TEST REPORT

Reference No.	:	WTX21X12148772W-1
FCC ID	:	2AVJG-T31
Applicant	:	Leanpath,Inc.
Address	:	8305 SW Creekside Place, Suite A, Beaverton OR 97008
Manufacturer	:	Leanpath,Inc.
Address	:	8305 SW Creekside Place, Suite A, Beaverton OR 97008
Product Name	:	Tracker 3.1
Model No.	:	T3.1
Standards	:	FCC Part 15.407
Date of Receipt sample	:	2021-12-27
Date of Test	:	2021-12-27 to 2022-03-01
Date of Issue	:	2022-03-01
Test Report Form No.	:	WTX_Part 15_407W
Test Result	:	**Pass**

Remarks:

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

Prepared By:

Waltek Testing Group (Shenzhen) Co., Ltd.

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

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

Tested by:

Mike Shi

Approved by:

Silin Chen

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Report version

Version No.	Date of issue	Description
Rev.00	2022-03-01	Original
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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

General Description of EUT	
Product Name:	Tracker 3.1
Trade Name:	Leanpath
Model No.:	T3.1
Adding Model(s):	/
Rated Voltage:	DC12V
Battery Capacity:	/
Power Adapter:	MODEL: SYS1546-3612-T3 INPUT: AC100-240V, 50/60Hz, 1.5A MAX OUTPUT: DC12V, 3.0A
Firmware Version:	Tracker3.1.V0.0.1
Hardware Version:	Z10-MB-D8
Note: The test data is gathered from a production sample, provided by the manufacturer.	

Technical Characteristics of EUT	
Support Standards:	802.11a, 802.11n(HT20) , 802.11n-HT40, 802.11ac-VHT80
Frequency Range:	5150-5250MHz, 5250-5350MHz, 5470-5725MHz, 5725-5850MHz
RF Output Power:	14.96dBm (Conducted)
Type of Modulation:	BPSK, QPSK,16QAM,64QAM, 256QAM
Quantity of Channels:	15
Type of Antenna:	FPC Antenna
Antenna Gain:	5150-5250MHz: 1.71dBi 5250-5350MHz: 2.04dBi 5470-5725MHz: 3.27dBi 5725-5850MHz: 3.59dBi
Note: The Antenna Gain is provided by the customer and can affect the validity of results.	

1.2 Test Standards

The tests were performed according to following standards:

FCC Rules Part 15.407: General technical requirements.
ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.
KDB789033 D02 v02r01: Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-Nii) Devices Part 15, Subparte.

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

1.3 Test Methodology

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

1.4 Table for parameters of Test Software setting

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

Mode	Test Frequency (MHz)												
	NCB: 20MHz												
	5180	5200	5240	5260	5300	5320	5500	5580	5700	5720	5745	5785	5825
802.11a 6Mbps	default	default	default	default	default	default	default	default	default	/	default	default	default
802.11n-HT20 MCS0	default	default	default	default	default	default	default	default	default	/	default	default	default

Mode	NCB: 40MHz									
	5190	5230	5270	5310	5510	5550	5670	5710	5755	5795
802.11n-HT40 MCS0	default	default	default	default	default	default	default	/	default	default

Mode	NCB: 80MHz					
	5210	5290	5530	5610	5690	5775
802.11ac-VH80 MCS0/Nss2	default	default	default	default	/	default

1.5 EUT Operating during test

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

1.6 Test Facility

Address of the test laboratory
Laboratory: Waltek Testing Group (Shenzhen) Co., Ltd.
Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road, Block 70 Bao'an District, Shenzhen, Guangdong, China

FCC – Registration No.: 125990
Waltek Testing Group (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintain ed 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.

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,5260MHz,5280MHz,5320MHz,5500MHz, 5600MHz,5700MHz,5745MHz, 5785MHz,5825MHz
TM2	802.11n-HT20	5180MHz,5200MHz,5240MHz,5260MHz,5280MHz,5320MHz,5500MHz, 5600MHz,5700MHz,5745MHz, 5785MHz,5825MHz
TM3	802.11n-HT40	5190MHz,5230MHz,5270MHz,5310MHz,5510MHz,5590MHz,5670MHz, 5755MHz,5795MHz
TM4	802.11ac-VH80	5210MHz,5290MHz,5530MHz,5610MHz,5775MHz
Note: 802.11ac-VHT20, 802.11ac-VHT40 covered by 802.11n-HT20 an802.11n-HT40.		

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

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
AC CABLE	1.80	Unshielded	Without Ferrite
DC CABLE	0.5	Unshielded	Without Ferrite

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

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
/	/	/	/

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

No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due. Date
SEMT-1075	Communication Tester	Rohde & Schwarz	CMW500	148650	2021-03-27	2022-03-26
SEMT-1063	GSM Tester	Rohde & Schwarz	CMU200	114403	2021-03-27	2022-03-26
SEMT-1072	Spectrum Analyzer	Agilent	E4407B	MY41440400	2021-03-27	2022-03-26
SEMT-1079	Spectrum Analyzer	Agilent	N9020A	US47140102	2021-03-27	2022-03-26
SEMT-1080	Signal Generator	Agilent	83752A	3610A01453	2021-03-27	2022-03-26
SEMT-1081	Vector Signal Generator	Agilent	N5182A	MY47070202	2021-03-27	2022-03-26
SEMT-1028	Power Divider	Weinschel	1506A	PM204	2021-03-27	2022-03-26
SEMT-1082	Power Divider	RF-Lambda	RFLT4W5M18G	14110400027	2021-03-27	2022-03-26
SEMT-C001	Cable	Zheng DI	LL142-07-07-10M(A)	/	/	/
SEMT-C002	Cable	Zheng DI	ZT40-2.92J-2.92J-6M	/	/	/
SEMT-C003	Cable	Zheng DI	ZT40-2.92J-2.92J-2.5M	/	/	/
SEMT-C004	Cable	Zheng DI	2M0RFC	/	/	/
SEMT-C005	Cable	Zheng DI	1M0RFC	/	/	/
SEMT-C006	Cable	Zheng DI	1M0RFC	/	/	/
☒Chamber A: Below 1GHz						
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2021-03-27	2022-03-26
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2021-03-27	2022-03-26
SEMT-1008	Amplifier	Agilent	8447F	3113A06717	2021-04-12	2022-04-11
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2021-03-19	2023-03-18
SEMT-1068	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2021-03-19	2023-03-18
☒Chamber A: Above 1GHz						
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2021-03-27	2022-03-26
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2021-03-27	2022-03-26
SEMT-1043	Amplifier	C&D	PAP-1G18	2002	2021-04-12	2022-04-11
SEMT-1042	Horn Antenna	ETS	3117	00086197	2021-03-19	2023-03-18
SEMT-1121	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA91705	2021-04-27	2023-04-26

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SEMT-1169	Pre-amplifier	Direction Systems Inc.	PAP-2640	14145-14153	2021-04-27	2022-04-26
SEMT-1163	Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2021-03-27	2022-03-26
SEMT-1166	Power Limiter	Agilent	N9356B	MY45450376	2021-03-27	2022-03-26
☐Chamber B:Below 1GHz						
SEMT-1068	Trilog Broadband Antenna	Schwarz beck	VULB9163(B)	9163-635	2021-04-09	2023-04-08
SEMT-1067	Amplifier	Agilent	8447D	2944A10179	2021-04-12	2022-04-11
SEMT-1066	EMI Test Receiver	Rohde & Schwarz	ESPI	101391	2021-05-06	2022-05-05
☐Chamber C:Below 1GHz						
SEMT-1319	EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2021-12-03	2022-12-02
SEMT-1343	Trilog Broadband Antenna	Schwarz beck	VULB 9168	1194	2021-05-28	2023-05-27
SEMT-1333	Amplifier	HP	8447F	2944A03869	2021-04-15	2022-04-14
☒Conducted Room 1#						
SEMT-1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2021-04-12	2022-04-11
SEMT-1002	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2021-04-15	2022-04-14
SEMT-1003	AC LISN	Schwarz beck	NSLK8126	8126-224	2021-04-12	2022-04-11
☐Conducted Room 2#						
SEMT-1334	EMI Test Receiver	Rohde & Schwarz	ESPI	101259	2021-04-12	2022-04-11
SEMT-1336	LISN	Rohde & Schwarz	ENV 216	100097	2021-04-12	2022-04-11

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 an FPC antenna, fulfill the requirement of this section.

4. Automatically Discontinue Transmission

4.1 Standard Applicable

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

4.2 Summary of Test Results

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

5. Power Spectral Density

5.1 Standard Applicable

Section 15.407(a) Power limits:

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

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

(3) For the band 5.725-5.85GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30dBm in any 500kHz band. If transmitting antennas of directional gain greater than 6dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

5.2 Test Procedure

According to 789033 D02 v02r01 General UNII Test Procedures New Rules v02, the following is the measurement procedure.
For devices operating in the bands 5.15-5.25GHz, 5.25-5.35GHz, and 5.47-5.725GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85GHz, the rules specify a measurement bandwidth of 500kHz. Many spectrum analyzers do not have 500kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500kHz, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (i.e., 1MHz, or 500kHz). If

measurements are performed using a reduced resolution bandwidth (< 1MHz, or < 500kHz) and integrated over 1 MHz, or 500kHz bandwidth, the following adjustments to the procedures apply:

a) Set RBW ≥ 1/T, where T is defined in section II.B.l.a).
b) Set VBW ≥ 3 RBW.
c) If measurement bandwidth of Maximum PSD is specified in 500kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (< 500kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10log(1MHz/RBW) to the measured result, whereas RBW (< 1MHz) 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=100kHZ is available on nearly all spectrum analyzers.

5.3 Summary of Test Results/Plots

Please refer to Appendix A

6. Emission Bandwidth and Occupied Bandwidth

6.1 Standard Applicable

According to 15.407(a) and (e):

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

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

(3) For the band 5.725-5.85GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30dBm in any 500kHz band. If transmitting antennas of directional gain greater than 6dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

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

6.2 Test Procedure

According to 789033 D02 v02r0r section C&D, the following is the measurement procedure.

1. Emission Bandwidth (EBW)
a) Set RBW = approximately 1% of the emission bandwidth.
b) Set the VBW > RBW.
c) Detector = Peak.

d) Trace mode = max hold.
e) Measure the maximum width of the emission that is 26dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

2. Minimum Emission Bandwidth for the band 5.725-5.85GHz
Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500KHz for the band 5.715-5.85 GHz. The following procedure shall be used for measuring this bandwidth:
a) Set RBW = 100kHz.
b) Set the video bandwidth (VBW) ≥ 3 × RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6dB relative to the maximum level measured in the fundamental emission.
Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described above.

D. 99 Percent Occupied Bandwidth
The 99-percent occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5 % of the total mean power of the given emission. Measurement of the 99-percent occupied bandwidth is required only as a condition for using the optional band-edge measurement techniques described in section II.G.3.d). Measurements of 99-percent occupied bandwidth may also optionally be used in lieu of the EBW to 789033 D02 v02r01 General UNII Test Procedures New Rules v01 define the minimum frequency range over which the spectrum is integrated when measuring maximum conducted output power as described in section II.E. However, the EBW must be measured to determine bandwidth dependent limits on maximum conducted output power in accordance with 15.407(a).

The following procedure shall be used for measuring (99 %) power bandwidth:
1. Set center frequency to the nominal EUT channel center frequency.
2. Set span = 1.5 times to 5.0 times the OBW.
3. Set RBW = 1 % to 5 % of the OBW
4. Set VBW ≥ 3 * 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. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

6.3 Summary of Test Results/Plots

Please refer to Appendix B

7. Maximum Conducted Output Power

7.1 Standard Applicable

Section 15.407(a) Power limits:

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

(2) For the 5.25-5.35GHz and 5.47-5.725GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250mW or 11dBm + 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 ≥ 3MHz.

(iv) Number of points in sweep ≥ 2 Span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)

(v) Sweep time = auto.

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

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

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

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

7.3 Summary of Test Results/Plots

Please refer to Appendix C

8. Radiated Spurious Emissions

8.1 Standard Applicable

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

(1) For transmitters operating in the 5.15-5.25GHz band: All emissions outside of the 5.15-5.35GHz band shall not exceed an e.i.r.p. of −27dBm/MHz.

(2) For transmitters operating in the 5.25-5.35GHz band: All emissions outside of the 5.15-5.35GHz band shall not exceed an e.i.r.p. of −27dBm/MHz.

(3) For transmitters operating in the 5.47-5.725GHz band: All emissions outside of the 5.47-5.725GHz band shall not exceed an e.i.r.p. of −27dBm/MHz.

(4) For transmitters operating in the 5.725-5.85GHz band:

(i) All emissions shall be limited to a level of −27dBm/MHz at 75MHz or more above or below the band edge increasing linearly to 10dBm/MHz at 25MHz above or below the band edge, and from 25MHz above or below the band edge increasing linearly to a level of 15.6dBm/MHz at 5MHz above or below the band edge, and from 5MHz above or below the band edge increasing linearly to a level of 27dBm/MHz at the band edge.

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

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

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

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.

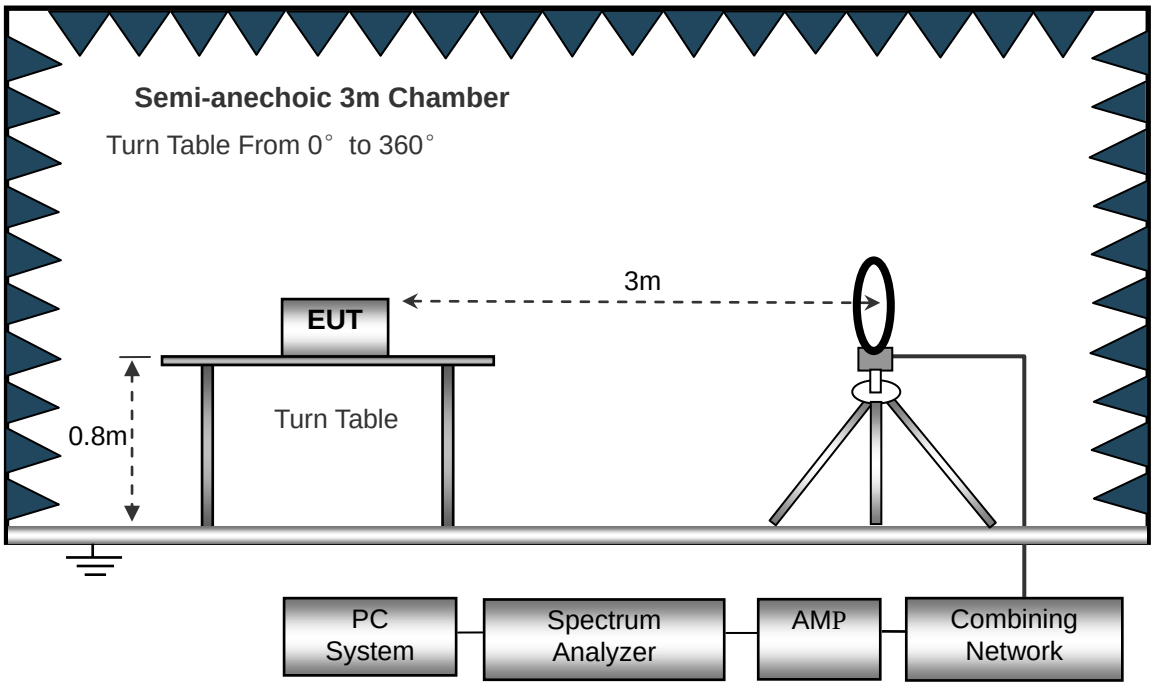
8.2 Test Procedure

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..

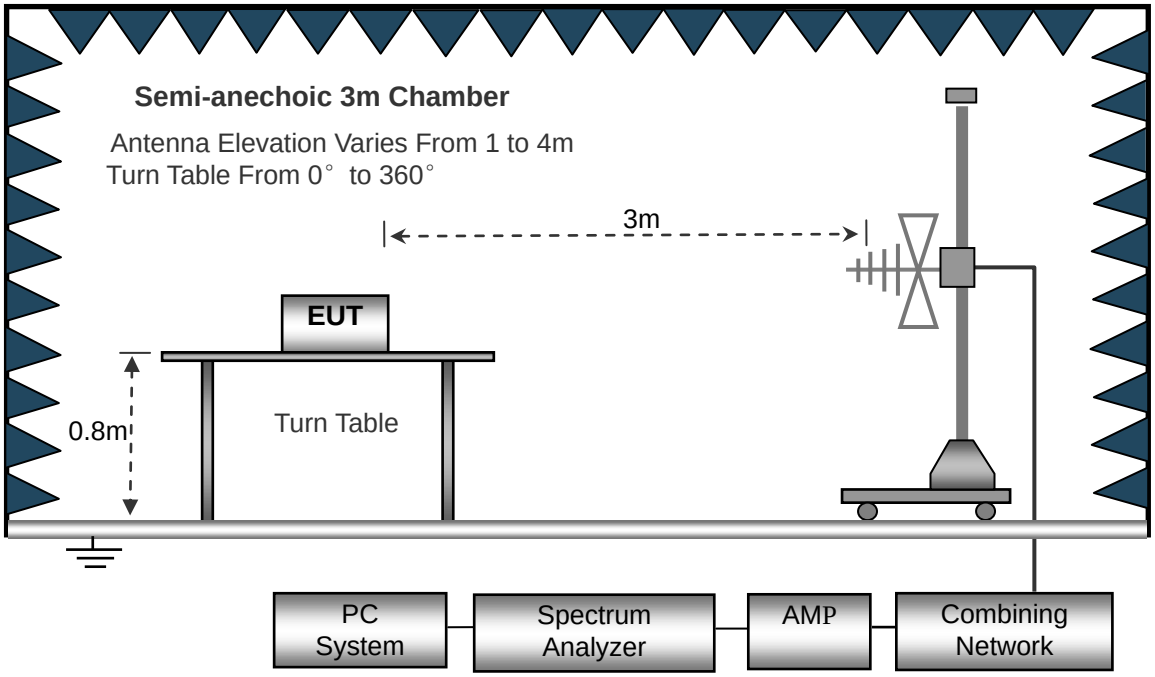
The external I/O cables were draped along the test table and formed a bundle 30 to 40cm long in the middle.

The spacing between the peripherals was 10cm.

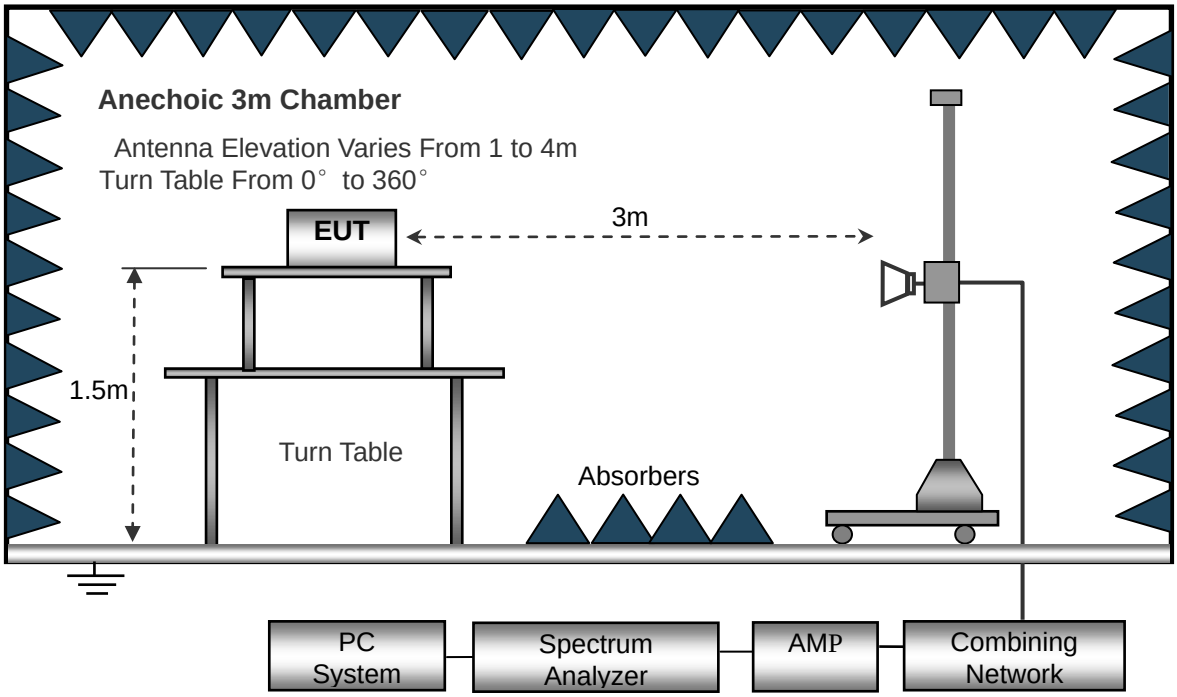
The test setup for emission measurement below 30MHz.



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



The test setup for emission measurement above 1GHz.



8.3 Test Receiver Setup

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

For peak detector:
RBW = 1000kHz, VBW = 3000kHz, Sweep Time = Auto

For average detector:
RBW = 1000kHz, VBW = 10Hz, Sweep Time = Auto

8.4 Corrected Amplitude & Margin Calculation

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

Corr. Ampl. = Indicated Reading + Ant. Factor + Cable Loss – Ampl. Gain

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

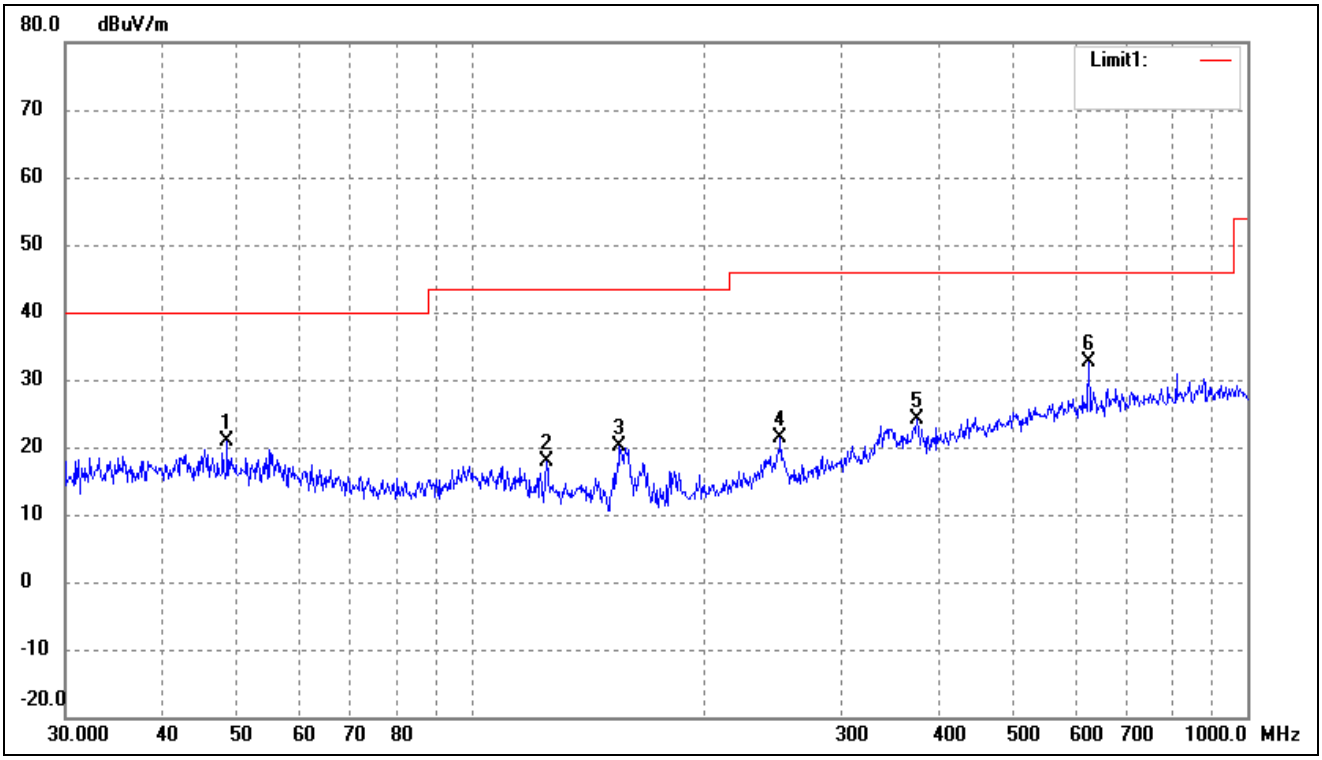
Margin = Corr. Ampl. – FCC Part 15 Limit

8.5 Summary of Test Results/Plots

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

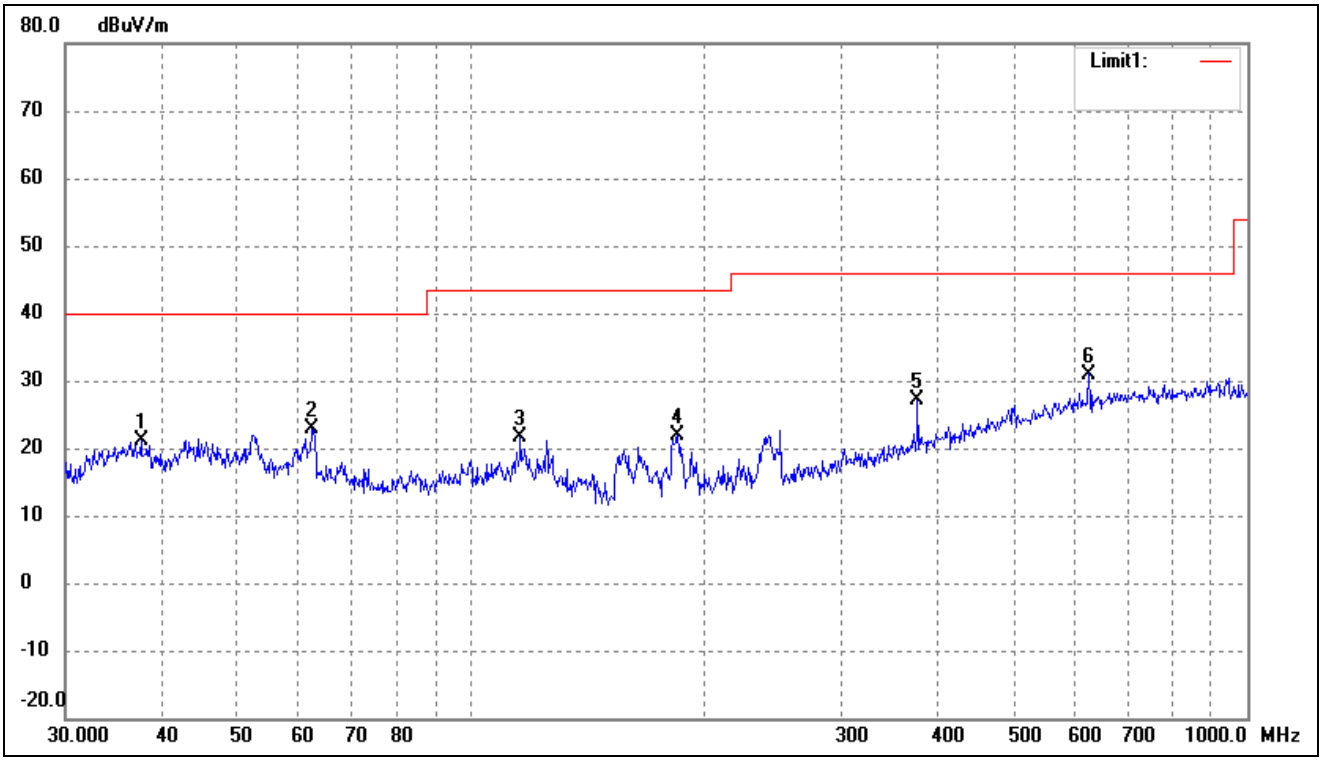
- Spurious Emission From 30MHz to 1GHz
- 5150-5250MHz

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



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	48.5016	27.95	-6.97	20.98	40.00	-19.02	-	-	peak
2	125.0066	28.28	-10.51	17.77	43.50	-25.73	-	-	peak
3	155.3644	32.45	-12.37	20.08	43.50	-23.42	-	-	peak
4	250.3012	29.65	-8.31	21.34	46.00	-24.66	-	-	peak
5	374.6226	28.87	-4.66	24.21	46.00	-21.79	-	-	peak
6	625.0780	32.04	0.65	32.69	46.00	-13.31	-	-	peak

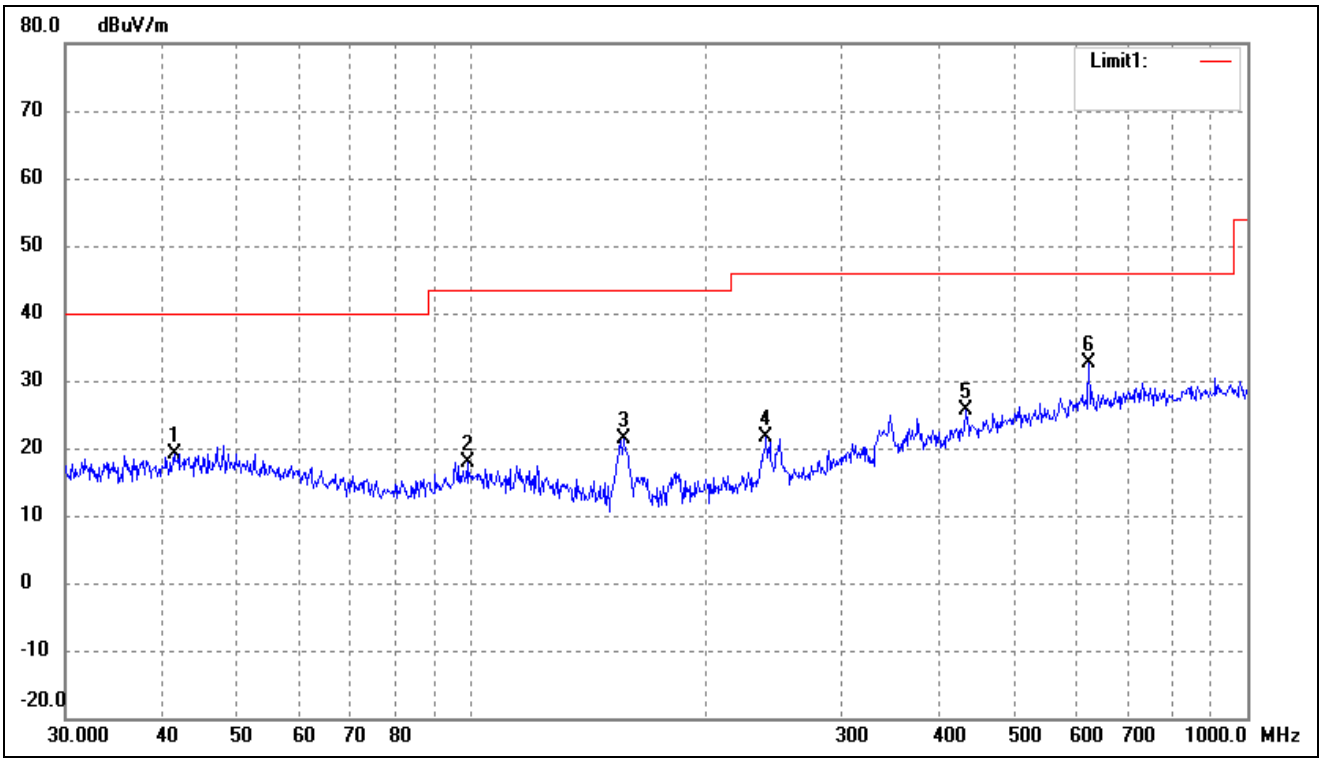
802.11a(Worst case)			
Test Channel	5180MHz(Worst case)	Polarity:	Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	37.5479	28.80	-7.60	21.20	40.00	-18.80	-	-	peak
2	62.4314	31.79	-8.85	22.94	40.00	-17.06	-	-	peak
3	115.7256	30.80	-9.29	21.51	43.50	-21.99	-	-	peak
4	184.4898	32.53	-10.72	21.81	43.50	-21.69	-	-	peak
5	375.9385	31.84	-4.61	27.23	46.00	-18.77	-	-	peak
6	625.0780	30.35	0.65	31.00	46.00	-15.00	-	-	peak

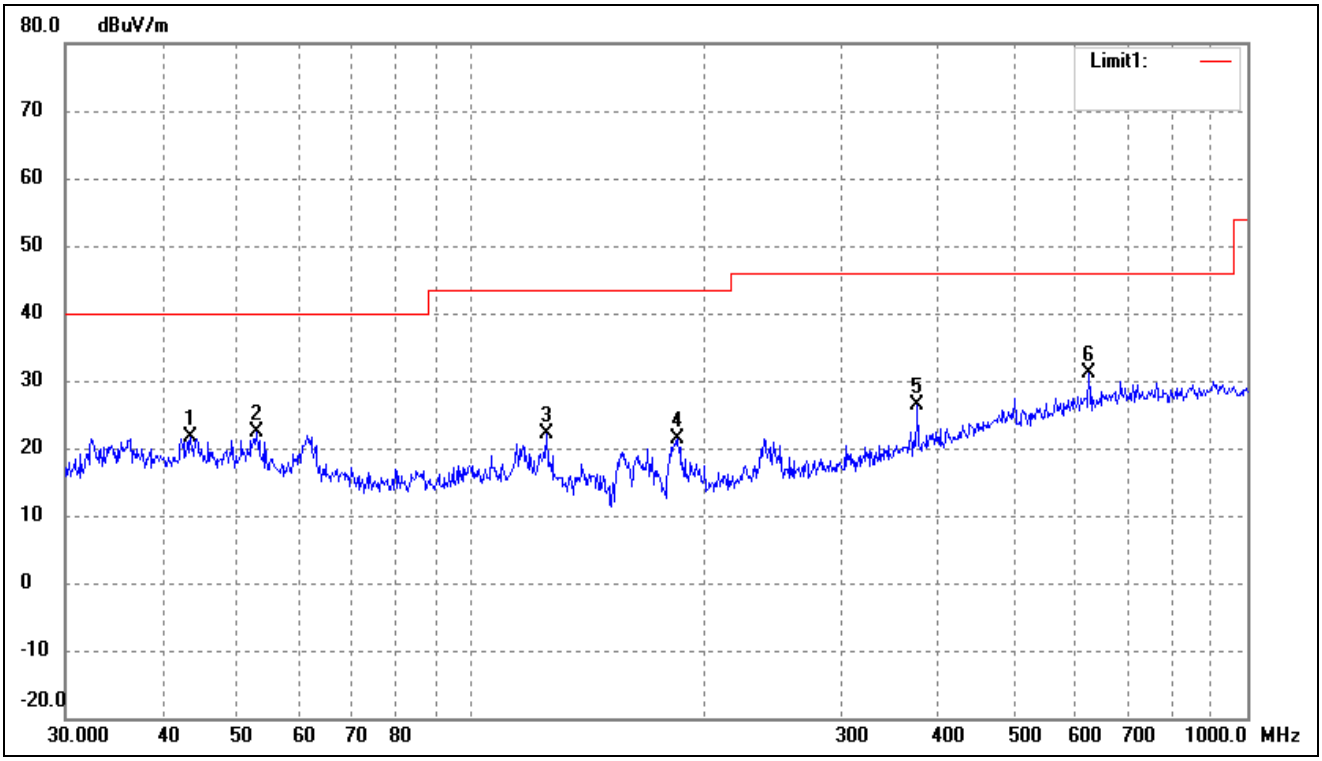
➢ 5250-5350MHz

802.11a(worst case)			
Test Channel	5260MHz(worst case)	Polarity:	Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	41.4215	26.21	-6.99	19.22	40.00	-20.78	-	-	peak
2	98.8326	26.71	-8.94	17.77	43.50	-25.73	-	-	peak
3	157.0074	33.58	-12.29	21.29	43.50	-22.21	-	-	peak
4	239.9874	30.28	-8.59	21.69	46.00	-24.31	-	-	peak
5	434.0651	28.65	-2.99	25.66	46.00	-20.34	-	-	peak
6	625.0780	32.04	0.65	32.69	46.00	-13.31	-	-	peak

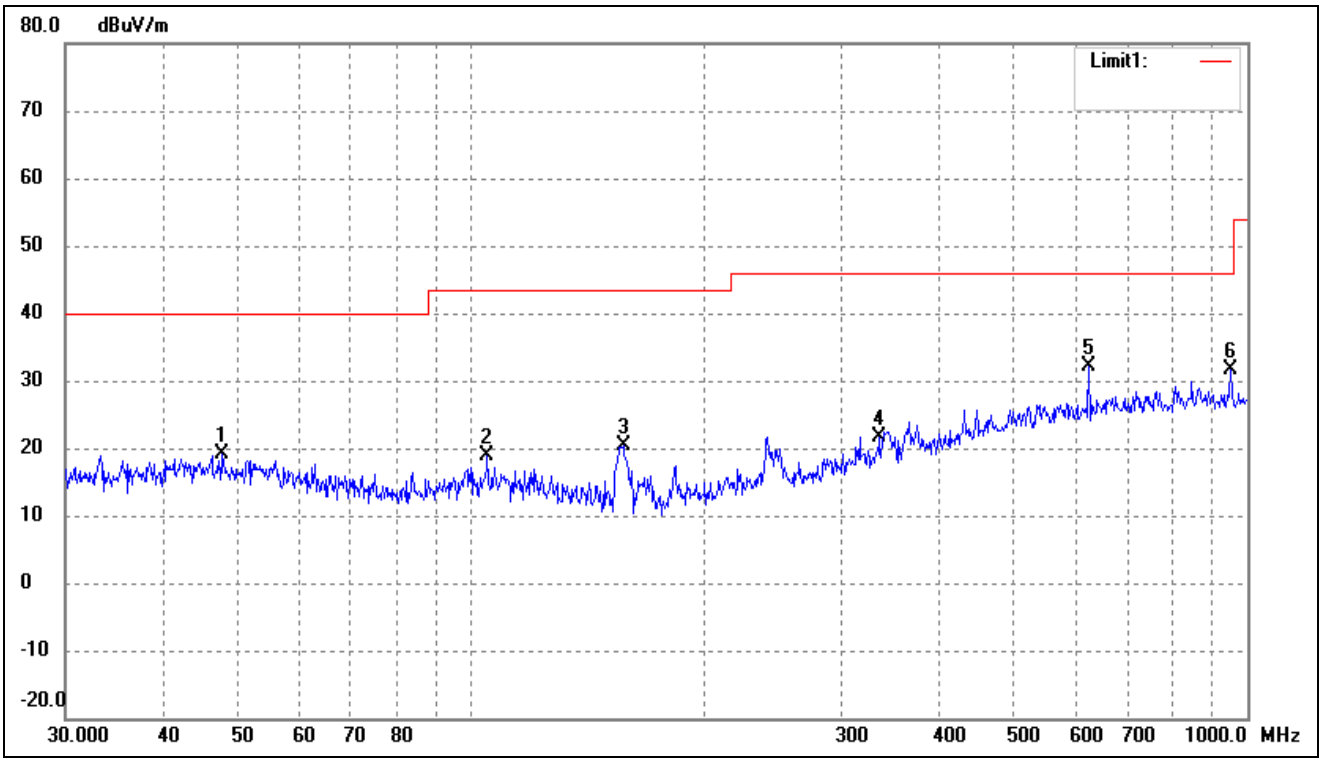
802.11a(worst case)			
Test Channel	5260MHz(worst case)	Polarity:	Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	43.5057	28.51	-6.99	21.52	40.00	-18.48	-	-	peak
2	52.9453	29.72	-7.39	22.33	40.00	-17.67	-	-	peak
3	125.0066	32.71	-10.51	22.20	43.50	-21.30	-	-	peak
4	184.4898	32.10	-10.72	21.38	43.50	-22.12	-	-	peak
5	375.9385	30.91	-4.61	26.30	46.00	-19.70	-	-	peak
6	625.0780	30.41	0.65	31.06	46.00	-14.94	-	-	peak

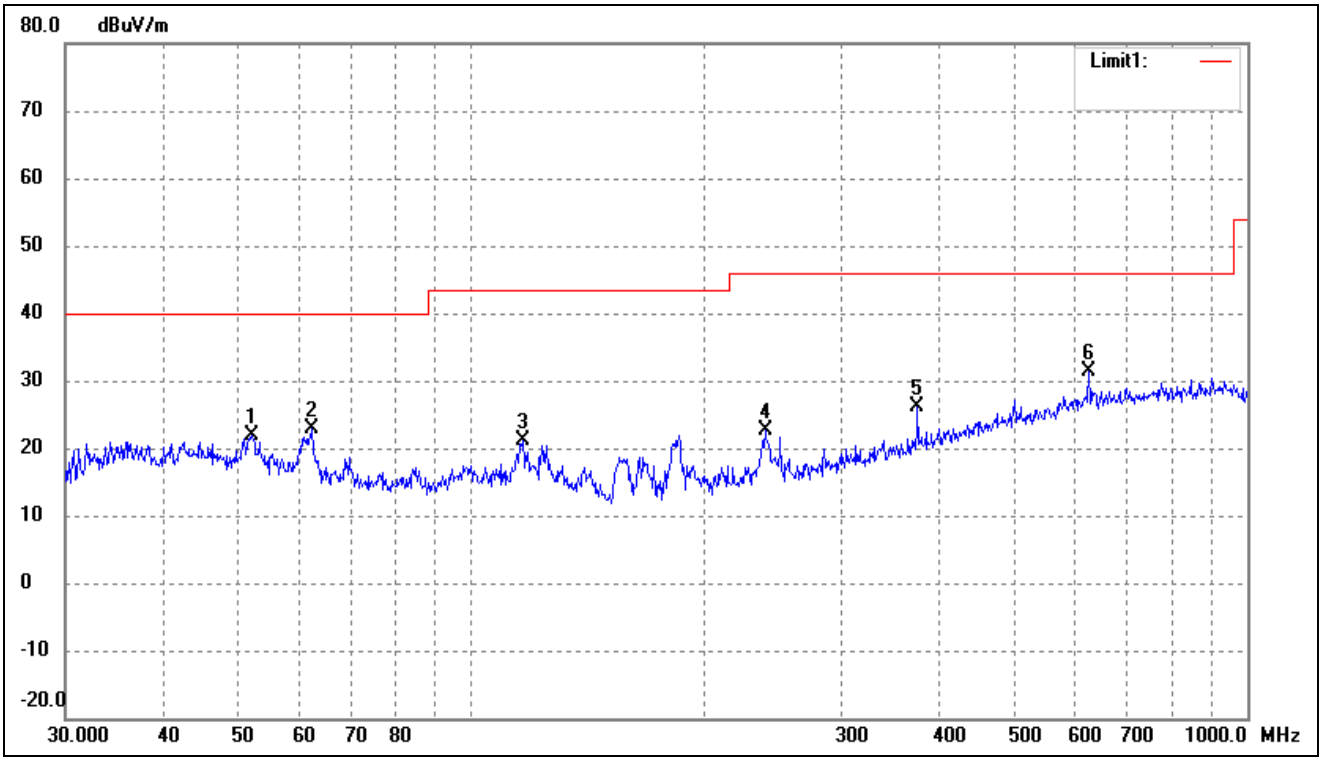
➢ 5470-5725MHz

802.11a			
Test Channel	5500MHz(worst case)	Polarity:	Horizontal



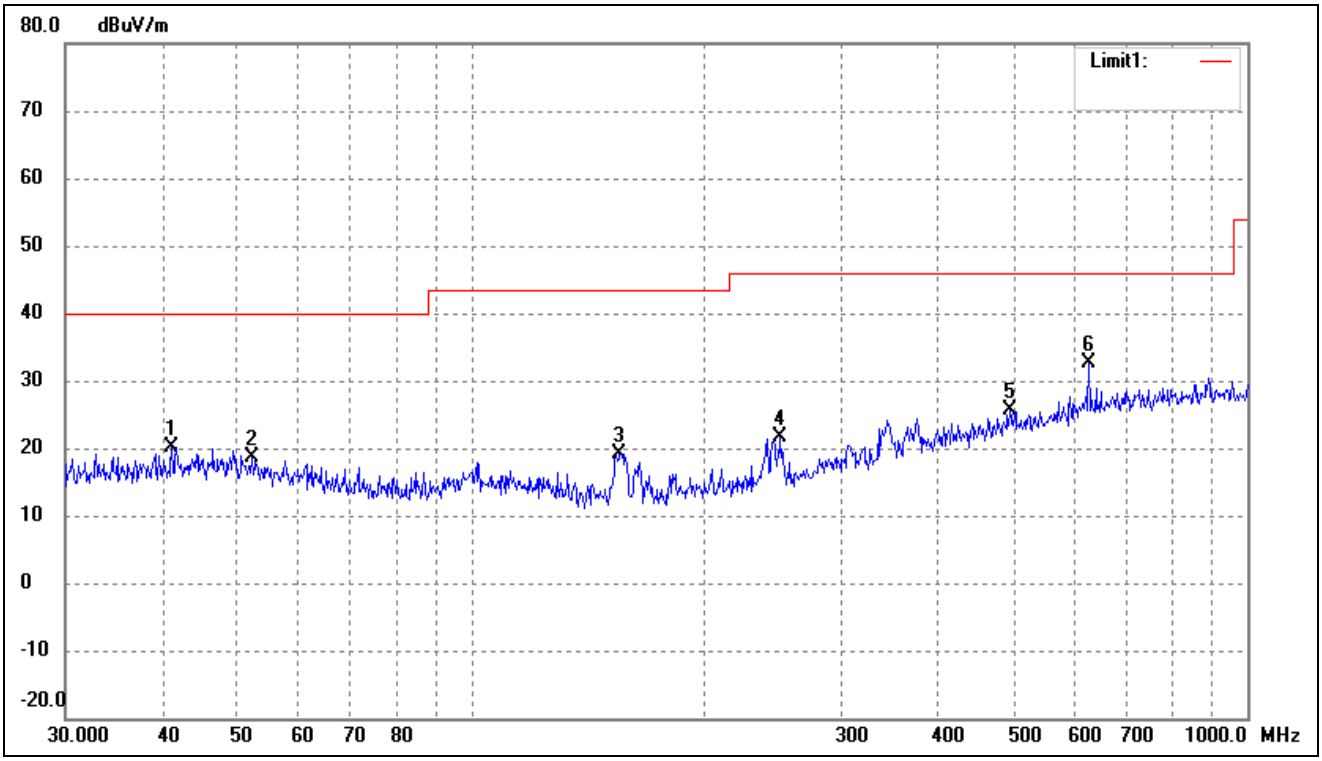
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	47.6586	26.10	-6.97	19.13	40.00	-20.87	-	-	peak
2	104.9033	27.67	-8.80	18.87	43.50	-24.63	-	-	peak
3	157.0074	32.78	-12.29	20.49	43.50	-23.01	-	-	peak
4	336.0352	27.48	-5.83	21.65	46.00	-24.35	-	-	peak
5	625.0780	31.51	0.65	32.16	46.00	-13.84	-	-	peak
6	952.0937	29.09	2.58	31.67	46.00	-14.33	-	-	peak

802.11a			
Test Channel	5500MHz(worst case)	Polarity:	Vertical



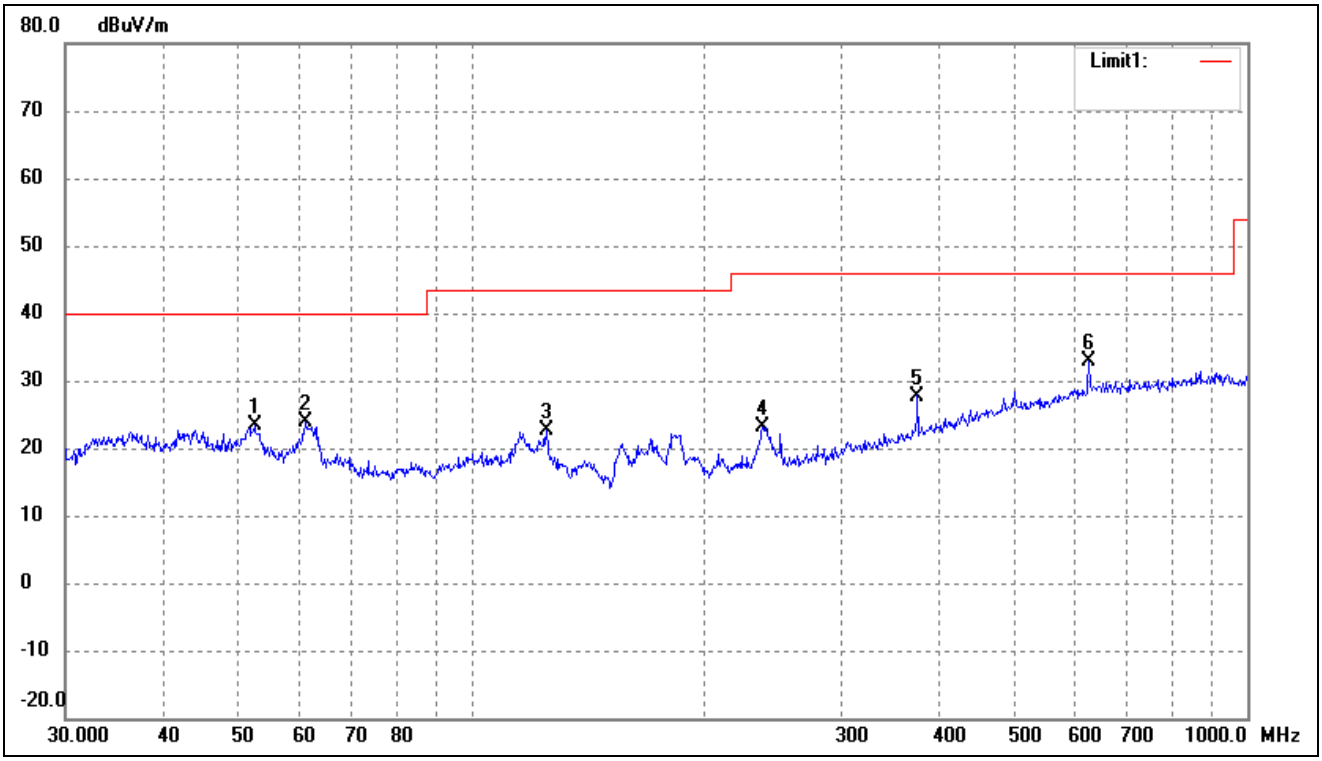
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	52.2079	29.11	-7.29	21.82	40.00	-18.18	-	-	peak
2	62.4314	31.76	-8.85	22.91	40.00	-17.09	-	-	peak
3	116.5401	30.43	-9.34	21.09	43.50	-22.41	-	-	peak
4	239.1473	31.29	-8.62	22.67	46.00	-23.33	-	-	peak
5	375.9385	30.85	-4.61	26.24	46.00	-19.76	-	-	peak
6	625.0780	30.83	0.65	31.48	46.00	-14.52	-	-	peak

802.11n-HT20			
Test Channel	5500MHz(worst case)	Polarity:	Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ( )	Height (cm)	Remark
1	41.1320	27.23	-6.99	20.24	40.00	-19.76	-	-	peak
2	52.2079	25.98	-7.29	18.69	40.00	-21.31	-	-	peak
3	155.3644	31.59	-12.37	19.22	43.50	-24.28	-	-	peak
4	250.3012	29.85	-8.31	21.54	46.00	-24.46	-	-	peak
5	494.1984	27.11	-1.44	25.67	46.00	-20.33	-	-	peak
6	625.0780	31.86	0.65	32.51	46.00	-13.49	-	-	peak

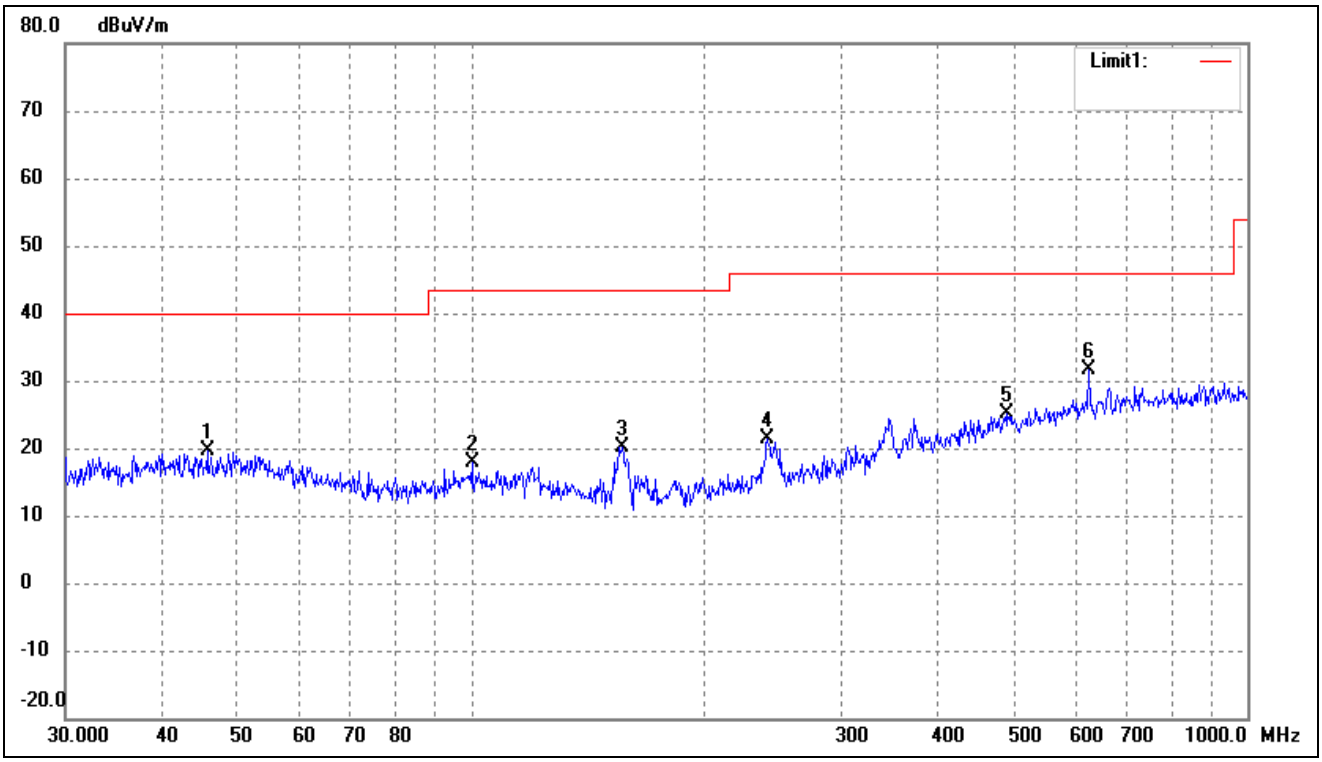
802.11n-HT20			
Test Channel	5500MHz(worst case)	Polarity:	Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	52.5753	30.66	-7.33	23.33	40.00	-16.67	-	-	peak
2	61.1316	32.49	-8.63	23.86	40.00	-16.14	-	-	peak
3	125.0066	33.23	-10.51	22.72	43.50	-20.78	-	-	peak
4	237.4760	31.75	-8.66	23.09	46.00	-22.91	-	-	peak
5	375.9385	32.36	-4.61	27.75	46.00	-18.25	-	-	peak
6	625.0780	32.17	0.65	32.82	46.00	-13.18	-	-	peak

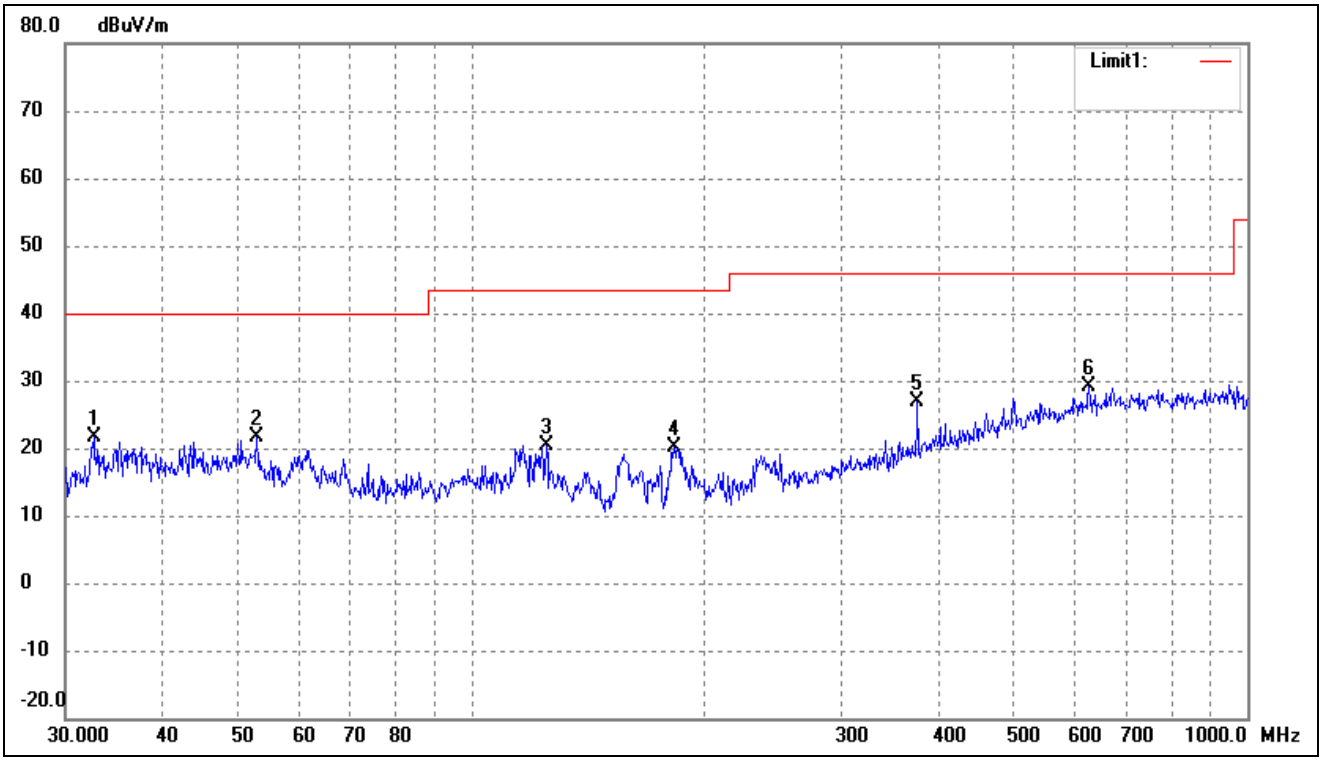
➢ 5725-5850MHz

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



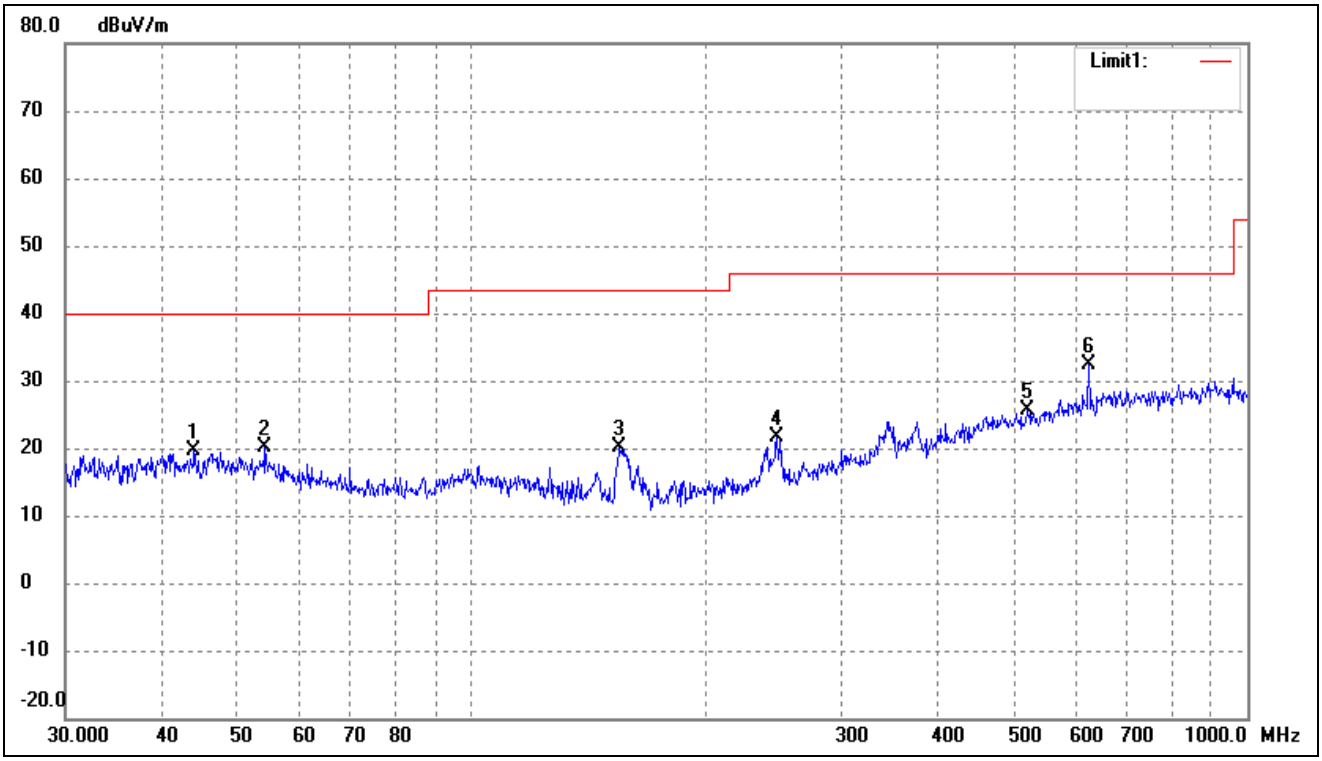
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	45.6948	26.62	-6.98	19.64	40.00	-20.36	-	-	peak
2	100.2286	26.62	-8.73	17.89	43.50	-25.61	-	-	peak
3	156.4578	32.56	-12.32	20.24	43.50	-23.26	-	-	peak
4	240.8304	30.01	-8.57	21.44	46.00	-24.56	-	-	peak
5	490.7447	26.68	-1.54	25.14	46.00	-20.86	-	-	peak
6	625.0780	31.09	0.65	31.74	46.00	-14.26	-	-	peak

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



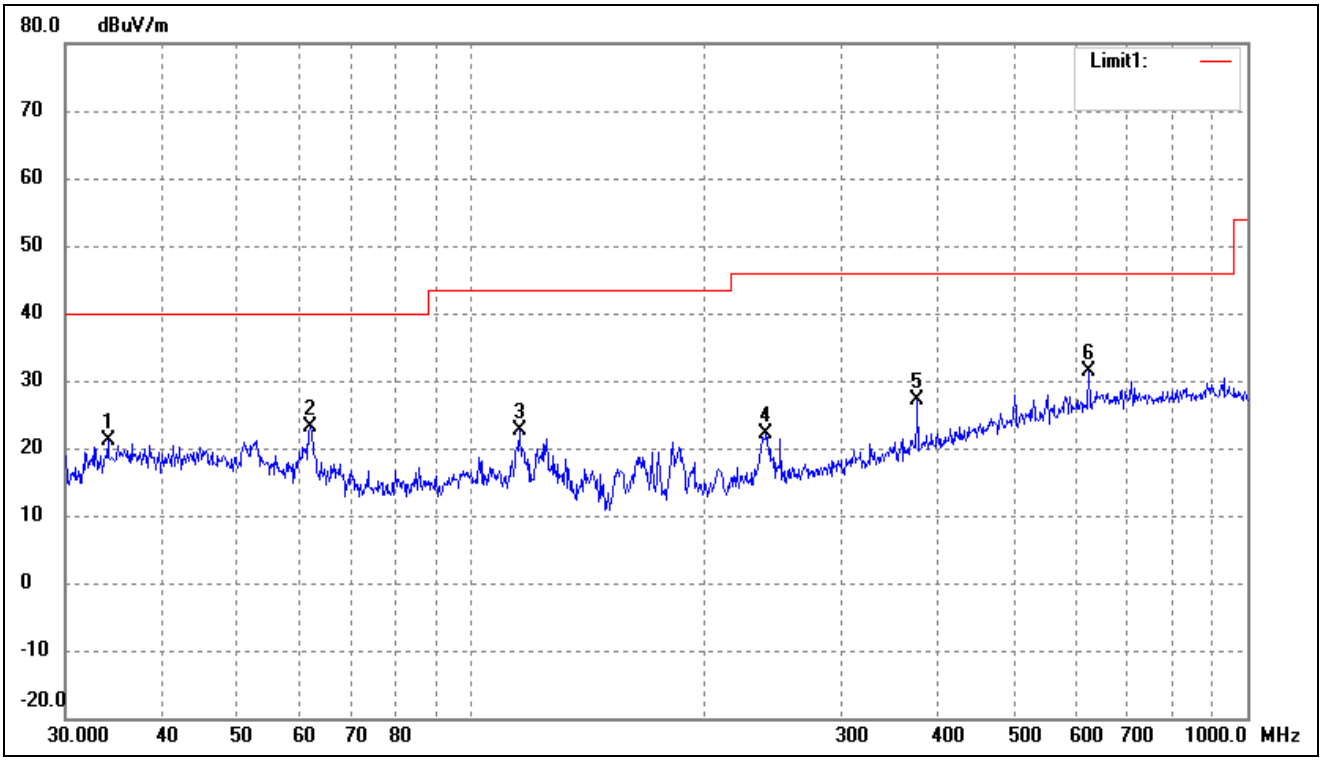
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	32.6340	30.40	-8.81	21.59	40.00	-18.41	-	-	peak
2	52.9453	28.97	-7.39	21.58	40.00	-18.42	-	-	peak
3	125.0066	31.00	-10.51	20.49	43.50	-23.01	-	-	peak
4	182.5592	31.14	-10.96	20.18	43.50	-23.32	-	-	peak
5	375.9385	31.44	-4.61	26.83	46.00	-19.17	-	-	peak
6	625.0780	28.43	0.65	29.08	46.00	-16.92	-	-	peak

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



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	43.9658	26.60	-6.98	19.62	40.00	-20.38	-	-	peak
2	54.2610	27.80	-7.59	20.21	40.00	-19.79	-	-	peak
3	155.3644	32.42	-12.37	20.05	43.50	-23.45	-	-	peak
4	247.6819	30.09	-8.38	21.71	46.00	-24.29	-	-	peak
5	520.8882	26.53	-0.94	25.59	46.00	-20.41	-	-	peak
6	625.0780	31.62	0.65	32.27	46.00	-13.73	-	-	peak

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

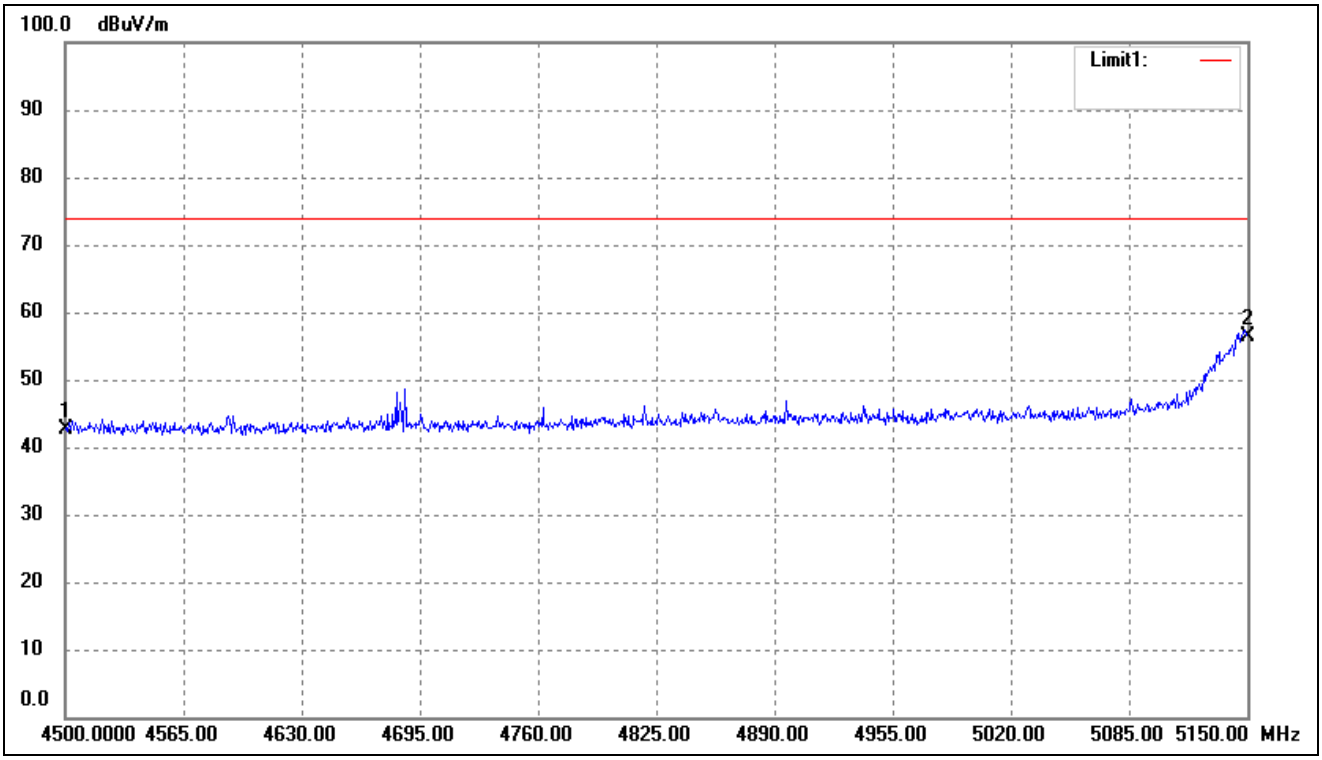


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	34.0365	29.62	-8.46	21.16	40.00	-18.84	-	-	peak
2	61.9951	31.85	-8.78	23.07	40.00	-16.93	-	-	peak
3	115.3205	31.85	-9.26	22.59	43.50	-20.91	-	-	peak
4	239.9874	30.65	-8.59	22.06	46.00	-23.94	-	-	peak
5	375.9385	31.65	-4.61	27.04	46.00	-18.96	-	-	peak
6	625.0780	30.65	0.65	31.30	46.00	-14.70	-	-	peak

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

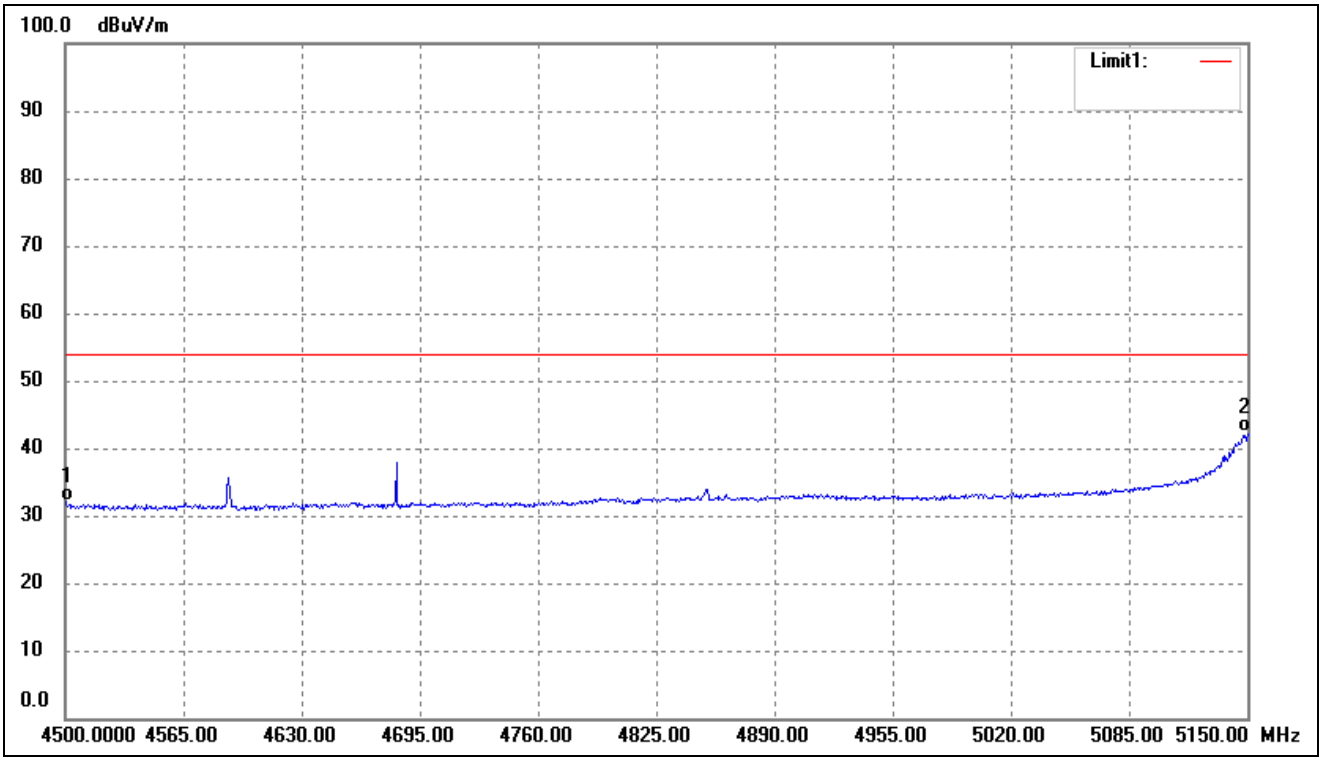
- Spurious Emission above 1GHz
- 5150-5250MHz

802.11a- Restricted Bandedge (worst case)			
Test Channel	band 4.50-5.15GHz	Polarity:	Horizontal (worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	4500.000	49.63	-6.92	42.71	74.00	-31.29	-	-	peak
2	5150.000	61.59	-5.33	56.26	74.00	-17.74	-	-	peak

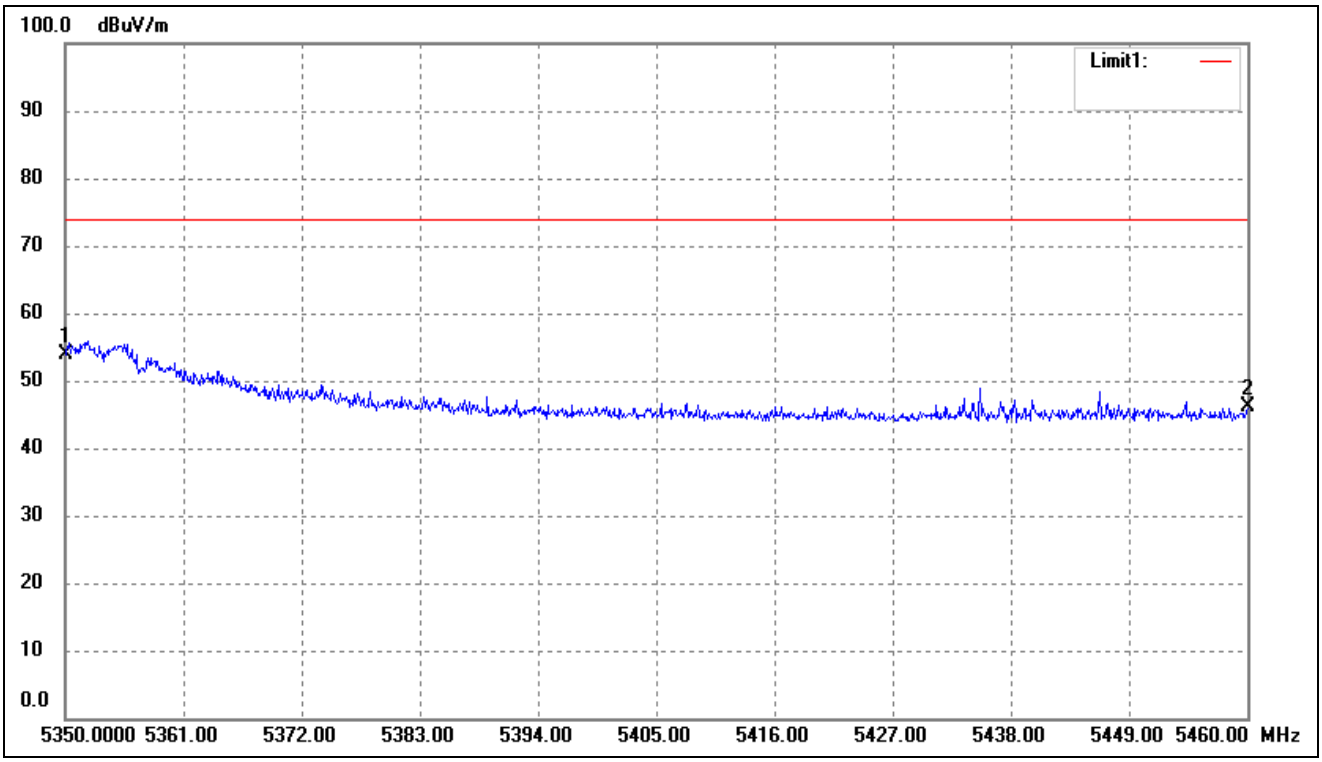
802.11a- Restricted Bandedge (worst case)			
Test Channel	band 4.50-5.15GHz	Polarity:	Horizontal (worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	4500.000	39.03	-6.92	32.11	54.00	-21.89	-	-	AVG
2	5150.000	47.68	-5.33	42.35	54.00	-11.65	-	-	AVG

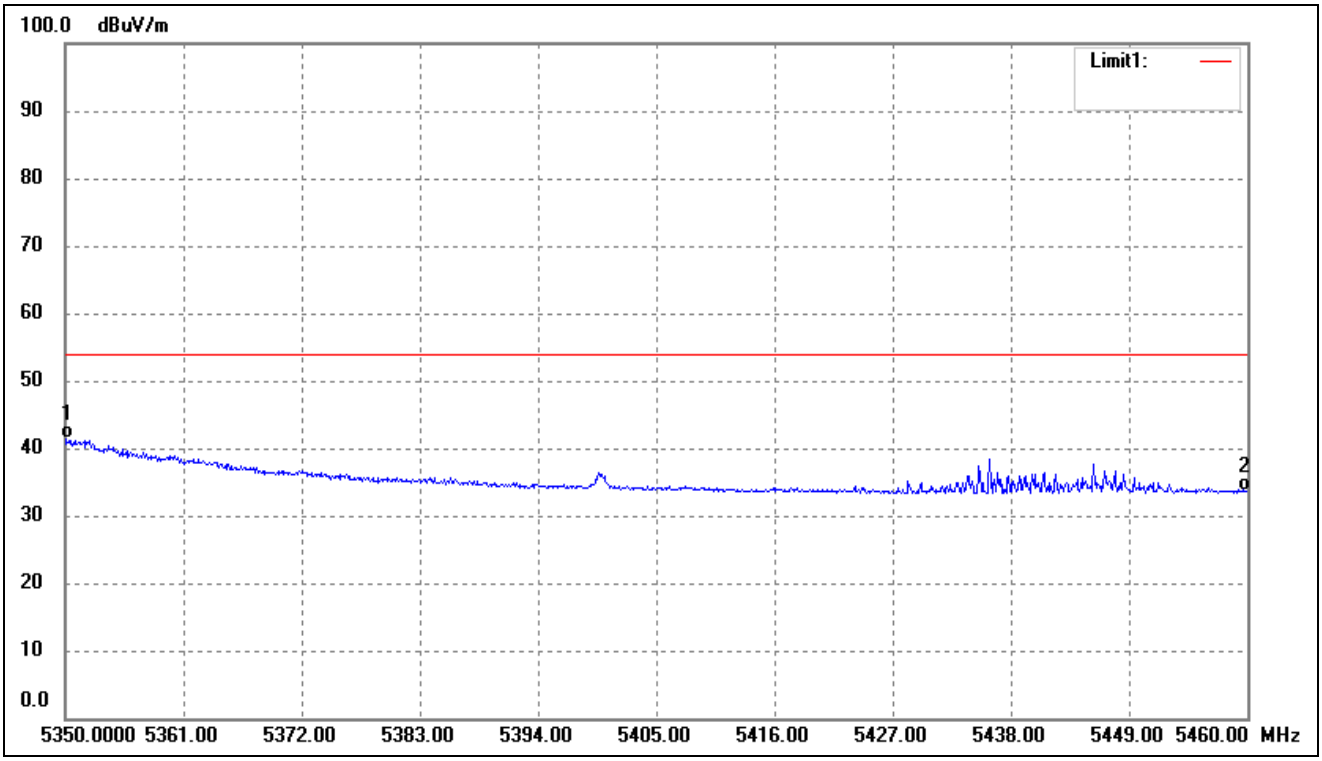
➢ 5250-5350MHz

802.11a- Restricted Bandedge (worst case)			
Test Channel	band 5.35-5.46GHz	Polarity:	Horizontal (worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	5350.000	58.87	-4.97	53.90	74.00	-20.10	-	-	peak
2	5460.000	51.00	-4.77	46.23	74.00	-27.77	-	-	peak

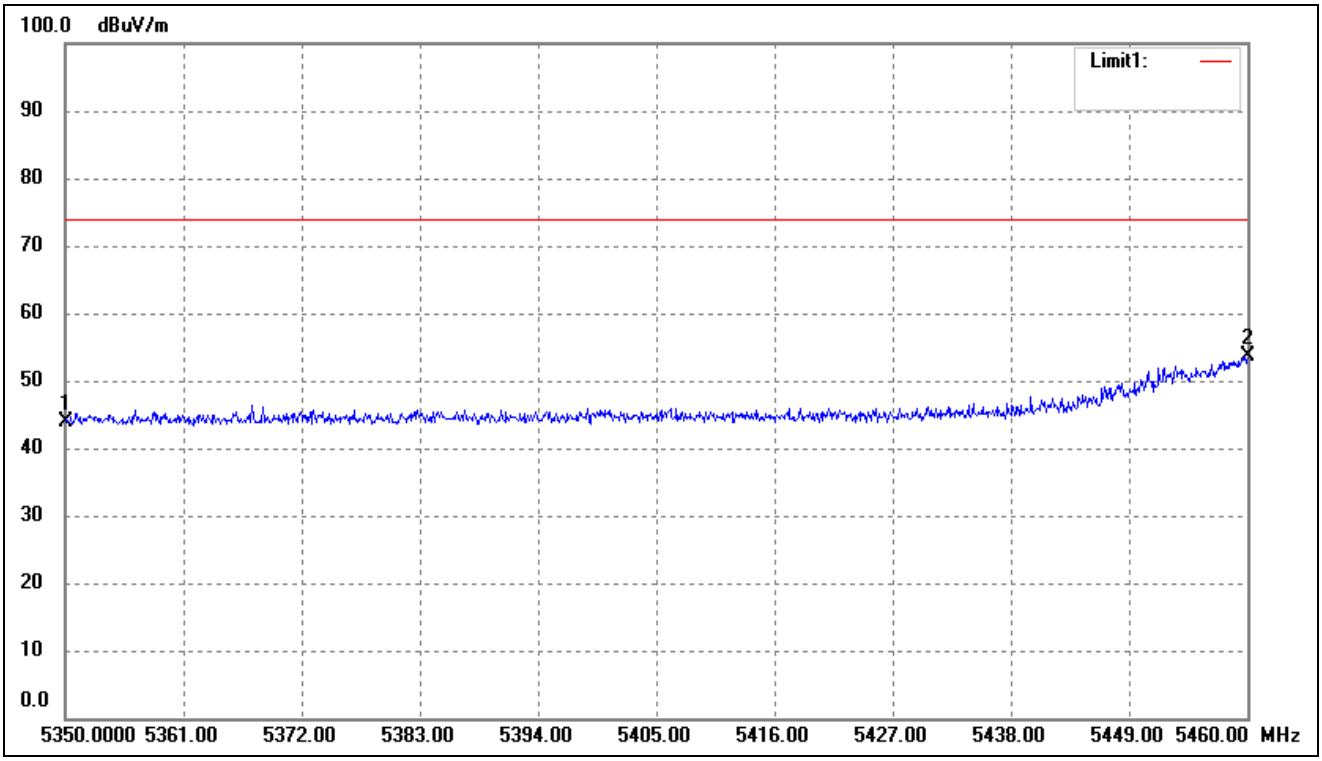
802.11a- Restricted Bandedge (worst case)			
Test Channel	band 5.35-5.46GHz	Polarity:	Horizontal (worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	5350.000	46.32	-4.97	41.35	54.00	-12.65	-	-	AVG
2	5460.000	38.51	-4.77	33.74	54.00	-20.26	-	-	AVG

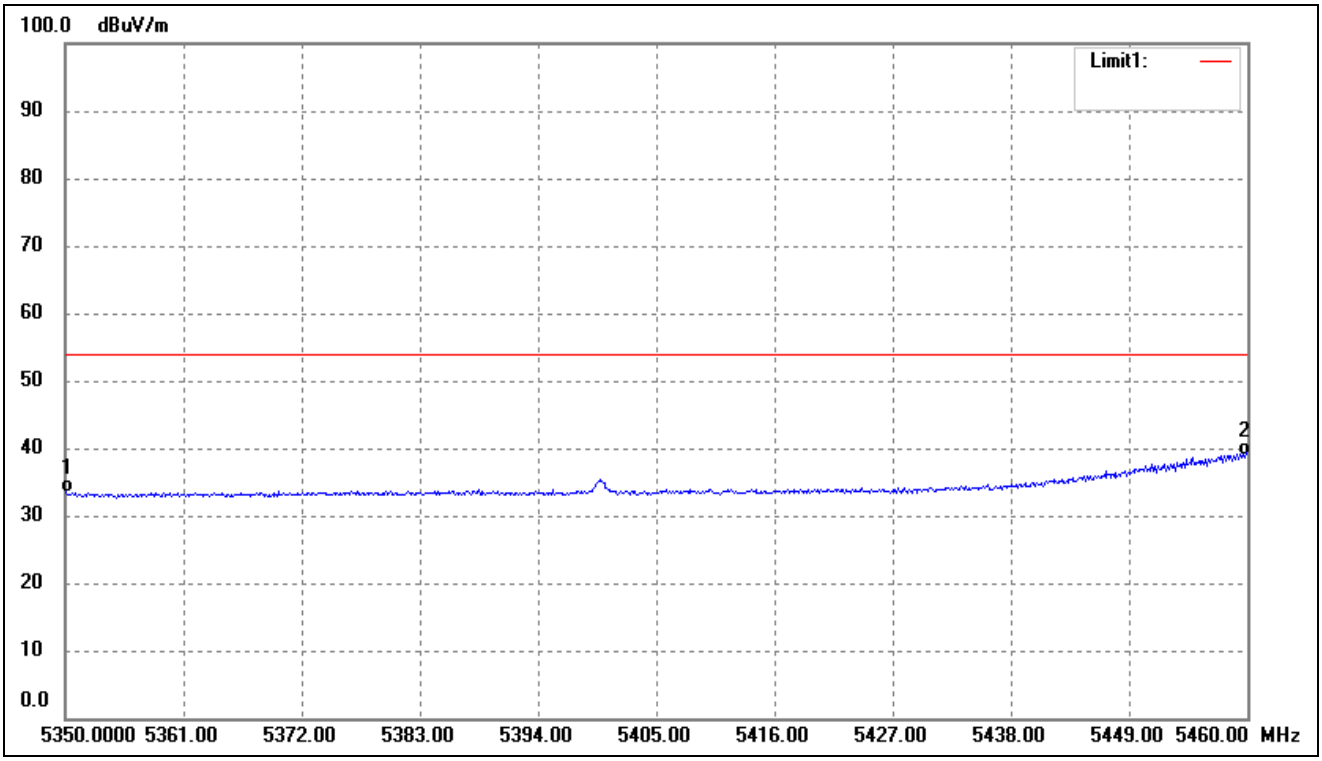
➢ 5470-5725MHz

802.11a- Restricted Bandedge (worst case)			
Test Channel	band 5.35-5.46GHz	Polarity:	Horizontal (worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	5350.000	48.82	-4.97	43.85	74.00	-30.15	-	-	peak
2	5460.000	58.52	-4.77	53.75	74.00	-20.25	-	-	peak

802.11a- Restricted Bandedge (worst case)			
Test Channel	band 5.35-5.46GHz	Polarity:	Horizontal (worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	5350.000	38.32	-4.97	33.35	54.00	-20.65	-	-	AVG
2	5460.000	43.63	-4.77	38.86	54.00	-15.14	-	-	AVG

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

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

- For the frequency band 5.15-5.25GHz, 5.250-5.350GHz, 5.470-5.725GHz, 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	60.09	7.11	67.20	74.00	-6.80	H	PK
15540	38.23	8.22	46.45	54.00	-7.55	H	AV
10360	59.57	7.11	66.68	74.00	-7.32	V	PK
15540	38.93	8.22	47.15	54.00	-6.85	V	AV
Middle Channel (5200MHz)							
10400	57.46	7.22	64.68	74.00	-9.32	H	PK
15600	33.03	8.67	41.70	54.00	-12.30	H	AV
10400	57.94	7.22	65.16	74.00	-8.84	V	PK
15600	37.67	8.67	46.34	54.00	-7.66	V	AV
High Channel (5240MHz)							
10480	57.32	7.69	65.01	74.00	-8.99	H	PK
15720	36.06	8.93	44.99	54.00	-9.01	H	AV
10480	58.80	7.69	66.49	74.00	-7.51	V	PK
15720	40.02	8.93	48.95	54.00	-5.05	V	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5260MHz)							
10520	57.62	7.96	65.58	74.00	-8.42	H	PK
15780	38.14	9.02	47.16	54.00	-6.84	H	AV
10520	60.54	7.96	68.50	74.00	-5.50	V	PK
15780	39.59	9.02	48.61	54.00	-5.39	V	AV
Middle Channel (5280MHz)							
10560	58.62	8.02	66.64	74.00	-7.36	H	PK
15840	36.86	9.42	46.28	54.00	-7.72	H	AV
10560	60.76	8.02	68.78	74.00	-5.22	V	PK
15840	35.22	9.42	44.64	54.00	-9.36	V	AV
High Channel (5320MHz)							
10640	57.94	8.35	66.29	74.00	-7.71	H	PK
15960	34.43	9.63	44.06	54.00	-9.94	H	AV
10640	58.51	8.35	66.86	74.00	-7.14	V	PK
15960	35.06	9.63	44.69	54.00	-9.31	V	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5500MHz)							
11000	56.64	8.82	65.46	74.00	-8.54	H	PK
16500	37.44	9.88	47.32	54.00	-6.68	H	AV
11000	57.13	8.82	65.95	74.00	-8.05	V	PK
16500	32.54	9.88	42.42	54.00	-11.58	V	AV
Middle Channel (5600MHz)							
11200	59.22	8.92	68.14	74.00	-5.86	H	PK
16800	36.34	10.03	46.37	54.00	-7.63	H	AV
11200	56.91	8.92	65.83	74.00	-8.17	V	PK
16800	38.57	10.03	48.60	54.00	-5.40	V	AV
High Channel (5700MHz)							
11400	55.70	9.36	65.06	74.00	-8.94	H	PK
17100	35.97	10.25	46.22	54.00	-7.78	H	AV
11400	57.58	9.36	66.94	74.00	-7.06	V	PK
17100	35.67	10.25	45.92	54.00	-8.08	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	56.96	9.45	66.41	74.00	-7.59	H	PK
17235	37.75	10.36	48.11	54.00	-5.89	H	AV
11490	55.71	9.45	65.16	74.00	-8.84	V	PK
17235	35.54	10.36	45.90	54.00	-8.10	V	AV
Middle Channel (5785MHz)							
11570	59.23	9.62	68.85	74.00	-5.15	H	PK
17355	35.77	10.67	46.44	54.00	-7.56	H	AV
11570	55.17	9.62	64.79	74.00	-9.21	V	PK
17355	36.21	10.67	46.88	54.00	-7.12	V	AV
High Channel (5825MHz)							
11650	56.28	9.84	66.12	74.00	-7.88	H	PK
17475	32.83	10.95	43.78	54.00	-10.22	H	AV
11650	55.39	9.84	65.23	74.00	-8.77	V	PK
17475	37.52	10.95	48.47	54.00	-5.53	V	AV

- Out of Band edge for 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-36.82	-27
Highest	Above 5350	-43.24	-27
Note: the data just list the worst cases			

- Out of Band edge for 5250-5350MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-36.82	-27
Highest	Above 5350	-43.24	-27
Note: the data just list the worst cases			

- Out of Band edge for 5470-5725MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5470	-37.24	-27
Highest	Above 5725	-33.08	-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 5715	-35.22	-27
	5715 to 5725	-38.85	-17
Highest	5850 to 5860	-42.01	-17
	Above 5860	-43.11	-27
Note: the data just list the worst cases			

- For the frequency band 5.15-5.25GHz, 5.250-5.350GHz, 5.470-5.725GHz, 5.725-5.850GHz (802.11n HT20)
- Harmonics And Spurious Emissions

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5180MHz)							
10360	58.32	7.11	65.43	74.00	-8.57	H	PK
15540	40.14	8.22	48.36	54.00	-5.64	H	AV
10360	61.91	7.11	69.02	74.00	-4.98	V	PK
15540	41.10	8.22	49.32	54.00	-4.68	V	AV
Middle Channel (5200MHz)							
10400	58.44	7.22	65.66	74.00	-8.34	H	PK
15600	34.99	8.67	43.66	54.00	-10.34	H	AV
10400	57.33	7.22	64.55	74.00	-9.45	V	PK
15600	36.04	8.67	44.71	54.00	-9.29	V	AV
High Channel (5240MHz)							
10480	55.62	7.69	63.31	74.00	-10.69	H	PK
15720	39.75	8.93	48.68	54.00	-5.32	H	AV
10480	59.27	7.69	66.96	74.00	-7.04	V	PK
15720	36.17	8.93	45.10	54.00	-8.90	V	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5260MHz)							
10520	59.73	7.96	67.69	74.00	-6.31	H	PK
15780	35.59	9.02	44.61	54.00	-9.39	H	AV
10520	60.65	7.96	68.61	74.00	-5.39	V	PK
15780	37.53	9.02	46.55	54.00	-7.45	V	AV
Middle Channel (5280MHz)							
10560	57.34	8.02	65.36	74.00	-8.64	H	PK
15840	35.52	9.42	44.94	54.00	-9.06	H	AV
10560	58.61	8.02	66.63	74.00	-7.37	V	PK
15840	36.73	9.42	46.15	54.00	-7.85	V	AV
High Channel (5320MHz)							
10640	57.55	8.35	65.90	74.00	-8.10	H	PK
15960	36.03	9.63	45.66	54.00	-8.34	H	AV
10640	57.69	8.35	66.04	74.00	-7.96	V	PK
15960	34.74	9.63	44.37	54.00	-9.63	V	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5500MHz)							
11000	55.99	8.82	64.81	74.00	-9.19	H	PK
16500	37.66	9.88	47.54	54.00	-6.46	H	AV
11000	55.97	8.82	64.79	74.00	-9.21	V	PK
16500	34.64	9.88	44.52	54.00	-9.48	V	AV
Middle Channel (5600MHz)							
11200	58.66	8.92	67.58	74.00	-6.42	H	PK
16800	37.91	10.03	47.94	54.00	-6.06	H	AV
11200	56.51	8.92	65.43	74.00	-8.57	V	PK
16800	37.07	10.03	47.10	54.00	-6.90	V	AV
High Channel (5700MHz)							
11400	54.73	9.36	64.09	74.00	-9.91	H	PK
17100	36.15	10.25	46.40	54.00	-7.60	H	AV
11400	58.53	9.36	67.89	74.00	-6.11	V	PK
17100	34.31	10.25	44.56	54.00	-9.44	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	58.63	9.45	68.08	74.00	-5.92	H	PK
17235	36.28	10.36	46.64	54.00	-7.36	H	AV
11490	56.83	9.45	66.28	74.00	-7.72	V	PK
17235	34.87	10.36	45.23	54.00	-8.77	V	AV
Middle Channel (5785MHz)							
11570	56.50	9.62	66.12	74.00	-7.88	H	PK
17355	36.45	10.67	47.12	54.00	-6.88	H	AV
11570	55.57	9.62	65.19	74.00	-8.81	V	PK
17355	35.64	10.67	46.31	54.00	-7.69	V	AV
High Channel (5825MHz)							
11650	57.91	9.84	67.75	74.00	-6.25	H	PK
17475	34.86	10.95	45.81	54.00	-8.19	H	AV
11650	55.04	9.84	64.88	74.00	-9.12	V	PK
17475	34.76	10.95	45.71	54.00	-8.29	V	AV

- Out of Band edge 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-29.73	-27
Highest	Above 5350	-38.04	-27
Note: the data just list the worst cases			

- Out of Band edge for 5250-5350MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-41.19	-27
Highest	Above 5350	-36.30	-27
Note: the data just list the worst cases			

- Out of Band edge for 5470-5725MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5470	-38.42	-27
Highest	Above 5725	-38.98	-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 5715	-45.40	-27
	5715 to 5725	-33.55	-17
Highest	5850 to 5860	-34.92	-17
	Above 5860	-40.82	-27
Note: the data just list the worst cases			

Note: this EUT was tested in the low, high channel and the worst case position data was reported.

- For the frequency band 5.15-5.25GHz, 5.250-5.350GHz, 5.470-5.725GHz, 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	57.28	7.25	64.53	74.00	-9.47	H	PK
15570	38.10	8.33	46.43	54.00	-7.57	H	AV
10380	55.86	7.25	63.11	74.00	-10.89	V	PK
15570	37.66	8.33	45.99	54.00	-8.01	V	AV
High Channel (5230MHz)							
10460	57.08	7.54	64.62	74.00	-9.38	H	PK
15690	35.45	8.86	44.31	54.00	-9.69	H	AV
10460	57.91	7.54	65.45	74.00	-8.55	V	PK
15690	35.56	8.86	44.42	54.00	-9.58	V	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5270MHz)							
10540	56.52	8.12	64.64	74.00	-9.36	H	PK
15810	34.48	9.24	43.72	54.00	-10.28	H	AV
10540	57.66	8.12	65.78	74.00	-8.22	V	PK
15810	35.04	9.24	44.28	54.00	-9.72	V	AV
High Channel (5310MHz)							
10620	56.54	8.30	64.84	74.00	-9.16	H	PK
15930	35.82	9.45	45.27	54.00	-8.73	H	AV
10620	55.56	8.30	63.86	74.00	-10.14	V	PK
15930	34.81	9.45	44.26	54.00	-9.74	V	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5510MHz)							
11020	56.32	8.95	65.27	74.00	-8.73	H	PK
16530	34.63	9.99	44.62	54.00	-9.38	H	AV
11020	55.04	8.95	63.99	74.00	-10.01	V	PK
16530	35.43	9.99	45.42	54.00	-8.58	V	AV
Middle Channel (5590MHz)							
11180	57.31	9.12	66.43	74.00	-7.57	H	PK
16770	35.75	10.12	45.87	54.00	-8.13	H	AV
11180	58.20	9.12	67.32	74.00	-6.68	V	PK
16770	35.98	10.12	46.10	54.00	-7.90	V	AV
High Channel (5670MHz)							
11340	55.15	9.39	64.54	74.00	-9.46	H	PK
17010	34.17	10.22	44.39	54.00	-9.61	H	AV
11340	53.82	9.39	63.21	74.00	-10.79	V	PK
17010	35.20	10.22	45.42	54.00	-8.58	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	54.73	9.65	64.38	74.00	-9.62	H	PK
17265	33.83	10.87	44.70	54.00	-9.30	H	AV
11510	56.44	9.65	66.09	74.00	-7.91	V	PK
17265	32.91	10.87	43.78	54.00	-10.22	V	AV
High Channel (5795MHz)							
11590	54.85	9.81	64.66	74.00	-9.34	H	PK
17385	33.32	10.89	44.21	54.00	-9.79	H	AV
11590	54.90	9.81	64.71	74.00	-9.29	V	PK
17385	35.60	10.89	46.49	54.00	-7.51	V	AV

- Out of Band edge for 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-39.56	-27
Highest	Above 5350	-43.48	-27
Note: the data just list the worst cases			

- Out of Band edge for 5250-5350MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-36.39	-27
Highest	Above 5350	-37.68	-27
Note: the data just list the worst cases			

- Out of Band edge for 5470-5725MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5470	-36.43	-27
Highest	Above 5725	-43.12	-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 5715	-42.10	-27
	5715 to 5725	-39.94	-17
Highest	5850 to 5860	-46.38	-17
	Above 5860	-39.50	-27
Note: the data just list the worst cases			

- For the frequency band 5.15-5.25GHz, 5.250-5.350GHz, 5.470-5.725GHz, 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	55.83	7.58	63.41	74.00	-10.59	H	PK
10420	35.82	8.67	44.49	54.00	-9.51	H	AV
10420	57.70	7.58	65.28	74.00	-8.72	H	PK
10420	34.63	8.67	43.30	54.00	-10.70	H	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
5290MHz							
10580	54.47	8.35	62.82	74.00	-11.18	H	PK
10580	34.84	9.64	44.48	54.00	-9.52	H	AV
10580	56.37	8.35	64.72	74.00	-9.28	V	PK
10580	34.92	9.64	44.56	54.00	-9.44	V	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5530MHz)							
11060	54.67	9.05	63.72	74.00	-10.28	H	PK
11060	31.62	10.25	41.87	54.00	-12.13	H	AV
11060	56.36	9.05	65.41	74.00	-8.59	V	PK
11060	33.65	10.25	43.90	54.00	-10.10	V	AV
Middle Channel (5610MHz)							
11220	55.55	9.22	64.77	74.00	-9.23	H	PK
11220	33.71	10.28	43.99	54.00	-10.01	H	AV
11220	53.57	9.22	62.79	74.00	-11.21	V	PK
11220	34.86	10.28	45.14	54.00	-8.86	V	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
5775MHz							
11550	54.94	9.87	64.81	74.00	-9.19	H	PK
11550	34.82	11.02	45.84	54.00	-8.16	H	AV
11550	55.10	9.87	64.97	74.00	-9.03	V	PK
11550	33.59	11.02	44.61	54.00	-9.39	V	AV

- Out of Band edge for 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-39.47	-27
Highest	Above 5350	-43.43	-27
Note: the data just list the worst cases			

- Out of Band edge for 5250-5350MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-39.14	-27
Highest	Above 5350	-37.22	-27
Note: the data just list the worst cases			

- Out of Band edge for 5470-5725MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5470	-39.27	-27
Highest	Above 5725	-43.84	-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 5715	-39.47	-27
	5715 to 5725	-38.98	-17
Highest	5850 to 5860	-44.33	-17
	Above 5860	-43.02	-27
Note: the data just list the worst cases			

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

9. Frequency Stability

9.1 Standard Applicable

According to §15.407(g), manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.

9.2 Test Procedure

According to §2.1055, the following test procedure was performed.
The Frequency Stability is measured directly with a Frequency Domain Analyzer. Frequency Deviation in ppm is calculated from the measured peak to peak value.
The Carrier Frequency Stability over Power Supply Voltage and over Temperature is measured with a Frequency Domain Analyzer in histogram mode.

9.3 Summary of Test Results/Plots

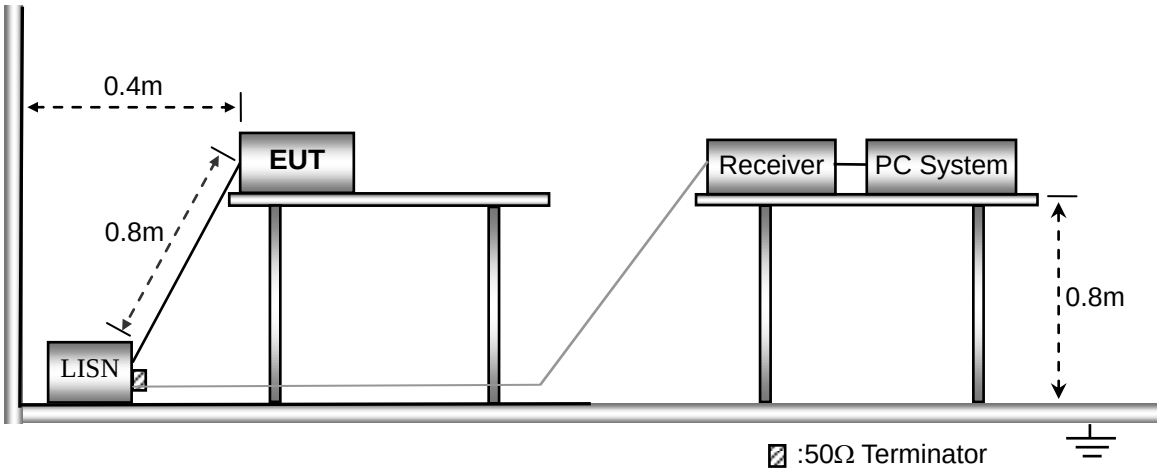
Please refer to Appendix D

10. Conducted Emissions

10.1 Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 Limit.
The external I/O cables were draped along the test table and formed a bundle 30 to 40cm long in the middle.
The spacing between the peripherals was 10cm.

10.2 Basic Test Setup Block Diagram



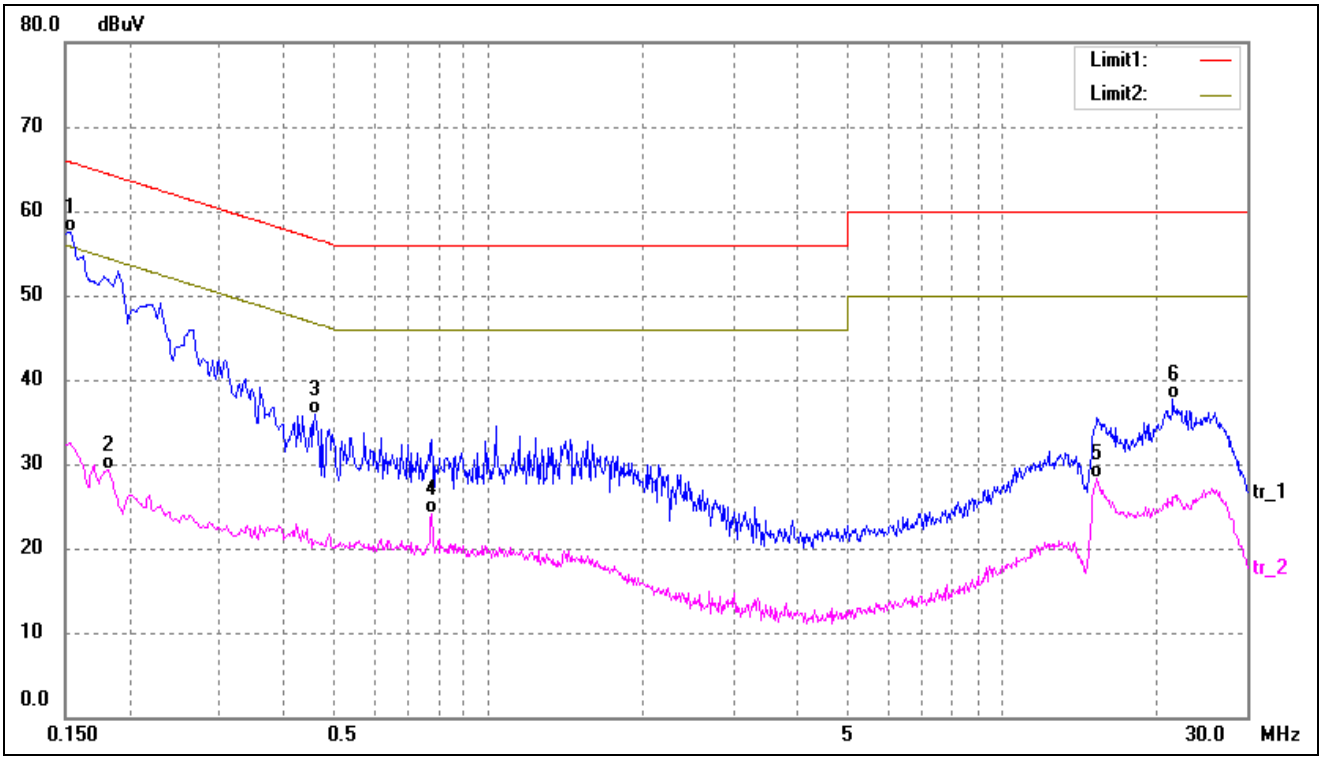
10.3 Test Receiver Setup

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

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

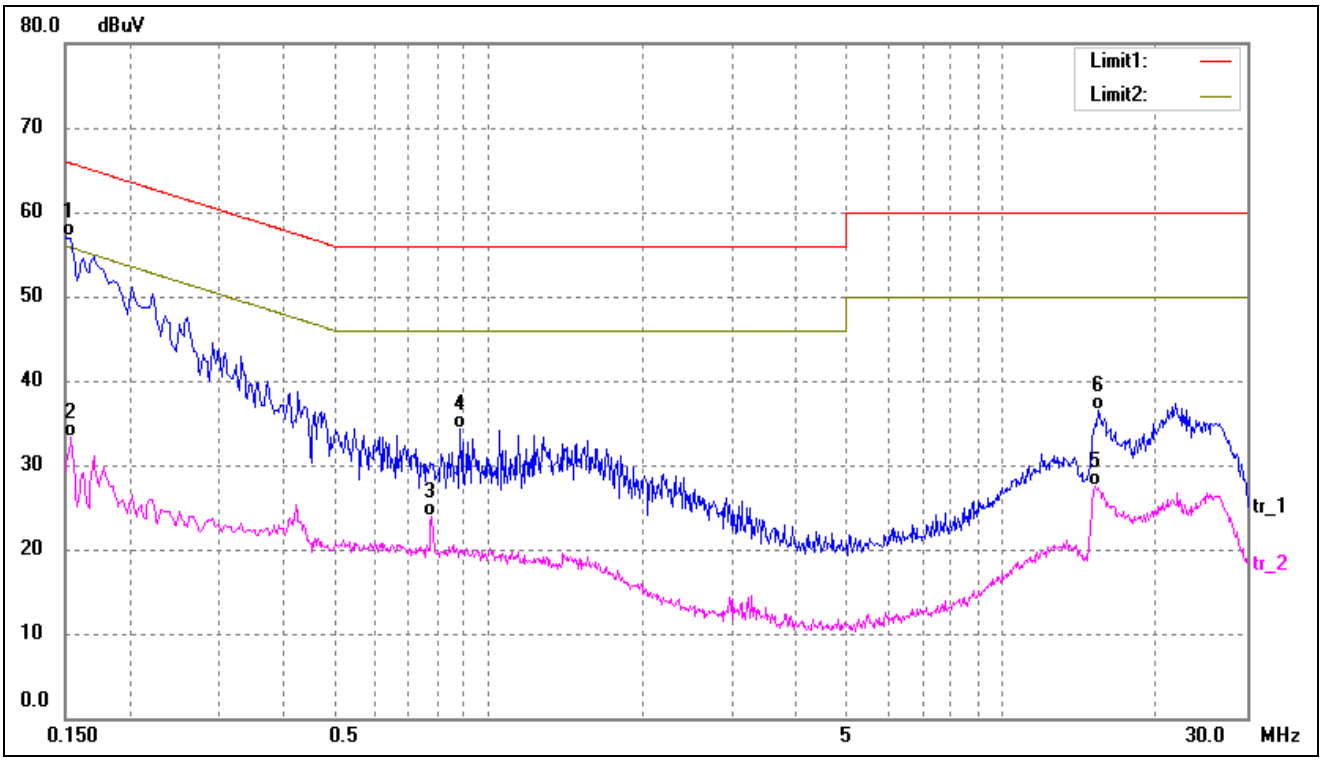
10.4 Summary of Test Results/Plots

Test Mode	Communication	AC120V 60Hz	Polarity:	Neutral



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dB)	
1*	0.1540	47.23	10.37	57.60	65.78	-8.18	QP
2	0.1820	18.96	10.37	29.33	54.39	-25.06	AVG
3	0.4580	25.55	10.27	35.82	56.73	-20.91	QP
4	0.7780	13.70	10.43	24.13	46.00	-21.87	AVG
5	15.3700	18.17	10.16	28.33	50.00	-21.67	AVG
6	21.5180	27.39	10.24	37.63	60.00	-22.37	QP

Test Mode	Communication	AC120V 60Hz	Polarity:	Line



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dB)	
1*	0.1500	46.63	10.38	57.01	66.00	-8.99	QP
2	0.1540	22.84	10.37	33.21	55.78	-22.57	AVG
3	0.7780	13.49	10.43	23.92	46.00	-22.08	AVG
4	0.8820	23.81	10.49	34.30	56.00	-21.70	QP
5	15.1820	17.41	10.15	27.56	50.00	-22.44	AVG
6	15.4060	26.28	10.16	36.44	60.00	-23.56	QP

APPENDIX SUMMARY

Project No.	WTX21X12148772W	Test Engineer	Gala
Start date	2022/2/21	Finish date	2022/2/21
Temperature	23℃	Humidity	43%
RF specifications	U-NII		

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

APPENDIX A

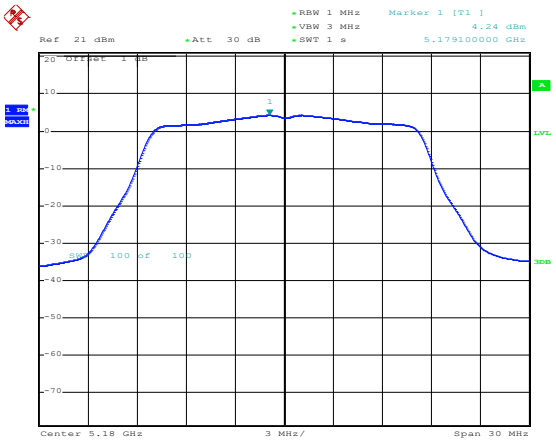
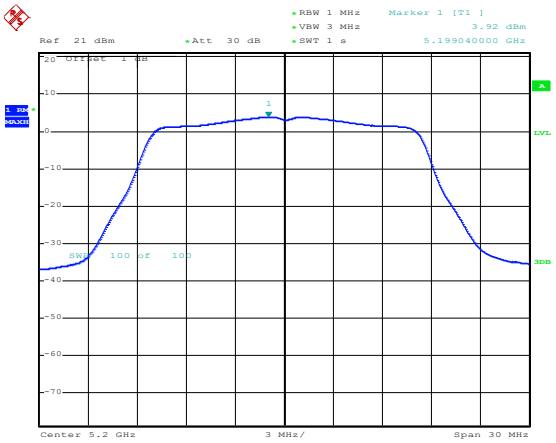
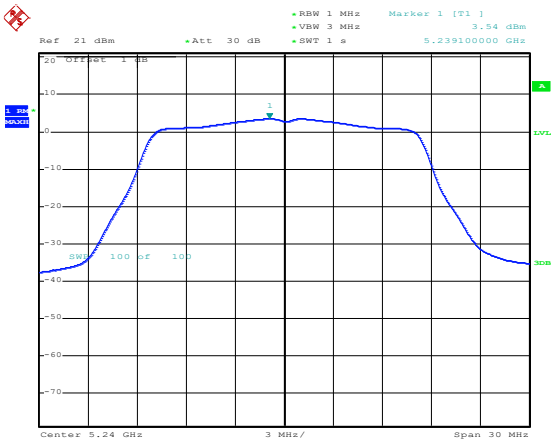
Power Spectral Density			
U-NII-1:5150-5250MHz			
Operating mode	Test Channel	Power Spectral Density dBm/MHz	Limit (dBm/MHz)
802.11a	5180	4.24	11
	5200	3.92	11
	5240	3.54	11
802.11n-HT20	5180	1.87	11
	5200	1.81	11
	5240	1.22	11
802.11n-HT40	5190	-2.95	11
	5230	-3.20	11
802.11ac-VHT80	5210	-8.08	11

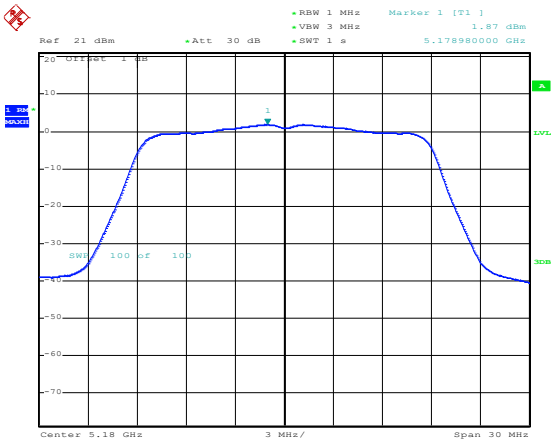
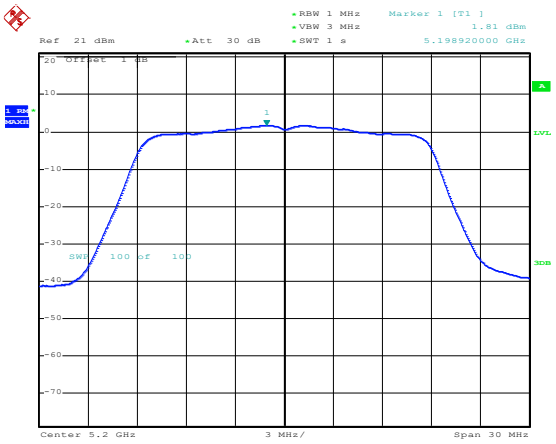
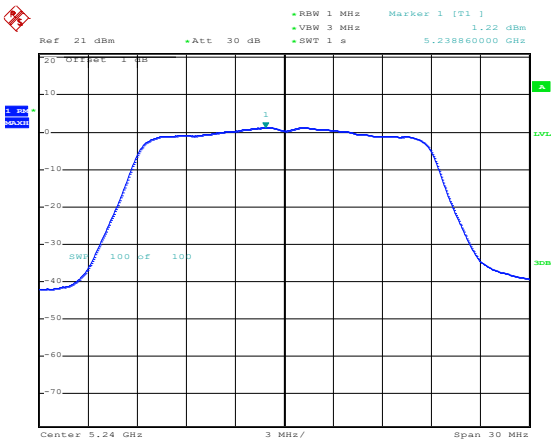
U-NII-2A: 5250-5350MHz			
Operating mode	Test Channel	Power Spectral Density dBm/MHz	Limit (dBm/MHz)
802.11a	5260	3.59	11
	5280	3.67	11
	5320	3.38	11
802.11n-HT20	5260	1.48	11
	5280	1.00	11
	5320	0.86	11
802.11n-HT40	5270	-3.57	11
	5310	-3.72	11
802.11ac-VHT80	5290	-8.58	11

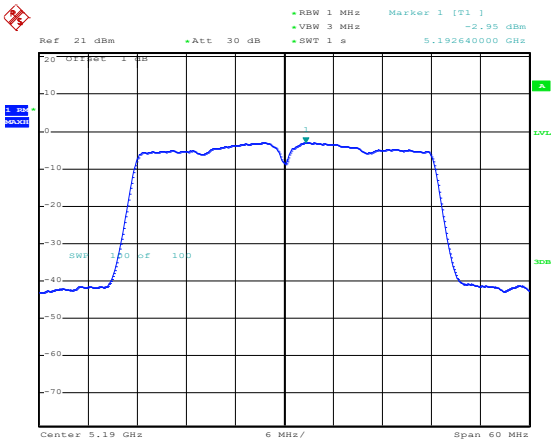
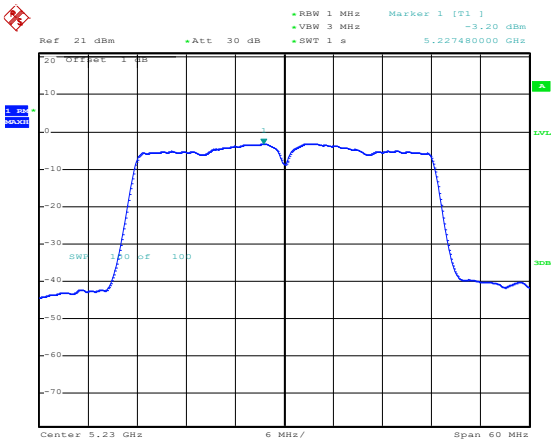
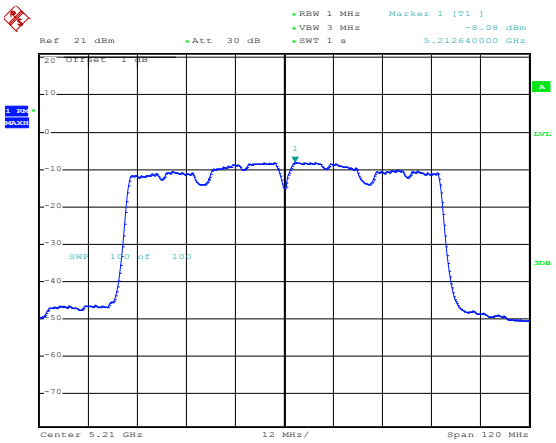
U-NII-2C: 5470-5725MHz			
Operating mode	Test Channel	Power Spectral Density dBm/MHz	Limit (dBm/MHz)
802.11a	5500	3.07	11
	5580	1.40	11
	5700	-0.43	11
802.11n-HT20	5500	0.14	11
	5580	-1.74	11
	5700	-3.86	11
802.11n-HT40	5510	-5.03	11
	5550	-5.91	11
	5670	-8.16	11
802.11ac-VHT80	5530	-11.00	11
802.11ac-VHT80	5610	-12.77	11

U-NII-3: 5725-5850MHz					
Operating mode	Test Channel	Power Spectral Density dBm/300kHz	Factor	Power Spectral Density* dBm/500kHz	Limit dBm/500kHz
802.11a	5745	-4.71	2.22	-2.49	30
	5785	-4.41	2.22	-2.19	30
	5825	-3.90	2.22	-1.68	30
802.11n-HT20	5745	-7.59	2.22	-5.37	30
	5785	-7.10	2.22	-4.88	30
	5825	-6.67	2.22	-4.45	30
802.11n HT40	5755	-11.64	2.22	-9.42	30
	5795	-11.34	2.22	-9.12	30
802.11ac-VHT80	5775	-12.82	2.22	-10.6	30
*Note: Maximum PSD=PSD(dBm/300kHz)+10log(500kHz/300kHz)=2.22					

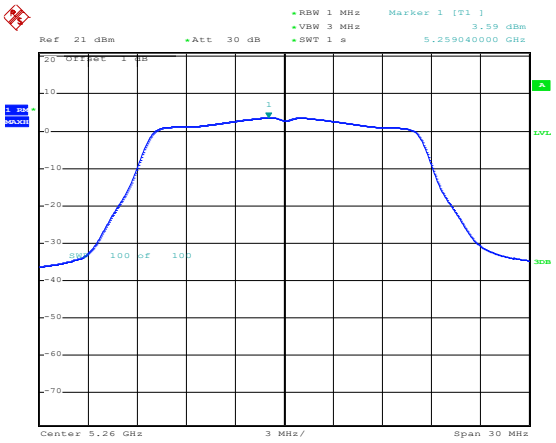
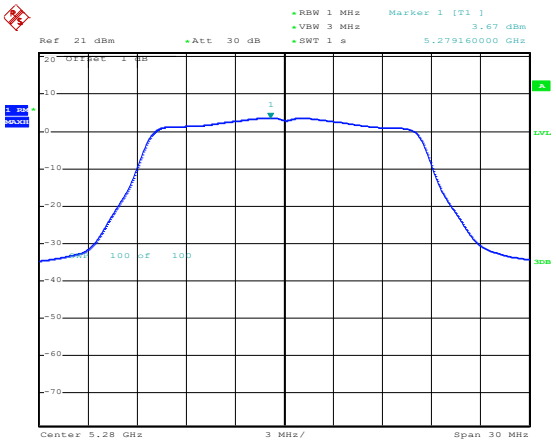
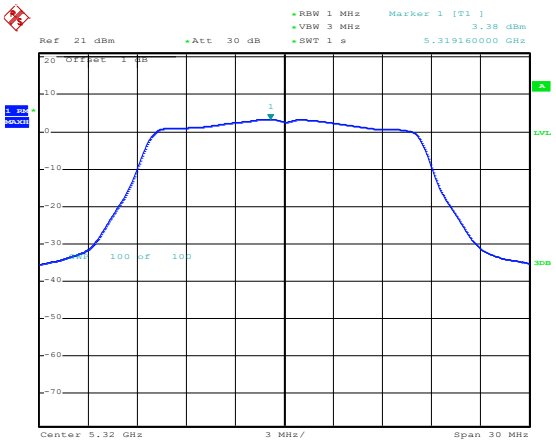
5150-5250MHz

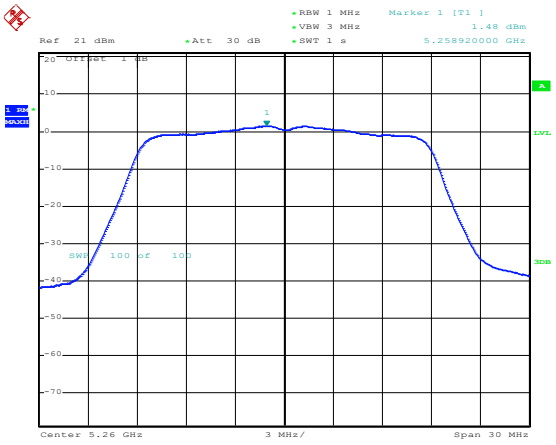
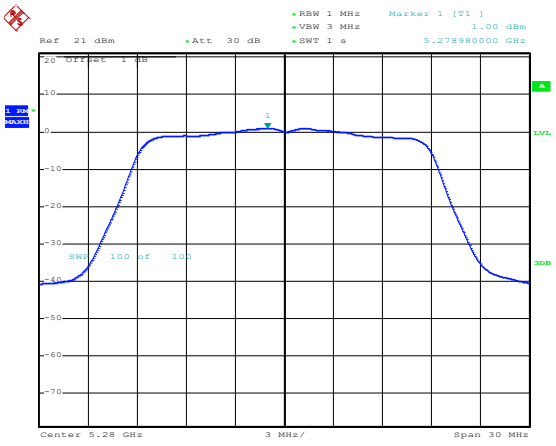
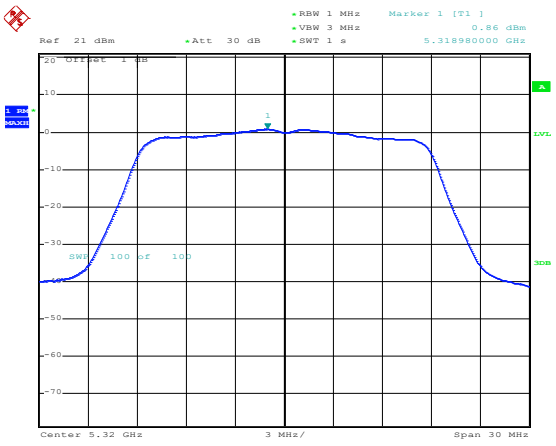
802.11a-Low	
802.11a-Middle	
802.11a-High	

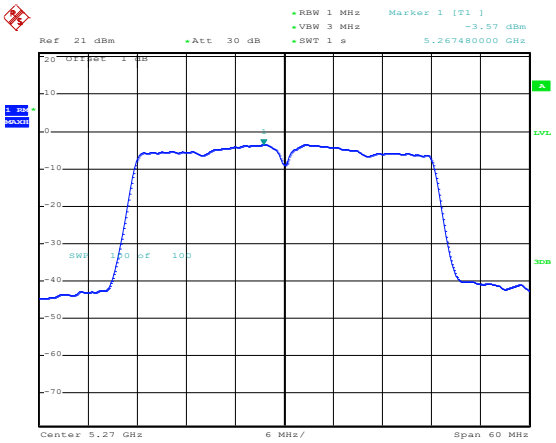
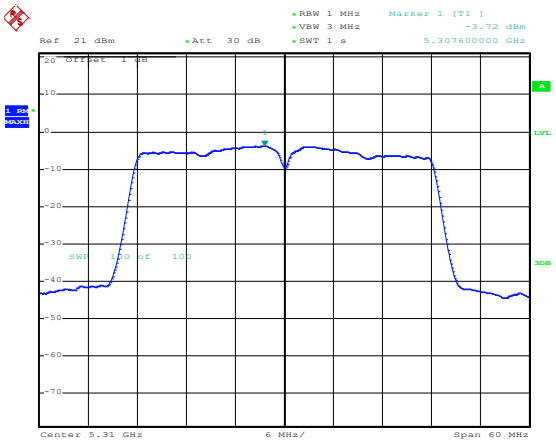
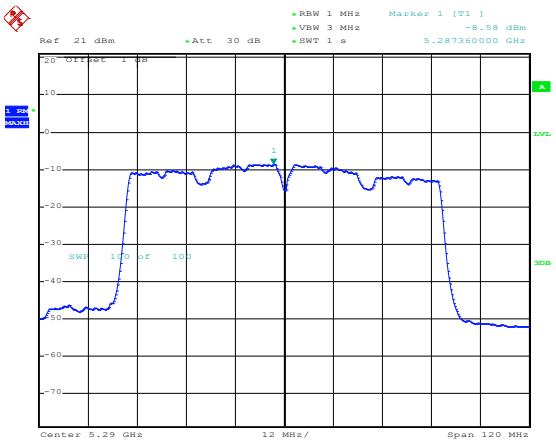
802.11n-HT20-Low	 Date: 18.FEB.2022 11:08:39
802.11n-HT20-Middle	 Date: 18.FEB.2022 11:11:12
802.11n-HT20-High	 Date: 18.FEB.2022 11:14:28

802.11n-HT40-Low	 Date: 18.FEB.2022 11:17:23
802.11n-HT40-High	 Date: 18.FEB.2022 11:19:32
802.11ac-VHT80-Low	 Date: 18.FEB.2022 17:04:29

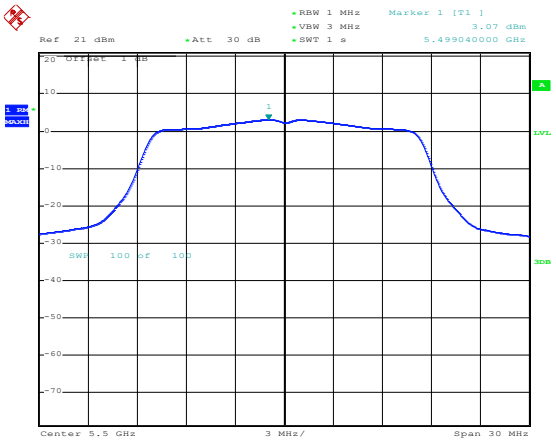
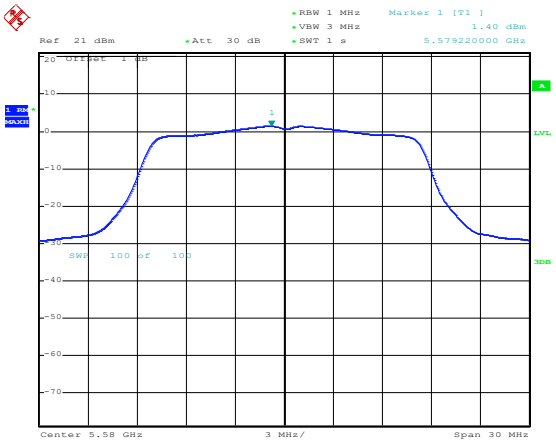
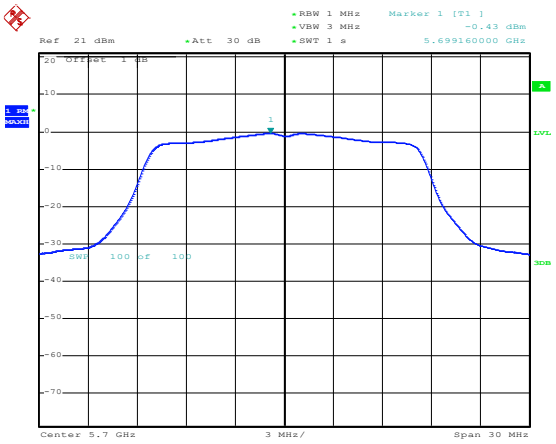
5250-5350MHz

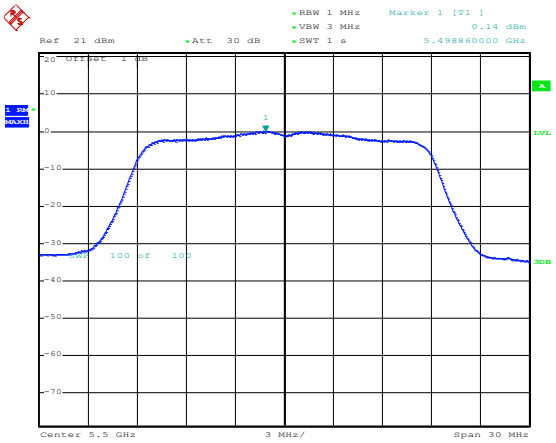
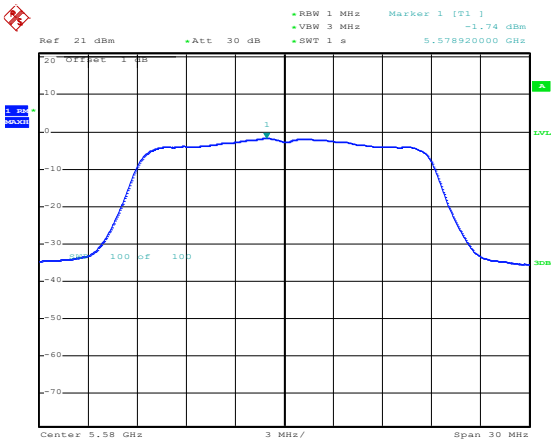
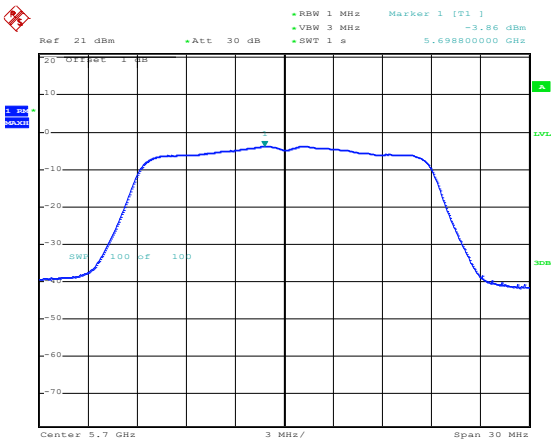
802.11a-Low	
802.11a-Middle	
802.11a-High	

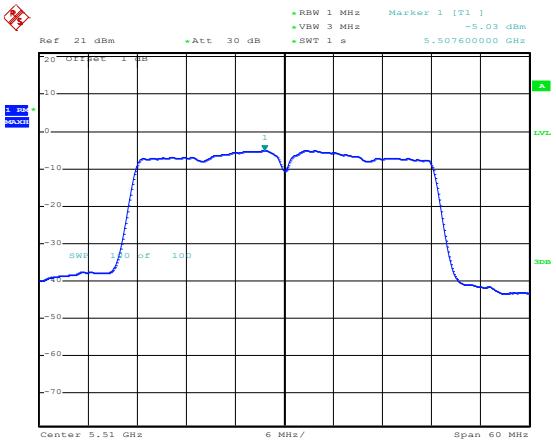
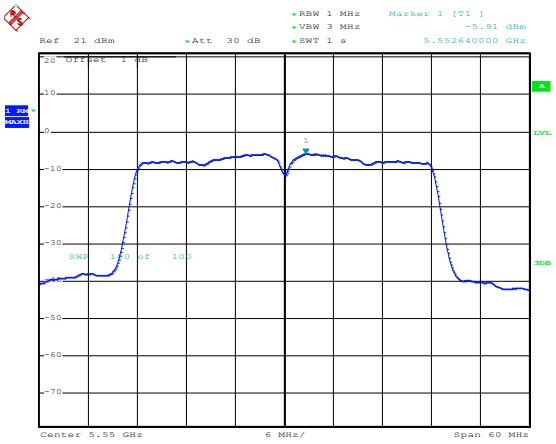
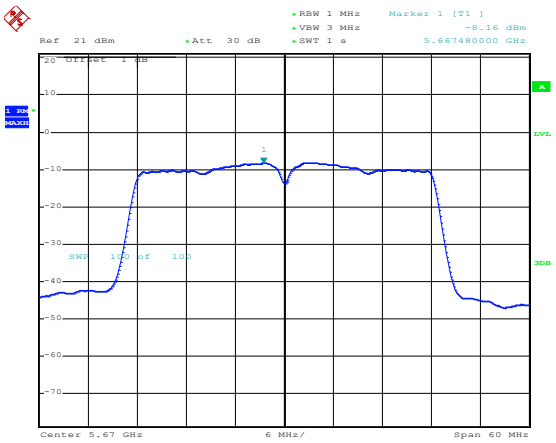
802.11n-HT20-Low	 Date: 18.FEB.2022 14:09:27
802.11n-HT20-Middle	 Date: 18.FEB.2022 14:11:42
802.11n-HT20-High	 Date: 18.FEB.2022 14:14:08

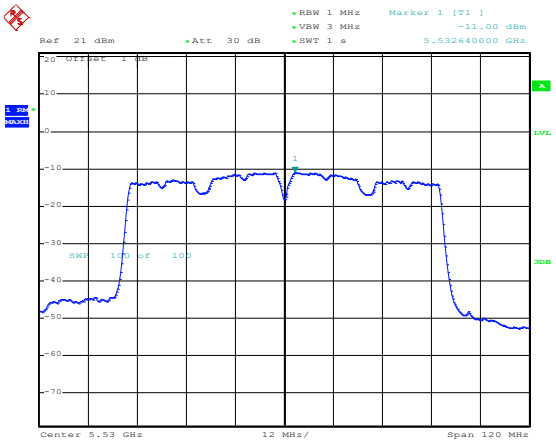
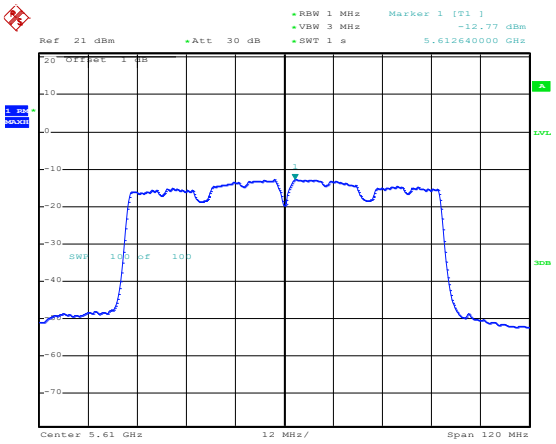
802.11n-HT40-Low	 Date: 18.FEB.2022 14:17:21
802.11n-HT40-High	 Date: 18.FEB.2022 14:19:50
802.11ac-VHT80-Low	 Date: 18.FEB.2022 17:07:05

5470-5725MHz

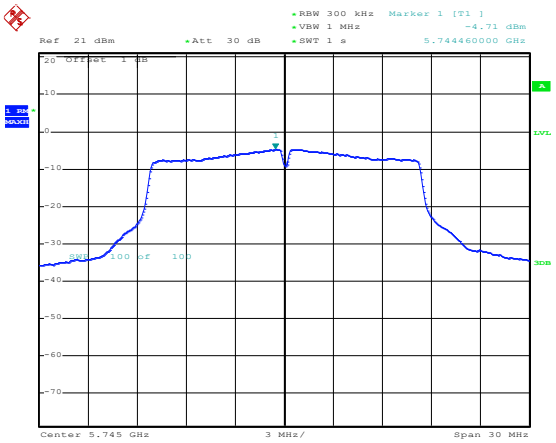
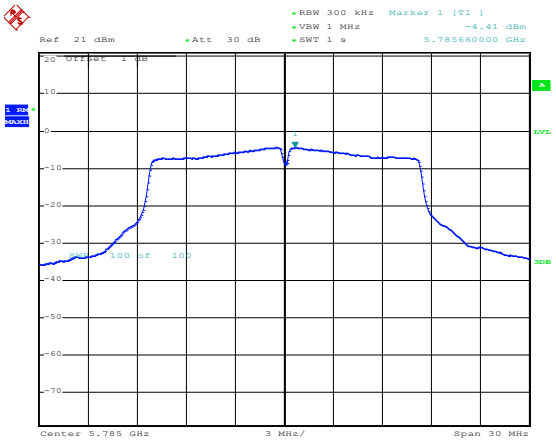
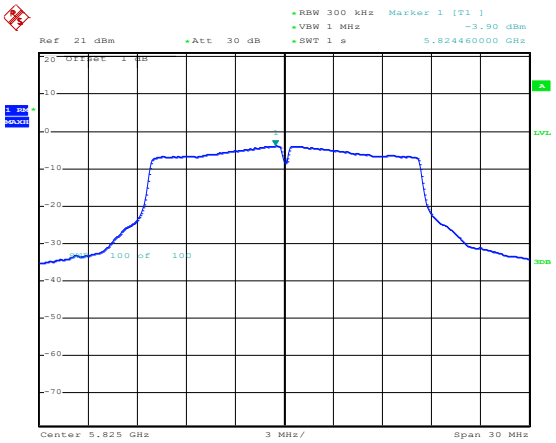
802.11a-Low	
802.11a-Middle	
802.11a-High	

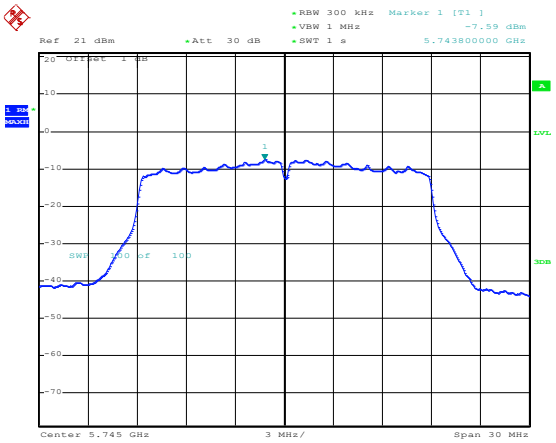
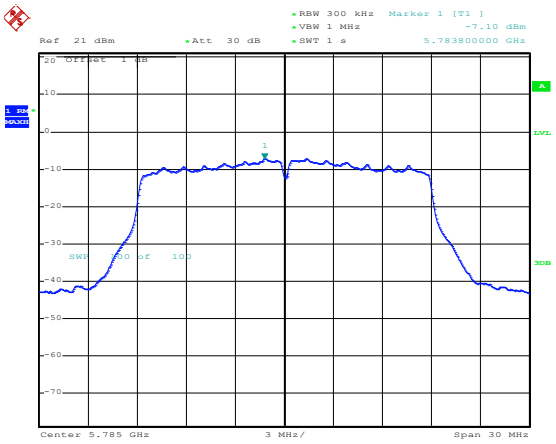
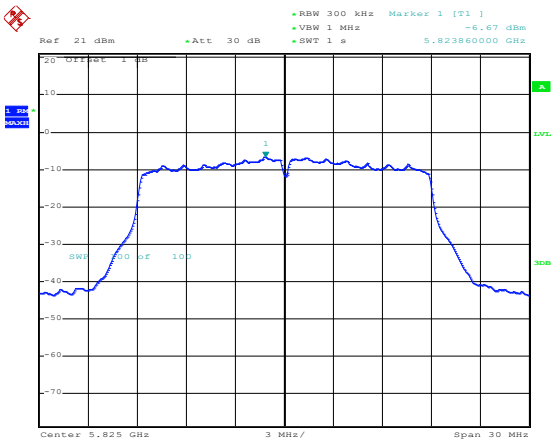
802.11n-HT20-Low	 Date: 18.FEB.2022 15:00:18
802.11n-HT20-Middle	 Date: 18.FEB.2022 15:02:22
802.11n-HT20-High	 Date: 18.FEB.2022 15:04:14

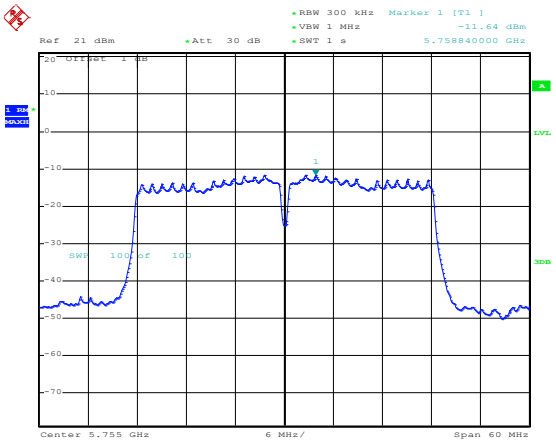
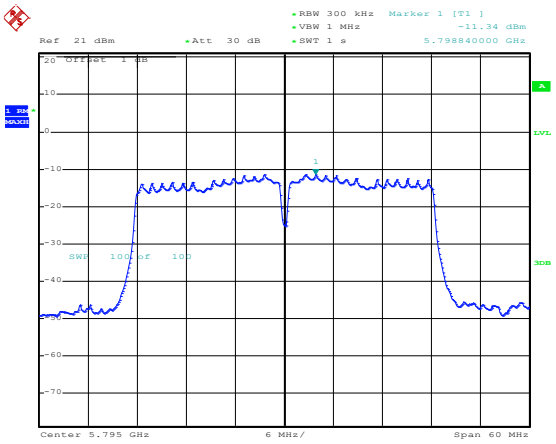
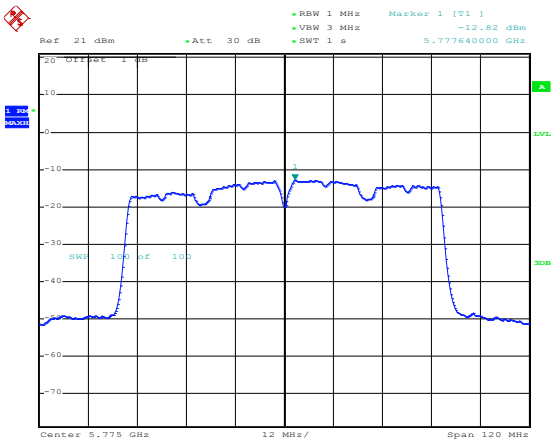
802.11n-HT40-Low	 Date: 18.FEB.2022 15:06:39
802.11n-HT40- Middle	 Date: 18.FEB.2022 15:08:46
802.11n-HT40-High	 Date: 18.FEB.2022 15:10:55

802.11ac-VHT80	
802.11ac-VHT80	

5725-5850MHz

802.11a-Low	
802.11a-Middle	
802.11a-High	

802.11n-HT20-Low	 Date: 18.FEB.2022 15:51:02
802.11n-HT20-Middle	 Date: 18.FEB.2022 15:53:00
802.11n-HT20-High	 Date: 18.FEB.2022 15:56:03

802.11n-HT40-Low	 Date: 18.FEB.2022 15:58:13
802.11n-HT40-High	 Date: 18.FEB.2022 16:00:44
802.11ac-VHT80-Low	 Date: 18.FEB.2022 17:16:28

APPENDIX B

Emission Bandwidth and Occupied Bandwidth

U-NII-1:5150-5250MHz				
Test Mode	**Test Channel MHz**	**26 dB Bandwidth MHz**	**99% Bandwidth MHz**	**Limit MHz**
802.11a	5180	21.54	17.16	Pass
	5200	21.54	17.16	Pass
	5240	21.54	17.16	Pass
802.11n-HT20	5180	21.60	18.06	Pass
	5200	21.60	18.06	Pass
	5240	21.60	18.00	Pass
802.11n-HT40	5190	39.00	36.24	Pass
	5230	39.12	36.12	Pass
802.11ac-VHT80	5210	81.84	75.60	Pass

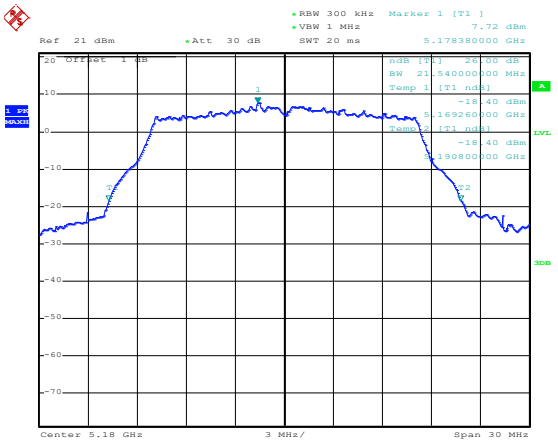
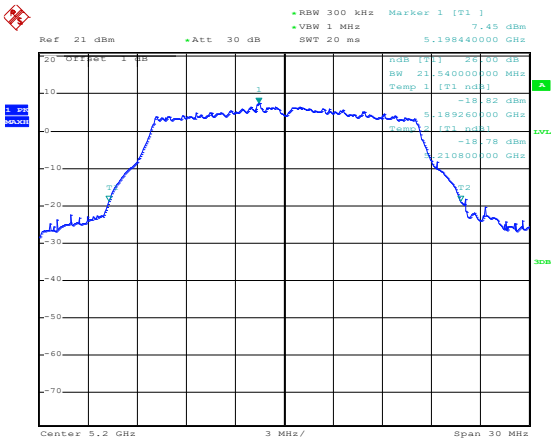
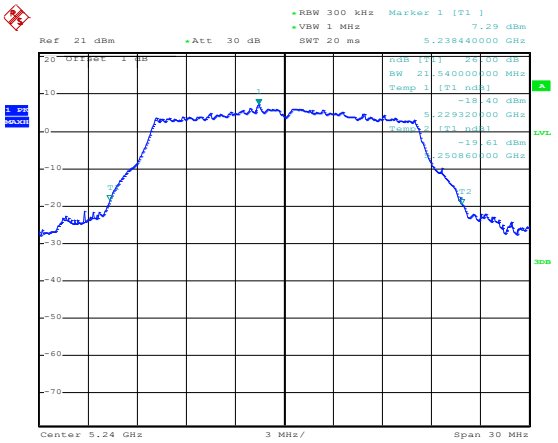
U-NII-2A: 5250-5350MHz				
Test Mode	**Test Channel MHz**	**26 dB Bandwidth MHz**	**99% Bandwidth MHz**	**Limit MHz**
802.11a	5260	21.48	17.16	Pass
	5280	21.48	17.16	Pass
	5320	21.42	17.10	Pass
802.11n-HT20	5260	21.48	18.00	Pass
	5280	21.60	18.00	Pass
	5320	21.54	18.00	Pass
802.11n-HT40	5270	39.36	36.24	Pass
	5310	39.12	36.36	Pass
802.11ac-VHT80	5290	81.84	75.60	Pass

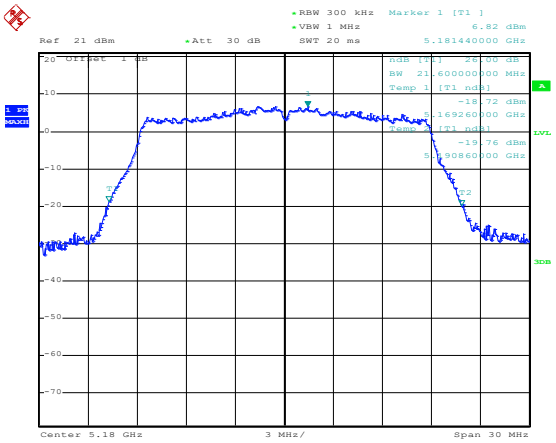
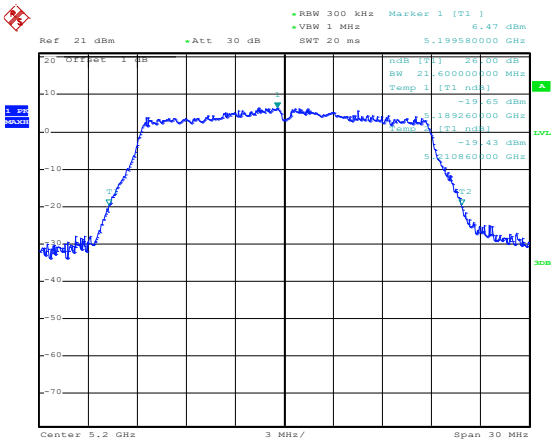
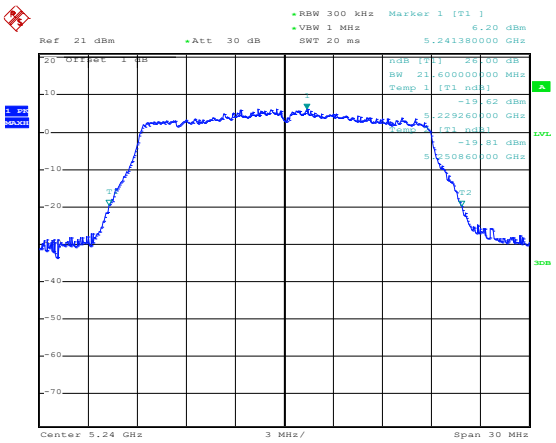
U-NII-2C: 5470-5725MHz				
Test Mode	**Test Channel MHz**	**26 dB Bandwidth MHz**	**99% Bandwidth MHz**	**Limit MHz**
802.11a	5500	21.90	17.40	Pass
	5580	22.02	17.46	Pass
	5700	21.84	17.40	Pass
802.11n-HT20	5500	21.72	18.12	Pass
	5580	21.84	18.06	Pass
	5700	21.48	18.06	Pass
802.11n-HT40	5510	39.48	36.36	Pass
	5550	39.24	36.24	Pass
	5670	39.24	36.24	Pass
802.11ac-VHT80	5530	81.84	75.84	Pass
802.11ac-VHT80	5610	81.60	75.60	Pass

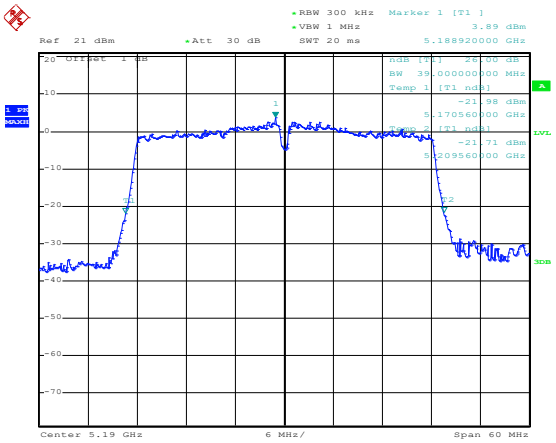
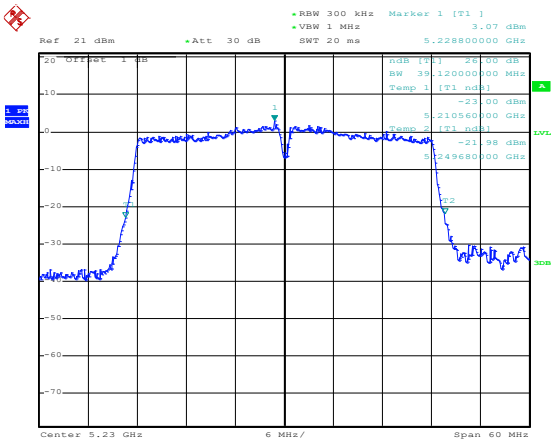
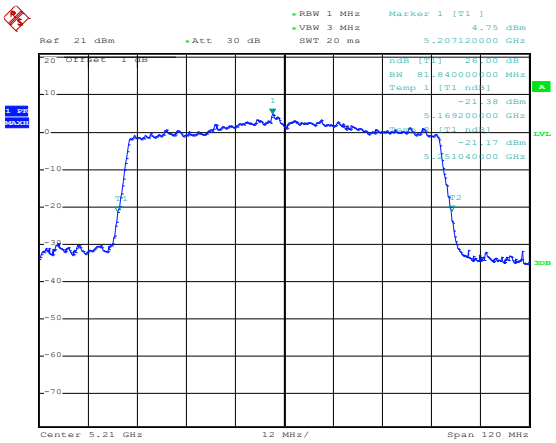
U-NII-3: 5725-5850MHz				
Test Mode	**Test Channel MHz**	**6 dB Bandwidth MHz**	**99% Bandwidth MHz**	**Limit MHz**
802.11a	5745	16.32	17.46	≥500
	5785	16.38	17.58	≥500
	5825	16.44	17.46	≥500
802.11n-HT20	5745	17.82	18.12	≥500
	5785	17.76	18.12	≥500
	5825	17.76	18.12	≥500
802.11n-HT40	5755	36.48	36.24	≥500
	5795	36.56	36.24	≥500
802.11ac-VHT80	5775	76.32	75.60	≥500

5150-5250MHz

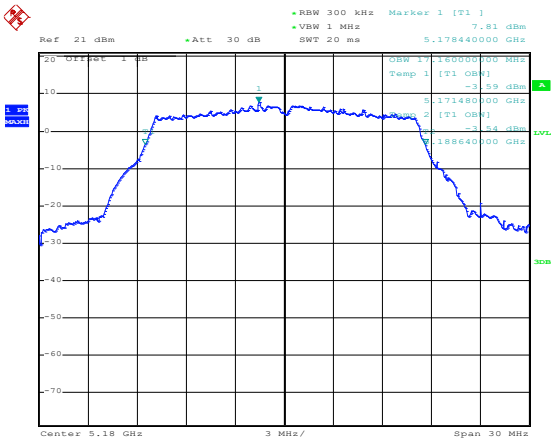
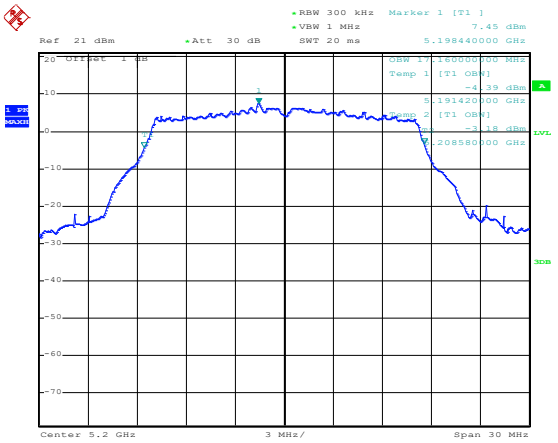
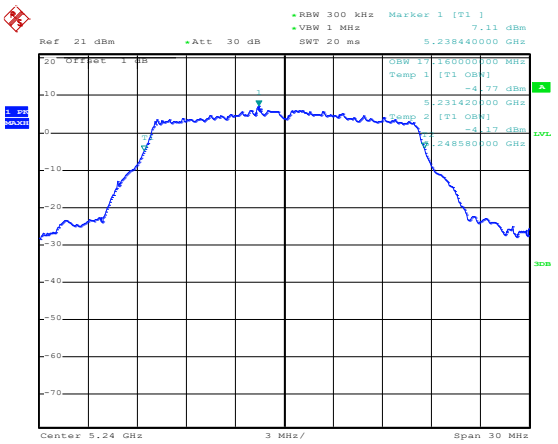
-26DB

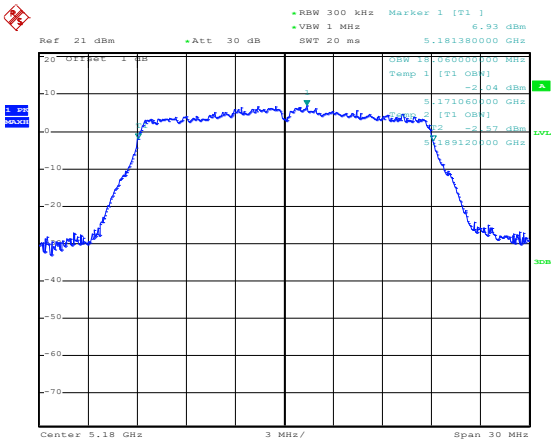
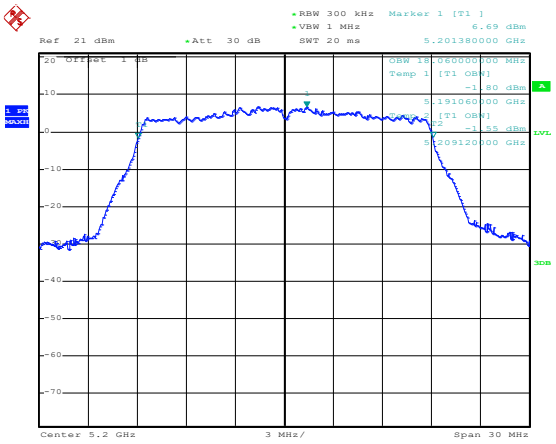
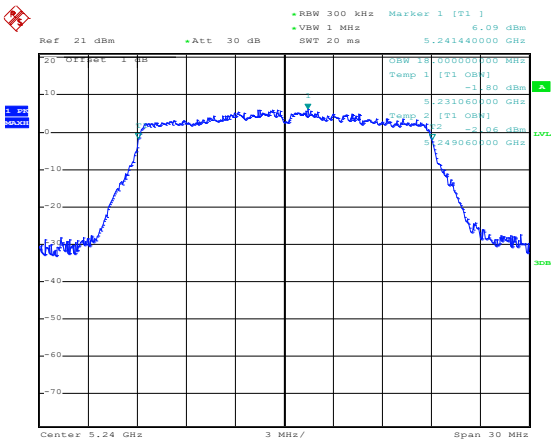
802.11a-Low	 Date: 18.FEB.2022 11:24:04
802.11a-Middle	 Date: 18.FEB.2022 11:25:31
802.11a-High	 Date: 18.FEB.2022 11:26:05

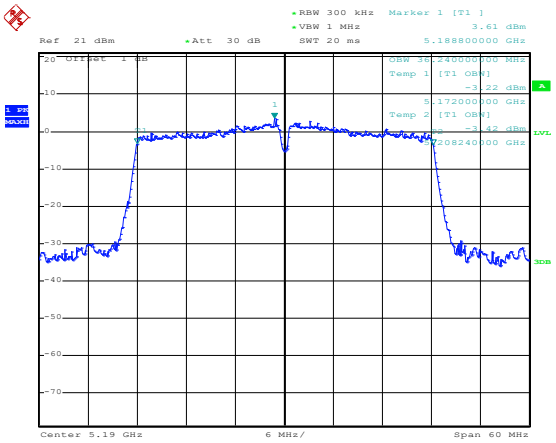
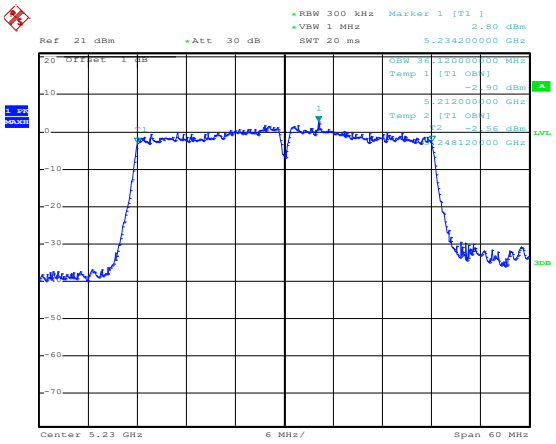
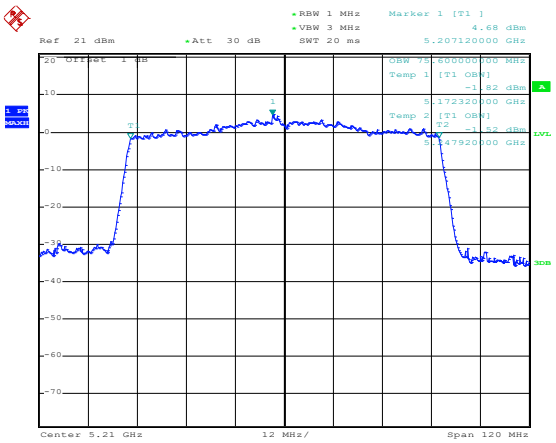
802.11n-HT20-Low	 Date: 18.FEB.2022 11:26:34
802.11n-HT20-Middle	 Date: 18.FEB.2022 11:27:07
802.11n-HT20-High	 Date: 18.FEB.2022 11:27:37

802.11n-HT40-Low	 Date: 18.FEB.2022 11:28:47
802.11n-HT40-High	 Date: 18.FEB.2022 11:29:17
802.11ac-VHT80-Low	 Date: 18.FEB.2022 17:19:44

99%

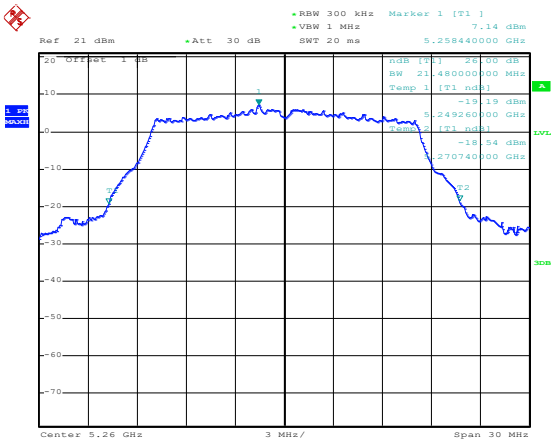
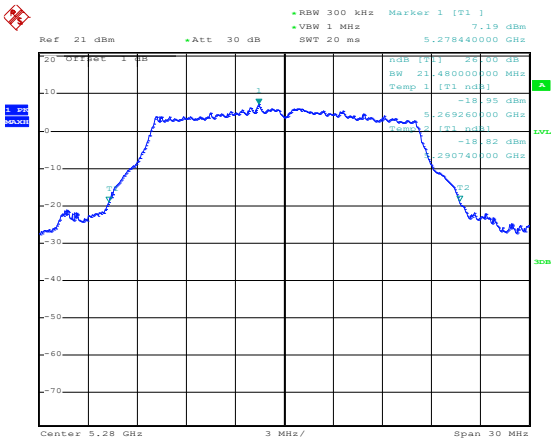
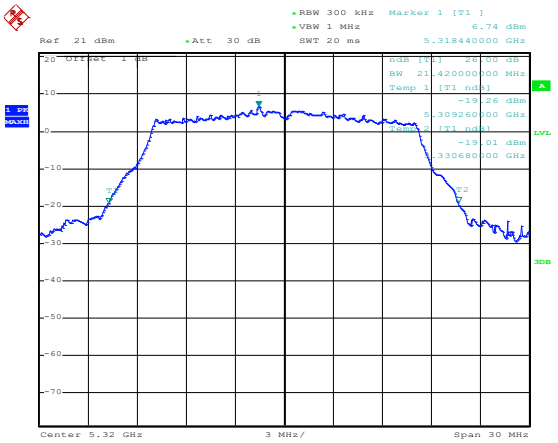
802.11a-Low	 Date: 18.FEB.2022 11:30:51
802.11a-Middle	 Date: 18.FEB.2022 11:31:19
802.11a-High	 Date: 18.FEB.2022 11:31:47

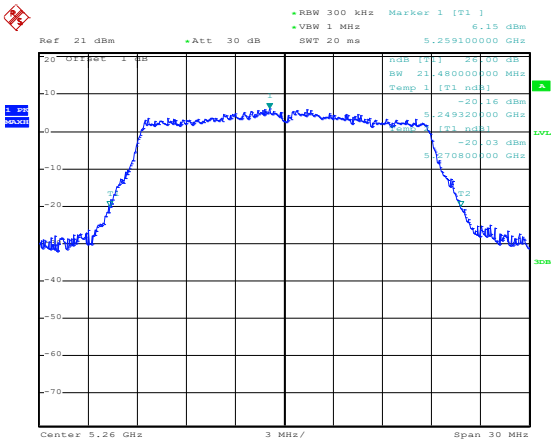
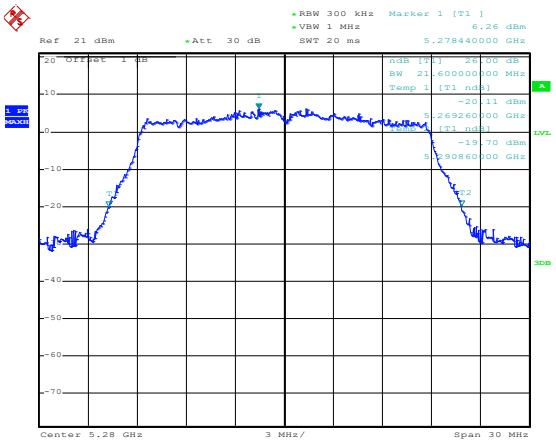
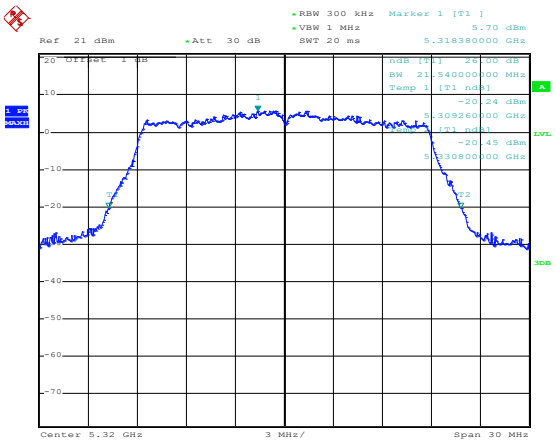
802.11n-HT20-Low	 Date: 18.FEB.2022 11:32:38
802.11n-HT20-Middle	 Date: 18.FEB.2022 11:33:40
802.11n-HT20-High	 Date: 18.FEB.2022 11:34:22

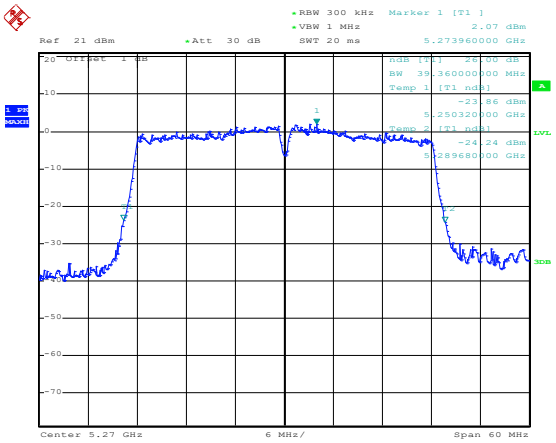
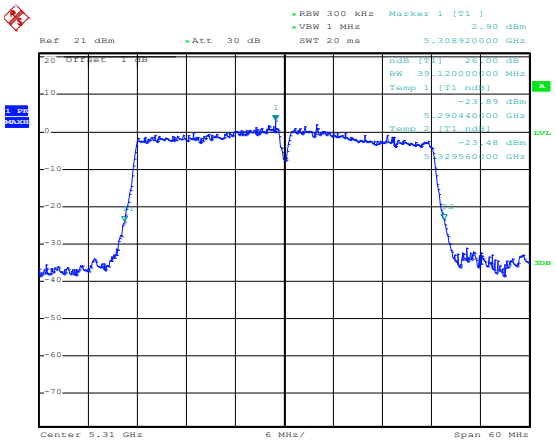
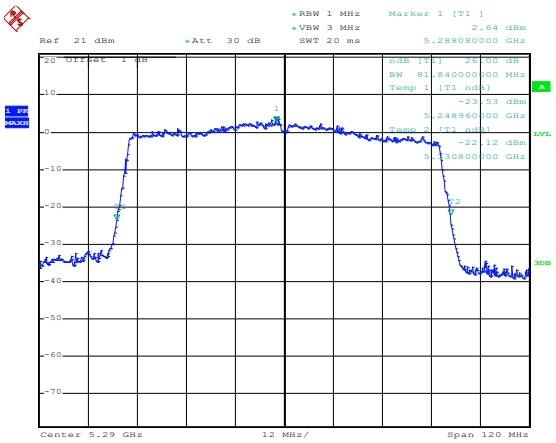
802.11n-HT40-Low	 Date: 18.FEB.2022 11:36:13
802.11n-HT40-High	 Date: 18.FEB.2022 11:36:54
802.11ac-VHT80-Low	 Date: 18.FEB.2022 17:20:58

5250-5350MHz

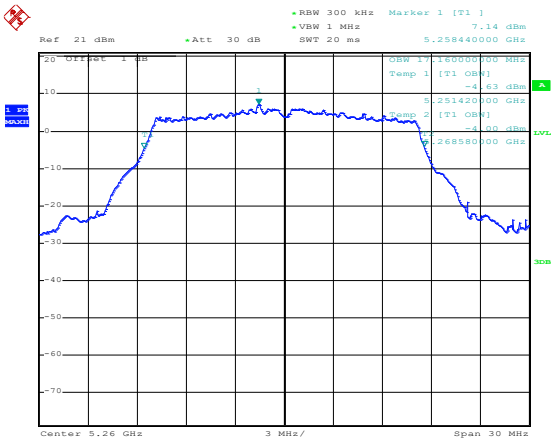
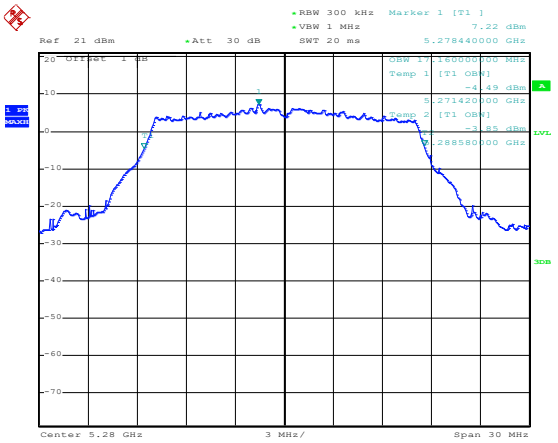
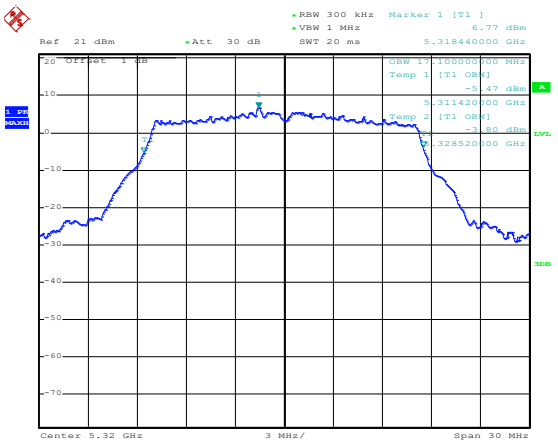
-26DB

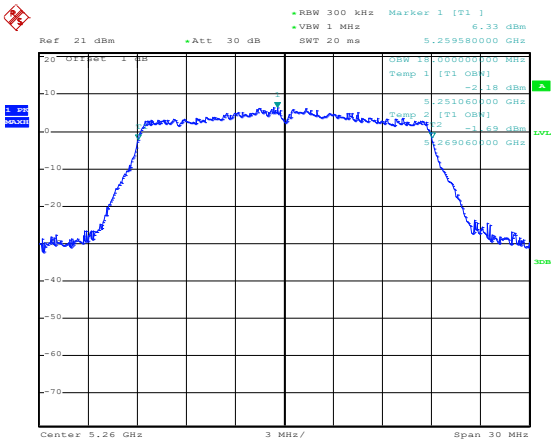
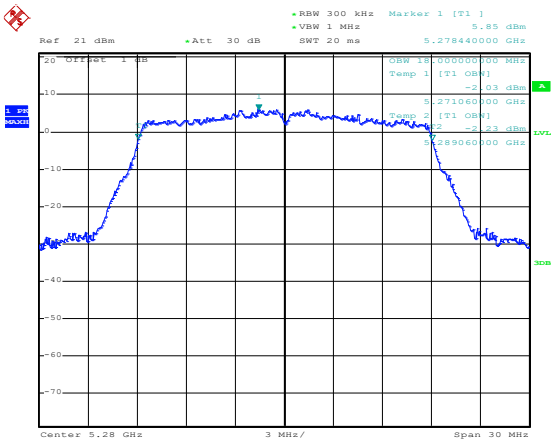
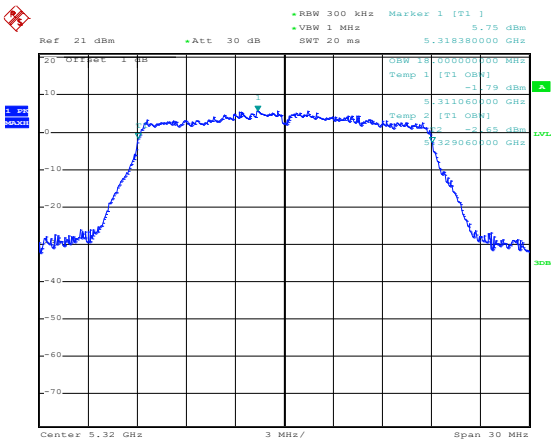
802.11a-Low	 Date: 18.FEB.2022 14:29:46
802.11a-Middle	 Date: 18.FEB.2022 14:30:12
802.11a-High	 Date: 18.FEB.2022 14:30:36

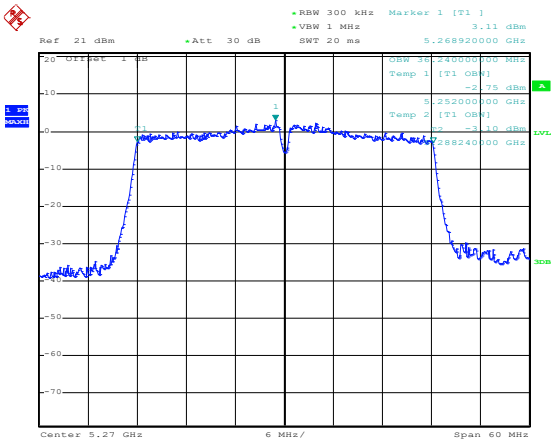
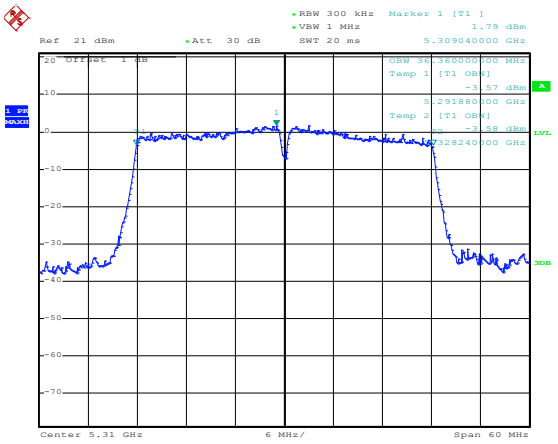
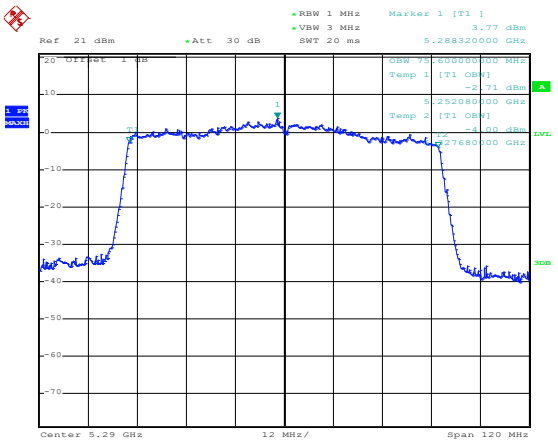
802.11n-HT20-Low	 Date: 18.FEB.2022 14:31:13
802.11n-HT20-Middle	 Date: 18.FEB.2022 14:31:37
802.11n-HT20-High	 Date: 18.FEB.2022 14:32:28

802.11n-HT40-Low	 Date: 18.FEB.2022 14:33:01
802.11n-HT40-High	 Date: 18.FEB.2022 14:34:21
802.11ac-VHT80-Low	 Date: 18.FEB.2022 17:23:34

99%

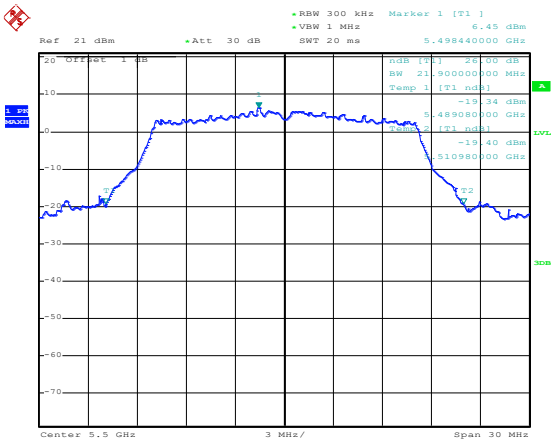
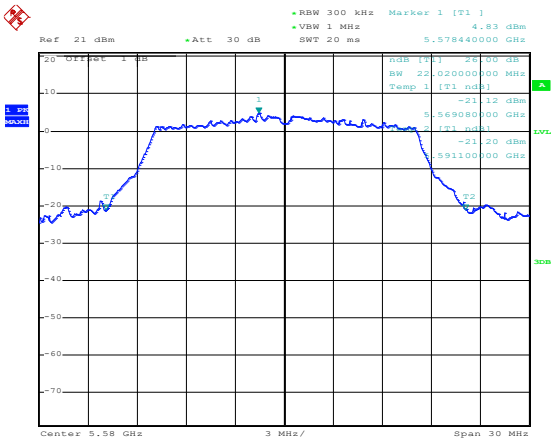
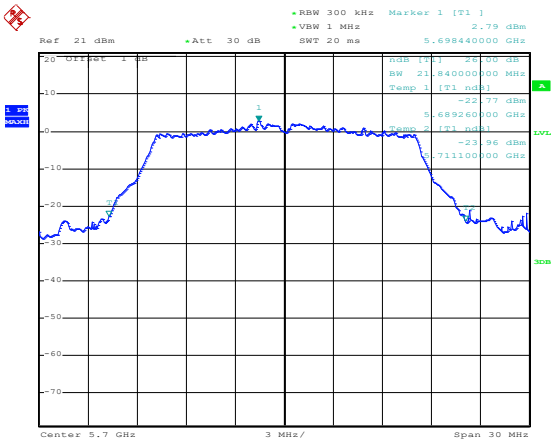
802.11a-Low	 Date: 18.FEB.2022 14:22:20
802.11a-Middle	 Date: 18.FEB.2022 14:23:13
802.11a-High	 Date: 18.FEB.2022 14:23:43

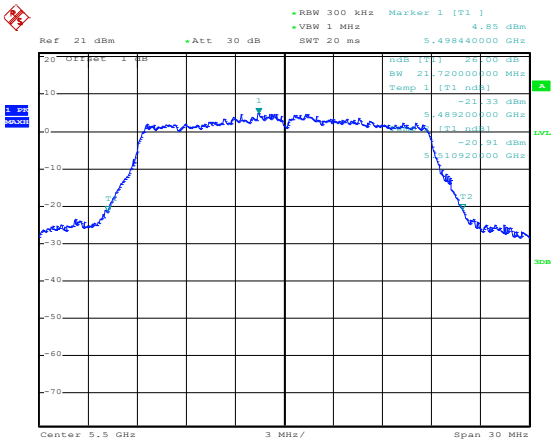
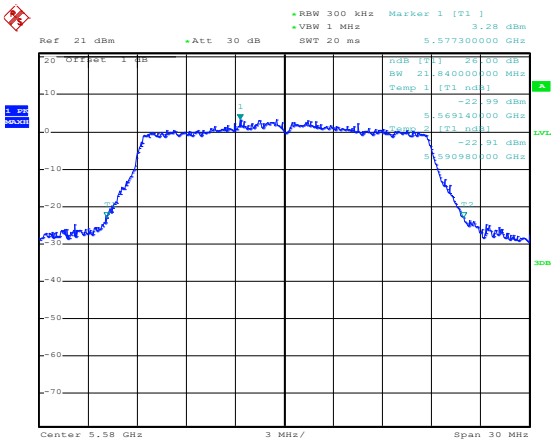
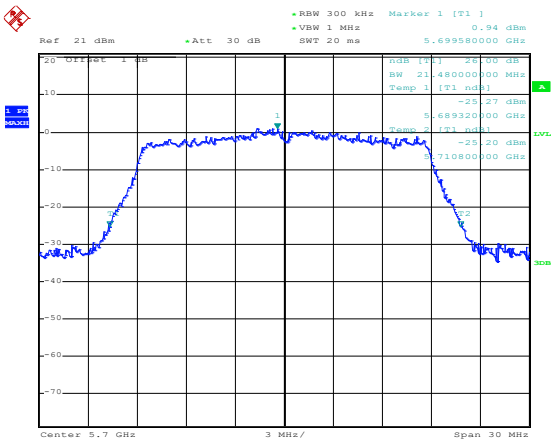
802.11n-HT20-Low	
802.11n-HT20-Middle	
802.11n-HT20-High	

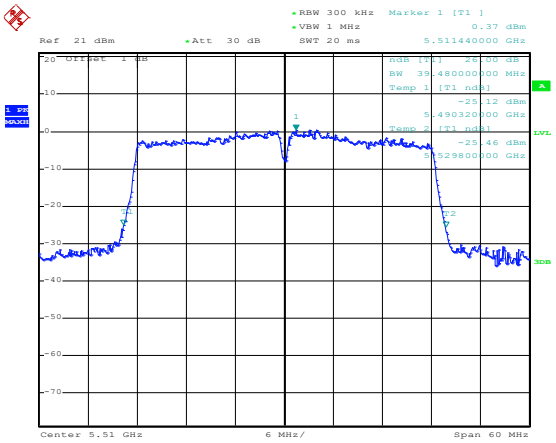
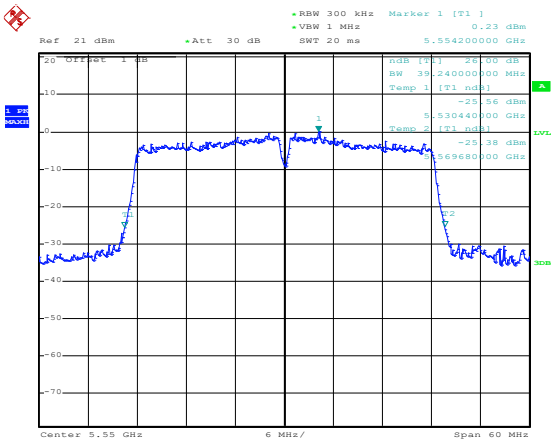
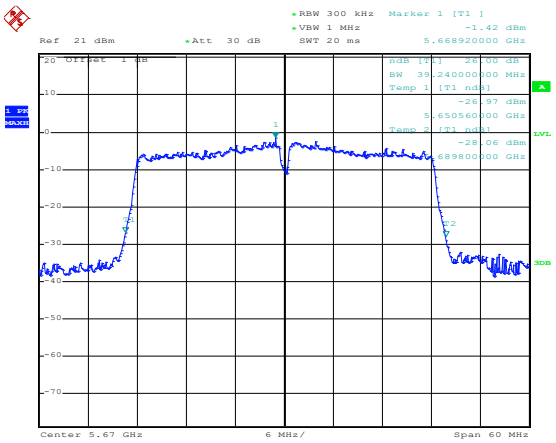
802.11n-HT40-Low	 Date: 18.FEB.2022 14:26:57
802.11n-HT40-High	 Date: 18.FEB.2022 14:27:32
802.11ac-VHT80-Low	 Date: 18.FEB.2022 17:28:41

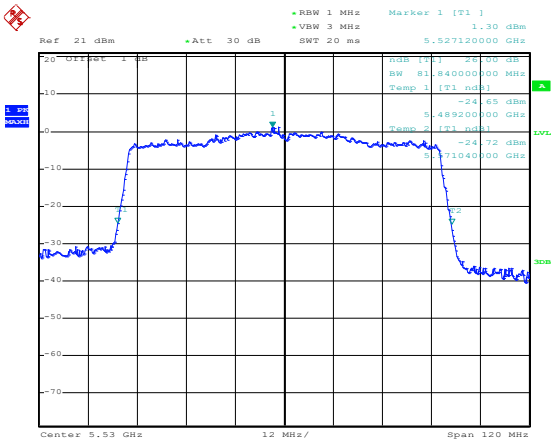
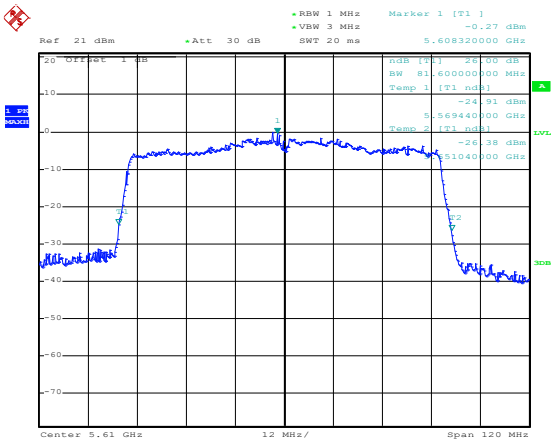
5470-5725MHz

-26DB

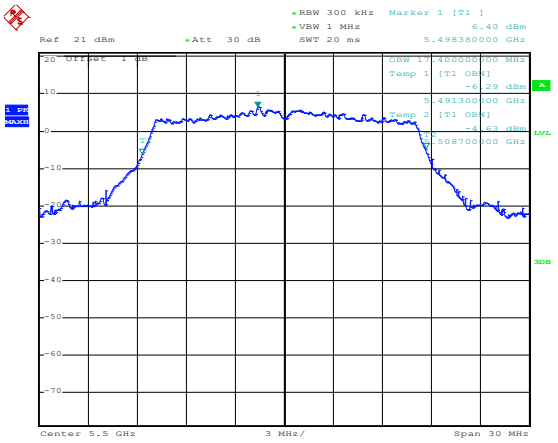
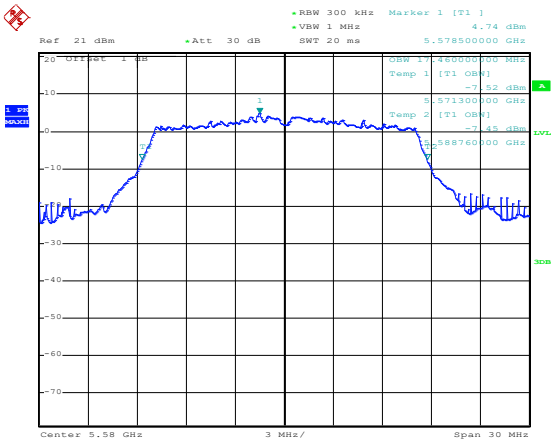
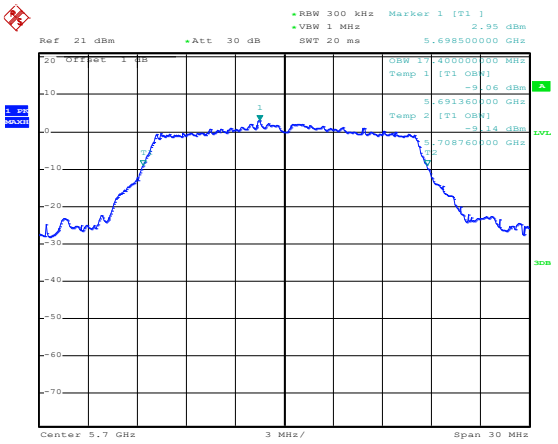
802.11a-Low	 Date: 18.FEB.2022 15:13:57
802.11a-Middle	 Date: 18.FEB.2022 15:14:48
802.11a-High	 Date: 18.FEB.2022 15:15:58

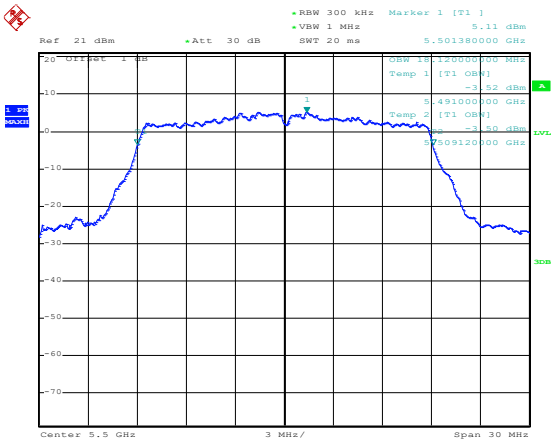
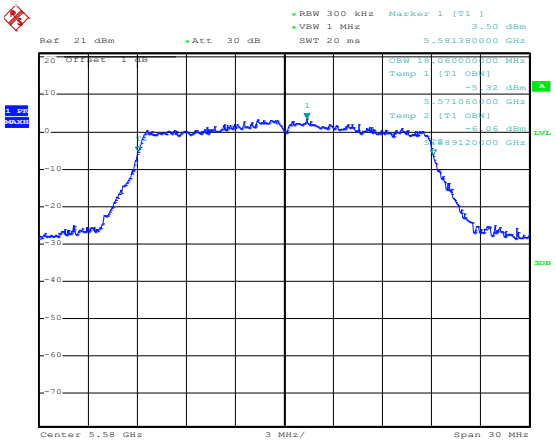
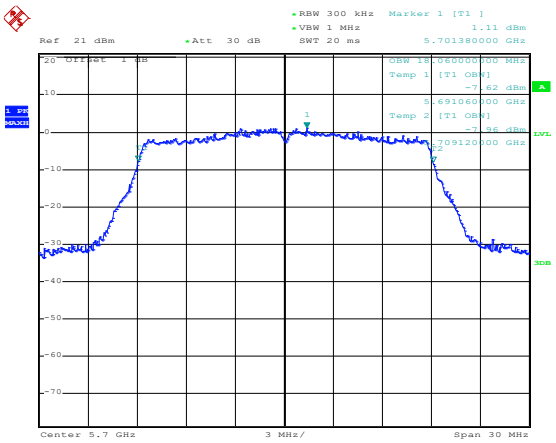
802.11n-HT20-Low	 Date: 18.FEB.2022 15:18:00
802.11n-HT20-Middle	 Date: 18.FEB.2022 15:18:26
802.11n-HT20-High	 Date: 18.FEB.2022 15:18:49

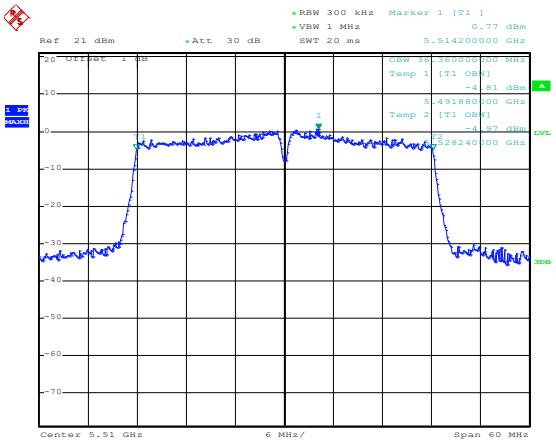
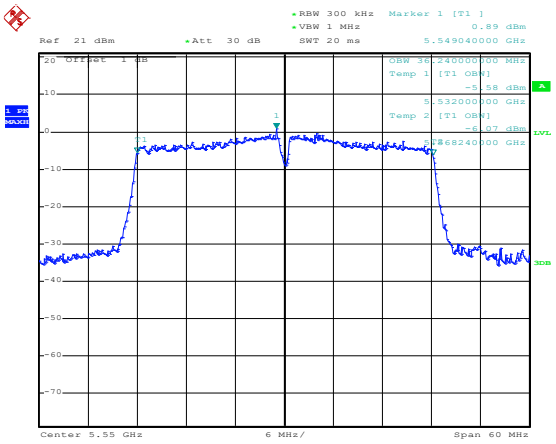
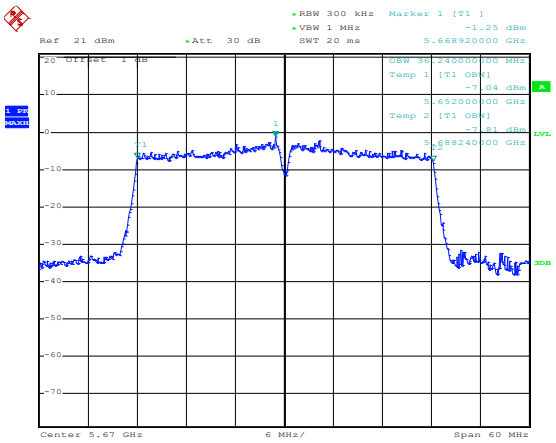
802.11n-HT40-Low	 Date: 18.FEB.2022 15:19:51
802.11n-HT40- Middle	 Date: 18.FEB.2022 15:20:20
802.11n-HT40-High	 Date: 18.FEB.2022 15:20:53

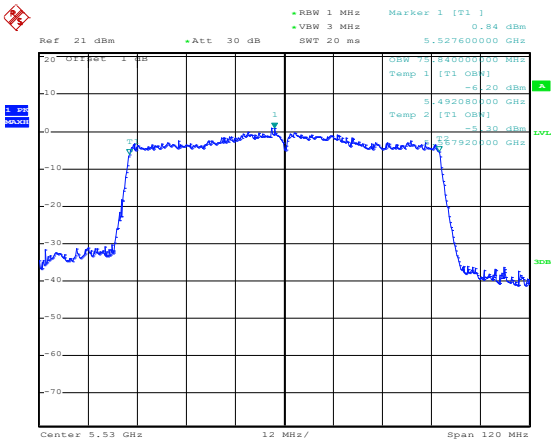
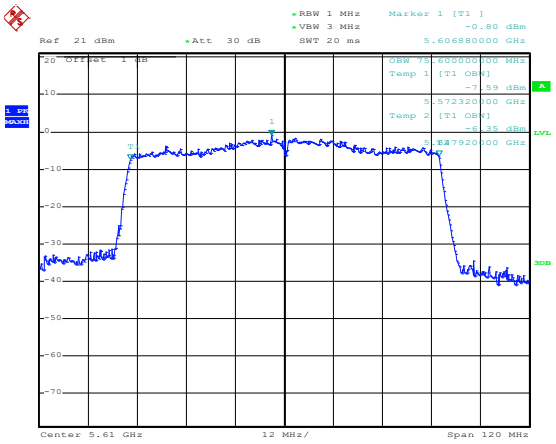
802.11ac-VHT80-Low	 Date: 18.FEB.2022 17:25:38
802.11ac-VHT80-High	 Date: 18.FEB.2022 17:26:35

99%

802.11a-Low	 Date: 18.FEB.2022 15:23:27
802.11a-Middle	 Date: 18.FEB.2022 15:24:42
802.11a-High	 Date: 18.FEB.2022 15:25:10

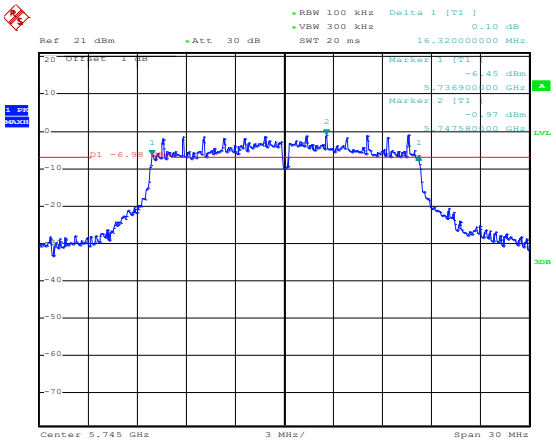
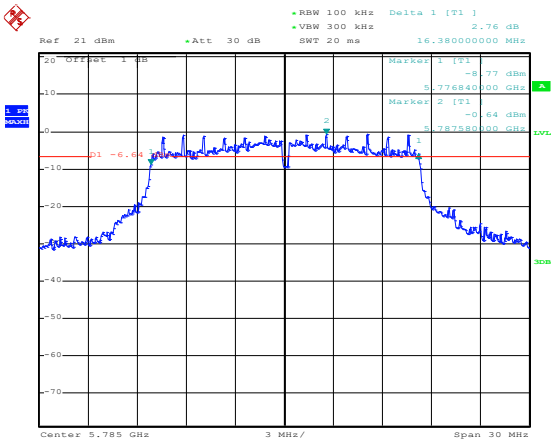
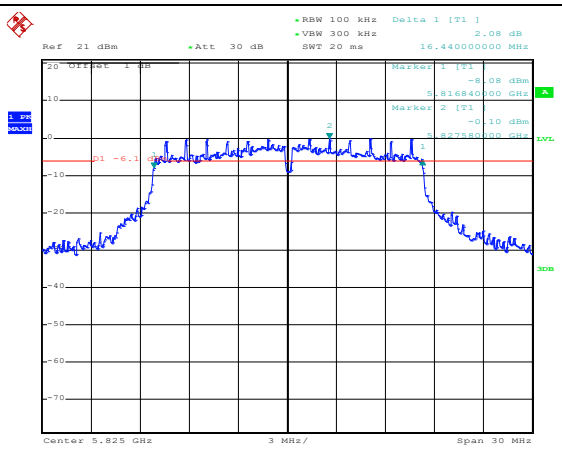
802.11n-HT20-Low	 Date: 18.FEB.2022 15:27:24
802.11n-HT20-Middle	 Date: 18.FEB.2022 15:28:02
802.11n-HT20-High	 Date: 18.FEB.2022 15:28:32

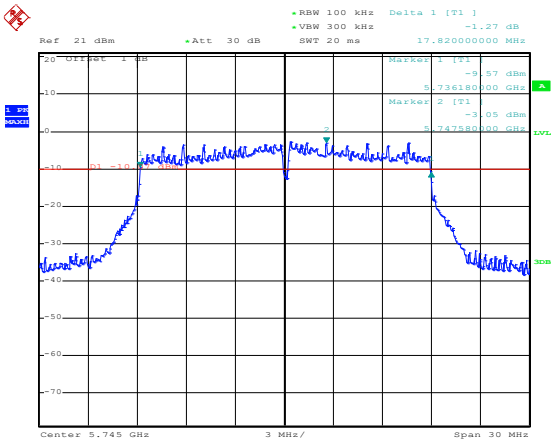
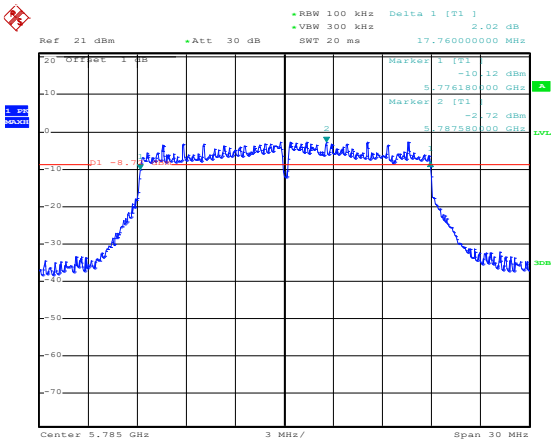
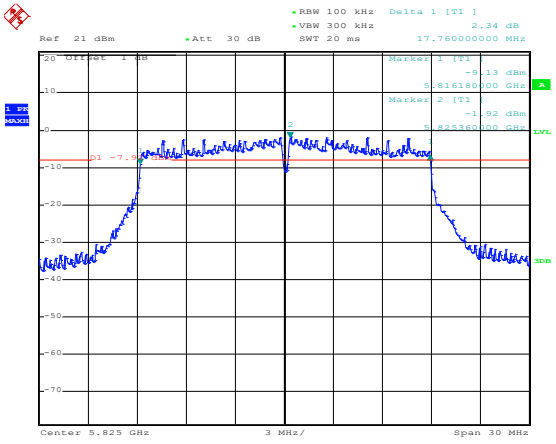
802.11n-HT40-Low	 Date: 18.FEB.2022 15:29:23
802.11n-HT40- Middle	 Date: 18.FEB.2022 15:29:53
802.11n-HT40-High	 Date: 18.FEB.2022 15:30:19

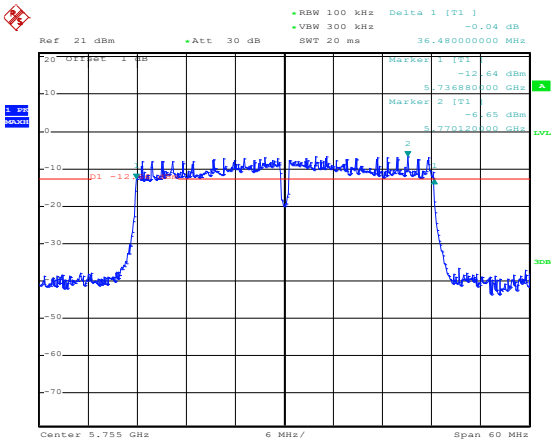
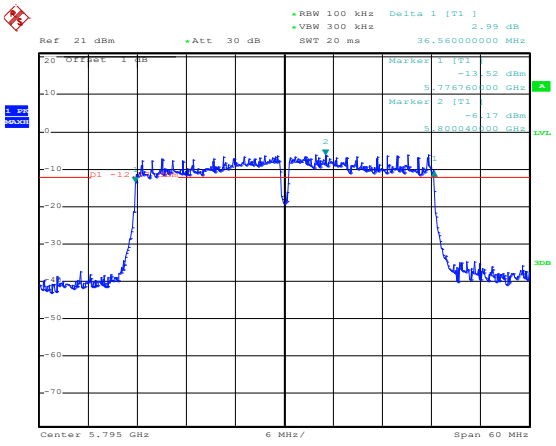
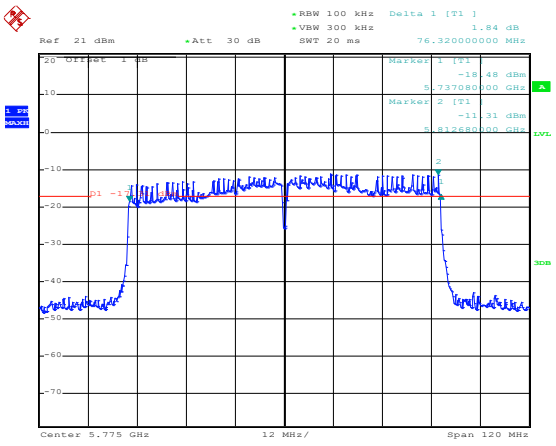
802.11ac-HT80-Low	 Date: 18.FEB.2022 17:29:43
802.11ac-VHT80-High	 Date: 18.FEB.2022 17:30:27

5725-5850MHz

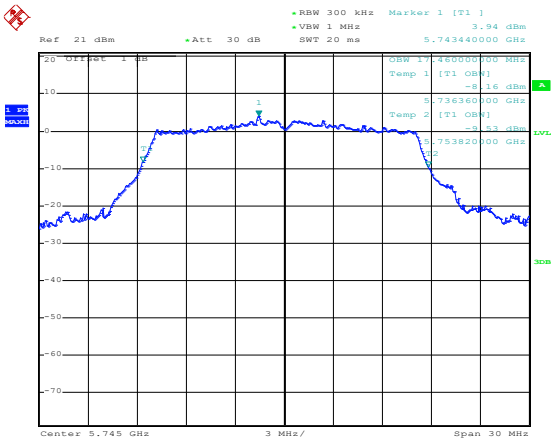
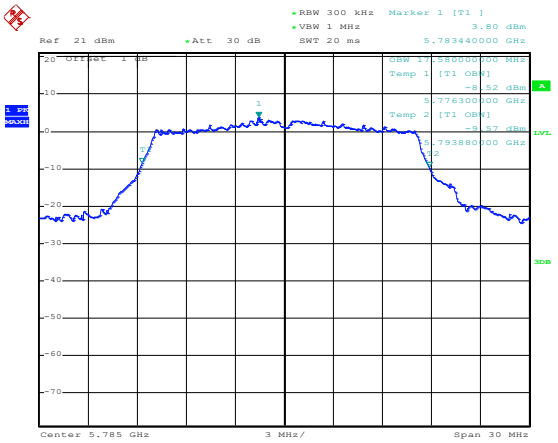
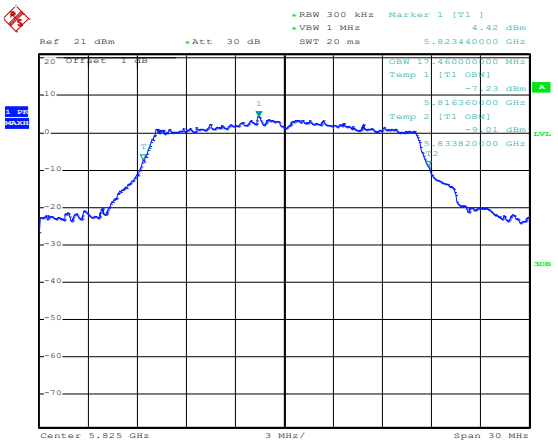
6dB

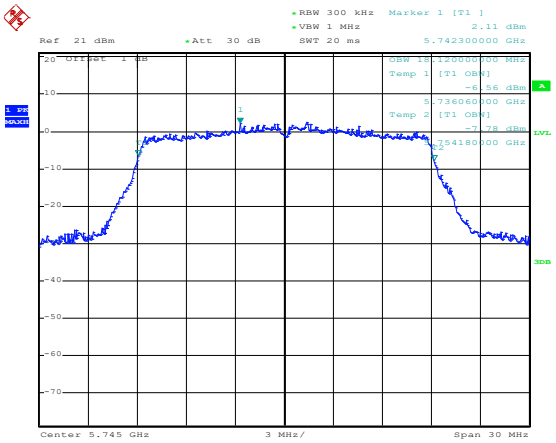
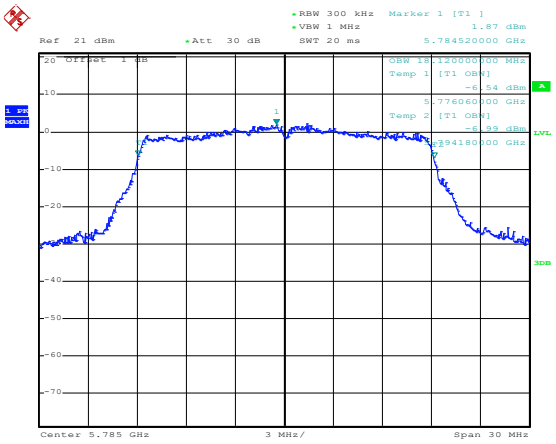
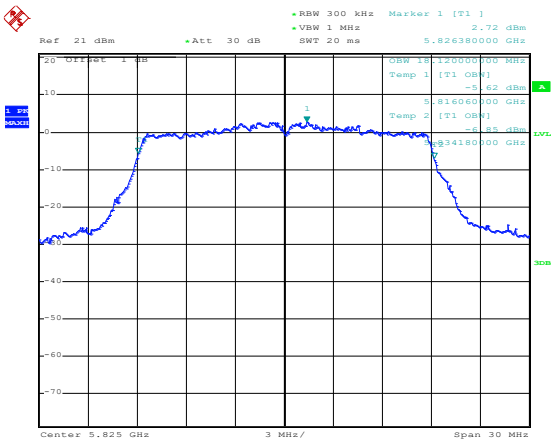
802.11a-Low	
802.11a-Middle	
802.11a-High	

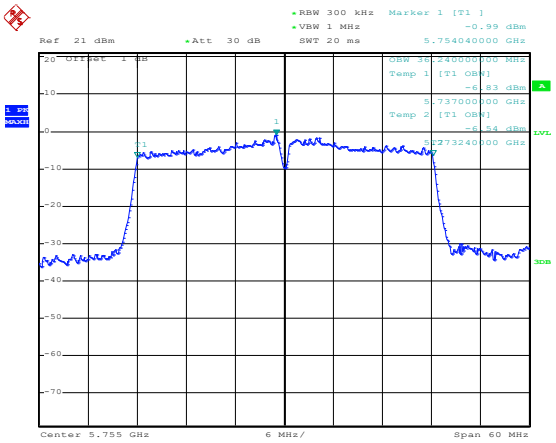
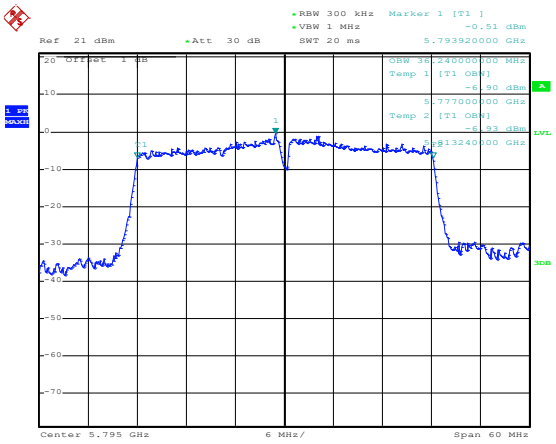
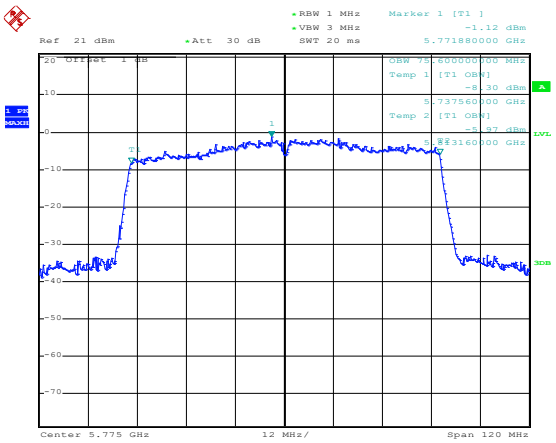
802.11n-HT20-Low	 Date: 18.FEB.2022 16:26:11
802.11n-HT20-Middle	 Date: 18.FEB.2022 16:27:17
802.11n-HT20-High	 Date: 18.FEB.2022 16:28:52

802.11n-HT40-Low	 Date: 18.FEB.2022 16:29:58
802.11n-HT40-High	 Date: 18.FEB.2022 16:33:17
802.11ac-VHT80-Low	 Date: 18.FEB.2022 17:33:06

99% OBW

802.11a-Low	
802.11a-Middle	
802.11a-High	

802.11n-HT20-Low	 Date: 18.FEB.2022 16:37:48
802.11n-HT20-Middle	 Date: 18.FEB.2022 16:38:40
802.11n-HT20-High	 Date: 18.FEB.2022 16:39:44

802.11n-HT40-Low	 Date: 18.FEB.2022 16:40:53
802.11n-HT40-High	 Date: 18.FEB.2022 16:41:28
802.11ac-VHT80-Low	 Date: 18.FEB.2022 16:46:57

APPENDIX C

Maximum Conducted Output Power

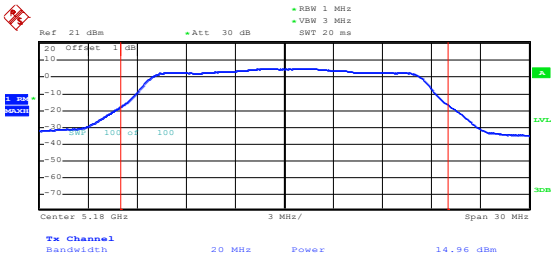
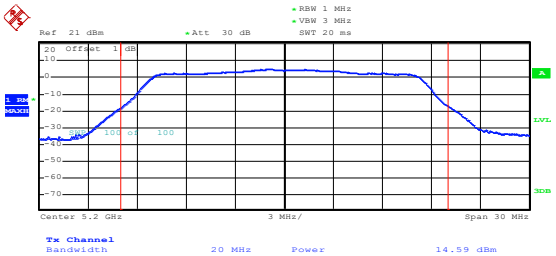
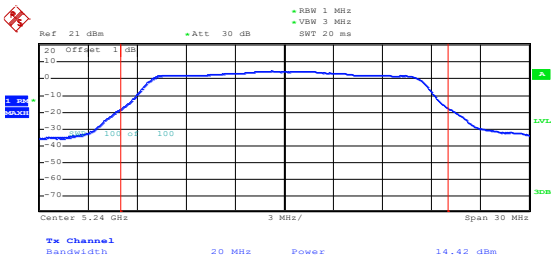
U-NII-1:5150-5250MHz			
Test mode	Frequency MHz	Output Power dBm	Limit dBm
802.11a	5180	14.96	23.98
	5200	14.59	23.98
	5240	14.42	23.98
802.11n-HT20	5180	13.88	23.98
	5200	13.80	23.98
	5240	13.37	23.98
802.11n-HT40	5190	12.69	23.98
	5230	12.20	23.98
802.11ac-VHT80	5210	10.01	23.98

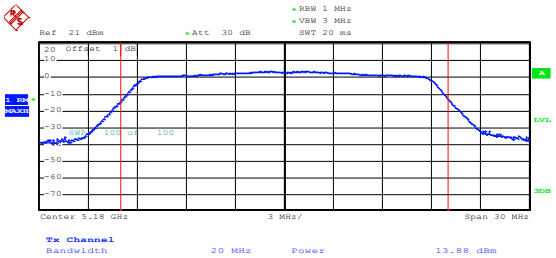
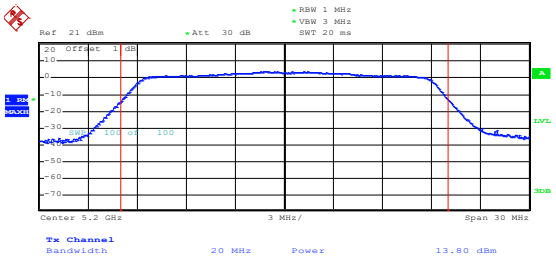
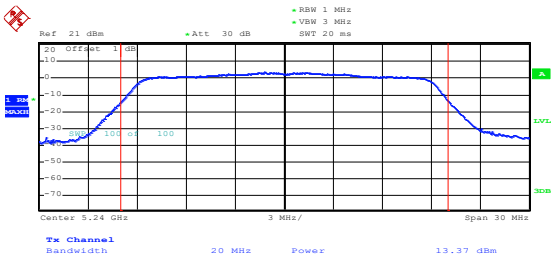
U-NII-2A: 5250-5350MHz			
Test mode	Frequency MHz	Output Power dBm	Limit dBm
802.11a	5260	14.12	23.98
	5280	14.25	23.98
	5320	13.79	23.98
802.11n-HT20	5260	13.44	23.98
	5280	13.32	23.98
	5320	12.88	23.98
802.11n-HT40	5270	12.04	23.98
	5310	11.83	23.98
802.11ac-VHT80	5290	9.56	23.98

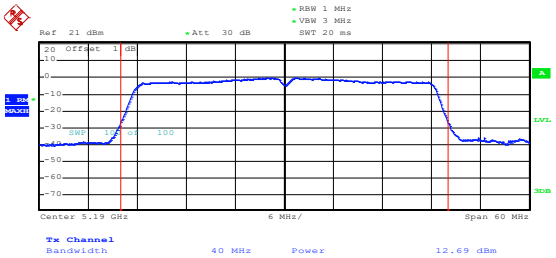
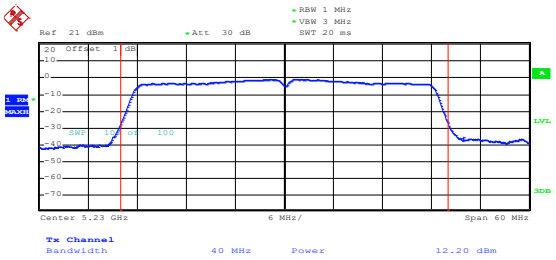
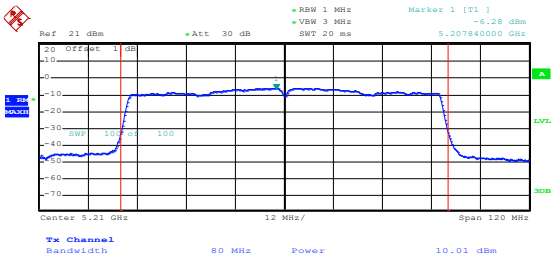
U-NII-2C: 5470-5725MHz			
Test mode	Frequency MHz	Output Power dBm	Limit dBm
802.11a	5500	13.65	23.98
	5580	12.85	23.98
	5700	10.98	23.98
802.11n-HT20	5500	12.11	23.98
	5580	10.37	23.98
	5700	8.20	23.98
802.11n-HT40	5510	10.46	23.98
	5550	9.82	23.98
	5670	7.55	23.98
802.11ac-VHT80	5530	7.82	23.98
802.11ac-VHT80	5610	6.30	23.98

U-NII-3: 5725-5850MHz			
Test mode	Frequency MHz	Output Power dBm	Limit dBm
802.11a	5745	11.85	30.00
	5785	11.79	30.00
	5825	12.33	30.00
802.11n-HT20	5745	10.10	30.00
	5785	10.26	30.00
	5825	11.08	30.00
802.11n-HT40	5755	8.91	30.00
	5795	9.64	30.00
802.11ac-VHT80	5775	5.99	30.00

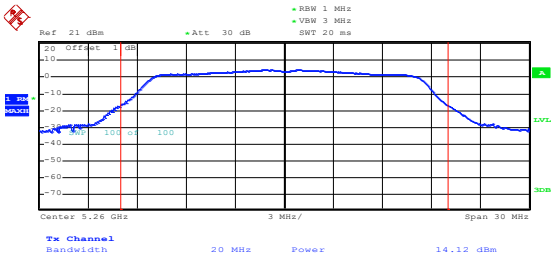
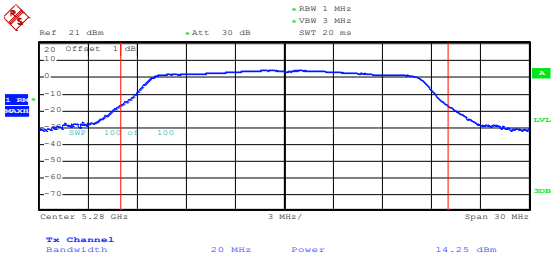
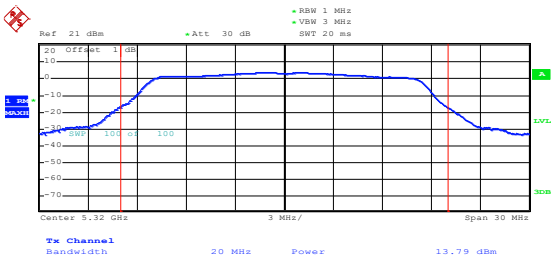
5150-5250MHz

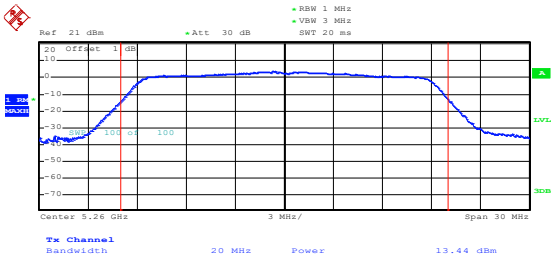
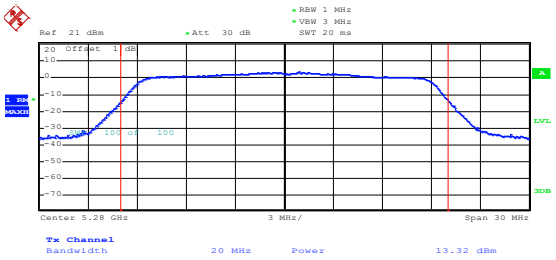
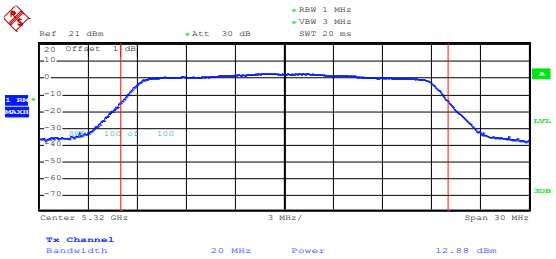
802.11a-Low	 Date: 18.FEB.2022 10:43:41
802.11a-Middle	 Date: 18.FEB.2022 10:44:15
802.11a-High	 Date: 18.FEB.2022 10:44:39

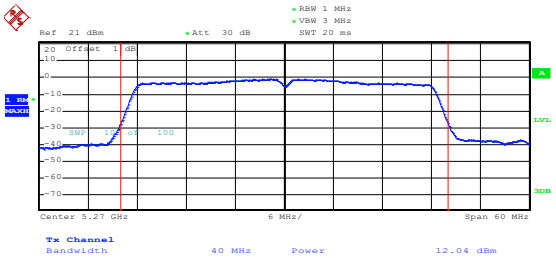
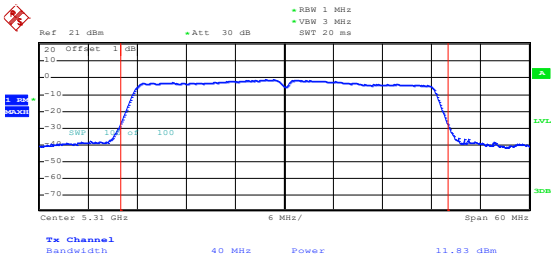
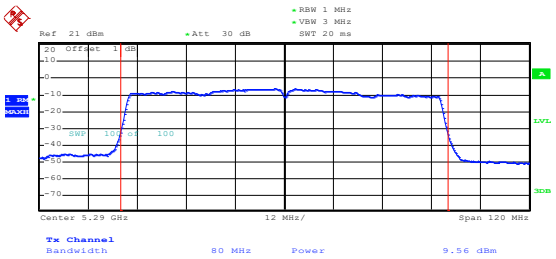
802.11n-HT20-Low	 Date: 18.FEB.2022 10:45:18
802.11n-HT20-Middle	 Date: 18.FEB.2022 10:45:43
802.11n-HT20-High	 Date: 18.FEB.2022 10:46:08

802.11n-HT40-Low	 Date: 18.FEB.2022 10:46:48
802.11n-HT40-High	 Date: 18.FEB.2022 10:47:23
802.11ac-VHT80-Low	 Date: 18.FEB.2022 16:49:36

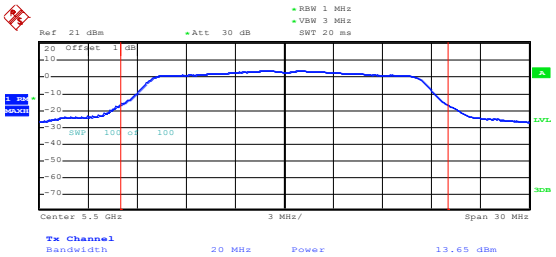
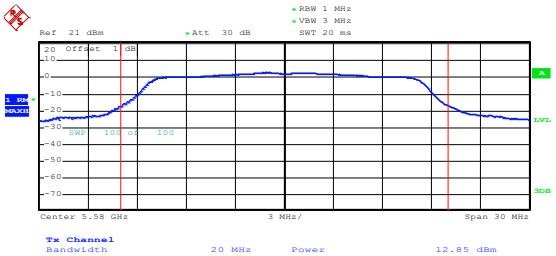
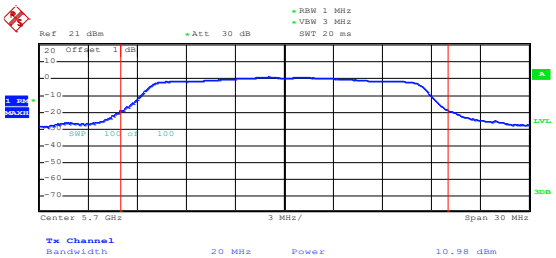
5250-5350MHz

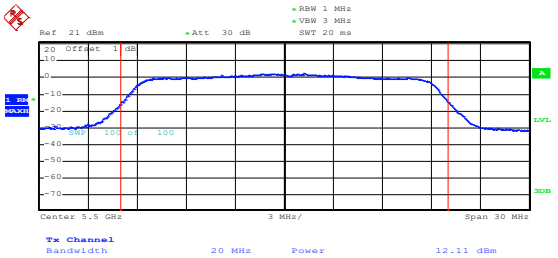
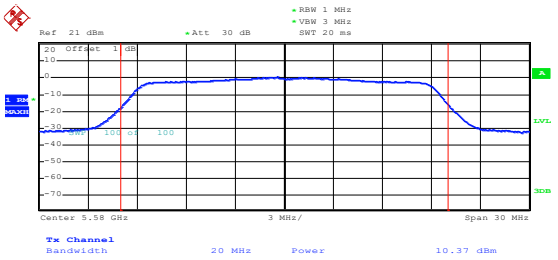
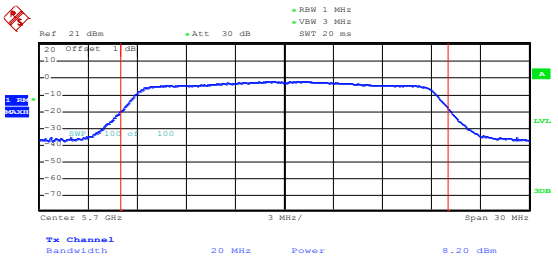
802.11a-Low	 Date: 18.FEB.2022 13:49:34
802.11a-Middle	 Date: 18.FEB.2022 13:49:55
802.11a-High	 Date: 18.FEB.2022 13:50:21

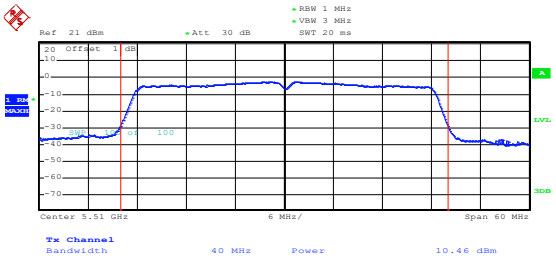
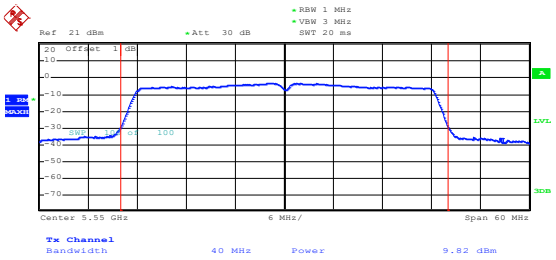
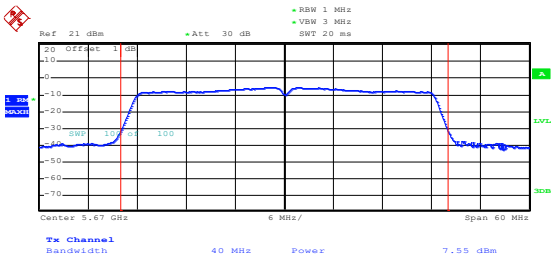
802.11n-HT20-Low	 Date: 18.FEB.2022 13:51:14
802.11n-HT20-Middle	 Date: 18.FEB.2022 13:51:46
802.11n-HT20-High	 Date: 18.FEB.2022 13:52:14

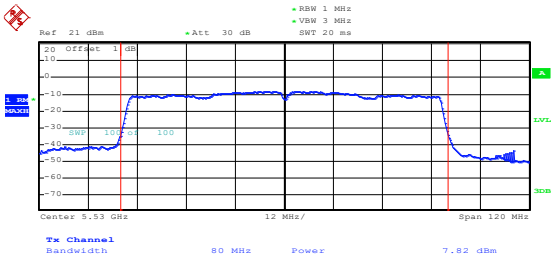
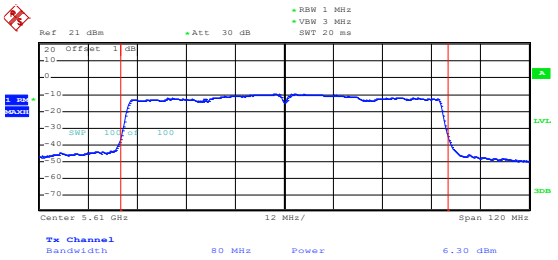
802.11n-HT40-Low	 Date: 18.FEB.2022 13:53:58
802.11n-HT40-High	 Date: 18.FEB.2022 13:54:31
802.11ac-VHT80-Low	 Date: 18.FEB.2022 16:51:15

5470-5725MHz

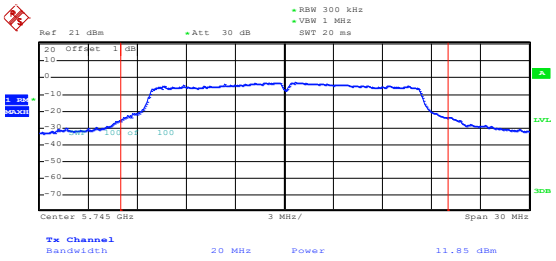
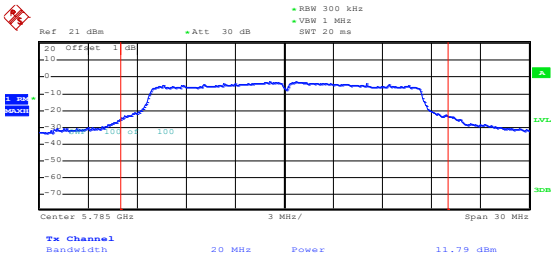
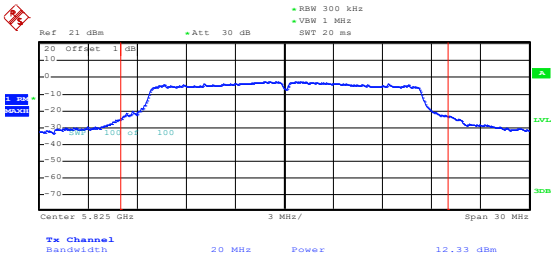
802.11a-Low	 Date: 18.FEB.2022 14:40:30
802.11a-Middle	 Date: 18.FEB.2022 14:41:35
802.11a-High	 Date: 18.FEB.2022 14:43:42

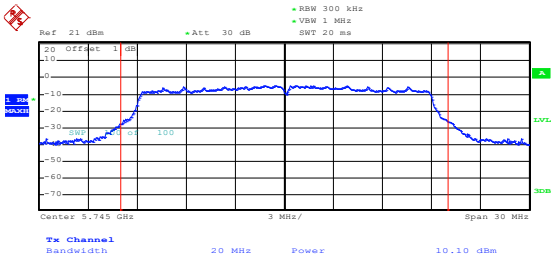
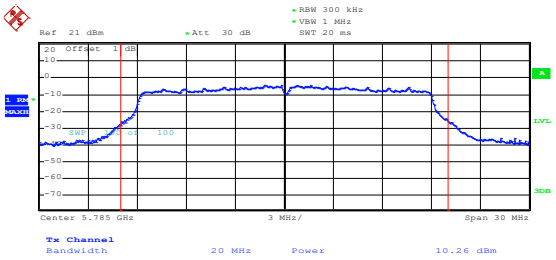
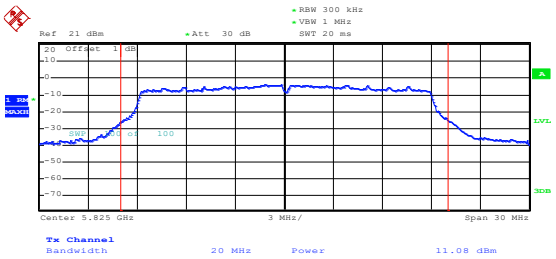
802.11n-HT20-Low	 Date: 18.FEB.2022 14:44:51
802.11n-HT20-Middle	 Date: 18.FEB.2022 14:45:31
802.11n-HT20-High	 Date: 18.FEB.2022 14:45:52

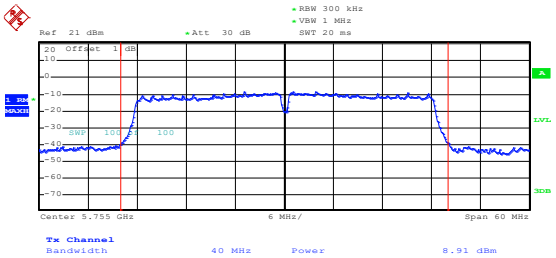
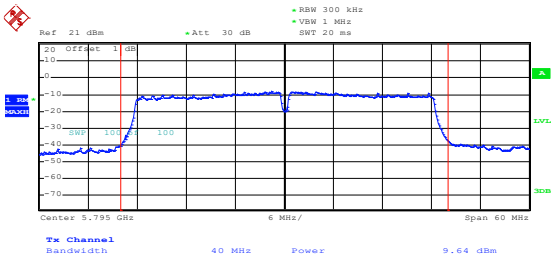
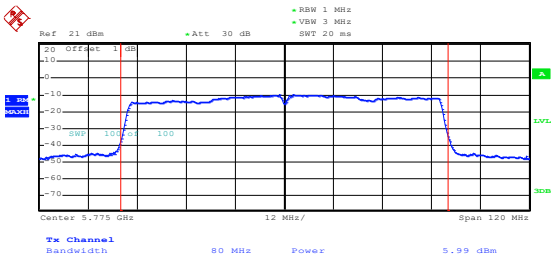
802.11n-HT40-Low	 Date: 18.FEB.2022 14:48:03
802.11n-HT40- Middle	 Date: 18.FEB.2022 14:49:20
802.11n-HT40-High	 Date: 18.FEB.2022 14:50:11

802.11ac-VHT80-Low	 Date: 18.FEB.2022 16:52:36
802.11ac-VHT80-High	 Date: 18.FEB.2022 16:58:04

5725-5850MHz

802.11a-Low	 Date: 18.FEB.2022 15:32:36
802.11a-Middle	 Date: 18.FEB.2022 15:33:01
802.11a-High	 Date: 18.FEB.2022 15:33:29

802.11n-HT20-Low	 Date: 18.FEB.2022 15:34:52
802.11n-HT20-Middle	 Date: 18.FEB.2022 15:35:25
802.11n-HT20-High	 Date: 18.FEB.2022 15:35:57

802.11n-HT40-Low	 Date: 18.FEB.2022 15:36:36
802.11n-HT40-High	 Date: 18.FEB.2022 15:39:14
802.11ac-VHT80-Low	 Date: 18.FEB.2022 17:00:56

APPENDIX D

Frequency Stability

U-NII-1:5150-5250MHz worst case at 802.11a middle channel

Voltage(%)	Power(VDC)	TEMP(℃)	Freq.Dev(Hz)	Deviation
100%		-30	3004	0.5777
100%		-20	3007	0.5783
100%		-10	3000	0.5769
100%		0	3005	0.5779
100%	12V	+10	3008	0.5785
100%		+20	3008	0.5785
100%		+30	3009	0.5787
100%		+40	3004	0.5777
100%		+50	3000	0.5769
Low Battery power	10.8V	+20	3002	0.5773
High Battery power	13.2V	+20	3006	0.5781

U-NII-2A: 5250-5350MHz worst case at 802.11a middle channel

Voltage(%)	Power(VDC)	TEMP(℃)	Freq.Dev(Hz)	Deviation
100%		-30	3000	0.5682
100%		-20	3005	0.5691
100%		-10	3010	0.5701
100%		0	3002	0.5686
100%	12V	+10	3002	0.5686
100%		+20	3003	0.5688
100%		+30	3006	0.5693
100%		+40	3006	0.5693
100%		+50	3005	0.5691
Low Battery power	10.8V	+20	3010	0.5701
High Battery power	13.2V	+20	3003	0.5688

U-NII-2C: 5470-5725MHz worst case at 802.11a middle channel

Voltage(%)	Power(VDC)	TEMP(℃)	Freq.Dev(Hz)	Deviation
100%		-30	3002	0.5361
100%		-20	3003	0.5363
100%		-10	3007	0.5370
100%		0	3010	0.5375
100%	12V	+10	3008	0.5371
100%		+20	3003	0.5363
100%		+30	3007	0.5370
100%		+40	3000	0.5357
100%		+50	3010	0.5375
Low Battery power	10.8V	+20	3009	0.5373
High Battery power	13.2V	+20	3002	0.5361

U-NII-3:5725-5850MHz worst case at 802.11a middle channel

Voltage(%)	Power(VDC)	TEMP(℃)	Freq.Dev(Hz)	Deviation
100%		-30	3002	0.5189
100%		-20	3009	0.5201
100%		-10	3003	0.5191
100%		0	3008	0.5200
100%	12V	+10	3008	0.5200
100%		+20	3007	0.5198
100%		+30	3004	0.5193
100%		+40	3005	0.5194
100%		+50	3006	0.5196
Low Battery power	10.8V	+20	3007	0.5198
High Battery power	13.2V	+20	3010	0.5203

APPENDIX PHOTOGRAPHS

Please refer to "ANNEX"

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