TEST REPORT

Reference No.	:	WTH23X05102867W001
FCC ID	:	2A7HY-DGE6
Applicant	:	Dragonglass Technology (SHENZHEN) Co., Ltd.
Address	:	Floor 4, No. 128, Potou Du West Road, Longxi community, Longgang street, Longgang District, Shenzhen, Guangdong
Manufacturer	:	The same as Applicant
Address	:	The same as Applicant
Product Name	:	Repeater
Model No.	:	DGE6
Standards	:	FCC Part 15.407
Date of Receipt sample	:	2023-05-12
Date of Test	:	2023-05-12 to 2023-06-14
Date of Issue	:	2023-06-14
Test Report Form No.	:	WTX_Part 15_407W
Test Result	:	**Pass**

Remarks:

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

Prepared By:

Waltek Testing Group (Shenzhen) Co., Ltd.

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

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

Tested by:

Dashan Chen

Approved by:

Silin Chen

TABLE OF CONTENTS

Report version

Version No.	Date of issue	Description
Rev.00	2023-06-14	Original
/	/	/

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

General Description of EUT	
Product Name:	Repeater
Trade Name:	Dragonglass
Model No.:	DGE6
Adding Model(s):	/
Rated Voltage:	AC120V
Battery Capacity:	/
Power Adapter:	/
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:	5725-5850MHz
RF Output Power:	Antenna 0:14.77dBm (Conducted) Antenna 1:14.75dBm (Conducted)
Type of Modulation:	QPSK, 16QAM, 64QAM,256QAM
Type of Antenna:	FPC Antenna
Antenna Gain:	4.63dBi
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.
KDB662911 D01 Multiple Transmitter Output v02r01: Emissions Testing of Transmitters with Multiple Outputs in the Same Band.

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

1.3 Test Methodology

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

1.4 Table for parameters of Test Software setting

Enter fixed frequency mode by connecting network port with command, 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	5280	5320	5500	5600	5700	5745	5785	5825
802.11a 6Mbps	/	/	/	/	/	/	/	/	/	1700	1800	1800
802.11n-HT20 MCS0	/	/	/	/	/	/	/	/	/	1600	1700	1700
Mode	NCB: 40MHz											
	5190	5230	5270	5310	5510	5590	5670	5755	5795			
802.11n-HT40 MCS0	/	/	/	/	/	/	/	1500	1600			
Mode	NCB: 80MHz											
	5210		5290		5530		5610		5775			
802.11ac-VH80 MCS0/Nss2	/		/		/		/		1400			

1.5 EUT Operating during test

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

1.6 Test Facility

Address of the test laboratory

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

Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, P.R.C. (518101）

FCC – Registration No.: 125990

Waltek Testing Group (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is mai ntained in our files. The Designation Number is CN5010, and Test Firm Registration Number is 125990.

Industry Canada (IC) Registration No.: 11464A

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

1.7 EUT Setup and Test Mode

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

Test Mode List		
Test Mode	Description	Remark
TM1	802.11a	5745MHz, 5785MHz,5825MHz
TM2	802.11n-HT20	5745MHz, 5785MHz,5825MHz
TM3	802.11n-HT40	5755MHz,5795MHz
TM4	802.11ac-VH80	5775MHz
Note1 : All test modes (different data rate and different modulation) are performed, but only the worst case is recorded in this report; 802.11ac-VHT20, 802.11ac-VHT40 covered by 802.11n-HT20 and 802.11n-HT40. Note 2: The 5GHz WIFI has two antennas and support Multiple Outputs for 802.11n/ac mode for this report; For 5725-5850MHz: Antenna 1 Gain is 4.63dBi; Antenna 2 Gain is 4.63dBi; According to KDB 662911, for same directional gain: For 5725-5850MHz: Directional gain = G_{ANT} + 10 log(N_{ANT}) dBi =4.63dBi +10log(2) dBi=7.64dBi		

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
/	/	/	/

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
Network Cable	1.0	Unshielded	Without Ferrite

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
Router	TP-LINK	TL-WR842N	13809116014

1.8 Measurement Uncertainty

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

1.9 Test Equipment List and Details

Fixed asset Number	Description	Manufacturer	Model	Serial No.	Cal Date	Due. Date
WTXE1041A1001	Communication Tester	Rohde & Schwarz	CMW500	148650	2023-02-25	2024-02-24
WTXE1022A1002	GSM Tester	Rohde & Schwarz	CMU200	114403	2023-02-25	2024-02-24
WTXE1005A1005	Spectrum Analyzer	Agilent	N9020A	US47140102	2023-02-25	2024-02-24
WTXE1084A1001	Spectrum Analyzer	Agilent	N9020A	MY54320548	2023-02-25	2024-02-24
WTXE1044A1001	Signal Generator	Agilent	83752A	3610A01453	2023-02-25	2024-02-24
WTXE1045A1001	Vector Signal Generator	Agilent	N5182A	MY47070202	2023-02-25	2024-02-24
WTXE1018A1001	Power Divider	Weinschel	1506A	PM204	2023-02-25	2024-02-24
WTXE1045A1001	Power Divider	RF-Lambda	RFLT4W5M18G	14110400027	2023-02-25	2024-02-24
☒Chamber A: Below 1GHz						
WTXE1005A1003	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2023-02-25	2024-02-24
WTXE1007A1001	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2023-02-25	2024-02-24
WTXE1007A1001	Amplifier	HP	8447F	2805A03475	2023-02-25	2024-02-24
WTXE1010A1007	Loop Antenna	Schwarz beck	FMZB 1516	9773	2021-03-20	2024-03-19
WTXE1010A1006	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2023-03-20	2026-03-19
☒Chamber A: Above 1GHz						
WTXE1005A1003	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2023-02-25	2024-02-24
WTXE1007A1001	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2023-02-25	2024-02-24
WTXE1065A1001	Amplifier	C&D	PAP-1G18	14918	2023-02-25	2024-02-24
WTXE1010A1005	Horn Antenna	ETS	3117	00086197	2021-03-19	2024-03-18
WTXE1010A1010	DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2021-03-19	2024-03-18

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

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

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

2. SUMMARY OF TEST RESULTS

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

N/A: Not applicable.

3. Antenna Requirement

3.1 Standard Applicable

According to FCC Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

3.2 Evaluation Information

This product has two FPC Antennas, fulfill the requirement of this section.

4. Automatically Discontinue Transmission

4.1 Standard Applicable

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

4.2 Summary of Test Results

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

5. Power Spectral Density

5.1 Standard Applicable

Section 15.407(a) Power limits:

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

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

5.2 Test Procedure

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

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

a) Set RBW ≥ 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 1MHz, 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 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 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 6dB emission bandwidth of at least 500KHz for the band 5.715-5.85GHz. The following procedure shall be used for measuring this bandwidth:
a) Set RBW = 100kHz.
b) Set the video bandwidth (VBW) ≥ 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 6 dB relative to the maximum level measured in the fundamental emission.
Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described above.

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

The following procedure shall be used for measuring (99 %) power bandwidth:
1. Set center frequency to the nominal EUT channel center frequency.
2. Set span = 1.5 times to 5.0 times the OBW.
3. Set RBW = 1 % to 5 % of the OBW
4. Set VBW ≥ 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 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 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 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

7.3 Summary of Test Results/Plots

Please refer to Appendix C

8. Radiated Spurious Emissions

8.1 Standard Applicable

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

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

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

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

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

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

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

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

789033 D02 v02r01 General UNII Test Procedures New Rules v01

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

EIRP = ((E*d)^2) / 30

where:

• E is the field strength in V/m;

• d is the measurement distance in meters;

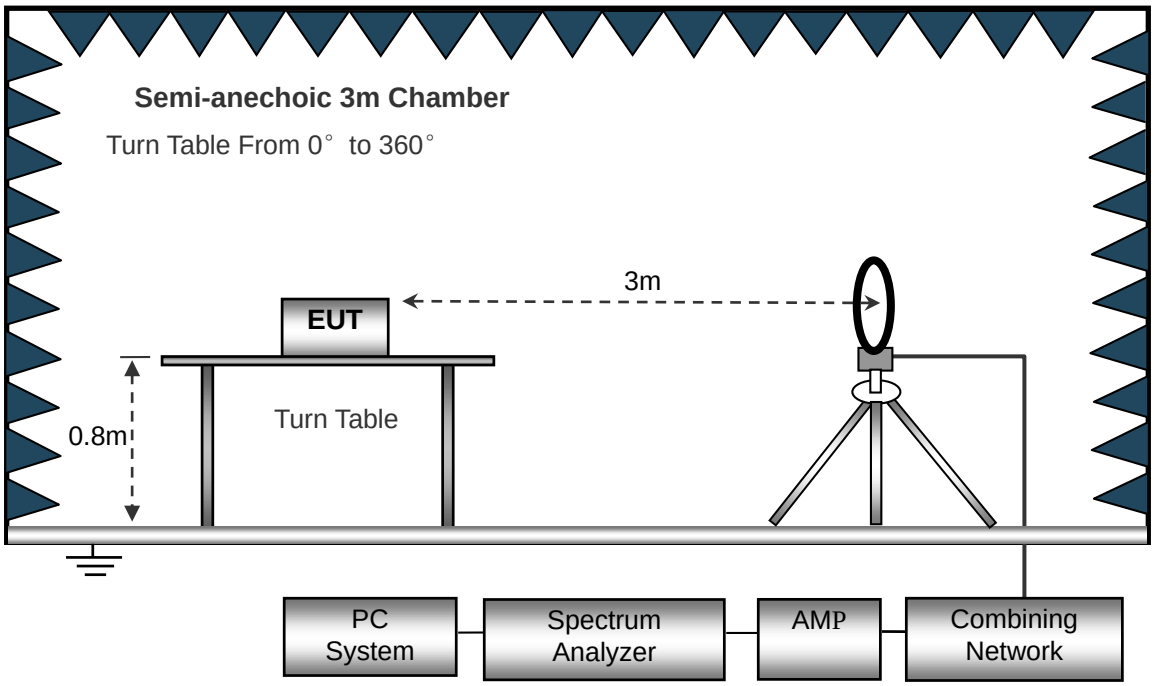
• EIRP is the equivalent isotropically radiated power in watts.

8.2 Test Procedure

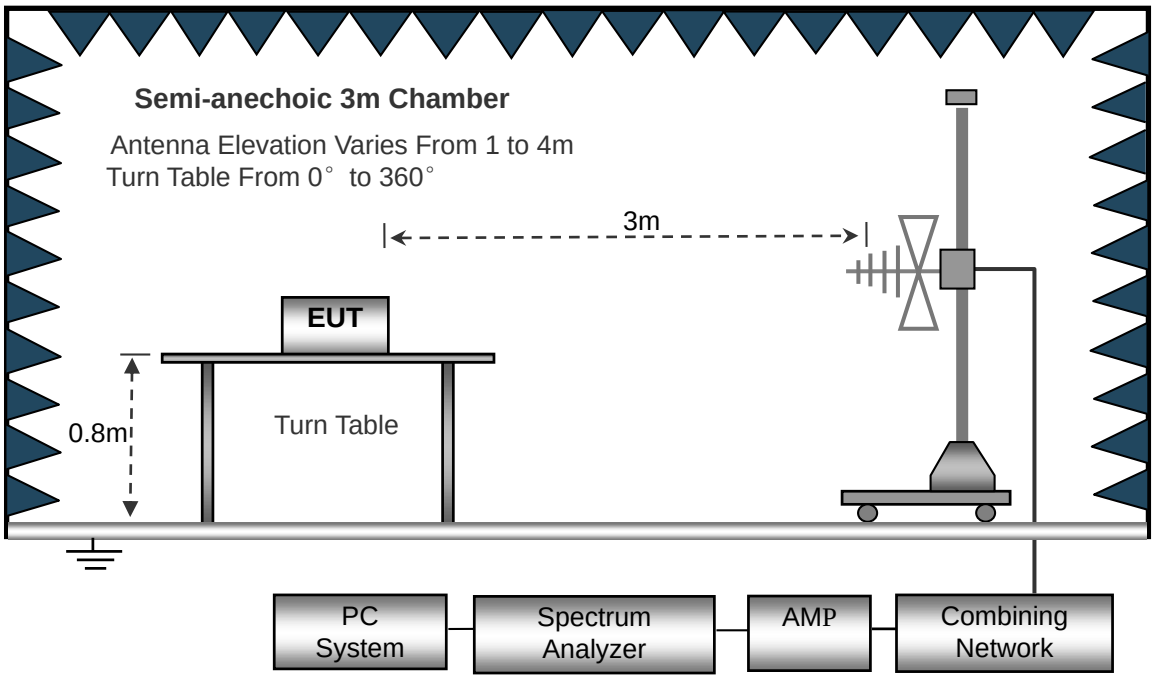
The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.205 15.407(b)(6) and FCC Part 15.209 Limit..

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

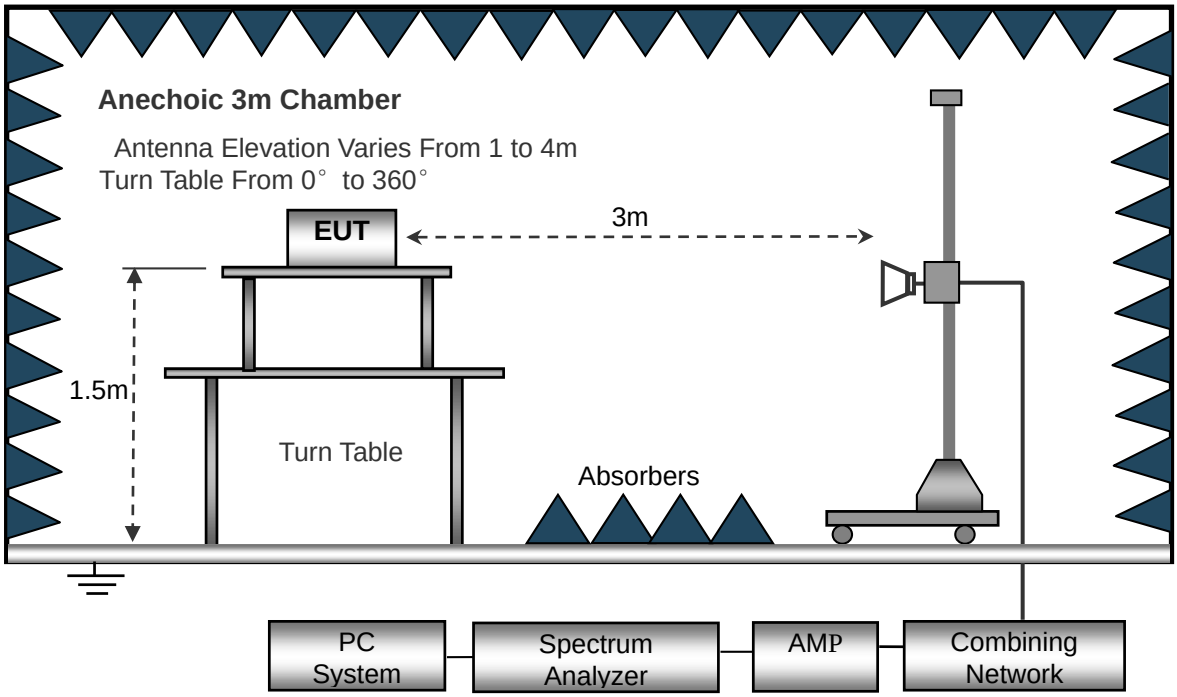
The test setup for emission measurement below 30MHz.



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



The test setup for emission measurement above 1GHz.



8.3 Test Receiver Setup

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

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

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

8.4 Corrected Amplitude & Margin Calculation

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

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

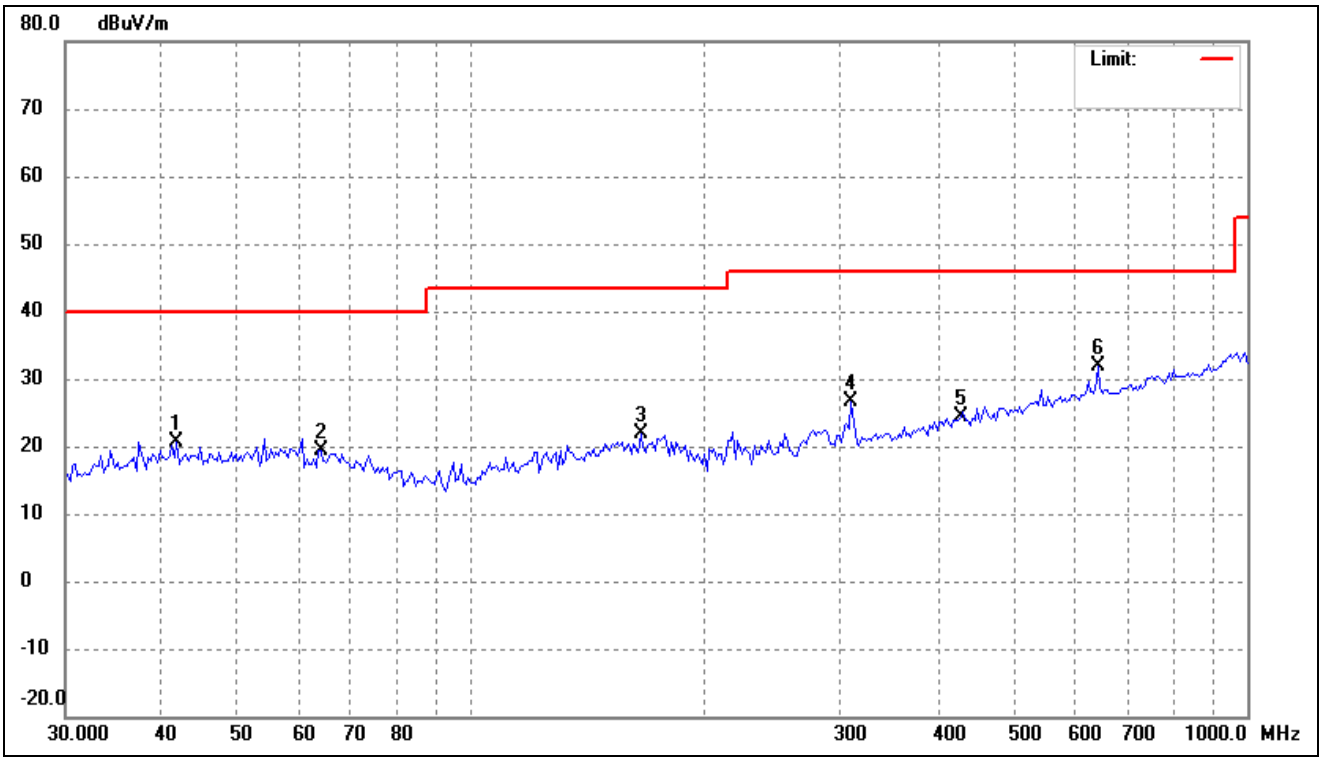
Note: *this EUT was tested in 3 orthogonal positions and the worst case position data was reported.*

- Spurious Emission From 30MHz to 1GHz

- Antenna 0(worst case)

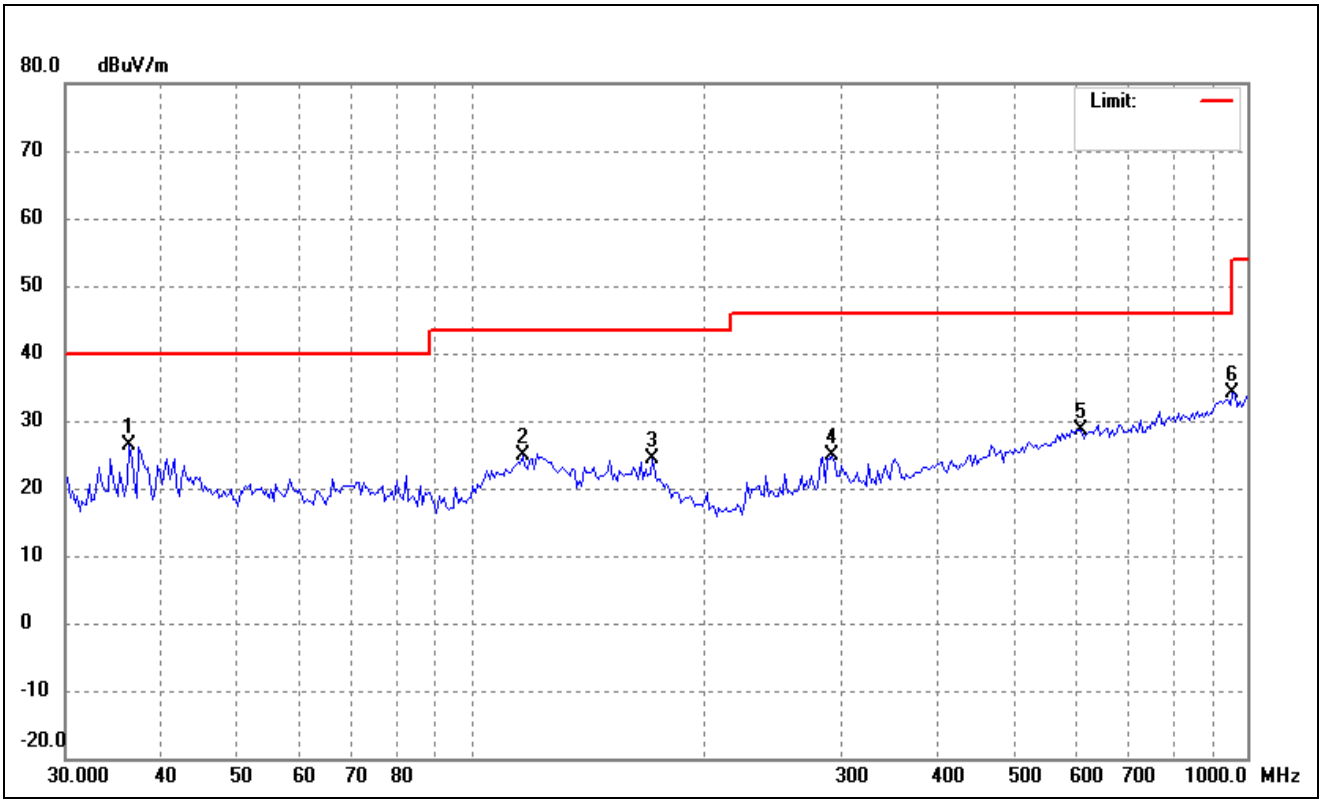
5725-5850MHz

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



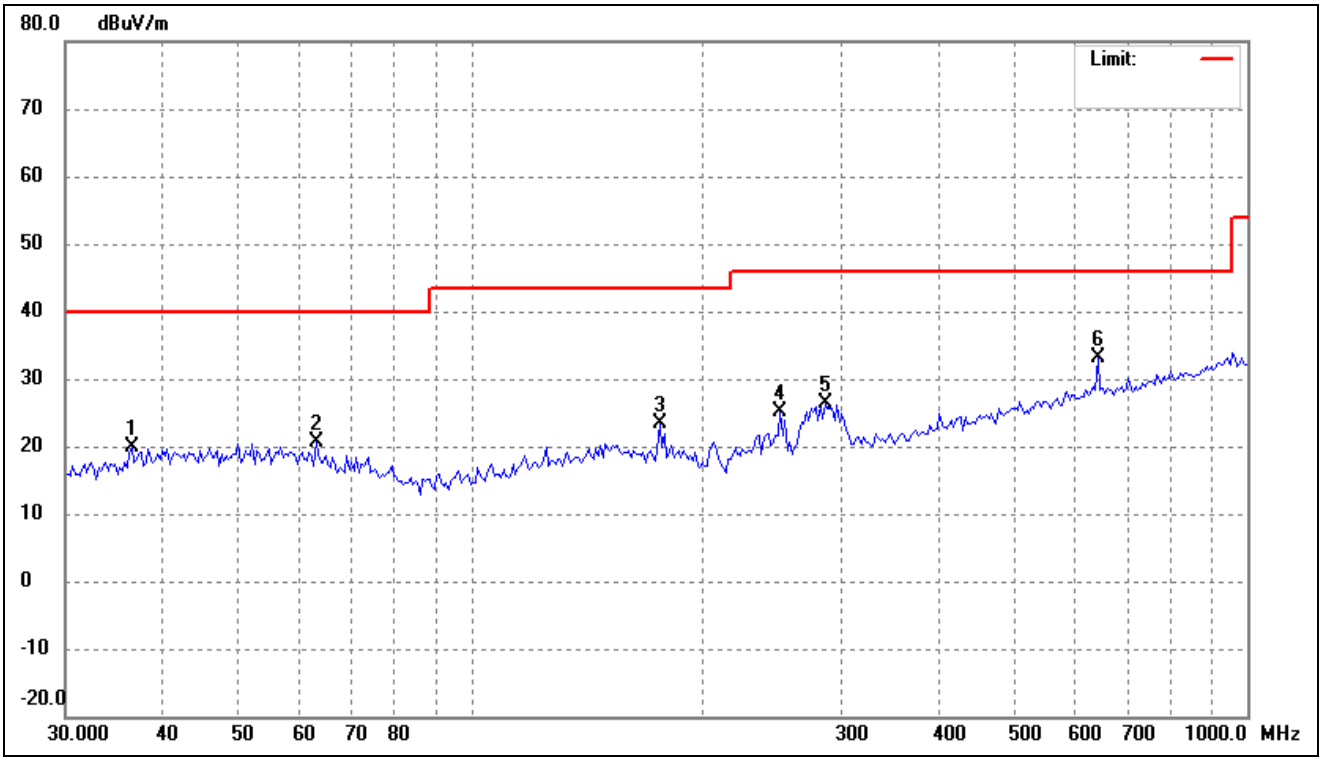
No.	Frequency	Reading	Corr.	Result	Limit	Margin	Deg.	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	41.7406	29.09	-8.47	20.62	40.00	-19.38	-	-	peak
2	64.0800	29.11	-9.68	19.43	40.00	-20.57	-	-	peak
3	165.4716	30.67	-8.76	21.91	43.50	-21.59	-	-	peak
4	309.2710	34.63	-8.00	26.63	46.00	-19.37	-	-	peak
5	427.2920	29.49	-5.22	24.27	46.00	-21.73	-	-	peak
6	642.2923	33.19	-1.33	31.86	46.00	-14.14	-	-	peak

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



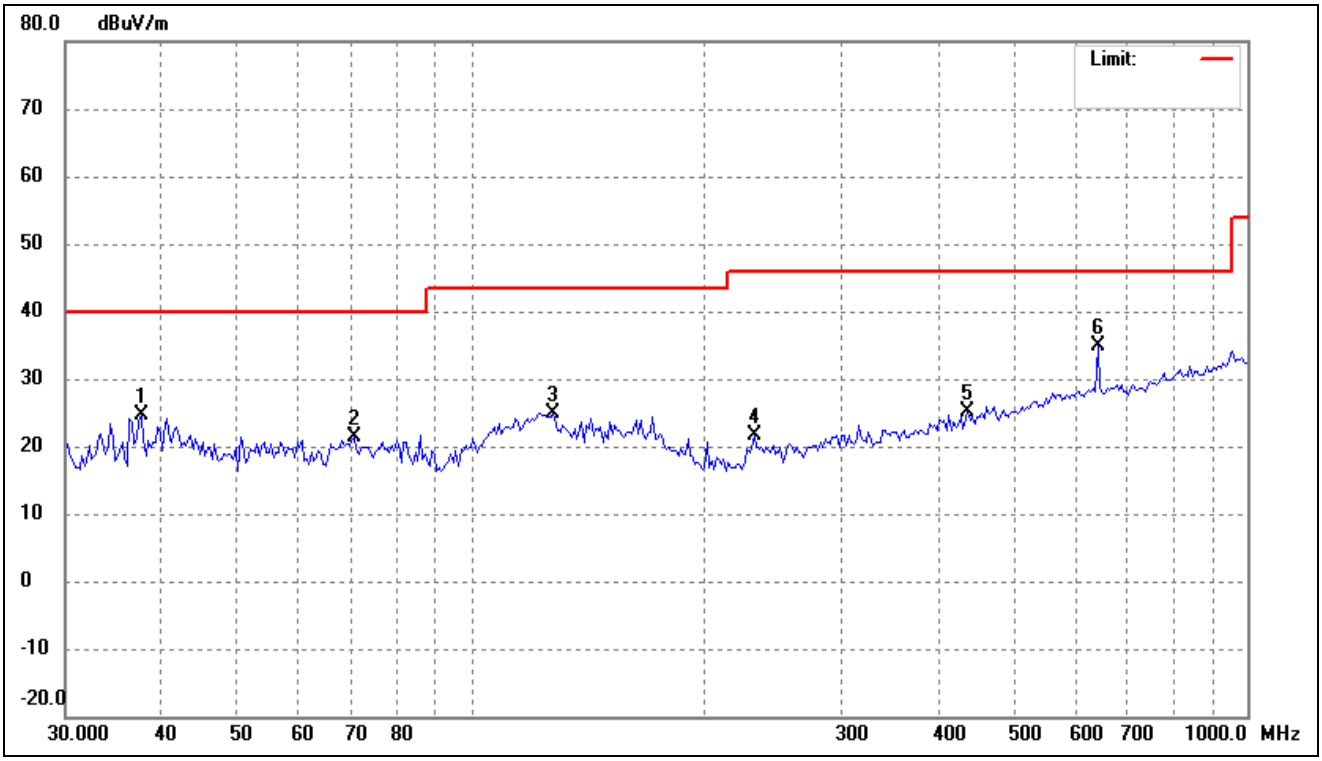
No.	Frequency	Reading	Corr.	Result	Limit	Margin	Deg.	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	36.2678	35.71	-9.28	26.43	40.00	-13.57	-	-	peak
2	116.4476	35.87	-10.90	24.97	43.50	-18.53	-	-	peak
3	171.3890	33.50	-9.08	24.42	43.50	-19.08	-	-	peak
4	292.3643	33.41	-8.52	24.89	46.00	-21.11	-	-	peak
5	611.4623	30.24	-1.59	28.65	46.00	-17.35	-	-	peak
6	958.7135	31.79	2.26	34.05	46.00	-11.95	-	-	peak

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



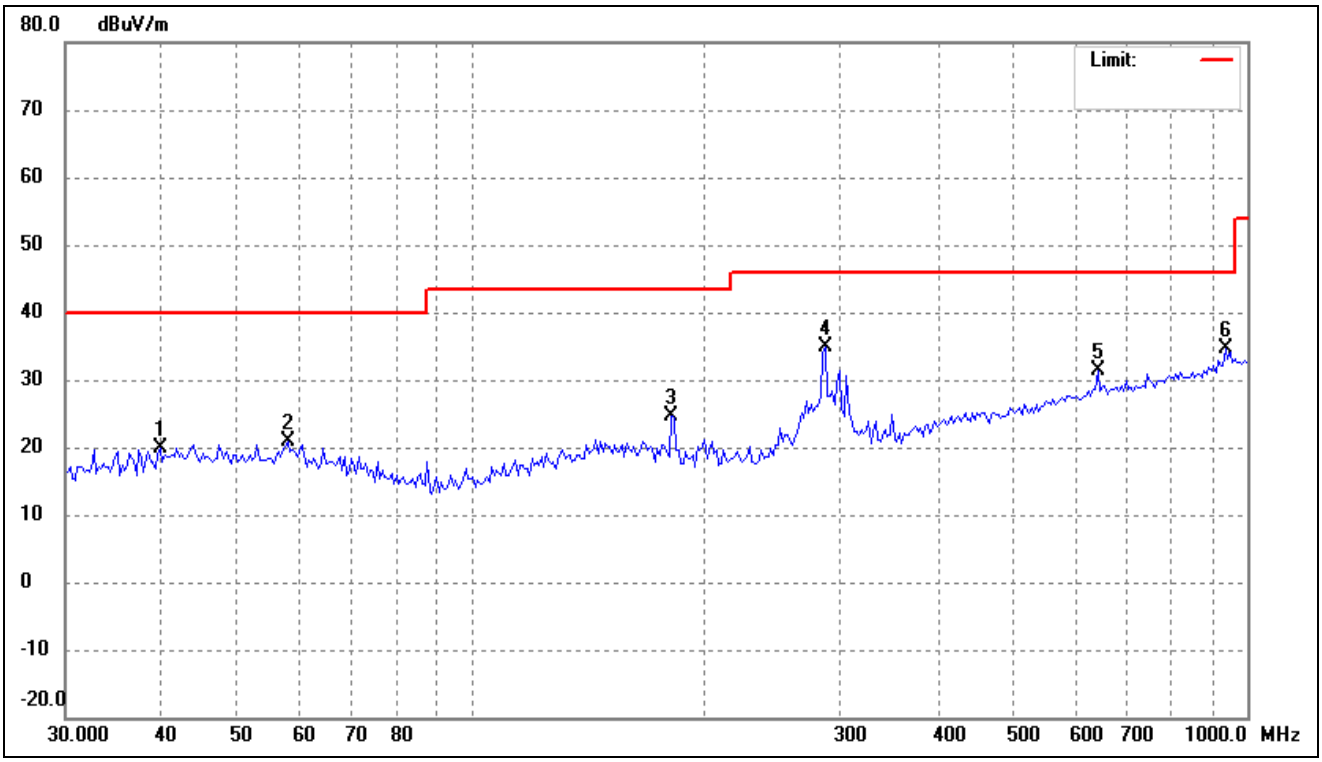
No.	Frequency	Reading	Corr.	Result	Limit	Margin	Deg.	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	36.5236	29.11	-9.22	19.89	40.00	-20.11	-	-	peak
2	63.1857	30.14	-9.52	20.62	40.00	-19.38	-	-	peak
3	175.0404	33.07	-9.61	23.46	43.50	-20.04	-	-	peak
4	250.4859	35.39	-10.18	25.21	46.00	-20.79	-	-	peak
5	286.2653	35.15	-8.72	26.43	46.00	-19.57	-	-	peak
6	642.2923	34.49	-1.33	33.16	46.00	-12.84	-	-	peak

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



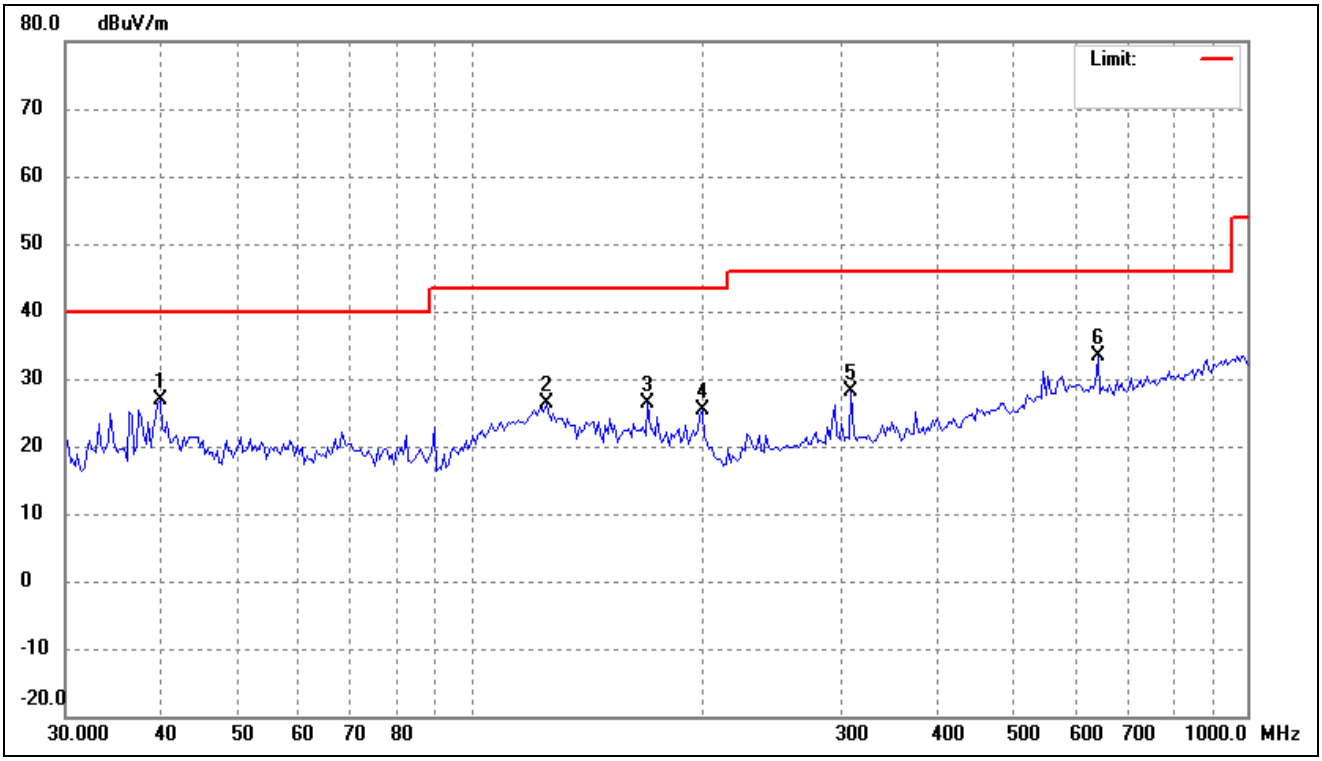
No.	Frequency	Reading	Corr.	Result	Limit	Margin	Deg.	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	37.5648	33.54	-9.00	24.54	40.00	-15.46	-	-	peak
2	70.7047	32.37	-10.92	21.45	40.00	-18.55	-	-	peak
3	127.5865	34.98	-10.01	24.97	43.50	-18.53	-	-	peak
4	231.8531	33.01	-11.43	21.58	46.00	-24.42	-	-	peak
5	436.3956	30.09	-4.96	25.13	46.00	-20.87	-	-	peak
6	642.2923	36.10	-1.33	34.77	46.00	-11.23	-	-	peak

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



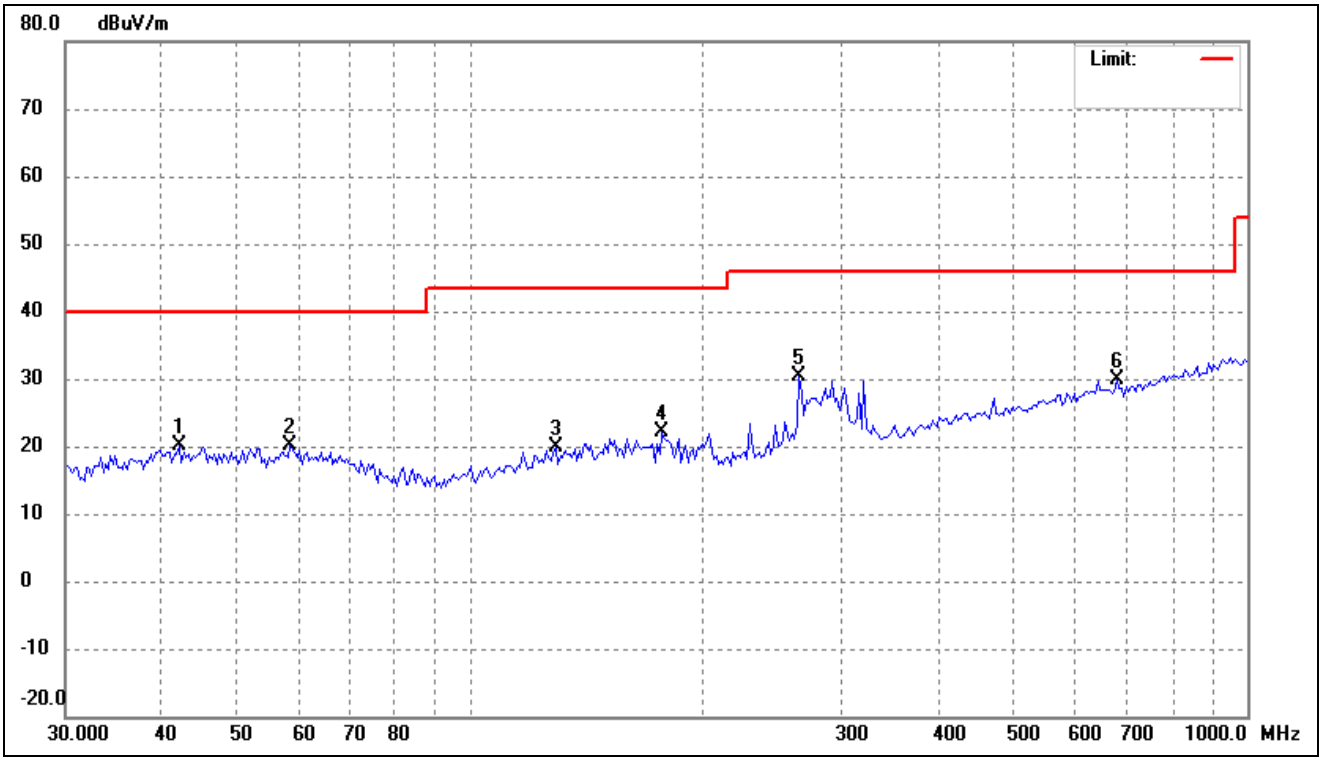
No.	Frequency	Reading	Corr.	Result	Limit	Margin	Deg.	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	39.7371	28.35	-8.54	19.81	40.00	-20.19	-	-	peak
2	58.0759	29.67	-8.82	20.85	40.00	-19.15	-	-	peak
3	181.3000	34.99	-10.46	24.53	43.50	-18.97	-	-	peak
4	286.2653	43.59	-8.72	34.87	46.00	-11.13	-	-	peak
5	642.2923	32.78	-1.33	31.45	46.00	-14.55	-	-	peak
6	938.7139	32.59	2.01	34.60	46.00	-11.40	-	-	peak

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



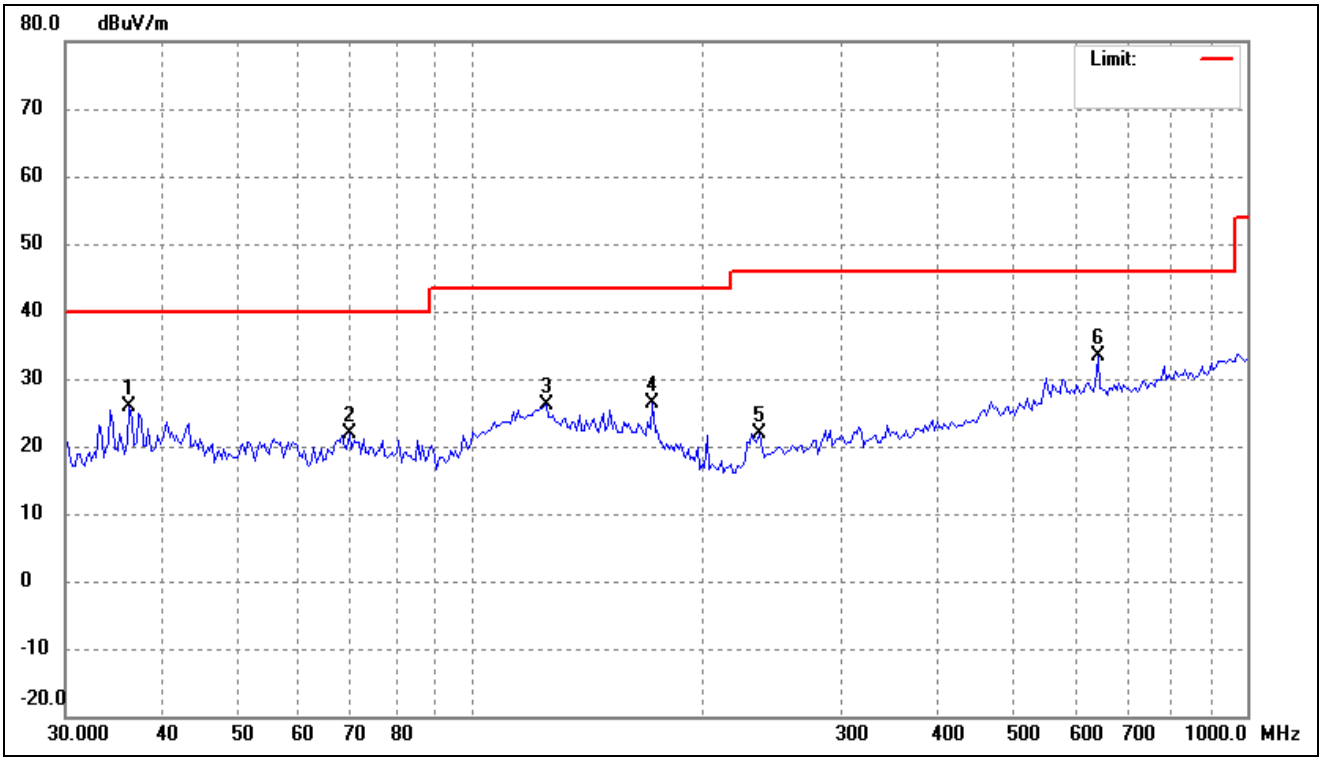
No.	Frequency	Reading	Corr.	Result	Limit	Margin	Deg.	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	39.7371	35.31	-8.54	26.77	40.00	-13.23	-	-	peak
2	124.9249	36.55	-10.19	26.36	43.50	-17.14	-	-	peak
3	168.9970	35.25	-8.85	26.40	43.50	-17.10	-	-	peak
4	198.6424	37.17	-11.91	25.26	43.50	-18.24	-	-	peak
5	309.2710	36.15	-8.00	28.15	46.00	-17.85	-	-	peak
6	642.2923	34.74	-1.33	33.41	46.00	-12.59	-	-	peak

802.11ac-HT80			
Test Channel	5775MHz(worst case)	Polarity:	Horizontal



No.	Frequency	Reading	Corr.	Result	Limit	Margin	Deg.	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	42.0350	28.63	-8.47	20.16	40.00	-19.84	-	-	peak
2	58.4855	28.85	-8.84	20.01	40.00	-19.99	-	-	peak
3	128.4862	29.76	-9.96	19.80	43.50	-23.70	-	-	peak
4	176.2748	31.92	-9.78	22.14	43.50	-21.36	-	-	peak
5	264.9709	40.04	-9.55	30.49	46.00	-15.51	-	-	peak
6	679.4346	31.17	-1.23	29.94	46.00	-16.06	-	-	peak

802.11ac-HT80			
Test Channel	5775MHz(worst case)	Polarity:	Vertical



No.	Frequency	Reading	Corr.	Result	Limit	Margin	Deg.	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	36.2678	35.17	-9.28	25.89	40.00	-14.11	-	-	peak
2	69.7179	32.53	-10.71	21.82	40.00	-18.18	-	-	peak
3	124.9249	36.27	-10.19	26.08	43.50	-17.42	-	-	peak
4	171.3890	35.41	-9.08	26.33	43.50	-17.17	-	-	peak
5	235.1346	32.98	-11.08	21.90	46.00	-24.10	-	-	peak
6	642.2923	34.75	-1.33	33.42	46.00	-12.58	-	-	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.

- For the frequency band For the frequency band 5.725-5.850GHz (802.11a)
- Antenna 0(worst case)
- 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 (5745MHz)							
11490	55.17	9.45	64.62	74	-9.38	H	PK
11490	38.13	9.45	47.58	54	-6.42	H	AV
11490	58.12	9.45	67.57	74	-6.43	V	PK
11490	39.73	9.45	49.18	54	-4.82	V	AV
Middle Channel (5785MHz)							
11570	57.88	9.62	67.50	74	-6.50	H	PK
11570	40.54	9.62	50.16	54	-3.84	H	AV
11570	58.71	9.62	68.33	74	-5.67	V	PK
11570	41.45	9.62	51.07	54	-2.93	V	AV
High Channel (5825MHz)							
11650	55.05	9.84	64.89	74	-9.11	H	PK
11650	41.43	9.84	51.27	54	-2.73	H	AV
11650	55.30	9.84	65.14	74	-8.86	V	PK
11650	38.84	9.84	48.68	54	-5.32	V	AV

- Out of Band edge for 5725-5850MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5650	-42.16	-27
	5650 to 5700	-36.65	-27 to -17
	5700 to 5720	-29.21	-17 to 15.6
	5720 to 5725	-18.69	15.6 to 27
Highest	5850 to 5855	-14.32	27 to 15.6
	5855 to 5875	-26.21	15.6 to -17
	5875 to 5925	-35.98	-17 to -27
	Above 5925	-40.06	-27
Note: the data just list the worst cases			

- For the frequency band 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 (5745MHz)							
11490	58.34	9.45	67.79	74	-6.21	H	PK
11490	40.77	9.45	50.22	54	-3.78	H	AV
11490	58.16	9.45	67.61	74	-6.39	V	PK
11490	38.97	9.45	48.42	54	-5.58	V	AV
Middle Channel (5785MHz)							
11570	57.97	9.62	67.59	74	-6.41	H	PK
11570	38.44	9.62	48.06	54	-5.94	H	AV
11570	56.06	9.62	65.68	74	-8.32	V	PK
11570	38.88	9.62	48.50	54	-5.50	V	AV
High Channel (5825MHz)							
11650	55.58	9.84	65.42	74	-8.58	H	PK
11650	40.79	9.84	50.63	54	-3.37	H	AV
11650	58.56	9.84	68.40	74	-5.60	V	PK
11650	40.42	9.84	50.26	54	-3.74	V	AV

- Out of Band edge for 5725-5850MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5650	-45.35	-27
	5650 to 5700	-37.59	-27 to -17
	5700 to 5720	-28.65	-17 to 15.6
	5720 to 5725	-17.33	15.6 to 27
Highest	5850 to 5855	-15.49	27 to 15.6
	5855 to 5875	-27.13	15.6 to -17
	5875 to 5925	-35.68	-17 to -27
	Above 5925	-39.16	-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 5.725-5.850GHz (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 (5755MHz)							
11510	57.49	9.45	66.94	74	-7.06	H	PK
11510	38.95	9.45	48.40	54	-5.60	H	AV
11510	56.61	9.45	66.06	74	-7.94	V	PK
11510	40.99	9.45	50.44	54	-3.56	V	AV
High Channel (5795MHz)							
11590	58.26	9.27	67.53	74	-6.47	H	PK
11590	38.16	9.27	47.43	54	-6.57	H	AV
11590	55.59	9.27	64.86	74	-9.14	V	PK
11590	40.73	9.27	50.00	54	-4.00	V	AV

- Out of Band edge for 5725-5850MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5650	-46.54	-27
	5650 to 5700	-37.09	-27 to -17
	5700 to 5720	-28.47	-17 to 15.6
	5720 to 5725	-19.16	15.6 to 27
Highest	5850 to 5855	-14.39	27 to 15.6
	5855 to 5875	-27.57	15.6 to -17
	5875 to 5925	-34.92	-17 to -27
	Above 5925	-39.81	-27
Note: the data just list the worst cases			

- For the frequency band 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	
5775MHz							
11550	57.84	9.93	67.77	74	-6.23	H	PK
11550	38.75	9.93	48.68	54	-5.32	H	AV
11550	56.70	9.93	66.63	74	-7.37	V	PK
11550	40.82	9.93	50.75	54	-3.25	V	AV

- Out of Band edge for 5725-5850MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5650	-45.57	-27
	5650 to 5700	-35.65	-27 to -17
	5700 to 5720	-29.34	-17 to 15.6
	5720 to 5725	-18.15	15.6 to 27
Highest	5850 to 5855	-14.49	27 to 15.6
	5855 to 5875	-26.56	15.6 to -17
	5875 to 5925	-35.38	-17 to -27
	Above 5925	-39.41	-27
Note: the data just list the worst cases			

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

9. Frequency Stability

9.1 Standard Applicable

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

9.2 Test Procedure

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

9.3 Summary of Test Results/Plots

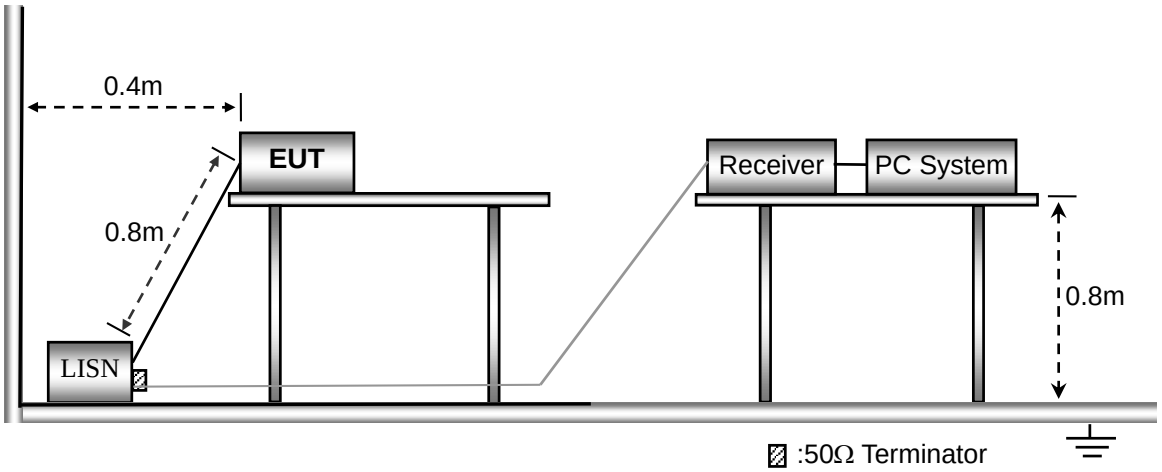
Please refer to Appendix D

10 Conducted Emissions

10.1 Test Procedure

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

10.2 Basic Test Setup Block Diagram



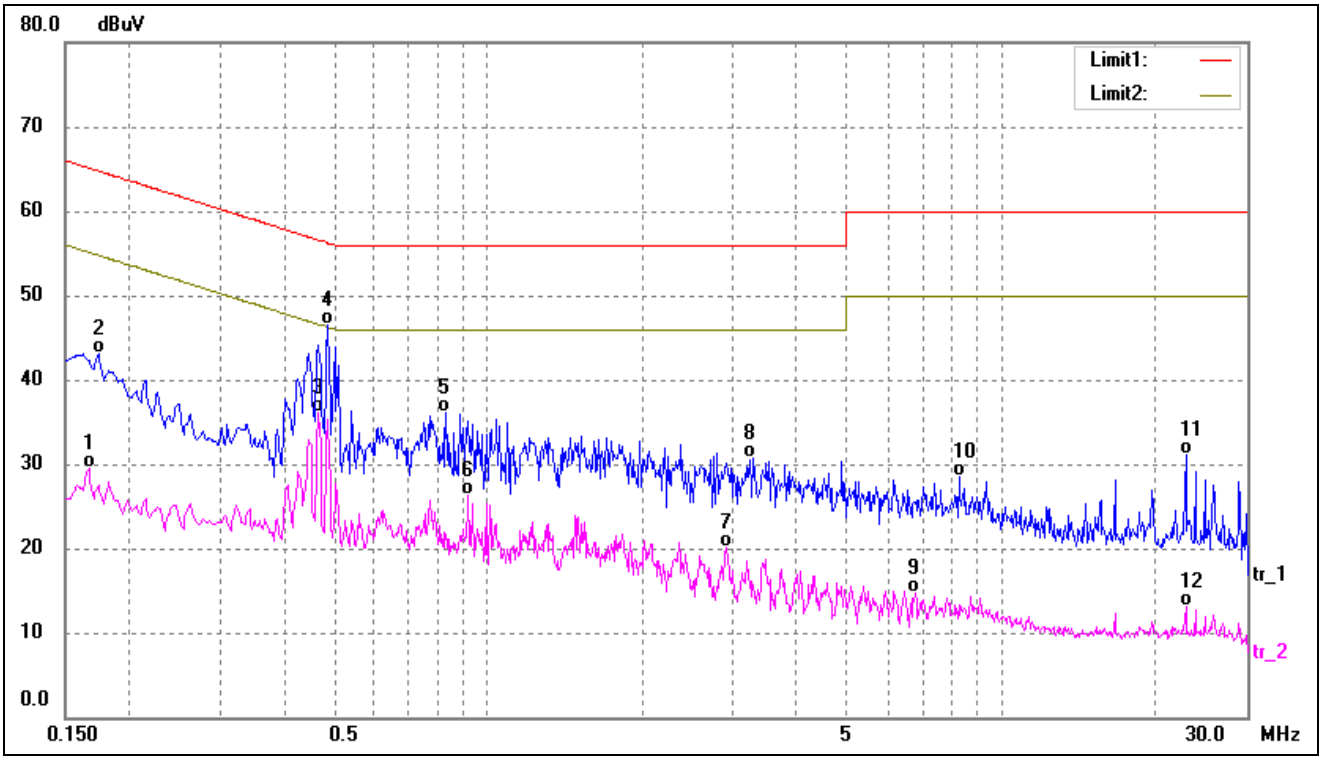
10.3 Test Receiver Setup

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

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

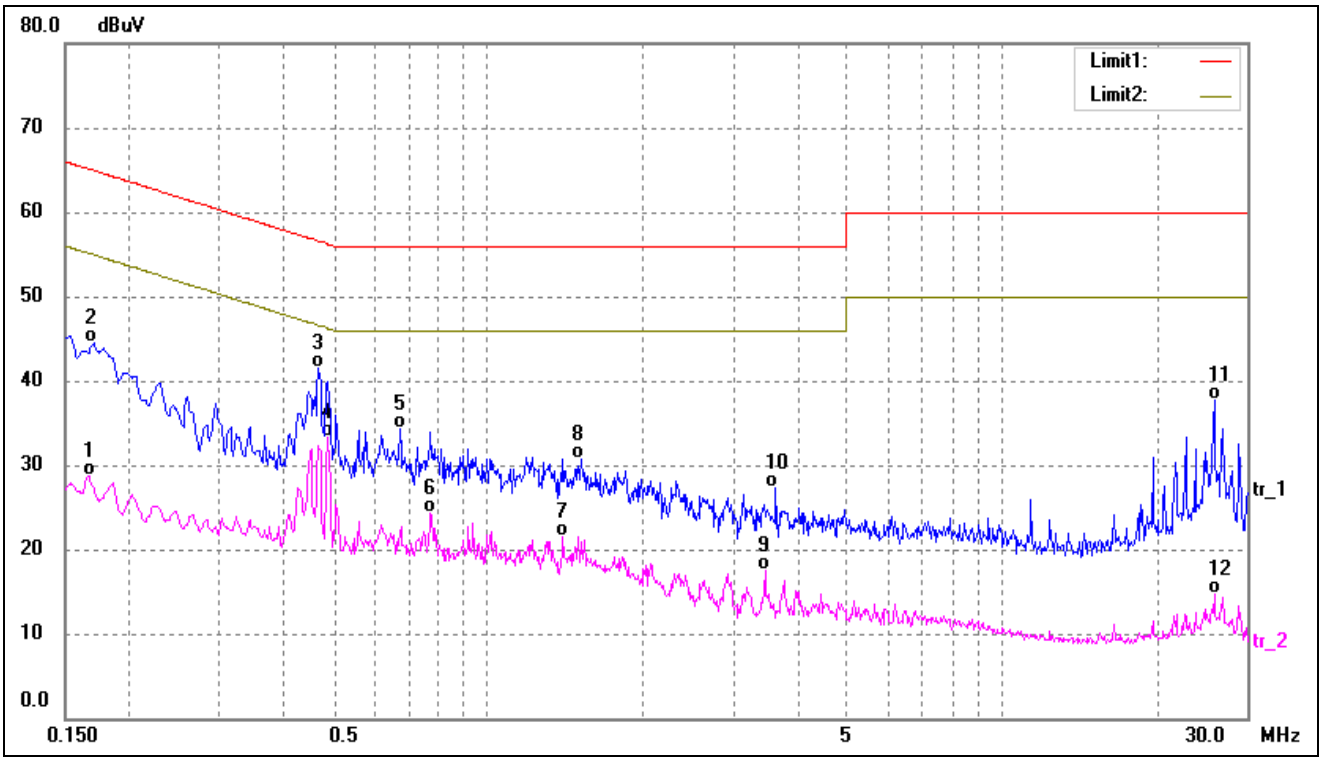
10.4 Summary of Test Results/Plots

Test Mode	Communication	AC120V 60Hz	Polarity:	Neutral



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dB)	
1	0.1660	19.03	10.40	29.43	55.15	-25.72	AVG
2	0.1740	32.72	10.39	43.11	64.76	-21.65	QP
3	0.4660	25.80	10.25	36.05	46.58	-10.53	AVG
4*	0.4860	36.27	10.23	46.50	56.24	-9.74	QP
5	0.8300	25.94	10.17	36.11	56.00	-19.89	QP
6	0.9140	16.06	10.15	26.21	46.00	-19.79	AVG
7	2.9140	9.69	10.35	20.04	46.00	-25.96	AVG
8	3.2780	20.42	10.35	30.77	56.00	-25.23	QP
9	6.7820	4.30	10.38	14.68	50.00	-35.32	AVG
10	8.2780	18.19	10.38	28.57	60.00	-31.43	QP
11	22.7900	20.80	10.33	31.13	60.00	-28.87	QP
12	22.7900	2.75	10.33	13.08	50.00	-36.92	AVG

Test Mode	Communication	AC120V 60Hz	Polarity:	Line



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dB)	
1	0.1660	18.38	10.40	28.78	55.15	-26.37	AVG
2	0.1700	34.12	10.40	44.52	64.96	-20.44	QP
3	0.4660	31.30	10.25	41.55	56.58	-15.03	QP
4*	0.4860	23.06	10.23	33.29	46.24	-12.95	AVG
5	0.6740	24.04	10.20	34.24	56.00	-21.76	QP
6	0.7740	14.13	10.18	24.31	46.00	-21.69	AVG
7	1.3980	11.33	10.22	21.55	46.00	-24.45	AVG
8	1.5180	20.51	10.24	30.75	56.00	-25.25	QP
9	3.4660	7.23	10.35	17.58	46.00	-28.42	AVG
10	3.6300	17.02	10.36	27.38	56.00	-28.62	QP
11	25.9700	27.41	10.29	37.70	60.00	-22.30	QP
12	25.9700	4.35	10.29	14.64	50.00	-35.36	AVG

APPENDIX SUMMARY

Project No.	WTH23X05102867W	Test Engineer	Elin Su
Start date	2023/6/5	Finish date	2023/6/5
Temperature	23℃	Humidity	59%
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

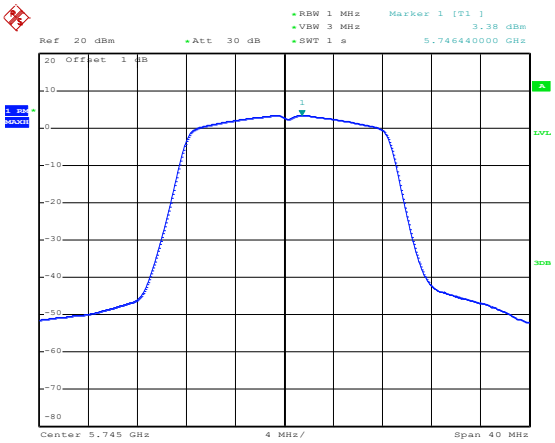
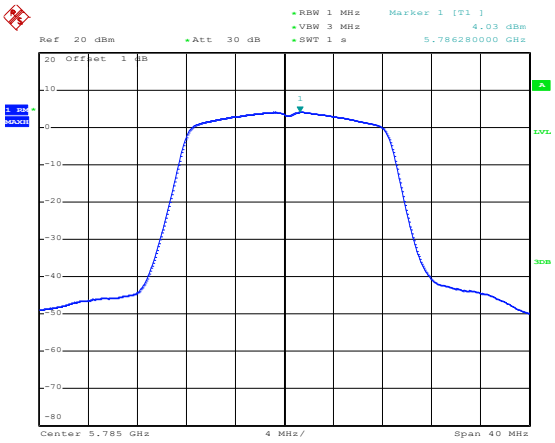
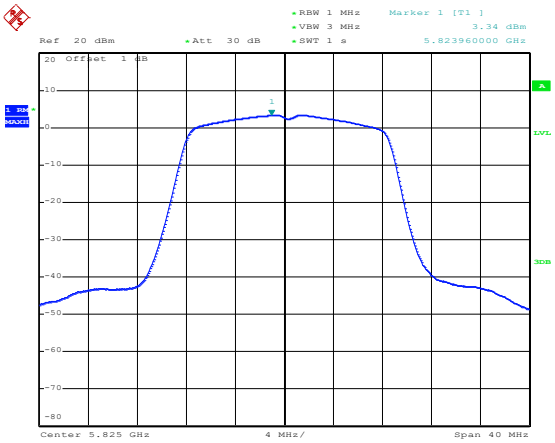
APPENDIX A

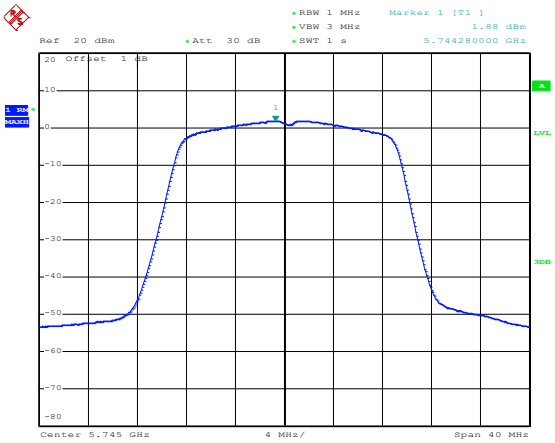
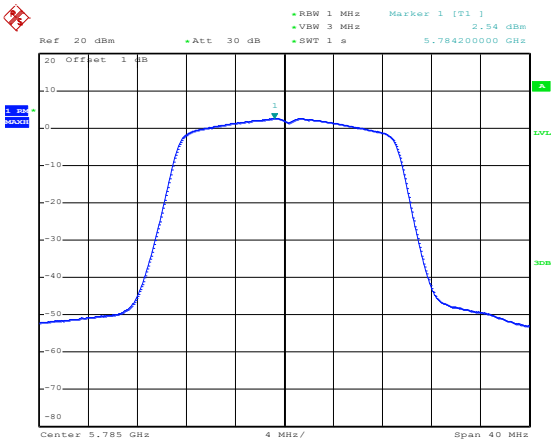
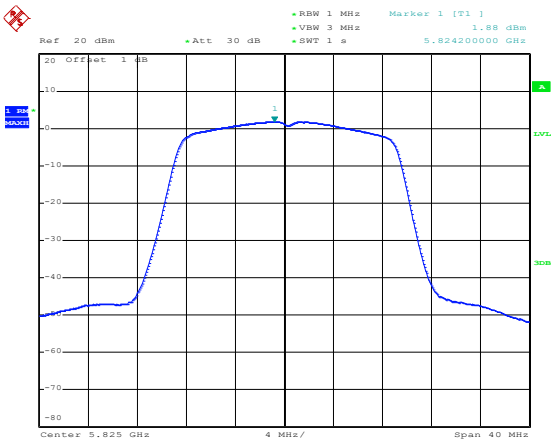
Power Spectral Density							
U-NII-3: 5725-5850MHz							
Operating mode	Test Channel	ANT 0 dBm/300kHz	ANT 1 dBm/300kHz	Factor	ANT 0 dBm/500kHz*	ANT 1 dBm/500kHz*	Limit dBm/500kHz
802.11a	5745	3.38	3.77	2.22	5.60	5.99	30
	5785	4.03	3.97	2.22	6.25	6.19	30
	5825	3.34	3.82	2.22	5.56	6.04	30
*Note: Maximum PSD=PSD(dBm/300kHz)+10log(500kHz/300kHz)=2.22							

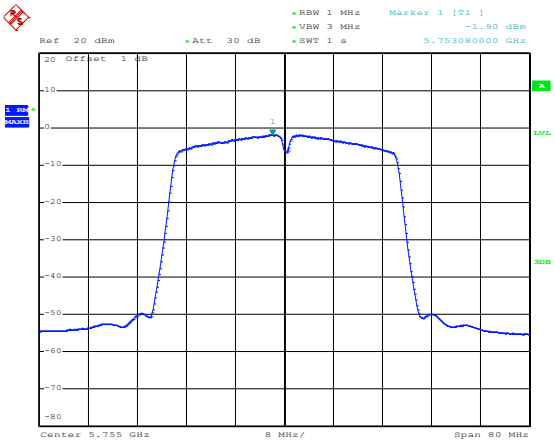
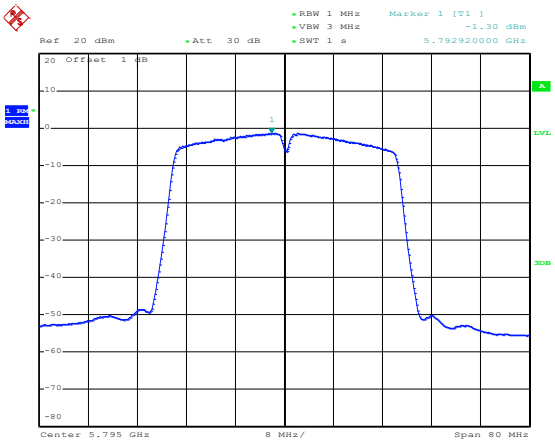
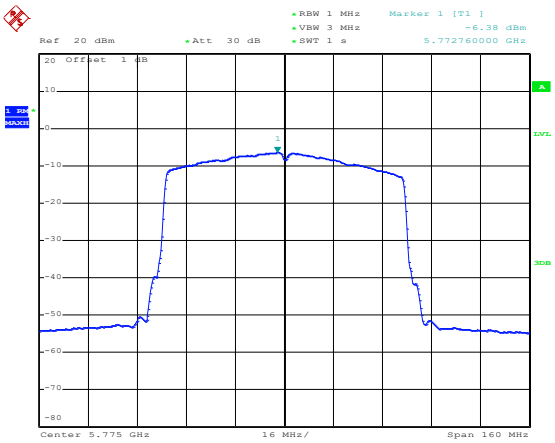
Power Spectral Density						
U-NII-3: 5725-5850MHz						
Operating mode	Test Channel	ANT 0 dBm/300kHz	ANT 1 dBm/300kHz	Factor	Total dBm/500kHz*	Limit dBm/500kHz
802.11n-HT20	5745	1.88	2.35	2.22	7.35	28.36
	5785	2.54	2.57	2.22	7.79	28.36
	5825	1.88	2.44	2.22	7.40	28.36
802.11n HT40	5755	-1.90	-1.65	2.22	3.46	28.36
	5795	-1.30	-1.62	2.22	3.77	28.36
802.11ac VH80	5775	-6.38	-6.54	2.22	-1.23	28.36
*Note: Maximum PSD=PSD(dBm/300kHz)+10log(500kHz/300kHz)=2.22						

ANT 0

5725-5850MHz

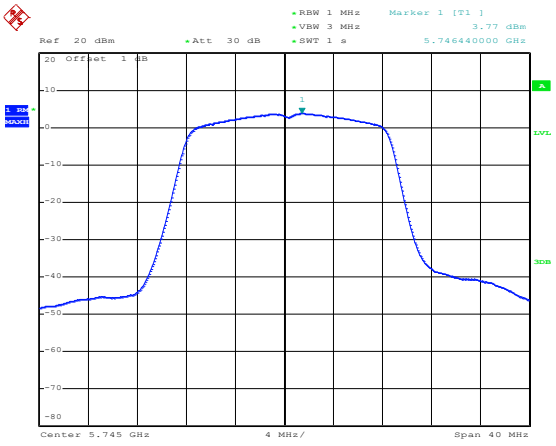
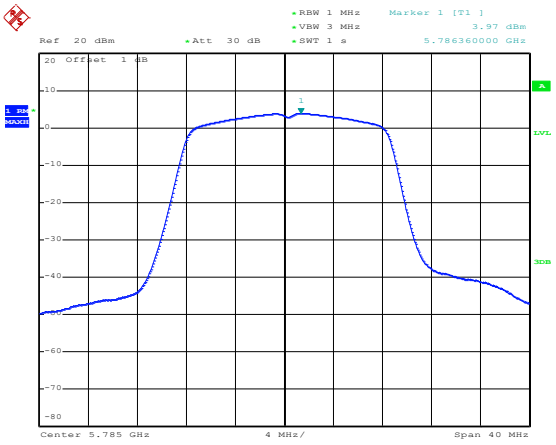
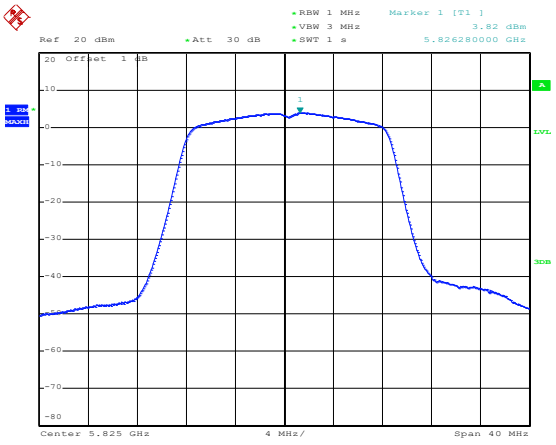
802.11a-Low	
802.11a-Middle	
802.11a-High	

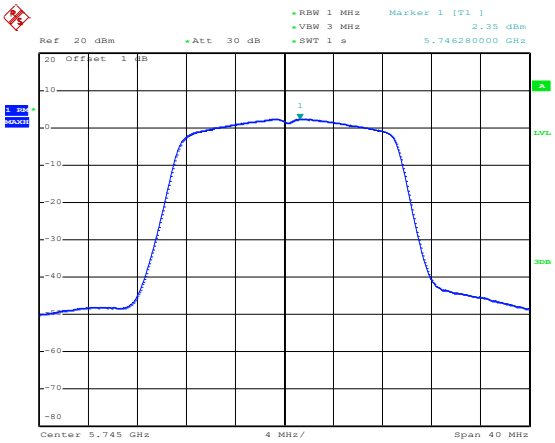
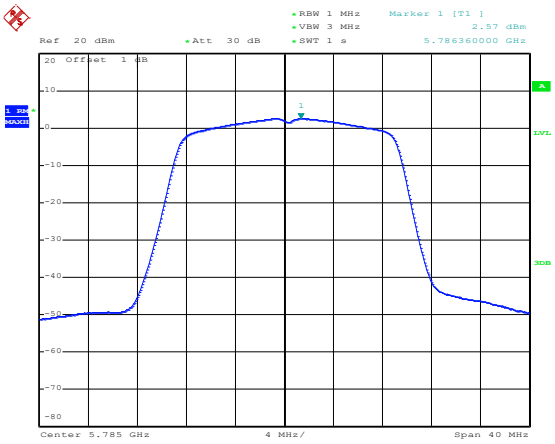
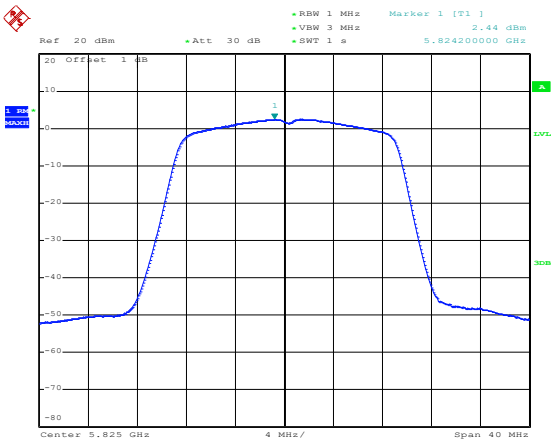
802.11n-HT20-Low	 Date: 5.JUN.2023 10:33:16
802.11n-HT20-Middle	 Date: 5.JUN.2023 10:33:37
802.11n-HT20-High	 Date: 5.JUN.2023 10:34:02

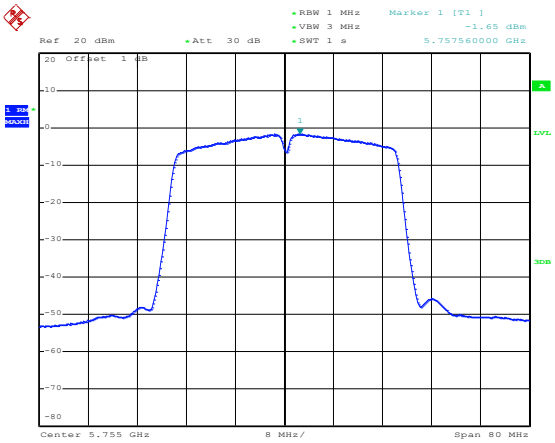
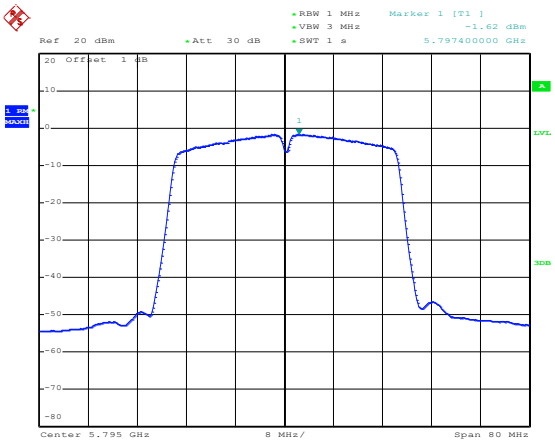
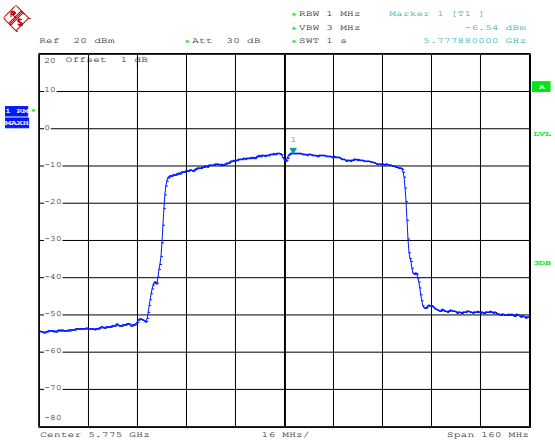
802.11n-HT40-Low	 Date: 5.JUN.2023 10:34:48
802.11n-HT40-High	 Date: 5.JUN.2023 10:35:16
802.11ac-HT80	 Date: 5.JUN.2023 10:35:56

ANT 1

5725-5850MHz

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

802.11n-HT20-Low	 Date: 5.JUN.2023 15:12:08
802.11n-HT20-Middle	 Date: 5.JUN.2023 15:12:35
802.11n-HT20-High	 Date: 5.JUN.2023 15:12:57

802.11n-HT40-Low	
802.11n-HT40-High	
802.11ac-HT80	

APPENDIX B

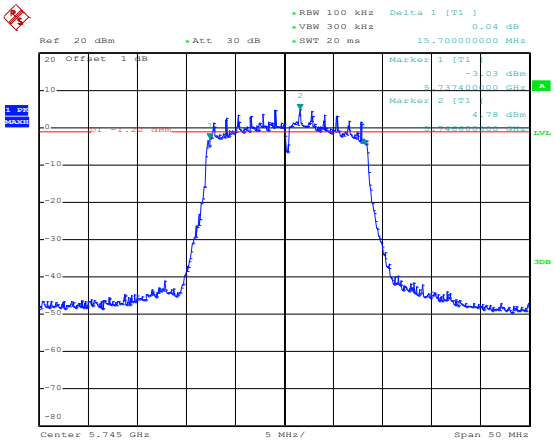
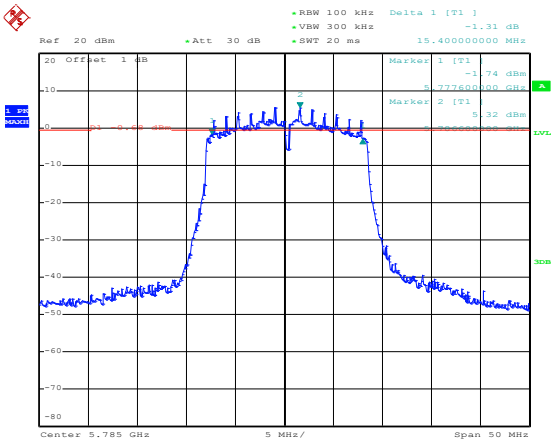
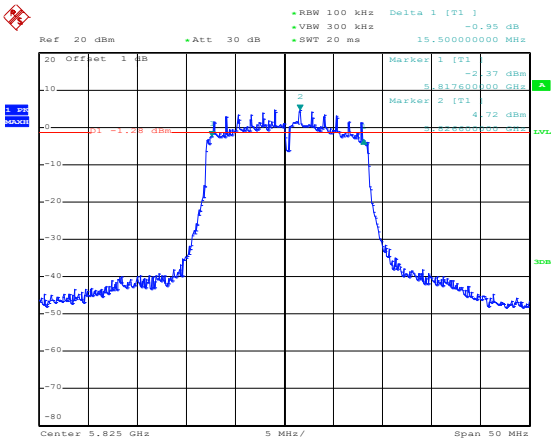
Emission Bandwidth and Occupied Bandwidth

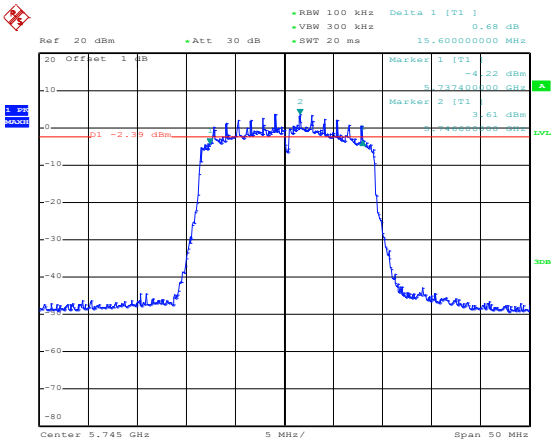
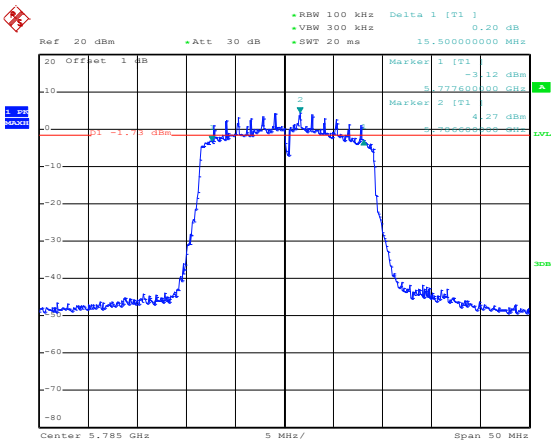
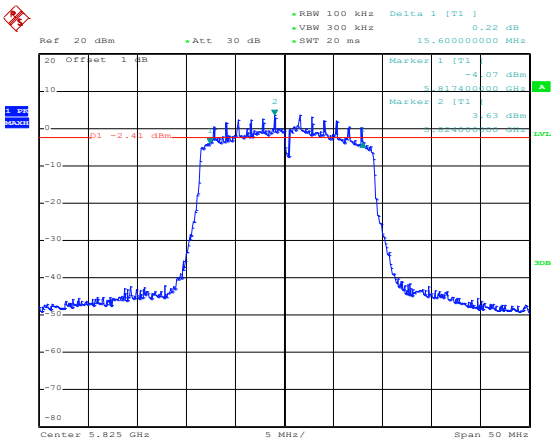
U-NII-3: 5725-5850MHz						
Test Mode	**Test Channel MHz**	**ANT 0**		**ANT 1**		**Limit kHz**
		6 dB Bandwidth MHz	**99% Bandwidth MHz**	**6 dB Bandwidth MHz**	**99% Bandwidth MHz**	
802.11a	5745	15.70	16.30	15.60	16.30	≥500
	5785	15.40	16.40	15.50	16.30	≥500
	5825	15.50	16.40	15.60	16.30	≥500
802.11n-HT20	5745	15.60	17.40	15.80	17.40	≥500
	5785	15.50	17.40	15.80	17.40	≥500
	5825	15.60	17.40	15.80	17.40	≥500
802.11n-HT40	5755	35.80	35.80	35.80	36.00	≥500
	5795	35.60	36.00	35.60	36.00	≥500
802.11ac-HT80	5775	74.80	76.40	76.00	76.80	≥500

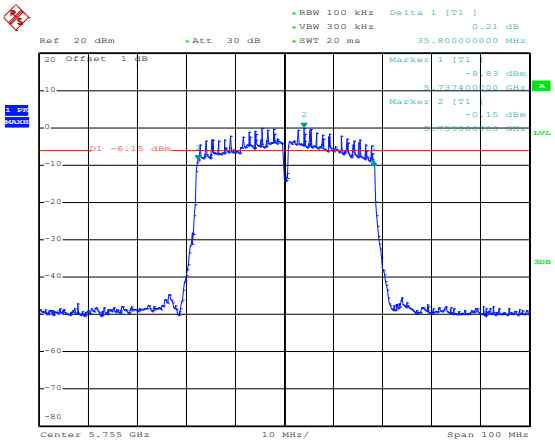
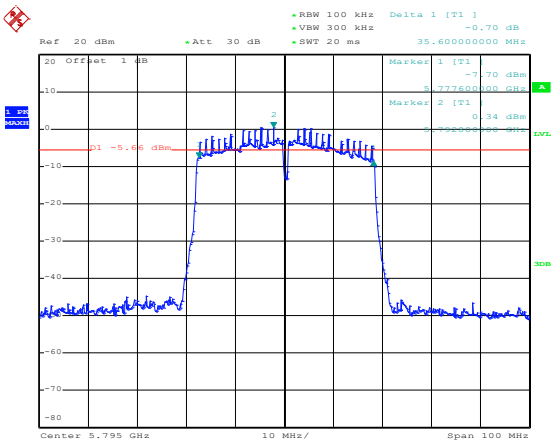
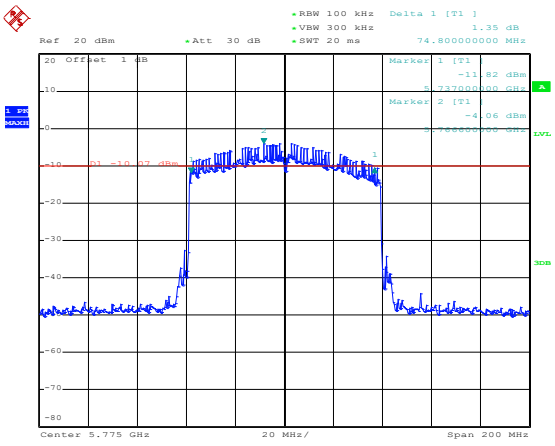
ANT 0

6 dB Bandwidth

5725-5850MHz

802.11a-Low	 Date: 5.JUN.2023 11:37:26
802.11a-Middle	 Date: 5.JUN.2023 11:38:24
802.11a-High	 Date: 5.JUN.2023 11:39:34

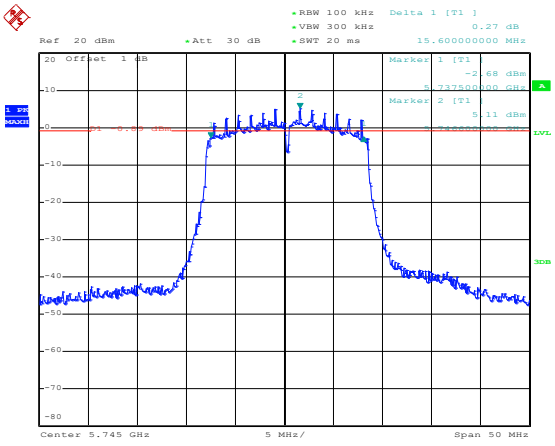
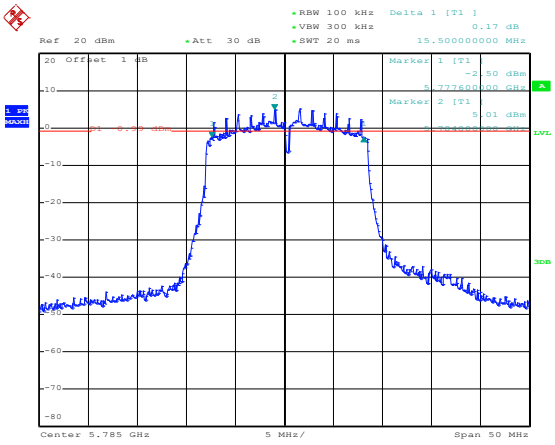
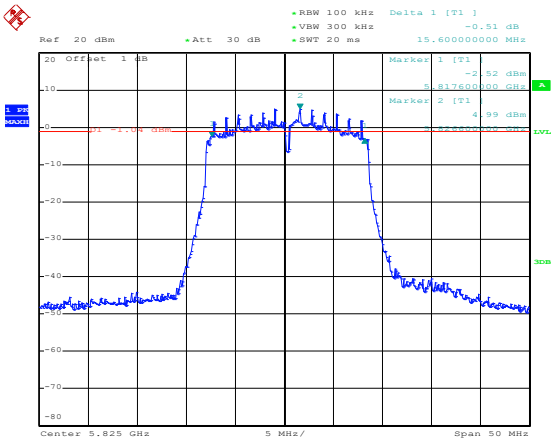
802.11n-HT20-Low	
802.11n-HT20-Middle	
802.11n-HT20-High	

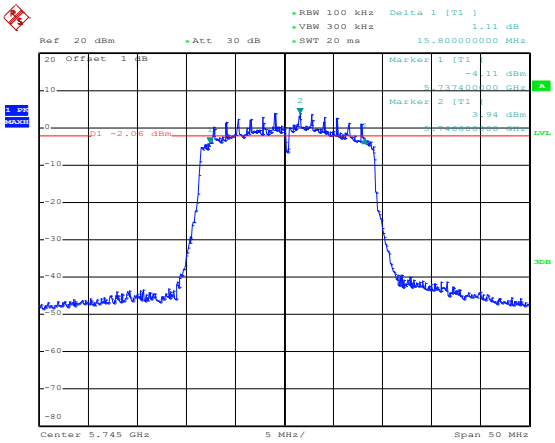
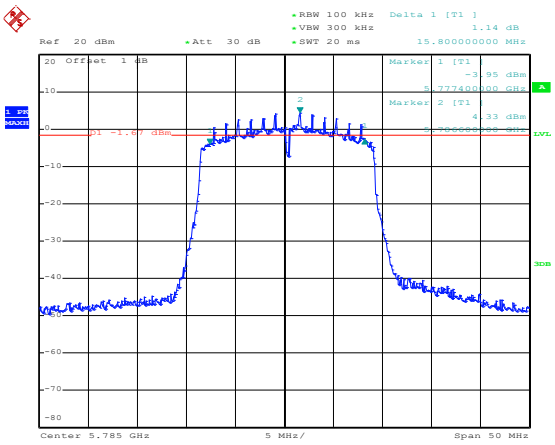
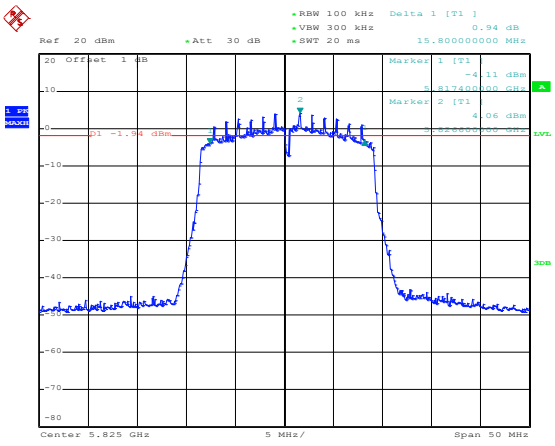
802.11n-HT40-Low	
802.11n-HT40-High	
802.11ac-HT80	

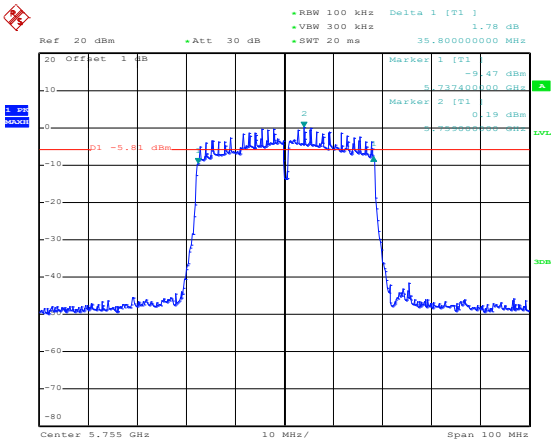
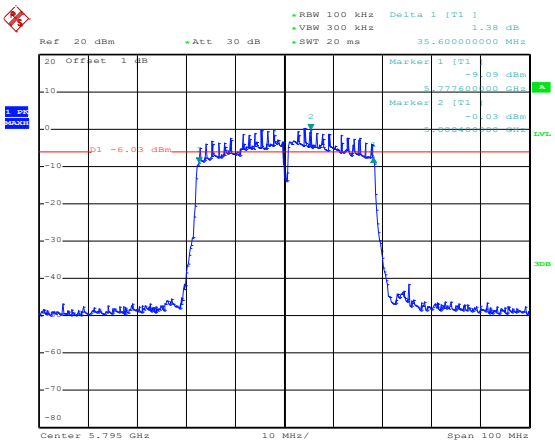
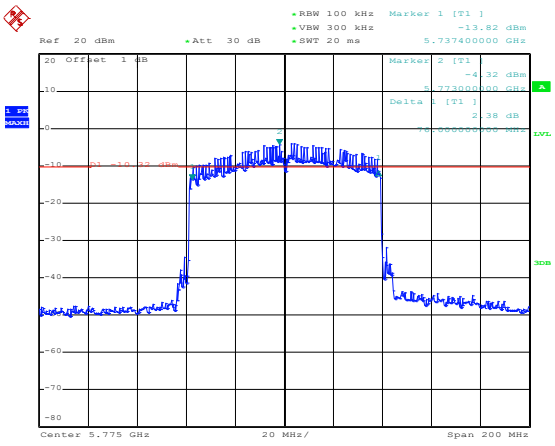
ANT 1

6 dB Bandwidth

5725-5850MHz

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

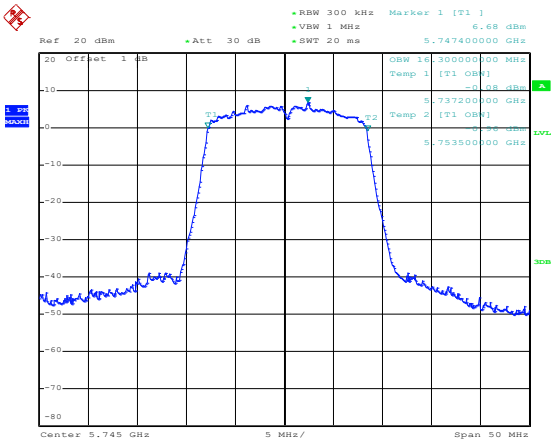
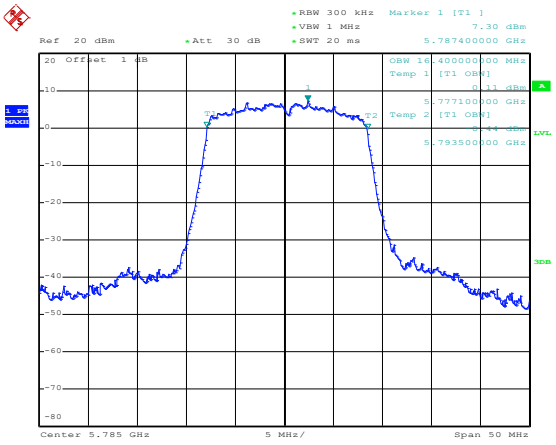
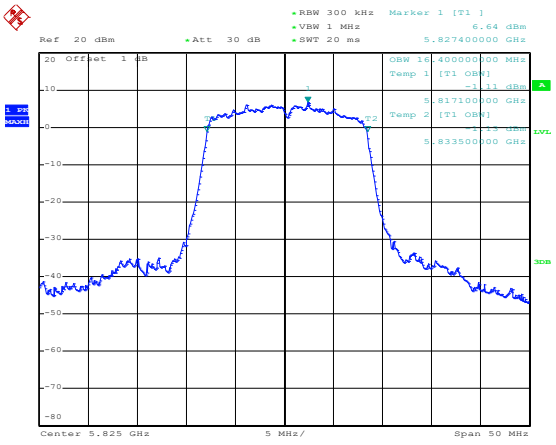
802.11n-HT20-Low	
802.11n-HT20-Middle	
802.11n-HT20-High	

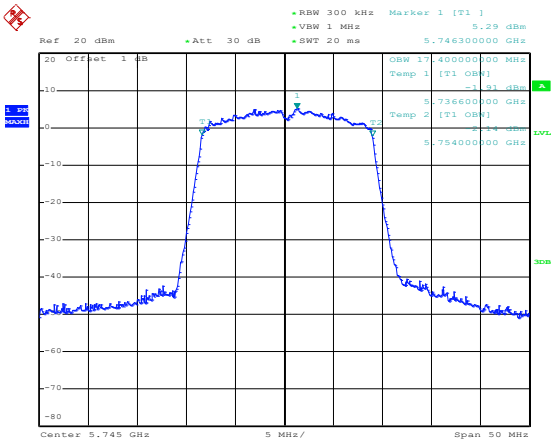
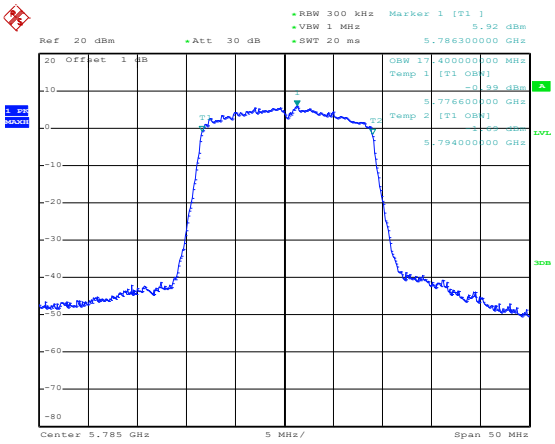
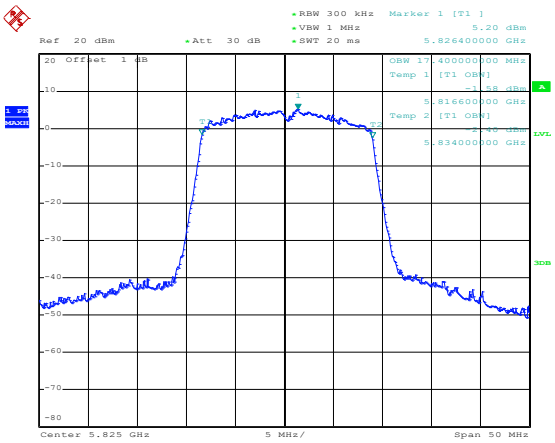
802.11n-HT40-Low	
802.11n-HT40-High	
802.11ac-HT80	

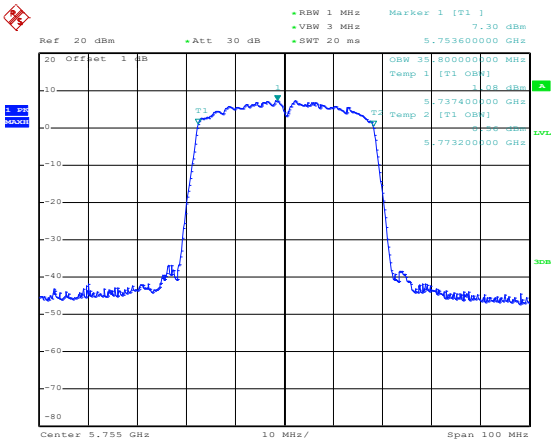
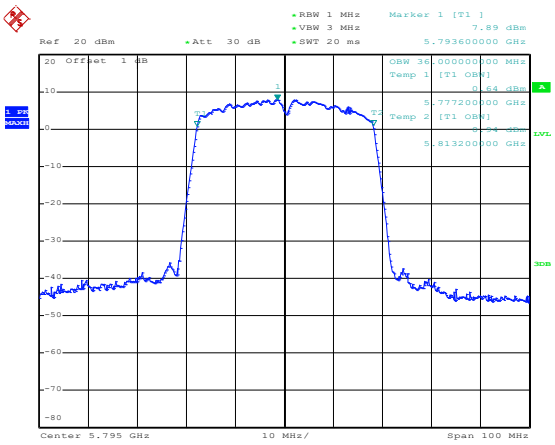
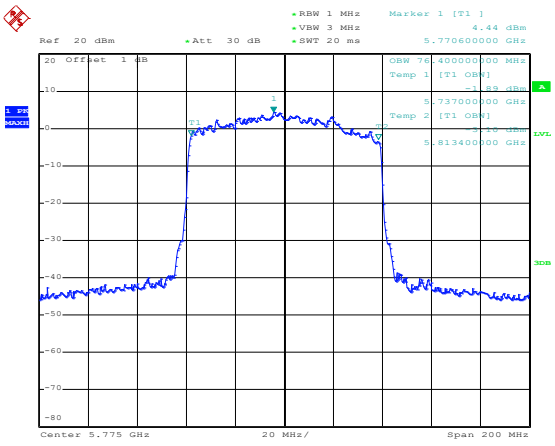
99% Bandwidth

ANT 0

5725-5850MHz

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

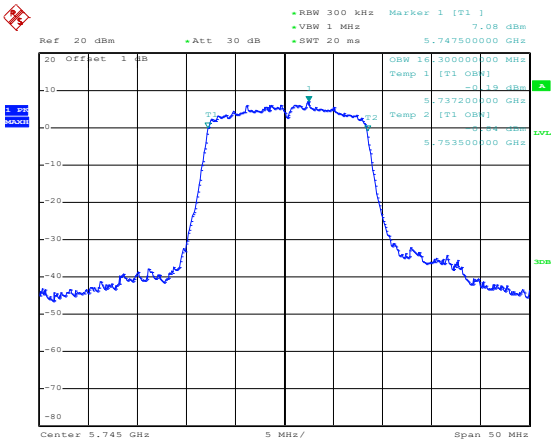
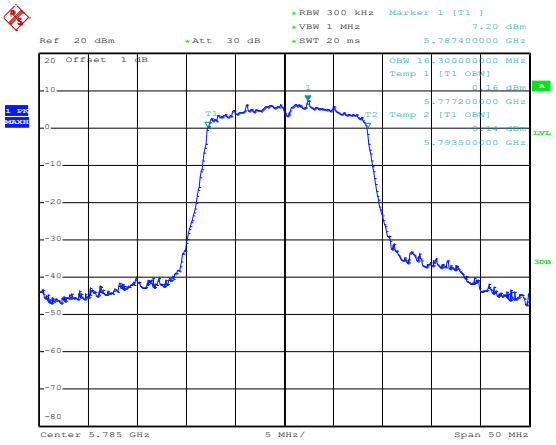
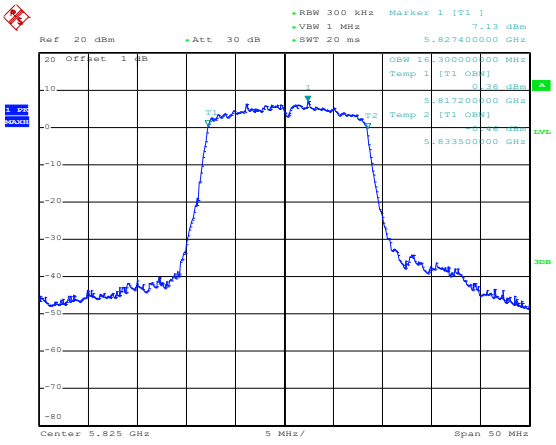
802.11n-HT20-Low	 Date: 5.JUN.2023 11:32:10
802.11n-HT20-Middle	 Date: 5.JUN.2023 11:32:35
802.11n-HT20-High	 Date: 5.JUN.2023 11:32:57

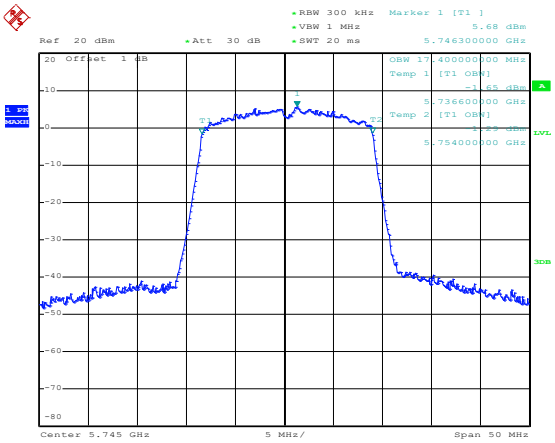
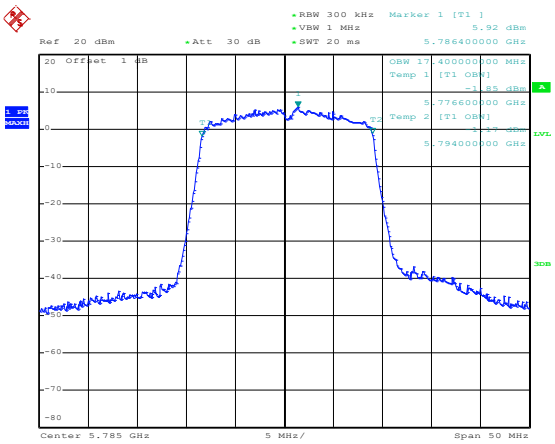
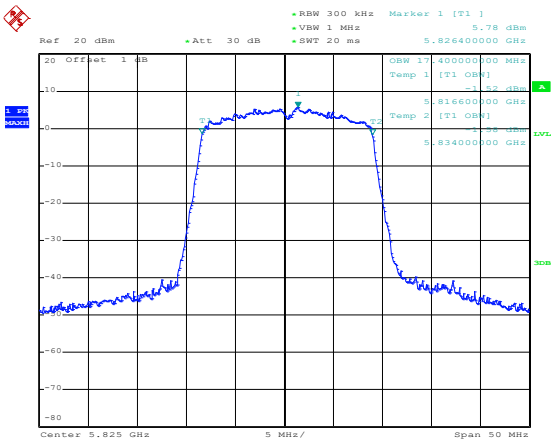
802.11n-HT40-Low	
802.11n-HT40-High	
802.11ac-HT80	

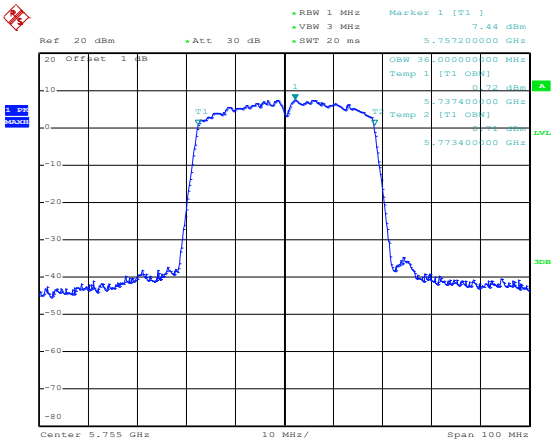
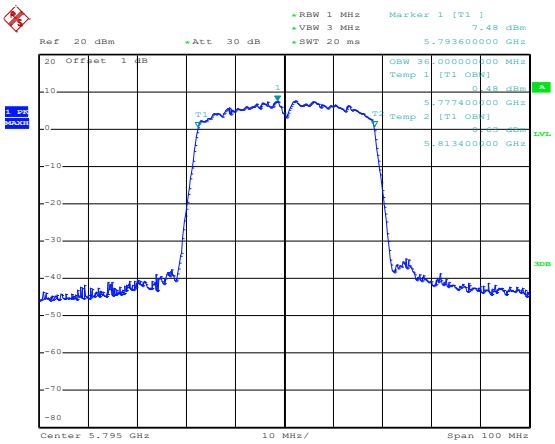
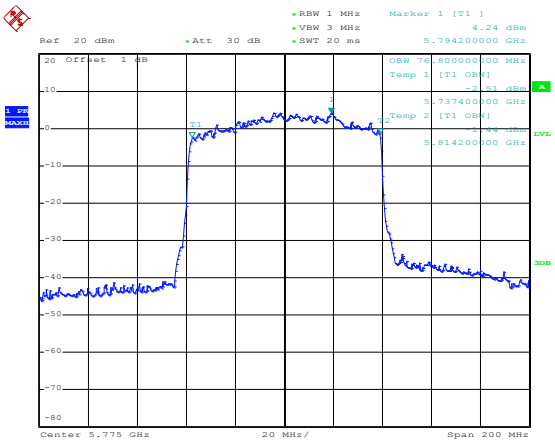
99% Bandwidth

ANT 1

5725-5850MHz

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

802.11n-HT20-Low	 Date: 5.JUN.2023 16:05:33
802.11n-HT20-Middle	 Date: 5.JUN.2023 16:05:49
802.11n-HT20-High	 Date: 5.JUN.2023 16:06:08

802.11n-HT40-Low	 Date: 5.JUN.2023 16:06:52
802.11n-HT40-High	 Date: 5.JUN.2023 16:07:09
802.11ac-HT80	 Date: 5.JUN.2023 16:07:46

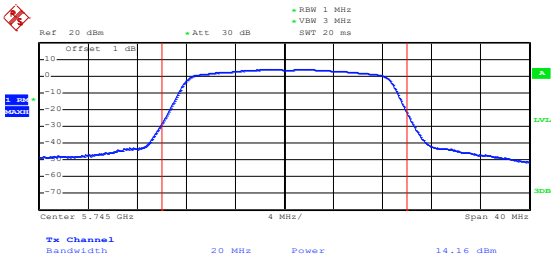
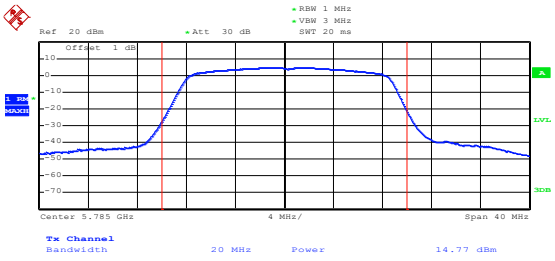
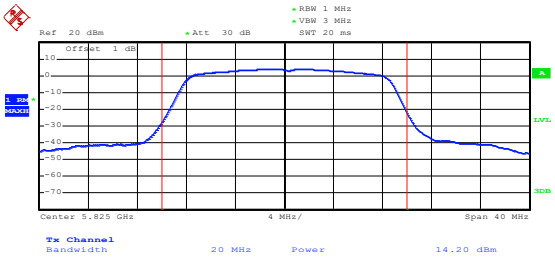
APPENDIX C

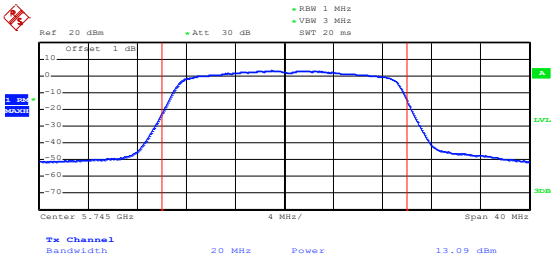
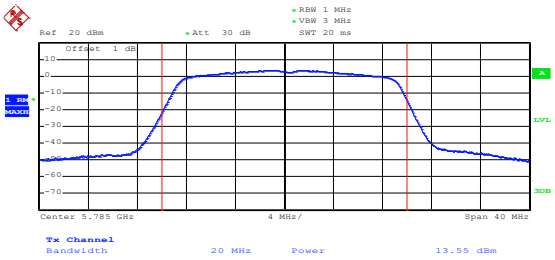
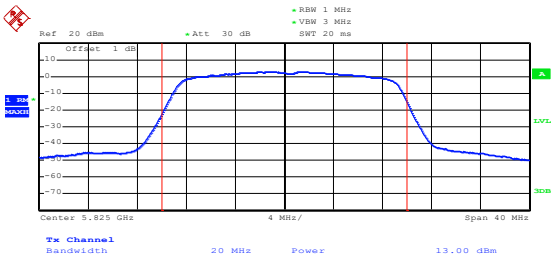
Maximum Conducted Output Power

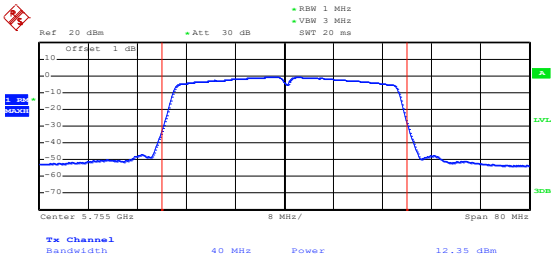
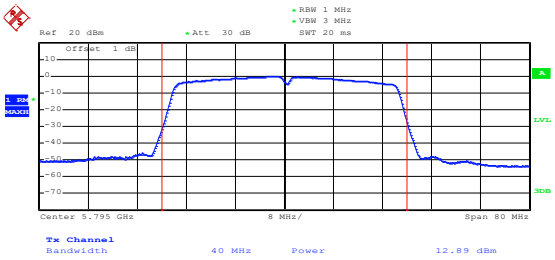
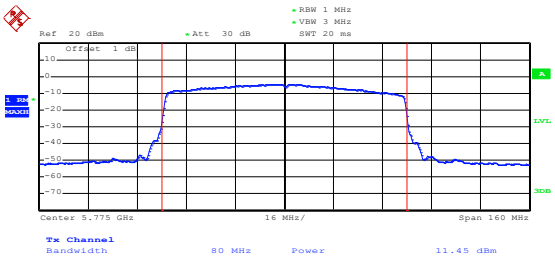
U-NII-3: 5725-5850MHz					
Test mode	Frequency MHz	Output Power dBm		Total dBm	Limit dBm
		ANT 0	ANT 1		
802.11a	5745	14.16	14.55	/	30.00
	5785	14.77	14.75	/	30.00
	5825	14.20	14.65	/	30.00
802.11n-HT20	5745	13.09	13.45	16.28	28.36
	5785	13.55	13.63	16.60	28.36
	5825	13.00	13.59	16.32	28.36
802.11n-HT40	5755	12.35	12.57	15.47	28.36
	5795	12.89	12.61	15.76	28.36
802.11ac VH80	5775	11.45	11.62	14.55	28.36

ANT 0

5725-5850MHz

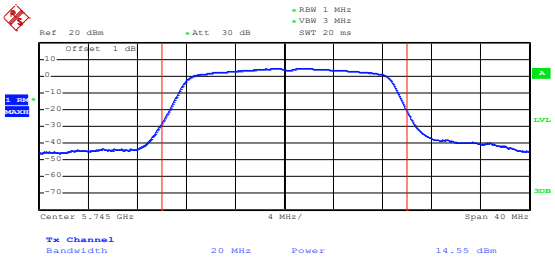
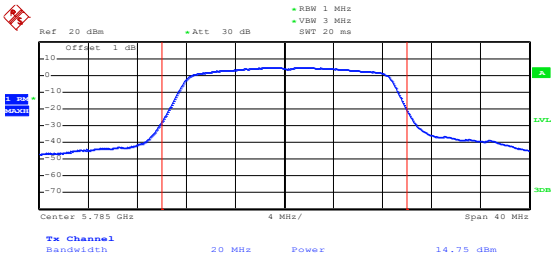
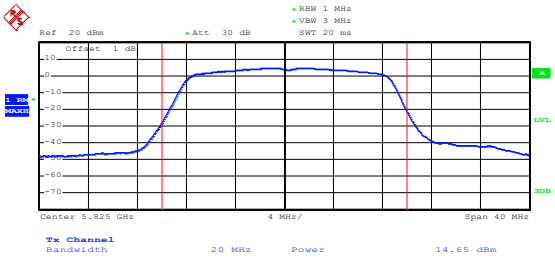
802.11a-Low	 Date: 5.JUN.2023 10:03:06
802.11a-Middle	 Date: 5.JUN.2023 10:03:46
802.11a-High	 Date: 5.JUN.2023 10:04:12

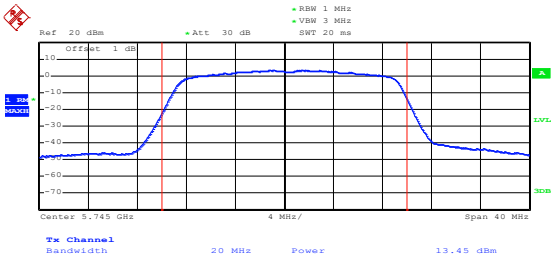
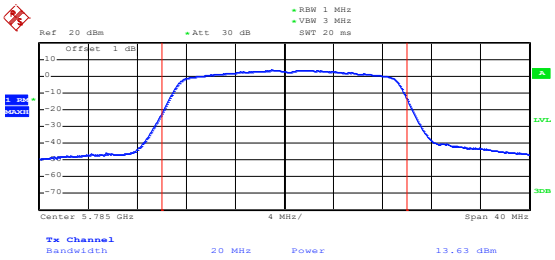
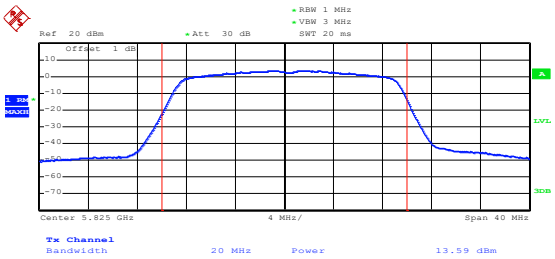
802.11n-HT20-Low	 Date: 5.JUN.2023 10:06:02
802.11n-HT20-Middle	 Date: 5.JUN.2023 10:06:55
802.11n-HT20-High	 Date: 5.JUN.2023 10:08:01

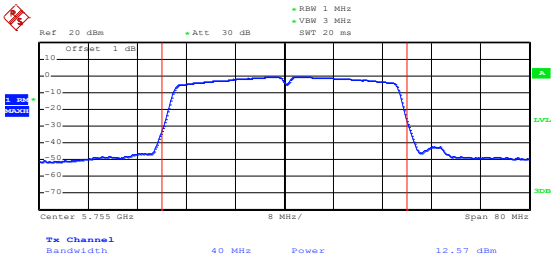
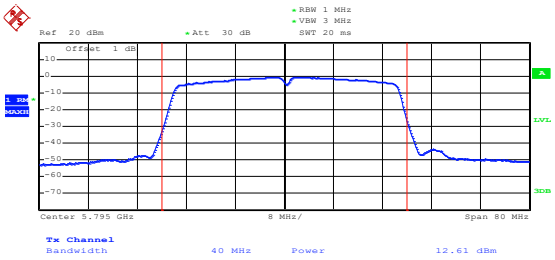
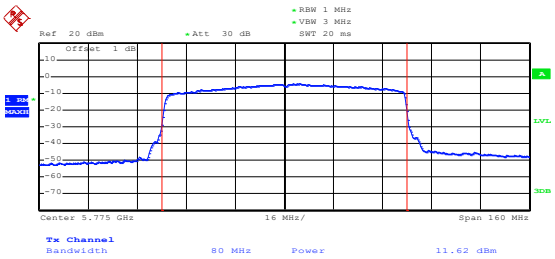
802.11n-HT40-Low	 Date: 5.JUN.2023 10:09:11
802.11n-HT40-High	 Date: 5.JUN.2023 10:09:54
802.11ac-HT80	 Date: 5.JUN.2023 10:11:12

ANT 1

5725-5850MHz

802.11a-Low	 Date: 5.JUN.2023 14:44:40
802.11a-Middle	 Date: 5.JUN.2023 14:45:02
802.11a-High	 Date: 5.JUN.2023 14:45:26

802.11n-HT20-Low	 Date: 5.JUN.2023 14:46:02
802.11n-HT20-Middle	 Date: 5.JUN.2023 14:46:22
802.11n-HT20-High	 Date: 5.JUN.2023 14:46:47

802.11n-HT40-Low	 Date: 5.JUN.2023 14:48:52
802.11n-HT40-High	 Date: 5.JUN.2023 14:48:24
802.11ac-HT80	 Date: 5.JUN.2023 14:50:13

APPENDIX D

Frequency Stability

U-NII-3:5725-5850MHz worst case at 802.11a middle channel				
Voltage(%)	Power(VAC)	TEMP(°C)	Freq.Dev(Hz)	Deviation
100%	120	-30	246	0.0425
100%		-20	265	0.0458
100%		-10	156	0.0270
100%		0	451	0.0780
100%		+10	439	0.0759
100%		+20	494	0.0854
100%		+30	136	0.0235
100%		+40	543	0.0939
100%		+50	853	0.1475
Low power	108	+20	290	0.0501
High power	132	+20	184	0.0318

APPENDIX PHOTOGRAPHS

Please refer to “ANNEX”

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