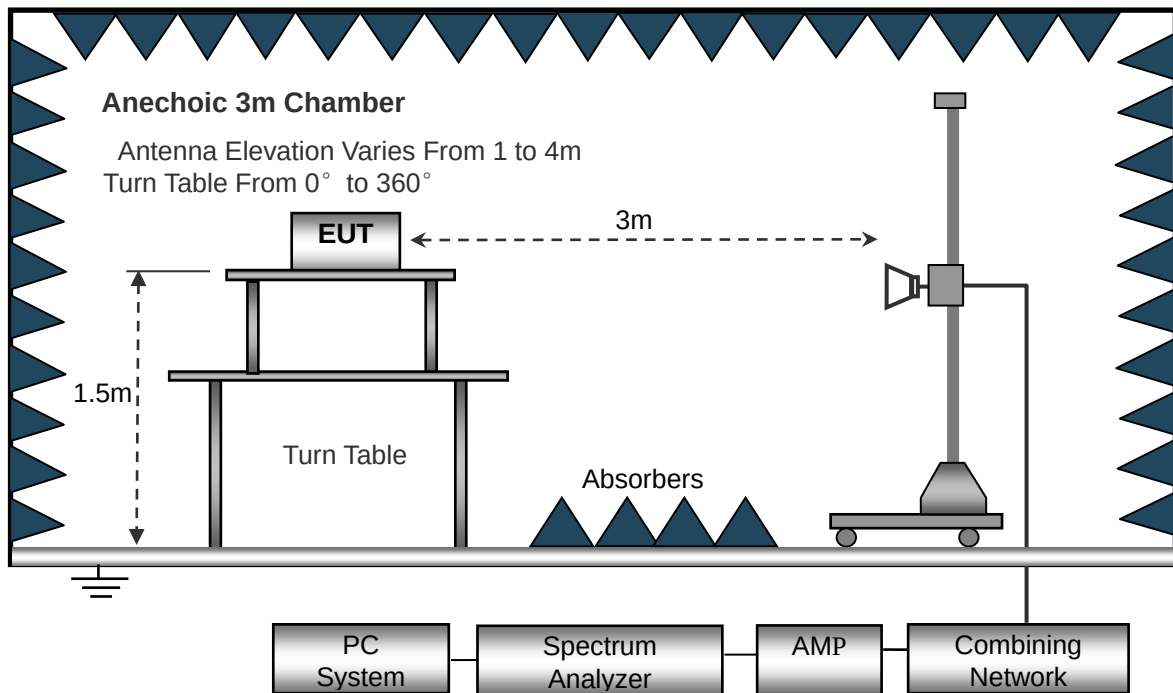
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30MHz to 1GHz.



The test setup for emission measurement above 1GHz.



8.3 Test Receiver Setup

During the radiated emission test for above 1GHz, the test receiver was set with the following configurations:

For peak detector:

RBW = 1000kHz, VBW = 3000kHz, Sweep Time = Auto

For average detector:

RBW = 1000kHz, VBW = 10Hz, Sweep Time = Auto

8.4 Corrected Amplitude & Margin Calculation

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

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Ant. Factor} + \text{Cable Loss} - \text{Ampl. Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dBμV means the emission is 6dBμV below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15 Limit}$$

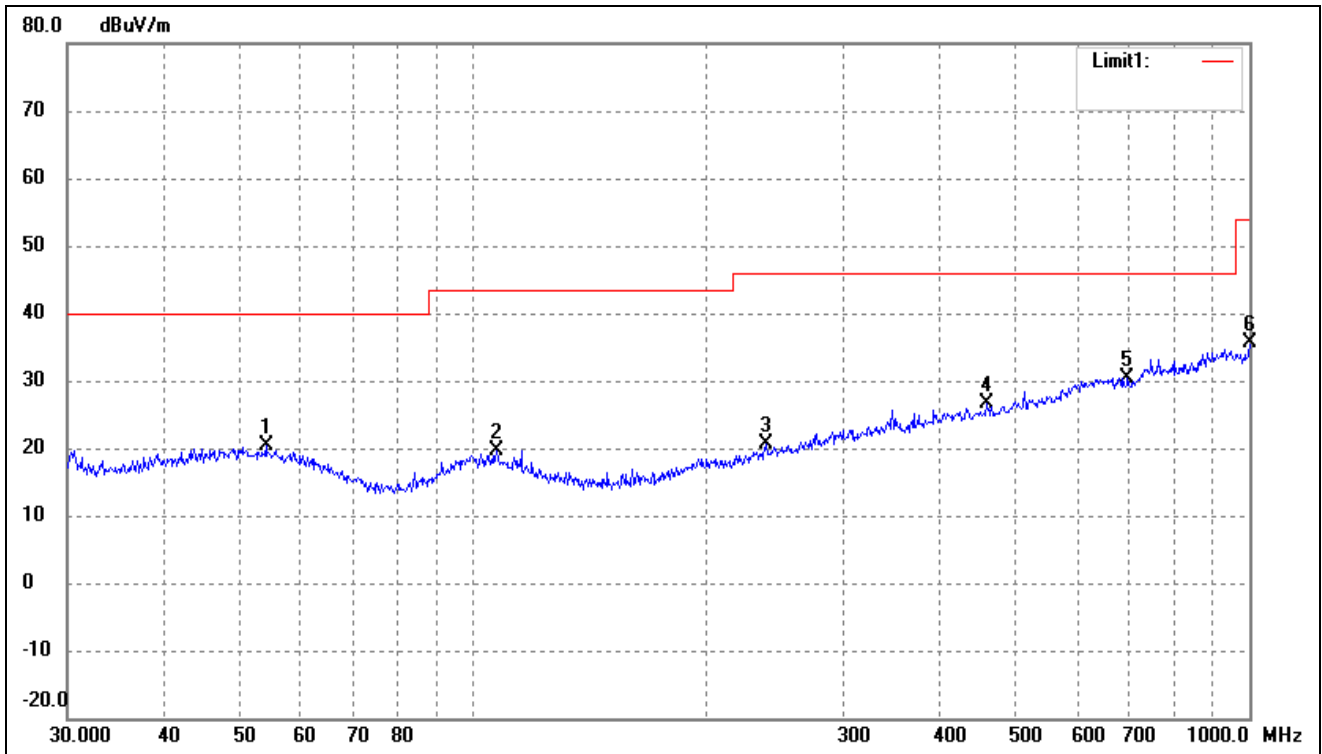
8.5 Summary of Test Results/Plots

Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

- Spurious Emission From 30MHz to 1GHz
- 5150-5250MHz

802.11a(Worst case)

Test Channel	5180MHz	Polarity:	Horizontal
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No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	54.0711	27.81	-7.52	20.29	40.00	-19.71	-	-	peak
2	107.1337	28.14	-8.51	19.63	43.50	-23.87	-	-	peak
3	238.3102	27.30	-6.74	20.56	46.00	-25.44	-	-	peak
4	459.1144	28.79	-2.05	26.74	46.00	-19.26	-	-	peak
5	696.8567	28.29	2.05	30.34	46.00	-15.66	-	-	peak
6	1000.0000	29.56	6.17	35.73	54.00	-18.27	-	-	peak

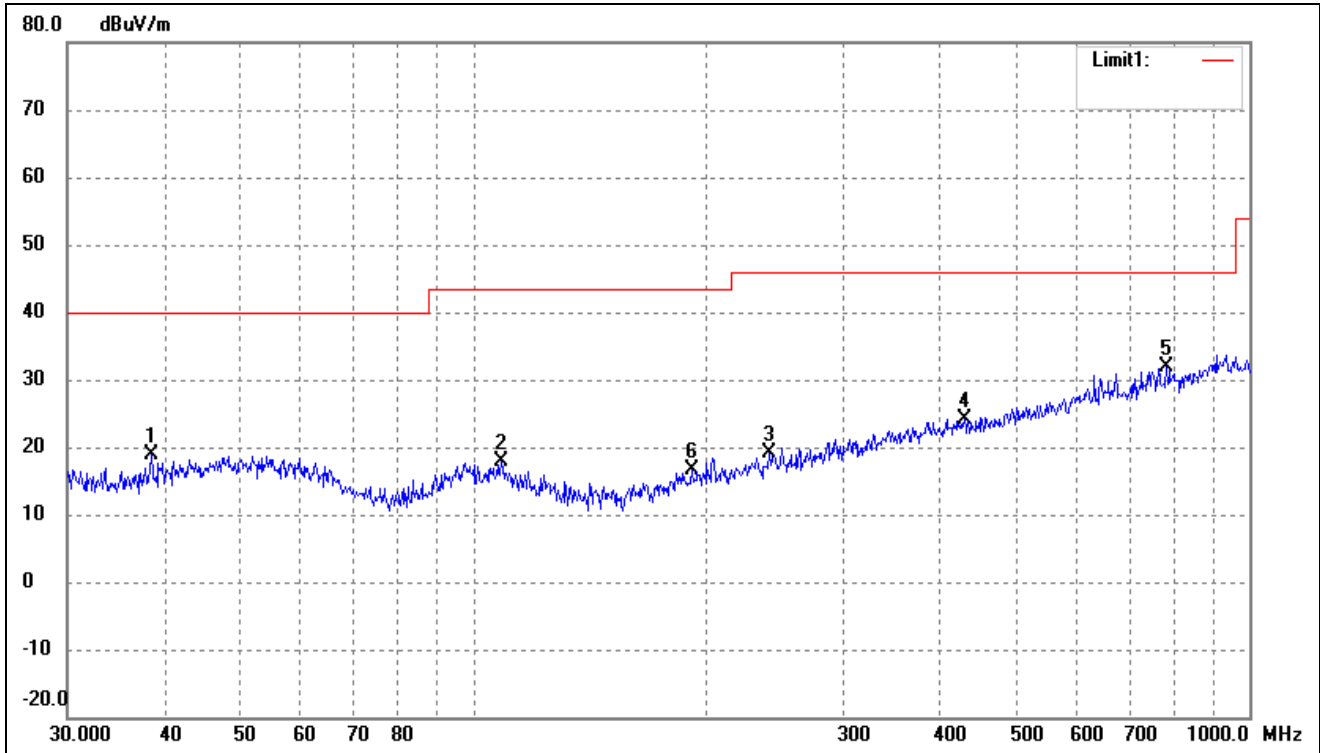
802.11a(Worst case)

Test Channel

5180MHz

Polarity:

Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	38.4809	27.69	-8.87	18.82	40.00	-21.18	-	-	peak
2	108.6470	26.41	-8.63	17.78	43.50	-25.72	-	-	peak
3	240.8304	25.86	-6.63	19.23	46.00	-26.77	-	-	peak
4	429.5228	26.19	-2.10	24.09	46.00	-21.91	-	-	peak
5	782.3453	27.85	4.08	31.93	46.00	-14.07	-	-	peak
6	191.0738	25.07	-8.53	16.54	43.50	-26.96	-	-	peak

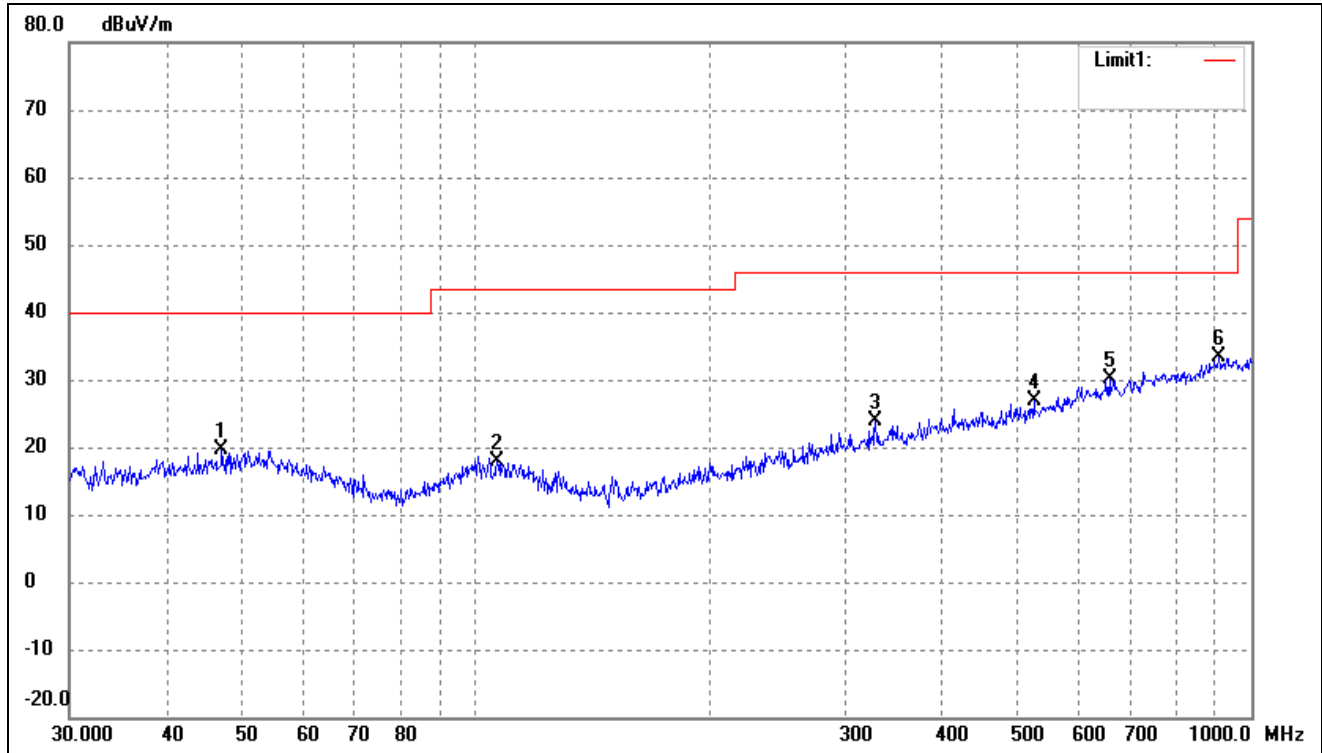
802.11a(Worst case)

Test Channel

5200MHz

Polarity:

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	47.1599	27.08	-7.48	19.60	40.00	-20.40	-	-	peak
2	106.7587	26.36	-8.51	17.85	43.50	-25.65	-	-	peak
3	327.8873	27.72	-3.93	23.79	46.00	-22.21	-	-	peak
4	524.5541	27.55	-0.78	26.77	46.00	-19.23	-	-	peak
5	656.5300	28.16	2.04	30.20	46.00	-15.80	-	-	peak
6	909.6667	27.26	6.18	33.44	46.00	-12.56	-	-	peak

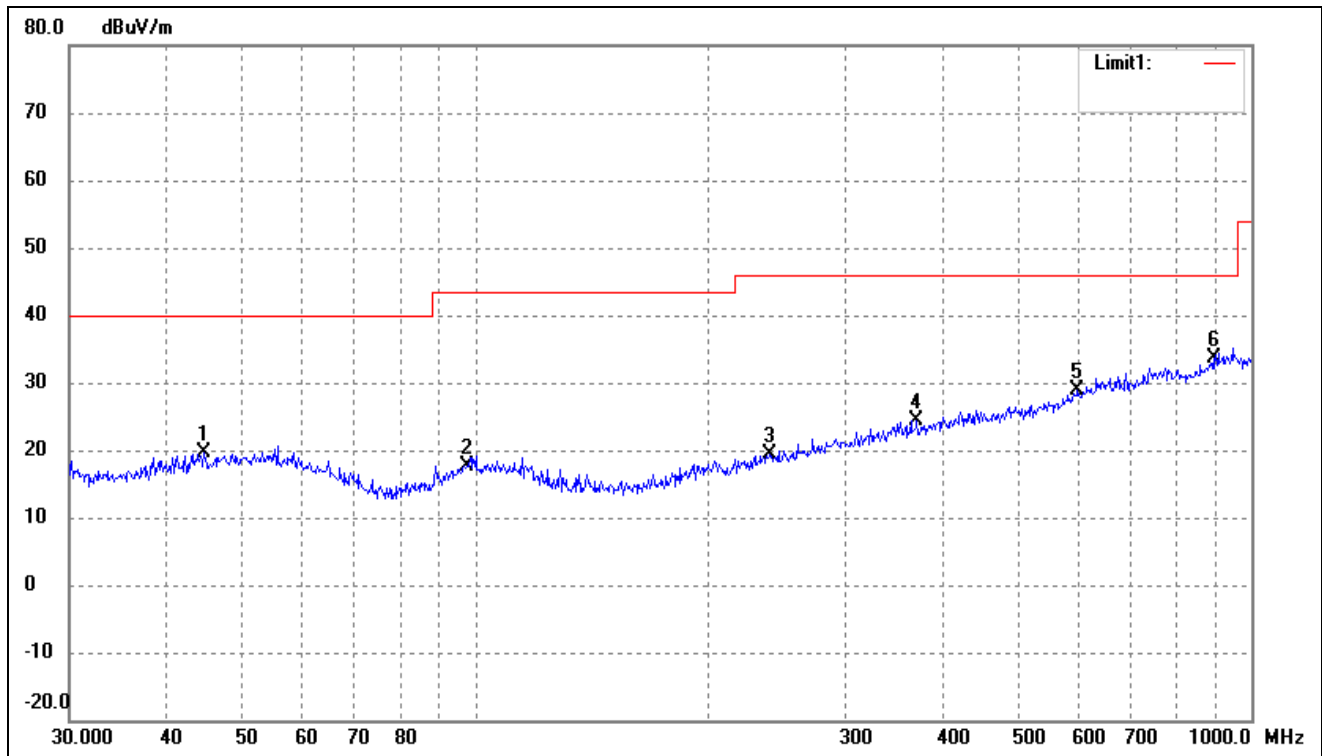
802.11a(Worst case)

Test Channel

5200MHz

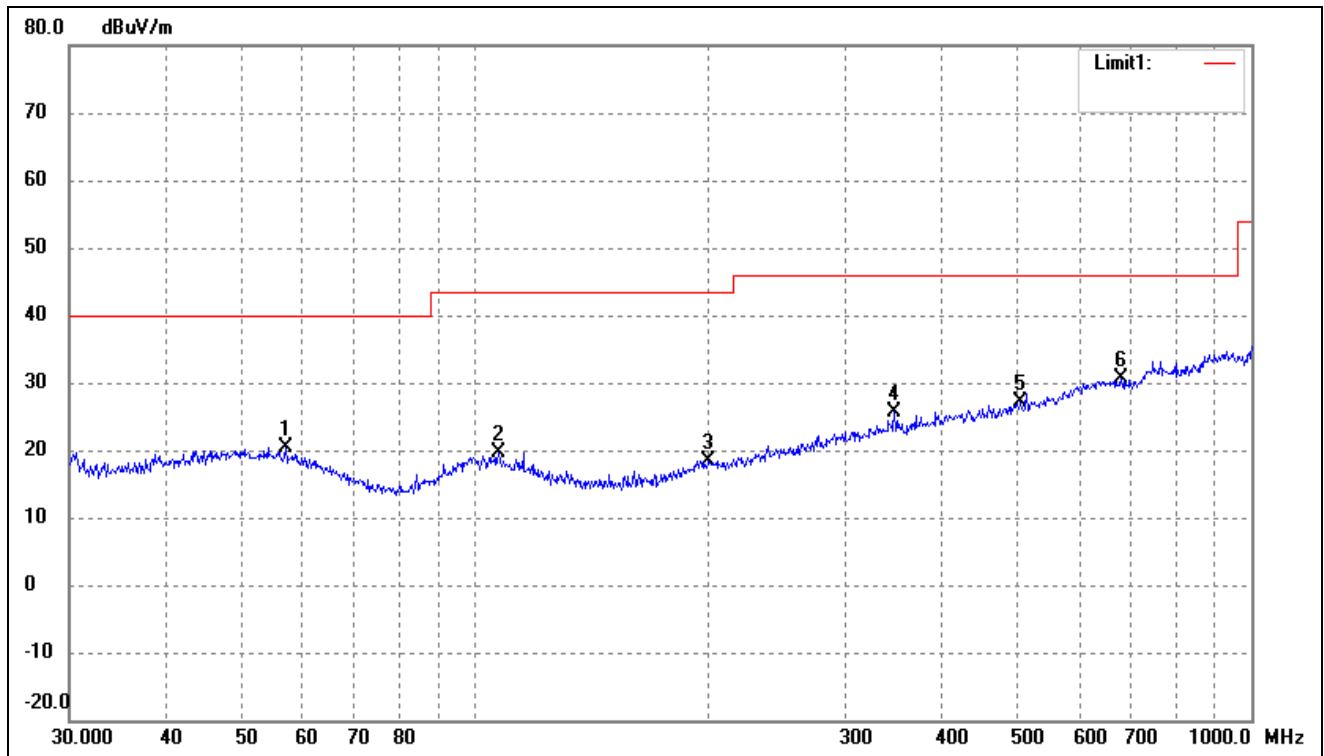
Polarity:

Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	44.7434	27.28	-7.75	19.53	40.00	-20.47	-	-	peak
2	97.4560	26.67	-8.97	17.70	43.50	-25.80	-	-	peak
3	239.9874	26.05	-6.67	19.38	46.00	-26.62	-	-	peak
4	370.7023	27.64	-3.29	24.35	46.00	-21.65	-	-	peak
5	597.2234	27.58	1.30	28.88	46.00	-17.12	-	-	peak
6	893.8567	27.64	5.88	33.52	46.00	-12.48	-	-	peak

802.11a(Worst case)			
Test Channel	5240MHz	Polarity:	Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	56.9912	28.26	-7.89	20.37	40.00	-19.63	-	-	peak
2	107.1337	28.14	-8.51	19.63	43.50	-23.87	-	-	peak
3	199.9856	26.51	-8.01	18.50	43.50	-25.00	-	-	peak
4	346.8092	29.00	-3.31	25.69	46.00	-20.31	-	-	peak
5	504.7062	28.20	-1.05	27.15	46.00	-18.85	-	-	peak
6	679.9600	28.49	2.03	30.52	46.00	-15.48	-	-	peak

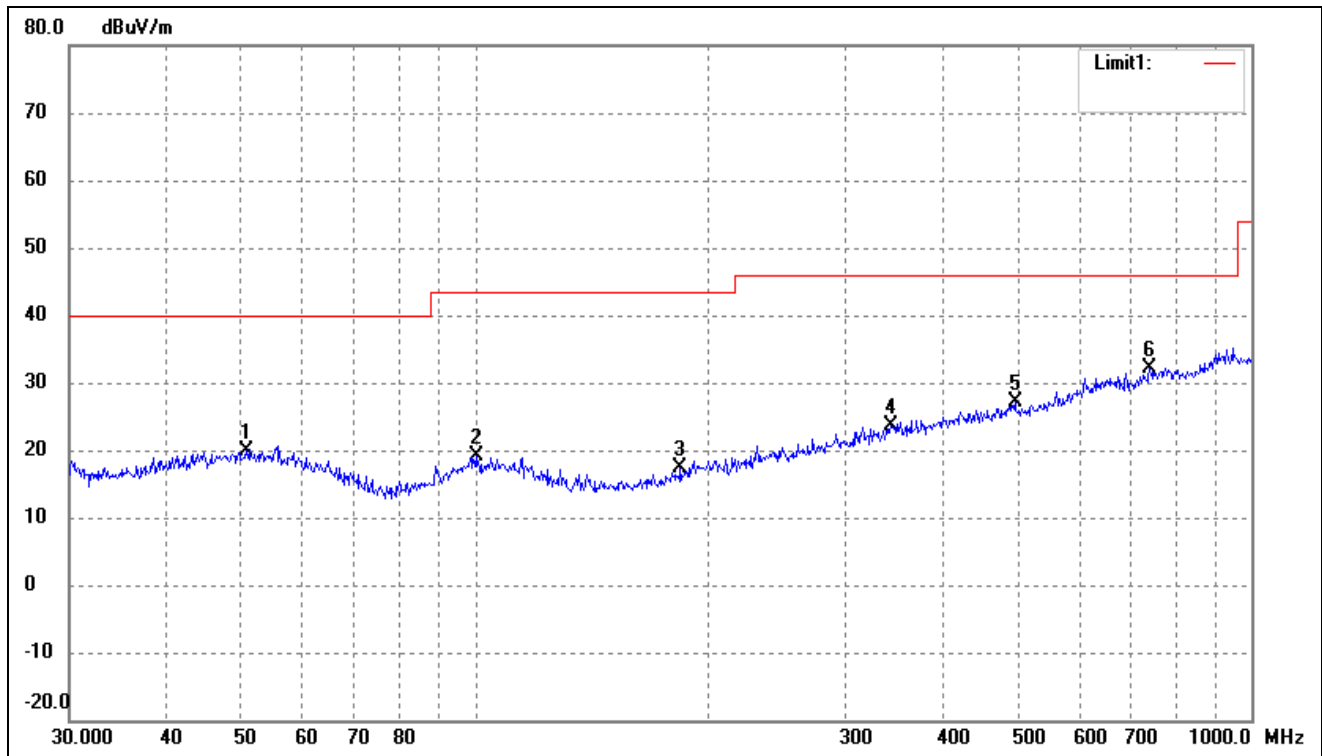
802.11a(Worst case)

Test Channel

5240MHz

Polarity:

Vertical

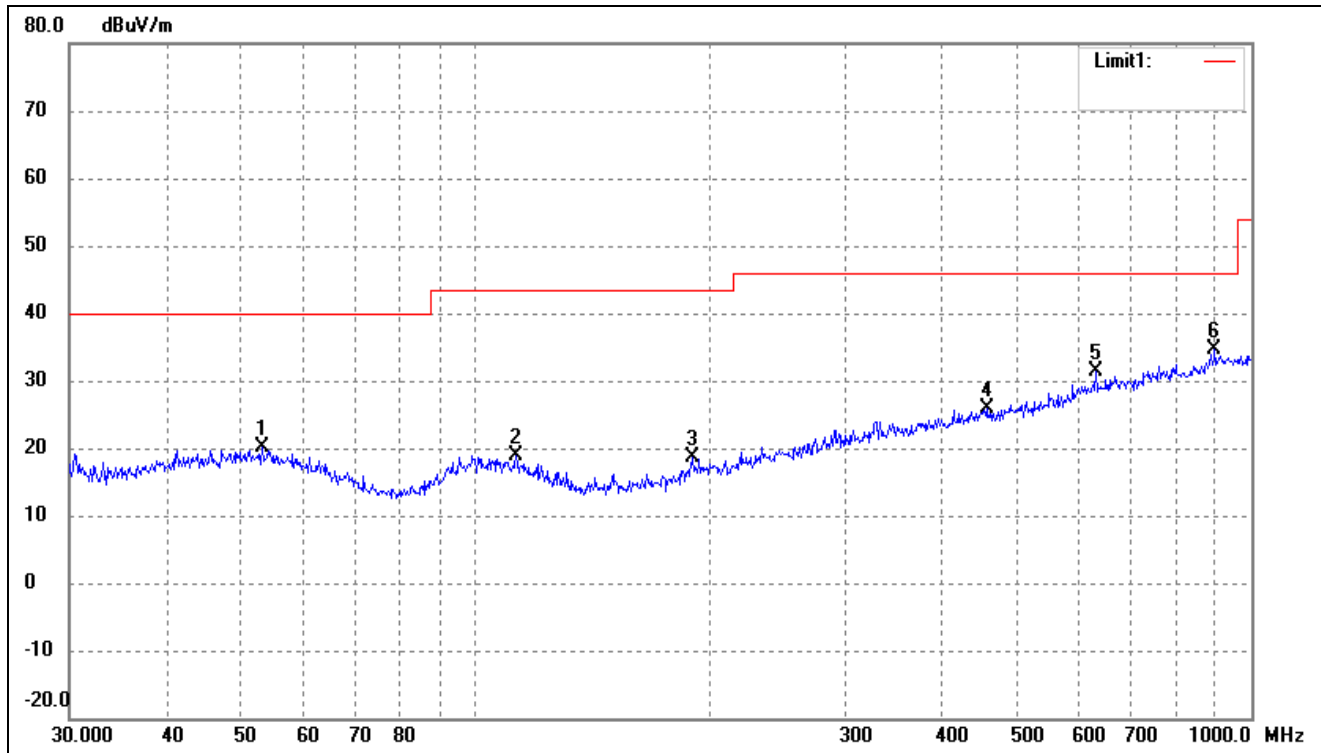


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	50.7637	27.36	-7.36	20.00	40.00	-20.00	-	-	peak
2	100.2286	27.67	-8.61	19.06	43.50	-24.44	-	-	peak
3	183.8440	26.75	-9.45	17.30	43.50	-26.20	-	-	peak
4	343.1800	27.02	-3.31	23.71	46.00	-22.29	-	-	peak
5	495.9344	28.14	-1.09	27.05	46.00	-18.95	-	-	peak
6	739.6605	28.47	3.67	32.14	46.00	-13.86	-	-	peak

➤ 5725-5850MHz

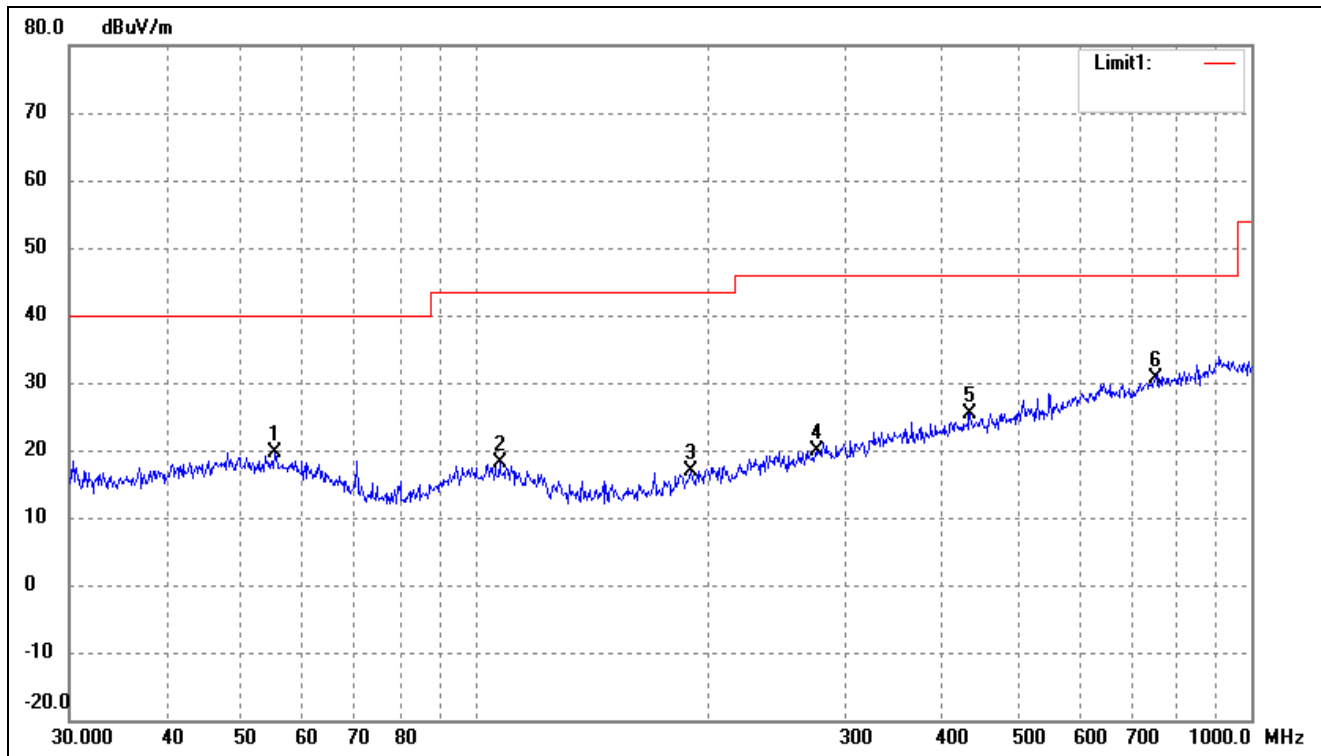
802.11a(worst case)

Test Channel	5745MHz	Polarity:	Horizontal
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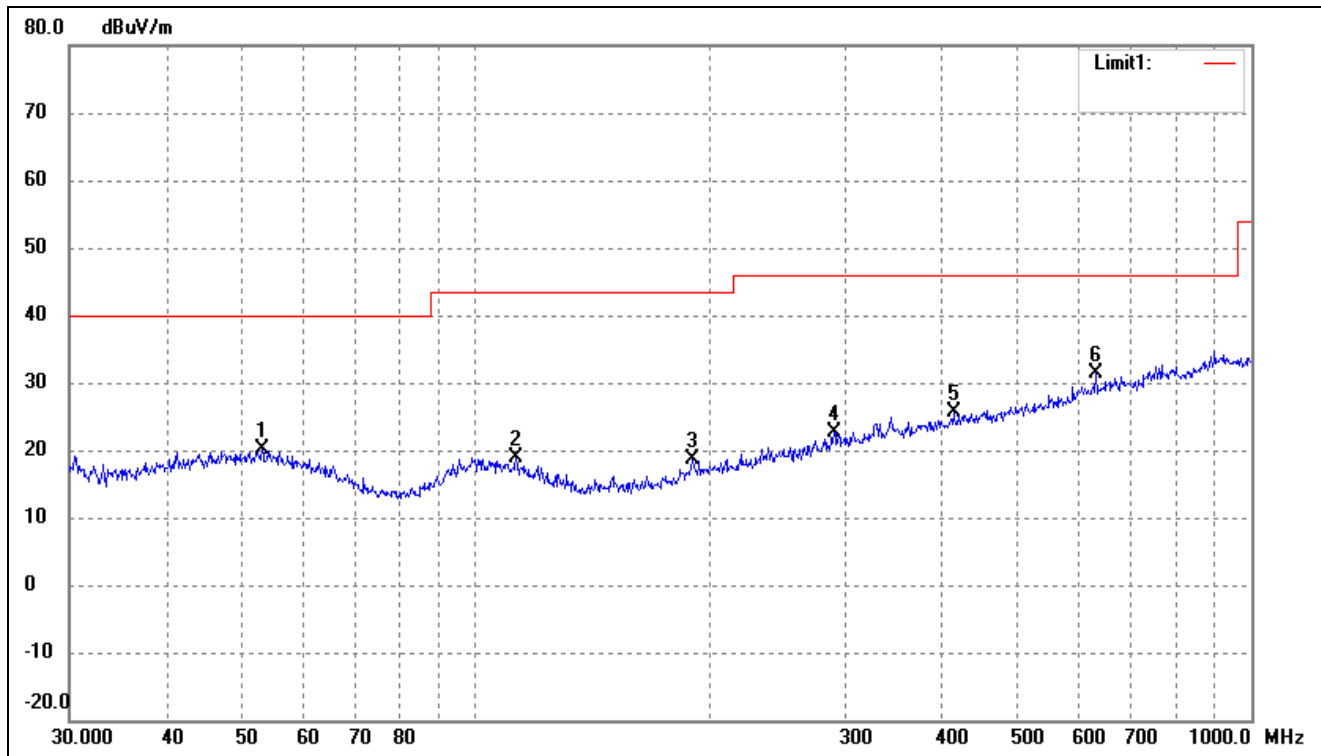
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	53.1313	27.48	-7.45	20.03	40.00	-19.97	-	-	peak
2	112.9196	27.98	-9.10	18.88	43.50	-24.62	-	-	peak
3	190.4050	27.32	-8.62	18.70	43.50	-24.80	-	-	peak
4	455.9058	27.98	-2.05	25.93	46.00	-20.07	-	-	peak
5	631.6884	29.77	1.58	31.35	46.00	-14.65	-	-	peak
6	896.9965	28.71	5.98	34.69	46.00	-11.31	-	-	peak

802.11a(worst case)			
Test Channel	5745MHz	Polarity:	Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	55.2207	27.26	-7.65	19.61	40.00	-20.39	-	-	peak
2	107.5101	26.62	-8.54	18.08	43.50	-25.42	-	-	peak
3	189.7385	25.66	-8.70	16.96	43.50	-26.54	-	-	peak
4	275.1570	25.55	-5.62	19.93	46.00	-26.07	-	-	peak
5	434.0651	27.58	-2.09	25.49	46.00	-20.51	-	-	peak
6	752.7432	26.87	3.86	30.73	46.00	-15.27	-	-	peak

802.11a(worst case)			
Test Channel	5785MHz	Polarity:	Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	53.1313	27.48	-7.45	20.03	40.00	-19.97	-	-	peak
2	112.9196	27.98	-9.10	18.88	43.50	-24.62	-	-	peak
3	190.4050	27.32	-8.62	18.70	43.50	-24.80	-	-	peak
4	290.0172	27.69	-4.96	22.73	46.00	-23.27	-	-	peak
5	413.2706	27.79	-2.27	25.52	46.00	-20.48	-	-	peak
6	631.6884	29.77	1.58	31.35	46.00	-14.65	-	-	peak

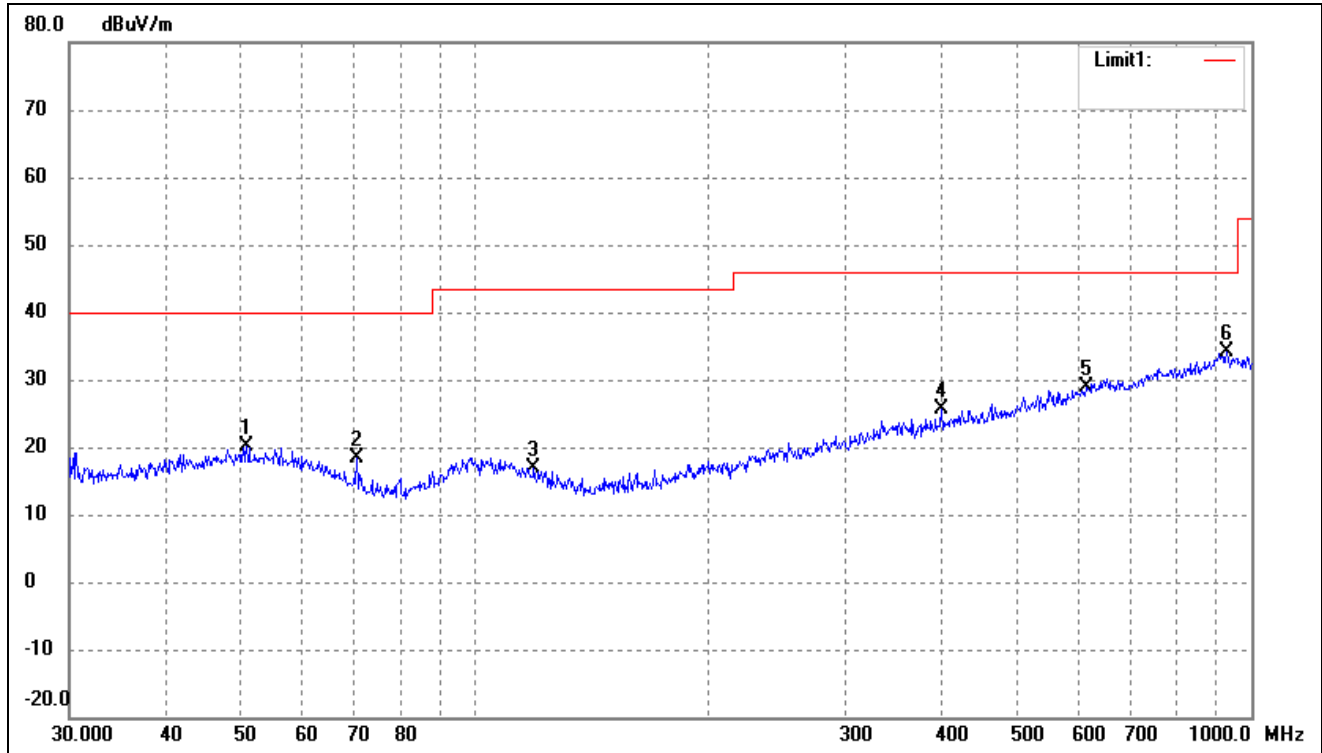
802.11a(worst case)

Test Channel

5785MHz

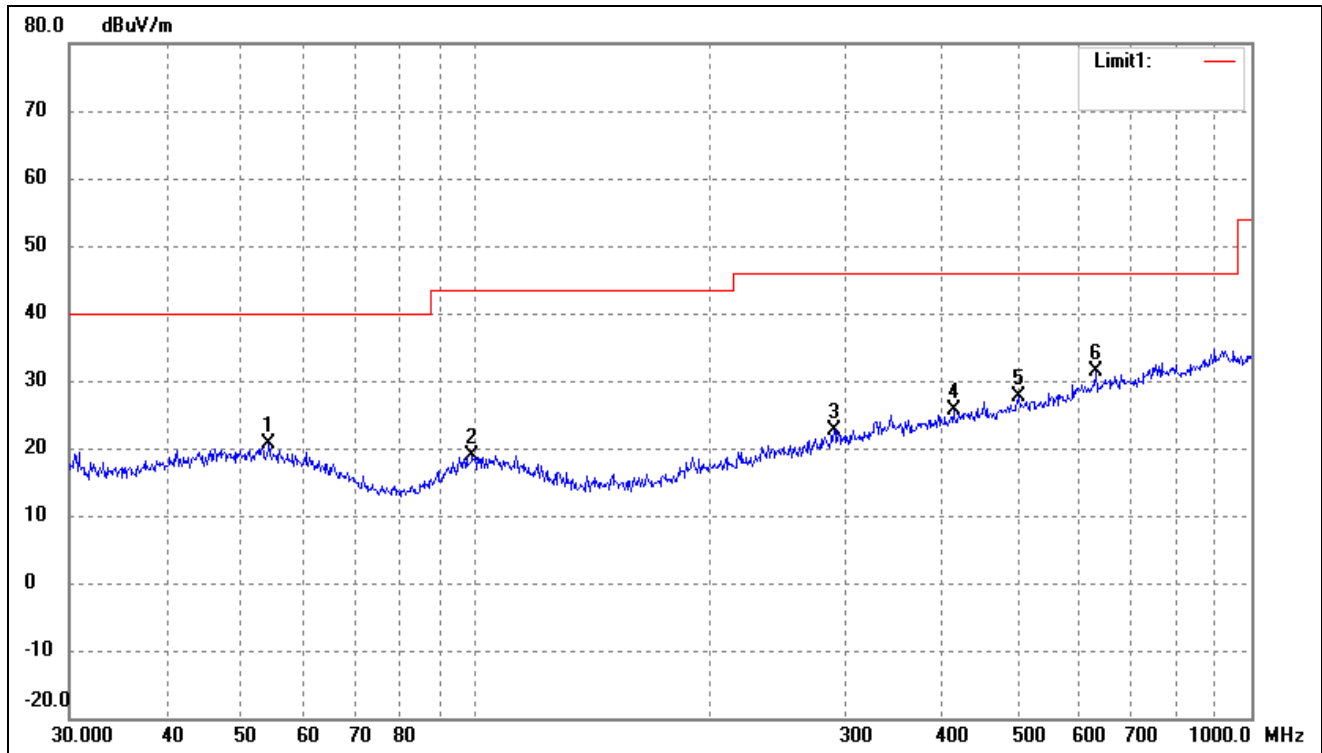
Polarity:

Vertical



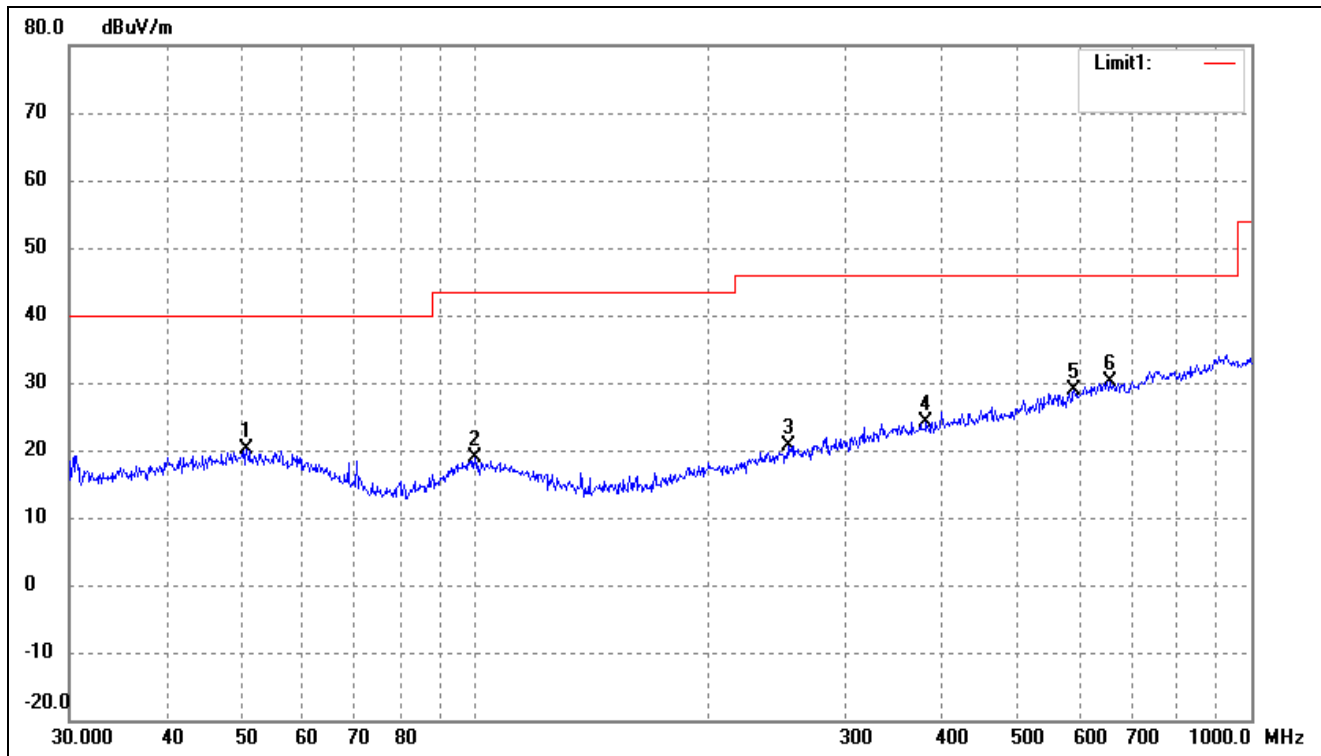
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	50.7637	27.40	-7.36	20.04	40.00	-19.96	-	-	peak
2	70.3365	29.90	-11.52	18.38	40.00	-21.62	-	-	peak
3	119.0180	26.88	-9.97	16.91	43.50	-26.59	-	-	peak
4	399.0302	28.14	-2.57	25.57	46.00	-20.43	-	-	peak
5	612.0642	27.36	1.52	28.88	46.00	-17.12	-	-	peak
6	929.0082	27.91	6.21	34.12	46.00	-11.88	-	-	peak

802.11a(worst case)			
Test Channel	5825MHz	Polarity:	Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	54.2610	28.22	-7.53	20.69	40.00	-19.31	-	-	peak
2	99.1797	27.50	-8.71	18.79	43.50	-24.71	-	-	peak
3	290.0172	27.69	-4.96	22.73	46.00	-23.27	-	-	peak
4	413.2706	27.79	-2.27	25.52	46.00	-20.48	-	-	peak
5	501.1790	28.72	-1.08	27.64	46.00	-18.36	-	-	peak
6	631.6884	29.77	1.58	31.35	46.00	-14.65	-	-	peak

802.11a(worst case)			
Test Channel	5825MHz	Polarity:	Vertical

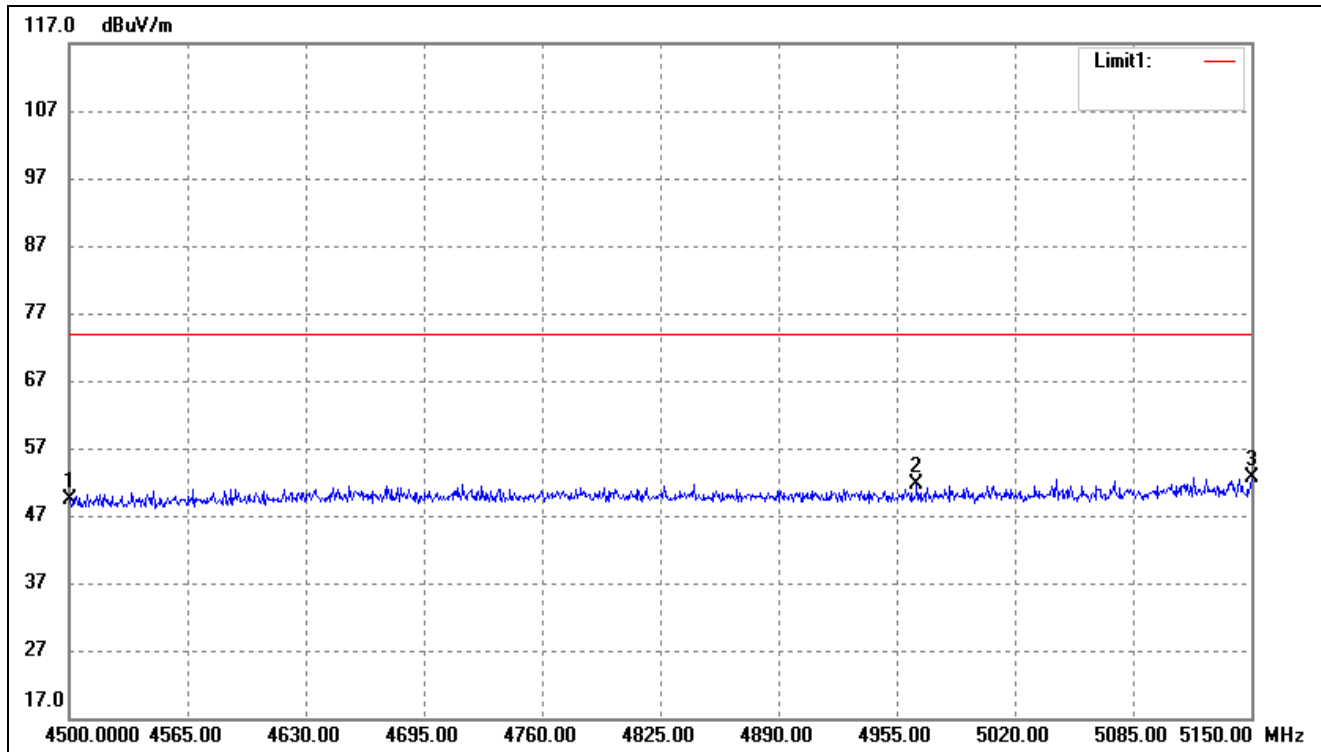


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	50.7637	27.40	-7.36	20.04	40.00	-19.96	-	-	peak
2	99.8777	27.54	-8.63	18.91	43.50	-24.59	-	-	peak
3	252.9482	26.94	-6.34	20.60	46.00	-25.40	-	-	peak
4	381.2487	27.19	-3.03	24.16	46.00	-21.84	-	-	peak
5	590.9737	27.78	0.99	28.77	46.00	-17.23	-	-	peak
6	656.5300	28.07	2.04	30.11	46.00	-15.89	-	-	peak

Remark: '-' Means' the test Degree and Height are not recorded by the test software and only show the worst case in the test report.

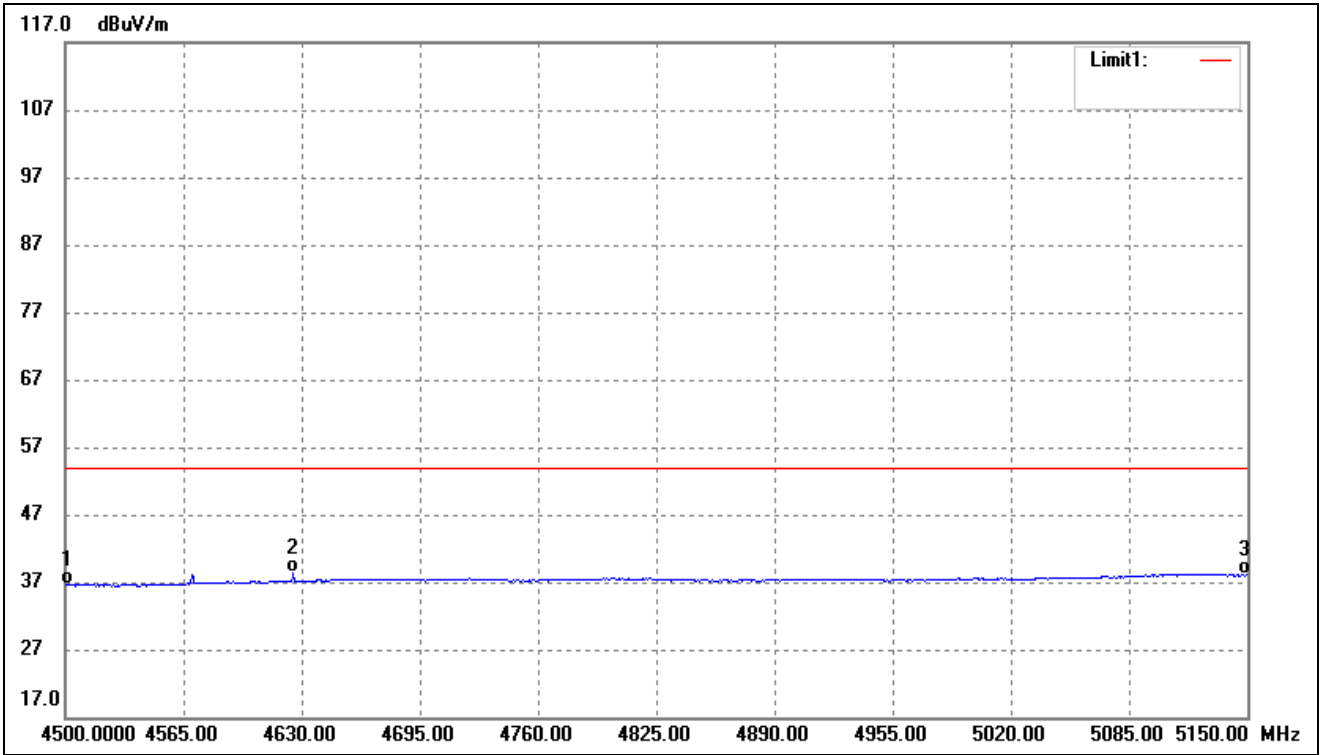
➤ Spurious Emission above 1GHz

802.11a- Restricted Bandedge			
Test Channel	band 5.15-5.25GHz	Polarity:	Horizontal(worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	4500.000	52.72	-3.45	49.27	74.00	-24.73	-	-	peak
2	4966.050	54.23	-2.54	51.69	74.00	-22.31	-	-	peak
3	5150.000	54.84	-2.23	52.61	74.00	-21.39	-	-	peak

802.11a- Restricted Bandedge			
Test Channel	band 5.15-5.25GHz	Polarity:	Horizontal(worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (□)	Height (cm)	Remark
1	4500.000	40.02	-3.45	36.57	54.00	-17.43	-	-	AVG
2	4625.450	41.51	-3.20	38.31	54.00	-15.69	-	-	AVG
3	5150.000	40.24	-2.23	38.01	54.00	-15.99	-	-	AVG

Note: The Restricted Bandedge was tested in Horizontal /Vertical and the worst case position data was reported.

Remark: '- 'Means' the test Degree and Height is not recorded by the test software and only show the worst case in the test report.

- For the frequency band 5.15-5.25GHz, 5.725-5.850GHz (802.11a)
- Harmonics And Spurious Emissions

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5180MHz)							
10360	54.37	7.11	61.48	74	-12.52	H	PK
10360	39.21	7.11	46.32	54	-7.68	H	AV
10360	52.87	7.11	59.98	74	-14.02	V	PK
10360	37.25	7.11	44.36	54	-9.64	V	AV
Middle Channel (5200MHz)							
10400	53.30	7.22	60.52	74	-13.48	H	PK
10400	37.94	7.22	45.16	54	-8.84	H	AV
10400	55.59	7.22	62.81	74	-11.19	V	PK
10400	40.32	7.22	47.54	54	-6.46	V	AV
High Channel (5240MHz)							
10480	55.11	7.69	62.80	74	-11.20	H	PK
10480	38.51	7.69	46.20	54	-7.80	H	AV
10480	51.22	7.69	58.91	74	-15.09	V	PK
10480	40.63	7.69	48.32	54	-5.68	V	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5745MHz)							
11490	53.63	9.45	63.08	74	-10.92	H	PK
11490	39.43	9.45	48.88	54	-5.12	H	AV
11490	55.04	9.45	64.49	74	-9.51	V	PK
11490	39.53	9.45	48.98	54	-5.02	V	AV
Middle Channel (5785MHz)							
11570	51.79	9.62	61.41	74	-12.59	H	PK
11570	39.48	9.62	49.10	54	-4.90	H	AV
11570	54.75	9.62	64.37	74	-9.63	V	PK
11570	36.99	9.62	46.61	54	-7.39	V	AV
High Channel (5825MHz)							
11650	52.51	9.84	62.35	74	-11.65	H	PK
11650	37.09	9.84	46.93	54	-7.07	H	AV
11650	50.83	9.84	60.67	74	-13.33	V	PK
11650	38.55	9.84	48.39	54	-5.61	V	AV

➤ Out of Band edge for 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-42.49	-27
Highest	Above 5350	-41.67	-27
Note: the data just list the worst cases			

➤ Out of Band edge for 5725-5850MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5650	-45.80	-27
	5650 to 5700	-35.61	-27 to -17
	5700 to 5720	-28.95	-17 to 15.6
	5720 to 5725	-16.99	15.6 to 27
Highest	5850 to 5855	-14.92	27 to 15.6
	5855 to 5875	-26.16	15.6 to -17
	5875 to 5925	-36.25	-17 to -27
	Above 5925	-39.48	-27
Note: the data just list the worst cases			

- For the frequency band 5.15-5.25GHz, 5.725-5.850GHz (802.11n HT20)
- Harmonics And Spurious Emissions

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5180MHz)							
10360	52.84	7.11	59.95	74	-14.05	H	PK
10360	38.84	7.11	45.95	54	-8.05	H	AV
10360	54.75	7.11	61.86	74	-12.14	V	PK
10360	40.11	7.11	47.22	54	-6.78	V	AV
Middle Channel (5200MHz)							
10400	56.25	7.22	63.47	74	-10.53	H	PK
10400	39.85	7.22	47.07	54	-6.93	H	AV
10400	52.09	7.22	59.31	74	-14.69	V	PK
10400	38.91	7.22	46.13	54	-7.87	V	AV
High Channel (5240MHz)							
10480	53.89	7.69	61.58	74	-12.42	H	PK
10480	37.85	7.69	45.54	54	-8.46	H	AV
10480	55.08	7.69	62.77	74	-11.23	V	PK
10480	38.29	7.69	45.98	54	-8.02	V	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5745MHz)							
11490	51.55	9.45	61.00	74	-13.00	H	PK
11490	38.29	9.45	47.74	54	-6.26	H	AV
11490	53.31	9.45	62.76	74	-11.24	V	PK
11490	37.91	9.45	47.36	54	-6.64	V	AV
Middle Channel (5785MHz)							
11570	55.41	9.62	65.03	74	-8.97	H	PK
11570	39.69	9.62	49.31	54	-4.69	H	AV
11570	52.13	9.62	61.75	74	-12.25	V	PK
11570	40.12	9.62	49.74	54	-4.26	V	AV
High Channel (5825MHz)							
11650	55.37	9.84	65.21	74	-8.79	H	PK
11650	38.90	9.84	48.74	54	-5.26	H	AV
11650	53.54	9.84	63.38	74	-10.62	V	PK
11650	37.15	9.84	46.99	54	-7.01	V	AV

➤ Out of Band edge 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-39.55	-27
Highest	Above 5350	-41.80	-27
Note: the data just list the worst cases			

➤ Out of Band edge for 5725-5850MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5650	-45.83	-27
	5650 to 5700	-36.50	-27 to -17
	5700 to 5720	-29.56	-17 to 15.6
	5720 to 5725	-18.05	15.6 to 27
Highest	5850 to 5855	-15.30	27 to 15.6
	5855 to 5875	-27.23	15.6 to -17
	5875 to 5925	-35.41	-17 to -27
	Above 5925	-39.24	-27
Note: the data just list the worst cases			

- For the frequency band 5.15-5.25GHz, 5.725-5.850GHz (802.11ac-VHT20)
- Harmonics And Spurious Emissions

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5180MHz)							
10360	53.53	7.11	60.64	74	-13.36	H	PK
10360	37.68	7.11	44.79	54	-9.21	H	AV
10360	54.35	7.11	61.46	74	-12.54	V	PK
10360	39.22	7.11	46.33	54	-7.67	V	AV
Middle Channel (5200MHz)							
10400	55.38	7.22	62.60	74	-11.40	H	PK
10400	40.68	7.22	47.90	54	-6.10	H	AV
10400	50.76	7.22	57.98	74	-16.02	V	PK
10400	39.94	7.22	47.16	54	-6.84	V	AV
High Channel (5240MHz)							
10480	53.06	7.69	60.75	74	-13.25	H	PK
10480	38.37	7.69	46.06	54	-7.94	H	AV
10480	56.57	7.69	64.26	74	-9.74	V	PK
10480	38.52	7.69	46.21	54	-7.79	V	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5745MHz)							
11490	50.20	9.45	59.65	74	-14.35	H	PK
11490	38.26	9.45	47.71	54	-6.29	H	AV
11490	52.14	9.45	61.59	74	-12.41	V	PK
11490	39.24	9.45	48.69	54	-5.31	V	AV
Middle Channel (5785MHz)							
11570	56.74	9.62	66.36	74	-7.64	H	PK
11570	40.17	9.62	49.79	54	-4.21	H	AV
11570	52.02	9.62	61.64	74	-12.36	V	PK
11570	39.18	9.62	48.80	54	-5.20	V	AV
High Channel (5825MHz)							
11650	55.29	9.84	65.13	74	-8.87	H	PK
11650	38.55	9.84	48.39	54	-5.61	H	AV
11650	52.39	9.84	62.23	74	-11.77	V	PK
11650	38.50	9.84	48.34	54	-5.66	V	AV

➤ Out of Band edge 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-39.31	-27
Highest	Above 5350	-40.65	-27
Note: the data just list the worst cases			

➤ Out of Band edge for 5725-5850MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5650	-46.68	-27
	5650 to 5700	-36.96	-27 to -17
	5700 to 5720	-29.91	-17 to 15.6
	5720 to 5725	-17.64	15.6 to 27
Highest	5850 to 5855	-14.67	27 to 15.6
	5855 to 5875	-28.01	15.6 to -17
	5875 to 5925	-36.23	-17 to -27
	Above 5925	-38.77	-27
Note: the data just list the worst cases			

- For the frequency band 5.15-5.25GHz, 5.725-5.850GHz (802.11n HT40)
- Harmonics And Spurious Emissions

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5190MHz)							
10380	54.18	7.89	62.07	74	-11.93	H	PK
10380	39.14	7.89	47.03	54	-6.97	H	AV
10380	53.81	7.89	61.70	74	-12.30	V	PK
10380	41.66	7.89	49.55	54	-4.45	V	AV
High Channel (5230MHz)							
10460	53.73	7.97	61.70	74	-12.30	H	PK
10460	39.77	7.97	47.74	54	-6.26	H	AV
10460	53.19	7.97	61.16	74	-12.84	V	PK
10460	38.41	7.97	46.38	54	-7.62	V	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5755MHz)							
11510	53.44	9.45	62.89	74	-11.11	H	PK
11510	39.78	9.45	49.23	54	-4.77	H	AV
11510	53.72	9.45	63.17	74	-10.83	V	PK
11510	40.45	9.45	49.90	54	-4.10	V	AV
High Channel (5795MHz)							
11590	52.38	9.27	61.65	74	-12.35	H	PK
11590	40.41	9.27	49.68	54	-4.32	H	AV
11590	53.36	9.27	62.63	74	-11.37	V	PK
11590	36.50	9.27	45.77	54	-8.23	V	AV

➤ Out of Band edge for 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-39.50	-27
Highest	Above 5350	-37.88	-27
Note: the data just list the worst cases			

➤ Out of Band edge for 5725-5850MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5650	-46.94	-27
	5650 to 5700	-35.19	-27 to -17
	5700 to 5720	-27.97	-17 to 15.6
	5720 to 5725	-18.71	15.6 to 27
Highest	5850 to 5855	-13.76	27 to 15.6
	5855 to 5875	-25.77	15.6 to -17
	5875 to 5925	-34.20	-17 to -27
	Above 5925	-40.07	-27
Note: the data just list the worst cases			

- For the frequency band 5.15-5.25GHz, 5.725-5.850GHz (802.11ac-VHT40)
- Harmonics And Spurious Emissions

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5190MHz)							
10380	53.04	7.89	60.93	74	-13.07	H	PK
10380	39.34	7.89	47.23	54	-6.77	H	AV
10380	53.71	7.89	61.60	74	-12.40	V	PK
10380	41.19	7.89	49.08	54	-4.92	V	AV
High Channel (5230MHz)							
10460	53.73	7.97	61.70	74	-12.30	H	PK
10460	39.93	7.97	47.90	54	-6.10	H	AV
10460	52.96	7.97	60.93	74	-13.07	V	PK
10460	38.34	7.97	46.31	54	-7.69	V	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5755MHz)							
11510	52.15	9.45	61.60	74	-12.40	H	PK
11510	39.48	9.45	48.93	54	-5.07	H	AV
11510	52.39	9.45	61.84	74	-12.16	V	PK
11510	39.92	9.45	49.37	54	-4.63	V	AV
High Channel (5795MHz)							
11590	52.14	9.27	61.41	74	-12.59	H	PK
11590	39.00	9.27	48.27	54	-5.73	H	AV
11590	54.40	9.27	63.67	74	-10.33	V	PK
11590	37.65	9.27	46.92	54	-7.08	V	AV

➤ Out of Band edge for 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-38.77	-27
Highest	Above 5350	-38.53	-27
Note: the data just list the worst cases			

➤ Out of Band edge for 5725-5850MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5650	-47.09	-27
	5650 to 5700	-35.55	-27 to -17
	5700 to 5720	-27.31	-17 to 15.6
	5720 to 5725	-17.86	15.6 to 27
Highest	5850 to 5855	-13.79	27 to 15.6
	5855 to 5875	-26.31	15.6 to -17
	5875 to 5925	-33.47	-17 to -27
	Above 5925	-40.55	-27
Note: the data just list the worst cases			

- For the frequency band 5.15-5.25GHz, 5.725-5.850GHz (802.11ac-VHT80)
- Harmonics And Spurious Emissions

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
5210MHz							
10420	55.52	7.53	63.05	74	-10.95	H	PK
10420	38.26	7.53	45.79	54	-8.21	H	AV
10420	53.73	7.53	61.26	74	-12.74	H	PK
10420	40.36	7.53	47.89	54	-6.11	H	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
5775MHz							
11550	56.71	9.93	66.64	74	-7.36	H	PK
11550	37.36	9.93	47.29	54	-6.71	H	AV
11550	53.50	9.93	63.43	74	-10.57	V	PK
11550	39.18	9.93	49.11	54	-4.89	V	AV

- Out of Band edge for 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-36.64	-27
Highest	Above 5350	-36.38	-27
Note: the data just list the worst cases			

- Out of Band edge for 5725-5850MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5650	-45.91	-27
	5650 to 5700	-36.79	-27 to -17
	5700 to 5720	-28.27	-17 to 15.6
	5720 to 5725	-18.98	15.6 to 27
Highest	5850 to 5855	-15.58	27 to 15.6
	5855 to 5875	-25.81	15.6 to -17
	5875 to 5925	-35.82	-17 to -27
	Above 5925	-40.22	-27
Note: the data just list the worst cases			

Note: Testing is carried out with frequency rang 9kHz to 40Ghz, other than listed in the table above are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

9. Frequency Stability

9.1 Standard Applicable

According to §15.407(g), 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.

9.2 Test Procedure

According to §2.1055, the following test procedure was performed.

The Frequency Stability is measured directly with a Frequency Domain Analyzer. Frequency Deviation in ppm is calculated from the measured peak to peak value.

The Carrier Frequency Stability over Power Supply Voltage and over Temperature is measured with a Frequency Domain Analyzer in histogram mode.

9.3 Summary of Test Results/Plots

Please refer to Appendix D

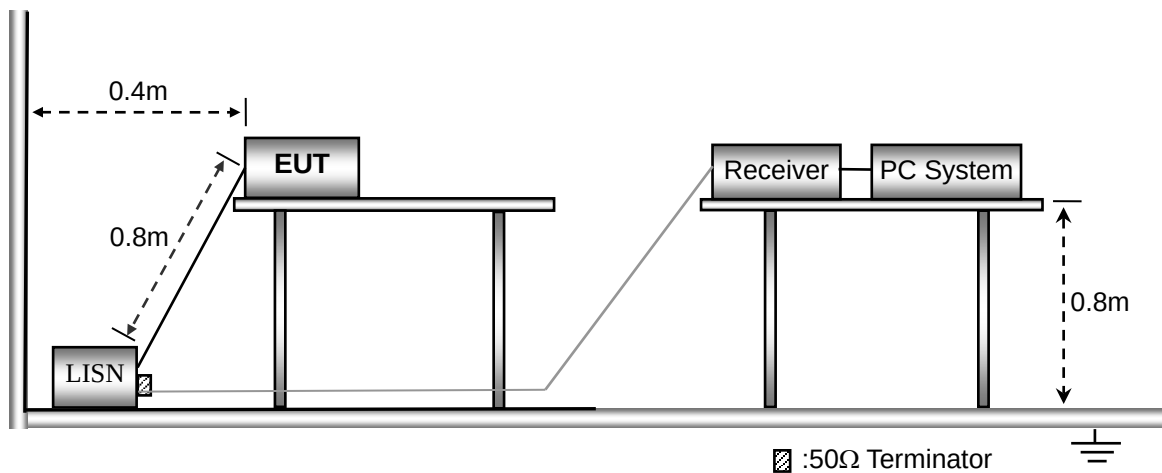
10. Conducted Emissions

10.1 Test Procedure

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

The external I/O cables were draped along the test table and formed a bundle 30 to 40cm long in the middle. The spacing between the peripherals was 10cm.

10.2 Basic Test Setup Block Diagram



10.3 Test Receiver Setup

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

Start Frequency	150kHz
Stop Frequency	30MHz
Sweep Speed	Auto
IF Bandwidth.....	10kHz
Quasi-Peak Adapter Bandwidth	9kHz
Quasi-Peak Adapter Mode	Normal

10.4 Summary of Test Results/Plots

Not applicable

APPENDIX SUMMARY

Project No.	WTX23X05115369W	Test Engineer	BAldi Zhong
Start date	2023/6/28	Finish date	2023/7/4
Temperature	25℃	Humidity	61%
RF specifications	U-NII		

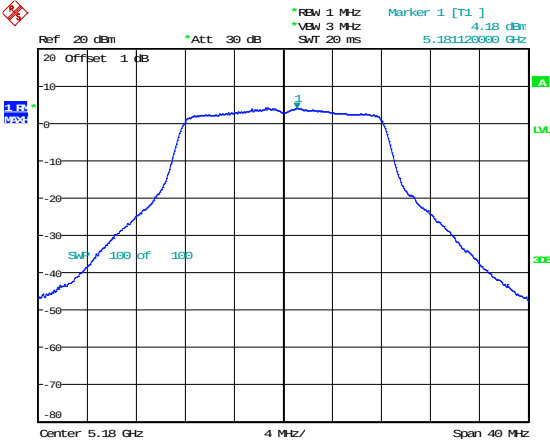
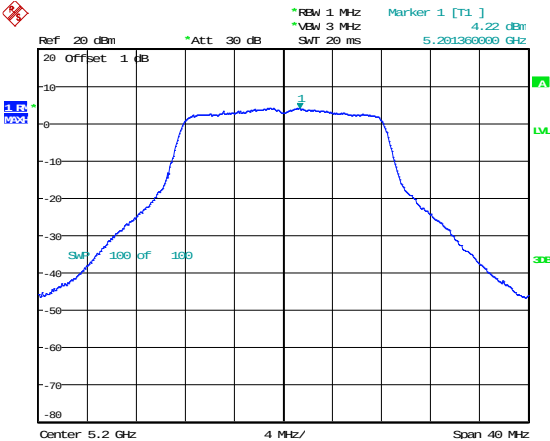
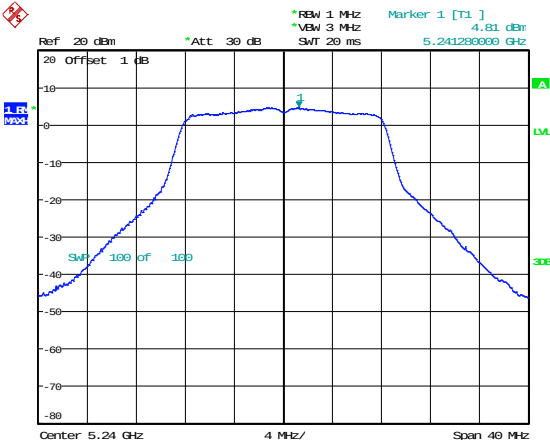
APPENDIX	Description of Test Item	Result
A	Power Spectral Density	Compliant
B	Emission Bandwidth and Occupied Bandwidth	Compliant
C	Maximum Conducted Output Power	Compliant
D	Frequency Stability	Compliant

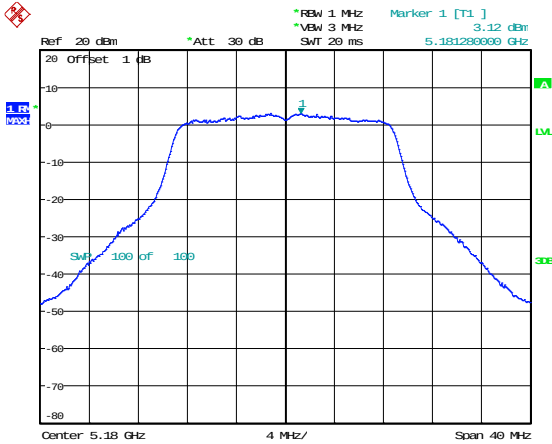
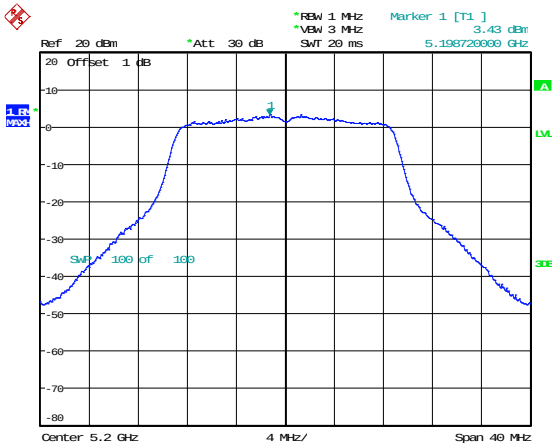
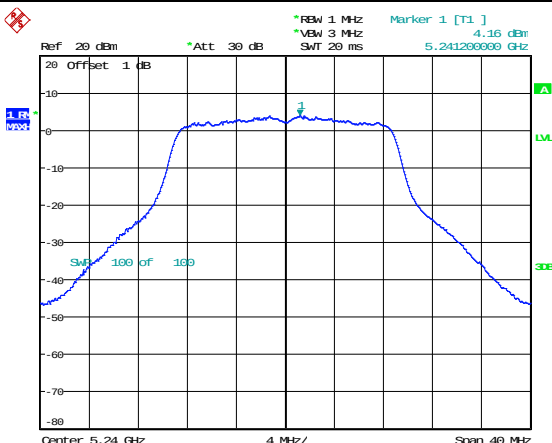
APPENDIX A

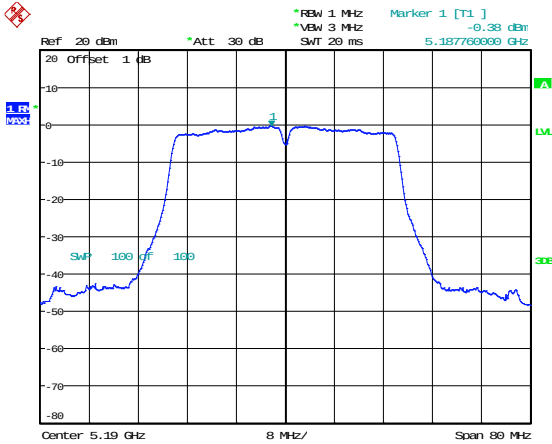
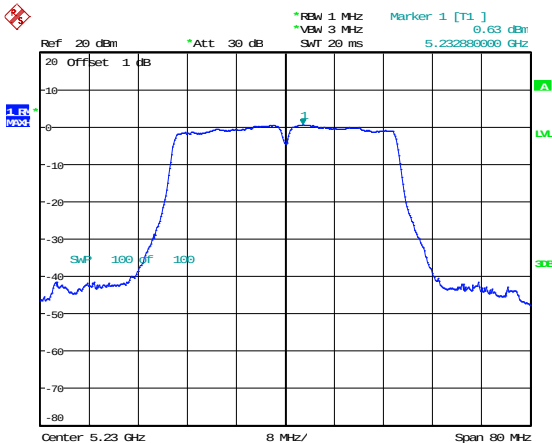
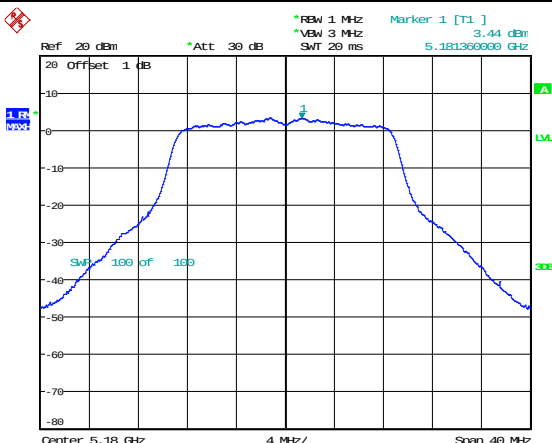
Power Spectral Density			
U-NII-1:5150-5250MHz			
Operating mode	Test Channel	Power Spectral Density dBm/MHz	Limit (dBm/MHz)
802.11a	5180	4.18	11
	5200	4.22	11
	5240	4.81	11
802.11n-HT20	5180	3.12	11
	5200	3.43	11
	5240	4.16	11
802.11n-HT40	5190	-0.38	11
	5230	0.63	11
802.11ac-VHT20	5180	3.44	11
	5200	3.59	11
	5240	3.79	11
802.11ac-VHT40	5190	-0.39	11
	5230	0.48	11
802.11ac-VHT80	5210	-3.35	11

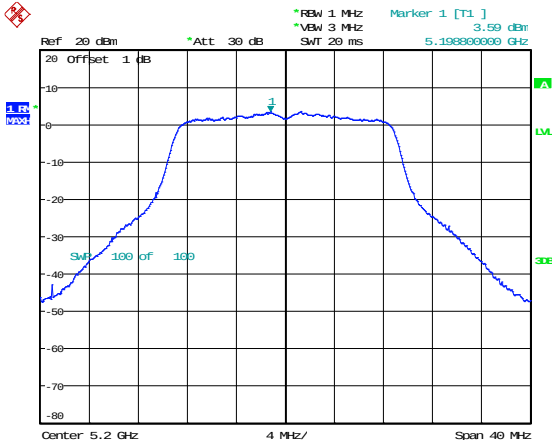
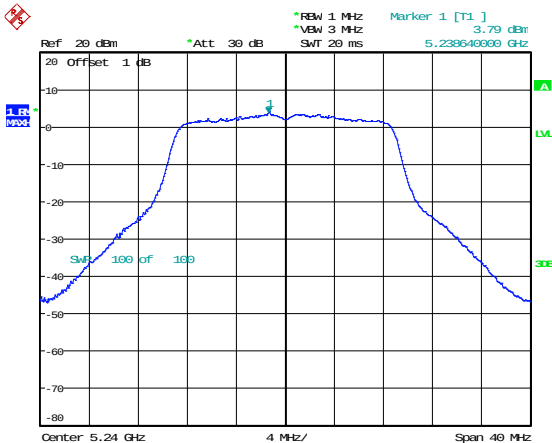
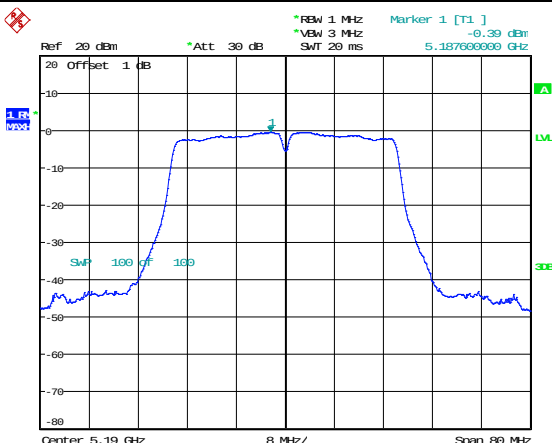
U-NII-3: 5725-5850MHz					
Operating mode	Test Channel	Power Spectral Density dBm/300kHz	Factor	Power Spectral Density* dBm/500kHz	Limit dBm/500kHz
802.11a	5745	3.28	2.22	5.50	30
	5785	3.59	2.22	5.81	30
	5825	3.37	2.22	5.59	30
802.11n-HT20	5745	2.68	2.22	4.90	30
	5785	3.67	2.22	5.89	30
	5825	2.56	2.22	4.78	30
802.11n HT40	5755	-1.13	2.22	1.09	30
	5795	-0.68	2.22	1.54	30
802.11ac-VHT20	5745	2.66	2.22	4.88	30
	5785	2.81	2.22	5.03	30
	5825	2.68	2.22	4.90	30
802.11ac-VHT40	5755	-1.18	2.22	1.04	30
	5795	-0.69	2.22	1.53	30
802.11ac-VHT80	5775	-3.21	2.22	-0.99	30
*Note: Maximum PSD=PSD(dBm/300kHz)+10log(500kHz/300kHz)=2.22					

5150-5250MHz

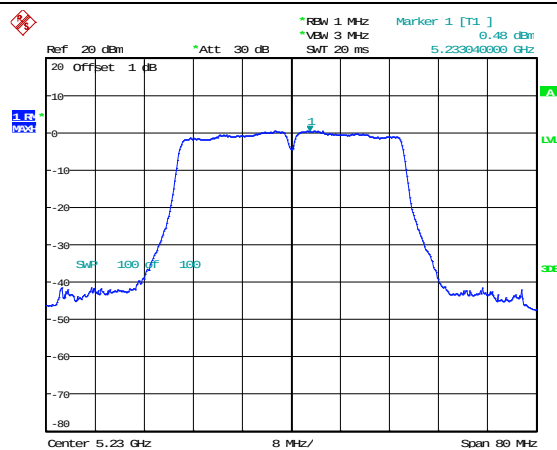
802.11a-Low	 Date: 4.JUL.2023 15:39:59
802.11a-Middle	 Date: 4.JUL.2023 15:40:25
802.11a-High	 Date: 4.JUL.2023 15:40:45

802.11n-HT20-Low	 Date: 4.JUL.2023 15:39:03
802.11n-HT20-Middle	 Date: 4.JUL.2023 15:39:15
802.11n-HT20-High	 Date: 4.JUL.2023 15:39:34

802.11n-HT40-Low	 Ref 20 dBm *Att 30 dB *RBW 1 MHz Marker 1 [T1] -6.38 dBm *VBW 3 MHz 5.197760000 GHz SWT 20 ms Center 5.19 GHz 8 MHz/ Span 80 MHz Date: 4.JUL.2023 15:37:13
802.11n-HT40-High	 Ref 20 dBm *Att 30 dB *RBW 1 MHz Marker 1 [T1] 0.63 dBm *VBW 3 MHz 5.232880000 GHz SWT 20 ms Center 5.23 GHz 8 MHz/ Span 80 MHz Date: 4.JUL.2023 15:37:33
802.11ac-VHT20-Low	 Ref 20 dBm *Att 30 dB *RBW 1 MHz Marker 1 [T1] -3.44 dBm *VBW 3 MHz 5.181360000 GHz SWT 20 ms Center 5.18 GHz 4 MHz/ Span 40 MHz Date: 4.JUL.2023 15:38:03

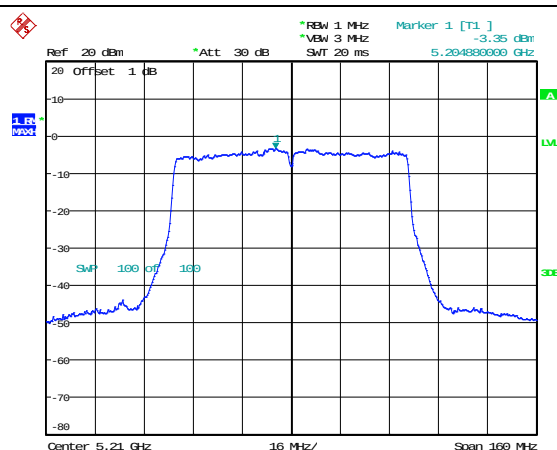
802.11ac-VHT20-Middle	 Date: 4.JUL.2023 15:38:31
802.11ac-VHT20-High	 Date: 4.JUL.2023 15:38:45
802.11ac-VHT40-Low	 Date: 4.JUL.2023 15:36:41

802.11ac-VHT40-High



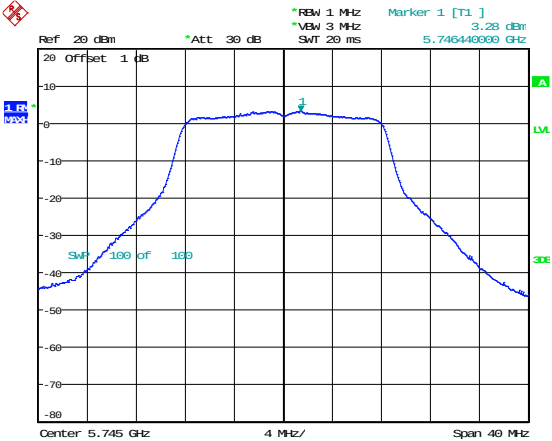
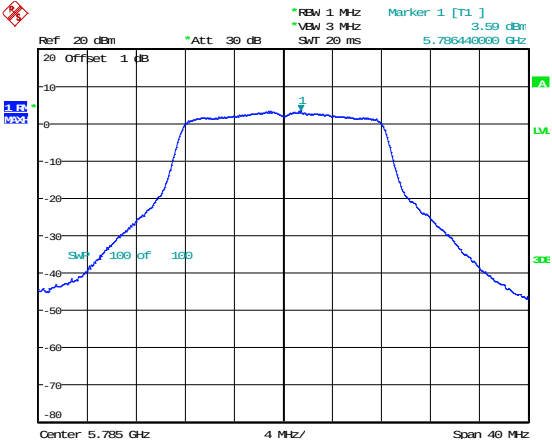
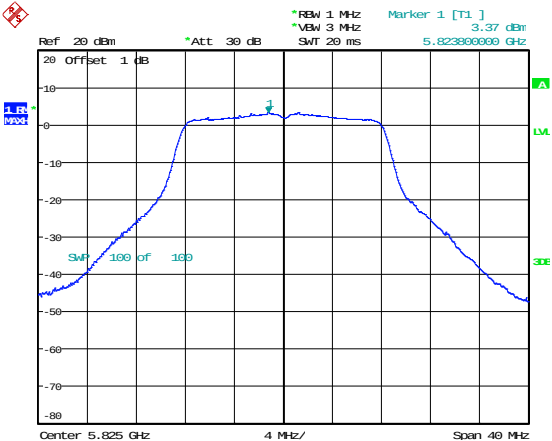
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802.11ac-VHT80-Low

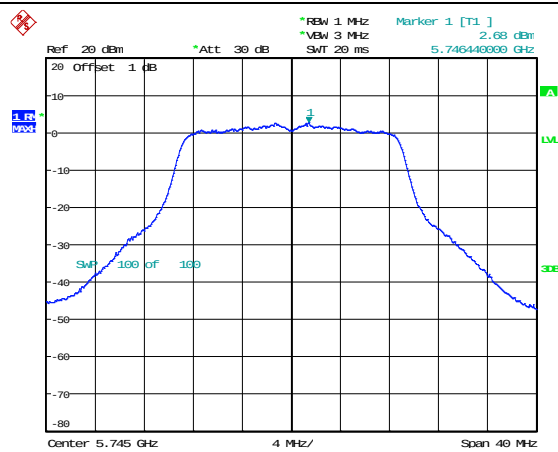


Date: 4.JUL.2023 15:36:19

5725-5850MHz

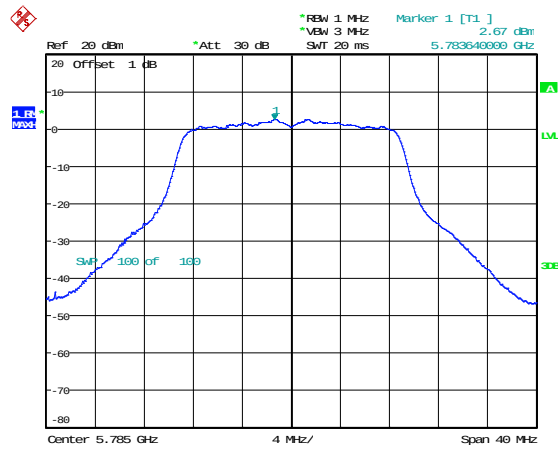
802.11a-Low	 Date: 4.JUL.2023 17:06:27
802.11a-Middle	 Date: 4.JUL.2023 17:06:39
802.11a-High	 Date: 4.JUL.2023 17:06:55

802.11n-HT20-Low



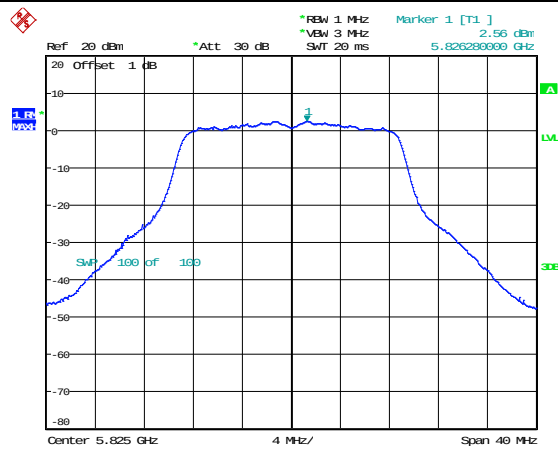
Date: 4.JUL.2023 17:07:30

802.11n-HT20-Middle

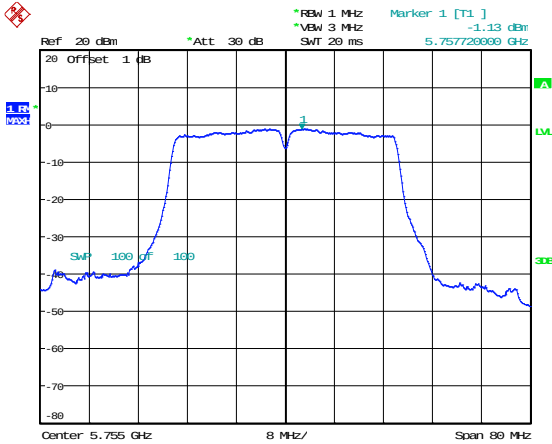
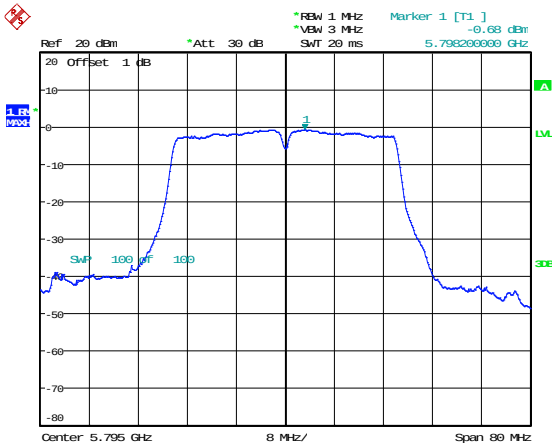
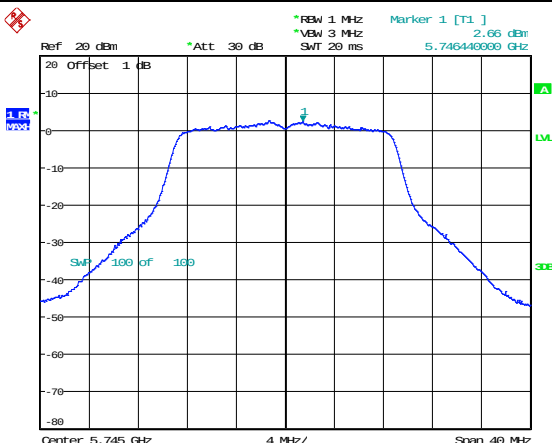


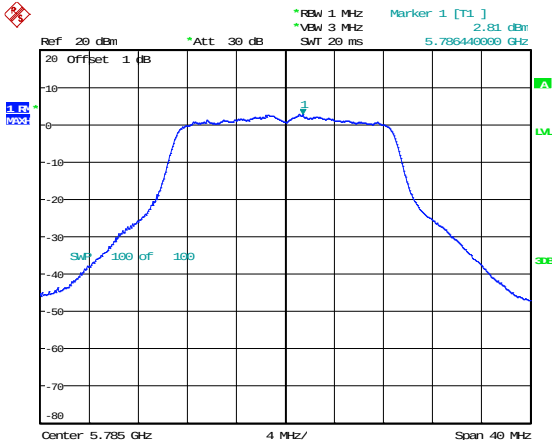
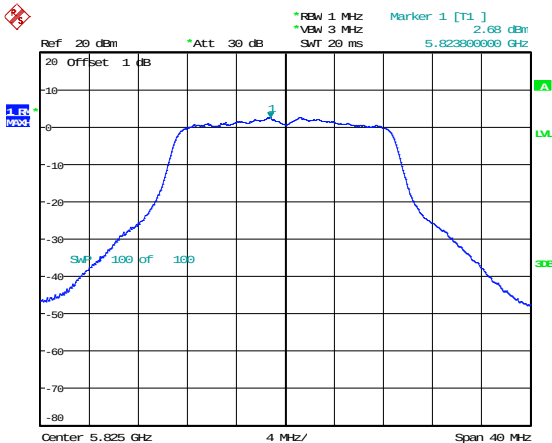
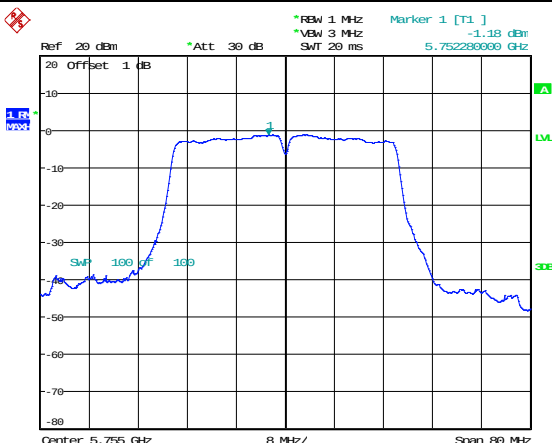
Date: 4.JUL.2023 17:08:08

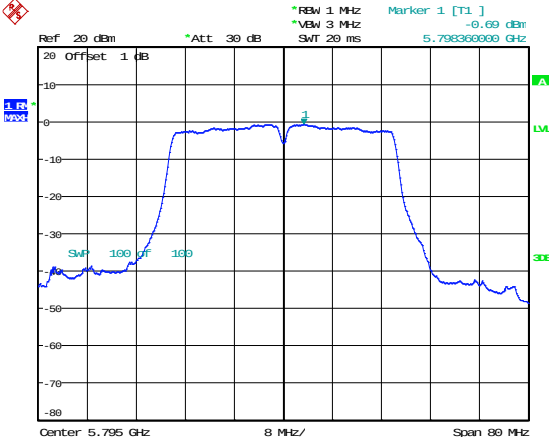
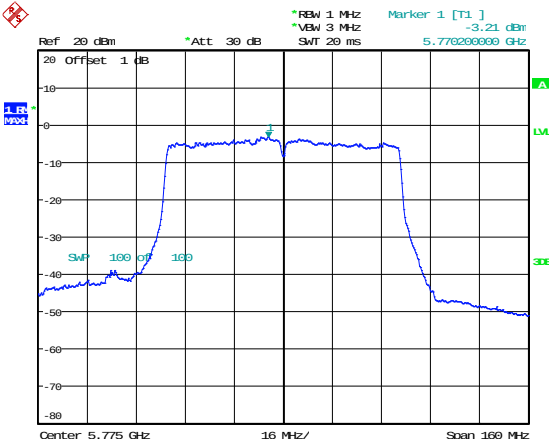
802.11n-HT20-High



Date: 4.JUL.2023 17:08:41

802.11n-HT40-Low	 Ref 20 dBm *Att 30 dB *RBW 1 MHz Marker 1 [T1] -1.13 dBm *VBW 3 MHz 5.75720000 GHz SWT 20 ms Center 5.755 GHz 8 MHz/ Span 80 MHz Date: 4.JUL.2023 17:10:57
802.11n-HT40-High	 Ref 20 dBm *Att 30 dB *RBW 1 MHz Marker 1 [T1] -0.68 dBm *VBW 3 MHz 5.79820000 GHz SWT 20 ms Center 5.795 GHz 8 MHz/ Span 80 MHz Date: 4.JUL.2023 17:12:27
802.11ac-VHT20-Low	 Ref 20 dBm *Att 30 dB *RBW 1 MHz Marker 1 [T1] 2.66 dBm *VBW 3 MHz 5.746440000 GHz SWT 20 ms Center 5.745 GHz 4 MHz/ Span 40 MHz Date: 4.JUL.2023 17:09:13

802.11ac-VHT20-Middle	 Date: 4.JUL.2023 17:09:48
802.11ac-VHT20-High	 Date: 4.JUL.2023 17:10:19
802.11ac-VHT40-Low	 Date: 4.JUL.2023 17:13:22

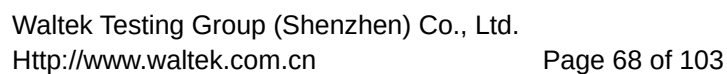
802.11ac-VHT40-High	 Ref 20 dBm *Att 30 dB *RBW 1 MHz Marker 1 [T1] -6.69 dBm *VBW 3 MHz *SWT 20 ms 5.795300000 GHz Center 5.795 GHz 8 MHz/ Span 80 MHz Date: 4.JUL.2023 17:15:25
802.11ac-VHT80-Low	 Ref 20 dBm *Att 30 dB *RBW 1 MHz Marker 1 [T1] -3.21 dBm *VBW 3 MHz *SWT 20 ms 5.775200000 GHz Center 5.775 GHz 16 MHz/ Span 160 MHz Date: 4.JUL.2023 17:16:18

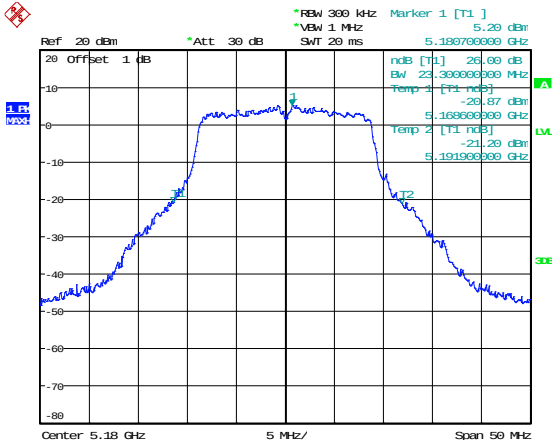
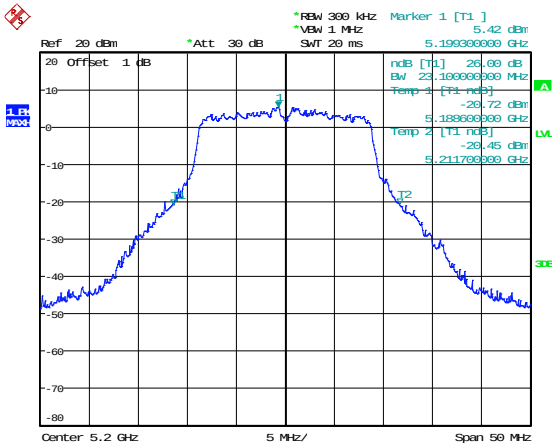
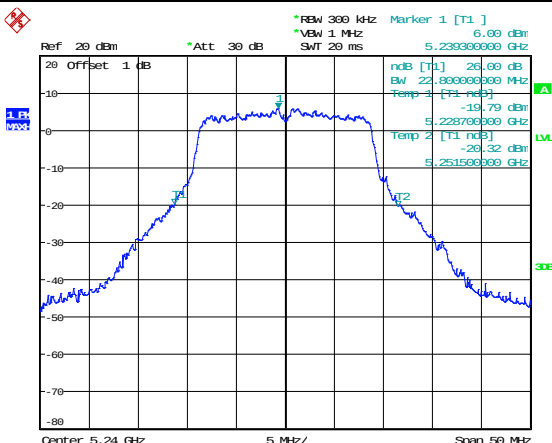
APPENDIX B

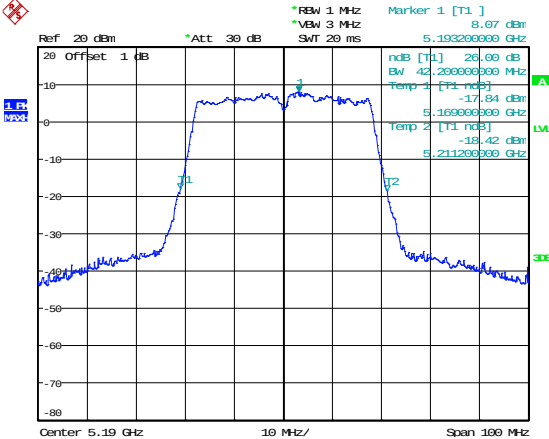
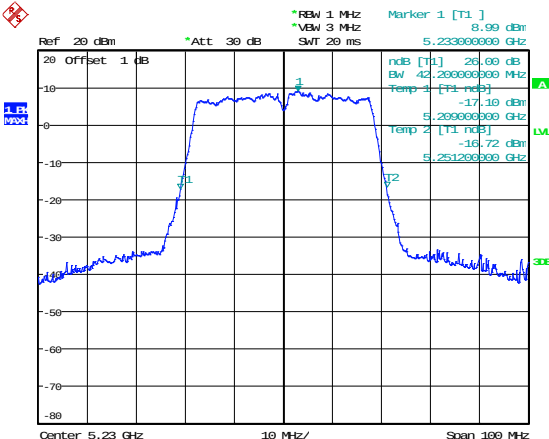
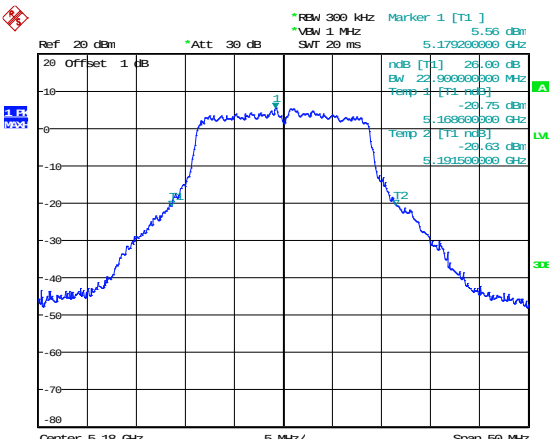
Emission Bandwidth and Occupied Bandwidth

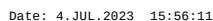
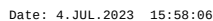
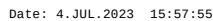
U-NII-1:5150-5250MHz				
Test Mode	Test Channel MHz	26 dB Bandwidth MHz	99% Bandwidth MHz	Limit MHz
802.11a	5180	21.90	16.80	Pass
	5200	21.70	16.80	Pass
	5240	21.70	16.72	Pass
802.11n-HT20	5180	23.30	18.00	Pass
	5200	23.10	18.00	Pass
	5240	22.80	18.00	Pass
802.11n-HT40	5190	42.20	36.80	Pass
	5230	42.20	36.80	Pass
802.11ac-VHT20	5180	22.90	18.00	Pass
	5200	22.90	18.00	Pass
	5240	23.00	18.00	Pass
802.11ac-VHT40	5190	42.00	36.80	Pass
	5230	42.20	36.80	Pass
802.11ac-VHT80	5210	86.76	76.80	Pass

U-NII-3: 5725-5850MHz				
Test Mode	Test Channel MHz	6 dB Bandwidth MHz	99% Bandwidth MHz	Limit MHz
802.11a	5745	15.60	16.80	≥500
	5785	15.60	16.80	≥500
	5825	15.84	16.80	≥500
802.11n-HT20	5745	16.56	18.00	≥500
	5785	16.56	18.00	≥500
	5825	16.80	17.92	≥500
802.11n-HT40	5755	35.68	36.96	≥500
	5795	36.16	36.80	≥500
802.11ac-VHT20	5745	16.80	18.00	≥500
	5785	16.80	18.00	≥500
	5825	16.80	18.00	≥500
802.11ac-VHT40	5755	36.00	36.64	≥500
	5795	36.32	36.80	≥500
802.11ac-VHT80	5775	76.16	76.16	≥500

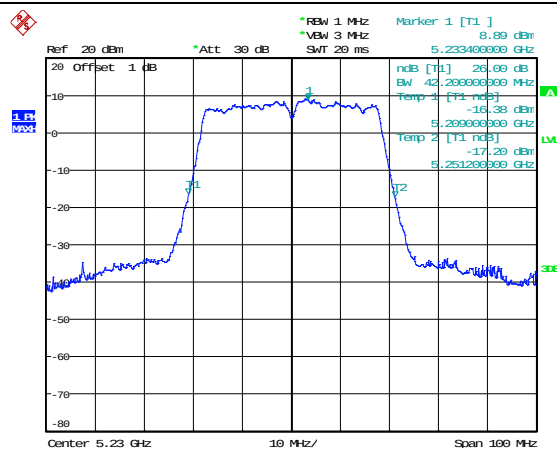


802.11n-HT20-Low	 Ref: 20 dBm, Offset: 1 dB, Att: 30 dB, RBW: 300 kHz, VBW: 1 MHz, SWT: 20 ms, Marker 1 [T1]: 5.20 dBm, 5.188700000 GHz, n dB [T1]: 20.00 dB, BW: 22.300000000 MHz, Temp 1 [T1-n dB]: -20.67 dBm, 5.168600000 GHz, Temp 2 [T1-n dB]: -21.20 dBm, 5.191900000 GHz Center: 5.18 GHz, 5 MHz/, Span: 50 MHz Date: 4.JUL.2023 15:59:39
802.11n-HT20-Middle	 Ref: 20 dBm, Offset: 1 dB, Att: 30 dB, RBW: 300 kHz, VBW: 1 MHz, SWT: 20 ms, Marker 1 [T1]: 5.42 dBm, 5.190300000 GHz, n dB [T1]: 20.00 dB, BW: 22.300000000 MHz, Temp 1 [T1-n dB]: -20.72 dBm, 5.188600000 GHz, Temp 2 [T1-n dB]: -20.45 dBm, 5.211700000 GHz Center: 5.2 GHz, 5 MHz/, Span: 50 MHz Date: 4.JUL.2023 15:59:48
802.11n-HT20-High	 Ref: 20 dBm, Offset: 1 dB, Att: 30 dB, RBW: 300 kHz, VBW: 1 MHz, SWT: 20 ms, Marker 1 [T1]: 6.00 dBm, 5.239300000 GHz, n dB [T1]: 20.00 dB, BW: 22.300000000 MHz, Temp 1 [T1-n dB]: -19.79 dBm, 5.228700000 GHz, Temp 2 [T1-n dB]: -20.32 dBm, 5.251500000 GHz Center: 5.24 GHz, 5 MHz/, Span: 50 MHz Date: 4.JUL.2023 16:00:04

802.11n-HT40-Low	 Ref: 20 dBm, Att: 30 dB, SW: 20 ms, Marker 1 [T1] 8.07 dBm, 5.19320000 GHz ndB [T1] 20.00 dB, BW 42.20000000 MHz, Temp 1 [T1-ndB] -17.84 dBm, 5.16900000 GHz Temp 2 [T1-ndB] -18.42 dBm, 5.21120000 GHz Center 5.19 GHz, 10 MHz/, Span 100 MHz Date: 4.JUL.2023 15:56:48
802.11n-HT40-High	 Ref: 20 dBm, Att: 30 dB, SW: 20 ms, Marker 1 [T1] 8.99 dBm, 5.23300000 GHz ndB [T1] 20.00 dB, BW 42.20000000 MHz, Temp 1 [T1-ndB] -17.10 dBm, 5.20000000 GHz Temp 2 [T1-ndB] -16.72 dBm, 5.25120000 GHz Center 5.23 GHz, 10 MHz/, Span 100 MHz Date: 4.JUL.2023 15:56:57
802.11ac-VHT20-Low	 Ref: 20 dBm, Att: 30 dB, SW: 20 ms, Marker 1 [T1] 5.56 dBm, 5.17920000 GHz ndB [T1] 20.00 dB, BW 22.90000000 MHz, Temp 1 [T1-ndB] -20.75 dBm, 5.16900000 GHz Temp 2 [T1-ndB] -20.63 dBm, 5.19150000 GHz Center 5.18 GHz, 5 MHz/, Span 50 MHz Date: 4.JUL.2023 15:57:39

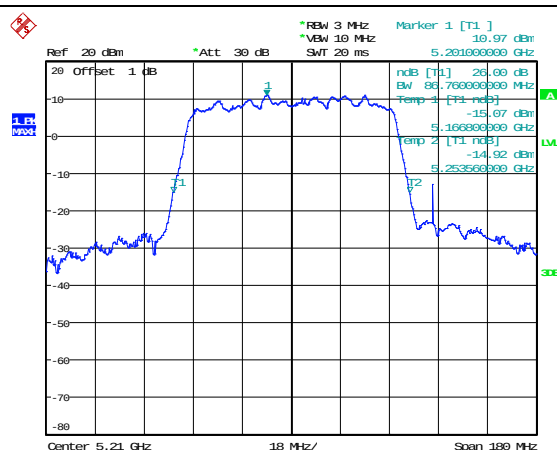


802.11ac-VHT40-High



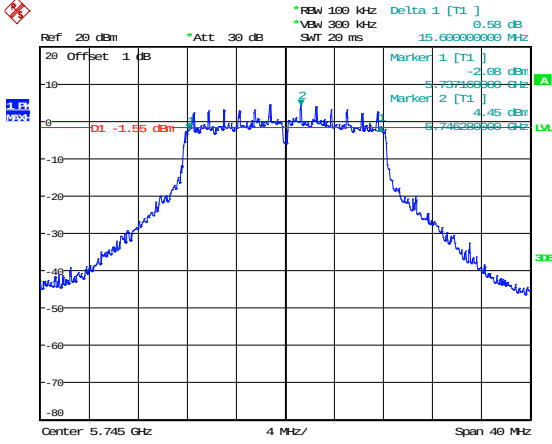
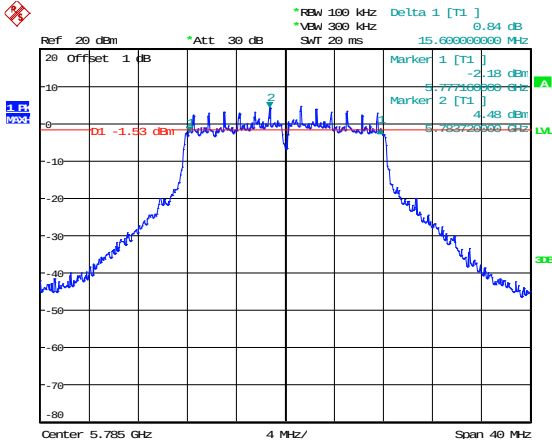
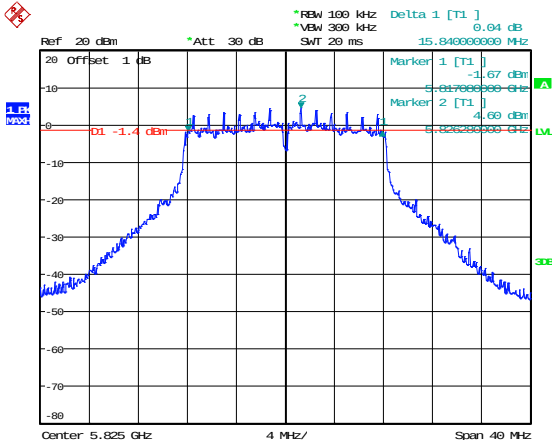
Date: 4.JUL.2023 15:56:25

802.11ac-VHT80-Low

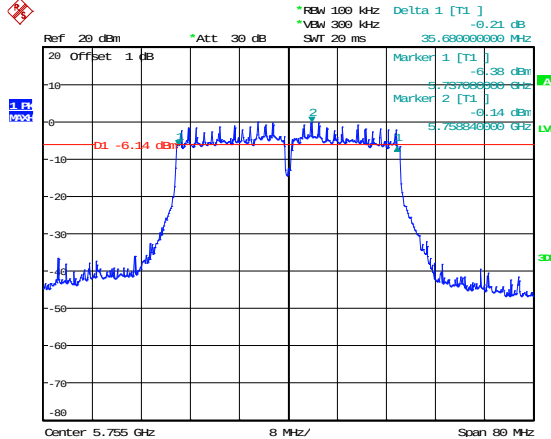
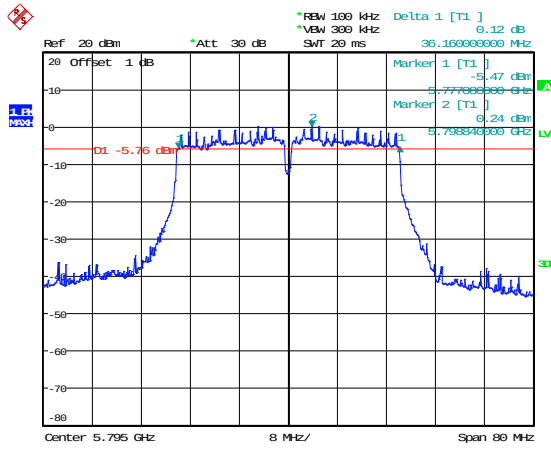
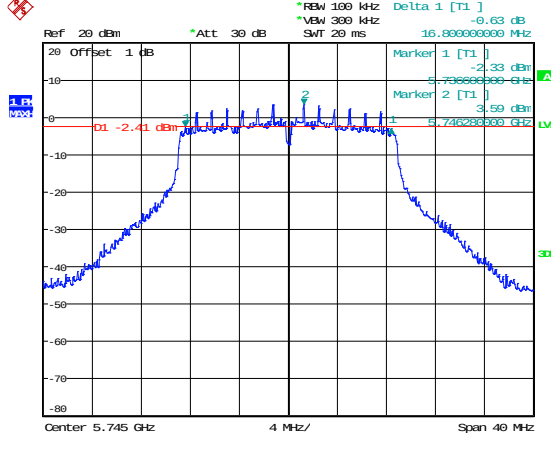


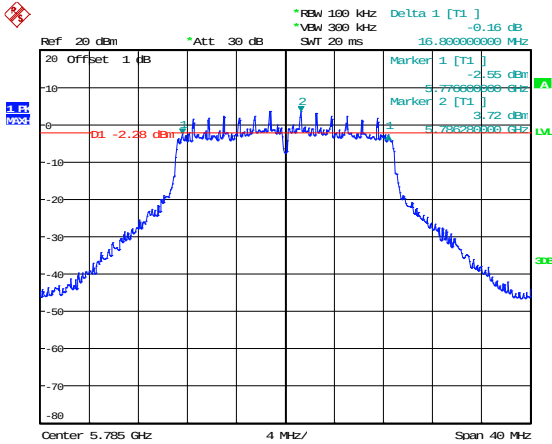
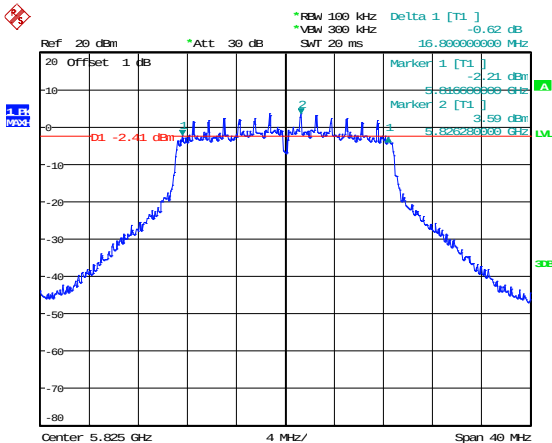
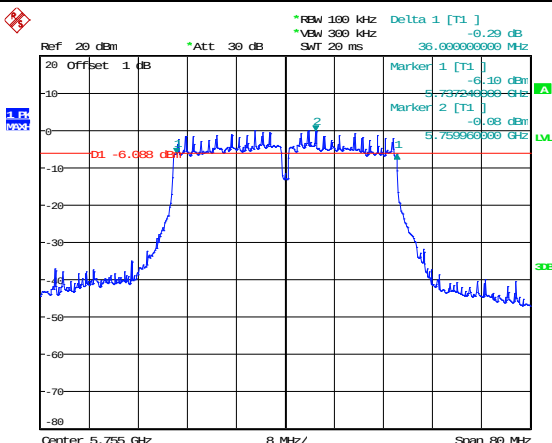
Date: 4.JUL.2023 15:55:24

5725-5850MHz

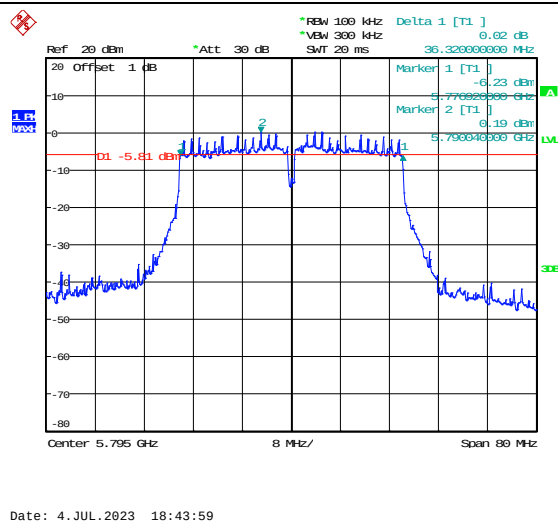
802.11a-Low	 Date: 4.JUL.2023 17:33:46
802.11a-Middle	 Date: 4.JUL.2023 17:34:23
802.11a-High	 Date: 4.JUL.2023 17:35:16

802.11n-HT20-Low	Date: 4.JUL.2023 17:36:22
802.11n-HT20-Middle	Date: 4.JUL.2023 17:37:27
802.11n-HT20-High	Date: 4.JUL.2023 17:38:08

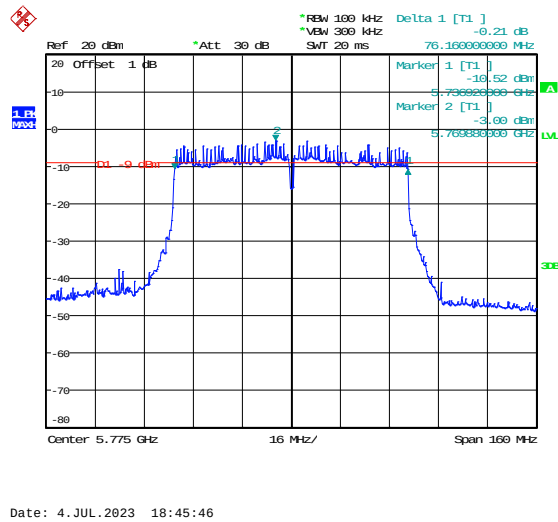
Test Case	Measurement Plot	Date
802.11n-HT40-Low	 Ref: 20 dBm, Att: 30 dB, RBW: 100 kHz, VBW: 300 kHz, SWT: 20 ms, Delta 1 [T1]: -6.21 dB, Marker 1 [T1]: -6.38 dBm, Marker 2 [T1]: -6.14 dBm, D1: -6.24 dBm, Center: 5.755 GHz, Span: 80 MHz	4.JUL.2023 17:41:56
802.11n-HT40-High	 Ref: 20 dBm, Att: 30 dB, RBW: 100 kHz, VBW: 300 kHz, SWT: 20 ms, Delta 1 [T1]: 0.12 dB, Marker 1 [T1]: -5.47 dBm, Marker 2 [T1]: -6.24 dBm, D1: -5.76 dBm, Center: 5.795 GHz, Span: 80 MHz	4.JUL.2023 18:28:43
802.11ac-VHT20-Low	 Ref: 20 dBm, Att: 30 dB, RBW: 100 kHz, VBW: 300 kHz, SWT: 20 ms, Delta 1 [T1]: -0.63 dB, Marker 1 [T1]: -2.33 dBm, Marker 2 [T1]: -3.59 dBm, D1: -2.41 dBm, Center: 5.745 GHz, Span: 40 MHz	4.JUL.2023 17:39:12

802.11ac-VHT20-Middle	 Ref: 20 dBm, Att: 30 dB, RBW: 100 kHz, VBW: 300 kHz, SWT: 20 ms, Delta 1 [T1]: -0.16 dB, Marker 1 [T1]: -2.55 dBm, Marker 2 [T1]: -3.72 dBm, Center: 5.785 GHz, Span: 40 MHz Date: 4.JUL.2023 17:39:50
802.11ac-VHT20-High	 Ref: 20 dBm, Att: 30 dB, RBW: 100 kHz, VBW: 300 kHz, SWT: 20 ms, Delta 1 [T1]: -0.62 dB, Marker 1 [T1]: -2.21 dBm, Marker 2 [T1]: -3.59 dBm, Center: 5.825 GHz, Span: 40 MHz Date: 4.JUL.2023 17:41:02
802.11ac-VHT40-Low	 Ref: 20 dBm, Att: 30 dB, RBW: 100 kHz, VBW: 300 kHz, SWT: 20 ms, Delta 1 [T1]: -0.29 dB, Marker 1 [T1]: -6.10 dBm, Marker 2 [T1]: -6.08 dBm, Center: 5.755 GHz, Span: 80 MHz Date: 4.JUL.2023 18:43:06

802.11ac-VHT40-High

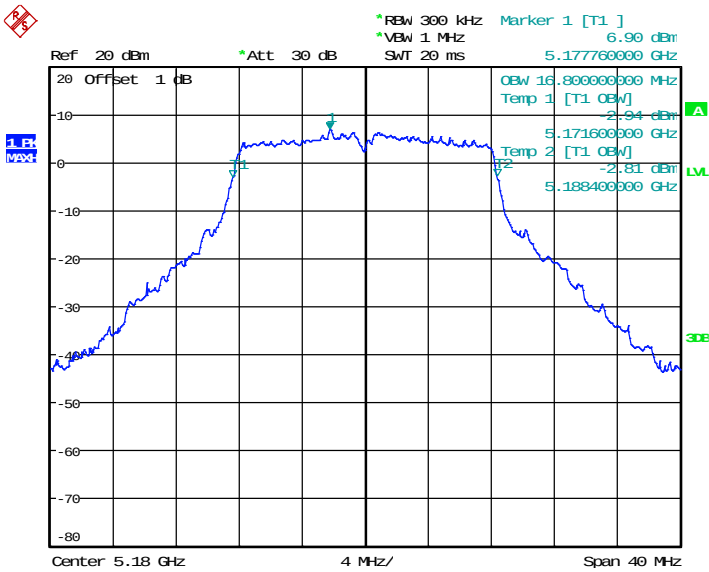


802.11ac-VHT80-Low



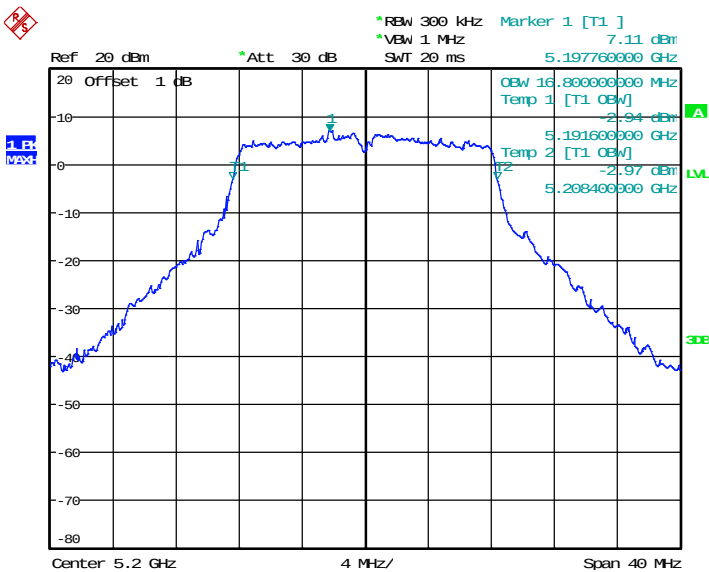
99% Bandwidth MHz
5150-5250MHz

802.11a-Low



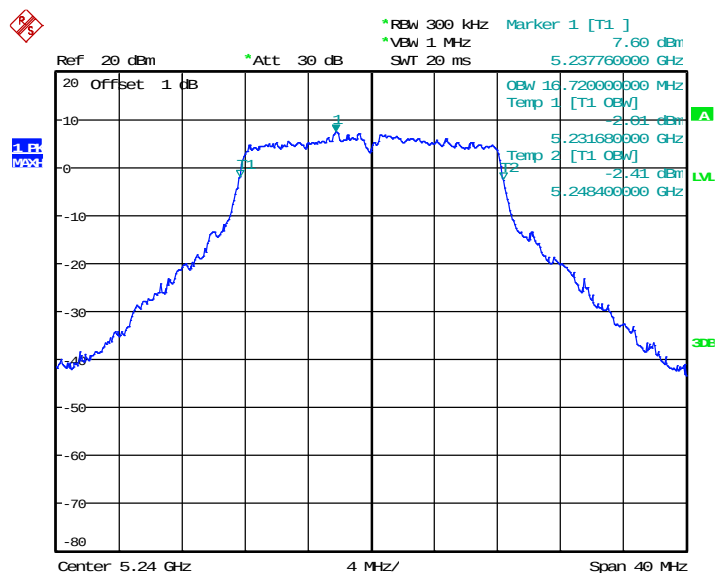
Date: 4.JUL.2023 15:43:15

802.11a-Middle



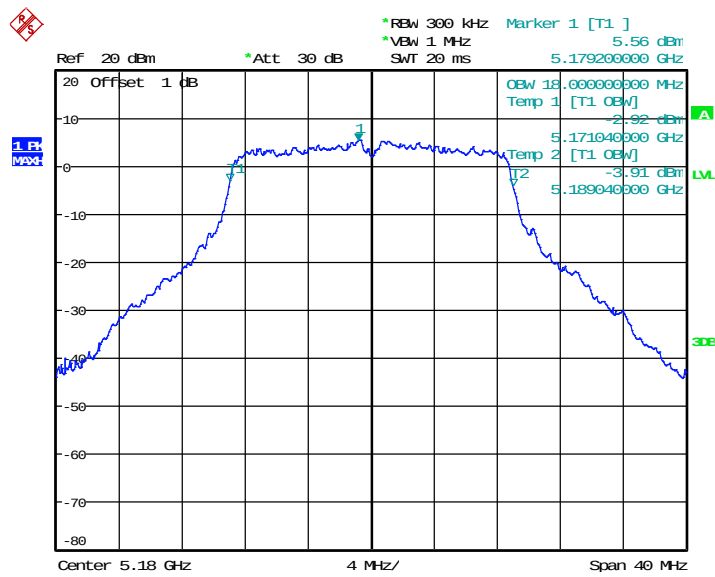
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802.11a-High



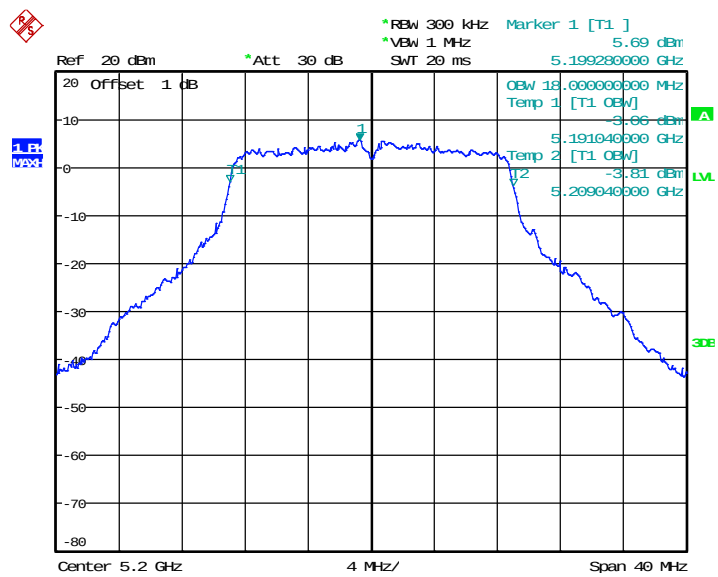
Date: 4.JUL.2023 15:43:49

802.11n-HT20-Low



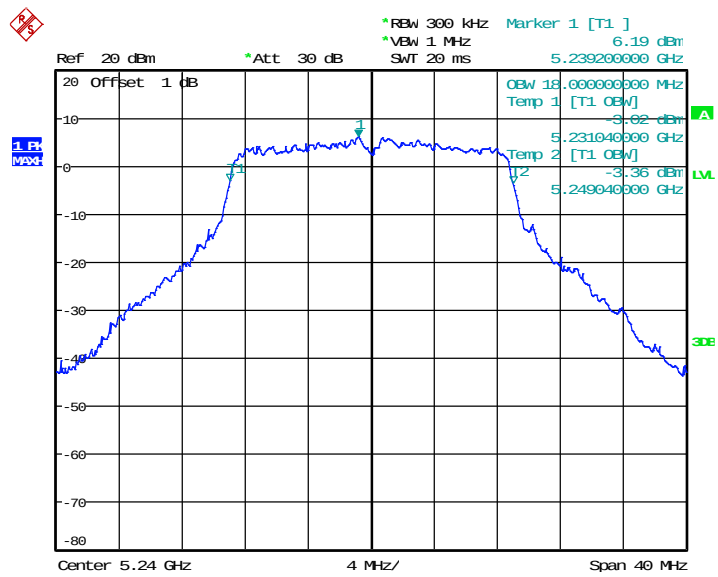
Date: 4.JUL.2023 15:44:47

802.11n-HT20-Middle

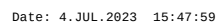
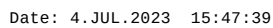


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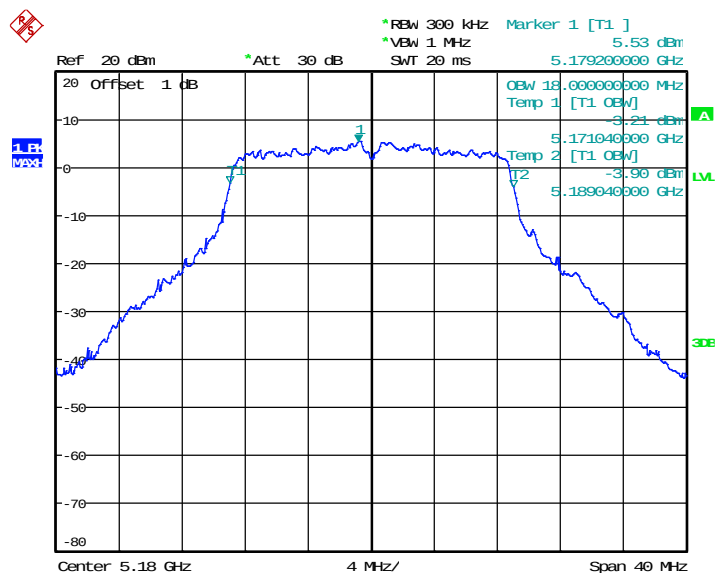
802.11n-HT20-High



Date: 4.JUL.2023 15:45:47

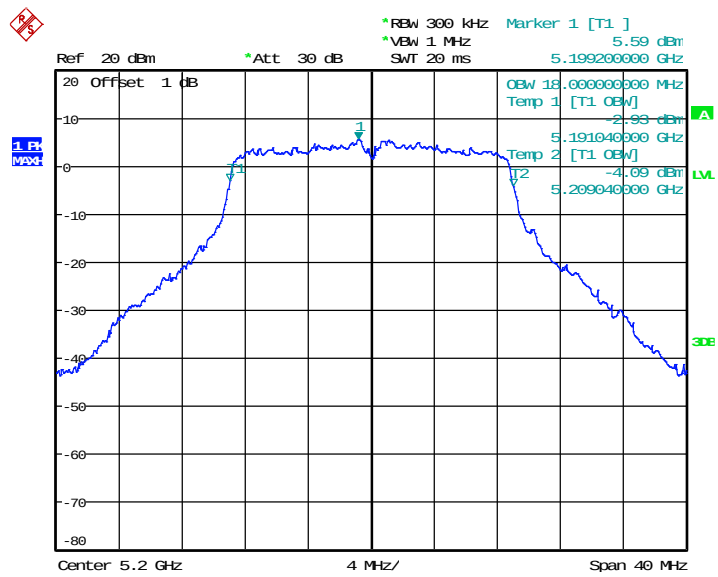


802.11ac-VHT20-Low



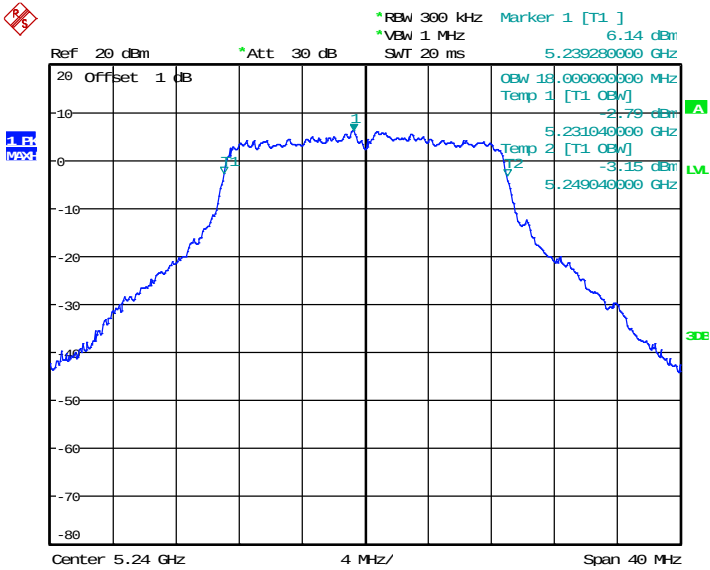
Date: 4.JUL.2023 15:46:18

802.11ac-VHT20-Middle



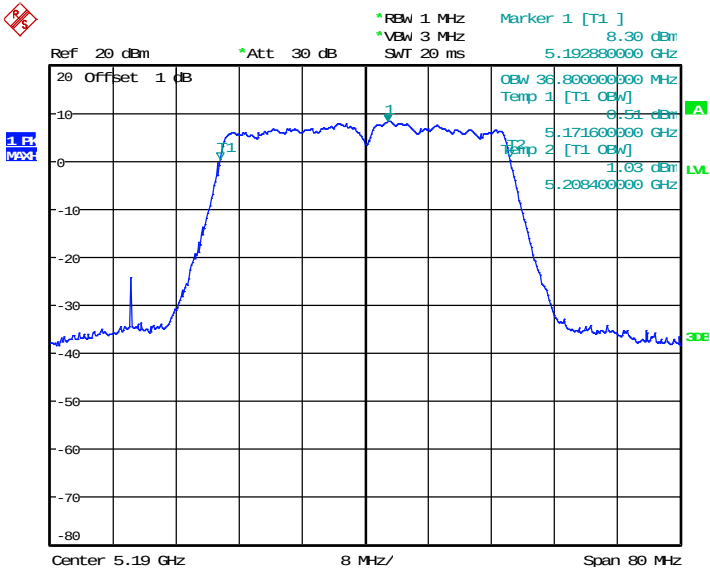
Date: 4.JUL.2023 15:46:41

802.11ac-VHT20-High



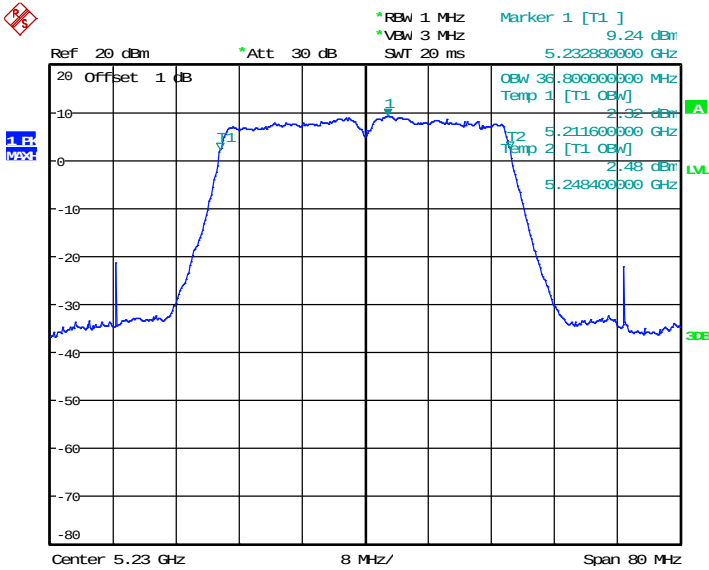
Date: 4.JUL.2023 15:47:01

802.11ac-VHT40-Low



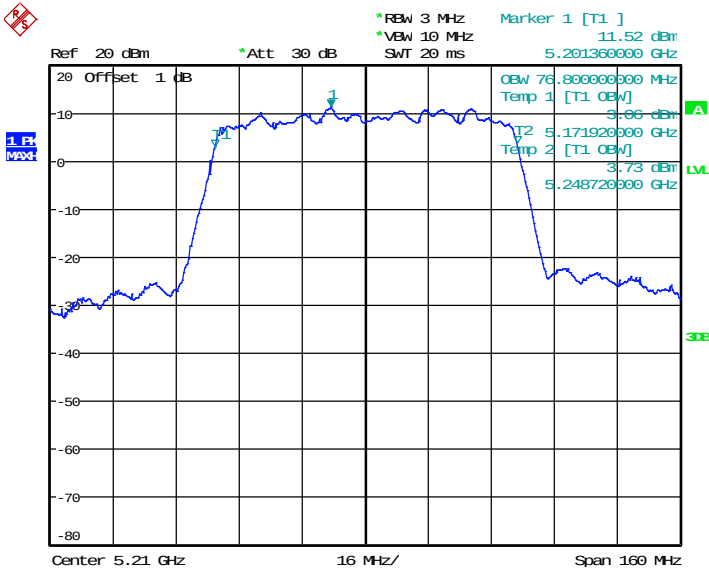
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802.11ac-VHT40-High



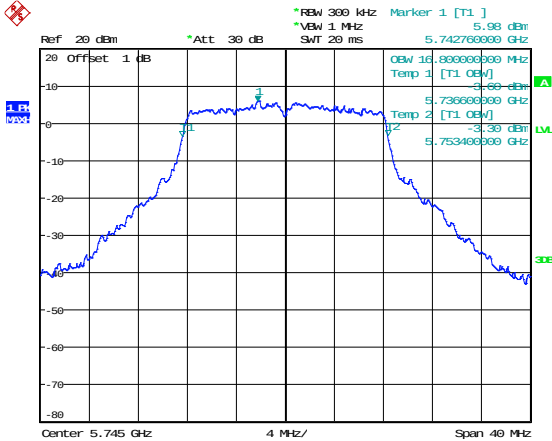
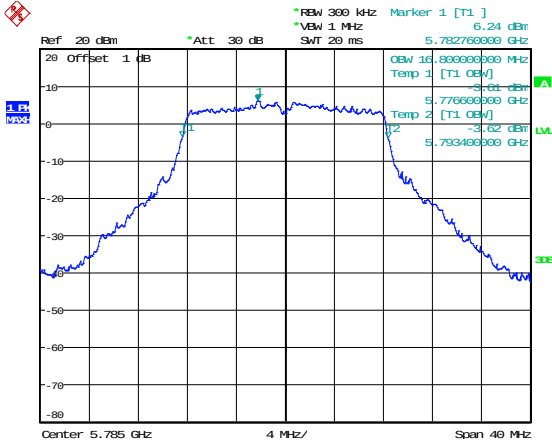
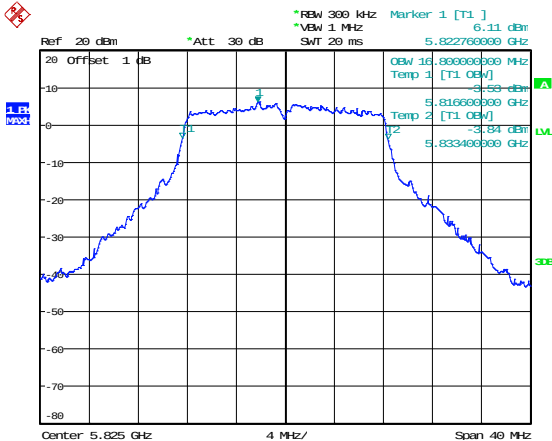
Date: 4.JUL.2023 15:50:29

802.11ac-VHT80-Low

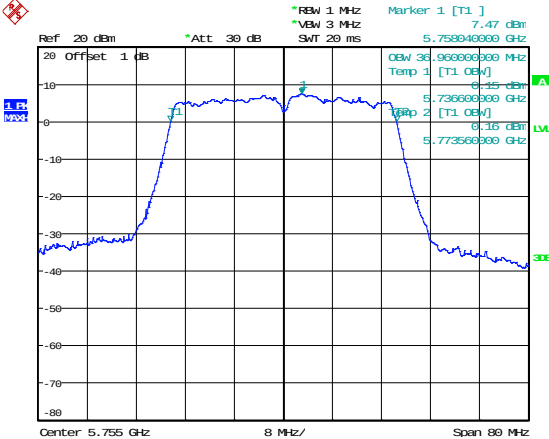
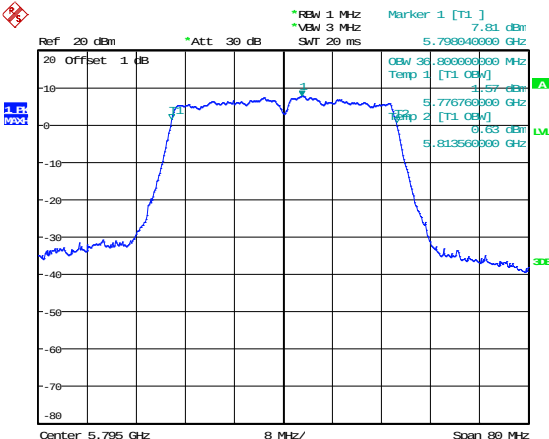
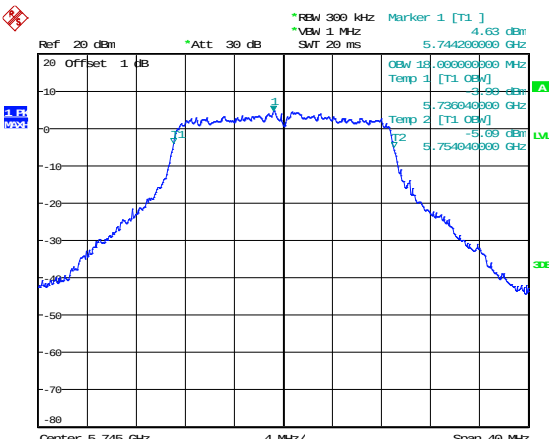


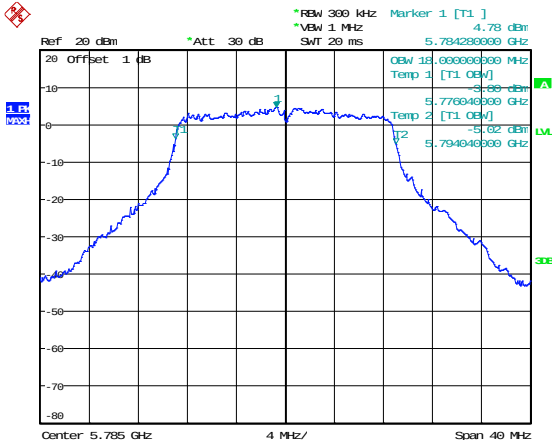
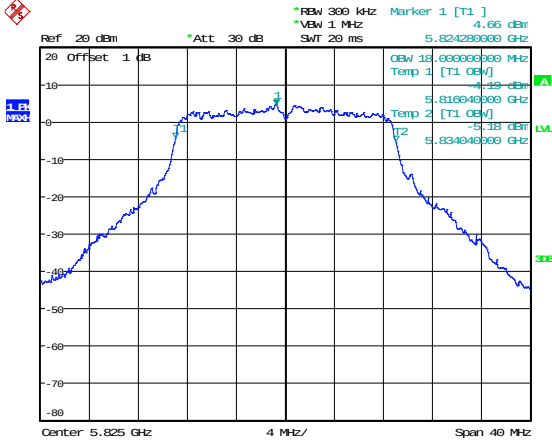
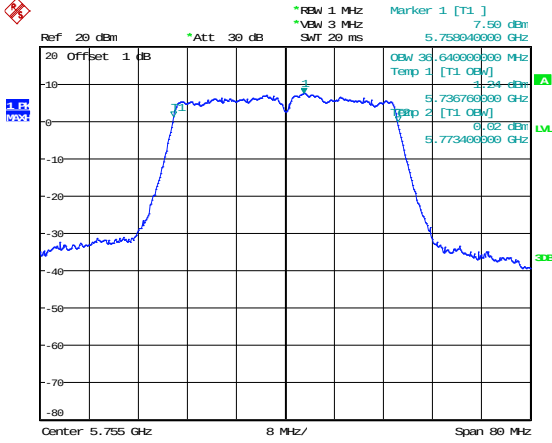
Date: 4.JUL.2023 15:53:25

5725-5850MHz

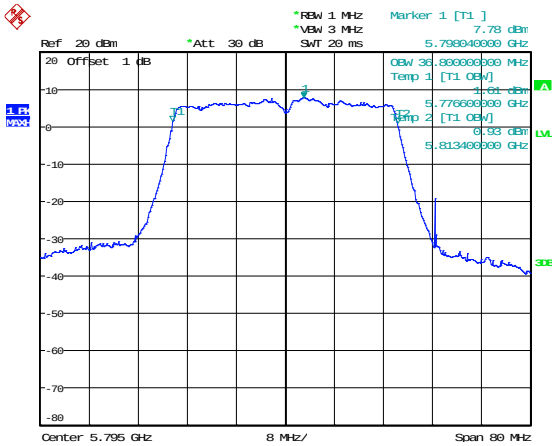
802.11a-Low	 Ref: 20 dBm, Att: 30 dB, RBW: 300 kHz, VBW: 1 MHz, SWT: 20 ms, Marker 1 [T1]: 5.98 dBm, 5.742760000 GHz, OBW: 16.800000000 MHz, Temp 1 [T1, OBW]: -3.69 dBm, Temp 2 [T1, OBW]: -3.30 dBm, 5.753400000 GHz, LVL: 30E Center 5.745 GHz, 4 MHz/, Span 40 MHz Date: 4.JUL.2023 17:20:03
802.11a-Middle	 Ref: 20 dBm, Att: 30 dB, RBW: 300 kHz, VBW: 1 MHz, SWT: 20 ms, Marker 1 [T1]: 6.24 dBm, 5.782760000 GHz, OBW: 16.800000000 MHz, Temp 1 [T1, OBW]: -3.69 dBm, Temp 2 [T1, OBW]: -3.82 dBm, 5.793400000 GHz, LVL: 30E Center 5.785 GHz, 4 MHz/, Span 40 MHz Date: 4.JUL.2023 17:20:31
802.11a-High	 Ref: 20 dBm, Att: 30 dB, RBW: 300 kHz, VBW: 1 MHz, SWT: 20 ms, Marker 1 [T1]: 6.11 dBm, 5.822760000 GHz, OBW: 16.800000000 MHz, Temp 1 [T1, OBW]: -3.59 dBm, Temp 2 [T1, OBW]: -3.84 dBm, 5.833400000 GHz, LVL: 30E Center 5.825 GHz, 4 MHz/, Span 40 MHz Date: 4.JUL.2023 17:20:49

802.11n-HT20-Low	Ref: 20 dBm Offset: 1 dB Att: 30 dB SWT: 20 ms Marker 1 [T1] 4.64 dBm 5.744200000 GHz OBW 18.000000000 MHz Temp 1 [T1 OBW] -4.34 dBm 5.736040000 GHz Temp 2 [T1 OBW] -4.97 dBm 5.754040000 GHz Center 5.745 GHz 4 MHz/ Span 40 MHz Date: 4.JUL.2023 17:23:11
802.11n-HT20-Middle	Ref: 20 dBm Offset: 1 dB Att: 30 dB SWT: 20 ms Marker 1 [T1] 4.79 dBm 5.784200000 GHz OBW 18.000000000 MHz Temp 1 [T1 OBW] -4.34 dBm 5.776040000 GHz Temp 2 [T1 OBW] -4.84 dBm 5.794040000 GHz Center 5.785 GHz 4 MHz/ Span 40 MHz Date: 4.JUL.2023 17:23:43
802.11n-HT20-High	Ref: 20 dBm Offset: 1 dB Att: 30 dB SWT: 20 ms Marker 1 [T1] 4.71 dBm 5.824200000 GHz OBW 17.920000000 MHz Temp 1 [T1 OBW] -5.01 dBm 5.816040000 GHz Temp 2 [T1 OBW] -4.18 dBm 5.833900000 GHz Center 5.825 GHz 4 MHz/ Span 40 MHz Date: 4.JUL.2023 17:24:43

802.11n-HT40-Low	 Ref 20 dBm *Att 30 dB *RBW 1 MHz *VBW 3 MHz SWT 20 ms Marker 1 [T1] 7.47 dBm 5.755040000 GHz Offset 1 dB OBW 30.00000000 MHz Temp 1 [T1] 0.00 dBm 5.736600000 GHz 0.15 dBm 5.736600000 GHz 0.15 dBm 5.773500000 GHz 0.15 dBm 5.773500000 GHz Center 5.755 GHz 8 MHz/ Span 80 MHz Date: 4.JUL.2023 17:27:18
802.11n-HT40-High	 Ref 20 dBm *Att 30 dB *RBW 1 MHz *VBW 3 MHz SWT 20 ms Marker 1 [T1] 7.81 dBm 5.795040000 GHz Offset 1 dB OBW 30.00000000 MHz Temp 1 [T1] 0.00 dBm 5.776700000 GHz 0.15 dBm 5.776700000 GHz 0.15 dBm 5.813500000 GHz 0.15 dBm 5.813500000 GHz Center 5.795 GHz 8 MHz/ Span 80 MHz Date: 4.JUL.2023 17:27:42
802.11ac-VHT20-Low	 Ref 20 dBm *Att 30 dB *RBW 300 kHz *VBW 1 MHz SWT 20 ms Marker 1 [T1] 4.63 dBm 5.744200000 GHz Offset 1 dB OBW 18.00000000 MHz Temp 1 [T1] 0.00 dBm 5.736040000 GHz 0.00 dBm 5.736040000 GHz 0.00 dBm 5.754040000 GHz 0.00 dBm 5.754040000 GHz Center 5.745 GHz 4 MHz/ Span 40 MHz Date: 4.JUL.2023 17:25:12

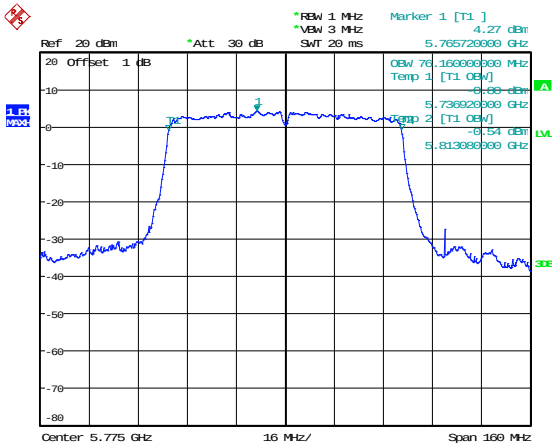
802.11ac-VHT20-Middle	 Ref 20 dBm *Att 30 dB *RBW 300 kHz Marker 1 [T1] 4.78 dBm *VBW 1 MHz 5.794280000 GHz SWT 20 ms Offset 1 dB OBW 18.000000000 MHz Temp 1 [T1 OBW] -4.66 dBm 5.816040000 GHz Temp 2 [T1 OBW] -5.18 dBm 5.834040000 GHz Center 5.785 GHz 4 MHz/ Span 40 MHz Date: 4 JUL 2023 17:26:05
802.11ac-VHT20-High	 Ref 20 dBm *Att 30 dB *RBW 300 kHz Marker 1 [T1] 4.66 dBm *VBW 1 MHz 5.824280000 GHz SWT 20 ms Offset 1 dB OBW 18.000000000 MHz Temp 1 [T1 OBW] -4.66 dBm 5.816040000 GHz Temp 2 [T1 OBW] -5.18 dBm 5.834040000 GHz Center 5.825 GHz 4 MHz/ Span 40 MHz Date: 4 JUL 2023 17:26:23
802.11ac-VHT40-Low	 Ref 20 dBm *Att 30 dB *RBW 1 MHz Marker 1 [T1] 7.50 dBm *VBW 3 MHz 5.758040000 GHz SWT 20 ms Offset 1 dB OBW 30.640000000 MHz Temp 1 [T1 OBW] 4.24 dBm 5.736700000 GHz Temp 2 [T1 OBW] 0.02 dBm 5.773400000 GHz Center 5.755 GHz 8 MHz/ Span 80 MHz Date: 4 JUL 2023 17:28:33

802.11ac-VHT40-High



Date: 4 JUL 2023 17:29:37

802.11ac-VHT80-Low



Date: 4 JUL 2023 17:30:22

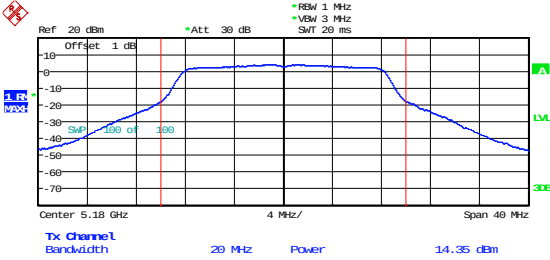
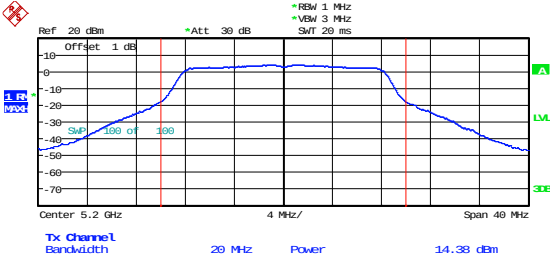
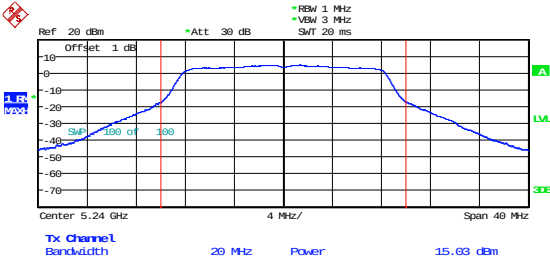
APPENDIX C

Maximum Conducted Output Power

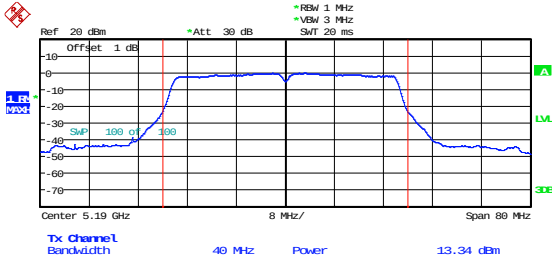
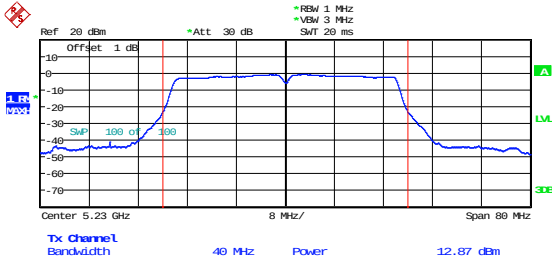
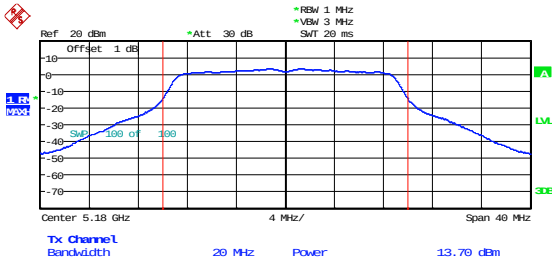
U-NII-1:5150-5250MHz			
Test mode	Frequency MHz	Output Power dBm	Limit dBm
802.11a	5180	14.35	23.98
	5200	14.38	23.98
	5240	15.03	23.98
802.11n-HT20	5180	13.48	23.98
	5200	13.81	23.98
	5240	13.35	23.98
802.11n-HT40	5190	13.34	23.98
	5230	12.87	23.98
802.11ac-VHT20	5180	13.70	23.98
	5200	13.61	23.98
	5240	13.40	23.98
802.11ac-VHT40	5190	13.29	23.98
	5230	14.24	23.98
802.11ac-VHT80	5210	13.24	23.98

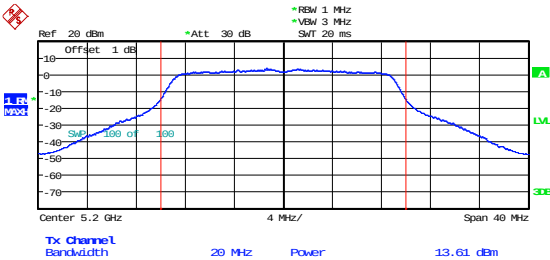
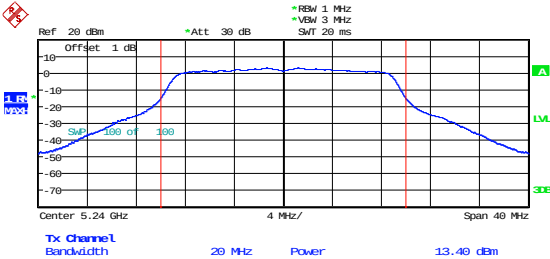
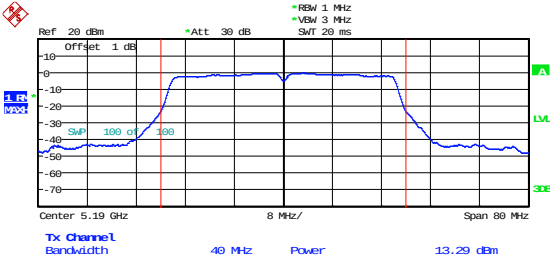
U-NII-3: 5725-5850MHz			
Test mode	Frequency MHz	Output Power dBm	Limit dBm
802.11a	5745	13.62	30.00
	5785	13.68	30.00
	5825	13.67	30.00
802.11n-HT20	5745	12.79	30.00
	5785	12.87	30.00
	5825	12.78	30.00
802.11n-HT40	5755	12.67	30.00
	5795	12.99	30.00
802.11ac-VHT20	5745	12.81	30.00
	5785	12.85	30.00
	5825	12.91	30.00
802.11ac-VHT40	5755	12.71	30.00
	5795	12.90	30.00
802.11ac-VHT80	5775	12.14	30.00

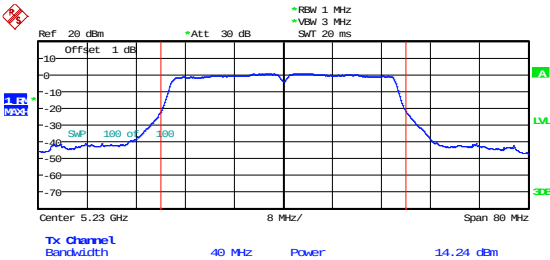
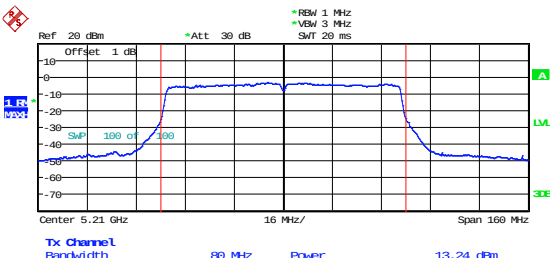
5150-5250MHz

802.11a-Low	 Ref: 20 dBm *Att: 30 dB *RBW: 1 MHz *VBW: 3 MHz *SMT: 20 ms Offset: 1 dB Sub: 100 of 100 Center 5.18 GHz 4 MHz/ Span 40 MHz Tx Channel Bandwidth 20 MHz Power 14.35 dBm Date: 4.JUL.2023 15:15:25
802.11a-Middle	 Ref: 20 dBm *Att: 30 dB *RBW: 1 MHz *VBW: 3 MHz *SMT: 20 ms Offset: 1 dB Sub: 100 of 100 Center 5.2 GHz 4 MHz/ Span 40 MHz Tx Channel Bandwidth 20 MHz Power 14.39 dBm Date: 4.JUL.2023 15:15:42
802.11a-High	 Ref: 20 dBm *Att: 30 dB *RBW: 1 MHz *VBW: 3 MHz *SMT: 20 ms Offset: 1 dB Sub: 100 of 100 Center 5.24 GHz 4 MHz/ Span 40 MHz Tx Channel Bandwidth 20 MHz Power 15.03 dBm Date: 4.JUL.2023 15:16:12

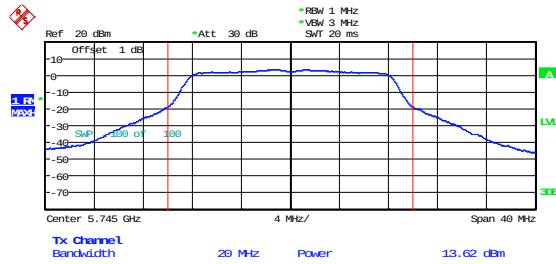
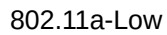
802.11n-HT20-Low	Date: 4.JUL.2023 15:16:32
802.11n-HT20-Middle	Date: 4.JUL.2023 15:17:13
802.11n-HT20-High	Date: 4.JUL.2023 15:17:35

802.11n-HT40-Low	 Date: 4.JUL.2023 15:20:26
802.11n-HT40-High	 Date: 4.JUL.2023 15:32:03
802.11ac-VHT20-Low	 Date: 4.JUL.2023 15:19:02

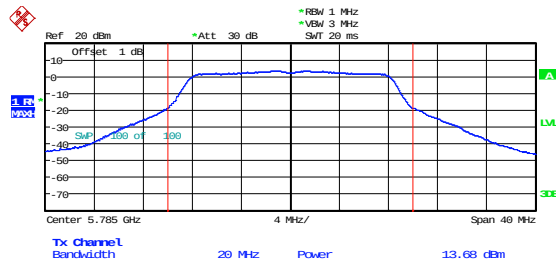
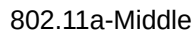
802.11ac-VHT20-Middle	 Date: 4.JUL.2023 15:19:15
802.11ac-VHT20-High	 Date: 4.JUL.2023 15:19:46
802.11ac-VHT40-Low	 Date: 4.JUL.2023 15:33:59

802.11ac-VHT40-High	 Ref 20 dBm Offset 1 dB Att 30 dB RBW 1 MHz VBW 3 MHz SMT 20 ms Center 5.23 GHz 8 MHz/ Span 80 MHz Tx Channel Bandwidth 40 MHz Power 14.24 dBm Date: 4.JUL.2023 15:34:18
802.11ac-VHT80-Low	 Ref 20 dBm Offset 1 dB Att 30 dB RBW 1 MHz VBW 3 MHz SMT 20 ms Center 5.21 GHz 16 MHz/ Span 160 MHz Tx Channel Bandwidth 80 MHz Power 13.24 dBm Date: 4.JUL.2023 15:34:53

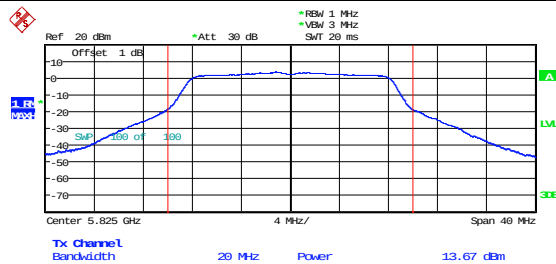
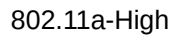
5725-5850MHz



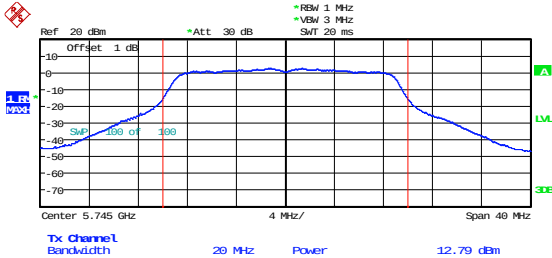
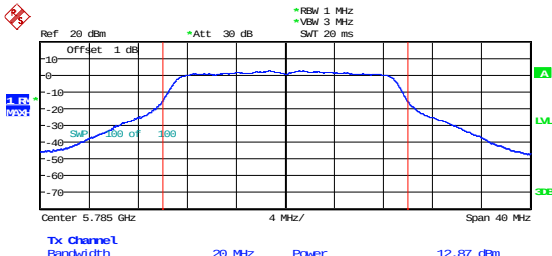
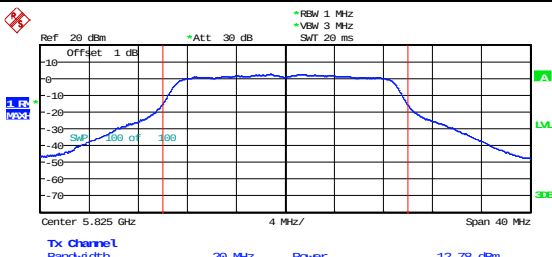
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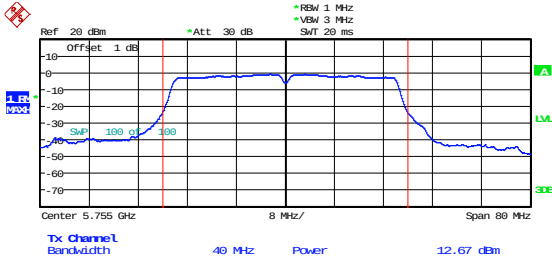
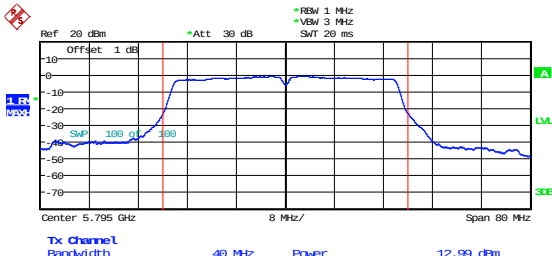
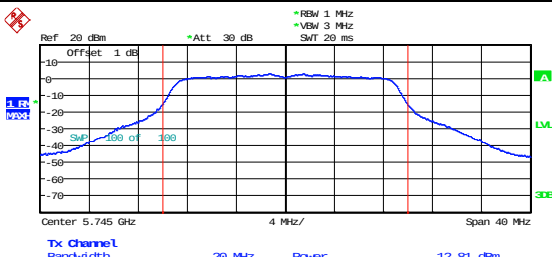


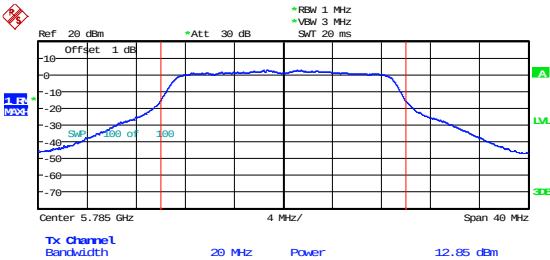
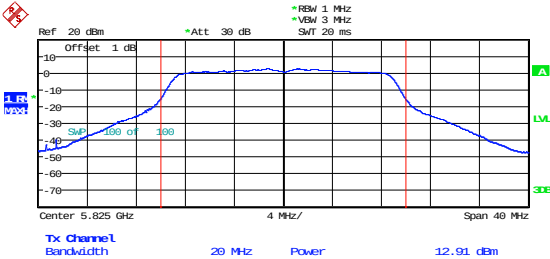
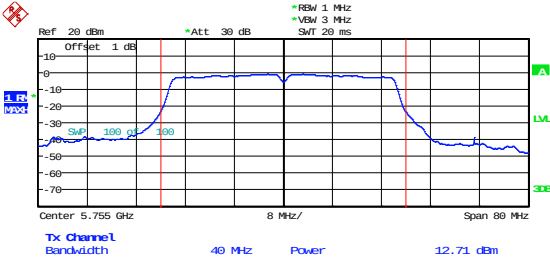
Date: 4.JUL.2023 18:52:36



Date: 4.JUL.2023 18:51:51

802.11n-HT20-Low	 Date: 4.JUL.2023 18:53:20
802.11n-HT20-Middle	 Date: 4.JUL.2023 18:53:57
802.11n-HT20-High	 Date: 4.JUL.2023 18:54:20

802.11n-HT40-Low	 Date: 4.JUL.2023 18:56:39
802.11n-HT40-High	 Date: 4.JUL.2023 18:57:16
802.11ac-VHT20-Low	 Date: 4.JUL.2023 18:54:56

802.11ac-VHT20-Middle	 Ref: 20 dBm Offset: 1 dB Att: 30 dB RBW: 1 MHz VBW: 3 MHz SMT: 20 ms Center 5.785 GHz 4 MHz/ Span 40 MHz Tx Channel Bandwidth 20 MHz Power 12.85 dBm Date: 4.JUL.2023 18:55:19
802.11ac-VHT20-High	 Ref: 20 dBm Offset: 1 dB Att: 30 dB RBW: 1 MHz VBW: 3 MHz SMT: 20 ms Center 5.825 GHz 4 MHz/ Span 40 MHz Tx Channel Bandwidth 20 MHz Power 12.91 dBm Date: 4.JUL.2023 18:56:06
802.11ac-VHT40-Low	 Ref: 20 dBm Offset: 1 dB Att: 30 dB RBW: 1 MHz VBW: 3 MHz SMT: 20 ms Center 5.755 GHz 8 MHz/ Span 80 MHz Tx Channel Bandwidth 40 MHz Power 12.71 dBm Date: 4.JUL.2023 18:59:12

802.11ac-VHT40-High	Date: 4.JUL.2023 18:59:35
802.11ac-VHT80-Low	Date: 4.JUL.2023 19:00:07

APPENDIX D

Frequency Stability

U-NII-1:5150-5250MHz worst case at 802.11a middle channel				
Voltage(%)	Power(VDC)	TEMP(°C)	Freq.Dev(Hz)	Deviation
100%	3.8	-30	1585	0.2871
100%		-20	1595	0.2889
100%		-10	1580	0.2863
100%		0	1588	0.2877
100%		+10	1586	0.2873
100%		+20	1602	0.2903
100%		+30	1599	0.2897
100%		+40	1590	0.2880
100%		+50	1585	0.2871
Low Battery power	3.4	+20	1583	0.2867
High Battery power	4.2	+20	1601	0.2900

U-NII-1:5725-5850MHz worst case at 802.11a middle channel				
Voltage(%)	Power(VDC)	TEMP(°C)	Freq.Dev(Hz)	Deviation
100%	3.8	-30	1590	0.2754
100%		-20	1592	0.2757
100%		-10	1583	0.2741
100%		0	1591	0.2756
100%		+10	1584	0.2743
100%		+20	1603	0.2776
100%		+30	1596	0.2763
100%		+40	1590	0.2753
100%		+50	1589	0.2752
Low Battery power	3.4	+20	1586	0.2747
High Battery power	4.2	+20	1593	0.2759

APPENDIX PHOTOGRAPHS

Please refer to “ANNEX”

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