FCC COMPLIANCE TEST REPORT

Technical Statement of Conformity

in accordance with FCC Part 15 Subpart B

The product

Equipment Under Test	: powerlineECCO+
Model Number	: powerlineECCO+
Product Series	: N/A
Report Number	: HA150773-CE
Issue Date	: 30-SEP-2015
Test Result	: Compliance

is produced by

advanced PANMOBIL Systems GmbH & Co. KG

Hansestrasse 91, D-51149 Koeln, Germany

HongAn TECHNOLOGY CO., LTD.

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BSMI Registration No.: SL2-IN-E-0023, SL2-A1-E-0023, SL2-IS-E-0023, SL2-R1-E-0023, SL2-R2-E-0023, SL2-L1-E-0023

FCC Designation No.: TW1071
TAF Accreditation No.: 1163
VCCI Registration No.: R-2156, C-2329, T-219
ICES No.: 46405-11226

Contents

Verification

Applicant：	advanced PANMOBIL Systems GmbH & Co. KG
Manufacturer：	advanced PANMOBIL Systems GmbH & Co. KG
Equipment Under Test：	powerlineECCO+
Model Number：	powerlineECCO+
Product Series：	N/A
Sample Received Date：	2015-07-28
Test Standard：	

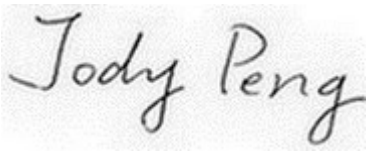
Emission: ☒ FCC Part 15 Subpart B: Class B

☒ CISPR 22: Class B

Deviations from standard test methods & any other specifications : NONE

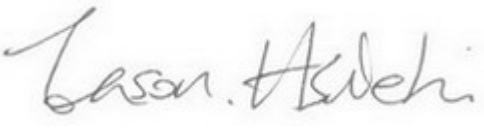
Remark:

This report details the results of the test carried out on one sample. The test results are contained in this test report and HongAn Technology Co., Ltd. assumes full responsibility for the accuracy and completeness of these tests. This report shows the EUT is technically compliant with FCC Part 15 B and CISPR 22 Class B official requirements. This report applies to the above sample only and shall not be reproduced in part without written approval of HongAn Technology Co., Ltd.



Documented by: _____ **Date:** 2015-09-30

Jody Peng/ ADM. Dept Staff



Tested by: _____ **Date:** 2015-09-08

Eason Hsieh/ ENG. Dept. Staff

Approved by: _____ **Date:** 2015-09-30

Peter Chin/ Section Manager

Summary of Test Result

Emission			
Test Standard	**Test Item**	**Test Result**	**Remark**
FCC Part15B CISPR22 Class B	Radiated Emission (Below 1GHz)	Pass	Highest Emission H: 483.960MHz, 49.58dBuV, Margin-1.21 dB Antenna Height 1.30 m, Turntable Angle 226° V: 125.060MHz, 51.01dBuV, Margin-2.78 dB Antenna Height 1.24 m, Turntable Angle 238°
FCC Part15B CISPR22 Class B	Radiated Emission (Above 1GHz)	Pass	Highest Emission H: 4960.000MHz, 50.76dBuV, Margin-2.09 dB Antenna Height 1 m, Turntable Angle 324° V: 4885.000MHz, 51.04dBuV, Margin-2.10 dB Antenna Height 1 m, Turntable Angle 295°

Measurement Uncertainty – Emission

The following measurement uncertainty has been calculated for Emission Tests performed on the EUT as specified in CISPR 16-4-2:

Test Item		**Uncertainty**
Conducted Emission		± 3.61dB
Radiated Emission	Below 1GHz	± 5.04dB
	Above 1GHz	± 4.97dB

This reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor of k = 2, providing a level of confidence of approximately 95%.

1 General Description

1.1 Description of EUT

Equipment Under Test	:	powerlineECCO+
Model Number	:	powerlineECCO+
Series	:	N/A
Applicant **Address of Applicant**	:	advanced PANMOBIL Systems GmbH & Co. KG Hansestrasse 91, D-51149 Koeln, Germany
Manufacturer **Address of Manufacturer**	:	advanced PANMOBIL Systems GmbH & Co. KG Hansestrasse 91, D-51149 Koeln, Germany
Power Supply	:	DC 5V through the USB system
Data Cable	:	☒Charging Cable ☐Shielded ☒Non-Shielded ☐Detachable ☒Un-Detachable, 1.45m ☐w Ferrite Core ☒w/o Ferrite Core
Description of EUT	:	**Dimensions :** 8.7 cm (L) X4.8 cm (W) X 2.6 cm (H) **Weight :** 96g **Highest Frequency of the Internal Source :** 928MHz **Position :** ☒Table-top / ☐Floor-standing **Intended Function :** The EUT is a powerlineECCO+.

1.2 Test Facility

All the Conducted Emission Tests are performed at No. 15-1, Cweishuh Keng, Cweipin Village, Linkou, New Taipei City, Taiwan, R.O.C.

1.3 Test Instruments

1.3.1. Instruments Used for Emission Measurement

HA1

Instrument	Manufacturer	Model	Serial No.	Calibration Date	Application
L.I.S.N.	Mess Tec	NNB-2/16Z	03/1006	2015-05-12	Conducted Disturbance
L.I.S.N.	EMCIS	LN2-16	LN04023	2015-02-13	
Pulse Limiter	Mess Tec	PL10	N/A	2014-11-30	
RF Cable	N/A	N/A	N/A	2014-10-05	
Coupling AND Decoupling Network	SCHAFFNER	ISN T400	16832	2014-10-08	Conducted Disturbance at Telecommunication Port
RF Current Probe	FCC	F-33-4	53	2015-05-16	
EMI Receiver	R&S	ESCI	100615	2015-02-13	Conducted Disturbance Radiated Disturbance (Below 1GHz)
Bilog Antenna	Teseq GmbH	CBL6111D	25769	2015-02-06	Radiated Disturbance (Below 1GHz)
Pre-Amplifier	WIRELESS	FPA-6592G	60009	2015-07-08	
Spectrum Analyzer	R & S	FSL6	100564	2015-06-15	
RF Cable	MIYAZAKI	8D-F8	N/A	2015-02-08	
Double-Ridged Waveguide Horn	EMCO	3115	9912-5992	2015-05-14	Radiated Disturbance (Above 1GHz)
Preamplifier	HD	HD17187	004	2015-08-02	
Spectrum Analyzer	ADVANTEST	R3172	101202158	2015-06-23	
Coaxial Cable	HUBER SUHNER	SUCOFLEX 104	197541/4	2015-08-02	
Programmable AC Source	Chroma	6520	2048	2015-01-31	Harmonic, Flicker
Universal Power Analyzer	Chroma	6630	0597	2015-01-31	

Note: The instruments listed above are within their calibration period of 1 year.

1.4 Test Methodology

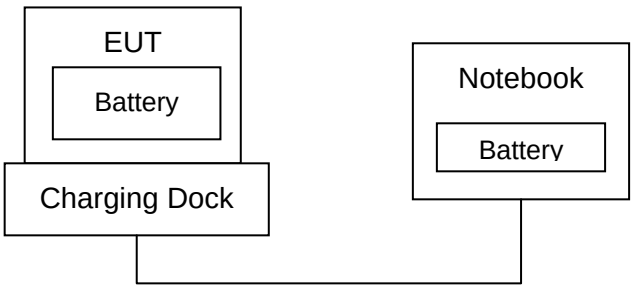
All Conducted and Radiated Emission Tests were performed according to the procedures stated in FCC Part15 B Sec. 15.31.

1.5 Auxiliary Equipments

Provided by HongAn Technology Co., Ltd.

No.	Equipment	Model No.	Serial No.	EMC Approved	Brand	Power Cord
01	NoteBook	N61J	N61JV-021A520M	CE,FCC, C-TICK N13219, BSMI R31018	ASUS	Adapter to Notebook Unshielded*1.8m AC to Adapter Unshielded*1.8m

1.6 Block Diagram



1.7 Identifying the Final Test Mode

1. Standby Mode
2. Operation Mode (Date transmission)

Note: After pre-test, we identified that the Operation Mode (the worst case) was most likely to cause maximum disturbance and most likely to be susceptible to disturbance. Therefore, the Final EMC Assessment was performed for the worst case.

1.8 Final Test Mode

Operation Mode

1.9 Condition of Power Supply

DC 5V

1.10 EUT Configuration

1. Setup the EUT as shown in Sec.1.6 Block Diagram.
2. Turn on the power of all equipments.
3. Activate the selected Final Test Mode.

1.11 Test Facility

Site Description	**:**	All tests are completed by *HongAn Technology Co., Ltd.*
Name of Firm	**:**	*HongAn Technology Co., Ltd.*
Site Location	**:**	NO.15-1, CWEISHUH KENG, CWEIPIN VILLAGE, LINKOU, NEW TAIPEI CITY, TAIWAN, R. O. C.

2 Radiated Disturbance Emission Test – Below 1 GHz

2.1 Test Instruments

Refer to Sec. 1.2 Test Instruments.

2.2 Test Arrangement and Procedure

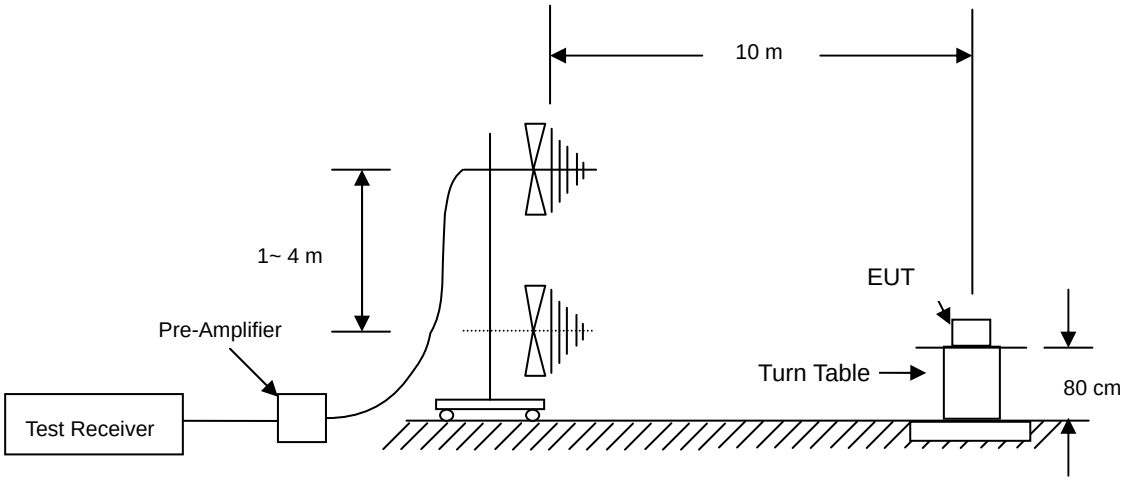


Table-top Equipment

- The EUT was place on a non-conductive turntable which was 80 cm above the horizontal ground plane. The EUT was set 10 m away from the receiving antenna that was mounted on a non-conductive mast.
- Main cables draped to the ground plane and were routed to the mains power outlet. The mains power outlet was bonded to and did not protrude above the ground plane.
- The antenna was adjusted between 1 m and 4 m in height above the ground plane and the Antenna-to-EUT azimuth was also varied during the measurements to find the top 6 maximum meter readings within the frequency range limit as indicated in Sec 3.3.
- The radiated emissions were measured when the Antenna-to-EUT polarization was set horizontally and vertically.
- The values were recorded.

2.3 Radiated Disturbance Limit

☐ FCC Part 15 Subpart B

	☐ Class A (10m)		☐ Class B (3m)	
Frequency (MHz)	Field Strength (μV/m)	Quasi-Peak (dBμV/m)	Field Strength (μV/m)	Quasi-Peak (dBμV/m)
30 ~ 88	90	39.08	100	40.00
88 ~ 216	150	43.52	150	43.52
216 ~ 960	210	46.44	200	46.02
Above 960	300	49.54	500	53.98

Emission Level (dBμV/m)=20 Log Emission Level (μV/m)

☒ CISPR 22

	☐ Class A (10m)	☒ Class B (10m)
Frequency (MHz)	Quasi-Peak (dBμV/m)	Quasi-Peak (dBμV/m)
30 ~ 230	40.0	30.0
230 ~ 1000	47.0	37.0

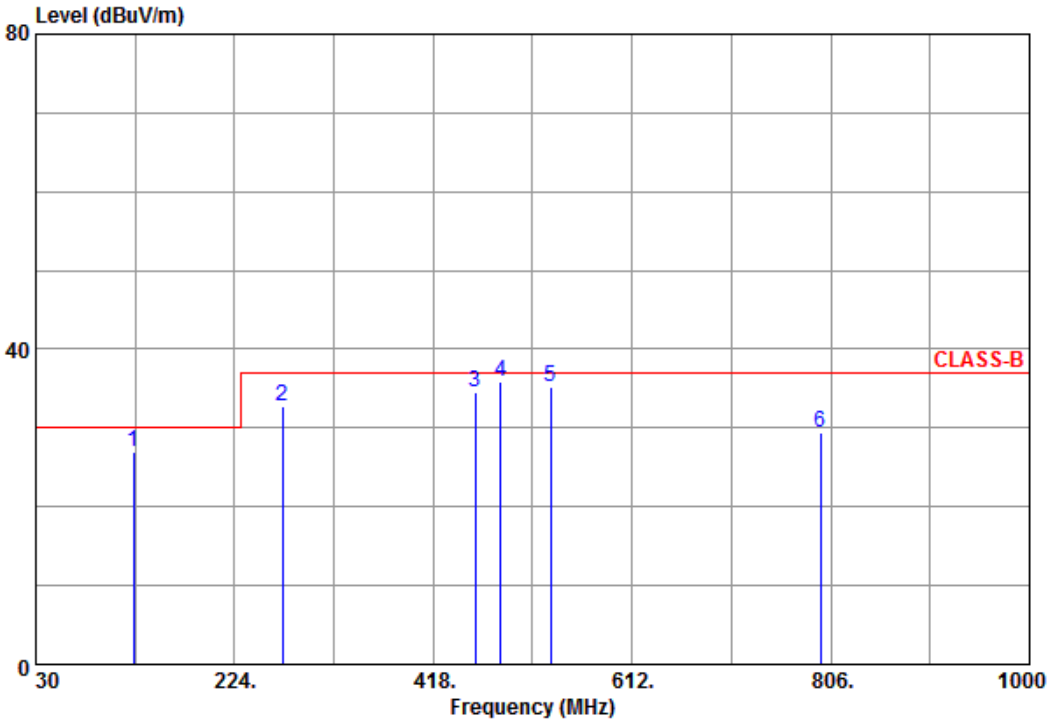
2.4 Test Result

Compliance

The final test data are shown on the following page(s).

Radiated Disturbance Emission Test Data

Test Date	:	2015-09-07	Polarization	:	Horizontal
Temperature	:	28.1℃	Humidity	:	36%



	Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1	125.060	50.84	-23.79	27.05	30.00	-2.95	231	162	
2	270.560	53.19	-20.37	32.82	37.00	-4.18	180	267	
3	458.740	49.16	-14.64	34.52	37.00	-2.48	199	317	
4 @	483.960	49.58	-13.79	35.79	37.00	-1.21	130	226	
5	532.460	47.60	-12.42	35.18	37.00	-1.82	159	279	
6	796.300	36.09	-6.65	29.44	37.00	-7.56	188	72	

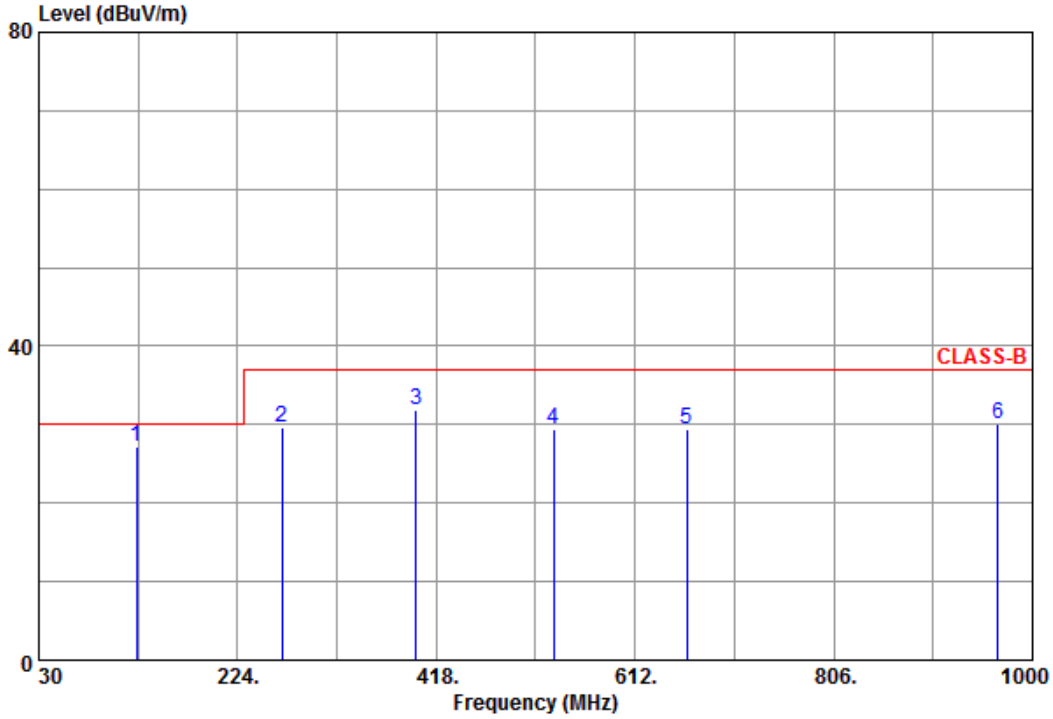
C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

@ :Maximum Data x :Over Limit

Remark：All readings are Quasi-Peak values.

Radiated Disturbance Emission Test Data

Test Date	:	2015-09-07	Polarization	:	Vertical
Temperature	:	28.1℃	Humidity	:	36%



	Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1	@ 125.060	51.01	-23.79	27.22	30.00	-2.78	124	238	
2	267.650	50.10	-20.47	29.63	37.00	-7.37	164	289	
3	398.600	47.35	-15.39	31.96	37.00	-5.04	317	104	
4	532.460	41.92	-12.42	29.50	37.00	-7.50	334	73	
5	662.440	38.82	-9.51	29.31	37.00	-7.69	359	191	
6	966.050	33.57	-3.51	30.06	37.00	-6.94	386	302	

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

@ :Maximum Data x :Over Limit

Remark：All readings are Quasi-Peak values.

3 Radiated Disturbance Emission Test – Above 1 GHz

3.1 Test Instruments

Refer to Sec. 1.3 Test Instruments.

3.2 Test Configuration and Procedure

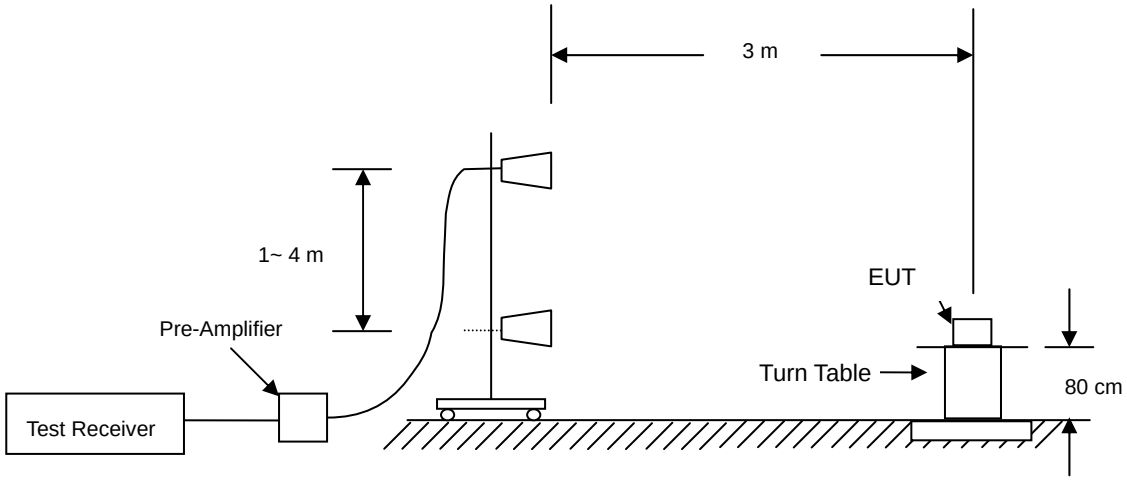


Table-top Equipment

- The EUT was place on a non-conductive turntable which was 80cm above the horizontal ground plane. The EUT was set 3m away from the receiving antenna that was mounted on a non-conductive mast.
- Main cables draped to the ground plane and were routed to the mains power outlet. The mains power outlet was bonded to and did not protrude above the ground plane.
- The antenna was adjusted between 1m and 4m in height above the ground plane and the Antenna-to-EUT azimuth was also varied during the measurements to find the top 6 maximum meter readings within the frequency range limit as indicated in Sec 4.3.
- The radiated emissions were measured when the Antenna-to-EUT polarization was set horizontally and vertically.
- The values were recorded.

3.3 Radiated Limit

☐ FCC Part 15 B

	☐ Class A (10m)		☐ Class B (3m)	
Frequency (MHz)	Field Strength (μV/m)	Quasi-Peak (dBμV/m)	Field Strength (μV/m)	Quasi-Peak (dBμV/m)
Above 960	300	49.54	500	53.98

Emission Level (dBμV/m)=20 Log Emission Level (μV/m)

☐ CISPR 22 Class A ITE at a measurement distance of 3m

Frequency GHz	Average limit dB(μV/m)	Peak limit dB(μV/m)
1 to 3	56	76
3 to 6	60	80
NOTE The lower limit applies at the transition frequency.		

☒ CISPR 22 Class B ITE at a measurement distance of 3m

Frequency GHz	Average limit dB(μV/m)	Peak limit dB(μV/m)
1 to 3	50	70
3 to 6	54	74
NOTE The lower limit applies at the transition frequency.		

Remark: In FCC Part15 B Sec. 15.105 (g), the EUT may be shown to comply with the standards contained in CISPR 22 as an alternative. Hence, the Radiated Emission Test limits and test methods were all based on CISPR 22.

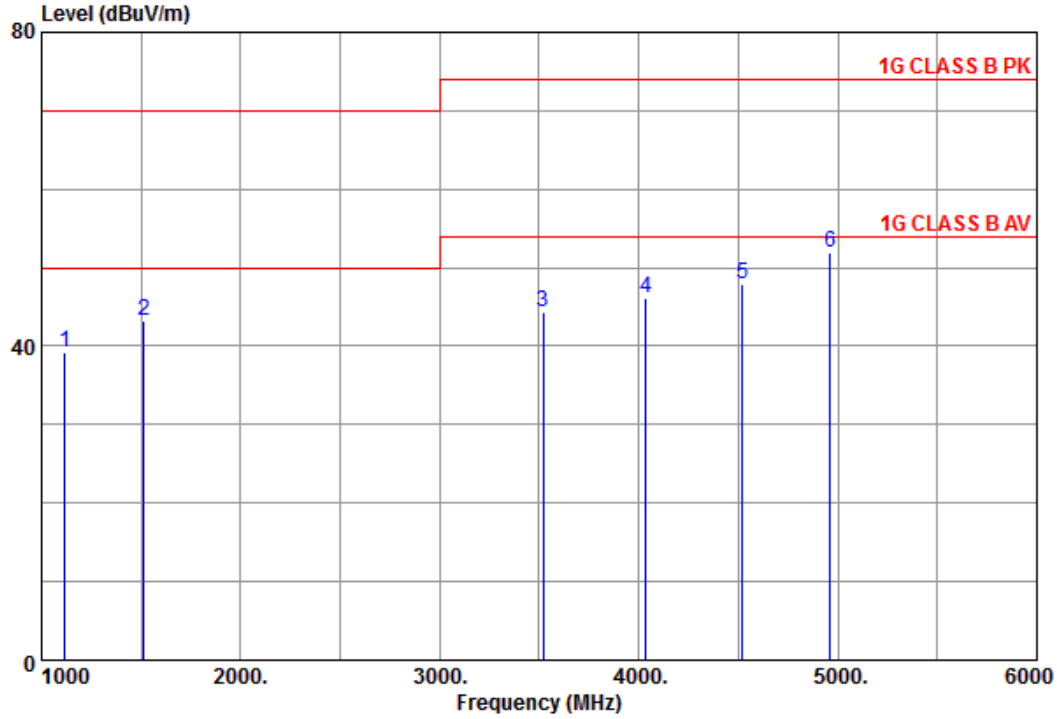
3.4 Test Result

PASS

The final tests data are shown on the following page(s).

Radiated Disturbance Emission Test Data

Test Date	:	2015-9-07	Polarization	:	Horizontal
Temperature	:	28.1℃	Humidity	:	36%



	Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1	1115.000	51.98	-12.78	39.20	50.00	-10.80	100	223	Peak
2	1515.000	54.18	-11.02	43.16	50.00	-6.84	100	316	Peak
3	3520.000	48.83	-4.37	44.46	54.00	-9.54	100	148	Peak
4	4035.000	48.81	-2.77	46.04	54.00	-7.96	100	313	Peak
5	4520.000	48.64	-0.74	47.90	54.00	-6.10	100	76	Peak
6	@4960.000	50.76	1.15	51.91	54.00	-2.09	100	324	Peak

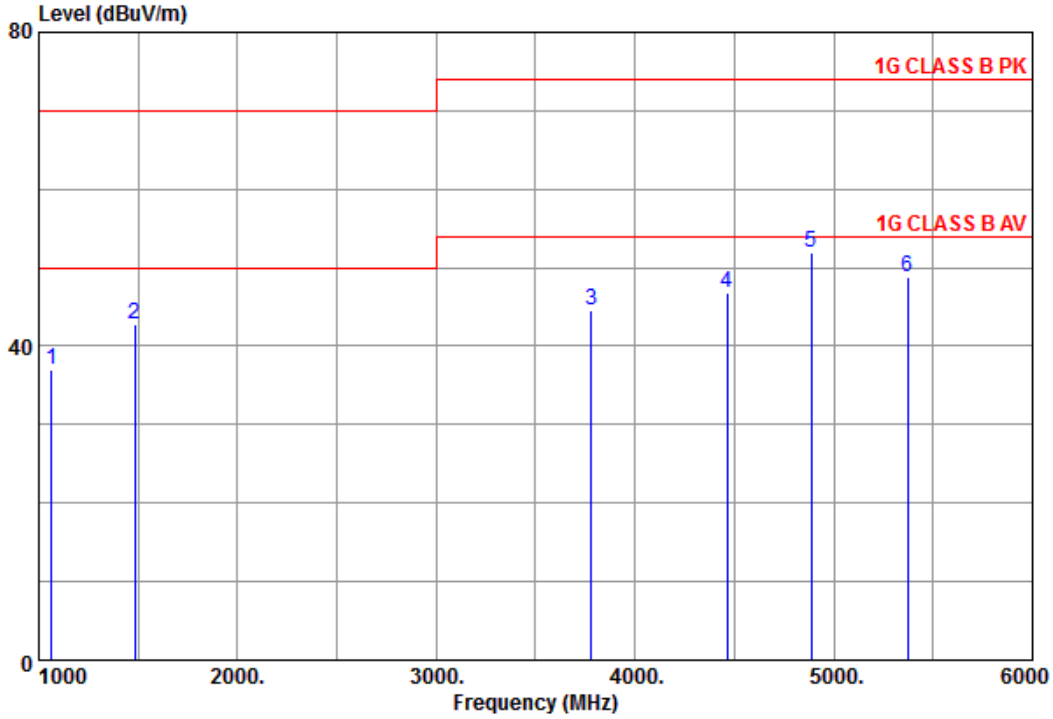
C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

@ :Maximum Data x :Over Limit

Remark：All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.

Radiated Disturbance Emission Test Data

Test Date	:	2015-09-07	Polarization	:	Vertical
Temperature	:	28.1℃	Humidity	:	36%



	Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1	1065.000	49.92	-13.01	36.91	50.00	-13.09	100	131	Peak
2	1485.000	53.78	-11.08	42.70	50.00	-7.30	100	264	Peak
3	3780.000	48.08	-3.58	44.50	54.00	-9.50	100	273	Peak
4	4465.000	47.84	-0.95	46.89	54.00	-7.11	100	317	Peak
5	@4885.000	51.04	0.86	51.90	54.00	-2.10	100	295	Peak
6	5370.000	46.52	2.26	48.78	54.00	-5.22	100	93	Peak

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

@ :Maximum Data x :Over Limit

Remark：All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.

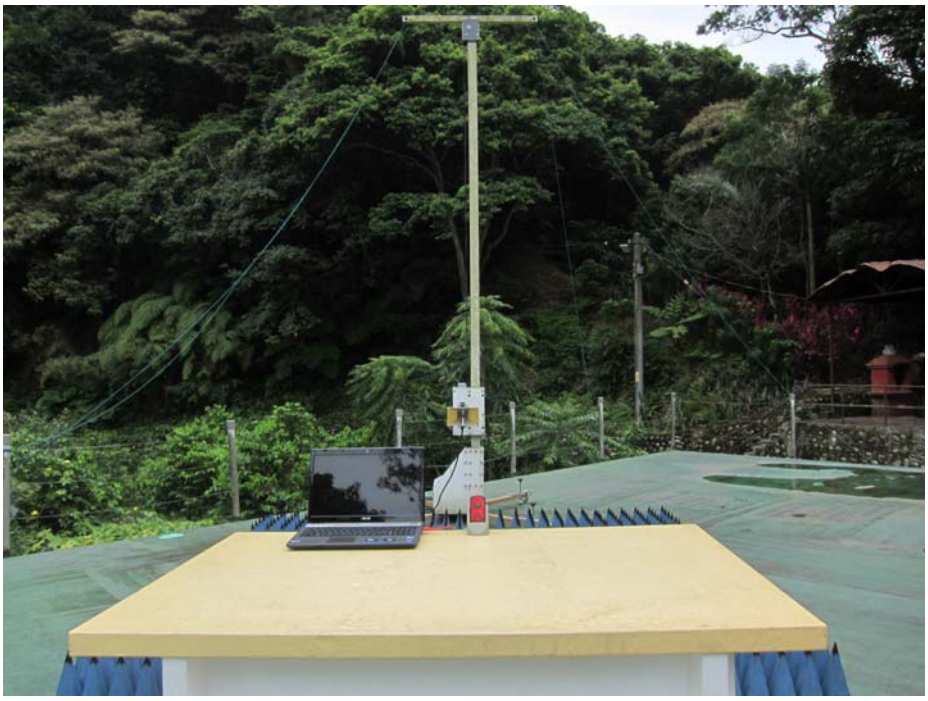
4 Photographs of the Tests

4.1 Radiated Disturbances Emission Test – Below 1 GHz

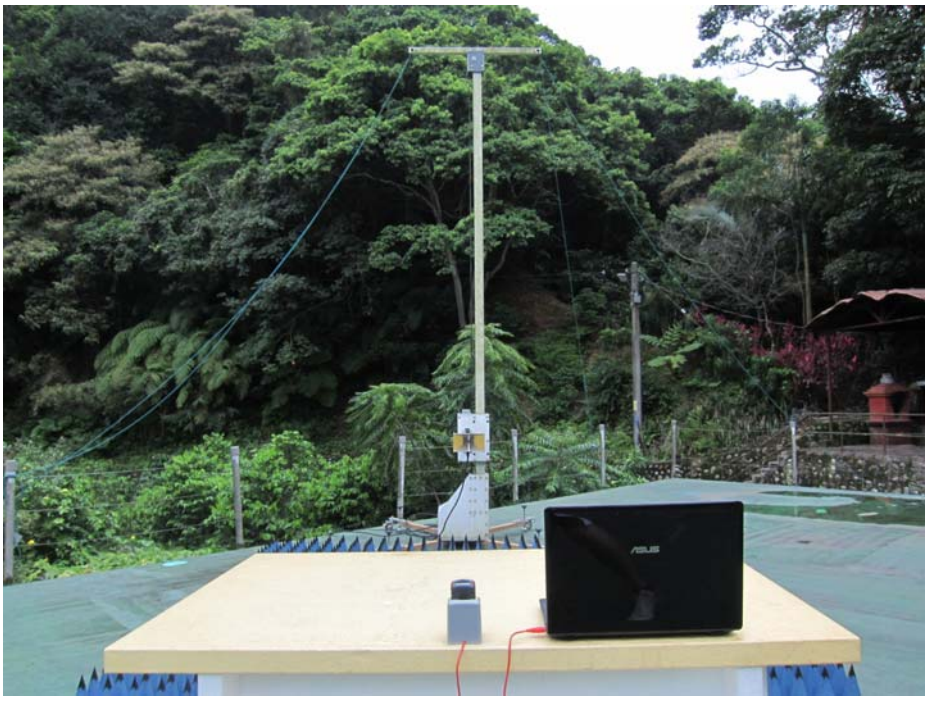
Front View

Rear View

4.2 Radiated Disturbances Emission Test – Above 1 GHz



Front View



Rear View

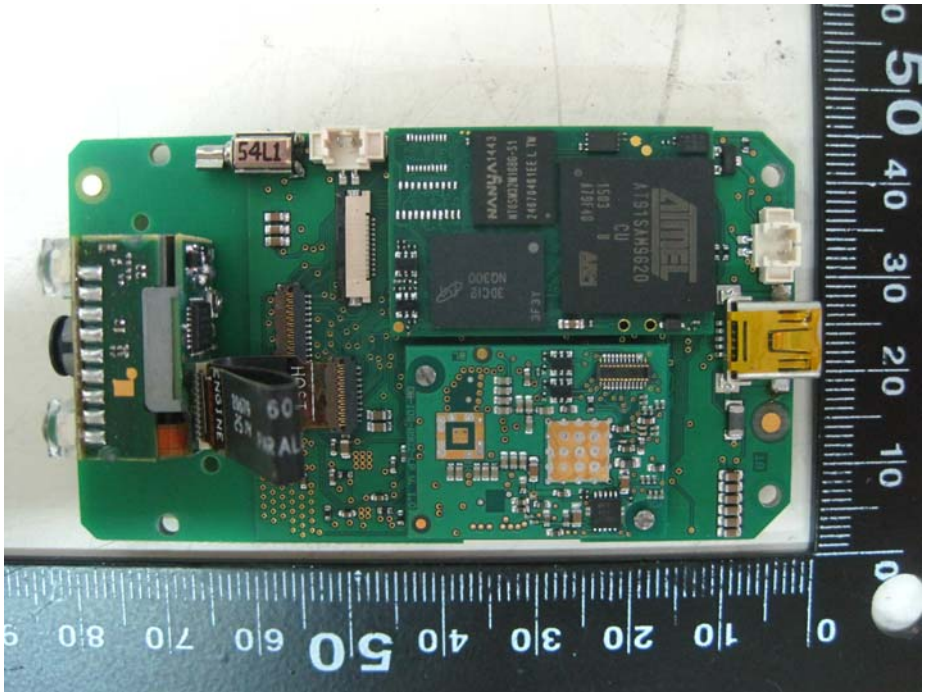
5 Photographs of the EUT

Front View of the EUT

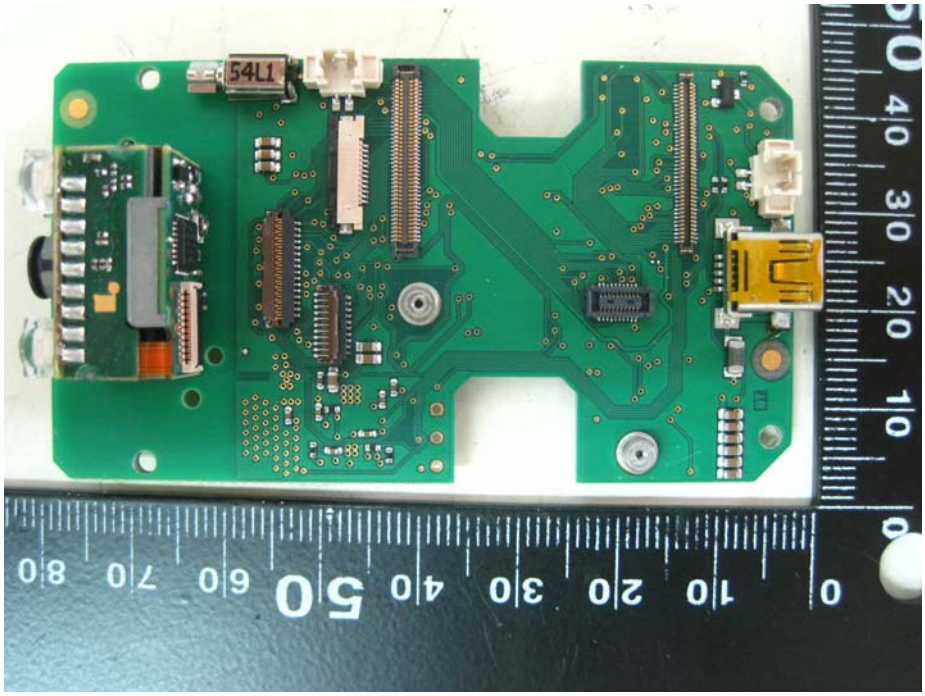
Rear View of the EUT

Inside View of the EUT

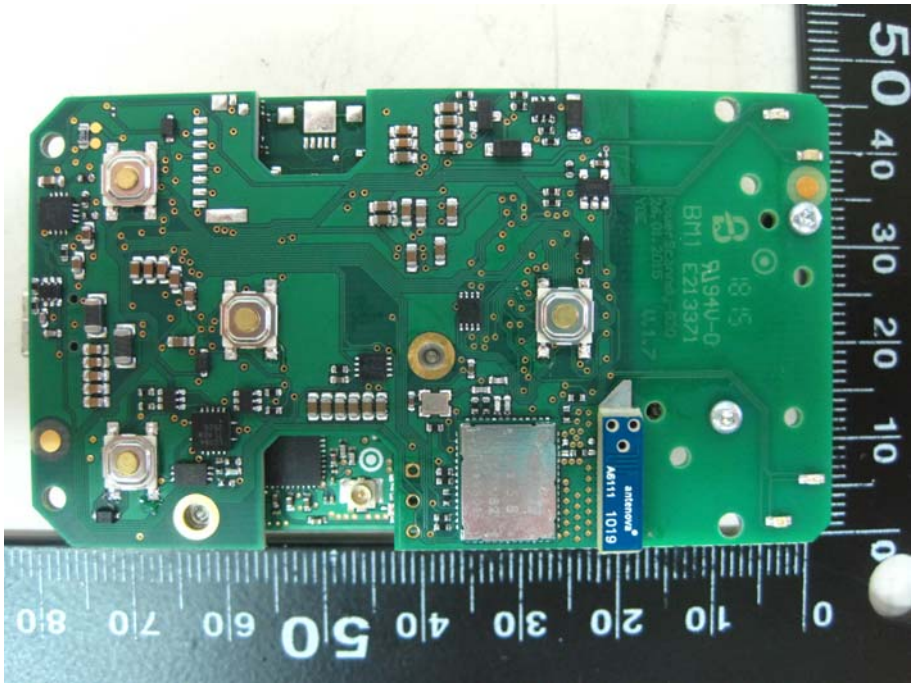
View of the I/O Port



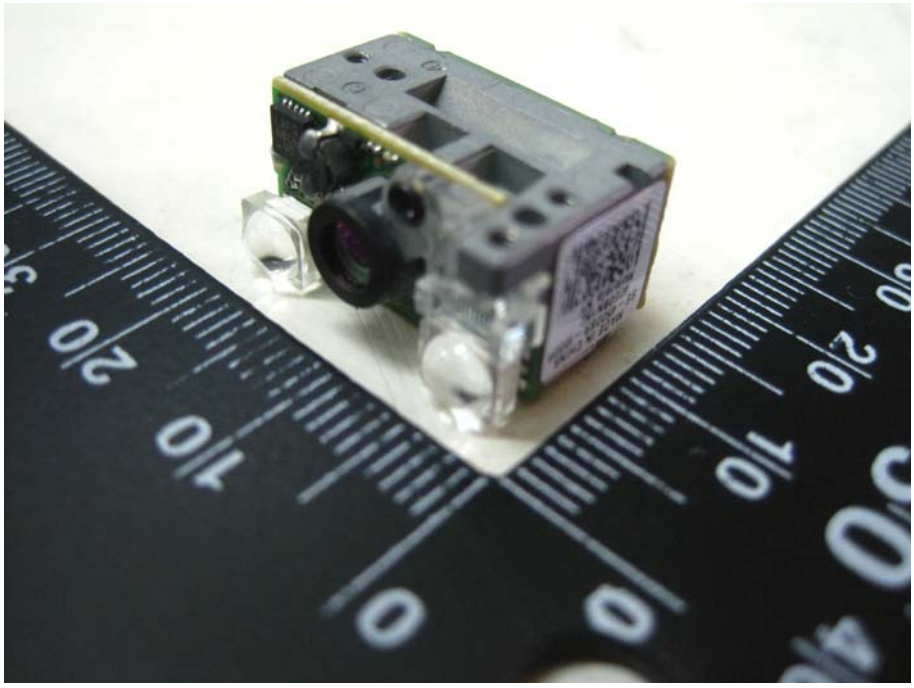
Front View of the PCB 1



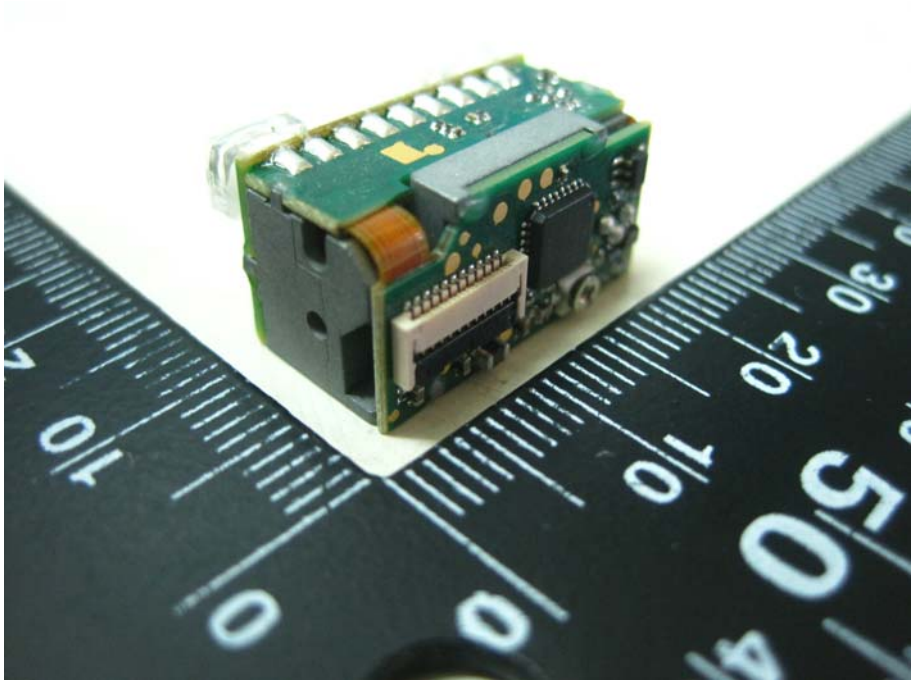
Front View of the PCB 1-1



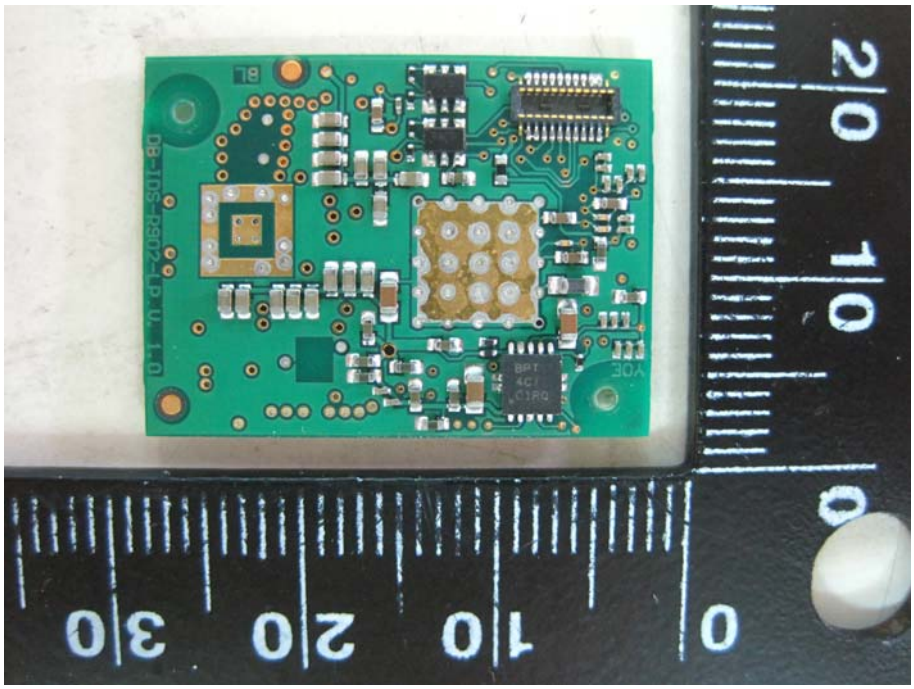
Rear View of the PCB 1



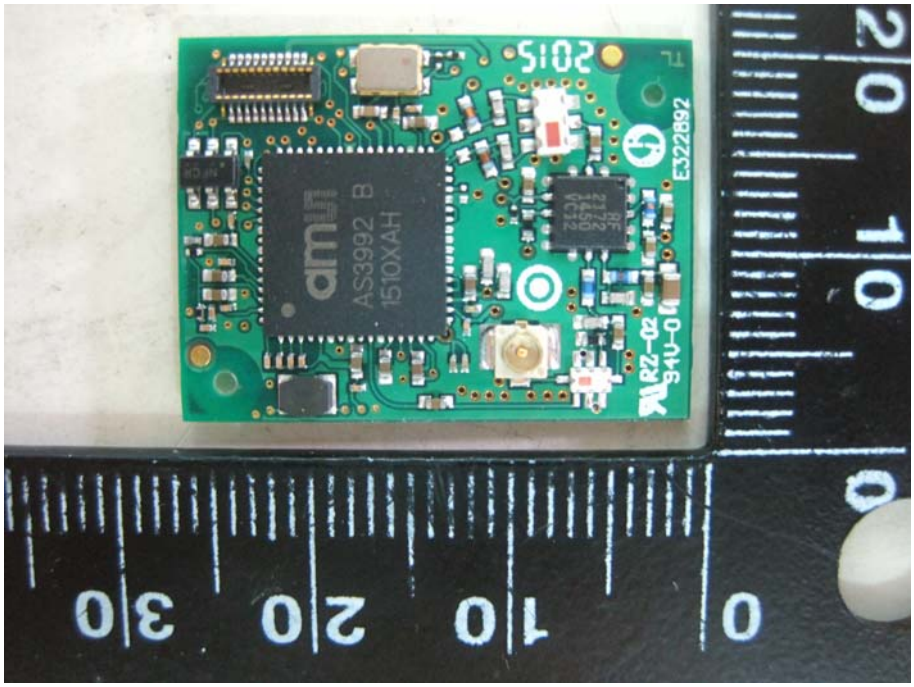
Front View of the PCB 2



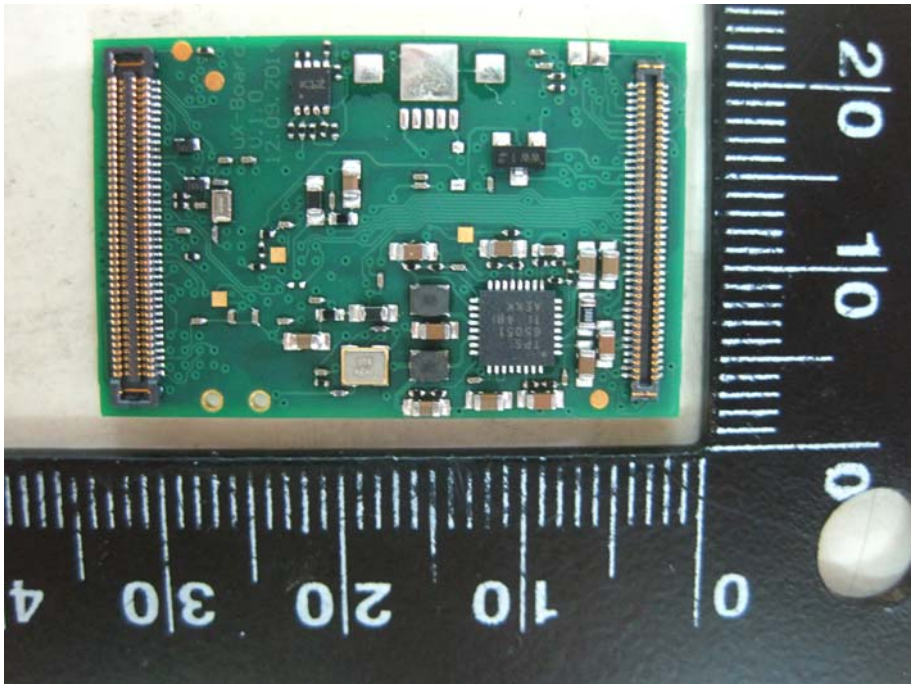
Rear View of the PCB 2



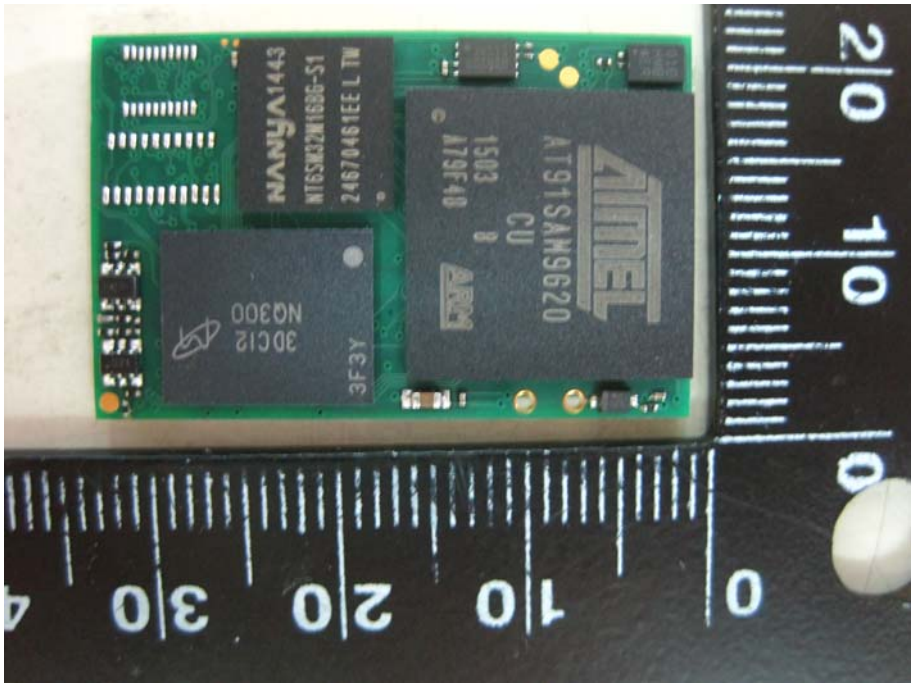
Front View of the PCB 3



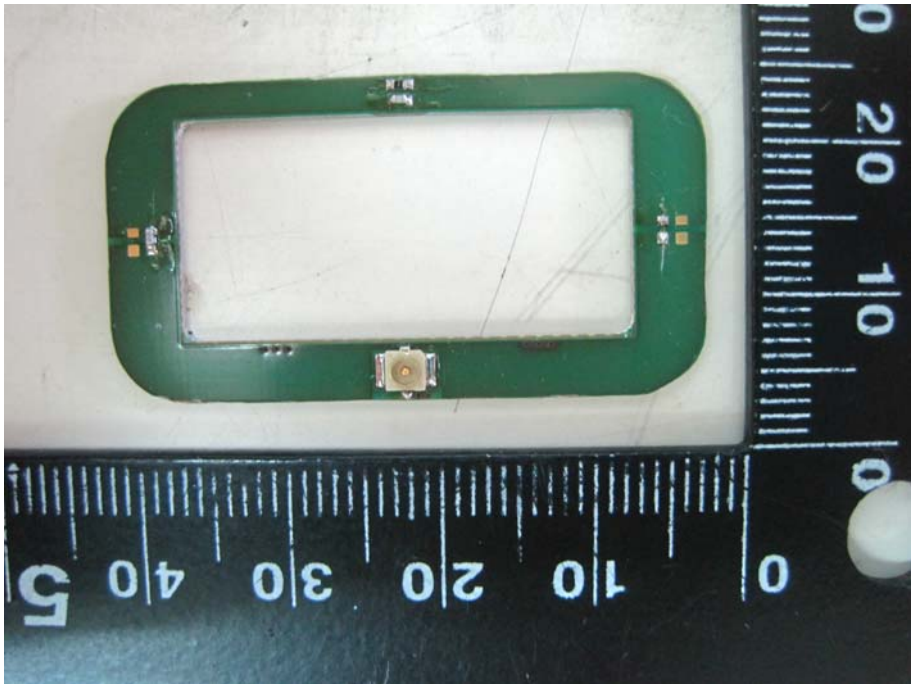
Rear View of the PCB 3



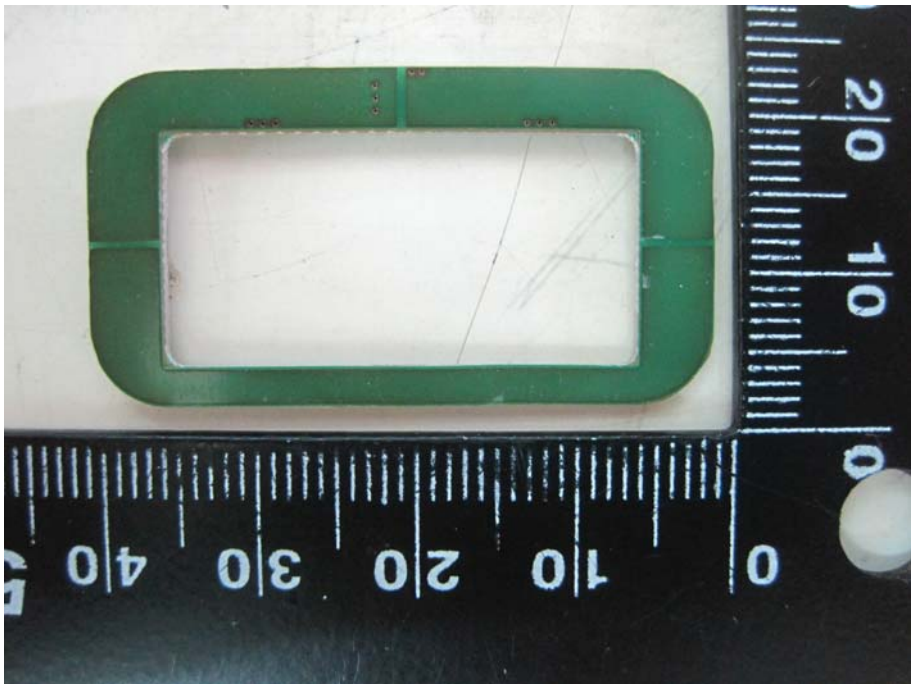
Front View of the PCB 4



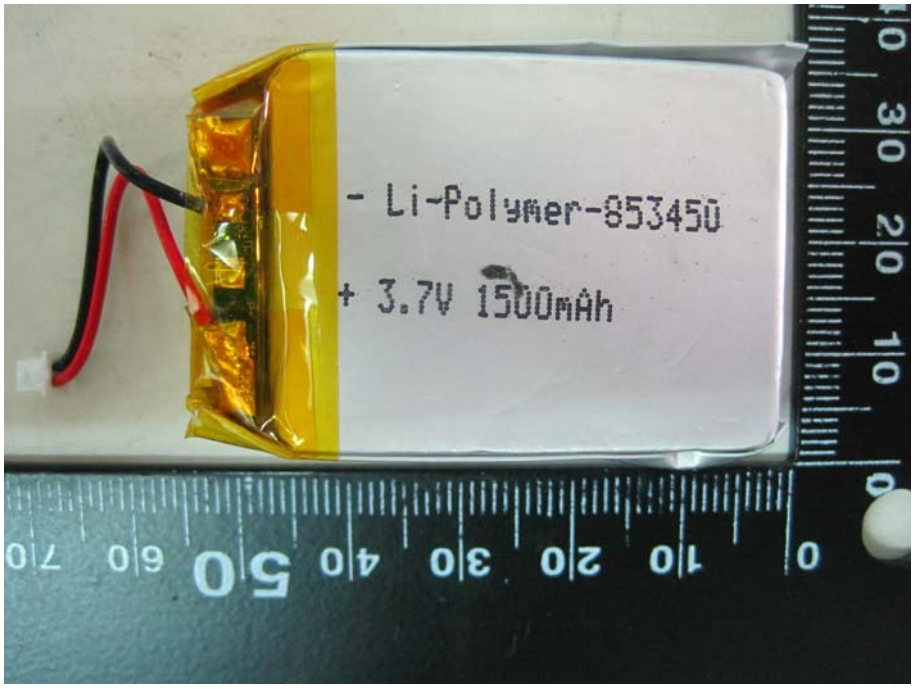
Rear View of the PCB 4



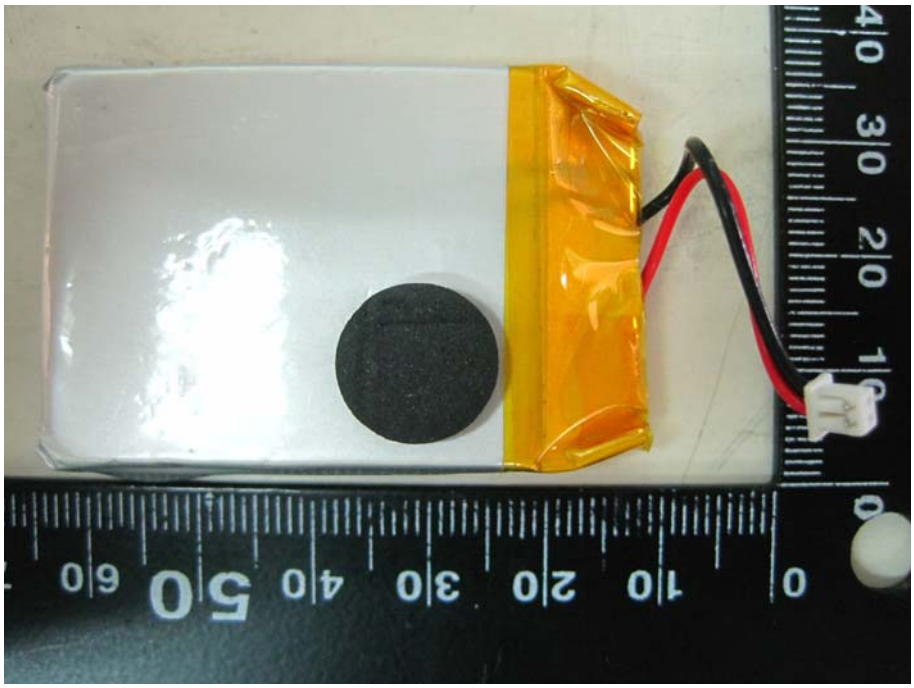
Front View of the PCB 5



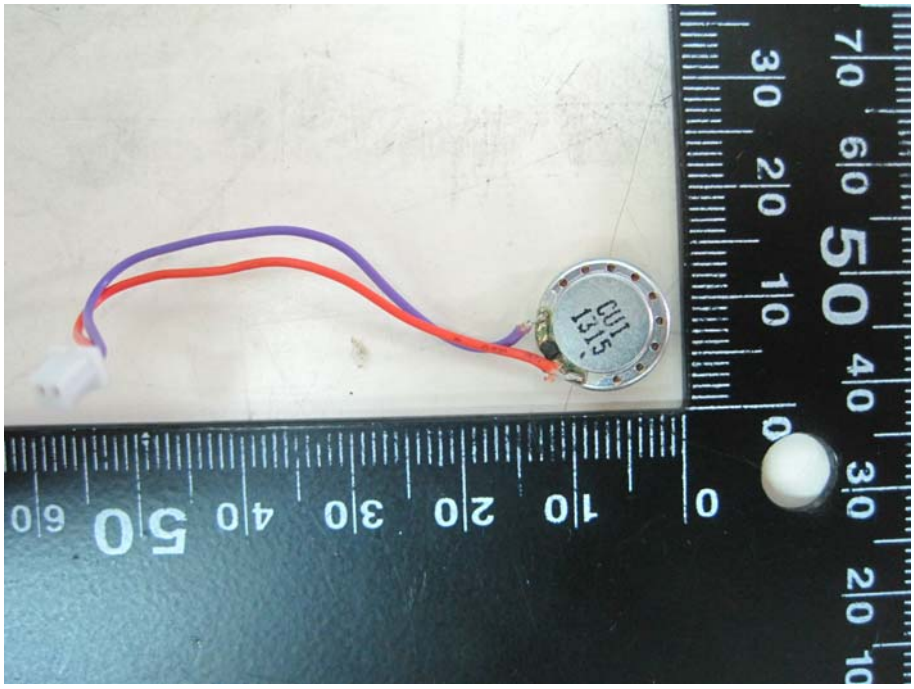
Rear View of the PCB 5



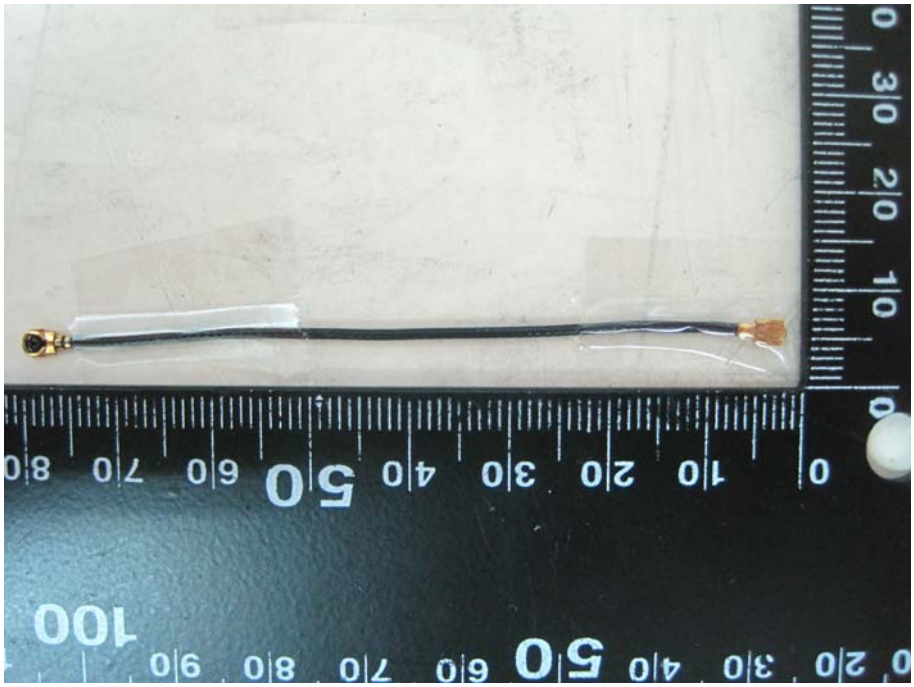
Front View of the Battery



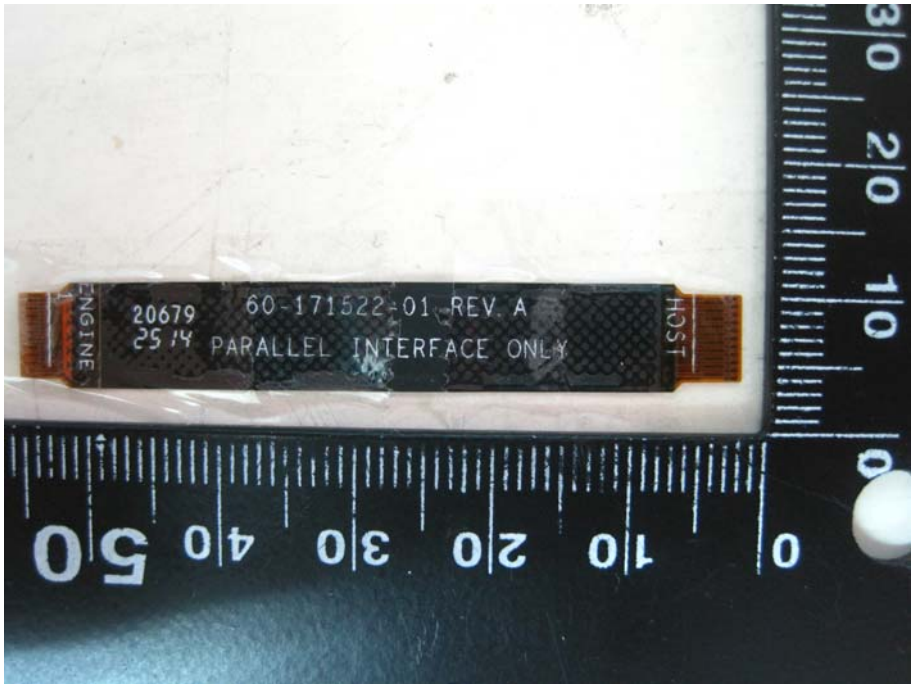
Rear View of the Battery



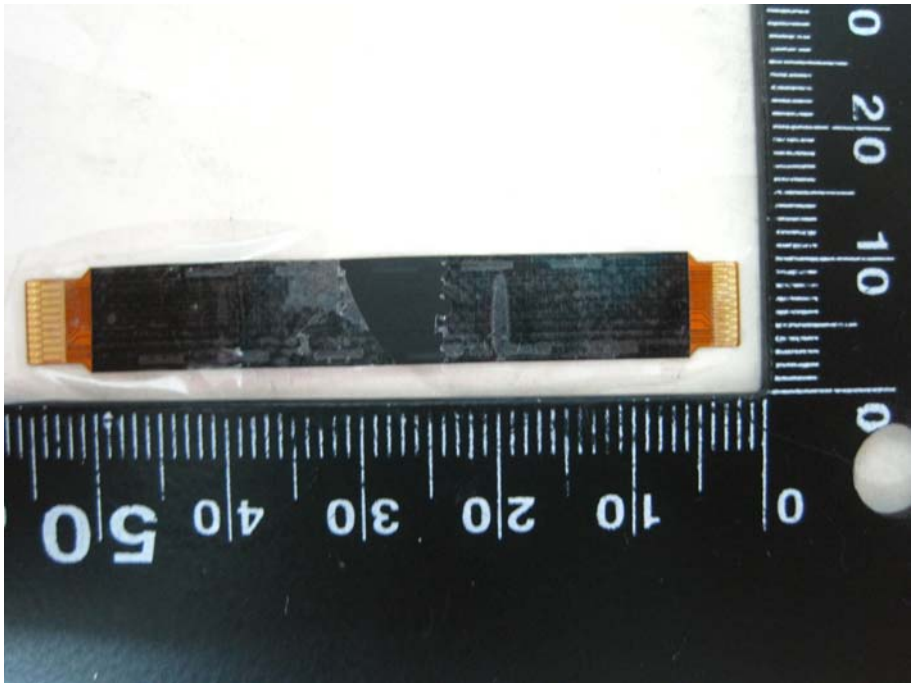
View of the Speaker



View of the Antenna



Front View of the Cable



Rear View of the Cable

View of the Cradle