

TEST REPORT

Applicant : Guangzhou Guangxi Technology Co., Ltd.
Address : Room C0440, 8th Floor, No. 88, Tangjing Road, Baiyun District,
Guangzhou, China
Manufacturer : Sofar (Shanghai) Intelligent Technology Co., Ltd.
Address : No. 101-201, No. 263, Lane 255, South Zhuan Road, Xinq Town,
Songjiang District, Shanghai City
Product Name : Permanent Magnet Variable Speed Booster Pump
Model Number : V3-45 PRO
Trademark : MIXBUBOLE
FCC ID : 2BUKG-V3-45PRO
Test Date : Apr. 09, 2026 – May 06, 2026
Date of Report : May 06, 2026
Test Result : This device described above has been tested by BKC, and the test results show that the equipment under test (EUT) is in compliance with the Standard requirements. And it is applicable only to the tested sample identified in the report.

Test Procedure Used:

Standards : FCC CFR Title 47 Part 15 Subpart C Section 15.247
ANSI C63.10-2020+Cor.1-2023

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Reviewer(Supervisor):
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Approved(Manager):
Abel Yu



TABLE OF CONTENT

1. General Information	5
1.1. Description of Device (EUT)	5
1.2. Channel List	5
1.3. Test configuration	5
1.4. Summary of test result	6
1.5. Special Accessories and Auxiliary Equipment	6
1.6. Test mode	6
1.7. Block Diagram	7
1.8. Test Conditions	7
1.9. Measurement Uncertainty (95% confidence levels, k=2)	7
1.10. Test Facility	8
1.11. Test Equipment	8
2. Conducted emission at the mains terminals test	10
2.1. Limit	10
2.2. Test Setup	10
2.3. Test Procedure	10
2.4. Test Result	11
3. Radiated Spurious Emissions	13
3.1. Limit	13
3.2. Test Setup	14
3.3. Test Procedure	16
3.4. Test Result	17
4. Duty cycle	24
4.1. Limit	24
4.2. Test Setup	24
4.3. Test Procedure	24
4.4. Test Result	24
5. Conducted Spurious Emissions	25
5.1. Limit	25
5.2. Test Setup	25
5.3. Test Procedure	25
5.4. Test Result	25
6. Band Edge Measurement	26
6.1. Limit	26
6.2. Test setup	26
6.3. Test Procedure	26
6.4. Test Result	26
7. -6 dB Bandwidth and 99% Bandwidth Measurement	27
7.1. Limit	27
7.2. Test Setup	27
7.3. Test Procedure	27
7.4. Test Result	27
8. Maximum Output Power	28
8.1. Limit	28
8.2. Test Setup	28
8.3. Test Procedure	28
8.4. Test Result	28
9. Power Spectral density	29
9.1. Limit	29
9.2. Test Setup	29
9.3. Test Procedure	29

9.4. Test Result	29
10. Antenna Requirement	30
11. TEST SETUP & EUT PHOTOGRAPH	31

Revision History of This Test Report

[illegible]

1. General Information

1.1. Description of Device (EUT)

EUT Name	:	Permanent Magnet Variable Speed Booster Pump
Model No.	:	V3-45 PRO
Model Difference	:	N/A
Power supply	:	AC 120V60Hz
Operation frequency	:	2412-2462MHz for 802.11b/g/n20; 2422-2452MHz for 802.11n40;
Modulation	:	802.11b (DSSS): DBPSK, DQPSK, CCK; 802.11g (OFDM): BPSK, QPSK, QAM16, QAM64; 802.11n (OFDM): BPSK, QPSK, QAM16, QAM64
Antenna Type	:	PCB antenna, Maximum Gain is 3.96dBi
Intend use environment	:	Residential, commercial and light industrial environment

1.2. Channel List

Frequency and Channel list for 802.11 b/g/n (HT20):

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	2412	2	2417	3	2422	4	2427
5	2432	6	2437	7	2442	8	2447
9	2452	10	2457	11	2462		

Test Frequency and Channel for 802.11 b/g/n (HT20):

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	2412	6	2437	11	2462

1.3. Test configuration

Transmitting mode	Keep the EUT in continuously transmitting mode.
Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.	
Test Software	Engineer Mode
Power level setup	19.5 dBm

1.4.Summary of test result

RF PART		
Test Items	Test Requirement	Result
Antenna requirement	FCC part 15.203/15.247 (b)	PASS
Duty cycle	ANSI C63.10-2020+Cor 1+2023	PASS
AC Power Line Conducted Emission	FCC part 15.207	PASS
Conducted Peak Output Power	FCC part 15.247 (b)(3)	PASS
Channel Bandwidth& 99% OCB	FCC part 15.247 (a)(2)	PASS
Power Spectral Density	FCC part 15.247 (e)	PASS
Band Edge	FCC part 15.247(d)	PASS
Spurious Emission	FCC part 15.205/15.209	PASS
Remark: N/A is an abbreviation for Not Applicable. Measurement Uncertainty is not taken into account for conformity statement		

1.5.Special Accessories and Auxiliary Equipment

Description	Manufacturer	Model No.	Hardware Version	Software Version
/	/	/	/	/

1.6.Test mode

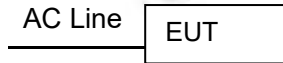
The special RF test software was used to control EUT work in Continuous WIFI TX mode, and select test channel, wireless mode.

Test mode	Low channel	Middle channel	High channel
802.11b	2412MHz	2437MHz	2462MHz
802.11g	2412MHz	2437MHz	2462MHz
802.11n20	2412MHz	2437MHz	2462MHz

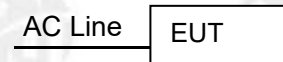
Note: Only the worst Data 1Mbps/6Mbps/6.5Mbps Record in the report

1.7.Block Diagram

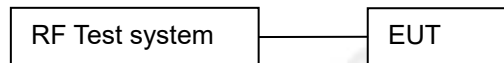
Radiated Emission



AC Power Line Conducted Emission



RF Test



1.8.Test Conditions

Category	Normal Conditions	Extreme Conditions
Temperature range	15-35°C	N/A
Humidity range	20-75%	N/A
Pressure range	86-106kPa	N/A
Power supply	AC 120V60Hz	N/A

Note: N/A is an abbreviation for Not Applicable.

1.9.Measurement Uncertainty (95% confidence levels, k=2)

Item	MU	Remark
Uncertainty for radio frequency	$\pm 7 \times 10^{-8}$	
Conducted Emissions (150kHz~30MHz)	$\pm 3.64\text{dB}$	
Radiated Emission(9KHz~30MHz)	$\pm 4.51\text{dB}$	
Radiated Emission(30MHz~1GHz)	$\pm 5.03\text{dB}$	
Radiated Emission(1GHz~6GHz)	$\pm 3.92\text{dB}$	
Radiated Emission(6GHz~18GHz)	$\pm 4.33\text{dB}$	
Radiated Emission(18GHz~40GHz)	$\pm 3.38\text{dB}$	
Uncertainty for conducted RF Power	$\pm 0.20\text{dB}$	
Conducted spurious emissions	$\pm 0.24\text{dB}$	
Uncertainty for temperature	0.6°C	
Uncertainty for humidity	1%	
Bandwidth	$\pm 1.5 \times 10^{-6}$	
Time	$\pm 2\%$	
Duty Cycle	$\pm 2\%$	

Remark: The coverage Factor (k=2), and measurement Uncertainty for a level of Confidence of 95%

1.10.Test Facility

Site Description		
Name of Firm	:	Shenzhen NTT Testing Technology Co.,Ltd.
Site Location	:	1B, Building 2, Factory Building & 103, Building 3, Factory Building, Dayang Industrial Park, No.4, Industrial Avenue, Tangwei Community, Fuhai Sub-district, Bao 'an District, Shenzhen City, Guangdong, China
FCC Designation Number	:	CN3446
FCC Test Firm Registration Number	:	129414

1.11.Test Equipment

Conducted Test Site

Name	Model No.	Serial No.	Manufacturer	Date of Cal.	Due Date
944 Shielded Room	HSRCE944	/	HTEC	2025/4/30	2028/4/29
EMI Test Receiver	ESPI	/	RS	2025/9/8	2026/9/7
LISN	NNLK 8129	00603	Schwarzbeck	2025/9/8	2026/9/7
LISN	NNHV 8123-400	00694	Schwarzbeck	2025/9/8	2026/9/7
LISN	NNHV 8123-400	00680	Schwarzbeck	2025/9/8	2026/9/7
Cable	RG223-1500MM	NA	RG	2025/9/8	2026/9/7

Radiated Test Site(Below 1G and Above 1G)&RF Test Site

Name	Model No.	Serial No.	Manufacturer	Date of Cal.	Due Date
966 Shielded Room	966 Room	/	EMToni	2025/7/24	2028/7/23
EMI Test Receiver	ESCI	101018	RS	2025/9/8	2026/9/7
Amplifi (30MHz-1GHz)	BBV 9718D	00042	SCHWARZBECK	2025/9/8	2026/9/7
Bilog Antenna (30MHz-1GHz)	VULB9168	1858	SCHWARZBECK	2025/9/9	2026/9/8
Horn antenna (1GHz-18GHz)	BBHA 9120 D	02622	SCHWARZBECK	2025/9/9	2026/9/8
Pream plifier (1GHz-18GHz)	BBV 9718D	0024	SCHWARZBECK	2025/9/8	2026/9/7
Spectrum Analyze (10Hz-40GHz)	FSV 40	100952	Rohde & Schwarz	2025/9/8	2026/9/7
Pream plifier (18GHz-40GHz)	BBV 9721	0056	SCHWARZBECK	2025/9/8	2026/9/7

Double Ridge Guide Horn Antenna (18GHz-40GHz)	SAS-574	588	A.H.System	2025/9/8	2026/9/7
Loop Antenna (9KHz-30MHz)	FMZB1519B	014	SCHWARZBECK	2025/9/8	2026/9/7
Amplifier (9KHz-30MHz)	CVP 9222 C	00109	SCHWARZBECK	2025/9/8	2026/9/7
MXG Signal Analyzer	N9020A	MY50510202	Agilent	2025/9/8	2026/9/7
MXG Vector Signal Generator	N5182A	MY50140020	Agilent	2025/9/8	2026/9/7
MXG Analog Signal Generator	N5181A	MY47420919	Agilent	2025/9/8	2026/9/7
Power Sensor	TR1029-2	512364	Techoy	2025/9/8	2026/9/7
RF Swith	TR1029-1	512364	Techoy	2025/9/8	2026/9/7
Cable	DA800-4000MM	NA	DA	2025/9/8	2026/9/7
Cable	DA800-11000MM	NA	DA	2025/9/8	2026/9/7

Test software

Item	Name	Manufacturer	Model	Software version
1	EMC Conduction Test System	FALA	EZ-EMC	Ver.EMC-CON 3A1.1+
2	EMC radiation test system	FALA	EZ-EMC	Ver.FA-03A2 RE+
3	RF test system	TACHOY	RFTest	V1.0.0
4	RF communication test system	TACHOY	RFTest	V1.0.0

2. Conducted emission at the mains terminals test

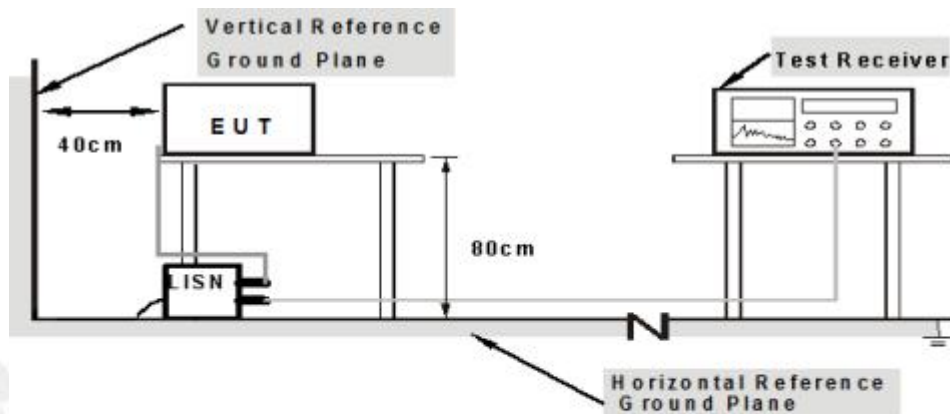
2.1.Limit

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10-2020+Cor.1-2023
Test Frequency Range:	150KHz to 30MHz
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto

Frequency MHz	Limits dB(μV)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66 ~ 56*	56 ~ 46*
0.50 ~ 5.00	56	46
5.00 ~ 30.00	60	50

Notes: 1. *Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

2.2.Test Setup



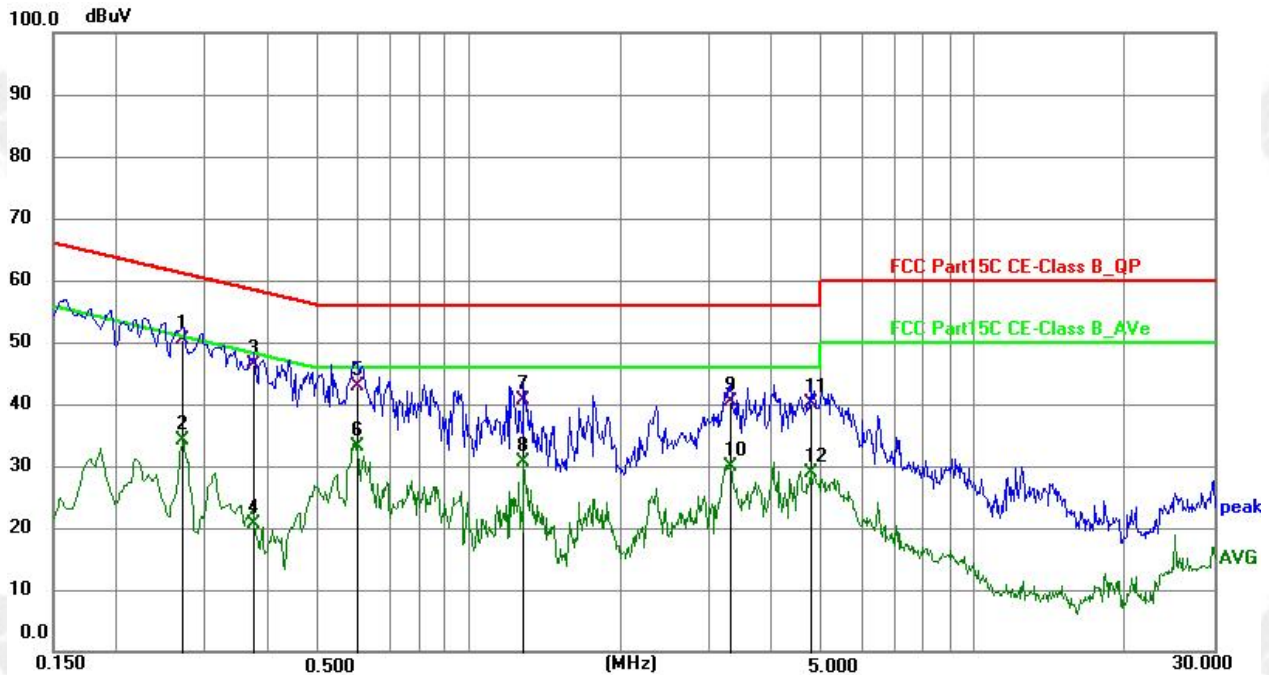
Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

2.3.Test Procedure

1. 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.
2. 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.
3. 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.
4. LISN at least 80 cm from nearest part of EUT chassis.
- 5.For the actual test configuration, please refer to the related Item - EUT Test Photos.

2.4.Test Result

Conducted Emission At The Mains Terminals Test Data			
Temperature:	26°C	Relative Humidity:	54%
Pressure:	1008hPa	Phase :	Line
Test Voltage :	AC 120V60Hz	Test Mode:	802.11b(2412.00MHz)



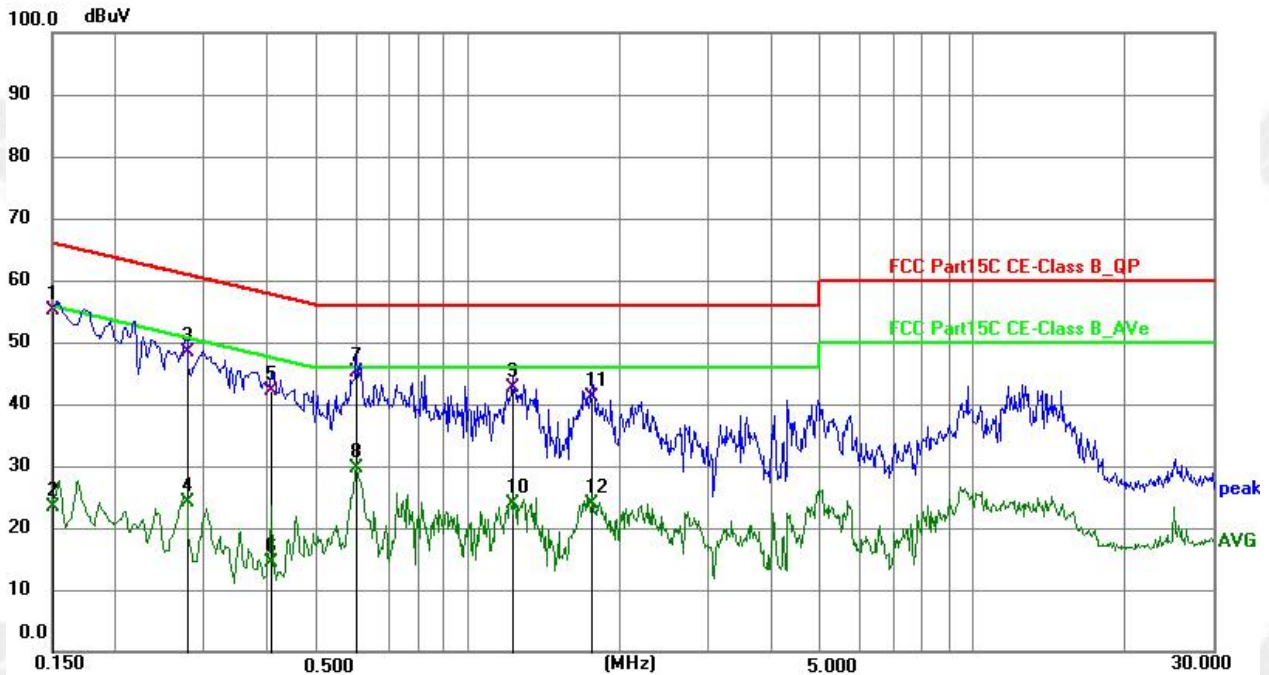
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1 *	0.2714	40.37	10.13	50.50	61.07	-10.57	QP	P
2	0.2714	23.99	10.13	34.12	51.07	-16.95	AVG	P
3	0.3750	36.32	10.12	46.44	58.39	-11.95	QP	P
4	0.3750	10.50	10.12	20.62	48.39	-27.77	AVG	P
5	0.6000	32.73	10.12	42.85	56.00	-13.15	QP	P
6	0.6000	22.94	10.12	33.06	46.00	-12.94	AVG	P
7	1.2882	30.48	10.13	40.61	56.00	-15.39	QP	P
8	1.2882	20.44	10.13	30.57	46.00	-15.43	AVG	P
9	3.2955	30.30	10.19	40.49	56.00	-15.51	QP	P
10	3.2955	19.61	10.19	29.80	46.00	-16.20	AVG	P
11	4.7670	29.95	10.24	40.19	56.00	-15.81	QP	P
12	4.7670	18.67	10.24	28.91	46.00	-17.09	AVG	P

Note:

1. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
2. Margin = Reading level + Correct Factor - Limit
3. All the modes have tested and recorded the worst mode(802.11b) in the report

Conducted Emission At The Mains Terminals Test Data

Temperature:	25.1°C	Relative Humidity:	56%
Pressure:	1008hPa	Phase :	Neutral
Test Voltage :	AC 120V60Hz	Test Mode:	802.11b(2412.00MHz)



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1 *	0.1500	45.04	10.19	55.23	66.00	-10.77	QP	P
2	0.1500	13.14	10.19	23.33	56.00	-32.67	AVG	P
3	0.2760	38.36	10.13	48.49	60.94	-12.45	QP	P
4	0.2760	14.11	10.13	24.24	50.94	-26.70	AVG	P
5	0.4063	32.01	10.12	42.13	57.72	-15.59	QP	P
6	0.4063	4.33	10.12	14.45	47.72	-33.27	AVG	P
7	0.6000	35.10	10.12	45.22	56.00	-10.78	QP	P
8	0.6000	19.44	10.12	29.56	46.00	-16.44	AVG	P
9	1.2255	32.40	10.13	42.53	56.00	-13.47	QP	P
10	1.2255	13.73	10.13	23.86	46.00	-22.14	AVG	P
11	1.7610	30.97	10.15	41.12	56.00	-14.88	QP	P
12	1.7610	13.82	10.15	23.97	46.00	-22.03	AVG	P

Note:

1. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
2. Margin = Reading level + Correct Factor - Limit
3. All the modes have tested and recorded the worst mode(802.11b) in the report

3. Radiated Spurious Emissions

3.1.Limit

Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.247
 Test Method: KDB 558074 D01 15.247 Meas Guidance v05 August 24, 2018;
 ANSI C63.10-2020+Cor.1-2023
 Test Result: PASS
 Measurement Distance: 3m

Frequency	Detector	RBW	VBW	Value
9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

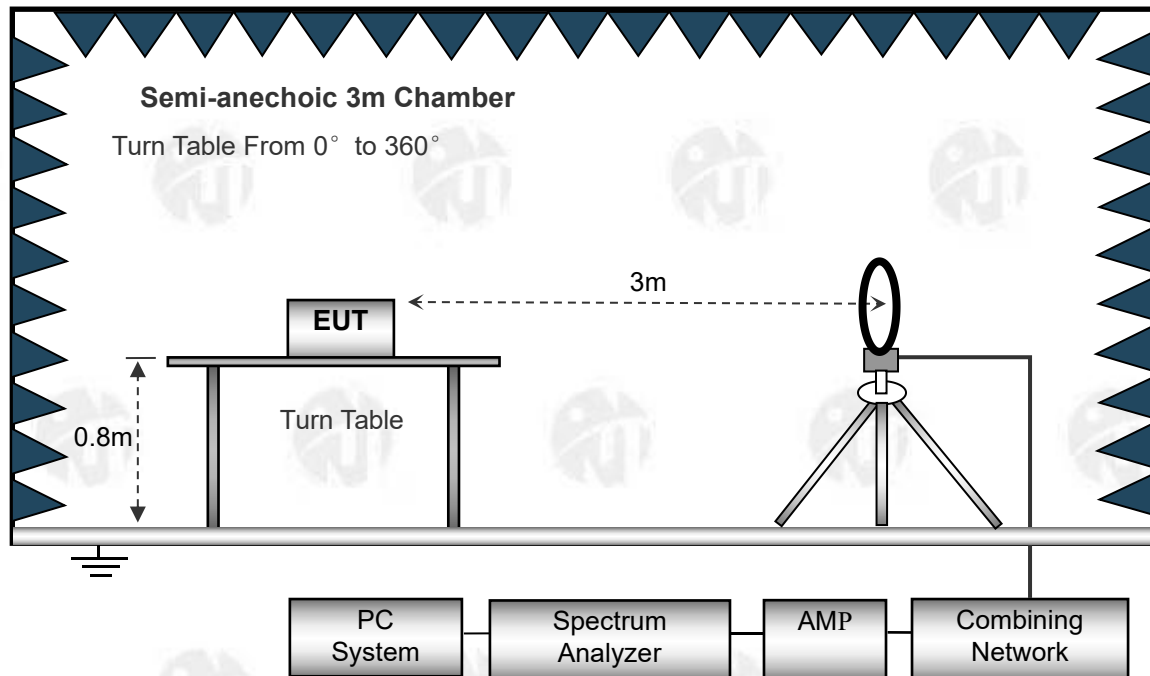
Limit:

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	$10000 * 2400/F(kHz)$	$20\log(2400/F(kHz)) + 80$
0.490 ~ 1.705	24000/F(kHz)	30	$100 * 24000/F(kHz)$	$20\log(24000/F(kHz)) + 40$
1.705 ~ 30	30	30	$100 * 30$	$20\log(30) + 40$
30 ~ 88	100	3	100	$20\log(100)$
88 ~ 216	150	3	150	$20\log(150)$
216 ~ 960	200	3	200	$20\log(200)$
Above 960	500	3	500	$20\log(500)$

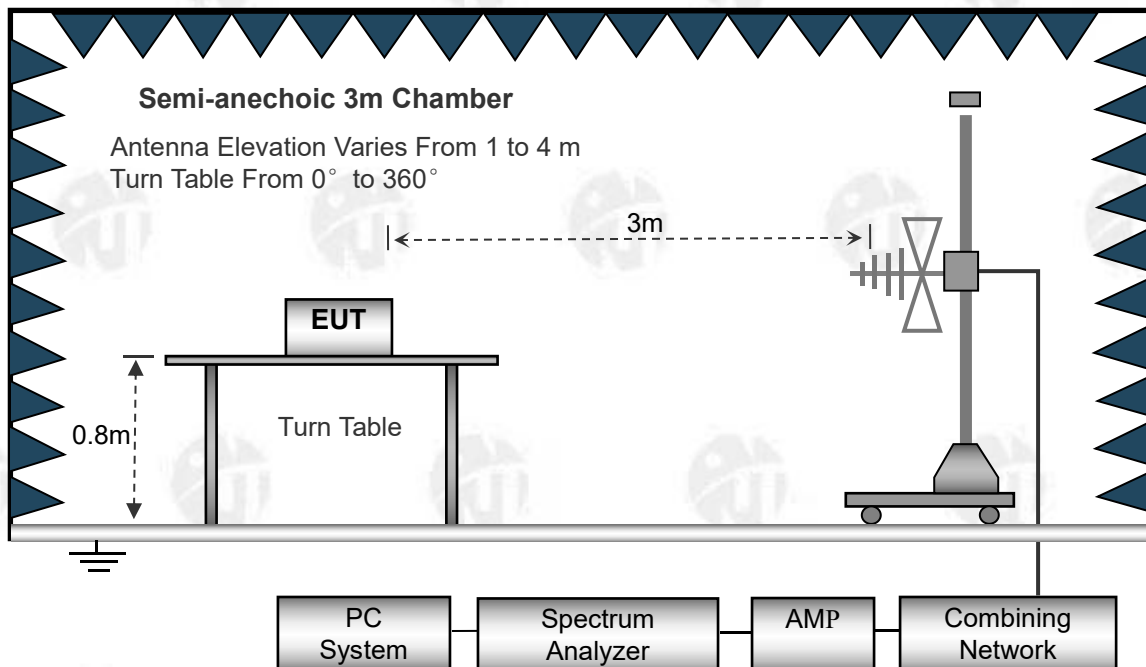
3.2.Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.10.

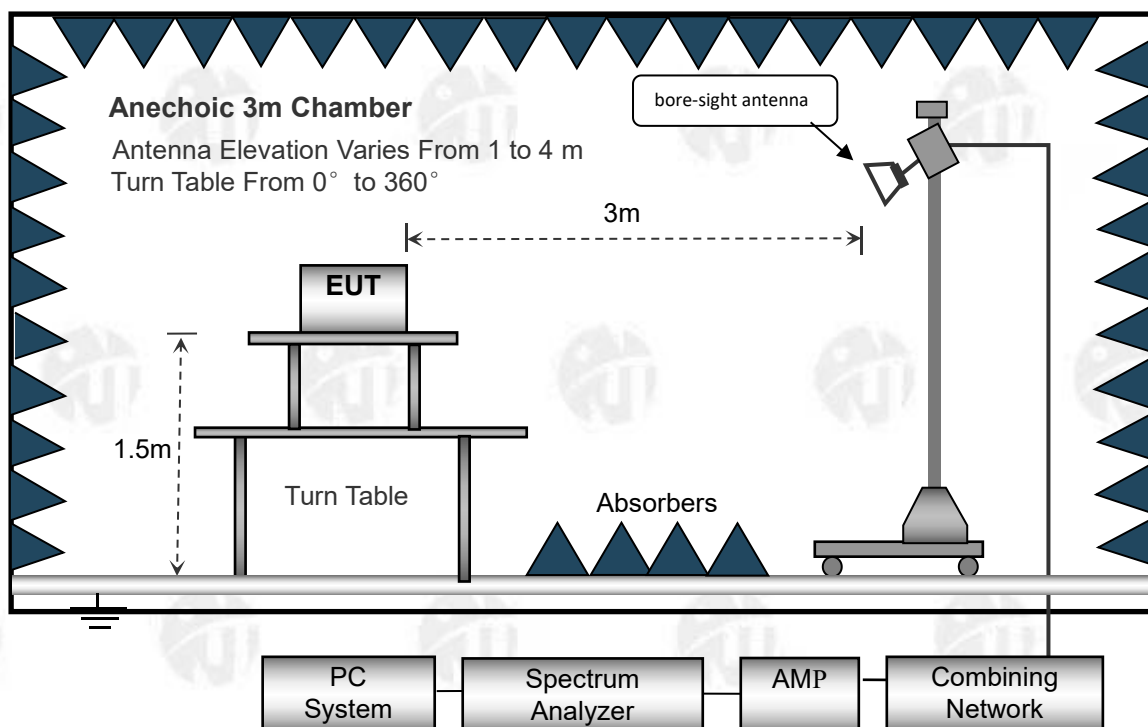
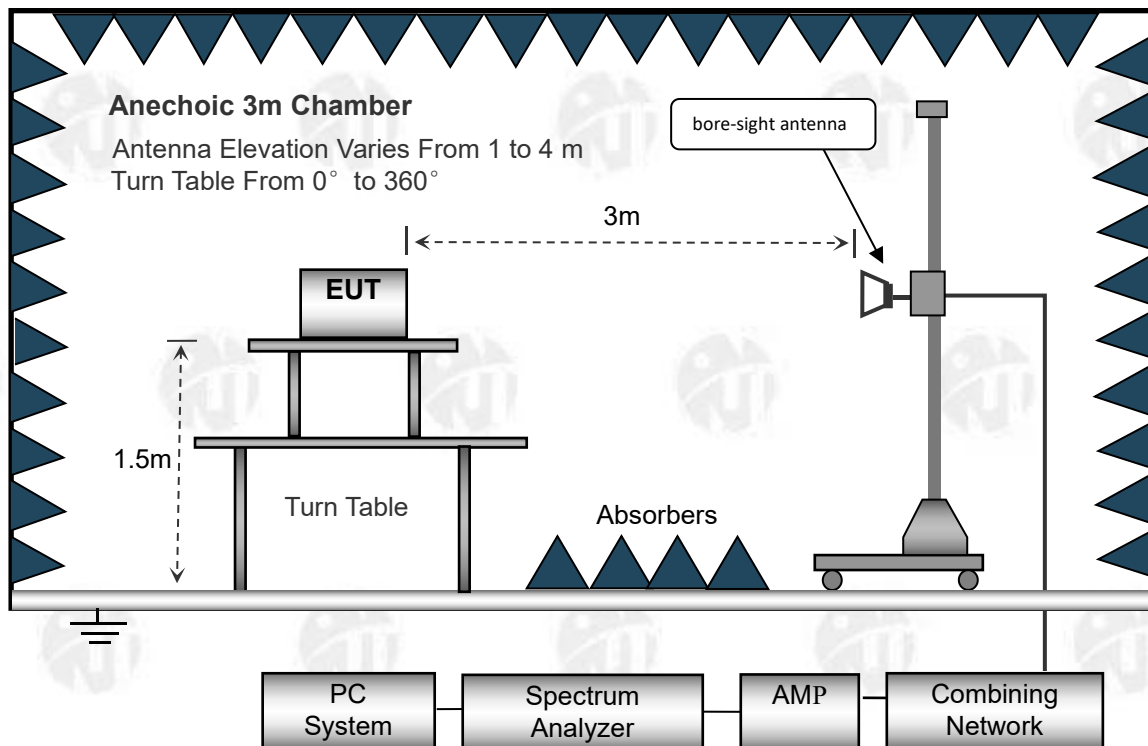
The test setup for emission measurement below 30MHz.



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



The test setup for emission measurement above 1 GHz.



3.3.Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane for below 1GHz and 1.5m for above 1GHz.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are performed in X,Y and Z axis positioning(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand),the worst condition was tested putting the eut in Z axis,so the worst data were shown as follow.
8. A 2.4GHz high - pass filter is used during radiated emissions above 1GHz measurement.

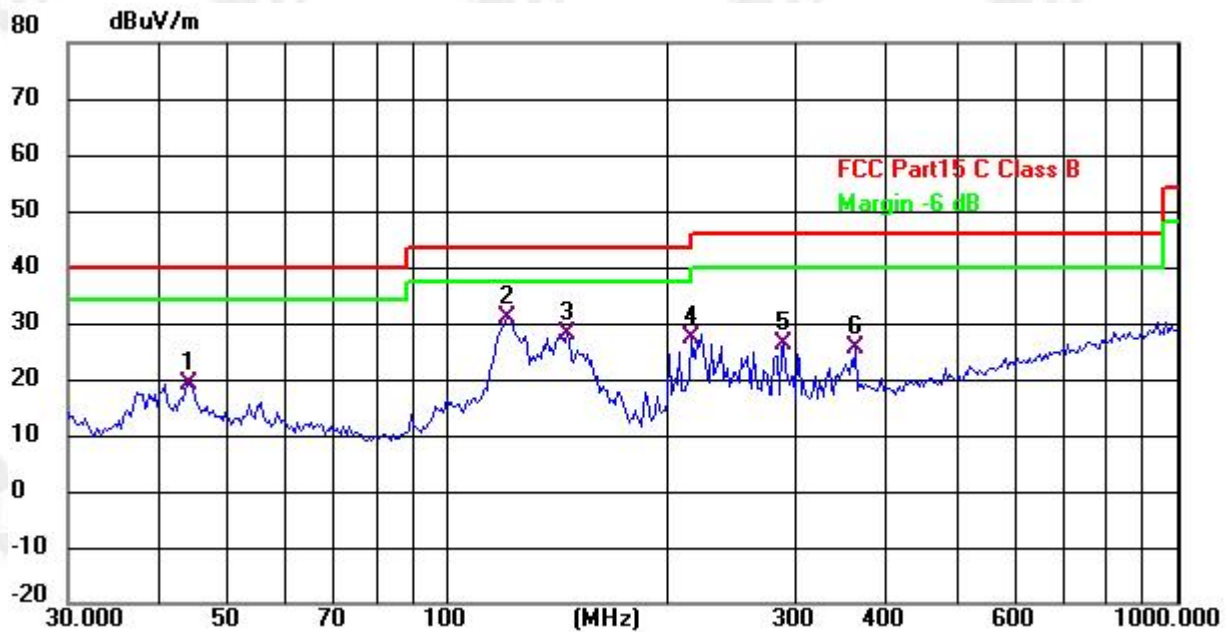
3.4.Test Result

Test Frequency: 9KHz~30MHz

The measurements were more than 20 dB below the limit and not reported.

Test Frequency : 30MHz ~ 1GHz

Radiation Emission Test Data			
Temperature:	26°C	Relative Humidity:	54%
Pressure:	1008hPa	Phase :	Horizontal
Test Voltage :	AC 120V60Hz	Test Mode :	802.11b(2412.00MHz)



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	44.1202	32.42	-13.28	19.14	40.00	-20.86	QP
2 *	120.2766	44.78	-13.89	30.89	43.50	-12.61	QP
3	145.3505	40.79	-12.67	28.12	43.50	-15.38	QP
4	215.2678	42.32	-15.17	27.15	43.50	-16.35	QP
5	289.0020	39.00	-12.68	26.32	46.00	-19.68	QP
6	361.7138	36.49	-10.87	25.62	46.00	-20.38	QP

Note:

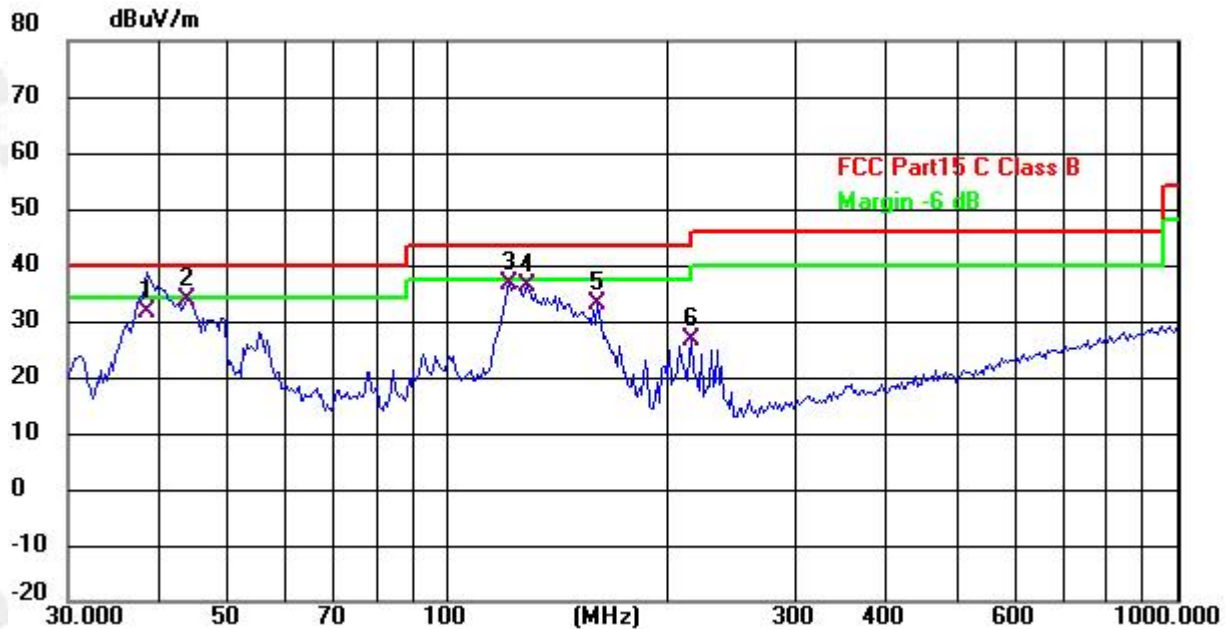
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Emission Level = Reading + Factor

Margin=Emission Level-Limit

2. All the modes have tested and recorded the worst mode(802.11b) in the report

Radiation Emission Test Data			
Temperature:	26°C	Relative Humidity:	54%
Pressure:	1008hPa	Phase :	Vertical
Test Voltage :	AC 120V60Hz	Test Mode :	802.11b(2412.00MHz)



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	38.6160	44.97	-13.37	31.60	40.00	-8.40	QP
2 *	43.8120	46.97	-13.27	33.70	40.00	-6.30	QP
3	121.1230	50.43	-13.84	36.59	43.50	-6.91	QP
4	128.1130	49.81	-13.51	36.30	43.50	-7.20	QP
5	160.3455	45.12	-11.95	33.17	43.50	-10.33	QP
6	215.2677	41.92	-15.17	26.75	43.50	-16.75	QP

Note:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Emission Level = Reading + Factor

Margin=Emission Level-Limit

2. All the modes have tested and recorded the worst mode(802.11b) in the report

Test Frequency 1GHz-25GHz

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-ampli fier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Low Channel:2412MHz									
V	4804.00	46.92	34.12	5.03	32.39	50.22	74.00	-23.78	Pk
V	4804.00	34.30	34.12	5.03	32.39	37.60	54.00	-16.40	AV
V	7206.00	45.32	32.54	6.29	35.86	54.93	74.00	-19.07	Pk
V	7206.00	28.79	32.54	6.29	35.86	38.40	54.00	-15.60	AV
V	9608.00	37.47	32.98	7.55	38.40	50.44	74.00	-23.56	Pk
V	9608.00	26.45	32.98	7.55	38.40	39.42	54.00	-14.58	AV
V	12010.00	33.30	32.09	8.93	39.00	49.14	74.00	-24.86	Pk
V	12010.00	23.49	32.09	8.93	39.00	39.33	54.00	-14.67	AV
H	4804.00	47.64	34.12	5.03	32.39	50.94	74.00	-23.06	Pk
H	4804.00	33.93	34.12	5.03	32.39	37.23	54.00	-16.77	AV
H	7206.00	38.69	32.54	6.29	35.86	48.30	74.00	-25.70	Pk
H	7206.00	26.14	32.54	6.29	35.86	35.75	54.00	-18.25	AV
H	9608.00	35.70	32.98	7.55	38.40	48.67	74.00	-25.33	Pk
H	9608.00	24.83	32.98	7.55	38.40	37.80	54.00	-16.20	AV
H	12010.00	34.00	32.09	8.93	39.00	49.84	74.00	-24.16	Pk
H	12010.00	25.34	32.09	8.93	39.00	41.18	54.00	-12.82	AV

Polar (H/V)	Frequency	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Middle Channel:2437MHz									
V	4882.00	50.31	34.07	5.09	32.59	53.92	74.00	-20.08	Pk
V	4882.00	39.79	34.07	5.09	32.59	43.40	54.00	-10.60	AV
V	7323.00	41.90	32.63	6.34	35.96	51.57	74.00	-22.43	Pk
V	7323.00	32.62	32.63	6.34	35.96	42.29	54.00	-11.71	AV
V	9764.00	39.47	32.92	7.59	38.40	52.54	74.00	-21.46	Pk
V	9764.00	31.36	32.92	7.59	38.40	44.43	54.00	-9.57	AV
V	12205.00	40.12	31.96	8.88	39.04	56.08	74.00	-17.92	Pk
V	12205.00	28.13	31.96	8.88	39.04	44.09	54.00	-9.91	AV
H	4882.00	47.85	34.07	5.09	32.59	51.46	74.00	-22.54	Pk
H	4882.00	31.77	34.07	5.09	32.59	35.38	54.00	-18.62	AV
H	7323.00	43.64	32.63	6.34	35.96	53.31	74.00	-20.69	Pk
H	7323.00	34.22	32.63	6.34	35.96	43.89	54.00	-10.11	AV
H	9764.00	44.51	32.92	7.59	38.40	57.58	74.00	-16.42	Pk
H	9764.00	28.83	32.92	7.59	38.40	41.90	54.00	-12.10	AV
H	12205.00	37.16	31.96	8.88	39.04	53.12	74.00	-20.88	Pk
H	12205.00	23.53	31.96	8.88	39.04	39.49	54.00	-14.51	AV

Polar (H/V)	Frequency	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
High Channel:2462MHz									
V	4960.00	48.40	34.02	5.15	32.80	52.33	74.00	-21.67	Pk
V	4960.00	35.56	34.02	5.15	32.80	39.49	54.00	-14.51	AV
V	7440.00	39.14	32.71	6.40	36.05	48.88	74.00	-25.12	Pk
V	7440.00	28.65	32.71	6.40	36.05	38.39	54.00	-15.61	AV
V	9920.00	40.87	32.86	7.62	38.40	54.03	74.00	-19.97	Pk
V	9920.00	27.94	32.86	7.62	38.40	41.10	54.00	-12.90	AV
V	12400.00	38.12	31.82	8.84	39.08	54.22	74.00	-19.78	Pk
V	12400.00	25.44	31.82	8.84	39.08	41.54	54.00	-12.46	AV
H	4960.00	47.44	34.02	5.15	32.80	51.37	74.00	-22.63	Pk
H	4960.00	35.47	34.02	5.15	32.80	39.40	54.00	-14.60	AV
H	7440.00	42.23	32.71	6.40	36.05	51.97	74.00	-22.03	Pk
H	7440.00	31.27	32.71	6.40	36.05	41.01	54.00	-12.99	AV
H	9920.00	40.23	32.86	7.62	38.40	53.39	74.00	-20.61	Pk
H	9920.00	26.58	32.86	7.62	38.40	39.74	54.00	-14.26	AV
H	12400.00	37.45	31.82	8.84	39.08	53.55	74.00	-20.45	Pk
H	12400.00	28.06	31.82	8.84	39.08	44.16	54.00	-9.84	AV

- Note: 1. The testing has been conformed to 10*2480MHz=24800MHz.
 2. All other emissions more than 30dB below the limit.
 3. Factor = Antenna Factor + Cable Loss – Pre-amplifier.
 Emission Level = Reading + Factor
 Margin=Emission Level-Limit
 4. All the modes have tested and recorded the worst mode(802.11b) in the report

Radiated Band Emission Measurement:

	Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre- amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
802.11b	Low Channel: 2412MHz									
	H	2390	58.23	35.17	3.48	27.49	54.03	74.00	-19.97	PK
	H	2390	49.58	35.17	3.48	27.49	45.38	54.00	-8.62	AV
	H	2400	59.69	35.16	3.49	27.52	55.54	74.00	-18.46	PK
	H	2400	49.85	35.16	3.49	27.52	45.70	54.00	-8.30	AV
	V	2390	57.83	35.17	3.48	27.49	53.63	74.00	-20.37	PK
	V	2390	49.92	35.17	3.48	27.49	45.72	54.00	-8.28	AV
	V	2400	59.29	35.16	3.49	27.52	55.14	74.00	-18.86	PK
	V	2400	49.41	35.16	3.49	27.52	45.26	54.00	-8.74	AV
	High Channel: 2462MHz									
	H	2483.5	57.27	35.11	3.56	27.75	53.47	74.00	-20.53	PK
	H	2483.5	48.60	35.11	3.56	27.75	44.80	54.00	-9.20	AV
	H	2500	59.04	35.10	3.57	27.80	55.31	74.00	-18.69	PK
	H	2500	49.97	35.10	3.57	27.80	46.24	54.00	-7.76	AV
	V	2483.5	58.72	35.11	3.56	27.75	54.92	74.00	-19.08	PK
	V	2483.5	49.84	35.11	3.56	27.75	46.04	54.00	-7.96	AV
	V	2500	58.38	35.10	3.57	27.80	54.65	74.00	-19.35	PK
	V	2500	49.68	35.10	3.57	27.80	45.95	54.00	-8.05	AV
802.11g	Low Channel: 2412MHz									
	H	2390	57.51	35.17	3.48	27.49	53.45	74.00	-20.55	PK
	H	2390	49.82	35.17	3.48	27.49	45.62	54.00	-8.38	AV
	H	2400	58.75	35.16	3.49	27.52	54.60	74.00	-19.40	PK
	H	2400	49.49	35.16	3.49	27.52	45.34	54.00	-8.66	AV
	V	2390	57.01	35.17	3.48	27.49	52.81	74.00	-21.19	PK
	V	2390	48.59	35.17	3.48	27.49	44.39	54.00	-9.61	AV
	V	2400	58.85	35.16	3.49	27.52	54.70	74.00	-19.30	PK
	V	2400	48.69	35.16	3.49	27.52	44.54	54.00	-9.46	AV
	High Channel: 2462MHz									
	H	2483.5	57.37	35.11	3.56	27.75	53.57	74.00	-20.43	PK
	H	2483.5	48.46	35.11	3.56	27.75	44.66	54.00	-9.34	AV
	H	2500	58.96	35.10	3.57	27.80	55.23	74.00	-18.77	PK
	H	2500	49.04	35.10	3.57	27.80	45.31	54.00	-8.69	AV
	V	2483.5	57.29	35.11	3.56	27.75	53.49	74.00	-20.51	PK
	V	2483.5	49.71	35.11	3.56	27.75	45.91	54.00	-8.09	AV
	V	2500	58.13	35.10	3.57	27.80	54.40	74.00	-19.60	PK
	V	2500	48.91	35.10	3.57	27.80	45.18	54.00	-8.82	AV
802.11 n20	Low Channel: 2412MHz									
	H	2390	57.52	35.17	3.48	27.49	53.32	74.00	-20.68	PK
	H	2390	49.54	35.17	3.48	27.49	45.34	54.00	-8.66	AV
	H	2400	60.68	35.16	3.49	27.52	56.53	74.00	-17.47	PK
	H	2400	49.39	35.16	3.49	27.52	45.24	54.00	-8.76	AV
	V	2390	57.64	35.17	3.48	27.49	53.44	74.00	-20.56	PK
	V	2390	50.04	35.17	3.48	27.49	45.84	54.00	-8.16	AV
	V	2400	59.46	35.16	3.49	27.52	55.31	74.00	-18.69	PK
	V	2400	49.81	35.16	3.49	27.52	45.66	54.00	-8.34	AV
	High Channel: 2462MHz									
	H	2483.5	57.71	35.11	3.56	27.75	53.91	74.00	-20.09	PK
	H	2483.5	49.00	35.11	3.56	27.75	45.20	54.00	-8.80	AV
	H	2500	59.44	35.10	3.57	27.80	55.71	74.00	-18.29	PK

	H	2500	49.80	35.10	3.57	27.80	46.07	54.00	-7.93	AV
	V	2483.5	58.19	35.11	3.56	27.75	54.39	74.00	-19.61	PK
	V	2483.5	49.86	35.11	3.56	27.75	46.06	54.00	-7.94	AV
	V	2500	58.49	35.10	3.57	27.80	54.76	74.00	-19.24	PK
	V	2500	50.35	35.10	3.57	27.80	46.62	54.00	-7.38	AV
802.11 n40	Low Channel: 2422MHz									
	H	2390	58.44	35.17	3.48	27.49	54.24	74.00	-19.76	PK
	H	2390	50.12	35.17	3.48	27.49	45.92	54.00	-8.08	AV
	H	2400	59.80	35.16	3.49	27.52	55.65	74.00	-18.35	PK
	H	2400	49.79	35.16	3.49	27.52	45.64	54.00	-8.36	AV
	V	2390	57.71	35.17	3.48	27.49	53.51	74.00	-20.49	PK
	V	2390	49.88	35.17	3.48	27.49	45.68	54.00	-8.32	AV
	V	2400	59.29	35.16	3.49	27.52	55.14	74.00	-18.86	PK
	V	2400	49.88	35.16	3.49	27.52	45.73	54.00	-8.27	AV
	High Channel: 2452MHz									
	H	2483.5	57.62	35.11	3.56	27.75	53.82	74.00	-20.18	PK
	H	2483.5	48.44	35.11	3.56	27.75	44.64	54.00	-9.36	AV
	H	2500	59.63	35.10	3.57	27.80	55.90	74.00	-18.10	PK
	H	2500	49.64	35.10	3.57	27.80	45.91	54.00	-8.09	AV
	V	2483.5	58.11	35.11	3.56	27.75	54.31	74.00	-19.69	PK
	V	2483.5	50.36	35.11	3.56	27.75	46.56	54.00	-7.44	AV
	V	2500	59.14	35.10	3.57	27.80	55.41	74.00	-18.59	PK
	V	2500	49.70	35.10	3.57	27.80	45.97	54.00	-8.03	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.

4. Duty cycle

4.1.Limit

Test Requirement: FCC CFR47 Part 15 Section 15.247
Test Method: KDB 558074 D01 15.247 Meas Guidance v05 August 24, 2018;
ANSI C63.10-2020+Cor.1-2023
Test Result: PASS

4.2.Test Setup



4.3.Test Procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer:
 - a) Set the center frequency of the instrument to the center frequency of the transmission.
 - b) Set $RBW \geq OBW$ if possible; otherwise, set RBW to the largest available value.
 - c) Set $VBW \geq RBW$. Detector = peak or average.
 - d) Sweep time = auto couple.
 - e) Trace mode = max hold.
 - f) Allow trace to fully stabilize.

4.4.Test Result

Please see the attachment for data.

5. Conducted Spurious Emissions

5.1.Limit

Test Requirement: FCC CFR47 Part 15 Section 15.247
Test Method: KDB 558074 D01 15.247 Meas Guidance v05 August 24, 2018;
ANSI C63.10-2020+Cor.1-2023
Test Result: PASS

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

5.2.Test Setup



5.3.Test Procedure

- Set instrument center frequency to DTS channel center frequency.
 - Set the span to ≥ 1.5 times the DTS bandwidth.
 - Set the RBW = 100 kHz.
 - Set the VBW $\geq [3 \times \text{RBW}]$.
 - Detector = peak.
 - Sweep time = No faster than coupled (auto) time.
 - Trace mode = max-hold.
 - Allow trace to fully stabilize.
 - Use the peak marker function to determine the maximum PSD level.
- Note that the channel found to contain the maximum PSD level can be used to establish the reference level
Establish an emission level by using the following procedure:

- Set the center frequency and span to encompass frequency range to be measured. Note that the frequency range might need to be divided into multiple frequency ranges to retain frequency resolution.

NOTE—the number of points can also be increased for large spans to retain frequency resolution

- Set the RBW = 100 kHz.
- Set the VBW $\geq [3 \times \text{RBW}]$.
- Detector = peak.
- Sweep time = No faster than coupled (auto) time.
- Trace mode = max-hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level.

5.4.Test Result

Please see the attachment for data.

6. Band Edge Measurement

6.1.Limit

Test Requirement: FCC CFR47 Part 15 Section 15.247

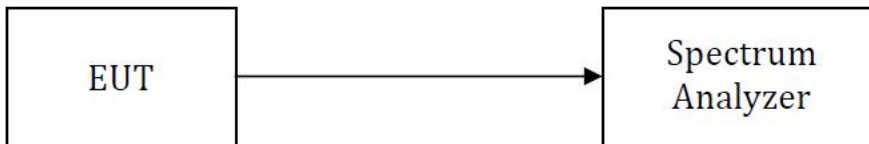
Test Method: KDB 558074 D01 15.247 Meas Guidance v05 August 24, 2018;

ANSI C63.10-2020+Cor.1-2023

Test Limit: Regulation 15.247 (d), In any 100 kHz bandwidth outside the frequency band which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Mode: Transmitting

6.2.Test setup



6.3.Test Procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer:
3. Establish a reference level by using the following procedure
 - a) Set instrument center frequency to DTS channel center frequency.
 - b) Set the span to ≈ 1.5 times the DTS bandwidth.
 - c) Set the RBW = 100 kHz.
 - d) Set the VBW $\approx [3 \times \text{RBW}]$.
 - e) Detector = peak.
 - f) Sweep time = No faster than coupled (auto) time.
 - g) Trace mode = max hold.
 - h) Allow trace to fully stabilize.
 - i) Use the peak marker function to determine the maximum PSD level.

Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

4. Establish an emission level by using the following procedure:

- a) Set the center frequency and span to encompass frequency range to be measured. Note that the frequency range might need to be divided into multiple frequency ranges to retain frequency resolution.

NOTE—the number of points can also be increased for large spans to retain frequency resolution

- b) Set the RBW = 100 kHz.
- c) Set the VBW $\geq [3 \times \text{RBW}]$.
- d) Detector = peak.
- e) Sweep time = No faster than coupled (auto) time.
- f) Trace mode = max-hold.
- g) Allow trace to fully stabilize.
- h) Use the peak marker function to determine the maximum amplitude level.

6.4.Test Result

Please see the attachment for data.

7. -6 dB Bandwidth and 99% Bandwidth Measurement

7.1.Limit

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB 558074 D01 15.247 Meas Guidance v05 August 24, 2018; ANSI C63.10-2020+Cor.1-2023

7.2.Test Setup



7.3.Test Procedure

DTS Bandwidth

- a) Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
- b) Set RBW = shall be in the range of 1% to 5% of the OBW but not less than 100 kHz.
- c) Set the VBW $\geq [3 \times \text{RBW}]$.
- d) Detector = peak.
- e) Trace mode = max-hold.
- f) Sweep = No faster than coupled (auto) time.
- g) Allow the trace to stabilize.

99% Bandwidth

- a) The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW.
- b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be at least three times the RBW, unless otherwise specified by the applicable requirement
- c) Detector = peak.
- d) Trace mode = max-hold.
- e) Sweep = No faster than coupled (auto) time.
- f) Allow the trace to stabilize.

7.4.Test Result

Please see the attachment for data.

8. Maximum Output Power

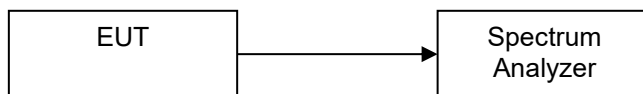
8.1.Limit

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB 558074 D01 15.247 Meas Guidance v05 August 24, 2018;ANSI C63.10-2020+Cor.1-2023

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)	Output Power	1 watt or 30dBm	2400-2483.5	PASS

8.2.Test Setup



8.3.Test Procedure

ANSI C63.10-2020 section 12.4

Method AVGSA-2 uses trace averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction. The procedure for this method is as follows:

- Measure the duty cycle D of the transmitter output signal as described in 11.6.
- Set span to >1.5 times the OBW.
- Set RBW = 1% to 5% of the OBW, but do not exceed 1 MHz.
- Set VBW $\geq [3 \times \text{RBW}]$.
- Number of points in sweep $\geq [2 \times \text{span} / \text{RBW}]$. (This gives bin-to-bin spacing $\leq \text{RBW} / 2$, so that narrowband signals are not lost between frequency bins.)
- Sweep time = auto.
- Detector = Power averaging (rms), if available. Otherwise, use the sample detector mode.
- Do not use sweep triggering. Allow the sweep to “free run.”
- Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 until trace is stabilized so that the average accurately represents the true average over the ON and OFF periods of the transmitter.
- Compute power by integrating the spectrum across the OBW of the signal using the instrument’ s band-power measurement function with band limits set equal to the OBW band-edges. If the instrument does not have a band-power function, then sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.
- Add $[10 \log (1 / D)]$, where D is the duty cycle, to the measured power to compute the average power during the actual transmission times (because the measurement represents an average over both the ON and OFF times of the transmission). For example, add $[10 \log (1/0.25)] = 6 \text{ dB}$ if the duty cycle is 25%.

8.4.Test Result

Please see the attachment for data.

9. Power Spectral density

9.1.Limit

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB 558074 D01 15.247 Meas Guidance v05 August 24, 2018; ANSI C63.10-2020+Cor.1-2023

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(e)	Power Spectral Density	8dBm/3kHz	2400-2483.5	PASS

9.2.Test Setup



9.3.Test Procedure

KDB 558074 D01 15.247 Meas Guidance v05r02;

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set instrument center frequency to DTS channel center frequency
3. Set span to > 1.5 times the OBW.
4. Set RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$
5. Set VBW $\geq [3 \times \text{RBW}]$
6. Detector = power averaging (rms) or sample detector (when rms not available).
7. Ensure that the number of measurement points in the sweep $\geq [2 \times \text{span} / \text{RBW}]$.
8. Sweep time = auto couple.
9. Employ trace averaging (rms) mode over a minimum of 100 traces.
10. Use the peak marker function to determine the maximum amplitude level.
11. If the measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat(note that this might require zooming in on the emission of interest and reducing the span to meet the minimum measurement point requirement as the RBW is reduced).
12. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section Submit this plot.

9.4.Test Result

Please see the attachment for data.

10. Antenna Requirement

According to the FCC Part 15 Paragraph 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. This product has an integrated antenna fulfill the requirement of this section.

This product has an PCB antenna, and the maximum antenna gain is 3.96dBi, fulfill the requirement of this section.

11. TEST SETUP & EUT PHOTOGRAPH

Please see the attachment for details.

----- End of Report -----