FCC Part 15E Test Report
FCC ID:2A58K-J505L0

Applicant:	Shenzhen Sorstek.Co
Address:	2001, Building 1, Nanshan Zhiyuan Chongwen Park, No.3370, Liuxian Avenue, Fuguang Community, Taoyuan Street, Nanshan District, Shenzhen
Manufacturer:	Shenzhen Sorstek.Co
Address:	2001, Building 1, Nanshan Zhiyuan Chongwen Park, No.3370, Liuxian Avenue, Fuguang Community, Taoyuan Street, Nanshan District, Shenzhen
EUT:	video projector
Trade Mark:	VIMGO
Model Number:	J50-5L0
Date of Receipt:	Sep. 28, 2022
Test Date:	Sep. 28, 2022 - Nov. 09, 2022
Date of Report:	Nov. 09, 2022
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-20221017032E

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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 8
2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED 9
2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE) 9
2.5 TABLE OF PARAMETERS OF TEST SOFTWARE SETTING 10
2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS 11
3 . EMC EMISSION TEST 12
3.1 CONDUCTED EMISSION MEASUREMENT 12
3.1.1 POWER LINE CONDUCTED EMISSION LIMITS 12
3.1.2 TEST PROCEDURE 12
3.1.3 DEVIATION FROM TEST STANDARD 12
3.1.4 TEST SETUP 13
3.1.5 EUT OPERATING CONDITIONS 13
3.1.6 TEST RESULTS 13
3.2 RADIATED EMISSION MEASUREMENT 16
3.2.1 RADIATED EMISSION LIMITS 16
3.2.2 TEST PROCEDURE 17
3.2.3 DEVIATION FROM TEST STANDARD 17
3.2.4 TEST SETUP 17
3.2.5 EUT OPERATING CONDITIONS 18
3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ) 19
3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ) 20
3.2.8 TEST RESULTS (1GHZ~40GHZ) 22
3.3 RADIATED BAND EMISSION MEASUREMENT 34
3.3.1 TEST REQUIREMENT: 34
3.3.2 TEST PROCEDURE 34
3.3.3 DEVIATION FROM TEST STANDARD 34
3.3.4 TEST SETUP 34
3.3.5 EUT OPERATING CONDITIONS 34
4 . PEAK OUTPUT POWER 39
4.1 APPLIED PROCEDURES / LIMIT 39
4.1.1 TEST PROCEDURE 39
4.1.2 DEVIATION FROM STANDARD 39
4.1.3 TEST SETUP 39

Table of Contents Page

4.1.4 EUT OPERATION CONDITIONS 39
4.1.5 TEST RESULTS 40
5 . POWER SPECTRAL DENSITY TEST 47
5.1 APPLIED PROCEDURES / LIMIT 47
5.1.1 TEST PROCEDURE 47
5.1.2 DEVIATION FROM STANDARD 47
5.1.3 TEST SETUP 47
5.1.4 EUT OPERATION CONDITIONS 47
5.1.5 TEST RESULTS 48
6 . 6DB&26DB&99% BANDWIDTH TEST 55
6.1 APPLIED PROCEDURES / LIMIT 55
6.1.1 TEST PROCEDURE 55
6.1.2 DEVIATION FROM STANDARD 55
6.1.3 TEST SETUP 55
6.1.4 EUT OPERATION CONDITIONS 56
6.1.5 TEST RESULTS 56
7 . DUTY CYCLE TEST SIGNAL 63
7.1 APPLIED PROCEDURES / LIMIT 63
7.1.1 TEST PROCEDURE 63
7.1.2 DEVIATION FROM STANDARD 63
7.1.3 TEST SETUP 63
7.1.4 EUT OPERATION CONDITIONS 63
7.1.5 TEST RESULTS 64
8 . FREQUENCY STABILITY 67
8.1 APPLIED PROCEDURES / LIMIT 67
8.1.1 TEST PROCEDURE 67
8.1.2 DEVIATION FROM STANDARD 67
8.1.3 TEST SETUP 67
8.1.4 EUT OPERATION CONDITIONS 67
8.1.5 TEST RESULTS 68
9 . TRANSMISSION IN THE ABSENCE OF DATA 70
9.1 STANDARD REQUIREMENT 70
9.2 TEST RESULT 70
10 . ANTENNA REQUIREMENT 70
10.1 STANDARD REQUIREMENT 70
10.2 EUT ANTENNA 70
11 . TEST SEUUP PHOTO 71

Table of Contents **Page**

12 . EUT PHOTO **73**

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)	Peak Output Power	PASS	
15.407 (a)	Power Spectral Density	PASS	
15.403(i) 15.407(e)	26dB bandwidth and 99%dB Bandwidth 6dB bandwidth and 99%dB 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

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%

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product Name:	video projector
Trademark	VIMGO
Model No.:	J50-5L0
Model Difference	N/A
Operation Frequency:	5180-5240, 5745-5825MHz(802.11a/n/ac(HT20)) 5190-5230, 5755-5795MHz(802.11n/ac(HT40)) 5210MHz , 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:	Internal Antenna
Antenna gain:	3.4dBi
Power supply:	DC 19.0V from adapter
Aaspter:	Model Number: CW1902500US Input: 100-240V~ 50/60Hz 1.2A Output: 19.0V⎓ 2500mA

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)
36	5180	44	5220
40	5200	48	5240

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)
38	5190	46	5230

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)
42	5210	/	/

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

2.2 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.

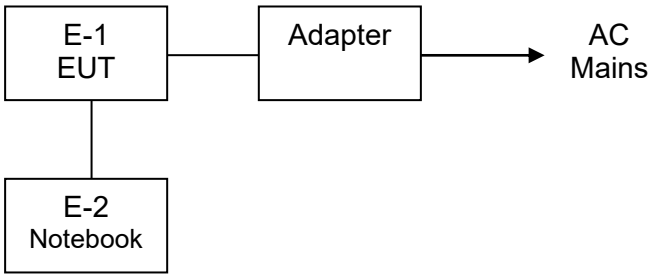
Description			
Pretest Mode	Channel	Band 1	Band 4
Mode 1	802.11a/n/acHT20	CH36, CH44, CH48	CH149, CH157, CH165
Mode 2	802.11n/acHT40	CH38, CH46	CH151, CH159
Mode 3	802.11acHT80	CH42	CH155
Mode 4	Other	Link Mode	

For Radiated Emission			
Pretest Mode	Channel	Band 1	Band 4
Mode 1	802.11a/n/acHT20	CH36, CH44, CH48	CH149, CH157, CH165
Mode 2	802.11n/acHT40	CH38, CH46	CH151, CH159
Mode 3	802.11acHT80	CH42	CH155
Mode 4	Other	Link Mode	

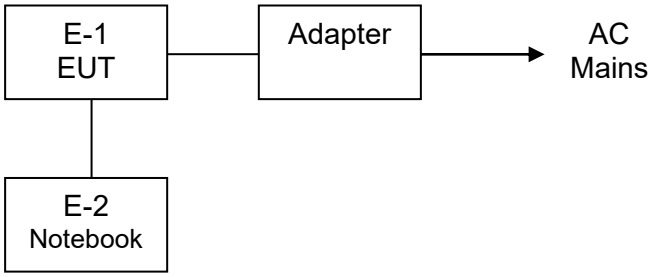
Note: 1. The measurements are performed at the highest, middle, lowest available channels.
2. During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's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

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated Spurious Emission Test



Conducted Spurious Emission Test



2.4 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	video projector	J50-5L0	N/A	EUT
E-2	Notebook	310S-14AST		

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.

2.5 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: AXDN-0002.0			
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

2.6 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. 06, 2021	Nov. 05, 2022
2	Test Receiver (9kHz-7GHz)	R&S	ESRP7	101393	Nov. 06, 2021	Nov. 05, 2022
3	Bilog Antenna (30MHz-1GHz)	R&S	VULB9162	00306	Nov. 06, 2021	Nov. 05, 2022
4	Horn Antenna (1GHz-18GHz)	Schwarzbeck	BBHA9120D	02139	Nov. 06, 2021	Nov. 05, 2022
5	Horn Antenna (18GHz-40GHz)	A.H. Systems	SAS-574	588	Nov. 06, 2021	Nov. 05, 2022
6	Amplifier (9KHz-6GHz)	Schwarzbeck	BBV9743B	00153	Nov. 06, 2021	Nov. 05, 2022
7	Amplifier (1GHz-18GHz)	EMEC	EM01G8GA	00270	Nov. 06, 2021	Nov. 05, 2022
8	Amplifier (18GHz-40GHz)	Quanjuda	DLE-161	97	Nov. 06, 2021	Nov. 05, 2022
9	Loop Antenna (9KHz-30MHz)	Schwarzbeck	FMZB1519B	00014	Nov. 06, 2021	Nov. 05, 2022
10	RF cables1 (9kHz-1GHz)	ChengYu	966	004	Nov. 06, 2021	Nov. 05, 2022
11	RF cables2 (1GHz-40GHz)	ChengYu	966	003	Nov. 06, 2021	Nov. 05, 2022
12	Antenna connector	Florida RF Labs	N/A	RF 01#	Nov. 06, 2021	Nov. 05, 2022
13	Power probe	KEYSIGHT	U2021XA	MY55210018	Nov. 06, 2021	Nov. 05, 2022
14	Signal Analyzer 9kHz-26.5GHz	Agilent	N9020A	MY55370280	Nov. 06, 2021	Nov. 05, 2022
15	Test Receiver 20kHz-40GHz	R&S	ESU 40	100376	Nov. 06, 2021	Nov. 05, 2022
16	D.C. Power Supply	LongWei	PS-305D	010964729	Nov. 06, 2021	Nov. 05, 2022

Conduction Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	843 Shielded Room	ChengYu	843 Room	843	Nov. 25, 2019	Nov. 24, 2022
2	EMI Receiver	R&S	ESR	101421	Nov. 06, 2021	Nov. 05, 2022
3	LISN	R&S	ENV216	102417	Nov. 06, 2021	Nov. 05, 2022
4	843 Cable 1#	ChengYu	CE Cable	001	Nov. 06, 2021	Nov. 05, 2022

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.

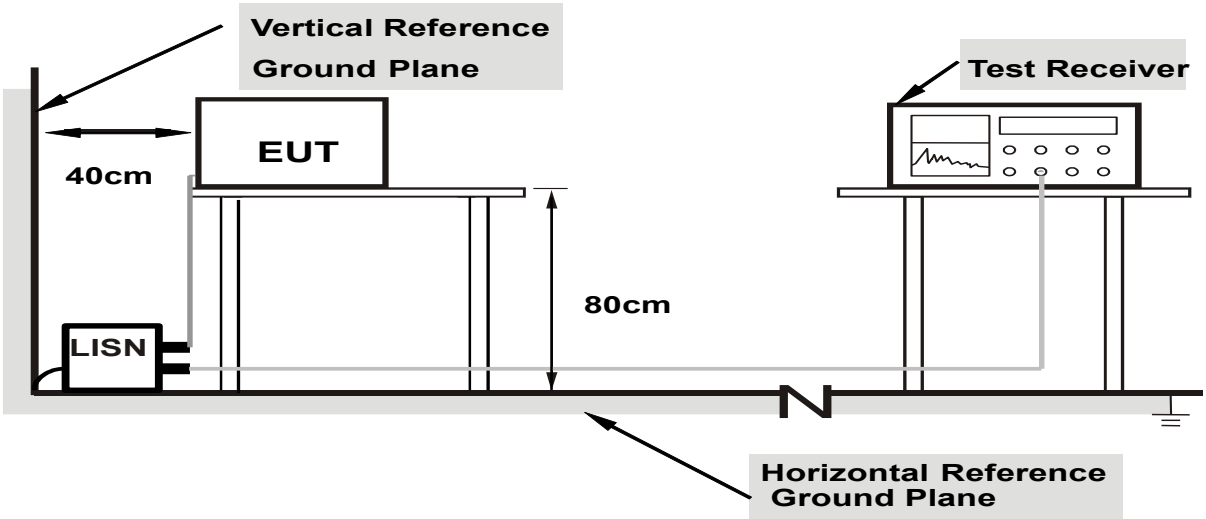
d. LISN at least 80 cm from nearest part of EUT chassis.

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



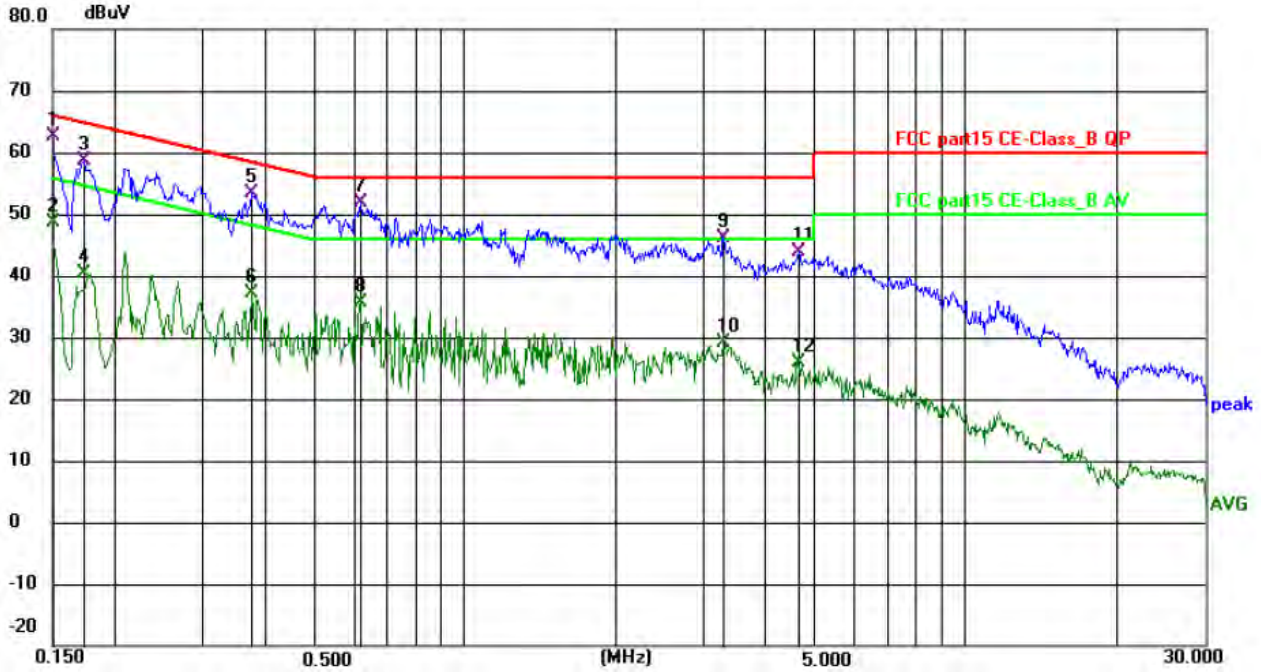
Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

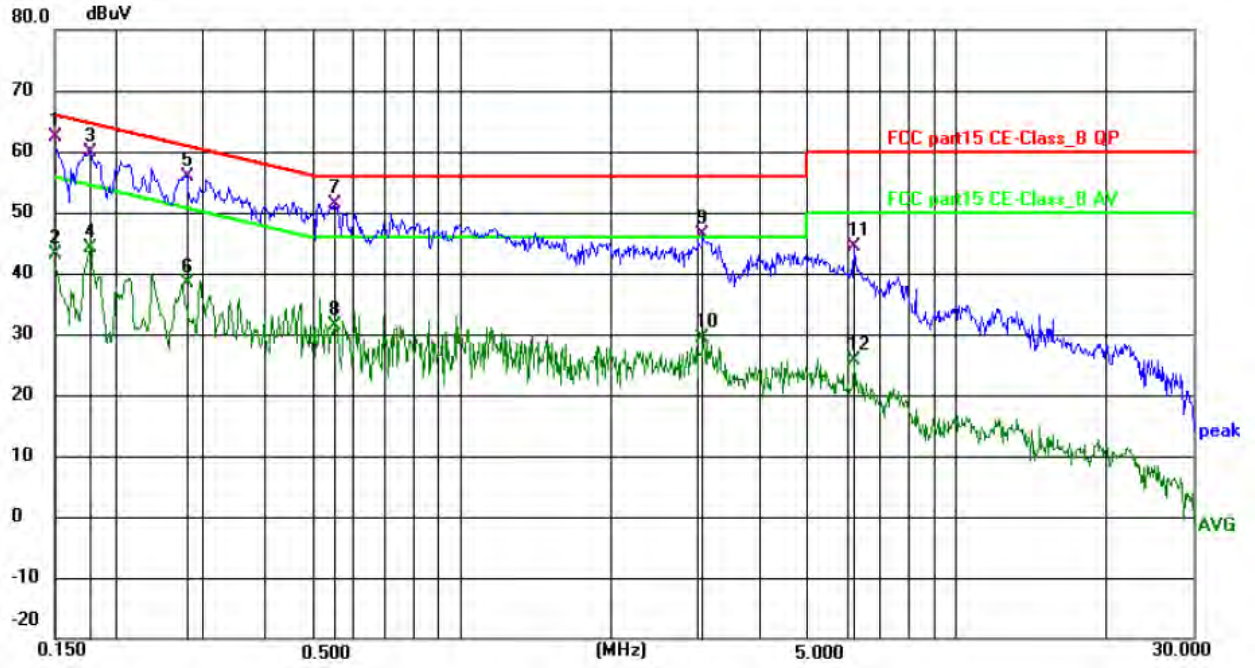


Remark:

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 *	0.150000	52.08	10.50	62.58	66.00	-3.42	QP	P	
2	0.150000	38.10	10.50	48.60	56.00	-7.40	AVG	P	
3	0.172300	48.61	10.04	58.65	64.85	-6.20	QP	P	
4	0.172300	30.39	10.04	40.43	54.85	-14.42	AVG	P	
5	0.375000	44.19	9.10	53.29	58.39	-5.10	QP	P	
6	0.375000	28.11	9.10	37.21	48.39	-11.18	AVG	P	
7	0.617900	42.53	9.33	51.86	56.00	-4.14	QP	P	
8	0.617900	26.41	9.33	35.74	46.00	-10.26	AVG	P	
9	3.277400	37.23	8.86	46.09	56.00	-9.91	QP	P	
10	3.277400	20.20	8.86	29.06	46.00	-16.94	AVG	P	
11	4.641000	34.14	9.66	43.80	56.00	-12.20	QP	P	
12	4.641000	16.18	9.66	25.84	46.00	-20.16	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 *	0.150000	51.96	10.35	62.31	66.00	-3.69	QP	P	
2	0.150000	32.87	10.35	43.22	56.00	-12.78	AVG	P	
3	0.176600	50.28	9.55	59.83	64.64	-4.81	QP	P	
4	0.176600	34.54	9.55	44.09	54.64	-10.55	AVG	P	
5	0.276000	46.92	9.00	55.92	60.94	-5.02	QP	P	
6	0.276000	29.36	9.00	38.36	50.94	-12.58	AVG	P	
7	0.552200	42.03	9.31	51.34	56.00	-4.66	QP	P	
8	0.552200	21.96	9.31	31.27	46.00	-14.73	AVG	P	
9	3.065900	36.46	9.83	46.29	56.00	-9.71	QP	P	
10	3.065900	19.53	9.83	29.36	46.00	-16.64	AVG	P	
11	6.216000	34.58	9.84	44.42	60.00	-15.58	QP	P	
12	6.216000	15.87	9.84	25.71	50.00	-24.29	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:

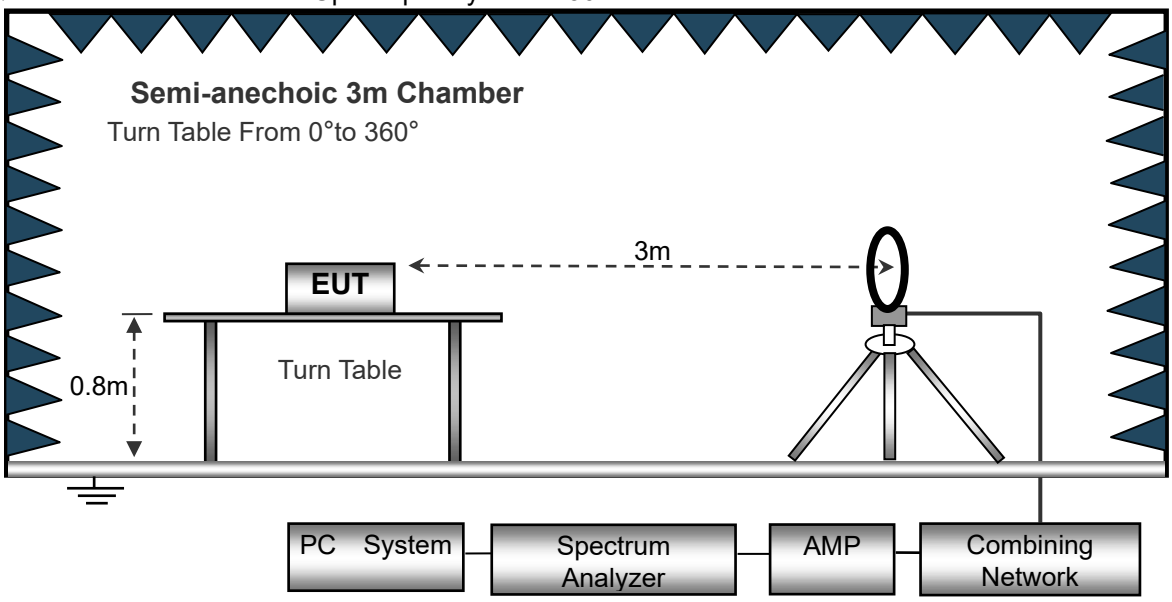
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

3.2.3 DEVIATION FROM TEST STANDARD

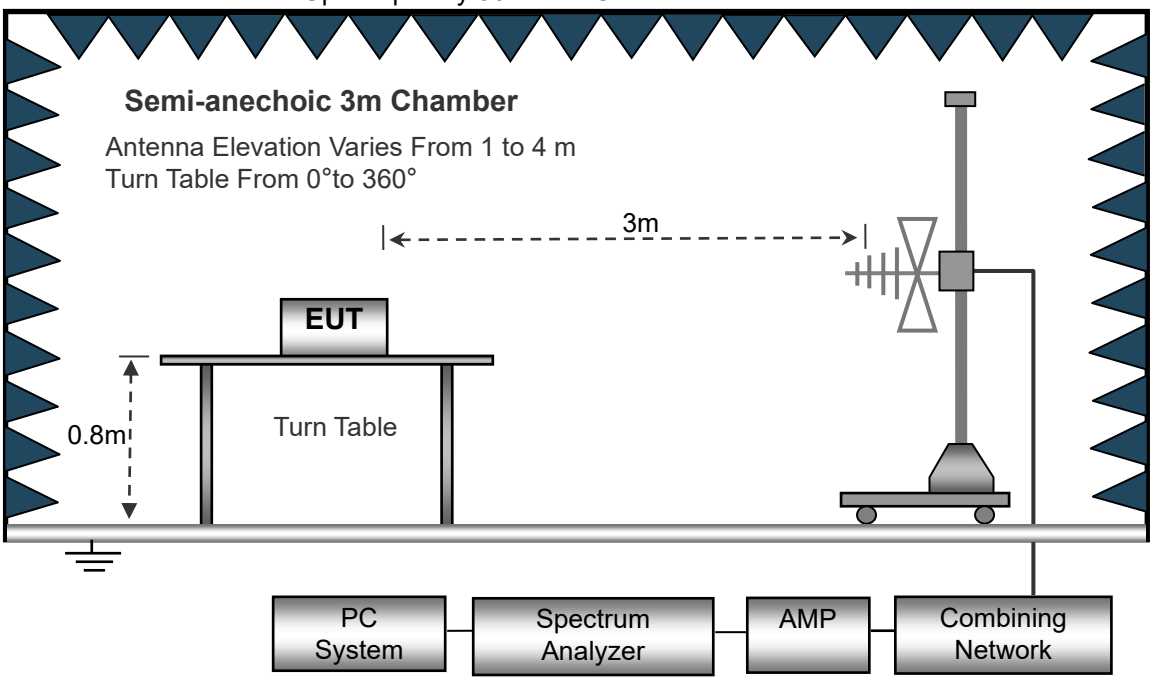
No deviation

3.2.4 TEST SETUP

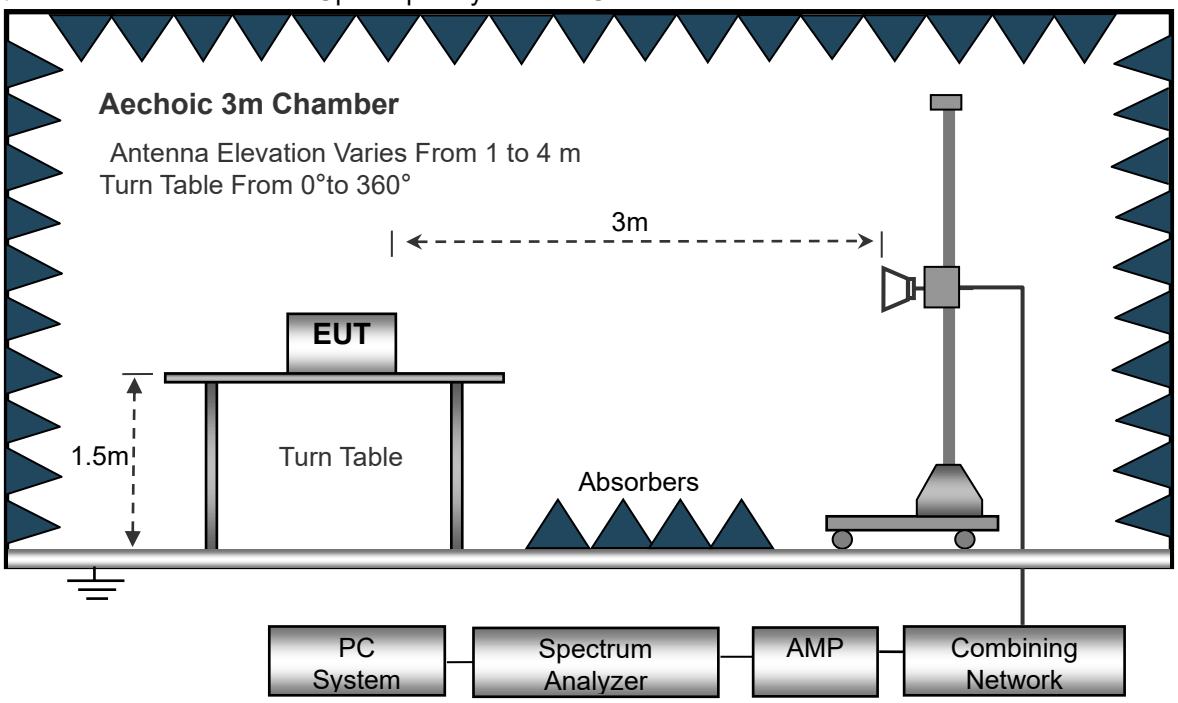
（A）Radiated Emission Test-Up Frequency Below 30MHz



（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 4	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 4		

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	51.1209	34.59	-11.47	23.12	40.00	-16.88	QP
2	139.3613	41.57	-16.10	25.47	43.50	-18.03	QP
3	250.3012	45.37	-11.74	33.63	46.00	-12.37	QP
4	263.8190	47.28	-11.46	35.82	46.00	-10.18	QP
5 *	312.1794	50.25	-10.53	39.72	46.00	-6.28	QP
6	360.4476	45.77	-9.85	35.92	46.00	-10.08	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 4		

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	87.7248	42.72	-15.45	27.27	40.00	-12.73	QP
2	139.8508	52.75	-16.17	36.58	43.50	-6.92	QP
3	216.0240	45.50	-12.34	33.16	46.00	-12.84	QP
4	248.5519	45.17	-11.01	34.16	46.00	-11.84	QP
5 !	312.1794	49.71	-9.44	40.27	46.00	-5.73	QP
6 *	383.9318	49.14	-8.50	40.64	46.00	-5.36	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 1

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:5180									
V	10360	56.69	49.05	15.3	37.39	60.33	74	-13.67	PK
V	10360	45.45	49.05	15.3	37.39	49.09	54	-4.91	AV
V	15540	56.38	49.16	15.27	40.45	62.94	74	-11.06	PK
V	15540	43.83	49.16	15.27	40.45	50.39	54	-3.61	AV
H	10360	56.14	49.05	15.3	37.39	59.78	74	-14.22	PK
H	10360	45.91	49.05	15.3	37.39	49.55	54	-4.45	AV
H	15540	54.29	49.16	15.27	40.45	60.85	74	-13.15	PK
H	15540	44.09	49.16	15.27	40.45	50.65	54	-3.35	AV
operation frequency:5200									
V	10400	57.47	49.09	15.34	37.42	61.14	74	-12.86	PK
V	10400	39.36	49.09	15.34	37.42	43.03	54	-10.97	AV
V	15600	59.43	49.18	15.29	40.47	66.01	74	-7.99	PK
V	15600	38.15	49.18	15.29	40.47	44.73	54	-9.27	AV
H	10400	56.32	49.09	15.34	37.42	59.99	74	-14.01	PK
H	10400	39.74	49.09	15.34	37.42	43.41	54	-10.59	AV
H	15600	59.43	49.18	15.29	40.47	66.01	74	-7.99	PK
H	15600	38.35	49.18	15.29	40.47	44.93	54	-9.07	AV
operation frequency:5240									
V	10480	58.58	49.11	15.37	37.46	62.3	74	-11.70	PK
V	10480	39.31	49.11	15.37	37.46	43.03	54	-10.97	AV
V	15720	59.19	49.21	15.34	40.51	65.83	74	-8.17	PK
V	15720	38.38	49.21	15.34	40.51	45.02	54	-8.98	AV
H	10480	57.21	49.11	15.37	31.31	54.78	74	-19.22	PK
H	10480	45.52	49.11	15.37	31.31	43.09	54	-10.91	AV
H	15720	57.49	49.21	15.34	40.51	64.13	74	-9.87	PK
H	15720	37.52	49.21	15.34	40.51	44.16	54	-9.84	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

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:5180									
V	10360	56.13	49.05	15.3	37.39	59.77	74	-14.23	PK
V	10360	38.47	49.05	15.3	37.39	42.11	54	-11.89	AV
V	15540	56.54	49.16	15.27	40.45	63.1	74	-10.90	PK
V	15540	38.23	49.16	15.27	40.45	44.79	54	-9.21	AV
H	10360	56.65	49.05	15.3	37.39	60.29	74	-13.71	PK
H	10360	39.34	49.05	15.3	37.39	42.98	54	-11.02	AV
H	15540	54.13	49.16	15.27	40.45	60.69	74	-13.31	PK
H	15540	38.37	49.16	15.27	40.45	44.93	54	-9.07	AV
operation frequency:5200									
V	10400	56.22	49.09	15.34	37.42	59.89	74	-14.11	PK
V	10400	39.71	49.09	15.34	37.42	43.38	54	-10.62	AV
V	15600	55.33	49.18	15.29	40.47	61.91	74	-12.09	PK
V	15600	38.38	49.18	15.29	40.47	44.96	54	-9.04	AV
H	10400	55.56	49.09	15.34	37.42	59.23	74	-14.77	PK
H	10400	40.34	49.09	15.34	37.42	44.01	54	-9.99	AV
H	15600	55.03	49.18	15.29	40.47	61.61	74	-12.39	PK
H	15600	39.21	49.18	15.29	40.47	45.79	54	-8.21	AV
operation frequency:5240									
V	10480	57.16	49.11	15.37	37.46	60.88	74	-13.12	PK
V	10480	40.58	49.11	15.37	37.46	44.3	54	-9.70	AV
V	15720	54.34	49.21	15.34	40.51	60.98	74	-13.02	PK
V	15720	38.46	49.21	15.34	40.51	45.1	54	-8.90	AV
H	10480	57.13	49.11	15.37	31.31	54.7	74	-19.30	PK
H	10480	44.61	49.11	15.37	31.31	42.18	54	-11.82	AV
H	15720	55.32	49.21	15.34	40.51	61.96	74	-12.04	PK
H	15720	39.28	49.21	15.34	40.51	45.92	54	-8.08	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

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:5190									
V	10380	56.76	49.07	15.33	37.41	60.43	74	-13.57	PK
V	10380	39.27	49.07	15.33	37.41	42.94	54	-11.06	AV
V	15570	56.21	49.17	15.28	40.46	62.78	74	-11.22	PK
V	15570	38.33	49.17	15.28	40.46	44.9	54	-9.10	AV
H	10380	56.64	49.07	15.33	37.41	60.31	74	-13.69	PK
H	10380	40.39	49.07	15.33	37.41	44.06	54	-9.94	AV
H	15570	54.63	49.17	15.28	40.46	61.2	74	-12.80	PK
H	15570	38.22	49.17	15.28	40.46	44.79	54	-9.21	AV
operation frequency:5230									
V	10460	57.17	49.11	15.37	37.46	60.89	74	-13.11	PK
V	10460	39.43	49.11	15.37	37.46	43.15	54	-10.85	AV
V	15690	54.44	49.21	15.34	40.51	61.08	74	-12.92	PK
V	15690	38.36	49.21	15.34	40.51	45	54	-9.00	AV
H	10460	57.28	49.11	15.37	31.31	54.85	74	-19.15	PK
H	10460	44.84	49.11	15.37	31.31	42.41	54	-11.59	AV
H	15690	55.33	49.21	15.34	40.51	61.97	74	-12.03	PK
H	15690	39.07	49.21	15.34	40.51	45.71	54	-8.29	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

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:5180									
V	10360	56.73	49.05	15.3	37.39	60.37	74	-13.63	PK
V	10360	39.55	49.05	15.3	37.39	43.19	54	-10.81	AV
V	15540	56.14	49.16	15.27	40.45	62.7	74	-11.30	PK
V	15540	38.33	49.16	15.27	40.45	44.89	54	-9.11	AV
H	10360	56.13	49.05	15.3	37.39	59.77	74	-14.23	PK
H	10360	38.11	49.05	15.3	37.39	41.75	54	-12.25	AV
H	15540	54.28	49.16	15.27	40.45	60.84	74	-13.16	PK
H	15540	39.33	49.16	15.27	40.45	45.89	54	-8.11	AV
operation frequency:5200									
V	10400	56.54	49.09	15.34	37.42	60.21	74	-13.79	PK
V	10400	41.73	49.09	15.34	37.42	45.4	54	-8.60	AV
V	15600	55.55	49.18	15.29	40.47	62.13	74	-11.87	PK
V	15600	40.32	49.18	15.29	40.47	46.9	54	-7.10	AV
H	10400	55.18	49.09	15.34	37.42	58.85	74	-15.15	PK
H	10400	40.54	49.09	15.34	37.42	44.21	54	-9.79	AV
H	15600	55.03	49.18	15.29	40.47	61.61	74	-12.39	PK
H	15600	41.27	49.18	15.29	40.47	47.85	54	-6.15	AV
operation frequency:5240									
V	10480	57.43	49.11	15.37	37.46	61.15	74	-12.85	PK
V	10480	40.64	49.11	15.37	37.46	44.36	54	-9.64	AV
V	15720	54.36	49.21	15.34	40.51	61	74	-13.00	PK
V	15720	39.72	49.21	15.34	40.51	46.36	54	-7.64	AV
H	10480	57.13	49.11	15.37	31.31	54.7	74	-19.30	PK
H	10480	44.55	49.11	15.37	31.31	42.12	54	-11.88	AV
H	15720	55.67	49.21	15.34	40.51	62.31	74	-11.69	PK
H	15720	40.03	49.21	15.34	40.51	46.67	54	-7.33	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

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:5190									
V	10380	56.73	49.07	15.33	37.41	60.4	74	-13.60	PK
V	10380	40.25	49.07	15.33	37.41	43.92	54	-10.08	AV
V	15570	56.31	49.17	15.28	40.46	62.88	74	-11.12	PK
V	15570	39.75	49.17	15.28	40.46	46.32	54	-7.68	AV
H	10380	56.56	49.07	15.33	37.41	60.23	74	-13.77	PK
H	10380	40.43	49.07	15.33	37.41	44.1	54	-9.90	AV
H	15570	54.54	49.17	15.28	40.46	61.11	74	-12.89	PK
H	15570	39.37	49.17	15.28	40.46	45.94	54	-8.06	AV
operation frequency:5230									
V	10460	57.13	49.11	15.37	37.46	60.85	74	-13.15	PK
V	10460	41.16	49.11	15.37	37.46	44.88	54	-9.12	AV
V	15690	54.44	49.21	15.34	40.51	61.08	74	-12.92	PK
V	15690	39.33	49.21	15.34	40.51	45.97	54	-8.03	AV
H	10460	57.16	49.11	15.37	31.31	54.73	74	-19.27	PK
H	10460	44.58	49.11	15.37	31.31	42.15	54	-11.85	AV
H	15690	55.13	49.21	15.34	40.51	61.77	74	-12.23	PK
H	15690	40.07	49.21	15.34	40.51	46.71	54	-7.29	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

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:5210									
V	10420	56.23	49.07	15.33	37.41	59.9	74	-14.10	PK
V	10420	41.64	49.07	15.33	37.41	45.31	54	-8.69	AV
V	15630	56.13	49.17	15.28	40.46	62.7	74	-11.30	PK
V	15630	39.18	49.17	15.28	40.46	45.75	54	-8.25	AV
H	10420	56.36	49.07	15.33	37.41	60.03	74	-13.97	PK
H	10420	41.27	49.07	15.33	37.41	44.94	54	-9.06	AV
H	15630	54.04	49.17	15.28	40.46	60.61	74	-13.39	PK
H	15630	40.32	49.17	15.28	40.46	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.

802.11a band 4

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	56.33	49.05	15.3	37.39	59.97	74	-14.03	PK
V	11490	45.55	49.05	15.3	37.39	49.19	54	-4.81	AV
V	17235	56.26	49.16	15.27	40.45	62.82	68.2	-5.38	PK
V	17235	43.19	49.16	15.27	40.45	49.75	54	-4.25	AV
H	11490	56.61	49.05	15.3	37.39	60.25	74	-13.75	PK
H	11490	45.53	49.05	15.3	37.39	49.17	54	-4.83	AV
H	17235	54.25	49.16	15.27	40.45	60.81	68.2	-7.39	PK
H	17235	44.18	49.16	15.27	40.45	50.74	54	-3.26	AV
operation frequency:5785									
V	11570	51.32	49.09	15.34	37.42	54.99	74	-19.01	PK
V	11570	41.76	49.09	15.34	37.42	45.43	54	-8.57	AV
V	17355	50.24	49.18	15.29	40.47	56.82	68.2	-11.38	PK
V	17355	40.33	49.18	15.29	40.47	46.91	54	-7.09	AV
H	11570	50.65	49.09	15.34	37.42	54.32	74	-19.68	PK
H	11570	42.21	49.09	15.34	37.42	45.88	54	-8.12	AV
H	17355	48.22	49.18	15.29	40.47	54.8	68.2	-13.40	PK
H	17355	40.69	49.18	15.29	40.47	47.27	54	-6.73	AV
operation frequency:5825									
V	11650	52.16	49.11	15.37	37.46	55.88	74	-18.12	PK
V	11650	41.57	49.11	15.37	37.46	45.29	54	-8.71	AV
V	17475	49.14	49.21	15.34	40.51	55.78	68.2	-12.42	PK
V	17475	40.65	49.21	15.34	40.51	47.29	54	-6.71	AV
H	11650	57.13	49.11	15.37	31.31	54.7	74	-19.30	PK
H	11650	48.38	49.11	15.37	31.31	45.95	54	-8.05	AV
H	17475	49.14	49.21	15.34	40.51	55.78	68.2	-12.42	PK
H	17475	40.13	49.21	15.34	40.51	46.77	54	-7.23	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

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	49.24	49.05	15.3	37.39	52.88	74	-21.12	PK
V	11490	42.22	49.05	15.3	37.39	45.86	54	-8.14	AV
V	17235	48.69	49.16	15.27	40.45	55.25	68.2	-12.95	PK
V	17235	40.14	49.16	15.27	40.45	46.7	54	-7.30	AV
H	11490	49.33	49.05	15.3	37.39	52.97	74	-21.03	PK
H	11490	41.88	49.05	15.3	37.39	45.52	54	-8.48	AV
H	17235	48.34	49.16	15.27	40.45	54.9	68.2	-13.30	PK
H	17235	40.66	49.16	15.27	40.45	47.22	54	-6.78	AV
operation frequency:5785									
V	11570	52.44	49.09	15.34	37.42	56.11	74	-17.89	PK
V	11570	42.19	49.09	15.34	37.42	45.86	54	-8.14	AV
V	17355	49.27	49.18	15.29	40.47	55.85	68.2	-12.35	PK
V	17355	40.23	49.18	15.29	40.47	46.81	54	-7.19	AV
H	11570	49.65	49.09	15.34	37.42	53.32	74	-20.68	PK
H	11570	43.44	49.09	15.34	37.42	47.11	54	-6.89	AV
H	17355	49.59	49.18	15.29	40.47	56.17	68.2	-12.03	PK
H	17355	40.03	49.18	15.29	40.47	46.61	54	-7.39	AV
operation frequency:5825									
V	11650	51.15	49.11	15.37	37.46	54.87	74	-19.13	PK
V	11650	41.63	49.11	15.37	37.46	45.35	54	-8.65	AV
V	17475	48.14	49.21	15.34	40.51	54.78	68.2	-13.42	PK
V	17475	40.23	49.21	15.34	40.51	46.87	54	-7.13	AV
H	11650	57.68	49.11	15.37	31.31	55.25	74	-18.75	PK
H	11650	44.19	49.11	15.37	31.31	41.76	54	-12.24	AV
H	17475	49.33	49.21	15.34	40.51	55.97	68.2	-12.23	PK
H	17475	40.47	49.21	15.34	40.51	47.11	54	-6.89	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

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	49.15	49.07	15.33	37.41	52.82	74	-21.18	PK
V	11510	41.53	49.07	15.33	37.41	45.2	54	-8.80	AV
V	17265	49.18	49.17	15.28	40.46	55.75	68.2	-12.45	PK
V	17265	40.74	49.17	15.28	40.46	47.31	54	-6.69	AV
H	11510	48.16	49.07	15.33	37.41	51.83	74	-22.17	PK
H	11510	41.31	49.07	15.33	37.41	44.98	54	-9.02	AV
H	17265	49.53	49.17	15.28	40.46	56.1	68.2	-12.10	PK
H	17265	40.38	49.17	15.28	40.46	46.95	54	-7.05	AV
operation frequency:5795									
V	11590	49.26	49.11	15.37	37.46	52.98	74	-21.02	PK
V	11590	41.38	49.11	15.37	37.46	45.1	54	-8.90	AV
V	17385	48.56	49.21	15.34	40.51	55.2	68.2	-13.00	PK
V	17385	40.44	49.21	15.34	40.51	47.08	54	-6.92	AV
H	11590	57.33	49.11	15.37	31.31	54.9	74	-19.10	PK
H	11590	44.41	49.11	15.37	31.31	41.98	54	-12.02	AV
H	17385	48.08	49.21	15.34	40.51	54.72	68.2	-13.48	PK
H	17385	40.53	49.21	15.34	40.51	47.17	54	-6.83	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

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	49.44	49.05	15.3	37.39	53.08	74	-20.92	PK
V	11490	42.53	49.05	15.3	37.39	46.17	54	-7.83	AV
V	17235	48.07	49.16	15.27	40.45	54.63	68.2	-13.57	PK
V	17235	40.13	49.16	15.27	40.45	46.69	54	-7.31	AV
H	11490	48.65	49.05	15.3	37.39	52.29	74	-21.71	PK
H	11490	41.61	49.05	15.3	37.39	45.25	54	-8.75	AV
H	17235	48.22	49.16	15.27	40.45	54.78	68.2	-13.42	PK
H	17235	40.59	49.16	15.27	40.45	47.15	54	-6.85	AV
operation frequency:5785									
V	11570	48.13	49.09	15.34	37.42	51.8	74	-22.20	PK
V	11570	41.78	49.09	15.34	37.42	45.45	54	-8.55	AV
V	17355	49.14	49.18	15.29	40.47	55.72	68.2	-12.48	PK
V	17355	40.63	49.18	15.29	40.47	47.21	54	-6.79	AV
H	11570	49.42	49.09	15.34	37.42	53.09	74	-20.91	PK
H	11570	43.14	49.09	15.34	37.42	46.81	54	-7.19	AV
H	17355	49.96	49.18	15.29	40.47	56.54	68.2	-11.66	PK
H	17355	40.43	49.18	15.29	40.47	47.01	54	-6.99	AV
operation frequency:5825									
V	11650	49.68	49.11	15.37	37.46	53.4	74	-20.60	PK
V	11650	41.43	49.11	15.37	37.46	45.15	54	-8.85	AV
V	17475	48.14	49.21	15.34	40.51	54.78	68.2	-13.42	PK
V	17475	40.92	49.21	15.34	40.51	47.56	54	-6.44	AV
H	11650	57.68	49.11	15.37	31.31	55.25	74	-18.75	PK
H	11650	44.13	49.11	15.37	31.31	41.7	54	-12.30	AV
H	17475	48.54	49.21	15.34	40.51	55.18	68.2	-13.02	PK
H	17475	40.22	49.21	15.34	40.51	46.86	54	-7.14	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

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	49.36	49.07	15.33	37.41	53.03	74	-20.97	PK
V	11510	42.15	49.07	15.33	37.41	45.82	54	-8.18	AV
V	17265	48.42	49.17	15.28	40.46	54.99	68.2	-13.21	PK
V	17265	41.13	49.17	15.28	40.46	47.7	54	-6.30	AV
H	11510	48.54	49.07	15.33	37.41	52.21	74	-21.79	PK
H	11510	42.68	49.07	15.33	37.41	46.35	54	-7.65	AV
H	17265	48.34	49.17	15.28	40.46	54.91	68.2	-13.29	PK
H	17265	40.26	49.17	15.28	40.46	46.83	54	-7.17	AV
operation frequency:5795									
V	11590	49.53	49.11	15.37	37.46	53.25	74	-20.75	PK
V	11590	41.38	49.11	15.37	37.46	45.1	54	-8.90	AV
V	17385	48.12	49.21	15.34	40.51	54.76	68.2	-13.44	PK
V	17385	40.66	49.21	15.34	40.51	47.3	54	-6.70	AV
H	11590	57.17	49.11	15.37	31.31	54.74	74	-19.26	PK
H	11590	44.83	49.11	15.37	31.31	42.4	54	-11.60	AV
H	17385	48.32	49.21	15.34	40.51	54.96	68.2	-13.24	PK
H	17385	40.53	49.21	15.34	40.51	47.17	54	-6.83	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

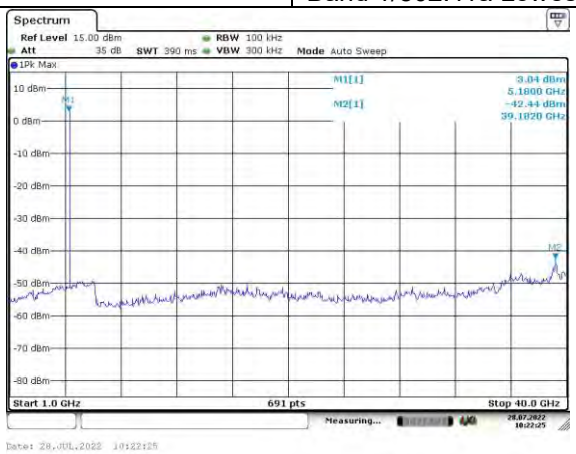
Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:5775									
V	11550	48.17	49.07	15.33	37.41	51.84	74	-22.16	PK
V	11550	42.33	49.07	15.33	37.41	46	54	-8.00	AV
V	17325	49.15	49.17	15.28	40.46	55.72	68.2	-12.48	PK
V	17325	40.21	49.17	15.28	40.46	46.78	54	-7.22	AV
H	11550	48.46	49.07	15.33	37.41	52.13	74	-21.87	PK
H	11550	41.18	49.07	15.33	37.41	44.85	54	-9.15	AV
H	17325	48.61	49.17	15.28	40.46	55.18	68.2	-13.02	PK
H	17325	40.46	49.17	15.28	40.46	47.03	54	-6.97	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.

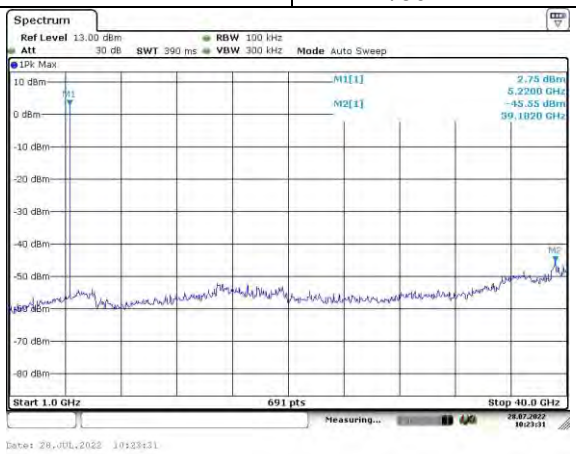
For Conducted
During the test, pre-scan the all modulation, the modulation below were found to have the worst test results, as reflected in the report.

Test channel:	Band 1/802.11a Lowest channel



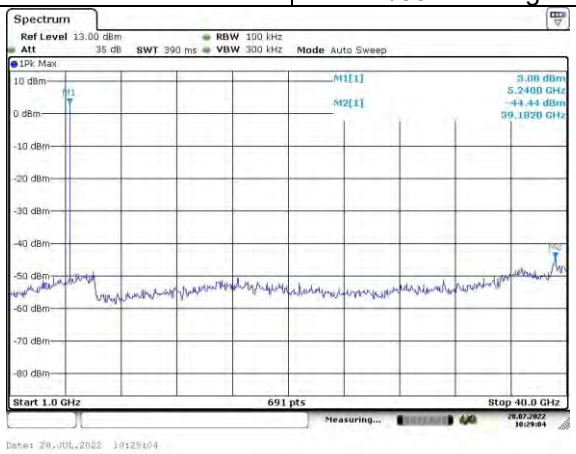
0.03Hz~40GHz

Test channel:	Band 1/802.11a Middle channel



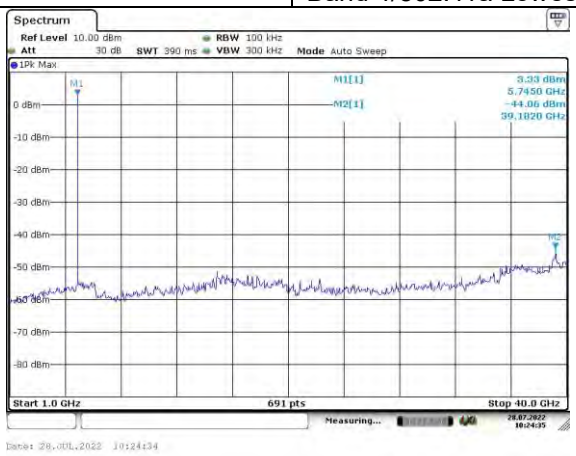
0.03GHz~40GHz

Test channel:	Band 1/802.11a Highest channel



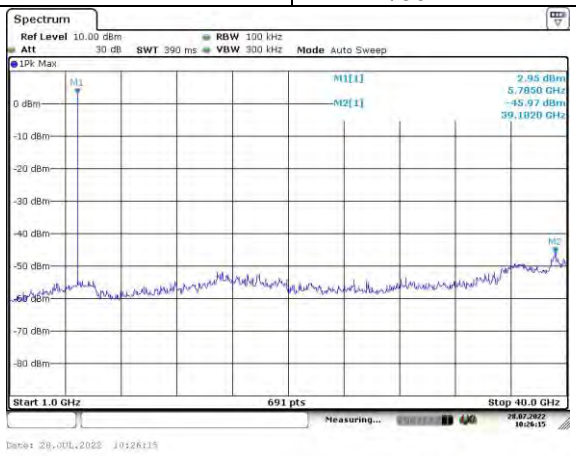
0.03GHz~40GHz

Test channel:	Band 4/802.11a Lowest channel



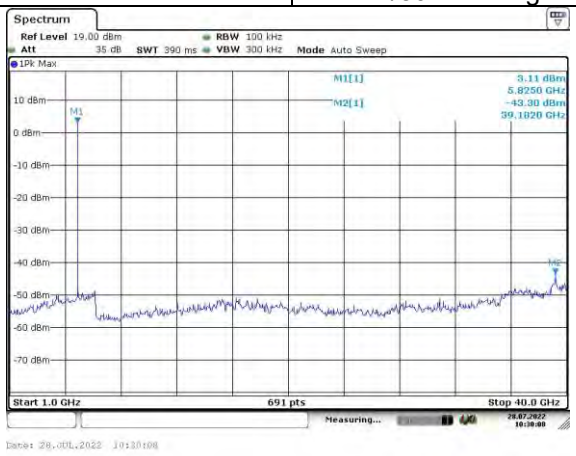
0.03Hz~40GHz

Test channel:	Band 4/802.11a Middle channel



0.03GHz~40GHz

Test channel:	Band 4/802.11a Highest channel



0.03GHz~40GHz

3.3 CONDUCTED BAND EMISSION MEASUREMENT

3.3.1 TEST REQUIREMENT:

FCC Part15 C Section 15.209 and 15.407

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

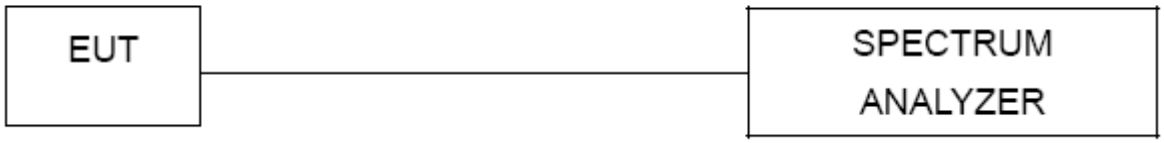
3.3.2 TEST PROCEDURE

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

3.3.3 DEVIATION FROM TEST STANDARD

No deviation

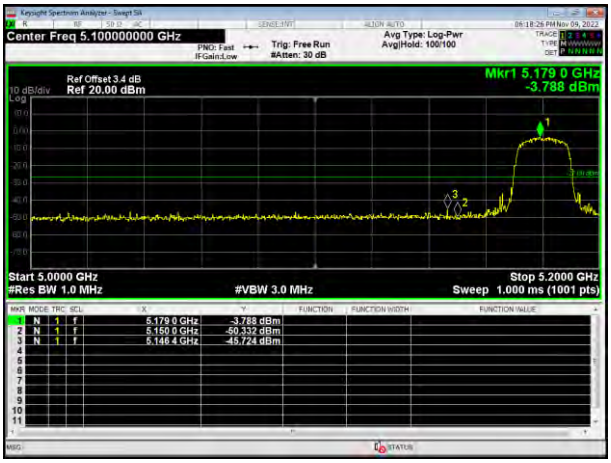
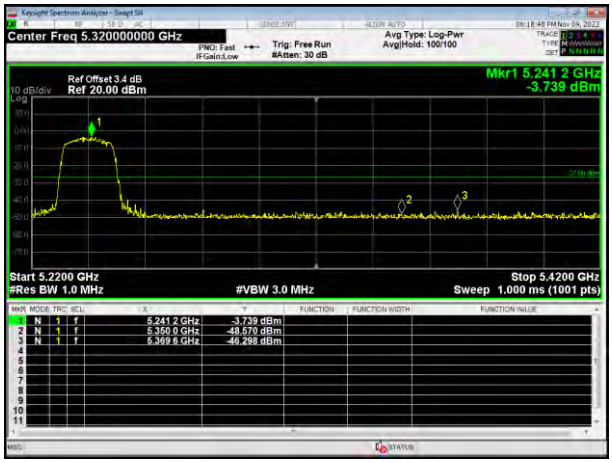
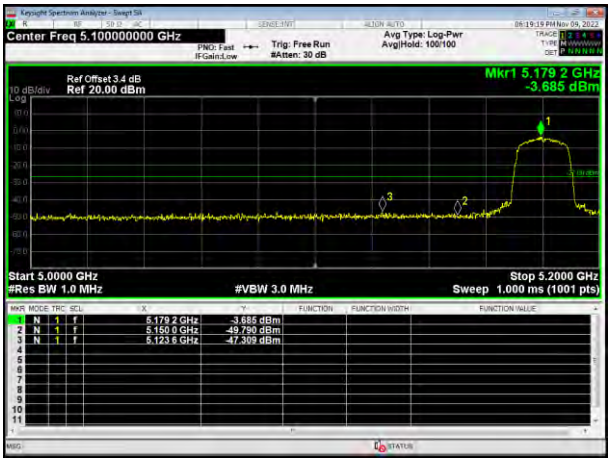
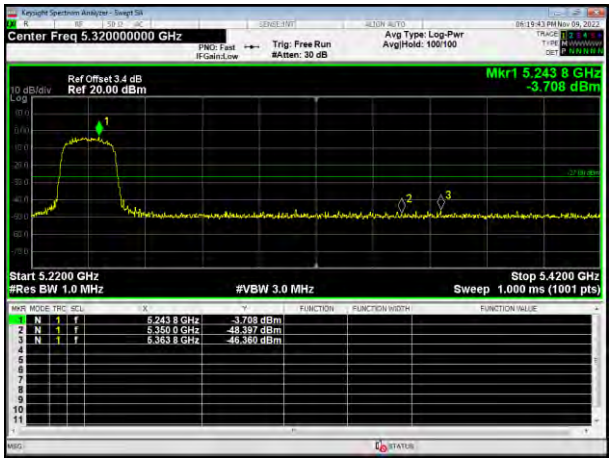
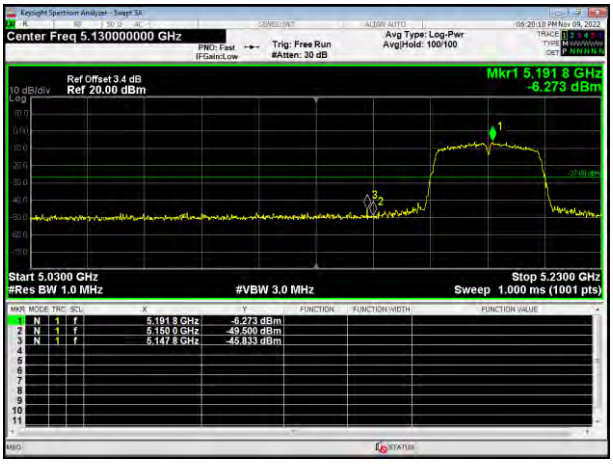
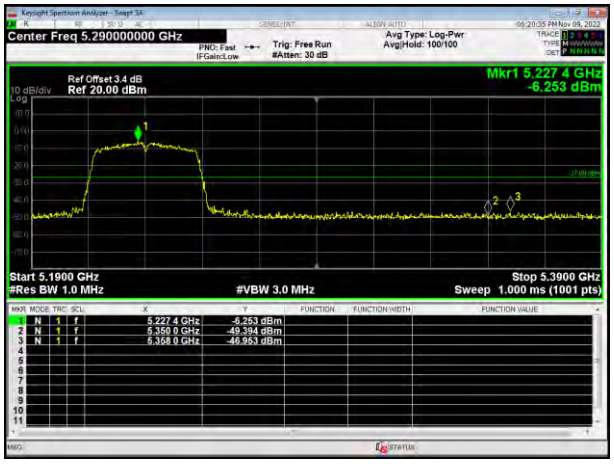
3.3.4 TEST SETUP

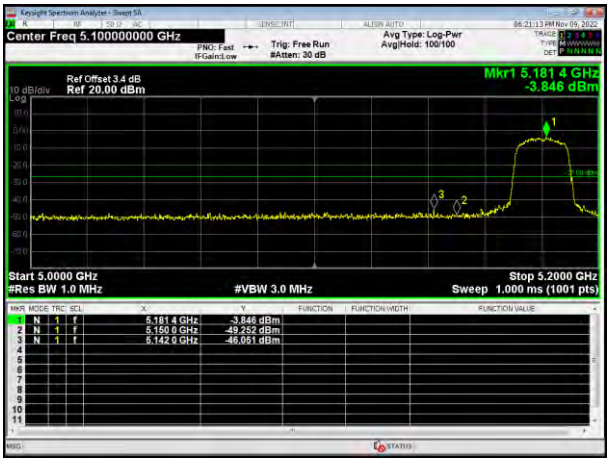
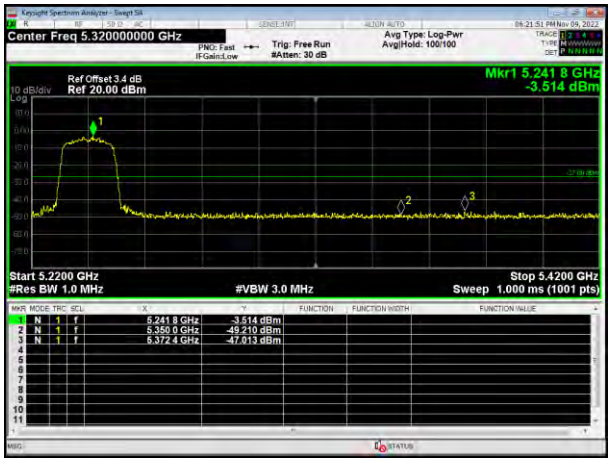
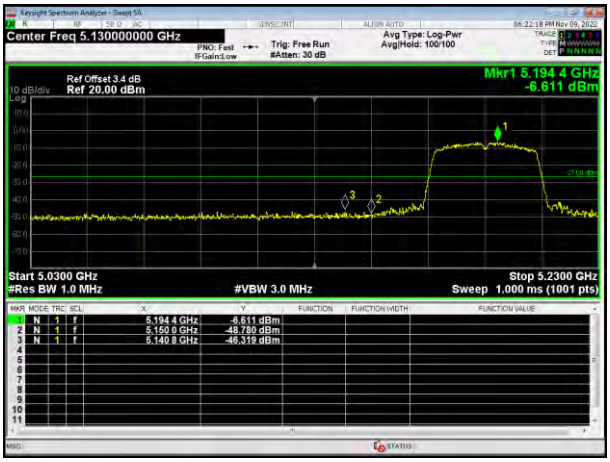
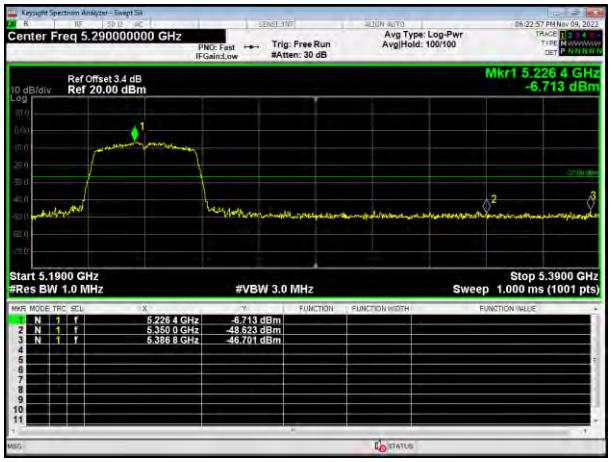
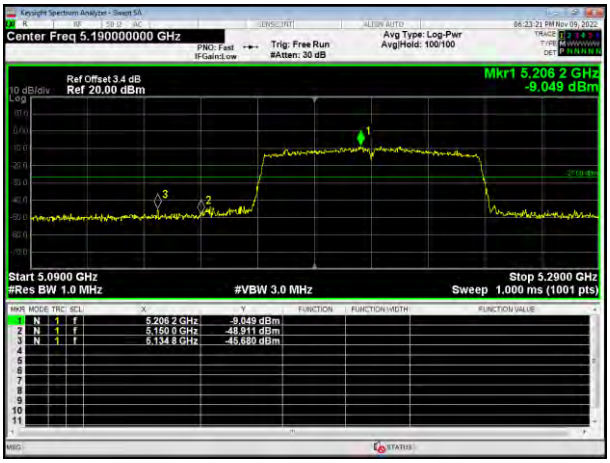


3.3.5 EUT OPERATING CONDITIONS

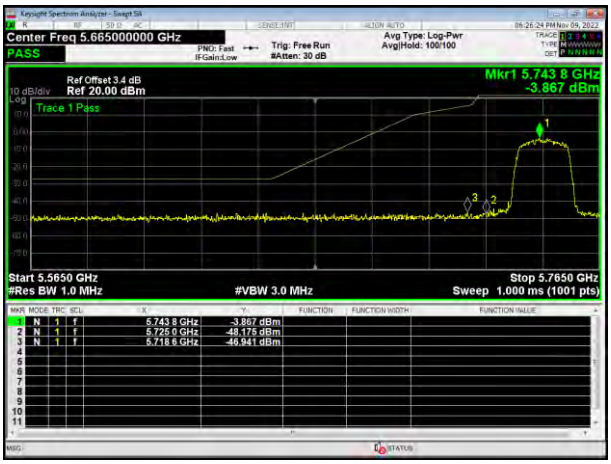
The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

3.3.6 TEST RESULT

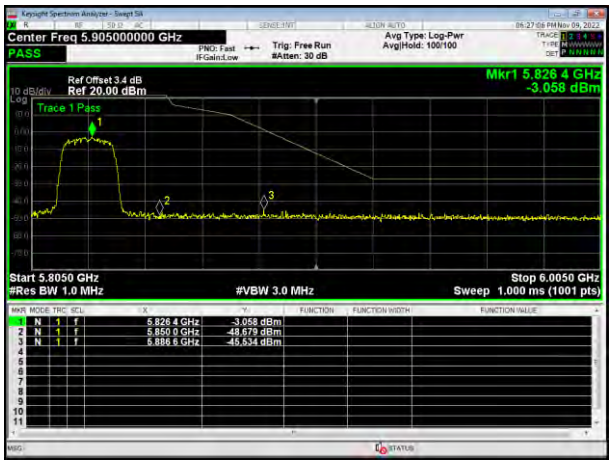
802.11a	
	
5180MHz	5240MHz
802.11n HT20	
	
5180MHz	5240MHz
802.11n HT40	
	
5190MHz	5230MHz

802.11ac HT20	
	
5180MHz	5240MHz
802.11ac HT40	
	
5190MHz	5230MHz
802.11ac HT80	
	
5210MHz	

802.11a

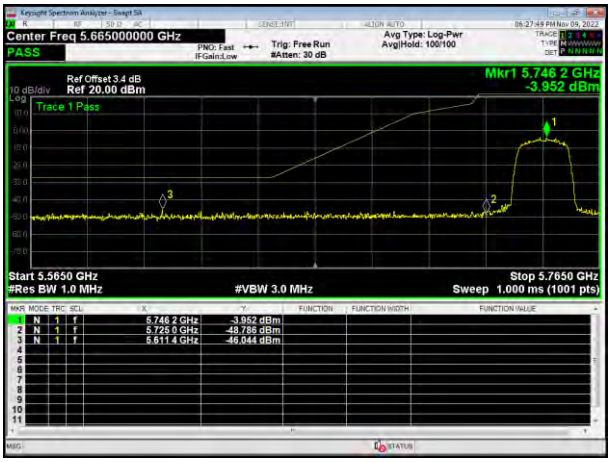


5745MHz

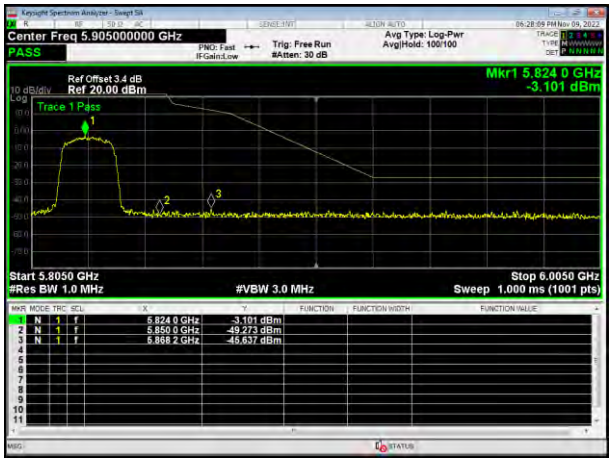


5825MHz

802.11n HT20

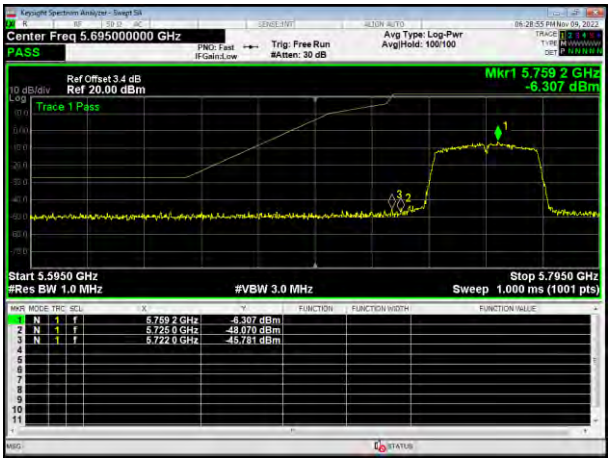


5745MHz

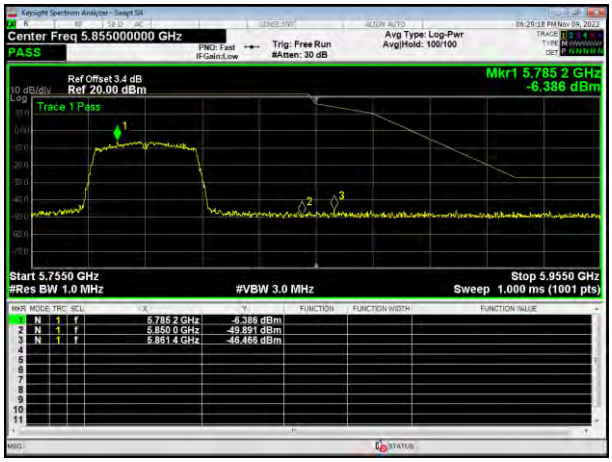


5825MHz

802.11n HT40

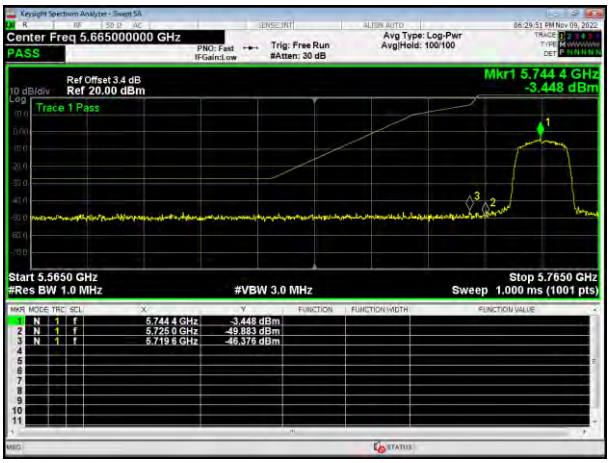


5755MHz

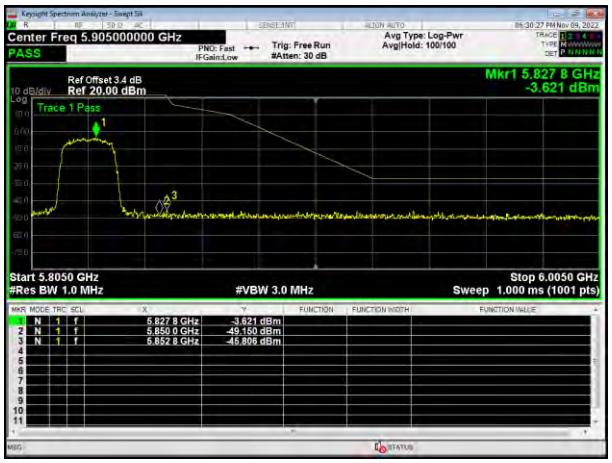


5795MHz

802.11ac HT20

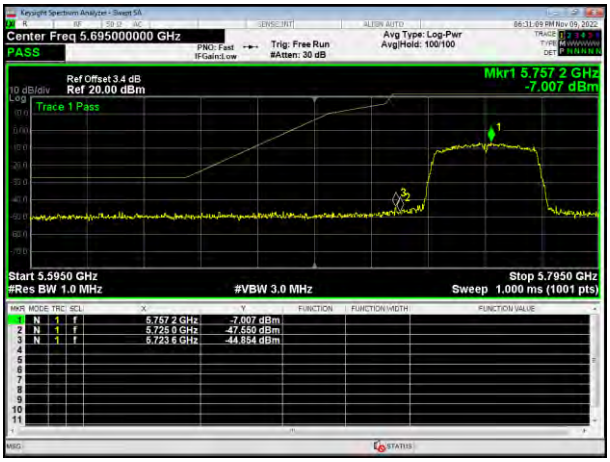


5745MHz

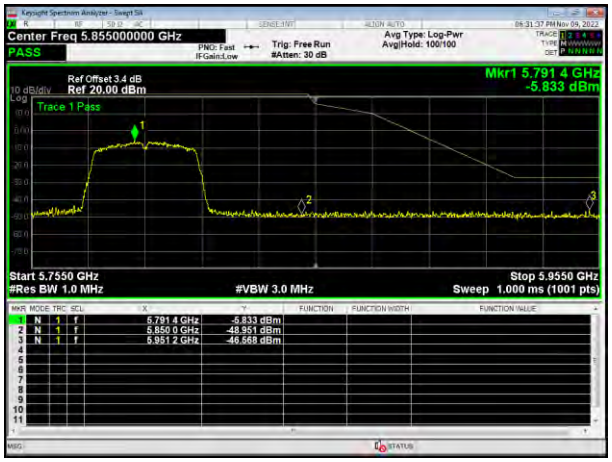


5825MHz

802.11ac HT40



5755MHz



5795MHz

802.11ac HT80

5775MHz

4. PEAK OUTPUT POWER

4.1 APPLIED PROCEDURES / LIMIT

For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi.
For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

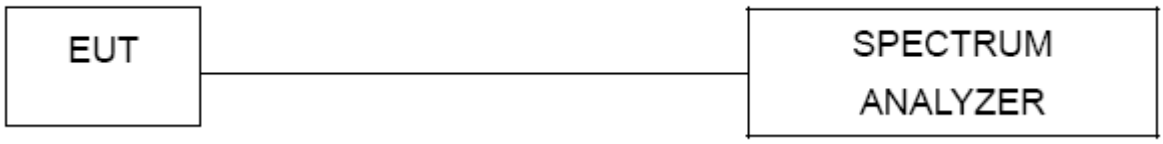
4.1.1 TEST PROCEDURE

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

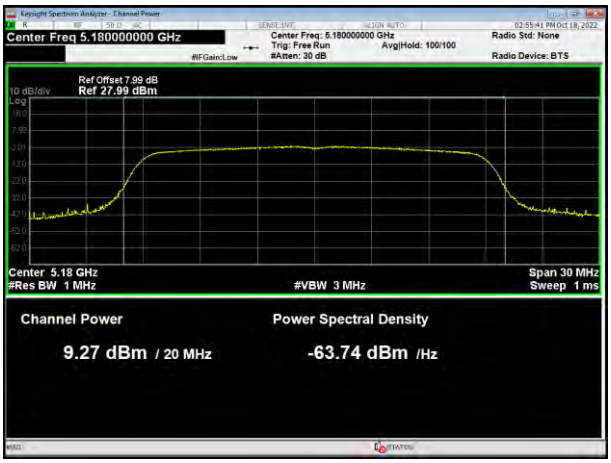
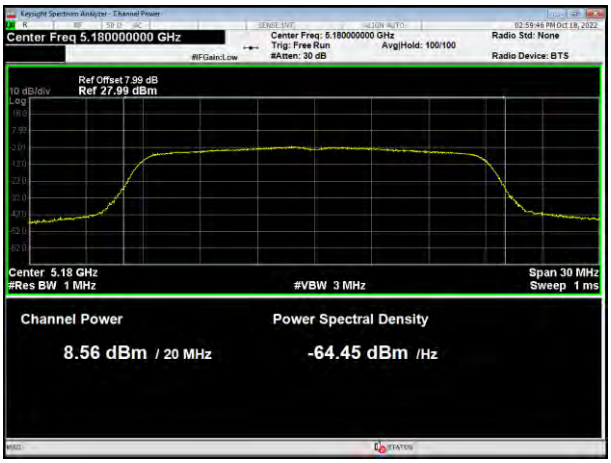
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

4.1.5 TEST RESULTS

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

Band	Mode	Test Channel	Peak Output Power (dBm)	Duty factor (dB)	Total Output Power(dB)	LIMIT (dBm)
Band 1	802.11a	Low	9.266	0.11	9.376	23.98
		Moddle	8.456	0.11	8.566	23.98
		High	8.309	0.11	8.419	23.98
	802.11n HT20	Low	8.561	0.21	8.771	23.98
		Moddle	7.817	0.21	8.027	23.98
		High	7.692	0.21	7.902	23.98
	802.11n HT40	Low	8.456	0.21	8.666	23.98
		High	7.714	0.21	7.924	23.98
	802.11ac HT20	Low	8.912	0.11	9.022	23.98
		Moddle	8.096	0.11	8.206	23.98
		High	7.974	0.11	8.084	23.98
	802.11ac HT40	Low	8.447	0.21	8.657	23.98
		High	7.696	0.21	7.906	23.98
	802.11ac HT80	/	7.945	0.4	8.345	23.98

Band	Mode	Test Channel	Peak Output Power (dBm)	Duty factor (dB)	Total Output Power(dB)	LIMIT (dBm)
Band 4	802.11a	Low	6.865	0.11	6.975	30
		Moddle	6.701	0.11	6.811	30
		High	7.656	0.11	7.766	30
	802.11n HT20	Low	6.758	0.21	6.968	30
		Moddle	6.634	0.21	6.844	30
		High	7.584	0.21	7.794	30
	802.11n HT40	Low	6.795	0.4	7.195	30
		High	5.879	0.4	6.279	30
	802.11ac HT20	Low	6.722	0.29	7.012	30
		Moddle	6.552	0.29	6.842	30
		High	7.282	0.29	7.572	30
	802.11ac HT40	Low	6.468	0.53	6.998	30
		High	5.616	0.53	6.146	30
	802.11ac HT80	/	6.162	0.87	7.032	30

802.11a	802.11n HT20
	
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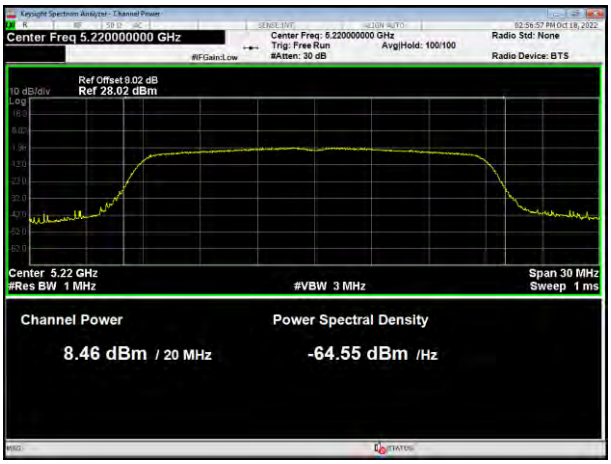	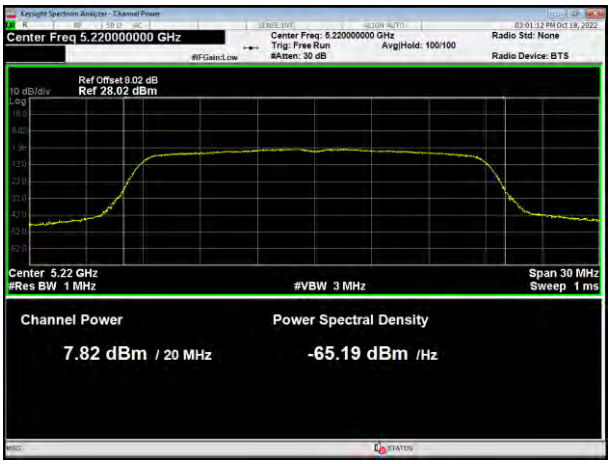
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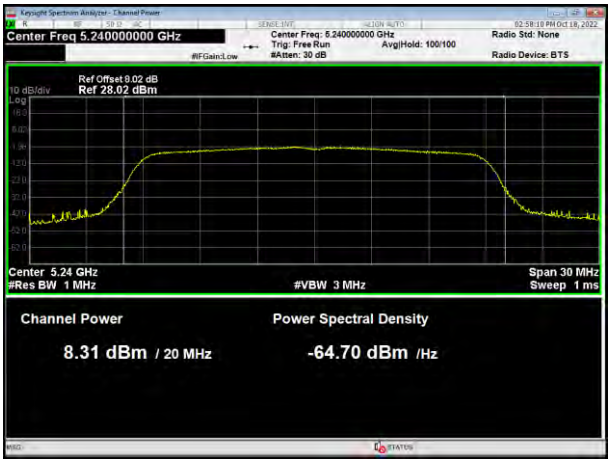
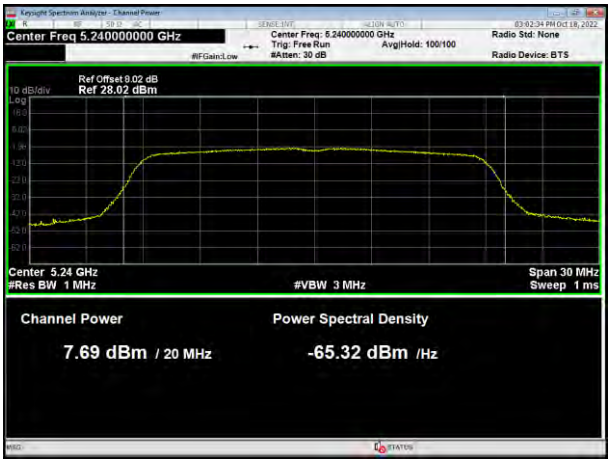
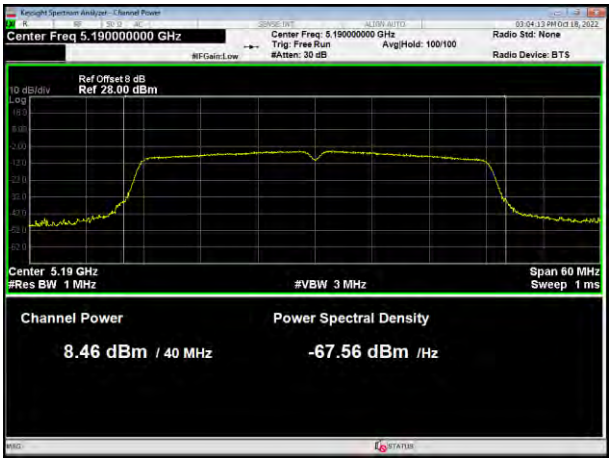
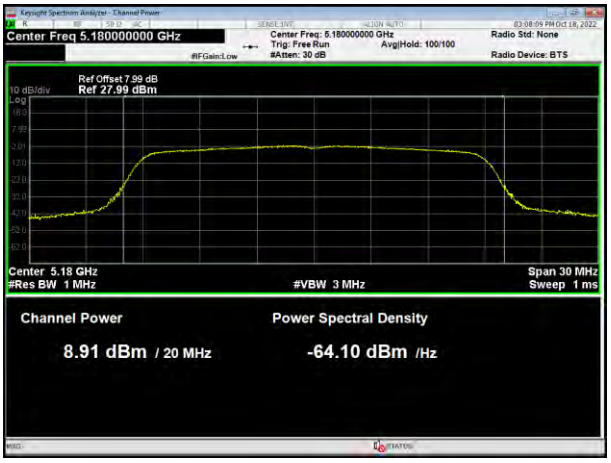
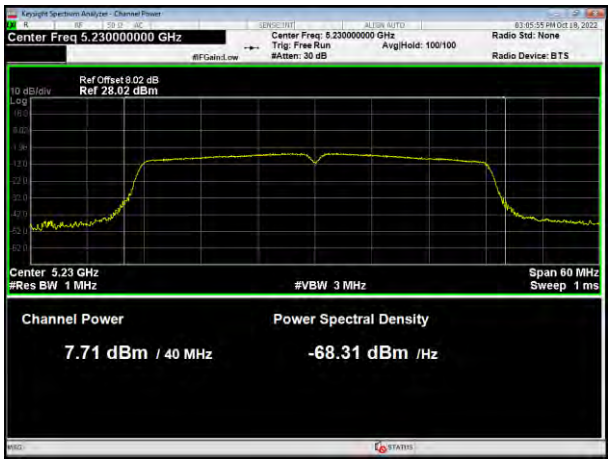
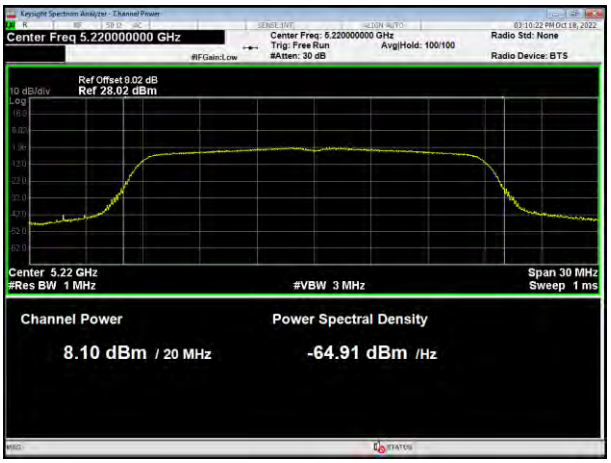
	
5240MHz	5240MHz

802.11n HT40	802.11ac HT20
	
5190MHz	5180MHz
	
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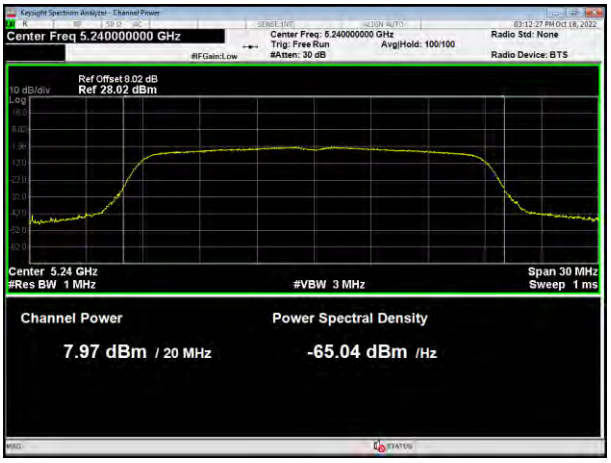
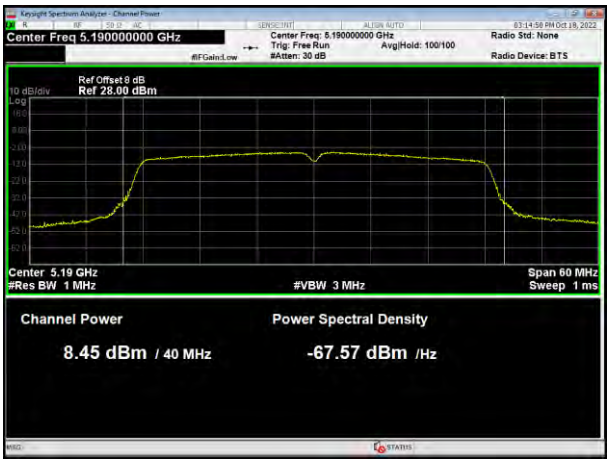
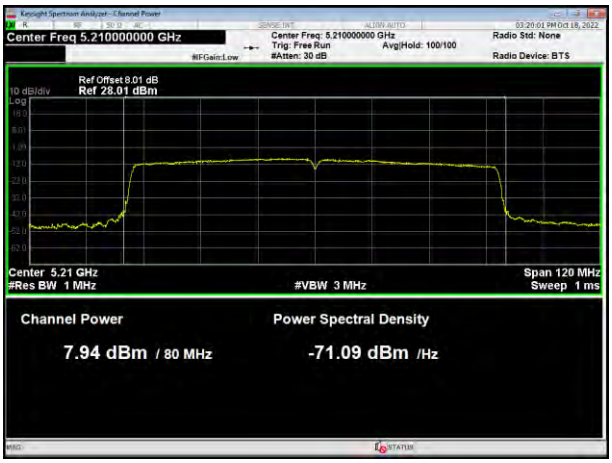
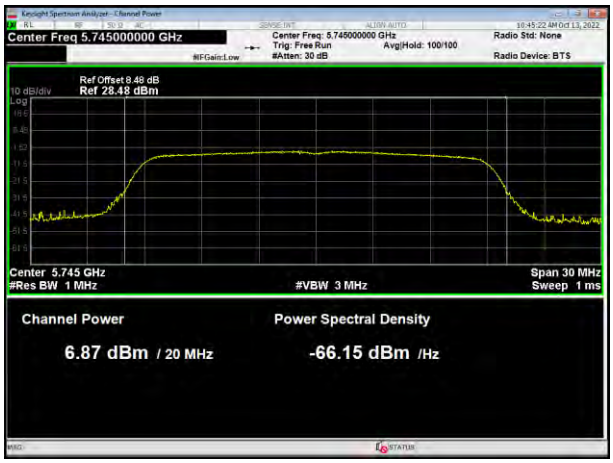
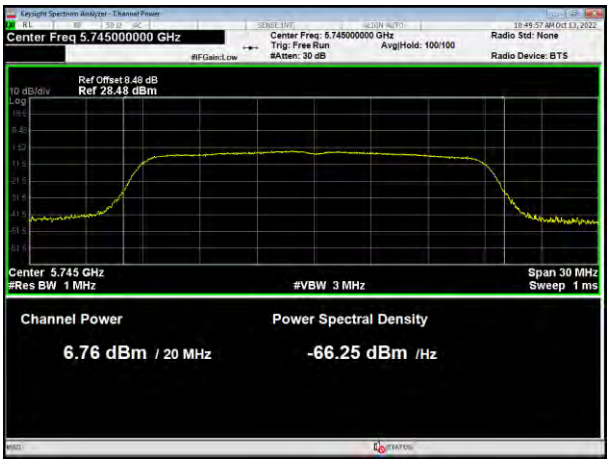
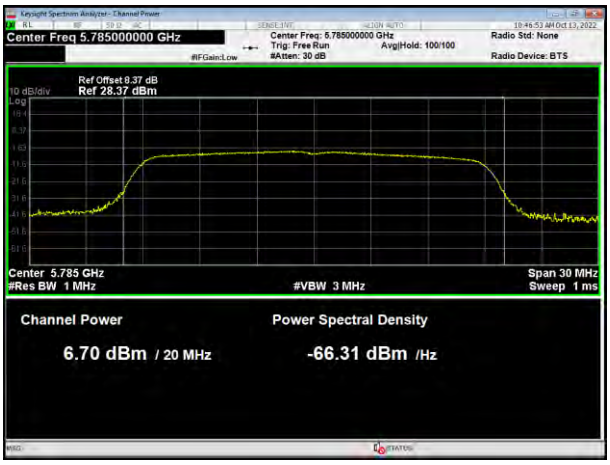
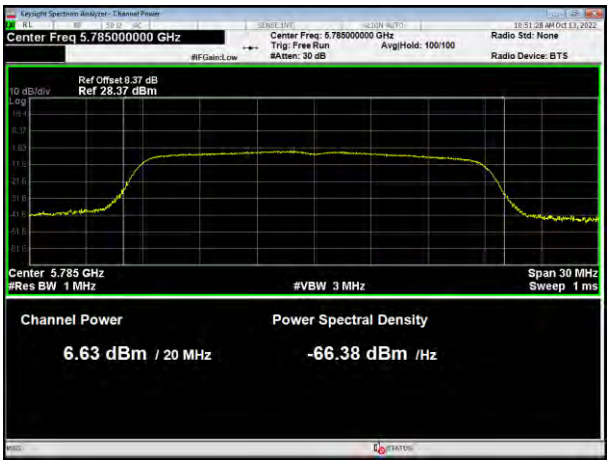
	
	5240MHz

802.11ac HT40	802.11ac HT80
	
5190MHz	5210MHz
5230MHz	

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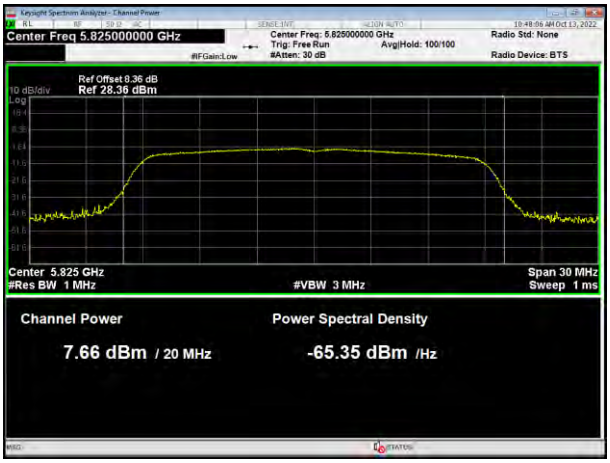
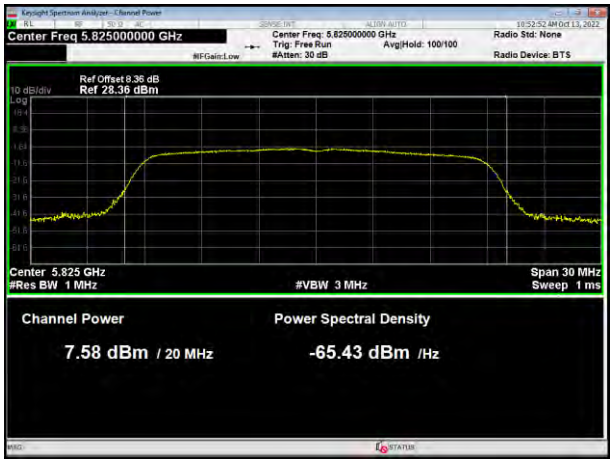
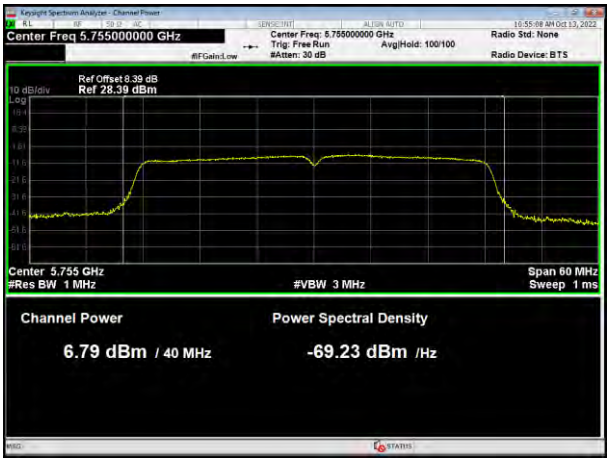
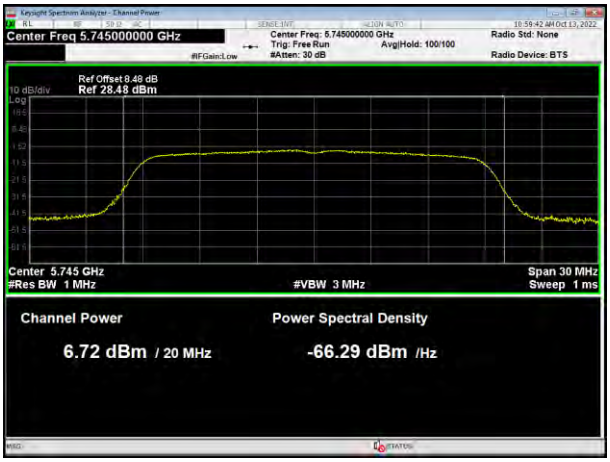
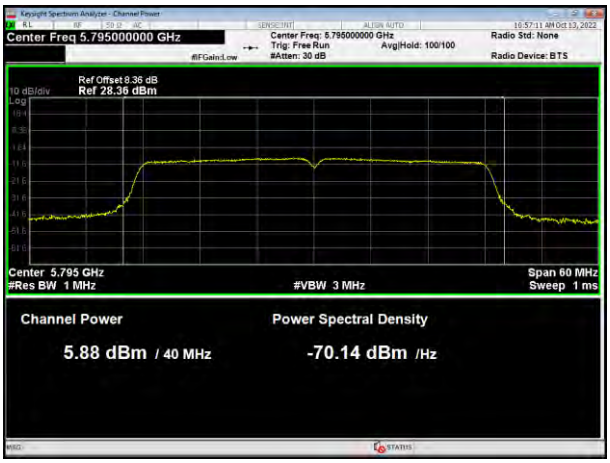
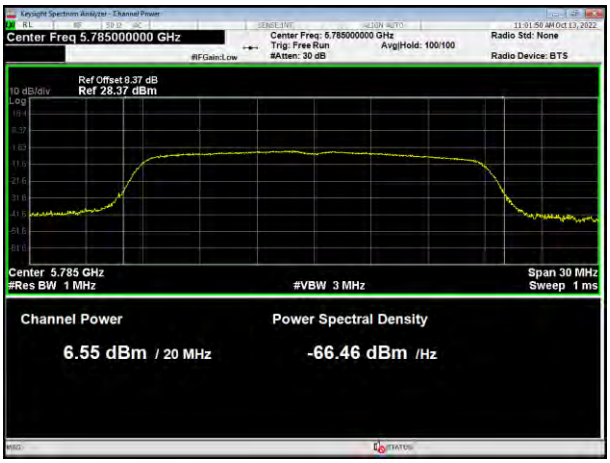
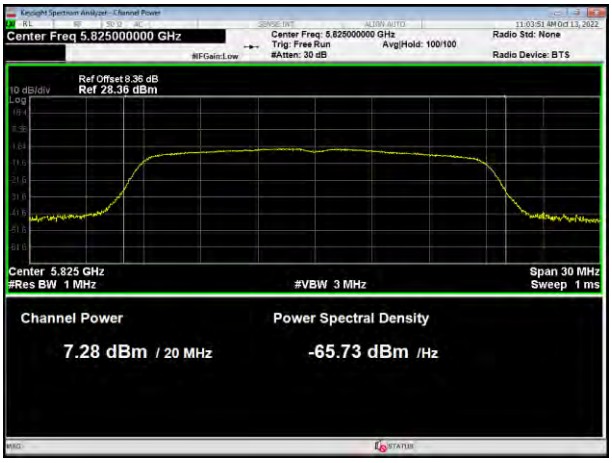
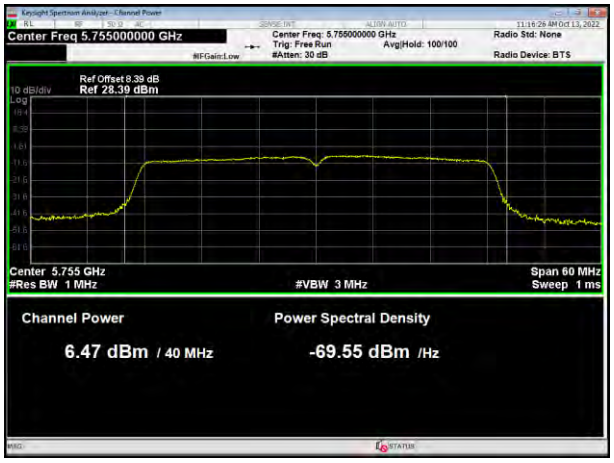
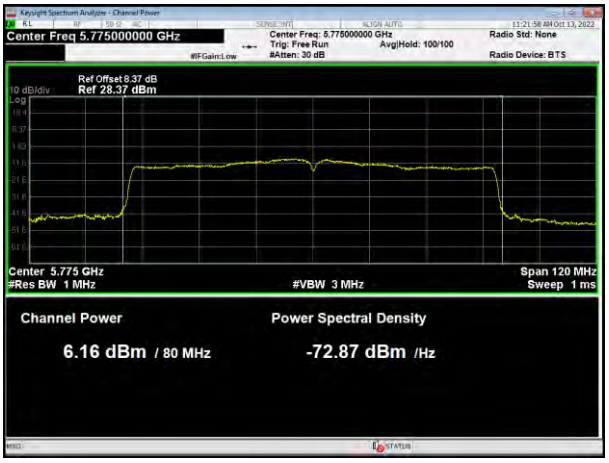
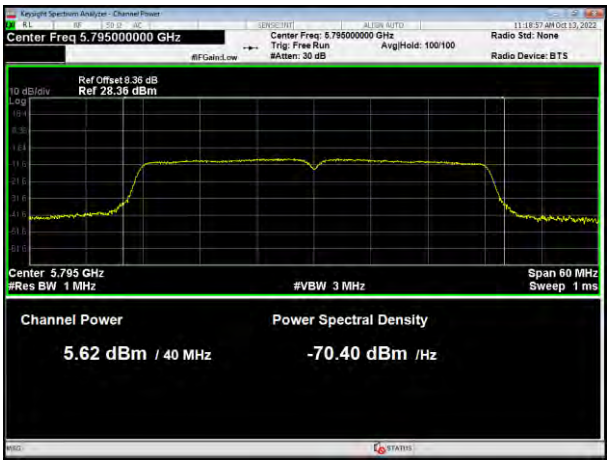
	
5825MHz	5825MHz

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 11 dBm in any 1 megahertz band.
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

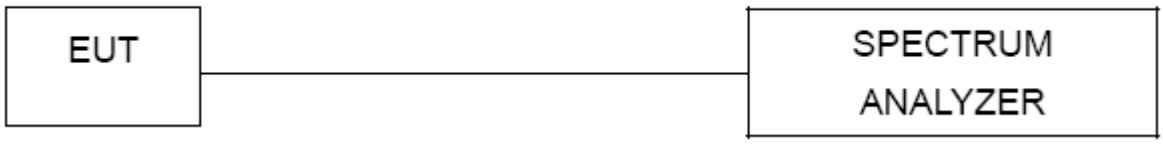
5.1.1 TEST PROCEDURE

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



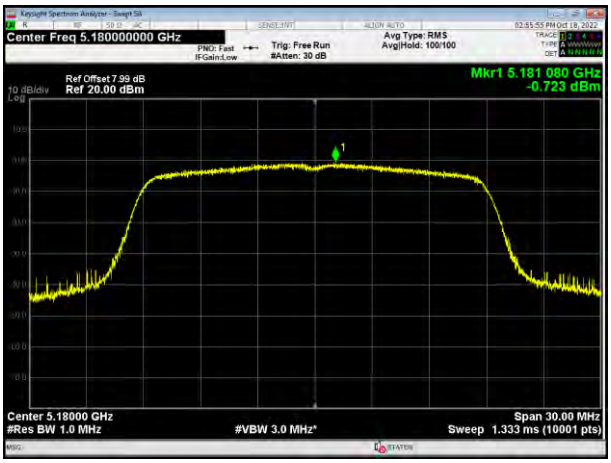
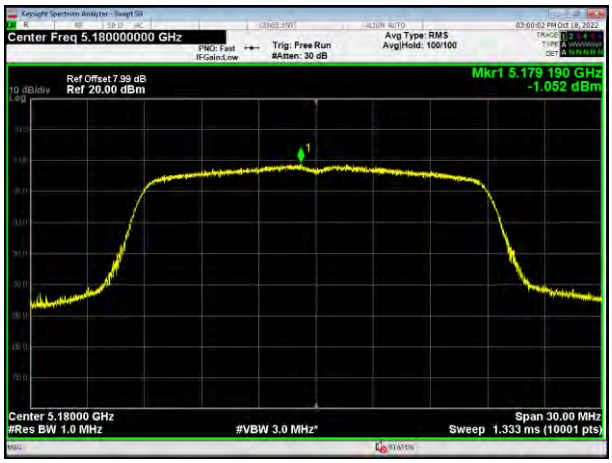
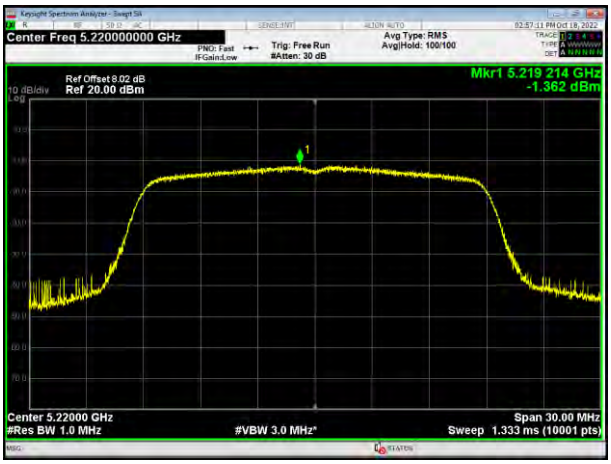
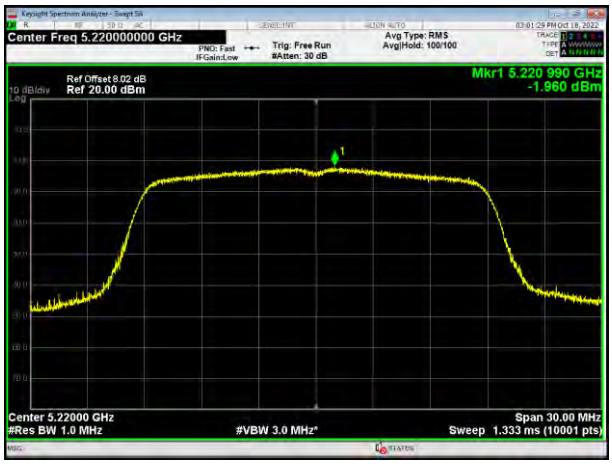
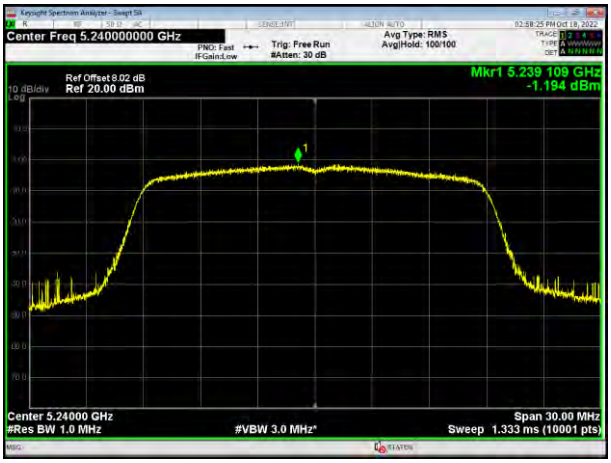
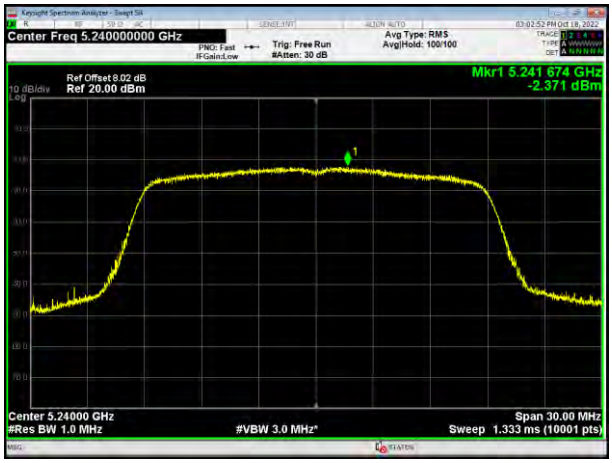
5.1.4 EUT OPERATION CONDITIONS

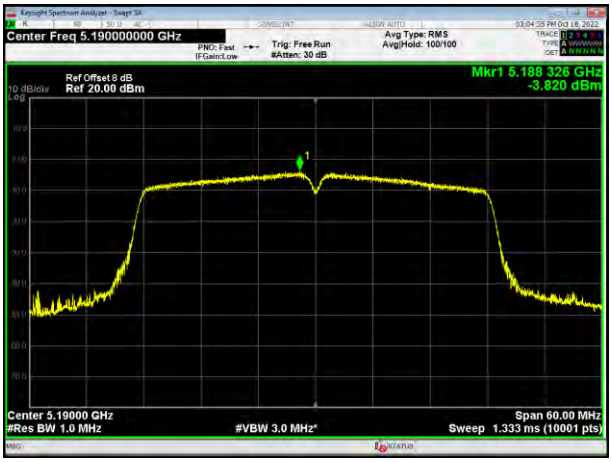
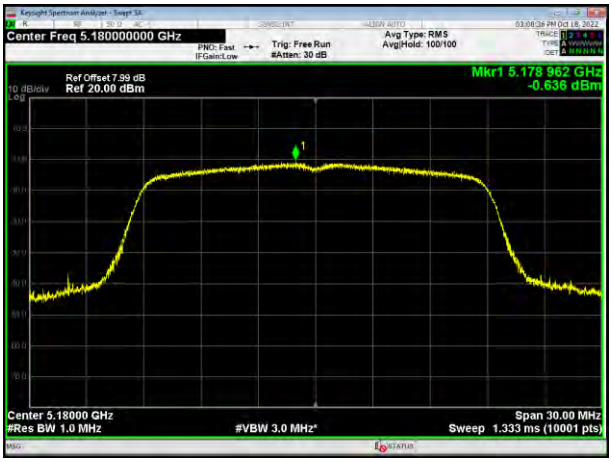
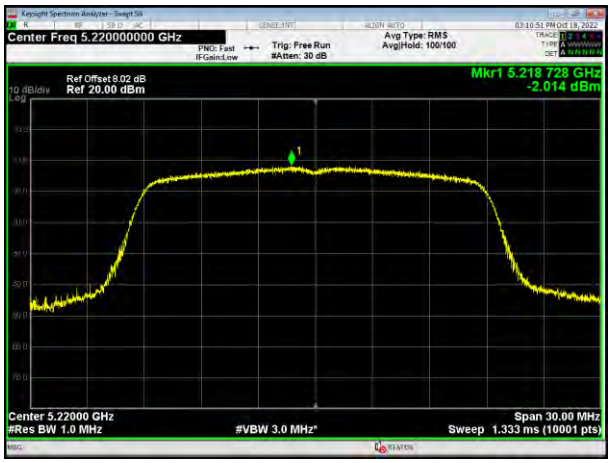
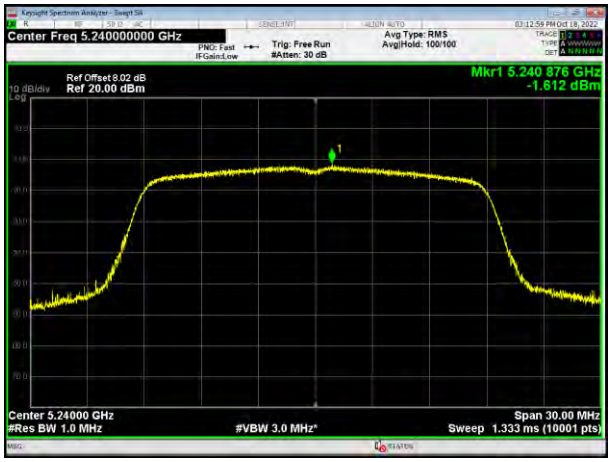
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

5.1.5 TEST RESULTS

	Mode	Test Channel	Reading Level (dBm)	Duty factor (dB)	PSD (dBm/MHz)	Limit (dBm)	Result
Band1	802.11a	Low	-0.723	0.11	-0.613	11.00	PASS
		Moddle	-1.362	0.11	-1.252	11.00	PASS
		High	-1.194	0.11	-1.084	11.00	PASS
	802.11n20	Low	-1.052	0.21	-0.842	11.00	PASS
		Moddle	-1.96	0.21	-1.75	11.00	PASS
		High	-2.371	0.21	-2.161	11.00	PASS
	802.11n40	Low	-3.82	0.21	-3.61	11.00	PASS
		High	-4.793	0.21	-4.583	11.00	PASS
	802.11ac20	Low	-0.636	0.11	-0.526	11.00	PASS
		Moddle	-2.014	0.11	-1.904	11.00	PASS
		High	-1.612	0.11	-1.502	11.00	PASS
	802.11ac40	Low	-4.082	0.21	-3.872	11.00	PASS
		High	-4.755	0.21	-4.545	11.00	PASS
	802.11ac80	/	-8.018	0.4	-7.618	11.00	PASS

	Mode	Test Channel	Reading Level (dBm)	Duty factor (dB)	PSD (dBm/ 500kHz)	Limit (dBm)	Result
Band4	802.11a	Low	-6.12	0.11	-6.01	30.00	PASS
		Moddle	-5.805	0.11	-5.695	30.00	PASS
		High	-4.797	0.11	-4.687	30.00	PASS
	802.11n20	Low	-5.815	0.21	-5.605	30.00	PASS
		Moddle	-6.113	0.21	-5.903	30.00	PASS
		High	-4.816	0.21	-4.606	30.00	PASS
	802.11n40	Low	-9.001	0.4	-8.601	30.00	PASS
		High	-10.564	0.4	-10.164	30.00	PASS
	802.11ac20	Low	-6.207	0.29	-5.917	30.00	PASS
		Moddle	-6.155	0.29	-5.865	30.00	PASS
		High	-5.272	0.29	-4.982	30.00	PASS
	802.11ac40	Low	-9.591	0.53	-9.061	30.00	PASS
		High	-10.793	0.53	-10.263	30.00	PASS
	802.11ac80	/	-11.247	0.87	-10.377	30.00	PASS

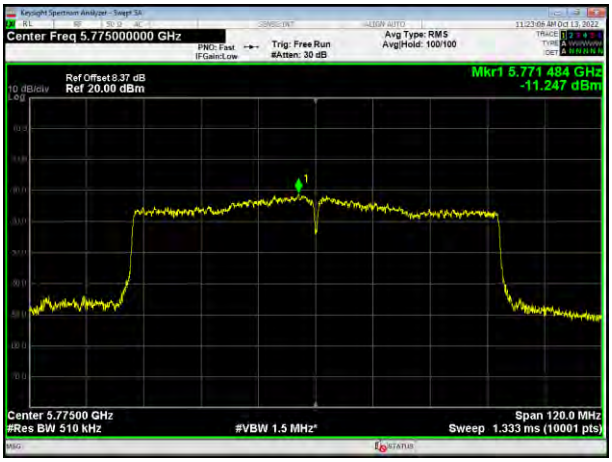
802.11a	802.11n HT20
	
5180MHz	5180MHz
	
5200MHz	5200MHz
	
5240MHz	5240MHz

802.11n HT40	802.11ac HT20
	
5190MHz	5180
	
5230MHz	5200
	
	5240

802.11ac HT40	802.11ac HT80
5190MHz	5210
5230MHz	

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&26DB&99% BANDWIDTH TEST

6.1 APPLIED PROCEDURES / LIMIT

The 26 dB bandwidth is used to determine the conducted power limits. 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

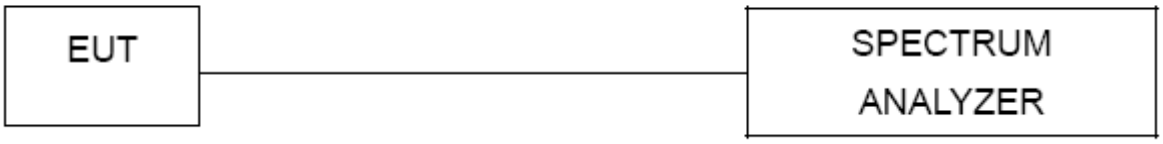
26dB Bandwidth	
Spectrum Parameters	Setting
RBW	approximately 1% of the emission bandwidth
VBW	>RBW
Span	30MHz(20MHz Bandwidth mode) 60MHz(40MHz Bandwidth mode) 120MHz(80MHz Bandwidth mode)
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

99% Occupied Bandwidth	
Spectrum Parameters	Setting
RBW	1% to 5% of the OBW
VBW	Approximately three times the RBW
Span	between 1.5 times and 5.0 times the OBW
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP



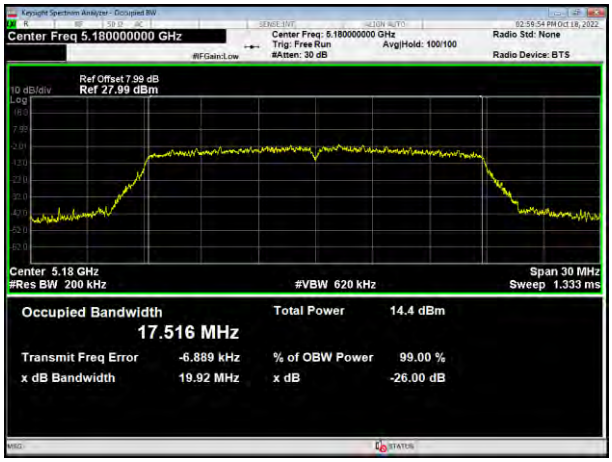
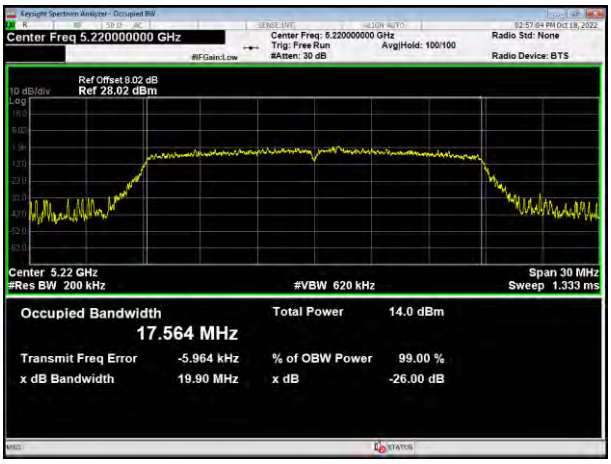
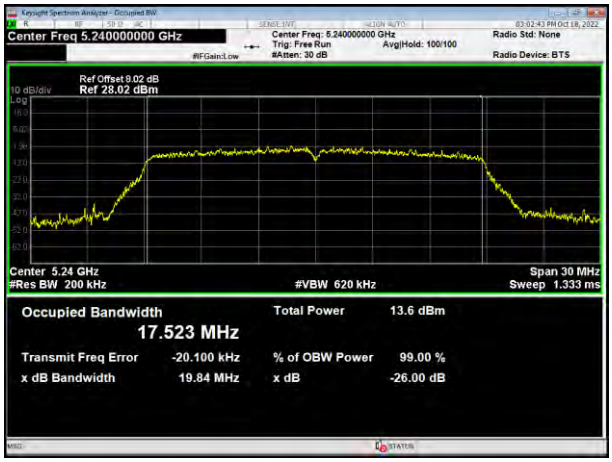
6.1.4 EUT OPERATION CONDITIONS

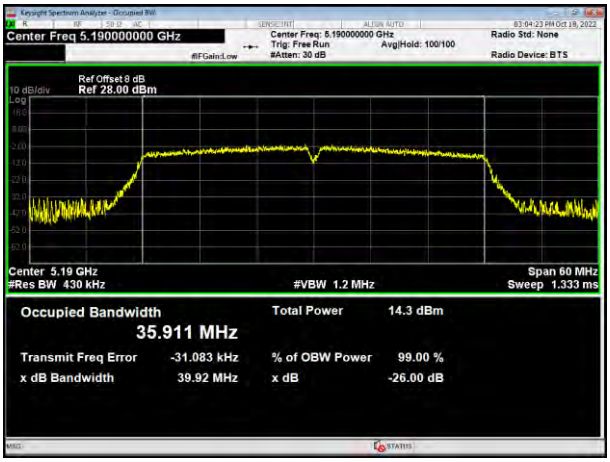
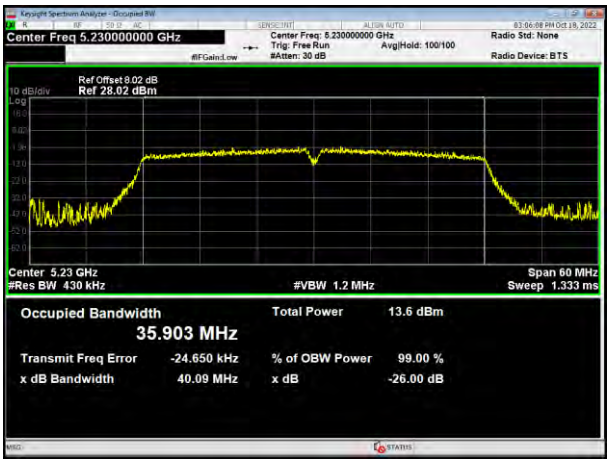
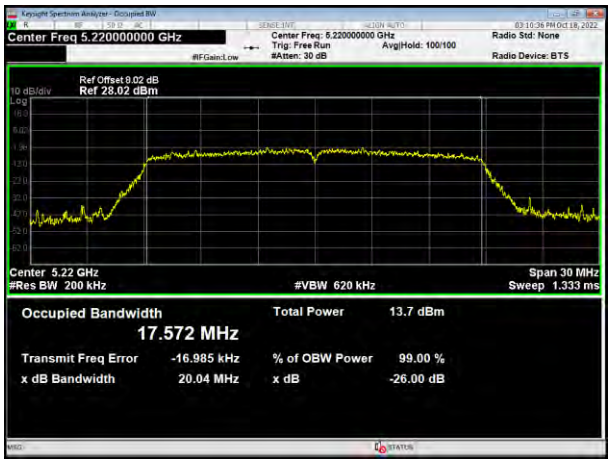
The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

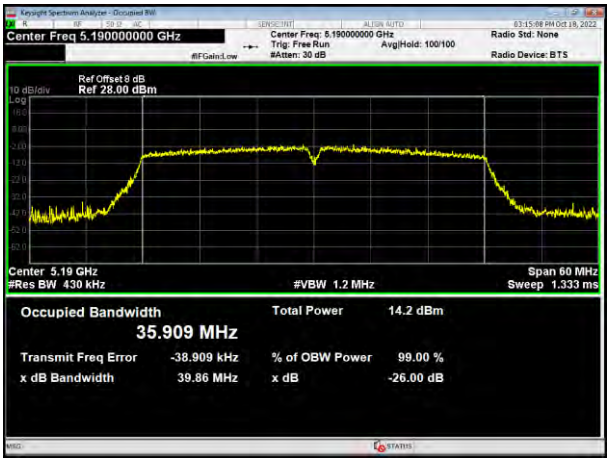
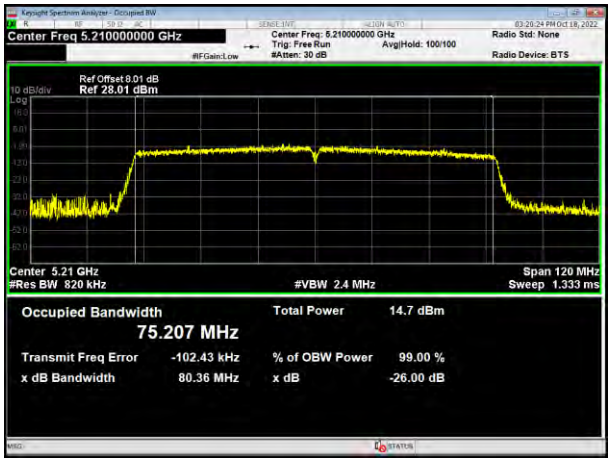
6.1.5 TEST RESULTS

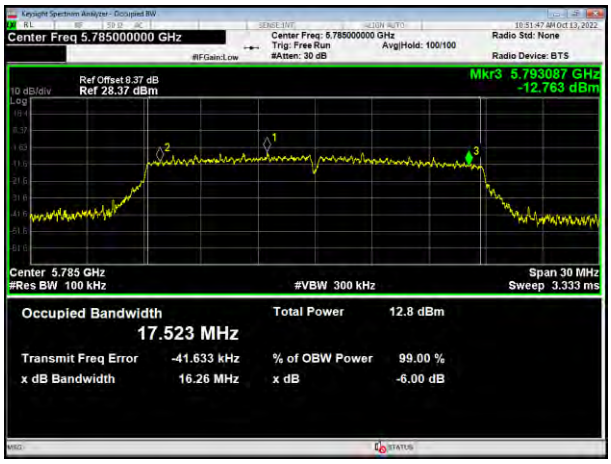
		Test Channel	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	Result
Band 1	802.11a	Low	19.94	17.537	Pass
		Middle	19.90	17.564	Pass
		High	20.06	17.564	Pass
	802.11n HT20	Low	19.92	17.516	Pass
		Middle	20.11	17.553	Pass
		High	19.84	17.523	Pass
	802.11n HT40	Low	39.92	35.911	Pass
		High	40.09	35.903	Pass
	802.11ac HT20	Low	20.04	17.546	Pass
		Middle	20.04	17.572	Pass
		High	20.11	17.559	Pass
	802.11ac HT40	Low	39.86	35.909	Pass
		High	40.23	35.932	Pass
	802.11ac HT80	/	80.36	75.207	Pass

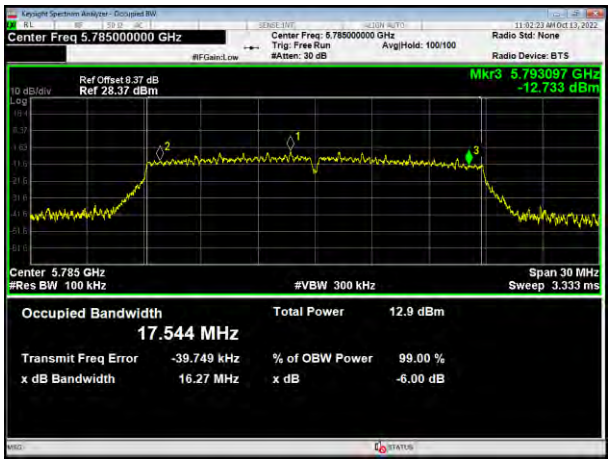
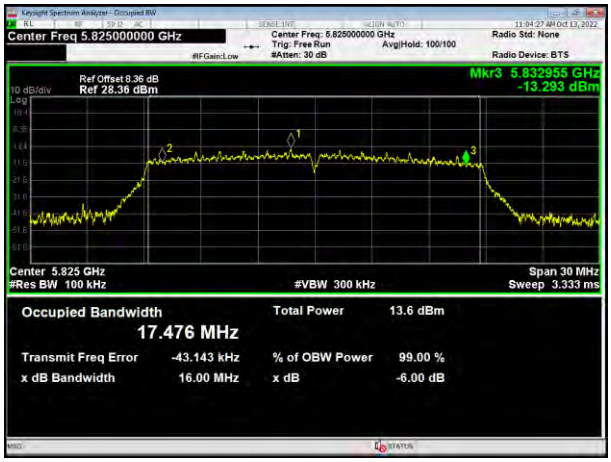
		Test Channel	6dB Bandwidth (MHz)	6dB Bandwidth Limit (MHz)	Result
Band 4	802.11a	Low	15.665	>0.5	Pass
		Middle	15.658	>0.5	Pass
		High	13.839	>0.5	Pass
	802.11n HT20	Low	15.654	>0.5	Pass
		Middle	16.257	>0.5	Pass
		High	15.033	>0.5	Pass
	802.11n HT40	Low	35.131	>0.5	Pass
		High	35.15	>0.5	Pass
	802.11ac HT20	Low	15.356	>0.5	Pass
		Middle	16.273	>0.5	Pass
		High	15.995	>0.5	Pass
	802.11ac HT40	Low	35.123	>0.5	Pass
		High	35.455	>0.5	Pass
	802.11ac HT80	/	75.059	>0.5	Pass

802.11a	802.11n HT20
	
5180MHz	5180MHz
	
5200MHz	5200MHz
	
5240MHz	5240MHz

802.11n HT40	802.11ac HT20
	
5190MHz	5180
	
5230MHz	5200
	5240

802.11ac HT40	802.11ac HT80
	
5190MHz	5210
5230MHz	

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.

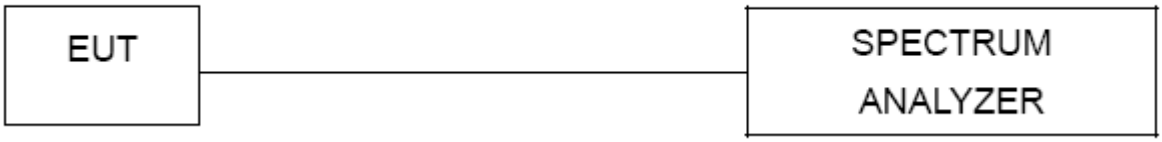
7.1.1 TEST PROCEDURE

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



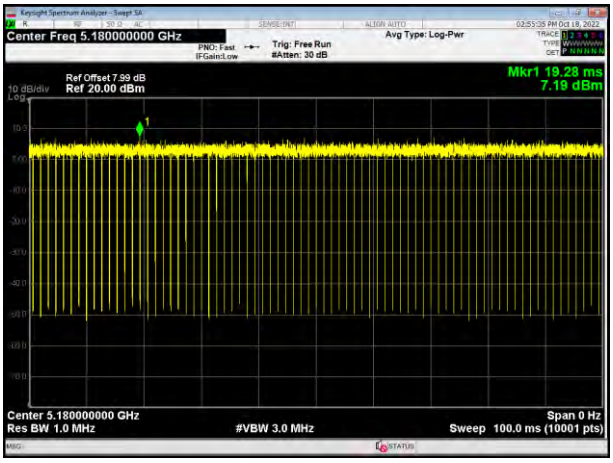
7.1.4 EUT OPERATION CONDITIONS

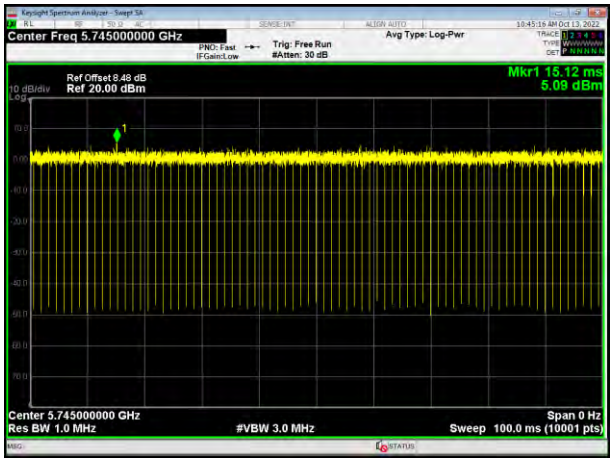
The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

7.1.5 TEST RESULTS

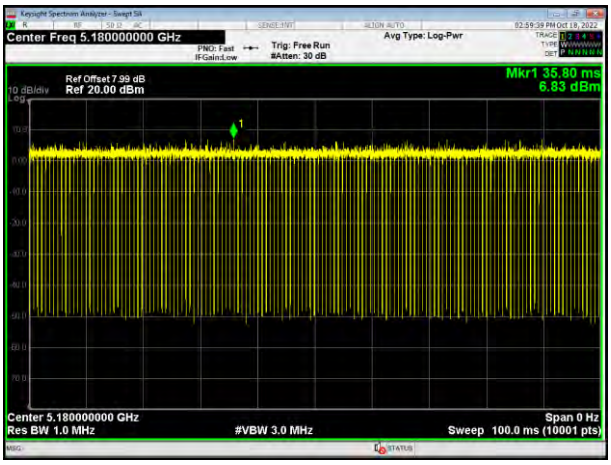
Operation Mode		Duty Cycle(%)	Duty Fator (dB) 10 * log (1/ Duty cycle)
Band 1	802.11a	97.58	0.11
	802.11n(HT20)	95.38	0.21
	802.11n(HT40)	95.36	0.21
	802.11ac(HT20)	97.61	0.11
	802.11ac(HT40)	95.38	0.21
	802.11ac(HT80)	91.23	0.4
Band 4	802.11a	97.53	0.11
	802.11n(HT20)	95.28	0.21
	802.11n(HT40)	91.21	0.4
	802.11ac(HT20)	93.47	0.29
	802.11ac(HT40)	88.56	0.53
	802.11ac(HT80)	81.82	0.87

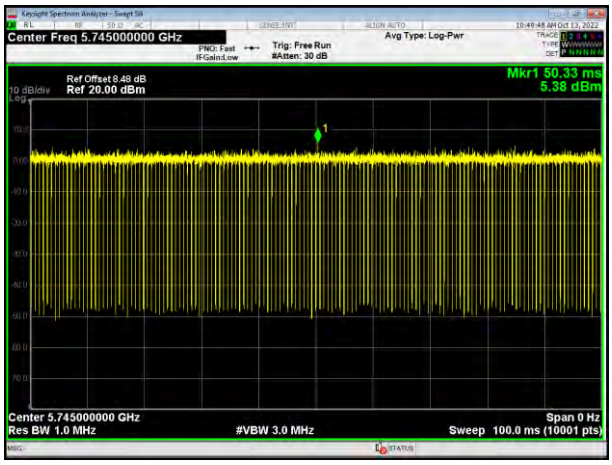
802.11a



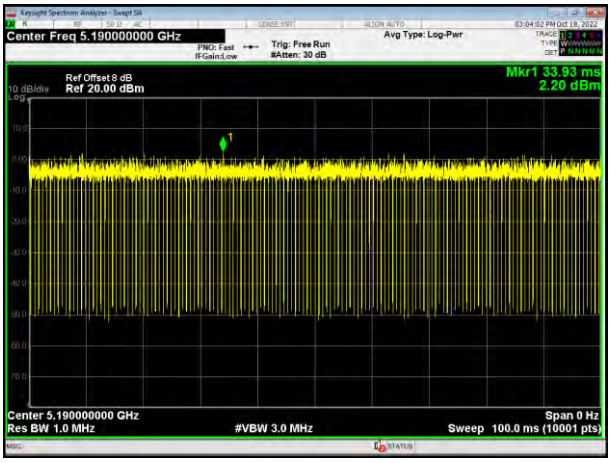


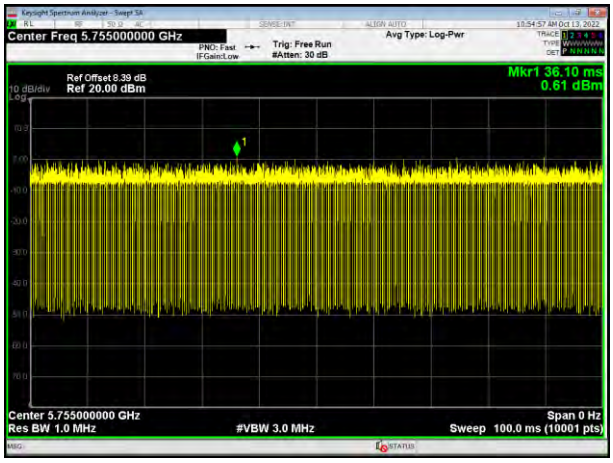
802.11n HT20



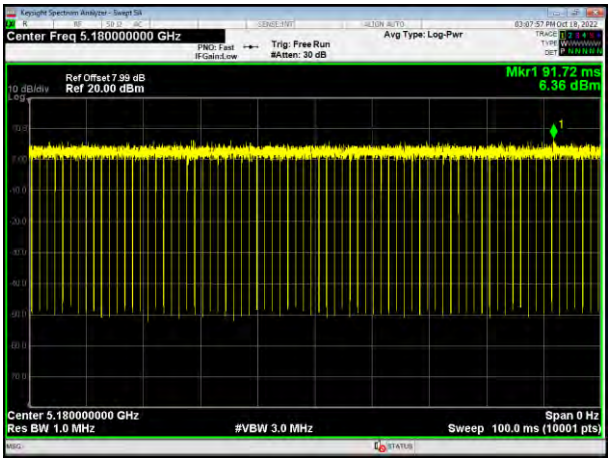


802.11n HT40

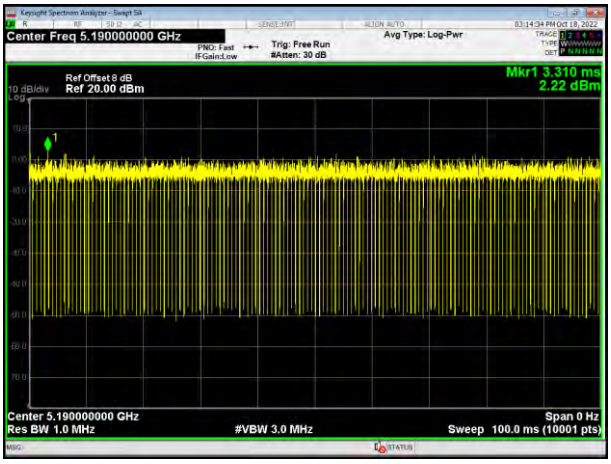


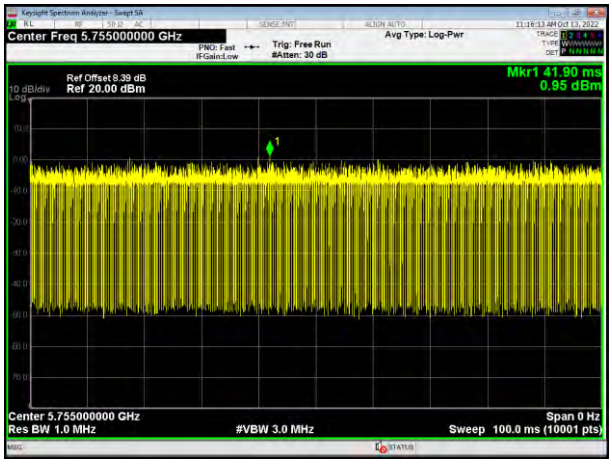


802.11ac HT20

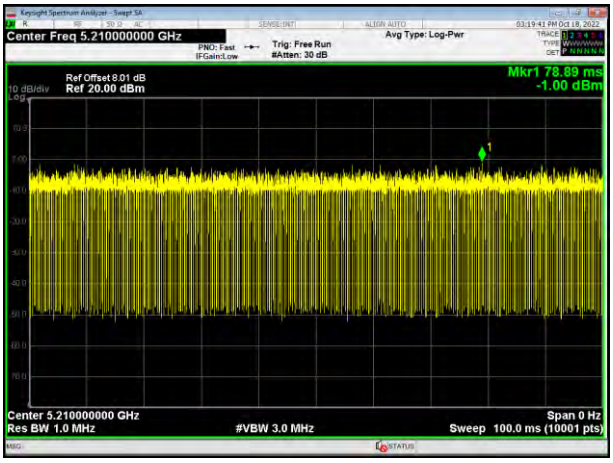


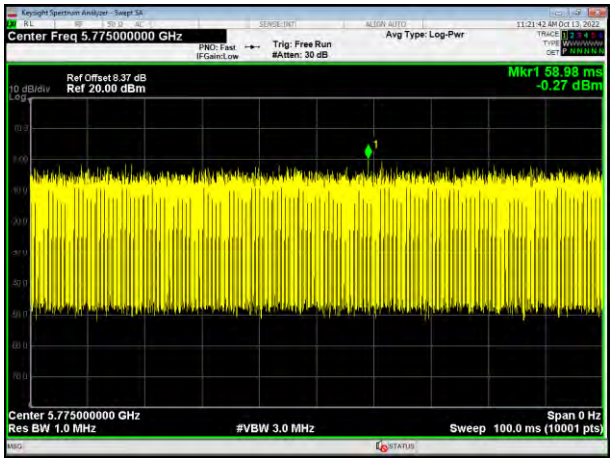
802.11ac HT40





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.

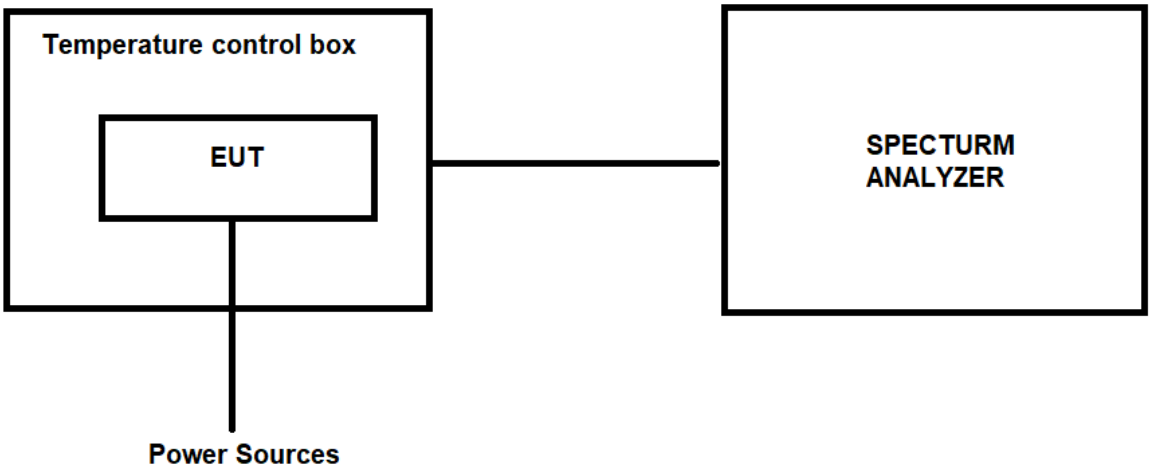
8.1.1 TEST PROCEDURE

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

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℃	5180	5180.0324	5180.0353	5180.0346	-0.0324	-0.0353	-0.0346
		5220	5220.0351	5220.0314	5220.0364	-0.0351	-0.0314	-0.0364
		5240	5240.0232	5240.0262	5240.0252	-0.0232	-0.0262	-0.0252
		5745	5745.0364	5745.0338	5745.0314	-0.0364	-0.0338	-0.0314
		5785	5785.0386	5785.0346	5785.0332	-0.0386	-0.0346	-0.0332
		5825	5825.0342	5825.0377	5825.0351	-0.0342	-0.0377	-0.0351
108V		5180	5180.0235	5180.0236	5180.0233	-0.0235	-0.0236	-0.0233
		5220	5220.0323	5220.0353	5220.0347	-0.0323	-0.0353	-0.0347
		5240	5240.0265	5240.0264	5240.0236	-0.0265	-0.0264	-0.0236
		5745	5745.0221	5745.0225	5745.0228	-0.0221	-0.0225	-0.0228
		5785	5785.0383	5785.0313	5785.0343	-0.0383	-0.0313	-0.0343
		5825	5825.0448	5825.0458	5825.0467	-0.0448	-0.0458	-0.0467
120V	25℃	5180	5180.0544	5180.0533	5180.0572	-0.0544	-0.0533	-0.0572
		5220	5220.0261	5220.0288	5220.0263	-0.0261	-0.0288	-0.0263
		5240	5240.0359	5240.0341	5240.0344	-0.0359	-0.0341	-0.0344
		5745	5745.0343	5745.0323	5745.0353	-0.0343	-0.0323	-0.0353
		5785	5785.0484	5785.0415	5785.0465	-0.0484	-0.0415	-0.0465
		5825	5825.0226	5825.0284	5825.0241	-0.0226	-0.0284	-0.0241
132V	50℃	5180	5180.0318	5180.0363	5180.0353	-0.0318	-0.0363	-0.0353
		5220	5220.0276	5220.0241	5220.0238	-0.0276	-0.0241	-0.0238
		5240	5240.0327	5240.0352	5240.0374	-0.0327	-0.0352	-0.0374
		5745	5745.0664	5745.0637	5745.0656	-0.0664	-0.0637	-0.0656
		5785	5785.0423	5785.0423	5785.0442	-0.0423	-0.0423	-0.0442
		5825	5825.0674	5825.0618	5825.0648	-0.0674	-0.0618	-0.0648
108V	50℃	5180	5180.0313	5180.0321	5180.0364	-0.0313	-0.0321	-0.0364
		5220	5220.0215	5220.0265	5220.0276	-0.0215	-0.0265	-0.0276
		5240	5240.0326	5240.0353	5240.0354	-0.0326	-0.0353	-0.0354
		5745	5745.0432	5745.0435	5745.0436	-0.0432	-0.0435	-0.0436
		5785	5785.0253	5785.0254	5785.0243	-0.0253	-0.0254	-0.0243
		5825	5825.0727	5825.0726	5825.0754	-0.0727	-0.0726	-0.0754

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℃	5190	5190.0213	5190.0233	-0.0213	-0.0233
		5230	5230.0328	5230.0367	-0.0328	-0.0367
		5755	5755.0554	5755.0555	-0.0554	-0.0555
		5795	5795.0616	5795.0613	-0.0616	-0.0613
108V		5190	5190.0253	5190.0231	-0.0253	-0.0231
		5230	5230.0325	5230.0346	-0.0325	-0.0346
		5755	5755.0244	5755.0668	-0.0244	-0.0668
		5795	5795.0446	5795.0476	-0.0446	-0.0476
120V	25℃	5190	5190.0273	5190.0255	-0.0273	-0.0255
		5230	5230.0668	5230.0653	-0.0668	-0.0653
		5755	5755.0252	5755.0267	-0.0252	-0.0267
		5795	5795.0564	5795.0534	-0.0564	-0.0534
132V	50℃	5190	5190.0656	5190.0643	-0.0656	-0.0643
		5230	5230.0563	5230.0555	-0.0563	-0.0555
		5755	5755.0468	5755.0436	-0.0468	-0.0436
		5795	5795.0364	5795.0323	-0.0364	-0.0323
108V	50℃	5190	5190.0553	5190.0548	-0.0553	-0.0548
		5230	5230.0337	5230.0335	-0.0337	-0.0335
		5755	5755.0313	5755.0336	-0.0313	-0.0336
		5795	5795.0465	5795.0444	-0.0465	-0.0444

Test Voltage	Test Temp.	Measured Frequency (MHz)	Spectrum Frequency (MHz)	Δ Frequency (MHz)
			802.11ac HT80	802.11ac HT80
132V	-20℃	5210	5210.0133	-0.0133
		5775	5775.0168	-0.0168
108V		5210	5210.0245	-0.0245
		5775	5775.0326	-0.0326
230V	25℃	5210	5210.0477	-0.0477
		5775	5775.0365	-0.0365
132V	50℃	5210	5210.0313	-0.0313
		5775	5775.0264	-0.0264
108V	50℃	5210	5210.0332	-0.0332
		5775	5775.0546	-0.0546

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

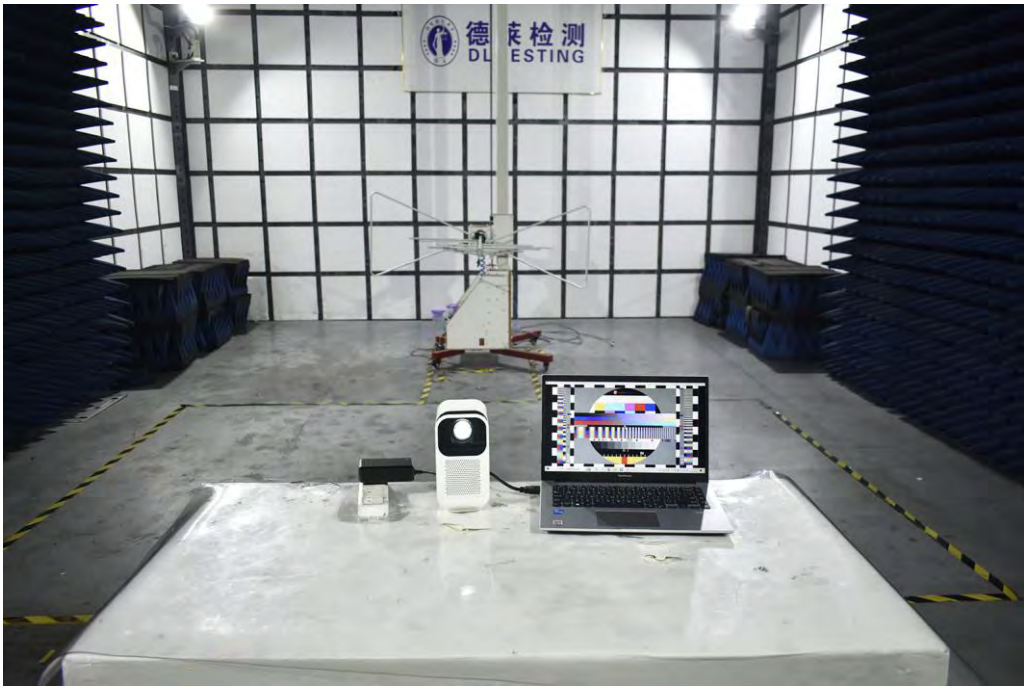
15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

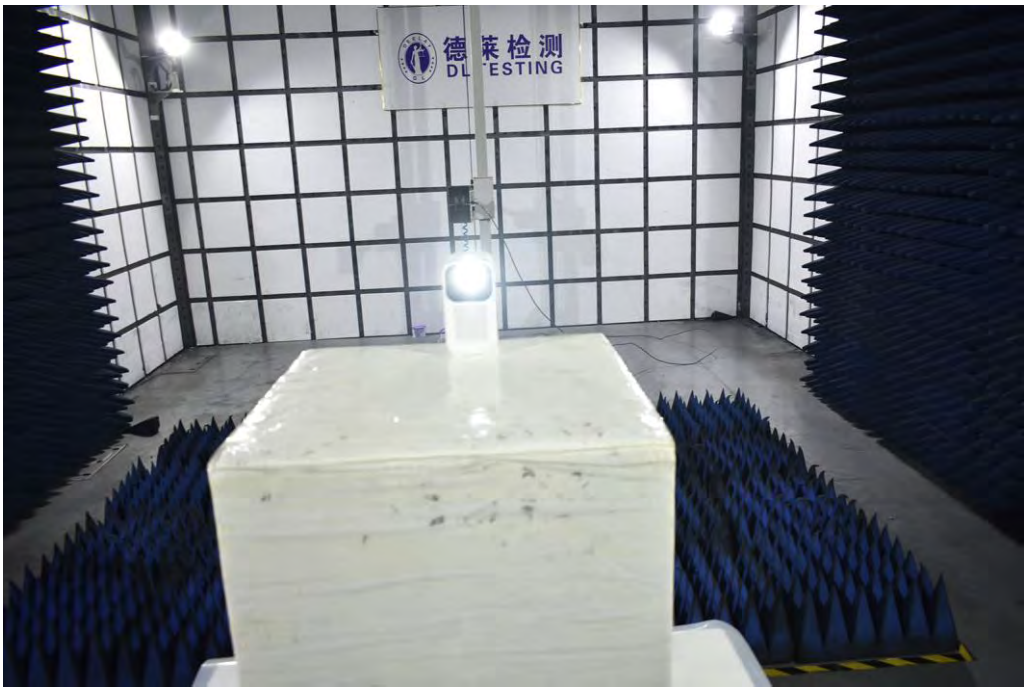
10.2 EUT ANTENNA

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

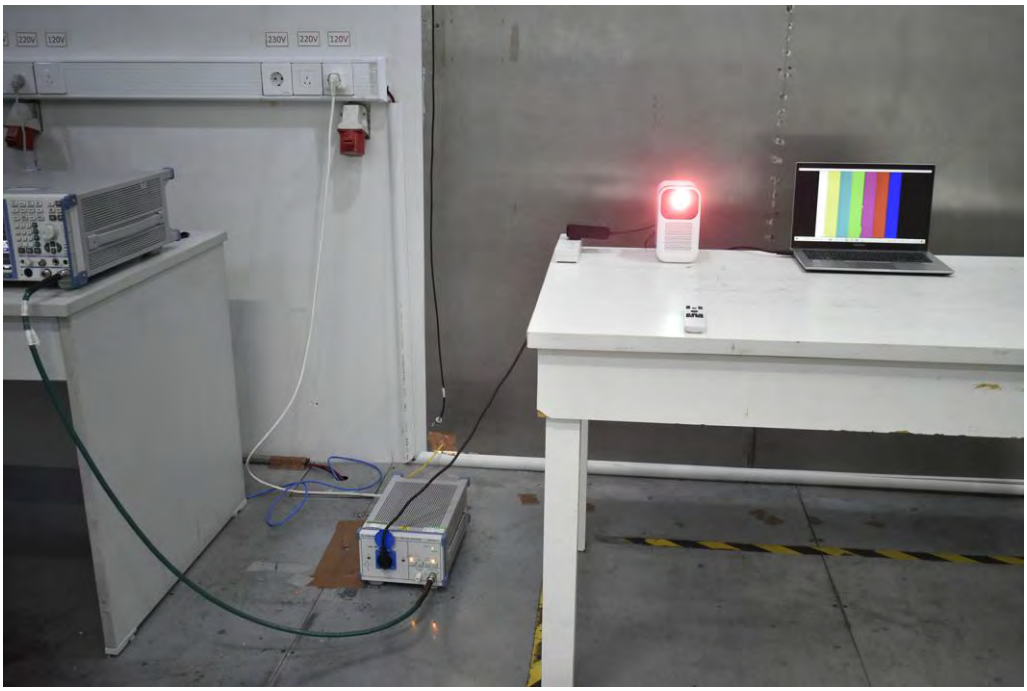
11. TEST SEUUP PHOTO

Radiated Measurement Photos



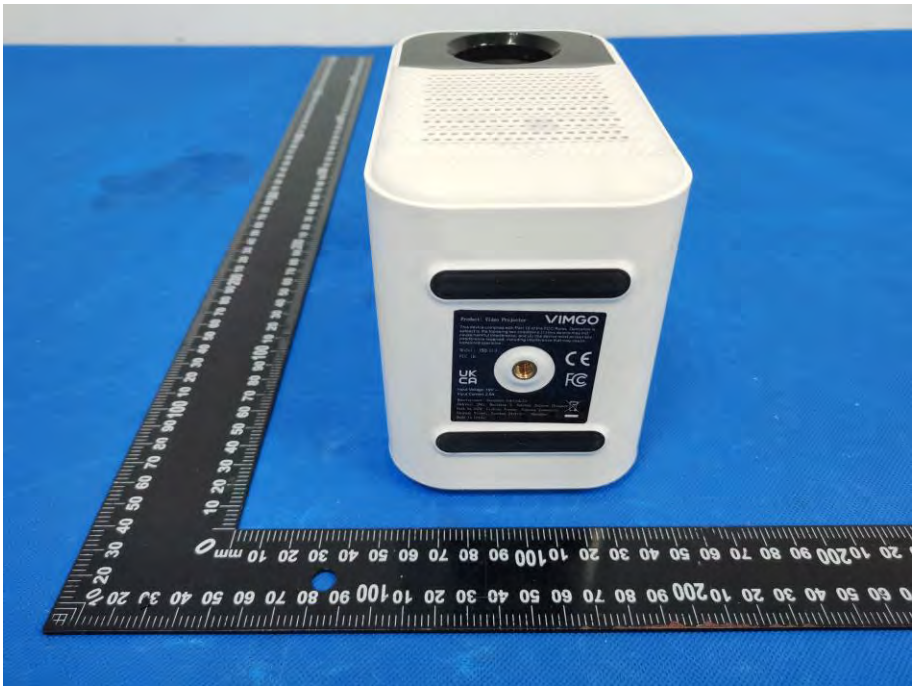


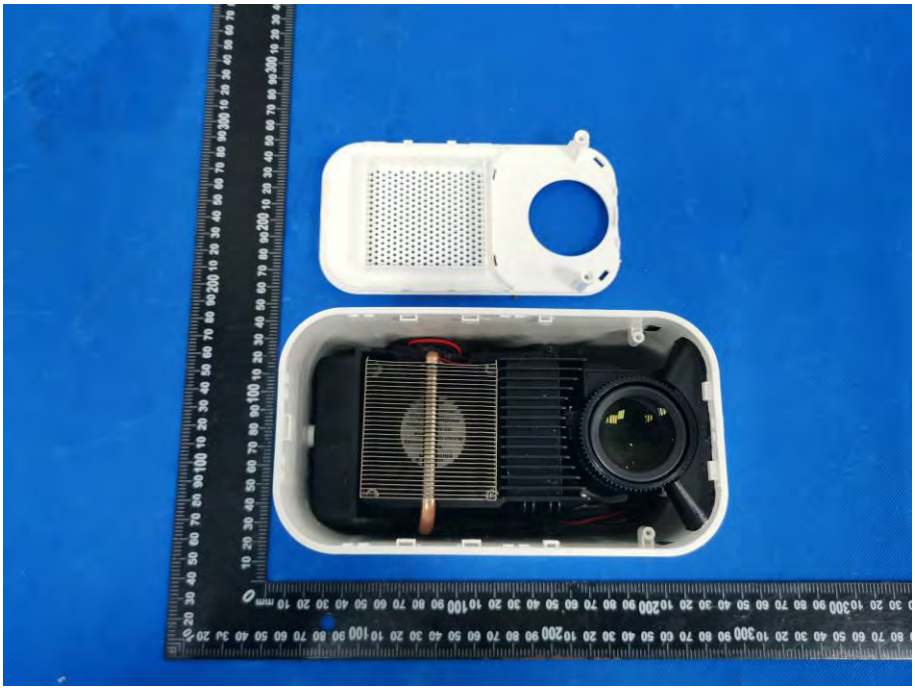
Conducted Measurement Photos

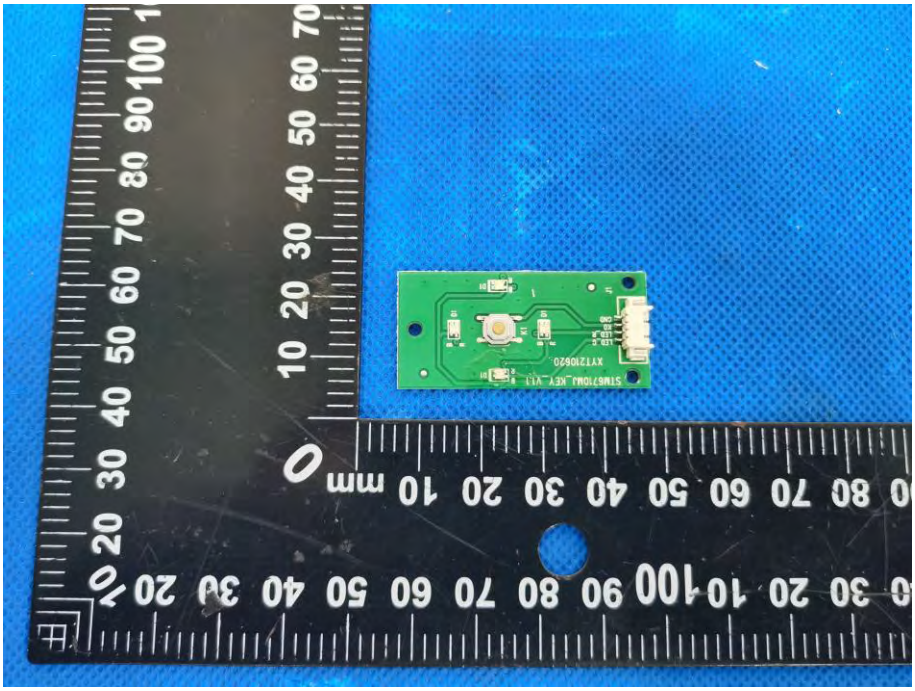


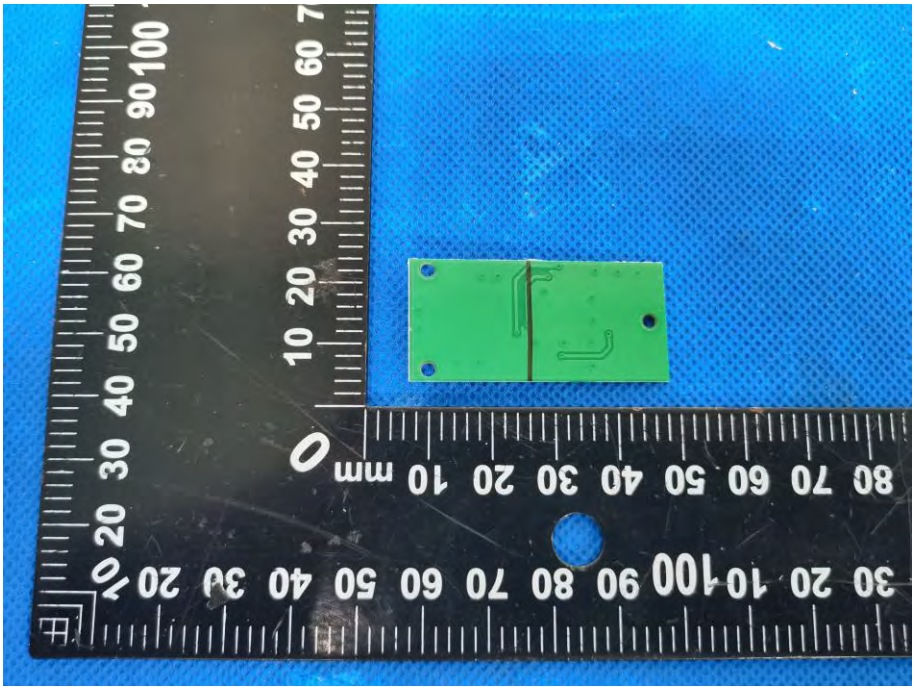
12. EUT PHOTO

VIMGO

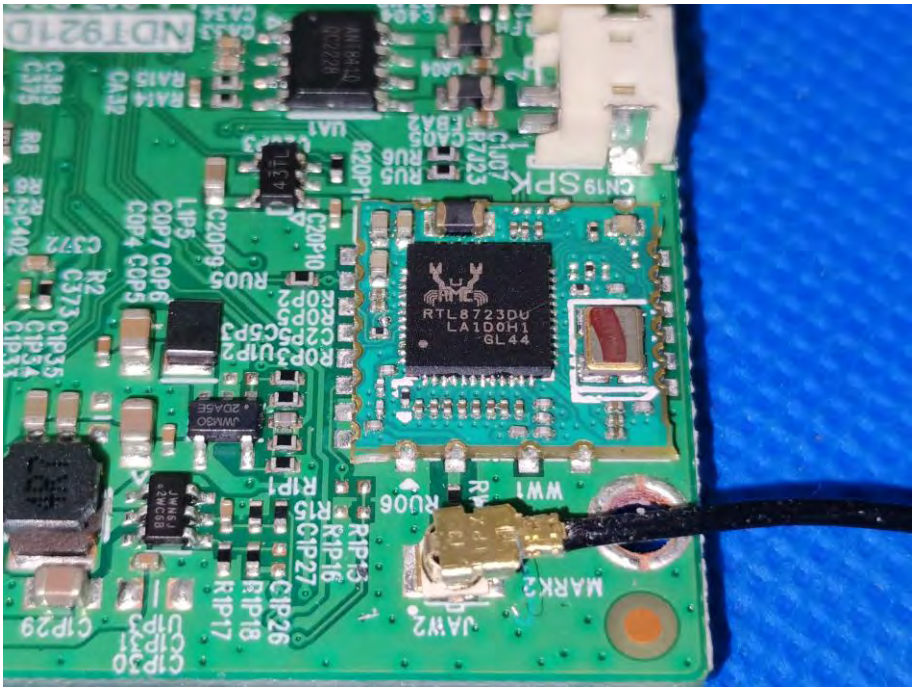

VIMGO







TS-03



※※※※※ **END OF REPORT** ※※※※※