

TEST REPORT

Reference No...... : WTX24X07180275W001
FCC ID..... : 2BK4Y-CCT1D1D30103
Applicant..... : Tinyphoton (Wuhan) Technology Co., Ltd.
Address..... : 2101 Huigushikong, No.4 Luoyu East Road, Wuhan, Hubei, China
Manufacturer..... : The same as Applicant
Address..... : The same as Applicant
Product Name..... : DWARF 3 Smart Telescope
Model No...... : CCT1D1D30103
Standards..... : FCC Part 15.407
Date of Receipt sample..... : 2024-07-31
Date of Test..... : 2024-07-31 to 2024-09-23
Date of Issue..... : 2024-09-23
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.

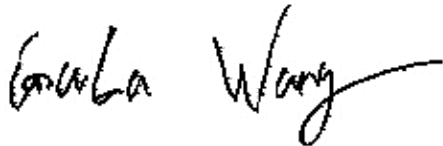
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Report version

Version No.	Date of issue	Description
Rev.00	2024-09-23	Original
/	/	/

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

General Description of EUT	
Product Name:	DWARF 3 Smart Telescope
Trade Name:	DWARFLAB
Model No.:	CCT1D1D30103
Adding Model(s):	/
Rated Voltage:	Input DC5V/9V/12V Battery DC3.85V
Battery Capacity:	10000mAh
Power Adapter:	/
<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:	5180-5240MHz, 5745-5825MHz
Max. RF Output Power:	Band 1: 14.24dBm (Conducted) Band 4: 14.55dBm (Conducted)
Type of Modulation:	QPSK, 16QAM, 64QAM, 256QAM
Type of Antenna:	FPC Antenna
Antenna Gain:	Band 1: 1.62dBi Band 4: 2.22dBi
<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

Run engineering instruction, 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	87	87	87	/	/	/	/	/	/	/	80	80	80
802.11n-HT20 MCS0	85	85	85	/	/	/	/	/	/	/	75	75	75
802.11ac-VHT20 MCS0	85	85	85	/	/	/	/	/	/	/	75	75	75
Mode	NCB: 40MHz												
	5190	5230	5270	5310	5510	5550	5670	5710	5755	5795			
802.11n-HT40 MCS0	85	85	/	/	/	/	/	/	75	75			
802.11ac-VHT40 MCS0	85	85	/	/	/	/	/	/	75	75			

Mode	NCB: 80MHz					
	5210	5290	5530	5610	5690	5775
802.11ac-VHT8 0 MCS0/Nss2	85	/	/	/	/	75

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,5775 MHz

Test Conditions	
Temperature:	22~25 °C
Relative Humidity:	45~75 %
ATM Pressure:	1019 mbar

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
Type-C Cable	1.0	Shielded	Without 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
Adapter	Xiaerduo	HMQ-Z24T-12C	/

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	2024-02-24	2025-02-23
WTXE1005A 1005	Spectrum Analyzer	Agilent	N9020A	US471401 02	2024-03-19	2025-03-18
WTXE1084A 1001	Spectrum Analyzer	Agilent	N9020A	MY543205 48	2024-02-24	2025-02-23
WTXE1004A 1-001	Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2024-02-27	2025-02-26
WTXE1103A 1003	Attenuator	Pasternack	PE4007-4	/	2024-02-24	2025-02-23
WTXE1003A 1-005	Coaxial Cable	/	0M4RFC	/	2024-07-03	2025-01-03
☐ Chamber A: Below 1GHz						
WTXE1005A 1003	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/03 5	2024-02-24	2025-02-23
WTXE1001A 1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2024-03-19	2025-03-18
WTXE1007A 1001	Amplifier	HP	8447F	2805A034 75	2024-02-24	2025-02-23
WTXE1010A 1007	Loop Antenna	Schwarz beck	FMZB 1516	9773	2024-02-26	2025-02-25
WTXE1010A 1006	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2024-02-24	2025-02-23
WTXE1104A 1032-1	Coaxial Cable	/	RC_6G-N-M	/	2024-03-15	2025-03-14
WTXE1104A 1032-2	Coaxial Cable	/	RC_6G-N-M	/	2024-03-15	2025-03-14
WTXE1104A 1032-3	Coaxial Cable	/	RC_6G-N-M	/	2024-03-15	2025-03-14
☐ Chamber A: Above 1GHz						
WTXE1005A 1003	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/03 5	2024-02-24	2025-02-23
WTXE1001A 1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2024-03-19	2025-03-18
WTXE1065A 1001	Amplifier	C&D	PAP-1G18	2002	2024-02-27	2025-02-26
WTXE1010A 1005	Horn Antenna	ETS	3117	00086197	2024-02-26	2025-02-25

WTXE1010A 1010	DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2024-03-17	2025-03-16
WTXE1003A 1001	Pre-amplifier	Schwarzbeck	BBV 9721	9721-031	2024-02-29	2025-02-28
WTXE1104A 1033-1	Coaxial Cable	/	C16-07-07	/	2024-03-15	2025-03-14
WTXE1104A 1033-2	Coaxial Cable	/	C16-07-07	/	2024-03-15	2025-03-14
WTXE1104A 1033-3	Coaxial Cable	/	C16-07-07	/	2024-03-15	2025-03-14
☐ Chamber B:Below 1GHz						
WTXE1010A 1006	Trilog Broadband Antenna	Schwarz beck	VULB9163(B)	9163-635	2024-03-17	2027-03-16
WTXE1038A 1001	Amplifier	Agilent	8447D	2944A104 57	2024-02-24	2025-02-23
WTXE1001A 1002	EMI Test Receiver	Rohde & Schwarz	ESPI	101391	2024-02-24	2025-02-23
WTXE1104A 1031-1	Coaxial Cable	/	1.5MRFC-LWB3	/	2024-07-03	2025-07-02
WTXE1104A 1031-2	Coaxial Cable	/	RG 316	/	2024-07-03	2025-07-02
WTXE1104A 1031-3	Coaxial Cable	/	RG 316	/	2024-07-03	2025-07-02
☒ Chamber C:Below 1GHz						
WTXE1093A 1001	EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2024-02-27	2025-02-26
WTXE1010A 1013-1	Trilog Broadband Antenna	Schwarz beck	VULB 9168	1194	2024-04-18	2027-04-17
WTXE1007A 1002	Amplifier	HP	8447F	2944A038 69	2024-02-24	2025-02-23
WTXE1010A 1007	Loop Antenna	Schwarz beck	FMZB 1516	9773	2024-02-26	2025-02-25
WTXE1104A 1034-1	Coaxial Cable	/	RC_6G-N-M	/	2024-07-03	2025-07-02
WTXE1104A 1034-2	Coaxial Cable	/	RC_6G-N-M	/	2024-07-03	2025-07-02
WTXE1104A 1034-3	Coaxial Cable	/	RC_6G-N-M	/	2024-07-03	2025-07-02
☒ Chamber C: Above 1GHz						
WTXE1093A	EMI Test	Rohde &	ESIB 26	100401	2024-02-27	2025-02-26

1001	Receiver	Schwarz				
WTXE1103A 1005	Horn Antenna	POAM	RTF-118A	1820	2023-03-10	2026-03-09
WTXE1103A 1006	Amplifier	Tonscend	TAP01018050	AP22E806 235	2024-02-27	2025-02-26
WTXE1010A 1010	DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2024-03-17	2025-03-16
WTXE1003A 1001	Pre-amplifier	Schwarzbeck	BBV 9721	9721-031	2024-02-29	2025-02-28
WTXE1104A 1035-1	Coaxial Cable	/	RC-18G-N-M	/	2024-07-03	2025-07-02
WTXE1104A 1035-2	Coaxial Cable	/	RC-18G-N-M	/	2024-07-03	2025-07-02
WTXE1104A 1035-3	Coaxial Cable	/	RC-18G-N-M	/	2024-07-03	2025-07-02
☐ Conducted Room 1#						
WTXE1104A 1029	EMI Test Receiver	Rohde & Schwarz	ESCI	100525	2023-12-12	2024-12-11
WTXE1002A 1001	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2024-02-24	2025-02-23
WTXE1003A 1001	AC LISN	Schwarz beck	NSLK8126	8126-279	2024-02-24	2025-02-23
WTXE1104A 1036	Coaxial Cable	/	RG 316	/	2024-07-03	2025-07-02
WTXE1104A 1038	Coaxial Cable	/	6MRFC-DP	/	2024-07-03	2025-07-02
☒ Conducted Room 2#						
WTXE1001A 1004	EMI Test Receiver	Rohde & Schwarz	ESPI	101259	2024-02-24	2025-02-23
WTXE1003A 1003	LISN	Rohde & Schwarz	ENV 216	100097	2024-02-24	2025-02-23
WTXE1104A 1036	Coaxial Cable	/	RG 316	/	2024-07-03	2025-07-02

Software List			
Description	Manufacturer	Model	Version
EMI Test Software (Radiated Emission A)	Farad	EZ-EMC	RA-03A1 (1.1.4.2)
EMI Test Software (Radiated Emission B)	Farad	EZ-EMC	RA-03A1 (1.1.4.2)
EMI Test Software (Radiated Emission C)	Farad	EZ-EMC	RA-03A1-2 (1.1.4.2)
EMI Test Software (Conducted Emission Room 1#)	Farad	EZ-EMC	3A1*CE-RE 1.1.4.3
EMI Test Software (Conducted Emission Room 2#)	Farad	EZ-EMC	3A1*CE-RE 1.1.4.3

*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	Compliant
§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.

Reference No.: WTX24X07180275W001

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:

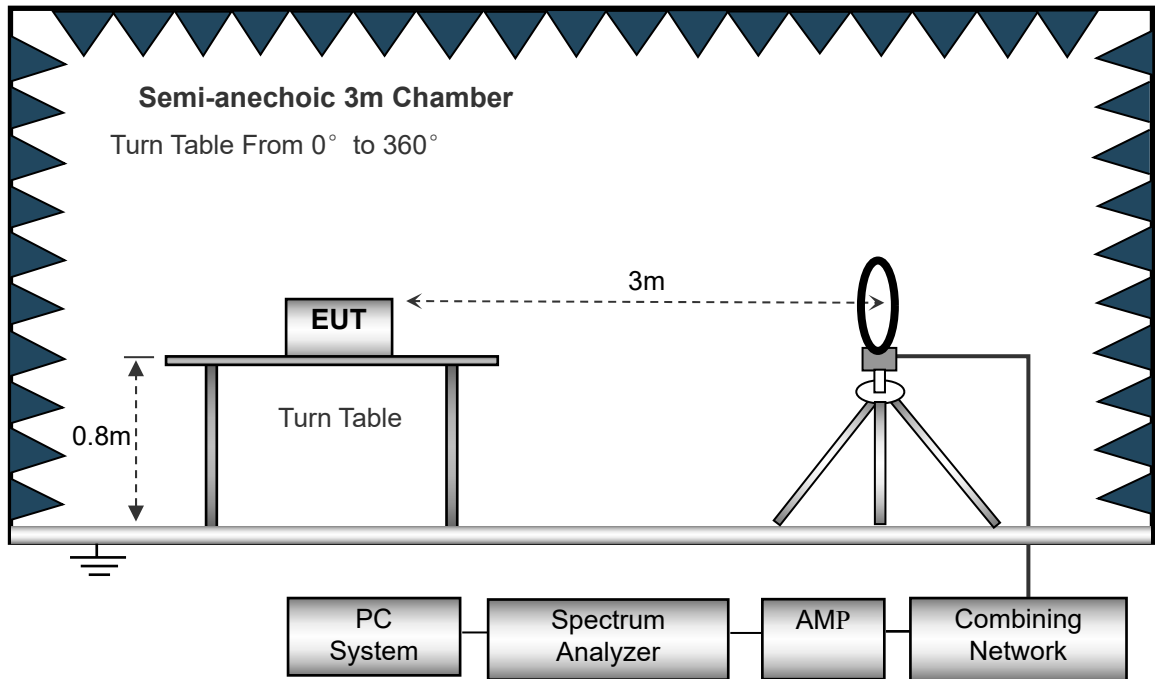
- E is the field strength in V/m;
- d is the measurement distance in meters;
- EIRP is the equivalent isotropically radiated power in watts.

8.2 Test Procedure

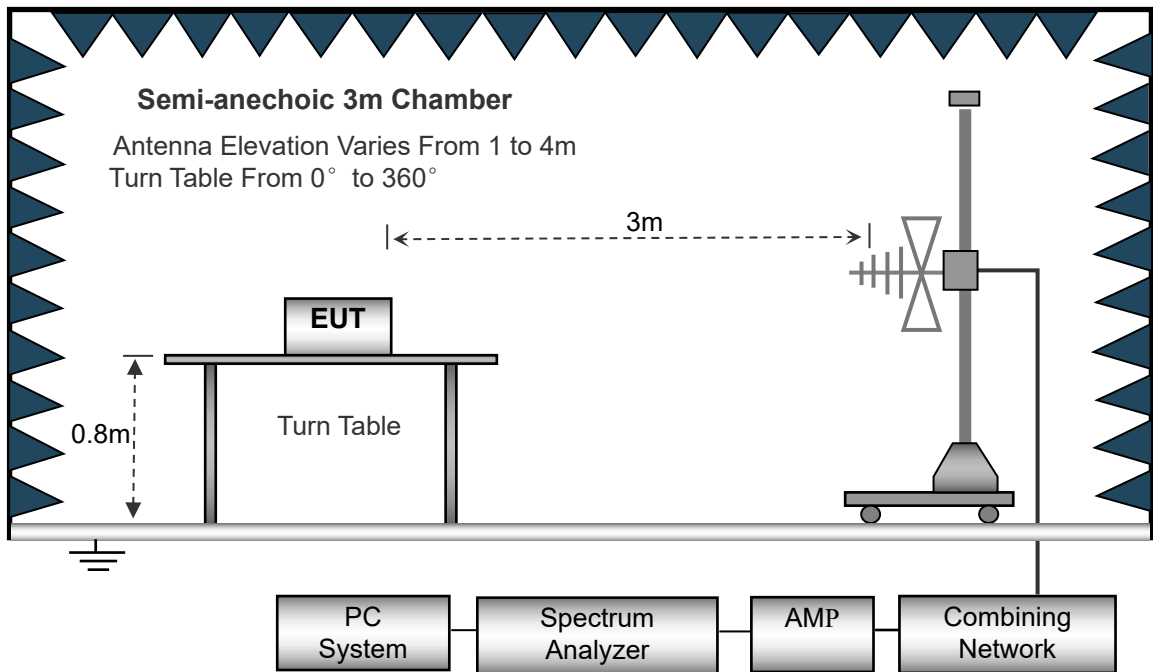
The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.205 15.407(b)(6) and FCC Part 15.209 Limit..

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.

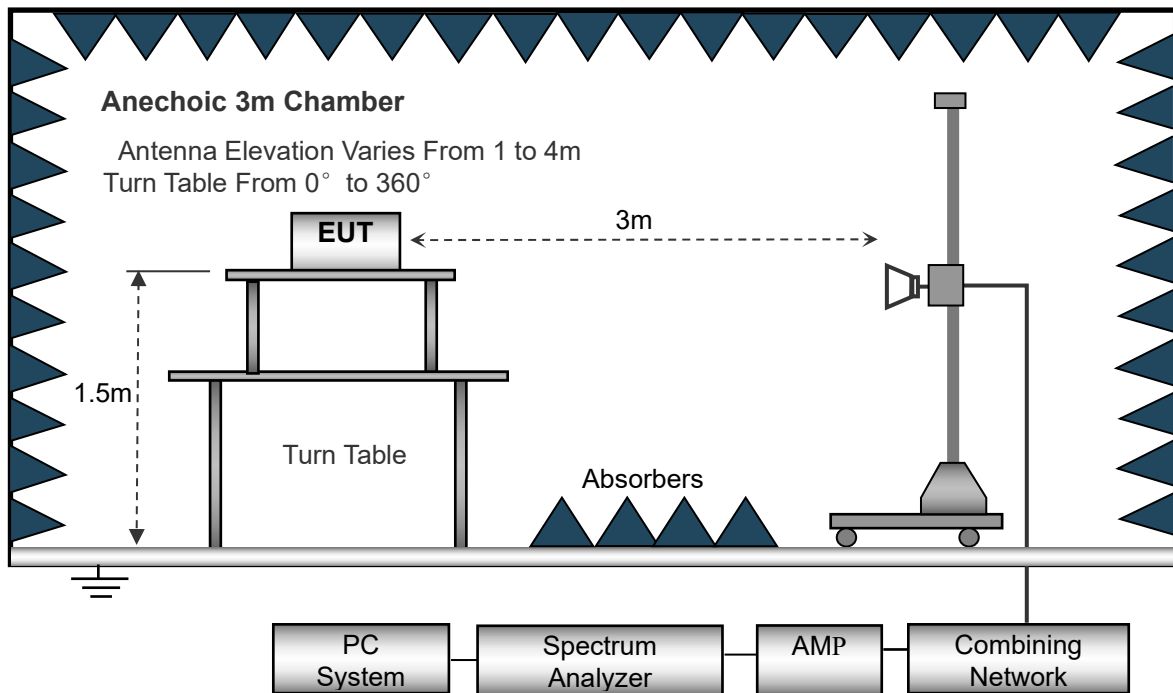
The test setup for emission measurement below 30MHz.



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 -6dB μ V means the emission is 6dB μ V below the maximum limit for Class B. The equation for margin calculation is as follows:

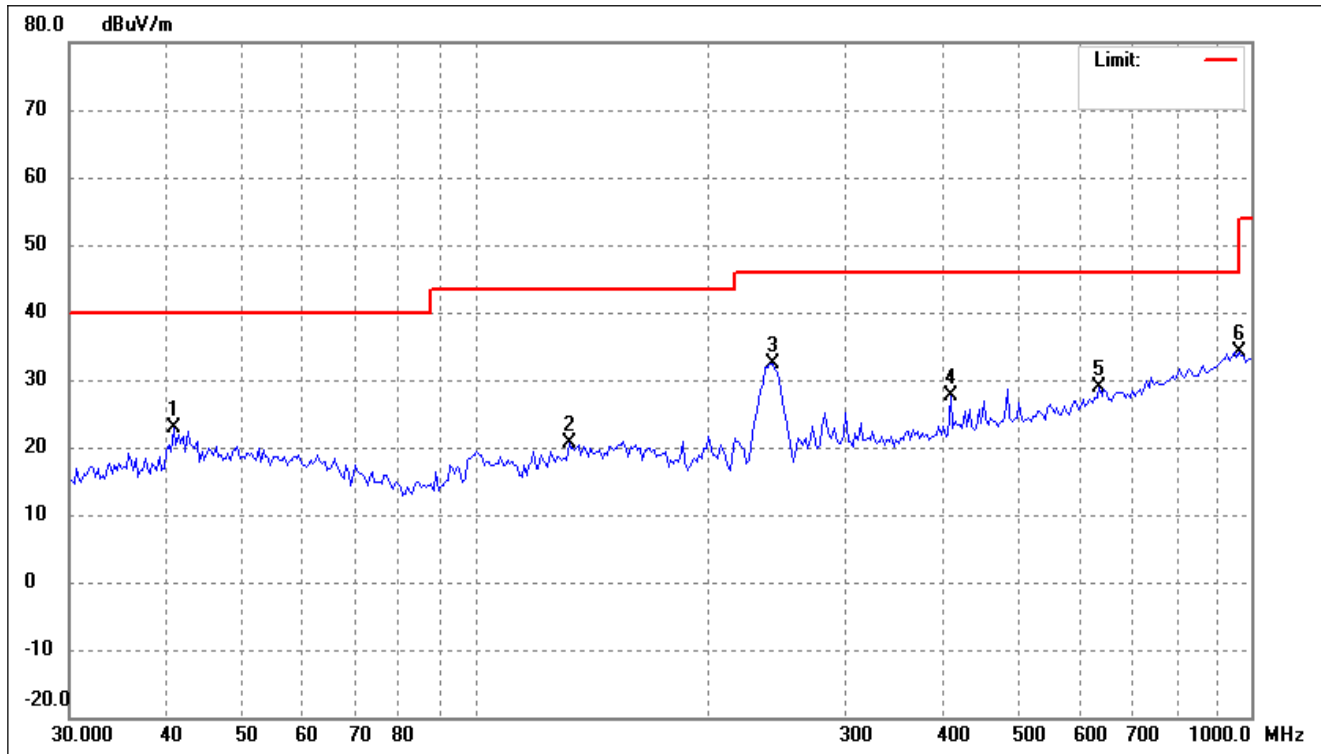
$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15 Limit}$$

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

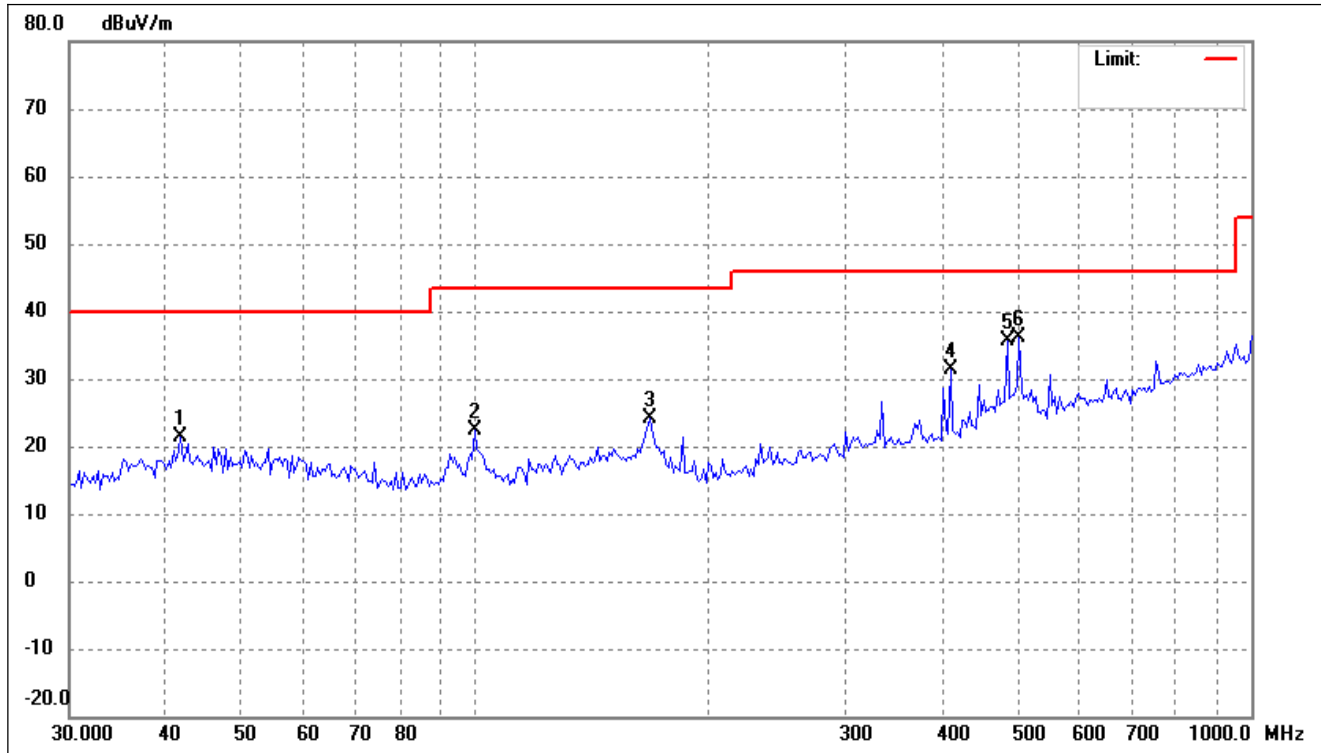
802.11a			
Test Channel	5180MHz(Worst case)	Polarity:	Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	40.8699	30.78	-7.95	22.83	40.00	-17.17	-	-	peak
2	132.1490	29.78	-9.23	20.55	43.50	-22.95	-	-	peak
3	241.8377	42.45	-9.97	32.48	46.00	-13.52	-	-	peak
4	409.6506	33.72	-6.06	27.66	46.00	-18.34	-	-	peak
5	637.7947	30.61	-1.67	28.94	46.00	-17.06	-	-	peak
6	965.4742	30.80	3.37	34.17	54.00	-19.83	-	-	peak

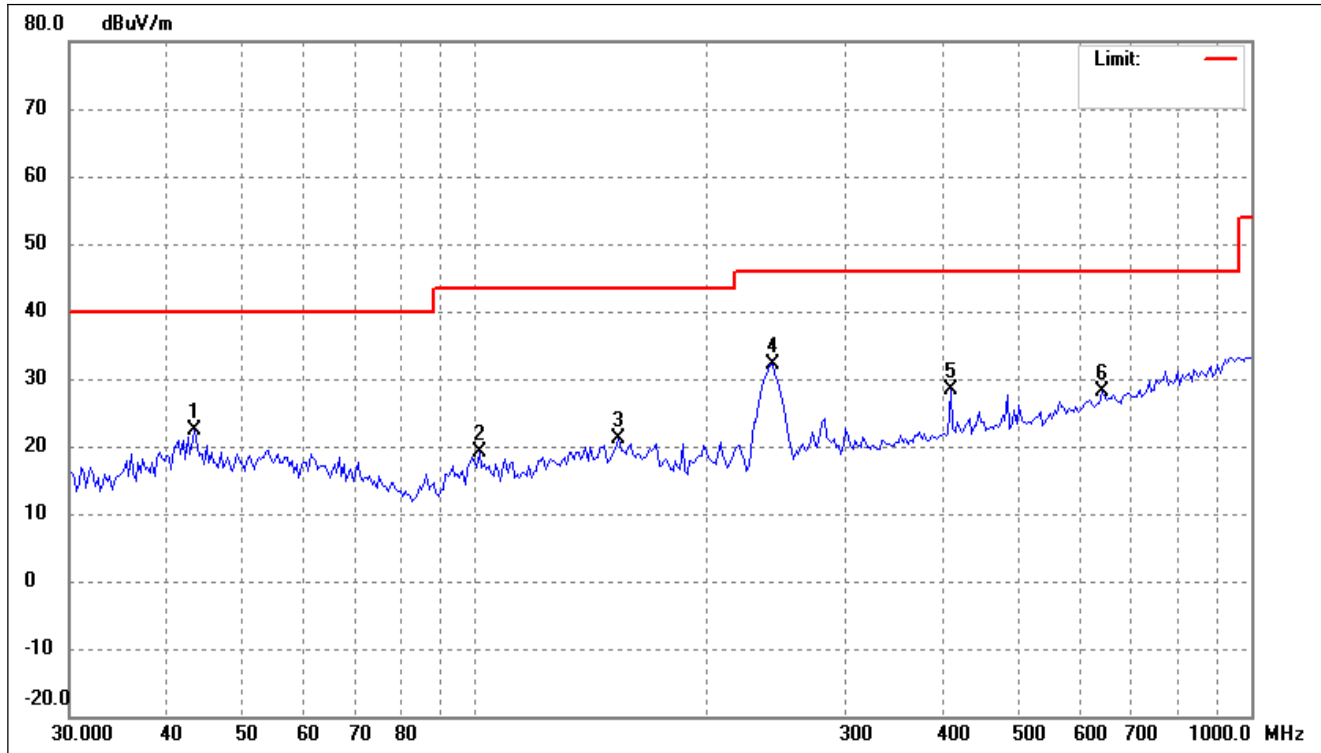
802.11a

Test Channel	5180MHz(Worst case)	Polarity:	Vertical
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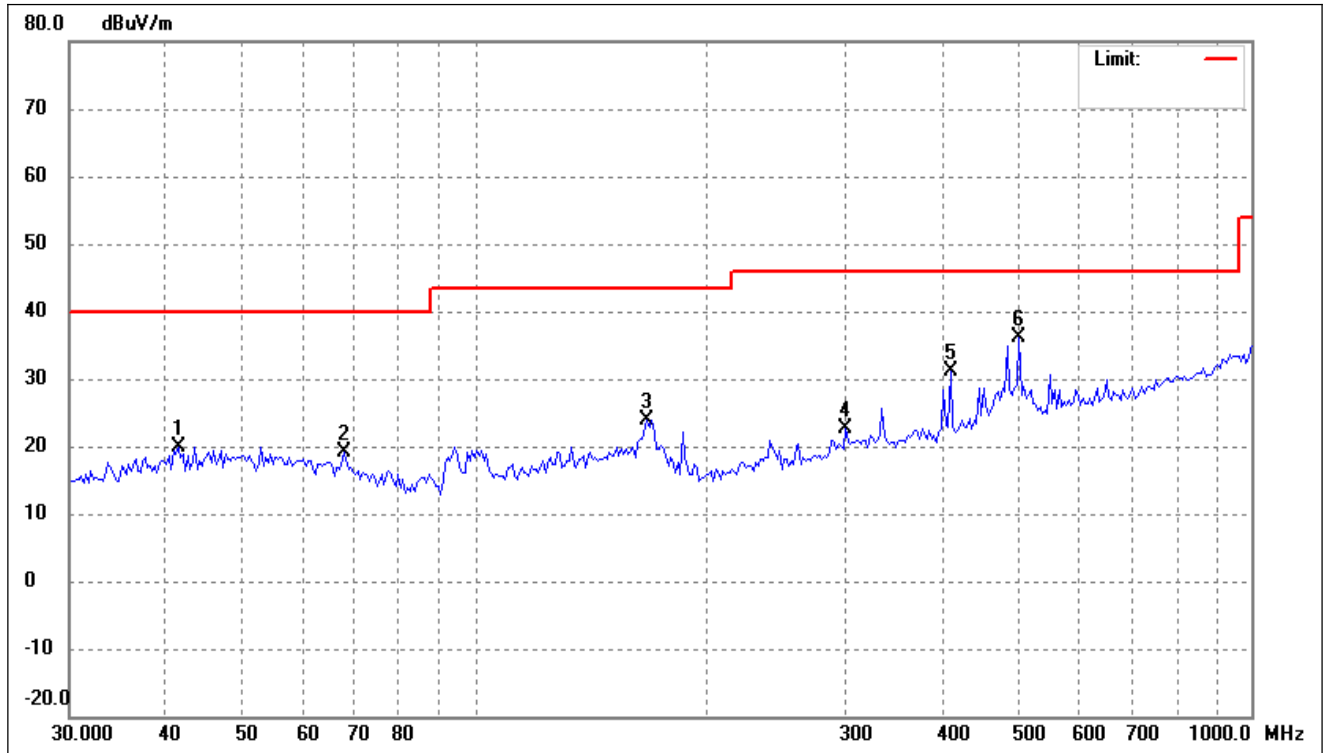
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	41.7406	29.37	-7.95	21.42	40.00	-18.58	-	-	peak
2	99.7676	34.31	-12.01	22.30	43.50	-21.20	-	-	peak
3	167.8136	32.28	-8.25	24.03	43.50	-19.47	-	-	peak
4	409.6506	37.49	-6.06	31.43	46.00	-14.57	-	-	peak
5	484.9068	40.49	-4.92	35.57	46.00	-10.43	-	-	peak
6	502.2473	40.83	-4.76	36.07	46.00	-9.93	-	-	peak

802.11n-HT20			
Test Channel	5180MHz(worst case)	Polarity:	Horizontal



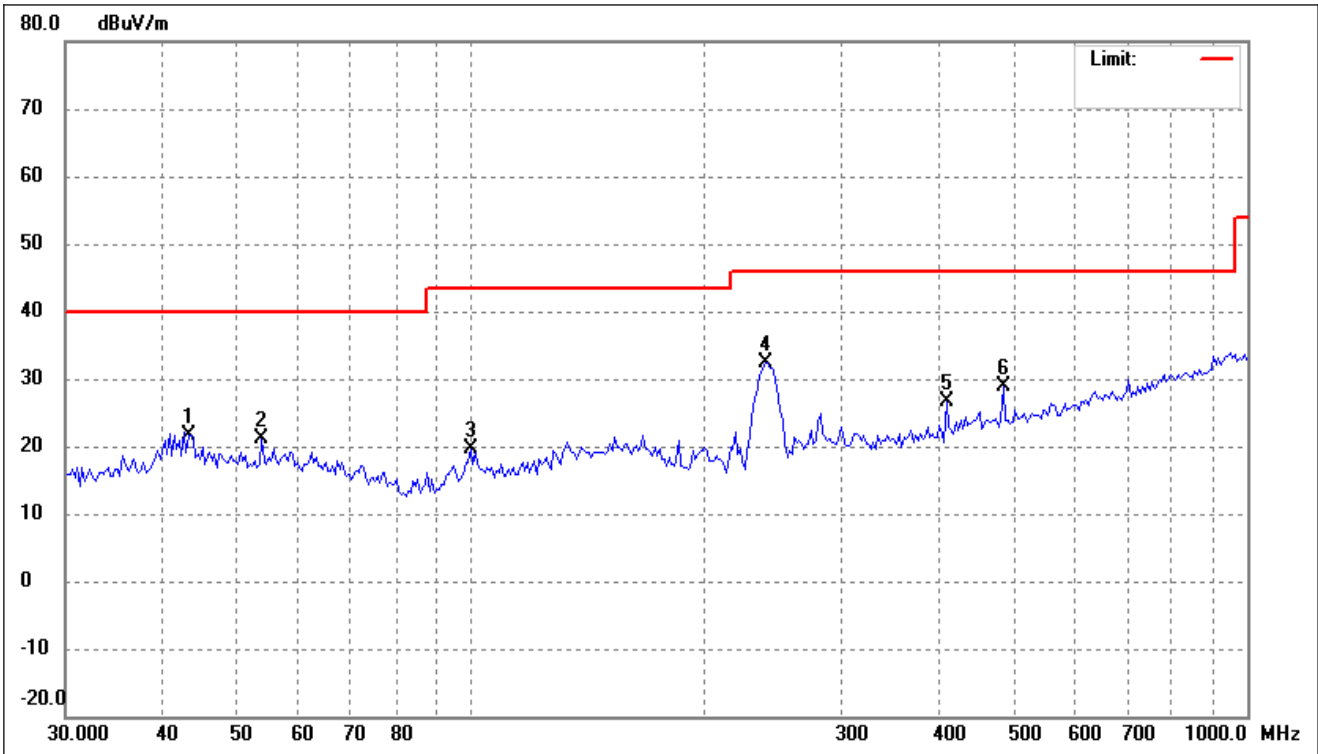
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	43.5381	30.43	-7.95	22.48	40.00	-17.52	-	-	peak
2	101.1797	30.96	-11.88	19.08	43.50	-24.42	-	-	peak
3	153.1627	29.07	-8.05	21.02	43.50	-22.48	-	-	peak
4	241.8377	42.14	-9.97	32.17	46.00	-13.83	-	-	peak
5	409.6506	34.38	-6.06	28.32	46.00	-17.68	-	-	peak
6	642.2923	29.64	-1.62	28.02	46.00	-17.98	-	-	peak

802.11n-HT20			
Test Channel	5180MHz(worst case)	Polarity:	Vertical



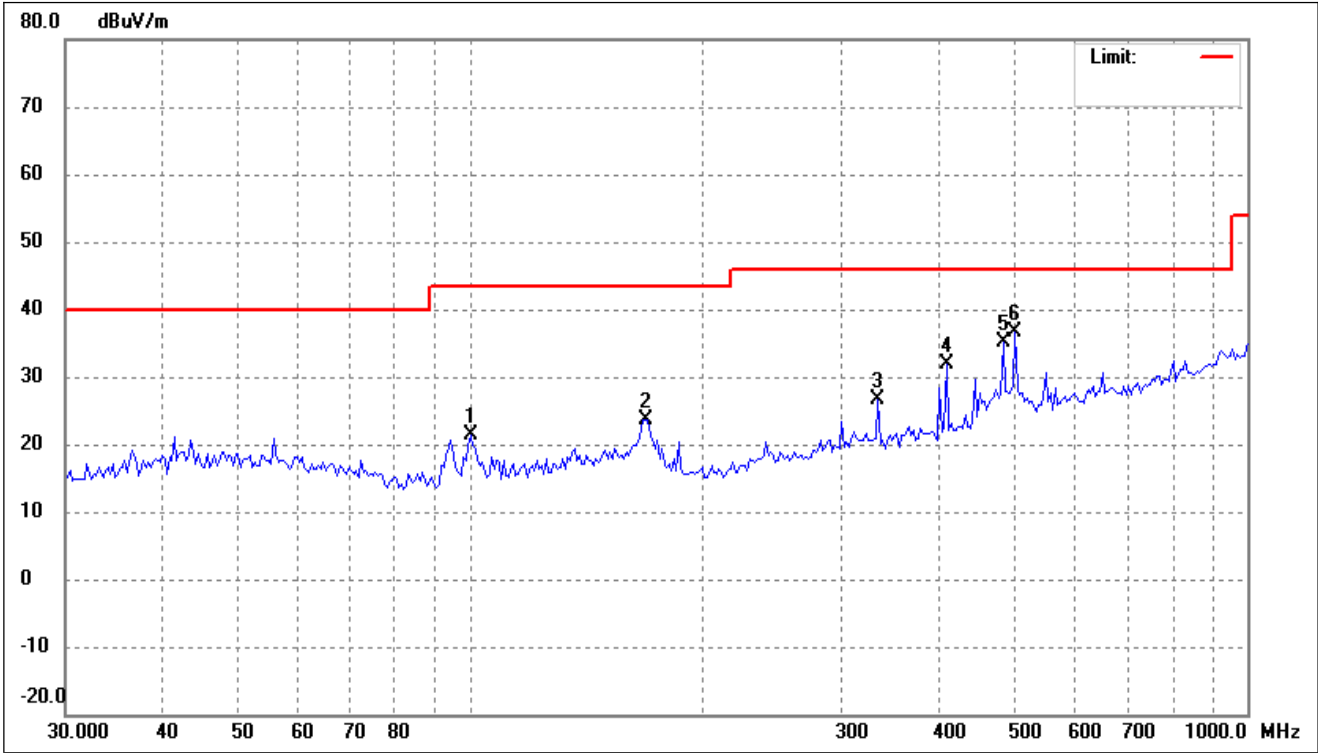
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	41.4483	27.95	-7.96	19.99	40.00	-20.01	-	-	peak
2	67.7856	28.89	-9.85	19.04	40.00	-20.96	-	-	peak
3	166.6385	32.14	-8.23	23.91	43.50	-19.59	-	-	peak
4	300.6988	30.53	-7.85	22.68	46.00	-23.32	-	-	peak
5	409.6506	37.13	-6.06	31.07	46.00	-14.93	-	-	peak
6	502.2473	40.87	-4.76	36.11	46.00	-9.89	-	-	peak

802.11ac-VHT20			
Test Channel	5180MHz(worst case)	Polarity:	Horizontal



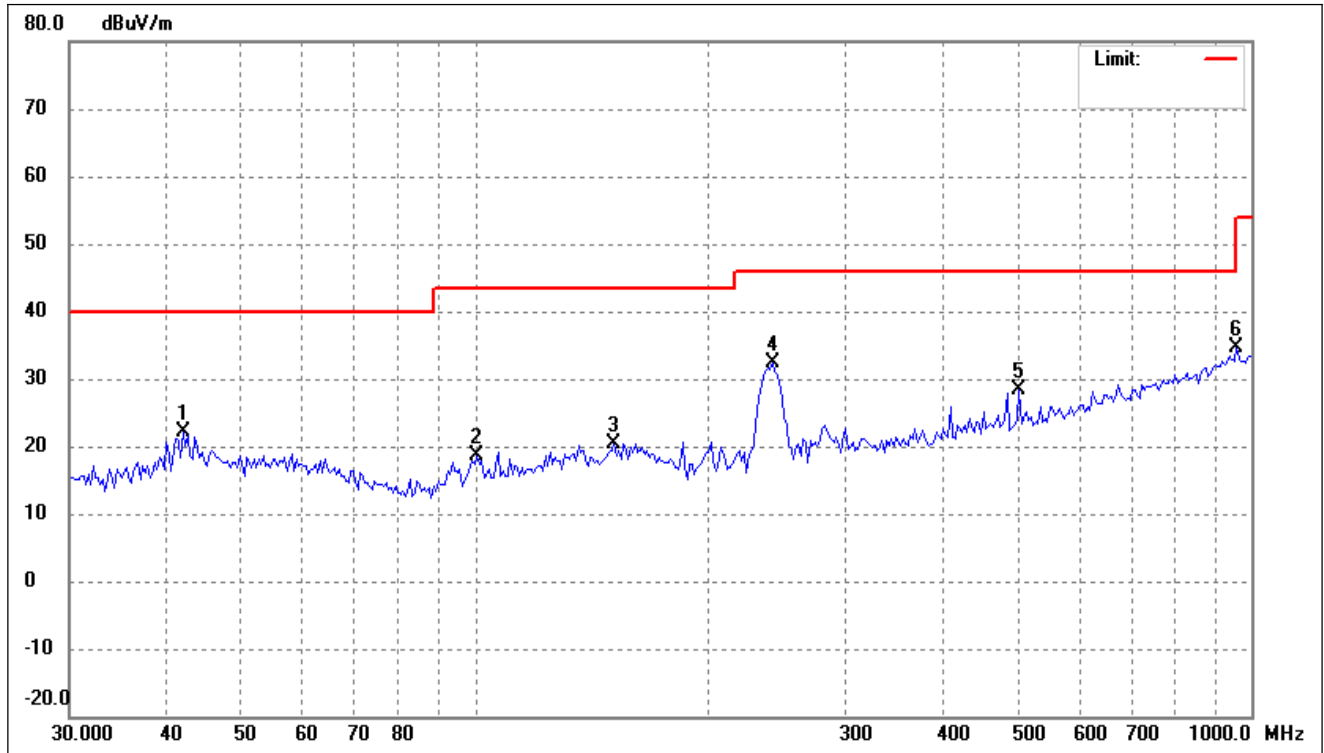
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	43.2333	29.52	-7.95	21.57	40.00	-18.43	-	-	peak
2	53.7559	29.16	-7.99	21.17	40.00	-18.83	-	-	peak
3	99.7676	31.54	-12.01	19.53	43.50	-23.97	-	-	peak
4	240.1442	42.51	-10.02	32.49	46.00	-13.51	-	-	peak
5	409.6506	32.70	-6.06	26.64	46.00	-19.36	-	-	peak
6	484.9068	33.90	-4.92	28.98	46.00	-17.02	-	-	peak

802.11ac-VHT20			
Test Channel	5180MHz(worst case)	Polarity:	Vertical



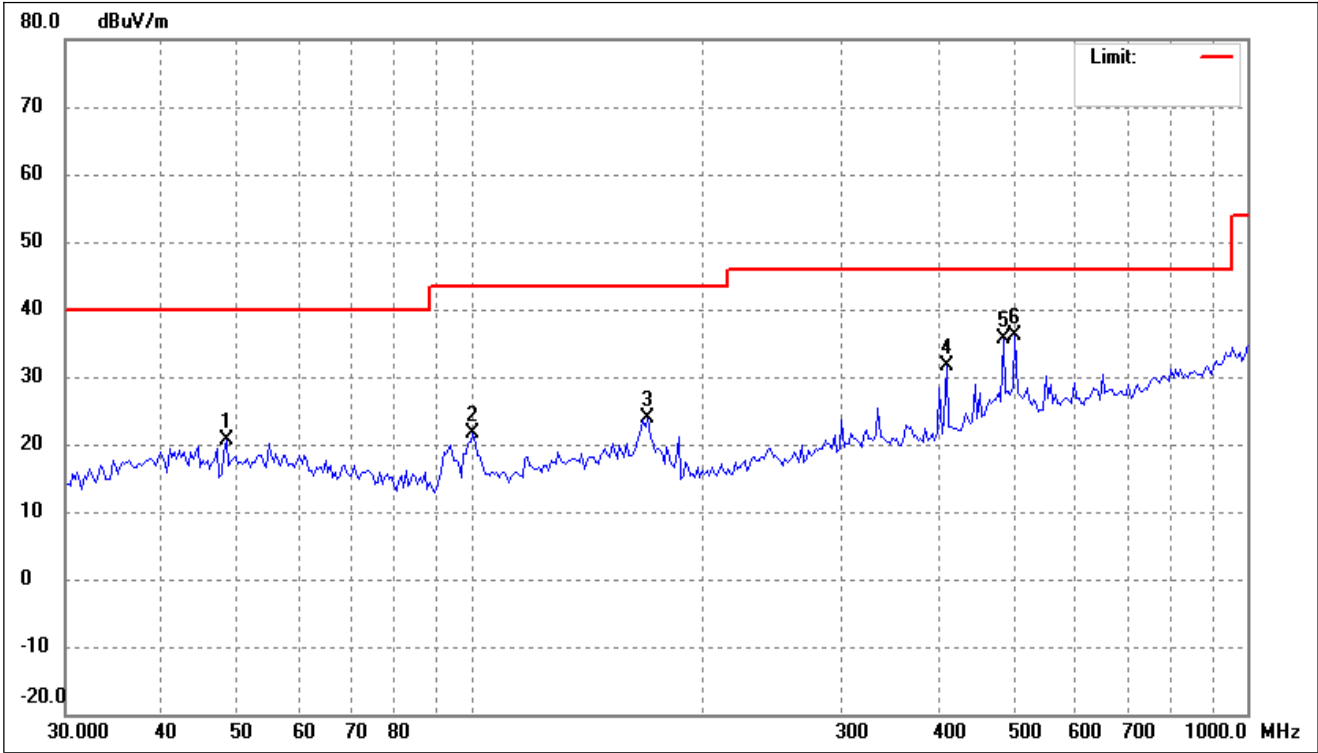
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	99.7676	33.46	-12.01	21.45	43.50	-22.05	-	-	peak
2	167.8136	31.86	-8.25	23.61	43.50	-19.89	-	-	peak
3	334.1255	33.74	-7.23	26.51	46.00	-19.49	-	-	peak
4	409.6506	38.00	-6.06	31.94	46.00	-14.06	-	-	peak
5	484.9068	40.10	-4.92	35.18	46.00	-10.82	-	-	peak
6	502.2473	41.48	-4.76	36.72	46.00	-9.28	-	-	peak

802.11n-HT40			
Test Channel	5190MHz(worst case)	Polarity:	Horizontal



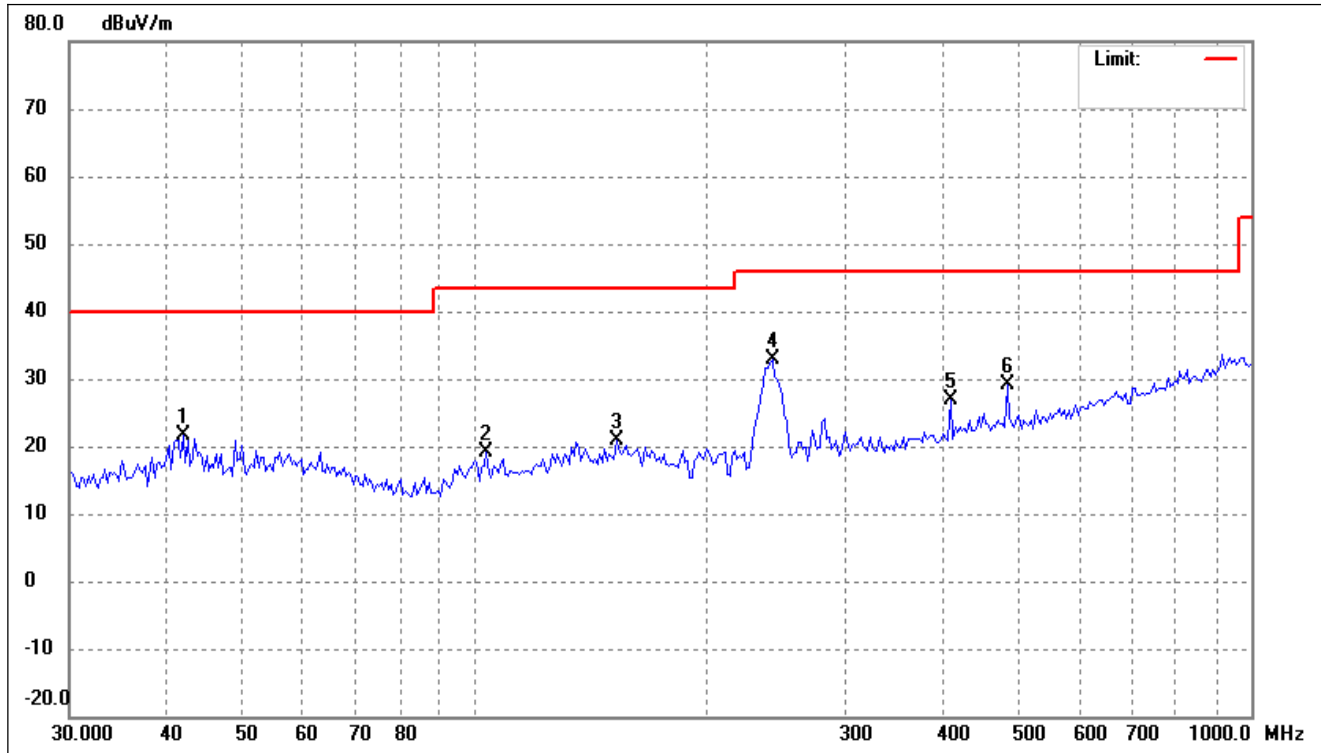
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	42.0350	30.08	-7.95	22.13	40.00	-17.87	-	-	peak
2	100.4712	30.51	-11.95	18.56	43.50	-24.94	-	-	peak
3	151.0252	28.38	-8.05	20.33	43.50	-23.17	-	-	peak
4	241.8377	42.33	-9.97	32.36	46.00	-13.64	-	-	peak
5	502.2473	33.03	-4.76	28.27	46.00	-17.73	-	-	peak
6	958.7135	31.36	3.34	34.70	46.00	-11.30	-	-	peak

802.11n-HT40			
Test Channel	5190MHz(worst case)	Polarity:	Vertical



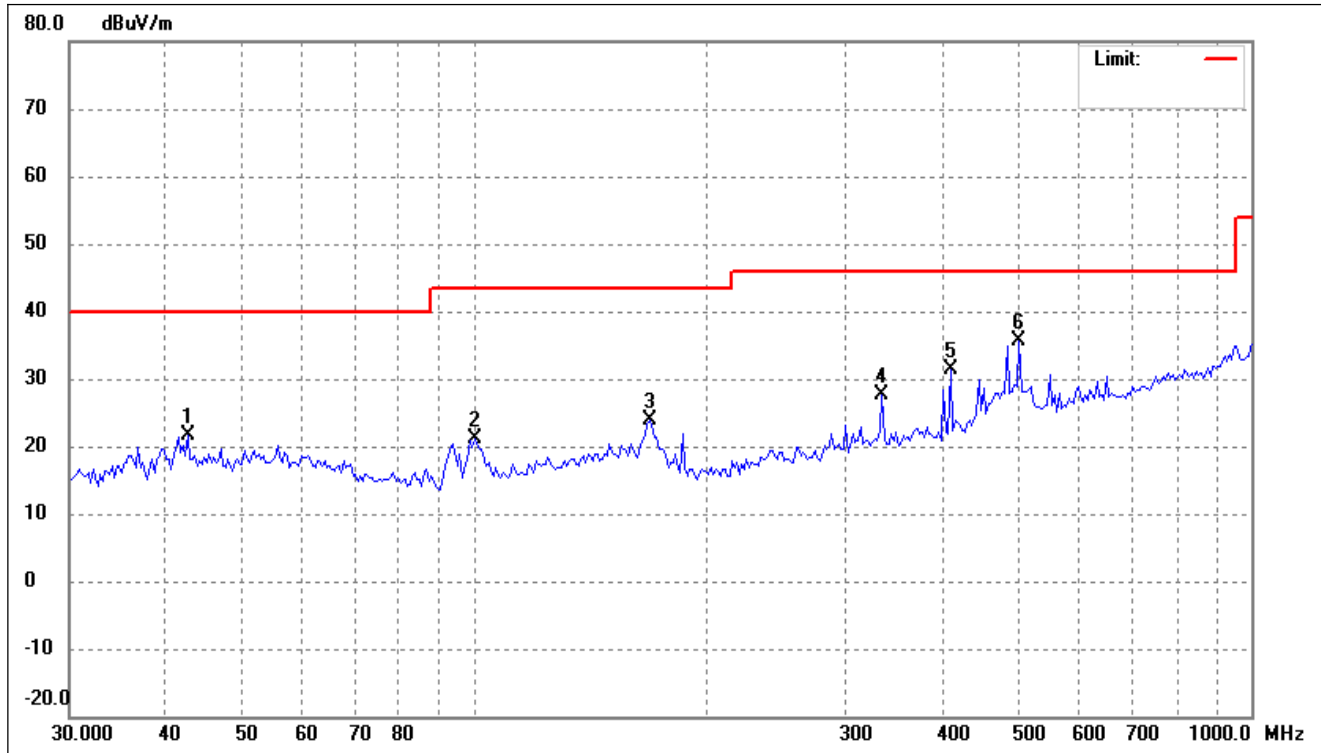
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	48.3780	28.32	-7.71	20.61	40.00	-19.39	-	-	peak
2	100.4712	33.50	-11.95	21.55	43.50	-21.95	-	-	peak
3	168.9970	32.21	-8.29	23.92	43.50	-19.58	-	-	peak
4	409.6506	37.61	-6.06	31.55	46.00	-14.45	-	-	peak
5	484.9068	40.57	-4.92	35.65	46.00	-10.35	-	-	peak
6	502.2473	40.90	-4.76	36.14	46.00	-9.86	-	-	peak

802.11ac-VHT40			
Test Channel	5190MHz(worst case)	Polarity:	Horizontal



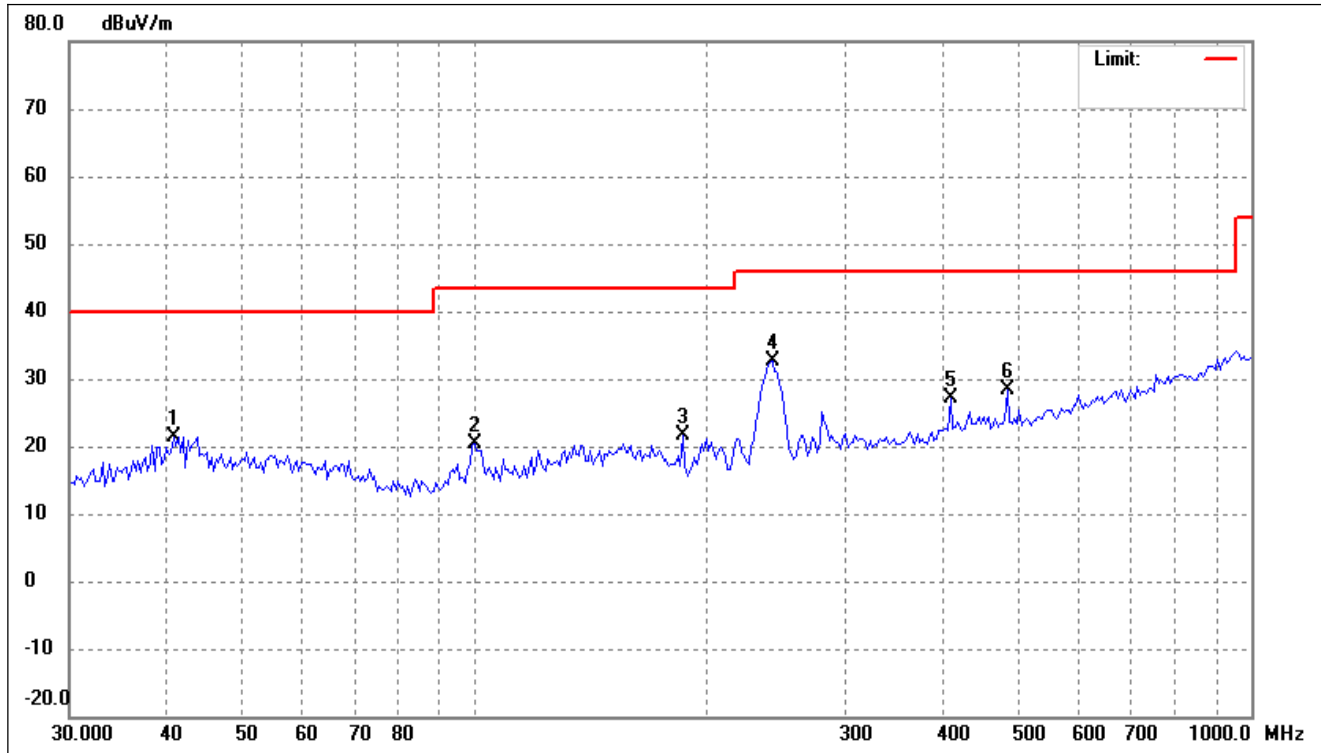
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	42.0350	29.56	-7.95	21.61	40.00	-18.39	-	-	peak
2	103.3353	30.92	-11.68	19.24	43.50	-24.26	-	-	peak
3	152.0902	28.98	-8.05	20.93	43.50	-22.57	-	-	peak
4	241.8377	42.85	-9.97	32.88	46.00	-13.12	-	-	peak
5	409.6506	32.95	-6.06	26.89	46.00	-19.11	-	-	peak
6	484.9068	34.07	-4.92	29.15	46.00	-16.85	-	-	peak

802.11ac-VHT40			
Test Channel	5190MHz(worst case)	Polarity:	Vertical



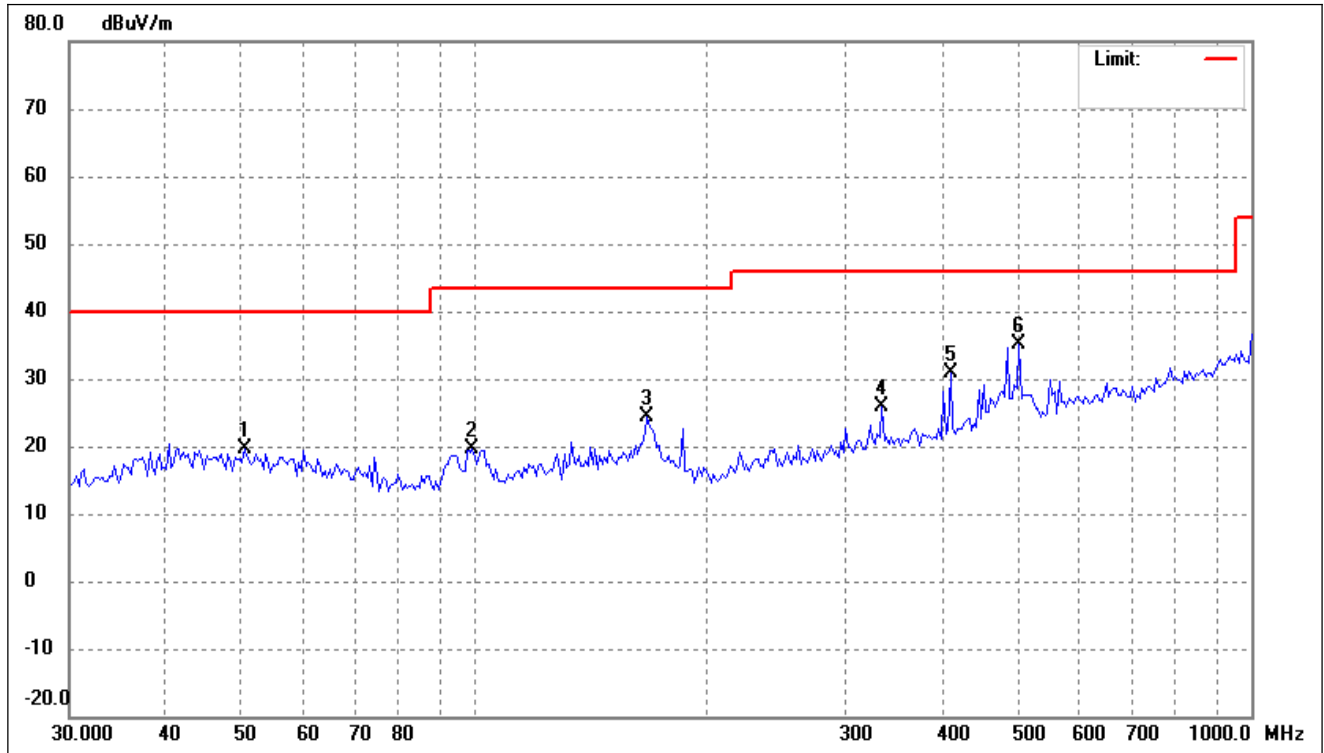
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	42.6299	29.67	-7.96	21.71	40.00	-18.29	-	-	peak
2	99.7676	33.12	-12.01	21.11	43.50	-22.39	-	-	peak
3	167.8136	32.15	-8.25	23.90	43.50	-19.60	-	-	peak
4	334.1255	34.74	-7.23	27.51	46.00	-18.49	-	-	peak
5	409.6506	37.36	-6.06	31.30	46.00	-14.70	-	-	peak
6	502.2473	40.44	-4.76	35.68	46.00	-10.32	-	-	peak

802.11ac-VHT80			
Test Channel	5210MHz(worst case)	Polarity:	Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	40.8699	29.43	-7.95	21.48	40.00	-18.52	-	-	peak
2	99.7676	32.44	-12.01	20.43	43.50	-23.07	-	-	peak
3	185.1626	31.83	-10.30	21.53	43.50	-21.97	-	-	peak
4	241.8377	42.49	-9.97	32.52	46.00	-13.48	-	-	peak
5	409.6506	33.14	-6.06	27.08	46.00	-18.92	-	-	peak
6	484.9068	33.18	-4.92	28.26	46.00	-17.74	-	-	peak

802.11ac-VHT80			
Test Channel	5210MHz(worst case)	Polarity:	Vertical

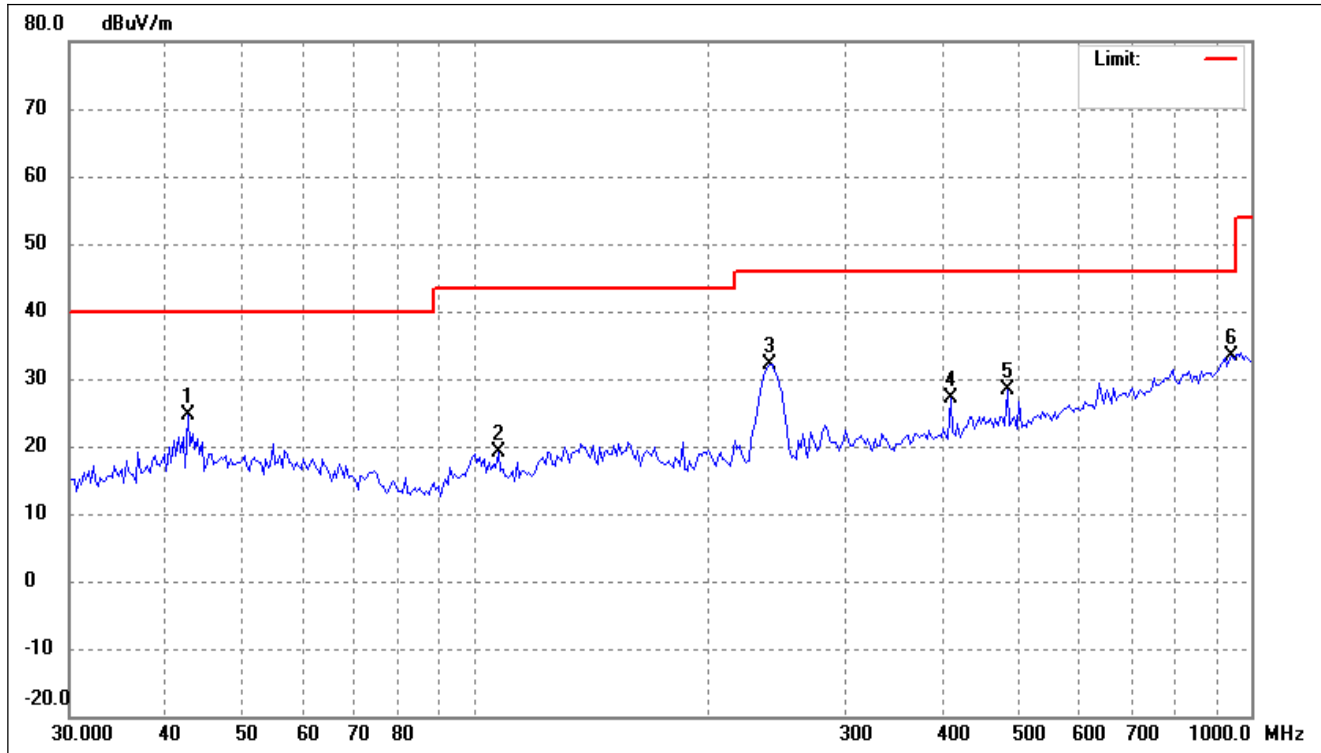


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	50.4614	27.19	-7.64	19.55	40.00	-20.45	-	-	peak
2	99.0690	31.56	-12.04	19.52	43.50	-23.98	-	-	peak
3	166.6385	32.54	-8.23	24.31	43.50	-19.19	-	-	peak
4	334.1255	33.03	-7.23	25.80	46.00	-20.20	-	-	peak
5	409.6506	37.01	-6.06	30.95	46.00	-15.05	-	-	peak
6	502.2473	39.79	-4.76	35.03	46.00	-10.97	-	-	peak

➤ 5725-5850MHz

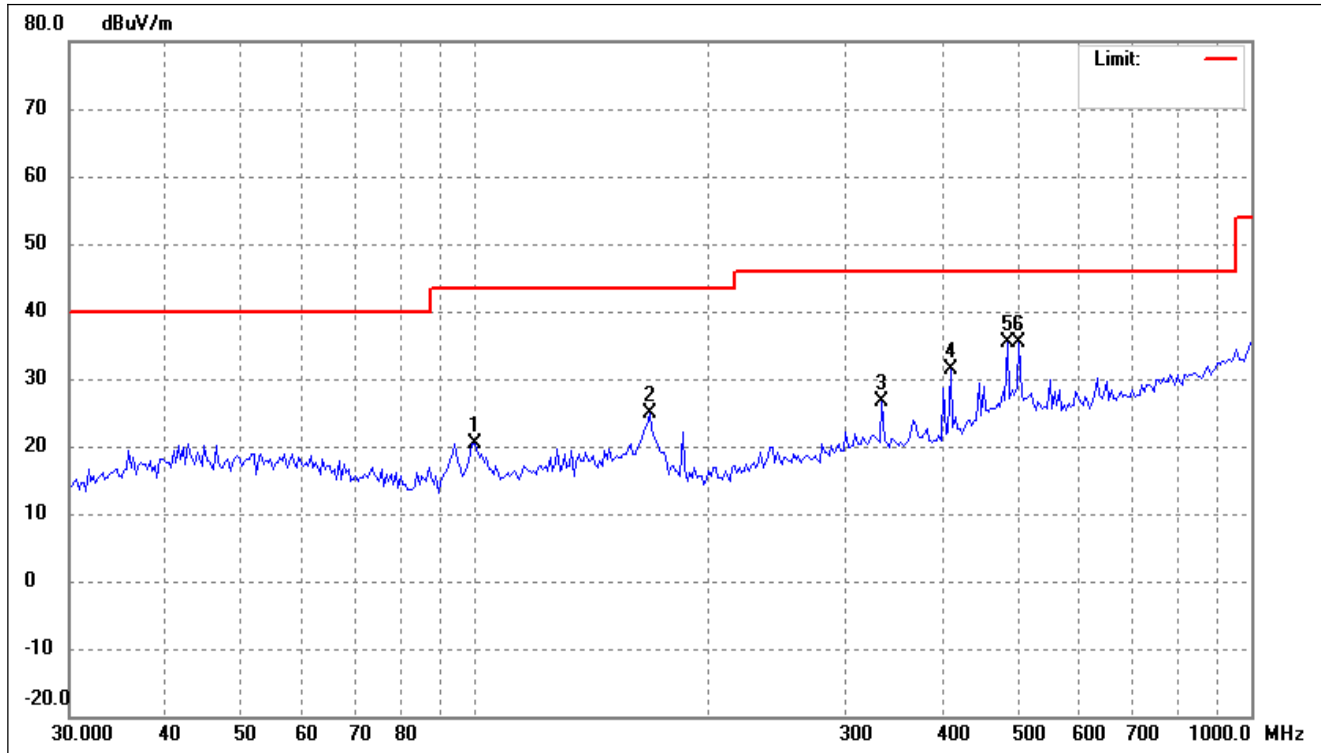
802.11a

Test Channel	5745MHz(worst case)	Polarity:	Horizontal
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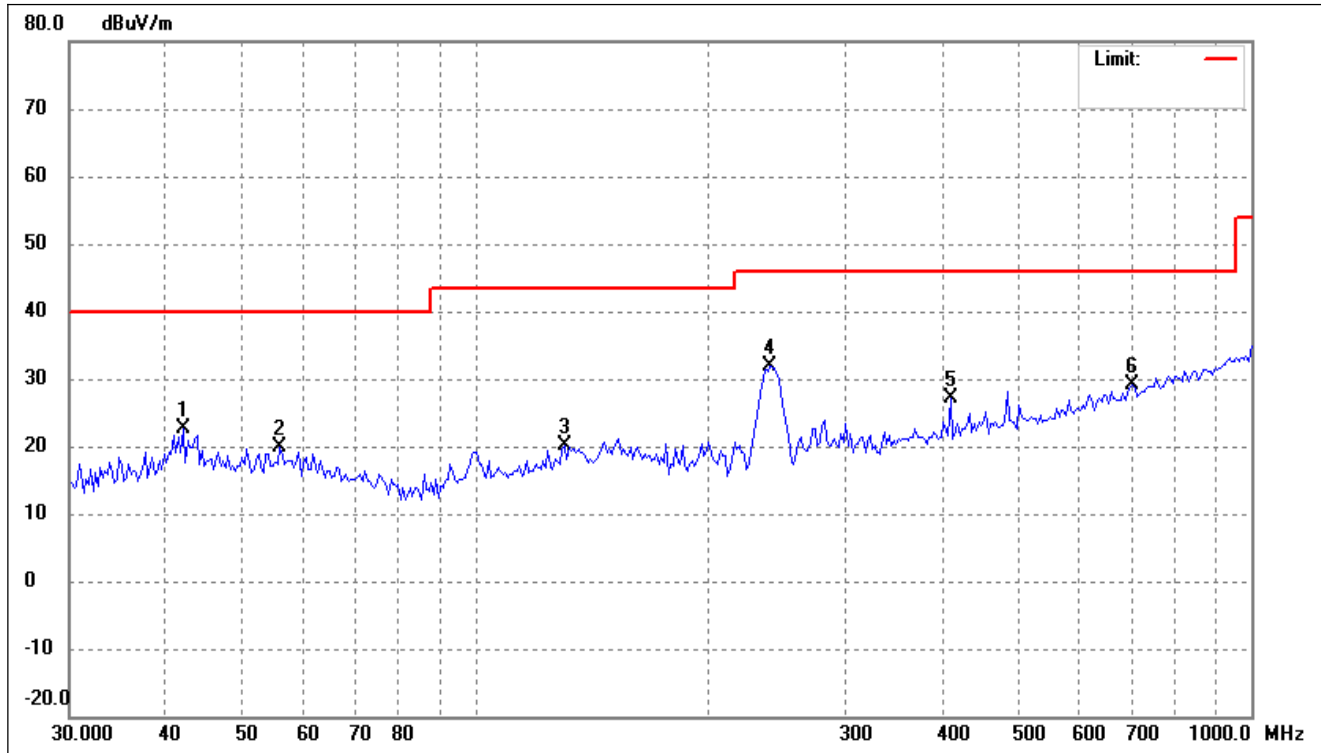
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	42.6299	32.49	-7.96	24.53	40.00	-15.47	-	-	peak
2	107.0306	30.41	-11.34	19.07	43.50	-24.43	-	-	peak
3	240.1442	42.14	-10.02	32.12	46.00	-13.88	-	-	peak
4	409.6506	33.23	-6.06	27.17	46.00	-18.83	-	-	peak
5	484.9068	33.23	-4.92	28.31	46.00	-17.69	-	-	peak
6	945.3336	30.18	3.19	33.37	46.00	-12.63	-	-	peak

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



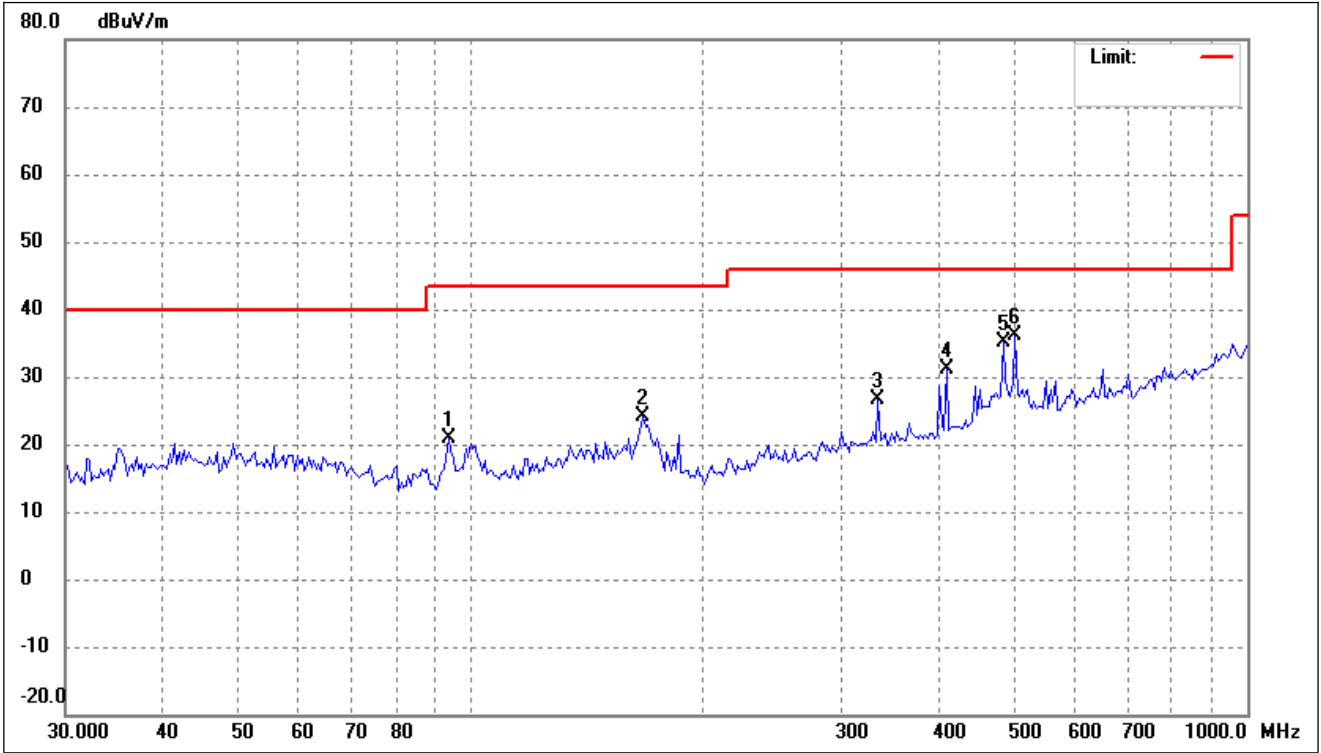
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	99.0690	32.41	-12.04	20.37	43.50	-23.13	-	-	peak
2	167.8136	33.02	-8.25	24.77	43.50	-18.73	-	-	peak
3	334.1255	33.97	-7.23	26.74	46.00	-19.26	-	-	peak
4	409.6506	37.36	-6.06	31.30	46.00	-14.70	-	-	peak
5	484.9068	40.32	-4.92	35.40	46.00	-10.60	-	-	peak
6	502.2473	40.26	-4.76	35.50	46.00	-10.50	-	-	peak

802.11n-HT20			
Test Channel	5745MHz(worst case)	Polarity:	Horizontal



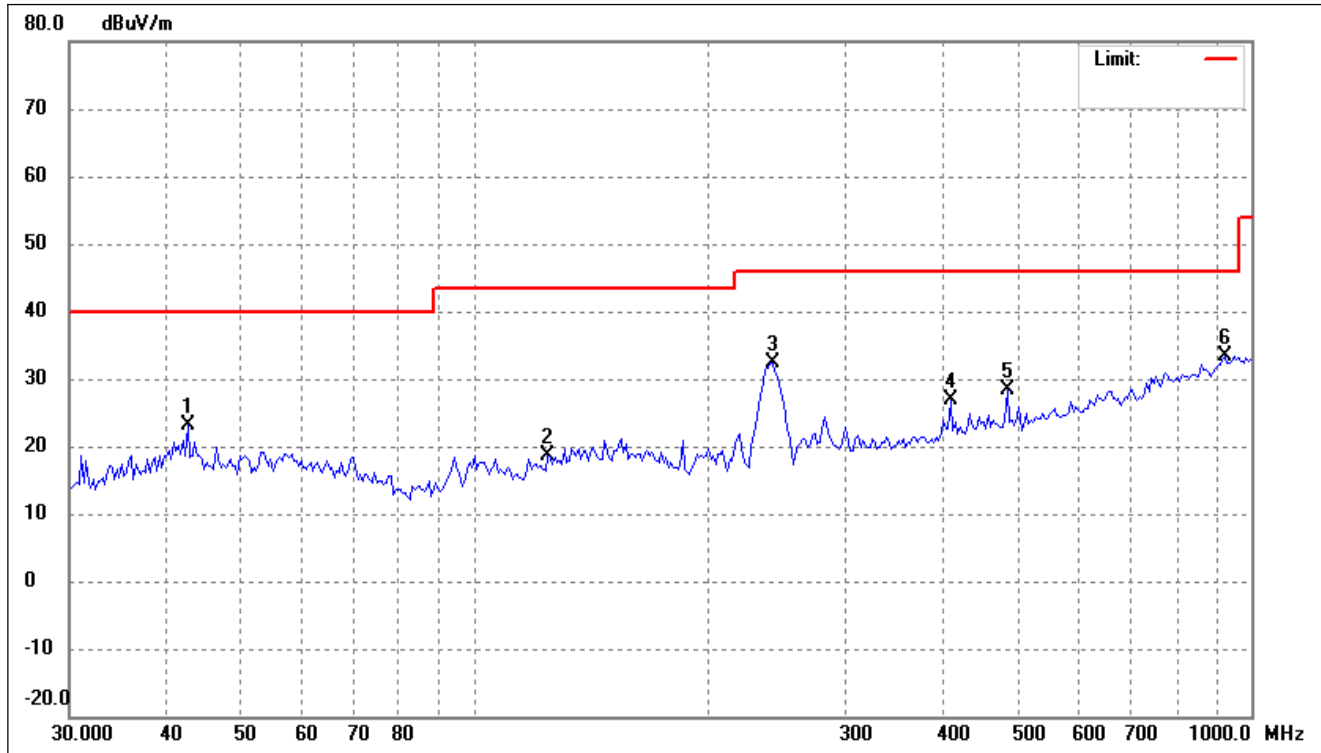
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	42.0350	30.49	-7.95	22.54	40.00	-17.46	-	-	peak
2	56.0708	27.98	-8.20	19.78	40.00	-20.22	-	-	peak
3	130.3048	29.39	-9.31	20.08	43.50	-23.42	-	-	peak
4	240.1442	41.95	-10.02	31.93	46.00	-14.07	-	-	peak
5	409.6506	33.09	-6.06	27.03	46.00	-18.97	-	-	peak
6	703.7314	30.01	-1.00	29.01	46.00	-16.99	-	-	peak

802.11n-HT20			
Test Channel	5745MHz(worst case)	Polarity:	Vertical



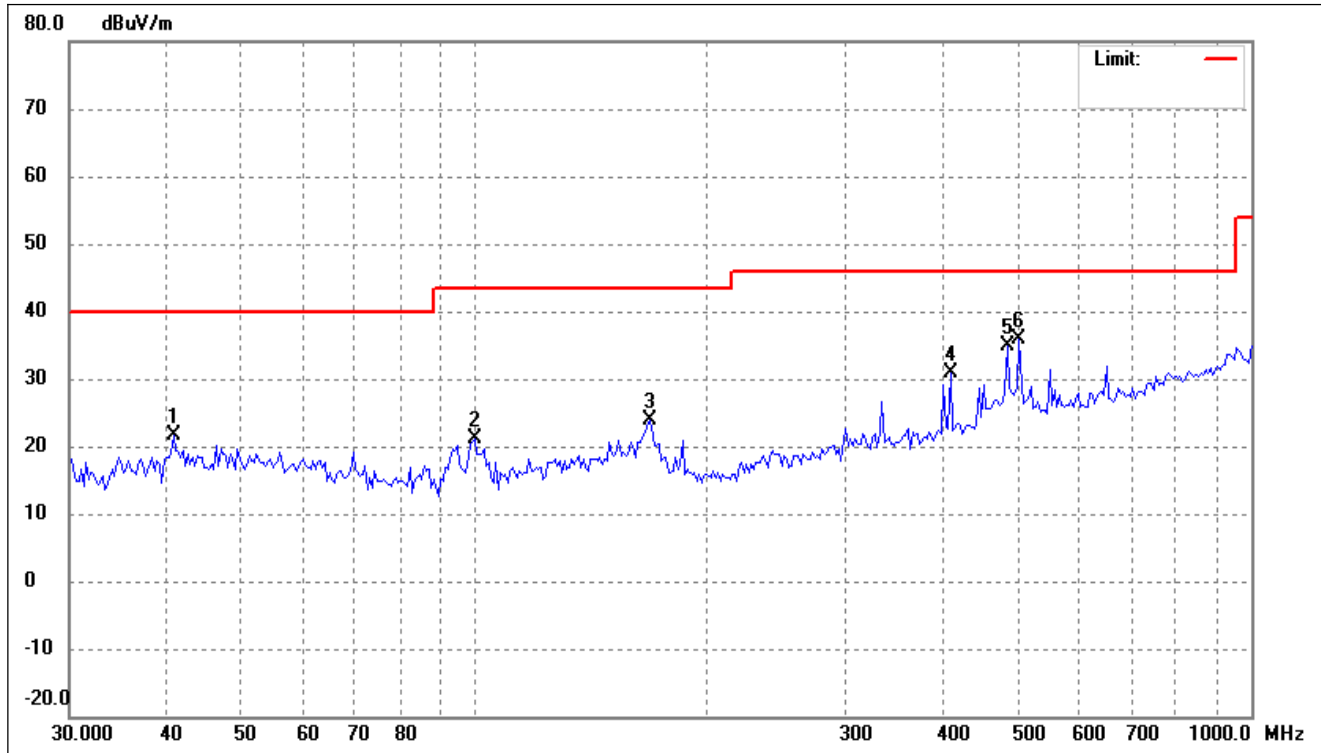
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	93.6532	33.17	-12.38	20.79	43.50	-22.71	-	-	peak
2	166.6385	32.30	-8.23	24.07	43.50	-19.43	-	-	peak
3	334.1255	33.90	-7.23	26.67	46.00	-19.33	-	-	peak
4	409.6506	37.19	-6.06	31.13	46.00	-14.87	-	-	peak
5	484.9068	40.04	-4.92	35.12	46.00	-10.88	-	-	peak
6	502.2473	40.82	-4.76	36.06	46.00	-9.94	-	-	peak

802.11ac-VHT20			
Test Channel	5745MHz(worst case)	Polarity:	Horizontal



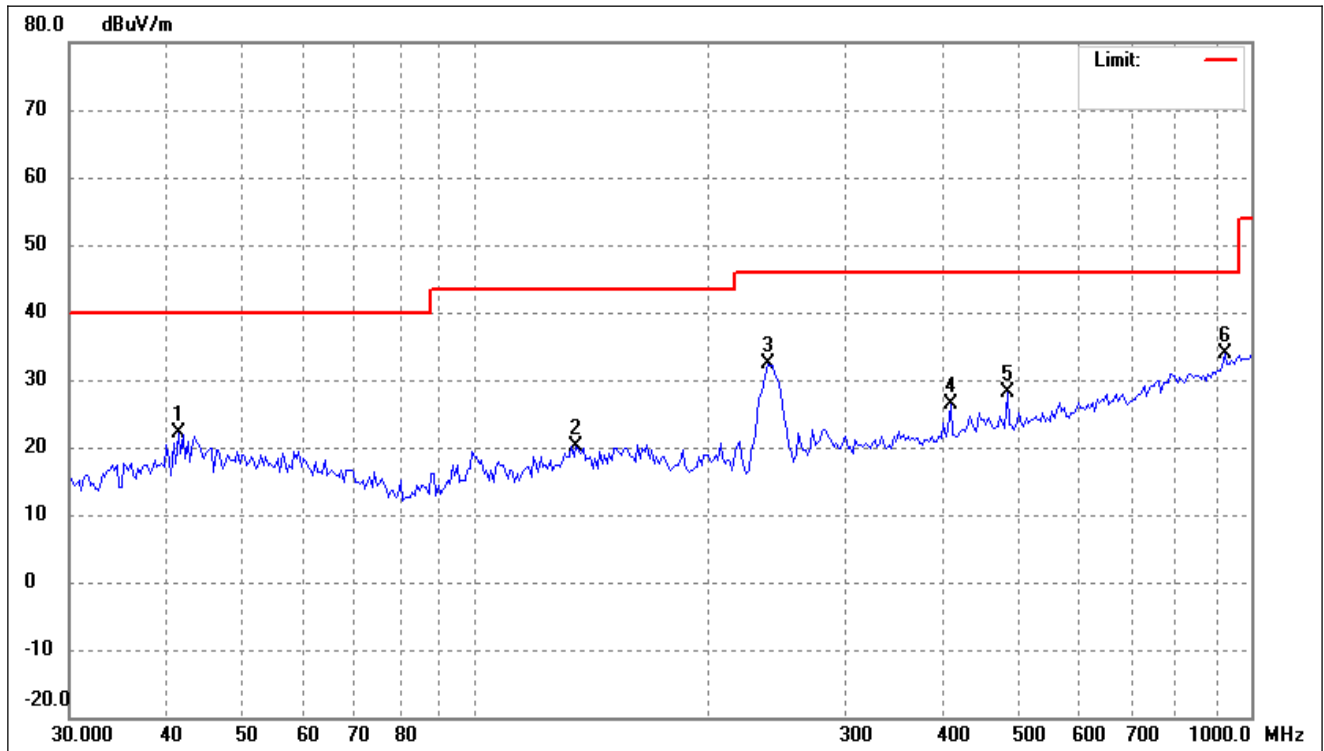
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	42.6299	31.02	-7.96	23.06	40.00	-16.94	-	-	peak
2	124.0501	28.33	-9.73	18.60	43.50	-24.90	-	-	peak
3	241.8377	42.45	-9.97	32.48	46.00	-13.52	-	-	peak
4	409.6506	32.95	-6.06	26.89	46.00	-19.11	-	-	peak
5	484.9068	33.42	-4.92	28.50	46.00	-17.50	-	-	peak
6	925.6132	30.76	2.72	33.48	46.00	-12.52	-	-	peak

802.11ac-VHT20			
Test Channel	5745MHz(worst case)	Polarity:	Vertical



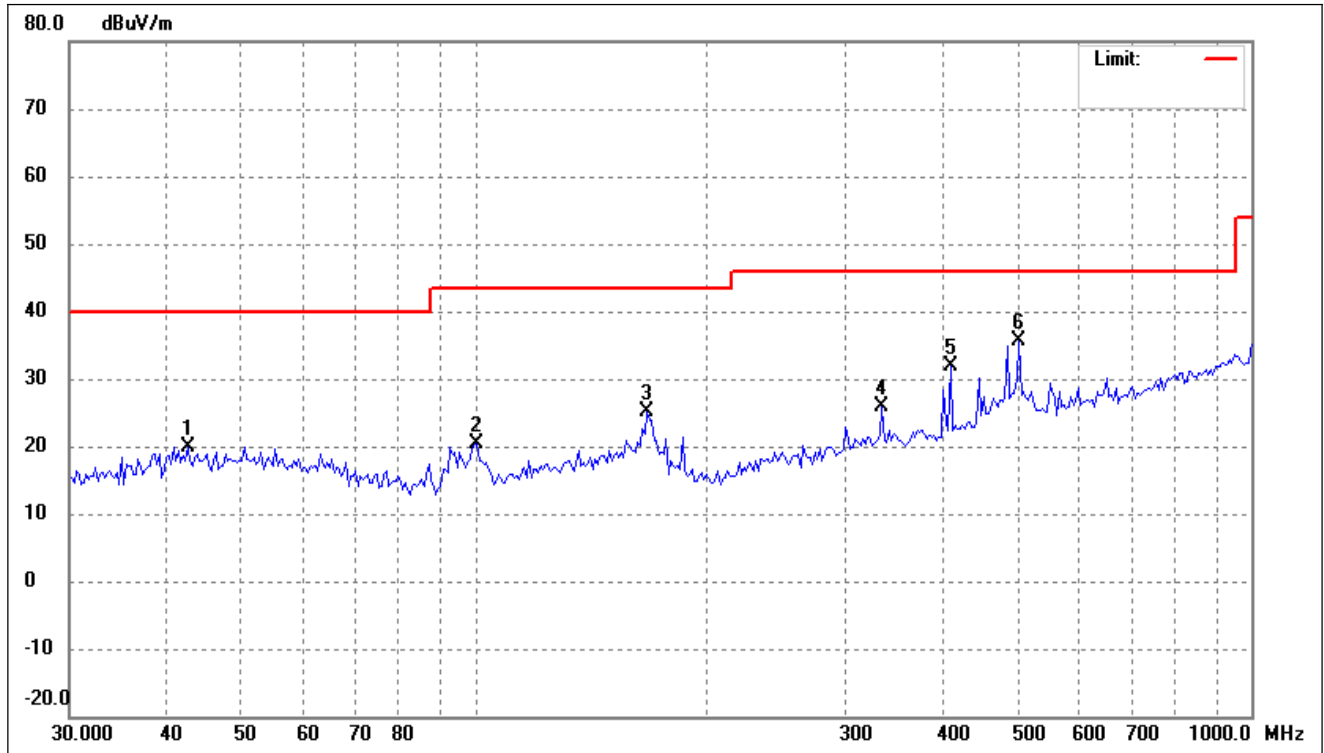
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	40.8699	29.61	-7.95	21.66	40.00	-18.34	-	-	peak
2	99.7676	33.08	-12.01	21.07	43.50	-22.43	-	-	peak
3	167.8136	32.08	-8.25	23.83	43.50	-19.67	-	-	peak
4	409.6506	37.04	-6.06	30.98	46.00	-15.02	-	-	peak
5	484.9068	39.75	-4.92	34.83	46.00	-11.17	-	-	peak
6	502.2473	40.69	-4.76	35.93	46.00	-10.07	-	-	peak

802.11n-HT40			
Test Channel	5755MHz(worst case)	Polarity:	Horizontal



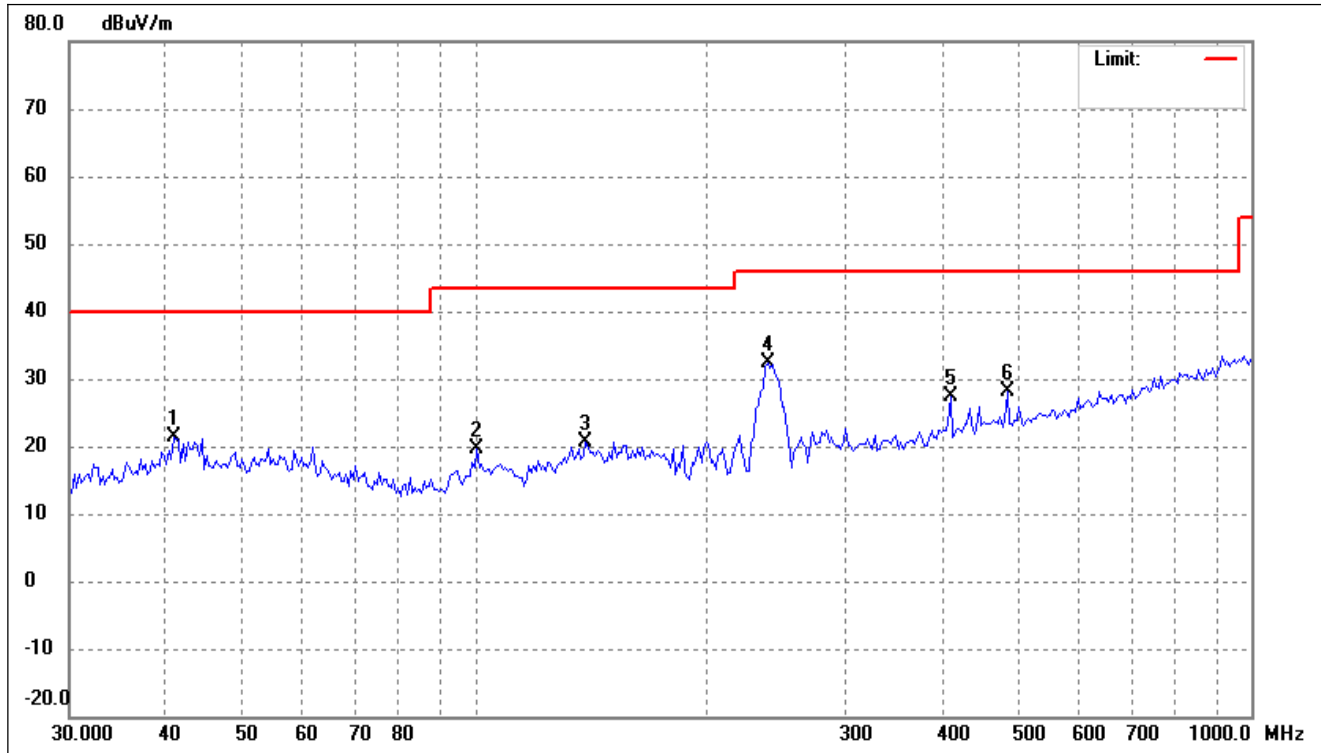
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	41.4483	29.98	-7.96	22.02	40.00	-17.98	-	-	peak
2	134.9645	29.27	-9.11	20.16	43.50	-23.34	-	-	peak
3	238.4626	42.48	-10.18	32.30	46.00	-13.70	-	-	peak
4	409.6506	32.37	-6.06	26.31	46.00	-19.69	-	-	peak
5	484.9068	33.00	-4.92	28.08	46.00	-17.92	-	-	peak
6	925.6132	31.18	2.72	33.90	46.00	-12.10	-	-	peak

802.11n-HT40			
Test Channel	5755MHz(worst case)	Polarity:	Vertical



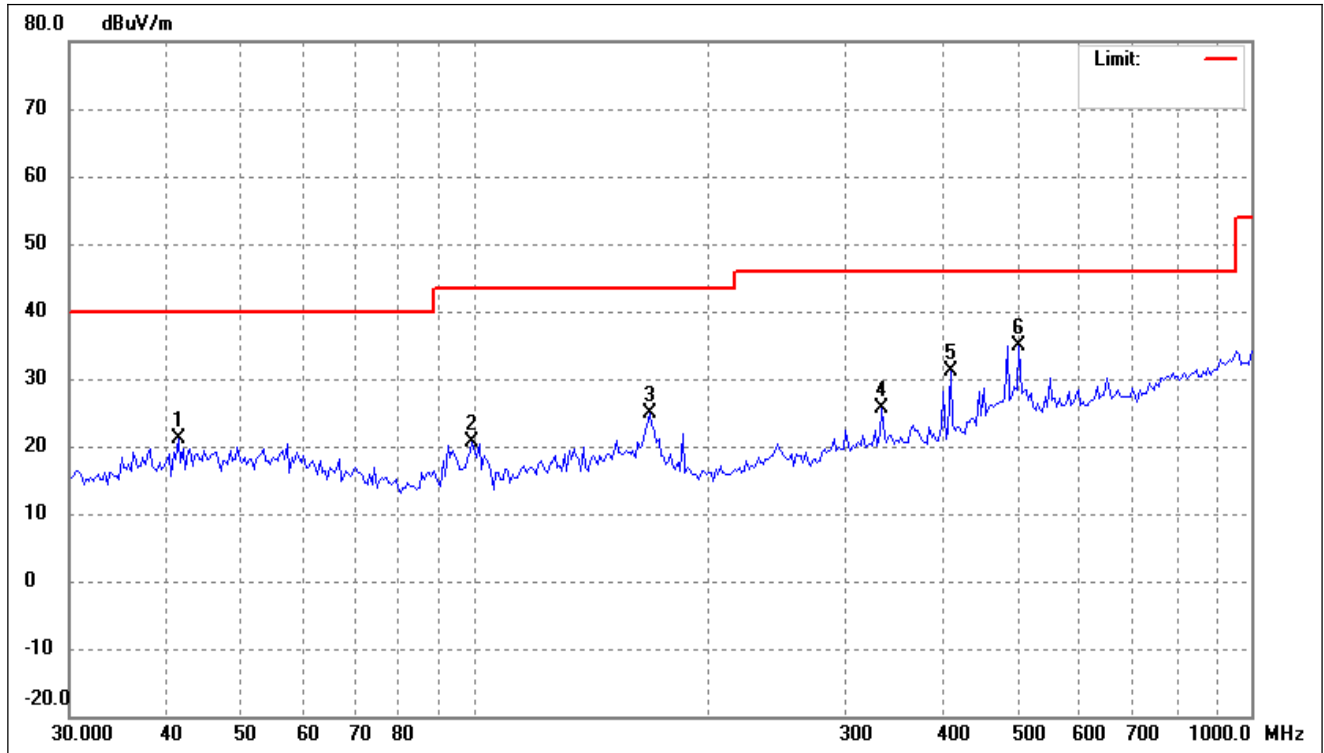
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	42.6299	27.75	-7.96	19.79	40.00	-20.21	-	-	peak
2	100.4712	32.45	-11.95	20.50	43.50	-23.00	-	-	peak
3	166.6385	33.29	-8.23	25.06	43.50	-18.44	-	-	peak
4	334.1255	33.17	-7.23	25.94	46.00	-20.06	-	-	peak
5	409.6506	37.85	-6.06	31.79	46.00	-14.21	-	-	peak
6	502.2473	40.36	-4.76	35.60	46.00	-10.40	-	-	peak

802.11ac-VHT40			
Test Channel	5755MHz(worst case)	Polarity:	Horizontal



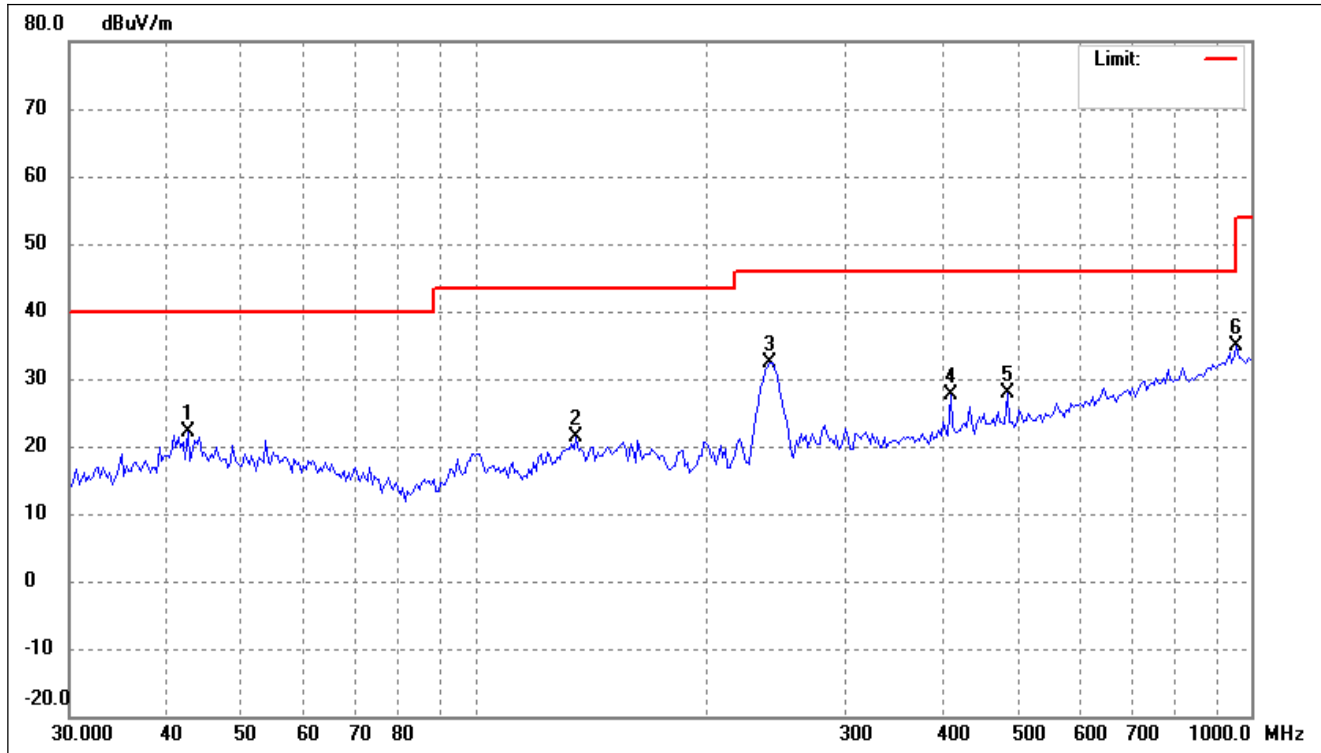
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	40.8699	29.40	-7.95	21.45	40.00	-18.55	-	-	peak
2	100.4712	31.46	-11.95	19.51	43.50	-23.99	-	-	peak
3	138.8120	29.54	-8.95	20.59	43.50	-22.91	-	-	peak
4	238.4626	42.60	-10.18	32.42	46.00	-13.58	-	-	peak
5	409.6506	33.38	-6.06	27.32	46.00	-18.68	-	-	peak
6	484.9068	32.95	-4.92	28.03	46.00	-17.97	-	-	peak

802.11ac-VHT40			
Test Channel	5755MHz(worst case)	Polarity:	Vertical



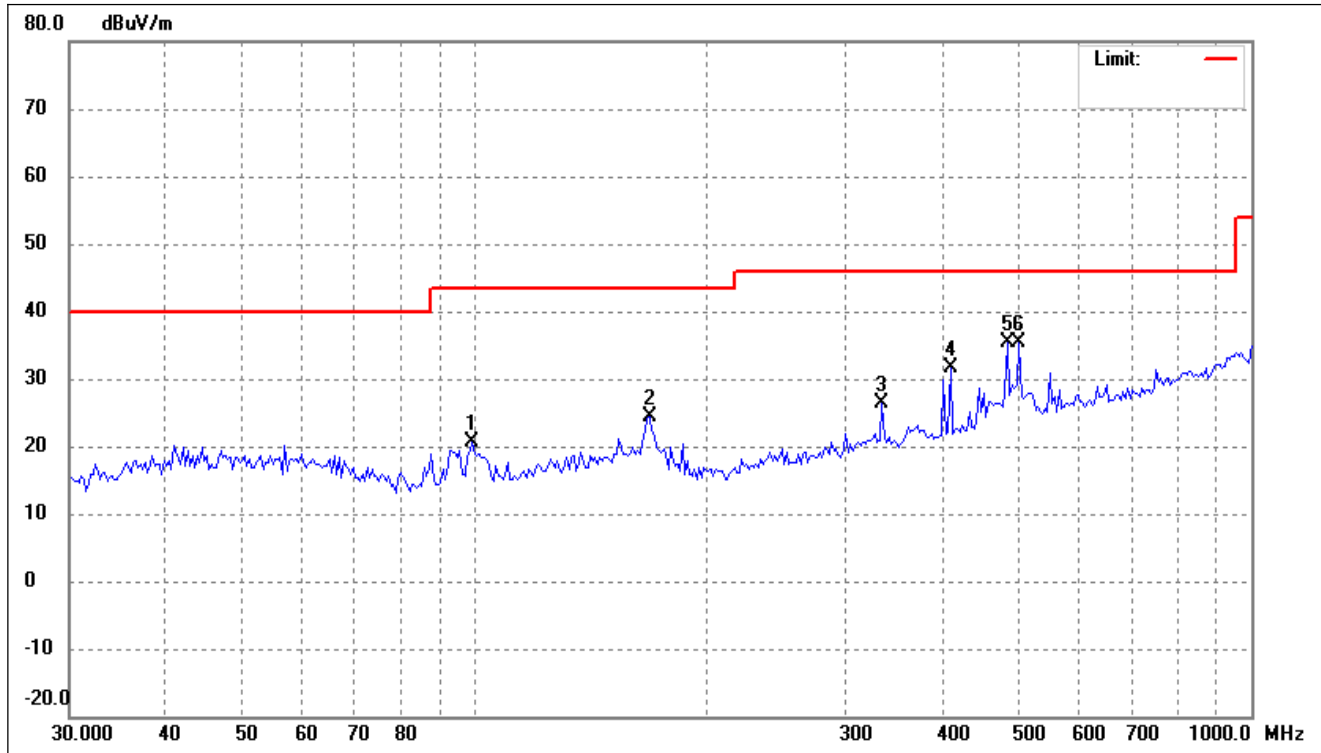
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	41.4483	29.17	-7.96	21.21	40.00	-18.79	-	-	peak
2	99.0690	32.56	-12.04	20.52	43.50	-22.98	-	-	peak
3	167.8136	33.16	-8.25	24.91	43.50	-18.59	-	-	peak
4	334.1255	32.76	-7.23	25.53	46.00	-20.47	-	-	peak
5	409.6506	37.16	-6.06	31.10	46.00	-14.90	-	-	peak
6	502.2473	39.64	-4.76	34.88	46.00	-11.12	-	-	peak

802.11ac-VHT80			
Test Channel	5775MHz(worst case)	Polarity:	Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	42.6299	30.02	-7.96	22.06	40.00	-17.94	-	-	peak
2	134.9645	30.47	-9.11	21.36	43.50	-22.14	-	-	peak
3	240.1442	42.48	-10.02	32.46	46.00	-13.54	-	-	peak
4	409.6506	33.62	-6.06	27.56	46.00	-18.44	-	-	peak
5	484.9068	32.70	-4.92	27.78	46.00	-18.22	-	-	peak
6	958.7135	31.63	3.34	34.97	46.00	-11.03	-	-	peak

802.11ac-VHT80			
Test Channel	5775MHz(worst case)	Polarity:	Vertical

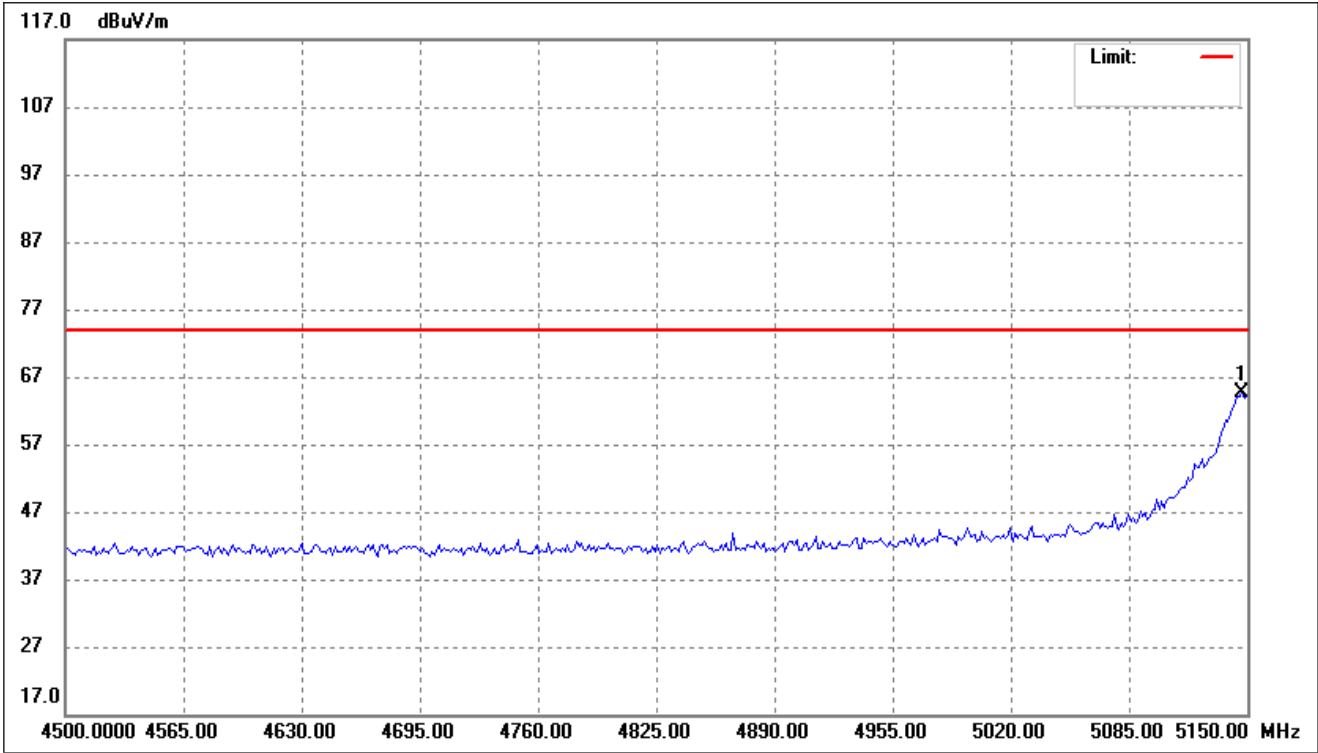


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	99.0690	32.79	-12.04	20.75	43.50	-22.75	-	-	peak
2	167.8136	32.51	-8.25	24.26	43.50	-19.24	-	-	peak
3	334.1255	33.52	-7.23	26.29	46.00	-19.71	-	-	peak
4	409.6506	37.62	-6.06	31.56	46.00	-14.44	-	-	peak
5	484.9068	40.36	-4.92	35.44	46.00	-10.56	-	-	peak
6	502.2473	40.03	-4.76	35.27	46.00	-10.73	-	-	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.

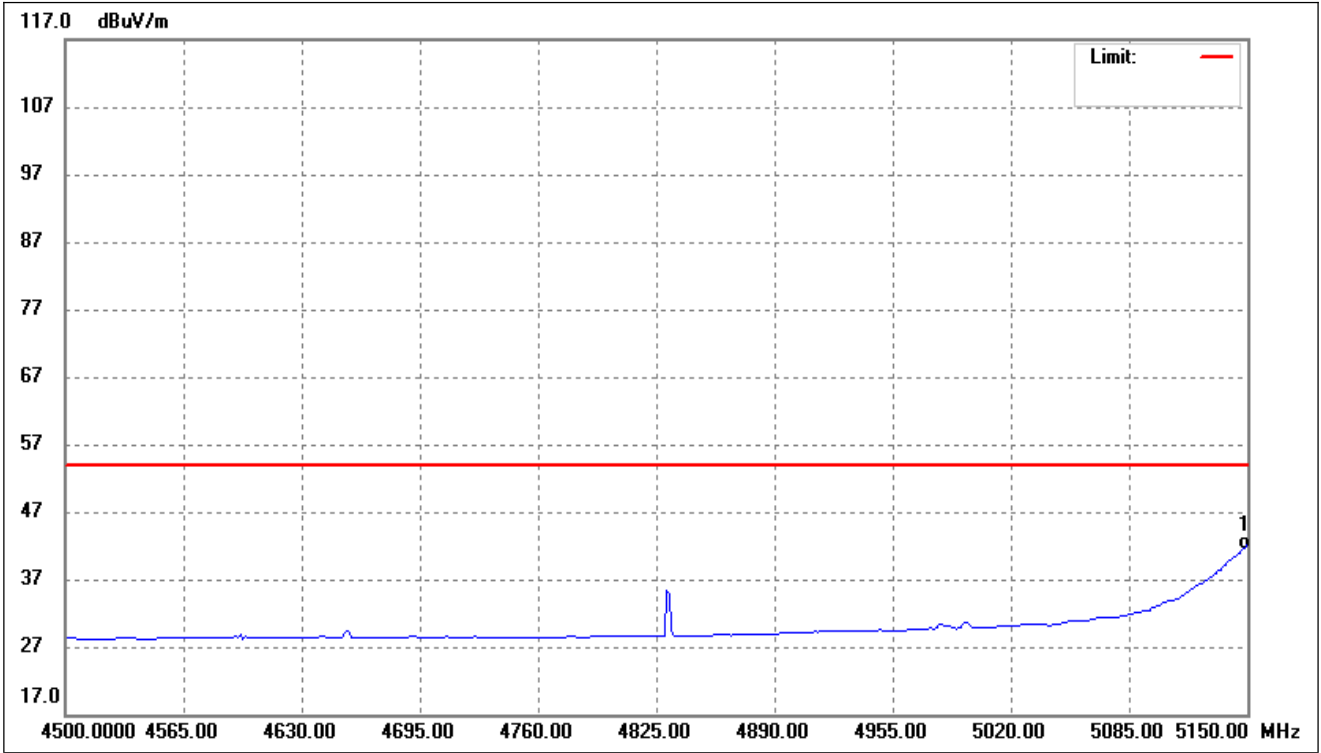
➤ Spurious Emission above 1GHz

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



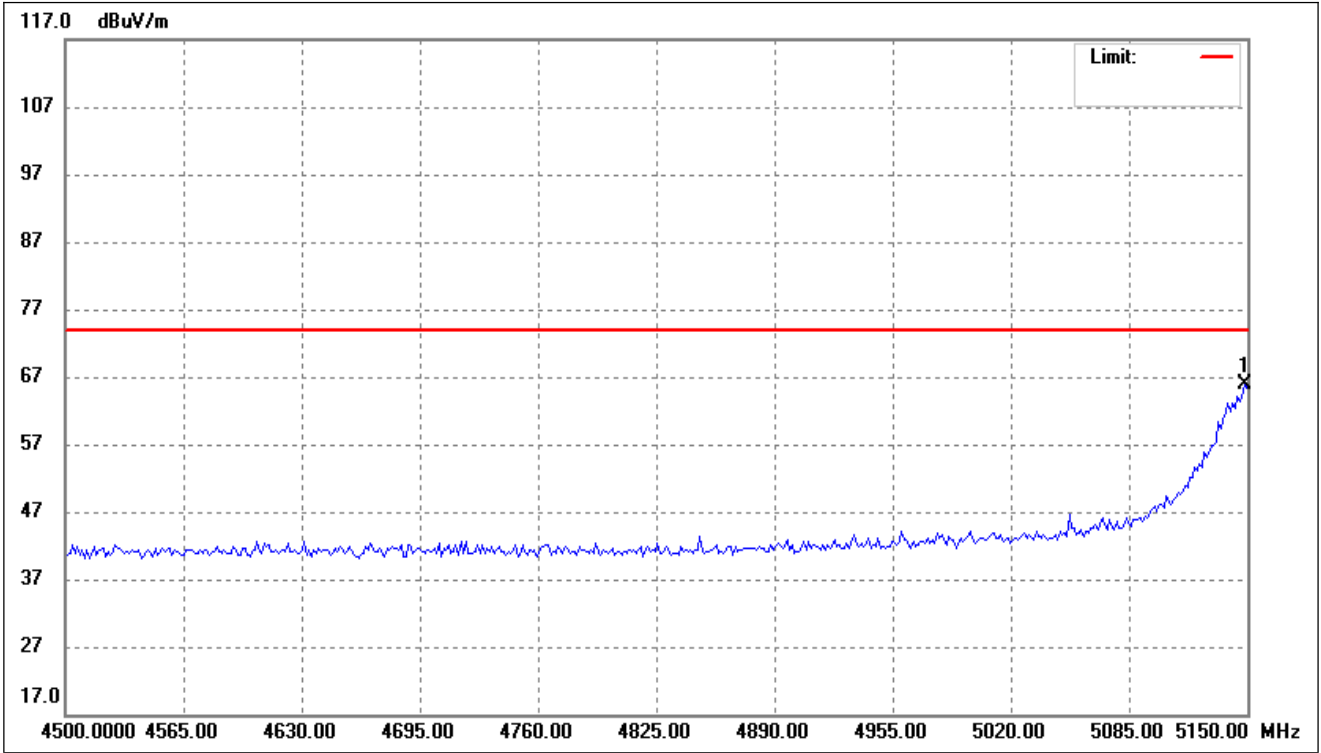
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	5147.395	77.10	-12.54	64.56	74.00	-9.44	-	-	peak

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



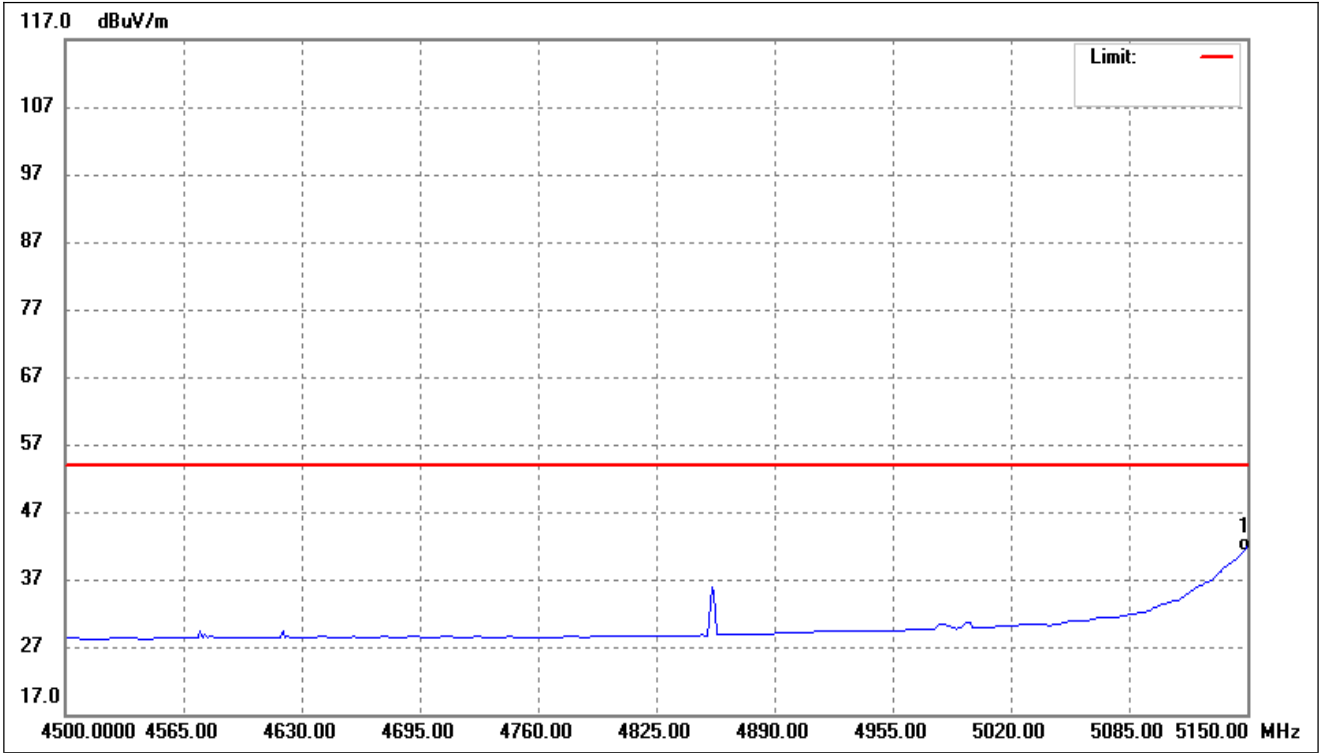
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	5150.000	54.92	-12.53	42.39	54.00	-11.61	-	-	AVG

802.11n-HT20- Restricted Bandedge			
Test Channel	band 5.15-5.25GHz	Polarity:	Horizontal(worst case)



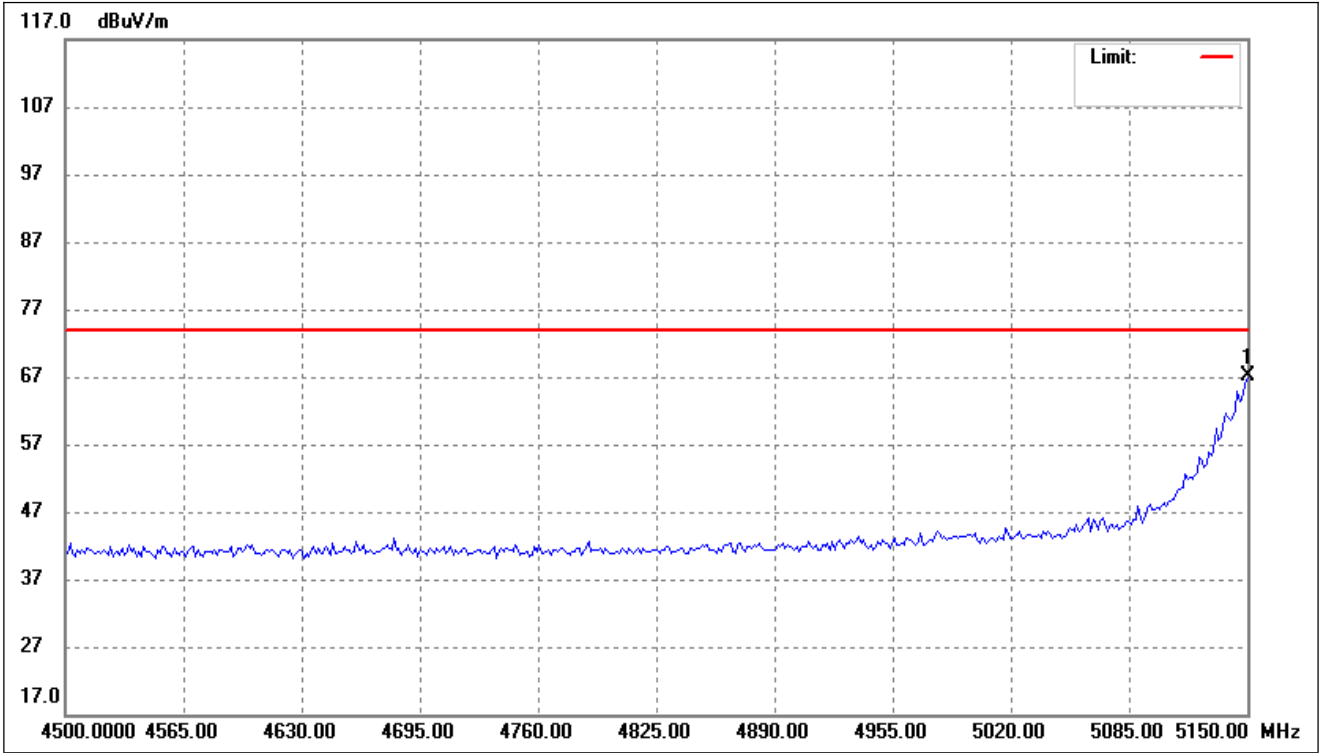
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	5148.697	78.39	-12.53	65.86	74.00	-8.14	-	-	peak

802.11n-HT20- Restricted Bandedge			
Test Channel	band 5.15-5.25GHz	Polarity:	Horizontal(worst case)



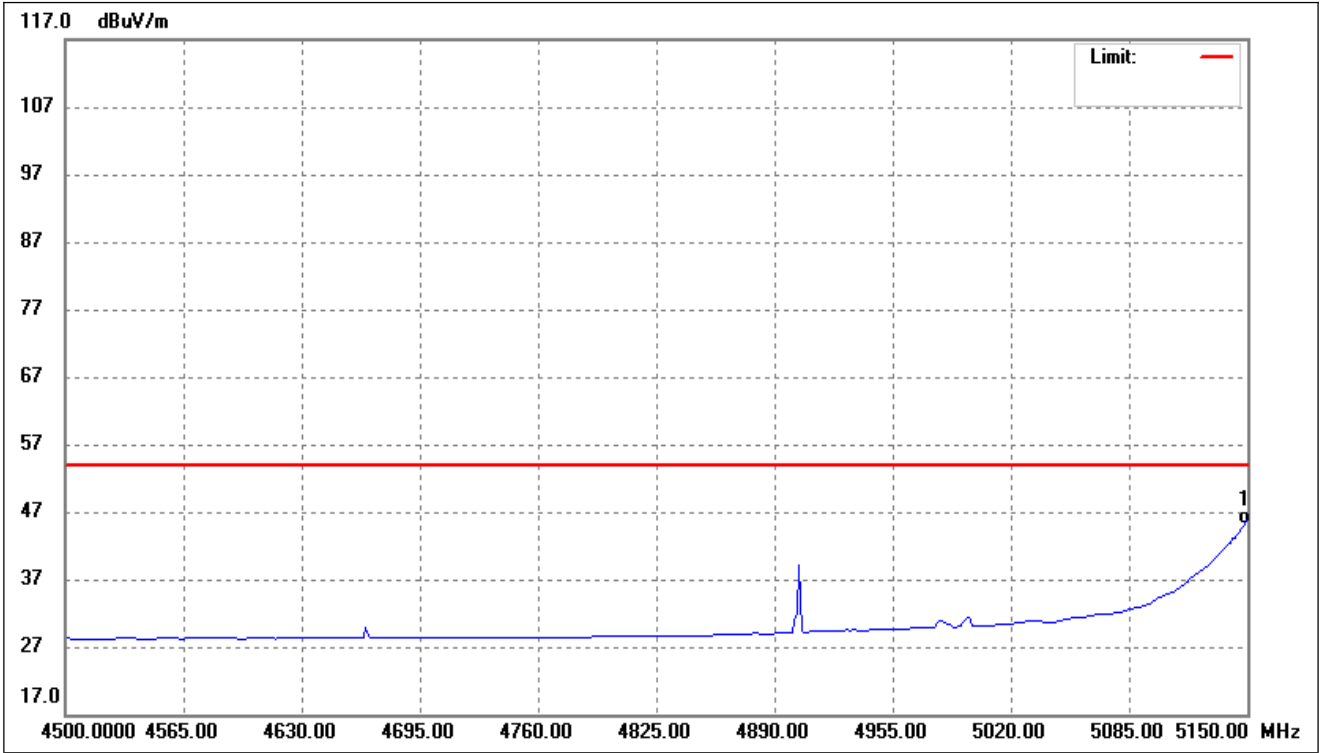
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	5150.000	54.70	-12.53	42.17	54.00	-11.83	-	-	AVG

802.11ac-VHT20- Restricted Bandedge			
Test Channel	band 5.15-5.25GHz	Polarity:	Horizontal(worst case)



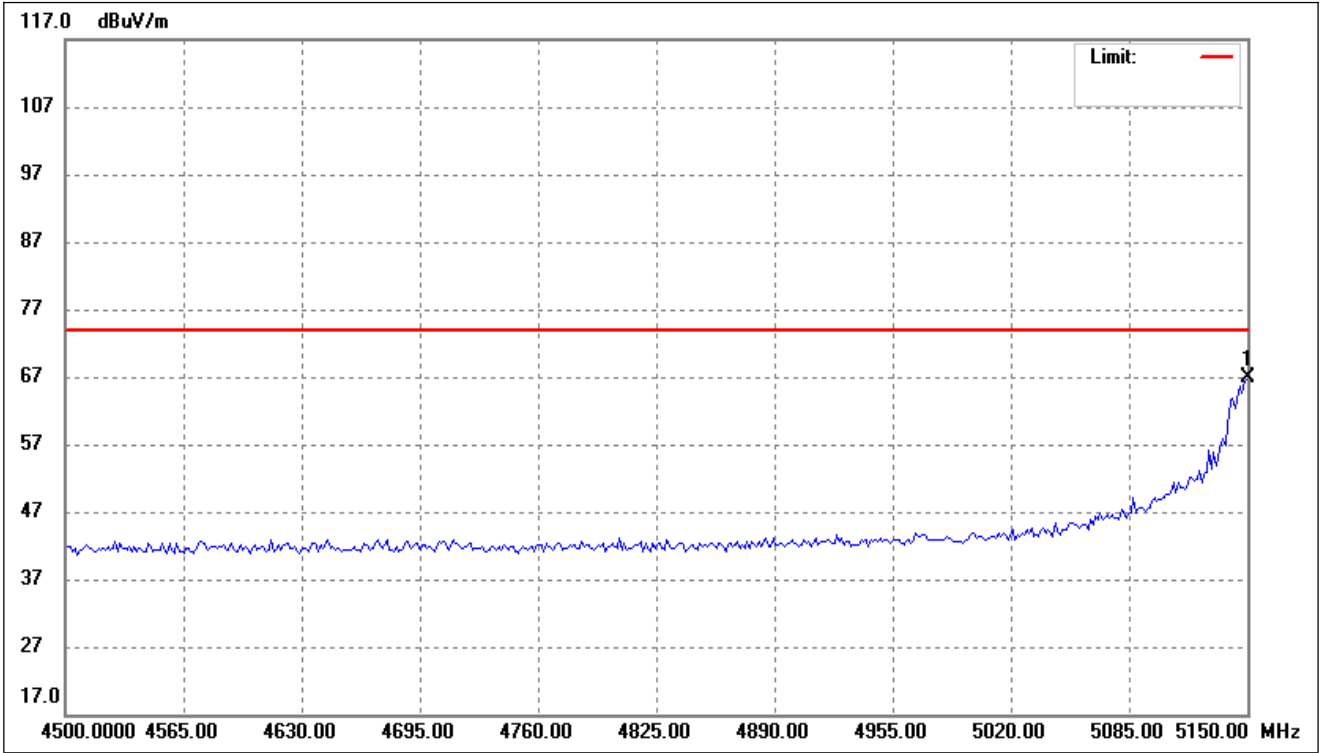
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	5150.000	79.78	-12.53	67.25	74.00	-6.75	-	-	peak

802.11ac-VHT20- Restricted Bandedge			
Test Channel	band 5.15-5.25GHz	Polarity:	Horizontal(worst case)



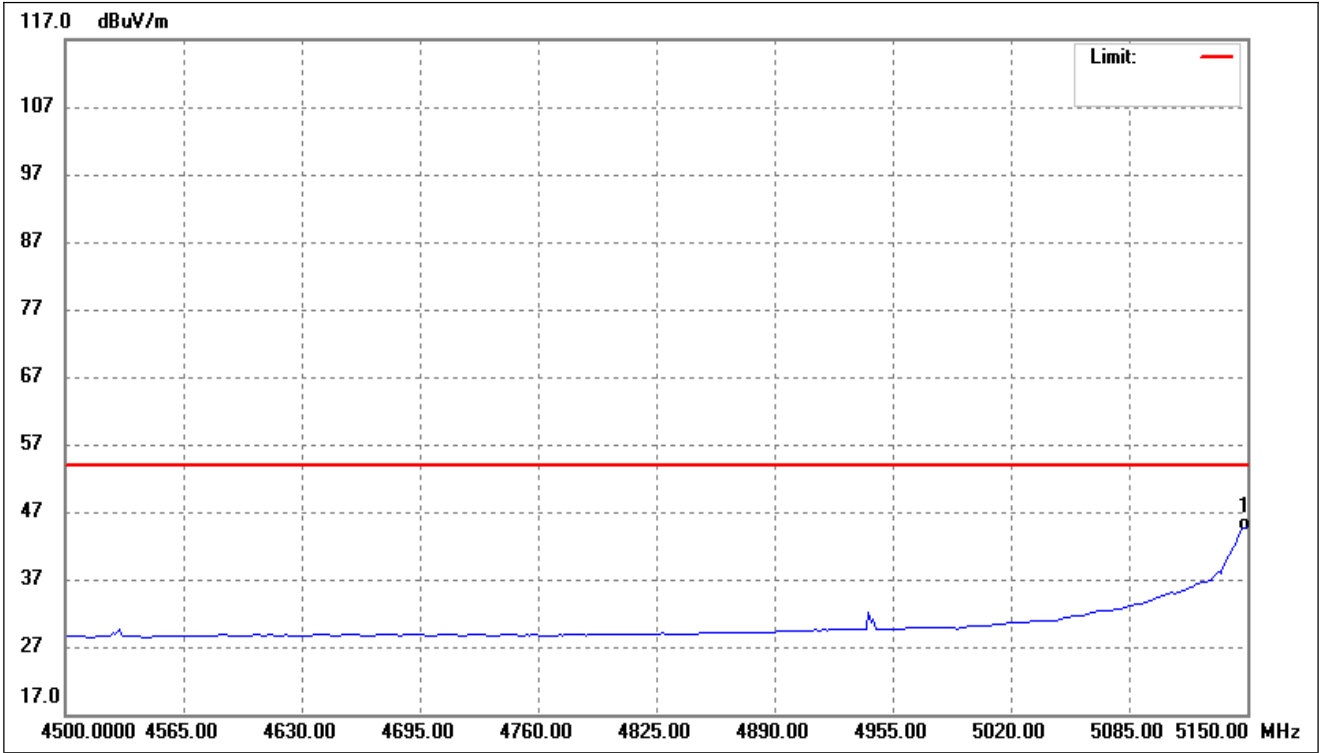
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	5150.000	58.65	-12.53	46.12	54.00	-7.88	-	-	AVG

802.11n-HT40- Restricted Bandedge			
Test Channel	band 5.15-5.25GHz	Polarity:	Horizontal(worst case)



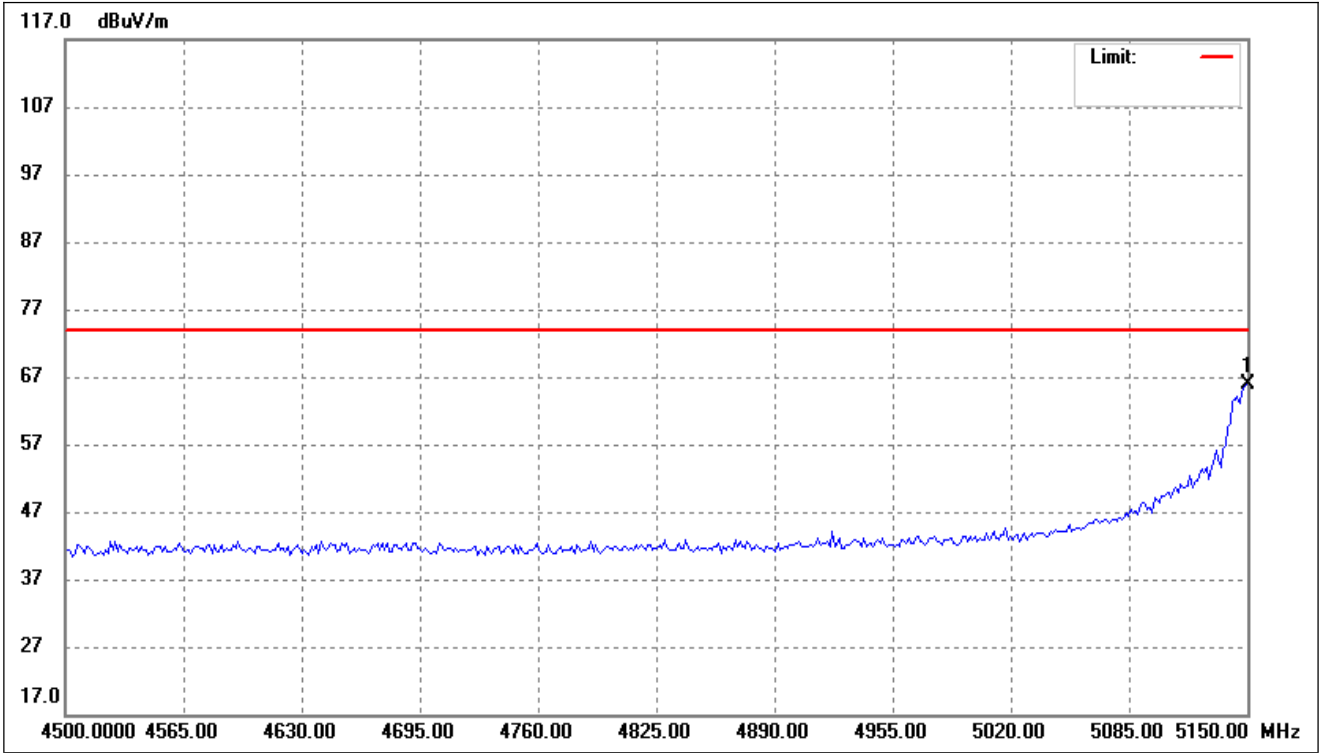
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	5150.000	79.50	-12.53	66.97	74.00	-7.03	-	-	peak

802.11n-HT40- Restricted Bandedge			
Test Channel	band 5.15-5.25GHz	Polarity:	Horizontal(worst case)



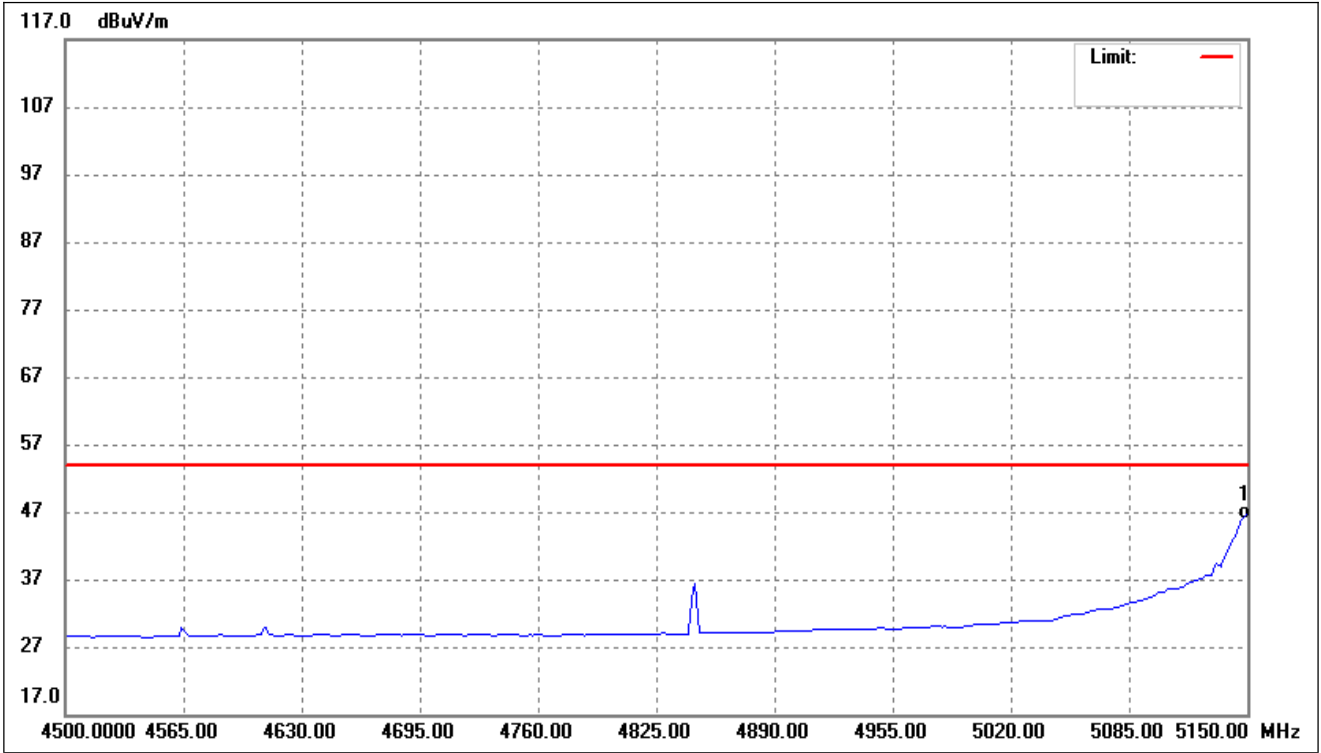
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	5150.000	57.78	-12.53	45.25	54.00	-8.75	-	-	AVG

802.11ac-VHT40- Restricted Bandedge			
Test Channel	band 5.15-5.25GHz	Polarity:	Horizontal(worst case)



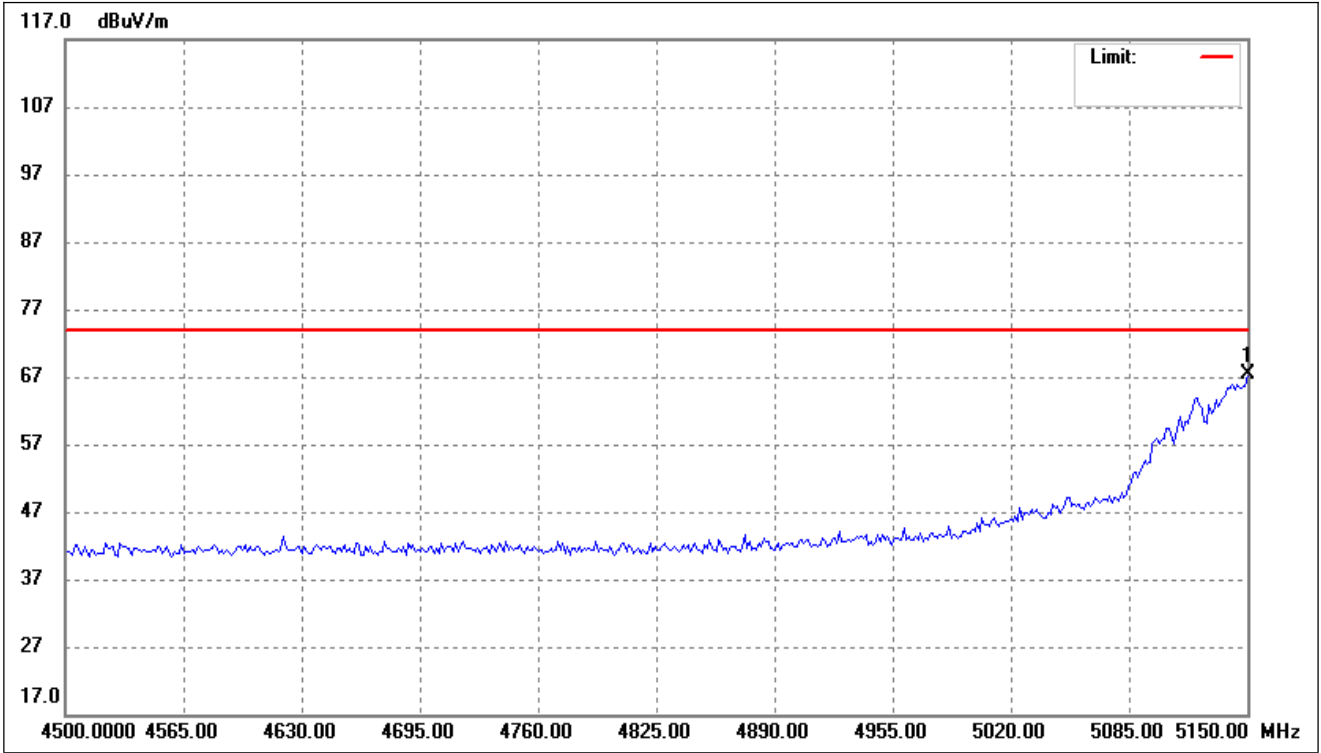
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	5150.000	78.35	-12.53	65.82	74.00	-8.18	-	-	peak

802.11ac-VHT40- Restricted Bandedge			
Test Channel	band 5.15-5.25GHz	Polarity:	Horizontal(worst case)



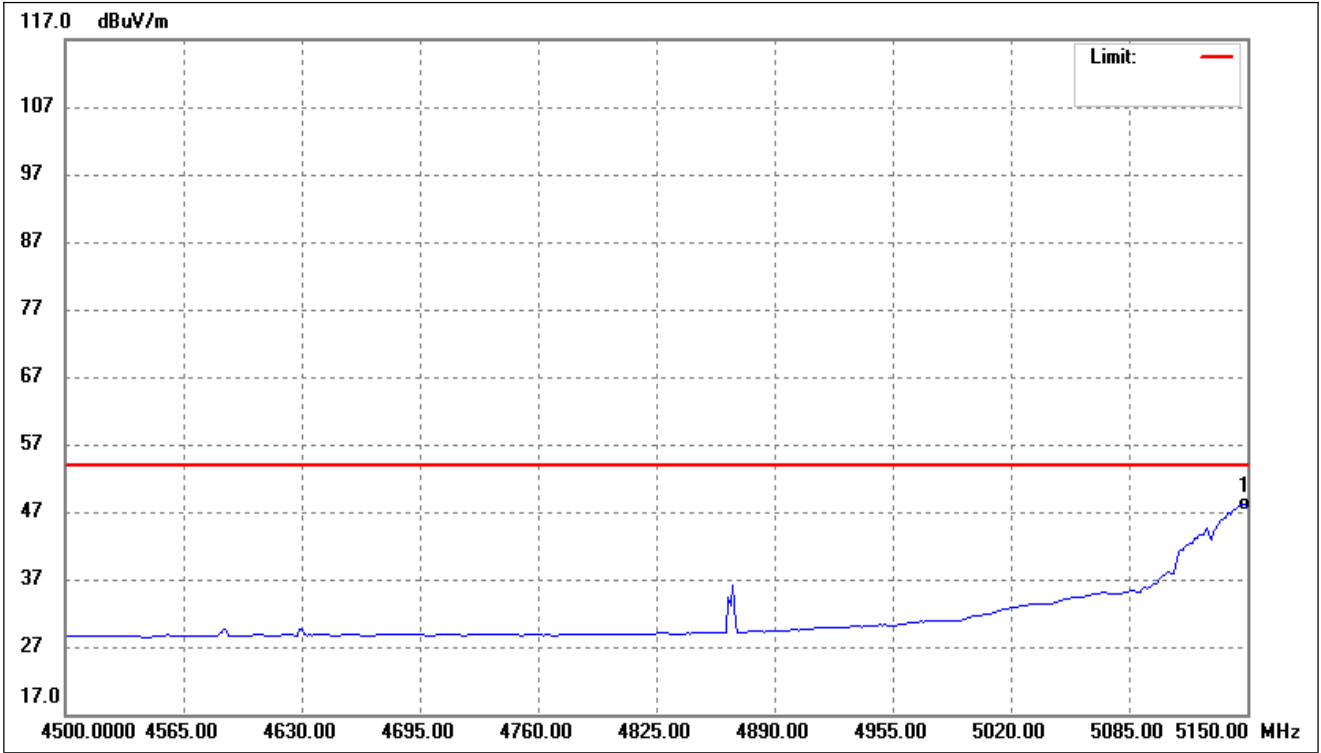
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	5150.000	59.46	-12.53	46.93	54.00	-7.07	-	-	AVG

802.11ac-VHT80- 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	5150.000	79.96	-12.53	67.43	74.00	-6.57	-	-	peak

802.11ac-VHT80- 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	5148.697	60.67	-12.53	48.14	54.00	-5.86	-	-	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 5.150-5.250GHz, 5.725-5.850GHz (802.11a)
- Harmonics And Spurious Emissions

Frequency (MHz)	Reading (dBuV/m)	Correct dB	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar H/V	Detector
Low Channel (5180MHz)							
10360	61.03	-6.13	54.9	74	-19.1	H	PK
10360	40.17	-6.13	34.04	54	-19.96	H	AV
15540	58.85	-1.64	57.21	74	-16.79	H	PK
15540	39	-1.64	37.36	54	-16.64	H	AV
10360	57.51	-6.13	51.38	74	-22.62	V	PK
10360	41.62	-6.13	35.49	54	-18.51	V	AV
15540	58.12	-1.64	56.48	74	-17.52	V	PK
15540	40.45	-1.64	38.81	54	-15.19	V	AV
Middle Channel (5200MHz)							
10400	61.48	-5.93	55.55	74	-18.45	H	PK
10400	40.16	-5.93	34.23	54	-19.77	H	AV
15600	58.74	-1.58	57.16	74	-16.84	H	PK
15600	38.78	-1.58	37.2	54	-16.8	H	AV
10400	58.16	-5.93	52.23	74	-21.77	V	PK
10400	38.55	-5.93	32.62	54	-21.38	V	AV
15600	58.63	-1.58	57.05	74	-16.95	V	PK
15600	38.27	-1.58	36.69	54	-17.31	V	AV
High Channel (5240MHz)							
10480	60.01	-5.71	54.3	74	-19.7	H	PK
10480	38.13	-5.71	32.42	54	-21.58	H	AV
15720	61.46	-1.52	59.94	74	-14.06	H	PK
15720	38.03	-1.52	36.51	54	-17.49	H	AV
10480	61.08	-5.71	55.37	74	-18.63	V	PK
10480	39.68	-5.71	33.97	54	-20.03	V	AV
15720	61.8	-1.52	60.28	74	-13.72	V	PK
15720	41.09	-1.52	39.57	54	-14.43	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	61.97	-6.13	55.84	74	-18.16	H	PK
11490	43.45	-6.13	37.32	54	-16.68	H	AV
17235	58.72	-1.64	57.08	74	-16.92	H	PK
17235	40.89	-1.64	39.25	54	-14.75	H	AV
11490	58.84	-6.13	52.71	74	-21.29	V	PK
11490	41.76	-6.13	35.63	54	-18.37	V	AV
17235	55.79	-1.64	54.15	74	-19.85	V	PK
17235	39.63	-1.64	37.99	54	-16.01	V	AV
Middle Channel (5785MHz)							
11570	58.53	-5.93	52.6	74	-21.4	H	PK
11570	38.28	-5.93	32.35	54	-21.65	H	AV
17355	58.63	-1.58	57.05	74	-16.95	H	PK
17355	40.42	-1.58	38.84	54	-15.16	H	AV
11570	58.6	-5.93	52.67	74	-21.33	V	PK
11570	39.37	-5.93	33.44	54	-20.56	V	AV
17355	58.96	-1.58	57.38	74	-16.62	V	PK
17355	39.3	-1.58	37.72	54	-16.28	V	AV
High Channel (5825MHz)							
11650	60.94	-5.71	55.23	74	-18.77	H	PK
11650	41.22	-5.71	35.51	54	-18.49	H	AV
17475	61.92	-1.52	60.4	74	-13.6	H	PK
17475	40.17	-1.52	38.65	54	-15.35	H	AV
11650	60.23	-5.71	54.52	74	-19.48	V	PK
11650	40.33	-5.71	34.62	54	-19.38	V	AV
17475	61.33	-1.52	59.81	74	-14.19	V	PK
17475	38.03	-1.52	36.51	54	-17.49	V	AV

➤ Out of Band edge for 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-28.25	-27
Highest	Above 5350	-33.81	-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	-40.01	-27
	5650 to 5700	-28.73	-27 to -17
	5700 to 5720	-26.83	-17 to 15.6
	5720 to 5725	-33.26	15.6 to 27
Highest	5850 to 5855	-39.70	27 to 15.6
	5855 to 5875	-30.25	15.6 to -17
	5875 to 5925	-27.79	-17 to -27
	Above 5925	-34.68	-27
Note: the data just list the worst cases			

- For the frequency band 5.150-5.250GHz, 5.725-5.850GHz (802.11n-HT20)
- Harmonics And Spurious Emissions

Frequency (MHz)	Reading (dBuV/m)	Correct dB	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar H/V	Detector
Low Channel (5180MHz)							
10360	60.13	-6.13	54	74	-20	H	PK
10360	42.19	-6.13	36.06	54	-17.94	H	AV
15540	56.24	-1.64	54.6	74	-19.4	H	PK
15540	41.07	-1.64	39.43	54	-14.57	H	AV
10360	55.25	-6.13	49.12	74	-24.88	V	PK
10360	41.78	-6.13	35.65	54	-18.35	V	AV
15540	57.71	-1.64	56.07	74	-17.93	V	PK
15540	40.64	-1.64	39	54	-15	V	AV
Middle Channel (5200MHz)							
10400	60.75	-5.93	54.82	74	-19.18	H	PK
10400	38.7	-5.93	32.77	54	-21.23	H	AV
15600	60.88	-1.58	59.3	74	-14.7	H	PK
15600	38.62	-1.58	37.04	54	-16.96	H	AV
10400	58.98	-5.93	53.05	74	-20.95	V	PK
10400	41.11	-5.93	35.18	54	-18.82	V	AV
15600	58.78	-1.58	57.2	74	-16.8	V	PK
15600	40.14	-1.58	38.56	54	-15.44	V	AV
High Channel (5240MHz)							
10480	61.59	-5.71	55.88	74	-18.12	H	PK
10480	41.79	-5.71	36.08	54	-17.92	H	AV
15720	60.79	-1.52	59.27	74	-14.73	H	PK
15720	40.17	-1.52	38.65	54	-15.35	H	AV
10480	59.12	-5.71	53.41	74	-20.59	V	PK
10480	38.52	-5.71	32.81	54	-21.19	V	AV
15720	58.38	-1.52	56.86	74	-17.14	V	PK
15720	38.86	-1.52	37.34	54	-16.66	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	59.39	-6.13	53.26	74	-20.74	H	PK
11490	42.08	-6.13	35.95	54	-18.05	H	AV
17235	56.85	-1.64	55.21	74	-18.79	H	PK
17235	40.22	-1.64	38.58	54	-15.42	H	AV
11490	56.45	-6.13	50.32	74	-23.68	V	PK
11490	40.69	-6.13	34.56	54	-19.44	V	AV
17235	56	-1.64	54.36	74	-19.64	V	PK
17235	39.43	-1.64	37.79	54	-16.21	V	AV
Middle Channel (5785MHz)							
11570	60.34	-5.93	54.41	74	-19.59	H	PK
11570	40.19	-5.93	34.26	54	-19.74	H	AV
17355	59.54	-1.58	57.96	74	-16.04	H	PK
17355	41.05	-1.58	39.47	54	-14.53	H	AV
11570	58.88	-5.93	52.95	74	-21.05	V	PK
11570	38.92	-5.93	32.99	54	-21.01	V	AV
17355	61.11	-1.58	59.53	74	-14.47	V	PK
17355	38.94	-1.58	37.36	54	-16.64	V	AV
High Channel (5825MHz)							
11650	60.36	-5.71	54.65	74	-19.35	H	PK
11650	41.36	-5.71	35.65	54	-18.35	H	AV
17475	58.19	-1.52	56.67	74	-17.33	H	PK
17475	40.52	-1.52	39	54	-15.00	H	AV
11650	61.07	-5.71	55.36	74	-18.64	V	PK
11650	40.78	-5.71	35.07	54	-18.93	V	AV
17475	60.29	-1.52	58.77	74	-15.23	V	PK
17475	41.28	-1.52	39.76	54	-14.24	V	AV

➤ Out of Band edge 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-27.57	-27
Highest	Above 5350	-34.31	-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	-39.70	-27
	5650 to 5700	-30.25	-27 to -17
	5700 to 5720	-27.79	-17 to 15.6
	5720 to 5725	-34.68	15.6 to 27
Highest	5850 to 5855	-40.40	27 to 15.6
	5855 to 5875	-27.93	15.6 to -17
	5875 to 5925	-25.76	-17 to -27
	Above 5925	-34.71	-27
Note: the data just list the worst cases			

- For the frequency band 5.150-5.250GHz, 5.725-5.850GHz (802.11ac-VHT20)
- Harmonics And Spurious Emissions

Frequency (MHz)	Reading (dBuV/m)	Correct dB	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar H/V	Detector
Low Channel (5180MHz)							
10360	58.94	-6.13	52.81	74	-21.19	H	PK
10360	42.92	-6.13	36.79	54	-17.21	H	AV
15540	58.92	-1.64	57.28	74	-16.72	H	PK
15540	39.45	-1.64	37.81	54	-16.19	H	AV
10360	55.32	-6.13	49.19	74	-24.81	V	PK
10360	38.34	-6.13	32.21	54	-21.79	V	AV
15540	58.56	-1.64	56.92	74	-17.08	V	PK
15540	41.56	-1.64	39.92	54	-14.08	V	PK
Middle Channel (5200MHz)							
10400	59.69	-5.93	53.76	74	-20.24	H	PK
10400	38.69	-5.93	32.76	54	-21.24	H	AV
15600	58.91	-1.58	57.33	74	-16.67	H	PK
15600	41.49	-1.58	39.91	54	-14.09	H	AV
10400	58.77	-5.93	52.84	74	-21.16	V	PK
10400	38.43	-5.93	32.5	54	-21.5	V	AV
15600	58.09	-1.58	56.51	74	-17.49	V	PK
15600	39.58	-1.58	38	54	-16	V	PK
High Channel (5240MHz)							
10480	59.66	-5.71	53.95	74	-20.05	H	PK
10480	39.36	-5.71	33.65	54	-20.35	H	AV
15720	59.69	-1.52	58.17	74	-15.83	H	PK
15720	40.8	-1.52	39.28	54	-14.72	H	AV
10480	58.66	-5.71	52.95	74	-21.05	V	PK
10480	41.83	-5.71	36.12	54	-17.88	V	AV
15720	58.07	-1.52	56.55	74	-17.45	V	PK
15720	38.26	-1.52	36.74	54	-17.26	V	PK

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5745MHz)							
11490	58.98	-6.13	52.85	74	-21.15	H	PK
11490	43.57	-6.13	37.44	54	-16.56	H	AV
17235	57.06	-1.64	55.42	74	-18.58	H	PK
17235	41.22	-1.64	39.58	54	-14.42	H	AV
11490	58.58	-6.13	52.45	74	-21.55	V	PK
11490	40.79	-6.13	34.66	54	-19.34	V	AV
11490	58.39	-1.64	56.75	74	-17.25	V	PK
17235	41	-1.64	39.36	54	-14.64	V	PK
Middle Channel (5785MHz)							
11570	61.55	-5.93	55.62	74	-18.38	H	PK
11570	39.51	-5.93	33.58	54	-20.42	H	AV
17355	59.5	-1.58	57.92	74	-16.08	H	PK
17355	40.41	-1.58	38.83	54	-15.17	H	AV
11570	59.04	-5.93	53.11	74	-20.89	V	PK
11570	40.13	-5.93	34.2	54	-19.8	V	AV
17355	61.24	-1.58	59.66	74	-14.34	V	PK
17355	40.3	-1.58	38.72	54	-15.28	V	PK
High Channel (5825MHz)							
11650	59.16	-5.71	53.45	74	-20.55	H	PK
11650	38.13	-5.71	32.42	54	-21.58	H	AV
17475	61.61	-1.52	60.09	74	-13.91	H	PK
17475	39.11	-1.52	37.59	54	-16.41	H	AV
11650	61.04	-5.71	55.33	74	-18.67	V	PK
11650	41.4	-5.71	35.69	54	-18.31	V	AV
17475	59.39	-1.52	57.87	74	-16.13	V	PK
17475	38.38	-1.52	36.86	54	-17.14	V	PK

➤ Out of Band edge 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-27.55	-27
Highest	Above 5350	-34.95	-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	-40.04	-27
	5650 to 5700	-29.93	-27 to -17
	5700 to 5720	-25.67	-17 to 15.6
	5720 to 5725	-33.40	15.6 to 27
Highest	5850 to 5855	-37.87	27 to 15.6
	5855 to 5875	-28.68	15.6 to -17
	5875 to 5925	-27.01	-17 to -27
	Above 5925	-35.00	-27
Note: the data just list the worst cases			

- For the frequency band 5.150-5.250GHz, 5.725-5.850GHz (802.11n-HT40)
- Harmonics And Spurious Emissions

Frequency (MHz)	Reading (dBuV/m)	Correct dB	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar H/V	Detector
Low Channel (5190MHz)							
10380	61.4	-6.13	55.27	74	-18.73	H	PK
10380	40.53	-6.13	34.4	54	-19.6	H	AV
15570	58.89	-1.64	57.25	74	-16.75	H	PK
15570	39.34	-1.64	37.7	54	-16.3	H	AV
10380	56.13	-6.13	50	74	-24	V	PK
10380	38.77	-6.13	32.64	54	-21.36	V	AV
15570	55.57	-1.64	53.93	74	-20.07	V	PK
15570	41.68	-1.64	40.04	54	-13.96	V	PK
High Channel (5230MHz)							
10460	61.81	-5.93	55.88	74	-18.12	H	PK
10460	38.16	-5.93	32.23	54	-21.77	H	AV
15690	59.42	-1.58	57.84	74	-16.16	H	PK
15690	41.33	-1.58	39.75	54	-14.25	H	AV
10460	59.64	-5.93	53.71	74	-20.29	V	PK
10460	38.39	-5.93	32.46	54	-21.54	V	AV
15690	59.23	-1.58	57.65	74	-16.35	V	PK
15690	41.05	-1.58	39.47	54	-14.53	V	PK

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5755MHz)							
11510	58.27	-5.71	52.56	74	-21.44	H	PK
11510	41.84	-5.71	36.13	54	-17.87	H	AV
17265	61.49	-1.52	59.97	74	-14.03	H	PK
17265	40.59	-1.52	39.07	54	-14.93	H	AV
11510	61.73	-5.71	56.02	74	-17.98	V	PK
11510	40.44	-5.71	34.73	54	-19.27	V	AV
17265	58.87	-1.52	57.35	74	-16.65	V	PK
17265	38.23	-1.52	36.71	54	-17.29	V	AV
High Channel (5795MHz)							
11590	61.4	-6.13	55.27	74	-18.73	H	PK
11590	43.1	-6.13	36.97	54	-17.03	H	AV
17385	56.65	-1.64	55.01	74	-18.99	H	PK
17385	38.25	-1.64	36.61	54	-17.39	H	AV
11590	58.83	-6.13	52.7	74	-21.3	V	PK
11590	41.69	-6.13	35.56	54	-18.44	V	AV
17385	58.39	-1.64	56.75	74	-17.25	V	PK
17385	38.1	-1.64	36.46	54	-17.54	V	AV

➤ Out of Band edge for 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-30.06	-27
Highest	Above 5350	-35.24	-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	-38.17	-27
	5650 to 5700	-27.76	-27 to -17
	5700 to 5720	-28.10	-17 to 15.6
	5720 to 5725	-33.88	15.6 to 27
Highest	5850 to 5855	-40.26	27 to 15.6
	5855 to 5875	-28.99	15.6 to -17
	5875 to 5925	-26.47	-17 to -27
	Above 5925	-34.61	-27
Note: the data just list the worst cases			

- For the frequency band 5.150-5.250GHz, 5.725-5.850GHz (802.11ac-VHT40)
- Harmonics And Spurious Emissions

Frequency (MHz)	Reading (dBuV/m)	Correct dB	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar H/V	Detector
Low Channel (5190MHz)							
10380	59.38	-6.13	53.25	74	-20.75	H	PK
10380	41.95	-6.13	35.82	54	-18.18	H	AV
15570	57.38	-1.64	55.74	74	-18.26	H	PK
15570	38.57	-1.64	36.93	54	-17.07	H	AV
10380	58.99	-6.13	52.86	74	-21.14	V	PK
10380	41.68	-6.13	35.55	54	-18.45	V	AV
15570	57.71	-1.64	56.07	74	-17.93	V	PK
15570	41.31	-1.64	39.67	54	-14.33	V	AV
High Channel (5230MHz)							
10460	61.15	-5.93	55.22	74	-18.78	H	PK
10460	40.45	-5.93	34.52	54	-19.48	H	AV
15690	58.42	-1.58	56.84	74	-17.16	H	PK
15690	40.81	-1.58	39.23	54	-14.77	H	AV
10460	58.56	-5.93	52.63	74	-21.37	V	PK
10460	41.11	-5.93	35.18	54	-18.82	V	AV
15690	61.43	-1.58	59.85	74	-14.15	V	PK
15690	41.46	-1.58	39.88	54	-14.12	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	58.6	-5.71	52.89	74	-21.11	H	PK
11510	40.22	-5.71	34.51	54	-19.49	H	AV
17265	60.18	-1.52	58.66	74	-15.34	H	PK
17265	41.1	-1.52	39.58	54	-14.42	H	AV
11510	60.79	-5.71	55.08	74	-18.92	V	PK
11510	39.25	-5.71	33.54	54	-20.46	V	AV
17265	61.14	-1.52	59.62	74	-14.38	V	PK
17265	38.99	-1.52	37.47	54	-16.53	V	AV
High Channel (5795MHz)							
11590	58.96	-6.13	52.83	74	-21.17	H	PK
11590	43.93	-6.13	37.8	54	-16.2	H	AV
17385	56.42	-1.64	54.78	74	-19.22	H	PK
17385	39.99	-1.64	38.35	54	-15.65	H	AV
11590	58.49	-6.13	52.36	74	-21.64	V	PK
11590	41.03	-6.13	34.9	54	-19.1	V	AV
17385	55.71	-1.64	54.07	74	-19.93	V	PK
17385	38.76	-1.64	37.12	54	-16.88	V	AV

➤ Out of Band edge for 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-28.57	-27
Highest	Above 5350	-34.73	-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	-39.20	-27
	5650 to 5700	-28.98	-27 to -17
	5700 to 5720	-25.59	-17 to 15.6
	5720 to 5725	-34.44	15.6 to 27
Highest	5850 to 5855	-39.64	27 to 15.6
	5855 to 5875	-30.06	15.6 to -17
	5875 to 5925	-27.85	-17 to -27
	Above 5925	-33.22	-27
Note: the data just list the worst cases			

- For the frequency band 5.150-5.250GHz, 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	
Middle Channel (5210MHz)							
10380	58.10	-5.93	52.17	74	-21.83	H	PK
10380	38.94	-5.93	33.01	54	-20.99	H	AV
15570	59.36	-1.58	57.78	74	-16.22	H	PK
15570	38.03	-1.58	36.45	54	-17.55	H	AV
10380	60.08	-5.93	54.15	74	-19.85	V	PK
10380	41.48	-5.93	35.55	54	-18.45	V	AV
15570	58.62	-1.58	57.04	74	-16.96	V	PK
15570	40.00	-1.58	38.42	54	-15.58	V	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Middle Channel (5775MHz)							
11510	59.19	-5.71	53.48	74	-20.52	H	PK
11510	39.19	-5.71	33.48	54	-20.52	H	AV
17265	60.01	-1.52	58.49	74	-15.51	H	PK
17265	39.04	-1.52	37.52	54	-16.48	H	AV
11510	60.9	-5.71	55.19	74	-18.81	V	PK
11510	38.68	-5.71	32.97	54	-21.03	V	AV
17265	59.82	-1.52	58.3	74	-15.7	V	PK
17265	40.79	-1.52	39.27	54	-14.73	V	AV

- Out of Band edge for 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-29.60	-27
Highest	Above 5350	-34.86	-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	-38.89	-27
	5650 to 5700	-27.56	-27 to -17
	5700 to 5720	-26.10	-17 to 15.6
	5720 to 5725	-34.34	15.6 to 27
Highest	5850 to 5855	-38.16	27 to 15.6
	5855 to 5875	-29.11	15.6 to -17
	5875 to 5925	-27.93	-17 to -27
	Above 5925	-34.23	-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

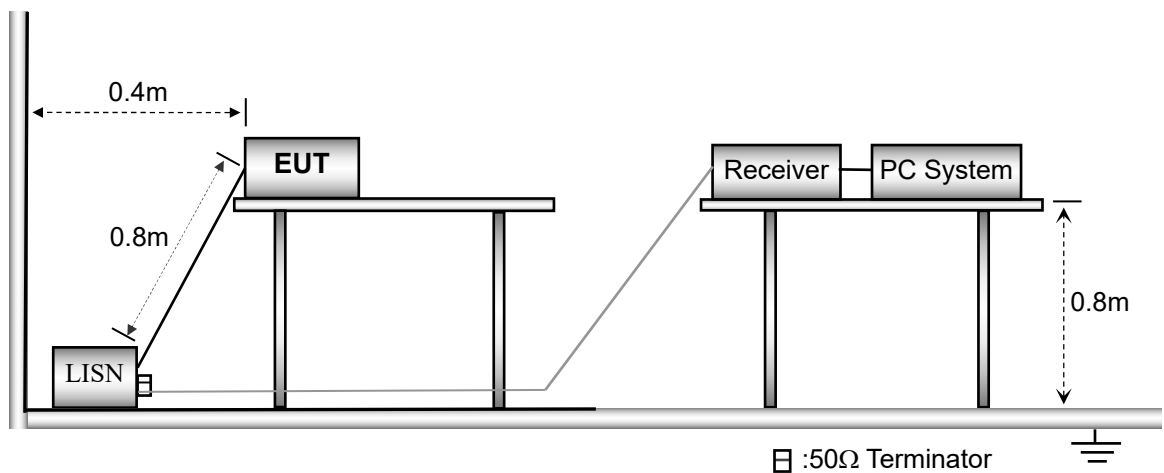
10. Conducted Emissions

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



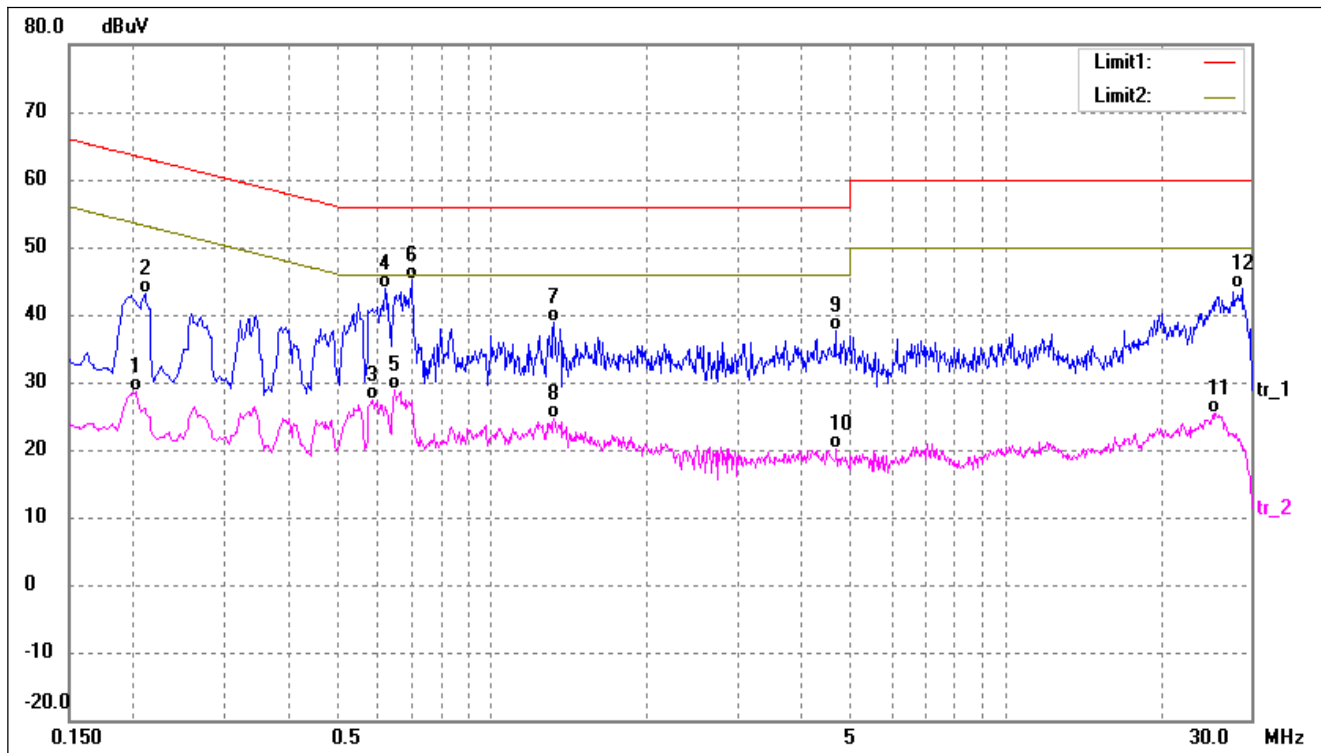
10.3 Test Receiver Setup

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

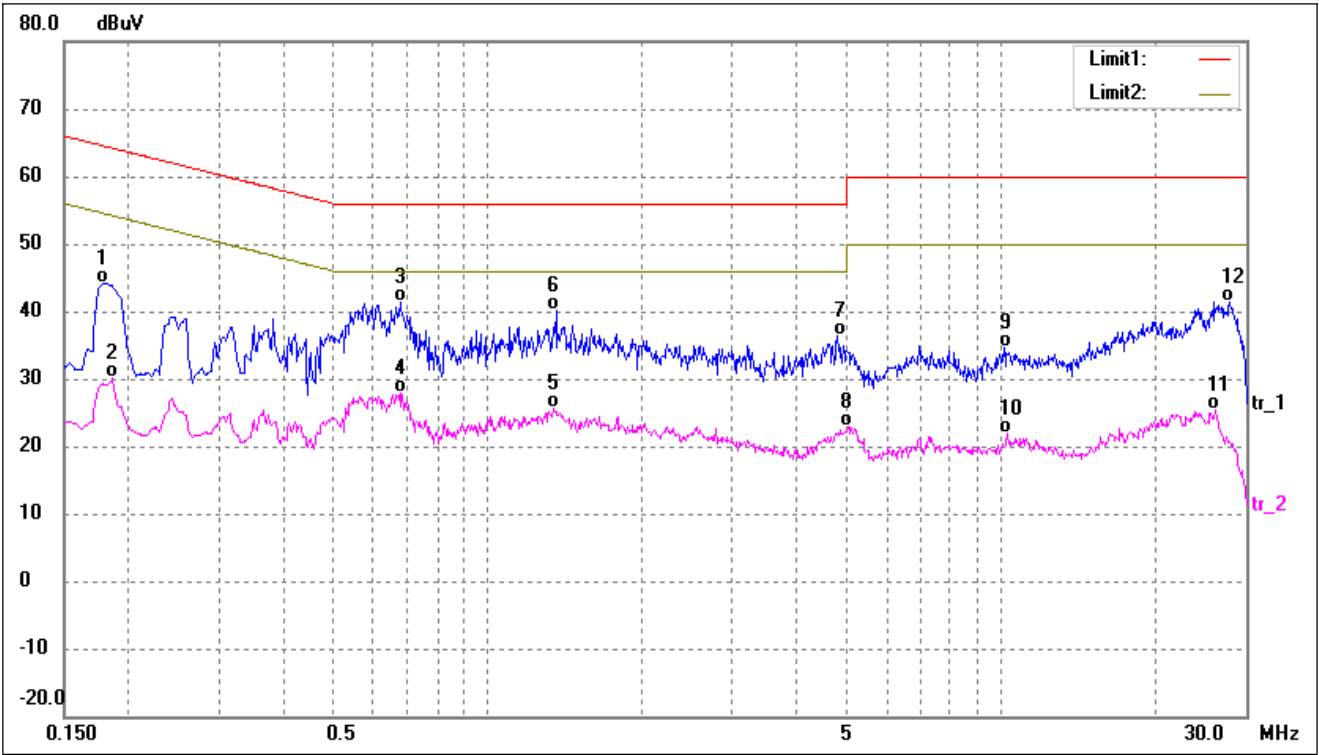
10.4 Summary of Test Results/Plots

Test Mode	Communication	AC120V 60Hz	Polarity:	Neutral
-----------	---------------	-------------	-----------	---------



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.2020	18.98	9.57	28.55	53.52	-24.97	AVG
2	0.2100	33.48	9.58	43.06	63.20	-20.14	QP
3	0.5860	17.61	9.72	27.33	46.00	-18.67	AVG
4	0.6180	34.11	9.71	43.82	56.00	-12.18	QP
5	0.6460	19.16	9.70	28.86	46.00	-17.14	AVG
6*	0.6980	35.55	9.69	45.24	56.00	-10.76	QP
7	1.3220	29.11	9.65	38.76	56.00	-17.24	QP
8	1.3220	15.09	9.65	24.74	46.00	-21.26	AVG
9	4.6500	27.92	9.70	37.62	56.00	-18.38	QP
10	4.6860	10.35	9.70	20.05	46.00	-25.95	AVG
11	25.3819	15.41	10.07	25.48	50.00	-24.52	AVG
12	28.8740	33.82	9.96	43.78	60.00	-16.22	QP

Test Mode	Communication	AC120V 60Hz	Polarity:	Line
-----------	---------------	-------------	-----------	------



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1780	34.50	9.66	44.16	64.57	-20.41	QP
2	0.1860	20.43	9.62	30.05	54.21	-24.16	AVG
3*	0.6780	31.77	9.69	41.46	56.00	-14.54	QP
4	0.6820	18.22	9.69	27.91	46.00	-18.09	AVG
5	1.3460	15.86	9.65	25.51	46.00	-20.49	AVG
6	1.3660	30.51	9.65	40.16	56.00	-15.84	QP
7	4.8100	26.70	9.70	36.40	56.00	-19.60	QP
8	5.0340	13.25	9.71	22.96	50.00	-27.04	AVG
9	10.1580	24.64	9.87	34.51	60.00	-25.49	QP
10	10.3300	11.96	9.88	21.84	50.00	-28.16	AVG
11	26.1620	15.26	10.05	25.31	50.00	-24.69	AVG
12	27.9780	31.32	9.99	41.31	60.00	-18.69	QP

APPENDIX SUMMARY

Project No.	WTX24X07180275W	Test Engineer	Timi Huang
Start date	2024/9/11	Finish date	2024/9/13
Temperature	23℃	Humidity	65%
RF specifications	U-NII		

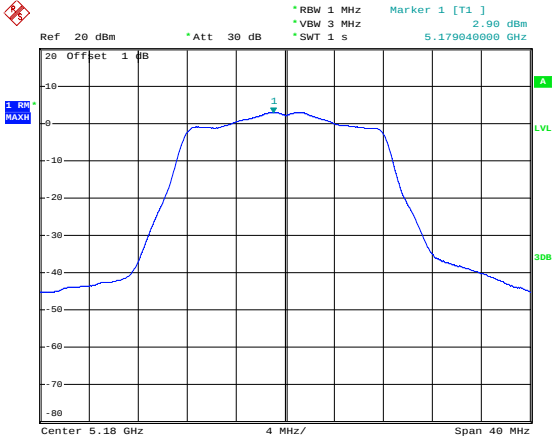
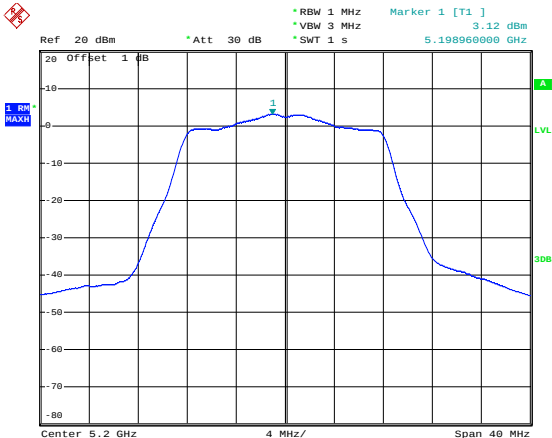
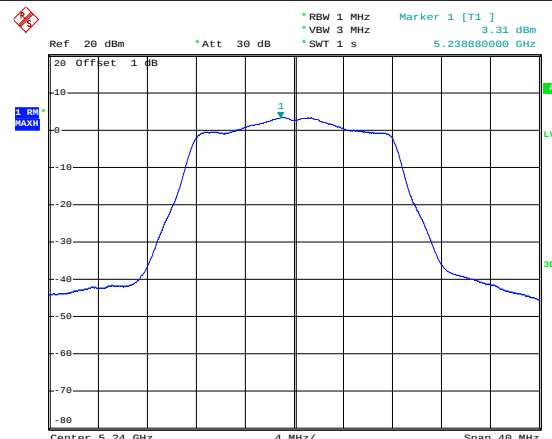
APPENDIX	Description of Test Item	Result
A	Power Spectral Density	Compliant
B	Emission Bandwidth and Occupied Bandwidth	Compliant
C	Maximum Conducted Output Power	Compliant
D	Frequency Stability	Compliant

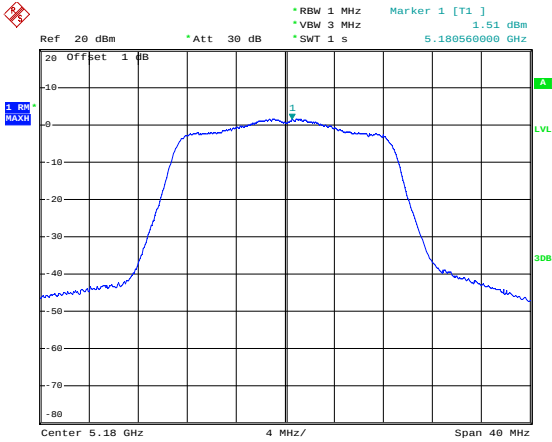
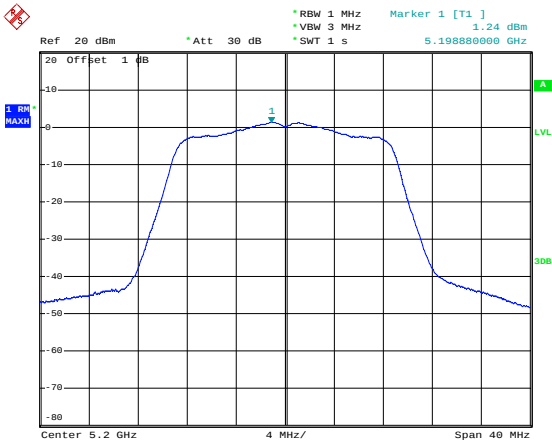
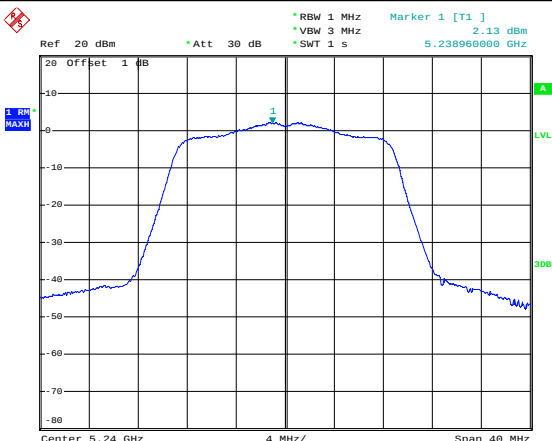
APPENDIX A

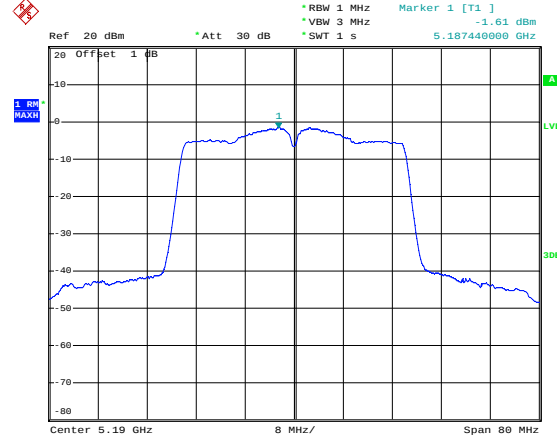
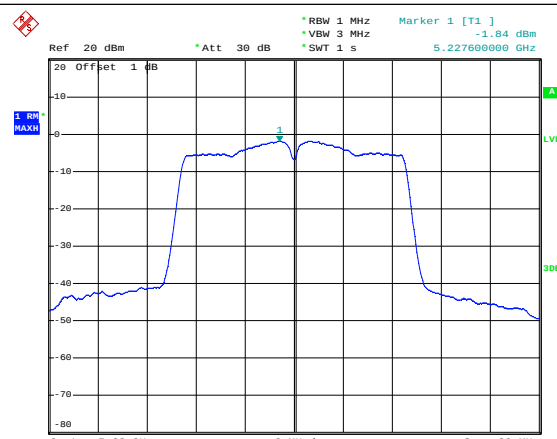
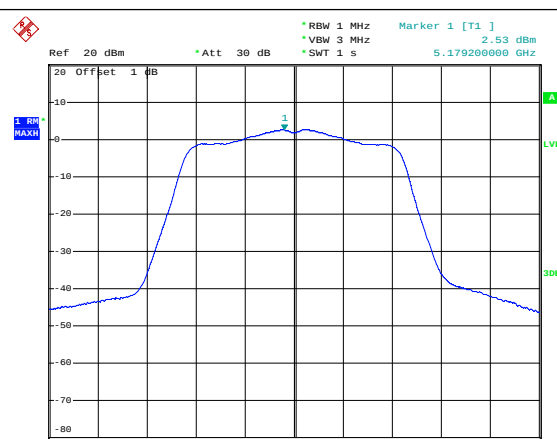
Power Spectral Density			
U-NII-1:5150-5250MHz			
Operating mode	Test Channel	Power Spectral Density dBm/MHz	Limit (dBm/MHz)
802.11a	5180	2.90	11
	5200	3.12	11
	5240	3.31	11
802.11n-HT20	5180	1.51	11
	5200	1.24	11
	5240	2.13	11
802.11n-HT40	5190	-1.61	11
	5230	-1.84	11
802.11ac-VHT20	5180	2.53	11
	5200	2.69	11
	5240	2.72	11
802.11ac-VHT40	5190	-1.28	11
	5230	-1.31	11
802.11ac-VHT80	5210	-4.64	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	-2.10	2.22	0	30
	5785	-1.92	2.22	0.18	30
	5825	-2.19	2.22	-0.09	30
802.11n-HT20	5745	-3.59	2.22	-1.49	30
	5785	-3.53	2.22	-1.43	30
	5825	-3.67	2.22	-1.57	30
802.11n-HT40	5755	-6.72	2.22	-4.62	30
	5795	-6.77	2.22	-4.67	30
802.11ac-VHT20	5745	-2.56	2.22	-0.46	30
	5785	-2.53	2.22	-0.43	30
	5825	-2.75	2.22	-0.65	30
802.11ac-VHT40	5755	-6.26	2.22	-4.16	30
	5795	-6.29	2.22	-4.19	30
802.11ac-VHT80	5775	-10.35	2.22	-8.25	30
*Note: Maximum PSD=PSD(dBm/300kHz)+10log(500kHz/300kHz)=2.22					

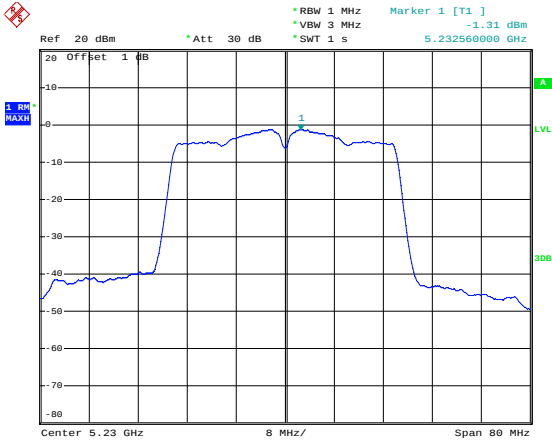
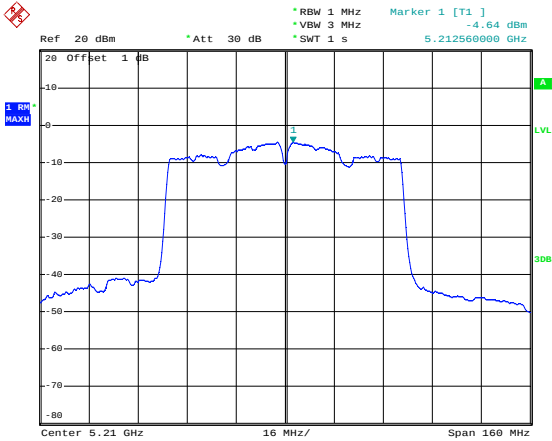
5150-5250MHz

802.11a-Low	 Date: 13.SEP.2024 09:02:17
802.11a-Middle	 Date: 13.SEP.2024 09:02:49
802.11a-High	 Date: 13.SEP.2024 09:03:12

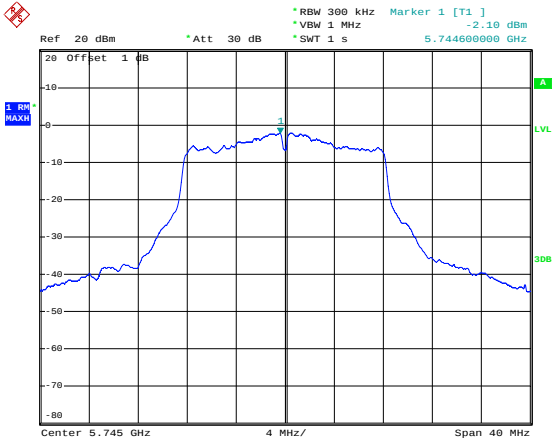
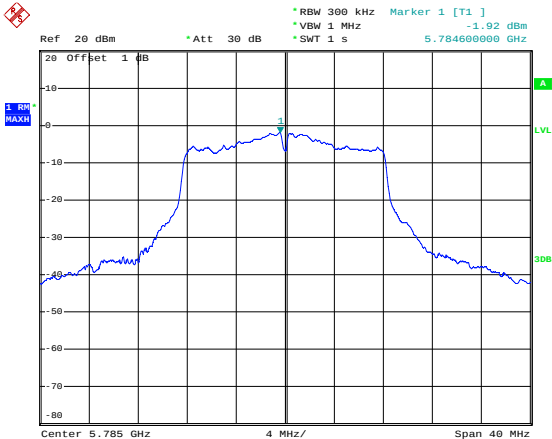
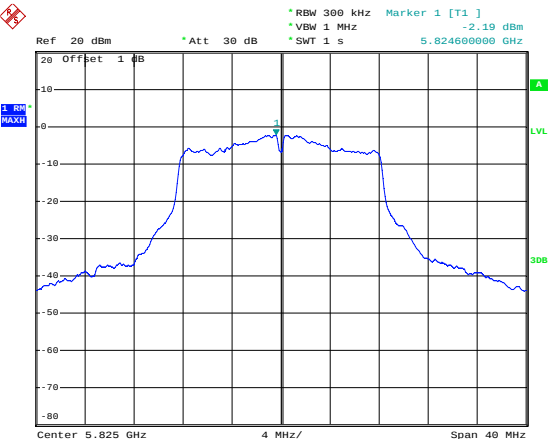
802.11n-HT20-Low	 Ref 20 dBm *Att 30 dB *RBW 1 MHz *VBW 3 MHz *SWT 1 s Marker 1 [T1] 1.51 dBm 5.18056000 GHz Center 5.18 GHz 4 MHz/ Span 40 MHz Date: 13.SEP.2024 09:04:36
802.11n-HT20-Middle	 Ref 20 dBm *Att 30 dB *RBW 1 MHz *VBW 3 MHz *SWT 1 s Marker 1 [T1] 1.24 dBm 5.19888000 GHz Center 5.2 GHz 4 MHz/ Span 40 MHz Date: 13.SEP.2024 09:04:17
802.11n-HT20-High	 Ref 20 dBm *Att 30 dB *RBW 1 MHz *VBW 3 MHz *SWT 1 s Marker 1 [T1] 2.13 dBm 5.23896000 GHz Center 5.24 GHz 4 MHz/ Span 40 MHz Date: 13.SEP.2024 09:03:59

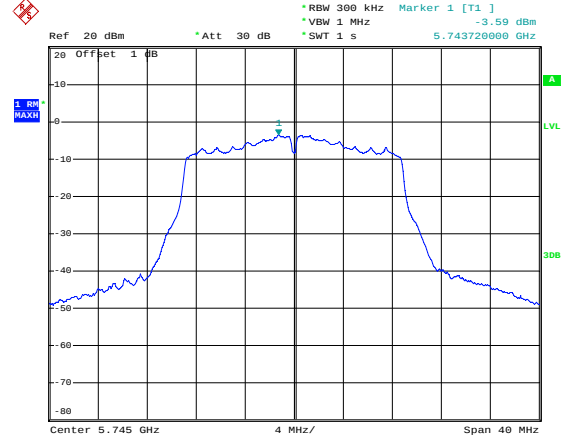
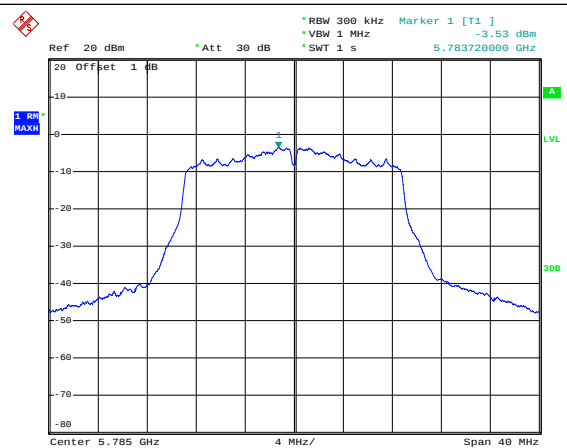
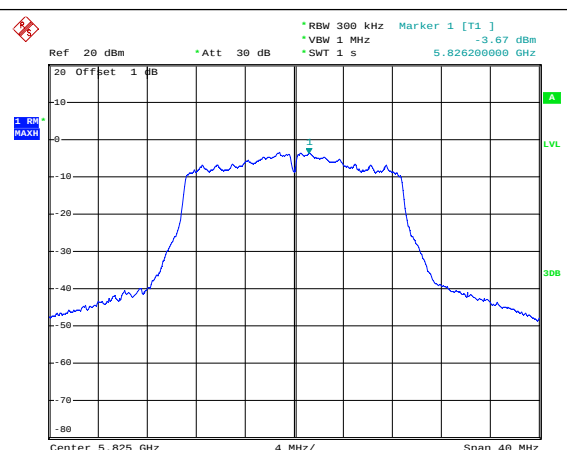
802.11n-HT40-Low	 Date: 13.SEP.2024 09:07:12
802.11n-HT40-High	 Date: 13.SEP.2024 09:07:34
802.11ac-VHT20-Low	 Date: 13.SEP.2024 09:05:42

[illegible]

802.11ac-VHT40-High	 Ref 20 dBm *Att 30 dB *RBW 1 MHz Marker 1 [T1] -1.31 dBm *VBW 3 MHz *SWT 1 s 5.232560000 GHz 20 Offset 1 dB 1 dB MAX Center 5.23 GHz 8 MHz/ Span 80 MHz Date: 13.SEP.2024 09:08:12
802.11ac-VHT80-Low	 Ref 20 dBm *Att 30 dB *RBW 1 MHz Marker 1 [T1] -4.64 dBm *VBW 3 MHz *SWT 1 s 5.212560000 GHz 20 Offset 1 dB 1 dB MAX Center 5.21 GHz 16 MHz/ Span 160 MHz Date: 13.SEP.2024 09:09:25

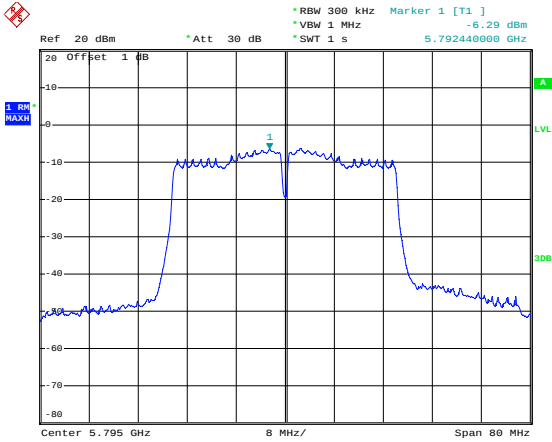
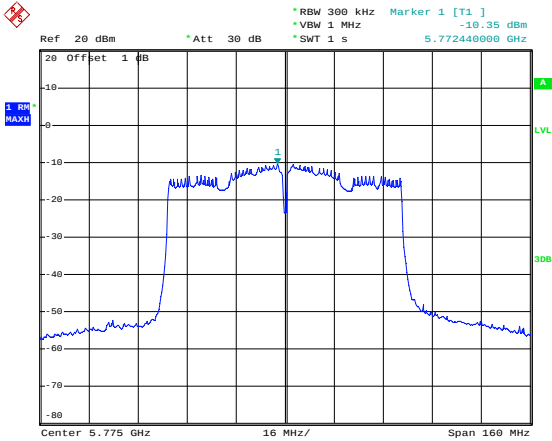
5725-5850MHz

802.11a-Low	 Date: 11.SEP.2024 17:33:58
802.11a-Middle	 Date: 11.SEP.2024 17:33:33
802.11a-High	 Date: 11.SEP.2024 17:33:08

802.11n-HT20-Low	 Date: 11.SEP.2024 17:31:55
802.11n-HT20-Middle	 Date: 11.SEP.2024 17:32:18
802.11n-HT20-High	 Date: 11.SEP.2024 17:32:50

802.11n-HT40-Low	*RBW 300 kHz Marker 1 [T1] -6.72 dBm *VBW 1 MHz *SWT 1 s 5.75740000 GHz Ref 20 dBm *Att 30 dB 20 Offset 1 dB 1 RBW 1 MHz Center 5.755 GHz 8 MHz/ Span 80 MHz Date: 11.SEP.2024 17:30:18
802.11n-HT40-High	*RBW 300 kHz Marker 1 [T1] -6.77 dBm *VBW 1 MHz *SWT 1 s 5.79740000 GHz Ref 20 dBm *Att 30 dB 20 Offset 1 dB 1 RBW 1 MHz Center 5.795 GHz 8 MHz/ Span 80 MHz Date: 11.SEP.2024 17:29:51
802.11ac-VHT20-Low	*RBW 300 kHz Marker 1 [T1] -2.56 dBm *VBW 1 MHz *SWT 1 s 5.74564000 GHz Ref 20 dBm *Att 30 dB 20 Offset 1 dB 1 RBW 1 MHz Center 5.745 GHz 4 MHz/ Span 40 MHz Date: 11.SEP.2024 17:31:32

Channel	Frequency (GHz)	Span (MHz)	Center (GHz)	Ref (dBm)	Att (dB)	RBW (kHz)	VBW (MHz)	SWT (s)	Marker 1 [T1] (dBm)
802.11ac-VHT20-Middle	5.785	40	5.785	20	30	300	1	1	-2.53
802.11ac-VHT20-High	5.825	40	5.825	20	30	300	1	1	-2.75
802.11ac-VHT40-Low	5.755	80	5.755	20	30	300	1	1	-6.26

802.11ac-VHT40-High	 Ref 20 dBm *Att 30 dB *RBW 300 kHz *VBW 1 MHz *SWT 1 s Marker 1 [T1] -10.35 dBm 5.792440000 GHz 20 Offset 1 dB 1 dB MAX Center 5.795 GHz 8 MHz/ Span 80 MHz Date: 11.SEP.2024 17:29:29
802.11ac-VHT80-Low	 Ref 20 dBm *Att 30 dB *RBW 300 kHz *VBW 1 MHz *SWT 1 s Marker 1 [T1] -10.35 dBm 5.772440000 GHz 20 Offset 1 dB 1 dB MAX Center 5.775 GHz 16 MHz/ Span 160 MHz Date: 11.SEP.2024 17:28:04

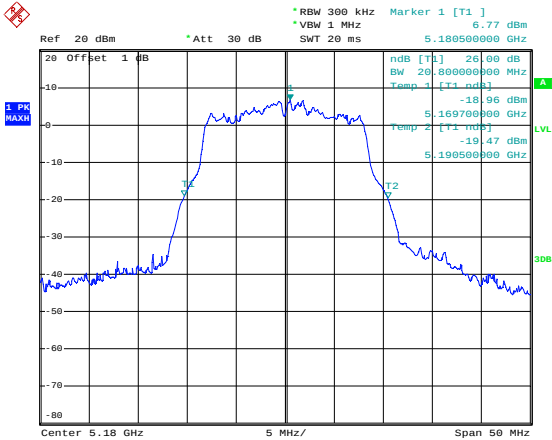
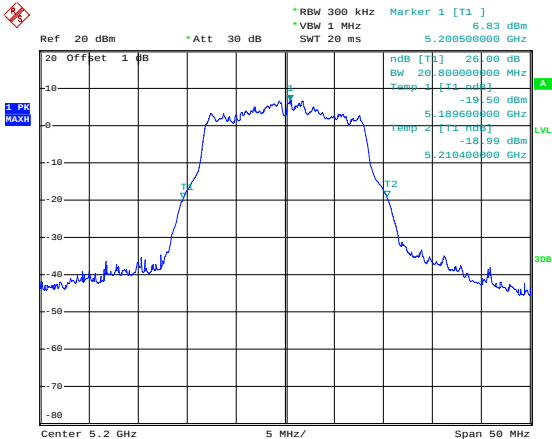
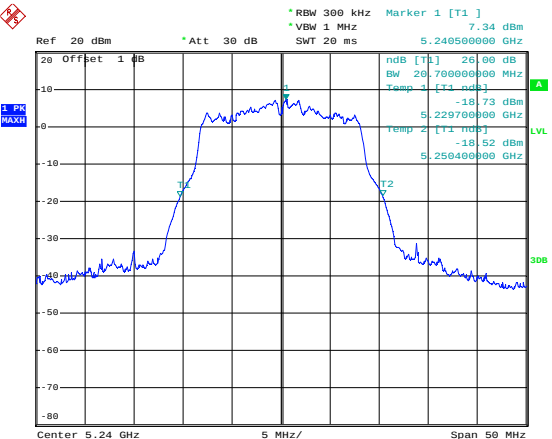
APPENDIX B

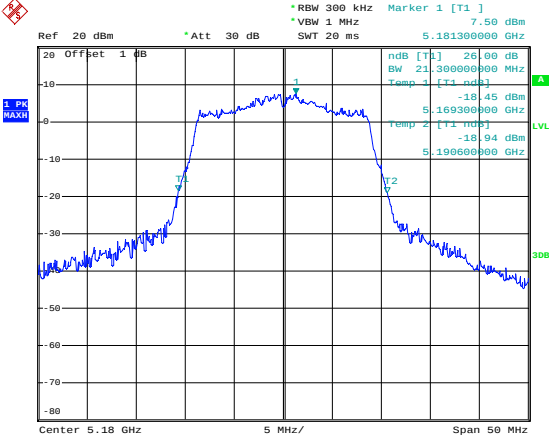
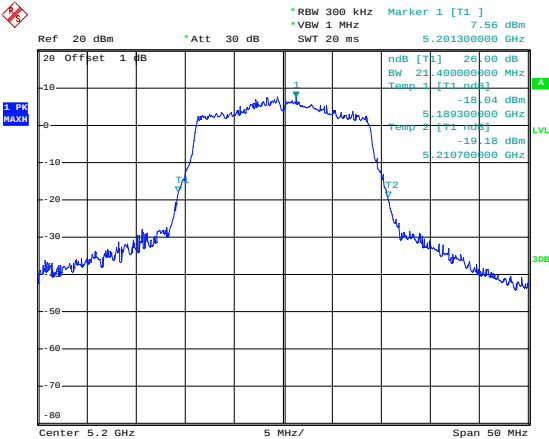
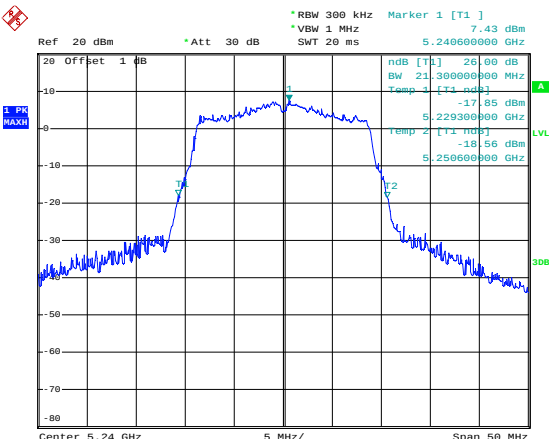
Emission Bandwidth and Occupied Bandwidth

U-NII-1:5150-5250MHz				
Test Mode	Test Channel MHz	26 dB Bandwidth MHz	99% Bandwidth MHz	Limit MHz
802.11a	5180	20.80	16.56	Pass
	5200	20.80	16.56	Pass
	5240	20.70	16.56	Pass
802.11n-HT20	5180	21.30	17.92	Pass
	5200	21.40	17.92	Pass
	5240	21.30	17.92	Pass
802.11n-HT40	5190	39.04	36.48	Pass
	5230	39.04	36.64	Pass
802.11ac-VHT20	5180	21.40	17.92	Pass
	5200	21.30	17.92	Pass
	5240	20.90	17.92	Pass
802.11ac-VHT40	5190	39.36	36.48	Pass
	5230	39.04	36.64	Pass
802.11ac-VHT80	5210	81.72	75.84	Pass

U-NII-3: 5725-5850MHz				
Test Mode	Test Channel MHz	6 dB Bandwidth MHz	99% Bandwidth MHz	Limit MHz
802.11a	5745	15.84	16.64	≥500
	5785	15.60	16.64	≥500
	5825	15.60	16.64	≥500
802.11n-HT20	5745	17.84	17.92	≥500
	5785	17.76	17.92	≥500
	5825	17.76	17.92	≥500
802.11n-HT40	5755	36.64	36.64	≥500
	5795	36.48	36.64	≥500
802.11ac-VHT20	5745	17.44	17.92	≥500
	5785	17.84	17.92	≥500
	5825	17.68	17.92	≥500
802.11ac-VHT40	5755	36.64	36.64	≥500
	5795	36.32	36.48	≥500
802.11ac-VHT80	5775	76.16	75.84	≥500

26 dB Bandwidth
5150-5250MHz

802.11a-Low	 Ref 20 dBm *Att 30 dB *RBW 300 kHz Marker 1 [T1] 6.77 dBm *VBW 1 MHz SWT 20 ms 5.180500000 GHz 20 Offset 1 dB ndB [T1] 26.00 dB BW 20.00000000 MHz Temp 1 [T1 ndB] -18.96 dBm 5.169700000 GHz Temp 2 [T1 ndB] -19.47 dBm 5.190500000 GHz Center 5.18 GHz 5 MHz/ Span 50 MHz Date: 13.SEP.2024 09:16:48
802.11a-Middle	 Ref 20 dBm *Att 30 dB *RBW 300 kHz Marker 1 [T1] 6.83 dBm *VBW 1 MHz SWT 20 ms 5.200500000 GHz 20 Offset 1 dB ndB [T1] 26.00 dB BW 20.00000000 MHz Temp 1 [T1 ndB] -19.50 dBm 5.189600000 GHz Temp 2 [T1 ndB] -18.99 dBm 5.210400000 GHz Center 5.2 GHz 5 MHz/ Span 50 MHz Date: 13.SEP.2024 09:16:33
802.11a-High	 Ref 20 dBm *Att 30 dB *RBW 300 kHz Marker 1 [T1] 7.34 dBm *VBW 1 MHz SWT 20 ms 5.240500000 GHz 20 Offset 1 dB ndB [T1] 26.00 dB BW 20.70000000 MHz Temp 1 [T1 ndB] -18.73 dBm 5.229700000 GHz Temp 2 [T1 ndB] -18.52 dBm 5.250400000 GHz Center 5.24 GHz 5 MHz/ Span 50 MHz Date: 13.SEP.2024 09:16:13

802.11n-HT20-Low	 Date: 13.SEP.2024 09:17:25
802.11n-HT20-Middle	 Date: 13.SEP.2024 09:17:45
802.11n-HT20-High	 Date: 13.SEP.2024 09:18:02

802.11n-HT40-Low	Ref 20 dBm *Att 30 dB RBW 300 kHz Marker 1 [T1] 4.41 dBm *VBW 1 MHz SWT 20 ms 5.18880000 GHz ndB [T1] 26.00 dB BW 39.04000000 MHz Temp 1 [T1 ndB] 5.17048000 GHz -21.88 dBm Temp 2 [T2 ndB] 5.20952000 GHz -20.54 dBm Center 5.19 GHz 8 MHz/ Span 80 MHz Date: 13.SEP.2024 09:19:58
802.11n-HT40-High	Ref 20 dBm *Att 30 dB RBW 300 kHz Marker 1 [T1] 3.33 dBm *VBW 1 MHz SWT 20 ms 5.22744000 GHz ndB [T1] 26.00 dB BW 39.04000000 MHz Temp 1 [T1 ndB] 5.21048000 GHz -22.66 dBm Temp 2 [T2 ndB] 5.24952000 GHz -22.08 dBm Center 5.23 GHz 8 MHz/ Span 80 MHz Date: 13.SEP.2024 09:20:18
802.11ac-VHT20-Low	Ref 20 dBm *Att 30 dB RBW 300 kHz Marker 1 [T1] 7.41 dBm *VBW 1 MHz SWT 20 ms 5.17960000 GHz ndB [T1] 26.00 dB BW 21.40000000 MHz Temp 1 [T1 ndB] 5.16930000 GHz -18.71 dBm Temp 2 [T2 ndB] 5.19070000 GHz -19.09 dBm Center 5.18 GHz 5 MHz/ Span 50 MHz Date: 13.SEP.2024 09:19:24

802.11ac-VHT20-Middle

Ref 20 dBm Att 30 dB RBW 300 kHz Marker 1 [T1] 7.88 dBm
VBW 1 MHz SWT 20 ms 5.20050000 GHz

20 Offset 1 dB ndB [T1] 26.00 dB
BW 21.30000000 MHz
Temp 1 [T1 ndB] -16.15 dBm
5.189300000 GHz
Temp 2 [T1 ndB] -17.79 dBm
5.210600000 GHz

1 PK MAXH 30dB

Center 5.2 GHz 5 MHz/ Span 50 MHz

Date: 13.SEP.2024 09:19:06

802.11ac-VHT20-High

Ref 20 dBm Att 30 dB RBW 300 kHz Marker 1 [T1] 9.39 dBm
VBW 1 MHz SWT 20 ms 5.239400000 GHz

20 Offset 1 dB ndB [T1] 26.00 dB
BW 20.90000000 MHz
Temp 1 [T1 ndB] -16.25 dBm
5.229600000 GHz
Temp 2 [T1 ndB] -16.75 dBm
5.250500000 GHz

1 PK MAXH 30dB

Center 5.24 GHz 5 MHz/ Span 50 MHz

Date: 13.SEP.2024 09:18:47

802.11ac-VHT40-Low

Ref 20 dBm Att 30 dB RBW 300 kHz Marker 1 [T1] 3.83 dBm
VBW 1 MHz SWT 20 ms 5.188560000 GHz

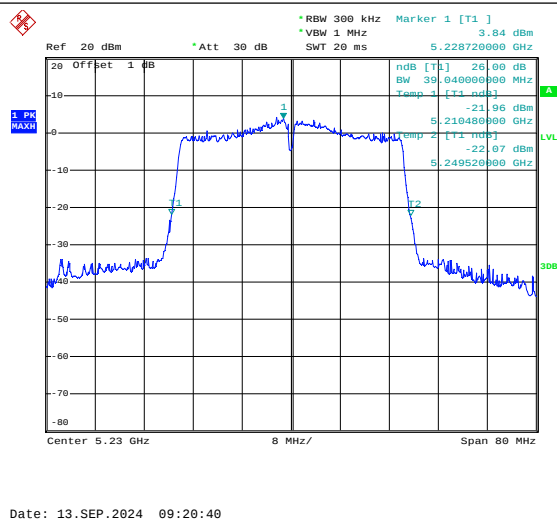
20 Offset 1 dB ndB [T1] 26.00 dB
BW 39.36000000 MHz
Temp 1 [T1 ndB] -22.41 dBm
5.178320000 GHz
Temp 2 [T1 ndB] -22.75 dBm
5.209680000 GHz

1 PK MAXH 30dB

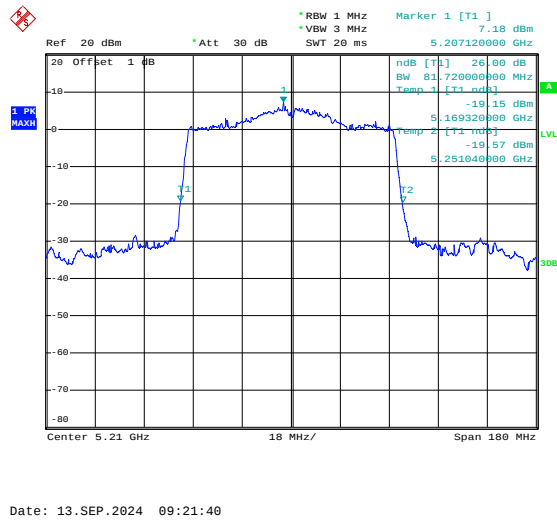
Center 5.19 GHz 8 MHz/ Span 80 MHz

Date: 13.SEP.2024 09:21:00

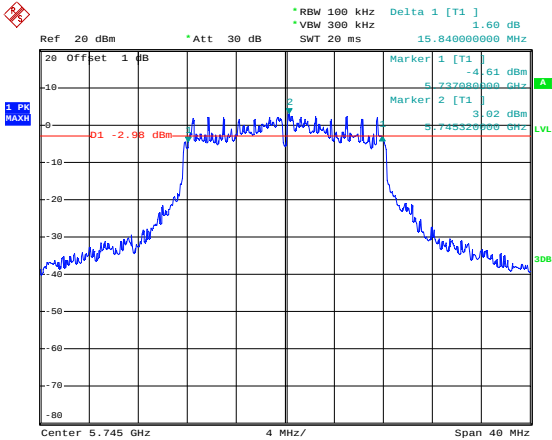
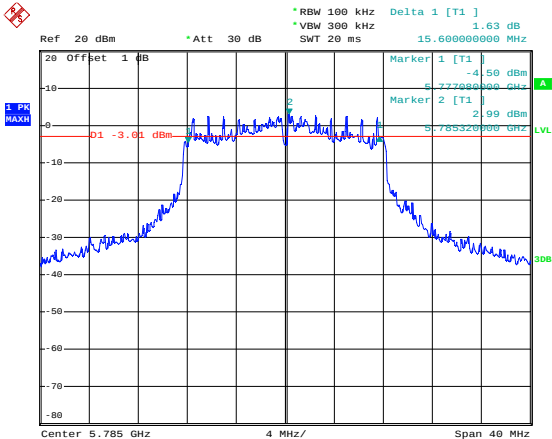
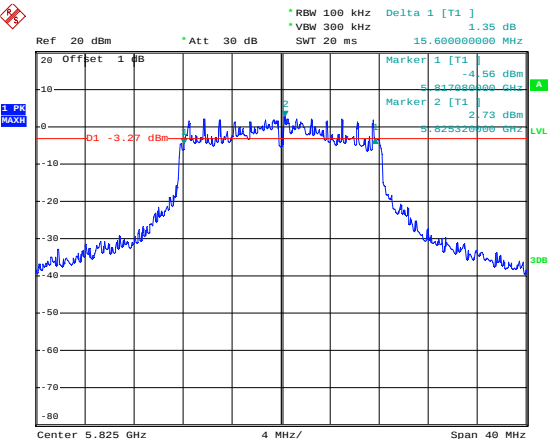
802.11ac-VHT40-High

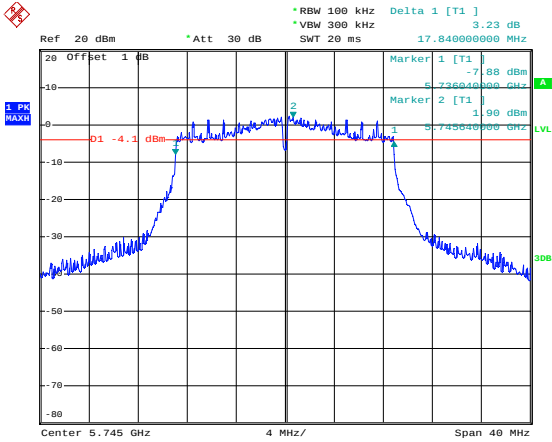
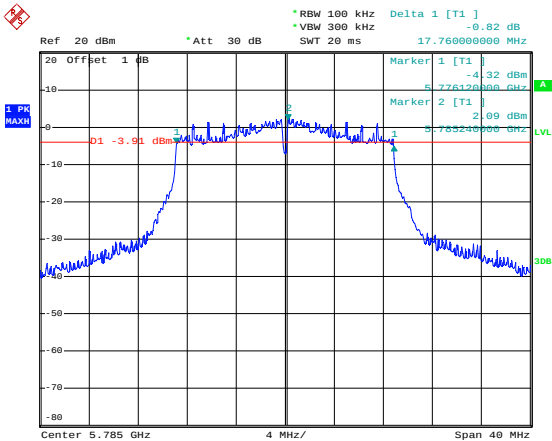
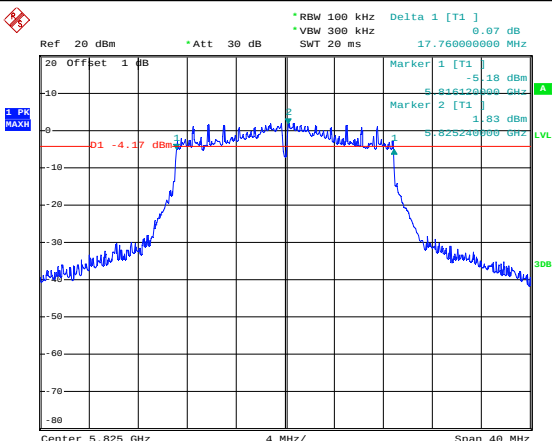


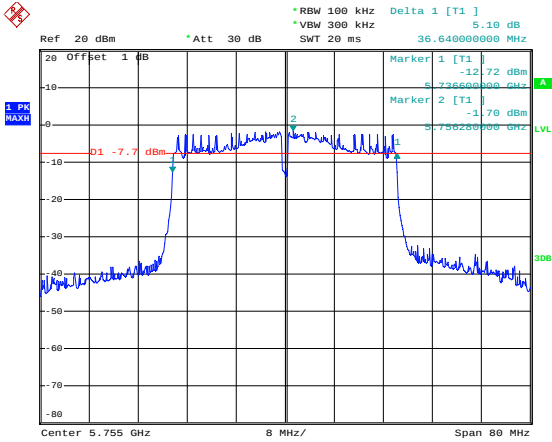
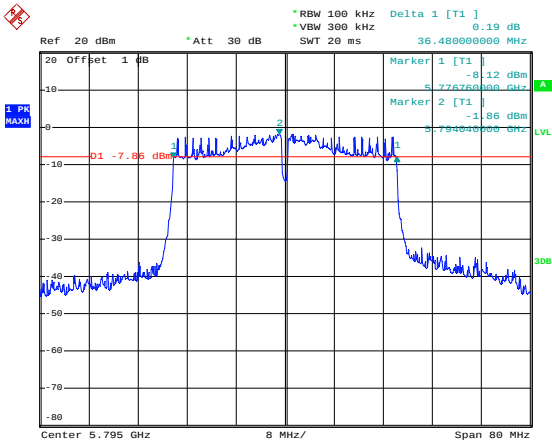
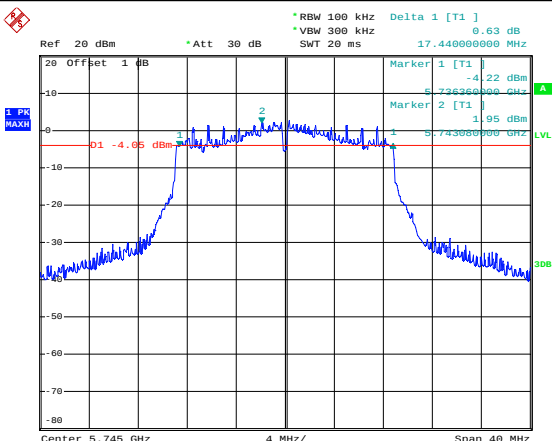
802.11ac-VHT80-Low



6dB Bandwidth
5725-5850MHz

802.11a-Low	 Ref 20 dBm *Att 30 dB *RBW 100 kHz Delta 1 [T1] 1.60 dB *VBW 300 kHz SWT 20 ms 15.840000000 MHz 20 Offset 1 dB Marker 1 [T1] -4.61 dBm -10 Marker 2 [T1] -3.02 dBm -20 -2.98 dBm -30 -2.98 dBm -40 -2.98 dBm -50 -2.98 dBm -60 -2.98 dBm -70 -2.98 dBm -80 -2.98 dBm Center 5.745 GHz 4 MHz/ Span 40 MHz Date: 11.SEP.2024 17:59:59
802.11a-Middle	 Ref 20 dBm *Att 30 dB *RBW 100 kHz Delta 1 [T1] 1.63 dB *VBW 300 kHz SWT 20 ms 15.600000000 MHz 20 Offset 1 dB Marker 1 [T1] -4.50 dBm -10 Marker 2 [T1] 2.99 dBm -20 -3.01 dBm -30 -3.01 dBm -40 -3.01 dBm -50 -3.01 dBm -60 -3.01 dBm -70 -3.01 dBm -80 -3.01 dBm Center 5.785 GHz 4 MHz/ Span 40 MHz Date: 11.SEP.2024 17:58:59
802.11a-High	 Ref 20 dBm *Att 30 dB *RBW 100 kHz Delta 1 [T1] 1.35 dB *VBW 300 kHz SWT 20 ms 15.600000000 MHz 20 Offset 1 dB Marker 1 [T1] -4.56 dBm -10 Marker 2 [T1] 2.73 dBm -20 -3.27 dBm -30 -3.27 dBm -40 -3.27 dBm -50 -3.27 dBm -60 -3.27 dBm -70 -3.27 dBm -80 -3.27 dBm Center 5.825 GHz 4 MHz/ Span 40 MHz Date: 11.SEP.2024 17:58:06

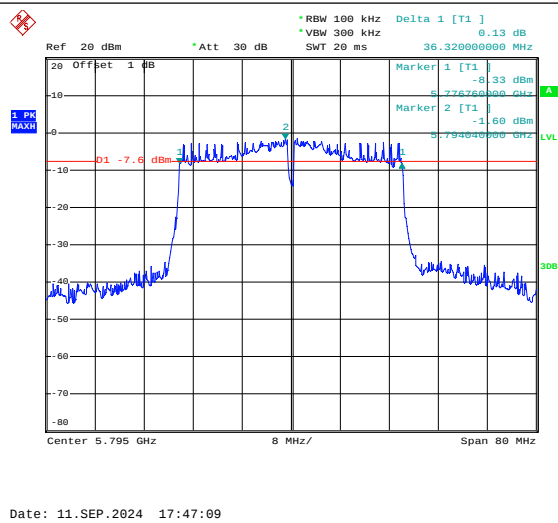
802.11n-HT20-Low	 Date: 11.SEP.2024 17:54:12
802.11n-HT20-Middle	 Date: 11.SEP.2024 17:56:02
802.11n-HT20-High	 Date: 11.SEP.2024 17:57:26

802.11n-HT40-Low	 Ref 20 dBm *Att 30 dB RBW 100 kHz Delta 1 [T1] 5.10 dB VBW 300 kHz SWT 20 ms 36.64000000 MHz Marker 1 [T1] -12.72 dBm 5.73660000 GHz Marker 2 [T1] -1.70 dBm 5.73620000 GHz Center 5.755 GHz 8 MHz/ Span 80 MHz Date: 11.SEP.2024 17:49:01
802.11n-HT40-High	 Ref 20 dBm *Att 30 dB RBW 100 kHz Delta 1 [T1] 0.19 dB VBW 300 kHz SWT 20 ms 36.48000000 MHz Marker 1 [T1] -8.12 dBm 5.73670000 GHz Marker 2 [T1] -1.86 dBm 5.73630000 GHz Center 5.795 GHz 8 MHz/ Span 80 MHz Date: 11.SEP.2024 17:47:57
802.11ac-VHT20-Low	 Ref 20 dBm *Att 30 dB RBW 100 kHz Delta 1 [T1] 0.63 dB VBW 300 kHz SWT 20 ms 17.44000000 MHz Marker 1 [T1] -4.22 dBm 5.73630000 GHz Marker 2 [T1] 1.95 dBm 5.73430000 GHz Center 5.745 GHz 4 MHz/ Span 40 MHz Date: 11.SEP.2024 17:52:00

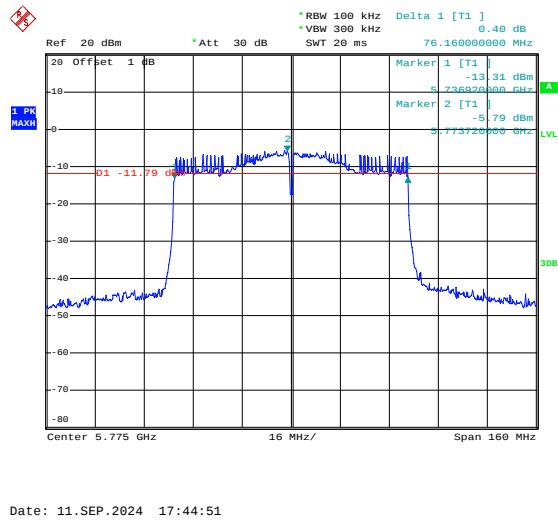
802.11ac-VHT20-Middle	Date: 11.SEP.2024 17:51:08
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| 802.11ac-VHT20-High | Date: 11.SEP.2024 17:50:18 |
| 802.11ac-VHT40-Low | Date: 11.SEP.2024 17:46:01 |

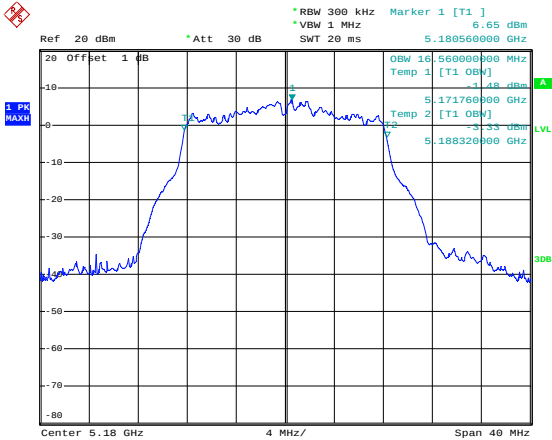
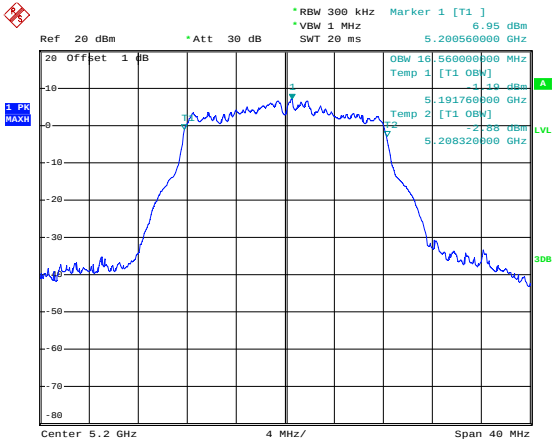
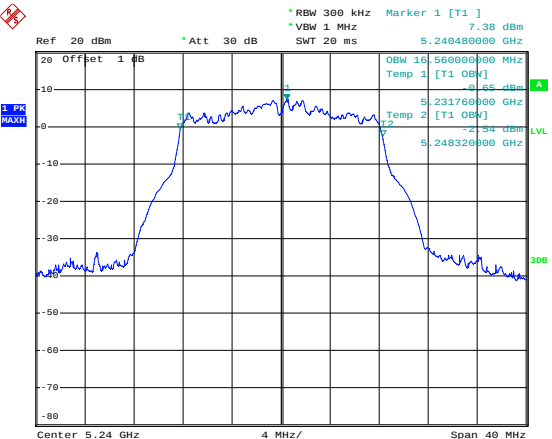
802.11ac-VHT40-High

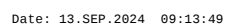
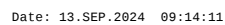
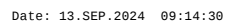


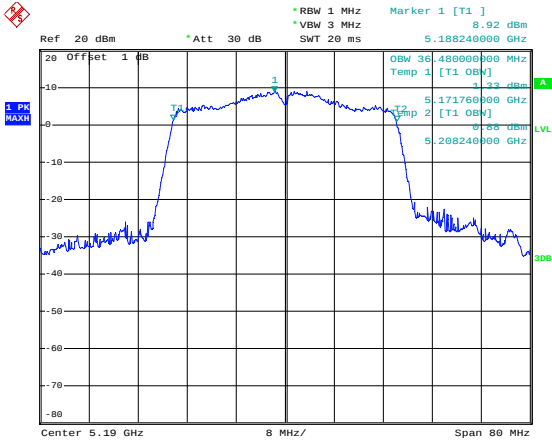
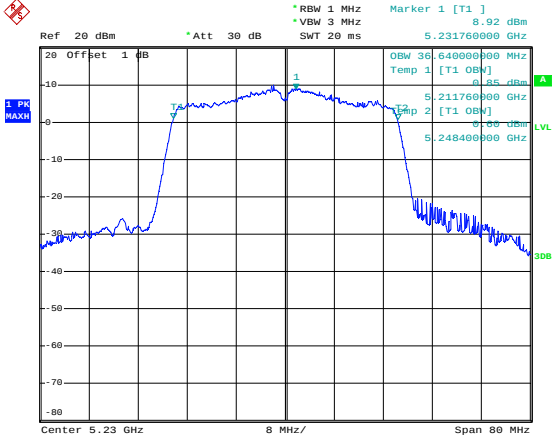
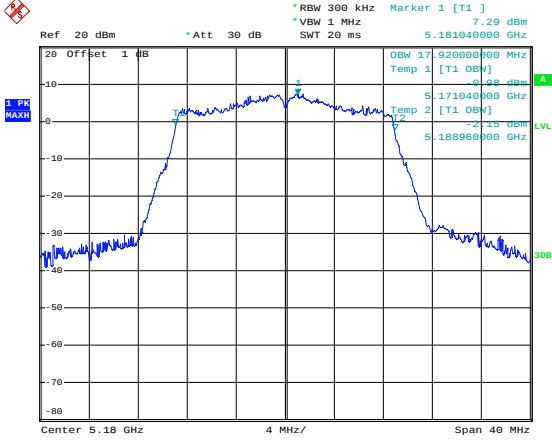
802.11ac-VHT80-Low

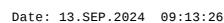


99% Bandwidth
5150-5250MHz

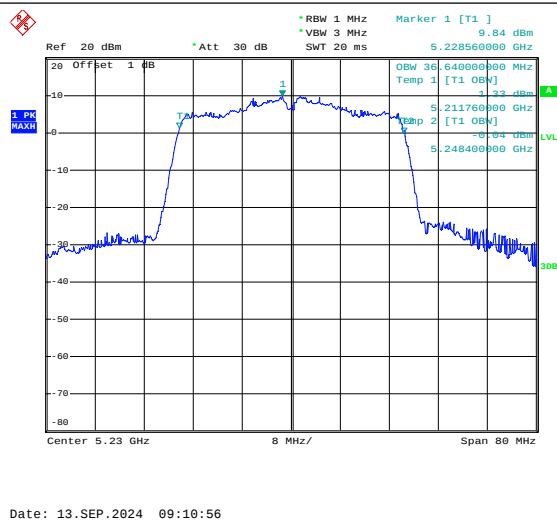
802.11a-Low	 Ref 20 dBm *Att 30 dB *RBW 300 kHz Marker 1 [T1] 6.65 dBm *VBW 1 MHz SWT 20 ms 5.180560000 GHz 20 Offset 1 dB OBW 16.560000000 MHz Temp 1 [T1 OBW] -1.48 dBm 1 PK MAXX 5.171760000 GHz Temp 2 [T1 OBW] -3.33 dBm 5.188320000 GHz LVL 30B Center 5.18 GHz 4 MHz/ Span 40 MHz Date: 13.SEP.2024 09:14:56
802.11a-Middle	 Ref 20 dBm *Att 30 dB *RBW 300 kHz Marker 1 [T1] 6.95 dBm *VBW 1 MHz SWT 20 ms 5.200560000 GHz 20 Offset 1 dB OBW 16.560000000 MHz Temp 1 [T1 OBW] -1.10 dBm 1 PK MAXX 5.191760000 GHz Temp 2 [T1 OBW] -2.88 dBm 5.208320000 GHz LVL 30B Center 5.2 GHz 4 MHz/ Span 40 MHz Date: 13.SEP.2024 09:15:16
802.11a-High	 Ref 20 dBm *Att 30 dB *RBW 300 kHz Marker 1 [T1] 7.38 dBm *VBW 1 MHz SWT 20 ms 5.240480000 GHz 20 Offset 1 dB OBW 16.560000000 MHz Temp 1 [T1 OBW] -0.65 dBm 1 PK MAXX 5.231760000 GHz Temp 2 [T1 OBW] -2.84 dBm 5.248320000 GHz LVL 30B Center 5.24 GHz 4 MHz/ Span 40 MHz Date: 13.SEP.2024 09:15:40



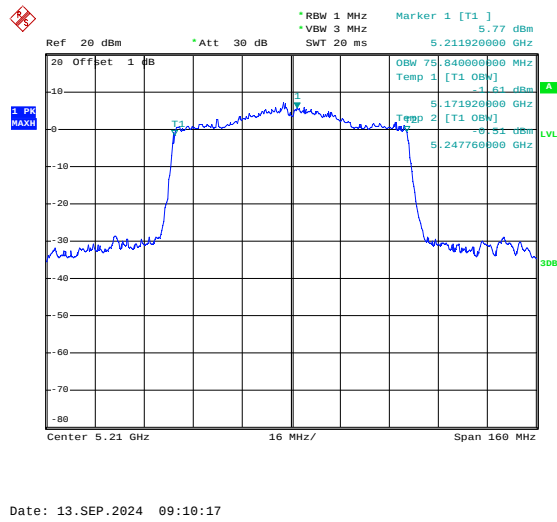
802.11n-HT40-Low	 Ref 20 dBm *Att 30 dB RBW 1 MHz Marker 1 [T1] 8.92 dBm *VBW 3 MHz SWT 20 ms 5.188240000 GHz OBW 36.480000000 MHz Temp 1 [T1 OBW] 1.33 dBm 5.171760000 GHz Temp 2 [T1 OBW] 0.88 dBm 5.208240000 GHz Center 5.19 GHz 8 MHz/ Span 80 MHz Date: 13.SEP.2024 09:11:41
802.11n-HT40-High	 Ref 20 dBm *Att 30 dB RBW 1 MHz Marker 1 [T1] 8.92 dBm *VBW 3 MHz SWT 20 ms 5.231760000 GHz OBW 36.640000000 MHz Temp 1 [T1 OBW] 0.85 dBm 5.211760000 GHz Temp 2 [T1 OBW] 0.88 dBm 5.248400000 GHz Center 5.23 GHz 8 MHz/ Span 80 MHz Date: 13.SEP.2024 09:12:06
802.11ac-VHT20-Low	 Ref 20 dBm *Att 30 dB RBW 300 kHz Marker 1 [T1] 7.29 dBm *VBW 1 MHz SWT 20 ms 5.181040000 GHz OBW 17.920000000 MHz Temp 1 [T1 OBW] 0.08 dBm 5.171040000 GHz Temp 2 [T1 OBW] -2.15 dBm 5.188960000 GHz Center 5.18 GHz 4 MHz/ Span 40 MHz Date: 13.SEP.2024 09:12:41

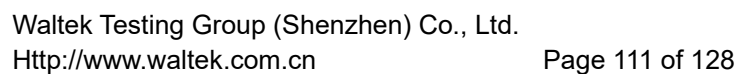


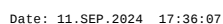
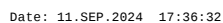
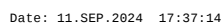
802.11ac-VHT40-High

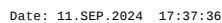
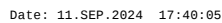
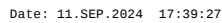


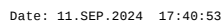
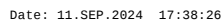
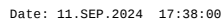
802.11ac-VHT80-Low



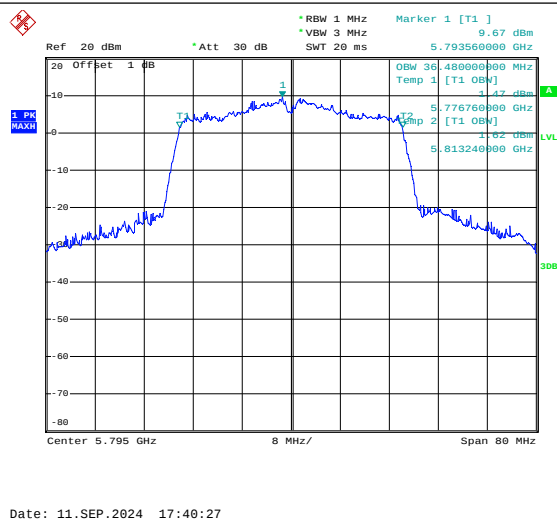




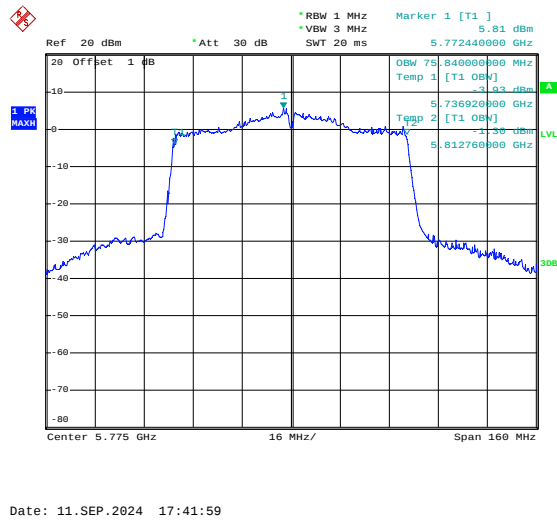




802.11ac-VHT40-High



802.11ac-VHT80-Low



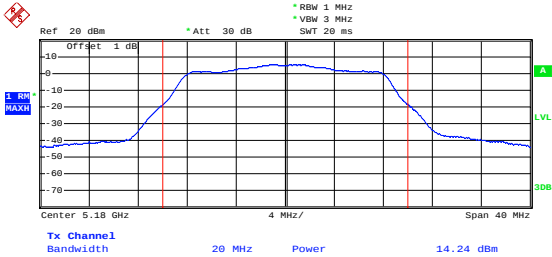
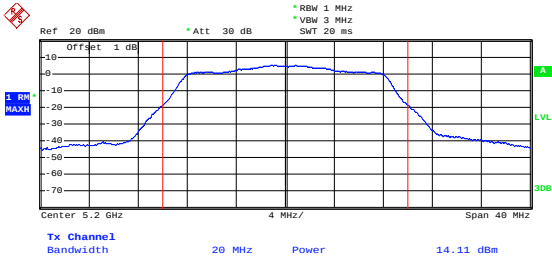
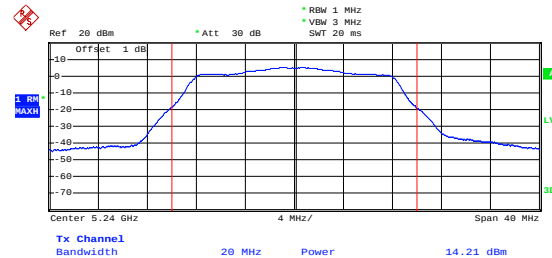
APPENDIX C

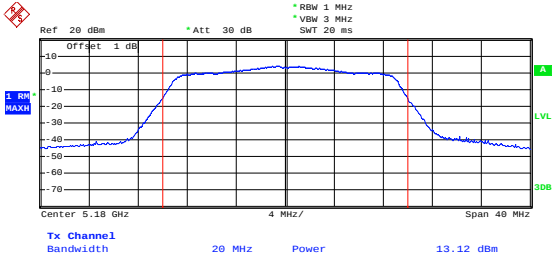
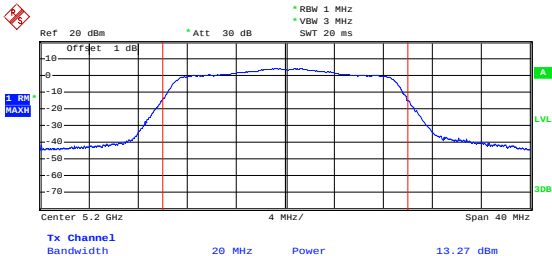
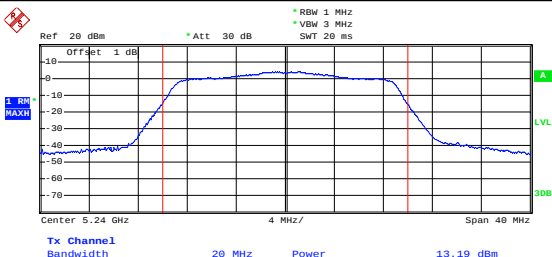
Maximum Conducted Output Power

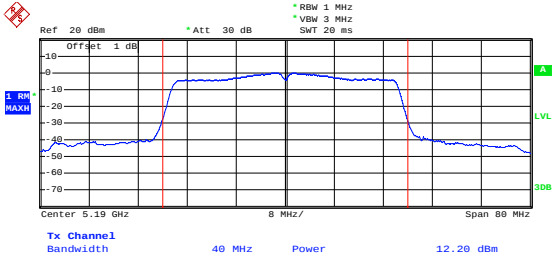
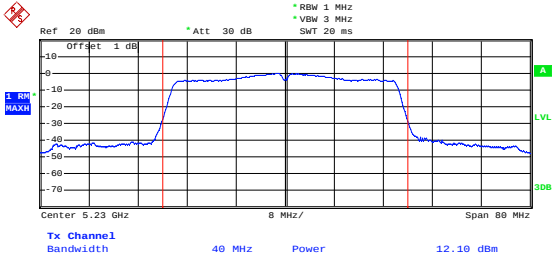
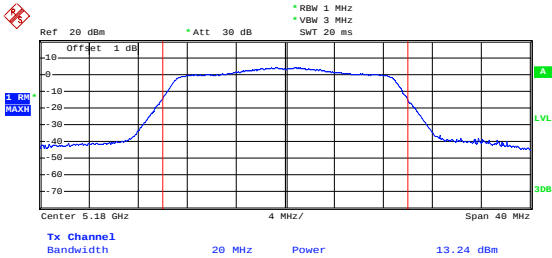
U-NII-1:5150-5250MHz			
Test mode	Frequency MHz	Output Power dBm	Limit dBm
802.11a	5180	14.24	23.98
	5200	14.11	23.98
	5240	14.21	23.98
802.11n-HT20	5180	13.12	23.98
	5200	13.27	23.98
	5240	13.19	23.98
802.11n-HT40	5190	12.20	23.98
	5230	12.10	23.98
802.11ac-VHT20	5180	13.24	23.98
	5200	13.07	23.98
	5240	13.15	23.98
802.11ac-VHT40	5190	12.07	23.98
	5230	12.06	23.98
802.11ac-VHT80	5210	11.74	23.98

U-NII-3: 5725-5850MHz			
Test mode	Frequency MHz	Output Power dBm	Limit dBm
802.11a	5745	14.55	30.00
	5785	14.42	30.00
	5825	14.24	30.00
802.11n-HT20	5745	13.47	30.00
	5785	13.41	30.00
	5825	13.29	30.00
802.11n-HT40	5755	12.53	30.00
	5795	12.76	30.00
802.11ac-VHT20	5745	13.50	30.00
	5785	13.35	30.00
	5825	13.22	30.00
802.11ac-VHT40	5755	12.73	30.00
	5795	12.75	30.00
802.11ac-VHT80	5775	11.24	30.00

5150-5250MHz

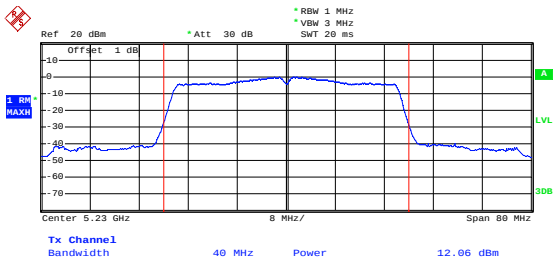
802.11a-Low	 Ref: 20 dBm, Offset: 1 dB, Att: 30 dB, RBW: 1 MHz, VBW: 3 MHz, SMT: 20 ms Center: 5.18 GHz, Span: 40 MHz, 4 MHz/div Tx Channel Bandwidth: 20 MHz, Power: 14.24 dBm Date: 11.SEP.2024 16:41:06
802.11a-Middle	 Ref: 20 dBm, Offset: 1 dB, Att: 30 dB, RBW: 1 MHz, VBW: 3 MHz, SMT: 20 ms Center: 5.2 GHz, Span: 40 MHz, 4 MHz/div Tx Channel Bandwidth: 20 MHz, Power: 14.11 dBm Date: 11.SEP.2024 16:41:40
802.11a-High	 Ref: 20 dBm, Offset: 1 dB, Att: 30 dB, RBW: 1 MHz, VBW: 3 MHz, SMT: 20 ms Center: 5.24 GHz, Span: 40 MHz, 4 MHz/div Tx Channel Bandwidth: 20 MHz, Power: 14.21 dBm Date: 11.SEP.2024 16:42:05

802.11n-HT20-Low	 Date: 11.SEP.2024 16:45:19
802.11n-HT20-Middle	 Date: 11.SEP.2024 16:44:50
802.11n-HT20-High	 Date: 11.SEP.2024 16:43:36

802.11n-HT40-Low	 Date: 11.SEP.2024 16:58:15
802.11n-HT40-High	 Date: 11.SEP.2024 16:59:01
802.11ac-VHT20-Low	 Date: 11.SEP.2024 17:05:16

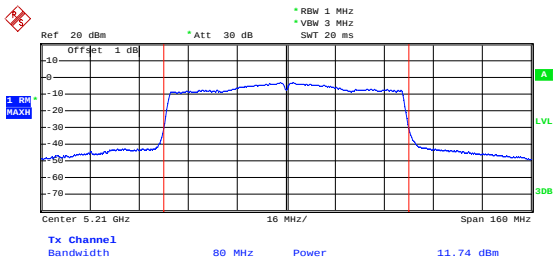
802.11ac-VHT20-Middle	Date: 11.SEP.2024 17:05:52
802.11ac-VHT20-High	Date: 11.SEP.2024 17:06:23
802.11ac-VHT40-Low	Date: 11.SEP.2024 17:00:34

802.11ac-VHT40-High



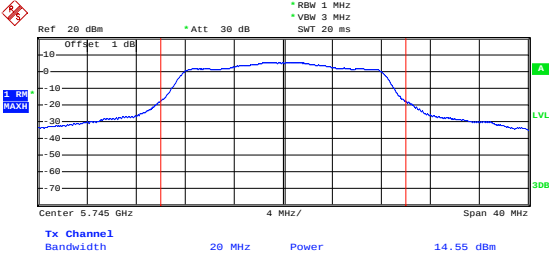
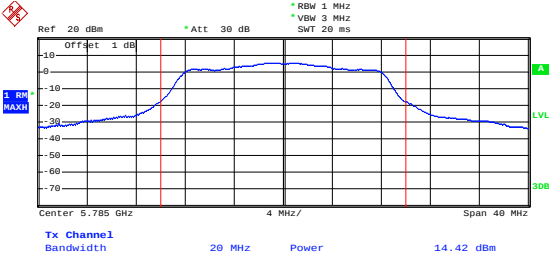
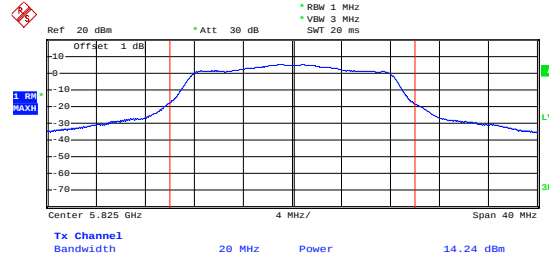
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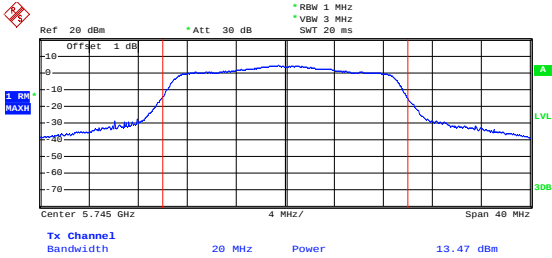
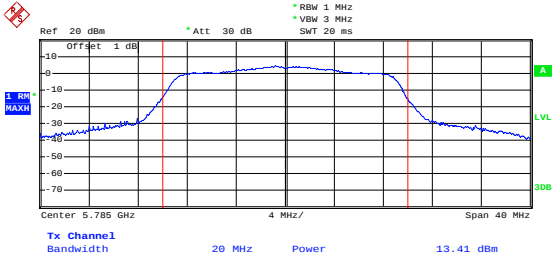
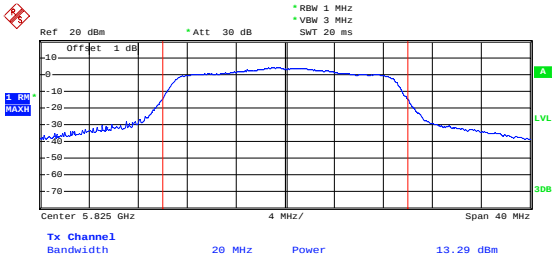
802.11ac-VHT80-Low

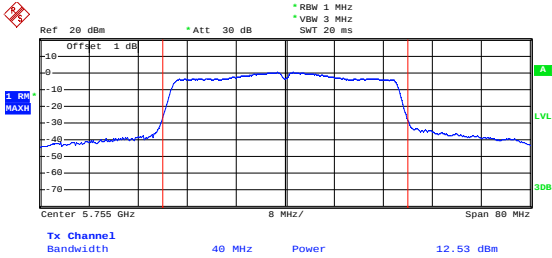
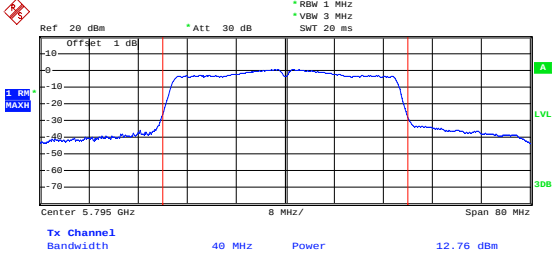
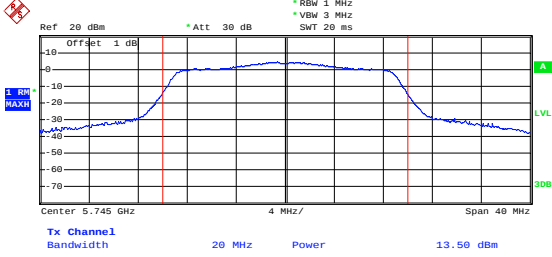


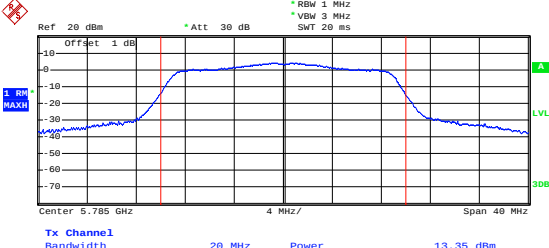
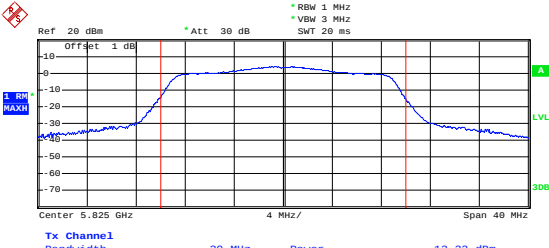
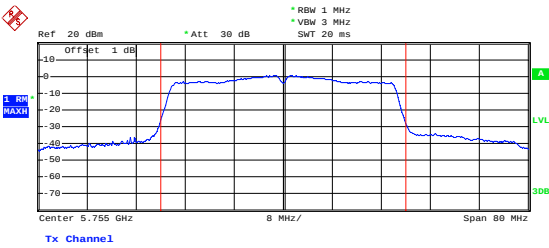
Date: 11.SEP.2024 17:03:39

5725-5850MHz

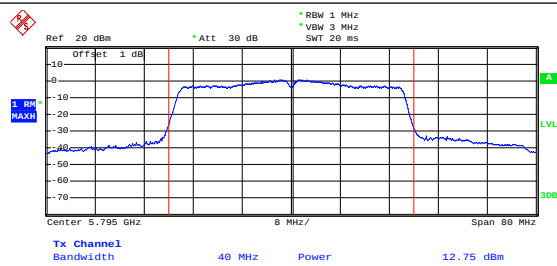
802.11a-Low	 Ref 20 dBm * Att 30 dB RBW 1 MHz VBW 3 MHz SWT 20 ms Offset 1 dB Center 5.745 GHz 4 MHz/ Span 40 MHz Tx Channel1 Bandwidth 20 MHz Power 14.55 dBm Date: 11.SEP.2024 17:18:22
802.11a-Middle	 Ref 20 dBm * Att 30 dB RBW 1 MHz VBW 3 MHz SWT 20 ms Offset 1 dB Center 5.785 GHz 4 MHz/ Span 40 MHz Tx Channel1 Bandwidth 20 MHz Power 14.42 dBm Date: 11.SEP.2024 17:18:50
802.11a-High	 Ref 20 dBm * Att 30 dB RBW 1 MHz VBW 3 MHz SWT 20 ms Offset 1 dB Center 5.825 GHz 4 MHz/ Span 40 MHz Tx Channel1 Bandwidth 20 MHz Power 14.24 dBm Date: 11.SEP.2024 17:19:16

802.11n-HT20-Low	 Date: 11.SEP.2024 17:21:05
802.11n-HT20-Middle	 Date: 11.SEP.2024 17:20:39
802.11n-HT20-High	 Date: 11.SEP.2024 17:20:11

802.11n-HT40-Low	 Date: 11.SEP.2024 17:24:04
802.11n-HT40-High	 Date: 11.SEP.2024 17:24:32
802.11ac-VHT20-Low	 Date: 11.SEP.2024 17:21:43

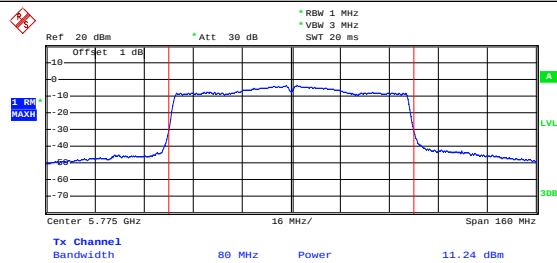
802.11ac-VHT20-Middle	 Date: 11.SEP.2024 17:22:07
802.11ac-VHT20-High	 Date: 11.SEP.2024 17:22:36
802.11ac-VHT40-Low	 Date: 11.SEP.2024 17:25:54

802.11ac-VHT40-High



Date: 11.SEP.2024 17:25:29

802.11ac-VHT80-Low



Date: 11.SEP.2024 17:27:20

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%	3.85	-30	503	0.097
100%		-20	504	0.097
100%		-10	501	0.096
100%		0	503	0.097
100%		+10	496	0.095
100%		+20	498	0.096
100%		+30	496	0.095
100%		+40	504	0.097
100%		+50	496	0.095
Low Battery power	4.235	+20	503	0.097
High Battery power	3.465	+20	501	0.096

U-NII-1:5725-5850MHz worst case at 802.11a middle channel				
Voltage(%)	Power(VDC)	TEMP(°C)	Freq.Dev(Hz)	Deviation
100%	3.85	-30	501	0.087
100%		-20	505	0.087
100%		-10	498	0.086
100%		0	498	0.086
100%		+10	501	0.087
100%		+20	497	0.086
100%		+30	503	0.087
100%		+40	497	0.086
100%		+50	499	0.086
Low Battery power	3.5	+20	499	0.086
High Battery power	4.2	+20	503	0.087

APPENDIX PHOTOGRAPHS

Please refer to “ANNEX”

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