FCC Part 15E Test Report
FCC ID: 2BCCG-DELTA

Applicant:	Shenzhen Algo Technologies Co., Ltd.
Address:	5th Floor, Building E5, Juyin Technology Industrial Park, Ganli Road, Longgang District, Shenzhen 518116, China
Manufacturer:	Shenzhen Algo Technologies Co., Ltd.
Address:	5th Floor, Building E5, Juyin Technology Industrial Park, Ganli Road, Longgang District, Shenzhen 518116, China
EUT:	Laser Engraver
Trade Mark:	N/A
Model Number:	Delta Delta MK2, Alpha, Alpha MK2, Gamma, Epsilon, Zeta, DIY KIT, DIY KIT Plus, DIY KIT Pro, DIY KIT Plus Pro, DIY KIT MK2, DIY KIT Plus MK2, DIY KIT Pro MK2, DIY KIT Plus Pro MK2
Date of Receipt:	Jul. 08, 2023
Test Date:	Jul. 08, 2023 - Jul. 22, 2023
Date of Report:	Jul. 22, 2023
Prepared By:	BTF Testing Lab (Shenzhen) Co., Ltd.
Address:	F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China
Applicable Standards:	FCC PART 15 E 15.407 ANSI C63.10:2013
Test Result:	Pass
Report Number:	DL-20230722048E

Project Engineer:	Elma.yang
EMC Manager:	Ryan.CJ

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 BTF Testing Lab (Shenzhen) Co., Ltd.

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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°C
7	Humidity	±2%

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2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product Name:	Laser Engraver
Trademark	N/A
Model No.:	Delta Delta MK2, Alpha, Alpha MK2, Gamma, Epsilon, Zeta, DIY KIT, DIY KIT Plus, DIY KIT Pro, DIY KIT Plus Pro, DIY KIT MK2, DIY KIT Plus MK2, DIY KIT Pro MK2, DIY KIT Plus Pro MK2
Model Difference	The product's different for model number and appearance color.
Operation Frequency:	5180-5240, 5745-5825MHz(802.11a/n(HT20)) 5190-5230, 5755-5795MHz(802.11n(HT40))
Channel numbers:	See channel list
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 150Mbps
Antenna Type:	External Antenna
Antenna gain:	3.5dBi
Power supply:	DC 24V from adapter
Adapter:	K1211-2406000D Input: AC 100-240V 50/60Hz 2.5A Output: DC 24V 6A

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.

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2. Channel List

Channel List for 802.11a/n(HT20)			
Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	44	5220
40	5200	48	5240

Channel List for 802.11n(HT40)			
Channel	Frequency (MHz)	Channel	Frequency (MHz)
38	5190	46	5230

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

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

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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/nHT20	CH36, CH44, CH48	CH149, CH157, CH165
Mode 2	802.11nHT40	CH38, CH46	CH151, CH159
Mode 3	Link Mode		

For Radiated Emission			
Pretest Mode	Channel	Band 1	Band 4
Mode 1	802.11a/nHT20	CH36, CH44, CH48	CH149, CH157, CH165
Mode 2	802.11nHT40	CH38, CH46	CH151, CH159
Mode 3	Link Mode		

Note: 1. The measurements are performed at the highest, middle, lowest available channels.
2. During the test, duty cycle has been measured., 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.

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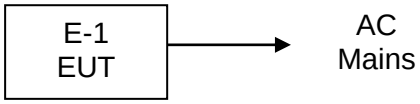
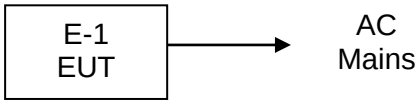
2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

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	Laser Engraver	Delta	N/A	EUT

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
Data Rate	6Mbps	MSC0	MSC0
Power Setting of Softwave	60	60	66

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2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS

Conducted Emission at AC power line					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Pulse Limiter	SCHWARZBECK	VTSD 9561-F	00953	2022-11-24	2023-11-23
Coaxial Switcher	SCHWARZBECK	CX210	CX210	2022-11-24	2023-11-23
V-LISN	SCHWARZBECK	NSLK 8127	01073	2022-11-24	2023-11-23
LISN	AFJ	LS16/110VAC	16010020076	2023-02-23	2024-02-22
EMI Receiver	ROHDE&SCHWARZ	ESCI3	101422	2022-11-24	2023-11-23

Occupied Bandwidth					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
RFTest software	/	V1.00	/	/	/
RF Control Unit	Techy	TR1029-1	/	2022-11-24	2023-11-23
RF Sensor Unit	Techy	TR1029-2	/	2022-11-24	2023-11-23
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022-11-24	2023-11-23
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022-11-24	2023-11-23
WIDEBAND RADIO COMMNUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022-11-24	2023-11-23
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022-11-24	2023-11-23

Emissions in non-restricted frequency bands					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
RFTest software	/	V1.00	/	/	/
RF Control Unit	Techy	TR1029-1	/	2022-11-24	2023-11-23
RF Sensor Unit	Techy	TR1029-2	/	2022-11-24	2023-11-23
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022-11-24	2023-11-23
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022-11-24	2023-11-23
WIDEBAND RADIO COMMNUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022-11-24	2023-11-23
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022-11-24	2023-11-23

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Band edge emissions (Radiated)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Coaxial cable Multiflex 141	Schwarzbeck	N/SMA 0.5m	517386	2023-03-24	2024-03-23
Preamplifier	SCHWARZBECK	BBV9744	00246	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMASMAM-10m	21101566	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-10m	21101570	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMASMAM-1m	21101568	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-1m	21101576	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-2.5m	21101573	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Horn Antenna	SCHWARZBECK	BBHA9170	01157	2021-11-28	2023-11-27
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI7	101032	2022-11-24	2023-11-23
SIGNAL ANALYZER	ROHDE&SCHWARZ	FSQ40	100010	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Broadband Preamplilifier	SCHWARZBECK	BBV9718D	00008	2023-03-24	2024-03-23
Horn Antenna	SCHWARZBECK	BBHA9120D	2597	2022-05-22	2024-05-21
EZ_EMC	Frad	FA-03A2 RE+	/	/	/
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Log periodic antenna	SCHWARZBECK	VULB 9168	01328	2021-11-28	2023-11-27

Emissions in restricted frequency bands (below 1GHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Coaxial cable Multiflex 141	Schwarzbeck	N/SMA 0.5m	517386	2023-03-24	2024-03-23
Preamplifier	SCHWARZBECK	BBV9744	00246	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMASMAM-10m	21101566	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-10m	21101570	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMASMAM-1m	21101568	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-1m	21101576	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-2.5m	21101573	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Horn Antenna	SCHWARZBECK	BBHA9170	01157	2021-11-28	2023-11-27
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI7	101032	2022-11-24	2023-11-23
SIGNAL ANALYZER	ROHDE&SCHWARZ	FSQ40	100010	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Broadband Preamplilifier	SCHWARZBECK	BBV9718D	00008	2023-03-24	2024-03-23

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Horn Antenna	SCHWARZBECK	BBHA9120D	2597	2022-05-22	2024-05-21
EZ_EMC	Frad	FA-03A2 RE+	/	/	/
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Log periodic antenna	SCHWARZBECK	VULB 9168	01328	2021-11-28	2023-11-27

Emissions in restricted frequency bands (above 1GHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Coaxial cable Multiflex 141	Schwarzbeck	N/SMA 0.5m	517386	2023-03-24	2024-03-23
Preamplifier	SCHWARZBECK	BBV9744	00246	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMASMAM-10m	21101566	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-10m	21101570	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMASMAM-1m	21101568	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-1m	21101576	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-2.5m	21101573	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Horn Antenna	SCHWARZBECK	BBHA9170	01157	2021-11-28	2023-11-27
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI7	101032	2022-11-24	2023-11-23
SIGNAL ANALYZER	ROHDE&SCHWARZ	FSQ40	100010	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Broadband Preamplilifier	SCHWARZBECK	BBV9718D	00008	2023-03-24	2024-03-23
Horn Antenna	SCHWARZBECK	BBHA9120D	2597	2022-05-22	2024-05-21
EZ_EMC	Frad	FA-03A2 RE+	/	/	/
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Log periodic antenna	SCHWARZBECK	VULB 9168	01328	2021-11-28	2023-11-27

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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.

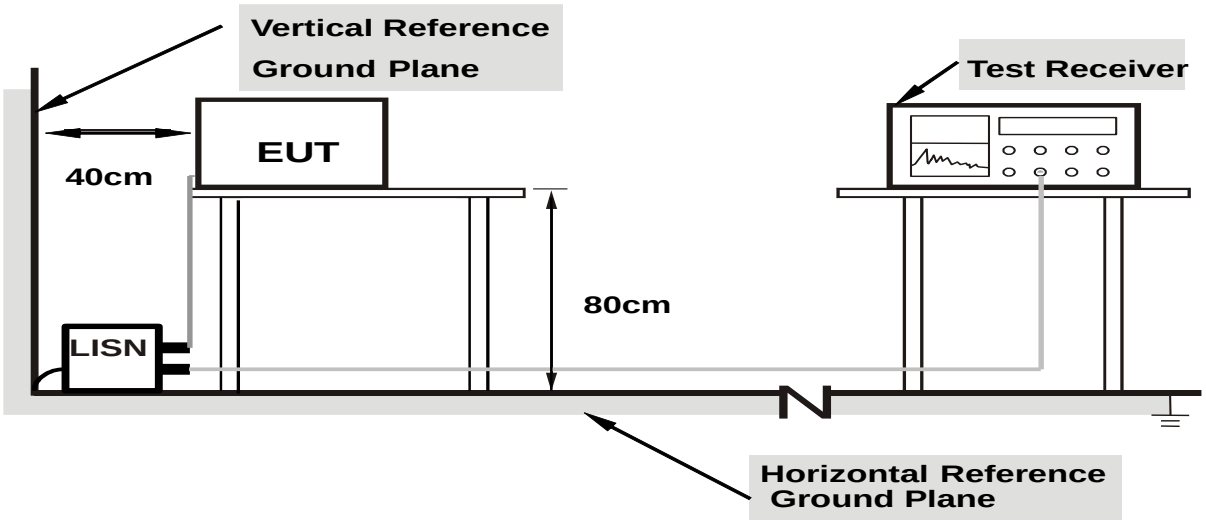
d. LISN at least 80 cm from nearest part of EUT chassis.

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



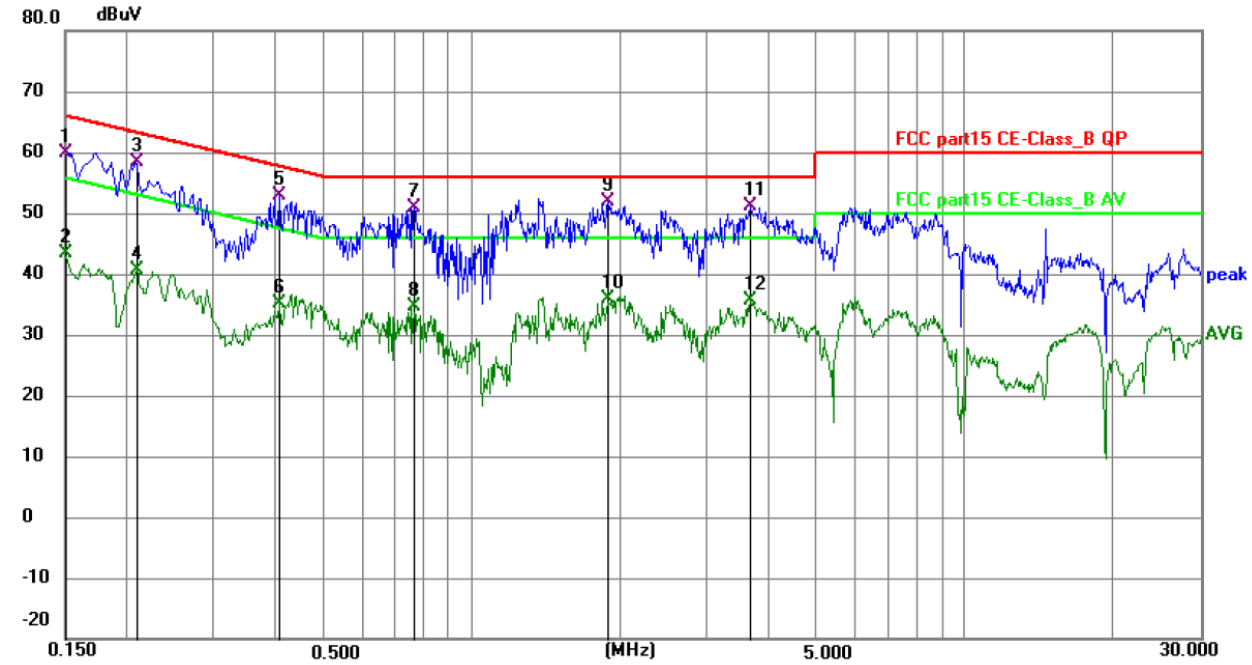
Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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 3



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	49.28	10.50	59.78	66.00	-6.22	QP	P	
2	0.150000	32.88	10.50	43.38	56.00	-12.62	AVG	P	
3	0.208400	48.97	9.45	58.42	63.27	-4.85	QP	P	
4	0.208400	31.12	9.45	40.57	53.27	-12.70	AVG	P	
5	0.406200	43.85	9.14	52.99	57.73	-4.74	QP	P	
6	0.406200	25.97	9.14	35.11	47.73	-12.62	AVG	P	
7	0.766100	41.55	9.36	50.91	56.00	-5.09	QP	P	
8	0.766100	25.32	9.36	34.68	46.00	-11.32	AVG	P	
9 *	1.891100	42.17	9.81	51.98	56.00	-4.02	QP	P	
10	1.891100	26.15	9.81	35.96	46.00	-10.04	AVG	P	
11	3.677900	41.89	9.28	51.17	56.00	-4.83	QP	P	
12	3.677900	26.34	9.28	35.62	46.00	-10.38	AVG	P	

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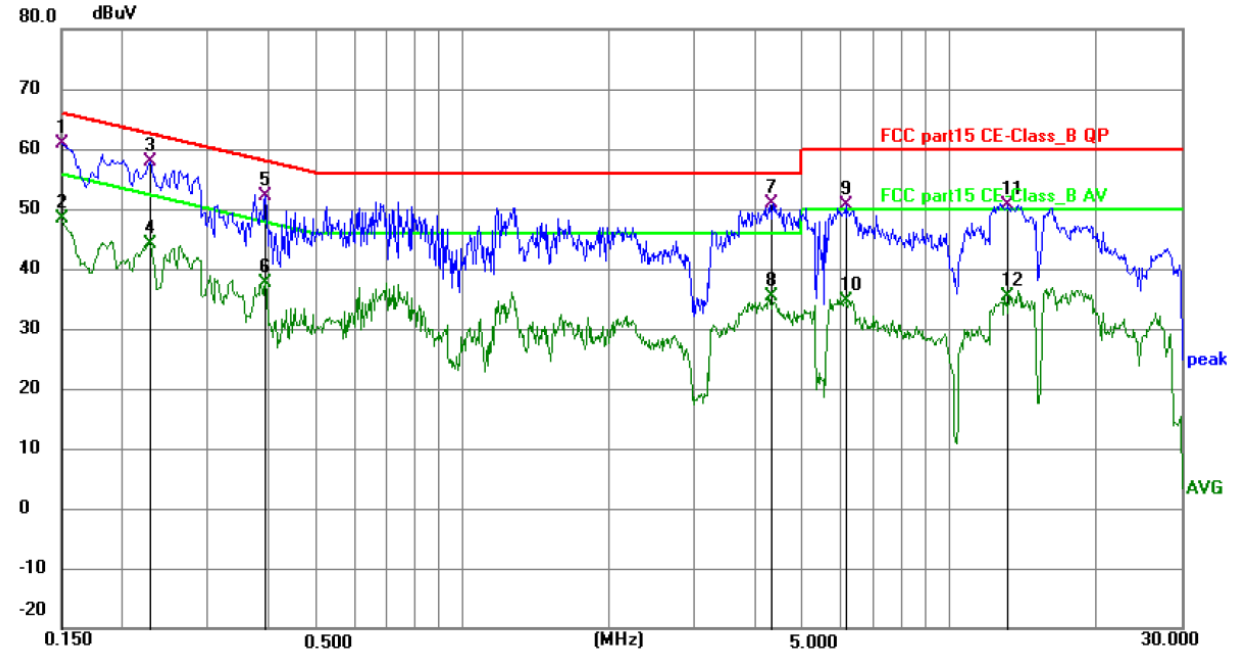
Temperature:	25 ℃	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	N
Test Voltage :	AC 120V/60Hz	Test Mode:	Mode 3



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	50.64	10.35	60.99	66.00	-5.01	QP	P	
2	0.150000	37.94	10.35	48.29	56.00	-7.71	AVG	P	
3 *	0.227800	48.86	8.91	57.77	62.53	-4.76	QP	P	
4	0.227800	35.31	8.91	44.22	52.53	-8.31	AVG	P	
5	0.393000	42.97	9.22	52.19	58.00	-5.81	QP	P	
6	0.393000	28.51	9.22	37.73	48.00	-10.27	AVG	P	
7	4.343900	41.11	9.81	50.92	56.00	-5.08	QP	P	
8	4.343900	25.50	9.81	35.31	46.00	-10.69	AVG	P	
9	6.130300	40.78	9.83	50.61	60.00	-9.39	QP	P	
10	6.130300	24.75	9.83	34.58	50.00	-15.42	AVG	P	
11	13.258300	40.38	10.21	50.59	60.00	-9.41	QP	P	
12	13.258300	25.23	10.21	35.44	50.00	-14.56	AVG	P	

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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

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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:

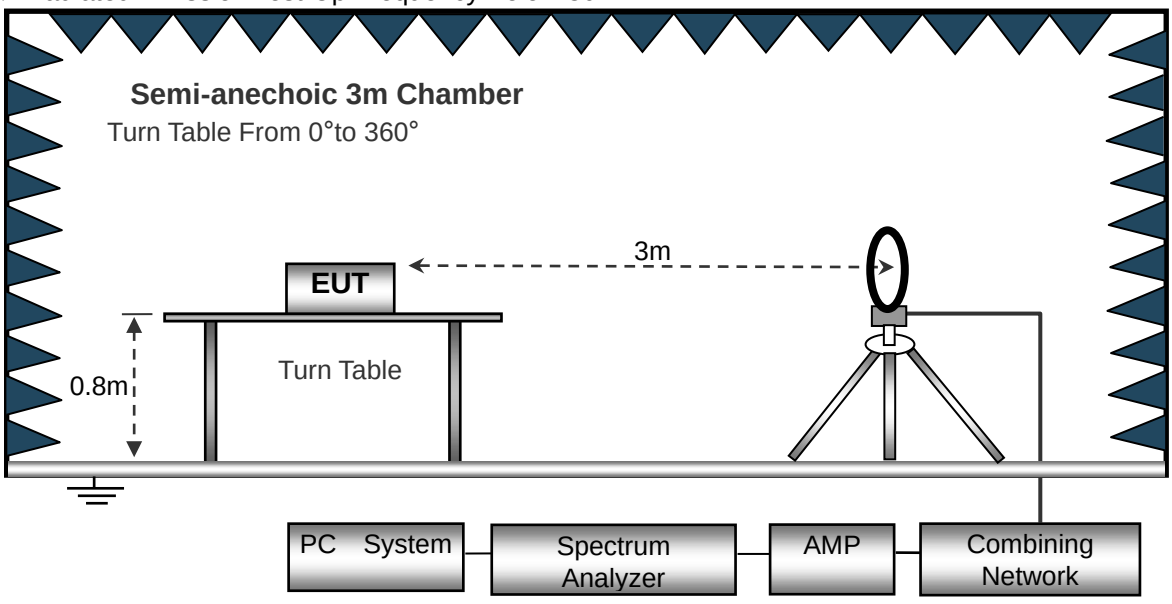
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

3.2.3 DEVIATION FROM TEST STANDARD

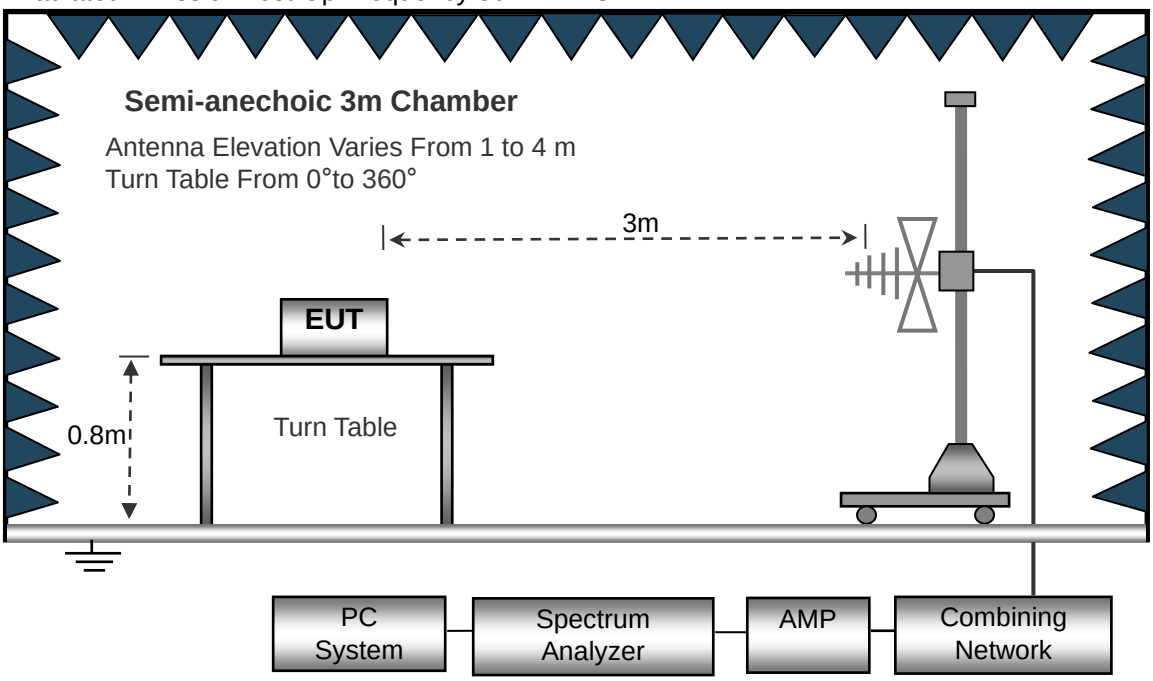
No deviation

3.2.4 TEST SETUP

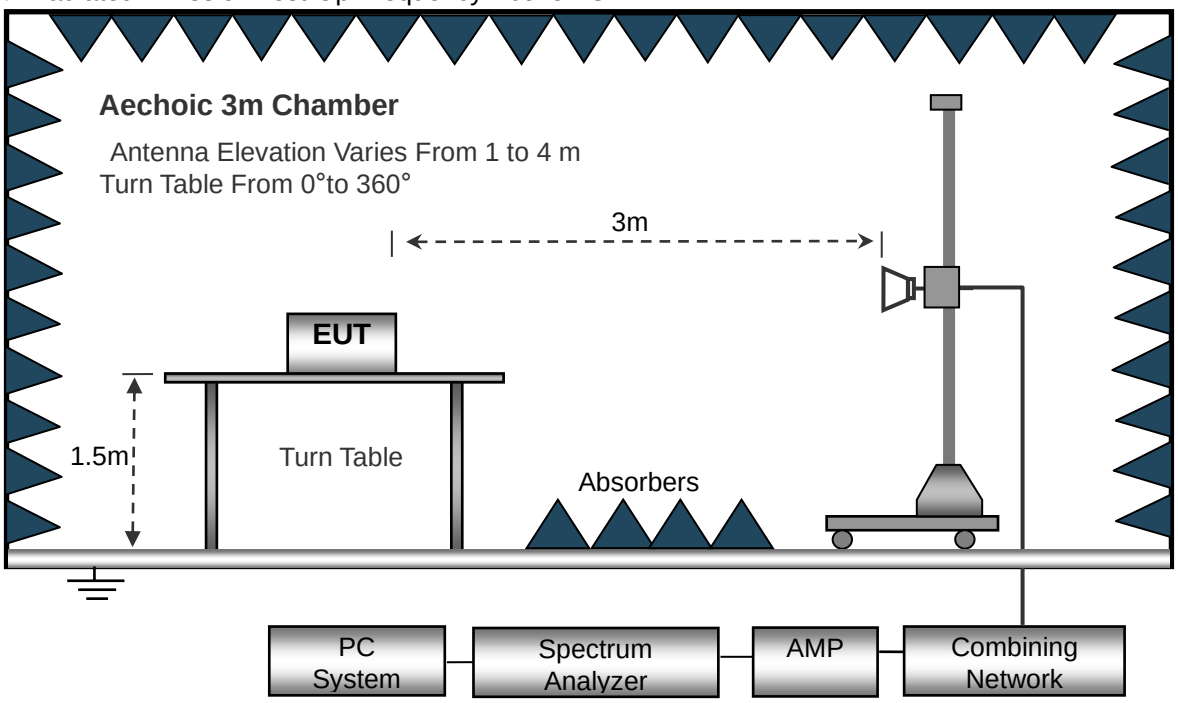
（A）Radiated Emission Test-Up Frequency Below 30MHz



（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 3	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.

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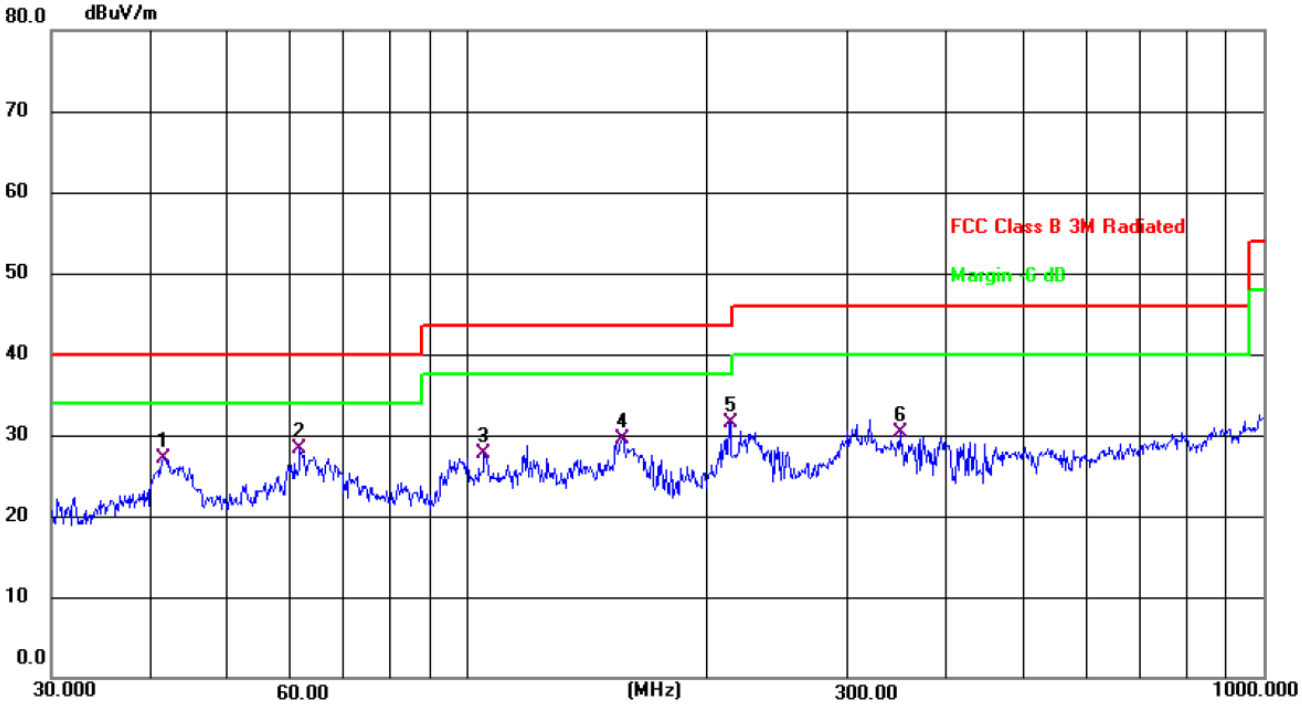
3.2.7 TEST RESULTS (Between 30MHz – 1GHz)

Temperature:	26℃	Relative Humidity:	54%
Pressure:	1010 hPa	Polarization :	Horizontal
Test Voltage :	AC 120V/60Hz		
Test Mode :	Mode 3		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		41.4215	41.35	-14.16	27.19	40.00	-12.81	QP
2	*	61.5617	42.92	-14.65	28.27	40.00	-11.73	QP
3		104.9030	45.42	-17.70	27.72	43.50	-15.78	QP
4		156.4576	48.25	-18.75	29.50	43.50	-14.00	QP
5		213.7632	46.96	-15.42	31.54	43.50	-11.96	QP
6		349.2500	42.00	-11.71	30.29	46.00	-15.71	QP

Remark:

Correct Factor = Cable loss + Antenna factor – Preamplifier;

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

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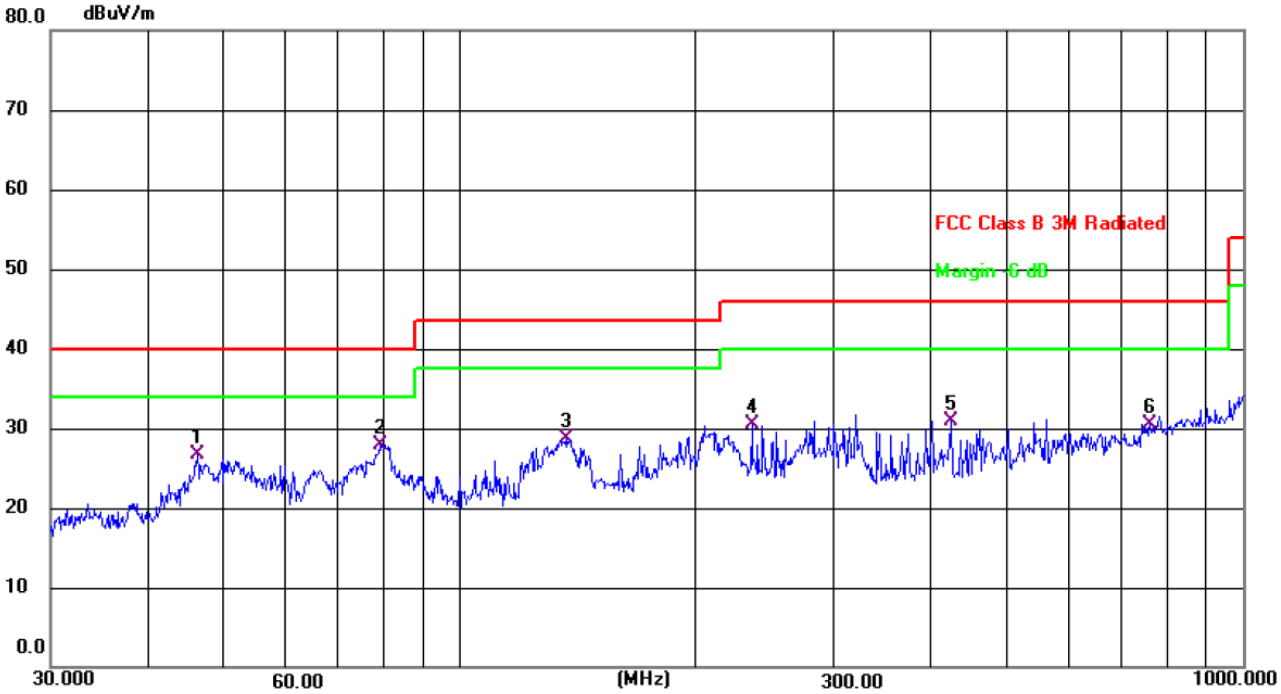
Temperature:	26℃	Relative Humidity:	54%
Pressure:	1010 hPa	Polarization :	Vertical
test voltage :	AC 120V/60Hz		
Test Mode :	Mode 3		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		46.1779	40.36	-13.68	26.68	40.00	-13.32	QP
2	*	78.9651	47.13	-19.21	27.92	40.00	-12.08	QP
3		136.4598	47.24	-18.62	28.62	43.50	-14.88	QP
4		235.8163	45.00	-14.50	30.50	46.00	-15.50	QP
5		423.5402	41.19	-10.23	30.96	46.00	-15.04	QP
6		760.7033	34.07	-3.59	30.48	46.00	-15.52	QP

Remark:

Correct Factor = Cable loss + Antenna factor – Preamplifier;

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

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3.2.8 TEST RESULTS (1ghz~40ghZ)

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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	56.63	49.05	15.3	37.39	60.27	74	-13.73	PK
V	10360	41.49	49.05	15.3	37.39	45.13	54	-8.87	AV
V	15540	56.95	49.16	15.27	40.45	63.51	74	-10.49	PK
V	15540	39.37	49.16	15.27	40.45	45.93	54	-8.07	AV
H	10360	56.38	49.05	15.3	37.39	60.02	74	-13.98	PK
H	10360	40.67	49.05	15.3	37.39	44.31	54	-9.69	AV
H	15540	59.45	49.16	15.27	40.45	66.01	74	-7.99	PK
H	15540	38.27	49.16	15.27	40.45	44.83	54	-9.17	AV
operation frequency:5200									
V	10400	57.73	49.09	15.34	37.42	61.40	74	-12.60	PK
V	10400	39.59	49.09	15.34	37.42	43.26	54	-10.74	AV
V	15600	59.76	49.18	15.29	40.47	66.34	74	-7.66	PK
V	15600	38.36	49.18	15.29	40.47	44.94	54	-9.06	AV
H	10400	57.28	49.09	15.34	37.42	60.95	74	-13.05	PK
H	10400	39.94	49.09	15.34	37.42	43.61	54	-10.39	AV
H	15600	59.80	49.18	15.29	40.47	66.38	74	-7.62	PK
H	15600	38.53	49.18	15.29	40.47	45.11	54	-8.89	AV
operation frequency:5240									
V	10480	58.88	49.11	15.37	37.46	62.60	74	-11.40	PK
V	10480	39.47	49.11	15.37	37.46	43.19	54	-10.81	AV
V	15720	59.46	49.21	15.34	40.51	66.10	74	-7.90	PK
V	15720	38.56	49.21	15.34	40.51	45.20	54	-8.80	AV
H	10480	57.57	49.11	15.37	31.31	55.14	74	-18.86	PK
H	10480	45.79	49.11	15.37	31.31	43.36	54	-10.64	AV
H	15720	57.73	49.21	15.34	40.51	64.37	74	-9.63	PK
H	15720	37.74	49.21	15.34	40.51	44.38	54	-9.62	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.

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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	56.45	49.05	15.3	37.39	60.09	74	-13.91	PK
V	10360	38.86	49.05	15.3	37.39	42.50	54	-11.50	AV
V	15540	56.87	49.16	15.27	40.45	63.43	74	-10.57	PK
V	15540	38.44	49.16	15.27	40.45	45.00	54	-9.00	AV
H	10360	56.93	49.05	15.3	37.39	60.57	74	-13.43	PK
H	10360	39.59	49.05	15.3	37.39	43.23	54	-10.77	AV
H	15540	54.44	49.16	15.27	40.45	61.00	74	-13.00	PK
H	15540	38.53	49.16	15.27	40.45	45.09	54	-8.91	AV
operation frequency:5200									
V	10400	56.58	49.09	15.34	37.42	60.25	74	-13.75	PK
V	10400	39.95	49.09	15.34	37.42	43.62	54	-10.38	AV
V	15600	55.62	49.18	15.29	40.47	62.20	74	-11.80	PK
V	15600	38.48	49.18	15.29	40.47	45.06	54	-8.94	AV
H	10400	55.84	49.09	15.34	37.42	59.51	74	-14.49	PK
H	10400	40.57	49.09	15.34	37.42	44.24	54	-9.76	AV
H	15600	55.37	49.18	15.29	40.47	61.95	74	-12.05	PK
H	15600	39.46	49.18	15.29	40.47	46.04	54	-7.96	AV
operation frequency:5240									
V	10480	57.46	49.11	15.37	37.46	61.18	74	-12.82	PK
V	10480	40.79	49.11	15.37	37.46	44.51	54	-9.49	AV
V	15720	54.62	49.21	15.34	40.51	61.26	74	-12.74	PK
V	15720	38.85	49.21	15.34	40.51	45.49	54	-8.51	AV
H	10480	57.46	49.11	15.37	31.31	55.03	74	-18.97	PK
H	10480	44.91	49.11	15.37	31.31	42.48	54	-11.52	AV
H	15720	55.64	49.21	15.34	40.51	62.28	74	-11.72	PK
H	15720	39.47	49.21	15.34	40.51	46.11	54	-7.89	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.

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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	57.08	49.07	15.33	37.41	60.75	74	-13.25	PK
V	10380	39.45	49.07	15.33	37.41	43.12	54	-10.88	AV
V	15570	56.56	49.17	15.28	40.46	63.13	74	-10.87	PK
V	15570	38.57	49.17	15.28	40.46	45.14	54	-8.86	AV
H	10380	56.95	49.07	15.33	37.41	60.62	74	-13.38	PK
H	10380	40.54	49.07	15.33	37.41	44.21	54	-9.79	AV
H	15570	54.94	49.17	15.28	40.46	61.51	74	-12.49	PK
H	15570	38.46	49.17	15.28	40.46	45.03	54	-8.97	AV
operation frequency:5230									
V	10460	57.44	49.11	15.37	37.46	61.16	74	-12.84	PK
V	10460	39.83	49.11	15.37	37.46	43.55	54	-10.45	AV
V	15690	54.73	49.21	15.34	40.51	61.37	74	-12.63	PK
V	15690	38.56	49.21	15.34	40.51	45.20	54	-8.80	AV
H	10460	57.57	49.11	15.37	31.31	55.14	74	-18.86	PK
H	10460	45.09	49.11	15.37	31.31	42.66	54	-11.34	AV
H	15690	55.65	49.21	15.34	40.51	62.29	74	-11.71	PK
H	15690	39.29	49.21	15.34	40.51	45.93	54	-8.07	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.

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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	54.52	49.05	15.3	37.39	58.16	74	-15.84	PK
V	11490	41.26	49.05	15.3	37.39	44.90	54	-9.10	AV
V	17235	55.65	49.16	15.27	40.45	62.21	68.2	-5.99	PK
V	17235	41.19	49.16	15.27	40.45	47.75	54	-6.25	AV
H	11490	52.63	49.05	15.3	37.39	56.27	74	-17.73	PK
H	11490	42.38	49.05	15.3	37.39	46.02	54	-7.98	AV
H	17235	51.60	49.16	15.27	40.45	58.16	68.2	-10.04	PK
H	17235	40.46	49.16	15.27	40.45	47.02	54	-6.98	AV
operation frequency:5785									
V	11570	51.95	49.09	15.34	37.42	55.62	74	-18.38	PK
V	11570	41.35	49.09	15.34	37.42	45.02	54	-8.98	AV
V	17355	50.62	49.18	15.29	40.47	57.20	68.2	-11.00	PK
V	17355	40.44	49.18	15.29	40.47	47.02	54	-6.98	AV
H	11570	50.74	49.09	15.34	37.42	54.41	74	-19.59	PK
H	11570	42.27	49.09	15.34	37.42	45.94	54	-8.06	AV
H	17355	48.99	49.18	15.29	40.47	55.57	68.2	-12.63	PK
H	17355	40.38	49.18	15.29	40.47	46.96	54	-7.04	AV
operation frequency:5825									
V	11650	52.34	49.11	15.37	37.46	56.06	74	-17.94	PK
V	11650	41.59	49.11	15.37	37.46	45.31	54	-8.69	AV
V	17475	49.51	49.21	15.34	40.51	56.15	68.2	-12.05	PK
V	17475	40.65	49.21	15.34	40.51	47.29	54	-6.71	AV
H	11650	57.73	49.11	15.37	31.31	55.30	74	-18.70	PK
H	11650	48.30	49.11	15.37	31.31	45.87	54	-8.13	AV
H	17475	49.62	49.21	15.34	40.51	56.26	68.2	-11.94	PK
H	17475	40.39	49.21	15.34	40.51	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.

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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	49.52	49.05	15.3	37.39	53.16	74	-20.84	PK
V	11490	42.40	49.05	15.3	37.39	46.04	54	-7.96	AV
V	17235	48.80	49.16	15.27	40.45	55.36	68.2	-12.84	PK
V	17235	40.44	49.16	15.27	40.45	47.00	54	-7.00	AV
H	11490	49.64	49.05	15.3	37.39	53.28	74	-20.72	PK
H	11490	41.36	49.05	15.3	37.39	45.00	54	-9.00	AV
H	17235	48.49	49.16	15.27	40.45	55.05	68.2	-13.15	PK
H	17235	40.79	49.16	15.27	40.45	47.35	54	-6.65	AV
operation frequency:5785									
V	11570	52.63	49.09	15.34	37.42	56.30	74	-17.70	PK
V	11570	42.48	49.09	15.34	37.42	46.15	54	-7.85	AV
V	17355	49.43	49.18	15.29	40.47	56.01	68.2	-12.19	PK
V	17355	40.73	49.18	15.29	40.47	47.31	54	-6.69	AV
H	11570	49.62	49.09	15.34	37.42	53.29	74	-20.71	PK
H	11570	43.50	49.09	15.34	37.42	47.17	54	-6.83	AV
H	17355	49.61	49.18	15.29	40.47	56.19	68.2	-12.01	PK
H	17355	40.37	49.18	15.29	40.47	46.95	54	-7.05	AV
operation frequency:5825									
V	11650	51.54	49.11	15.37	37.46	55.26	74	-18.74	PK
V	11650	41.66	49.11	15.37	37.46	45.38	54	-8.62	AV
V	17475	48.52	49.21	15.34	40.51	55.16	68.2	-13.04	PK
V	17475	40.85	49.21	15.34	40.51	47.49	54	-6.51	AV
H	11650	57.58	49.11	15.37	31.31	55.15	74	-18.85	PK
H	11650	44.58	49.11	15.37	31.31	42.15	54	-11.85	AV
H	17475	49.52	49.21	15.34	40.51	56.16	68.2	-12.04	PK
H	17475	41.09	49.21	15.34	40.51	47.73	54	-6.27	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.

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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	49.41	49.07	15.33	37.41	53.08	74	-20.92	PK
V	11510	41.78	49.07	15.33	37.41	45.45	54	-8.55	AV
V	17265	49.93	49.17	15.28	40.46	56.50	68.2	-11.70	PK
V	17265	40.46	49.17	15.28	40.46	47.03	54	-6.97	AV
H	11510	48.59	49.07	15.33	37.41	52.26	74	-21.74	PK
H	11510	41.36	49.07	15.33	37.41	45.03	54	-8.97	AV
H	17265	50.22	49.17	15.28	40.46	56.79	68.2	-11.41	PK
H	17265	40.49	49.17	15.28	40.46	47.06	54	-6.94	AV
operation frequency:5795									
V	11590	49.44	49.11	15.37	37.46	53.16	74	-20.84	PK
V	11590	41.48	49.11	15.37	37.46	45.20	54	-8.80	AV
V	17385	48.73	49.21	15.34	40.51	55.37	68.2	-12.83	PK
V	17385	40.56	49.21	15.34	40.51	47.20	54	-6.80	AV
H	11590	57.94	49.11	15.37	31.31	55.51	74	-18.49	PK
H	11590	44.99	49.11	15.37	31.31	42.56	54	-11.44	AV
H	17385	48.40	49.21	15.34	40.51	55.04	68.2	-13.16	PK
H	17385	40.44	49.21	15.34	40.51	47.08	54	-6.92	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.

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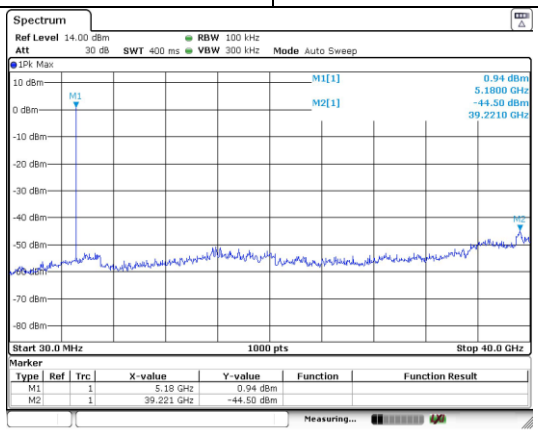
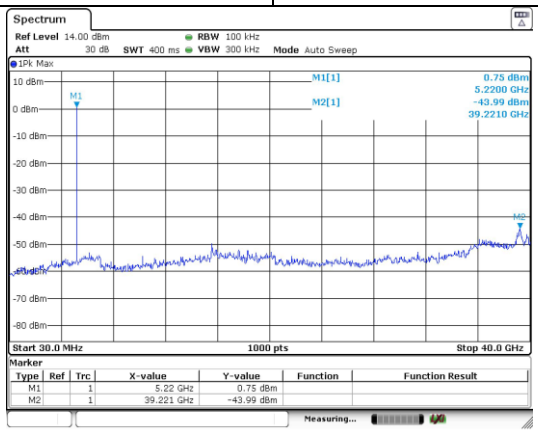
For Conducted
During the test, pre-scan the all modulation, the modulation below were found to have the worst test results, as reflected in the report.

Test channel:	Band 1/802.11a Lowest channel
Limits(dB/m):	-27



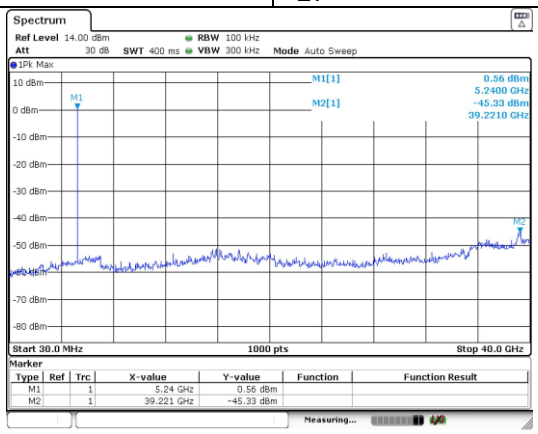
0.03GHz~40GHz

Test channel:	Band 1/802.11a Middle channel
Limits(dB/m):	-27



0.03GHz~40GHz

Test channel:	Band 1/802.11a Highest channel
Limits(dB/m):	-27



0.03GHz~40GHz

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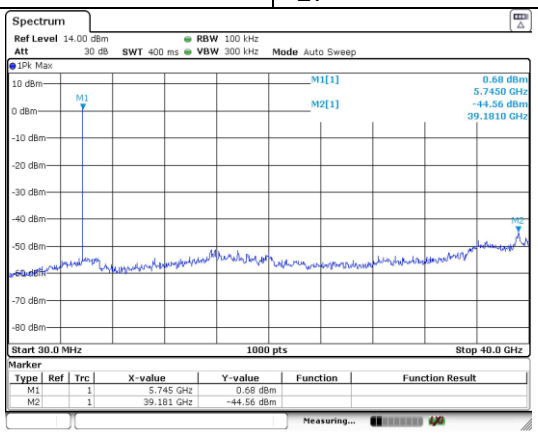
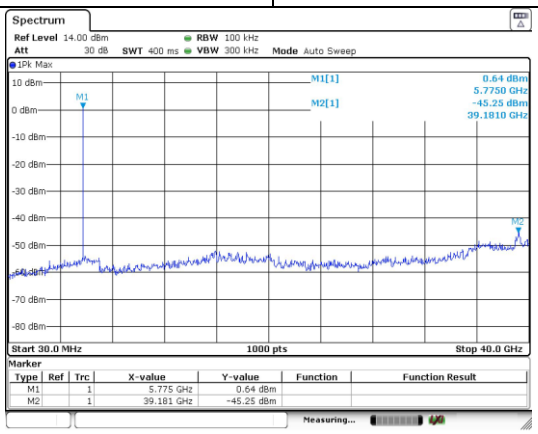
Test channel:	Band 4/802.11a Lowest channel
Limits(dB/m):	-27



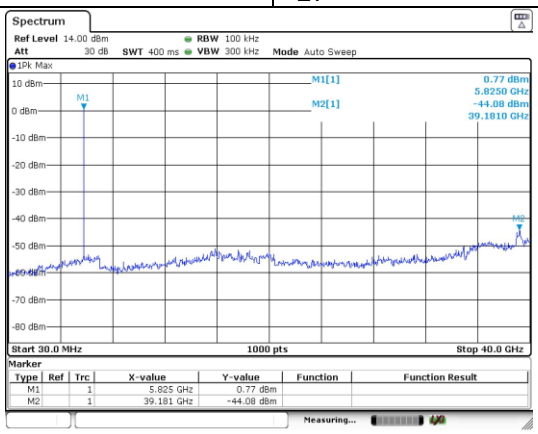
0.03GHz~40GHz

Test channel:	Band 4/802.11a Middle channel
Limits(dB/m):	-27



0.03GHz~40GHz

Test channel:	Band 4/802.11a Highest channel
Limits(dB/m):	-27



0.03GHz~40GHz

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3.3 RADIATED BAND EMISSION MEASUREMENT

3.3.1 TEST REQUIREMENT:

FCC PART 15.407 (b)

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	5000MHz
Stop Frequency	5420MHz
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

3.3.2 TEST PROCEDURE

Above 1GHz test procedure as below:

a. 1. The EUT was placed on the top of a rotating table 0.1 meters above the ground at a 3 meter 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 and the rota 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.

g. Test the EUT in the lowest channel,the Highest channel

Note:

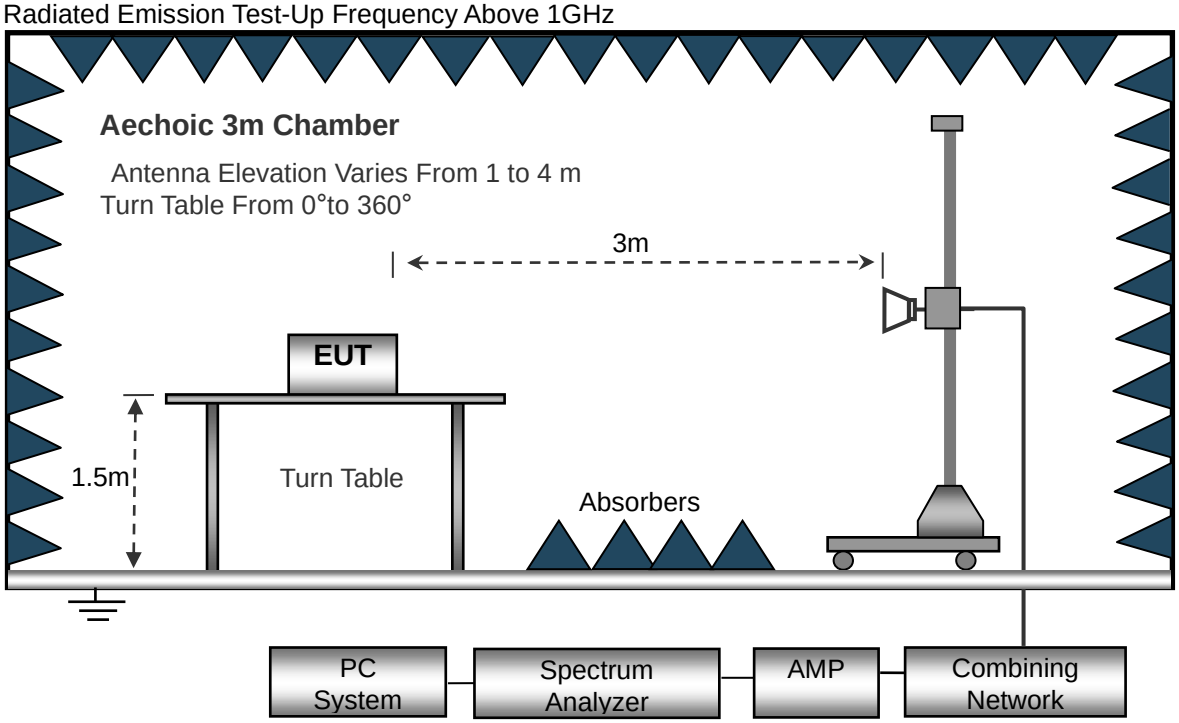
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

3.3.3 DEVIATION FROM TEST STANDARD

No deviation

3.3.4 TEST SETUP

Radiated Emission Test-Up Frequency Above 1GHz



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

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	5150	53.44	49.12	15.6	37.34	57.26	74	-16.74	PK
V	5150	39.58	49.12	15.6	37.34	43.40	54	-10.60	AV
V	5145	54.51	49.19	15.24	40.43	60.99	74	-13.01	PK
V	5145	36.55	49.19	15.24	40.43	43.03	54	-10.97	AV
H	5150	53.22	49.12	15.6	37.34	57.04	74	-16.96	PK
H	5150	37.76	49.12	15.6	37.34	41.58	54	-12.42	AV
H	5145	54.67	49.19	15.24	40.43	61.15	74	-12.85	PK
H	5145	33.31	49.19	15.24	40.43	39.79	54	-14.21	AV
operation frequency:5240									
V	5350	53.46	49.13	15.32	37.46	57.11	74	-16.89	PK
V	5350	35.74	49.13	15.32	37.46	39.39	54	-14.61	AV
V	5370	53.54	49.24	15.36	40.51	60.17	74	-13.83	PK
V	5370	32.45	49.24	15.36	40.51	39.08	54	-14.92	AV
H	5350	52.42	49.13	15.32	31.31	49.92	74	-24.08	PK
H	5350	40.47	49.13	15.32	31.31	37.97	54	-16.03	AV
H	5370	52.76	49.24	15.36	40.51	59.39	74	-14.61	PK
H	5370	32.73	49.24	15.36	40.51	39.36	54	-14.64	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.

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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	5150	51.55	49.12	15.6	37.34	55.37	74	-18.63	PK
V	5150	33.31	49.12	15.6	37.34	37.13	54	-16.87	AV
V	5145	51.74	49.19	15.24	40.43	58.22	74	-15.78	PK
V	5145	33.33	49.19	15.24	40.43	39.81	54	-14.19	AV
H	5150	51.73	49.12	15.6	37.34	55.55	74	-18.45	PK
H	5150	33.66	49.12	15.6	37.34	37.48	54	-16.52	AV
H	5145	50.40	49.19	15.24	40.43	56.88	74	-17.12	PK
H	5145	32.85	49.19	15.24	40.43	39.33	54	-14.67	AV
operation frequency:5240									
V	5350	53.94	49.13	15.32	37.46	57.59	74	-16.41	PK
V	5350	34.36	49.13	15.32	37.46	38.01	54	-15.99	AV
V	5370	50.51	49.24	15.36	40.51	57.14	74	-16.86	PK
V	5370	33.74	49.24	15.36	40.51	40.37	54	-13.63	AV
H	5350	54.43	49.13	15.32	31.31	51.93	74	-22.07	PK
H	5350	36.45	49.13	15.32	31.31	33.95	54	-20.05	AV
H	5370	51.55	49.24	15.36	40.51	58.18	74	-15.82	PK
H	5370	33.71	49.24	15.36	40.51	40.34	54	-13.66	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.

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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	5150	52.45	49.12	15.6	37.39	56.32	74	-17.68	PK
V	5150	35.64	49.12	15.6	37.39	39.51	54	-14.49	AV
V	5145	51.83	49.19	15.24	40.45	58.33	74	-15.67	PK
V	5145	34.85	49.19	15.24	40.45	41.35	54	-12.65	AV
H	5150	52.89	49.12	15.6	37.39	56.76	74	-17.24	PK
H	5150	34.91	49.12	15.6	37.39	38.78	54	-15.22	AV
H	5145	50.45	49.19	15.24	40.45	56.95	74	-17.05	PK
H	5145	35.82	49.19	15.24	40.45	42.32	54	-11.68	AV
operation frequency:5230									
V	5350	53.91	49.13	15.34	37.46	57.58	74	-16.42	PK
V	5350	37.87	49.13	15.34	37.46	41.54	54	-12.46	AV
V	5370	50.52	49.24	15.35	40.51	57.14	74	-16.86	PK
V	5370	36.55	49.24	15.35	40.51	43.17	54	-10.83	AV
H	5350	54.57	49.13	15.34	31.31	52.09	74	-21.91	PK
H	5350	41.46	49.13	15.34	31.31	38.98	54	-15.02	AV
H	5370	52.91	49.24	15.35	40.51	59.53	74	-14.47	PK
H	5370	37.08	49.24	15.35	40.51	43.70	54	-10.30	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.

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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 / 3 MHz for Peak, 1 MHz / 10Hz for Average	

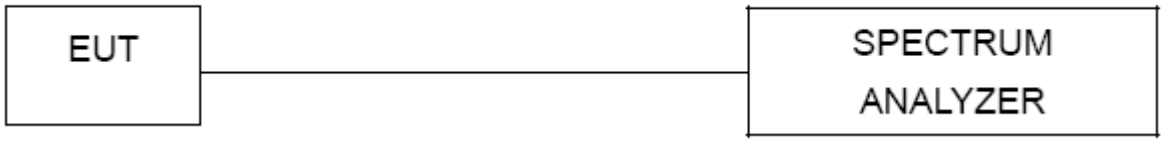
3.3.2 TEST PROCEDURE

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

Please see annex 2

4. AVERAGING 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.

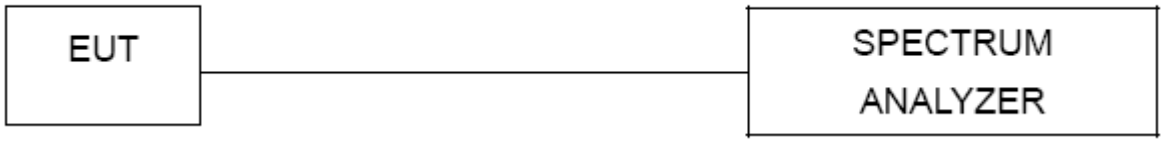
4.1.1 TEST PROCEDURE

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

Please see annex 2

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

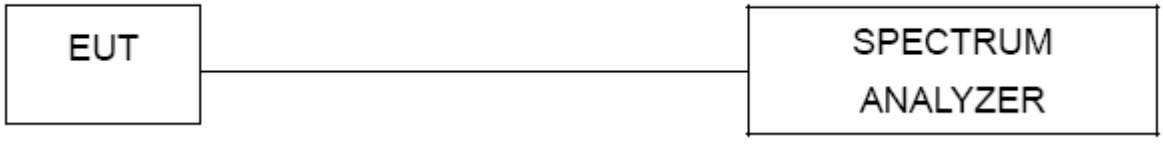
5.1.1 TEST PROCEDURE

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

Please see annex 2

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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.

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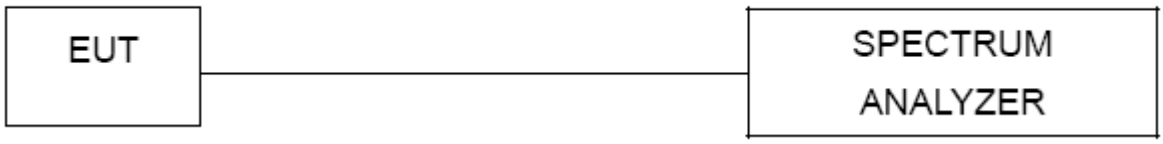
6.1.3 TEST SETUP



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

Please see annex 2

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.

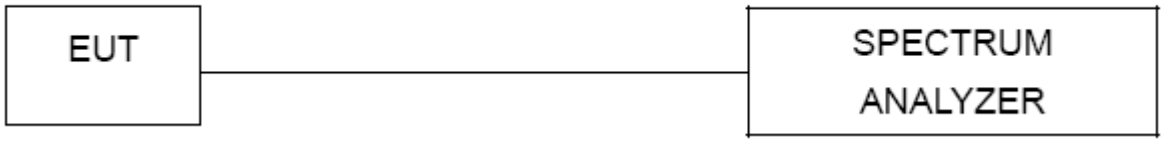
7.1.1 TEST PROCEDURE

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

Please see annex 2

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.

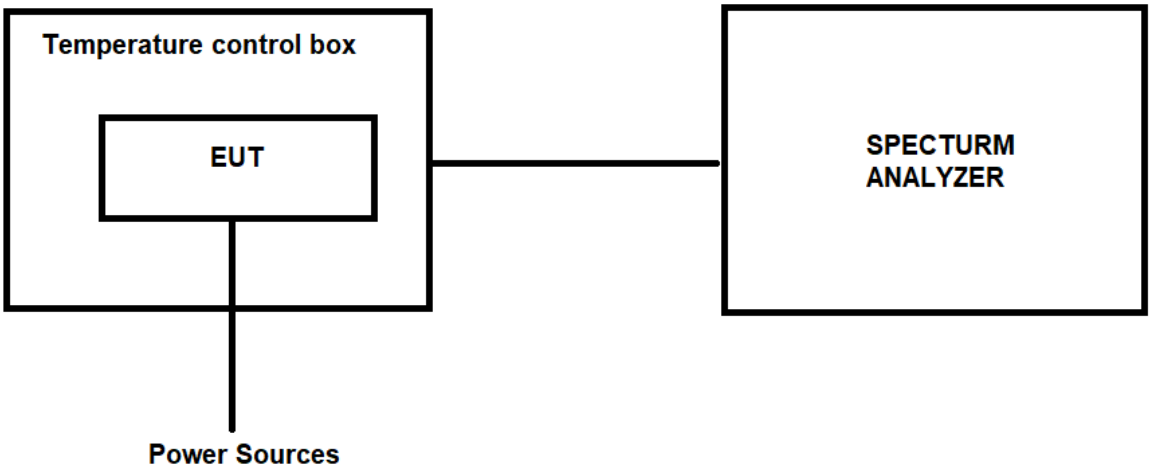
8.1.1 TEST PROCEDURE

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	Spectrum Frequency (MHz)		Δ Frequency (MHz)	
		(MHz)	802.11a	802.11n HT20	802.11a	802.11n HT20
132V	-20℃	5180	5180.0287	5180.0308	-0.0287	-0.0308
		5220	5220.0321	5220.0299	-0.0321	-0.0299
		5240	5240.0197	5240.0237	-0.0197	-0.0237
		5745	5745.0326	5745.0303	-0.0326	-0.0303
		5785	5785.0348	5785.0291	-0.0348	-0.0291
		5825	5825.0284	5825.0327	-0.0284	-0.0327
108V		5180	5180.0230	5180.0188	-0.0230	-0.0188
		5220	5220.0315	5220.0348	-0.0315	-0.0348
		5240	5240.0204	5240.0227	-0.0204	-0.0227
		5745	5745.0223	5745.0186	-0.0223	-0.0186
		5785	5785.0347	5785.0341	-0.0347	-0.0341
		5825	5825.0374	5825.0414	-0.0374	-0.0414
120V	25℃	5180	5180.0507	5180.0478	-0.0507	-0.0478
		5220	5220.0227	5220.0204	-0.0227	-0.0204
		5240	5240.0321	5240.0280	-0.0321	-0.0280
		5745	5745.0294	5745.0283	-0.0294	-0.0283
		5785	5785.0446	5785.0373	-0.0446	-0.0373
		5825	5825.0207	5825.0230	-0.0207	-0.0230
132V	50℃	5180	5180.0277	5180.0329	-0.0277	-0.0329
		5220	5220.0218	5220.0209	-0.0218	-0.0209
		5240	5240.0289	5240.0317	-0.0289	-0.0317
		5745	5745.0628	5745.0598	-0.0628	-0.0598
		5785	5785.0384	5785.0386	-0.0384	-0.0386
		5825	5825.0635	5825.0587	-0.0635	-0.0587
108V	50℃	5180	5180.0281	5180.0290	-0.0281	-0.0290
		5220	5220.0178	5220.0227	-0.0178	-0.0227
		5240	5240.0289	5240.0315	-0.0289	-0.0315
		5745	5745.0387	5745.0396	-0.0387	-0.0396
		5785	5785.0204	5785.0218	-0.0204	-0.0218
		5825	5825.0690	5825.0694	-0.0690	-0.0694

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Test Voltage	Test Temp.	Measured Frequency (MHz)	Spectrum Frequency (MHz)	Δ Frequency(MHz)
			802.11n HT40	802.11n HT40
132V	-20℃	5190	5190.0190	-0.0190
		5230	5230.0291	-0.0291
		5755	5755.0515	-0.0515
		5795	5795.0595	-0.0595
108V		5190	5190.0192	-0.0192
		5230	5230.0288	-0.0288
		5755	5755.0206	-0.0206
		5795	5795.0403	-0.0403
120V	25℃	5190	5190.0239	-0.0239
		5230	5230.0599	-0.0599
		5755	5755.0218	-0.0218
		5795	5795.0525	-0.0525
132V	50℃	5190	5190.0621	-0.0621
		5230	5230.0528	-0.0528
		5755	5755.0423	-0.0423
		5795	5795.0297	-0.0297
108V	50℃	5190	5190.0526	-0.0526
		5230	5230.0297	-0.0297
		5755	5755.0286	-0.0286
		5795	5795.0427	-0.0427

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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

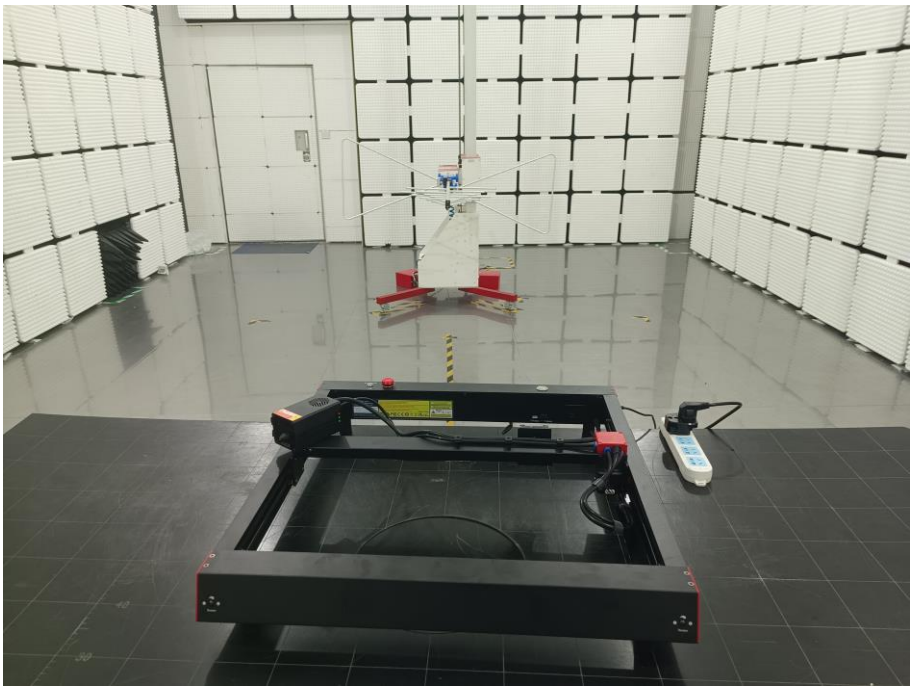
15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

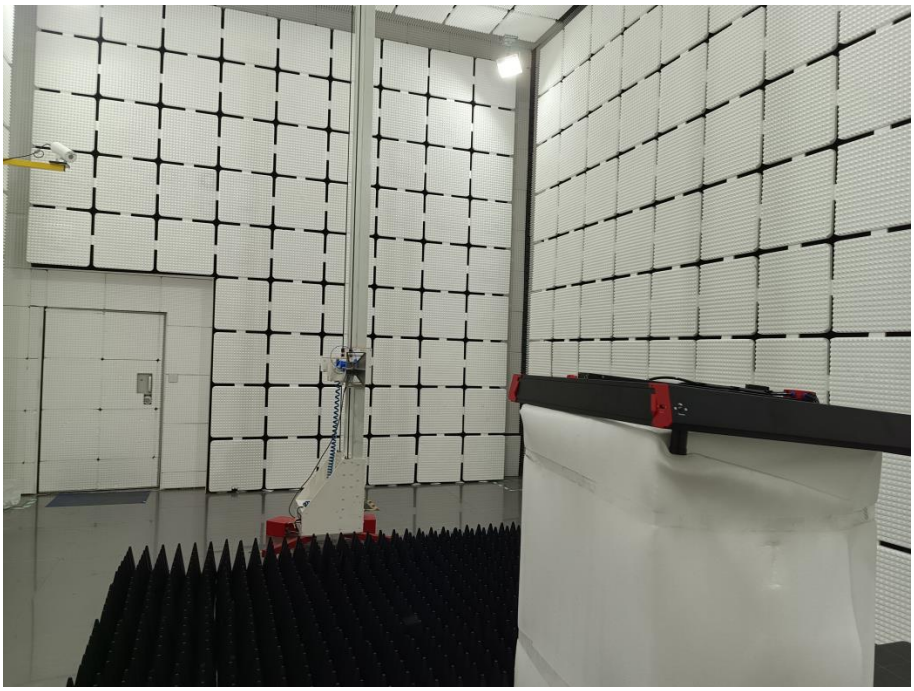
10.2 EUT ANTENNA

EUT antenna is equipped with a unique antenna connector (connected with reverse spiral pattern), and the antenna gain is less than 6dBi, which meets the standard requirements.

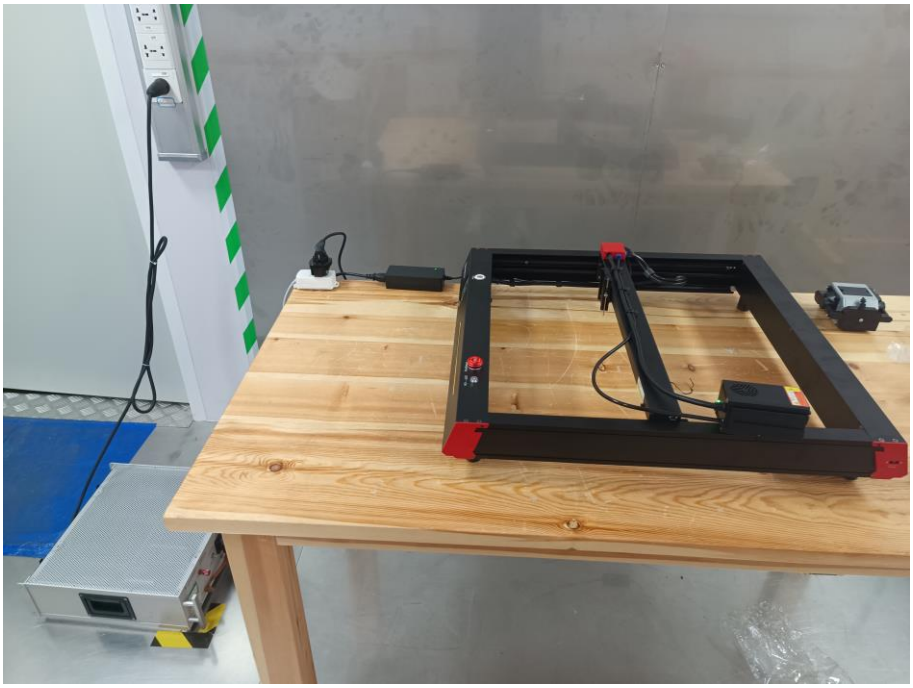
11. TEST SEUUP PHOTO

Radiated Measurement Photos





Conducted Measurement Photos



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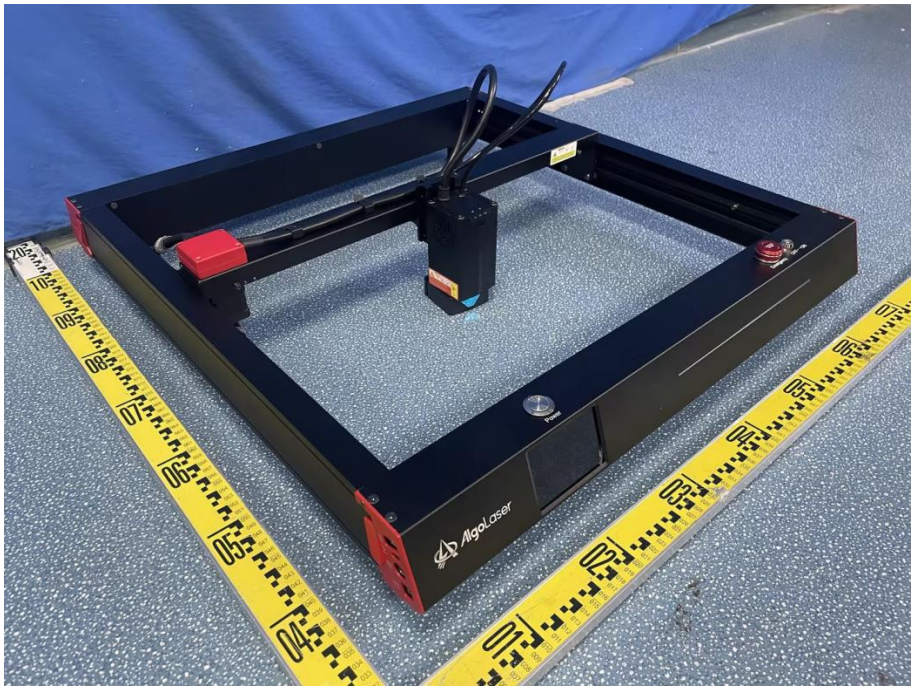
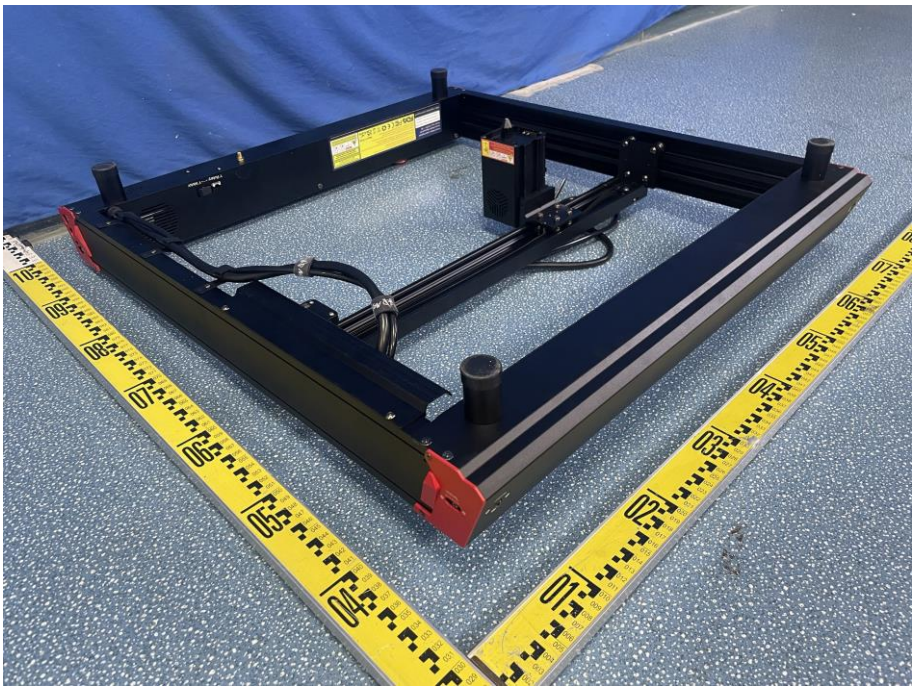
12. EUT PHOTO





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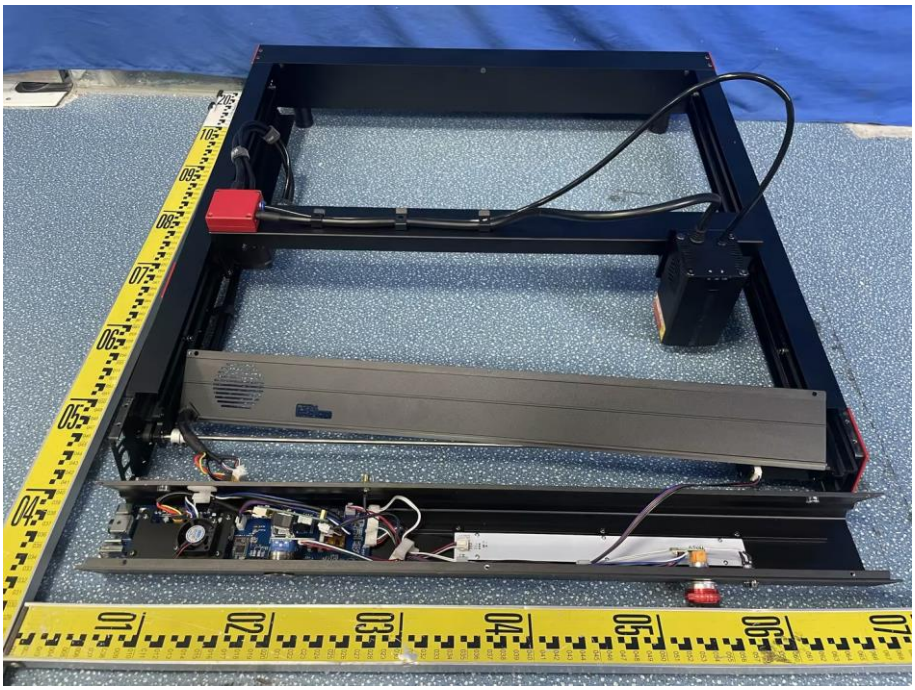

※※※※※ **END OF REPORT** ※※※※※

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