TEST REPORT

Applicant:	Dragino Technology Co., Limited.
Address of Applicant:	Room 7009, Zi'An Commercial Building, Qian Jin 1 Road, Xin'An 6thDistrict, Baoan, Shenzhen, China

Equipment Under Test (EUT)

Product Name:	Wireless Sensor Node / ATA
Model No.:	DT01, MP2.0 Phone, MP2.0 Basic, MS14-P, MS14-S, MS14-HEV
Applicable standards:	FCC CFR Title 47 Part 15 Subpart B:2014
Date of sample receipt:	December 01, 2015
Date of Test:	December 02-14, 2015
Date of report issued:	December 15, 2015
Test Result :	Pass *

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

Authorized Signature:

Robinson Lo
Laboratory Manager

2 Version

Version No.	Date	Description
00	*December 15, 2015*	*Original*

Prepared by: Edward.Pan ***Date:*** *December 15, 2015*

Project Engineer

Reviewed by: Hank.yan ***Date:*** *December 15, 2015*

Reviewer

3 Contents

4 Test Summary

Test Item	Section in CFR 47	Result
Conducted Emission	Part15.107	Pass
Radiated Emissions	Part15.109	Pass

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

Remark: Test according to ANSI C63.4: 2014

Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz ~ 30MHz	± 4.34dB	(1)
Radiated Emission	30MHz ~ 1000MHz	± 4.24dB	(1)
Radiated Emission	1GHz ~ 26.5GHz	± 4.68dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	± 3.45dB	(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 Client Information

Applicant:	Dragino Technology Co., Limited.
Address of Applicant:	Room 7009, Zi'An Commercial Building, Qian Jin 1 Road, Xin'An 6thDistrict, Baoan, Shenzhen, China
Manufacturer/ Factory:	Dragino Technology Co., Limited.
Address of Manufacturer/ Factory:	Room 7009, Zi'An Commercial Building, Qian Jin 1 Road, Xin'An 6thDistrict, Baoan, Shenzhen, China

5.2 General Description of EUT

Product Name:	Wireless Sensor Node / ATA
Model No.:	DT01, MP2.0 Phone, MP2.0 Basic, MS14-P, MS14-S, MS14-HEV
Test model No.:	DT01
Remark：All above models are identical in the same PCB layout, interior structure and electrical circuits. The differences are color and model name for commercial purpose.	
Power Supply:	Adapter: Model:F05W-120050SPAV Input:AC100-240V~50/60Hz, 190mA Output:DC 12V 0.5A

5.3 Test mode and Test voltage

Test mode:	
WAN mode	Keep the EUT in ping with external network by PC mode
Phone mode	Keep the EUT in dialing mode
USB mode	Keep the EUT in USB storage mode
Test voltage:	
AC 24V/60Hz	

5.4 Description of Support Units

Manufacturer	Description	Model	Serial Number	FCC Approval
Apple	PC	A1278	C1MN99ERDTY3	FCC ID

5.5 Deviation from Standards

None.

5.6 Abnormalities from Standard Conditions

None.

5.7 Test Facility

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

● **FCC —Registration No.: 600491**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fuly described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 600491, June 28, 2013.

● **Industry Canada (IC) —Registration No.: 9079A-2**

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-2, June 26, 2013.

5.8 Test Location

Tests were performed at:

Global United Technology Services Co., Ltd.
Address: No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China
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	9.0(L)*6.0(W)* 6.0(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	ESU EMI Test Receiver	R&S	ESU26	GTS203	July. 03 2015	July. 02 2016
4	BiConiLog Antenna	SCHWARZBECK	VULB9163	GTS214	July. 06 2015	July. 05 2016
5	Double -ridged waveguide horn	SCHWARZBECK	9120D	GTS208	July. 06 2015	July. 05 2016
6	RF Amplifier	HP	8347A	GTS204	July. 03 2015	July. 02 2016
7	Broadband Preamplifier	SCHWARZBECK	BBV9718	GTS535	July. 03 2015	July. 02 2016
8	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
9	Coaxial cable	GTS	N/A	GTS210	July. 05 2015	July. 04 2016
10	Coaxial Cable	GTS	N/A	GTS211	July. 05 2015	July. 04 2016
11	Thermo meter	N/A	N/A	GTS256	July. 06 2015	July. 05 2016

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. 16 2014	May. 15 2019
2	EMI Test Receiver	R&S	ESCI 7	GTS552	April. 29 2015	April. 29 2016
3	Pulse Limiter	R&S	ESH3-Z2	GTS224	July. 03 2015	July. 02 2016
4	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	July. 03 2015	July. 02 2016
5	Artificial Mains Network	SCHWARZBECK MESS	NSLK8127	GTS226	July. 03 2015	July. 02 2016
6	Coaxial Cable	GTS	N/A	GTS227	Jul. 05 2015	Jul. 04 2016
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Thermo meter	KTJ	TA328	GTS233	July. 07 2015	July. 06 2016

General used equipment:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (dd-mm-yy)**	**Cal.Due date (dd-mm-yy)**
1	Barometer	ChangChun	DYM3	GTS257	July. 07 2015	July. 06 2016

7 Test Results and Measurement Data

7.1 Radiated Emission

Test Requirement:	FCC Part15 B Section 15.109
Test Method:	ANSI C63.4:2014
Test Frequency Range:	30MHz to 6GHz
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)
Receiver setup:	

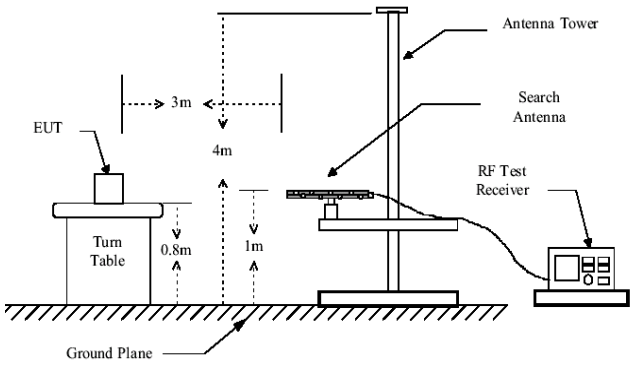
Frequency	Detector	RBW	VBW	Value
30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	AV	1MHz	3MHz	Average

Limit:

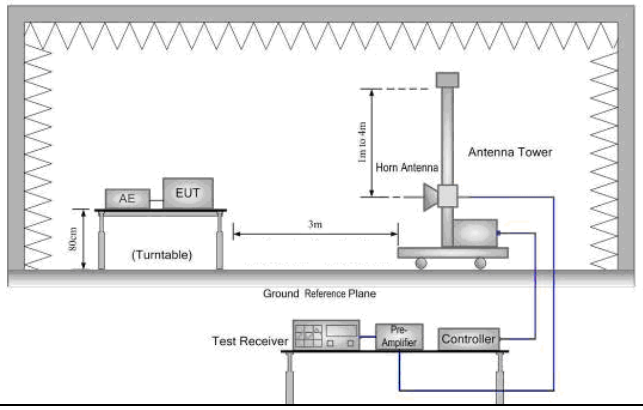
Frequency	Limit (dBμV/m @3m)	Value
30MHz-88MHz	40.00	Quasi-peak
88MHz-216MHz	43.50	Quasi-peak
216MHz-960MHz	46.00	Quasi-peak
960MHz-1GHz	54.00	Quasi-peak
Above 1GHz	54.00	Average
	74.00	Peak

Test setup:

Below 1GHz



Above 1GHz

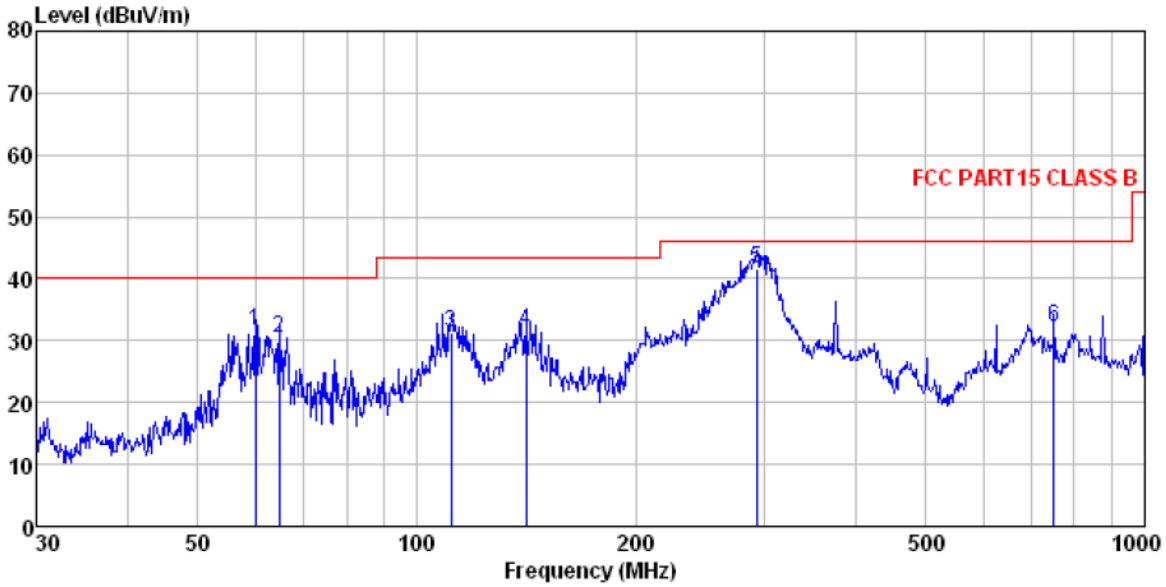


Test Procedure:	1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was 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 rotatable 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 environment:	Temp.:	25 □C	Humid.:	52%	Press.:	1 012mbar
Measurement Record:					Uncertainty: ± 4.50dB	
Test Instruments:	Refer to section 6 for details					
Test mode:	Refer to section 5.3 for details					
Test results:	Pass					

Measurement Data

Below 1GHz

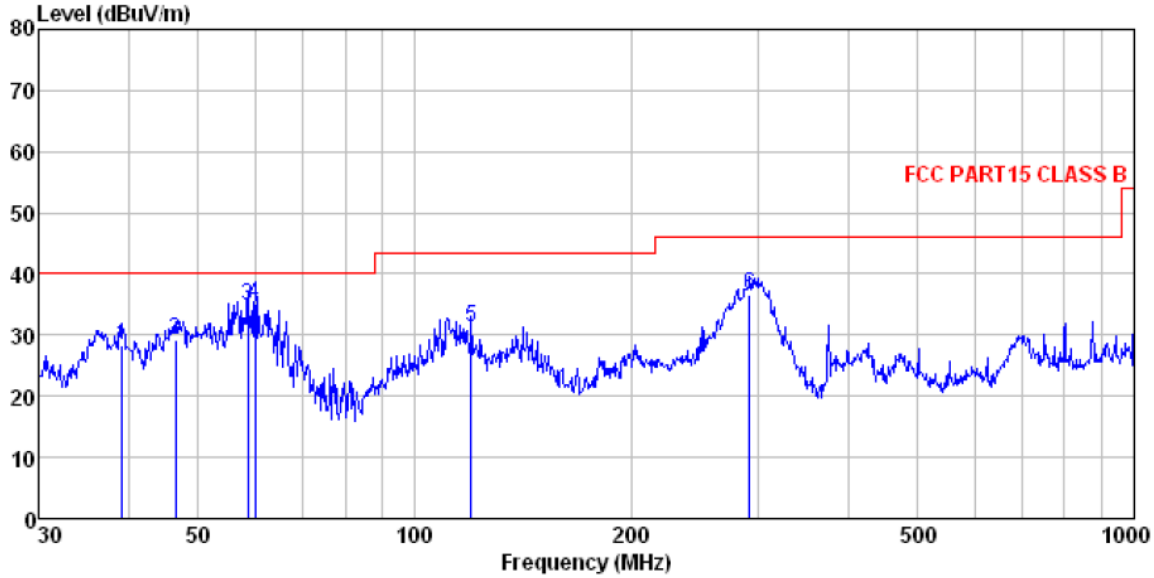
Test mode:	WAN mode	Antenna Polarity:	Horizontal



Condition : FCC PART15 CLASS B VULB9163-2013M HORIZONTAL
Job No. : 2069IT
Test Mode : WAN mode
Test Engineer: He

	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	60.069	45.87	14.69	0.86	29.92	31.50	40.00	-8.50	QP
2	64.659	46.50	12.84	0.90	29.89	30.35	40.00	-9.65	QP
3	111.347	45.65	14.04	1.29	29.62	31.36	43.50	-12.14	QP
4	141.330	49.21	10.20	1.51	29.45	31.47	43.50	-12.03	QP
5	293.084	54.26	14.92	2.32	29.95	41.55	46.00	-4.45	QP
6	750.108	35.59	21.43	4.28	29.20	32.10	46.00	-13.90	QP

Test mode:	WAN mode	Antenna Polarity:	Vertical

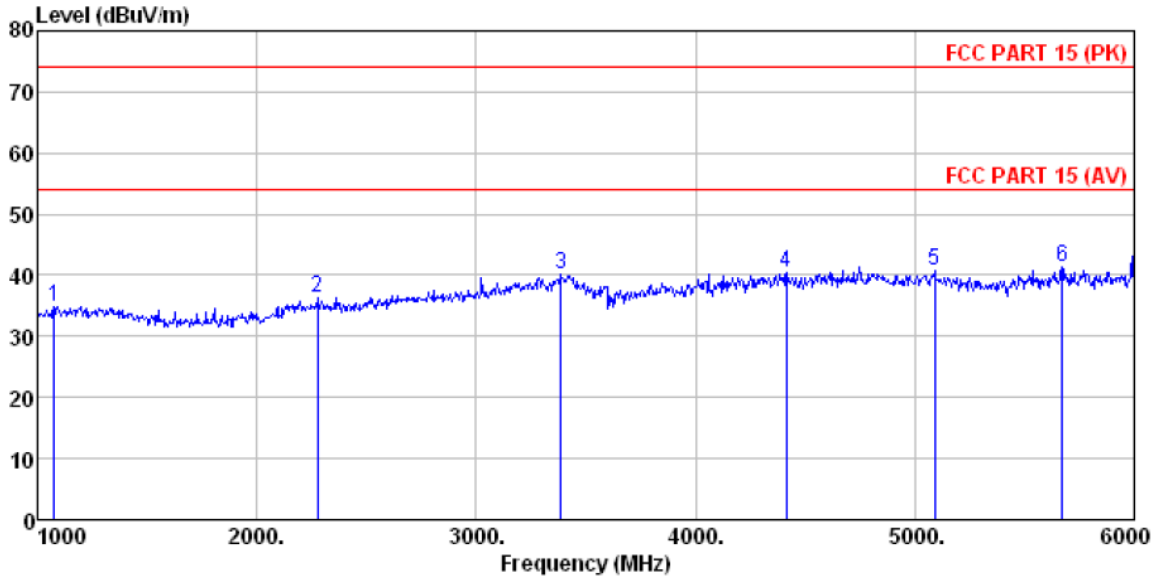


Condition : FCC PART15 CLASS B VULB9163-2013M VERTICAL
Job No. : 2069IT
Test Mode : WAN mode
Test Engineer: He

	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	39.162	42.27	15.34	0.65	30.05	28.21	40.00	-11.79	QP
2	46.503	43.03	15.46	0.74	30.01	29.22	40.00	-10.78	QP
3	58.613	49.20	14.78	0.85	29.93	34.90	40.00	-5.10	QP
4	60.069	49.54	14.69	0.86	29.92	35.17	40.00	-4.83	QP
5	119.856	46.94	12.48	1.36	29.57	31.21	43.50	-12.29	QP
6	292.058	49.29	14.89	2.32	29.95	36.55	46.00	-9.45	QP

Above 1GHz

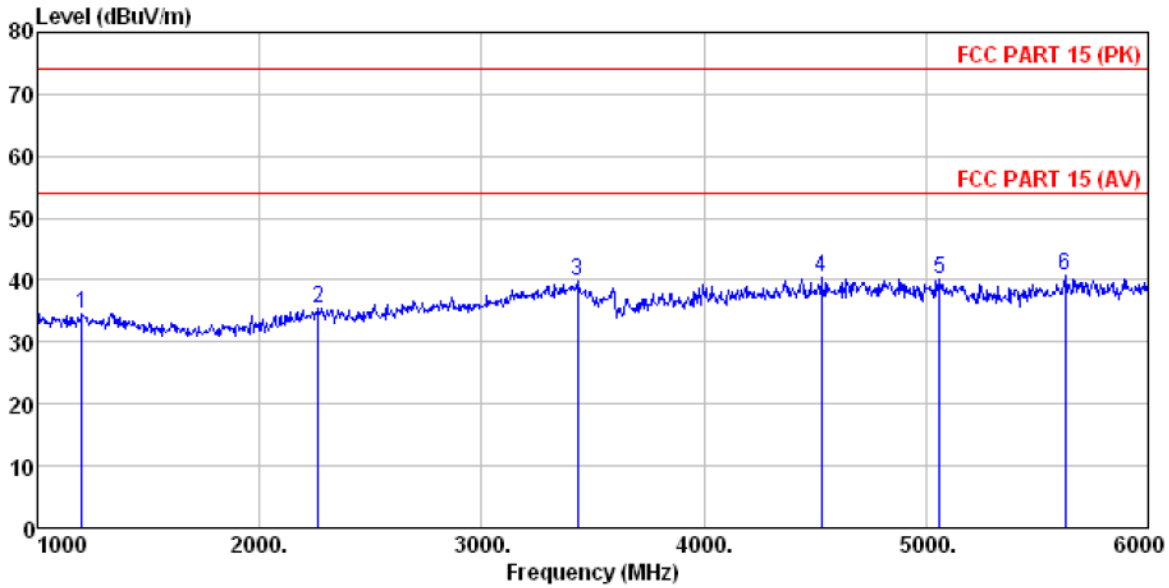
Test mode:	WAN mode	Antenna Polarity:	Horizontal



Condition : FCC PART 15 (PK) BBHA9120D ANT(>1GHZ) HORIZONTAL
Job No. : 2069IT
Test Mode : WAN mode
Test Engineer: HE

	Freq	ReadLevel	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1075.000	38.71	24.69	4.36	32.87	34.89	74.00	-39.11	Peak
2	2275.000	37.32	27.99	5.26	34.15	36.42	74.00	-37.58	Peak
3	3385.000	37.73	28.57	6.74	32.89	40.15	74.00	-33.85	Peak
4	4415.000	33.06	31.13	8.26	31.90	40.55	74.00	-33.45	Peak
5	5090.000	31.93	32.03	8.90	32.23	40.63	74.00	-33.37	Peak
6	5670.000	31.35	32.44	9.74	32.33	41.20	74.00	-32.80	Peak

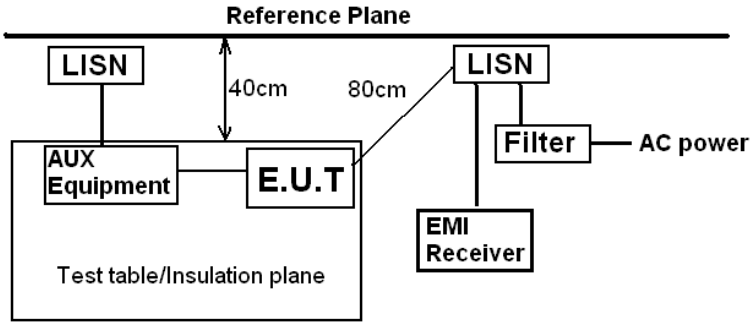
Test mode:	WAN mode	Antenna Polarity:	Vertical



Condition : FCC PART 15 (PK) BBHA9120D ANT(>1GHZ) VERTICAL
Job No. : 2069IT
Test Mode : WAN mode
Test Engineer: HE

	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1200.000	37.87	25.34	4.47	33.10	34.58	74.00	-39.42	Peak
2	2265.000	36.31	28.01	5.25	34.17	35.40	74.00	-38.60	Peak
3	3430.000	37.02	28.72	6.82	32.83	39.73	74.00	-34.27	Peak
4	4530.000	32.78	31.40	8.37	31.96	40.59	74.00	-33.41	Peak
5	5060.000	31.56	32.01	8.85	32.21	40.21	74.00	-33.79	Peak
6	5625.000	31.09	32.32	9.70	32.36	40.75	74.00	-33.25	Peak

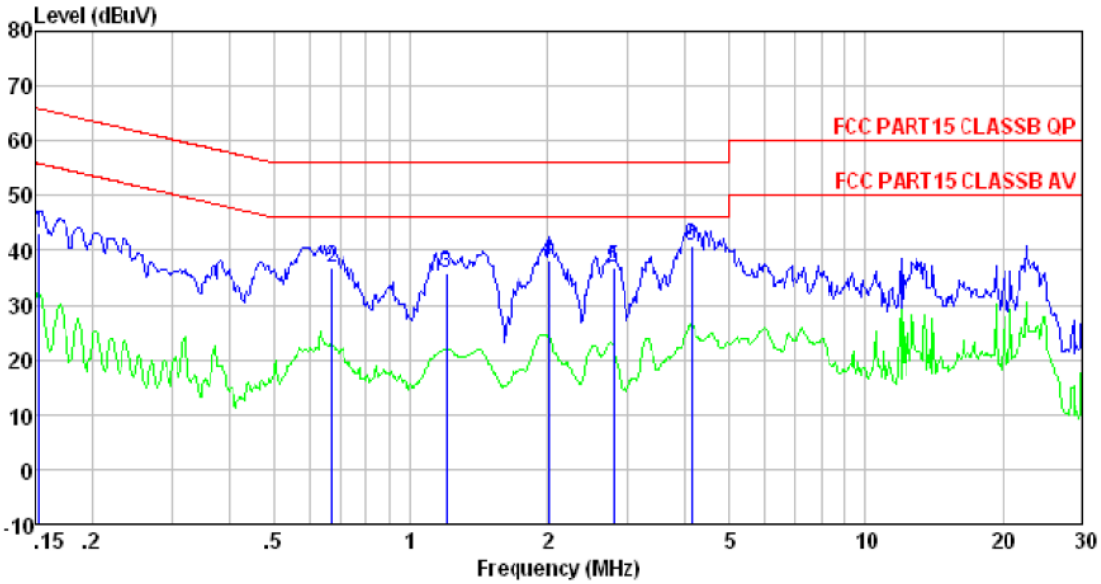
7.2 Conducted Emissions

<table>
<tr><td>Test Requirement:</td><td colspan="6">FCC Part15 B Section 15.107</td></tr>
<tr><td>Test Method:</td><td colspan="6">ANSI C63.4:2014</td></tr>
<tr><td>Test Frequency Range:</td><td colspan="6">150kHz to 30MHz</td></tr>
<tr><td>Class / Severity:</td><td colspan="6">Class B</td></tr>
<tr><td>Receiver setup:</td><td colspan="6">RBW=9kHz, VBW=30kHz</td></tr>
<tr><td>Limit:</td><td colspan="6">
<table>
<tr><td rowspan="2">Frequency range (MHz)</td><td colspan="2">Limit (dBµV)</td></tr>
<tr><td>Quasi-peak</td><td>Average</td></tr>
<tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr>
<tr><td>0.5-5</td><td>56</td><td>46</td></tr>
<tr><td>0.5-30</td><td>60</td><td>50</td></tr>
</table>
</td></tr>
<tr><td>Test setup:</td><td colspan="6"> 

Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m</td></tr>
<tr><td>Test procedure</td><td colspan="6">1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network(L.I.S.N.). The provide 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 refers 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 C63.4: 2009 on conducted measurement.</td></tr>
<tr><td>Test environment:</td><td>Temp.:</td><td>25 °C</td><td>Humid.:</td><td>52%</td><td>Press.:</td><td>1 012mbar</td></tr>
<tr><td>Test Instruments:</td><td colspan="6">Refer to section 6 for details</td></tr>
<tr><td>Test mode:</td><td colspan="6">Refer to section 5.3 for details</td></tr>
<tr><td>Test results:</td><td colspan="6">Pass</td></tr>
</table>

Measurement Data

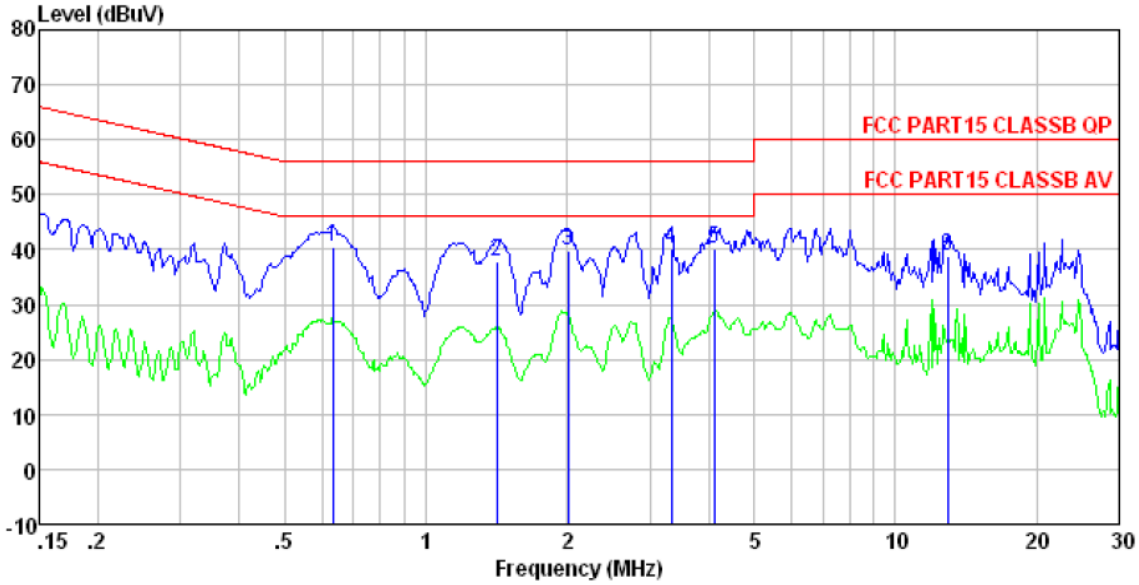
Test mode:	On mode	Phase Polarity:	Line



Condition : FCC PART15 CLASSB QP LISN-2013 LINE
Job No. : 2069IT
Test mode : WAN mode
Test Engineer: Rong

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.153	42.99	0.15	0.12	43.26	65.82	-22.56	QP
2	0.672	36.68	0.14	0.13	36.95	56.00	-19.05	QP
3	1.197	35.45	0.13	0.13	35.71	56.00	-20.29	QP
4	2.012	38.05	0.12	0.15	38.32	56.00	-17.68	QP
5	2.794	36.46	0.14	0.15	36.75	56.00	-19.25	QP
6	4.158	40.43	0.20	0.15	40.78	56.00	-15.22	QP

Test mode:	On mode	Phase Polarity:	Neutral

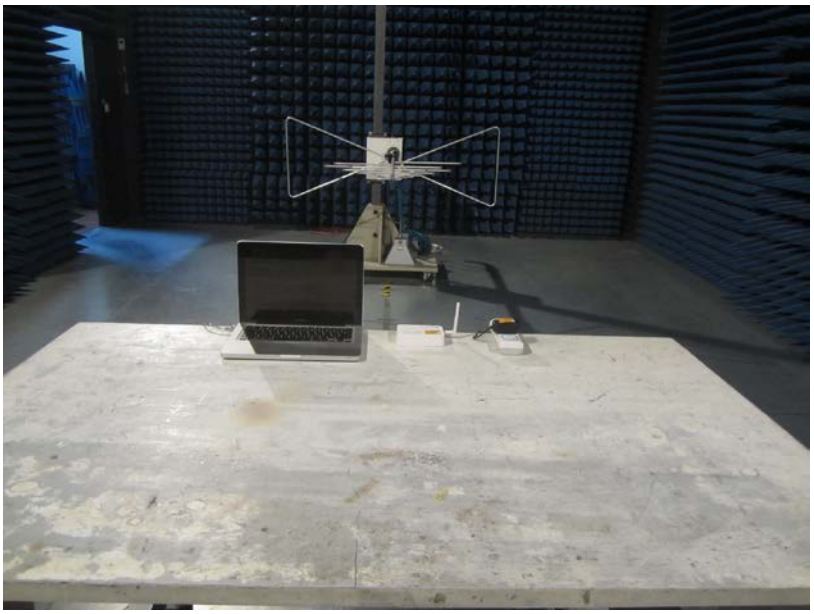


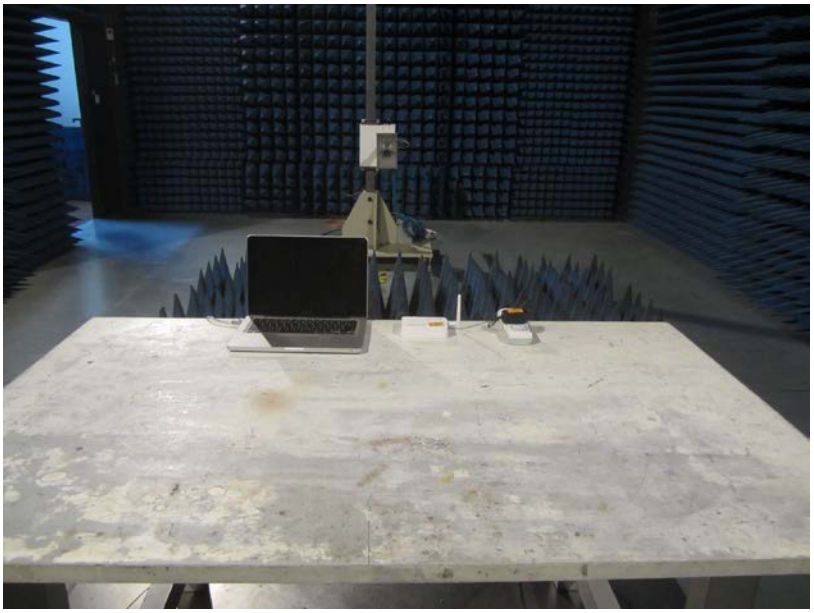
Condition : FCC PART15 CLASSB QP LISN-2013 NEUTRAL
Job No. : 2069IT
Test mode : WAN mode
Test Engineer: Rong

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.634	40.36	0.07	0.13	40.56	56.00	-15.44	QP
2	1.418	37.70	0.09	0.13	37.92	56.00	-18.08	QP
3	2.012	39.52	0.09	0.15	39.76	56.00	-16.24	QP
4	3.328	39.87	0.13	0.15	40.15	56.00	-15.85	QP
5	4.114	39.76	0.14	0.15	40.05	56.00	-15.95	QP
6	12.920	38.32	0.32	0.21	38.85	60.00	-21.15	QP

8 Test Setup Photo

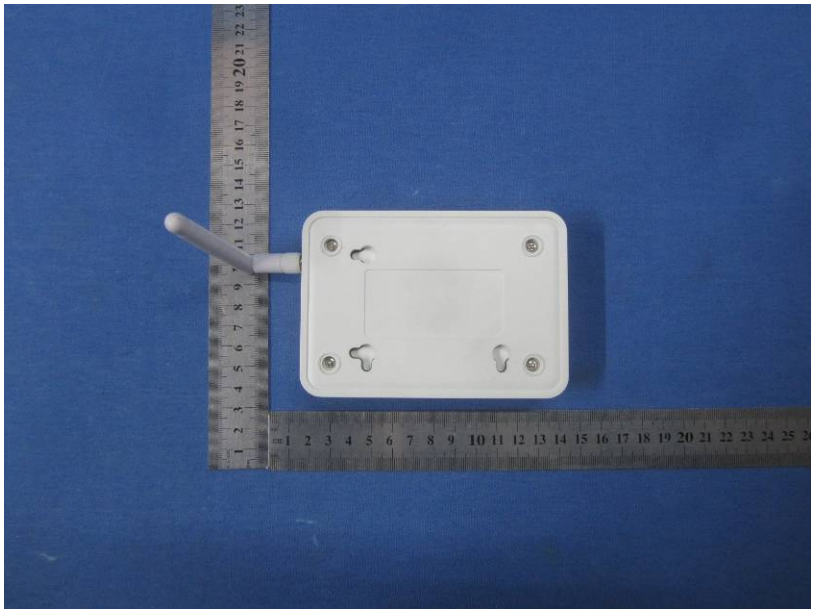
Radiated Emission



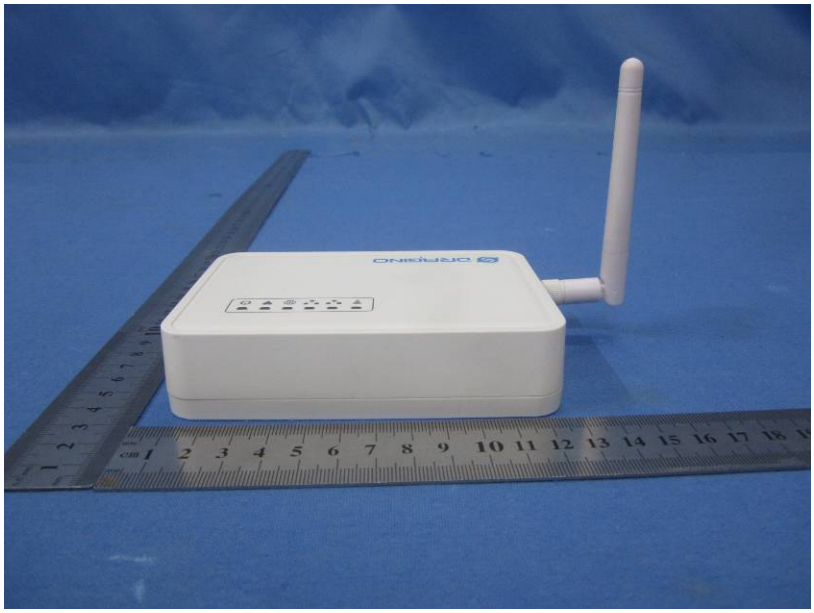


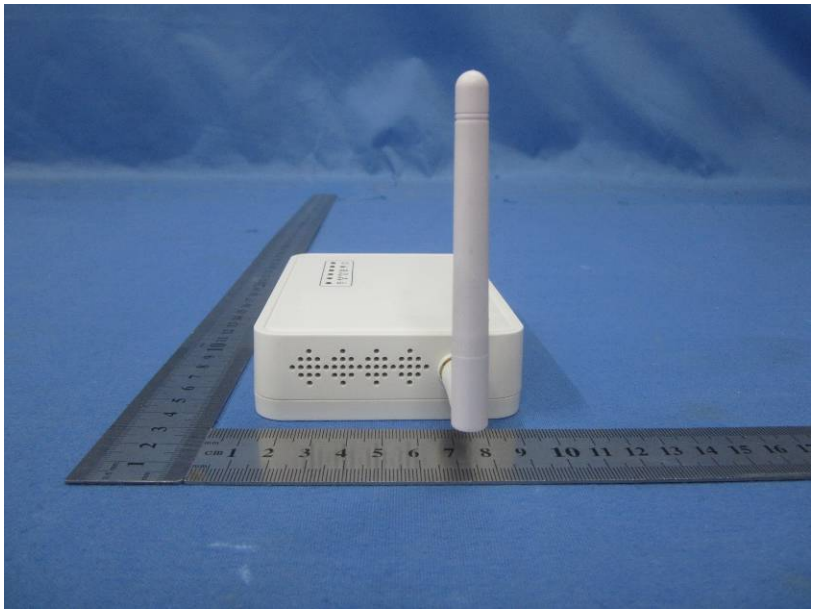
Conducted Emissions

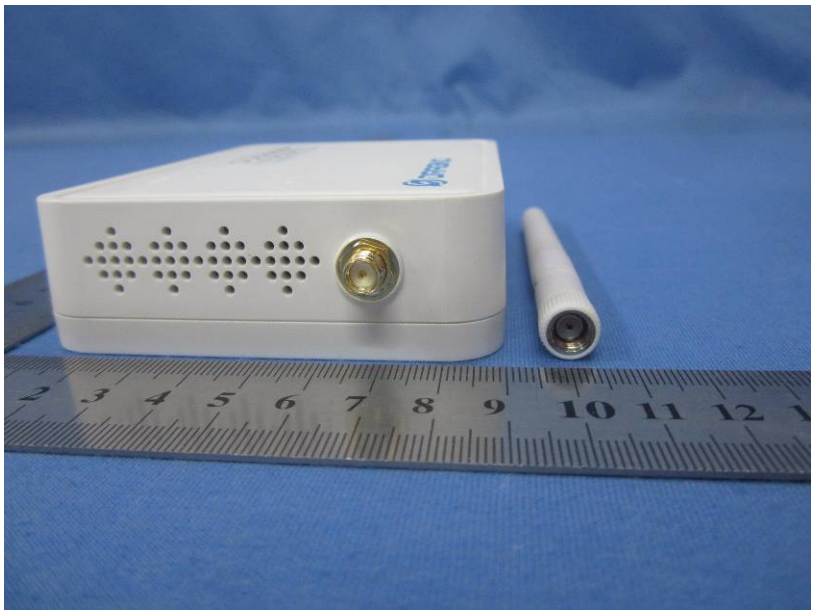
9 EUT Constructional Details

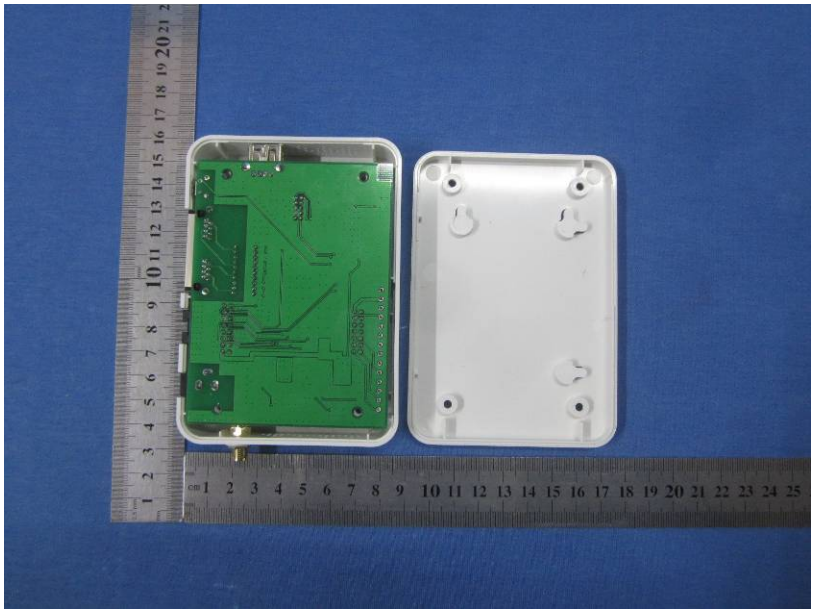


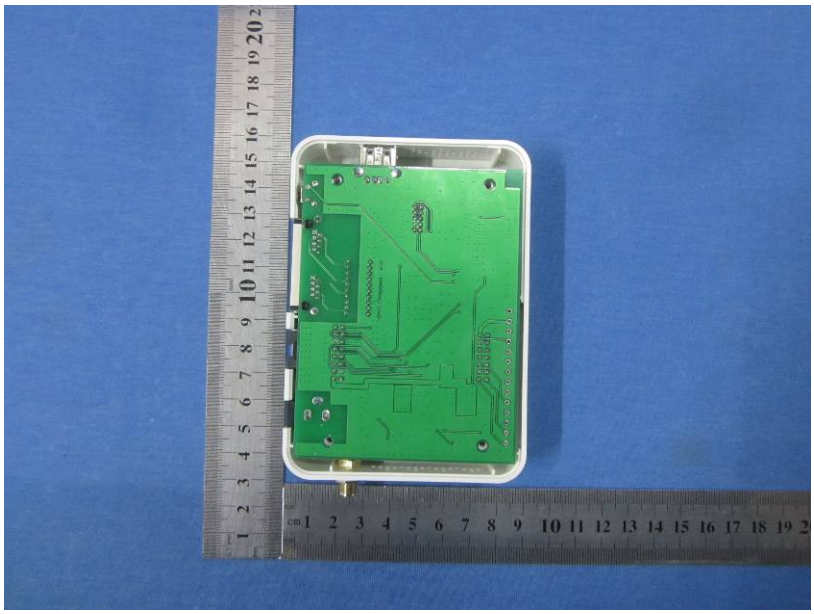

PWR
9-15V
PHONE
WAN
LAN
toggle

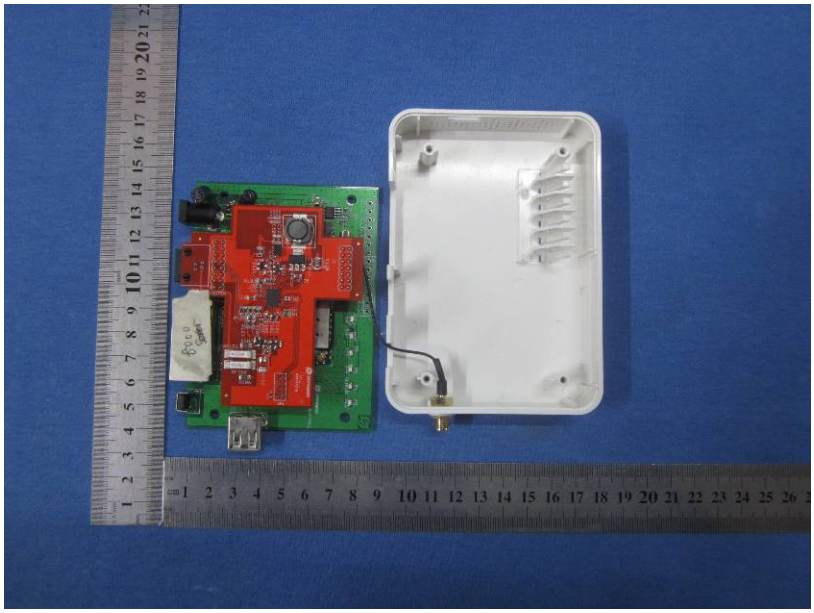


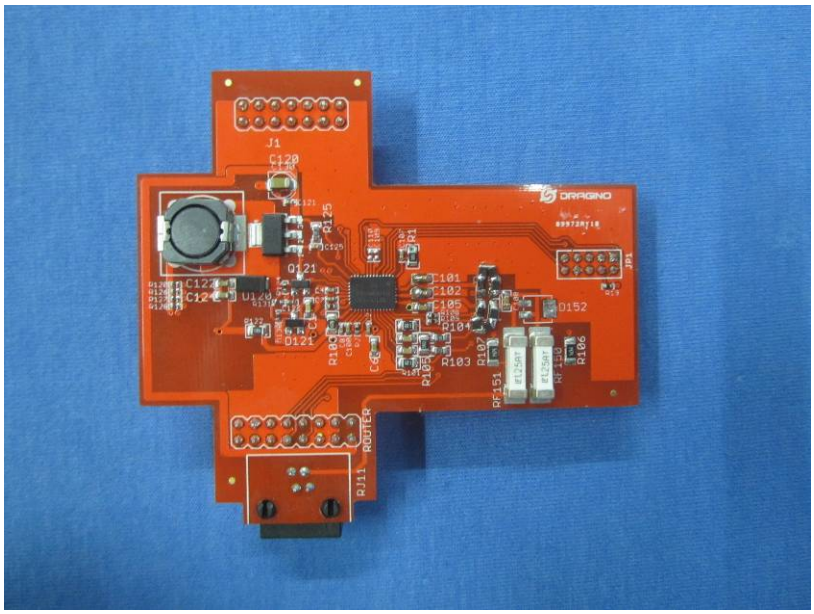


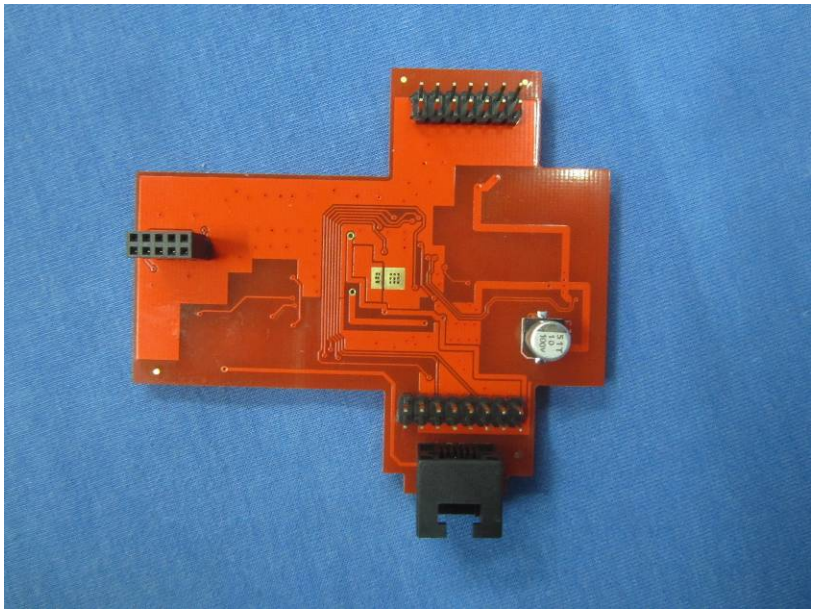


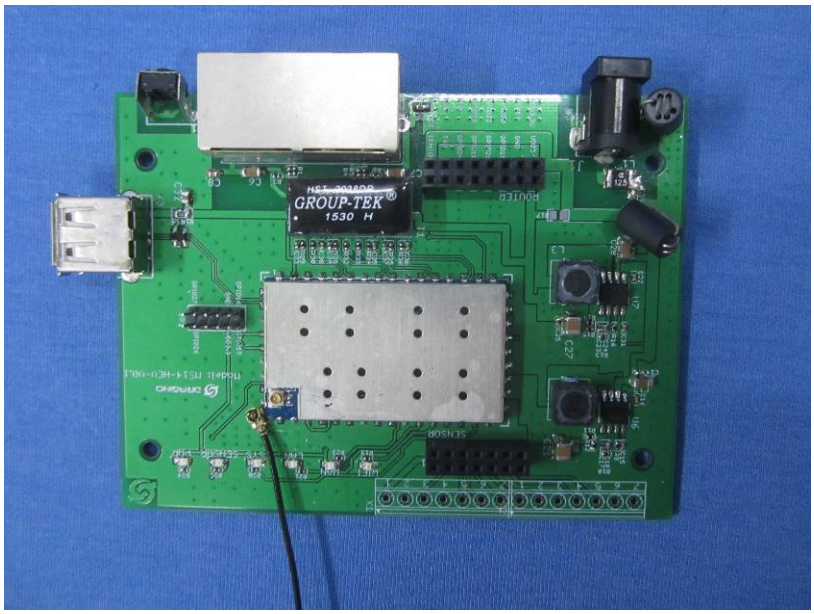







DRAGINO
J1
C120
Q121
C101
C102
C105
D152
R104
R103
R107
D121
RJ11
ROUTER

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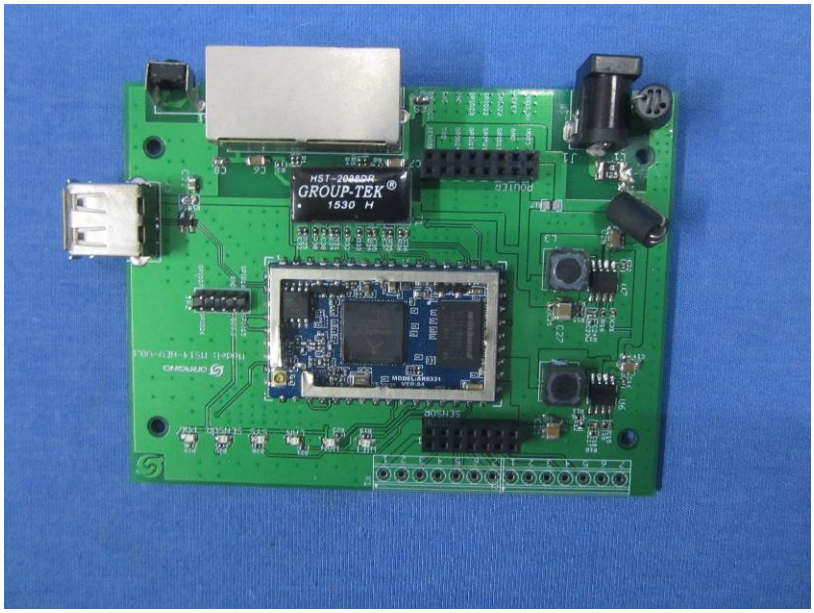
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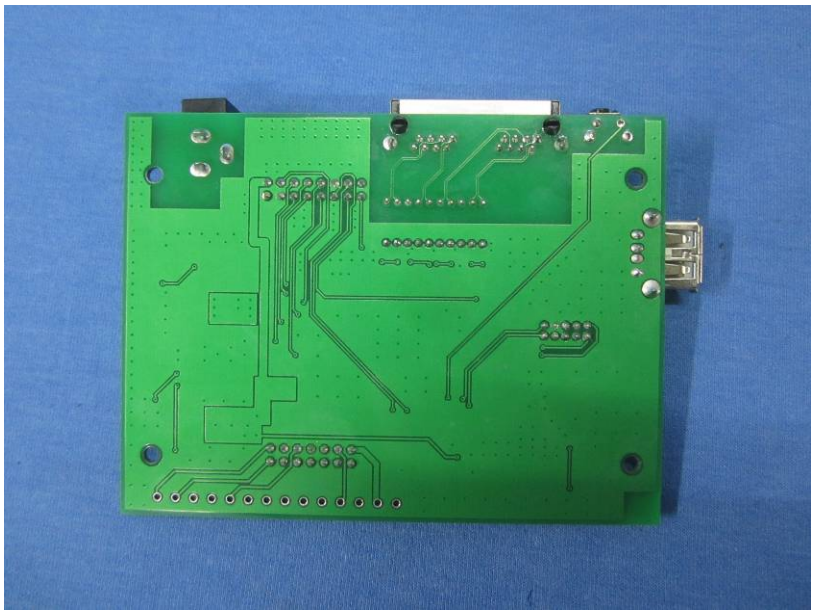

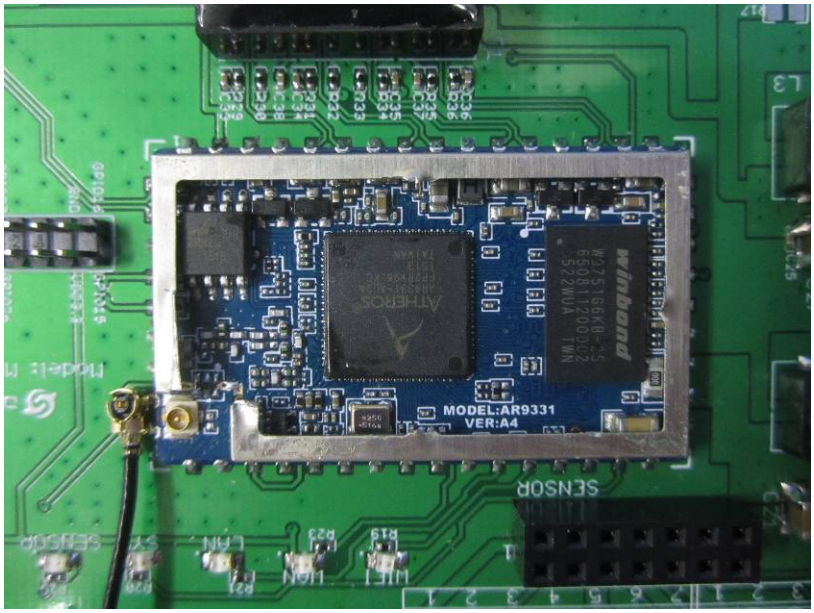
MODEL:AR9331
VER:A4
SENSOR


Switching Mode Power Adaptor
MODEL:F05W-120050SPAV L.P.S.
INPUT:100-240V～50/60Hz 190mA
OUTPUT:12V ⎓ 0.5A
I.T.E. POWER SUPPLY
SHENZHEN FRECOM
ELECTRONICS CO.,LTD.
MADE IN CHINA
F0935SAR

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