EMC - TEST REPORT

Test Report No.:	CPSC01150814	April 28, 2014 Date of issue

Type / Model Name	:	POKA POKA
Modified Model List	:	None
Product Description	:	HEATING PAD
Applicant	:	Richway & Fuji Bio Inc.
Address	:	1750 Kalakaua Avenue #103 - 3534 Honolulu, Hawaii 96826
Contact person	:	Mr. Calvin Kim Tel.: 808 589 2800
Manufacturer	:	RICHWAY & LIFE Co., Ltd.
Address	:	11F, ACE Gwang Myeong Tower B, 1365, Soha 1-dong, Gwangmyeong-si, Gyeonggi-do, 423-798 Republic of Korea
Test Standards	:	EN 60601-1-2:2007+AC:2010
Test Result	:	Complied

This test report consists of 37 pages. The test report only responds to the tested sample only.
It's not allowed to copy this report partly without the allowance of the test laboratory.

Contents

Test Standards

- EN 60601-1-2:2007+AC:2011
  Medical electrical equipment – Part 1-2: General requirements for basic safety and essential performance – Collateral standard: Electromagnetic compatibility – Requirements and tests

Referenced document

- EN 55014-1:2006+A1:2009+A2:2011
  Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission
- EN 61000-3-2:2006+A1:2009+A2:2009
  Electromagnetic compatibility (EMC) – Part 3-2: Limits for harmonic current emissions (equipment input current up to and including 16 A per phase).
- EN 61000-3-3:2008
  Electromagnetic compatibility (EMC) – Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current <= 16 A per phase and not subject to conditional connection.
- EN 61000-4-2:2009
  EMC – Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test.
- EN 61000-4-3:2006+A1:2008+A2:2010
  EMC – Part 4-3: Testing and measurement techniques - Radiated, radio-frequency of Electromagnetic field immunity test
- EN 61000-4-4:2004+A1:2010
  EMC – Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test.
- EN 61000-4-5:2006
  EMC – Part 4-5: Testing and measurement techniques – Surge immunity test.
- EN 61000-4-6:2009
  EMC – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields.
- EN 61000-4-8:
  EMC – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test
- EN 61000-4-11:2004
  EMC – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variation immunity tests.

Additions, deviations and exclusions from standards

No additions, deviations or exclusions have been made from standards

Test Environment

Address of the test Laboratory.

- **ESTECH Co., Ltd.**

97-1, Hoiuk-Ri, Majang-Myun,
Icheon-City, Kyungki-Do,
Korea

Environmental condition

During the measurement the environmental conditions were within the listed ranges:

Temperature:	20.8 °C – 21.8 °C
Relative Humidity:	49.2% - 51.6%

Statement of measurement uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT in the above-mentioned way.
Measurement uncertainty is calculated in accordance with ISO "Guide to the expression of uncertainty in measurement". The measurement uncertainty is given with a confidence of 95%.

Continuous disturbacne, mains terminal voltage, (k = 2, 95%)

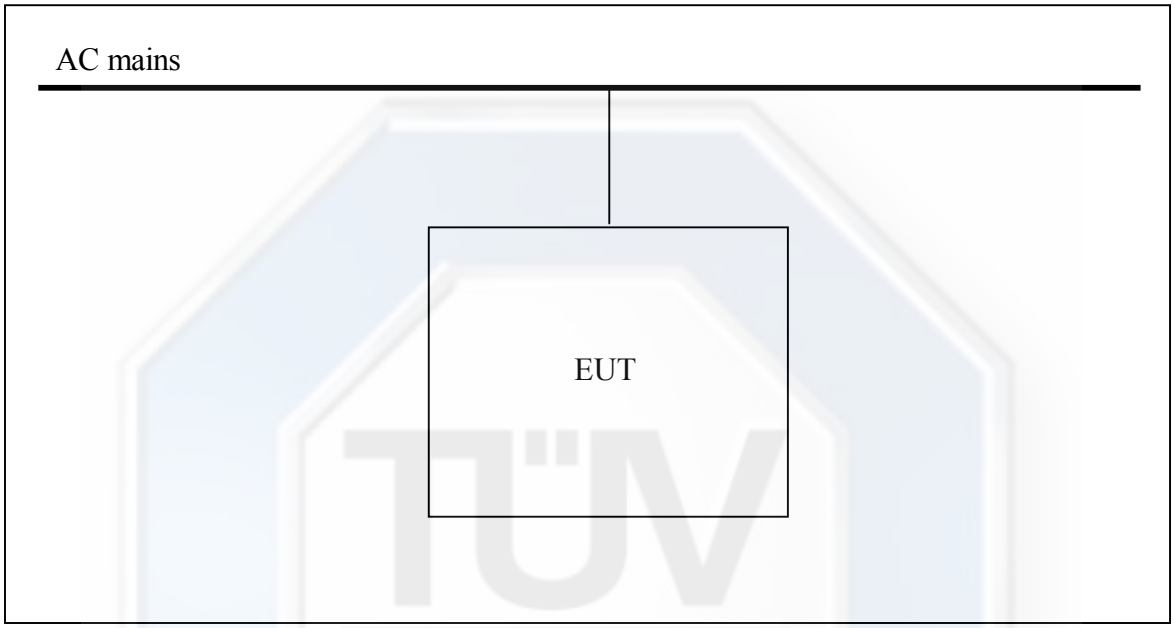
- 0.15 MHz – 30 MHz: ± *1.66dB*

Radiated Disturbances: (k = 2, 95%)

- Horizontal polarization: ± *3.20dB*
- Vertical polarization: ± *4.02 dB*

Test set-up and Condition

For the test set-up and condition, please see the below and the photographs of test set-up, Appendix A.



Test Operation Mode of the Equipment Under Test (EUT) :

During the testing, the equipment under test was operated under the following conditions:

☐ Stand-by

☐ Test Program (H-Pattern)

☐ Test Program (Customer Specified)

■ Operating Mode: Set the controller to the Max temperature mode

☐ _____

_____

_____

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

■	Power cable	Type :	Unshielded type (2.8 m)
☐		Type :	
☐		Type :	
☐		Type :	

Performance Criteria for Immunity testing

Performance criterion A: No function disturbances, such as changes in the power are allowed during the test.

Performance criterion B: The EUT shall continue to operate as intended after the test.
During the test, degradation of performance is allowed however.

Performance criterion C: Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by power on/off.

Performance verification: The EUT was observed the status of controller during immunity test.

Summary

General Remarks

The results in this report apply only to sample tested.
No additions, deviations or exclusions have been made from standard.
All tests are performed with the contents of the accreditation.

Final Assessment

We confirm that the product tested without reasonable doubt will fulfil the requirements concerning electromagnetic compatibility according to the above mentioned standard harmonised with the EMC Directive 2004/108/EC.

Date of receipt of test sample : March 24, 2014

Testing commenced on : April 04, 2014

Testing concluded on : April 28, 2014

Reviewed by:

Jin-Mo Yang / Technical Manager of ESTECH

Tested by:

Jin-Ho Kim / Test Engineer of ESTECH

Approved by:

TÜV SÜD Korea Ltd.

Test Results

Order No.:	CPSC01150814			
Manufacture	RICHWAY & LIFE Co., Ltd.	Type	HEATING PAD	■ Approval Test (EMI/EMS)
Applicant	Richway & Fuji Bio Inc.	Incoming date	Mar. 26, 2014	☐ Retest / Pre-test
Model	POKA POKA	Outgoing date	Apr. 28, 2014	☐ Mass Production test
M/L models	None			☐ Technical Documentation

Test are made according to the EN 60601-1-2

Kind of Test	Serial No.: None			
Emission	Max. Limit exceeding	O.K	Not O.K	N/A
2.1 Mains terminal voltage, (0.15 MHz – 30 MHz)				
2.1.1 Continuous disturbance		■	☐	☐
2.1.2 Discontinuous disturbance		■	☐	☐
2.2 Disturbance power, (30 MHz – 300 MHz)		■	☐	☐
2.3 Harmonic current / Voltage fluctuation & flicker		☐	☐	■
Immunity				
2.4 ESD (EN 61000-4-2)		■	☐	☐
2.5 Immunity to radiated electromagnetic fields (EN 61000-4-3)		■	☐	☐
2.6 EFT/Burst (EN 61000-4-4)		■	☐	☐
2.7 Surge (EN 61000-4-5)		■	☐	☐
2.8 Immunity to conducted disturbance (EN 61000-4-6)		■	☐	☐
2.9 Power frequency magnetic field immunity (EN 61000-4-8)		■	☐	☐
2.10 Voltage dip, interruption & variations (EN 61000-4-11)		■	☐	☐

Remarks: Rated input voltage is AC 120 V with 60 Hz.

2.1.1	Mains terminal voltages - Continuous disturbance		
Product	**HEATING PAD**		
Model / Type No.	**POKA POKA**	***Applicant***	**Richway & Fuji Bio Inc.**
Serial No.	**NONE**	***Test Engineer***	**Jin-Ho Kim**

- Test data

Frequency [MHz]	Line	Quasi-Peak			Average		
	H / N	Disturbance Level [dBµV]	Permitted Limit [dBµV]	Margin [dB]	Disturbance Level [dBµV]	Permitted Limit [dBµV]	Margin [dB]
Fundamental frequencies:							
0.16	H / N	<<	65.5	<<	<<	58.3	<<
0.24	H / N	<<	62.1	<<	<<	53.9	<<
0.55	H / N	<<	56.0	<<	<<	46.0	<<
1.00	H / N	<<	56.0	<<	<<	46.0	<<
1.40	H / N	<<	56.0	<<	<<	46.0	<<
2.00	H / N	<<	56.0	<<	<<	46.0	<<
3.50	H / N	<<	56.0	<<	<<	46.0	<<
6.00	H / N	<<	60.0	<<	<<	50.0	<<
10.00	H / N	<<	60.0	<<	<<	50.0	<<
22.00	H / N	<<	60.0	<<	<<	50.0	<<
30.00	H / N	<<	60.0	<<	<<	50.0	<<
Other frequencies:							
0.150	H	56.0	66.0	-10.1	<<	59.0	<<
0.200	H	52.9	63.7	-10.8	<<	56.0	<<
0.270	H	49.6	61.1	-11.5	<<	52.7	<<

Note) '<<' means that the disturbance voltage level is lower than 20dB below the limit.
The measured disturbance voltage level includes the factor of LISN and Pulse Limiter and Cable loss.

Remarks: ***For the detailed graph, see the Appendix B1.***

Test instrumentation

Equipment	Manufacturer	Type	Serial No.	Due calibration
Test receiver	R&S	ESPI	100005	2015. 01. 12
LISN	R&S	ESH3-Z5	838979/010	2015. 01. 12
Pulse Limiter	R&S	ESH3-Z2	-	2015. 01. 12

2.1.2	Mains terminal voltages - Discontinuous disturbance		
Product	**HEATING PAD**		
Model / Type No.	**POKA POKA**	***Applicant***	**Richway & Fuji Bio Inc.**
Serial No.	**NONE**	***Test Engineer***	**Jin-Ho Kim**

Operating mode: Normal operation mode

Observation time (min): 120 minutes

Frequency	(MHz)	0.15	0.50	1.40	30.00
Permitted limit for continuous interference	(dBμV)	66	56	56	60
Counted clicks < 10 ms	(number)	0	0	0	0
10 ms < clicks < 20 ms	(number)	0	0	0	0
Counted clicks > 20 ms	(number)	0	0	0	0
Counted clicks sum	(number)	0	0	0	0
Duration of continuous interference	(s)	0	0	0	0
Switching operations	(number)	-			
Factor	(f)	-	-	-	-
Click rate, N		-			
Value to be added	(dB)	-	-	-	-
Permitted limit for clicks	(dBμV)	-	-	-	-
Counted clicks exceeding the limit	(number)	-	-	-	-
Counted clicks allowed to exceed the permitted limit	(number)	-	-	-	-
Complies with the limit		YES	YES	YES	YES

Remarks:

Test instrumentation

Equipment	Manufacturer	Type	Serial No.	Due calibration
Discontinuous Interference analyzer	Schaffner	DIA1512D	5239	2014. 10. 21
LISN	R&S	ESH3-Z5	838979/010	2015. 01. 12

2.2	Radiated disturbances (30 MHz – 1000 MHz)		
Product	HEATING PAD		
Model / Type No.	POKA POKA	*Applicant*	Richway & Fuji Bio Inc.
Serial No.	NONE	*Test Engineer*	Jin-Ho Kim

- **Test data**

Frequency [MHz]	Reading [dBμV]	Pol. [Hor./Ver.]	Height [m]	Correction factor		Result [dBμV/m]	Limit [dBμV/m]	Margin [dB]
				Antenna [dB/m]	Cable [dB]			
45.2	3.2	V	4.0	12.8	1.2	17.20	30.0	12.8
66.2	4.8	V	1.0	11.6	1.3	17.81	30.0	12.2
102.2	5.0	V	1.0	8.5	1.7	15.20	30.0	14.8
144.0	2.5	H	4.0	12.3	2.0	16.80	30.0	13.2
206..4	8.1	H	4.0	9.8	2.3	20.10	30.0	9.9
302.8	3.5	V	1.0	13.6	2.7	19.80	37.0	17.2
325.8	4.5	H	3.2	14.1	2.8	21.50	37.0	15.5

Note) H: Horizontal polarization, V: Vertical polarization
Total Results (dBμV/m) = Level (dBμV) + Antenna Factor (dB/m) + Cable Loss (dB)

Remarks:

Test instrumentation

Equipment	Manufacturer	Type	Serial No.	Due calibration
Test Receiver	R&S	ESCI7	100916	2015. 01. 22
Logbicon Antenna	Schwarzbeck	VULB 9168	237	2015. 01. 12

2.3	Harmonic current / Voltage fluctuations & flicker		
Product	HEATING PAD		
Model / Type No.	POKA POKA	*Applicant*	Richway & Fuji Bio Inc.
Serial No.	NONE	*Test Engineer*	Jin-Ho Kim

■ - Test not applicable

Harmonic current emissions

Voltage fluctuations flicker

Note: The input voltage is 120 V / 60 Hz

Remarks:

Test instrumentation

Equipment	Manufacturer	Type	Serial No.	Due calibration

2.4	Electrostatic Discharge (ESD)		
Product	**HEATING PAD**		
Model / Type No.	**POKA POKA**	***Applicant***	**Richway & Fuji Bio Inc.**
Serial No.	**NONE**	***Test engineer***	**Jin-Ho Kim**

TEST CONDITIONS AND RESULTS

The **measurement of the immunity against electrostatic discharge** was performed in a shielded room.

☐ **- Test not applicable**

Test location:

- ■ Shielded room
- ☐ Anechoic chamber no.1
- ☐ Full compact chamber

Test specifications:

Discharge voltage Conducted:	☐ 1 kV	■ 2 kV	☐ 3 kV
	■ 4 kV	■ 6 kV	☐ __ kV
Discharge voltage Air:	■ 2 kV	■ 4 kV	☐ 6 kV
	■ 8 kV	☐ 15 kV	☐ __ kV
Discharge impedance:	■ 330 Ω / 150 pF	☐ 150 Ω / 150 pF	
Discharge factor:	■ 1 s		
Number of discharges:	■ 10 times (each point, voltage and polarity)		
Kind of discharges:	Direct discharge	■ Air discharge	
		■ Contact discharge	
	Indirect discharge	■ Contact discharge	
Polarity:	■ positive	■ negative	

Location of discharge:

■ - See drawing in Appendix C

■ - Each location on the surface touchable by hand

■ Horizontal Coupling Plane (HCP)

■ Vertical Coupling Plane (VCP)

☐ Infrared remote control

Test point #	Test level [kV]	Air/ Contact	Polarity (+/-)	Pass/ Fail	Comment
VCP	2/4/6	Contact	+/-	Pass	Criterion A fulfilled
HCP	2/4/6	Contact	+/-	Pass	Criterion A fulfilled
1. Front LED part	2/4/8	Air	+/-	Pass	Criterion A fulfilled
2. Front Button part	2/4/8	Air	+/-	Pass	Criterion A fulfilled
3. Front power cable part	2/4/8	Air	+/-	Pass	Criterion A fulfilled
4. Front connector part	2/4/8	Air	+/-	Pass	Criterion A fulfilled
5. Rear side cover part	2/4/8	Air	+/-	Pass	Criterion A fulfilled
6. Rear connector part	2/4/8	Air	+/-	Pass	Criterion A fulfilled
7. Left side cover part	2/4/8	Air	+/-	Pass	Criterion A fulfilled
8. Right side cover part	2/4/8	Air	+/-	Pass	Criterion A fulfilled

Result:

■ No degradation of function - Met Criterion A

☐ Distortion of function - Met Criterion B

☐ Error of function - Met Criterion C

☐ Loss of function - Unrecoverable Failure

☐ Safe failure

☐ Unsafe failure

Remarks:

Test instrumentation

Equipment	Manufacturer	Model	Serial No.	Due Calibration
ESD Generator	Haefely	PESD-1600	H605105	2014. 04. 26

2.5	Immunity to radiated electromagnetic fields		
Product	HEATING PAD		
Model / Type No.	POKA POKA	*Applicant*	Richway & Fuji Bio Inc.
Serial No.	NONE	*Test engineer*	Jin-Ho Kim

TEST CONDITIONS AND RESULTS

The measurement of the immunity against radiated electromagnetic fields was performed in a chamber.

☐ **- Test not applicable**

Test location:

☐ Anechoic chamber

☐ Full compact chamber

Test specifications:

Frequency - range:	☐ 27 MHz - 500 MHz	☐ 26 MHz – 1 000 MHz
	■ 80 MHz – 2 500 MHz	☐ 1 400 MHz – 2 000 MHz
	☐ 2 000 MHz – 2 700 MHz	
Field strength:	☐ 1 V/m (2 000 MHz – 2 700 MHz)	■ 3 V/m
	☐ 10 V/m	☐ 20 V/m
Distance of antenna - EUT:	☐ 1 m ■ 3 m	☐ __ m
Modulation:	■ AM 80% with 1 kHz sinewave	
	☐ FM : kHz	
	☐ PM 50% with 200 Hz	
	☐ un-modulated	
Frequency step:	☐ 0.0015 decades/s	
	■ 1% / 3 s ☐ 1% / 1 s	
Polarization of antenna:	■ Horizontal ■ Vertical	☐ circular
Position of EUT:	■ Front ■ Rear ■ Right	■ Left

Result:

■	No degradation of function	- Met Criterion A
☐	Distortion of function	- Met Criterion B
☐	Error of function	- Met Criterion C
☐	Loss of function	- Unrecoverable Failure
☐	Safe failure	
☐	Unsafe failure	

Remarks:

Test instrumentation

Equipment	Manufacturer	Model	Serial No.	Due calibration
Signal Generator	HP	8648C	3623A03549	2015.01.12
Amplifier	AR	205W1000AM1	311841	2015.01.12
Amplifier	AR	60S1G3M1	311684	2015.01.12
Power meter	R&S	NRVD	DE25524	2015.01.12
Power Sensor	R&S	URV5-Z2	100592	2015.01.13
Hybrid Log periodic Antenna	TDK	LPDA-0803	130243	-
System interface	TDK	SI-300-2	41610	-

2.6	Electrical Fast Transients (BURST)		
Product	**HEATING PAD**		
Model / Type No.	**POKA POKA**	***Applicant***	**Richway & Fuji Bio Inc.**
Serial No.	**NONE**	***Test engineer***	**Jin-Ho Kim**

TEST CONDITIONS AND RESULTS

The measurement of the immunity against electrical fast transients was performed in a shielded room.

☐ **Test not applicable**

Test location:

■ Shielded room
☐ Anechoic chamber no.1
☐ Anechoic chamber no.2
☐ Full compact chamber

Test specifications:

Pulse Amplitude-	■ 0.5 kV	■ 1.0 kV	☐ Coupling Clamp
AC Power Port	■ 2.0 kV	☐ 4.0 kV	■ C/D Network
Pulse Amplitude-	☐ 0.5 kV	☐ 1.0 kV	☐ Coupling Clamp
Signal Port	☐ 2.0 kV	☐ 4.0 kV	☐ C/D Network
Pulse Amplitude- Signal/Control	☐ 0.5 kV	☐ 1.0 kV	☐ Coupling Clamp
RS-485	☐ 2.0 kV	☐ ___ kV	
Pulse Amplitude- Process	☐ 0.5 kV	☐ 1.0 kV	☐ Coupling Clamp
Audio/Video Signal Port	☐ 2.0 kV	☐ ___ kV	
Burst frequency:	☐ 2.5 kHz	■ 5.0 kHz	☐ ___
Coupling time:	■ 120 s	☐ ___ minute	
Polarity:	■ positive	■ negative	

Test points of coupling:

Name of lines: AC Power line

type of lines:	☐ shielded	■ unshielded
status of lines:	☐ passive	■ active
kind of transmission:	■ analogue	☐ digital
length of lines:	■ 2.8 m	

Result:

- ■ No degradation of function - Met Criterion A
- ☐ Distortion of function - Met Criterion B
- ☐ Error of function - Met Criterion C
- ☐ Loss of function - Unrecoverable Failure
- ☐ Safe failure
- ☐ Unsafe failure

Remarks:

Test No. #	Level [kV]	Polarity +/-	Line for test	Pass/ Fail	Comment
1	2	+	AC-mains (L1, L2, L1-L2)	Pass	Criterion A fulfilled
2	2	-	AC-mains (L1, L2, L1-L2)	Pass	Criterion A fulfilled

Test instrumentation

Equipment	Manufacturer	Model	Serial No.	Due calibration
Compact test system	Haefely	ECOMPACT 4	153528	2015. 01. 12

2.7	Surge		
Product	HEATING PAD		
Model / Type No.	POKA POKA	*Applicant*	Richway & Fuji Bio Inc.
Serial No.	NONE	*Test engineer*	Jin-Ho Kim

TEST CONDITIONS AND RESULTS

The measurement of the immunity against surge was performed in a shielded room.

☐ **Test not applicable**

Test location:

■ Shielded room
☐ Anechoic chamber no.1
☐ Anechoic chamber no.2
☐ Full compact chamber

Test specifications:

Test Voltage - AC Power Port	■ 0.5 kV	■ 1.0 kV	☐ Coupling Clamp
(Differential mode)	☐ 2.0 kV	☐ 4.0 kV	■ C/D Network
Test Voltage - AC Power Port	☐ 0.5 kV	☐ 1.0 kV	☐ Coupling Clamp
(Common mode)	☐ 2.0 kV	☐ 4.0 kV	☐ C/D Network
Test Voltage - Signal/Data	☐ 0.5 kV	☐ 1.0 kV	☐ Coupling Clamp
Non Control Port	☐ 2.0 kV	☐ ___ kV	
Test Voltage - Process	☐ 0.5 kV	☐ 1.0 kV	☐ Coupling Clamp
Audio/Video Signal Port	☐ 2.0 kV	☐ ___ kV	
Phase	■ 0 degree	■ 90 degree	
	■ 270 degree	■ 360 degree	☐ other _____ degree
Number of surges:	■ 5 times / angle	☐ ___ times	
Polarity:	■ positive	■ negative	
Repetition Rate	■ 60 s	☐ ____ s	

Test points of coupling:

name of lines: AC Power line

type of lines:	☐ shielded	■ unshielded
status of lines:	☐ passive	■ active
kind of transmission:	■ analogue	☐ digital
length of lines:	■ 2.8 m	

Result:

- ■ No degradation of function - Met Criterion A
- ☐ Distortion of function - Met Criterion B
- ☐ Error of function - Met Criterion C
- ☐ Loss of function - Unrecoverable Failure
- ☐ Safe failure
- ☐ Unsafe failure

Remarks:

Test No. #	Level [kV]	Phase [°]	Diff. / Comm.	Line for test	Pass/ Fail	Comment
1	0.5 / 1	0/90/270/ 360	Diff.	AC mains (L1-L2)	Pass	Criterion A fulfilled

Test instrumentation

Equipment	Manufacturer	Model	Serial No.	Due calibration
Compact test system	Haefely	ECOMPACT 4	153528	2015. 01. 12

2.8	Immunity to conducted disturbance		
Product	HEATING PAD		
Model / Type No.	POKA POKA	*Applicant*	Richway & Fuji Bio Inc.
Serial No.	NONE	*Test engineer*	Jin-Ho Kim

TEST CONDITIONS AND RESULTS

The measurement of the immunity against conducted disturbance was performed in a shielded room.

☐ **Test not applicable**

Test location:

■ Shielded room
☐ Anechoic chamber no.1
☐ Anechoic chamber no.2
☐ Full compact chamber

Test specifications:

Frequency - range:
☐ 27 MHz - 80 MHz ☐ 26 MHz - 230 MHz
■ 150 kHz - 80 MHz ☐ 150 kHz - 230 MHz

Field strength:
☐ 1 V ■ - 3 V
☐ 10 V ☐ - __V

Modulation:
■ AM 80% with 1 kHz sinewave
☐ FM : kHz
☐ sine wave 1 000 Hz
☐ un-modulated
☐ PM 1 Hz (0.5 s ON: 0.5 s OFF)

Frequency step / Dwell time:
☐ 0.0015 decades/s
■ 1% / 3 s ☐ 1% / 1 s

Test points of coupling:

Name of lines: AC Power line

Type of lines:	☐ shielded	■ unshielded
Status of lines:	☐ passive	■ active
Kind of transmission:	■ analogue	☐ digital
Length of lines:	■ 2.8 m	

Result:

■ No degradation of function	- Met Criterion A
☐ Distortion of function	- Met Criterion B
☐ Error of function	- Met Criterion C
☐ Loss of function	- Unrecoverable Failure
☐ Safe failure	
☐ Unsafe failure	

Remarks:

Freq. [MHz]	Level [V]	Tested line	Pass/ Fail	Comment
0.15 - 80	3.0	Mains	Pass	Criterion A fulfilled.

Test instrumentation

Equipment	Manufacturer	Model	Serial No.	Due calibration
Continuous Wave Simulator	EM TEST	CWS 500C	1101-07	2015. 02. 13
CDN	TESEQ	CDN M016	27445	2015. 01. 12
Attenuator	EM TEST	ATT6/75	1001-43	2015. 01. 12

2.9	Power frequency magnetic field immunity		
Type	HEATING PAD		
Model / Type No.	POKA POKA	*Applicant*	Richway & Fuji Bio Inc.
Serial No.	NONE	*Test engineer*	Jin-Ho Kim

TEST CONDITIONS AND RESULTS

The measurement of the immunity against Power frequency magnetic field was performed in a shielded room.

☐ **Test not applicable**

Test location:

■ Shielded room
☐ Anechoic chamber no.1
☐ Anechoic chamber no.2
☐ Full compact chamber

Test specifications:

Test level	■ 3 A/m	☐ 10 A/m	☐ other ____ A/m
Frequency tested	☐ 50 Hz	■ 60 Hz	☐ Hz
Duration:	■ 120 s	☐ ____ s	
Axis of Orientation	■ X axis	■ Y axis	■ Z axis
EUT type:	☐ Table top	■ Floor standing	

Result:

■ No degradation of function - Met Criterion A
☐ Distortion of function - Met Criterion B
☐ Error of function (for voltage interruption) - Met Criterion C
☐ Loss of function - Unrecoverable Failure
☐ Safe failure
☐ Unsafe failure

Remarks:

Test Point	Freq. [Hz]	Axis	Test level [A/m]	Pass/ Fail	Description
Enclosure	60	X	3	Pass	There was no deviation from normal operation condition during and after test.
Enclosure	60	Y	3	Pass	
Enclosure	60	Z	3	Pass	

Test instrumentation

Equipment	Manufacturer	Model	Serial No.	Due calibration
Magnetic field test system	Haefely	MFS 100	154006	Verification
Induction coil	Schaffner	INA 702	200117-022SC	Verification
Magnetic field meter	Narda	ELT-400	L-0033	2015.01.27

2.10	Voltage dips, interruptions & variations		
Product	HEATING PAD		
Model / Type No.	POKA POKA	*Applicant*	Richway & Fuji Bio Inc.
Serial No.	NONE	*Test engineer*	Jin-Ho Kim

TEST CONDITIONS AND RESULTS

The measurement of the immunity against interruptions & variations was performed in a shielded room.

☐ **Test not applicable**

Test location:

■ Shielded room
☐ Anechoic chamber no.1
☐ Anechoic chamber no.2
☐ Full compact chamber

Test specifications:

Voltage reduction	■ 30%	■ 60%	■ 100%
Duration of reduction	■ 0.5 periods (for 100% reduction)		
(No. of periods)	■ 5 periods (for 60% reduction)		
	■ 25 periods (for 30% reduction)		
	■ 250 periods (for 100% reduction)		
Number of reduction	■ 3 times	☐ other _____ times	
Interval between reduction	■ 10 s	☐ other ____ s	
Phase	■ Zero crossing (0 °)		
Nominal Voltage(V_{nom})	☐ 100 Va.c.	■ 120 Va.c.	
Nominal Frequency (Hz)	☐ 50 Hz	■ 60 Hz	

Result:

☐	No degradation of function	- Met Criterion A
■	Distortion of function	- Met Criterion B
☐	Error of function	- Met Criterion C
☐	Loss of function	- Unrecoverable Failure
☐	Safe failure	
☐	Unsafe failure	

Remarks:

Test no.	Test level	Voltage level in % of rated U_t	Duration in periods of rated freq.	Pass/ Fail	Comment
1	30%	70	25	Pass	Criterion A fulfilled.
2	60%	40	5	Pass	Criterion A fulfilled.
3	100% positive half cycle	0	0.5	Pass	Criterion A fulfilled.
4	100 % negative half cycle	0	0.5	Pass	Criterion A fulfilled.
5	100%	0	250	Pass	Criterion C fulfilled.

* Note: For the 100 % voltage dips, we applied the positive and negative polarity dips starting degree 0 and 180, respectively.

Test instrumentation

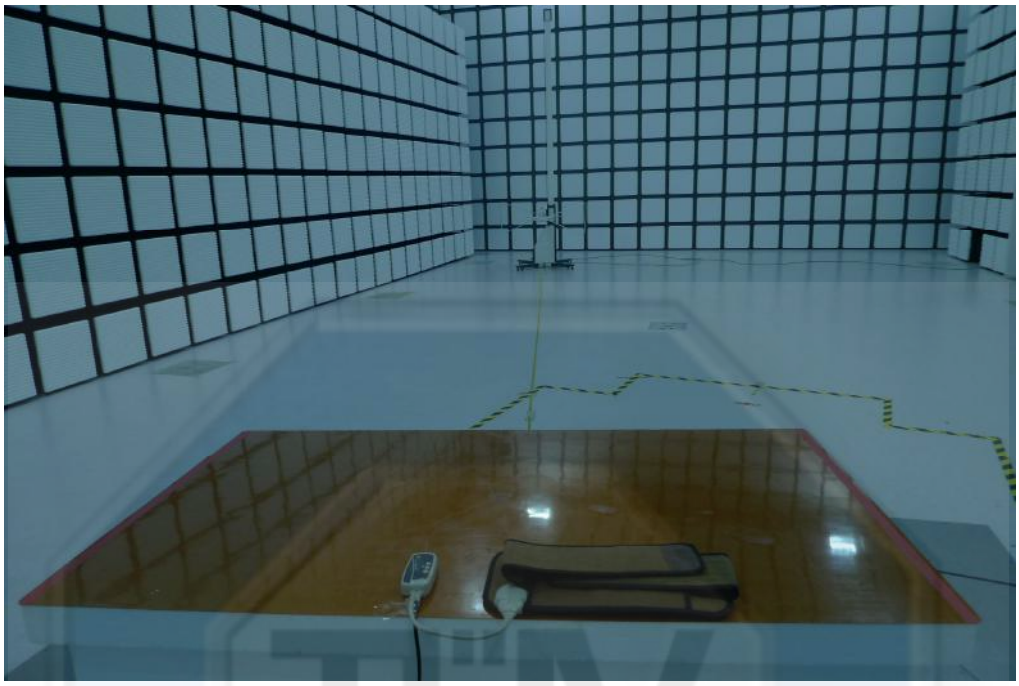
Equipment	Manufacturer	Model	Serial No.	Due calibration
Compact Test System	Haefely	ECOMPACT 4	153528	2015. 01. 12
Motorized Variac	Haefely	PEV 1610	154005	2015. 01. 12

APPENDIX A. Photographs of Test Set-up

A1. Mains terminal disturbance – Continuous disturbance (0.15 MHz ~ 30 MHz)

A2. Mains terminal disturbance – Discontinuous disturbance

A3. Radiated Disturbance



A4. Harmonic current / Voltage fluctuation & flicker

Not Applicable

A5. ESD

A6. Immunity to radiated electromagnetic fields

A7. Fast transient (Burst)

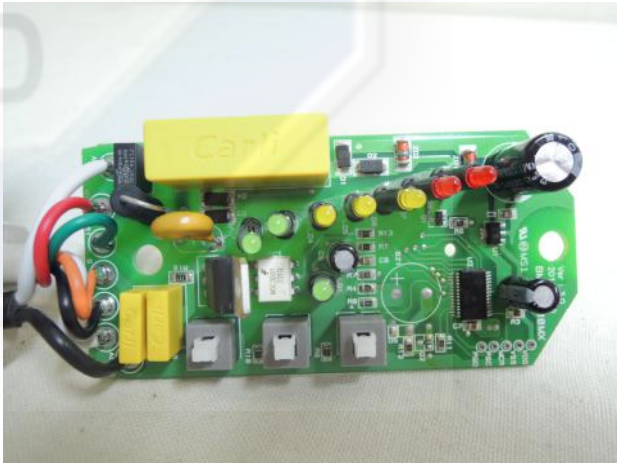
A8. Surge

A9. Conducted disturbance

A10. Power frequency magnetic field immunity

A11. Voltage dips, interruptions & variations

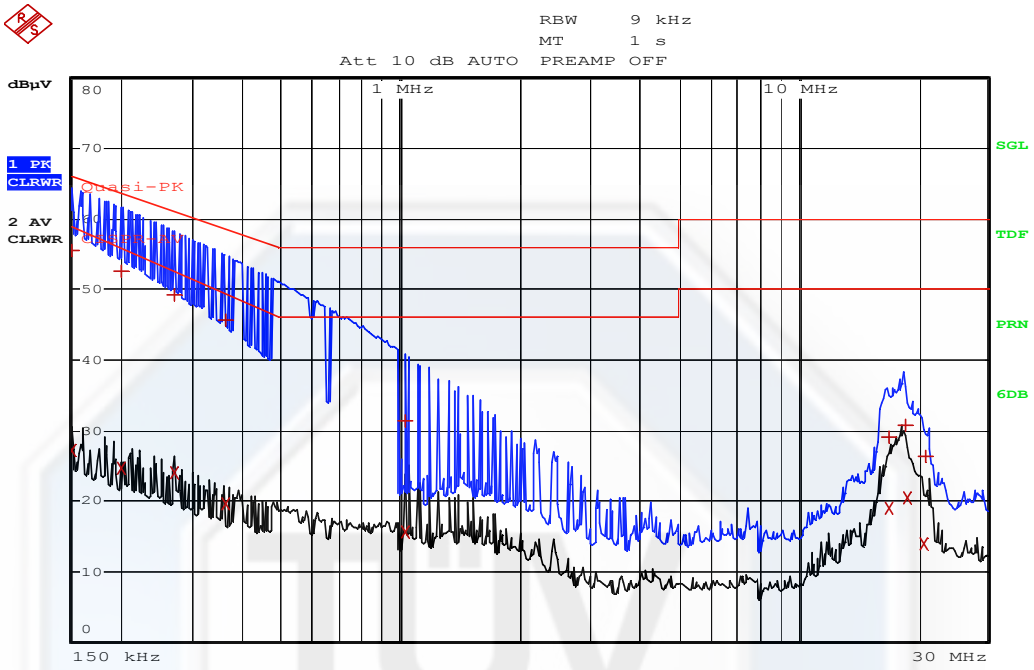
A12. Inside of EUT



APPENDIX B. Test graph / data

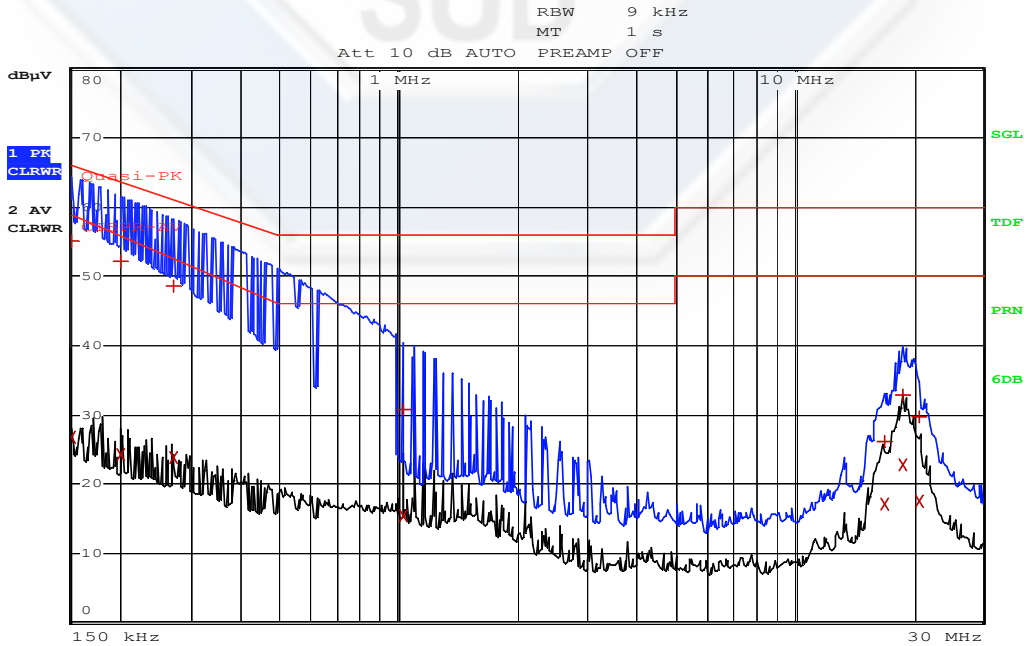
B1. Mains terminal voltage

- Phase H



Comment: ESTC-00563 HOT
Date: 4.APR.2014 18:37:43

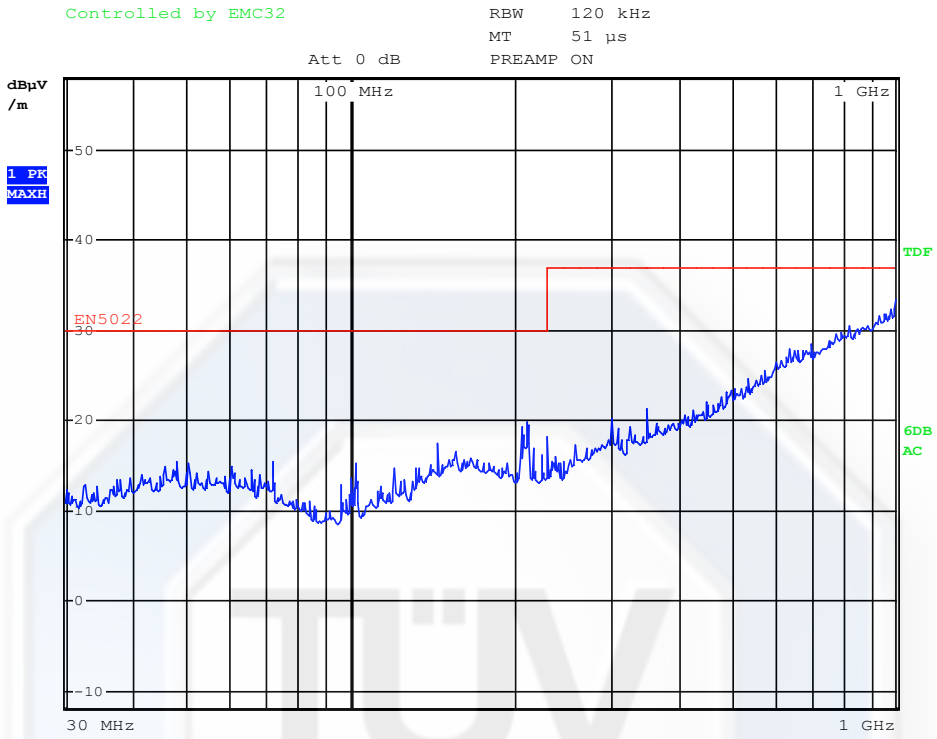
- Phase N



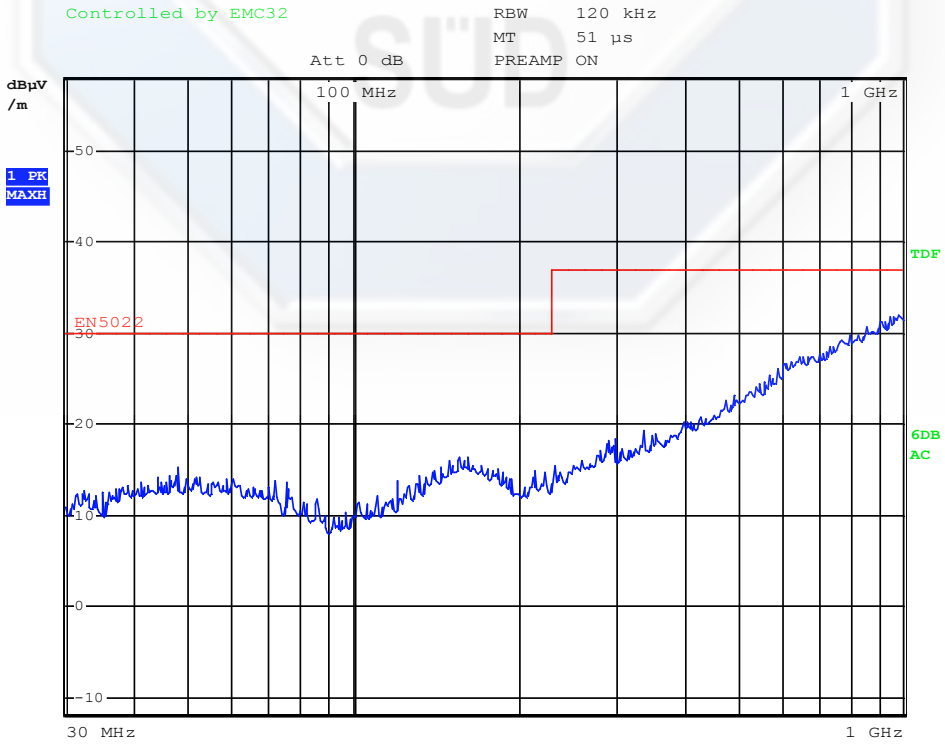
Comment: ESTC-00563 NEUTRAL
Date: 4.APR.2014 18:34:14

B2. Radiated Disturbances

- Horizontal



- Vertical



APPENDIX C. Injection point of ESD

*** The application points of *ESD* (*BLUE TAG*: Contact Discharge, *RED TAG*: Air Discharge):**

Constructional data form for EMC testing

Type	: HEATING PAD		
Model	: POKA POKA	**Rated Voltage**	: AC (120) V
Serial Number	: N/A		60 Hz
Protection class	: CLASS II	**Rated input power**	: 50 W

Configuration of equipment:

Main Board and Ass`y — **Rev.**

Rev.

Rev.

Short description of the EUT (Purpose of system, area of use, function of the system) :

Household appliances, HEATING PAD

Source of Interference :

Internal oscillator

Internal frequencies :

Main Clock: 4 MHz

Noise suppression components : Varistor : 10D471 / X2-Capacitor : 1uF 275V

Ferrite bead (TB2012-601), Capacitor (0.047 μF), and ESD adhesive tapes

Measures for electromagnetic shielding : N/A

Korea — Place of issue

Date: April 30, 2014

seal and signature of applicant