



EMC TEST REPORT

Test Report No. : KES-EM-23T0302
Date of Issue : Apr. 12, 2023
Product name : Security LED MONITOR
Model/Type No. : SMT-2710
Variant Model : -
Applicant : Hanwha Vision Co., Ltd
Applicant Address : 6, Pangyo-ro 319Beon-gil, Bundang-gu, Seongnam-si,
Gyeonggi-do, Republic of Korea
Manufacturer : Weihai Daewoo Electronics Co., Ltd.
Manufacturer Address : No.26, Hongkong Road, Economic & Technical Development
Zone, 264205 Weihai City, Shandong Province, China
Date of Receipt : Mar. 28, 2023
Test date : Apr. 04, 2023 ~ Apr. 06, 2023
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

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EMC Test Engineer

Reviewed by

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Dong Il, Lee
EMC Technical Manager

This test report is not related to KS Q ISO/IEC 17025 and KOLAS.

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Report No.:

KES-EM-23T0302

Page (2) of (78)

REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Apr. 12, 2023	KES-EM-23T0302	Issued

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TABLE OF CONTENTS

1.0	General Product Description	4
1.1	Test Voltage & Frequency	5
1.2	Variant Model Differences.....	5
1.3	Device Modifications	5
1.4	Equipment Under Test.....	5
1.5	Support Equipments	5
1.6	External I/O Cabling	6
1.7	EUT Operating Mode(s)	6
1.8	Configuration.....	7
1.9	Remarks when standards applied	8
1.10	Calibration Details of Equipment Used for Measurement.....	8
1.11	Test Facility	8
1.12	Laboratory Accreditations and Listings	8
2.0	Test Regulations.....	9
2.1	Conducted Emissions at Mains Power Ports	10
2.2	Conducted Emissions at Telecommunication Ports	11
2.3	Radiated Electric Field Emissions(Below 1 GHz)	11
2.4	Radiated Electric Field Emissions(Above 1 GHz)	13
2.5	Harmonic Current Emissions	14
2.6	Voltage Fluctuations and Flicker	15
3.0	Criteria for compliance	16
3.1	Electrostatic Discharge.....	17
3.2	Radiated Electric Field Immunity	22
3.3	Electrical Fast Transients/Bursts	26
3.4	Surge	30
3.5	Conducted Disturbance	35
3.6	Power Frequency Magnetic Field Immunity	40
3.7	Voltage Dips and Short Interruptions	42
APPENDIX A – TEST DATA.....		44
Conducted Emissions at Mains Power Ports.....		44
Conducted Emissions at Telecommunication Ports		50
Radiated Electric Field Emissions(Below 1 GHz)		51
Radiated Electric Field Emissions(Above 1 GHz).....		54
Harmonic Current Emissions and Voltage Fluctuations and Flicker		57
APPENDIX B – Test Setup Photos and Configuration		64
Conducted Voltage Emissions		64
Conducted Telecommunication Emissions		65
Radiated Electric Field Emissions(Below 1 GHz)		66
Radiated Electric Field Emissions(Above 1 GHz).....		67
Harmonic Current Emissions and Voltage Fluctuations and Flicker		68
Electrostatic Discharge		68
Radiated Electric Field Immunity		69
Electrical Fast Transients/Bursts		69
Surge Transients		70
Conducted Disturbance		70
Power Frequency Magnetic Field Immunity		71
Voltage Dips and Short Interruptions		71
APPENDIX C – EUT Photographs		72
EUT External Photographs		72
Label and Location		73

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1.0 General Product Description

Main Specifications of EUT are:

Model		FHD 27" SMT-2710	Remark
Display			
Screen Size		27"	
Max. Resolution		1920*1080 60Hz (FHD)	
Brightness		250 cd/m ² (Typ)	
Contrast Ratio		3000:1 (Min) 4000:1 (Typ)	
Aspect Ratio		16:9	
Viewing Angle (H/V)		178°/178°	
Display Color		16.7M	
Response Time		6.5ms(Typ)	
Panel Life		30,000 hours	
Interface			
Video	Connector	VGA (1) HDMI 1.4(1), DP 1.2(1) Ain(1) Aout (1)	
	Connector	VGA	
VGA	Available Format	640 x 480@60Hz, 800 x 600@56Hz/60Hz/72Hz/75Hz, 1024 x 768@60Hz/70Hz/75Hz, 1280 x 1024@60Hz/75Hz, 1440 x 900@60Hz, 1680 x 1050@60Hz, 1920 x 1080@50Hz/60Hz, 1280 x 800@60Hz, 1280 x 960@60Hz, 1280 x 720@60Hz	
	Connector	HDMI	
HDMI	Available Format	640 x 480@60Hz, 800 x 600@56Hz/60Hz/72Hz/75Hz, 1024 x 768@60Hz/70Hz/75Hz, 1280 x 1024@60Hz/75Hz, 1440 x 900@60Hz, 1680 x 1050@60Hz, 1920 x 1080@50Hz/60Hz, 720 x 480P60Hz, 1280 x 720P@50Hz, 720 x 576P@50Hz, 1920x1080P@50/60Hz, 1280 x 800@60Hz, 1280 x 960@60Hz, 1280 x 720@60Hz	
	Connector	DP	
DP	Available Format	640 x 480@60Hz, 800 x 600@56Hz/60Hz/72Hz/75Hz, 1024 x 768@60Hz/70Hz/75Hz, 1280 x 1024@60Hz/75Hz, 1440 x 900@60Hz, 1680 x 1050@60Hz, 1920 x 1080@50Hz/60Hz, 720 x 480P60Hz, 1280 x 720P@50Hz, 720 x 576P@50Hz, 1920x1080P@50/60Hz, 1280 x 800@60Hz, 1280 x 960@60Hz, 1280 x 720@60Hz	
	Connector	Audio in/out	
Audio	Output Signal	Loop-through line level(PC only), Speakers : 4Ω 2.5Wx 2	
	PIP/PBP	NO	
Remocon		N/A	
On Screen Display (OSD)			
Functions		VESA™ DPM Compatible	
Language		Korean, English, Русский, Deutsch, Français, Español, Italiano, Português, Chinese (Simplified), Chinese (Traditional), Japanese, Arabic	
General			
Electrical	Input Voltage	AC 100-240V, 50/60HZ, 1.0A	
	Power Consumption	<45W	
Environmental	Operating Temperature	0 ~ +40°C (+32°F ~ +104°F)	
	Operating Humidity	10% ~ 80% (non-condensing)	
Mechanical	Dimensions with Stand	614.7*452.5*224.1mm	
	Dimensions without Stand	614.7*336.4*50.8mm	
	Bezel Size	3 Frameless : Top:2.2mm, Bottom:21mm, Side : 2.2mm	
	Cabinet Color	Black	
	VESA Mounts Interface	100*100mm	
Weight	Monitor with Stand	4.55kg	
	Monitor without Stand	4.14kg	
Stand		including	

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1.1 Test Voltage & Frequency

Unless indicated otherwise on the individual data sheet or test results, the test voltage and frequency was as indicated below.

☒ AC 230 V, 50 Hz

1.2 Variant Model Differences

Not applicable

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
Security LED MONITOR	SMT-2710	-	Weihai Daewoo Electronics Co., Ltd.	EUT

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Laptop 1	LG15N54	507NZET040180	LG	-
Laptop 1 Adapter	PA-1900-14	OF4A263348701J247	LITE-ON TECHNOLOGY COPORATION	-
Laptop 2	P95G001	8KM8HT2	DELL INC.	-
Laptop 2 Adapter	HA65NM130	-	Chicony Power Technology(Suzhou)Co., Ltd.	-
Desktop	D32M	-	DELL	-
Keyboard	KB216t1	-	DELL	-
Mouse	SM-9023	-	LG	-
Headset	K550	-	Britz®	-

1.6 External I/O Cabling

■ DP, HDMI, D-SUB Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
Security LED MONITOR (EUT)	D-SUB	Laptop 1	D-SUB	1.5	S
	3.5 mm		3.5 mm		U
	HDMI	Laptop 2	HDMI	1.5	S
	DP	Desktop	DP	1.5	S
	3.5 mm	Headset	3.5 mm	1.8	U
Laptop 1	DC Jack	Laptop 1 Adapter	DC Jack	1.4	U
Laptop 2	DC Jack	Laptop 2 Adapter	DC Jack	1.4	U
Desktop	USB	Keyboard	USB	1.4	U
	USB	Mouse	USB	1.4	U

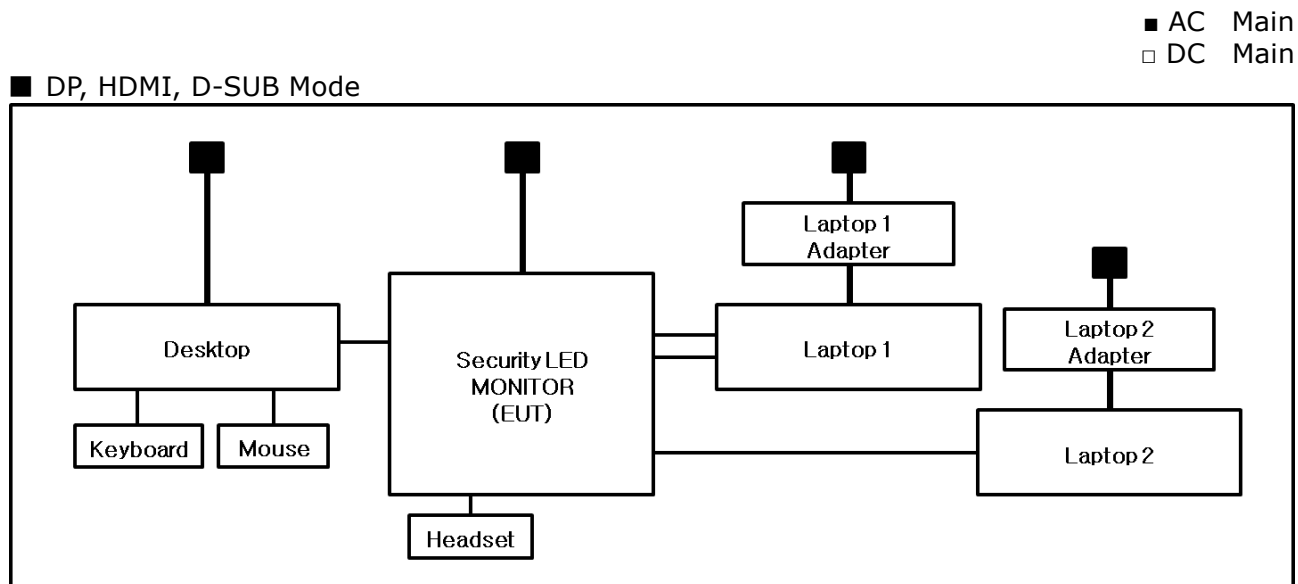
* Unshielded = U, Shielded = S

1.7 EUT Operating Mode(s)

Test mode	operating
DP	Play a includ 1 kHz tone moving color bar on the desktop. Check output of EUT and headset.
HDMI	Play a includ 1 kHz tone moving color bar on the laptop 2. Check output of EUT and headset.
D-SUB	Play a includ 1 kHz tone moving color bar on the laptop 1. Check output of EUT and headset.

EUT Test operating S/W		
Name	Version	Manufacture Company
-	-	-

1.8 Configuration



1.9 Remarks when standards applied

N/A

1.10 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less.

1.11 Test Facility

The measurement facility is located at 473-21, Gayeo-ro, Yeosu-si, Gyeonggi-do, 12658, Korea, Republic of. The sites are constructed in conformance with the requirements of ANSI C63.4a-2017 and CISPR 16-1-4:2019

1.12 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
KOREA	RRA	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 KR0100
International	KOLAS	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 KT489
USA	FCC	3 m & 10 m Semi-Anechoic Chamber Conducted test site to perform FCC Part 15/18 measurements.	 KR0100
Canada	ISED	3 m & 10 m Semi-Anechoic Chamber and Conducted test site	 23298
JAPAN	VCCI	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site)	 C-20136, T-20137, R-20181, G-20176
Europe	TÜV SÜD	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 CARAT 001633 0004

2.0 Test Regulations

The emissions tests were performed according to following regulations:

☒ **EMC – Directive 2014/30/EU**

☒ EN 55032:2015/A11:2020

☒ Class A

☐ Class B

☒ EN 55035:2017/A11:2020

☒ EN 61000-3-2:2014

☒ EN 61000-3-3:2013

☒ **EMC – Regulations 2016**

☒ EN 55032:2015/A11:2020

☒ Class A

☐ Class B

☒ EN 55035:2017/A11:2020

☒ EN 61000-3-2:2014

☒ EN 61000-3-3:2013



2.1 Conducted Emissions at Mains Power Ports

Test Date

Apr. 04, 2023

Test Location

Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EMC32	R & S	9.12.00	-
☒	EMI TEST RECEIVER	ESR3	R & S	101783	11, 11, 2023
☒	LISN	ENV216	R & S	101787	11, 10, 2023
☒	LISN	ESH2-Z5	R & S	100450	11, 10, 2023
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 10, 2023

Test Conditions

Temperature: (23,2 ± 0,0) °C

Relative Humidity: (42,9 ± 0,1) % R.H.

Frequency Range of Measurement

150 kHz to 30 MHz

Instrument Settings

IF Band Width: 9 kHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.



2.2 Conducted Emissions at Telecommunication Ports

Test Date

N/A

Test Location

Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☐	EMI Test S/W	EMC32	R & S	9.12.00	-
☐	EMI TEST RECEIVER	ESR3	R & S	101783	11, 11, 2023
☐	LISN	ENV216	R & S	101787	11, 10, 2023
☐	LISN	ESH2-Z5	R & S	100450	11, 10, 2023
☐	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 10, 2023
☐	8-WIRE ISN CAT3,5	ENY81	R & S	100174	11, 22, 2023
☐	8-WIRE ISN CAT6	ENY81-CAT6	R & S	101665	11, 22, 2023
☐	CDN	CDNS502A	TESEQ	40431	11, 10, 2023

Test Conditions

Temperature: (±) °C

Relative Humidity: (±) % R.H.

Frequency Range of Measurement

150 kHz to 30 MHz

Instrument Settings

IF Band Width: 9 kHz

Test Results

The requirements are:

- ☐ PASS
☐ NOT PASS
☒ NOT APPLICABLE

Remarks

Does not apply because there is no signal line ports.



2.3 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Apr. 04, 2023

Test Location

☐ OPEN AREA TEST SITE #2 ☒ SEMI ANECHOIC CHAMBER #4(10 m)

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
☒	EMI TEST RECEIVER	ESU26	R & S	100551	03, 21, 2024
☒	AMPLIFIER	SCU 01	R & S	100603	11, 10, 2023
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	11, 17, 2024
☒	ATTENUATOR	8491A	HP	32173	03, 03, 2024

Test Conditions

Temperature: (22,1 ± 0,0) °C
Relative Humidity: (42,2 ± 0,3) % R.H.

Frequency Range of Measurement

30 MHz to 1 GHz

Instrument Settings

IF Band Width: 120 kHz

Test Results

The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.



2.4 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Apr. 04, 2023

Test Location

SEMI ANECHOIC CHAMBER #5

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	ES10/RE	TOYO Corporation	2022.01.000	-
☒	EMI TEST RECEIVER	ESU26	Rohde & Schwarz	100552	03, 21, 2024
☒	HORN ANTENNA	BBHA 9120D	SCHWARZBECK	9120D-1802	11, 08, 2023
☒	PREAMPLIFIER	8449B	HP	3008A00538	06, 02, 2023
☒	ATTENUATOR	8491B	HP	23094	03, 21, 2024

Test Conditions

Temperature: (24,6 ± 0,0) °C

Relative Humidity: (43,3 ± 0,2) % R.H.

Frequency Range of Measurement

1 GHz to 6 GHz

Instrument Settings

IF Band Width: 1 MHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.



2.5 Harmonic Current Emissions

Test Date

Apr. 05, 2023

Test Location

Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	net.control	EM TEST	2.1.4	-
☒	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	03, 27, 2024
☒	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Temperature: (23,6 ± 0,0) °C

Relative Humidity: (44,5 ± 0,0) % R.H.

Classification of Equipment for Harmonic Current Emissions

- ☐ Class A
☐ Class B
☐ Class C(Below 25 W)
☐ Class C(Above 25 W)
☒ Class D

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.



2.6 Voltage Fluctuations and Flicker

Test Date

Apr. 05, 2023

Test Location

Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	net.control	EM TEST	2.1.4	-
☒	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	03, 27, 2024
☒	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Temperature: (23,6 ± 0,1) °C
Relative Humidity: (44,5 ± 0,2) % R.H.

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.

3.0 Criteria for compliance

General performance criteria

General performance criteria are defined in 8.2, 8.3 and 8.4. These criteria shall be used during the testing of primary functions where no relevant annex is applicable.

When assessing the impact of a disturbance on a function, the assessment should take into consideration the function's performance prior to the application of the disturbance and only identify as failures those changes in performance that are a result of the disturbance.

Performance criterion A

The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended.

The performance level may be replaced by a permissible loss of performance. 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 by what the user may reasonably expect from the equipment if used as intended.

Performance criterion B

During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test. After the test, the equipment shall continue to operate as intended without operator intervention; no degradation of performance or loss of function is allowed, below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level (or the permissible performance loss), or recovery time, is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Performance criterion C

Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed.

Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.



3.1 Electrostatic Discharge

Reference Standard

EN 61000-4-2:2009

Test Date

Apr. 05, 2023

Test Location

EMS-ESD: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	ESD SIMULATOR	ESS-2000	Noise Ken	ESS01Z0454	01, 31, 2024
☒	HCP	-	KES	-	-
☒	VCP	-	Noise Ken	-	-

Test Conditions

Temperature: (23,7 ± 0,0) °C
Relative Humidity: (43,7 ± 0,1) % R.H.
Atmospheric Pressure: (100,7 ± 0,0) kPa

Test Specifications

Discharge Factor: ≥ 1 s

Discharge Impedance: 330 ohm / 150 pF

Kind of Discharge: Air, Contact (direct and indirect)

Polarity: Positive and Negative

Number of Discharge: 10 at all locations for Air discharge
10 at all locations for Contact discharge

Discharge Voltage:	Contact	Air	HCP	VCP
	☐ 2 kV	☒ 2 kV	☐ 2 kV	☐ 2 kV
	☒ 4 kV	☒ 4 kV	☒ 4 kV	☒ 4 kV
	☐ 6 kV	☐ 6 kV	☐ 6 kV	☐ 6 kV
	☐ 8 kV	☒ 8 kV	☐ 8 kV	☐ 8 kV
	☐ 15 kV	☐ 15 kV	☐ 15 kV	☐ 15 kV

Notes: HCP: Horizontal coupling plane

VCP: Vertical coupling plane

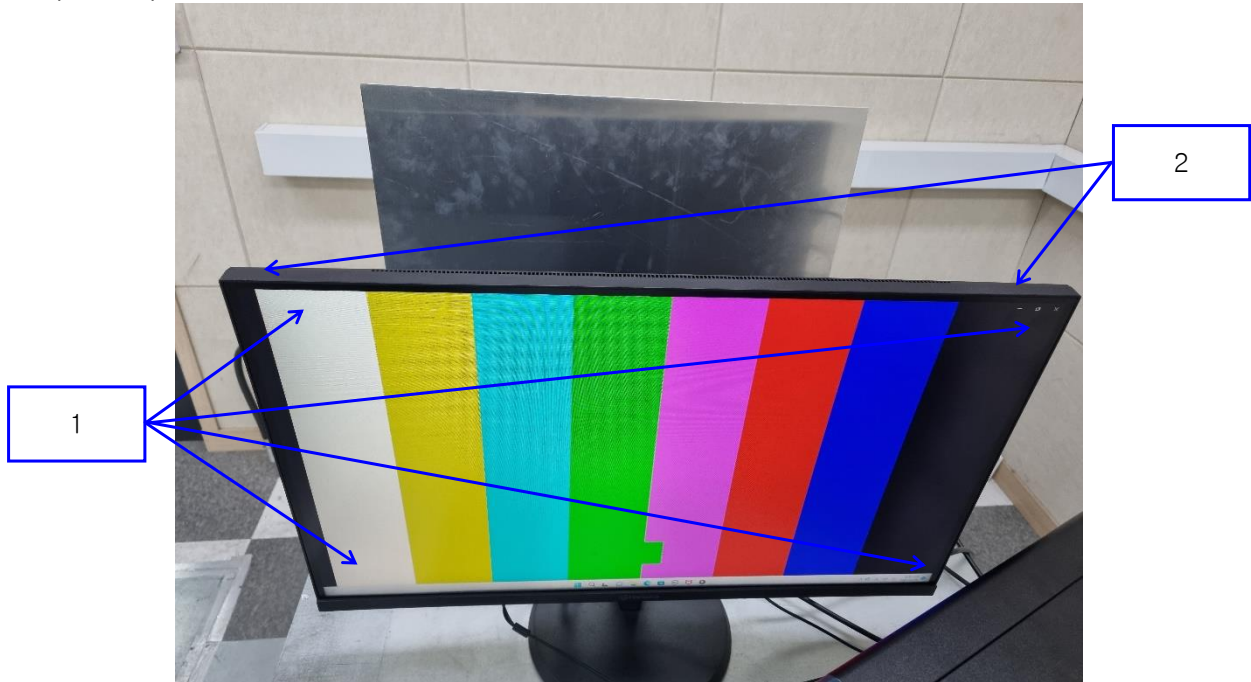
Required Performance Criteria: ☒ B

Location of Discharge:

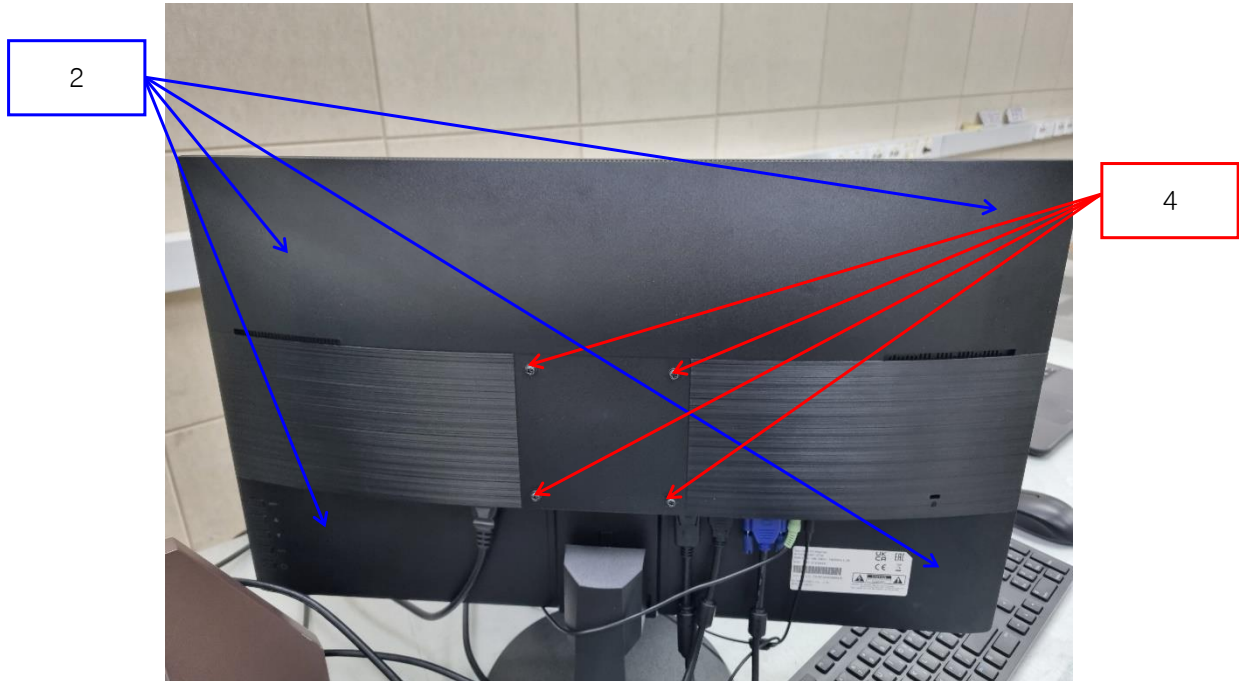
Contact
Air



■ DP, HDMI, D-SUB Mode



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Report No.:

KES-EM-23T0302

Page (20) of (78)

Test Data

■ DP Mode

No.	Test Point	Discharge Method	Performance		Remarks
			Criteria	Results	
1	HCP Contact	Contact Discharge	B	A	-
2	VCP Contact	Contact Discharge	B	A	-

Direct Discharge

No.	Test Point	Discharge Method	Performance		Remarks
			Criteria	Results	
1	Display	Air Discharge	B	A	-
2	Enclosure	Air Discharge	B	A	-
3	Around Port	Contact Discharge	B	A	-
4	Screw	Contact Discharge	B	A	-

■ HDMI Mode

No.	Test Point	Discharge Method	Performance		Remarks
			Criteria	Results	
1	HCP Contact	Contact Discharge	B	A	-
2	VCP Contact	Contact Discharge	B	A	-

Direct Discharge

No.	Test Point	Discharge Method	Performance		Remarks
			Criteria	Results	
1	Display	Air Discharge	B	A	-
2	Enclosure	Air Discharge	B	A	-
3	Around Port	Contact Discharge	B	A	-
4	Screw	Contact Discharge	B	A	-

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Report No.:

KES-EM-23T0302

Page (21) of (78)

■ D-SUB Mode

No.	Test Point	Discharge Method	Performance		Remarks
			Criteria	Results	
1	HCP Contact	Contact Discharge	B	A	-
2	VCP Contact	Contact Discharge	B	A	-

Direct Discharge

No.	Test Point	Discharge Method	Performance		Remarks
			Criteria	Results	
1	Display	Air Discharge	B	A	-
2	Enclosure	Air Discharge	B	A	-
3	Around Port	Contact Discharge	B	A	-
4	Screw	Contact Discharge	B	A	-

Note: "Blank" = Not performed

Results:

A – No degradation of function

B – Distortion/Error of function (self-recoverable)

C – Loss of function

Test Results☒ PASS Required Performance Criteria☐ NOT PASS Required Performance Criteria**Remarks**Any degradations of performance was not observed during in the test.

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3.2 Radiated Electric Field Immunity

Reference Standard

EN 61000-4-3:2006 +A2:2010

Test Date

Apr. 06, 2023

Test Location

EMS-RS: ☐ SEMI ANECHOIC CHAMBER #2 ☒ SEMI ANECHOIC CHAMBER #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	EMC32	R & S	10.10.02	-
☒	SIGNAL GENERATOR	SMB 100A	Rohde & Schwarz	108252	08, 01, 2023
☒	HIGH POWER DUAL AMP	SSA532	SUNGSAN	SSA532-001	-
☒	POWER METER	E4419B	Agilent	GB40203000	03, 21, 2024
☒	AVERAGE POWER SENSOR	E9301A	Agilent	MY52170007	03, 21, 2024
☒	AVERAGE POWER SENSOR	E9301A	Agilent	MY41498669	03, 21, 2024
☒	STACKED DOUBLE LOG-PER- ANTENNA	STPL9128 E	Schwarzbeck	9128ES-121	-
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	03, 06, 2024
☒	SOUND ACOUSTIC TESTER	TST-1000	TESTEK	150045	11, 01, 2023
☒	MICROPHONE	MP201	BSWA	551675	10, 31, 2023

Test Conditions

Temperature: (23,2 ± 0,1) °C
Relative Humidity: (43,6 ± 0,4) % R.H.
Atmospheric Pressure: (100,2 ± 0,0) kPa



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Report No.:

KES-EM-23T0302

Page (23) of (78)

Test Specifications

Antenna Polarization: Horizontal & vertical unless indicated otherwise

Antenna Distance: ☒ 3 m

Field Strength: ☐ 1 V/m ☒ 3 V/m
☐ 10 V/m

Frequency Range: ☒ 80 MHz to 1 GHz (swept test) ☐ 1,4 GHz to 2,7 GHz
☒ 1.8 GHz , 2.6 GHz , 3.5 GHz , 5 GHz ($\pm 1\%$) (spot test)

Modulation: ☒ AM, 80 %, 1 kHz sine wave
☐ PM, 1 Hz (0,5 s ON : 0,5 s OFF)

Frequency step: ☒ 1 % step

Dwell Time: ☒ 1 s ☐ 3 s

of Sides Radiated: ☒ 4

Required Performance Criteria: ☒ A

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Test Data
■ DP Mode

Side Exposed	Performance Criteria	Results	
		Horizontal	Vertical
Front	A	A	A
Right	A	A	A
Back	A	A	A
Left	A	A	A

[Audio output function]

☐ Electrical Measurements / ☐ Acoustic Measurements

Measured parts	Test method	Level (dB)		Performance criteria	Observations	
		Criteria	Measured		Horizontal	Vertical
-	-	-	-	-	-	-

* The SOUND ACOUSTIC TESTER mark characteristics indicate low if less than 50 dB.

■ HDMI Mode

Side Exposed	Performance Criteria	Results	
		Horizontal	Vertical
Front	A	A	A
Right	A	A	A
Back	A	A	A
Left	A	A	A

[Audio output function]

☐ Electrical Measurements / ☐ Acoustic Measurements

Measured parts	Test method	Level (dB)		Performance criteria	Observations	
		Criteria	Measured		Horizontal	Vertical
-	-	-	-	-	-	-

* The SOUND ACOUSTIC TESTER mark characteristics indicate low if less than 50 dB.

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Report No.:

KES-EM-23T0302

Page (25) of (78)

■ D-SUB Mode

Side Exposed	Performance Criteria	Results	
		Horizontal	Vertical
Front	A	A	A
Right	A	A	A
Back	A	A	A
Left	A	A	A

[Audio output function]

☐ Electrical Measurements / ☒ Acoustic Measurements

Measured parts	Test method	Level (dB)		Performance criteria	Observations	
		Criteria	Measured		Horizontal	Vertical
Headset	On ear	75.19	Low	A	A	A
Speaker	Off ear	85.44	Low	A	A	A

* The SOUND ACOUSTIC TESTER mark characteristics indicate low if less than 50 dB.

Note: "Blank" = Not performed

Results:

A – No degradation of function

B – Distortion/Error of function (self-recoverable)

C – Loss of function

Test Results☒ PASS Required Performance Criteria☐ NOT PASS Required Performance Criteria**Remarks**Any degradations of performance was not observed during in the test.

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3.3 Electrical Fast Transients/Bursts

Reference Standard

EN 61000-4-4:2012

Test Date

Apr. 05, 2023

Test Location

EMS-EFT: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	iec.control	EM TEST	5.4.8	-
☒	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	11, 28, 2023
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 29, 2023
☐	CAPACITIVE COUPLING CLAMP	HFK	EM TEST	P1633183115	11, 28, 2023

Test Conditions

Temperature: (23,7 ± 0,1) °C
Relative Humidity: (43,7 ± 0,2) % R.H.
Atmospheric Pressure: (100,7 ± 0,0) kPa

Test Specifications

Pulse Amplitude & Polarity:
(Power Lines) ☒ ± 1.0 kV ☐ ± 2.0 kV
☐ ± 4.0 kV

Pulse Amplitude & Polarity:
(Signal Lines) ☐ ± 0.5 kV ☐ ± 1.0 kV
☐ ± 2.0 kV

Burst Period: ☒ 300 ms ☐ 2 s

Repetition Rate: ☒ 5 kHz ☐ 100 kHz

Duration of Test Voltage: ☒ ≥ 1 min

Required Performance Criteria: ☒ B

Test Data

■ DP Mode

☒ Input a.c. power ports – Coupling/Decoupling Network used

Mode of Application	Performance Criteria	Results	
		(+) Burst (kV)	(-) Burst (kV)
L	B	A	A
N	B	A	A
PE	B	A	A
L – N	B	A	A
L – PE	B	A	A
N – PE	B	A	A
L – N – PE	B	A	A

☐ Input d.c. power ports – Coupling/Decoupling Network used

Mode of Application	Performance Criteria	Results	
		(+) Burst (kV)	(-) Burst (kV)
-	B	-	-

☐ Signal ports and telecommunication ports – Coupling Clamp used

Mode of Application	Performance Criteria	Results	
		(+) Burst (kV)	(-) Burst (kV)
-	B	-	-

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Report No.:

KES-EM-23T0302

Page (28) of (78)

■ HDMI Mode☒ Input a.c. power ports – Coupling/Decoupling Network used

Mode of Application	Performance Criteria	Results	
		(+) Burst (kV)	(-) Burst (kV)
L	B	A	A
N	B	A	A
PE	B	A	A
L – N	B	A	A
L – PE	B	A	A
N – PE	B	A	A
L – N – PE	B	A	A

☐ Input d.c. power ports – Coupling/Decoupling Network used

Mode of Application	Performance Criteria	Results	
		(+) Burst (kV)	(-) Burst (kV)
-	B	-	-

☐ Signal ports and telecommunication ports – Coupling Clamp used

Mode of Application	Performance Criteria	Results	
		(+) Burst (kV)	(-) Burst (kV)
-	B	-	-

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■ D-SUB Mode

☒ Input a.c. power ports – Coupling/Decoupling Network used

Mode of Application	Performance Criteria	Results	
		(+) Burst (kV)	(-) Burst (kV)
L	B	A	A
N	B	A	A
PE	B	A	A
L – N	B	A	A
L – PE	B	A	A
N – PE	B	A	A
L – N – PE	B	A	A

☐ Input d.c. power ports – Coupling/Decoupling Network used

Mode of Application	Performance Criteria	Results	
		(+) Burst (kV)	(-) Burst (kV)
-	B	-	-

☐ Signal ports and telecommunication ports – Coupling Clamp used

Mode of Application	Performance Criteria	Results	
		(+) Burst (kV)	(-) Burst (kV)
-	B	-	-

Note: “Blank” = Not performed

Results:

A – No degradation of function

B – Distortion/Error of function (self-recoverable)

C – Loss of function

Test Results

☒ PASS Required Performance Criteria

☐ NOT PASS Required Performance Criteria

Remarks

Any degradations of performance was not observed during in the test.

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Report No.:

KES-EM-23T0302

Page (30) of (78)

3.4 Surge

Reference Standard

EN 61000-4-5:2014+A1:2017

Test Date

Apr. 05, 2023

Test Location

EMS-Surge: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	iec.control	EM TEST	5.4.8	-
☒	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	11, 28, 2023
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 29, 2023

Test Conditions

Temperature: (23,7 ± 0,1) °C
Relative Humidity: (43,7 ± 0,3) % R.H.
Atmospheric Pressure: (100,7 ± 0,0) kPa

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Report No.:

KES-EM-23T0302

Page (31) of (78)

Test Specifications

AC Power Lines

Source Impedance: 12 ohm for common mode and 2 ohm for differential mode

Surge Amplitude :

Common Mode

☒ (0,5 / 1,0 / 2,0) kV

Differential Mode

☒ (0,5 / 1,0) kV

Number of Surges:

☒ 5 surges per angle

Angle:

☒ 90°, 270° (input a.c. power port)

Polarity:

☒ Positive & Negative

Repetition Rate:

☐ 1 surge per min ☒ 1 surge per 30 sec.

Required Performance Criteria: ☒ B

Signal Lines

Source Impedance:

42 ohm for common mode

Surge Amplitude:

Common Mode

☐ (1,0) kV

Number of Surges:

☐ 5 Surges

Polarity:

☐ Positive & Negative

Repetition Rate:

☐ 1 surge per min ☐ 1 surge per 30 sec.

Required Performance Criteria: ☐ B

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Report No.:

KES-EM-23T0302

Page (32) of (78)

Test Data

■ DP Mode

☒ Line to Line – Differential Mode

Mode of Application	Performance Criteria	Results	
		(+) Surge (kV)	(-) Surge (kV)
L - N	B	A	A

☒ Line to Earth – Common Mode

Mode of Application	Performance Criteria	Results	
		(+) Surge (kV)	(-) Surge (kV)
L – PE	B	A	A
N – PE	B	A	A

Signal Lines☐ Line to Earth – Common Mode

Mode of Application	Performance Criteria	Results	
		(+) Surge (kV)	(-) Surge (kV)
-	B	-	-

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Report No.:

KES-EM-23T0302

Page (33) of (78)

■ HDMI Mode☒ Line to Line – Differential Mode

Mode of Application	Performance Criteria	Results	
		(+) Surge (kV)	(-) Surge (kV)
L - N	B	A	A

☒ Line to Earth – Common Mode

Mode of Application	Performance Criteria	Results	
		(+) Surge (kV)	(-) Surge (kV)
L – PE	B	A	A
N – PE	B	A	A

Signal Lines☐ Line to Earth – Common Mode

Mode of Application	Performance Criteria	Results	
		(+) Surge (kV)	(-) Surge (kV)
-	B	-	-

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■ D-SUB Mode

☒ Line to Line – Differential Mode

Mode of Application	Performance Criteria	Results	
		(+) Surge (kV)	(-) Surge (kV)
L - N	B	A	A

☒ Line to Earth – Common Mode

Mode of Application	Performance Criteria	Results	
		(+) Surge (kV)	(-) Surge (kV)
L – PE	B	A	A
N – PE	B	A	A

Signal Lines

☐ Line to Earth – Common Mode

Mode of Application	Performance Criteria	Results	
		(+) Surge (kV)	(-) Surge (kV)
-	B	-	-

Note: “Blank” = Not performed

Results:

A – No degradation of function

B – Distortion/Error of function (self-recoverable)

C – Loss of function

Test Results

☒ PASS Required Performance Criteria

☐ NOT PASS Required Performance Criteria

Remarks

Any degradations of performance was not observed during in the test.

3.5 Conducted Disturbance

Reference Standard

EN 61000-4-6:2014

Test Date

Apr. 05, 2023

Test Location

EMS-CS: Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	icd.control	EM TEST	5.3.12	-
☒	CONTINUOUS WAVE SIMULATOR	CWS 500N1.4	EM TEST	P1602169880	11, 10, 2023
☒	ATTENUATOR	ATT 6/80	EM TEST	P1614178148	11, 10, 2023
☒	CDN	CDN M016	TESEQ	43694	11, 10, 2023
☒	CDN	CDN M016	TESEQ	43697	11, 10, 2023
☐	CDN	CDN T800	TESEQ	42800	11, 10, 2023
☐	EM CLAMP	KEMZ 801A	TESEQ	44099	11, 14, 2023
☒	SOUND ACOUSTIC TESTER	TST-1000	TESTEK	150045	11, 01, 2023
☒	MICROPHONE	MP201	BSWA	551675	10, 31, 2023

Test Conditions

Temperature: (24,1 ± 0,1) °C
Relative Humidity: (43,2 ± 0,4) % R.H.
Atmospheric Pressure: (100,6 ± 0,0) kPa



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Report No.:

KES-EM-23T0302

Page (36) of (78)

Test Specifications

Frequency range:

☐ 150 kHz to 100 MHz

☒ 150 kHz to 80 MHz

Voltage Level:

☒ 3 Vrms (150 kHz to 10 MHz)

☒ 3 Vrms to 1Vrms (10 MHz to 30 MHz)

☒ 1 Vrms (30 MHz to 80 MHz)

Modulation:

☒ AM, 80 %, 1 kHz sine wave

☐ PM, 1 Hz (0,5 s ON : 0,5 s OFF)

Frequency step:

☒ 1 % step

Dwell Time:

☒ 1 s

☐ 3 s

Required Performance Criteria: ☒ A

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Test Data
☒ DP Mode

☒ Input a.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Performance Criteria	Results
L – N – PE	CDN	A	-

☐ Input d.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Performance Criteria	Results
-	CDN	A	-

☐ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Performance Criteria	Results
-	CDN	A	-

[Audio output function]

☐ Electrical Measurements / ☐ Acoustic Measurements

Measured parts	Test method	Level (dB)		Performance criteria	Observations	
		Criteria	Measured		Horizontal	Vertical
-	-	-	-	-	-	-

* The SOUND ACOUSTIC TESTER mark characteristics indicate low if less than 50 dB.

■ HDMI Mode
☒ Input a.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Performance Criteria	Results
L – N – PE	CDN	A	-

☐ Input d.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Performance Criteria	Results
-	CDN	A	-

☐ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Performance Criteria	Results
-	CDN	A	-

[Audio output function]
☐ Electrical Measurements / ☐ Acoustic Measurements

Measured parts	Test method	Level (dB)		Performance criteria	Observations	
		Criteria	Measured		Horizontal	Vertical
-	-	-	-	-	-	-

* The SOUND ACOUSTIC TESTER mark characteristics indicate low if less than 50 dB.

■ D-SUB Mode
☒ Input a.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Performance Criteria	Results
L - N - PE	CDN	A	-

☐ Input d.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Performance Criteria	Results
-	CDN	A	-

☐ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Performance Criteria	Results
-	CDN	A	-

[Audio output function]

☐ Electrical Measurements / ☒ Acoustic Measurements

Measured parts	Test method	Level (dB)		Performance criteria	Observations
Headset	On ear	75.19	Low	A	A
Speaker	Off ear	85.44	Low	A	A

* The SOUND ACOUSTIC TESTER mark characteristics indicate low if less than 50 dB.

Notes: CDN = Coupling Decoupling Network
"blank" = Not performed

Results:

A - No degradation of function

B - Distortion/Error of function (self-recoverable)

C - Loss of function

Test Results
☒ PASS Required Performance Criteria

☐ NOT PASS Required Performance Criteria

Remarks

Any degradations of performance was not observed during in the test.



3.6 Power Frequency Magnetic Field Immunity

Reference Standard

EN 61000-4-8:2010

Test Date

N/A

Test Location

EMS-Magnetic: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☐	EMS Test S/W	iec.control	EM TEST	5.4.8	-
☐	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	11, 28, 2023
☐	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 29, 2023
☐	MAGNETIC FIELD COIL	MS 100N	EM TEST	P1536163691	11, 28, 2023
☐	CURRENT TRANSFORMER	MC 2630	EM TEST	P1629182219	11, 28, 2023

Test Conditions

Temperature: (±) °C
Relative Humidity: (±) % R.H.
Atmospheric Pressure: (±) kPa

Test Specifications

Field Strength: ☐ 1 A/m ☐ 3 A/m
☐ 30 A/m

Frequency: ☐ 50 Hz ☐ 60 Hz

Required Performance Criteria: ☐ A

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Report No.:

KES-EM-23T0302

Page (41) of (78)

Test Data☐ Immersion method

Coil orientation	Performance Criteria	Results
X - axis	A	-
Y - axis	A	-
Z - axis	A	-

Note: "blank" = Not performed

Results:

A – No degradation of function

B – Distortion/Error of function (self-recoverable)

C – Loss of function

Test Results

- ☐ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria
☒ NOT APPLICABLE

RemarksN/A

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Report No.:

KES-EM-23T0302

Page (42) of (78)

3.7 Voltage Dips and Short Interruptions

Reference Standard

EN 61000-4-11:2004+A1:2017

Test Date

Apr. 05, 2023

Test Location

EMS-Voltage dip: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	iec.control	EM TEST	5.4.8	-
☒	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	11, 29, 2023
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 29, 2023

Test Conditions

Temperature: (23,6 ± 0,0) °C
Relative Humidity: (44,5 ± 0,0) % R.H.
Atmospheric Pressure: (100,4 ± 0,0) kPa

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Test Data
■ DP Mode

NO	Depth	Duration	Performance		Remarks
			Criteria	Results	
1	95 %	0.5	B	A	-
2	30 %	25	C	A	-
3	95 %	250	C	C	-

■ HDMI Mode

NO	Depth	Duration	Performance		Remarks
			Criteria	Results	
1	95 %	0.5	B	A	-
2	30 %	25	C	A	-
3	95 %	250	C	C	-

■ D-SUB Mode

NO	Depth	Duration	Performance		Remarks
			Criteria	Results	
1	95 %	0.5	B	A	-
2	30 %	25	C	A	-
3	95 %	250	C	C	-

Results:

- A – No response observed from EUT
- B – Unit shuts down then automatically restarts when full voltage is restored.
- C – Unit shuts down then manually restarts when full voltage is restored or Loss of function.

Test Results

- ☒ PASS Required Performance Criteria
- ☐ NOT PASS Required Performance Criteria

Remarks

During the interruption, EUT was turned off but after the test, it was recovered without operator's intervention.

APPENDIX A – TEST DATA

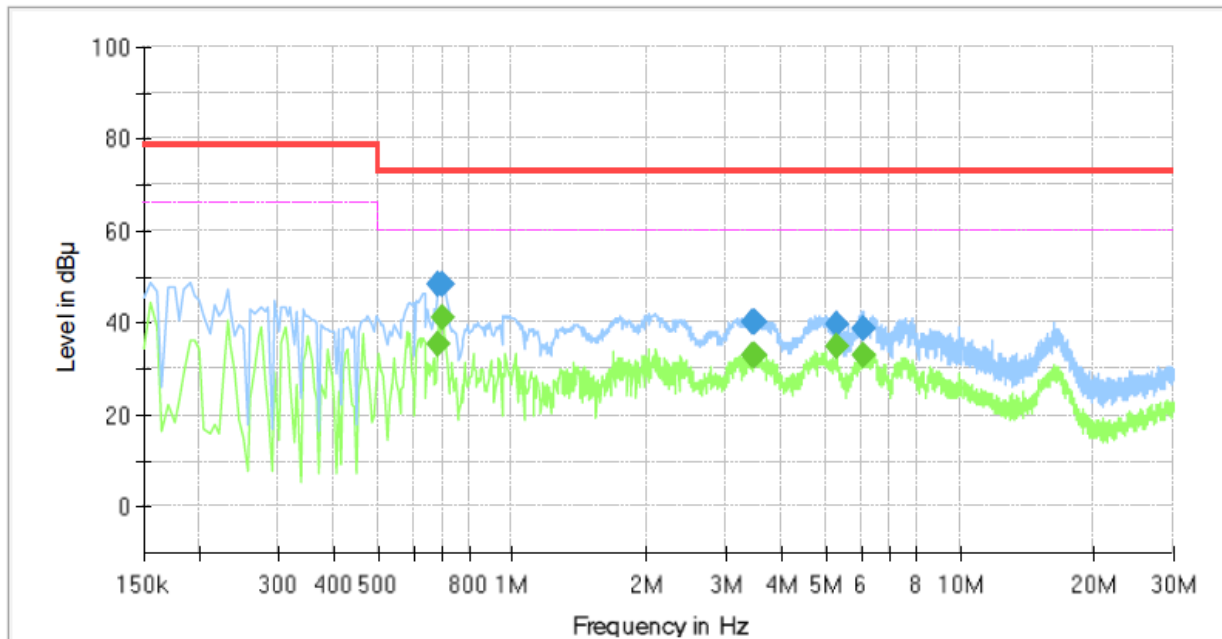
Conducted Emissions at Mains Power Ports

■ DP Mode

[HOT]

Common Information

Test Description:	Conducted Emission
Model No.:	SMT-2710
Phase:	L1
Mode:	DP
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.685000	---	35.41	60.00	24.59	5000.0	9.000	L1	19.9
0.685000	48.14	---	73.00	24.86	5000.0	9.000	L1	19.9
0.700000	---	41.36	60.00	18.64	5000.0	9.000	L1	19.9
0.700000	48.16	---	73.00	24.84	5000.0	9.000	L1	19.9
3.435000	---	32.92	60.00	27.08	5000.0	9.000	L1	20.1
3.435000	40.02	---	73.00	32.98	5000.0	9.000	L1	20.1
3.480000	---	33.10	60.00	26.90	5000.0	9.000	L1	20.0
3.480000	40.17	---	73.00	32.83	5000.0	9.000	L1	20.0
5.310000	---	34.87	60.00	25.13	5000.0	9.000	L1	19.6
5.310000	39.59	---	73.00	33.41	5000.0	9.000	L1	19.6
6.090000	---	32.75	60.00	27.25	5000.0	9.000	L1	19.6
6.090000	38.76	---	73.00	34.24	5000.0	9.000	L1	19.6

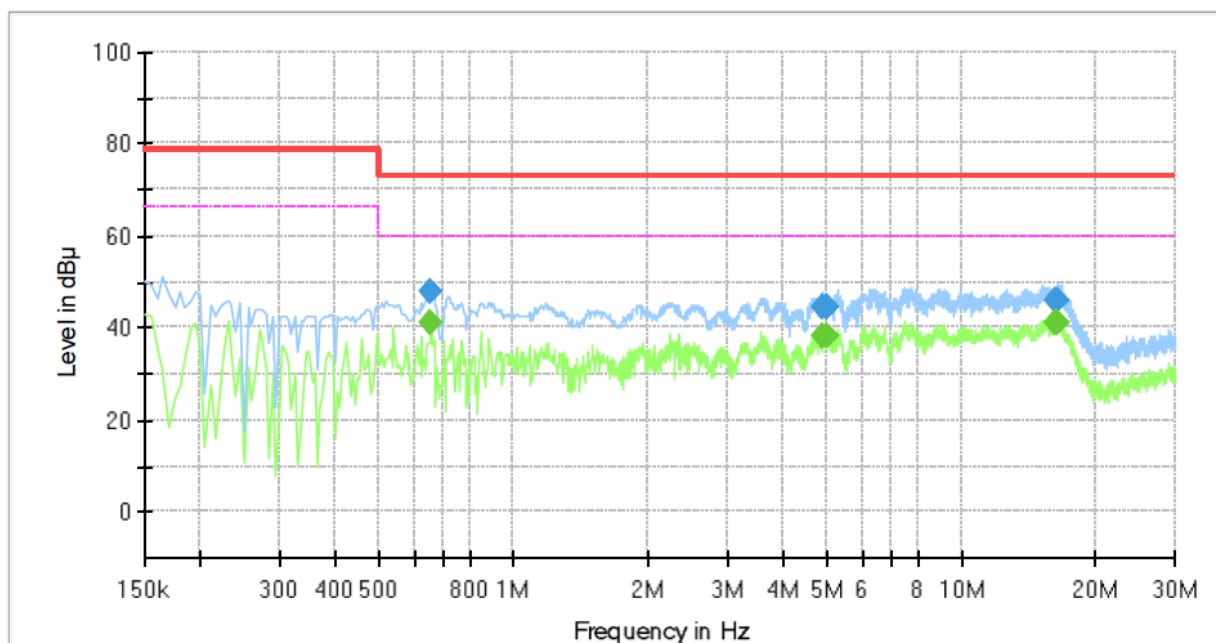
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[NEUTRAL]
Common Information

Test Description:	Conducted Emission
Model No.:	SMT-2710
Phase:	N
Mode:	DP
Operator Name:	KES


Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.655000	---	41.32	60.00	18.68	5000.0	9.000	N	19.9
0.655000	47.80	---	73.00	25.20	5000.0	9.000	N	19.9
4.920000	---	38.14	60.00	21.86	5000.0	9.000	N	19.7
4.920000	44.65	---	73.00	28.35	5000.0	9.000	N	19.7
5.030000	---	38.39	60.00	21.61	5000.0	9.000	N	19.7
5.030000	44.72	---	73.00	28.28	5000.0	9.000	N	19.7
16.255000	---	40.98	60.00	19.02	5000.0	9.000	N	20.0
16.255000	46.03	---	73.00	26.97	5000.0	9.000	N	20.0
16.465000	---	41.09	60.00	18.91	5000.0	9.000	N	20.0
16.465000	46.13	---	73.00	26.87	5000.0	9.000	N	20.0

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■ HDMI Mode

[HOT]

Common Information

Test Description:

Model No.:

Phase:

Mode:

Operator Name:

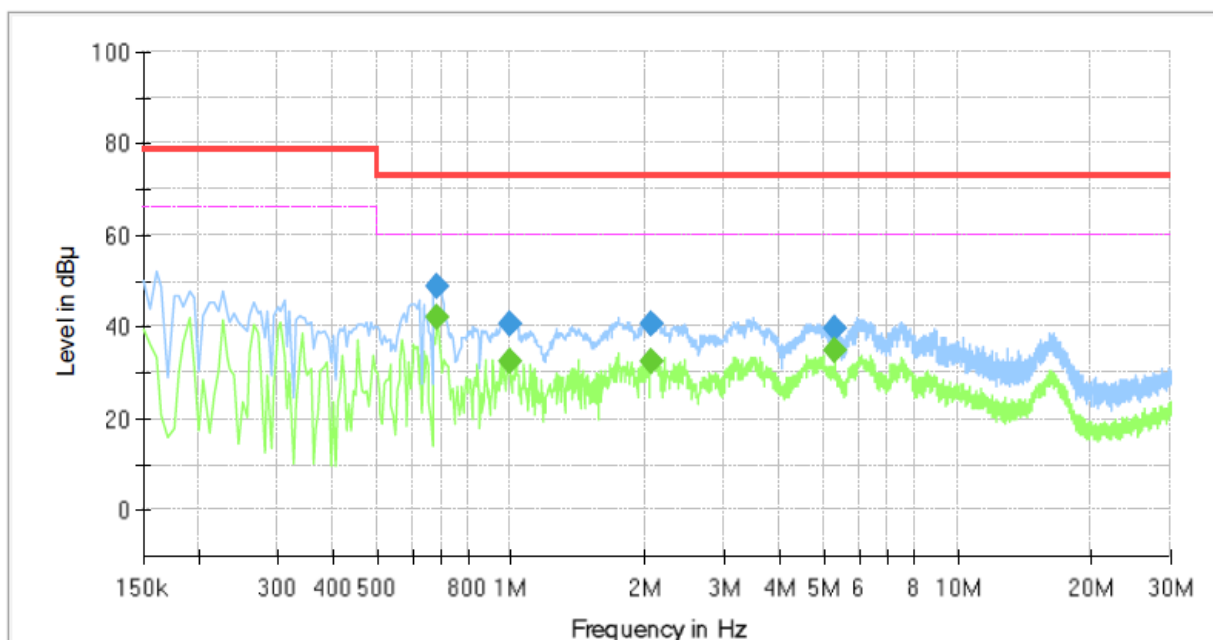
Conducted Emission

SMT-2710

L1

HDMI

KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.685000	---	42.10	60.00	17.90	5000.0	9.000	L1	19.9
0.685000	49.04	---	73.00	23.96	5000.0	9.000	L1	19.9
0.990000	---	32.44	60.00	27.56	5000.0	9.000	L1	20.1
0.990000	40.62	---	73.00	32.38	5000.0	9.000	L1	20.1
2.055000	---	32.64	60.00	27.36	5000.0	9.000	L1	20.3
2.055000	40.48	---	73.00	32.52	5000.0	9.000	L1	20.3
5.310000	---	34.76	60.00	25.24	5000.0	9.000	L1	19.6
5.310000	39.47	---	73.00	33.53	5000.0	9.000	L1	19.6

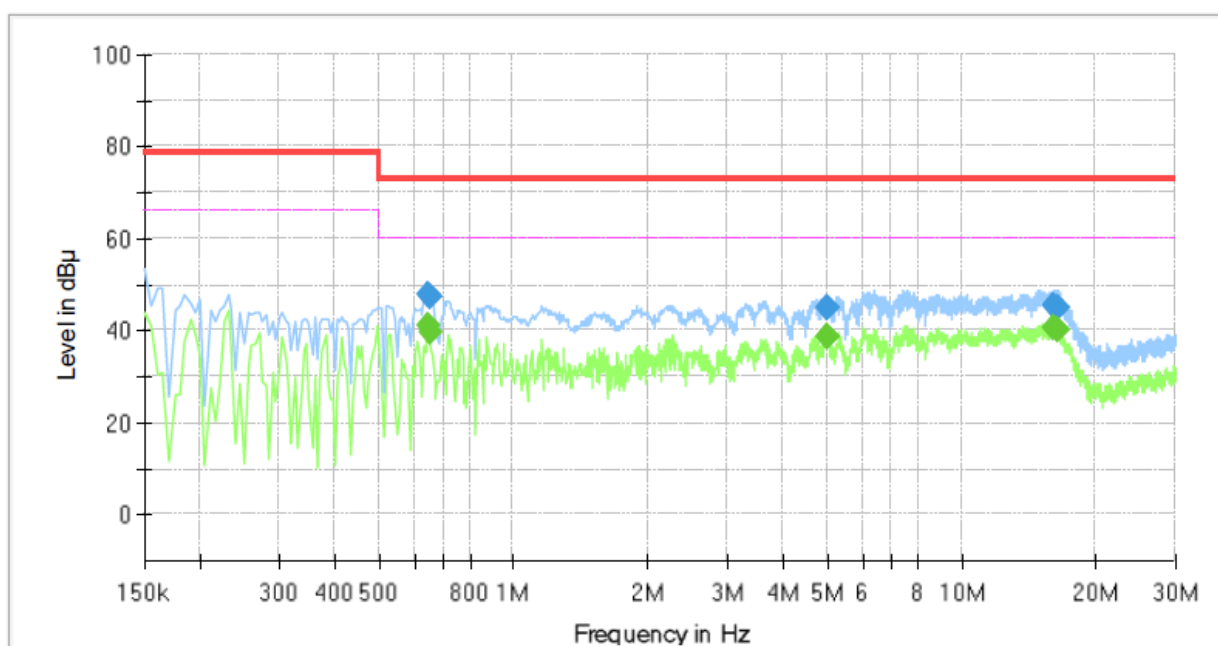
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[NEUTRAL]
Common Information

Test Description:	Conducted Emission
Model No.:	SMT-2710
Phase:	N
Mode:	HDMI
Operator Name:	KES


Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.645000	---	41.16	60.00	18.84	5000.0	9.000	N	19.9
0.645000	47.88	---	73.00	25.12	5000.0	9.000	N	19.9
0.650000	---	39.89	60.00	20.11	5000.0	9.000	N	19.9
0.650000	47.63	---	73.00	25.37	5000.0	9.000	N	19.9
5.000000	---	38.55	60.00	21.45	5000.0	9.000	N	19.7
5.000000	44.91	---	73.00	28.09	5000.0	9.000	N	19.7
5.005000	---	38.52	60.00	21.48	5000.0	9.000	N	19.7
5.005000	44.82	---	73.00	28.18	5000.0	9.000	N	19.7
16.095000	---	40.68	60.00	19.32	5000.0	9.000	N	20.0
16.095000	45.71	---	73.00	27.29	5000.0	9.000	N	20.0
16.355000	---	40.09	60.00	19.91	5000.0	9.000	N	20.0
16.355000	45.12	---	73.00	27.88	5000.0	9.000	N	20.0

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Report No.:

KES-EM-23T0302

Page (48) of (78)

■ D-SUB Mode

[HOT]

Common Information

Test Description:

Model No.:

Phase:

Mode:

Operator Name:

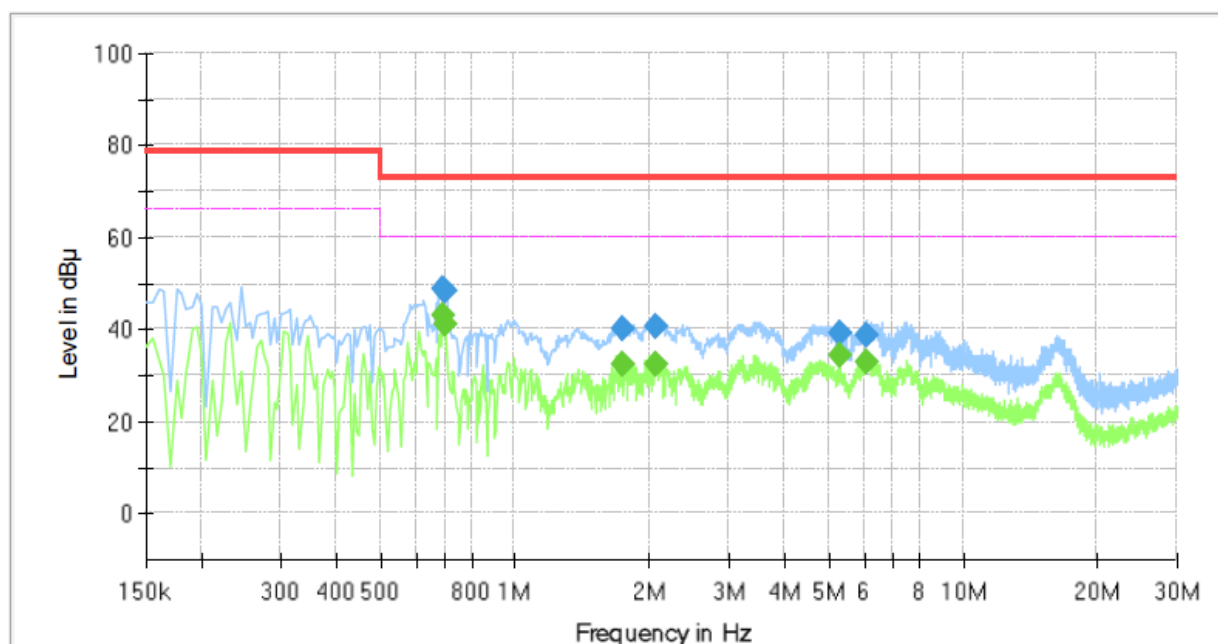
Conducted Emission

SMT-2710

L1

D-SUB

KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.690000	---	42.95	60.00	17.05	5000.0	9.000	L1	19.9
0.690000	49.00	---	73.00	24.00	5000.0	9.000	L1	19.9
0.695000	---	40.91	60.00	19.09	5000.0	9.000	L1	19.9
0.695000	48.38	---	73.00	24.62	5000.0	9.000	L1	19.9
1.735000	---	32.50	60.00	27.50	5000.0	9.000	L1	20.3
1.735000	40.25	---	73.00	32.75	5000.0	9.000	L1	20.3
2.060000	---	32.35	60.00	27.65	5000.0	9.000	L1	20.3
2.060000	40.63	---	73.00	32.37	5000.0	9.000	L1	20.3
5.315000	---	34.46	60.00	25.54	5000.0	9.000	L1	19.6
5.315000	39.21	---	73.00	33.79	5000.0	9.000	L1	19.6
6.100000	---	33.08	60.00	26.92	5000.0	9.000	L1	19.6
6.100000	38.93	---	73.00	34.07	5000.0	9.000	L1	19.6

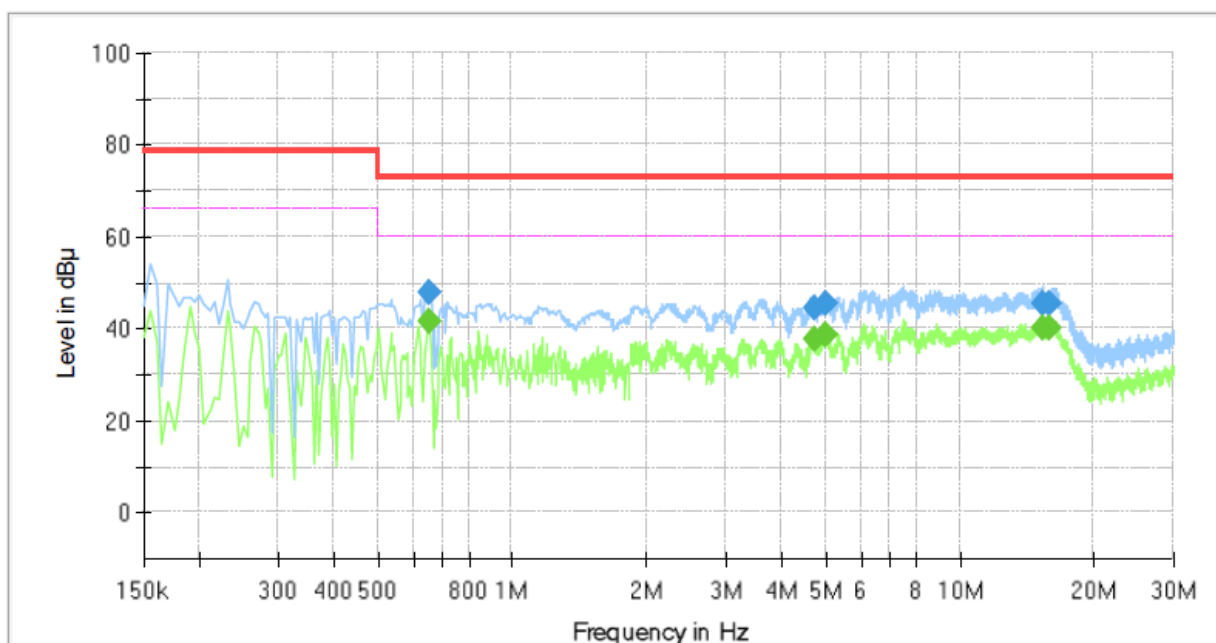
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[NEUTRAL]
Common Information

Test Description:	Conducted Emission
Model No.:	SMT-2710
Phase:	N
Mode:	D-SUB
Operator Name:	KES


Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.650000	---	41.49	60.00	18.51	5000.0	9.000	N	19.9
0.650000	47.78	---	73.00	25.22	5000.0	9.000	N	19.9
4.730000	---	37.55	60.00	22.45	5000.0	9.000	N	19.7
4.730000	44.49	---	73.00	28.51	5000.0	9.000	N	19.7
5.000000	---	38.77	60.00	21.23	5000.0	9.000	N	19.7
5.000000	45.25	---	73.00	27.75	5000.0	9.000	N	19.7
15.235000	---	40.28	60.00	19.72	5000.0	9.000	N	19.9
15.235000	45.33	---	73.00	27.67	5000.0	9.000	N	19.9
15.920000	---	40.31	60.00	19.69	5000.0	9.000	N	19.9
15.920000	45.34	---	73.00	27.66	5000.0	9.000	N	19.9

◆ Calculation

$$\text{QuasiPeak [dBuV]} / \text{CAverage [dBuV]} = \text{Reading Value [dBuV]} + \text{Corr. [dB]}$$

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

Corr. : Correction values (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

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Page (50) of (78)

Conducted Emissions at Telecommunication Ports [100 Mbps]

N/A

◆ Calculation

QuasiPeak[dBuV] / CAverage [dBuV] = Reading Value[dBuV] + Corr. [dB]

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

Corr. : Correction values (ISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

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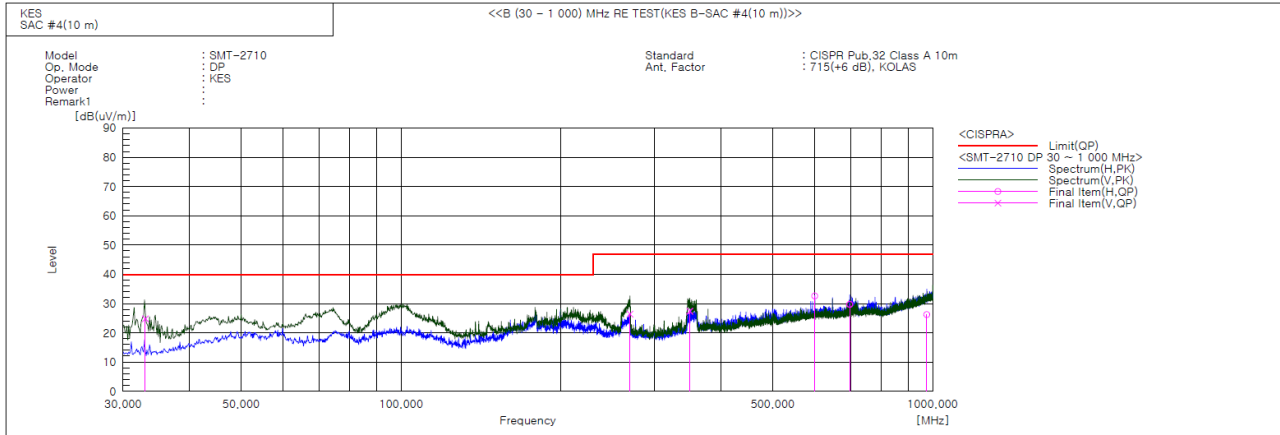
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Report No.:
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Page (51) of (78)

Radiated Electric Field Emissions(Below 1 GHz)

■ DP Mode



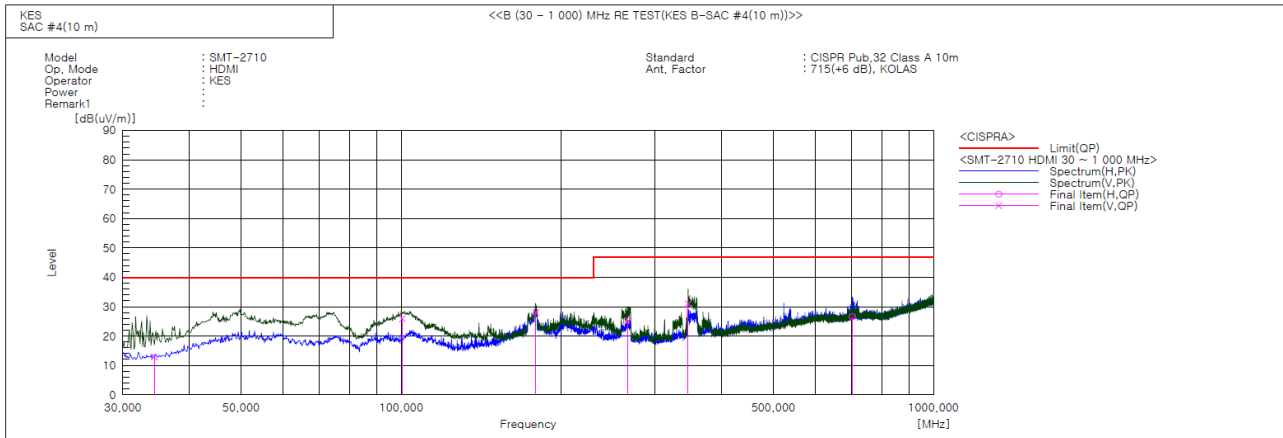
Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	33.013	V	49.5	-24.7	24.8	40.0	15.2	100.0	301.0	
2	269.509	V	45.3	-18.9	26.4	47.0	20.6	122.0	174.0	
3	348.997	V	42.7	-15.3	27.4	47.0	19.6	131.0	10.0	
4	599.998	H	40.8	-8.2	32.6	47.0	14.4	374.0	240.0	
5	697.966	H	37.3	-7.6	29.7	47.0	17.3	381.0	132.0	
6	974.570	H	29.0	-2.8	26.2	47.0	20.8	355.0	329.0	

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HDMI Mode

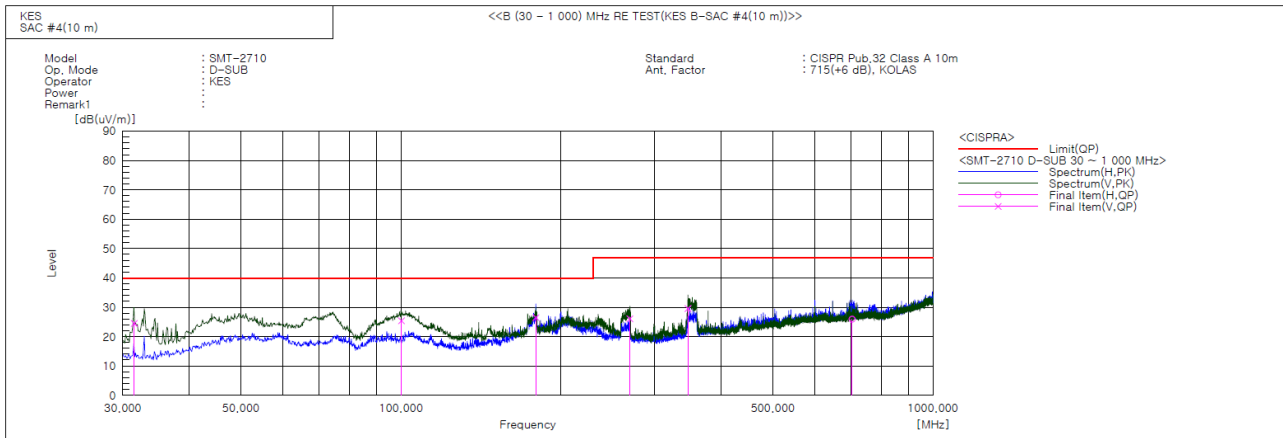


Final Result

No.	Frequency	(P)	Reading	c.f	Result	Limit	Margin	Height	Angle	Remark
	[MHz]		QP [dB(uV)]	[dB(1/m)]	QP [dB(uV/m)]	QP [dB(uV/m)]	QP [dB]	[cm]	[deg]	
1	34.347	V	37.4	-24.5	12.9	40.0	27.1	100.0	198.0	
2	100.378	V	48.3	-22.4	25.9	40.0	14.1	111.0	161.0	
3	178.905	V	51.7	-23.7	28.0	40.0	12.0	121.0	308.0	
4	266.804	V	44.3	-19.0	25.3	47.0	21.7	100.0	154.0	
5	345.834	V	46.4	-15.4	31.0	47.0	16.0	122.0	154.0	
6	703.706	H	34.2	-7.6	26.6	47.0	20.4	357.0	130.0	



D-SUB Mode



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	31.523	V	49.4	-24.9	24.5	40.0	15.5	100.0	256.0	
2	100.198	V	47.8	-22.4	25.4	40.0	14.6	110.0	121.0	
3	179.293	V	50.2	-23.7	26.5	40.0	13.5	116.0	318.0	
4	269.273	V	45.0	-18.9	26.1	47.0	20.9	124.0	155.0	
5	346.184	V	45.0	-15.4	29.6	47.0	17.4	136.0	144.0	
6	704.540	H	33.5	-7.6	25.9	47.0	21.1	361.0	138.0	

◆ Calculation - SAC #4(10 m)

Result(QP) [dB(μV/m)] = (Reading(QP)[dB(μV)] + c.f[dB(1/m)])

Margin(QP)[dB] = Limit[dB(μV/m)] - Result(QP) [dB(μV/m)]

Reading(QP) : Reading value, Result(QP) : Reading value + Factor value

Limit(QP) : Limit value, c.f : (ANT Factor + Cable Loss - Preamplifier Factor), Margin: Margin value



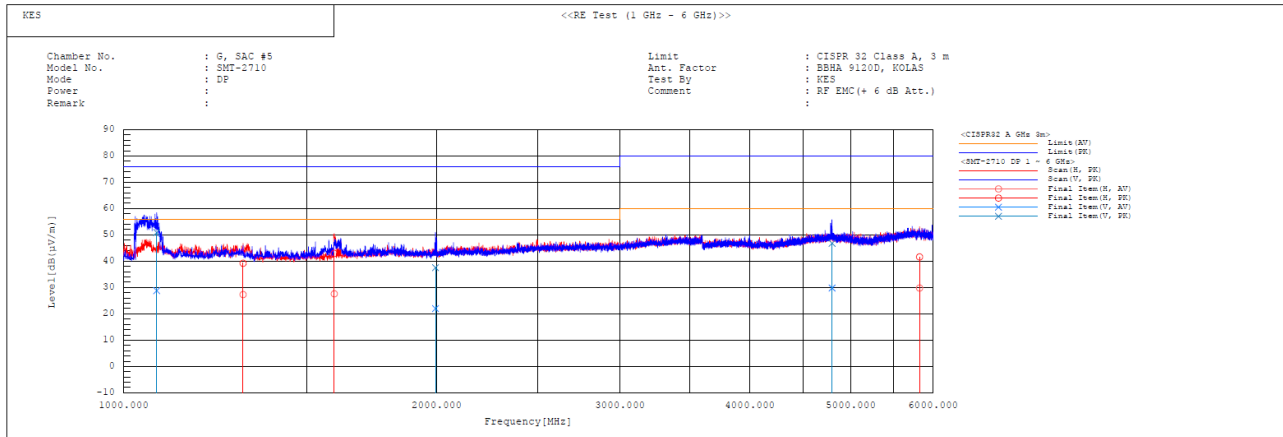
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Report No.:
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Page (54) of (78)

Radiated Electric Field Emissions(Above 1 GHz)

DP Mode



Final Result

No.	Frequency [MHz]	Pol	Reading AV [dB(μV)]	Reading PK [dB(μV)]	c.f [dB(1/m)]	Result AV [dB(μV/m)]	Result PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Remark
1	1075.748	V	30.7	52.8	-1.9	28.8	50.9	56.0	76.0	27.2	25.1	100.0	187.7	
2	1302.618	H	27.8	39.7	-0.5	27.3	39.2	56.0	76.0	28.7	36.8	100.0	37.6	
3	1593.402	H	27.3	42.7	0.3	27.6	43.0	56.0	76.0	28.4	33.0	100.0	203.7	
4	1994.110	V	20.0	35.5	2.0	22.0	37.5	56.0	76.0	34.0	38.5	100.0	348.4	
5	4795.824	V	19.8	36.8	10.0	29.8	46.8	60.0	80.0	30.2	33.2	100.0	144.2	
6	5820.345	H	17.2	29.0	12.6	29.8	41.6	60.0	80.0	30.2	38.4	100.0	171.4	

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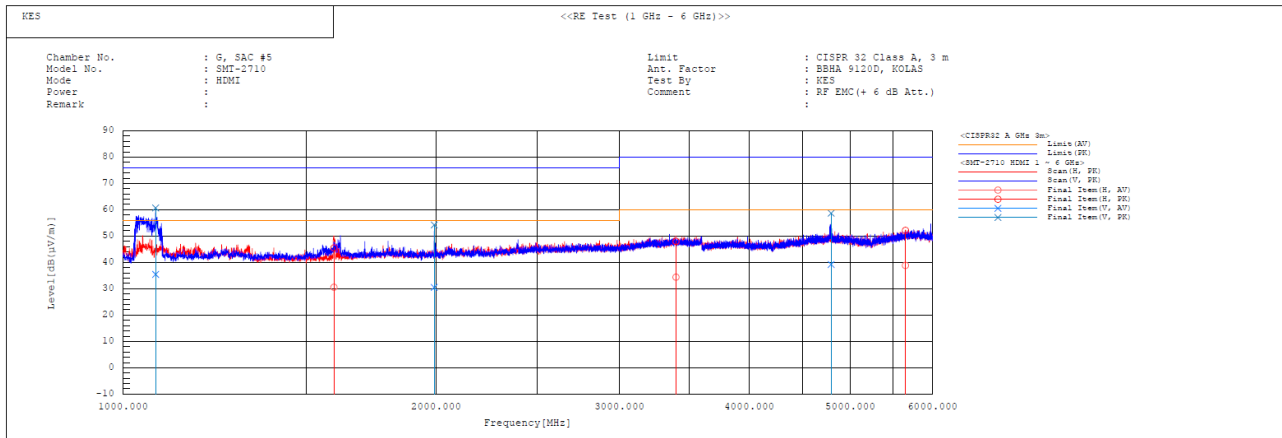


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Page (55) of (78)

HDMI Mode



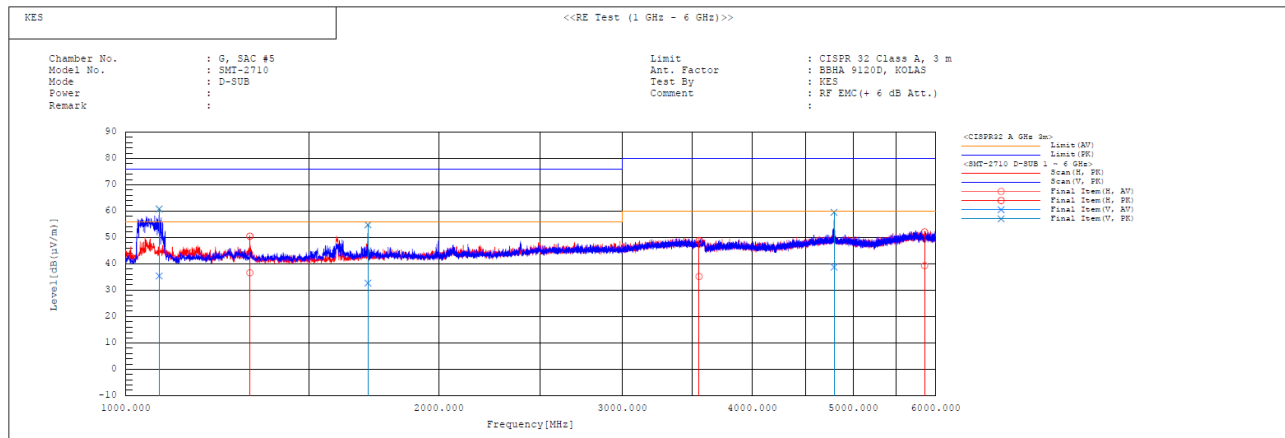
Final Result

No.	Frequency	Pol	Reading AV	Reading PK	c.f	Result AV	Result PK	Limit AV	Limit PK	Margin AV	Margin PK	Height	Angle	Remark
	[MHz]		[dB(μV)]	[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[dB]	[cm]	[deg]	
1	1074.708	V	37.4	62.6	-1.9	35.5	60.7	56.0	76.0	20.5	15.3	100.0	189.2	
2	1594.403	H	30.3	45.2	0.3	30.6	45.5	56.0	76.0	25.4	30.5	100.0	209.1	
3	1990.616	V	28.5	52.2	2.0	30.5	54.2	56.0	76.0	25.5	21.8	100.0	343.2	
4	3398.852	H	28.6	42.2	5.8	34.4	48.0	60.0	80.0	25.6	32.0	100.0	89.5	
5	4792.010	V	29.2	48.7	10.0	39.2	58.7	60.0	80.0	20.8	21.3	100.0	38.4	
6	5648.585	H	27.0	40.3	11.9	38.9	52.2	60.0	80.0	21.1	27.8	100.0	173.8	

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D-SUB Mode



Final Result

No.	Frequency	Pol	Reading AV	Reading PK	c.f	Result AV	Result PK	Limit AV	Limit PK	Margin AV	Margin PK	Height	Angle	Remark
	[MHz]		[dB(μV)]	[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[dB]	[cm]	[deg]	
1	1076.834	V	37.3	62.7	-1.9	35.4	60.8	56.0	76.0	20.6	15.2	100.0	183.6	
2	1316.182	H	37.0	50.9	-0.4	36.6	50.5	56.0	76.0	19.4	25.5	100.0	45.0	
3	1708.282	V	31.6	53.7	1.1	32.7	54.8	56.0	76.0	23.3	21.2	100.0	328.0	
4	3553.985	H	29.3	42.9	5.9	35.2	48.8	60.0	80.0	24.8	31.2	100.0	333.6	
5	4791.211	V	28.7	49.5	10.0	38.7	59.5	60.0	80.0	21.3	20.5	100.0	22.9	
6	5851.685	H	26.7	39.5	12.6	39.3	52.1	60.0	80.0	20.7	27.9	100.0	329.2	

◆ Calculation

Result(PK/CAV) [dB(μV/m)] = (Reading(PK/CAV)[dB(μV)] + c.f[dB(1/m)])

Margin(PK/CAV)[dB] = Limit[dB(μV/m)] - Result(PK/CAV) [dB(μV/m)]

Reading(PK/CAV) : Reading value, Result(PK/CAV) : Reading value + Factor value

Limit(QP) : Limit value, c.f : (ANT Factor + Cable Loss - Preamp Factor), Margin: Margin value

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Report No.:

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Page (57) of (78)

Harmonic Current Emissions and Voltage Fluctuations and Flicker

■ DP Mode

Average harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	0.103			
2	0.002			
3	0.093	4.059	2.300	PASS
4	0.002			
5	0.088	7.734	1.140	PASS
6	0.002			
7	0.082	10.643	0.770	PASS
8	0.001			
9	0.073	18.290	0.400	PASS
10	0.002			
11	0.063	19.125	0.330	PASS
12	0.001			
13	0.053	25.451	0.210	PASS
14	0.001			
15	0.044	29.060	0.150	PASS
16	0.001			
17	0.033	25.071	0.132	PASS
18	0.001			
19	0.023	19.494	0.118	PASS
20	0.001			
21	0.014	8.933	0.161	PASS
22	0.001			
23	0.007	5.030	0.147	PASS
24	0.001			
25	0.003	2.175	0.135	n/a
26	0.001			
27	0.004	3.328	0.125	n/a
28	0.001			
29	0.006	5.382	0.117	PASS
30	0.001			
31	0.007	6.767	0.110	PASS
32	0.001			
33	0.008	7.423	0.102	PASS
34	0.001			
35	0.007	7.267	0.096	PASS
36	0.001			
37	0.006	6.231	0.092	PASS
38	0.001			
39	0.004	4.535	0.087	n/a
40	0.001			

Note: 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.

* Application of limits for average is 100% except for odd harmonics from 21 to 39, where 150% applies.

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Report No.:

KES-EM-23T0302

Page (58) of (78)

Test Data - Harmonics (continued)

Maximum harmonic current results

Hn	Ieff [A]	% of Limit	Limit [A]	Result
1	0.104			
2	0.002			
3	0.094	2.711	3.450	PASS
4	0.003			
5	0.088	5.163	1.710	PASS
6	0.002			
7	0.082	7.105	1.155	PASS
8	0.002			
9	0.073	12.228	0.600	PASS
10	0.002			
11	0.063	12.821	0.495	PASS
12	0.002			
13	0.054	17.111	0.315	PASS
14	0.001			
15	0.044	19.614	0.225	PASS
16	0.001			
17	0.034	17.007	0.198	PASS
18	0.001			
19	0.024	13.340	0.177	PASS
20	0.001			
21	0.015	9.295	0.161	PASS
22	0.001			
23	0.008	5.350	0.147	PASS
24	0.001			
25	0.003	2.286	0.135	n/a
26	0.001			
27	0.004	3.527	0.125	n/a
28	0.001			
29	0.007	5.565	0.117	PASS
30	0.001			
31	0.008	6.973	0.110	PASS
32	0.001			
33	0.008	7.581	0.102	PASS
34	0.001			
35	0.007	7.517	0.096	PASS
36	0.001			
37	0.006	6.547	0.092	PASS
38	0.001			
39	0.004	4.910	0.087	n/a
40	0.001			

Note: 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.

* Application of limits for average is 100% except for odd harmonics from 21 to 39, where 150% applies.

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Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:
KES-EM-23T0302
Page (59) of (78)

■ HDMI Mode

Average harmonic current results

Hn	Ieff [A]	% of Limit	Limit [A]	Result
1	0.103			
2	0.002			
3	0.093	4.045	2.300	PASS
4	0.003			
5	0.088	7.735	1.140	PASS
6	0.002			
7	0.082	10.700	0.770	PASS
8	0.002			
9	0.074	18.528	0.400	PASS
10	0.002			
11	0.065	19.577	0.330	PASS
12	0.002			
13	0.055	26.379	0.210	PASS
14	0.001			
15	0.046	30.590	0.150	PASS
16	0.001			
17	0.036	27.022	0.132	PASS
18	0.001			
19	0.026	21.800	0.118	PASS
20	0.001			
21	0.017	10.592	0.161	PASS
22	0.001			
23	0.010	6.653	0.147	PASS
24	0.001			
25	0.004	3.147	0.135	n/a
26	0.001			
27	0.003	2.447	0.125	n/a
28	0.001			
29	0.005	4.480	0.117	PASS
30	0.001			
31	0.007	6.270	0.110	PASS
32	0.001			
33	0.008	7.409	0.102	PASS
34	0.001			
35	0.007	7.741	0.096	PASS
36	0.001			
37	0.007	7.132	0.092	PASS
38	0.001			
39	0.005	5.745	0.087	n/a
40	0.001			

Note: 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.

* Application of limits for average is 100% except for odd harmonics from 21 to 39, where 150% applies.

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KES-EM-23T0302

Page (60) of (78)

Test Data - Harmonics (continued)

Maximum harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	0.103			
2	0.002			
3	0.093	2.699	3.450	PASS
4	0.003			
5	0.088	5.167	1.710	PASS
6	0.002			
7	0.083	7.145	1.155	PASS
8	0.002			
9	0.074	12.381	0.600	PASS
10	0.003			
11	0.065	13.141	0.495	PASS
12	0.002			
13	0.056	17.654	0.315	PASS
14	0.001			
15	0.046	20.514	0.225	PASS
16	0.001			
17	0.036	18.171	0.198	PASS
18	0.001			
19	0.026	14.721	0.177	PASS
20	0.001			
21	0.017	10.764	0.161	PASS
22	0.001			
23	0.010	6.844	0.147	PASS
24	0.001			
25	0.005	3.349	0.135	n/a
26	0.001			
27	0.003	2.582	0.125	n/a
28	0.001			
29	0.005	4.604	0.117	PASS
30	0.001			
31	0.007	6.513	0.110	PASS
32	0.001			
33	0.008	7.550	0.102	PASS
34	0.001			
35	0.008	7.866	0.096	PASS
36	0.001			
37	0.007	7.268	0.092	PASS
38	0.001			
39	0.005	5.905	0.087	PASS
40	0.001			

Note: 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.

* Application of limits for average is 100% except for odd harmonics from 21 to 39, where 150% applies.

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KES-EM-23T0302
Page (61) of (78)

■ D-SUB Mode**Average harmonic current results**

Hn	Ieff [A]	% of Limit	Limit [A]	Result
1	0.103			
2	0.002			
3	0.093	4.058	2.300	PASS
4	0.002			
5	0.088	7.747	1.140	PASS
6	0.002			
7	0.082	10.691	0.770	PASS
8	0.002			
9	0.074	18.442	0.400	PASS
10	0.002			
11	0.064	19.387	0.330	PASS
12	0.001			
13	0.055	25.978	0.210	PASS
14	0.001			
15	0.045	29.907	0.150	PASS
16	0.001			
17	0.034	26.134	0.132	PASS
18	0.001			
19	0.024	20.761	0.118	PASS
20	0.001			
21	0.016	9.850	0.161	PASS
22	0.001			
23	0.009	5.929	0.147	PASS
24	0.001			
25	0.004	2.626	0.135	n/a
26	0.001			
27	0.003	2.707	0.125	n/a
28	0.001			
29	0.006	4.784	0.117	PASS
30	0.001			
31	0.007	6.383	0.110	PASS
32	0.001			
33	0.007	7.294	0.102	PASS
34	0.001			
35	0.007	7.416	0.096	PASS
36	0.001			
37	0.006	6.623	0.092	PASS
38	0.001			
39	0.004	5.107	0.087	n/a
40	0.001			

Note: 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.

* Application of limits for average is 100% except for odd harmonics from 21 to 39, where 150% applies.

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Page (62) of (78)

Test Data - Harmonics (continued)

Maximum harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	0.103			
2	0.002			
3	0.093	2.709	3.450	PASS
4	0.003			
5	0.088	5.170	1.710	PASS
6	0.002			
7	0.082	7.141	1.155	PASS
8	0.002			
9	0.074	12.321	0.600	PASS
10	0.002			
11	0.065	13.056	0.495	PASS
12	0.002			
13	0.055	17.409	0.315	PASS
14	0.001			
15	0.045	20.097	0.225	PASS
16	0.001			
17	0.035	17.593	0.198	PASS
18	0.001			
19	0.025	14.028	0.177	PASS
20	0.001			
21	0.016	10.039	0.161	PASS
22	0.001			
23	0.009	6.140	0.147	PASS
24	0.001			
25	0.004	2.789	0.135	n/a
26	0.001			
27	0.004	2.833	0.125	n/a
28	0.001			
29	0.006	4.899	0.117	PASS
30	0.001			
31	0.007	6.575	0.110	PASS
32	0.001			
33	0.008	7.403	0.102	PASS
34	0.001			
35	0.007	7.585	0.096	PASS
36	0.001			
37	0.006	6.834	0.092	PASS
38	0.001			
39	0.005	5.346	0.087	n/a
40	0.001			

Note: 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.

* Application of limits for average is 100% except for odd harmonics from 21 to 39, where 150% applies.

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Page (63) of (78)

Test Data - Voltage Fluctuations**■ DP Mode**

Flicker Measurements					
	P_{It}	Max P_{st}	Max D_c	Max D_{max}	Max T_{max}
Line 1:	0.028	0.028	0	< 0.2	0
Limits:	0.65	1	3.3	4	0.5
Results:	PASS	PASS	PASS	PASS	PASS

■ HDMI Mode

Flicker Measurements					
	P_{It}	Max P_{st}	Max D_c	Max D_{max}	Max T_{max}
Line 1:	0.028	0.028	0	< 0.2	0
Limits:	0.65	1	3.3	4	0.5
Results:	PASS	PASS	PASS	PASS	PASS

■ D-SUB Mode

Flicker Measurements					
	P_{It}	Max P_{st}	Max D_c	Max D_{max}	Max T_{max}
Line 1:	0.028	0.028	0	< 0.2	0
Limits:	0.65	1	3.3	4	0.5
Results:	PASS	PASS	PASS	PASS	PASS

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APPENDIX B – Test Setup Photos and Configuration

Conducted Voltage Emissions



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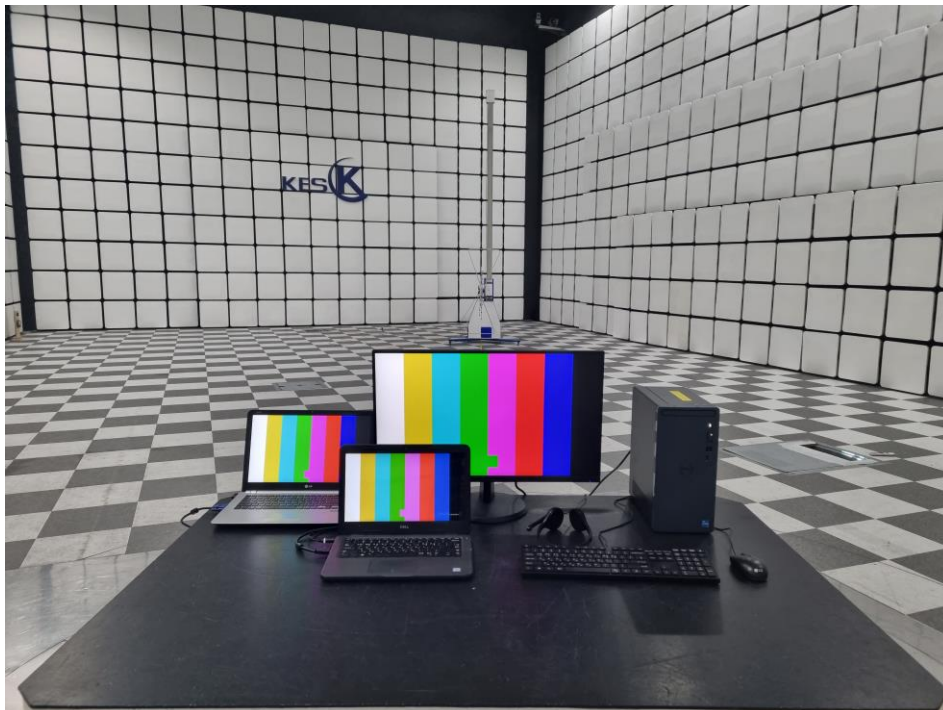
Report No.:
KES-EM-23T0302
Page (65) of (78)

Conducted Telecommunication Emissions

N/A

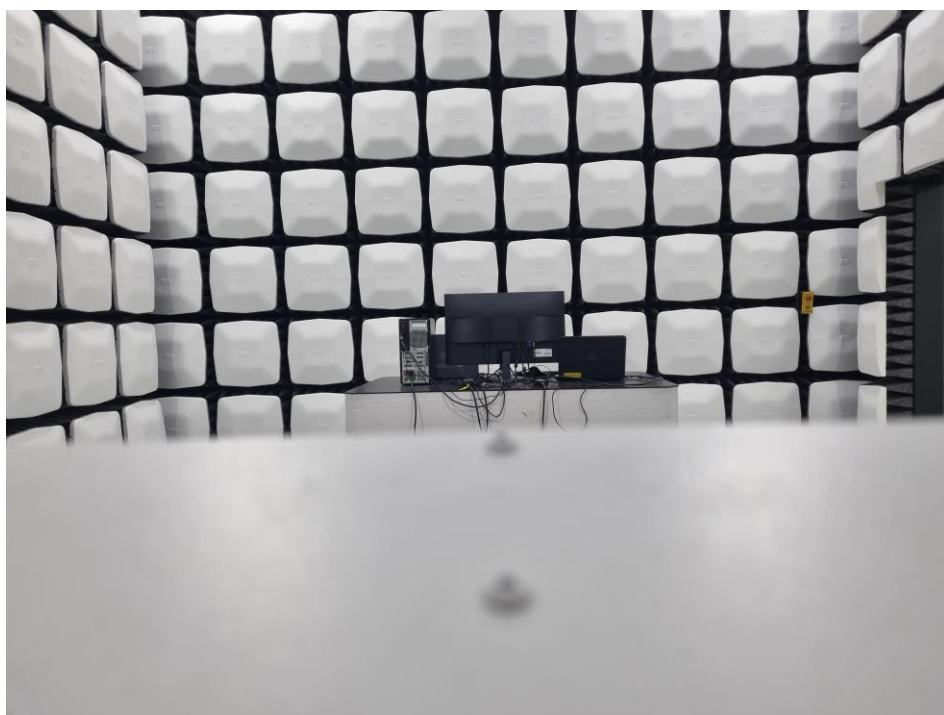
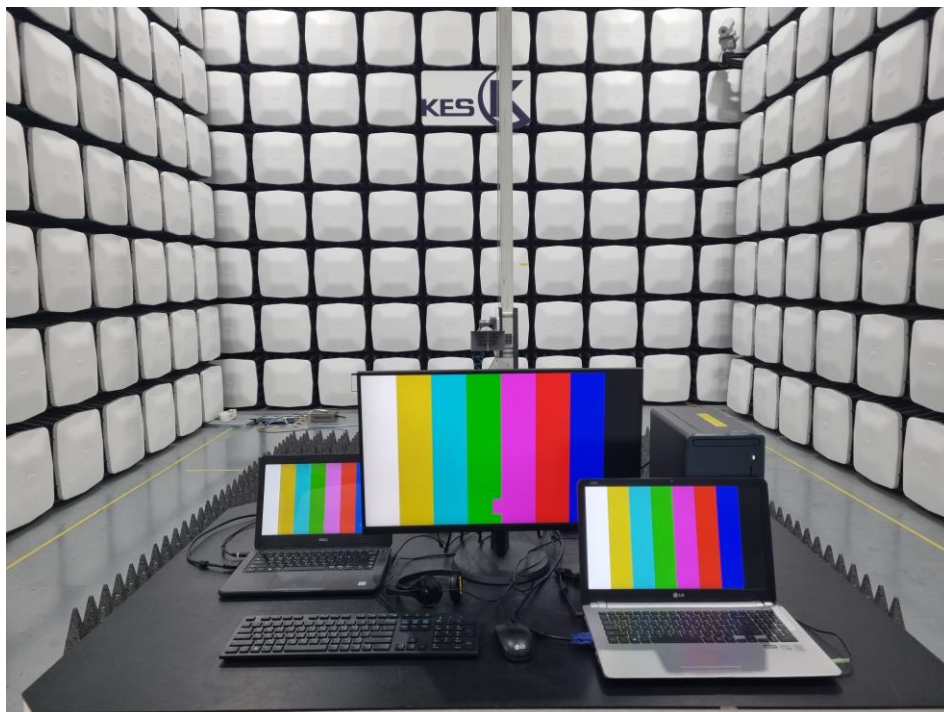
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Radiated Electric Field Emissions(Below 1 GHz)



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Radiated Electric Field Emissions(Above 1 GHz)



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Harmonic Current Emissions and Voltage Fluctuations and Flicker



Electrostatic Discharge



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Radiated Electric Field Immunity



Electrical Fast Transients/Bursts

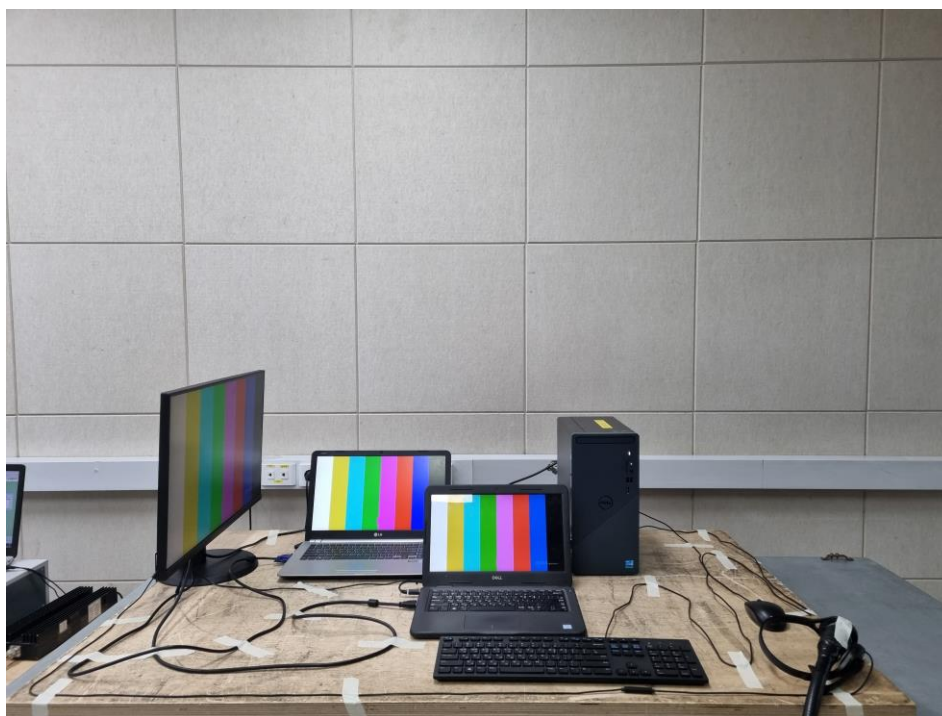


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Surge Transients



Conducted Disturbance

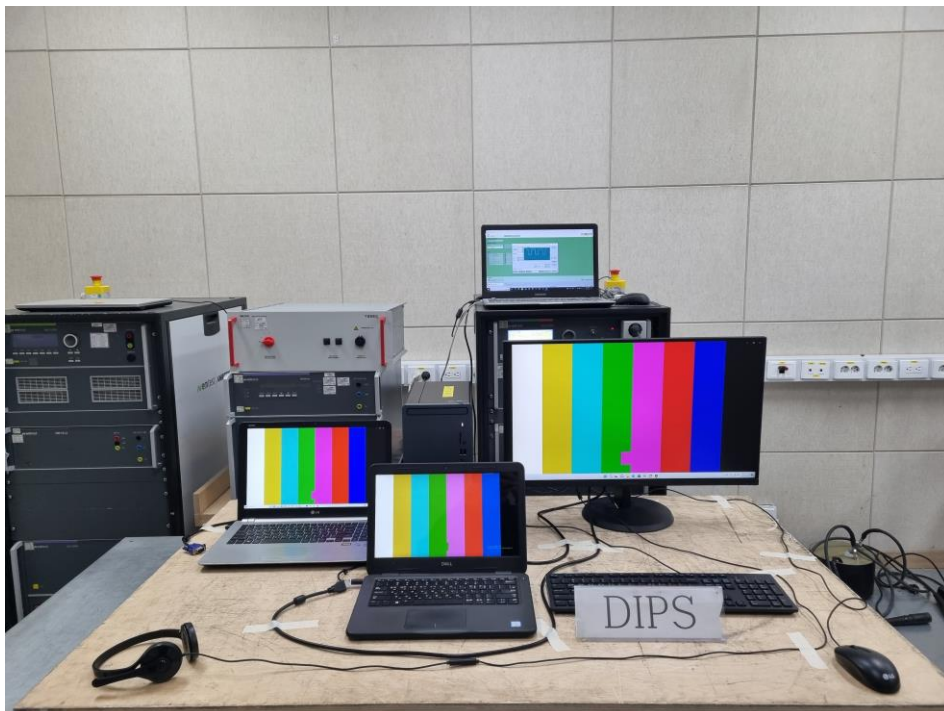


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Power Frequency Magnetic Field Immunity

N/A

Voltage Dips and Short Interruptions



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APPENDIX C – EUT Photographs EUT External Photographs

(Top)



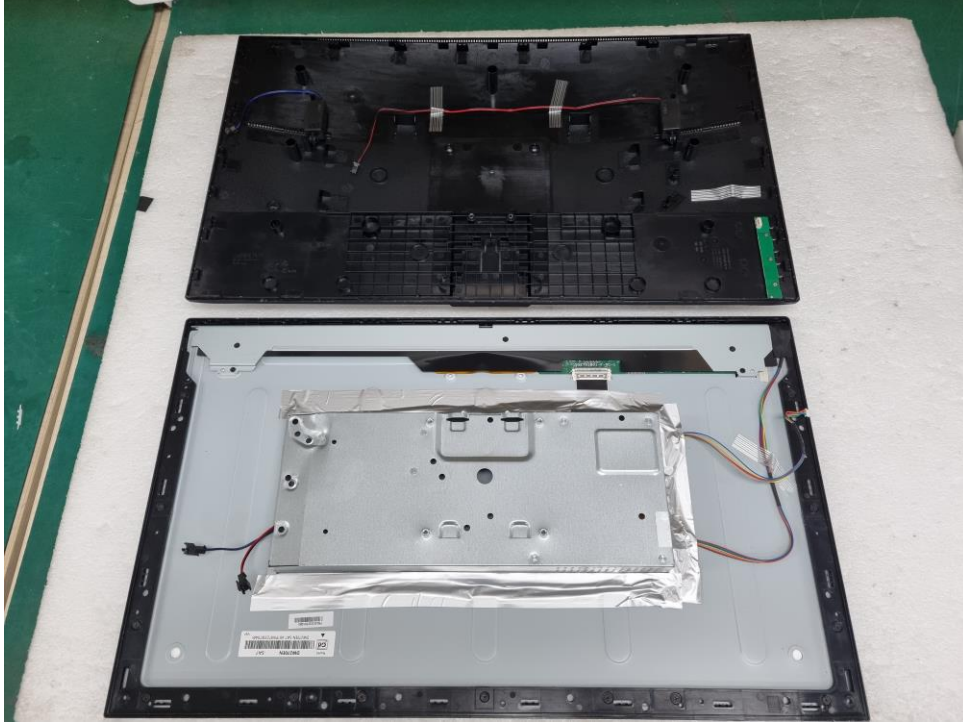
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EUT Internal Photographs

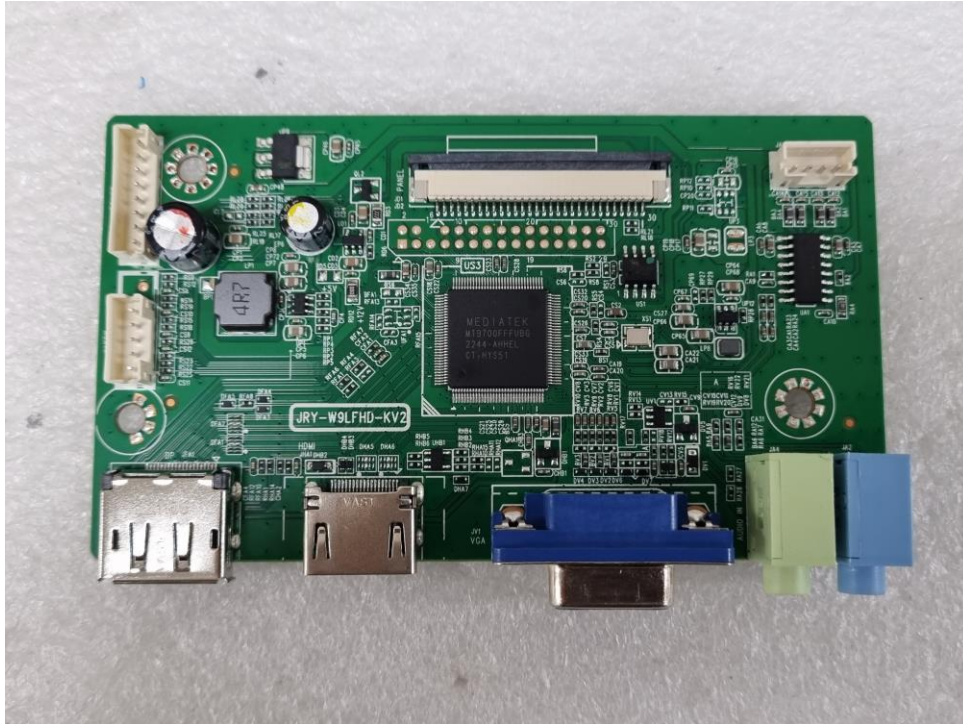
(Internal View)



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EUT Internal View – Main Board

(Top)



(Bottom)



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EUT Internal View – Button Board

(Top)



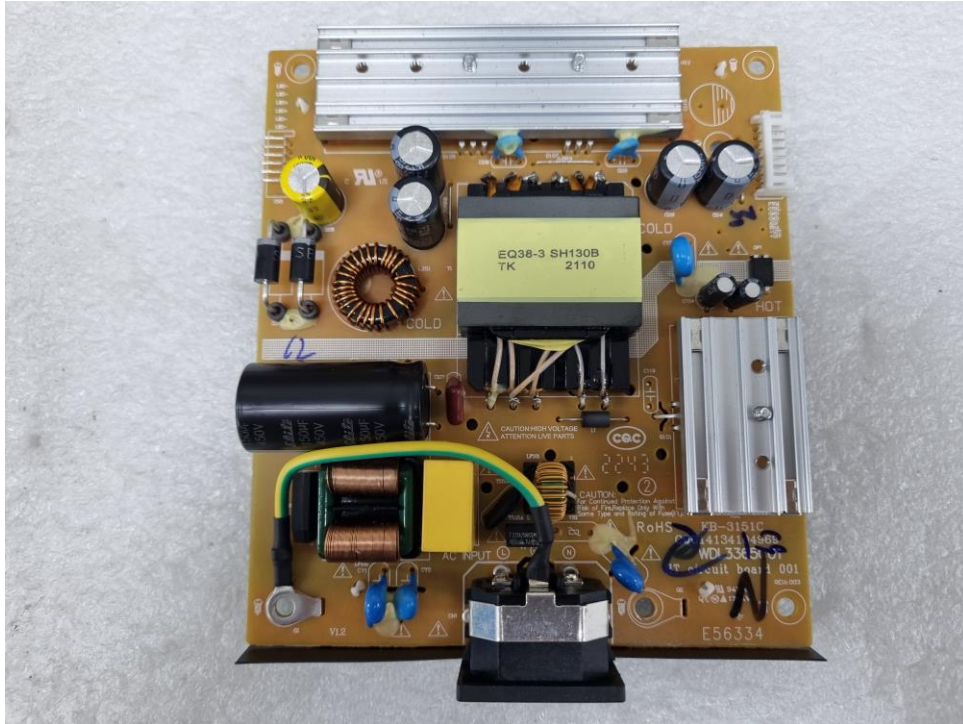
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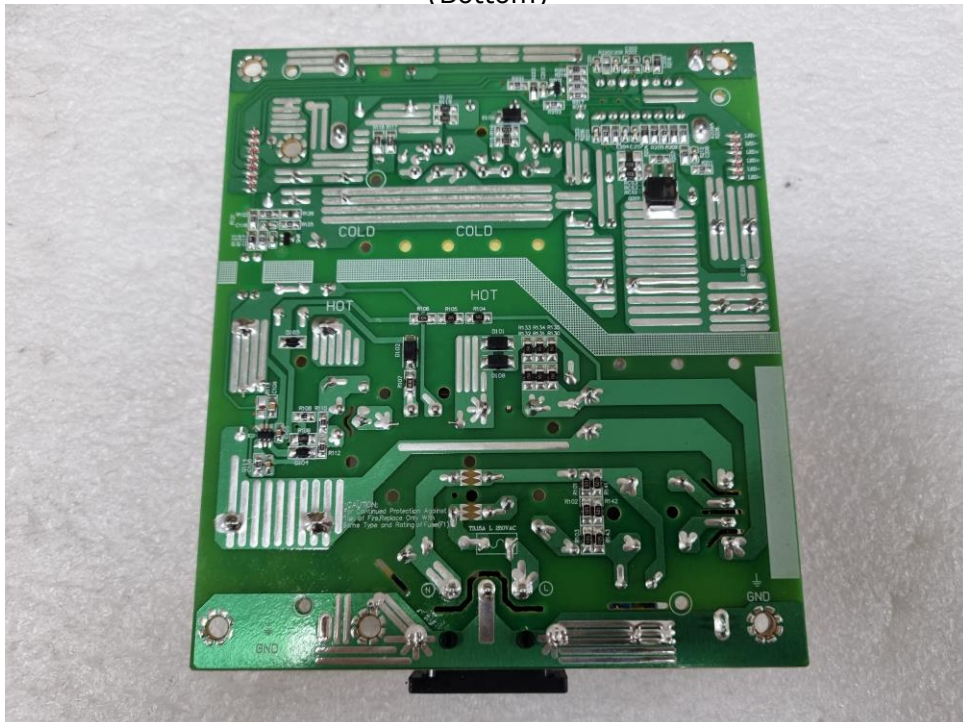
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EUT Internal View – Power Board

(Top)



(Bottom)



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EUT Internal View – Panel

(Top)



(Bottom)



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Label and Location

**Security LED MONITOR**

Model No : SMT-2710

Manufacturer : Weihai Daewoo Electronics Co., Ltd.

Made in China

