TEST REPORT

1. Applicant

Name : STARNEX CO., LTD.
Address : #804, E&C Venture Dream Tower Ⅲ, Guro-Sam-Dong, Guro-gu, Korea

2. Products

Name : Play-Guard
Model/Type : SG-20
Manufacturer : STARNEX CO., LTD.

3. Test Standard : FCC CFR 47 Part 15, Subpart B

4. Test Method : ANSI C63.4-2003

5. Test Result : Positive

6. Date of Application : May 27, 2008

7. Date of Issue : June 18, 2008

Tested by

Yang-Hyun Kim
EMC Team Engineer

Approved by

Hee-Soo Kim
EMC Team Director

Korea Testing Laboratory

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1. GENERAL INFORMATIONS

1.1. Applicant (Client)

Name	STARNEX CO., LTD.
Address	#804, E&C Venture Dream Tower Ⅲ, Guro-Sam-Dong, Guro-Gu, Korea
Contact Person	Kim, Jong-Bae
Telephone No.	+ 82-2-873-9700
Facsimile No.	+ 82-2-873-9050
E-mail address	jbkim@starnex.co.kr

1.2. Equipment (EUT)

Type of equipment	PC peripheral
Model Name	SG-20
FCC ID	TN9SG-20
Interface	USB port, Micro SD slot, A/V output
Memory	128 MB flash memory
Power Source	DC 5 V (USB BUS Power), DC 3.7 V (Rechargeable Li-Polymer Battery)
Weight	20 g (Including Battery)
Size	37 mm (Diameter)
Manufacturer Name	STARNEX CO., LTD.
Manufacturer Address	#804, E&C Venture Dream Tower Ⅲ, Guro-Sam-Dong, Guro-Gu, Korea
-	-

1.3. Testing Laboratory

Testing Place	Korea Testing Labortory (KTL) 1271-12, Sa-Dong Sangnok-Gu, Ansan-si Gyunggi-Do , Korea
FCC registration number	408324
Industry Canada filing number	6298
Test Engineer	Yang-Hyun KIM
Telephone number	+82 31 5000 1541
Facsimile number	+82 31 5000 159
E-mail address	Kyh0510@wm.ktl.re.kr
Other Comments	-

1.4. EuT configuration

(The CDF filled by the applicant can be viewed at the test laboratory.)

The following peripheral devices and interface cables were connected during the measurement :

■ Notebook Model : SP28

■ Adaptor Model : API1AD02

■ Mouse Model : GM-3030

o _____ Model : -

o - unscreened power cables

■ - customer specific cables

Cable name	Shielded or unshielded	The Contents of a conduit	Length
Connection Cable	Shielded	-	1.25 m
-	-	-	-

2. SUMMARY OF TEST RESULTS

Testing performed for : STARNEX CO., LTD.

Equipment Under Test : Play-Guard

Receipt of Test Sample :June 13, 2008

Test Start Date : June 01, 2008

Test End Date : June 09, 2008

The following table represents the list of measurements required under the FCC CFR47 Part 15.107 and 15.109

FCC Rules	Test Requirements	Result	Comments
15.107(a)	AC conducted Emission	Pass	See Data sheets
15.109(a)	Radiated Emission	Pass	See Data sheets

Note 1 : Test results reported in this document relate only to the items tested
Note 2 : The required tests demonstrated compliance as per client declaration of test configuration, monitoring methodology and associated pass/fail criteria
Note 3 : Test results apply only to the item(s) tested
Note 4 : N/A : Not Applicable

*** Modifications required for compliance**
No modifications were implemented by KTL.
All results in this report pertain to the un-modified sample provided to KTL.

3. Measurement & Results

3.1. AC Conducted Emissions

3.1.1. Test Procedure

Conducted emission measurements on the EUT were performed by "AC Power Line Conducted Emissions Testing" procedure as per ANSI C63.4. The EUT was set up on a wooden table 0.8 meters height, 1.0 by 1.5 meters in size, placed in the shielded enclosed with a side of wall of which constituted a vertical conducting surface of 8.2 m x 3.2 m in size to maintain 40 cm from the rear of EUT

LISN(Line Impedance Stabilization Network, ROHDE & SCHWARZ, ENV216, 50 ohm / 50 μH) was installed and electrically boned to the conducting ground plane. The EUT was connected to the LISN using a typical power adapter.

One of two 50 ohm output terminals of the LISN was connected to the EMI Receiver (ROHDE & SCHWARZ, ESCI, 9 kHz to 3 GHz) and the other was terminated in 50 ohms. Measurements were again performed after interchanging such a connection oppositely.

The frequency range from 150 kHz to 30 MHz was examined and the remarkable frequencies were measured with Quasi-peak and Average values using the EMI receiver instrument (ROHDE & SCHWARZ, ESIB, 9 kHz to 26.5 GHz ; Detector Function ; CISPR Quasi-Peak & Average). The 6 dB bandwidth of the Receiver was set to 9 kHz

The position of connecting cables of the EUT was changed to find the worst case configuration during measurements. The maximum emission level from the EUT occurred in such configuration as shown in the following photograph.

3.1.2. Limits

(a) Except for a Class A digital device, for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

Frequency (MHz)	Conducted Limits (dBuV)	
	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.

(b) For a Class A digital device that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency (MHz)	Conducted Limits (dBuV)	
	Quasi-peak	Average
0.15-0.5	79	66
0.5-30	73	60

3.1.3. Sample calculation

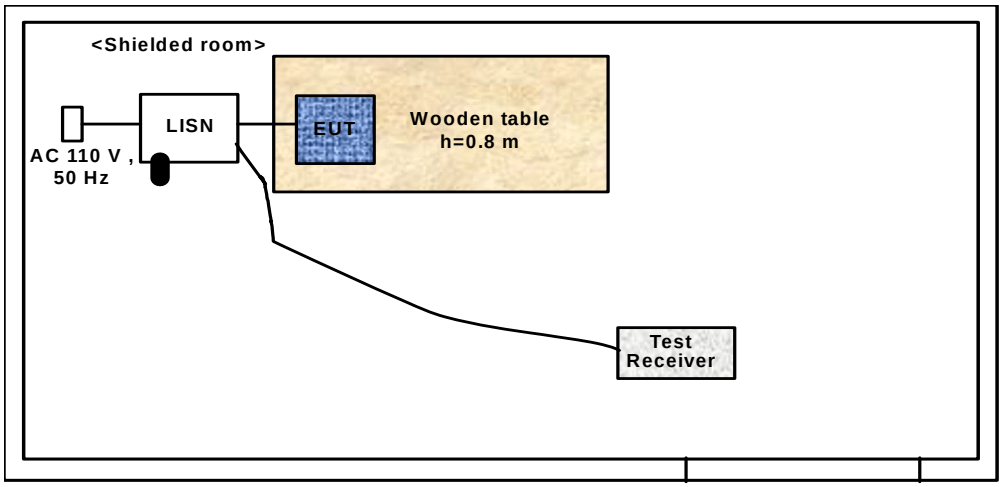
The emission level measured in decibels above one microvolt (dBμV) was converted into microvolt (μV) as shown in following sample calculation.

For example :

Measured Value at	11.55	MHz	42.7 dBμV @ Q-Peak mode
+ Correct factor *			10.2 dB
= Conducted Emission			52.9 dBμV

* Correct factor is adding RF cable loss and Attenuation

3.1.4. Photograph for the test configuration



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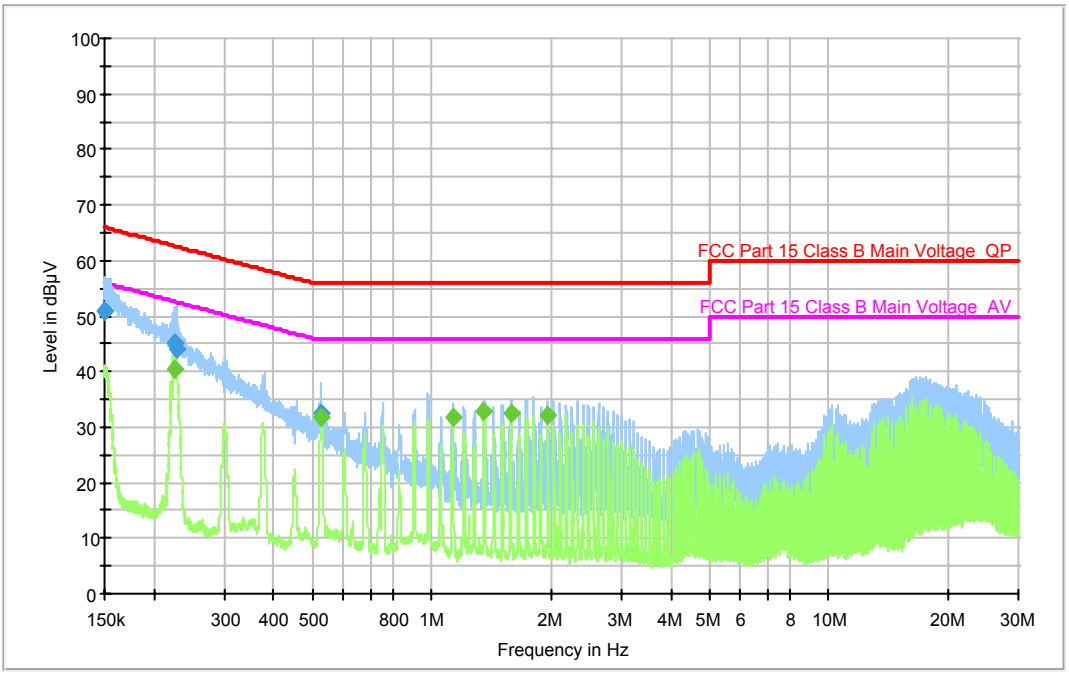
3.1.5. Test Results



Final Measurement Detector 1

Frequency (MHz)	Q-peak (dBuV)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150150	50.8	L1	9.7	15.2	66.0
0.150752	50.7	L1	9.7	15.3	66.0
0.224413	45.1	N	9.7	17.6	62.7
0.224498	45.1	N	9.7	17.6	62.7
0.227674	43.9	N	9.7	18.6	62.5
0.525792	32.5	N	9.8	23.5	56.0

Final Measurement Detector 2

Frequency (MHz)	Average (dBuV)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.226568	40.5	N	9.7	12.1	52.6
0.525792	31.8	N	9.8	14.2	46.0
1.126797	31.9	N	9.9	14.1	46.0
1.351819	32.9	N	10.0	13.1	46.0
1.577368	32.5	N	10.0	13.5	46.0
1.953650	32.3	L1	10.0	13.7	46.0

3.2. Radiated Emissions

3.2.1. Test Procedure

3.2.1.1 Preliminary Testing for Reference

Preliminary testing was performed in a KTL absorber-lined room to determine the emission characteristics of the EUT. The EUT was placed on the wooden table which has dimensions of 0.8 meters in height, 1 meter in length and 1.5 meters in width. Receiving antenna (Biconi-Log antenna : 30 to 1000 MHz or Horn Antenna : 1 to 40 GHz) was placed at the distance of 3 meter from the EUT.

An attempt was made to maximize the emission level with the various configurations of the EUT. Emission levels from the EUT with various configurations were examined on a spectrum analyzer connected with a RF amplifier and graphed.
The emission was within the illumination area of the 3 dB beam width of the antenna so that the maximum emission from the EUT is measured.

3.2.1.2 Final Radiated Emission Test at an Absorber-Lined Room

The final measurement of radiated field strength was carried out in a KTL Absorber-Lined Room that was listed up at FCC according to the "Radiated Emissions Testing" procedure specified by ANSI C63.4.

Based on the test results in preliminary test, measurement was made in same test set up and configuration which produced maximum emission level. Receiving antenna was installed at 3-meter distance from the EUT, and was connected to an EMI receiver.

Turntable was rotated through 360 degrees and receiving antenna height was varied from 1 to 4 meters above the ground plane to read maximum emission level. Receiving antenna polarization was changed vertical and horizontal. The worst value was recorded.

If necessary, the radiated emission measurements could be performed at a closer distance than specified distance to ensure higher accuracy and their results were extrapolated to the specified distance using an inverse linear distance extrapolation factor (20 dB/decade) as per Section 15.31(f).

The maximum emission level from the EUT occurred in such configuration as shown in the following photograph.

3.2.2. Limits

(a) Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency of Emission (MHz)	Field strength (Microvolts/meters)
30 – 88	100
88 – 216	150
216 – 960	200
Above 960	500

(b) The field strength of radiated emissions from a Class A digital device, as determined at a distance of 10 meters, shall not exceed the following :

Frequency of Emission (MHz)	Field strength (Microvolts/meters)
30 – 88	90
88 – 216	150
216 – 960	210
Above 960	300

3.2.3. Sample Calculation

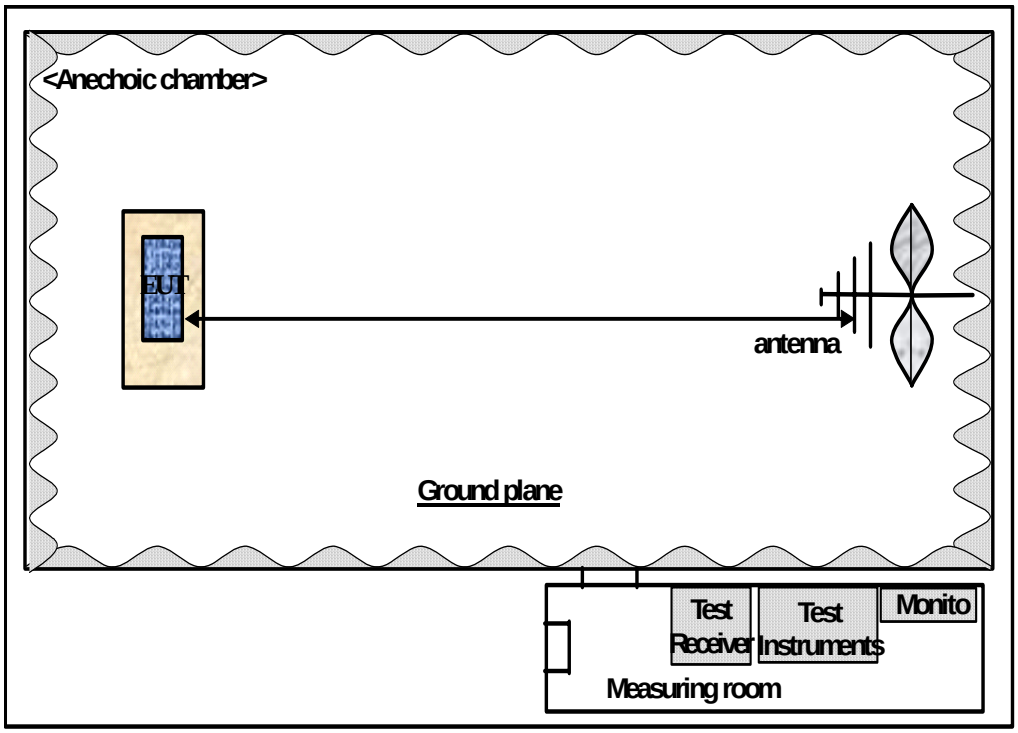
The emission level measured in decibels above one microvolt (dBμV) was following sample calculation.

For example :

Measured Value at 31.5 MHz	24.6 dBμV
Antenna Factor & Cable loss	13.2 dB
− Preamplifier	0.0 dB
− Distance Correction Factor *	0.0 dB
= Radiated Emission	37.8 dBμV/m
	(=77.6 μV/m)

* Extrapolated from the measured distance to the specified distance by an inverse linear distance extrapolation.

3.2.4. Photograph for the test configuration



3.2.5. Test Results

3.2.5.1 Radiated Emission

Model No.	SG-20
Resolution Bandwidth	□ Peak & Average (3dB Bandwidth : 1MHz for above 1GHz) ■ Quasi-Peak (6dB Bandwidth : 120kHz for below 1GHz)
Test Distance	3 m
EUT Operation	Normal Operation
Test Date	June 03, 2008

Frequency (MHz)	* D.M.	* A.P.	Measured Value (dBμV)	* A.F. + C.L (dB/m)	* A.G. (dB)	* D.C.F. (dB)	Emission Level		Limit (dBμV/m)	** Margin (dB)
							(dBμV/m)	(μV/m)		
119.0	Q	V	20.7	12.3	0.0	0.0	33.0	44.7	43.5	10.5
122.8	Q	V	20.3	12.6	0.0	0.0	32.9	44.2	43.5	10.6
175.3	Q	V	22.1	13.4	0.0	0.0	35.5	59.6	43.5	8.0
399.8	Q	V	19.0	18.0	0.0	0.0	37.0	70.8	46.0	9.0
432.0	Q	V	16.6	19.1	0.0	0.0	35.7	61.0	46.0	10.3
480.0	Q	V	11.1	20.3	0.0	0.0	31.4	37.2	46.0	14.6
498.4	Q	V	16.5	20.4	0.0	0.0	36.9	70.0	46.0	9.1
528.1	Q	V	11.5	21.1	0.0	0.0	32.6	42.7	46.0	13.4
635.3	Q	V	13.6	23.6	0.0	0.0	37.2	72.4	46.0	8.8
651.5	Q	V	10.6	24.1	0.0	0.0	34.7	54.3	46.0	11.3
655.3	Q	V	13.2	24.0	0.0	0.0	37.2	72.4	46.0	8.8
700.0	Q	V	8.1	24.3	0.0	0.0	32.4	41.7	46.0	13.6
720.0	Q	V	10.1	24.3	0.0	0.0	34.4	52.5	46.0	11.6

Note

The observed EMI receiver(ESCI) noise floor level was 2.0 dBμV.
And all other emissions not reported on data were more than 25 dB below the permitted level.

* D.M. : Detect Mode (P : Peak, Q : Quasi-Peak, A : Average)
A.P. : Antenna Polarization (H : Horizontal, V : Vertical)
A.F. : Antenna Factor
C.L. : Cable Loss
A.G. : Amplifier Gain
D.C.F. : Distance Correction Factor
< : Less than

** Margin (dB) = Limit (dB) - Emission Level (dB)

4. TEST EQUIPMENTS

No.	Equipment	Manufacturer	Model	S/N	Effective Cal.Duration
1	EMI Receiver (20 Hz ~ 26.5 GHz)	R&S	ESIB	100280	08/17/2007 ~ 08/17/2008
2	Spectrum Analyzer (100 Hz ~ 26.5 GHz)	Agilent	E4407B	US41443316	12/01/2007 ~ 12/01/2008
3	Spectrum Analyzer (3 Hz ~ 50 GHz)	Agilent	E4448A	MY43360322	08/30/2007 ~ 08/30/2008
4	Pre-Amplifier (100 kHz ~ 1 GHz)	SONOMA.	310N	186270	08/25/2007 ~ 08/25/2008
5	Pre-Amplifier (0.5 GHz ~ 26.5 GHz)	Agilent	83017A	MY39500982	04/02/2008 ~ 04/02/2009
6	LISN(50 Ω , 50 μH) (10 kHz ~ 100 MHz)	R&S	ESH3-Z5	826789009	07/05/2007 ~ 07/05/2008
7	Biconi-Log Ant. (30 MHz ~ 1000 MHz)	Schwarzbeck	VULB9168	9168-180	08/24/2007 ~ 08/24/2008
8	Horn Ant. (1 GHz ~ 18 GHz)	EMCO	3115	9012-3595	03/26/2007 ~ 03/26/2009
9	Horn Ant. (18 GHz ~ 40 GHz)	EMCO	3116	2664	03/26/2007 ~ 03/26/2009
10	Active Loop Ant. (9 kHz ~ 30 MHz)	EMCO	6502	2532	06/08/2007 ~ 06/08/2008
11	DC Power Supply	Agilent	E4356A	MY41000296	10/01/2007 ~ 10/01/2008
12	Power Meter	Agilent	E4417A	GB4129075	09/17/2007 ~ 09/17/2008
13	Bluetooth tester	anritsu	MT8852B	6K00006994	03/03/2008 ~ 03/03/2009
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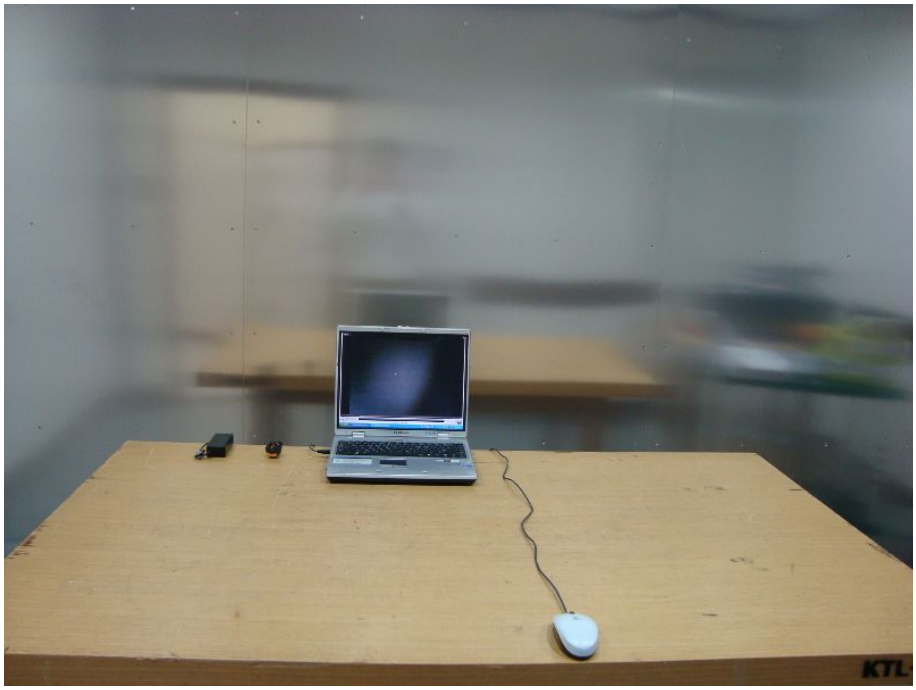
	-	-	-	-	-

Appendix.1 Test setup photo



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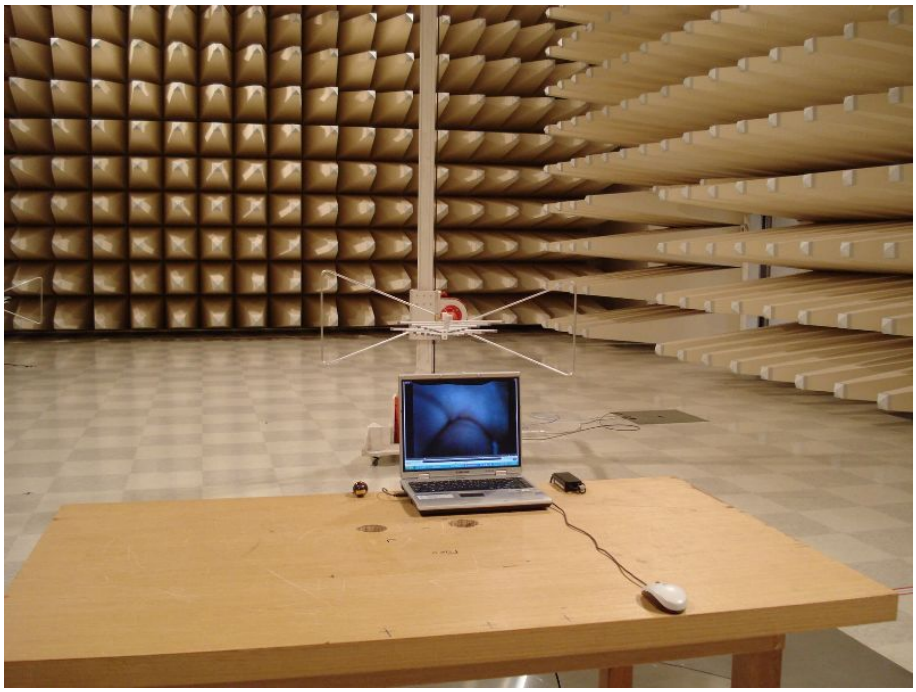


<Radiated Emission>

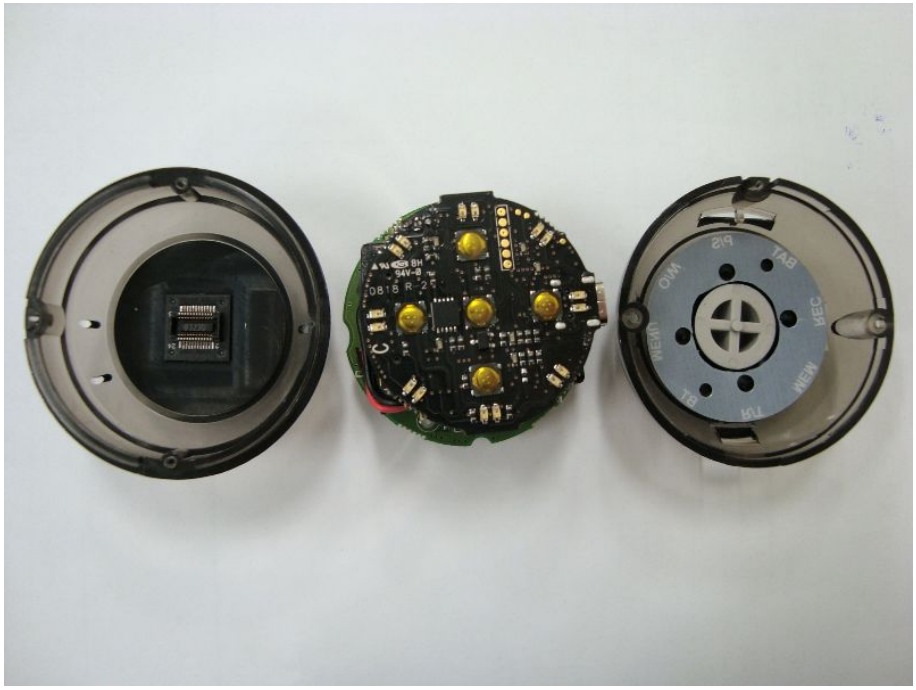
Appendix.2 EUT photo

<Front>

<Rear>

<Left>

<Right>



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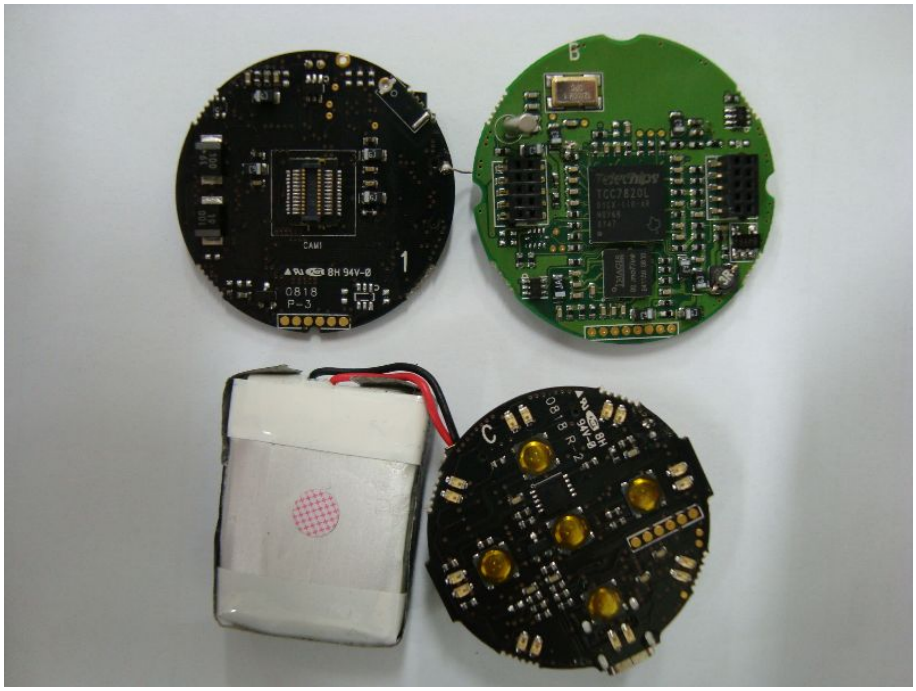

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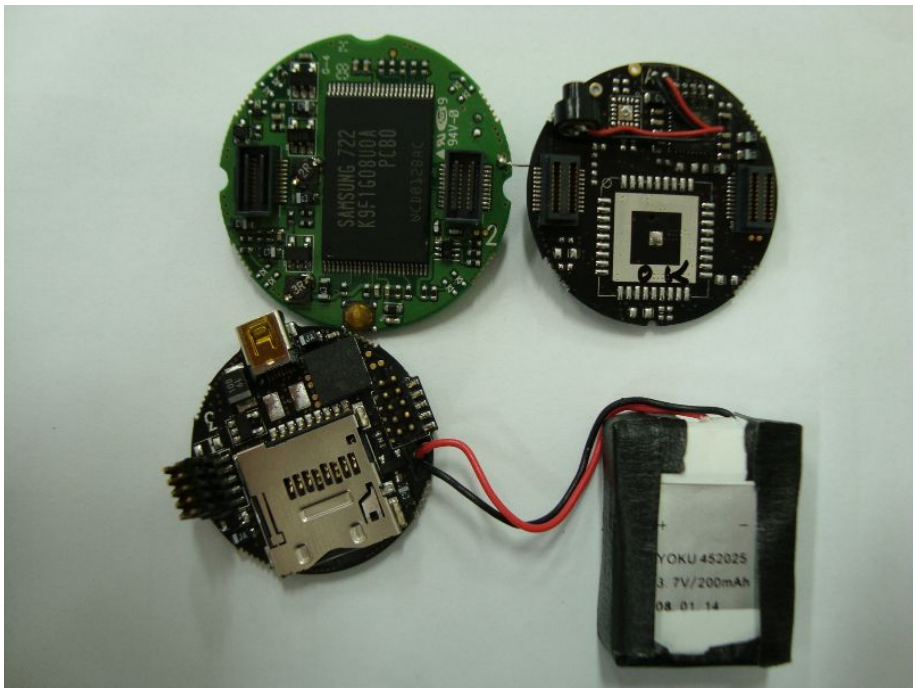

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