

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/ Factory: HANSHOW TECHNOLOGY CO., LTD

Address of Manufacturer/ Factory: Building 1F and Building 5F in Jiaxing Photovoltaic High-tech Park,No,1288 Kanghe Rd.,Xiuzhou District,Jiaxing,Zhejiang,China

Equipment Under Test (EUT)

Product Name: digital signage

Model No.: HS-AT3701, HS-AT3703, HS-AT3711, HS-AT3721, HS-AT3713, HS-AT3723, HS-AT3731, HS-AT3733, HS-AT3791, HS-AT3793, HS-AT37B1, HS-AT37B

FCC ID: 2AYMH-AT3701

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

Date of sample receipt: October 21, 2021

Date of Test: October 22, 2021-November 24, 2021

Date of report issued: November 25, 2021

Test Result : PASS *

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

Authorized Signature:



Robinson Luo

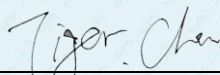
Laboratory Manager

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	November 25, 2021	Original

Prepared By:

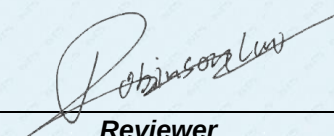


Project Engineer

Date:

November 25, 2021

Check By:



Reviewer

Date:

November 25, 2021

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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	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.:	HS-AT3701, HS-AT3703, HS-AT3711, HS-AT3721, HS-AT3713, HS-AT3723, HS-AT3731, HS-AT3733, HS-AT3791, HS-AT3793, HS-AT37B1, HS-AT37B
Test Model No.:	HS-AT3701
Remark: All above models are identical in the same PCB layout, interior structure and electrical circuits. The difference is model name for commercial purpose.	
Test sample(s) ID:	GTS202110000134-1
Sample(s) Status	Engineer sample
S/N:	200319240000000018
Hardware Version:	V1.0
Software Version:	V1.0
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:	Integral Antenna
Antenna gain:	2dBi
Power supply:	AC 120V

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	

5.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode
<i>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.</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	6.5Mbps	

5.3 Description of Support Units

None.

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. ● IC —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 Industry Canada 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).
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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 software 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	July. 02 2020	July. 01 2025
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	June. 24 2021	June. 23 2022
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 24 2021	June. 23 2022
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 24 2021	June. 23 2022
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 24 2021	June. 23 2022
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 24 2021	June. 23 2022
9	Coaxial Cable	GTS	N/A	GTS211	June. 24 2021	June. 23 2022
10	Coaxial cable	GTS	N/A	GTS210	June. 24 2021	June. 23 2022
11	Coaxial Cable	GTS	N/A	GTS212	June. 24 2021	June. 23 2022
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 24 2021	June. 23 2022
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 24 2021	June. 23 2022
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 24 2021	June. 23 2022
15	Band filter	Amindeon	82346	GTS219	June. 24 2021	June. 23 2022
16	Power Meter	Anritsu	ML2495A	GTS540	June. 24 2021	June. 23 2022
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 24 2021	June. 23 2022
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 24 2021	June. 23 2022
19	Splitter	Agilent	11636B	GTS237	June. 24 2021	June. 23 2022
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 24 2021	June. 23 2022
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 17 2021	Oct. 16 2022
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 17 2021	Oct. 16 2022
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 17 2021	Oct. 16 2022
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 24 2021	June. 23 2022

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	May.15 2019	May.14 2022
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 24 2021	June. 23 2022
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 24 2021	June. 23 2022
4	ENV216 2-L-V-NETZNACHB.DE	ROHDE&SCHWARZ	ENV216	GTS226	June. 24 2021	June. 23 2022
5	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Thermo meter	KTJ	TA328	GTS233	June. 24 2021	June. 23 2022
8	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	June. 24 2021	June. 23 2022
9	ISN	SCHWARZBECK	NTFM 8158	GTD565	June. 24 2021	June. 23 2022
10	High voltage probe	SCHWARZBECK	TK9420	GTS537	July. 09 2021	July. 08 2022

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	June. 24 2021	June. 23 2022
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 24 2021	June. 23 2022
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June. 24 2021	June. 23 2022
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	June. 24 2021	June. 23 2022
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	June. 24 2021	June. 23 2022
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	June. 24 2021	June. 23 2022
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	June. 24 2021	June. 23 2022
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	June. 24 2021	June. 23 2022

General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 24 2021	June. 23 2022
2	Barometer	ChangChun	DYM3	GTS255	June. 24 2021	June. 23 2022

7 Test results and Measurement Data

7.1 Antenna requirement

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

7.2 Conducted Emissions

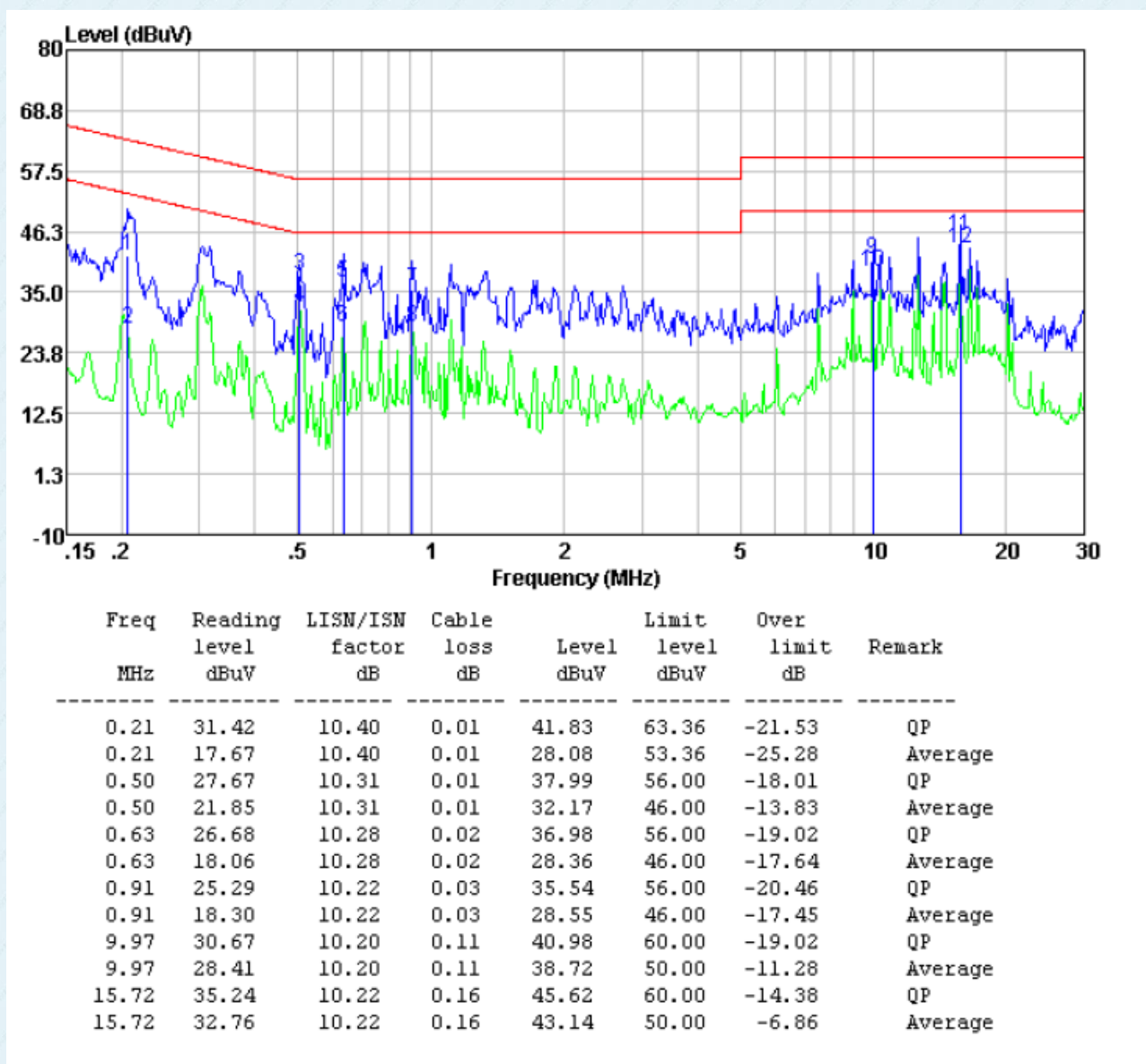
Test Requirement:	FCC Part15 C Section 15.207						
Test Method:	ANSI C63.10:2013						
Test Frequency Range:	150KHz to 30MHz						
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto						
Limit:	Frequency range (MHz)		Limit (dBuV)				
			Quasi-peak		Average		
	0.15-0.5		66 to 56*		56 to 46*		
	0.5-5		56		46		
	5-30		60		50		
* Decreases with the logarithm of the frequency.							
Test setup:	Reference Plane LISN AUX Equipment E.U.T Test table/Insulation plane 40cm 80cm LISN Filter EMI Receiver AC power 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: Both high and low voltages have been tested to show only the worst low voltage test data.

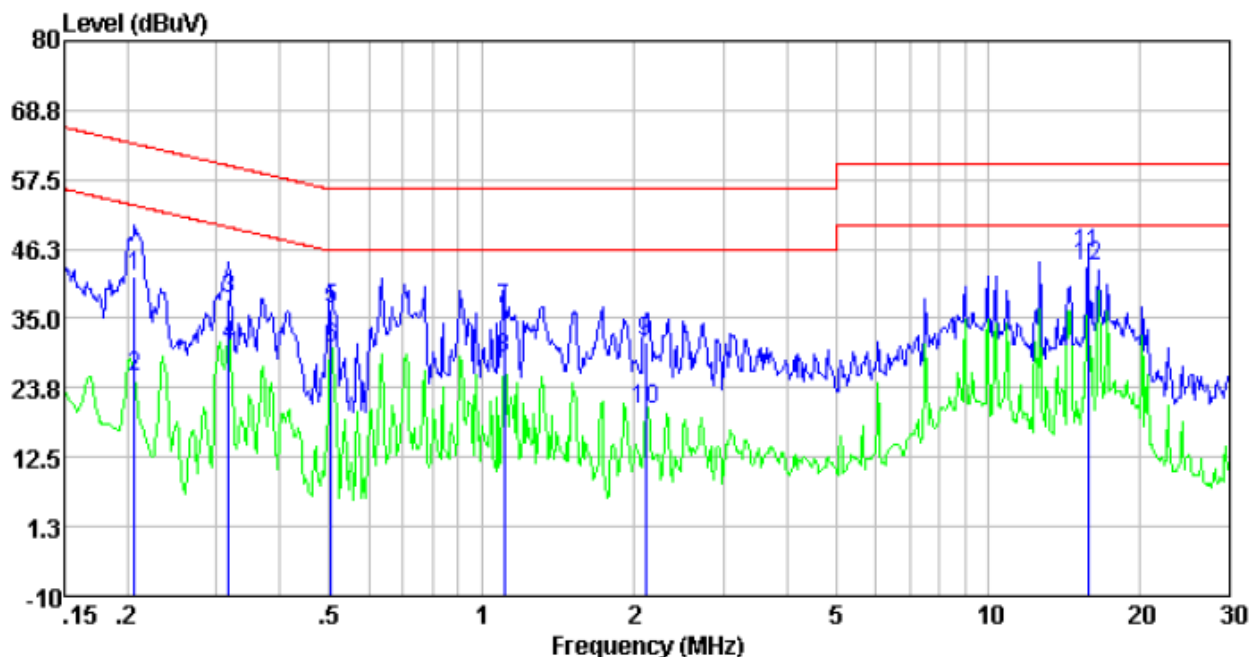
Measurement data

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

Line:



Neutral:

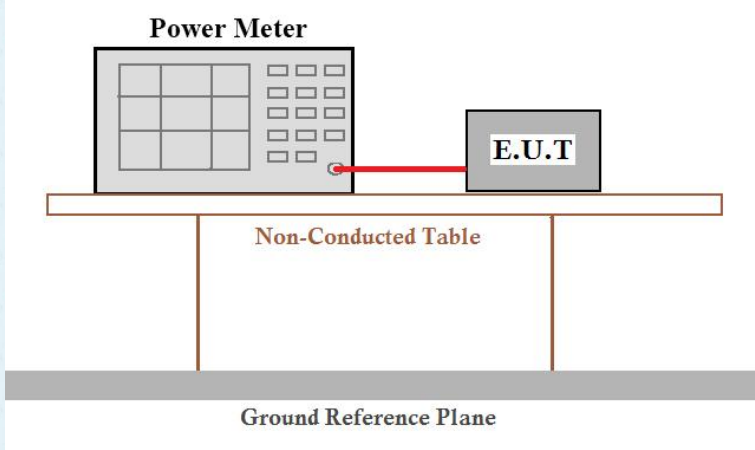


Freq MHz	Reading level dBUV	LISN/ISN factor dB	Cable loss dB	Level dBUV	Limit level dBUV	Over limit dB	Remark
0.21	31.32	10.40	0.01	41.73	63.36	-21.63	QP
0.21	15.02	10.40	0.01	25.43	53.36	-27.93	Average
0.32	27.84	10.39	0.01	38.24	59.80	-21.56	QP
0.32	20.06	10.39	0.01	30.46	49.80	-19.34	Average
0.50	26.31	10.31	0.01	36.63	56.00	-19.37	QP
0.50	20.01	10.31	0.01	30.33	46.00	-15.67	Average
1.11	26.25	10.20	0.03	36.48	56.00	-19.52	QP
1.11	18.15	10.20	0.03	28.38	46.00	-17.62	Average
2.11	20.94	10.20	0.05	31.19	56.00	-24.81	QP
2.11	9.93	10.20	0.05	20.18	46.00	-25.82	Average
15.72	35.08	10.22	0.16	45.46	60.00	-14.54	QP
15.72	33.17	10.22	0.16	43.55	50.00	-6.45	Average

Notes:

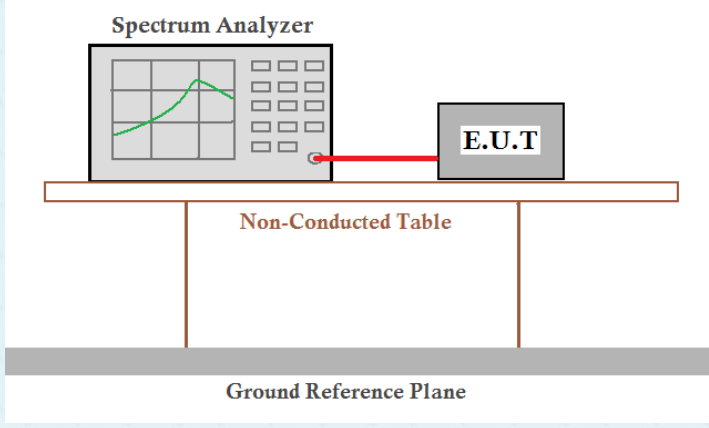
1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss

7.3 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:	 The diagram illustrates the test setup. A Power Meter is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Power Meter and the E.U.T. are placed on a Non-Conducted Table. The table 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

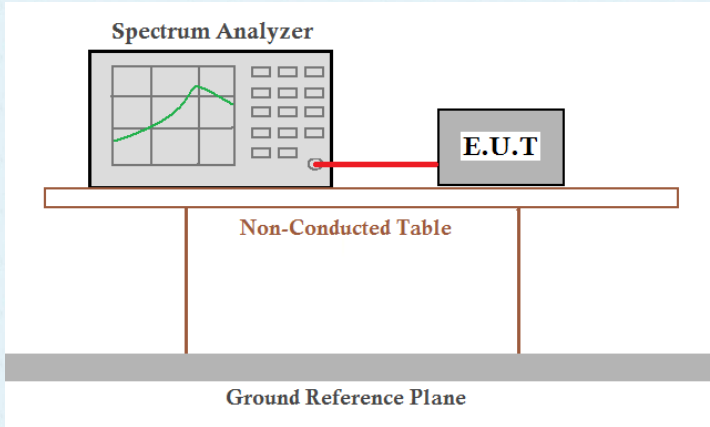
Measurement Data: The detailed test data see Appendix

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:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T are placed on a Non-Conducted Table. The table 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

Measurement Data: The detailed test data see Appendix

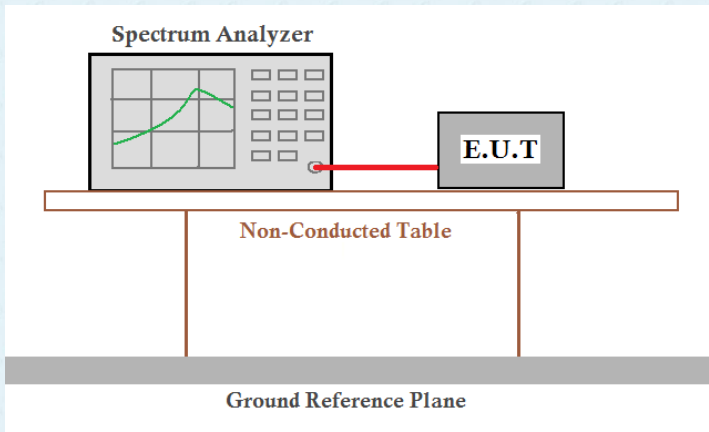
7.5 Power Spectral Density

Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	KDB558074 D01 15.247 Meas Guidance v05r02
Limit:	8dBm/3kHz
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T are placed on a Non-Conducted Table. The table 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

Measurement Data: The detailed test data see Appendix

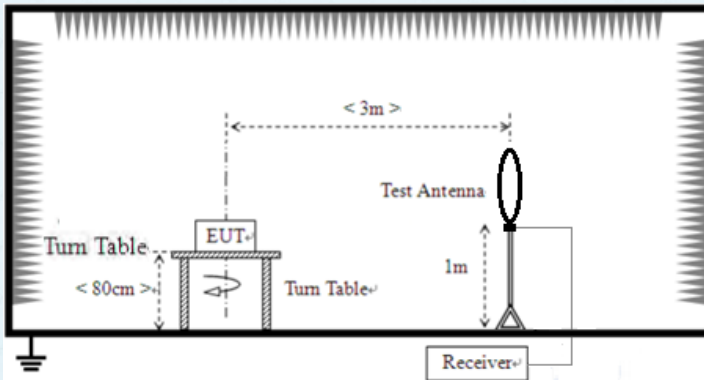
7.6 Spurious Emission in Non-restricted & restricted Bands

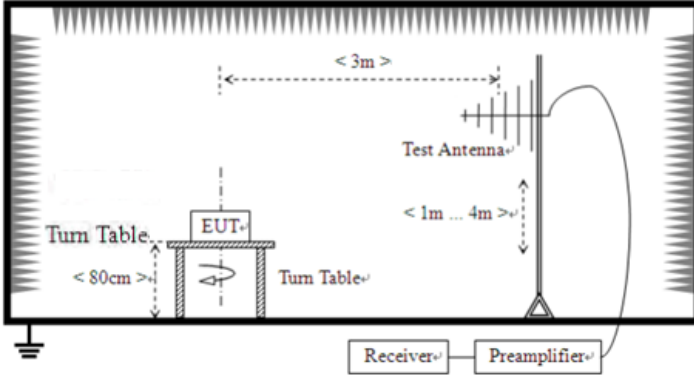
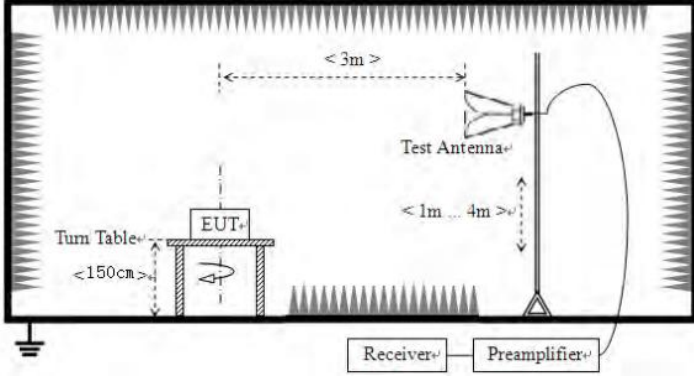
7.6.1 Conducted Emission Method

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 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. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by two vertical legs and sits on 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

Measurement Data: The detailed test data see Appendix

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
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. 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 voltage:	AC120V 60Hz					
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:

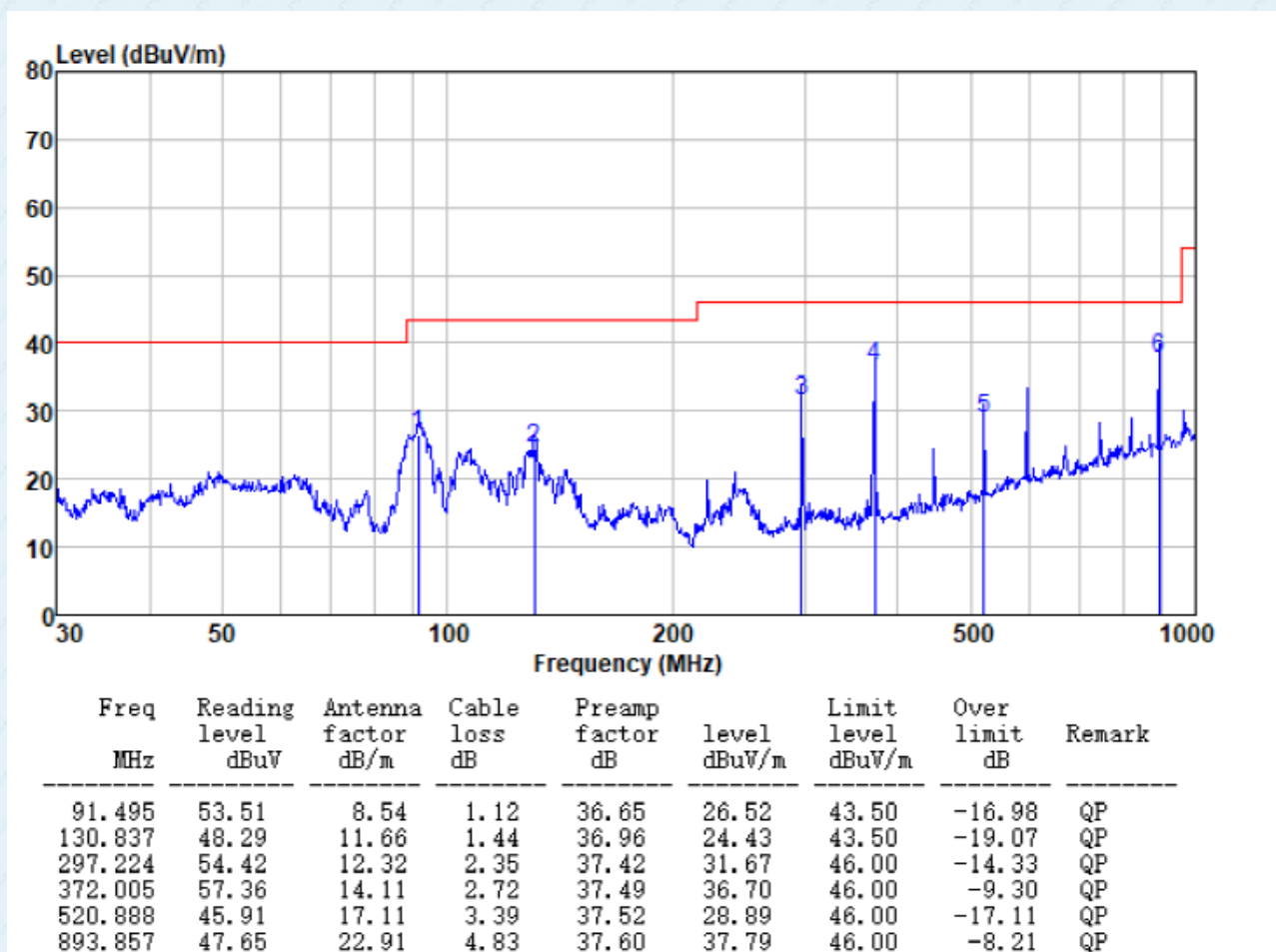
■ **9kHz~30MHz**

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.

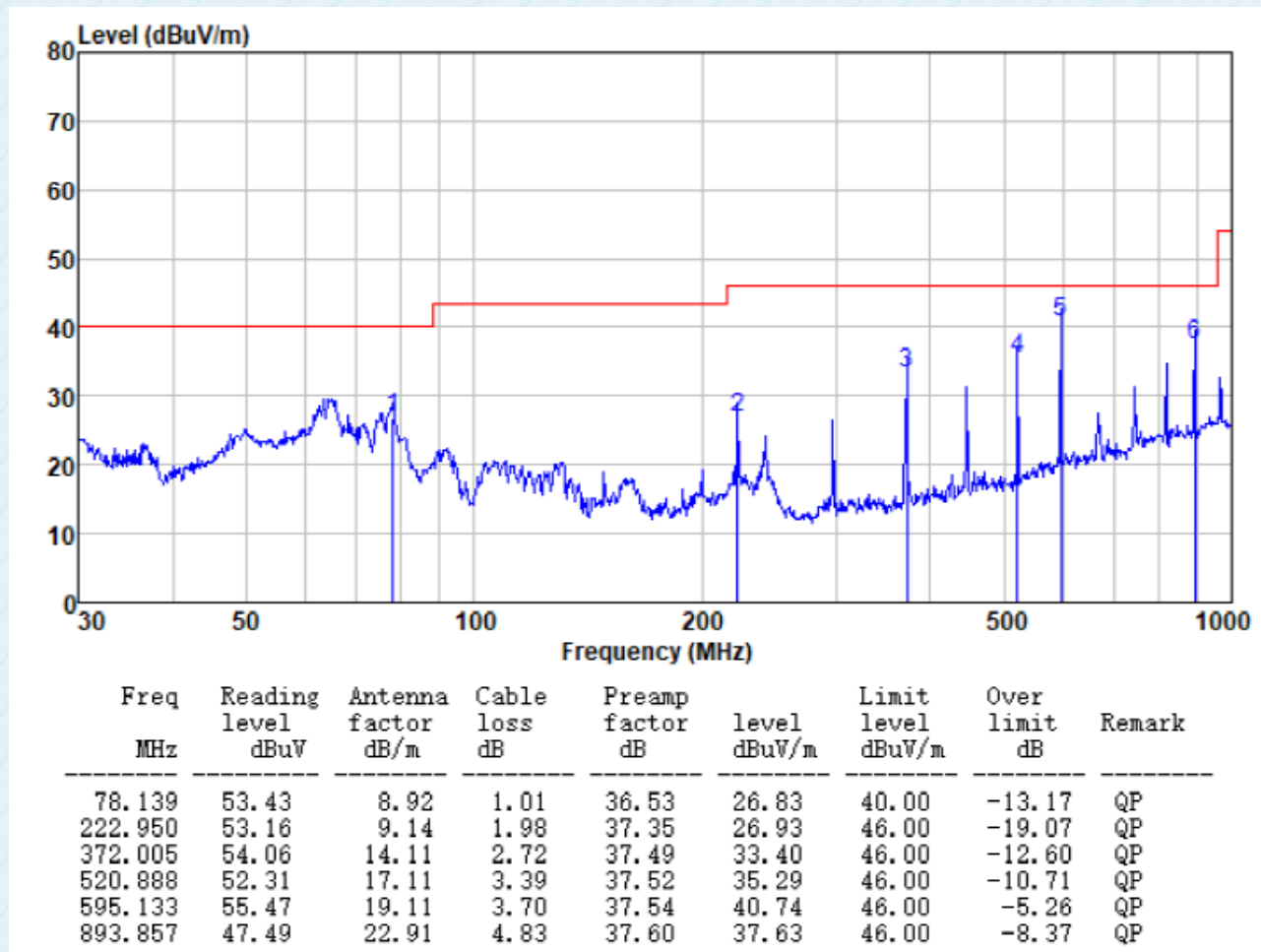
■ Below 1GHz

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

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)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824.00	39.11	31.79	8.62	32.10	47.42	74.00	-26.58	Vertical
7236.00	33.47	36.19	11.68	31.97	49.37	74.00	-24.63	Vertical
9648.00	32.18	38.07	14.16	31.56	52.85	74.00	-21.15	Vertical
4824.00	37.96	31.79	8.62	32.10	46.27	74.00	-27.73	Horizontal
7236.00	33.31	36.19	11.68	31.97	49.21	74.00	-24.79	Horizontal
9648.00	31.80	38.07	14.16	31.56	52.47	74.00	-21.53	Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824.00	28.29	31.79	8.62	32.10	36.60	54.00	-17.40	Vertical
7236.00	22.36	36.19	11.68	31.97	38.26	54.00	-15.74	Vertical
9648.00	22.55	38.07	14.16	31.56	43.22	54.00	-10.78	Vertical
4824.00	27.56	31.79	8.62	32.10	35.87	54.00	-18.13	Horizontal
7236.00	21.91	36.19	11.68	31.97	37.81	54.00	-16.19	Horizontal
9648.00	21.56	38.07	14.16	31.56	42.23	54.00	-11.77	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	38.37	31.85	8.66	32.12	46.76	74.00	-27.24	Vertical
7311.00	33.67	36.37	11.71	31.91	49.84	74.00	-24.16	Vertical
9748.00	33.29	38.27	14.25	31.56	54.25	74.00	-19.75	Vertical
4874.00	39.00	31.85	8.66	32.12	47.39	74.00	-26.61	Horizontal
7311.00	32.39	36.37	11.71	31.91	48.56	74.00	-25.44	Horizontal
9748.00	33.21	38.27	14.25	31.56	54.17	74.00	-19.83	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	29.30	31.85	8.66	32.12	37.69	54.00	-16.31	Vertical
7311.00	22.01	36.37	11.71	31.91	38.18	54.00	-15.82	Vertical
9748.00	22.56	38.27	14.25	31.56	43.52	54.00	-10.48	Vertical
4874.00	29.17	31.85	8.66	32.12	37.56	54.00	-16.44	Horizontal
7311.00	21.49	36.37	11.71	31.91	37.66	54.00	-16.34	Horizontal
9748.00	22.94	38.27	14.25	31.56	43.90	54.00	-10.10	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	43.19	31.90	8.70	32.15	51.64	74.00	-22.36	Vertical
7386.00	33.90	36.49	11.76	31.83	50.32	74.00	-23.68	Vertical
9848.00	36.27	38.62	14.31	31.77	57.43	74.00	-16.57	Vertical
4924.00	42.76	31.90	8.70	32.15	51.21	74.00	-22.79	Horizontal
7386.00	32.93	36.49	11.76	31.83	49.35	74.00	-24.65	Horizontal
9848.00	32.49	38.62	14.31	31.77	53.65	74.00	-20.35	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	34.24	31.90	8.70	32.15	42.69	54.00	-11.31	Vertical
7386.00	23.85	36.49	11.76	31.83	40.27	54.00	-13.73	Vertical
9848.00	24.80	38.62	14.31	31.77	45.96	54.00	-8.04	Vertical
4924.00	33.21	31.90	8.70	32.15	41.66	54.00	-12.34	Horizontal
7386.00	22.35	36.49	11.76	31.83	38.77	54.00	-15.23	Horizontal
9848.00	21.78	38.62	14.31	31.77	42.94	54.00	-11.06	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	38.52	31.79	8.62	32.10	46.83	74.00	-27.17	Vertical
7236.00	33.10	36.19	11.68	31.97	49.00	74.00	-25.00	Vertical
9648.00	31.91	38.07	14.16	31.56	52.58	74.00	-21.42	Vertical
4824.00	37.46	31.79	8.62	32.10	45.77	74.00	-28.23	Horizontal
7236.00	32.99	36.19	11.68	31.97	48.89	74.00	-25.11	Horizontal
9648.00	31.55	38.07	14.16	31.56	52.22	74.00	-21.78	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	27.74	31.79	8.62	32.10	36.05	54.00	-17.95	Vertical
7236.00	22.00	36.19	11.68	31.97	37.90	54.00	-16.10	Vertical
9648.00	22.29	38.07	14.16	31.56	42.96	54.00	-11.04	Vertical
4824.00	27.10	31.79	8.62	32.10	35.41	54.00	-18.59	Horizontal
7236.00	21.60	36.19	11.68	31.97	37.50	54.00	-16.50	Horizontal
9648.00	21.33	38.07	14.16	31.56	42.00	54.00	-12.00	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	37.88	31.85	8.66	32.12	46.27	74.00	-27.73	Vertical
7311.00	33.36	36.37	11.71	31.91	49.53	74.00	-24.47	Vertical
9748.00	33.07	38.27	14.25	31.56	54.03	74.00	-19.97	Vertical
4874.00	38.59	31.85	8.66	32.12	46.98	74.00	-27.02	Horizontal
7311.00	32.12	36.37	11.71	31.91	48.29	74.00	-25.71	Horizontal
9748.00	33.01	38.27	14.25	31.56	53.97	74.00	-20.03	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	28.85	31.85	8.66	32.12	37.24	54.00	-16.76	Vertical
7311.00	21.71	36.37	11.71	31.91	37.88	54.00	-16.12	Vertical
9748.00	22.35	38.27	14.25	31.56	43.31	54.00	-10.69	Vertical
4874.00	28.78	31.85	8.66	32.12	37.17	54.00	-16.83	Horizontal
7311.00	21.23	36.37	11.71	31.91	37.40	54.00	-16.60	Horizontal
9748.00	22.75	38.27	14.25	31.56	43.71	54.00	-10.29	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	42.35	31.90	8.70	32.15	50.80	74.00	-23.20	Vertical
7386.00	33.37	36.49	11.76	31.83	49.79	74.00	-24.21	Vertical
9848.00	35.89	38.62	14.31	31.77	57.05	74.00	-16.95	Vertical
4924.00	42.05	31.90	8.70	32.15	50.50	74.00	-23.50	Horizontal
7386.00	32.47	36.49	11.76	31.83	48.89	74.00	-25.11	Horizontal
9848.00	32.14	38.62	14.31	31.77	53.30	74.00	-20.70	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	33.46	31.90	8.70	32.15	41.91	54.00	-12.09	Vertical
7386.00	23.34	36.49	11.76	31.83	39.76	54.00	-14.24	Vertical
9848.00	24.43	38.62	14.31	31.77	45.59	54.00	-8.41	Vertical
4924.00	32.55	31.90	8.70	32.15	41.00	54.00	-13.00	Horizontal
7386.00	21.90	36.49	11.76	31.83	38.32	54.00	-15.68	Horizontal
9848.00	21.44	38.62	14.31	31.77	42.60	54.00	-11.40	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	38.74	31.79	8.62	32.10	47.05	74.00	-26.95	Vertical
7236.00	33.24	36.19	11.68	31.97	49.14	74.00	-24.86	Vertical
9648.00	32.01	38.07	14.16	31.56	52.68	74.00	-21.32	Vertical
4824.00	37.65	31.79	8.62	32.10	45.96	74.00	-28.04	Horizontal
7236.00	33.11	36.19	11.68	31.97	49.01	74.00	-24.99	Horizontal
9648.00	31.65	38.07	14.16	31.56	52.32	74.00	-21.68	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	27.95	31.79	8.62	32.10	36.26	54.00	-17.74	Vertical
7236.00	22.14	36.19	11.68	31.97	38.04	54.00	-15.96	Vertical
9648.00	22.39	38.07	14.16	31.56	43.06	54.00	-10.94	Vertical
4824.00	27.27	31.79	8.62	32.10	35.58	54.00	-18.42	Horizontal
7236.00	21.72	36.19	11.68	31.97	37.62	54.00	-16.38	Horizontal
9648.00	21.42	38.07	14.16	31.56	42.09	54.00	-11.91	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	38.07	31.85	8.66	32.12	46.46	74.00	-27.54	Vertical
7311.00	33.48	36.37	11.71	31.91	49.65	74.00	-24.35	Vertical
9748.00	33.15	38.27	14.25	31.56	54.11	74.00	-19.89	Vertical
4874.00	38.75	31.85	8.66	32.12	47.14	74.00	-26.86	Horizontal
7311.00	32.22	36.37	11.71	31.91	48.39	74.00	-25.61	Horizontal
9748.00	33.09	38.27	14.25	31.56	54.05	74.00	-19.95	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	29.02	31.85	8.66	32.12	37.41	54.00	-16.59	Vertical
7311.00	21.82	36.37	11.71	31.91	37.99	54.00	-16.01	Vertical
9748.00	22.43	38.27	14.25	31.56	43.39	54.00	-10.61	Vertical
4874.00	28.92	31.85	8.66	32.12	37.31	54.00	-16.69	Horizontal
7311.00	21.33	36.37	11.71	31.91	37.50	54.00	-16.50	Horizontal
9748.00	22.82	38.27	14.25	31.56	43.78	54.00	-10.22	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	42.67	31.90	8.70	32.15	51.12	74.00	-22.88	4924.00
7386.00	33.57	36.49	11.76	31.83	49.99	74.00	-24.01	7386.00
9848.00	36.03	38.62	14.31	31.77	57.19	74.00	-16.81	9848.00
4924.00	42.32	31.90	8.70	32.15	50.77	74.00	-23.23	Horizontal
7386.00	32.64	36.49	11.76	31.83	49.06	74.00	-24.94	Horizontal
9848.00	32.28	38.62	14.31	31.77	53.44	74.00	-20.56	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	33.76	31.90	8.70	32.15	42.21	54.00	-11.79	Vertical
7386.00	23.53	36.49	11.76	31.83	39.95	54.00	-14.05	Vertical
9848.00	24.57	38.62	14.31	31.77	45.73	54.00	-8.27	Vertical
4924.00	32.80	31.90	8.70	32.15	41.25	54.00	-12.75	Horizontal
7386.00	22.07	36.49	11.76	31.83	38.49	54.00	-15.51	Horizontal
9848.00	21.57	38.62	14.31	31.77	42.73	54.00	-11.27	Horizontal

Notes:

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.

■ 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)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	38.26	27.14	6.19	42.04	29.55	74.00	-44.45	Horizontal
2390.00	46.14	27.37	6.31	42.11	37.71	74.00	-36.29	Horizontal
2310.00	36.71	27.14	6.19	42.04	28.00	74.00	-46.00	Vertical
2390.00	47.03	27.37	6.31	42.11	38.60	74.00	-35.40	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	29.00	27.14	6.19	42.04	20.29	54.00	-33.71	Horizontal
2390.00	35.93	27.37	6.31	42.11	27.50	54.00	-26.50	Horizontal
2310.00	27.55	27.14	6.19	42.04	18.84	54.00	-35.16	Vertical
2390.00	37.79	27.37	6.31	42.11	29.36	54.00	-24.64	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)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	46.47	27.66	6.45	42.01	38.57	74.00	-35.43	Horizontal
2500.00	39.38	27.70	6.47	42.00	31.55	74.00	-42.45	Horizontal
2483.50	46.03	27.66	6.45	42.01	38.13	74.00	-35.87	Vertical
2500.00	40.28	27.70	6.47	42.00	32.45	74.00	-41.55	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	35.85	27.66	6.45	42.01	27.95	54.00	-26.05	Horizontal
2500.00	32.60	27.70	6.47	42.00	24.77	54.00	-29.23	Horizontal
2483.50	36.50	27.66	6.45	42.01	28.60	54.00	-25.40	Vertical
2500.00	31.35	27.70	6.47	42.00	23.52	54.00	-30.48	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)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	38.20	27.14	6.19	42.04	29.49	74.00	-44.51	Horizontal
2390.00	46.05	27.37	6.31	42.11	37.62	74.00	-36.38	Horizontal
2310.00	36.64	27.14	6.19	42.04	27.93	74.00	-46.07	Vertical
2390.00	46.92	27.37	6.31	42.11	38.49	74.00	-35.51	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	28.95	27.14	6.19	42.04	20.24	54.00	-33.76	Horizontal
2390.00	35.87	27.37	6.31	42.11	27.44	54.00	-26.56	Horizontal
2310.00	27.50	27.14	6.19	42.04	18.79	54.00	-35.21	Vertical
2390.00	37.74	27.37	6.31	42.11	29.31	54.00	-24.69	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)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	46.37	27.66	6.45	42.01	38.47	74.00	-35.53	Horizontal
2500.00	39.31	27.70	6.47	42.00	31.48	74.00	-42.52	Horizontal
2483.50	45.93	27.66	6.45	42.01	38.03	74.00	-35.97	Vertical
2500.00	40.20	27.70	6.47	42.00	32.37	74.00	-41.63	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	35.80	27.66	6.45	42.01	27.90	54.00	-26.10	Horizontal
2500.00	32.56	27.70	6.47	42.00	24.73	54.00	-29.27	Horizontal
2483.50	36.43	27.66	6.45	42.01	28.53	54.00	-25.47	Vertical
2500.00	31.30	27.70	6.47	42.00	23.47	54.00	-30.53	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)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	38.25	27.14	6.19	42.04	29.54	74.00	-44.46	Horizontal
2390.00	46.12	27.37	6.31	42.11	37.69	74.00	-36.31	Horizontal
2310.00	36.69	27.14	6.19	42.04	27.98	74.00	-46.02	Vertical
2390.00	47.00	27.37	6.31	42.11	38.57	74.00	-35.43	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	28.99	27.14	6.19	42.04	20.28	54.00	-33.72	Horizontal
2390.00	35.92	27.37	6.31	42.11	27.49	54.00	-26.51	Horizontal
2310.00	27.54	27.14	6.19	42.04	18.83	54.00	-35.17	Vertical
2390.00	37.78	27.37	6.31	42.11	29.35	54.00	-24.65	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)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	46.45	27.66	6.45	42.01	38.55	74.00	-35.45	Horizontal
2500.00	39.36	27.70	6.47	42.00	31.53	74.00	-42.47	Horizontal
2483.50	46.01	27.66	6.45	42.01	38.11	74.00	-35.89	Vertical
2500.00	40.26	27.70	6.47	42.00	32.43	74.00	-41.57	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	35.84	27.66	6.45	42.01	27.94	54.00	-26.06	Horizontal
2500.00	32.59	27.70	6.47	42.00	24.76	54.00	-29.24	Horizontal
2483.50	36.48	27.66	6.45	42.01	28.58	54.00	-25.42	Vertical
2500.00	31.34	27.70	6.47	42.00	23.51	54.00	-30.49	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.

-----End-----