

TEST REPORT

Reference No...... : WTH24X10253629W001
FCC ID..... : 2ADXC-PLMOKNTX
Applicant..... : Shenzhen Lenkeng Technology Co.,Ltd
Address..... : West 4F,Jinguangxia Culture&Tech Park, 3 Guangxia Road, Shenzhen ,
China
Manufacturer..... : The same as Applicant
Address..... : The same as Applicant
Product Name..... : HDMI Wireless Extender
Model No..... : LKV488Mini-V2.0-TX
Standards..... : FCC Part 15.407
Date of Receipt sample..... : 2024-10-31
Date of Test..... : 2024-10-31 to 2025-01-04
Date of Issue..... : 2025-01-04
Test Report Form No..... : WTX_Part 15_407W
Test Result..... : **Pass**

Remarks:

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

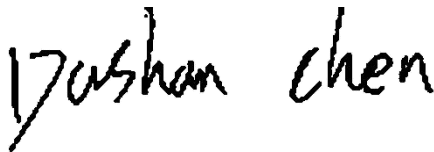
Prepared By:

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

Tel.: +86-755-33663308 Fax.: +86-755-33663309 Email: sem@waltek.com.cn

Tested by:



Dashan Chen

Approved by:



Jason Su

TABLE OF CONTENTS

1. GENERAL INFORMATION	5
1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	5
1.2 TEST STANDARDS	6
1.3 TEST METHODOLOGY	6
1.4 TABLE FOR PARAMETERS OF TEST SOFTWARE SETTING	6
1.5 EUT OPERATING DURING TEST	8
1.6 TEST FACILITY	8
1.7 EUT SETUP AND TEST MODE	9
1.8 MEASUREMENT UNCERTAINTY	11
1.9 TEST EQUIPMENT LIST AND DETAILS	12
2. SUMMARY OF TEST RESULTS	16
3. ANTENNA REQUIREMENT	17
3.1 STANDARD APPLICABLE	17
3.2 EVALUATION INFORMATION	17
4. AUTOMATICALLY DISCONTINUE TRANSMISSION	18
4.1 STANDARD APPLICABLE	18
4.2 SUMMARY OF TEST RESULTS	18
5. POWER SPECTRAL DENSITY	19
5.1 STANDARD APPLICABLE	19
5.2 TEST PROCEDURE	19
5.3 SUMMARY OF TEST RESULTS/PLOTS	20
6. EMISSION BANDWIDTH AND OCCUPIED BANDWIDTH	21
6.1 STANDARD APPLICABLE	21
6.2 TEST PROCEDURE	21
6.3 SUMMARY OF TEST RESULTS/PLOTS	23
7. MAXIMUM CONDUCTED OUTPUT POWER	24
7.1 STANDARD APPLICABLE	24
7.2 TEST PROCEDURE	24
7.3 SUMMARY OF TEST RESULTS/PLOTS	25
8. RADIATED SPURIOUS EMISSIONS	26
8.1 STANDARD APPLICABLE	26
8.2 TEST PROCEDURE	26
8.3 TEST RECEIVER SETUP	28
8.4 CORRECTED AMPLITUDE & MARGIN CALCULATION	28
8.5 SUMMARY OF TEST RESULTS/PLOTS	29
9. FREQUENCY STABILITY	71
9.1 STANDARD APPLICABLE	71
9.2 TEST PROCEDURE	71
9.3 SUMMARY OF TEST RESULTS/PLOTS	71
10 CONDUCTED EMISSIONS	72
10.1 TEST PROCEDURE	72
10.2 BASIC TEST SETUP BLOCK DIAGRAM	72
10.3 TEST RECEIVER SETUP	72
10.4 SUMMARY OF TEST RESULTS/PLOTS	72
APPENDIX SUMMARY	75
APPENDIX A	76
APPENDIX B	87
APPENDIX C	108
APPENDIX D	119

APPENDIX PHOTOGRAPHS 120

Report version

Version No.	Date of issue	Description
Rev.00	2025-01-04	Original
/	/	/

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

General Description of EUT	
Product Name:	HDMI Wireless Extender
Trade Name:	LENKENG
Model No.:	LKV488Mini-V2.0-TX
Adding Model(s):	LKV477Mini-V2.0-TX, LKV455Mini-V2.0-TX, LKV488TypeC-V2.0-TX, LKV477TypeC-V2.0-TX, LKV455TypeC-V2.0-TX
Rated Voltage:	DC5V
Battery Capacity:	/
Power Adapter:	/
<i>Note: The test data is gathered from a production sample, provided by the manufacturer. The appearance of others models listed in the report is different from main-test model LKV488Mini-V2.0-TX, but the circuit and the electronic construction do not change, declared 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
Max. RF Output Power:	Antenna 0: 15.89dBm (Conducted) Antenna 1: 16.17dBm (Conducted)
Type of Modulation:	QPSK, 16QAM, 64QAM, 256QAM
Type of Antenna:	FPC Antenna
Antenna Gain:	ANT 0:1.76dBi ANT 1:2.86dBi
<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.

KDB662911 D01 Multiple Transmitter Output v02r01: Emissions Testing of Transmitters with Multiple Outputs in the Same Band.

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

1.3 Test Methodology

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

1.4 Table for parameters of Test Software setting

Enter the fixed frequency using adb, 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											
	518 0	520 0	524 0									
802.11a 6Mbps	14	14	14									
802.11n-HT20 MCS0	13	13	13									
802.11ac-VHT2 0 MCS0	13	13	13									
Mode	NCB: 40MHz											
	5190	5230										
802.11n-HT40 MCS0	11	11										
802.11ac-VHT4 0 MCS0	11	11										

Mode	NCB: 80MHz					
	5210					
802.11ac-VHT8 0 MCS0/Nss2	11					

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, Bao'an District, Shenzhen, P.R.C. (518101)

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
TM2	802.11n-HT20/802.11ac-VHT20	5180MHz,5200MHz,5240MHz
TM3	802.11n-HT40/802.11ac-VHT40	5190MHz,5230MHz
TM4	802.11ac-VHT80	5210MHz
Note1 : All test modes (different data rate and different modulation) are performed, but only the worst case is recorded in this report. Note 2: The 5GHz WIFI has two antennas and support Multiple Outputs for 802.11n/ac mode for this report; Antenna 1 Gain is 1.76dBi; Antenna 2 Gain is 2.86dBi; According to KDB 662911, Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}]$ dBi=5.34dBi		

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
DC Cable	0.95	Unshielded	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
Notebook	ASUS	FA506IC	/
Displayer	Samsung	S32BG854NC	/
HDMI Wireless Extender	Lenkeng	LKV488Mini-V2.0-RX	/
HDMI Wireless Extender	Lenkeng	LKV488TypeC-V2.0-RX	/
HDMI Wireless Extender	Lenkeng	LKV477Mini-V2.0-RX	/
HDMI Wireless Extender	Lenkeng	LKV477TypeC-V2.0-RX	/
HDMI Wireless Extender	Lenkeng	LKV455Mini-V2.0-RX	/
HDMI Wireless Extender	Lenkeng	LKV455TypeC-V2.0-RX	/

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
					2025-01-03	2025-07-02
☐ 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	2024-12-08	2025-12-07
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 1037	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 two FPC antennas, 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 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.

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 1MHz RBW to satisfy directly the 1MHz 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 1MHz, 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 MHz, or < 500 kHz) and integrated over 1 MHz, or 500kHz bandwidth, the following adjustments to the procedures apply:

- a) Set $RBW \geq 1/T$, where T is defined in section II.B.I.a).
- b) Set $VBW \geq 3$ RBW.
- c) If measurement bandwidth of Maximum PSD is specified in 500kHz, add $10\log(500\text{kHz}/RBW)$ to the measured result, whereas RBW (< 500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
- d) If measurement bandwidth of Maximum PSD is specified in 1MHz, add $10\log(1\text{MHz}/RBW)$ to the measured result, whereas RBW (< 1 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 $RBW=100\text{kHz}$ 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 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.

(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 6dB emission bandwidth of at least 500kHz for the band 5.715-5.85GHz. 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 6 dB 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.: WTH24X10253629W001

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 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.

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 ≥ 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 1 MHz 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 75 MHz 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.

789033 D02 v02r01 General UNII Test Procedures New Rules v01

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.

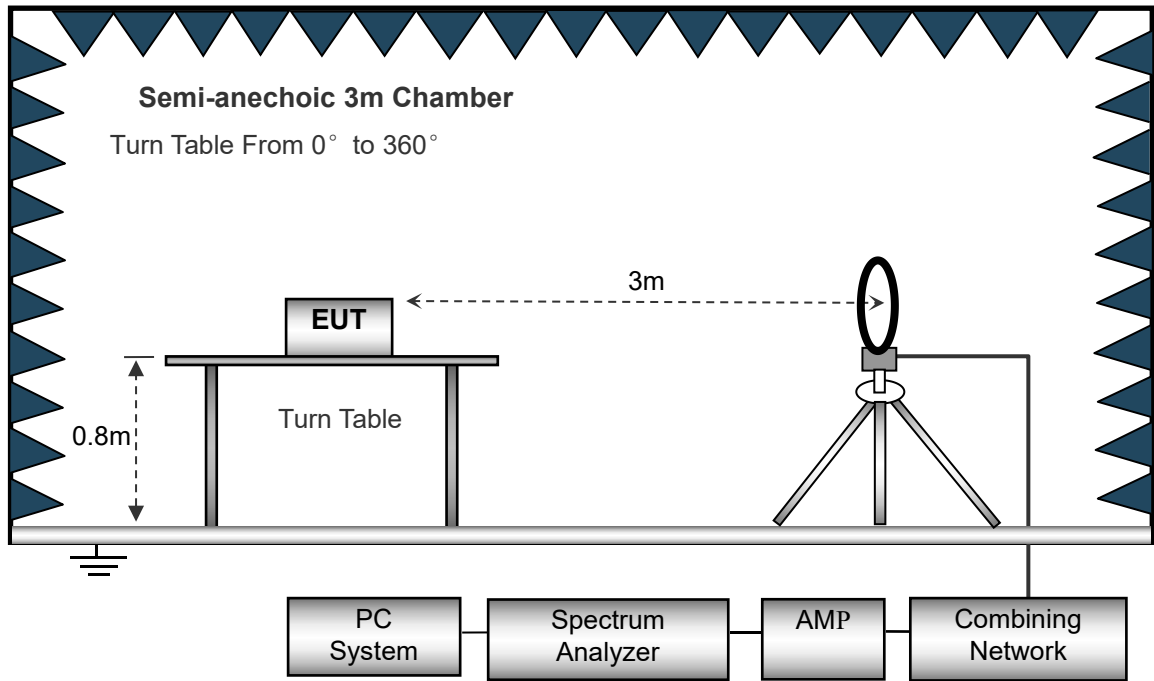
8.2 Test Procedure

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..

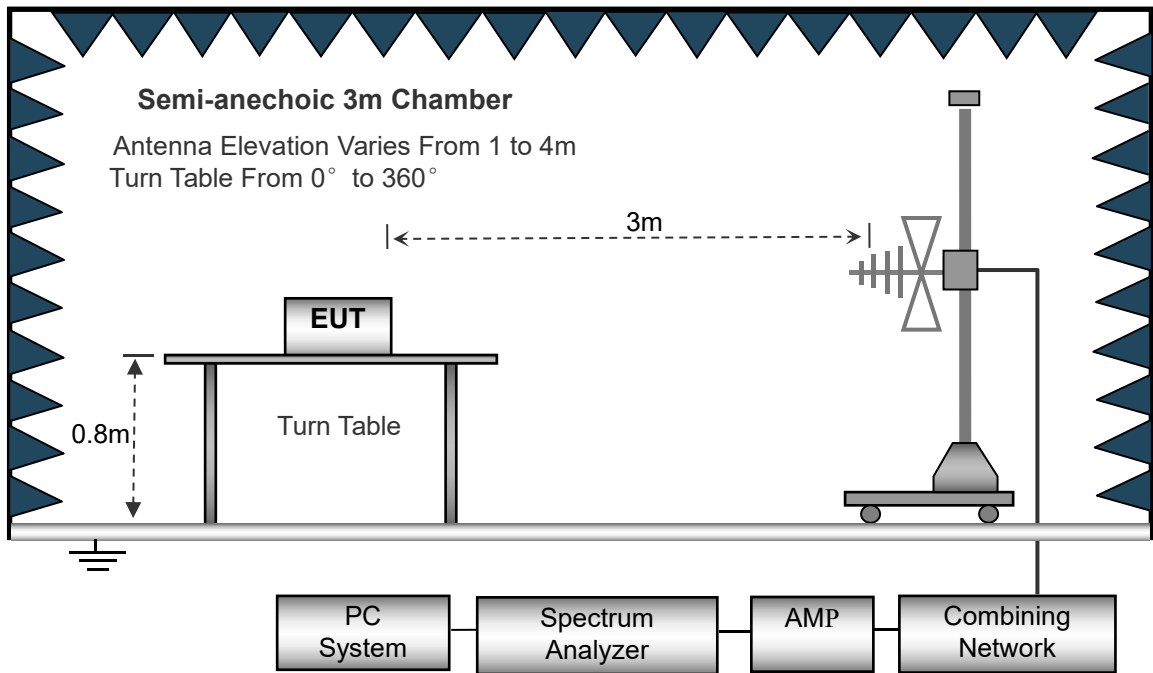
The external I/O cables were draped along the test table and formed a bundle 30 to 40cm long in the middle.

The spacing between the peripherals was 10cm.

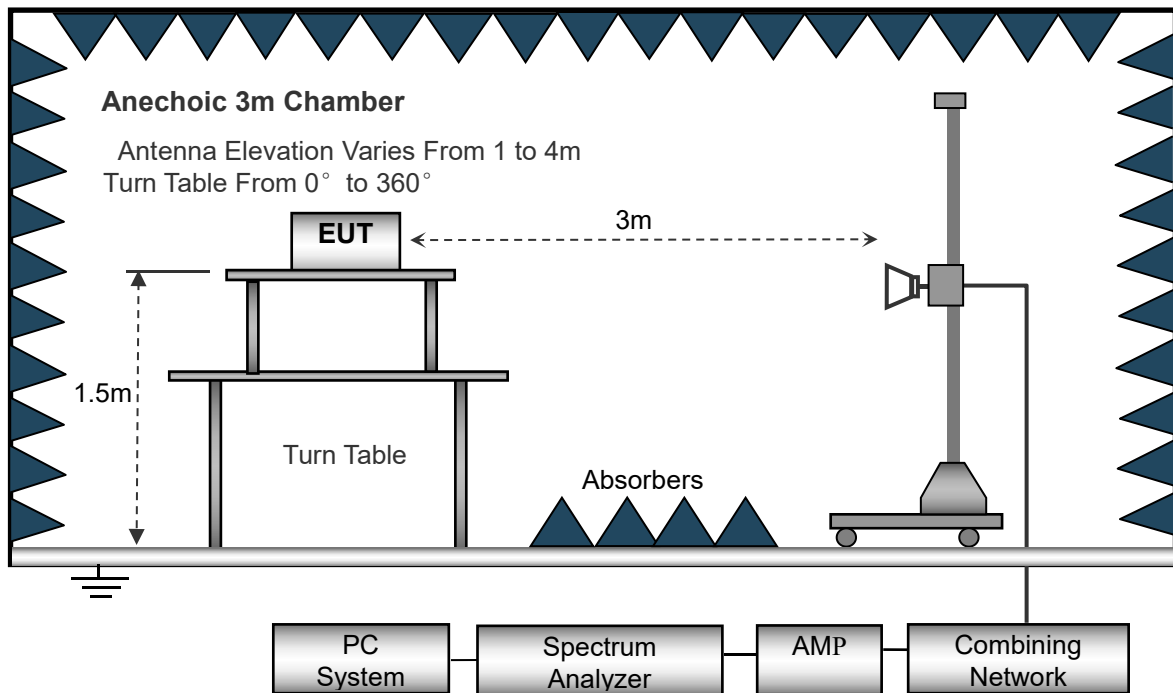
The test setup for emission measurement below 30MHz.



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



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:

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

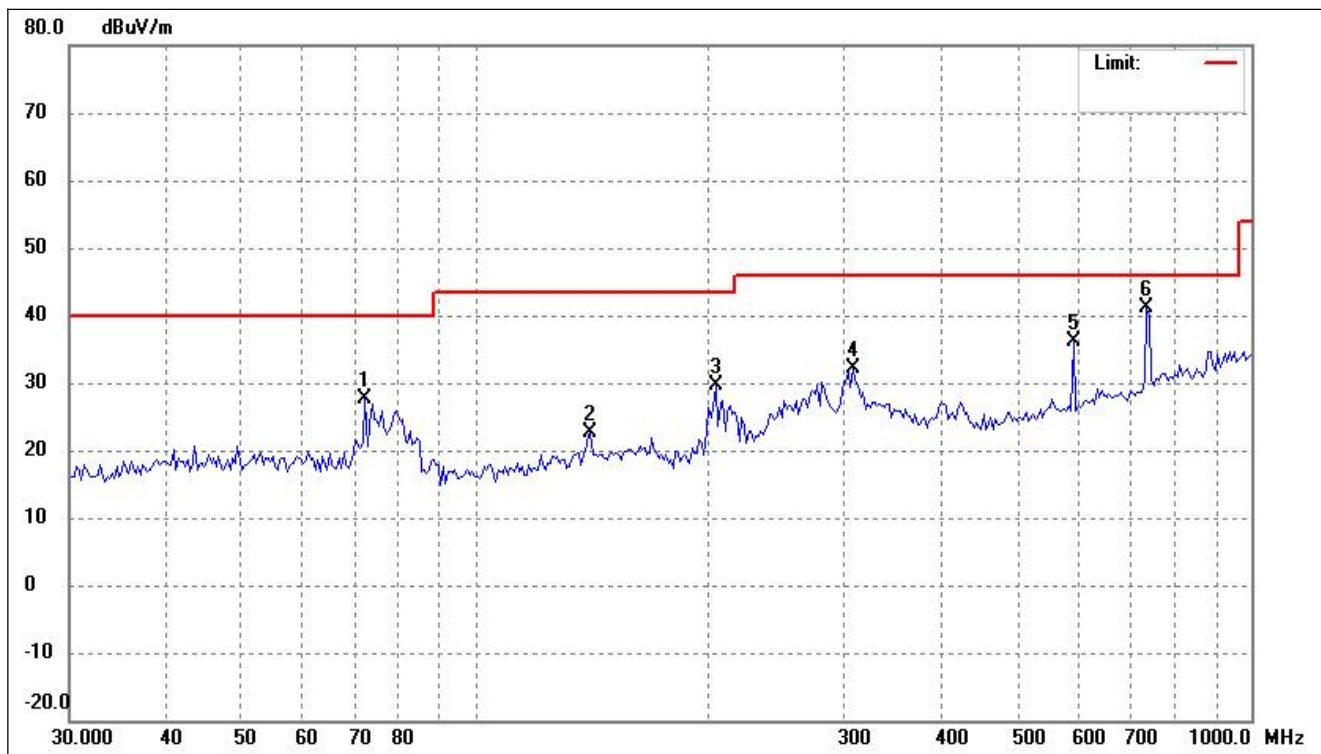
8.5 Summary of Test Results/Plots

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

- Spurious Emission From 30MHz to 1GHz
- Antenna 0(Worst case)
- 5150-5250MHz
- Model: LKV488Mini-V2.0-TX

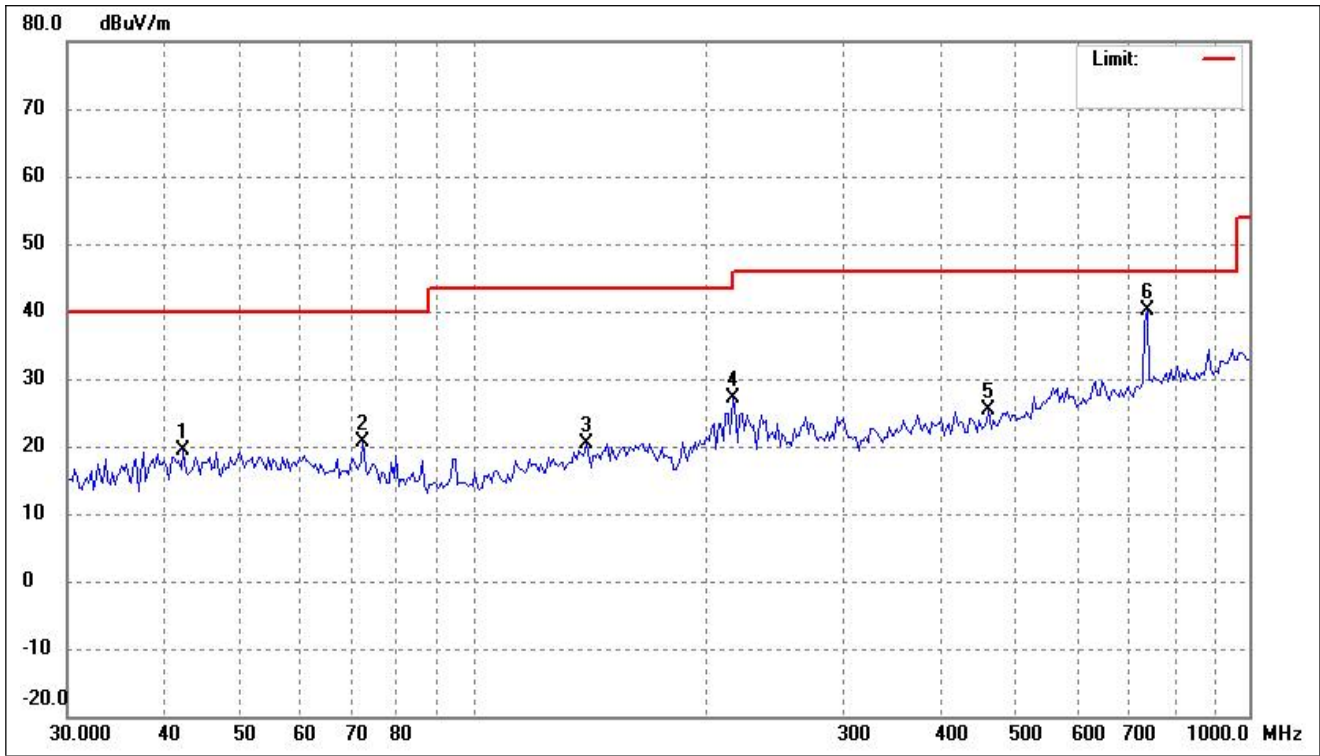
802.11a

Test Channel	5180MHz(Worst case)	Polarity:	Horizontal
--------------	---------------------	-----------	------------



No.	Frequency (MHz)	Reading (dBuV/m)	Corr. dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Deg. ()	Height (cm)	Remark
1	72.2111	38.31	-10.74	27.57	40.00	-12.43	-	-	peak
2	140.7767	31.35	-8.83	22.52	43.50	-20.98	-	-	peak
3	204.3052	41.22	-11.47	29.75	43.50	-13.75	-	-	peak
4	307.1053	39.91	-7.71	32.20	46.00	-13.80	-	-	peak
5	590.3511	38.60	-2.48	36.12	46.00	-9.88	-	-	peak
6	734.0373	41.45	-0.23	41.22	46.00	-4.78	-	-	peak

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



No.	Frequency (MHz)	Reading (dBuV/m)	Corr. dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Deg. ()	Height (cm)	Remark
1	42.3314	27.39	-7.96	19.43	40.00	-20.57	-	-	peak
2	72.2111	31.28	-10.74	20.54	40.00	-19.46	-	-	peak
3	139.7909	29.35	-8.90	20.45	43.50	-23.05	-	-	peak
4	216.1197	38.64	-11.55	27.09	46.00	-18.91	-	-	peak
5	461.6313	30.37	-5.09	25.28	46.00	-20.72	-	-	peak
6	739.2136	40.24	-0.09	40.15	46.00	-5.85	-	-	peak

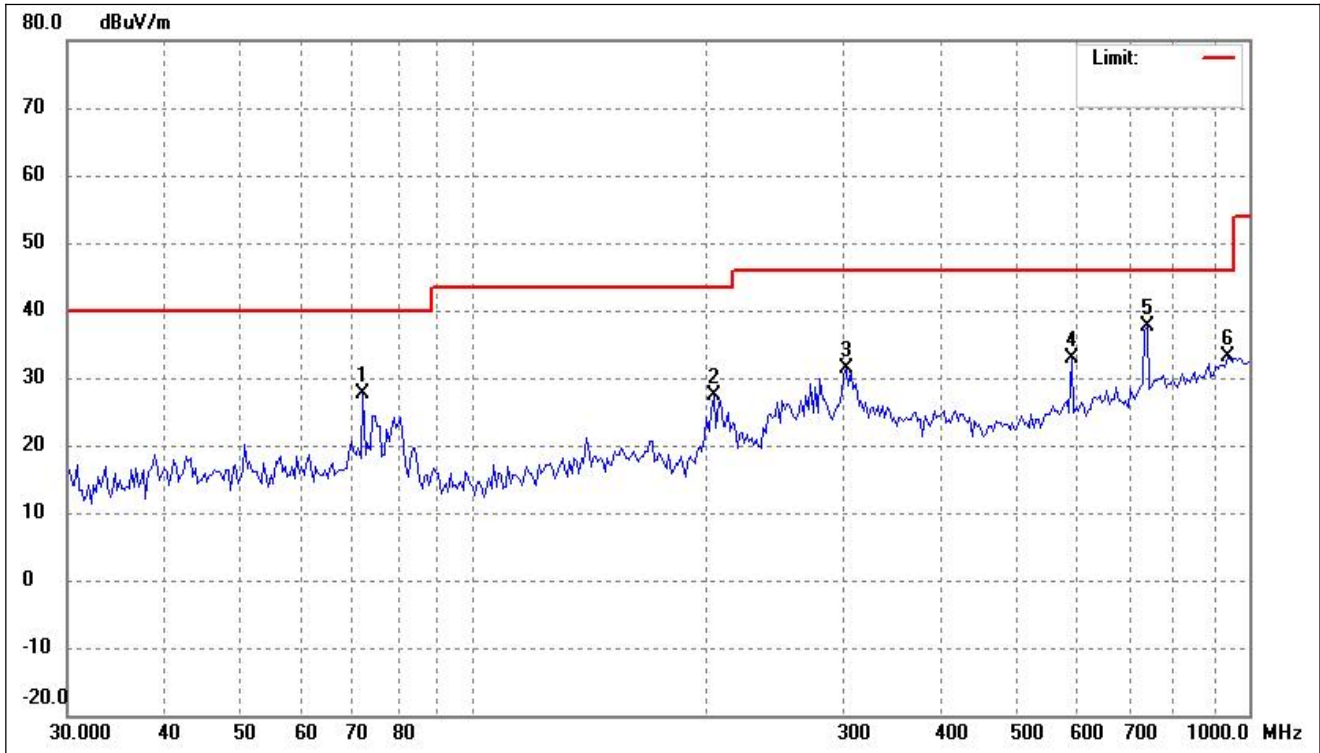
802.11n-HT20

Test Channel

5180MHz(worst case)

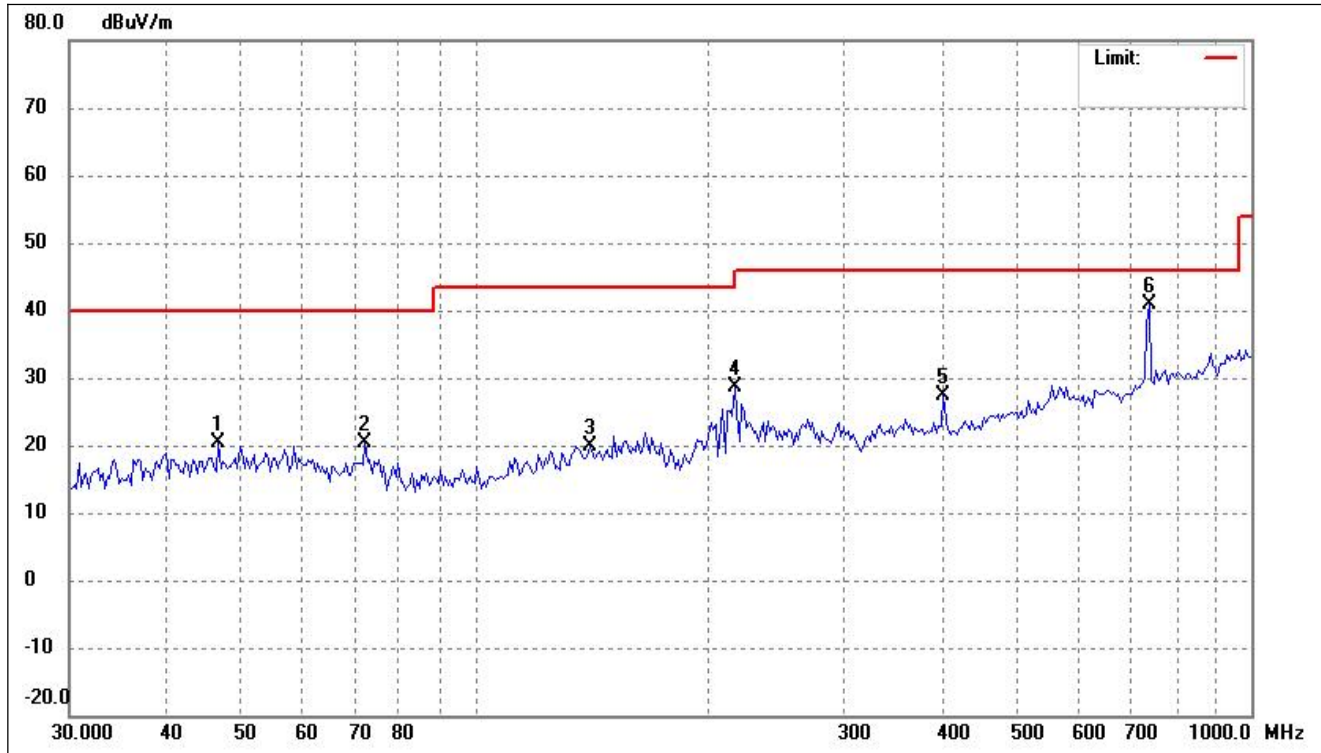
Polarity:

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Corr. dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Deg. ()	Height (cm)	Remark
1	72.2111	38.38	-10.74	27.64	40.00	-12.36	-	-	peak
2	204.3052	38.73	-11.47	27.26	43.50	-16.24	-	-	peak
3	302.8193	39.12	-7.80	31.32	46.00	-14.68	-	-	peak
4	590.3511	35.38	-2.48	32.90	46.00	-13.10	-	-	peak
5	739.2136	37.71	-0.09	37.62	46.00	-8.38	-	-	peak
6	938.7139	30.03	3.03	33.06	46.00	-12.94	-	-	peak

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



No.	Frequency (MHz)	Reading (dBuV/m)	Corr. dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Deg. ()	Height (cm)	Remark
1	46.7077	28.11	-7.83	20.28	40.00	-19.72	-	-	peak
2	72.2111	31.00	-10.74	20.26	40.00	-19.74	-	-	peak
3	140.7767	28.78	-8.83	19.95	43.50	-23.55	-	-	peak
4	216.1197	40.29	-11.55	28.74	46.00	-17.26	-	-	peak
5	401.1050	33.67	-6.24	27.43	46.00	-18.57	-	-	peak
6	739.2136	40.95	-0.09	40.86	46.00	-5.14	-	-	peak

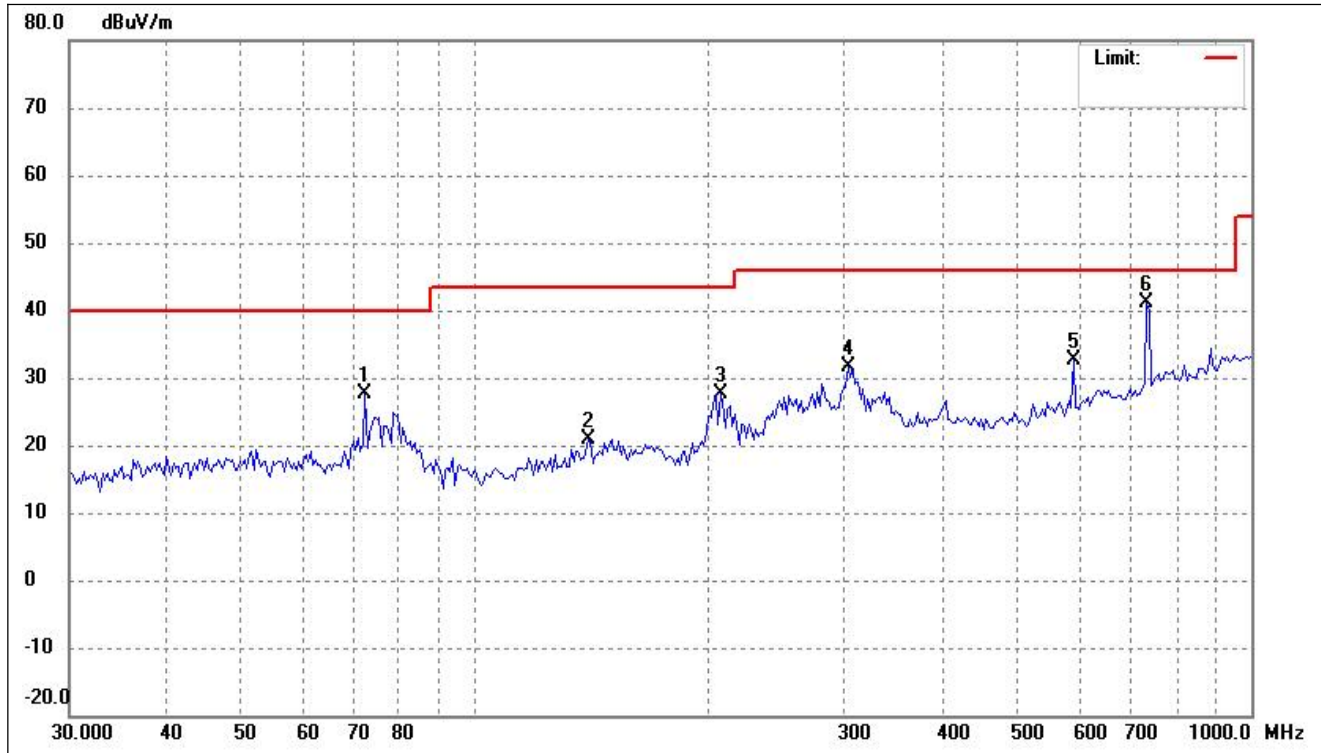
802.11ac-VHT20

Test Channel

5180MHz(worst case)

Polarity:

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Corr. dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Deg. ()	Height (cm)	Remark
1	72.2111	38.44	-10.74	27.70	40.00	-12.30	-	-	peak
2	139.7909	29.75	-8.90	20.85	43.50	-22.65	-	-	peak
3	207.1968	39.26	-11.55	27.71	43.50	-15.79	-	-	peak
4	302.8193	39.34	-7.80	31.54	46.00	-14.46	-	-	peak
5	590.3511	35.14	-2.48	32.66	46.00	-13.34	-	-	peak
6	734.0373	41.27	-0.23	41.04	46.00	-4.96	-	-	peak

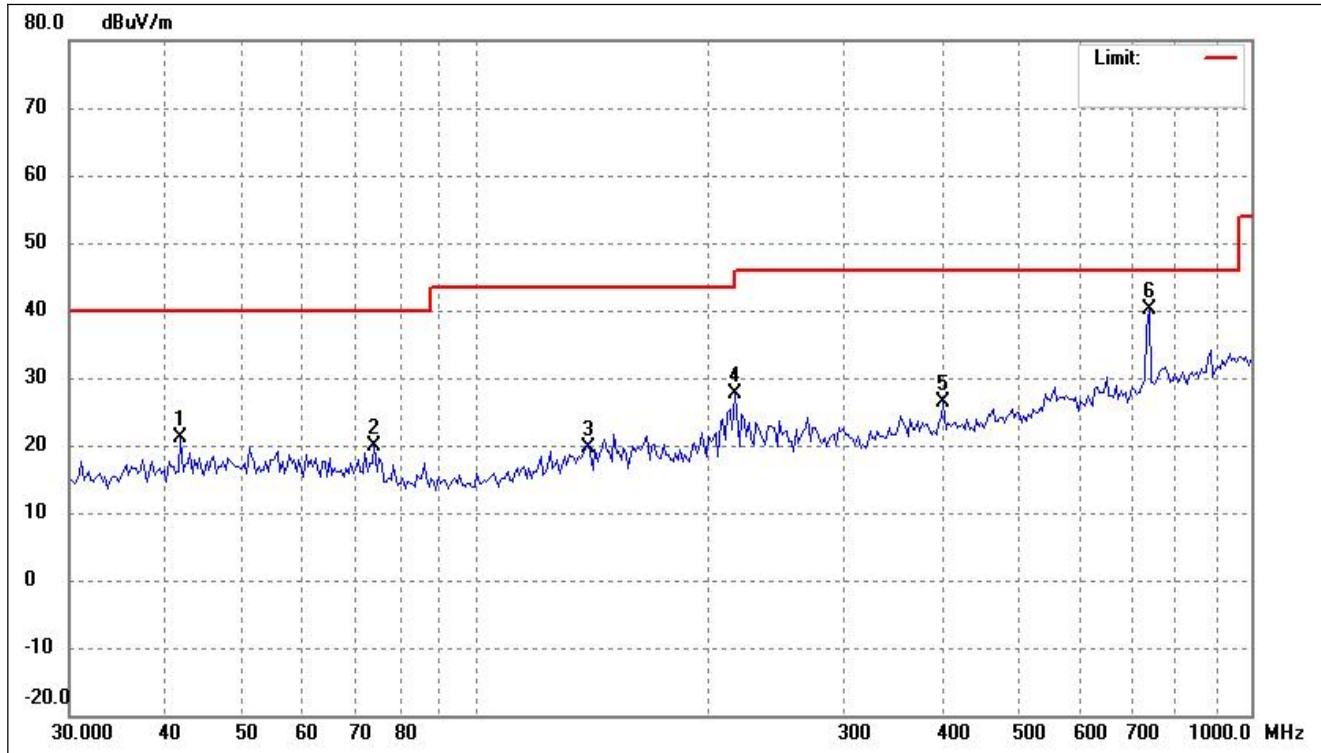
802.11ac-VHT20

Test Channel

5180MHz(worst case)

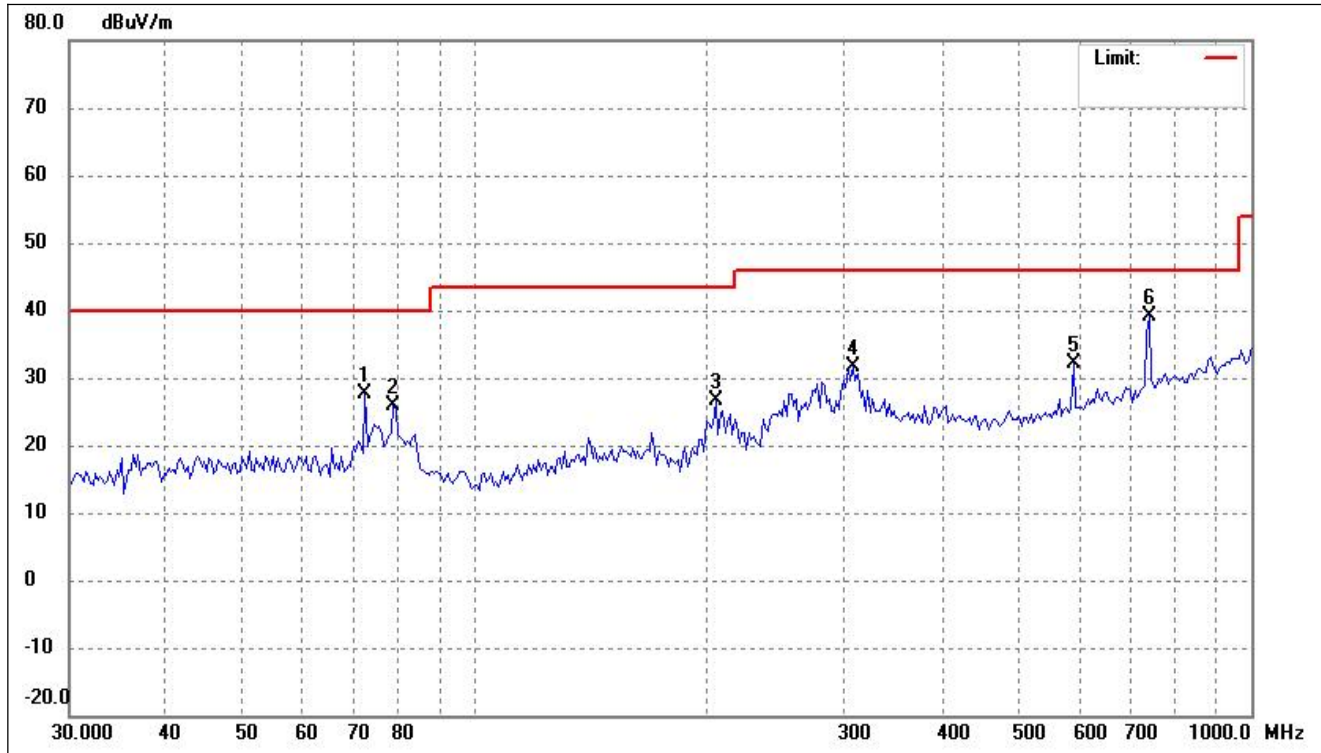
Polarity:

Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Corr. dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Deg. ()	Height (cm)	Remark
1	41.7406	29.01	-7.95	21.06	40.00	-18.94	-	-	peak
2	74.2696	31.03	-11.18	19.85	40.00	-20.15	-	-	peak
3	138.8120	28.53	-8.95	19.58	43.50	-23.92	-	-	peak
4	216.1197	39.06	-11.55	27.51	46.00	-18.49	-	-	peak
5	401.1050	32.51	-6.24	26.27	46.00	-19.73	-	-	peak
6	739.2136	40.22	-0.09	40.13	46.00	-5.87	-	-	peak

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



No.	Frequency (MHz)	Reading (dBuV/m)	Corr. dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Deg. ()	Height (cm)	Remark
1	72.2111	38.48	-10.74	27.74	40.00	-12.26	-	-	peak
2	78.5645	37.97	-12.13	25.84	40.00	-14.16	-	-	peak
3	204.3052	38.18	-11.47	26.71	43.50	-16.79	-	-	peak
4	307.1053	39.45	-7.71	31.74	46.00	-14.26	-	-	peak
5	590.3511	34.50	-2.48	32.02	46.00	-13.98	-	-	peak
6	739.2136	39.17	-0.09	39.08	46.00	-6.92	-	-	peak

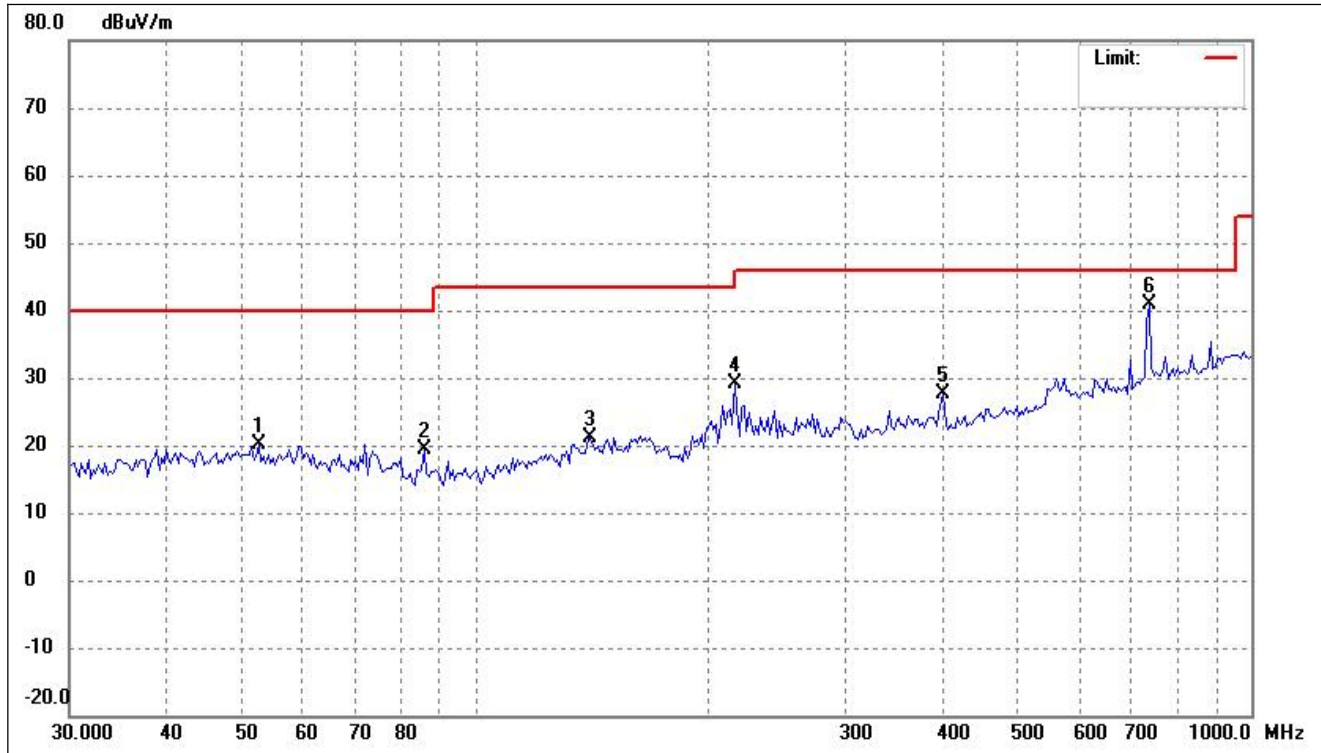
802.11n-HT40

Test Channel

5190MHz(worst case)

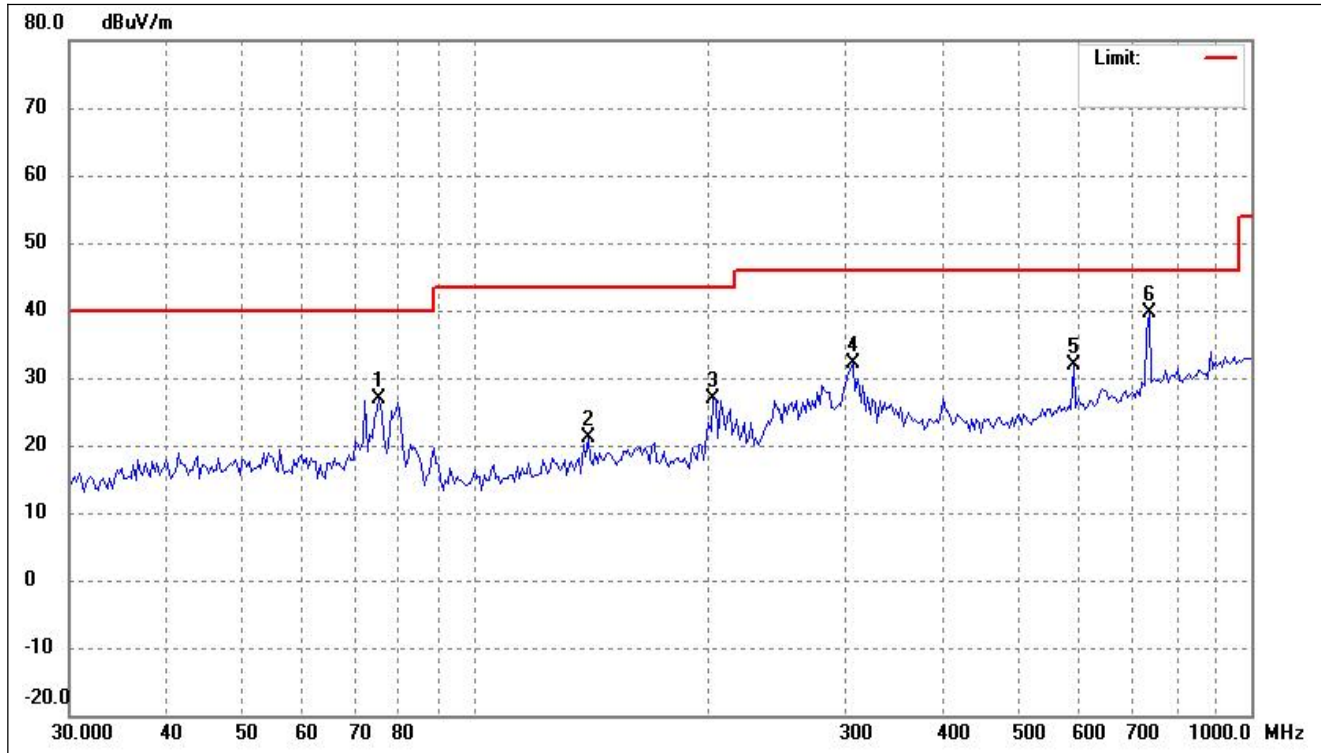
Polarity:

Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Corr. dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Deg. ()	Height (cm)	Remark
1	52.6345	27.88	-7.87	20.01	40.00	-19.99	-	-	peak
2	86.0796	31.90	-12.53	19.37	40.00	-20.63	-	-	peak
3	140.7767	30.07	-8.83	21.24	43.50	-22.26	-	-	peak
4	216.1197	40.72	-11.55	29.17	46.00	-16.83	-	-	peak
5	401.1050	33.98	-6.24	27.74	46.00	-18.26	-	-	peak
6	739.2136	40.95	-0.09	40.86	46.00	-5.14	-	-	peak

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



No.	Frequency (MHz)	Reading (dBuV/m)	Corr. dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Deg. ()	Height (cm)	Remark
1	75.3208	38.36	-11.42	26.94	40.00	-13.06	-	-	peak
2	139.7909	30.11	-8.90	21.21	43.50	-22.29	-	-	peak
3	202.8745	38.29	-11.44	26.85	43.50	-16.65	-	-	peak
4	307.1053	39.72	-7.71	32.01	46.00	-13.99	-	-	peak
5	590.3511	34.40	-2.48	31.92	46.00	-14.08	-	-	peak
6	739.2136	39.75	-0.09	39.66	46.00	-6.34	-	-	peak

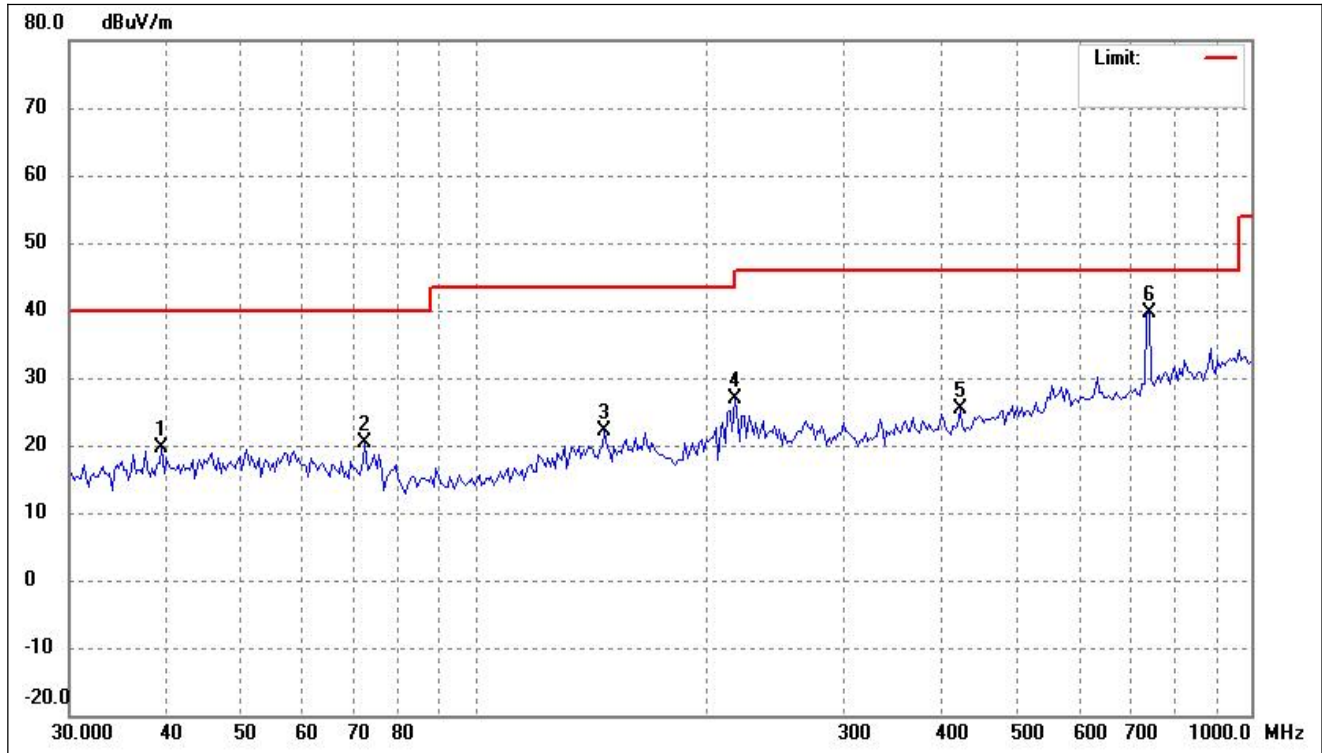
802.11ac-VHT40

Test Channel

5190MHz(worst case)

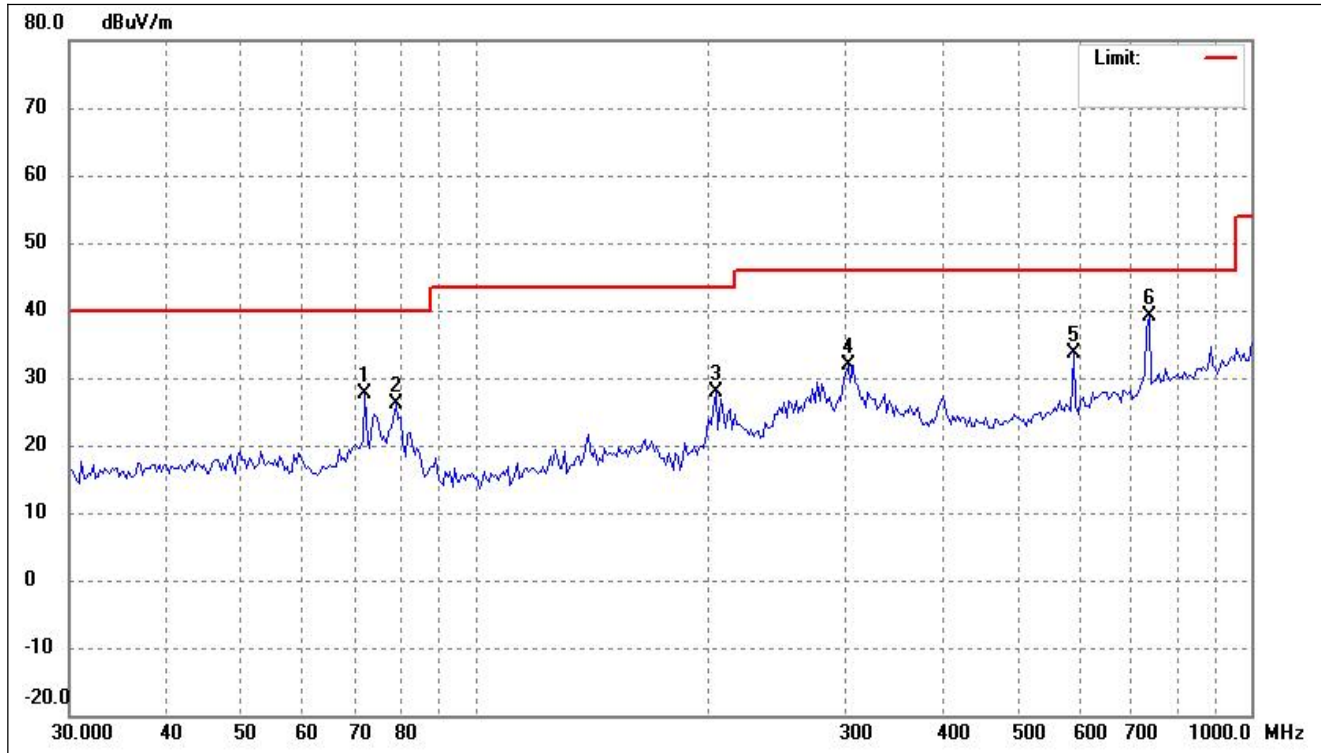
Polarity:

Vertical



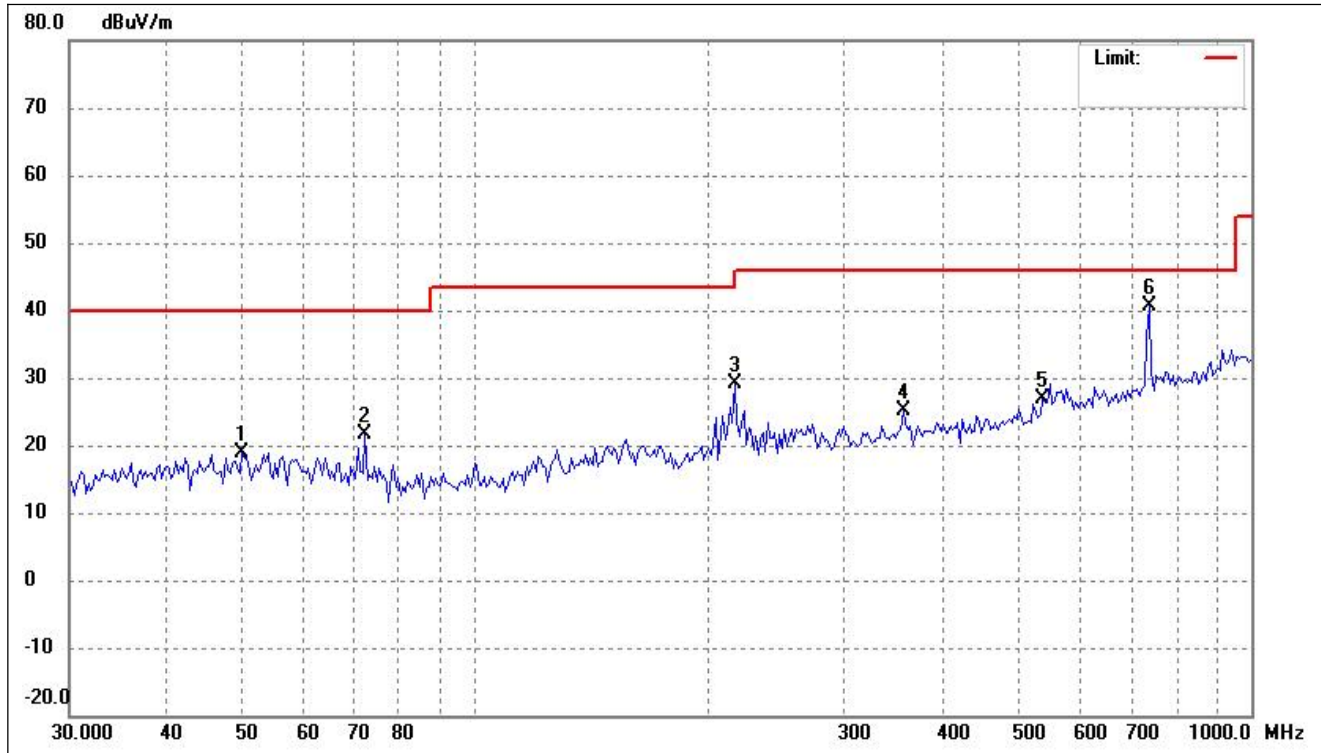
No.	Frequency (MHz)	Reading (dBuV/m)	Corr. dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Deg. ()	Height (cm)	Remark
1	39.4588	27.65	-8.07	19.58	40.00	-20.42	-	-	peak
2	72.2111	31.17	-10.74	20.43	40.00	-19.57	-	-	peak
3	146.8392	30.54	-8.31	22.23	43.50	-21.27	-	-	peak
4	216.1197	38.34	-11.55	26.79	46.00	-19.21	-	-	peak
5	421.3287	31.13	-5.81	25.32	46.00	-20.68	-	-	peak
6	739.2136	39.78	-0.09	39.69	46.00	-6.31	-	-	peak

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



No.	Frequency (MHz)	Reading (dBuV/m)	Corr. dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Deg. ()	Height (cm)	Remark
1	72.2111	38.49	-10.74	27.75	40.00	-12.25	-	-	peak
2	79.1185	38.39	-12.25	26.14	40.00	-13.86	-	-	peak
3	204.3052	39.46	-11.47	27.99	43.50	-15.51	-	-	peak
4	302.8193	39.66	-7.80	31.86	46.00	-14.14	-	-	peak
5	590.3511	36.11	-2.48	33.63	46.00	-12.37	-	-	peak
6	739.2136	39.23	-0.09	39.14	46.00	-6.86	-	-	peak

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

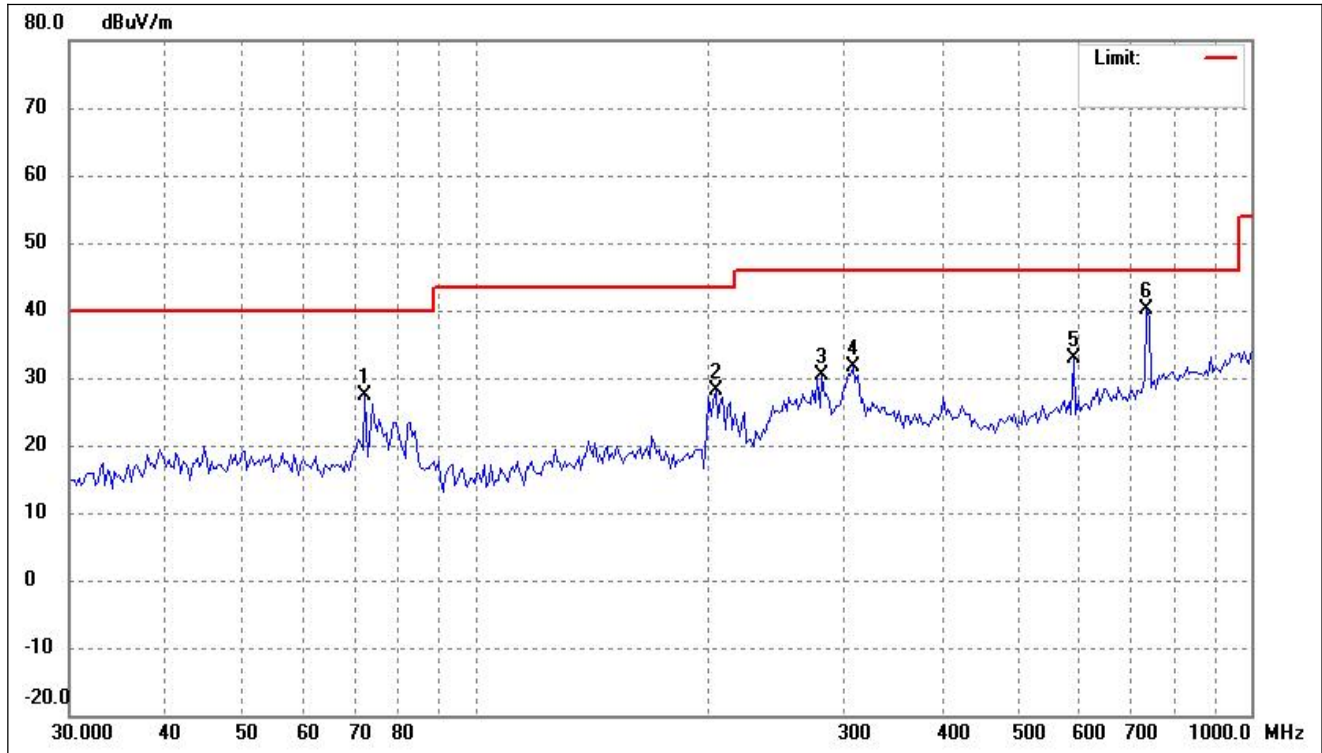


No.	Frequency (MHz)	Reading (dBuV/m)	Corr. dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Deg. ()	Height (cm)	Remark
1	50.1080	26.59	-7.59	19.00	40.00	-21.00	-	-	peak
2	72.2111	32.40	-10.74	21.66	40.00	-18.34	-	-	peak
3	216.1197	40.77	-11.55	29.22	46.00	-16.78	-	-	peak
4	355.9397	32.18	-6.95	25.23	46.00	-20.77	-	-	peak
5	538.8107	30.66	-3.90	26.76	46.00	-19.24	-	-	peak
6	739.2136	40.61	-0.09	40.52	46.00	-5.48	-	-	peak

➤ Model: LKV488TypeC-V2.0-TX

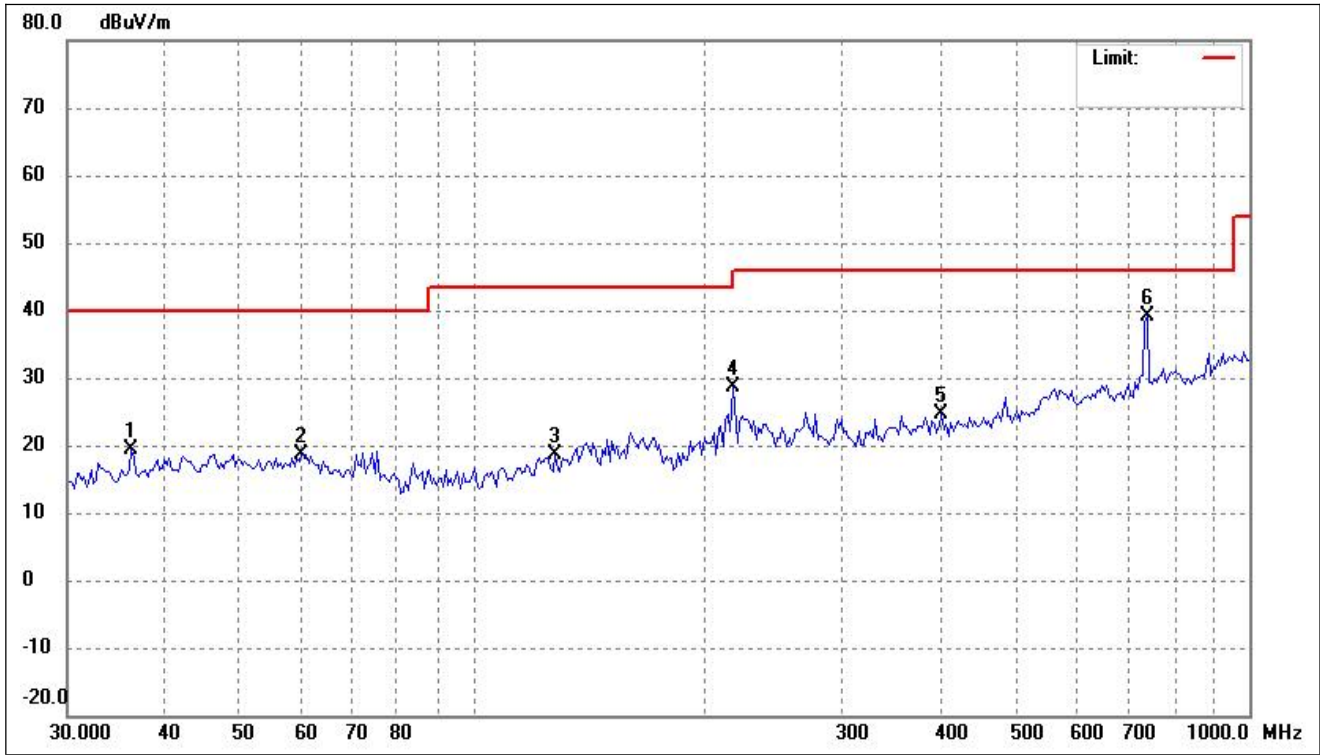
802.11a

Test Channel	5180MHz(Worst case)	Polarity:	Horizontal
--------------	---------------------	-----------	------------



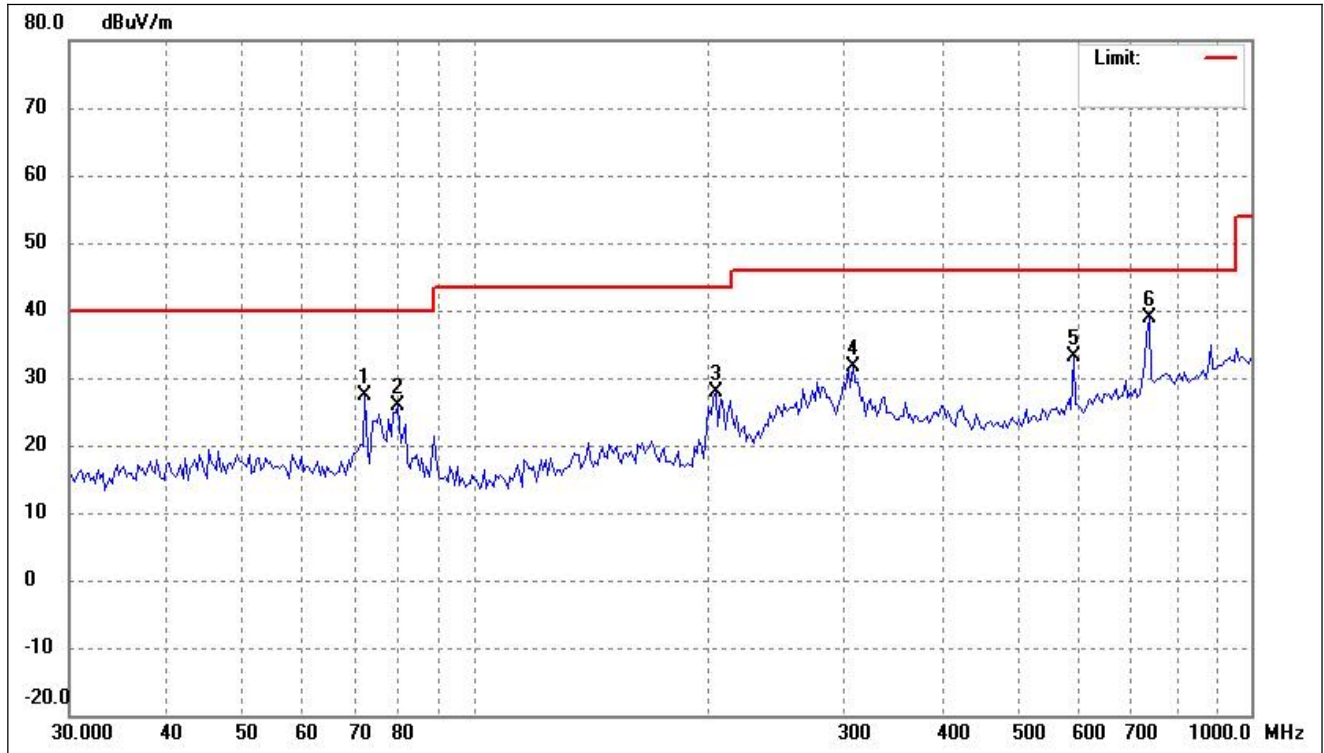
No.	Frequency (MHz)	Reading (dBuV/m)	Corr. dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Deg. ()	Height (cm)	Remark
1	72.2111	38.24	-10.74	27.50	40.00	-12.50	-	-	peak
2	204.3052	39.61	-11.47	28.14	43.50	-15.36	-	-	peak
3	280.2936	38.97	-8.49	30.48	46.00	-15.52	-	-	peak
4	307.1053	39.40	-7.71	31.69	46.00	-14.31	-	-	peak
5	590.3511	35.36	-2.48	32.88	46.00	-13.12	-	-	peak
6	734.0373	40.43	-0.23	40.20	46.00	-5.80	-	-	peak

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



No.	Frequency (MHz)	Reading (dBuV/m)	Corr. dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Deg. ()	Height (cm)	Remark
1	36.2678	28.22	-8.75	19.47	40.00	-20.53	-	-	peak
2	60.1528	27.17	-8.46	18.71	40.00	-21.29	-	-	peak
3	127.5865	28.15	-9.48	18.67	43.50	-24.83	-	-	peak
4	216.1197	40.07	-11.55	28.52	46.00	-17.48	-	-	peak
5	401.1050	30.83	-6.24	24.59	46.00	-21.41	-	-	peak
6	739.2136	39.16	-0.09	39.07	46.00	-6.93	-	-	peak

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



No.	Frequency (MHz)	Reading (dBuV/m)	Corr. dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Deg. ()	Height (cm)	Remark
1	72.2111	38.01	-10.74	27.27	40.00	-12.73	-	-	peak
2	79.6764	38.24	-12.36	25.88	40.00	-14.12	-	-	peak
3	204.3052	39.32	-11.47	27.85	43.50	-15.65	-	-	peak
4	307.1053	39.46	-7.71	31.75	46.00	-14.25	-	-	peak
5	590.3511	35.64	-2.48	33.16	46.00	-12.84	-	-	peak
6	739.2136	39.09	-0.09	39.00	46.00	-7.00	-	-	peak

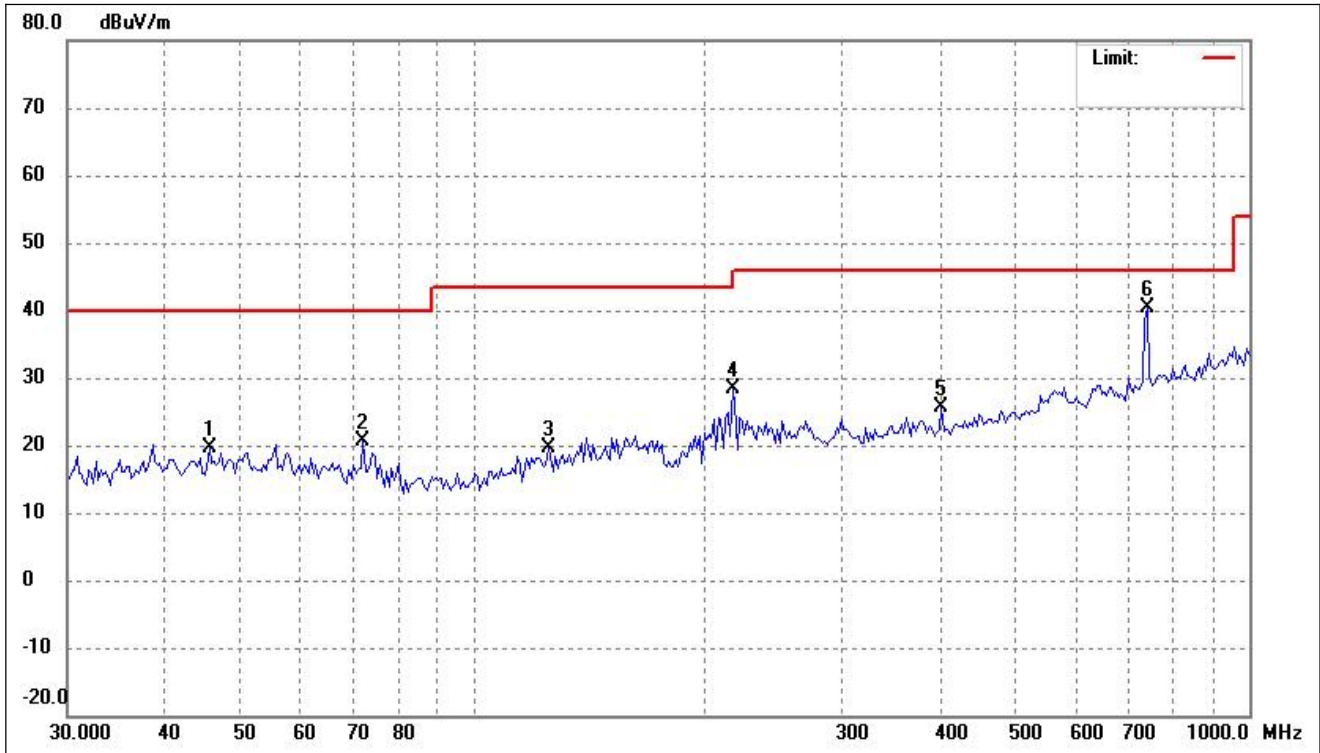
802.11n-HT20

Test Channel

5180MHz(worst case)

Polarity:

Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Corr. dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Deg. ()	Height (cm)	Remark
1	45.7333	27.62	-7.90	19.72	40.00	-20.28	-	-	peak
2	72.2111	31.39	-10.74	20.65	40.00	-19.35	-	-	peak
3	124.9249	29.27	-9.67	19.60	43.50	-23.90	-	-	peak
4	216.1197	40.00	-11.55	28.45	46.00	-17.55	-	-	peak
5	401.1050	31.81	-6.24	25.57	46.00	-20.43	-	-	peak
6	739.2136	40.40	-0.09	40.31	46.00	-5.69	-	-	peak

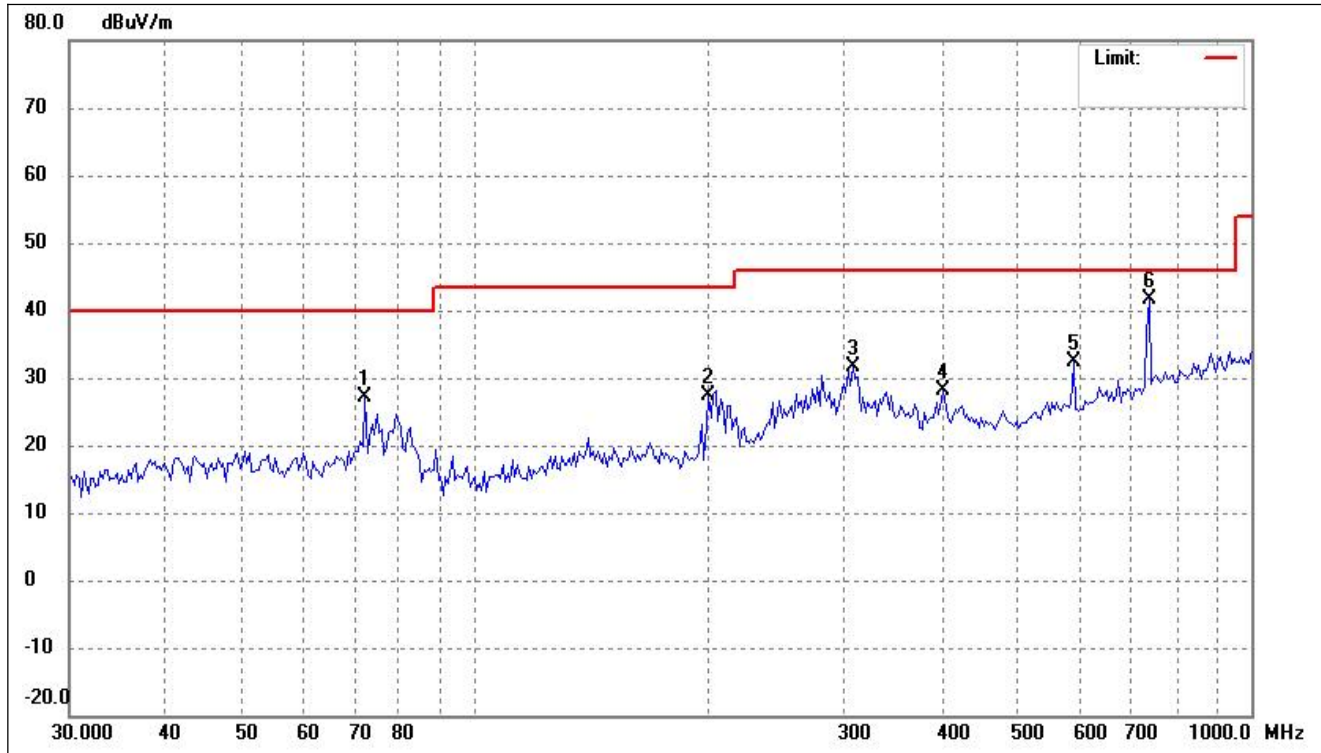
802.11ac-VHT20

Test Channel

5180MHz(worst case)

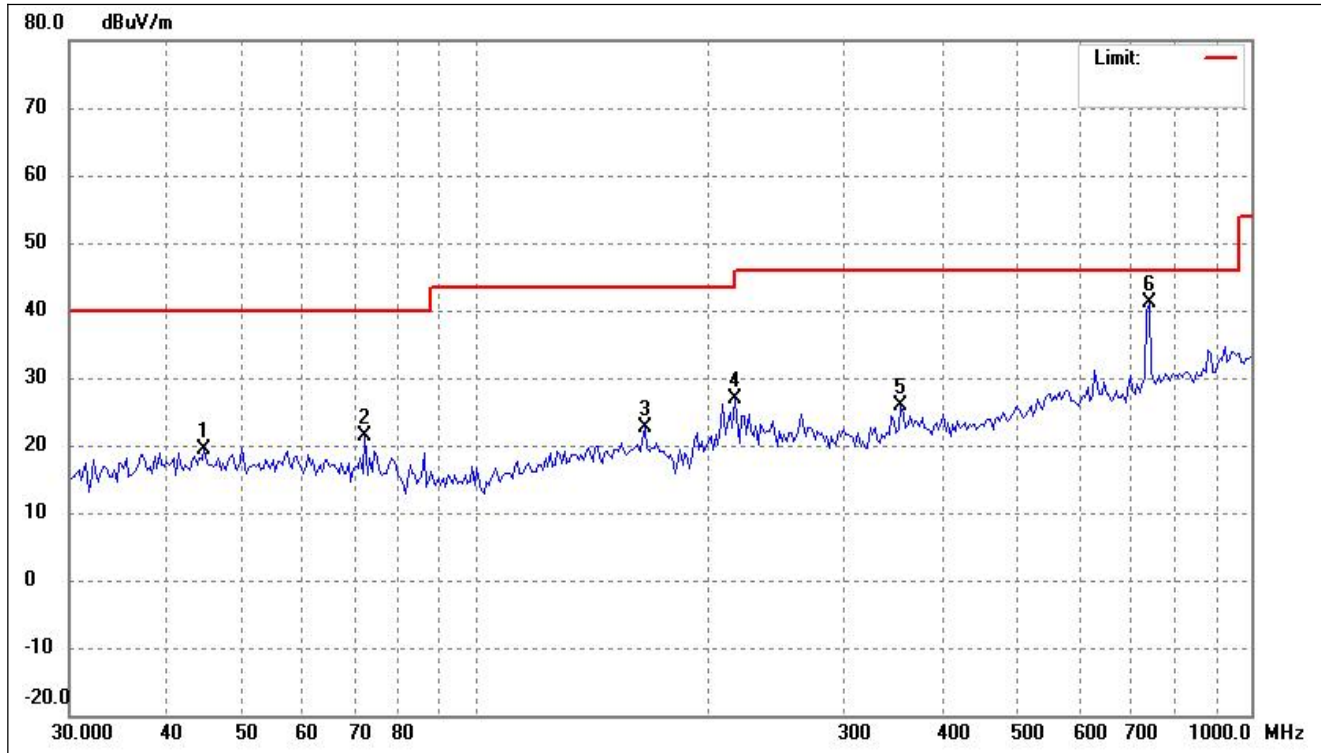
Polarity:

Horizontal



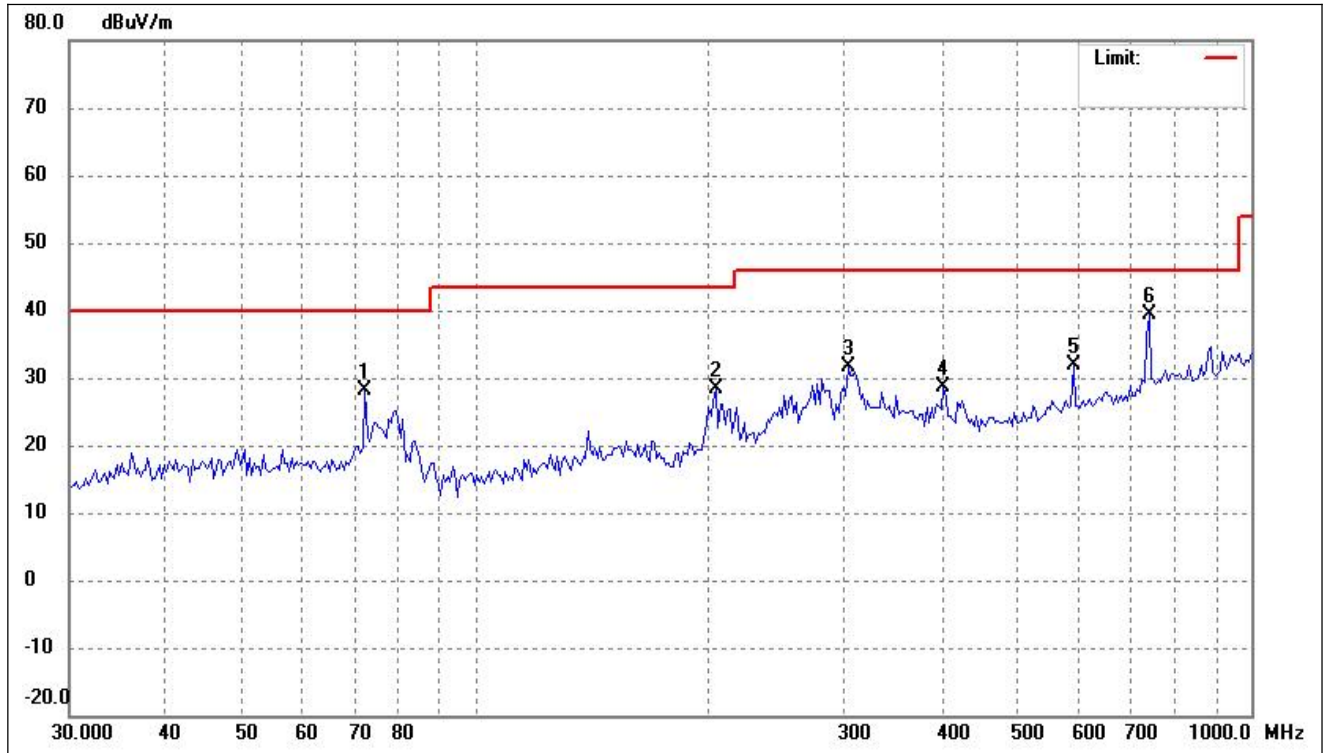
No.	Frequency (MHz)	Reading (dBuV/m)	Corr. dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Deg. ()	Height (cm)	Remark
1	72.2111	37.83	-10.74	27.09	40.00	-12.91	-	-	peak
2	200.0432	38.72	-11.38	27.34	43.50	-16.16	-	-	peak
3	307.1053	39.35	-7.71	31.64	46.00	-14.36	-	-	peak
4	401.1050	34.34	-6.24	28.10	46.00	-17.90	-	-	peak
5	590.3511	34.81	-2.48	32.33	46.00	-13.67	-	-	peak
6	739.2136	41.79	-0.09	41.70	46.00	-4.30	-	-	peak

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



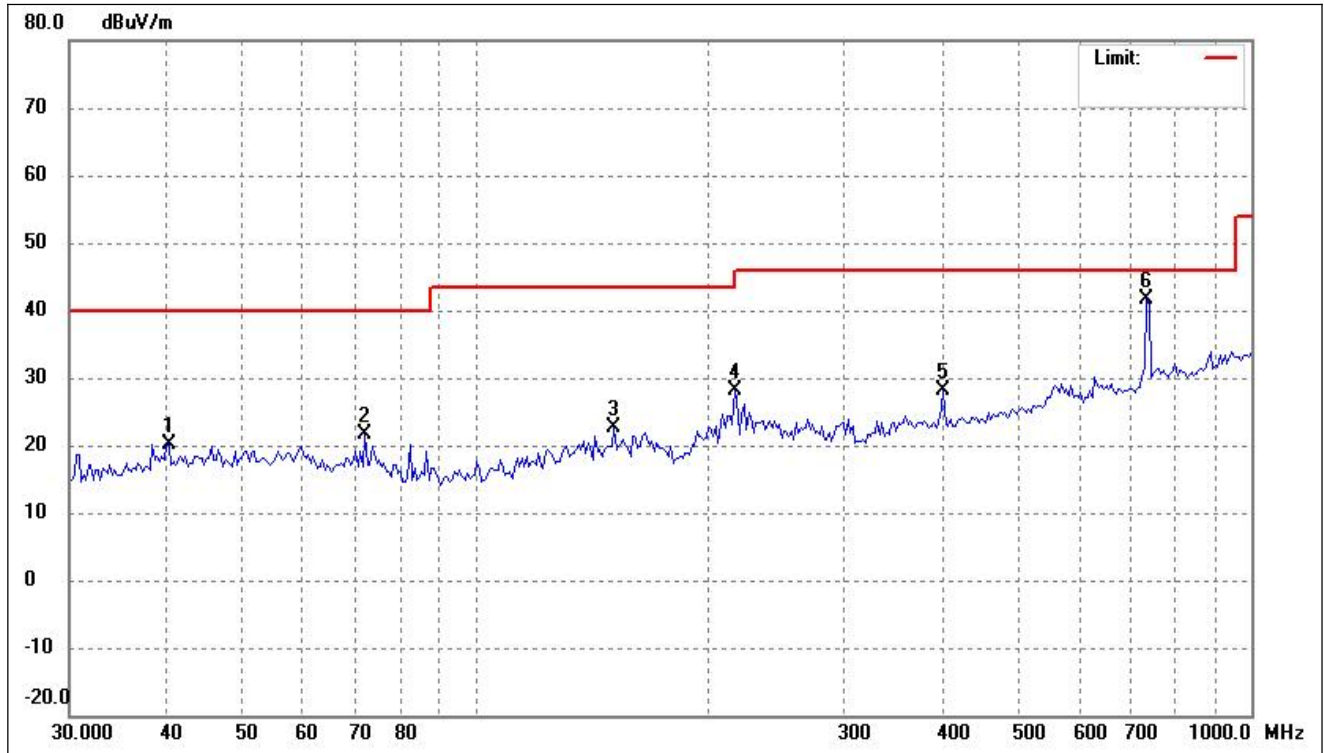
No.	Frequency (MHz)	Reading (dBuV/m)	Corr. dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Deg. ()	Height (cm)	Remark
1	44.7793	27.35	-7.96	19.39	40.00	-20.61	-	-	peak
2	72.2111	32.20	-10.74	21.46	40.00	-18.54	-	-	peak
3	165.4716	30.76	-8.19	22.57	43.50	-20.93	-	-	peak
4	216.1197	38.47	-11.55	26.92	46.00	-19.08	-	-	peak
5	353.4472	32.85	-7.00	25.85	46.00	-20.15	-	-	peak
6	739.2136	41.18	-0.09	41.09	46.00	-4.91	-	-	peak

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



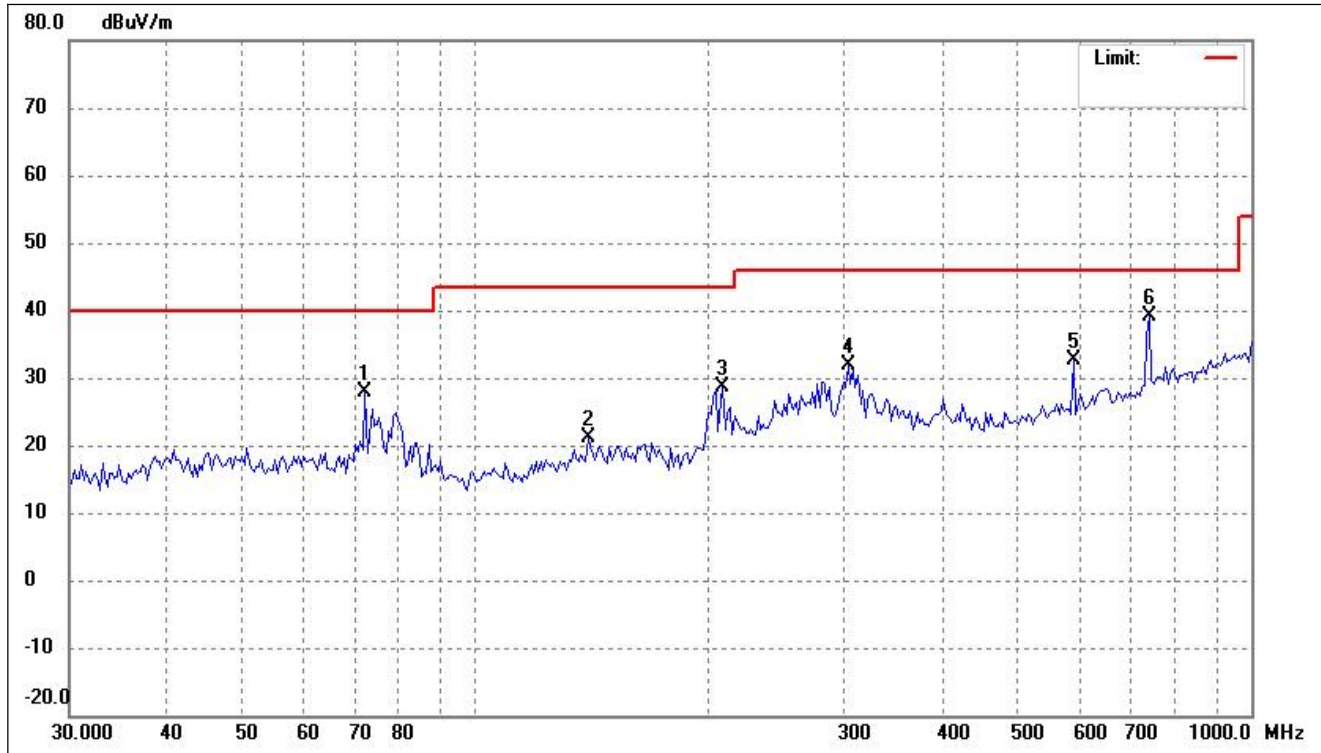
No.	Frequency (MHz)	Reading (dBuV/m)	Corr. dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Deg. ()	Height (cm)	Remark
1	72.2111	38.75	-10.74	28.01	40.00	-11.99	-	-	peak
2	204.3052	39.96	-11.47	28.49	43.50	-15.01	-	-	peak
3	302.8193	39.32	-7.80	31.52	46.00	-14.48	-	-	peak
4	401.1050	34.77	-6.24	28.53	46.00	-17.47	-	-	peak
5	590.3511	34.34	-2.48	31.86	46.00	-14.14	-	-	peak
6	739.2136	39.38	-0.09	39.29	46.00	-6.71	-	-	peak

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



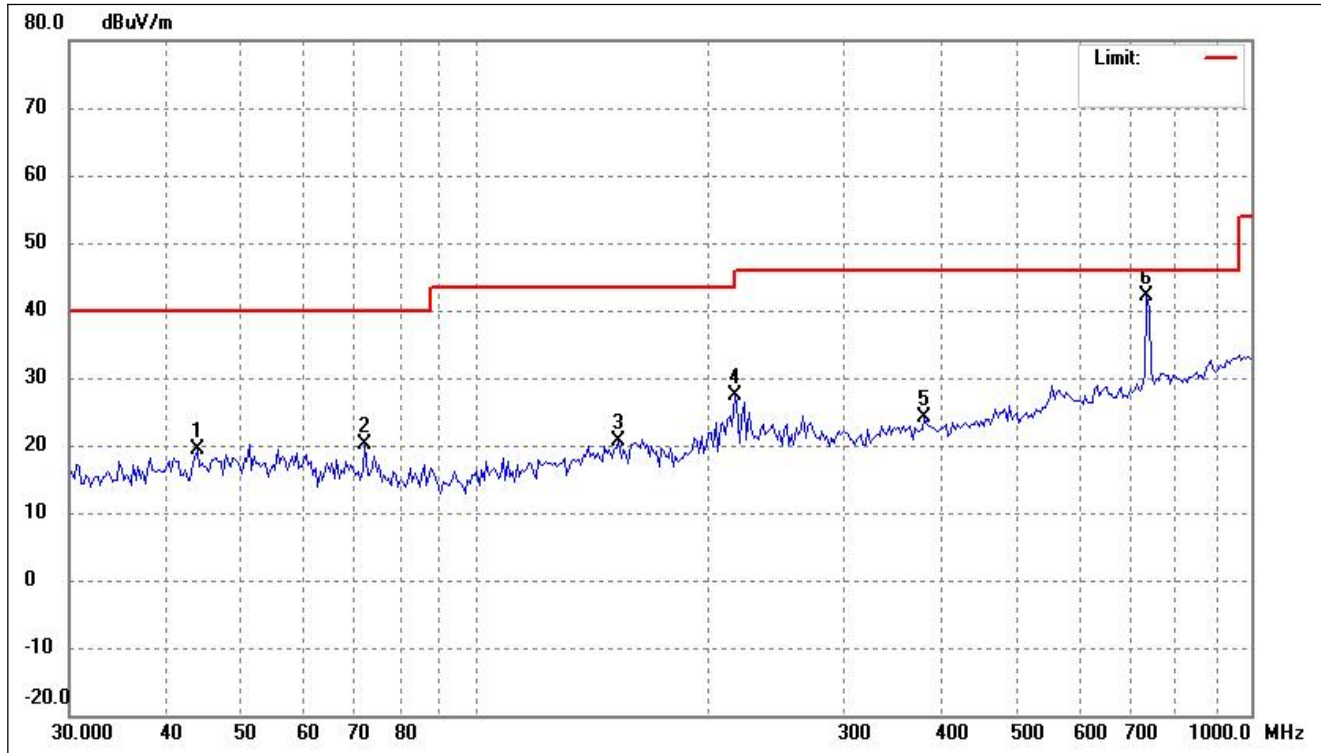
No.	Frequency (MHz)	Reading (dBuV/m)	Corr. dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Deg. ()	Height (cm)	Remark
1	40.2995	28.02	-7.96	20.06	40.00	-19.94	-	-	peak
2	72.2111	32.44	-10.74	21.70	40.00	-18.30	-	-	peak
3	151.0252	30.79	-8.05	22.74	43.50	-20.76	-	-	peak
4	216.1197	39.76	-11.55	28.21	46.00	-17.79	-	-	peak
5	401.1050	34.41	-6.24	28.17	46.00	-17.83	-	-	peak
6	734.0373	41.78	-0.23	41.55	46.00	-4.45	-	-	peak

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



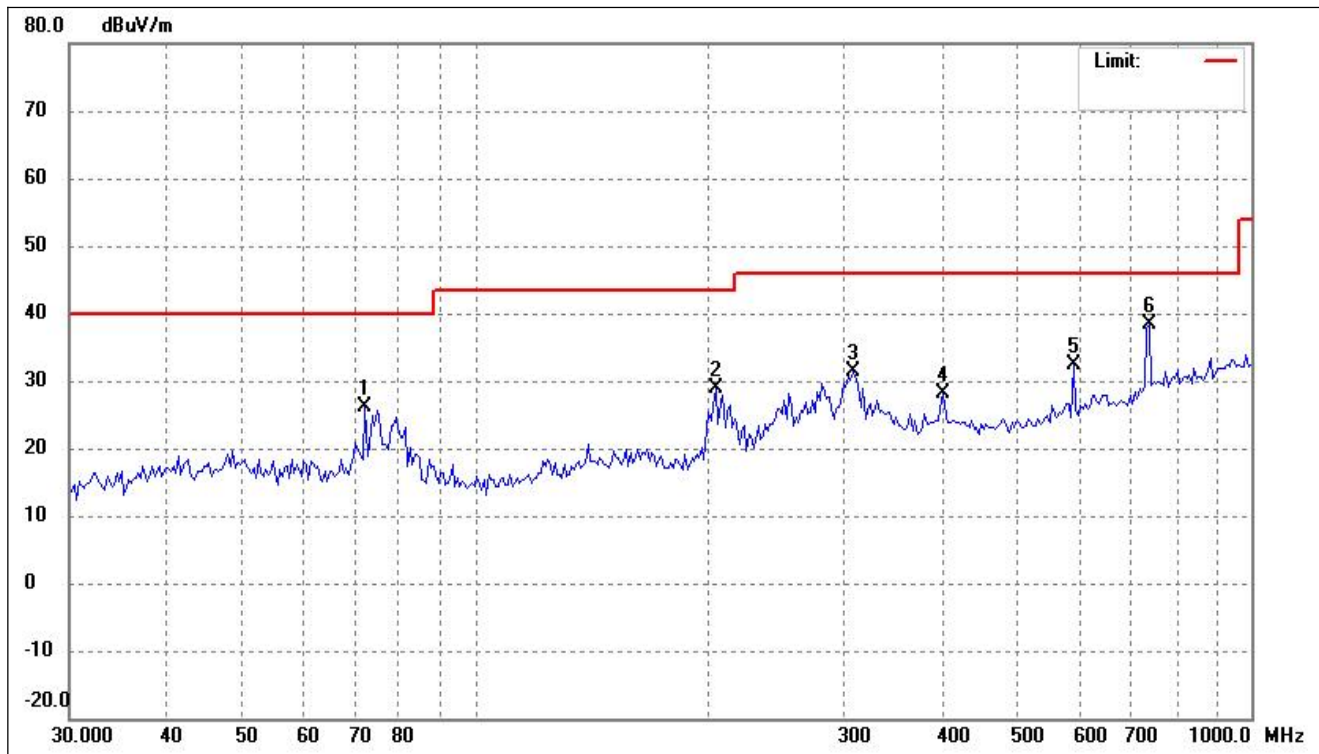
No.	Frequency (MHz)	Reading (dBuV/m)	Corr. dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Deg. ()	Height (cm)	Remark
1	72.2111	38.68	-10.74	27.94	40.00	-12.06	-	-	peak
2	139.7909	30.02	-8.90	21.12	43.50	-22.38	-	-	peak
3	208.6580	40.14	-11.58	28.56	43.50	-14.94	-	-	peak
4	302.8193	39.63	-7.80	31.83	46.00	-14.17	-	-	peak
5	590.3511	35.04	-2.48	32.56	46.00	-13.44	-	-	peak
6	739.2136	39.20	-0.09	39.11	46.00	-6.89	-	-	peak

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



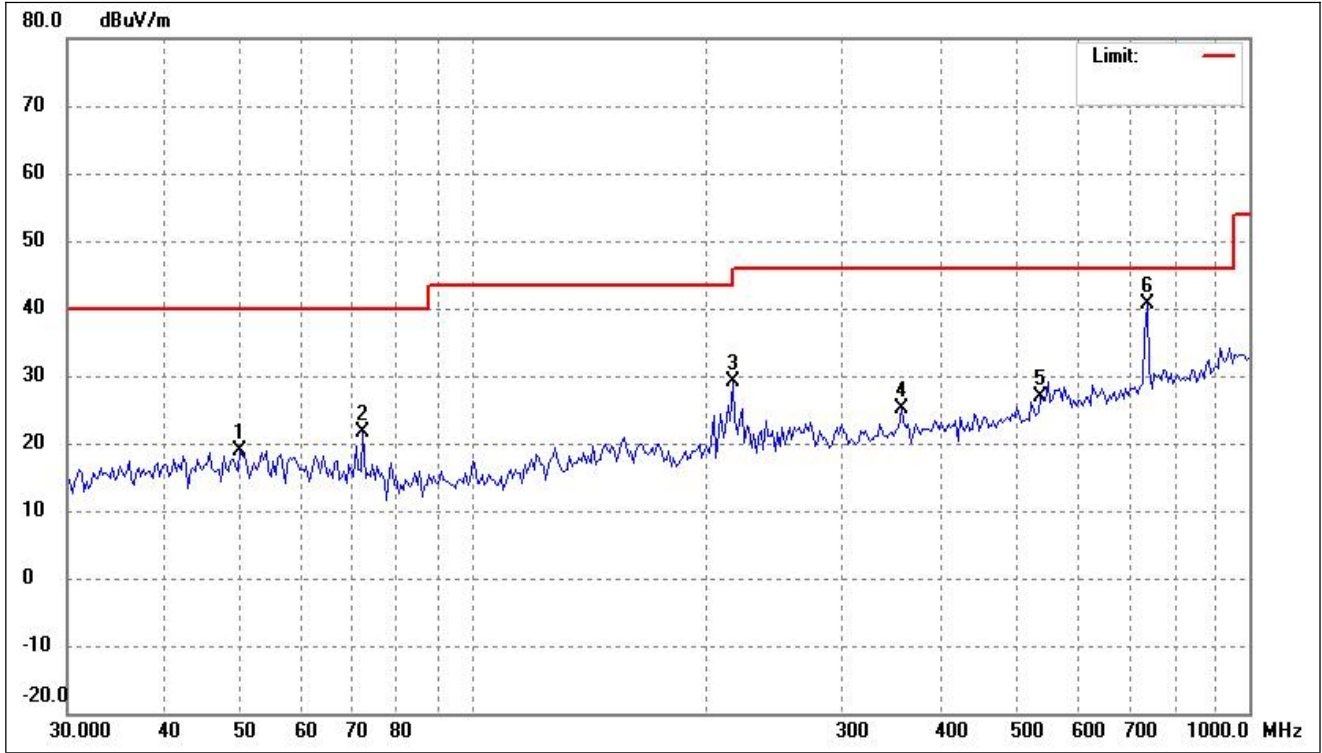
No.	Frequency (MHz)	Reading (dBuV/m)	Corr. dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Deg. ()	Height (cm)	Remark
1	43.8452	27.45	-7.96	19.49	40.00	-20.51	-	-	peak
2	72.2111	30.82	-10.74	20.08	40.00	-19.92	-	-	peak
3	153.1627	28.73	-8.05	20.68	43.50	-22.82	-	-	peak
4	216.1197	38.95	-11.55	27.40	46.00	-18.60	-	-	peak
5	379.1780	30.64	-6.53	24.11	46.00	-21.89	-	-	peak
6	734.0373	42.41	-0.23	42.18	46.00	-3.82	-	-	peak

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



No.	Frequency (MHz)	Reading (dBuV/m)	Corr. dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Deg. ()	Height (cm)	Remark
1	72.2111	36.79	-10.74	26.05	40.00	-13.95	-	-	peak
2	204.3052	40.31	-11.47	28.84	43.50	-14.66	-	-	peak
3	307.1053	39.21	-7.71	31.50	46.00	-14.50	-	-	peak
4	401.1050	34.33	-6.24	28.09	46.00	-17.91	-	-	peak
5	590.3511	34.98	-2.48	32.50	46.00	-13.50	-	-	peak
6	739.2136	38.37	-0.09	38.28	46.00	-7.72	-	-	peak

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

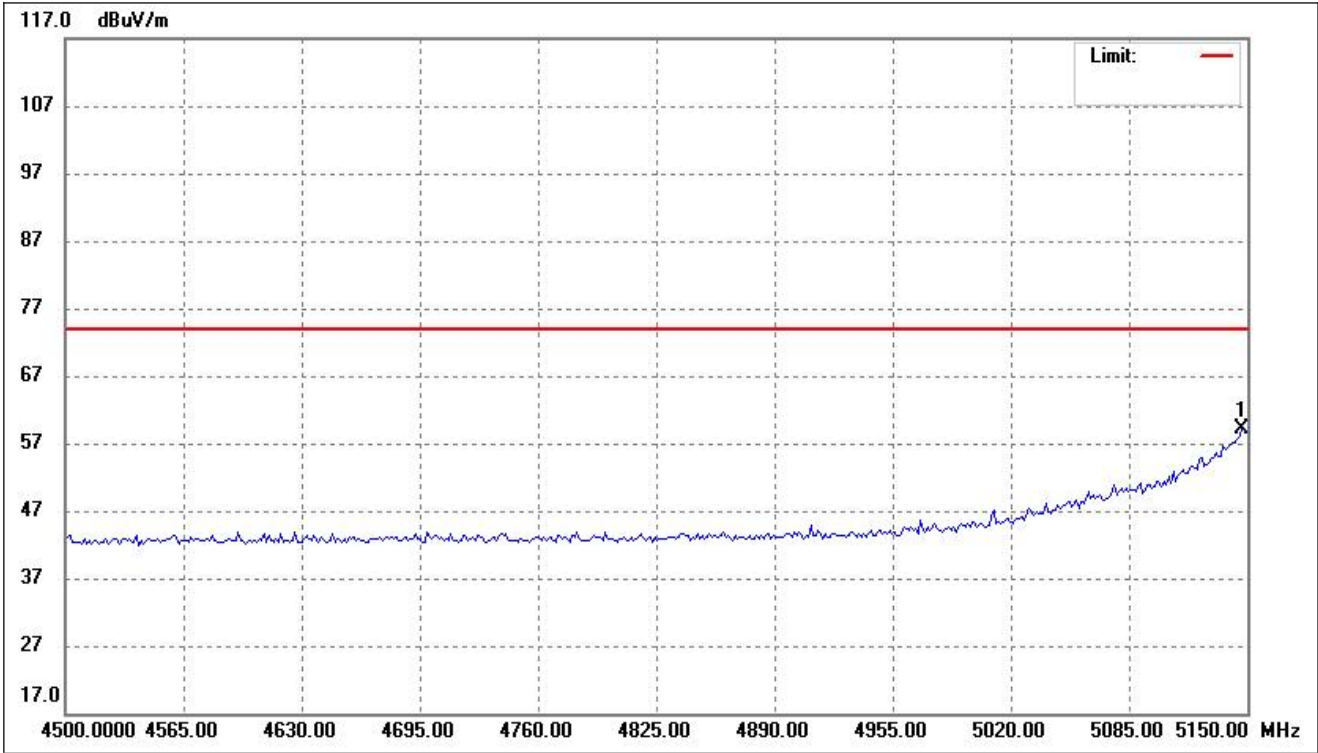


No.	Frequency (MHz)	Reading (dBuV/m)	Corr. dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Deg. ()	Height (cm)	Remark
1	54.1349	27.36	-8.03	19.33	40.00	-20.67	-	-	peak
2	80.2383	31.44	-12.44	19.00	40.00	-21.00	-	-	peak
3	140.7767	29.79	-8.83	20.96	43.50	-22.54	-	-	peak
4	216.1197	41.21	-11.55	29.66	46.00	-16.34	-	-	peak
5	346.0740	31.93	-7.10	24.83	46.00	-21.17	-	-	peak
6	739.2136	40.10	-0.09	40.01	46.00	-5.99	-	-	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.

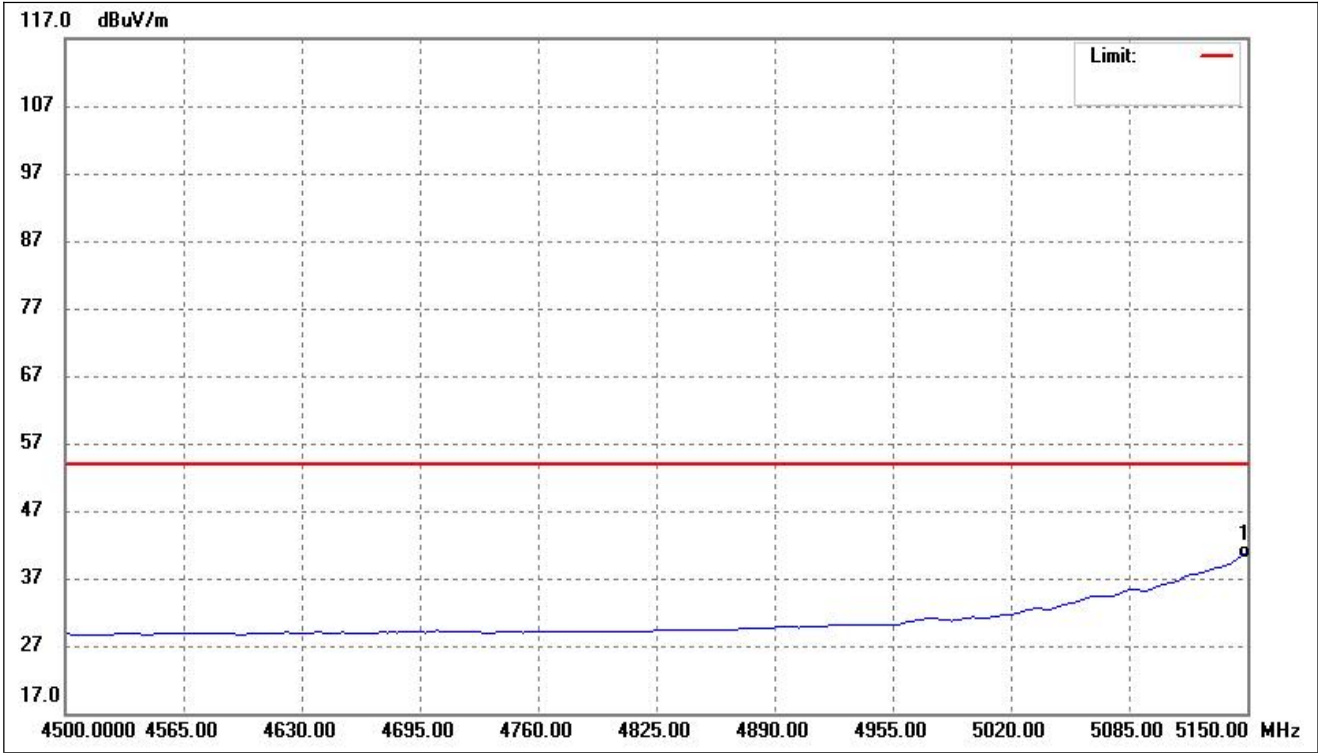
- Spurious Emission above 1GHz
- Antenna 0(worst case)

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



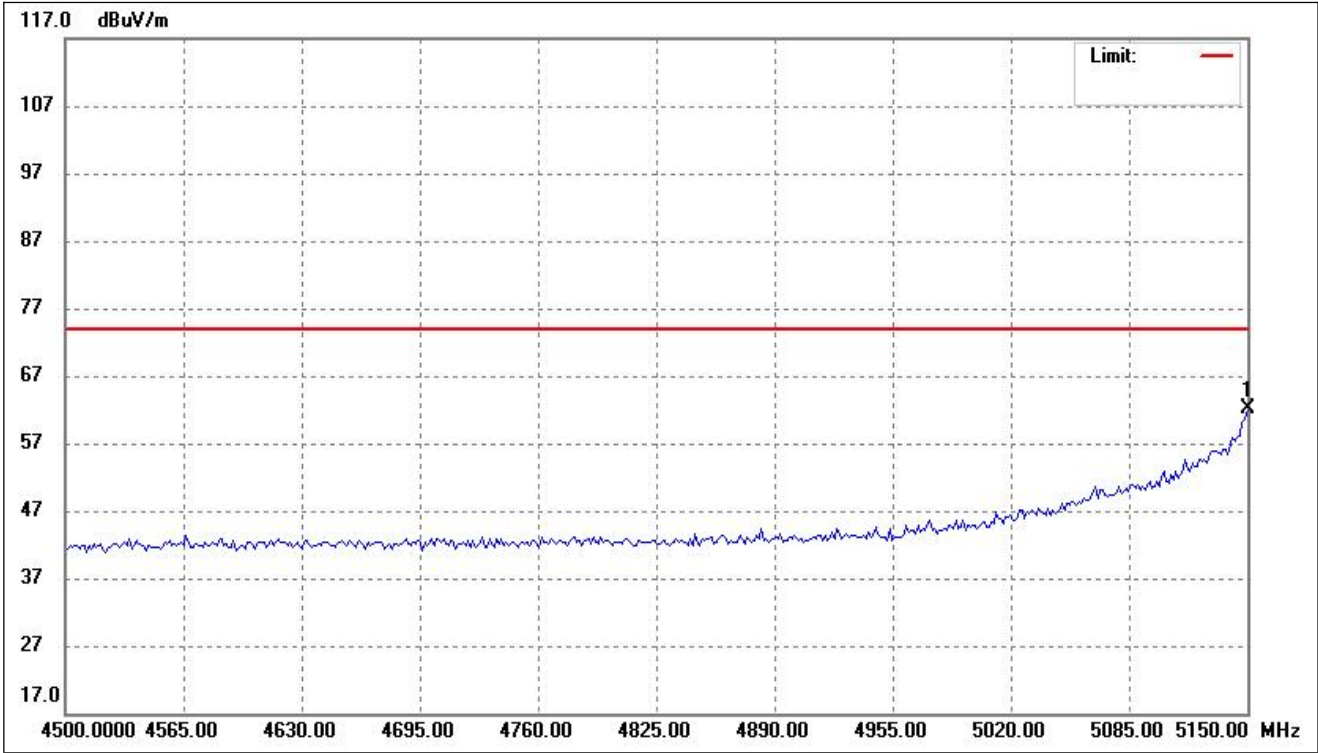
No.	Frequency (MHz)	Reading (dBuV/m)	Corr. dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Deg. ()	Height (cm)	Remark
1	5147.395	71.78	-12.54	59.24	74.00	-14.76	-	-	peak

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



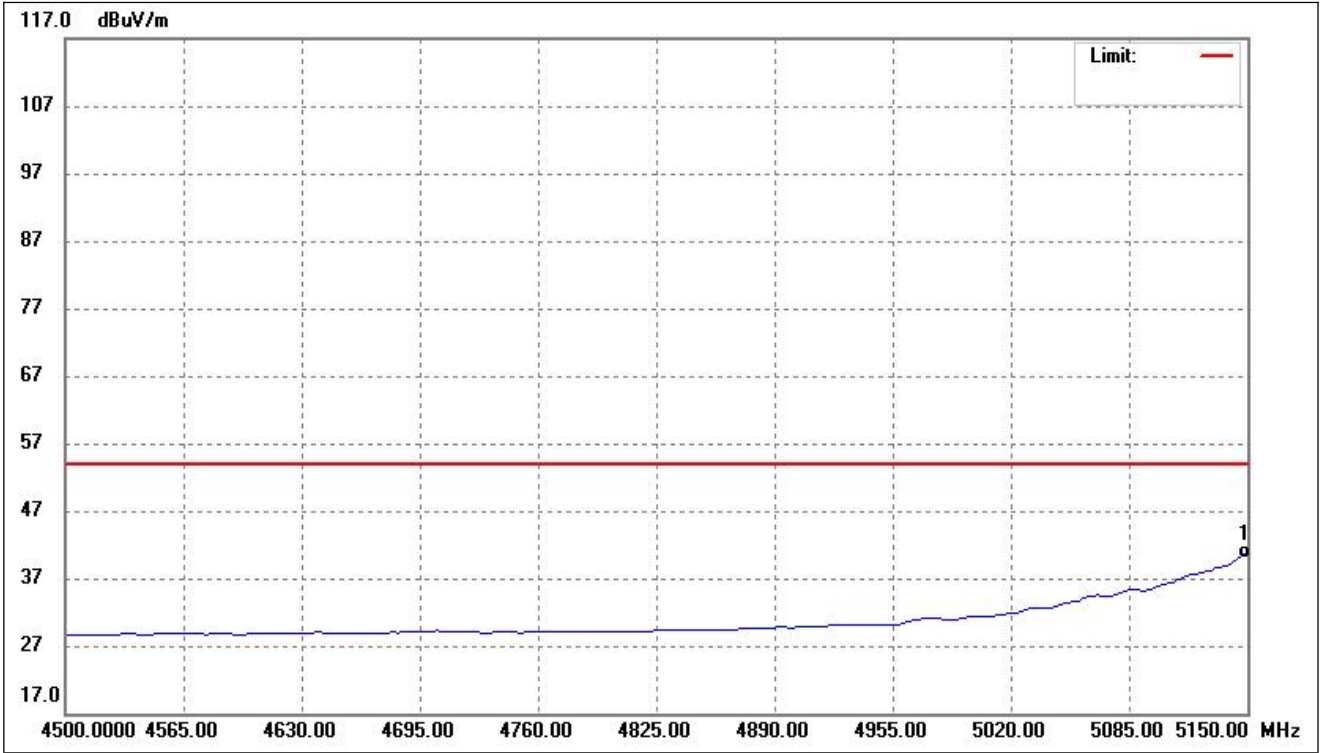
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	5150.000	53.49	-12.53	40.96	54.00	-13.04	-	-	AVG

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



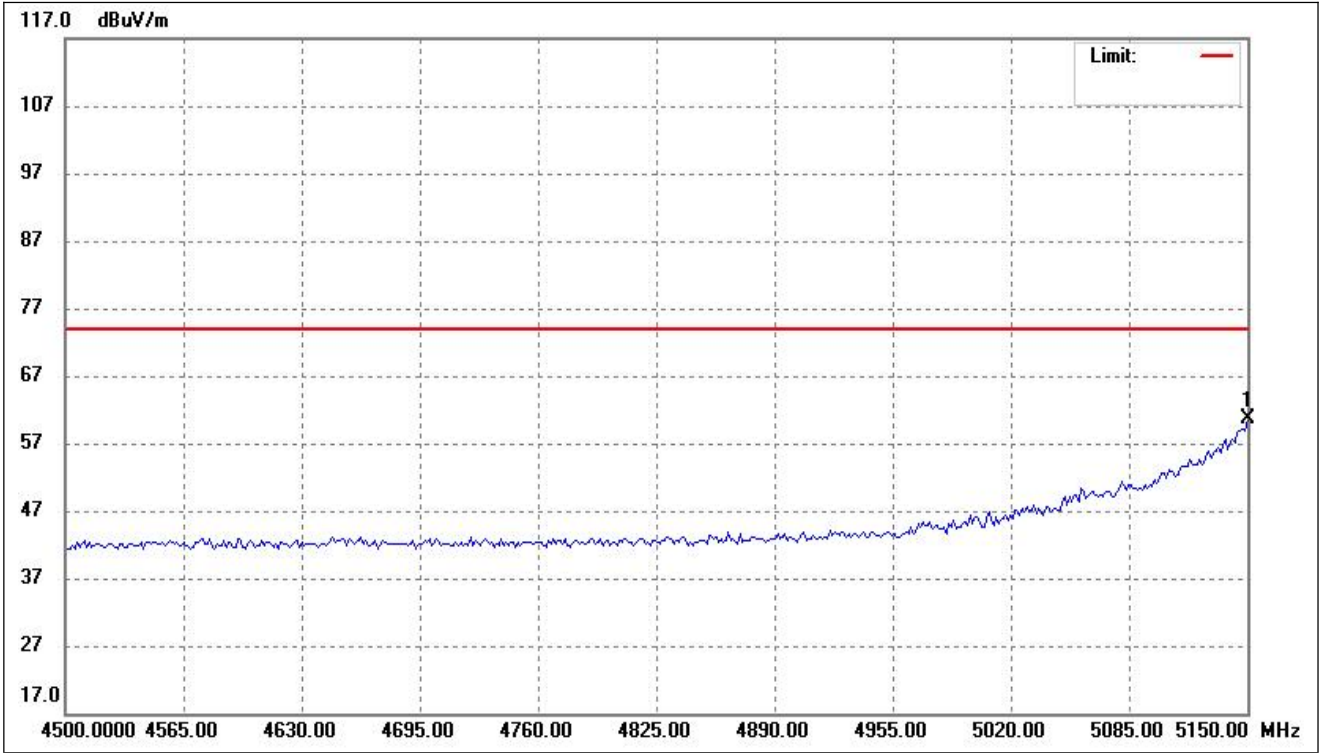
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	5150.000	74.77	-12.53	62.24	74.00	-11.76	-	-	peak

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



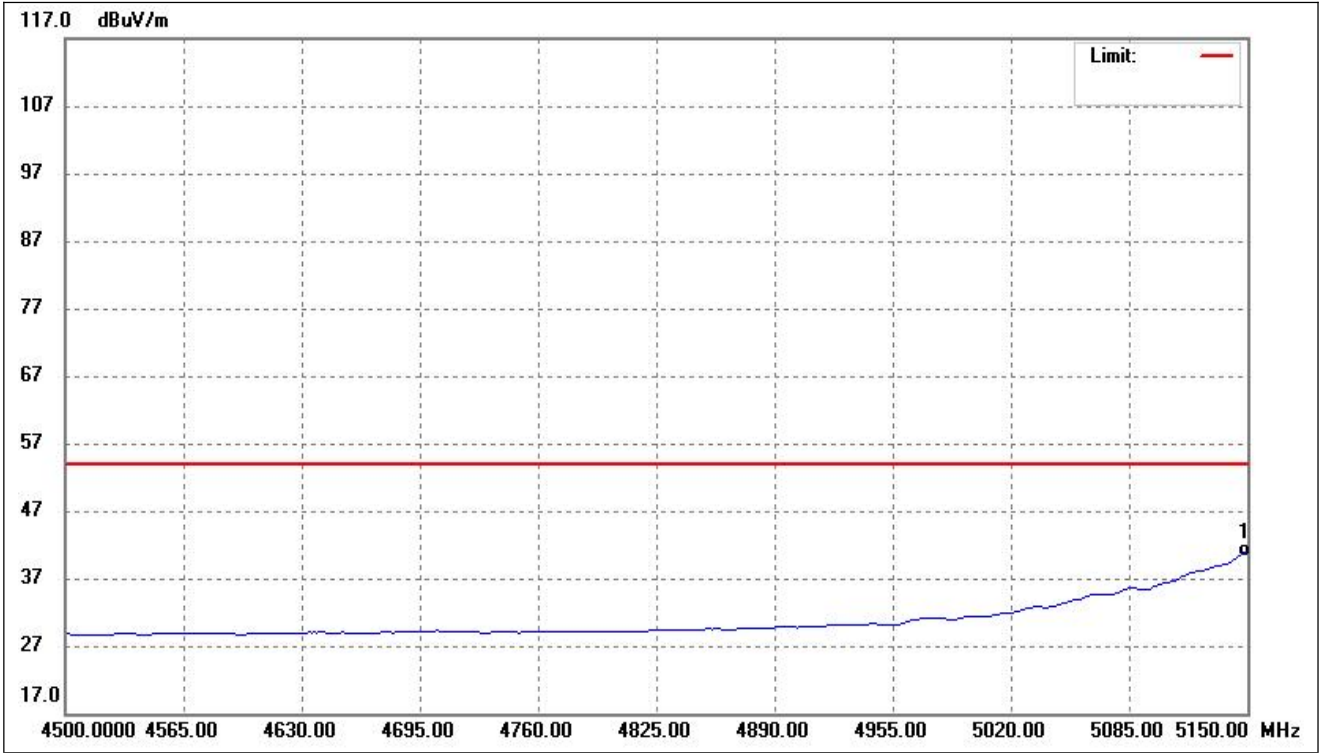
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	5150.000	53.53	-12.53	41.00	54.00	-13.00	-	-	AVG

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



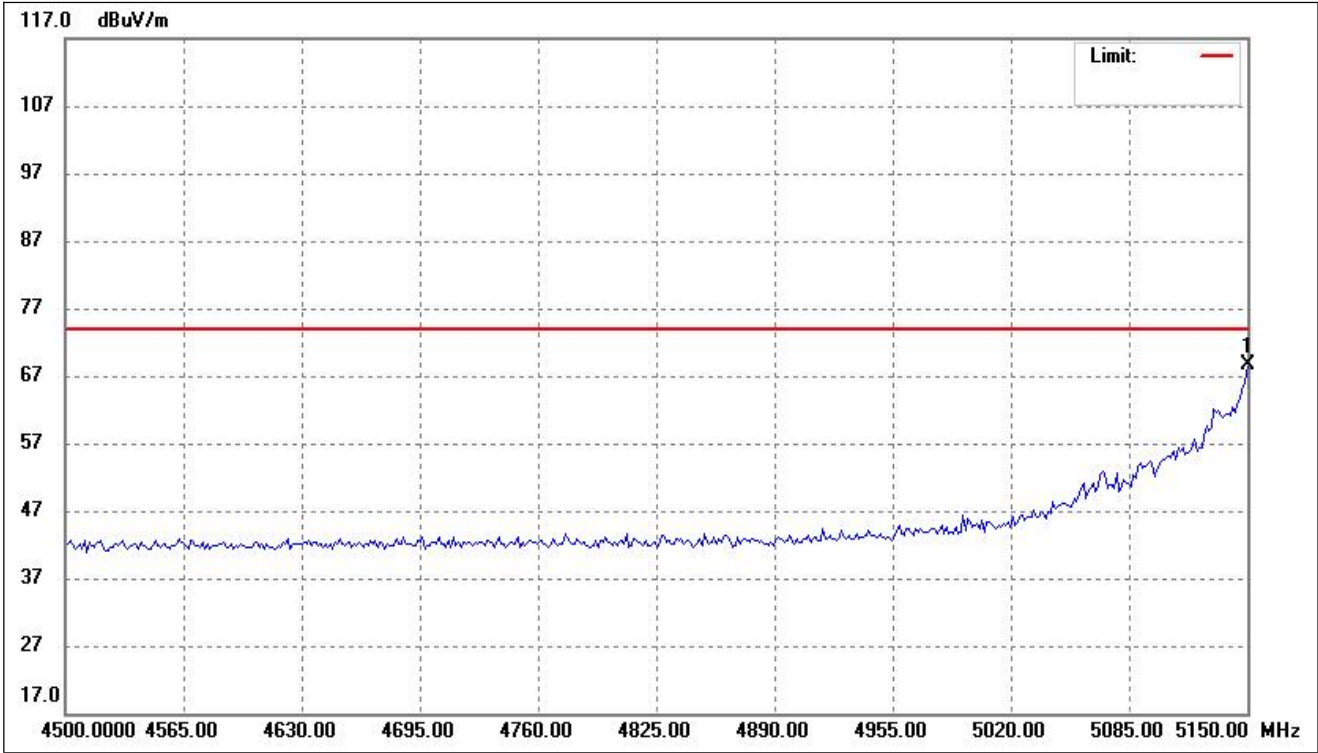
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	5150.000	73.20	-12.53	60.67	74.00	-13.33	-	-	peak

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



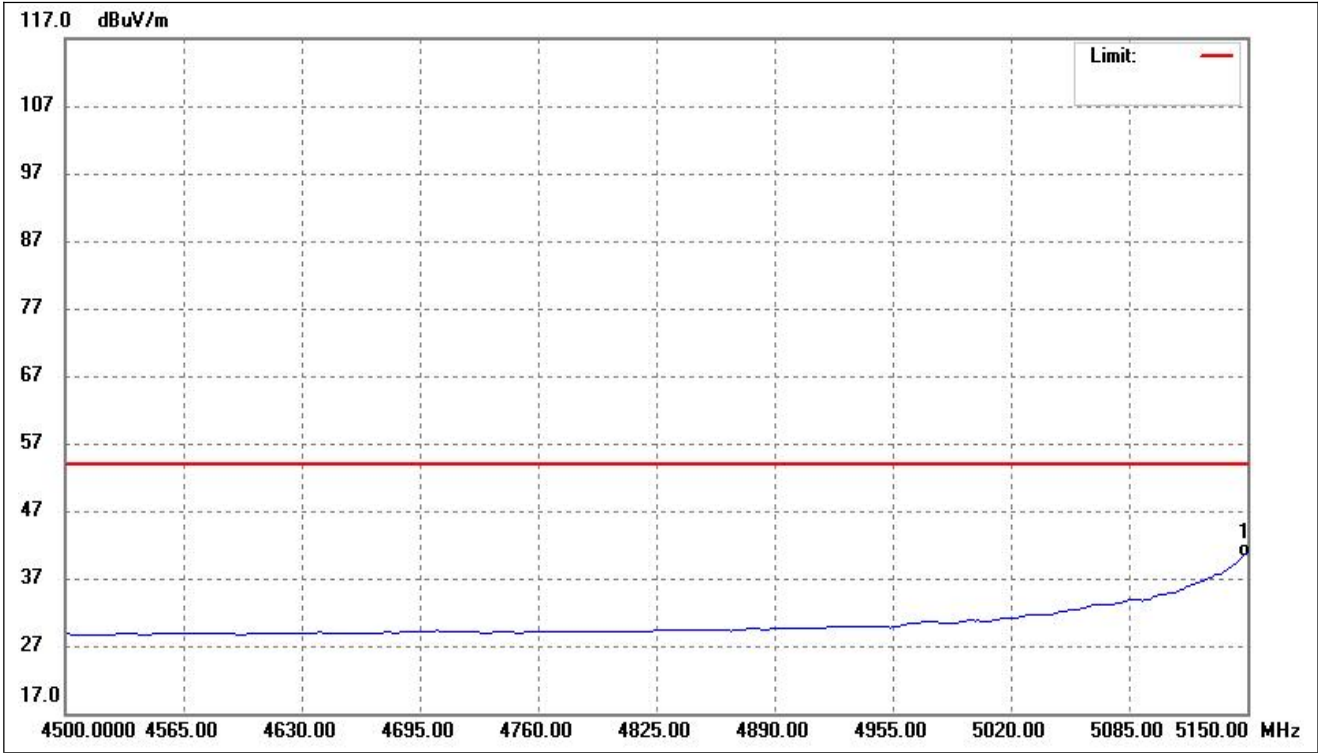
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	5150.000	53.65	-12.53	41.12	54.00	-12.88	-	-	AVG

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



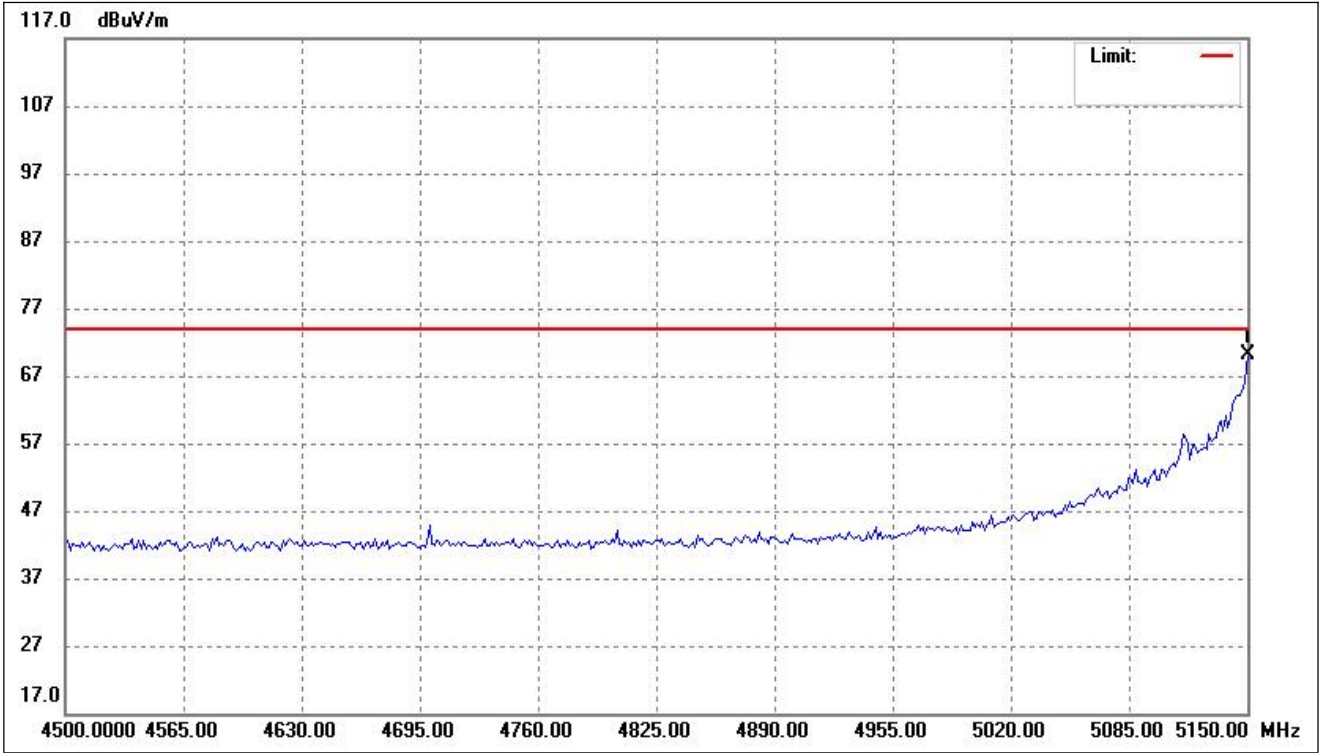
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	5150.000	81.09	-12.53	68.56	74.00	-5.44	-	-	peak

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



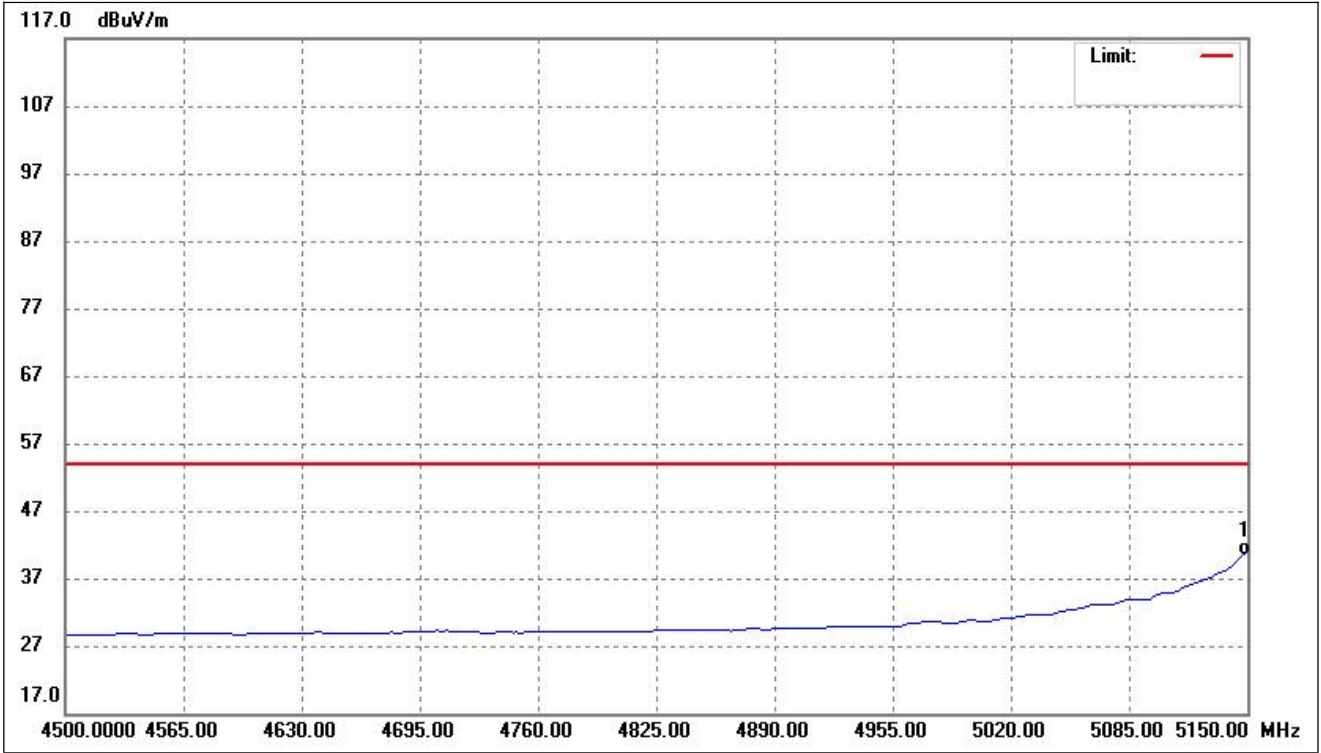
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	5150.000	53.54	-12.53	41.01	54.00	-12.99	-	-	AVG

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



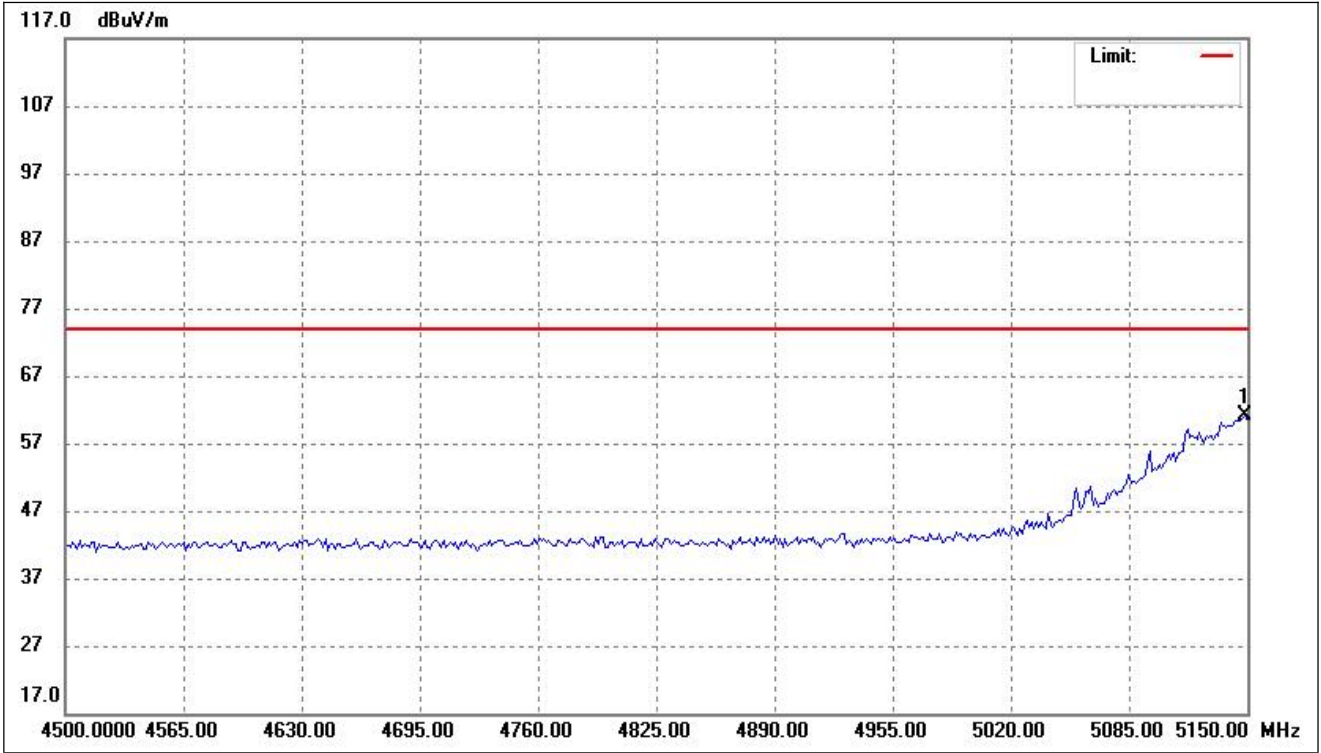
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	5150.000	82.60	-12.53	70.07	74.00	-3.93	-	-	peak

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



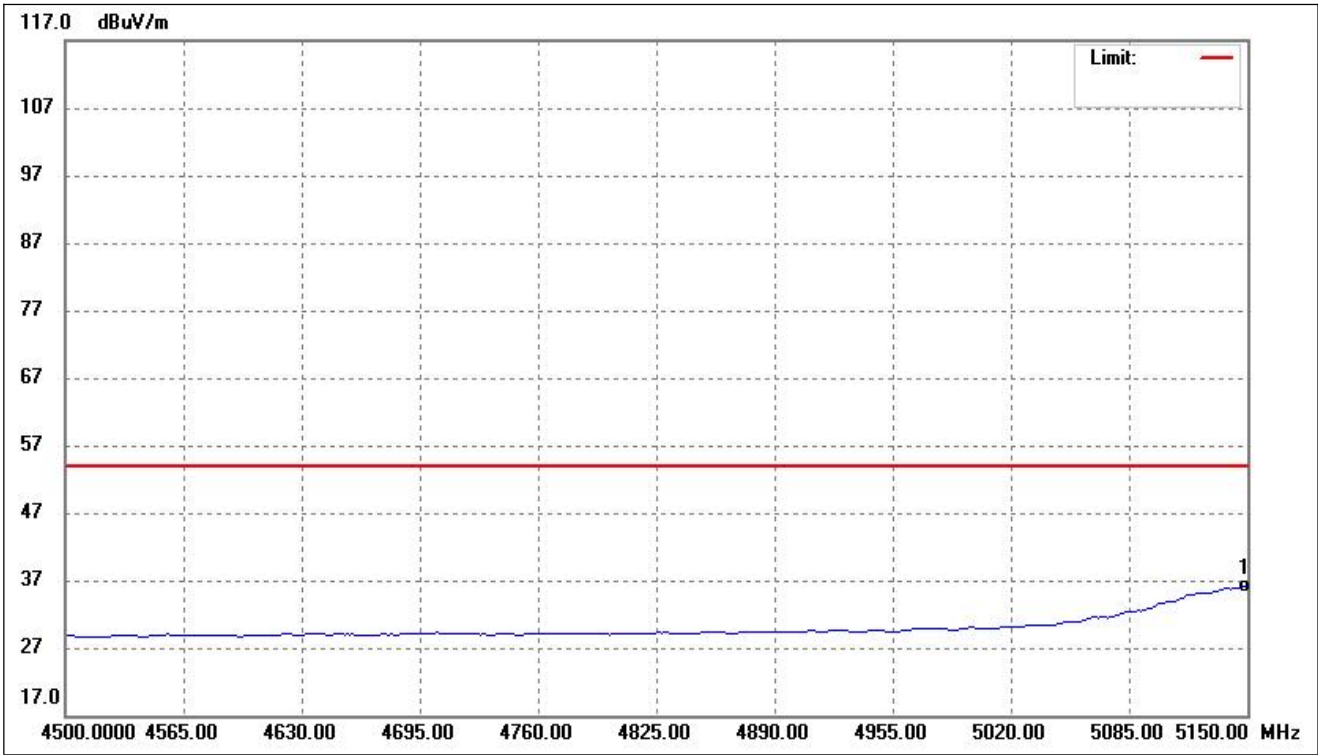
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	5150.000	53.83	-12.53	41.30	54.00	-12.70	-	-	AVG

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	5148.697	73.58	-12.53	61.05	74.00	-12.95	-	-	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	48.62	-12.53	36.09	54.00	-17.91	-	-	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.

- Antenna 0(worst case)
- For the frequency band 5.15-5.25GHz, 5.725-5.850GHz (802.11a)
- Harmonics And Spurious Emissions

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5180MHz)							
10360	57.88	7.11	64.99	74	-9.01	H	PK
10360	41.17	7.11	48.28	54	-5.72	H	AV
10360	55.27	7.11	62.38	74	-11.62	V	PK
10360	40.67	7.11	47.78	54	-6.22	V	AV
Middle Channel (5200MHz)							
10400	58.42	7.22	65.64	74	-8.36	H	PK
10400	38.19	7.22	45.41	54	-8.59	H	AV
10400	58.00	7.22	65.22	74	-8.78	V	PK
10400	40.57	7.22	47.79	54	-6.21	V	AV
High Channel (5240MHz)							
10480	55.23	7.69	62.92	74	-11.08	H	PK
10480	38.60	7.69	46.29	54	-7.71	H	AV
10480	56.37	7.69	64.06	74	-9.94	V	PK
10480	39.04	7.69	46.73	54	-7.27	V	AV

- Out of Band edge for 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-42.19	-27
Highest	Above 5350	-43.20	-27
Note: the data just list the worst cases			

- For the frequency band 5.15-5.25GHz (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	58.00	7.11	65.11	74	-8.89	H	PK
10360	39.98	7.11	47.09	54	-6.91	H	AV
10360	58.60	7.11	65.71	74	-8.29	V	PK
10360	41.83	7.11	48.94	54	-5.06	V	AV
Middle Channel (5200MHz)							
10400	55.35	7.22	62.57	74	-11.43	H	PK
10400	38.90	7.22	46.12	54	-7.88	H	AV
10400	58.23	7.22	65.45	74	-8.55	V	PK
10400	39.98	7.22	47.20	54	-6.80	V	AV
High Channel (5240MHz)							
10480	56.80	7.69	64.49	74	-9.51	H	PK
10480	40.57	7.69	48.26	54	-5.74	H	AV
10480	55.28	7.69	62.97	74	-11.03	V	PK
10480	40.94	7.69	48.63	54	-5.37	V	AV

- Out of Band edge 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-38.51	-27
Highest	Above 5350	-39.69	-27
Note: the data just list the worst cases			

- For the frequency band 5.15-5.25GHz (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	58.36	7.11	65.47	74	-8.53	H	PK
10360	38.28	7.11	45.39	54	-8.61	H	AV
10360	55.63	7.11	62.74	74	-11.26	V	PK
10360	40.68	7.11	47.79	54	-6.21	V	AV
Middle Channel (5200MHz)							
10400	58.99	7.22	66.21	74	-7.79	H	PK
10400	41.68	7.22	48.90	54	-5.10	H	AV
10400	55.40	7.22	62.62	74	-11.38	V	PK
10400	41.34	7.22	48.56	54	-5.44	V	AV
High Channel (5240MHz)							
10480	56.66	7.69	64.35	74	-9.65	H	PK
10480	40.32	7.69	48.01	54	-5.99	H	AV
10480	57.74	7.69	65.43	74	-8.57	V	PK
10480	39.70	7.69	47.39	54	-6.61	V	AV

- Out of Band edge 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-38.96	-27
Highest	Above 5350	-39.15	-27
Note: the data just list the worst cases			

- For the frequency band 5.15-5.25GHz (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	55.72	7.89	63.61	74	-10.39	H	PK
10380	39.69	7.89	47.58	54	-6.42	H	AV
10380	55.79	7.89	63.68	74	-10.32	V	PK
10380	41.27	7.89	49.16	54	-4.84	V	AV
High Channel (5230MHz)							
10460	55.28	7.97	63.25	74	-10.75	H	PK
10460	38.50	7.97	46.47	54	-7.53	H	AV
10460	58.39	7.97	66.36	74	-7.64	V	PK
10460	38.25	7.97	46.22	54	-7.78	V	AV

- Out of Band edge for 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-38.18	-27
Highest	Above 5350	-37.53	-27
Note: the data just list the worst cases			

- For the frequency band 5.15-5.25GHz (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	56.23	7.89	64.12	74	-9.88	H	PK
10380	38.41	7.89	46.30	54	-7.70	H	AV
10380	58.39	7.89	66.28	74	-7.72	V	PK
10380	41.04	7.89	48.93	54	-5.07	V	AV
High Channel (5230MHz)							
10460	57.16	7.97	65.13	74	-8.87	H	PK
10460	39.25	7.97	47.22	54	-6.78	H	AV
10460	58.43	7.97	66.40	74	-7.60	V	PK
10460	41.94	7.97	49.91	54	-4.09	V	AV

- Out of Band edge for 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-38.19	-27
Highest	Above 5350	-37.51	-27
Note: the data just list the worst cases			

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

Frequency (MHz)	Reading (dBuV/m)	Correct dB	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar H/V	Detector
5210MHz							
10420	58.50	7.53	66.03	74	-7.97	H	PK
10420	41.21	7.53	48.74	54	-5.26	H	AV
10420	56.55	7.53	64.08	74	-9.92	H	PK
10420	41.65	7.53	49.18	54	-4.82	H	AV

- Out of Band edge for 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-37.15	-27
Highest	Above 5350	-36.32	-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

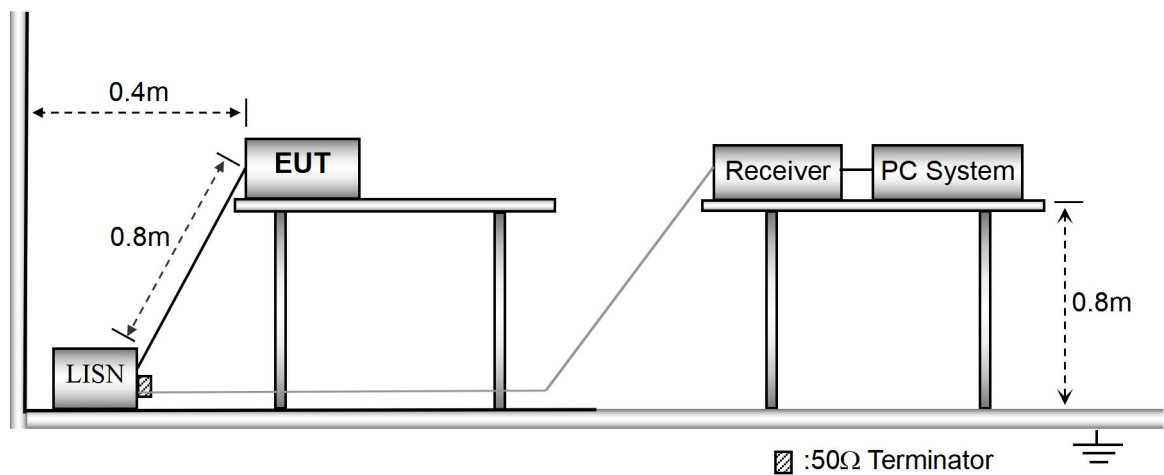
10 Conducted Emissions

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



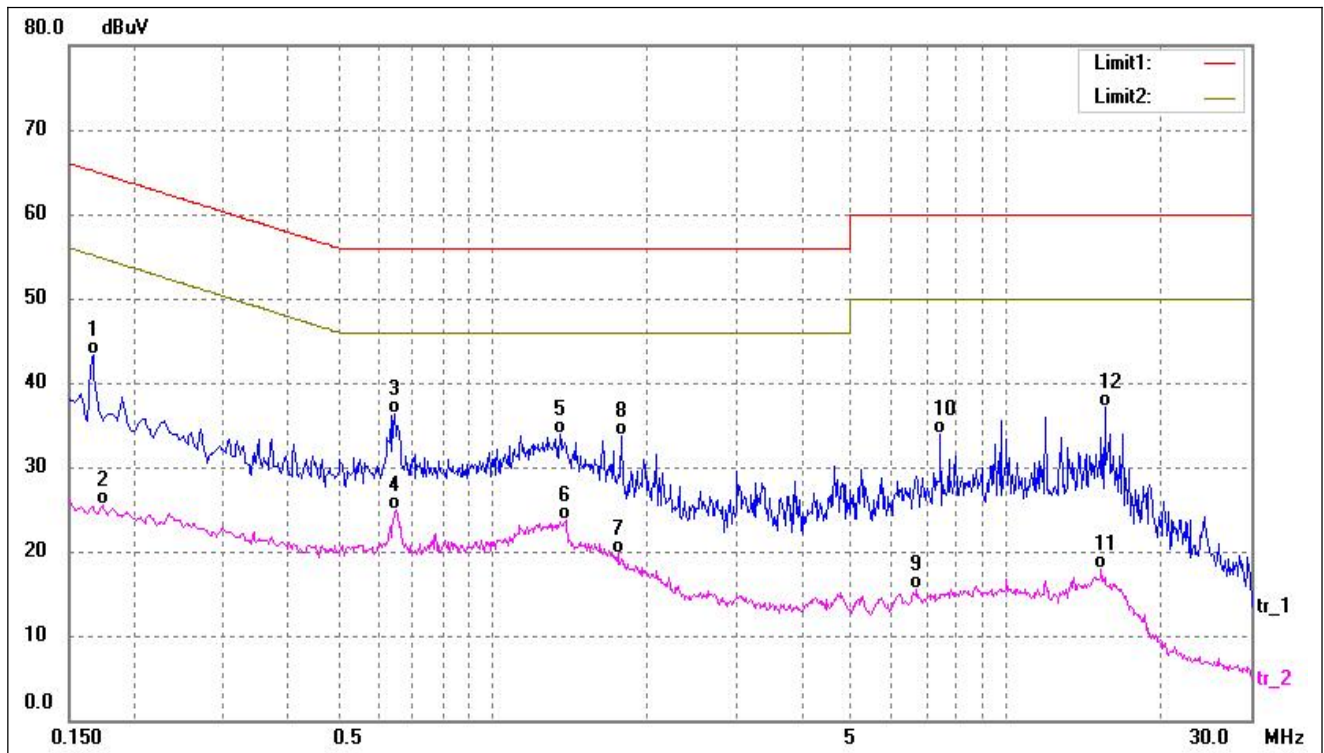
10.3 Test Receiver Setup

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

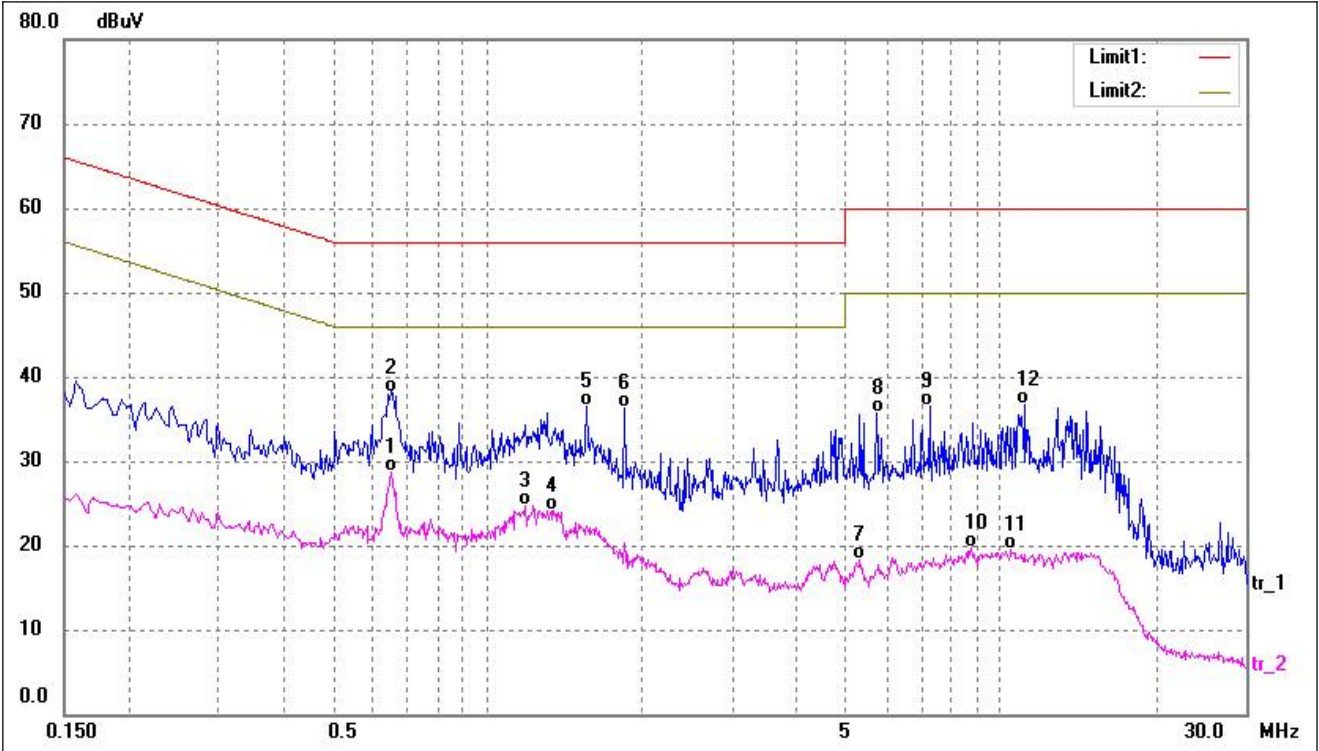
10.4 Summary of Test Results/Plots

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



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1660	33.51	9.70	43.21	65.15	-21.94	QP
2	0.1740	15.75	9.67	25.42	54.76	-29.34	AVG
3*	0.6460	26.60	9.70	36.30	56.00	-19.70	QP
4	0.6500	15.28	9.70	24.98	46.00	-21.02	AVG
5	1.3540	24.33	9.65	33.98	56.00	-22.02	QP
6	1.3900	13.98	9.65	23.63	46.00	-22.37	AVG
7	1.7580	9.99	9.63	19.62	46.00	-26.38	AVG
8	1.7900	24.01	9.63	33.64	56.00	-22.36	QP
9	6.7300	5.73	9.79	15.52	50.00	-34.48	AVG
10	7.4820	24.09	9.81	33.90	60.00	-26.10	QP
11	15.3300	8.01	9.99	18.00	50.00	-32.00	AVG
12	15.5820	27.11	10.01	37.12	60.00	-22.88	QP

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



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1*	0.6500	18.99	9.70	28.69	46.00	-17.31	AVG
2	0.6508	28.48	9.70	38.18	56.00	-17.82	QP
3	1.1860	15.00	9.66	24.66	46.00	-21.34	AVG
4	1.3340	14.53	9.65	24.18	46.00	-21.82	AVG
5	1.5620	26.91	9.64	36.55	56.00	-19.45	QP
6	1.8500	26.68	9.63	36.31	56.00	-19.69	QP
7	5.3180	8.54	9.72	18.26	50.00	-31.74	AVG
8	5.7180	25.99	9.75	35.74	60.00	-24.26	QP
9	7.2620	26.64	9.81	36.45	60.00	-23.55	QP
10	8.7380	9.82	9.84	19.66	50.00	-30.34	AVG
11	10.4900	9.59	9.89	19.48	50.00	-30.52	AVG
12	11.1780	26.73	9.90	36.63	60.00	-23.37	QP

APPENDIX SUMMARY

Project No.	WTH24X10253629W	Test Engineer	Timi Huang
Start date	2024/12/3	Finish date	2024/12/3
Temperature	24℃	Humidity	52%
RF specifications	U-NII		

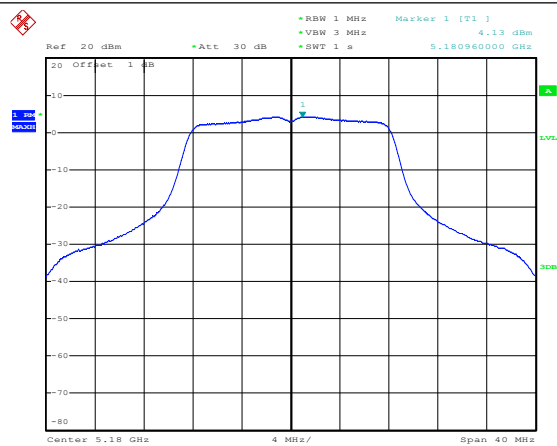
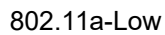
APPENDIX	Description of Test Item	Result
A	Power Spectral Density	Compliant
B	Emission Bandwidth and Occupied Bandwidth	Compliant
C	Maximum Conducted Output Power	Compliant
D	Frequency Stability	Compliant

APPENDIX A

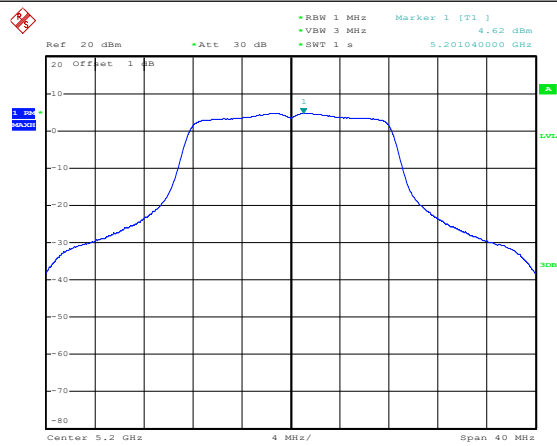
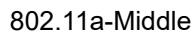
Power Spectral Density					
U-NII-1:5150-5250MHz					
Operating mode	Test Channel	ANT 0 dBm/MHz	ANT 1 dBm/MHz	Total dBm/MHz	Limit (dBm/MHz)
802.11a	5180	4.13	4.76	/	11
	5200	4.62	5.21	/	11
	5240	5.01	5.31	/	11
802.11n-HT20	5180	3.20	3.40	6.31	11
	5200	3.66	3.80	6.74	11
	5240	3.70	3.94	6.83	11
802.11n-HT40	5190	-0.62	-0.99	2.21	11
	5230	-0.17	-0.40	2.73	11
802.11ac-VHT20	5180	3.22	3.43	6.34	11
	5200	3.56	3.82	6.70	11
	5240	3.62	3.92	6.78	11
802.11ac-VHT40	5190	-0.45	-0.84	2.37	11
	5230	-0.12	-0.34	2.78	11
802.11ac-VHT80	5210	-4.17	-4.22	-1.18	11

ANT 0

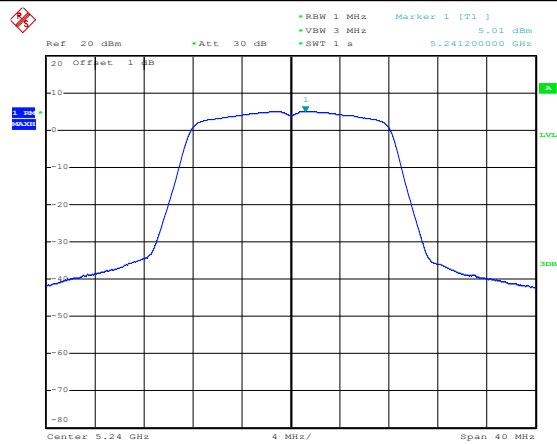
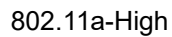
5150-5250MHz



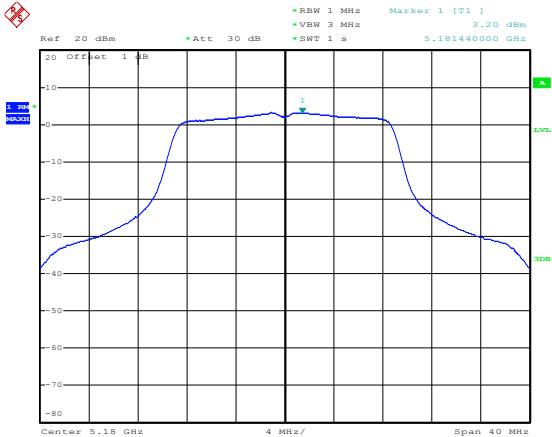
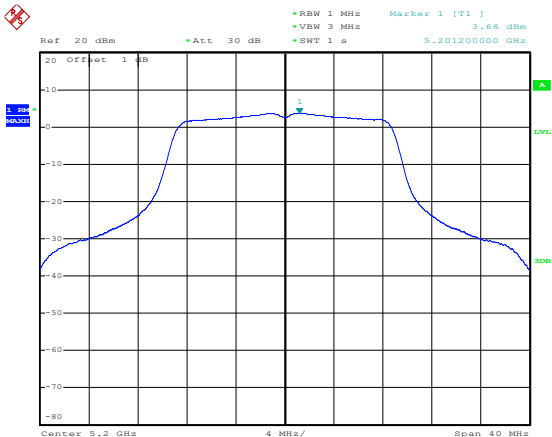
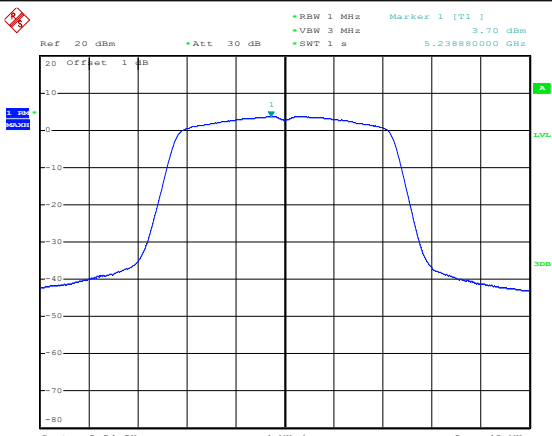
Date: 3.DEC.2024 18:48:48

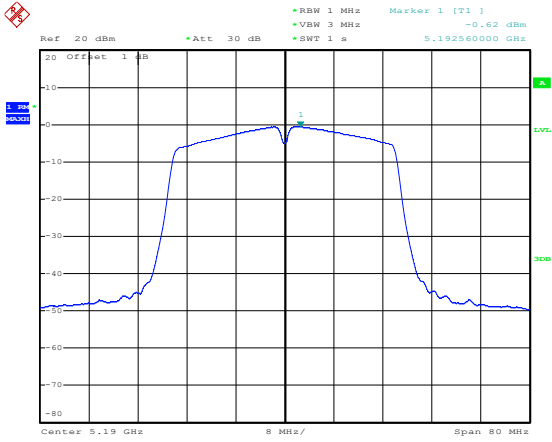
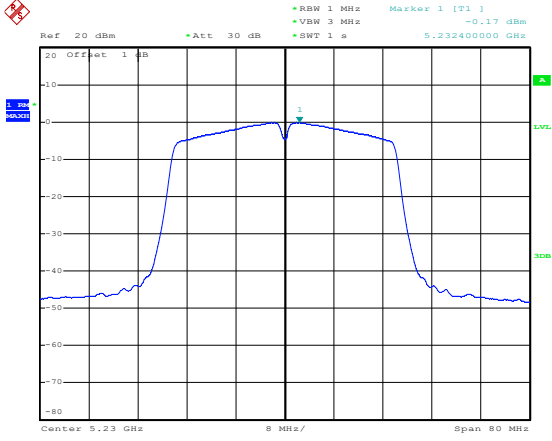
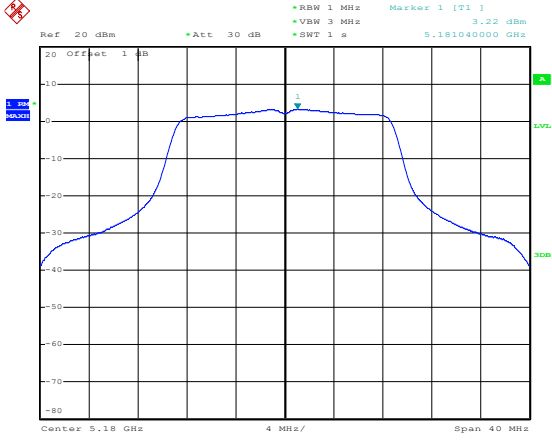


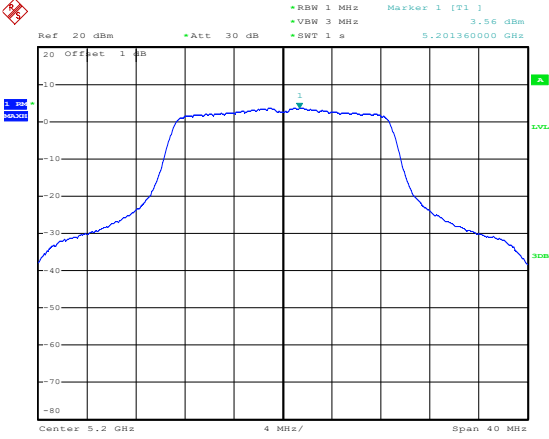
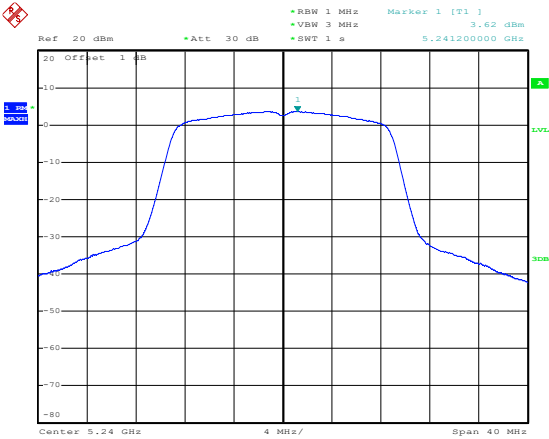
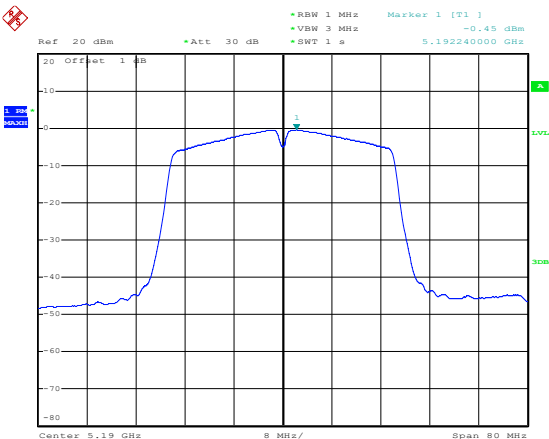
Date: 3.DEC.2024 18:48:33



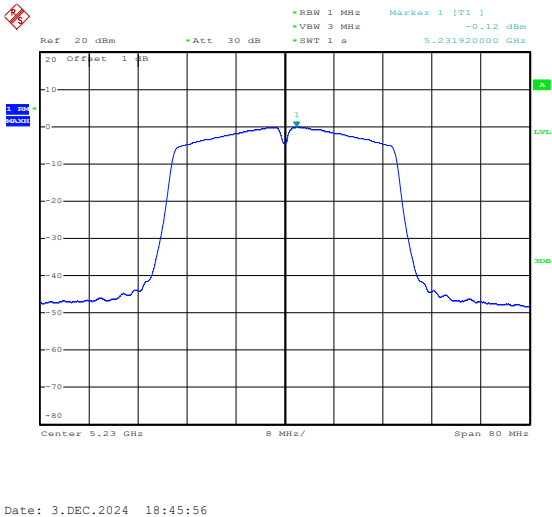
Date: 3.DEC.2024 18:48:17

802.11n-HT20-Low	 Date: 3.DEC.2024 18:47:33
802.11n-HT20-Middle	 Date: 3.DEC.2024 18:47:51
802.11n-HT20-High	 Date: 3.DEC.2024 18:48:06

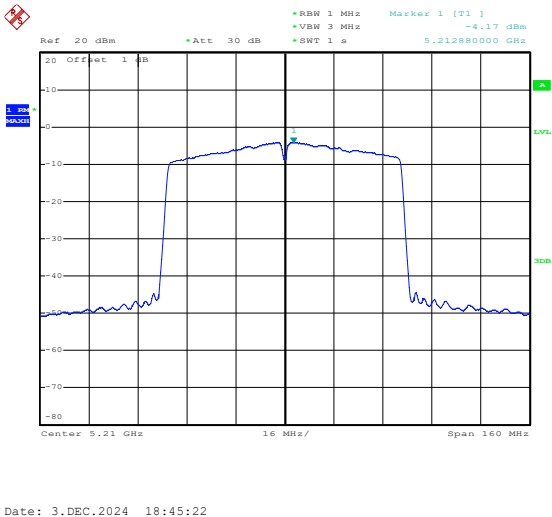
802.11n-HT40-Low	 Ref 20 dBm *Att 30 dB *RBW 1 MHz Marker 1 [T1] -0.62 dBm *VBW 3 MHz *SWT 1 s 5.192560000 GHz Center 5.19 GHz 8 MHz/ Span 80 MHz Date: 3.DEC.2024 18:46:26
802.11n-HT40-High	 Ref 20 dBm *Att 30 dB *RBW 1 MHz Marker 1 [T1] -0.17 dBm *VBW 3 MHz *SWT 1 s 5.232400000 GHz Center 5.23 GHz 8 MHz/ Span 80 MHz Date: 3.DEC.2024 18:46:09
802.11ac-VHT20-Low	 Ref 20 dBm *Att 30 dB *RBW 1 MHz Marker 1 [T1] 3.22 dBm *VBW 3 MHz *SWT 1 s 5.181040000 GHz Center 5.18 GHz 4 MHz/ Span 40 MHz Date: 3.DEC.2024 18:47:20

802.11ac-VHT20-Middle	 Date: 3.DEC.2024 18:47:04
802.11ac-VHT20-High	 Date: 3.DEC.2024 18:46:47
802.11ac-VHT40-Low	 Date: 3.DEC.2024 18:45:39

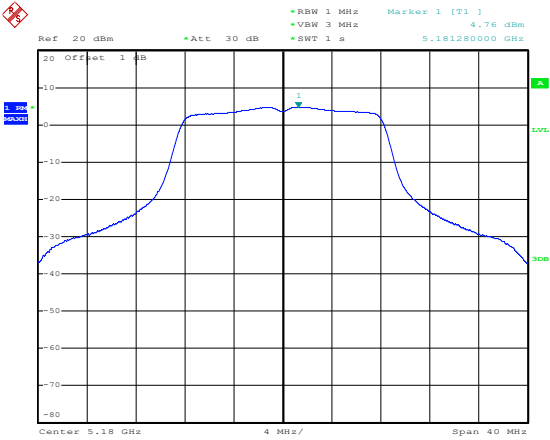
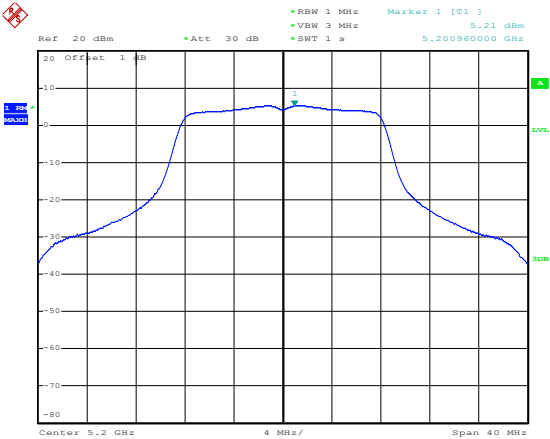
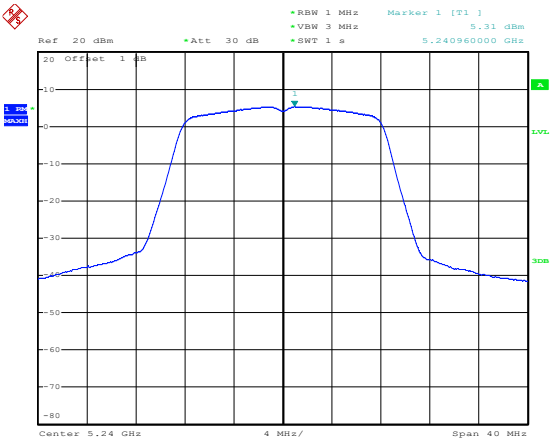
802.11ac-VHT40-High



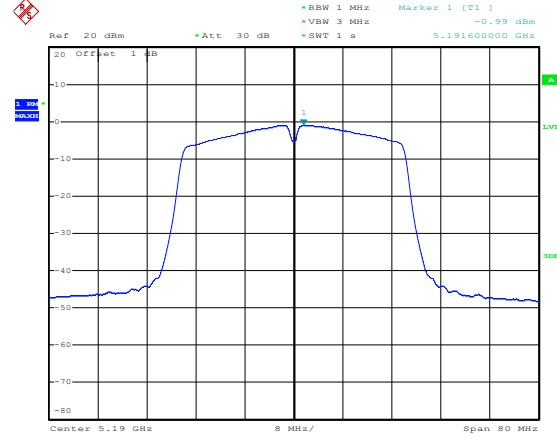
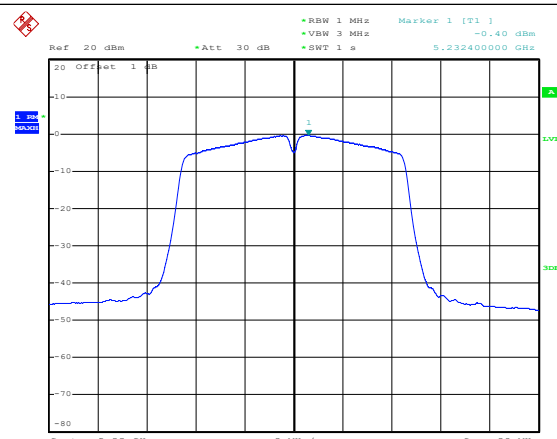
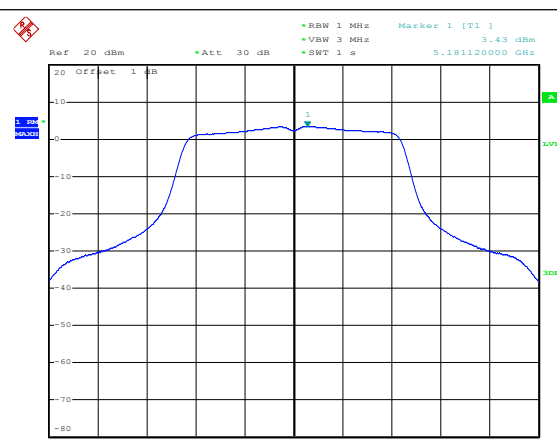
802.11ac-VHT80

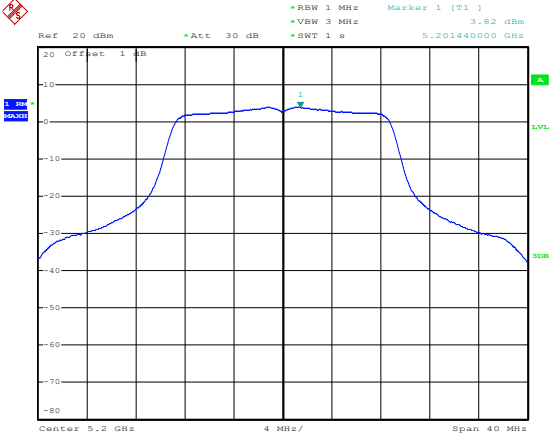
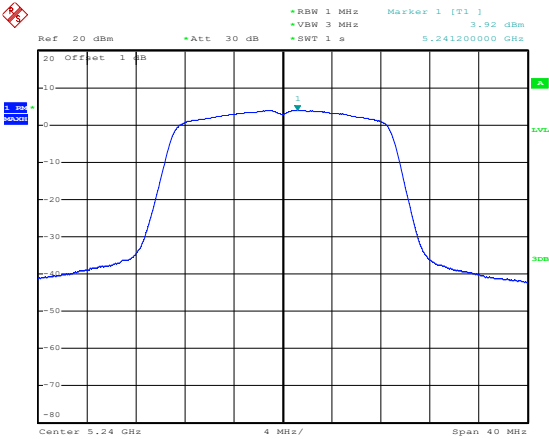
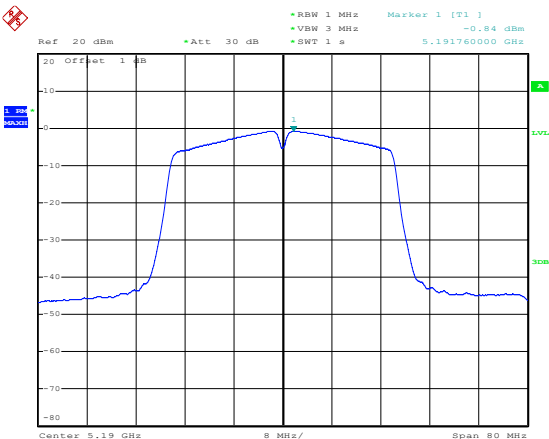


ANT 1
5150-5250MHz

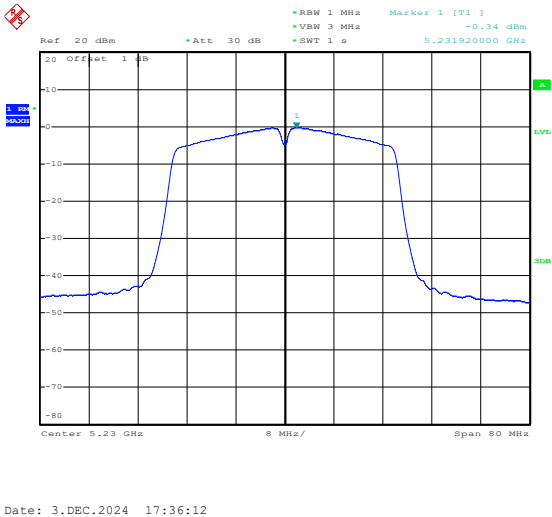
802.11a-Low	 Date: 3.DEC.2024 17:38:50
802.11a-Middle	 Date: 3.DEC.2024 17:38:30
802.11a-High	 Date: 3.DEC.2024 17:38:16

802.11n-HT20-Low	Date: 3.DEC.2024 17:37:39
802.11n-HT20-Middle	Date: 3.DEC.2024 17:37:52
802.11n-HT20-High	Date: 3.DEC.2024 17:38:05

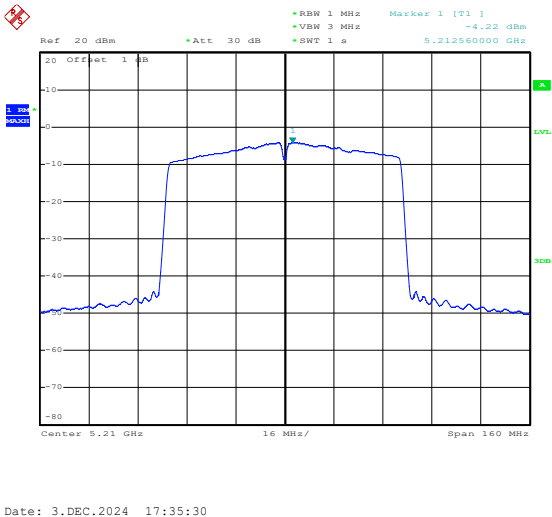
802.11n-HT40-Low	 Date: 3.DEC.2024 17:36:39
802.11n-HT40-High	 Date: 3.DEC.2024 17:36:23
802.11ac-VHT20-Low	 Date: 3.DEC.2024 17:37:28

802.11ac-VHT20-Middle	 Date: 3.DEC.2024 17:37:14
802.11ac-VHT20-High	 Date: 3.DEC.2024 17:36:56
802.11ac-VHT40-Low	 Date: 3.DEC.2024 17:35:51

802.11ac-VHT40-High



802.11ac-VHT80



APPENDIX B

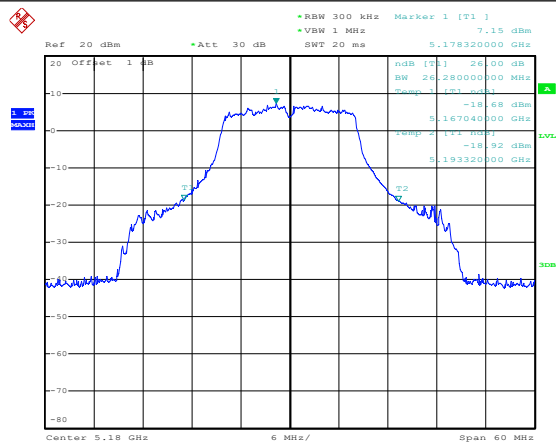
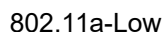
Emission Bandwidth and Occupied Bandwidth

U-NII-1:5150-5250MHz						
Test Mode	Test Channel MHz	ANT 0		ANT 1		Result
		26 dB Bandwidth MHz	99% Bandwidth MHz	26 dB Bandwidth MHz	99% Bandwidth MHz	
802.11a	5180	26.28	18.16	27.00	18.08	Pass
	5200	27.48	18.16	26.76	18.16	Pass
	5240	20.40	16.88	20.40	16.88	Pass
802.11n-HT20	5180	27.60	18.72	27.72	18.72	Pass
	5200	27.60	18.80	27.24	18.72	Pass
	5240	20.70	17.76	20.60	17.76	Pass
802.11n-HT40	5190	39.84	36.16	39.68	36.00	Pass
	5230	39.68	36.16	38.84	36.00	Pass
802.11ac-VHT20	5180	27.72	18.72	27.72	18.72	Pass
	5200	27.48	18.72	27.72	18.72	Pass
	5240	20.60	17.76	20.60	17.68	Pass
802.11ac-VHT40	5190	39.84	36.00	39.84	36.00	Pass
	5230	39.68	36.00	39.52	36.00	Pass
802.11ac-VHT80	5210	81.00	75.20	80.64	75.20	Pass

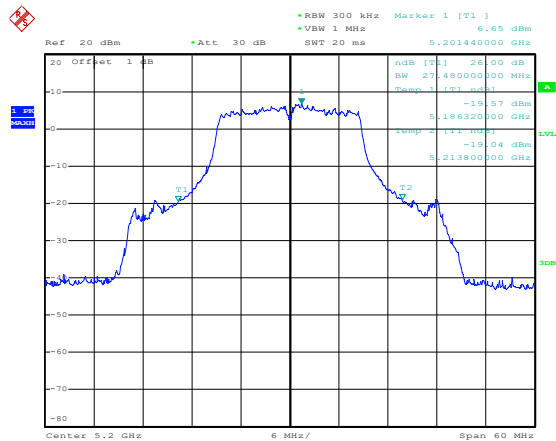
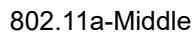
ANT 0

26 dB Bandwidth

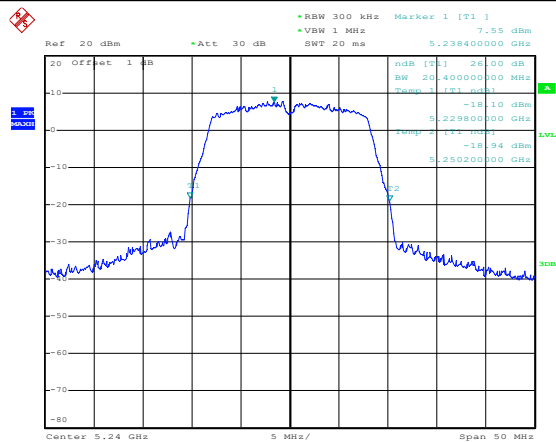
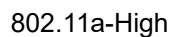
5150-5250MHz



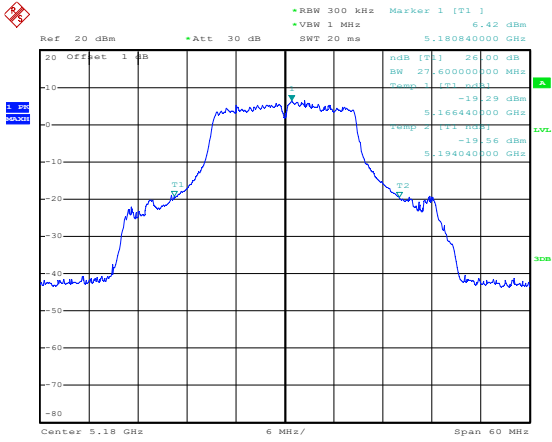
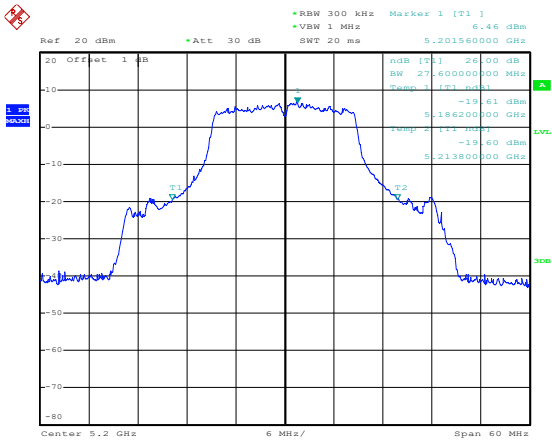
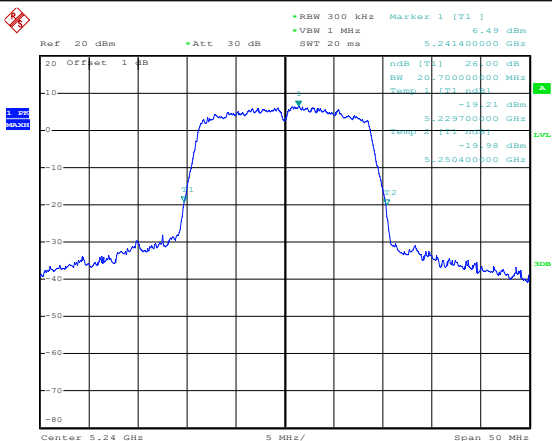
Date: 3.DEC.2024 19:00:30



Date: 3.DEC.2024 19:00:58



Date: 3.DEC.2024 18:59:45

802.11n-HT20-Low	 Ref 20 dBm *Att 30 dB SWT 20 ms Marker 1 [T1] 5.180840000 GHz ndB [T1] 26.00 dB SW 27.600000000 MHz Temp 1 [T1] ndB -19.29 dBm 5.166440000 GHz -19.56 dBm 5.194040000 GHz Center 5.18 GHz 6 MHz/ Span 60 MHz Date: 3.DEC.2024 18:58:46
802.11n-HT20-Middle	 Ref 20 dBm *Att 30 dB SWT 20 ms Marker 1 [T1] 5.201560000 GHz ndB [T1] 26.00 dB SW 27.600000000 MHz Temp 1 [T1] ndB -19.61 dBm 5.186200000 GHz -19.40 dBm 5.213800000 GHz Center 5.2 GHz 6 MHz/ Span 60 MHz Date: 3.DEC.2024 18:59:06
802.11n-HT20-High	 Ref 20 dBm *Att 30 dB SWT 20 ms Marker 1 [T1] 5.241400000 GHz ndB [T1] 26.00 dB SW 20.700000000 MHz Temp 1 [T1] ndB -19.21 dBm 5.229700000 GHz -19.98 dBm 5.250400000 GHz Center 5.24 GHz 5 MHz/ Span 50 MHz Date: 3.DEC.2024 18:59:29

[illegible]

802.11ac-VHT20-Middle

802.11ac-VHT20-High

802.11ac-VHT40-Low

Ref 20 dBm Att 30 dB RBW 300 kHz VBW 1 MHz Marker 1 [T1] 6.72 dBm

20 Offset 1 dB

10 0 -10 -20 -30 -40 -50 -60 -70 -80

Center 5.2 GHz 6 MHz/ Span 60 MHz

ndB [T1] 26.90 dB BW 27.48000000 MHz Temp 1 [X1] dBm -19.70 dBm 5.18644000 GHz Temp 2 [X2] dBm -19.42 dBm 5.21392000 GHz

802.11ac-VHT20-Middle

802.11ac-VHT20-High

Ref 20 dBm Att 30 dB RBW 300 kHz VBW 1 MHz Marker 1 [T1] 6.70 dBm

20 Offset 1 dB

10 0 -10 -20 -30 -40 -50 -60 -70 -80

Center 5.24 GHz 5 MHz/ Span 50 MHz

ndB [T1] 26.90 dB BW 20.60000000 MHz Temp 1 [X1] dBm -18.89 dBm 5.22970000 GHz Temp 2 [X2] dBm -18.36 dBm 5.25030000 GHz

802.11ac-VHT20-High

802.11ac-VHT40-Low

Ref 20 dBm Att 30 dB RBW 300 kHz VBW 1 MHz Marker 1 [T1] 2.85 dBm

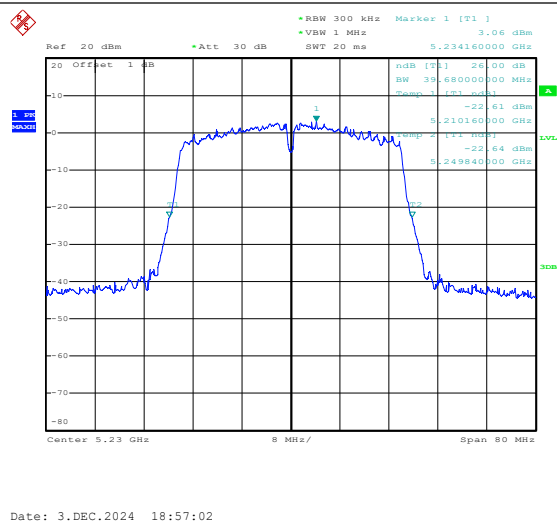
20 Offset 1 dB

10 0 -10 -20 -30 -40 -50 -60 -70 -80

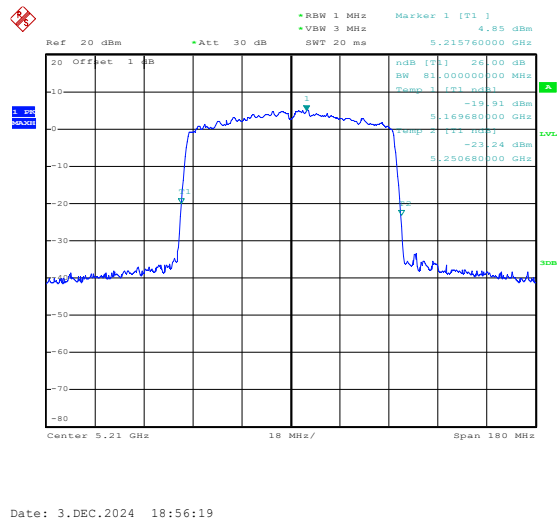
Center 5.19 GHz 8 MHz/ Span 80 MHz

ndB [T1] 26.90 dB BW 39.84000000 MHz Temp 1 [X1] dBm -23.50 dBm 5.17016000 GHz Temp 2 [X2] dBm -23.12 dBm 5.21000000 GHz

802.11ac-VHT40-High



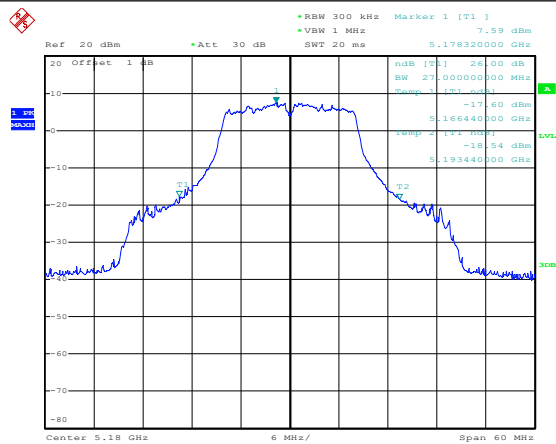
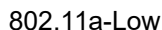
802.11ac-VHT80



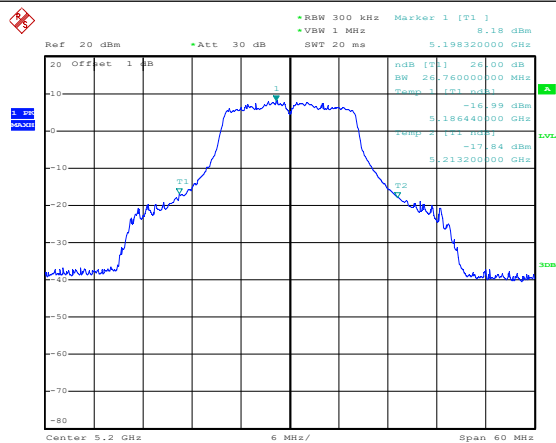
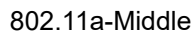
ANT 1

26 dB Bandwidth

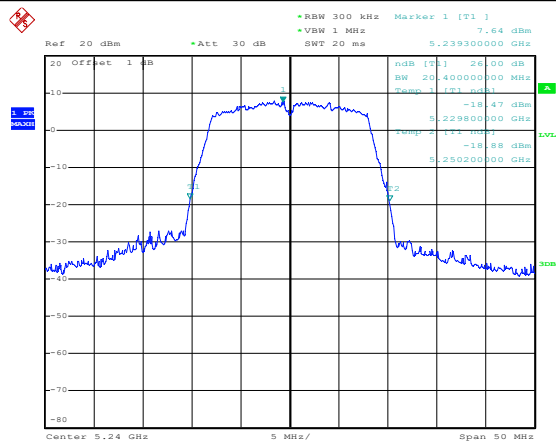
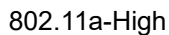
5150-5250MHz



Date: 3.DEC.2024 17:47:06

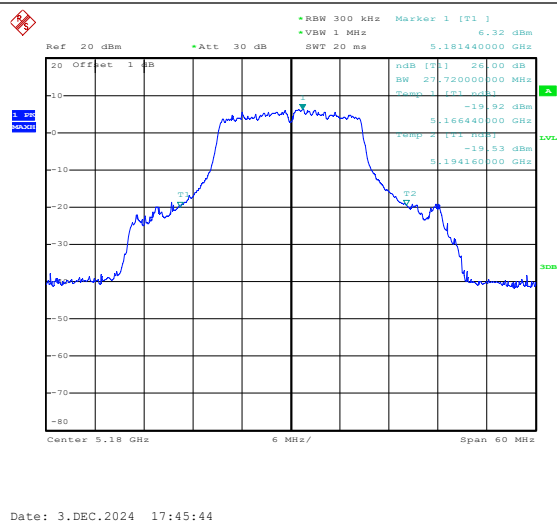


Date: 3.DEC.2024 17:46:48

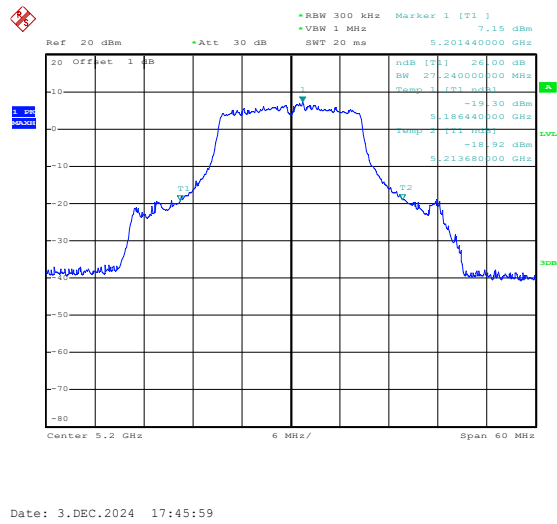


Date: 3.DEC.2024 17:46:30

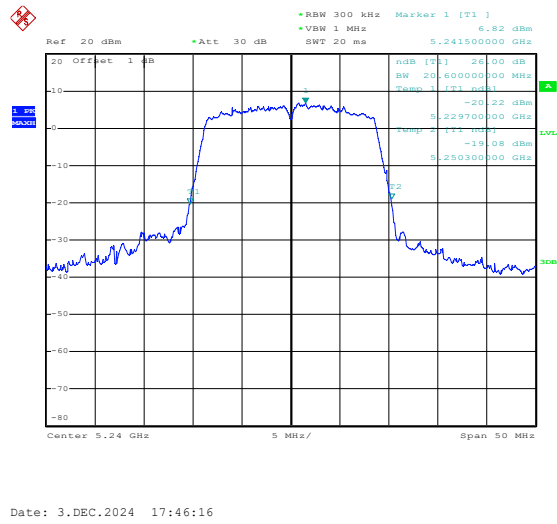
802.11n-HT20-Low

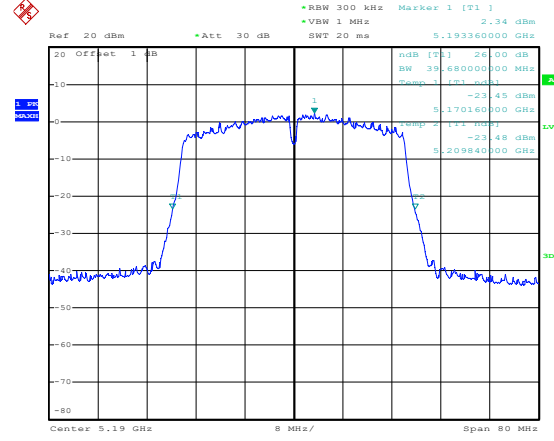
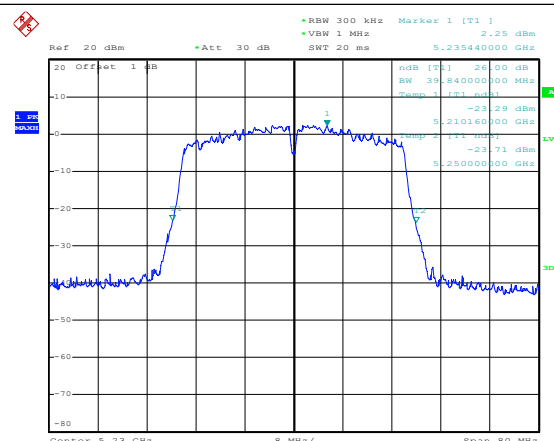
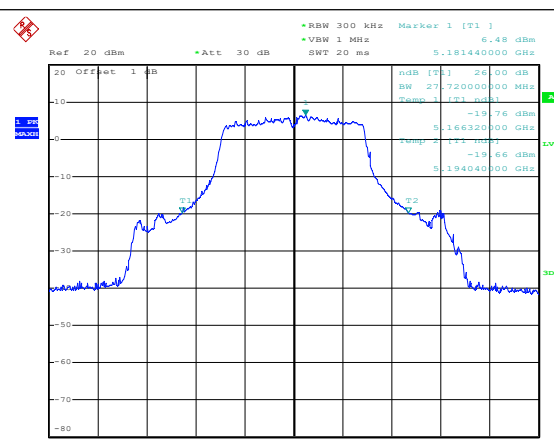


802.11n-HT20-Middle



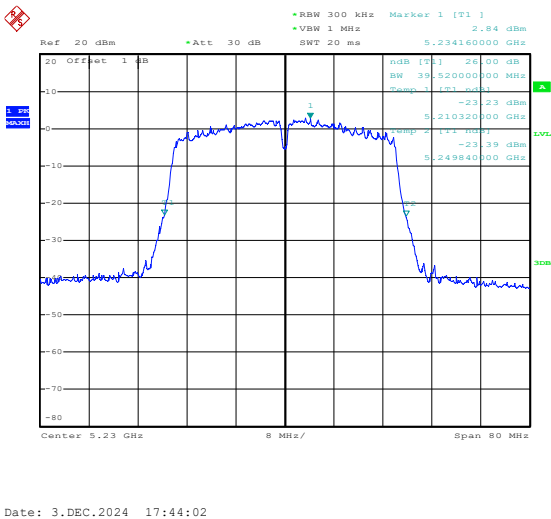
802.11n-HT20-High



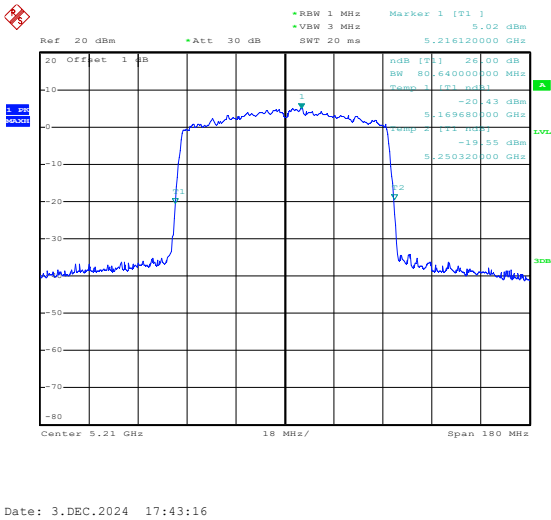
802.11n-HT40-Low	 Date: 3.DEC.2024 17:44:30
802.11n-HT40-High	 Date: 3.DEC.2024 17:44:14
802.11ac-VHT20-Low	 Date: 3.DEC.2024 17:45:27

[illegible]

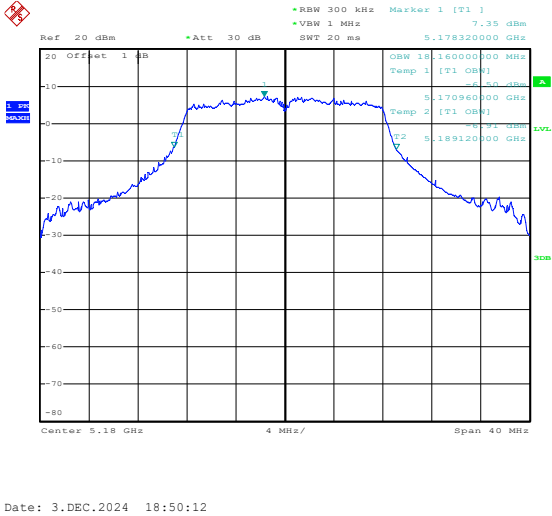
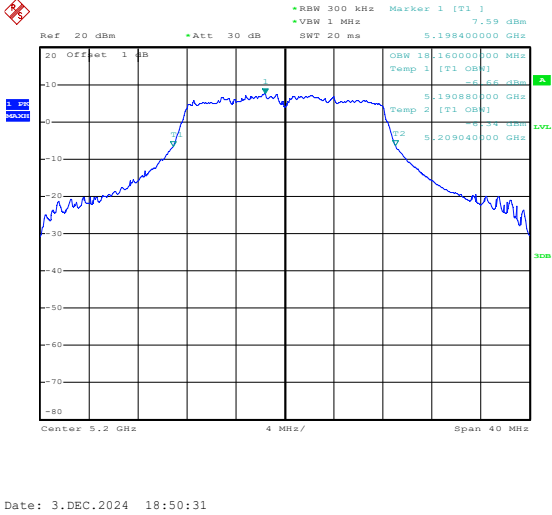
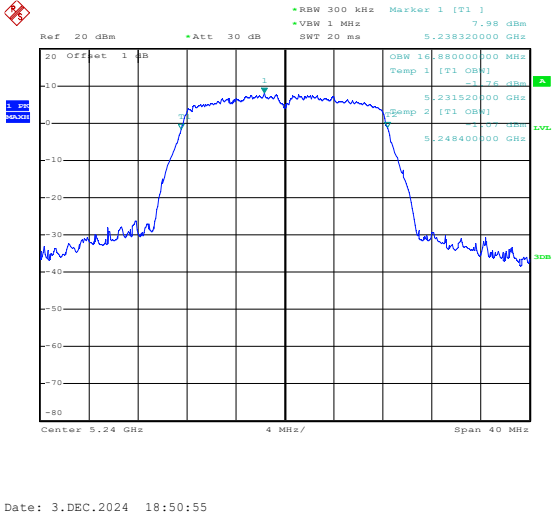
802.11ac-VHT40-High

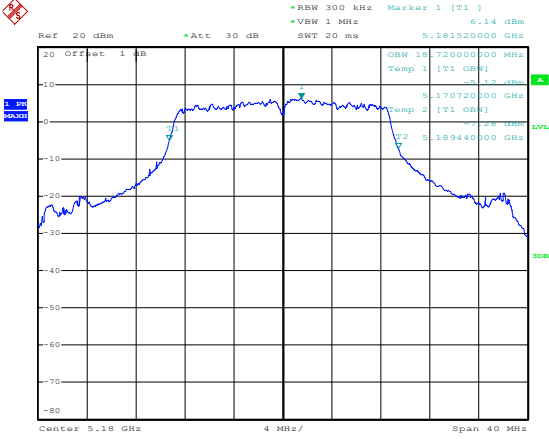
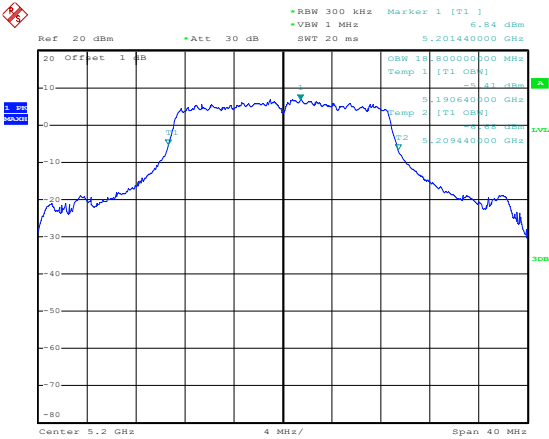
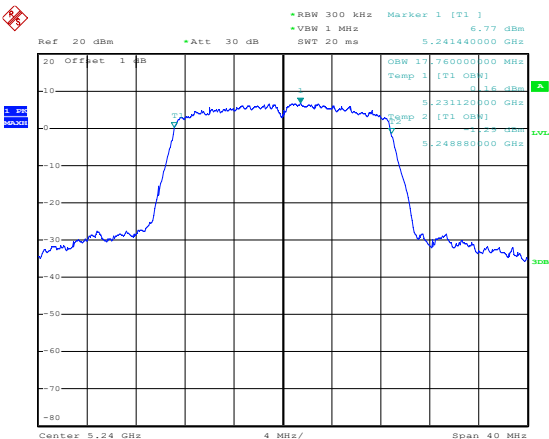


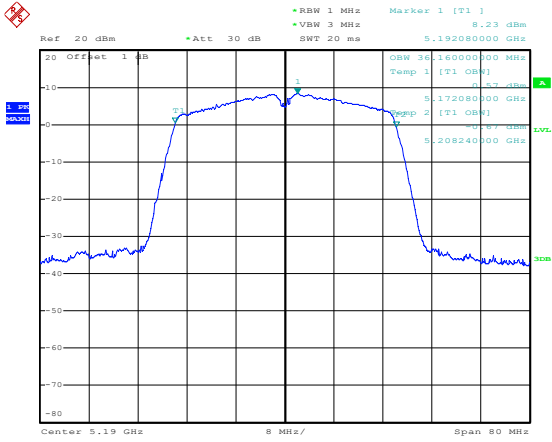
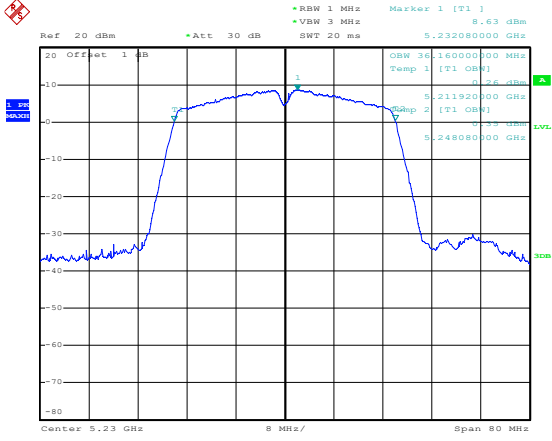
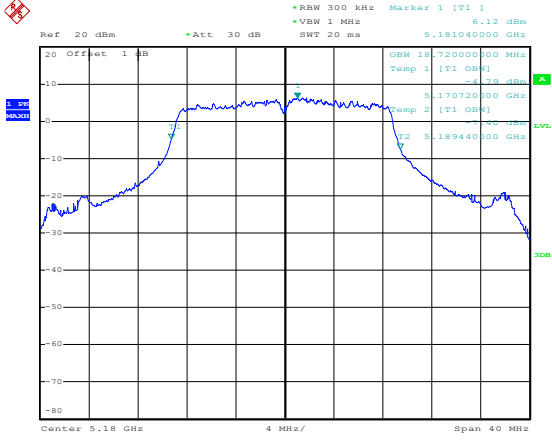
802.11ac-VHT80

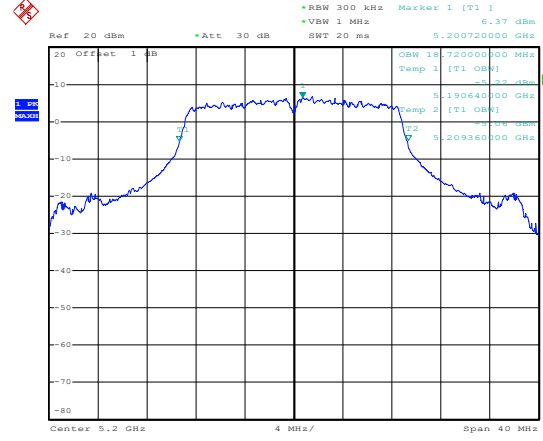
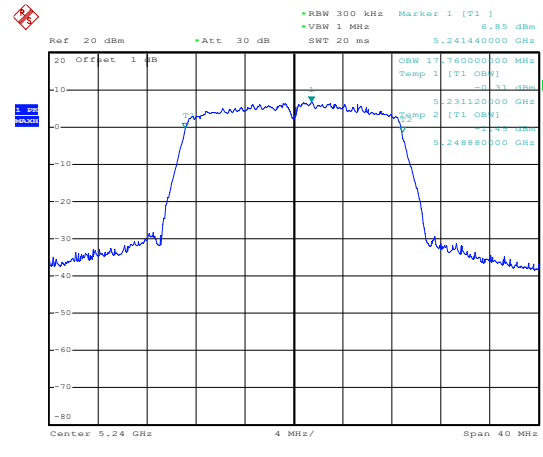
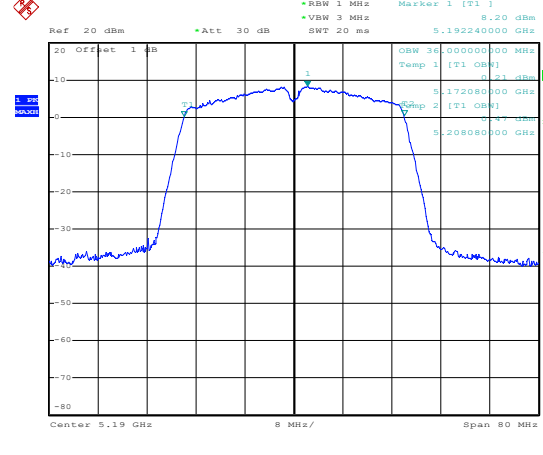


ANT 0
99% Bandwidth
5150-5250MHz

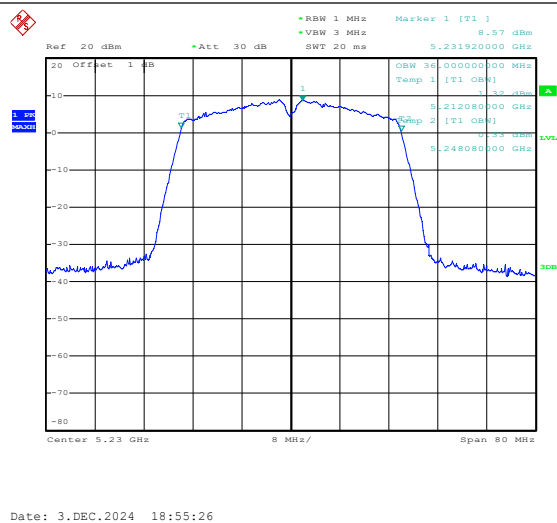
802.11a-Low	 Date: 3.DEC.2024 18:50:12
802.11a-Middle	 Date: 3.DEC.2024 18:50:31
802.11a-High	 Date: 3.DEC.2024 18:50:55

802.11n-HT20-Low	 Ref 20 dBm *Att 30 dB SWT 20 ms RBW 300 kHz Marker 1 [T1] 6.14 dBm VSW 1 MHz 5.181520000 GHz OSW 18.720000000 MHz Temp 1 [T1] 0.00 dBm Temp 2 [T1] 0.00 dBm 5.170720000 GHz 5.189440000 GHz Center 5.18 GHz 4 MHz/ Span 40 MHz Date: 3.DEC.2024 18:52:41
802.11n-HT20-Middle	 Ref 20 dBm *Att 30 dB SWT 20 ms RBW 300 kHz Marker 1 [T1] 6.84 dBm VSW 1 MHz 5.201440000 GHz OSW 18.720000000 MHz Temp 1 [T1] 0.00 dBm Temp 2 [T1] 0.00 dBm 5.190640000 GHz 5.209440000 GHz Center 5.2 GHz 4 MHz/ Span 40 MHz Date: 3.DEC.2024 18:52:19
802.11n-HT20-High	 Ref 20 dBm *Att 30 dB SWT 20 ms RBW 300 kHz Marker 1 [T1] 6.77 dBm VSW 1 MHz 5.241440000 GHz OSW 17.760000000 MHz Temp 1 [T1] 0.00 dBm Temp 2 [T1] 0.00 dBm 5.231120000 GHz 5.248880000 GHz Center 5.24 GHz 4 MHz/ Span 40 MHz Date: 3.DEC.2024 18:51:33

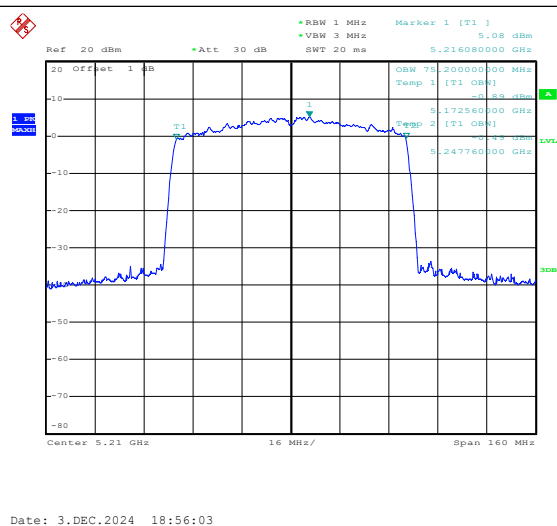
802.11n-HT40-Low	 Ref 20 dBm *Att 30 dB SWT 20 ms Marker 1 [T1] 5.192080000 GHz 8.23 dBm OSW 30.160000000 MHz Temp 1 [T1] 0.27 dBm 5.172080000 GHz 5.172080000 GHz 5.172080000 GHz 5.172080000 GHz Center 5.19 GHz 8 MHz/ Span 80 MHz Date: 3.DEC.2024 18:54:21
802.11n-HT40-High	 Ref 20 dBm *Att 30 dB SWT 20 ms Marker 1 [T1] 5.232080000 GHz 8.63 dBm OSW 30.160000000 MHz Temp 1 [T1] 0.26 dBm 5.211920000 GHz 5.211920000 GHz 5.211920000 GHz 5.211920000 GHz Center 5.23 GHz 8 MHz/ Span 80 MHz Date: 3.DEC.2024 18:55:05
802.11ac-VHT20-Low	 Ref 20 dBm *Att 30 dB SWT 20 ms Marker 1 [T1] 5.181040000 GHz 6.12 dBm OSW 18.720000000 MHz Temp 1 [T1] 0.25 dBm 5.170720000 GHz 5.170720000 GHz 5.170720000 GHz 5.170720000 GHz Center 5.18 GHz 4 MHz/ Span 40 MHz Date: 3.DEC.2024 18:52:58

Channel	Plot	Ref	Att	RBW	VBW	Span	Center	Date
802.11ac-VHT20-Middle		20 dBm	30 dB	300 kHz	1 MHz	40 MHz	5.2 GHz	3.DEC.2024 18:53:15
802.11ac-VHT20-High		20 dBm	30 dB	300 kHz	1 MHz	40 MHz	5.24 GHz	3.DEC.2024 18:53:38
802.11ac-VHT40-Low		20 dBm	30 dB	1 MHz	3 MHz	80 MHz	5.19 GHz	3.DEC.2024 18:55:42

802.11ac-VHT40-High



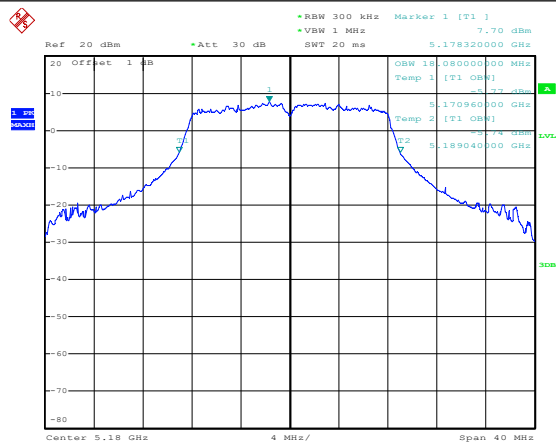
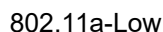
802.11ac-VHT80



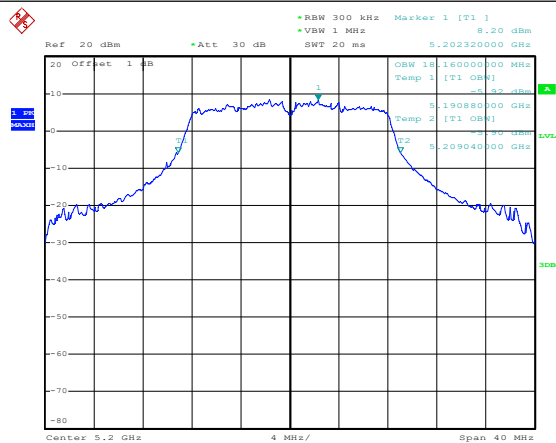
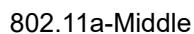
ANT 1

99% Bandwidth

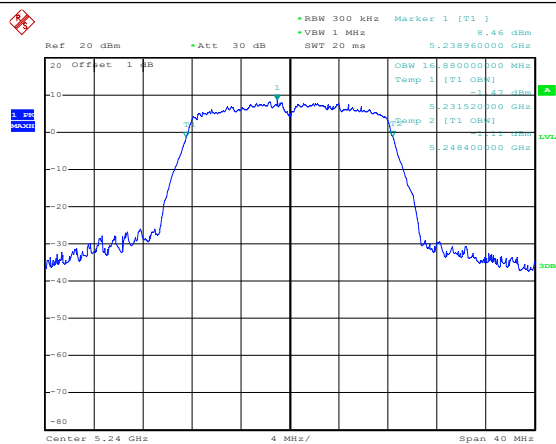
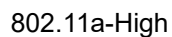
5150-5250MHz



Date: 3.DEC.2024 17:39:25



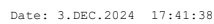
Date: 3.DEC.2024 17:39:42



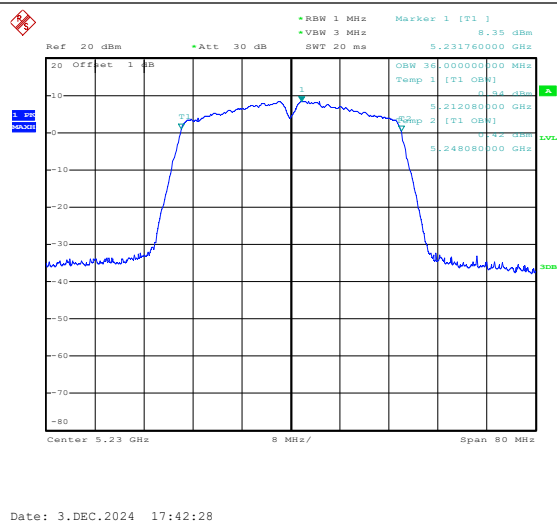
Date: 3.DEC.2024 17:39:56

802.11n-HT20-Low	Ref 20 dBm *Att 30 dB SWT 20 ms RBW 300 kHz VBW 1 MHz Marker 1 [T1] 6.56 dBm 5.181440000 GHz 20 Offset 1 dB 10 0 -10 -20 -30 -40 -50 -60 -70 -80 OSW 18.720000000 MHz Temp 1 [T1 OSW] 5.170720000 GHz Temp 2 [T1 OSW] 5.189440000 GHz Center 5.18 GHz 4 MHz/ Span 40 MHz Date: 3.DEC.2024 17:40:52
802.11n-HT20-Middle	Ref 20 dBm *Att 30 dB SWT 20 ms RBW 300 kHz VBW 1 MHz Marker 1 [T1] 7.03 dBm 5.201440000 GHz 20 Offset 1 dB 10 0 -10 -20 -30 -40 -50 -60 -70 -80 OSW 18.720000000 MHz Temp 1 [T1 OSW] 5.190640000 GHz Temp 2 [T1 OSW] 5.209360000 GHz Center 5.2 GHz 4 MHz/ Span 40 MHz Date: 3.DEC.2024 17:40:30
802.11n-HT20-High	Ref 20 dBm *Att 30 dB SWT 20 ms RBW 300 kHz VBW 1 MHz Marker 1 [T1] 6.72 dBm 5.241040000 GHz 20 Offset 1 dB 10 0 -10 -20 -30 -40 -50 -60 -70 -80 OSW 17.760000000 MHz Temp 1 [T1 OSW] 5.231120000 GHz Temp 2 [T1 OSW] 5.248880000 GHz Center 5.24 GHz 4 MHz/ Span 40 MHz Date: 3.DEC.2024 17:40:14

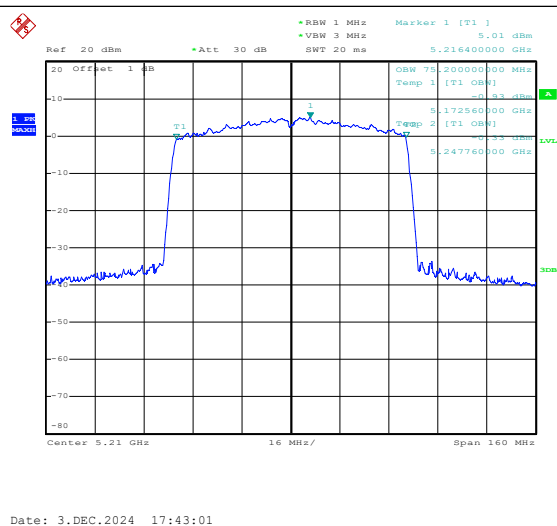
[illegible]



802.11ac-VHT40-High



802.11ac-VHT80



APPENDIX C

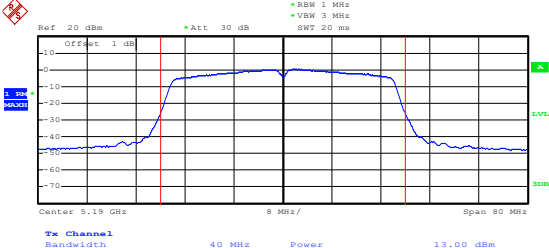
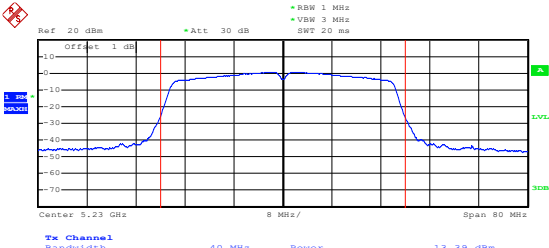
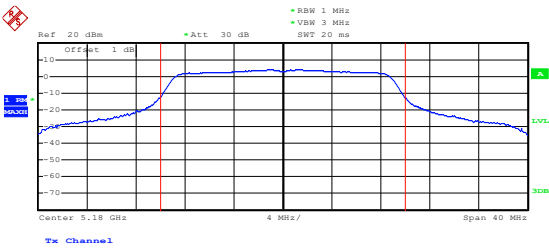
Maximum Conducted Output Power

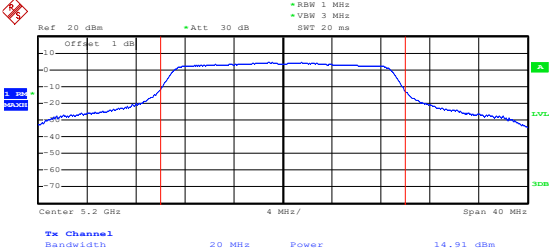
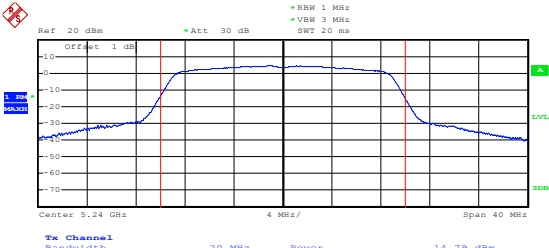
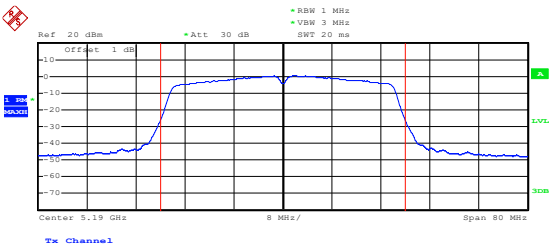
U-NII-1:5150-5250MHz					
Test mode	Frequency MHz	Output Power dBm		Total dBm	Limit dBm
		ANT 0	ANT 1		
802.11a	5180	15.59	15.55	/	23.98
	5200	15.89	16.17	/	23.98
	5240	15.82	16.10	/	23.98
802.11n-HT20	5180	14.43	14.58	17.52	23.98
	5200	14.93	15.11	18.03	23.98
	5240	14.81	15.10	17.97	23.98
802.11n-HT40	5190	13.00	12.55	15.79	23.98
	5230	13.39	13.17	16.29	23.98
802.11ac-VHT20	5180	14.49	14.64	17.58	23.98
	5200	14.91	15.10	18.02	23.98
	5240	14.79	15.03	17.92	23.98
802.11ac-VHT40	5190	13.01	12.53	15.79	23.98
	5230	13.42	13.12	16.28	23.98
802.11ac-VHT80	5210	12.93	12.81	15.88	23.98

ANT 0
5150-5250MHz

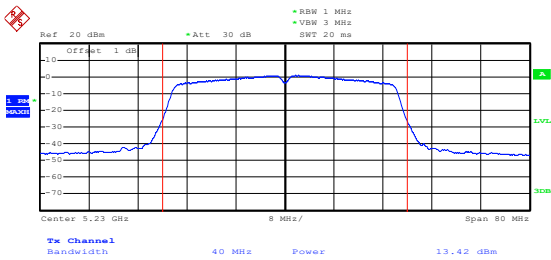
802.11a-Low	Date: 3.DEC.2024 18:40:20
802.11a-Middle	Date: 3.DEC.2024 18:40:41
802.11a-High	Date: 3.DEC.2024 18:41:18

802.11n-HT20-Low	Date: 3.DEC.2024 18:42:05
802.11n-HT20-Middle	Date: 3.DEC.2024 18:41:47
802.11n-HT20-High	Date: 3.DEC.2024 18:41:31

802.11n-HT40-Low	 Date: 3.DEC.2024 18:43:27
802.11n-HT40-High	 Date: 3.DEC.2024 18:43:45
802.11ac-VHT20-Low	 Date: 3.DEC.2024 18:42:23

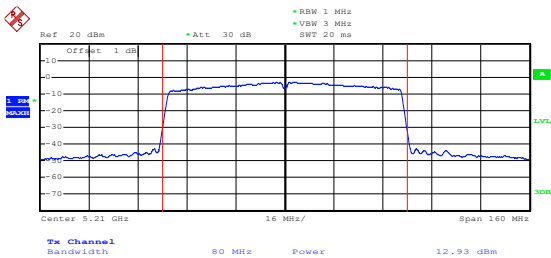
802.11ac-VHT20-Middle	 Date: 3.DEC.2024 18:42:37
802.11ac-VHT20-High	 Date: 3.DEC.2024 18:42:51
802.11ac-VHT40-Low	 Date: 3.DEC.2024 18:44:34

802.11ac-VHT40-High



Date: 3.DEC.2024 18:44:08

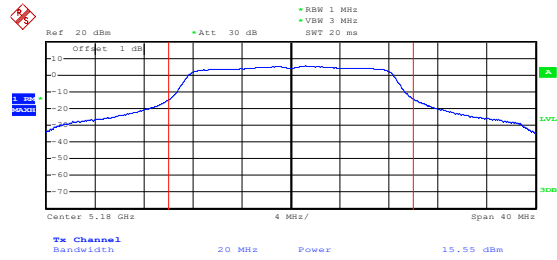
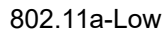
802.11ac-VHT80



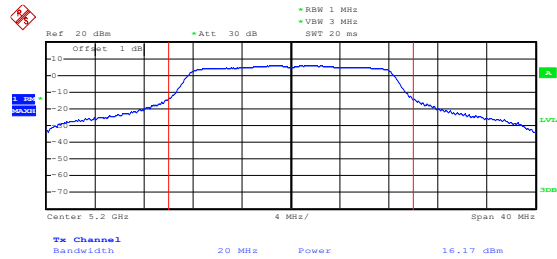
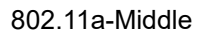
Date: 3.DEC.2024 18:45:05

ANT 1

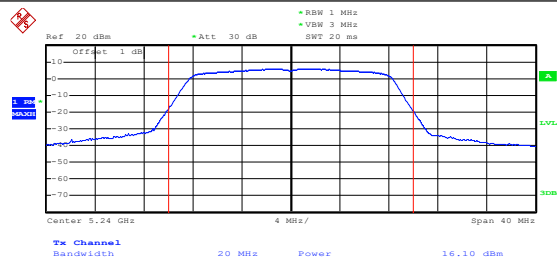
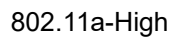
5150-5250MHz



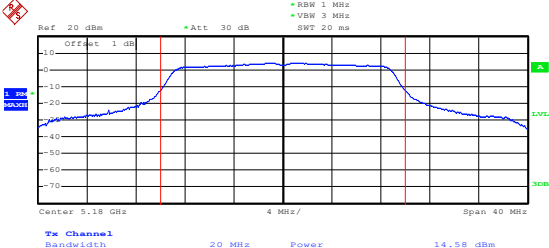
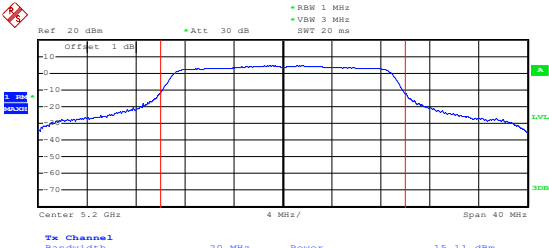
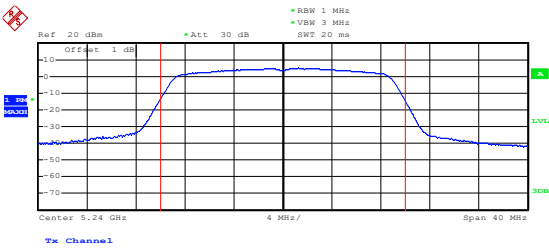
Date: 3.DEC.2024 17:30:46



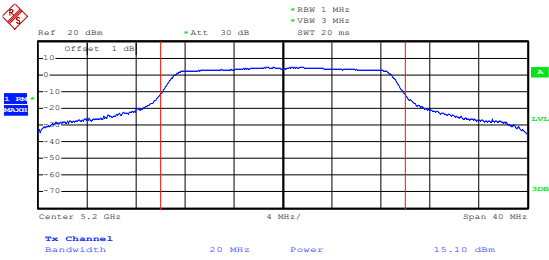
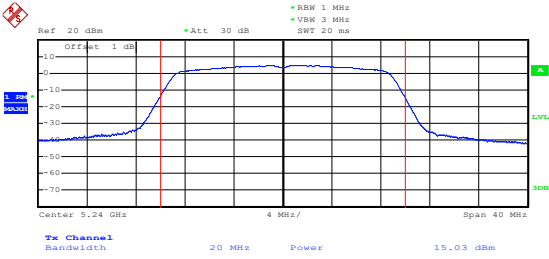
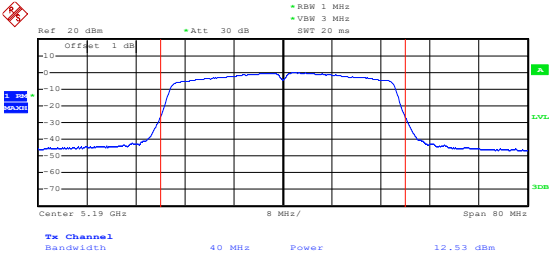
Date: 3.DEC.2024 17:31:09



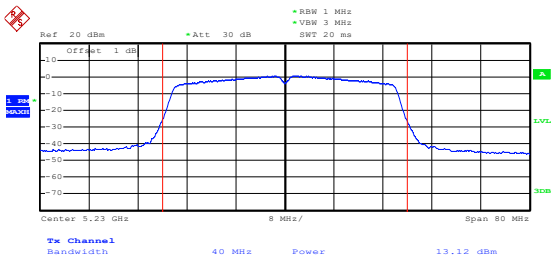
Date: 3.DEC.2024 17:31:25

802.11n-HT20-Low	 Ref: 20 dBm Offset: 1 dB Att: 30 dB RBW: 1 MHz VBW: 3 MHz SWT: 20 ms Center: 5.18 GHz Span: 40 MHz Tx Channel Bandwidth: 20 MHz Power: -14.58 dBm Date: 3.DEC.2024 17:32:12
802.11n-HT20-Middle	 Ref: 20 dBm Offset: 1 dB Att: 30 dB RBW: 1 MHz VBW: 3 MHz SWT: 20 ms Center: 5.2 GHz Span: 40 MHz Tx Channel Bandwidth: 20 MHz Power: -15.11 dBm Date: 3.DEC.2024 17:31:57
802.11n-HT20-High	 Ref: 20 dBm Offset: 1 dB Att: 30 dB RBW: 1 MHz VBW: 3 MHz SWT: 20 ms Center: 5.24 GHz Span: 40 MHz Tx Channel Bandwidth: 20 MHz Power: -15.10 dBm Date: 3.DEC.2024 17:31:40

802.11n-HT40-Low	Date: 3.DEC.2024 17:33:26
802.11n-HT40-High	Date: 3.DEC.2024 17:33:54
802.11ac-VHT20-Low	Date: 3.DEC.2024 17:32:26

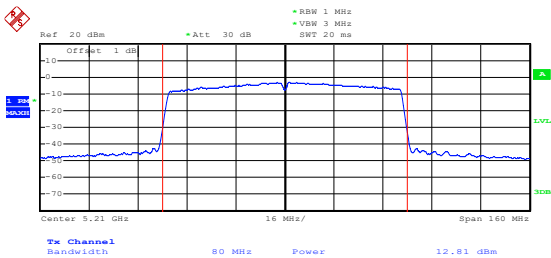
802.11ac-VHT20-Middle	 Date: 3.DEC.2024 17:32:41
802.11ac-VHT20-High	 Date: 3.DEC.2024 17:32:56
802.11ac-VHT40-Low	 Date: 3.DEC.2024 17:34:37

802.11ac-VHT40-High



Date: 3.DEC.2024 17:34:17

802.11ac-VHT80



Date: 3.DEC.2024 17:34:59

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%	5.0	-30	497	0.096
100%		-20	492	0.095
100%		-10	495	0.095
100%		0	503	0.097
100%		+10	494	0.095
100%		+20	506	0.097
100%		+30	491	0.094
100%		+40	492	0.095
100%		+50	509	0.098
Low Battery power	4.50	+20	491	0.094
High Battery power	5.50	+20	507	0.098

APPENDIX PHOTOGRAPHS

Please refer to “ANNEX”

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