# Declaration of Conformity

Hanwha

CE

| | |
|---|---|
| **Type of equipment:** | **LCD MONITOR** |
| **Brand Name /Trade Mark:** | **HANWHA** |
| **Type designation /model:** | **SMT-2731** |
| **Applicant:** | **Hanwha Techwin Company Limited** |

**In accordance with the following Directives:**

| | |
|---|---|
| 2004/108/EC | The Electromagnetic Compatibility Directive |
| Including amendments by the CE Marking Directive 93/68/EEC | |
| 2011/65/EU | Restriction of the use of certain hazardous substances in electrical and electronic equipment (recast) |

**The following harmonized European standards or technical specifications have been applied:**

| | |
|---|---|
| EN 55022:2010 | Limits and methods of measurement of radio disturbance characteristics of information technology equipment |
| EN 50581:2012 | Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances |
| EN 55024:2010 | Limits and methods of measurement of Immunity characteristics of Information technology equipment |
| EN 61000-3-2:2014 | Limits for harmonic current emissions (equipment input current <= 16 A per phase) |
| EN 61000-3-3:2013 | Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current <= 16 A per phase and not subject to conditional connection |
| EN 61000-4-2:2009 | Electrostatic discharge immunity test |
| EN 61000-4-3:2006+A2:2010 | Radiated, radio-frequency, electromagnetic field immunity test |
| EN 61000-4-4:2012 | Electrical fast transient/burst immunity test |
| EN 61000-4-5:2014 | Surge immunity test |
| EN 61000-4-6:2009 | Immunity to conducted disturbances, induced by radio-frequency fields |
| EN 61000-4-8:2010 | Power frequency magnetic field Immunity test |
| EN 61000-4-11:2004 | Voltage Dips and Voltage Interruptions Immunity test |

**The CE Marking on the products and/or their packaging signifies that Hanwha Techwin Company Limited holds the reference technical file available to the European Union authorities.**

**Place and date of issue:** 1204, Changwon-daero, Seongsan-gu, Chang-won-si, Gyeongsangnam-do,Korea / Nor 19, 2015

**Authorized Signatory:** Name : Jei Soon, Kang

Title : Principal Research Engineer

Signatur :

# CE Conformance EMC Test Report

| | | |
|---|---|---|
| **Test Report No.** | : | KES-E1-15T0310 |
| **Date of Issue** | : | 11. 03. 2015 |
| **Description of Product** | : | LCD MONITOR |
| **Model No.** | : | SMT-2731 |
| **Variant Model** | : | - |
| **Applicant** | : | Hanwha Techwin Company Limited |
| **Address** | : | 1204, Changwon-daero, Seongsan-gu, Chang-won-si, Gyeongsangnam-do, korea |
| **Manufacturer** | : | Weihai Daewoo Electronics Co.,Ltd. |
| **Address** | : | No.26, Hongkong Road, Economic & Technical Development Zone, 264205 Weihai City, Shandong Province, China |
| **Applicable Regulation** | : | **EMC Directive 2004/108/EC**<br>EN 55022:2010<br>EN 55024:2010<br>EN 61000-3-2:2014<br>EN 61000-3-3:2013 |
| **Date of Receipt** | : | 11. 23. 2015 |
| **Test Date** | : | 11. 13. 2015 ~ 11. 19. 2015 |

**Tested by:** Kyeng Sun, Min
Test Engineer

**Reviewed by:** Dong Hun, Jang
Technical Manager

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# Revision history

| Revision | Date of issue | Test report No. | Description |
|---|---|---|---|
| - | 11. 23. 2015 | KES-E1-15T0310 | Initial |

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# 1. General Information

## 1.1 Introduction

The EMC Test Report for CE Declaration of Conformity is prepared on behalf of named applicant in accordance with the EMC Directive(2004/108/EC) of the European Economic Community. The test results reported in this document relate only to the item that was tested.

All radiated emission, conducted emission measurements required by the EMC Directive were performed manually at KES Co., Ltd. (here in after called KES), 473-29, Gayeo-ro, Yeoju-si, Gyeonggi-do, 12658 KOREA.

The radiated emission measurements performed on 10 meter, Open Area Test Site, test range maintained by KES. Complete ANSI63.4;2009 description and site attenuation measurement data records are maintained at the test facility and have been placed on file with the Federal Communications Commission.

All immunity measurements required by the EMC Directive were performed manually at

KES Co., Ltd. (here in after called KES), 473-29, Gayeo-ro, Yeoju-si, Gyeonggi-do, 12658 KOREA.

The immunity measurements were performed in a shielded enclosure and/or anechoic chamber also located at the same facility.

The KES EMC test facilities in Yeoju-si are designated testing laboratory according to ISO/IEC 17025 by Radio Research Agency(RRA), Korea Communication Commission.

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## 1.2 Product Description for Equipment Under Test (E.U.T)

Hanwha Techwin Company Limited, LCD MONITOR, Model No: SMT-2731 or the "E.U.T" as referred to in this report is base model.

Main Specifications of EUT are:

| Model Name | | | 备注 |
|---|---|---|---|
| Display | | LED | |
| Screen Size | | 27" | |
| Max. Resolution | | 1920 x 1080 | |
| Brightness | | 300cd/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 | 35w | 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) | 648mm*479.1mm*212mm | |
| | Dimensions without Stand (WxHxD) | 648mm*396mm*61.66mm | |
| | Weight | 7.3Kg | |
| | LCD Protection Glass | Yes | |
| | Cabinet Color | Black | |
| | VESA Mounts Interface | 100mm x 100mm | |

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## 1.3 Equipment Under Test

| Description | Model Number | Serial Number | Manufacturer | Remarks |
|---|---|---|---|---|
| LCD MONITOR | SMT-2731 | - | Weihai Daewoo Electronics Co.,Ltd. | E.U.T |
| Notebook | LG15N54 | 410NZET022292 | LG Electronics Inc., | - |
| AC/DC Adapter | ADP-90WH B | 84ZW19F1557 | DELTA ELECTRONICS(JIANGSU) LTD. | - |
| DVD Player | DVD-D530 | ZRW51R2G701216V | Samsung Electronics Co., Ltd. | - |
| MONITOR | SMT-2232 | C95V67VF900015Y | Weihai Daewoo Electronics Co., Ltd. | - |

## 1.4 Support Equipments

| Description | Model Number | Serial Number | Manufacturer | Remarks |
|---|---|---|---|---|
| remote controller | - | - | - | - |

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## 1.5 External I/O Cabling

■ BNC, AUDIO IN Mode

| Start | | END | | Cable Spec. | |
|---|---|---|---|---|---|
| Description | I/O Port | Description | I/O Port | Length | Shield |
| LCD MONITOR (E.U.T) | BNC IN | DVD Player | BNC | 3.0 | Shielded |
| | BNC OUT | MONITOR | BNC | 3.0 | Shielded |
| | AUDIO IN | DVD Player | AUDIO OUT(L) | 1.5 | Unshielded |
| | AUDIO IN | DVD Player | AUDIO OUT(R) | 1.5 | Unshielded |

■ HDMI Mode

| Start | | END | | Cable Spec. | |
|---|---|---|---|---|---|
| Description | I/O Port | Description | I/O Port | Length | Shield |
| LCD MONITOR (E.U.T) | HDMI | Notebook | HDMI | 1.6 | Shielded |

■ D-SUB Mode

| Start | | END | | Cable Spec. | |
|---|---|---|---|---|---|
| Description | I/O Port | Description | I/O Port | Length | Shield |
| LCD MONITOR (E.U.T) | D-SUB | Notebook | D-SUB | 1.6 | Shielded |

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## 1.6 Special Accessories

As shown in section 1.9, all interface cables used for compliance testing are shielded as normally supplied or by use respective component manufacturers.

## 1.7 E.U.T Modifications

No modifications were made to the E.U.T in order to achieve and maintain compliance to the standards described in this report.

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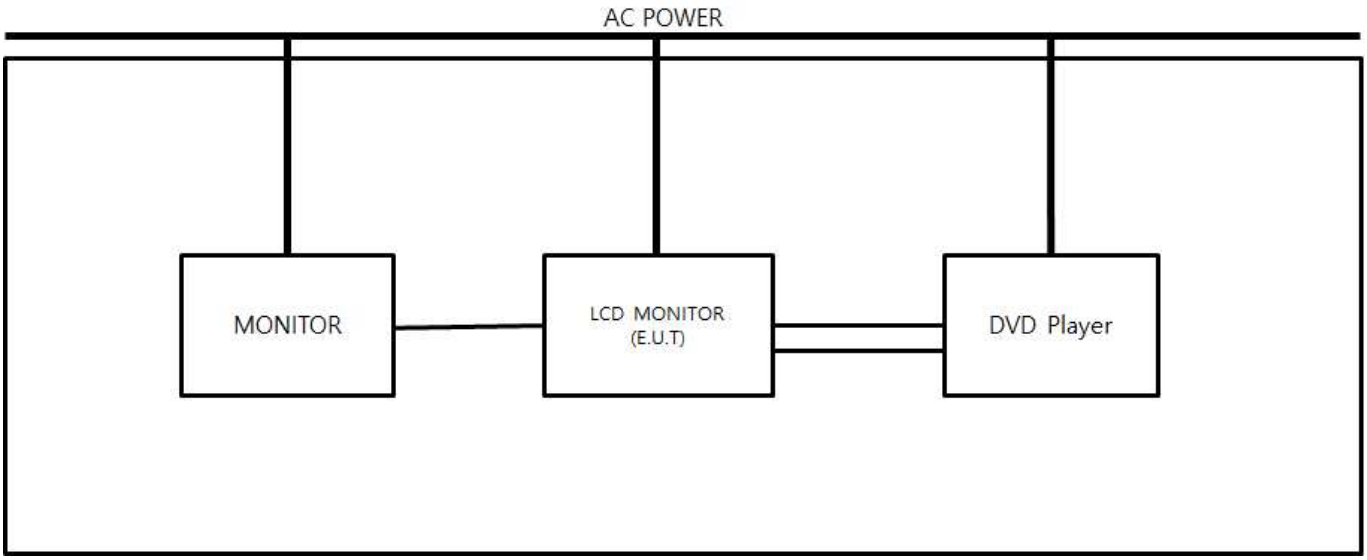
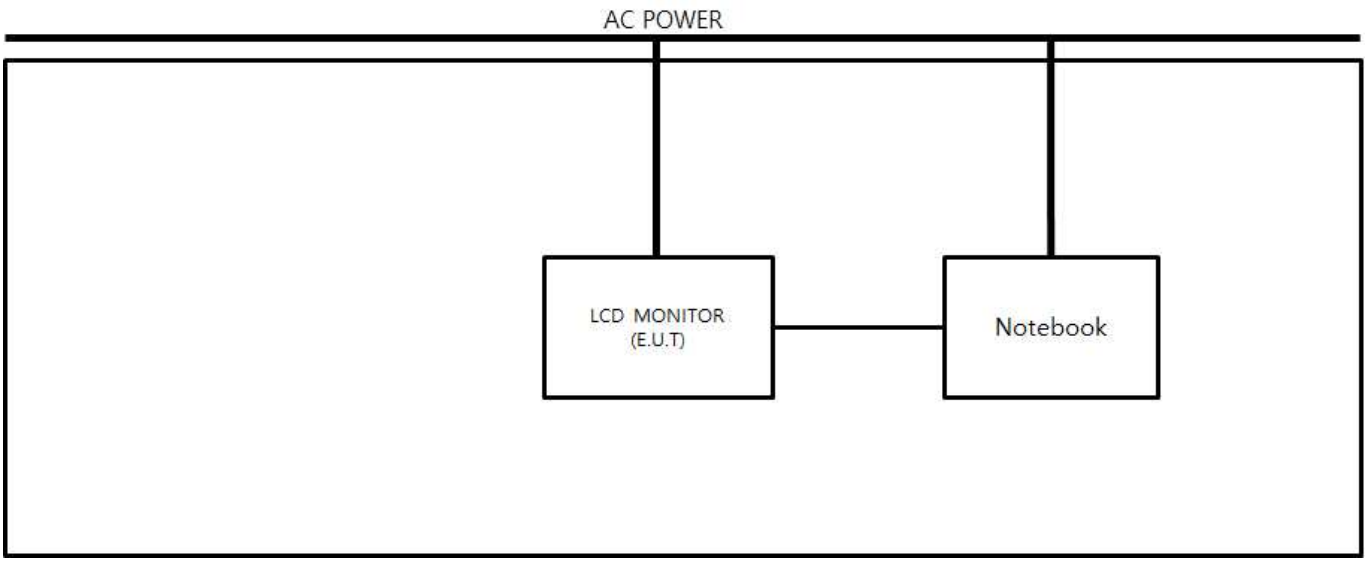
## 1.8 Configuration of Test System

■ BNC, AUDIO IN Mode




■ HDMI, D-SUB Mode




## 1.9 Operating condition

- "H" scrolling, Color Bar test and video play
- DVD player video play

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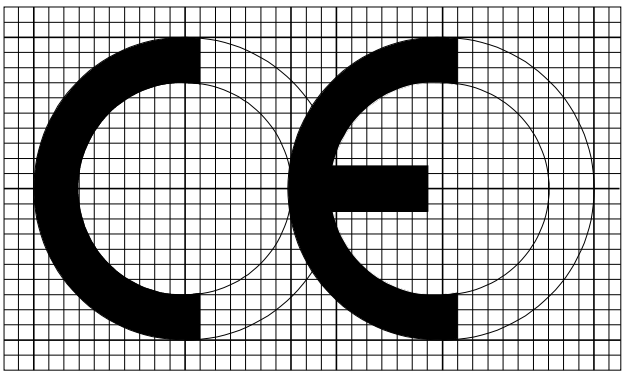
# 2. Product Labelling Requirements

## 2.1 CE Mark

The CE Conformity Marking must consist of the initials "CE" in the stylized font and proportional to the dimensional requirements shown in following figure. Regardless of its size, the symbol must retain the specified proportionality.

The Various components of the CE Marking must have substantially the same vertical dimensions, and shall not be less than 5mm in height.



Radius of Outer Circle 100 units
Radius of Inner Circle 70 units
Stroke Width 30 units
Length of Bar 85 units
Axis to Axis 170 units
Minimum Height 5.0 mm

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# 3. Applicable Regulations

## 3.1 Emission

EN 55022:2010/CISPR22 are the applicable regulations that apply to Information Technology Equipment. The intention of these standards, is to establish uniform requirements for the radio disturbance level of the equipment contained in the scope, to fix limits of disturbance, to describe method of measurement and to standardize operation conditions and interpretation of the results.

EN 55022:2010/CISPR22 defines Information Technology Equipment (ITE) as follows:

Any equipment which has a primary function of either (or a combination of) entry, storage, display, retrieval, transmission, processing, switching, or control, of data and of telecommunication message and which may be equipped with one or more terminal ports typically operated for information transfer.

Any equipment with a rated supply voltage not exceeding 600 V(ac)

## 3.2 Immunity

EN55024:2010 is the Generic Immunity standard that covers ITE products. Immunity requires the following as specific performance criteria:

a. The apparatus shall continue to operate as intended during and after test. Some minimum performance level is specified by the manufacturer. The performance level may be specified by the manufacturer as a permissible loss of performance.

b. The apparatus shall continue to operate as intended after the test. This indicates that the E.U.T does not need to function at normal performance levels during the test, but must recover. Again some minimal performance is defined by the manufacturer. No change in operating state or loss of data is permitted.

c. Temporary loss of function is allowed. Operation of the E.U.T may stop as long as it is either automatically reset or can be manually restored by operation of the controls.

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## 4. Test standards and results

| STANDARDS | | LIMIT | RESULTS |
|---|---|---|---|
| EN 55022 | Conducted Emission on AC mains Port | Refer to EN 55022 | PASS |
| | Conducted Emission on Telecommunication Port | Refer to EN 55022 | (1) N/A |
| | Radiated Emission | Refer to EN 55022 | PASS |
| EN 61000-3-2 | Harmonic Current Emission on AC Mains Input Port | Refer to EN 61000-3-2 | PASS |
| EN 61000-3-3 | Voltage Fluctuations and Flicker on AC Mains Input Port | Refer to EN 61000-3-3 | PASS |
| EN 55024 | Electrostatic Discharge Immunity | Refer to EN 61000-4-2 | PASS |
| | Radio-frequency electromagnetic field Amplitude modulated Immunity | Refer to EN 61000-4-3 | PASS |
| | Fast Transients Immunity | Refer to EN 61000-4-4 | PASS |
| | Surges Immunity | Refer to EN 61000-4-5 | PASS |
| | Radio-frequency common mode Immunity | Refer to EN 61000-4-6 | PASS |
| | Power-frequency magnetic field Immunity | Refer to EN 61000-4-8 | PASS |
| | Voltage Dips, Voltage Interruptions Immunity | Refer to EN 61000-4-11 | PASS |

※ Note.

(1) N/A : This device is non telecommunication port, test is not applicable.

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# 5. Test Performed

## 5.1 Conducted Emission Measurements

### 5.1.1 Test Description

The power line conducted emission measurements were performed in a shielded enclosure. The E.U.T was placed on a wooden table, 80 centimeters height above the floor. Power was fed to the E.U.T through a 50 ohm/ 50 micro henry Line Impedance Stabilization Network (LISN). The ground plane that was electrically bonded to the shield room ground system and all power lines entering the shield room were filtered.

### 5.1.2 Test Equipments

| Description | Manufacturer | Model Number | Serial Number | Cal. Due |
|---|---|---|---|---|
| EMI Test Receiver | ESR | R&S | 101783 | 05. 06. 2016 |
| LISN | R&S | ENV216 | 101137 | 02. 10. 2016 |
| LISN | R&S | ENV216 | 101786 | 05. 06. 2016 |
| Electro wave Shieldroom | SEMITEC | - | - | - |

### 5.1.3 Test Environments

| Ambient Temperatures | Relative Humidity |
|---|---|
| see the data | see the data |

### 5.1.4 Test Limits

- AC Main

| Frequency (㎒) | EN 55022 | | | |
|---|---|---|---|---|
| | Class B (dB㎶) | | Class A (dB㎶) | |
| | Quasi-peak | Average | Quasi-peak | Average |
| 0.15 to 0.50 | 66.0 to 56.0 | 56.0 to 46.0 | 79.0 | 66.0 |
| 0.50 to 5.00 | 56.0 | 46.0 | 73.0 | 60.0 |
| 5.00 to 30.00 | 60.0 | 50.0 | 73.0 | 60.0 |

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- Telecommunication

| Frequency (㎒) | EN 55022(Voltage) | | | |
|---|---|---|---|---|
| | Class B (dB㎶) | | Class A (dB㎶) | |
| | Quasi-peak | Average | Quasi-peak | Average |
| 0.15 to 0.50 | 84.0 to 74.0 | 74.0 to 64.0 | 97.0 to 87.0 | 84.0 to 74.0 |
| 0.50 to 30.00 | 74.0 | 64.0 | 87.0 | 74.0 |

| Frequency (㎒) | EN 55022(Current) | | | |
|---|---|---|---|---|
| | Class B (dB㎂) | | Class A (dB㎂) | |
| | Quasi-peak | Average | Quasi-peak | Average |
| 0.15 to 0.50 | 40.0 to 30.0 | 30.0 to 20.0 | 53.0 to 43.0 | 40.0 to 30.0 |
| 0.50 to 30.00 | 30.0 | 20.0 | 43.0 | 30.0 |

### 5.1.5 Test Procedure

The conducted emission levels were measured on each current-carrying line with the spectrum analyzer operating in the CISPR quasi-peak mode (or peak mode if applicable). The analyzer's 6 ㏈ bandwidth was set to 9 ㎑. The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. If the conducted emission exceed the average limit with the instrument set to the quasi-peak mode, the measurements are made in the average mode. The emission spectrum was scanned from 150 ㎑ to 30 ㎒. The highest emission amplitudes relative to the appropriate limits were measured and have been recorded. Quasi-peak readings are distinguished with a "QP".

The conducted emission test was performed with the E.U.T exercise program loaded, and the emissions were scanned between 150 ㎑ to 30 ㎒ on the HOT side and NEUTRAL side, herein referred to as H and N, respectively.

### 5.1.6 Test Results

According to the data in section 5.1.7, the E.U.T complied with the EN 55022/CISPR22 standards.

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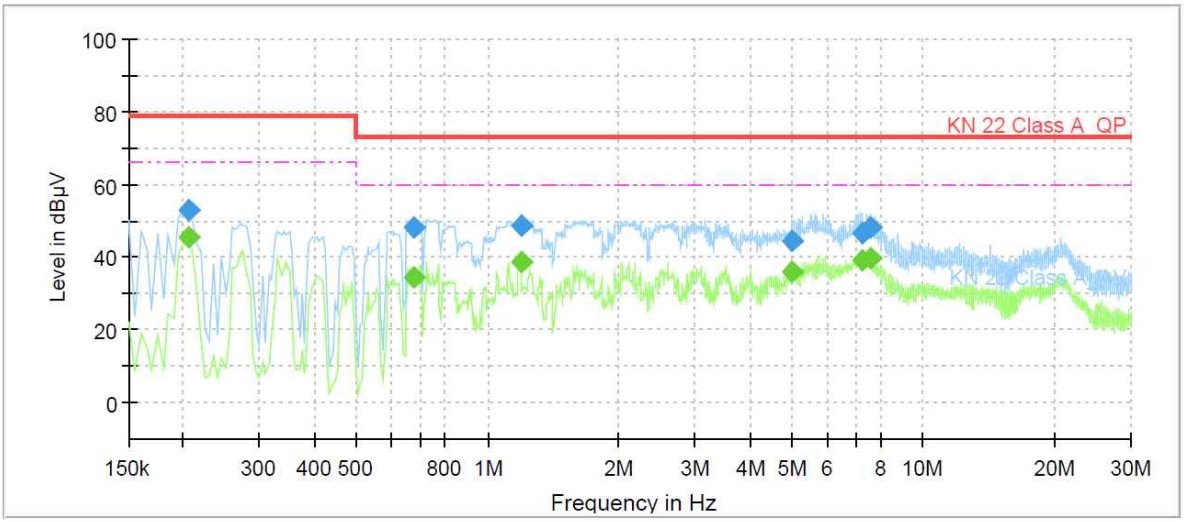
### 5.1.7 Test Data

Temperature: 19.1 ℃ Humidity: 53.7 % R.H. Test Date: 11. 13. 2015 Tested by: Kyeng Sun, Min

■ BNC, AUDIO IN Mode
Polarization: HOT

Test Description: Conducted Emission
Model No.: SMT-2731
Mode BNC IN,OUT + Audio IN_CE
Operator Name: KES




## Final_Result

| Frequency (MHz) | QuasiPeak (dBµV) | CAverage (dBµV) | Limit (dBµV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|
| 0.205000 | --- | 45.30 | 66.00 | 20.70 | 1000.0 | 9.000 | L1 | 9.7 |
| 0.205000 | 53.07 | --- | 79.00 | 25.93 | 1000.0 | 9.000 | L1 | 9.7 |
| 0.675000 | --- | 34.40 | 60.00 | 25.60 | 1000.0 | 9.000 | L1 | 9.7 |
| 0.675000 | 48.08 | --- | 73.00 | 24.92 | 1000.0 | 9.000 | L1 | 9.7 |
| 1.190000 | --- | 38.46 | 60.00 | 21.54 | 1000.0 | 9.000 | L1 | 9.7 |
| 1.190000 | 48.64 | --- | 73.00 | 24.36 | 1000.0 | 9.000 | L1 | 9.7 |
| 4.985000 | --- | 36.10 | 60.00 | 23.90 | 1000.0 | 9.000 | L1 | 9.8 |
| 4.985000 | 44.43 | --- | 73.00 | 28.57 | 1000.0 | 9.000 | L1 | 9.8 |
| 7.230000 | --- | 38.99 | 60.00 | 21.01 | 1000.0 | 9.000 | L1 | 9.9 |
| 7.230000 | 46.62 | --- | 73.00 | 26.38 | 1000.0 | 9.000 | L1 | 9.9 |
| 7.580000 | --- | 39.74 | 60.00 | 20.26 | 1000.0 | 9.000 | L1 | 9.9 |
| 7.580000 | 48.31 | --- | 73.00 | 24.69 | 1000.0 | 9.000 | L1 | 9.9 |

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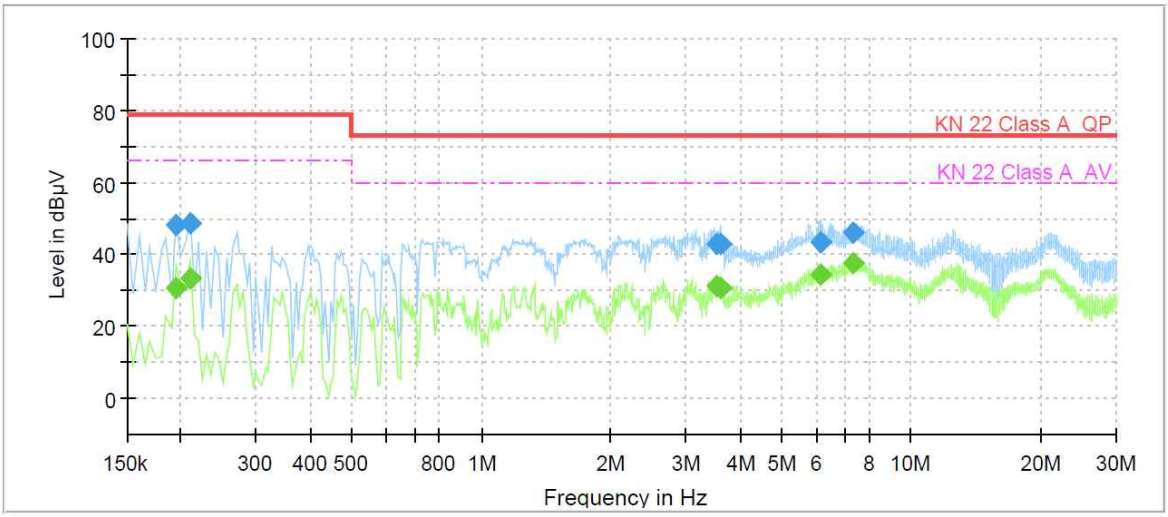
Polarization: NEUTRAL

| | |
|---|---|
| Test Description: | Conducted Emission |
| Model No.: | SMT-2731 |
| Mode | BNC IN,OUT + Audio IN_CE |
| Operator Name: | KES |




## Final_Result

| Frequency (MHz) | QuasiPeak (dBµV) | CAverage (dBµV) | Limit (dBµV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|
| 0.195000 | --- | 30.86 | 66.00 | 35.14 | 1000.0 | 9.000 | N | 9.7 |
| 0.195000 | 48.34 | --- | 79.00 | 30.66 | 1000.0 | 9.000 | N | 9.7 |
| 0.210000 | --- | 33.15 | 66.00 | 32.85 | 1000.0 | 9.000 | N | 9.7 |
| 0.210000 | 48.73 | --- | 79.00 | 30.27 | 1000.0 | 9.000 | N | 9.7 |
| 3.515000 | --- | 31.36 | 60.00 | 28.64 | 1000.0 | 9.000 | N | 9.8 |
| 3.515000 | 43.08 | --- | 73.00 | 29.92 | 1000.0 | 9.000 | N | 9.8 |
| 3.585000 | --- | 30.89 | 60.00 | 29.11 | 1000.0 | 9.000 | N | 9.8 |
| 3.585000 | 42.90 | --- | 73.00 | 30.10 | 1000.0 | 9.000 | N | 9.8 |
| 6.185000 | --- | 34.65 | 60.00 | 25.35 | 1000.0 | 9.000 | N | 9.9 |
| 6.185000 | 43.23 | --- | 73.00 | 29.77 | 1000.0 | 9.000 | N | 9.9 |
| 7.305000 | --- | 37.52 | 60.00 | 22.48 | 1000.0 | 9.000 | N | 9.9 |
| 7.305000 | 45.88 | --- | 73.00 | 27.12 | 1000.0 | 9.000 | N | 9.9 |

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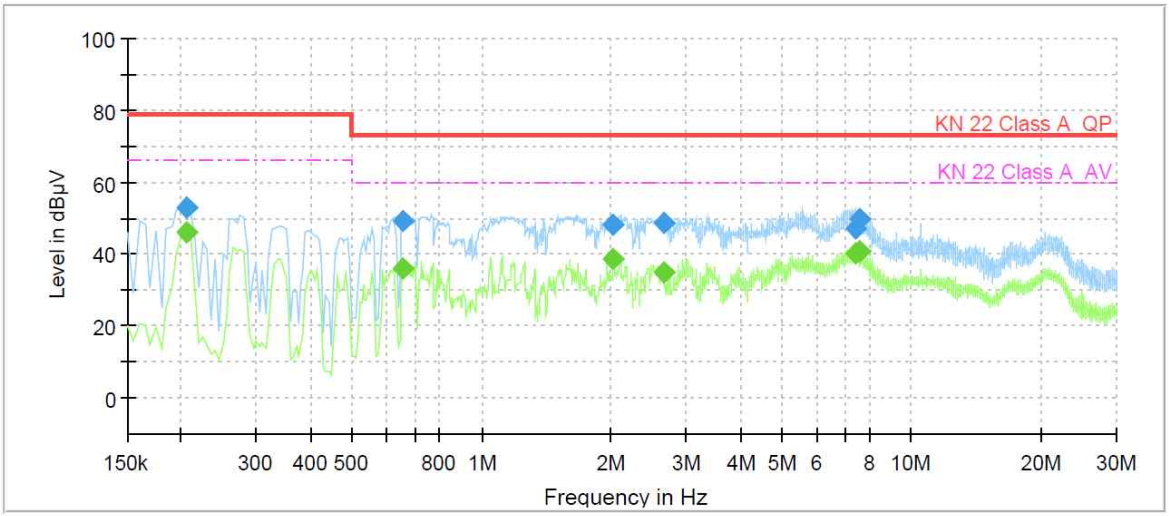
■ HDMI Mode
Polarization: HOT

Test Description: Conducted Emission
Model No.: SMT-2731
Mode HDMI_CE
Operator Name: KES




## Final_Result

| Frequency (MHz) | QuasiPeak (dBµV) | CAverage (dBµV) | Limit (dBµV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|
| 0.205000 | --- | 46.31 | 66.00 | 19.69 | 1000.0 | 9.000 | L1 | 9.7 |
| 0.205000 | 52.85 | --- | 79.00 | 26.15 | 1000.0 | 9.000 | L1 | 9.7 |
| 0.655000 | --- | 35.76 | 60.00 | 24.24 | 1000.0 | 9.000 | L1 | 9.7 |
| 0.655000 | 49.07 | --- | 73.00 | 23.93 | 1000.0 | 9.000 | L1 | 9.7 |
| 2.025000 | --- | 38.66 | 60.00 | 21.34 | 1000.0 | 9.000 | L1 | 9.7 |
| 2.025000 | 48.22 | --- | 73.00 | 24.78 | 1000.0 | 9.000 | L1 | 9.7 |
| 2.660000 | --- | 35.15 | 60.00 | 24.85 | 1000.0 | 9.000 | L1 | 9.7 |
| 2.660000 | 48.83 | --- | 73.00 | 24.17 | 1000.0 | 9.000 | L1 | 9.7 |
| 7.425000 | --- | 40.22 | 60.00 | 19.78 | 1000.0 | 9.000 | L1 | 9.9 |
| 7.425000 | 47.28 | --- | 73.00 | 25.72 | 1000.0 | 9.000 | L1 | 9.9 |
| 7.560000 | --- | 40.56 | 60.00 | 19.44 | 1000.0 | 9.000 | L1 | 9.9 |
| 7.560000 | 50.01 | --- | 73.00 | 22.99 | 1000.0 | 9.000 | L1 | 9.9 |

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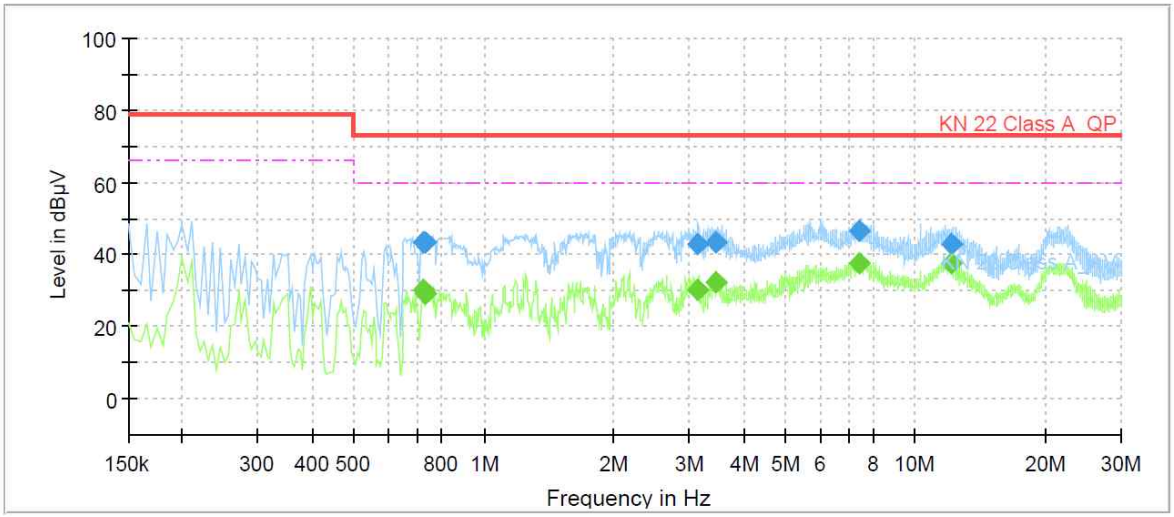
Polarization: NEUTRAL

Test Description: Conducted Emission
Model No.: SMT-2731
Mode HDMI_CE
Operator Name: KES




## Final_Result

| Frequency (MHz) | QuasiPeak (dBµV) | CAverage (dBµV) | Limit (dBµV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|
| 0.720000 | --- | 29.97 | 60.00 | 30.03 | 1000.0 | 9.000 | N | 9.7 |
| 0.720000 | 43.60 | --- | 73.00 | 29.40 | 1000.0 | 9.000 | N | 9.7 |
| 0.730000 | --- | 29.20 | 60.00 | 30.80 | 1000.0 | 9.000 | N | 9.7 |
| 0.730000 | 43.31 | --- | 73.00 | 29.69 | 1000.0 | 9.000 | N | 9.7 |
| 3.140000 | --- | 30.41 | 60.00 | 29.59 | 1000.0 | 9.000 | N | 9.8 |
| 3.140000 | 42.78 | --- | 73.00 | 30.22 | 1000.0 | 9.000 | N | 9.8 |
| 3.455000 | --- | 32.41 | 60.00 | 27.59 | 1000.0 | 9.000 | N | 9.8 |
| 3.455000 | 43.66 | --- | 73.00 | 29.34 | 1000.0 | 9.000 | N | 9.8 |
| 7.415000 | --- | 37.71 | 60.00 | 22.29 | 1000.0 | 9.000 | N | 9.9 |
| 7.415000 | 46.34 | --- | 73.00 | 26.66 | 1000.0 | 9.000 | N | 9.9 |
| 12.110000 | --- | 37.53 | 60.00 | 22.47 | 1000.0 | 9.000 | N | 10.0 |
| 12.110000 | 43.01 | --- | 73.00 | 29.99 | 1000.0 | 9.000 | N | 10.0 |

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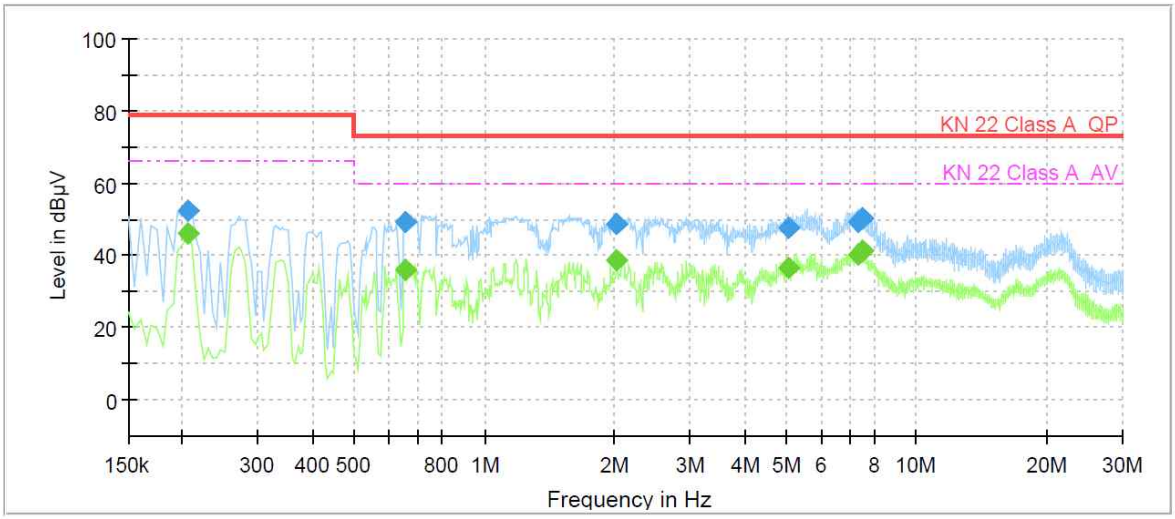
■ D-SUB Mode
Polarization: HOT

Test Description: Conducted Emission
Model No.: SMT-2731
Mode D-SUB_CE
Operator Name: KES




## Final_Result

| Frequency (MHz) | QuasiPeak (dBµV) | CAverage (dBµV) | Limit (dBµV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|
| 0.205000 | --- | 45.92 | 66.00 | 20.08 | 1000.0 | 9.000 | L1 | 9.7 |
| 0.205000 | 52.60 | --- | 79.00 | 26.40 | 1000.0 | 9.000 | L1 | 9.7 |
| 0.655000 | --- | 36.24 | 60.00 | 23.76 | 1000.0 | 9.000 | L1 | 9.7 |
| 0.655000 | 49.21 | --- | 73.00 | 23.79 | 1000.0 | 9.000 | L1 | 9.7 |
| 2.020000 | --- | 38.40 | 60.00 | 21.60 | 1000.0 | 9.000 | L1 | 9.7 |
| 2.020000 | 48.49 | --- | 73.00 | 24.51 | 1000.0 | 9.000 | L1 | 9.7 |
| 5.035000 | --- | 36.39 | 60.00 | 23.61 | 1000.0 | 9.000 | L1 | 9.8 |
| 5.035000 | 47.70 | --- | 73.00 | 25.30 | 1000.0 | 9.000 | L1 | 9.8 |
| 7.340000 | --- | 40.09 | 60.00 | 19.91 | 1000.0 | 9.000 | L1 | 9.9 |
| 7.340000 | 49.14 | --- | 73.00 | 23.86 | 1000.0 | 9.000 | L1 | 9.9 |
| 7.480000 | --- | 41.20 | 60.00 | 18.80 | 1000.0 | 9.000 | L1 | 9.9 |
| 7.480000 | 50.25 | --- | 73.00 | 22.75 | 1000.0 | 9.000 | L1 | 9.9 |

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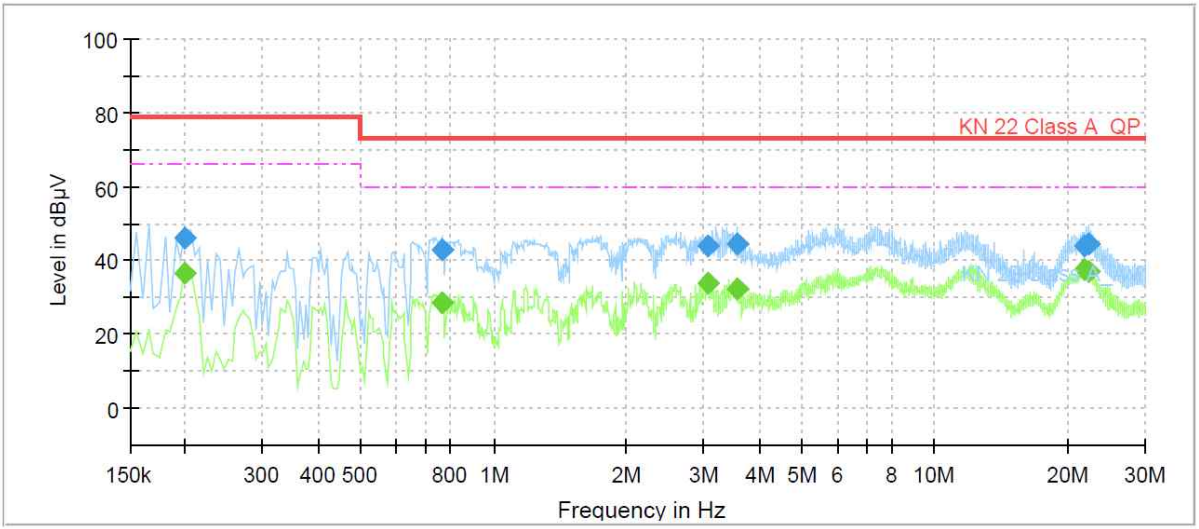
Polarization: NEUTRAL

| | |
|---|---|
| Test Description: | Conducted Emission |
| Model No.: | SMT-2731 |
| Mode | D-SUB_CE |
| Operator Name: | KES |




## Final_Result

| Frequency (MHz) | QuasiPeak (dBµV) | CAverage (dBµV) | Limit (dBµV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|
| 0.200000 | --- | 36.28 | 66.00 | 29.72 | 1000.0 | 9.000 | N | 9.7 |
| 0.200000 | 46.02 | --- | 79.00 | 32.98 | 1000.0 | 9.000 | N | 9.7 |
| 0.760000 | --- | 28.70 | 60.00 | 31.30 | 1000.0 | 9.000 | N | 9.7 |
| 0.760000 | 42.84 | --- | 73.00 | 30.16 | 1000.0 | 9.000 | N | 9.7 |
| 3.070000 | --- | 33.82 | 60.00 | 26.18 | 1000.0 | 9.000 | N | 9.8 |
| 3.070000 | 43.98 | --- | 73.00 | 29.02 | 1000.0 | 9.000 | N | 9.8 |
| 3.560000 | --- | 32.25 | 60.00 | 27.75 | 1000.0 | 9.000 | N | 9.8 |
| 3.560000 | 44.42 | --- | 73.00 | 28.58 | 1000.0 | 9.000 | N | 9.8 |
| 21.885000 | --- | 37.45 | 60.00 | 22.55 | 1000.0 | 9.000 | N | 10.0 |
| 21.885000 | 44.02 | --- | 73.00 | 28.98 | 1000.0 | 9.000 | N | 10.0 |
| 22.225000 | --- | 37.11 | 60.00 | 22.89 | 1000.0 | 9.000 | N | 10.0 |
| 22.225000 | 44.24 | --- | 73.00 | 28.76 | 1000.0 | 9.000 | N | 10.0 |

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- Telecommunication

Temperature: ℃ Humidity: % R.H. Test Date: Tested by:

[10 Mbps]

N/A

[100 Mbps]

N/A

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[1000 Mbps]

N/A

## 5.2 Radiated Emission Measurements

### 5.2.1 Test Description

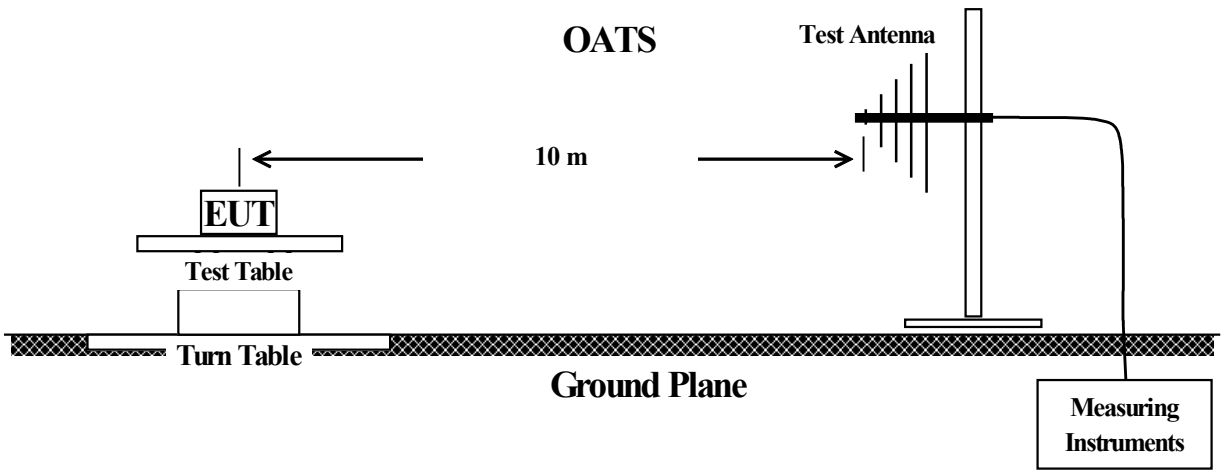
The radiated emissions measurements were performed on the ten-meter open-field test site and 3 m full chamber. The E.U.T was placed on a nonconductive turntable approximately 0.8 meters above the ground plane.

The frequency spectrum from 30 ㎒ to 1 000 ㎒ and 1 000 ㎒ to 6 000 ㎒ was scanned and maximum emission levels at each frequency recorded.

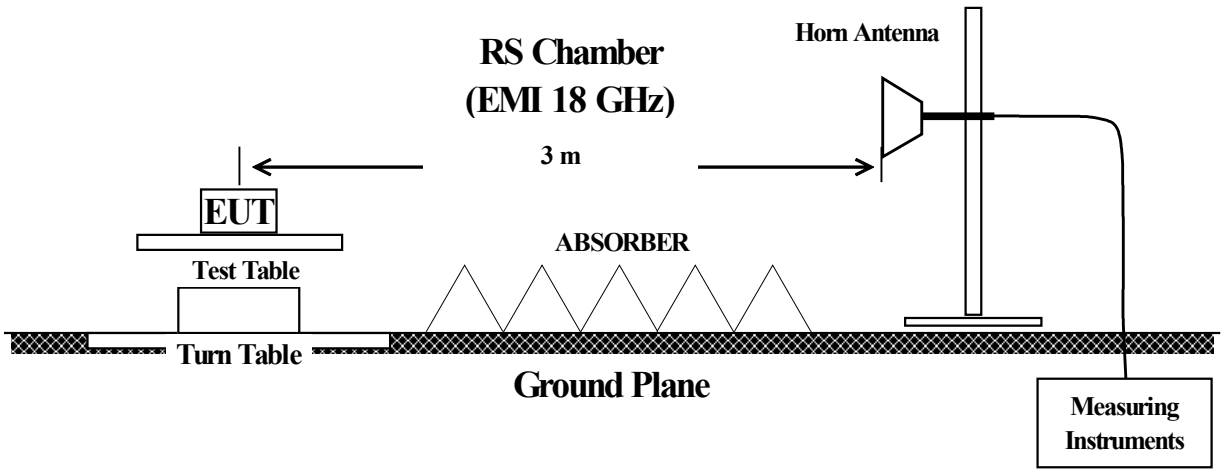
The system was rotated 360°, and the antenna was varied in the height between 1.0 and 4.0 meters in order to determine the maximum emission levels. This procedure was performed for horizontal and vertical polarization of the receiving antenna.

- above 1 GHz : Antenna height is fixed to 1.0 m

*** Below 1 ㎓**




*** Above 1 ㎓**

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### 5.2.2 Test Equipments

| Description | Manufacturer | Model Number | Serial Number | Cal. Due |
|---|---|---|---|---|
| EMI TEST Receiver | R & S | ESR3 | 101781 | 05. 06. 2016 |
| Trilog-Broadband Antenna | SCHWARZBECK | VULB 9163 | 9168-713 | 05. 15. 2017 |
| OATS | KES | - | - | - |
| Antenna Mast | DAEIL EMC | - | - | - |
| Turn Table | DAEIL EMC | - | - | - |
| EMI TEST Receiver | R & S | ESU26 | 100552 | 05. 06. 2016 |
| Broadband Coaxial Preamplifier | Schwarzbeck Mess - Elektronik | BBV 9718 | 9718-246 | 10. 23. 2016 |
| DOUBLE RIDGED HORN ANTENNA | A.H.SYSTEM,INC | SAS-571 | 781 | 05. 07. 2017 |
| RS Chamber (EMI 18 GHz) | SEMITEC | - | - | - |
| Antenna Mast | AUDIX | - | - | - |
| Turn Table | AUDIX | - | - | - |

### 5.2.3 Test Environments

| Ambient Temperatures | Relative Humidity |
|---|---|
| see the data | see the data |

### 5.2.4 Test Limits

| Frequency (㎒) | EN 55022 | |
|---|---|---|
| | Class B @ 10 m (dB㎶/m) | Class A @ 10 m (dB㎶/m) |
| 30 to 230 | 30.0 | 40.0 |
| 230 to 1 000 | 37.0 | 47.0 |

| Frequency (㎒) | EN 55022 | | | |
|---|---|---|---|---|
| | Class B @ 3 m (dB㎶/m) | | Class A @ 3 m (dB㎶/m) | |
| | PK | AV | PK | AV |
| 1 000 to 3 000 | 70 | 50 | 76 | 56 |
| 3 000 to 6 000 | 74 | 54 | 80 | 60 |

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### 5.2.5 Test Procedure

Before final measurements of radiated emission were made on the OATS, the E.U.T was scanned in semi-anechoic chamber in order to determine its emission spectrum signature. The physical arrangement of the test system and associated cabling was varied in order to determine the effect on the E.U.T's emission in amplitude, direction and frequency. This process was repeated during final radiated emission measurements on the OATS range, at each frequency, in order to ensure that maximum emissions amplitudes were attained.

The radiated emission test was performed with E.U.T exercise program loaded, and the emissions were scanned between 30 ㎒ to 6 000 ㎒ using the spectrum analyzer. The spectrum analyzer's 6 ㏈ bandwidth was set to 120 ㎑(1 ㎒), and the analyzer was operated in the CISPR quasi-peak(Peak) detection mode.

Measurements were taken using both HORIZONTAL and VERTICAL antenna polarization, herein referred to as H and V, respectively.

### 5.2.6 Field Strength Calculation

F.S = Field Strength

M.R = Meter Reading

A.F = Antenna Factor

C.L = Cable Loss

A.G= Amplifier Gain

* Below 1 ㎓ : F.S(㏈㎶/m) = M.R(㏈㎶) + [A.F(㏈/m) + C.L(㏈)]
* Above 1 ㎓ : F.S(㏈㎶/m) = M.R(㏈㎶) + [A.F(㏈/m) + C.L(㏈)] - A.G

*** Measurement in the presence of high ambient signals**

In general, the ambient signals should not exceed the limit. Radiated emanations from the EUT at the point of measurement may, however, be impossible to measure at some frequencies due to ambient noise fields generated by local broadcast services, other manmade devices, and natural sources.

a) Perform measurements at close-in distances and determine the limit L2 corresponding to the close-in distance d2 by applying the following relation:
L2 = L1 (d1/d2)

where L1 is the specified limit in microvolts per metre (μV/m) at the distance d1. Determine the possible environmental and compliance test conditions stipulated in Clause 8 using L2 as the new limit for distance d2.

b) In the frequency bands where the ambient noise values of Clause 8 are exceeded (measured values higher than 6 dB below the limit), the disturbance values of the EUT may be interpolated from the adjacent disturbance values. The interpolated value shall lie on the curve describing a continuous function of the disturbance values adjacent to the ambient noise.

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### 5.2.7 Test Results

According to the data in section 5.1.7, the EUT complied with the EN55022/CISPR22 standards.

### 5.2.8 Test Data

*** Below 1 ㎓**

Temperature: 15.1 ℃ Humidity: 80.0 % R.H. Test Date: 11. 17. 2015 Tested by: Kyeng Sun, Min

■ BNC, AUDIO IN Mode

| Frequency (㎒) | Amplitude (dBμV/m) | Antenna | | Correction Factor | | Corrected Amplitude (dBμV/m) | Applicable Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|
| | | Polar. (H/V) | Height (m) | Ant. (dB) | Cable (dB) | | | |
| 148.02 | 10.33 | V | 1.20 | 8.13 | 3.15 | 21.61 | 40.00 | 18.39 |
| 351.39 | 14.16 | H | 4.00 | 14.57 | 5.22 | 33.95 | 47.00 | 13.05 |
| 356.72 | 10.89 | V | 1.30 | 14.70 | 5.28 | 30.87 | 47.00 | 16.13 |
| 405.24 | 14.63 | H | 3.30 | 15.77 | 5.82 | 36.22 | 47.00 | 10.78 |
| 436.86 | 10.08 | V | 1.80 | 16.22 | 6.07 | 32.37 | 47.00 | 14.63 |
| 736.69 | 8.91 | H | 4.00 | 20.10 | 8.35 | 37.36 | 47.00 | 9.64 |

■ HDMI Mode

| Frequency (㎒) | Amplitude (dBμV/m) | Antenna | | Correction Factor | | Corrected Amplitude (dBμV/m) | Applicable Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|
| | | Polar. (H/V) | Height (m) | Ant. (dB) | Cable (dB) | | | |
| 149.34 | 12.53 | H | 4.00 | 8.18 | 3.16 | 23.87 | 40.00 | 16.13 |
| 151.17 | 12.30 | V | 1.10 | 8.24 | 3.19 | 23.73 | 40.00 | 16.27 |
| 300.21 | 10.33 | H | 4.00 | 13.38 | 4.93 | 28.64 | 47.00 | 18.36 |
| 348.02 | 9.59 | V | 1.30 | 14.49 | 5.19 | 29.27 | 47.00 | 17.73 |
| 353.36 | 13.72 | H | 3.60 | 14.62 | 5.24 | 33.58 | 47.00 | 13.42 |
| 439.98 | 8.80 | V | 1.30 | 16.26 | 6.10 | 31.16 | 47.00 | 15.84 |

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■ D-SUB Mode

| Frequency (㎒) | Amplitude (dB㎶/m) | Antenna | | Correction Factor | | Corrected Amplitude (dB㎶/m) | Applicable Limit (dB㎶/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|
| | | Polar. (H/V) | Height (m) | Ant. (dB) | Cable (dB) | | | |
| 149.17 | 13.19 | H | 4.00 | 8.17 | 3.16 | 24.52 | 40.00 | 15.48 |
| 150.89 | 14.52 | V | 1.20 | 8.23 | 3.18 | 25.93 | 40.00 | 14.07 |
| 298.64 | 12.04 | H | 3.80 | 13.35 | 4.91 | 30.30 | 47.00 | 16.70 |
| 354.57 | 8.84 | V | 1.30 | 14.65 | 5.25 | 28.74 | 47.00 | 18.26 |
| 355.61 | 10.20 | H | 3.60 | 14.67 | 5.27 | 30.14 | 47.00 | 16.86 |
| 445.56 | 5.14 | V | 1.10 | 16.34 | 6.14 | 27.62 | 47.00 | 19.38 |

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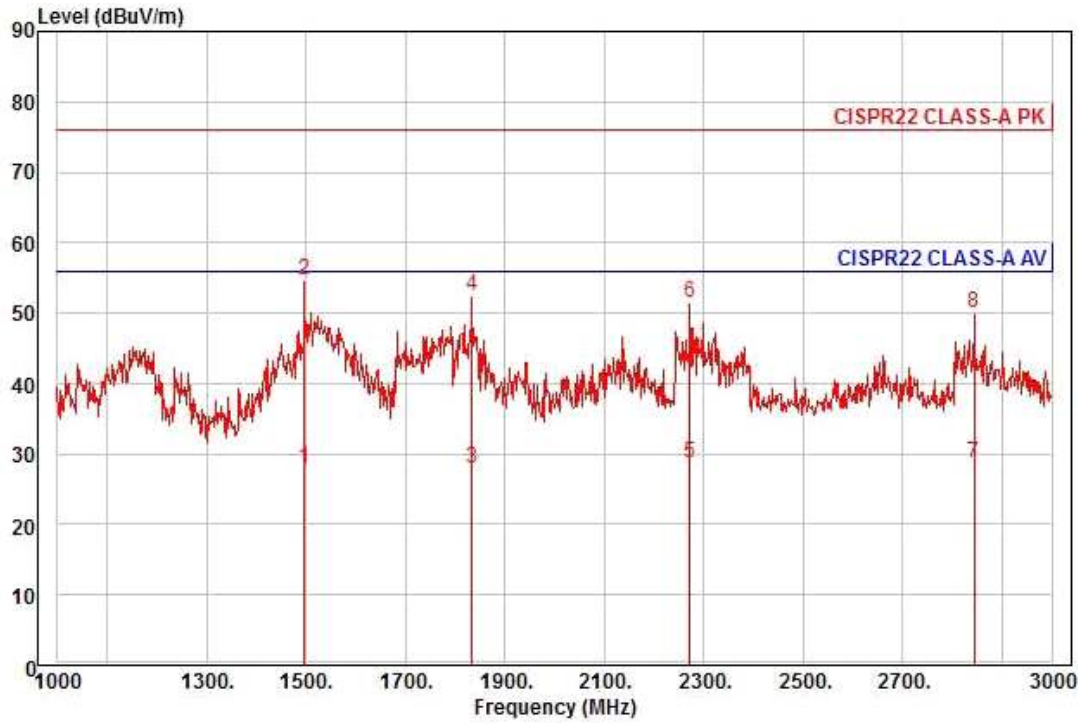
## * Above 1 GHz

Temperature: 20.4 ℃ Humidity: 52.8 % R.H. Test Date: 11. 17. 2015 Tested by: Kyeng Sun, Min

■ BNC, AUDIO IN Mode




Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project : LCD MONITOR
Model : SMT-2731
Mode : BNC IN,OUT + Audio IN_CE
Memo : (1 ~ 3) GHz

| | Freq | Read Level | Ant Factor | Cable Loss | Preamp Factor | TPos | Limit Line | Over Limit | Pol/Phase | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB/m | dB | dB | deg | dBuV/m | dB | | |
| 1 | 1496.00 | 34.47 | 25.88 | 7.47 | 39.88 | 54 | 56.00 | -28.06 | horizontal | Average |
| 2 pp | 1496.00 | 61.33 | 25.88 | 7.47 | 39.88 | 54 | 76.00 | -21.20 | horizontal | Peak |
| 3 | 1834.00 | 32.10 | 27.22 | 8.44 | 39.71 | 33 | 56.00 | -27.95 | horizontal | Average |
| 4 | 1834.00 | 56.57 | 27.22 | 8.44 | 39.71 | 33 | 76.00 | -23.48 | horizontal | Peak |
| 5 av | 2272.00 | 30.26 | 28.55 | 9.68 | 39.79 | 50 | 56.00 | -27.30 | horizontal | Average |
| 6 | 2272.00 | 52.95 | 28.55 | 9.68 | 39.79 | 50 | 76.00 | -24.61 | horizontal | Peak |
| 7 | 2844.00 | 27.48 | 29.95 | 11.27 | 40.12 | 54 | 56.00 | -27.42 | horizontal | Average |
| 8 | 2844.00 | 49.02 | 29.95 | 11.27 | 40.12 | 54 | 76.00 | -25.88 | horizontal | Peak |

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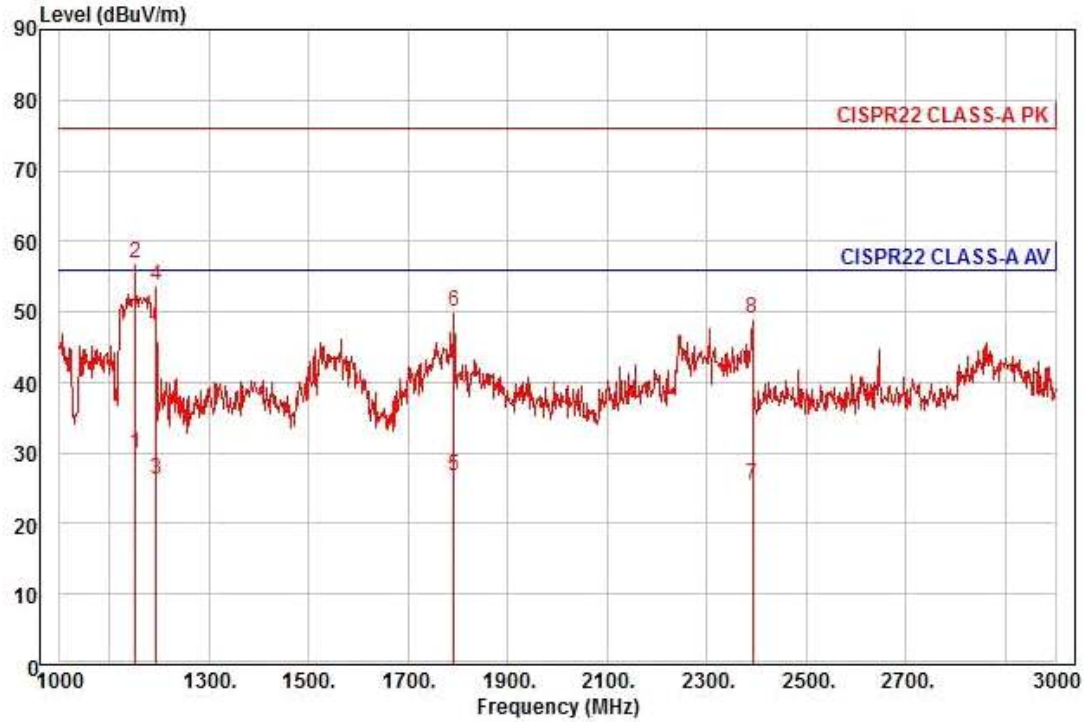


Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project : LCD MONITOR
Model : SMT-2731
Mode : BNC IN,OUT + Audio IN_CE
Memo : (1 ~ 3) GHz

| | Freq | Read Level | Ant Factor | Cable Loss | Preamp Factor | TPos | Limit Line | Over Limit | Pol/Phase | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB/m | dB | dB | deg | dBuV/m | dB | | |
| 1 av | 1152.00 | 38.87 | 24.51 | 6.49 | 40.05 | 10 | 56.00 | -26.18 | vertical | Average |
| 2 pp | 1152.00 | 65.95 | 24.51 | 6.49 | 40.05 | 10 | 76.00 | -19.10 | vertical | Peak |
| 3 | 1194.00 | 34.91 | 24.68 | 6.61 | 40.02 | 18 | 56.00 | -29.82 | vertical | Average |
| 4 | 1194.00 | 62.41 | 24.68 | 6.61 | 40.02 | 18 | 76.00 | -22.32 | vertical | Peak |
| 5 | 1792.00 | 31.17 | 27.05 | 8.32 | 39.73 | 54 | 56.00 | -29.19 | vertical | Average |
| 6 | 1792.00 | 54.46 | 27.05 | 8.32 | 39.73 | 54 | 76.00 | -25.90 | vertical | Peak |
| 7 | 2392.00 | 26.41 | 28.84 | 10.01 | 39.86 | 321 | 56.00 | -30.60 | vertical | Average |
| 8 | 2392.00 | 50.18 | 28.84 | 10.01 | 39.86 | 321 | 76.00 | -26.83 | vertical | Peak |

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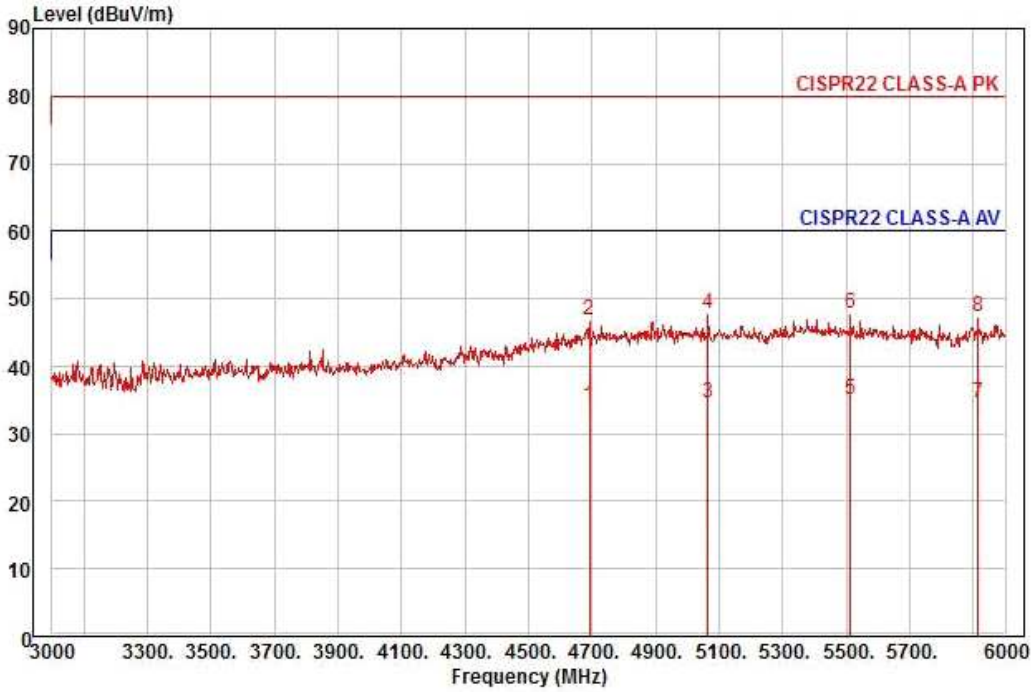


Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project : LCD MONITOR
Model : SMT-2731
Mode : BNC IN,OUT + Audio IN_CE
Memo : (3 ~ 6) GHz

| | Freq | Read Level | Ant Factor | Cable Loss | Preamp Factor | TPos | Limit Line | Over Limit | Pol/Phase | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB/m | dB | dB | deg | dBuV/m | dB | | |
| 1 | 4692.00 | 24.16 | 35.96 | 14.30 | 40.41 | 238 | 60.00 | -25.99 | horizontal | Average |
| 2 | 4692.00 | 36.91 | 35.96 | 14.30 | 40.41 | 238 | 80.00 | -33.24 | horizontal | Peak |
| 3 | 5064.00 | 22.39 | 37.59 | 14.99 | 40.40 | 101 | 60.00 | -25.43 | horizontal | Average |
| 4 | 5064.00 | 35.55 | 37.59 | 14.99 | 40.40 | 101 | 80.00 | -32.27 | horizontal | Peak |
| 5 pp | 5514.00 | 22.88 | 36.68 | 15.81 | 40.34 | 247 | 60.00 | -24.97 | horizontal | Average |
| 6 pk | 5514.00 | 35.67 | 36.68 | 15.81 | 40.34 | 247 | 80.00 | -32.18 | horizontal | Peak |
| 7 | 5916.00 | 22.53 | 35.87 | 16.54 | 40.28 | 8 | 60.00 | -25.34 | horizontal | Average |
| 8 | 5916.00 | 35.22 | 35.87 | 16.54 | 40.28 | 8 | 80.00 | -32.65 | horizontal | Peak |

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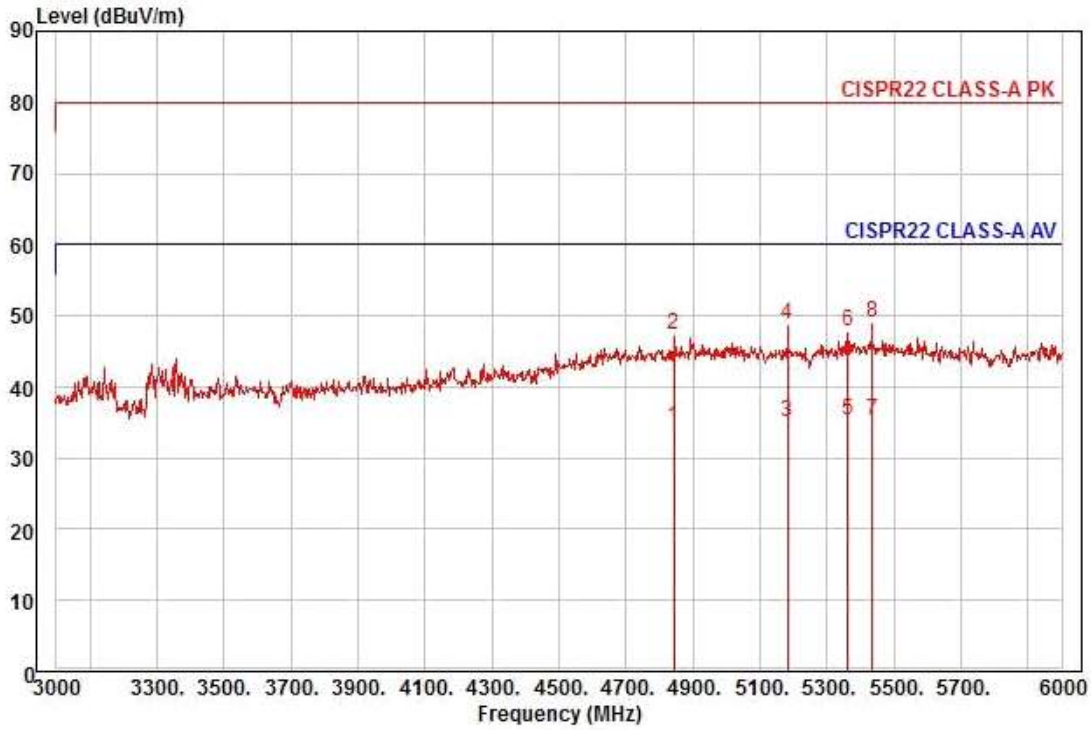


Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project : LCD MONITOR
Model : SMT-2731
Mode : BNC IN,OUT + Audio IN_CE
Memo : (3 ~ 6) GHz

| | Freq | Read Level | Ant Factor | Cable Loss | Preamp Factor | TPos | Limit Line | Over Limit | Pol/Phase | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB/m | dB | dB | deg | dBuV/m | dB | | |
| 1 | 4842.00 | 23.32 | 36.82 | 14.58 | 40.41 | 239 | 60.00 | -25.69 | vertical | Average |
| 2 | 4842.00 | 36.33 | 36.82 | 14.58 | 40.41 | 239 | 80.00 | -32.68 | vertical | Peak |
| 3 | 5181.00 | 22.82 | 37.35 | 15.20 | 40.38 | 16 | 60.00 | -25.01 | vertical | Average |
| 4 | 5181.00 | 36.65 | 37.35 | 15.20 | 40.38 | 16 | 80.00 | -31.18 | vertical | Peak |
| 5 | 5361.00 | 23.08 | 36.99 | 15.53 | 40.36 | 253 | 60.00 | -24.76 | vertical | Average |
| 6 | 5361.00 | 35.61 | 36.99 | 15.53 | 40.36 | 253 | 80.00 | -32.23 | vertical | Peak |
| 7 pp | 5436.00 | 23.23 | 36.84 | 15.66 | 40.35 | 320 | 60.00 | -24.62 | vertical | Average |
| 8 pk | 5436.00 | 36.89 | 36.84 | 15.66 | 40.35 | 320 | 80.00 | -30.96 | vertical | Peak |

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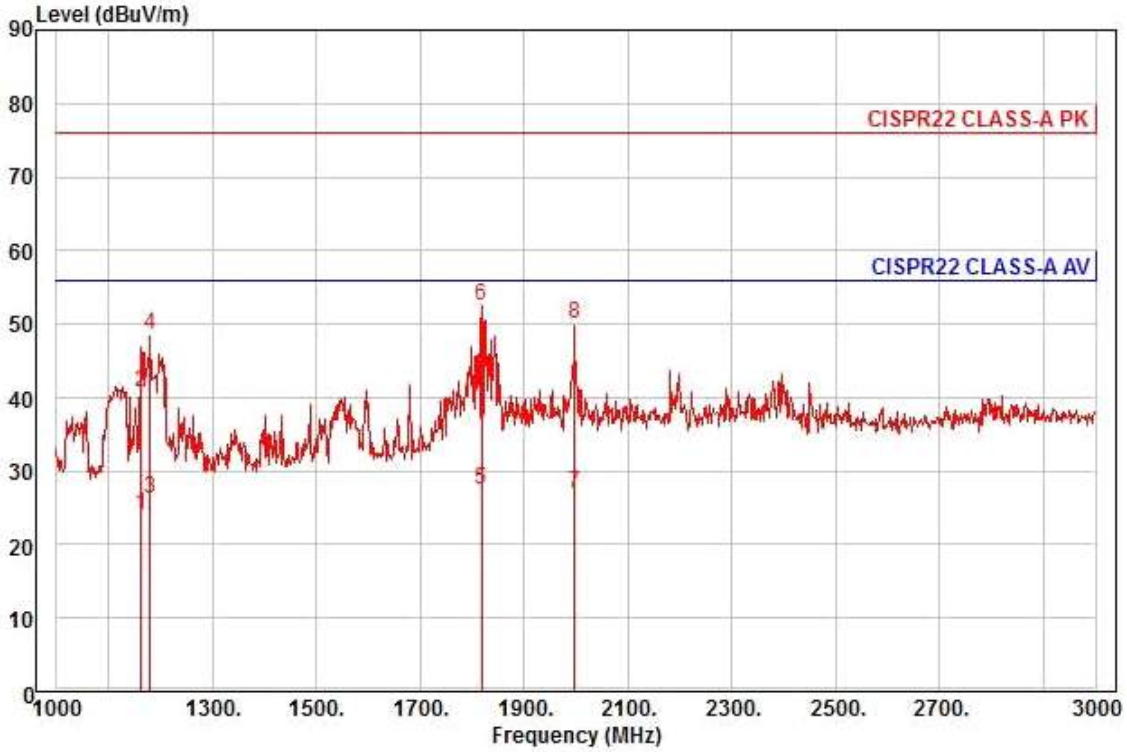
## ■ HDMI Mode




Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project : LCD MONITOR
Model : SMT-2731
Mode : HDMI_CE
Memo : (1 ~ 3) GHz

| | Freq | Read Level | Ant Factor | Cable Loss | Preamp Factor | TPos | Limit Line | Over Limit | Pol/Phase | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB/m | dB | dB | deg | dBuV/m | dB | | |
| 1 | 1162.00 | 33.04 | 24.55 | 6.51 | 40.04 | 23 | 56.00 | -31.94 | horizontal | Average |
| 2 | 1162.00 | 49.74 | 24.55 | 6.51 | 40.04 | 23 | 76.00 | -35.24 | horizontal | Peak |
| 3 | 1180.00 | 35.04 | 24.62 | 6.57 | 40.03 | 23 | 56.00 | -29.80 | horizontal | Average |
| 4 | 1180.00 | 57.32 | 24.62 | 6.57 | 40.03 | 23 | 76.00 | -27.52 | horizontal | Peak |
| 5 av | 1818.00 | 31.63 | 27.16 | 8.40 | 39.72 | 27 | 56.00 | -28.53 | horizontal | Average |
| 6 pp | 1818.00 | 56.63 | 27.16 | 8.40 | 39.72 | 27 | 76.00 | -23.53 | horizontal | Peak |
| 7 | 1998.00 | 29.88 | 27.87 | 8.91 | 39.63 | 228 | 56.00 | -28.97 | horizontal | Average |
| 8 | 1998.00 | 52.78 | 27.87 | 8.91 | 39.63 | 228 | 76.00 | -26.07 | horizontal | Peak |

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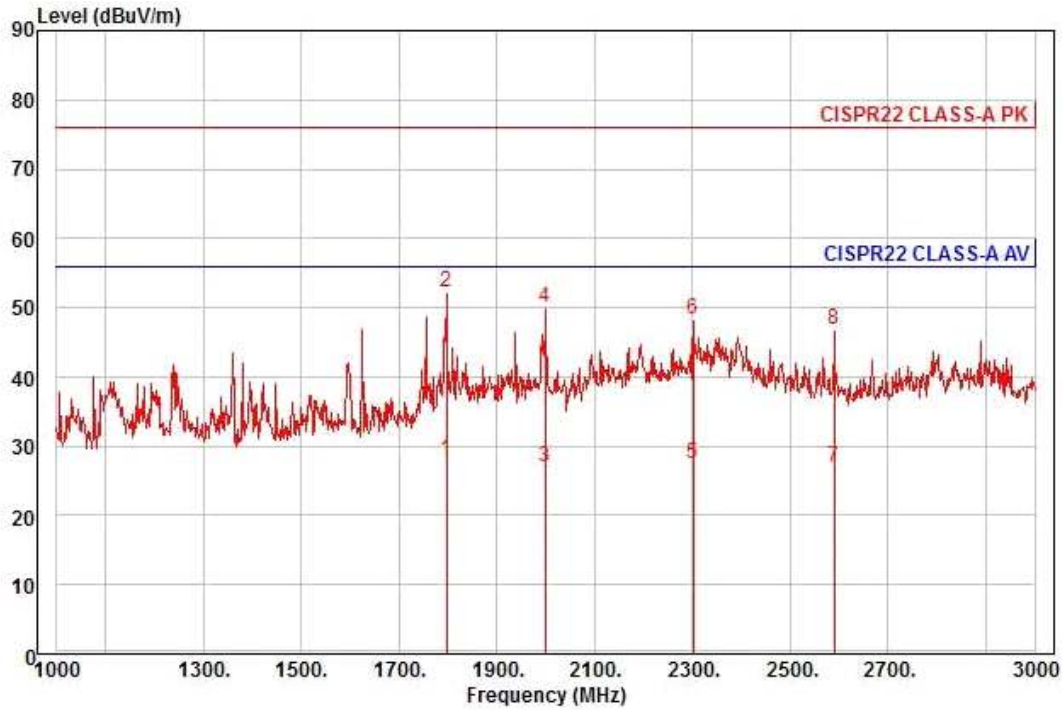


Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project : LCD MONITOR
Model : SMT-2731
Mode : HDMI_CE
Memo : (1 ~ 3) GHz

| | Freq | Read Level | Ant Factor | Cable Loss | Preamp Factor | TPos | Limit Line | Over Limit | Pol/Phase | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB/m | dB | dB | deg | dBuV/m | dB | | |
| 1 av | 1798.00 | 32.32 | 27.08 | 8.34 | 39.73 | 216 | 56.00 | -27.99 | vertical | Average |
| 2 pp | 1798.00 | 56.51 | 27.08 | 8.34 | 39.73 | 216 | 76.00 | -23.80 | vertical | Peak |
| 3 | 2000.00 | 29.89 | 27.88 | 8.92 | 39.63 | 1 | 56.00 | -28.94 | vertical | Average |
| 4 | 2000.00 | 52.96 | 27.88 | 8.92 | 39.63 | 1 | 76.00 | -25.87 | vertical | Peak |
| 5 | 2302.00 | 28.96 | 28.62 | 9.76 | 39.81 | 108 | 56.00 | -28.47 | vertical | Average |
| 6 | 2302.00 | 49.64 | 28.62 | 9.76 | 39.81 | 108 | 76.00 | -27.79 | vertical | Peak |
| 7 | 2590.00 | 26.99 | 29.33 | 10.56 | 39.97 | 211 | 56.00 | -29.09 | vertical | Average |
| 8 | 2590.00 | 46.96 | 29.33 | 10.56 | 39.97 | 211 | 76.00 | -29.12 | vertical | Peak |

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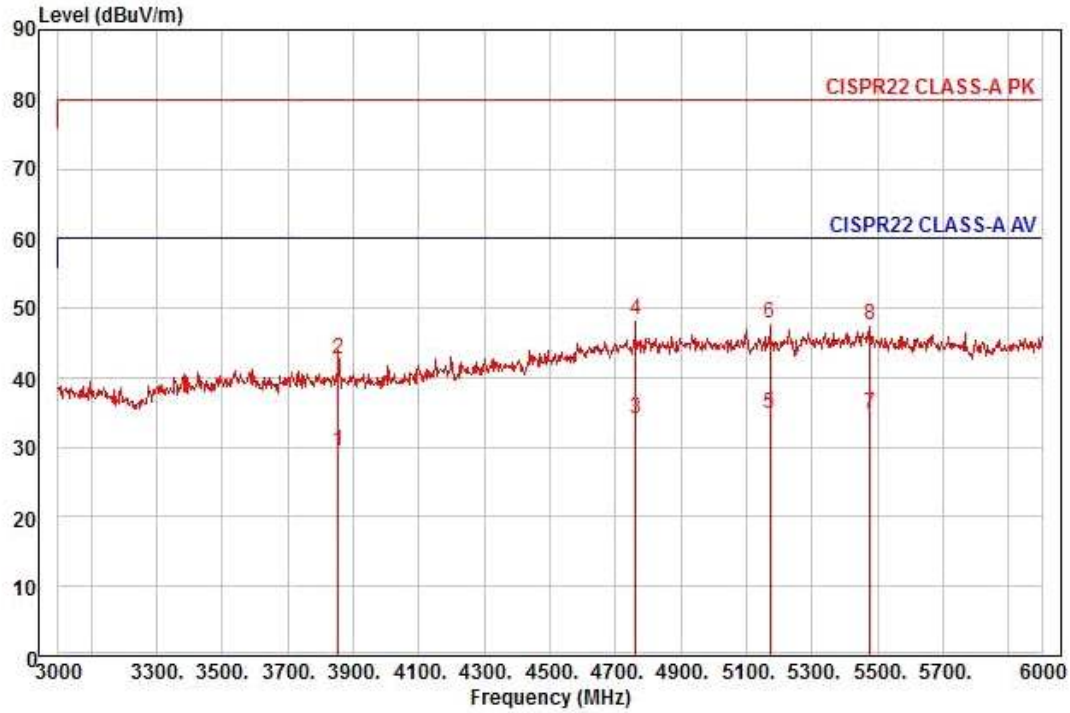


Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project : LCD MONITOR
Model : SMT-2731
Mode : HDMI_CE
Memo : (3 ~ 6) GHz

| | Freq | Read Level | Ant Factor | Cable Loss | Preamp Factor | TPos | Limit Line | Over Limit | Pol/Phase | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB/m | dB | dB | deg | dBuV/m | dB | | |
| 1 | 3855.00 | 25.16 | 31.77 | 12.84 | 40.38 | 34 | 60.00 | -30.61 | horizontal | Average |
| 2 | 3855.00 | 38.45 | 31.77 | 12.84 | 40.38 | 34 | 80.00 | -37.32 | horizontal | Peak |
| 3 | 4761.00 | 23.74 | 36.36 | 14.43 | 40.41 | 118 | 60.00 | -25.88 | horizontal | Average |
| 4 pk | 4761.00 | 37.95 | 36.36 | 14.43 | 40.41 | 118 | 80.00 | -31.67 | horizontal | Peak |
| 5 | 5172.00 | 22.57 | 37.37 | 15.18 | 40.39 | 293 | 60.00 | -25.27 | horizontal | Average |
| 6 | 5172.00 | 35.57 | 37.37 | 15.18 | 40.39 | 293 | 80.00 | -32.27 | horizontal | Peak |
| 7 pp | 5478.00 | 22.78 | 36.75 | 15.74 | 40.34 | 255 | 60.00 | -25.07 | horizontal | Average |
| 8 | 5478.00 | 35.36 | 36.75 | 15.74 | 40.34 | 255 | 80.00 | -32.49 | horizontal | Peak |

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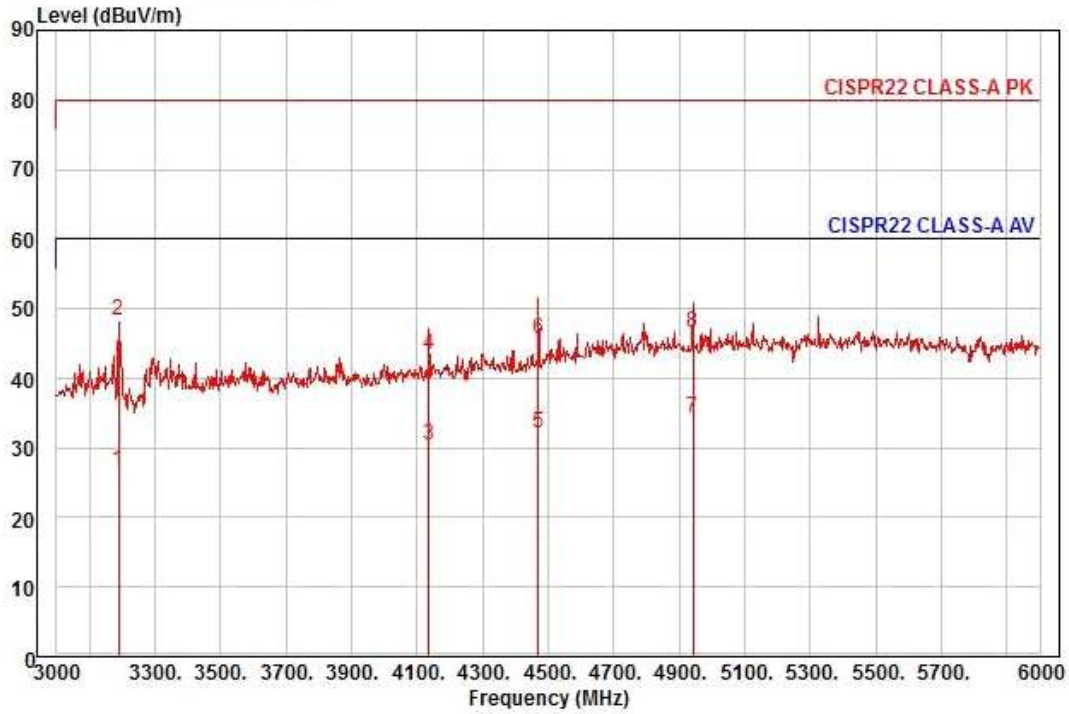


Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project : LCD MONITOR
Model : SMT-2731
Mode : HDMI_CE
Memo : (3 ~ 6) GHz

| | Freq | Read Level | Ant Factor | Cable Loss | Preamp Factor | TPos | Limit Line | Over Limit | Pol/Phase | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB/m | dB | dB | deg | dBuV/m | dB | | |
| 1 | 3189.00 | 24.36 | 30.65 | 11.95 | 40.25 | 211 | 60.00 | -33.29 | vertical | Average |
| 2 pk | 3189.00 | 46.04 | 30.65 | 11.95 | 40.25 | 211 | 80.00 | -31.61 | vertical | Peak |
| 3 | 4137.00 | 24.75 | 32.79 | 13.28 | 40.41 | 217 | 60.00 | -29.59 | vertical | Average |
| 4 | 4137.00 | 37.73 | 32.79 | 13.28 | 40.41 | 217 | 80.00 | -36.61 | vertical | Peak |
| 5 | 4470.00 | 23.91 | 34.69 | 13.89 | 40.41 | 249 | 60.00 | -27.92 | vertical | Average |
| 6 | 4470.00 | 37.50 | 34.69 | 13.89 | 40.41 | 249 | 80.00 | -34.33 | vertical | Peak |
| 7 pp | 4941.00 | 22.66 | 37.38 | 14.76 | 40.41 | 217 | 60.00 | -25.61 | vertical | Average |
| 8 | 4941.00 | 34.97 | 37.38 | 14.76 | 40.41 | 217 | 80.00 | -33.30 | vertical | Peak |

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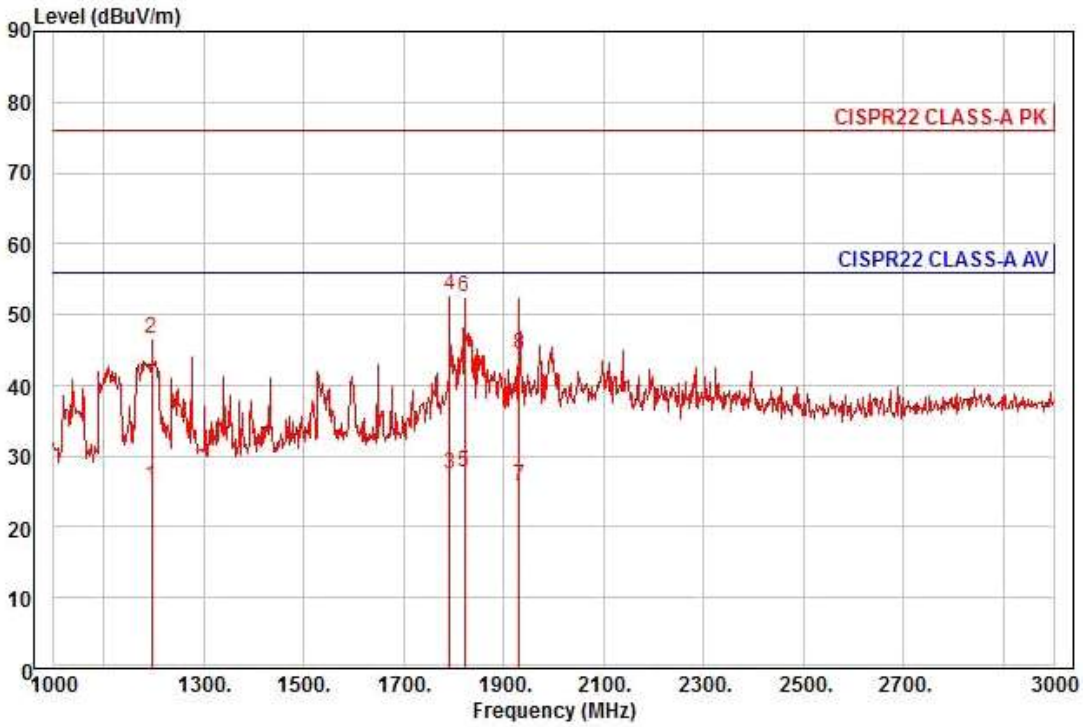
## ■ D-SUB Mode




```
Site      : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal
          : RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project   : LCD MONITOR
Model     : SMT-2731
Mode      : D-SUB_CE
Memo      : (1 ~ 3) GHz
```

| | Freq | Read Level | Ant Factor | Cable Loss | Preamp Factor | TPos | Limit Line | Over Limit | Pol/Phase | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB/m | dB | dB | deg | dBuV/m | dB | | |
| 1 | 1196.00 | 34.47 | 24.69 | 6.61 | 40.02 | 46 | 56.00 | -30.25 | horizontal | Average |
| 2 | 1196.00 | 55.33 | 24.69 | 6.61 | 40.02 | 46 | 76.00 | -29.39 | horizontal | Peak |
| 3 | 1792.00 | 31.87 | 27.05 | 8.32 | 39.73 | 125 | 56.00 | -28.49 | horizontal | Average |
| 4 pp | 1792.00 | 57.17 | 27.05 | 8.32 | 39.73 | 125 | 76.00 | -23.19 | horizontal | Peak |
| 5 av | 1822.00 | 31.77 | 27.17 | 8.41 | 39.72 | 26 | 56.00 | -28.37 | horizontal | Average |
| 6 | 1822.00 | 56.54 | 27.17 | 8.41 | 39.72 | 26 | 76.00 | -23.60 | horizontal | Peak |
| 7 | 1932.00 | 28.96 | 27.61 | 8.72 | 39.66 | 122 | 56.00 | -30.37 | horizontal | Average |
| 8 | 1932.00 | 47.81 | 27.61 | 8.72 | 39.66 | 122 | 76.00 | -31.52 | horizontal | Peak |

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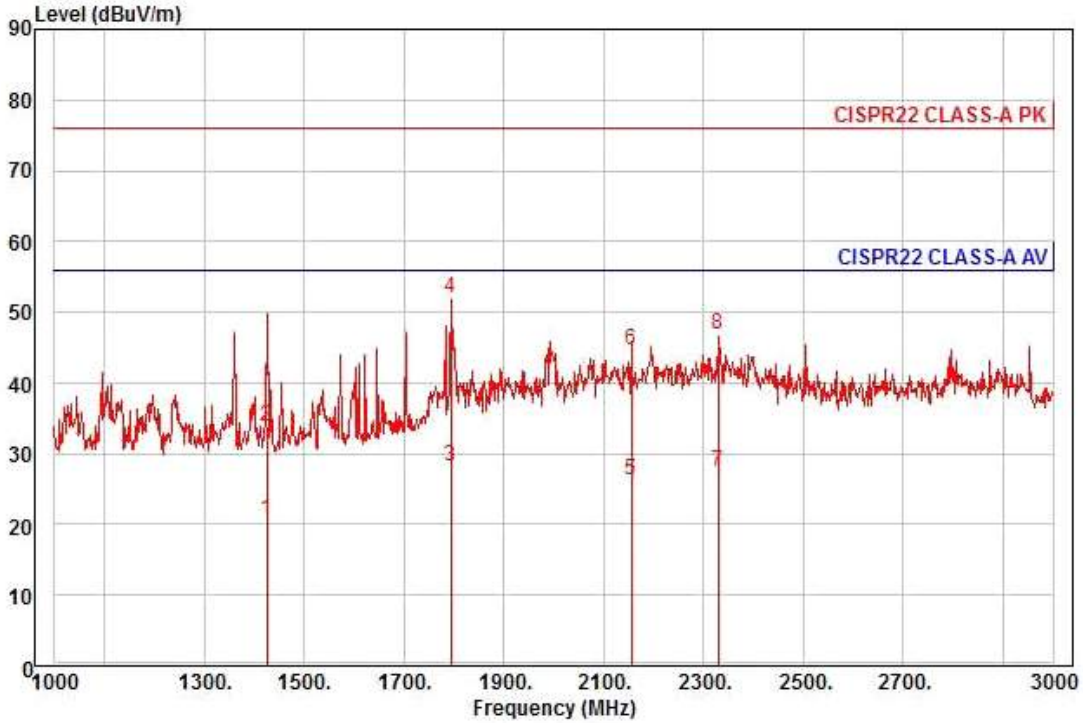


Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project : LCD MONITOR
Model : SMT-2731
Mode : D-SUB_CE
Memo : (1 ~ 3) GHz

| | Freq | Read Level | Ant Factor | Cable Loss | Preamp Factor | TPos | Limit Line | Over Limit | Pol/Phase | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB/m | dB | dB | deg | dBuV/m | dB | | |
| 1 | 1426.00 | 27.71 | 25.60 | 7.27 | 39.91 | 233 | 56.00 | -35.33 | vertical | Average |
| 2 | 1426.00 | 40.84 | 25.60 | 7.27 | 39.91 | 233 | 76.00 | -42.20 | vertical | Peak |
| 3 av | 1794.00 | 32.60 | 27.06 | 8.33 | 39.73 | 218 | 56.00 | -27.74 | vertical | Average |
| 4 pp | 1794.00 | 56.39 | 27.06 | 8.33 | 39.73 | 218 | 76.00 | -23.95 | vertical | Peak |
| 5 | 2156.00 | 28.40 | 28.26 | 9.35 | 39.72 | 153 | 56.00 | -29.71 | vertical | Average |
| 6 | 2156.00 | 46.71 | 28.26 | 9.35 | 39.72 | 153 | 76.00 | -31.40 | vertical | Peak |
| 7 | 2330.00 | 28.69 | 28.69 | 9.84 | 39.82 | 114 | 56.00 | -28.60 | vertical | Average |
| 8 | 2330.00 | 48.02 | 28.69 | 9.84 | 39.82 | 114 | 76.00 | -29.27 | vertical | Peak |

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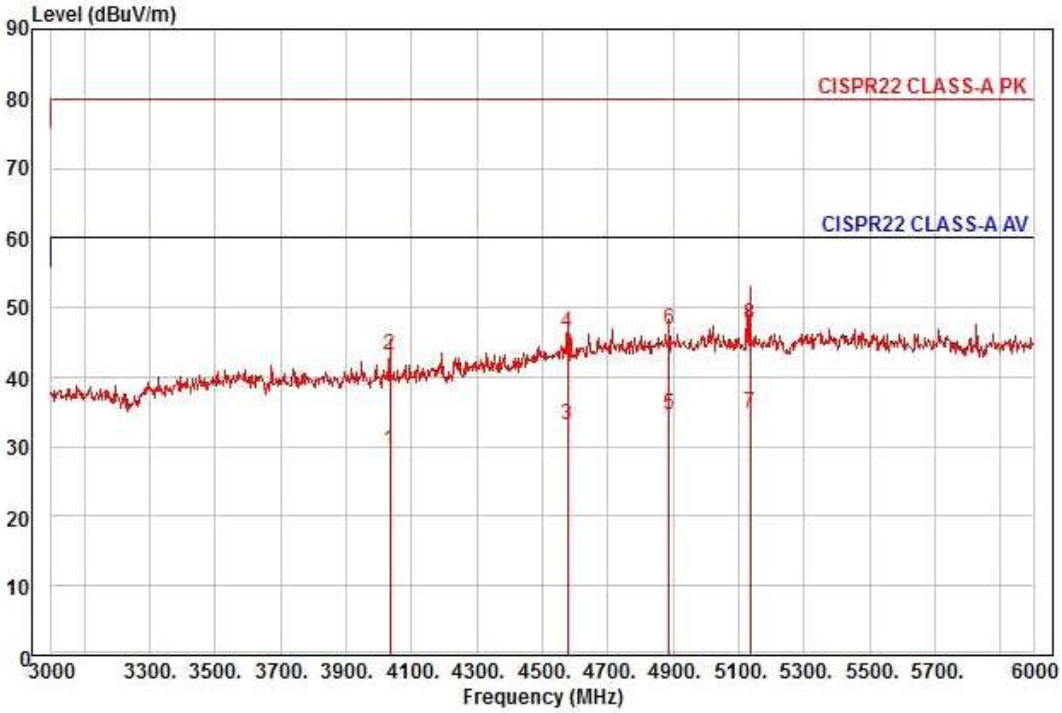


Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project : LCD MONITOR
Model : SMT-2731
Mode : D-SUB_CE
Memo : (3 ~ 6) GHz

| | Freq | Read Level | Ant Factor | Cable Loss | Preamp Factor | TPos | Limit Line | Over Limit | Pol/Phase | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB/m | dB | dB | deg | dBuV/m | dB | | |
| 1 | 4035.00 | 24.60 | 32.21 | 13.09 | 40.41 | 203 | 60.00 | -30.51 | horizontal | Average |
| 2 | 4035.00 | 38.27 | 32.21 | 13.09 | 40.41 | 203 | 80.00 | -36.84 | horizontal | Peak |
| 3 | 4578.00 | 24.00 | 35.31 | 14.09 | 40.41 | 174 | 60.00 | -27.01 | horizontal | Average |
| 4 | 4578.00 | 37.26 | 35.31 | 14.09 | 40.41 | 174 | 80.00 | -33.75 | horizontal | Peak |
| 5 | 4887.00 | 23.18 | 37.07 | 14.66 | 40.41 | 293 | 60.00 | -25.50 | horizontal | Average |
| 6 | 4887.00 | 35.60 | 37.07 | 14.66 | 40.41 | 293 | 80.00 | -33.08 | horizontal | Peak |
| 7 pp | 5136.00 | 22.59 | 37.45 | 15.12 | 40.39 | 308 | 60.00 | -25.23 | horizontal | Average |
| 8 pk | 5136.00 | 35.31 | 37.45 | 15.12 | 40.39 | 308 | 80.00 | -32.51 | horizontal | Peak |

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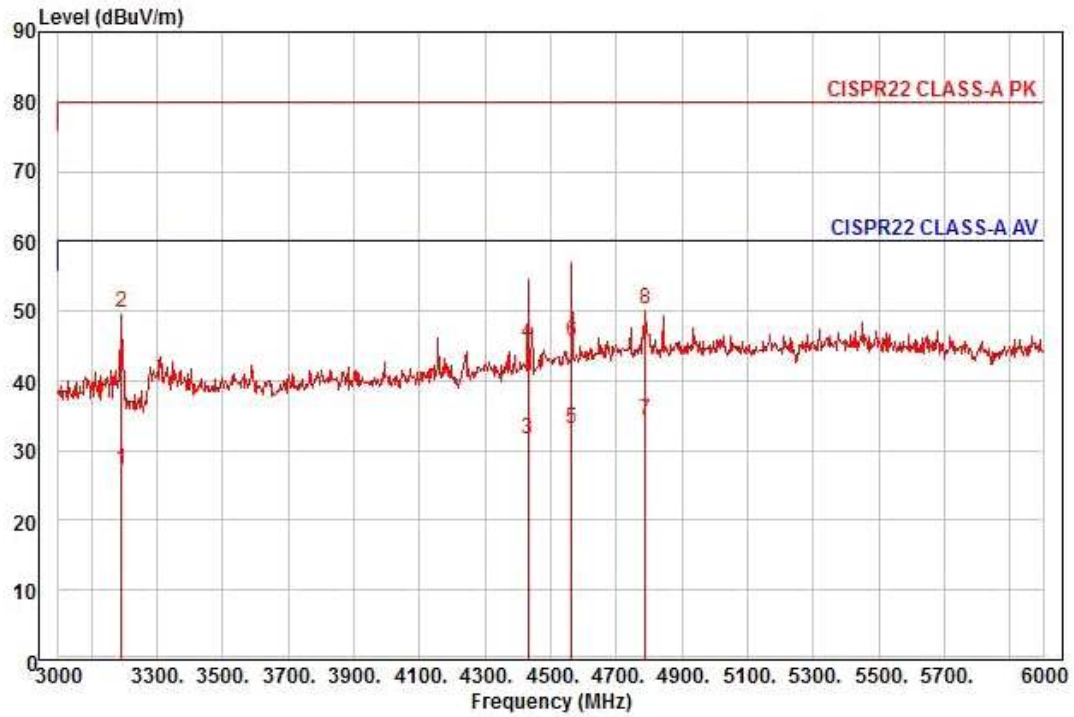


Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project : LCD MONITOR
Model : SMT-2731
Mode : D-SUB_CE
Memo : (3 ~ 6) GHz

| | Freq | Read Level | Ant Factor | Cable Loss | Preamp Factor | TPos | Limit Line | Over Limit | Pol/Phase | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB/m | dB | dB | deg | dBuV/m | dB | | |
| 1 | 3192.00 | 24.84 | 30.65 | 11.96 | 40.25 | 225 | 60.00 | -32.80 | vertical | Average |
| 2 | 3192.00 | 47.31 | 30.65 | 11.96 | 40.25 | 225 | 80.00 | -30.33 | vertical | Peak |
| 3 | 4431.00 | 23.82 | 34.47 | 13.82 | 40.41 | 210 | 60.00 | -28.30 | vertical | Average |
| 4 | 4431.00 | 37.56 | 34.47 | 13.82 | 40.41 | 210 | 80.00 | -34.56 | vertical | Peak |
| 5 | 4563.00 | 24.15 | 35.22 | 14.07 | 40.41 | 216 | 60.00 | -26.97 | vertical | Average |
| 6 | 4563.00 | 36.75 | 35.22 | 14.07 | 40.41 | 216 | 80.00 | -34.37 | vertical | Peak |
| 7 pp | 4788.00 | 23.81 | 36.51 | 14.48 | 40.41 | 222 | 60.00 | -25.61 | vertical | Average |
| 8 pk | 4788.00 | 39.79 | 36.51 | 14.48 | 40.41 | 222 | 80.00 | -29.63 | vertical | Peak |

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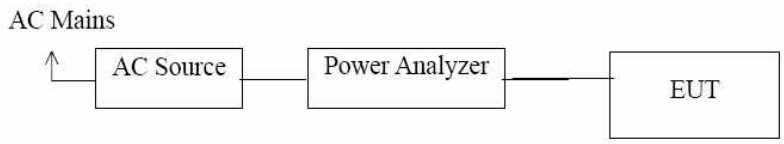
## 5.3 Harmonics / Voltage Fluctuations Measurements

### 5.3.1 Test Description

Harmonics of the fundamental current were measured up to 2 ㎑ using a universal power analyzer. The measurements were carried out under steady conditions and using averaging.

Before making measurements the class of the E.U.T has been evaluated, it is necessary for the E.U.T to decide which class the E.U.T fulfills into; A, B, C or D




### 5.3.2 Test Equipments

| Description | Manufacturer | Model Number | Serial Number | Cal. Due |
|---|---|---|---|---|
| AC Source | EM test | ACS 500 N | V1024106760 | 08. 13. 2016 |
| Digital Power Analyzer | EM test | DPA 500 N | V1024106759 | 08. 13. 2016 |

### 5.3.3 Test Environments

Ambient Temperatures : see the data

Relative Humidity : see the data

### 5.3.4 Test Procedures

The E.U.T was installed and placed on a non-conductive table and was connected to the AC power source, 230 V(ac), 50 ㎐ via the measuring equipment with its attached AC power cord. All other equipment or peripherals included in the test, and having a separate power supply, are connected to the outlet, supplying 230 V(ac), 50 ㎐. A typical configuration is defined in the specification ANSI 63.4 or CISPR22. This ensures the repeatability of the test.

The E.U.T is set in operation and was monitored for measurements with the software, supplied by test equipment manufacturer. An EMC test program provided by client was used to exercise the E.U.T.

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### 5.3.5 Test Results

According to the data in section 5.3.6 and 5.3.7, the EUT complied with the EN 61000-3-2:2014 and EN 61000-3-3:2013 standard, and detailed test results are found in the following test data.

### 5.3.6 Test Data - Homonic

Temperature: 20.4 ℃ Humidity: 52.8 % R.H. Test Date: 11. 17. 2015 Tested by: Kyeng Sun, Min

■ BNC, AUDIO IN Mode

***Average harmonic current results***

| Hn | Ieff [A] | % of Limit | Limit [A] | Result |
|---|---|---|---|---|
| 1 | 158.120E-3 | 100.000 | | |
| 2 | 2.442E-3 | 1.544 | | PASS |
| 3 | 150.187E-3 | 94.983 | 2.30 | PASS |
| 4 | 2.105E-3 | 1.331 | | PASS |
| 5 | 141.970E-3 | 89.786 | 1.14 | PASS |
| 6 | 2.399E-3 | 1.517 | | PASS |
| 7 | 131.541E-3 | 83.191 | 770.00E-3 | PASS |
| 8 | 1.959E-3 | 1.239 | | PASS |
| 9 | 119.414E-3 | 75.521 | 400.00E-3 | PASS |
| 10 | 2.027E-3 | 1.282 | | PASS |
| 11 | 104.554E-3 | 66.123 | 330.00E-3 | PASS |
| 12 | 1.800E-3 | 1.138 | | PASS |
| 13 | 88.220E-3 | 55.793 | 210.00E-3 | PASS |
| 14 | 1.306E-3 | 0.826 | | PASS |
| 15 | 71.712E-3 | 45.353 | 150.00E-3 | PASS |
| 16 | 1.065E-3 | 0.674 | | PASS |
| 17 | 56.117E-3 | 35.490 | 130.00E-3 | PASS |
| 18 | 963.607E-6 | 0.609 | | PASS |
| 19 | 41.670E-3 | 26.353 | 120.00E-3 | PASS |
| 20 | 1.023E-3 | 0.647 | | PASS |
| 21 | 29.192E-3 | 18.462 | 165.00E-3 | PASS |
| 22 | 1.000E-3 | 0.632 | | PASS |
| 23 | 19.338E-3 | 12.230 | 150.00E-3 | PASS |
| 24 | 1.078E-3 | 0.682 | | PASS |
| 25 | 13.384E-3 | 8.464 | 135.00E-3 | PASS |
| 26 | 1.102E-3 | 0.697 | | PASS |
| 27 | 12.044E-3 | 7.617 | 120.00E-3 | PASS |
| 28 | 952.596E-6 | 0.602 | | PASS |
| 29 | 13.005E-3 | 8.224 | 120.00E-3 | PASS |
| 30 | 919.037E-6 | 0.581 | | PASS |
| 31 | 13.953E-3 | 8.825 | 105.00E-3 | PASS |
| 32 | 747.521E-6 | 0.473 | | PASS |
| 33 | 13.683E-3 | 8.654 | 105.00E-3 | PASS |
| 34 | 704.293E-6 | 0.445 | | PASS |
| 35 | 12.569E-3 | 7.949 | 90.00E-3 | PASS |
| 36 | 555.609E-6 | 0.351 | | PASS |
| 37 | 10.346E-3 | 6.543 | 90.00E-3 | PASS |
| 38 | 603.884E-6 | 0.382 | | PASS |
| 39 | 7.847E-3 | 4.963 | 90.00E-3 | PASS |
| 40 | 561.555E-6 | 0.355 | | 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

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## Test Data - Harmonics (continued)

***Maximum harmonic voltage results***

| Hn | Ieff [A] | Ueff [%] | Limit [%] | Result |
|---|---|---|---|---|
| 1 | 231.54 | 100.668 | | |
| 2 | 101.73E-3 | 0.044 | 0.2 | PASS |
| 3 | 84.27E-3 | 0.037 | 0.9 | PASS |
| 4 | 85.46E-3 | 0.037 | 0.2 | PASS |
| 5 | 32.36E-3 | 0.014 | 0.4 | PASS |
| 6 | 62.97E-3 | 0.027 | 0.2 | PASS |
| 7 | 73.57E-3 | 0.032 | 0.3 | PASS |
| 8 | 32.38E-3 | 0.014 | 0.2 | PASS |
| 9 | 101.85E-3 | 0.044 | 0.2 | PASS |
| 10 | 18.87E-3 | 0.008 | 0.2 | PASS |
| 11 | 90.34E-3 | 0.039 | 0.1 | PASS |
| 12 | 14.93E-3 | 0.006 | 0.1 | PASS |
| 13 | 62.70E-3 | 0.027 | 0.1 | PASS |
| 14 | 27.04E-3 | 0.012 | 0.1 | PASS |
| 15 | 43.01E-3 | 0.019 | 0.1 | PASS |
| 16 | 29.44E-3 | 0.013 | 0.1 | PASS |
| 17 | 53.64E-3 | 0.023 | 0.1 | PASS |
| 18 | 16.11E-3 | 0.007 | 0.1 | PASS |
| 19 | 61.87E-3 | 0.027 | 0.1 | PASS |
| 20 | 20.73E-3 | 0.009 | 0.1 | PASS |
| 21 | 67.99E-3 | 0.030 | 0.1 | PASS |
| 22 | 19.75E-3 | 0.009 | 0.1 | PASS |
| 23 | 38.98E-3 | 0.017 | 0.1 | PASS |
| 24 | 5.11E-3 | 0.002 | 0.1 | PASS |
| 25 | 13.14E-3 | 0.006 | 0.1 | PASS |
| 26 | 19.08E-3 | 0.008 | 0.1 | PASS |
| 27 | 57.22E-3 | 0.025 | 0.1 | PASS |
| 28 | 13.89E-3 | 0.006 | 0.1 | PASS |
| 29 | 38.94E-3 | 0.017 | 0.1 | PASS |
| 30 | 10.87E-3 | 0.005 | 0.1 | PASS |
| 31 | 27.47E-3 | 0.012 | 0.1 | PASS |
| 32 | 14.05E-3 | 0.006 | 0.1 | PASS |
| 33 | 28.77E-3 | 0.013 | 0.1 | PASS |
| 34 | 13.95E-3 | 0.006 | 0.1 | PASS |
| 35 | 45.26E-3 | 0.020 | 0.1 | PASS |
| 36 | 11.76E-3 | 0.005 | 0.1 | PASS |
| 37 | 24.38E-3 | 0.011 | 0.1 | PASS |
| 38 | 8.92E-3 | 0.004 | 0.1 | PASS |
| 39 | 30.25E-3 | 0.013 | 0.1 | PASS |
| 40 | 11.82E-3 | 0.005 | 0.1 | 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

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### 5.3.7 Test Data - Voltage Fluctuations

## Maximum Flicker results

| | E.U.T values | Limit | Result |
|---|---|---|---|
| Pst | 0.028 | 1.00 | PASS |
| Plt | 0.028 | 0.65 | PASS |
| dc [%] | 0.000 | 3.30 | PASS |
| dmax [%] | 0.030 | 4.00 | PASS |
| dt [s] | 0.000 | 0.50 | PASS |

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## ■ HDMI Mode

***Average harmonic current results***

| Hn | Ieff [A] | % of Limit | Limit [A] | Result |
|---|---|---|---|---|
| 1 | 158.642E-3 | 100.000 | | |
| 2 | 2.621E-3 | 1.652 | | PASS |
| 3 | 150.673E-3 | 94.977 | 2.30 | PASS |
| 4 | 2.190E-3 | 1.381 | | PASS |
| 5 | 142.604E-3 | 89.891 | 1.14 | PASS |
| 6 | 2.472E-3 | 1.558 | | PASS |
| 7 | 132.198E-3 | 83.331 | 770.00E-3 | PASS |
| 8 | 1.958E-3 | 1.234 | | PASS |
| 9 | 120.061E-3 | 75.680 | 400.00E-3 | PASS |
| 10 | 1.995E-3 | 1.257 | | PASS |
| 11 | 105.240E-3 | 66.338 | 330.00E-3 | PASS |
| 12 | 1.722E-3 | 1.085 | | PASS |
| 13 | 88.964E-3 | 56.078 | 210.00E-3 | PASS |
| 14 | 1.236E-3 | 0.779 | | PASS |
| 15 | 72.517E-3 | 45.711 | 150.00E-3 | PASS |
| 16 | 1.001E-3 | 0.631 | | PASS |
| 17 | 56.912E-3 | 35.875 | 130.00E-3 | PASS |
| 18 | 920.184E-6 | 0.580 | | PASS |
| 19 | 42.411E-3 | 26.734 | 120.00E-3 | PASS |
| 20 | 1.007E-3 | 0.635 | | PASS |
| 21 | 29.856E-3 | 18.819 | 165.00E-3 | PASS |
| 22 | 1.023E-3 | 0.645 | | PASS |
| 23 | 19.865E-3 | 12.522 | 150.00E-3 | PASS |
| 24 | 1.118E-3 | 0.705 | | PASS |
| 25 | 13.674E-3 | 8.619 | 135.00E-3 | PASS |
| 26 | 1.140E-3 | 0.719 | | PASS |
| 27 | 12.088E-3 | 7.620 | 120.00E-3 | PASS |
| 28 | 985.541E-6 | 0.621 | | PASS |
| 29 | 12.978E-3 | 8.181 | 120.00E-3 | PASS |
| 30 | 947.275E-6 | 0.597 | | PASS |
| 31 | 13.947E-3 | 8.792 | 105.00E-3 | PASS |
| 32 | 769.281E-6 | 0.485 | | PASS |
| 33 | 13.759E-3 | 8.673 | 105.00E-3 | PASS |
| 34 | 696.974E-6 | 0.439 | | PASS |
| 35 | 12.714E-3 | 8.014 | 90.00E-3 | PASS |
| 36 | 532.043E-6 | 0.335 | | PASS |
| 37 | 10.530E-3 | 6.637 | 90.00E-3 | PASS |
| 38 | 559.629E-6 | 0.353 | | PASS |
| 39 | 8.063E-3 | 5.083 | 90.00E-3 | PASS |
| 40 | 507.842E-6 | 0.320 | | 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

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## Test Data - Harmonics (continued)

***Maximum harmonic voltage results***

| Hn | Ieff [A] | Ueff [%] | Limit [%] | Result |
|---|---|---|---|---|
| 1 | 231.60 | 100.694 | | |
| 2 | 125.55E-3 | 0.055 | 0.2 | PASS |
| 3 | 125.25E-3 | 0.054 | 0.9 | PASS |
| 4 | 46.40E-3 | 0.020 | 0.2 | PASS |
| 5 | 31.40E-3 | 0.014 | 0.4 | PASS |
| 6 | 35.25E-3 | 0.015 | 0.2 | PASS |
| 7 | 60.64E-3 | 0.026 | 0.3 | PASS |
| 8 | 23.24E-3 | 0.010 | 0.2 | PASS |
| 9 | 101.59E-3 | 0.044 | 0.2 | PASS |
| 10 | 19.11E-3 | 0.008 | 0.2 | PASS |
| 11 | 101.05E-3 | 0.044 | 0.1 | PASS |
| 12 | 11.36E-3 | 0.005 | 0.1 | PASS |
| 13 | 57.40E-3 | 0.025 | 0.1 | PASS |
| 14 | 28.39E-3 | 0.012 | 0.1 | PASS |
| 15 | 45.52E-3 | 0.020 | 0.1 | PASS |
| 16 | 28.93E-3 | 0.013 | 0.1 | PASS |
| 17 | 56.71E-3 | 0.025 | 0.1 | PASS |
| 18 | 17.68E-3 | 0.008 | 0.1 | PASS |
| 19 | 60.77E-3 | 0.026 | 0.1 | PASS |
| 20 | 20.62E-3 | 0.009 | 0.1 | PASS |
| 21 | 67.56E-3 | 0.029 | 0.1 | PASS |
| 22 | 17.34E-3 | 0.008 | 0.1 | PASS |
| 23 | 40.27E-3 | 0.018 | 0.1 | PASS |
| 24 | 6.70E-3 | 0.003 | 0.1 | PASS |
| 25 | 13.66E-3 | 0.006 | 0.1 | PASS |
| 26 | 16.53E-3 | 0.007 | 0.1 | PASS |
| 27 | 57.01E-3 | 0.025 | 0.1 | PASS |
| 28 | 13.69E-3 | 0.006 | 0.1 | PASS |
| 29 | 41.81E-3 | 0.018 | 0.1 | PASS |
| 30 | 12.92E-3 | 0.006 | 0.1 | PASS |
| 31 | 27.18E-3 | 0.012 | 0.1 | PASS |
| 32 | 14.51E-3 | 0.006 | 0.1 | PASS |
| 33 | 30.71E-3 | 0.013 | 0.1 | PASS |
| 34 | 13.86E-3 | 0.006 | 0.1 | PASS |
| 35 | 44.94E-3 | 0.020 | 0.1 | PASS |
| 36 | 10.73E-3 | 0.005 | 0.1 | PASS |
| 37 | 24.10E-3 | 0.010 | 0.1 | PASS |
| 38 | 8.98E-3 | 0.004 | 0.1 | PASS |
| 39 | 30.25E-3 | 0.013 | 0.1 | PASS |
| 40 | 14.14E-3 | 0.006 | 0.1 | 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

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### 5.3.8 Test Data - Voltage Fluctuations

## Maximum Flicker results

| | E.U.T values | Limit | Result |
|---|---|---|---|
| Pst | 0.028 | 1.00 | PASS |
| Plt | 0.028 | 0.65 | PASS |
| dc [%] | 0.000 | 3.30 | PASS |
| dmax [%] | 0.040 | 4.00 | PASS |
| dt [s] | 0.000 | 0.50 | PASS |

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## ■ D-SUB Mode

***Average harmonic current results***

| Hn | Ieff [A] | % of Limit | Limit [A] | Result |
|---|---|---|---|---|
| 1 | 1.032E-3 | 100.000 | | |
| 2 | 237.380E-6 | 23.002 | | PASS |
| 3 | 205.685E-6 | 19.931 | | PASS |
| 4 | 193.454E-6 | 18.745 | | PASS |
| 5 | 766.344E-6 | 74.258 | | PASS |
| 6 | 187.165E-6 | 18.136 | | PASS |
| 7 | 189.603E-6 | 18.372 | | PASS |
| 8 | 186.258E-6 | 18.048 | | PASS |
| 9 | 147.117E-6 | 14.255 | | PASS |
| 10 | 329.993E-6 | 31.976 | | PASS |
| 11 | 157.128E-6 | 15.226 | | PASS |
| 12 | 143.838E-6 | 13.938 | | PASS |
| 13 | 139.447E-6 | 13.512 | | PASS |
| 14 | 147.159E-6 | 14.260 | | PASS |
| 15 | 187.765E-6 | 18.194 | | PASS |
| 16 | 138.302E-6 | 13.401 | | PASS |
| 17 | 132.070E-6 | 12.797 | | PASS |
| 18 | 133.739E-6 | 12.959 | | PASS |
| 19 | 137.670E-6 | 13.340 | | PASS |
| 20 | 203.848E-6 | 19.753 | | PASS |
| 21 | 133.191E-6 | 12.906 | | PASS |
| 22 | 150.108E-6 | 14.545 | | PASS |
| 23 | 129.058E-6 | 12.506 | | PASS |
| 24 | 144.726E-6 | 14.024 | | PASS |
| 25 | 136.683E-6 | 13.244 | | PASS |
| 26 | 131.231E-6 | 12.716 | | PASS |
| 27 | 130.251E-6 | 12.621 | | PASS |
| 28 | 157.829E-6 | 15.293 | | PASS |
| 29 | 138.669E-6 | 13.437 | | PASS |
| 30 | 146.643E-6 | 14.210 | | PASS |
| 31 | 127.300E-6 | 12.335 | | PASS |
| 32 | 158.947E-6 | 15.402 | | PASS |
| 33 | 143.487E-6 | 13.904 | | PASS |
| 34 | 143.762E-6 | 13.930 | | PASS |
| 35 | 138.331E-6 | 13.404 | | PASS |
| 36 | 142.207E-6 | 13.780 | | PASS |
| 37 | 132.931E-6 | 12.881 | | PASS |
| 38 | 140.216E-6 | 13.587 | | PASS |
| 39 | 198.765E-6 | 19.260 | | PASS |
| 40 | 164.967E-6 | 15.985 | | 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

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## Test Data - Harmonics (continued)

***Maximum harmonic voltage results***

| Hn | Ieff [A] | Ueff [%] | Limit [%] | Result |
|---|---|---|---|---|
| 1 | 231.59 | 100.690 | | |
| 2 | 48.39E-3 | 0.021 | 0.2 | PASS |
| 3 | 59.19E-3 | 0.026 | 0.9 | PASS |
| 4 | 45.97E-3 | 0.020 | 0.2 | PASS |
| 5 | 43.87E-3 | 0.019 | 0.4 | PASS |
| 6 | 33.86E-3 | 0.015 | 0.2 | PASS |
| 7 | 53.35E-3 | 0.023 | 0.3 | PASS |
| 8 | 22.99E-3 | 0.010 | 0.2 | PASS |
| 9 | 87.44E-3 | 0.038 | 0.2 | PASS |
| 10 | 7.08E-3 | 0.003 | 0.2 | PASS |
| 11 | 74.47E-3 | 0.032 | 0.1 | PASS |
| 12 | 11.32E-3 | 0.005 | 0.1 | PASS |
| 13 | 18.52E-3 | 0.008 | 0.1 | PASS |
| 14 | 29.04E-3 | 0.013 | 0.1 | PASS |
| 15 | 67.15E-3 | 0.029 | 0.1 | PASS |
| 16 | 30.52E-3 | 0.013 | 0.1 | PASS |
| 17 | 38.35E-3 | 0.017 | 0.1 | PASS |
| 18 | 15.92E-3 | 0.007 | 0.1 | PASS |
| 19 | 32.83E-3 | 0.014 | 0.1 | PASS |
| 20 | 21.25E-3 | 0.009 | 0.1 | PASS |
| 21 | 63.11E-3 | 0.027 | 0.1 | PASS |
| 22 | 17.77E-3 | 0.008 | 0.1 | PASS |
| 23 | 47.54E-3 | 0.021 | 0.1 | PASS |
| 24 | 6.12E-3 | 0.003 | 0.1 | PASS |
| 25 | 12.86E-3 | 0.006 | 0.1 | PASS |
| 26 | 14.70E-3 | 0.006 | 0.1 | PASS |
| 27 | 44.56E-3 | 0.019 | 0.1 | PASS |
| 28 | 14.00E-3 | 0.006 | 0.1 | PASS |
| 29 | 44.82E-3 | 0.019 | 0.1 | PASS |
| 30 | 10.63E-3 | 0.005 | 0.1 | PASS |
| 31 | 23.44E-3 | 0.010 | 0.1 | PASS |
| 32 | 12.37E-3 | 0.005 | 0.1 | PASS |
| 33 | 29.55E-3 | 0.013 | 0.1 | PASS |
| 34 | 14.43E-3 | 0.006 | 0.1 | PASS |
| 35 | 38.12E-3 | 0.017 | 0.1 | PASS |
| 36 | 10.30E-3 | 0.004 | 0.1 | PASS |
| 37 | 30.74E-3 | 0.013 | 0.1 | PASS |
| 38 | 8.36E-3 | 0.004 | 0.1 | PASS |
| 39 | 28.63E-3 | 0.012 | 0.1 | PASS |
| 40 | 10.43E-3 | 0.005 | 0.1 | 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

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### 5.3.9 Test Data - Voltage Fluctuations

## Maximum Flicker results

| | E.U.T values | Limit | Result |
|---|---|---|---|
| Pst | 0.028 | 1.00 | PASS |
| Plt | 0.028 | 0.65 | PASS |
| dc [%] | 0.000 | 3.30 | PASS |
| dmax [%] | 0.029 | 4.00 | PASS |
| dt [s] | 0.000 | 0.50 | PASS |

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## 5.4 Electrostatic Discharge Immunity

### 5.4.1 Test Description

The E.U.T and all local support equipment were placed on non-metallic support 0.8 m above a reference ground plane (RGP) and was put into operation according to the specified operating mode.

### 5.4.2 Test Equipments

| Description | Manufacturer | Model Number | Serial Number | Cal. Due |
|---|---|---|---|---|
| ESD SIMULATOR | Noise Ken | ESS-2000 | ESS05X4620 | 06. 30. 2016 |

### 5.4.3 Test Environment

| | |
|---|---|
| Ambient Temperatures : | 15 ℃ ~ 35 ℃ |
| Relative Humidity : | 30 % R.H. ~ 60 % R.H. |
| Atmospheric Pressure : | 86.0 kPa ~ 106.0 kPa |

### 5.4.4 Test Levels

| | |
|---|---|
| Discharge Impedance : | 330 Ω ± 10 % / 150 pF ± 10 % |
| Type of Discharge : | Direct - Air Discharge(± 2 / ± 4 / ± 8 kV),<br>Contact Discharge(± 2 / ± 4 )<br>Indirect - HCP Discharge(± 4), VCP Discharge(± 4) |
| Polarity of Output Voltage : | Positive and Negative |
| Discharge Repetition Rate : | 1/sec |
| Number of Discharges : | more than 10 times |
| Performance Criteria : | B |

### 5.4.5 Test Procedure

Test programs and software were chosen so as to exercise all normal modes of operation of the E.U.T. The use of special exercising software is encouraged, but permitted only where it can be shown that the E.U.T is being comprehensively exercised.

The test was conducted in the following order: Air discharge, Direct Contact discharge, Indirect Contact Horizontal Coupling Plane (HCP) discharge, and Indirect Contact Vertical Coupling Plane (VCP) discharge. The electrostatic discharge test levels were set and discharges for the different test modes were set appropriately. The electrostatic discharge is applied to the conductive surface of the E.U.T, and along all seams and control surfaces on the E.U.T. When a discharge occurs and an error is caused, the type of error, discharge level and location is recorded.

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### 5.4.6 Test Results Test Data

According to the data in section 5.4.7, the E.U.T complied with the EN61000-4-2 standards, and detailed test results are found in the following test data.

### 5.4.7 Test Data

Temperature: 19.1 ℃ Humidity: 53.7 % R.H. Test Date: 11. 13. 2015 Tested by: Kyeng Sun, Min

■ BNC I/O + AUDIO IN Mode

Indirect Discharge

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

Direct Discharge

| No. | Test Point | Discharge Method | Results | Remarks |
|---|---|---|---|---|
| 1 | LCD PANEL | Air Discharge | A | - |
| 2 | BNC Port | Contact Discharge | A | - |

■ HDMI Mode

Indirect Discharge

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

Direct Discharge

| No. | Test Point | Discharge Method | Results | Remarks |
|---|---|---|---|---|
| 1 | LCD PANEL | Air Discharge | A | - |
| 2 | HDMI Port | Contact Discharge | A | - |

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## ■ D-SUB Mode

### Indirect Discharge

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

### Direct Discharge

| No. | Test Point | Discharge Method | Results | Remarks |
|---|---|---|---|---|
| 1 | LCD PANEL | Air Discharge | A | - |
| 2 | D-SUB Port | Contact Discharge | A | - |

Performance Results

A: Normal performance within the specification limits.

B: Temporary degradation or loss of function or performance which is self-recoverable.

C: Temporary degradation or loss of function or performance which requires operator intervention or system reset.

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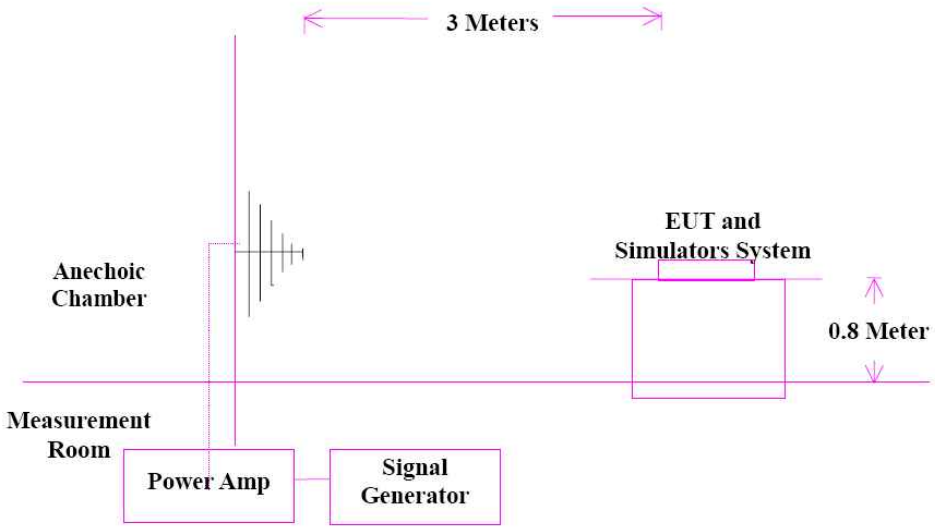
## 5.5 Radio-frequency electromagnetic field Amplitude modulated Immunity

### 5.5.1 Test Description

The E.U.T and all local support equipment were placed on a non-metallic support 0.8 m above a reference ground plane (RGP) and was put into operation according to the specified operating mode.




### 5.5.2 Test Equipments

| Description | Manufacturer | Model Number | Serial Number | Cal. Due |
|---|---|---|---|---|
| SUGNAL GENERATOR | Rohde & Schwarz | SMB 100A | 108252 | 08. 13. 2016 |
| BROADBAND AMPLIFIER | Rohde & Schwarz | BBA100 | 101239 | 08. 13. 2016 |
| BROADBAND AMPLIFIER | AR | 100S1G6M1 | 579931 | 08. 13. 2016 |
| POWER METER | Rohde & Schwarz | NRP2 | 103475 | 08. 13. 2016 |
| AVG POWER SENSOR | Rohde & Schwarz | NRP-Z91 | 102526 | 08. 13. 2016 |
| AVG POWER SENSOR | Rohde & Schwarz | NRP-Z91 | 102527 | 08. 13. 2016 |
| Stacked Log.-Per.Antenna | Schwarzbeck | STLP 9128 D | 9128D038 | - |
| Semi Anachoic Chamber #2 | SEMITEC | - | - | - |

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### 5.5.3 Test Environments

| | |
|---|---|
| Ambient Temperatures : | 15 ℃ ~ 35 ℃ |
| Relative Humidity : | 30 % R.H. ~ 60 % R.H. |
| Atmospheric Pressure : | 86.0 kPa ~ 106.0 kPa |

### 5.5.4 Test Levels

| | |
|---|---|
| Frequency Range : | 80 MHz to 1 000 MHz |
| Field Strength : | 3 V/m |
| Modulation : | 80 % AM in depth by a 1 kHz sine wave |
| Distance of ANT-E.U.T : | 3 meters |
| Antenna Polarity : | Horizontal and Vertical |
| Frequency Step : | 1 % |
| Performance Criteria : | A |

### 5.5.5 Test Procedures

The E.U.T is set into operation and was monitored for variations in performance. The test signal start frequency (80 MHz) and stop frequency (1 000 MHz) were set, including the field strength at 3 V/m, 80 % modulated through immunity test software. The software maintains the necessary field strength through the frequency range, with the transmitting antenna horizontally polarized. If an error is detected, the field is reduced until the error is not repeatable, the field is then manually increased until the error begins to occur. This threshold level, the frequency and the error created are noted before continuing. The test is then repeated with vertical polarization, using the same test configuration for all four sides.

### 5.5.6 Test Results

According to the data in section 5.5.7, the E.U.T complied with the EN 61000-4-3 standards, and detailed test results are found in the following test data.

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### 5.5.7 Test Data

Temperature: 18.7 ℃ Humidity: 48.9 % R.H. Test Date: 11. 19. 2015 Tested by: Kyeng Sun, Min

■ BNC, AUDIO IN Mode

| No. | Test Point | Performance Criteria | Performance Results | | Remarks |
|---|---|---|---|---|---|
| | | | Horizontal | Vertical | |
| 1 | Front | A | A | A | - |
| 2 | Rear | A | A | A | - |
| 3 | Right Side | A | A | A | - |
| 4 | Left Side | A | A | A | - |

■ HDMI Mode

| No. | Test Point | Performance Criteria | Performance Results | | Remarks |
|---|---|---|---|---|---|
| | | | Horizontal | Vertical | |
| 1 | Front | A | A | A | - |
| 2 | Rear | A | A | A | - |
| 3 | Right Side | A | A | A | - |
| 4 | Left Side | A | A | A | - |

■ D-SUB Mode

| No. | Test Point | Performance Criteria | Performance Results | | Remarks |
|---|---|---|---|---|---|
| | | | Horizontal | Vertical | |
| 1 | Front | A | A | A | - |
| 2 | Rear | A | A | A | - |
| 3 | Right Side | A | A | A | - |
| 4 | Left Side | A | A | A | - |

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The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

Performance Results

A: Normal performance within the specification limits.

B: Temporary degradation or loss of function or performance which is self-recoverable.

C: Temporary degradation or loss of function or performance which requires operator intervention or system reset.

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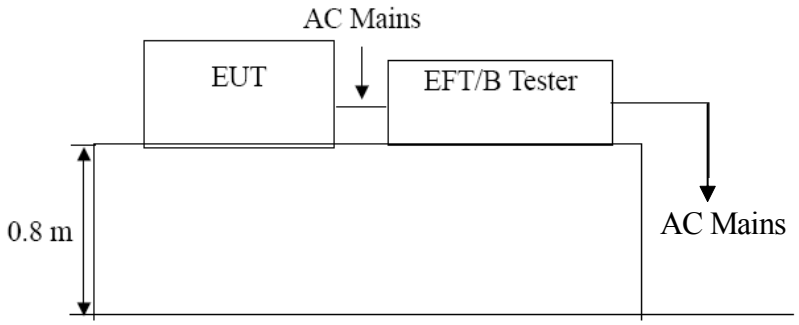
## 5.6 Fast Transient Immunity

### 5.6.1 Test Description

The E.U.T and all local support equipment were placed a non-metallic support 0.8 m above a reference ground plane (RGP) and was put into operation according to the specified operating mode. If the E.U.T has a non-detachable supply cable more than 1 m long, the excess length of this cable was gathered into a flat coil with a 0.4 m diameter and situated at a distance of 0.1 m above the RGP.




### 5.6.2 Test Equipments

| Description | Manufacturer | Model Number | Serial Number | Cal. Due |
|---|---|---|---|---|
| Ultra Compact Simulator | EMC TEST | UCS 500 N5 | V0936105120 | 07. 14. 2016 |
| Motorized Variac | EMC TEST | MV2616 | V0936105123 | 07. 14. 2016 |
| Capacitive Coupling Clamp | EMC TEST | HFK | 070925 | 07. 14. 2016 |

### 5.6.3 Test Environments

Ambient Temperatures : 15 ℃ ~ 35 ℃

Relative Humidity : 30 % R.H. ~ 60 % R.H.

Atmospheric Pressure : 86.0 kPa ~ 106.0 kPa

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### 5.6.4 Test Levels

| | |
|---|---|
| Open Circuit Output Test Voltage : | ■ Power Supply AC ; ±1 kV<br>□ Power Supply DC ; ± 0.5 kV<br>■ I/O Signal, Data and Control ports: 0.5 kV |
| Repetition Frequency of the Impulses : | 5 ㎑ |
| Polarity : | Positive and Negative |
| Rise Time of One Pulse : | 5 ㎱ ± 30 % |
| Impulse Duration : | 50 ㎱ ± 30 % |
| Burst Duration : | 15 ㎳ ± 20 % |
| Burst Period : | 300 ㎳ ± 20 % |
| Performance Criteria : | B |

### 5.6.5 Test Procedures

The E.U.T was connected to the test equipment, and monitored for performance. The test level was set and the test signal was applied for 200 seconds. A test signal of ± 0.5 kV, and ± 1 kV was Coupled to Line and Ground, Neutral and Ground, Line plus Neutral and Ground, and Protective Earth and Ground. When an error occurs, the test level is reduced until the error recovers and then increased until the threshold level is reached. This threshold and the error conditions were noted. This procedure was then repeated for the other coupling modes.

### 5.6.6 Test Results

According to the data in section 5.6.7, the E.U.T complied with the EN61000-4-4 standards, and detailed test results are found in the following test data.

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### 5.6.7 Test Data

Temperature: 19.3 ℃ Humidity: 53.7 % R.H. Test Date: 11. 18. 2015 Tested by: Kyeng Sun, Min

■ BNC, AUDIO IN Mode

On AC Power Supply

| No. | Test Point | Performance Criteria | Performance Results | | Remarks |
|---|---|---|---|---|---|
| | | | +Burst | -Burst | |
| 1 | L1 | B | A | A | - |
| 2 | L2 | B | A | A | - |
| 3 | PE | B | A | A | - |
| 4 | L1-L2 | B | A | A | - |
| 5 | L1-PE | B | A | A | - |
| 6 | L2-PE | B | A | A | - |
| 7 | L1-L2-PE | B | A | A | - |

On DC Power Supply

| No. | Test Point | Performance Criteria | Performance Results | | Remarks |
|---|---|---|---|---|---|
| | | | +Burst | -Burst | |
| 1 | - | B | - | - | - |
| 2 | - | B | - | - | - |
| 3 | - | B | - | - | - |

On I/O Signal, Data and Control ports

| No. | Test Point | Performance Criteria | Performance Results | | Remarks |
|---|---|---|---|---|---|
| | | | +Burst | -Burst | |
| 1 | BNC Port | B | A | A | - |

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■ HDMI Mode

On AC Power Supply

| No. | Test Point | Performance Criteria | Performance Results | | Remarks |
|---|---|---|---|---|---|
| | | | +Burst | -Burst | |
| 1 | L1 | B | A | A | - |
| 2 | L2 | B | A | A | - |
| 3 | PE | B | A | A | - |
| 4 | L1-L2 | B | A | A | - |
| 5 | L1-PE | B | A | A | - |
| 6 | L2-PE | B | A | A | - |
| 7 | L1-L2-PE | B | A | A | - |

On DC Power Supply

| No. | Test Point | Performance Criteria | Performance Results | | Remarks |
|---|---|---|---|---|---|
| | | | +Burst | -Burst | |
| 1 | - | B | - | - | - |
| 2 | - | B | - | - | - |
| 3 | - | B | - | - | - |

On I/O Signal, Data and Control ports

| No. | Test Point | Performance Criteria | Performance Results | | Remarks |
|---|---|---|---|---|---|
| | | | +Burst | -Burst | |
| 1 | - | B | - | - | - |

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■ D-SUB Mode

On AC Power Supply

| No. | Test Point | Performance Criteria | Performance Results | | Remarks |
|---|---|---|---|---|---|
| | | | +Burst | -Burst | |
| 1 | L1 | B | A | A | - |
| 2 | L2 | B | A | A | - |
| 3 | PE | B | A | A | - |
| 4 | L1-L2 | B | A | A | - |
| 5 | L1-PE | B | A | A | - |
| 6 | L2-PE | B | A | A | - |
| 7 | L1-L2-PE | B | A | A | - |

On DC Power Supply

| No. | Test Point | Performance Criteria | Performance Results | | Remarks |
|---|---|---|---|---|---|
| | | | +Burst | -Burst | |
| 1 | - | B | - | - | - |
| 2 | - | B | - | - | - |
| 3 | - | B | - | - | - |

On I/O Signal, Data and Control ports

| No. | Test Point | Performance Criteria | Performance Results | | Remarks |
|---|---|---|---|---|---|
| | | | +Burst | -Burst | |
| 1 | - | B | - | - | - |

Performance Results

A: Normal performance within the specification limits.

B: Temporary degradation or loss of function or performance which is self-recoverable.

C: Temporary degradation or loss of function or performance which requires operator intervention or system reset.

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## 5.7 Surge Immunity

### 5.7.1 Test Description

The E.U.T and all local support equipment was placed on a non-metallic support 0.8 m above a reference ground plane (RGP) and was put into operation according to the specified operating mode.

### 5.7.2 Test Equipments

| Description | Manufacturer | Model Number | Serial Number | Cal. Due |
|---|---|---|---|---|
| Ultra Compact Simulator | EM TEST | UCS 500 N5 | V0936105120 | 07. 14. 2016 |
| MotorVariac | EM TEST | MV2616 | V0936105123 | 07. 14. 2016 |

### 5.7.3 Test Environments

| | |
|---|---|
| Ambient Temperatures : | 15 ℃ ~ 35 ℃ |
| Relative Humidity : | 30 % R.H. ~ 60 % R.H. |
| Atmospheric Pressure : | 86.0 kPa ~ 106.0 kPa |

### 5.7.4 Test Levels

| | |
|---|---|
| ☐Open Circuit Test Voltage : | ■ AC Power; ± 1 kV line-to-line,<br>■ AC Power, ± 2 kV line-to-ground<br>☐ DC Power; ± 0,5 kV line-to-ground<br>☐ Data and Control Line; ± 1 kV line-to-ground |
| Open Circuit Voltage Waveform : | 1.2/50 microsecond |
| Short Circuit Current Waveform : | 8/20 microsecond |
| Number of Tests : | 5 positive and 5 negative |
| Repetition Rate : | 1/min |
| Performance Criteria : | B |

### 5.7.5 Test Procedures

The surges have to be applied line to line and line(s) and ground. In case of testing line to ground the test voltage has to be applied successively between each of the lines and ground, if there is no other specification. All lower levels including the selected test level must be satisfied. For testing the secondary protection the output voltage of the generator must be increased up to the worst case voltage break down level of the primary protection.

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The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

### 5.7.6 Test Results

According to the data in section 5.7.7, the E.U.T complied with the EN61000-4-5 standards, and detailed test results are found in the following test data.

### 5.7.7 Test Data

Temperature: 19.3 ℃ Humidity: 53.7 % R.H. Test Date: 11. 18. 2015 Tested by: Kyeng Sun, Min

■ BNC, AUDIO IN Mode

On AC Power Supply

| No. | Test Point | Performance Criteria | Performance Results | | Remarks |
|---|---|---|---|---|---|
| | | | +Surge | -Surge | |
| 1 | L1-L2 | B | A | A | - |
| 2 | L1-PE | B | A | A | - |
| 3 | L2-PE | B | A | A | - |

On I/O Signal, Data and Control ports

| No. | Test Point | Performance Criteria | Performance Results | | Remarks |
|---|---|---|---|---|---|
| | | | +Surge | -Surge | |
| 1 | - | B | - | - | - |

■ HDMI Mode

On AC Power Supply

| No. | Test Point | Performance Criteria | Performance Results | | Remarks |
|---|---|---|---|---|---|
| | | | +Surge | -Surge | |
| 1 | L1-L2 | B | A | A | - |
| 2 | L1-PE | B | A | A | - |
| 3 | L2-PE | B | A | A | - |

On I/O Signal, Data and Control ports

| No. | Test Point | Performance Criteria | Performance Results | | Remarks |
|---|---|---|---|---|---|
| | | | +Surge | -Surge | |
| 1 | - | B | - | - | - |

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## ■ D-SUB Mode

### On AC Power Supply

| No. | Test Point | Performance Criteria | Performance Results | | Remarks |
|---|---|---|---|---|---|
| | | | +Surge | -Surge | |
| 1 | L1-L2 | B | A | A | - |
| 2 | L1-PE | B | A | A | - |
| 3 | L2-PE | B | A | A | - |

### On I/O Signal, Data and Control ports

| No. | Test Point | Performance Criteria | Performance Results | | Remarks |
|---|---|---|---|---|---|
| | | | +Surge | -Surge | |
| 1 | - | B | - | - | - |

Performance Results

A: Normal performance within the specification limits.

B: Temporary degradation or loss of function or performance which is self-recoverable.

C: Temporary degradation or loss of function or performance which requires operator intervention or system reset.

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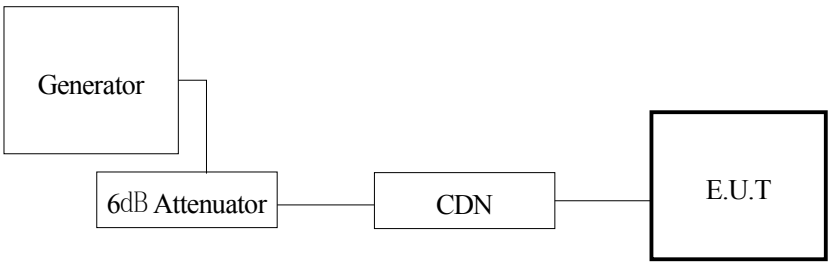
## 5.8 Radio-frequency continuous conducted Immunity

### 5.8.1 Test Description

The E.U.T and all local support equipment were placed on a non-metallic support 0.1 m above a reference ground plane (RGP) and was put into operation according to the specified operating mode.




### 5.8.2 Test Equipments

| Description | Manufacturer | Model Number | Serial Number | Cal. Due |
|---|---|---|---|---|
| Continuous Wave Generator | EM TEST | CWS 500 N1 | P1251106910 | 04. 01. 2016 |
| 6dB Attenuator | EM TEST | ATT6 | 1208-34 | 08. 13. 2016 |
| CDN | EM TEST | CDN-M2/M3N | 0909-06 | 08. 13. 2016 |
| EM Injection Clamp | EM TEST | EM 101 | 35943 | 02. 11. 2016 |

### 5.8.3 Test Environments

Ambient Temperatures : 15 ℃ ~ 35 ℃

Relative Humidity : 30 % R.H. ~ 60 % R.H.

Atmospheric Pressure : 86.0 kPa ~ 106.0 kPa

### 5.8.4 Test Levels

Frequency Range : 150 kHz to 80 MHz

Voltage Level : 3 V

Modulation : 80 % AM in depth by a 1 kHz sine wave

Frequency Step : 1 %

Performance Criteria : A

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### 5.8.5 Test Procedures

The test was performed with the test generator connected to each of the coupling and decoupling devices in turn while the other non-excited RF-input ports of the coupling devices are terminated by a 50-ohms load resistor. The frequency range is swept from 150 ㎑ to 80 ㎒, using the signal levels established during the setting process, and with the disturbance signal 80 % amplitude modulated with a 1㎑ sine wave, pausing to adjust the RF-signal level or to switch coupling device as necessary.

### 5.8.6 Test Results

According to the data in section 5.8.7, the E.U.T complied with the EN61000-4-6 standards, and detailed test results are found in the following test data.

### 5.8.7 Test Data

Temperature: 19.1 ℃ Humidity: 53.7 % R.H. Test Date: 11. 13. 2015 Tested by: Kyeng Sun, Min

■ BNC, AUDIO IN Mode

On AC Power Supply

| No. | Test Point | Performance | | Remarks |
|---|---|---|---|---|
| | | Criteria | Results | |
| 1 | CDN-M2/M3N | A | A | CDN-M3N |

On DC Power Supply

| No. | Test Point | Performance | | Remarks |
|---|---|---|---|---|
| | | Criteria | Results | |
| 1 | - | A | - | - |

On I/O Signal, Data and Control ports

| No. | Test Point | Performance | | Remarks |
|---|---|---|---|---|
| | | Criteria | Results | |
| 1 | BNC Port | A | A | - |

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■ HDMI Mode

On AC Power Supply

| No. | Test Point | Performance | | Remarks |
|---|---|---|---|---|
| | | Criteria | Results | |
| 1 | CDN-M2/M3N | A | A | CDN-M3N |

On DC Power Supply

| No. | Test Point | Performance | | Remarks |
|---|---|---|---|---|
| | | Criteria | Results | |
| 1 | - | A | - | - |

On I/O Signal, Data and Control ports

| No. | Test Point | Performance | | Remarks |
|---|---|---|---|---|
| | | Criteria | Results | |
| 1 | - | A | - | - |

■ D-SUB Mode

On AC Power Supply

| No. | Test Point | Performance | | Remarks |
|---|---|---|---|---|
| | | Criteria | Results | |
| 1 | CDN-M2/M3N | A | A | CDN-M3N |

On DC Power Supply

| No. | Test Point | Performance | | Remarks |
|---|---|---|---|---|
| | | Criteria | Results | |
| 1 | - | A | - | - |

On I/O Signal, Data and Control ports

| No. | Test Point | Performance | | Remarks |
|---|---|---|---|---|
| | | Criteria | Results | |
| 1 | - | A | - | - |

Performance Results

A: Normal performance within the specification limits.

B: Temporary degradation or loss of function or performance which is self-recoverable.

C: Temporary degradation or loss of function or performance which requires operator intervention or system reset.

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## 5.9 Power frequency magnetic field Immunity

### 5.9.1 Test Equipments

| Description | Manufacturer | Model Number | Serial Number | Cal. Due |
|---|---|---|---|---|
| Magnetic coil | EM TEST | MS100 | 0809-10 | 08. 13. 2016 |
| MotorVariac | EM TEST | MV2616 | V0936105123 | 07. 14. 2016 |
| Ultra Compact Simulator | EM TEST | UCS 500 N5 | V0936105120 | 07. 14. 2016 |
| Current Transformer | EM TEST | MC2630 | 0307-46 | 08. 13. 2016 |

### 5.9.2 Test Environments

Ambient Temperatures : 15 ℃ ~ 35 ℃

Relative Humidity : 30 % R.H. ~ 60 % R.H.

Atmospheric Pressure : 86.0 ㎪ ~ 106.0 ㎪

### 5.9.3 Test Levels

Test Level : 3 A/m

Test Frequency : 50 ㎐ , 60 ㎐

Dwell time : 1 minutes.

Test Axis : X, Y, and Z

### 5.9.4 Test Procedures

The E.U.T was set up according to the guidelines of EN 61000-4-8 for tabletop equipment. For tabletop equipment, a calibrated 1 square meter magnetic loop was used to test the E.U.T in its x, y, and z-axis. A current generator was used to provide power to the magnetic loop and generate the required magnetic field level. The E.U.T was centered in the loop and then monitored and evaluated for results.

For the tabletop or equipment larger than the loop, the “proximity method” of testing was adopted to accomplish the test. The loop was moved as close as possible to the

most probable susceptible areas of the E.U.T. The E.U.T was then monitored and evaluated for results.

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### 5.9.5 Test Results

According to the data in section 5.9.6, the E.U.T complied with the EN 61000-4-8 standards, and detailed test results are found in the following test data.

### 5.9.6 Test Data

Temperature: 20.4 ℃ Humidity: 52.8 % R.H. Test Date: 11. 17. 2015 Tested by: Kyeng Sun, Min

■ BNC, AUDIO IN Mode

| No. | Test Point | Performance Result | Remarks |
|---|---|---|---|
| 1 | X | A | 50 Hz , 60 Hz |
| 2 | Y | A | 50 Hz , 60 Hz |
| 3 | Z | A | 50 Hz , 60 Hz |

■ HDMI Mode

| No. | Test Point | Performance Result | Remarks |
|---|---|---|---|
| 1 | X | A | 50 Hz , 60 Hz |
| 2 | Y | A | 50 Hz , 60 Hz |
| 3 | Z | A | 50 Hz , 60 Hz |

■ D-SUB Mode

| No. | Test Point | Performance Result | Remarks |
|---|---|---|---|
| 1 | X | A | 50 Hz , 60 Hz |
| 2 | Y | A | 50 Hz , 60 Hz |
| 3 | Z | A | 50 Hz , 60 Hz |

Performance Results

A: Normal performance within the specification limits.

B: Temporary degradation or loss of function or performance which is self-recoverable.

C: Temporary degradation or loss of function or performance which requires operator intervention or system reset.

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## 5.10 Voltage Dips and Voltage Interruptions Immunity Measurements

### 5.10.1 Test Description

The E.U.T and all local support equipment was placed on a non-metallic support 0.8 m above a reference ground plane (RGP) and was put into operation according to the specified operating mode.

### 5.10.2 Test Equipments

| Description | Manufacturer | Model Number | Serial Number | Cal. Due |
|---|---|---|---|---|
| Ultra Compact Simulator | EM TEST | UCS 500 N5 | V0936105120 | 07. 14. 2016 |
| MotorVariac | EM TEST | MV2616 | V0936105123 | 07. 14. 2016 |

### 5.10.3 Test Environments

| | |
|---|---|
| Ambient Temperatures : | 15 ℃ ~ 35 ℃ |
| Relative Humidity : | 30 % R.H. ~ 60 % R.H. |
| Atmospheric Pressure : | 86.0 ㎪ ~ 106.0 ㎪ |

### 5.10.4 Test Levels

| | |
|---|---|
| Overshoot/Undershoot of Actual Voltage : | Less than ± 5 % of the change in voltage |
| Voltage Rise and Fall Time : | Between 1 and 5 microseconds |
| Test Voltage / Test Frequency : | 230 Ⅴ(ac) / 50 ㎐ |
| Frequency Deviation of Test Voltage : | Less than ± 2 % of rated frequency |
| Number of Tests : | 3 times |
| Test Intervals : | 10 sec |
| Performance Criteria : | B for Voltage Dips( >95 %, 0,5 T)<br>C for Voltage Dips( 30 %, 25 T)<br>C for Voltage Interruptions(>95 %, 250 T) |

### 5.10.5 Test Procedures

For each test any degradation of performance were recorded. The monitoring equipment should be capable of displaying the status of the operational mode of the E.U.T during and after the tests. After each group of tests a full functional check were performed.

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### 5.10.6 Test Results

According to the data in section 5.10,7, the E.U.T complied with the EN61000-4-11 standards, and detailed test results are found in the following test data.

### 5.10.7 Test Data

Temperature: 19.3 ℃ Humidity: 53.7 % R.H. Test Date: 11. 18. 2015 Tested by: Kyeng Sun, Min

■ BNC, AUDIO IN Mode

Voltage Dips

| No. | Depth | Duration | Performance | | Remarks |
|---|---|---|---|---|---|
| | | | Criteria | Results | |
| 1 | > 95 % | 0.5 T | B | A | - |
| 2 | 30 % | 25 T | C | A | - |

Short Interruptions

| No. | Depth | Duration | Performance | | Remarks |
|---|---|---|---|---|---|
| | | | Criteria | Results | |
| 1 | > 95 % | 250 T | C | B | - |

■ HDMI Mode

Voltage Dips

| No. | Depth | Duration | Performance | | Remarks |
|---|---|---|---|---|---|
| | | | Criteria | Results | |
| 1 | > 95 % | 0.5 T | B | A | - |
| 2 | 30 % | 25 T | C | A | - |

Short Interruptions

| No. | Depth | Duration | Performance | | Remarks |
|---|---|---|---|---|---|
| | | | Criteria | Results | |
| 1 | > 95 % | 250 T | C | B | - |

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## ■ D-SUB Mode

### Voltage Dips

| No. | Depth | Duration | Performance | | Remarks |
|---|---|---|---|---|---|
| | | | Criteria | Results | |
| 1 | > 95 % | 0.5 T | B | A | - |
| 2 | 30 % | 25 T | C | A | - |

### Short Interruptions

| No. | Depth | Duration | Performance | | Remarks |
|---|---|---|---|---|---|
| | | | Criteria | Results | |
| 1 | > 95 % | 250 T | C | B | - |

Performance Results

A: Normal performance within the specification limits.

B: Temporary degradation or loss of function or performance which is self-recoverable.

C: Temporary degradation or loss of function or performance which requires operator intervention or system reset.

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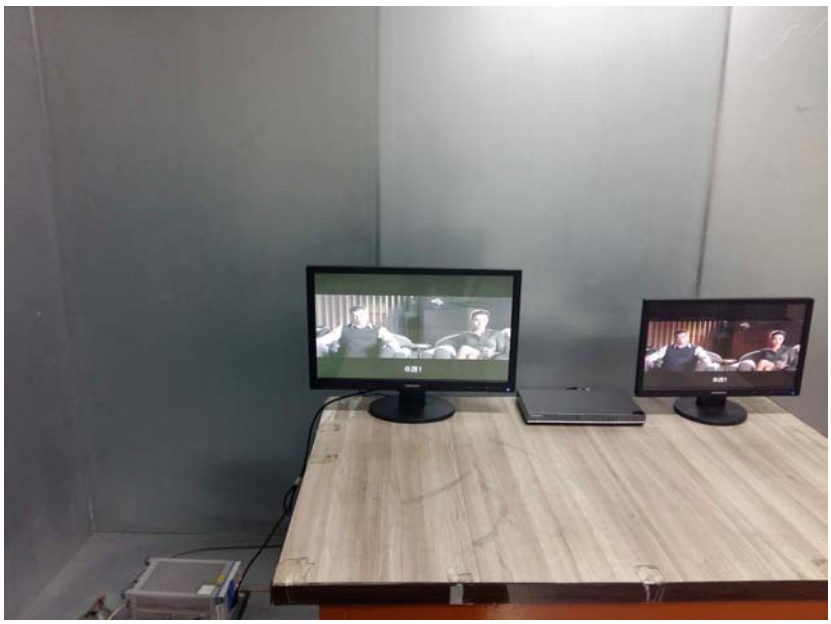
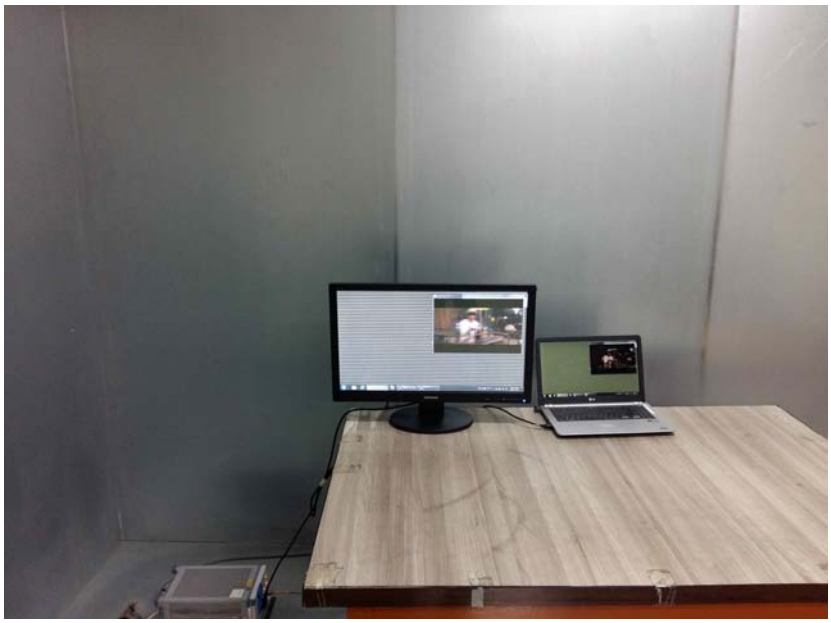
# 6. Test Setup Photographs

## 6.1 Conducted Emission

■ BNC, AUDIO IN Mode



■ HDMI Mode



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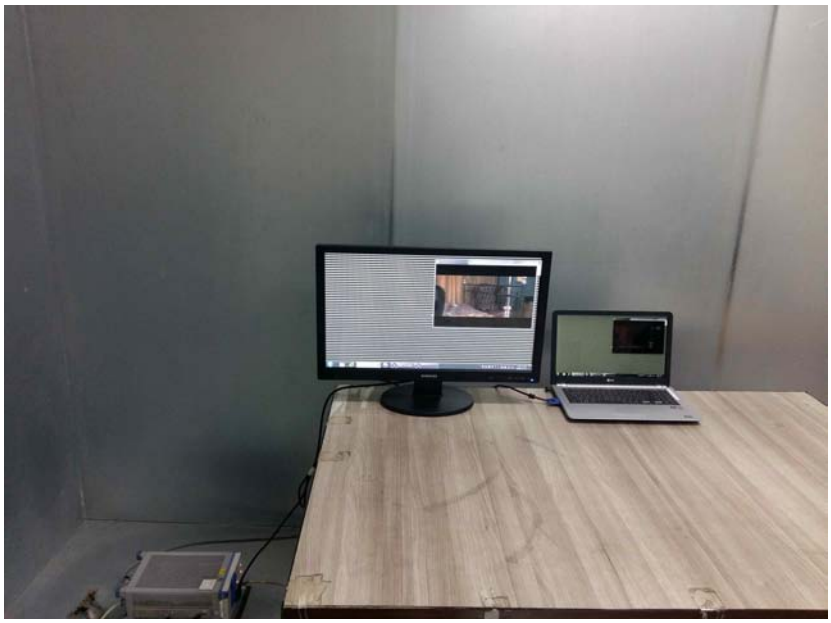
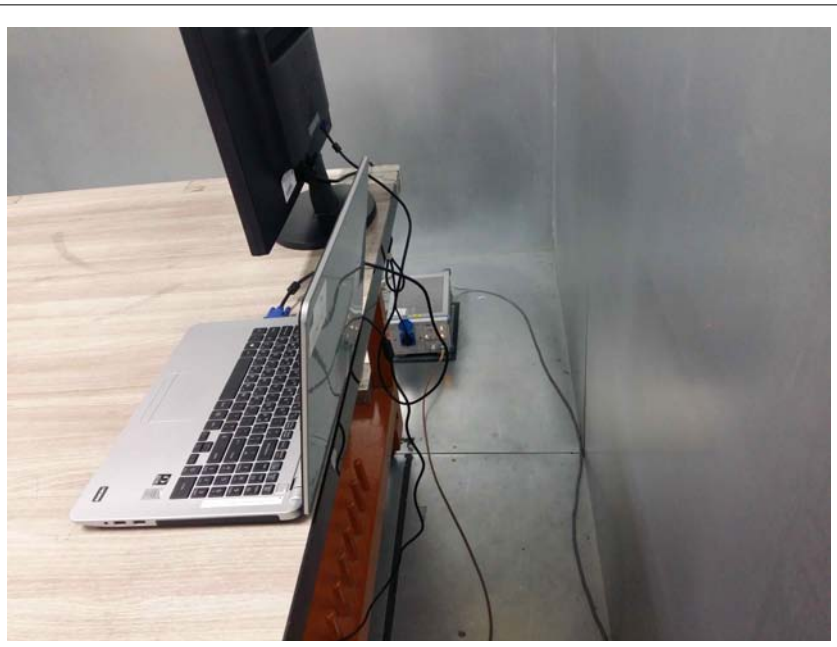
■ D-SUB Mode





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## - Telecommunication Emission

N/A

N/A

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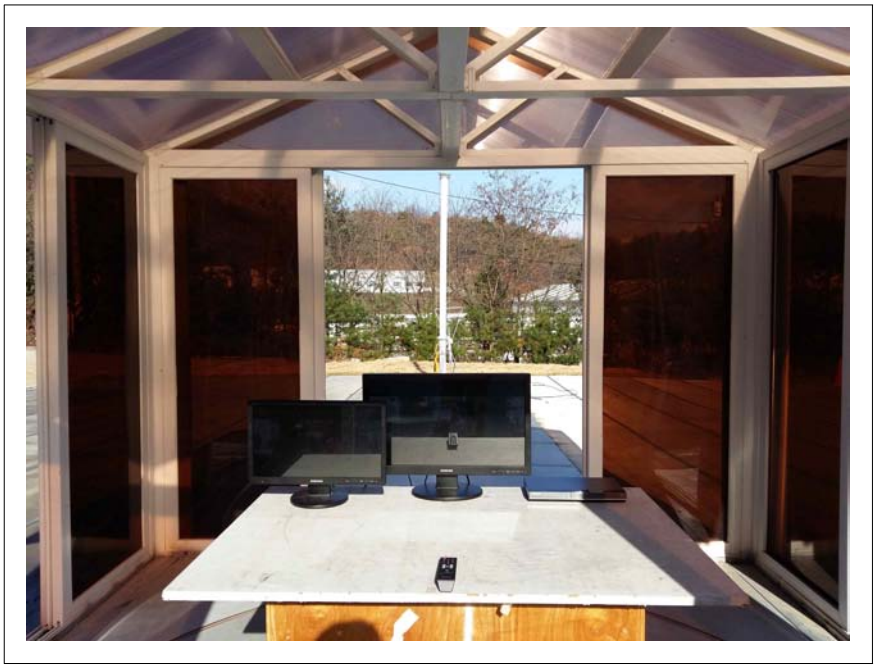
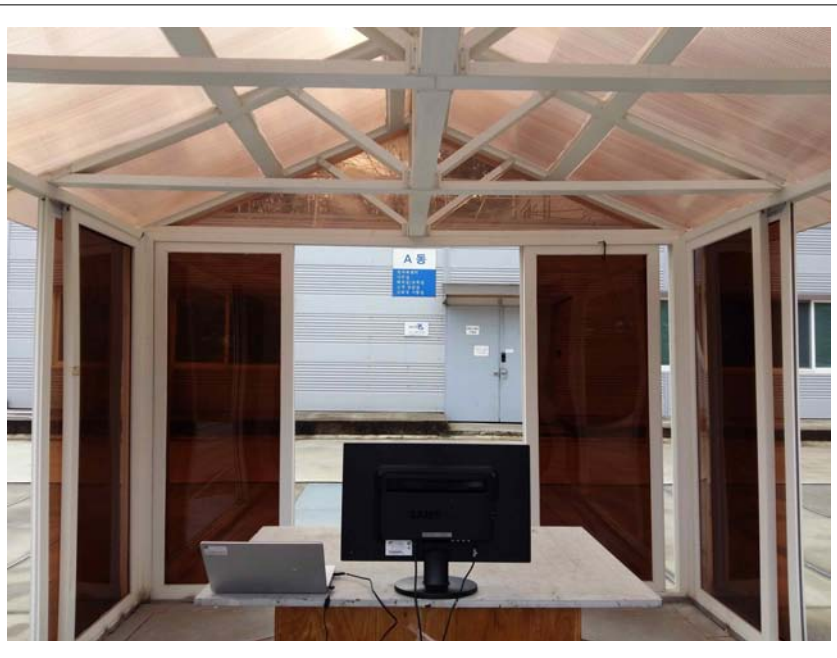
## 6.2 Radiated Emission

*** Below 1 GHz**

■ BNC, AUDIO IN Mode



■ HDMI Mode



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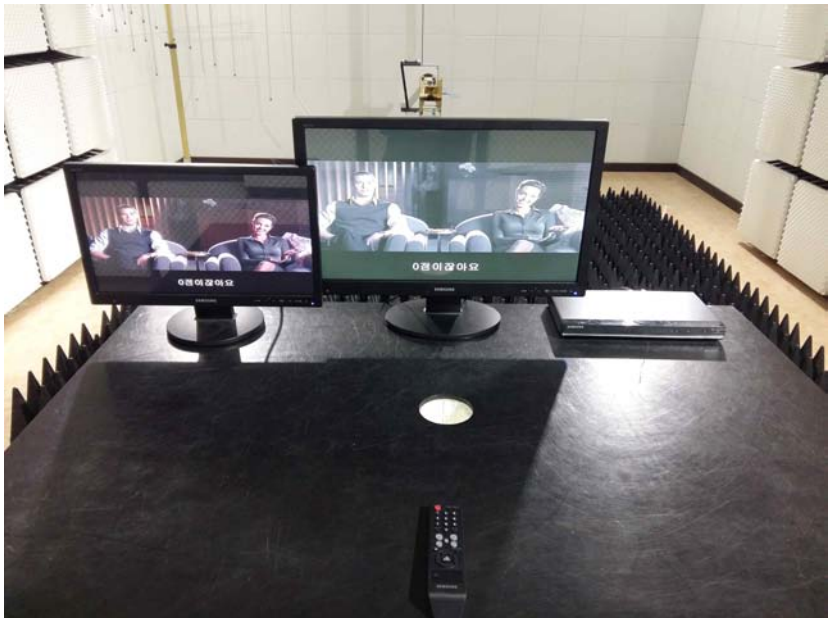
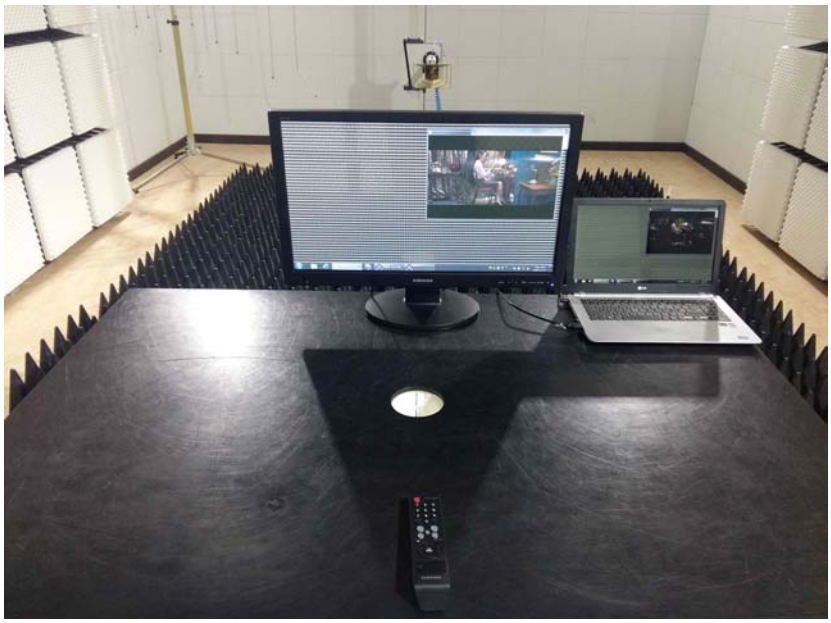
■ D-SUB Mode

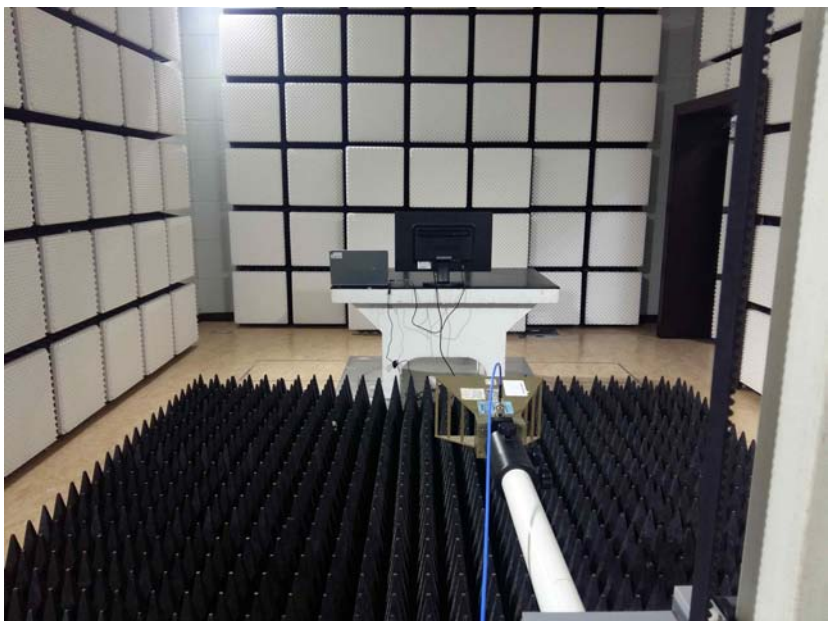
*** Above 1 GHz**

■ BNC, AUDIO IN Mode



■ HDMI Mode





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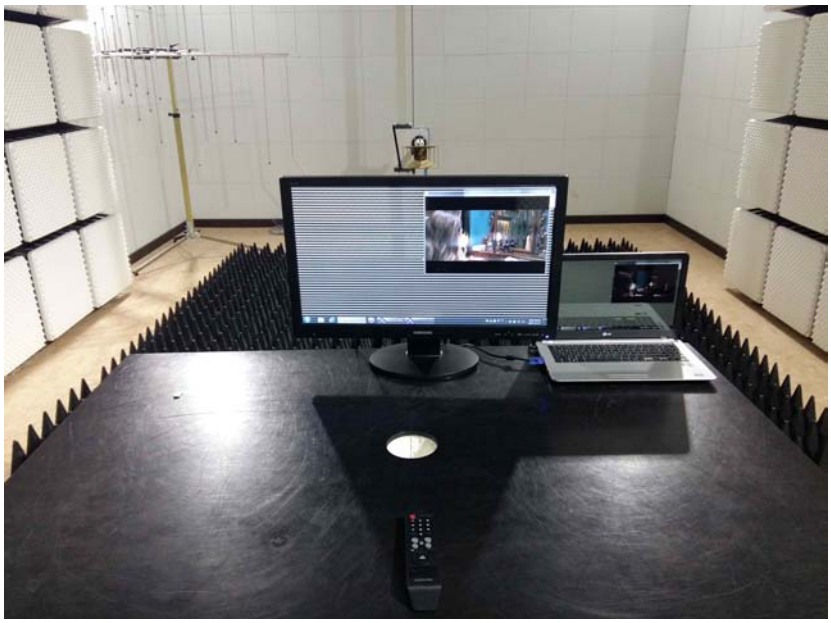
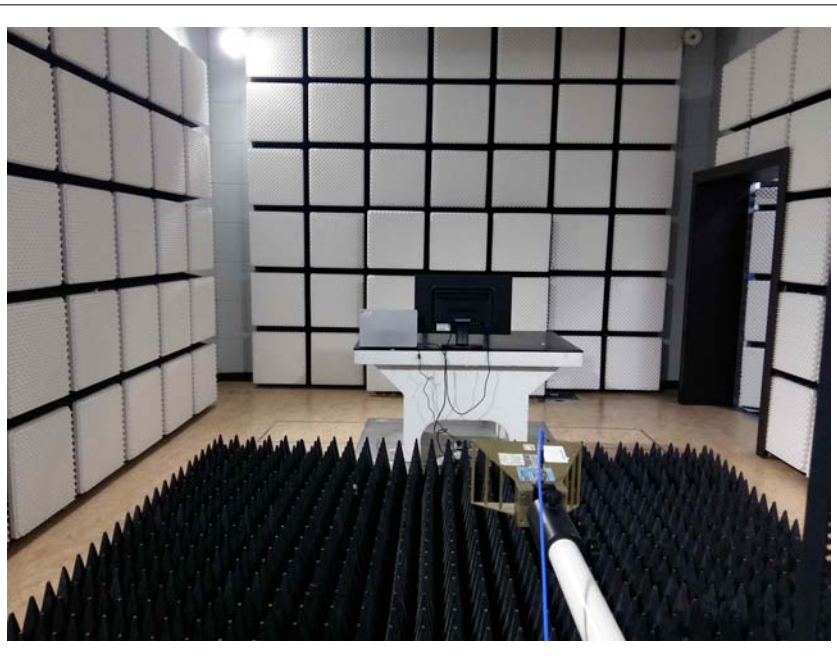
■ D-SUB Mode





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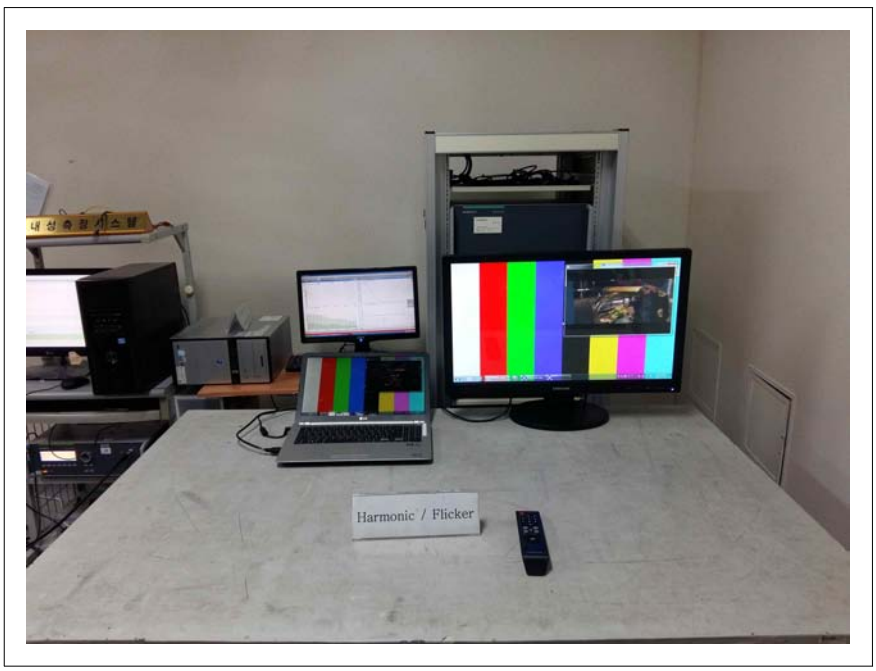
## 6.3 Harmonics / Voltage Fluctuations

■ BNC, AUDIO IN Mode

■ HDMI Mode

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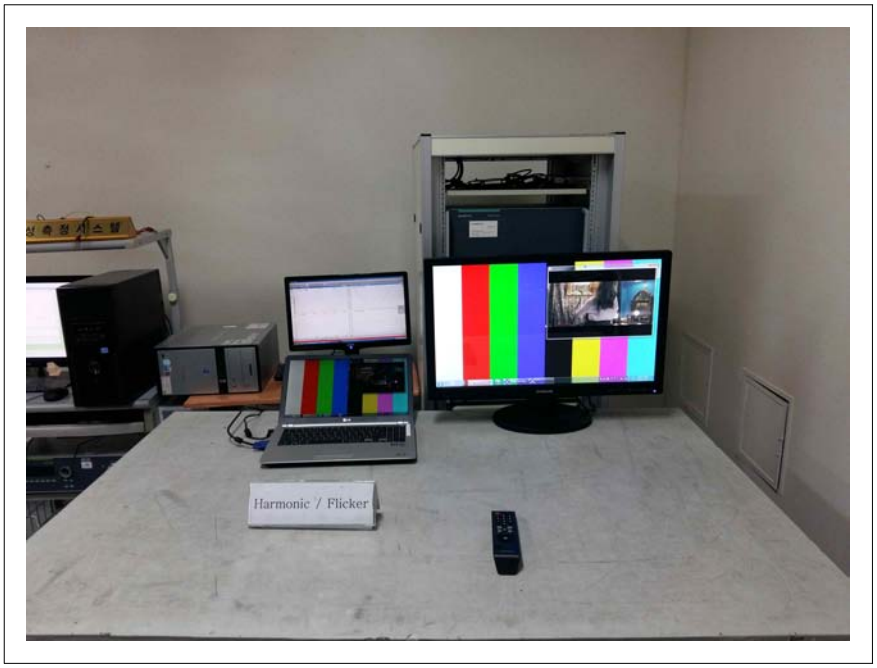
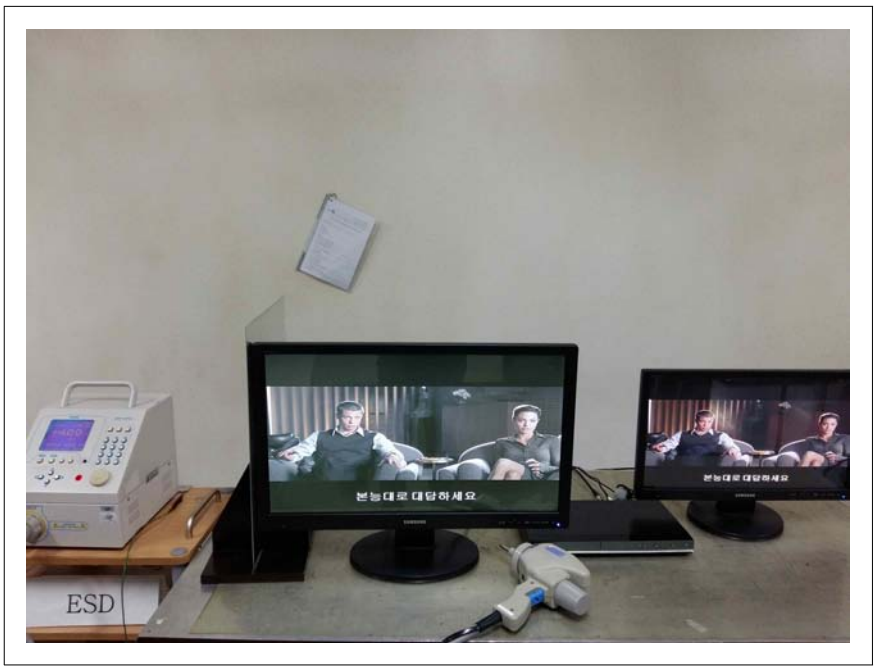
■ D-SUB Mode



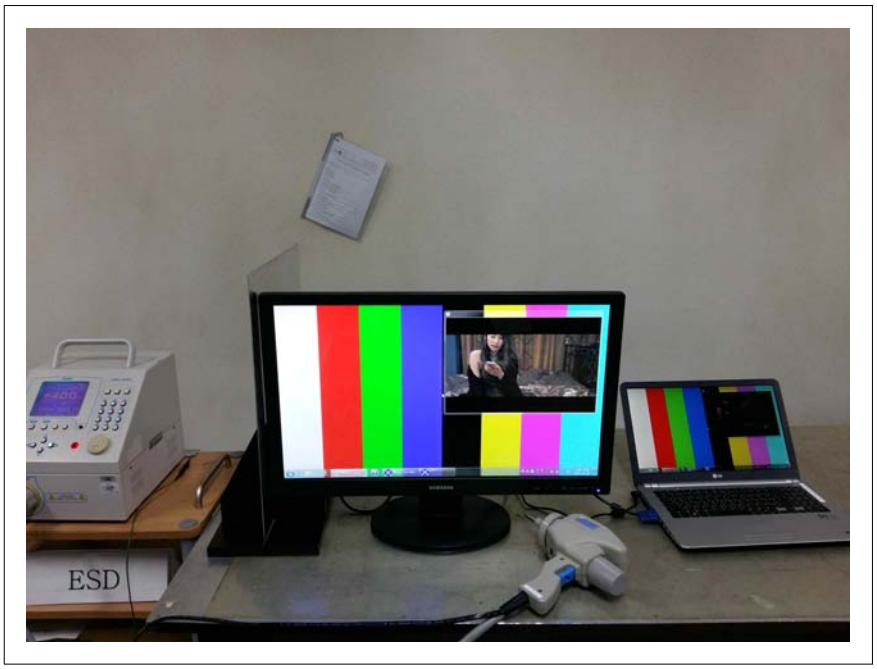

## 6.4 Electrostatic Discharge Immunity

■ BNC, AUDIO IN Mode



■ HDMI Mode

■ D-SUB Mode

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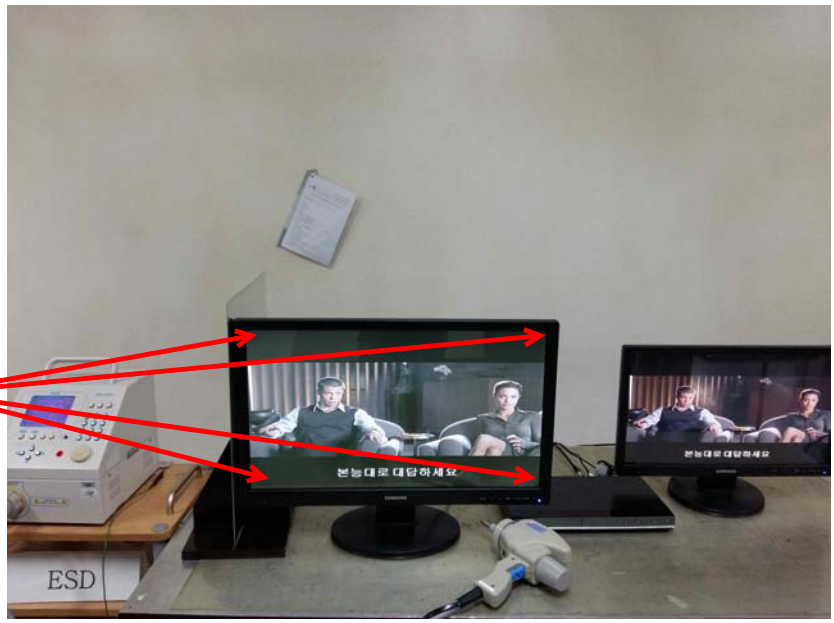
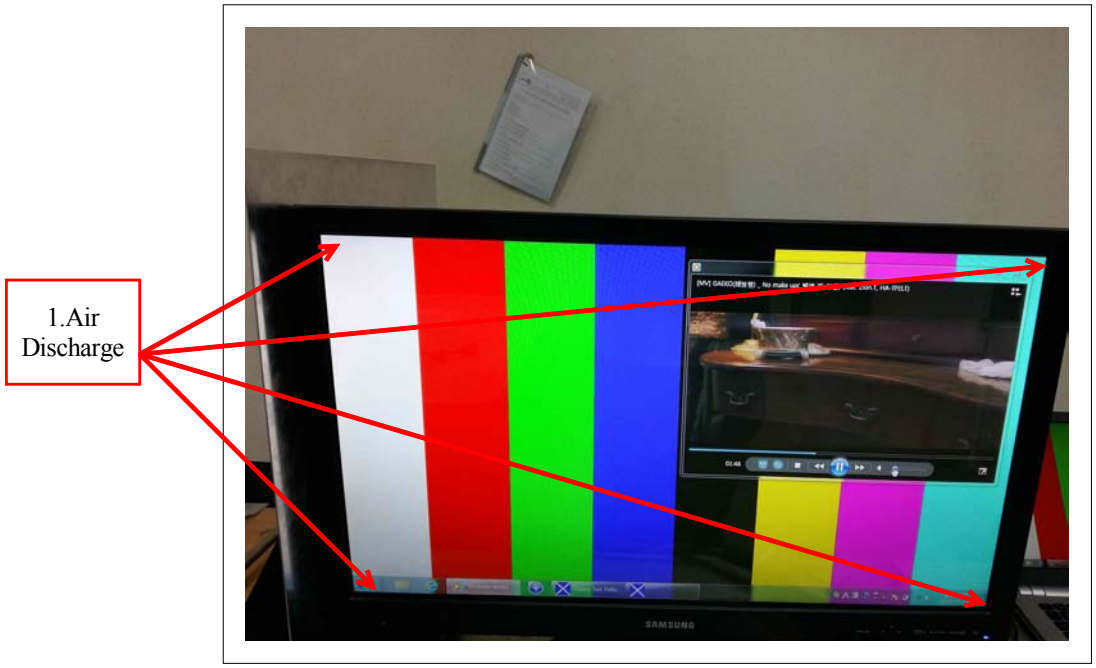
■ BNC, AUDIO IN Mode

1.Air Discharge



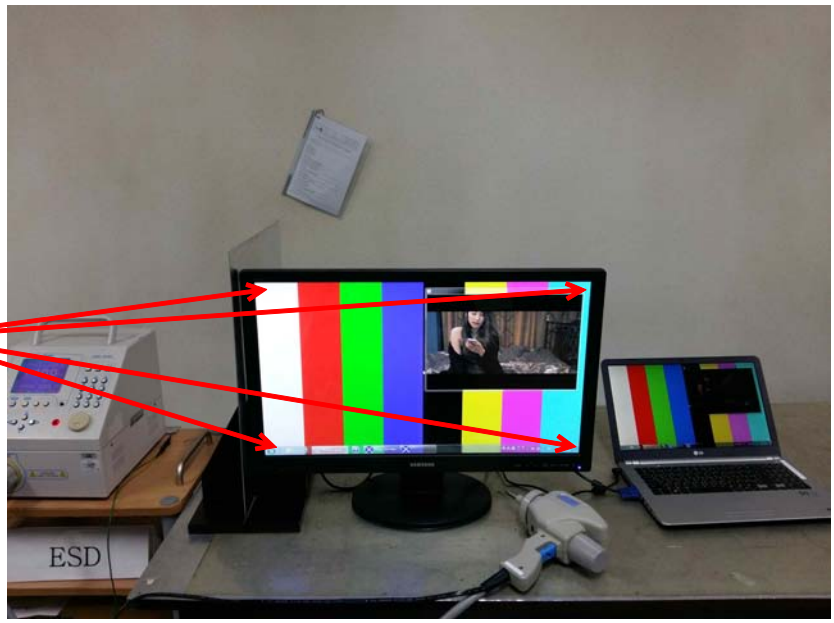

2.Contact Discharge

■ HDMI Mode



■ D-SUB Mode

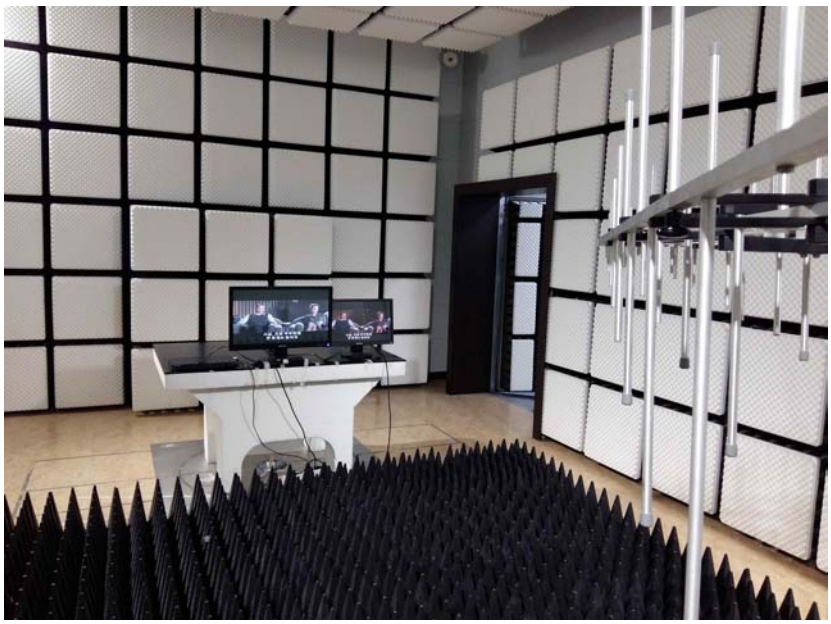
1.Air Discharge



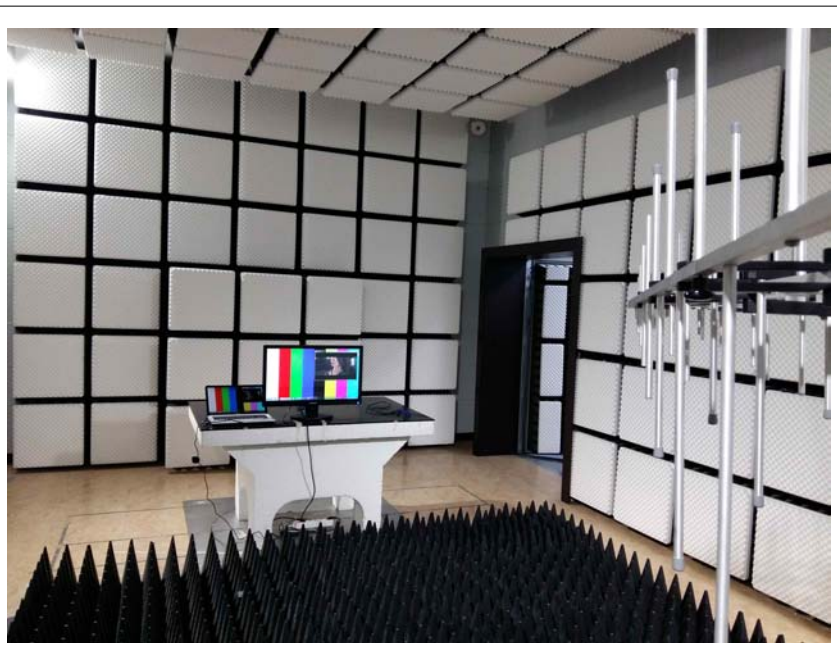

2.Contact Discharge

## 6.5 Radio frequency electromagnetic field immunity

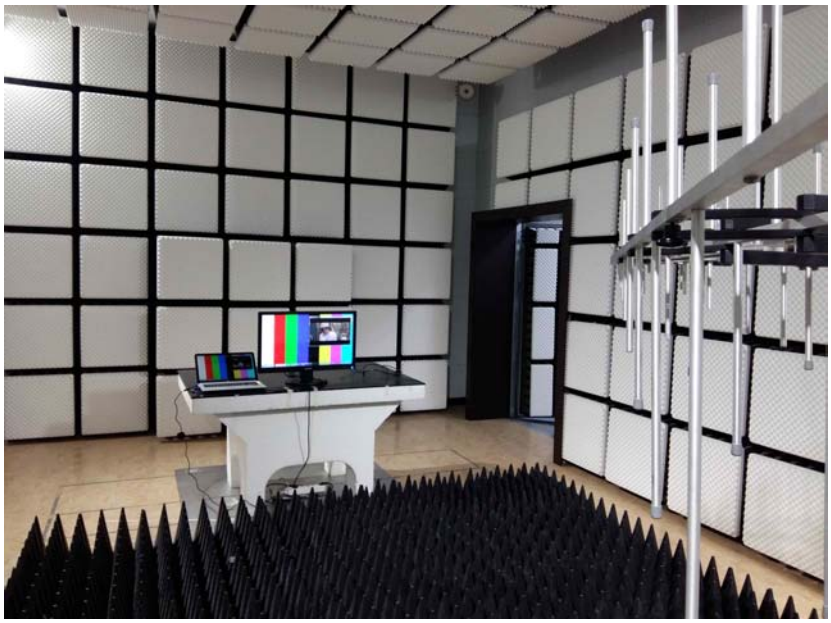
■ BNC, AUDIO IN Mode



■ HDMI Mode



■ D-SUB Mode



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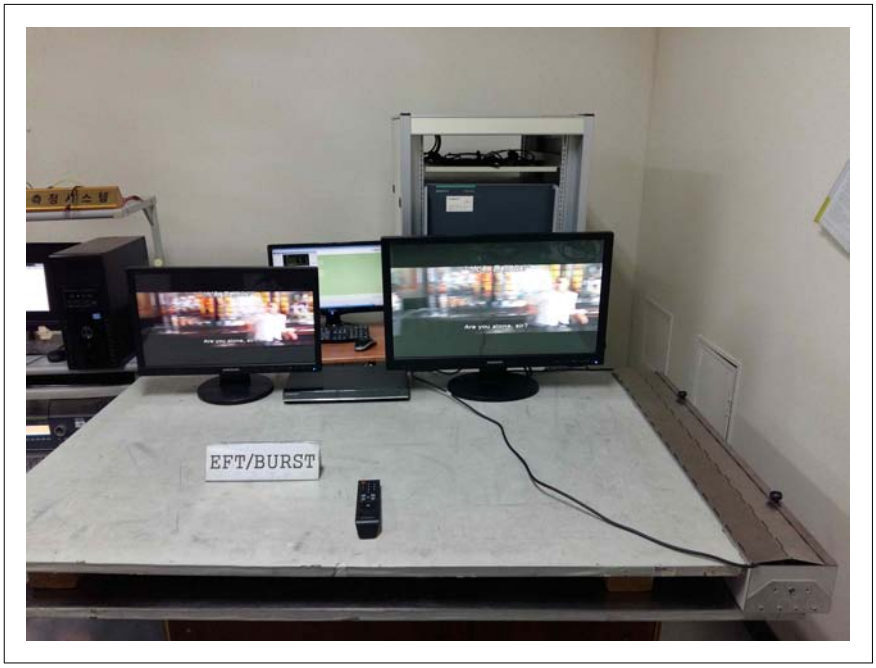
## 6.6 Fast Transient Immunity

■ BNC, AUDIO IN Mode



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■ HDMI Mode

■ D-SUB Mode

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## 6.7 Surge Immunity

■ BNC, AUDIO IN Mode

■ HDMI Mode

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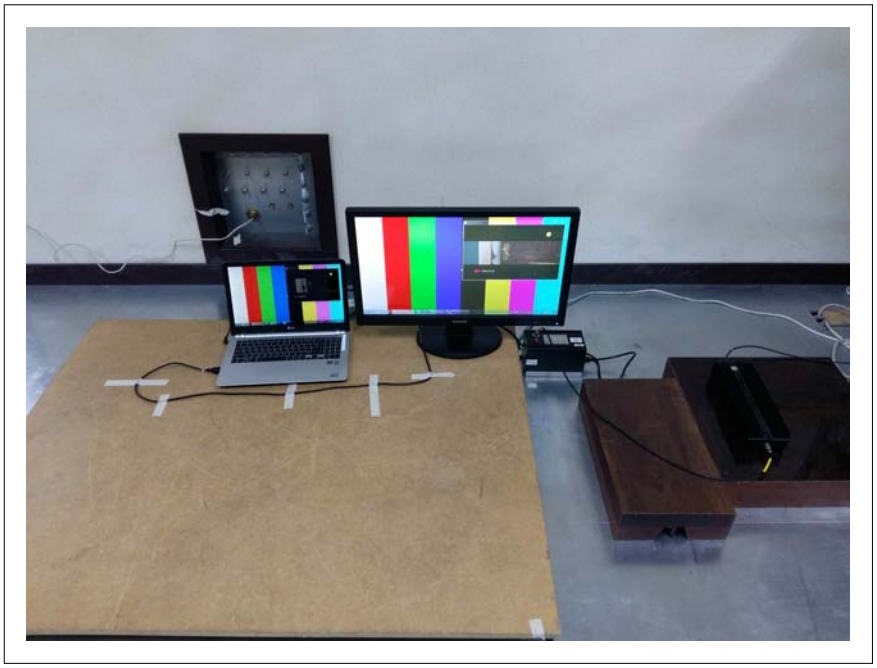
## 6.8 Radio-frequency continuous conducted Immunity

■ BNC, AUDIO IN Mode

■ HDMI Mode



■ D-SUB Mode

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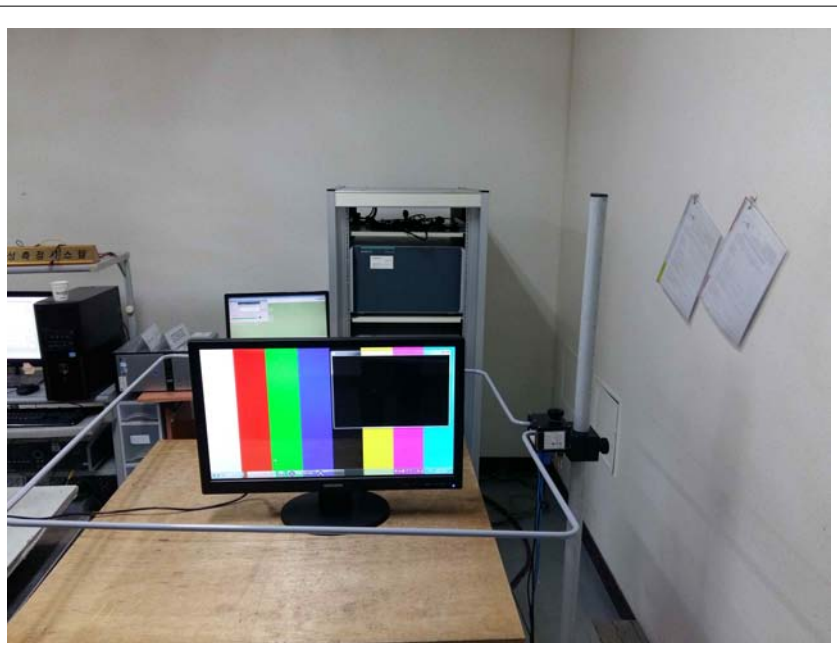
## 6.9 Power-frequency magnetic field Immunity

■ BNC, AUDIO IN Mode

■ HDMI Mode



■ D-SUB Mode

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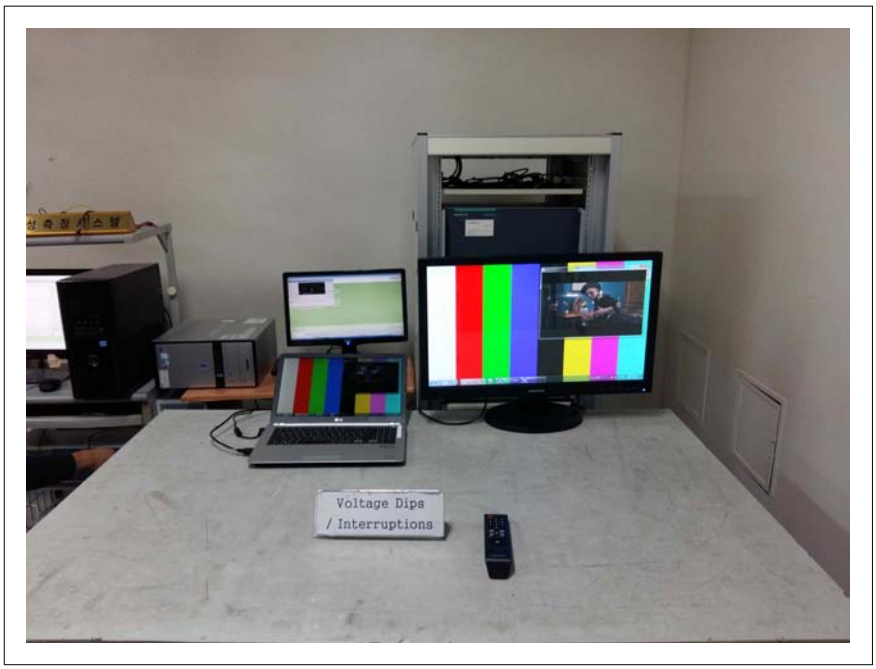
## 6.10 Voltage Dips and Voltage Interruptions Immunity

■ BNC, AUDIO IN Mode

■ HDMI Mode

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■ D-SUB Mode

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# 7. External Photographs

[ FRONT VIEW]

[ REAR VIEW]

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**LCD MONITOR**

Model No : SMT-2731

Manufacturer : Weihai Daewoo Electronics Co.,Ltd.

Made in of Chnia

[LABEL VIEW]

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# 8. Internal Photographs

[INTERNAL VIEW]

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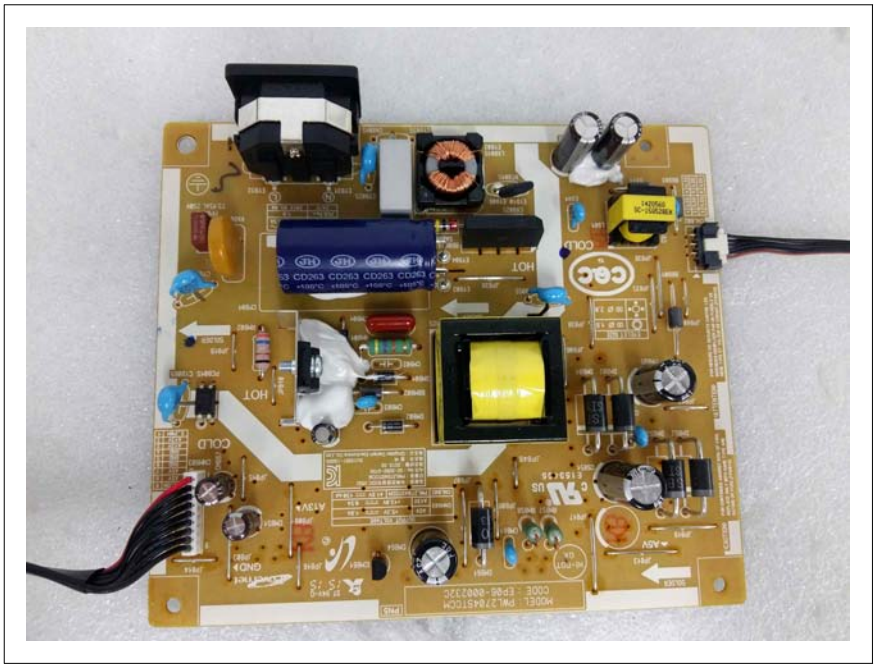
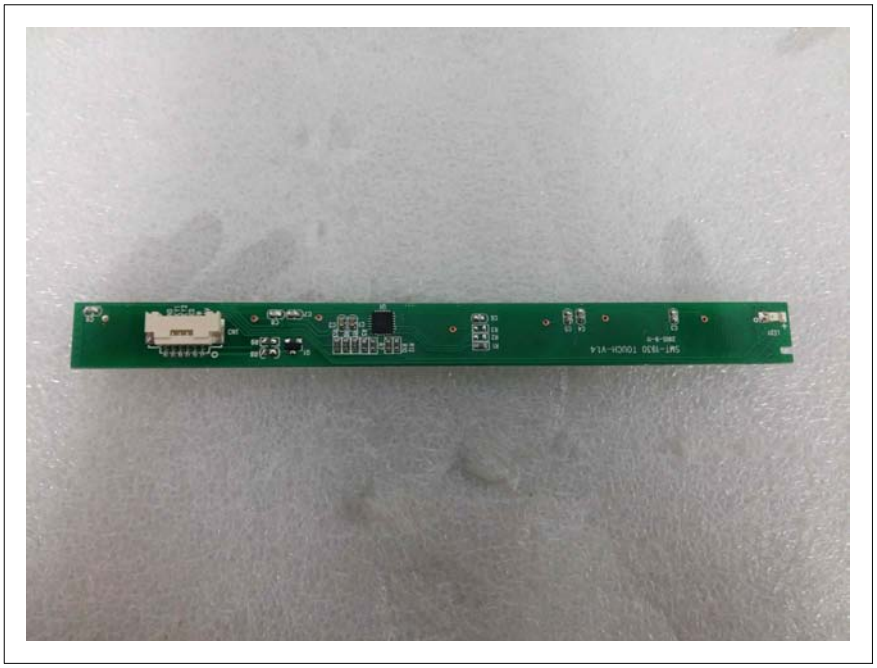
○ Power Board



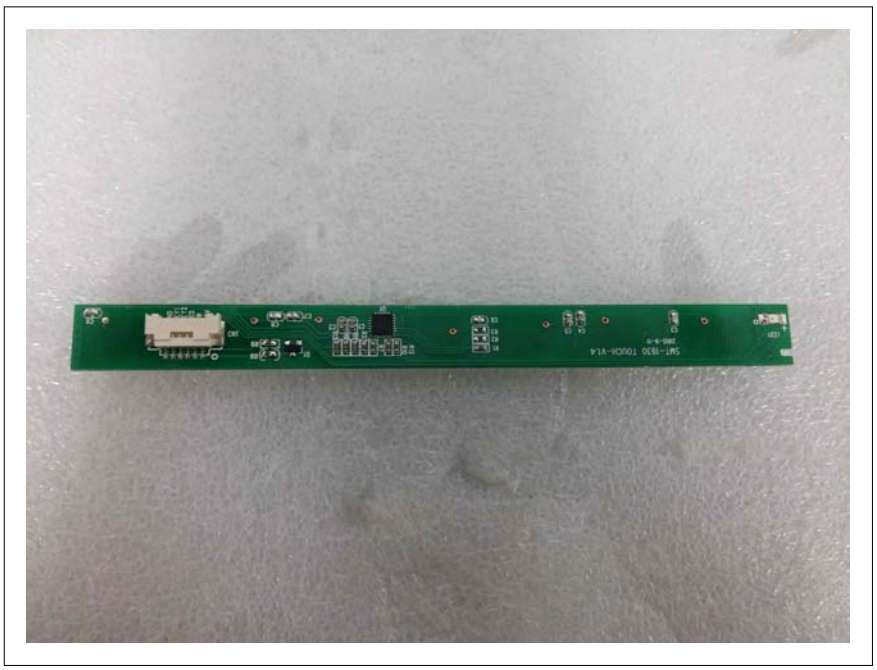
[TOP VIEW]

[BOTTOM VIEW]

○ Panel Board 1



[TOP VIEW]



[BOTTOM VIEW]

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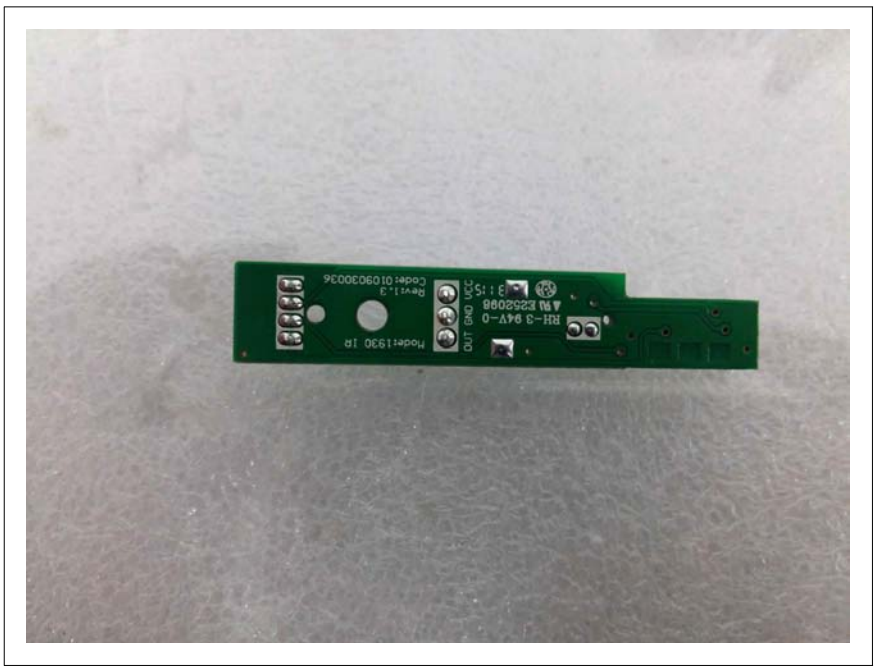
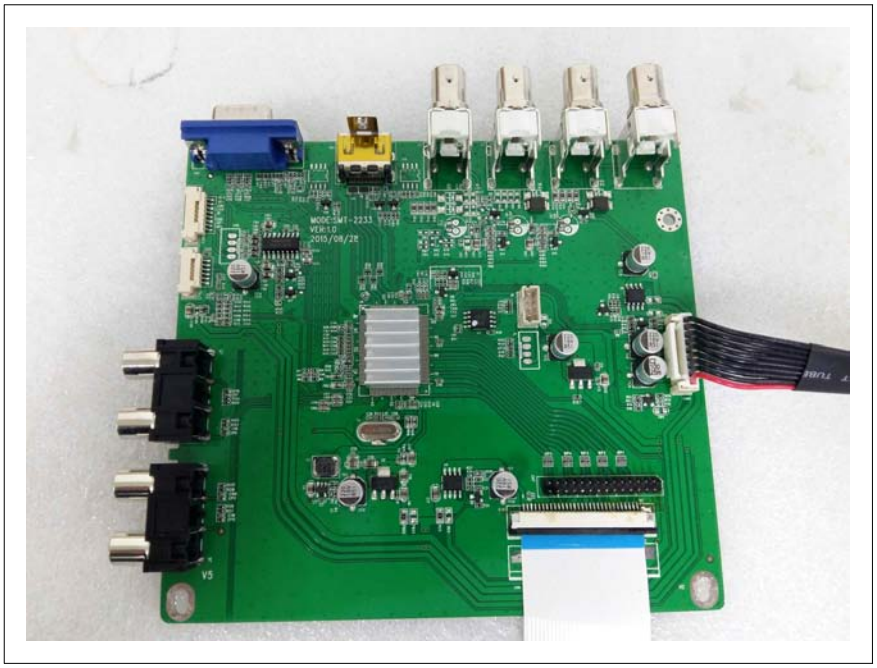
○ Panel Board 2

[TOP VIEW]

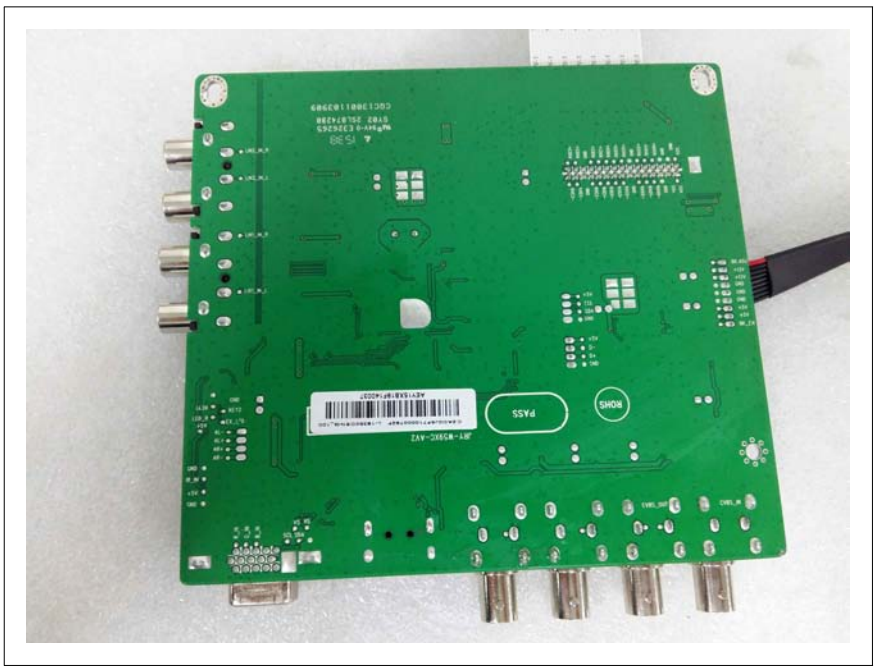


[BOTTOM VIEW]

○ Port Board



[TOP VIEW]



[BOTTOM VIEW]

○ LCD Panel

[TOP VIEW]

[BOTTOM VIEW]

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# Appendix A - Schematics/Block Diagram

Please see attached document(s).

## Appendix B - User's Manual

Please see attached document(s).

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