

TEST REPORT

Applicant: Dragino Technology Co., Limited
Address of Applicant: Room 1101, City Invest Commercial Center, No.546
QingLinRoad, LongCheng Street, LongGang District,
Shenzhen 518116, China
Manufacturer/ Factory: Dragino Technology Co., Limited
**Address of
Manufacturer/ Factory:** Room 1101, City Invest Commercial Center, No.546
QingLinRoad, LongCheng Street, LongGang District,
Shenzhen 518116, China
Equipment Under Test (EUT)
Product Name: LoRa IoT Gateway
Model No.: LG01, LG01-P, LG01-S, MS14N-P, MS14N-S
Applicable standards: EN 55032:2015
EN 55024:2010+A1:2015
EN 61000-3-2:2014
EN 61000-3-3:2013
Date of sample receipt: June 15, 2017
Date of Test: June 15-20, 2017
Date of report issued: June 20, 2017
Test Result : PASS *

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

Authorized Signature:



Robinson Lo

Laboratory Manager



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2 Version

Version No.	Date	Description
00	June 20, 2017	Original

Prepared By:

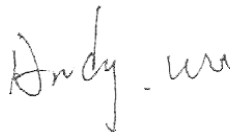


Date:

June 20, 2017

Project Engineer

Reviewed By:



Date:

June 20, 2017

Reviewer

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4 Test Summary

Test Item	Test Requirement	Test Method	Class / Severity	Result
Radiated Emission(up to 1G)	EN 55032	CISPR 16-2-3	Table A4.1	Pass
Radiated Emission(above 1G)	EN 55032	CISPR 16-2-3	Table A.5	Pass
Conducted Emission	EN 55032	CISPR 16-2-1	Table A.10 for AC port Table A12.1 for Telecommunication Port	Pass
Disturbance voltage at antenna terminal	EN 55032	CISPR 16-1-4	Table A13.5	N/A
Harmonic Emission	EN 61000-3-2	EN 61000-3-2	Class A	N/A
Flicker Emission	EN 61000-3-3	EN 61000-3-3	Clause 5	Pass
ESD	EN55024	EN 61000-4-2	Contact ± 4 kV Air $\pm 2, \pm 4, \pm 8$ kV	Pass
Electrical Fast Transients	EN55024	EN 61000-4-4	± 1.0 kV for AC port; ± 0.5 kV for Telecommunication Port	Pass
Surges	EN 55024	EN 61000-4-5	± 1 kV for AC port; ± 1 kV for Telecommunication Port	Pass
Radio-frequency continuous conducted	EN 55024	EN 61000-4-6	3Vrms (emf), 80%, 1kHz Amp. Mod.	Pass
Radio-frequency electromagnetic field Amplitude modulated	EN 55024	EN 61000-4-3	3V/m 80%, 1kHz, AM	Pass
Voltage dips and Voltage interruptions	EN 55024	EN 61000-4-11	0 % U_T^* for 0.5per 0 % U_T^* for 250per 70 % U_T^* for 25per	Pass

1. Pass: Comply with the essential requirements in the standard.
2. N/A; not applicable
3. U_T : the nominal supply voltage;
4. # Refer to EN55032 clause 8 conditional testing procedure :

The highest frequency generated or used in the EUT	Test frequency range of Radiated emission
<108MHz	30MHz ~ 1GHz
108MHz ~ 500MHz	30MHz ~ 2GHz
500MHz ~ 1GHz	30MHz ~ 5GHz
>1GHz	30MHz ~ 5times the highest frequency or 30MHz ~ 6 GHz, whichever is less

The highest frequency of the internal sources of the EUT is more than 108MHz.

5 General Information

5.1 General Description of EUT

Product Name:	LoRa IoT Gateway
Model No.:	LG01, LG01-P, LG01-S, MS14N-P, MS14N-S
Test model:	LG01
<p><i>Remark: All above models are identical in the same PCB layout, interior structure and electrical circuits. The only differences are the model name and LG01 include LG01-P and LG01-S. LG01-S with terminal and 868 module LG01-P without terminal and 868 module MS14N-P with termina MS14N-S without terminal</i></p>	
Power supply:	Adapter Input: AC100-240V 50-60Hz 0.5A Output: DC12V 0.1-1.3A

5.2 Test mode and Test voltage

Test mode:	
LAN mode	Keep the EUT in LAN mode.
Test voltage:	
AC 230V/50Hz	

5.3 Description of Support Units

Manufacturer	Description	Model	Serial Number
Apple	PC	A1278	C1MN99ERDTY3
Lenovo	PC	E40-80	MP14ZYYD
DELL	KEYBOARD	SK-8115	N/A
DELL	MOUSE	MOC5UO	N/A

5.4 Deviation from Standards

None.

5.5 Abnormalities from Standard Conditions

None.

5.6 Monitoring of EUT for All Immunity Tests

Visual:	Monitor the work status of the PC
Audio:	N/A

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 fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 600491, June 22, 2016.

- **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, August 15, 2016

5.8 Test Location

RI test was performed at:

China Shenzhen Academy of Metrology and Quality Inspection,
Metrology and Quality Inspection building, Central Section of LongZhu Road, Nan Shan, Shenzhen, China.

All other tests were performed at:

Global United Technology Services Co., Ltd.
Address: No. 301-309, 3/F., 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	9.0(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	June. 29 2016	June. 28 2017
4	BiConiLog Antenna	SCHWARZBECK	VULB9163	GTS214	June. 29 2016	June. 28 2017
5	Double-ridged horn antenna	SCHWARZBECK	9120D	GTS208	June. 29 2016	June. 28 2017
6	RF Amplifier	HP	8347A	GTS204	June. 29 2016	June. 28 2017
7	Broadband Preamplifier	SCHWARZBECK	BBV9718	GTS535	June. 29 2016	June. 28 2017
8	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
9	Coaxial cable	GTS	N/A	GTS210	N/A	N/A
10	Coaxial Cable	GTS	N/A	GTS211	N/A	N/A
11	Thermo meter	N/A	N/A	GTS256	June. 29 2016	June. 28 2017

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	June. 29 2016	June. 28 2017
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 29 2016	June. 28 2017
4	Artificial Mains Network	SCHWARZBECK MESS	NSLK8127	GTS226	June. 29 2016	June. 28 2017
5	High voltage probe	SCHWARZBECK	TK9420	GTS537	June. 29 2016	June. 28 2017
6	ISN	SCHWARZBECK	NTFM 8158	GTS565	June. 29 2016	June. 28 2017
7	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
8	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
9	Thermo meter	KTJ	TA328	GTS233	June. 29 2016	June. 28 2017

ESD						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	ESD Simulator	EMPEK	ESD-2030A	GTS242	June. 29 2016	June. 28 2017
2	Thermo meter	KTJ	TA328	GTS243	June. 29 2016	June. 28 2017

Flicker:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Power Analyzer	EMTEST	DPA500	GTS235	June.29 2016	June.28 2017
2	AC Power Source	EMTEST	ACS500	GTS236	June.29 2016	June.28 2017
3	Test software	EMTEST	ACS	N/A	N/A	N/A
4	Thermo meter	KTJ	TA328	GTS256	June.29 2016	June.28 2017

EFT, Surge, Voltage dips and Interruption:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	EMTEST system	EMTEST	UCS500N	GTS239	June. 29 2016	June. 28 2017
2	capacitive Clamp	EMTEST	HFK	GTS557	June. 29 2016	June. 28 2017
3	Thermo meter	KTJ	TA328	GTS238	June. 29 2016	June. 28 2017

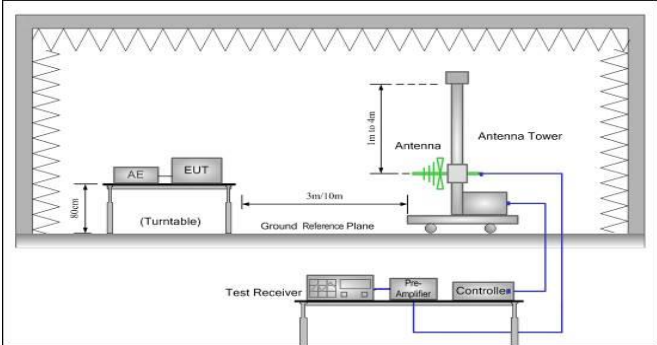
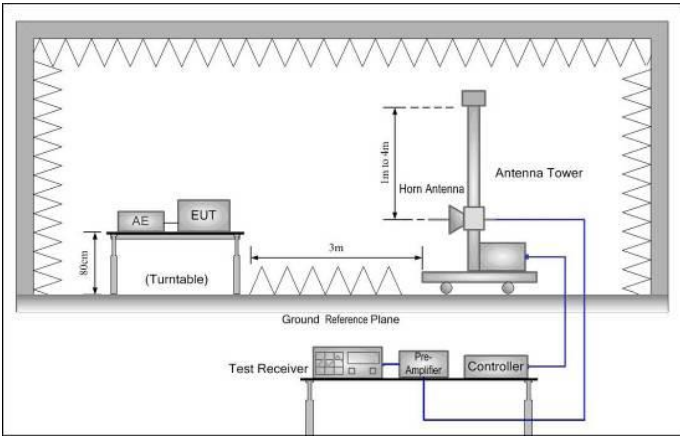
Conducted Immunity:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Signal Generator	SCHLODER	CDG-6000-25	GTS553	June. 29 2016	June. 28 2017
2	CDN	SCHLODER	CDN-M2+3	GTS554	June. 29 2016	June. 28 2017
3	EM-Clapm	SCHLODER	EMCL-20	GTS555	June. 29 2016	June. 28 2017
4	ATT	SCHLODER	ATT-6DB-100	GTS556	June. 29 2016	June. 28 2017

Radiated Immunity:						
Item	Test Equipment	Manufacturer	Model No.	Serial NO.	Cal.Date (mm-dd-yy)	Cal.Due Date (mm-dd-yy)
1	Signal Generator	Rohde & Schwarz	SMT03	100059	Jan. 16 2017	Jan. 15 2018
2	Power Amplifier	AR	150W1000	300999	Jan. 16 2017	Jan. 15 2018
3	Power Amplifier	AR	25S1G4AM1	305993	Jan. 16 2017	Jan. 15 2018
4	Power Amplifier	AR	150A220M6	305965	Jan. 16 2017	Jan. 15 2018
5	Broadband antenna	CHASE	CBL6111C	2576	Jan. 16 2017	Jan. 15 2018
6	Horn Antenna	AR	AT4002A	2783	Jan. 16 2017	Jan. 15 2018
7	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	N/A	Jan. 16 2017	Jan. 15 2018

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	June. 29 2016	June. 28 2017

7 Emission Test Results

7.1 Radiated Emissions

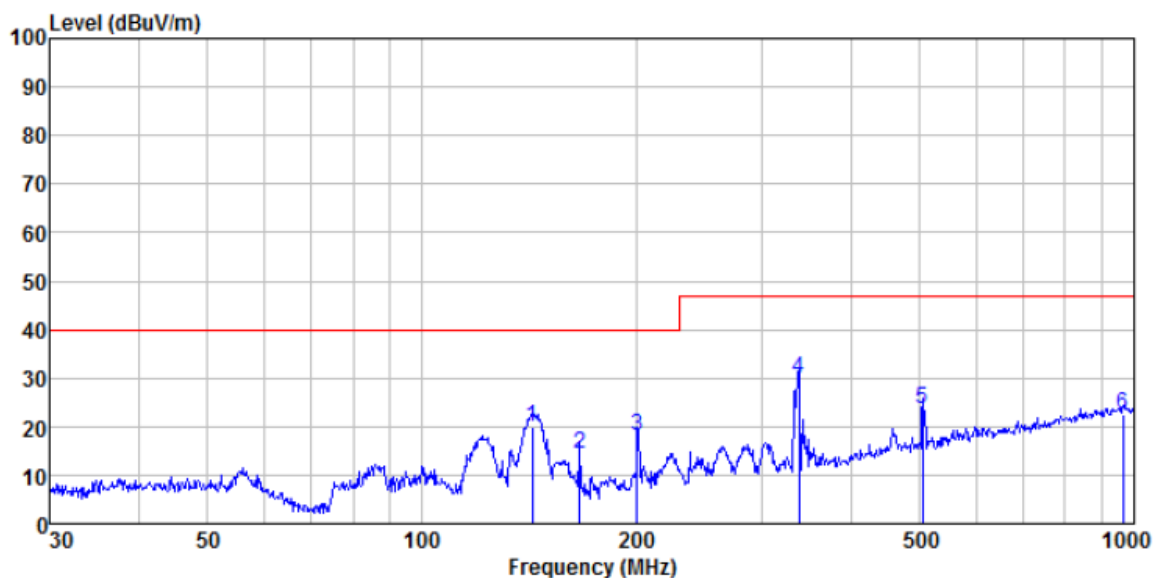
Test Requirement:	EN 55032																					
Test Method:	CISPR 16-2-3																					
Test Frequency Range:	30MHz to 6GHz																					
Class / Severity: Class B	Class B																					
Test site:	Measurement Distance: 3m																					
Receiver setup:	<table border="1"> <thead> <tr> <th>Frequency</th> <th>Detector</th> <th>RBW</th> <th>VBW</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>30MHz-1GHz</td> <td>Quasi-peak</td> <td>120KHz</td> <td>300KHz</td> <td>Quasi-peak</td> </tr> <tr> <td rowspan="2">Above 1GHz</td> <td>Peak</td> <td>1MHz</td> <td>3MHz</td> <td>Peak</td> </tr> <tr> <td>AV</td> <td>1MHz</td> <td>3MHz</td> <td>Average</td> </tr> </tbody> </table>	Frequency	Detector	RBW	VBW	Value	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak	Above 1GHz	Peak	1MHz	3MHz	Peak	AV	1MHz	3MHz	Average		
Frequency	Detector	RBW	VBW	Value																		
30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak																		
Above 1GHz	Peak	1MHz	3MHz	Peak																		
	AV	1MHz	3MHz	Average																		
Limit:	<table border="1"> <thead> <tr> <th>Frequency</th> <th>Limit (dBμV/m @3m)</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>30MHz-230MHz</td> <td>40.00</td> <td>Quasi-peak</td> </tr> <tr> <td>230MHz-1GHz</td> <td>47.00</td> <td>Quasi-peak</td> </tr> <tr> <td>1GHz-3GHz</td> <td>70.00</td> <td>Peak</td> </tr> <tr> <td>1GHz-3GHz</td> <td>50.00</td> <td>Average</td> </tr> <tr> <td>3GHz-6GHz</td> <td>74.00</td> <td>Peak</td> </tr> <tr> <td>3GHz-6GHz</td> <td>54.00</td> <td>Average</td> </tr> </tbody> </table>	Frequency	Limit (dB μ V/m @3m)	Value	30MHz-230MHz	40.00	Quasi-peak	230MHz-1GHz	47.00	Quasi-peak	1GHz-3GHz	70.00	Peak	1GHz-3GHz	50.00	Average	3GHz-6GHz	74.00	Peak	3GHz-6GHz	54.00	Average
Frequency	Limit (dB μ V/m @3m)	Value																				
30MHz-230MHz	40.00	Quasi-peak																				
230MHz-1GHz	47.00	Quasi-peak																				
1GHz-3GHz	70.00	Peak																				
1GHz-3GHz	50.00	Average																				
3GHz-6GHz	74.00	Peak																				
3GHz-6GHz	54.00	Average																				
Test setup:	<p>Below 1GHz:</p>  <p>Above 1GHz:</p> 																					

<p>Test Procedure:</p>	<p>From 30MHz to 1GHz:</p> <ol style="list-style-type: none"> 1. The radiated emissions test was conducted in a semi-anechoic chamber. 2. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation. 3. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emissions spectrum plots of the EUT. 4. The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization. <p>Above 1GHz:</p> <ol style="list-style-type: none"> 1. The radiated emissions test was conducted in a fully-anechoic chamber. 2. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation. 3. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emission spectrum plots of the EUT. 4. The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization. 						
<p>Test environment:</p>	<table border="1"> <tr> <td>Temp.:</td> <td>25 °C</td> <td>Humid.:</td> <td>52%</td> <td>Press.:</td> <td>1 012mbar</td> </tr> </table>	Temp.:	25 °C	Humid.:	52%	Press.:	1 012mbar
Temp.:	25 °C	Humid.:	52%	Press.:	1 012mbar		
<p>Measurement Record:</p>	<p>Uncertainty: ± 4.50dB</p>						
<p>Test Instruments:</p>	<p>Refer to section 6 for details</p>						
<p>Test mode:</p>	<p>Refer to section 5.2 for details</p>						
<p>Test results:</p>	<p>Pass</p>						

Measurement Data

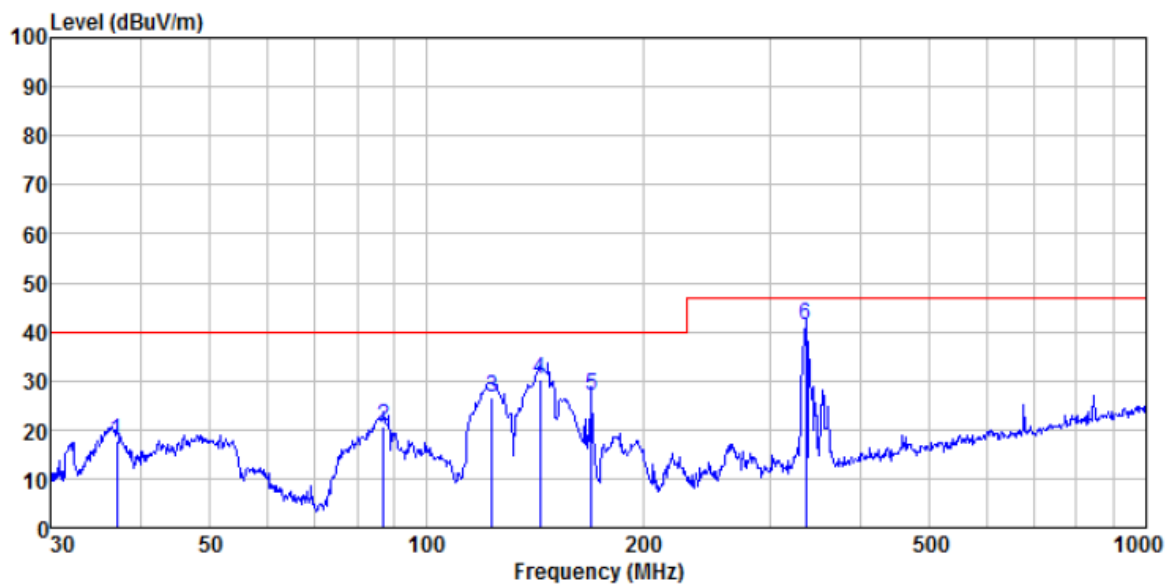
Below 1GHz

Test mode:	LAN mode	Antenna Polarity:	Horizontal
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Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
142.824	40.38	7.37	1.52	29.44	19.83	40.00	-20.17	QP
166.651	33.86	8.33	1.67	29.33	14.53	40.00	-25.47	QP
200.688	35.26	10.20	1.84	29.21	18.09	40.00	-21.91	QP
338.400	42.97	14.26	2.57	29.79	30.01	47.00	-16.99	QP
504.706	32.13	17.61	3.33	29.30	23.77	47.00	-23.23	QP
965.542	23.83	22.59	5.09	29.10	22.41	47.00	-24.59	QP

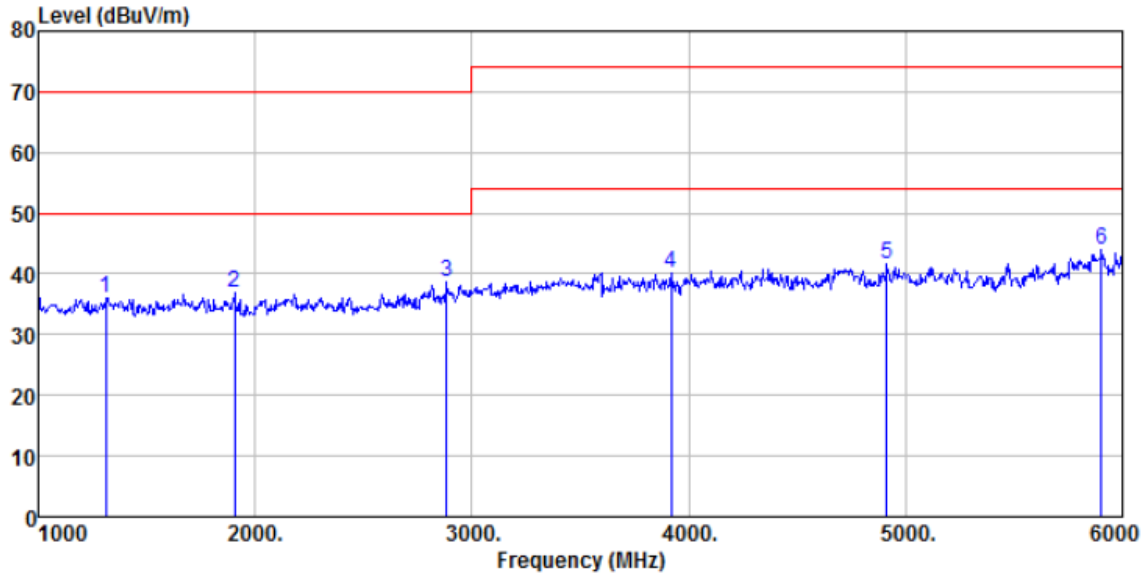
Test mode:	LAN mode	Antenna Polarity:	Vertical
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Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
37.155	36.05	11.20	0.63	30.06	17.82	40.00	-22.18	QP
87.112	39.83	9.50	1.09	29.76	20.66	40.00	-19.34	QP
123.266	45.79	9.07	1.38	29.55	26.69	40.00	-13.31	QP
143.830	50.78	7.37	1.53	29.44	30.24	40.00	-9.76	QP
169.599	46.06	8.40	1.69	29.32	26.83	40.00	-13.17	QP
336.035	54.45	14.21	2.55	29.80	41.41	47.00	-5.59	QP

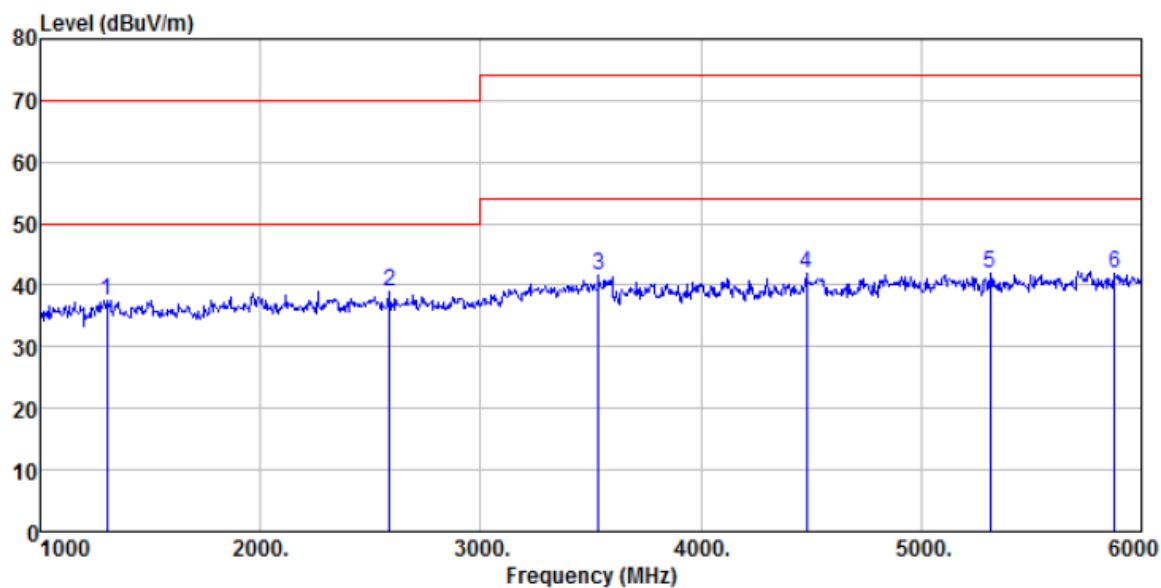
Above 1G

Test mode:	LAN mode	Antenna Polarity:	Horizontal
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Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
1310.000	39.08	25.65	4.55	33.27	36.01	70.00	-33.99	Peak
1905.000	40.65	25.77	4.91	34.29	37.04	70.00	-32.96	Peak
2885.000	37.76	28.42	5.83	33.45	38.56	70.00	-31.44	Peak
3920.000	35.08	29.54	7.73	32.27	40.08	74.00	-33.92	Peak
4915.000	33.09	31.89	8.69	32.14	41.53	74.00	-32.47	Peak
5905.000	33.34	32.78	10.06	32.18	44.00	74.00	-30.00	Peak

Test mode:	LAN mode	Antenna Polarity:	Vertical
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Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
1305.000	40.57	25.64	4.55	33.27	37.49	70.00	-32.51	Peak
2585.000	39.44	27.74	5.57	33.80	38.95	70.00	-31.05	Peak
3535.000	38.15	29.06	7.03	32.71	41.53	74.00	-32.47	Peak
4480.000	34.10	31.29	8.32	31.93	41.78	74.00	-32.22	Peak
5315.000	33.24	31.71	9.24	32.34	41.85	74.00	-32.15	Peak
5880.000	31.22	32.74	10.04	32.20	41.80	74.00	-32.20	Peak

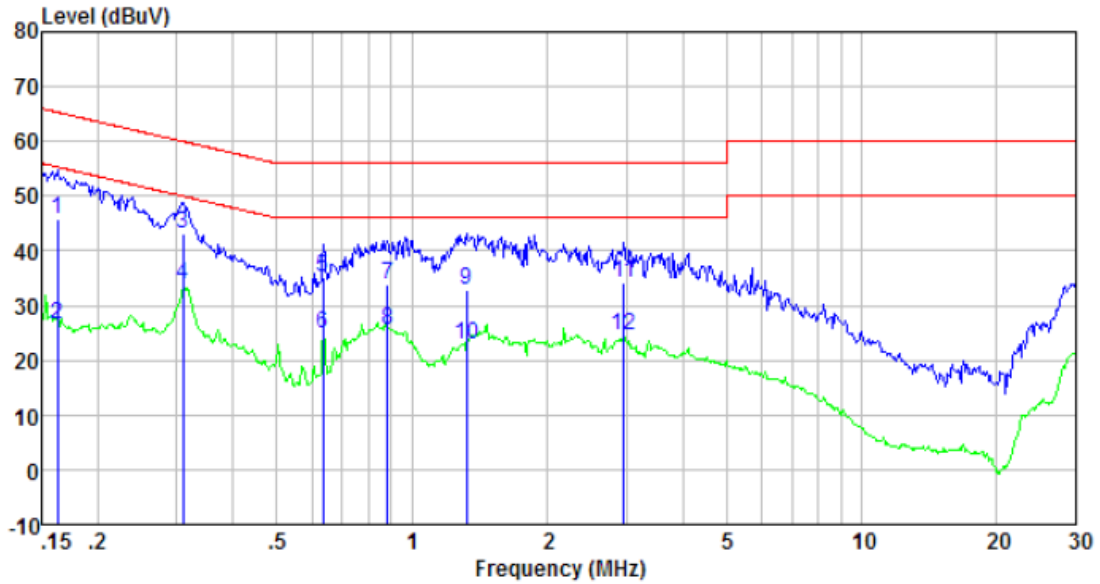
7.2 Conducted Emissions

Test Requirement:	EN 55032					
Test Method:	CISPR 16-2-1					
Test Frequency Range:	150kHz to 30MHz					
Limit for AC ports:	Frequency range (MHz)		Limit (dB μ V)			
			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.						
Limit for Telecommunication ports:	Frequency range (MHz)		Limit (dB μ V)			
			Quasi-peak Average			
	0.15-0.5	84 to 74*	74 to 64*			
	0.5-30	74	64			
* Decreases with the logarithm of the frequency.						
Test setup:	<p><i>Remark:</i> E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p>					
Test procedure	<ol style="list-style-type: none"> 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. 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). 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 EN55032 Class B on conducted measurement. 					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1 012mbar
Measurement Record:	Uncertainty: \pm 3.45dB					
Test Instruments:	Refer to section 6 for details					
Test mode:	Refer to section 5.2 for details					
Test results:	Pass					

Measurement Data

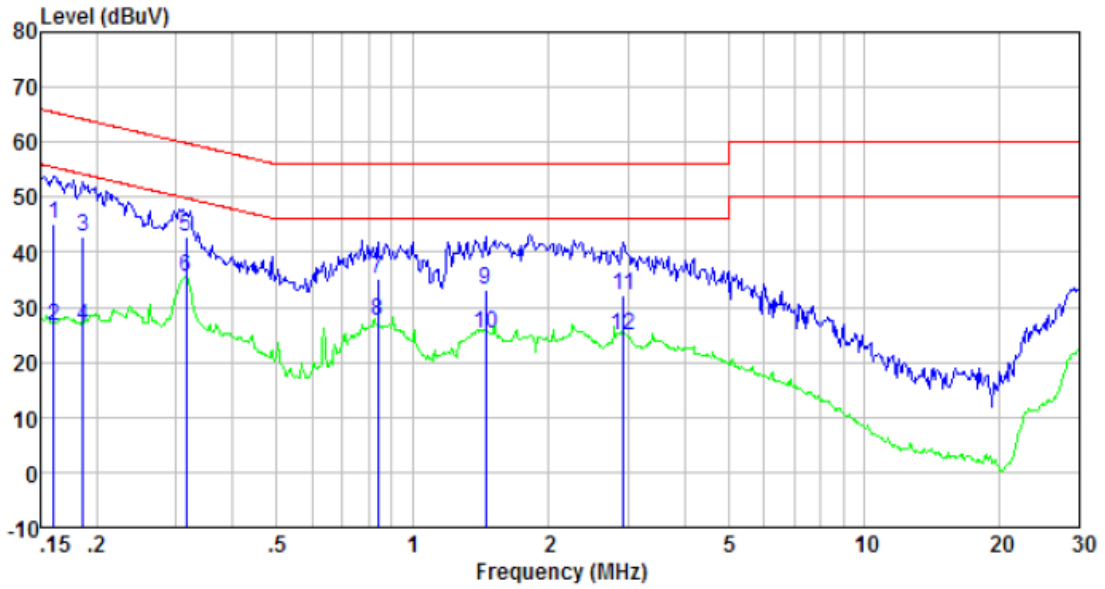
AC ports

Test mode:	LAN mode	Phase Polarity:	Line
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Freq MHz	Reading level dBuV	IISN/ISN factor dB	Cable loss dB	level dBuV	Limit level dBuV	Over limit dB	Remark
0.162	45.27	0.42	0.12	45.81	65.34	-19.53	QP
0.162	25.87	0.42	0.12	26.41	55.34	-28.93	Average
0.310	42.49	0.44	0.10	43.03	59.97	-16.94	QP
0.310	33.39	0.44	0.10	33.93	49.97	-16.04	Average
0.634	34.58	0.30	0.13	35.01	56.00	-20.99	QP
0.634	24.41	0.30	0.13	24.84	46.00	-21.16	Average
0.880	33.36	0.26	0.13	33.75	56.00	-22.25	QP
0.880	25.20	0.26	0.13	25.59	46.00	-20.41	Average
1.324	32.35	0.23	0.13	32.71	56.00	-23.29	QP
1.324	22.40	0.23	0.13	22.76	46.00	-23.24	Average
2.962	33.80	0.20	0.15	34.15	56.00	-21.85	QP
2.962	24.25	0.20	0.15	24.60	46.00	-21.40	Average

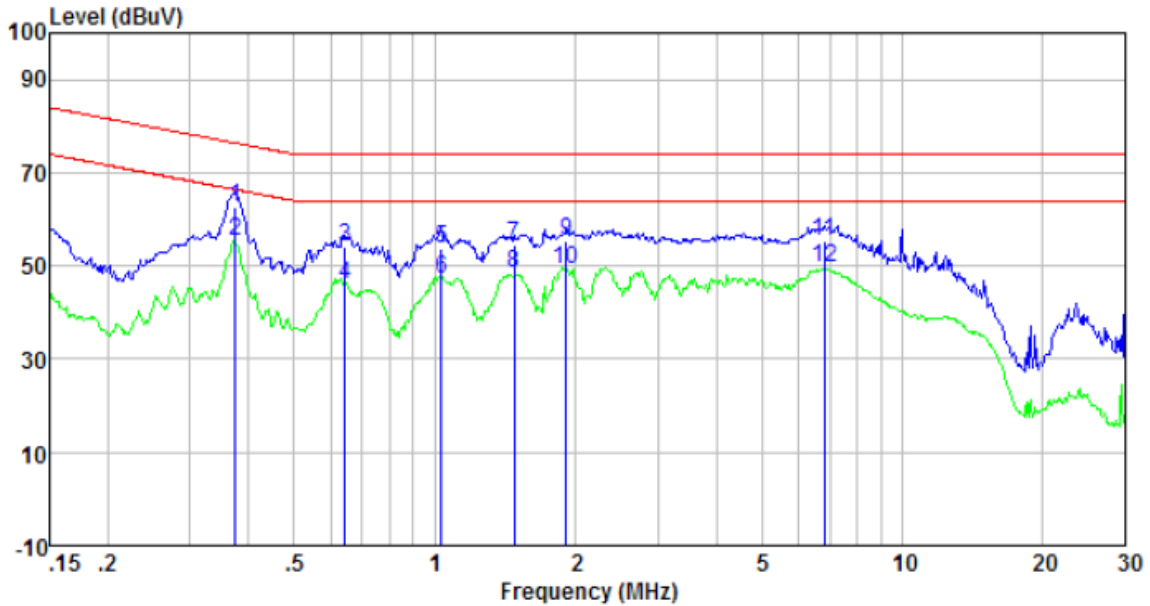
Test mode:	LAN mode	Phase Polarity:	Neutral
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Freq MHz	Reading level dBuV	LISN/ISN factor dB	Cable loss dB	level dBuV	Limit level dBuV	Over limit dB	Remark
0.161	44.70	0.41	0.12	45.23	65.43	-20.20	QP
0.161	26.13	0.41	0.12	26.66	55.43	-28.77	Average
0.186	42.29	0.41	0.13	42.83	64.20	-21.37	QP
0.186	25.88	0.41	0.13	26.42	54.20	-27.78	Average
0.315	42.23	0.42	0.10	42.75	59.84	-17.09	QP
0.315	34.86	0.42	0.10	35.38	49.84	-14.46	Average
0.839	34.96	0.22	0.13	35.31	56.00	-20.69	QP
0.839	27.11	0.22	0.13	27.46	46.00	-18.54	Average
1.449	32.94	0.20	0.13	33.27	56.00	-22.73	QP
1.449	24.95	0.20	0.13	25.28	46.00	-20.72	Average
2.931	31.96	0.20	0.15	32.31	56.00	-23.69	QP
2.931	24.68	0.20	0.15	25.03	46.00	-20.97	Average

Telecommunication ports

Test mode:	LAN mode
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Freq MHz	Reading level dBuV	IISN/ISN factor dB	Cable loss dB	level dBuV	Limit level dBuV	Over limit dB	Remark
0.375	53.38	9.38	0.10	62.86	76.39	-13.53	QP
0.375	45.91	9.38	0.10	55.39	66.39	-11.00	Average
0.644	44.81	9.24	0.13	54.18	74.00	-19.82	QP
0.644	36.56	9.24	0.13	45.93	64.00	-18.07	Average
1.032	44.47	9.20	0.13	53.80	74.00	-20.20	QP
1.032	38.01	9.20	0.13	47.34	64.00	-16.66	Average
1.480	45.16	9.18	0.13	54.47	74.00	-19.53	QP
1.480	39.02	9.18	0.13	48.33	64.00	-15.67	Average
1.908	46.03	9.13	0.14	55.30	74.00	-18.70	QP
1.908	40.01	9.13	0.14	49.28	64.00	-14.72	Average
6.805	46.11	9.00	0.17	55.28	74.00	-18.72	QP
6.805	40.30	9.00	0.17	49.47	64.00	-14.53	Average

7.3 Harmonics Test Results

Test Requirement:	EN 61000-3-2
Test Method:	N/A: See Remark Below
Remark	<p>There is no need for Harmonics test to be performed on this product (rated power is less than 75W) in accordance with EN 61000-3-2.</p> <p>For further details, please refer to Clause 7, Note 1 of EN 61000-3-2 which states:</p> <p>“For the following categories of equipment limits are not specified in this edition of the standard.</p> <p>Note 1: Equipment with a rated power of 75W or less, other than lighting equipment.”</p>

7.4 Flicker Test Result

Test Requirement:	EN 61000-3-3					
Test Method:	EN 61000-3-3					
Class/Severity:	Clause 5 of EN 61000-3-3					
Measurement Time:	10 min					
Detector:	As per EN 61000-3-3					
Test environment:	Temp.:	24 °C	Humid.:	51%	Press.:	1 012mbar
Test Instruments:	Refer to section 6 for details					
Test mode:	Operation mode					
Test results:	Pass					

Measurement Data

	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.011	3.30	PASS
dmax [%]	0.069	4.00	PASS
dt [s]	0.000	0.50	PASS

8 Immunity Test Results

8.1 Performance Criteria Description in Clause 7 EN 55024

<p>Criterion A:</p>	<p>During and after the test the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a minimum performance level specified by the manufacturer when the EUT is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the EUT if used as intended.</p>
<p>Criterion B:</p>	<p>After the test, the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the EUT is used as intended. The performance level may be replaced by a permissible loss of performance.</p> <p>During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test.</p> <p>If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the EUT if used as intended.</p>
<p>Criterion C:</p>	<p>During and after testing, a temporary loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls or cycling of the power to the EUT by the user in accordance with the manufacturer's instructions.</p> <p>Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.</p>

8.2 Electrostatic Discharge

Test Requirement:	EN55024
Test Method:	EN 61000-4-2
Discharge Voltage:	Contact Discharge: $\pm 4\text{kV}$ Air Discharge: $\pm 2\text{kV}$, $\pm 4\text{kV}$, $\pm 8\text{kV}$ HCP/VCP: $\pm 4\text{kV}$
Polarity:	Positive & Negative
Number of Discharge:	Contact Discharge: Minimum 25 times at each test point, Air Discharge: Minimum 10 times at each test point.
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum
Limit:	Criteria B
Test setup:	
Test Procedure:	<p>1. Air discharge: The test was applied on non-conductive surfaces of EUT. The round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT. After each discharge, the discharge electrode was removed from the EUT. The generator was re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure was repeated until all the air discharge completed</p> <p>2. Contact Discharge: The test was applied on conductive surfaces of EUT. the generator was re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. the tip of the discharge electrode was touch the EUT before the discharge switch was operated.</p> <p>3. Indirect discharge for horizontal coupling plane At least 10 single discharges shall be applied at the front edge of each HCP opposite the centre point of each unit of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge. Consideration should be given to exposing all sides of the EUT.</p> <p>4. Indirect discharge for vertical coupling plane At least 10 single discharges were applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X</p>

	0.5m, was placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges were applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.					
Test environment:	Temp.:	24 °C	Humid.:	51%	Press.:	1 012mbar
Test mode:	Refer to section 5.2 for details					
Test Instruments:	Refer to section 6 for details					
Test results:	Pass					

Measurement Record:

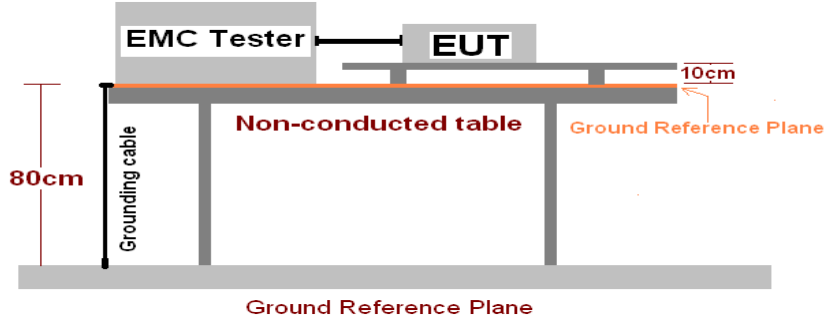
Test points:	I: All metallic parts			
	II: Seams. Holes			
Direct discharge				
Discharge Voltage (KV)	Type of discharge	Test points	Observations (Performance Criterion)	Result
± 4	Contact	I	A	Pass
± 2, ± 4, ± 8	Air	II	A	Pass
Indirect discharge				
Discharge Voltage (KV)	Type of discharge	Test points	Observation Performance	Result
± 4	HCP-Bottom/Top/ Front/Back/Left/Right	Edge of the HCP	A	Pass
± 4	VCP-Bottom/Top/ Front/Back/Left/Right	Center of the VCP	A	Pass

Remark:

A: No degradation in performance of the EUT was observed.

8.3 Electrical Fast Transients

8.3.1 AC Port

Test Requirement:	EN55024
Test Method:	EN 61000-4-4
Test Level:	1.0kV
Polarity:	Positive & Negative
Test signal specification:	Rise time=5ns, Duration time=50ns; Burst Duration=15ms, Burst Period=300ms; Repetition Frequency=5KHz
Test Duration:	2 minute per level & polarity
Performance Criterion:	Criterion B
Test setup:	 <p>The diagram illustrates the test setup. An EMC Tester and an EUT (Under Test) are placed on a non-conducted table. The table is supported by a wood support that is 80cm high. A grounding cable is connected to the table. A ground reference plane is shown extending 10cm beyond the EUT. The ground reference plane is a 1m*1m metallic sheet with a minimum thickness of 0.65mm.</p>
Test Procedure:	<ol style="list-style-type: none"> 1. The EUT and its simulators were placed on the ground reference plane and were insulated from it by a wood support 0.1m + 0.01m thick. The ground reference plane was 1m*1m metallic sheet with 0.65mm minimum thickness. 2. This reference ground plane was project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane was more than 0.5m. 3. All cables to the EUT was placed on the wood support, cables not subject to EFT/B was routed as far as possible from the cable under test to minimize the coupling between the cables. 4. The length of power lines between the coupling device and the EUT is 0.5m 5. The EUT is connected to the power mains through a coupling device that directly couples the EFT/B interference signal. 6. Each of the Line and Neutral conductors is impressed with burst noise for 2 minutes.
Test environment:	Temp.: 26 °C Humid.: 54% Press.: 1 012mbar
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Record:

Lead under Test	Level (\pm kV)	Coupling Direct/Clamp	Observations (Performance Criterion)	Result
L	± 1.0	Direct	A	Pass
N	± 1.0	Direct	A	Pass
L-N	± 1.0	Direct	A	Pass

Remark:

A: No degradation in performance of the EUT was observed.

8.3.2 Signal ports and Telecommunication ports

Test Requirement:	EN 55024
Test Method:	EN 61000-4-4
Test Level:	0.5KV
Polarity:	Positive & Negative
Test signal specification:	Rise time=5ns, Duration time=50ns; Burst Duration=15ms, Burst Period=300ms; Repetition Frequency=5KHz
Test Duration:	2 minute per level & polarity
Performance Criterion:	Criterion B
Test setup:	<p>The diagram illustrates the test setup. An EMC Tester is connected to a Capacitive coupling clamp, which is in turn connected to the EUT (Equipment Under Test) via a Telecommunication line. Both the EMC Tester and the EUT are placed on a Non-conducted table that is 80cm high. The table is supported by a Ground Reference Plane. The distance between the EUT and the Ground Reference Plane is 10cm. A Grounding cable is also shown connected to the table.</p>
Test Procedure:	<ol style="list-style-type: none"> 1. The EUT and its simulators were placed on the ground reference plane and were insulated from it by a wood support 0.1m + 0.01m thick. The ground reference plane was 1m*1m metallic sheet with 0.65mm minimum thickness. 2. The capacitive coupling clamp were placed on the ground reference plane. 3. This reference ground plane was project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane was more than 0.5m. 4. The length of the signal lines between the coupling device and the EUT is 0.5m 5. The signal line were place in the campacitive coupling clamp, and the clamp itself shall be closed as much as possible to provide maximum coupling 6. The EFT interference signal is through a coupling clamp device couples to the signal and control lines of the EUT with burst noise for 2 minutes.
Test environment:	Temp.: 26 °C Humid.: 54% Press.: 1 012mbar
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Record:

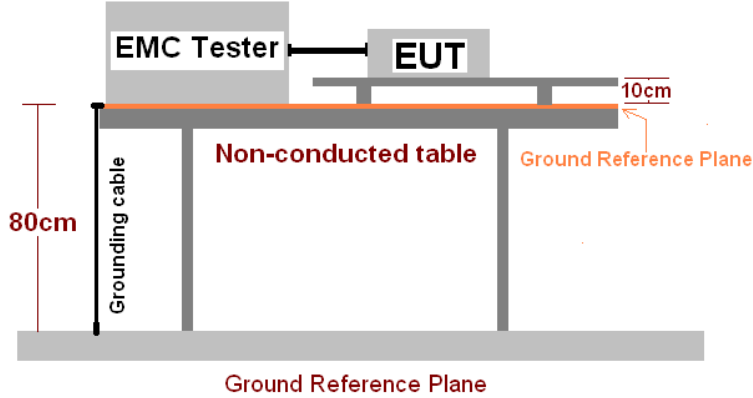
Lead under Test	Level (kV)	Coupling Direct/Clamp	Observations (Performance Criterion)	Result
Signal line	± 0.5	Clamp	A	Pass

Remark:

A: No degradation in performance of the EUT was observed.

8.4 Surges

8.4.1 AC ports

Test Requirement:	EN 55024
Test Method:	EN 61000-4-5
Test Level:	1kV line to line: Differential mode 2kV line to earth: Common mode
Polarity:	Positive & Negative
Generator source impedance:	2Ω (line-line coupling) 12Ω (line-earth coupling)
Test signal specification:	Rise time=1.2us, Duration time=50us; Test Interval: 60s between each surge;
No. of surges:	5 positive, 5 negative at 0°, 90°, 180°, 270°.
Performance Criterion:	Criterion B
Test setup:	 <p>The diagram illustrates the test setup. An EMC Tester is connected to an EUT (Equipment Under Test) which is placed on a non-conducted table. The table is 80cm high. A 10cm gap is maintained between the EUT and the table surface. A Ground Reference Plane is shown below the table.</p>
Test Procedure:	<ol style="list-style-type: none"> For line-to-line coupling mode, provide a 1kV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points, and for active line / neutral lines to ground are same except test level is 2kV. At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are applied during test. Different phase angles are done individually. Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.
Test environment:	Temp.: 26 °C Humid.: 53% Press.: 1 012mbar
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Record:

Location	Level(kV)	Pulse No	Surge Interval	Phase(deg)	Observations (Performance Criterion)	Result
L-N	± 1	5	60s	0°	A	Pass
				90°	A	Pass
				180°	A	Pass
				270°	A	Pass

Remark:

A: No degradation in performance of the EUT was observed.

8.4.2 Signal ports and Telecommunication ports

Test Requirement:	EN 55024
Test Method:	EN 61000-4-5
Test Level:	1kV
Polarity:	Positive & Negative
Generator source impedance:	42Ω (line-earth coupling)
Test signal specification:	Rise time=10us, Duration time=700us; Test Interval: 60s between each surge;
No. of surges:	5 positive, 5 negative
Performance Criterion:	Criterion C
Test setup:	
Test Procedure:	<ol style="list-style-type: none"> 1. For Coupling/decoupling networks mode, provide a 1kV 10/700us voltage surge 2. At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are applied during test. 3. Different phase angles are done individually. 4. Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.
Test environment:	Temp.: 26 °C Humid.: 53% Press.: 1 012mbar
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Record:

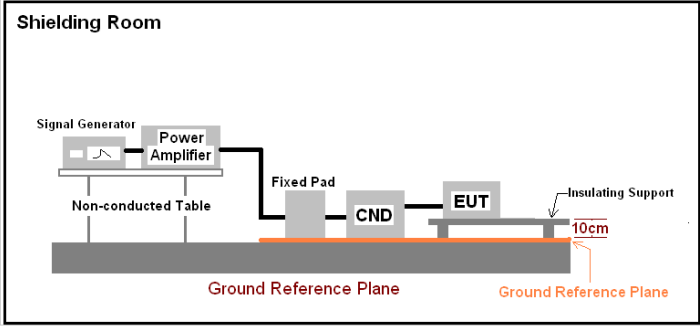
Location	Level(kV)	Pulse No	Surge Interval	Observations (Performance Criterion)	Result
Signal port	± 1	5	60s	A	Pass

Remark:

A: No degradation in performance of the EUT was observed.

8.5 Radio-frequency continuous conducted

8.5.1 AC ports

Test Requirement:	EN 55024
Test Method:	EN 61000-4-6
Frequency range:	0.15MHz to 80MHz
Test Level:	3V rms on AC Ports (unmodulated emf into 150 Ω)
Performance Criterion:	Criterion A
Test setup:	
Test Procedure:	<ol style="list-style-type: none"> The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible). The disturbance signal described below is injected to EUT through CDN. The EUT operates within its operational mode(s) under intended climatic conditions after power on. Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.
Test environment:	Temp.: 24 °C Humid.: 51% Press.: 1 012mbar
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Record:

Frequency	Injected Position	Level	Modulation	Observations (Performance Criterion)	Result
150kHz to 80MHz	AC Mains	3Vrms	1 kHz, 80 % Amp. Mod, 1 % increment, dwell time=2seconds	A	Pass

Remark:

A: No degradation in performance of the EUT was observed.

8.5.2 Signal ports and Telecommunication ports

Test Requirement:	EN 55024
Test Method:	EN 61000-4-6
Frequency range:	0.15MHz to 80MHz
Test Level:	3V rms
Performance Criterion:	Criterion A
Test setup:	
Test Procedure:	<ol style="list-style-type: none"> 1. The EUT are placed on an insulating support 0.1m high above a ground reference plane. EM Clamp is placed on the ground plane about 0.3m from EUT. Cables between EM clamp and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible). 2. The signal line were place in the EM clamp. 3. The disturbance signal described below is injected to EUT through EM clamp. 4. The EUT operates within its operational mode(s) under intended climatic conditions after power on. 5. Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.
Test environment:	Temp.: 24 °C Humid.: 51% Press.: 1 012mbar
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

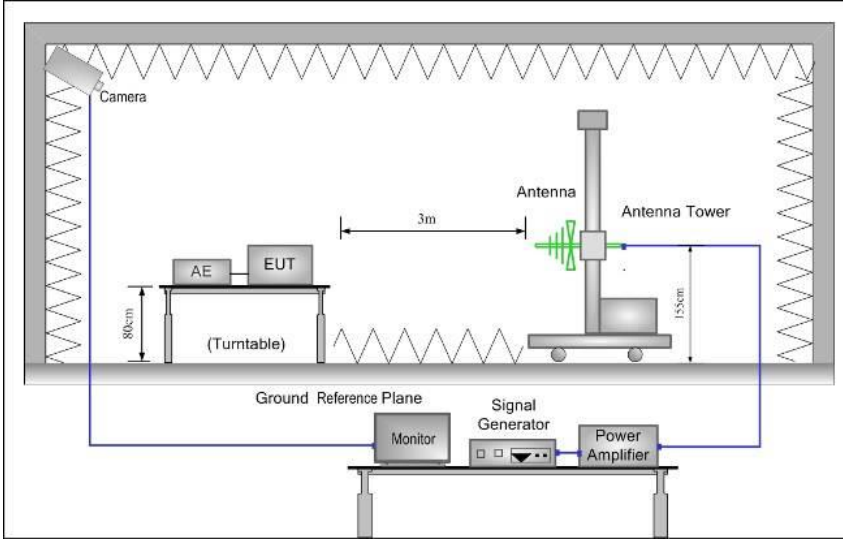
Measurement Record:

Frequency	Injected Position	Level	Modulation	Observations (Performance Criterion)	Result
150kHz to 80MHz	Clamp	3Vrms	1 kHz, 80 % Amp. Mod, 1 % increment, dwell time=2seconds	A	Pass

Remark:

A: No degradation in performance of the EUT was observed.

8.6 Radio-frequency electromagnetic field Amplitude modulated

Test Requirement:	EN 55024
Test Method:	EN 61000-4-3
Frequency range:	80MHz to 1GHz
Test Level:	3V/m
Modulation:	80%, 1kHz Amplitude Modulation
Performance Criterion:	Criterion A
Test setup:	
Test Procedure:	<ol style="list-style-type: none"> 1. For table-top equipment, the EUT was placed in the chamber on a non-conductive table 0.8m high. For arrangement of floor-standing equipment, the EUT was mounted on a non-conductive support 0.1m above the supporting plane. For human body-mounted equipment, the EUT may be tested in the same manner as table top items. 2. If possible, a minimum of 1 m of cable is exposed to the electromagnetic field. Excess length of cables interconnecting units of the EUT shall be bundled low-inductively in the approximate center of the cable to form a bundle 30 cm to 40 cm in length. 3. The EUT was initially placed with one face coincident with the calibration plane. The EUT face being illuminated was contained within the UFA (Uniform Field Area). 4. The frequency ranges to be considered were swept with the signal modulated and pausing to adjust the RF signal level or to switch oscillators and antennas as necessary. Where the frequency range was swept incrementally, the step size was not exceed 1 % of the preceding frequency value. 5. The dwell time of the amplitude modulated carrier at each frequency was not be less than the time necessary for the EUT to be exercised and to respond, and was not less than 0,5 s. 6. The test normally was performed with the generating antenna facing each side of the EUT. 7. The polarization of the field generated by each antenna necessitates

	testing each selected side twice, once with the antenna positioned vertically and again with the antenna positioned horizontally. 8. The EUT was performed in a configuration to actual installation conditions, a video camera and/or a audio monitor were used to monitor the performance of the EUT.
Test environment:	Temp.: 25 °C Humid.: 52% Press.: 1 012mbar
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

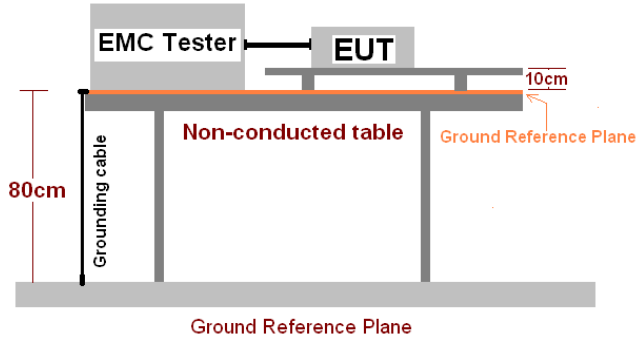
Measurement Record:

Frequency	Level	Modulation	Antenna Polarization	EUT Face	Observations (Performance Criterion)	Result
80 MHz-1 GHz	3 V/m	1 kHz, 80 % Amp. Mod, 1 % increment, dwell time=3seconds	V	Front	A	Pass
			H		A	Pass
			V	Rear	A	Pass
			H		A	Pass
			V	Left	A	Pass
			H		A	Pass
			V	Right	A	Pass
			H		A	Pass
			V	Top	A	Pass
			H		A	Pass
			V	Bottom	A	Pass
			H		A	Pass

Remark:

A: No degradation in performance of the EUT was observed.

8.7 Voltage dips and Voltage interruptions

Test Requirement:	EN 55024
Test Method:	EN 61000-4-11
Test Level:	0% of VT(Supply Voltage) for 0.5 period 70% of VT(Supply Voltage) for 25 period 0% of VT(Supply Voltage) for 250 period
Number of Dips / Interruptions:	3 per Level
Performance Criterion:	>95% VD, 0.5 period----Performance criterion: B 30% VD, 25 period----Performance criterion: C >95% VI, 250 period----Performance criterion: C
Test setup:	
Test Procedure:	<ol style="list-style-type: none"> The EUT and test generator were setup as shown on above setup photo. The interruptions are introduced at selected phase angles with specified duration. Record any degradation of performance.
Test environment:	Temp.: 26 °C Humid.: 53% Press.: 1 012mbar
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Record:

Test Level % U _T	Duration (Periods)	Phase angle	No. of drop out	Time between dropout	Observations (Performance Criterion)	Result
0	0.5	0°, 90°, 180°, 270°	3	10s	A	Pass
70	25	0°, 90°, 180°, 270°	3	10s	A	Pass
0	250	0°, 90°, 180°, 270°	3	10s	B	Pass

A: No degradation in performance of the EUT was observed.

B: During the test, the adapter stops work, but after the test, it can automatically return to normal.

9 Test Setup Photo

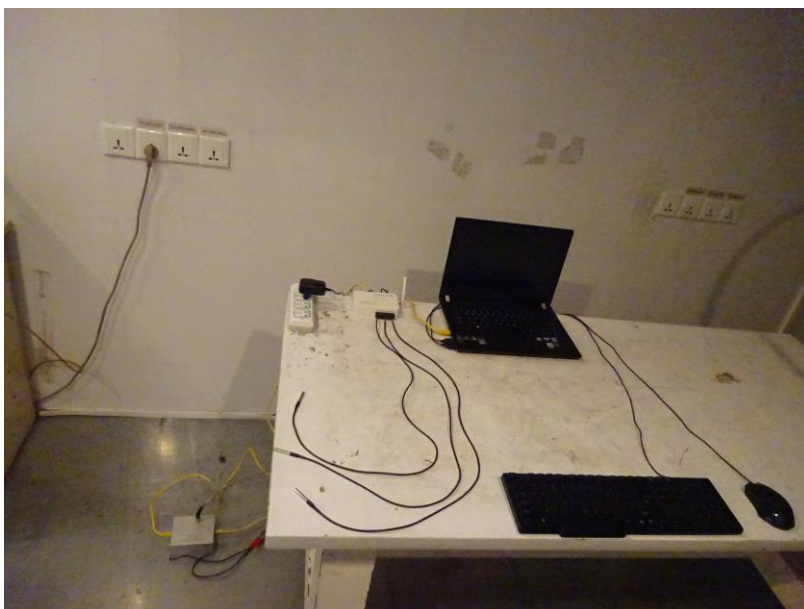
Radiated Emission



Conducted Emission (AC Port)



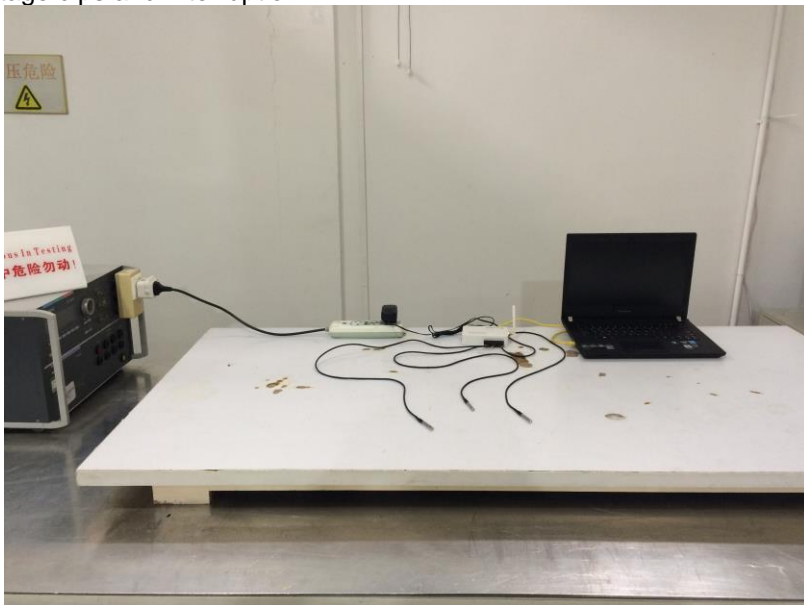
Conducted Emission (Telecommunication Port)



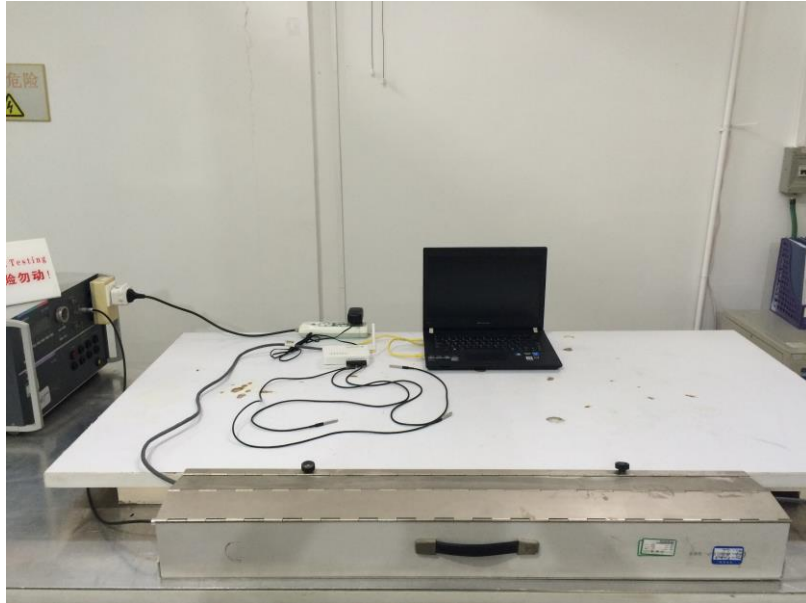
Electrostatic discharge



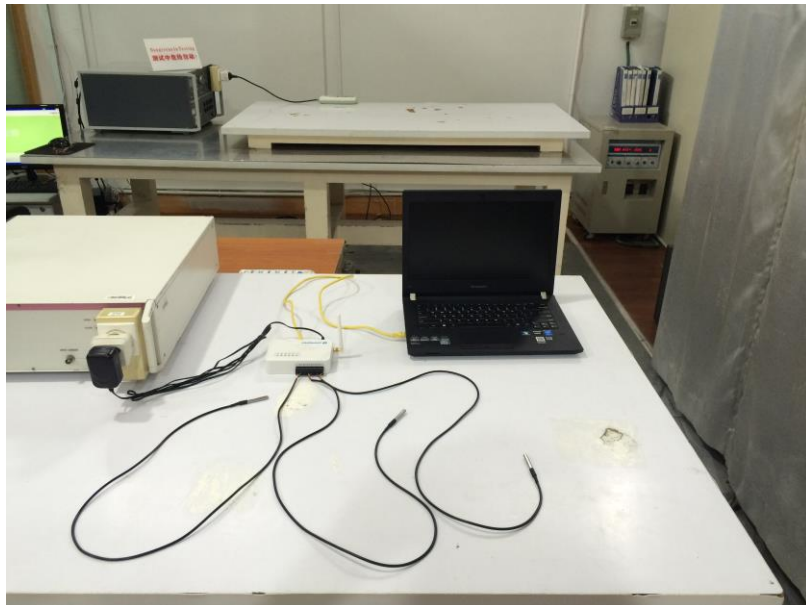
EFT, Surge, Voltage dips and Interruption:



EFT (Telecommunication Port)



Flicker

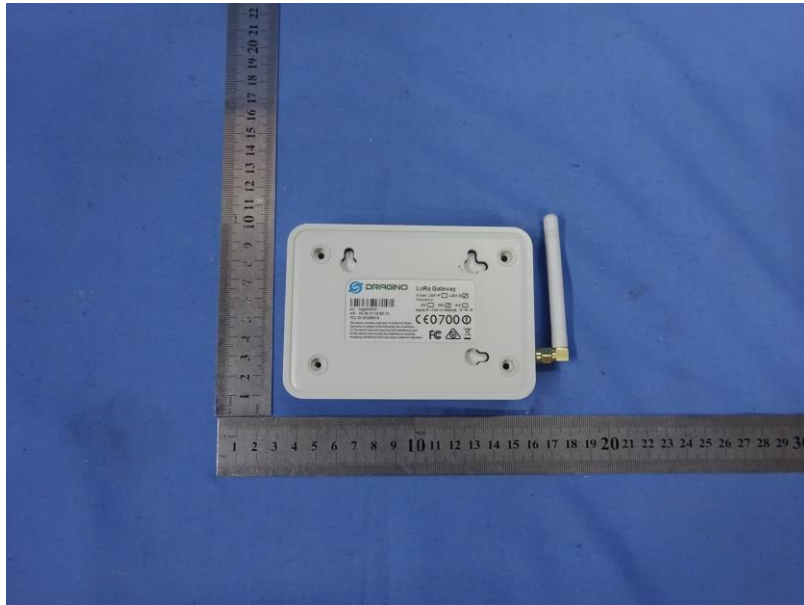


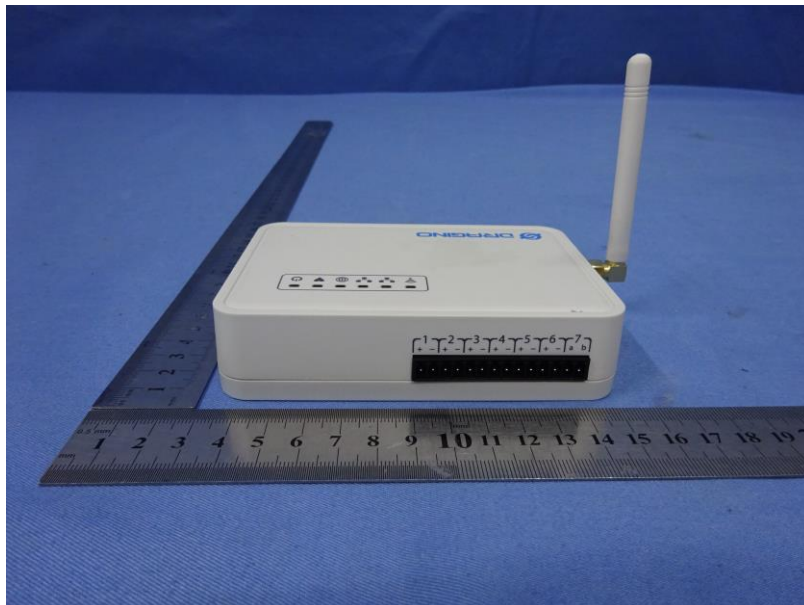
RS



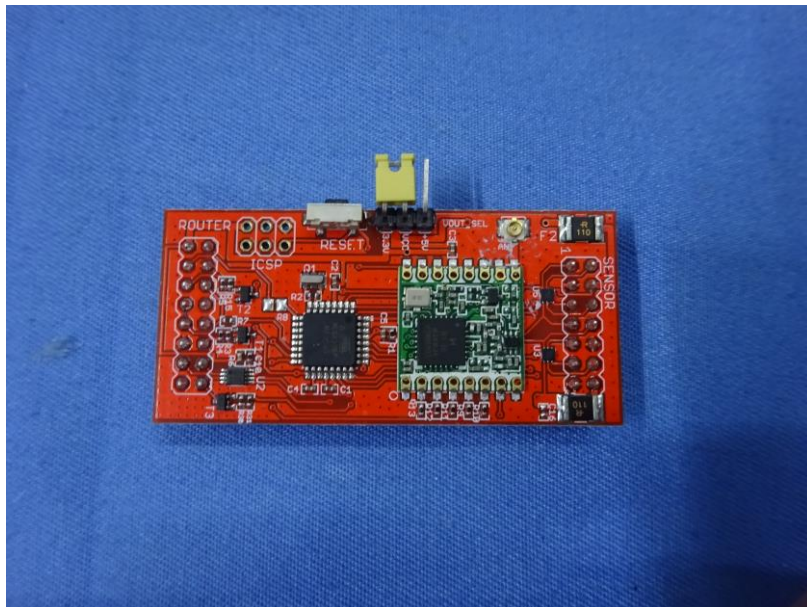
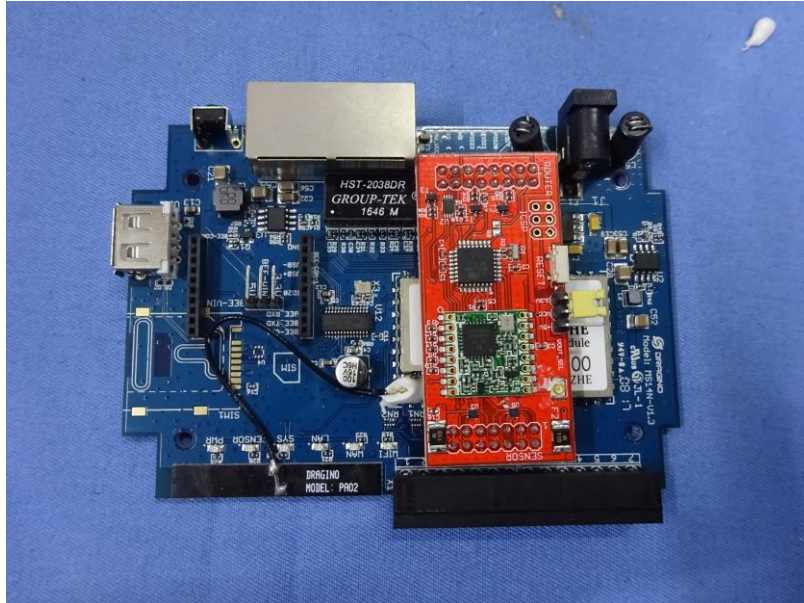
10 EUT Constructional Details



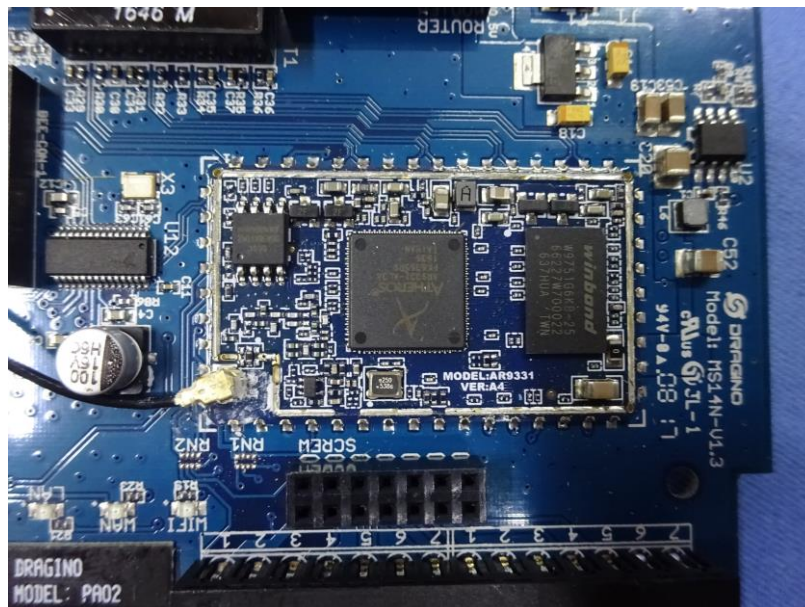
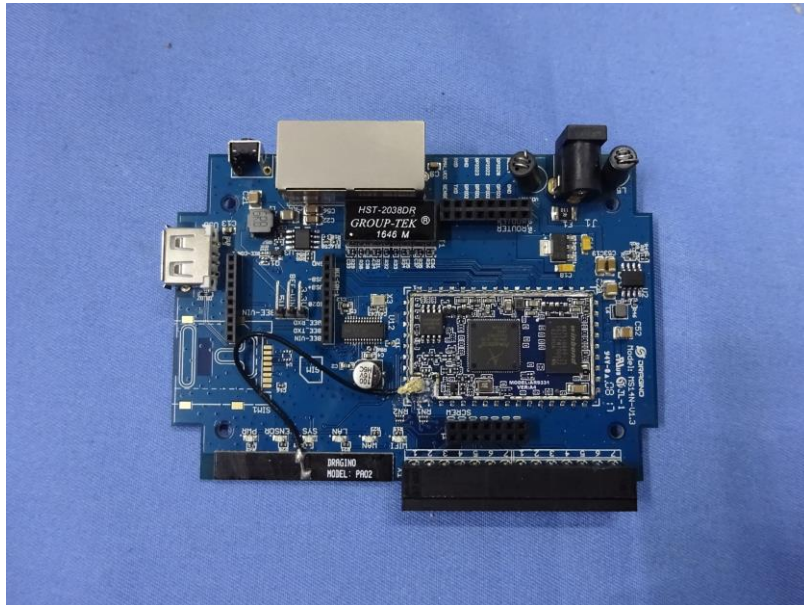


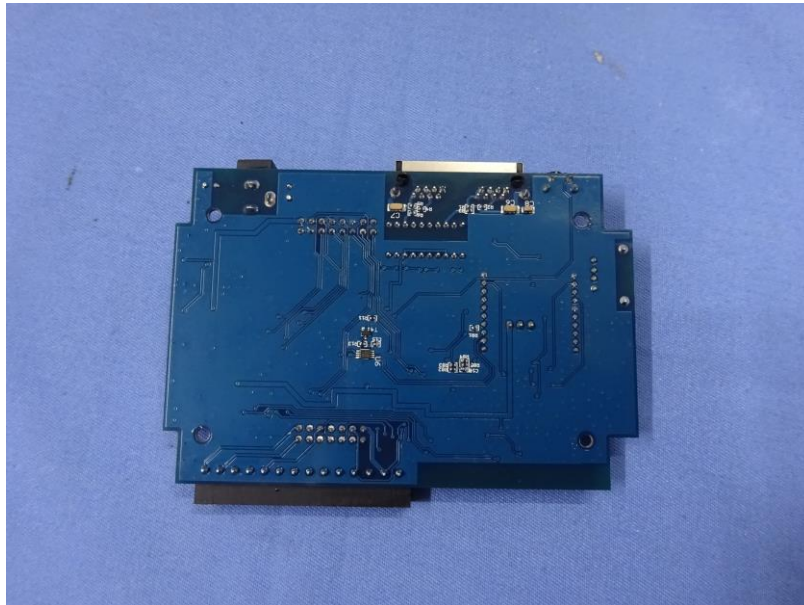














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