

TEST REPORT

Applicant: Dragino Technology Co., Limited.

Address of Applicant: Room 202,BaoChengTai industrial park,No.8 CaiYun LongCheng Street,LongGang District, Shenzhen 518116, China

Manufacturer/Factory: Dragino Technology Co., Limited.

Address of Manufacturer/Factory: Room 202,BaoChengTai industrial park,No.8 CaiYun LongCheng Street,LongGang District, Shenzhen 518116, China

Equipment Under Test (EUT)

Product Name: LoRaWAN Gateway

Model No.: LPS8

Trade Mark : Dragino

FCC ID: ZHZLPS8

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

Date of sample receipt: Nov 21,2019

Date of Test: Nov 21,2019-April16,2020

Date of report issued: April16,2020

Test Result : PASS *

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

Authorized Signature:



The image shows a circular stamp with the text 'GLOBAL UNITED TECHNOLOGY SERVICES' around the perimeter and 'GTS' in the center. Overlaid on the stamp is a handwritten signature in blue ink that reads 'Robinson Lo' and the date 'April 16, 2020'.

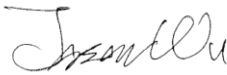
Robinson Lo

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	April 16, 2020	Original

Prepared By:  **Date:** April 16, 2020

Project Engineer

Check By:  **Date:** April 16, 2020

Reviewer

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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	Pass
AC Power Line Conducted Emission	15.207	Pass
Radiated Spurious Emission	15.205/15.209	Pass

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

Remark: Test according to ANSI C63.10: 2013.

4.1 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:	LoRaWAN Gateway
Model No.:	LPS8
Serial No.:	N/A
Test sample(s) ID:	GTS201912000229-1
Sample(s) Status	Engineered sample
Operation Frequency:	802.11b/802.11g/802.11n(HT20): 2412MHz~2462MHz 802.11n(HT40): 2422MHz~2452MHz
Channel numbers:	802.11b/802.11g /802.11n(HT20): 11 802.11(HT40): 7
Channel separation:	5MHz
Modulation technology:	802.11b: Direct Sequence Spread Spectrum (DSSS) 802.11g/802.11n(H20)/802.11n(H40): Orthogonal Frequency Division Multiplexing (OFDM)
Antenna Type:	Integral antenna
Antenna gain:	2.0dBi (Declared by applicant)
Power supply:	DC 5.0V

Note: The Wifi module has certificated as a limited signal modular, FCC ID: ZHZHE. So only conducted emission and radiated spurious emission were tested for the LoRaWAN Gateway.

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)	802.11n(HT40)
Lowest channel	2412MHz	2422MHz
Middle channel	2437MHz	2437MHz
Highest channel	2462MHz	2452MHz

5.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode
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.	

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:				
Per-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)	802.11n(HT40)
Data rate	1Mbps	6Mbps	6.5Mbps	13Mbps

5.3 Description of Support Units

Manufacturer	Description	Model	Serial Number
N/A	N/A	N/A	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**

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. Registration 381383.

- **IC —Registration No.: 9079A**

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 with Registration No.: 9079A

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

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0

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

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. 03 2015	July. 02 2020
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. 26 2019	June. 25 2020
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 26 2019	June. 25 2020
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 26 2019	June. 25 2020
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 26 2019	June. 25 2020
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 26 2019	June. 25 2020
9	Coaxial Cable	GTS	N/A	GTS211	June. 26 2019	June. 25 2020
10	Coaxial cable	GTS	N/A	GTS210	June. 26 2019	June. 25 2020
11	Coaxial Cable	GTS	N/A	GTS212	June. 26 2019	June. 25 2020
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 26 2019	June. 25 2020
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 26 2019	June. 25 2020
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 26 2019	June. 25 2020
15	Band filter	Amindeon	82346	GTS219	June. 26 2019	June. 25 2020
16	Power Meter	Anritsu	ML2495A	GTS540	June. 26 2019	June. 25 2020
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 26 2019	June. 25 2020
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 26 2019	June. 25 2020
19	Splitter	Agilent	11636B	GTS237	June. 26 2019	June. 25 2020
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 26 2019	June. 25 2020
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 19 2019	Oct. 18 2020
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 19 2019	Oct. 18 2020
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 19 2019	Oct. 18 2020
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 26 2019	June. 25 2020

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. 26 2019	June. 25 2020
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 26 2019	June. 25 2020
4	Artificial Mains Network	SCHWARZBECK MESS	NSLK8127	GTS226	June. 26 2019	June. 25 2020
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. 26 2019	June. 25 2020
8	Absorbing clamp	Elektronik- Feinmechanik	MDS21	GTS229	June. 26 2019	June. 25 2020
9	ISN	SCHWARZBECK	NTFM 8158	GTD565	June. 26 2019	June. 25 2020

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. 26 2019	June. 25 2020
2	Barometer	ChangChun	DYM3	GTS255	June. 26 2019	June. 25 2020

7 Test results and Measurement Data

7.1 Antenna requirement

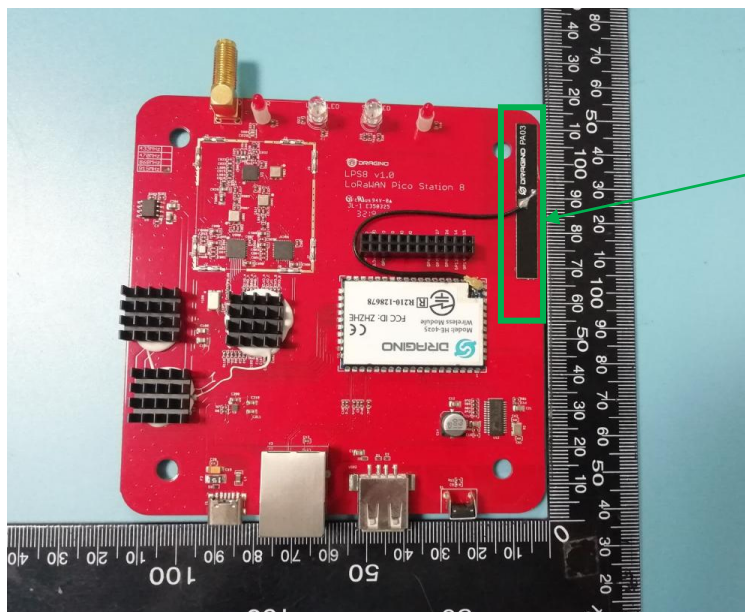
Standard requirement:

FCC part 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.

EUT Antenna:

The antenna is external antenna, the best case gain of the antenna is 2.0dBi



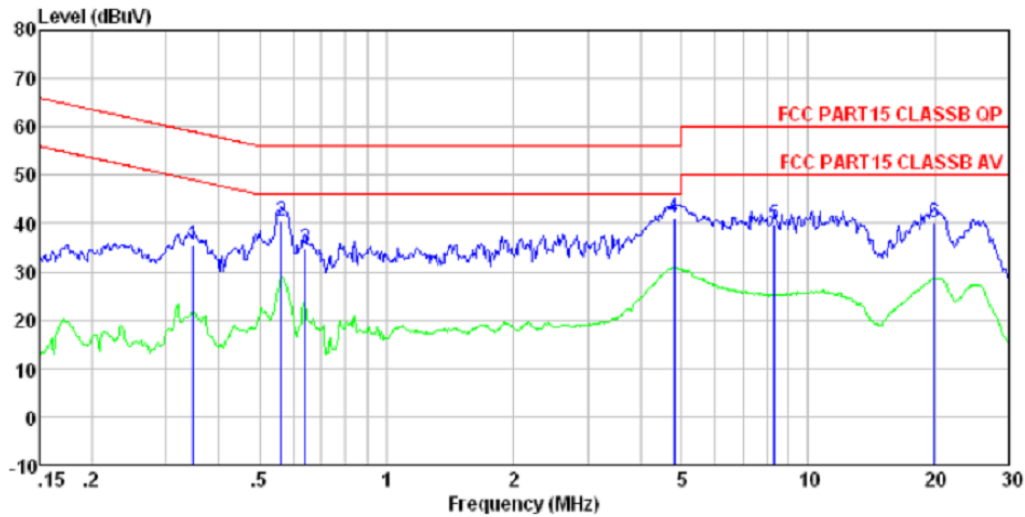
WiFi antenna

7.2 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:	<p>Remark 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"> 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 results:	Pass					
Test voltage:	AC120V 60Hz					

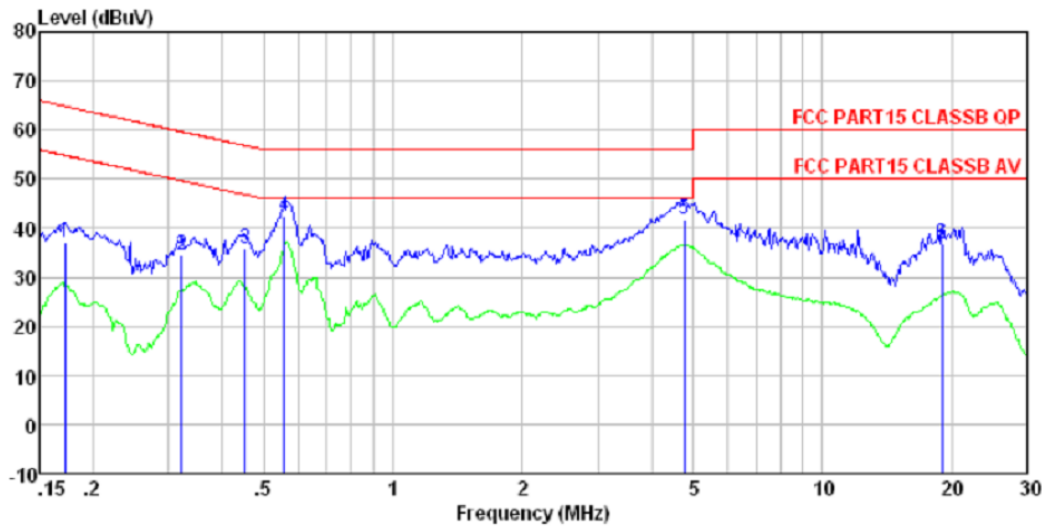
Measurement data:

Line:



	Read Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.348	35.18	0.11	0.10	35.39	59.00	-23.61	QP
2	0.564	40.32	0.13	0.12	40.57	56.00	-15.43	QP
3	0.641	34.56	0.13	0.13	34.82	56.00	-21.18	QP
4	4.822	40.66	0.21	0.15	41.02	56.00	-14.98	QP
5	8.323	39.40	0.28	0.18	39.86	60.00	-20.14	QP
6	19.950	39.29	0.60	0.22	40.11	60.00	-19.89	QP

Neutral:



	Read Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.172	36.96	0.07	0.12	37.15	64.86	-27.71	QP
2	0.322	34.33	0.06	0.10	34.49	59.66	-25.17	QP
3	0.452	35.51	0.06	0.11	35.68	56.85	-21.17	QP
4	0.558	42.36	0.07	0.12	42.55	56.00	-13.45	QP
5	4.772	41.43	0.15	0.15	41.73	56.00	-14.27	QP
6	19.021	36.00	0.47	0.22	36.69	60.00	-23.31	QP

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 Radiated Spurious Emission

Test Requirement:	FCC Part15 C Section 15.209			
Test Method:	ANSI C63.10:2013			
Test Frequency Range:	30MHz to 25GHz			
Test site:	Measurement Distance: 3m			
Receiver setup:	Frequency	Detector	RBW	VBW
	30MHz-1GHz	Quasi-peak	120KHz	300KHz
	Above 1GHz	Peak	1MHz	3MHz
		RMS	1MHz	3MHz
Limit:	Frequency	Limit (dBuV/m @3m)	Value	
	30MHz-88MHz	40.00	Quasi-peak	
	88MHz-216MHz	43.50	Quasi-peak	
	216MHz-960MHz	46.00	Quasi-peak	
	Above 1GHz	54.00	Average	
		74.00	Peak	
Test setup:	Below 1GHz			
Test setup:	Above 1GHz			

<p>Test Procedure:</p>	<ol style="list-style-type: none"> 1. The EUT was placed on the top of a rotating table(0.8 meters below 1G and 1.5 meters 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. 7. The radiation measurements are performed in X, Y, Z axis positioning. And found the Y axis positioning which it is worse case, only the test worst case mode is recorded in the report.
<p>Test Instruments:</p>	<p>Refer to section 6.0 for details</p>
<p>Test mode:</p>	<p>Refer to section 5.2 for details</p>
<p>Test results:</p>	<p>Pass</p>

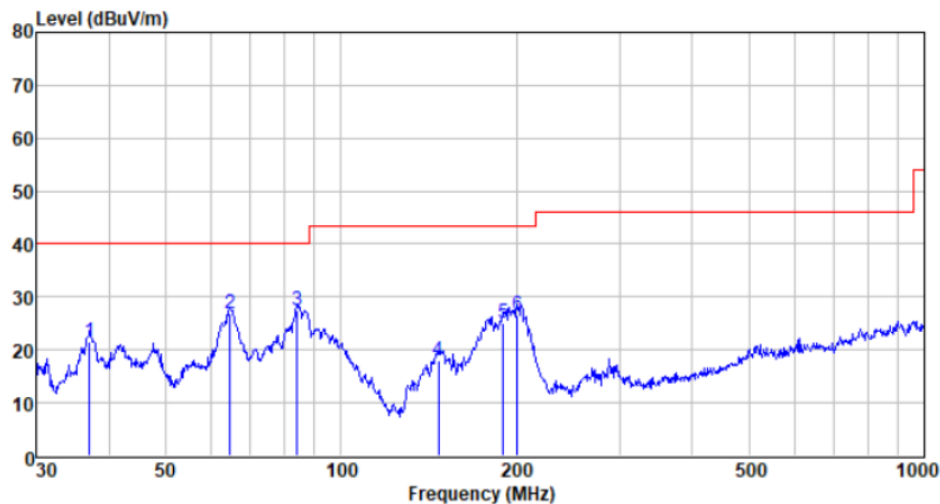
Remark:

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

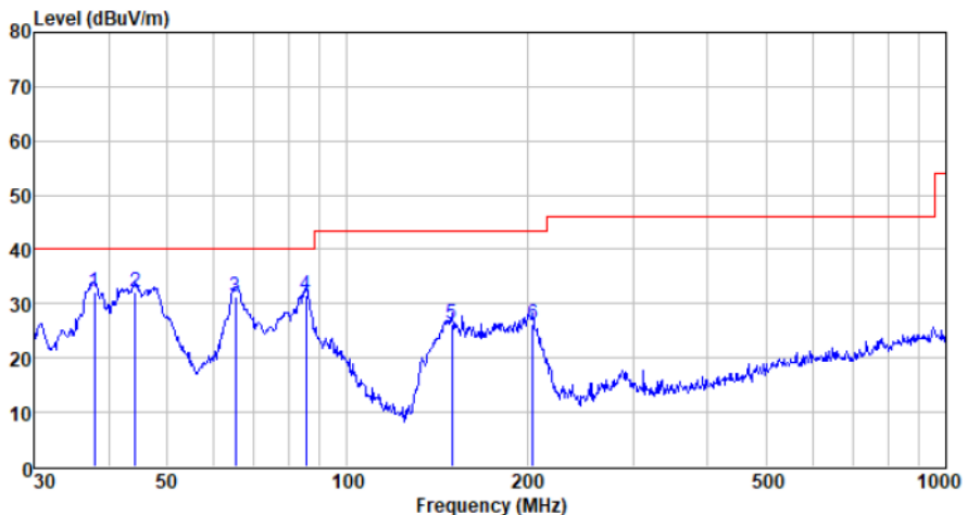
■ **Below 1GHz**

Horizontal:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
37.025	44.67	11.70	0.63	35.49	21.51	40.00	-18.49	QP
64.433	52.68	9.57	0.90	36.38	26.77	40.00	-13.23	QP
84.110	54.27	8.80	1.06	36.59	27.54	40.00	-12.46	QP
146.888	45.88	7.54	1.55	37.06	17.91	43.50	-25.59	QP
189.739	50.75	9.90	1.79	37.28	25.16	43.50	-18.34	QP
200.688	51.60	10.44	1.84	37.33	26.55	43.50	-16.95	QP

Vertical:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
37.812	55.36	11.83	0.64	35.53	32.30	40.00	-7.70	QP
44.275	55.19	12.25	0.71	35.90	32.25	40.00	-7.75	QP
65.114	57.34	9.34	0.90	36.39	31.19	40.00	-8.81	QP
85.298	58.04	9.18	1.07	36.60	31.69	40.00	-8.31	QP
149.486	54.10	7.60	1.56	37.07	26.19	43.50	-17.31	QP
204.238	51.31	10.58	1.86	37.33	26.42	43.50	-17.08	QP

■ 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	40.89	31.79	8.62	32.10	49.20	74.00	-24.80	Vertical
7236.00	34.60	36.19	11.68	31.97	50.50	74.00	-23.50	Vertical
9648.00	32.98	38.07	14.16	31.56	53.65	74.00	-20.35	Vertical
12060.00	*					74.00		Vertical
14472.00	*					74.00		Vertical
16884.00	*					74.00		Vertical
4824.00	39.47	31.79	8.62	32.10	47.78	74.00	-26.22	Horizontal
7236.00	34.30	36.19	11.68	31.97	50.20	74.00	-23.80	Horizontal
9648.00	32.54	38.07	14.16	31.56	53.21	74.00	-20.79	Horizontal
12060.00	*					74.00		Horizontal
14472.00	*					74.00		Horizontal
16884.00	*					74.00		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
4824.00	29.93	31.79	8.62	32.10	38.24	54.00	-15.76	Vertical
7236.00	23.45	36.19	11.68	31.97	39.35	54.00	-14.65	Vertical
9648.00	23.32	38.07	14.16	31.56	43.99	54.00	-10.01	Vertical
12060.00	*					54.00		Vertical
14472.00	*					54.00		Vertical
16884.00	*					54.00		Vertical
4824.00	28.97	31.79	8.62	32.10	37.28	54.00	-16.72	Horizontal
7236.00	22.87	36.19	11.68	31.97	38.77	54.00	-15.23	Horizontal
9648.00	22.28	38.07	14.16	31.56	42.95	54.00	-11.05	Horizontal
12060.00	*					54.00		Horizontal
14472.00	*					54.00		Horizontal
16884.00	*					54.00		Horizontal

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Pre-amplifier Factor
2. “*”, means this data is the too weak instrument of signal is unable to test.

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	39.84	31.85	8.66	32.12	48.23	74.00	-25.77	Vertical
7311.00	34.60	36.37	11.71	31.91	50.77	74.00	-23.23	Vertical
9748.00	33.96	38.27	14.25	31.56	54.92	74.00	-19.08	Vertical
12185.00	*					74.00		Vertical
14622.00	*					74.00		Vertical
17059.00	*					74.00		Vertical
4874.00	40.25	31.85	8.66	32.12	48.64	74.00	-25.36	Horizontal
7311.00	33.20	36.37	11.71	31.91	49.37	74.00	-24.63	Horizontal
9748.00	33.83	38.27	14.25	31.56	54.79	74.00	-19.21	Horizontal
12185.00	*					74.00		Horizontal
14622.00	*					74.00		Horizontal
17059.00	*					74.00		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
4874.00	30.66	31.85	8.66	32.12	39.05	54.00	-14.95	Vertical
7311.00	22.91	36.37	11.71	31.91	39.08	54.00	-14.92	Vertical
9748.00	23.20	38.27	14.25	31.56	44.16	54.00	-9.84	Vertical
12185.00	*					54.00		Vertical
14622.00	*					54.00		Vertical
17059.00	*					54.00		Vertical
4874.00	30.33	31.85	8.66	32.12	38.72	54.00	-15.28	Horizontal
7311.00	22.28	36.37	11.71	31.91	38.45	54.00	-15.55	Horizontal
9748.00	23.53	38.27	14.25	31.56	44.49	54.00	-9.51	Horizontal
12185.00	*					54.00		Horizontal
14622.00	*					54.00		Horizontal
17059.00	*					54.00		Horizontal

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *“*” , means this data is the too weak instrument of signal is unable to test.*

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	45.73	31.90	8.70	32.15	54.18	74.00	-19.82	Vertical
7386.00	35.50	36.49	11.76	31.83	51.92	74.00	-22.08	Vertical
9848.00	37.41	38.62	14.31	31.77	58.57	74.00	-15.43	Vertical
12310.00	*					74.00		Vertical
14772.00	*					74.00		Vertical
17234.00	*					74.00		Vertical
4924.00	44.90	31.90	8.70	32.15	53.35	74.00	-20.65	Horizontal
7386.00	34.34	36.49	11.76	31.83	50.76	74.00	-23.24	Horizontal
9848.00	33.55	38.62	14.31	31.77	54.71	74.00	-19.29	Horizontal
12310.00	*					74.00		Horizontal
14772.00	*					74.00		Horizontal
17234.00	*					74.00		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	36.58	31.90	8.70	32.15	45.03	54.00	-8.97	Vertical
7386.00	25.40	36.49	11.76	31.83	41.82	54.00	-12.18	Vertical
9848.00	25.90	38.62	14.31	31.77	47.06	54.00	-6.94	Vertical
12310.00	*					54.00		Vertical
14772.00	*					54.00		Vertical
17234.00	*					54.00		Vertical
4924.00	35.22	31.90	8.70	32.15	43.67	54.00	-10.33	Horizontal
7386.00	23.71	36.49	11.76	31.83	40.13	54.00	-13.87	Horizontal
9848.00	22.80	38.62	14.31	31.77	43.96	54.00	-10.04	Horizontal
12310.00	*					54.00		Horizontal
14772.00	*					54.00		Horizontal
17234.00	*					54.00		Horizontal

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *“*” , means this data is the too weak instrument of signal is unable to test.*

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	39.77	31.79	8.62	32.10	48.08	74.00	-25.92	Vertical
7236.00	33.89	36.19	11.68	31.97	49.79	74.00	-24.21	Vertical
9648.00	32.48	38.07	14.16	31.56	53.15	74.00	-20.85	Vertical
12060.00	*					74.00		Vertical
14472.00	*					74.00		Vertical
16884.00	*					74.00		Vertical
4824.00	38.52	31.79	8.62	32.10	46.83	74.00	-27.17	Horizontal
7236.00	33.68	36.19	11.68	31.97	49.58	74.00	-24.42	Horizontal
9648.00	32.07	38.07	14.16	31.56	52.74	74.00	-21.26	Horizontal
12060.00	*					74.00		Horizontal
14472.00	*					74.00		Horizontal
16884.00	*					74.00		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
4824.00	28.90	31.79	8.62	32.10	37.21	54.00	-16.79	Vertical
7236.00	22.77	36.19	11.68	31.97	38.67	54.00	-15.33	Vertical
9648.00	22.83	38.07	14.16	31.56	43.50	54.00	-10.50	Vertical
12060.00	*					54.00		Vertical
14472.00	*					54.00		Vertical
16884.00	*					54.00		Vertical
4824.00	28.09	31.79	8.62	32.10	36.40	54.00	-17.60	Horizontal
7236.00	22.27	36.19	11.68	31.97	38.17	54.00	-15.83	Horizontal
9648.00	21.83	38.07	14.16	31.56	42.50	54.00	-11.50	Horizontal
12060.00	*					54.00		Horizontal
14472.00	*					54.00		Horizontal
16884.00	*					54.00		Horizontal

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *“*” , means this data is the too weak instrument of signal is unable to test.*

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	38.92	31.85	8.66	32.12	47.31	74.00	-26.69	Vertical
7311.00	34.02	36.37	11.71	31.91	50.19	74.00	-23.81	Vertical
9748.00	33.54	38.27	14.25	31.56	54.50	74.00	-19.50	Vertical
12185.00	*					74.00		Vertical
14622.00	*					74.00		Vertical
17059.00	*					74.00		Vertical
4874.00	39.46	31.85	8.66	32.12	47.85	74.00	-26.15	Horizontal
7311.00	32.69	36.37	11.71	31.91	48.86	74.00	-25.14	Horizontal
9748.00	33.44	38.27	14.25	31.56	54.40	74.00	-19.60	Horizontal
12185.00	*					74.00		Horizontal
14622.00	*					74.00		Horizontal
17059.00	*					74.00		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
4874.00	29.80	31.85	8.66	32.12	38.19	54.00	-15.81	Vertical
7311.00	22.34	36.37	11.71	31.91	38.51	54.00	-15.49	Vertical
9748.00	22.80	38.27	14.25	31.56	43.76	54.00	-10.24	Vertical
12185.00	*					54.00		Vertical
14622.00	*					54.00		Vertical
17059.00	*					54.00		Vertical
4874.00	29.60	31.85	8.66	32.12	37.99	54.00	-16.01	Horizontal
7311.00	21.79	36.37	11.71	31.91	37.96	54.00	-16.04	Horizontal
9748.00	23.16	38.27	14.25	31.56	44.12	54.00	-9.88	Horizontal
12185.00	*					54.00		Horizontal
14622.00	*					54.00		Horizontal
17059.00	*					54.00		Horizontal

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *“*” , means this data is the too weak instrument of signal is unable to test.*

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	44.14	31.90	8.70	32.15	52.59	74.00	-21.41	Vertical
7386.00	34.49	36.49	11.76	31.83	50.91	74.00	-23.09	Vertical
9848.00	36.69	38.62	14.31	31.77	57.85	74.00	-16.15	Vertical
12310.00	*					74.00		Vertical
14772.00	*					74.00		Vertical
17234.00	*					74.00		Vertical
4924.00	43.56	31.90	8.70	32.15	52.01	74.00	-21.99	Horizontal
7386.00	33.45	36.49	11.76	31.83	49.87	74.00	-24.13	Horizontal
9848.00	32.89	38.62	14.31	31.77	54.05	74.00	-19.95	Horizontal
12310.00	*					74.00		Horizontal
14772.00	*					74.00		Horizontal
17234.00	*					74.00		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	35.11	31.90	8.70	32.15	43.56	54.00	-10.44	Vertical
7386.00	24.43	36.49	11.76	31.83	40.85	54.00	-13.15	Vertical
9848.00	25.21	38.62	14.31	31.77	46.37	54.00	-7.63	Vertical
12310.00	*					54.00		Vertical
14772.00	*					54.00		Vertical
17234.00	*					54.00		Vertical
4924.00	33.96	31.90	8.70	32.15	42.41	54.00	-11.59	Horizontal
7386.00	22.86	36.49	11.76	31.83	39.28	54.00	-14.72	Horizontal
9848.00	22.16	38.62	14.31	31.77	43.32	54.00	-10.68	Horizontal
12310.00	*					54.00		Horizontal
14772.00	*					54.00		Horizontal
17234.00	*					54.00		Horizontal

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *“*”, means this data is the too weak instrument of signal is unable to test.*

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	40.36	31.79	8.62	32.10	48.67	74.00	-25.33	Vertical
7236.00	34.26	36.19	11.68	31.97	50.16	74.00	-23.84	Vertical
9648.00	32.74	38.07	14.16	31.56	53.41	74.00	-20.59	Vertical
12060.00	*					74.00		Vertical
14472.00	*					74.00		Vertical
16884.00	*					74.00		Vertical
4824.00	39.02	31.79	8.62	32.10	47.33	74.00	-26.67	Horizontal
7236.00	34.00	36.19	11.68	31.97	49.90	74.00	-24.10	Horizontal
9648.00	32.32	38.07	14.16	31.56	52.99	74.00	-21.01	Horizontal
12060.00	*					74.00		Horizontal
14472.00	*					74.00		Horizontal
16884.00	*					74.00		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
4824.00	29.43	31.79	8.62	32.10	37.74	54.00	-16.26	Vertical
7236.00	23.12	36.19	11.68	31.97	39.02	54.00	-14.98	Vertical
9648.00	23.09	38.07	14.16	31.56	43.76	54.00	-10.24	Vertical
12060.00	*					54.00		Vertical
14472.00	*					54.00		Vertical
16884.00	*					54.00		Vertical
4824.00	28.55	31.79	8.62	32.10	36.86	54.00	-17.14	Horizontal
7236.00	22.58	36.19	11.68	31.97	38.48	54.00	-15.52	Horizontal
9648.00	22.07	38.07	14.16	31.56	42.74	54.00	-11.26	Horizontal
12060.00	*					54.00		Horizontal
14472.00	*					54.00		Horizontal
16884.00	*					54.00		Horizontal

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “*”, means this data is the too weak instrument of signal is unable to test.

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	39.40	31.85	8.66	32.12	47.79	74.00	-26.21	Vertical
7311.00	34.32	36.37	11.71	31.91	50.49	74.00	-23.51	Vertical
9748.00	33.76	38.27	14.25	31.56	54.72	74.00	-19.28	Vertical
12185.00	*					74.00		Vertical
14622.00	*					74.00		Vertical
17059.00	*					74.00		Vertical
4874.00	39.87	31.85	8.66	32.12	48.26	74.00	-25.74	Horizontal
7311.00	32.96	36.37	11.71	31.91	49.13	74.00	-24.87	Horizontal
9748.00	33.64	38.27	14.25	31.56	54.60	74.00	-19.40	Horizontal
12185.00	*					74.00		Horizontal
14622.00	*					74.00		Horizontal
17059.00	*					74.00		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
4874.00	30.25	31.85	8.66	32.12	38.64	54.00	-15.36	Vertical
7311.00	22.64	36.37	11.71	31.91	38.81	54.00	-15.19	Vertical
9748.00	23.01	38.27	14.25	31.56	43.97	54.00	-10.03	Vertical
12185.00	*					54.00		Vertical
14622.00	*					54.00		Vertical
17059.00	*					54.00		Vertical
4874.00	29.98	31.85	8.66	32.12	38.37	54.00	-15.63	Horizontal
7311.00	22.05	36.37	11.71	31.91	38.22	54.00	-15.78	Horizontal
9748.00	23.36	38.27	14.25	31.56	44.32	54.00	-9.68	Horizontal
12185.00	*					54.00		Horizontal
14622.00	*					54.00		Horizontal
17059.00	*					54.00		Horizontal

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “*”, means this data is the too weak instrument of signal is unable to test.

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	44.97	31.90	8.70	32.15	53.42	74.00	-20.58	4924.00
7386.00	35.02	36.49	11.76	31.83	51.44	74.00	-22.56	7386.00
9848.00	37.07	38.62	14.31	31.77	58.23	74.00	-15.77	9848.00
12310.00	*					74.00		Vertical
14772.00	*					74.00		Vertical
17234.00	*					74.00		Vertical
4924.00	44.26	31.90	8.70	32.15	52.71	74.00	-21.29	Horizontal
7386.00	33.92	36.49	11.76	31.83	50.34	74.00	-23.66	Horizontal
9848.00	33.24	38.62	14.31	31.77	54.40	74.00	-19.60	Horizontal
12310.00	*					74.00		Horizontal
14772.00	*					74.00		Horizontal
17234.00	*					74.00		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	35.88	31.90	8.70	32.15	44.33	54.00	-9.67	Vertical
7386.00	24.94	36.49	11.76	31.83	41.36	54.00	-12.64	Vertical
9848.00	25.57	38.62	14.31	31.77	46.73	54.00	-7.27	Vertical
12310.00	*					54.00		Vertical
14772.00	*					54.00		Vertical
17234.00	*					54.00		Vertical
4924.00	34.62	31.90	8.70	32.15	43.07	54.00	-10.93	Horizontal
7386.00	23.30	36.49	11.76	31.83	39.72	54.00	-14.28	Horizontal
9848.00	22.49	38.62	14.31	31.77	43.65	54.00	-10.35	Horizontal
12310.00	*					54.00		Horizontal
14772.00	*					54.00		Horizontal
17234.00	*					54.00		Horizontal

Remark:

- 1 Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
- 2 “*”, means this data is the too weak instrument of signal is unable to test.

Test mode:	802.11n(HT40)	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
4844.00	39.01	31.81	8.63	32.11	47.34	74.00	-26.66	Vertical
7266.00	33.40	36.28	11.69	31.94	49.43	74.00	-24.57	Vertical
9688.00	32.13	38.13	14.21	31.52	52.95	74.00	-21.05	Vertical
12060.00	*					74.00		Vertical
14472.00	*					74.00		Vertical
16884.00	*					74.00		Vertical
4844.00	37.88	31.81	8.63	32.11	46.21	74.00	-27.79	Horizontal
7266.00	33.26	36.28	11.69	31.94	49.29	74.00	-24.71	Horizontal
9688.00	31.76	38.13	14.21	31.52	52.58	74.00	-21.42	Horizontal
12060.00	*					74.00		Horizontal
14472.00	*					74.00		Horizontal
16884.00	*					74.00		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
4844.00	28.19	31.81	8.63	32.11	36.52	54.00	-17.48	Vertical
7266.00	22.30	36.28	11.69	31.94	38.33	54.00	-15.67	Vertical
9688.00	22.50	38.13	14.21	31.52	43.32	54.00	-10.68	Vertical
12060.00	*					54.00		Vertical
14472.00	*					54.00		Vertical
16884.00	*					54.00		Vertical
4844.00	27.48	31.81	8.63	32.11	35.81	54.00	-18.19	Horizontal
7266.00	21.86	36.28	11.69	31.94	37.89	54.00	-16.11	Horizontal
9688.00	21.52	38.13	14.21	31.52	42.34	54.00	-11.66	Horizontal
12060.00	*					54.00		Horizontal
14472.00	*					54.00		Horizontal
16884.00	*					54.00		Horizontal

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *“*” , means this data is the too weak instrument of signal is unable to test.*

Test mode:	802.11n(HT40)	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	38.29	31.85	8.66	32.12	46.68	74.00	-27.32	Vertical
7311.00	33.62	36.37	11.71	31.91	49.79	74.00	-24.21	Vertical
9748.00	33.25	38.27	14.25	31.56	54.21	74.00	-19.79	Vertical
12185.00	*					74.00		Vertical
14622.00	*					74.00		Vertical
17059.00	*					74.00		Vertical
4874.00	38.93	31.85	8.66	32.12	47.32	74.00	-26.68	Horizontal
7311.00	32.34	36.37	11.71	31.91	48.51	74.00	-25.49	Horizontal
9748.00	33.18	38.27	14.25	31.56	54.14	74.00	-19.86	Horizontal
12185.00	*					74.00		Horizontal
14622.00	*					74.00		Horizontal
17059.00	*					74.00		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
4874.00	29.22	31.85	8.66	32.12	37.61	54.00	-16.39	Vertical
7311.00	21.96	36.37	11.71	31.91	38.13	54.00	-15.87	Vertical
9748.00	22.52	38.27	14.25	31.56	43.48	54.00	-10.52	Vertical
12185.00	*					54.00		Vertical
14622.00	*					54.00		Vertical
17059.00	*					54.00		Vertical
4874.00	29.10	31.85	8.66	32.12	37.49	54.00	-16.51	Horizontal
7311.00	21.45	36.37	11.71	31.91	37.62	54.00	-16.38	Horizontal
9748.00	22.91	38.27	14.25	31.56	43.87	54.00	-10.13	Horizontal
12185.00	*					54.00		Horizontal
14622.00	*					54.00		Horizontal
17059.00	*					54.00		Horizontal

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Pre-amplifier Factor
2. “*”, means this data is the too weak instrument of signal is unable to test.

Test mode:	802.11n(HT40)	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
4904.00	43.05	31.88	8.68	32.13	51.48	74.00	-22.52	Vertical
7356.00	33.80	36.45	11.75	31.86	50.14	74.00	-23.86	Vertical
9808.00	36.20	38.43	14.29	31.68	57.24	74.00	-16.76	Vertical
12310.00	*					74.00		Vertical
14772.00	*					74.00		Vertical
17234.00	*					74.00		Vertical
4904.00	42.64	31.88	8.68	32.13	51.07	74.00	-22.93	Horizontal
7356.00	32.85	36.45	11.75	31.86	49.19	74.00	-24.81	Horizontal
9808.00	32.43	38.43	14.29	31.68	53.47	74.00	-20.53	Horizontal
12310.00	*					74.00		Horizontal
14772.00	*					74.00		Horizontal
17234.00	*					74.00		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
4904.00	34.10	31.88	8.68	32.13	42.53	54.00	-11.47	Vertical
7356.00	23.76	36.45	11.75	31.86	40.10	54.00	-13.90	Vertical
9808.00	24.73	38.43	14.29	31.68	45.77	54.00	-8.23	Vertical
12310.00	*					54.00		Vertical
14772.00	*					54.00		Vertical
17234.00	*					54.00		Vertical
4904.00	33.10	31.88	8.68	32.13	41.53	54.00	-12.47	Horizontal
7356.00	22.27	36.45	11.75	31.86	38.61	54.00	-15.39	Horizontal
9808.00	21.72	38.43	14.29	31.68	42.76	54.00	-11.24	Horizontal
12310.00	*					54.00		Horizontal
14772.00	*					54.00		Horizontal
17234.00	*					54.00		Horizontal

Remark:

- 1 Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
- 2 “*”, means this data is the too weak instrument of signal is unable to test.

8 Test Setup Photo

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

9 EUT Constructional Details

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

-----End-----