

TEST REPORT

Reference No..... : WTH23X05094416W001
FCC ID..... : XOMCETV65UQW1F2US
Applicant : Shenzhen Qiyue Optronics Company Limited
Address..... : Flat3,Tower 3, Excellence Meilin Center Plaza, Zhongkang Road 128,
Shangmeilin, Futian District, Shenzhen , China
Manufacturer : SHENZHEN QIYUE OPTRONICS COMPANY LIMITED BRANCH
Address..... : A/B/C/D Building, Xitian Industrial Park, Dashuikeng Community,Guanlan
Street, Longhua New District, Shenzhen City, China
Product Name : 65" LED UHD TV
Model No..... : CE-TV65UQW1F2US
Standards : FCC Part 15.407
Date of Receipt sample : 2023-05-04
Date of Test..... : 2023-05-04 to 2023-05-29
Date of Issue : 2023-05-29
Test Report Form No. : WTX_Part 15_407W
Test Result..... : **Pass**

Remarks:

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

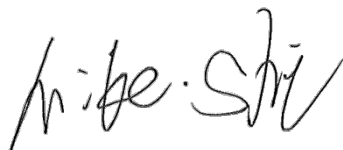
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Report version

Version No.	Date of issue	Description
Rev.00	2023-05-29	Original
/	/	/

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Factory:	YIBIN WANXIN Electronic Technology Co.,LTD
Address of factory	Building 5, building6, Yibin Wanxin Electronic Technology Intelligent Terminal Industrial Park, Xinggong Road West 136, Lingang Economic Development Zone Yibin city, Sichuan province.

General Description of EUT	
Product Name:	65" LED UHD TV
Trade Name:	Continental
Model No.:	CE-TV65UQW1F2US
Adding Model(s):	D65N218-U-A-I, XXXXXXXX65XXXXXXXX(Where "X" can be any alphanumeric of A-Z or 0-9 or blank or -, indicates different client)
Rated Voltage:	AC120V/60Hz
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 CE-TV65UQW1F2US, 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-VHT80
Frequency Range:	5150-5250MHz, 5725-5850MHz
RF Output Power:	5150-5250MHz: Antenna 0: 14.41dBm (Conducted) Antenna 1: 14.45dBm (Conducted) 5725-5850MHz: Antenna 0: 13.33dBm (Conducted) Antenna 1: 12.57dBm (Conducted)
Type of Modulation:	QPSK, 16QAM, 64QAM,256QAM
Type of Antenna:	Integral Antenna
Antenna Gain:	5150-5250MHz Antenna 0 & 1: 1.93dBi 5725-5850MHz Antenna 0 & 1: 1.73dBi
<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 "3646631+=" into the calculator to enter the engineer mode, you can start to test. During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Mode	Ant.	Test Frequency (MHz)												
		NCB: 20MHz												
		5180	5200	5240	5260	5300	5320	5500	5580	5700	5720	5745	5785	5825
802.11a 6Mbps	ANT 0	75	75	75	/	/	/	/	/	/	/	67	67	67
	ANT 1	70	70	70	/	/	/	/	/	/	/	58	58	58
802.11n-HT20 MCS0	ANT 0	72	72	72	/	/	/	/	/	/	/	60	60	60
	ANT 1	65	65	65	/	/	/	/	/	/	/	55	55	55
Mode	Ant.	NCB: 40MHz												
		5190	5230	5270	5310	5510	5550	5670	5710	5755	5795			
802.11n-HT40 MCS0	ANT 0	72	72	/	/	/	/	/	/	/	/	60	60	
	ANT 1	65	65	/	/	/	/	/	/	/	/	53	53	

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Mode	Ant.	NCB: 80MHz					
		5210	5290	5530	5610	5690	5775
65802.11ac-VH	ANT 0	70	/	/	/	/	60
80 MCS0/Nss2	ANT 1		/	/	/	/	53

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, 5745MHz, 5785MHz,5825MHz
TM2	802.11n-HT20	5180MHz,5200MHz,5240MHz,5745MHz, 5785MHz,5825MHz
TM3	802.11n-HT40	5190MHz,5230MHz, 5755MHz,5795MHz
TM4	802.11ac-VH80	5210MHz ,5775 MHz

Note1 : All test modes (different data rate and different modulation) are performed, but only the worst case is recorded in this report; 802.11ac-VHT20, 802.11ac-VHT40 covered by 802.11n-HT20 and 802.11n-HT40.

Note 2: The 5GHz WIFI has two antennas and support Multiple Outputs for 802.11n/ac mode for this report;
 For 5150-5250MHz: Antenna 0 Gain is 1.93dBi; Antenna 1 Gain is 1.93dBi;
 For 5725-5850MHz: Antenna 0 Gain is 1.73dBi; Antenna 1 Gain is 1.73dBi;
 According to KDB 662911, for same directional gain:
 For 5150-5250MHz: Directional gain = $G_{ANT} + 10 \log(N_{ANT})$ dBi = $1.93+10\log(2)$ dBi=4.94dBi
 For 5725-5850MHz: Directional gain = $G_{ANT} + 10 \log(N_{ANT})$ dBi = $1.73+10\log(2)$ dBi=4.74dBi

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

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
AC Cable	1.5	Unshielded	Without Ferrite

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
HDMI	1.5	Shielded	Without Ferrite

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
Computer	Dell	9MMJ442	/

1.8 Measurement Uncertainty

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

1.9 Test Equipment List and Details

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

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

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

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

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§15.203; §15.405	Antenna Requirement	Compliant
15.407 (c)	Automatically Discontinue Transmission	Compliant
§15.207; §15.407(b)(6)	Conducted Emission	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 integral 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 < 500kHz) 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 $RBW (< 500\text{kHz})$ 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 $RBW (< 1\text{MHz})$ is the reduced resolution bandwidth of spectrum analyzer set during measurement.
- e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Note: As a practical matter, it is recommended to use reduced RBW of 100kHz for the sections 5.c) and 5.d) above, since $RBW=100\text{kHz}$ 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.: WTH23X05094416W001

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 \geq 98 percent, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run".

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

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

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

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

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.

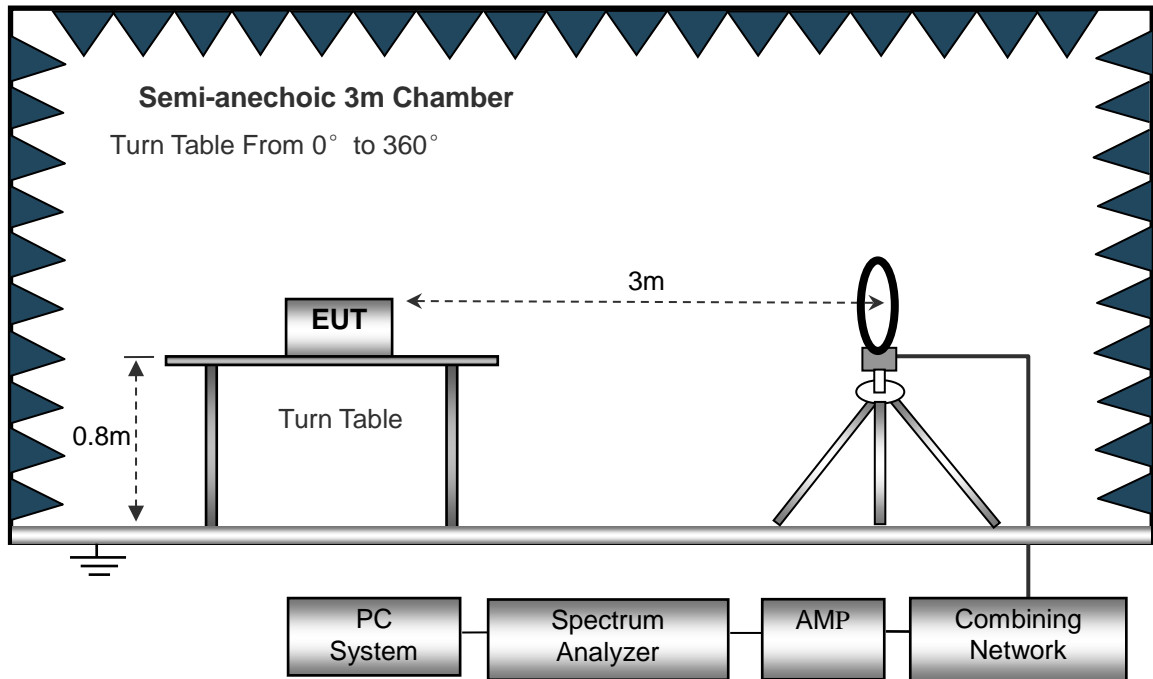
8.2 Test Procedure

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..

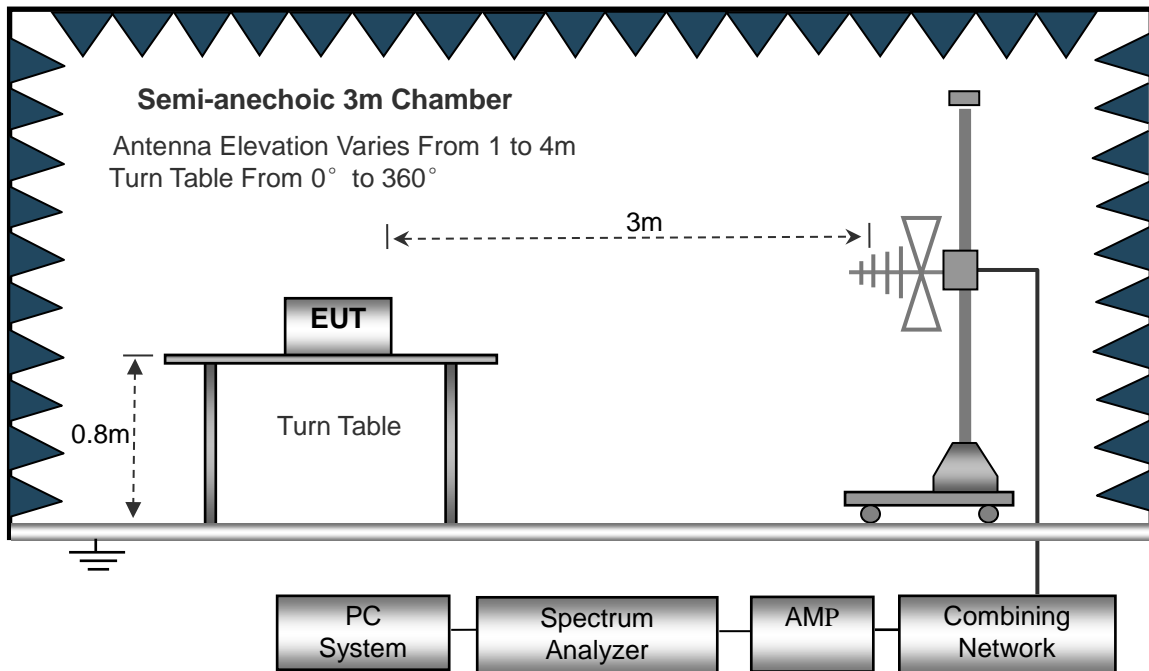
The external I/O cables were draped along the test table and formed a bundle 30 to 40cm long in the middle.

The spacing between the peripherals was 10cm.

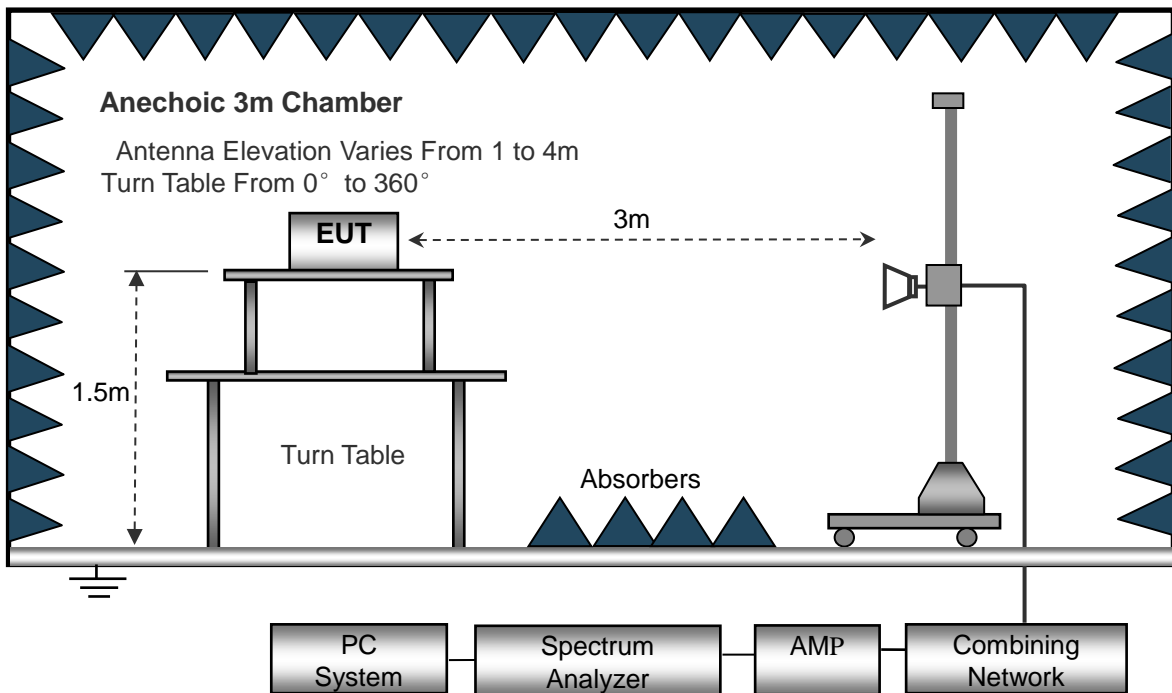
The test setup for emission measurement below 30MHz.



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:

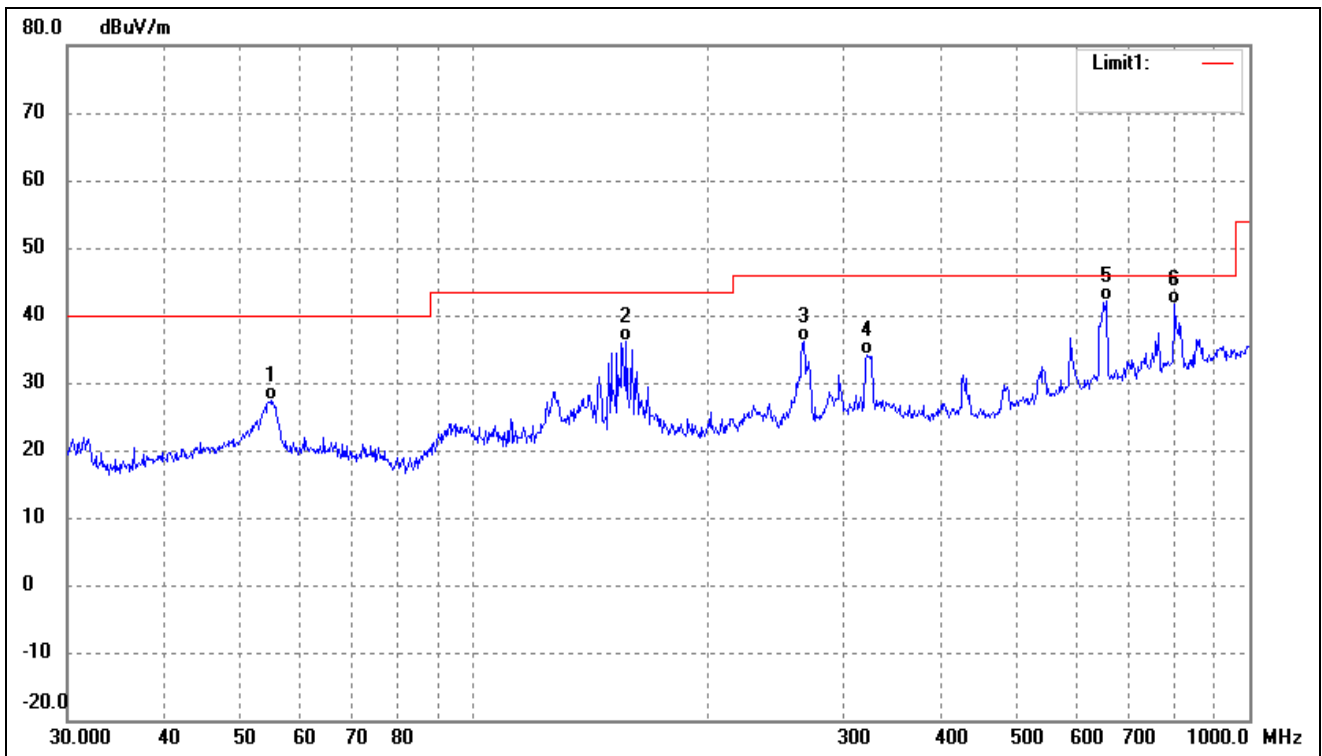
$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15 Limit}$$

8.5 Summary of Test Results/Plots

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

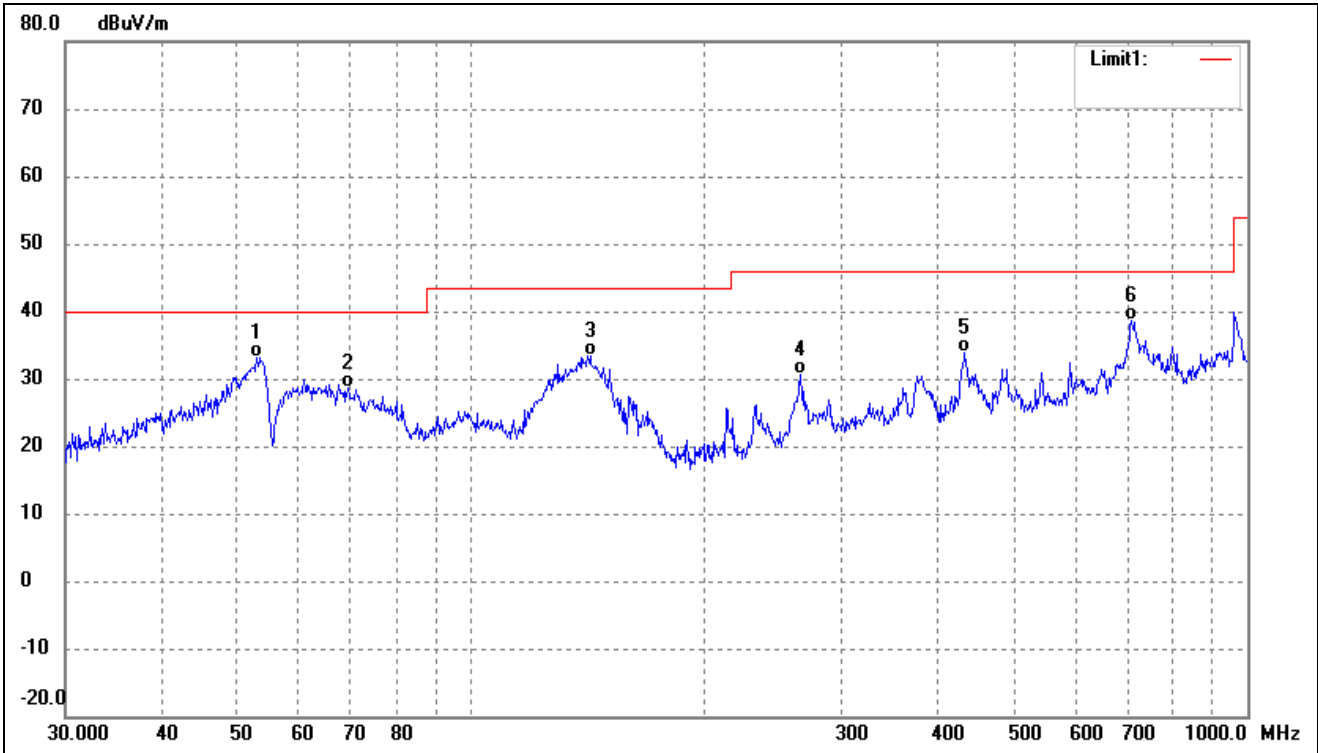
- Spurious Emission From 30MHz to 1GHz
- Antenna 0(Worst case)
- 5150-5250MHz

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



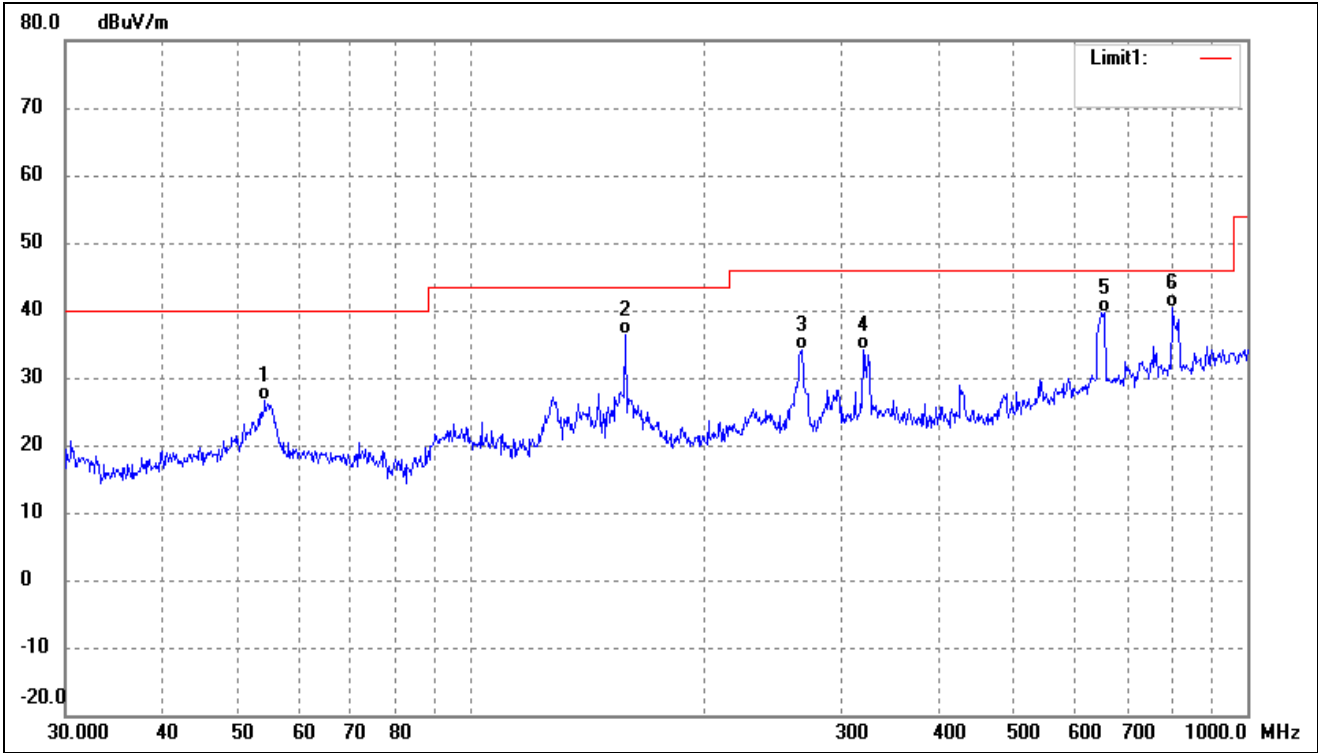
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	54.8348	34.88	-7.61	27.27	40.00	-12.73	-	-	QP
2	157.5589	47.48	-11.35	36.13	43.50	-7.37	-	-	QP
3	266.6089	42.16	-6.14	36.02	46.00	-9.98	-	-	QP
4	321.0608	38.34	-4.24	34.10	46.00	-11.90	-	-	QP
5	654.2318	40.06	2.03	42.09	46.00	-3.91	-	-	QP
6	801.7863	37.67	4.03	41.70	46.00	-4.30	-	-	QP

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



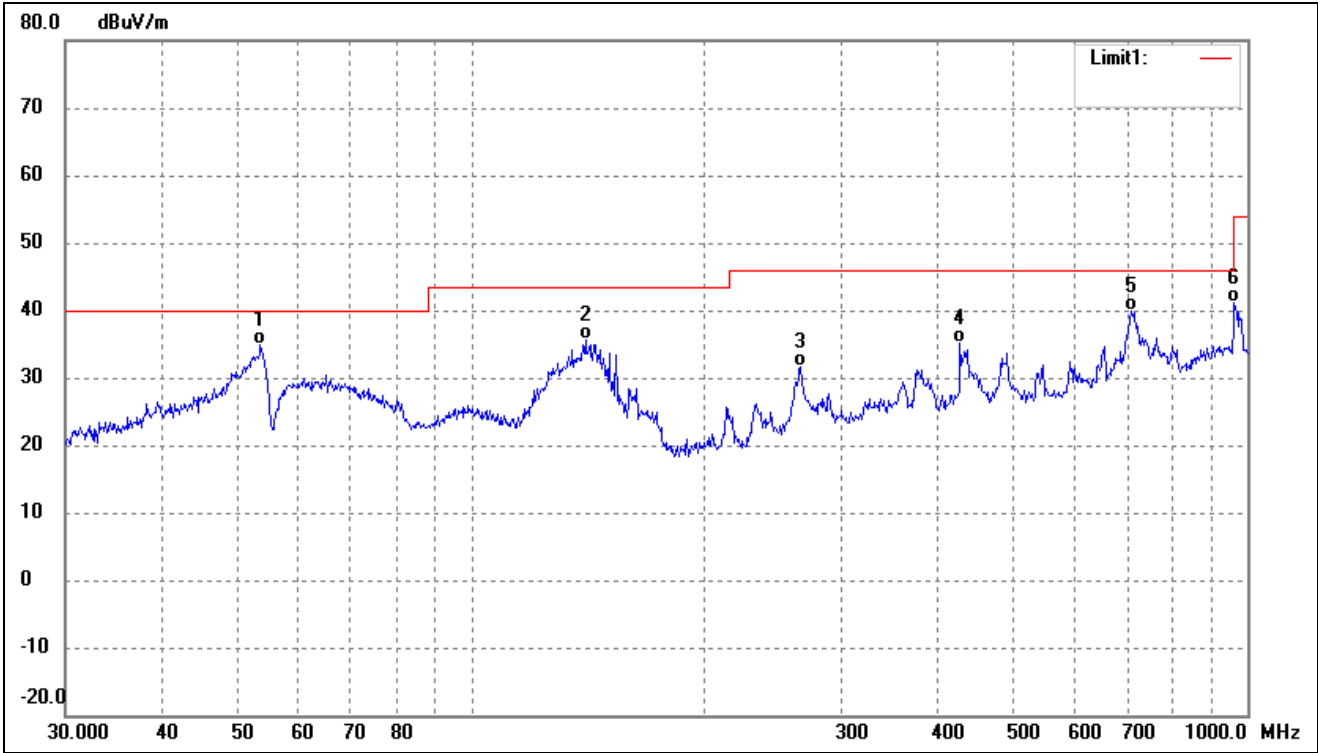
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	52.9453	40.55	-7.44	33.11	40.00	-6.89	-	-	QP
2	69.3568	39.90	-11.20	28.70	40.00	-11.30	-	-	QP
3	142.3244	45.24	-11.83	33.41	43.50	-10.09	-	-	QP
4	265.6757	36.86	-6.17	30.69	46.00	-15.31	-	-	QP
5	432.5457	36.08	-2.09	33.99	46.00	-12.01	-	-	QP
6	709.1823	36.44	2.11	38.55	46.00	-7.45	-	-	QP

802.11a(Worst case)			
Test Channel	5200MHz	Polarity:	Horizontal



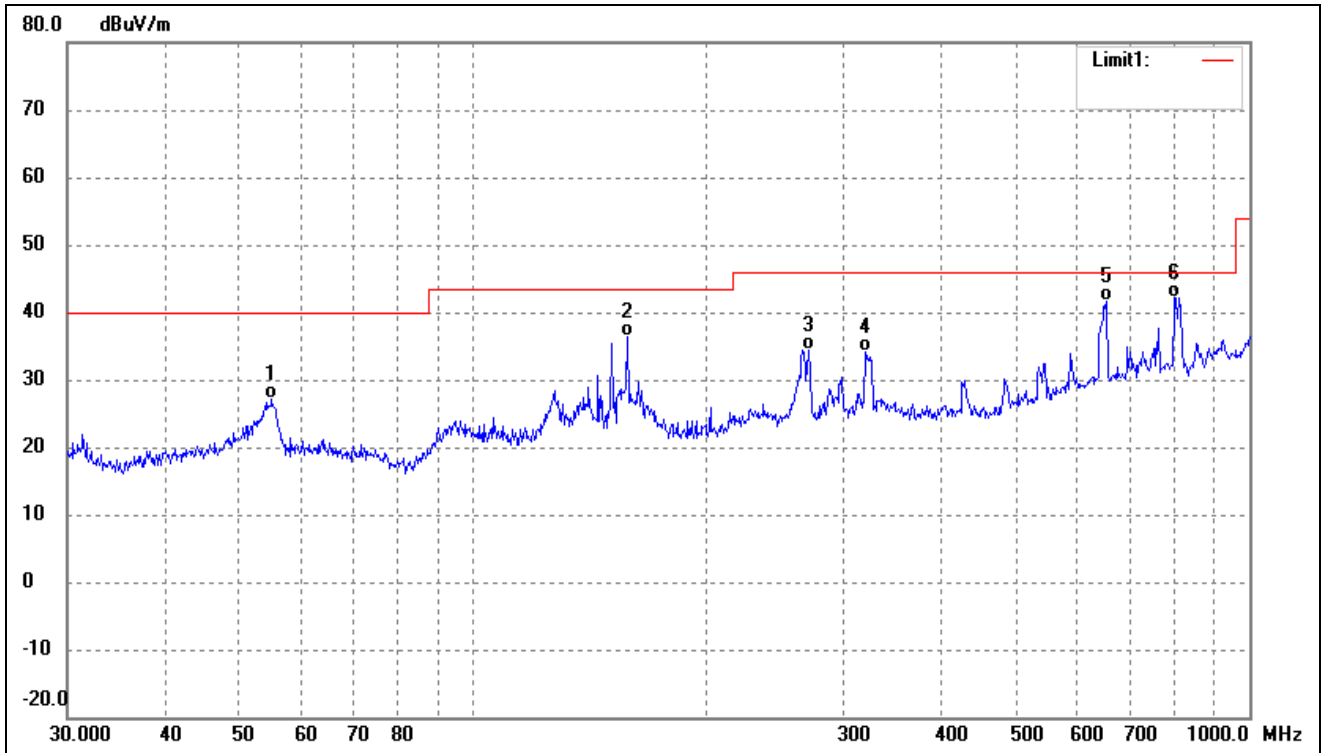
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (□)	Height (cm)	Remark
1	54.2610	34.23	-7.53	26.70	40.00	-13.30	-	-	QP
2	158.1123	47.68	-11.32	36.36	43.50	-7.14	-	-	QP
3	266.6089	40.27	-6.14	34.13	46.00	-11.87	-	-	QP
4	319.9370	38.36	-4.28	34.08	46.00	-11.92	-	-	QP
5	654.2318	37.69	2.03	39.72	46.00	-6.28	-	-	QP
6	801.7863	36.35	4.03	40.38	46.00	-5.62	-	-	QP

802.11a(Worst case)			
Test Channel	5200MHz	Polarity:	Vertical



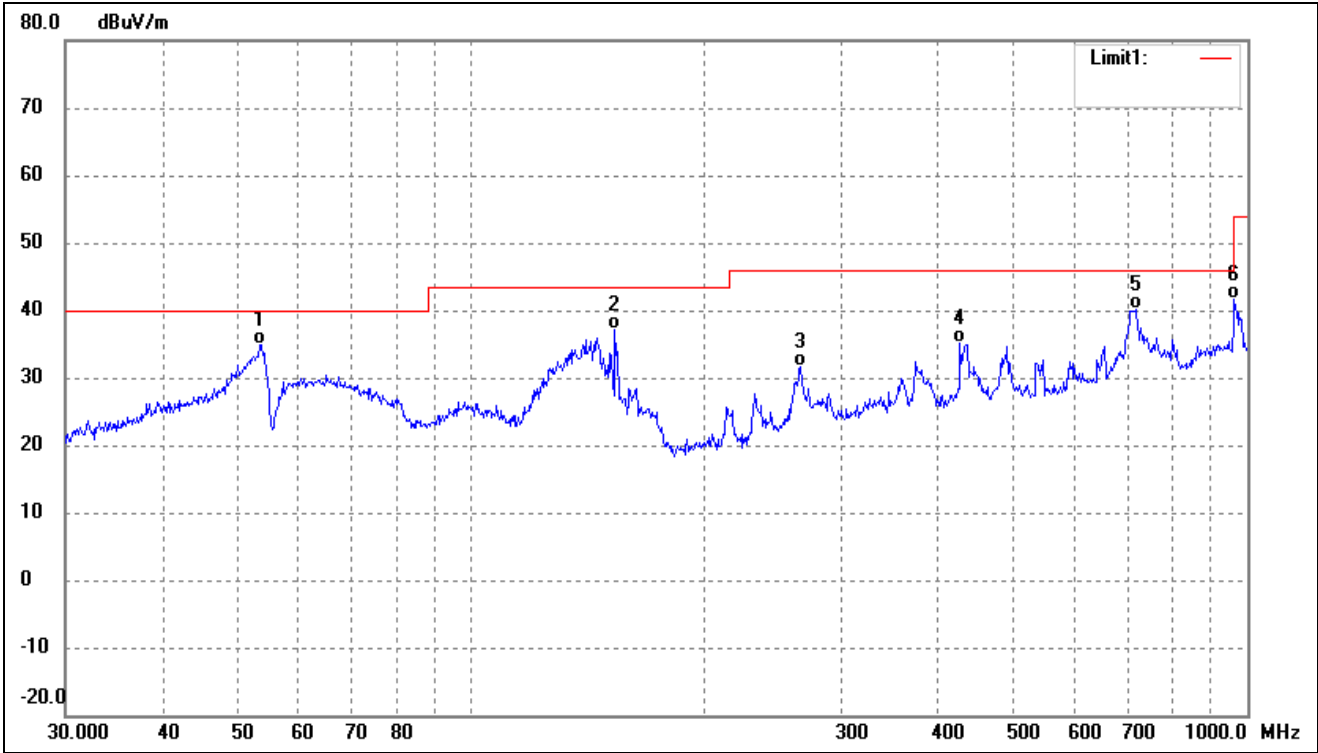
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (□)	Height (cm)	Remark
1	53.5052	42.34	-7.47	34.87	40.00	-5.13	-	-	QP
2	140.3421	47.54	-11.81	35.73	43.50	-7.77	-	-	QP
3	265.6757	37.76	-6.17	31.59	46.00	-14.41	-	-	QP
4	426.5210	37.12	-2.10	35.02	46.00	-10.98	-	-	QP
5	709.1823	37.74	2.11	39.85	46.00	-6.15	-	-	QP
6	962.1623	35.32	5.87	41.19	54.00	-12.81	-	-	QP

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



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	55.0274	34.71	-7.62	27.09	40.00	-12.91	-	-	QP
2	158.1123	47.68	-11.32	36.36	43.50	-7.14	-	-	QP
3	270.3748	40.41	-5.93	34.48	46.00	-11.52	-	-	QP
4	319.9370	38.36	-4.28	34.08	46.00	-11.92	-	-	QP
5	654.2318	39.62	2.03	41.65	46.00	-4.35	-	-	QP
6	801.7863	38.02	4.03	42.05	46.00	-3.95	-	-	QP

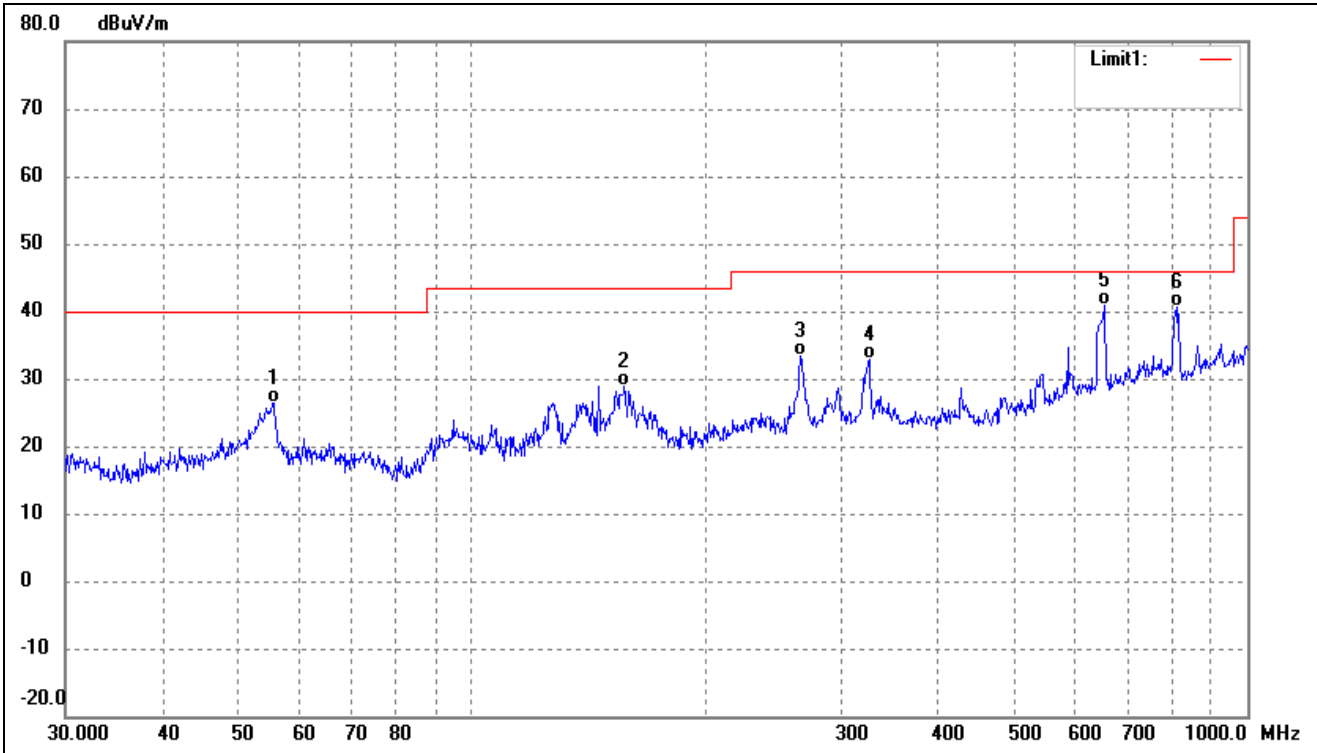
802.11a(Worst case)			
Test Channel	5240MHz	Polarity:	Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (□)	Height (cm)	Remark
1	53.5052	42.34	-7.47	34.87	40.00	-5.13	-	-	QP
2	153.2004	48.84	-11.60	37.24	43.50	-6.26	-	-	QP
3	265.6757	37.76	-6.17	31.59	46.00	-14.41	-	-	QP
4	426.5210	37.12	-2.10	35.02	46.00	-10.98	-	-	QP
5	719.1995	37.55	2.59	40.14	46.00	-5.86	-	-	QP
6	962.1623	35.79	5.87	41.66	54.00	-12.34	-	-	QP

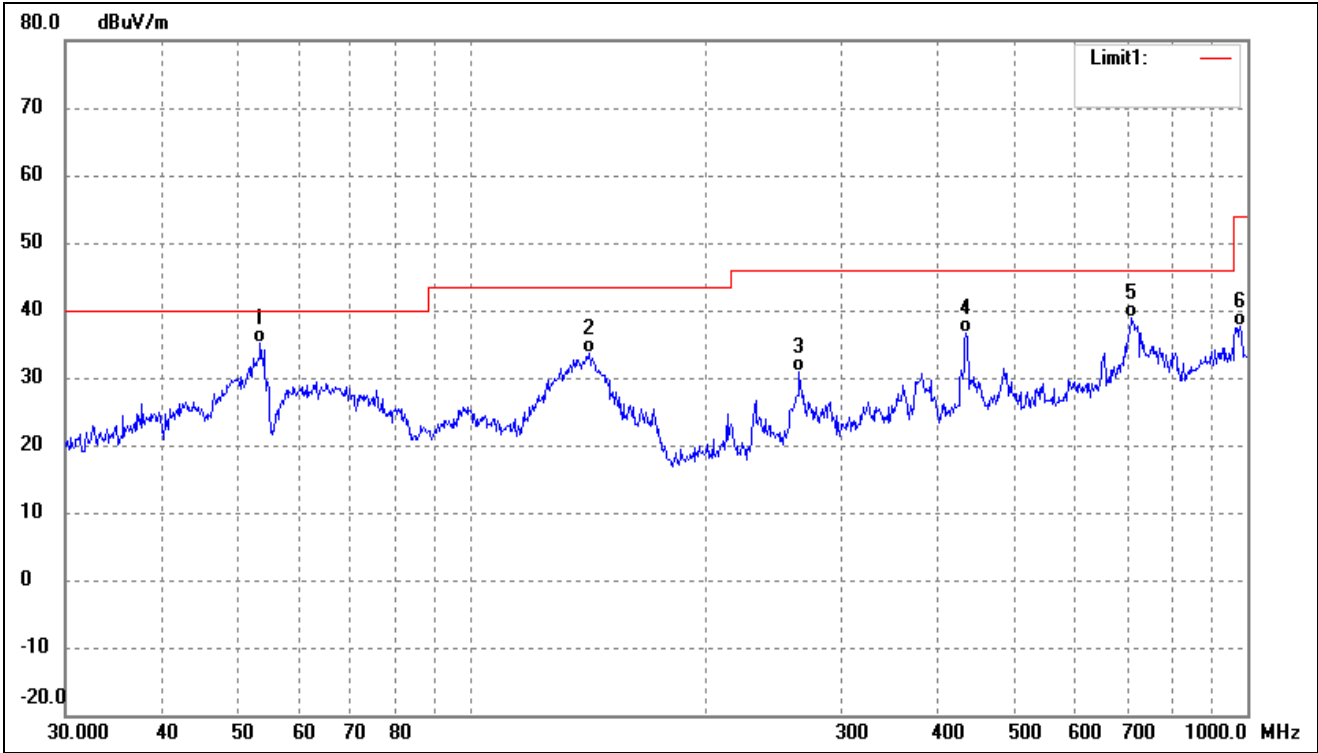
5725-5850MHz

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



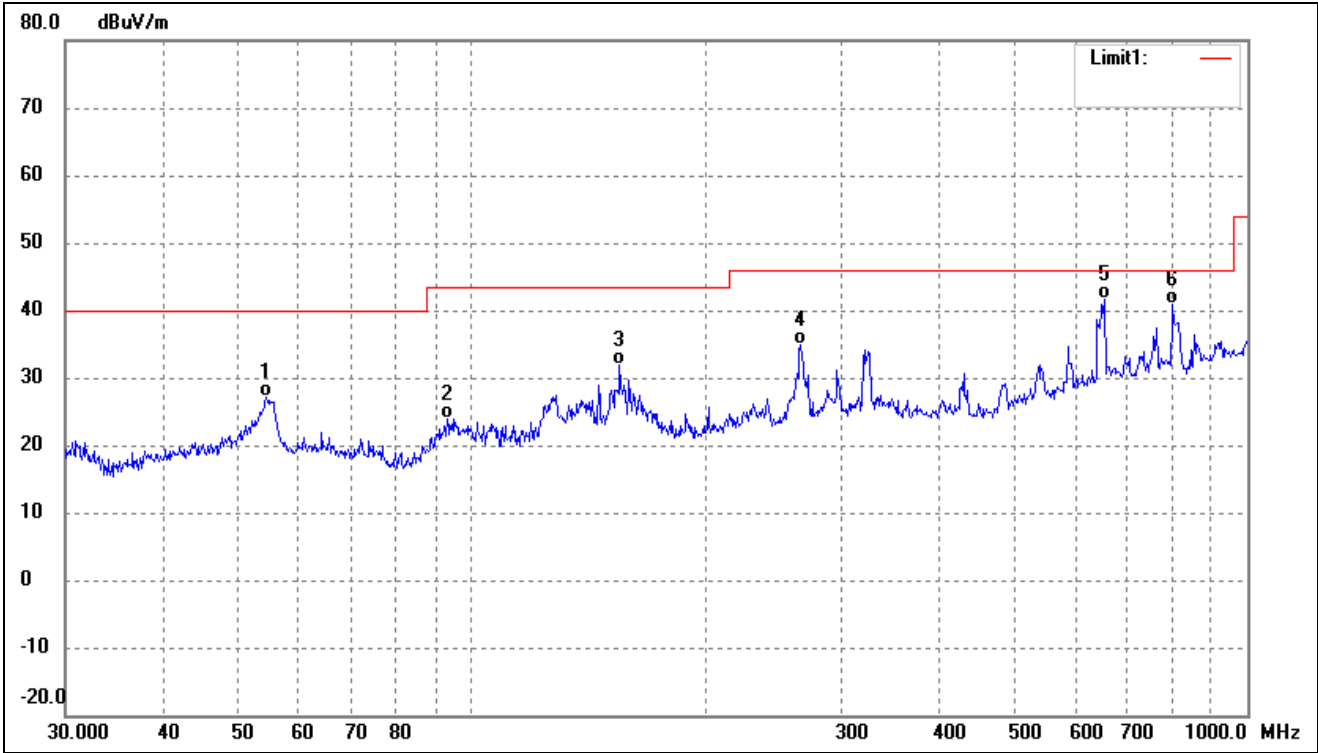
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	55.6094	34.17	-7.71	26.46	40.00	-13.54	-	-	QP
2	157.5589	40.29	-11.35	28.94	43.50	-14.56	-	-	QP
3	265.6757	39.58	-6.17	33.41	46.00	-12.59	-	-	QP
4	325.5958	37.03	-4.04	32.99	46.00	-13.01	-	-	QP
5	654.2318	38.81	2.03	40.84	46.00	-5.16	-	-	QP
6	813.1116	36.79	3.86	40.65	46.00	-5.35	-	-	QP

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



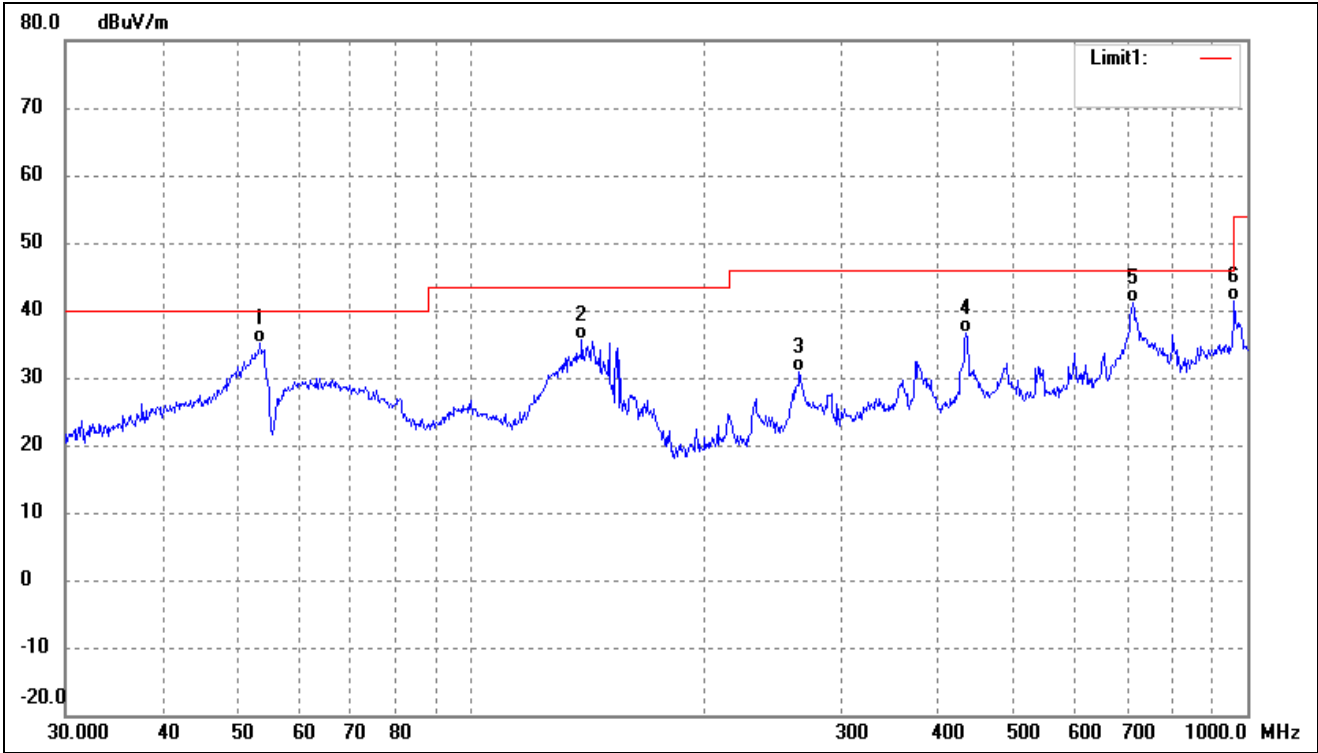
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (□)	Height (cm)	Remark
1	53.5052	42.71	-7.47	35.24	40.00	-4.76	-	-	QP
2	141.8262	45.44	-11.82	33.62	43.50	-9.88	-	-	QP
3	264.7457	37.22	-6.22	31.00	46.00	-15.00	-	-	QP
4	434.0651	38.77	-2.09	36.68	46.00	-9.32	-	-	QP
5	709.1823	36.67	2.11	38.78	46.00	-7.22	-	-	QP
6	979.1804	31.74	5.99	37.73	54.00	-16.27	-	-	QP

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



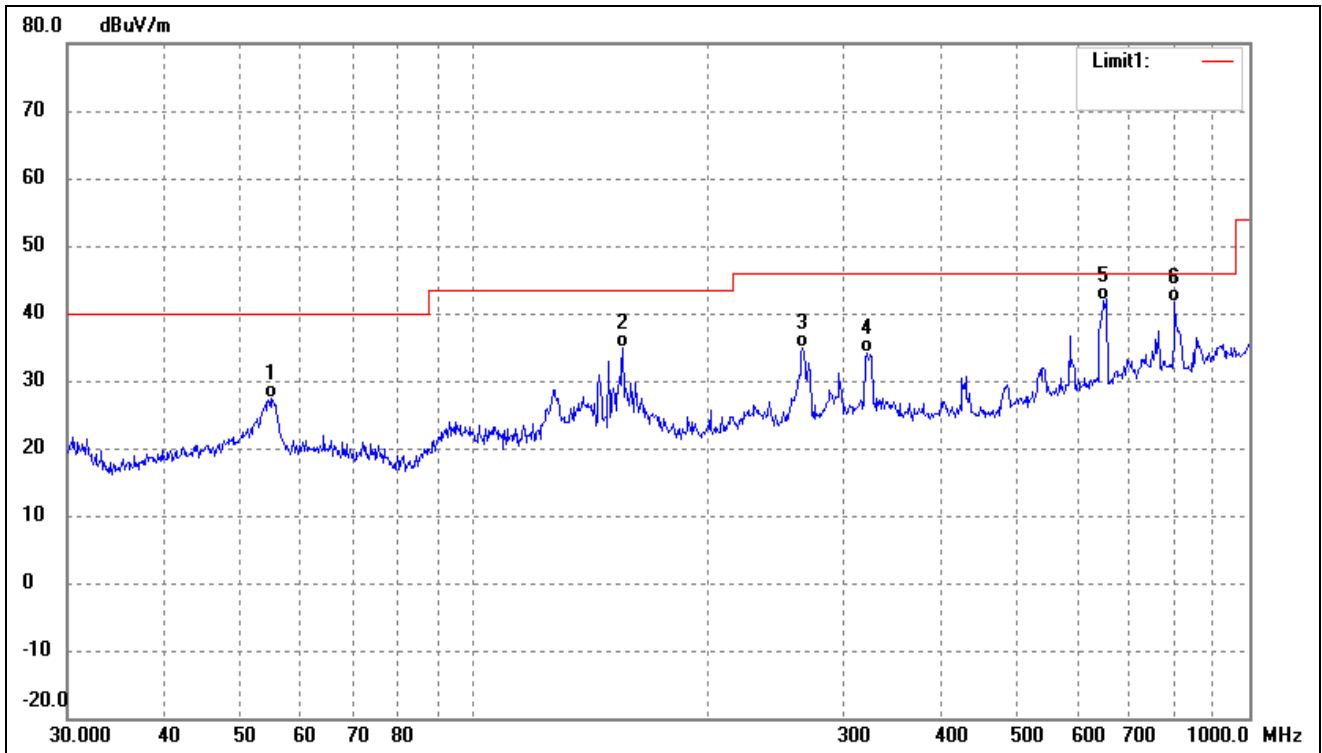
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (□)	Height (cm)	Remark
1	54.4516	34.75	-7.55	27.20	40.00	-12.80	-	-	QP
2	93.1132	33.75	-9.90	23.85	43.50	-19.65	-	-	QP
3	155.3644	43.32	-11.48	31.84	43.50	-11.66	-	-	QP
4	265.6757	41.15	-6.17	34.98	46.00	-11.02	-	-	QP
5	654.2318	39.56	2.03	41.59	46.00	-4.41	-	-	QP
6	801.7863	36.91	4.03	40.94	46.00	-5.06	-	-	QP

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



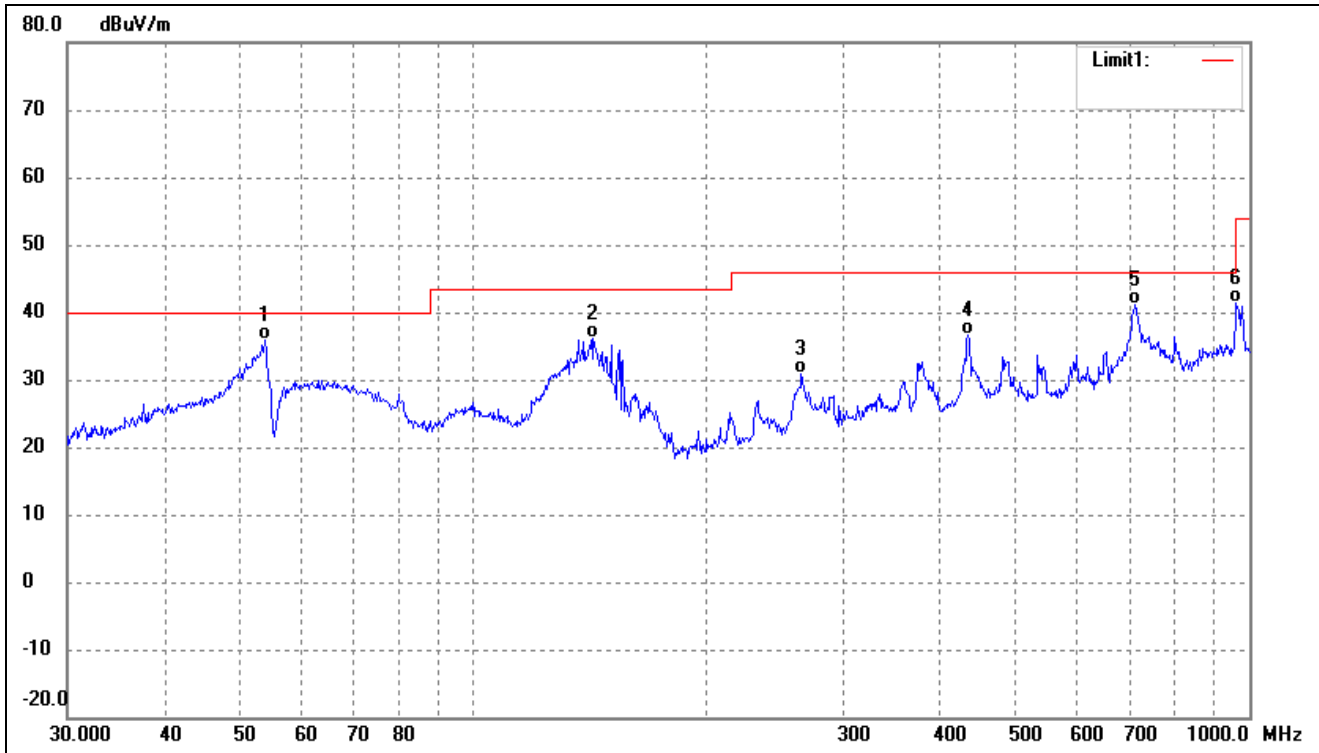
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (□)	Height (cm)	Remark
1	53.5052	42.71	-7.47	35.24	40.00	-4.76	-	-	QP
2	138.8735	47.53	-11.78	35.75	43.50	-7.75	-	-	QP
3	264.7457	37.22	-6.22	31.00	46.00	-15.00	-	-	QP
4	434.0651	38.77	-2.09	36.68	46.00	-9.32	-	-	QP
5	711.6734	38.89	2.19	41.08	46.00	-4.92	-	-	QP
6	962.1623	35.61	5.87	41.48	54.00	-12.52	-	-	QP

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



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	54.8348	34.88	-7.61	27.27	40.00	-12.73	-	-	QP
2	155.9101	46.43	-11.45	34.98	43.50	-8.52	-	-	QP
3	265.6757	41.15	-6.17	34.98	46.00	-11.02	-	-	QP
4	321.0608	38.25	-4.24	34.01	46.00	-11.99	-	-	QP
5	649.6597	39.76	2.00	41.76	46.00	-4.24	-	-	QP
6	801.7863	37.67	4.03	41.70	46.00	-4.30	-	-	QP

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

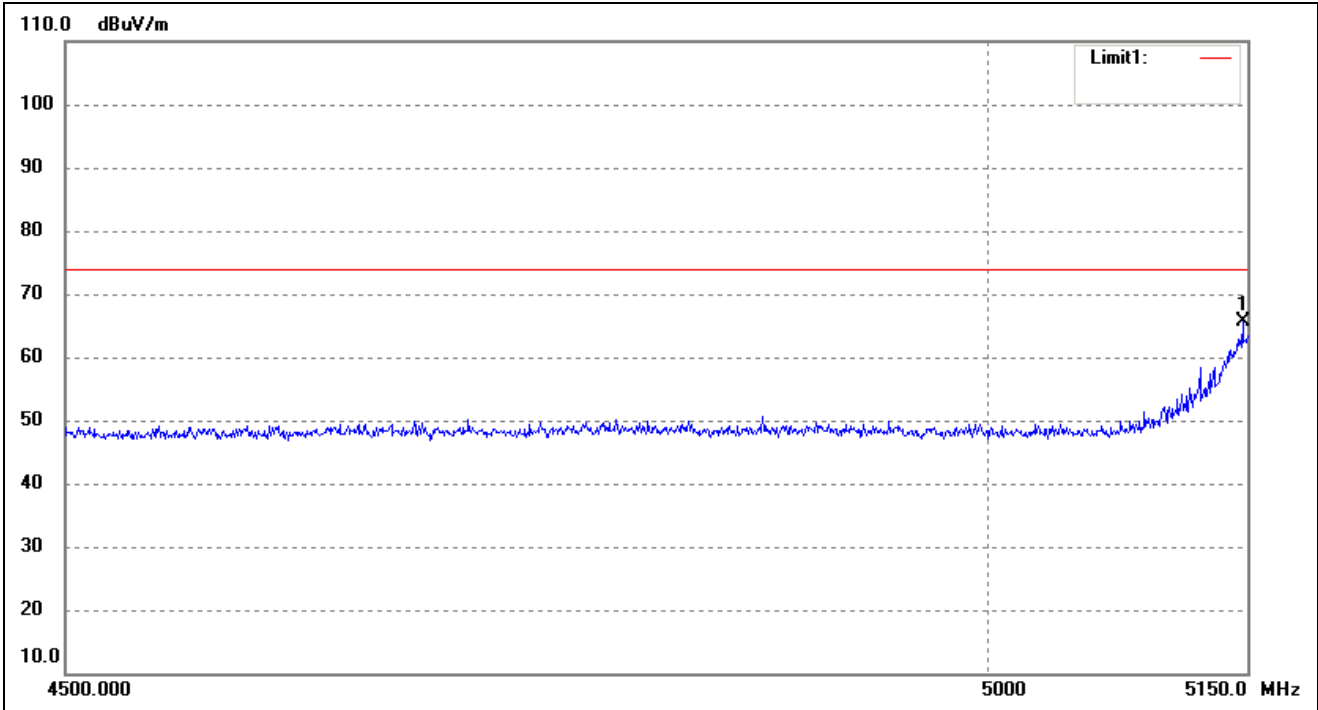


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (□)	Height (cm)	Remark
1	53.8818	43.26	-7.50	35.76	40.00	-4.24	-	-	QP
2	142.8244	47.97	-11.84	36.13	43.50	-7.37	-	-	QP
3	264.7457	37.22	-6.22	31.00	46.00	-15.00	-	-	QP
4	434.0651	38.77	-2.09	36.68	46.00	-9.32	-	-	QP
5	711.6734	38.89	2.19	41.08	46.00	-4.92	-	-	QP
6	962.1623	35.61	5.87	41.48	54.00	-12.52	-	-	QP

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

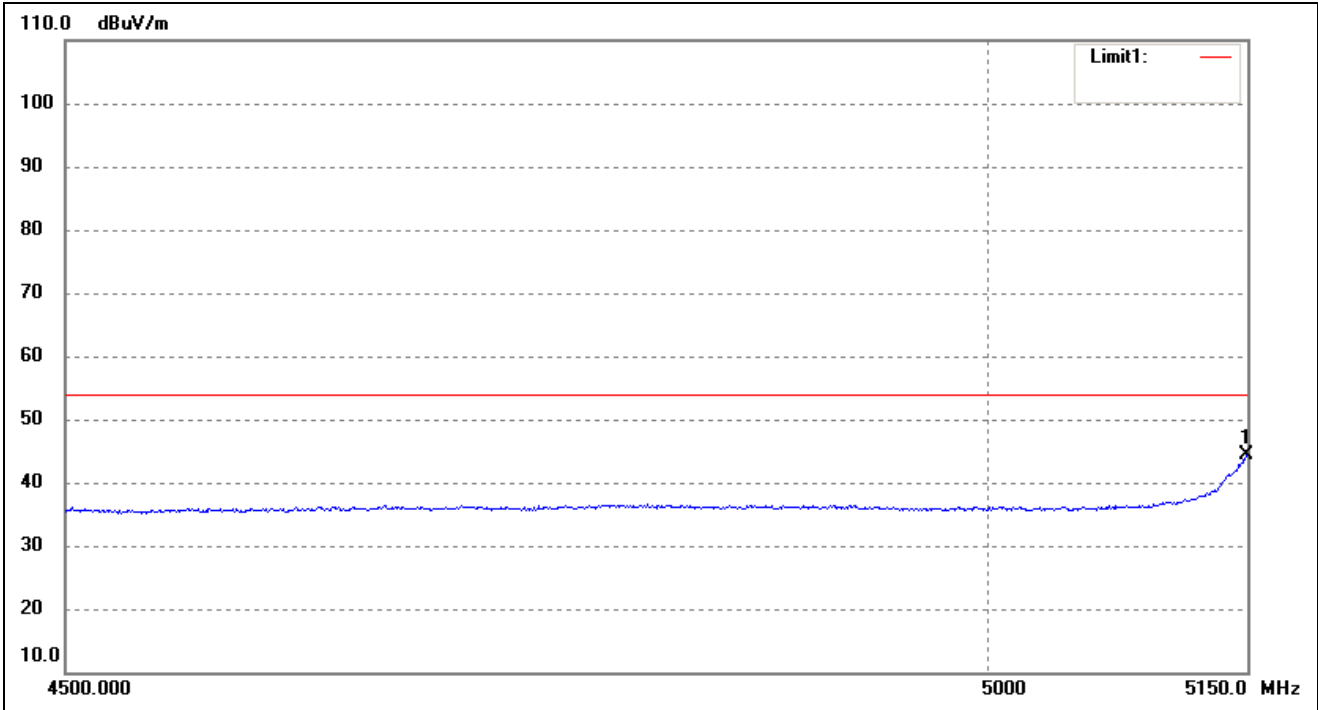
- Spurious Emission above 1GHz
- Antenna 0

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



No.	Frequency (MHz)	Reading (dBuV/m)	Corr. dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Deg. (□)	Height (cm)	Remark
1	5133.163	26.95	-13.39	13.56	43.50	-29.94	-	-	peak

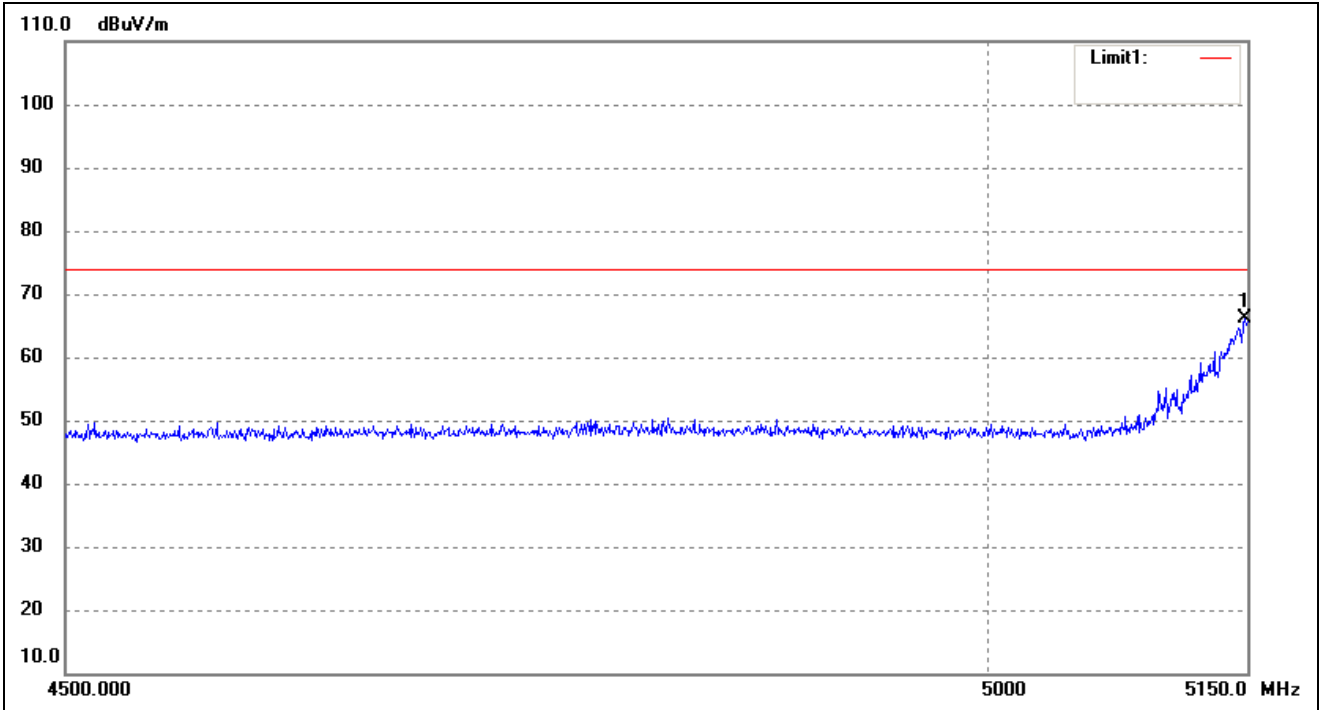
802.11a- Restricted Bandedge			
Test Channel	band 5.15-5.25GHz	Polarity:	Vertical(worst case)



No.	Frequenc y (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	5149.305	48.59	-4.32	44.27	54.00	-9.73	-	-	AVG

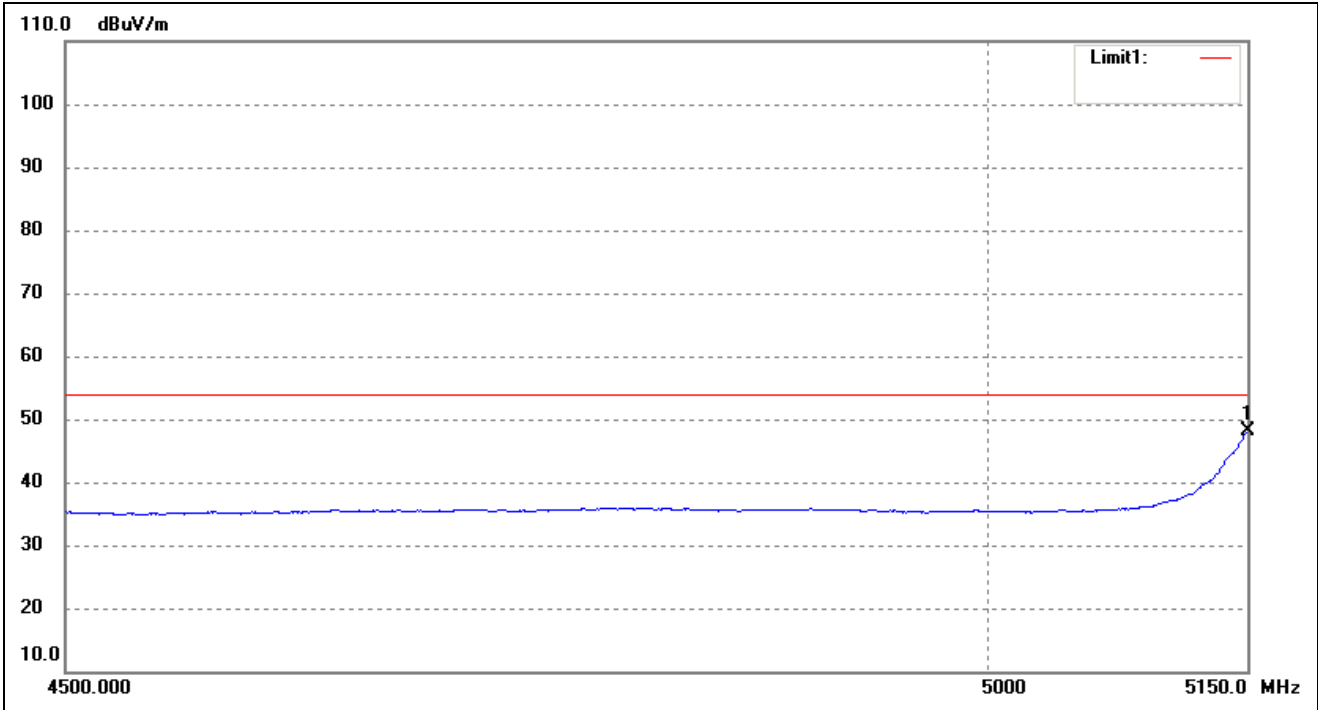
➤ Antenna 1

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



No.	Frequenc y (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (□)	Height (cm)	Remark
1	5148.610	70.50	-4.32	66.18	74.00	-7.82	-	-	peak

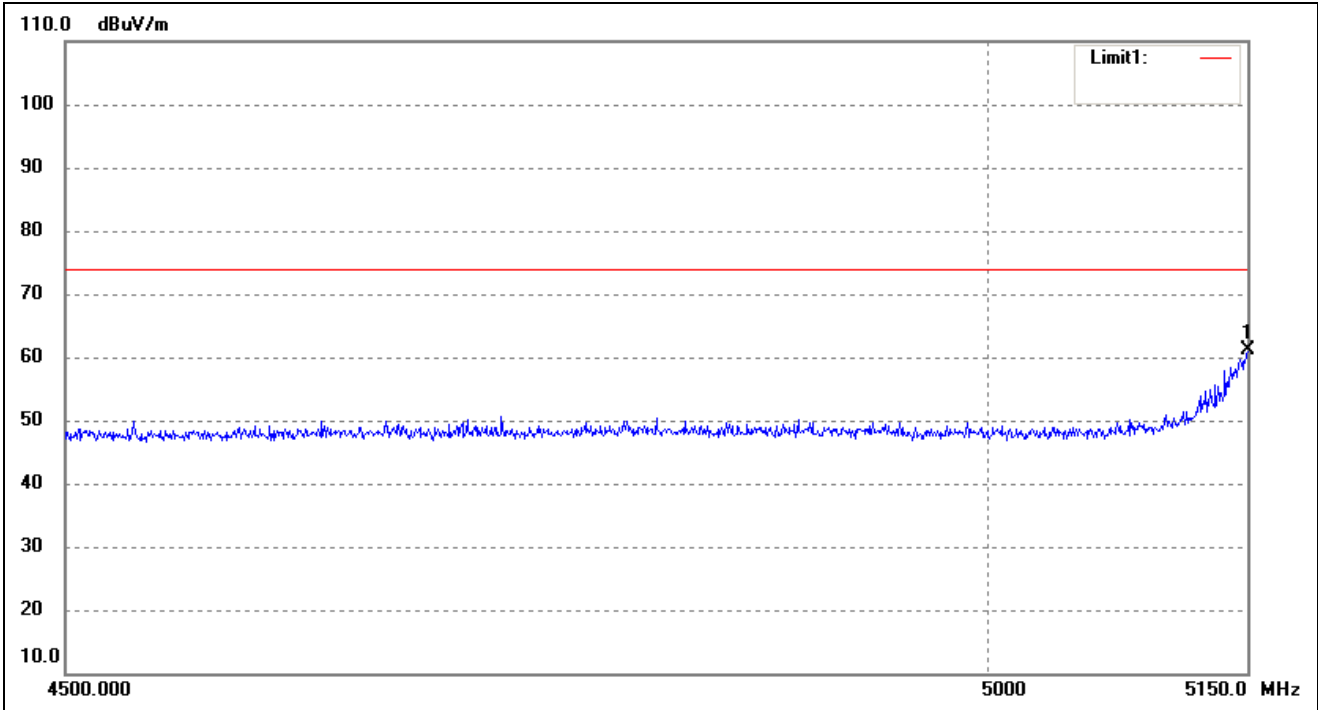
802.11a- Restricted Bandedge			
Test Channel	band 5.15-5.25GHz	Polarity:	Vertical(worst case)



No.	Frequenc y (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (□)	Height (cm)	Remark
1	5150.000	52.57	-4.32	48.25	54.00	-5.75	-	-	AVG

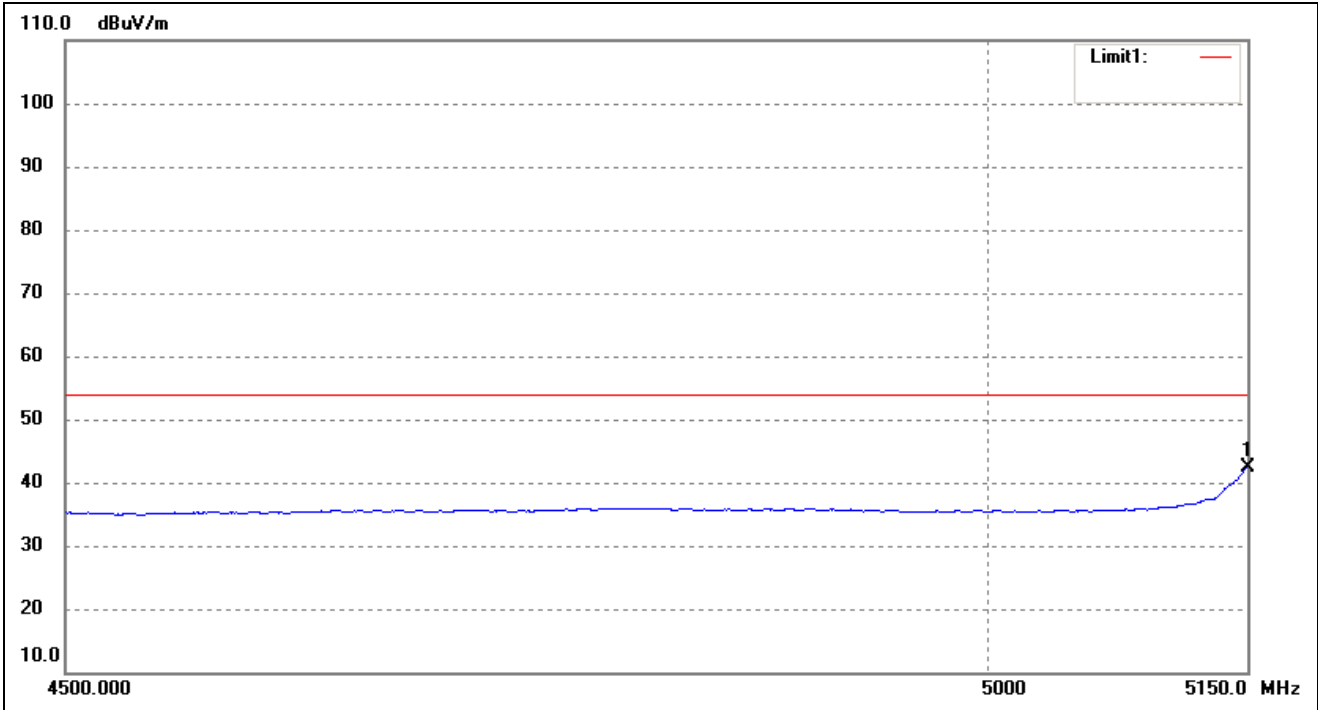
➤ Antenna 0 & Antenna 1

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



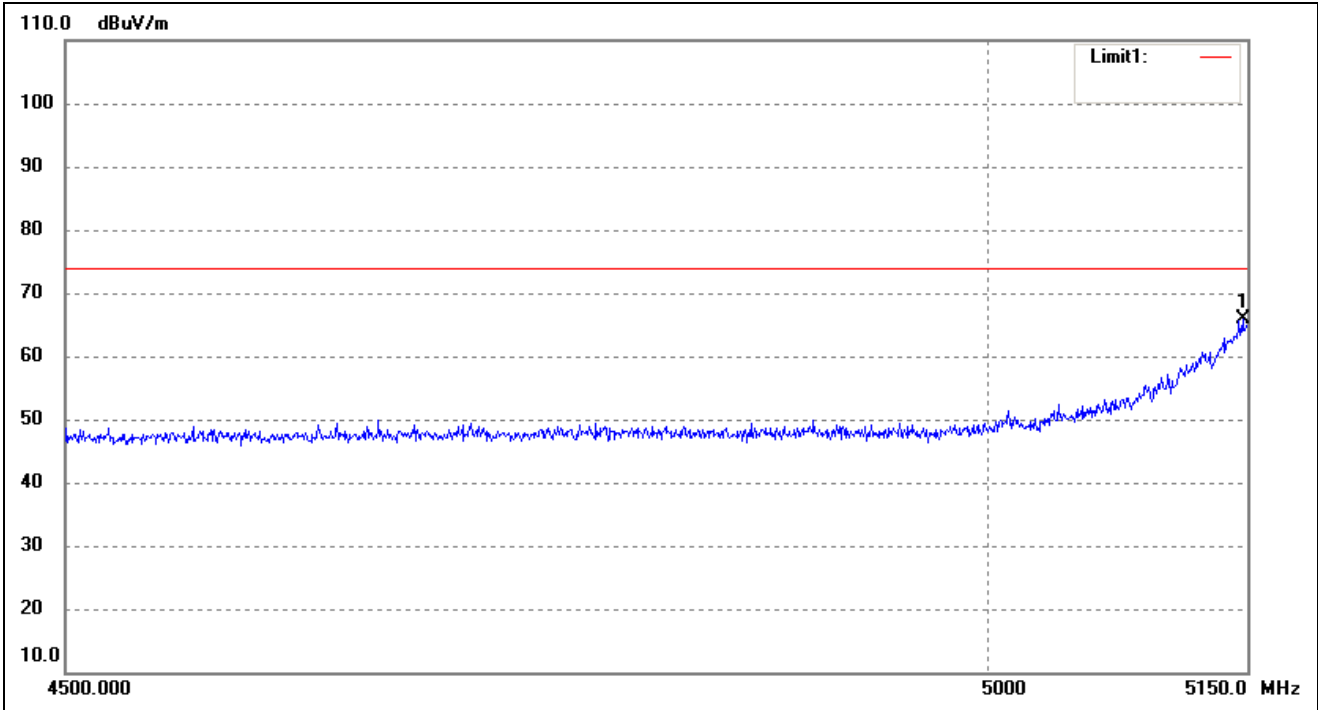
No.	Frequenc y (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (□)	Height (cm)	Remark
1	5150.000	65.46	-4.32	61.14	74.00	-12.86	-	-	peak

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



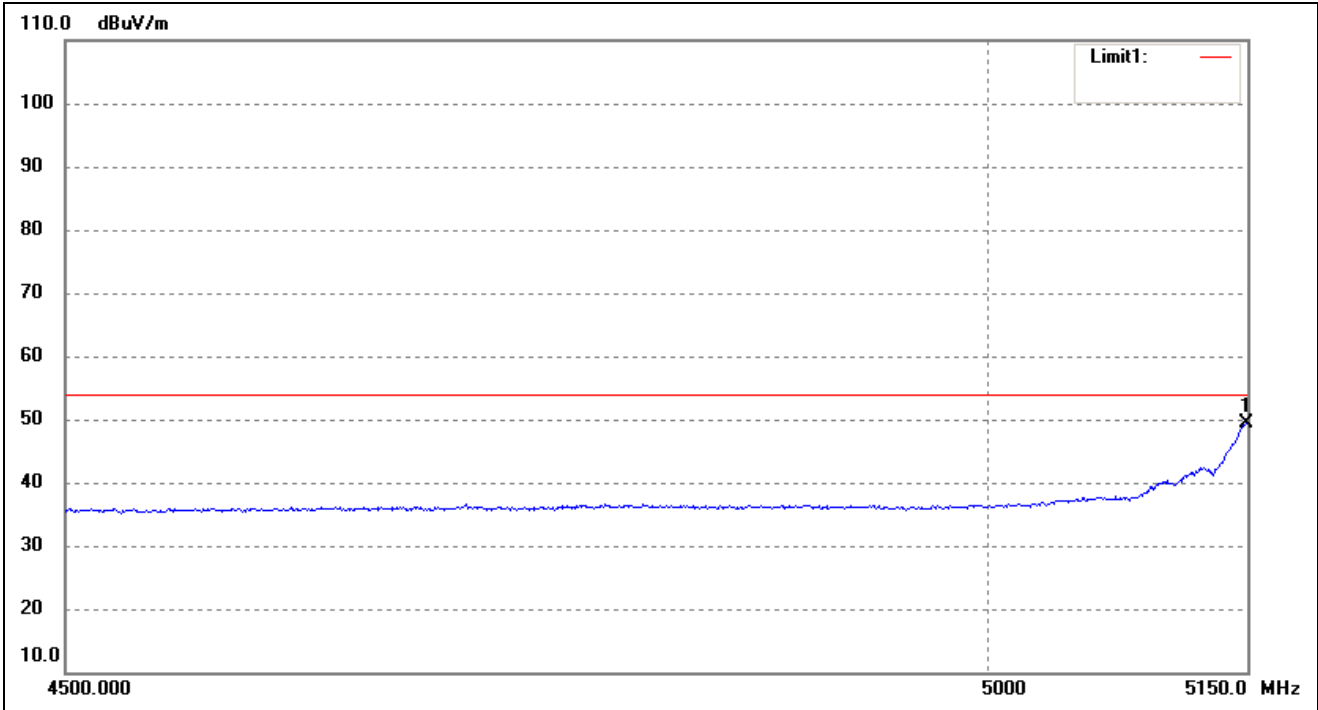
No.	Frequenc y (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (□)	Height (cm)	Remark
1	5150.000	46.76	-4.32	42.44	54.00	-11.56	-	-	AVG

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



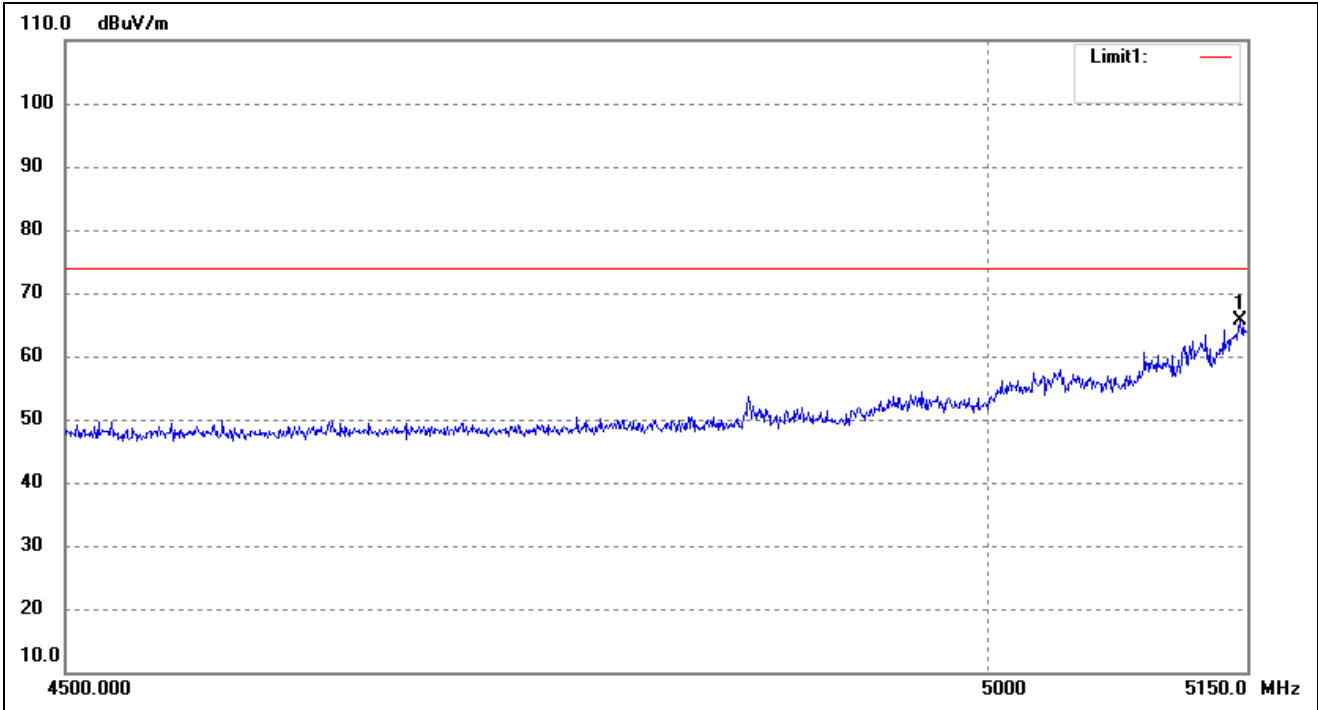
No.	Frequenc y (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (□)	Height (cm)	Remark
1	5147.221	70.23	-4.32	65.91	74.00	-8.09	-	-	peak

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



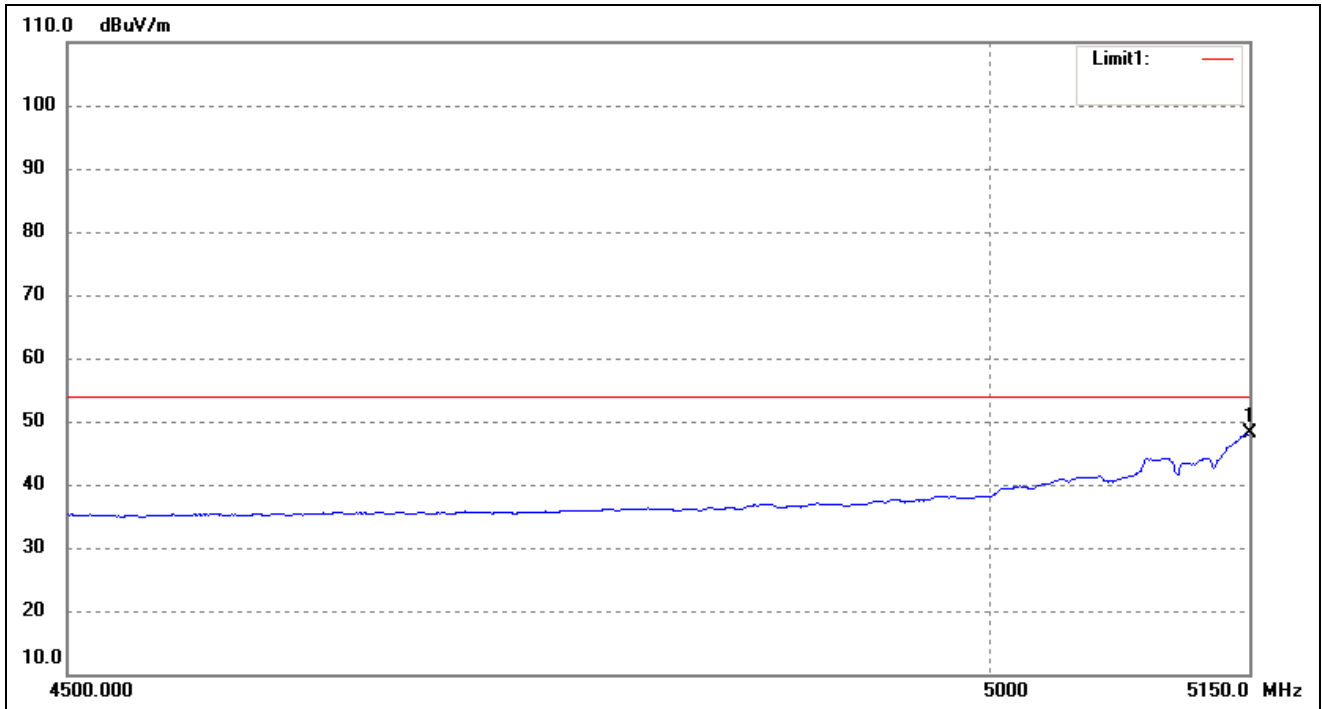
No.	Frequenc y (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (□)	Height (cm)	Remark
1	5149.305	53.66	-4.32	49.34	54.00	-4.66	-	-	AVG

802.11ac-HT80- Restricted Bandedge			
Test Channel	band 5.15-5.25GHz	Polarity:	Vertical(worst case)



No.	Frequenc y (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (□)	Height (cm)	Remark
1	5145.833	69.92	-4.32	65.60	74.00	-8.40	-	-	peak

802.11ac-HT80- Restricted Bandedge			
Test Channel	band 5.15-5.25GHz	Polarity:	Vertical(worst case)



No.	Frequenc y (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (□)	Height (cm)	Remark
1	5150.000	52.39	-4.32	48.07	54.00	-5.93	-	-	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	56.04	7.11	63.15	74	-10.85	H	PK
15540	35.88	8.22	44.10	54	-9.90	H	AV
10360	59.01	7.11	66.12	74	-7.88	V	PK
15540	37.78	8.22	46.00	54	-8.00	V	AV
Middle Channel (5200MHz)							
10400	56.86	7.22	64.08	74	-9.92	H	PK
15600	32.48	8.67	41.15	54	-12.85	H	AV
10400	55.21	7.22	62.43	74	-11.57	V	PK
15600	32.36	8.67	41.03	54	-12.97	V	AV
High Channel (5240MHz)							
10480	52.65	7.69	60.34	74	-13.66	H	PK
15720	36.52	8.93	45.45	54	-8.55	H	AV
10480	54.80	7.69	62.49	74	-11.51	V	PK
15720	36.71	8.93	45.64	54	-8.36	V	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5745MHz)							
11490	55.75	9.45	65.20	74	-8.80	H	PK
17235	31.25	10.36	41.61	54	-12.39	H	AV
11490	50.34	9.45	59.79	74	-14.21	V	PK
17235	33.20	10.36	43.56	54	-10.44	V	AV
Middle Channel (5785MHz)							
11570	54.68	9.62	64.30	74	-9.70	H	PK
17355	32.86	10.67	43.53	54	-10.47	H	AV
11570	54.70	9.62	64.32	74	-9.68	V	PK
17355	35.37	10.67	46.04	54	-7.96	V	AV
High Channel (5825MHz)							
11650	56.34	9.84	66.18	74	-7.82	H	PK
17475	31.86	10.95	42.81	54	-11.19	H	AV
11650	50.53	9.84	60.37	74	-13.63	V	PK
17475	33.86	10.95	44.81	54	-9.19	V	AV

➤ Out of Band edge for 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-36.13	-27
Highest	Above 5350	-43.41	-27

Note: the data just list the worst cases

➤ Out of Band edge for 5725-5850MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5650	-45.89	-27
	5650 to 5700	-37.37	-27 to -17
	5700 to 5720	-29.10	-17 to 15.6
	5720 to 5725	-17.50	15.6 to 27
Highest	5850 to 5855	-15.99	27 to 15.6
	5855 to 5875	-27.10	15.6 to -17
	5875 to 5925	-36.44	-17 to -27
	Above 5925	-38.79	-27

Note: the data just list the worst cases

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

Frequency (MHz)	Reading (dBuV/m)	Correct dB	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar H/V	Detector
Low Channel (5180MHz)							
10360	54.44	7.11	61.55	74	-12.45	H	PK
15540	39.56	8.22	47.78	54	-6.22	H	AV
10360	57.65	7.11	64.76	74	-9.24	V	PK
15540	37.20	8.22	45.42	54	-8.58	V	AV
Middle Channel (5200MHz)							
10400	58.76	7.22	65.98	74	-8.02	H	PK
15600	34.23	8.67	42.90	54	-11.10	H	AV
10400	54.90	7.22	62.12	74	-11.88	V	PK
15600	35.91	8.67	44.58	54	-9.42	V	AV
High Channel (5240MHz)							
10480	53.05	7.69	60.74	74	-13.26	H	PK
15720	36.21	8.93	45.14	54	-8.86	H	AV
10480	51.59	7.69	59.28	74	-14.72	V	PK
15720	32.91	8.93	41.84	54	-12.16	V	AV

Frequency (MHz)	Reading (dBuV/m)	Correct dB	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar H/V	Detector
Low Channel (5745MHz)							
11490	57.47	9.45	66.92	74	-7.08	H	PK
17235	33.84	10.36	44.20	54	-9.80	H	AV
11490	52.86	9.45	62.31	74	-11.69	V	PK
17235	31.61	10.36	41.97	54	-12.03	V	AV
Middle Channel (5785MHz)							
11570	56.51	9.62	66.13	74	-7.87	H	PK
17355	31.57	10.67	42.24	54	-11.76	H	AV
11570	51.21	9.62	60.83	74	-13.17	V	PK
17355	35.16	10.67	45.83	54	-8.17	V	AV
High Channel (5825MHz)							
11650	52.95	9.84	62.79	74	-11.21	H	PK
17475	34.87	10.95	45.82	54	-8.18	H	AV
11650	51.56	9.84	61.40	74	-12.60	V	PK
17475	31.60	10.95	42.55	54	-11.45	V	AV

➤ Out of Band edge for 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-28.42	-27
Highest	Above 5350	-37.56	-27

Note: the data just list the worst cases

➤ Out of Band edge for 5725-5850MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5650	-47.13	-27
	5650 to 5700	-37.46	-27 to -17
	5700 to 5720	-25.37	-17 to 15.6
	5720 to 5725	-17.17	15.6 to 27
Highest	5850 to 5855	-15.21	27 to 15.6
	5855 to 5875	-26.12	15.6 to -17
	5875 to 5925	-35.52	-17 to -27
	Above 5925	-36.69	-27

Note: the data just list the worst cases

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

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5190MHz)							
10380	57.80	7.25	65.05	74	-8.95	H	PK
15570	34.25	8.33	42.58	54	-11.42	H	AV
10380	54.77	7.25	62.02	74	-11.98	V	PK
15570	37.40	8.33	45.73	54	-8.27	V	AV
High Channel (5230MHz)							
10460	52.64	7.54	60.18	74	-13.82	H	PK
15690	31.72	8.86	40.58	54	-13.42	H	AV
10460	53.00	7.54	60.54	74	-13.46	V	PK
15690	32.38	8.86	41.24	54	-12.76	V	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5755MHz)							
11510	56.54	9.65	66.19	74	-7.81	H	PK
17265	34.61	10.87	45.48	54	-8.52	H	AV
11510	56.77	9.65	66.42	74	-7.58	V	PK
17265	33.50	10.87	44.37	54	-9.63	V	AV
High Channel (5795MHz)							
11590	55.29	9.81	65.10	74	-8.90	H	PK
17385	31.37	10.89	42.26	54	-11.74	H	AV
11590	56.23	9.81	66.04	74	-7.96	V	PK
17385	34.04	10.89	44.93	54	-9.07	V	AV

➤ Out of Band edge for 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-40.28	-27
Highest	Above 5350	-44.22	-27

Note: the data just list the worst cases.

➤ Out of Band edge for 5725-5850MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5650	-46.24	-27
	5650 to 5700	-35.33	-27 to -17
	5700 to 5720	-24.89	-17 to 15.6
	5720 to 5725	-15.97	15.6 to 27
Highest	5850 to 5855	-14.69	27 to 15.6
	5855 to 5875	-26.92	15.6 to -17
	5875 to 5925	-36.35	-17 to -27
	Above 5925	-39.55	-27

Note: the data just list the worst cases

- For the frequency band 5.15-5.25GHz, 5.725-5.850GHz (802.11ac VH80)
- Harmonics And Spurious Emissions

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
5210MHz							
10420	56.18	7.58	63.76	74	-10.24	H	PK
10420	35.32	8.67	43.99	54	-10.01	H	AV
10420	58.06	7.58	65.64	74	-8.36	H	PK
10420	36.05	8.67	44.72	54	-9.28	H	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
5775MHz							
11550	53.61	9.87	63.48	74	-10.52	H	PK
11550	35.03	11.02	46.05	54	-7.95	H	AV
11550	55.20	9.87	65.07	74	-8.93	H	PK
11550	33.65	11.02	44.67	54	-9.33	H	AV

- Out of Band edge for 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-39.84	-27
Highest	Above 5350	-45.47	-27

Note: the data just list the worst cases.

- Out of Band edge for 5725-5850MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5650	-44.58	-27
	5650 to 5700	-36.71	-27 to -17
	5700 to 5720	-27.64	-17 to 15.6
	5720 to 5725	-16.04	15.6 to 27
Highest	5850 to 5855	-14.13	27 to 15.6
	5855 to 5875	-24.26	15.6 to -17
	5875 to 5925	-37.81	-17 to -27
	Above 5925	-40.39	-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

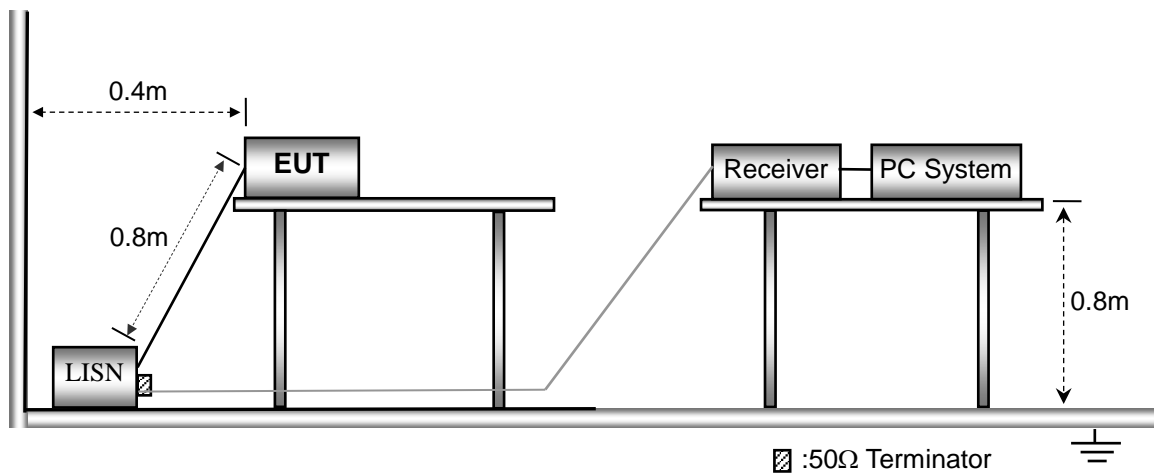
10 Conducted Emissions

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



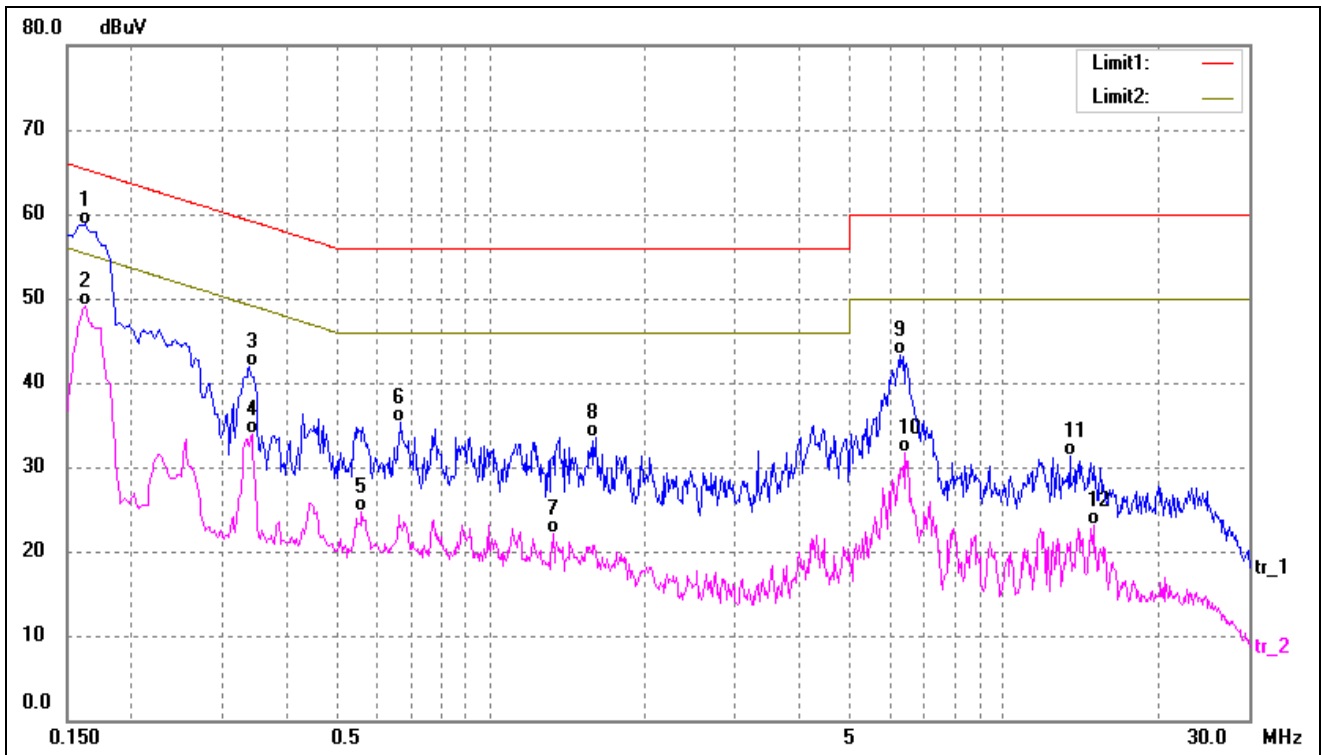
10.3 Test Receiver Setup

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

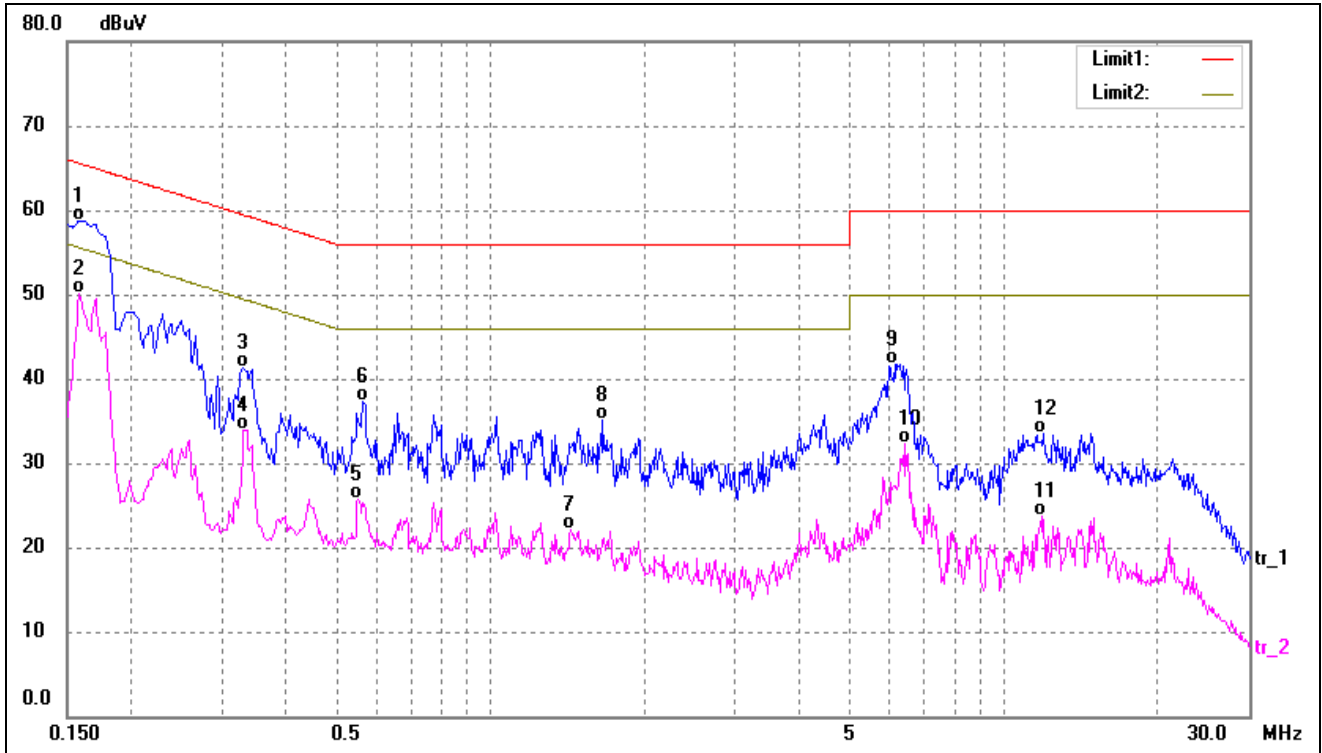
10.4 Summary of Test Results/Plots

Test Mode	Communication	AC120V 60Hz	Polarity:	Neutral
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No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1620	48.40	10.40	58.80	65.36	-6.56	QP
2*	0.1620	38.79	10.40	49.19	55.36	-6.17	AVG
3	0.3379	31.54	10.28	41.82	59.25	-17.43	QP
4	0.3420	23.58	10.28	33.86	49.15	-15.29	AVG
5	0.5620	14.43	10.22	24.65	46.00	-21.35	AVG
6	0.6700	25.02	10.20	35.22	56.00	-20.78	QP
7	1.3260	11.93	10.20	22.13	46.00	-23.87	AVG
8	1.6060	23.20	10.25	33.45	56.00	-22.55	QP
9	6.2740	32.95	10.38	43.33	60.00	-16.67	QP
10	6.4500	21.42	10.38	31.80	50.00	-18.20	AVG
11	13.4260	21.06	10.27	31.33	60.00	-28.67	QP
12	14.9100	12.85	10.22	23.07	50.00	-26.93	AVG

Test Mode	Communication	AC120V 60Hz	Polarity:	Line
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No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1580	48.37	10.40	58.77	65.56	-6.79	QP
2*	0.1580	39.80	10.40	50.20	55.56	-5.36	AVG
3	0.3300	30.93	10.29	41.22	59.45	-18.23	QP
4	0.3300	23.58	10.29	33.87	49.45	-15.58	AVG
5	0.5540	15.50	10.22	25.72	46.00	-20.28	AVG
6	0.5660	27.13	10.22	37.35	56.00	-18.65	QP
7	1.4340	11.98	10.22	22.20	46.00	-23.80	AVG
8	1.6580	24.77	10.27	35.04	56.00	-20.96	QP
9	6.1500	31.40	10.38	41.78	60.00	-18.22	QP
10	6.4500	21.91	10.38	32.29	50.00	-17.71	AVG
11	11.8220	13.36	10.32	23.68	50.00	-26.32	AVG
12	11.9540	23.24	10.32	33.56	60.00	-26.44	QP

APPENDIX SUMMARY

Project No.	WTH23X05094416W	Test Engineer	BAldi Zhong
Start date	2023/5/12	Finish date	2023/5/20
Temperature	23°C	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	2.13	3.22	/	11
	5200	2.38	3.33	/	11
	5240	2.40	3.44	/	11
802.11n-HT20	5180	0.84	1.58	4.24	11
	5200	1.29	1.82	4.57	11
	5240	1.21	1.89	4.57	11
802.11n-HT40	5190	-2.02	-1.46	1.28	11
	5230	-2.00	-1.38	1.33	11
802.11ac-HT80	5210	-6.29	-6.34	-3.30	11

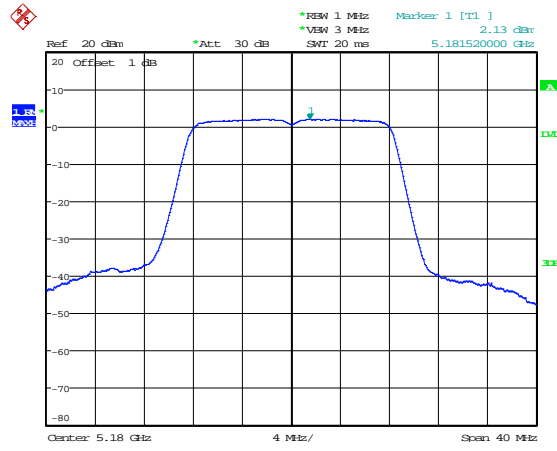
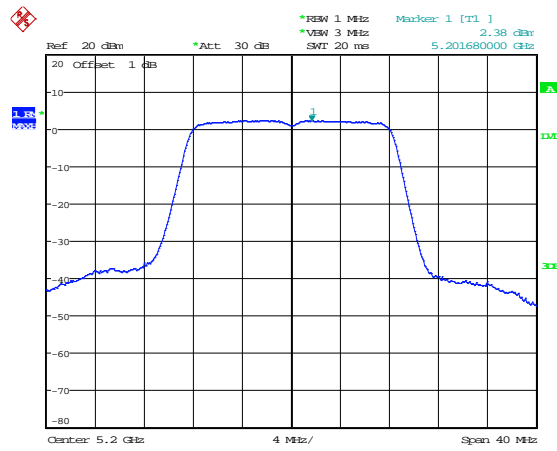
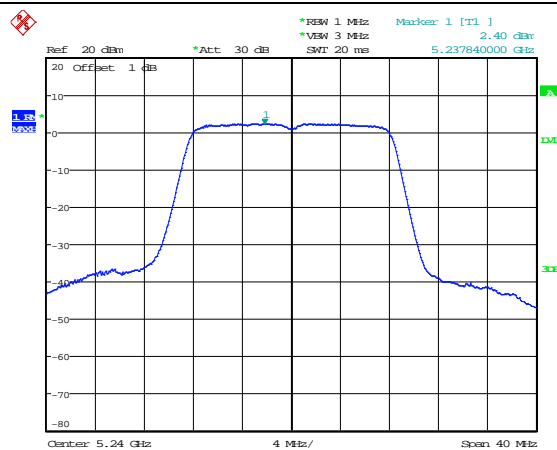
Power Spectral Density							
U-NII-3: 5725-5850MHz							
Operating mode	Test Channel	ANT 0 dBm/300kHz	ANT 1 dBm/300kHz	Factor	ANT 0 dBm/500kHz*	ANT 1 dBm/500kHz*	Limit dBm/500kHz
802.11a	5745	-2.25	-1.90	2.22	-0.03	0.32	30
	5785	-2.14	-1.97	2.22	0.08	0.25	30
	5825	-2.31	-2.14	2.22	-0.09	0.08	30

*Note: Maximum PSD=PSD(dBm/300kHz)+10log(500kHz/300kHz)=2.22

Power Spectral Density							
U-NII-3: 5725-5850MHz							
Operating mode	Test Channel	ANT 0 dBm/300kHz	ANT 1 dBm/300kHz	Factor	Total dBm/500kHz*	Limit dBm/500kHz	
802.11n-HT20	5745	-3.51	-3.63	2.22	1.66	30	
	5785	-3.46	-3.44	2.22	6.49	30	
	5825	-3.55	-3.63	2.22	1.64	30	
802.11n HT40	5755	-6.26	-6.83	2.22	-1.31	30	
	5795	-6.80	-6.79	2.22	-1.56	30	
802.11ac VH80	5775	-9.60	-10.68	2.22	-4.88	30	

*Note: Maximum PSD=PSD(dBm/300kHz)+10log(500kHz/300kHz)=2.22

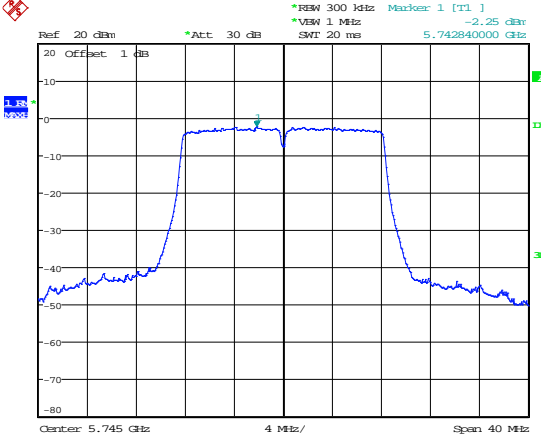
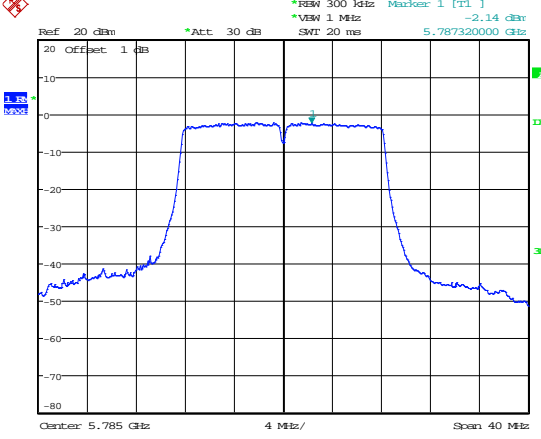
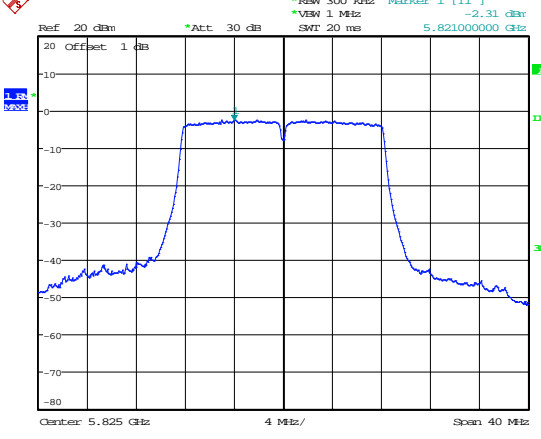
ANT 0
5150-5250MHz

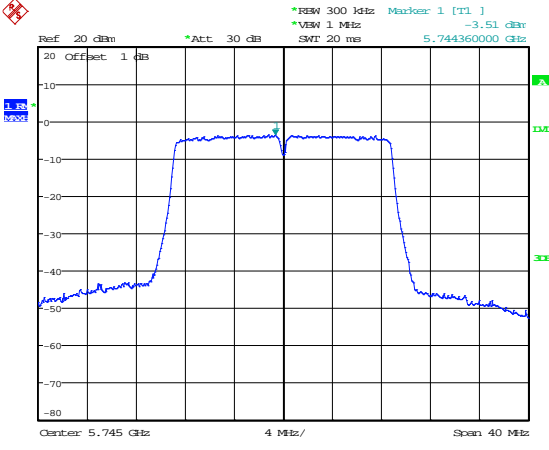
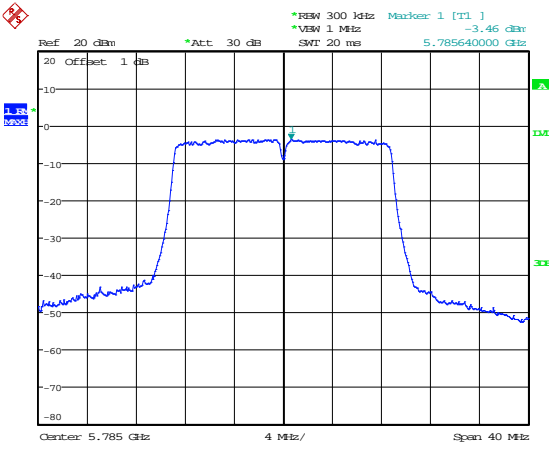
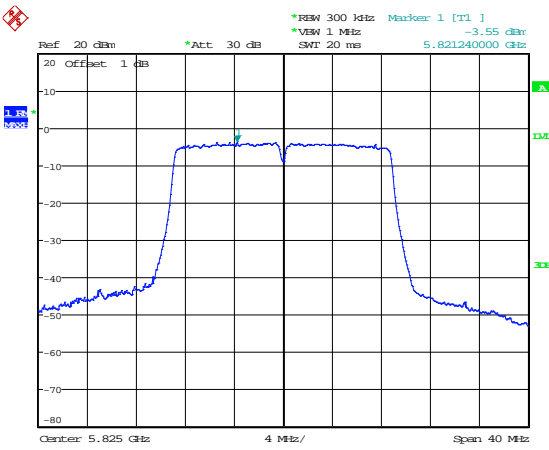
<p>802.11a-Low</p>	 <p>Ref: 20 dBm *Att: 30 dB *REW 1 MHz Marker 1 [T1] 2.13 dBm *VIEW 3 MHz *SWI 20 ms 5.181520000 GHz</p> <p>Offset: 1 dB</p> <p>Center: 5.18 GHz 4 MHz/ Span 40 MHz</p> <p>Date: 17.MAY.2023 14:51:15</p>
<p>802.11a-Middle</p>	 <p>Ref: 20 dBm *Att: 30 dB *REW 1 MHz Marker 1 [T1] 2.38 dBm *VIEW 3 MHz *SWI 20 ms 5.201680000 GHz</p> <p>Offset: 1 dB</p> <p>Center: 5.2 GHz 4 MHz/ Span 40 MHz</p> <p>Date: 17.MAY.2023 14:51:39</p>
<p>802.11a-High</p>	 <p>Ref: 20 dBm *Att: 30 dB *REW 1 MHz Marker 1 [T1] 2.40 dBm *VIEW 3 MHz *SWI 20 ms 5.237840000 GHz</p> <p>Offset: 1 dB</p> <p>Center: 5.24 GHz 4 MHz/ Span 40 MHz</p> <p>Date: 17.MAY.2023 14:52:10</p>

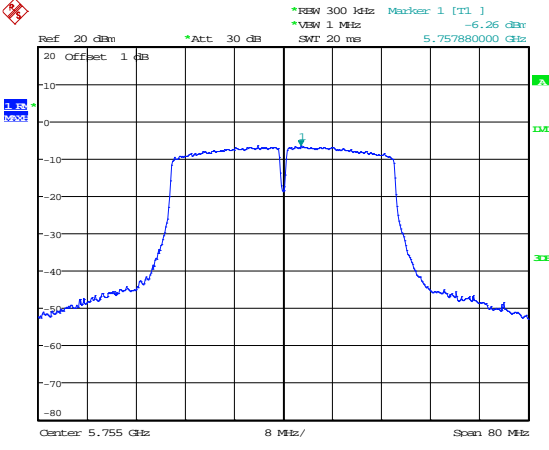
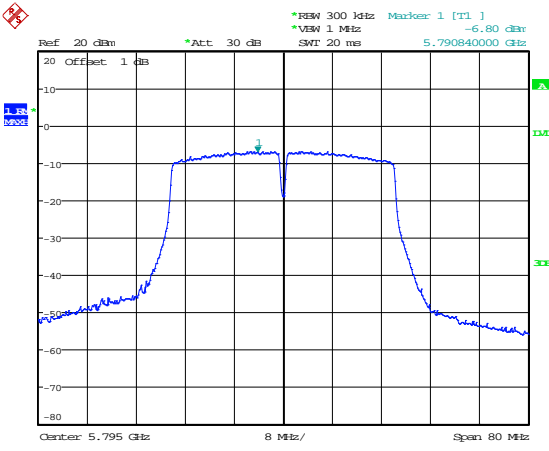
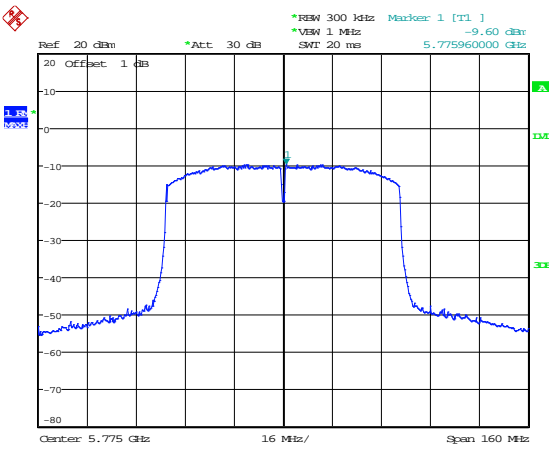
<p>802.11n-HT20-Low</p>	<p>Date: 17.MAY.2023 14:49:48</p>
<p>802.11n-HT20-Middle</p>	<p>Date: 17.MAY.2023 14:50:29</p>
<p>802.11n-HT20-High</p>	<p>Date: 17.MAY.2023 14:50:53</p>

<p>802.11n-HT40-Low</p>	<p>Ref: 20 dBm *Att: 30 dB RBW: 1 MHz VBW: 3 MHz SWT: 20 ms Marker: 1 [T1] -2.02 dBm 5.187440000 GHz</p> <p>Center: 5.19 GHz 8 MHz/ Span: 80 MHz</p> <p>Date: 17.MAY.2023 14:47:56</p>
<p>802.11n-HT40-High</p>	<p>Ref: 20 dBm *Att: 30 dB RBW: 1 MHz VBW: 3 MHz SWT: 20 ms Marker: 1 [T1] -2.00 dBm 5.227600000 GHz</p> <p>Center: 5.23 GHz 8 MHz/ Span: 80 MHz</p> <p>Date: 17.MAY.2023 14:48:17</p>
<p>802.11ac-HT80</p>	<p>Ref: 20 dBm *Att: 30 dB RBW: 1 MHz VBW: 3 MHz SWT: 20 ms Marker: 1 [T1] -6.29 dBm 5.197840000 GHz</p> <p>Center: 5.21 GHz 16 MHz/ Span: 160 MHz</p> <p>Date: 17.MAY.2023 14:47:15</p>

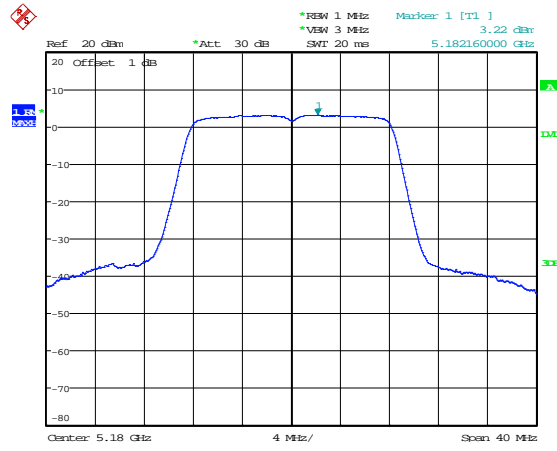
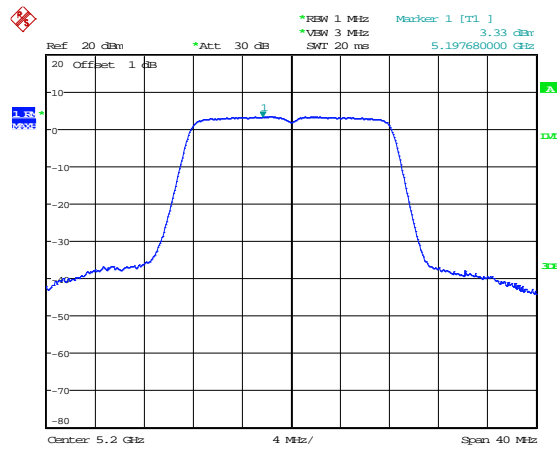
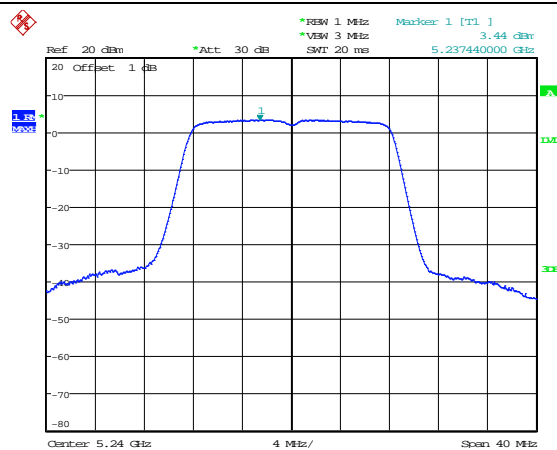
5725-5850MHz

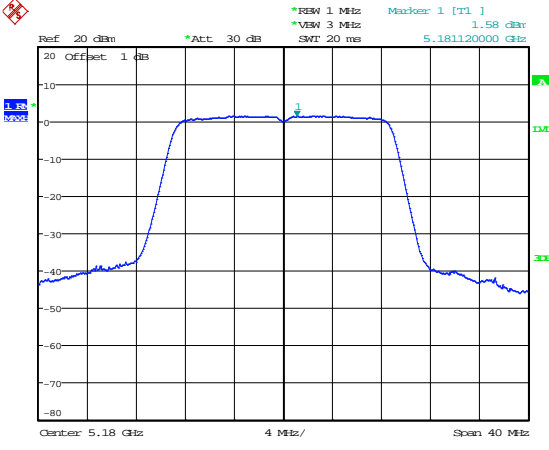
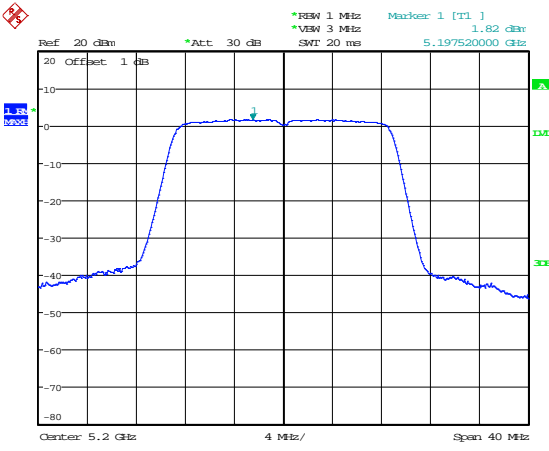
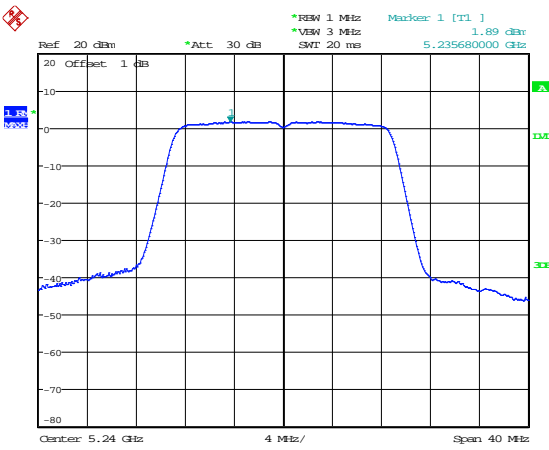
<p>802.11a-Low</p>	 <p>Date: 17.MAY.2023 15:32:01</p>
<p>802.11a-Middle</p>	 <p>Date: 17.MAY.2023 15:32:36</p>
<p>802.11a-High</p>	 <p>Date: 17.MAY.2023 15:34:03</p>

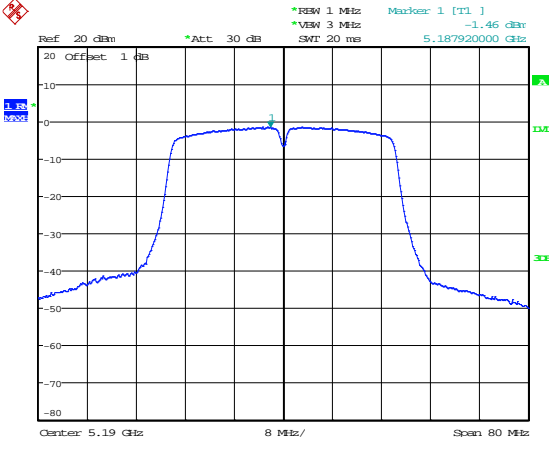
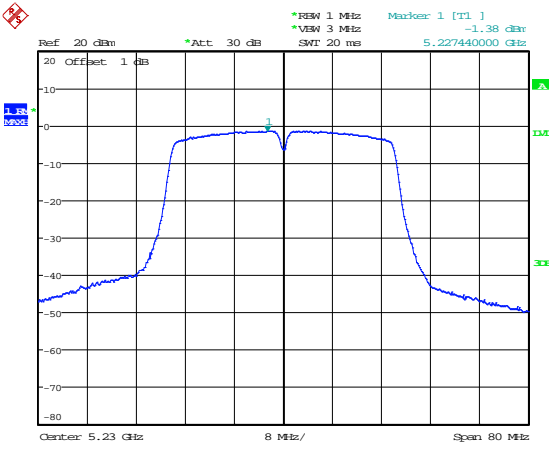
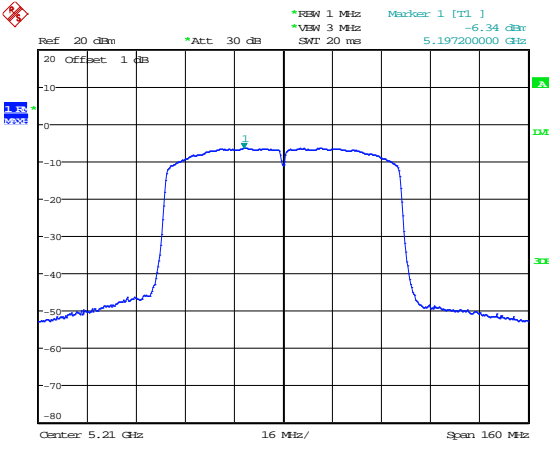
<p>802.11n-HT20-Low</p>	 <p>Date: 17.MAY.2023 15:34:33</p>
<p>802.11n-HT20-Middle</p>	 <p>Date: 17.MAY.2023 15:34:55</p>
<p>802.11n-HT20-High</p>	 <p>Date: 17.MAY.2023 15:36:25</p>

<p>802.11n-HT40-Low</p>	 <p>Date: 17.MAY.2023 15:37:29</p>
<p>802.11n-HT40-High</p>	 <p>Date: 17.MAY.2023 15:38:03</p>
<p>802.11ac-HT80</p>	 <p>Date: 17.MAY.2023 15:39:16</p>

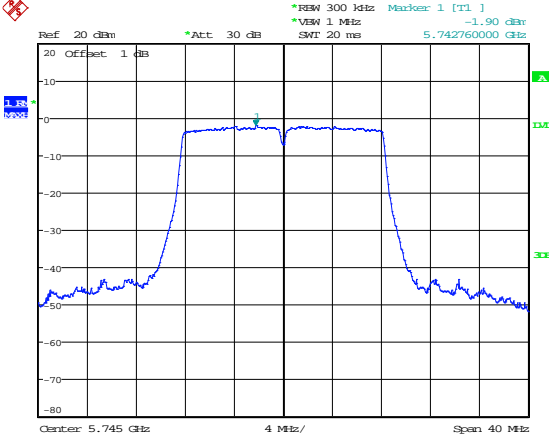
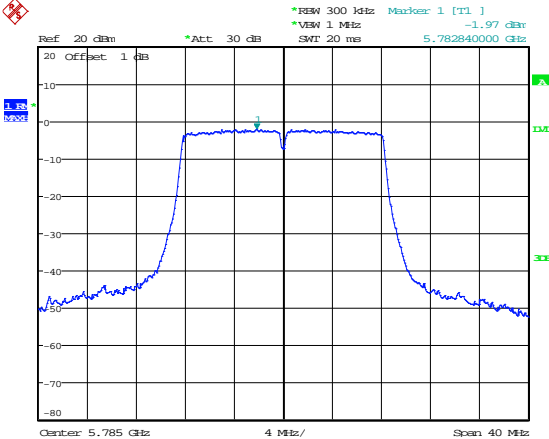
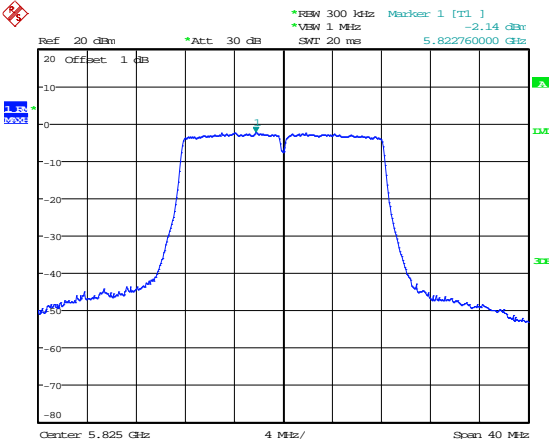
ANT 1
5150-5250MHz

<p>802.11a-Low</p>	 <p>Date: 17.MAY.2023 16:03:22</p>
<p>802.11a-Middle</p>	 <p>Date: 17.MAY.2023 16:03:39</p>
<p>802.11a-High</p>	 <p>Date: 17.MAY.2023 16:04:09</p>

<p>802.11n-HT20-Low</p>	 <p>Date: 17.MAY.2023 16:02:19</p>
<p>802.11n-HT20-Middle</p>	 <p>Date: 17.MAY.2023 16:02:31</p>
<p>802.11n-HT20-High</p>	 <p>Date: 17.MAY.2023 16:02:54</p>

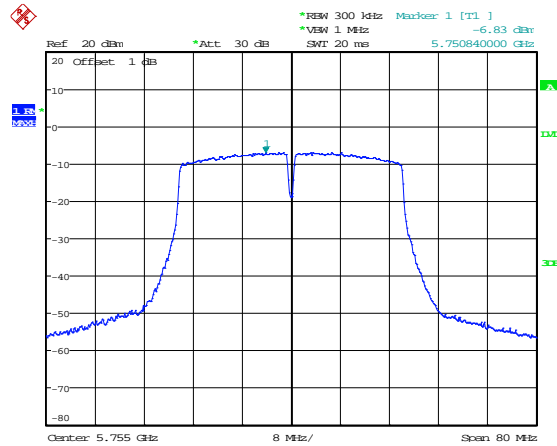
<p>802.11n-HT40-Low</p>	 <p>Date: 17.MAY.2023 16:01:32</p>
<p>802.11n-HT40-High</p>	 <p>Date: 17.MAY.2023 16:01:51</p>
<p>802.11ac-HT80</p>	 <p>Date: 17.MAY.2023 16:01:09</p>

5725-5850MHz

<p>802.11a-Low</p>	 <p>Ref: 20 dBm *Att: 30 dB *RES: 300 kHz Marker: 1 [T1] -1.90 dBm *VIEW: 1 MHz SWT: 20 ms 5.742760000 GHz</p> <p>Offset: 1 dB</p> <p>Center: 5.745 GHz 4 MHz/ Span: 40 MHz</p> <p>Date: 17.MAY.2023 16:59:10</p>
<p>802.11a-Middle</p>	 <p>Ref: 20 dBm *Att: 30 dB *RES: 300 kHz Marker: 1 [T1] -1.97 dBm *VIEW: 1 MHz SWT: 20 ms 5.782840000 GHz</p> <p>Offset: 1 dB</p> <p>Center: 5.785 GHz 4 MHz/ Span: 40 MHz</p> <p>Date: 17.MAY.2023 16:59:25</p>
<p>802.11a-High</p>	 <p>Ref: 20 dBm *Att: 30 dB *RES: 300 kHz Marker: 1 [T1] -2.14 dBm *VIEW: 1 MHz SWT: 20 ms 5.822760000 GHz</p> <p>Offset: 1 dB</p> <p>Center: 5.825 GHz 4 MHz/ Span: 40 MHz</p> <p>Date: 17.MAY.2023 16:59:41</p>

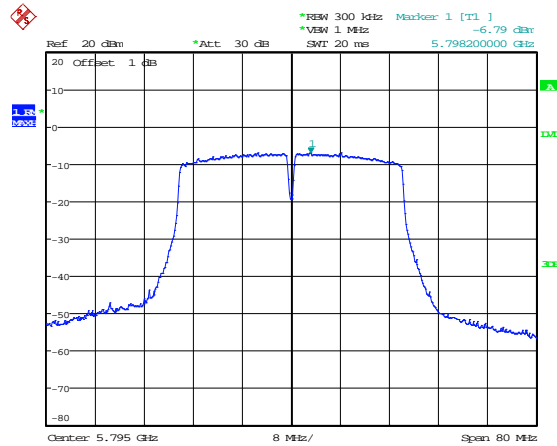
<p>802.11n-HT20-Low</p>	<p>Date: 17.MAY.2023 16:57:59</p>
<p>802.11n-HT20-Middle</p>	<p>Date: 17.MAY.2023 16:58:16</p>
<p>802.11n-HT20-High</p>	<p>Date: 17.MAY.2023 16:58:35</p>

802.11n-HT40-Low



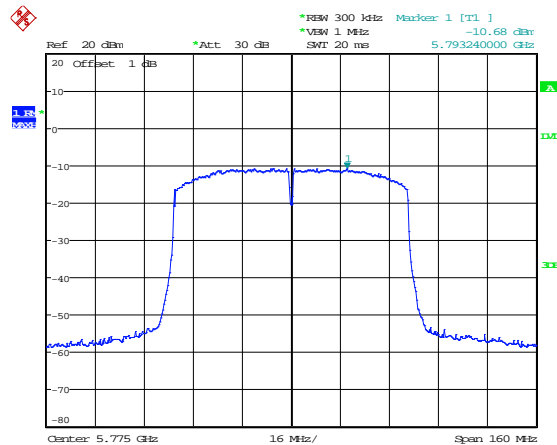
Date: 17.MAY.2023 16:57:16

802.11n-HT40-High



Date: 17.MAY.2023 16:57:34

802.11ac-HT80



Date: 17.MAY.2023 16:56:45

APPENDIX B

Emission Bandwidth and Occupied Bandwidth

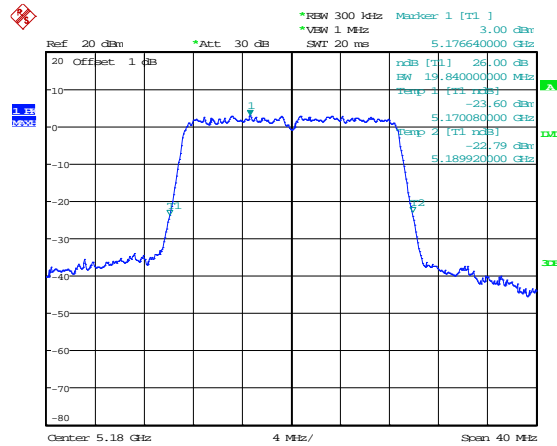
U-NII-1:5150-5250MHz						
Test Mode	Test Channel MHz	ANT 0		ANT 1		Result
		26 dB Bandwidth MHz	99% Bandwidth MHz	26 dB Bandwidth MHz	99% Bandwidth MHz	
802.11a	5180	18.88	16.48	18.88	16.48	Pass
	5200	18.88	16.48	18.88	16.48	Pass
	5240	18.88	16.48	18.88	16.48	Pass
802.11n-HT20	5180	19.84	17.60	19.76	17.60	Pass
	5200	19.84	17.60	19.76	17.60	Pass
	5240	19.76	17.60	19.76	17.60	Pass
802.11n-HT40	5190	42.80	36.64	42.60	36.48	Pass
	5230	42.80	36.48	42.60	36.48	Pass
802.11ac-HT80	5210	84.24	74.88	84.24	74.56	Pass

U-NII-3: 5725-5850MHz						
Test Mode	Test Channel MHz	ANT 0		ANT 1		Limit kHz
		6 dB Bandwidth MHz	99% Bandwidth MHz	6 dB Bandwidth MHz	99% Bandwidth MHz	
802.11a	5745	16.64	16.48	16.64	16.48	≥500
	5785	16.64	16.48	16.64	16.48	≥500
	5825	16.64	16.48	16.72	16.48	≥500
802.11n-HT20	5745	17.76	17.60	17.84	17.60	≥500
	5785	17.84	17.60	17.84	17.60	≥500
	5825	17.76	17.60	17.76	17.60	≥500
802.11n-HT40	5755	36.80	36.48	36.80	36.48	≥500
	5795	36.80	36.48	36.80	36.48	≥500
802.11ac-HT80	5775	77.12	74.88	76.16	74.56	≥500

26 dB Bandwidth MHz
 ANT 0
 5150-5250MHz

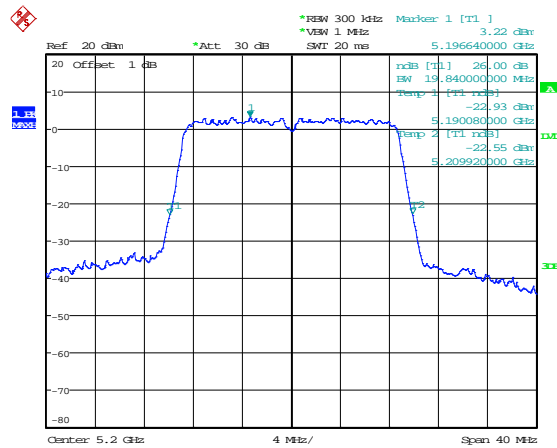
<p>802.11a-Low</p>	<p>Date: 17.MAY.2023 15:07:08</p>
<p>802.11a-Middle</p>	<p>Date: 17.MAY.2023 15:08:37</p>
<p>802.11a-High</p>	<p>Date: 17.MAY.2023 15:10:26</p>

802.11n-HT20-Low



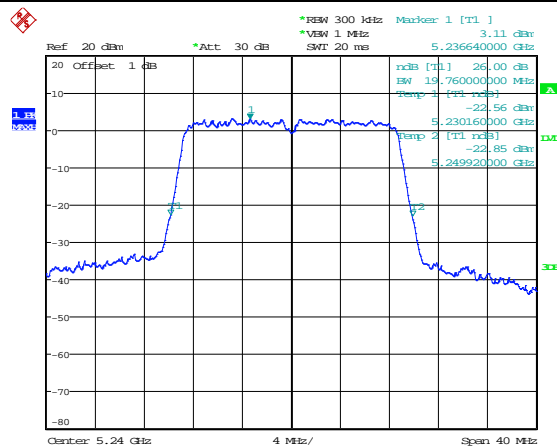
Date: 17.MAY.2023 15:03:56

802.11n-HT20-Middle

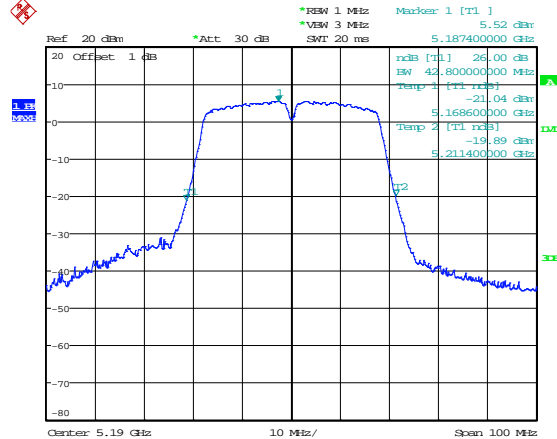
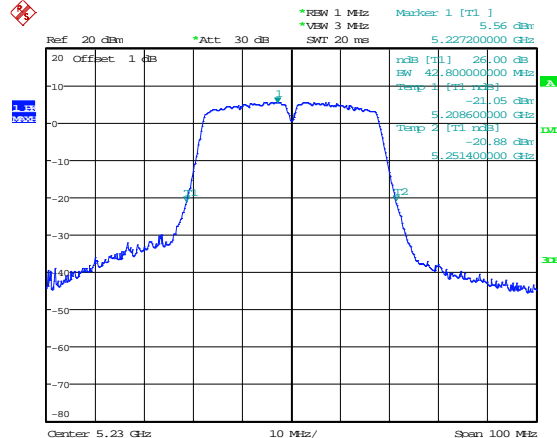
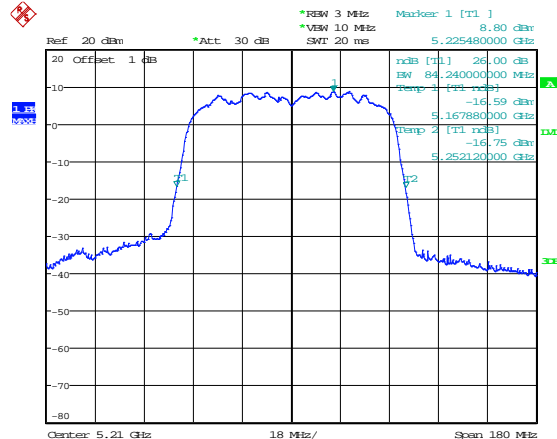


Date: 17.MAY.2023 15:04:53

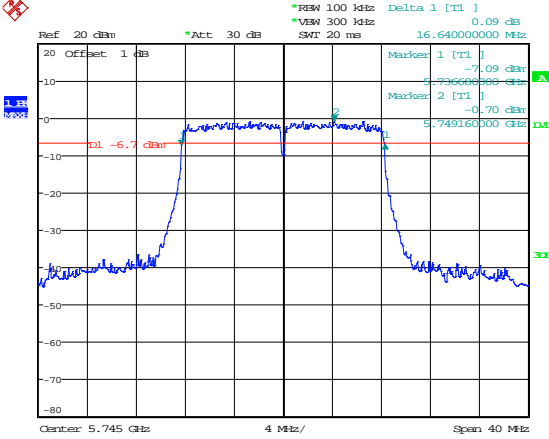
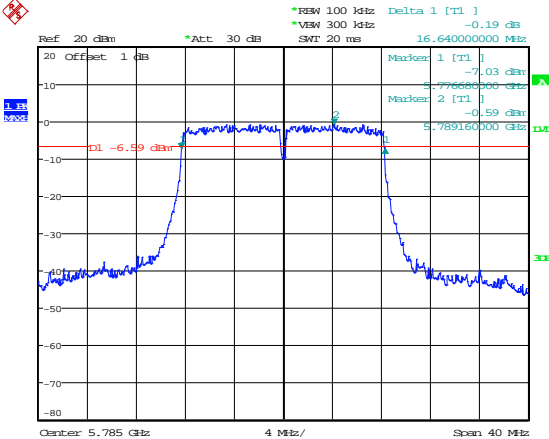
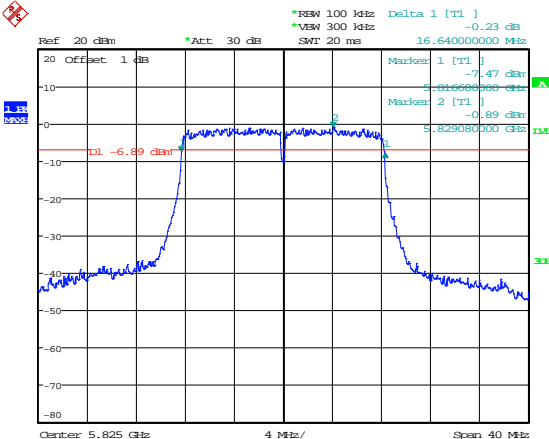
802.11n-HT20-High

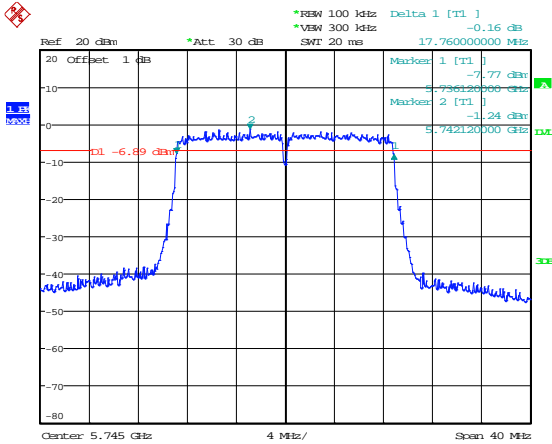
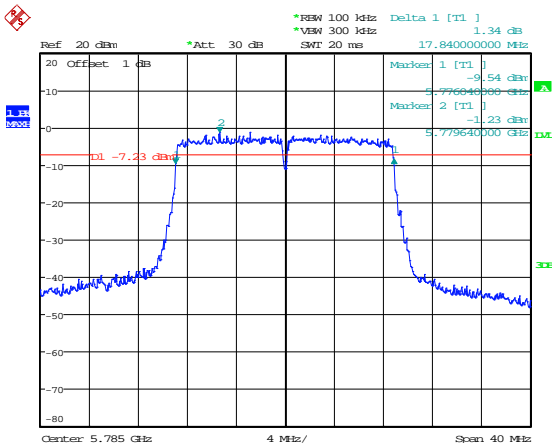
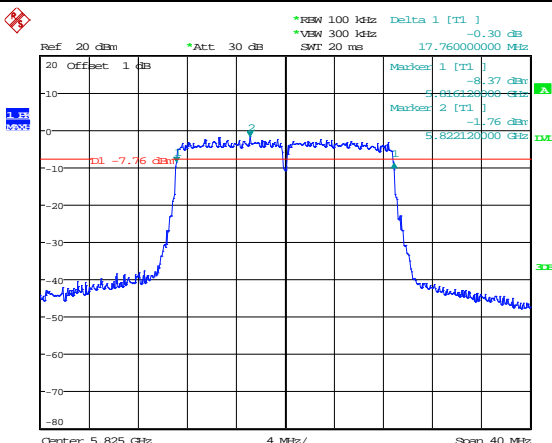


Date: 17.MAY.2023 15:06:16

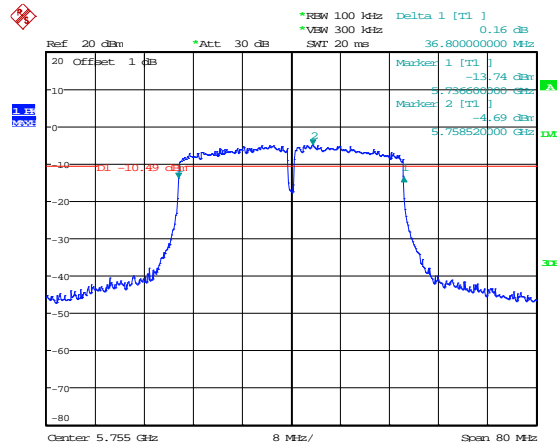
<p>802.11n-HT40-Low</p>	 <p>Ref: 20 dBm, Offset: 1 dB, Att: 30 dB, Span: 100 MHz, Center: 5.19 GHz</p> <p>Parameters: *RES 1 MHz, *VIEW 3 MHz, *SWT 20 ms Marker 1 [T1]: 5.52 dBm, 5.187400000 GHz indB [T1]: 26.00 dB, BW: 42.800000000 MHz Temp 1 [T1 n33]: -21.04 dBm, 5.168600000 GHz Temp 2 [T1 n33]: -19.89 dBm, 5.211400000 GHz</p> <p>Date: 17.MAY.2023 15:02:58</p>
<p>802.11n-HT40-High</p>	 <p>Ref: 20 dBm, Offset: 1 dB, Att: 30 dB, Span: 100 MHz, Center: 5.23 GHz</p> <p>Parameters: *RES 1 MHz, *VIEW 3 MHz, *SWT 20 ms Marker 1 [T1]: 5.56 dBm, 5.227200000 GHz indB [T1]: 26.00 dB, BW: 42.800000000 MHz Temp 1 [T1 n33]: -21.05 dBm, 5.208600000 GHz Temp 2 [T1 n33]: -20.88 dBm, 5.251400000 GHz</p> <p>Date: 17.MAY.2023 15:03:26</p>
<p>802.11ac-HT80</p>	 <p>Ref: 20 dBm, Offset: 1 dB, Att: 30 dB, Span: 180 MHz, Center: 5.21 GHz</p> <p>Parameters: *RES 3 MHz, *VIEW 10 MHz, *SWT 20 ms Marker 1 [T1]: 8.80 dBm, 5.225480000 GHz indB [T1]: 26.00 dB, BW: 84.240000000 MHz Temp 1 [T1 n33]: -16.59 dBm, 5.167880000 GHz Temp 2 [T1 n33]: -15.75 dBm, 5.252120000 GHz</p> <p>Date: 17.MAY.2023 15:02:21</p>

5725-5850MHz

<p>802.11a-Low</p>	 <p>Date: 17.MAY.2023 15:47:09</p>
<p>802.11a-Middle</p>	 <p>Date: 17.MAY.2023 15:47:54</p>
<p>802.11a-High</p>	 <p>Date: 17.MAY.2023 15:49:03</p>

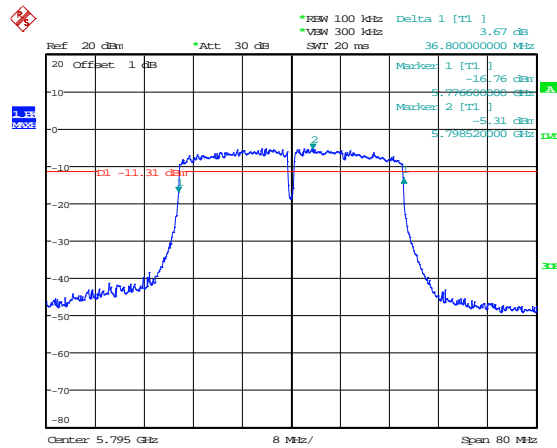
<p>802.11n-HT20-Low</p>	 <p>Date: 17.MAY.2023 15:49:52</p>
<p>802.11n-HT20-Middle</p>	 <p>Date: 17.MAY.2023 15:50:37</p>
<p>802.11n-HT20-High</p>	 <p>Date: 17.MAY.2023 15:52:03</p>

802.11n-HT40-Low



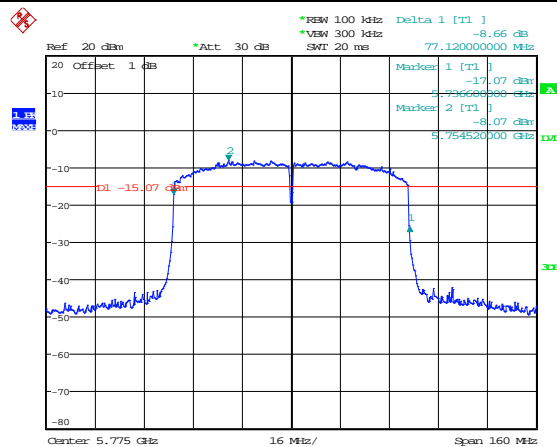
Date: 17.MAY.2023 15:52:54

802.11n-HT40-High



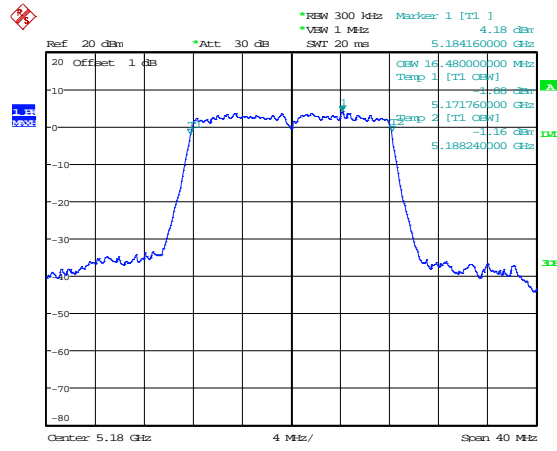
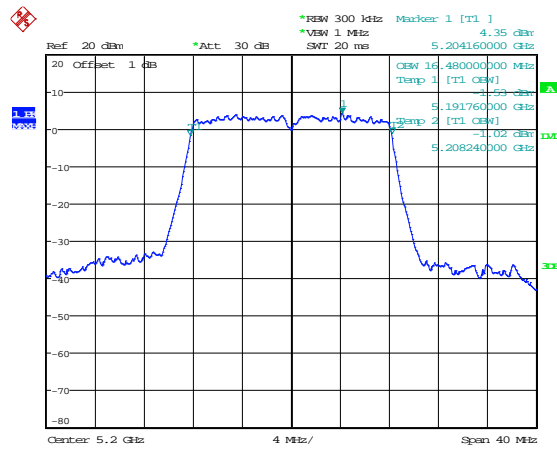
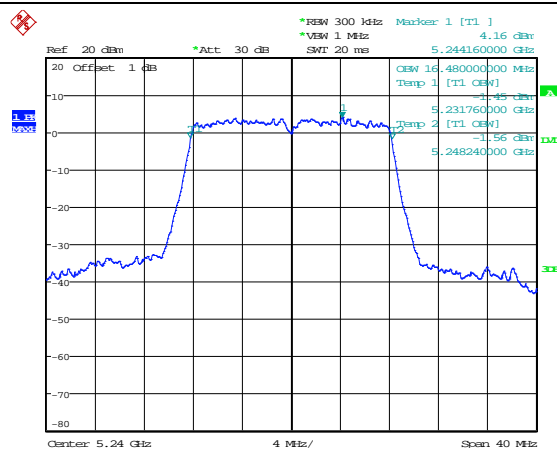
Date: 17.MAY.2023 15:53:33

802.11ac-HT80

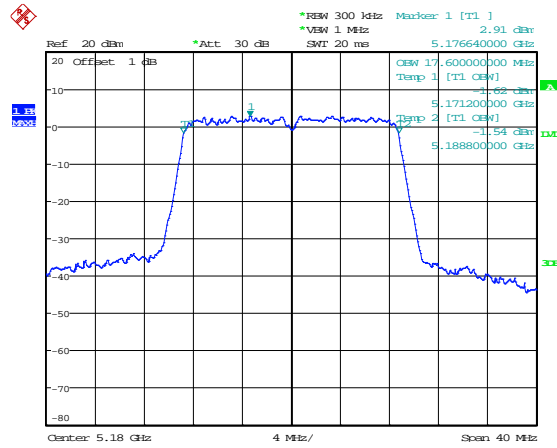


Date: 17.MAY.2023 15:54:16

99% Bandwidth MHz
5150-5250MHz

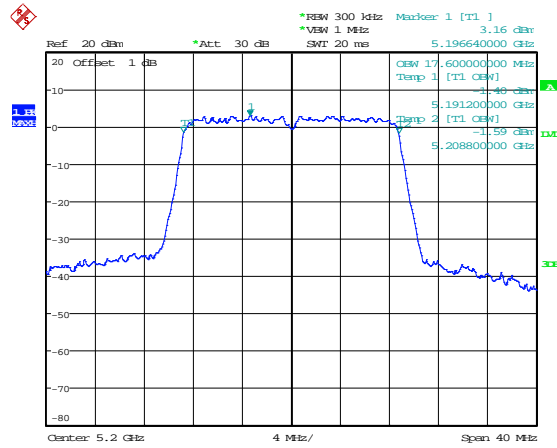
<p>802.11a-Low</p>	 <p>Ref: 20 dBm *Att: 30 dB SWI: 20 ms Marker: 1 [T1] 4.18 dBm 5.184160000 GHz CEW 16.480000000 MHz [T1] CEW Temp 1 [T1] CEW -1.86 dBm 5.171760000 GHz Temp 2 [T1] CEW -1.16 dBm 5.188240000 GHz</p> <p>Center: 5.18 GHz 4 MHz/ Span: 40 MHz</p> <p>Date: 17.MAY.2023 15:12:42</p>
<p>802.11a-Middle</p>	 <p>Ref: 20 dBm *Att: 30 dB SWI: 20 ms Marker: 1 [T1] 4.35 dBm 5.204160000 GHz CEW 16.480000000 MHz [T1] CEW Temp 1 [T1] CEW -1.69 dBm 5.191760000 GHz Temp 2 [T1] CEW -1.02 dBm 5.208240000 GHz</p> <p>Center: 5.2 GHz 4 MHz/ Span: 40 MHz</p> <p>Date: 17.MAY.2023 15:13:14</p>
<p>802.11a-High</p>	 <p>Ref: 20 dBm *Att: 30 dB SWI: 20 ms Marker: 1 [T1] 4.16 dBm 5.244160000 GHz CEW 16.480000000 MHz [T1] CEW Temp 1 [T1] CEW -1.45 dBm 5.231760000 GHz Temp 2 [T1] CEW -1.56 dBm 5.248240000 GHz</p> <p>Center: 5.24 GHz 4 MHz/ Span: 40 MHz</p> <p>Date: 17.MAY.2023 15:15:06</p>

802.11n-HT20-Low



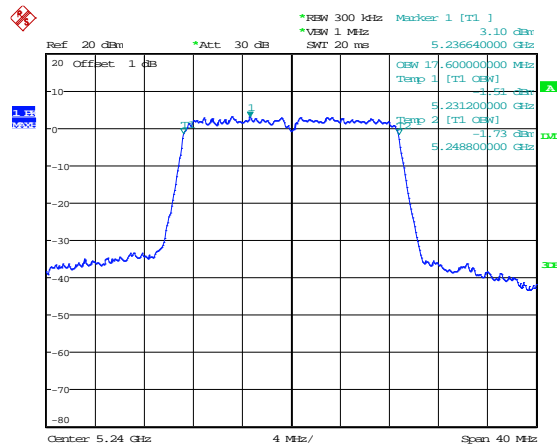
Date: 17.MAY.2023 15:16:20

802.11n-HT20-Middle



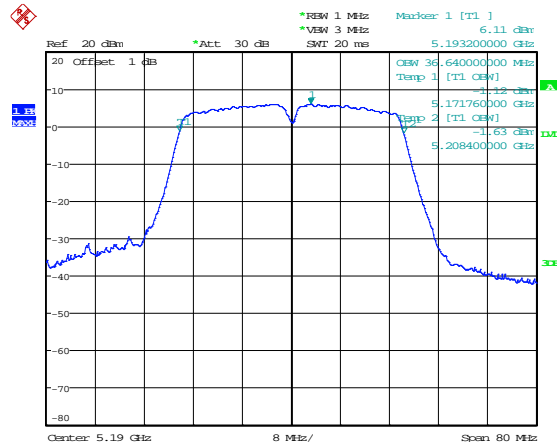
Date: 17.MAY.2023 15:17:01

802.11n-HT20-High



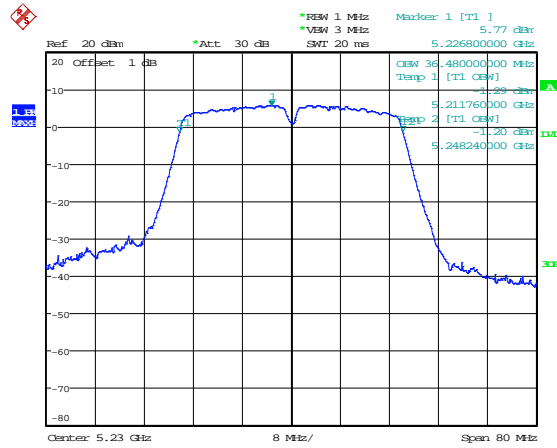
Date: 17.MAY.2023 15:18:34

802.11n-HT40-Low



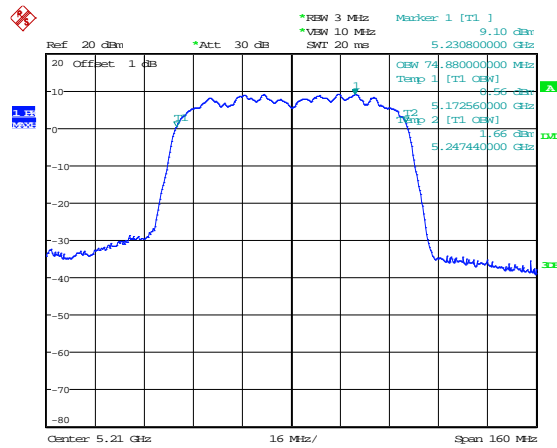
Date: 17.MAY.2023 15:19:50

802.11n-HT40-High



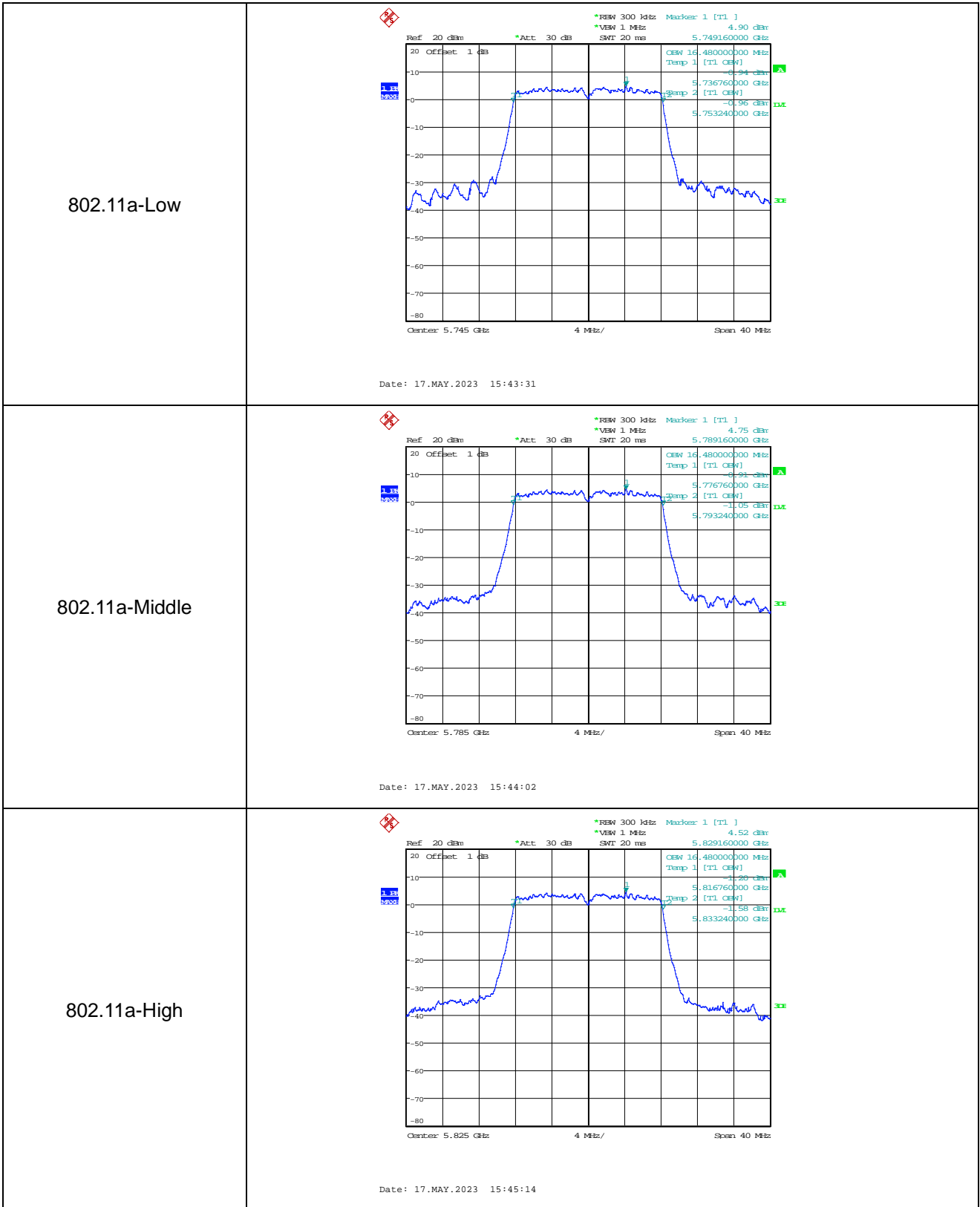
Date: 17.MAY.2023 15:19:26

802.11ac-HT80

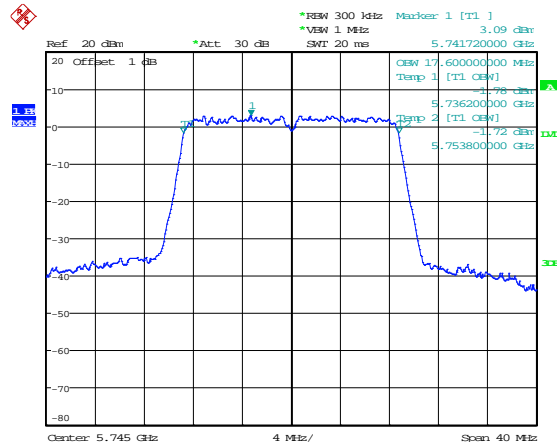


Date: 17.MAY.2023 15:20:33

5725-5850MHz

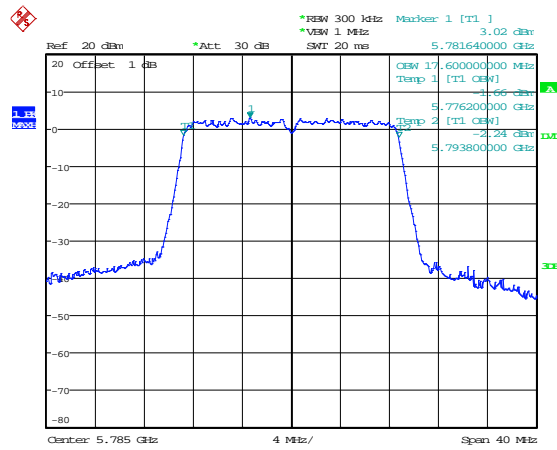


802.11n-HT20-Low



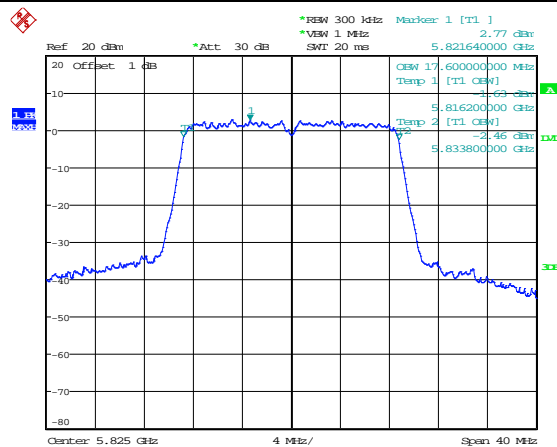
Date: 17.MAY.2023 15:42:12

802.11n-HT20-Middle



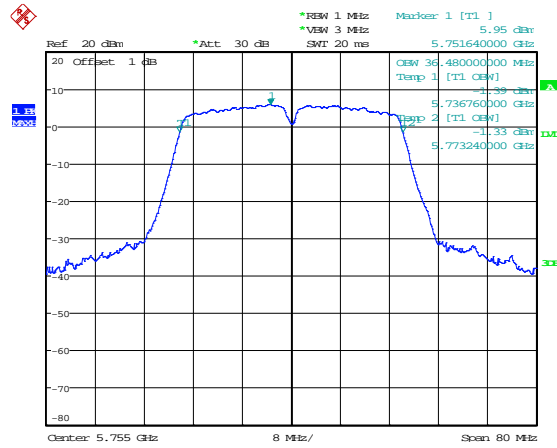
Date: 17.MAY.2023 15:42:25

802.11n-HT20-High



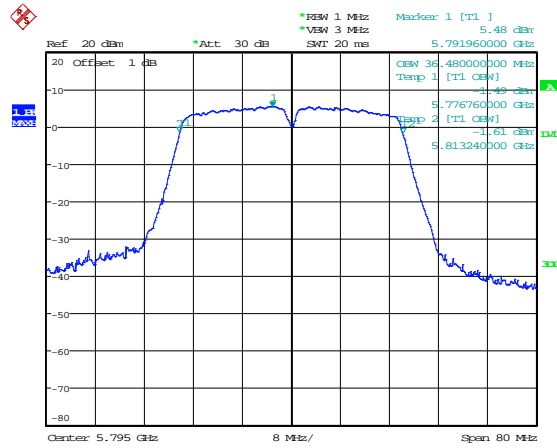
Date: 17.MAY.2023 15:43:08

802.11n-HT40-Low



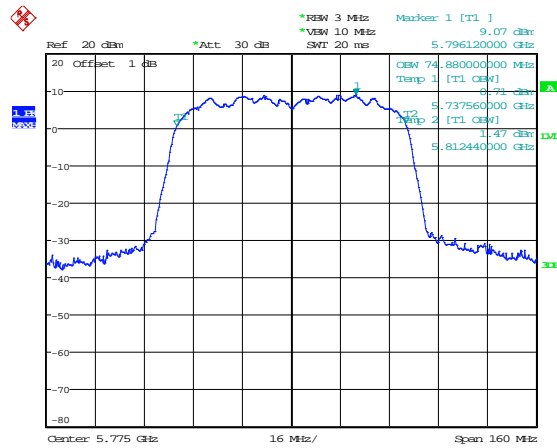
Date: 17.MAY.2023 15:40:47

802.11n-HT40-High



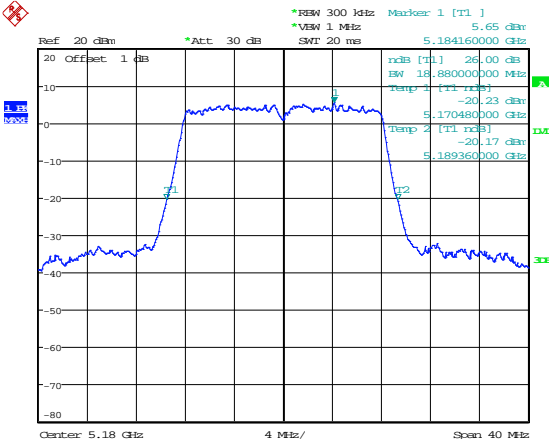
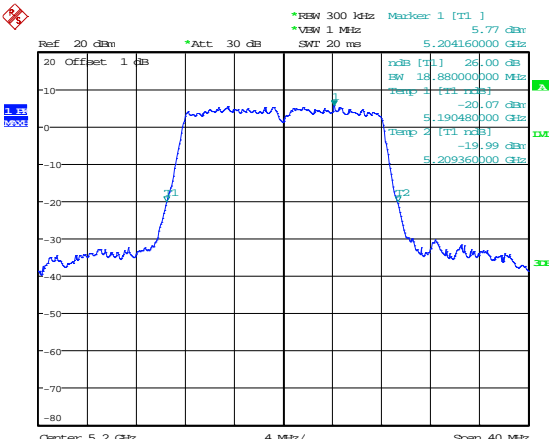
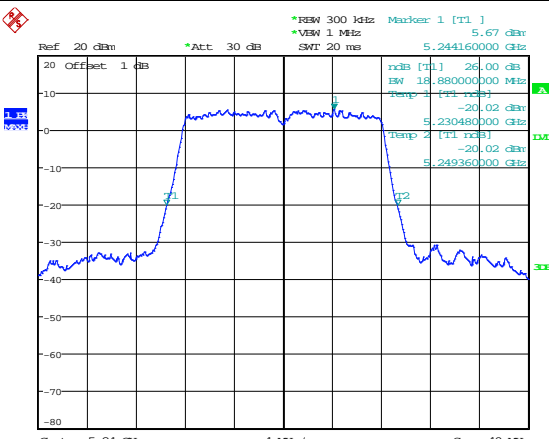
Date: 17.MAY.2023 15:41:04

802.11ac-HT80

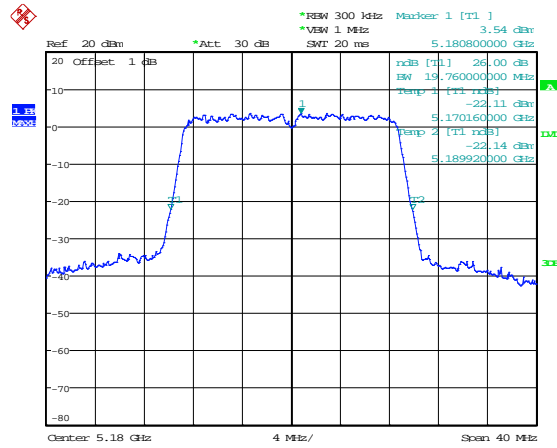


Date: 17.MAY.2023 15:40:21

ANT 1
26 dB Bandwidth MHz
5150-5250MHz

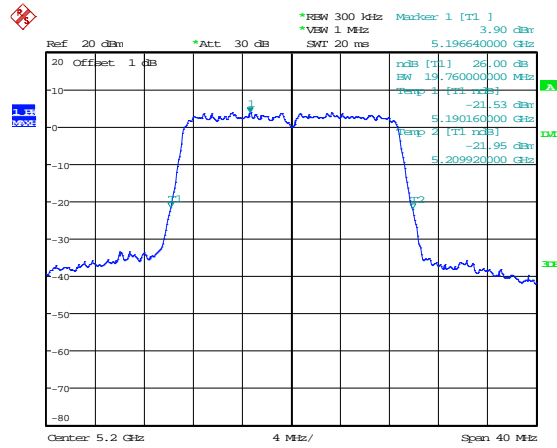
<p>802.11a-Low</p>	 <p>Ref: 20 dBm *Att: 30 dB *RES: 300 kHz *VIEW: 1 MHz *SWT: 20 ms Marker: 1 [T1] 5.184160000 GHz 5.65 dBm</p> <p>ncB [T1] 26.00 dB BW 18.880000000 MHz Temp 1 [T1.ncB] -20.23 dBm 5.170480000 GHz Temp 2 [T1.ncB] -20.17 dBm 5.189360000 GHz</p> <p>Center: 5.18 GHz 4 MHz/ Span: 40 MHz</p> <p>Date: 17.MAY.2023 16:23:25</p>
<p>802.11a-Middle</p>	 <p>Ref: 20 dBm *Att: 30 dB *RES: 300 kHz *VIEW: 1 MHz *SWT: 20 ms Marker: 1 [T1] 5.204160000 GHz 5.77 dBm</p> <p>ncB [T1] 26.00 dB BW 18.880000000 MHz Temp 1 [T1.ncB] -20.07 dBm 5.190480000 GHz Temp 2 [T1.ncB] -19.99 dBm 5.209360000 GHz</p> <p>Center: 5.2 GHz 4 MHz/ Span: 40 MHz</p> <p>Date: 17.MAY.2023 16:23:53</p>
<p>802.11a-High</p>	 <p>Ref: 20 dBm *Att: 30 dB *RES: 300 kHz *VIEW: 1 MHz *SWT: 20 ms Marker: 1 [T1] 5.244160000 GHz 5.67 dBm</p> <p>ncB [T1] 26.00 dB BW 18.880000000 MHz Temp 1 [T1.ncB] -20.02 dBm 5.230480000 GHz Temp 2 [T1.ncB] -20.02 dBm 5.249360000 GHz</p> <p>Center: 5.24 GHz 4 MHz/ Span: 40 MHz</p> <p>Date: 17.MAY.2023 16:24:45</p>

802.11n-HT20-Low



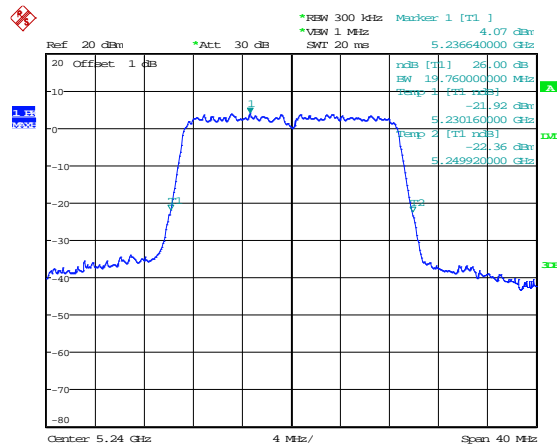
Date: 17.MAY.2023 16:21:46

802.11n-HT20-Middle



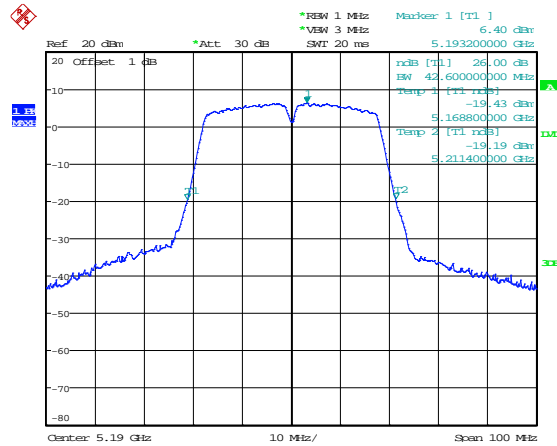
Date: 17.MAY.2023 16:22:35

802.11n-HT20-High



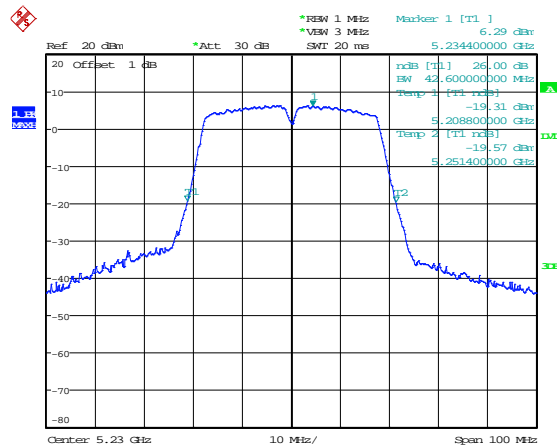
Date: 17.MAY.2023 16:22:59

802.11n-HT40-Low



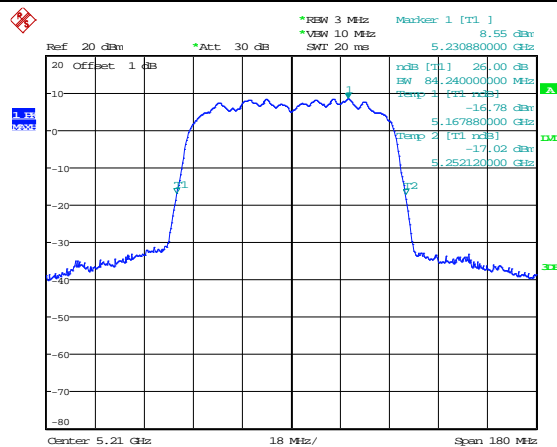
Date: 17.MAY.2023 16:21:10

802.11n-HT40-High



Date: 17.MAY.2023 16:20:25

802.11ac-HT80

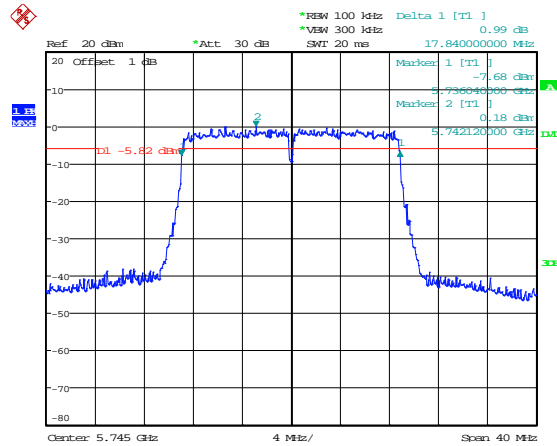


Date: 17.MAY.2023 16:18:42

5725-5850MHz

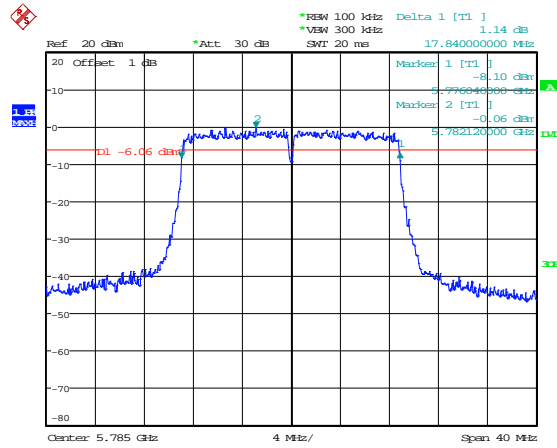
<p>802.11a-Low</p>	<p>Ref: 20 dBm *Att: 30 dB SWI: 20 ms Delta 1 [T1]: -0.06 dB *REW 100 KHz *VIEW 300 KHz Center: 5.745 GHz 4 MHz/ Span 40 MHz</p> <p>Date: 17.MAY.2023 17:14:32</p>
<p>802.11a-Middle</p>	<p>Ref: 20 dBm *Att: 30 dB SWI: 20 ms Delta 1 [T1]: -0.63 dB *REW 100 KHz *VIEW 300 KHz Center: 5.785 GHz 4 MHz/ Span 40 MHz</p> <p>Date: 17.MAY.2023 17:20:54</p>
<p>802.11a-High</p>	<p>Ref: 20 dBm *Att: 30 dB SWI: 20 ms Delta 1 [T1]: 4.94 dB *REW 100 KHz *VIEW 300 KHz Center: 5.825 GHz 4 MHz/ Span 40 MHz</p> <p>Date: 17.MAY.2023 17:21:36</p>

802.11n-HT20-Low



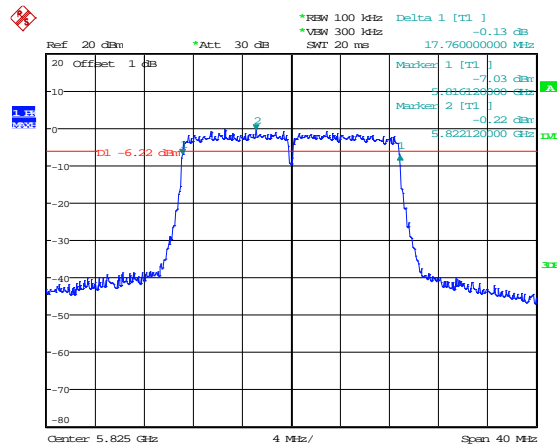
Date: 17.MAY.2023 17:10:39

802.11n-HT20-Middle



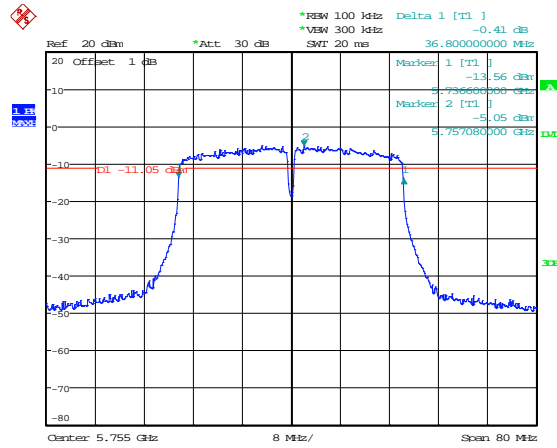
Date: 17.MAY.2023 17:11:29

802.11n-HT20-High



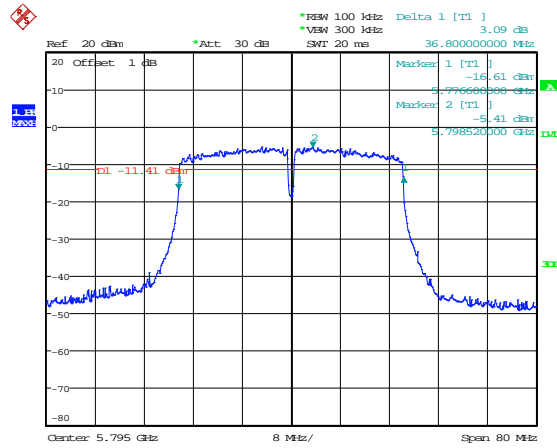
Date: 17.MAY.2023 17:13:31

802.11n-HT40-Low



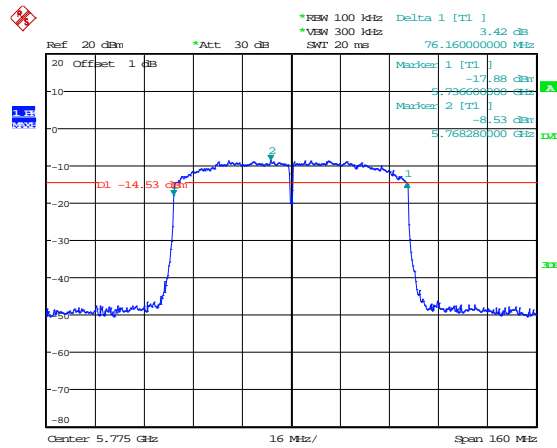
Date: 17.MAY.2023 17:06:41

802.11n-HT40-High



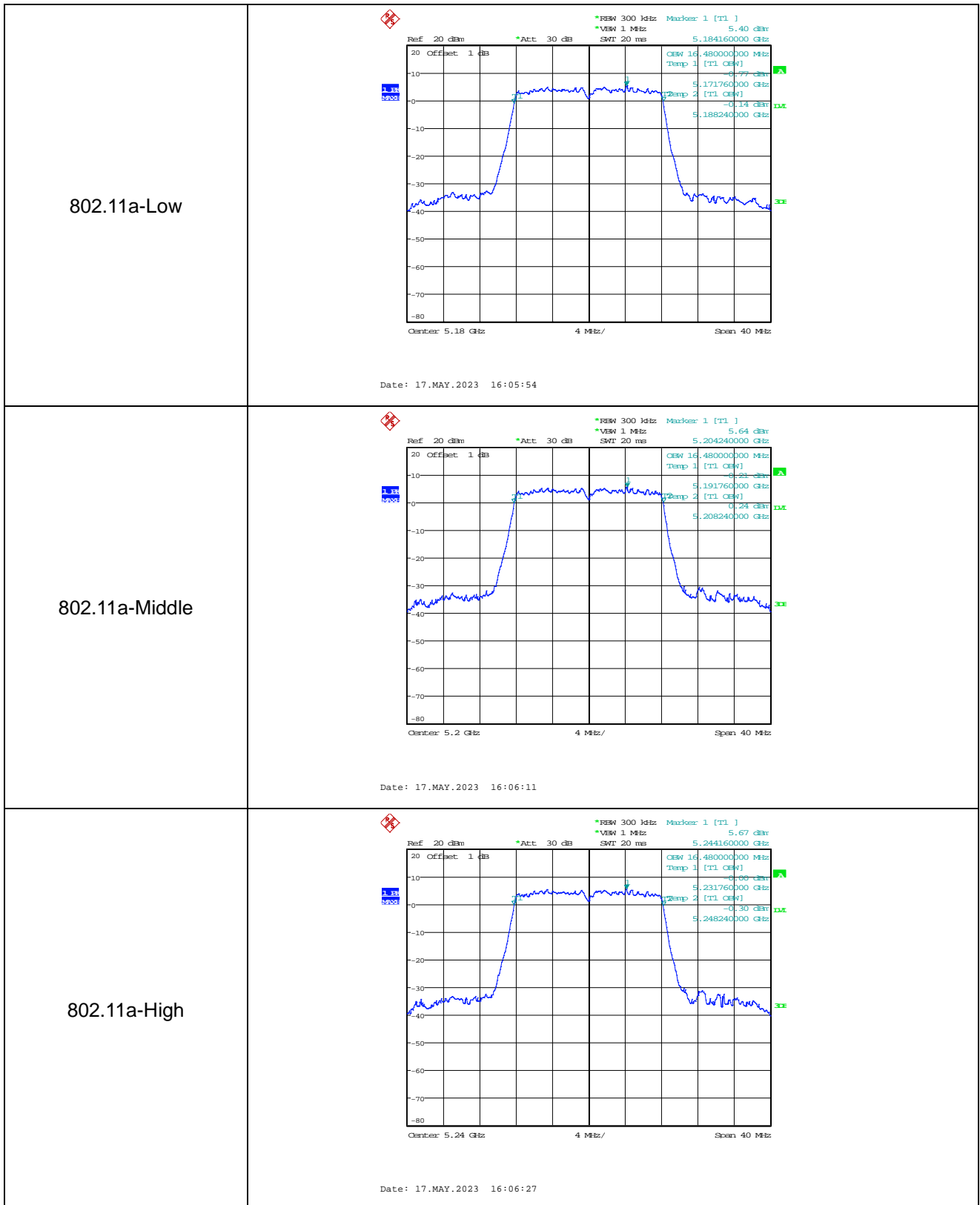
Date: 17.MAY.2023 17:07:18

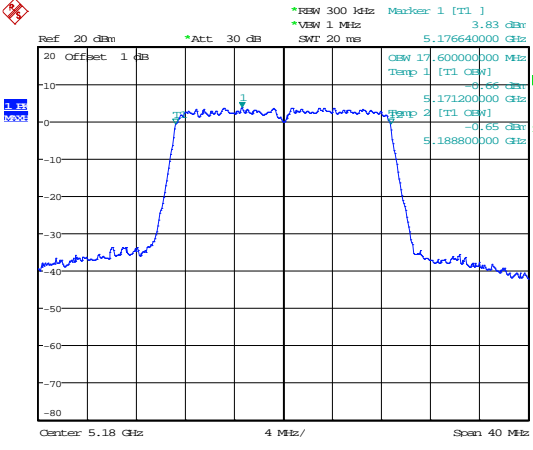
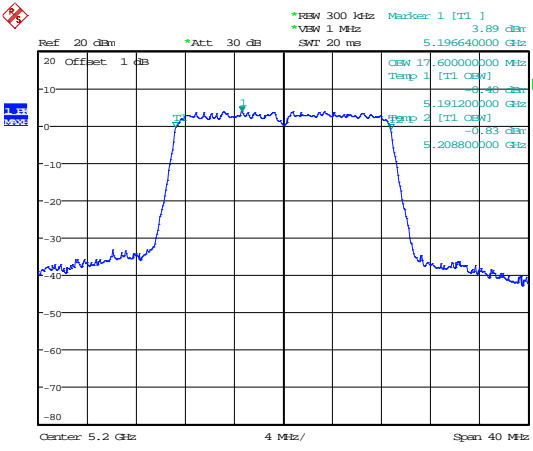
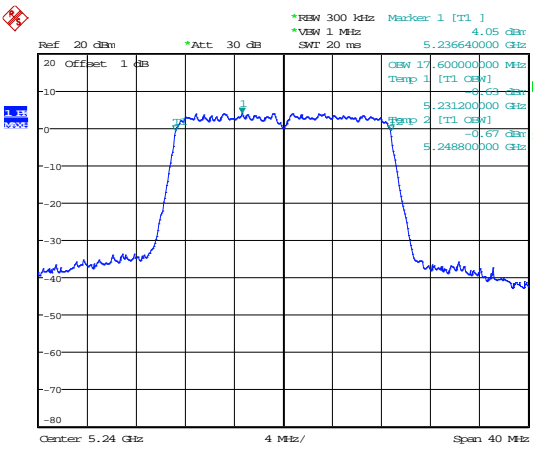
802.11ac-HT80



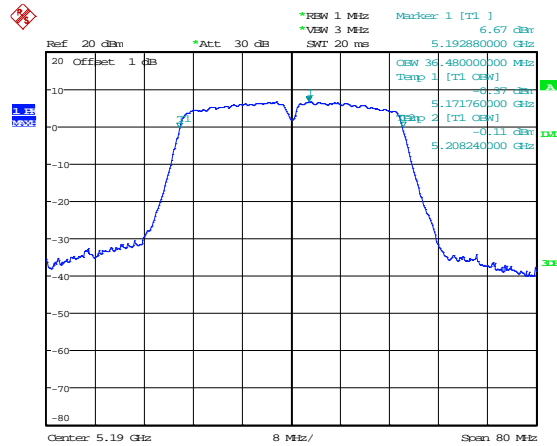
Date: 17.MAY.2023 17:05:57

99% Bandwidth MHz
5150-5250MHz



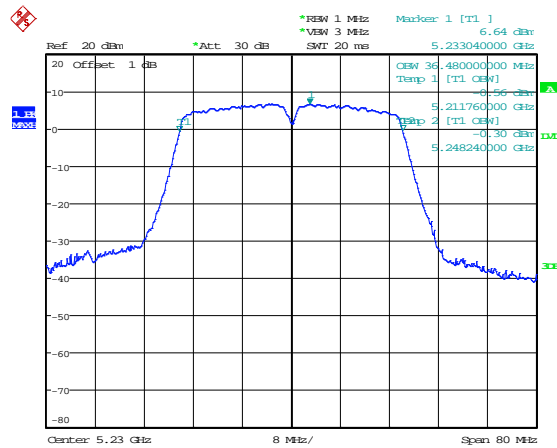
<p>802.11n-HT20-Low</p>	 <p>Date: 17.MAY.2023 16:07:02</p>
<p>802.11n-HT20-Middle</p>	 <p>Date: 17.MAY.2023 16:07:21</p>
<p>802.11n-HT20-High</p>	 <p>Date: 17.MAY.2023 16:07:43</p>

802.11n-HT40-Low



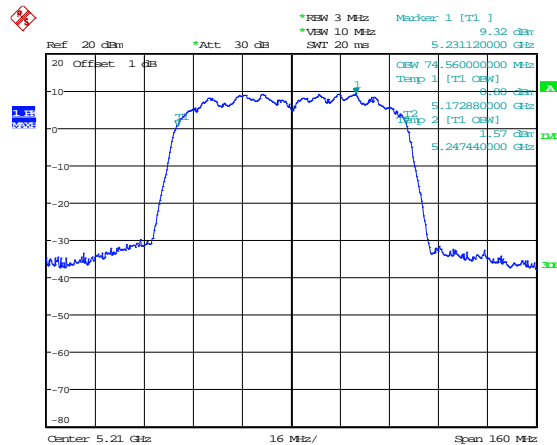
Date: 17.MAY.2023 16:08:30

802.11n-HT40-High



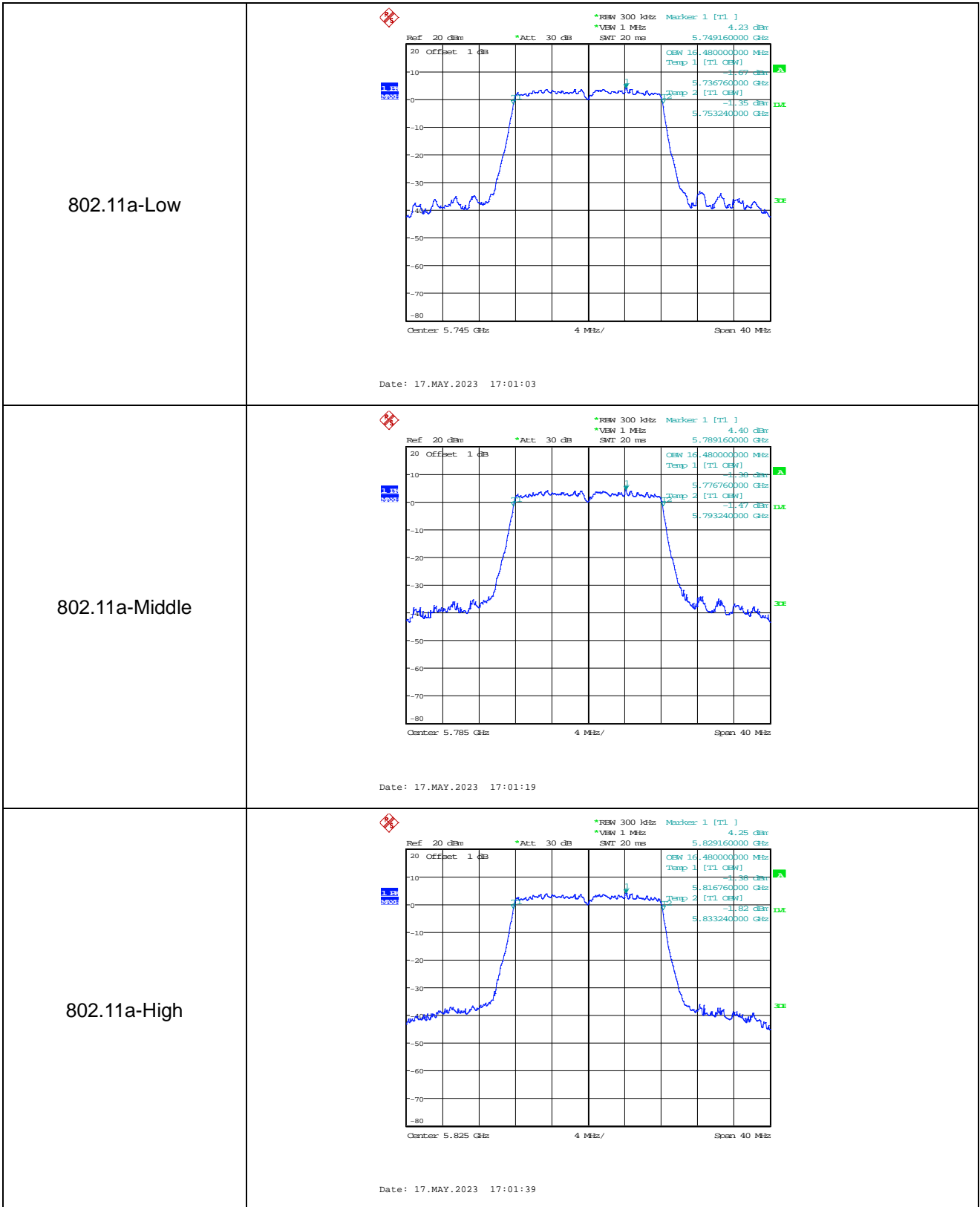
Date: 17.MAY.2023 16:08:54

802.11ac-HT80

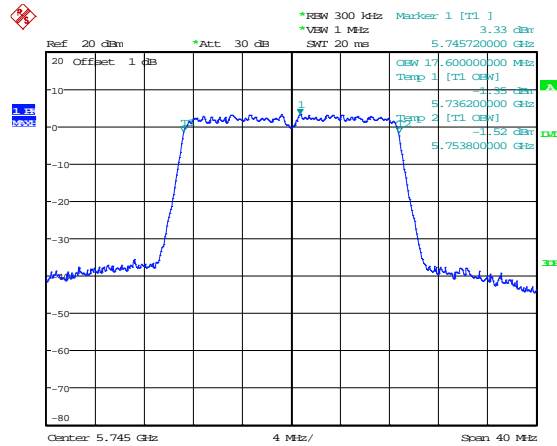


Date: 17.MAY.2023 16:09:36

5725-5850MHz

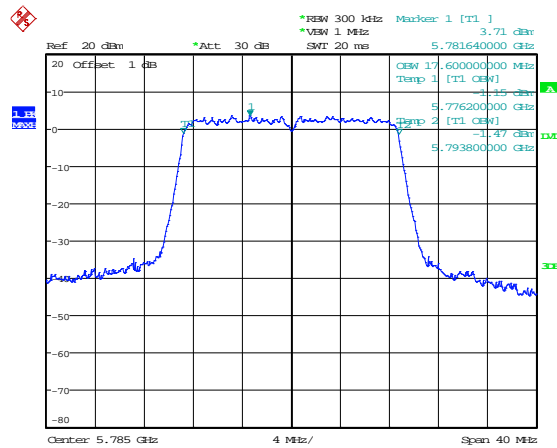


802.11n-HT20-Low



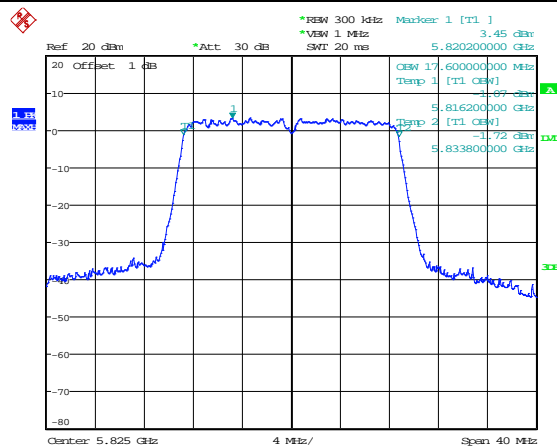
Date: 17.MAY.2023 17:02:14

802.11n-HT20-Middle



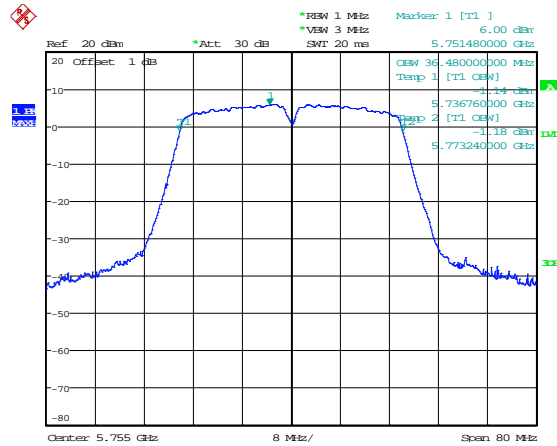
Date: 17.MAY.2023 17:02:30

802.11n-HT20-High



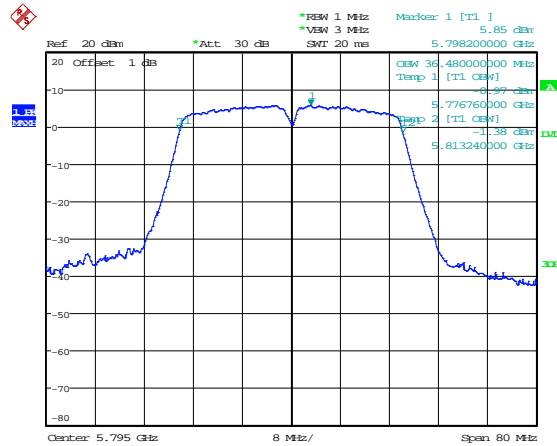
Date: 17.MAY.2023 17:02:48

802.11n-HT40-Low



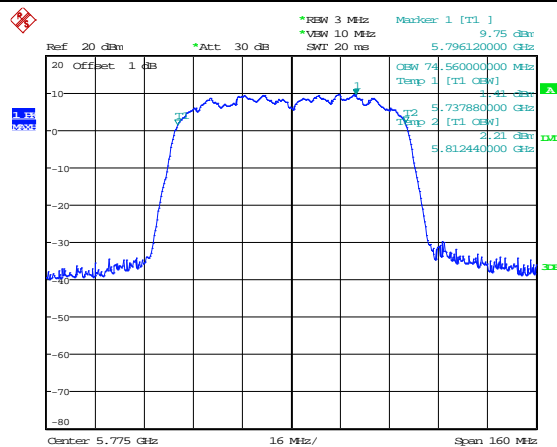
Date: 17.MAY.2023 17:03:21

802.11n-HT40-High



Date: 17.MAY.2023 17:03:43

802.11ac-HT80



Date: 17.MAY.2023 17:04:14

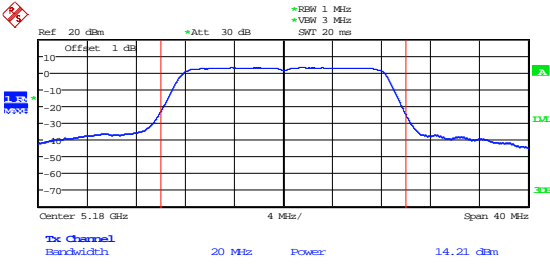
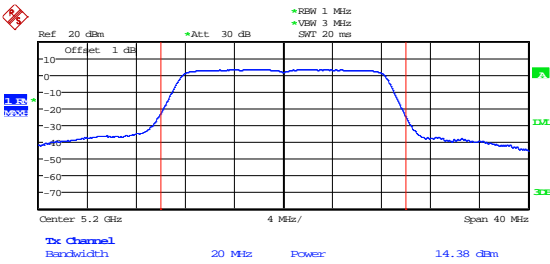
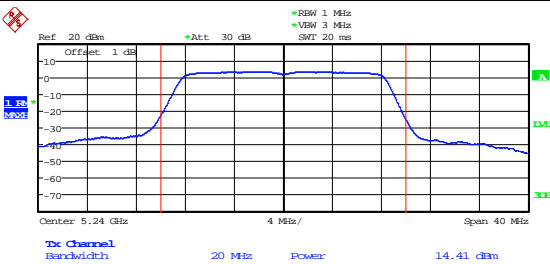
APPENDIX C

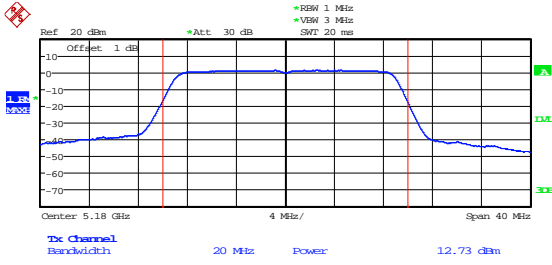
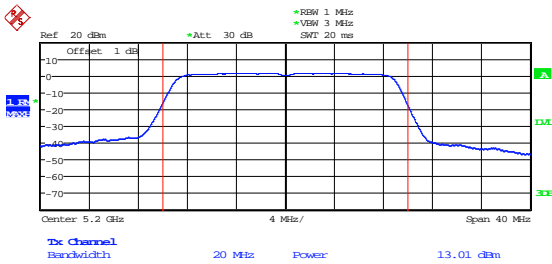
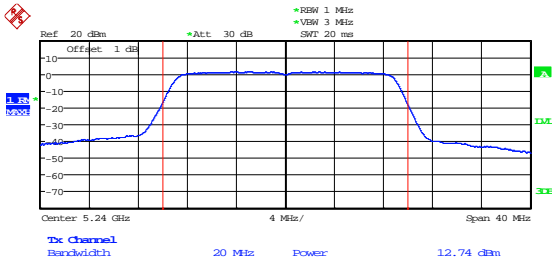
Maximum Conducted Output Power

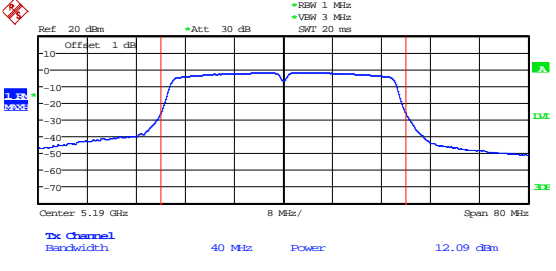
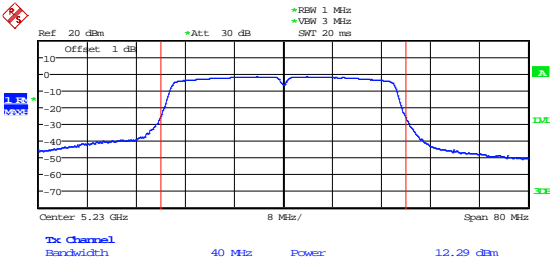
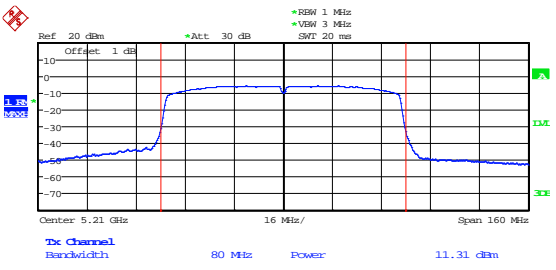
U-NII-1:5150-5250MHz					
Test mode	Frequency MHz	Output Power dBm		Total dBm	Limit dBm
		ANT 0	ANT 1		
802.11a	5180	14.21	14.28	/	23.98
	5200	14.38	14.32	/	23.98
	5240	14.41	14.45	/	23.98
802.11n-HT20	5180	12.73	13.00	15.88	23.98
	5200	13.01	13.39	16.21	23.98
	5240	12.74	13.40	16.09	23.98
802.11n-HT40	5190	12.09	12.61	15.37	23.98
	5230	12.29	12.68	15.50	23.98
802.11ac VH80	5210	11.31	11.17	14.25	23.98

U-NII-3: 5725-5850MHz					
Test mode	Frequency MHz	Output Power dBm		Total dBm	Limit dBm
		ANT 0	ANT 1		
802.11a	5745	13.32	12.51	/	30.00
	5785	13.33	12.57	/	30.00
	5825	13.00	12.42	/	30.00
802.11n-HT20	5745	12.40	12.14	15.28	30.00
	5785	12.53	12.28	15.42	30.00
	5825	11.79	11.93	14.87	30.00
802.11n-HT40	5755	11.54	11.32	14.44	30.00
	5795	11.39	11.25	14.33	30.00
802.11ac VH80	5775	11.24	10.48	13.89	30.00

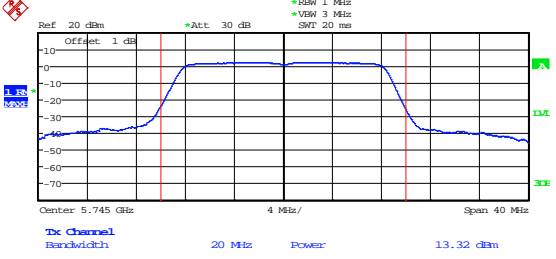
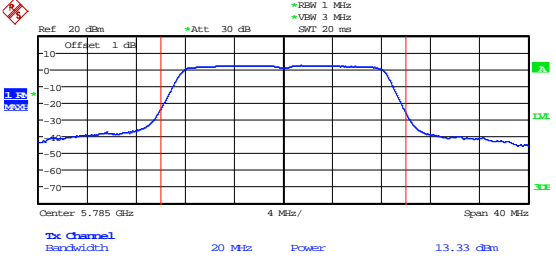
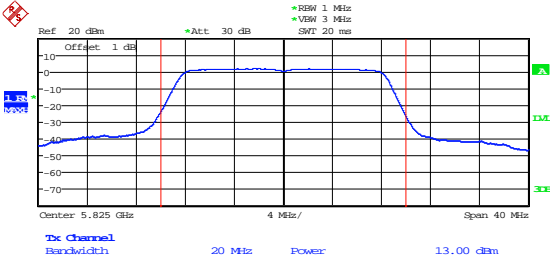
ANT 0
5150-5250MHz

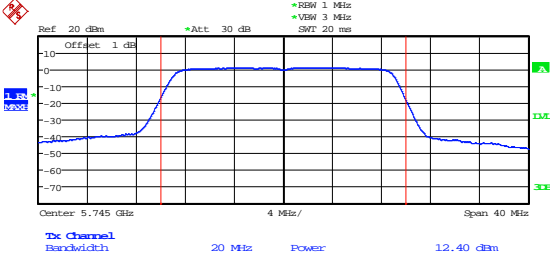
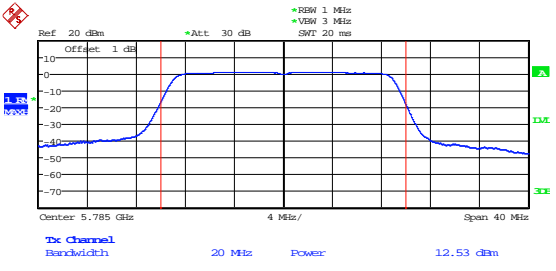
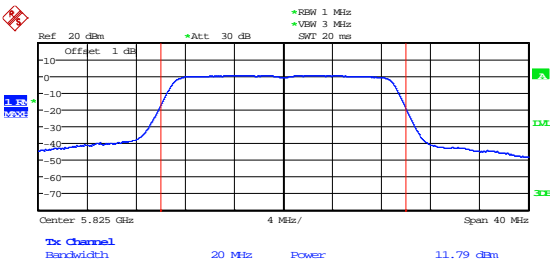
<p>802.11a-Low</p>	 <p>Date: 17.MAY.2023 14:38:06</p>
<p>802.11a-Middle</p>	 <p>Date: 17.MAY.2023 14:38:24</p>
<p>802.11a-High</p>	 <p>Date: 17.MAY.2023 14:38:42</p>

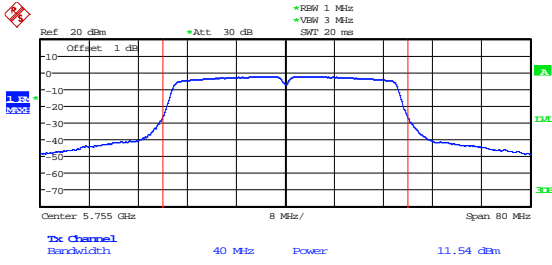
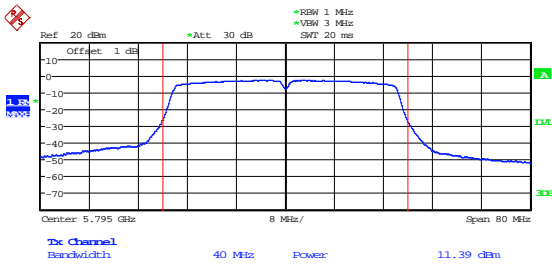
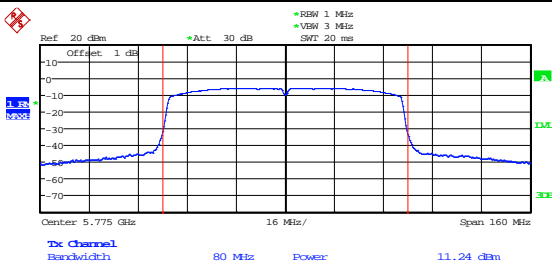
<p>802.11n-HT20-Low</p>	 <p>Date: 17.MAY.2023 14:40:21</p>
<p>802.11n-HT20-Middle</p>	 <p>Date: 17.MAY.2023 14:40:59</p>
<p>802.11n-HT20-High</p>	 <p>Date: 17.MAY.2023 14:41:59</p>

<p>802.11n-HT40-Low</p>	 <p>Date: 17.MAY.2023 14:42:56</p>
<p>802.11n-HT40-High</p>	 <p>Date: 17.MAY.2023 14:43:54</p>
<p>802.11ac-HT80</p>	 <p>Date: 17.MAY.2023 14:44:44</p>

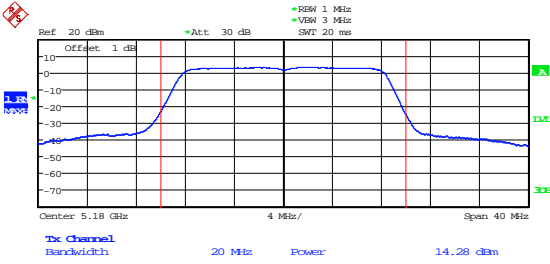
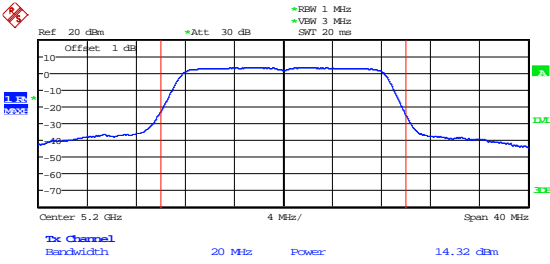
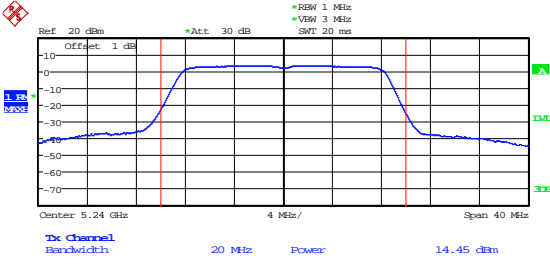
5725-5850MHz

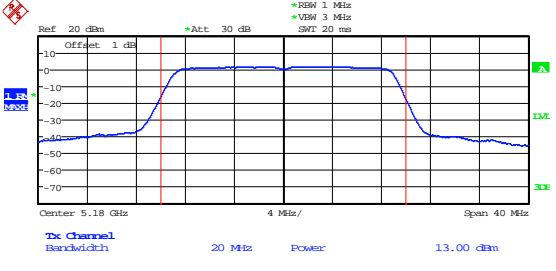
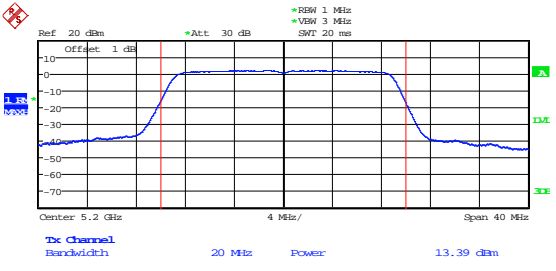
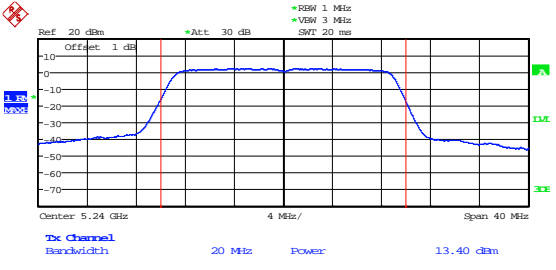
<p>802.11a-Low</p>	 <p>Ref: 20 dBm Offset: 1 dB Att: 30 dB RBW: 1 MHz VBW: 3 MHz SMT: 20 ms</p> <p>Center: 5.745 GHz 4 MHz/ Span: 40 MHz</p> <p>Channel: 20 MHz Power: 13.32 dBm</p> <p>Date: 17.MAY.2023 15:28:44</p>
<p>802.11a-Middle</p>	 <p>Ref: 20 dBm Offset: 1 dB Att: 30 dB RBW: 1 MHz VBW: 3 MHz SMT: 20 ms</p> <p>Center: 5.785 GHz 4 MHz/ Span: 40 MHz</p> <p>Channel: 20 MHz Power: 13.33 dBm</p> <p>Date: 17.MAY.2023 15:28:56</p>
<p>802.11a-High</p>	 <p>Ref: 20 dBm Offset: 1 dB Att: 30 dB RBW: 1 MHz VBW: 3 MHz SMT: 20 ms</p> <p>Center: 5.825 GHz 4 MHz/ Span: 40 MHz</p> <p>Channel: 20 MHz Power: 13.00 dBm</p> <p>Date: 17.MAY.2023 15:29:18</p>

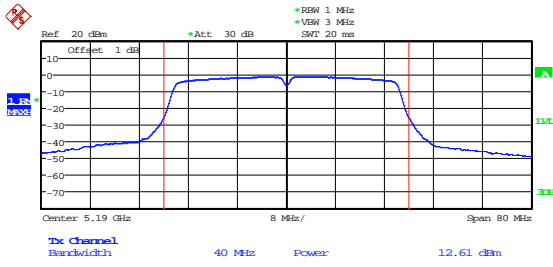
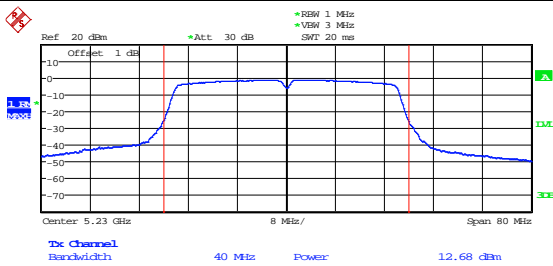
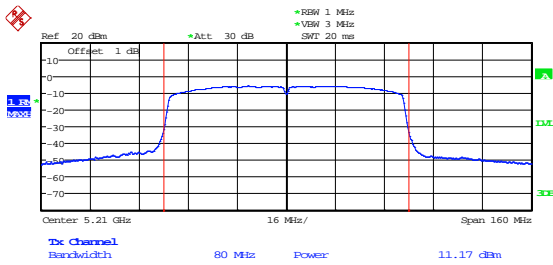
<p>802.11n-HT20-Low</p>	 <p>Date: 17.MAY.2023 15:26:48</p>
<p>802.11n-HT20-Middle</p>	 <p>Date: 17.MAY.2023 15:27:00</p>
<p>802.11n-HT20-High</p>	 <p>Date: 17.MAY.2023 15:28:15</p>

<p>802.11n-HT40-Low</p>	 <p>Date: 17.MAY.2023 15:25:53</p>
<p>802.11n-HT40-High</p>	 <p>Date: 17.MAY.2023 15:26:10</p>
<p>802.11ac-HT80</p>	 <p>Date: 17.MAY.2023 15:25:24</p>

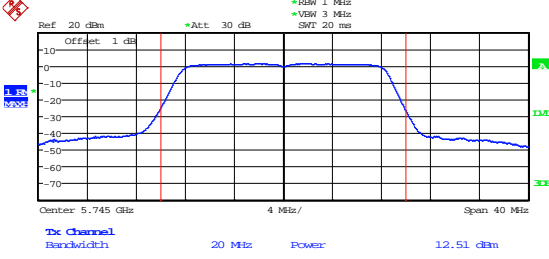
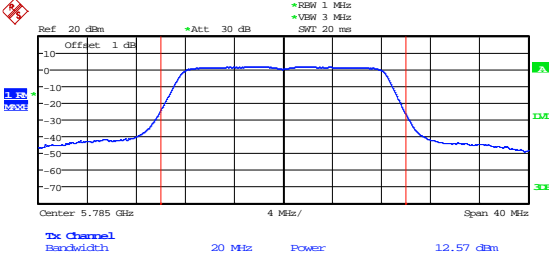
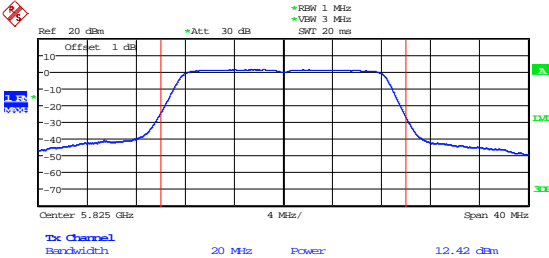
ANT 1
5150-5250MHz

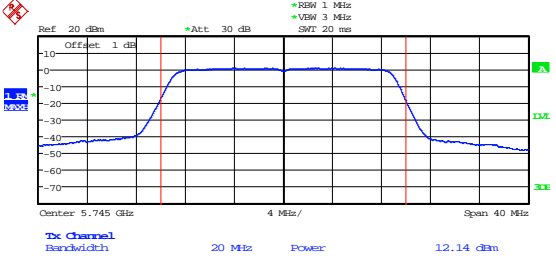
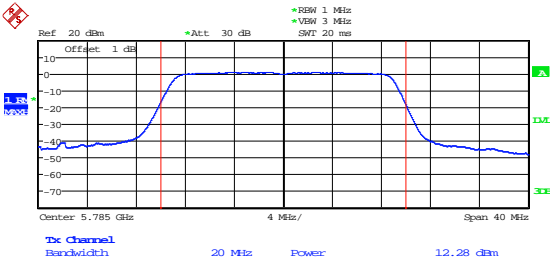
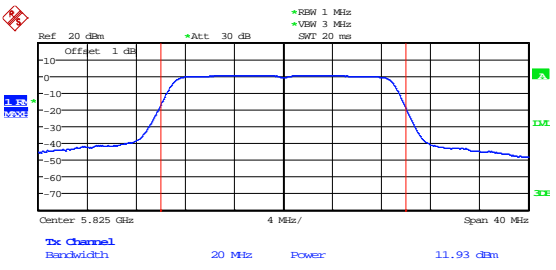
<p>802.11a-Low</p>	 <p>Date: 17.MAY.2023 15:57:16</p>
<p>802.11a-Middle</p>	 <p>Date: 17.MAY.2023 15:57:34</p>
<p>802.11a-High</p>	 <p>Date: 17.MAY.2023 15:57:48</p>

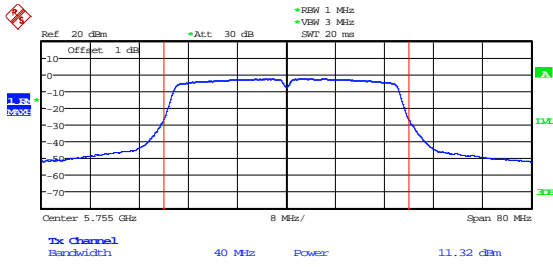
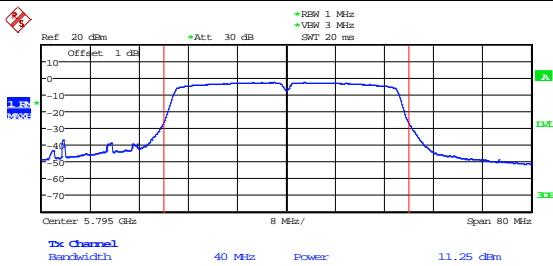
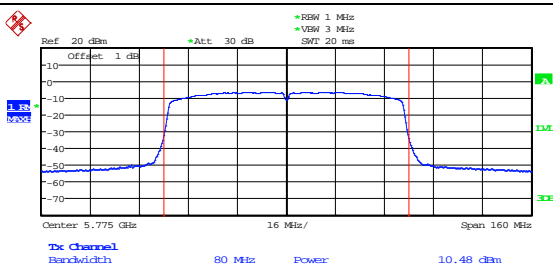
<p>802.11n-HT20-Low</p>	 <p>Date: 17.MAY.2023 15:58:12</p>
<p>802.11n-HT20-Middle</p>	 <p>Date: 17.MAY.2023 15:58:31</p>
<p>802.11n-HT20-High</p>	 <p>Date: 17.MAY.2023 15:58:50</p>

<p>802.11n-HT40-Low</p>	 <p>Date: 17.MAY.2023 15:59:25</p>
<p>802.11n-HT40-High</p>	 <p>Date: 17.MAY.2023 15:59:42</p>
<p>802.11ac-HT80</p>	 <p>Date: 17.MAY.2023 16:00:24</p>

5725-5850MHz

<p>802.11a-Low</p>	 <p>Date: 17.MAY.2023 16:28:13</p>
<p>802.11a-Middle</p>	 <p>Date: 17.MAY.2023 16:28:30</p>
<p>802.11a-High</p>	 <p>Date: 17.MAY.2023 16:28:54</p>

<p>802.11n-HT20-Low</p>	 <p>Ref: 20 dBm Offset: 1 dB Att: 30 dB RBW: 1 MHz VBW: 3 MHz SMT: 20 ms</p> <p>Center: 5.745 GHz 4 MHz/ Span: 40 MHz</p> <p>Ch: Channel Bandwidth: 20 MHz Power: 12.14 dBm</p> <p>Date: 17.MAY.2023 16:29:21</p>
<p>802.11n-HT20-Middle</p>	 <p>Ref: 20 dBm Offset: 1 dB Att: 30 dB RBW: 1 MHz VBW: 3 MHz SMT: 20 ms</p> <p>Center: 5.785 GHz 4 MHz/ Span: 40 MHz</p> <p>Ch: Channel Bandwidth: 20 MHz Power: 12.28 dBm</p> <p>Date: 17.MAY.2023 16:30:07</p>
<p>802.11n-HT20-High</p>	 <p>Ref: 20 dBm Offset: 1 dB Att: 30 dB RBW: 1 MHz VBW: 3 MHz SMT: 20 ms</p> <p>Center: 5.825 GHz 4 MHz/ Span: 40 MHz</p> <p>Ch: Channel Bandwidth: 20 MHz Power: 11.93 dBm</p> <p>Date: 17.MAY.2023 16:31:22</p>

<p>802.11n-HT40-Low</p>	 <p>Date: 17.MAY.2023 16:32:07</p>
<p>802.11n-HT40-High</p>	 <p>Date: 17.MAY.2023 16:47:25</p>
<p>802.11ac-HT80</p>	 <p>Date: 17.MAY.2023 16:53:25</p>

APPENDIX D

Frequency Stability

U-NII-1:5150-5250MHz worst case at 802.11a middle channel				
Voltage(%)	Power(VAC)	TEMP(°C)	Freq.Dev(Hz)	Deviation
100%	120	-30	1593	0.3064
100%		-20	1591	0.3059
100%		-10	1593	0.3063
100%		0	1583	0.3045
100%		+10	1599	0.3075
100%		+20	1584	0.3046
100%		+30	1586	0.3049
100%		+40	1590	0.3057
100%		+50	1593	0.3064
Low power		102	+20	1593
High power	138	+20	1591	0.3059

U-NII-1:5725-5850MHz worst case at 802.11a middle channel				
Voltage(%)	Power(VAC)	TEMP(°C)	Freq.Dev(Hz)	Deviation
100%	120	-30	1593	0.2754
100%		-20	1590	0.2748
100%		-10	1580	0.2732
100%		0	1592	0.2752
100%		+10	1599	0.2765
100%		+20	1591	0.2751
100%		+30	1592	0.2752
100%		+40	1589	0.2747
100%		+50	1581	0.2732
Low power		102	+20	1593
High power	138	+20	1590	0.2748

APPENDIX PHOTOGRAPHS

Please refer to "ANNEX"

**** END OF REPORT ****