



# EMC TEST REPORT

Authorized under **Declaration of Conformity**

According to

|                             |                                      |
|-----------------------------|--------------------------------------|
| EN 55022: 2010/AC:2011      | EN 55024 : 2010                      |
| EN 61000-6-3: 2007/A1:2011  | EN 50130-4: 2011                     |
| EN 61000-3-2: 2006+A2: 2009 | IEC 61000-4-2 : 2008                 |
| EN 61000-3-3 : 2008         | IEC 61000-4-3 : 2006+A1:2007+A2:2010 |
|                             | IEC 61000-4-4 : 2012                 |
|                             | IEC 61000-4-5 : 2005                 |
|                             | IEC 61000-4-6 : 2008                 |
|                             | IEC 61000-4-8 : 2009                 |
|                             | IEC 61000-4-11 : 2004                |

Applicant : Zhejiang Dahua Vision Technology Co., Ltd.

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Address : The 1<sup>st</sup> floor, building F, No.1199 Bin'an road, Changhe Street, Binjiang District, Hangzhou, P.R. China.

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Equipment : HDCVI Digital Video Recorder

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Model No. : HCVR7816S,DHI-HCVR7816S,DH-HCVR7816S

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- The test result refers exclusively to the test presented test model / sample.
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- The test report must not be used by the clients to claim product certification approval by **NVLAP** or any agency of the Government.



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## History of this test report

☒ ORIGINAL.

☐ Additional attachment as following record:

| Attachment No. | Date | Description |
|----------------|------|-------------|
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## CERTIFICATE OF COMPLIANCE

According to

EN 55022: 2010/AC:2011

EN 61000-6-3: 2007/A1:2011

EN 61000-3-2: 2006+A2: 2009

EN 61000-3-3 : 2008

EN 55024 : 2010

EN 50130-4: 2011

IEC 61000-4-2 : 2008

IEC 61000-4-3 : 2006+A1:2007+A2:2010

IEC 61000-4-4 : 2012

IEC 61000-4-5 : 2005

IEC 61000-4-6 : 2008

IEC 61000-4-8 : 2009

IEC 61000-4-11 : 2004

Applicant : Zhejiang Dahua Vision Technology Co., Ltd.

Address : The 1<sup>st</sup> floor, building F, No.1199 Bin'an road, Changhe  
Street, Binjiang District, Hangzhou, P.R. China.

Equipment : HDCVI Digital Video Recorder

Model No. : HCVR7816S,DHI-HCVR7816S,DH-HCVR7816S

### I HEREBY CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **EUROPEAN COUNCIL DIRECTIVE 2004/108/EC**.

The test was carried out on May 16, 2014 at **Cerpass Technology(Suzhou) Corp.**

Signature

Miro Chueh/ Technical director



## 1. Summary of Test Procedure and Test Results

| EMISSION(EN 55022: 2010/AC:2011 / EN 61000-6-3: 2007/A1:2011) |                                                       |             |
|---------------------------------------------------------------|-------------------------------------------------------|-------------|
| Test Item                                                     | Normative References                                  | Test Result |
| Conducted Emission                                            | EN 55022 : 2010/AC:2011<br>EN 61000-6-3: 2007/A1:2011 | PASS        |
| Radiated Emission                                             | EN 55022 : 2010/AC:2011<br>EN 61000-6-3: 2007/A1:2011 | PASS        |
| Harmonics                                                     | EN 61000-3-2: 2006+A2: 2009                           | PASS        |
| Voltage Fluctuations                                          | EN 61000-3-3: 2008                                    | PASS        |

| IMMUNITY (EN 55024 : 2010)                                |                                                                                                                        |             |
|-----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|-------------|
| Test Item                                                 | Test Spec                                                                                                              | Test Result |
| Electrostatic Discharge Immunity Test (ESD)               | $\pm 4$ kV (contact discharge, HCP/VCP)<br>$\pm 8$ kV (Air discharge)                                                  | PASS        |
| Radio Frequency electromagnetic field immunity test (RS)  | 80-1000 MHz, 3V/m, 80%AM(1KHz)                                                                                         | PASS        |
| Electrical Fast Transient/ Burst Immunity Test (EFT)      | AC Port: $\pm 1$ kV, Signal Port: $\pm 0.5$ kV                                                                         | PASS        |
| Surge Immunity Test                                       | AC Power Ports: Line to Line: $\pm 1$ kV<br>Line to earth: $\pm 2$ kV<br>Signal and telecommunication port: $\pm 1$ kV | PASS        |
| Conduction Disturbances induced by Radio-Frequency Fields | 0.15-80MHz, 3V, 80%AM(1KHz)                                                                                            | PASS        |
| Power Frequency Magnetic Field Immunity Test              | 50Hz, 1A/m                                                                                                             | PASS        |
| Voltage Dips and Voltage Interruptions Immunity Test      | Voltage dips:<br>>95% Reduction, 0.5 Durations (Cycle)                                                                 | PASS        |
|                                                           | 30% Reduction, 25 Durations (Cycle)                                                                                    | PASS        |
|                                                           | Voltage interruptions:<br>>95% Reduction, 250 Durations (Cycle)                                                        | PASS        |



| IMMUNITY (EN 50130-4: 2011)                               |                                                                                                                                                |             |
|-----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Test Item                                                 | Test Spec                                                                                                                                      | Test Result |
| Electrostatic Discharge Immunity Test (ESD)               | $\pm 6$ kV (contact discharge ,HCP/VCP)<br>$\pm 8$ kV (Air discharge)                                                                          | PASS        |
| Radio Frequency electromagnetic field immunity test (RS)  | 80-2700 MHz, 10V/m, 80%AM(1KHz)                                                                                                                | PASS        |
| Electrical Fast Transient/ Burst Immunity Test (EFT)      | AC Port: $\pm 2.0$ kV, Signal Port: $\pm 1.0$ kV                                                                                               | PASS        |
| Surge Immunity Test                                       | AC Power Ports: line to line: $\pm 0.5$ , $\pm 1$ kV<br>line to earth: $\pm 0.5$ , $\pm 1$ , $\pm 2$ kV<br>Signal Port: $\pm 0.5$ , $\pm 1$ kV | PASS        |
| Conduction Disturbances induced by Radio-Frequency Fields | 0.15-100MHz, 10V, 80%AM(1KHz)                                                                                                                  | PASS        |
| Voltage Dips and Voltage Interruptions Immunity Test      | Voltage Interruptions:<br>100% Reduction, 250 Cycle                                                                                            | PASS        |
|                                                           | Voltage Dips:<br>60% Reduction, 10 Cycle<br>30% Reduction, 25 Cycle<br>20% Reduction, 250 Cycle                                                | PASS        |

## 2. Immunity Testing Performance Criteria Definition

- A. Normal performance within limits specified by the manufacture, requestor or purchaser;
- B. Temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the equipment under test recovers its normal performance, without operator intervention;
- C. Temporary loss of function or degradation of performance, the correction of which requires operation intervention;
- D. Loss of function or degradation of performance which is not recoverable, owing to damage to hardware or software, or loss of data.



### 3. Test Configuration of Equipment under Test

#### 3.1. Manufacturer

Zhejiang Dahua Vision Technology Co., Ltd.

The 1<sup>st</sup> floor, building F, No.1199 Bin'an road, Changhe Street, Binjiang District, Hangzhou, P.R. China.

#### 3.2. Feature of Equipment under Test

|                                    |                                                                                                 |                                      |
|------------------------------------|-------------------------------------------------------------------------------------------------|--------------------------------------|
| HDCVI<br>Digital Video<br>Recorder | Model No.:                                                                                      | HCVR7816S,DHI-HCVR7816S,DH-HCVR7816S |
| Remark                             | <b>HCVR7816S</b> was selected as the test model and its data have been recorded in this report. |                                      |

Models' Differences:

| Model No      | Differences                                                                      |
|---------------|----------------------------------------------------------------------------------|
| HCVR7816S     | Software and hardware are same,the differences are label and front panel's logo. |
| DHI-HCVR7816S |                                                                                  |
| HCVR7816S     | The difference between with "DH" and without "DH" is different sale areas.       |
| DH-HCVR7816S  |                                                                                  |

#### 3.3. Test Software and Test Mode

##### Test Manner

- During testing, the interface cables and equipment positions were varied according to Europe Standard.
- Turn on the power of all equipment.
- The complete test system included LCD Monitor, DVD, HDD, HDCVI Camera, iPod Mouse, Video Distributor, Monitor, Notebook PC and EUT for EMC test.

##### The pre-test modes

Test Mode 1: Normal Operation

##### Select the worst case of the pre-test modes as the final test mode

Test Mode 1: Normal Operation



**3.4. Description of Support Unit**

| No | Device            | Manufacturer | Model No.        | Description                       |
|----|-------------------|--------------|------------------|-----------------------------------|
| 1  | LCD Monitor       | DELL         | U2713HMT         | Non-Shielded,1.8m                 |
| 2  | LCD Monitor       | DELL         | SE198WFPf        | Non-Shielded,1.8m<br>(R43346)     |
| 3  | LCD Monitor       | Lenovo       | L2364wA          | Non-Shielded,1.8m<br>(R33B65)     |
| 4  | DVD               | Pioneer      | DV-600AV-S       | Non-Shielded,1.5m<br>(R31271-ETC) |
| 5  | iPod              | Apple        | A1199            | R33057                            |
| 6  | iPod              | Apple        | A1199            | R33057                            |
| 7  | iPod              | Apple        | A1199            | R33057                            |
| 8  | Mouse             | DAHUA        | N/A              | N/A                               |
| 9  | Monitor           | PTS          | PTS-1401C        | Non-Shielded,1.8m                 |
| 10 | Notebook PC       | SONY         | PCG-71811P       | Non-Shielded,1.8m<br>(R33021)     |
| 11 | Notebook PC       | DELL         | Vostro 3560      | Non-Shielded,1.8m                 |
| 12 | HDCVI Camera      | DAHUA        | DH-HAC-HDW3103CP | Non-Shielded,1.5m                 |
| 13 | Video Distributor | N/A          | N/A              | Non-Shielded,1.0m                 |
| 14 | HDD               | WD           | 3409A            | Non-Shielded,1.8m                 |



| No | Cable        | Quantity | Description                                   |
|----|--------------|----------|-----------------------------------------------|
| A  | VGA Cable    | 1        | Shielded, 1.8m, with two ferrites core bonded |
| B  | HDMI Cable   | 1        | Shielded, 1.8m,                               |
| C  | HDMI Cable   | 1        | Shielded, 1.8m,                               |
| D  | e-SATA Cable | 1        | Non-Shielded,0.6m                             |
| E  | BNC Cable    | 1        | Shielded,>3.0m                                |
| F  | BNC Cable    | 2        | Shielded,>3.0m                                |
| G  | BNC Cable    | 16       | Shielded,>3.0m                                |
| H  | BNC Cable    | 3        | Shielded,>3.0m                                |
| I  | LAN Cable    | 1        | Non-Shielded,>3.0m                            |
| J  | LAN Cable    | 1        | Non-Shielded,>3.0m                            |
| K  | USB Cable    | 1        | Non-Shielded, 1.2m                            |
| L  | USB Cable    | 1        | Non-Shielded, 1.2m                            |
| M  | USB Cable    | 1        | Non-Shielded, 1.2m                            |
| N  | USB Cable    | 1        | Shielded, 1.2m                                |
| O  | RS232 Cable  | 1        | Non-Shielded,1.5m                             |

**3.5. General Information of Test**

|                                |                                                                                                                                                                        |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Site:                     | Cerpass Technology (Suzhou) Co.,Ltd                                                                                                                                    |
| Test Site Location :           | No.66,Tangzhuang Road, Suzhou Industrial Park, Jiangsu 215006, China                                                                                                   |
| NVLAP LAB Code :               | 200814-0                                                                                                                                                               |
| FCC Registration Number :      | 916572, 331395                                                                                                                                                         |
| IC Registration Number :       | 7290A-1, 7290A-2                                                                                                                                                       |
| VCCI Registration Number :     | T-1945 for Telecommunication Test<br>C-2919 for Conducted emission test<br>R-2670 for Radiated emission test below 1GHz<br>G-227 for Radiated emission test above 1GHz |
| Frequency Range Investigated : | Conducted Emission Test: from 150kHz to 30 MHz<br>Radiated Emission Test: from 30 MHz to 1,000 MHz<br>Radiated Emission Test: from 1GHz to 6GHz                        |
| Test Distance :                | The test distance of radiated emission below 1GHz from antenna to EUT is 10 M.<br>The test distance of radiated emission above 1GHz from antenna to EUT is 3 M.        |

**LABORATORY ACCREDITATION**



### 3.6. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

| Measurement         | Frequency     | Uncertainty   |
|---------------------|---------------|---------------|
| Conducted emissions | 0.09MHz-30MHz | +/- 1.2462 dB |

| Measurement                        | Polarity | Frequency          | Uncertainty  |
|------------------------------------|----------|--------------------|--------------|
| Radiated emissions<br>(below 1GHz) | H        | 30MHz ~ 200MHz     | +/- 4.0246dB |
|                                    |          | 200MHz ~1000MHz    | +/- 3.8673dB |
|                                    | V        | 30MHz ~ 200MHz     | +/- 4.0242dB |
|                                    |          | 200MHz ~1000MHz    | +/- 3.8688dB |
| Radiated emissions<br>(above 1GHz) | H        | 1000MHz ~18000MHz  | +/- 3.8856dB |
|                                    |          | 18000MHz ~40000MHz | +/- 3.8674dB |
|                                    | V        | 1000MHz ~18000MHz  | +/- 3.8852dB |
|                                    |          | 18000MHz ~40000MHz | +/- 3.8670dB |

| Measurement           | Uncertainty |
|-----------------------|-------------|
| ESD—Rise time tr      | 9%          |
| ESD—Peak current Ip   | 2.5%        |
| ESD—Current at 30 ns  | 1%          |
| ESD—Current at 60 ns  | 4%          |
| RS above 3GHz         | ±3.62dB     |
| RS under 3GHz         | ±3.70dB     |
| EFT—Rise time tr      | 4%          |
| EFT—Peak current Ip   | 4%          |
| EFT—Current           | 4%          |
| Surge—Rise time tr    | 4%          |
| Surge—Peak current Ip | 4%          |
| Surge—Current         | 4%          |



|          |                     |
|----------|---------------------|
| CS-CND   | $\pm 0.80\text{dB}$ |
| CS-Clamp | $\pm 1.06\text{dB}$ |

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .

Consistent with industry standard (e.g. CISPR 22: 2008, clause 11, Measurement Uncertainty) determining compliance with the limits shall be based on the results of the compliance measurement. Consequently the measured emissions being less than the maximum allowed emission result in this being a compliant test or passing test.



## 4. Test of Conducted Emission

### 4.1. Test Limit

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 kHz and return leads of the EUT according to the methods defined in European Standard EN 61000-6-3. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position producing maximum conducted emissions.

**Table 1 Class B Line Conducted Emission Limits:**

| Frequency range<br>(MHz)                                                                                  | Limits (dB $\mu$ V) |          |
|-----------------------------------------------------------------------------------------------------------|---------------------|----------|
|                                                                                                           | Quasi Peak          | Average  |
| 0.15 to 0.50                                                                                              | 66 to 56            | 56 to 46 |
| 0.50 to 5                                                                                                 | 56                  | 46       |
| 5. to 30.                                                                                                 | 60                  | 50       |
| Note 1: The lower limits shall apply at the transition frequencies.                                       |                     |          |
| Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to .50MHz. |                     |          |

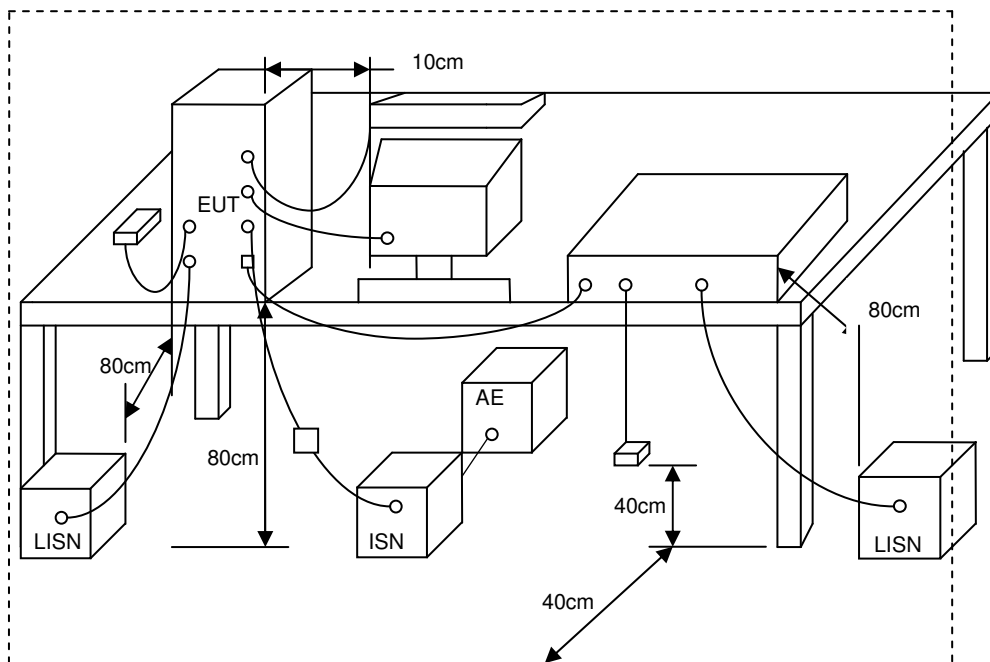
**Table 2 - Limits of conducted common mode (asymmetric mode) disturbance at telecommunication ports in the frequency range 0.15 MHz to 30 MHz for class B equipment.**

| Frequency range<br>(MHz)                                                                                                                                                                                                                                                                      | Voltage limits<br>dB( $\mu$ V) |          | Current limits<br>dB( $\mu$ A) |          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|----------|--------------------------------|----------|
|                                                                                                                                                                                                                                                                                               | Quasi-peak                     | Average  | Quasi-peak                     | Average  |
| 0.15 to 0.5                                                                                                                                                                                                                                                                                   | 84 to 74                       | 74 to 64 | 40 to 30                       | 30 to 20 |
| 0.5 to 30                                                                                                                                                                                                                                                                                     | 74                             | 64       | 30                             | 20       |
| Note 1: The limits decrease linearly with the logarithm of the frequency in the range 0.15 to 0.5 MHz.                                                                                                                                                                                        |                                |          |                                |          |
| Note 2: The current and voltage disturbance limits are derived for use with an impedance stabilization network (ISN) which presents a common mode (asymmetric mode) impedance of 150 $\Omega$ to the telecommunication under test (conversion factor is $20 \log_{10} 150/1 = 44\text{dB}$ ). |                                |          |                                |          |

## 4.2. Test Procedures

- a. The EUT was placed on a desk 0.8 meters height from the metal ground plane and 0.4 meter from the conducting wall of the shielding room and it was kept at least 0.8 meters from any other grounded conducting surface.
- b. Connect EUT to the power mains through a line impedance stabilization network (LISN).
- c. All the support units are connecting to the other LISN.
- d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
- e. The CISPR states that a 50 ohm, 50 micro-Henry LISN should be used.
- f. Both sides of AC line were checked for maximum conducted interference.
- g. The frequency range from 150 kHz to 30 MHz was searched
- h. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

### 4.3. Typical Test Setup



**4.4. Measurement equipment**

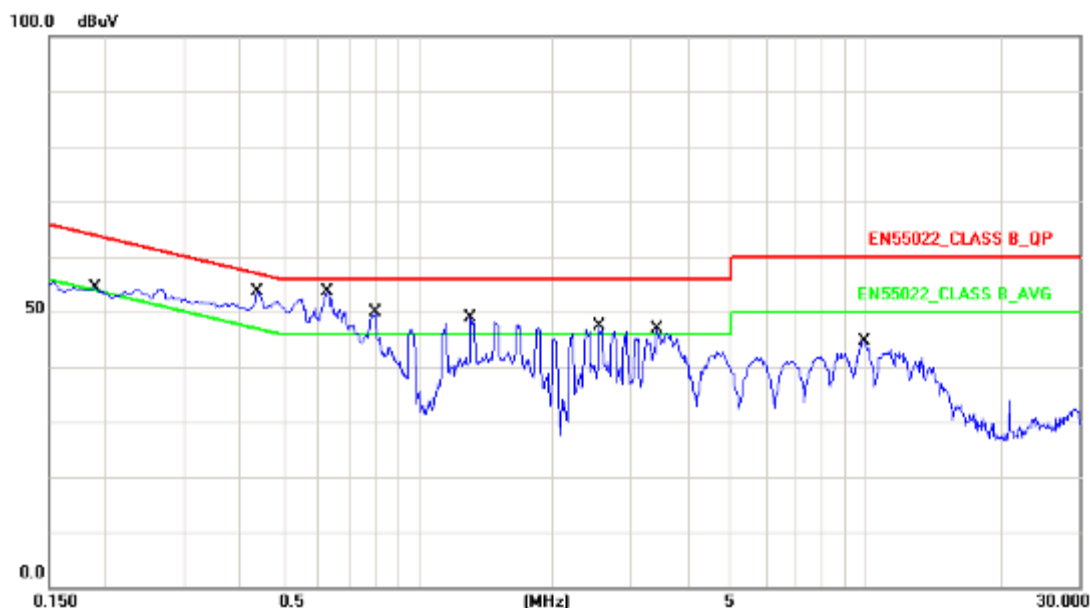
| Instrument/Ancillary        | Manufacturer | Model No.       | Serial No. | Calibration Date | Valid Date. |
|-----------------------------|--------------|-----------------|------------|------------------|-------------|
| Test Receiver               | R&S          | ESCI            | 100565     | 2014.03.24       | 2015.03.23  |
| AMN                         | R&S          | ESH2-Z5         | 100182     | 2013.09.11       | 2014.09.10  |
| Two-Line V-Network          | R&S          | ENV216          | 100325     | 2013.12.04       | 2014.12.03  |
| ISN                         | FCC          | FCC-TLISN-T2-02 | 20379      | 2014.03.24       | 2015.03.23  |
| ISN                         | FCC          | FCC-TLISN-T4-02 | 20380      | 2014.03.24       | 2015.03.23  |
| ISN                         | FCC          | FCC-TLISN-T8-02 | 20381      | 2014.03.24       | 2015.03.23  |
| ISN                         | TESEQ        | ISN ST08        | 30175      | 2014.03.24       | 2015.03.23  |
| Current Probe               | R&S          | EZ-17           | 100303     | 2014.04.04       | 2015.04.03  |
| Passive Voltage Probe       | R&S          | ESH2-Z3         | 100026     | 2014.03.24       | 2015.03.23  |
| Pulse Limiter               | R&S          | ESH3-Z2         | 100529     | 2014.03.24       | 2015.03.23  |
| Temperature/ Humidity Meter | Zhicheng     | ZC1-11          | CEP-TH-004 | 2014.03.31       | 2015.03.30  |





#### 4.5. Test Data and Result

|                  |                              |            |            |
|------------------|------------------------------|------------|------------|
| Test Mode :      | Mode 1: Normal Operation     |            |            |
| AC Power :       | AC 230V/50Hz                 | Phase :    | LINE       |
| Equipment :      | HDCVI Digital Video Recorder | Model No : | HCVR7816S  |
| Temperature :    | 23℃                          | Humidity : | 52%        |
| Pressure(mbar) : | 1002                         | Date :     | 2014/05/14 |

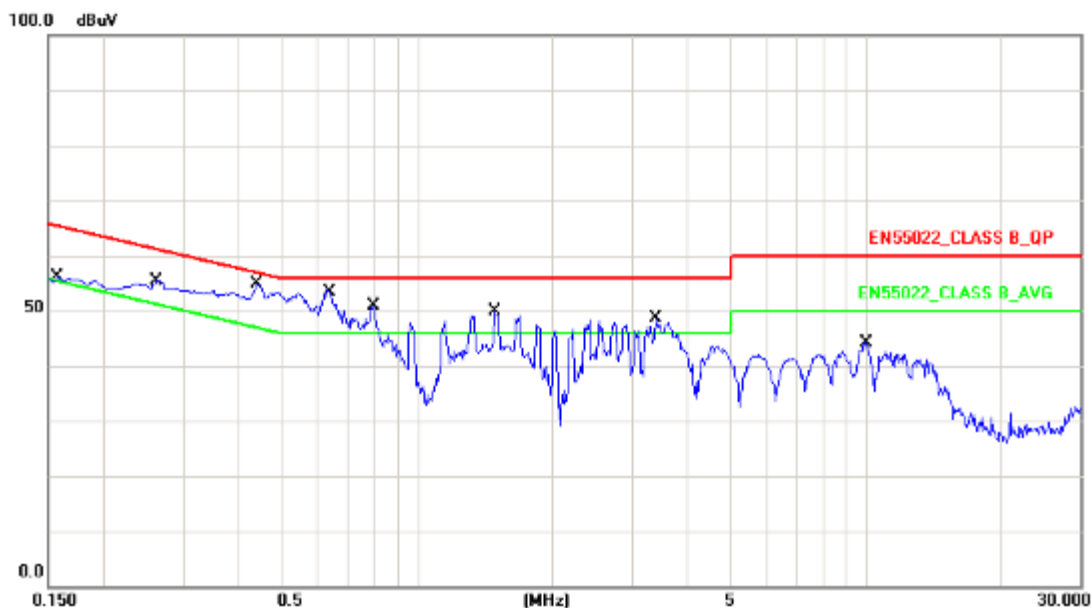


| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|-----|-----------------|-------------|----------------|--------------|--------------|-------------|----------|
| 1   | 0.1900          | 10.12       | 39.53          | 49.65        | 64.04        | -14.39      | QP       |
| 2   | 0.1900          | 10.12       | 36.55          | 46.67        | 54.04        | -7.37       | AVG      |
| 3   | 0.4380          | 10.15       | 39.50          | 49.65        | 57.10        | -7.45       | QP       |
| 4   | 0.4380          | 10.15       | 32.54          | 42.69        | 47.10        | -4.41       | AVG      |
| 5   | 0.6300          | 10.15       | 41.83          | 51.98        | 56.00        | -4.02       | QP       |
| 6   | 0.6300          | 10.15       | 32.21          | 42.36        | 46.00        | -3.64       | AVG      |
| 7   | 0.8020          | 10.15       | 35.53          | 45.68        | 56.00        | -10.32      | QP       |
| 8   | 0.8020          | 10.15       | 29.27          | 39.42        | 46.00        | -6.58       | AVG      |
| 9   | 1.3140          | 10.16       | 34.50          | 44.66        | 56.00        | -11.34      | QP       |
| 10  | 1.3140          | 10.16       | 27.75          | 37.91        | 46.00        | -8.09       | AVG      |
| 11  | 2.5500          | 10.18       | 32.29          | 42.47        | 56.00        | -13.53      | QP       |
| 12  | 2.5500          | 10.18       | 24.52          | 34.70        | 46.00        | -11.30      | AVG      |
| 13  | 3.4180          | 10.19       | 31.12          | 41.31        | 56.00        | -14.69      | QP       |
| 14  | 3.4180          | 10.19       | 24.90          | 35.09        | 46.00        | -10.91      | AVG      |
| 15  | 9.9260          | 10.25       | 29.84          | 40.09        | 60.00        | -19.91      | QP       |
| 16  | 9.9260          | 10.25       | 24.13          | 34.38        | 50.00        | -15.62      | AVG      |

Note: Measurement Level = Reading Level + Correct Factor



|                  |                              |            |            |
|------------------|------------------------------|------------|------------|
| Test Mode :      | Mode 1: Normal Operation     |            |            |
| AC Power :       | AC 230V/50Hz                 | Phase :    | NEUTRAL    |
| Equipment :      | HDCVI Digital Video Recorder | Model No : | HCVR7816S  |
| Temperature :    | 23℃                          | Humidity : | 52%        |
| Pressure(mbar) : | 1002                         | Date :     | 2014/05/14 |

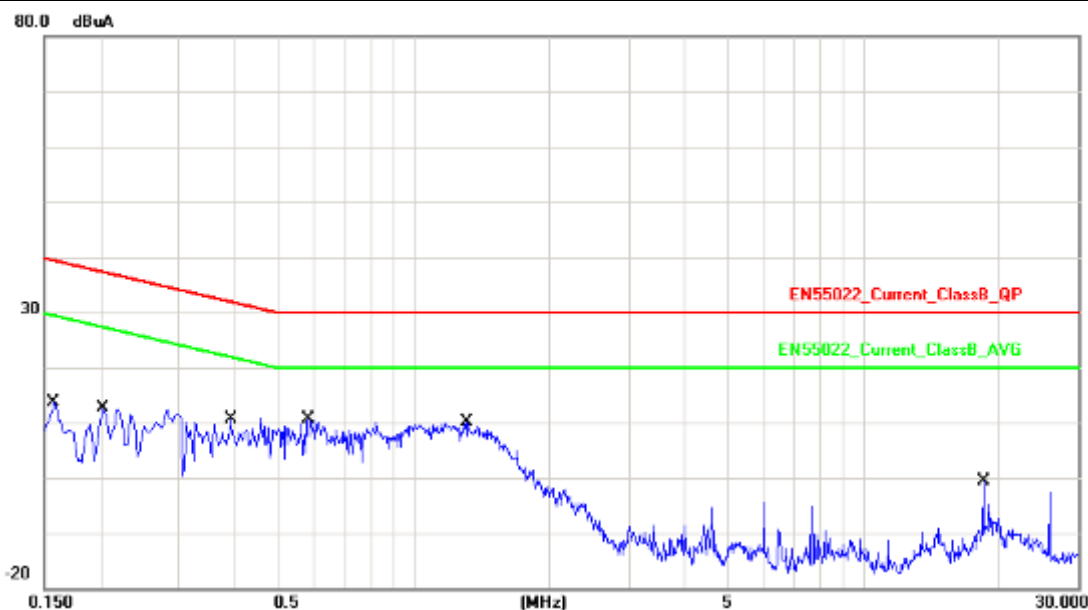


| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|-----|-----------------|-------------|----------------|--------------|--------------|-------------|----------|
| 1   | 0.1580          | 10.13       | 40.60          | 50.73        | 65.56        | -14.83      | QP       |
| 2   | 0.1580          | 10.13       | 37.35          | 47.48        | 55.56        | -8.08       | AVG      |
| 3   | 0.2620          | 10.13       | 41.50          | 51.63        | 61.36        | -9.73       | QP       |
| 4   | 0.2620          | 10.13       | 37.57          | 47.70        | 51.36        | -3.66       | AVG      |
| 5   | 0.4380          | 10.15       | 40.83          | 50.98        | 57.10        | -6.12       | QP       |
| 6   | 0.4380          | 10.15       | 30.21          | 40.36        | 47.10        | -6.74       | AVG      |
| 7   | 0.6419          | 10.16       | 41.69          | 51.85        | 56.00        | -4.15       | QP       |
| 8   | 0.6419          | 10.16       | 32.20          | 42.36        | 46.00        | -3.64       | AVG      |
| 9   | 0.7980          | 10.16       | 36.72          | 46.88        | 56.00        | -9.12       | QP       |
| 10  | 0.7980          | 10.16       | 31.02          | 41.18        | 46.00        | -4.82       | AVG      |
| 11  | 1.4860          | 10.18       | 35.17          | 45.35        | 56.00        | -10.65      | QP       |
| 12  | 1.4860          | 10.18       | 28.38          | 38.56        | 46.00        | -7.44       | AVG      |
| 13  | 3.3980          | 10.21       | 30.72          | 40.93        | 56.00        | -15.07      | QP       |
| 14  | 3.3980          | 10.21       | 25.77          | 35.98        | 46.00        | -10.02      | AVG      |
| 15  | 9.9980          | 10.26       | 28.56          | 38.82        | 60.00        | -21.18      | QP       |
| 16  | 9.9980          | 10.26       | 23.09          | 33.35        | 50.00        | -16.65      | AVG      |

Note: Measurement Level = Reading Level + Correct Factor



|                  |                              |            |            |
|------------------|------------------------------|------------|------------|
| Test Mode :      | Mode 1: Normal Operation     |            |            |
| AC Power :       | AC 230V/50Hz                 | Phase :    | BNC        |
| Equipment :      | HDCVI Digital Video Recorder | Model No : | HCVR7816S  |
| Temperature :    | 23℃                          | Humidity : | 52%        |
| Pressure(mbar) : | 1002                         | Date :     | 2014/05/14 |



| No. | Frequency (MHz) | Factor (dB) | Reading (dBuA) | Level (dBuA) | Limit (dBuA) | Margin (dB) | Detector |
|-----|-----------------|-------------|----------------|--------------|--------------|-------------|----------|
| 1   | 0.1580          | 3.46        | 6.95           | 10.41        | 39.56        | -29.15      | QP       |
| 2   | 0.1580          | 3.46        | 5.66           | 9.12         | 29.56        | -20.44      | AVG      |
| 3   | 0.2020          | 5.23        | 5.22           | 10.45        | 37.52        | -27.07      | QP       |
| 4   | 0.2020          | 5.23        | 3.01           | 8.24         | 27.52        | -19.28      | AVG      |
| 5   | 0.3899          | 6.37        | 1.68           | 8.05         | 32.06        | -24.01      | QP       |
| 6   | 0.3899          | 6.37        | -3.81          | 2.56         | 22.06        | -19.50      | AVG      |
| 7   | 0.5820          | 7.56        | -2.13          | 5.43         | 30.00        | -24.57      | QP       |
| 8   | 0.5820          | 7.56        | -7.36          | 0.20         | 20.00        | -19.80      | AVG      |
| 9   | 1.3099          | 8.65        | -1.51          | 7.14         | 30.00        | -22.86      | QP       |
| 10  | 1.3099          | 8.65        | -9.31          | -0.66        | 20.00        | -20.66      | AVG      |
| 11  | 18.4540         | 9.90        | -30.07         | -20.17       | 30.00        | -50.17      | QP       |
| 12  | 18.4540         | 9.90        | -36.11         | -26.21       | 20.00        | -46.21      | AVG      |

Note: Measurement Level = Reading Level + Correct Factor



|                  |                              |            |            |
|------------------|------------------------------|------------|------------|
| Test Mode :      | Mode 1: Normal Operation     |            |            |
| AC Power :       | AC 230V/50Hz                 | Phase :    | 10M        |
| Equipment :      | HDCVI Digital Video Recorder | Model No : | HCVR7816S  |
| Temperature :    | 23℃                          | Humidity : | 52%        |
| Pressure(mbar) : | 1002                         | Date :     | 2014/05/14 |

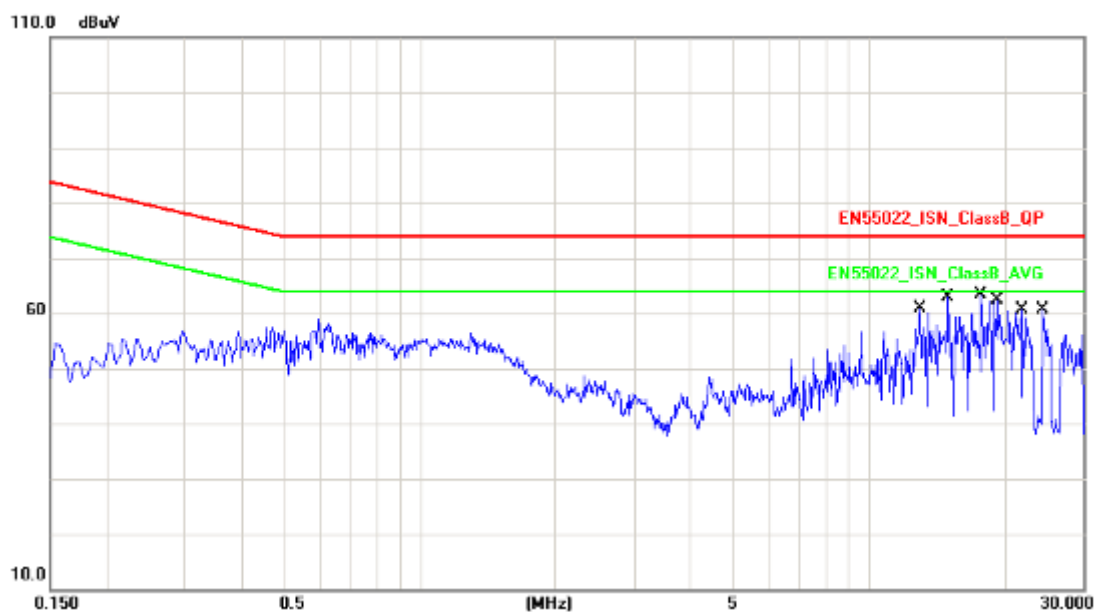


| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|-----|-----------------|-------------|----------------|--------------|--------------|-------------|----------|
| 1   | 5.0580          | 9.80        | 38.69          | 48.49        | 74.00        | -25.51      | QP       |
| 2   | 5.0580          | 9.80        | 32.24          | 42.04        | 64.00        | -21.96      | AVG      |
| 3   | 7.3380          | 9.79        | 42.62          | 52.41        | 74.00        | -21.59      | QP       |
| 4   | 7.3380          | 9.79        | 34.84          | 44.63        | 64.00        | -19.37      | AVG      |
| 5   | 8.8140          | 9.85        | 37.00          | 46.85        | 74.00        | -27.15      | QP       |
| 6   | 8.8140          | 9.85        | 26.58          | 36.43        | 64.00        | -27.57      | AVG      |
| 7   | 9.9940          | 9.89        | 42.39          | 52.28        | 74.00        | -21.72      | QP       |
| 8   | 9.9940          | 9.89        | 27.49          | 37.38        | 64.00        | -26.62      | AVG      |
| 9   | 11.9060         | 9.86        | 41.90          | 51.76        | 74.00        | -22.24      | QP       |
| 10  | 11.9060         | 9.86        | 33.01          | 42.87        | 64.00        | -21.13      | AVG      |
| 11  | 15.0020         | 9.82        | 42.56          | 52.38        | 74.00        | -21.62      | QP       |
| 12  | 15.0020         | 9.82        | 34.13          | 43.95        | 64.00        | -20.05      | AVG      |

Note: Measurement Level = Reading Level + Correct Factor



|                  |                              |            |            |
|------------------|------------------------------|------------|------------|
| Test Mode :      | Mode 1: Normal Operation     |            |            |
| AC Power :       | AC 230V/50Hz                 | Phase :    | 100M       |
| Equipment :      | HDCVI Digital Video Recorder | Model No : | HCVR7816S  |
| Temperature :    | 23℃                          | Humidity : | 52%        |
| Pressure(mbar) : | 1002                         | Date :     | 2014/05/14 |



| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|-----|-----------------|-------------|----------------|--------------|--------------|-------------|----------|
| 1   | 13.0100         | 9.84        | 45.61          | 55.45        | 74.00        | -18.55      | QP       |
| 2   | 13.0100         | 9.84        | 19.64          | 29.48        | 64.00        | -34.52      | AVG      |
| 3   | 15.0260         | 9.82        | 47.51          | 57.33        | 74.00        | -16.67      | QP       |
| 4   | 15.0260         | 9.82        | 26.63          | 36.45        | 64.00        | -27.55      | AVG      |
| 5   | 17.8340         | 9.84        | 48.31          | 58.15        | 74.00        | -15.85      | QP       |
| 6   | 17.8340         | 9.84        | 24.18          | 34.02        | 64.00        | -29.98      | AVG      |
| 7   | 19.3620         | 9.86        | 47.27          | 57.13        | 74.00        | -16.87      | QP       |
| 8   | 19.3620         | 9.86        | 25.12          | 34.98        | 64.00        | -29.02      | AVG      |
| 9   | 21.8660         | 9.85        | 45.72          | 55.57        | 74.00        | -18.43      | QP       |
| 10  | 21.8660         | 9.85        | 24.41          | 34.26        | 64.00        | -29.74      | AVG      |
| 11  | 24.3540         | 9.83        | 33.42          | 43.25        | 74.00        | -30.75      | QP       |
| 12  | 24.3540         | 9.83        | 22.23          | 32.06        | 64.00        | -31.94      | AVG      |

Note: Measurement Level = Reading Level + Correct Factor



|                  |                              |            |            |
|------------------|------------------------------|------------|------------|
| Test Mode :      | Mode 1: Normal Operation     |            |            |
| AC Power :       | AC 230V/50Hz                 | Phase :    | 1000M      |
| Equipment :      | HDCVI Digital Video Recorder | Model No : | HCVR7816S  |
| Temperature :    | 23℃                          | Humidity : | 52%        |
| Pressure(mbar) : | 1002                         | Date :     | 2014/05/14 |



| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|-----|-----------------|-------------|----------------|--------------|--------------|-------------|----------|
| 1   | 0.4540          | 9.75        | 44.87          | 54.62        | 75.31        | -20.69      | QP       |
| 2   | 0.4540          | 9.75        | 39.87          | 49.62        | 65.31        | -15.69      | AVG      |
| 3   | 0.6260          | 9.72        | 46.72          | 56.44        | 74.00        | -17.56      | QP       |
| 4   | 0.6260          | 9.72        | 40.40          | 50.12        | 64.00        | -13.88      | AVG      |
| 5   | 0.7980          | 9.62        | 43.77          | 53.39        | 74.00        | -20.61      | QP       |
| 6   | 0.7980          | 9.62        | 33.60          | 43.22        | 64.00        | -20.78      | AVG      |
| 7   | 7.9780          | 9.72        | 31.35          | 41.07        | 74.00        | -32.93      | QP       |
| 8   | 7.9780          | 9.72        | 25.53          | 35.25        | 64.00        | -28.75      | AVG      |
| 9   | 10.1820         | 9.74        | 31.28          | 41.02        | 74.00        | -32.98      | QP       |
| 10  | 10.1820         | 9.74        | 26.05          | 35.79        | 64.00        | -28.21      | AVG      |
| 11  | 24.2700         | 9.80        | 30.05          | 39.85        | 74.00        | -34.15      | QP       |
| 12  | 24.2700         | 9.80        | 21.46          | 31.26        | 64.00        | -32.74      | AVG      |

Note: Measurement Level = Reading Level + Correct Factor

Test engineer: Seben



#### 4.6. Test Photographs

Main

Front View



Rear View







BNC

Front View



Rear View





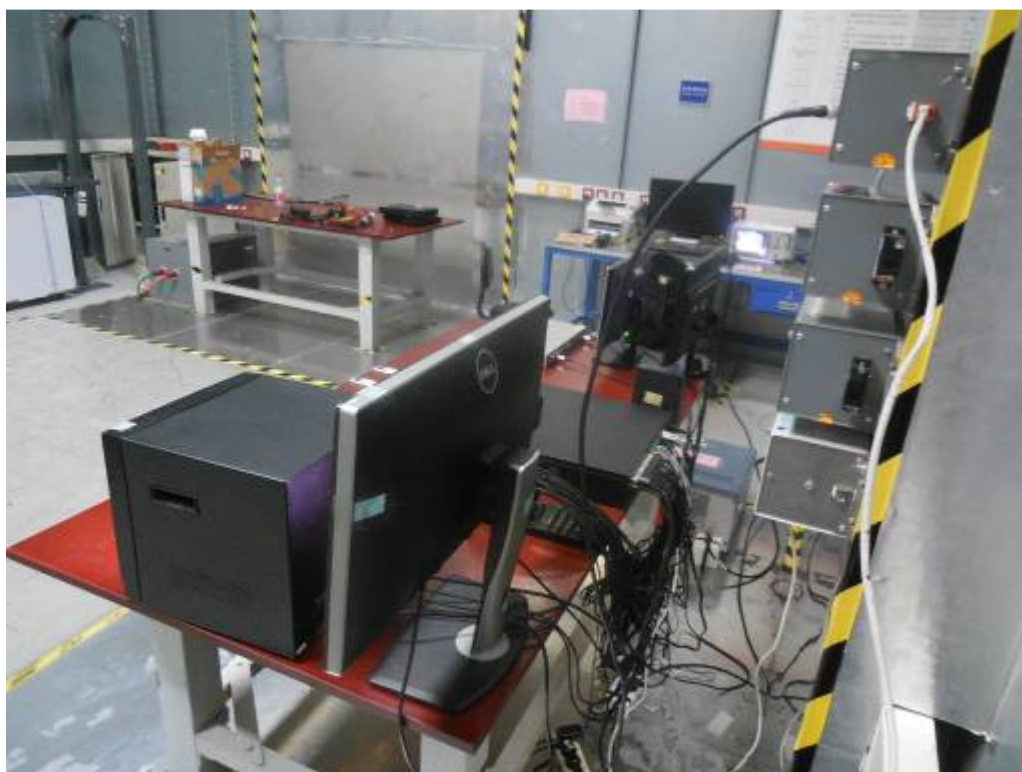


LAN

Front View



Rear View





## 5. Test of Radiated Emission

### 5.1. Test Limit

The EUT shall meet the limits of below Table when measured at the measuring distance R in accordance with the methods described in European Standard EN 61000-6-3. If the reading on the measuring receiver shows fluctuations close to the limit, the reading shall be observed for at least 15 s at each measurement frequency; the highest reading shall be recorded, with the exception of any brief isolated high reading, which shall be ignored.

Table – Limits for radiated disturbance of class B ITE at a measuring distance of 10 m

| Frequency range<br>MHz                                                                                                                               | Quasi-peak limits<br>dB(μV/m) |
|------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| 30 to 230                                                                                                                                            | 30                            |
| 230 to 1000                                                                                                                                          | 37                            |
| NOTE 1 The lower limit shall apply at the transition frequency.<br>NOTE 2 Additional provisions may be required for cases where interference occurs. |                               |

The EUT shall meet the limits of below Table when measured in accordance with the method described in European Standard EN 61000-6-3 and the conditional testing procedure described below.

Table – Limits for radiated disturbance of class B ITE at a measuring distance of 3 m

| Frequency range<br>GHz                                    | Average limit<br>dB(μV/m) | Peak limits<br>dB(μV/m) |
|-----------------------------------------------------------|---------------------------|-------------------------|
| 1 to 3                                                    | 50                        | 70                      |
| 3 to 6                                                    | 54                        | 74                      |
| NOTE The lower limit applies at the transition frequency. |                           |                         |

#### • Conditional testing procedure:

The highest internal source of an EUT is defined as the highest frequency generated or used within the EUT or on which the EUT operates or tunes.

If the highest frequency of the internal sources of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz.

If the highest frequency of the internal sources of the EUT is between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz.

If the highest frequency of the internal sources of the EUT is between 500 MHz and 1 GHz, the measurement shall only be made up to 5 GHz.

If the highest frequency of the internal sources of the EUT is above 1 GHz, the measurement shall be made up to 5 times the highest frequency or 6 GHz, whichever is less.



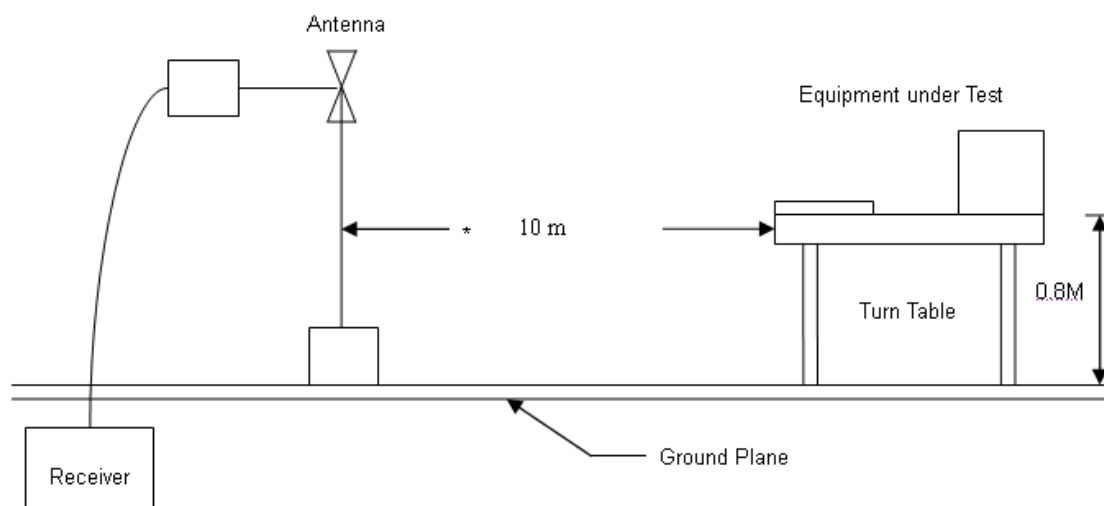
## **5.2. Test Procedures**

- a. The EUT was placed on a relatable table top 0.8 meter above ground.
- b. The EUT was set 10 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The antenna is a half wave dipole and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- f. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

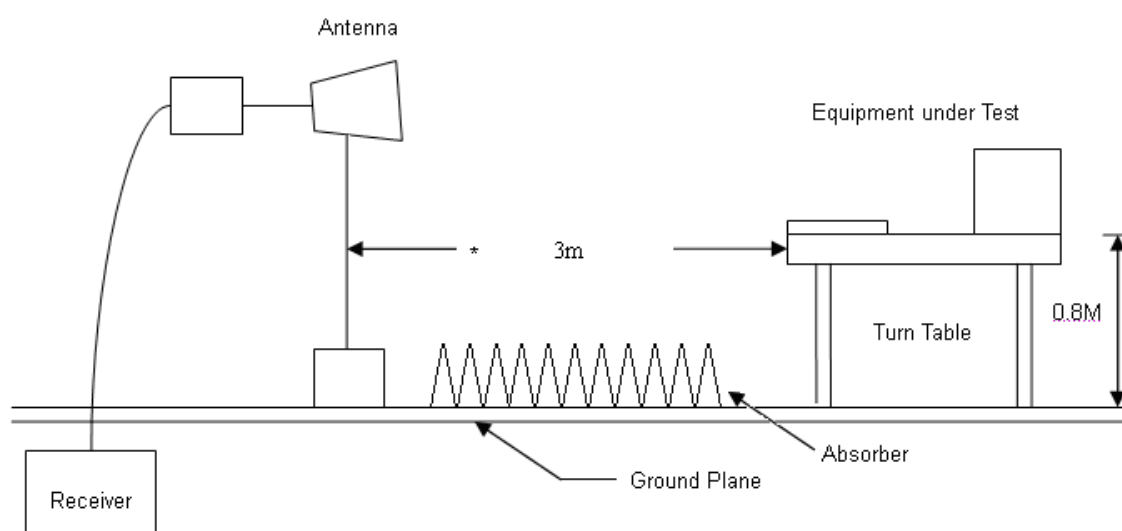


### 5.3. Typical test Setup

#### Below 1GHz Test Setup



#### Above 1GHz Test Setup



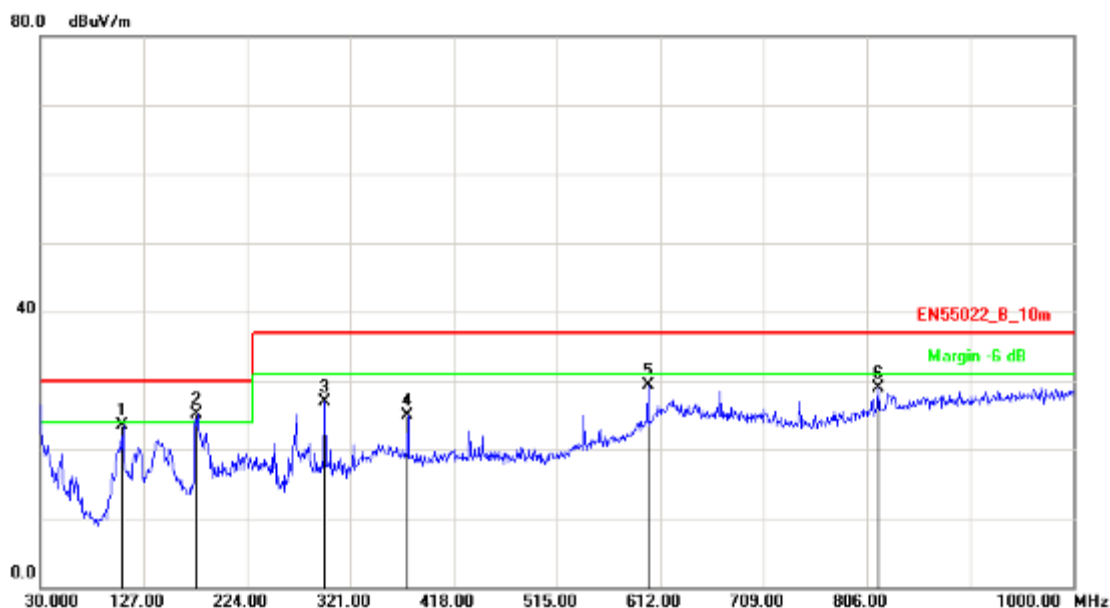
**5.4. Measurement equipment**

| Instrument/Ancillary        | Manufacturer | Model No. | Serial No. | Calibration Date | Valid Date. |
|-----------------------------|--------------|-----------|------------|------------------|-------------|
| EMI Test Receiver           | R&S          | ESCI      | 101183     | 2014.03.24       | 2015.03.23  |
| Preamplifier                | Agilent      | 87405B    | My39500554 | 2014.03.24       | 2015.03.23  |
| Preamplifier                | Agilent      | 8449B     | 3008A02342 | 2014.03.24       | 2015.03.23  |
| Bilog Antenna               | Schaffner    | CBL6141A  | 4257       | 2014.05.02       | 2015.05.01  |
| Broad-Band Horn Antenna     | Schwarzbeck  | BBHA9120D | 9120D-618  | 2014.05.02       | 2015.05.01  |
| Spectrum Analyzer           | R&S          | FSP40     | 100324     | 2014.03.24       | 2015.03.23  |
| Temperature/ Humidity Meter | Zhicheng     | ZC1-11    | CEP-TH-001 | 2014.03.31       | 2015.03.30  |



## 5.5. Test Result and Data (30MHz ~ 1000MHz)

|                  |                              |                    |            |
|------------------|------------------------------|--------------------|------------|
| Test Mode :      | Mode 1: Normal Operation     |                    |            |
| AC Power :       | AC 230V/50Hz                 | Ant. Polarization: | Horizontal |
| Equipment :      | HDCVI Digital Video Recorder | Model No :         | HCVR7816S  |
| Temp :           | 23℃                          | Humidity :         | 52%        |
| Pressure(mbar) : | 1002                         | Date :             | 2014/04/14 |

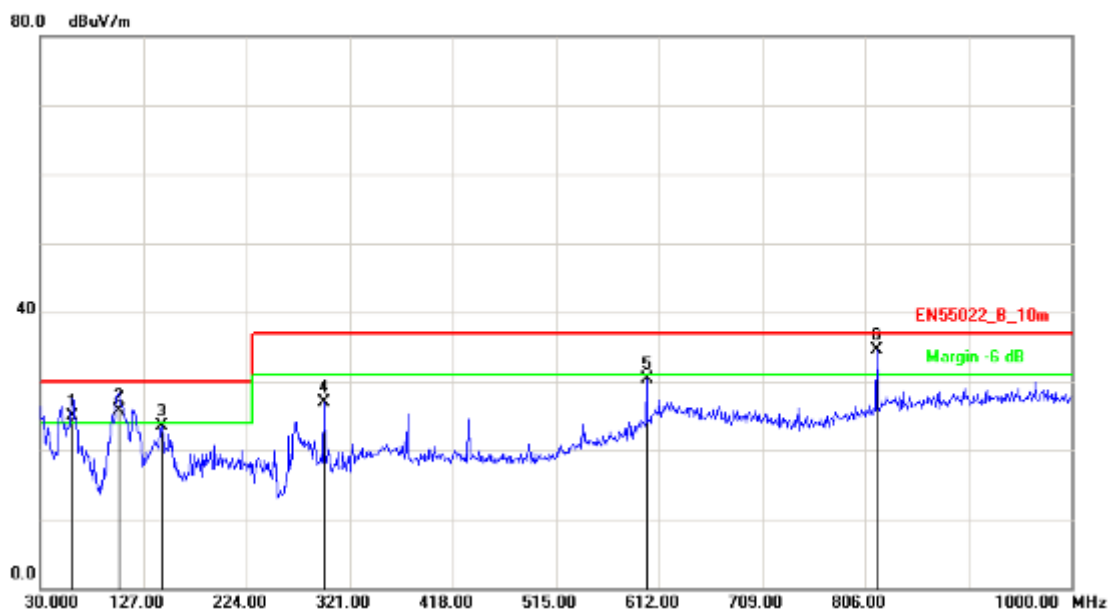


| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | Height (cm) | Azimuth (deg) |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|-------------|---------------|
| 1   | 107.5999        | -11.66        | 35.15          | 23.49          | 30.00          | -6.51       | QP   | 400         | 142           |
| 2   | 177.4399        | -12.51        | 37.62          | 25.11          | 30.00          | -4.89       | QP   | 400         | 172           |
| 3   | 296.7500        | -9.23         | 36.10          | 26.87          | 37.00          | -10.13      | QP   | 400         | 188           |
| 4   | 375.3199        | -5.74         | 30.71          | 24.97          | 37.00          | -12.03      | QP   | 200         | 71            |
| 5   | 600.3600        | -0.54         | 29.76          | 29.22          | 37.00          | -7.78       | QP   | 400         | 37            |
| 6   | 816.6699        | 0.84          | 28.03          | 28.87          | 37.00          | -8.13       | QP   | 200         | 271           |

Note: Measurement Level = Reading Level + Correct Factor



|                  |                              |                    |            |
|------------------|------------------------------|--------------------|------------|
| Test Mode :      | Mode 1: Normal Operation     |                    |            |
| AC Power :       | AC 230V/50Hz                 | Ant. Polarization: | Vertical   |
| Equipment :      | HDCVI Digital Video Recorder | Model No :         | HCVR7816S  |
| Temp :           | 23℃                          | Humidity :         | 52%        |
| Pressure(mbar) : | 1002                         | Date :             | 2014/04/14 |



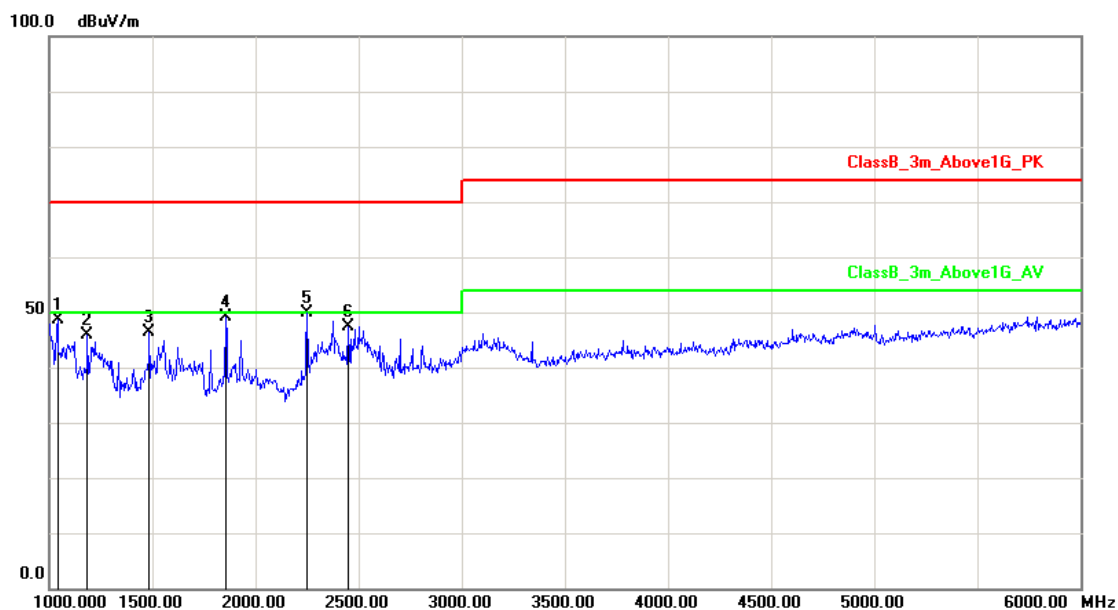
| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | Height (cm) | Azimuth (deg) |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|-------------|---------------|
| 1   | 60.4550         | -12.80        | 37.70          | 24.90          | 30.00          | -5.10       | QP   | 100         | 348           |
| 2   | 104.7400        | -12.09        | 37.89          | 25.80          | 30.00          | -4.20       | QP   | 100         | 342           |
| 3   | 144.4600        | -10.20        | 33.66          | 23.46          | 30.00          | -6.54       | QP   | 200         | 26            |
| 4   | 296.7500        | -9.23         | 36.11          | 26.88          | 37.00          | -10.12      | QP   | 100         | 250           |
| 5   | 600.3600        | -0.54         | 30.83          | 30.29          | 37.00          | -6.71       | QP   | 300         | 127           |
| 6   | 816.6700        | 0.84          | 33.70          | 34.54          | 37.00          | -2.46       | QP   | 200         | 352           |

Note: Measurement Level = Reading Level + Correct Factor



### 5.6. Test Result and Data (1000MHz ~ 6000MHz)

|                  |                              |                    |            |
|------------------|------------------------------|--------------------|------------|
| Test Mode :      | Mode 1: Normal Operation     |                    |            |
| AC Power :       | AC 230V/50Hz                 | Ant. Polarization: | Horizontal |
| Equipment :      | HDCVI Digital Video Recorder | Model No :         | HCVR7816S  |
| Temp :           | 23℃                          | Humidity :         | 52%        |
| Pressure(mbar) : | 1002                         | Date :             | 2014/05/13 |



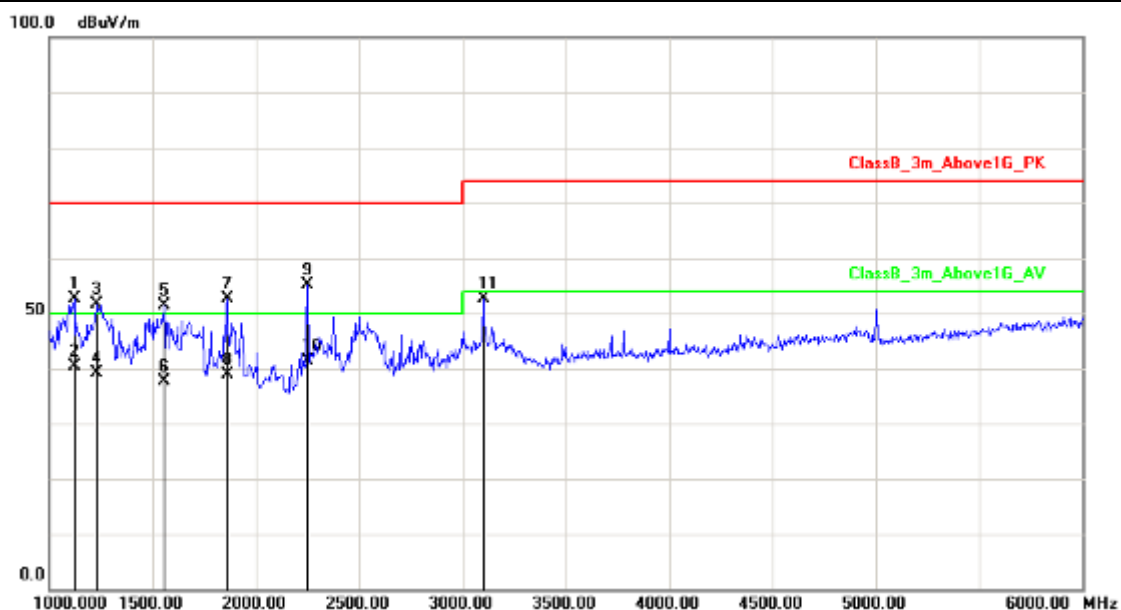
| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | Height (cm) | Azimuth (deg) |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|-------------|---------------|
| 1   | 1040.000        | -15.34        | 63.92          | 48.58          | 70.00          | -21.42      | peak | 100         | 210           |
| 2   | 1185.000        | -14.60        | 60.43          | 45.83          | 70.00          | -24.17      | peak | 100         | 169           |
| 3   | 1485.000        | -12.41        | 58.77          | 46.36          | 70.00          | -23.64      | peak | 100         | 205           |
| 4   | 1855.000        | -10.17        | 59.41          | 49.24          | 70.00          | -20.76      | peak | 100         | 205           |
| 5   | 2250.000        | -4.29         | 54.21          | 49.92          | 70.00          | -20.08      | peak | 100         | 132           |
| 6   | 2450.000        | -3.56         | 50.97          | 47.41          | 70.00          | -22.59      | peak | 100         | 235           |

Note: Measurement Level = Reading Level + Correct Factor





|                  |                              |                    |            |
|------------------|------------------------------|--------------------|------------|
| Test Mode :      | Mode 1: Normal Operation     |                    |            |
| AC Power :       | AC 230V/50Hz                 | Ant. Polarization: | Vertical   |
| Equipment :      | HDCVI Digital Video Recorder | Model No :         | HCVR7816S  |
| Temp :           | 23℃                          | Humidity :         | 52%        |
| Pressure(mbar) : | 1002                         | Date :             | 2014/05/13 |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | Height (cm) | Azimuth (deg) |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|-------------|---------------|
| 1   | 1120.000        | -14.97        | 67.50          | 52.53          | 70.00          | -17.47      | peak | 100         | 168           |
| 2   | 1120.000        | -14.97        | 55.33          | 40.36          | 50.00          | -9.64       | AVG  | 100         | 168           |
| 3   | 1230.000        | -14.17        | 65.83          | 51.66          | 70.00          | -18.34      | peak | 100         | 164           |
| 4   | 1230.000        | -14.17        | 53.23          | 39.06          | 50.00          | -10.94      | AVG  | 100         | 164           |
| 5   | 1555.000        | -12.17        | 63.60          | 51.43          | 70.00          | -18.57      | peak | 100         | 146           |
| 6   | 1555.000        | -12.17        | 49.73          | 37.56          | 50.00          | -12.44      | AVG  | 100         | 146           |
| 7   | 1860.000        | -10.13        | 62.81          | 52.68          | 70.00          | -17.32      | peak | 100         | 197           |
| 8   | 1860.000        | -10.13        | 49.09          | 38.96          | 50.00          | -11.04      | AVG  | 100         | 197           |
| 9   | 2250.000        | -4.29         | 59.30          | 55.01          | 70.00          | -14.99      | peak | 100         | 305           |
| 10  | 2250.000        | -4.29         | 45.55          | 41.26          | 50.00          | -8.74       | AVG  | 100         | 305           |
| 11  | 3100.000        | -2.37         | 54.89          | 52.52          | 74.00          | -21.48      | peak | 100         | 180           |

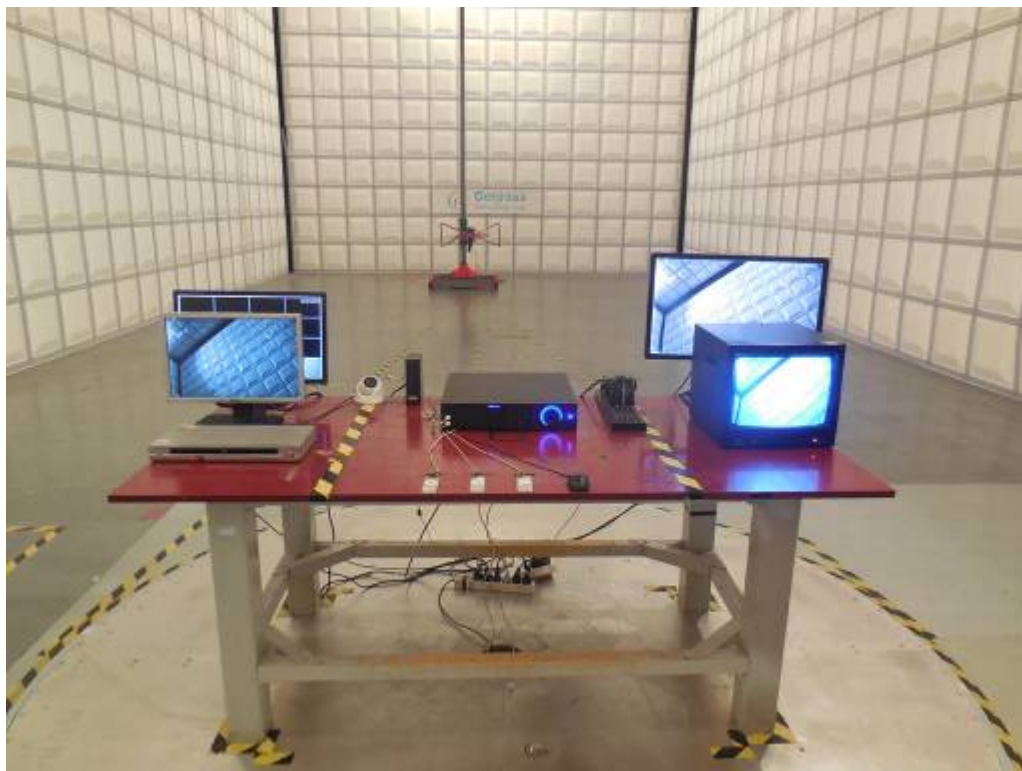
Note: Measurement Level = Reading Level + Correct Factor

Test engineer: Seben



## 5.7. Test Photographs (30MHz ~ 1000MHz)

Front View



Rear View



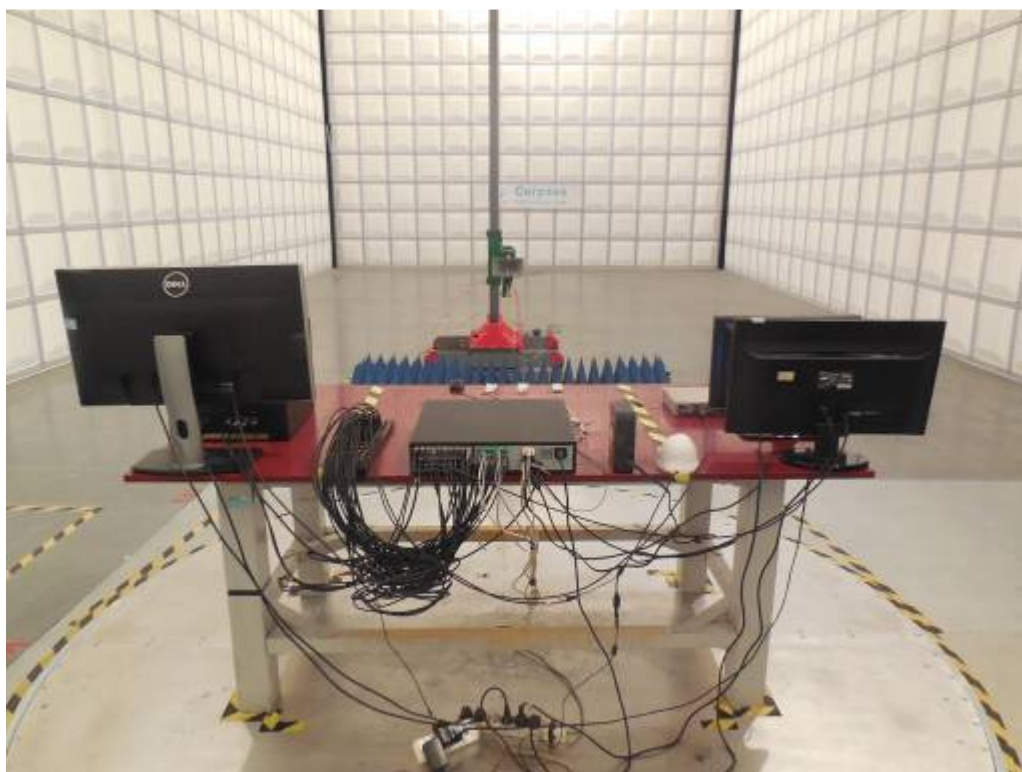


## 5.8. Test Photographs (1000MHz ~ 6000MHz)

Front View



Rear View





## 6. Harmonics Test

### 6.1. Limits of Harmonics Current Measurement

#### (a) Limits for Class A equipment

| Harmonics Order<br>n | Max. permissible<br>harmonics current<br>A | Harmonics Order<br>n | Max. permissible harmonics<br>current<br>A |
|----------------------|--------------------------------------------|----------------------|--------------------------------------------|
| Odd harmonics        |                                            | Even harmonics       |                                            |
| 3                    | 2.30                                       | 2                    | 1.08                                       |
| 5                    | 1.14                                       | 4                    | 0.43                                       |
| 7                    | 0.77                                       | 6                    | 0.30                                       |
| 9                    | 0.40                                       | 8≤n≤40               | 0.23x8/n                                   |
| 11                   | 0.33                                       |                      |                                            |
| 13                   | 0.21                                       |                      |                                            |
| 15≤n≤39              | 0.15x15/n                                  |                      |                                            |

#### (b) Limits for Class B equipment

For Class B equipment, the harmonics of the input current shall not exceed the values given in Table that is the limit of Class A multiplied by a factor of 1,5.

#### (c) Limits for Class C equipment

| Harmonics Order<br>n            | Maximum permissible harmonic current expressed as a percentage of<br>the input current at the fundamental frequency<br>% |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| 2                               | 2                                                                                                                        |
| 3                               | $30 \cdot \lambda^*$                                                                                                     |
| 5                               | 10                                                                                                                       |
| 7                               | 7                                                                                                                        |
| 9                               | 5                                                                                                                        |
| 11<n<39<br>(odd harmonics only) | 3                                                                                                                        |

\*  $\lambda$  is the circuit power factor

#### (d) Limits for Class D equipment

| Harmonics Order<br>n                | Maximum permissible<br>harmonic current per watt<br>mA/W | Maximum permissible<br>harmonic current<br>A |
|-------------------------------------|----------------------------------------------------------|----------------------------------------------|
| 3                                   | 3.4                                                      | 2.30                                         |
| 5                                   | 1.9                                                      | 1.14                                         |
| 7                                   | 1.0                                                      | 0.77                                         |
| 9                                   | 0.5                                                      | 0.40                                         |
| 11                                  | 0.35                                                     | 0.33                                         |
| 11 < n < 39<br>(odd harmonics only) | 3.85/n                                                   | See limit of Class A                         |

**NOTE:** According to section 7 of EN 61000-3-2, the above limits for all equipment except for lighting equipment having an active input power > 75 W and no limits apply for equipment with an active input power up to and including 75 W.

**6.2. Measurement equipment**

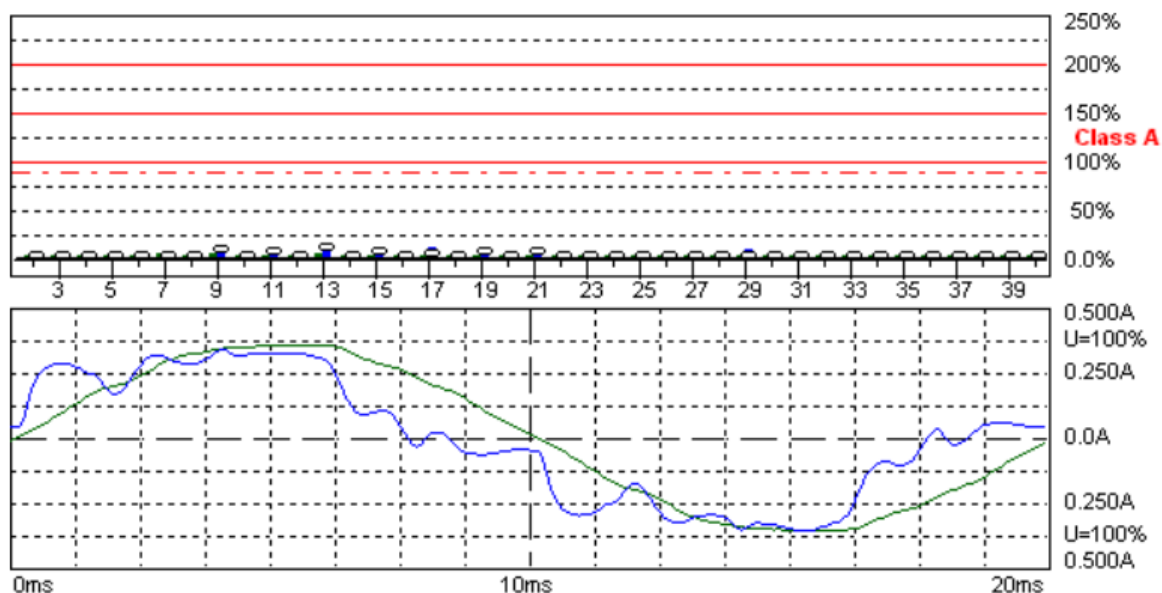
| Instrument/Ancillary           | Manufacturer | Model No.      | Serial No. | Calibration Date | Valid Date. |
|--------------------------------|--------------|----------------|------------|------------------|-------------|
| EMC Emission Tester            | EMCPARTNER   | Harmonics-1000 | 159        | 2014.03.24       | 2015.03.23  |
| Temperature/<br>Humidity Meter | Zhicheng     | ZC1-11         | CEP-TH-004 | 2014.03.31       | 2015.03.30  |





### 6.3. Test Result and Data

|                      |   |                              |
|----------------------|---|------------------------------|
| Basic Standard       | : | EN 61000-3-2                 |
| Final Test Result    | : | PASS                         |
| Test Mode            | : | Mode 1                       |
| Equipment            | : | HDCVI Digital Video Recorder |
| Model No.            | : | HCVR7816S                    |
| Temperature          | : | 20°C                         |
| Humidity             | : | 50 %                         |
| Atmospheric Pressure | : | 100 kPa                      |
| Test Date            | : | May 15, 2014                 |



Harmonic Emission - IEC 61000-3-2 , EN 61000-3-2 , (EN60555-2)

2014-5-15 9:44:03 harmonic.hsu

Urms = 222.1 V P = 44.63 W THC = 0.058 A  
Irms = 0.233 A pf = 0.861

Range: 0.5 A  
V-nom: 230 V  
TestTime: 15 min (100%)

HCVR7816S

**Test completed, Result: PASSED**

HAR-1000 EMC-Partner

Full Bar : Actual Values

Empty Bar : Maximum Values

Blue : Current , Green : Voltage , Red : Failed

Urms = 222.1V Freq = 49.974 Range: 0.5 A

Irms = 0.233A Ipk = 0.362A cf = 1.552

P = 44.63W S = 51.83VA pf = 0.861

THDi = 24.8 % THDu = 2.50 % Class A

Test - Time : 15min ( 100 %)

Test completed, Result: PASSED



| Order | Freq.<br>[Hz] | Irms<br>[A] | Irms%L<br>[%] | I <sub>max</sub><br>[A] | I <sub>max</sub> %L<br>[%] | Limit<br>[A] | Status |
|-------|---------------|-------------|---------------|-------------------------|----------------------------|--------------|--------|
| 1     | 50            | 0.2264      |               | 0.2269                  |                            |              |        |
| 2     | 100           | 0.0021      | 0.1950        | 0.0026                  | 0.2374                     | 1.0800       |        |
| 3     | 150           | 0.0251      | 1.0893        | 0.0252                  | 1.0960                     | 2.3000       |        |
| 4     | 200           | 0.0017      | 0.4045        | 0.0018                  | 0.4187                     | 0.4300       |        |
| 5     | 250           | 0.0305      | 2.6743        | 0.0309                  | 2.7145                     | 1.1400       |        |
| 6     | 300           | 0.0012      | 0.3967        | 0.0012                  | 0.4069                     | 0.3000       |        |
| 7     | 350           | 0.0142      | 1.8469        | 0.0176                  | 2.2908                     | 0.7700       |        |
| 8     | 400           | 0.0012      | 0.5175        | 0.0013                  | 0.5440                     | 0.2300       |        |
| 9     | 450           | 0.0254      | 6.3400        | 0.0262                  | 6.5460                     | 0.4000       |        |
| 10    | 500           | 0.0013      | 0.6800        | 0.0013                  | 0.7298                     | 0.1840       |        |
| 11    | 550           | 0.0170      | 5.1510        | 0.0207                  | 6.2607                     | 0.3300       |        |
| 12    | 600           | 0.0005      | 0.3582        | 0.0010                  | 0.6369                     | 0.1533       |        |
| 13    | 650           | 0.0155      | 7.3969        | 0.0191                  | 9.1117                     | 0.2100       |        |
| 14    | 700           | 0.0004      | 0.2786        | 0.0007                  | 0.5341                     | 0.1314       |        |
| 15    | 750           | 0.0069      | 4.6183        | 0.0078                  | 5.2287                     | 0.1500       |        |
| 16    | 800           | 0.0003      | 0.2654        | 0.0008                  | 0.6900                     | 0.1150       |        |
| 17    | 850           | 0.0090      | 6.8251        | 0.0102                  | 7.6782                     | 0.1324       |        |
| 18    | 900           | 0.0003      | 0.2985        | 0.0011                  | 1.0449                     | 0.1022       |        |
| 19    | 950           | 0.0109      | 9.1743        | 0.0120                  | 10.128                     | 0.1184       |        |
| 20    | 1000          | 0.0003      | 0.2985        | 0.0006                  | 0.6966                     | 0.0920       |        |
| 21    | 1050          | 0.0099      | 9.2570        | 0.0104                  | 9.7412                     | 0.1071       |        |
| 22    | 1100          | 0.0004      | 0.4379        | 0.0005                  | 0.5838                     | 0.0836       |        |
| 23    | 1150          | 0.0033      | 3.3379        | 0.0044                  | 4.5234                     | 0.0978       |        |
| 24    | 1200          | 0.0005      | 0.5971        | 0.0005                  | 0.6767                     | 0.0767       |        |
| 25    | 1250          | 0.0016      | 1.8311        | 0.0041                  | 4.5098                     | 0.0900       |        |
| 26    | 1300          | 0.0003      | 0.3881        | 0.0003                  | 0.4312                     | 0.0708       |        |
| 27    | 1350          | 0.0003      | 0.4028        | 0.0016                  | 1.9409                     | 0.0833       |        |
| 28    | 1400          | 0.0002      | 0.3251        | 0.0005                  | 0.6966                     | 0.0657       |        |
| 29    | 1450          | 0.0046      | 5.9787        | 0.0049                  | 6.3721                     | 0.0776       |        |
| 30    | 1500          | 0.0001      | 0.1990        | 0.0003                  | 0.4976                     | 0.0613       |        |
| 31    | 1550          | 0.0029      | 3.9944        | 0.0031                  | 4.2046                     | 0.0726       |        |
| 32    | 1600          | 0.0001      | 0.2123        | 0.0003                  | 0.5838                     | 0.0575       |        |
| 33    | 1650          | 0.0025      | 3.6255        | 0.0028                  | 4.1626                     | 0.0682       |        |
| 34    | 1700          | 0.0002      | 0.3383        | 0.0003                  | 0.5075                     | 0.0541       |        |
| 35    | 1750          | 0.0033      | 5.0795        | 0.0034                  | 5.3168                     | 0.0643       |        |
| 36    | 1800          | 0.0002      | 0.2985        | 0.0002                  | 0.4180                     | 0.0511       |        |
| 37    | 1850          | 0.0015      | 2.5092        | 0.0016                  | 2.6598                     | 0.0608       |        |
| 38    | 1900          | 0.0002      | 0.4412        | 0.0002                  | 0.5042                     | 0.0484       |        |
| 39    | 1950          | 0.0024      | 4.1789        | 0.0029                  | 5.0781                     | 0.0577       |        |
| 40    | 2000          | 0.0002      | 0.3981        | 0.0002                  | 0.5307                     | 0.0460       |        |

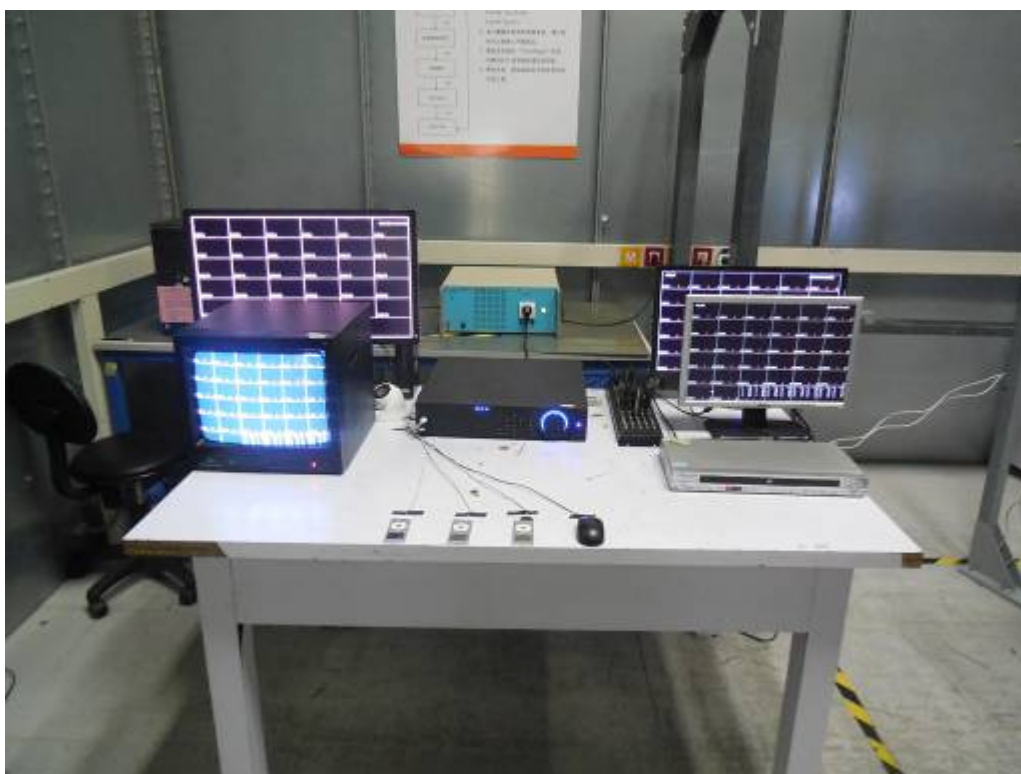
EUT is PASSED if:

- all Average values of the Individual Harmonic Currents (I<sub>avg</sub>) are below 100% of the Individual Limits.
- all Maximum values of the Individual Harmonic Currents (I<sub>max</sub>) are below 150% of the Individual Limits.

Test engineer: \_\_\_\_\_



## 6.1. Test Photographs







## 7. Voltage Fluctuations Test

### 7.1. Test Procedure

The equipment shall be tested under the conditions of **Clause 5**.

The total impedance of the test circuit, excluding the appliance under test, but including the internal impedance of the supply source, shall be equal to the reference impedance. The stability and tolerance of the reference impedance shall be adequate to ensure that the overall accuracy of  $\pm 8\%$  is achieved during the whole assessment procedure.

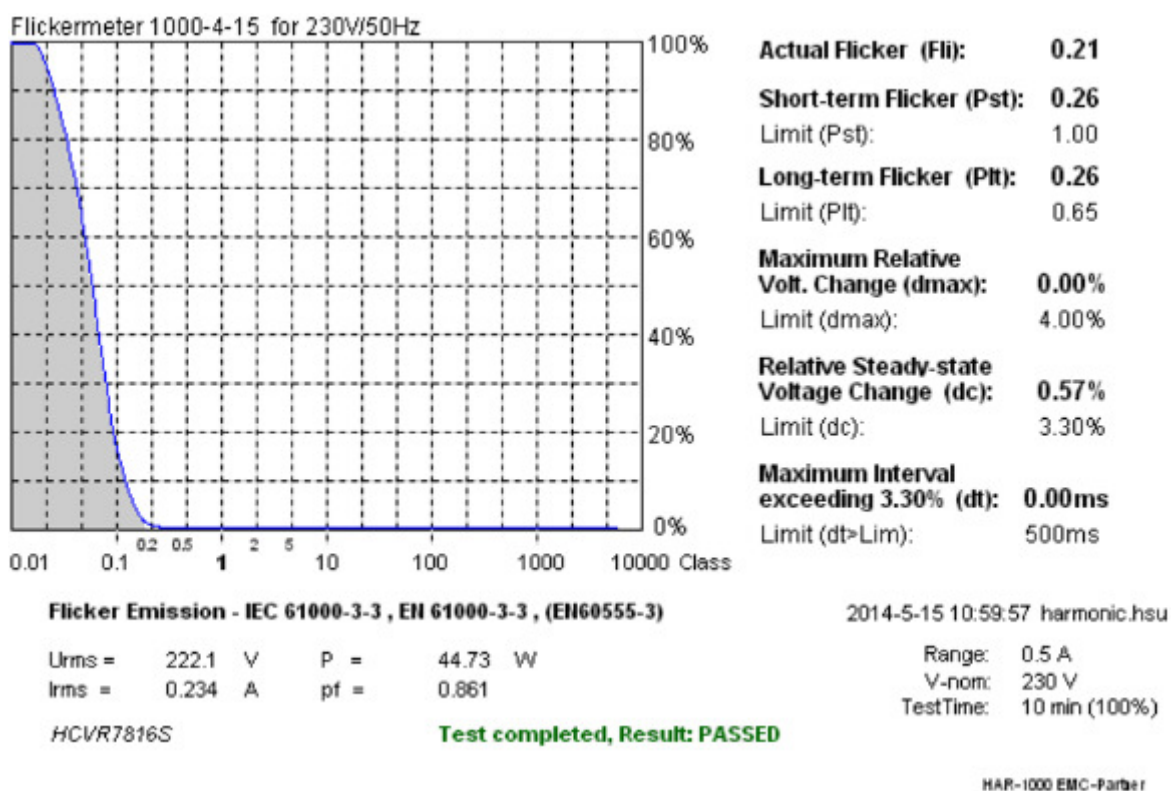
### 7.2. Measurement equipment

| Instrument/Ancillary           | Manufacturer | Model No.      | Serial No. | Calibration Date | Valid Date. |
|--------------------------------|--------------|----------------|------------|------------------|-------------|
| EMC Emission Tester            | EMCPARTNER   | Harmonics-1000 | 159        | 2014.03.24       | 2015.03.23  |
| Temperature/<br>Humidity Meter | Zhicheng     | ZC1-11         | CEP-TH-004 | 2014.03.31       | 2015.03.30  |



### 7.3. Test Result and Data

|                      |   |                              |
|----------------------|---|------------------------------|
| Basic Standard       | : | EN 61000-3-3                 |
| Final Test Result    | : | PASS                         |
| Test Mode            | : | Mode 1                       |
| Equipment            | : | HDCVI Digital Video Recorder |
| Model No.            | : | HCVR7816S                    |
| Temperature          | : | 20°C                         |
| Humidity             | : | 50 %                         |
| Atmospheric Pressure | : | 100 kPa                      |
| Test Date            | : | May 15, 2014                 |



Full Bar : Actual Values

Empty Bar : Maximum Values

Circles : Average Values

Blue : Current , Green : Voltage , Red : Failed



Urms = 222.1V Freq = 49.987 Range: 0.5 A  
Irms = 0.234A Ipk = 0.365A cf = 1.559  
P = 44.73W S = 51.94VA pf = 0.861

Test - Time : 1 x 10min = 10min ( 100 %)

LIN (Line Impedance Network) : No LIN

Limits : Plt : 0.65 Pst : 1.00  
dmax : 4.00 % dc : 3.30 %  
dtLim: 3.30 % dt>Lim: 500ms

Test completed, Result: PASSED

Test engineer: Seben



#### 7.4. Test Photographs





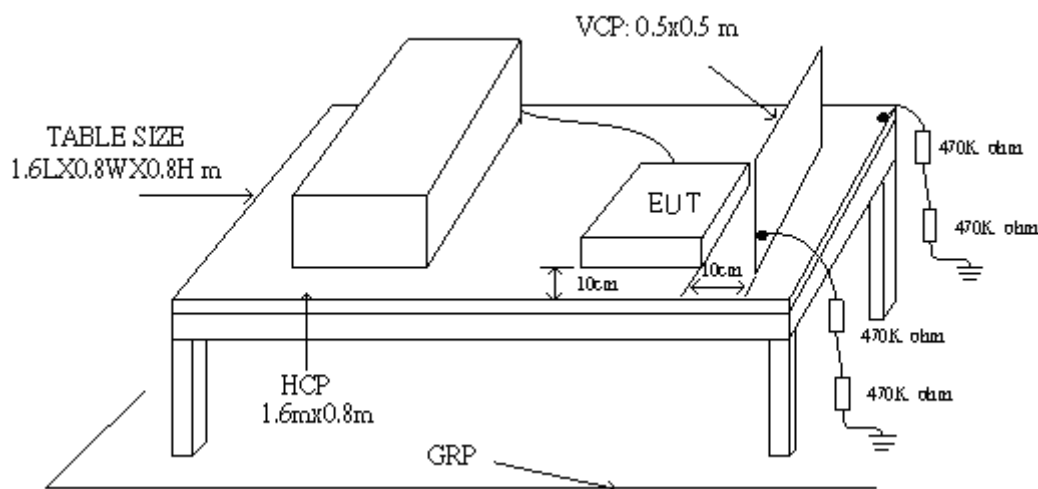
## 8. Electrostatic Discharge Immunity Test

### 8.1. Test Procedure

- a. In the case of air discharge testing the climatic conditions shall be within the following ranges:
  - ambient temperature: 15°C to 35°C;
  - relative humidity : 30% to 60%;
  - atmospheric pressure : 86 KPa (860 hPa) to 106 KPa (1060 hPa).
- b. Test programs and software shall be chosen so as to exercise all normal modes of operation of the EUT. The use of special exercising software is encouraged, but permitted only where it can be shown that the EUT is being comprehensively exercised.
- c. The test voltage shall be increased from the minimum to the selected test severity level, in order to determine any threshold of failure. The final severity level should not exceed the product specification value in order to avoid damage to the equipment.
- d. The test shall be performed with both air discharge and contact discharge. On reselected points at least 10 single discharges (in the most sensitive polarity) shall be applied on air discharge. On reselected points at least 25 single discharges (in the most sensitive polarity) shall be applied on contact discharge.
- e. For the time interval between successive single discharges an initial value of one second is recommended. Longer intervals may be necessary to determine whether a system failure has occurred.
- f. In the case of contact discharges, the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.
- g. In the case of painted surface covering a conducting substrate, the following procedure shall be adopted :
  - ✧ If the coating is not declared to be an insulating coating by the equipment manufacturer, then the pointed tip of the generator shall penetrate the coating so as to make contact with the conducting substrate.
  - ✧ Coating declared as insulating by the manufacturer shall only be submitted to the air discharge.
  - ✧ The contact discharge test shall not be applied to such surfaces.
- h. In the case of air discharges, the round discharge tip of the discharge electrode shall be approached as fast as possible (without causing mechanical damage) to touch the EUT . After each discharge, the ESD generator (discharge electrode) shall be removed from the EUT. The generator is then retriggered for a new single discharge. This procedure shall be repeated until the discharges are completed. In the case of an air discharge test, the discharge switch, which is used for contact discharge, shall be closed.



## 8.2. Test Setup for Tests Performed in Laboratory



The test setup consists of the test generator, EUT and auxiliary instrumentation necessary to perform DIRECT and INDIRECT application of discharges to the EUT as applicable, in the follow manner :

- Contact Discharge to the conductive surfaces and to coupling plane;
- Air Discharge at insulating surfaces.

The preferred test method is that of type tests performed in laboratories and the only accepted method of demonstrating conformance with this standard. The EUT was arranged as closely as possible to arrangement in final installed conditions.

A ground reference plane was provided on the floor of the test site. It was a metallic sheet (copper or aluminum) of 0.25 mm, minimum thickness; other metallic may be used but they shall have at least 0.65 mm thickness. In the Exclusive Certification Corp., we provided 1 mm thickness stainless steel ground reference plane. The minimum size of the ground reference plane is 2.5 m x 2.5 m, the exact size depending on the dimensions of the EUT. It was connected to the protective grounding system.

The EUT was arranged and connected according to its functional requirements. A distance of 1m minimum was provided between the EUT and the wall of the lab. and any other metallic structure. In cases where this length exceeds the length necessary to apply the discharges to the selected points, the excess length shall, where possible, be placed non-inductively off the ground reference plane and shall not come closer than 0.2m to other conductive parts in the test setup.

Where the EUT is installed on a metal table, the table was connected to the reference plane via a cable with a 470k ohm resistor located at each end, to prevent a build-up of charge. The test setup was consist a wooden table, 0.8m high, standing on the ground reference plane. A HCP, 1.6 m x 0.8 m, was placed on the table. The EUT and cables was isolated from the HCP by an insulating support 0.5 mm thick. The VCP size, 0.5 m x 0.5 m.



### 8.3. Test Severity Levels

| Contact Discharge             |                                        | Air Discharge |                                    |
|-------------------------------|----------------------------------------|---------------|------------------------------------|
| Level                         | Test Voltage (KV) of Contact discharge | Level         | Test Voltage (KV) of Air Discharge |
| 1                             | $\pm 2$                                | 1             | $\pm 2$                            |
| 2                             | $\pm 4$                                | 2             | $\pm 4$                            |
| 3                             | $\pm 6$                                | 3             | $\pm 8$                            |
| 4                             | $\pm 8$                                | 4             | $\pm 15$                           |
| X                             | Specified                              | X             | Specified                          |
| Remark: "X" is an open level. |                                        |               |                                    |

### 8.4. Measurement equipment

| Instrument/Ancillary           | Manufacturer    | Model No. | Serial No.  | Calibration Date | Valid Date. |
|--------------------------------|-----------------|-----------|-------------|------------------|-------------|
| ESD Simulator                  | EM Test         | dito      | V0714102399 | 2014.04.04       | 2015.04.03  |
| Tonometer                      | shanghaifengyun | DYM3      | 3251        | 2014.03.31       | 2015.03.30  |
| Dehumidifier                   | ZEDO            | ZD-220LB  | CEP-TH-01   | N/A              | N/A         |
| Humidifier                     | YADU            | YZ-DS251C | CEP-TH-02   | N/A              | N/A         |
| Temperature/<br>Humidity Meter | feiyang         | N/A       | 102         | 2014.03.31       | 2015.03.30  |



### 8.5. Test Result and Data

Basic Standard : IEC 61000-4-2  
Product Standard : EN 50130-4: 2011  
Product Standard : EN 55024 : 2010  
Equipment : HDCVI Digital Video Recorder  
Model No. : HCVR7816S  
Final Test Result : PASS  
Temperature : 22° C  
Relative Humidity : 50 %  
Atmospheric Pressure : 100 kPa  
Test Date : May 05, 2014

Test Mode 1: Normal Operation

For EN 55024: 2010

Test Voltage: AC 230V/50Hz

|                | Contact Discharge |     |      |     |      |     |      |     | Air Discharge   |     |      |     |      |     |       |     |
|----------------|-------------------|-----|------|-----|------|-----|------|-----|-----------------|-----|------|-----|------|-----|-------|-----|
|                | 25 times / each   |     |      |     |      |     |      |     | 10 times / each |     |      |     |      |     |       |     |
| Voltage        | 2 kV              |     | 4 kV |     | 6 kV |     | 8 kV |     | 2 kV            |     | 4 kV |     | 8 kV |     | 10 kV |     |
| Point\Polarity | +                 | —   | +    | —   | +    | —   | +    | —   | +               | —   | +    | —   | +    | —   | +     | —   |
| HCP            | A                 | A   | A    | A   | ---  | --- | ---  | --- | ---             | --- | ---  | --- | ---  | --- | ---   | --- |
| VCP            | A                 | A   | A    | A   | ---  | --- | ---  | --- | ---             | --- | ---  | --- | ---  | --- | ---   | --- |
| 1-32           | A                 | A   | A    | A   | ---  | --- | ---  | --- | ---             | --- | ---  | --- | ---  | --- | ---   | --- |
| 33-50          | ---               | --- | ---  | --- | ---  | --- | ---  | --- | A               | A   | A    | A   | A    | A   | ---   | --- |
| 51-62          | A                 | A   | A    | A   | ---  | --- | ---  | --- | ---             | --- | ---  | --- | ---  | --- | ---   | --- |
| 63-68          | ---               | --- | ---  | --- | ---  | --- | ---  | --- | A               | A   | A    | A   | A    | A   | ---   | --- |





For EN 50130-4: 2011

| Test Voltage: AC 230V/50Hz |                   |     |      |     |      |     |      |     |                 |     |      |     |      |     |       |     |
|----------------------------|-------------------|-----|------|-----|------|-----|------|-----|-----------------|-----|------|-----|------|-----|-------|-----|
|                            | Contact Discharge |     |      |     |      |     |      |     | Air Discharge   |     |      |     |      |     |       |     |
|                            | 25 times / each   |     |      |     |      |     |      |     | 10 times / each |     |      |     |      |     |       |     |
| Voltage                    | 2 kV              |     | 4 kV |     | 6 kV |     | 8 kV |     | 2 kV            |     | 4 kV |     | 8 kV |     | 10 kV |     |
| Point\Polarity             | +                 | -   | +    | -   | +    | -   | +    | -   | +               | -   | +    | -   | +    | -   | +     | -   |
| HCP                        | A                 | A   | A    | A   | A    | A   | ---  | --- | ---             | --- | ---  | --- | ---  | --- | ---   | --- |
| VCP                        | A                 | A   | A    | A   | A    | A   | ---  | --- | ---             | --- | ---  | --- | ---  | --- | ---   | --- |
| 1-32                       | A                 | A   | A    | A   | A    | A   | ---  | --- | ---             | --- | ---  | --- | ---  | --- | ---   | --- |
| 33-50                      | ---               | --- | ---  | --- | ---  | --- | ---  | --- | A               | A   | A    | A   | A    | A   | ---   | --- |
| 51-62                      | A                 | A   | A    | A   | A    | A   | ---  | --- | ---             | --- | ---  | --- | ---  | --- | ---   | --- |
| 63-68                      | ---               | --- | ---  | --- | ---  | --- | ---  | --- | A               | A   | A    | A   | A    | A   | ---   | --- |

| Test Voltage: AC 195.5V/50Hz |                   |     |      |     |      |     |      |     |                 |     |      |     |      |     |       |     |
|------------------------------|-------------------|-----|------|-----|------|-----|------|-----|-----------------|-----|------|-----|------|-----|-------|-----|
|                              | Contact Discharge |     |      |     |      |     |      |     | Air Discharge   |     |      |     |      |     |       |     |
|                              | 25 times / each   |     |      |     |      |     |      |     | 10 times / each |     |      |     |      |     |       |     |
| Voltage                      | 2 kV              |     | 4 kV |     | 6 kV |     | 8 kV |     | 2 kV            |     | 4 kV |     | 8 kV |     | 10 kV |     |
| Point\Polarity               | +                 | -   | +    | -   | +    | -   | +    | -   | +               | -   | +    | -   | +    | -   | +     | -   |
| HCP                          | A                 | A   | A    | A   | A    | A   | ---  | --- | ---             | --- | ---  | --- | ---  | --- | ---   | --- |
| VCP                          | A                 | A   | A    | A   | A    | A   | ---  | --- | ---             | --- | ---  | --- | ---  | --- | ---   | --- |
| 1-32                         | A                 | A   | A    | A   | A    | A   | ---  | --- | ---             | --- | ---  | --- | ---  | --- | ---   | --- |
| 33-50                        | ---               | --- | ---  | --- | ---  | --- | ---  | --- | A               | A   | A    | A   | A    | A   | ---   | --- |
| 51-62                        | A                 | A   | A    | A   | A    | A   | ---  | --- | ---             | --- | ---  | --- | ---  | --- | ---   | --- |
| 63-68                        | ---               | --- | ---  | --- | ---  | --- | ---  | --- | A               | A   | A    | A   | A    | A   | ---   | --- |

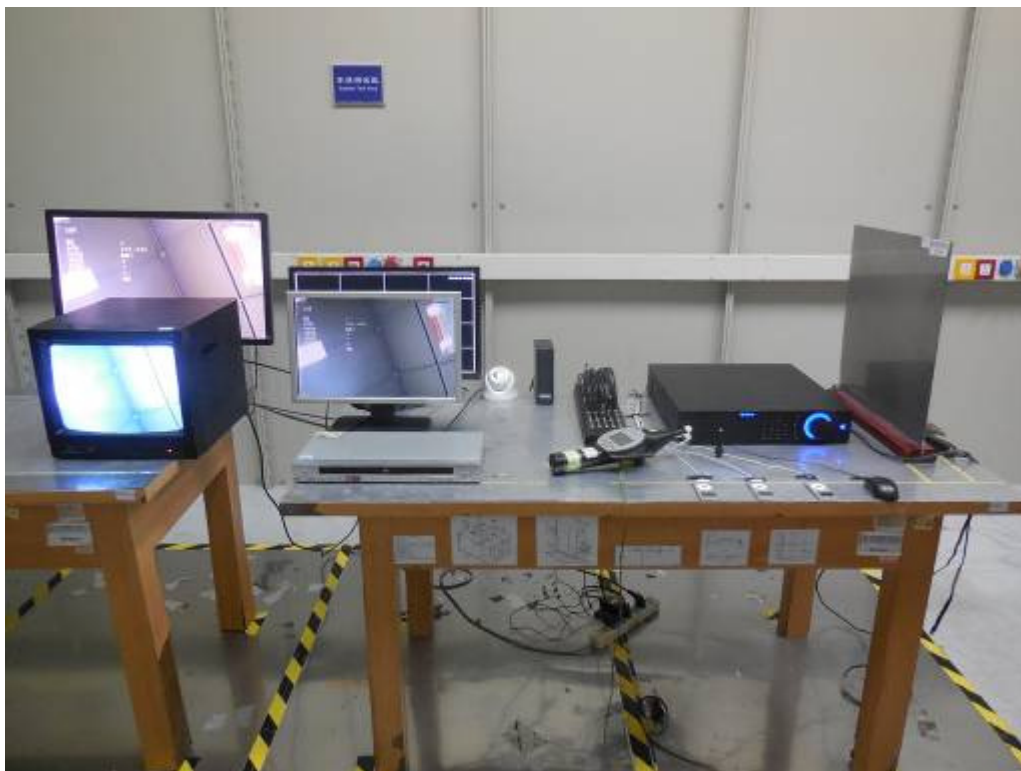


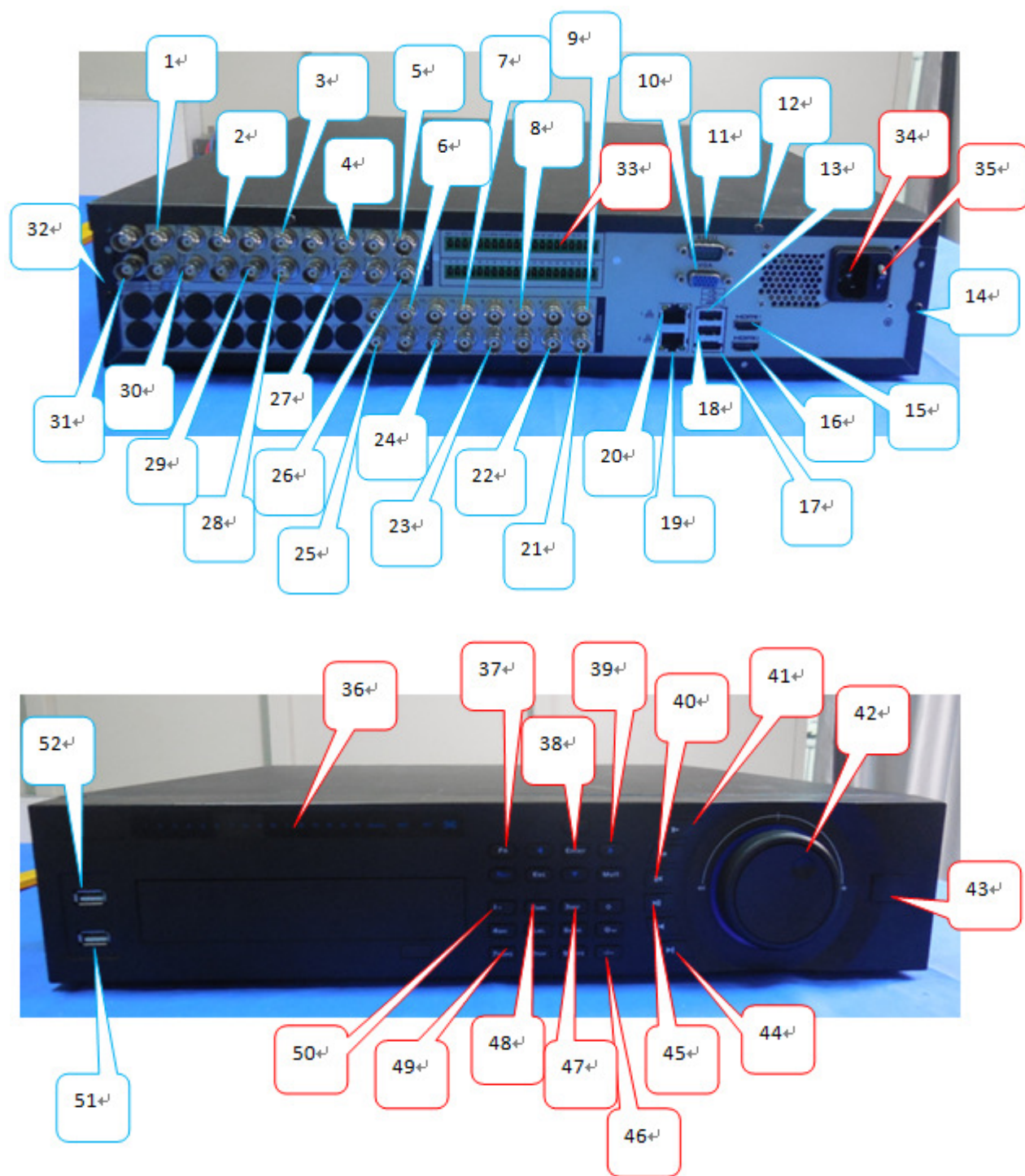
| Test Voltage: AC 253V/50Hz |                   |     |      |     |      |     |      |     |                 |     |      |     |      |     |       |     |
|----------------------------|-------------------|-----|------|-----|------|-----|------|-----|-----------------|-----|------|-----|------|-----|-------|-----|
|                            | Contact Discharge |     |      |     |      |     |      |     | Air Discharge   |     |      |     |      |     |       |     |
|                            | 25 times / each   |     |      |     |      |     |      |     | 10 times / each |     |      |     |      |     |       |     |
| Voltage                    | 2 kV              |     | 4 kV |     | 6 kV |     | 8 kV |     | 2 kV            |     | 4 kV |     | 8 kV |     | 10 kV |     |
| Point\Polarity             | +                 | -   | +    | -   | +    | -   | +    | -   | +               | -   | +    | -   | +    | -   | +     | -   |
| HCP                        | A                 | A   | A    | A   | A    | A   | ---  | --- | ---             | --- | ---  | --- | ---  | --- | ---   | --- |
| VCP                        | A                 | A   | A    | A   | A    | A   | ---  | --- | ---             | --- | ---  | --- | ---  | --- | ---   | --- |
| 1-32                       | A                 | A   | A    | A   | A    | A   | ---  | --- | ---             | --- | ---  | --- | ---  | --- | ---   | --- |
| 33-50                      | ---               | --- | ---  | --- | ---  | --- | ---  | --- | A               | A   | A    | A   | A    | A   | ---   | --- |
| 51-62                      | A                 | A   | A    | A   | A    | A   | ---  | --- | ---             | --- | ---  | --- | ---  | --- | ---   | --- |
| 63-68                      | ---               | --- | ---  | --- | ---  | --- | ---  | --- | A               | A   | A    | A   | A    | A   | ---   | --- |

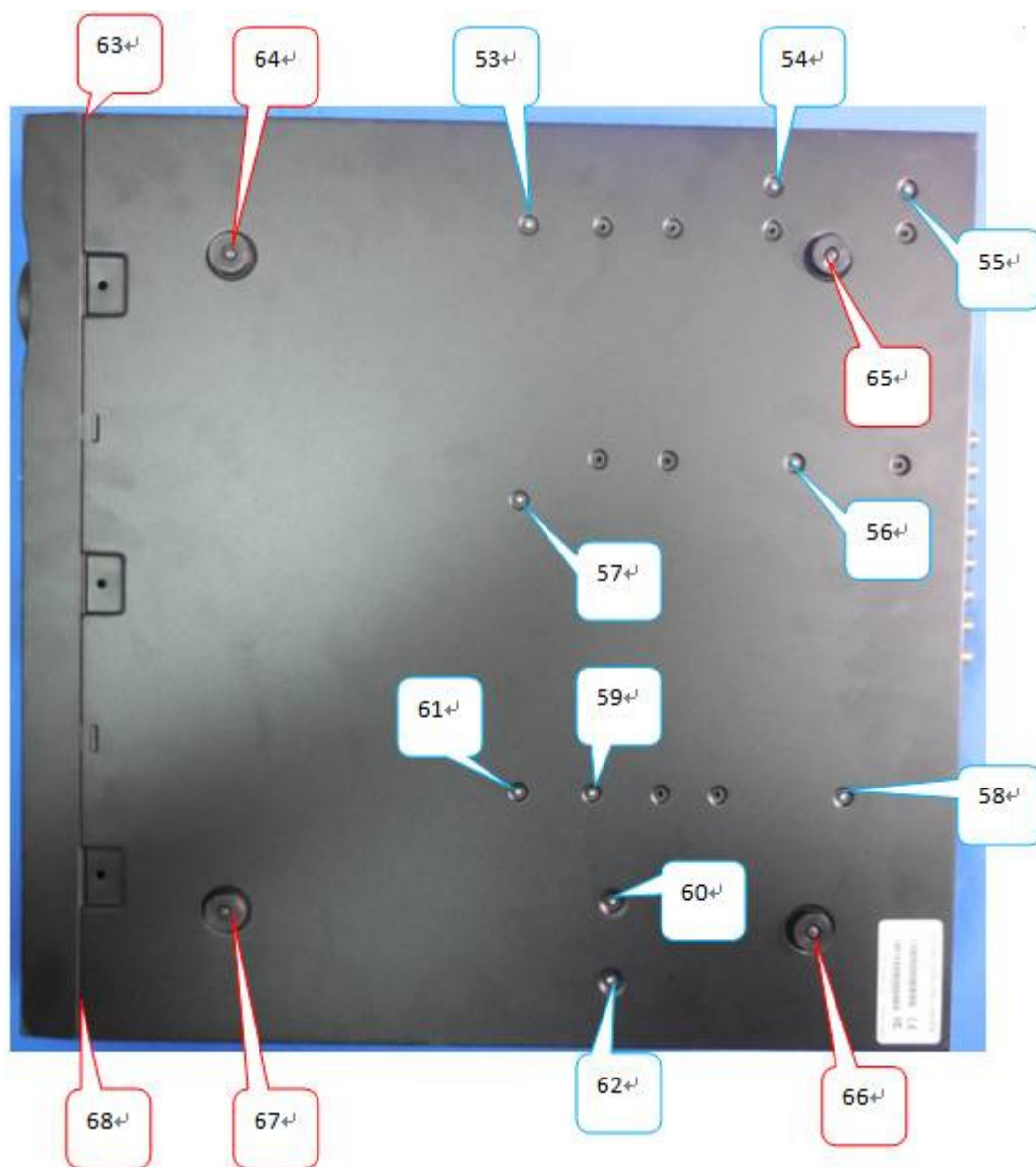
Test engineer:



## 8.6. Test Photographs









## 9. Radio Frequency electromagnetic field immunity test

### 9.1. Test Procedure

- a. The equipment to be tested is placed in the center of the enclosure on a wooden table. The equipment is then connected to power and signal leads according to pertinent installation instructions.
- b. The required field strength is determined by placing the field strength meter(s) on top of or directly alongside the equipment under test and monitoring the field strength meter via a remote field strength indicator outside the enclosure while adjusting the continuous-wave to the applicable antennae.
- c. The test is normally performed with the antenna facing the most sensitive side of the EUT. The polarization of the field generated by the bucolical antenna necessitates testing each position twice, once with the antenna positioned vertically and again with the antenna positioned horizontally. The circular polarization of the field from the log-spiral antenna makes a change of position of the antenna unnecessary.
- d. At each of the above conditions, the frequency range is swept 80-2700 MHz, pausing to adjust the R.F. signal level or to switch oscillators and antenna. The rate of sweep is in the order of  $1.5 \times 10^{-3}$  decades/s. The sensitive frequencies or frequencies of dominant interest may be discretely analyzed.





## 9.2. Test Severity Levels

|    | Condition of Test              | Remarks                                                                |
|----|--------------------------------|------------------------------------------------------------------------|
| 1. | Field Strength                 | 10 V/m                                                                 |
| 2. | Radiated Signal                | AM 80% Modulated with 1kHz<br>Pulse modulation 1Hz (0.5s ON; 0.5s OFF) |
| 3. | Scanning Frequency             | 80MHz - 2700MHz                                                        |
| 4. | Dwell Time                     | 3 Seconds                                                              |
| 5. | Frequency step size $\Delta f$ | 1%                                                                     |
| 6. | The rate of Swept of Frequency | 1.5 x 10 <sup>-3</sup> decades/s                                       |

## 9.3. Measurement equipment

| Instrument/Ancillary           | Manufacturer  | Model No.                | Serial No. | Calibration Date | Valid Date. |
|--------------------------------|---------------|--------------------------|------------|------------------|-------------|
| Signal Generator               | R&S           | SML03                    | 103287     | 2014.03.24       | 2015.03.23  |
| Power Sensor                   | R&S           | NR P-Z91                 | 100383     | 2014.03.24       | 2015.03.23  |
| Power Sensor                   | R&S           | NRP-Z91                  | 100384     | 2014.03.24       | 2015.03.23  |
| Power Meter                    | R&S           | NRP                      | 101206     | 2014.03.24       | 2015.03.23  |
| Power Amplifier                | BONN          | BLWA0830-16<br>0/100/40D | 076659     | 2014.03.24       | 2015.03.23  |
| Istropic Electric Field Probe  | EST.LINDGREEN | HI-6105                  | 137445     | 2013.09.03       | 2014.09.02  |
| EMS Antenna                    | R&S           | HL046E                   | 100028     | N/A              | N/A         |
| Temperature/<br>Humidity Meter | feiyang       | N/A                      | 101        | 2014.03.31       | 2015.03.30  |



#### 9.4. Test Result and Data

Basic Standard : IEC 61000-4-3  
Product Standard : EN 50130-4: 2011  
Product Standard : EN 55024 : 2010  
Equipment : HDCVI Digital Video Recorder  
Model No. : HCVR7816S  
Final Test Result : PASS  
Temperature : 22° C  
Relative Humidity : 50%  
Atmospheric Pressure : 100 kPa  
Test Date : May 05, 2014

Test Mode 1: Normal Operation

For EN 55024: 2010

Test Voltage: AC 230V/50Hz

| Modulation : AM 80% , 1KHz sine wave , Dwell time: 3.0 S |                      |       |                      |        |
|----------------------------------------------------------|----------------------|-------|----------------------|--------|
| Frequency Step Size : 1 % of preceding frequency value   |                      |       |                      |        |
| Frequency (MHz)                                          | Antenna Polarization | face  | Field strength (V/m) | Result |
| 80~1000                                                  | Horizontal &Vertical | Front | 3 V/m                | A      |
| 80~1000                                                  | Horizontal &Vertical | Rear  | 3 V/m                | A      |
| 80~1000                                                  | Horizontal &Vertical | Left  | 3 V/m                | A      |
| 80~1000                                                  | Horizontal &Vertical | Right | 3 V/m                | A      |

For EN 50130-4: 2011

Test Voltage: AC 230V/50Hz

| Modulation : AM 80% , 1KHz sine wave , Dwell time: 3.0S |                      |       |                      |        |
|---------------------------------------------------------|----------------------|-------|----------------------|--------|
| Frequency Step Size : 1 % of preceding frequency value  |                      |       |                      |        |
| Frequency (MHz)                                         | Antenna Polarization | face  | Field strength (V/m) | Result |
| 80~2700                                                 | Horizontal &Vertical | Front | 10 V/m               | A      |
| 80~2700                                                 | Horizontal &Vertical | Rear  | 10 V/m               | A      |
| 80~2700                                                 | Horizontal &Vertical | Left  | 10 V/m               | A      |
| 80~2700                                                 | Horizontal &Vertical | Right | 10 V/m               | A      |





Test Voltage: AC 195.5V/50Hz

| Modulation : AM 80% , 1KHz sine wave , Dwell time: 3.0 S |                       |       |                      |        |
|----------------------------------------------------------|-----------------------|-------|----------------------|--------|
| Frequency Step Size : 1 % of preceding frequency value   |                       |       |                      |        |
| Frequency (MHz)                                          | Antenna Polarization  | face  | Field strength (V/m) | Result |
| 80~2700                                                  | Horizontal & Vertical | Front | 10 V/m               | A      |
| 80~2700                                                  | Horizontal & Vertical | Rear  | 10 V/m               | A      |
| 80~2700                                                  | Horizontal & Vertical | Left  | 10 V/m               | A      |
| 80~2700                                                  | Horizontal & Vertical | Right | 10 V/m               | A      |

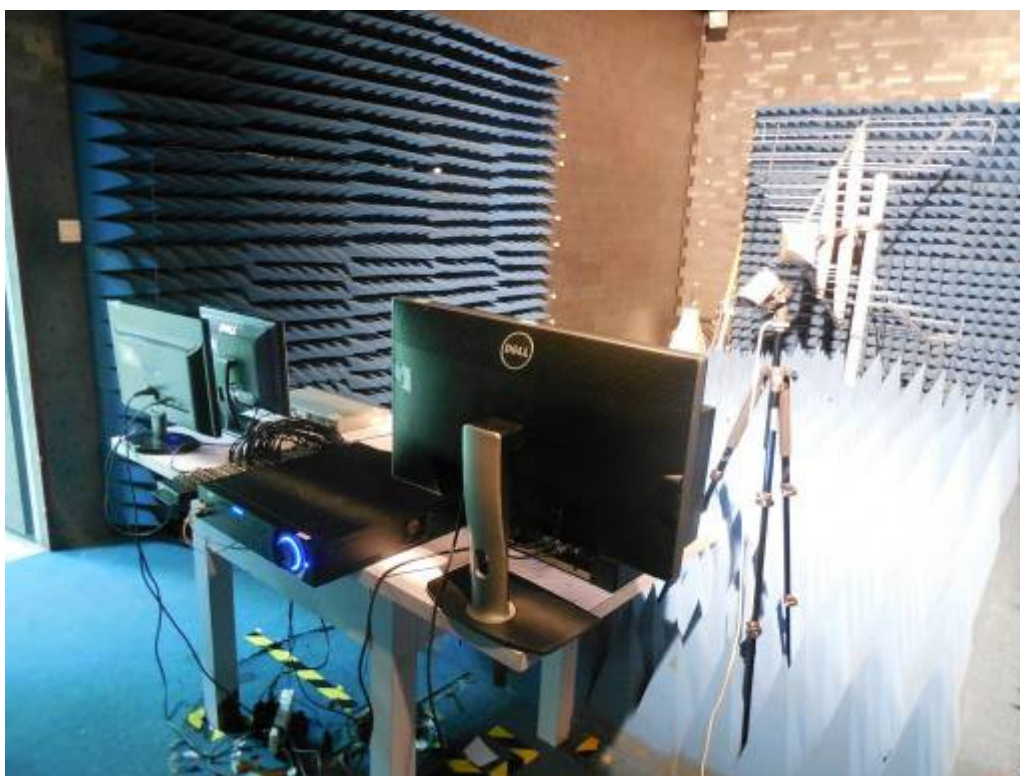
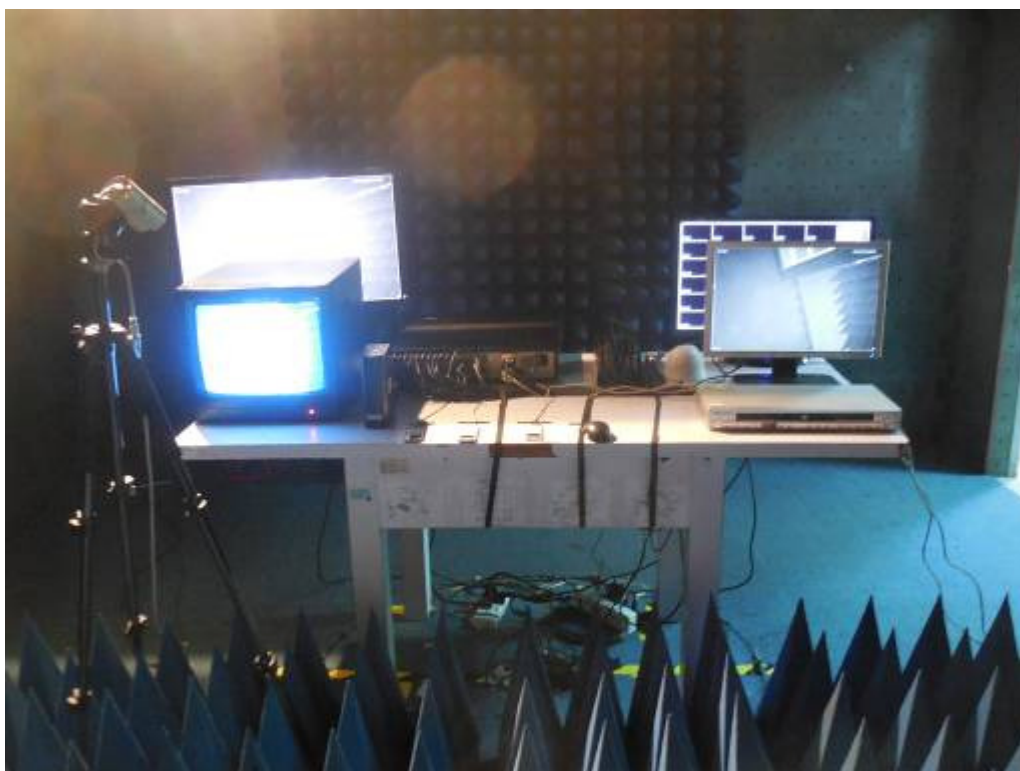
Test Voltage: AC 253V/50Hz

| Modulation : AM 80% , 1KHz sine wave , Dwell time: 3.0 S |                       |       |                      |        |
|----------------------------------------------------------|-----------------------|-------|----------------------|--------|
| Frequency Step Size : 1 % of preceding frequency value   |                       |       |                      |        |
| Frequency (MHz)                                          | Antenna Polarization  | face  | Field strength (V/m) | Result |
| 80~2700                                                  | Horizontal & Vertical | Front | 10 V/m               | A      |
| 80~2700                                                  | Horizontal & Vertical | Rear  | 10 V/m               | A      |
| 80~2700                                                  | Horizontal & Vertical | Left  | 10 V/m               | A      |
| 80~2700                                                  | Horizontal & Vertical | Right | 10 V/m               | A      |

Test engineer: Seben



## 9.5. Test Photographs





## 10. Electrical Fast Transient/ Burst Immunity Test

### 10.1. Test Procedure

- a. In order to minimize the effect of environmental parameters on test results, the climatic conditions when test is carrying out shall comply with the following requirements:
  - ✧ ambient temperature: 15°C to 35°C;
  - ✧ relative humidity : 45% to 75%;
  - ✧ Atmospheric pressure: 86 Kpa (860 hPa) to 106 Kpa (1060 hPa).
- b. In order to minimize the effect of environmental parameters on test results, the electromagnetic environment of the laboratory shall not influence the test results.
- c. The variety and diversity of equipment and systems to be tested make it difficult to establish general criteria for the evaluation of the effects of fast transients/bursts on equipment and systems.
- d. Test on Power Line:
  - ✧ The EFT/B-generator was located on the GRP.. The length from the EFT/B-generator to the EUT is not exceeding 1 m.
  - ✧ The EFT/B-generator provides the ability to apply the test voltage in a non-symmetrical condition to the power supply input terminals of the EUT.
- e. Test on Communication Lines
  - ✧ The coupling clamp is composed of a clamp unit for housing the cable (length more than 3 m), and was placed on the GRP.
  - ✧ The coupling clamp provides the ability of coupling the fast transient/bursts to the cable under test.
- f. The test results may be classified on the basic of the operating conditions and the functional specification of the equipment under test, according to the following performance criteria :
  - ✧ Normal performance within the specification limits.
  - ✧ Temporary degradation or loss of function or performance which is self-recoverable.
  - ✧ Temporary degradation or loss of function or performance which requires operator intervention or system reset.
  - ✧ Degradation or loss of function which is not recoverable due to damage of equipment (components).



## 10.2. Test Severity Levels

The following test severity levels are recommended for the fast transient/burst test :

| Open circuit output test voltage $\pm 10\%$ |                 |                                      |
|---------------------------------------------|-----------------|--------------------------------------|
| Level                                       | On Power Supply | On I/O signal, data and control line |
| 1                                           | 0.5 KV          | 0.25 KV                              |
| 2                                           | 1.0 KV          | 0.50 KV                              |
| 3                                           | 2.0 KV          | 1.00 KV                              |
| 4                                           | 4.0 KV          | 2.00 KV                              |
| X                                           | Specified       | Specified                            |

Remark : “ X ” is an open level. The level is subject to negotiation between the user and the manufacturer or is specified by the manufacturer.

## 10.3. Measurement equipment

| Instrument/Ancillary        | Manufacturer | Model No.     | Serial No. | Calibration Date | Valid Date. |
|-----------------------------|--------------|---------------|------------|------------------|-------------|
| TRANSIENT                   | EMCPARTNER   | TRA2000IN6    | 901        | 2014.03.24       | 2015.03.23  |
| CDN                         | EMCPARTNER   | CDN2000-06-32 | 121        | 2014.03.24       | 2015.03.23  |
| Coupling clamp              | EMCPARTNER   | CN-EFT1000    | 547        | 2014.03.24       | 2015.03.23  |
| Temperature/ Humidity Meter | Zhicheng     | ZC1-11        | CEP-TH-005 | 2014.03.31       | 2015.03.30  |

**10.4. Test Result and Data**

Basic Standard : IEC 61000-4-4  
 Product Standard : EN 50130-4: 2011  
 Product Standard : EN 55024 : 2010  
 Equipment : HDCVI Digital Video Recorder  
 Model No. : HCVR7816S  
 Final Test Result : PASS  
 Temperature : 22°C  
 Relative Humidity : 49 %  
 Atmospheric Pressure : 100 kPa  
 Test Date : May 07, 2014

Test Mode 1: Normal Operation

For EN 55024: 2010

Test Voltage: AC 230V/50Hz

|                                        |        |                                            |     |               |     |
|----------------------------------------|--------|--------------------------------------------|-----|---------------|-----|
| Pulse : 5/50 ns                        |        | Repetition Rate: <u>5 kHz</u> above 2.0 kV |     |               |     |
| Burst : 15m/300ms                      |        | 5 <u>kHz</u> below and equal 2.0 kV        |     |               |     |
| Test time : 1 min/each condition       |        |                                            |     |               |     |
| Voltage/ Mode/ Polarity/ Result/ Phase |        | <u>0.5 kV</u>                              |     | <u>1.0 kV</u> |     |
|                                        |        | +                                          | —   | +             | —   |
| Power Line                             | L      | ---                                        | --- | A             | A   |
|                                        | N      | ---                                        | --- | A             | A   |
|                                        | L-N    | ---                                        | --- | A             | A   |
|                                        | PE     | ---                                        | --- | A             | A   |
|                                        | L-PE   | ---                                        | --- | A             | A   |
|                                        | N-PE   | ---                                        | --- | A             | A   |
|                                        | L-N-PE | ---                                        | --- | A             | A   |
| Signal Line                            | BNC    | A                                          | A   | ---           | --- |
|                                        | RJ45   | A                                          | A   | ---           | --- |



For EN 50130-4: 2011

Test Voltage: AC 230V/50Hz

|                                        |        |                                         |     |               |     |
|----------------------------------------|--------|-----------------------------------------|-----|---------------|-----|
| Pulse : 5/50 ns                        |        | Repetition Rate: 5/100 kHz above 2.0 kV |     |               |     |
| Burst : 15m/300ms                      |        | 5/100 kHz below and equal 2.0 kV        |     |               |     |
| Test time : 1 min/each condition       |        |                                         |     |               |     |
| Voltage/ Mode/ Polarity/ Result/ Phase |        | <u>1 kV</u>                             |     | <u>2.0 kV</u> |     |
|                                        |        | +                                       | —   | +             | —   |
| Power Line                             | L      | ---                                     | --- | A             | A   |
|                                        | N      | ---                                     | --- | A             | A   |
|                                        | L-N    | ---                                     | --- | A             | A   |
|                                        | PE     | ---                                     | --- | A             | A   |
|                                        | L-PE   | ---                                     | --- | A             | A   |
|                                        | N-PE   | ---                                     | --- | A             | A   |
|                                        | L-N-PE | ---                                     | --- | A             | A   |
| Signal Line                            | RJ45   | A                                       | A   | ---           | --- |
|                                        | BNC    | A                                       | A   | ---           | --- |

Test Voltage: AC 195.5V/50Hz

|                                        |        |                                         |     |               |     |
|----------------------------------------|--------|-----------------------------------------|-----|---------------|-----|
| Pulse : 5/50 ns                        |        | Repetition Rate: 5/100 kHz above 2.0 kV |     |               |     |
| Burst : 15m/300ms                      |        | 5/100 kHz below and equal 2.0 kV        |     |               |     |
| Test time : 1 min/each condition       |        |                                         |     |               |     |
| Voltage/ Mode/ Polarity/ Result/ Phase |        | <u>1 kV</u>                             |     | <u>2.0 kV</u> |     |
|                                        |        | +                                       | —   | +             | —   |
| Power Line                             | L      | ---                                     | --- | A             | A   |
|                                        | N      | ---                                     | --- | A             | A   |
|                                        | L-N    | ---                                     | --- | A             | A   |
|                                        | PE     | ---                                     | --- | A             | A   |
|                                        | L-PE   | ---                                     | --- | A             | A   |
|                                        | N-PE   | ---                                     | --- | A             | A   |
|                                        | L-N-PE | ---                                     | --- | A             | A   |
| Signal Line                            | RJ45   | A                                       | A   | ---           | --- |
|                                        | BNC    | A                                       | A   | ---           | --- |



Test Voltage: AC 253V/50Hz

|                                        |        |                                         |     |               |     |
|----------------------------------------|--------|-----------------------------------------|-----|---------------|-----|
| Pulse : 5/50 ns                        |        | Repetition Rate: 5/100 kHz above 2.0 kV |     |               |     |
| Burst : 15m/300ms                      |        | 5/100 kHz below and equal 2.0 kV        |     |               |     |
| Test time : 1 min/each condition       |        |                                         |     |               |     |
| Voltage/ Mode/ Polarity/ Result/ Phase |        | <u>1 kV</u>                             |     | <u>2.0 kV</u> |     |
|                                        |        | +                                       | —   | +             | —   |
| Power Line                             | L      | ---                                     | --- | A             | A   |
|                                        | N      | ---                                     | --- | A             | A   |
|                                        | L-N    | ---                                     | --- | A             | A   |
|                                        | PE     | ---                                     | --- | A             | A   |
|                                        | L-PE   | ---                                     | --- | A             | A   |
|                                        | N-PE   | ---                                     | --- | A             | A   |
|                                        | L-N-PE | ---                                     | --- | A             | A   |
| Signal Line                            | RJ45   | A                                       | A   | ---           | --- |
|                                        | BNC    | A                                       | A   | ---           | --- |

Test engineer: Seben





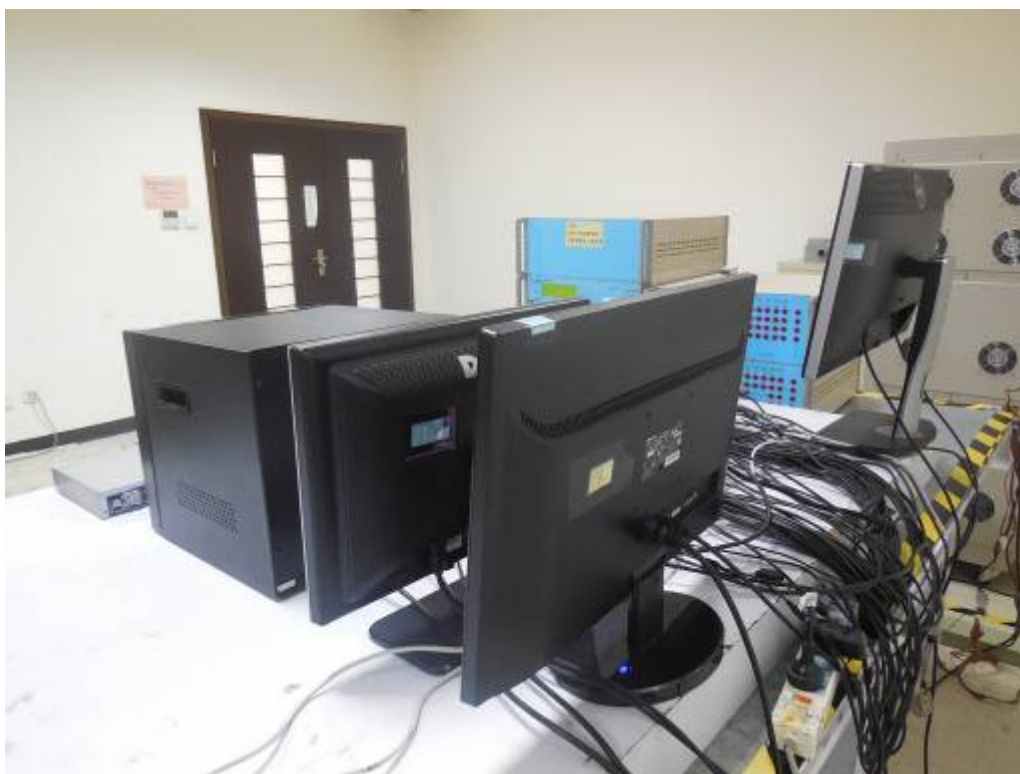
## 10.5. Test Photographs

Main





BNC





LAN





## 11. Surge Immunity Test

### 11.1. Test Procedure

a. Climatic conditions

The climatic conditions shall comply with the following requirements :

- ✧ ambient temperature : 15 °C to 35 °C
- ✧ relative humidity : 10 % to 75 %
- ✧ atmospheric pressure : 86 kPa to 106 kPa ( 860 hPa to 1060 hPa )

b. Electromagnetic conditions

the electromagnetic environment of the laboratory shall not influence the test results.

c. The test shall be performed according the test plan that shall specify the test set-up with

- ✧ generator and other equipment utilized;
- ✧ test level ( voltage/current );
- ✧ generator source impedance;
- ✧ internal or external generator trigger;
- ✧ number of tests : at least five positive and five negative at the selected points;
- ✧ repetition rate : maximum 1/min.
- ✧ inputs and outputs to be tested;
- ✧ representative operating conditions of the EUT;
- ✧ sequence of application of the surge to the circuit;
- ✧ phase angle in the case of AC. power supply;
- ✧ actual installation conditions, for example :

AC : neutral earthed,

DC : ( + ) or ( - ) earthed to simulated the actual earthing conditions.

- d. If not otherwise specified the surges have to be applied synchronized to the voltage phase at the zero-crossing and the peak value of the AC. voltage wave ( positive and negative ).
- e. The surges have to be applied line to line and line(s) and earth. When testing line to earth, the test voltage has to be applied successively between each of the lines and earth, if there is no other specification.
- f. The test procedure shall also consider the non-linear current-voltage characteristics of the equipment under test. Therefore the test voltage has to be increased by steps up to the test level specified in the product standard or test plan.
- g. All lower levels including the selected test level shall be satisfied. For testing the secondary protection, the output voltage of the generator shall be increased up to the worst-case voltage breakdown level ( let-through level ) of the primary protection.
- h. If the actual operating signal sources are not available, that may be simulated. Under no circumstances may the test level exceed the product specification. The test shall be carried out according to a test plan.
- i. To find all critical points of the duty cycle of the equipment, a sufficient number of positive and negative test pulses shall be applied. For acceptance test previously unstressed equipment shall be used to the protection devices shall be replaced.





### 11.2. Test Severity Level

| Level                                                                                 | Open-circuit test voltage, $\pm 10\%$ , KV |
|---------------------------------------------------------------------------------------|--------------------------------------------|
| 1                                                                                     | 0.5                                        |
| 2                                                                                     | 1.0                                        |
| 3                                                                                     | 2.0                                        |
| 4                                                                                     | 4.0                                        |
| X                                                                                     | Specified                                  |
| NOTE: "X" is an open class. This level can be specified in the product specification. |                                            |

### 11.3. Measurement equipment

| Instrument/Ancillary        | Manufacturer | Model No.     | Serial No. | Calibration Date | Valid Date. |
|-----------------------------|--------------|---------------|------------|------------------|-------------|
| TRANSIENT                   | EMCPARTNER   | TRA2000IN6    | 901        | 2014.03.24       | 2015.03.23  |
| CDN                         | EMCPARTNER   | CDN-UTP8      | 021        | 2014.03.24       | 2015.03.23  |
| CDN                         | EMCPARTNER   | CDN2000-06-32 | 121        | 2014.03.24       | 2015.03.23  |
| Temperature/ Humidity Meter | Zhicheng     | ZC1-11        | CEP-TH-005 | 2014.03.31       | 2015.03.30  |

**11.4. Test Result and Data**

Basic Standard : IEC 61000-4-5  
 Product Standard : EN 50130-4: 2011  
 Product Standard : EN 55024 : 2010  
 Equipment : HDCVI Digital Video Recorder  
 Model No. : HCVR7816S  
 Final Test Result : PASS  
 Temperature : 22°C  
 Relative Humidity : 49 %  
 Atmospheric Pressure : 100 kPa  
 Test Date : May 08, 2014

Test Mode 1: Normal Operation

For EN 55024: 2010

Test Voltage: AC 230V/50Hz

|                                                                                          |      |   |    |     |      |      |
|------------------------------------------------------------------------------------------|------|---|----|-----|------|------|
| Test Voltage:230V/50Hz                                                                   |      |   |    |     |      |      |
| Waveform : 1.2/50μs(8/20μs)    Repetition rate : 60 sec    Time : 20 time/each condition |      |   |    |     |      |      |
| /Phase Voltage / Mode / Polarity / Result                                                |      |   | 0° | 90° | 180° | 270° |
| 0.5/1.0 kV                                                                               | L-N  | + | A  | A   | A    | A    |
|                                                                                          |      | — | A  | A   | A    | A    |
| 0.5/1.0/2.0kV                                                                            | L-PE | + | A  | A   | A    | A    |
|                                                                                          |      | — | A  | A   | A    | A    |
|                                                                                          | N-PE | + | A  | A   | A    | A    |
|                                                                                          |      | — | A  | A   | A    | A    |

|                                                                                |        |   |      |   |
|--------------------------------------------------------------------------------|--------|---|------|---|
| Waveform :10/700μs    Repetition rate : 60 sec    Time : 5 time/each condition |        |   |      |   |
| Voltage                                                                        | 0.5 kV |   | 1 kV |   |
| Mode / Polarity / Result                                                       | +      | — | +    | — |
| RJ45                                                                           | A      | A | A    | A |
| BNC                                                                            | A      | A | A    | A |



For EN 50130-4: 2011

|                                                                                                      |      |   |    |     |      |      |
|------------------------------------------------------------------------------------------------------|------|---|----|-----|------|------|
| Test Voltage:230V/50Hz                                                                               |      |   |    |     |      |      |
| Waveform : 1.2/50 $\mu$ s(8/20 $\mu$ s)    Repetition rate : 60 sec    Time : 20 time/each condition |      |   |    |     |      |      |
| /Phase Voltage / Mode / Polarity / Result                                                            |      |   | 0° | 90° | 180° | 270° |
| 0.5/1.0 kV                                                                                           | L-N  | + | A  | A   | A    | A    |
|                                                                                                      |      | — | A  | A   | A    | A    |
| 0.5/1.0/2.0kV                                                                                        | L-PE | + | A  | A   | A    | A    |
|                                                                                                      |      | — | A  | A   | A    | A    |
|                                                                                                      | N-PE | + | A  | A   | A    | A    |
|                                                                                                      |      | — | A  | A   | A    | A    |

|                                                                                                     |  |        |   |      |
|-----------------------------------------------------------------------------------------------------|--|--------|---|------|
| Waveform : 1.2/50 $\mu$ s(8/20 $\mu$ s)    Repetition rate : 60 sec    Time : 5 time/each condition |  |        |   |      |
| Voltage                                                                                             |  | 0.5 kV |   | 1 kV |
| Mode / Polarity / Result                                                                            |  | +      | — | +    |
| RJ45                                                                                                |  | A      | A | A    |
| BNC                                                                                                 |  | A      | A | A    |

|                                                                                       |  |        |   |      |
|---------------------------------------------------------------------------------------|--|--------|---|------|
| Waveform : 10/700 $\mu$ s    Repetition rate : 60 sec    Time : 5 time/each condition |  |        |   |      |
| Voltage                                                                               |  | 0.5 kV |   | 1 kV |
| Mode / Polarity / Result                                                              |  | +      | — | +    |
| RJ45                                                                                  |  | A      | A | A    |
| BNC                                                                                   |  | A      | A | A    |

|                                                                                                      |      |   |    |     |      |      |
|------------------------------------------------------------------------------------------------------|------|---|----|-----|------|------|
| Test Voltage:195.5V/50Hz                                                                             |      |   |    |     |      |      |
| Waveform : 1.2/50 $\mu$ s(8/20 $\mu$ s)    Repetition rate : 60 sec    Time : 20 time/each condition |      |   |    |     |      |      |
| /Phase Voltage / Mode / Polarity / Result                                                            |      |   | 0° | 90° | 180° | 270° |
| 0.5/1.0 kV                                                                                           | L-N  | + | A  | A   | A    | A    |
|                                                                                                      |      | — | A  | A   | A    | A    |
| 0.5/1.0/2.0kV                                                                                        | L-PE | + | A  | A   | A    | A    |
|                                                                                                      |      | — | A  | A   | A    | A    |
|                                                                                                      | N-PE | + | A  | A   | A    | A    |
|                                                                                                      |      | — | A  | A   | A    | A    |





|                                                                                                     |        |   |      |   |
|-----------------------------------------------------------------------------------------------------|--------|---|------|---|
| Waveform : 1.2/50 $\mu$ s(8/20 $\mu$ s)    Repetition rate : 60 sec    Time : 5 time/each condition |        |   |      |   |
| Voltage                                                                                             | 0.5 kV |   | 1 kV |   |
| Mode / Polarity / Result                                                                            | +      | — | +    | — |
| RJ45                                                                                                | A      | A | A    | A |
| BNC                                                                                                 | A      | A | A    | A |

|                                                                                       |        |   |      |    |
|---------------------------------------------------------------------------------------|--------|---|------|----|
| Waveform : 10/700 $\mu$ s    Repetition rate : 60 sec    Time : 5 time/each condition |        |   |      |    |
| Voltage                                                                               | 0.5 kV |   | 1 kV |    |
| Mode / Polarity / Result                                                              | +      | — | +    | —  |
| RJ45                                                                                  | A      | A | A    | A  |
| BNC                                                                                   | A      | A | A    | AA |

|                                                                                                      |      |   |    |     |      |      |
|------------------------------------------------------------------------------------------------------|------|---|----|-----|------|------|
| Test Voltage:253V/50Hz                                                                               |      |   |    |     |      |      |
| Waveform : 1.2/50 $\mu$ s(8/20 $\mu$ s)    Repetition rate : 60 sec    Time : 20 time/each condition |      |   |    |     |      |      |
| /Phase Voltage / Mode / Polarity / Result                                                            |      |   | 0° | 90° | 180° | 270° |
| 0.5/1.0 kV                                                                                           | L-N  | + | A  | A   | A    | A    |
|                                                                                                      |      | — | A  | A   | A    | A    |
| 0.5/1.0/2.0kV                                                                                        | L-PE | + | A  | A   | A    | A    |
|                                                                                                      |      | — | A  | A   | A    | A    |
|                                                                                                      | N-PE | + | A  | A   | A    | A    |
|                                                                                                      |      | — | A  | A   | A    | A    |

|                                                                                                     |        |   |      |   |
|-----------------------------------------------------------------------------------------------------|--------|---|------|---|
| Waveform : 1.2/50 $\mu$ s(8/20 $\mu$ s)    Repetition rate : 60 sec    Time : 5 time/each condition |        |   |      |   |
| Voltage                                                                                             | 0.5 kV |   | 1 kV |   |
| Mode / Polarity / Result                                                                            | +      | — | +    | — |
| RJ45                                                                                                | A      | A | A    | A |
| BNC                                                                                                 | A      | A | A    | A |



|                                                                                       |        |   |      |   |
|---------------------------------------------------------------------------------------|--------|---|------|---|
| Waveform : 10/700 $\mu$ s    Repetition rate : 60 sec    Time : 5 time/each condition |        |   |      |   |
| Voltage                                                                               | 0.5 kV |   | 1 kV |   |
| Mode / Polarity / Result                                                              | +      | — | +    | — |
| RJ45                                                                                  | A      | A | A    | A |
| BNC                                                                                   | A      | A | A    | A |

*Seben*

Test engineer:\_\_\_\_\_



## 11.5. Test Photographs





## 12. Conduction Disturbances induced by Radio-Frequency Fields

### 12.1. Test Procedure

- a. The EUT shall be operated within its intended climatic conditions. The temperature and relative humidity should be recorded.
- b. This test method test can be performed without using a sell shielded enclosure. This is because the disturbance levels applied and the geometry of the setups are not likely to radiated a high amount of energy, especially at the lower frequencies. If under certain circumstances the radiated energy is too high, a shielded enclosure has to be used.
- c. The test shall be 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 ohm load resistor.
- d. The frequency range is swept from 150 KHz to 100 MHz, using the signal levels established during the setting process, and with the disturbance signal 80% amplitude modulated with a 1KHz sign wave, pausing to adjust the RF-signal level or to switch coupling devices as necessary. The rate of sweep shall no exceed  $1.5 \times 10^{-3}$  decades/s. Where the frequency is swept incrementally, the step size shall no exceed 1% of the start and thereafter 1% of the preceding frequency value.
- e. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies e.g. clock frequency (ies) and harmonics or frequencies of dominant interest shall be analyzed separately.
- f. An alternative test procedure may be adopted, wherein the frequency range is swept incrementally, with a step size not exceeding 4% of the start ad thereafter 4% of the preceding frequency value. The test level should be at least twice the value of the specified test level.
- g. In cases of dispute, the test procedure using a step size not exceeding 1% of the start and thereafter 1% of preceding frequency value shall take precedence.
- h. Attempts should be made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility.
- i. The use of special exercising programs is recommended.
- j. Testing shall be performed according to a Test Plan, which shall be included in the test report.
- k. It may be necessary to carry out some investigatory testing in order to establish some aspects of the test plan.



## 12.2. Test Severity Levels

| Level                                                                                | Voltage Level ( emf.) |
|--------------------------------------------------------------------------------------|-----------------------|
| 1                                                                                    | 1 V                   |
| 2                                                                                    | 3 V                   |
| 3                                                                                    | 10 V                  |
| x                                                                                    | Specified             |
| NOTE - x is an open class. This level can be specified in the product specification. |                       |

## 12.3. Measurement equipment

| Instrument/Ancillary           | Manufacturer | Model No.   | Serial No. | Calibration Date | Valid Date. |
|--------------------------------|--------------|-------------|------------|------------------|-------------|
| Conducted immunity test system | FRANKONIA    | CIT-10/75   | 102D1294   | 2014.03.24       | 2015.03.23  |
| EM Injection clamp             | FCC          | F-203I-23MM | 536        | 2014.03.24       | 2015.03.23  |
| CDN                            | FRANKONIA    | CDN-T2      | A3010029   | 2014.03.24       | 2015.03.23  |
| CDN                            | FRANKONIA    | CDN-T4      | A3015017   | 2014.03.24       | 2015.03.23  |
| CDN                            | FRANKONIA    | CDN-T8      | A3022010   | 2014.03.24       | 2015.03.23  |
| CDN                            | FRANKONIA    | CDN-M2      | A3002037   | 2014.03.24       | 2015.03.23  |
| CDN                            | FRANKONIA    | CDN-M2+M3   | A3011102   | 2014.03.24       | 2015.03.23  |
| CDN                            | FCC          | CDN-M5/32   | A3013024   | 2014.03.24       | 2015.03.23  |
| 6 dB Attenuator                | FRANKONIA    | N/A         | N/A        | 2014.03.24       | 2015.03.23  |
| Temperature/ Humidity Meter    | Zhicheng     | ZC1-11      | CEP-TH-005 | 2014.03.31       | 2015.03.30  |

**12.4. Test Result and Data**

Basic Standard : IEC 61000-4-6  
Product Standard : EN 50130-4: 2011  
Product Standard : EN 55024 : 2010  
Equipment : HDCVI Digital Video Recorder  
Model No. : HCVR7816S  
Final Test Result : PASS  
Temperature : 22°C  
Relative Humidity : 49%  
Atmospheric Pressure : 100 kPa  
Test Date : May 09, 2014

Test Mode 1: Normal Operation

For EN 55024: 2010

Test Voltage: AC 230V/50Hz

| Frequency : 0.15~80MHz, Modulation : AM 80%,1KHz sine wave, Dwell time: 3.0s<br>Frequency Step Size : 1 % of preceding frequency value |           |            |        |
|----------------------------------------------------------------------------------------------------------------------------------------|-----------|------------|--------|
| Frequency                                                                                                                              | Test mode | Voltage(V) | Result |
| 0.15 ~ 80MHz                                                                                                                           | Power(M3) | 3          | A      |
| 0.15 ~ 80MHz                                                                                                                           | RJ45      | 3          | A      |
| 0.15 ~ 80MHz                                                                                                                           | BNC       | 3          | A      |

For EN 50130-4: 2011

Test Voltage: AC 230V/50Hz

| Frequency : 0.15~100MHz, Modulation : AM 80%,1KHz sine wave, Dwell time: 3.0s<br>Frequency Step Size : 1 % of preceding frequency value |           |            |        |
|-----------------------------------------------------------------------------------------------------------------------------------------|-----------|------------|--------|
| Frequency                                                                                                                               | Test mode | Voltage(V) | Result |
| 0.15 ~ 100MHz                                                                                                                           | Power(M3) | 10         | A      |
| 0.15 ~ 100MHz                                                                                                                           | RJ45      | 10         | A      |
| 0.15 ~ 100MHz                                                                                                                           | BNC       | 10         | A      |



Test Voltage: AC 195.5V/50Hz

| Frequency : 0.15~100MHz, Modulation : AM 80%,1KHz sine wave, Dwell time: 3.0s<br>Frequency Step Size : 1 % of preceding frequency value |           |            |        |
|-----------------------------------------------------------------------------------------------------------------------------------------|-----------|------------|--------|
| Frequency                                                                                                                               | Test mode | Voltage(V) | Result |
| 0.15 ~ 100MHz                                                                                                                           | Power(M3) | 10         | A      |
| 0.15 ~ 100MHz                                                                                                                           | RJ45      | 10         | A      |
| 0.15 ~ 100MHz                                                                                                                           | BNC       | 10         | A      |

Test Voltage: AC 253V/50Hz

| Frequency : 0.15~100MHz, Modulation : AM 80%,1KHz sine wave, Dwell time: 3.0s<br>Frequency Step Size : 1 % of preceding frequency value |           |            |        |
|-----------------------------------------------------------------------------------------------------------------------------------------|-----------|------------|--------|
| Frequency                                                                                                                               | Test mode | Voltage(V) | Result |
| 0.15 ~ 100MHz                                                                                                                           | Power(M3) | 10         | A      |
| 0.15 ~ 100MHz                                                                                                                           | RJ45      | 10         | A      |
| 0.15 ~ 100MHz                                                                                                                           | BNC       | 10         | A      |

Test engineer: Seben





## 12.5. Test Photographs

LAN





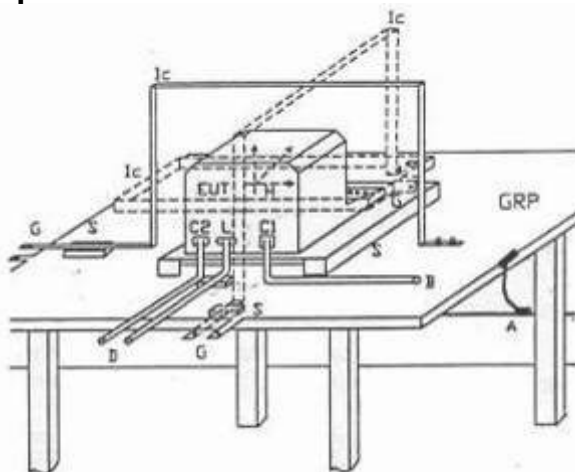
BNC





## 13. Power Frequency Magnetic Field Immunity Tests

### 13.1. Test Setup



|     |   |                      |    |   |                             |
|-----|---|----------------------|----|---|-----------------------------|
| GPR | : | Ground plane         | C1 | : | Power supply circuit        |
| A   | : | Safety earth         | C2 | : | Signal circuit              |
| S   | : | Insulating support   | L  | : | Communication line          |
| EUT | : | Equipment under test | B  | : | To power supply source      |
| Lc  | : | Induction coil       | D  | : | To signal source, simulator |
| E   | : | Earth terminal       | G  | : | To the test generator       |

### 13.1. Test Severity Levels

| Level                                                                              | Magnetic field strength<br>A/m |
|------------------------------------------------------------------------------------|--------------------------------|
| 1                                                                                  | 1                              |
| 2                                                                                  | 3                              |
| 3                                                                                  | 10                             |
| 4                                                                                  | 30                             |
| 5                                                                                  | 100                            |
| X <sup>1)</sup>                                                                    | special                        |
| NOTE 1 "X" is an open level. This level can be given in the product specification. |                                |

### 13.1. Measurement equipment

| Instrument/Ancillary        | Manufacturer | Model No.  | Serial No. | Calibration Date | Valid Date. |
|-----------------------------|--------------|------------|------------|------------------|-------------|
| TRANSIENT                   | EMCPARTNER   | TRA2000IN6 | 901        | 2014.03.24       | 2015.03.23  |
| H-Filed-Loop                | EMCPARTNER   | MF1000-1   | 144        | 2014.03.09       | 2015.03.08  |
| Temperature/ Humidity Meter | Zhicheng     | ZC1-11     | CEP-TH-005 | 2014.03.31       | 2015.03.30  |



### 13.1. Test Result and Data

Basic Standard : IEC 61000-4-8  
Product Standard : EN 55024 : 2010  
Equipment : HDCVI Digital Video Recorder  
Model No. : HCVR7816S  
Final Test Result : PASS  
Temperature : 22° C  
Relative Humidity : 49%  
Atmospheric Pressure : 100 kPa  
Test Date : May 11, 2014

#### Test Mode 1: Normal Operation

| Power Frequency Magnetic Field : <u>50</u> Hz, <u>1</u> A/m |                  |         |
|-------------------------------------------------------------|------------------|---------|
| Coil Orientation                                            | Testing duration | Results |
| X-axis                                                      | 1.0 Min          | A       |
| Y-axis                                                      | 1.0 Min          | A       |
| Z-axis                                                      | 1.0 Min          | A       |

Test engineer: 





## 13.2. Test Photographs





## 14. Voltage Dips and Voltage Interruptions Immunity Test Setup

### 14.1. Test Conditions

1. Source voltage and frequency : 230V / 50Hz, Single phase.
2. Test of interval : 10 sec.
3. Level and duration : Sequence of 3 dips/interrupts.
4. Voltage rise (and fall) time : 1 ~ 5  $\mu$ s.
5. Test severity :

| Voltage dips and Interrupt reduction (%) | Test Duration<br>(period) |
|------------------------------------------|---------------------------|
| >95%                                     | 250                       |
| 30%                                      | 25                        |
| >95%                                     | 0.5                       |

| Item                  | Environmental<br>Phenomena | Units                 | Test<br>Specification | Performance<br>Criteria |
|-----------------------|----------------------------|-----------------------|-----------------------|-------------------------|
| Input AC Power Ports  |                            |                       |                       |                         |
| Voltage Dips          |                            | % Reduction<br>period | 20<br>250             |                         |
|                       |                            | % Reduction<br>period | 30<br>25              |                         |
|                       |                            | % Reduction<br>period | 60<br>10              |                         |
| Voltage Interruptions |                            | % Reduction<br>period | 100<br>250            |                         |

### 14.2. Measurement equipment

| Instrument/Ancillary           | Manufacturer | Model No.  | Serial No. | Calibration<br>Date | Valid Date. |
|--------------------------------|--------------|------------|------------|---------------------|-------------|
| TRANSIENT                      | EMCPARTNER   | TRA2000IN6 | 901        | 2014.03.24          | 2015.03.23  |
| Temperature/ Humidity<br>Meter | Zhicheng     | ZC1-11     | CEP-TH-005 | 2014.03.31          | 2015.03.30  |



### 14.3. Test Result and Data

Basic Standard : IEC 61000-4-11  
Product Standard : EN 50130-4: 2011  
Product Standard : EN 55024 : 2010  
Equipment : HDCVI Digital Video Recorder  
Model No. : HCVR7816S  
Final Test Result : PASS  
Temperature : 22°C  
Relative Humidity : 49%  
Atmospheric Pressure : 100 kPa  
Test Date : May 10, 2014

Test Mode 1: Normal Operation

For EN 55024: 2010

| Voltage(UT): AC 100V/50 Hz Interval(s) : 10s Times : 3 |                    |                                |                |    |    |     |     |     |     |     |
|--------------------------------------------------------|--------------------|--------------------------------|----------------|----|----|-----|-----|-----|-----|-----|
| Test mod                                               | Test level<br>UT % | Durations<br>(period /<br>ms ) | Phase / Result |    |    |     |     |     |     |     |
|                                                        |                    |                                | 0              | 45 | 90 | 135 | 180 | 225 | 270 | 315 |
| Voltage interruptions                                  | >95%               | 250                            | C              | C  | C  | C   | C   | C   | C   | C   |
| Voltage dips                                           | 30%                | 25                             | B              | B  | B  | B   | B   | B   | B   | B   |
|                                                        | >95%               | 0.5                            | B              | B  | B  | B   | B   | B   | B   | B   |

| Voltage(UT): AC 230V/240 V/50 Hz Interval(s) : 10s Times : 3 |                    |                                |                |    |    |     |     |     |     |     |
|--------------------------------------------------------------|--------------------|--------------------------------|----------------|----|----|-----|-----|-----|-----|-----|
| Test mod                                                     | Test level<br>UT % | Durations<br>(period /<br>ms ) | Phase / Result |    |    |     |     |     |     |     |
|                                                              |                    |                                | 0              | 45 | 90 | 135 | 180 | 225 | 270 | 315 |
| Voltage interruptions                                        | >95%               | 250                            | C              | C  | C  | C   | C   | C   | C   | C   |
| Voltage dips                                                 | 30%                | 25                             | A              | A  | A  | A   | A   | A   | A   | A   |
|                                                              | >95%               | 0.5                            | A              | A  | A  | A   | A   | A   | A   | A   |





For EN 50130-4: 2011

| Test Voltage: AC 230V/50Hz Interval(s) : 10s Times : 3 |                    |                                |                |    |    |     |     |     |     |     |
|--------------------------------------------------------|--------------------|--------------------------------|----------------|----|----|-----|-----|-----|-----|-----|
| Test mod                                               | Test level<br>UT % | Durations<br>(period /<br>ms ) | Phase / Result |    |    |     |     |     |     |     |
|                                                        |                    |                                | 0              | 45 | 90 | 135 | 180 | 225 | 270 | 315 |
| Voltage interruptions                                  | 100%               | 250                            | A              | A  | A  | A   | A   | A   | A   | A   |
| Voltage dips                                           | 20%                | 250                            | A              | A  | A  | A   | A   | A   | A   | A   |
|                                                        | 30%                | 25                             | A              | A  | A  | A   | A   | A   | A   | A   |
|                                                        | 60%                | 10                             | A              | A  | A  | A   | A   | A   | A   | A   |

100% and 20% is permitted to UPS to meet the requirements of Result A.

| Test Voltage: AC 195.5V/50Hz Interval(s) : 10s Times : 3 |                    |                                |                |    |    |     |     |     |     |     |
|----------------------------------------------------------|--------------------|--------------------------------|----------------|----|----|-----|-----|-----|-----|-----|
| Test mod                                                 | Test level<br>UT % | Durations<br>(period /<br>ms ) | Phase / Result |    |    |     |     |     |     |     |
|                                                          |                    |                                | 0              | 45 | 90 | 135 | 180 | 225 | 270 | 315 |
| Voltage interruptions                                    | 100%               | 250                            | A              | A  | A  | A   | A   | A   | A   | A   |
| Voltage dips                                             | 20%                | 250                            | A              | A  | A  | A   | A   | A   | A   | A   |
|                                                          | 30%                | 25                             | A              | A  | A  | A   | A   | A   | A   | A   |
|                                                          | 60%                | 10                             | A              | A  | A  | A   | A   | A   | A   | A   |

100% and 20% is permitted to UPS to meet the requirements of Result A.

| Test Voltage: AC 253 V 50 Hz Interval(s) : 10s Times : 3 |                    |                                |                |    |    |     |     |     |     |     |
|----------------------------------------------------------|--------------------|--------------------------------|----------------|----|----|-----|-----|-----|-----|-----|
| Test mod                                                 | Test level<br>UT % | Durations<br>(period /<br>ms ) | Phase / Result |    |    |     |     |     |     |     |
|                                                          |                    |                                | 0              | 45 | 90 | 135 | 180 | 225 | 270 | 315 |
| Voltage interruptions                                    | 100%               | 250                            | A              | A  | A  | A   | A   | A   | A   | A   |
| Voltage dips                                             | 20%                | 250                            | A              | A  | A  | A   | A   | A   | A   | A   |
|                                                          | 30%                | 25                             | A              | A  | A  | A   | A   | A   | A   | A   |
|                                                          | 60%                | 10                             | A              | A  | A  | A   | A   | A   | A   | A   |

100% and 20% is permitted to UPS to meet the requirements of Result A.

Test engineer: Seben



#### 14.4. Test Photographs





## 15. EUT Photographs

### 1) EUT Photo



### 2) EUT Photo





3) EUT Photo



4) EUT Photo





5) EUT Photo

