

EMC REPORT

Applicant: Red Bear Company Limited

Address of Applicant: 1711 Block B, Wah Luen Industrial Centre, 15-21 Wong Chuk Yeung Street, Fo Tan, Hong Kong

Equipment Under Test (EUT)

Product Name: RedBear IoT pHAT

Model No.: PHAT-IOT

Applicable standards: ETSI EN 301 489-1 V1.9.2 (2011-09)
ETSI EN 301 489-17 V2.2.1 (2012-09)

Date of sample receipt: July 06, 2016

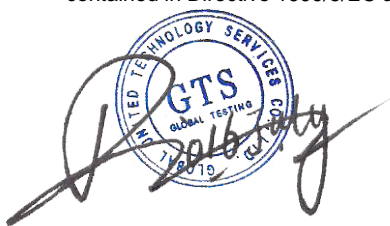
Date of Test: July 07-12, 2016

Date of report issue: July 13, 2016

Test Result : PASS *

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

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EC Directives. The protection requirements with respect to electromagnetic compatibility contained in Directive 1999/5/EC are considered.



Robinson Lo

Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the GTS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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2 Version

Version No.	Date	Description
00	July 13, 2016	Original

Prepared By:

Edward Pan

Date:

July 13, 2016

Project Engineer

Check By:

Andy Wu

Date:

July 13, 2016

Reviewer

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4 Test Summary

EMI Test				
Test Item	Test Requirement	Test Method	Application	Result
Radiated Emission	ETSI EN 301 489-17	ETSI EN301 489-1	Enclosure	Pass
Conducted Emission	ETSI EN 301 489-17	ETSI EN301 489-1	AC port	N/A
Harmonic Current Emissions	ETSI EN 301 489-17	ETSI EN301 489-1	AC port	N/A
Voltage Fluctuations and Flicker	ETSI EN 301 489-17	ETSI EN301 489-1	AC port	N/A
EMS Test				
ESD (Electrostatic Discharge)	ETSI EN 301 489-17	EN 61000-4-2	Enclosure	Pass
Radiated Immunity, 80MHz to 2.7 GHz	ETSI EN 301 489-17	EN 61000-4-3	Enclosure	Pass
EFT (Electrical Fast Transients)	ETSI EN 301 489-17	EN 61000-4-4	AC port	N/A
Surge Immunity	ETSI EN 301 489-17	EN 61000-4-5	AC port	N/A
Injected Currents 150kHz to 80MHz	ETSI EN 301 489-17	EN 61000-4-6	AC port	N/A
Voltage Dips and Interruptions	ETSI EN 301 489-17	EN 61000-4-11	AC port	N/A

Remark:

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

N/A: not applicable.

5 General Information

5.1 Client Information

Applicant:	Red Bear Company Limited
Address of Applicant:	1711 Block B, Wah Luen Industrial Centre, 15-21 Wong Chuk Yeung Street, Fo Tan, Hong Kong
Manufacturer/Factory:	Red Bear Company Limited
Address of Manufacturer/Factory:	1711 Block B, Wah Luen Industrial Centre, 15-21 Wong Chuk Yeung Street, Fo Tan, Hong Kong

5.2 General Description of EUT

Product Name:	RedBear IoT pHAT
Model No.:	PHAT-IOT
Power Supply:	DC 5.0V
Bluetooth	
Operation Frequency:	2402~2480MHz
Channel Numbers:	40
Channel Separation:	2MHz
Modulation Type:	GFSK
Antenna Type:	PCB Antenna
Antenna Gain:	3.3dBi (declare by Applicant)
WIFI	
Operation Frequency:	2412MHz~2472MHz(802.11b/802.11g/802.11n(H20))
Channel Numbers:	13 for 802.11b/802.11g/802.11n(HT20)
Channel Separation:	5MHz
Modulation Type: (IEEE 802.11b)	Direct Sequence Spread Spectrum(DSSS)
Modulation Type: (IEEE 802.11g/802.11n)	Orthogonal Frequency Division Multiplexing(OFDM)
Antenna Type:	PCB Antenna
Antenna Gain:	3.3dBi (declare by Applicant)

5.3 Operating Modes

Operating mode	Detail description
Bluetooth mode	Keep the EUT in charging and communications with bluetooth function.
WiFi mode	Keep the EUT in charging and play internet information by wifi network.

5.4 Description of Support Units

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

5.5 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, June 26, 2013.

5.6 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
Tel: 0755-27798480
Fax: 0755-27798960

5.7 Deviation from Standards

None.

5.8 Abnormalities from Standard Conditions

None.

5.9 Other Information Requested by the Customer

None.

6 Equipment Used during Test

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	Mar. 27 2016	Mar. 26 2017
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 29 2016	June 28 2017
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	Feb. 21 2016	Feb. 20 2017
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 25 2016	June 24 2017
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 26 2016	Mar. 26 2017
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	Mar. 27 2016	Mar. 26 2017
9	Coaxial Cable	GTS	N/A	GTS211	Mar. 27 2016	Mar. 26 2017
10	Coaxial cable	GTS	N/A	GTS210	Mar. 27 2016	Mar. 26 2017
11	Coaxial Cable	GTS	N/A	GTS212	Mar. 27 2016	Mar. 26 2017
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June 29 2016	June 28 2017
13	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	June 29 2016	June 28 2017
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 25 2016	June 24 2017
15	Band filter	Amindeon	82346	GTS219	Mar. 27 2016	Mar. 26 2017
16	Constant temperature and humidity box	Oregon Scientific	BA-888	GTS248	May 08 2016	May 07 2017
17	D.C. Power Supply	Instek	PS-3030	GTS232	May 08 2016	May 07 2017
18	Universal radio communication tester	Rohde & Schwarz	CMU200	GTS235	May 08 2016	May 07 2017
19	Splitter	Agilent	11636B	GTS237	May 08 2016	May 07 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

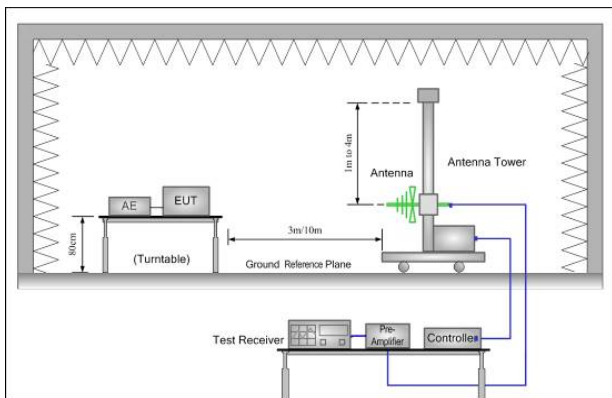
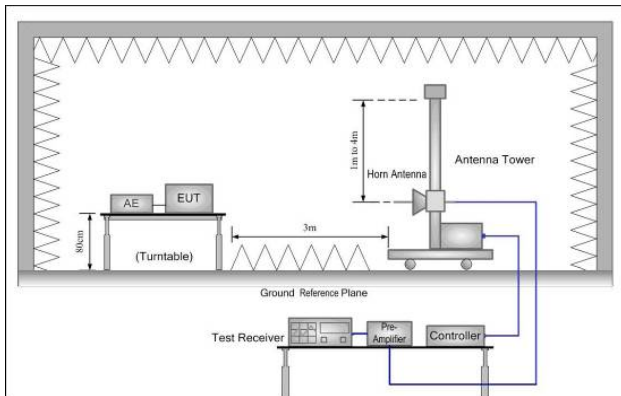
General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Humidity/ Temperature Indicator	Shanghai	ZJ1-2B	GTS243	July 01 2016	June 30 2017
2	Barometer	ChangChun	DYM3	GTS255	July 06 2016	July 05 2017

Radiated Immunity:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEL0017	June 11 2016	June 10 2017
2	Signal Generator	Rohde & Schwarz	SML03	SEL0068	June 18 2016	June 17 2017
3	RF Amplifier 30M-1GHz	Amplifier Research	250W1000A	SEL0066	Nov. 01 2015	Oct. 31 2016
4	RF Amplifier 0.8-3.0GHz	Amplifier Research	60S1G3	SEL0065	Nov. 01 2015	Oct. 31 2016
5	Power Meter	Rohde & Schwarz	NRVD	SEL0069	June 18 2016	June 17 2017
6	Power Sensor	Rohde & Schwarz	URV5-Z2	SEL0071	June 18 2016	June 17 2017
7	Power Sensor	Rohde & Schwarz	URV5-Z2	SEL0072	June 18 2016	June 17 2017
8	Software EMC32	Rohde & Schwarz	EMC32-S	SEL0082	N/A	N/A
9	Log-periodic Antenna	Amplifier Research	AT1080	SEL0073	N/A	N/A
10	Antenna Tripod	Amplifier Research	TP1000A	SEL0074	N/A	N/A
11	High Gain Horn Antenna (0.8-5GHz)	Amplifier Research	AT4002A	SEL0075	N/A	N/A
12	Audio Analyzer	Rohde & Schwarz	UPL 16	SEL0076	June 18 2016	June 17 2017
13	Nexus conditioning amplifier	B&K	2690	SEL0078	June 18 2016	June 17 2017
14	Mouth simulator	B&K	4227	SEL0079	June 18 2016	June 17 2017
15	Sound level calibrator	B&K	4231	SEL0080	June 18 2016	June 17 2017
16	Universal radio communication tester	Rohde & Schwarz	CMU200	SEL0081	June 18 2016	June 17 2017

7 EMC Requirements Specification in ETSI EN 301 489-17

7.1 EMI (Emission)

7.1.1 Radiated Emission

Test Requirement:	ETSI EN 301 489-17				
Test Method:	ETSI EN 301 489-1 and EN55016-2-3				
Test Frequency Range:	30MHz to 6GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	30MHz-1GHz	Quasi-peak	100kHz	300kHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		AV	1MHz	3MHz	Average Value
Limit:	Frequency		Limit (dBuV/m @3m)		Remark
	30MHz-230MHz		40.00		Quasi-peak Value
	230MHz-1GHz		47.00		Quasi-peak Value
	1GHz-3GHz		50.00		Average Value
			70.00		Peak Value
	3GHz-6GHz		54.00		Average Value
			74.00		Peak Value
Test setup:	Below 1GHz				
					
	Above 1GHz				
					

Test Procedure:	<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. 					
Test environment:	Temp.:	25 °C	Humid.:	50%	Press.:	1 010mbar
Measurement Record:	Uncertainty: ± 4.5dB					
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.3 for details					
Test results:	Pass					

Remark:

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

Measurement Data

Below 1GHz

WIFI model:

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)	Polarity
51.66	42.65	15.17	0.79	29.99	28.62	40.00	-11.38	Vertical
125.01	51.39	11.70	1.40	29.54	34.95	40.00	-5.05	Vertical
208.58	49.67	12.84	1.89	29.29	35.11	40.00	-4.89	Vertical
292.06	43.55	14.89	2.32	29.95	30.81	47.00	-16.19	Vertical
459.11	46.02	17.59	3.13	29.38	37.36	47.00	-9.64	Vertical
541.37	48.33	19.41	3.49	29.30	41.93	47.00	-5.07	Vertical
125.01	47.63	11.70	1.40	29.54	31.19	40.00	-8.81	Horizontal
208.58	49.71	12.84	1.89	29.29	35.15	40.00	-4.85	Horizontal
292.06	46.56	14.89	2.32	29.95	33.82	47.00	-13.18	Horizontal
375.94	41.35	16.56	2.75	29.61	31.05	47.00	-15.95	Horizontal
459.11	44.13	17.59	3.13	29.38	35.47	47.00	-11.53	Horizontal
541.37	47.95	19.41	3.49	29.30	41.55	47.00	-5.45	Horizontal

BT4.0 model:

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)	Polarity
50.76	46.65	15.21	0.78	29.99	32.65	40.00	-7.35	Vertical
100.23	43.19	15.11	1.19	29.70	29.79	43.50	-13.71	Vertical
125.01	51.23	11.70	1.40	29.54	34.79	43.50	-8.71	Vertical
208.58	49.36	12.84	1.89	29.29	34.80	43.50	-8.70	Vertical
375.94	45.04	16.56	2.75	29.61	34.74	46.00	-11.26	Vertical
541.37	47.71	19.41	3.49	29.30	41.31	46.00	-4.69	Vertical
125.01	46.05	11.70	1.40	29.54	29.61	40.00	-10.39	Horizontal
208.58	50.27	12.84	1.89	29.29	35.71	40.00	-4.29	Horizontal
292.06	47.50	14.89	2.32	29.95	34.76	47.00	-12.24	Horizontal
375.94	42.04	16.56	2.75	29.61	31.74	47.00	-15.26	Horizontal
459.11	44.72	17.59	3.13	29.38	36.06	47.00	-10.94	Horizontal
541.37	47.99	19.41	3.49	29.30	41.59	47.00	-5.41	Horizontal

Above 1GHz

WIFI model:

Peak measurement

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)	Polarity
1285.00	36.64	25.60	4.53	33.24	33.53	70.00	-36.47	Vertical
2390.00	35.29	27.59	5.38	34.01	34.25	70.00	-35.75	Vertical
3185.00	36.43	28.76	6.33	33.10	38.42	74.00	-35.58	Vertical
4040.00	33.26	29.78	7.90	32.13	38.81	74.00	-35.19	Vertical
4885.00	29.60	31.86	8.67	32.13	38.00	74.00	-36.00	Vertical
5525.00	29.69	32.05	9.54	32.42	38.86	74.00	-35.14	Vertical
1240.00	36.72	25.50	4.50	33.16	33.56	70.00	-36.44	Horizontal
2010.00	35.59	26.17	4.97	34.46	32.27	70.00	-37.73	Horizontal
2810.00	35.16	28.41	5.76	33.55	35.78	70.00	-34.22	Horizontal
3785.00	30.82	29.34	7.50	32.42	35.24	74.00	-38.76	Horizontal
5000.00	29.56	31.96	8.76	32.18	38.10	74.00	-35.90	Horizontal
5955.00	27.82	32.84	10.13	32.16	38.63	74.00	-35.37	Horizontal

BT4.0 model:

Peak measurement

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)	Polarity
1745.00	36.69	25.06	4.83	34.03	32.55	70.00	-37.45	Vertical
2570.00	36.60	27.71	5.56	33.82	36.05	70.00	-33.95	Vertical
3590.00	36.19	29.12	7.13	32.66	39.78	74.00	-34.22	Vertical
4565.00	31.42	31.44	8.39	31.97	39.28	74.00	-34.72	Vertical
5190.00	29.49	32.00	9.06	32.27	38.28	74.00	-35.72	Vertical
5745.00	28.85	32.56	9.86	32.28	38.99	74.00	-35.01	Vertical
1830.00	36.56	25.42	4.87	34.17	32.68	70.00	-37.32	Horizontal
2640.00	35.74	27.91	5.62	33.74	35.53	70.00	-34.47	Horizontal
3340.00	36.15	28.43	6.64	32.93	38.29	74.00	-35.71	Horizontal
4645.00	31.14	31.57	8.46	32.01	39.16	74.00	-34.84	Horizontal
5380.00	28.74	31.79	9.33	32.37	37.49	74.00	-36.51	Horizontal
5815.00	28.63	32.66	9.95	32.24	39.00	74.00	-35.00	Horizontal

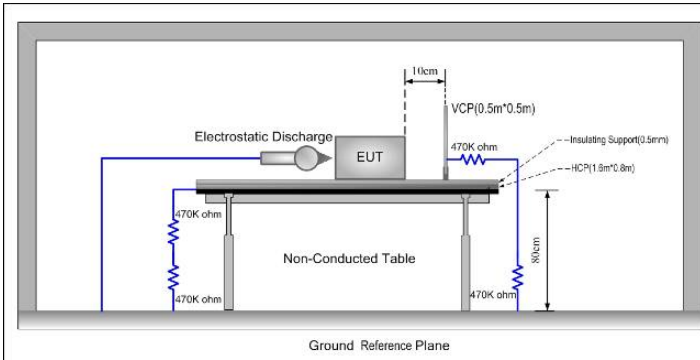
Remark:

1. The EUT was test at 3m in field chamber.
2. If the average limit is met when using a Peak detector, the EUT shall be deemed to meet both peak and average limits. And measurement with the average detector is unnecessary.

7.2 Immunity

Performance Criteria of ETSI EN 301 489-17, clause 6	
Continuous phenomena applied to transmitters (CT)	<ol style="list-style-type: none"> 1. During the test, the uplink speech output level shall be at least 35 dB less than the previously recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz (audio breakthrough check). 2. At the conclusion of the test, the EUT shall operate as intended with no loss of user control functions or stored data, and the communication link shall have been maintained. 3. In addition to confirming the above performance during a call, the test shall also be performed in idle mode, and the transmitter shall not unintentionally operate.
Transient phenomena applied to Transmitters (TT)	<ol style="list-style-type: none"> 1. At the conclusion of each exposure the EUT shall operate with no user noticeable loss of the communication link. 2. At the conclusion of the total test comprising the series of individual exposures, the EUT shall operate as intended with no loss of user control functions or stored data, as declared by the manufacturer, and the communication link shall have been maintained. 3. In addition to confirming the above performance during a call, the test shall also be performed in idle mode, and the transmitter shall not unintentionally operate.
Continuous phenomena applied to Receivers (CR)	<ol style="list-style-type: none"> 1. During the test, the RXQUAL of the downlink shall not exceed the value of three, measured during each individual exposure in the test sequence. 2. During the test, the downlink speech output level shall be at least 35 dB less than the previously recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz (audio breakthrough check). 3. At the conclusion of the test, the EUT shall operate as intended with no loss of user control the The communication link shall have been maintained.
Transient phenomena applied to Receivers (TR)	<ol style="list-style-type: none"> 1. At the conclusion of each exposure the EUT shall operate with no user noticeable loss of the communication link. 2. At the conclusion of the total test comprising the series of individual exposures, the EUT shall operate as intended with no loss of user control functions or stored data, as declared by the manufacturer, and the communication link shall have been maintained
Ancillary equipment tested on a stand alone basis	If ancillary equipment is intended to be tested on a stand alone basis, the performance criteria described in the clauses above are not appropriate, then the manufacturer shall declare, for inclusion in the test report, his own specification for an acceptable level of performance or degradation of performance during and/or after the immunity tests. The performance specification shall be included in the product description and documentation.

7.2.1 Electrostatic Discharge

Test Requirement:	ETSI EN 301 489-17
Test Method:	EN 61000-4-2
Discharge Voltage:	Contact Discharge: $\pm 2\text{kV}$, $\pm 4\text{kV}$ Air Discharge: $\pm 2\text{kV}$, $\pm 4\text{kV}$, $\pm 8\text{kV}$ HCP/VCP: $\pm 2\text{kV}$, $\pm 4\text{kV}$
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>Air discharge:</p> <ol style="list-style-type: none"> 1. The test was applied on non-conductive surfaces of EUT. 2. The round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT. 3. After each discharge, the discharge electrode was removed from the EUT. 4. The generator was re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. 5. This procedure was repeated until all the air discharge completed <p>Contact Discharge:</p> <ol style="list-style-type: none"> 1. The test was applied on conductive surfaces of EUT. 2. the generator was re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. 3. the tip of the discharge electrode was touch the EUT before the discharge switch was operated. <p>Indirect discharge for horizontal coupling plane</p> <ol style="list-style-type: none"> 1. 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. 2. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge. 3. Consideration should be given to exposing all sides of the EUT.

	Indirect discharge for vertical coupling plane 1. At least 10 single discharges were applied to the center of one vertical edge of the coupling plane. 2. The coupling plane, of dimensions 0.5m X 0.5m, was placed parallel to, and positioned at a distance of 0.1m from the EUT. 3. 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 010mbar
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

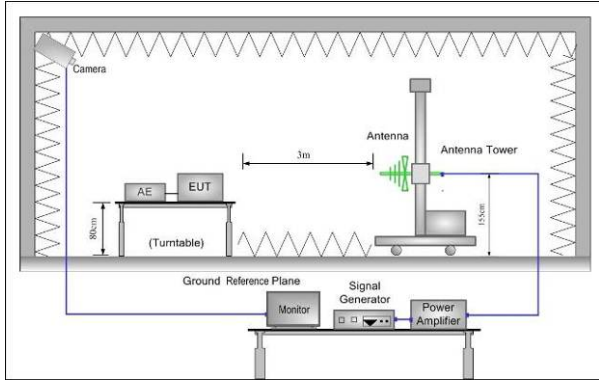
Measurement Record:

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

Remark:

A: Normal performance within the specification limits.

7.2.2 Radiated Immunity

Test Requirement:	ETSI EN 301 489-17
Test Method:	EN 61000-4-3
Frequency range:	80MHz to 1GHz, 1.4GHz to 2.7GHz
Test Level:	3V/m
Modulation:	80%, 1kHz Amplitude Modulation
Performance Criterion:	Criteria 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 monitor:	Traffic mode: Uplink level, downlink level, RX quality					
	Idle mode: 1. The test system shall simulate a Base Station (BS) with Broadcast Control Channel/Common Control Channel (BCCH/CCCH) on one carrier. 2. The EUT shall be synchronized to the BCCH, listening to the CCCH and able to respond to paging messages.					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1 010mbar
Test Instruments:	Refer to section 6.0 for details					
Test results:	Pass					

Measurement Record:

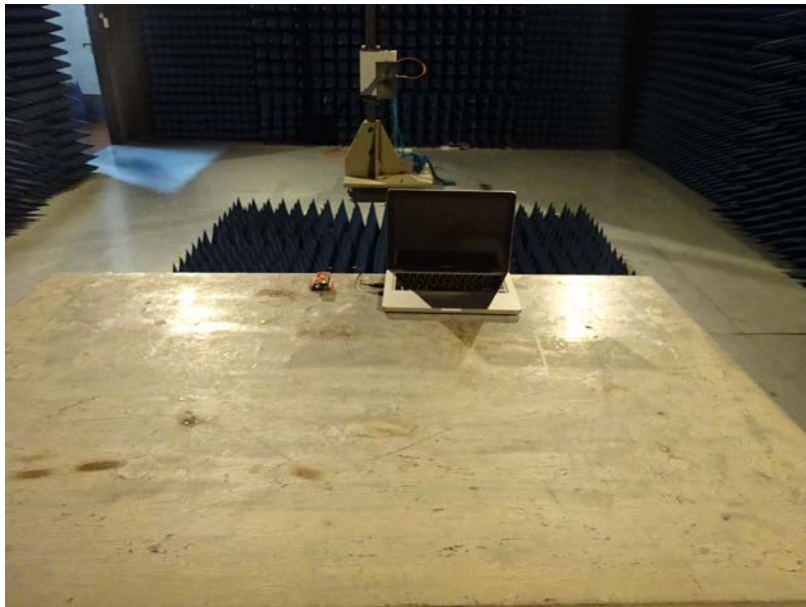
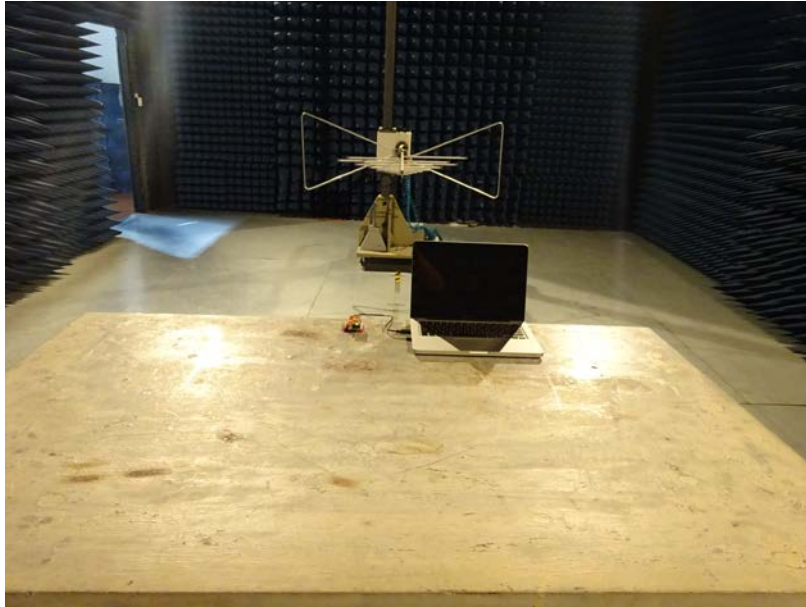
Frequency	Level	Modulation	Antenna Polarization	EUT Face	Observations (Performance Criterion)
80 MHz-1 GHz 1.4GHz-2.7GHz	3 V/m	1 kHz, 80 % Amp. Mod, 10 % increment, dwell time=3seconds	V	Front	A
			H		A
			V	Rear	A
			H		A
			V	Left	A
			H		A
			V	Right	A
			H		A
			V	Top	A
			H		A
			V	Bottom	A
			H		A

Remarks:

A: Normal performance within the specification limits.

8 Test Setup Photo

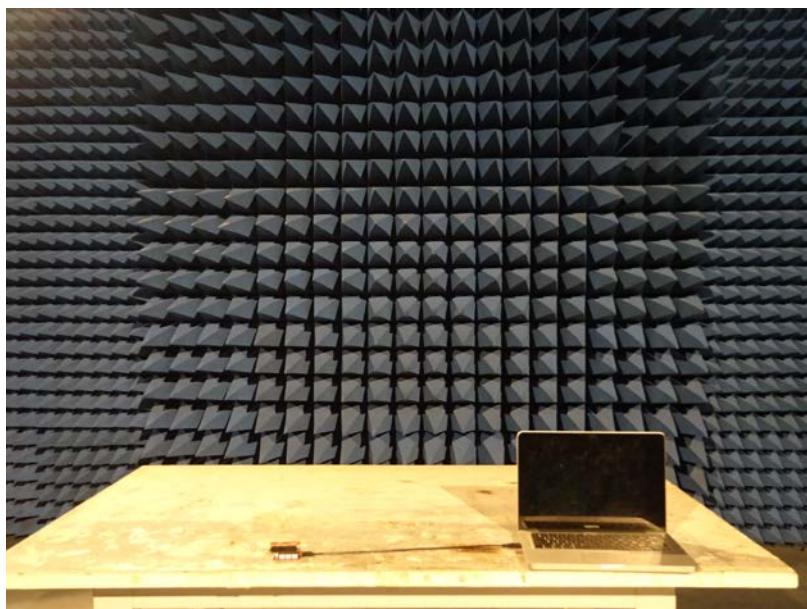
Radiated Emission



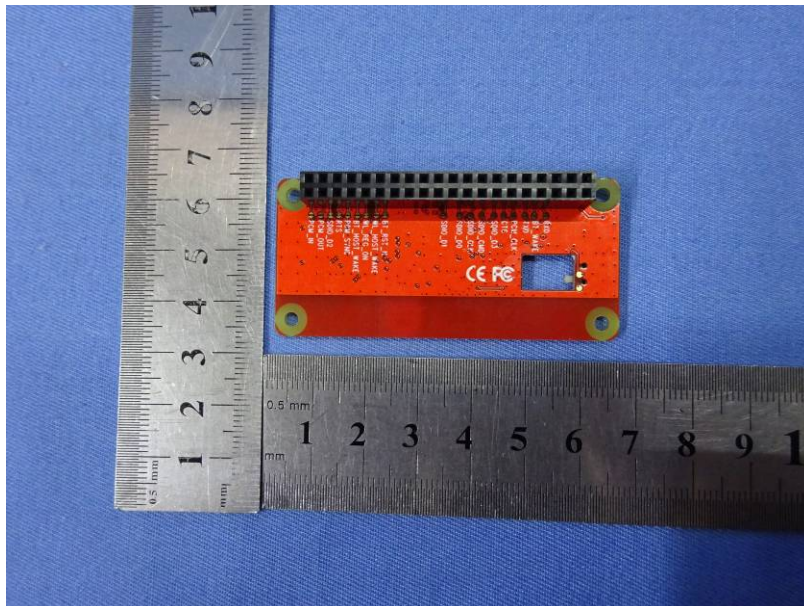
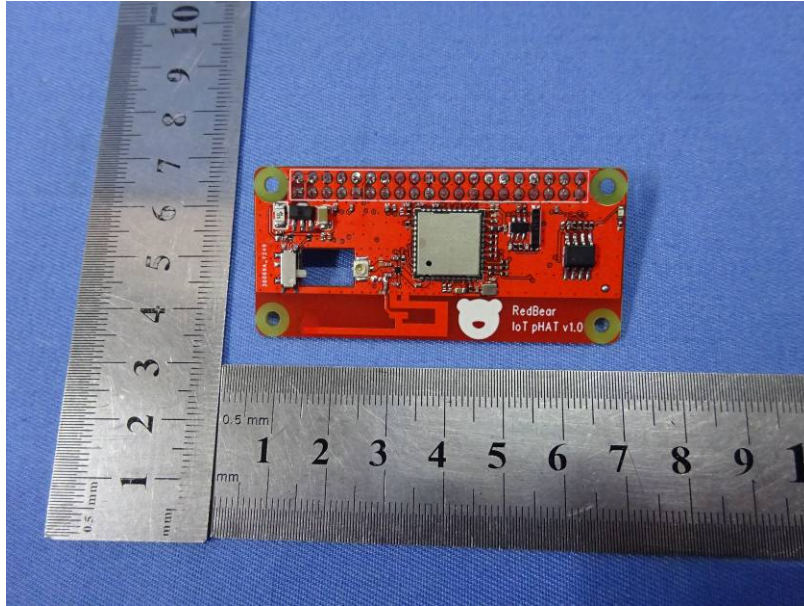
ESD

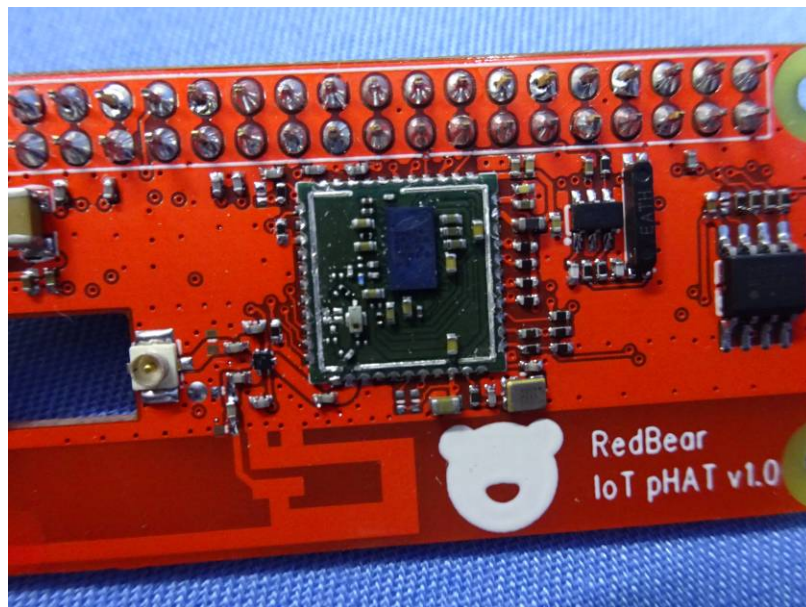
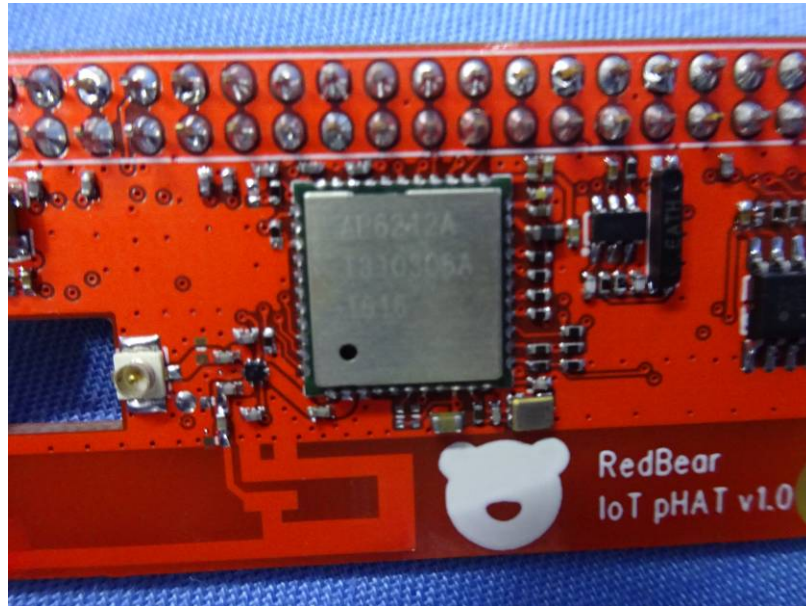


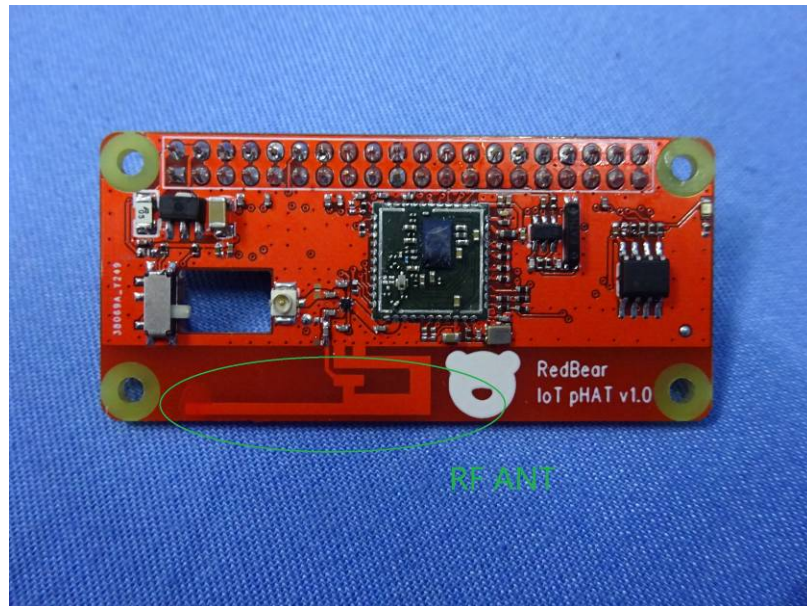
ESD



9 EUT Constructional Details







-----End-----