

EMC TEST REPORT

Test item : Heating Mat
Model No. : BIOMAT QUEEN
Order No. : DTNC1412-05428
Date of receipt : 2014-12-08
Test duration : 2015-01-21 ~ 2015-04-20
Date of Issue : 2015-04-27
Applicant : RICHWAY&FUJIBIO INC.
1314 South King St 520 Honolulu, Hawaii 96814
Test laboratory : DT&C Co., Ltd.
42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 449-935
Test specification : ANSI C 63.4:2009
FCC Part 18

Test environment : Temperature : 22 °C,
Humidity : (35 ~ 36) % R.H.
Test result : ☒ Comply ☐ Not Comply

The test results presented in this test report are limited only to the sample supplied by applicant and the use of this test report is inhibited other than its purpose.
This test report shall not be reproduced except in full, without the written approval of DT&C Co., Ltd.

Tested by:

Reviewed by:



Engineer
JunHo Park



Technical Manager
YoungKyu Shin

PRESIDENT OF DT&C Co., Ltd.

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1. General Remarks

This report contains the result of tests performed by:

DT&C Co., Ltd.

Address : 42, Yurim-ro 154beon-gil, Cheoin-Gu, Yongin-Si, Gyeonggi-Do, Korea, 449-935

<http://www.dtnet.net>

Tel: +82-31-321-2664 Fax: +82-31-321-1664

2. Test Laboratory

DT&C Co., Ltd. has been accredited / filed / authorized by the agencies listed in the following table;

Certificate	Nation	Agency	Code	Mark
Accreditation	Korea	KOLAS	393	ISO/IEC 17025
Site Filing	USA	FCC	KR0034 101842 678747, 596748, 804488, 165783	Accredited 2.948 Listed
	Canada	IC	5740A-1 5740A-2	Registered
	Japan	VCCI	C-1427 R-1364, R-3385, R-4076, R-4180, T-1442, G-338, G754, G-815	Registered
Certification	Korea	KC	KR0034	Designation
	Germany	TUV	CARAT 13 11 86721 001	ISO/IEC 17025

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the "General requirements for the competent of calibration and testing laboratory".

3. General Information of EUT

Kind of Equipment	Heating Mat
Model Name	BIOMAT QUEEN
Add Model Name	BIOMAT KING, ORGONE BIOMAT QUEEN, ORGONE BIOMAT KING
Serial No.	None
Type of Sample Tested	Pre-Production
Supplied Power for Test	120 V, 60 Hz
Clock Frequency	32 kHz
Applicant	RICHWAY&FUJIBIO INC. 1314 South King St 520 Honolulu, Hawaii 96814
Manufacturer	R&L Co., Ltd. 11th Floor, B-line ACE Gwang Myeong Tower #1365, Soha-dong, Gwangmyeong-si, Gyeonggi-do, South Korea 423-798
Factory	R&L Co., Ltd. 11th Floor, B-line ACE Gwang Myeong Tower #1365, Soha-dong, Gwangmyeong-si, Gyeonggi-do, South Korea 423-798

4. Test Summary

4.1 Applied standards and test results

Test Items	Applied Standards	Results
Conducted Disturbance	ANSI C63.4:2009	C
Radiated Disturbance	ANSI C63.4:2009	C
C=Comply N/C=Not Comply N/T=Not Tested N/A=Not Applicable		

The data in this test report are traceable to the national or international standards.

4.2 Test environment and conditions

Test Items	Test date (YYYY-MM-DD)	Temp (°C)	Humidity (% R.H.)
Conducted Disturbance	2015-01-21	22	35
Radiated Disturbance	2015-04-20	22	36

5. Test Set-up and operation mode

5.1 Principle of Configuration Selection

Emission : The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

5.2 Test Operation Mode

- EUT was continuous heating mode.

5.3 Support Equipment Used

Unit	Model No.	Serial No.	Manufacturer	CABLE			Backshell	FCC ID
				Connect type	Length (m)	shield		
-	-	-	-	-	-	-	-	-

NOTE

- See "APPENDIX 2 Photographs" for actual system test setup

6. Test Results : Emission

6.1 Conducted Disturbance

6.1.1 Measurement Procedure

In the range of 0.15 MHz to 30 MHz, the conducted disturbance was measured and set-up was made accordance with **ANSI C63.4**.

If the EUT is table top equipment, it was placed on a wooden table with a height of 0.8 m above the reference ground plane and 0.4 m from the conducting wall of the shielded room.

Also if the EUT is floor-standing equipment, it was placed on a non-conducted support with a height up to 0.15 m above the reference ground plane.

Connect the EUT's power source lines to the appropriate power mains / peripherals through the LISN. All the other peripherals are connected to the 2nd LISN, if any.

Unused measuring port of the LISN was resistively terminated by 50 ohm terminator.

The measuring port of the LISN for EUT was connected to spectrum analyzer.

Using conducted emission test software, the emissions were scanned with peak detector mode.

After scanning over the frequency range, suspected emissions were selected to perform final measurement. When performing final measurement, the receiver was used which has Quasi-Peak detector and Average detector.

By varying the configuration of the test sample and the cable routing it was attempted to maximize the emission.

For further description of the configuration refer to the picture of the test set-up.

6.1.2 Limit for Conducted Disturbance

(1) Conducted disturbance at mains ports.

Frequency range (MHz)	Limits dB(μV)			
	Quasi-peak		Average	
	Class A	Class B	Class A	Class B
0.15 to 0.50	79	66 to 56	66	56 to 46
0.50 to 5	73	56	60	46
5 to 30		60		50
Note 1 The lower limit shall apply at the transition frequencies.				
Note 2 The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

Note) 1. Emission Level = Reading Value + Correction Factor.

2. Correction Factor = Cable Loss + Insertion Loss of LISN

3. Margin = Limit - Emission level

Test Result

Results of Conducted Emission

DT&C

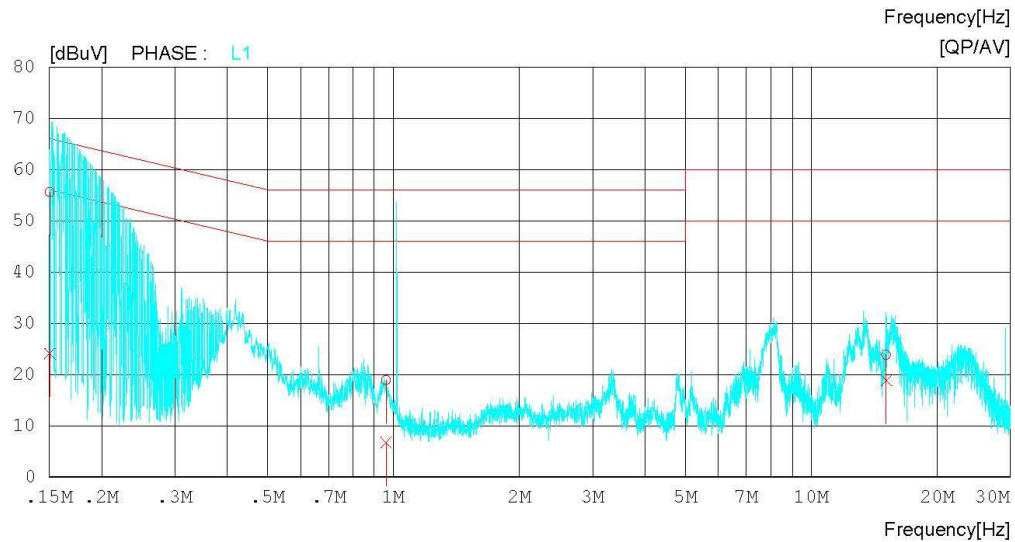
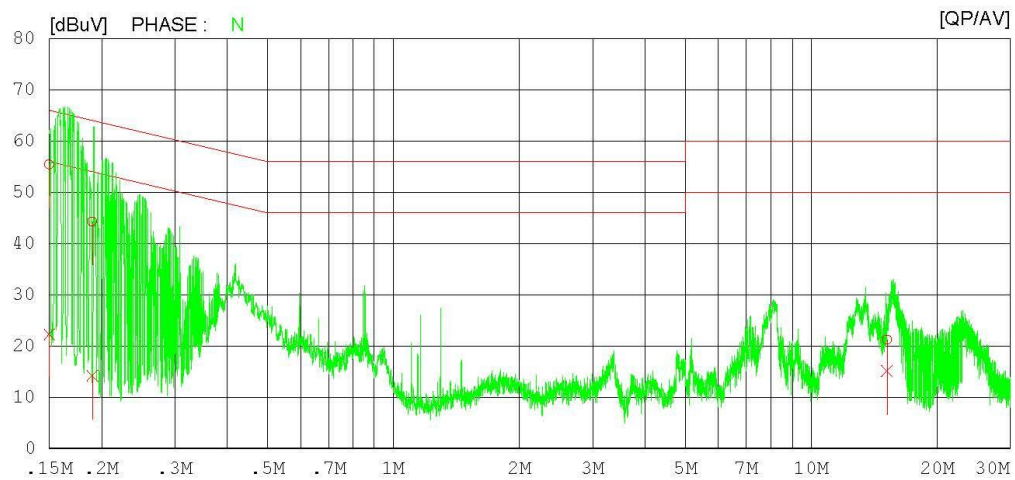
Date : 2015-01-21

Order No. : DTNC1412-05428
Model No. :
Serial No. :
Test Condition :

Reference No. :
Power Supply : 120 V 60 Hz
Temp/Humi. : 22 °C 35 % R.H.
Operator :

Memo :

LIMIT : CISPR22_B QP
CISPR22_B AV



Results of Conducted Emission

DT&C

Date : 2015-01-21

Order No. : DTNC1412-05428
Model No. :
Serial No. :
Test Condition :

Reference No. :
Power Supply : 120 V 60 Hz
Temp/Humi. : 22 °C 35 % R.H.
Operator :

Memo :

LIMIT : CISPR22_B QP
CISPR22_B AV

NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.15000	55.2	22.1	0.2	55.4	22.3	66.0	56.0	10.6	33.7	N
2	0.19026	44.1	14.0	0.2	44.3	14.2	64.0	54.0	19.7	39.8	N
3	15.18880	20.6	14.4	0.7	21.3	15.1	60.0	50.0	38.7	34.9	N
4	0.15056	55.2	23.8	0.3	55.5	24.1	66.0	56.0	10.5	31.9	L1
5	0.96040	18.6	6.4	0.2	18.8	6.6	56.0	46.0	37.2	39.4	L1
6	15.13120	23.2	18.2	0.6	23.8	18.8	60.0	50.0	36.2	31.2	L1

6.2 Radiated Disturbance

6.2.1 Measurement Procedure

The radiated disturbance was measured and set-up was made accordance with **ANSI C63.4**.

If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 m above the reference ground plane and 3 m or 10 m away from the interference receiving antenna in the **10m semi-anechoic chamber**.

Also if the EUT is floor-standing equipment, it was placed on a non-conducted support with a height up to 0.15 m above the reference ground plane.

Rotate the EUT from (0 - 360)° and position the receiving antenna at heights from (1 - 4) m above the reference ground plane continuously to determine associated with higher emission levels and record them.

The measurement was made in both the vertical and horizontal polarization, and the maximum value is presented in the report.

For below 1 GHz frequency range, Quasi-Peak detector with 120 kHz RBW was used.

Also Peak and Average detector with 1 MHz RBW were used for above 1 GHz frequency range.

For further description of the configuration refer to the picture of the test set-up.

6.2.2 Limit for Radiated Disturbance

- The test frequency range of Radiated Disturbance measurements are listed below.

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 108	1 000
108 – 500	2 000
500 – 1 000	5 000
Above 1 000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

(1) Limit for Radiated Emission below 1 000MHz

Frequency range (MHz)	Class A Equipment (10 m distance)	Class B Equipment (3 m distance)
	Quasi-peak (dBμV/m)	Quasi-peak (dBμV/m)
30 to 88	39.1	40
88 to 216	43.5	43.5
216 to 960	46.4	46
960 to 1 000	49.5	54

Note 1 The lower limit shall apply at the transition frequency.

Note 2 Additional provisions may be required for cases where interference occurs.

Note 3 According to 15.109(g), as an alternative to the radiated emission limit shown above, digital devices may be shown to comply with the standards(CISPR), Pub. 22 shown as below.

Frequency range (MHz)	Class A Equipment (10 m distance)	Class B Equipment (10 m distance)
	Quasi-peak (dBμV/m)	Quasi-peak (dBμV/m)
30 to 230	40	30
230 to 1 000	47	37

(2) Limits for Radiated Emission above 1 000MHz at a measuring distance of 3 m

Frequency (GHz)	Class A Equipment		Class B Equipment	
	Peak (dBμV/m)	Average (dBμV/m)	Peak (dBμV/m)	Average (dBμV/m)
1 to 40	80	60	74	54

Note) 1. Emission Level = Reading Value + loss - gain + Ant Factor

2. Margin = Limit - Emission level

3. loss = Cable loss, gain = Amp gain, Ant Factor = Antenna Factor

Test Result

< 30 MHz ~ 1 GHz >

RADIATED EMISSION

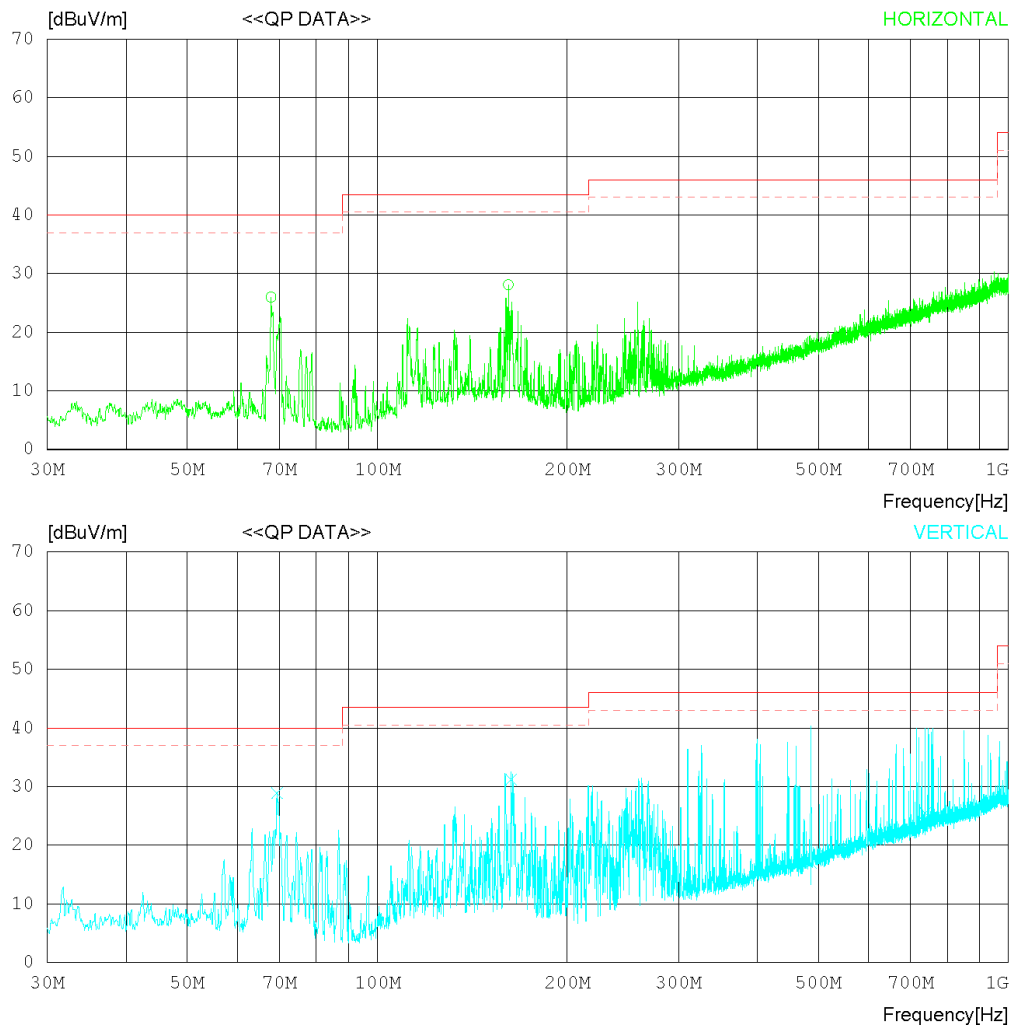
Date : 2015-04-20

Oder No. : DTNC1412-05428
Model No. :
Serial No. :
Test Condition :

Reference No. :
Power Supply : 120 V 60 Hz
Temp/Humi : 22 °C 36 % R.H.
Operator :

Memo :

LIMIT : FCC Part15 Subpart.B Class B (3m)
MARGIN: 3 dB



RADIATED EMISSION

Date : 2015-04-20

Order No. : DTNC1412-05428	Reference No. :
Model No. :	Power Supply : 120 V 60 Hz
Serial No. :	Temp/Humi : 22 'C 36 % R.H.
Test Condition :	Operator :
Memo :	

LIMIT : FCC Part15 Subpart.B Class B (3m)
MARGIN: 3 dB

No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	67.830	37.0	10.7	1.0	22.7	26.0	40.0	14.0	230	190
2	161.311	36.5	13.0	1.6	23.0	28.1	43.5	15.4	310	130
----- Vertical -----										
3	69.406	40.1	10.5	1.0	22.7	28.9	40.0	11.1	100	150
4	162.887	39.7	12.9	1.6	23.0	31.2	43.5	12.3	100	220
5	486.372	20.6	17.6	3.2	24.4	17.0	46.0	29.0	100	180
6	738.137	22.0	21.8	4.2	22.5	25.5	46.0	20.5	100	200

Appendix 1

List of Test and Measurement Instruments

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment is identified by the Test Laboratory.

1. Conducted Disturbance

Name of Instrument	Model No.	Manufacturer	Serial No.	Cal. Date	Next Cal. Date
<input checked="" type="checkbox"/> MEASUREMENT SOFTWARE	EMI-C VER. 2.00.0143	TSJ	N/A	N/A	N/A
<input type="checkbox"/> SPECTRUM ANALYZER	8591E	H/P	3649A05889	N/A	N/A
<input type="checkbox"/> LISN	KNW-407	KYORITSU	8-317-8	2015.01.07	2016.01.07
<input checked="" type="checkbox"/> LISN	PMM L2-16B	NARDA S.T.S. / PMM	000WX20305	2014.06.26	2015.06.26
<input type="checkbox"/> 50 OHM TERMINATOR	CT-01	TME	N/A	2015.01.06	2016.01.06
<input checked="" type="checkbox"/> EMI TEST RECEIVER	ESCI	ROHDE & SCHWARZ	100364	2015.02.25	2016.02.25
<input type="checkbox"/> LISN	ESH2-Z5	ROHDE & SCHWARZ	828739/006	2014.09.11	2015.09.11
<input type="checkbox"/> LISN	LISN1600	TTI	197204	2014.06.27	2015.06.27
<input type="checkbox"/> 50 OHM TERMINATOR	CT-01	TME	N/A	2015.01.06	2016.01.06
<input type="checkbox"/> ISN	T4A	TESEQ GMBH	24869	2015.01.07	2016.01.07
<input type="checkbox"/> ISN	T8	TESEQ GMBH	24815	2015.01.07	2016.01.07
<input type="checkbox"/> LISN (DC)	NNBM8125	SCHWARZBECK	8125-821	2014.09.12	2015.09.12
<input type="checkbox"/> LISN (DC)	NNBM8125	SCHWARZBECK	8125-1390	2014.09.12	2015.09.12

2. Radiated Disturbance

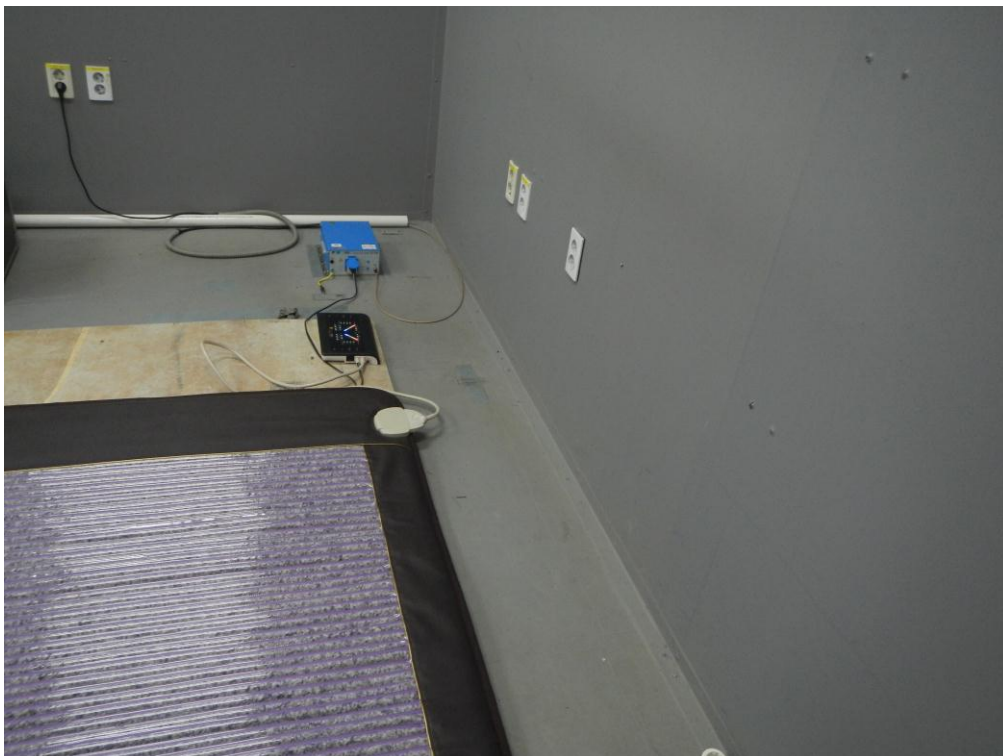
Name of Instrument	Model No.	Manufacturer	Serial No.	Cal. Date	Next Cal. Date
<input checked="" type="checkbox"/> MEASUREMENT SOFTWARE	EMI-R VER. 2.00.0121	TSJ	N/A	N/A	N/A
<input checked="" type="checkbox"/> EMI TEST RECEIVER	ESU	ROHDE & SCHWARZ	100014	2015.01.06	2016.01.06
<input checked="" type="checkbox"/> TRILOG BROADBAND TEST-ANTENNA	VULB9160	SCHWARZBECK	9160-3362	2014.07.31	2016.07.31
<input type="checkbox"/> HORN ANTENNA	BBHA9120A	SCHWARZBEC	322	2014.05.12	2016.05.12
<input checked="" type="checkbox"/> AMPLIFIER	8447E	H/P	2945A02865	2015.01.06	2016.01.06
<input type="checkbox"/> AMPLIFIER	8449B	AGILENT	3008A01590	2015.02.25	2016.02.25
<input type="checkbox"/> SPECTRUM ANALYZER	E4411B	AGILENT	US41062735	2014.06.27	2015.06.27
<input type="checkbox"/> AMPLIFIER	8447D	AGILENT	2443A03690	2014.06.27	2015.06.27
<input type="checkbox"/> EMI TEST RECEIVER	ESCI	ROHDE & SCHWARZ	100364	2015.02.25	2016.02.25
<input type="checkbox"/> AMPLIFIER	MLA-100K01-B01-26	TSJ	1252741	2015.02.25	2016.02.25

Appendix 2

Photographs of the Test Configurations

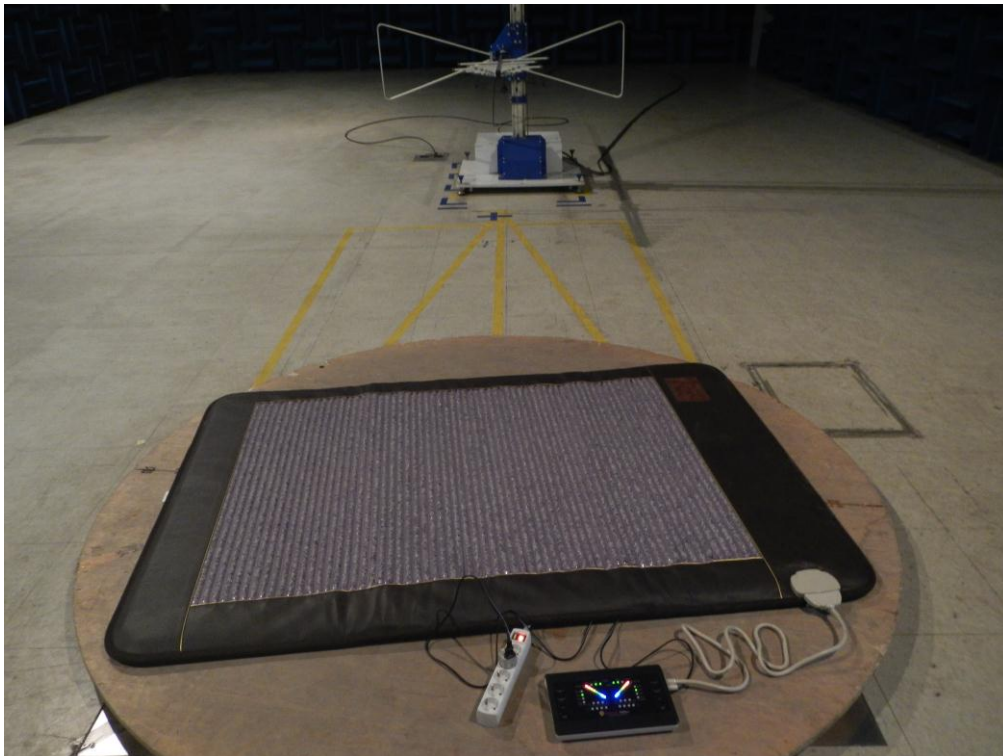
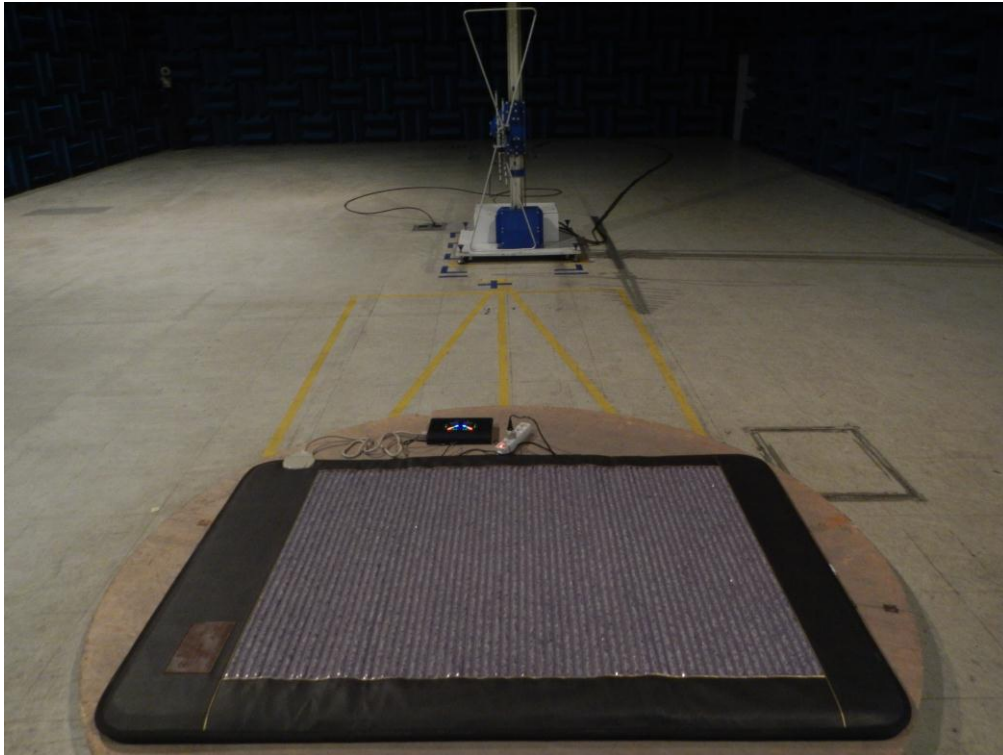
1. Conducted Disturbance
2. Radiated Disturbance

A2-1. Conducted Disturbance



A2-2. Radiated Disturbance

< 30 MHz ~ 1 GHz >



Appendix 3

Photographs of EUT

A3. EUT

1. Front View of Product

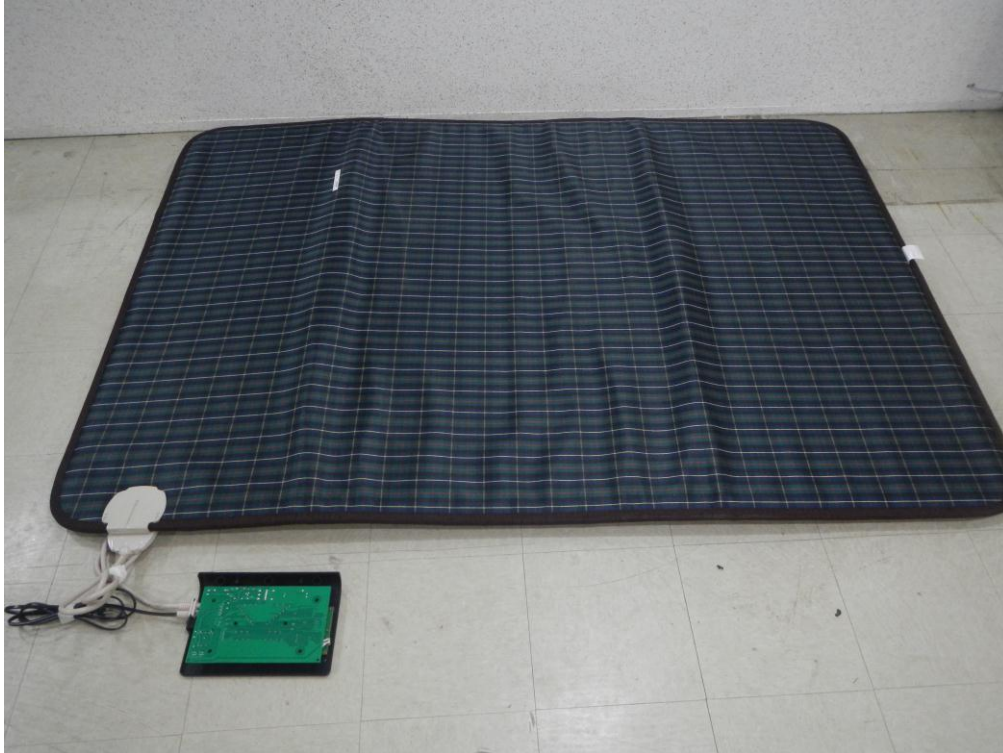


2. Rear View of Product



A3. EUT

3. Inside View of Product



Appendix 4

Report Revision History

Revision Date	Description	Revised By	Revision Reviewed By
None	Original	N/A	N/A