



# EMC TEST REPORT

Authorized under **Declaration of Conformity**

According to

EN 55032: 2012+AC 2013 (Class B)

EN 61000-3-2 : 2014

EN 61000-3-3 : 2013

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 : 2014

IEC 61000-4-6 : 2013

IEC 61000-4-8 : 2009


IEC 61000-4-11 : 2004

Applicant : ZHEJIANG DAHUA VISION TECHNOLOGY CO.,LTD.

Address : No.1199, Bin'an Road, Binjiang District, Hangzhou, P.R. China

Equipment: NETWORK VIDEO RECORDER

Model No. : DHI-NVR4104-4KS2; DHI-NVR4108-4KS2;  
DHI-NVR4116-4KS2; NVR4104-4KS2;  
NVR4108-4KS2; NVR4116-4KS2;  
DHI-NVR4104HS-4KS2; DHI-NVR4108HS-4KS2;  
DHI-NVR4116HS-4KS2; NVR4104HS-4KS2;  
NVR4108HS-4KS2; NVR4116HS-4KS2; NVR2104-4KS2;  
NVR2108-4KS2; NVR2116-4KS2;  
DHI-NVR2104-4KS2; DHI-NVR2108-4KS2;  
DHI-NVR2116-4KS2; NVR2104HS-4KS2;  
NVR2108HS-4KS2; NVR2116HS-4KS2; DHI-NVR2104HS-4KS2;  
DHI-NVR2108HS-4KS2; DHI-NVR2116HS-4KS2;

Trade mark : 

## I HEREBY CERTIFY THAT :

The sample was received on Oct 12, 2016 and the testing was carried out on Dec 27, 2016 at CerpPASS Technology Corp. The test result refers exclusively to the test presented test model / sample. Without written approval of CerpPASS Technology Corp., the test report shall not be reproduced except in full.



# EMC TEST REPORT

Issued by:

**CerpPASS Technology (Suzhou) Co.,Ltd**

**No.66,Tangzhuang Road, Suzhou Industrial Park, Jiangsu 215006, China**

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The test record, data evaluation & Equipment Under Test configurations represented herein are true and accurate accounts of the measurements of the samples EMC characteristics under the conditions specified in this report.

The above equipment was tested by CerpPASS Technology Corp. for compliance with the requirements of technical standards specified above under the EMC Directive **2014/30/EU**. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties

Approved by:

Miro Chueh  
EMC/RF B.U. Manager

## Laboratory Accreditation:

☐ CerpPASS Technology Corporation Test Laboratory

<b>NVLAP LAB Code:</b>	<b>200954-0</b>
<b>TAF LAB Code:</b>	<b>1439</b>

☒ CerpPASS Technology(SuZhou) Co., Ltd.

<b>NVLAP LAB Code:</b>	<b>200814-0</b>
<b>CNAS LAB Code:</b>	<b>L5515</b>



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### History of this test report

☒ ORIGINAL.

☐ Additional attachment as following record:

Report No	Version	Date	Description
SECE1610021	Rev 01	Dec 28, 2016	Initial Issue



## 1. Summary of Test Procedure and Test Results

EMISSION[EN 55032: 2012+AC 2013]			
Standard	Item	Result	Remarks
EN 55032: 2012+AC 2013	Conducted (Power Port)	PASS	Meets Class B Limit Minimum passing margin(AV)is -15.36 dB 0.3140 MHz
	Conducted (Telecom port)	PASS	Meets Class B Limit Minimum passing margin(AV) is -20.73 dB at 5.8380 MHz
	Radiated	PASS	Meets Class B Limit Minimum passing margin(QP) is -4.31 dB at 40.6699 MHz
EN 61000-3-2: 2014	Harmonic current emissions	PASS	Meet Class A Limit
EN61000-3-3:2013	Voltage fluctuations & flicker	PASS	Meets the requirements

IMMUNITY[EN 55024:2010]			
Standard	Item	Result	Remarks
IEC 61000-4-2: 2008	ESD	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-3: 2006+A1:2007+A2:2010	RS	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-4: 2012	EFT	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-5:2014	Surge	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-6:2013	CS	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-8:2009	PFMF	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-11:2004	Voltage dips & voltage variations	PASS	Meets the requirements of Voltage Dips: 1) >95% reduction Performance Criterion B 2) 30% reduction Performance Criterion B Voltage Interruptions: 1) >95% reduction Performance Criterion C



IMMUNITY[EN 50130-4: 2011]			
Standard	Item	Result	Remarks
IEC 61000-4-2: 2008	ESD	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-3: 2006+A1:2007+A2:2010	RS	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-4: 2012	EFT	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-5:2014	Surge	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-6:2013	CS	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-11:2004	Voltage dips & voltage variations	PASS	Meets the requirements of <b>Voltage Dips:</b> 1) 60% reduction Performance Criterion A 2) 30% reduction Performance Criterion A 3) 20% reduction Performance Criterion A <b>Voltage Interruptions:</b> 1) 100% reduction Performance Criterion A

## 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.

No.1199, Bin'an Road, Binjiang District, Hangzhou, P.R. China

#### 3.2. Feature of Equipment under Test

NETWORK VIDEO RECORDER	Model No.:	DHI-NVR4104-4KS2; DHI-NVR4108-4KS2; DHI-NVR4116-4KS2; NVR4104-4KS2; NVR4108-4KS2; NVR4116-4KS2; DHI-NVR4104HS-4KS2; DHI-NVR4108HS-4KS2; DHI-NVR4116HS-4KS2; NVR4104HS-4KS2; NVR4108HS-4KS2; NVR4116HS-4KS2; NVR2104-4KS2; NVR2108-4KS2; NVR2116-4KS2; DHI-NVR2104-4KS2; DHI-NVR2108-4KS2; DHI-NVR2116-4KS2; NVR2104HS-4KS2; NVR2108HS-4KS2; NVR2116HS-4KS2; DHI-NVR2104HS-4KS2; DHI-NVR2108HS-4KS2; DHI-NVR2116HS-4KS2;
Remark	1) <b>DHI-NVR4116-4KS2, DHI-NVR4116HS-4KS2</b> were selected as the test model and their data have been recorded in this report. 2) They are identical except the model name, the case and the front panel	
Adapter	Model No.:	ADS-25FSG-12 12024GPG
	Input:	100-240V~50/60Hz Max. 0.7A
	Output:	12V,2.0A

#### 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 Notebook PC, Earphone, HDD, USB Mouse, LCD Monitor, Router, IP Camera and EUT for EMI test.

##### The pre-test modes for CE/RE

- |        |  |
|--------|--|
| Mode 1 | Full System With VGA(1920*1080@60Hz)+HDMI (1920*1080@60Hz) Mode for DHI-NVR4116HS-4KS2 (110V/60Hz) |
| Mode 2 | Full System With VGA(1280*1024@75Hz)+HDMI (1280*1024@75Hz) Mode for DHI-NVR4116HS-4KS2 (110V/60Hz) |
| Mode 3 | Full System With VGA(1024*768@60Hz)+HDMI (1024*768@60Hz) Mode for DHI-NVR4116HS-4KS2 (110V/60Hz)   |
| Mode 4 | Full System With VGA(1920*1080@60Hz)+HDMI (1920*1080@60Hz) Mode for DHI-NVR4116HS-4KS2 (230V/50Hz) |
| Mode 5 | Full System With VGA(1280*1024@75Hz)+HDMI (1280*1024@75Hz) Mode for DHI-NVR4116HS-4KS2 (230V/50Hz) |





- Mode 6 Full System With VGA(1024\*768@60Hz)+HDMI (1024\*768@60Hz) Mode for DHI-NVR4116HS-4KS2 (230V/50Hz)
- Mode 7 Full System With VGA(1920\*1080@60Hz)+HDMI (1920\*1080@60Hz) Mode for DHI-NVR4116-4KS2 (110V/60Hz)
- Mode 8 Full System With VGA(1280\*1024@75Hz)+HDMI (1280\*1024@75Hz) Mode for DHI-NVR4116-4KS2 (110V/60Hz)
- Mode 9 Full System With VGA(1024\*768@60Hz)+HDMI (1024\*768@60Hz) Mode for DHI-NVR4116-4KS2 (110V/60Hz)
- Mode 10 Full System With VGA(1920\*1080@60Hz)+HDMI (1920\*1080@60Hz) Mode for DHI-NVR4116-4KS2 (230V/50Hz)
- Mode 11 Full System With VGA(1280\*1024@75Hz)+HDMI (1280\*1024@75Hz) Mode for DHI-NVR4116-4KS2 (230V/50Hz)
- Mode 12 Full System With VGA(1024\*768@60Hz)+HDMI (1024\*768@60Hz) Mode for DHI-NVR4116-4KS2 (230V/50Hz)

**Select the worst case of the pre-test modes as the final test mode for CE/RE**

- Mode 1 Full System With VGA(1920\*1080@60Hz)+HDMI (1920\*1080@60Hz) Mode for DHI-NVR4116HS-4KS2 (110V/60Hz)
- Mode 4 Full System With VGA(1920\*1080@60Hz)+HDMI (1920\*1080@60Hz) Mode for DHI-NVR4116HS-4KS2 (230V/50Hz)

**The pre-test modes for ISN**

- Mode 1 Full System (LAN 100Mbps) for DHI-NVR4116HS-4KS2 (110V/60Hz)
- Mode 2 Full System (LAN 100Mbps) for DHI-NVR4116HS-4KS2 (230V/50Hz)
- Mode 3 Full System (LAN 100Mbps) for DHI-NVR4116-4KS2 (110V/60Hz)
- Mode 4 Full System (LAN 100Mbps) for DHI-NVR4116-4KS2 (230V/50Hz)

**Select the worst case of the pre-test modes as the final test mode for ISN**

- Mode 1 Full System (LAN 100Mbps) for DHI-NVR4116HS-4KS2 (110V/60Hz)
- Mode 2 Full System (LAN 100Mbps) for DHI-NVR4116HS-4KS2 (230V/50Hz)

**The pre-test modes for EMS/H&F**

- Mode 1 Full System With VGA(1920\*1080@60Hz)+HDMI (1920\*1080@60Hz) Mode for DHI-NVR4116HS-4KS2
- Mode 2 Full System With VGA(1280\*1024@75Hz)+HDMI (1280\*1024@75Hz) Mode for DHI-NVR4116HS-4KS2
- Mode 3 Full System With VGA(1024\*768@60Hz)+HDMI (1024\*768@60Hz) Mode for DHI-NVR4116HS-4KS2
- Mode 4 Full System With VGA(1920\*1080@60Hz)+HDMI (1920\*1080@60Hz) Mode for DHI-NVR4116-4KS2
- Mode 5 Full System With VGA(1280\*1024@75Hz)+HDMI (1280\*1024@75Hz) Mode for DHI-NVR4116-4KS2
- Mode 6 Full System With VGA(1024\*768@60Hz)+HDMI (1024\*768@60Hz) Mode for DHI-NVR4116-4KS2

**Select the worst case of the pre-test modes as the final test mode for EMS/H&F**

- Mode 1 Full System With VGA(1920\*1080@60Hz)+HDMI (1920\*1080@60Hz) Mode for DHI-NVR4116HS-4KS2



### 3.4. Description of Support Unit

No.	Device	Manufacturer	Model No.	Description
1	HDD	WD	WDBPCK5000ABK-01	N/A
2	Earphone	Salar	V-18	N/A
3	USB Mouse	DAHUA	M16-601	N/A
4	LCD Monitor	Lenovo	L2364wA	Non-Shielded,1.8m (R33B65)
5	LCD Monitor	DELL	SE198WFPT	Non-Shielded,1.8m(R43346)
6	Notebook PC	LENOVO	IDEAPAD Y510P	N/A
7	Router	N/A	N/A	Non-Shielded,1.5m
8	IP Camera	DAHUA	DH-IPC-HFW4431 EN-S	Non-Shielded,1.5m

No.	Cable	Quantity	Description
A	VGA Cable	1	Shielded, 1.8m,with two ferrite core bonded
B	HDMI Cable	1	Shielded, 1.8m,with two ferrite core bonded
C	USB Cable	1	Shielded, 1.5m
D	Audio Cable	1	Non-Shielded, 1.8m
E	USB Cable	1	Shielded, 0.6m
F	LAN Cable	1	Non-Shielded, >3.0m
G	LAN Cable	1	Non-Shielded, >3.0m
H	LAN Cable	1	Non-Shielded, >3.0m



### 3.5. General Information of Test

<input type="checkbox"/>	Test Site	<b>Cerpass Technology Corporation Test Laboratory</b> Address: No.10, Ln. 2, Lianfu St., Luzhu Dist., Taoyuan City 33848, Taiwan (R.O.C.) Tel:+886-3-3226-888 Fax:+886-3-3226-881 Address: No.68-1, Shihbachongsi, Shihding Township, New Taipei City 223, Taiwan, R.O.C. Tel: +886-2-2663-8582
	FCC	TW1079, TW1061,390316, 228391, 641184
	IC	4934B-1, 4934E-1, 4934E-2
	VCCI	T-2205 for Telecommunication Test C-4463 for Conducted emission test R-3428, R-4128 for Radiated emission test G-812, G-813 for radiated disturbance above 1GHz
<input checked="" type="checkbox"/>	Test Site	<b>Cerpass Technology (Suzhou) Co.,Ltd</b> Address: No.66,Tangzhuang Road, Suzhou Industrial Park, Jiangsu 215006, China Tel: +86-512-6917-5888 Fax: +86-512-6917-5666
	FCC	331395
	IC	7290A-1, 7290A-2
	VCCI	T-1945 for Telecommunication Test C-2919 for Conducted emission test R-2670 for Radiated emission test G-227 for radiated disturbance above 1GHz
Frequency Range Investigated:		Conducted: from 150kHz to 30 MHz Radiation: from 30 MHz to 6000MHz
Test Distance :		The test distance of radiated emission below 1GHz from antenna to EUT is 10 M. The test distance of radiated emission above 1GHz from antenna to EUT is 3 M.



### 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(LINE)	9KHz-30MHz	+/- 0.7738 dB
Conducted emissions(NEUTRAL)	9KHz-30MHz	+/- 0.7886 dB
Conducted emissions(10Mbps)	150KHz-30MHz	+/- 1.3013dB
Conducted emissions(100Mbps)	150KHz-30MHz	+/- 1.3197 dB
Conducted emissions(1000Mbps)	150KHz-30MHz	+/- 1.2987 dB

Measurement	Polarity	Frequency	Uncertainty
Radiated emissions (below 1GHz)	H	30MHz ~ 200MHz	+/- 3.8909dB
		200MHz ~1000MHz	+/- 3.6555dB
	V	30MHz ~ 200MHz	+/- 3.8948dB
		200MHz ~1000MHz	+/- 3.6538dB
Radiated emissions (above 1GHz)	H	1000MHz ~18000MHz	+/- 3.8948 dB
		18000MHz ~40000MHz	+/-3.8844dB
	V	1000MHz ~18000MHz	+/- 3.8906dB
		18000MHz ~40000MHz	+/- 3.8744dB

Measurement	Uncertainty
ESD—Rise time tr	10%
ESD—Peak current Ip	6%
ESD—Current at 30 ns	6%
ESD—Current at 60 ns	6%
ESD- Charging voltage	1%
RS above 1GHz	±2.37dB
RS under 1GHz	±3.83dB
EFT—Rise time tr	4%
EFT—Peak current Ip	4%



EFT—Current	4%
Surge—Rise time $t_r$	4%
Surge—Peak current $I_p$	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 55032.

**Table A.8 – Requirements for conducted emissions from the AC mains power ports of Class A equipment**

Applicable to				
1. AC mains power ports (3.1.1)				
Table clause	Frequency range MHz	Coupling device (see Table A.7)	Detector type / bandwidth	Class A limits dB(μV)
A8.1	0,15 – 0,5	AMN	Quasi Peak / 9 kHz	79
	0,5 – 30			73
A8.2	0,15 – 0,5	AMN	Average / 9 kHz	66
	0,5 – 30			60
NOTE Apply A8.1 and A8.2 across the entire frequency range.				

**Table A.9 – Requirements for conducted emissions from the AC mains power ports of Class B equipment**

Applicable to				
1. AC mains power ports (3.1.1)				
Table clause	Frequency range MHz	Coupling device (see Table A.7)	Detector type / bandwidth	Class B limits dB(μV)
A9.1	0,15 – 0,5	AMN	Quasi Peak / 9 kHz	66 – 56
	0,5 – 5			56
	5 – 30			60
A9.2	0,15 – 0,5	AMN	Average / 9 kHz	56 – 46
	0,5 – 5			46
	5 – 30			50

NOTE Apply A9.1 and A9.2 across the entire frequency range.

**Table A.10 – Requirements for asymmetric mode conducted emissions from Class A equipment**

Applicable to					
1. wired network ports (3.1.30) 2. optical fibre ports (3.1.24) with metallic shield or tension members 3. antenna ports (3.1.3)					
Table clause	Frequency range MHz	Coupling device (see Table A.7)	Detector type / bandwidth	Class A voltage limits dB(μV)	Class A current limits dB(μA)
A10.1	0,15 – 0,5	AAN	Quasi Peak / 9 kHz	97 – 87	n/a
	0,5 – 30			87	
	0,15 – 0,5	AAN	Average / 9 kHz	84 – 74	
	0,5 – 30			74	
A10.2	0,15 – 0,5	CVP and current probe	Quasi Peak / 9 kHz	97 – 87	53 – 43
	0,5 – 30			87	43
	0,15 – 0,5	CVP and current probe	Average / 9 kHz	84 – 74	40 – 30
	0,5 – 30			74	30
A10.3	0,15 – 0,5	Current Probe	Quasi Peak / 9 kHz	n/a	53 – 43
	0,5 – 30				43
	0,15 – 0,5	Current Probe	Average / 9 kHz		40 – 30
	0,5 – 30				30
NOTE 1 The choice of coupling device and measurement procedure is defined in Annex C.					
NOTE 2 AC mains power ports shall meet the limits given in Table A.8.					
NOTE 3 The test shall cover the entire frequency range.					
NOTE 4 The application of the voltage and/or current limits is dependent on the measurement procedure used. Refer to Table C.1 for applicability.					
NOTE 5 Testing is required at only one EUT supply voltage and frequency.					
NOTE 6 Applicable to ports listed above and intended to connect to cables longer than 3 m.					

**Table A.11 – Requirements for asymmetric mode conducted emissions from Class B equipment**

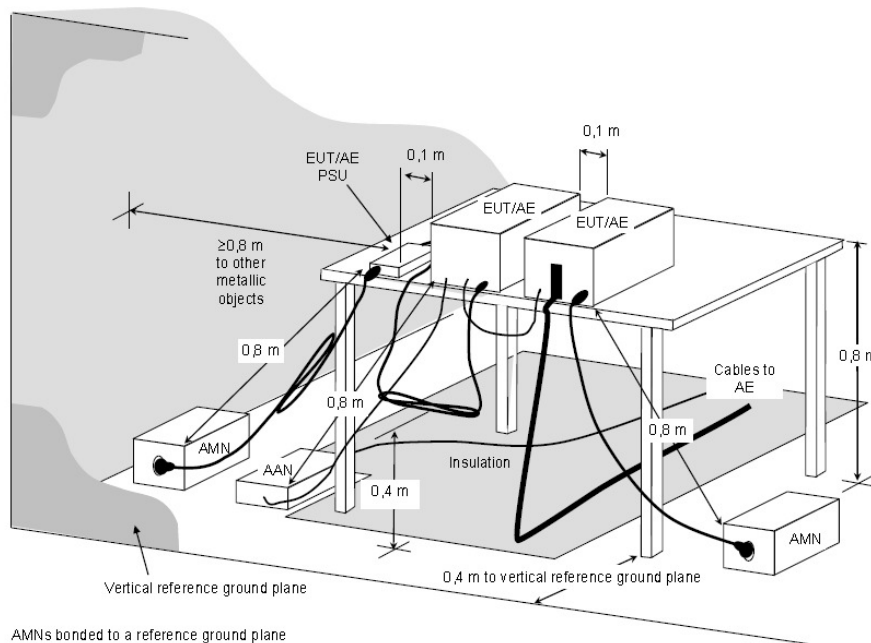
Applicable to					
1. wired network ports (3.1.30) 2. optical fibre ports (3.1.24) with metallic shield or tension members 3. broadcast receiver tuner ports (3.1.8) 4. antenna ports (3.1.3)					
Table clause	Frequency range MHz	Coupling device (see Table A.7)	Detector type / bandwidth	Class B voltage limits dB(μV)	Class B current limits dB(μA)
A11.1	0,15 – 0,5	AAN	Quasi Peak / 9 kHz	84 – 74	n/a
	0,5 – 30			74	
	0,15 – 0,5	AAN	Average / 9 kHz	74 – 64	
	0,5 – 30			64	
A11.2	0,15 – 0,5	CVP and current probe	Quasi Peak / 9 kHz	84 – 74	40 – 30
	0,5 – 30			74	30
	0,15 – 0,5	CVP and current probe	Average / 9 kHz	74 – 64	30 – 20
	0,5 – 30			64	20
A11.3	0,15 – 0,5	Current Probe	Quasi Peak / 9 kHz	n/a	40 – 30
	0,5 – 30				30
	0,15 – 0,5	Current Probe	Average / 9 kHz		30 – 20
	0,5 – 30				20
NOTE 1 The choice of coupling device and measurement procedure is defined in Annex C.					
NOTE 2 Screened ports including TV broadcast receiver tuner ports are tested with a common-mode impedance of 150 Ω. This is typically accomplished with the screen terminated by 150 Ω to earth.					
NOTE 3 AC mains power ports shall meet the limits given in Table A.9.					
NOTE 4 The test shall cover the entire frequency range.					
NOTE 5 The application of the voltage and/or current limits is dependent on the measurement procedure used. Refer to Table C.1 for applicability.					
NOTE 6 Testing is required at only one EUT supply voltage and frequency.					
NOTE 7 Applicable to ports listed above and intended to connect to cables longer than 3 m.					



## 4.2. Test Procedures

- 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.
- Connect EUT to the power mains through a line impedance stabilization network (AMN).
- All the support units are connecting to the other AMN.
- The LISN provides 50 ohm coupling impedance for the measuring instrument.
- The CISPR states that a 50 ohm, 50 micro-Henry AMN should be used.
- Both sides of AC line were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched
- Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

### 4.3. Typical Test Setup



NOTE The 0,8 m distance specified between EUT/AE/PSU and AMN/AAN, is applicable only to the EUT being measured. If the device is AE then it shall be  $\geq 0,8$  m.

**Figure D.2 – Example measurement arrangement for table-top EUT  
(Conducted emission measurement – alternative 1)**



#### 4.4. Measurement equipment

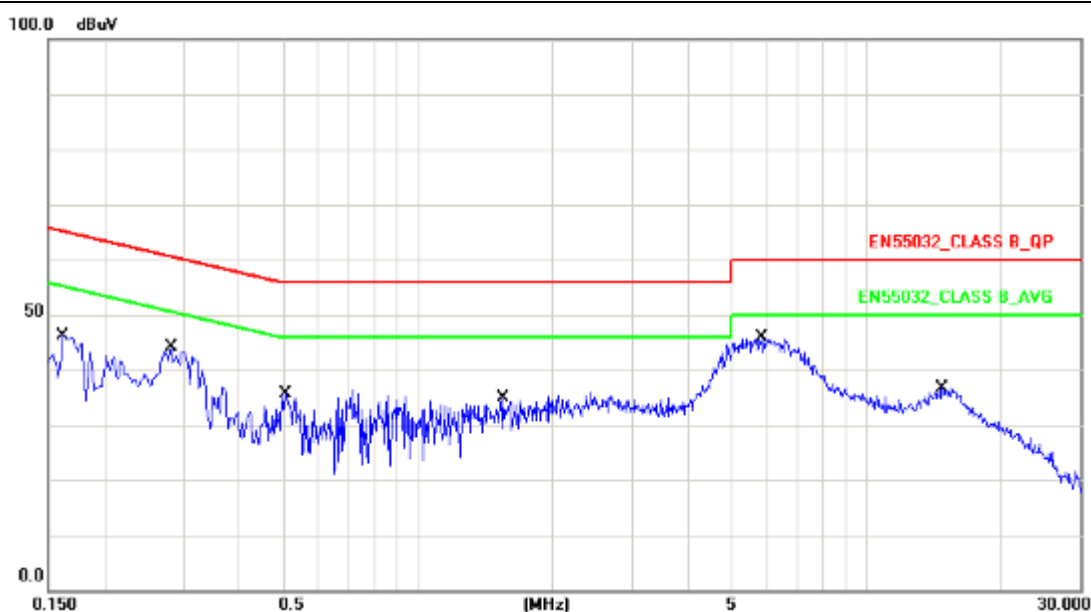
Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
Test Receiver	R&S	ESCI	100565	2016.07.07	2017.07.06
AMN	R&S	ESH2-Z5	100182	2016.08.31	2017.08.30
Two-Line V-Network	R&S	ENV216	100325	/	/
ISN	FCC	FCC-TLISN-T2-02	20379	2016.03.26	2017.03.25
ISN	FCC	FCC-TLISN-T4-02	20380	2016.06.24	2017.06.24
ISN	FCC	FCC-TLISN-T8-02	20381	2016.03.26	2017.03.25
ISN	TESEQ	ISN ST08	30175	2016.03.26	2017.03.25
Current Probe	R&S	EZ-17	100303	2016.03.26	2017.03.25
Passive Voltage Probe	R&S	ESH2-Z3	100026	2016.03.26	2017.03.25
Pulse Limiter	R&S	ESH3-Z2	100529	2016.03.26	2017.03.25
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-004	2016.03.29	2017.03.28
EZ-EMC	Fala	Ver CT3A1	N/A	N/A	N/A



## 4.5. Test Data and Result

### 4.5.1 Conducted Emission for Power Port Test Data

Test Mode :	Mode 1: Full System With VGA(1920*1080@60Hz)+HDMI (1920*1080@60Hz) Mode for DHI-NVR4116HS-4KS2 (110V/60Hz)		
AC Power :	AC 110V/60Hz	Phase :	LINE
Equipment :	NETWORK VIDEO RECORDER	Model No :	DHI-NVR4116HS-4KS2
Temperature :	22°C	Humidity :	53%
Pressure(mbar) :	1002	Date :	2016/12/27



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1620	10.13	32.14	42.27	65.36	-23.09	QP
2	0.1620	10.13	15.98	26.11	55.36	-29.25	AVG
3	0.2819	10.14	30.59	40.73	60.76	-20.03	QP
4	0.2819	10.14	20.27	30.41	50.76	-20.35	AVG
5	0.5100	10.16	19.80	29.96	56.00	-26.04	QP
6	0.5100	10.16	10.91	21.07	46.00	-24.93	AVG
7	1.5540	10.17	17.58	27.75	56.00	-28.25	QP
8	1.5540	10.17	8.30	18.47	46.00	-27.53	AVG
9	5.8580	10.25	29.37	39.62	60.00	-20.38	QP
10	5.8580	10.25	19.67	29.92	50.00	-20.08	AVG
11	14.7660	10.52	20.17	30.69	60.00	-29.31	QP
12	14.7660	10.52	12.34	22.86	50.00	-27.14	AVG

Note: Measurement Level = Reading Level + Correct Factor



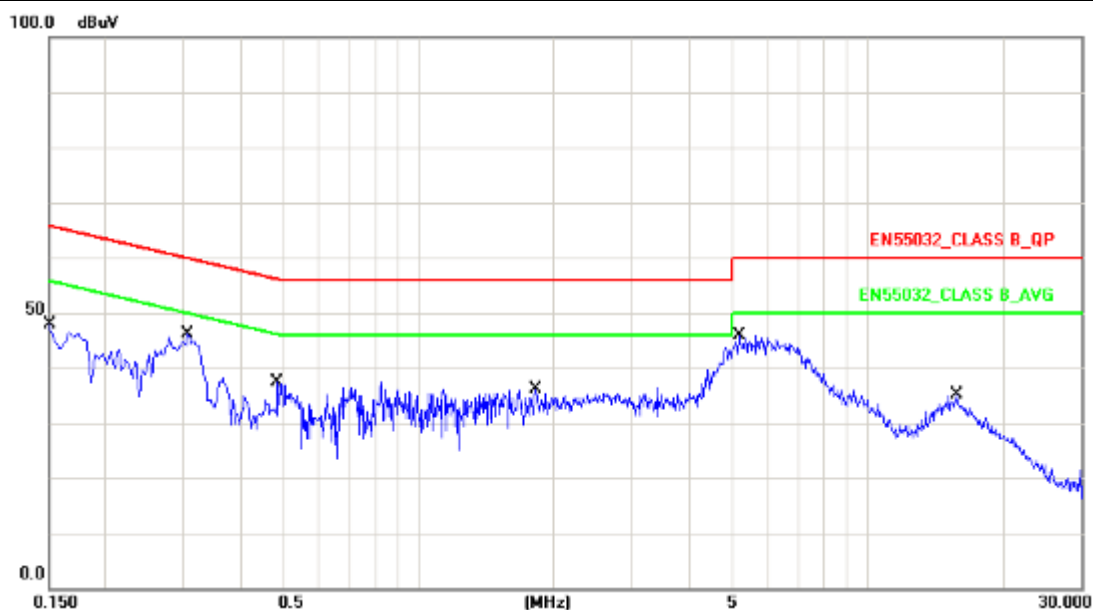
Test Mode : Mode 1: Full System With VGA(1920\*1080@60Hz)+HDMI  
(1920\*1080@60Hz) Mode for DHI-NVR4116HS-4KS2 (110V/60Hz)

AC Power : AC 110V/60Hz Phase : NEUTRAL

Equipment : NETWORK VIDEO RECORDER Model No : DHI-NVR4116HS-4KS2

Temperature : 22°C Humidity : 53%

Pressure(mbar) : 1002 Date : 2016/12/27



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1500	10.13	32.32	42.45	65.99	-23.54	QP
2	0.1500	10.13	17.60	27.73	55.99	-28.26	AVG
3	0.3060	10.14	31.30	41.44	60.08	-18.64	QP
4	0.3060	10.14	20.35	30.49	50.08	-19.59	AVG
5	0.4860	10.15	21.33	31.48	56.24	-24.76	QP
6	0.4860	10.15	13.15	23.30	46.24	-22.94	AVG
7	1.8260	10.18	19.06	29.24	56.00	-26.76	QP
8	1.8260	10.18	10.82	21.00	46.00	-25.00	AVG
9	5.1779	10.26	28.25	38.51	60.00	-21.49	QP
10	5.1779	10.26	18.41	28.67	50.00	-21.33	AVG
11	15.8220	10.51	16.97	27.48	60.00	-32.52	QP
12	15.8220	10.51	7.52	18.03	50.00	-31.97	AVG

Note: Measurement Level = Reading Level + Correct Factor



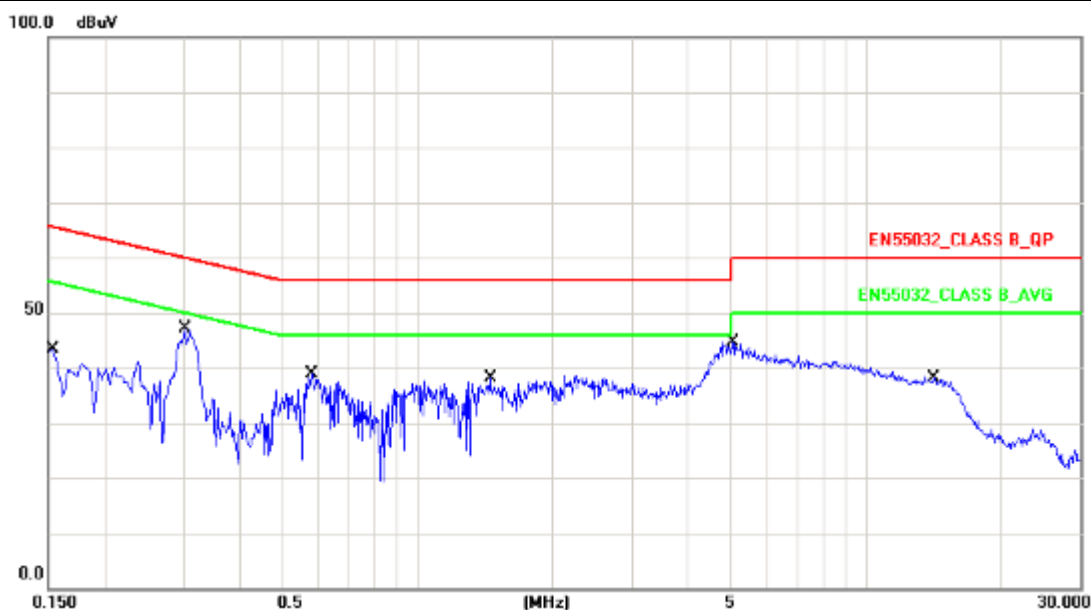
Test Mode : Mode 4: Full System With VGA(1920\*1080@60Hz)+HDMI  
(1920\*1080@60Hz) Mode for DHI-NVR4116HS-4KS2 (230V/50Hz)

AC Power : AC 230V/50Hz Phase : LINE

Equipment : NETWORK VIDEO RECORDER Model No : DHI-NVR4116HS-4KS2

Temperature : 22°C Humidity : 53%

Pressure(mbar) : 1002 Date : 2016/12/27



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1539	10.13	29.86	39.99	65.78	-25.79	QP
2	0.1539	10.13	14.79	24.92	55.78	-30.86	AVG
3	0.3020	10.14	33.72	43.86	60.19	-16.33	QP
4	0.3020	10.14	22.65	32.79	50.19	-17.40	AVG
5	0.5820	10.15	24.57	34.72	56.00	-21.28	QP
6	0.5820	10.15	14.50	24.65	46.00	-21.35	AVG
7	1.4540	10.18	22.44	32.62	56.00	-23.38	QP
8	1.4540	10.18	12.98	23.16	46.00	-22.84	AVG
9	5.0500	10.26	28.83	39.09	60.00	-20.91	QP
10	5.0500	10.26	19.33	29.59	50.00	-20.41	AVG
11	14.1620	10.49	22.99	33.48	60.00	-26.52	QP
12	14.1620	10.49	15.18	25.67	50.00	-24.33	AVG

Note: Measurement Level = Reading Level + Correct Factor



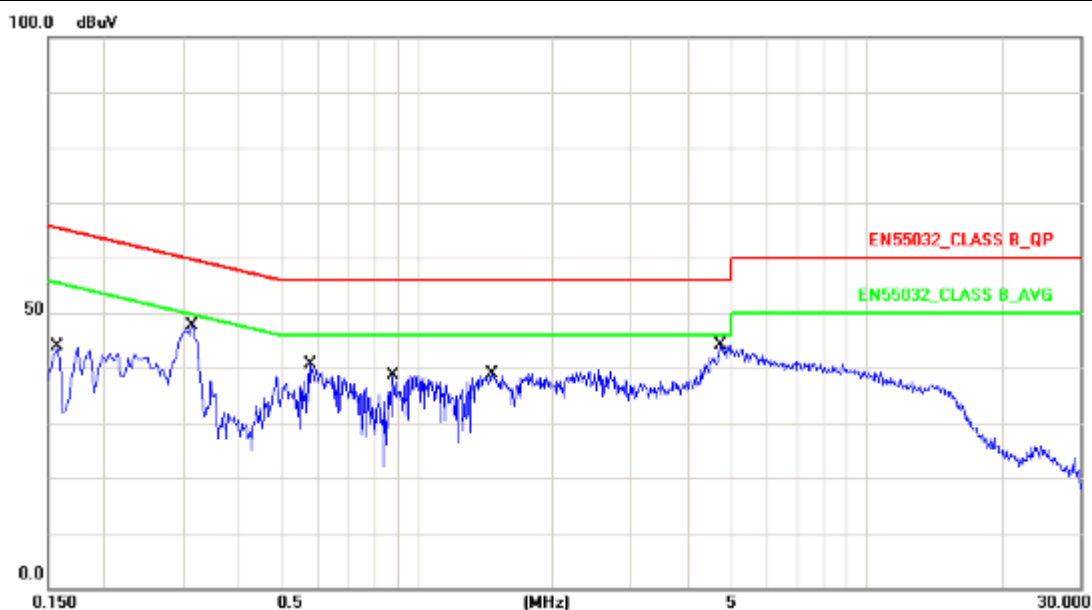
Test Mode : Mode 4: Full System With VGA(1920\*1080@60Hz)+HDMI  
(1920\*1080@60Hz) Mode for DHI-NVR4116HS-4KS2 (230V/50Hz)

AC Power : AC 230V/50Hz Phase : NEUTRAL

Equipment : NETWORK VIDEO RECORDER Model No : DHI-NVR4116HS-4KS2

Temperature : 22°C Humidity : 53%

Pressure(mbar) : 1002 Date : 2016/12/27



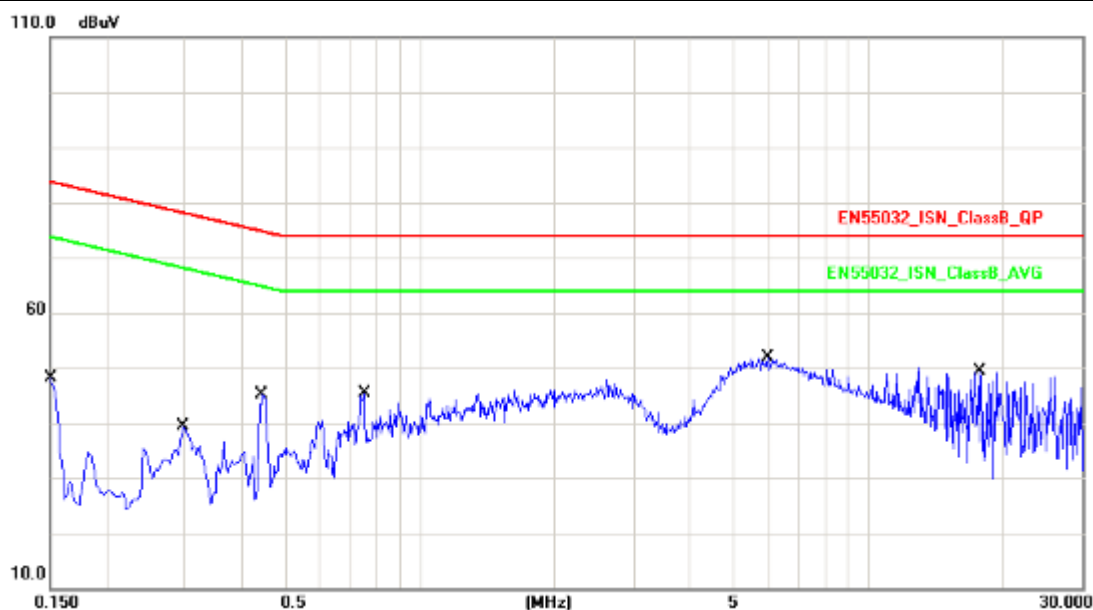
No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1580	10.13	27.45	37.58	65.56	-27.98	QP
2	0.1580	10.13	10.58	20.71	55.56	-34.85	AVG
3	0.3140	10.14	34.00	44.14	59.86	-15.72	QP
4	0.3140	10.14	24.36	34.50	49.86	-15.36	AVG
5	0.5780	10.15	25.98	36.13	56.00	-19.87	QP
6	0.5780	10.15	17.74	27.89	46.00	-18.11	AVG
7	0.8820	10.17	22.59	32.76	56.00	-23.24	QP
8	0.8820	10.17	12.84	23.01	46.00	-22.99	AVG
9	1.4660	10.18	24.02	34.20	56.00	-21.80	QP
10	1.4660	10.18	15.55	25.73	46.00	-20.27	AVG
11	4.7460	10.24	28.16	38.40	56.00	-17.60	QP
12	4.7460	10.24	18.74	28.98	46.00	-17.02	AVG

Note: Measurement Level = Reading Level + Correct Factor



## 4.5.2 Conducted Emission for Telecommunication Port Test Data

Test Mode :	Mode 1: Full System (LAN 100Mbps) for DHI-NVR4116HS-4KS2 (110V/60Hz)		
AC Power :	AC 110V/60Hz	Phase :	100Mbps
Equipment :	NETWORK VIDEO RECORDER	Model No :	DHI-NVR4116HS-4KS2
Temperature :	22°C	Humidity :	53%
Pressure(mbar) :	1002	Date :	2016/12/27



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1500	19.57	27.31	46.88	83.99	-37.11	QP
2	0.1500	19.57	26.89	46.46	73.99	-27.53	AVG
3	0.2980	19.62	17.15	36.77	78.30	-41.53	QP
4	0.2980	19.62	14.51	34.13	68.30	-34.17	AVG
5	0.4460	19.61	23.62	43.23	74.95	-31.72	QP
6	0.4460	19.61	20.16	39.77	64.95	-25.18	AVG
7	0.7539	19.50	21.42	40.92	74.00	-33.08	QP
8	0.7539	19.50	15.36	34.86	64.00	-29.14	AVG
9	5.9620	19.55	26.53	46.08	74.00	-27.92	QP
10	5.9620	19.55	20.72	40.27	64.00	-23.73	AVG
11	17.8300	19.43	23.97	43.40	74.00	-30.60	QP
12	17.8300	19.43	1.71	21.14	64.00	-42.86	AVG

Note: Measurement Level = Reading Level + Correct Factor



Test Mode :	Mode 2: Full System (LAN 100Mbps) for DHI-NVR4116HS-4KS2 (230V/50Hz)		
AC Power :	AC 230V/50Hz	Phase :	100Mbps
Equipment :	NETWORK VIDEO RECORDER	Model No :	DHI-NVR4116HS-4KS2
Temperature :	22°C	Humidity :	53%
Pressure(mbar) :	1002	Date :	2016/12/27



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1500	19.57	27.53	47.10	83.99	-36.89	QP
2	0.1500	19.57	26.86	46.43	73.99	-27.56	AVG
3	0.2980	19.62	19.19	38.81	78.30	-39.49	QP
4	0.2980	19.62	15.48	35.10	68.30	-33.20	AVG
5	0.4500	19.60	23.51	43.11	74.87	-31.76	QP
6	0.4500	19.60	19.25	38.85	64.87	-26.02	AVG
7	2.1700	19.23	25.01	44.24	74.00	-29.76	QP
8	2.1700	19.23	18.01	37.24	64.00	-26.76	AVG
9	5.8380	19.57	28.99	48.56	74.00	-25.44	QP
10	5.8380	19.57	23.70	43.27	64.00	-20.73	AVG
11	25.3420	19.81	29.11	48.92	74.00	-25.08	QP
12	25.3420	19.81	5.35	25.16	64.00	-38.84	AVG

Note: Measurement Level = Reading Level + Correct Factor

Test engineer: Sun. Zhang





#### 4.6. Test Photographs of Power Port

Front View



Rear View





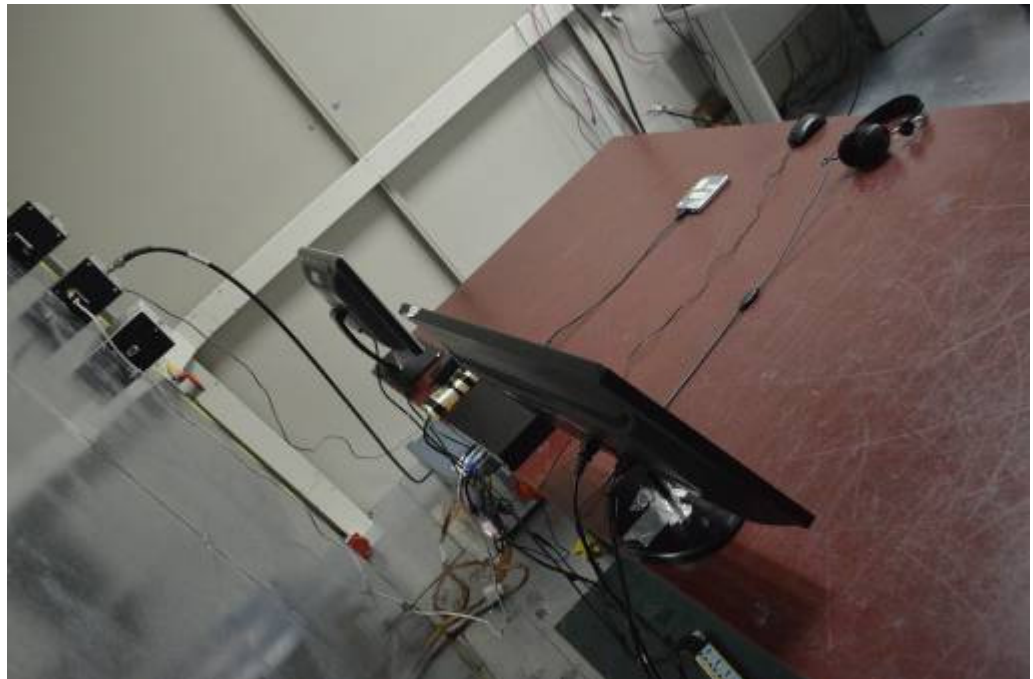
#### 4.7. Test Photographs of Telecommunication Port

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 55032. 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 1 – Required highest frequency for radiated measurement**

Highest internal frequency ( $F_x$ )	Highest measured frequency
$F_x \leq 108$ MHz	1 GHz
$108 \text{ MHz} < F_x \leq 500$ MHz	2 GHz
$500 \text{ MHz} < F_x \leq 1$ GHz	5 GHz
$F_x > 1$ GHz	$5 \times F_x$ up to a maximum of 6 GHz
NOTE 1 For FM and TV broadcast receivers, $F_x$ is determined from the highest frequency generated or used excluding the local oscillator and tuned frequencies.	
NOTE 2 $F_x$ is defined in 3.1.19.	

Where the  $F_x$  is unknown, the radiated emission measurements shall be performed up to 6 GHz.

**Table A.2 – Requirements for radiated emissions at frequencies up to 1 GHz for Class A equipment**

Table clause	Frequency range MHz	Measurement		Class A limits dB(μV/m)
		Distance m	Detector type/ bandwidth	OATS/SAC (see Table A.1)
A2.1	30 – 230	10	Quasi Peak / 120 kHz	40
	230 – 1 000			47
A2.2	30 – 230	3		50
	230 – 1 000			57
NOTE Apply only A2.1 or A2.2 across the entire frequency range.				

**Table A.3 – Requirements for radiated emissions at frequencies above 1 GHz for Class A equipment**

Table clause	Frequency range MHz	Measurement		Class A limits dB(μV/m)
		Distance m	Detector type/ bandwidth	FSOATS (see Table A.1)
A3.1	1 000 – 3 000	3	Average / 1 MHz	56
	3 000 – 6 000			60
A3.2	1 000 – 3 000		Peak / 1 MHz	76
	3 000 – 6 000			80
NOTE Apply A3.1 and A3.2 across the frequency range from 1 000 MHz to the highest required frequency of measurement derived from Table 1.				

**Table A.4 – Requirements for radiated emissions at frequencies up to 1 GHz for Class B equipment**

Table clause	Frequency range MHz	Measurement		Class B limits dB(μV/m)
		Distance m	Detector type/ bandwidth	OATS/SAC (see Table A.1)
A4.1	30 – 230	10	Quasi Peak / 120 kHz	30
	230 – 1 000			37
A4.2	30 – 230	3		40
	230 – 1 000			47
NOTE Apply only table clause A4.1 or A4.2 across the entire frequency range.				

**Table A.5 – Requirements for radiated emissions at frequencies above 1 GHz for Class B equipment**

Table clause	Frequency range MHz	Measurement		Class B limits dB(μV/m)
		Distance m	Detector type/ bandwidth	FSOATS (see Table A.1)
A5.1	1 000 – 3 000	3	Average/ 1 MHz	50
	3 000 – 6 000			54
A5.2	1 000 – 3 000		Peak/ 1 MHz	70
	3 000 – 6 000			74
NOTE Apply A5.1 and A5.2 across the frequency range from 1 000 MHz to the highest required frequency of measurement derived from Table 1.				

**Table A.6 – Requirements for radiated emissions from FM receivers**

Table clause	Frequency range MHz	Measurement		Class B limit dB(μV/m)			
		Distance m	Detector type/ bandwidth	Fundamental	Harmonics		
				OATS/SAC (see Table A.1)	OATS/SAC (see Table A.1)		
A6.1	30 – 230	10	Quasi peak/ 120 kHz	50	42		
	230 – 300				42		
	300 – 1 000				46		
A6.2	30 – 230	3			60	52	
	230 – 300					52	
	300 – 1 000					56	
NOTE 1 Apply only A.6.1 or A.6.2 across the entire frequency range.							
NOTE 2 These relaxed limits apply only to emissions at the fundamental and harmonic frequencies of the local oscillator. Signals at all other frequencies shall be compliant with the limits given in Table A.4.							

**Table A.12 – Requirements for conducted differential voltage emissions from Class B equipment**

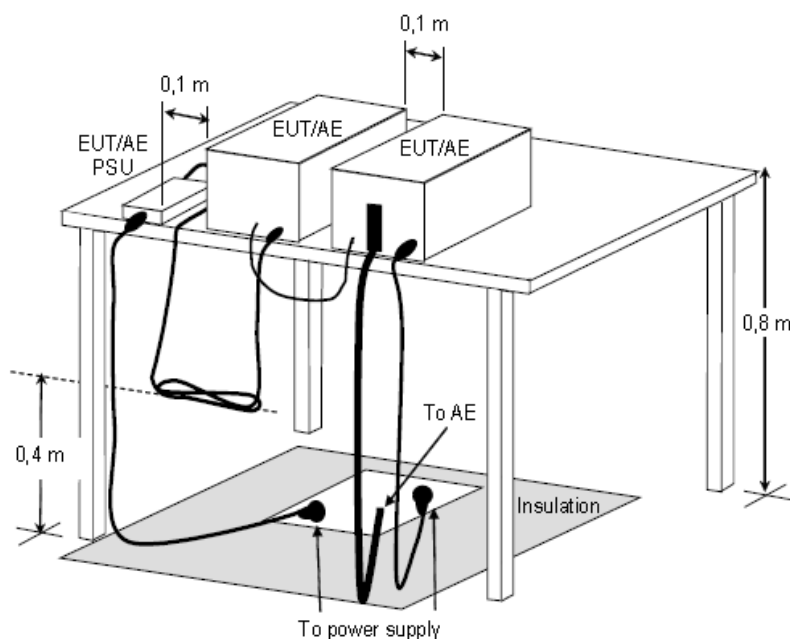
Applicable to						
1. TV broadcast receiver tuner ports (3.1.8) with an accessible connector						
2. RF modulator output ports (3.1.27)						
3. FM broadcast receiver tuner ports (3.1.8) with an accessible connector						
Table clause	Frequency range MHz	Detector type/ bandwidth	Class B limits dB(μV) 75 Ω			Applicability
			Other	Local Oscillator Fundamental	Local Oscillator Harmonics	
A12.1	30 – 950	For frequencies ≤1 GHz	46	46	46	See NOTE 1
	950 – 2 150		46	54	54	
A12.2	950 – 2 150	Quasi Peak/ 120 kHz	46	54	54	See NOTE 2
A12.3	30 – 300		46	54	50	See NOTE 3
	300 – 1 000	52				
A12.4	30 – 300	For frequencies ≥1 GHz	46	66	59	See NOTE 4
	300 – 1 000				52	
A12.5	30 – 950	Peak/ 1 MHz	46	76	46	See NOTE 5
	950 – 2 150			n/a	54	
NOTE 1 Television receivers (analogue or digital), video recorders and PC TV broadcast receiver tuner cards working in channels between 30 MHz and 1 GHz, and digital audio receivers.						
NOTE 2 Tuner units (not the LNB) for satellite signal reception.						
NOTE 3 Frequency modulation audio receivers and PC tuner cards.						
NOTE 4 Frequency modulation car radios.						
NOTE 5 Applicable to EUTs with RF modulator output ports (for example DVD equipment, video recorders, camcorders and decoders etc.) designed to connect to TV broadcast receiver tuner ports.						
NOTE 6 Testing is required at only one EUT supply voltage and frequency.						
NOTE 7 The term 'other' refers to all emissions other than the fundamental and the harmonics of the local oscillator.						
NOTE 8 The test shall be performed with the device operating at each reception channel.						
NOTE 9 The test shall cover the entire frequency range.						



## 5.2. Test Procedures

- The EUT was placed on a rotatable table top 0.8 meter above ground.
- The EUT was set 3/10 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- The table was rotated 360 degrees to determine the position of the highest radiation.
- 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.
- 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.
- Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.

## 5.3. Typical Test Setup



**Figure D.8 – Example measurement arrangement for table-top EUT (Radiated emission measurement)**

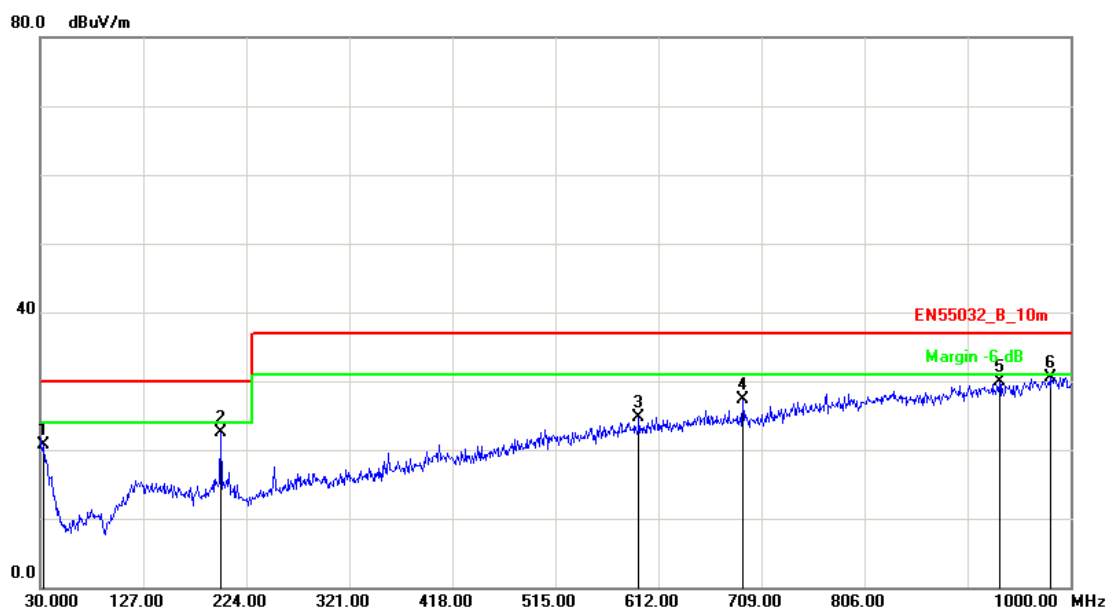
**5.4. Measurement equipment**

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
EMI Test Receiver	R&S	ESCI7	100968	2016.07.21	2017.07.20
Preamplifier	Agilent	87405B	My39500554	2016.03.26	2017.03.25
Preamplifier	Agilent	8449B	3008A02342	2016.03.26	2017.03.25
Bilog Antenna	Sunol Science	JB1	A072414-1	2016.04.16	2017.04.15
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-618	2016.04.16	2017.04.15
Spectrum Analyzer	R&S	FSP40	100324	2016.08.02	2017.08.01
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-001	2016.03.29	2017.03.28
EZ-EMC	Fala	Ver CT3A1	N/A	N/A	N/A



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

Test Mode :	Mode 1: Full System With VGA(1920*1080@60Hz)+HDMI (1920*1080@60Hz) Mode for DHI-NVR4116HS-4KS2 (110V/60Hz)		
AC Power :	AC 110V/60Hz	Ant. Polarization:	Horizontal
Equipment :	NETWORK VIDEO RECORDER	Model No :	DHI-NVR4116HS-4KS2
Temp :	23℃	Humidity :	53%
Pressure(mbar) :	1002	Date :	2016/12/23



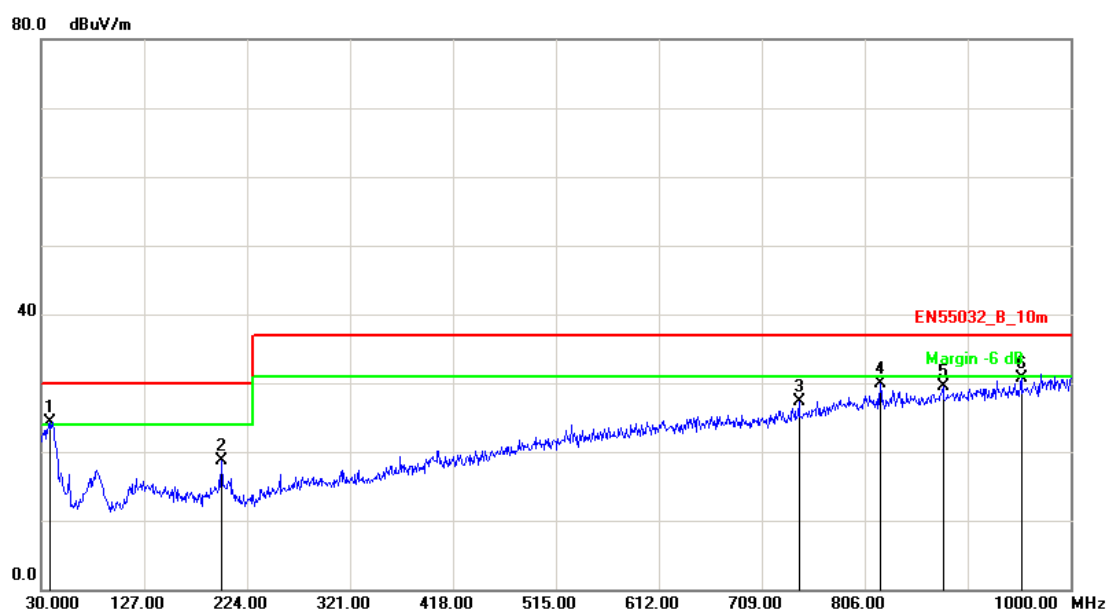
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	32.9099	-5.36	26.09	20.73	30.00	-9.27	QP	400	87
2	199.7500	-9.94	32.46	22.52	30.00	-7.48	QP	400	311
3	593.5700	-1.33	25.97	24.64	37.00	-12.36	QP	400	127
4	691.5399	-0.16	27.50	27.34	37.00	-9.66	QP	400	180
5	933.0700	3.84	26.01	29.85	37.00	-7.15	QP	400	127
6	981.5700	4.79	25.70	30.49	37.00	-6.51	QP	400	12

Note: Measurement Level = Reading Level + Correct Factor





Test Mode :	Mode 1: Full System With VGA(1920*1080@60Hz)+HDMI (1920*1080@60Hz) Mode for DHI-NVR4116HS-4KS2 (110V/60Hz)		
AC Power :	AC 110V/60Hz	Ant. Polarization:	Vertical
Equipment :	NETWORK VIDEO RECORDER	Model No :	DHI-NVR4116HS-4KS2
Temp :	23℃	Humidity :	53%
Pressure(mbar) :	1002	Date :	2016/12/23

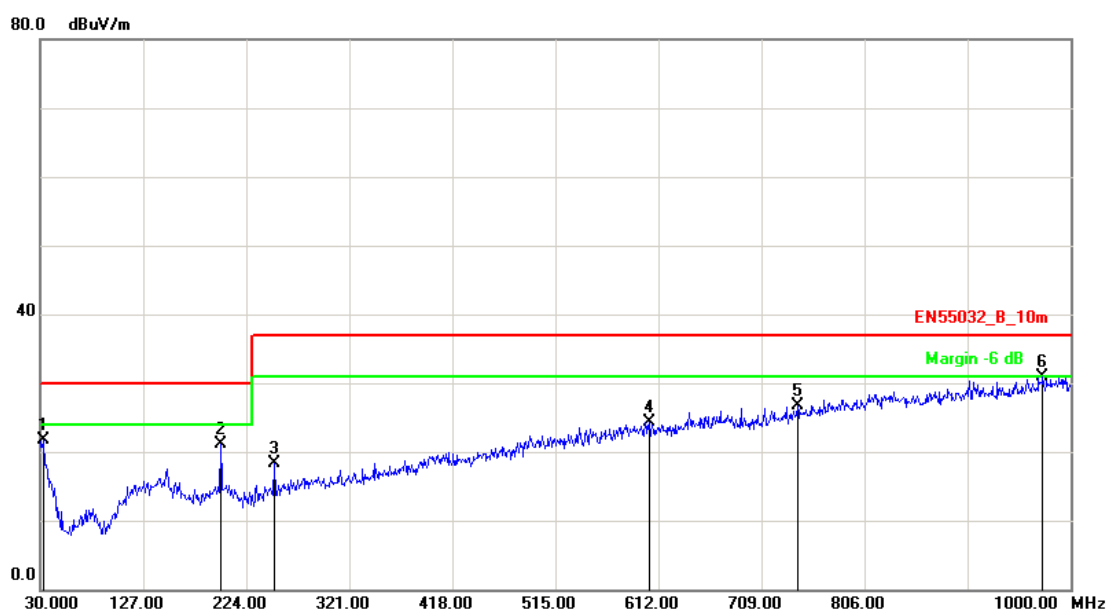


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	38.7300	-9.56	33.86	24.30	30.00	-5.70	QP	100	233
2	199.7500	-9.94	28.58	18.64	30.00	-11.36	QP	100	158
3	743.9200	0.94	26.31	27.25	37.00	-9.75	QP	400	288
4	820.5500	2.33	27.49	29.82	37.00	-7.18	QP	100	138
5	879.7200	3.06	26.35	29.41	37.00	-7.59	QP	100	361
6	953.4400	4.21	26.47	30.68	37.00	-6.32	QP	100	286

Note: Measurement Level = Reading Level + Correct Factor



Test Mode :	Mode 4: Full System With VGA(1920*1080@60Hz)+HDMI (1920*1080@60Hz) Mode for DHI-NVR4116HS-4KS2 (230V/50Hz)		
AC Power :	AC 230V/50Hz	Ant. Polarization:	Horizontal
Equipment :	NETWORK VIDEO RECORDER	Model No :	DHI-NVR4116HS-4KS2
Temp :	23℃	Humidity :	53%
Pressure(mbar) :	1002	Date :	2016/12/23

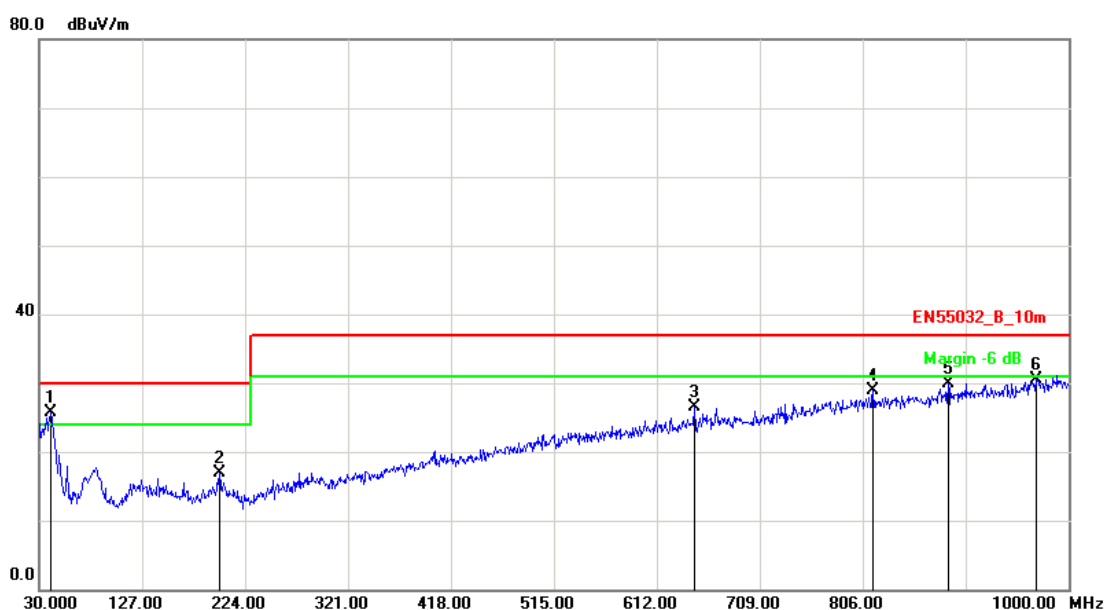


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	32.9099	-5.36	27.13	21.77	30.00	-8.23	QP	100	186
2	199.7500	-9.94	30.97	21.03	30.00	-8.97	QP	400	144
3	250.1899	-10.44	28.69	18.25	37.00	-18.75	QP	400	133
4	603.2698	-1.20	25.52	24.32	37.00	-12.68	QP	100	88
5	742.9500	0.92	25.70	26.62	37.00	-10.38	QP	100	13
6	973.8099	4.66	26.19	30.85	37.00	-6.15	QP	100	84

Note: Measurement Level = Reading Level + Correct Factor



Test Mode :	Mode 4: Full System With VGA(1920*1080@60Hz)+HDMI (1920*1080@60Hz) Mode for DHI-NVR4116HS-4KS2 (230V/50Hz)		
AC Power :	AC 230V/50Hz	Ant. Polarization:	Vertical
Equipment :	NETWORK VIDEO RECORDER	Model No :	DHI-NVR4116HS-4KS2
Temp :	23℃	Humidity :	53%
Pressure(mbar) :	1002	Date :	2016/12/23

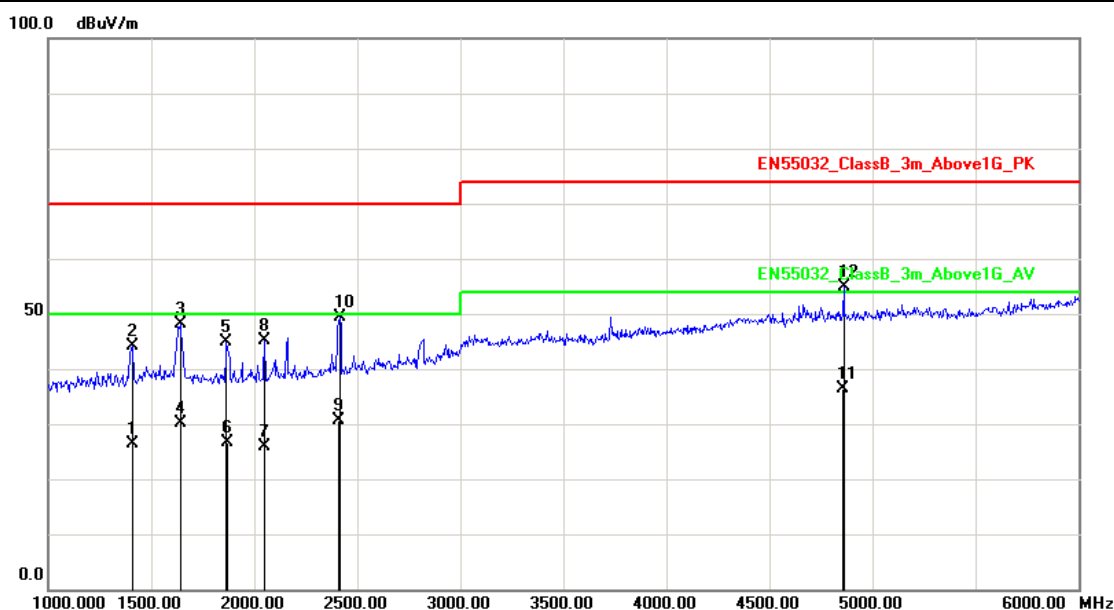


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	40.6699	-10.87	36.56	25.69	30.00	-4.31	QP	400	68
2	199.7500	-9.94	26.75	16.81	30.00	-13.19	QP	400	215
3	647.8900	-0.36	26.92	26.56	37.00	-10.44	QP	100	288
4	815.7000	2.27	26.60	28.87	37.00	-8.13	QP	100	95
5	886.5100	3.21	26.60	29.81	37.00	-7.19	QP	100	175
6	968.9600	4.55	25.96	30.51	37.00	-6.49	QP	100	213

Note: Measurement Level = Reading Level + Correct Factor

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

Test Mode :	Mode 1: Full System With VGA(1920*1080@60Hz)+HDMI (1920*1080@60Hz) Mode for DHI-NVR4116HS-4KS2 (110V/60Hz)		
AC Power :	AC 110V/60Hz	Ant. Polarization:	Horizontal
Equipment :	NETWORK VIDEO RECORDER	Model No :	DHI-NVR4116HS-4KS2
Temp :	23℃	Humidity :	53%
Pressure(mbar) :	1002	Date :	2016/12/23

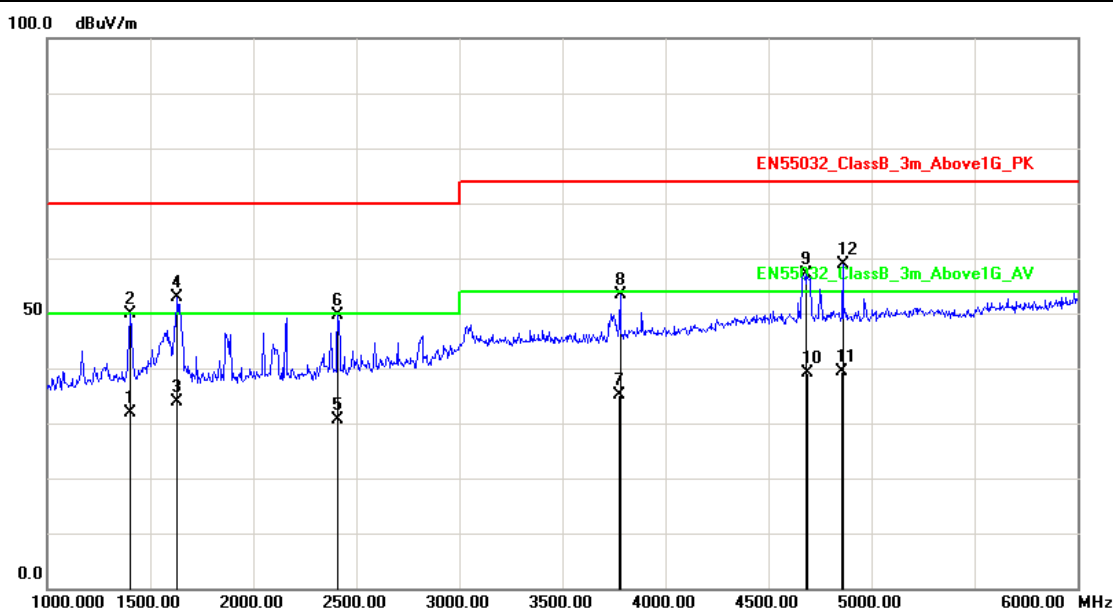


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	1408.000	-3.25	29.63	26.38	50.00	-23.62	AVG	100	74
2	1410.000	-3.24	47.46	44.22	70.00	-25.78	peak	100	74
3	1640.000	-2.24	50.33	48.09	70.00	-21.91	peak	200	68
4	1642.000	-2.23	32.47	30.24	50.00	-19.76	AVG	200	68
5	1865.000	-1.59	46.40	44.81	70.00	-25.19	peak	100	206
6	1867.000	-1.58	28.16	26.58	50.00	-23.42	AVG	100	206
7	2049.000	-0.95	26.89	25.94	50.00	-24.06	AVG	100	234
8	2050.000	-0.94	45.98	45.04	70.00	-24.96	peak	100	234
9	2413.000	0.91	29.73	30.64	50.00	-19.36	AVG	200	173
10	2415.000	0.92	48.49	49.41	70.00	-20.59	peak	200	173
11	4858.000	10.83	25.54	36.37	54.00	-17.63	AVG	200	19
12	4860.000	10.83	43.99	54.82	74.00	-19.18	peak	200	19

Note: Measurement Level = Reading Level + Correct Factor



Test Mode :	Mode 1: Full System With VGA(1920*1080@60Hz)+HDMI (1920*1080@60Hz) Mode for DHI-NVR4116HS-4KS2 (110V/60Hz)		
AC Power :	AC 110V/60Hz	Ant. Polarization:	Vertical
Equipment :	NETWORK VIDEO RECORDER	Model No :	DHI-NVR4116HS-4KS2
Temp :	23°C	Humidity :	53%
Pressure(mbar) :	1002	Date :	2016/12/23

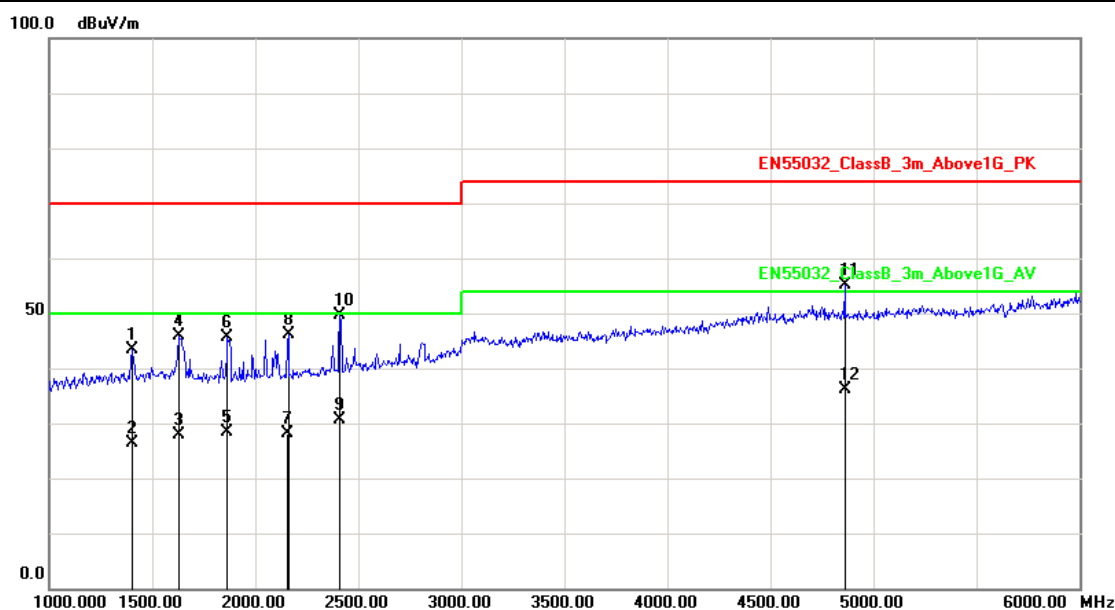


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	1404.000	-3.28	35.25	31.97	50.00	-18.03	AVG	108	0
2	1405.000	-3.27	53.20	49.93	70.00	-20.07	peak	108	0
3	1628.000	-2.27	36.12	33.85	50.00	-16.15	AVG	100	240
4	1630.000	-2.27	55.03	52.76	70.00	-17.24	peak	100	240
5	2408.000	0.88	29.77	30.65	50.00	-19.35	AVG	200	264
6	2410.000	0.89	48.81	49.70	70.00	-20.30	peak	200	264
7	3776.000	6.60	28.43	35.03	54.00	-18.97	AVG	175	0
8	3780.000	6.62	46.70	53.32	74.00	-20.68	peak	175	0
9	4685.000	10.47	46.57	57.04	74.00	-16.96	peak	100	0
10	4688.000	10.48	28.61	39.09	54.00	-14.91	AVG	100	0
11	4859.000	10.83	28.49	39.32	54.00	-14.68	AVG	100	28
12	4860.000	10.83	47.93	58.76	74.00	-15.24	peak	100	28

Note: Measurement Level = Reading Level + Correct Factor



Test Mode :	Mode 4: Full System With VGA(1920*1080@60Hz)+HDMI (1920*1080@60Hz) Mode for DHI-NVR4116HS-4KS2 (230V/50Hz)		
AC Power :	AC 230V/50Hz	Ant. Polarization:	Horizontal
Equipment :	NETWORK VIDEO RECORDER	Model No :	DHI-NVR4116HS-4KS2
Temp :	23℃	Humidity :	53%
Pressure(mbar) :	1002	Date :	2016/12/23

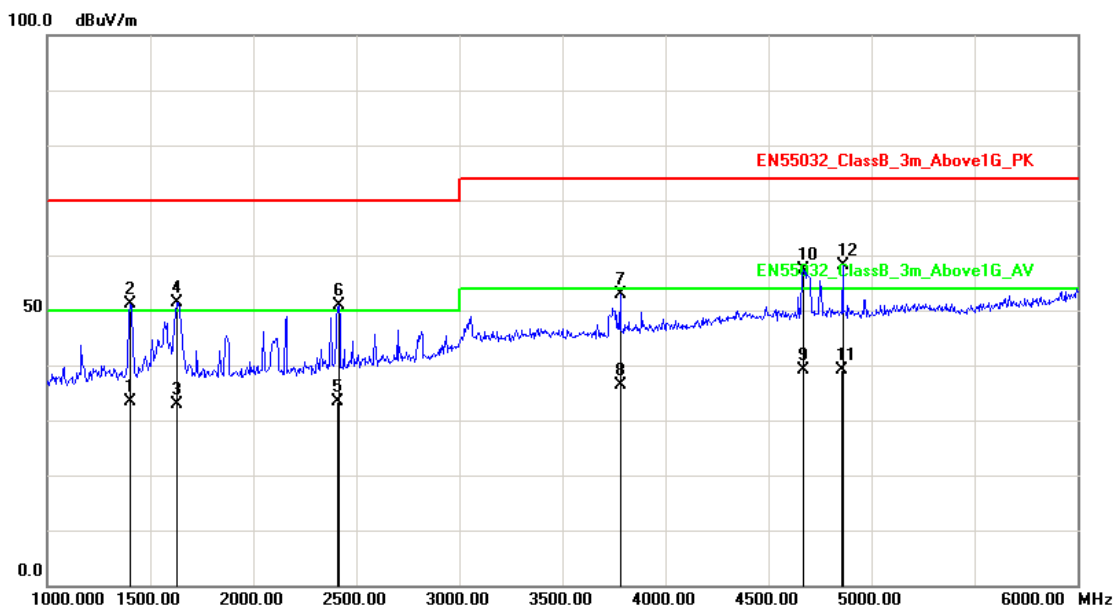


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	1400.000	-3.31	46.60	43.29	70.00	-26.71	peak	100	79
2	1401.000	-3.30	29.63	26.33	50.00	-23.67	AVG	100	79
3	1629.000	-2.27	30.14	27.87	50.00	-22.13	AVG	100	159
4	1630.000	-2.27	48.10	45.83	70.00	-24.17	peak	100	159
5	1864.000	-1.59	29.87	28.28	50.00	-21.72	AVG	200	233
6	1865.000	-1.59	47.25	45.66	70.00	-24.34	peak	200	233
7	2159.000	-0.39	28.43	28.04	50.00	-21.96	AVG	100	77
8	2160.000	-0.38	46.50	46.12	70.00	-23.88	peak	100	77
9	2408.000	0.88	29.66	30.54	50.00	-19.46	AVG	200	337
10	2410.000	0.89	48.70	49.59	70.00	-20.41	peak	200	337
11	4860.000	10.83	44.22	55.05	74.00	-18.95	peak	100	125
12	4861.000	10.83	25.34	36.17	54.00	-17.83	AVG	100	125

Note: Measurement Level = Reading Level + Correct Factor



Test Mode :	Mode 4: Full System With VGA(1920*1080@60Hz)+HDMI (1920*1080@60Hz) Mode for DHI-NVR4116HS-4KS2 (230V/50Hz)		
AC Power :	AC 230V/50Hz	Ant. Polarization:	Vertical
Equipment :	NETWORK VIDEO RECORDER	Model No :	DHI-NVR4116HS-4KS2
Temp :	23℃	Humidity :	53%
Pressure(mbar) :	1002	Date :	2016/12/23



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	1403.000	-3.29	36.58	33.29	50.00	-16.71	AVG	100	2
2	1405.000	-3.27	54.34	51.07	70.00	-18.93	peak	100	2
3	1628.000	-2.27	35.17	32.90	50.00	-17.10	AVG	100	156
4	1630.000	-2.27	53.68	51.41	70.00	-18.59	peak	100	156
5	2413.000	0.91	32.53	33.44	50.00	-16.56	AVG	100	217
6	2415.000	0.92	49.99	50.91	70.00	-19.09	peak	100	217
7	3780.000	6.62	46.26	52.88	74.00	-21.12	peak	152	0
8	3782.000	6.62	29.66	36.28	54.00	-17.72	AVG	152	0
9	4668.000	10.44	28.70	39.14	54.00	-14.86	AVG	120	360
10	4670.000	10.44	46.82	57.26	74.00	-16.74	peak	120	360
11	4859.000	10.83	28.41	39.24	54.00	-14.76	AVG	100	0
12	4860.000	10.83	47.36	58.19	74.00	-15.81	peak	100	0

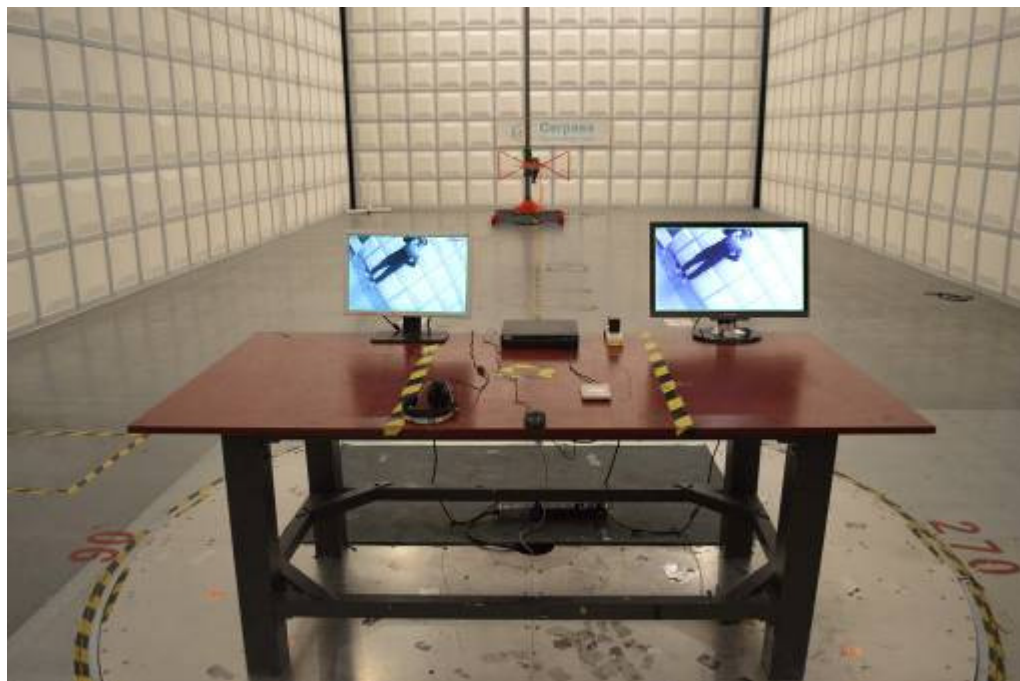
Note: Measurement Level = Reading Level + Correct Factor

Test engineer: Sun. Zhang

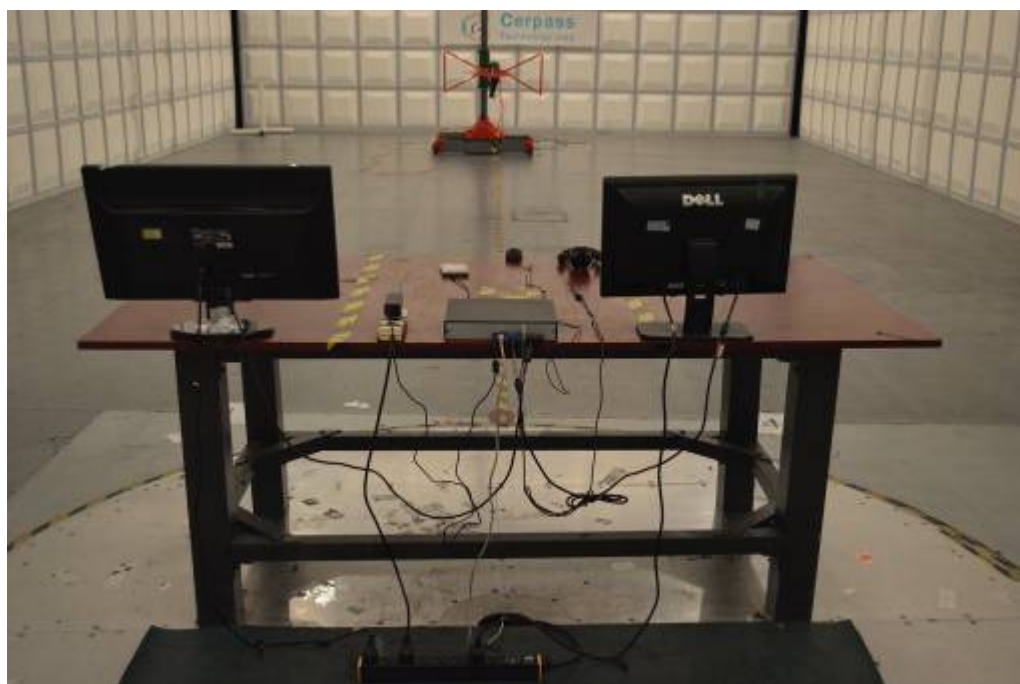


## 5.7. Test Photographs (30MHz ~ 1000MHz)

Front View



Rear View

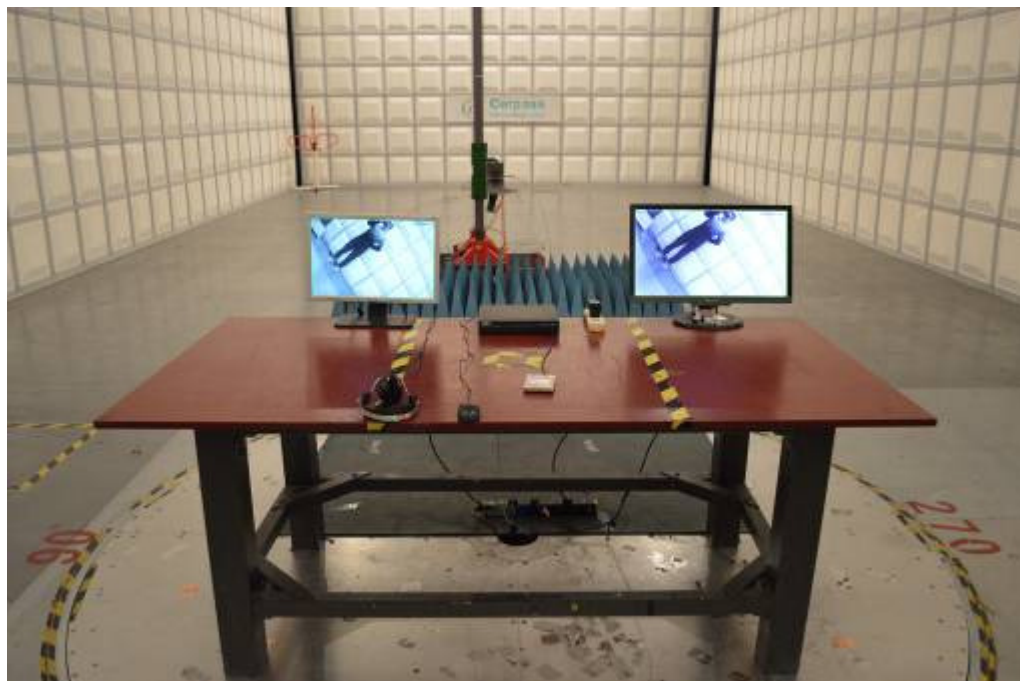




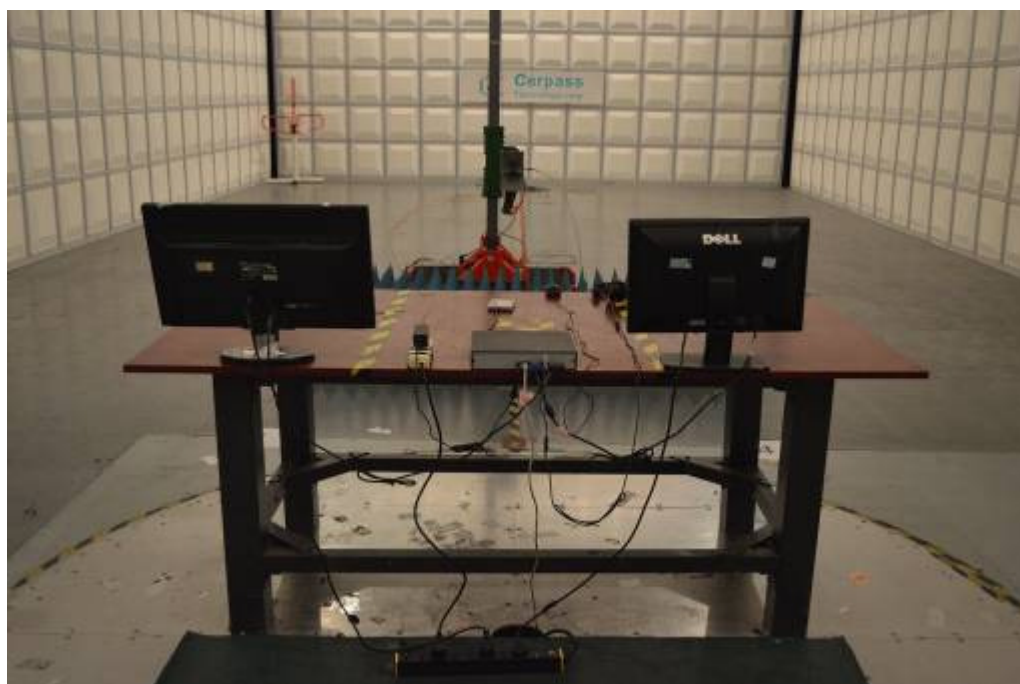


## 5.8. Test Photographs (1000MHz ~ 6000MHz)

Front View



Rear View





## 6. Harmonics Test

### 6.1. Limits of Harmonics Current Measurement

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

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

\*  $\lambda$  is the circuit power factor

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

Harmonics Order n	Maximum permissible harmonic current per watt mA/W	Maximum permissible harmonic current 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 (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.

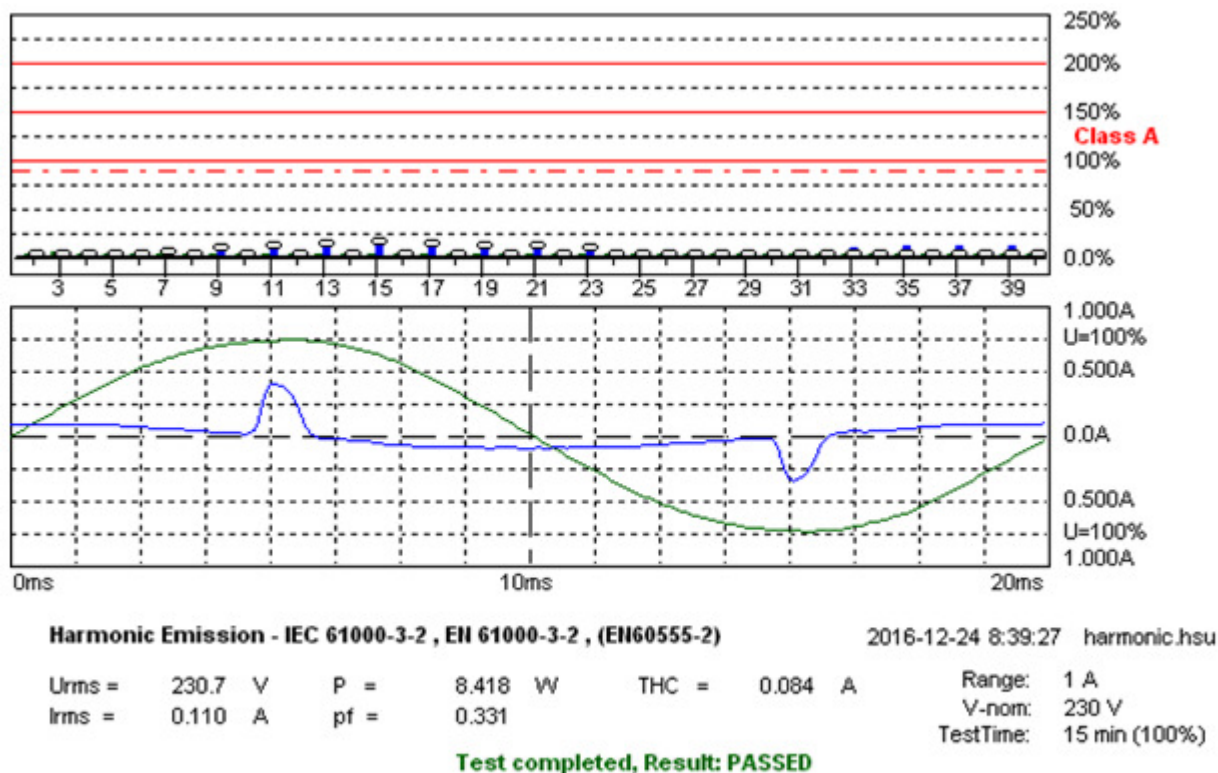
**6.2. Measurement equipment**

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
EMC Emission Tester	EMCPARTNER	Harmonics-1000	159	2016.03.26	2017.03.25
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-004	2016.03.29	2017.03.28
HARCS	EMC Partner AG	Ver 4.18	N/A	N/A	N/A



### 6.3. Test Result and Data

Basic Standard	:	EN 61000-3-2
Final Test Result	:	PASS
Test Mode	:	Mode 1
Equipment	:	NETWORK VIDEO RECORDER
Model No.	:	DHI-NVR4116HS-4KS2
Temperature	:	22°C
Humidity	:	50 %
Atmospheric Pressure	:	100 kPa
Test Date	:	Dec 24, 2016



HAR-1000 EMC-Partner

Full Bar : Actual Values

Empty Bar : Maximum Values

Blue : Current , Green : Voltage , Red : Failed

Urms = 230.7V Freq = 50.013 Range: 1 A  
Irms = 0.110A Ipk = 0.404A cf = 3.659  
P = 8.418W S = 25.46VA pf = 0.331  
THDi = 74.9 % THDu = 1.80 % Class A  
Test - Time : 15min ( 100 %)  
Test completed, Result: PASSED



Order	Freq. [Hz]	Irms [A]	Irms%L [%]	I <sub>max</sub> [A]	I <sub>max</sub> %L [%]	Limit [A]
1	50	0.0745		0.0745		
2	100	0.0045	0.4182	0.0048	0.4465	1.0800
3	150	0.0374	1.6267	0.0377	1.6373	2.3000
4	200	0.0042	0.9652	0.0043	1.0078	0.4300
5	250	0.0352	3.0892	0.0353	3.0999	1.1400
6	300	0.0042	1.3835	0.0043	1.4242	0.3000
7	350	0.0319	4.1456	0.0320	4.1615	0.7700
8	400	0.0034	1.4861	0.0035	1.5391	0.2300
9	450	0.0295	7.3700	0.0295	7.3853	0.4000
10	500	0.0024	1.3269	0.0026	1.3932	0.1840
11	550	0.0280	8.4894	0.0283	8.5634	0.3300
12	600	0.0025	1.6320	0.0026	1.7116	0.1533
13	650	0.0241	11.480	0.0242	11.539	0.2100
14	700	0.0020	1.4861	0.0021	1.5790	0.1314
15	750	0.0198	13.184	0.0200	13.306	0.1500
16	800	0.0015	1.2738	0.0016	1.3799	0.1150
17	850	0.0160	12.082	0.0163	12.313	0.1324
18	900	0.0008	0.7762	0.0010	0.9553	0.1022
19	950	0.0125	10.514	0.0128	10.772	0.1184
20	1000	0.0005	0.5307	0.0007	0.7298	0.0920
21	1050	0.0093	8.7158	0.0096	9.0007	0.1071
22	1100	0.0005	0.6568	0.0006	0.7298	0.0836
23	1150	0.0067	6.8007	0.0070	7.1126	0.0978
24	1200	0.0007	0.9553	0.0008	1.0349	0.0767
25	1250	0.0045	5.0184	0.0048	5.2897	0.0900
26	1300	0.0009	1.2937	0.0010	1.3799	0.0708
27	1350	0.0032	3.8818	0.0034	4.0283	0.0833
28	1400	0.0010	1.5790	0.0012	1.7647	0.0657
29	1450	0.0031	4.0120	0.0033	4.2480	0.0776
30	1500	0.0012	1.8908	0.0012	1.9903	0.0613
31	1550	0.0036	4.9615	0.0038	5.2138	0.0726
32	1600	0.0011	1.9107	0.0012	2.1230	0.0575
33	1650	0.0042	6.1768	0.0044	6.4453	0.0682
34	1700	0.0010	1.9173	0.0012	2.1429	0.0541
35	1750	0.0047	7.3107	0.0049	7.5955	0.0643
36	1800	0.0009	1.7912	0.0010	1.9107	0.0511
37	1850	0.0049	8.1299	0.0051	8.3306	0.0608
38	1900	0.0007	1.5126	0.0009	1.7647	0.0484
39	1950	0.0049	8.4635	0.0051	8.7809	0.0577
40	2000	0.0006	1.3269	0.0007	1.4595	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: Sun. Zhang



#### 6.4. 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

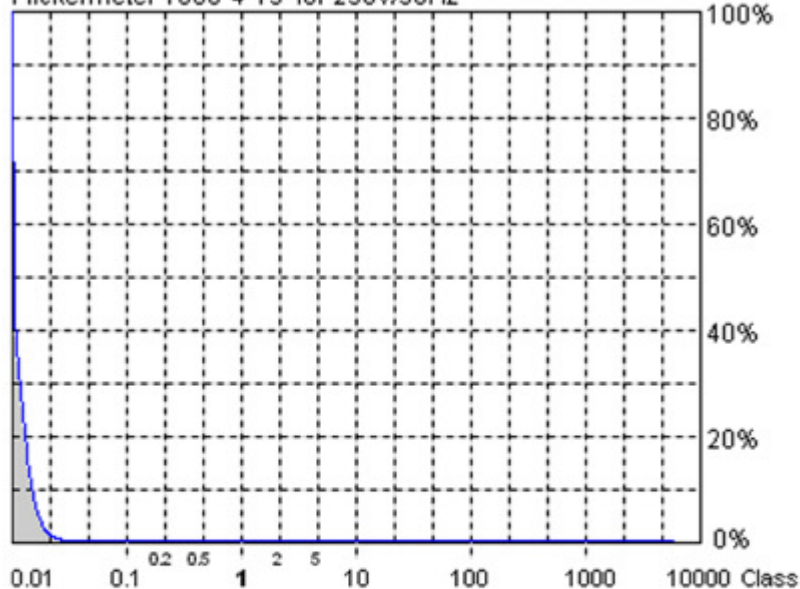
Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
EMC Emission Tester	EMCPARTNER	Harmonics-1000	159	2016.03.26	2017.03.25
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-004	2016.03.29	2017.03.28
HARCS	EMC Partner AG	Ver 4.18	N/A	N/A	N/A



### 7.3. Test Result and Data

Basic Standard	:	EN 61000-3-3
Final Test Result	:	PASS
Test Mode	:	Mode 1
Equipment	:	NETWORK VIDEO RECORDER
Model No.	:	DHI-NVR4116HS-4KS2
Temperature	:	22°C
Humidity	:	50 %
Atmospheric Pressure	:	100 kPa
Test Date	:	Dec 24, 2016

Flickermeter 1000-4-15 for 230V/50Hz

**Actual Flicker (Fli): 0.02****Short-term Flicker (Pst): 0.09**

Limit (Pst): 1.00

**Long-term Flicker (Plt): 0.09**

Limit (Plt): 0.65

**Maximum Relative Volt. Change (dmax): 0.00%**

Limit (dmax): 4.00%

**Relative Steady-state Voltage Change (dc): 0.12%**

Limit (dc): 3.30%

**Maximum Interval exceeding 3.30% (dt): 0.00ms**

Limit (dt&gt;Lim): 500ms

**Flicker Emission - IEC 61000-3-3, EN 61000-3-3, (EN60555-3)**

Urms = 230.7 V P = 8.369 W

Irms = 0.110 A pf = 0.330

2016-12-24 8:50:31 harmonic.hsu

Range: 1 A

V-nom: 230 V

TestTime: 10 min (100%)

**Test completed, Result: PASSED**

HAR-1000 EMC-Parber

Full Bar : Actual Values

Empty Bar : Maximum Values

Circles : Average Values

Blue : Current , Green : Voltage , Red : Failed





Urms = 230.7V Freq = 50.000 Range: 1 A  
Irms = 0.110A Ipk = 0.402A cf = 3.662  
P = 8.369W S = 25.35VA pf = 0.330

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:

Sun. Zhang



#### 7.4. Test Photographs



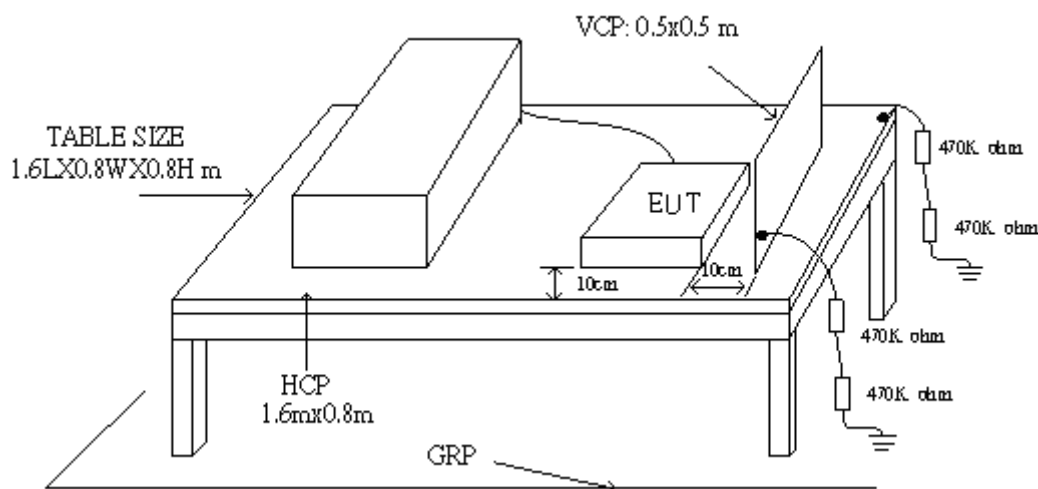


## 8. Electrostatic Discharge Immunity Test

### 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	2016.04.21	2017.04.20
Tonometer	shanghaifengyun	DYM3	3251	2016.12.21	2017.12.20
Dehumidifier	ZEDO	ZD-220LB	CEP-TH-01	N/A	N/A
Humidifier	YADU	YZ-DS251C	CEP-TH-02	N/A	N/A
Temperature/ Humidity Meter	feiyang	N/A	102	2016.03.29	2017.03.28
ESD Simulator	NoiseKen	ESS-B3011A	AEC00315-00 C-0A	2016.12.12	2017.12.11

**8.5. Test Result and Data**

Basic Standard : IEC 61000-4-2  
 Product Standard : EN 50130-4: 2011  
 Product Standard : EN 55024 : 2010  
 Equipment : NETWORK VIDEO RECORDER  
 Model No. : DHI-NVR4116HS-4KS2  
 Final Test Result : PASS  
 Temperature : 23°C  
 Relative Humidity : 50 %  
 Atmospheric Pressure : 100 kPa  
 Test Date : Dec 24, 2016

Test Mode 1

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	---	---	---	---	---	---	---	---	---	---	---	---
1-9	A	A	A	A	---	---	---	---	---	---	---	---	---	---	---	---
10-15	---	---	---	---	---	---	---	---	A	A	A	A	A	A	---	---
16-36	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	---	---	---	---	---	---	---	---	---	---
1-9	A	A	A	A	A	A	---	---	---	---	---	---	---	---	---	---
10-15	---	---	---	---	---	---	---	---	A	A	A	A	A	A	---	---
16-36	A	A	A	A	A	A	---	---	---	---	---	---	---	---	---	---



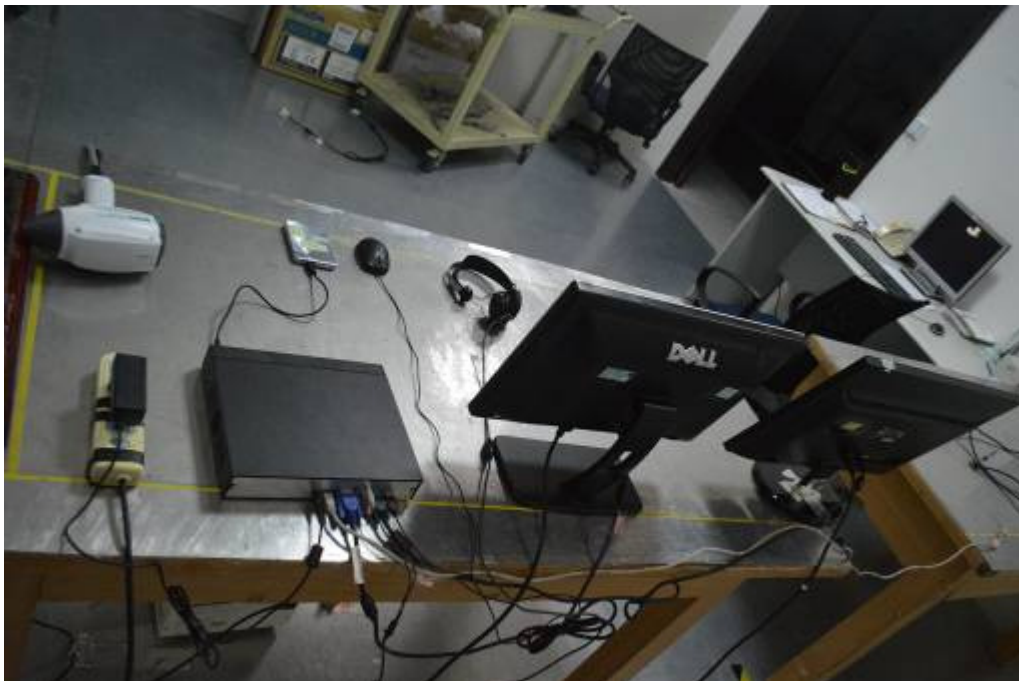
Test Voltage: AC 195.5V/50Hz																
	Contact Discharge								Air Discharge							
	25 times / each								10 times / each							
Voltage	2 kV		4 kV		6 kV		8 kV		2 kV		4 kV		8 kV		10 kV	
Point\Polarity	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
HCP	A	A	A	A	A	A	---	---	---	---	---	---	---	---	---	---
VCP	A	A	A	A	A	A	---	---	---	---	---	---	---	---	---	---
1-9	A	A	A	A	A	A	---	---	---	---	---	---	---	---	---	---
10-15	---	---	---	---	---	---	---	---	A	A	A	A	A	A	---	---
16-36	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	---	---	---	---	---	---	---	---	---	---
1-9	A	A	A	A	A	A	---	---	---	---	---	---	---	---	---	---
10-15	---	---	---	---	---	---	---	---	A	A	A	A	A	A	---	---
16-36	A	A	A	A	A	A	---	---	---	---	---	---	---	---	---	---

Test engineer: Sun. Zhang

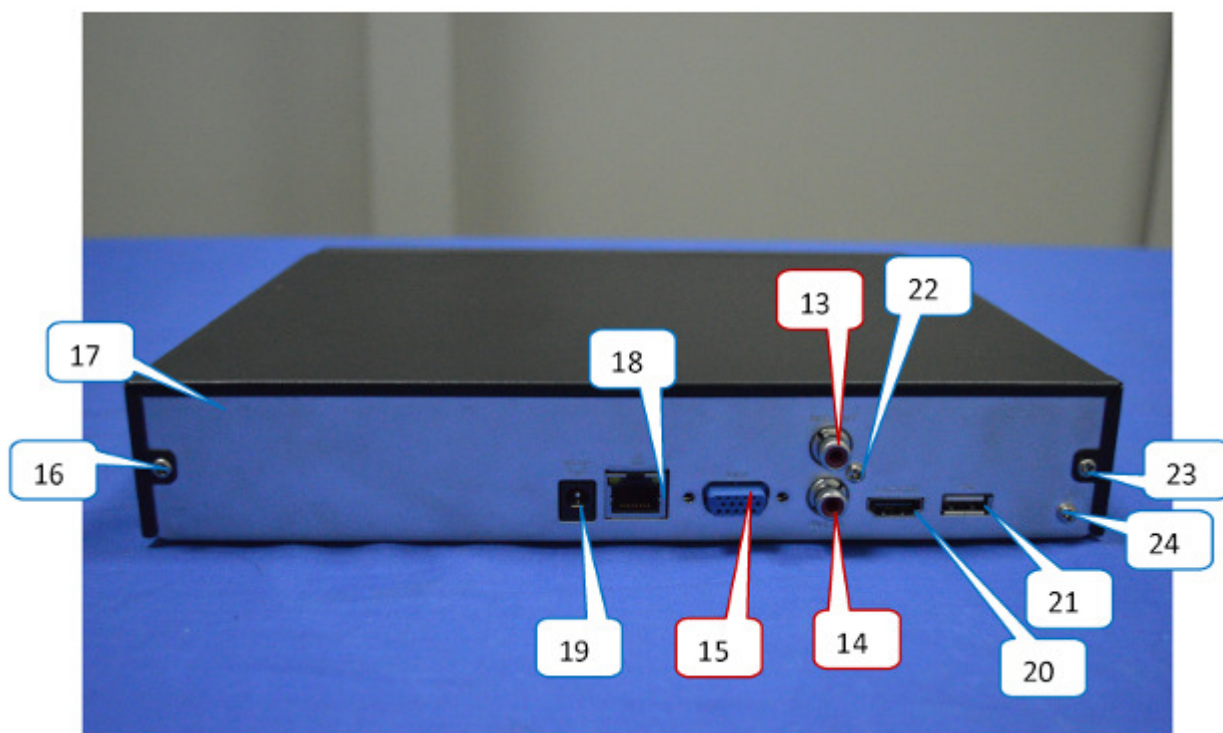
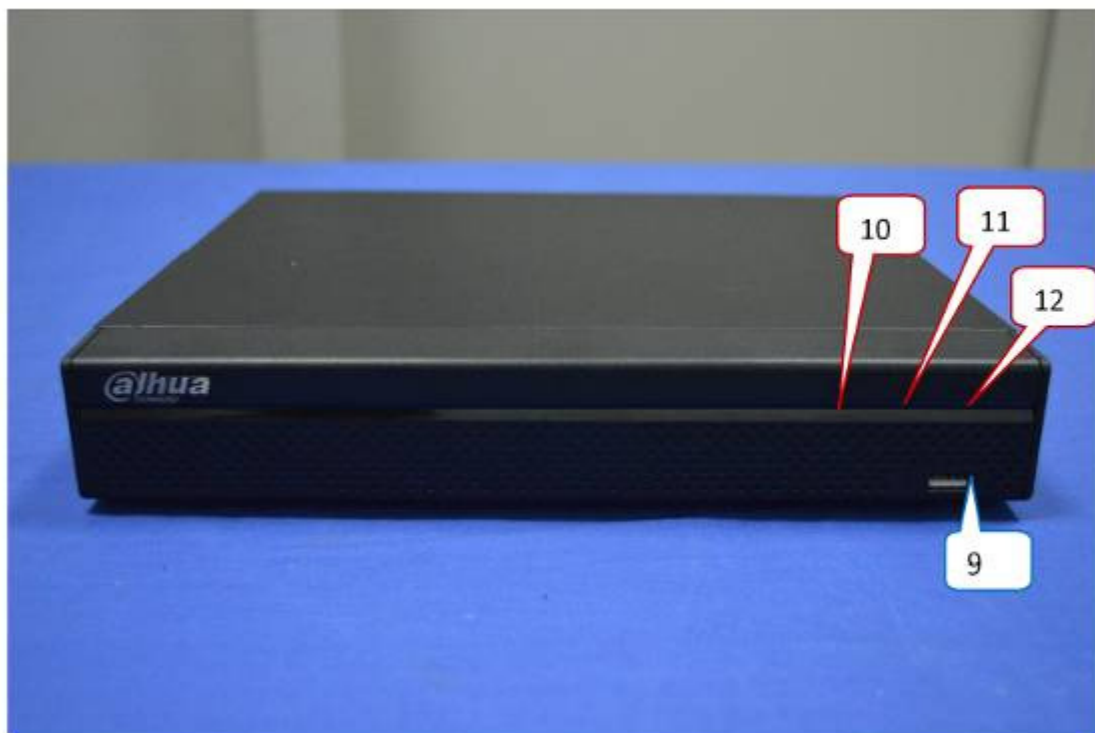


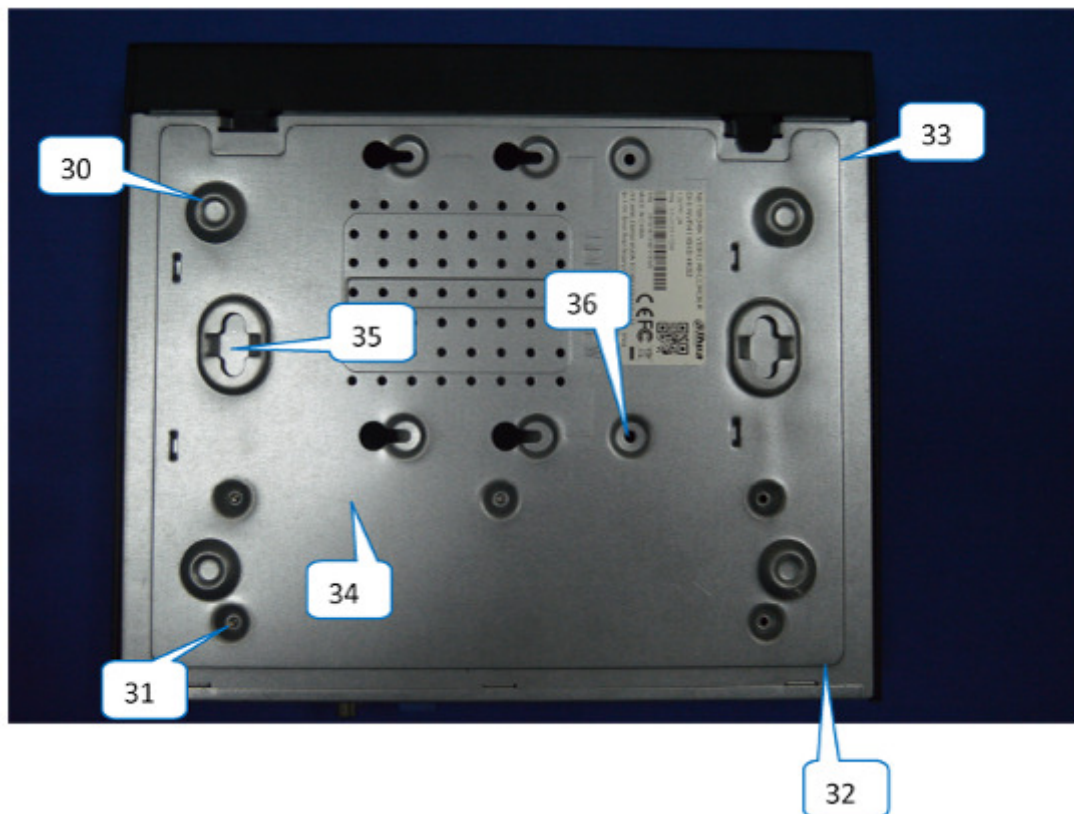
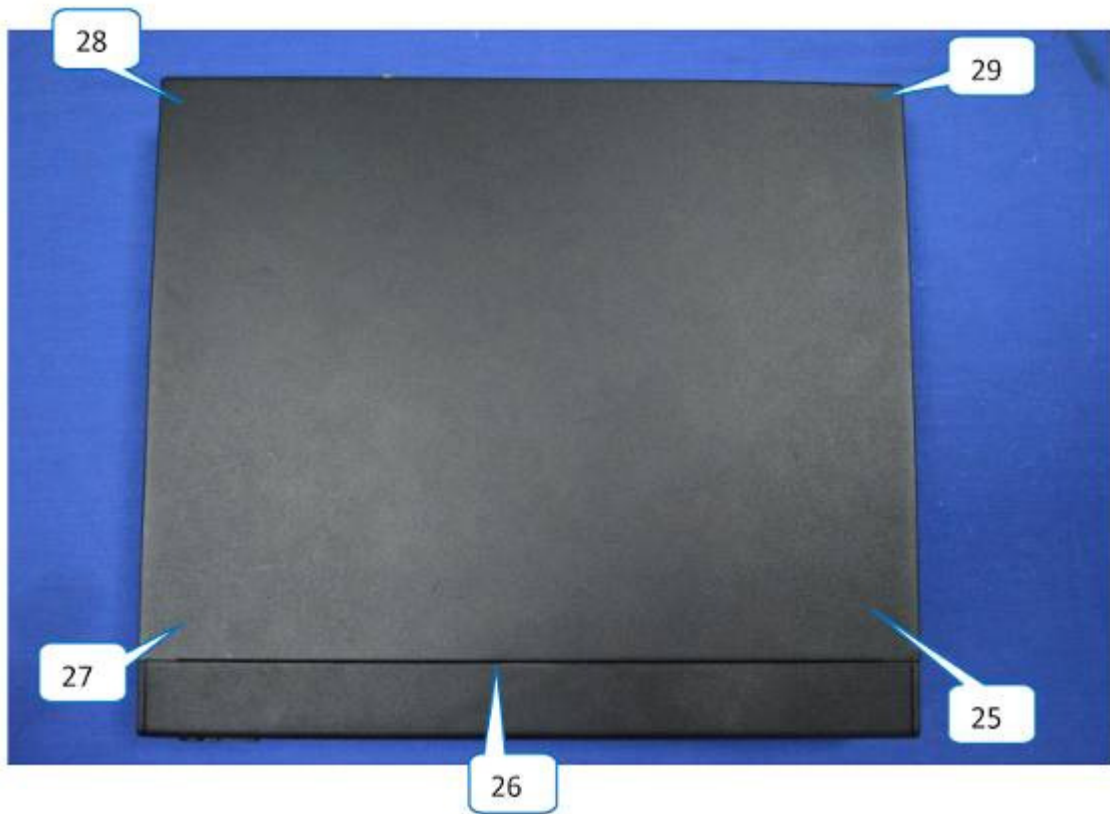
## 8.6. Test Photographs













## 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 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	$1.5 \times 10^{-3}$ decades/s



### 9.3. Measurement equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
Signal Generator	R&S	SML03	103287	2016.03.26	2017.03.25
Power Sensor	R&S	NR P-Z91	100383	2016.03.26	2017.03.25
Power Sensor	R&S	NRP-Z91	100384	2016.03.26	2017.03.25
Power Meter	R&S	NRP	101206	2016.03.26	2017.03.25
Power Amplifier	BONN	BLWA0830-16 0/100/40D	076659	2016.03.26	2017.03.25
Istropic Electric Field Probe	EST.LINDGREN	HI-6105	137445	2016.11.20	2017.11.19
EMS Antenna	R&S	HL046E	100028	N/A	N/A
Temperature/ Humidity Meter	feiyang	N/A	101	2016.03.29	2017.03.28
EMC-32	Rohde&Schwarz	Ver 6.10.0	N/A	N/A	N/A



#### 9.4. Test Result and Data

Basic Standard	: IEC 61000-4-3
Product Standard	: EN 50130-4: 2011
Product Standard	: EN 55024 : 2010
Equipment	: NETWORK VIDEO RECORDER
Model No.	: DHI-NVR4116HS-4KS2
Final Test Result	: PASS
Temperature	: 23°C
Relative Humidity	: 50%
Atmospheric Pressure	: 100 kPa
Test Date	: Dec 24, 2016

##### Test Mode 1

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

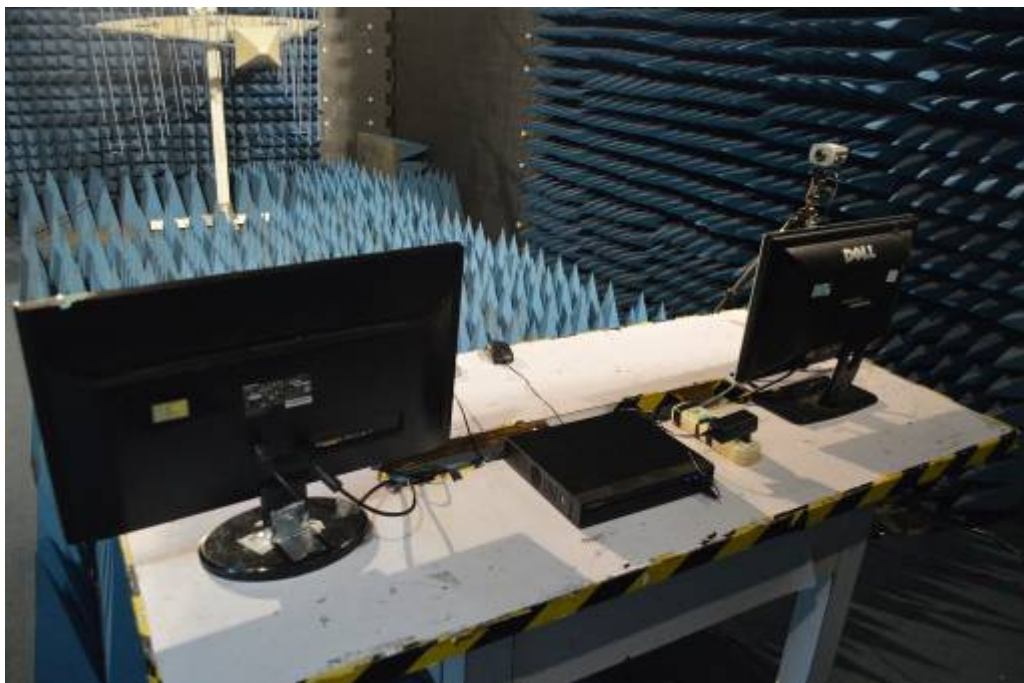
Test Voltage: AC 253V/50Hz

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: Sun. Zhang



## 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	2016.06.26	2017.06.25
CDN	EMCPARTNER	CDN2000-06-32	121	2016.03.26	2017.03.25
Coupling clamp	EMCPARTNER	CN-EFT1000	547	2016.03.26	2017.03.25
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-005	2016.03.29	2017.03.28



## 10.4. Test Result and Data

Basic Standard : IEC 61000-4-4  
Product Standard : EN 50130-4: 2011  
Product Standard : EN 55024 : 2010  
Equipment : NETWORK VIDEO RECORDER  
Model No. : DHI-NVR4116HS-4KS2  
Final Test Result : PASS  
Temperature : 23°C  
Relative Humidity : 49 %  
Atmospheric Pressure : 100 kPa  
Test Date : Dec 24, 2016

Test Mode 1

For EN 55024: 2010

Test Voltage: AC 230V/50Hz

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

For EN 50130-4: 2011

Test Voltage: AC 230V/50Hz

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



Test Voltage: AC 195.5V/50Hz

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

Test Voltage: AC 253V/50Hz

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

Test engineer: Sun. Zhang



## 10.5. Test Photographs

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## 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	TESEQ	NSG 3060	1830	2016.02.04	2017.02.03
CDN	TESEQ	CDN 3061	1575	2016.02.04	2017.02.03
CDN	TESEQ	CNV508T5	P 1546167499	2016.02.17	2017.02.16
CDN	TESEQ	CDN HSS-2	41020	2016.02.24	2017.02.23
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-005	2016.03.29	2017.03.28





#### 11.4. Test Result and Data

Basic Standard : IEC 61000-4-5  
Product Standard : EN 50130-4: 2011  
Product Standard : EN 55024 : 2010  
Equipment : NETWORK VIDEO RECORDER  
Model No. : DHI-NVR4116HS-4KS2  
Final Test Result : PASS  
Temperature : 24 °C  
Relative Humidity : 52%  
Atmospheric Pressure : 100 kPa  
Test Date : Dec 24, 2016

Test Mode 1

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°
<u>0.5/1.0</u> kV	L-N	+	A	A	A	A
		—	A	A	A	A

Waveform :10/700µs    Repetition rate : 60 sec    Time : 5 time/each condition				
Voltage	<u>0.5</u> kV		<u>1.0</u> kV	
Mode / Polarity / Result	+	—	+	—
RJ45	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°
<u>0.5/1.0</u> kV	L-N	+	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	<u>0.5</u> KV		<u>1.0</u> KV	
Mode / Polarity / Result	+	—	+	—
RJ45	A	A	A	A

Waveform : 10/700 $\mu$ s    Repetition rate : 60 sec    Time : 5 time/each condition				
Voltage	<u>0.5</u> kV		<u>1.0</u> kV	
Mode / Polarity / Result	+	—	+	—
RJ45	A	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°
<u>0.5/1.0</u> kV	L-N	+	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	<u>0.5</u> KV		<u>1.0</u> KV	
Mode / Polarity / Result	+	—	+	—
RJ45	A	A	A	A



Waveform : 10/700 $\mu$ s    Repetition rate : 60 sec    Time : 5 time/each condition				
Voltage	<u>0.5</u> kV		<u>1.0</u> kV	
Mode / Polarity / Result	+	—	+	—
RJ45	A	A	A	A

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°
<u>0.5/1.0</u> kV	L-N	+	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	<u>0.5</u> KV		<u>1.0</u> KV	
Mode / Polarity / Result	+	—	+	—
RJ45	A	A	A	A

Waveform : 10/700 $\mu$ s    Repetition rate : 60 sec    Time : 5 time/each condition				
Voltage	<u>0.5</u> kV		<u>1.0</u> kV	
Mode / Polarity / Result	+	—	+	—
RJ45	A	A	A	A

Test engineer: Sun Zhang



## 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	2016.03.26	2017.03.25
EM Injection clamp	FCC	F-203I-23MM	536	2016.03.26	2017.03.25
CDN	FRANKONIA	CDN-T2	A3010029	2016.03.26	2017.03.25
CDN	FRANKONIA	CDN-T4	A3015017	2016.03.26	2017.03.25
CDN	FRANKONIA	CDN-T8	A3022010	2016.03.26	2017.03.25
CDN	FRANKONIA	CDN-M2	A3002037	2016.03.26	2017.03.25
CDN	FRANKONIA	CDN-M2+M3	A3011102	2016.03.26	2017.03.25
CDN	FCC	CDN-M5/32	A3013024	2016.03.26	2017.03.25
6 dB Attenuator	FRANKONIA	N/A	N/A	2016.03.26	2017.03.25
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-005	2016.03.29	2017.03.28
EN61000-4-6	Hubert GmbH	Ver 2.21	N/A	N/A	N/A



## 12.4. Test Result and Data

Basic Standard : IEC 61000-4-6  
Product Standard : EN 50130-4: 2011  
Product Standard : EN 55024 : 2010  
Equipment : NETWORK VIDEO RECORDER  
Model No. : DHI-NVR4116HS-4KS2  
Final Test Result : PASS  
Temperature : 23°C  
Relative Humidity : 50 %  
Atmospheric Pressure : 100 kPa  
Test Date : Dec 24, 2016

### Test Mode 1

For EN 55024: 2010

Test Voltage: AC 230V/50Hz

Frequency : 0.15~80MHz, Modulation : AM 80%,1KHz sine wave, Dwell time: 3.0s Frequency Step Size : 1 % of preceding frequency value			
Frequency	Test mode	Voltage(V)	Result
0.15 ~ 80MHz	Power(M2)	3	A
0.15 ~ 80MHz	RJ45	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 Frequency Step Size : 1 % of preceding frequency value			
Frequency	Test mode	Voltage(V)	Result
0.15 ~ 100MHz	Power(M2)	10	A
0.15 ~ 100MHz	RJ45	10	A





Test Voltage: AC 195.5V/50Hz

Frequency : 0.15~100MHz, Modulation : AM 80%,1KHz sine wave, Dwell time: 3.0s Frequency Step Size : 1 % of preceding frequency value			
Frequency	Test mode	Voltage(V)	Result
0.15 ~ 100MHz	Power(M2)	10	A
0.15 ~ 100MHz	RJ45	10	A

Test Voltage: AC 253V/50Hz

Frequency : 0.15~100MHz, Modulation : AM 80%,1KHz sine wave, Dwell time: 3.0s Frequency Step Size : 1 % of preceding frequency value			
Frequency	Test mode	Voltage(V)	Result
0.15 ~ 100MHz	Power(M2)	10	A
0.15 ~ 100MHz	RJ45	10	A

Test engineer: Sun. Zhang

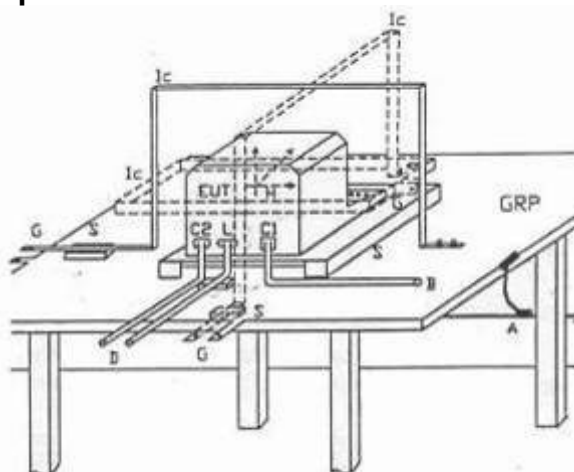


## 12.5. Test Photographs



## 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 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	2016.06.26	2017.06.25
H-Filed-Loop	EMCPARTNER	MF1000-1	144	2016.03.26	2017.03.25
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-005	2016.03.29	2017.03.28



### 13.1. Test Result and Data

Basic Standard : IEC 61000-4-8  
Product Standard : EN 55024 : 2010  
Equipment : NETWORK VIDEO RECORDER  
Model No. : DHI-NVR4116HS-4KS2  
Final Test Result : PASS  
Temperature : 23° C  
Relative Humidity : 50%  
Atmospheric Pressure : 100 kPa  
Test Date : Dec 24, 2016

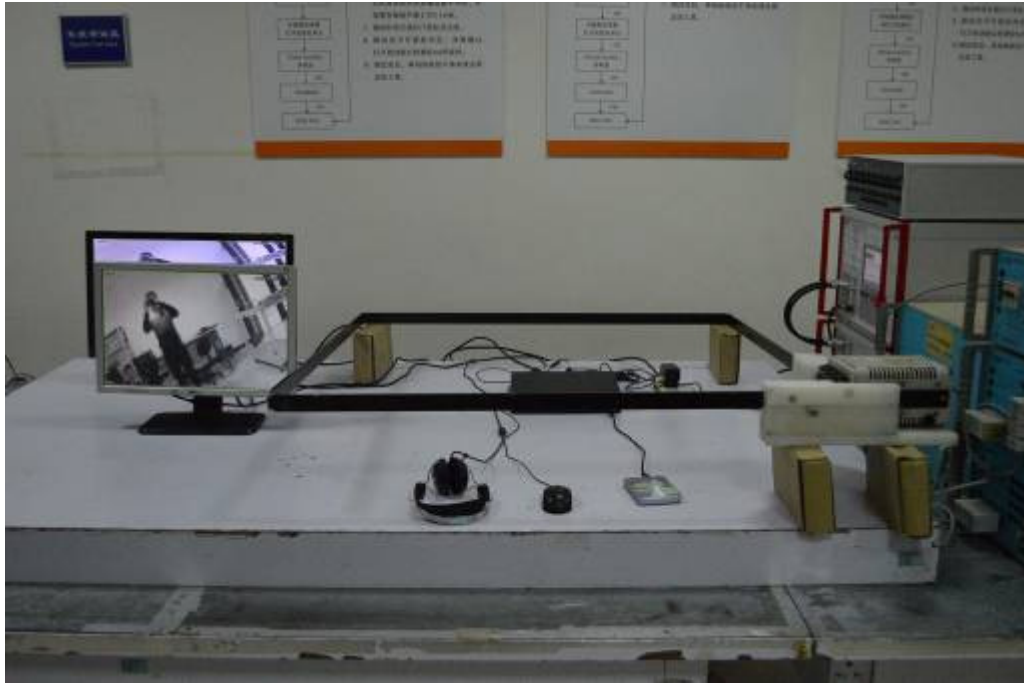
#### Test Mode 1

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
Power Frequency Magnetic Field : <u>60</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: Sun Zhang



## 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 (period)
>95%	250
30%	25
>95%	0.5

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

### 14.2. Measurement equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
TRANSIENT	EMCPARTNER	TRA2000IN6	901	2016.06.26	2017.06.25
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-005	2016.03.29	2017.03.28



### 14.3. Test Result and Data

Basic Standard : IEC 61000-4-11  
Product Standard : EN 50130-4: 2011  
Product Standard : EN 55024 : 2010  
Equipment : NETWORK VIDEO RECORDER  
Model No. : DHI-NVR4116HS-4KS2  
Final Test Result : PASS  
Temperature : 23°C  
Relative Humidity : 50%  
Atmospheric Pressure : 100 kPa  
Test Date : Dec 24, 2016

#### Test Mode 1

For EN 55024: 2010

Voltage(UT): AC 100V/50 Hz Interval(s) : 10s Times : 3										
Test mod	Test level UT %	Durations (period / 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 UT %	Durations (period / 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 UT %	Durations (period / 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 UT %	Durations (period / 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 UT %	Durations (period / 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: Sun. Zhang



#### 14.4. Test Photographs



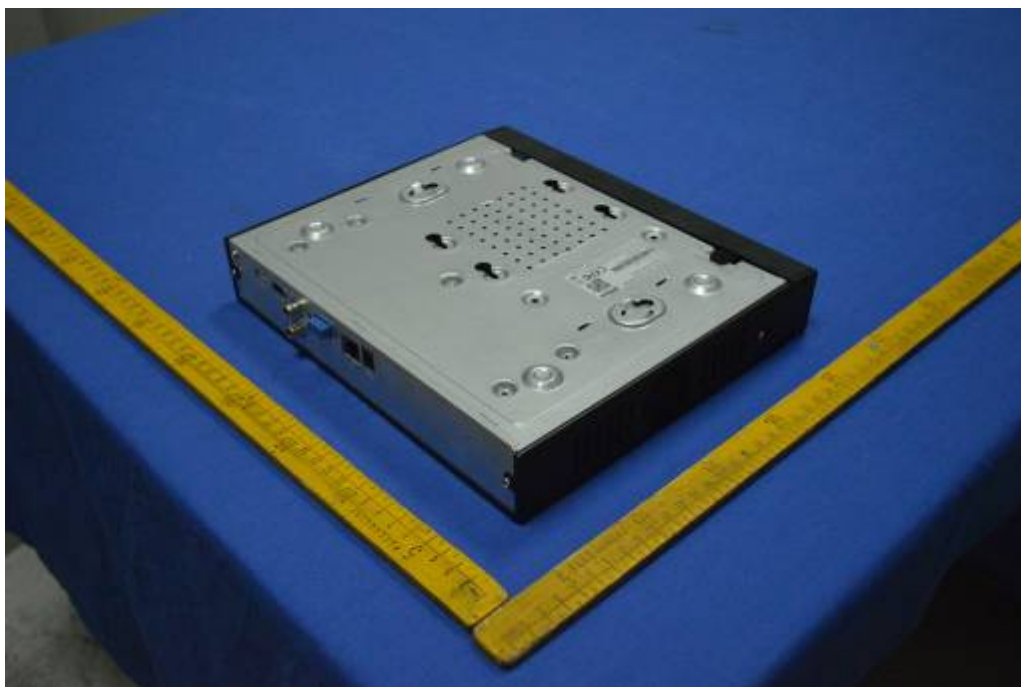


## 15. EUT Photographs

### 1) EUT Photo(DHI-NVR4116HS-4KS2)



### 2) EUT Photo





3) EUT Photo



4) EUT Photo





5) EUT Photo



6) EUT Photo





7) EUT Photo



8) EUT Photo







9) EUT Photo(DHI-NVR4116-4KS2)



10) EUT Photo







11) EUT Photo



12) EUT Photo





13) EUT Photo



14) EUT Photo





15) EUT Photo



16) EUT Photo





17) EUT Photo(adapter)



18) EUT Photo(adapter)





19) EUT Photo(adapter)



20) EUT Photo(adapter)

