FCC Part 15E Test Report
FCC ID: 2BBO6-Z10

Applicant:	XiXi Technology (Shenzhen) CO, Ltd
Address:	5 / F, Building 2, Watsi Science Park, Datang Road, Guanlan, Longhua District, Shenzhen
Manufacturer:	XiXi Technology (Shenzhen) CO, Ltd
Address:	5 / F, Building 2, Watsi Science Park, Datang Road, Guanlan, Longhua District, Shenzhen
EUT:	repeater
Trade Mark:	N/A
Model Number:	Z10 Z10A
Date of Receipt:	Sep. 01, 2023
Test Date:	Sep. 01, 2023 - Sep. 14, 2023
Date of Report:	Sep. 14, 2023
Prepared By:	Shenzhen DL Testing Technology Co., Ltd.
Address:	101-201, Building C, Shuanghuan, No.8, Baoqing Road, Baolong Industrial Zone, Baolong Street, Longgang District, Shenzhen, Guangdong, China
Applicable Standards:	FCC PART 15 E 15.407 ANSI C63.10:2013
Test Result:	Pass
Report Number:	DL-20230914012E

Prepared (Test Engineer):	Pxing Huang
Reviewer (Supervisor):	Jack Bu
Approved (Manager):	Jade Yang

This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Shenzhen DL Testing Technology Co., Ltd.

Table of Contents **Page**

1 . SUMMARY OF TEST RESULTS 5
1.1 MEASUREMENT UNCERTAINTY 5
2 . GENERAL INFORMATION 6
2.1 GENERAL DESCRIPTION OF EUT 6
2.2 DESCRIPTION OF TEST MODES 7
2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED 8
2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE) 8
2.5 TABLE OF PARAMETERS OF TEST SOFTWARE SETTING 8
2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS 9
3 . EMC EMISSION TEST 10
3.1 CONDUCTED EMISSION MEASUREMENT 10
3.1.1 POWER LINE CONDUCTED EMISSION LIMITS 10
3.1.2 TEST PROCEDURE 10
3.1.3 DEVIATION FROM TEST STANDARD 10
3.1.4 TEST SETUP 11
3.1.5 EUT OPERATING CONDITIONS 11
3.1.6 TEST RESULTS 11
3.2 RADIATED EMISSION MEASUREMENT 14
3.2.1 RADIATED EMISSION LIMITS 14
3.2.2 TEST PROCEDURE 15
3.2.3 DEVIATION FROM TEST STANDARD 15
3.2.4 TEST SETUP 15
3.2.5 EUT OPERATING CONDITIONS 16
3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ) 17
3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ) 18
3.2.8 TEST RESULTS (1GHZ~40GHZ) 20
3.3 RADIATED BAND EMISSION MEASUREMENT 25
3.3.1 TEST REQUIREMENT: 25
3.3.2 TEST PROCEDURE 25
3.3.3 DEVIATION FROM TEST STANDARD 25
3.3.4 TEST SETUP 25
3.3.5 EUT OPERATING CONDITIONS 25
4 . PEAK OUTPUT POWER 28
4.1 APPLIED PROCEDURES / LIMIT 28
4.1.1 TEST PROCEDURE 28
4.1.2 DEVIATION FROM STANDARD 28
4.1.3 TEST SETUP 28

Table of Contents **Page**

4.1.4 EUT OPERATION CONDITIONS 28
4.1.5 TEST RESULTS 29

5 . POWER SPECTRAL DENSITY TEST 37

5.1 APPLIED PROCEDURES / LIMIT 37
5.1.1 TEST PROCEDURE 37
5.1.2 DEVIATION FROM STANDARD 37
5.1.3 TEST SETUP 37
5.1.4 EUT OPERATION CONDITIONS 37
5.1.5 TEST RESULTS 38

6 . 6DB BANDWIDTH TEST 46

6.1 APPLIED PROCEDURES / LIMIT 46
6.1.1 TEST PROCEDURE 46
6.1.2 DEVIATION FROM STANDARD 46
6.1.3 TEST SETUP 46
6.1.4 EUT OPERATION CONDITIONS 46
6.1.5 TEST RESULTS 47

7 . DUTY CYCLE TEST SIGNAL 54

7.1 APPLIED PROCEDURES / LIMIT 54
7.1.1 TEST PROCEDURE 54
7.1.2 DEVIATION FROM STANDARD 54
7.1.3 TEST SETUP 54
7.1.4 EUT OPERATION CONDITIONS 54
7.1.5 TEST RESULTS 55

8 . FREQUENCY STABILITY 58

8.1 APPLIED PROCEDURES / LIMIT 58
8.1.1 TEST PROCEDURE 58
8.1.2 DEVIATION FROM STANDARD 58
8.1.3 TEST SETUP 58
8.1.4 EUT OPERATION CONDITIONS 58
8.1.5 TEST RESULTS 59

9 . TRANSMISSION IN THE ABSENCE OF DATA 61

9.1 STANDARD REQUIREMENT 61

9.2 TEST RESULT 61

10 . ANTENNA REQUIREMENT 61

10.1 STANDARD REQUIREMENT 61

10.2 EUT ANTENNA 61

11 . TEST SEUUP PHOTO 62

Table of Contents **Page**

12 . EUT PHOTO **64**

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.407) , Subpart E			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	
15.407(b), 15.209	Radiated Spurious Emission	PASS	
15.407 (b)	Band Edge Emission	PASS	
15.407 (a)	Averaging Output Power	PASS	
15.407 (a)	Power Spectral Density	PASS	
15.403(i) 15.407(e)	6dB bandwidth	PASS	
15.407(g)	Frequency Stability	PASS	
15.407(c)	Transmission in case of Absence of Information	PASS	
15.203	Antenna Requirement	PASS	

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

(2) Test Facility: Shenzhen DL Testing Technology Co., Ltd.
Address: 101-201, Building C, Shuanghuan, No.8, Baoqing Road, Baolong Industrial Zone, Baolong Street, Longgang District, Shenzhen, Guangdong, China
FCC Test Firm Registration Number: 854456
Designation Number: CN1307
IC Registered No.: 27485
CAB ID.: CN0118

1.1 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y** ± **U**, where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**，providing a level of confidence of approximately **95** %。

No.	Item	Uncertainty
1	Conducted Emission Test	±2.56dB
2	RF power,conducted	±0.42dB
3	Spurious emissions,conducted	±2.76dB
4	All emissions,radiated(<1G)	±3.65dB
5	All emissions,radiated(>1G)	±4.89dB
6	Temperature	±0.5℃
7	Humidity	±2%
8	6dB Bandwidth	±0.2MHz

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product Name:	repeater
Trademark	N/A
Model No.:	Z10 Z10A
Model Difference	The product's different for model number and appearance color.
Operation Frequency:	5745-5825MHz(802.11a/n/ac(HT20)) 5755-5795MHz(802.11n/ac(HT40)) 5775MHz (802.11ac(HT80))
Channel numbers:	See channel list
Channel separation:	20MHz/40MHz/80MHz
Modulation technology:	64QAM, 16QAM, QPSK, BPSK for OFDM
Rate of Transmitter	802.11a: 6Mbps, 9Mbps, 12Mbps, 18Mbps, 24Mbps, 36Mbps, 48Mbps,54Mbps 802.11n: Up to 500Mbps
Antenna Type:	External antenna
Antenna gain:	3.1dBi
Power Supply:	100-240V~ 50/60Hz
Note:	The MIMO mode only support external External antenna3 and External antenna4 the 802.11n/ac mode, the Directional Gain=3.1dBi+10log(2)=6.1dBi.

Note:

1.For a more detailed features description, please refer to the manufacturer’s specifications or the User's Manual.

2.The EUT’s all information provided by client.

2. Channel List

Channel List for 802.11a/n(HT20)/ac(HT20)			
Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	161	5805
153	5765	165	5825
157	5785		

Channel List for 802.11n(HT40)/ac(HT40)			
Channel	Frequency (MHz)	Channel	Frequency (MHz)
151	5755	159	5795

Channel List for 802.11ac(HT80)			
Channel	Frequency (MHz)	Channel	Frequency (MHz)
155	5775	/	/

2.1.1 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

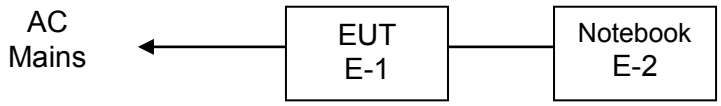
Description		
Pretest Mode	Channel	Band 4
Mode 1	802.11a/n/acHT20	CH149, CH157, CH165
Mode 2	802.11n/acHT40	CH151, CH159
Mode 3	802.11acHT80	CH155
Mode 4	Link Mode	
Mode 5	MIMO Mode	

For Radiated Emission		
Pretest Mode	Channel	Band 4
Mode 1	802.11a/n/acHT20	CH149, CH157, CH165
Mode 2	802.11n/acHT40	CH151, CH159
Mode 3	802.11acHT80	CH155
Mode 4	Link Mode	
Mode 5	MIMO Mode	

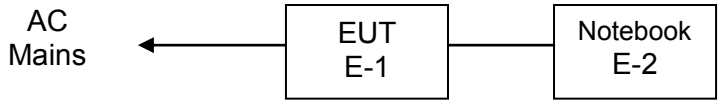
Note: 1. The measurements are performed at the highest, middle, lowest available channels.
2. During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.

2.2 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated Spurious Emission Test



Conducted Spurious Emission Test



2.3 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Model/Type No.	Series No.	Note
E-1	repeater	Z10	N/A	EUT
E-2	Notebook	310S-14AST	N/A	

Item	Shielded Type	Ferrite Core	Length	Note

Note:

(1) For detachable type I/O cable should be specified the length in cm in『Length』column.

2.4 TABLE OF PARAMETERS OF TEST SOFTWARE SETTING

During testing, channel & 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 end product.

Max output power Setting				
Test software Version	Test program: MTK			
Mode	802.11a	802.11n HT20	802.11n HT40	802.11ac HT20/HT40/HT80
Data Rate	6Mbps	MSC0	MSC0	MSC0
Power Setting of Softwave	60	60	66	66

2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation test, Band-edge test and 6db bandwidth test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	Agilent	E4408B	MY50140780	Nov. 05, 2022	Nov. 04, 2023
2	Test Receiver (9kHz-7GHz)	R&S	ESRP7	101393	Nov. 05, 2022	Nov. 04, 2023
3	Bilog Antenna (30MHz-1GHz)	R&S	VULB9162	00306	Nov. 05, 2022	Nov. 04, 2023
4	Horn Antenna (1GHz-18GHz)	Schwarzbeck	BBHA9120D	02139	Nov. 05, 2022	Nov. 04, 2023
5	Horn Antenna (18GHz-40GHz)	A.H. Systems	SAS-574	588	Nov. 05, 2022	Nov. 04, 2023
6	Amplifier (9KHz-6GHz)	Schwarzbeck	BBV9743B	00153	Nov. 05, 2022	Nov. 04, 2023
7	Amplifier (1GHz-18GHz)	EMEC	EM01G8GA	00270	Nov. 05, 2022	Nov. 04, 2023
8	Amplifier (18GHz-40GHz)	Quanjuda	DLE-161	97	Nov. 05, 2022	Nov. 04, 2023
9	Loop Antenna (9KHz-30MHz)	Schwarzbeck	FMZB1519B	00014	Nov. 05, 2022	Nov. 04, 2023
10	RF cables1 (9kHz-1GHz)	ChengYu	966	004	Nov. 05, 2022	Nov. 04, 2023
11	RF cables2 (1GHz-40GHz)	ChengYu	966	003	Nov. 05, 2022	Nov. 04, 2023
12	Antenna connector	Florida RF Labs	N/A	RF 01#	Nov. 05, 2022	Nov. 04, 2023
13	Power probe	KEYSIGHT	U2021XA	MY55210018	Nov. 05, 2022	Nov. 04, 2023
14	Signal Analyzer 9kHz-26.5GHz	Agilent	N9020A	MY55370280	Nov. 05, 2022	Nov. 04, 2023
15	Test Receiver 20kHz-40GHz	R&S	ESU 40	100376	Nov. 05, 2022	Nov. 04, 2023
16	D.C. Power Supply	LongWei	PS-305D	010964729	Nov. 05, 2022	Nov. 04, 2023

Conduction Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	843 Shielded Room	ChengYu	843 Room	843	Sep. 20, 2022	Sep. 19, 2025
2	EMI Receiver	R&S	ESR	101421	Nov. 05, 2022	Nov. 04, 2023
3	LISN	R&S	ENV216	102417	Nov. 05, 2022	Nov. 04, 2023
4	843 Cable 1#	ChengYu	CE Cable	001	Nov. 05, 2022	Nov. 04, 2023

Other

Item	Name	Manufacturer	Model	Software version
1	EMC Conduction Test System	FALA	EZ_EMC	EMC-CON 3A1.1
2	EMC radiation test system	FALA	EZ_EMC	FA-03A2
3	RF test system	MAIWEI	MTS8310	2.0.0.0
4	RF communication test system	MAIWEI	MTS8200	2.0.0.0

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Limit (dBuV)		Standard
	Quasi-peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.5 -5.0	56.00	46.00	FCC
5.0 -30.0	60.00	50.00	FCC

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.1.2 TEST PROCEDURE

a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

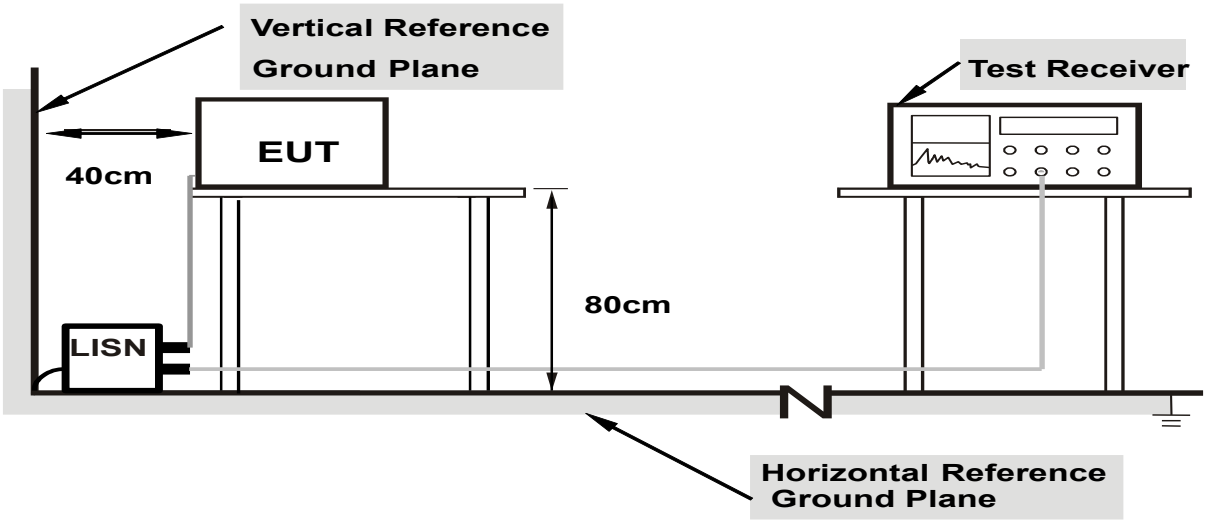
d. LISN at least 80 cm from nearest part of EUT chassis.

e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 TEST SETUP



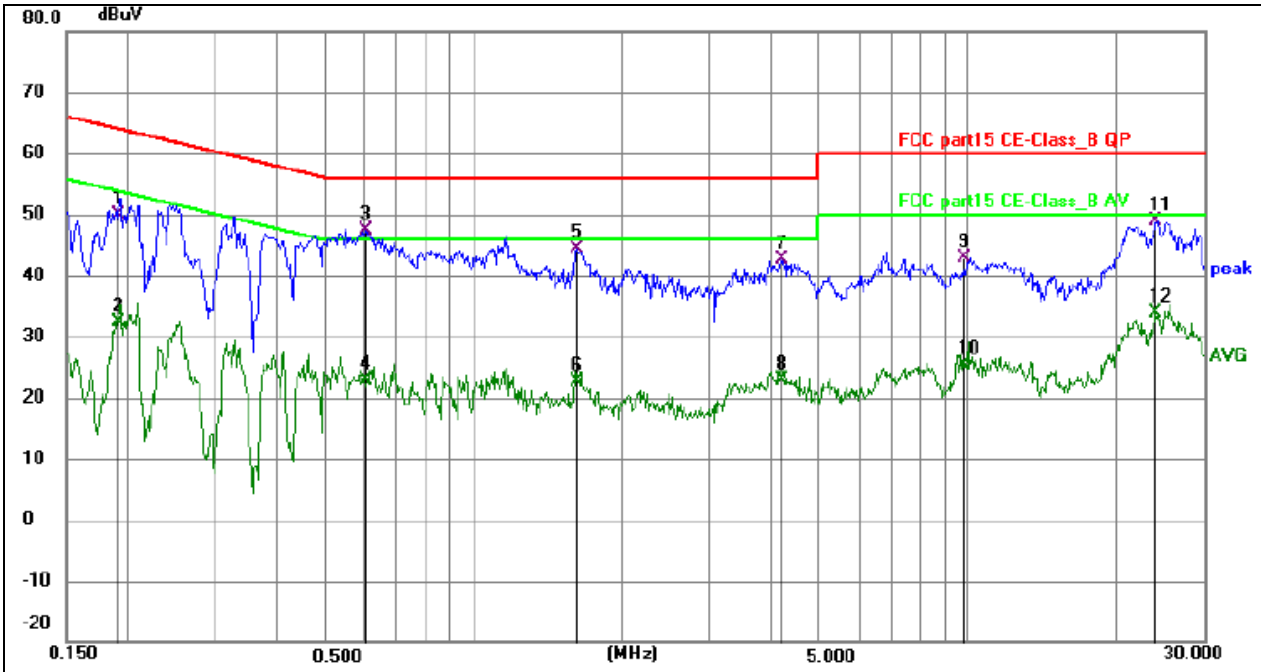
Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.
We pretest AC 120V and AC 230V, the worst voltage was AC 120V and the data recording in the report.

3.1.6 TEST RESULTS

Temperature:	25 ℃	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	L
Test Voltage :	AC 120V/60Hz	Test Mode:	Mode 4

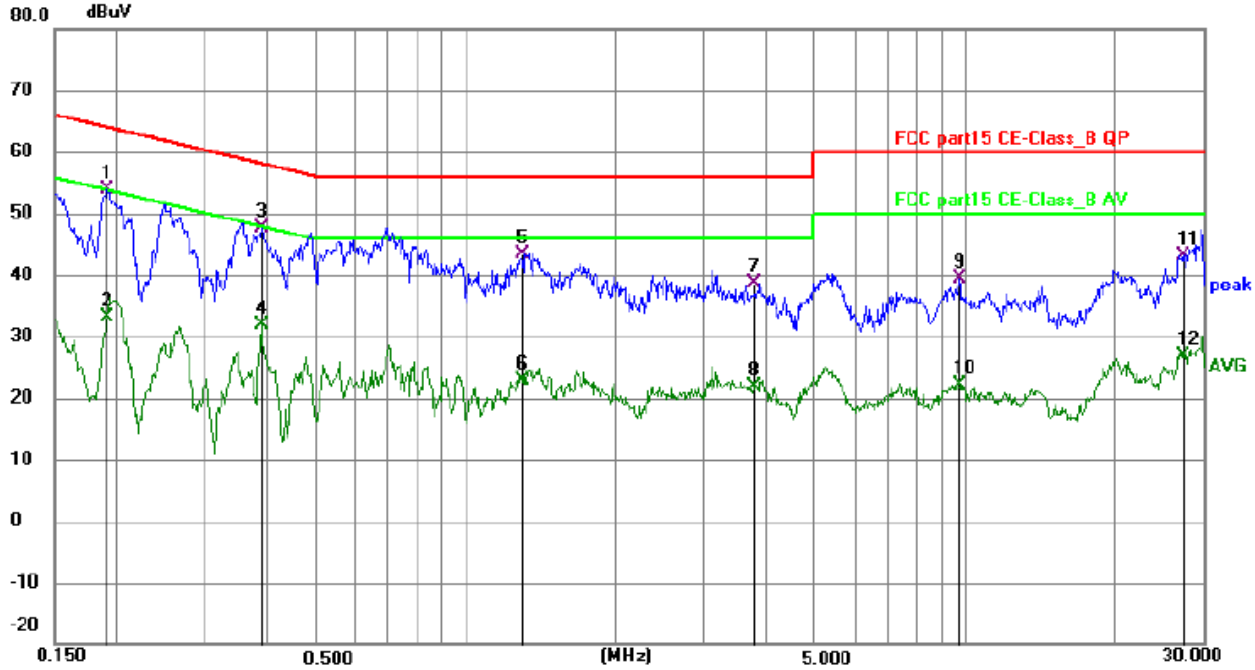


Remark:

Margin = Limit – Level, Correct Factor = Cable lose + LISN insertion loss, Level= Reading + Correct factor

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.190500	40.28	9.67	49.95	64.01	-14.06	QP	P	
2	0.190500	22.77	9.67	32.44	54.01	-21.57	AVG	P	
3 *	0.604500	37.98	9.32	47.30	56.00	-8.70	QP	P	
4	0.604500	13.56	9.32	22.88	46.00	-23.12	AVG	P	
5	1.620900	34.83	9.64	44.47	56.00	-11.53	QP	P	
6	1.620900	13.04	9.64	22.68	46.00	-23.32	AVG	P	
7	4.186300	32.90	9.63	42.53	56.00	-13.47	QP	P	
8	4.186300	13.28	9.63	22.91	46.00	-23.09	AVG	P	
9	9.762000	33.07	9.87	42.94	60.00	-17.06	QP	P	
10	9.762000	15.58	9.87	25.45	50.00	-24.55	AVG	P	
11	23.986200	37.65	11.16	48.81	60.00	-11.19	QP	P	
12	23.986200	22.61	11.16	33.77	50.00	-16.23	AVG	P	

Temperature:	25 ℃	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	N
Test Voltage :	AC 120V/60Hz	Test Mode:	Mode 4



Remark:

Margin = Limit – Level, Correct Factor = Cable lose + LISN insertion loss, Level= Reading + Correct factor

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1 *	0.190500	44.77	9.13	53.90	64.01	-10.11	QP	P	
2	0.190500	23.96	9.13	33.09	54.01	-20.92	AVG	P	
3	0.388500	38.49	9.21	47.70	58.10	-10.40	QP	P	
4	0.388500	22.71	9.21	31.92	48.10	-16.18	AVG	P	
5	1.302000	33.82	9.54	43.36	56.00	-12.64	QP	P	
6	1.302000	13.24	9.54	22.78	46.00	-23.22	AVG	P	
7	3.786000	28.78	9.81	38.59	56.00	-17.41	QP	P	
8	3.786000	12.06	9.81	21.87	46.00	-24.13	AVG	P	
9	9.734700	29.27	10.05	39.32	60.00	-20.68	QP	P	
10	9.734700	12.11	10.05	22.16	50.00	-27.84	AVG	P	
11	27.397500	31.94	11.15	43.09	60.00	-16.91	QP	P	
12	27.397500	15.79	11.15	26.94	50.00	-23.06	AVG	P	

3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Limit (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

(1) The limit for radiated test was performed according to FCC PART 15C.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	40GHz
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.2.2 TEST PROCEDURE

Below 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 metre to 1.5 metre(Above 18GHz the distance is 1 meter and table is 1.5 metre).
h. Test the EUT in the lowest channel, the middle channel, the Highest channel

Note:

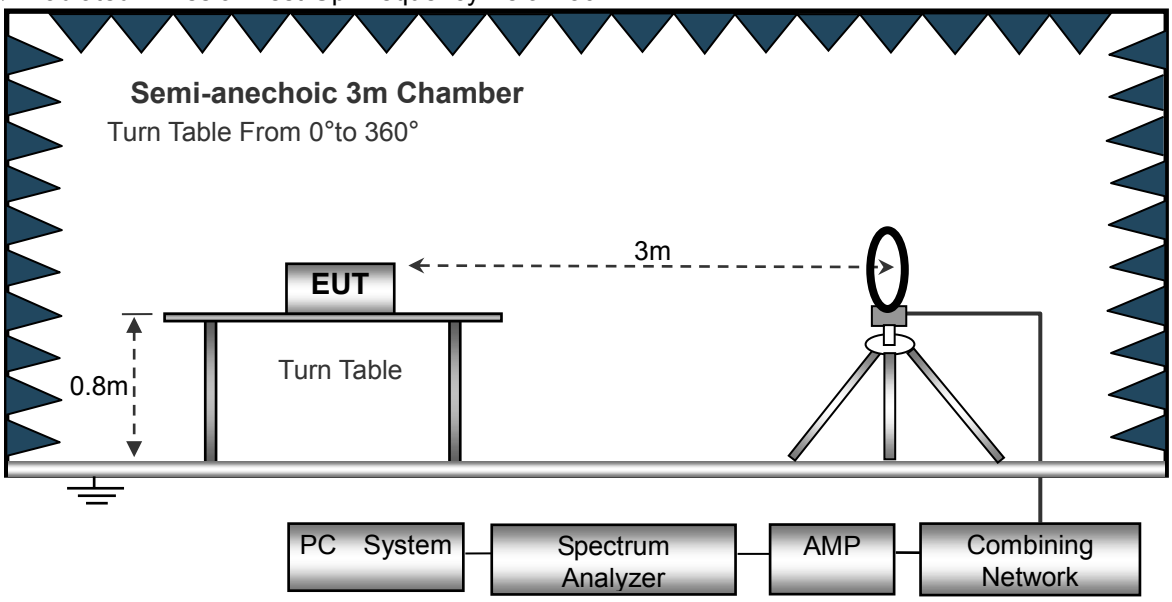
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

3.2.3 DEVIATION FROM TEST STANDARD

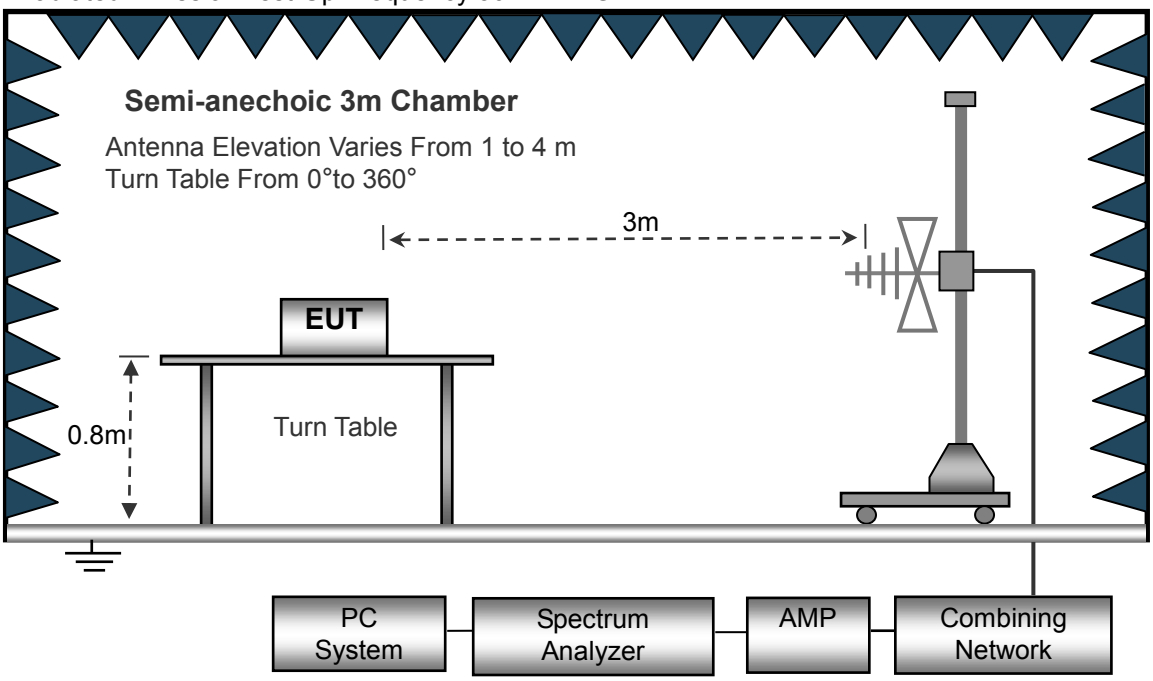
No deviation

3.2.4 TEST SETUP

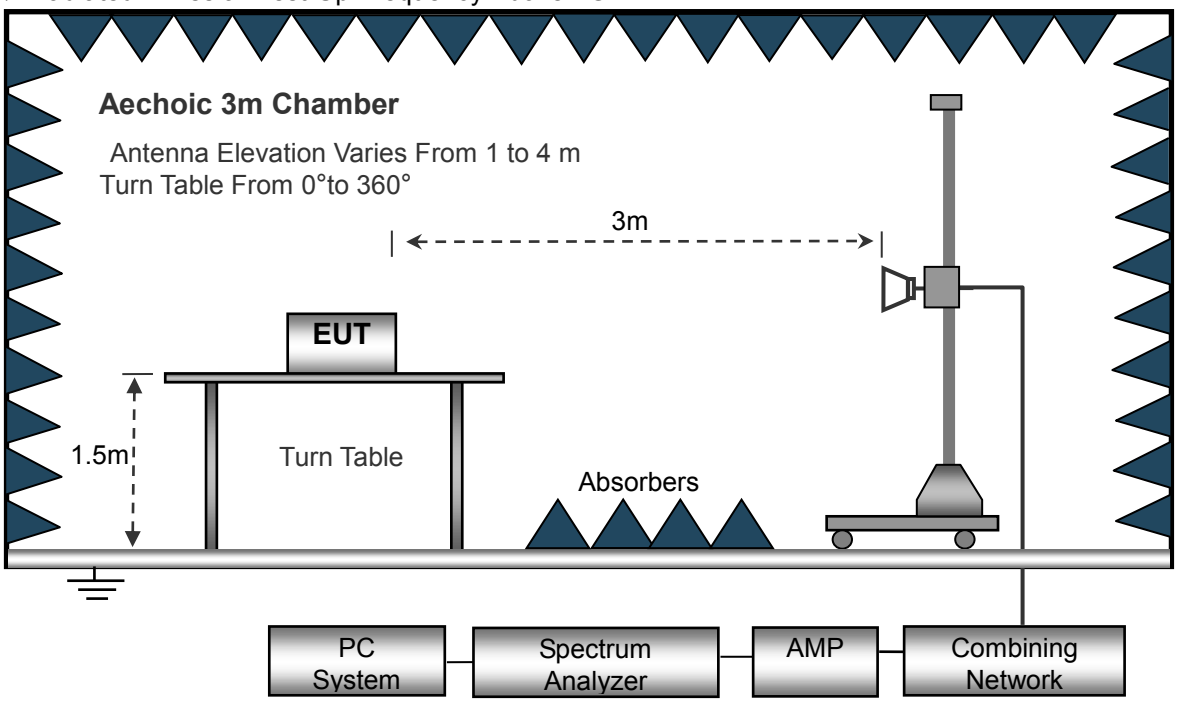
（A）Radiated Emission Test-Up Frequency Below 30MHz



（B）Radiated Emission Test-Up Frequency 30MHz~1GHz



（C）Radiated Emission Test-Up Frequency Above 1GHz



3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.6 TEST RESULTS (Between 9KHz – 30 MHz)

Temperature:	20℃	Relative Humidtity:	48%
Pressure:	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	Mode 5	Polarization :	--

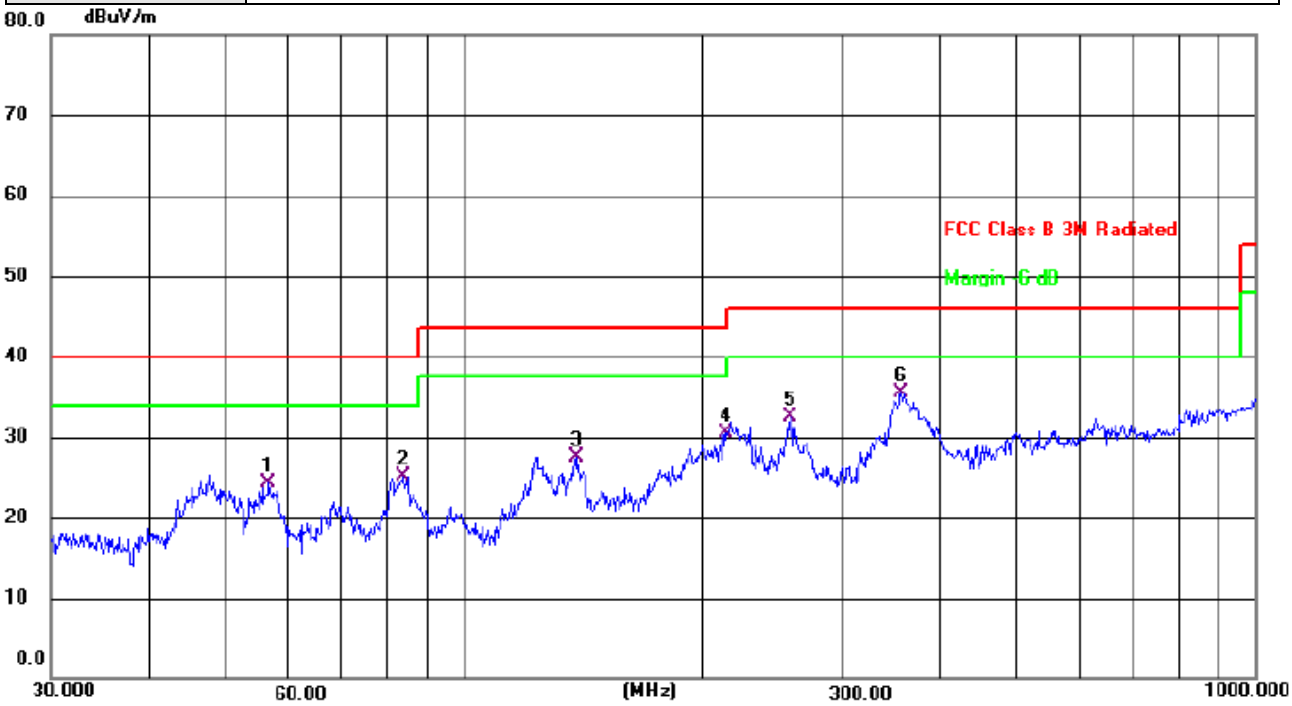
Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	PASS
--	--	--	--	PASS

NOTE:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
Distance extrapolation factor =40 log (specific distance/test distance)(dB);
Limit line = specific limits(dBuv) + distance extrapolation factor.

3.2.7 TEST RESULTS (Between 30MHz – 1GHz)

Temperature:	26℃	Relative Humidity:	54%
Pressure:	1010 hPa	Polarization :	Horizontal
Test Voltage :	AC 120V/60Hz		
Test Mode :	Mode 5		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		56.5929	35.56	-11.27	24.29	40.00	-15.71	QP
2		83.5220	41.27	-16.12	25.15	40.00	-14.85	QP
3		138.3873	43.61	-16.09	27.52	43.50	-15.98	QP
4		213.7632	43.38	-12.87	30.51	43.50	-12.99	QP
5		258.3263	44.16	-11.57	32.59	46.00	-13.41	QP
6	*	356.6757	45.34	-9.91	35.43	46.00	-10.57	QP

Remark:

Correct Factor = Cable loss + Antenna factor – Preamplifier;

Level = Reading Level + Correct Factor; Margin = Level - Limit;

Temperature:	26℃	Relative Humidity:	54%
Pressure:	1010 hPa	Polarization :	Vertical
test voltage :	AC 120V/60Hz		
Test Mode :	Mode 5		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		36.3813	42.01	-13.40	28.61	40.00	-11.39	QP
2		54.8348	36.68	-11.52	25.16	40.00	-14.84	QP
3		96.0985	45.35	-15.16	30.19	43.50	-13.31	QP
4		207.1225	42.90	-12.71	30.19	43.50	-13.31	QP
5		403.2500	42.79	-8.22	34.57	46.00	-11.43	QP
6	*	485.6091	41.05	-6.21	34.84	46.00	-11.16	QP

Remark:

Correct Factor = Cable loss + Antenna factor – Preamplifier;

Level = Reading Level + Correct Factor; Margin = Level - Limit;

3.2.8 TEST RESULTS (1ghz~40ghZ)

802.11a band 4
We test all antenna's data, the data only show the antenna3 worst mode4.

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:5745									
V	11490	54.29	49.05	15.3	37.39	57.93	74	-16.07	PK
V	11490	41.03	49.05	15.3	37.39	44.67	54	-9.33	AV
V	17235	55.35	49.16	15.27	40.45	61.91	68.2	-6.29	PK
V	17235	40.97	49.16	15.27	40.45	47.53	54	-6.47	AV
H	11490	52.35	49.05	15.3	37.39	55.99	74	-18.01	PK
H	11490	42.18	49.05	15.3	37.39	45.82	54	-8.18	AV
H	17235	51.35	49.16	15.27	40.45	57.91	68.2	-10.29	PK
H	17235	40.23	49.16	15.27	40.45	46.79	54	-7.21	AV
operation frequency:5785									
V	11570	51.67	49.09	15.34	37.42	55.34	74	-18.66	PK
V	11570	41.15	49.09	15.34	37.42	44.82	54	-9.18	AV
V	17355	50.36	49.18	15.29	40.47	56.94	68.2	-11.26	PK
V	17355	40.74	49.18	15.29	40.47	47.32	54	-6.68	AV
H	11570	50.63	49.09	15.34	37.42	54.3	74	-19.70	PK
H	11570	42.08	49.09	15.34	37.42	45.75	54	-8.25	AV
H	17355	48.75	49.18	15.29	40.47	55.33	68.2	-12.87	PK
H	17355	40.13	49.18	15.29	40.47	46.71	54	-7.29	AV
operation frequency:5825									
V	11650	52.07	49.11	15.37	37.46	55.79	74	-18.21	PK
V	11650	41.31	49.11	15.37	37.46	45.03	54	-8.97	AV
V	17475	49.28	49.21	15.34	40.51	55.92	68.2	-12.28	PK
V	17475	40.46	49.21	15.34	40.51	47.1	54	-6.90	AV
H	11650	57.44	49.11	15.37	31.31	55.01	74	-18.99	PK
H	11650	48.06	49.11	15.37	31.31	45.63	54	-8.37	AV
H	17475	49.37	49.21	15.34	40.51	56.01	68.2	-12.19	PK
H	17475	40.14	49.21	15.34	40.51	46.78	54	-7.22	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
   Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

802.11n HT20
We test all antenna's data, the data only show the mode 5 worst mode.

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:5745									
V	11490	49.23	49.05	15.3	37.39	52.87	74	-21.13	PK
V	11490	42.18	49.05	15.3	37.39	45.82	54	-8.18	AV
V	17235	48.54	49.16	15.27	40.45	55.1	68.2	-13.10	PK
V	17235	40.26	49.16	15.27	40.45	46.82	54	-7.18	AV
H	11490	49.33	49.05	15.3	37.39	52.97	74	-21.03	PK
H	11490	41.17	49.05	15.3	37.39	44.81	54	-9.19	AV
H	17235	48.24	49.16	15.27	40.45	54.8	68.2	-13.40	PK
H	17235	40.46	49.16	15.27	40.45	47.02	54	-6.98	AV
operation frequency:5785									
V	11570	52.37	49.09	15.34	37.42	56.04	74	-17.96	PK
V	11570	42.25	49.09	15.34	37.42	45.92	54	-8.08	AV
V	17355	49.96	49.18	15.29	40.47	56.54	68.2	-11.66	PK
V	17355	40.54	49.18	15.29	40.47	47.12	54	-6.88	AV
H	11570	49.37	49.09	15.34	37.42	53.04	74	-20.96	PK
H	11570	43.63	49.09	15.34	37.42	47.3	54	-6.70	AV
H	17355	49.38	49.18	15.29	40.47	55.96	68.2	-12.24	PK
H	17355	40.76	49.18	15.29	40.47	47.34	54	-6.66	AV
operation frequency:5825									
V	11650	51.27	49.11	15.37	37.46	54.99	74	-19.01	PK
V	11650	41.46	49.11	15.37	37.46	45.18	54	-8.82	AV
V	17475	48.28	49.21	15.34	40.51	54.92	68.2	-13.28	PK
V	17475	40.69	49.21	15.34	40.51	47.33	54	-6.67	AV
H	11650	57.27	49.11	15.37	31.31	54.84	74	-19.16	PK
H	11650	44.35	49.11	15.37	31.31	41.92	54	-12.08	AV
H	17475	49.23	49.21	15.34	40.51	55.87	68.2	-12.33	PK
H	17475	40.65	49.21	15.34	40.51	47.29	54	-6.71	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
   Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

802.11n HT40

We test all antenna's data, the data only show the mode 5 worst mode.

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:5755									
V	11510	49.16	49.07	15.33	37.41	52.83	74	-21.17	PK
V	11510	41.57	49.07	15.33	37.41	45.24	54	-8.76	AV
V	17265	49.61	49.17	15.28	40.46	56.18	68.2	-12.02	PK
V	17265	40.28	49.17	15.28	40.46	46.85	54	-7.15	AV
H	11510	48.36	49.07	15.33	37.41	52.03	74	-21.97	PK
H	11510	41.14	49.07	15.33	37.41	44.81	54	-9.19	AV
H	17265	49.96	49.17	15.28	40.46	56.53	68.2	-11.67	PK
H	17265	40.27	49.17	15.28	40.46	46.84	54	-7.16	AV
operation frequency:5795									
V	11590	49.16	49.11	15.37	37.46	52.88	74	-21.12	PK
V	11590	41.27	49.11	15.37	37.46	44.99	54	-9.01	AV
V	17385	48.46	49.21	15.34	40.51	55.1	68.2	-13.10	PK
V	17385	40.38	49.21	15.34	40.51	47.02	54	-6.98	AV
H	11590	57.53	49.11	15.37	31.31	55.1	74	-18.90	PK
H	11590	44.74	49.11	15.37	31.31	42.31	54	-11.69	AV
H	17385	48.19	49.21	15.34	40.51	54.83	68.2	-13.37	PK
H	17385	40.25	49.21	15.34	40.51	46.89	54	-7.11	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
   Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

802.11ac HT20
We test all antenna's data, the data only show the mode 5 worst mode.

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:5745									
V	11490	49.33	49.05	15.3	37.39	52.97	74	-21.03	PK
V	11490	42.48	49.05	15.3	37.39	46.12	54	-7.88	AV
V	17235	48.64	49.16	15.27	40.45	55.2	68.2	-13.00	PK
V	17235	40.22	49.16	15.27	40.45	46.78	54	-7.22	AV
H	11490	48.43	49.05	15.3	37.39	52.07	74	-21.93	PK
H	11490	41.37	49.05	15.3	37.39	45.01	54	-8.99	AV
H	17235	48.26	49.16	15.27	40.45	54.82	68.2	-13.38	PK
H	17235	40.48	49.16	15.27	40.45	47.04	54	-6.96	AV
operation frequency:5785									
V	11570	48.46	49.09	15.34	37.42	52.13	74	-21.87	PK
V	11570	41.87	49.09	15.34	37.42	45.54	54	-8.46	AV
V	17355	49.25	49.18	15.29	40.47	55.83	68.2	-12.37	PK
V	17355	40.46	49.18	15.29	40.47	47.04	54	-6.96	AV
H	11570	49.67	49.09	15.34	37.42	53.34	74	-20.66	PK
H	11570	43.16	49.09	15.34	37.42	46.83	54	-7.17	AV
H	17355	49.38	49.18	15.29	40.47	55.96	68.2	-12.24	PK
H	17355	40.85	49.18	15.29	40.47	47.43	54	-6.57	AV
operation frequency:5825									
V	11650	49.13	49.11	15.37	37.46	52.85	74	-21.15	PK
V	11650	41.37	49.11	15.37	37.46	45.09	54	-8.91	AV
V	17475	48.14	49.21	15.34	40.51	54.78	68.2	-13.42	PK
V	17475	40.66	49.21	15.34	40.51	47.3	54	-6.70	AV
H	11650	57.78	49.11	15.37	31.31	55.35	74	-18.65	PK
H	11650	44.21	49.11	15.37	31.31	41.78	54	-12.22	AV
H	17475	48.37	49.21	15.34	40.51	55.01	68.2	-13.19	PK
H	17475	40.56	49.21	15.34	40.51	47.2	54	-6.80	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
   Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

802.11ac HT40

We test all antenna's data, the data only show the mode 5 worst mode.

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:5755									
V	11510	49.26	49.07	15.33	37.41	52.93	74	-21.07	PK
V	11510	42.85	49.07	15.33	37.41	46.52	54	-7.48	AV
V	17265	48.64	49.17	15.28	40.46	55.21	68.2	-12.99	PK
V	17265	41.16	49.17	15.28	40.46	47.73	54	-6.27	AV
H	11510	48.33	49.07	15.33	37.41	52	74	-22.00	PK
H	11510	42.74	49.07	15.33	37.41	46.41	54	-7.59	AV
H	17265	48.82	49.17	15.28	40.46	55.39	68.2	-12.81	PK
H	17265	40.25	49.17	15.28	40.46	46.82	54	-7.18	AV
operation frequency:5795									
V	11590	49.46	49.11	15.37	37.46	53.18	74	-20.82	PK
V	11590	41.37	49.11	15.37	37.46	45.09	54	-8.91	AV
V	17385	48.14	49.21	15.34	40.51	54.78	68.2	-13.42	PK
V	17385	40.66	49.21	15.34	40.51	47.3	54	-6.70	AV
H	11590	57.28	49.11	15.37	31.31	54.85	74	-19.15	PK
H	11590	44.73	49.11	15.37	31.31	42.3	54	-11.70	AV
H	17385	48.27	49.21	15.34	40.51	54.91	68.2	-13.29	PK
H	17385	40.41	49.21	15.34	40.51	47.05	54	-6.95	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
   Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

802.11ac HT80

We test all antenna's data, the data only show the mode 5 worst mode.

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:5775									
V	11550	48.36	49.07	15.33	37.41	52.03	74	-21.97	PK
V	11550	42.87	49.07	15.33	37.41	46.54	54	-7.46	AV
V	17325	49.66	49.17	15.28	40.46	56.23	68.2	-11.97	PK
V	17325	40.18	49.17	15.28	40.46	46.75	54	-7.25	AV
H	11550	48.35	49.07	15.33	37.41	52.02	74	-21.98	PK
H	11550	41.23	49.07	15.33	37.41	44.9	54	-9.10	AV
H	17325	48.44	49.17	15.28	40.46	55.01	68.2	-13.19	PK
H	17325	40.68	49.17	15.28	40.46	47.25	54	-6.75	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
   Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

3.3 CONDUCTED BAND EMISSION MEASUREMENT

3.3.1 TEST REQUIREMENT:

FCC Part15 C Section 15.209 and 15.407

(4) For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Spectrum Parameter	Setting	
Attenuation	Auto	
Start Frequency	5150MHz	5725MHz
Stop Frequency	5250MHz	5850MHz
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average	

3.3.2 TEST PROCEDURE

Test method: FCC KDB 789033 G)& Parts 15.407(b)(4) & 15.209(a)

3.3.3 DEVIATION FROM TEST STANDARD

No deviation

3.3.4 TEST SETUP

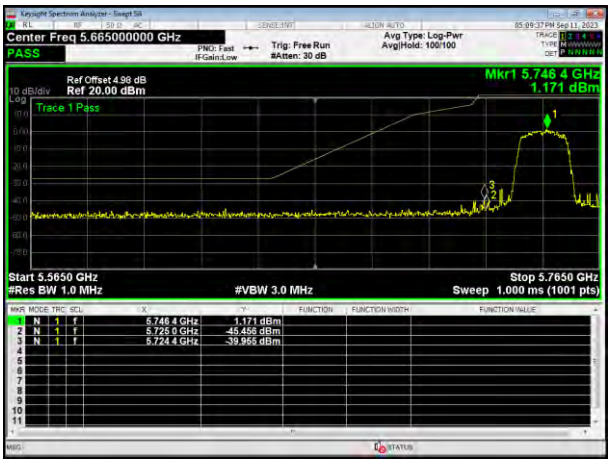
3.3.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

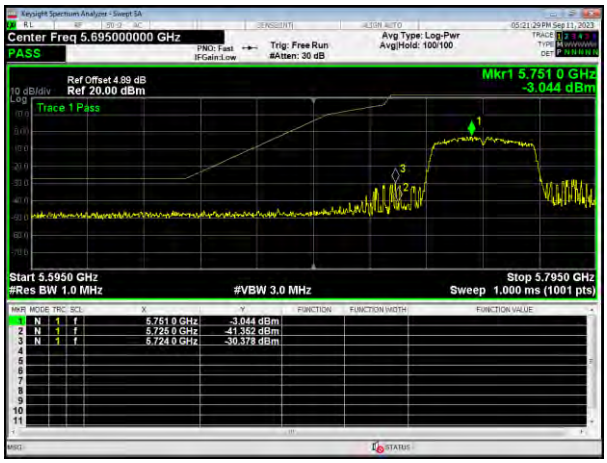
3.3.6 TEST RESULT

The antenna gain is compensated in the test data.

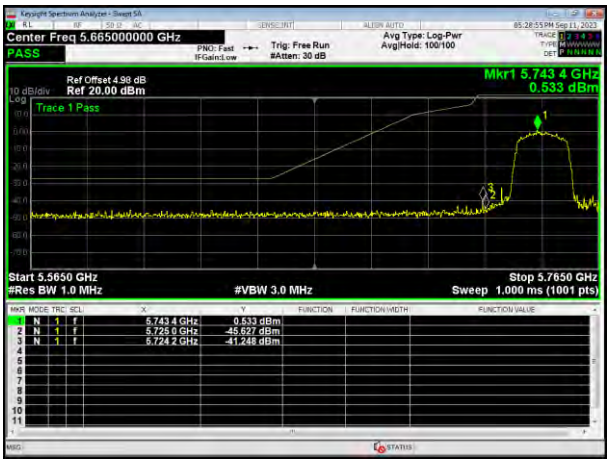
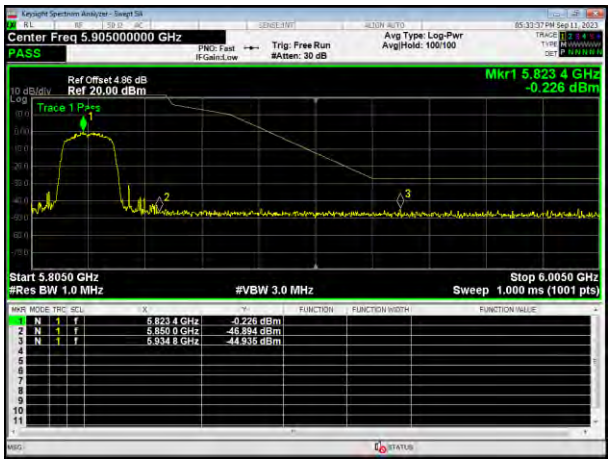
We test all antenna's data, the data only show the antenna3 worst mode.

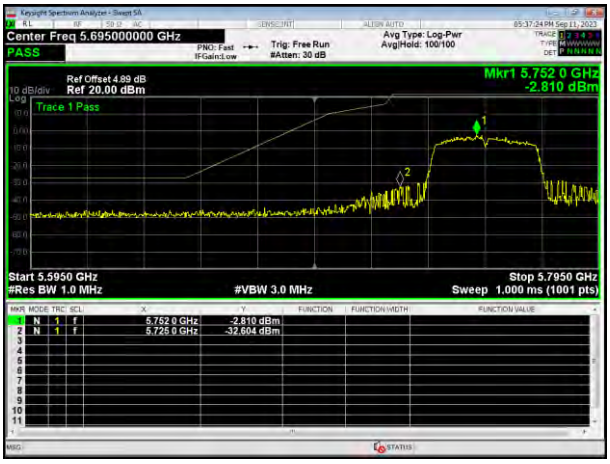
802.11a	
	
5745MHz	5825MHz

We test all antenna's data, the data only show the mode 5(antenna3) worst mode.

802.11n HT20	
5745MHz	5825MHz
802.11n HT40	
	
5755MHz	5795MHz

We test all antenna's data, the data only show the mode 5(antenna3) worst mode.

802.11ac HT20	
	
5745MHz	5825MHz

802.11ac HT40	
	
5755MHz	5795MHz

802.11ac HT80	
5775MHz	

Note:The test result of ANT3 & ANT4 are all attenuated 3dB below the limit. So the MIMO mode is passed.

4. AVERAGING OUTPUT POWER

4.1 APPLIED PROCEDURES / LIMIT

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

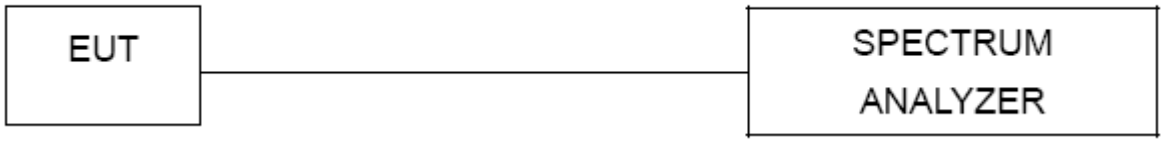
4.1.1 TEST PROCEDURE

a. The EUT was directly connected to the power meter and antenna output port as show in the block diagram below,
b. Spectrum Setting : RBW > the 20 dB bandwidth of the emission being measured
Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel
VBW ≥ RBW
Sweep = auto
Detector function = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
Trace = max hold

4.1.2 DEVIATION FROM STANDARD

No deviation.

4.1.3 TEST SETUP



4.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

4.1.5 TEST RESULTS

Temperature:	25 ℃	Relative Humidity:	60%
Pressure:	1012 hPa	Test Voltage :	AC 120V/60Hz

Antenna3

Mode	Test Channel	Averaging Output Power (dBm)	Duty factor (dB)	Total Output Power(dB)	LIMIT (dBm)
802.11a	Low	6.225	0.7	6.925	30
	Middle	6.437	0.7	7.137	30
	High	6.1	0.7	6.8	30
802.11n HT20	Low	7.008	0.11	7.118	30
	Middle	7.312	0.11	7.422	30
	High	6.83	0.11	6.94	30
802.11n HT40	Low	6.373	0.21	6.583	30
	High	6.536	0.21	6.746	30
802.11ac HT20	Low	6.394	0.2	6.594	30
	Middle	6.442	0.2	6.642	30
	High	6.05	0.2	6.25	30
802.11ac HT40	Low	6.021	0.38	6.401	30
	High	6.232	0.38	6.612	30
802.11ac HT80	/	5.834	0.67	6.504	30

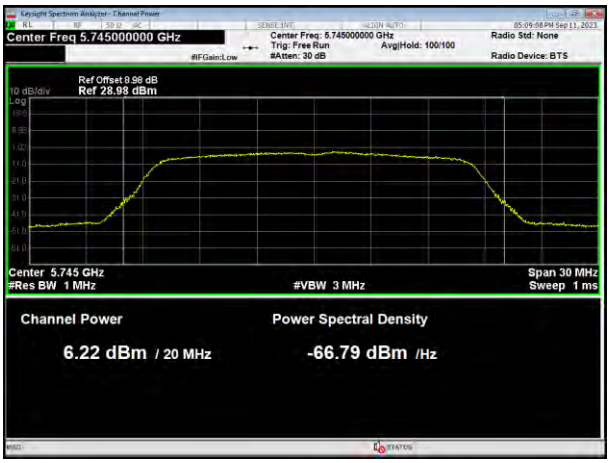
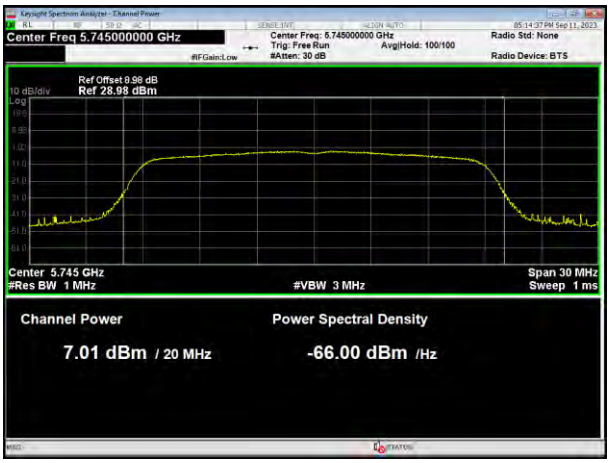
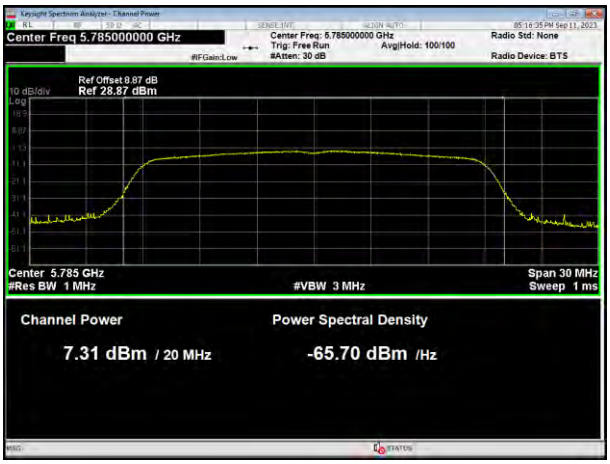
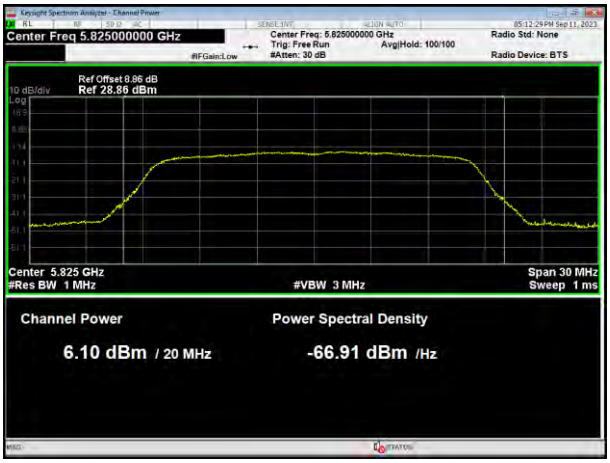
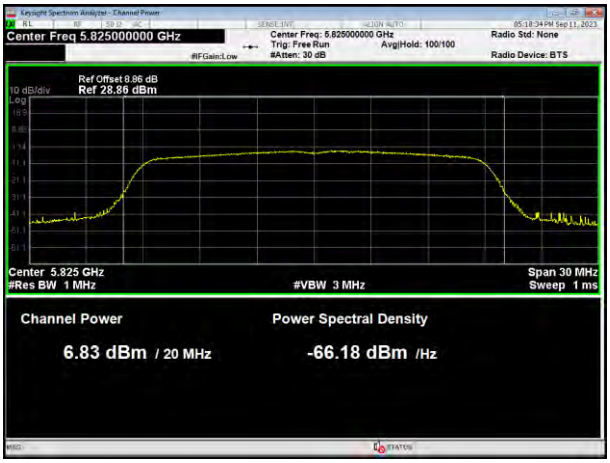
Antenna4

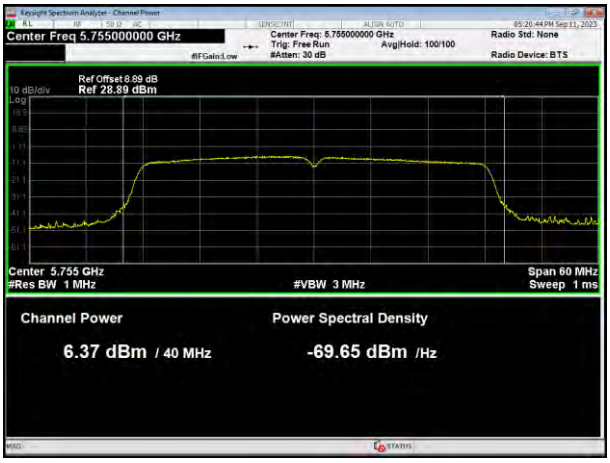
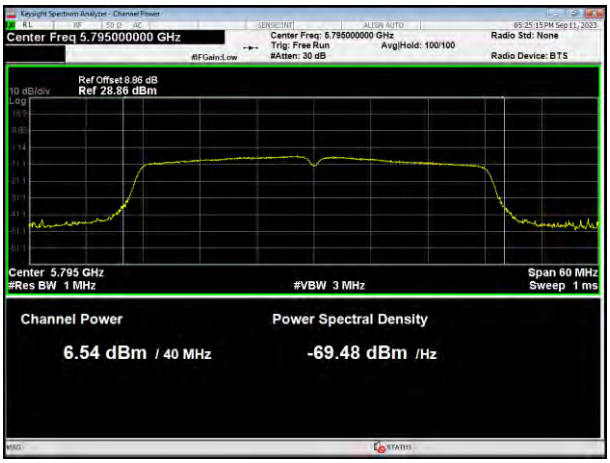
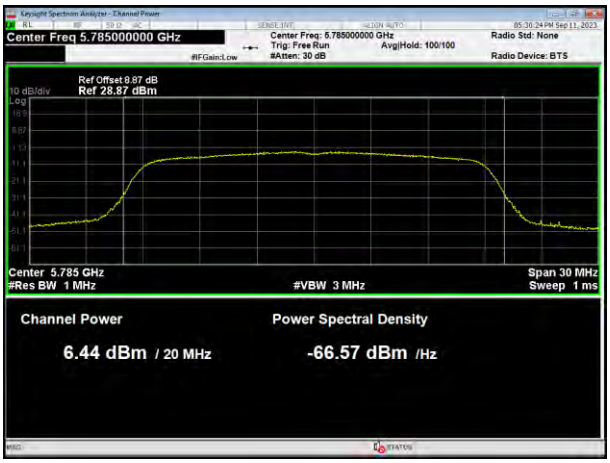
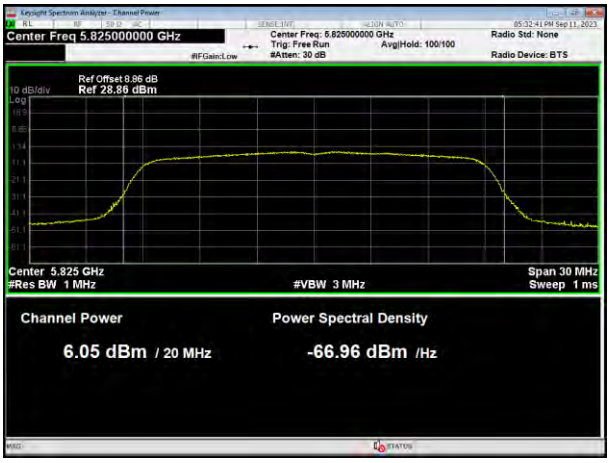
Mode	Test Channel	Averaging Output Power (dBm)	Duty factor (dB)	Total Output Power(dB)	LIMIT (dBm)
802.11a	Low	6.276	0.69	6.966	30
	Middle	6.454	0.69	7.144	30
	High	6.147	0.69	6.837	30
802.11n HT20	Low	7.226	0.11	7.336	30
	Middle	6.65	0.11	6.76	30
	High	6.245	0.11	6.355	30
802.11n HT40	Low	5.872	0.21	6.082	30
	High	6.005	0.21	6.215	30
802.11ac HT20	Low	6.344	0.2	6.544	30
	Middle	6.513	0.2	6.713	30
	High	6.202	0.2	6.402	30
802.11ac HT40	Low	5.534	0.38	5.914	30
	High	5.631	0.38	6.011	30
802.11ac HT80	/	5.309	0.67	5.979	30

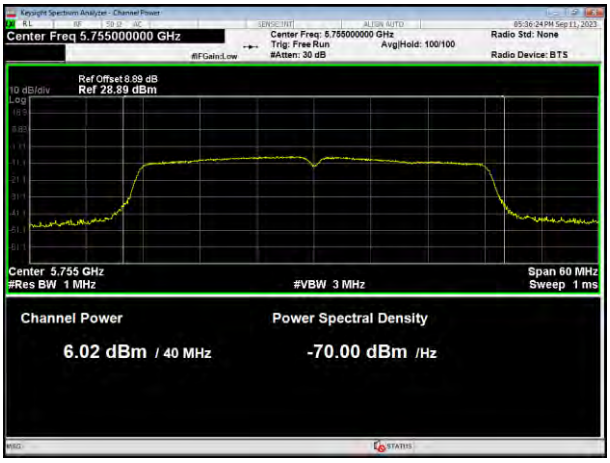
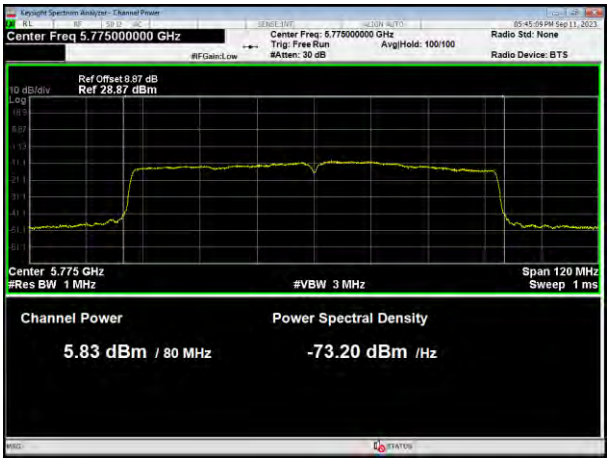
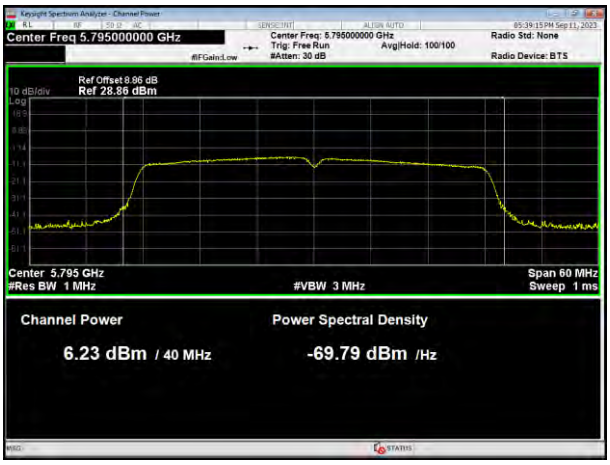
For MIMO

Mode	Test Channel	Antenna	Total Output Power(dB)	Limit (dBm)	Result
802.11n20	Low	Antenna3+ Antenna4	10.24	30.00	PASS
	Middle		10.11	30.00	PASS
	High		9.67	30.00	PASS
802.11n40	Low		9.35	30.00	PASS
	High		9.50	30.00	PASS
802.11ac HT20	Low		9.58	30.00	PASS
	Middle		9.69	30.00	PASS
	High		9.34	30.00	PASS
802.11ac HT40	Low		9.17	30.00	PASS
	High		9.33	30.00	PASS
802.11ac HT80	/		9.26	30.00	PASS

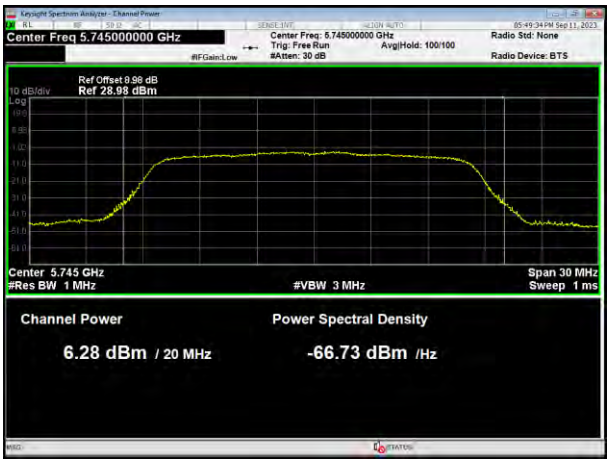
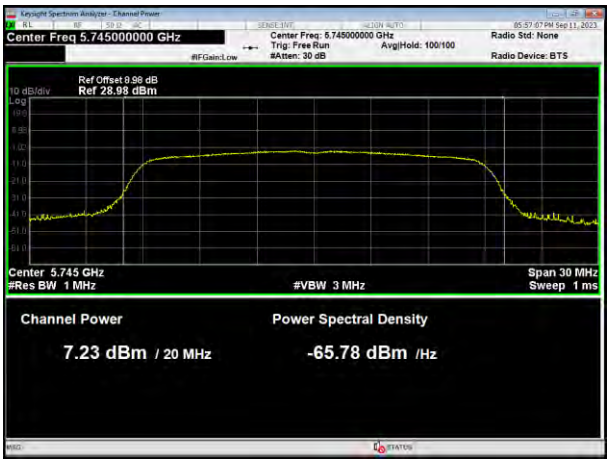
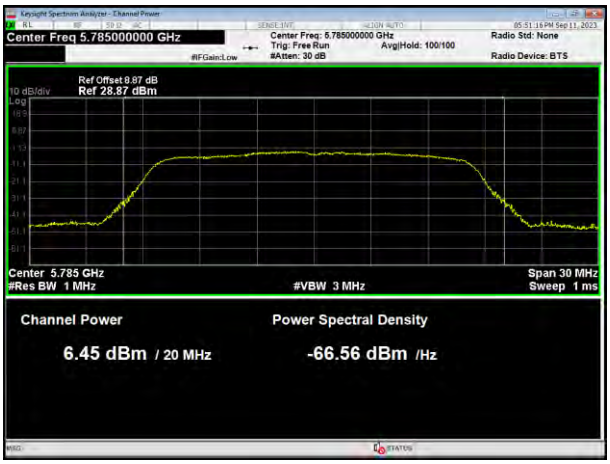
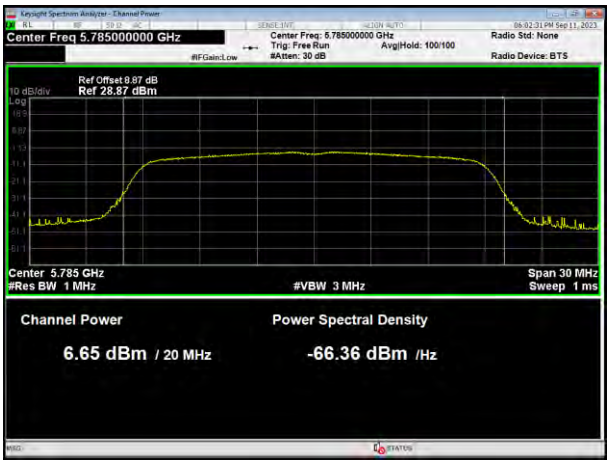
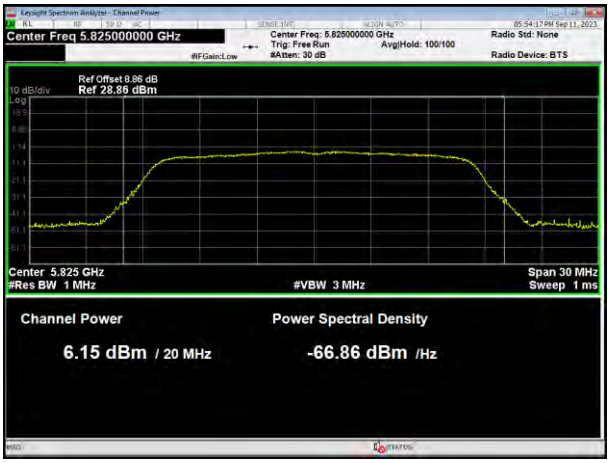
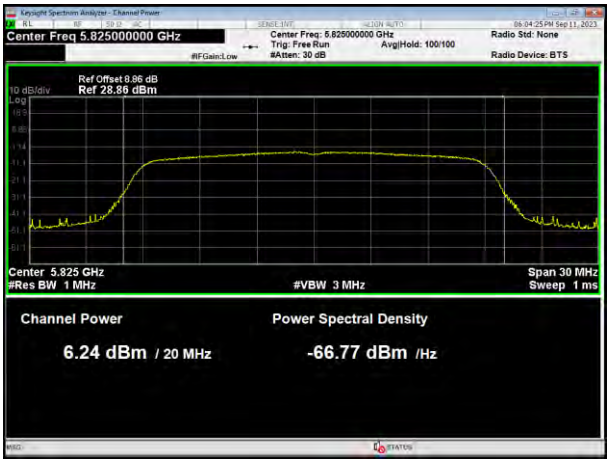
Antenna3

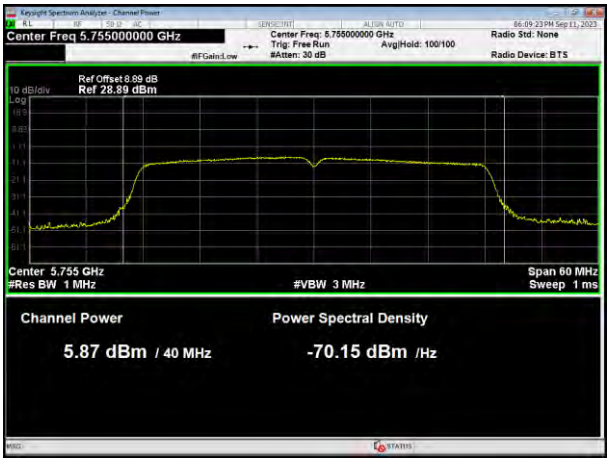
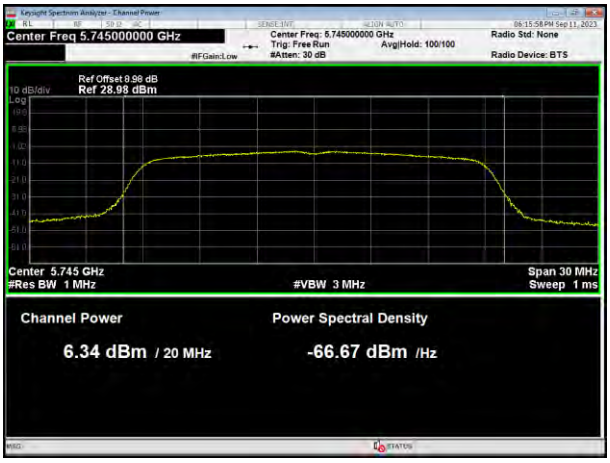
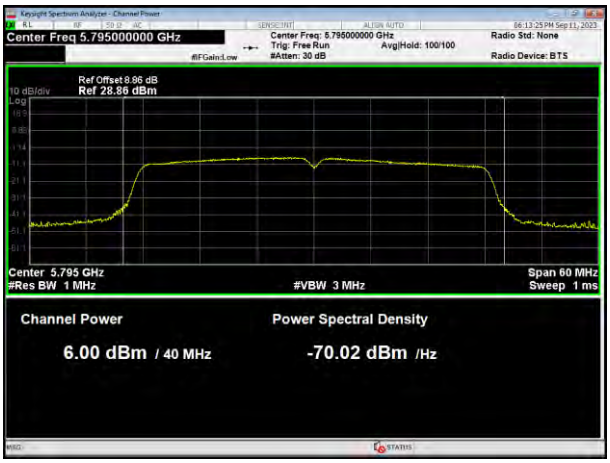
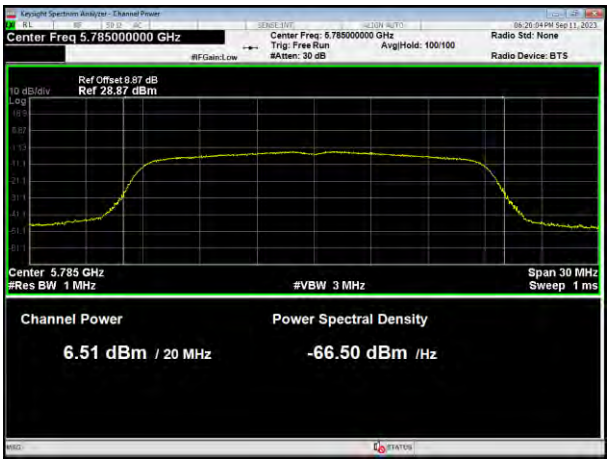
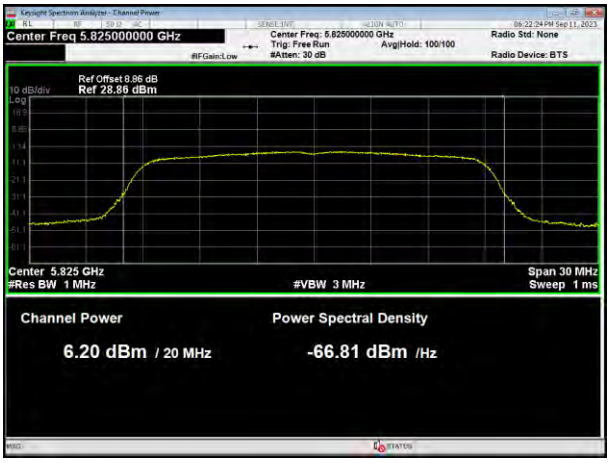
802.11a	802.11n HT20
	
5745MHz	5745MHz
	
5785MHz	5785MHz
	
5825MHz	5825MHz

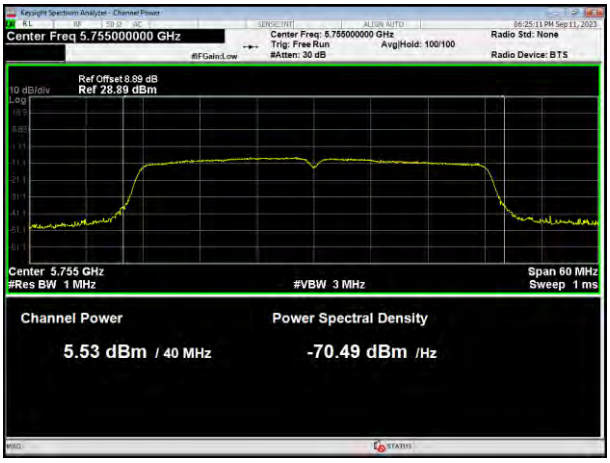
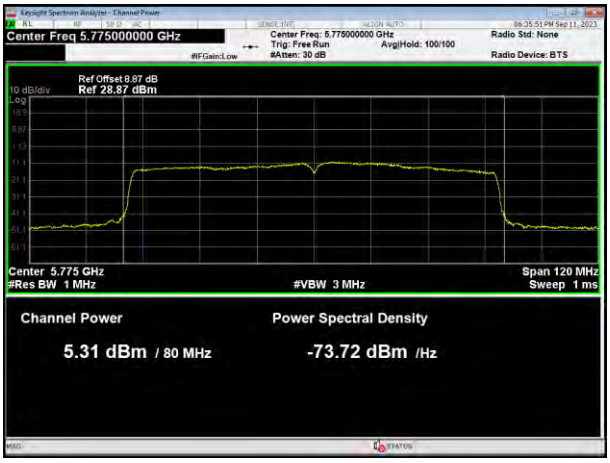
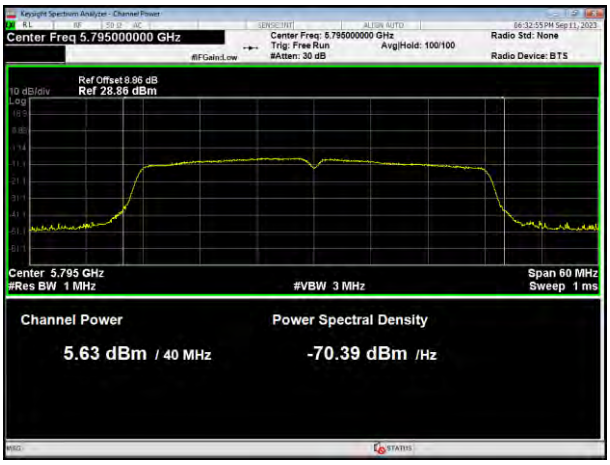
802.11n HT40	802.11ac HT20
	
5755MHz	5745MHz
	
5795MHz	5785MHz
	
	5825MHz

802.11ac HT40	802.11ac HT80
	
5755MHz	5775MHz
	
5795MHz	

Antenna4

802.11a	802.11n HT20
	
5745MHz	5745MHz
	
5785MHz	5785MHz
	
5825MHz	5825MHz

802.11n HT40	802.11ac HT20
	
5755MHz	5745MHz
	
5795MHz	5785MHz
	
	5825MHz

802.11ac HT40	802.11ac HT80
	
5755MHz	5775MHz
	
5795MHz	

5. POWER SPECTRAL DENSITY TEST

5.1 APPLIED PROCEDURES / LIMIT

In addition, the maximum power spectral density shall not exceed 30 dBm in any 500 kHz band.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	= the frequency band of operation
RB	RBW ≥ 1MHz for band 1 RBW ≥ 510KHz for band 4
VB	VBW ≥ 3RBW
Detector	RMS (i.e., power averaging).
Trace	Max Hold
Sweep Time	Auto

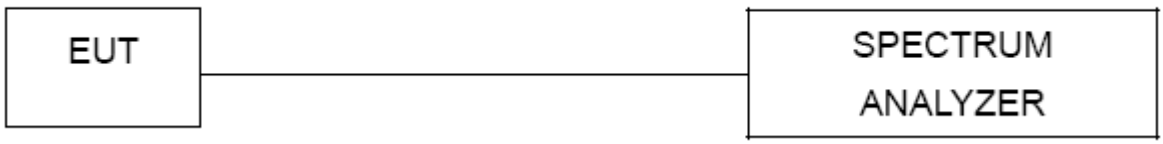
5.1.1 TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows FCC KDB 789033 D02.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to Spectrum.
4. For U-NII1, U-NII-2A, U-NII-2C Band:
Set RBW=1MHz, VBW=3MHz, where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = sample, traces 100 sweeps of video averaging. (SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)
For U-NII-3 Band:
Set RBW=510 kHz, VBW=3*RBW, where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = sample, traces 100 sweeps of video averaging. (SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)
5. User the cursor on spectrum to peak search the highest level of trace
6. Record the max. reading and add 10 log(1/duty cycle).
   we test all antennas, the antenna 1 was worst mode and the data recording in the report.
7. Duty factor Reference is made to the test results in Section 7.1.5.

5.1.2 DEVIATION FROM STANDARD

No deviation.

5.1.3 TEST SETUP



5.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

5.1.5 TEST RESULTS

Antenna3

	Mode	Test Channel	Reading Level (dBm)	Duty factor (dB)	PSD (dBm/ 500kHz)	Limit (dBm/ 500kHz)	Result
Band4	802.11a	Low	-5.565	0.7	-4.865	30.00	PASS
		Middle	-5.77	0.7	-5.07	30.00	PASS
		High	-6.026	0.7	-5.326	30.00	PASS
	802.11n20	Low	-5.426	0.11	-5.316	30.00	PASS
		Middle	-5.213	0.11	-5.103	30.00	PASS
		High	-5.651	0.11	-5.541	30.00	PASS
	802.11n40	Low	-9.604	0.21	-9.394	30.00	PASS
		High	-9.703	0.21	-9.493	30.00	PASS
	802.11ac20	Low	-5.996	0.2	-5.796	30.00	PASS
		Middle	-6.282	0.2	-6.082	30.00	PASS
		High	-6.585	0.2	-6.385	30.00	PASS
	802.11ac40	Low	-9.799	0.38	-9.419	30.00	PASS
		High	-9.234	0.38	-8.854	30.00	PASS
	802.11ac80	/	-12.331	0.67	-11.661	30.00	PASS

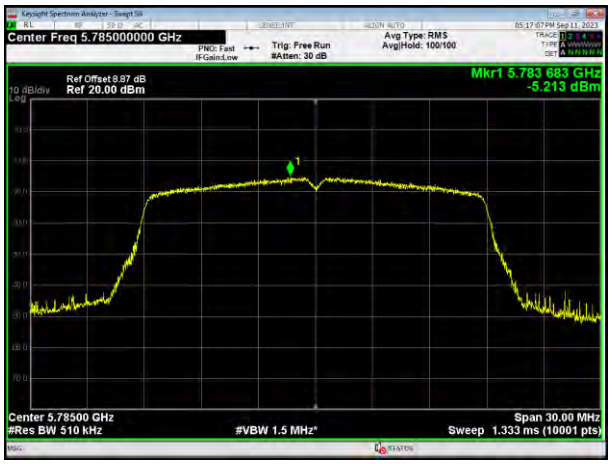
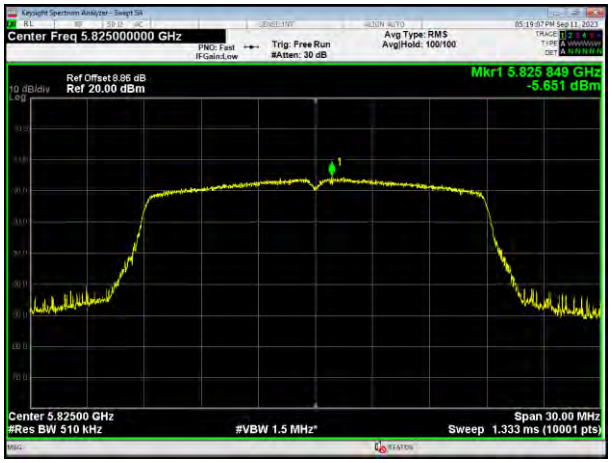
Antenna4

	Mode	Test Channel	Reading Level (dBm)	Duty factor (dB)	PSD (dBm/ 500kHz)	Limit (dBm/ 500kHz)	Result
Band4	802.11a	Low	-5.823	0.69	-5.133	30.00	PASS
		Middle	-5.768	0.69	-5.078	30.00	PASS
		High	-6.001	0.69	-5.311	30.00	PASS
	802.11n20	Low	-5.053	0.11	-4.943	30.00	PASS
		Middle	-5.707	0.11	-5.597	30.00	PASS
		High	-6.45	0.11	-6.34	30.00	PASS
	802.11n40	Low	-9.947	0.21	-9.737	30.00	PASS
		High	-9.527	0.21	-9.317	30.00	PASS
	802.11ac20	Low	-6.149	0.2	-5.949	30.00	PASS
		Middle	-6.054	0.2	-5.854	30.00	PASS
		High	-6.519	0.2	-6.319	30.00	PASS
	802.11ac40	Low	-10.068	0.38	-9.688	30.00	PASS
		High	-9.641	0.38	-9.261	30.00	PASS
	802.11ac80	/	-12.845	0.67	-12.175	30.00	PASS

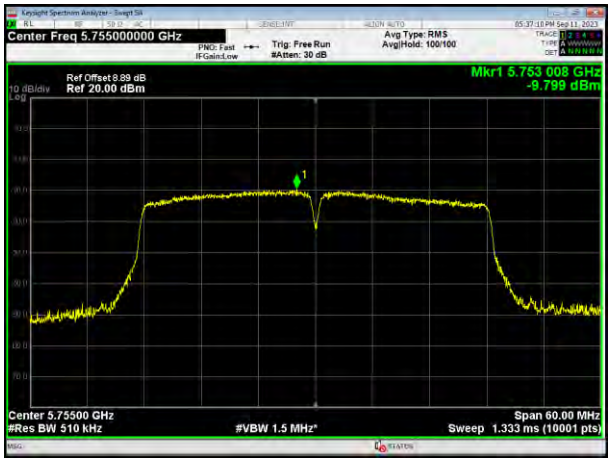
For MIMO

Mode	Test Channel	Antenna	PSD (dBm/ 500kHz)	Limit (dBm/ 500kHz)	Result
802.11n20	Low	Antenna3+ Antenna4	-2.12	30.00	PASS
	Middle		-2.33	30.00	PASS
	High		-2.91	30.00	PASS
802.11n40	Low		-6.55	30.00	PASS
	High		-6.39	30.00	PASS
802.11ac20	Low		-2.86	30.00	PASS
	Middle		-2.96	30.00	PASS
	High		-3.34	30.00	PASS
802.11ac40	Low		-6.54	30.00	PASS
	High		-6.04	30.00	PASS
802.11ac80	/		-8.90	30.00	PASS

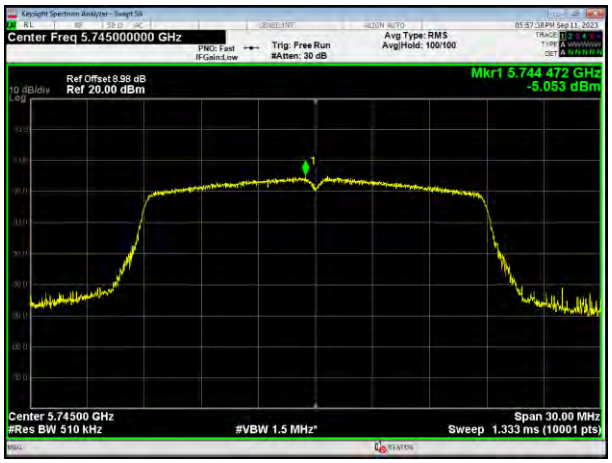
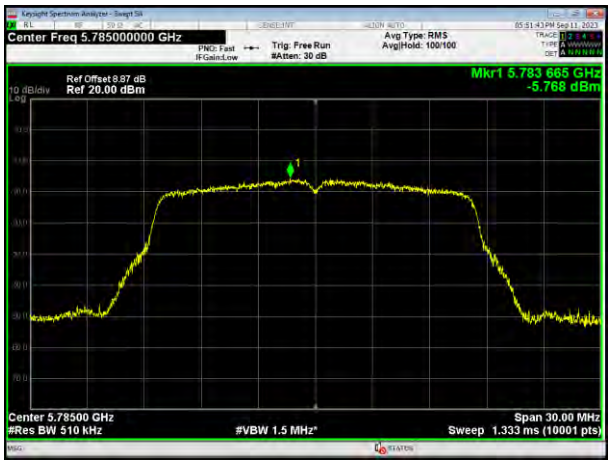
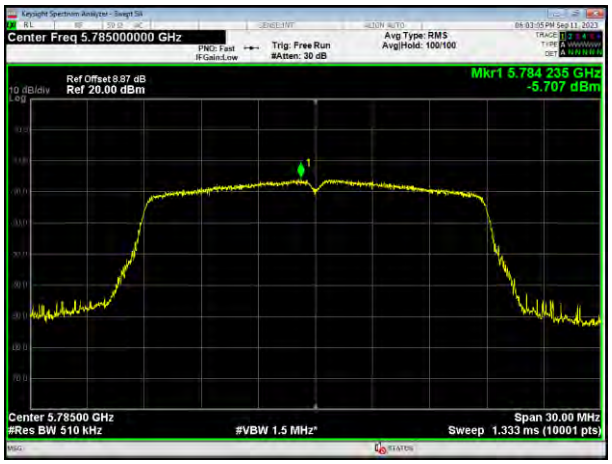
Antenna3

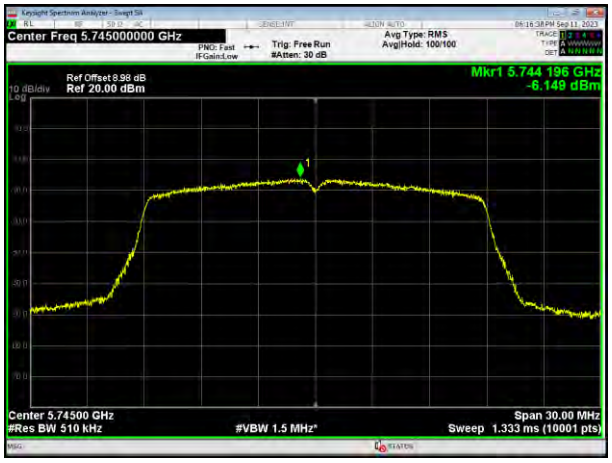
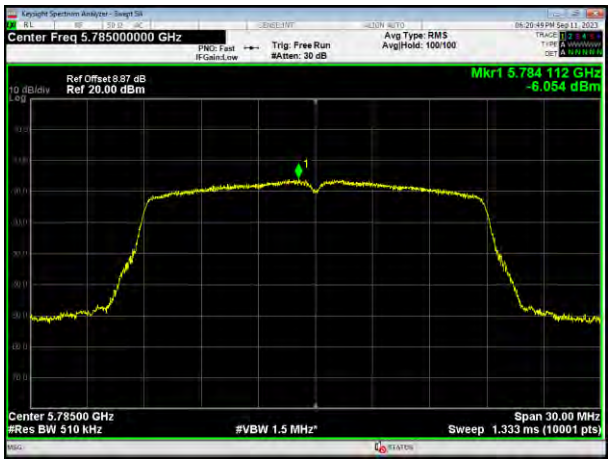
802.11a	802.11n HT20
5745MHz	5745MHz
	
5785MHz	5785MHz
	
5825MHz	5825MHz

802.11n HT40	802.11ac HT20
5755MHz	5745MHz
5795MHz	5785MHz
	5825MHz

802.11ac HT40	802.11ac HT80
	
5755MHz	5775MHz
5795MHz	

Antenna4

802.11a	802.11n HT20
	
5745MHz	5745MHz
	
5785MHz	5785MHz
5825MHz	5825MHz

802.11n HT40	802.11ac HT20
	
5755MHz	5745MHz
	
5795MHz	5785MHz
	5825MHz

802.11ac HT40	802.11ac HT80
5755MHz	5775MHz
5795MHz	

6. 6DB BANDWIDTH TEST

6.1 APPLIED PROCEDURES / LIMIT

There is no limit bandwidth for U-NII-1, U-NII-2-A and U-NII-2-C.

The minimum of 6dB Bandwidth measurement is 0.5 MHz for U-NII-3

6.1.1 TEST PROCEDURE

6dB Bandwidth	
Spectrum Parameters	Setting
RBW	100KHz
VBW	300KHz
Span	30MHz(20MHz Bandwidth mode) 60MHz(40MHz Bandwidth mode) 120MHz(80MHz Bandwidth mode)
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP

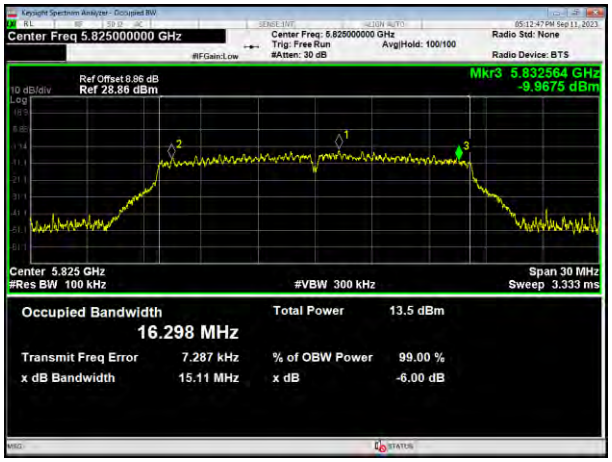
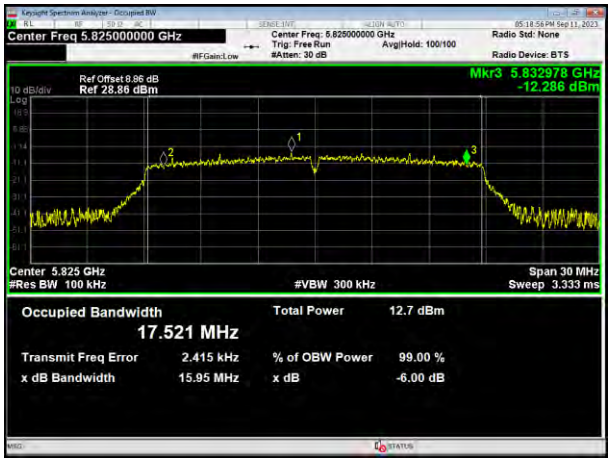
6.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

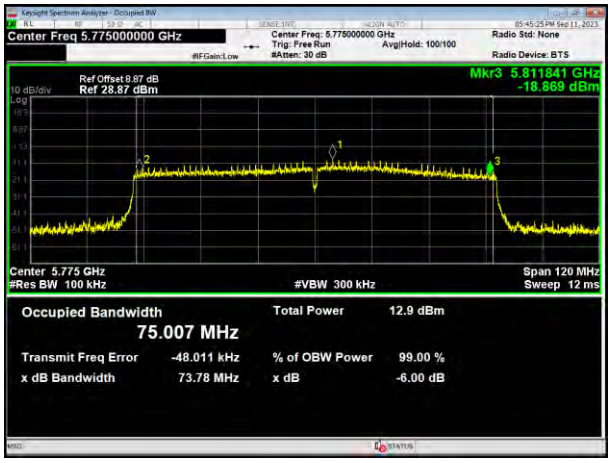
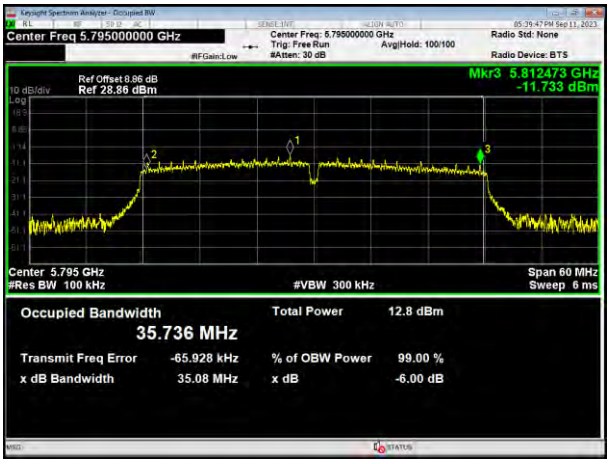
6.1.5 TEST RESULTS

		Test Channel	6dB Bandwidth (MHz)		6dB Bandwidth Limit (MHz)	Result
			Antenna3	Antenna4		
Band 4	802.11a	Low	15.097	16.122	>0.5	Pass
		Middle	15.377	15.087	>0.5	Pass
		High	15.114	15.448	>0.5	Pass
	802.11n HT20	Low	14.746	13.818	>0.5	Pass
		Middle	13.745	13.839	>0.5	Pass
		High	15.952	15.055	>0.5	Pass
	802.11n HT40	Low	35.107	35.021	>0.5	Pass
		High	35.048	35.05	>0.5	Pass
	802.11ac HT20	Low	15.105	15.102	>0.5	Pass
		Middle	15.06	14.444	>0.5	Pass
		High	15.06	14.085	>0.5	Pass
	802.11ac HT40	Low	35.12	35.053	>0.5	Pass
		High	35.078	35.081	>0.5	Pass
	802.11ac HT80	/	73.777	75.077	>0.5	Pass

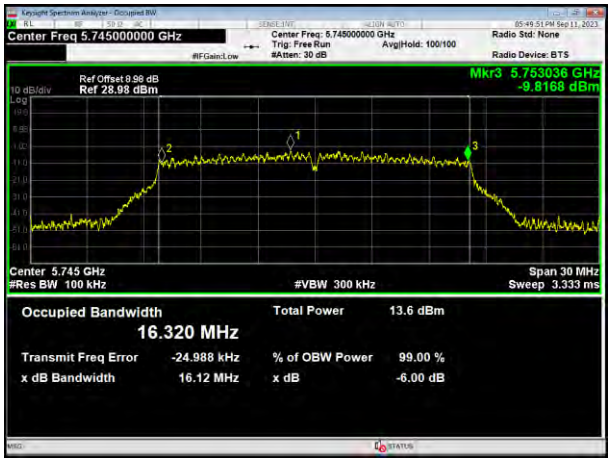
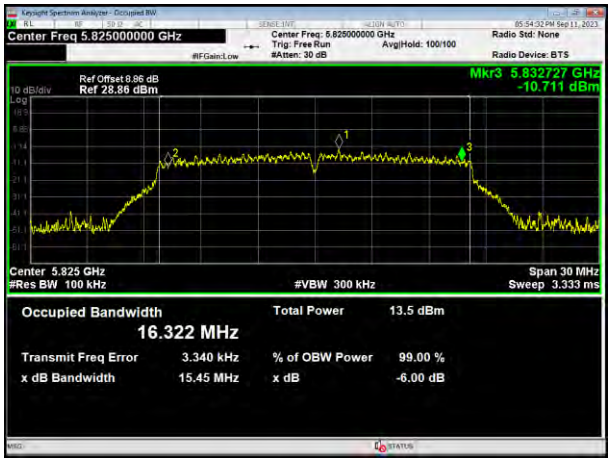
Antenna3

802.11a	802.11n HT20
5745MHz	5745MHz
5785MHz	5785MHz
	
5825MHz	5825MHz

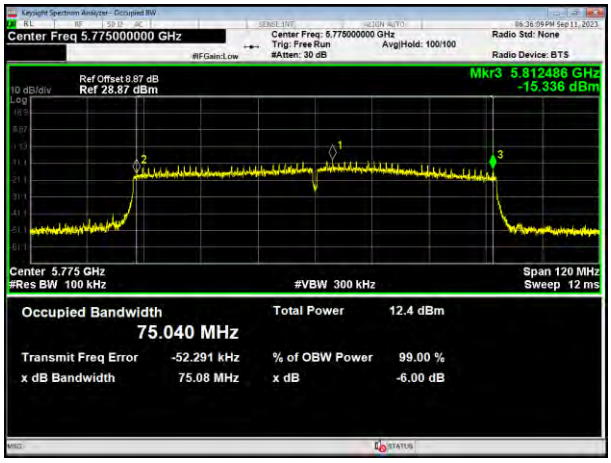
802.11n HT40	802.11ac HT20
5755MHz	5745MHz
5795MHz	5785MHz
	5825MHz

802.11ac HT40	802.11ac HT80
	
5755MHz	5775MHz
	
5795MHz	

Antenna4

802.11a	802.11n HT20
	
5745MHz	5745MHz
5785MHz	5785MHz
	
5825MHz	5825MHz

802.11n HT40	802.11ac HT20
5755MHz	5745MHz
5795MHz	5785MHz
	5825MHz

802.11ac HT40	802.11ac HT80
	
5755MHz	5775MHz
5795MHz	

7. DUTY CYCLE TEST SIGNAL

7.1 APPLIED PROCEDURES / LIMIT

Pre-analysis Check: While conducting average power measurement, duty cycle of each mode shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle. All duty cycle is pre-scanned, and result as obtained below shows only the most representative ones where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage.

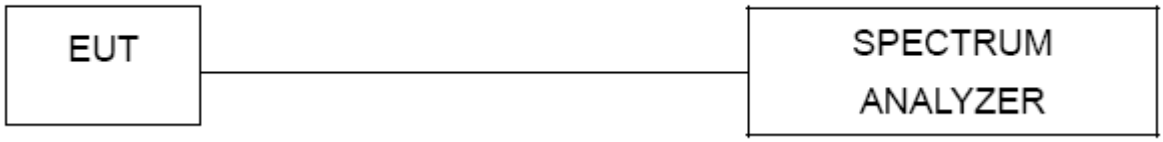
7.1.1 TEST PROCEDURE

1. Set RBW = 1 MHz.
2. Set the video bandwidth (VBW) ≥RBW.
3. Detector = Peak.
4. Sweep = auto couple.
5. Allow the trace to stabilize.
6. Span=0

7.1.2 DEVIATION FROM STANDARD

No deviation.

7.1.3 TEST SETUP



7.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

7.1.5 TEST RESULTS

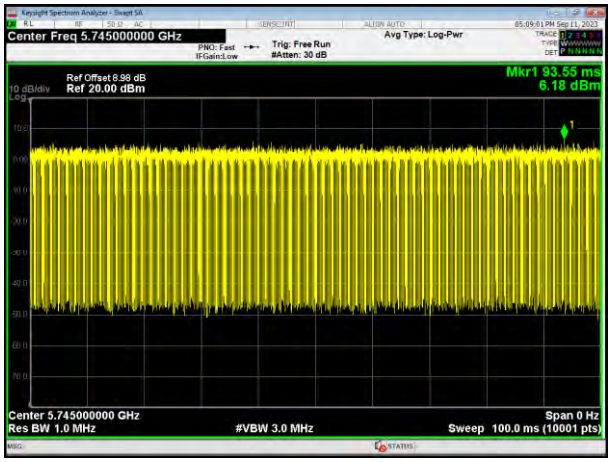
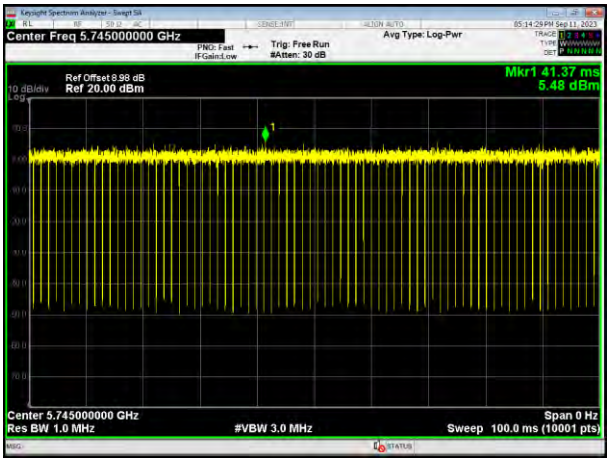
Antenna3

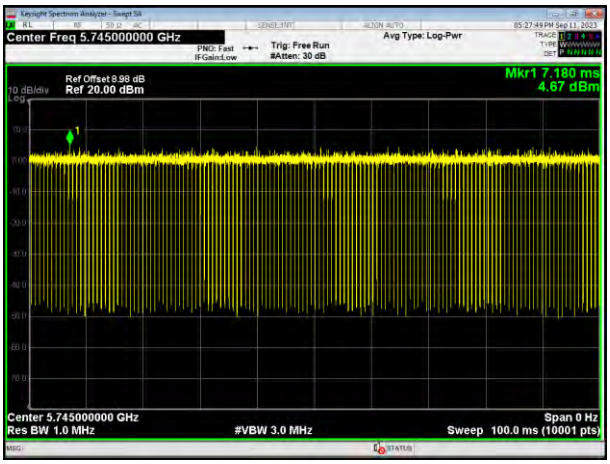
Operation Mode		Duty Cycle(%)	Duty Fator (dB) 10 * log (1/ Duty cycle)
Band 4	802.11a	85.21	0.7
	802.11n(HT20)	97.57	0.11
	802.11n(HT40)	95.3	0.21
	802.11ac(HT20)	95.43	0.2
	802.11ac(HT40)	91.62	0.38
	802.11ac(HT80)	85.64	0.67

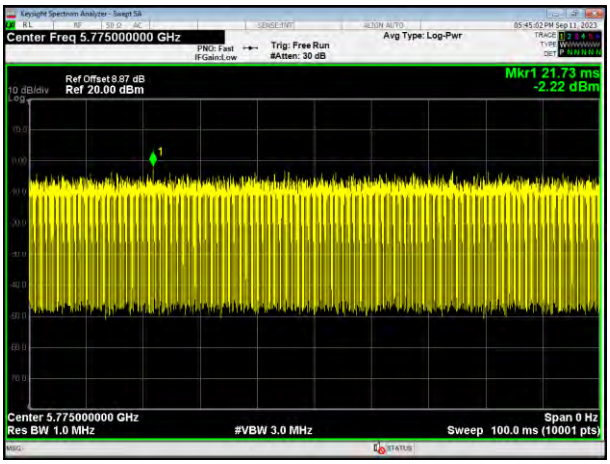
Antenna4

Operation Mode		Duty Cycle(%)	Duty Fator (dB) 10 * log (1/ Duty cycle)
Band 4	802.11a	85.23	0.69
	802.11n(HT20)	97.59	0.11
	802.11n(HT40)	95.27	0.21
	802.11ac(HT20)	95.49	0.2
	802.11ac(HT40)	91.65	0.38
	802.11ac(HT80)	85.77	0.67

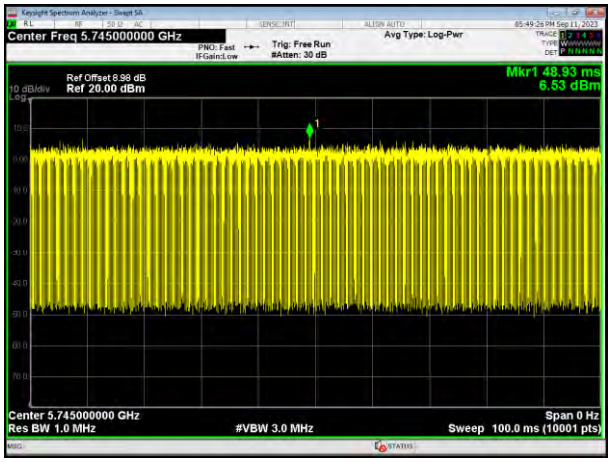
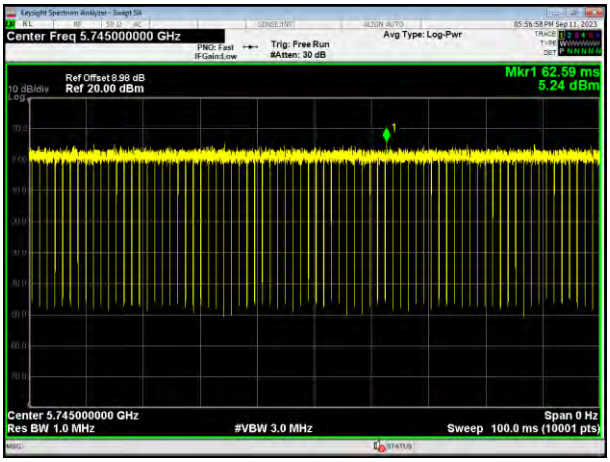
Antenna3

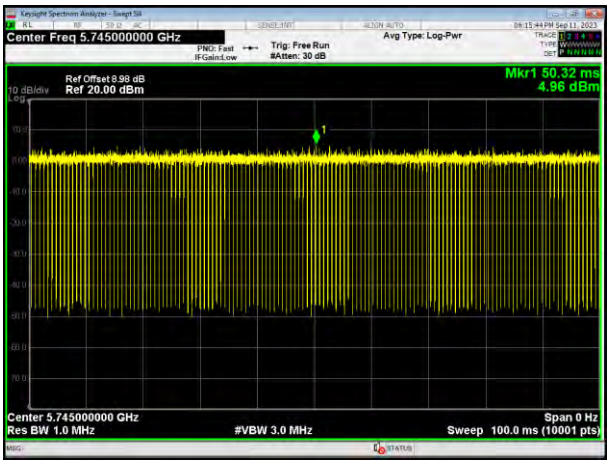
802.11a	802.11n HT20
	

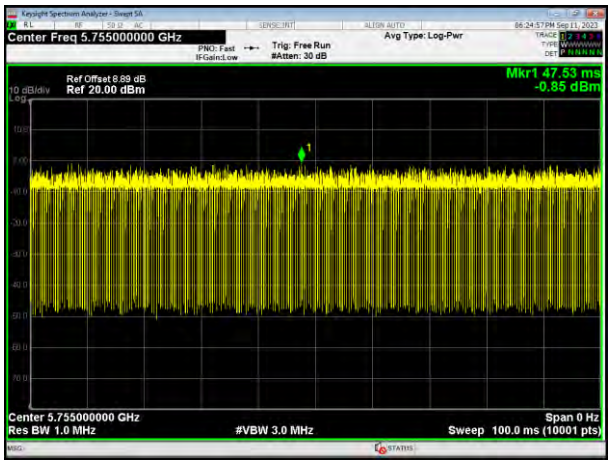
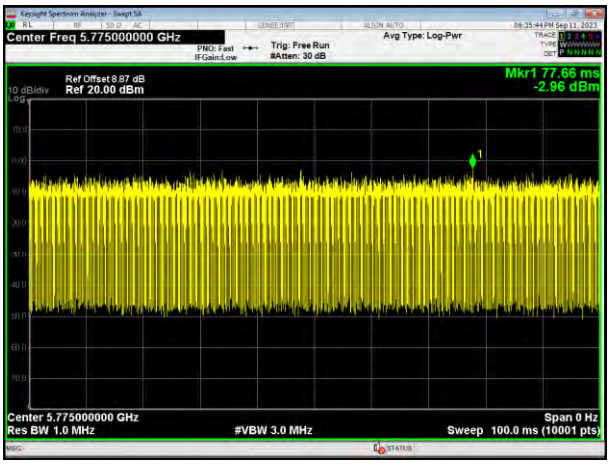
802.11n HT40	802.11ac HT20
	

802.11ac HT40	802.11ac HT80
	

Antenna4

802.11a	802.11n HT20
	

802.11n HT40	802.11ac HT20
	

802.11ac HT40	802.11ac HT80
	

8. FREQUENCY STABILITY

8.1 APPLIED PROCEDURES / LIMIT

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 user's manual.

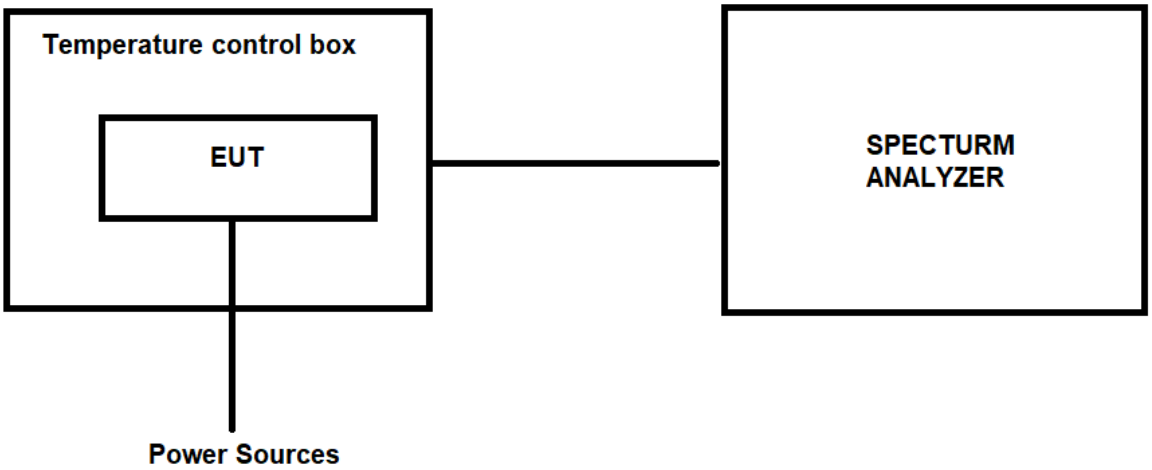
8.1.1 TEST PROCEDURE

1. The EUT was placed inside temperature chamber and powered and powered by nominal DC voltage.
2. Set EUT as normal operation.
3. Turn the EUT on and couple its output to spectrum.
4. Turn the EUT off and set the chamber to the highest temperature specified.
5. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT and measure the operating frequency.
6. Repeat step with the temperature chamber set to the lowest temperature.

8.1.2 DEVIATION FROM STANDARD

No deviation.

8.1.3 TEST SETUP



8.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

8.1.5 TEST RESULTS

We test all antenna's data, the data only show the antenna3 worst mode.

Test Voltage	Test Temp.	Measured Frequency (MHz)	Spectrum Frequency (MHz)			Δ Frequency (MHz)		
			802.11a	802.11n HT20	802.11ac HT20	802.11a	802.11n HT20	802.11ac HT20
132V	-20℃	5745	5745.0335	5745.0323	5745.0315	-0.0335	-0.0323	-0.0315
		5785	5785.0356	5785.0325	5785.0314	-0.0356	-0.0325	-0.0314
		5825	5825.0314	5825.0318	5825.0326	-0.0314	-0.0318	-0.0326
108V		5745	5745.0221	5745.0524	5745.0268	-0.0221	-0.0524	-0.0268
		5785	5785.0358	5785.0316	5785.0325	-0.0358	-0.0316	-0.0325
		5825	5825.0435	5825.0435	5825.0431	-0.0435	-0.0435	-0.0431
120V	25℃	5745	5745.0356	5745.0342	5745.0346	-0.0356	-0.0342	-0.0346
		5785	5785.0414	5785.0426	5785.0424	-0.0414	-0.0426	-0.0424
		5825	5825.0222	5825.0214	5825.0225	-0.0222	-0.0214	-0.0225
132V	50℃	5745	5745.0663	5745.0664	5745.0613	-0.0663	-0.0664	-0.0613
		5785	5785.0445	5785.0441	5785.0424	-0.0445	-0.0441	-0.0424
		5825	5825.0666	5825.0616	5825.0635	-0.0666	-0.0616	-0.0635
108V	50℃	5745	5745.0477	5745.0438	5745.0423	-0.0477	-0.0438	-0.0423
		5785	5785.0234	5785.0244	5785.0228	-0.0234	-0.0244	-0.0228
		5825	5825.0766	5825.0713	5825.0736	-0.0766	-0.0713	-0.0736

Test Voltage	Test Temp.	Measured Frequency (MHz)	Spectrum Frequency (MHz)		Δ Frequency (MHz)	
			802.11n HT40	802.11ac HT40	802.11n HT40	802.11ac HT40
132V	-20℃	5755	5755.0513	5755.0514	-0.0513	-0.0514
		5795	5795.0635	5795.0665	-0.0635	-0.0665
108V		5755	5755.0214	5755.0523	-0.0214	-0.0523
		5795	5795.0443	5795.0434	-0.0443	-0.0434
120V	25℃	5755	5755.0235	5755.0215	-0.0235	-0.0215
		5795	5795.0511	5795.0553	-0.0511	-0.0553
132V	50℃	5755	5755.0426	5755.0454	-0.0426	-0.0454
		5795	5795.0347	5795.0395	-0.0347	-0.0395
108V	50℃	5755	5755.0312	5755.0366	-0.0312	-0.0366
		5795	5795.0423	5795.0437	-0.0423	-0.0437

Test Voltage	Test Temp.	Measured Frequency (MHz)	Spectrum Frequency (MHz)	Δ Frequency (MHz)
			802.11ac HT80	802.11ac HT80
132V	-20℃	5775	5775.0156	-0.0156
108V		5775	5775.0315	-0.0315
120V	25℃	5775	5775.0464	-0.0464
132V	50℃	5775	5775.0226	-0.0226
108V	50℃	5775	5775.0538	-0.0538

9. TRANSMISSION IN THE ABSENCE OF DATA

9.1 STANDARD REQUIREMENT

According to §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 a description of how this requirement is met.

9.2 TEST RESULT

No non-compliance noted:
Refer to the theory of operation.

10. ANTENNA REQUIREMENT

10.1 STANDARD REQUIREMENT

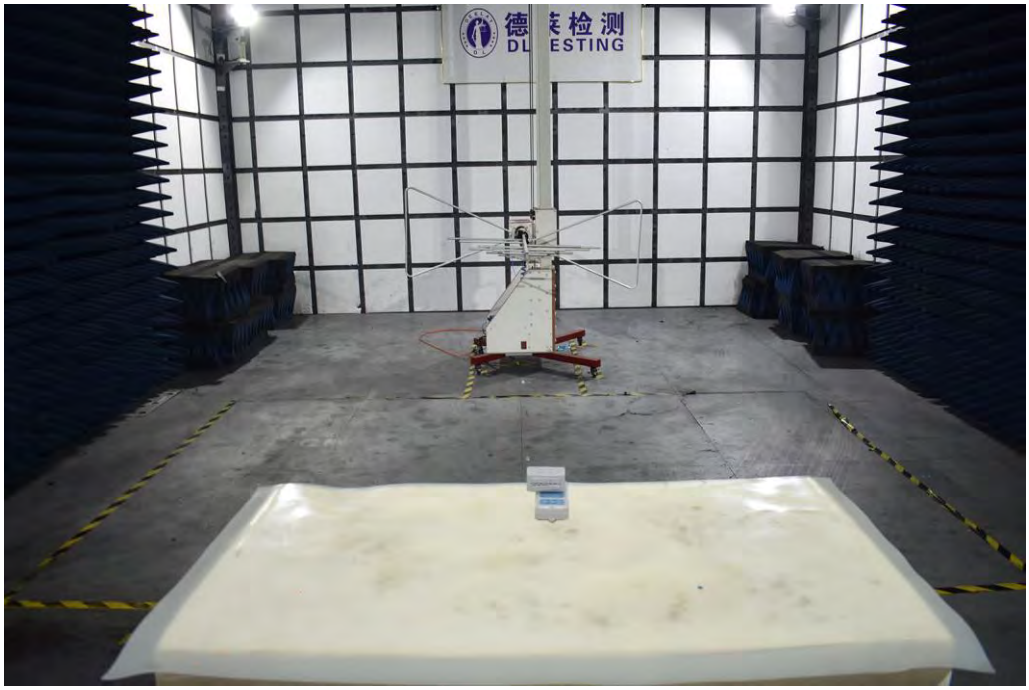
15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

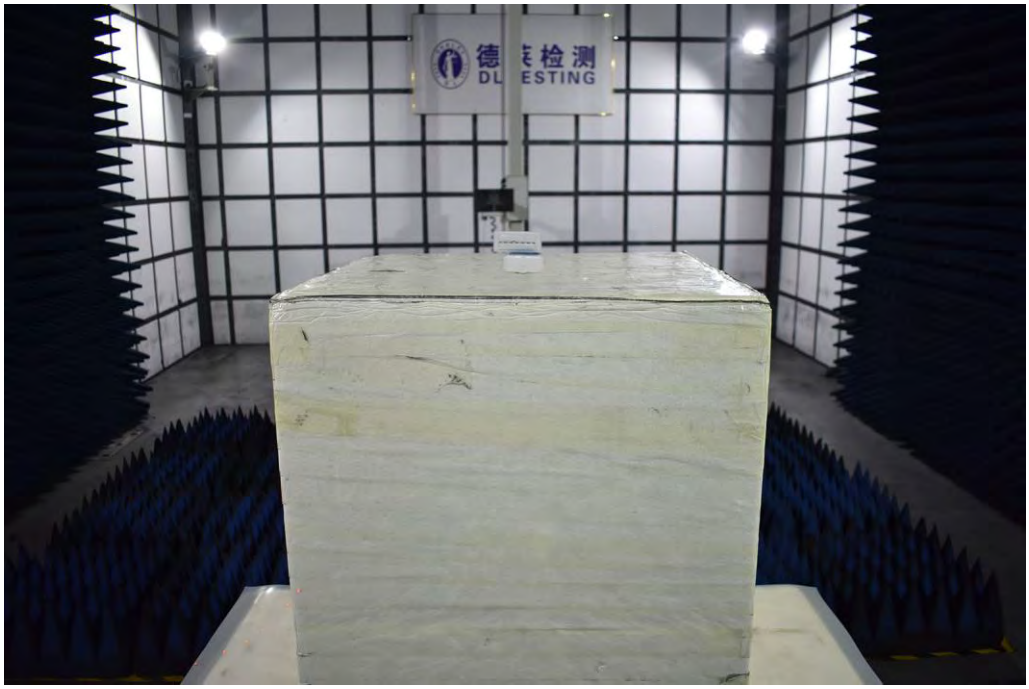
10.2 EUT ANTENNA

The EUT antenna is External antenna, It comply with the standard requirement.

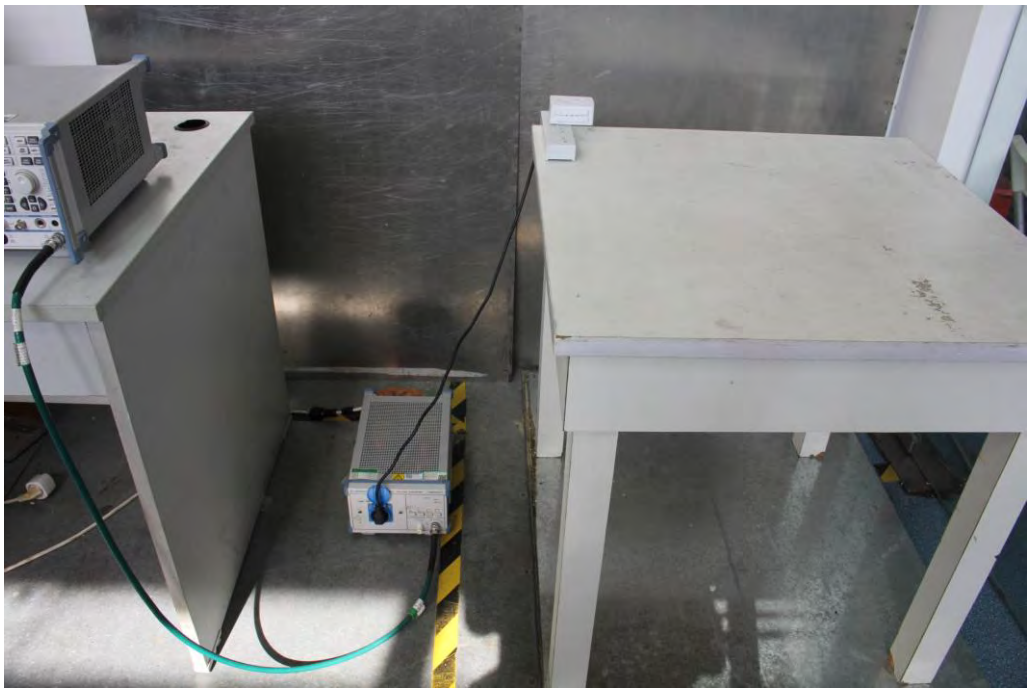
11. TEST SEUUP PHOTO

Radiated Measurement Photos

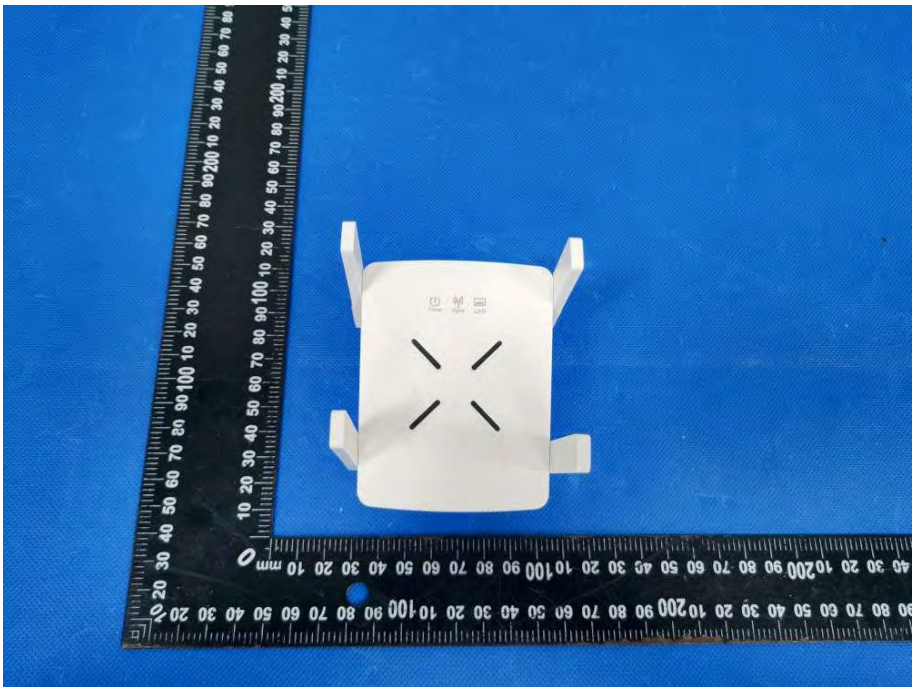


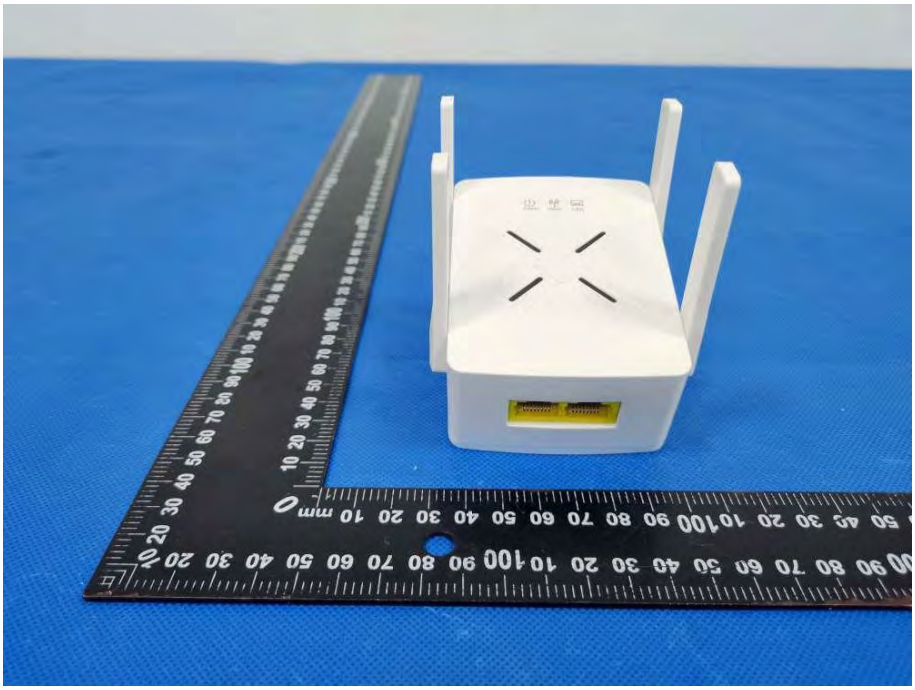


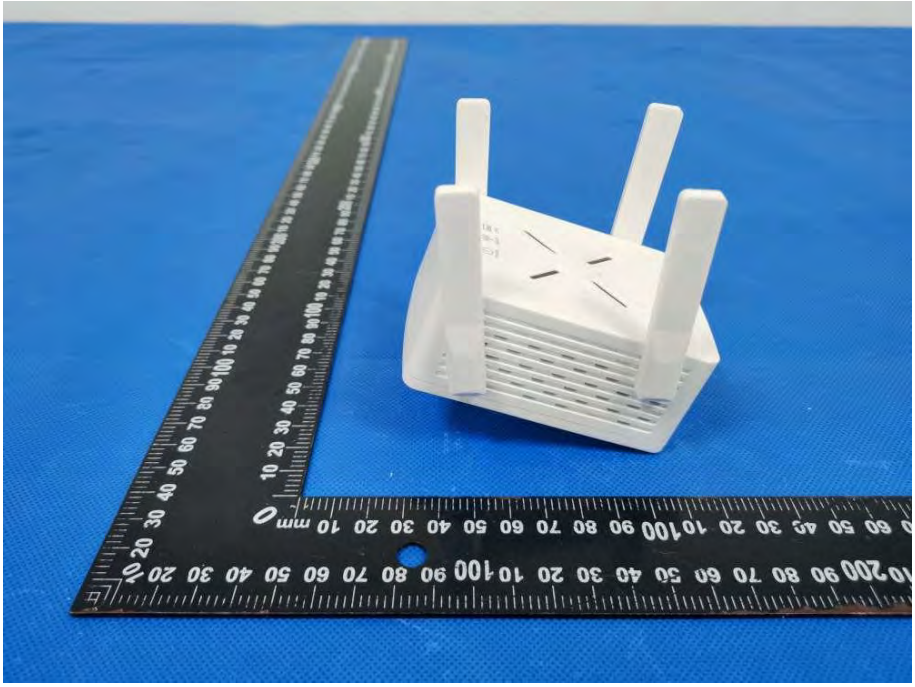
Conducted Measurement Photos

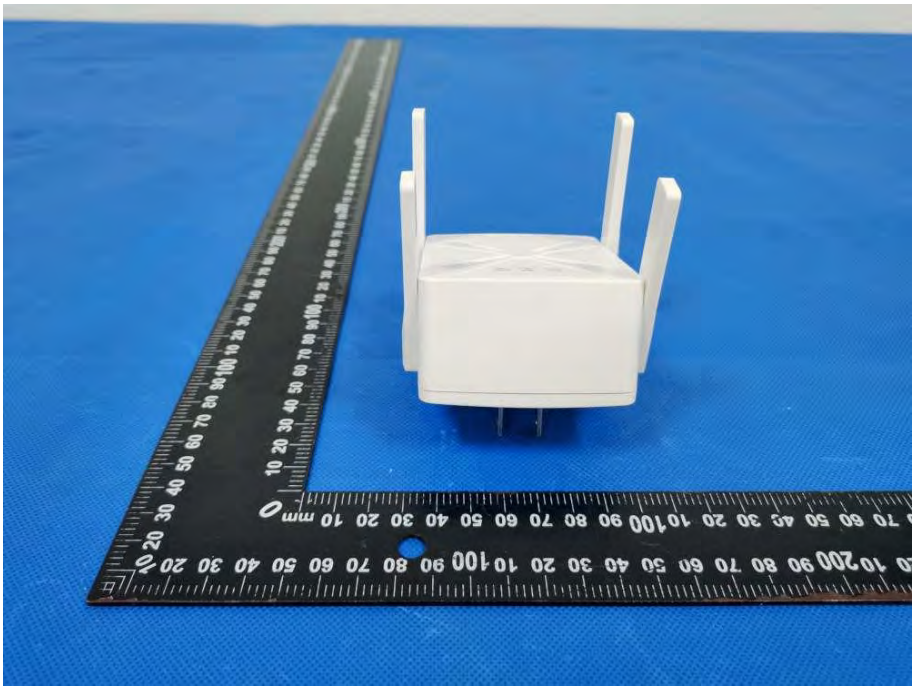


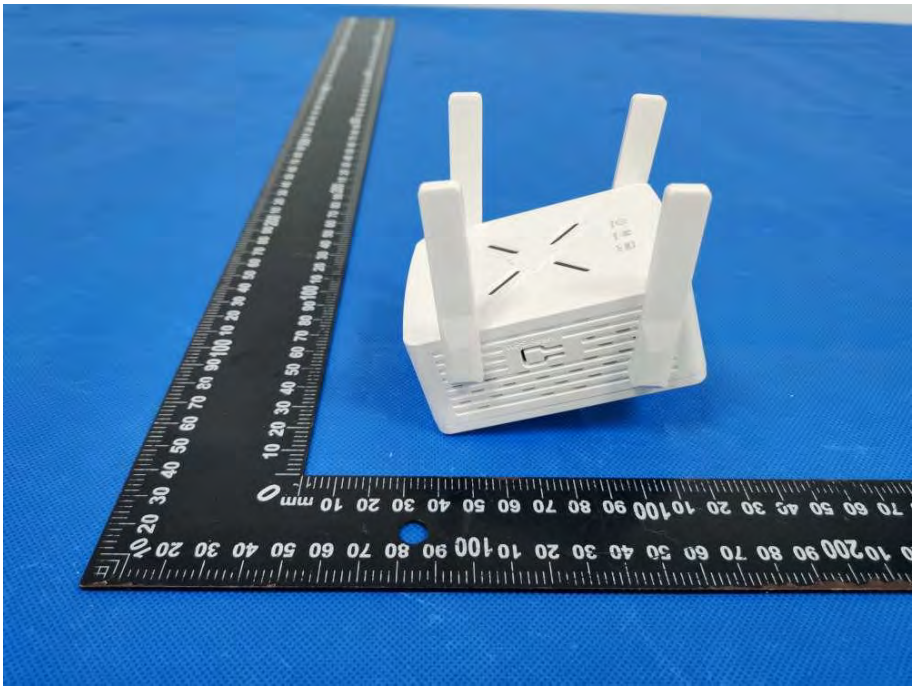
12. EUT PHOTO



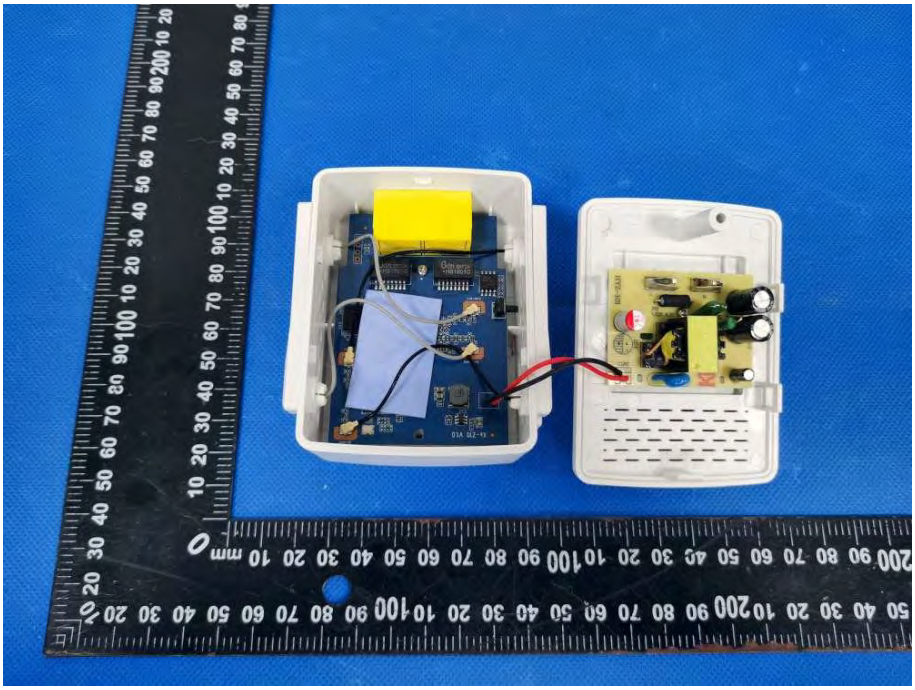


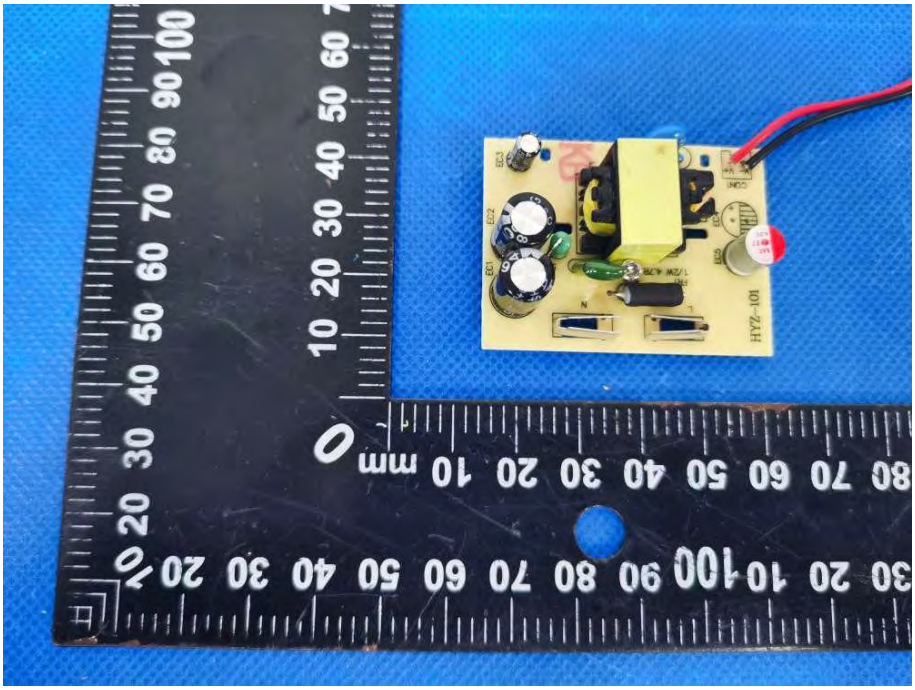


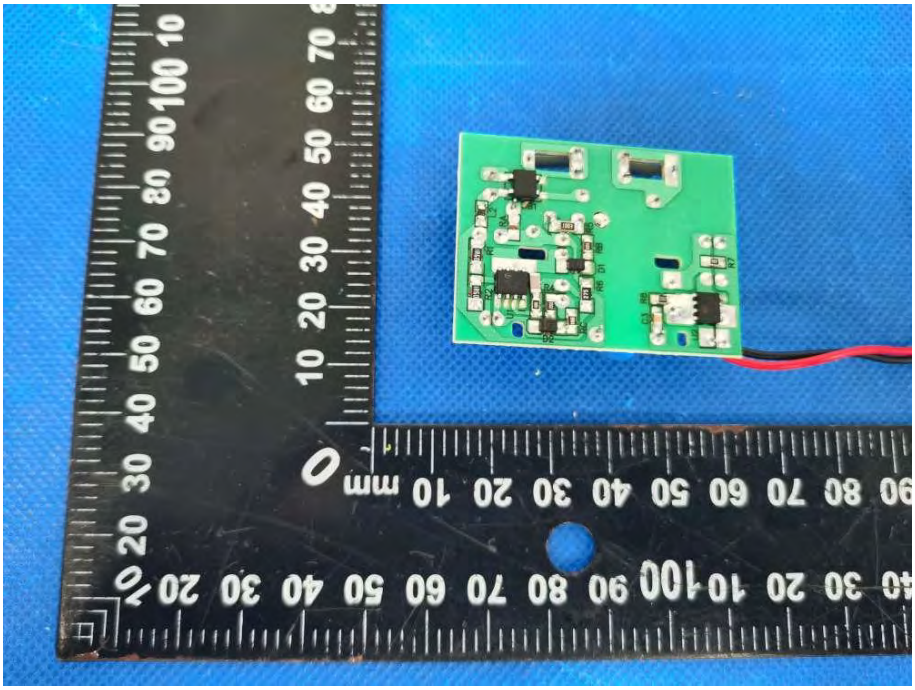


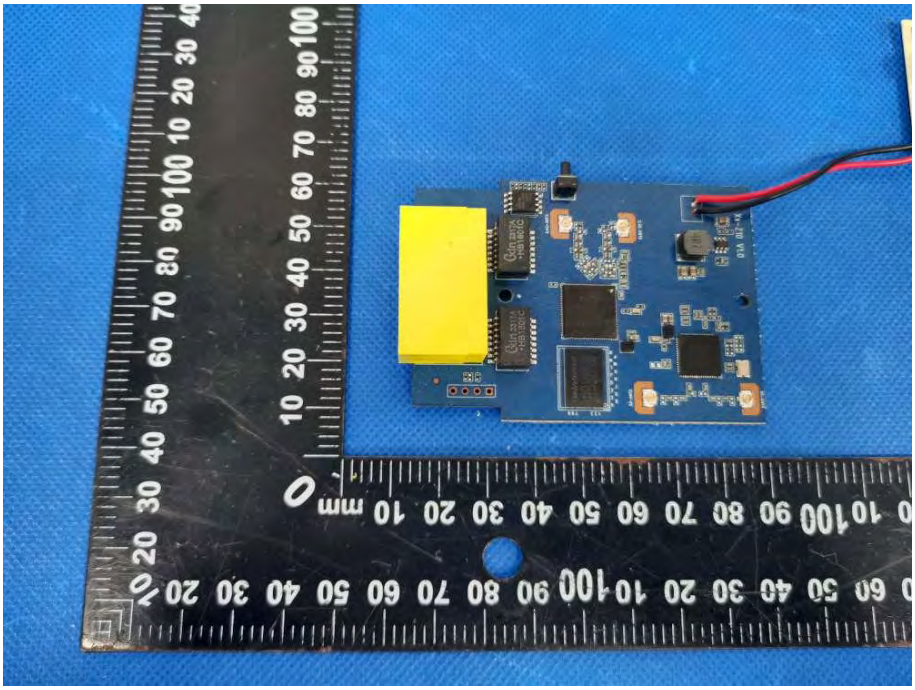


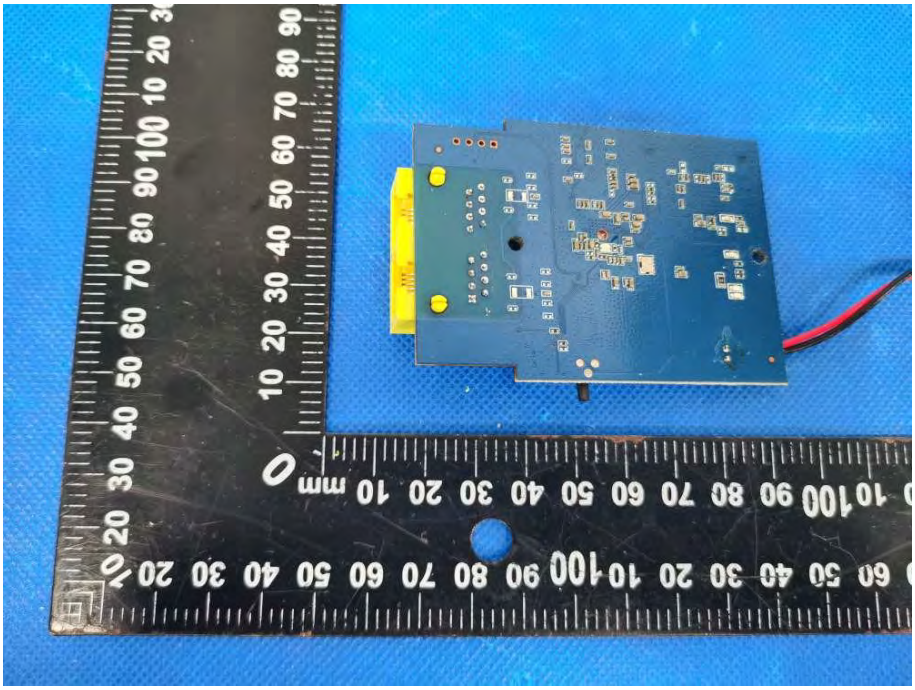
DRAPER











※※※※※ **END OF REPORT** ※※※※※