

# TEST REPORT

**Applicant:** HANSHOW TECHNOLOGY CO.,LTD.

**Address of Applicant:** Building 1(IF podium building and 4F) and Building 5 (7F) in Jiaxing Photovolta High-tech Park, No., 1288 Kanghe Rd., Xiuzhou District,Jiaxing,Zhejiang, China

**Manufacturer:** Hanshow Technology Co., Ltd.

**Address of Manufacturer:** The 1st Floor Podium and Floor 4 of Building 1, Floor 7 of Building 5, Jiaxing Photovoltaic Technology Innovation Park, No.1288, Kanghe Road, Xiuzhou District.Jiaxing, Zhejiang, China

**Equipment Under Test (EUT)**

**Product Name:** digital signage

**Model No.:** Lumina Aqua 1410

**FCC ID:** 2AYMH-LUMINA14

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

**Date of sample receipt:** December 11, 2023

**Date of Test:** December 12-22, 2023

**Date of report issued:** December 25, 2023

**Test Result :** PASS \*

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

Authorized Signature:



**Robinson Luo**

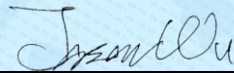
**Laboratory Manager**

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

## 2 Version

Version No.	Date	Description
00	December 25, 2023	Original

Prepared By:

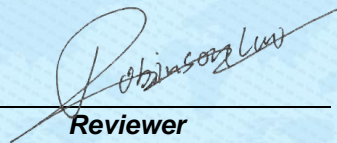


Date:

December 25, 2023

Project Engineer

Check By:



Reviewer

Date:

December 25, 2023

## 3 Contents

	Page
1 COVER PAGE.....	1
2 VERSION.....	2
3 CONTENTS .....	3
4 TEST SUMMARY .....	4
5 GENERAL INFORMATION.....	5
5.1 GENERAL DESCRIPTION OF EUT .....	5
5.2 TEST MODE .....	7
5.3 DESCRIPTION OF SUPPORT UNITS .....	7
5.4 DEVIATION FROM STANDARDS.....	7
5.5 ABNORMALITIES FROM STANDARD CONDITIONS .....	7
5.6 TEST FACILITY.....	7
5.7 TEST LOCATION .....	7
5.8 ADDITIONAL INSTRUCTIONS.....	7
6 TEST INSTRUMENTS LIST .....	8
7 TEST RESULTS AND MEASUREMENT DATA.....	10
7.1 ANTENNA REQUIREMENT .....	10
7.2 CONDUCTED EMISSIONS .....	11
7.3 CONDUCTED OUTPUT POWER .....	14
7.4 CHANNEL BANDWIDTH .....	15
7.5 POWER SPECTRAL DENSITY .....	16
7.6 SPURIOUS EMISSION IN NON-RESTRICTED & RESTRICTED BANDS .....	17
7.6.1 Conducted Emission Method.....	17
7.6.2 Radiated Emission Method.....	18
8 TEST SETUP PHOTO .....	31
9 EUT CONSTRUCTIONAL DETAILS .....	31

## 4 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
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: 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	3.1dB	(1)
Radiated Emission	30MHz-200MHz	3.8039dB	(1)
Radiated Emission	200MHz-1GHz	3.9679dB	(1)
Radiated Emission	1GHz-18GHz	4.29dB	(1)
Radiated Emission	18GHz-40GHz	3.30dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	3.44dB	(1)

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

## 5 General Information

### 5.1 General Description of EUT

Product Name:	digital signage
Model No.:	Lumina Aqua 1410
Test sample(s) ID:	GTS2023120116-1
Sample(s) Status	Engineer sample
S/N:	N/A
Operation Frequency:	802.11b/802.11g/802.11n(HT20): 2412MHz~2462MHz
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(HT20): Orthogonal Frequency Division Multiplexing (OFDM)
Antenna Type:	FPC Antenna
Antenna gain:	2.20dBi
Power supply:	DC 12.0V by Adapter

Remark:

1. Antenna gain information provided by the customer
2. The relevant information of the sample is provided by the entrusting company, and the laboratory is not responsible for its authenticity.

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	X	

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

## 5.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode
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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	6.5Mbps

## 5.3 Description of Support Units

Manufacturer	Description	Model	Serial Number
GTS	Adapter	UE200410DGWZ2RI	N/A

## 5.4 Deviation from Standards

None.

## 5.5 Abnormalities from Standard Conditions

None.

## 5.6 Test Facility

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

- **FCC —Registration No.: 381383**

Designation Number: CN5029

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files.

- **ISED—Registration No.: 9079A**

CAB identifier: CN0091

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of ISED for radio equipment testing.

- **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

## 5.7 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102

Tel: 0755-27798480

Fax: 0755-27798960

## 5.8 Additional Instructions

Test Software	Special test command provided by manufacturer
Power level setup	Default

## 6 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	June 23, 2021	June 22, 2024
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	April 14, 2023	April 13, 2024
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9168	GTS640	March 19, 2023	March 18, 2025
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	April 17, 2023	April 16, 2025
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	April 14, 2023	April 13, 2024
8	Loop Antenna	ZHINAN	ZN30900A	GTS534	Nov. 13, 2023	Nov.12, 2024
9	Broadband Preamplifier	SCHWARZBECK	BBV9718	GTS535	April 14, 2023	April 13, 2024
10	Amplifier(1GHz-26.5GHz)	HP	8449B	GTS601	April 14, 2023	April 13, 2024
11	Horn Antenna (18-26.5GHz)	/	UG-598A/U	GTS664	Oct. 29, 2023	Oct. 28, 2024
12	Horn Antenna (26.5-40GHz)	A.H Systems	SAS-573	GTS665	Oct. 29, 2023	Oct. 28, 2024
13	FSV·Signal Analyzer (10Hz-40GHz)	Keysight	FSV-40-N	GTS666	March 13, 2023	March 12, 2024
14	Amplifier	/	LNA-1000-30S	GTS650	April 14, 2023	April 13, 2024
15	CDNE M2+M3-16A	HCT	30MHz-300MHz	GTS692	Nov. 08, 2023	Nov.07, 2024
16	Wideband Amplifier	/	WDA-01004000-15P35	GTS602	April 14, 2023	April 13, 2024
17	Thermo meter	JINCHUANG	GSP-8A	GTS643	April 19, 2023	April 18, 2024
18	RE cable 1	GTS	N/A	GTS675	July 31. 2023	July 30. 2024
19	RE cable 2	GTS	N/A	GTS676	July 31. 2023	July 30. 2024
20	RE cable 3	GTS	N/A	GTS677	July 31. 2023	July 30. 2024
21	RE cable 4	GTS	N/A	GTS678	July 31. 2023	July 30. 2024
22	RE cable 5	GTS	N/A	GTS679	July 31. 2023	July 30. 2024
23	RE cable 6	GTS	N/A	GTS680	July 31. 2023	July 30. 2024
24	RE cable 7	GTS	N/A	GTS681	July 31. 2023	July 30. 2024
25	RE cable 8	GTS	N/A	GTS682	July 31. 2023	July 30. 2024



Conducted Emission						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	July 12, 2022	July 11, 2027
2	EMI Test Receiver	R&S	ESCI 7	GTS552	April 14, 2023	April 13, 2024
3	LISN	ROHDE & SCHWARZ	ENV216	GTS226	April 14, 2023	April 13, 2024
4	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
5	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
6	Thermo meter	JINCHUANG	GSP-8A	GTS642	April 19, 2023	April 18, 2024
7	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	April 14, 2023	April 13, 2024
8	ISN	SCHWARZBECK	NTFM 8158	GTS565	April 14, 2023	April 13, 2024
9	High voltage probe	SCHWARZBECK	TK9420	GTS537	April 14, 2023	April 13, 2024
10	Antenna end assembly	Weinschel	1870A	GTS560	April 14, 2023	April 13, 2024

RF Conducted Test:						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	April 14, 2023	April 13, 2024
2	EMI Test Receiver	R&S	ESCI 7	GTS552	April 14, 2023	April 13, 2024
3	PSA Series Spectrum Analyzer	Agilent	E4440A	GTS536	April 14, 2023	April 13, 2024
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	April 14, 2023	April 13, 2024
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	April 14, 2023	April 13, 2024
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	April 14, 2023	April 13, 2024
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	April 14, 2023	April 13, 2024
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	April 14, 2023	April 13, 2024
9	Thermo meter	JINCHUANG	GSP-8A	GTS641	April 19, 2023	April 18, 2024

General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Barometer	KUMAO	SF132	GTS647	April 19, 2023	April 18, 2024

## 7 Test results and Measurement Data

### 7.1 Antenna requirement

<b>Standard requirement:</b>	FCC Part15 C Section 15.203 /247(c)
<p><b>15.203 requirement:</b></p> <p>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.</p> <p><b>15.247(c) (1)(i) requirement:</b></p> <p>(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.</p>	
<b>EUT Antenna:</b>	
The antenna is FPC antenna, reference to the appendix II for details	

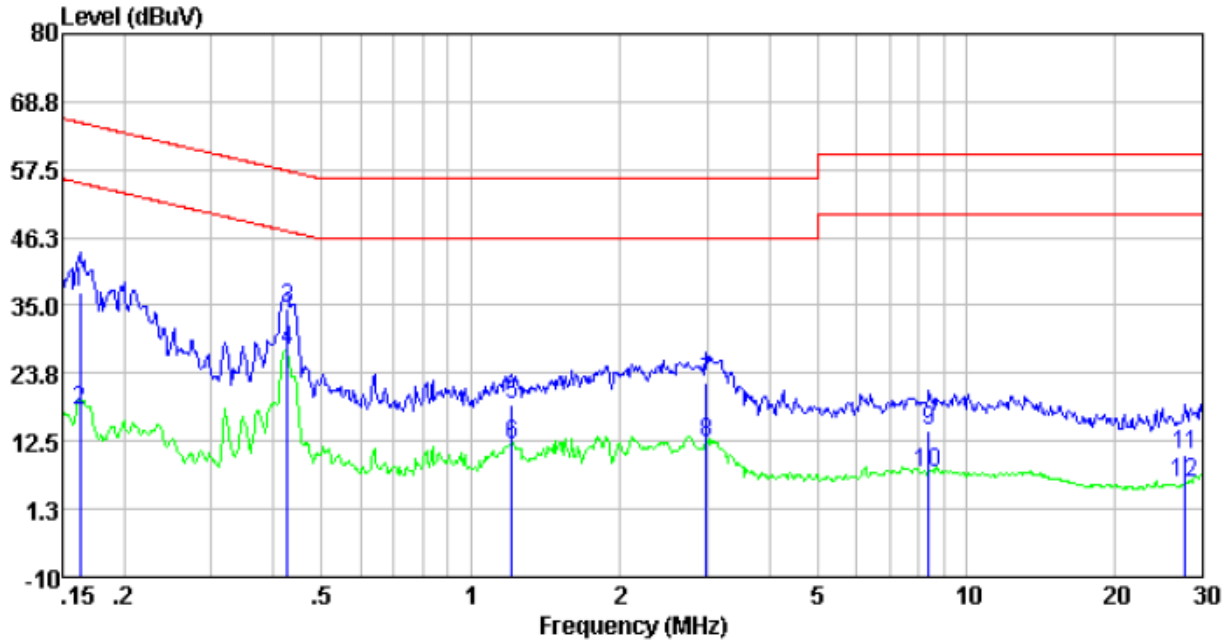
## 7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207					
Test Method:	ANSI C63.10:2013					
Test Frequency Range:	150KHz to 30MHz					
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:	<p><i>Remark</i>  E.U.T. Equipment Under Test  LISN Line Impedance Stabilization Network  Test table height=0.8m</p>					
Test procedure:	<ol style="list-style-type: none"> <li>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.</li> <li>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).</li> <li>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.</li> </ol>					
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					

**Measurement data**

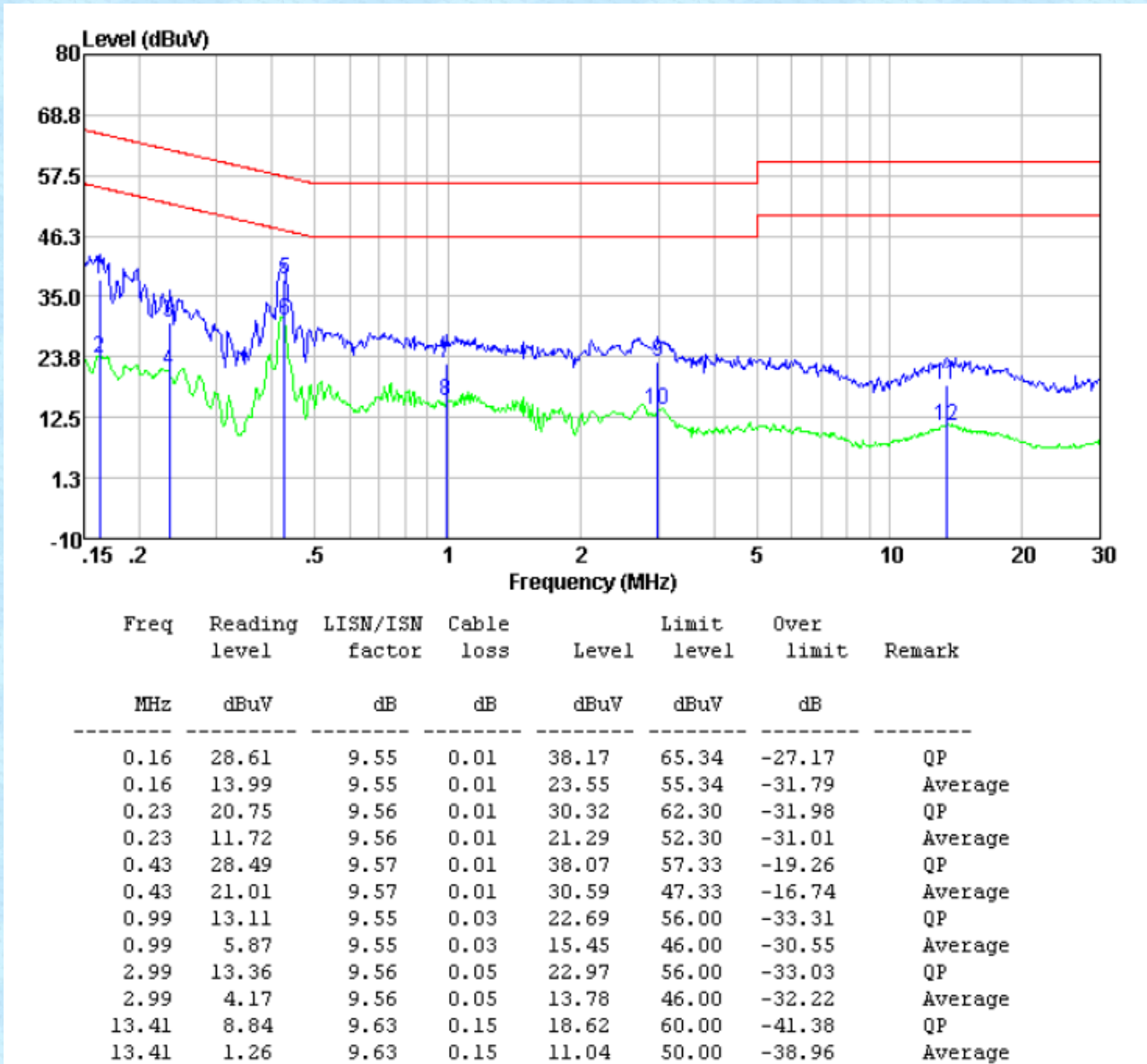
Pre-scan all test modes, found worst case at 802.11b 2462MHz, and so only show the test result of it.

Line:



Freq	Reading level	LISN/ISN factor	Cable loss	Level	Limit level	Over limit	Remark
MHz	dBuV	dB	dB	dBuV	dBuV	dB	
0.16	27.67	9.55	0.01	37.23	65.34	-28.11	QP
0.16	8.02	9.55	0.01	17.58	55.34	-37.76	Average
0.43	25.11	9.49	0.01	34.61	57.33	-22.72	QP
0.43	18.03	9.49	0.01	27.53	47.33	-19.80	Average
1.21	9.11	9.52	0.03	18.66	56.00	-37.34	QP
1.21	2.46	9.52	0.03	12.01	46.00	-33.99	Average
2.99	12.47	9.53	0.05	22.05	56.00	-33.95	QP
2.99	2.61	9.53	0.05	12.19	46.00	-33.81	Average
8.41	4.90	9.31	0.10	14.31	60.00	-45.69	QP
8.41	-2.17	9.31	0.10	7.24	50.00	-42.76	Average
27.71	0.13	10.05	0.20	10.38	60.00	-49.62	QP
27.71	-4.80	10.05	0.20	5.45	50.00	-44.55	Average

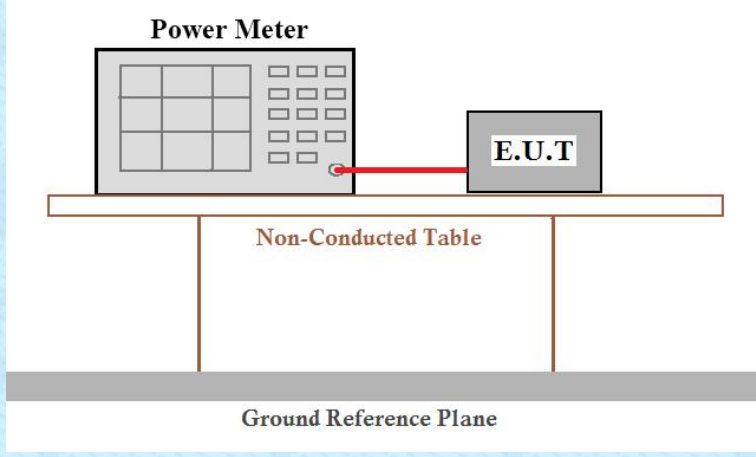
Neutral:



Notes:

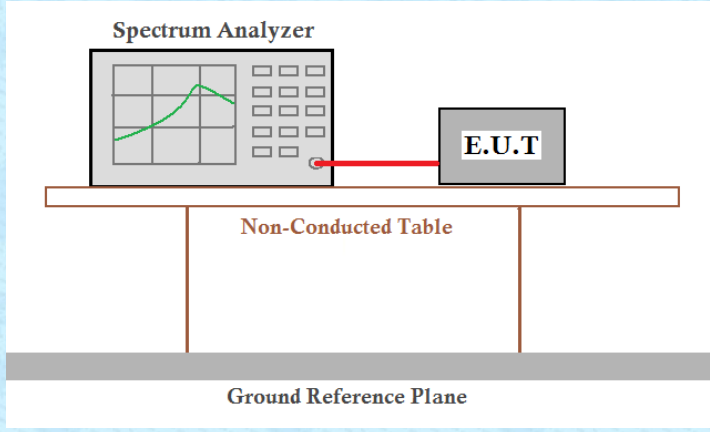
1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss
4. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

## 7.3 Conducted 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:	 <p>The diagram illustrates the test setup. A Power Meter is connected to an E.U.T (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

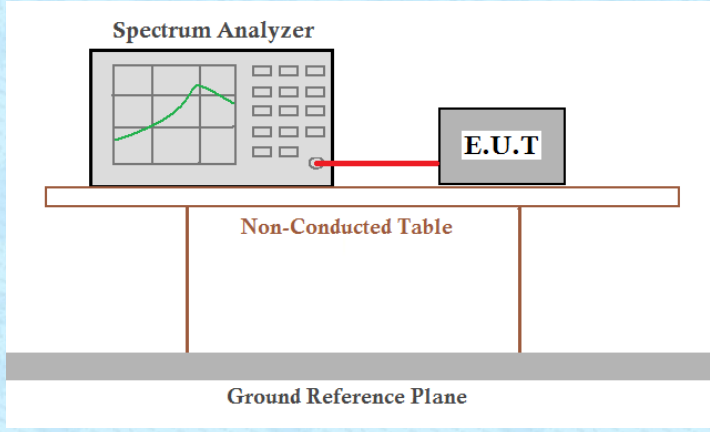
**Measurement Data:** The detailed test data see Appendix for WIFI 2.4G.

## 7.4 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:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table, which sits on a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

**Measurement Data:** The detailed test data see Appendix for WIFI 2.4G.

## 7.5 Power Spectral Density

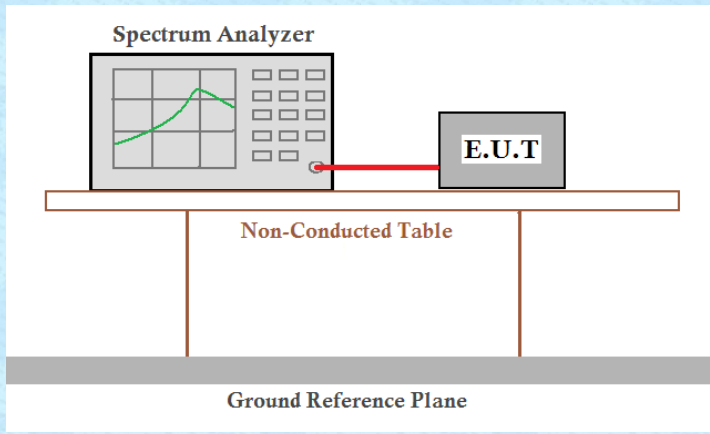
Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	KDB558074 D01 15.247 Meas Guidance v05r02
Limit:	8dBm/3kHz
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table, which sits on a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

**Measurement Data:** The detailed test data see Appendix for WIFI 2.4G.



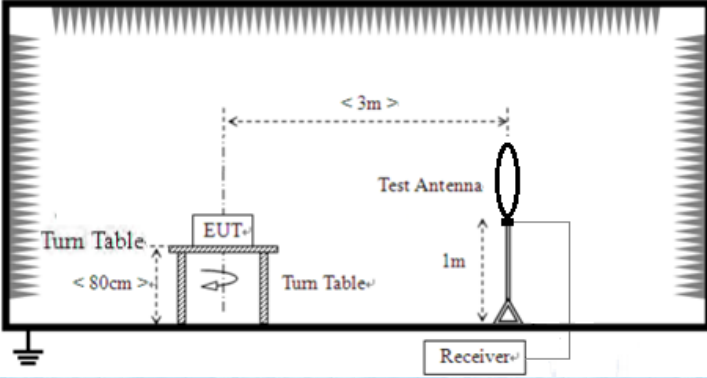
## 7.6 Spurious Emission in Non-restricted & restricted Bands

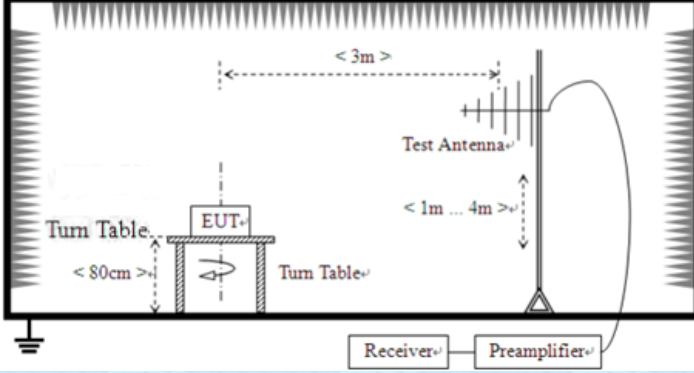
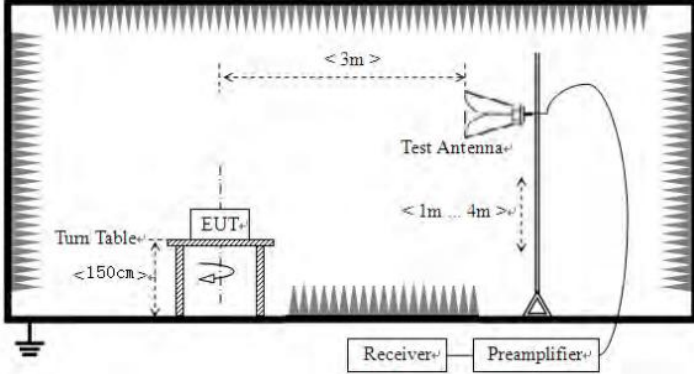
### 7.6.1 Conducted Emission Method

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 30 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:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table, which is supported by a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

**Measurement Data:** The detailed test data see Appendix for WIFI 2.4G.

## 7.6.2 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
Note: For Duty cycle $\geq 98\%$ , average detector set as above For Duty cycle $< 98\%$ , average detector set as below: $VBW \geq 1 / T$					
Limit:	Frequency	Limit (uV/m)	Value	Measurement Distance	
	0.009MHz-0.490MHz	2400/F(KHz)	PK/QP/AV	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				
	 <p>The diagram illustrates the test setup for radiated emissions from 9kHz to 30MHz. It shows an Equipment Under Test (EUT) placed on a turn table. A test antenna is positioned 3m away from the EUT. The antenna is mounted on a stand that is 1m high. A receiver is connected to the antenna. The turn table has a diameter of less than 80cm.</p>				
For radiated emissions from 30MHz to 1GHz					

	 <p>For radiated emissions above 1GHz</p> 
<p>Test Procedure:</p>	<ol style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>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.</li> <li>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.</li> <li>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>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.</li> </ol>
<p>Test Instruments:</p>	<p>Refer to section 6.0 for details</p>

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. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.

**Measurement data:**

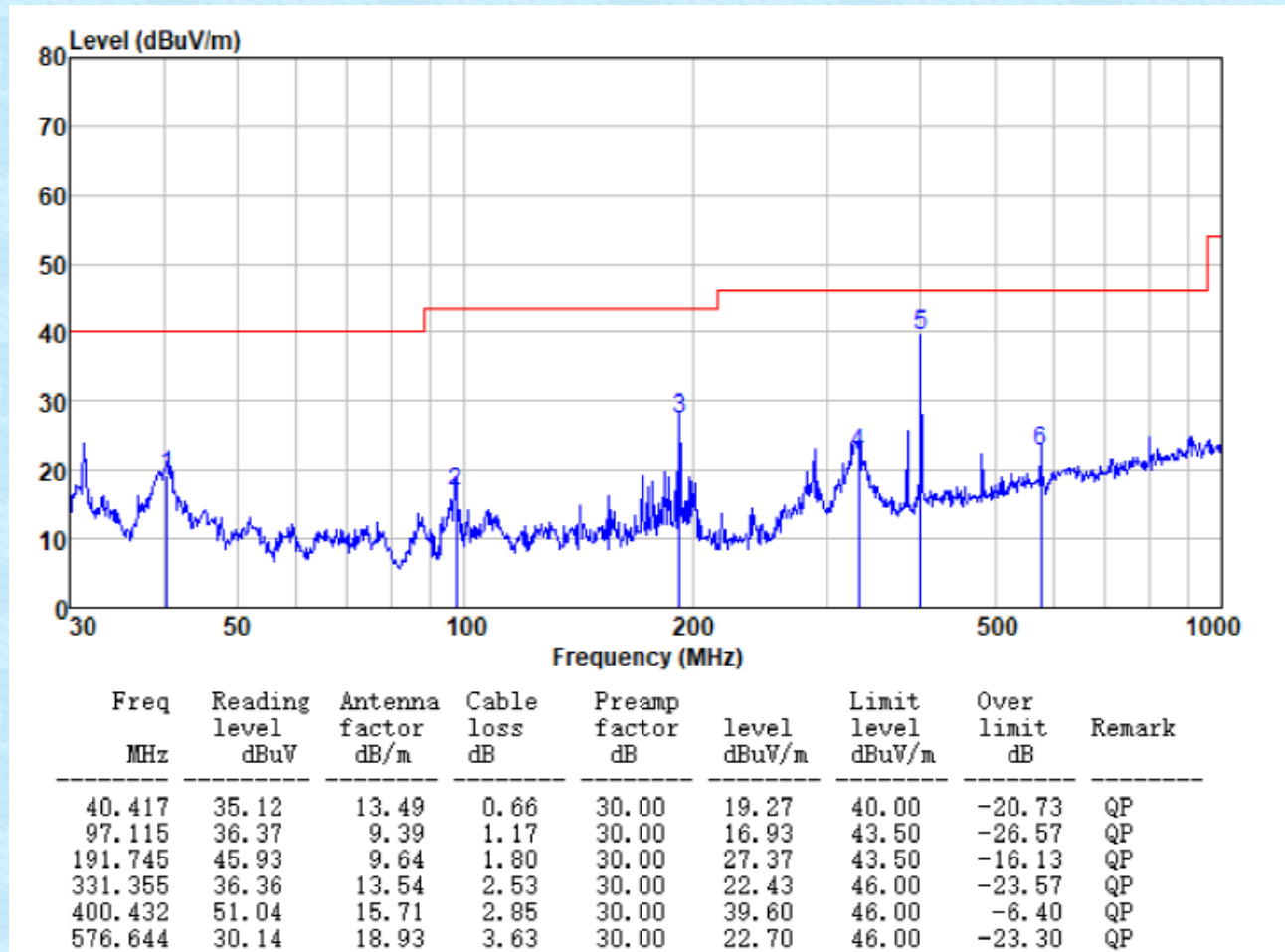
■ **9kHz~30MHz**

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), the test result no need to reported.

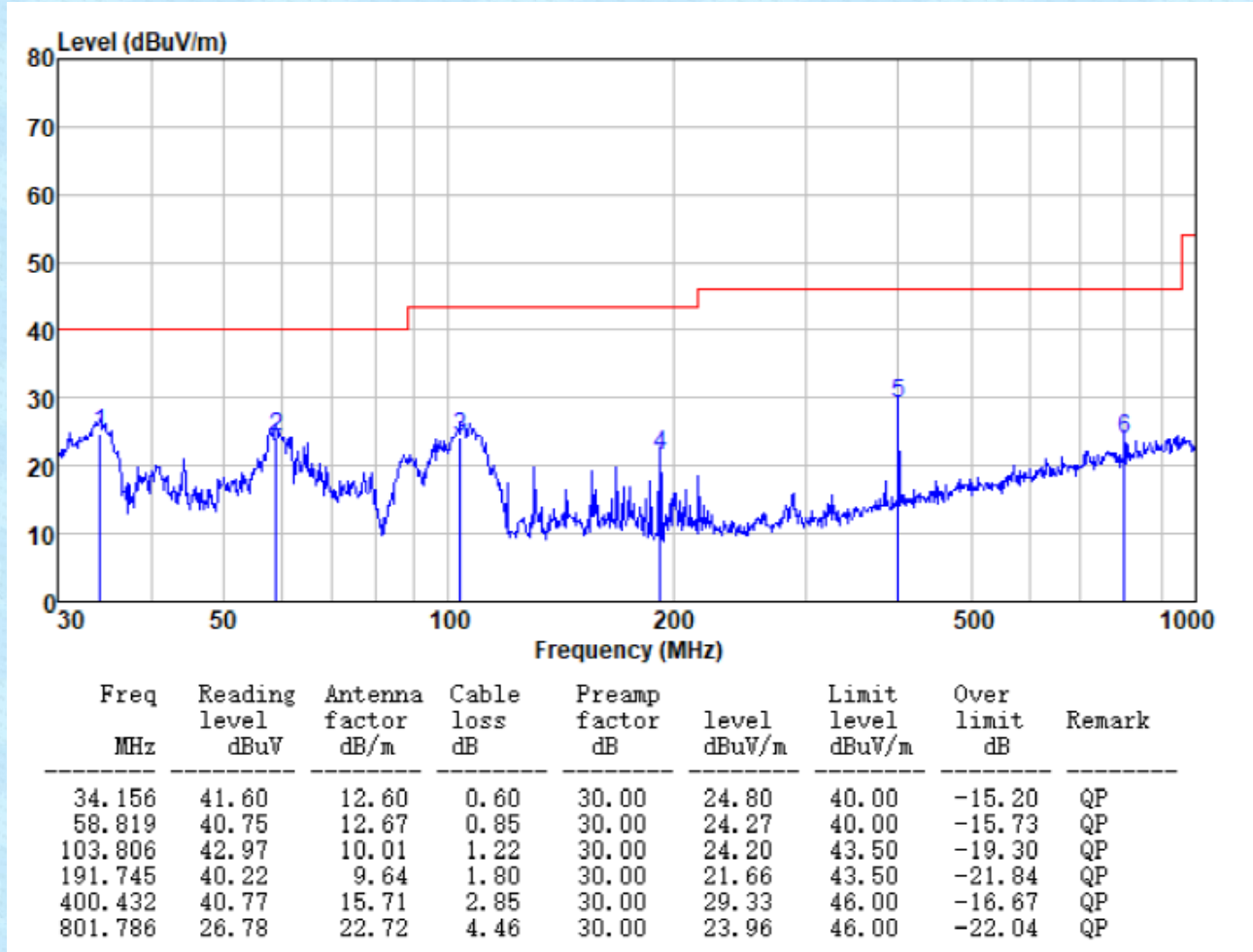
■ **Below 1GHz**

Pre-scan all test modes, found worst case at 802.11b 2462MHz, and so only show the test result of it.

**Horizontal:**



Vertical:



## Unwanted Emissions in non-restricted Frequency Bands

### ■ Above 1GHz

Test mode:	802.11b	Test channel:	Lowest
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#### Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824.00	36.91	31.22	4.63	37.68	35.08	74.00	-38.92	Vertical
7236.00	32.08	36.25	6.52	37.81	37.04	74.00	-36.96	Vertical
9648.00	31.19	37.97	7.99	37.93	39.22	74.00	-34.78	Vertical
4824.00	36.11	31.22	4.63	37.68	34.28	74.00	-39.72	Horizontal
7236.00	32.10	36.25	6.52	37.81	37.06	74.00	-36.94	Horizontal
9648.00	30.88	37.97	7.99	37.93	38.91	74.00	-35.09	Horizontal

#### Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824.00	26.26	31.22	4.63	37.68	24.43	54.00	-29.57	Vertical
7236.00	21.02	36.25	6.52	37.81	25.98	54.00	-28.02	Vertical
9648.00	21.59	37.97	7.99	37.93	29.62	54.00	-24.38	Vertical
4824.00	25.82	31.22	4.63	37.68	23.99	54.00	-30.01	Horizontal
7236.00	20.74	36.25	6.52	37.81	25.70	54.00	-28.30	Horizontal
9648.00	20.68	37.97	7.99	37.93	28.71	54.00	-25.29	Horizontal

Test mode:	802.11b	Test channel:	Middle
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#### Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874.00	36.55	31.31	4.69	37.63	34.92	74.00	-39.08	Vertical
7311.00	32.52	36.39	6.61	37.78	37.74	74.00	-36.26	Vertical
9748.00	32.47	38.10	8.03	37.95	40.65	74.00	-33.35	Vertical
4874.00	37.47	31.31	4.69	37.63	35.84	74.00	-38.16	Horizontal
7311.00	31.38	36.39	6.61	37.78	36.60	74.00	-37.40	Horizontal
9748.00	32.45	38.10	8.03	37.95	40.63	74.00	-33.37	Horizontal

#### Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874.00	27.62	31.31	4.69	37.63	25.99	54.00	-28.01	Vertical
7311.00	20.90	36.39	6.61	37.78	26.12	54.00	-27.88	Vertical
9748.00	21.77	38.10	8.03	37.95	29.95	54.00	-24.05	Vertical
4874.00	27.72	31.31	4.69	37.63	26.09	54.00	-27.91	Horizontal
7311.00	20.52	36.39	6.61	37.78	25.74	54.00	-28.26	Horizontal
9748.00	22.21	38.10	8.03	37.95	30.39	54.00	-23.61	Horizontal

Test mode:	802.11b	Test channel:	Highest
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**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924.00	40.06	31.37	4.75	37.58	38.60	74.00	-35.40	Vertical
7386.00	31.92	36.57	6.71	37.74	37.46	74.00	-36.54	Vertical
9848.00	34.85	38.20	8.07	37.58	43.54	74.00	-30.46	Vertical
4924.00	40.11	31.37	4.75	37.58	38.65	74.00	-35.35	Horizontal
7386.00	31.20	36.57	6.71	37.74	36.74	74.00	-37.26	Horizontal
9848.00	31.19	38.20	8.07	37.58	39.88	74.00	-34.12	Horizontal

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924.00	31.35	31.37	4.75	37.58	29.89	54.00	-24.11	Vertical
7386.00	21.94	36.57	6.71	37.74	27.48	54.00	-26.52	Vertical
9848.00	23.44	38.20	8.07	37.58	32.13	54.00	-21.87	Vertical
4924.00	30.73	31.37	4.75	37.58	29.27	54.00	-24.73	Horizontal
7386.00	20.67	36.57	6.71	37.74	26.21	54.00	-27.79	Horizontal
9848.00	20.52	38.20	8.07	37.58	29.21	54.00	-24.79	Horizontal

Test mode:	802.11g	Test channel:	lowest
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**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824.00	37.12	31.24	4.63	37.68	35.31	74.00	-38.69	Vertical
7236.00	32.21	36.25	6.52	37.80	37.18	74.00	-36.82	Vertical
9648.00	31.28	37.97	7.98	37.93	39.30	74.00	-34.70	Vertical
4824.00	36.28	31.24	4.63	37.68	34.47	74.00	-39.53	Horizontal
7236.00	32.21	36.25	6.52	37.80	37.18	74.00	-36.82	Horizontal
9648.00	30.97	37.97	7.98	37.93	38.99	74.00	-35.01	Horizontal

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824.00	26.45	31.24	4.63	37.68	24.64	54.00	-29.36	Vertical
7236.00	21.15	36.25	6.52	37.80	26.12	54.00	-27.88	Vertical
9648.00	21.68	37.97	7.98	37.93	29.70	54.00	-24.30	Vertical
4824.00	25.99	31.24	4.63	37.68	24.18	54.00	-29.82	Horizontal
7236.00	20.85	36.25	6.52	37.80	25.82	54.00	-28.18	Horizontal
9648.00	20.76	37.97	7.98	37.93	28.78	54.00	-25.22	Horizontal



Test mode:	802.11g	Test channel:	Middle
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**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874.00	36.72	31.31	4.69	37.62	35.10	74.00	-38.90	Vertical
7311.00	32.63	36.39	6.61	37.78	37.85	74.00	-36.15	Vertical
9748.00	32.55	38.10	8.02	37.95	40.72	74.00	-33.28	Vertical
4874.00	37.61	31.31	4.69	37.62	35.99	74.00	-38.01	Horizontal
7311.00	31.48	36.39	6.61	37.78	36.70	74.00	-37.30	Horizontal
9748.00	32.53	38.10	8.02	37.95	40.70	74.00	-33.30	Horizontal

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874.00	27.78	31.31	4.69	37.62	26.16	54.00	-27.84	Vertical
7311.00	21.00	36.39	6.61	37.78	26.22	54.00	-27.78	Vertical
9748.00	21.85	38.10	8.02	37.95	30.02	54.00	-23.98	Vertical
4874.00	27.86	31.31	4.69	37.62	26.24	54.00	-27.76	Horizontal
7311.00	20.61	36.39	6.61	37.78	25.83	54.00	-28.17	Horizontal
9748.00	22.28	38.10	8.02	37.95	30.45	54.00	-23.55	Horizontal

Test mode:	802.11g	Test channel:	Highest
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**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924.00	40.36	31.37	4.75	37.58	38.90	74.00	-35.10	Vertical
7386.00	32.10	36.57	6.71	37.74	37.64	74.00	-36.36	Vertical
9848.00	34.98	38.20	8.07	37.58	43.67	74.00	-30.33	Vertical
4924.00	40.37	31.37	4.75	37.58	38.91	74.00	-35.09	Horizontal
7386.00	31.36	36.57	6.71	37.74	36.90	74.00	-37.10	Horizontal
9848.00	31.31	38.20	8.07	37.58	40.00	74.00	-34.00	Horizontal

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924.00	31.63	31.37	4.75	37.58	30.17	54.00	-23.83	Vertical
7386.00	22.12	36.57	6.71	37.74	27.66	54.00	-26.34	Vertical
9848.00	23.57	38.20	8.07	37.58	32.26	54.00	-21.74	Vertical
4924.00	30.97	31.37	4.75	37.58	29.51	54.00	-24.49	Horizontal
7386.00	20.83	36.57	6.71	37.74	26.37	54.00	-27.63	Horizontal
9848.00	20.64	38.20	8.07	37.58	29.33	54.00	-24.67	Horizontal

Test mode:	802.11n(HT20)	Test channel:	Lowest
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**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824.00	37.34	31.24	4.63	37.68	35.53	74.00	-38.47	Vertical
7236.00	32.35	36.25	6.52	37.80	37.32	74.00	-36.68	Vertical
9648.00	31.38	37.97	7.98	37.93	39.40	74.00	-34.60	Vertical
4824.00	36.47	31.24	4.63	37.68	34.66	74.00	-39.34	Horizontal
7236.00	32.34	36.25	6.52	37.80	37.31	74.00	-36.69	Horizontal
9648.00	31.06	37.97	7.98	37.93	39.08	74.00	-34.92	Horizontal

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824.00	26.66	31.24	4.63	37.68	24.85	54.00	-29.15	Vertical
7236.00	21.28	36.25	6.52	37.80	26.25	54.00	-27.75	Vertical
9648.00	21.78	37.97	7.98	37.93	29.80	54.00	-24.20	Vertical
4824.00	26.16	31.24	4.63	37.68	24.35	54.00	-29.65	Horizontal
7236.00	20.97	36.25	6.52	37.80	25.94	54.00	-28.06	Horizontal
9648.00	20.85	37.97	7.98	37.93	28.87	54.00	-25.13	Horizontal

Test mode:	802.11n(HT20)	Test channel:	Middle
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**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874.00	36.91	31.31	4.69	37.62	35.29	74.00	-38.71	Vertical
7311.00	32.75	36.39	6.61	37.78	37.97	74.00	-36.03	Vertical
9748.00	32.63	38.10	8.02	37.95	40.80	74.00	-33.20	Vertical
4874.00	37.77	31.31	4.69	37.62	36.15	74.00	-37.85	Horizontal
7311.00	31.58	36.39	6.61	37.78	36.80	74.00	-37.20	Horizontal
9748.00	32.60	38.10	8.02	37.95	40.77	74.00	-33.23	Horizontal

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874.00	27.95	31.31	4.69	37.62	26.33	54.00	-27.67	Vertical
7311.00	21.12	36.39	6.61	37.78	26.34	54.00	-27.66	Vertical
9748.00	21.93	38.10	8.02	37.95	30.10	54.00	-23.90	Vertical
4874.00	28.01	31.31	4.69	37.62	26.39	54.00	-27.61	Horizontal
7311.00	20.71	36.39	6.61	37.78	25.93	54.00	-28.07	Horizontal
9748.00	22.36	38.10	8.02	37.95	30.53	54.00	-23.47	Horizontal

Test mode:	802.11n(HT20)	Test channel:	Highest
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**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924.00	40.67	31.37	4.75	37.58	39.21	74.00	-34.79	Vertical
7386.00	32.30	36.57	6.71	37.74	37.84	74.00	-36.16	Vertical
9848.00	35.13	38.20	8.07	37.58	43.82	74.00	-30.18	Vertical
4924.00	40.63	31.37	4.75	37.58	39.17	74.00	-34.83	Horizontal
7386.00	31.54	36.57	6.71	37.74	37.08	74.00	-36.92	Horizontal
9848.00	31.44	38.20	8.07	37.58	40.13	74.00	-33.87	Horizontal

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924.00	31.92	31.37	4.75	37.58	30.46	54.00	-23.54	Vertical
7386.00	22.31	36.57	6.71	37.74	27.85	54.00	-26.15	Vertical
9848.00	23.71	38.20	8.07	37.58	32.40	54.00	-21.60	Vertical
4924.00	31.22	31.37	4.75	37.58	29.76	54.00	-24.24	Horizontal
7386.00	21.00	36.57	6.71	37.74	26.54	54.00	-27.46	Horizontal
9848.00	20.77	38.20	8.07	37.58	29.46	54.00	-24.54	Horizontal

Notes:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Pre-amplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

■ **Unwanted Emissions in restricted Frequency Bands**

Test mode:	802.11b	Test channel:	Lowest
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**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	39.61	27.14	2.81	38.64	30.92	74.00	-43.08	Horizontal
2390.00	47.94	27.37	2.91	38.84	39.38	74.00	-34.62	Horizontal
2310.00	38.15	27.14	2.81	38.64	29.46	74.00	-44.54	Vertical
2390.00	49.18	27.37	2.91	38.84	40.62	74.00	-33.38	Vertical

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	29.96	27.14	2.81	38.64	21.27	54.00	-32.73	Horizontal
2390.00	37.03	27.37	2.91	38.84	28.47	54.00	-25.53	Horizontal
2310.00	28.61	27.14	2.81	38.64	19.92	54.00	-34.08	Vertical
2390.00	39.00	27.37	2.91	38.84	30.44	54.00	-23.56	Vertical

Test mode:	802.11b	Test channel:	Highest
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**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	48.39	27.82	2.99	39.05	40.15	74.00	-33.85	Horizontal
2500.00	40.87	27.70	3.01	39.10	32.48	74.00	-41.52	Horizontal
2483.50	48.23	27.82	2.99	39.05	39.99	74.00	-34.01	Vertical
2500.00	42.03	27.70	3.01	39.10	33.64	74.00	-40.36	Vertical

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	37.01	27.82	2.99	39.05	28.77	54.00	-25.23	Horizontal
2500.00	33.50	27.70	3.01	39.10	25.11	54.00	-28.89	Horizontal
2483.50	37.78	27.82	2.99	39.05	29.54	54.00	-24.46	Vertical
2500.00	32.31	27.70	3.01	39.10	23.92	54.00	-30.08	Vertical

Test mode:	802.11g	Test channel:	Lowest
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**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	39.41	27.14	2.81	38.64	30.72	74.00	-43.28	Horizontal
2390.00	47.67	27.37	2.91	38.84	39.11	74.00	-34.89	Horizontal
2310.00	37.93	27.14	2.81	38.64	29.24	74.00	-44.76	Vertical
2390.00	48.86	27.37	2.91	38.84	40.30	74.00	-33.70	Vertical

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	29.81	27.14	2.81	38.64	21.12	54.00	-32.88	Horizontal
2390.00	36.87	27.37	2.91	38.84	28.31	54.00	-25.69	Horizontal
2310.00	28.46	27.14	2.81	38.64	19.77	54.00	-34.23	Vertical
2390.00	38.82	27.37	2.91	38.84	30.26	54.00	-23.74	Vertical

Test mode:	802.11g	Test channel:	Highest
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**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	48.10	27.82	2.99	39.05	39.86	74.00	-34.14	Horizontal
2500.00	40.65	27.70	3.01	39.10	32.26	74.00	-41.74	Horizontal
2483.50	47.90	27.82	2.99	39.05	39.66	74.00	-34.34	Vertical
2500.00	41.77	27.70	3.01	39.10	33.38	74.00	-40.62	Vertical

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	36.84	27.82	2.99	39.05	28.60	54.00	-25.40	Horizontal
2500.00	33.37	27.70	3.01	39.10	24.98	54.00	-29.02	Horizontal
2483.50	37.59	27.82	2.99	39.05	29.35	54.00	-24.65	Vertical
2500.00	32.16	27.70	3.01	39.10	23.77	54.00	-30.23	Vertical

Test mode:	802.11n(HT20)	Test channel:	Lowest
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**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	39.53	27.14	2.81	38.64	30.84	74.00	-43.16	Horizontal
2390.00	47.83	27.37	2.91	38.84	39.27	74.00	-34.73	Horizontal
2310.00	38.06	27.14	2.81	38.64	29.37	74.00	-44.63	Vertical
2390.00	49.06	27.37	2.91	38.84	40.50	74.00	-33.50	Vertical

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	29.90	27.14	2.81	38.64	21.21	54.00	-32.79	Horizontal
2390.00	36.97	27.37	2.91	38.84	28.41	54.00	-25.59	Horizontal
2310.00	28.55	27.14	2.81	38.64	19.86	54.00	-34.14	Vertical
2390.00	38.93	27.37	2.91	38.84	30.37	54.00	-23.63	Vertical

Test mode:	802.11n(HT20)	Test channel:	Highest
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**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	48.28	27.82	2.99	39.05	40.04	74.00	-33.96	Horizontal
2500.00	40.78	27.70	3.01	39.10	32.39	74.00	-41.61	Horizontal
2483.50	48.10	27.82	2.99	39.05	39.86	74.00	-34.14	Vertical
2500.00	41.92	27.70	3.01	39.10	33.53	74.00	-40.47	Vertical

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	36.95	27.82	2.99	39.05	28.71	54.00	-25.29	Horizontal
2500.00	33.45	27.70	3.01	39.10	25.06	54.00	-28.94	Horizontal
2483.50	37.70	27.82	2.99	39.05	29.46	54.00	-24.54	Vertical
2500.00	32.25	27.70	3.01	39.10	23.86	54.00	-30.14	Vertical

*Remarks:*

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

## **8 Test Setup Photo**

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

## **9 EUT Constructional Details**

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

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