

No.	N1611CR8888-00338-Y
Total page	43



中国认可  
国际互认  
检测  
TESTING  
CNAS L0462

# TEST REPORT

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Product Name : Network Camera

Type and Specification : DS-2XM6522WD-IM;DS-2XM6512WD-IM

Test Category : Entrusted Test

Factory : Hangzhou Hikvision Technology Co.,Ltd.


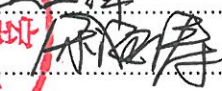

Client: Hangzhou Hikvision Digital Technology Co., Ltd.

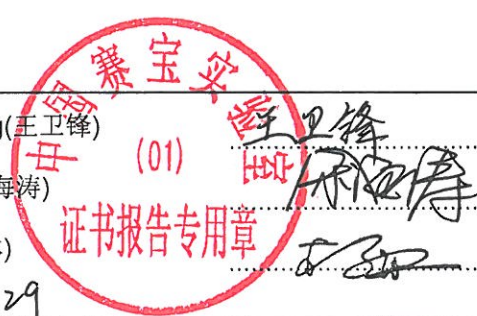


**China Electronic Product Reliability And  
Environmental Testing Research Institute**

**China CEPREI Laboratory**

# TEST REPORT

Report reference No .....	N1611CR8888-00338-Y
Total number of pages .....	43
Test item description .....	Network Camera
Trademark .....	/
Model and/or type reference .....	DS-2XM6522WD-IM
Factory's Name .....	Hangzhou Hikvision Technology Co.,Ltd.
Address .....	No. 700 Dongliu Road, Binjiang District, Hangzhou 310052,Zhejiang , China
Client's Name .....	Hangzhou Hikvision Digital Technology Co., Ltd.
Address .....	No. 555 Qianmo Road, Binjiang District, Hangzhou 310052,Zhejiang , China
Testing Laboratory Name .....	China CEPREI Laboratory/ China Electronic Product Reliability and Environmental Testing Research Institute
Address .....	No.110 Dongguanzhuang Rd., Tianhe District,Guangzhou, Guangdong, 510610, China
Testing location .....	China CEPREI Laboratory
Test specification	
Standard.....	EN 50155:2007;EN 50121-3-2:2006;IEC 60068-2-1:2007;IEC 60068-2-2:2007;IEC 60068-2-30:2005;IEC 60068-2-64:1993;IEC 61373:1999;
Test category .....	Entrusted Test
Number of test item.....	1
Date of receipt of test item .....	2016.11.23
Date(s) of performance of test.....	2016.11.23-2016.12.14
Ambient Condition.....	15~35°C, 45~75%RH, 86~106Kpa
Test Instruments and Equipment.....	See Equipment List of This Report.
<b>Summary of Testing and Conclusions</b>	
PASS.	
Tested by (printed name and signature).....	Wang Weifeng(王卫锋) 
Reviewed by (printed name and signature).....	Yu Haitao (余海涛) 
Approved by (printed name and signature).....	Yang Lin (杨林) 
Date of issue .....	2016.12.29



<b>Test case verdicts</b>	
Test case does not apply to the test object.....:	N
Test item does meet the requirement(Pass).....:	PASS
Test item does not meet the requirement(Fail).....:	F
<b>General remarks</b>	
<ol style="list-style-type: none"> <li>1. Report without "specific stamp" of inspection organization or the authority will be regarded as invalid.</li> <li>2. Duplicated report without original "specific stamp" of inspection organization or the authority will be regarded as invalid.</li> <li>3. Report without the signatures of Tester, Reviewer or Approval will be regarded as invalid.</li> <li>4. Test report if altered will be regarded as invalid.</li> <li>5. Any dispute about the report must be submitted to inspection organization within 15 days upon report received, it will be rejected if out of the period.</li> <li>6. Generally, the entrusted test only responsible for the samples.</li> </ol>	
<b>General product information:</b>	
<p>The models of entrusted test: DS-2XM6522WD-IM, DS-2XM6512WD-IM. Description of the difference between the product models: in addition to the resolution is different, other aspects are all the same. The tests carried out on the model DS-2XM6522WD-IM.</p>	
<b>Testing Laboratory Contact Info:</b>	
<p>China CEPREI Laboratory/ China Electronic Product Reliability and Environmental Testing Research Institute  Address: No.110 Dongguanhuang Rd., Tianhe District,Guangzhou, Guangdong, 510610, China  Post: P.O.Box1501-07,Guangzhou  Postcode: 510610  TEL: +86-20-85131111  FAX: +86-20-87236171, +86-20-85131313  Technical Consultant: +86-20-85131285, +86-20-85131260  Business Contact: +86-20-87237177,market@ceprei.biz  Enquiry: +86-20-87237150, +86-20-85131123,info@ceprei.biz  Complaint: +86-20-87237622, +86-20-87236789,qic@ceprei.biz</p>	

## EMC Standards Compliance List / Test summary

The following standards have been applied to ensure the product conforms to the protection requirements of the client.

Electromagnetic Emissions				
Test Item	Class	Standard	Result	
Conducted Emission at mains terminals (0.15-30MHz)	/	EN 50155:2007	PASS	
Radiated Emission(30-1000MHz)	/	EN 50155:2007	PASS	
Electromagnetic Immunity				
Test Item	Performance Criteria	Standard	Test Level	Result
Electrical Fast Transient/Burst Immunity	A	EN 50155:2007	± 2kV Peak 5/50ns Tr/Th 5kHz Repetition frequency	PASS
Radio-frequency Electromagnetic Fields Immunity	A	EN 50155:2007	80-1000 MHz 20 V/m(r.m.s) unmodulated carrier 80 % AM,1kHz	PASS
Radio-frequency Electromagnetic Field,from Digital Mobile Telephones Immunity	A	EN 50155:2007	800-1000 MHz,20 V/m(r.m.s); 1400-2100 MHz,10 V/m(r.m.s); 2100-2500 MHz,5 V/m(r.m.s); unmodulated carrier 80 % AM,1kHz	PASS
Radio-frequency Conducted Disturbance Immunity	A	EN 50155:2007	0.15-80 MHz 10 V(r.m.s) unmodulated carrier 80 % AM,1kHz	PASS
Surge Immunity	B	EN 50155:2007	1.2/50 μ s ± 1kV(line to line) ± 2kV(line to earth)	PASS
Electrostatic Discharge Immunity	B	EN 50155:2007	± 6 kV(Contact discharge) ± 8 kV(Air discharge)	PASS
Interruptions of Voltage Supply Immunity	/	EN 50155:2007	100% reduction 10ms	PASS
Variations of Voltage Supply Immunity	/	EN 50155:2007	Minimum voltage 0.7Un Maximum voltage 1.25Un 60-140% change linear 0.1s 125-140% change linear 1s	PASS
Supply Overvoltages	/	EN 50155:2007	1.4Un	PASS



## Environment Standards Compliance List and Test equipment

The following standards have been applied to ensure the product conforms to the protection requirements of the client.

<b>Environment Standards</b>			
<b>Test Item</b>	<b>Standard</b>		<b>Result</b>
Visual Inspection	EN 50155:2007		PASS
Insulation Resistance Test	EN 50155:2007		PASS
Dielectric Strength Test	EN 50155:2007		PASS
Low Temperature Test	IEC 60068-2-1:2007		PASS
Low Temperature Storage Test	IEC 60068-2-1:2007		PASS
High temperature Test	IEC 60068-2-2:2007		PASS
Damp Heat Cyclic Test	IEC 60068-2-30:2005		PASS
Random Vibration Test	IEC 60068-2-64:1993		PASS
Mechanical Shock Test	IEC 61373:1999		PASS
<b>Environment Test equipment</b>			
<b>Test Equipment</b>	<b>Model</b>	<b>Serial No.</b>	<b>Due Date</b>
Environment Test Chamber	CEEC-WSJ-2000B	12024-3	Dec.09, 2016
Electrodynamic Vibration System	DC-3200-36	071023	Jul.9, 2017
Withstanding Voltage and Insulation Resistance tester	TOS9201	TC001054	Dec.08, 2016

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## Section 1 General Information

### 1.1 Introduction

This report documents the emission and immunity test results for the Network Camera.

### 1.2 EUT general and technical Descriptions

EUT Name:	Network Camera
EUT Model:	DS-2XM6522WD-IM;DS-2XM6512WD-IM
EUT Trademark:	/
Input Voltage:	DC12V
Frequency:	/
Input Power/Current:	/
Power Cable Description:	/
Other Cables Description:	/
Function(s) Description:	/

## Section 2 Electromagnetic Emissions

### 2.1 Conducted Emission at Mains Terminals

#### 2.1.1 Conducted Emission Test Information (mains terminal)

<b>Temperature:</b>	20 °C	<b>Humidity:</b>	50%RH
<b>ATM Pressure:</b>	101 k Pa	<b>Grounding:</b>	/
<b>Test Voltage:</b>	DC12V	<b>Tested Range:</b>	150kHz to 30MHz
<b>Tested by:</b>	Wang Weifeng	<b>Date of test:</b>	2016-11-24
<b>Test Reference:</b>	EN 50155:2007		
<b>Results:</b>	The Conducted Emission at Mains Terminals of EUT Met the requirement of the standard EN 50155:2007.		

#### 2.1.2 Measurement Equipments Used for Conducted Emission (mains terminal)

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
EMI Test Receiver	R&S	ESC17	100940	2016-06-06	2017-06-05
LISN	R&S	ESH2-Z5	100378	2016-06-06	2017-06-05
Shielded Room	ETS	CT000568	1167	2015-01-14	2017-01-13

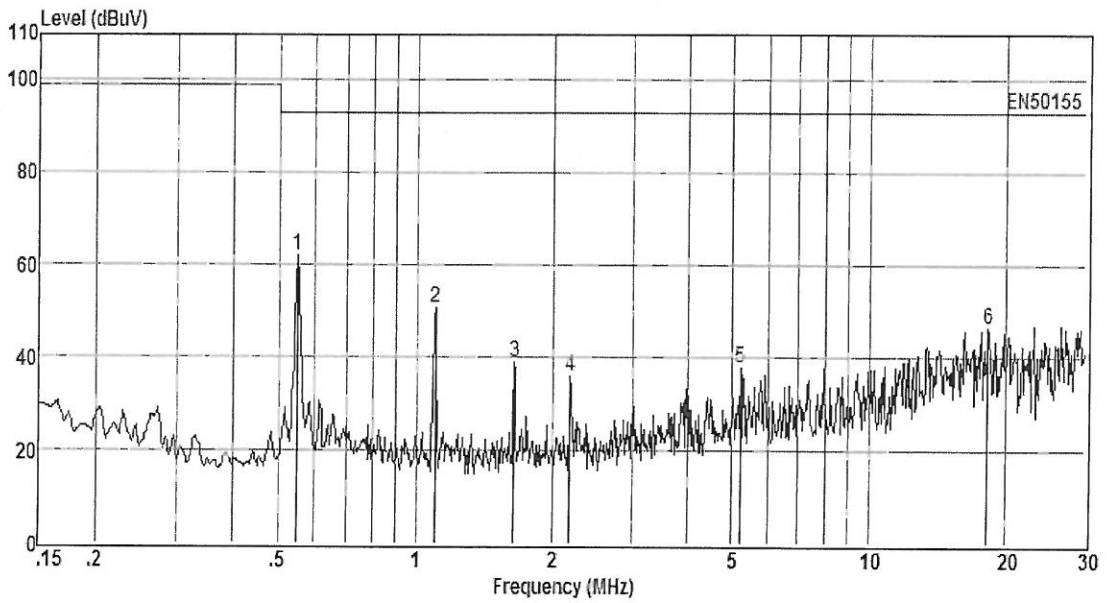
#### 2.1.3 Test Data

Line Positive (INPUT LINE, LINE)							
No.	Frequency (MHz)	Corrected P Level (dB $\mu$ V)	Limits QP (dB $\mu$ V)	Margin P (dB)	Corrected AVE Level (dB $\mu$ V)	Limits AVE (dB $\mu$ V)	Margin AVE (dB)
1	0.549	62.1	93.0	/	/	/	/
2	1.100	50.6	93.0	/	/	/	/
3	1.645	38.9	93.0	/	/	/	/
4	2.190	36.0	93.0	/	/	/	/
5	5.221	37.6	93.0	/	/	/	/
6	18.23	46.5	93.0	/	/	/	/
Line Negative (INPUT LINE, RETURN)							
No.	Frequency (MHz)	Corrected P Level (dB $\mu$ V)	Limits QP (dB $\mu$ V)	Margin P (dB)	Corrected AVE Level (dB $\mu$ V)	Limits AVE (dB $\mu$ V)	Margin AVE (dB)
1	0.549	62.4	93.0	/	/	/	/
2	1.100	51.1	93.0	/	/	/	/
3	1.654	38.4	93.0	/	/	/	/
4	2.190	35.9	93.0	/	/	/	/
5	7.935	42.0	93.0	/	/	/	/
6	19.74	52.8	93.0	/	/	/	/

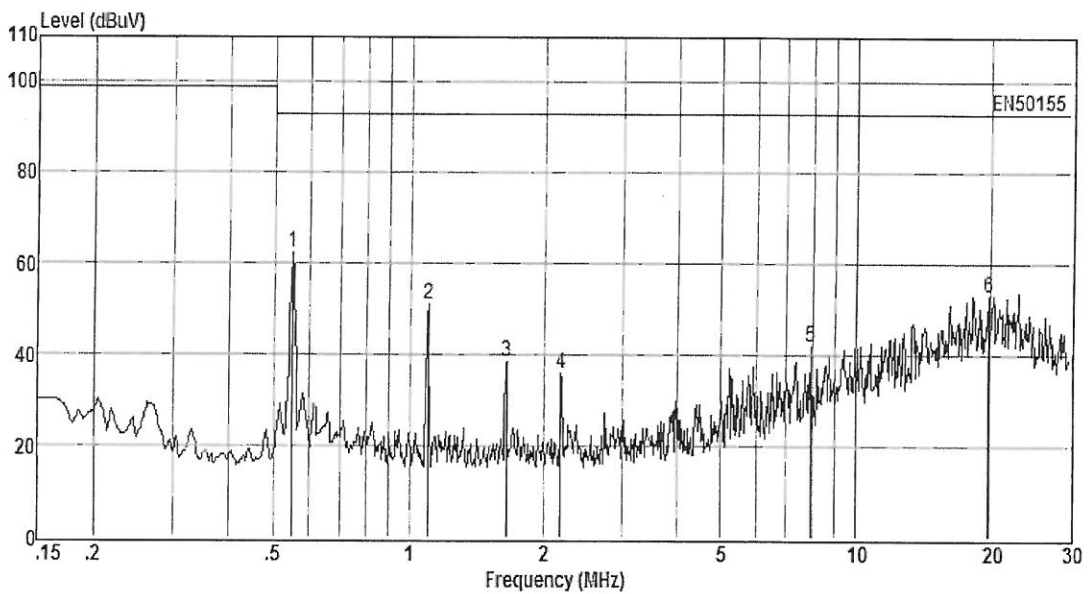
Note: The Corrected P Level included The Cable attenuation.



## 2.1.4 Test curves



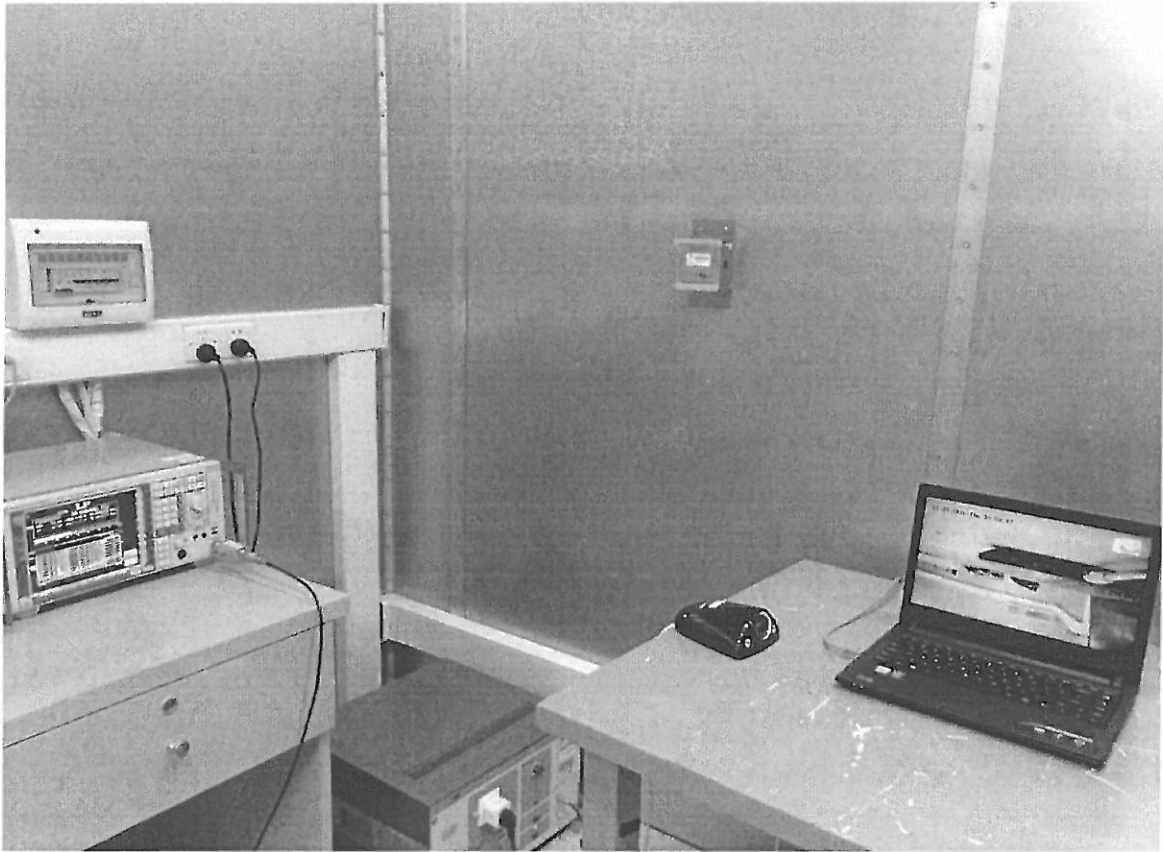
Line Positive (INPUT LINE DC12V, LINE ) Conducted Emission Graph



Line Negative (INPUT LINE DC12V, RETURN) Conducted Emission Graph

Note: The curves included The Cable attenuation.

## 2.1.5 Test Setup



Conducted Emission at mains terminal Test Set-up Front View

## 2.2 Radiated Emission ( 30-1000MHz )

### 2.2.1 Radiated Emission Test Information

Temperature:	18 °C	Humidity:	50%RH
ATM Pressure:	101 k Pa	Grounding:	/
Test Voltage:	DC12V	Tested Range:	30MHz to 1000MHz
Tested by:	Wang Weifeng	Date of test:	2016-11-24
Test Reference:	EN 50155:2007		
Results:	The Radiated Emission of EUT Met the standard EN 50155:2007.		

### 2.2.2 Measurement Equipments Used for Radiated Emission

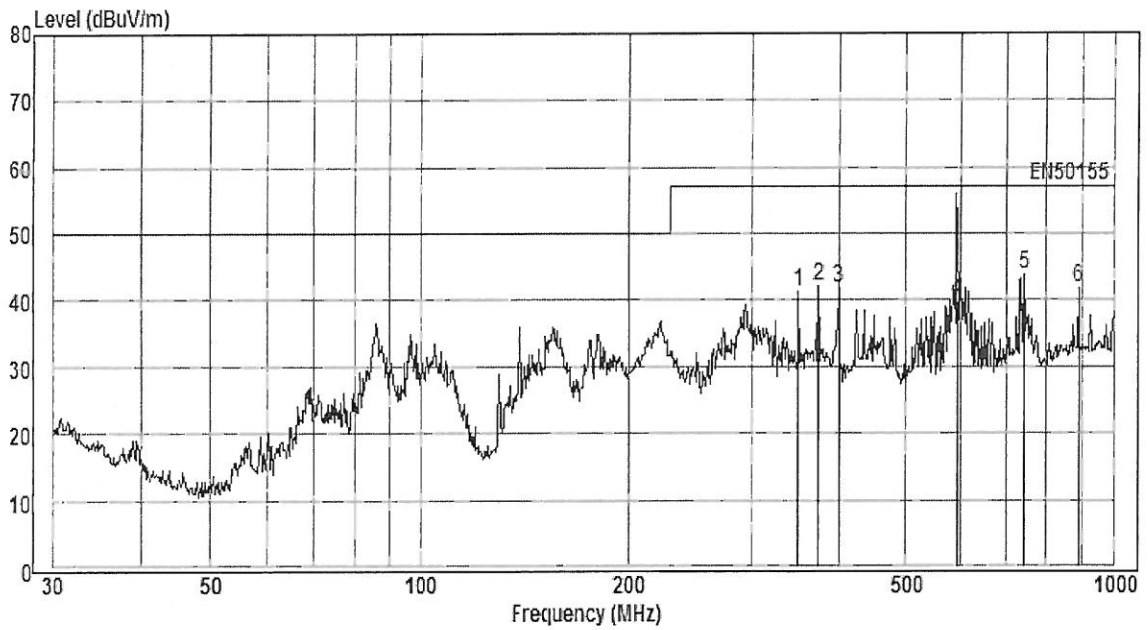
Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
EMI Test Receiver	R&S	ESR	101294	2016-06-06	2017-06-05
Periodic-Log antenna	ETS	3142E	144754	2016-06-27	2017-06-26
Anechoic Chamber	ETS	RFD-F/A-100	5374	2015-01-14	2017-01-13

### 2.2.3 Test Data

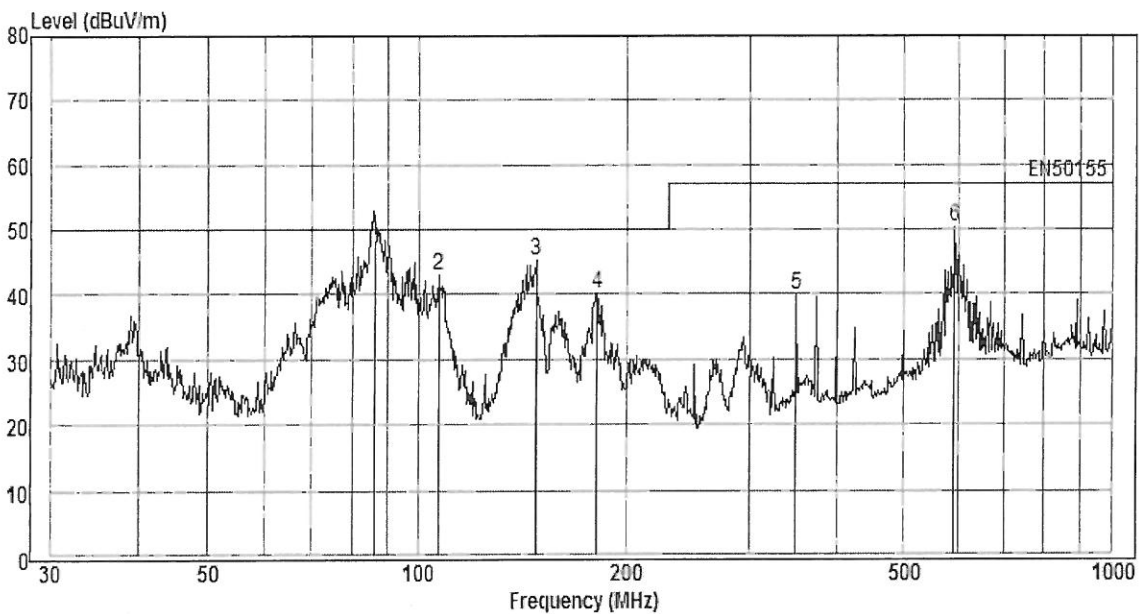
Horizontal						
No.	Frequency (MHz)	Corrected QP Level dB(μV/m)	3 Meter Limits dB(μV/m)	Margin (dB)	Angle of Turner (degree)	Height of Tower (cm)
1	350.5	41.4	57.0	/	/	/
2	374.6	42.2	57.0	/	/	/
3	400.4	41.9	57.0	/	/	/
4	594.1	39.8	57.0	/	/	/
5	742.3	43.9	57.0	/	/	/
6	890.7	41.7	57.0	/	/	/
Vertical						
No.	Frequency (MHz)	Corrected QP Level dB(μV/m)	3 Meter Limits dB(μV/m)	Margin (dB)	Angle of Turner (degree)	Height of Tower (cm)
1	86.0	48.4	50.0	/	/	/
2	106.8	42.9	50.0	/	/	/
3	147.9	45.1	50.0	/	/	/
4	181.3	40.2	50.0	/	/	/
5	350.5	39.9	57.0	/	/	/
6	593.1	50.4	57.0	/	/	/

Note: The Corrected QP Level included The Cable attenuation and The Antenna Factor.

## 2.2.4 Test Curves



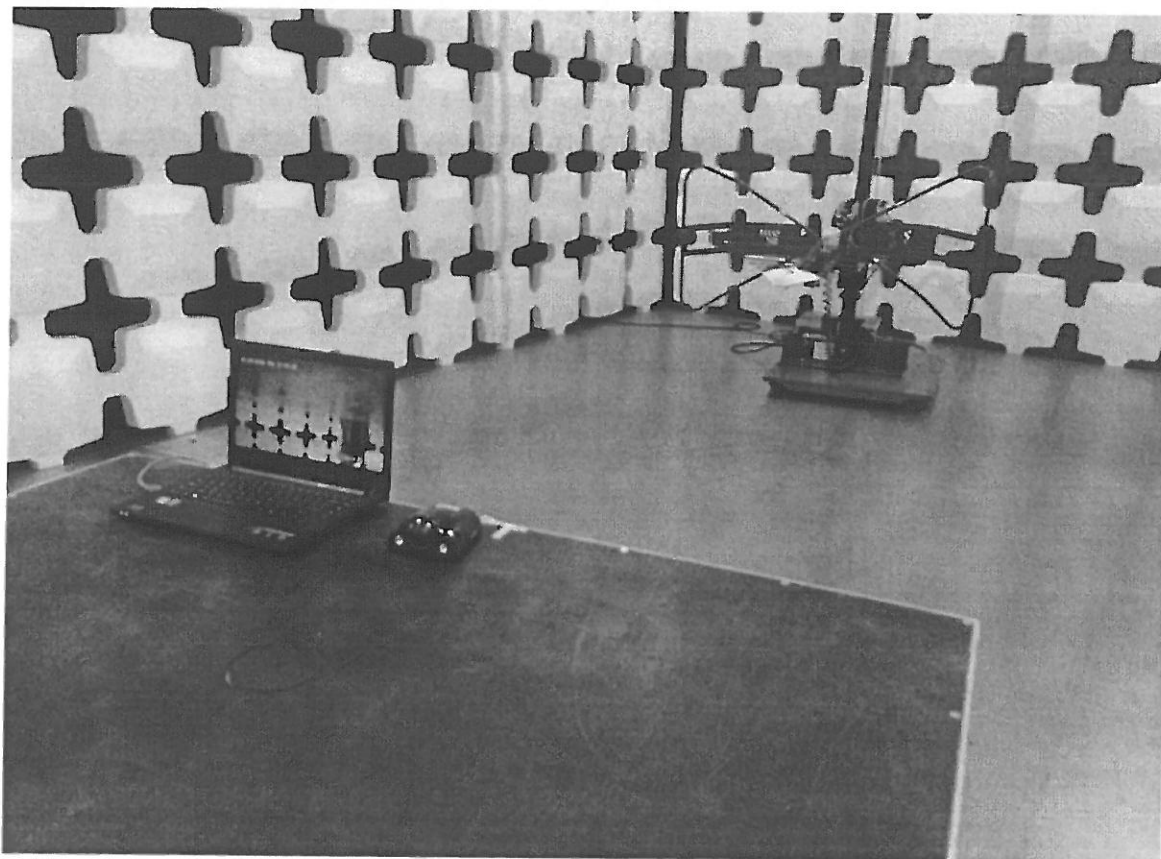
Horizontal Radiated Emission Graph (Peak, Max Hold Mode)



Vertical Radiated Emission Graph (Peak, Max Hold Mode)

Note: The Curves included The Cable attenuation and The Antenna Factor.

## 2.2.5 Test Setup



Radiated Emission Test Set-Up – Front View



## Section 3 Electromagnetic Immunity

### 3.1 Electrical Fast Transient/Burst Immunity

#### 3.1.1 Electrical Fast Transient/Burst Immunity Test Information

<b>Temperature:</b>	22 °C	<b>Humidity:</b>	62%RH
<b>ATM Pressure:</b>	101 k Pa	<b>Grounding:</b>	/
<b>Test Voltage:</b>	DC12V	<b>Date of test:</b>	2016-12-01
<b>Tested by:</b>	Wang Weifeng	<b>Test Reference:</b>	EN 50155:2007
<b>Performance Criteria:</b>	A		
<b>Results:</b>	The Electrical Fast Transient/Burst Immunity of EUT Met the performance criteria A of the requirement of the standard EN 50155:2007.		

#### 3.1.2 Measurement Equipment Used for Electrical Fast Transient/Burst Immunity Test

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
EMS Testing system	TESEQ	NSG3060	1916	2016-06-08	2017-06-07

#### 3.1.3 Test Data

Injected position	Waveform (ns)	Voltage peak (kV) Power port PE				Repetition rate (kHz)	Test time at each polarity (s)	EUT performance comply to criteria	Result
		0.5	1	2	4				
		+/-	+/-	+/-	+/-				
Power line	5/50	/	/	P/P	/	5	60	A	PASS
Return line	5/50	/	/	P/P	/	5	60	A	PASS
Power line& Return line	5/50	/	/	P/P	/	5	60	A	PASS

Note:

The performance criteria are classified into four groups:

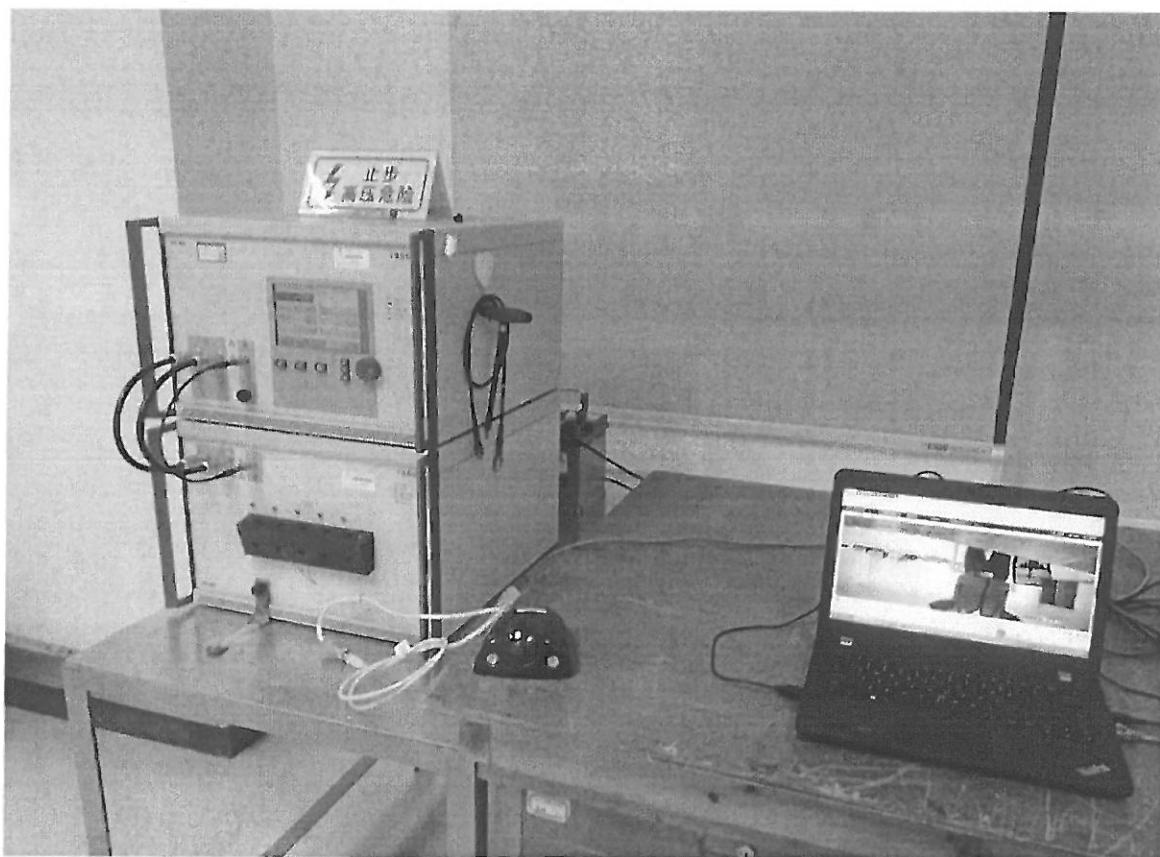
A ---- Normal performance within the specification limits;

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

C ---- Temporary degradation or loss of function or performance which requires operator intervention or system reset;

D ---- Degradation or loss of function which is not recoverable due to damage of equipment (components) or software, or loss of data.

### 3.1.4 Test Setup



**Electrical Fast Transient/Burst Immunity Test Set-Up –Front View(POWER LINE)**

### 3.2 Radio-frequency Electromagnetic Field Immunity

#### 3.2.1 Radio-frequency Electromagnetic Field Immunity Test Information

<b>Temperature:</b>	22 °C	<b>Humidity:</b>	60%RH
<b>ATM Pressure:</b>	101 k Pa	<b>Grounding:</b>	/
<b>Test Voltage:</b>	DC12V	<b>Date of test:</b>	2016-12-02
<b>Tested by:</b>	Wang Weifeng	<b>Test Reference:</b>	EN 50155:2007
<b>Performance Criteria:</b>	A		
<b>Results:</b>	The Radio-frequency Electromagnetic Field Immunity of EUT Met the performance criteria A of the requirement of the standard EN 50155:2007.		

#### 3.2.2 Measurement Equipment Used for Radio-frequency Electromagnetic Field Immunity Test

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
Signal Generator	R&S	SMB100A	102984	2016-06-08	2017-06-07
RF power Amplifier	AR	500W1000A	7161990011-02	2016-06-08	2017-06-07
RF power Amplifier	AR	50S1G4A	7161990011-03	2016-06-08	2017-06-07
Electrical field monitor system	HOLADAY	HI-6005	82913	2016-06-08	2017-06-07

#### 3.2.3 Test Data

Frequency Range (MHz)	Strength (V/m)	1kHz AM Mod. %	EUT Tuned degree	EUT performance comply to criteria	Result
80-1000	20	80	0° ,90° ,180° ,270°	A	PASS

**Note:**

The performance criteria are classified into four groups:

A ---- Normal performance within the specification limits;

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

C ---- Temporary degradation or loss of function or performance which requires operator intervention or system reset;

D ---- Degradation or loss of function which is not recoverable due to damage of equipment (components) or software, or loss of data.

### 3.2.4 Radio-frequency Electromagnetic Field, from Digital Mobile Telephones Immunity Test Information

<b>Temperature:</b>	22 °C	<b>Humidity:</b>	60%RH
<b>ATM Pressure:</b>	101 k Pa	<b>Grounding:</b>	/
<b>Test Voltage:</b>	DC12V	<b>Date of test:</b>	2016-12-02
<b>Tested by:</b>	Wang Weifeng	<b>Test Reference:</b>	EN 50155:2007
<b>Performance Criteria:</b>	A		
<b>Results:</b>	The Radio-frequency Electromagnetic Field, from Digital Mobile Telephones Immunity of EUT Met the performance criteria A of the requirement of the standard EN 50155:2007.		

### 3.2.5 Measurement Equipment Used for Radio-frequency Electromagnetic Field, from Digital Mobile Telephones Immunity Test

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
Signal Generator	R&S	SMB100A	102984	2016-06-08	2017-06-07
RF power Amplifier	AR	500W1000A	7161990011-02	2016-06-08	2017-06-07
RF power Amplifier	AR	50S1G4A	7161990011-03	2016-06-08	2017-06-07
Electrical field monitor system	HOLADAY	HI-6005	82913	2016-06-08	2017-06-07

### 3.2.6 Test Data

Frequency Range (MHz)	Strength (V/m)	1kHz AM Mod. %	EUT Tuned degree	EUT performance comply to criteria	Result
800-1000	20	80	0° ,90° ,180° ,270°	A	PASS
1400-2100	10	80	0° ,90° ,180° ,270°	A	PASS
2100-2500	5	80	0° ,90° ,180° ,270°	A	PASS

Note:

The performance criteria are classified into four groups:

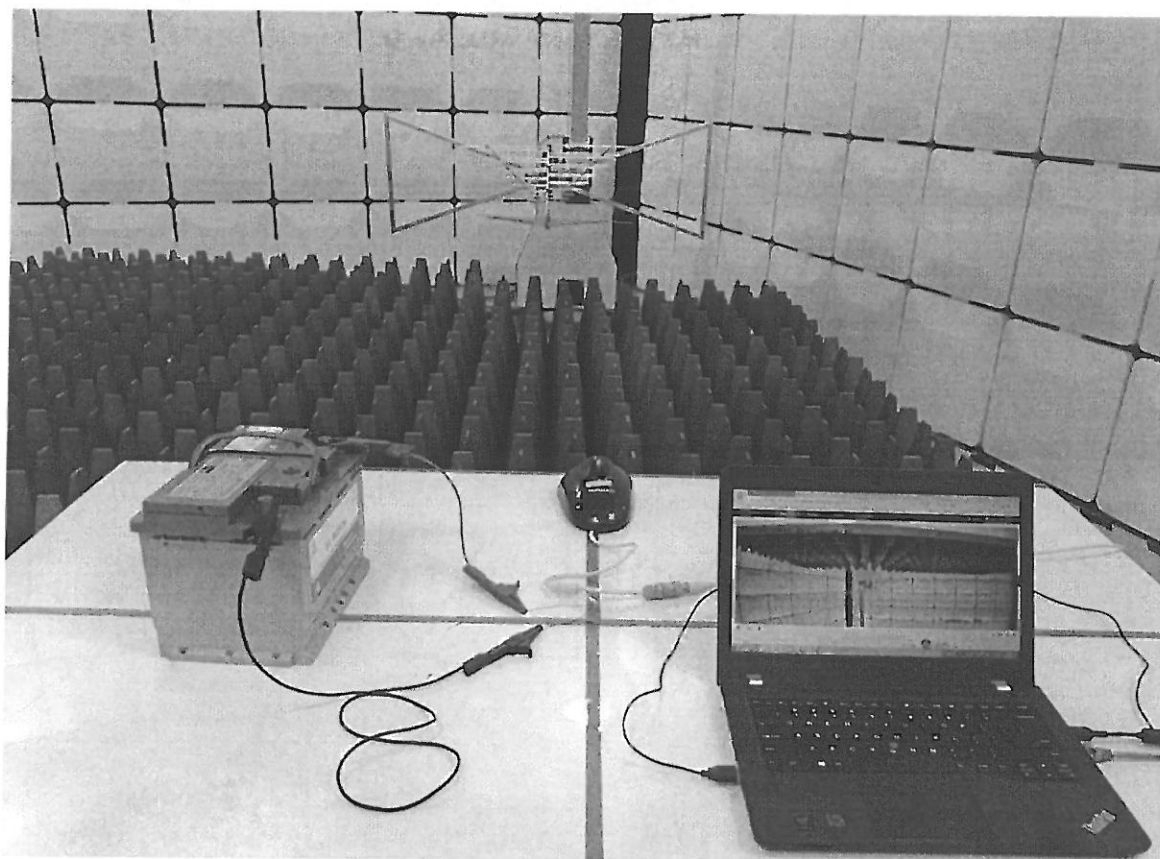
A ---- Normal performance within the specification limits;

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

C ---- Temporary degradation or loss of function or performance which requires operator intervention or system reset;

D ---- Degradation or loss of function which is not recoverable due to damage of equipment (components) or software, or loss of data.

### 3.2.7 Test Setup



**Radio-frequency Electromagnetic Field Immunity Test Set-Up –Front View**



### 3.3 Radio-frequency Conducted Disturbance Immunity

#### 3.3.1 Radio-frequency Conducted Disturbance Immunity Test Information

<b>Temperature:</b>	22 °C	<b>Humidity:</b>	63%RH
<b>ATM Pressure:</b>	101 k Pa	<b>Grounding:</b>	/
<b>Test Voltage:</b>	DC12V	<b>Date of test:</b>	2016-12-02
<b>Tested by:</b>	Wang Weifeng	<b>Test Reference:</b>	EN 50155:2007
<b>Performance Criteria:</b>	A		
<b>Results:</b>	The Radio-frequency Conducted Disturbance Immunity of EUT Met the performance criteria A of the requirement of the standard EN 50155:2007.		

#### 3.3.2 Measurement Equipment Used for Radio-frequency Conducted Disturbance Immunity Test

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
EM TEST	EM	CWS 500C	640101047	2016-06-08	2017-06-07
EM TEST CDN	EM	M1	640101047-01	2016-06-08	2017-06-07

#### 3.3.3 Test Data

Injected position	Frequency Range (MHz)	Strength (rms) (unmodulated)	1kHz AM Mod. %	EUT performance comply to criteria	Result
Power line	0.15~80	10V	80	A	PASS
Return line	0.15~80	10V	80	A	PASS

**Note:**

The performance criteria are classified into four groups:

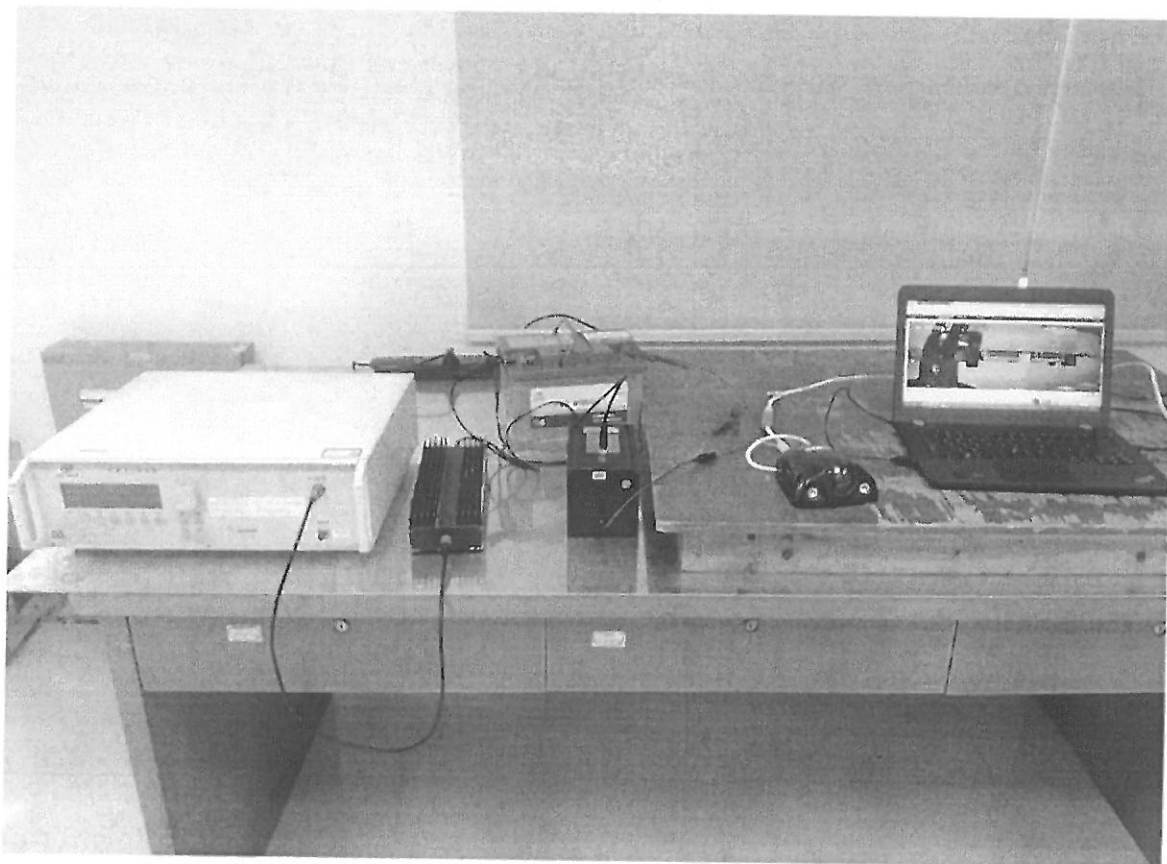
A ---- Normal performance within the specification limits;

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

C ---- Temporary degradation or loss of function or performance which requires operator intervention or system reset;

D ---- Degradation or loss of function which is not recoverable due to damage of equipment (components) or software, or loss of data.

### 3.3.4 Test Setup

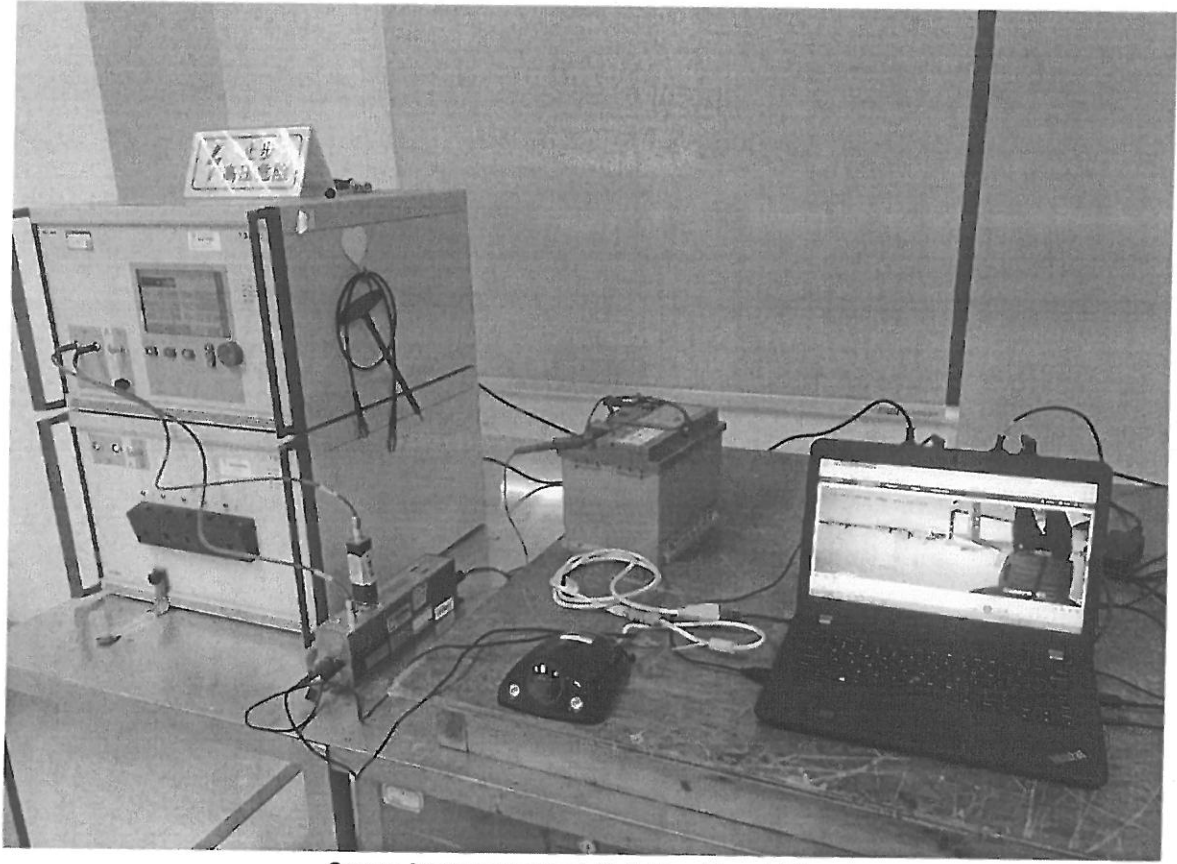


**Radio-frequency Conducted Disturbance Immunity Test Set-Up –Front View**

/



### 3.4.4 Test Setup



Surge Immunity Test Set-Up –Front View

### 3.5 Electrostatic Discharge Immunity

#### 3.5.1 Electrostatic Discharge Immunity Test Information

Temperature:	22°C	Humidity:	59%RH
ATM Pressure:	101 k Pa	Grounding:	/
Test Voltage:	DC12V	Date of test:	2016-12-05
Tested by:	Wang Weifeng	Test Reference:	EN 50155:2007
Performance Criteria:	B		
Results:	The Electrostatic Discharge Immunity of EUT Met the performance criteria B of the requirement of the standard EN 50155:2007.		

#### 3.5.2 Measurement Equipment Used for Electrostatic Discharge Immunity

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
ESD Generator	SCHAFFNER	NSG438	640101065	2016-06-08	2017-06-07

#### 3.5.3 Test Data

Test Point	Test Voltage (kV)				Discharge type	Repetition Rate Hz	Number Of Discharge at each polarity	EUT performance comply to criteria	Result
	2 +/-	4 +/-	6 +/-	8 +/-					
HCP	/	/	P/P	/	Contact discharge	1Hz	10	A	PASS
VCP	/	/	P/P	/	Contact discharge	1Hz	10	A	PASS
Screws	/	/	P/P	/	Contact discharge	1Hz	10	A	PASS
Metal shell	/	/	P/P	/	Contact discharge	1Hz	10	A	PASS
Test Point	Test Voltage (kV)				Discharge type	Repetition Rate Hz	Number Of Discharge at each polarity	EUT performance comply to criteria	Result
	2 +/-	4 +/-	8 +/-	15 +/-					
Gap	/	/	P/P	/	Air discharge	1Hz	10	A	PASS

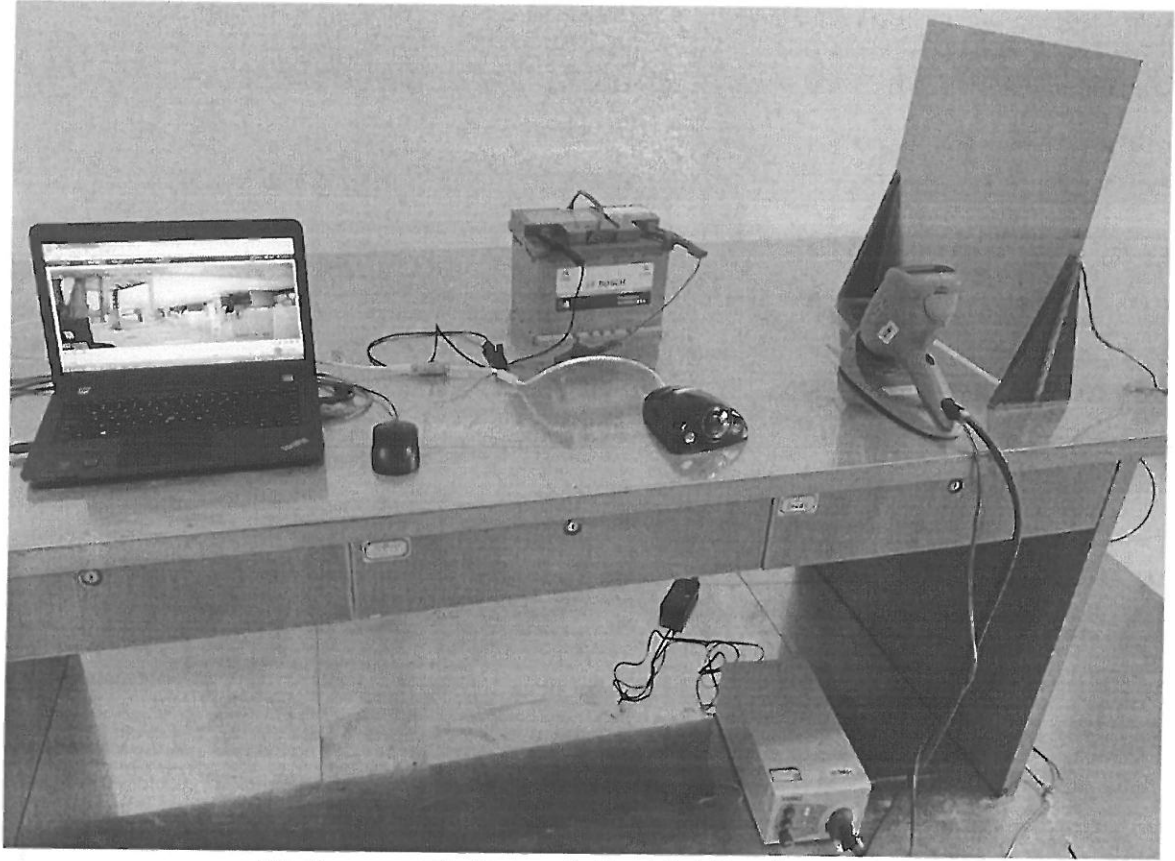
Note:

The performance criteria are classified into four groups:

- A ---- Normal performance within the specification limits;
- B ---- Temporary degradation or loss of function or performance which is self-recoverable;
- C ---- Temporary degradation or loss of function or performance which requires operator intervention or system reset;
- D ---- Degradation or loss of function which is not recoverable due to damage of equipment (components) or software, or loss of data.



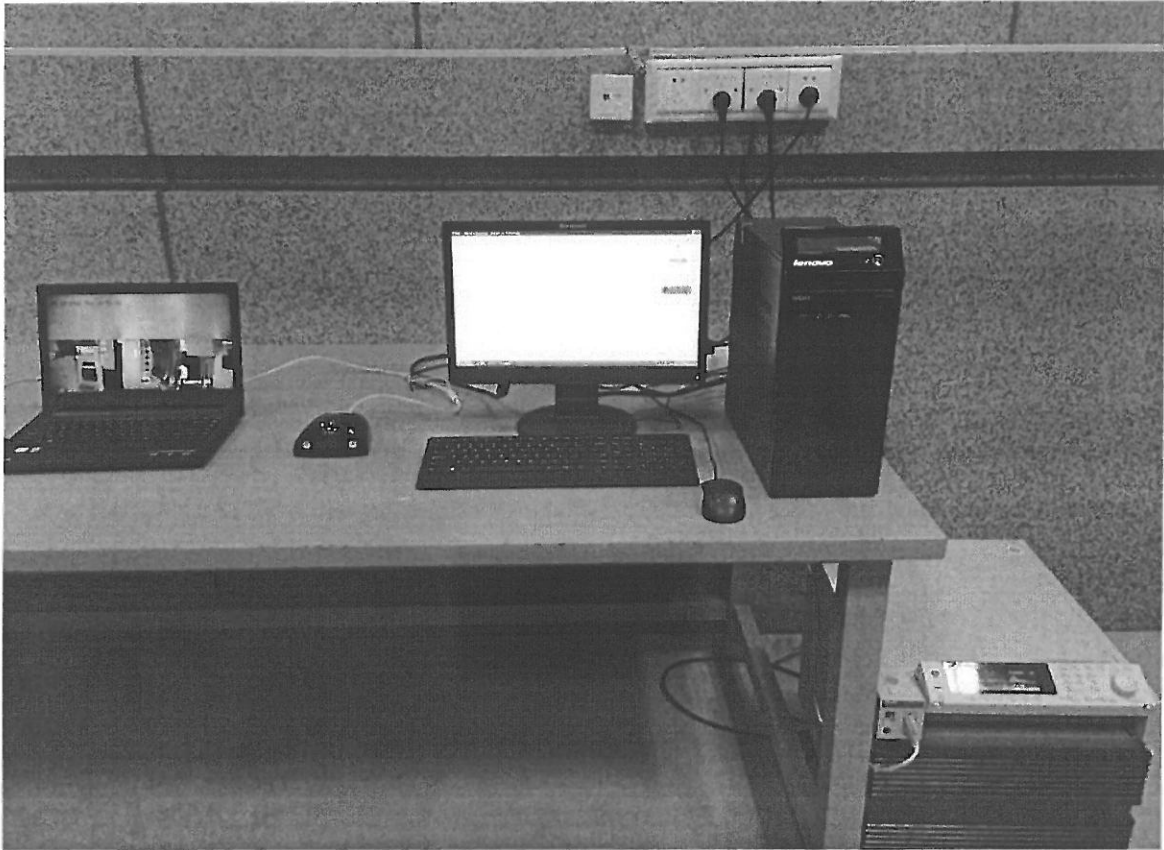
### 3.5.4 Test Setup



**Electromagnetic Immunity Test Set-Up –Front View**



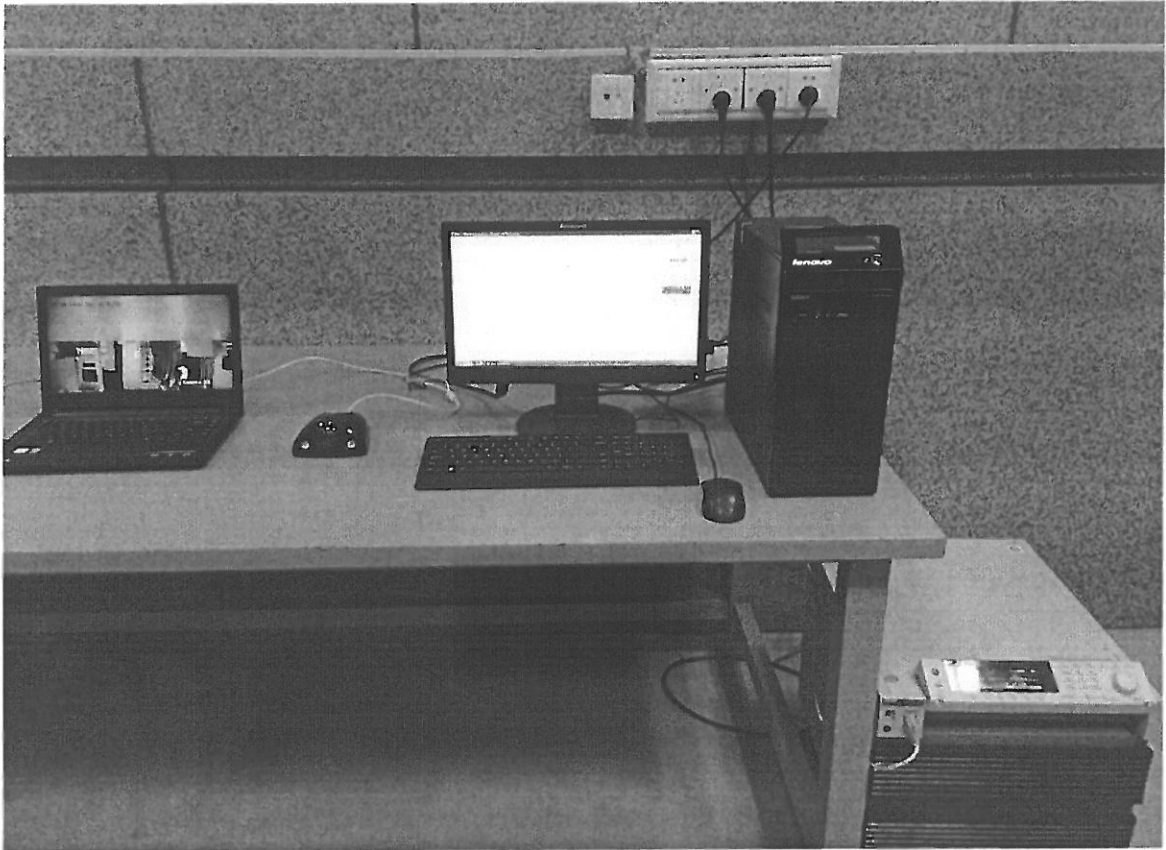
### 3.6.4 Test Setup



**Interruptions of Voltage Supply Test Set-Up –Front View**



### 3.7.4 Test Setup

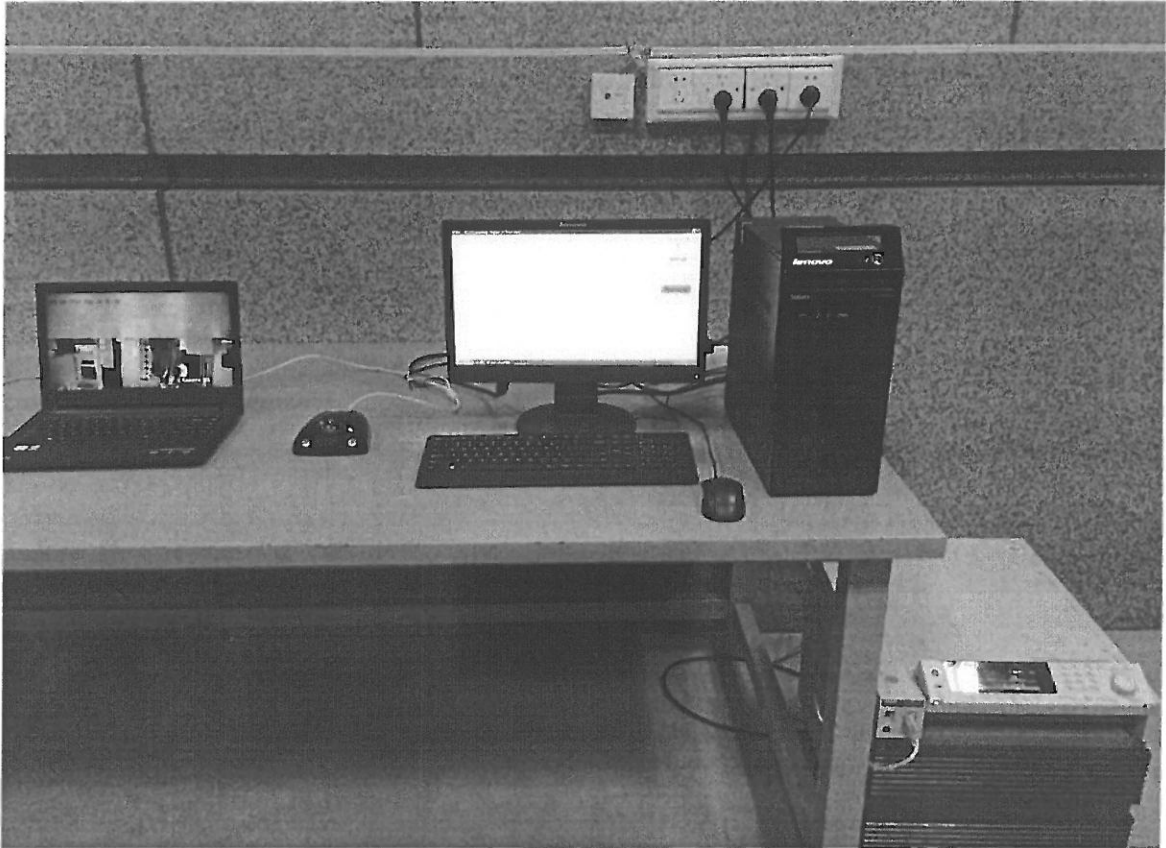


Variations of Voltage Supply Test Set-Up –Front View





### 3.8.4 Test Setup



Supply Overvoltages Test Set-Up –Front View

## Section 4 Environment Test

### 4.1 Test purpose

In order to show the endurance about the sample in condition of the High & Low temperature, damp heat cyclic, vibration and shock test environment.

### 4.2 Test procedure

#### 4.2.1 Visual Inspection

Check standard: no breakage, damage.

#### 4.2.2 Insulation Resistance Test

Testmethod: Measure insulation resistance of all leads to shell of the sample applied 500VDC by Insulation Resistance Meter.

Check standard:  $\geq 50M\Omega$ .

#### 4.2.3 Dielectric Strength Test

Testmethod: All leads to shell of the sample applied 500V/50Hz voltage within 60s.

Check standard: leakagecurrent  $\leq 1mA$ , no breakdown and flashover phenomenon.

The sample visual inspection, insulation resistance test and dielectric strength test results referring to Table 1.

Table 1: The performance of sample test results

Product Name	Sample	Product NO.	/
Conclusion	Meet Check standard		Remarks
NO	Test Item		Check standard
Test record			
1	Visual Inspection		no breakage, damage.
2	Insulation Resistance	all lead - shell	$\geq 50M\Omega$
3	Dielectric Strength	all lead - shell	$\leq 1mA$ (500V/50Hz)

#### 4.2.4 Low Temperature Test

Test Requirement:

The sample is placed in the Environment Test Chamber (the mounting see the Figure 1);

Storage time at -25°C for 2h;

At the end of this period, the sample shall be switched on and a performance check is carried out, keeping the sample at the low temperature. After recovery, this performance check is repeated at normal room temperature.



Figure 1: The mounting of the sample in the Environment Test Chamber.

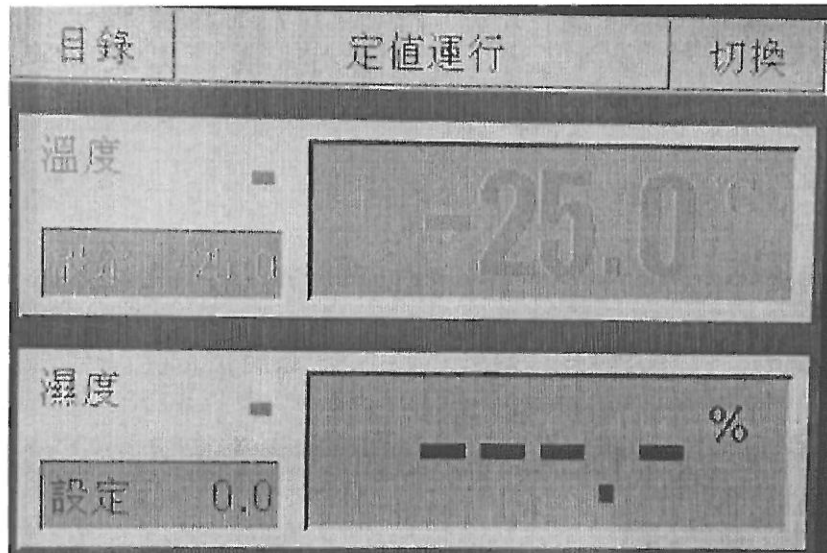


Figure 2: The actual running state of the Environment Test Chamber.

After Low temperature test, the sample was no deformation, breakage, damage, functioning normally.

### 4.2.5 Low Temperature Storage Test

Test Requirement:

The sample is placed in the Environment Test Chamber (the mounting see the Figure 3);

Storage time at  $-40^{\circ}\text{C}$  for 16h;

After recovery, the sample shall be switched on and a performance check is carried out.



Figure 3: The mounting of the sample in the Environment Test Chamber.

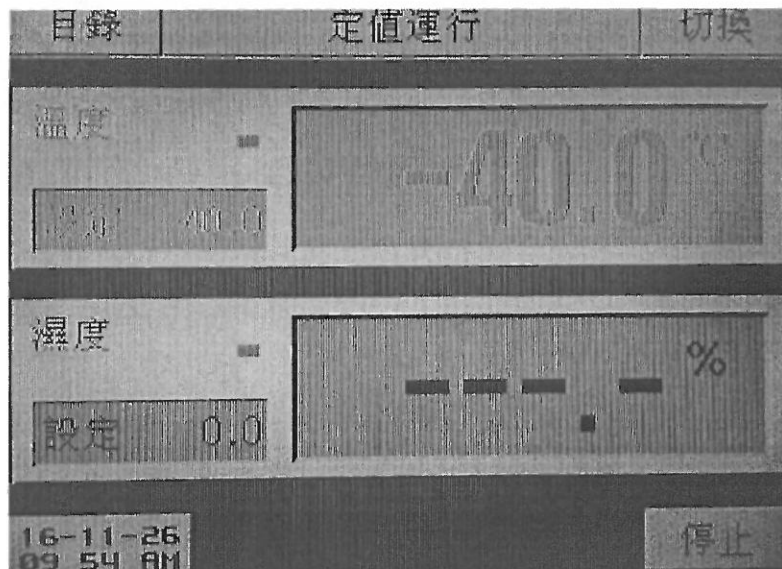


Figure 4: The actual running state of the Environment Test Chamber.

After Low temperature storage test, the sample was no deformation, breakage, damage, functioning normally.

#### 4.2.6 High Temperature Test

Test Requirement:

The sample with voltage supplied, is placed in the Environment Test Chamber (the mounting see the Figure 5);

Storage time at 70°C for 6h;

When the temperature has stabilised, the sample shall be switched on and a performance check is carried out. After recovery, this performance check is repeated at normal room temperature.



Figure 5: The mounting of the sample in the Environment Test Chamber.

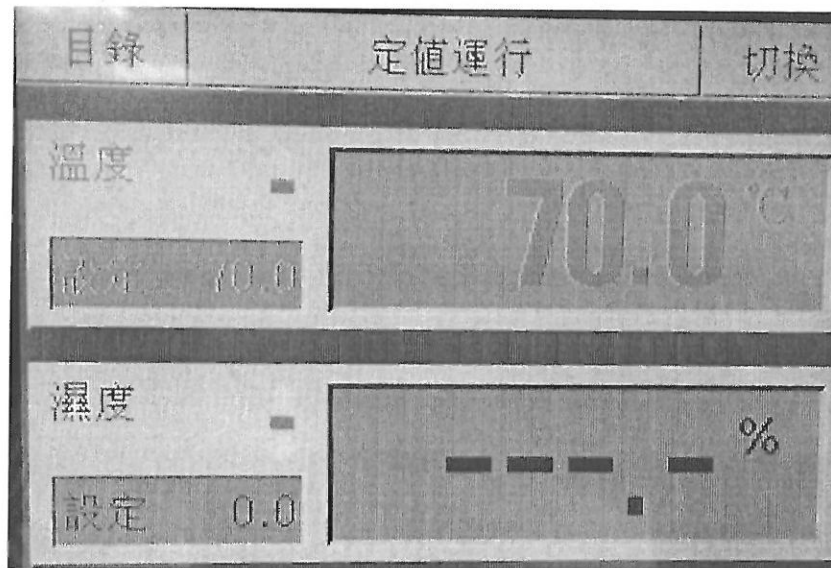


Figure 6: The actual running state of the Environment Test Chamber.

After High temperature test, the sample was no deformation, breakage, damage, functioning normally.





### 4.2.8 Random Vibration Test (Function test)

Test Requirement:

The sample is placed on the vibration test system according to requirement of client in X, Y and Z direction (the mounting see the Figure 9).

The sample with voltage supplied is switched on duration the test.

Do vibration test as following method referring to Table 2:

At the end of test, the sample shall be switched on and a performance check is carried out.

Table 2-1: vibration test conditions

Test conditions	Frequency (Hz)	PSD (g <sup>2</sup> /Hz)	Slope(dB/oct)
	5	0.00006	/
	20	0.00006	/
	150	/	-6
vibration direction	X direction (see the Figure 9-1)		
Test time	10min		

Table 2-2: vibration test conditions

Test conditions	Frequency (Hz)	PSD (g <sup>2</sup> /Hz)	Slope(dB/oct)
	5	0.000144	/
	20	0.000144	/
	150	/	-6
vibration direction	Y direction (see the Figure 9-2)		
Test time	10min		

Table 2-3: vibration test conditions

Test conditions	Frequency (Hz)	PSD (g <sup>2</sup> /Hz)	Slope(dB/oct)
	5	0.000298	/
	20	0.000298	/
	150	/	-6
vibration direction	Z direction (see the Figure 9-3)		
Test time	10min		

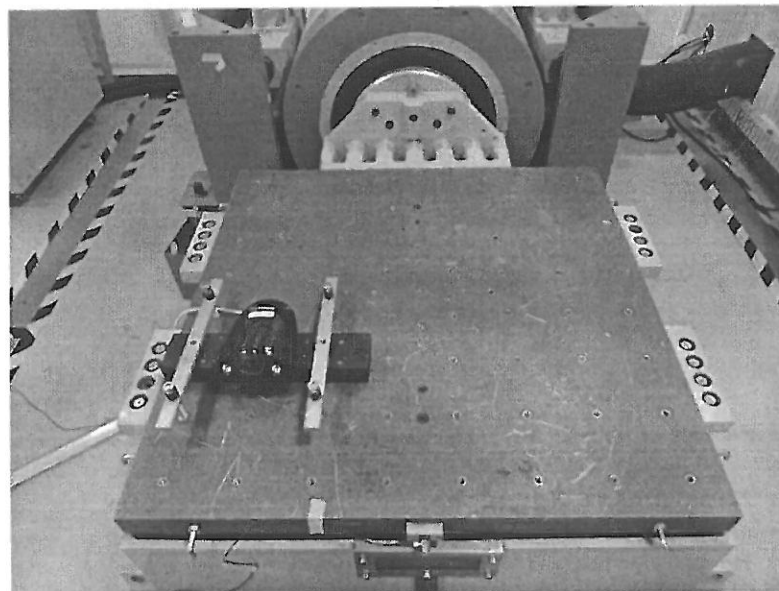


Figure 9-1: The mounting of the sample on the vibration platform in X axis.

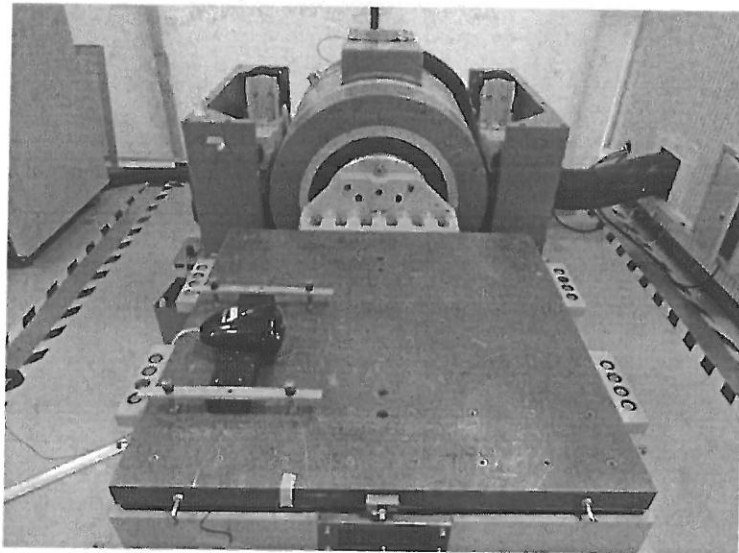


Figure 9-2: The mounting of the sample on the vibration platform in Y axis.

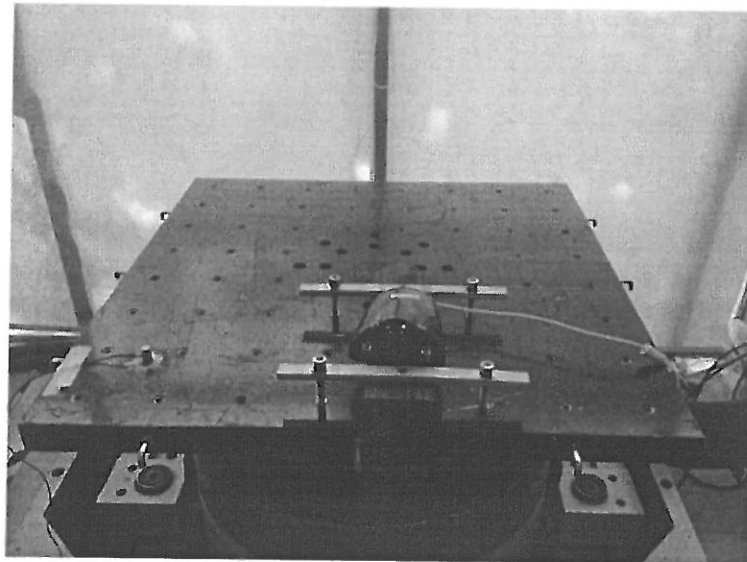


Figure 9-3: The mounting of the sample on the vibration platform in Z axis.

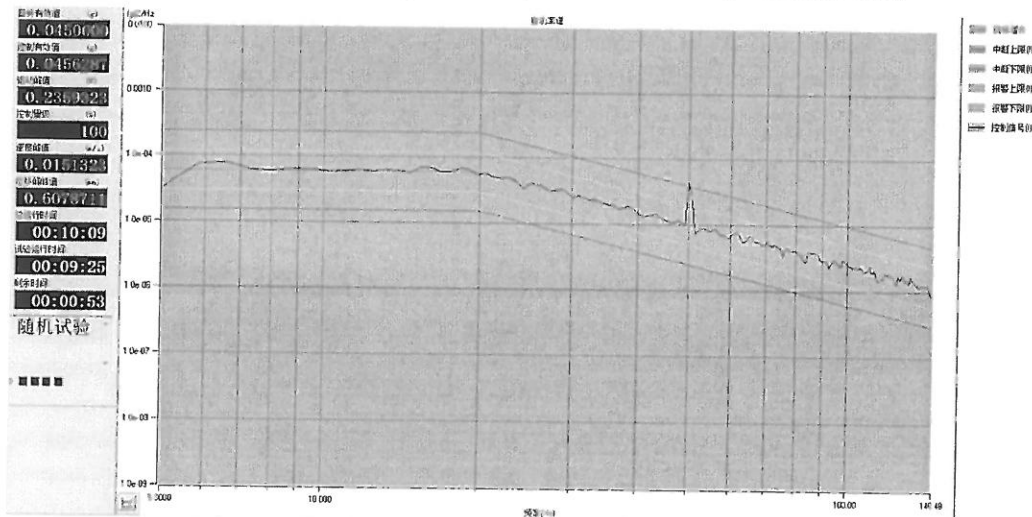


Figure 10-1: The vibration control spectrum in X axis.

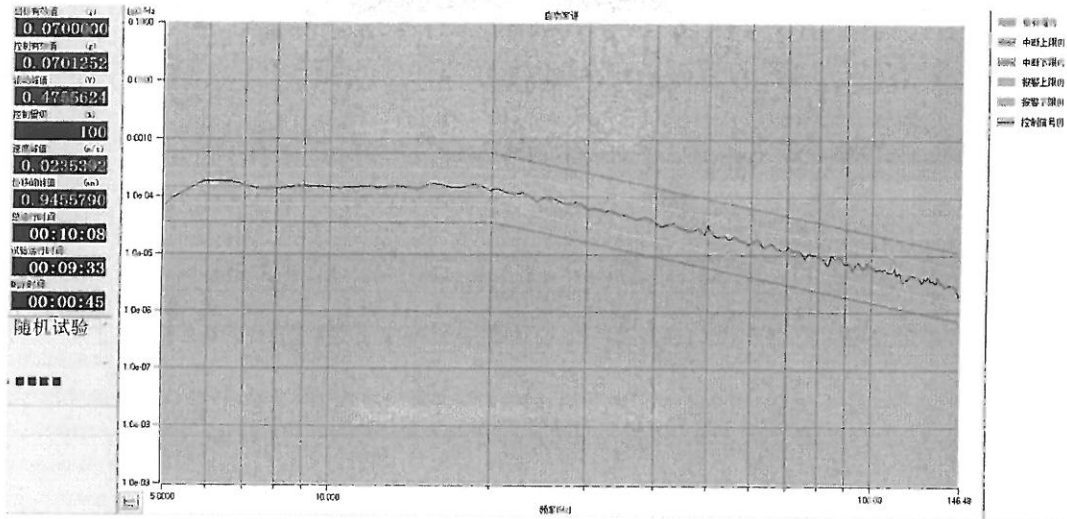


Figure 10-2: The vibration control spectrum in Y axis.

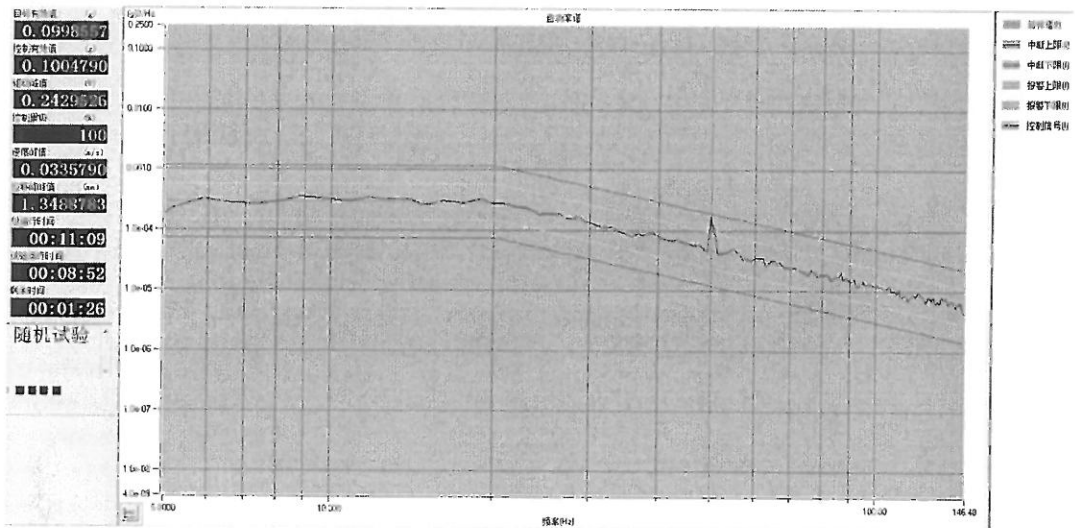


Figure 10-3: The vibration control spectrum in Z axis.

After random vibration test (Function test), the sample was no deformation, breakage, damage, functioning normally.

### 4.2.9 Random Vibration Test (Long life test)

Test Requirement:

The sample is placed on the vibration test system according to requirement of client in X, Y and Z direction (the mounting see the Figure 9).

Do vibration test as following method referring to Table 3:

At the end of test, the sample shall be switched on and a performance check is carried out.

Table 3-1: vibration test conditions

Test conditions	Frequency (Hz)	PSD (g <sup>2</sup> /Hz)	Slope(dB/oct)
	5	0.00366	/
	20	0.00366	/
	150	/	-6
vibration direction	X direction (see the Figure 9-1)		
Test time	5hours		

Table 3-2: vibration test conditions

Test conditions	Frequency (Hz)	PSD (g <sup>2</sup> /Hz)	Slope(dB/oct)
	5	0.00901	/
	20	0.00901	/
	150	/	-6
vibration direction	Y direction (see the Figure 9-2)		
Test time	5hours		

Table 3-3: vibration test conditions

Test conditions	Frequency (Hz)	PSD (g <sup>2</sup> /Hz)	Slope(dB/oct)
	5	0.01857	/
	20	0.01857	/
	150	/	-6
vibration direction	Z direction (see the Figure 9-3)		
Test time	5hours		

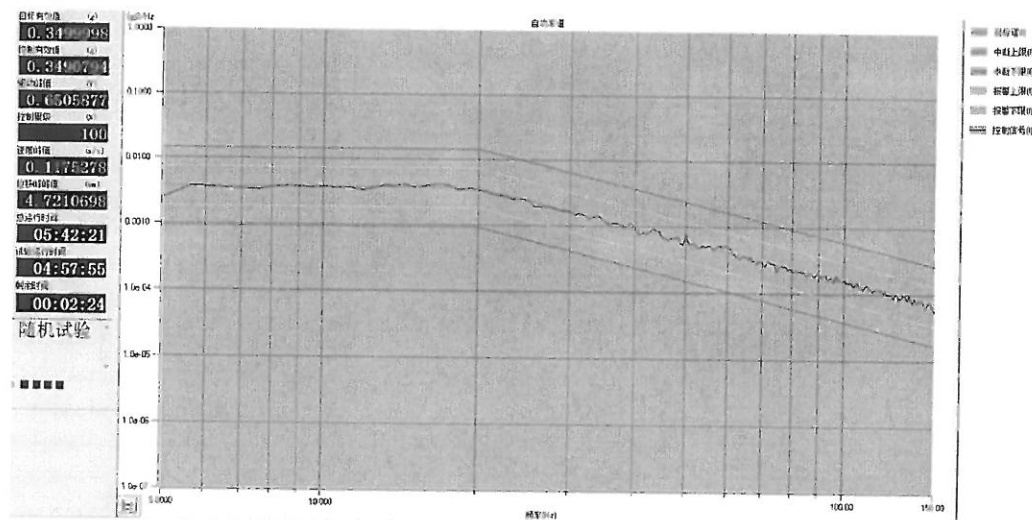


Figure 11-1: The vibration control spectrum in X axis.

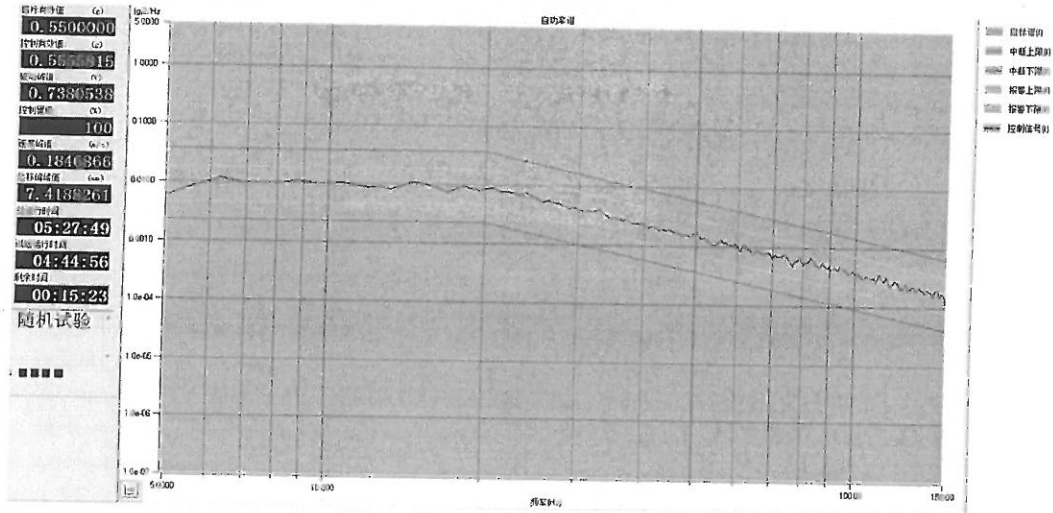


Figure 11-2: The vibration control spectrum in Y axis.

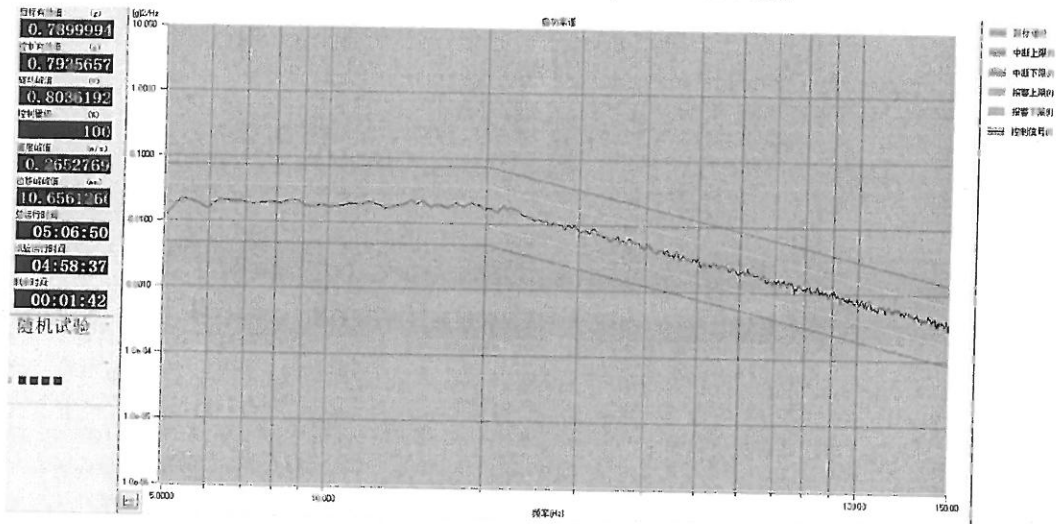


Figure 11-3: The vibration control spectrum in Z axis.

After random vibration test (Function test), the sample was no deformation, breakage, damage, functioning normally.

### 4.2.10 Mechanical Shock Test

Test Requirement:

The sample is placed on the vibration test system according to requirement of client in X, Y and Z direction (the mounting see the Figure 9).

Do vibration test as following method referring to Table 4:

At the end of test, the sample shall be switched on and a performance check is carried out.

Table 4-1: Mechanical Shock test conditions

Test conditions	Pulse shape	Acceleration amplitude(g)	Shock duration (ms)
	Half sine wave	3	30
Shock axis	±X direction (see the Figure 9-1)		
Shock times	3times / axis, total 6 times		

Table 4-2: Mechanical Shock test conditions

Test conditions	Pulse shape	Acceleration amplitude(g)	Shock duration (ms)
	Half sine wave	5	30
Shock axis	±Y direction (see the Figure 9-2)		
Shock times	3times / axis, total 6 times		

Table 4-3: Mechanical Shock test conditions

Test conditions	Pulse shape	Acceleration amplitude(g)	Shock duration (ms)
	Half sine wave	3	30
Shock axis	±Z direction (see the Figure 9-3)		
Shock times	3times / axis, total 6 times		

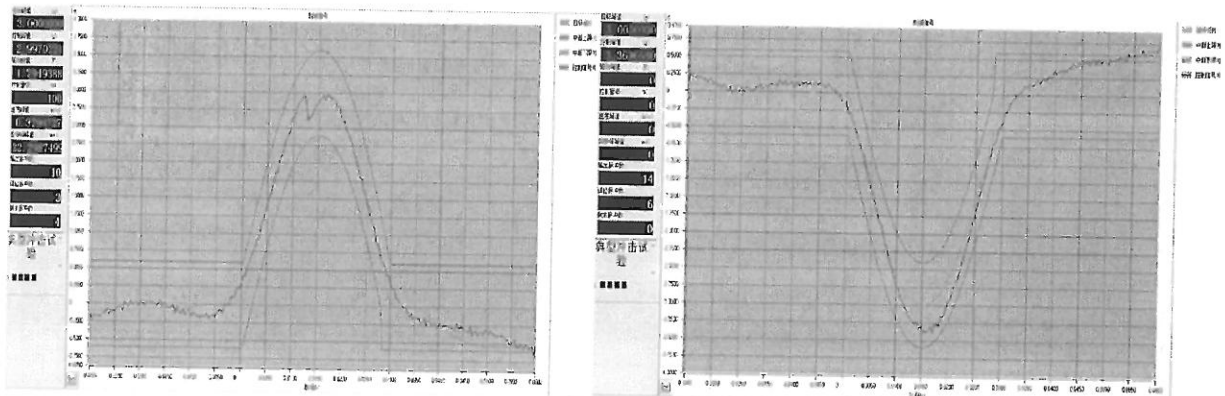


Figure 12-1: The control spectrum of Mechanical Shock Test (±3g 30ms).



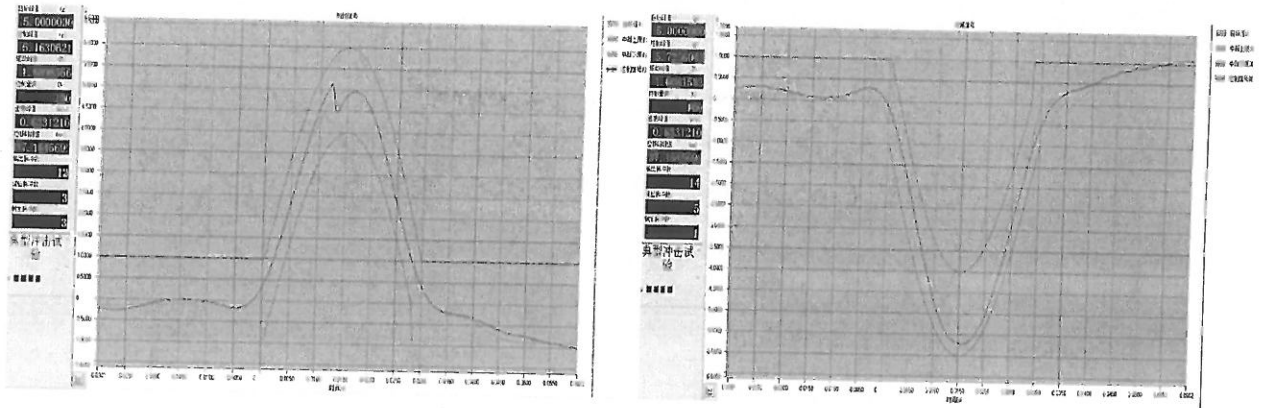


Figure 12-2: The control spectrum of Mechanical Shock Test ( $\pm 5g$  30ms).

After mechanical shock test, the sample was no deformation, breakage, damage, functioning normally.

END OF THE TEST REPORT