



EMC TEST REPORT For CE

Test Report No. : KES-E1-17T0421
Date of Issue : Jul. 06, 2017
Product name : LED MONITOR
Model/Type No. : SMT-2233
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. 17, 2017 – Jun. 18, 2017
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

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Test report No.:
KES-E1-17T0421
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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Jul. 06, 2017	KES-E1-17T0421	Issued

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1.0 General Product Description

Main Specifications of E.U.T are:

Model Name		SMT-2233	Remark
Display		LED	
Screen Size		22"	
Max. Resolution		1920 x 1080	
Brightness		250cd/m ²	
Contrast Ratio		1,000 : 1	
Aspect Ratio		16:9	
Display		LED	
Screen size		22	
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			
Electrical	Input Voltage	AC100 ~ 240V (50/60Hz)	
	Power consumption	24w	
Environmental	Operating Temperature	0 ~ +40°C (+32°F ~ +104°F)	
	Humidity	20% – 90% (non-condensing)	
Mechanical	Dimensions with Stand (WxHxD)	515mm x 391.8mm x 217.4mm	
	Dimensions without Stand (WxHxD)	515mm x 316mm x 59.9mm	
	Weight	5.2kg	
	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-2233	-	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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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

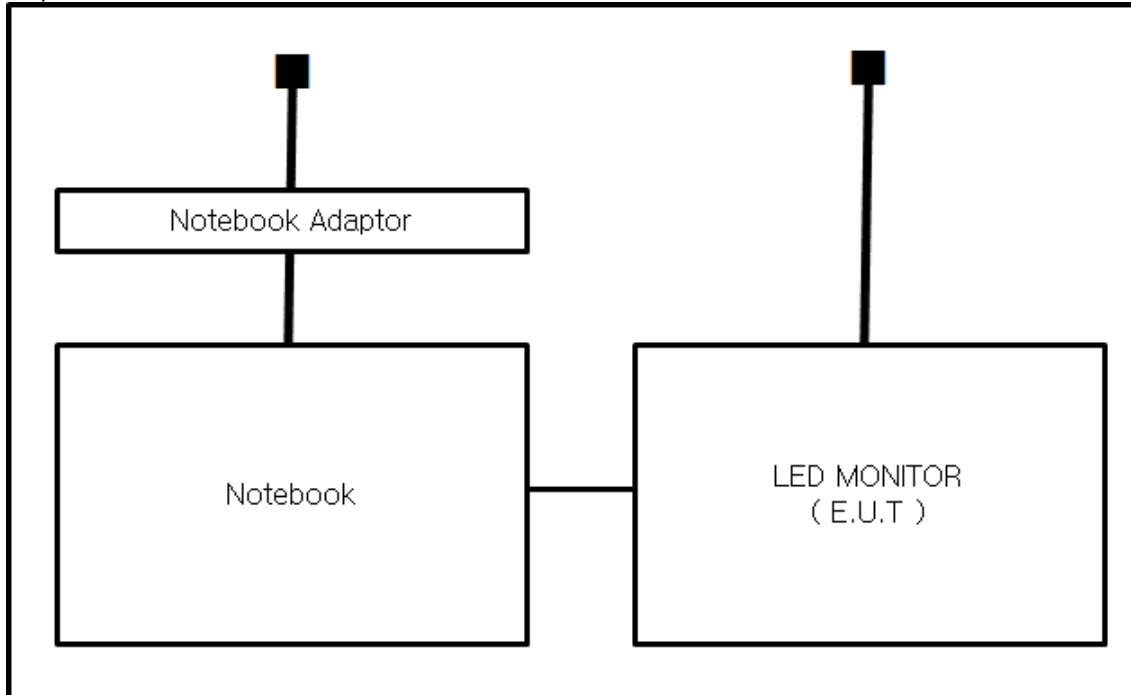
E.U.T Test operating S/W		
Name	Version	Manufacture Company
-	-	-

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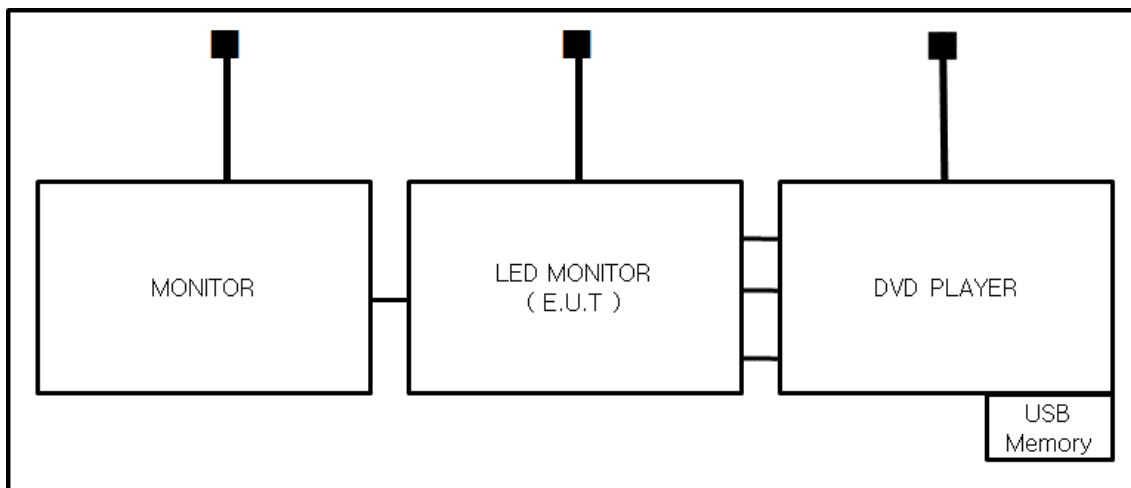
1.8 Configuration

■ 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, Yeosu-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. 17, 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: 21,4 °C

Relative Humidity: 44,9 %

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

RemarksSee 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. 17, 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: 24,2 °C
Relative Humidity: 47,4 %

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. 17, 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: 23,0 °C

Relative Humidity: 46,2 %

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. 17, 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

21,4 °C
Relative Humidity: 44,9 %

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. 17, 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: 21,4 °C
44,9 %

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. 18, 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: 22,2 °C
Relative Humidity: 45,2 %
Atmospheric Pressure: 100,0 kPa



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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

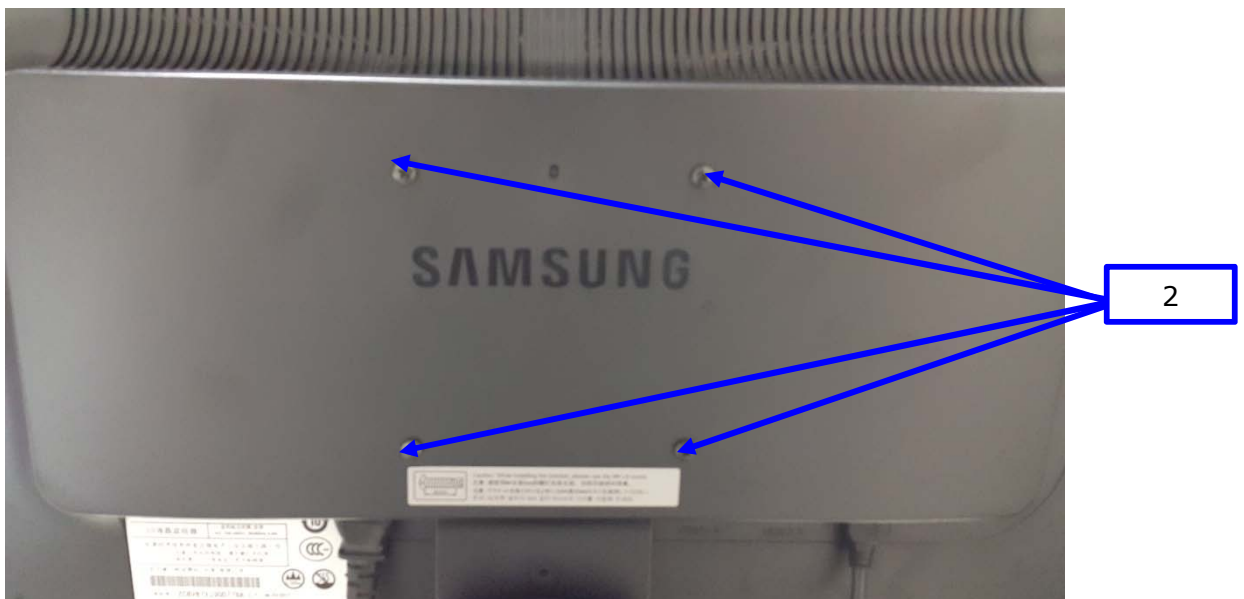
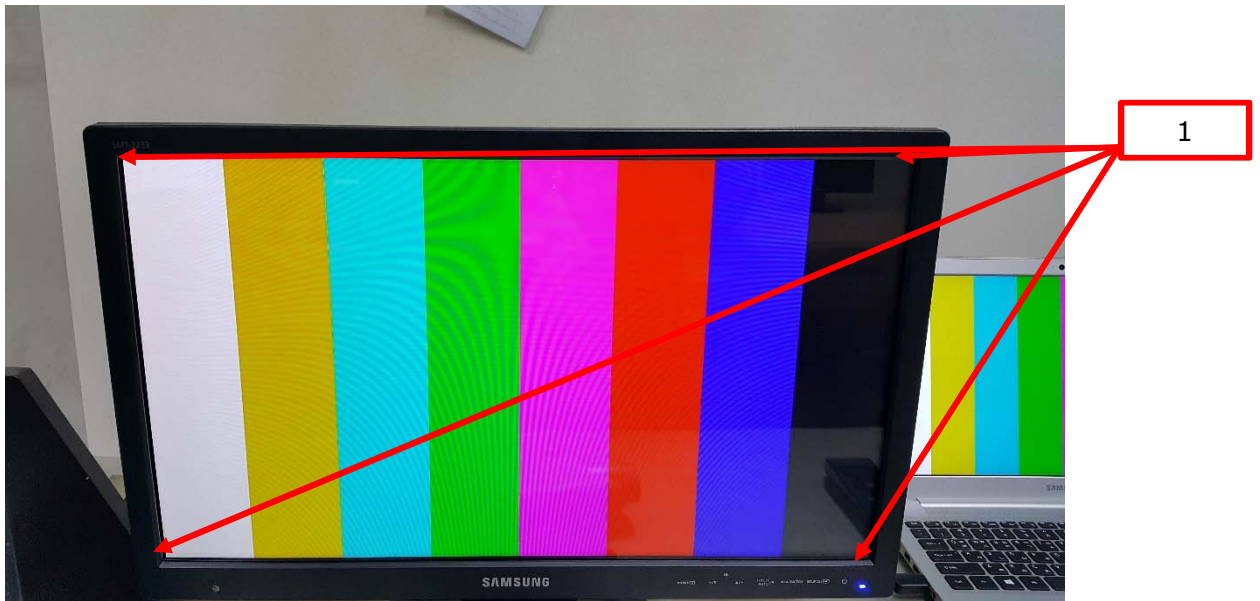
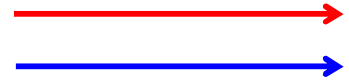
Notes: HCP: Horizontal coupling plane

VCP: Vertical coupling plane

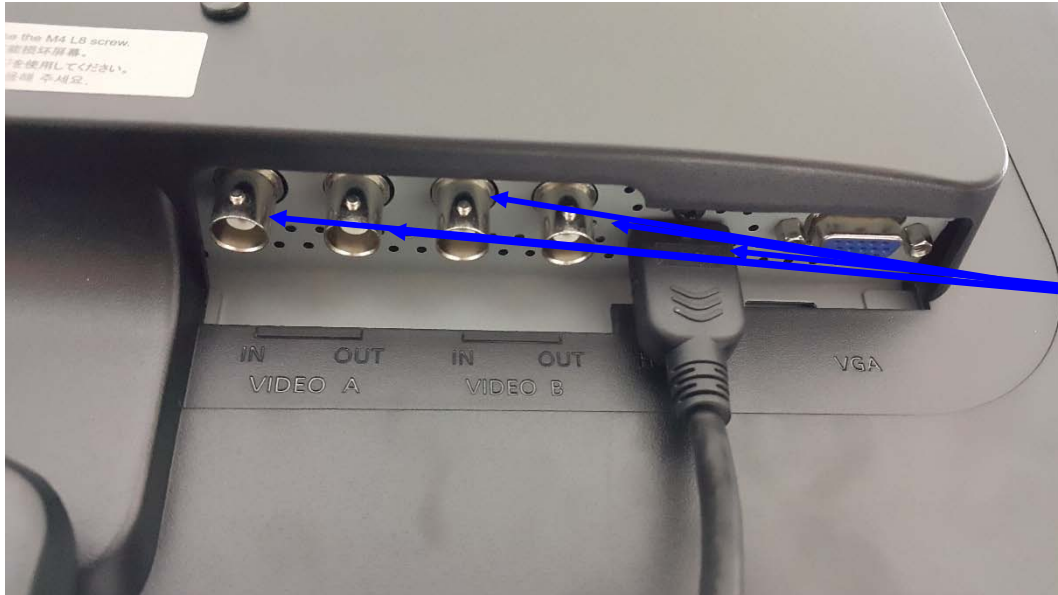
Required Performance Criteria: ☒ B

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	Screw	Contact D.	A	-
3	Ports	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	Screw	Contact D.	A	-
3	Ports	Contact D.	A	-

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- 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	Screw	Contact D.	A	-
3	Ports	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. 18, 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: 23,5 °C
Relative Humidity: 46,1 %
Atmospheric Pressure: 99,7 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 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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- 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.

3.3 Electrical Fast Transients/Bursts

Reference Standard

EN 61000-4-4:2012

Test Date

Jun. 18, 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: 22,2 °C
Relative Humidity: 45,2 %
Atmospheric Pressure: 100,0 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 klz ☐ 100 klz

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	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. 18, 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: 22,2 °C
Relative Humidity: 45,2 %
Atmospheric Pressure: 100,0 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

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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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- 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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- 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	C	C

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. 18, 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: 22,2 °C
Relative Humidity: 45,2 %
Atmospheric Pressure: 100,0 kPa



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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-M2/M3N	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-M2/M3N	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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- BNC Mode☒ Input a.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
L – N – PE	CDN-M2/M3N	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	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. 18, 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: 22,2 °C
Relative Humidity: 45,2 %
Atmospheric Pressure: 100,0 kPa

**Test Specifications & Observations/Remarks****- D-SUB Mode**

<u>Test Level</u>	<u>Duration [in period/ms (50 Hz)]</u>	<u>Criteria</u>	<u>Results</u>
☒ 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

<u>Test Level</u>	<u>Duration [in period/ms (50 Hz)]</u>	<u>Criteria</u>	<u>Results</u>
☒ 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

<u>Test Level</u>	<u>Duration [in period/ms (50 Hz)]</u>	<u>Criteria</u>	<u>Results</u>
☒ 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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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

APPENDIX A – TEST DATA

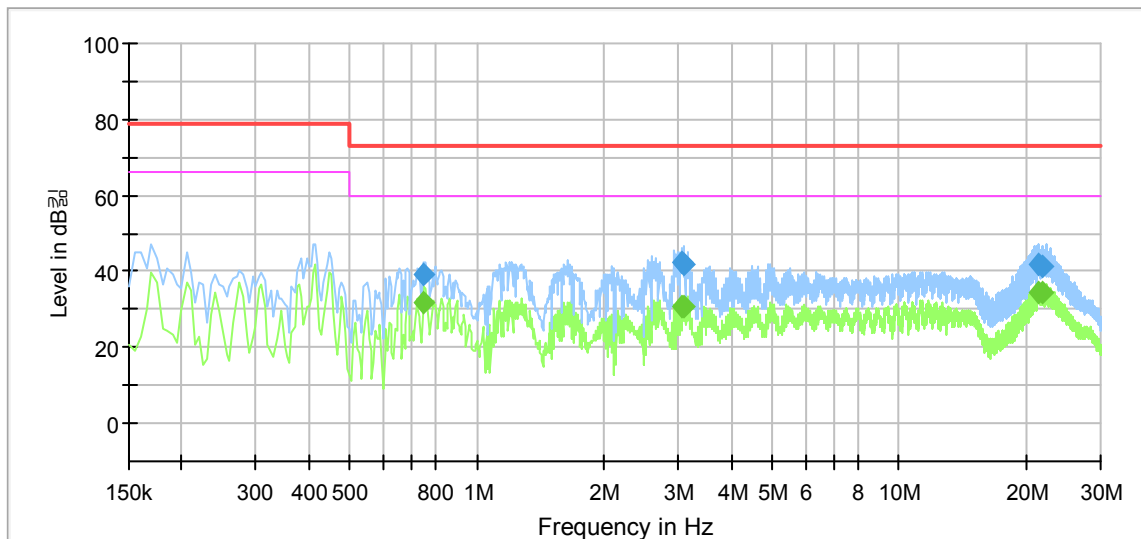
Conducted Emissions at Mains Power Ports

- D-SUB Mode

[HOT]

Common Information

Test Description: Conducted Emission
Model No.: SMT-2233
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)
0.750000	---	31.78	60.00	28.22	1000.0	9.000	L1	20.3
0.750000	39.34	---	73.00	33.66	1000.0	9.000	L1	20.3
3.070000	---	30.71	60.00	29.29	1000.0	9.000	L1	19.7
3.070000	42.26	---	73.00	30.74	1000.0	9.000	L1	19.7
3.085000	---	30.80	60.00	29.20	1000.0	9.000	L1	19.7
3.085000	41.90	---	73.00	31.10	1000.0	9.000	L1	19.7
21.415000	---	34.47	60.00	25.53	1000.0	9.000	L1	20.3
21.415000	41.83	---	73.00	31.17	1000.0	9.000	L1	20.3
21.935000	---	34.65	60.00	25.35	1000.0	9.000	L1	20.3
21.935000	41.41	---	73.00	31.59	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.

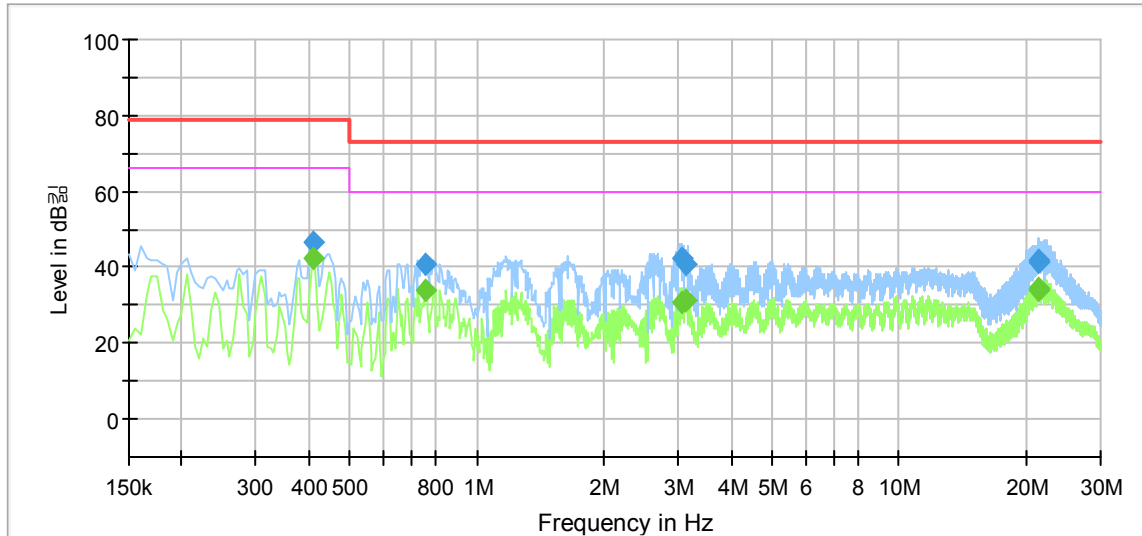
Corr. : Correction values (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))



[NEUTRAL]

Common Information

Test Description: Conducted Emission
Model No.: SMT-2233
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)
0.410000	---	42.39	66.00	23.61	1000.0	9.000	N	20.7
0.410000	46.64	---	79.00	32.36	1000.0	9.000	N	20.7
0.755000	---	33.89	60.00	26.11	1000.0	9.000	N	20.3
0.755000	40.61	---	73.00	32.39	1000.0	9.000	N	20.3
3.055000	---	30.67	60.00	29.33	1000.0	9.000	N	19.7
3.055000	42.17	---	73.00	30.83	1000.0	9.000	N	19.7
3.130000	---	31.38	60.00	28.62	1000.0	9.000	N	19.7
3.130000	40.92	---	73.00	32.08	1000.0	9.000	N	19.7
21.420000	---	34.21	60.00	25.79	1000.0	9.000	N	20.2
21.420000	41.59	---	73.00	31.41	1000.0	9.000	N	20.2
21.470000	---	33.99	60.00	26.01	1000.0	9.000	N	20.2
21.470000	41.44	---	73.00	31.56	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))

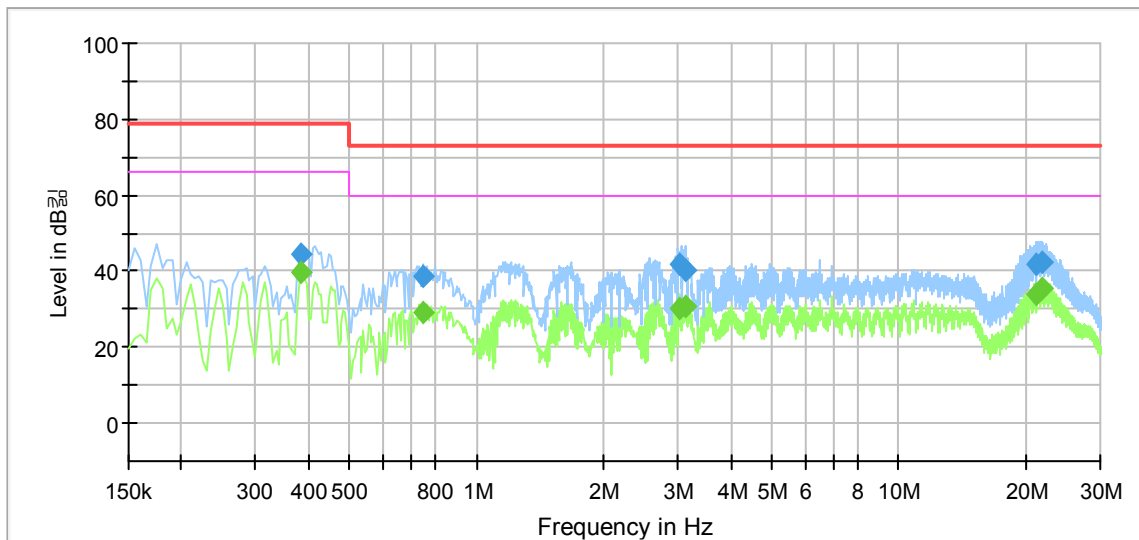


- HDMI Mode

[HOT]

Common Information

Test Description: Conducted Emission
Model No.: SMT-2233
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)
0.385000	---	39.76	66.00	26.24	1000.0	9.000	L1	20.7
0.385000	44.31	---	79.00	34.69	1000.0	9.000	L1	20.7
0.745000	---	29.34	60.00	30.66	1000.0	9.000	L1	20.3
0.745000	38.59	---	73.00	34.41	1000.0	9.000	L1	20.3
3.035000	---	30.18	60.00	29.82	1000.0	9.000	L1	19.7
3.035000	42.06	---	73.00	30.94	1000.0	9.000	L1	19.7
3.130000	---	30.59	60.00	29.41	1000.0	9.000	L1	19.7
3.130000	40.37	---	73.00	32.63	1000.0	9.000	L1	19.7
21.260000	---	34.03	60.00	25.97	1000.0	9.000	L1	20.3
21.260000	41.94	---	73.00	31.06	1000.0	9.000	L1	20.3
21.850000	---	35.33	60.00	24.67	1000.0	9.000	L1	20.3
21.850000	42.37	---	73.00	30.63	1000.0	9.000	L1	20.3

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

QuasiPeak / CAverage : The Final Value

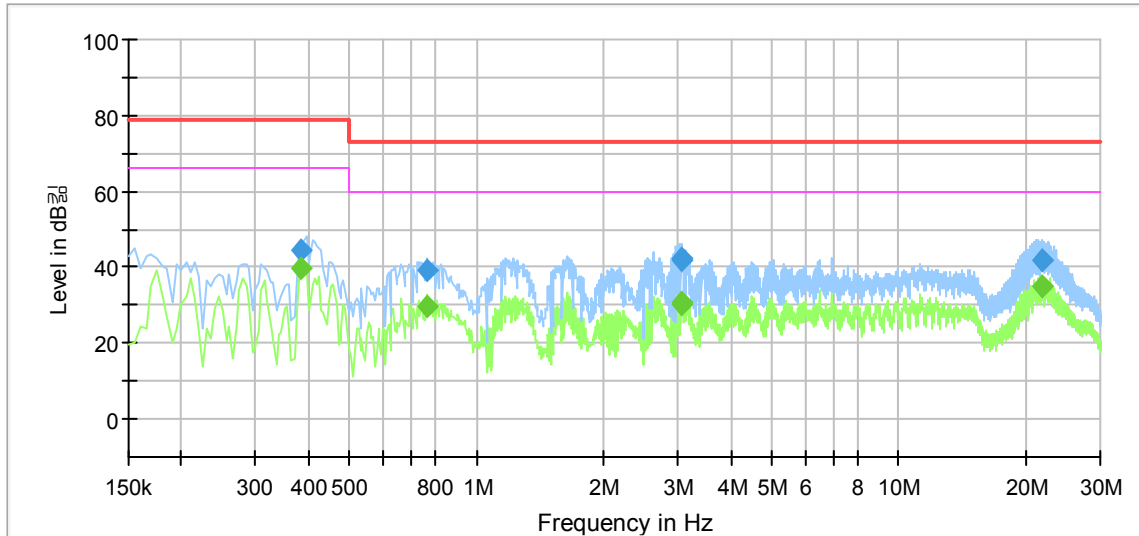
Reading Value : Not shown in the table.

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

[NEUTRAL]

Common Information

Test Description: Conducted Emission
Model No.: SMT-2233
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)
0.385000	---	39.75	66.00	26.25	1000.0	9.000	N	20.7
0.385000	44.30	---	79.00	34.70	1000.0	9.000	N	20.7
0.760000	---	29.84	60.00	30.16	1000.0	9.000	N	20.3
0.760000	39.01	---	73.00	33.99	1000.0	9.000	N	20.3
3.050000	---	30.32	60.00	29.68	1000.0	9.000	N	19.7
3.050000	41.85	---	73.00	31.15	1000.0	9.000	N	19.7
3.070000	---	30.63	60.00	29.37	1000.0	9.000	N	19.7
3.070000	42.12	---	73.00	30.88	1000.0	9.000	N	19.7
21.810000	---	34.92	60.00	25.08	1000.0	9.000	N	20.2
21.810000	42.04	---	73.00	30.96	1000.0	9.000	N	20.2
21.955000	---	34.76	60.00	25.24	1000.0	9.000	N	20.2
21.955000	41.92	---	73.00	31.08	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))

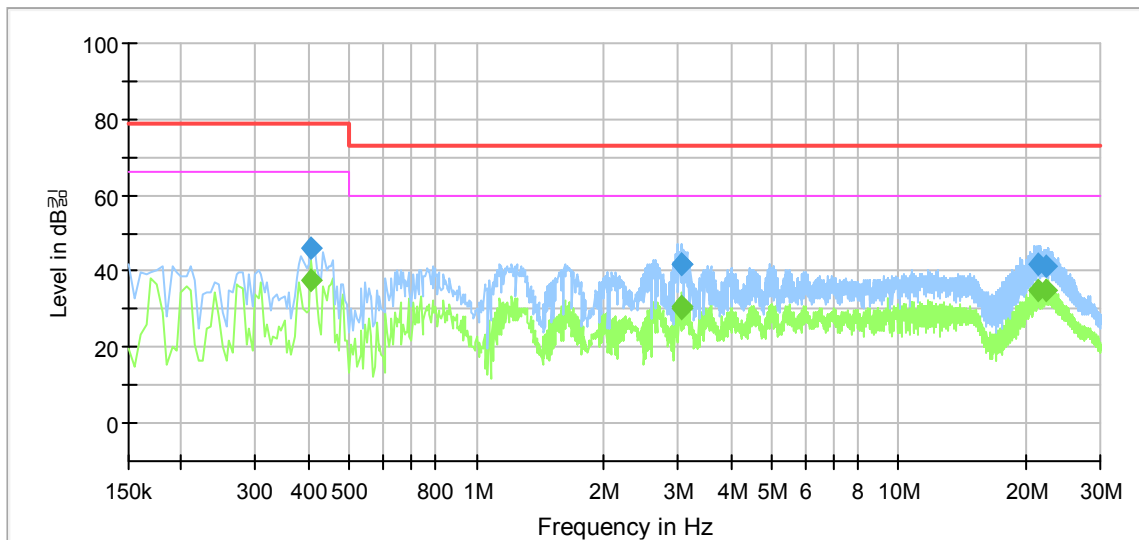


- BNC Mode

[HOT]

Common Information

Test Description: Conducted Emission
Model No.: SMT-2233
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)
0.405000	---	37.45	66.00	28.55	1000.0	9.000	L1	20.7
0.405000	45.89	---	79.00	33.11	1000.0	9.000	L1	20.7
3.060000	---	30.25	60.00	29.75	1000.0	9.000	L1	19.7
3.060000	41.87	---	73.00	31.13	1000.0	9.000	L1	19.7
3.075000	---	30.49	60.00	29.51	1000.0	9.000	L1	19.7
3.075000	42.06	---	73.00	30.94	1000.0	9.000	L1	19.7
21.485000	---	34.89	60.00	25.11	1000.0	9.000	L1	20.3
21.485000	41.84	---	73.00	31.16	1000.0	9.000	L1	20.3
22.435000	---	34.81	60.00	25.19	1000.0	9.000	L1	20.3
22.435000	41.17	---	73.00	31.83	1000.0	9.000	L1	20.3

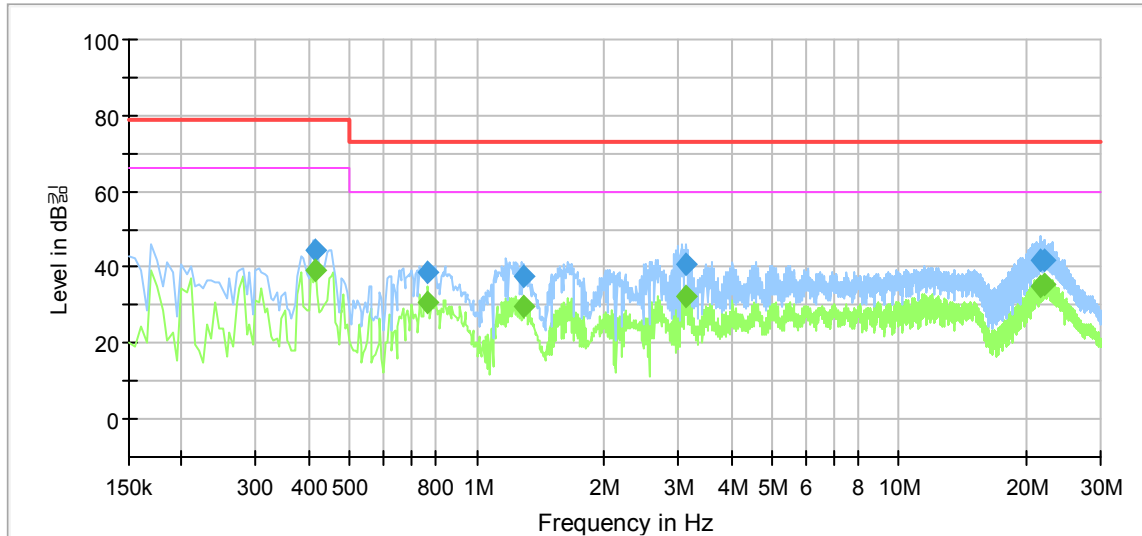
QuasiPeak[dBuV] / CAverage [dBuV] = Reading Value[dBuV] + Corr. [dB]
QuasiPeak / CAverage : The Final Value
Reading Value : Not shown in the table.
Corr. : Correction values (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))



[NEUTRAL]

Common Information

Test Description: Conducted Emission
Model No.: SMT-2233
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)
0.415000	---	38.98	66.00	27.02	1000.0	9.000	N	20.6
0.415000	44.48	---	79.00	34.52	1000.0	9.000	N	20.6
0.765000	---	30.51	60.00	29.49	1000.0	9.000	N	20.3
0.765000	38.78	---	73.00	34.22	1000.0	9.000	N	20.3
1.290000	---	29.73	60.00	30.27	1000.0	9.000	N	20.0
1.290000	37.47	---	73.00	35.53	1000.0	9.000	N	20.0
3.140000	---	32.21	60.00	27.79	1000.0	9.000	N	19.7
3.140000	40.92	---	73.00	32.08	1000.0	9.000	N	19.7
21.585000	---	35.18	60.00	24.82	1000.0	9.000	N	20.2
21.585000	41.98	---	73.00	31.02	1000.0	9.000	N	20.2
22.020000	---	35.57	60.00	24.43	1000.0	9.000	N	20.2
22.020000	42.01	---	73.00	30.99	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))



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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[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))



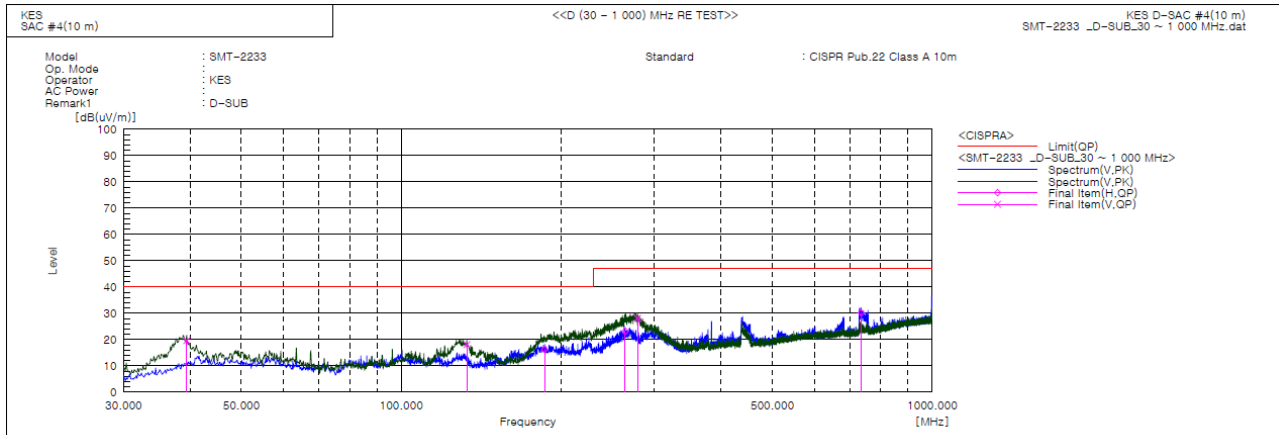
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Radiated Electric Field Emissions(Below 1 GHz)

- D-SUB Mode



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	39.458	V	49.6	-30.0	19.6	40.0	20.4	150.0	105.0	
2	132.941	V	50.5	-32.4	18.1	40.0	21.9	150.0	153.0	
3	186.170	H	45.4	-29.2	16.2	40.0	23.8	400.0	288.0	
4	264.152	H	48.9	-25.7	23.2	47.0	23.8	186.0	48.0	
5	278.684	V	53.4	-25.3	28.1	47.0	18.9	100.0	199.0	
6	734.705	H	44.9	-14.7	30.2	47.0	16.8	100.0	358.0	

◆ 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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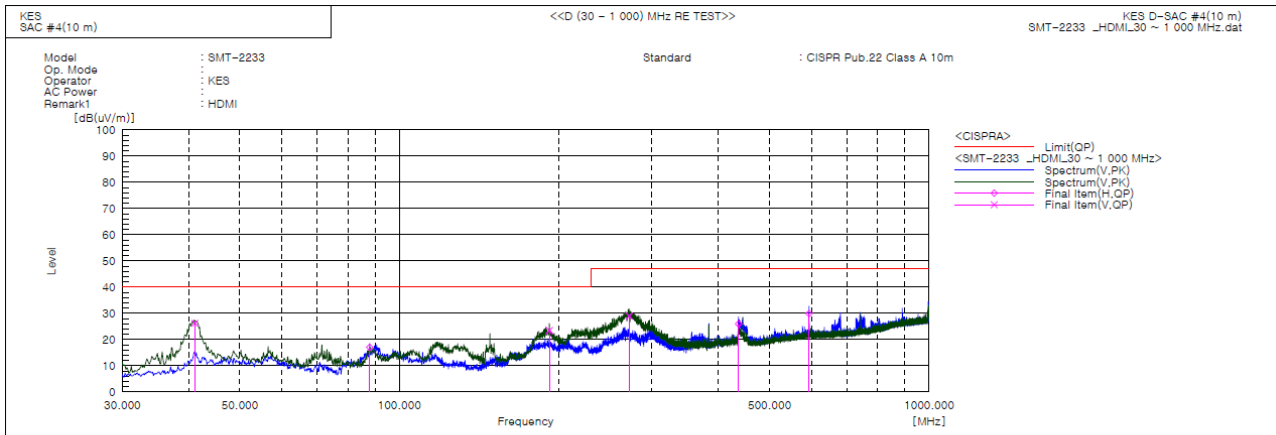


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- HDMI Mode



Final Result

No.	Frequency	(P)	Reading	c.f	Result	Limit	Margin	Height	Angle	Remark
	[MHz]		OP		OP	OP	OP			
			[dB(uV)]	[dB(1/m)]	[dB(uV/m)]	[dB(uV/m)]	[dB]	[cm]	[deg]	
1	41.125	V	55.4	-29.2	26.2	40.0	13.8	155.0	129.0	
2	87.958	H	48.9	-31.8	17.1	40.0	22.9	400.0	22.0	
3	191.990	V	51.7	-28.2	23.5	40.0	16.5	100.0	194.0	
4	271.651	V	54.4	-25.5	28.9	47.0	18.1	100.0	194.0	
5	436.794	H	46.4	-20.4	26.0	47.0	21.0	200.0	350.0	
6	593.449	H	45.8	-15.9	29.9	47.0	17.1	200.0	124.0	

◆ Calculation

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

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

Correction Factor : ANT FACTOR + Cable loss

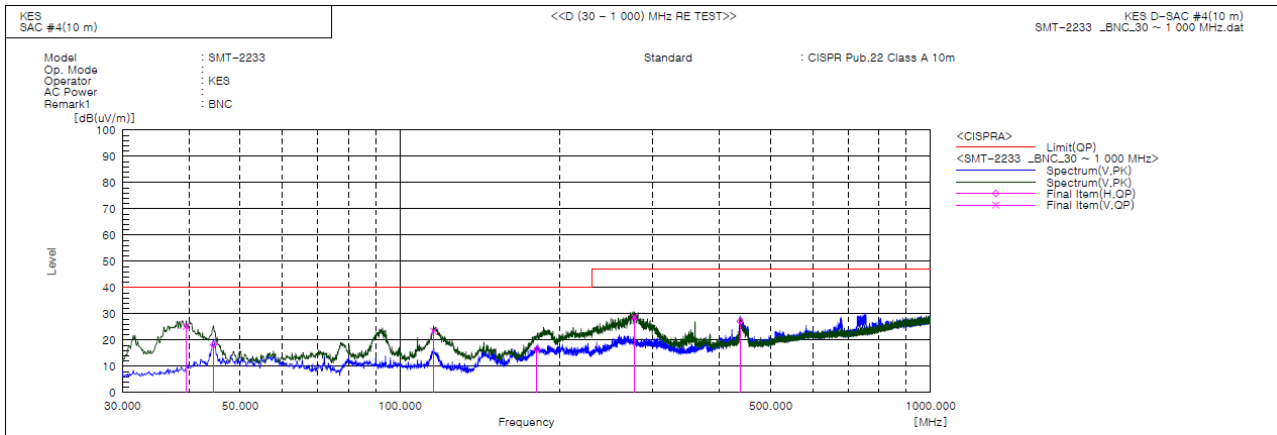


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- BNC Mode



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	39.579	V	55.2	-29.9	25.3	40.0	14.7	150.0	95.0	
2	44.550	H	46.6	-28.3	18.3	40.0	21.7	400.0	4.0	
3	115.724	V	54.1	-30.7	23.4	40.0	16.6	150.0	191.0	
4	181.240	H	46.5	-30.0	16.5	40.0	23.5	400.0	226.0	
5	276.501	V	54.2	-25.4	28.8	47.0	18.2	100.0	173.0	
6	437.885	H	47.6	-20.4	27.2	47.0	19.8	100.0	2.0	

◆ 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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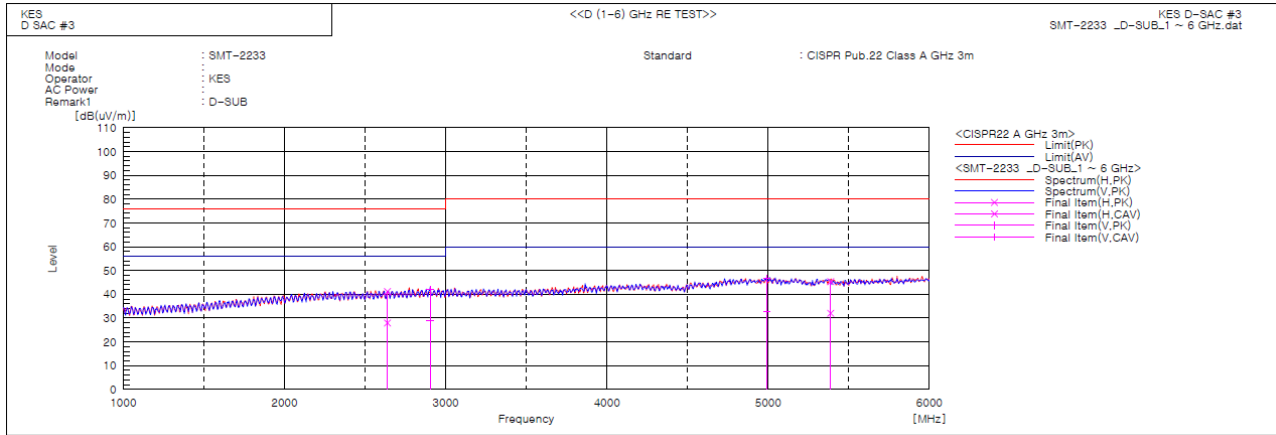
Test report No.:

KES-EI-17T0421

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Radiated Electric Field Emissions(Above 1 GHz)

- D-SUB Mode



◆ 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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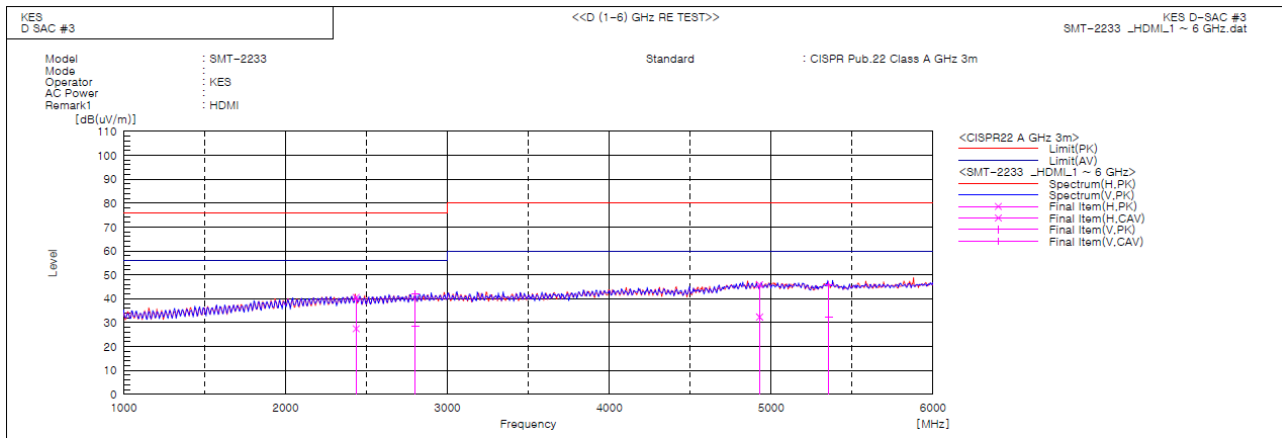
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- HDMI Mode



◆ 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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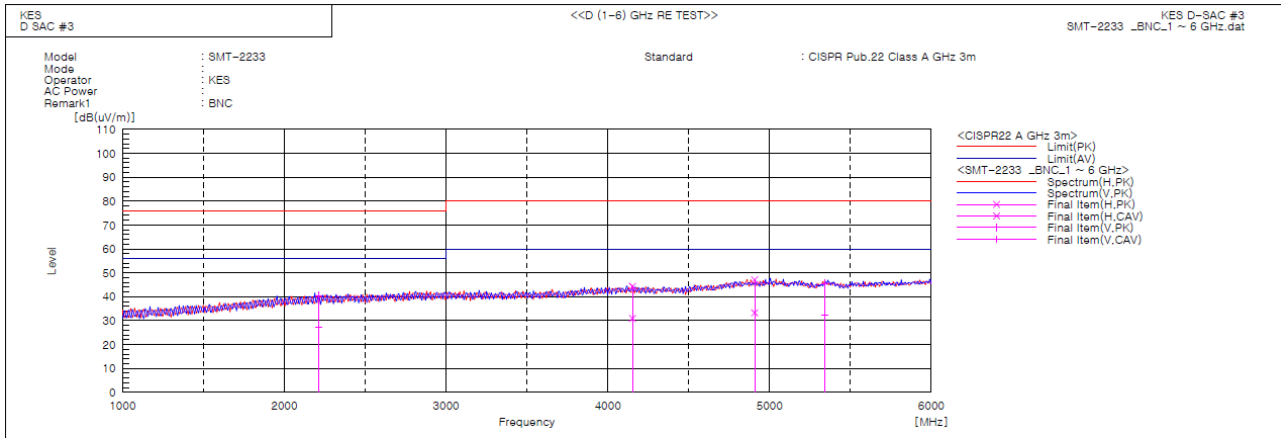
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- BNC Mode



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	2211.029	V	43.6	30.3	-3.0	40.6	27.3	76.0	56.0	35.4	28.7	100.0	326.2	
2	4152.398	H	41.5	28.2	2.8	44.3	31.0	80.0	60.0	35.7	29.0	100.0	82.0	
3	4907.977	H	41.0	27.2	6.1	47.1	33.3	80.0	60.0	32.9	26.7	100.0	42.6	
4	5341.004	V	39.7	26.5	5.9	45.6	32.4	80.0	60.0	34.4	27.6	100.0	49.2	

◆ 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	65.778E-3	100.000		
2	1.131E-3	1.720		PASS
3	53.530E-3	81.379	2.30	PASS
4	1.731E-3	2.632		PASS
5	51.135E-3	77.738	1.14	PASS
6	1.294E-3	1.967		PASS
7	48.576E-3	73.848	770.00E-3	PASS
8	1.177E-3	1.789		PASS
9	44.147E-3	67.114	400.00E-3	PASS
10	1.426E-3	2.167		PASS
11	39.684E-3	60.330	330.00E-3	PASS
12	1.055E-3	1.604		PASS
13	35.844E-3	54.492	210.00E-3	PASS
14	1.154E-3	1.754		PASS
15	31.160E-3	47.371	150.00E-3	PASS
16	972.557E-6	1.479		PASS
17	25.527E-3	38.808	130.00E-3	PASS
18	777.889E-6	1.183		PASS
19	19.960E-3	30.344	120.00E-3	PASS
20	778.873E-6	1.184		PASS
21	14.896E-3	22.646	165.00E-3	PASS
22	628.738E-6	0.956		PASS
23	10.377E-3	15.775	150.00E-3	PASS
24	628.975E-6	0.956		PASS
25	6.604E-3	10.040	135.00E-3	PASS
26	573.402E-6	0.872		PASS
27	3.777E-3	5.742		PASS
28	630.228E-6	0.958		PASS
29	2.042E-3	3.104		PASS
30	604.928E-6	0.920		PASS
31	2.353E-3	3.578		PASS
32	547.697E-6	0.833		PASS
33	3.378E-3	5.135		PASS
34	598.609E-6	0.910		PASS
35	4.191E-3	6.371		PASS
36	562.231E-6	0.855		PASS
37	4.390E-3	6.674		PASS
38	606.817E-6	0.923		PASS
39	4.006E-3	6.090		PASS
40	559.084E-6	0.850		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	66.453E-3	100.000		
2	1.405E-3	2.114		PASS
3	54.313E-3	81.732	3.45	PASS
4	2.192E-3	3.299		PASS
5	51.763E-3	77.895	1.71	PASS
6	1.477E-3	2.222		PASS
7	49.136E-3	73.941	1.15	PASS
8	1.362E-3	2.050		PASS
9	44.658E-3	67.202	600.00E-3	PASS
10	1.922E-3	2.892		PASS
11	40.131E-3	60.391	495.00E-3	PASS
12	1.180E-3	1.776		PASS
13	36.202E-3	54.479	315.00E-3	PASS
14	1.511E-3	2.273		PASS
15	31.395E-3	47.245	225.00E-3	PASS
16	1.220E-3	1.836		PASS
17	25.646E-3	38.594	195.00E-3	PASS
18	928.598E-6	1.397		PASS
19	20.081E-3	30.219	180.00E-3	PASS
20	901.960E-6	1.357		PASS
21	15.014E-3	22.594	165.00E-3	PASS
22	705.383E-6	1.061		PASS
23	10.627E-3	15.993	150.00E-3	PASS
24	700.034E-6	1.053		PASS
25	6.957E-3	10.469	135.00E-3	PASS
26	639.455E-6	0.962		PASS
27	4.015E-3	6.042		PASS
28	733.683E-6	1.104		PASS
29	2.179E-3	3.279		PASS
30	705.412E-6	1.062		PASS
31	2.529E-3	3.806		PASS
32	674.469E-6	1.015		PASS
33	3.514E-3	5.289		PASS
34	704.807E-6	1.061		PASS
35	4.290E-3	6.456		PASS
36	674.920E-6	1.016		PASS
37	4.501E-3	6.774		PASS
38	677.872E-6	1.020		PASS
39	4.106E-3	6.178		PASS
40	626.038E-6	0.942		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	65.976E-3	100.000		
2	1.106E-3	1.676		PASS
3	53.749E-3	81.468	2.30	PASS
4	1.702E-3	2.580		PASS
5	51.299E-3	77.754	1.14	PASS
6	1.242E-3	1.882		PASS
7	48.679E-3	73.783	770.00E-3	PASS
8	1.112E-3	1.686		PASS
9	44.170E-3	66.948	400.00E-3	PASS
10	1.389E-3	2.105		PASS
11	39.607E-3	60.033	330.00E-3	PASS
12	997.089E-6	1.511		PASS
13	35.685E-3	54.088	210.00E-3	PASS
14	1.055E-3	1.600		PASS
15	30.931E-3	46.883	150.00E-3	PASS
16	874.379E-6	1.325		PASS
17	25.238E-3	38.254	130.00E-3	PASS
18	710.954E-6	1.078		PASS
19	19.637E-3	29.765	120.00E-3	PASS
20	741.381E-6	1.124		PASS
21	14.559E-3	22.068	165.00E-3	PASS
22	613.399E-6	0.930		PASS
23	10.043E-3	15.223	150.00E-3	PASS
24	638.916E-6	0.968		PASS
25	6.306E-3	9.558	135.00E-3	PASS
26	598.470E-6	0.907		PASS
27	3.572E-3	5.414		PASS
28	673.220E-6	1.020		PASS
29	2.047E-3	3.103		PASS
30	638.660E-6	0.968		PASS
31	2.500E-3	3.790		PASS
32	565.464E-6	0.857		PASS
33	3.499E-3	5.303		PASS
34	605.232E-6	0.917		PASS
35	4.251E-3	6.443		PASS
36	553.920E-6	0.840		PASS
37	4.378E-3	6.636		PASS
38	572.636E-6	0.868		PASS
39	3.931E-3	5.958		PASS
40	538.448E-6	0.816		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	66.154E-3	100.000		
2	1.379E-3	2.084		PASS
3	53.869E-3	81.430	3.45	PASS
4	2.077E-3	3.140		PASS
5	51.440E-3	77.758	1.71	PASS
6	1.443E-3	2.181		PASS
7	48.812E-3	73.786	1.15	PASS
8	1.270E-3	1.920		PASS
9	44.287E-3	66.945	600.00E-3	PASS
10	1.796E-3	2.715		PASS
11	39.935E-3	60.367	495.00E-3	PASS
12	1.127E-3	1.704		PASS
13	35.803E-3	54.120	315.00E-3	PASS
14	1.429E-3	2.160		PASS
15	31.124E-3	47.047	225.00E-3	PASS
16	1.098E-3	1.659		PASS
17	25.383E-3	38.369	195.00E-3	PASS
18	853.586E-6	1.290		PASS
19	19.772E-3	29.888	180.00E-3	PASS
20	858.531E-6	1.298		PASS
21	14.712E-3	22.239	165.00E-3	PASS
22	704.953E-6	1.066		PASS
23	10.181E-3	15.390	150.00E-3	PASS
24	713.092E-6	1.078		PASS
25	6.467E-3	9.775	135.00E-3	PASS
26	666.341E-6	1.007		PASS
27	3.661E-3	5.535		PASS
28	781.852E-6	1.182		PASS
29	2.170E-3	3.281		PASS
30	717.015E-6	1.084		PASS
31	2.794E-3	4.223		PASS
32	655.297E-6	0.991		PASS
33	3.645E-3	5.509		PASS
34	680.563E-6	1.029		PASS
35	4.344E-3	6.566		PASS
36	628.736E-6	0.950		PASS
37	4.451E-3	6.728		PASS
38	652.264E-6	0.986		PASS
39	4.024E-3	6.083		PASS
40	622.470E-6	0.941		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	66.253E-3	100.000		
2	868.859E-6	1.311		PASS
3	54.022E-3	81.539	2.30	PASS
4	1.413E-3	2.133		PASS
5	51.471E-3	77.689	1.14	PASS
6	1.078E-3	1.626		PASS
7	48.730E-3	73.552	770.00E-3	PASS
8	0.998E-3	1.506		PASS
9	44.069E-3	66.517	400.00E-3	PASS
10	1.240E-3	1.871		PASS
11	39.329E-3	59.362	330.00E-3	PASS
12	927.856E-6	1.400		PASS
13	35.272E-3	53.239	210.00E-3	PASS
14	1.046E-3	1.579		PASS
15	30.417E-3	45.911	150.00E-3	PASS
16	875.364E-6	1.321		PASS
17	24.611E-3	37.148	130.00E-3	PASS
18	730.174E-6	1.102		PASS
19	18.949E-3	28.601	120.00E-3	PASS
20	738.520E-6	1.115		PASS
21	13.863E-3	20.925	165.00E-3	PASS
22	592.727E-6	0.895		PASS
23	9.377E-3	14.153	150.00E-3	PASS
24	627.599E-6	0.947		PASS
25	5.744E-3	8.670	135.00E-3	PASS
26	575.452E-6	0.869		PASS
27	3.273E-3	4.941		PASS
28	623.753E-6	0.941		PASS
29	2.219E-3	3.350		PASS
30	606.625E-6	0.916		PASS
31	2.829E-3	4.270		PASS
32	569.203E-6	0.859		PASS
33	3.746E-3	5.655		PASS
34	614.393E-6	0.927		PASS
35	4.406E-3	6.651		PASS
36	583.625E-6	0.881		PASS
37	4.435E-3	6.694		PASS
38	595.352E-6	0.899		PASS
39	3.907E-3	5.897		PASS
40	573.148E-6	0.865		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	66.411E-3	100.000		
2	1.210E-3	1.822		PASS
3	54.183E-3	81.587	3.45	PASS
4	1.910E-3	2.877		PASS
5	51.595E-3	77.690	1.71	PASS
6	1.357E-3	2.043		PASS
7	48.889E-3	73.615	1.15	PASS
8	1.224E-3	1.844		PASS
9	44.224E-3	66.592	600.00E-3	PASS
10	1.613E-3	2.429		PASS
11	39.677E-3	59.745	495.00E-3	PASS
12	1.077E-3	1.621		PASS
13	35.543E-3	53.519	315.00E-3	PASS
14	1.394E-3	2.098		PASS
15	30.719E-3	46.256	225.00E-3	PASS
16	1.147E-3	1.727		PASS
17	24.925E-3	37.532	195.00E-3	PASS
18	849.957E-6	1.280		PASS
19	19.271E-3	29.018	180.00E-3	PASS
20	829.817E-6	1.250		PASS
21	14.187E-3	21.362	165.00E-3	PASS
22	660.911E-6	0.995		PASS
23	9.644E-3	14.521	150.00E-3	PASS
24	700.863E-6	1.055		PASS
25	6.031E-3	9.081	135.00E-3	PASS
26	673.239E-6	1.014		PASS
27	3.465E-3	5.217		PASS
28	761.541E-6	1.147		PASS
29	2.328E-3	3.505		PASS
30	695.860E-6	1.048		PASS
31	3.129E-3	4.712		PASS
32	653.582E-6	0.984		PASS
33	3.904E-3	5.879		PASS
34	693.132E-6	1.044		PASS
35	4.547E-3	6.846		PASS
36	684.997E-6	1.031		PASS
37	4.579E-3	6.895		PASS
38	672.050E-6	1.012		PASS
39	4.024E-3	6.059		PASS
40	645.711E-6	0.972		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	0.034	1.00	PASS
Plt	0.034	0.65	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.187	4.00	PASS
Tmax [s]	0.000	0.50	PASS

- HDMI Mode

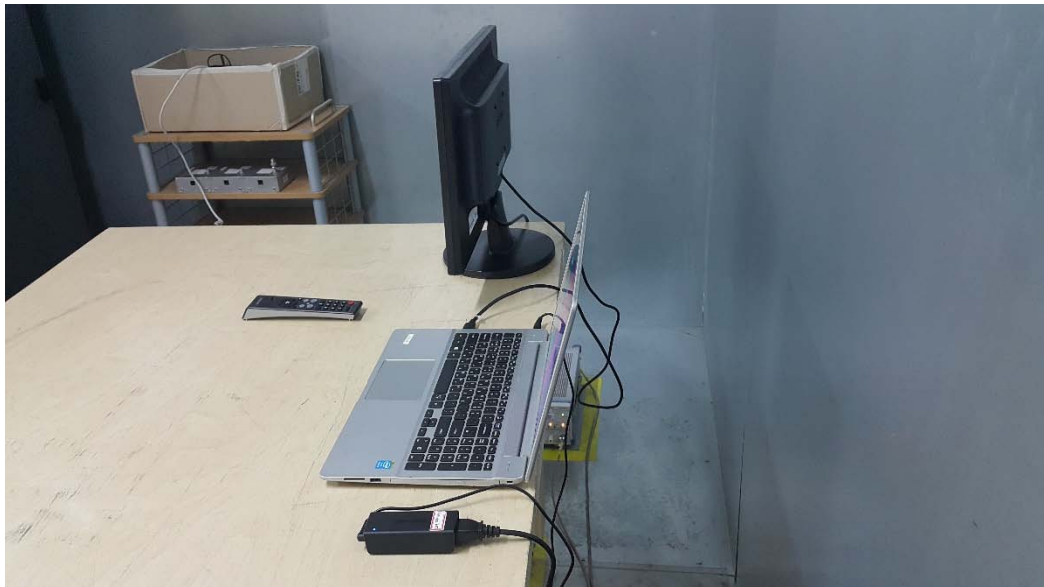
	EUT values	Limit	Result
Pst	0.028	1.00	PASS
Plt	0.028	0.65	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.036	4.00	PASS
Tmax [s]	0.000	0.50	PASS

- 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 [%]	0.034	4.00	PASS
Tmax [s]	0.000	0.50	PASS

Test Setup Photos and Configuration

Conducted Voltage Emissions



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Test report No.:
KES-E1-17T0421
Page (67) of (86)

Conducted Telecommunication Emissions

N/A

N/A

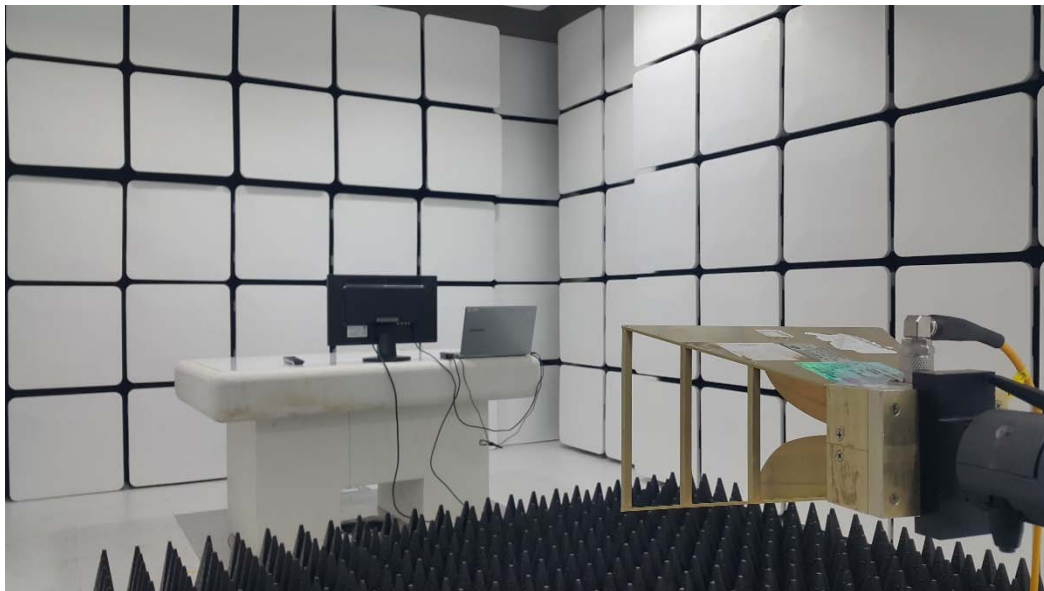
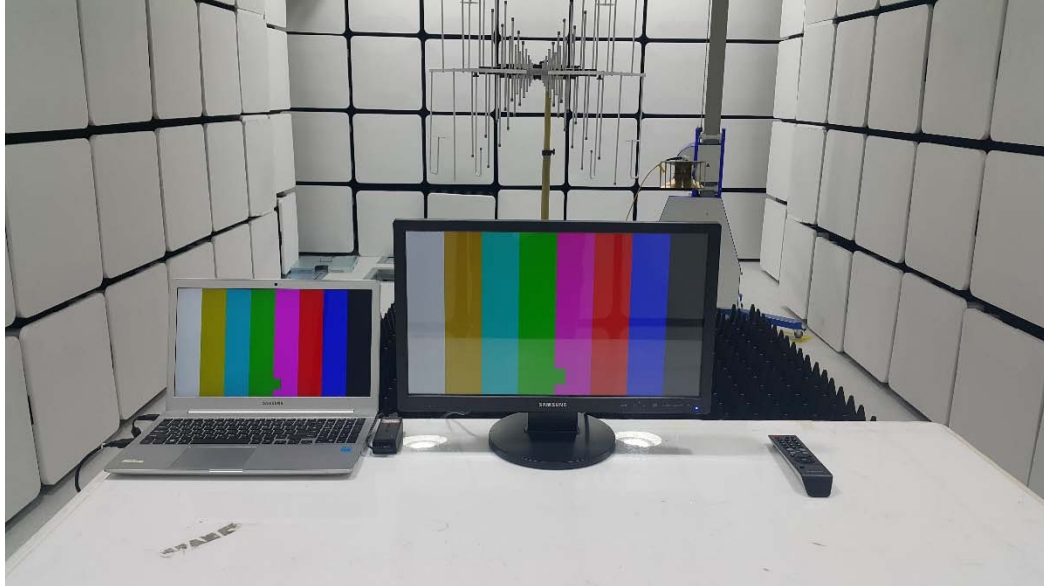
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Radiated Electric Field Emissions(Below 1 GHz)



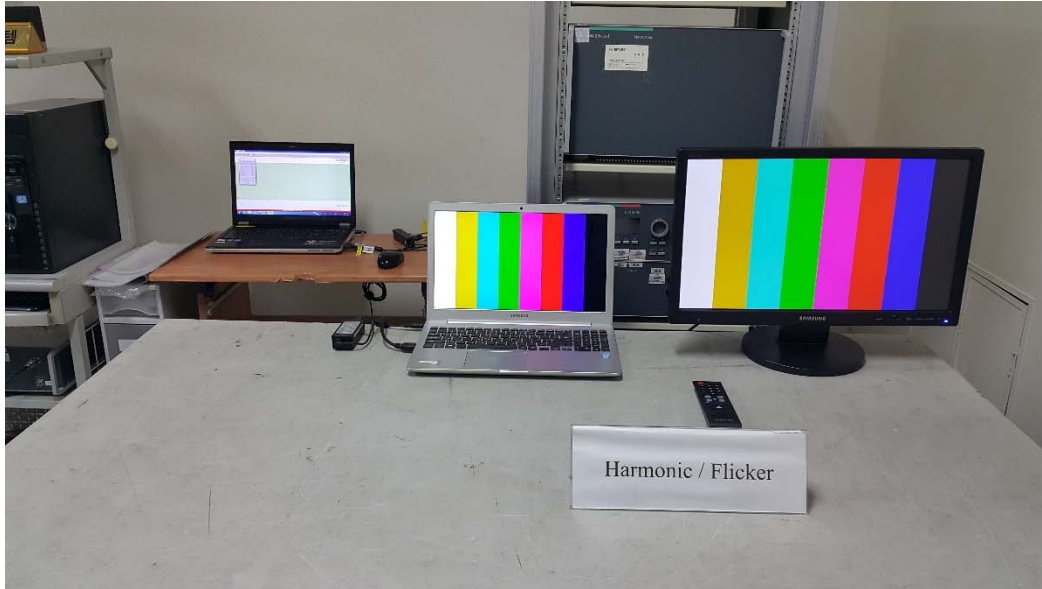
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Radiated Electric Field Emissions(Above 1 GHz)



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Harmonic Current Emissions and Voltage Fluctuations and Flicker

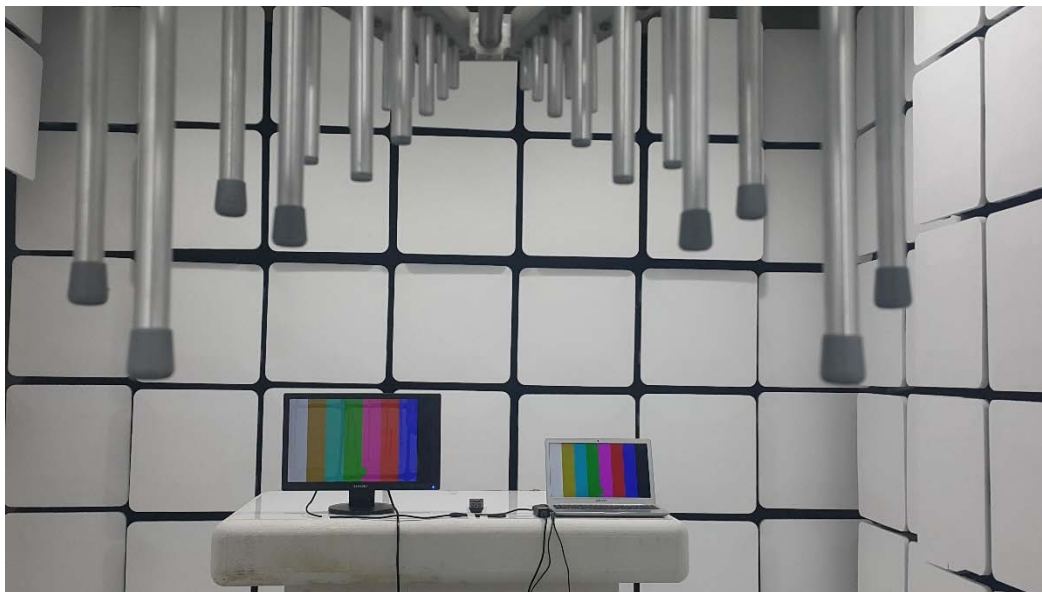


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Electrostatic Discharge

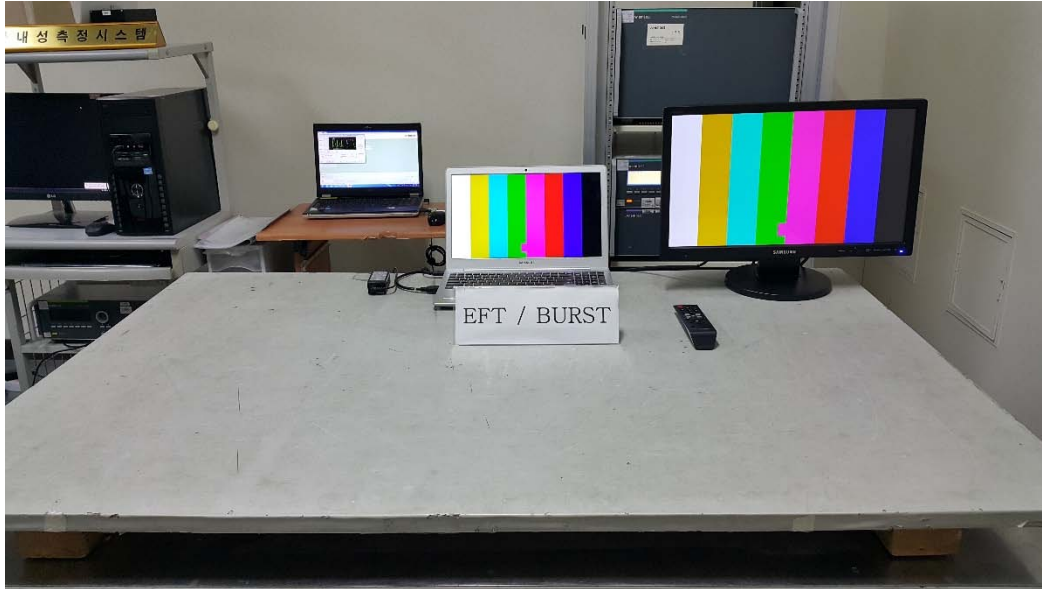


Radiated Electric Field Immunity



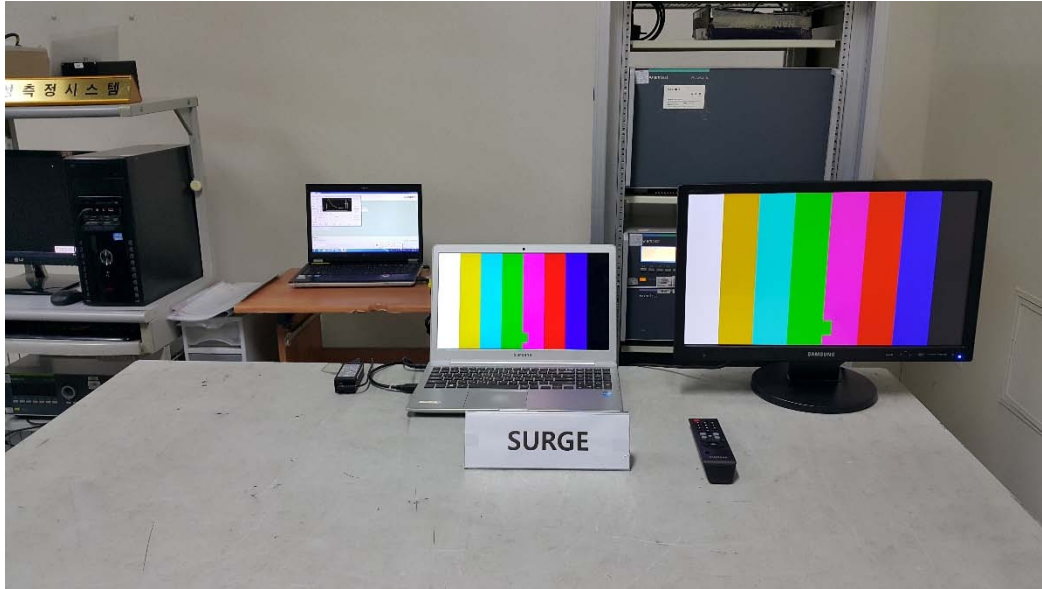
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Electrical Fast Transients/Bursts



N/A

Surge Transients

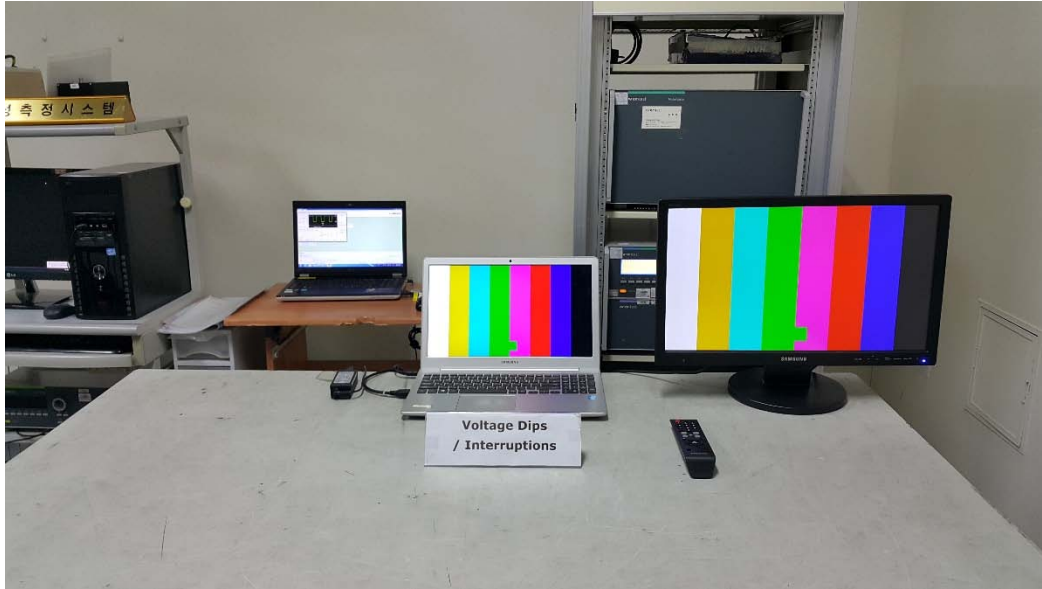


Conducted Disturbance



N/A

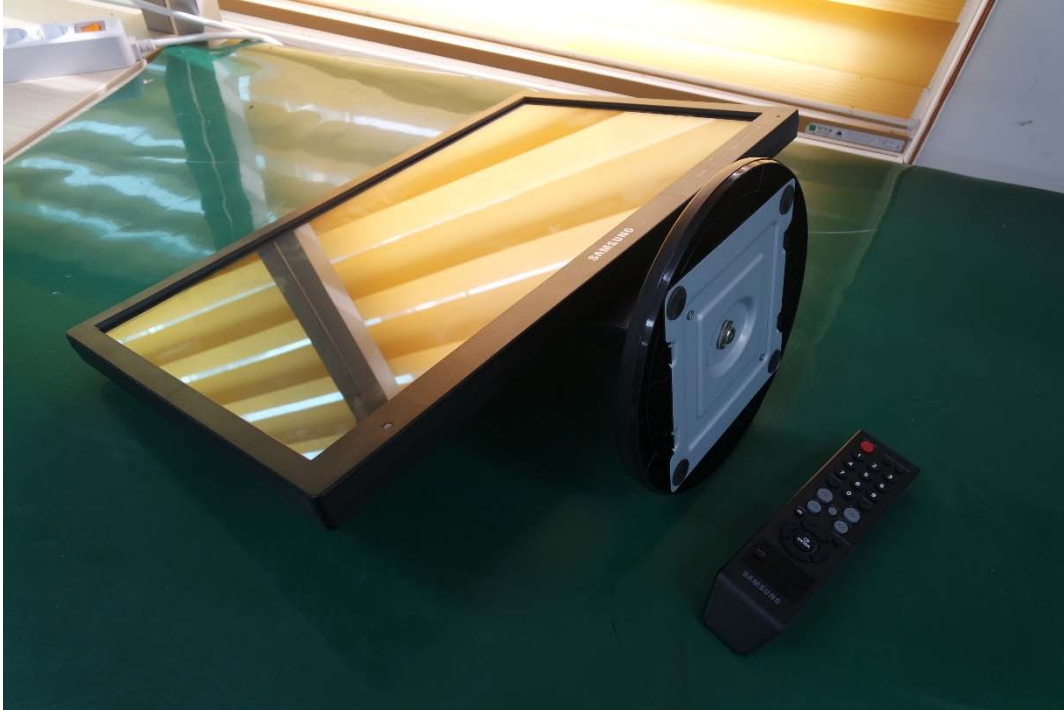
Voltage Dips and Short Interruptions



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EUT External Photographs

(Top)



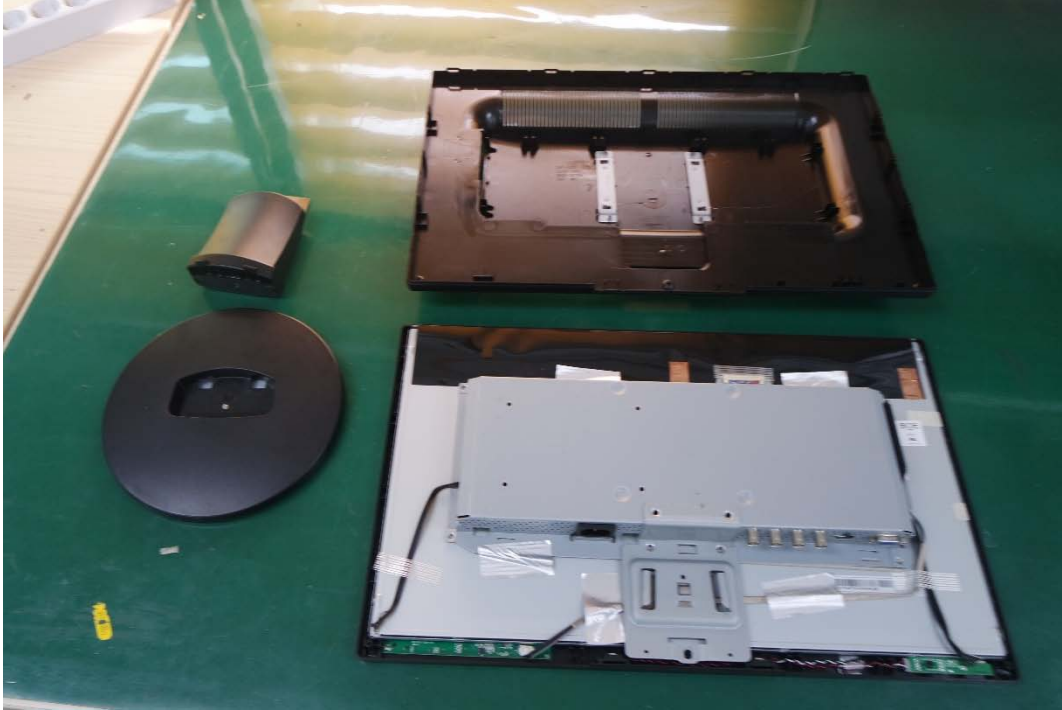
(Bottom)



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EUT Internal Photographs

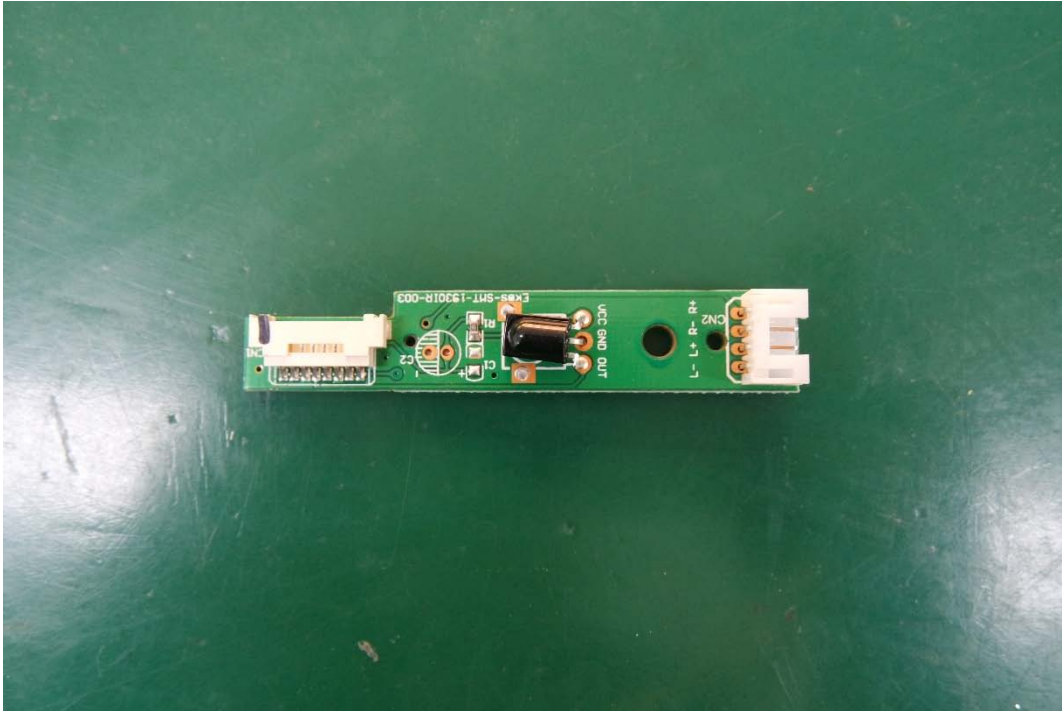
(Internal View)



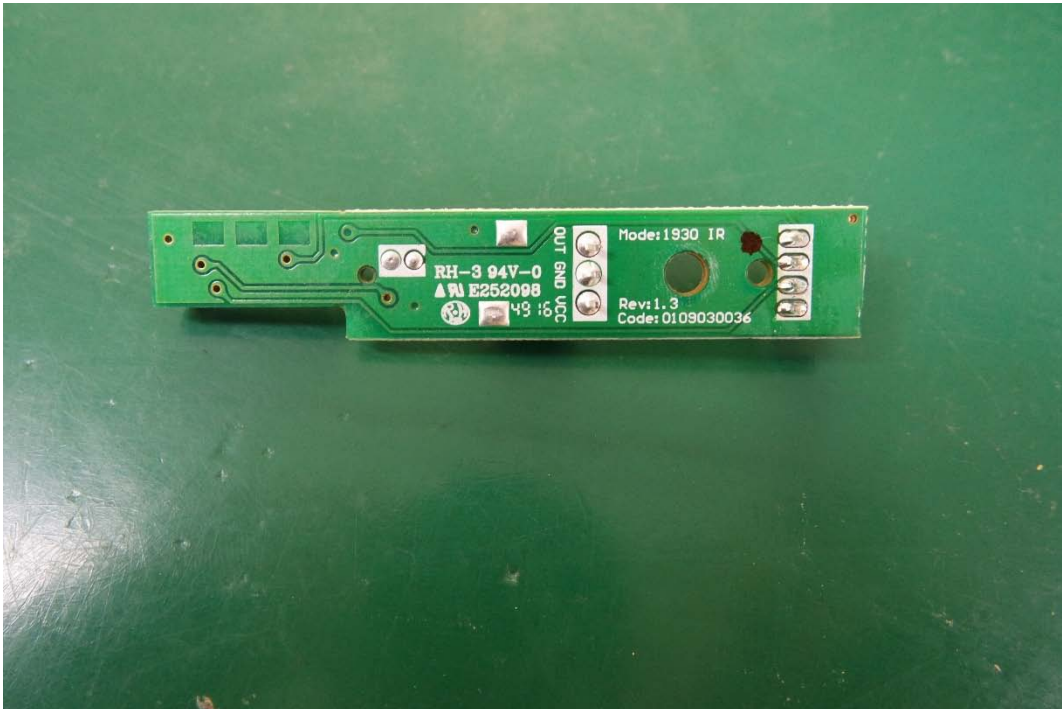
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EUT Internal View – Sub Board 1

(Top)



(Bottom)



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EUT Internal View – Sub Board 2

(Top)

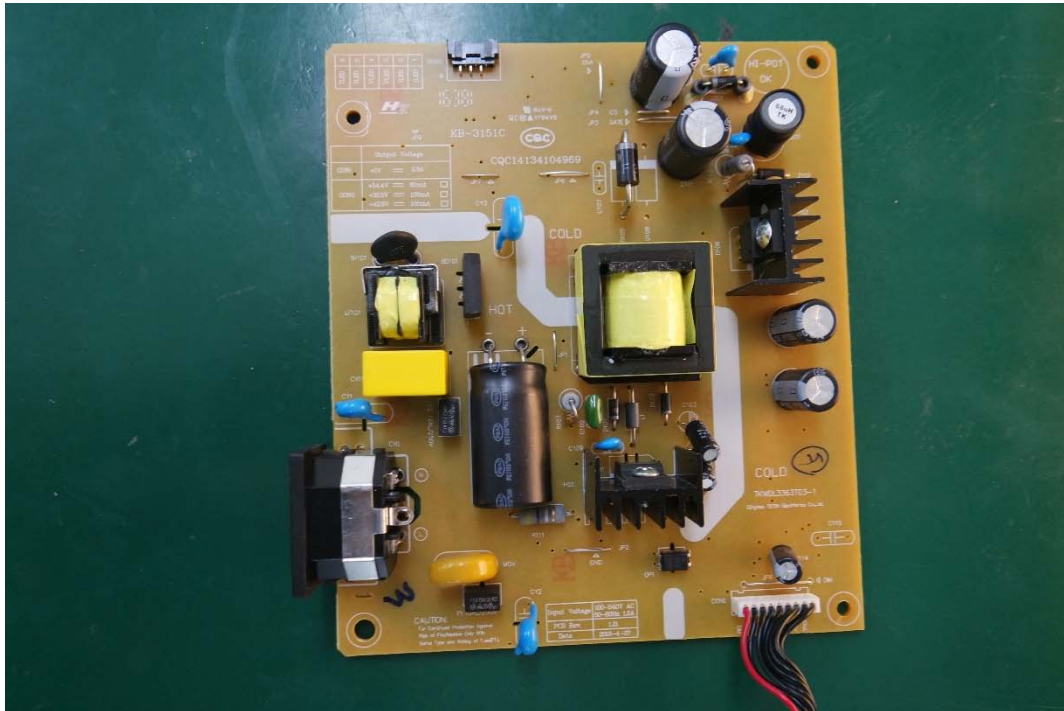


(Bottom)

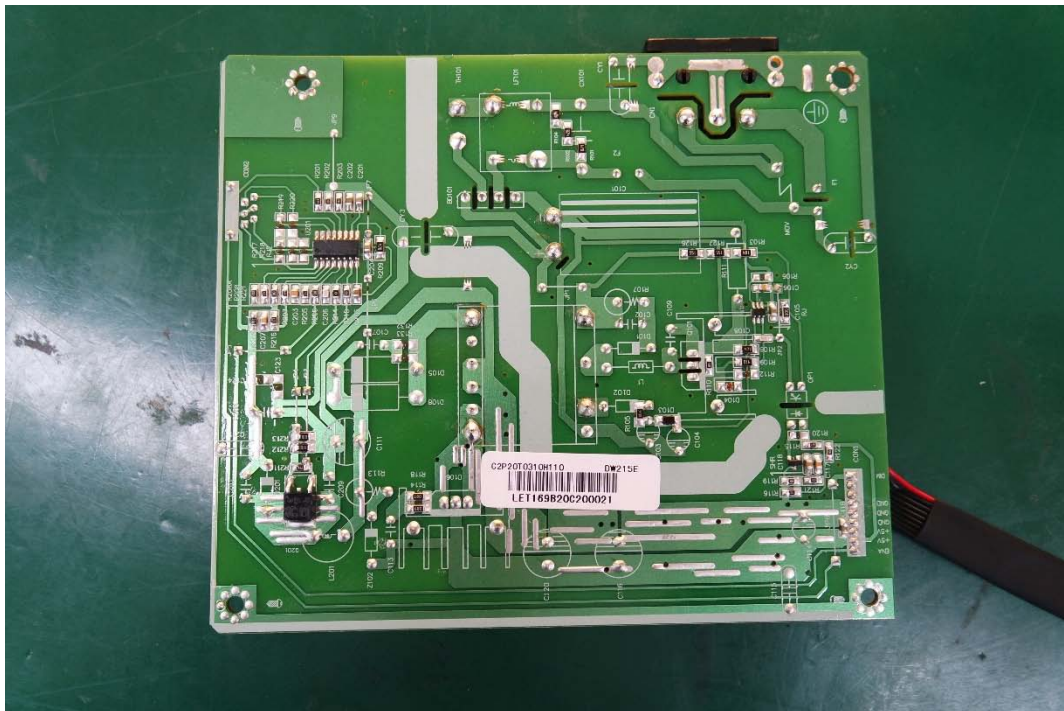
N/A

EUT Internal View – Power Board

(Top)



(Bottom)



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EUT Internal View – Power Board

(Top)



(Bottom)

N/A

EUT Internal View – Panel Board

(Top)



(Bottom)



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EUT Internal View – Panel

(Top)



(Bottom)



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EUT Internal View – Panel

(Top)

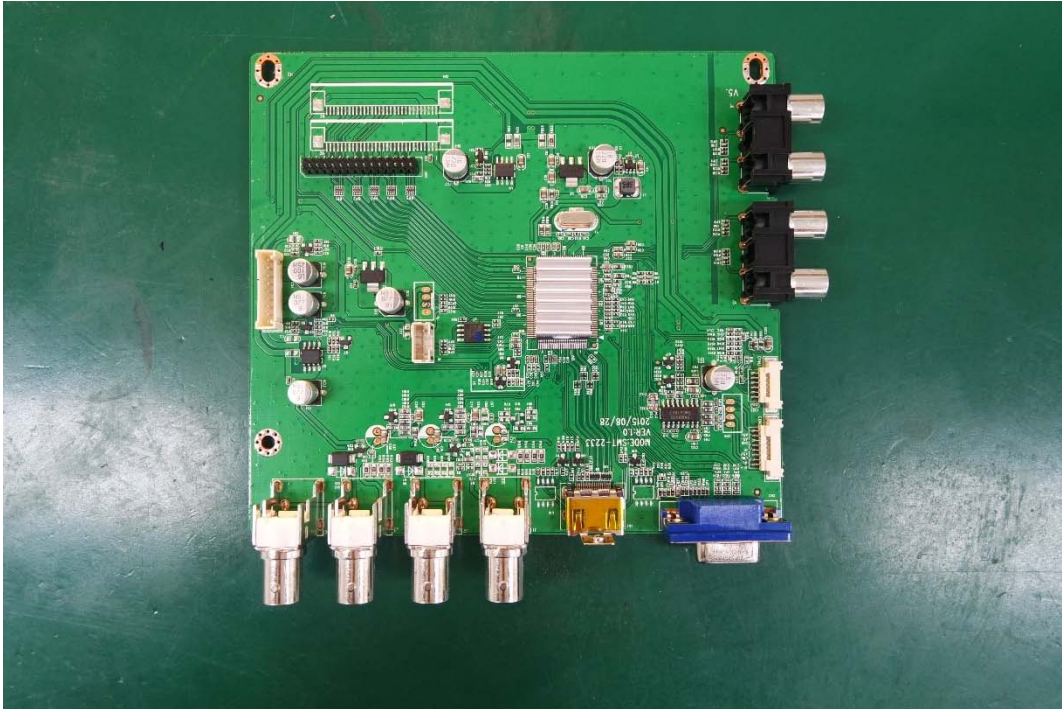


(Bottom)

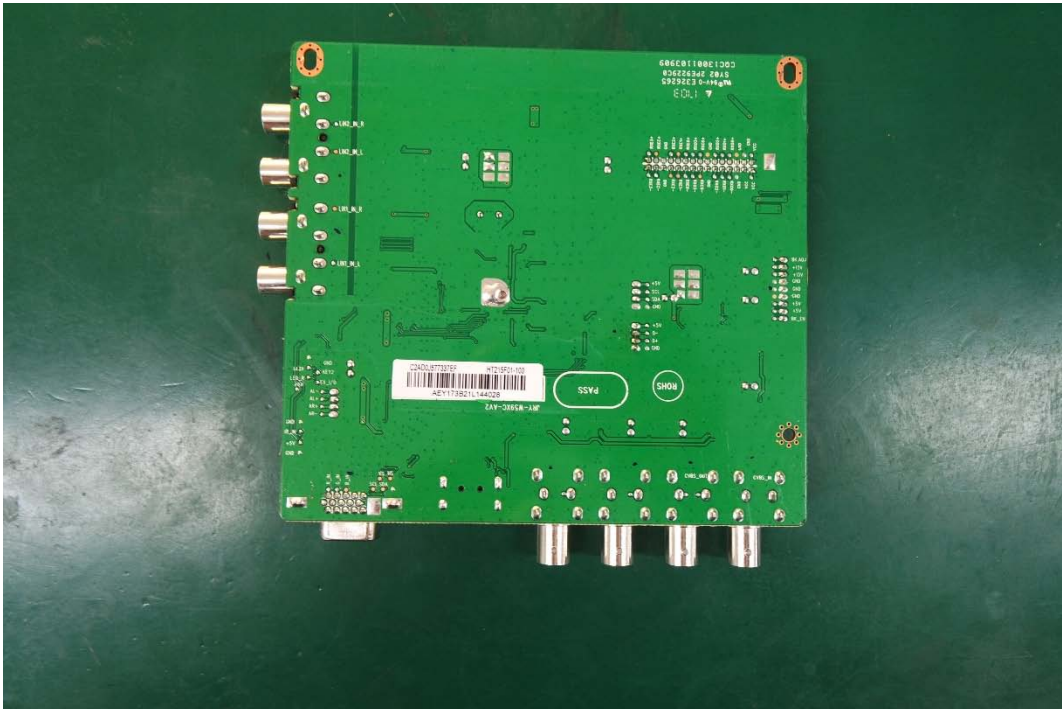
N/A

EUT Internal View – Port Board

(Top)



(Bottom)



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Label and Location



LED MONITOR

Model No : SMT-2233

Manufacturer : Weihai Daewoo Electronics Co.,Ltd.

Made in of China

