EMC TEST REPORT

Reference No. : **G-44-2016-02417**

Applicant : **HYUNDAI Wacortec.Co,Ltd.**

Equipment Under Test (EUT) :

Product Name : Wearable Air Purifier

Model Name : WAP-10

Applied Standards : **EN 55014-1:2006/A1:2009/A2:2011**

EN 55014-2:1997/A1:2001/A2:2008 (Category Ⅱ)

EN 61000-3-2:2014

EN 61000-3-3:2013

Date of Receipt : **July 14, 2016**

Date of Test : **September 19, 2016 ~ September 22, 2016**

Date of Issue : **October 11, 2016**

Test Results : **Complied**

Tested by :

Clark Lee

Reviewed by :

Paul Kang

Remarks :

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1. General Information

1.1 Client Information

Applicant : HYUNDAI Wacortec. Co,Ltd.
Address of Applicant : A-301, Hagye Techotown, 10, Nowon-ro 15 gil, Nowon-gu, Seoul, Republic of Korea

Manufacturer : HYUNDAI Wacortec. Co,Ltd.
Address of Manufacturer : A-301, Hagye Techotown, 10, Nowon-ro 15 gil, Nowon-gu, Seoul, Republic of Korea

1.2 Test Laboratory

Name and Address : SGS Korea Co., Ltd.
Giheung 1 Laboratory : 35, Giheungdanji-ro 121beon-gil, Giheung-gu, Yongin-si, Gyeonggi-do, Republic of Korea
Giheung 2 Laboratory : 23, Giheungdanji-ro 24beon-gil, Giheung-gu,Yongin-si, Gyeonggi-do, Republic of Korea
Gunpo Laboratory : 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, 435-040 Republic of Korea

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1.3 General Information of E.U.T.

Product Name	Wearable Air Purifier
Model Name	WAP-10
Internal clock Frequency	8 ㎒
Serial No.	-
Rated Voltage	100 – 240 V~, 50 / 60 ㎐
Test Voltage	230 V~, 50 ㎐
Category	Ⅱ
EUT Description	Air Purifier

1.4 Operating Modes and Conditions

Operating mode	Operating condition
1) Charging & Operating Mode	Charging and the air purifier operating mode the test at the same time.

1.4.1 Monitoring Method

- Check the LED status of the EUT by eyes
- Check the Air Purifier status by using the EUT's LED.

1.5 Auxiliary Equipments

Description	Model	Serial No.	Manufacturer
Travel Adapter	WL2015-WB1000A	-	J-PLUS

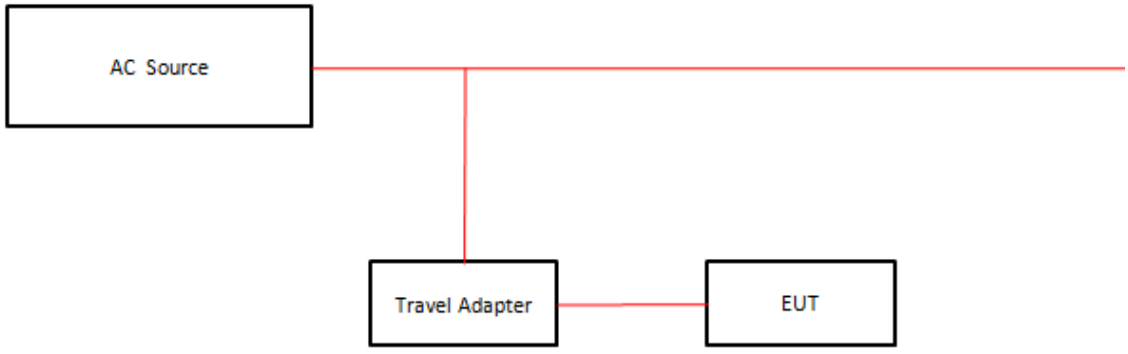
1.6 Cable List

Start		END		Cable Spec.		Used core
Name	I/O Port	Name	I/O Port	Length	Shield	
EUT	DC IN	Travel Adapter	DC OUT	0.8	Unshield	No.
Travel Adapter	AC IN	AC SOURCE	AC OUT	-	Unshield	No.

1.7 System Configurations

Description	Model	Serial No.	Manufacturer
Main Board	-	-	HYUNDAI Wacortec Co., Ltd.
Fan Board	-	-	HYUNDAI Wacortec Co., Ltd.
Battery	-	-	-
Fan	AB3505HB-GA0	-	ADDA CORP.

1.8 Test System Layout



1.9 Modifications

- There was no modified item during the test.

1.10 Applicable Standards for Testing

Standards	Status	Deviation
EN 55014-1:2006 /A1:2009/A2:2011	Applicable	No Deviation
EN 55014-2:1997/A1:2001/A2:2008	Applicable	No Deviation
EN 61000-3-2:2014	Applicable	No Deviation
EN 61000-3-3:2013	Applicable	No Deviation
EN 61000-4-2:2009	Applicable	No Deviation
EN 61000-4-4:2012	Applicable	No Deviation
EN 61000-4-5:2006	Applicable	No Deviation
EN 61000-4-6:2009	Applicable	No Deviation
EN 61000-4-11:2004	Applicable	No Deviation

1.11 Summary of Test Results

Test Item	Basic Standards	Results
Conducted Emission	EN 55014-1:2006/ A1:2009/A2:2011	Complied
Radiated Emission	EN 55014-1:2006/ A1:2009/A2:2011	Complied
Harmonics	EN 61000-3-2:2014	Complied
Flicker	EN 61000-3-3:2013	Complied
Electrostatic Discharge	EN 61000-4-2:2009	Complied
Fast Transient	EN 61000-4-4:2012	Complied
Surge	EN 61000-4-5:2006	Complied
Conducted Immunity	EN 61000-4-6:2009	Complied
Voltage dips and Interruptions	EN 61000-4-11:2004	Complied

Note : Test methods of all test items are performed according to the basic standards in this table.

EMISSION

2.1 Test Results

Test Items	Basic Standards	Test Results
Conducted Emission	EN 55014-1:2006/ A1:2009/A2:2011	**Complied**
Radiated Emission	EN 55014-1:2006/ A1:2009/A2:2011	**Complied**

2.2 Test Method and Limits

2.2.1 Test Method

Test Items	Measuring Frequency Range	RBW	Measuring Distance
Conducted Emission	0.15 ㎒ ~ 30 ㎒	9 ㎑	-
Radiated Emission	30 ㎒ ~ 1 ㎓	120 ㎑	10 ㎝
	Above 1 ㎓	1 ㎒	3 ㎝

2.2.2 Test Limits

-Conducted Emission Limits

Frequency Range	Limits(dB(㎶))	
	Quasi-peak	Average
0.15 ㎒ ~ 0.5 ㎒	66 to 56	56 to 46
0.5 ㎒ ~ 5 ㎒	56	46
5 ㎒ ~ 30 ㎒	60	50

Note : The lower limit shall apply at the transition frequencies. The limit decreases linearly with the logarithm of the frequency in the range 0.15 ㎒ to 0.5 ㎒.

Radiated Emission Limits below 1 ㎓

Frequency Range	Limits(dB(㎶/㎝))
	Quasi-peak
30 ㎒ ~ 230 ㎒	40
230 ㎒ ~ 1 ㎓	47

2.3 Conducted Emission

The initial preliminary exploratory scans were performed over the measuring frequency range(0.15 ㎒ to 30 ㎒) using a max hold mode incorporating a Peak detector and Average detector and using the software of EMC32(Version V9.12.00 from R&S). The final test data was measured using a Quasi-Peak detector and Average detector.

2.3.1 Test Equipments

Description	Model No.	Manufacturer	S/N	Cal. Due Date
Two-Line V-Network	ENV216	R & S	100190	2016.12.21
Test Receiver	ESCI 7	R & S	100911	2016.12.22
Click Meter	AFJ CL55C	AFJ INSTRUMENTS	55041008129	2016.10.08
Two-Line V-Network	ENV216	R & S	100190	2016.12.21

Note : The calibration period of every equipment is 1 year.

2.3.2 Test Site

Shield Room in Gunpo Laboratory

2.3.3 Environment Conditions and data

- Conducted Emission

Temperature : (Minimum 22.2, Maximum 22.7) ℃
Humidity : (Minimum 35.0, Maximum 36.0) % R.H.
Atmospheric Pressure : (100.4) ㎪

Test Date: September 19, 2016

-Discontinuous Conducted Emission

Temperature : (Minimum 22.2, Maximum 22.7) ℃
Humidity : (Minimum 35.0, Maximum 36.0) % R.H.
Atmospheric Pressure : (100.4) ㎪

Test Date: September 20, 2016

- Conducted Emission

Freq.	Line	Level (dBμV)		CL	LISN	Result (dBμV)		Limit (dBμV)		Margin (dB)	
(MHz)	(H/N)	Q/P	A/V	(dB)	(dB)	Q/P	A/V	Q/P	A/V	Q/P	A/V
0.21	N	32.19	20.99	0.01	9.70	41.90	30.70	63.21	53.21	21.31	22.51
0.28	N	31.89	17.79	0.01	9.70	41.60	27.50	60.82	50.82	19.22	23.32
0.49	N	23.69	10.69	0.01	9.70	33.40	20.40	56.17	46.17	22.77	25.77
0.64	N	25.69	10.99	0.01	9.70	35.40	20.70	56.00	46.00	20.60	25.30
0.92	N	27.19	11.19	0.01	9.70	36.90	20.90	56.00	46.00	19.10	25.10
1.27	N	26.58	10.28	0.02	9.70	36.30	20.00	56.00	46.00	19.70	26.00
1.69	N	33.46	15.86	0.04	9.70	43.20	25.60	56.00	46.00	12.80	20.40
2.97	N	30.71	13.91	0.09	9.70	40.50	23.70	56.00	46.00	15.50	22.30
3.82	N	30.69	13.19	0.11	9.70	40.50	23.00	56.00	46.00	15.50	23.00
6.00	N	21.66	7.56	0.14	9.70	31.50	17.40	60.00	50.00	28.50	32.60
0.23	H	30.09	12.89	0.01	9.60	39.70	22.50	62.63	52.63	22.93	30.13
0.38	H	25.67	9.97	0.03	9.60	35.30	19.60	58.39	48.39	23.09	28.79
0.53	H	25.49	9.29	0.01	9.60	35.10	18.90	56.00	46.00	20.90	27.10
0.60	H	27.69	9.99	0.01	9.60	37.30	19.60	56.00	46.00	18.70	26.40
0.98	H	31.59	13.69	0.01	9.60	41.20	23.30	56.00	46.00	14.80	22.70
1.58	H	33.96	16.06	0.04	9.60	43.60	25.70	56.00	46.00	12.40	20.30
2.97	H	27.61	10.01	0.09	9.60	37.30	19.70	56.00	46.00	18.70	26.30
5.74	H	17.66	5.36	0.14	9.60	27.40	15.10	60.00	50.00	32.60	34.90

Measurement Uncertainty : 2.98 dB (The confidential level is about 95%, k=2)

Note : • Line (H) : Hot • Line (N) : Neutral
• CL: Cable Loss • LISN : LISN Factor
• Result = Level + CL + LISN • Margin = Limit – Result

See Appendix A (Conducted Emission)

-Discontinuous Conducted Emission

Frequency (㎒)	Count (1) Click*(f)/Min	N (2)	Click Limit Lq=L+i	Clicks (3)	Limit of (4) Count Click	Result
0.15	0 * / 120	0.00	66 + 44 = 110	0	0	**Complied**
0.5	0 * / 120	0.00	56 + 44 = 100	0	0	**Complied**
1.4	0 * / 120	0.00	56 + 44 = 100	0	0	**Complied**
30	0 * / 120	0.00	60 + 44 = 104	0	0	**Complied**

Measurement Uncertainty : 5.26 ㏈(The confidential level is about 95%, *k*=2)

Note : i = 44 ㏈ (N<0.2), 20log(30/N) ㏈ (0.2<N<30), 0 ㏈ (N>30)

(1) First Time Test,(f)Factor (2) N = Click Rate (3) Allowed number of clicks(1/4)

(4) Are the clicks above click limit (Second Test)

See Appendix B (Discontinuous Conducted Emission)

2.4 Radiated Emission

The initial preliminary exploratory scans were performed at 3 ㎙ distance over the measuring frequency range(30 ㎒ to 1 ㎓) using a max hold mode incorporating a Peak detector and using the software of EP5RE(Version Ver3.10.20 from TOYO). The final test data was measured using a Quasi-Peak detector below 1 ㎓ at 10 ㎙ distance. Measurements were made with the antenna positioned in both the horizontal and vertical planes of polarization. The antenna height was varied from 1 m to 4 m and the EUT was rotated 360° to find the maximum emitting point for each frequency.

2.4.1 Test Equipments

Description	Model No.	Manufacturer	S/N	Cal. Due Date
EMI TEST RECEIVER	ESR7	R & S	101179	2016.11.03
BILOG ANTENNA	VULB9163	SCHWARZBECK MESS-ELEKTRONIK	9163-437	2016.10.24
AMPLIFIER	8447D	HP	1726A01265	2017.09.07
10m SEMI-ANECHOIC CHAMBER	-	SY CORPORATION	-	-

Note : Only the calibration period of Antennas is 2 years but the period of every equipment is 1 year.

2.4.2 Test Site

10m SEMI-ANECHOIC CHAMBER in Giheung 1 Laboratory (Below 1 ㎓)

2.4.3 Environment Conditions and data

Below 1 ㎓ (10 m method)

Temperature (Minimum 21.7 ℃, Maximum 22.1 ℃) ,
Humidity (Minimum 35.0 % R.H., Maximum 36.0 % R.H.)
Atmospheric Pressure : (100.6 ㎪)

Test Date : September 19, 2016

2.4.4 Test Results

Below 1 ㎓ (10 m method)

Freq. (㎒)	Level (㏈㎶)	Pol. (H/V)	A (°)	H (cm)	AF (㏈)	CL (㏈)	Amp. (㏈)	F/S (㏈㎶/m)	Limit (㏈㎶/m)	Margin (㏈)
96.39	22.65	V	321	400	11.29	1.37	27.10	8.21	30.00	21.79
107.59	26.23	V	93	100	11.21	1.38	27.07	11.75	30.00	18.25
136.85	24.25	V	66	400	8.34	1.84	26.95	7.48	30.00	22.52
142.51	22.63	V	66	400	8.08	1.90	26.93	5.68	30.00	24.32
175.45	18.10	V	79	100	9.26	1.98	26.80	2.54	30.00	27.46
997.54	21.55	H	268	400	22.54	4.50	26.71	21.88	37.00	15.12

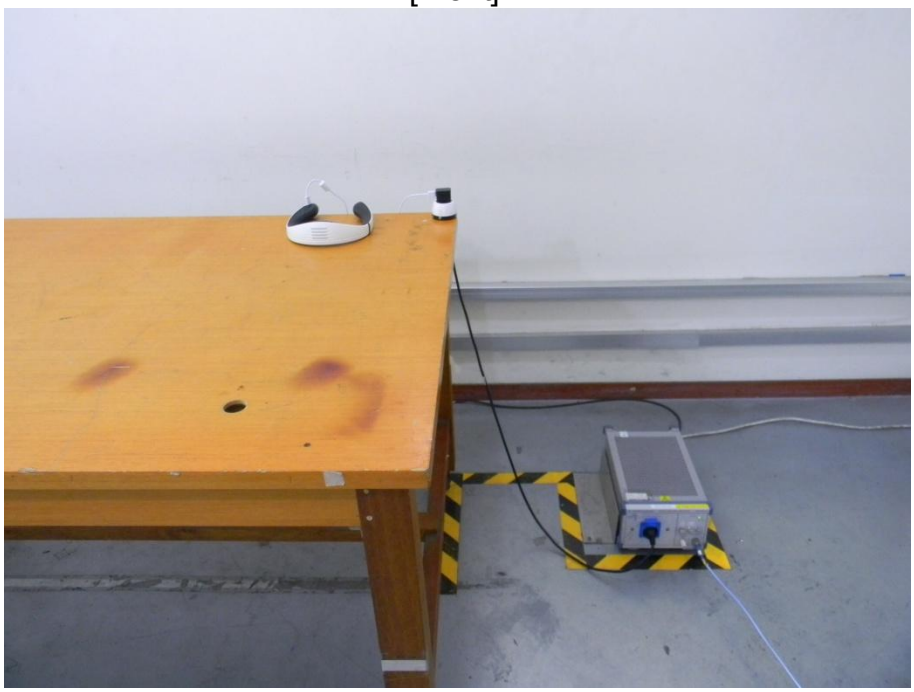
Measurement Uncertainty (Horizontal) : 5.04 ㏈ (The confidential level is about 95%, *k*=2)
Measurement Uncertainty (Vertical) : 5.36 ㏈ (The confidential level is about 95%, *k*=2)

Note: • AF = Antenna Factor • CL = Cable Loss • F/S = Field Strength
• Pol.(H) = Horizontal • Pol.(V) = Vertical • Amp. = Amplifier Gain
• Margin = Limit – F/S • F/S = Level + AF + CL – Amp.
• A : Angle • H : Height

See Appendix C (Radiated Emission)

2.5 Photographs of Continuous Conducted Emission

[Front]

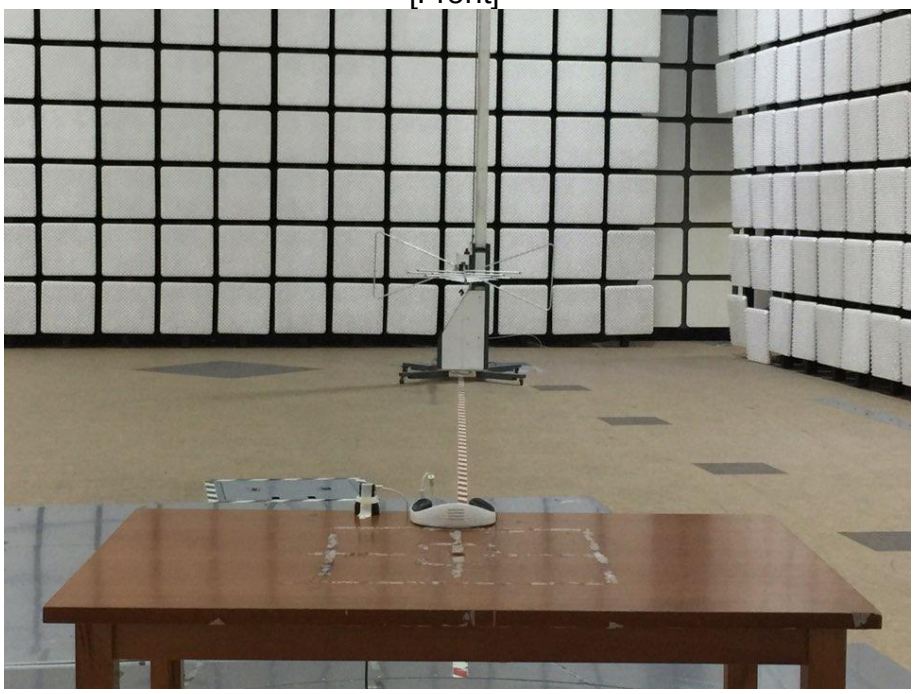


[Rear]

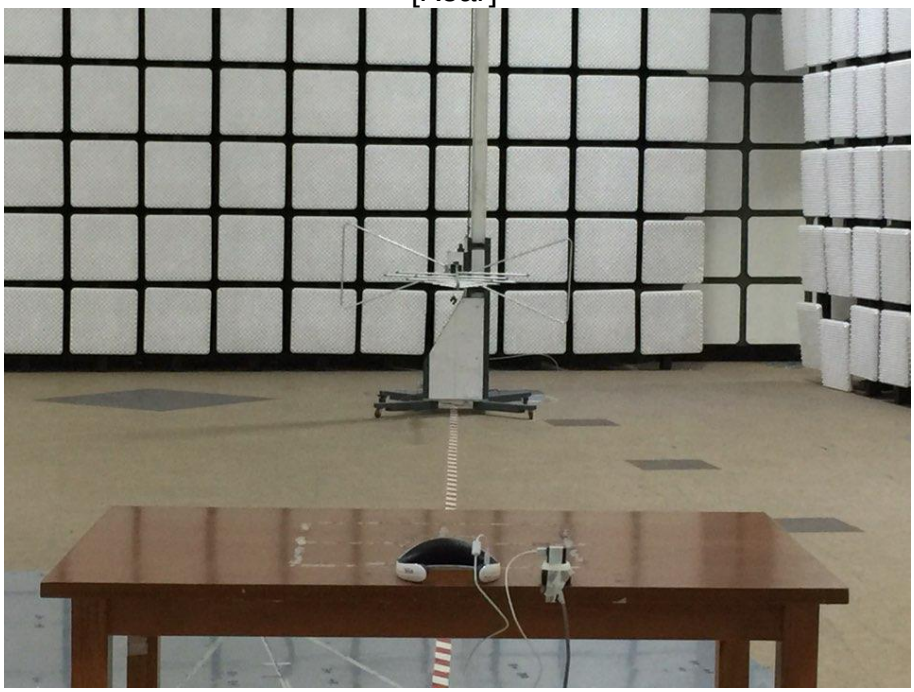
2.6 Photographs of Discontinuous Conducted Emission

2.7 Photographs of Radiated Emission (10m method below 1 ㎓)

[Front]



[Rear]



Harmonics & Flicker

3.1 Test Results

Test Items	Basic Standards	Test Results
Harmonics	EN61000-3-2:2014	**Complied**
Flicker	EN61000-3-3:2013	**Complied**

3.2 Test Equipments

Equipment	Model	Manufacturer	S/N	Cal. Due Date
H/F Analyzer	DPA 500	EM TEST	V0508100155	2017.05.16
AC Source	ACS 500	EM TEST	V0508100156	2017.05.18

Note : The calibration period of every equipment is 1 year.

3.3 Test Site

Harmonics & Flicker Site in Gunpo Laboratory

3.4 Harmonics Test Data

The measurement was conducted with an automatic harmonics analyzing system, Measured were all harmonics up to order 40.

Temperature : (Minimum 23.5, Maximum 23.5) ℃
Humidity : (Minimum 38.0, Maximum 38.0) % R.H.
Atmospheric Pressure : (101.5) ㎪

Test Date : September 22, 2016

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See Appendix D (Harmonics on AC Mains)

3.5 Flicker Test Data

The measurement was conducted with an automatic flicker system, Measured were all Flicker up to order 12.

Temperature : (Minimum 23.5, Maximum 23.5) ℃
Humidity : (Minimum 38.0, Maximum 38.0) % R.H.
Atmospheric Pressure : (101.5) ㎪

Test Date : September 22, 2016

See Appendix E (Flicker on AC Mains)

3.6 Photograph of Harmonics & Flicker

IMMUNITY

4.1 Test Results

Test Items	Basic Standards	Test Results
Electrostatic Discharge	EN 61000-4-2:2009	**Complied**
Fast Transients/Burst	EN 61000-4-4:2012	**Complied**
Surges	EN 61000-4-5:2006	**Complied**
Conducted Immunity	EN 61000-4-6:2009	**Complied**
Voltage dips and Interruptions	EN 61000-4-11:2004	**Complied**

4.2 Performance Criteria

Performance criterion A - The apparatus shall continue to operate as intended during the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

Performance criterion B - The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance)specified by the manufacturer, when the apparatus is used as intended. During the test, degradation of performance is allowed, however, no change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

Performance criterion C - Temporary loss of function is allowed, provided the function is self- recoverable or can be restored by the operation of the controls, or by any operation specified in the instructions for use.

4.3 Electrostatic Discharge

4.3.1 Test Equipments

Description	Model	Manufacturer	S/N	Cal. Due Date
ESD Simulator	ESS-2000	NoiseKen	ESS0746780	2017.05.26
HCP/VCP	-	-	-	-

Note : The calibration period of every equipment is 1 year.

4.3.2 Test Site

Shield Room in Gunpo Laboratory

4.3.3 Environment Conditions

Temperature : (Minimum 22.2, Maximum 22.7) ℃
Humidity : (Minimum 37.0, Maximum 37.0) % R.H.
Atmospheric Pressure : (100.8) ㎪

Test Date: September 20, 2016

4.3.4 Performance Criterion : B

4.3.5 Test Points

No.	Test Points	No.	Test Points
1	HCP/VCP	3	LED
2	ON/OFF Switch	4	Body

4.3.6 Test Results

Direct Application											
No.	Discharge Method	Number of Discharge	Level(㎸)								Results
			+2	-2	+4	-4	+6	-6	+8	-8	
1	Air	≥10 times	-	-	-	-	-	-	A	A	**Complied**
2	Air	≥10 times	-	-	-	-	-	-	A	A	**Complied**
3	Air	≥10 times	-	-	-	-	-	-	A	A	**Complied**
4	Air	≥10 times	-	-	-	-	-	-	A	A	**Complied**
Indirect Application											
No.	Discharge Method	Number of Discharge	Level(㎸)								Results
			+2	-2	+4	-4	+6	-6	+8	-8	
1	Contact	≥10 times	-	-	A	A	-	-	-	-	**Complied**

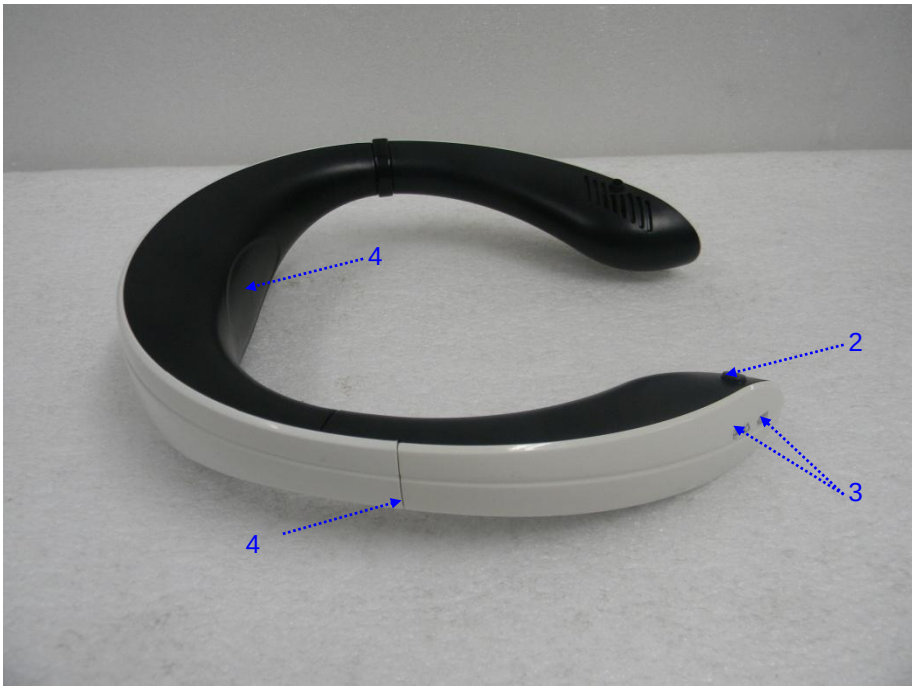
Performance Criteria A, the EUT normally operates during and after the test.

4.3.7 Test Points

Contact

Air

- Front View



- Rear View

4.3.8 Photograph of Electrostatic Discharge

4.4 Fast Transients/Burst

4.4.1 Test Equipments

Description	Model No.	Manufacturer	S/N	Cal. Due Date
Motion Driven AC Source	MV2616	EM TEST	V0508100161	2016.12.06
Ultra-Compact Simulator	UCS 500-M	EM TEST	V0508100159	2016.12.06

Note : The calibration period of every equipment is 1 year.

4.4.2 Test Site

Immunity Test Site in Gunpo Laboratory

4.4.3 Environment Conditions

Temperature : (Minimum 23.1, Maximum 23.6) ℃
Humidity : (Minimum 37.0, Maximum 37.0) % R.H.
Atmospheric Pressure : (100.7) ㎪

Test Date : September 20, 2016

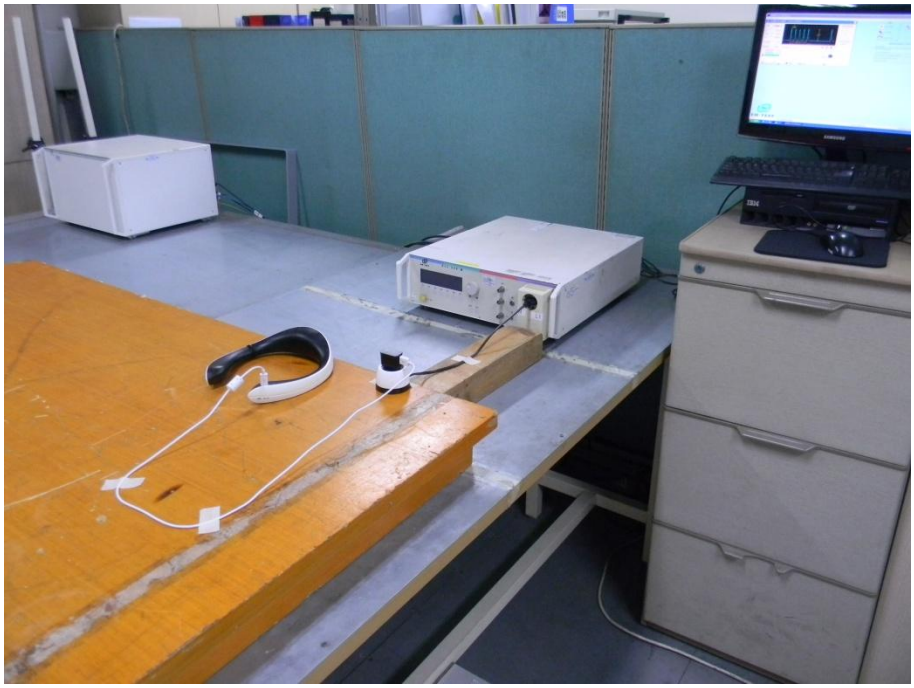
4.4.4 Performance Criterion : B

4.4.5 Test Results

Test Point	Polarity	Coupling	Repetition	Pulse (㎱)	Duration	Test Level (㎸)	Results
L1-N	+/-	Direct	5 ㎑	5/50	≥ 2 min	1.0	**Complied**

Performance Criteria A, the EUT normally operates during and after the test.

4.4.6 Photograph of Fast Transients/Burst



4.5 Surges

4.5.1 Test Equipments

Description	Model No.	Manufacturer	S/N	Cal. Due Date
Motion Driven AC Source	MV2616	EM TEST	V0508100161	2016.12.06
Ultra-Compact Simulator	UCS 500-M	EM TEST	V0508100159	2016.12.06

Note : The calibration period of every equipment is 1 year.

4.5.2 Test Site

Immunity Test Site in Gunpo Laboratory

4.5.3 Environment Conditions

Temperature : (Minimum 23.1, Maximum 23.6) ℃
Humidity : (Minimum 37.0, Maximum 37.0) % R.H.
Atmospheric Pressure : (100.7) ㎪

Test Date: September 20, 2016

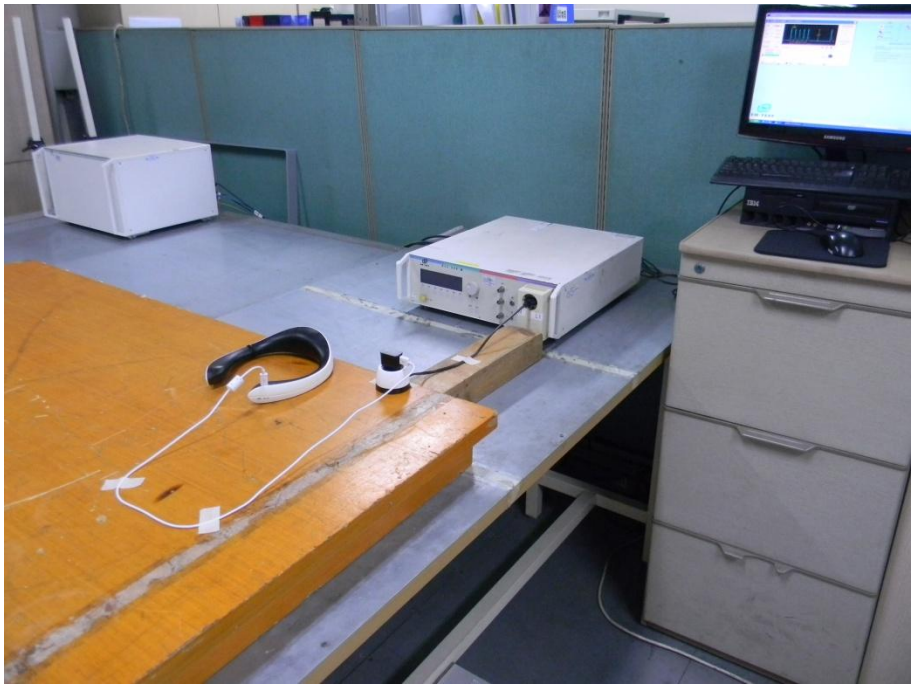
4.5.4 Performance Criterion : B

4.5.5 Test Results

Test Point	Polarity	Coupling	Pulse (㎲)	Number of Surges	Repetition	Phase Angle(°)	Test Level (㎸)	Results
L1-N	+/-	Direct	1.2/50	5	≤ 60 s	90, 270	1.0	**Complied**

Performance Criteria A, the EUT normally operates during and after the test.

4.5.6 Photograph of Surges



4.6 Conducted Immunity Test

4.6.1 Test Equipments

Description	Model No.	Manufacturer	S/N	Cal. Due Date
Power Line Coupling Decoupling Network	FCC-801-M2-16A	Fisher Custom Communication Inc.	04001	2016.09.24
Amplifier	150A250	AR	312201	2017.01.06
Dual Directional Coupler	DC2600M2	AR	311978	2016.11.26
Signal Generator	SMB100A	R & S	106781	2016.12.04
Voltage Sensor	NRP-Z91	R & S	103092-Jc, 103093-ZH	2017.08.16
Attenuator	300-A-FFN-06	BIRD Electronics Corporation	0433	2016.12.24

Note : The calibration period of every equipment is 1 year.

4.6.2 Test Site

Immunity Test Site in Gunpo Laboratory

4.6.3 Environment Conditions

Temperature : (Minimum 23.2, Maximum 23.2) ℃
Humidity : (Minimum 38.0, Maximum 38.0) % R.H.
Atmospheric Pressure : (101.1) ㎪

Test Date: September 22, 2016

4.6.4 Performance Criterion : A

4.6.5 Test Results

Frequency (㎒)	Test Point	Coupling	Voltage Level	Modulation	Frequency Step	Dwell Time	Results
0.15 ~ 80	AC IN	CDN (M2)	3 V	80% AM(1 ㎑)	1 %	3 s	**Complied**

Measurement Uncertainty : 2.23 ㏈(The confidential level is about 95%, *k*=2)
Performance Criteria A, the EUT normally operates during and after the test.

4.6.6 Photograph of Conducted Immunity

4.7 Voltage Dips and Interruptions

4.7.1 Test Equipments

Description	Model No.	Manufacturer	S/N	Cal. Due Date
Motion Driven AC Source	MV2616	EM TEST	V0508100161	2016.12.06
Ultra-Compact Simulator	UCS 500-M	EM TEST	V0508100159	2016.12.06

Note : The calibration period of every equipment is 1 year.

4.7.2 Test Site

Immunity Test Site in Gunpo Laboratory

4.7.3 Environment Conditions

Temperature : (Minimum 23.1, Maximum 23.6) ℃
Humidity : (Minimum 37.0, Maximum 37.0) % R.H.
Atmospheric Pressure : (100.7) ㎪

Test Date: September 20, 2016

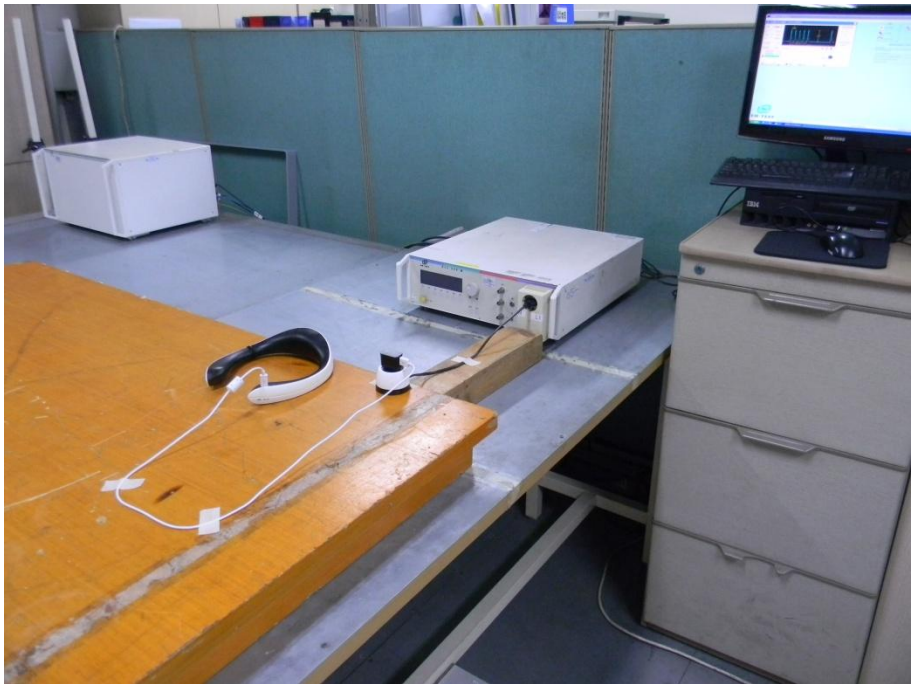
4.7.4 Performance Criterion : C

4.7.5 Test Results

Test Level % U_T	Voltage Dip/Int. % U_T	Duration ㎳/Cycle	Results
0 %	100 %	0.5 Cycle	**Complied**
40 %	60 %	10 Cycle	**Complied**
70 %	30 %	25 Cycle	**Complied**

Performance Criteria A, the EUT normally operates during and after the test.

4.7.6 Photograph of Voltage Dips and Interruptions



5. Photographs of EUT

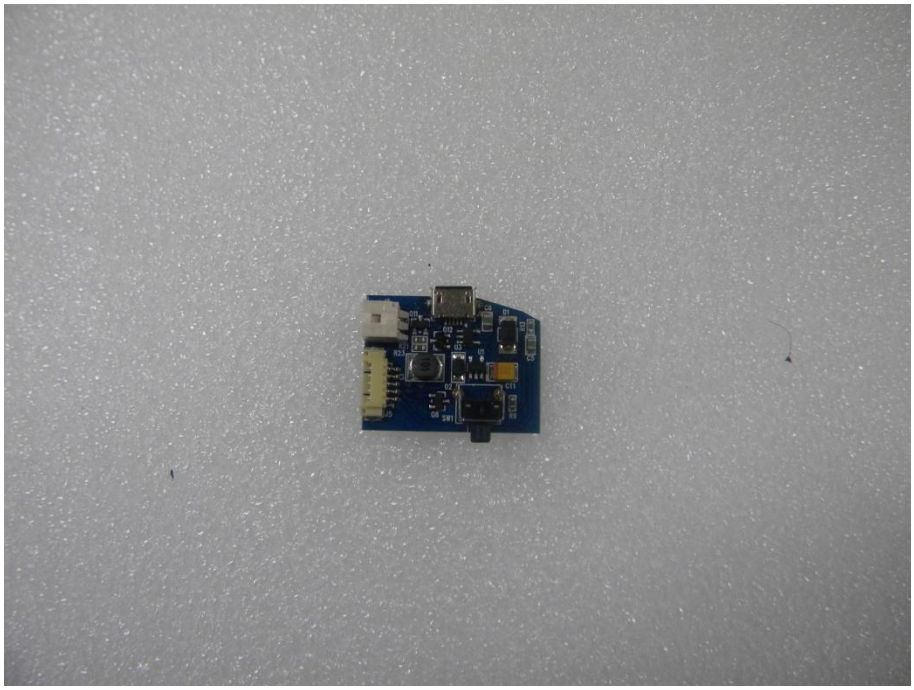
- **Front View of EUT**

- **Rear View of EUT**

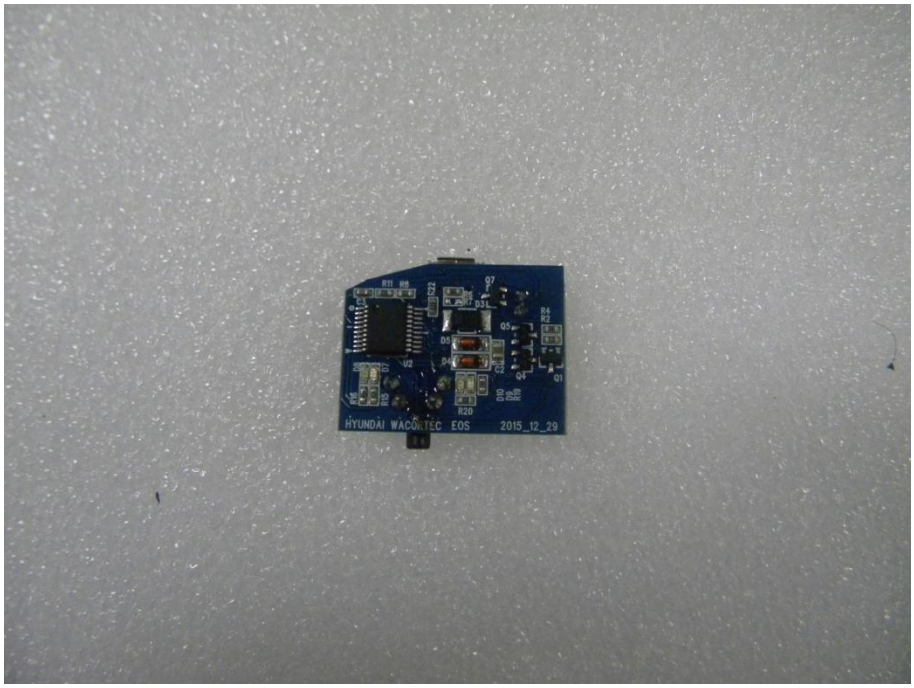
- **Left View of EUT**

- **Right View of EUT**

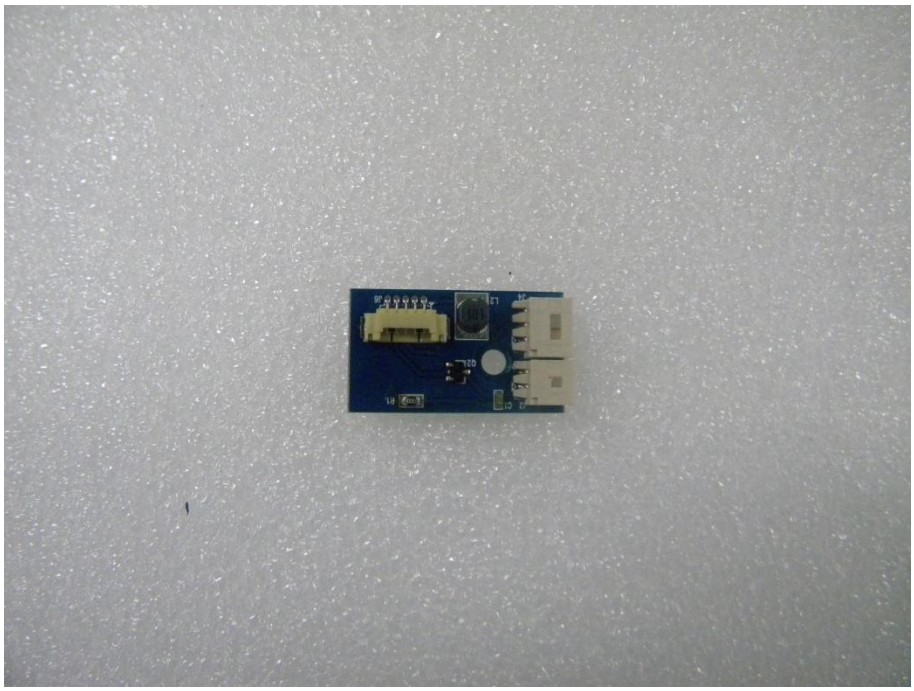
- **Front View of Main Board**



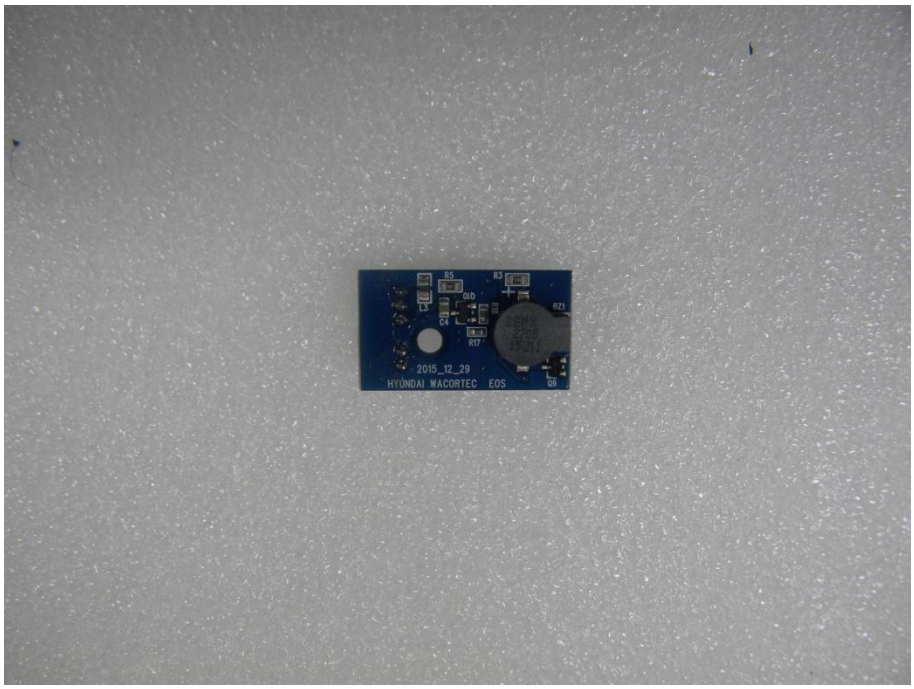
- **Rear View of Main Board**



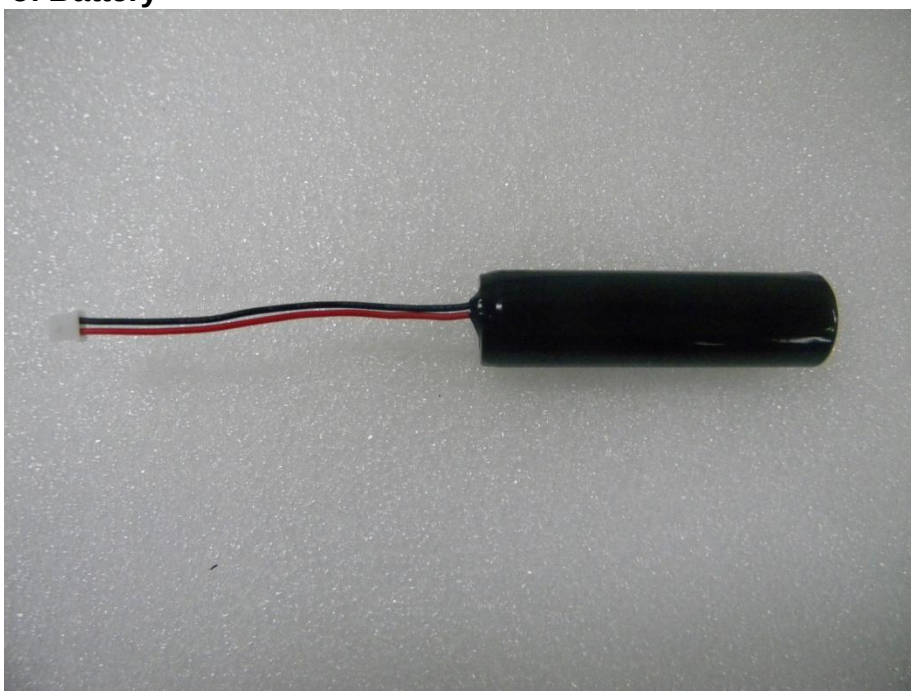
- **Front View of Fan Board**



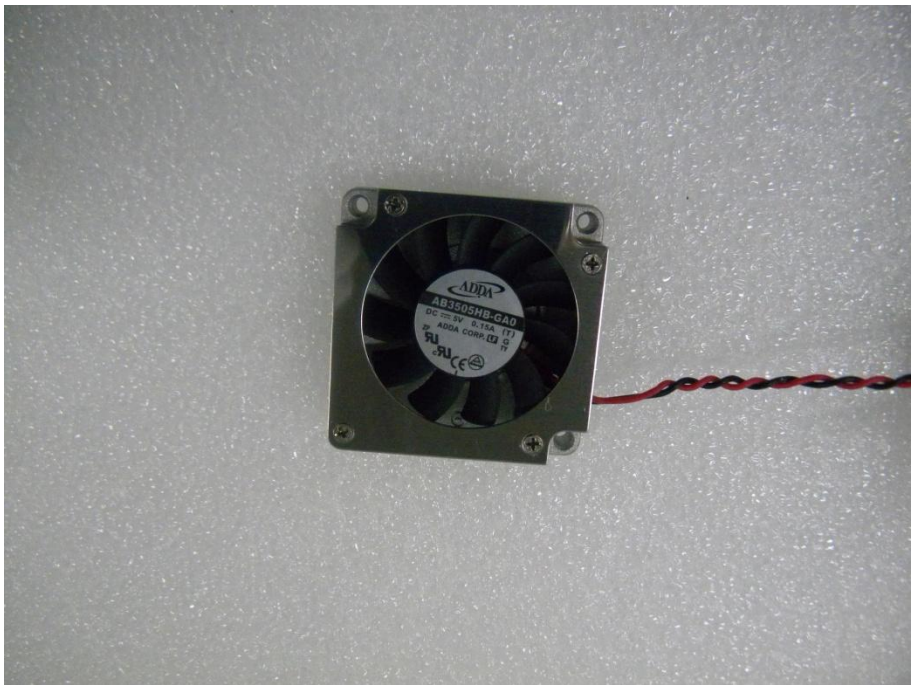
- **Rear View of Fan Board**



- **View of Battery**



- **View of Fan**

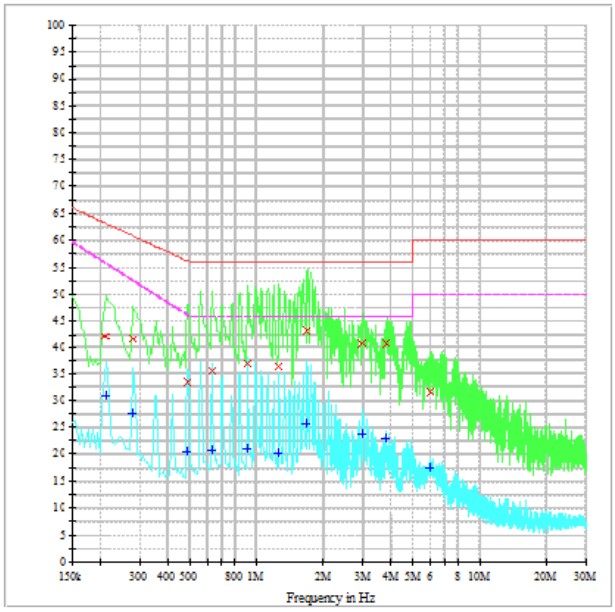


- **View of Inside 1**

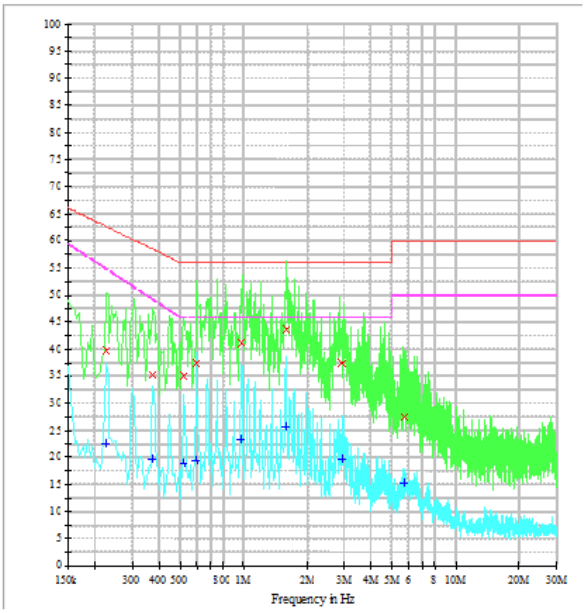
- **View of Inside 2**

- **View of Inside 3**

Appendix A : Conducted Emission

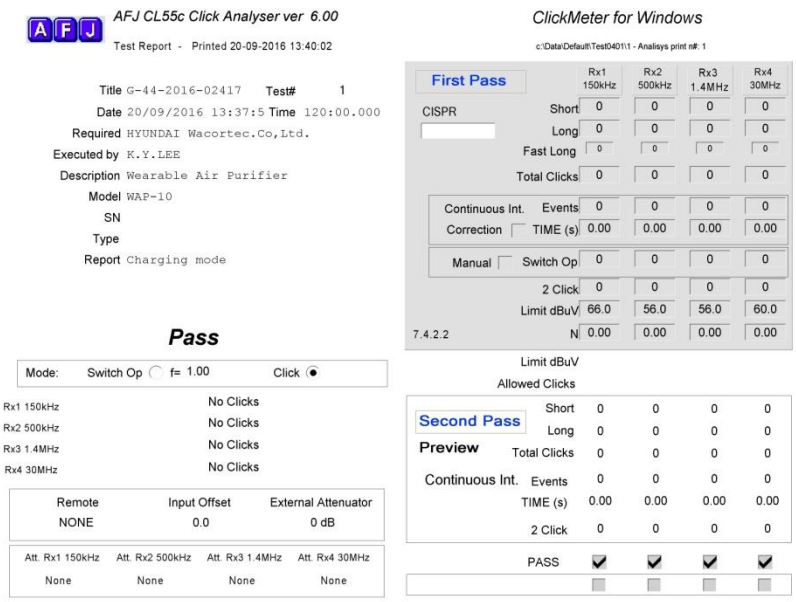


<Hot>



<Netural>

Appendix B : Discontinuous Conducted Emission



AFJ CL55c Click Analyser ver 6.00

Test Report - Printed 20-09-2016 13:40:02

Title G-44-2016-02417 Test# 1
Date 20/09/2016 13:37:5 Time 120:00.000
Required HYUNDAI Wacortec.Co,Ltd.
Executed by K.Y.LEE
Description Wearable Air Purifier
Model WAP-10
SN
Type
Report Charging mode

Pass

Mode: Switch Op f= 1.00 Click

Rx1 150kHz	No Clicks
Rx2 500kHz	No Clicks
Rx3 1.4MHz	No Clicks
Rx4 30MHz	No Clicks

Remote	Input Offset	External Attenuator
NONE	0.0	0 dB

Att. Rx1 150kHz	Att. Rx2 500kHz	Att. Rx3 1.4MHz	Att. Rx4 30MHz
None	None	None	None

ClickMeter for Windows

c:\Data\Default\Test0401\1 - Analisys print n#: 1

First Pass

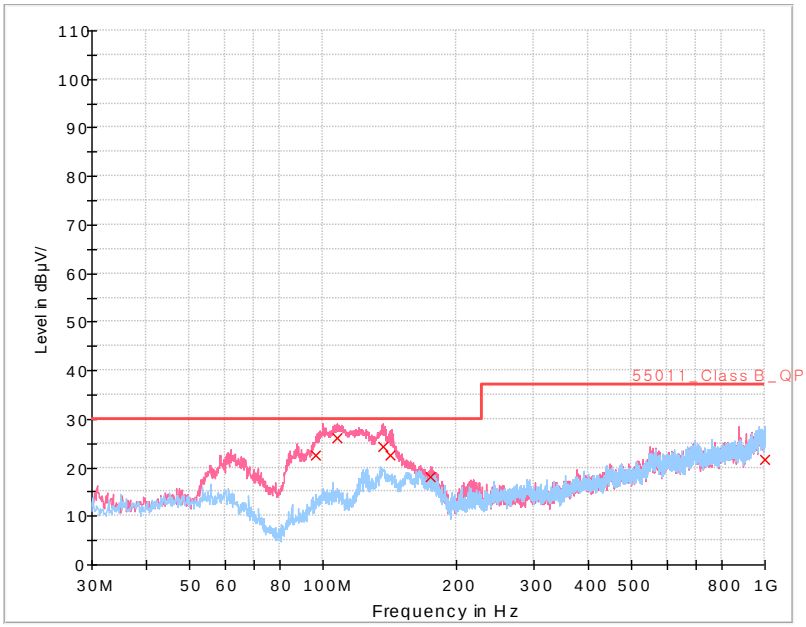
		Rx1 150kHz	Rx2 500kHz	Rx3 1.4MHz	Rx4 30MHz
CISPR	Short	0	0	0	0
	Long	0	0	0	0
	Fast Long	0	0	0	0
	Total Clicks	0	0	0	0
Continuous Int.	Events	0	0	0	0
Correction	TIME (s)	0.00	0.00	0.00	0.00
Manual	Switch Op	0	0	0	0
	2 Click	0	0	0	0
	Limit dBuV	66.0	56.0	56.0	60.0
7.4.2.2	N	0.00	0.00	0.00	0.00

Limit dBuV
Allowed Clicks

Second Pass

	Short	0	0	0	0
	Long	0	0	0	0
Preview	Total Clicks	0	0	0	0
Continuous Int.	Events	0	0	0	0
	TIME (s)	0.00	0.00	0.00	0.00
	2 Click	0	0	0	0
	PASS	✓	✓	✓	✓

Appendix C : Radiated Emission



Appendix D : Harmonics on AC Mains

Report title:	G-44-2016-02417
Company Name:	SGS Korea Co., Ltd.
Date of test:	17:01 22.Sep 2016
Measurement file name:	Harmonics_3_2_Ed4.rsd
Tester:	K.Y.LEE
Standard used:	EN/IEC 61000-3-2 Ed.4 Quasi-stationary Equipment class A <= 150% of the limit
Observation time:	150s
Windows width:	10 periods - (EN/IEC 61000-4-7 Edition 2002 + A1:2008)
Customer:	HYUNDAI Wacortec.Co,Ltd.
E. U. T.:	Wearable Air Purifier (WAP-10)
Temperature :	(23.5~23.5) ℃
Humidity :	(38.0~38.0) %R.H.,
Atmosphere :	(101.5~101.5)kpa

Test Result	
E. U. T.:	PASS
Power Source:	PASS

E. U. T. Result

Check harmonics 2..40 [exception odd 21..39]:

Harmonic(s) > 150%:	
Order (n):	None
Harmonic(s) with average > 100%:	
Order (n):	None

Check odd harmonics 21..39:

All Partial Odd Harmonics below partial limits.	
Harmonic(s) > 150%:	
Order (n):	None
Harmonic(s) with average > 150%:	
Order (n):	None

Power Source Result

First dataset out of limit:	
DS (time):	None
Harmonic(s) out of limit:	
Order (n):	None

Average harmonic current results

Hn	Ieff [A]	% of Limit	Limit [A]	Result
1	5.247E-3			
2	564.443E-6			PASS
3	4.768E-3			PASS
4	1.695E-3			PASS
5	7.755E-3	0.680	1.14	PASS
6	937.669E-6			PASS
7	4.585E-3			PASS
8	911.532E-6			PASS
9	4.826E-3			PASS
10	972.745E-6			PASS
11	4.319E-3			PASS
12	678.282E-6			PASS
13	4.158E-3			PASS
14	1.714E-3			PASS
15	3.956E-3			PASS
16	686.166E-6			PASS
17	3.735E-3			PASS
18	739.467E-6			PASS
19	3.538E-3			PASS
20	733.991E-6			PASS
21	3.282E-3			PASS
22	722.450E-6			PASS
23	3.335E-3			PASS
24	819.892E-6			PASS
25	2.788E-3			PASS
26	652.759E-6			PASS
27	2.543E-3			PASS
28	1.556E-3			PASS
29	2.284E-3			PASS
30	655.621E-6			PASS
31	2.029E-3			PASS
32	698.217E-6			PASS
33	1.997E-3			PASS
34	681.685E-6			PASS
35	1.576E-3			PASS
36	641.580E-6			PASS
37	1.696E-3			PASS
38	715.270E-6			PASS
39	1.203E-3			PASS
40	631.402E-6			PASS

Harmonic currents less than 0.6% of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.

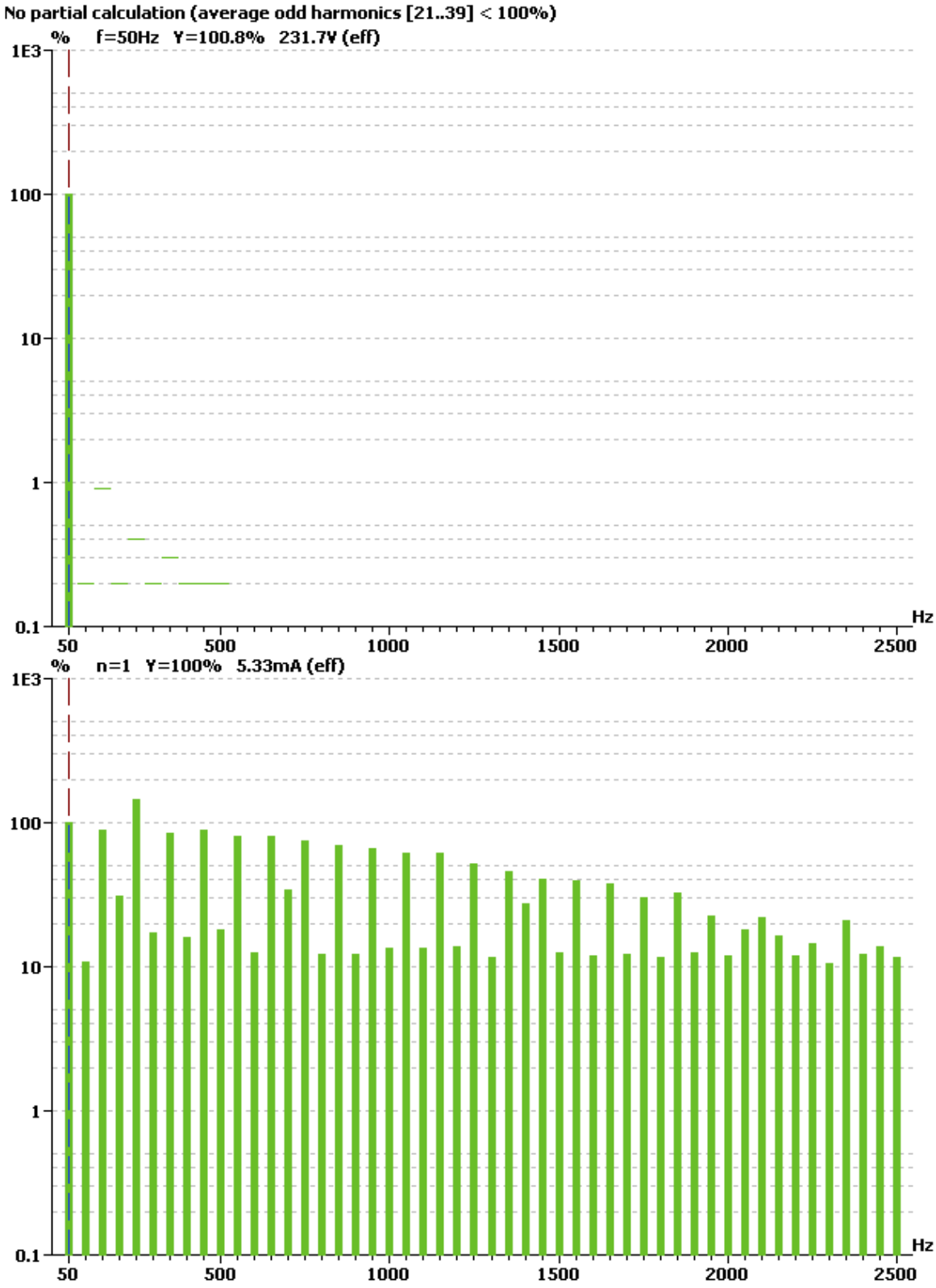
Maximum harmonic current results

Hn	Ieff [A]	% of Limit	Limit [A]	Result
1	5.476E-3			
2	682.561E-6			PASS
3	4.945E-3			PASS
4	1.804E-3			PASS
5	7.874E-3	0.460	1.71	PASS
6	1.030E-3			PASS
7	4.683E-3			PASS
8	1.010E-3			PASS
9	4.966E-3			PASS
10	1.087E-3			PASS
11	4.427E-3			PASS
12	748.702E-6			PASS
13	4.279E-3			PASS
14	1.882E-3			PASS
15	4.081E-3			PASS
16	741.774E-6			PASS
17	3.825E-3			PASS
18	822.246E-6			PASS
19	3.602E-3			PASS
20	813.868E-6			PASS
21	3.390E-3			PASS
22	810.411E-6			PASS
23	3.442E-3			PASS
24	902.695E-6			PASS
25	2.876E-3			PASS
26	723.445E-6			PASS
27	2.619E-3			PASS
28	1.674E-3			PASS
29	2.368E-3			PASS
30	773.620E-6			PASS
31	2.098E-3			PASS
32	803.218E-6			PASS
33	2.078E-3			PASS
34	791.173E-6			PASS
35	1.650E-3			PASS
36	723.470E-6			PASS
37	1.776E-3			PASS
38	802.255E-6			PASS
39	1.270E-3			PASS
40	744.359E-6			PASS

Harmonic currents less than 0.6% of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.

Maximum harmonic voltage results

Hn	Ueff [V]	Ueff [%]	Limit [%]	Result
1	231.81	100.785		
2	80.62E-3	0.035	0.2	PASS
3	102.39E-3	0.045	0.9	PASS
4	18.01E-3	0.008	0.2	PASS
5	21.29E-3	0.009	0.4	PASS
6	16.04E-3	0.007	0.2	PASS
7	68.40E-3	0.030	0.3	PASS
8	17.12E-3	0.007	0.2	PASS
9	27.79E-3	0.012	0.2	PASS
10	25.71E-3	0.011	0.2	PASS
11	83.38E-3	0.036	0.1	PASS
12	20.67E-3	0.009	0.1	PASS
13	63.11E-3	0.027	0.1	PASS
14	17.63E-3	0.008	0.1	PASS
15	45.25E-3	0.020	0.1	PASS
16	25.26E-3	0.011	0.1	PASS
17	71.71E-3	0.031	0.1	PASS
18	21.79E-3	0.009	0.1	PASS
19	35.73E-3	0.016	0.1	PASS
20	24.95E-3	0.011	0.1	PASS
21	52.34E-3	0.023	0.1	PASS
22	22.15E-3	0.010	0.1	PASS
23	55.90E-3	0.024	0.1	PASS
24	26.91E-3	0.012	0.1	PASS
25	32.42E-3	0.014	0.1	PASS
26	20.42E-3	0.009	0.1	PASS
27	69.07E-3	0.030	0.1	PASS
28	25.60E-3	0.011	0.1	PASS
29	32.26E-3	0.014	0.1	PASS
30	19.35E-3	0.008	0.1	PASS
31	52.23E-3	0.023	0.1	PASS
32	19.67E-3	0.009	0.1	PASS
33	40.89E-3	0.018	0.1	PASS
34	12.79E-3	0.006	0.1	PASS
35	38.10E-3	0.017	0.1	PASS
36	16.56E-3	0.007	0.1	PASS
37	40.51E-3	0.018	0.1	PASS
38	15.10E-3	0.007	0.1	PASS
39	27.41E-3	0.012	0.1	PASS
40	14.84E-3	0.006	0.1	PASS


No partial calculation (average odd harmonics [21..39] < 100%)
%
f=50Hz Y=100.8% 231.7V (eff)
1E3
100
10
1
0.1
Hz
50
500
1000
1500
2000
2500
%
n=1 Y=100% 5.33mA (eff)
1E3
100
10
1
0.1
Hz
50
500
1000
1500
2000
2500

Appendix E : Flickers on AC Mains

Report title:	G-44-2016-02417
Company Name:	SGS Korea Co., Ltd.
Date of test:	17:34 22.Sep 2016
Tester:	K.Y.LEE
Standard used:	EN/IEC 61000-3-3 Ed.3 Flicker
Short time (Pst):	10 min
Observation time:	120 min (12 Flicker measurements)
Flickermeter:	230V / 50Hz according IEC 61000-4-15 Ed.2
Flicker Impedance:	Zref (IEC 60725)
Customer:	HYUNDAI Wacortec.Co,Ltd.
E. U. T.:	Wearable Air Purifier (WAP-10)
Temperature :	(23.5~23.5) ℃
Humidity :	(38.0~38.0) %R.H.,
Atmosphere :	(101.5~101.5)kpa

Test Result	PASS

Maximum Flicker results

	EUT values	Limit	Result
Pst	0.028	1.00	PASS
Plt	0.028	0.65	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.037	4.00	PASS
dt [s]	0.000	0.50	PASS

Detail Flicker data

Flicker measurement 1	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.035	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 2	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.033	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 3	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.035	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 4	**EUT values**	**Limit**	**Result**
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.032	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 5	**EUT values**	**Limit**	**Result**
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.037	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 6	**EUT values**	**Limit**	**Result**
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.031	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 7	**EUT values**	**Limit**	**Result**
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.037	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 8	**EUT values**	**Limit**	**Result**
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.035	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 9	**EUT values**	**Limit**	**Result**
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.035	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 10	**EUT values**	**Limit**	**Result**
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.031	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 11	**EUT values**	**Limit**	**Result**
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.034	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 12	**EUT values**	**Limit**	**Result**
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.032	4.00	PASS
dt [s]	0.000	0.50	PASS