



TEST Report

Applicant: Guangdong Lingxiao Pump Industry Co., Ltd.

Address of Applicant: 117 CHUNJIANG RD YANGCHUN, Guangdong 529600 China

Manufacturer : Guangdong Lingxiao Pump Industry Co., Ltd.

Address of Manufacturer : 117 CHUNJIANG RD YANGCHUN, Guangdong 529600 China

Equipment Under Test (EUT)

Product Name: Variable Speed Swimming Pool Pump

Model No.: SFP220-VS

Series model: SHP130-VS, SWP390-VS, Relaax130-VS, SPH130-VS, ILG8PP130-VS, LU-VS130, VSP13-Pro; Relaax220-VS, SPH220-VS, ILG8PP220-VS, LU-VS220, VSP22-Pro; Relaax390-VS, SPH390-VS, ILG8PP-390-VS, LU-VS390, VSP39-Pro

Trade Mark: LX, LINGXIAO, Relaax, KEY LANDER

FCC ID: 2BQZL-SFP220-VS

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247

Date of sample receipt: Jul. 10, 2025

Date of Test: Jul. 10, 2025 ~ Jul. 21, 2025

Date of report issued: Jul. 21, 2025

Test Result : PASS *

* In the configuration tested, the EUT complied with the standards specified above.



Report No.: HTT202507513F01

1. Version

Version No.	Date	Description
00	Jul. 21, 2025	Original

Tested/ Prepared By Heber He Date: Jul. 21, 2025
Project Engineer

Check By: Bruce Zhu Date: Jul. 21, 2025
Reviewer

Approved By : Kevin Yang Date: Jul. 21, 2025
Authorized Signature



2. Contents

	Page
1. VERSION.....	2
2. CONTENTS	3
3. TEST SUMMARY	4
4. GENERAL INFORMATION.....	5
4.1. GENERAL DESCRIPTION OF EUT	5
4.2. TEST MODE	6
4.3. DESCRIPTION OF SUPPORT UNITS	6
4.4. DEVIATION FROM STANDARDS	7
4.5. ABNORMALITIES FROM STANDARD CONDITIONS.....	7
4.6. TEST FACILITY	7
4.7. TEST LOCATION	7
4.8. ADDITIONAL INSTRUCTIONS	7
5. TEST INSTRUMENTS LIST.....	7
6. TEST RESULTS AND MEASUREMENT DATA	9
6.1. CONDUCTED EMISSIONS	9
6.2. CONDUCTED PEAK OUTPUT POWER	13
6.3. CHANNEL BANDWIDTH.....	14
6.4. POWER SPECTRAL DENSITY	15
6.5. BAND EDGE.....	16
6.5.1. <i>Conducted Emission Method</i>	16
6.5.2. <i>Radiated Emission Method</i>	17
6.6. SPURIOUS EMISSION.....	19
6.6.1. <i>Conducted Emission Method</i>	19
6.6.2. <i>Radiated Emission Method</i>	20
6.7. ANTENNA REQUIREMENT.....	28
7. TEST SETUP PHOTO.....	29
8. EUT CONSTRUCTIONAL DETAILS	29

3. Test Summary

Test Item	Section	Result
Antenna requirement	FCC part 15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	FCC part 15.207	Pass
Conducted Peak Output Power	FCC part 15.247 (b)(3)	Pass
6dB Bandwidth	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: Test according to ANSI C63.10:2013 and RSS-Gen

Pass: The EUT complies with the essential requirements in the standard.

Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9KHz~30MHz	3.12 dB	(1)
Radiated Emission	30~1000MHz	4.37 dB	(1)
Radiated Emission	1~18GHz	5.40 dB	(1)
Radiated Emission	18-40GHz	5.45 dB	(1)
Conducted Disturbance	0.15~30MHz	2.68 dB	(1)
Spectrum bandwidth	/	1.2%	(1)
Output Peak power	30MHz~18GHz	0.57dB	(1)
Time	/	±10%	(1)

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.



4. General Information

4.1. General Description of EUT

Product Name:	Variable Speed Swimming Pool Pump
Model No.:	SFP220-VS
Series model:	SHP130-VS,SWP390-VS, Relaax130-VS,SPH130-VS, ILG8PP130-VS,LU-VS130,VSP13-Pro; Relaax220-VS, SPH220-VS,ILG8PP220-VS,LU-VS220,VSP22-Pro; Relaax390-VS,SPH390-VS,ILG8PP-390-VS,LU-VS390,VSP39-Pro
Test sample(s) ID:	HTT202507513-1(Engineer sample) HTT202507513-2(Normal sample)
Channel numbers:	802.11b /802.11g /802.11n(HT20): 11
Channel separation:	5MHz
Modulation technology:	802.11b: Direct Sequence Spread Spectrum (DSSS) 802.11g/802.11n(H20): Orthogonal Frequency Division Multiplexing (OFDM)
Antenna Type:	PCB Antenna
Antenna gain:	2.54 dBi
Power Supply:	AC 110-230V



Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	4	2427MHz	7	2442MHz	10	2457MHz
2	2417MHz	5	2432MHz	8	2447MHz	11	2462MHz
3	2422MHz	6	2437MHz	9	2452MHz		

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Test channel	Frequency (MHz)
	802.11b/802.11g/802.11n(HT20)
Lowest channel	2412MHz
Middle channel	2437MHz
Highest channel	2462MHz

Test Software Version	AmebaZ2_mptool 1v3		
Frequency	2412 MHz	2437MHz	2462 MHz
802.11b	80	80	80
802.11g	80	80	80
802.11n20	80	80	80

4.2. Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode
<i>Remark: During the test, the dutycycle >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.</i>	

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:				
Pre-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.				
Mode	802.11b	802.11g	802.11n(HT20)	
Data rate	1Mbps	6Mbps	MCS 0	

4.3. Description of Support Units

None.



4.4. Deviation from Standards

None.

4.5. Abnormalities from Standard Conditions

None.

4.6. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.: 779513 Designation Number: CN1319

Shenzhen HTT Technology Co.,Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

A2LA-Lab Cert. No.: 6435.01

Shenzhen HTT Technology Co.,Ltd. has been accredited by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010.

4.7. Test Location

All tests were performed at:

Shenzhen HTT Technology Co.,Ltd.

1F, Building B, Huafeng International Robotics Industrial Park, Hangcheng Road,Nanchang Community, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China

Tel: 0755-23595200

Fax: 0755-23595201

4.8. Additional Instructions

Test Software	Special AT test command provided by manufacturer to Keep the EUT in continuously transmitting mode and hopping mode
Power level setup	Default

5. Test Instruments list

Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	Shenzhen C.R.T technology co., LTD	9*6*6	HTT-E028	Aug. 10 2024	Aug. 09 2027
2	Control Room	Shenzhen C.R.T technology co., LTD	4.8*3.5*3.0	HTT-E030	Aug. 10 2024	Aug. 09 2027
3	EMI Test Receiver	Rohde&Schwar	ESCI7	HTT-E022	Apr. 22 2025	Apr. 21 2026
4	Spectrum Analyzer	ROHDE&SCHWARZ	FSV40-N	HTT-E050	Jun. 09 2025	Jun. 08 2026
5	Coaxial Cable	ZDecl	ZT26-NJ-NJ-0.6M	HTT-E018	Apr. 22 2025	Apr. 21 2026
6	Coaxial Cable	ZDecl	ZT26-NJ-SMAJ-2M	HTT-E019	Apr. 22 2025	Apr. 21 2026
7	Coaxial Cable	ZDecl	ZT26-NJ-SMAJ-0.6M	HTT-E020	Apr. 22 2025	Apr. 21 2026
8	Coaxial Cable	ZDecl	ZT26-NJ-SMAJ-8.5M	HTT-E021	Apr. 22 2025	Apr. 21 2026
9	Composite logarithmic antenna	Schwarzbeck	VULB 9168	HTT-E017	Apr. 19 2025	Apr. 18 2026
10	Horn Antenna	Schwarzbeck	BBHA9120D	HTT-E016	Apr. 19 2025	Apr. 18 2026
11	Loop Antenna	Zhinan	ZN30900C	HTT-E039	Apr. 19 2025	Apr. 18 2026
12	Horn Antenna	A.H. Systems, inc.	SAS-574	HTT-E040	Jun. 04 2025	Jun. 03 2026
13	low frequency	Sonoma Instrument	310	HTT-E015	Apr. 22 2025	Apr. 21 2026

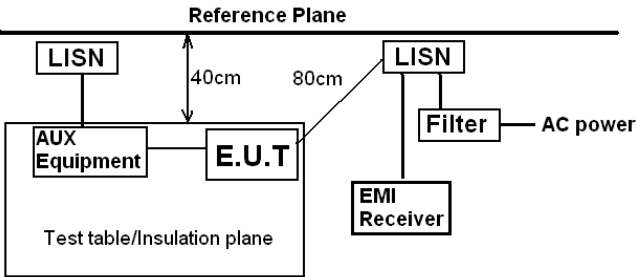


Report No.: HTT202507513F01

	Amplifier					
14	high-frequency Amplifier	HP	8449B	HTT-E014	Apr. 22 2025	Apr. 21 2026
15	Variable frequency power supply	Shenzhen Anbiao Instrument Co., Ltd	ANB-10VA	HTT-082	Apr. 22 2025	Apr. 21 2026
16	EMI Test Receiver	Rohde & Schwarz	ESCI3	HTT-E043	Apr. 22 2025	Apr. 21 2026
17	Artificial Mains	Rohde & Schwarz	ESH3-Z5	HTT-E006	Apr. 22 2025	Apr. 21 2026
18	Artificial Mains	Rohde & Schwarz	ENV-216	HTT-E038	Apr. 22 2025	Apr. 21 2026
19	Cable Line	Robinson	Z302S-NJ-BNCJ-1.5M	HTT-E001	Apr. 22 2025	Apr. 21 2026
20	Filter	ROHDE&SCHWARZ	ESH3-Z2	HTT-E045	Sep. 20 2024	Sep. 19 2025
21	Variable frequency power supply	Shenzhen Yanghong Electric Co., Ltd	YF-650 (5KVA)	HTT-E032	Apr. 22 2025	Apr. 21 2026
22	Control Room	Shenzhen C.R.T technology co., LTD	8*4*3.5	HTT-E029	Aug. 10 2024	Aug. 09 2027
23	DC power supply	Agilent	E3632A	HTT-E023	Apr. 22 2025	Apr. 21 2026
24	EMI Test Receiver	Agilent	N9020A	HTT-E024	Apr. 22 2025	Apr. 21 2026
25	Analog signal generator	Agilent	N5181A	HTT-E025	Apr. 22 2025	Apr. 21 2026
26	Vector signal generator	Agilent	N5182A	HTT-E026	Apr. 22 2025	Apr. 21 2026
27	RF Switch box	Keysight	Switchbox	HTT-E047	May. 19 2025	May. 18 2026
28	Temperature and humidity meter	Shenzhen Anbiao Instrument Co., Ltd	TH10R	HTT-074	Apr. 21 2025	Apr. 20 2026
29	Radiated Emission Test Software	Farad	EZ-EMC	N/A	N/A	N/A
30	Conducted Emission Test Software	Farad	EZ-EMC	N/A	N/A	N/A
31	RF Test Software	panshanrf	TST	N/A	N/A	N/A
32	Power Meter	R&S	NRVS	HTT-E057	Apr. 22 2025	Apr. 21 2026

6. Test results and Measurement Data

6.1. Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207						
Test Method:	ANSI C63.10:2013						
Test Frequency Range:	150KHz to 30MHz						
Class / Severity:	Class B						
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto						
Limit:	Frequency range (MHz)		Limit (dBuV)				
			Quasi-peak		Average		
	0.15-0.5		66 to 56*		56 to 46*		
	0.5-5		56		46		
	5-30		60		50		
* Decreases with the logarithm of the frequency.							
Test setup:	Reference Plane  Remark: E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m						
Test procedure:	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.						
Test Instruments:	Refer to section 6.0 for details						
Test mode:	Refer to section 5.2 for details						
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar	
Test voltage:	AC 120V, 60Hz						
Test results:	PASS						

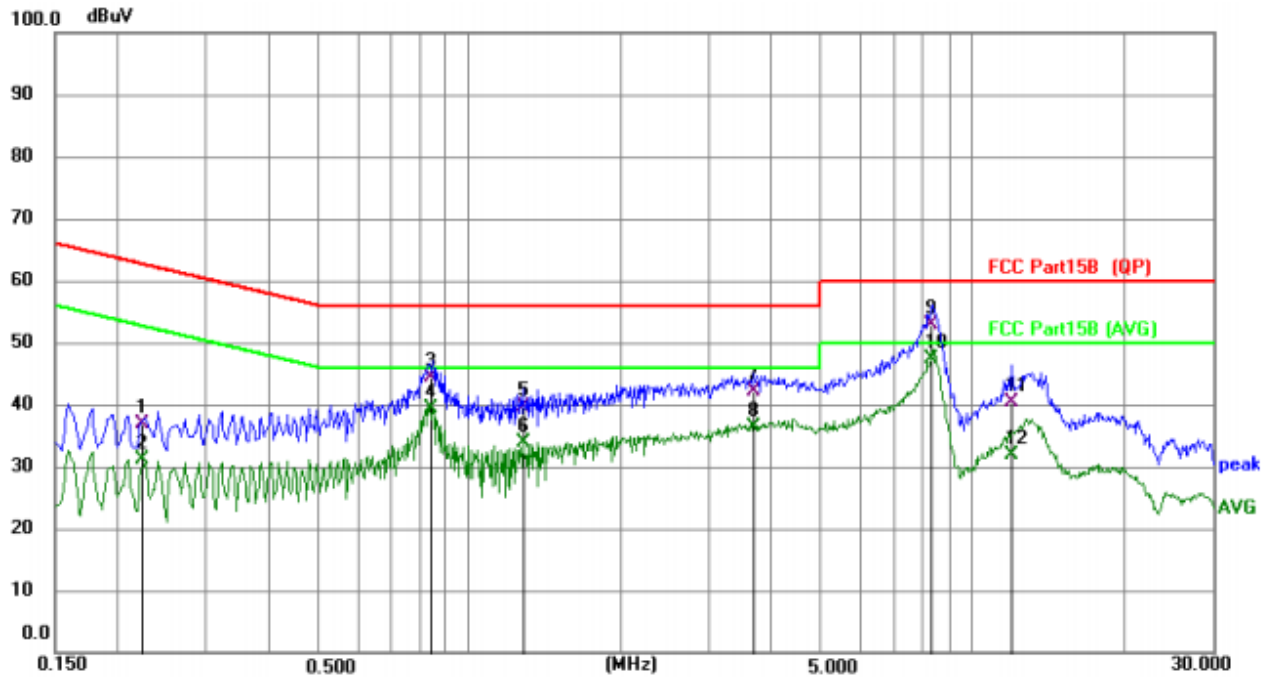
Remark: 1. All modes of 802.11b/g/n were tested at Low, Middle, and High channel; only the worst result of 802.11b CH11 was reported as below:

2. Both 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz power supply have been tested, only the worst result of 120 VAC, 60 Hz was reported as below:



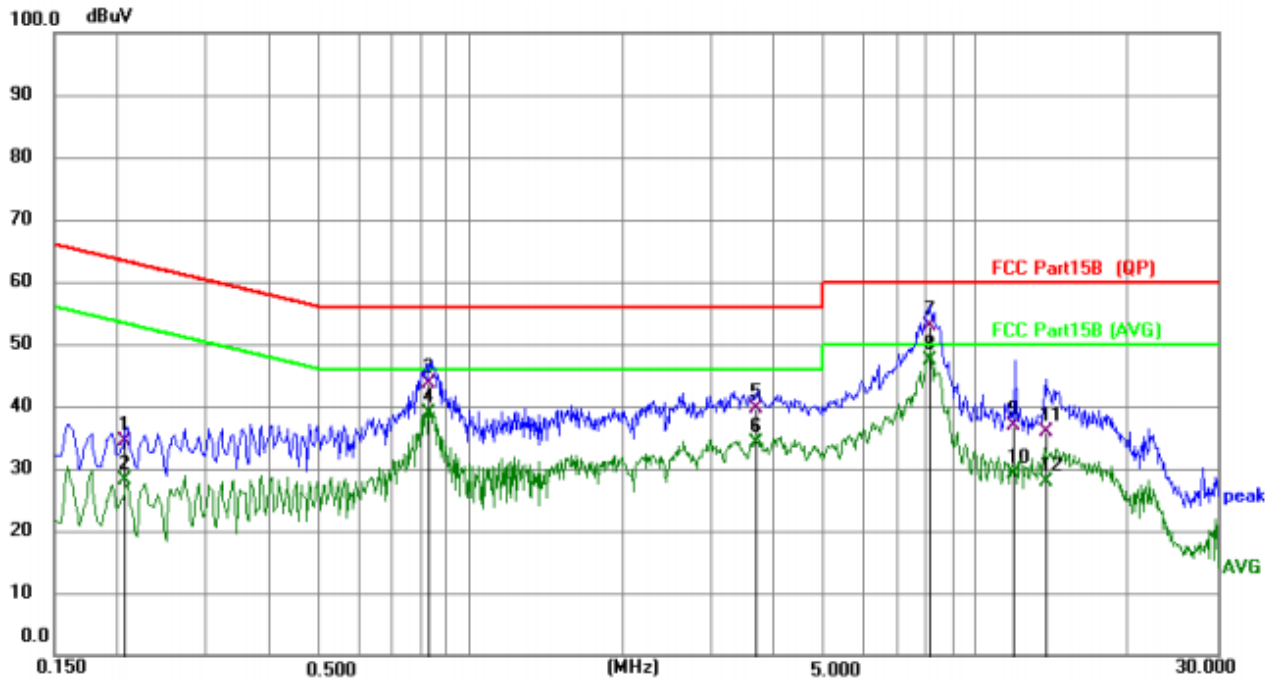
Measurement data:

Line:



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	
		MHz	Level	Factor	ment			Detector
				dB	dBuV	dBuV	dB	
1		0.2239	26.56	10.21	36.77	62.67	-25.90	QP
2		0.2239	21.00	10.21	31.21	52.67	-21.46	AVG
3		0.8474	34.26	10.14	44.40	56.00	-11.60	QP
4		0.8474	29.12	10.14	39.26	46.00	-6.74	AVG
5		1.2811	29.50	10.23	39.73	56.00	-16.27	QP
6		1.2811	23.55	10.23	33.78	46.00	-12.22	AVG
7		3.6647	31.92	10.20	42.12	56.00	-13.88	QP
8		3.6647	26.24	10.20	36.44	46.00	-9.56	AVG
9		8.3523	42.67	10.10	52.77	60.00	-7.23	QP
10	*	8.3523	37.19	10.10	47.29	50.00	-3.11	AVG
11		11.9892	30.14	10.35	40.49	60.00	-19.51	QP
12		11.9892	21.56	10.35	31.91	50.00	-18.09	AVG

Neutral:



No.	Mk.	Freq. MHz	Reading Level dB	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		0.2076	24.27	10.20	34.47	63.30	-28.83	QP
2		0.2076	17.95	10.20	28.15	53.30	-25.15	AVG
3		0.8337	33.54	10.18	43.72	56.00	-12.28	QP
4		0.8337	28.64	10.18	38.82	46.00	-7.18	AVG
5		3.6795	29.36	10.22	39.58	56.00	-16.42	QP
6		3.6795	23.96	10.22	34.18	46.00	-11.82	AVG
7		8.1142	42.75	10.18	52.93	60.00	-7.07	QP
8	*	8.1142	37.14	10.18	47.32	50.00	-3.28	AVG
9		11.9850	26.40	10.48	36.88	60.00	-23.12	QP
10		11.9850	18.53	10.48	29.01	50.00	-20.99	AVG
11		13.7218	25.28	10.69	35.97	60.00	-24.03	QP
12		13.7218	17.16	10.69	27.85	50.00	-22.15	AVG

Notes:

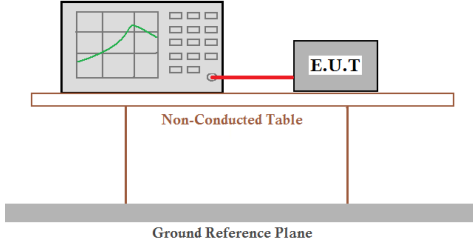
1. An initial pre-scan was performed on the line and neutral lines with peak detector.



Report No.: HTT202507513F01

2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level =Receiver Read level + LISN Factor + Cable Los

6.2. Conducted Peak Output Power

Test Requirement:	FCC Part15 C Section 15.247 (b)(3)					
Test Method:	KDB558074 D01 15.247 Meas Guidance v05r02					
Limit:	30dBm					
Test setup:	Power sensor and Spectrum analyzer 					
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test results:	Pass					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar

Test Results

Please refer to Appendix RF Test Data for WIFI 2.4G.

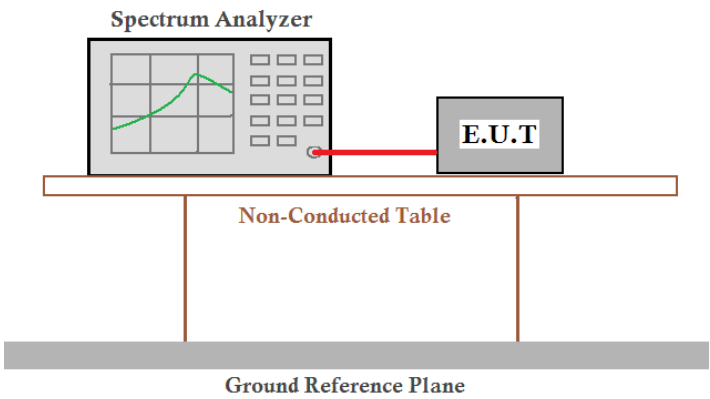
6.3. Channel Bandwidth

Test Requirement:	FCC Part15 C Section 15.247 (a)(2)					
Test Method:	KDB558074 D01 15.247 Meas Guidance v05r02					
Limit:	>500KHz					
Test setup:						
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test results:	Pass					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar

Test Results

Please refer to Appendix RF Test Data for WIFI 2.4G.

6.4. Power Spectral Density

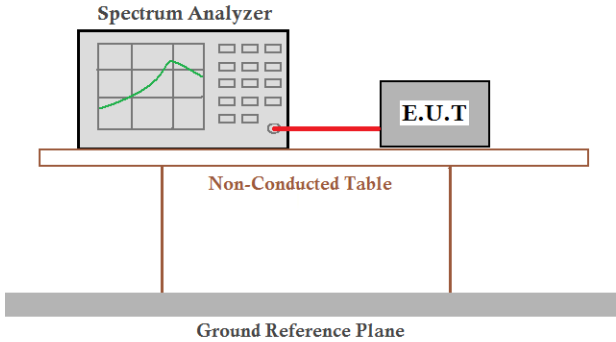
Test Requirement:	FCC Part15 C Section 15.247 (e)					
Test Method:	KDB558074 D01 15.247 Meas Guidance v05r02					
Limit:	8dBm/3kHz					
Test setup:						
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test results:	Pass					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar

Test Results

Please refer to Appendix RF Test Data for WIFI 2.4G.

6.5. Band Edge

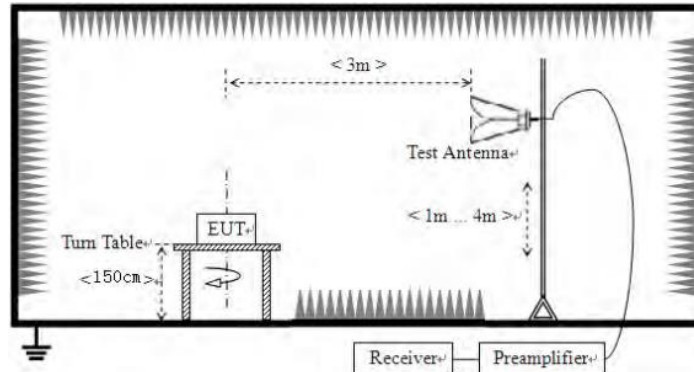
6.5.1. Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d)					
Test Method:	KDB558074 D01 15.247 Meas Guidance v05r02					
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.					
Test setup:						
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test results:	Pass					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar

Test Results

Please refer to Appendix RF Test Data for WIFI 2.4G.

6.5.2. Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209 and 15.205					
Test Method:	ANSI C63.10: 2013					
Test Frequency Range:	All of the restrict bands were tested, only the worst band's (2310MHz to 2500MHz) data was showed.					
Test site:	Measurement Distance: 3m					
Receiver setup:	Frequency	Detector	RBW	VBW	Remark	
	Above 1GHz	Peak	1MHz	3MHz	Peak Value	
		Peak	1MHz	10Hz	Average Value	
Limit:	Frequency		Limit (dBuV/m @3m)		Remark	
	Above 1GHz		54.00		Average Value	
			74.00		Peak Value	
Test setup:						
Test Procedure:	1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. 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. 4. 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. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. 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.					
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test results:	Pass					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar

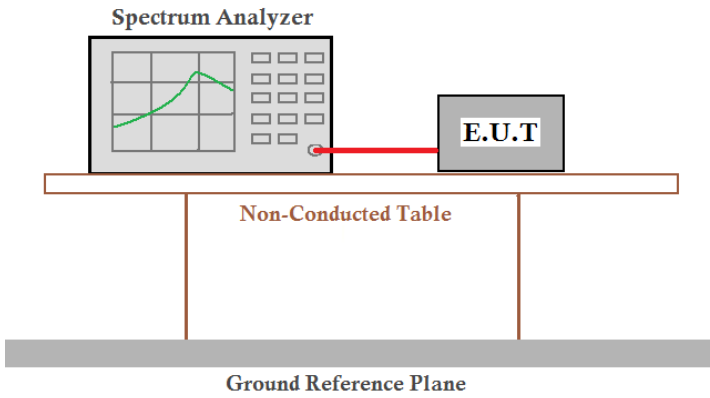
**Measurement Data**

Remark: During the test, pre-scan the 802.11b/802.11g/802.11n (H20) modulation, and found the 802.11n20 modulation which it is worse case.

Frequency(MHz):			2412		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2390.00	61.33	PK	74	12.67	62.72	27.2	4.31	32.9	-1.39
2390.00	44.43	AV	54	9.57	45.82	27.2	4.31	32.9	-1.39
Frequency(MHz):			2412		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2390.00	59.64	PK	74	14.36	61.03	27.2	4.31	32.9	-1.39
2390.00	45.05	AV	54	8.95	46.44	27.2	4.31	32.9	-1.39
Frequency(MHz):			2462		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2483.50	57.21	PK	74	16.79	58.14	27.4	4.47	32.8	-0.93
2483.50	43.66	AV	54	10.34	44.59	27.4	4.47	32.8	-0.93
Frequency(MHz):			2462		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2483.50	56.07	PK	74	17.93	57.00	27.4	4.47	32.8	-0.93
2483.50	44.40	AV	54	9.60	45.33	27.4	4.47	32.8	-0.93

6.6. Spurious Emission

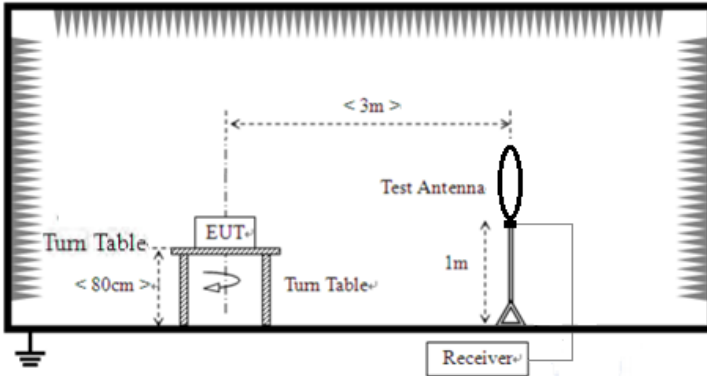
6.6.1. Conducted Emission Method

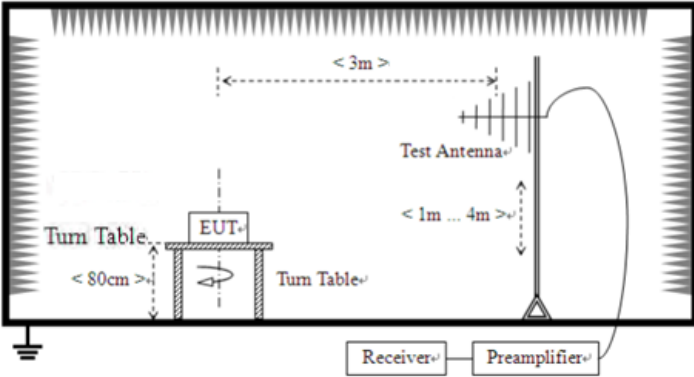
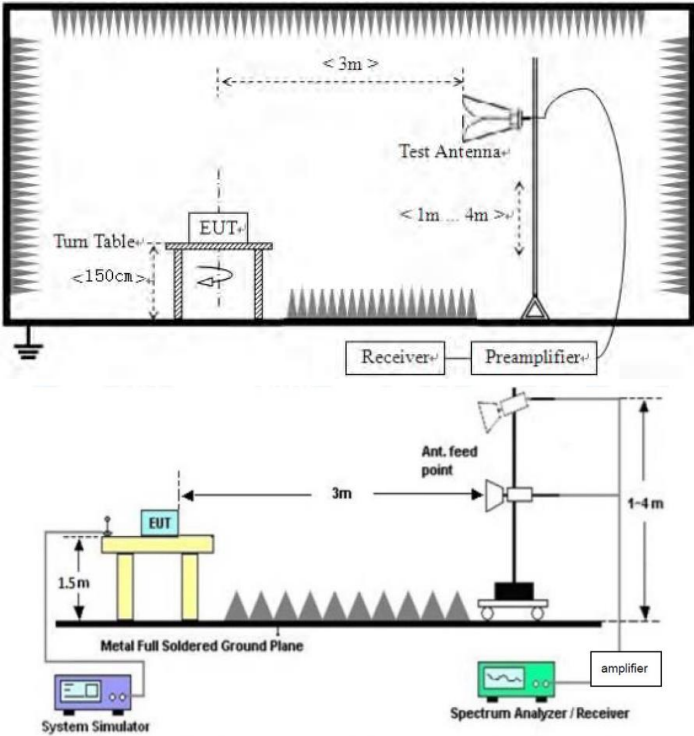
Test Requirement:	FCC Part15 C Section 15.247 (d)					
Test Method:	KDB558074 D01 15.247 Meas Guidance v05r02					
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator 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.					
Test setup:	 The diagram illustrates the test setup for conducted emission measurement. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table, which is supported by a Ground Reference Plane.					
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test results:	Pass					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar

Test Results

Please refer to Appendix RF Test Data for WIFI 2.4G.

6.6.2. Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	9kHz to 25GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	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	120KHz	300KHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Peak	1MHz	10Hz	Average
Limit:	Frequency	Limit (uV/m)	Value	Measurement Distance	
	0.009MHz-0.490MHz	2400/F(KHz)	QP	300m	
	0.490MHz-1.705MHz	24000/F(KHz)	QP	30m	
	1.705MHz-30MHz	30	QP	30m	
	30MHz-88MHz	100	QP	3m	
	88MHz-216MHz	150	QP		
	216MHz-960MHz	200	QP		
	960MHz-1GHz	500	QP		
	Above 1GHz	500	Average		
		5000	Peak		
Test setup:	For radiated emissions from 9kHz to 30MHz				
					

	For radiated emissions from 30MHz to 1GHz  For radiated emissions above 1GHz 
Test Procedure:	1. The EUT was placed on the top of a rotating table (0.8m for below 1G and 1.5m for above 1G) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. 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. 4. 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.



Report No.: HTT202507513F01

	5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. 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.					
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
Test voltage:	AC 120V, 60Hz					
Test results:	Pass					

Remarks:

- 1. This test was performed with EUT in X, Y, Z position and the worse case was found when EUT in X position.*
- 2. All three channels (lowest/middle/highest) of each mode were measured below 1GHz and recorded worst case at 802.11n20 low channel.*
- 3. Radiated emission test from 9 KHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor in 9 KHz to 30MHz and not recorded in this report.*

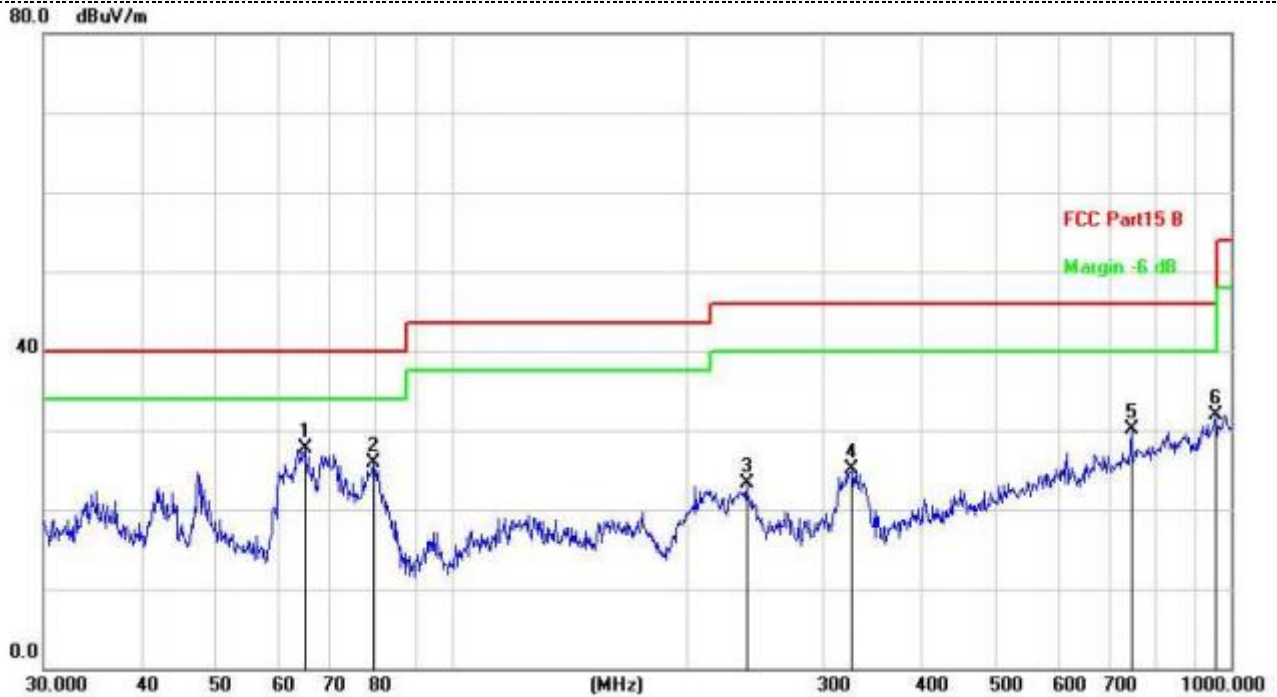
Measurement data:

■ **9kHz~30MHz**

The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o) & RSS-Gen 6.13, the test result no need to reported.

Below 1GHz

Horizontal



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over
		MHz	Level	Factor	ment		
			dBuV	dB/m	dBuV/m	dB/m	dB Detector
1	*	64.8864	40.06	-12.45	27.61	40.00	-12.39 peak
2		79.5208	41.02	-15.17	25.85	40.00	-14.15 peak
3		239.1473	35.20	-11.89	23.31	46.00	-22.69 peak
4		326.7395	35.50	-10.45	25.05	46.00	-20.95 peak
5		744.8660	30.86	-0.73	30.13	46.00	-15.87 peak
6		955.4380	28.72	3.25	31.97	46.00	-14.03 peak

Final Level =Receiver Read level + Correct Factor

Vertical



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	
		MHz	Level	Factor	ment			
			dBuV	dB/m	dBuV/m	dB/m	dB	Detector
1	*	47.1600	47.72	-10.76	36.96	40.00	-3.04	peak
2	!	64.6594	49.23	-12.41	36.82	40.00	-3.18	peak
3		95.0930	45.59	-15.28	30.31	43.50	-13.19	peak
4		220.6168	39.94	-13.18	26.76	46.00	-19.24	peak
5		605.6592	30.93	-3.40	27.53	46.00	-18.47	peak
6		932.2712	29.23	2.52	31.75	46.00	-14.25	peak

Final Level =Receiver Read level + Correct Factor



■ Above 1-25GHz

Remark: During the test, pre-scan the 802.11b/802.11g/802.11n (H20) modulation, and found the 802.11n20 modulation which it is worse case.

802.11n20:

Frequency(MHz):			2412		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4824.00	58.69	PK	74	15.31	52.87	31.05	6.52	31.75	5.82
4824.00	43.66	AV	54	10.34	37.84	31.05	6.52	31.75	5.82
7236.00	57.36	PK	74	16.64	44.55	36.08	8.18	31.45	12.81
7236.00	46.71	AV	54	7.29	33.90	36.08	8.18	31.45	12.81

Frequency(MHz):			2412		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4824.00	58.99	PK	74	15.01	53.17	31.05	6.52	31.75	5.82
4824.00	44.55	AV	54	9.45	38.73	31.05	6.52	31.75	5.82
7236.00	56.39	PK	74	17.61	43.58	36.08	8.18	31.45	12.81
7236.00	47.18	AV	54	6.82	34.37	36.08	8.18	31.45	12.81

Frequency(MHz):			2437		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4874.00	62.28	PK	74	11.72	55.84	31.25	6.7	31.51	6.44
4874.00	44.29	AV	54	9.71	37.85	31.25	6.7	31.51	6.44
7311.00	54.75	PK	74	19.25	41.61	36.25	8.31	31.42	13.14
7311.00	45.83	AV	54	8.17	32.69	36.25	8.31	31.42	13.14



Report No.: HTT202507513F01

Frequency(MHz):			2437		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4874.00	60.92	PK	74	13.08	54.48	31.25	6.7	31.51	6.44
4874.00	46.15	AV	54	7.85	39.71	31.25	6.7	31.51	6.44
7311.00	56.60	PK	74	17.40	43.46	36.25	8.31	31.42	13.14
7311.00	46.73	AV	54	7.27	33.59	36.25	8.31	31.42	13.14

Frequency(MHz):			2462		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4924.00	60.81	PK	74	13.19	53.94	31.52	6.8	31.45	6.87
4924.00	46.43	AV	54	7.57	39.56	31.52	6.8	31.45	6.87
7386.00	55.08	PK	74	18.92	41.52	36.51	8.4	31.35	13.56
7386.00	46.79	AV	54	7.21	33.23	36.51	8.4	31.35	13.56

Frequency(MHz):			2462		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4924.00	61.58	PK	74	12.42	54.71	31.52	6.8	31.45	6.87
4924.00	44.16	AV	54	9.84	37.29	31.52	6.8	31.45	6.87
7386.00	57.05	PK	74	16.95	43.49	36.51	8.4	31.35	13.56
7386.00	46.36	AV	54	7.64	32.80	36.51	8.4	31.35	13.56



Remark:

(1) Data of measurement within this frequency range shown “--- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

(2) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed.



6.7. Antenna Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR Section 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited

FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1) (I):

(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

Antenna Connected Construction

The maximum gain of antenna was 2.54 dBi.

Remark: The antenna gain is provided by the customer, if the data provided by the customer is not accurate, Shenzhen HTT Technology Co., Ltd. does not assume any responsibility.



7. Test Setup Photo

Reference to the **appendix I** for details.

8. EUT Constructional Details

Reference to the **appendix II** for details.

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