FCC Report

Applicant:	Ambient, LLC dba Ambient Weather
Address of Applicant:	6845 W. Frye Road, Chandler, AZ 85226

Equipment Under Test (EUT)

Product Name:	Wireless Thermometer
Model No.:	WS40
FCC ID:	S2SWS40
Applicable standards:	FCC CFR Title 47 Part 15 Subpart B:2014
Date of sample receipt:	May 04, 2015
Date of Test:	May 05-06, 2015
Date of report issue:	May 07, 2015
Test Result :	PASS *

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

Authorized Signature:

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	*May 07, 2015*	*Original*

Prepared By: Edward.Pan ***Date:*** *May 07, 2015*

Project Engineer

Check By: hank.yan ***Date:*** *May 07, 2015*

Reviewer

3 Contents

4 Test Summary

Test Item	Section in CFR 47	Result
Conducted Emission	Part15.107	N/A
Radiated Emissions	Part15.109	PASS

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

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:	Ambient, LLC dba Ambient Weather
Address of Applicant:	6845 W. Frye Road, Chandler, AZ 85226
Manufacturer/Factory:	Shenzhen Kello Science Technology Co., Ltd.
Address of Manufacturer/ Factory:	8F-3, No. 166, Jian 1 Road, Zhonghe Dist., New Taipei City 23511, Taiwan

5.2 General Description of EUT

Product Name:	Wireless Thermometer
Model No.:	WS40
Receiver Frequency:	433.92MHz
Power supply:	DC 3.0V(2*1.5V(”AAA” Size battery))

5.3 Test mode

Receiving mode	Keep the EUT in receiving mode

5.4 Test Facility

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

● **CNAS —Registration No.: CNAS L5775**

CNAS has accredited Global United Technology Services Co., Ltd. To ISO/IEC 17025 General Requirements for the competence of testing and calibration laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

● **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.

5.5 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.
Address: Room 301-309, 3th Floor, Block A, Huafeng Jinyuan Business Building, No. 300 Laodong Industrial Zone,Xixiang Road, Baoan District, Shenzhen 518102
Tel: 0755-27798480
Fax: 0755-27798960

5.6 Description of Support Units

None.

5.7 Deviation from Standards

None.

5.8 Abnormalities from Standard Conditions

None.

5.9 Other Information Requested by the Customer

None.

6 Test Instruments list

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	Mar. 28 2015	Mar. 27 2016
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	Spectrum Analyzer	Agilent	E4440A	GTS533	Jul. 01 2014	Jun 30 2015
4	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	Jul. 01 2014	Jun 30 2015
5	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	Jul. 01 2014	Jun 30 2015
6	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 27 2014	June 26 2015
7	Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 27 2015	Mar. 26 2016
8	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
9	Coaxial Cable	GTS	N/A	GTS213	Mar. 28 2015	Mar. 27 2016
10	Coaxial Cable	GTS	N/A	GTS211	Mar. 28 2015	Mar. 27 2016
11	Coaxial cable	GTS	N/A	GTS210	Mar. 28 2015	Mar. 27 2016
12	Coaxial Cable	GTS	N/A	GTS212	Mar. 28 2015	Mar. 27 2016
13	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	Jul. 01 2014	Jun. 30, 2015
14	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	Jul. 01 2014	Jun. 30, 2015
15	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 27 2014	June 26 2015
16	Band filter	Amindeon	82346	GTS219	Mar. 28 2015	Mar. 27 2016

General used equipment:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Barometer	ChangChun	DYM3	GTS257	July 08 2014	July 07 2015

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 2GHz
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)
Receiver setup:	

Frequency	Detector	RBW	VBW	Remark
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value
Above 1GHz	Peak	1MHz	3MHz	Peak Value
	Peak	1MHz	10Hz	Average Value

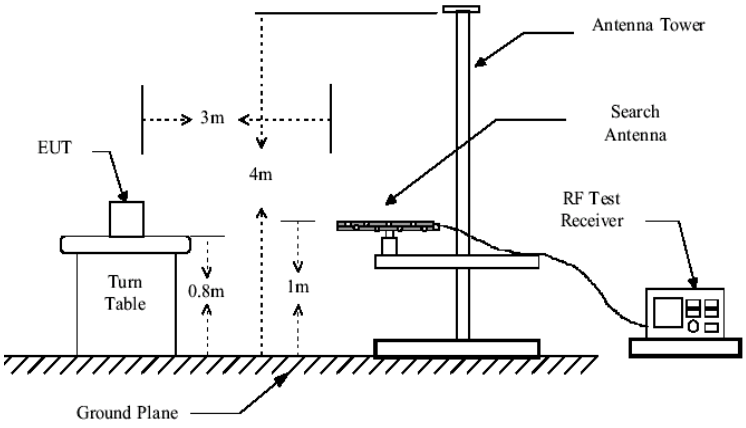
Limit:

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

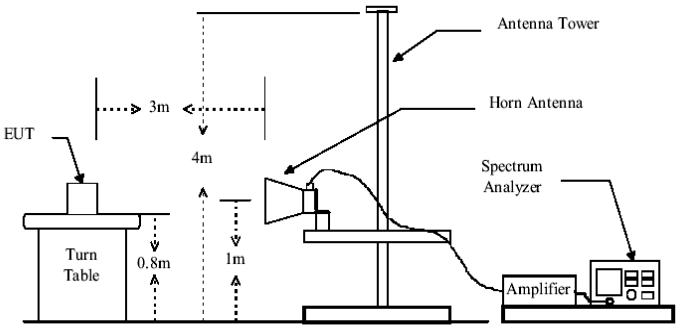
Test Procedure:

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Test setup: Below 1GHz



Above 1GHz



Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1 012mbar
Measurement Record:					Uncertainty: ± 4.5dB	
Test Instruments:	Refer to section 6 for details					
Test mode:	Refer to section 5.3 for details					
Test results:	Pass					

Note:
The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

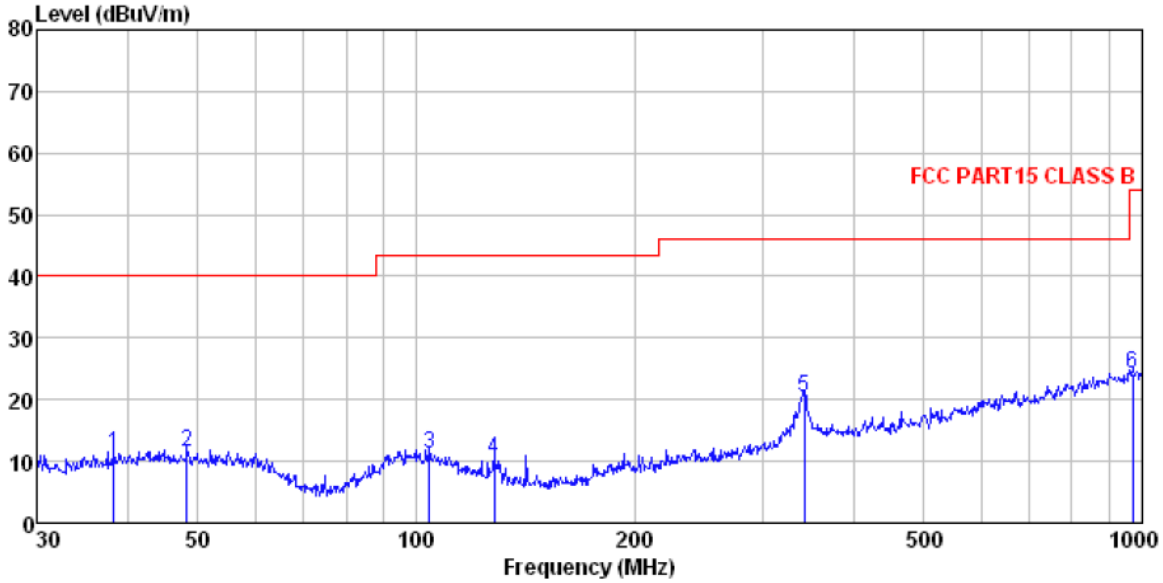
New battery is used during whole test

The EUT was tested on X axis, Y axis, Z axis. Only the data of worst mode is reported.

Measurement Data

Below 1GHz

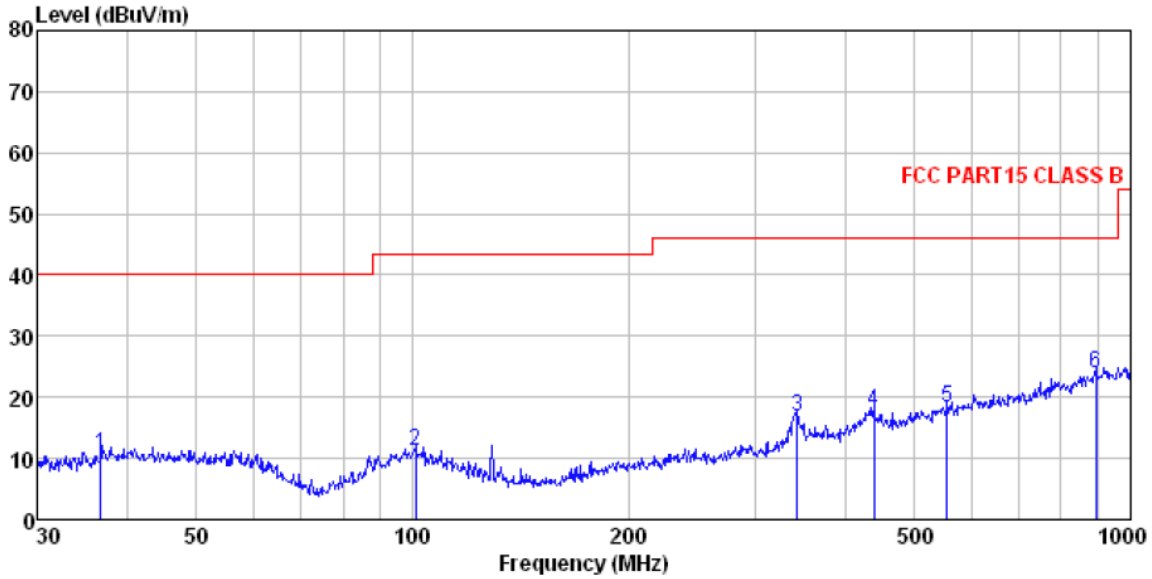
Horizontal:



Site : 3m chamber
Condition : FCC PART15 CLASS B 3m VULB9163-2013M HORIZONTAL
Job No. : 0554IT
Test Mode : Receiving mode
Test Engineer: Chen

	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	38.346	25.50	15.15	0.64	30.05	11.24	40.00	-28.76	QP
2	48.332	25.34	15.35	0.75	30.01	11.43	40.00	-28.57	QP
3	104.170	24.80	14.78	1.23	29.67	11.14	43.50	-32.36	QP
4	128.113	27.24	11.22	1.42	29.52	10.36	43.50	-33.14	QP
5	341.979	31.52	16.15	2.58	29.77	20.48	46.00	-25.52	QP
6	968.934	24.58	23.55	5.11	29.10	24.14	54.00	-29.86	QP

Vertical:

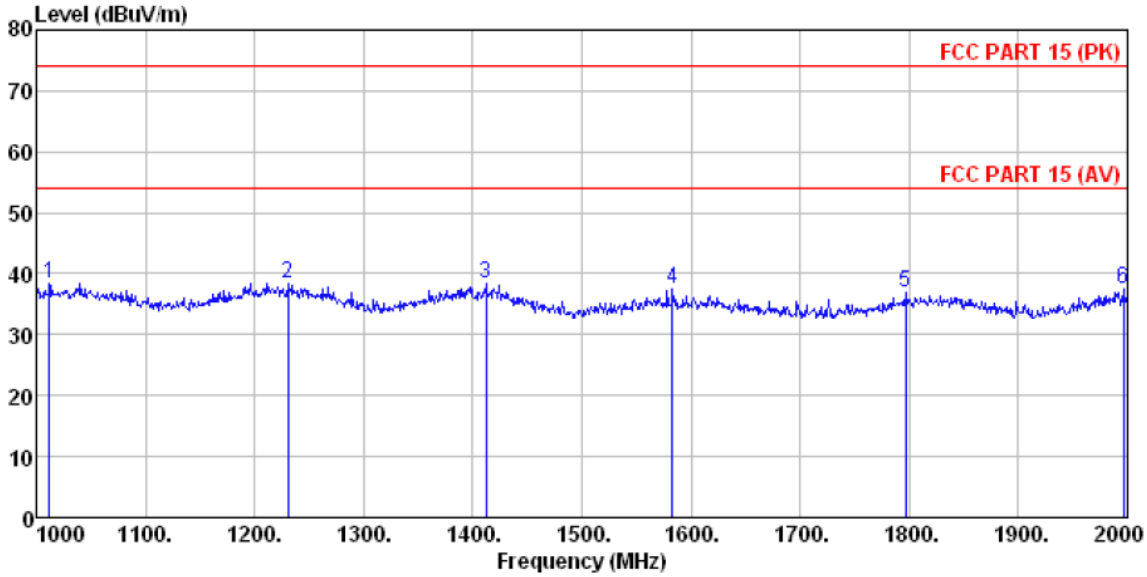


Site : 3m chamber
Condition : FCC PART15 CLASS B 3m VULB9163-2013M VERTICAL
Job No. : 0554IT
Test Mode : Receiving mode
Test Engineer: Chen

	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	36.766	25.37	14.77	0.63	30.06	10.71	40.00	-29.29	QP
2	100.934	24.66	15.06	1.20	29.70	11.22	43.50	-32.28	QP
3	343.180	27.78	16.17	2.59	29.76	16.78	46.00	-29.22	QP
4	438.655	26.54	17.55	3.04	29.42	17.71	46.00	-28.29	QP
5	554.825	24.47	19.67	3.54	29.30	18.38	46.00	-27.62	QP
6	893.857	25.26	23.05	4.83	29.10	24.04	46.00	-21.96	QP

Above 1GHz

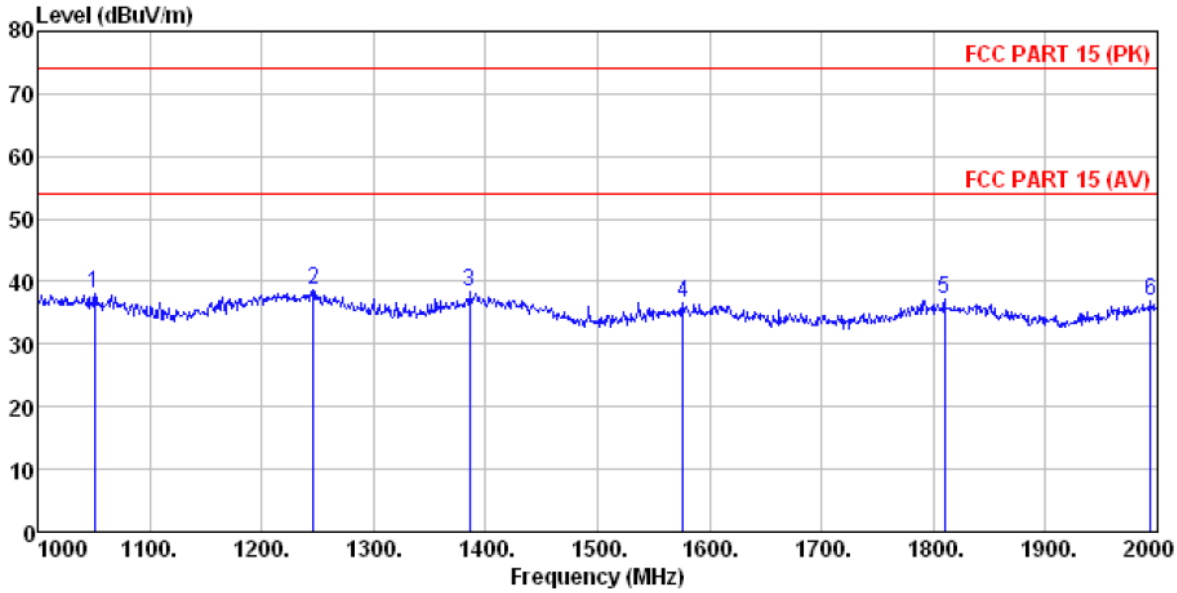
Horizontal:



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL
Job No. : 0554IT
Test Mode : Receiving mode
Test Engineer: Chen

	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	1012.000	42.30	24.54	4.30	32.78	38.36	74.00	-35.64	Peak
2	1231.000	41.61	25.47	4.49	33.16	38.41	74.00	-35.59	Peak
3	1412.000	41.61	25.53	4.62	33.45	38.31	74.00	-35.69	Peak
4	1583.000	41.41	25.01	4.73	33.74	37.41	74.00	-36.59	Peak
5	1797.000	41.02	25.27	4.86	34.11	37.04	74.00	-36.96	Peak
6	1996.000	40.89	26.11	4.96	34.46	37.50	74.00	-36.50	Peak

Vertical:

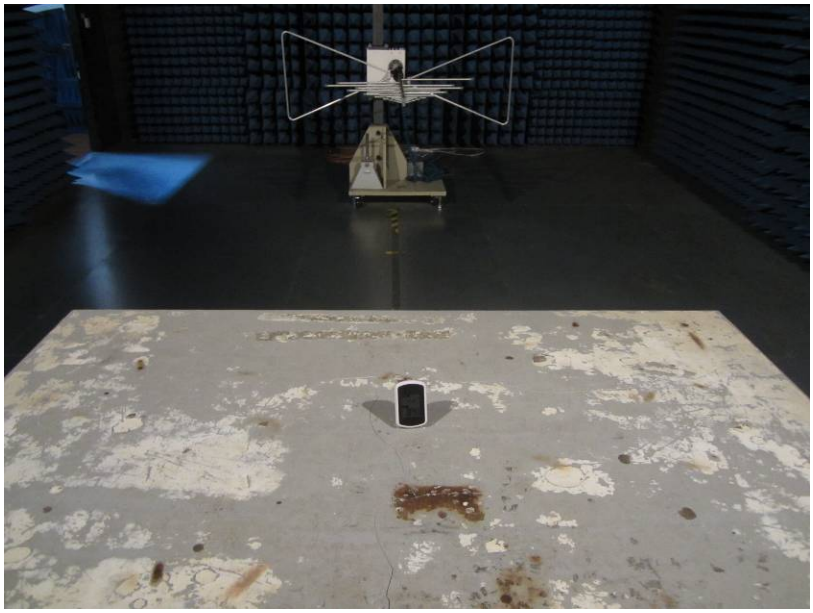


Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL
Job No. : 0554IT
Test Mode : Receiving mode
Test Engineer: Chen

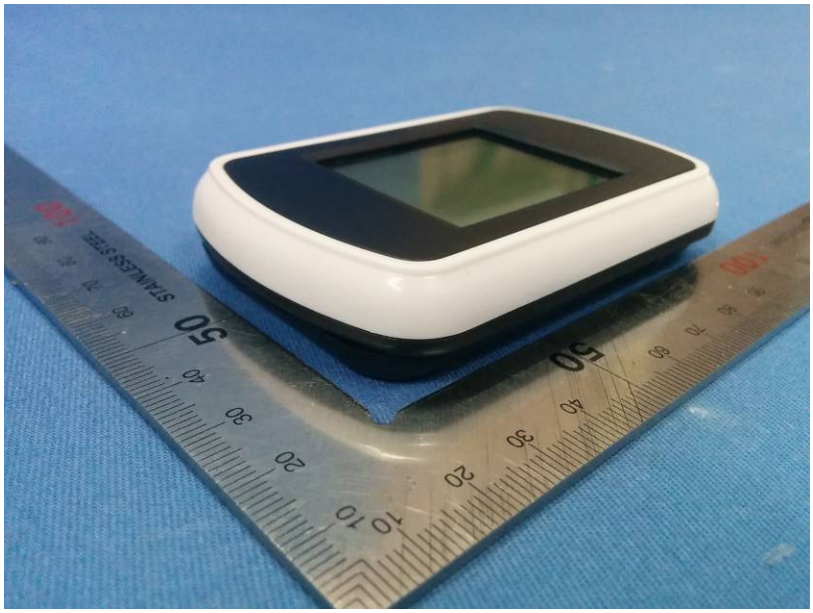
	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1051.000	42.04	24.62	4.34	32.84	38.16	74.00	-35.84	Peak
2	1246.000	41.87	25.51	4.50	33.16	38.72	74.00	-35.28	Peak
3	1386.000	41.43	25.62	4.61	33.42	38.24	74.00	-35.76	Peak
4	1576.000	40.64	25.02	4.73	33.74	36.65	74.00	-37.35	Peak
5	1810.000	41.10	25.31	4.86	34.14	37.13	74.00	-36.87	Peak
6	1994.000	40.40	26.11	4.96	34.43	37.04	74.00	-36.96	Peak

8 Test Setup Photo

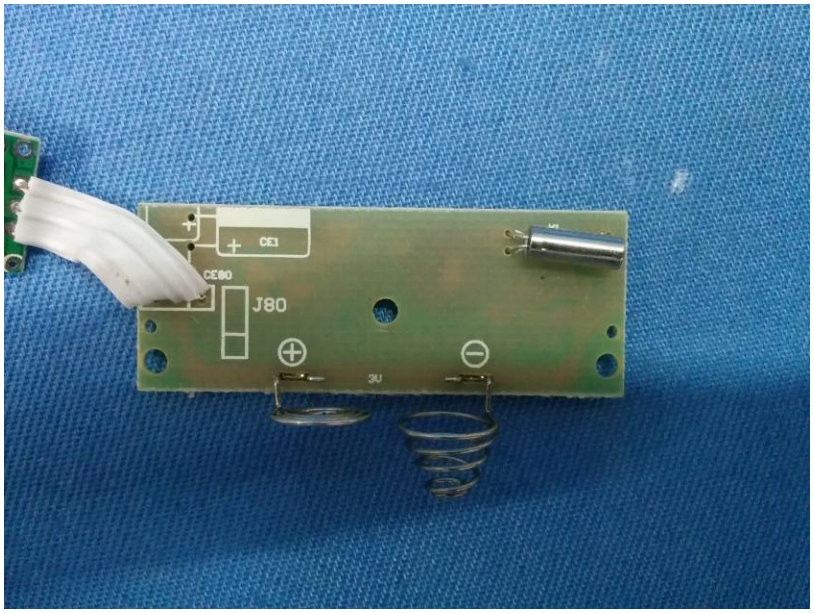
Radiated Emission

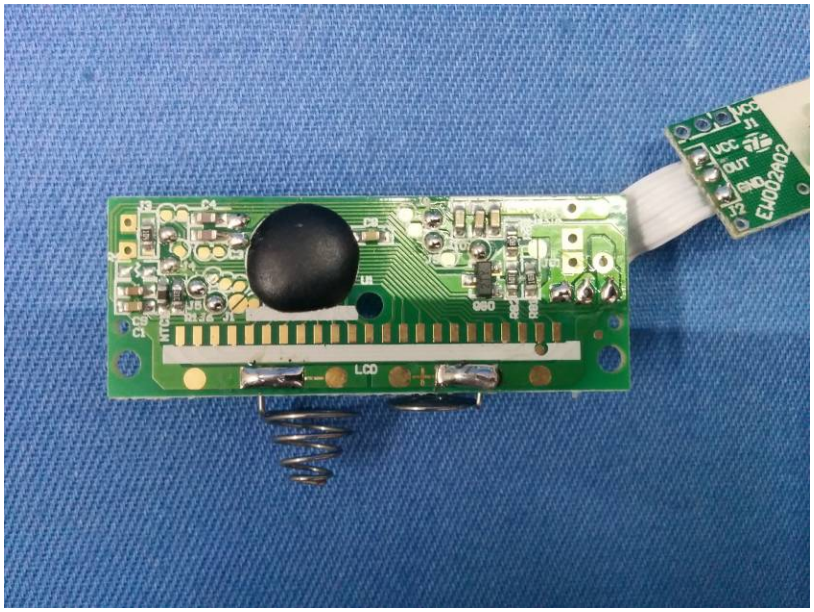


9 EUT Constructional Details




J80
VCC
OUT
GND


CE1
CE80
J80
3V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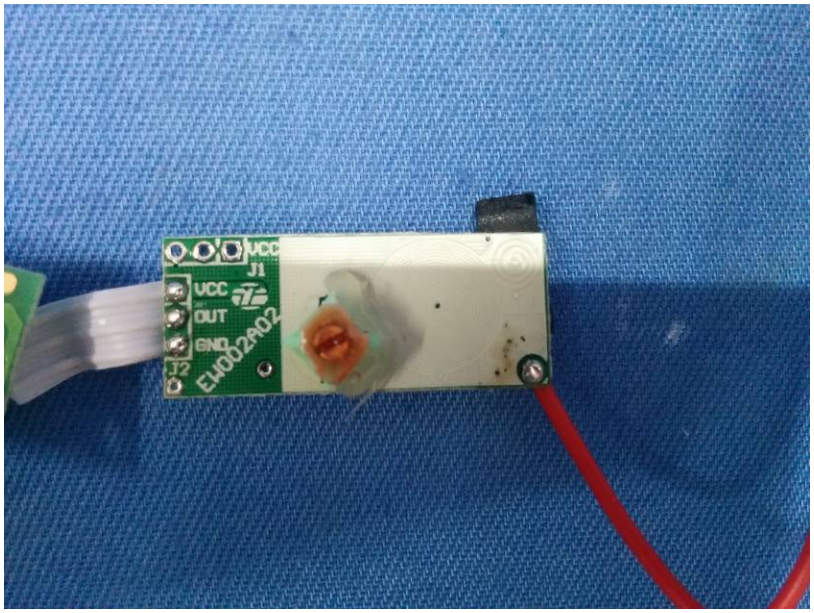
J1
VCC
OUT
GND
J2
EW002A02
LCD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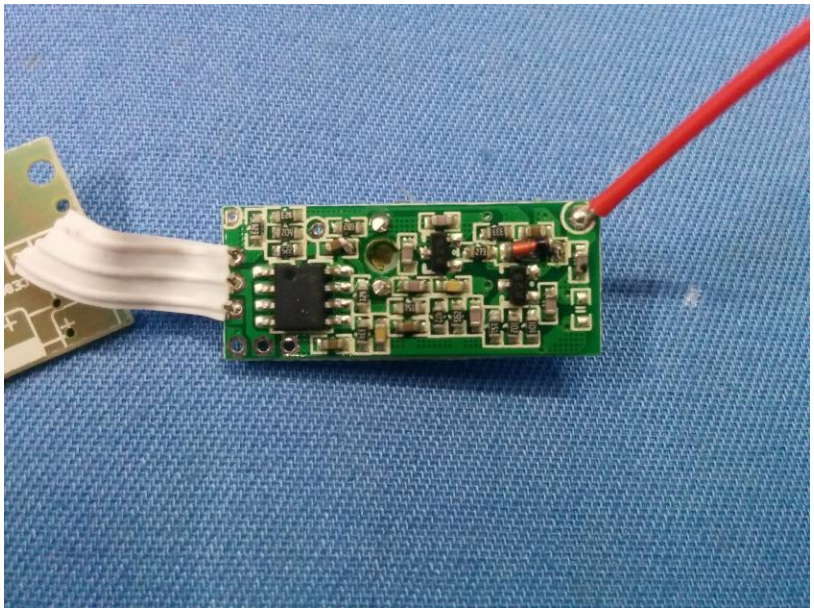
J1
VCC
OUT
GND
J2
EW002A02



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