



EMC TEST REPORT For CE

Test Report No. : KES-E1-17T0399
Date of Issue : Jun. 28, 2017
Product name : LED MONITOR
Model/Type No. : SMT-1931
Variant Model : -
Applicant : Hanwha Techwin Co., Ltd.
Applicant Address : 1204, Changwon-daero, Seongsan-gu, Changwon-si,
Gyeongsangnam-do, 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 : Jun. 15, 2017
Test date : Jun. 22, 2017 – Jun. 24, 2017
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

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Reviewed by

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Test report No.:
KES-E1-17T0399
Page (2) of (83)

REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Jun. 28, 2017	KES-E1-17T0399	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	E.U.T Operating Mode(s)	7
1.8	Configuration.....	8
1.9	Calibration Details of Equipment Used for Measurement	9
1.10	Test Facility	9
1.11	Laboratory Accreditations and Listings	9
2.0	Test Regulations.....	10
2.1	Conducted Emissions at Mains Power Ports	12
2.2	Conducted Emissions at Telecommunication Ports	13
2.3	Radiated Electric Field Emissions(Below 1 GHz)	14
2.4	Radiated Electric Field Emissions(Above 1 GHz)	15
2.5	Harmonic Current Emissions.....	16
2.6	Voltage Fluctuations and Flicker	17
3.0	Criteria for compliance.....	18
3.1	Electrostatic Discharge.....	20
3.2	Radiated Electric Field Immunity	26
3.3	Electrical Fast Transients/Bursts	30
3.4	Surge Transients	33
3.5	Conducted Disturbance	38
3.6	Voltage Dips and Short Interruptions	42
APPENDIX A	– TEST DATA.....	45
	Conducted Emissions at Mains Power Ports.....	45
	Conducted Emissions at Telecommunication Ports	51
	Radiated Electric Field Emissions(Below 1 GHz)	53
	Radiated Electric Field Emissions(Above 1 GHz).....	56
	Harmonic Current Emissions and Voltage Fluctuations and Flicker	59
	Test Setup Photos and Configuration	66
	Conducted Voltage Emissions	66
	Conducted Telecommunication Emissions	67
	Radiated Electric Field Emissions(Below 1 GHz)	68
	Radiated Electric Field Emissions(Above 1 GHz).....	69
	Harmonic Current Emissions and Voltage Fluctuations and Flicker	70
	Electrostatic Discharge	71
	Radiated Electric Field Immunity	71
	Electrical Fast Transients/Bursts	72
	Surge Transients	73
	Conducted Disturbance	74
	Voltage Dips and Short Interruptions.....	75
	EUT External Photographs	76
	EUT Internal Photographs	77

1.0 General Product Description

Main Specifications of E.U.T are:

Display		LED	
Screen Size		19"	
Max. Resolution		1366 x 768	
Brightness		250cd/m2	
Contrast Ratio		1,000 : 1	
Aspect Ratio		16:9	
Viewing Angle (H/V)		170°/160°	
Display Color		16.7Million	
Response Time		5ms	
Video System		NTSC / PAL	
Panel Life		30,000 hours	
Filter Type		3D Combfilter	
Interface			
Video	Connector	BNC types: (2 in/2 out)	
RGB	Connector	One(1) Analog RGB 15-pin D-sub	
	Input signal	0.7 Vp-p ±5 %	
HDMI	Connector	One(1) HDMI input (type A connector)	
Audio	Connector	Two(2) RCA type (2 stereo inputs)	
	Output signal	Speakers: two(2) x 1 W	
Application Support		Remote Controller	
On Screen Display		Samsung UI	
Functions		VESA™ DPM Compatible	
Language		English, Spanish, French, German, Italian, Portuguese, Russian Swedish, Turkish, Thai,Dutch,Danish,Arabic,Chinese, Japanese, Korea	
General		Auto Switch	
Electrical	Input Voltage	AC100 ~ 240V (50/60Hz)	
	Power consumption	30w	PV 阶段确认
Environmental	Operating Temperature	0 ~ +40°C (+32°F ~ +104°F)	
	Humidity	20% – 90% (non-condensing)	
Mechanical	Dimensions with Stand (WxHxD)	446.4mm x 359.6mm x 217.4mm	
	Dimensions without Stand (WxHxD)	446.4mm x 59.4mm x 276.9mm	
	Weight	4.7kg	
	LCD Protection Glass	Yes	
	Cabinet Color	Black	
	VESA Mounts Interface	100mm x 100mm	



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.

Voltage ☒ 230Vac ☐ 100 Vac ☐ 24 Vac ☐ 12 Vdc ☐ PoE
Frequency ☒ 50 Hz ☐ 60 Hz ☐ 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
LED MONITOR	SMT-1931	-	Weihai Daewoo Electronics Co.,Ltd.	E.U.T
Remote Control	-	-	-	-

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Notebook	NT63025J	JK9091EF400432X	Samsung Electronics Co., Ltd.	-
Notebook Adaptor	A13-040N2A	CN60BA4400313AD 0N843KO243	Chicony Power Technology (suzhou)Co., Ltd.	-
MONITOR	SMT-1935	-	Weihai Daewoo Electronics Co.,Ltd.	-
DVD PLAYER	KRIZER FLAVO HDV-808PRO	2010070920	Shenzhen, YALIJIA Electronics Co., Ltd.	-
USB Memory	-	-	Sandisk	16 GB



1.6 External I/O Cabling

- D-SUB Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
LED MONITOR (E.U.T)	D-SUB	Notebook	D-SUB	1.5	S

* Unshielded=U, Shielded=S

- HDMI Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
LED MONITOR (E.U.T)	HDMI	Notebook	HDMI	1.5	S

* Unshielded=U, Shielded=S

- BNC Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
LED MONITOR (E.U.T)	BNC out	MONITOR	BNC in	3.0	S
	BNC in	DVD PLAYER	BNC out	3.0	S
	Audio in		Audio out (R)	1.0	U
	Audio in		Audio out (L)	1.0	U
DVD PLAYER	USB	USB Memory	USB	-	-

* Unshielded=U, Shielded=S

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Test report No.:
KES-E1-17T0399
Page (7) of (83)

1.7 E.U.T Operating Mode(s)

Test mode	operating
D-SUB	E.U.T Monitoring
HDMI	E.U.T Monitoring
BNC	E.U.T Monitoring

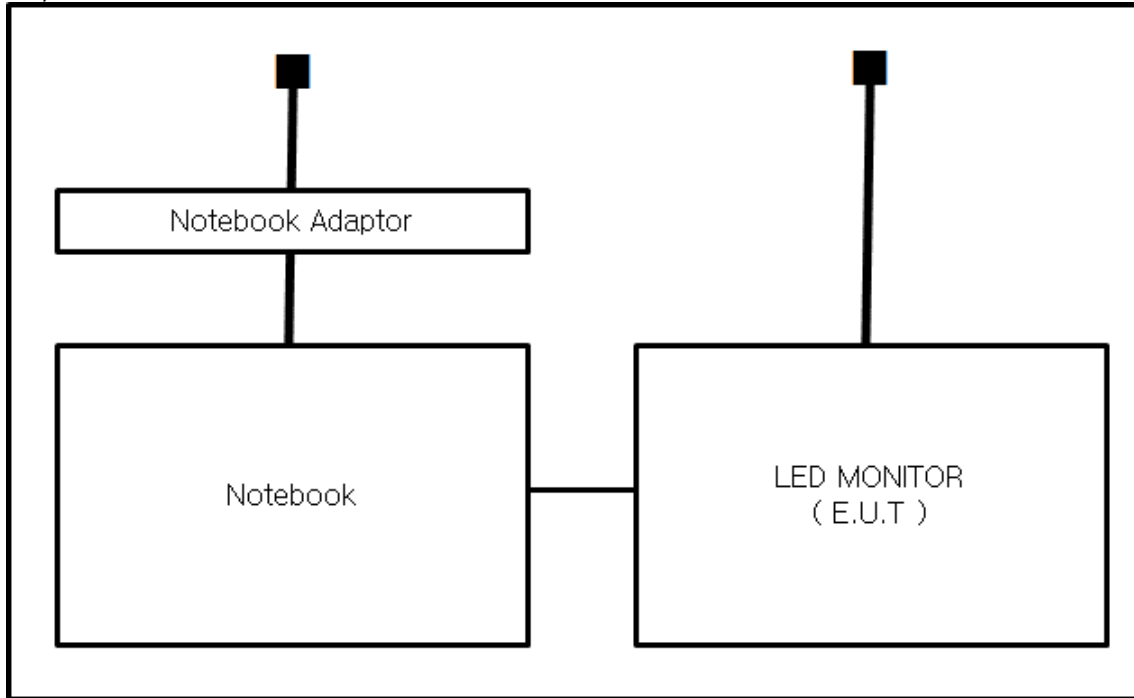
E.U.T Test operating S/W		
Name	Version	Manufacture Company
-	-	-

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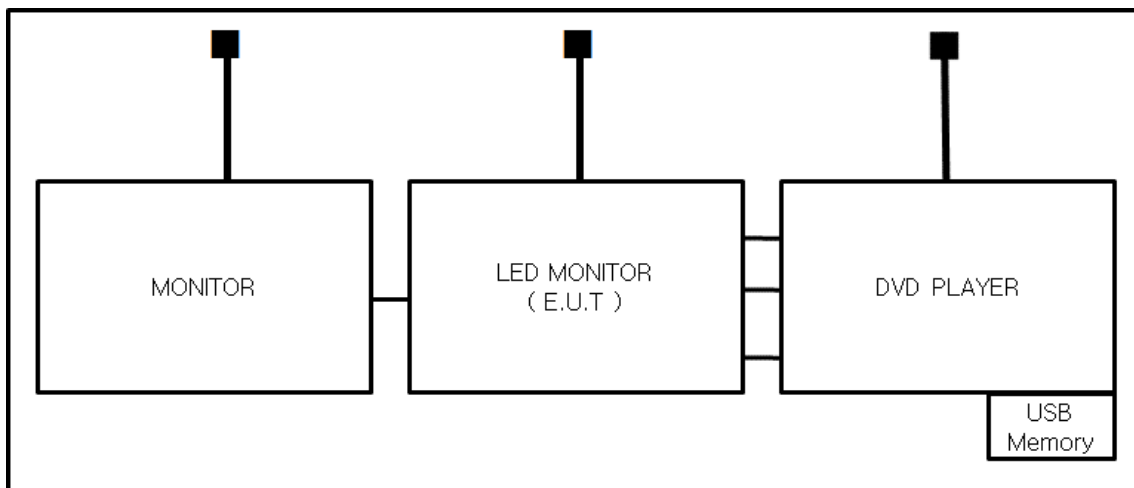
1.8 Configuration

■ AC Main
 □ DC Main

- D-SUB, HDMI Mode



- BNC Mode



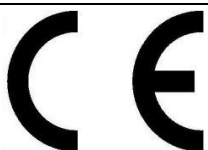
1.9 Calibration Details of Equipment Used for Measurement

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.

1.10 Test Facility

The measurement facility is located at 473-21 Gayeo-ro, Yeoju-si, Gyeonggi-do, 12658, Korea. The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22.

1.11 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3 & 10 meter Open Area Test Sites and one conducted site to perform FCC Part 15/18 measurements.	
JAPAN	VCCI	Mains Ports Conducted Interference Measurement, Telecommunication Ports Conducted Disturbance Measurement and Radiation 10 meter site, Facility for measuring radiated disturbance above 1 GHz	 R-4308, C-4798, T-2311, G-914
KOREA	MSIP	EMI (10 meter Open Area Test Site and two conducted sites) Radio(3 & 10 meter Open Area Test Sites and one conducted site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 KR0100
Canada	IC	3 & 10 meter Open Area Test Sites and one conducted site	 4769B-1
Europe	CE	EMI (10 meter Open Area Test Site and two conducted sites) Radio(3 & 10 meter Open Area Test Sites and one conducted site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	
International	KOLAS	EMI (10 meter Open Area Test Site and two conducted sites) Radio(3 & 10 meter Open Area Test Sites and one conducted site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	

2.0 Test Regulations

The emissions tests were performed according to following regulations:

☒ **EMC – Directive 2014/30/EU**

☐ EN 61000-6-3:2011

☐ EN 61000-6-1:2007

☐ EN 61000-6-4:2007 +A1:2011

☐ EN 61000-6-2:2005

☐ EN 55011:2007 +A1:2010

☐ Group 1
☐ Class A

☐ Group 2
☐ Class B

☐ EN 55014-1:2006 +A2:2011

☐ EN 55014-2:1997 +A2:2008

☐ EN 55015:2013

☐ EN 61547:2009

☒ EN 55032:2012/AC:2013

☒ Class A

☐ Class B

☒ EN 55024:2010 +A1:2015

☐ EN 50130-4:2011 +A1:2014

☒ EN 61000-3-2:2014

☒ EN 61000-3-3:2013

☐ EN 61326-1:2013



-
- | | | |
|---|----------------------------------|----------------------------------|
| ☐ VCCI V-3 / 2015.04 | ☐ Class A | ☐ Class B |
| ☐ AS/NZS CISPR22:2009 +A1:2010 | ☐ Class A | ☐ Class B |
| ☐ 47 CFR Part 15, Subpart B | | |
| ☐ CISPR 22:2009 +A1:2010 | ☐ Class A | ☐ Class B |
| ☐ ANSI C63.4-2009 | | |
| ☐ IC Regulation ICES-003 : 2016 | | |
| ☐ CAN/CSA CISPR 22-10 | ☐ Class A | ☐ Class B |
| ☐ ANSI C63.4-2014 | | |
|
☐ RE- Directive 2014/53/EU | | |
|
☐ EN 301 489-1 V1.9.2 | | |
| ☐ Equipment for fixed use | | |
| ☐ Equipment for vehicular use | | |
| ☐ Equipment for portable use | | |
|
☐ EN 301 489-3 V1.6.1 | | |
|
☐ EN 301 489-17 V2.2.1 | | |
|
☐ EN 60945:2002 | | |



2.1 Conducted Emissions at Mains Power Ports

Test Date

Jun. 22, 2017

Test Location

Electro wave Shieldroom

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	04, 27, 2018
☒	LISN	ENV216	R & S	101137	02, 03, 2018
☒	LISN	ENV216	R & S	101786	04, 27, 2018
☒	PULSE LIMITER	ESH3-Z2	R & S	101914	12, 13, 2017

Test Conditions

Temperature: 23,7 °C
Relative Humidity: 51,5 %

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

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	04, 27, 2018
☐	LISN	ENV216	R & S	101137	02, 03, 2018
☐	LISN	ENV216	R & S	101786	04, 27, 2018
☐	PULSE LIMITER	ESH3-Z2	R & S	101914	12, 13, 2017
☐	8-WIRE ISN CAT3	CAT3 8158	SCHWARZBECK	8158-0019	03, 29, 2018
☐	8-WIRE ISN CAT5	CAT5 8158	SCHWARZBECK	8158-0030	03, 29, 2018

Test Conditions

Temperature: °C

Relative Humidity: %

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

-



2.3 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Jun. 22, 2017

Test Location

☐ OPEN AREA TEST SITE #2 ☒ SAC #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	04, 18, 2018
☒	AMPLIFIER	SCU 01	R & S	100603	12, 13, 2017
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	716	11, 28, 2018

Test Conditions

Temperature: 25,1 °C
Relative Humidity: 46,8 %

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

Jun. 22, 2017

Test Location

SEMI ANECHOIC CHAMBER #3

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	ESR7	R & S	101190	08, 08, 2017
☒	PREAMPLIFIER	8449B	AGILENT	3008A01967	05, 31, 2018
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	05, 02, 2019

Test Conditions

Temperature: 25,5 °C
Relative Humidity: 47,5 %

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

Jun. 22, 2017

Test Location

Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	dpa.control	EM TEST	5.4.8.0	-
☒	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	08, 08, 2017
☒	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	08, 08, 2017

Test Conditions

23,7 °C
Relative Humidity: 51,5 %

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

Jun. 22, 2017

Test Location

Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	dpa.control	EM TEST	5.4.8.0	-
☒	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	08, 08, 2017
☒	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	08, 08, 2017

Test Conditions

Relative Humidity: 23,7 °C
51,5 %

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.

3.0 Criteria for compliance

Criteria for compliance was based on the following guidelines:

EN 50130-4:2011 +A1:2014 Alarm systems-Part 4: Electromagnetic compatibility Product family standard: Immunity requirements for components of fire, intruder and social alarm systems

The variety and the diversity of the apparatus within the scope of this document makes it difficult to define precise criteria for the evaluation of the immunity test results.

If as a result of the application of the tests defined in this standard, the apparatus becomes dangerous or unsafe then the apparatus shall be deemed to have failed the test.

A functional description and a definition of performance by the manufacture and noted in the test report, based on the following criteria:

Electrostatic discharge

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing that is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change.

Radiated electromagnetic fields

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing which could be interpreted by associated equipment as a change, and no such

Flickering of indicators occurs at a field strength of 3 V/m.

For components of CCTV systems, where the picture is allowed at 10 V/m, providing.

(a) there is no permanent damage or change to EUT

(e.g. no corruption of memory or changes to programmable setting etc.)

(b) at 3 V/m, any deterioration of the picture is so minor that the system could still be used; and

(c) there is no observable deterioration of the picture at 1 V/m.

Fast transient burst / slow high energy voltage surge

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing

That there is no residual is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change.

Conducted RF immunity

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing

That there is no residual is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change,
and no such flickering of indicators oeuvres at $U = 130 \text{ dB}\mu\text{V}$.

For component of CCTV systems, where the status is monitored by observing the TV picture,
then deterioration of the picture is allowed at $U = 140 \text{ dB}\mu\text{V}$, providing:

- (a) there is no permanent damage or change to the EUT
(e.g. no corruption of memory or changes to programmable settings etc.)
- (b) at $U = 130 \text{ dB}\mu\text{V}$, any deterioration of the picture is so minor that the system could still be used; and
- (c) there in no observable deterioration of the picture at $U = 120 \text{ dB}\mu\text{V}$.

Voltage dip/interruption / Voltage variation

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change. The EUT shall meet the acceptance criteria for the functional test, after the conditioning.



3.1 Electrostatic Discharge

Reference Standard

EN 61000-4-2:2009

Test Date

Jun. 23, 2017

Test Location

EMS-ESD: Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	-	-	-	-
☒	ESD SIMULATOR	ESS-2000	Noise Ken	ESS05X4620	02, 24, 2018
☒	HCP	-	Noise Ken	-	-
☒	VCP	-	Noise Ken	-	-

Test Conditions

Temperature: 24,7 °C
Relative Humidity: 50,1 %
Atmospheric Pressure: 99,2 kPa



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Test report No.:
KES-E1-17T0399
Page (21) of (83)

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

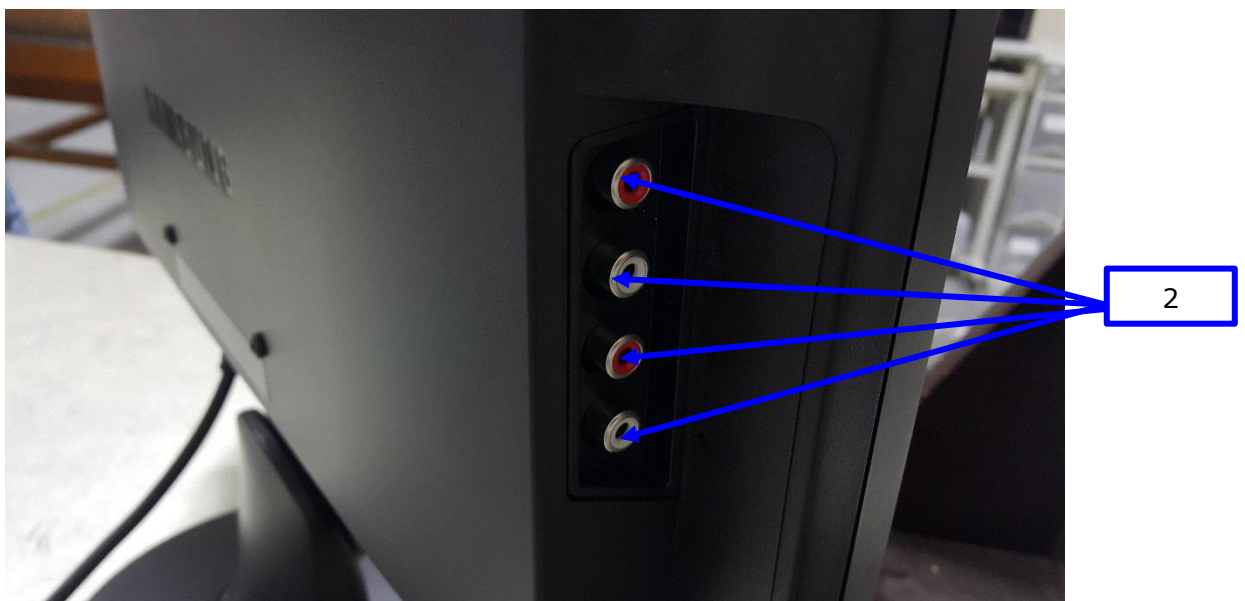
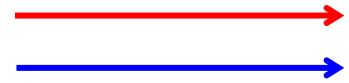
Notes: HCP: Horizontal coupling plane

VCP: Vertical coupling plane

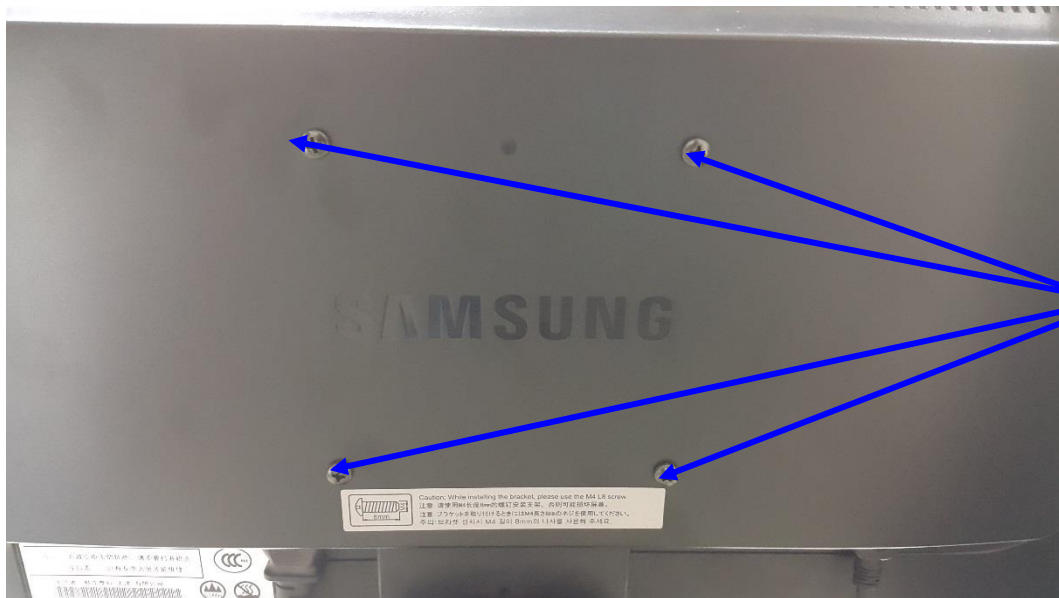
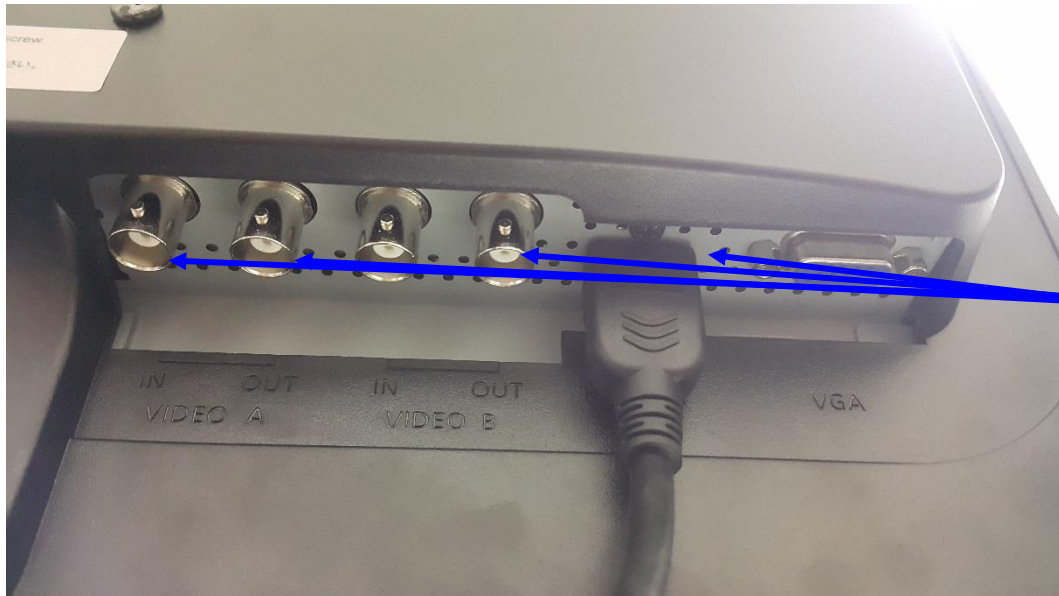
Required Performance Criteria: ☒ B

Location of Discharge:

Air
Contact



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Test Data

- D-SUB Mode

Indirect Discharge

No.	Test Point	Discharge Method	Observations	Remarks
1	HCP Contact	Contact Discharge	A	-
2	VCP Contact	Contact Discharge	A	-

Direct Discharge

No.	Test Point	Discharge Method	Observations	Remarks
1	Panel	Air D.	A	-
2	Ports	Contact D.	A	-
3	Screw	Contact D.	A	-

- HDMI Mode

Indirect Discharge

No.	Test Point	Discharge Method	Observations	Remarks
1	HCP Contact	Contact Discharge	A	-
2	VCP Contact	Contact Discharge	A	-

Direct Discharge

No.	Test Point	Discharge Method	Observations	Remarks
1	Panel	Air D.	A	-
2	Ports	Contact D.	A	-
3	Screw	Contact D.	A	-

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Test report No.:
KES-E1-17T0399
Page (25) of (83)

- BNC Mode**Indirect Discharge**

No.	Test Point	Discharge Method	Observations	Remarks
1	HCP Contact	Contact Discharge	A	-
2	VCP Contact	Contact Discharge	A	-

Direct Discharge

No.	Test Point	Discharge Method	Observations	Remarks
1	Panel	Air D.	A	-
2	Ports	Contact D.	A	-
3	Screw	Contact D.	A	-

Note: "Blank" = Not performed

Observations:

Complied – No degradation of function

Test Results

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

Remarks

PASS Required Performance Criteria.



3.2 Radiated Electric Field Immunity

Reference Standard

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

Test Date

Jun. 23, 2017

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	08, 08, 2017
☒	SIGNAL GENERATOR	SMB 100A	R & S	177586	08, 08, 2017
☒	BROADBAND AMPLIFIER	BBA100	R & S	101239	08, 08, 2017
☒	BROADBAND AMPLIFIER	100S1G6M1	AR	579931	08, 08, 2017
☒	POWER METER	NRP2	R & S	103475	08, 08, 2017
☒	AVG POWER SENSOR	NRP-Z91	R & S	102526	08, 08, 2017
☒	AVG POWER SENSOR	NRP-Z91	R & S	102527	08, 08, 2017
☒	STACKED DOUBLE LOG-PER- ANTENNA	STPL9128 E	Schwarzbeck	9128ES-121	—

Test Conditions

Temperature: 21,3 °C
Relative Humidity: 48,1 %
Atmospheric Pressure: 99,4 kPa



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 ☐ 1,4 GHz to 2,7 GHz
☐ 80 MHz to 2,7 GHz

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 report No.:
KES-E1-17T0399
Page (28) of (83)

Test Data**- D-SUB Mode**

Side Exposed	Observations	
	Horizontal	Vertical
Front	A	A
Right	A	A
Back	A	A
Left	A	A

- HDMI Mode

Side Exposed	Observations	
	Horizontal	Vertical
Front	A	A
Right	A	A
Back	A	A
Left	A	A

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Test report No.:
KES-E1-17T0399
Page (29) of (83)

- BNC Mode

Side Exposed	Observations	
	Horizontal	Vertical
Front	A	A
Right	A	A
Back	A	A
Left	A	A

Note: "Blank" = Not performed

Observations:

Complied – No degradation of function

Test Results

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

Remarks

PASS Required Performance Criteria.

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3.3 Electrical Fast Transients/Bursts

Reference Standard

EN 61000-4-4:2012

Test Date

Jun. 24, 2017

Test Location

EMS-EFT: Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	iec.control	EM TEST	5.0.9.0	-
☒	ULTRA COMPACT SIMULATOR	UCS 500 N5	EM TEST	V0936105120	06, 27, 2017
☒	MOTOR VARIAC	MV2616	EM TEST	V0936105123	06, 27, 2017
☒	CAPACITIVE COUPLING CLAMP	HFK	EM TEST	070925	06, 27, 2017

Test Conditions

Temperature: 24,6 °C
Relative Humidity: 49,8 %
Atmospheric Pressure: 99,4 kPa

Test Specifications

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

Pulse Amplitude & Polarity:
(Other supply / 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

- D-SUB Mode

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

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
L – N – PE	A	A

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

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
-	-	-

☐ Signal ports and telecommunication ports – Coupling Clamp used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
-	-	-

- HDMI Mode

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

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
L – N – PE	A	A

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

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
-	-	-

☐ Signal ports and telecommunication ports – Coupling Clamp used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
-	-	-

- BNC Mode

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

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
L – N – PE	A	A

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

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
-	-	-

☒ Signal ports and telecommunication ports – Coupling Clamp used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
BNC in	A	A
BNC out	A	A

Note: “Blank” = Not performed

Observations:

Complied – No degradation of function

Test Results

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

Remarks

PASS Required Performance Criteria.



3.4 Surge Transients

Reference Standard

EN 61000-4-5:2014

Test Date

Jun. 24, 2017

Test Location

EMS-Surge: Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	iec.control	EM TEST	5.0.9.0	-
☒	ULTRA COMPACT SIMULATOR	UCS 500 N5	EM TEST	V0936105120	06, 27, 2017
☒	MOTOR VARIAC	MV2616	EM TEST	V0936105123	06, 27, 2017
☒	CDN	CNV 508N1	EM TEST	P1551168979	04, 26, 2018
☐	CDN	CNV 508T5	EM TEST	P1549168422	04, 26, 2018

Test Conditions

Temperature: 24,6 °C
Relative Humidity: 49,8 %
Atmospheric Pressure: 99,4 kPa



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:

☒ 0°, 90°, 180°, 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: ☒ C



Test Data

- D-SUB Mode

☒ Line to Line – Differential Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
L – N	A	A
L – PE	A	A
N – PE	A	A

☐ Line to Earth – Common Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
-	-	-

Signal Lines

☐ Line to Earth – Common Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
-	-	-

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Test report No.:
KES-E1-17T0399
Page (36) of (83)

- HDMI Mode☒ **Line to Line – Differential Mode**

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
L – N	A	A
L – PE	A	A
N – PE	A	A

☐ **Line to Earth – Common Mode**

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
-	-	-

Signal Lines☐ **Line to Earth – Common Mode**

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
-	-	-

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Test report No.:
KES-E1-17T0399
Page (37) of (83)

- BNC Mode☒ Line to Line – Differential Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
L – N	A	A
L – PE	A	A
N – PE	A	A

☐ Line to Earth – Common Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
-	-	-

Signal Lines☒ Line to Earth – Common Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
BNC in	A	A
BNC out	A	A

Note: “Blank” = Not performed

Observations:
Complied – No degradation of function

Test Results

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

Remarks

PASS Required Performance Criteria.



3.5 Conducted Disturbance

Reference Standard

EN 61000-4-6:2014

Test Date

Jun. 24, 2017

Test Location

EMS-CS: Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	icd.control	EM TEST	5.3.7	-
☒	CONTINUOUS WAVE SIMULATOR	CWS 500N1	EM TEST	V0936105119	08, 08, 2017
☒	ATTENUATOR	ATT6	EM TEST	1208-34	08, 08, 2017
☒	CDN	CDN-M2/M3N	EM TEST	0909-06	08, 08, 2017
☒	CDN	CDN T8RJ45	EM TEST	0909-09	08, 08, 2017
☒	EM INJECTION CLAMP	EM 101	Liithi	35943	02, 03, 2018
☐	MICROPHONE	MP201	BSWA	520963	11, 11, 2017
☐	SOUND ACOUSTIC TESTER	TST-1000	TESTEK	150045	11, 08, 2018

Test Conditions

Temperature: 24,6 °C
Relative Humidity: 49,8 %
Atmospheric Pressure: 99,4 kPa



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Test report No.:
KES-E1-17T0399
Page (39) of (83)

Test Specifications

- Frequency range: ☐ 150 kHz to 100 MHz ☒ 150 kHz to 80 MHz
- Voltage Level: ☐ 1 Vrms ☒ 3 Vrms
☐ 10 Vrms
- 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**- D-SUB Mode**☒ Input a.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
L – N – PE	CDN	A

☐ Input d.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
-	CDN	-

☐ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observations
-	EM Injection Clamp	-

- HDMI Mode☒ Input a.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
L – N – PE	CDN	A

☐ Input d.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
-	CDN	-

☐ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observations
-	EM Injection Clamp	-

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Test report No.:
KES-E1-17T0399
Page (41) of (83)

- BNC Mode☒ Input a.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
L – N – PE	CDN	A

☐ Input d.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
-	CDN	-

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observations
BNC in	EM Injection Clamp	A
BNC out	EM Injection Clamp	A

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

Observations:
Complied – No degradation of function

Test Results

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

Remarks

PASS Required Performance Criteria.



3.6 Voltage Dips and Short Interruptions

Reference Standard

EN 61000-4-11:2004

Test Date

Jun. 24, 2017

Test Location

EMS-Voltage dip: Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	iec.control	EM TEST	5.0.9.0	-
☒	ULTRA COMPACT SIMULATOR	UCS 500 N5	EM TEST	V0936105120	06, 27, 2017
☒	MOTOR VARIAC	MV2616	EM TEST	V0936105123	06, 27, 2017

Test Conditions

Temperature: 24,6 °C
Relative Humidity: 49,8 %
Atmospheric Pressure: 99,4 kPa



Test Specifications & Observations/Remarks

- D-SUB Mode

Test Level	Duration [in period/ms (50 Hz)]	Criteria	Results
☒ 0 %Ut (>95 % dip)	☒ 0.5 / 10	<u>B</u>	<u>A</u>
☒ 30 %Ut (70 % dip)	☒ 25 / 500	<u>C</u>	<u>A</u>
☒ 0 %Ut (>95 % Interruptions)	☒ 250 / 5 000	<u>C</u>	<u>B</u>

- HDMI Mode

Test Level	Duration [in period/ms (50 Hz)]	Criteria	Results
☒ 0 %Ut (>95 % dip)	☒ 0.5 / 10	<u>B</u>	<u>A</u>
☒ 30 %Ut (70 % dip)	☒ 25 / 500	<u>C</u>	<u>A</u>
☒ 0 %Ut (>95 % Interruptions)	☒ 250 / 5 000	<u>C</u>	<u>B</u>

- BNC Mode

Test Level	Duration [in period/ms (50 Hz)]	Criteria	Results
☒ 0 %Ut (>95 % dip)	☒ 0.5 / 10	<u>B</u>	<u>A</u>
☒ 30 %Ut (70 % dip)	☒ 25 / 500	<u>C</u>	<u>A</u>
☒ 0 %Ut (>95 % Interruptions)	☒ 250 / 5 000	<u>C</u>	<u>B</u>



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Test report No.:
KES-E1-17T0399
Page (44) of (83)

Observations:

- A – No response observed from E.U.T
- 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

Refer to the results

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APPENDIX A – TEST DATA

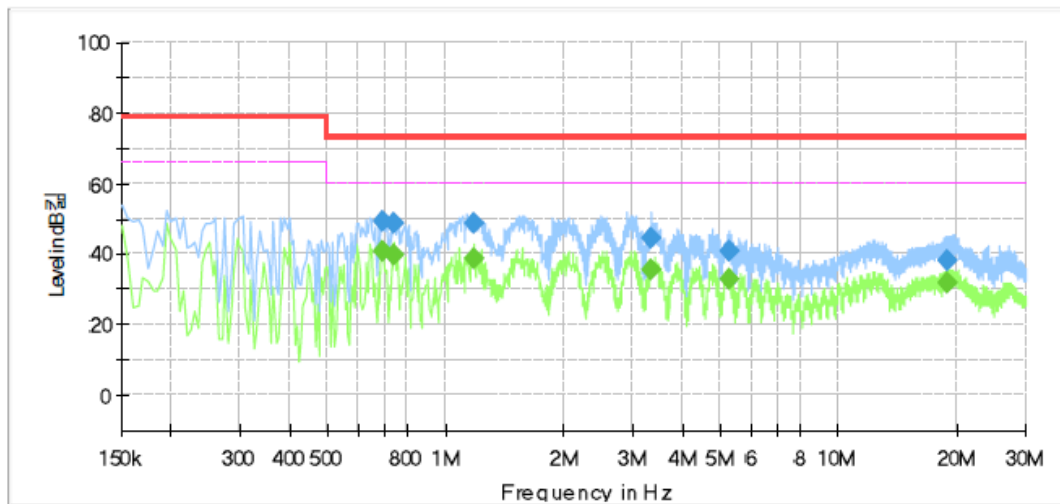
Conducted Emissions at Mains Power Ports

- D-SUB Mode

[HOT]

Common Information

Test Description:	Conducted Emission
Model No.:	SMT-1931
Mode	D-SUB_H
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.690000	---	40.69	60.00	19.31	1000.0	9.000	L1	20.4
0.690000	49.14	---	73.00	23.86	1000.0	9.000	L1	20.4
0.740000	---	39.79	60.00	20.21	1000.0	9.000	L1	20.3
0.740000	48.68	---	73.00	24.32	1000.0	9.000	L1	20.3
1.180000	---	38.90	60.00	21.10	1000.0	9.000	L1	20.1
1.180000	48.50	---	73.00	24.50	1000.0	9.000	L1	20.1
3.330000	---	35.69	60.00	24.31	1000.0	9.000	L1	19.7
3.330000	44.33	---	73.00	28.67	1000.0	9.000	L1	19.7
5.305000	---	32.84	60.00	27.16	1000.0	9.000	L1	19.8
5.305000	40.70	---	73.00	32.30	1000.0	9.000	L1	19.8
19.045000	---	31.77	60.00	28.23	1000.0	9.000	L1	20.3
19.045000	38.20	---	73.00	34.80	1000.0	9.000	L1	20.3

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

QuasiPeak / CAverage : The Final Value

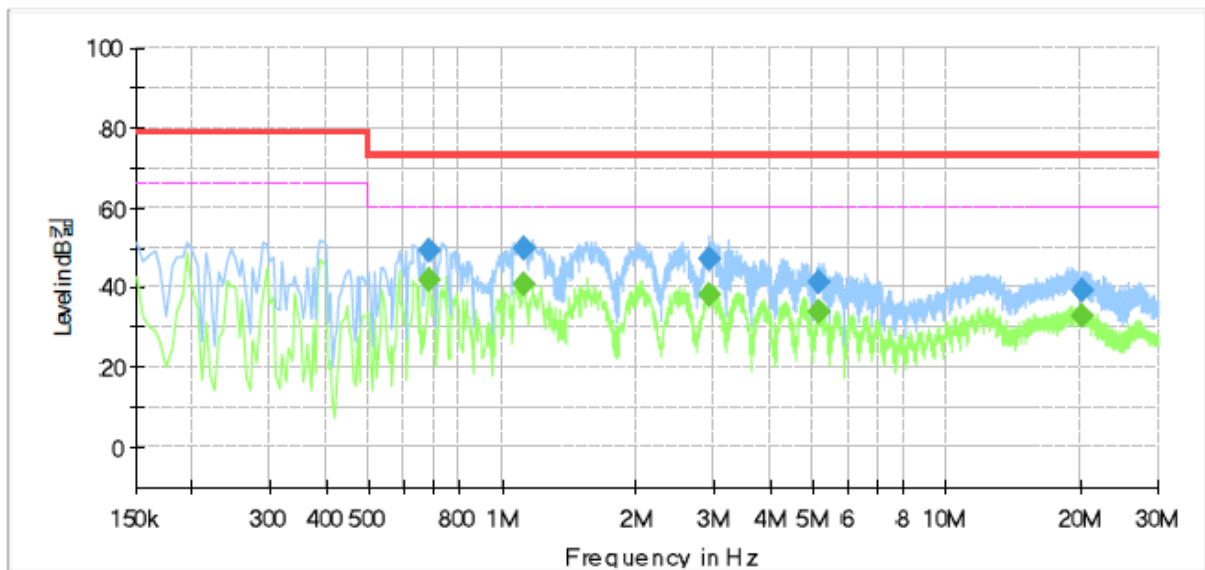
Reading Value : Not shown in the table.

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

[NEUTRAL]

Common Information

Test Description:	Conducted Emission
Model No.:	SMT-1931
Mode	D-SUB_N
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	---	41.59	60.00	18.41	1000.0	9.000	N	20.4
0.685000	49.42	---	73.00	23.58	1000.0	9.000	N	20.4
1.125000	---	40.54	60.00	19.46	1000.0	9.000	N	20.1
1.125000	49.54	---	73.00	23.46	1000.0	9.000	N	20.1
2.915000	---	38.24	60.00	21.76	1000.0	9.000	N	19.8
2.915000	47.09	---	73.00	25.91	1000.0	9.000	N	19.8
5.180000	---	33.92	60.00	26.08	1000.0	9.000	N	19.8
5.180000	41.07	---	73.00	31.93	1000.0	9.000	N	19.8
20.235000	---	32.79	60.00	27.21	1000.0	9.000	N	20.2
20.235000	39.43	---	73.00	33.57	1000.0	9.000	N	20.2

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

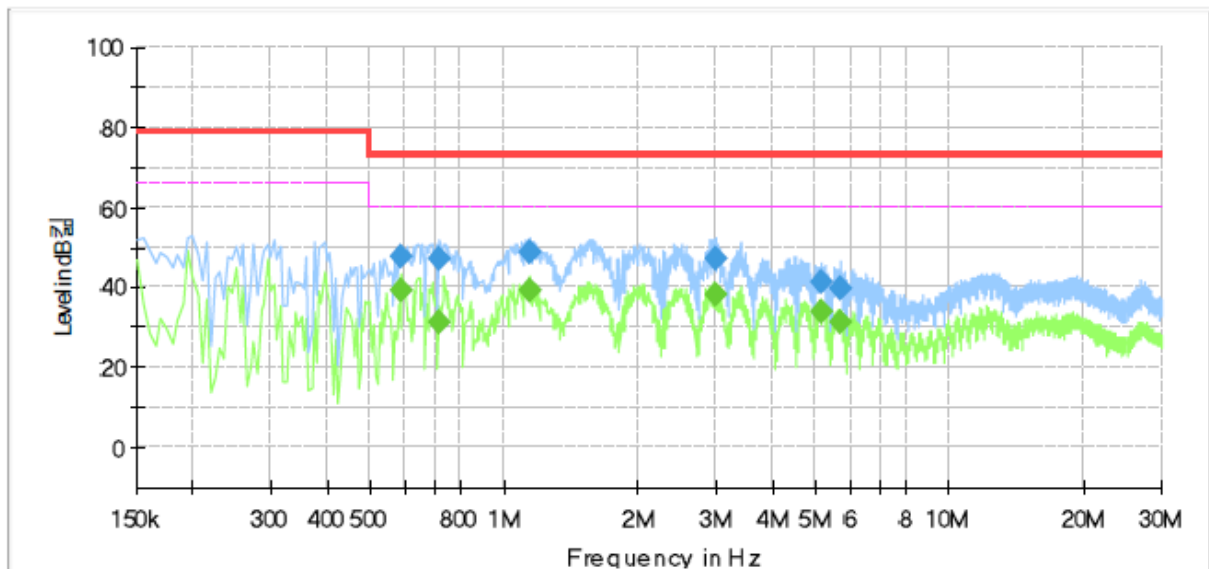
Corr. : Correction values (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

- HDMI Mode

[HOT]

Common Information

Test Description:	Conducted Emission
Model No.:	SMT-1931
Mode	HDMI_H
Operator Name:	KES



Final Result

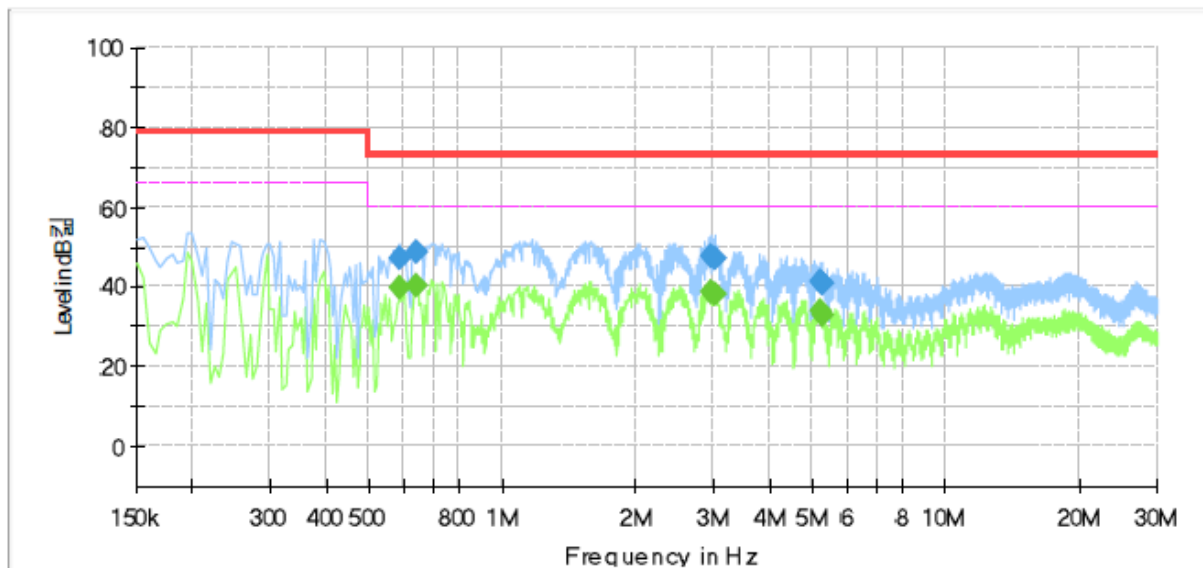
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.590000	---	39.01	60.00	20.99	1000.0	9.000	L1	20.5
0.590000	47.54	---	73.00	25.46	1000.0	9.000	L1	20.5
0.715000	---	31.48	60.00	28.52	1000.0	9.000	L1	20.3
0.715000	47.07	---	73.00	25.93	1000.0	9.000	L1	20.3
1.145000	---	39.09	60.00	20.91	1000.0	9.000	L1	20.1
1.145000	48.96	---	73.00	24.04	1000.0	9.000	L1	20.1
2.985000	---	38.20	60.00	21.80	1000.0	9.000	L1	19.7
2.985000	47.11	---	73.00	25.89	1000.0	9.000	L1	19.7
5.195000	---	33.97	60.00	26.03	1000.0	9.000	L1	19.8
5.195000	41.41	---	73.00	31.59	1000.0	9.000	L1	19.8
5.715000	---	31.39	60.00	28.61	1000.0	9.000	L1	19.8
5.715000	39.49	---	73.00	33.51	1000.0	9.000	L1	19.8

$\text{QuasiPeak [dBuV]} / \text{CAverage [dBuV]} = \text{Reading Value [dBuV]} + \text{Corr. [dB]}$
 QuasiPeak / CAverage : The Final Value
 Reading Value : Not shown in the table.
 Corr. : Correction values (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

[NEUTRAL]

Common Information

Test Description:	Conducted Emission
Model No.:	SMT-1931
Mode	HDMI_N
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.590000	---	39.45	60.00	20.55	1000.0	9.000	N	20.5
0.590000	47.33	---	73.00	25.67	1000.0	9.000	N	20.5
0.640000	---	40.33	60.00	19.67	1000.0	9.000	N	20.4
0.640000	48.56	---	73.00	24.44	1000.0	9.000	N	20.4
2.955000	---	38.89	60.00	21.11	1000.0	9.000	N	19.7
2.955000	47.40	---	73.00	25.60	1000.0	9.000	N	19.7
3.010000	---	37.93	60.00	22.07	1000.0	9.000	N	19.7
3.010000	46.90	---	73.00	26.10	1000.0	9.000	N	19.7
5.215000	---	33.95	60.00	26.05	1000.0	9.000	N	19.8
5.215000	41.39	---	73.00	31.61	1000.0	9.000	N	19.8
5.275000	---	32.94	60.00	27.06	1000.0	9.000	N	19.8
5.275000	41.01	---	73.00	31.99	1000.0	9.000	N	19.8

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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

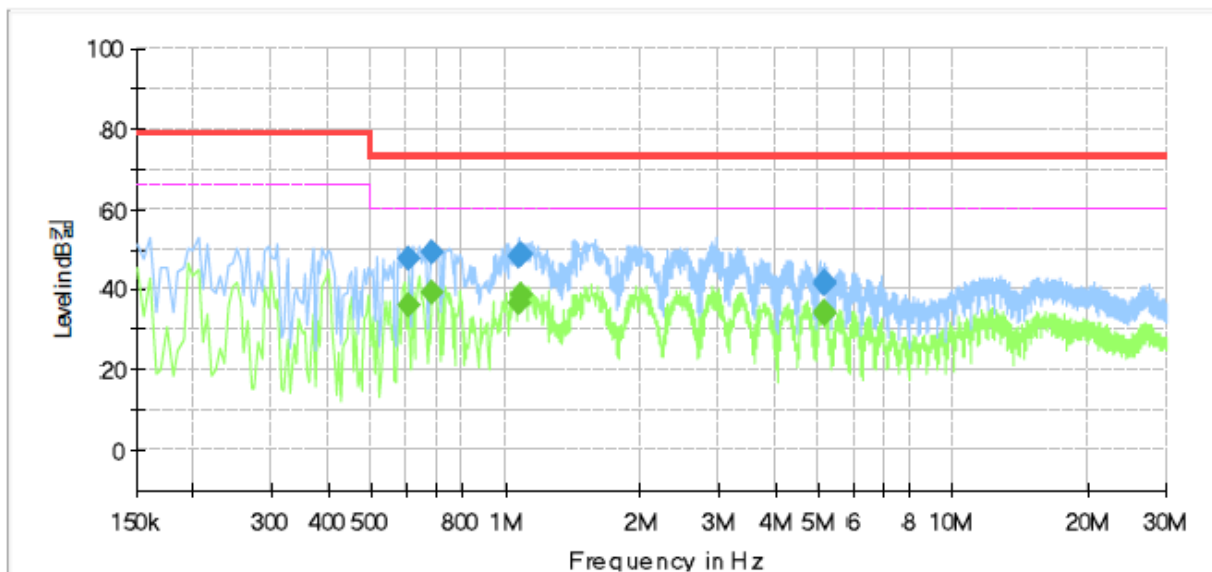


- BNC Mode

[HOT]

Common Information

Test Description: Conducted Emission
Model No.: SMT-1931
Mode: BNC_H
Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.605000	---	36.16	60.00	23.84	1000.0	9.000	L1	20.4
0.605000	47.53	---	73.00	25.47	1000.0	9.000	L1	20.4
0.685000	---	39.35	60.00	20.65	1000.0	9.000	L1	20.4
0.685000	49.00	---	73.00	24.00	1000.0	9.000	L1	20.4
1.070000	---	36.32	60.00	23.68	1000.0	9.000	L1	20.1
1.070000	48.16	---	73.00	24.84	1000.0	9.000	L1	20.1
1.080000	---	38.62	60.00	21.38	1000.0	9.000	L1	20.1
1.080000	48.85	---	73.00	24.15	1000.0	9.000	L1	20.1
5.140000	---	34.23	60.00	25.77	1000.0	9.000	L1	19.8
5.140000	41.04	---	73.00	31.96	1000.0	9.000	L1	19.8
5.155000	---	33.91	60.00	26.09	1000.0	9.000	L1	19.8
5.155000	41.68	---	73.00	31.32	1000.0	9.000	L1	19.8

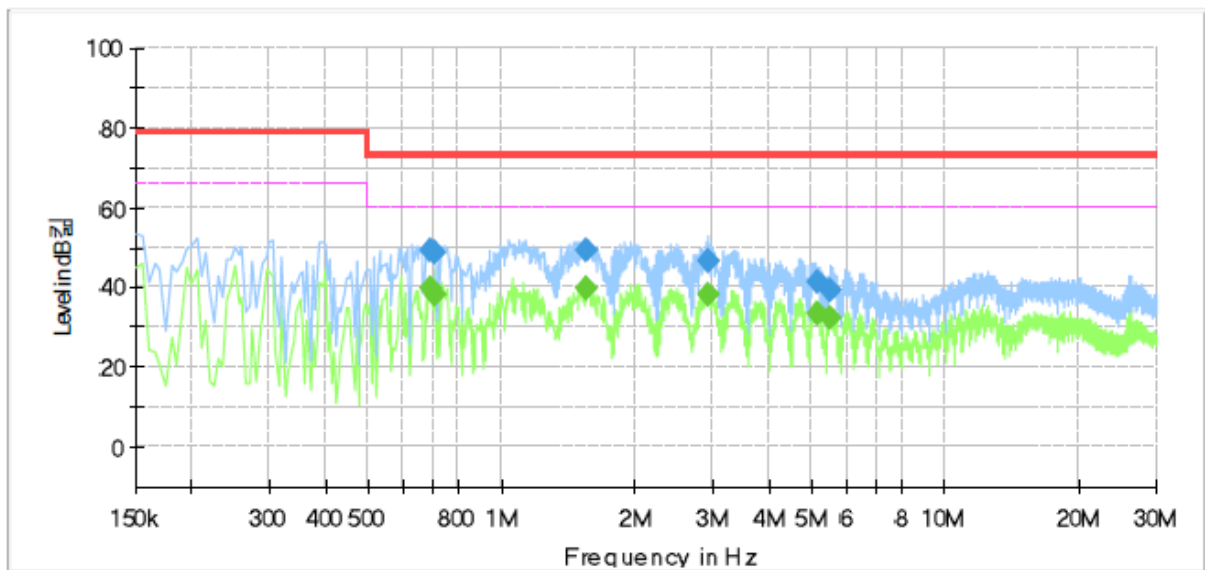
QuasiPeak[dBuV] / CAverage [dBuV] = Reading Value[dBuV] + Corr. [dB]
QuasiPeak / CAverage : The Final Value
Reading Value : Not shown in the table.
Corr. : Correction values (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

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[NEUTRAL]

Common Information

Test Description:	Conducted Emission
Model No.:	SMT-1931
Mode	BNC_N
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.690000	---	39.84	60.00	20.16	1000.0	9.000	N	20.4
0.690000	48.97	---	73.00	24.03	1000.0	9.000	N	20.4
0.705000	---	37.95	60.00	22.05	1000.0	9.000	N	20.4
0.705000	48.70	---	73.00	24.30	1000.0	9.000	N	20.4
1.560000	---	39.75	60.00	20.25	1000.0	9.000	N	19.9
1.560000	48.98	---	73.00	24.02	1000.0	9.000	N	19.9
2.925000	---	37.94	60.00	22.06	1000.0	9.000	N	19.8
2.925000	46.81	---	73.00	26.19	1000.0	9.000	N	19.8
5.195000	---	33.55	60.00	26.45	1000.0	9.000	N	19.8
5.195000	41.56	---	73.00	31.44	1000.0	9.000	N	19.8
5.505000	---	32.05	60.00	27.95	1000.0	9.000	N	19.8
5.505000	39.30	---	73.00	33.70	1000.0	9.000	N	19.8

◆ 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 (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))



Conducted Emissions at Telecommunication Ports

[10 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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Test report No.:
KES-E1-17T0399
Page (52) of (83)

[100 Mbps]

N/A

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

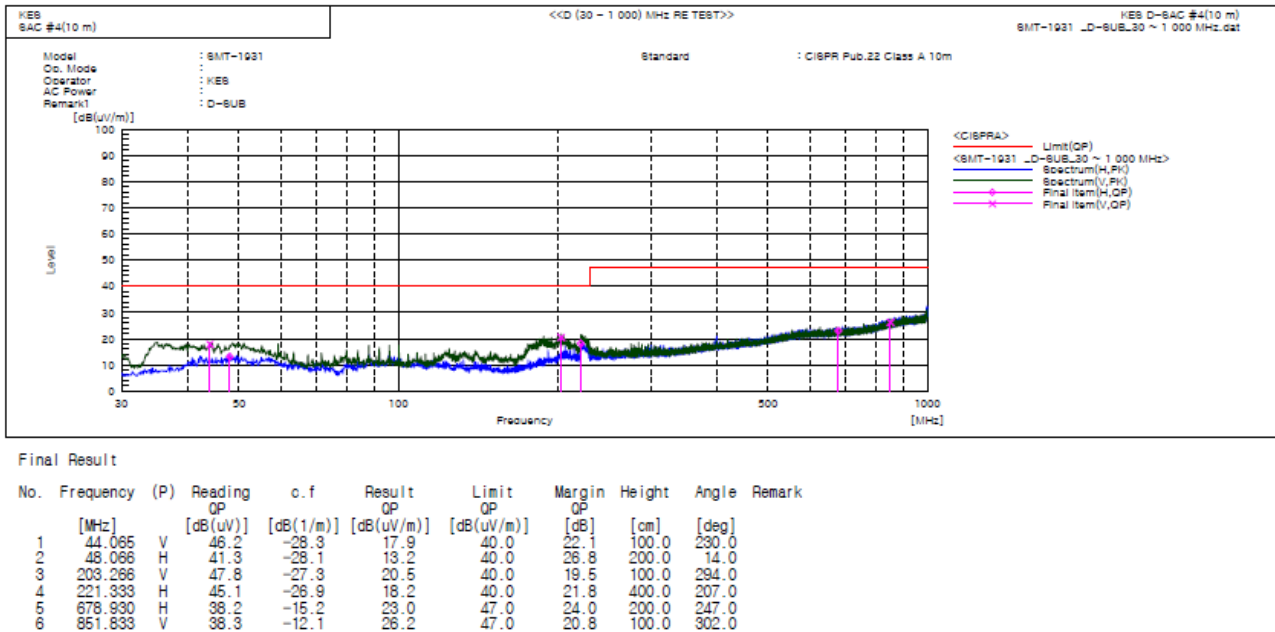
Reading Value : Not shown in the table.

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

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Radiated Electric Field Emissions(Below 1 GHz)

- D-SUB Mode



◆ Calculation

Corrected Amplitude [dBuV] = Amplitude[dBuV] + Correction Factor [dB]

Corrected Amplitude : The Final Value, Amplitude : Reading Value,

Correction Factor : ANT FACTOR + Cable loss

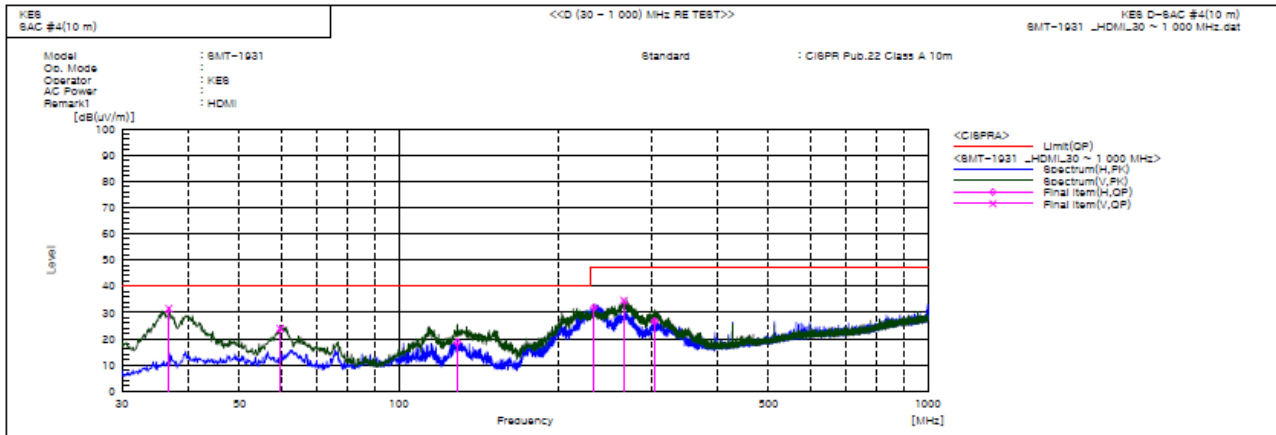


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Test report No.:
KES-E1-17T0399
Page (54) of (83)

- HDMI Mode



Final Result

No.	Frequency [MHz]	(P)	Reading OP [dB(uV)]	c.f [dB(1/m)]	Result OP [dB(uV/m)]	Limit OP [dB(uV/m)]	Margin OP [dB]	Height [cm]	Angle [deg]	Remark
1	36.790	V	62.6	-31.1	31.5	40.0	8.5	150.0	147.0	
2	59.706	V	53.2	-29.3	23.9	40.0	16.1	400.0	267.0	
3	129.061	H	51.0	-32.3	18.7	40.0	21.3	200.0	293.0	
4	233.943	H	58.6	-26.6	32.0	47.0	15.0	400.0	115.0	
5	266.393	V	60.2	-25.6	34.6	47.0	12.4	106.0	187.0	
6	304.510	H	51.2	-24.6	26.6	47.0	20.4	400.0	286.0	

◆ Calculation

Corrected Amplitude [dBuV] = Amplitude[dBuV] + Correction Factor [dB]

Corrected Amplitude : The Final Value, Amplitude : Reading Value,

Correction Factor : ANT FACTOR + Cable loss

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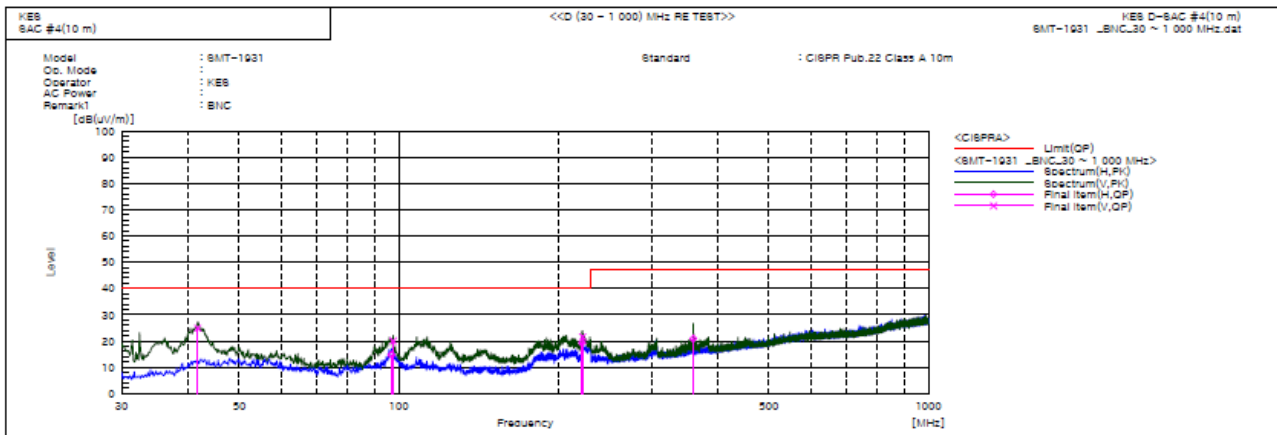


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Test report No.:
KES-E1-17T0399
Page (55) of (83)

- BNC Mode



Final Result

No.	Frequency [MHz]	(P)	Reading OP [dB(uV)]	c.f. [dB(1/m)]	Result OP [dB(uV/m)]	Limit OP [dB(uV/m)]	Margin OP [dB]	Height [cm]	Angle [deg]	Remark
1	41.761	V	53.9	-29.0	24.9	40.0	15.1	100.0	11.0	
2	96.930	H	43.8	-29.1	14.7	40.0	25.3	400.0	144.0	
3	97.658	V	49.0	-29.0	20.0	40.0	20.0	100.0	243.0	
4	222.060	H	46.1	-26.9	19.2	40.0	20.8	400.0	168.0	
5	222.424	V	48.5	-26.9	21.6	40.0	18.4	100.0	267.0	
6	359.992	H	43.6	-22.7	20.9	47.0	26.1	400.0	53.0	

◆ Calculation

Corrected Amplitude [dBuV] = Amplitude[dBuV] + Correction Factor [dB]

Corrected Amplitude : The Final Value, Amplitude : Reading Value,

Correction Factor : ANT FACTOR + Cable loss

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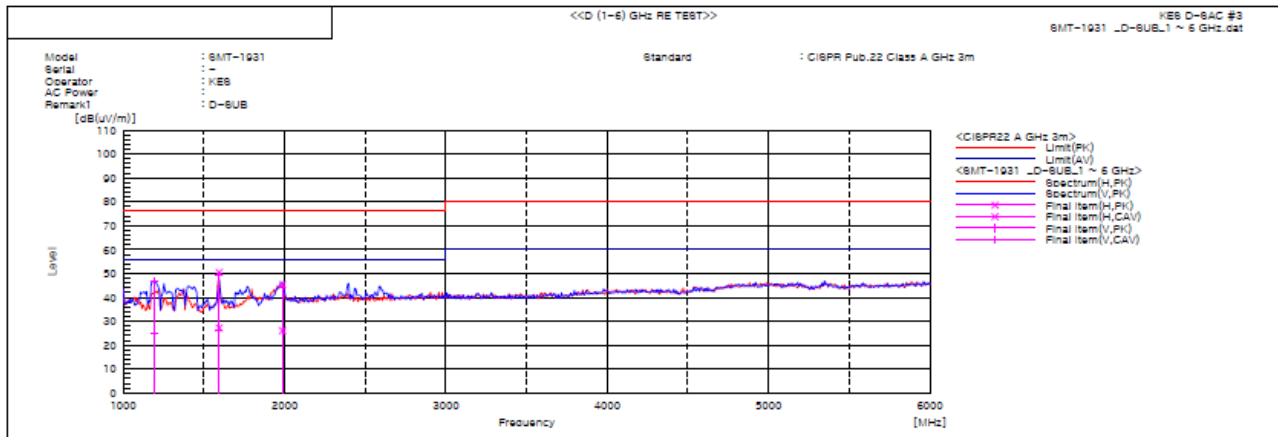
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Test report No.:
KES-E1-17T0399
Page (56) of (83)

Radiated Electric Field Emissions(Above 1 GHz)

- D-SUB Mode



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Result CAV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin CAV [dB]	Height [cm]	Angle [deg]	Remark
1	1191.145	V	57.2	35.1	-10.3	46.9	24.8	76.0	56.0	29.1	31.2	100.0	2.4	
2	1594.203	V	56.8	33.6	-7.5	49.3	26.1	76.0	56.0	26.7	29.9	100.0	330.0	
3	1595.216	H	58.0	34.7	-7.5	50.5	27.2	76.0	56.0	25.5	28.8	100.0	262.0	
4	1988.774	H	49.3	30.0	-4.0	45.3	26.0	76.0	56.0	30.7	30.0	100.0	91.9	

◆ Calculation

Over Limit [dB] = (Read Level[dBuV] + Ant Factor[dB/m] + Cable Loss [dB] - Preamp Factor [dB]) - Limit Line[dBuV]

Over Limit : Margin Value, Read Level : Reading Value, Ant Factor : Ant Factor,
Cable Loss : Cable loss, Preamp Factor : Preamp Factor

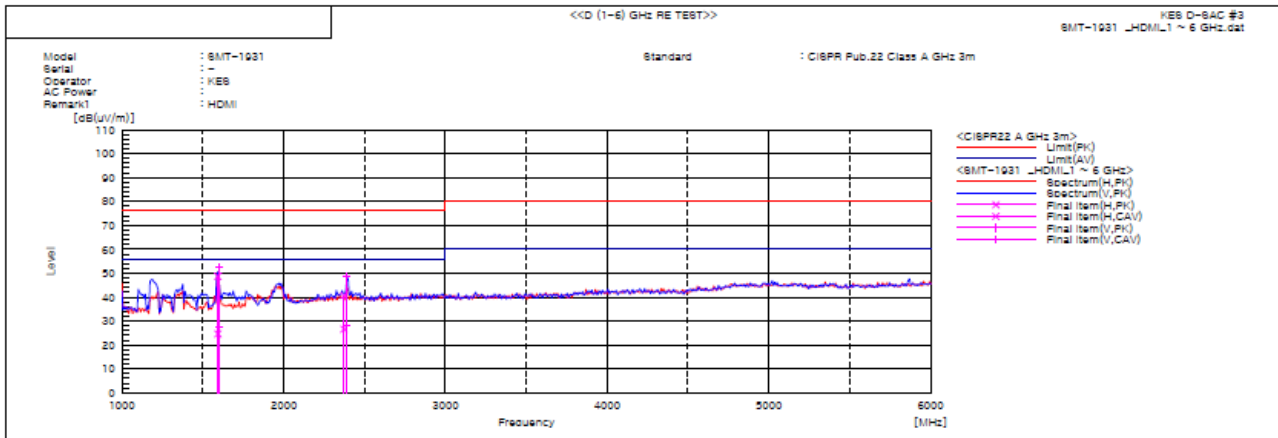


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Test report No.:
KES-E1-17T0399
Page (57) of (83)

- HDMI Mode



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Result CAV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin CAV [dB]	Height [cm]	Angle [deg]	Remark
1	1593.045	H	66.2	32.2	-7.5	48.7	24.7	78.0	56.0	27.3	31.3	100.0	209.7	
2	1599.765	V	60.1	34.9	-7.4	52.7	27.5	78.0	56.0	23.3	28.5	100.0	55.8	
3	2372.057	H	43.1	29.1	-2.5	40.6	26.6	78.0	56.0	35.4	29.4	100.0	77.2	
4	2390.519	V	51.0	30.6	-2.4	48.6	28.2	78.0	56.0	27.4	27.8	100.0	112.5	

◆ Calculation

Over Limit [dB] = (Read Level [dBuV] + Ant Factor [dB/m] + Cable Loss [dB] - Preamp Factor [dB]) - Limit Line [dBuV]

Over Limit : Margin Value, Read Level : Reading Value, Ant Factor : Ant Factor,
Cable Loss : Cable loss, Preamp Factor : Preamp Factor

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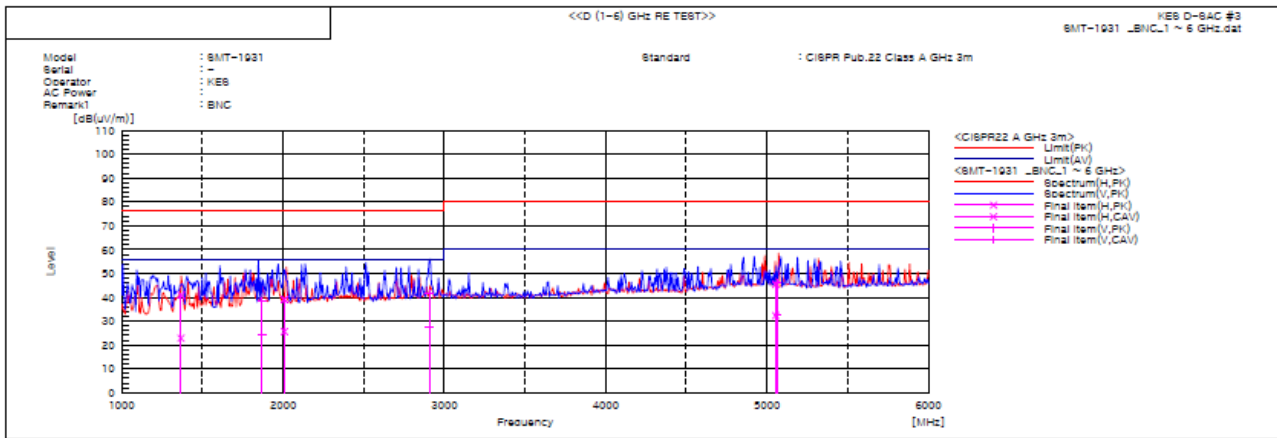


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Test report No.:
KES-E1-17T0399
Page (58) of (83)

- BNC Mode



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Result CAV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin CAV [dB]	Height [cm]	Angle [deg]	Remark
1	1367.828	H	49.9	31.9	-9.0	40.9	22.9	76.0	56.0	35.1	33.1	100.0	6.9	
2	1871.343	V	42.9	28.8	-4.8	38.1	24.0	76.0	56.0	37.9	32.0	100.0	26.5	
3	2009.149	H	43.0	29.5	-3.9	39.1	25.6	76.0	56.0	36.9	30.4	100.0	243.6	
4	2906.821	V	42.2	28.3	-0.7	41.5	27.6	76.0	56.0	34.5	28.4	100.0	138.5	
5	5053.940	H	39.1	26.0	6.3	45.4	32.3	80.0	60.0	34.6	27.7	100.0	216.8	
6	5066.479	V	39.6	26.5	6.3	45.9	32.8	80.0	60.0	34.1	27.2	100.0	212.4	

◆ Calculation

Over Limit [dB] = (Read Level[dBuV] + Ant Factor[dB/m] + Cable Loss [dB] - Preamp Factor [dB]) - Limit Line[dBuV]

Over Limit : Margin Value, Read Level : Reading Value, Ant Factor : Ant Factor,
Cable Loss : Cable loss, Preamp Factor : Preamp Factor

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**Harmonic Current Emissions and Voltage Fluctuations and Flicker**

- D-SUB Mode

Average harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	90.762E-3	100.000		
2	1.364E-3	1.503		PASS
3	79.709E-3	87.822	2.30	PASS
4	1.986E-3	2.188		PASS
5	75.451E-3	83.130	1.14	PASS
6	1.466E-3	1.616		PASS
7	69.901E-3	77.016	770.00E-3	PASS
8	1.366E-3	1.505		PASS
9	62.024E-3	68.338	400.00E-3	PASS
10	1.630E-3	1.796		PASS
11	53.921E-3	59.410	330.00E-3	PASS
12	1.102E-3	1.214		PASS
13	45.736E-3	50.391	210.00E-3	PASS
14	1.466E-3	1.615		PASS
15	36.686E-3	40.421	150.00E-3	PASS
16	1.064E-3	1.172		PASS
17	27.738E-3	30.562	130.00E-3	PASS
18	764.799E-6	0.843		PASS
19	19.569E-3	21.561	120.00E-3	PASS
20	809.318E-6	0.892		PASS
21	12.427E-3	13.692	165.00E-3	PASS
22	744.647E-6	0.820		PASS
23	6.859E-3	7.557	150.00E-3	PASS
24	784.122E-6	0.864		PASS
25	4.038E-3	4.449		PASS
26	731.892E-6	0.806		PASS
27	4.683E-3	5.160		PASS
28	713.457E-6	0.786		PASS
29	5.945E-3	6.550	120.00E-3	PASS
30	684.250E-6	0.754		PASS
31	6.668E-3	7.346	105.00E-3	PASS
32	696.635E-6	0.768		PASS
33	6.467E-3	7.125	105.00E-3	PASS
34	666.622E-6	0.734		PASS
35	5.992E-3	6.602	90.00E-3	PASS
36	666.109E-6	0.734		PASS
37	4.842E-3	5.334		PASS
38	650.634E-6	0.717		PASS
39	3.276E-3	3.609		PASS
40	594.515E-6	0.655		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.



Test Data - Harmonics (continued)

Maximum harmonic current results				
Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	90.957E-3	100.000		
2	3.167E-3	3.482		PASS
3	79.864E-3	87.804	3.45	PASS
4	2.751E-3	3.024		PASS
5	75.596E-3	83.112	1.71	PASS
6	2.370E-3	2.605		PASS
7	70.260E-3	77.245	1.15	PASS
8	1.624E-3	1.786		PASS
9	63.330E-3	69.626	600.00E-3	PASS
10	2.045E-3	2.248		PASS
11	54.693E-3	60.131	495.00E-3	PASS
12	1.298E-3	1.427		PASS
13	46.494E-3	51.116	315.00E-3	PASS
14	2.081E-3	2.288		PASS
15	37.680E-3	41.426	225.00E-3	PASS
16	1.445E-3	1.589		PASS
17	28.329E-3	31.146	195.00E-3	PASS
18	886.092E-6	0.974		PASS
19	20.136E-3	22.138	180.00E-3	PASS
20	977.187E-6	1.074		PASS
21	12.925E-3	14.210	165.00E-3	PASS
22	931.441E-6	1.024		PASS
23	7.156E-3	7.867	150.00E-3	PASS
24	901.337E-6	0.991		PASS
25	4.205E-3	4.623		PASS
26	995.534E-6	1.095		PASS
27	5.238E-3	5.759	120.00E-3	PASS
28	938.294E-6	1.032		PASS
29	6.439E-3	7.080	120.00E-3	PASS
30	861.697E-6	0.947		PASS
31	7.288E-3	8.013	105.00E-3	PASS
32	889.331E-6	0.978		PASS
33	6.768E-3	7.440	105.00E-3	PASS
34	810.620E-6	0.891		PASS
35	6.126E-3	6.736	90.00E-3	PASS
36	821.239E-6	0.903		PASS
37	5.079E-3	5.584	90.00E-3	PASS
38	732.144E-6	0.805		PASS
39	3.609E-3	3.968		PASS
40	770.300E-6	0.847		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.



- HDMI Mode

Average harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	91.186E-3	100.000		
2	1.343E-3	1.473		PASS
3	80.175E-3	87.924	2.30	PASS
4	1.948E-3	2.137		PASS
5	75.942E-3	83.282	1.14	PASS
6	1.490E-3	1.634		PASS
7	70.696E-3	77.529	770.00E-3	PASS
8	1.396E-3	1.531		PASS
9	62.526E-3	68.569	400.00E-3	PASS
10	1.475E-3	1.617		PASS
11	54.559E-3	59.832	330.00E-3	PASS
12	1.128E-3	1.237		PASS
13	47.175E-3	51.735	210.00E-3	PASS
14	1.364E-3	1.496		PASS
15	38.455E-3	42.173	150.00E-3	PASS
16	1.044E-3	1.145		PASS
17	29.197E-3	32.019	130.00E-3	PASS
18	779.887E-6	0.855		PASS
19	20.930E-3	22.953	120.00E-3	PASS
20	812.394E-6	0.891		PASS
21	13.779E-3	15.111	165.00E-3	PASS
22	722.817E-6	0.793		PASS
23	7.896E-3	8.659	150.00E-3	PASS
24	789.735E-6	0.866		PASS
25	4.599E-3	5.044		PASS
26	742.466E-6	0.814		PASS
27	4.406E-3	4.832		PASS
28	707.496E-6	0.776		PASS
29	5.498E-3	6.030	120.00E-3	PASS
30	671.655E-6	0.737		PASS
31	6.311E-3	6.921	105.00E-3	PASS
32	672.315E-6	0.737		PASS
33	6.395E-3	7.013	105.00E-3	PASS
34	664.509E-6	0.729		PASS
35	6.141E-3	6.734	90.00E-3	PASS
36	669.663E-6	0.734		PASS
37	5.220E-3	5.724	90.00E-3	PASS
38	693.812E-6	0.761		PASS
39	3.834E-3	4.205		PASS
40	610.317E-6	0.669		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.



Test Data - Harmonics (continued)

Maximum harmonic current results				
Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	91.742E-3	100.000		
2	1.643E-3	1.791		PASS
3	80.603E-3	87.858	3.45	PASS
4	2.494E-3	2.719		PASS
5	76.452E-3	83.333	1.71	PASS
6	1.657E-3	1.806		PASS
7	71.138E-3	77.541	1.15	PASS
8	1.615E-3	1.760		PASS
9	63.179E-3	68.866	600.00E-3	PASS
10	1.770E-3	1.930		PASS
11	55.222E-3	60.192	495.00E-3	PASS
12	1.311E-3	1.429		PASS
13	47.333E-3	51.593	315.00E-3	PASS
14	1.866E-3	2.033		PASS
15	38.703E-3	42.186	225.00E-3	PASS
16	1.413E-3	1.540		PASS
17	29.447E-3	32.097	195.00E-3	PASS
18	890.435E-6	0.971		PASS
19	21.188E-3	23.095	180.00E-3	PASS
20	905.851E-6	0.987		PASS
21	14.046E-3	15.310	165.00E-3	PASS
22	789.496E-6	0.861		PASS
23	8.118E-3	8.849	150.00E-3	PASS
24	882.782E-6	0.962		PASS
25	4.749E-3	5.176		PASS
26	846.932E-6	0.923		PASS
27	4.595E-3	5.009		PASS
28	813.857E-6	0.887		PASS
29	5.841E-3	6.367	120.00E-3	PASS
30	849.702E-6	0.926		PASS
31	6.665E-3	7.265	105.00E-3	PASS
32	878.038E-6	0.957		PASS
33	6.554E-3	7.144	105.00E-3	PASS
34	770.753E-6	0.840		PASS
35	6.226E-3	6.787	90.00E-3	PASS
36	814.460E-6	0.888		PASS
37	5.332E-3	5.812	90.00E-3	PASS
38	761.843E-6	0.830		PASS
39	3.986E-3	4.345		PASS
40	688.659E-6	0.751		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.



- BNC Mode

Average harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	90.814E-3	100.000		
2	1.457E-3	1.604		PASS
3	79.863E-3	87.941	2.30	PASS
4	2.107E-3	2.320		PASS
5	75.759E-3	83.422	1.14	PASS
6	1.621E-3	1.785		PASS
7	70.655E-3	77.801	770.00E-3	PASS
8	1.542E-3	1.699		PASS
9	62.710E-3	69.053	400.00E-3	PASS
10	1.592E-3	1.753		PASS
11	55.035E-3	60.602	330.00E-3	PASS
12	1.249E-3	1.375		PASS
13	47.849E-3	52.689	210.00E-3	PASS
14	1.469E-3	1.617		PASS
15	39.247E-3	43.217	150.00E-3	PASS
16	1.072E-3	1.181		PASS
17	30.139E-3	33.188	130.00E-3	PASS
18	780.119E-6	0.859		PASS
19	21.946E-3	24.166	120.00E-3	PASS
20	773.530E-6	0.852		PASS
21	14.733E-3	16.223	165.00E-3	PASS
22	693.219E-6	0.763		PASS
23	8.732E-3	9.615	150.00E-3	PASS
24	842.715E-6	0.928		PASS
25	5.111E-3	5.628	135.00E-3	PASS
26	820.443E-6	0.903		PASS
27	4.448E-3	4.898		PASS
28	803.829E-6	0.885		PASS
29	5.395E-3	5.941	120.00E-3	PASS
30	764.552E-6	0.842		PASS
31	6.276E-3	6.910	105.00E-3	PASS
32	746.701E-6	0.822		PASS
33	6.489E-3	7.145	105.00E-3	PASS
34	694.334E-6	0.765		PASS
35	6.363E-3	7.007	90.00E-3	PASS
36	641.567E-6	0.706		PASS
37	5.494E-3	6.049	90.00E-3	PASS
38	629.338E-6	0.693		PASS
39	4.111E-3	4.527		PASS
40	535.746E-6	0.590		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.



Test Data - Harmonics (continued)

Maximum harmonic current results				
Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	90.963E-3	100.000		
2	1.753E-3	1.927		PASS
3	80.006E-3	87.955	3.45	PASS
4	2.668E-3	2.933		PASS
5	75.890E-3	83.430	1.71	PASS
6	1.814E-3	1.994		PASS
7	70.760E-3	77.790	1.15	PASS
8	1.694E-3	1.862		PASS
9	63.360E-3	69.655	600.00E-3	PASS
10	1.953E-3	2.147		PASS
11	55.728E-3	61.264	495.00E-3	PASS
12	1.386E-3	1.524		PASS
13	47.985E-3	52.752	315.00E-3	PASS
14	1.927E-3	2.119		PASS
15	39.411E-3	43.327	225.00E-3	PASS
16	1.415E-3	1.555		PASS
17	30.285E-3	33.294	195.00E-3	PASS
18	946.246E-6	1.040		PASS
19	22.120E-3	24.317	180.00E-3	PASS
20	856.587E-6	0.942		PASS
21	14.906E-3	16.387	165.00E-3	PASS
22	769.179E-6	0.846		PASS
23	8.893E-3	9.776	150.00E-3	PASS
24	971.229E-6	1.068		PASS
25	5.204E-3	5.721	135.00E-3	PASS
26	898.249E-6	0.987		PASS
27	4.538E-3	4.989		PASS
28	926.374E-6	1.018		PASS
29	5.562E-3	6.115	120.00E-3	PASS
30	840.172E-6	0.924		PASS
31	6.512E-3	7.160	105.00E-3	PASS
32	872.781E-6	0.959		PASS
33	6.626E-3	7.285	105.00E-3	PASS
34	814.460E-6	0.895		PASS
35	6.476E-3	7.120	90.00E-3	PASS
36	750.689E-6	0.825		PASS
37	5.591E-3	6.147	90.00E-3	PASS
38	723.980E-6	0.796		PASS
39	4.216E-3	4.635		PASS
40	599.510E-6	0.659		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.



Test Data - Voltage Fluctuations

Maximum Flicker results

- D-SUB Mode

	EUT values	Limit	Result
Pst	0.028	1.00	PASS
Plt	0.028	0.65	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.036	4.00	PASS
Tmax [s]	0.000	0.50	PASS

- HDMI Mode

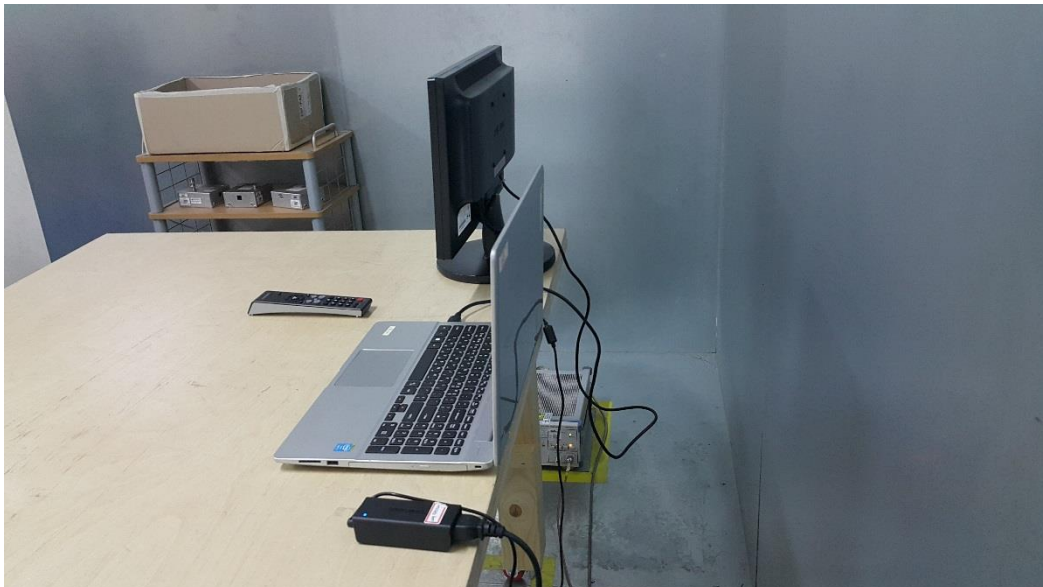
	EUT values	Limit	Result
Pst	0.028	1.00	PASS
Plt	0.028	0.65	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.035	4.00	PASS
Tmax [s]	0.000	0.50	PASS

- BNC Mode

	EUT values	Limit	Result
Pst	0.028	1.00	PASS
Plt	0.028	0.65	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.033	4.00	PASS
Tmax [s]	0.000	0.50	PASS

Test Setup Photos and Configuration

Conducted Voltage Emissions



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KES Co., Ltd.

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www.kes.co.kr

Test report No.:
KES-E1-17T0399
Page (67) of (83)

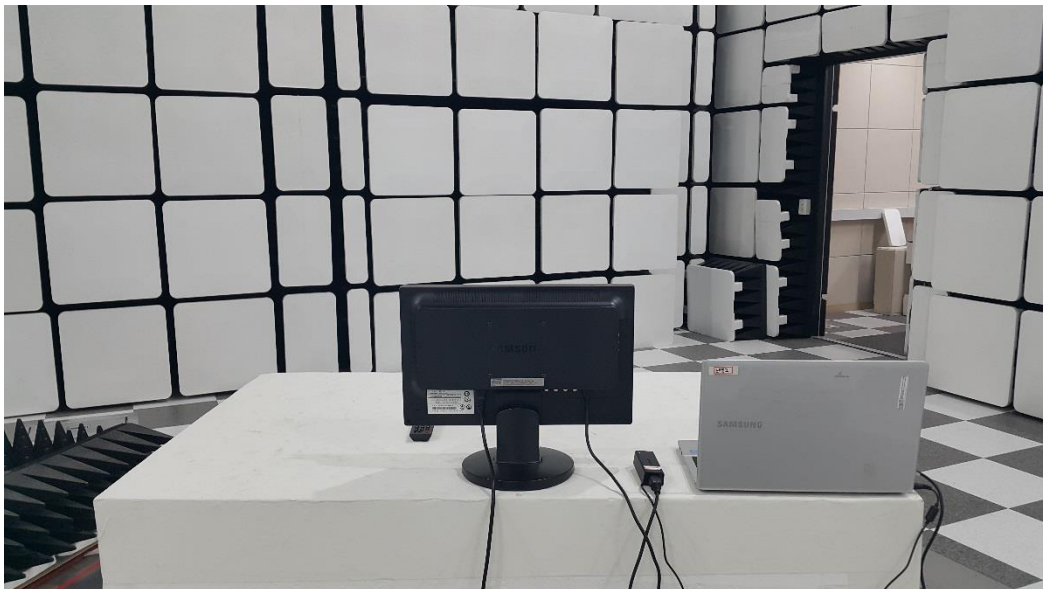
Conducted Telecommunication Emissions

N/A

N/A

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Radiated Electric Field Emissions(Below 1 GHz)



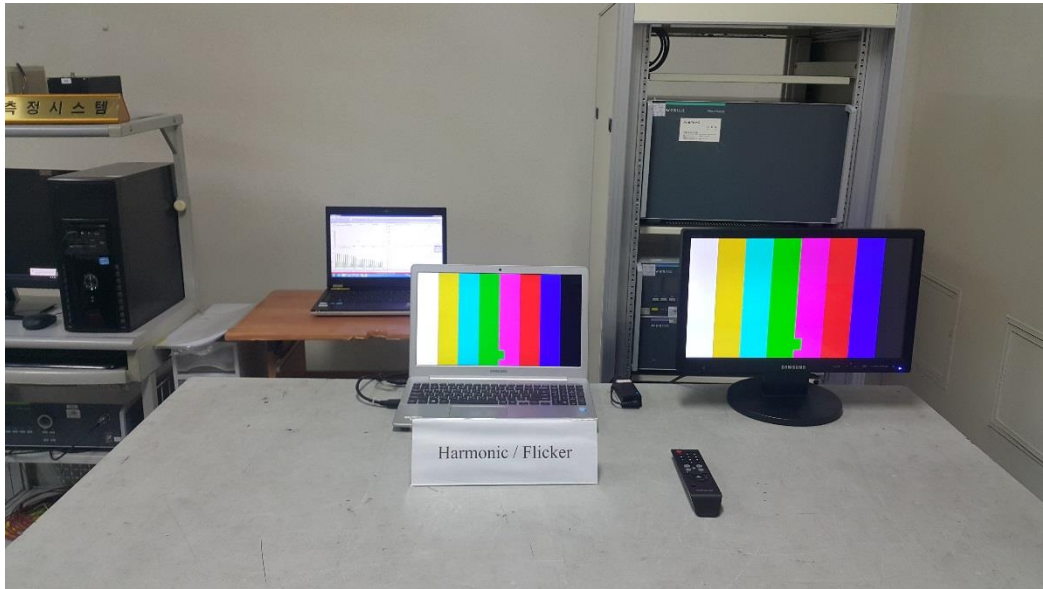
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Radiated Electric Field Emissions(Above 1 GHz)



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Harmonic Current Emissions and Voltage Fluctuations and Flicker

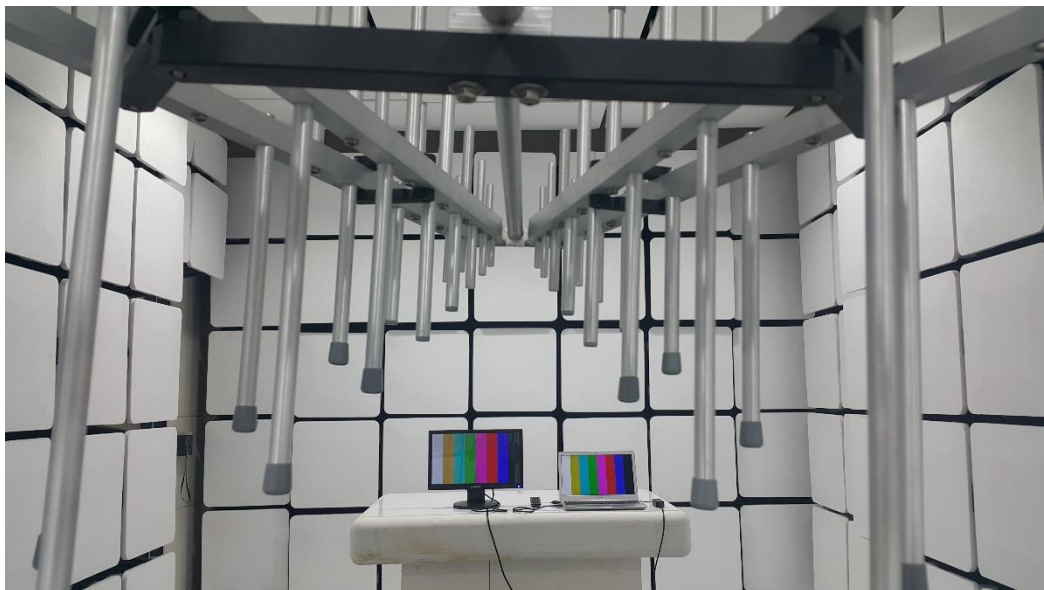


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Electrostatic Discharge

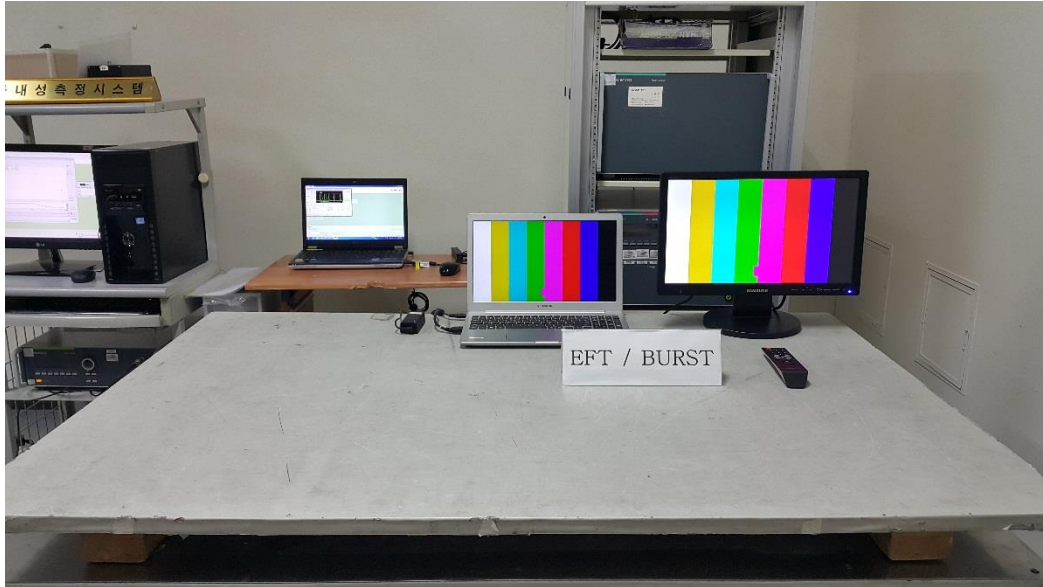


Radiated Electric Field Immunity



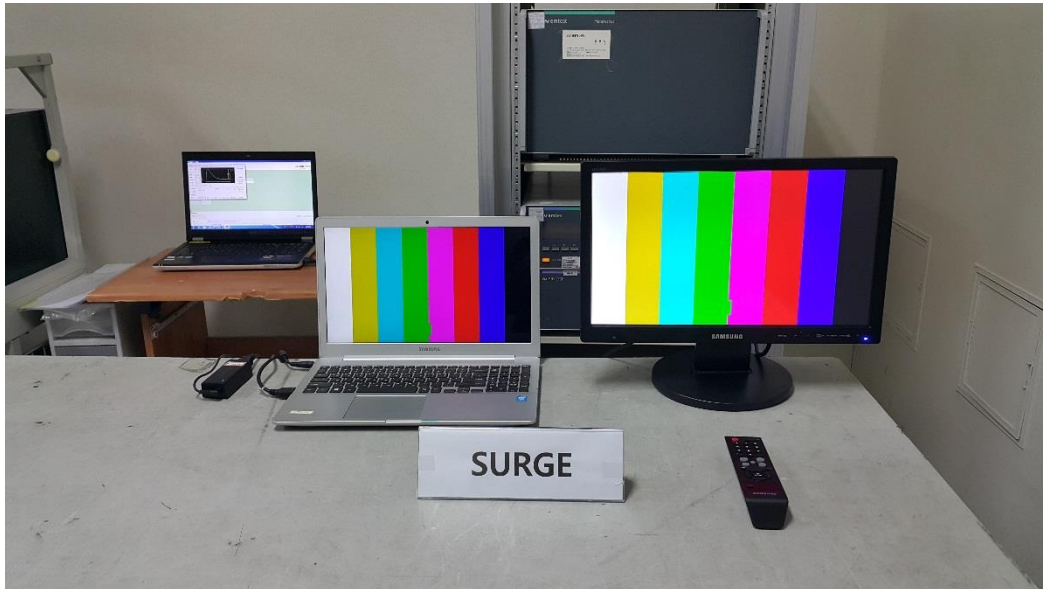
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Electrical Fast Transients/Bursts



N/A

Surge Transients



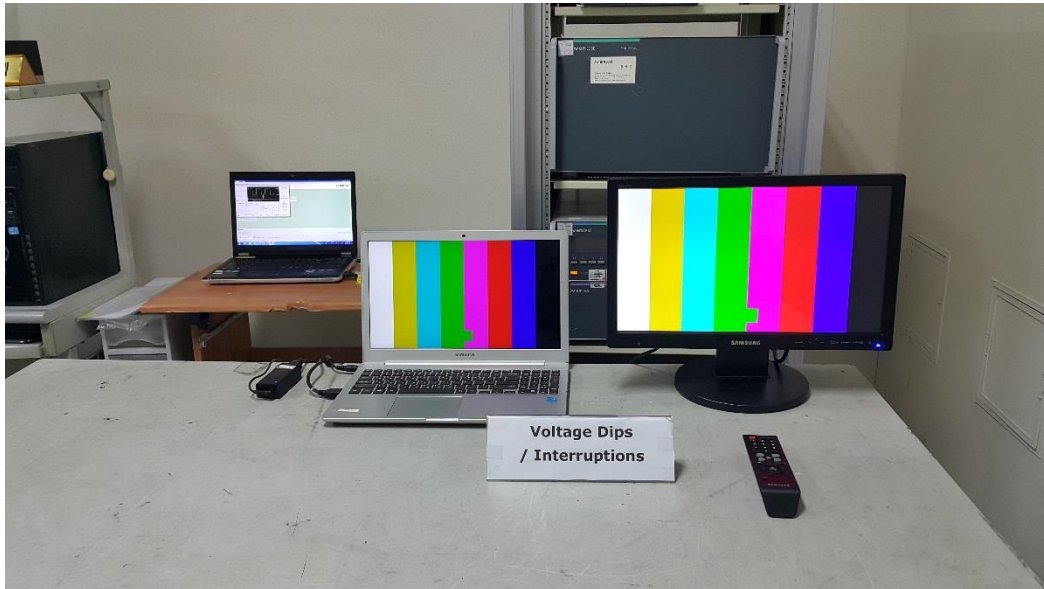
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Conducted Disturbance



N/A

Voltage Dips and Short Interruptions



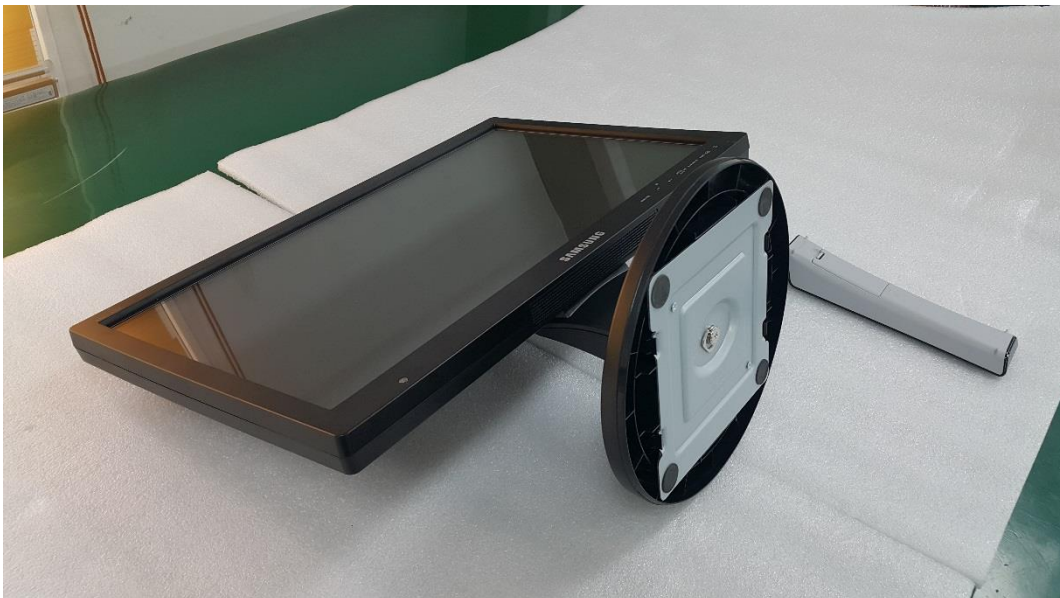
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EUT External Photographs

(Top)

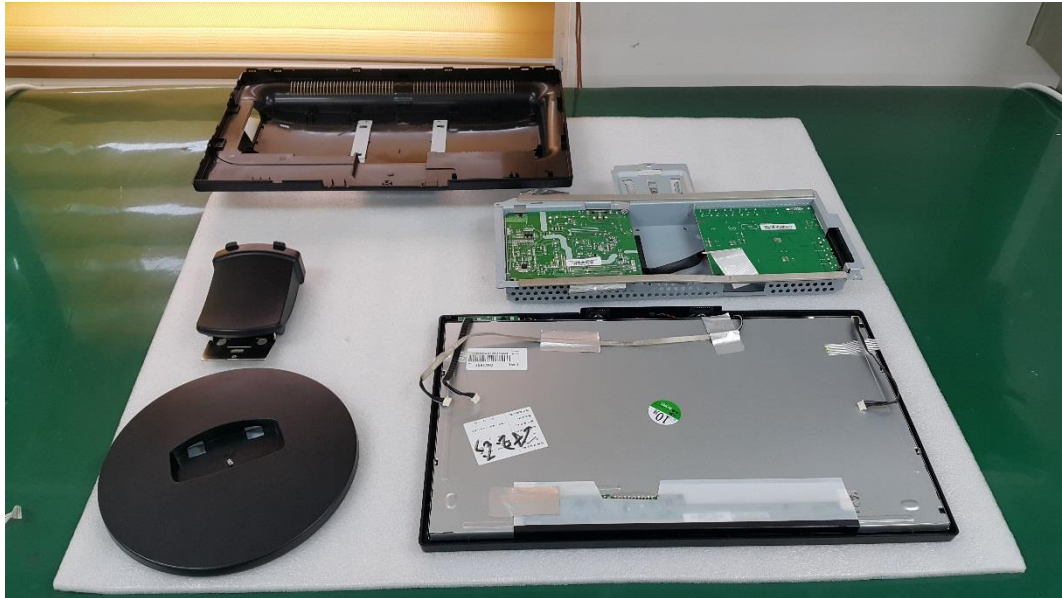


(Bottom)



EUT Internal Photographs

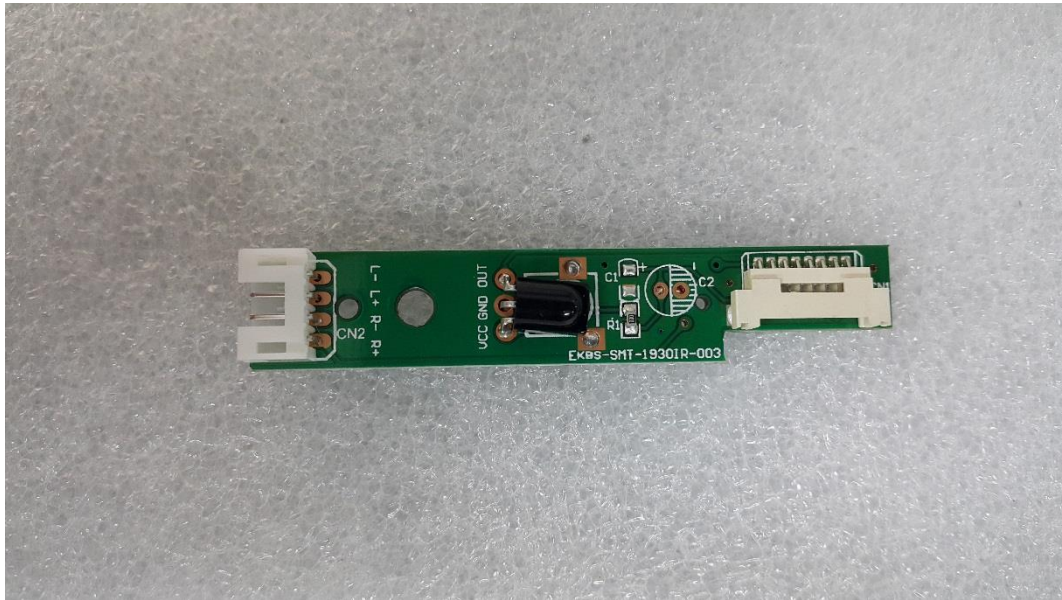
(Internal View)



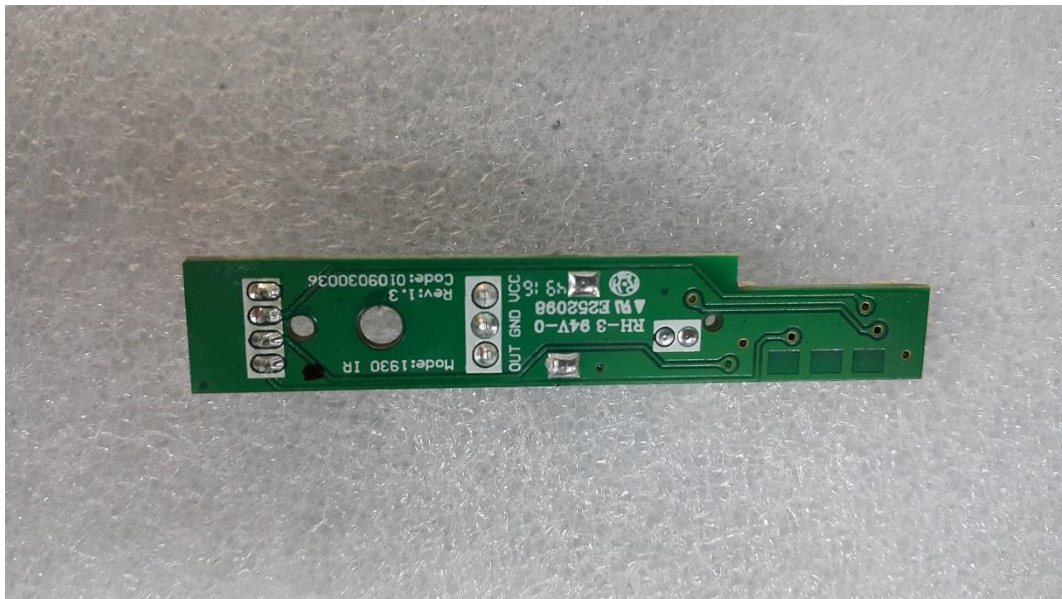
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EUT Internal View – Sub Board 1

(Top)



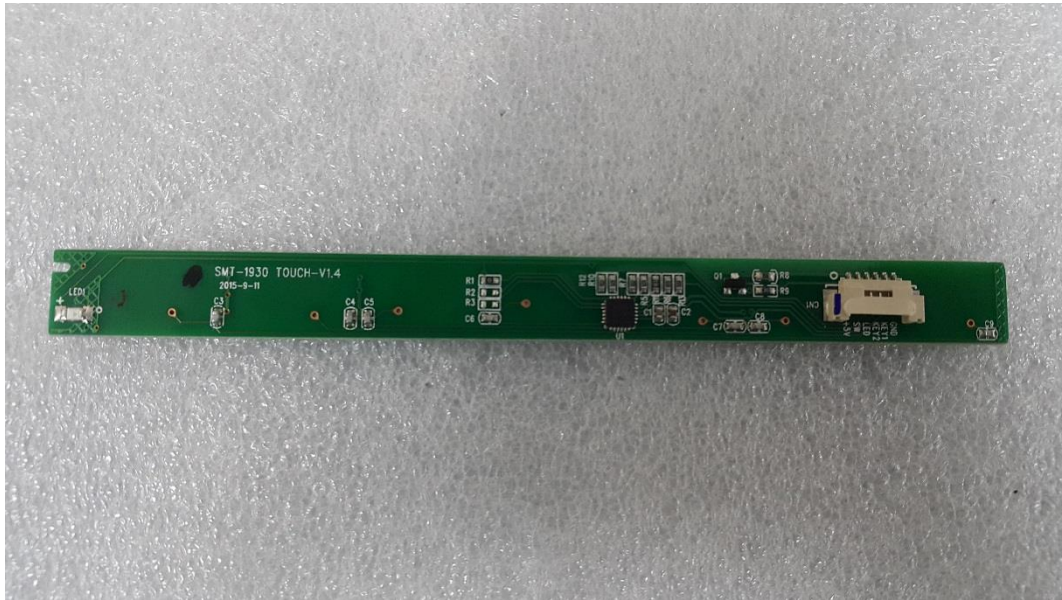
(Bottom)



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EUT Internal View – Sub Board 2

(Top)



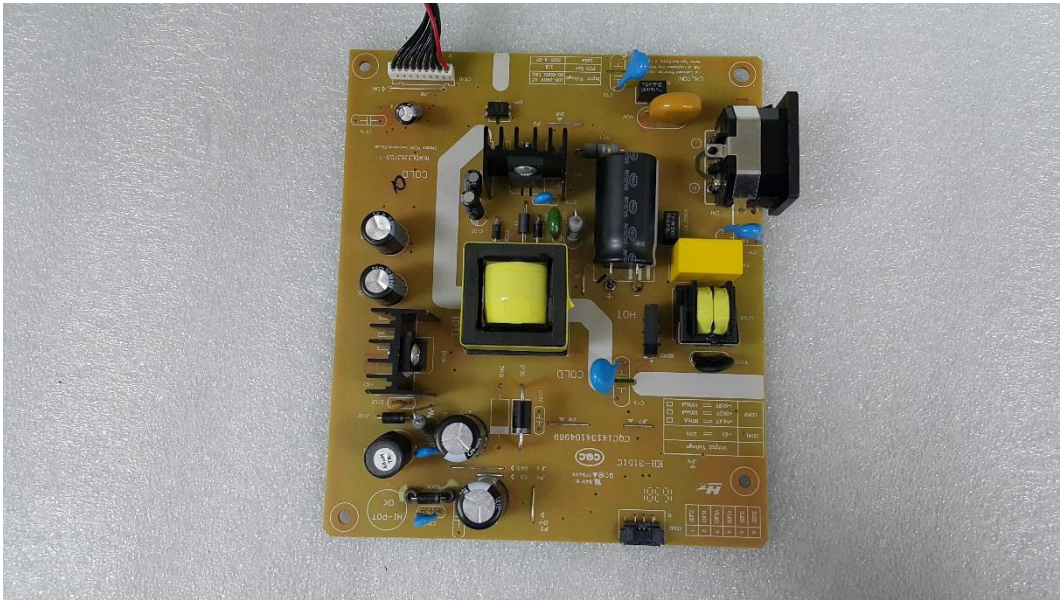
(Bottom)



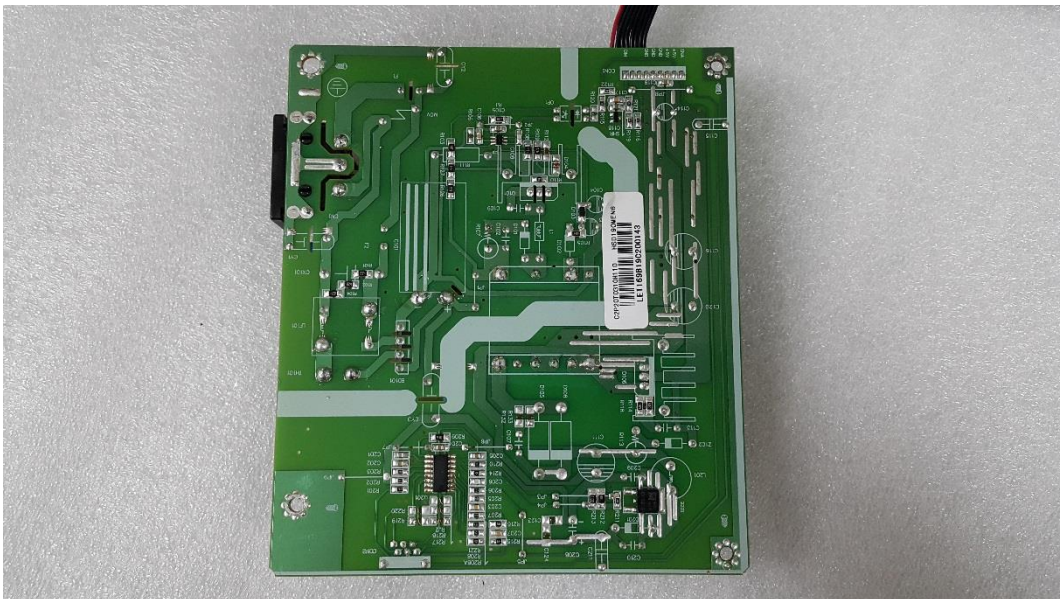
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EUT Internal View – Power Board

(Top)



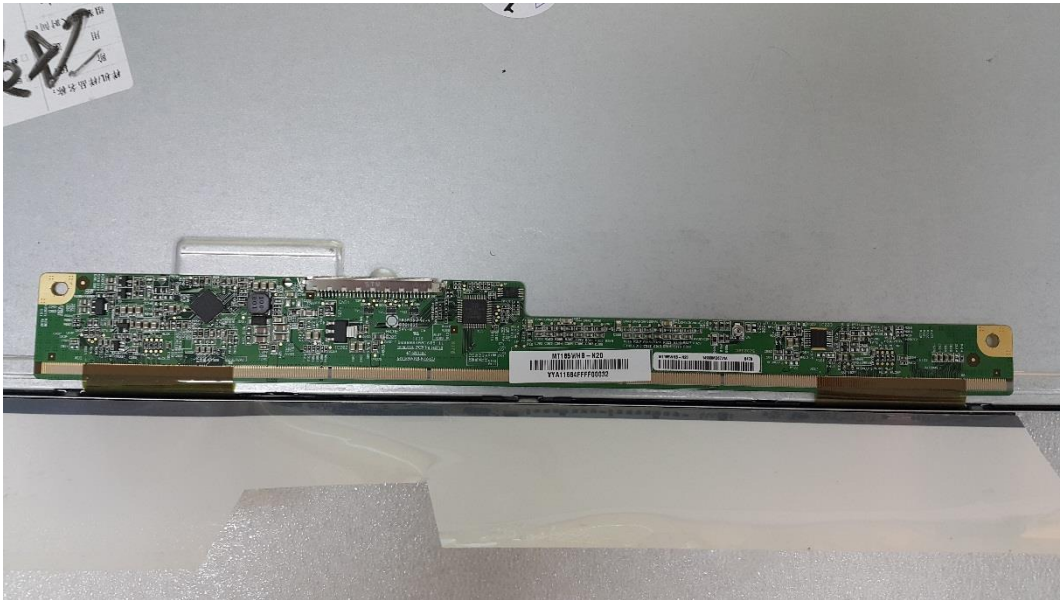
(Bottom)



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EUT Internal View – Panel Board

(Top)



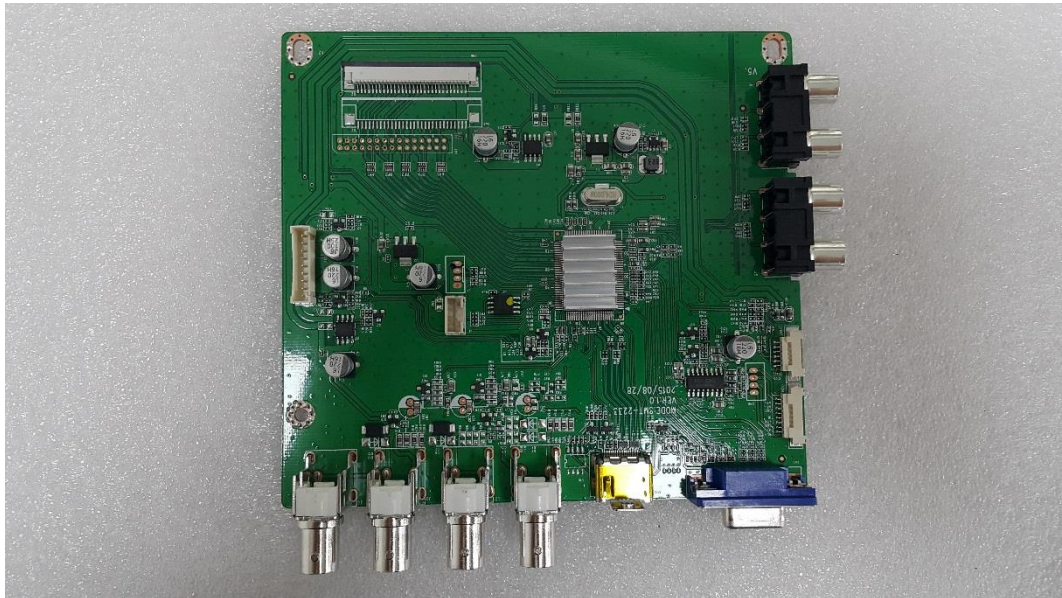
(Bottom)



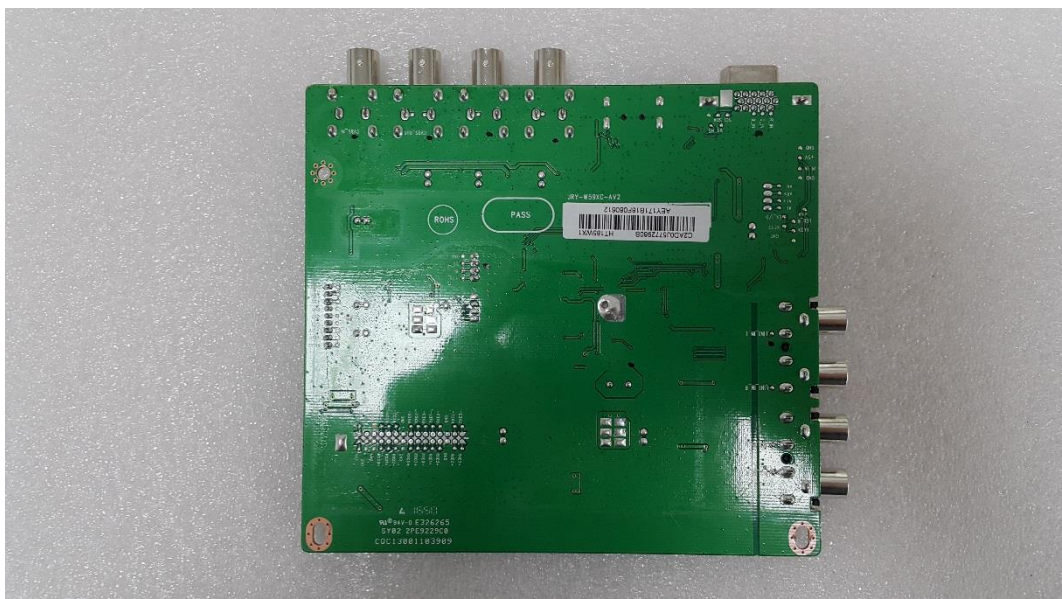
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EUT Internal View – Main Board

(Top)



(Bottom)



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Label and Location



LED MONITOR

Model No : SMT-1931

Manufacturer : Weihai Daewoo Electronics Co.,Ltd.

Made in of China

