



FCC Part 15C Test Report

FCC ID: 2A5LY-IPDA091

Applicant: Guangzhou MUNBYN Information Technology Co., Ltd.

Address: 329 3rd Floor, Tairong Business Center, No. 63 Xizeng Road, Liwan District, Guangzhou, China.

Manufacturer: Guangzhou MUNBYN Information Technology Co., Ltd.

Address: 329 3rd Floor, Tairong Business Center, No. 63 Xizeng Road, Liwan District, Guangzhou, China.

EUT: Commercial PDA

Trade Mark: MUNBYN

Model Number: IPDA091, IPDA092

Date of Receipt: Apr. 15, 2022

Test Date: Apr. 15, 2022 – May. 05, 2022

Date of Report: May. 05, 2022

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Applicable Standards: FCC PART 15 C 15.407
ANSI C63.10:2013

Test Result: Pass

Report Number: DL-20220505021-3E

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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.



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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.407) , Subpart C			
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 $y \pm U$, 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	$\pm 2.56\text{dB}$
2	RF power,conducted	$\pm 0.42\text{dB}$
3	Spurious emissions,conducted	$\pm 2.76\text{dB}$
4	All emissions,radiated(<1G)	$\pm 3.65\text{dB}$
5	All emissions,radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^{\circ}\text{C}$
7	Humidity	$\pm 2\%$



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product Name:	Commercial PDA
Trademark	MUNBYN
Model No.:	IPDA091, IPDA092
Model Difference	All samples are the same except the model number and appearance color, so we prepare " IPDA091" for test only.
Operation Frequency:	5180-5240 (802.11a/n(HT20)) 5190-5230 (802.11n(HT40))
Channel numbers:	See channel list
Channel separation:	20MHz
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:	2dBi
Power supply:	DC 7.4V from battery DC 5V from Charger
Adapter:	Model:TPA-23A050200UU01 Input: AC 100-240V 50/60Hz 0.3A Output: DC 5V 2000mA

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)			
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



2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly 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	
Mode 1	802.11a/n/acHT20	CH36, CH44, CH48	
Mode 2	802.11n/acHT40	CH38, CH46	
Mode 3	Other	Link Mode	

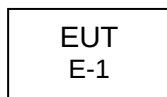
For Radiated Emission			
Pretest Mode	Channel	Band 1	
Mode 1	802.11a/n/acHT20	CH36, CH44, CH48	
Mode 2	802.11n/acHT40	CH38, CH46	
Mode 3	Other	Link Mode	

Note: 1. The measurements are performed at the highest, middle, lowest available channels.
2. During the test, the duty cycle >98%, 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.

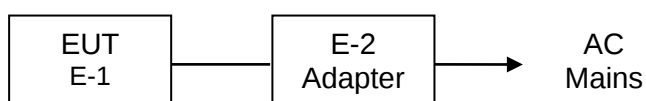


2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

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	Commercial PDA	IPDA091	N/A	EUT
E-2	Adapter	TPA-23A050200UU01	N/A	Provide by client.

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	MCS0	MSC0	MSC0
Power Setting of Software	45	45	45



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_EMCC	EMC-CON 3A1.1
2	EMC radiation test system	FALA	EZ_EMCC	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
0.50 -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

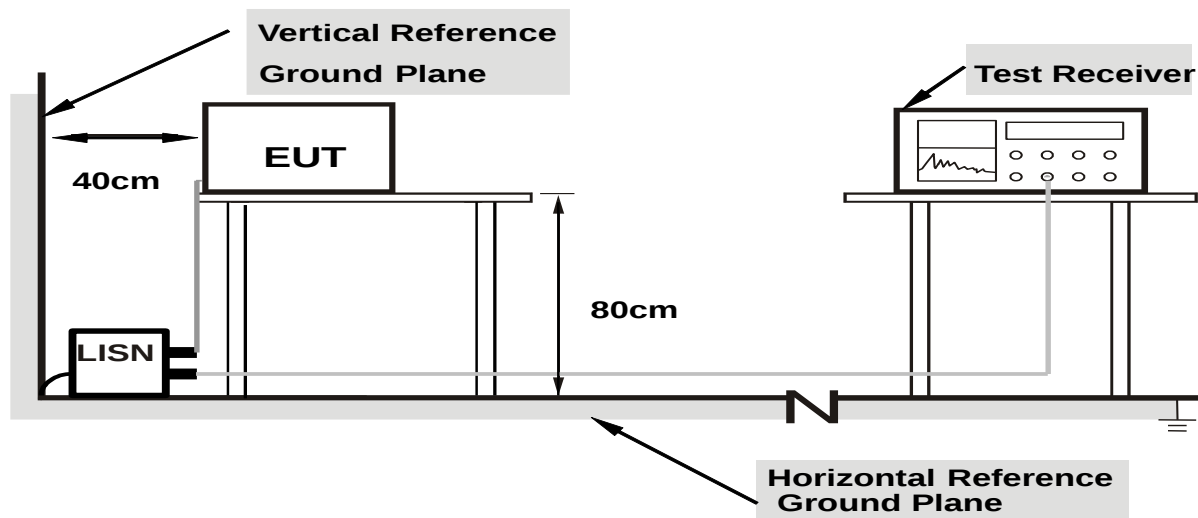
3.1.2 TEST PROCEDURE

- 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

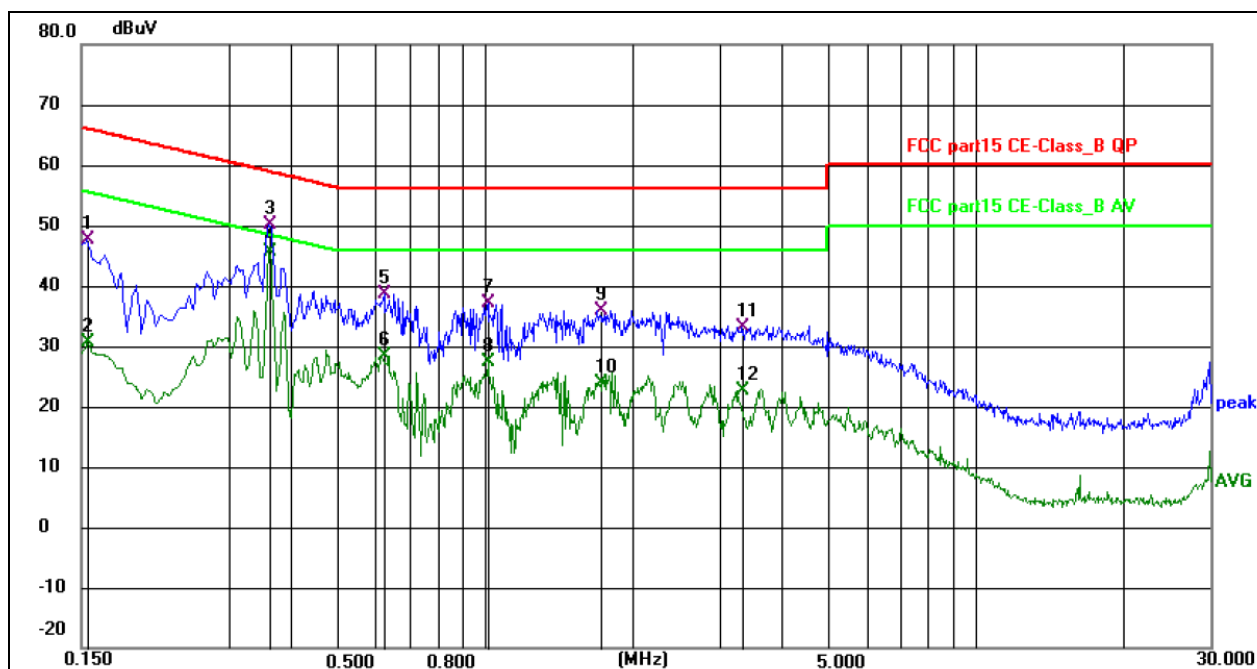
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

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 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	L
Test Voltage :	AC 120V/60Hz	Test Mode:	Mode 3



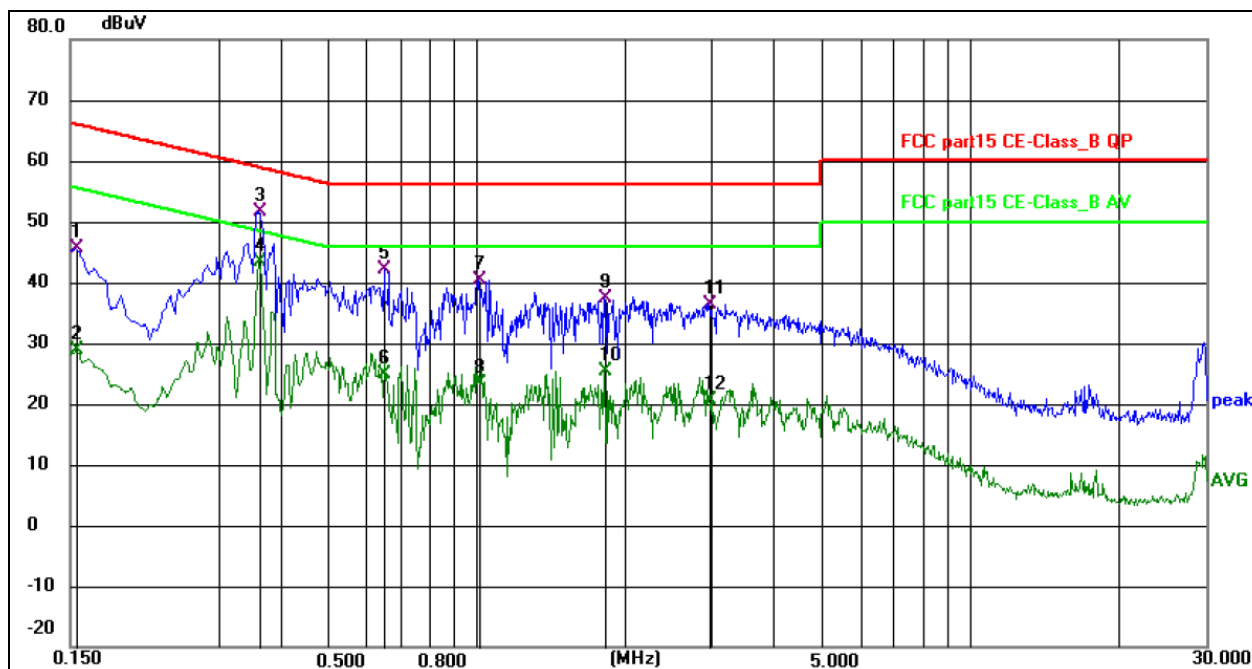
Remark:

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	0.1545	37.17	10.41	47.58	65.75	18.17	QP	P	
2	0.1545	20.10	10.41	30.51	55.75	25.24	AVG	P	
3	0.3615	41.06	9.08	50.14	58.69	8.55	QP	P	
4 *	0.3615	36.58	9.08	45.66	48.69	3.03	AVG	P	
5	0.6225	29.40	9.34	38.74	56.00	17.26	QP	P	
6	0.6225	18.93	9.34	28.27	46.00	17.73	AVG	P	
7	1.0140	27.94	9.29	37.23	56.00	18.77	QP	P	
8	1.0140	18.10	9.29	27.39	46.00	18.61	AVG	P	
9	1.7250	26.17	9.71	35.88	56.00	20.12	QP	P	
10	1.7250	14.25	9.71	23.96	46.00	22.04	AVG	P	
11	3.3360	24.14	8.92	33.06	56.00	22.94	QP	P	
12	3.3360	13.83	8.92	22.75	46.00	23.25	AVG	P	



Temperature:	25 °C	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	0.1545	35.34	10.21	45.55	65.75	20.20	QP	P	
2	0.1545	18.68	10.21	28.89	55.75	26.86	AVG	P	
3	0.3615	42.47	9.16	51.63	58.69	7.06	QP	P	
4 *	0.3615	34.29	9.16	43.45	48.69	5.24	AVG	P	
5	0.6495	32.99	9.22	42.21	56.00	13.79	QP	P	
6	0.6495	15.66	9.22	24.88	46.00	21.12	AVG	P	
7	1.0095	30.96	9.41	40.37	56.00	15.63	QP	P	
8	1.0095	13.88	9.41	23.29	46.00	22.71	AVG	P	
9	1.8105	27.69	9.76	37.45	56.00	18.55	QP	P	
10	1.8105	15.57	9.76	25.33	46.00	20.67	AVG	P	
11	2.9490	26.67	9.82	36.49	56.00	19.51	QP	P	
12	2.9490	10.85	9.82	20.67	46.00	25.33	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	25GHz
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:

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 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.
- 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.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- 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:

- 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).
- Test the EUT in the lowest channel, the middle channel, the Highest channel

Note:

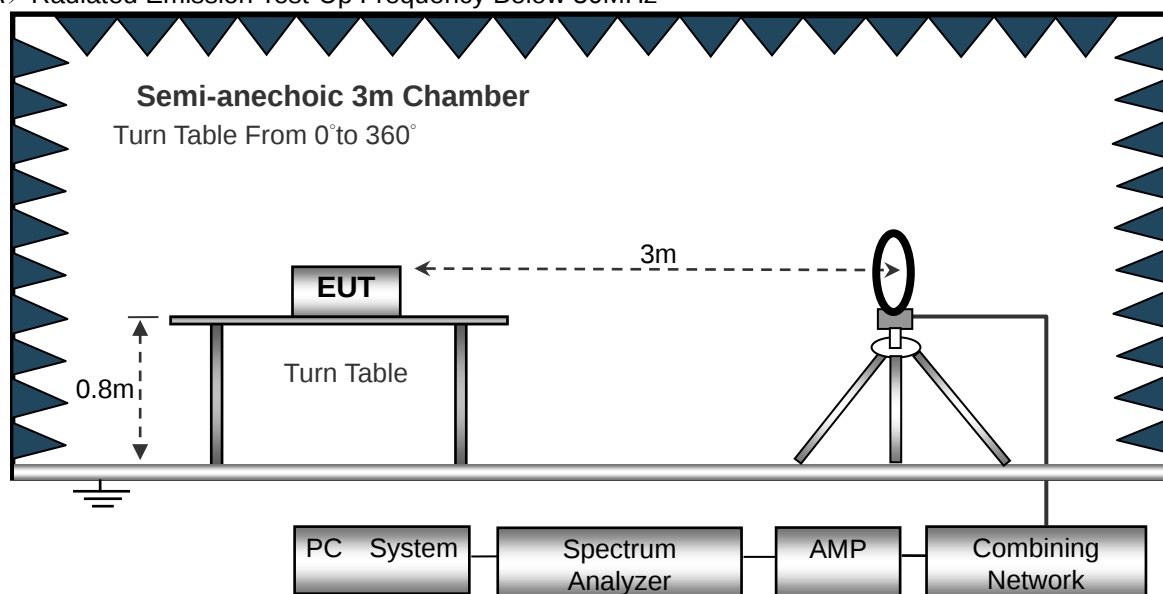
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

3.2.3 DEVIATION FROM TEST STANDARD

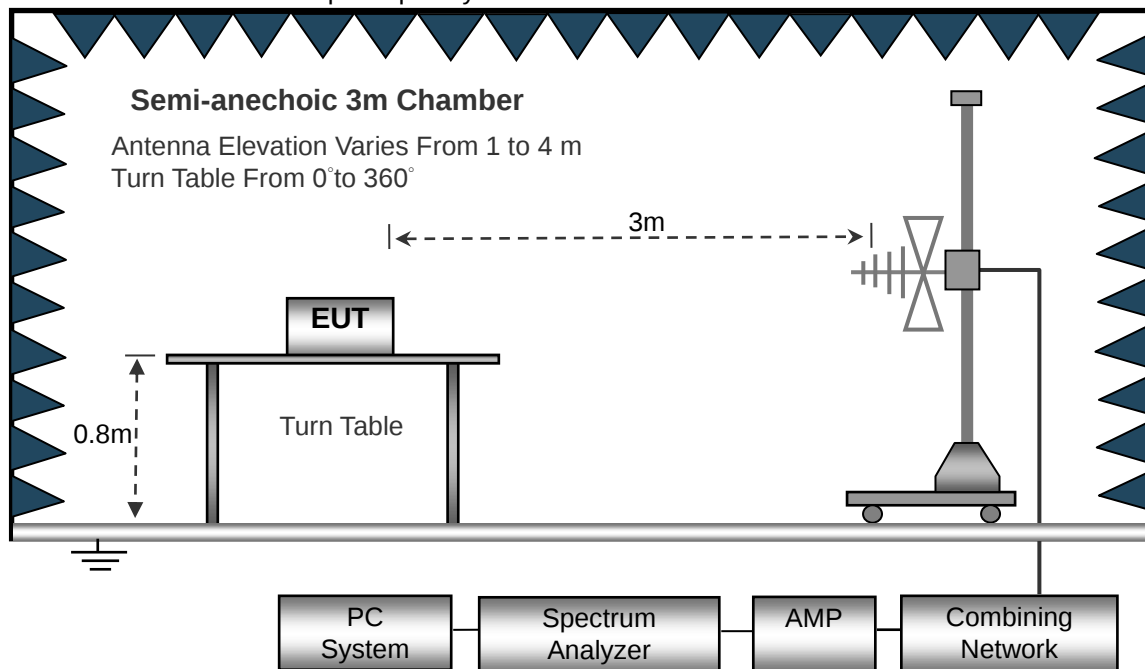
No deviation

3.2.4 TEST SETUP

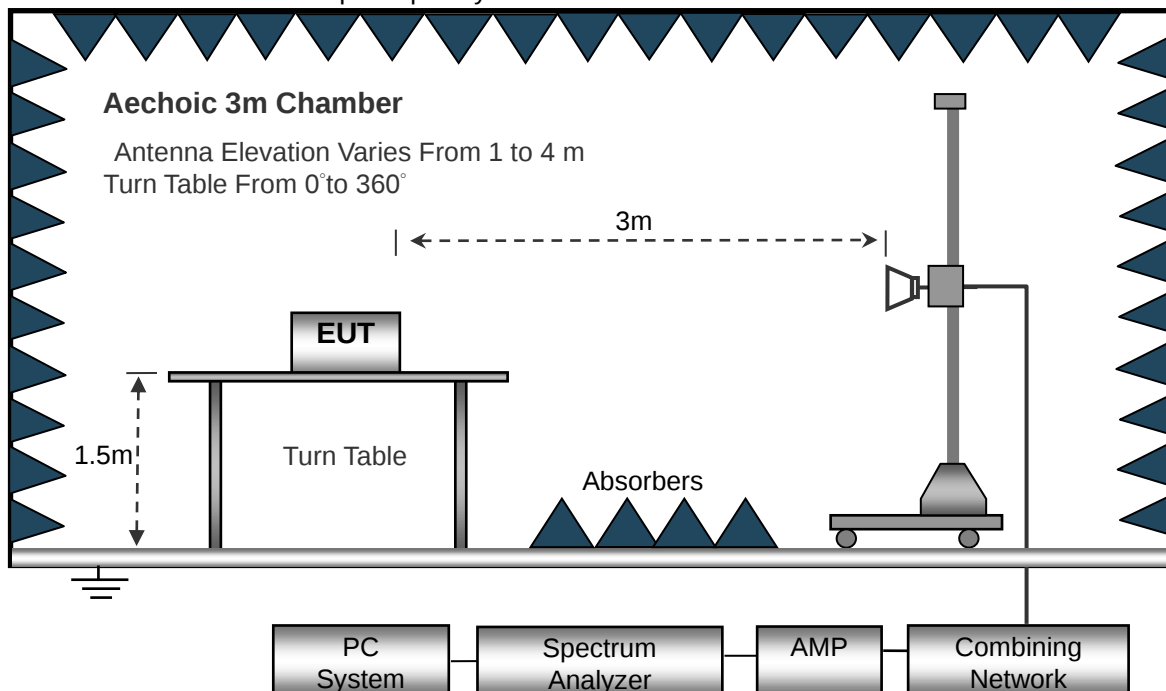
(A) Radiated Emission Test-Up Frequency Below 30MHz



(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°C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	Mode 3	Polarization :	--

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

NOTE:

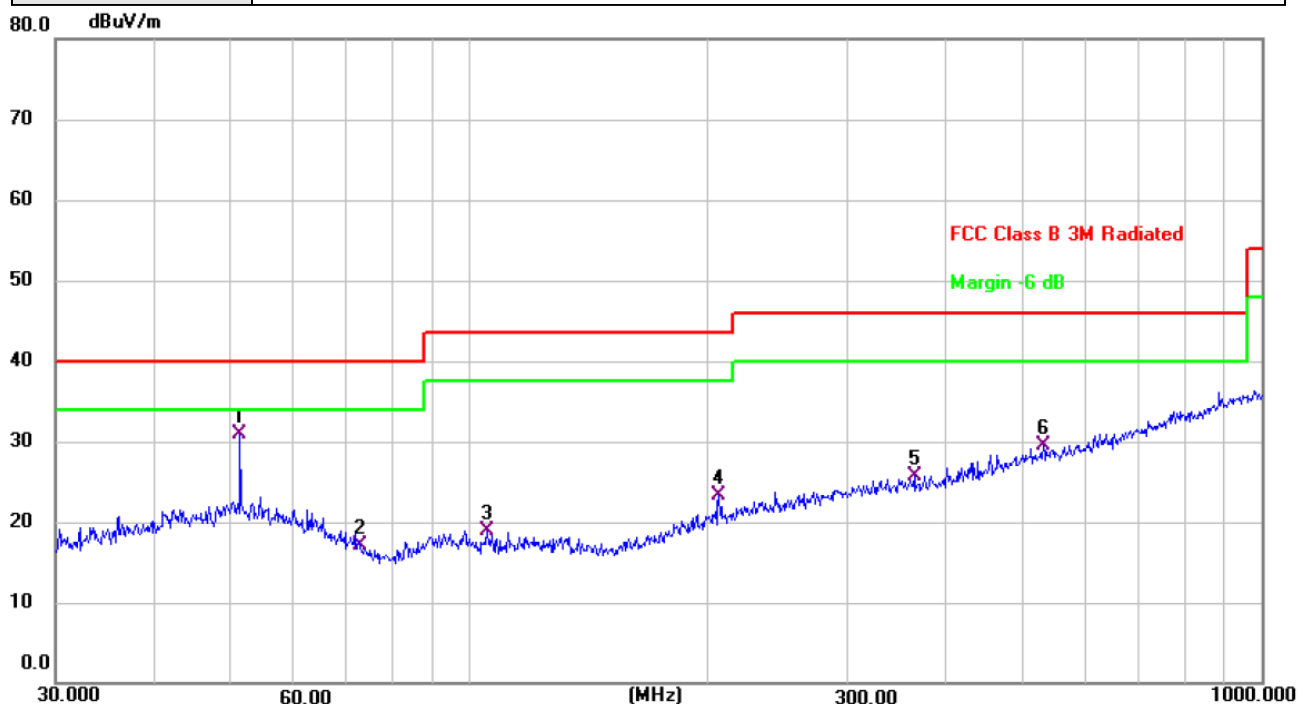
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance}/\text{test distance})$ (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 :	DC 3.7V		
Test Mode :	Mode 3		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1	*	51.3005	42.07	-11.21	30.86	40.00	-9.14	QP
2		72.8466	32.69	-15.64	17.05	40.00	-22.95	QP
3		105.2718	34.22	-15.36	18.86	43.50	-24.64	QP
4		206.3976	36.01	-12.74	23.27	43.50	-20.23	QP
5		364.2595	34.55	-8.77	25.78	46.00	-20.22	QP
6		530.1014	35.07	-5.50	29.57	46.00	-16.43	QP

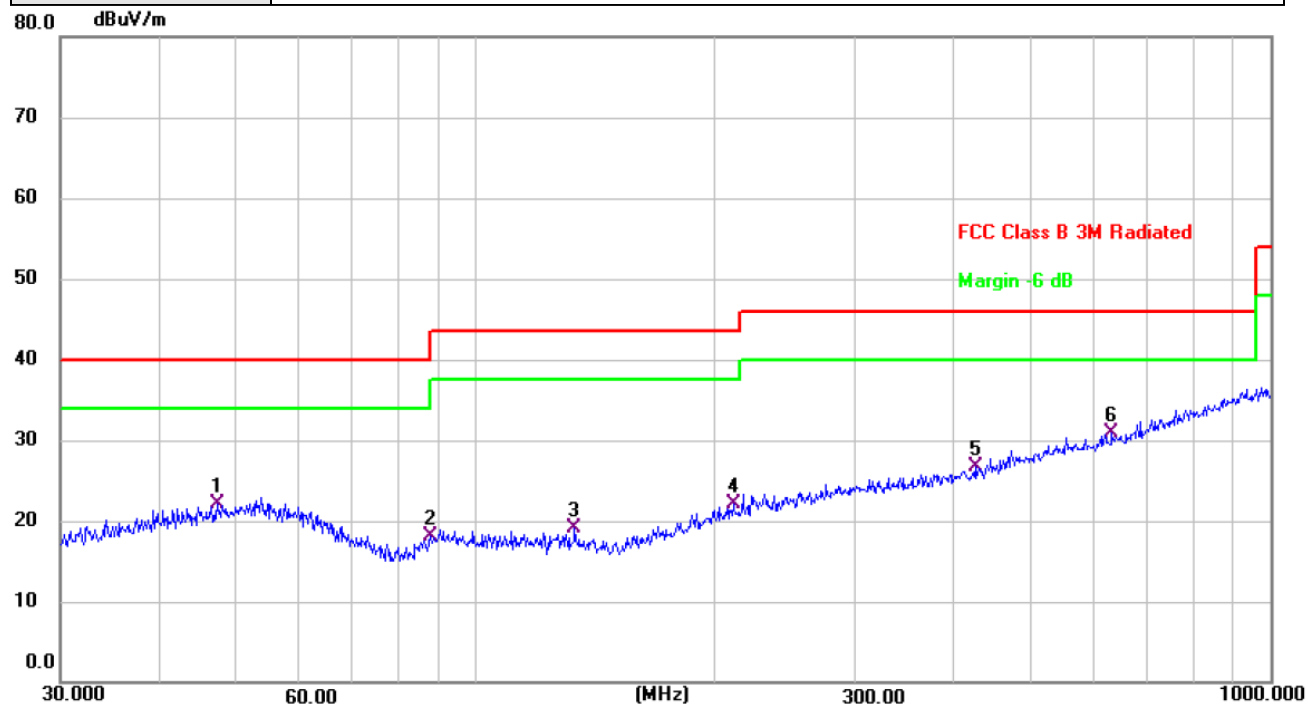
Remark:

Correct Factor = Cable loss + Antenna factor – Preamplifier;

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



Temperature:	26℃	Relative Humidity:	54%
Pressure:	1010 hPa	Polarization :	Vertical
test voltage :	DC 3.7V		
Test Mode :	Mode 3		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector
		MHz	dBuV	dB	dBuV/m	dB/m	dB	
1		47.3255	33.81	-11.66	22.15	40.00	-17.85	QP
2		87.7248	33.95	-15.81	18.14	40.00	-21.86	QP
3		133.1511	35.08	-15.98	19.10	43.50	-24.40	QP
4		210.7860	35.09	-12.97	22.12	43.50	-21.38	QP
5		425.0280	35.44	-8.66	26.78	46.00	-19.22	QP
6	*	631.6884	35.92	-5.10	30.82	46.00	-15.18	QP

Remark:

Correct Factor = Cable loss + Antenna factor – Preamplifier;

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

**3.2.8 TEST RESULTS (1ghz~40ghZ)**

802.11a band 1

Polar (H/V)	Frequency	Meter Reading	Pre- amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
operation frequency:5180									
V	10360	56.37	49.05	15.30	37.39	60.01	74	-13.99	PK
V	10360	45.18	49.05	15.30	37.39	48.82	54	-5.18	AV
V	15540	56.55	49.16	15.27	40.45	63.11	74	-10.89	PK
V	15540	43.48	49.16	15.27	40.45	50.04	54	-3.96	AV
H	10360	56.00	49.05	15.30	37.39	59.64	74	-14.36	PK
H	10360	45.34	49.05	15.30	37.39	48.98	54	-5.02	AV
H	15540	59.04	49.16	15.27	40.45	65.60	74	-8.40	PK
H	15540	43.00	49.16	15.27	40.45	49.56	54	-4.44	AV
operation frequency:5200									
V	10400	57.37	49.09	15.34	37.42	61.04	74	-12.96	PK
V	10400	45.24	49.09	15.34	37.42	48.91	54	-5.09	AV
V	15600	59.34	49.18	15.29	40.47	65.92	74	-8.08	PK
V	15600	43.04	49.18	15.29	40.47	49.62	54	-4.38	AV
H	10400	56.60	49.09	15.34	37.42	60.27	74	-13.73	PK
H	10400	45.67	49.09	15.34	37.42	49.34	54	-4.66	AV
H	15600	59.34	49.18	15.29	40.47	65.92	74	-8.08	PK
H	15600	43.28	49.18	15.29	40.47	49.86	54	-4.14	AV
operation frequency:5240									
V	10480	58.43	49.11	15.37	37.46	62.15	74	-11.85	PK
V	10480	45.26	49.11	15.37	37.46	48.98	54	-5.02	AV
V	15720	59.06	49.21	15.34	40.51	65.70	74	-8.30	PK
V	15720	43.29	49.21	15.34	40.51	49.93	54	-4.07	AV
H	10480	56.93	49.11	15.37	31.31	54.50	74	-19.50	PK
H	10480	45.47	49.11	15.37	31.31	43.04	54	-10.96	AV
H	15720	57.35	49.21	15.34	40.51	63.99	74	-10.01	PK
H	15720	42.49	49.21	15.34	40.51	49.13	54	-4.87	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	Meter Reading	Pre- amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
operation frequency:5180									
V	10360	56.64	49.05	15.3	37.39	60.28	74	-13.72	PK
V	10360	45.60	49.05	15.3	37.39	49.24	54	-4.76	AV
V	15540	56.16	49.16	15.27	40.45	62.72	74	-11.28	PK
V	15540	43.26	49.16	15.27	40.45	49.82	54	-4.18	AV
H	10360	56.56	49.05	15.3	37.39	60.20	74	-13.80	PK
H	10360	45.24	49.05	15.3	37.39	48.88	54	-5.12	AV
H	15540	54.06	49.16	15.27	40.45	60.62	74	-13.38	PK
H	15540	44.27	49.16	15.27	40.45	50.83	54	-3.17	AV
operation frequency:5200									
V	10400	56.17	49.09	15.34	37.42	59.84	74	-14.16	PK
V	10400	44.70	49.09	15.34	37.42	48.37	54	-5.63	AV
V	15600	55.26	49.18	15.29	40.47	61.84	74	-12.16	PK
V	15600	43.36	49.18	15.29	40.47	49.94	54	-4.06	AV
H	10400	55.47	49.09	15.34	37.42	59.14	74	-14.86	PK
H	10400	43.25	49.09	15.34	37.42	46.92	54	-7.08	AV
H	15600	54.97	49.18	15.29	40.47	61.55	74	-12.45	PK
H	15600	43.14	49.18	15.29	40.47	49.72	54	-4.28	AV
operation frequency:5240									
V	10480	57.04	49.11	15.37	37.46	60.76	74	-13.24	PK
V	10480	44.56	49.11	15.37	37.46	48.28	54	-5.72	AV
V	15720	54.28	49.21	15.34	40.51	60.92	74	-13.08	PK
V	15720	43.40	49.21	15.34	40.51	50.04	54	-3.96	AV
H	10480	57.08	49.11	15.37	31.31	54.65	74	-19.35	PK
H	10480	44.57	49.11	15.37	31.31	42.14	54	-11.86	AV
H	15720	55.25	49.21	15.34	40.51	61.89	74	-12.11	PK
H	15720	44.17	49.21	15.34	40.51	50.81	54	-3.19	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	Meter Reading	Pre- amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
operation frequency:5190									
V	10380	56.68	49.07	15.33	37.41	60.35	74	-13.65	PK
V	10380	45.18	49.07	15.33	37.41	48.85	54	-5.15	AV
V	15570	56.16	49.17	15.28	40.46	62.73	74	-11.27	PK
V	15570	43.31	49.17	15.28	40.46	49.88	54	-4.12	AV
H	10380	56.55	49.07	15.33	37.41	60.22	74	-13.78	PK
H	10380	45.24	49.07	15.33	37.41	48.91	54	-5.09	AV
H	15570	54.57	49.17	15.28	40.46	61.14	74	-12.86	PK
H	15570	44.16	49.17	15.28	40.46	50.73	54	-3.27	AV
operation frequency:5230									
V	10460	57.10	49.11	15.37	37.46	60.82	74	-13.18	PK
V	10460	44.39	49.11	15.37	37.46	48.11	54	-5.89	AV
V	15690	54.34	49.21	15.34	40.51	60.98	74	-13.02	PK
V	15690	43.26	49.21	15.34	40.51	49.90	54	-4.10	AV
H	10460	57.27	49.11	15.37	31.31	54.84	74	-19.16	PK
H	10460	44.74	49.11	15.37	31.31	42.31	54	-11.69	AV
H	15690	55.28	49.21	15.34	40.51	61.92	74	-12.08	PK
H	15690	43.98	49.21	15.34	40.51	50.62	54	-3.38	AV

Remark:

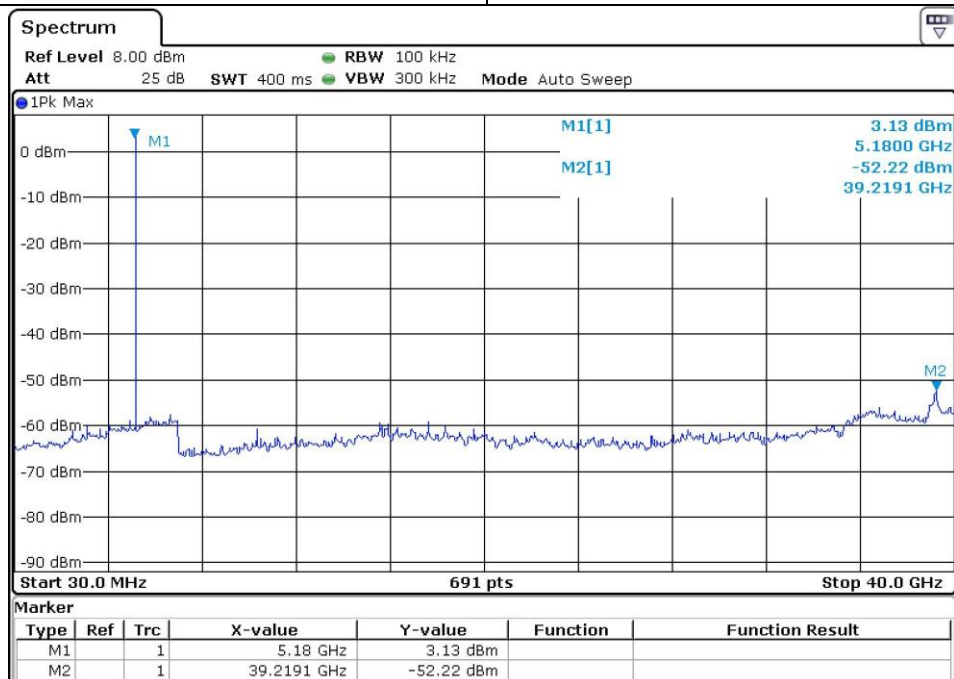
1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to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



For Conducted

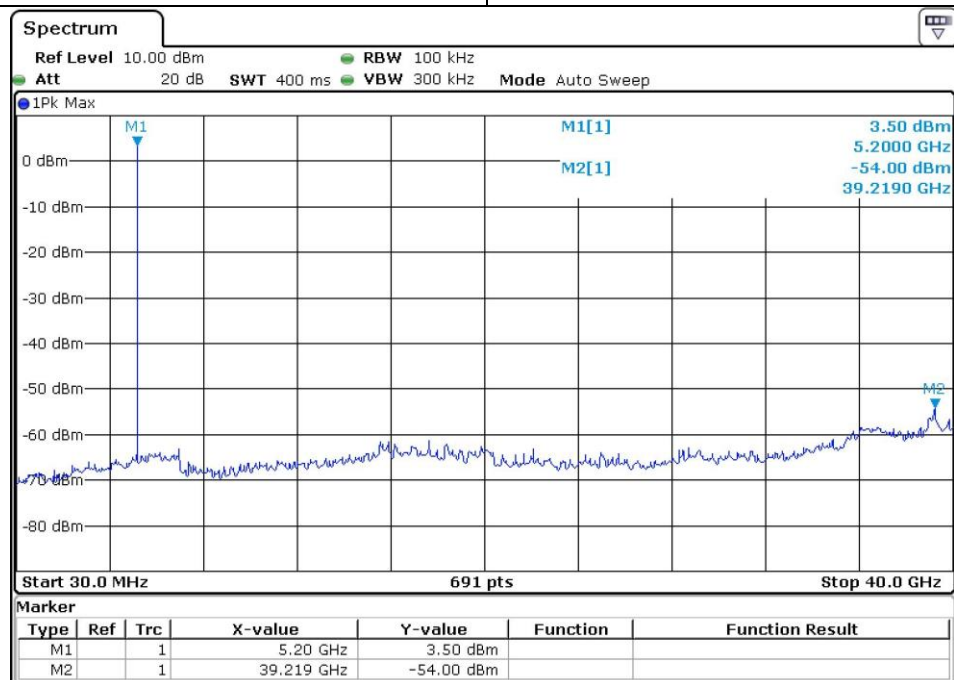
During the test, pre-scan the all modulation, the modulation below were found to have the worst test results, as reflected in the report.

Test channel: Band 1/802.11a Lowest channel



0.03Hz~40GHz

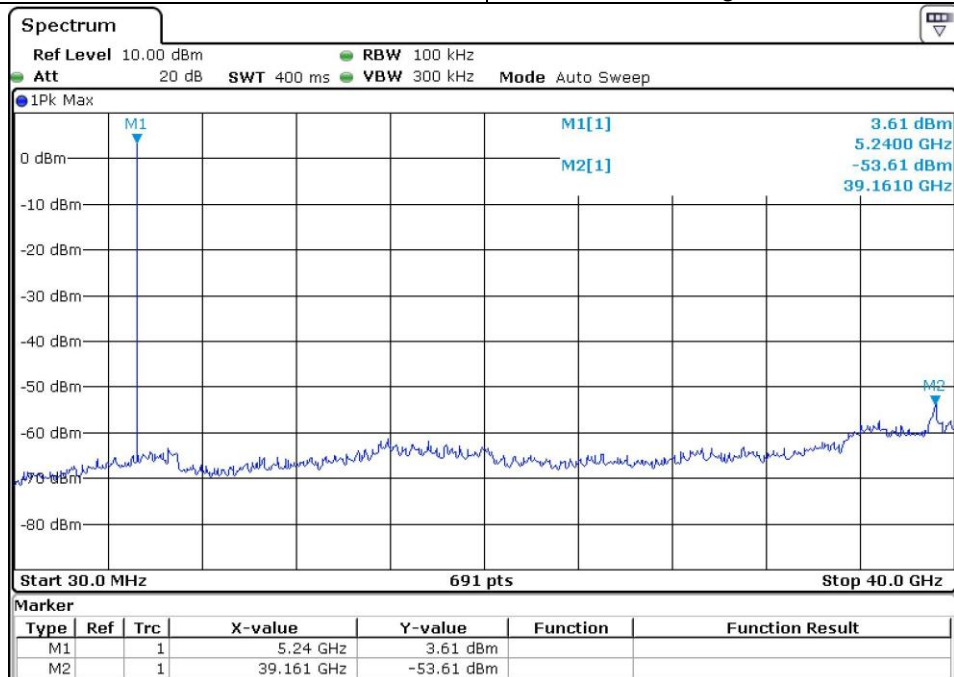
Test channel: Band 1/802.11a Middle channel



0.03GHz~40GHz



Test channel: Band 1/802.11a Highest channel



0.03GHz~40GHz



3.3 RADIATED 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 within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of -27 dBm/MHz.

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

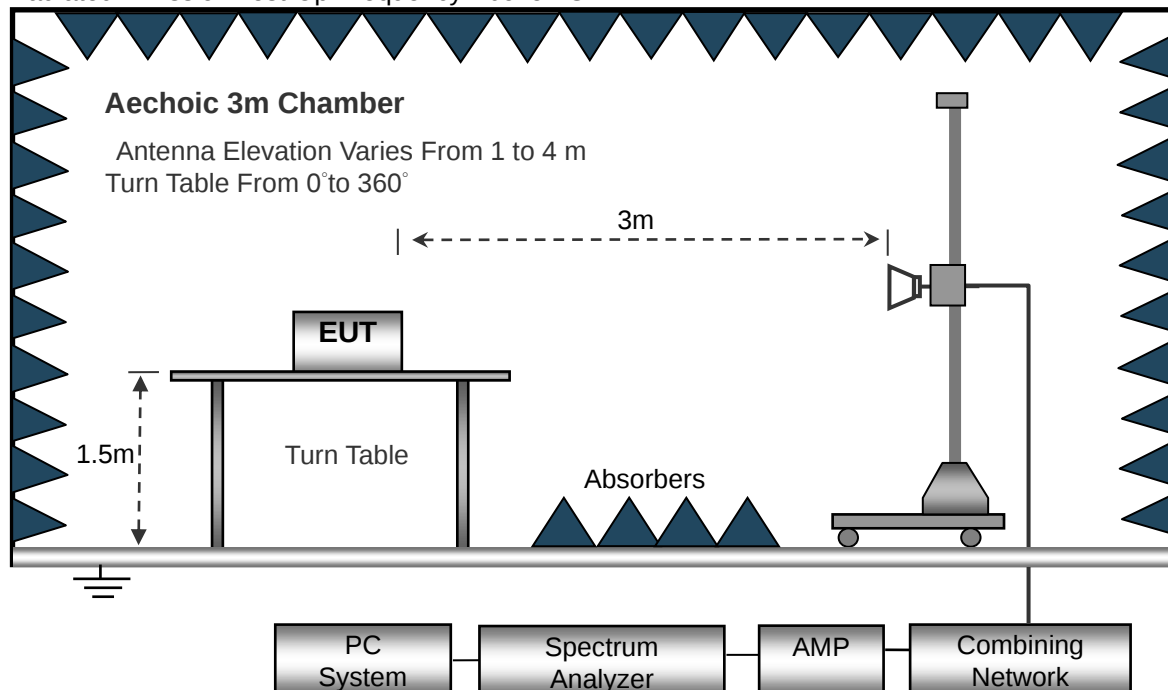
Test method: FCC KDB 789033 G)& Parts 15.407(b)(4) & 15.209(a)

3.3.3 DEVIATION FROM TEST STANDARD

No deviation

3.3.4 TEST SETUP

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**

Modulation	Test Frequency (MHz)	Max Level Frequency (MHz)	Max Level (dBμV/m)	EIRP (dBm)	Limit (dBm)	Result
802.11a	5180	5148.22	51.62	-43.58	-27.00	Pass
	5240	5255.17	53.13	-42.07	-27.00	Pass
802.11n(HT20)	5180	5146.25	52.13	-43.07	-27.00	Pass
	5240	5253.32	52.22	-42.98	-27.00	Pass
802.11n(HT40)	5190	5147.24	51.40	-43.80	-27.00	Pass
	5230	5253.32	52.31	-42.89	-27.00	Pass

Remark: 1. According to KDB 789033 D02 section H) d) (iii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows: $EIRP[dBm] = E[dB\mu V/m] - 95.2$

For Conducted
Please see annex 2



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 $\geq$ RBW
Sweep = auto
Detector function = peak
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 $\geq$ 1MHz for band 1 RBW $\geq$ 510KHz for band 4
VB	VBW $\geq$ 3RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

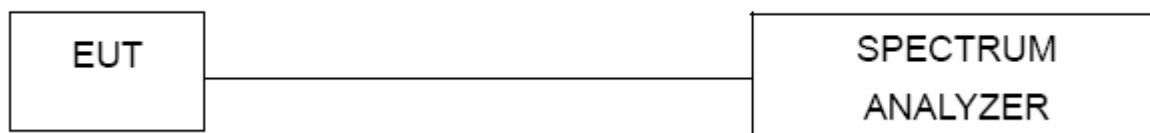
5.1.1 TEST PROCEDURE

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. Use 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



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

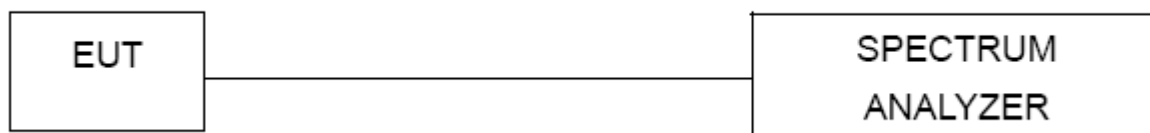
26dB Bandwidth	
Spectrum Parameters	Setting
RBW	approximately 1% of the emission bandwidth
VBW	>RBW
Span	30MHz(20MHz Bandwidth mode) 60MHz(40MHz Bandwidth mode) 120MHz(80MHz Bandwidth mode)
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

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

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) $\geq$ 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.

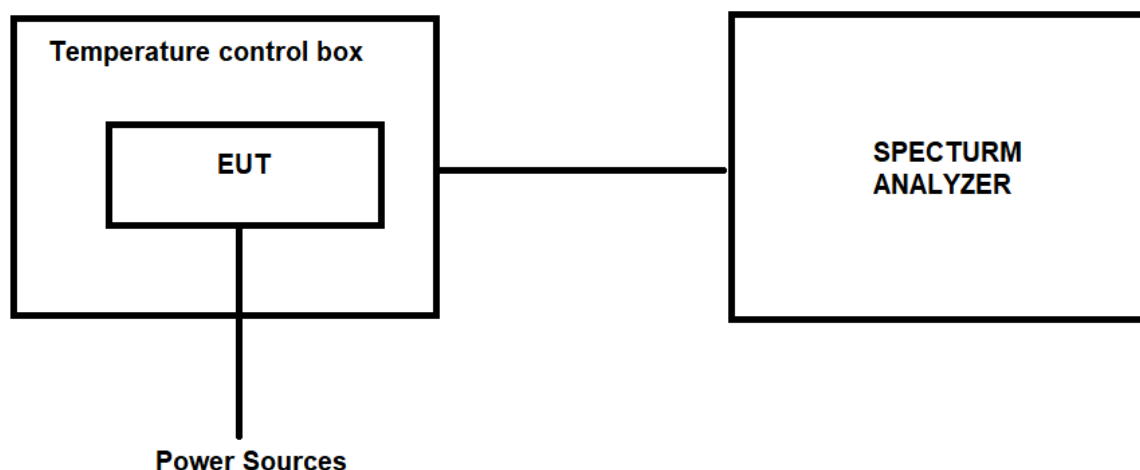
8.1.1 TEST PROCEDURE

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 (MHz)	Spectrum Frequency (MHz)		Δ Frequency (MHz)	
			802.11a	802.11n HT20	802.11a	802.11n HT20
132V	-20℃	5180.0000	5180.0192	5180.0191	-0.0192	-0.0191
		5220.0000	5220.0206	5220.0203	-0.0206	-0.0203
		5240.0000	5240.0057	5240.0088	-0.0057	-0.0088
108V		5180.0000	5180.0103	5180.0097	-0.0103	-0.0097
		5220.0000	5220.0209	5220.0187	-0.0209	-0.0187
		5240.0000	5240.0257	5240.0263	-0.0257	-0.0263
120V	25℃	5180.0000	5180.0400	5180.0414	-0.0400	-0.0414
		5220.0000	5220.0079	5220.0098	-0.0079	-0.0098
		5240.0000	5240.0184	5240.0190	-0.0184	-0.0190
132V	50℃	5180.0000	5180.0219	5180.0186	-0.0219	-0.0186
		5220.0000	5220.0068	5220.0068	-0.0068	-0.0068
		5240.0000	5240.0379	5240.0363	-0.0379	-0.0363
108V	50℃	5180.0000	5180.0363	5180.0363	-0.0363	-0.0363
		5220.0000	5220.0273	5220.0306	-0.0273	-0.0306
		5240.0000	5240.0301	5240.0298	-0.0301	-0.0298

Test Voltage	Test Temp.	Measured Frequency (MHz)	Spectrum Frequency (MHz)	Δ Frequency (MHz)
			802.11n HT40	802.11n HT40
132V	-20℃	5190.000	5190.0198	-0.0198
		5230.000	5230.0339	-0.0339
108V		5190.000	5190.0247	-0.0247
		5230.000	5230.0312	-0.0312
120V	25℃	5190.000	5190.0231	-0.0231
		5230.000	5230.0650	-0.0650
132V	50℃	5190.000	5190.0631	-0.0631
		5230.000	5230.0543	-0.0543
108V	50℃	5190.000	5190.0533	-0.0533
		5230.000	5230.0342	-0.0342



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.

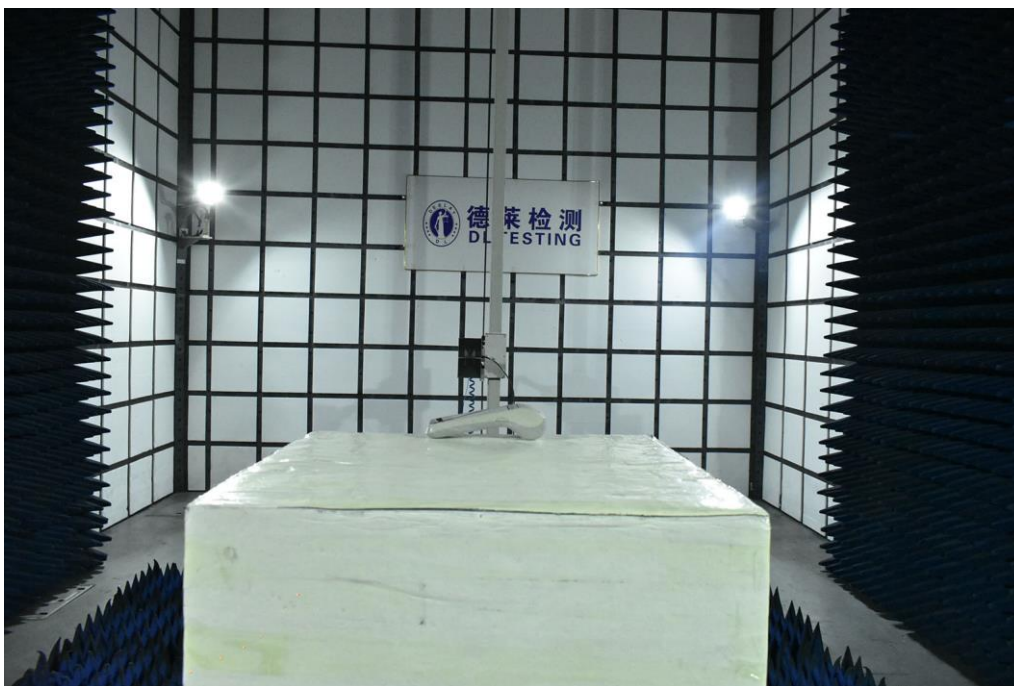
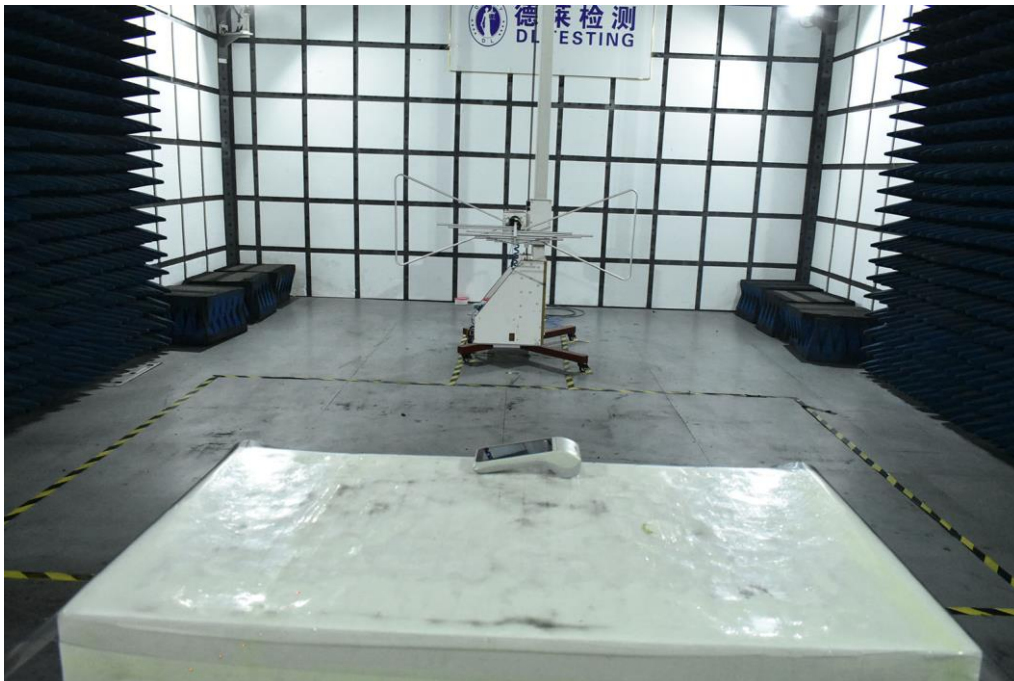
10.2 EUT ANTENNA

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







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