No.	N1804CR8888-00117-Y
Total page	38

CMA 170009012246

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CNAS 中国认可 国际互认 检测 TESTING CNAS L0462

TEST REPORT

Product Name : Mobile DVR

Type and Specification : DS-MP7608HN

Test Category : Entrusted Test

Factory : Hangzhou Hikvision Technology Co.,Ltd.

Client: Hangzhou Hikvision Digital Technology Co., Ltd.

CEPREI

China Electronic Product Reliability And Environmental Testing Research Institute

China CEPREI Laboratory

TEST REPORT

Report reference No . ..... :	N1804CR8888-00117-Y
Total number of pages ..... :	38
Test item description ..... :	Mobile DVR
Trademark ..... :	/
Model and/or type reference ..... :	DS-MP7608HN,DS-MP76XXHN,DS-MP76XXH
Factory's Name ..... :	Hangzhou Hikvision Technology Co.,Ltd.
Address ..... :	No.700 Dongliu Road, Binjiang District, Hangzhou 310052,Zhejiang
Client's Name ..... :	Hangzhou Hikvision Digital Technology Co., Ltd.
Address ..... :	No.555 Qianmo Road, Binjiang District, Hangzhou 310052, 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 ..... :	2018.06.01
Date(s) of performance of test..... :	2018.06.01-2018.09.07
Ambient Condition..... :	15~35°C，45~75%RH，86~106Kpa
Test Instruments and Equipment..... :	See Equipment List of This Report.

Summary of Testing and Conclusions

The item Met the requirements of the client.

Tested by (printed name and signature)..... :	Wang Weifeng(王卫锋) Sun Di（孙迪）Wang Zhen（王振）
Reviewed by (printed name and signature)..... :	Chen Hui (陈辉) Liu Ju（刘菊）
Approved by (printed name and signature)..... :	Yang Lin (杨林)
Date of issue ..... :	2018.09.26

Test case verdicts	
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

General remarks

1. Report without "specific stamp" of inspection organization or the authority will be regarded as invalid.

2. Duplicated report without original "specific stamp" of inspection organization or the authority will be regarded as invalid.

3. Report without the signatures of Tester, Reviewer or Approval will be regarded as invalid.

4. Test report if altered will be regarded as invalid.

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.

6. Generally, the entrusted test only responsible for the samples.

General product information:

The models of entrusted test: DS-MP7608HN,DS-MP76XXHN, DS-MP76XXH. Description of the differen ce between the product models: in addition to the naming is different, other aspects are all the same. The tests carried out on the model DS-MP7608HN.

Testing Laboratory Contact Info:

China CEPREI Laboratory/ China Electronic Product Reliability and Environmental Testing Research Institute

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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	1.2/50μs ±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	N
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	N
Supply Overvoltages	/	EN 50155:2007	1.4Un	N

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.

Environment Standards			
Test Item	**Standard**	**Test Level**	**Result**
Visual Inspection	EN 50155:2007	/	PASS
Insulation Resistance Test	EN 50155:2007	500VDC	PASS
Dielectric Strength Test	EN 50155:2007	500V/50Hz,60s	PASS
Low Temperature Test	IEC 60068-2-1:2007	-25℃,2h	PASS
Low Temperature Storage Test	IEC 60068-2-1:2007	-40℃,16h	PASS
High temperature Test	IEC 60068-2-2:2007	70℃,6h	PASS
Damp Heat Cyclic Test	IEC 60068-2-30:2005	Temperature: +55℃and +25℃; Number of cycle: 2; Time: 2X24 hours;	PASS
Random Vibration Test	IEC 60068-2-64:1993	Function test X:10min,Y:10min,Z:10min; Long life test X:5h,Y: 5h,Z: 5h;	PASS
Mechanical Shock Test	IEC 61373:1999	3times / axis, total 6 times	PASS

Environment Test equipment			
Test Equipment	**Model**	**Serial No.**	**Due Date**
Environment Test Chamber	EU-04KA	17107118	2019.06.07
Electrodynamic Vibration System	DC-3200-36	071023	2019.07.08
Withstanding Voltage and Insulation Resistance tester	215B	1703AG07	2019.06.07

TABLE OF CONTENTS

Section 1 General Information

1.1 Introduction

This report documents the emission and immunity test results for the Mobile DVR.

1.2 EUT general and technical Descriptions

EUT Name:	Mobile DVR
EUT Model:	DS-MP7608HN,DS-MP76XXHN,DS-MP76XXH
EUT Trademark:	/
Input Voltage:	100-240V
Frequency:	50/60Hz
Input Power/Current:	1.7A
Power Cable Description:	/
Other Cables Description:	/
Function(s) Description:	/

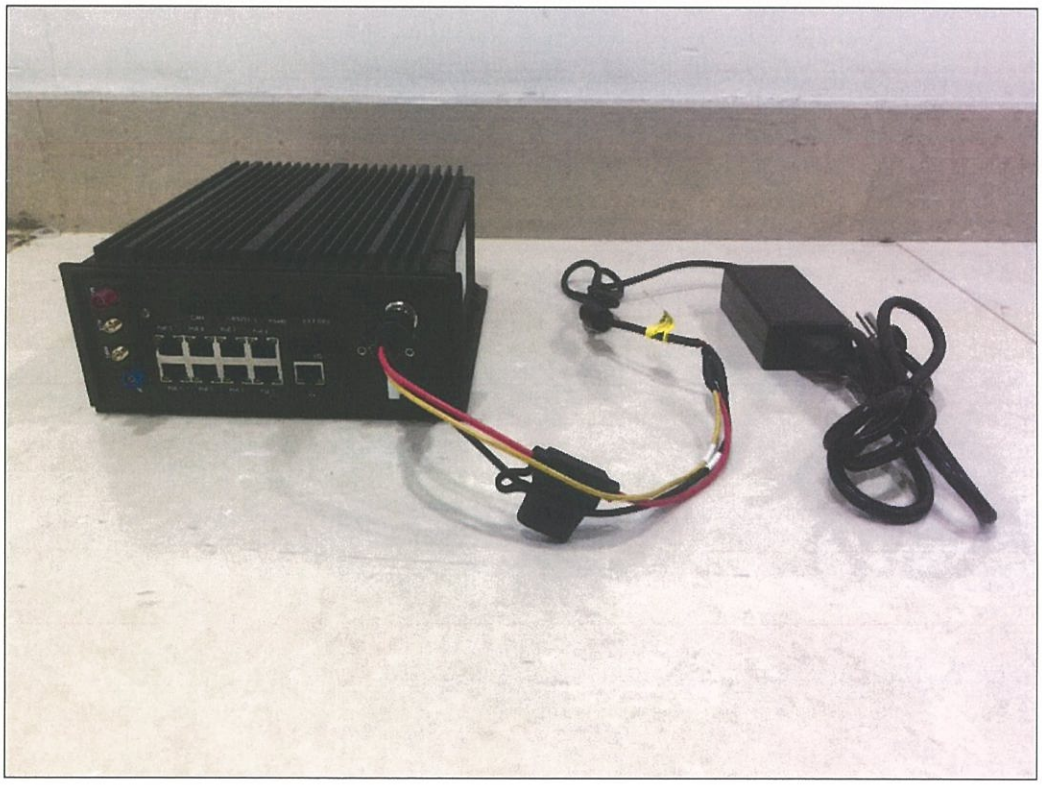
1.3 Support Equipment(s) and Test Configuration

1.3.1 Working State of EUT

1. Power Supply of EUT: AC220V

2. Typical working status of the client requirements: the power port is powered by the randomly sold adapter, the IPC port is connected to the network camera, and the other ports are not connected, so that the samples can reach the normal working status of camera shooting and video recording. After the test, the recording was checked and the recording was normal.

1.4 EUT Photographs



Section 2 Electromagnetic Emissions

2.1 Conducted Emission at Mains Terminals

2.1.1 Conducted Emission Test Information (mains terminal)

Temperature:	25 °C	**Humidity:**	52%RH
ATM Pressure:	101 k Pa	**Grounding:**	/
Test Voltage:	AC220V	**Tested Range:**	150kHz to 30MHz
Tested by:	Wang Weifeng	**Date of test:**	2018.06.13
Test Reference:	EN 50155:2007		
Results:	The Conducted Emission at Mains Terminals of EUT Met the standard EN 50155:2007.		

2.1.2 Measurement Equipments Used for Conducted Emission (mains terminal)

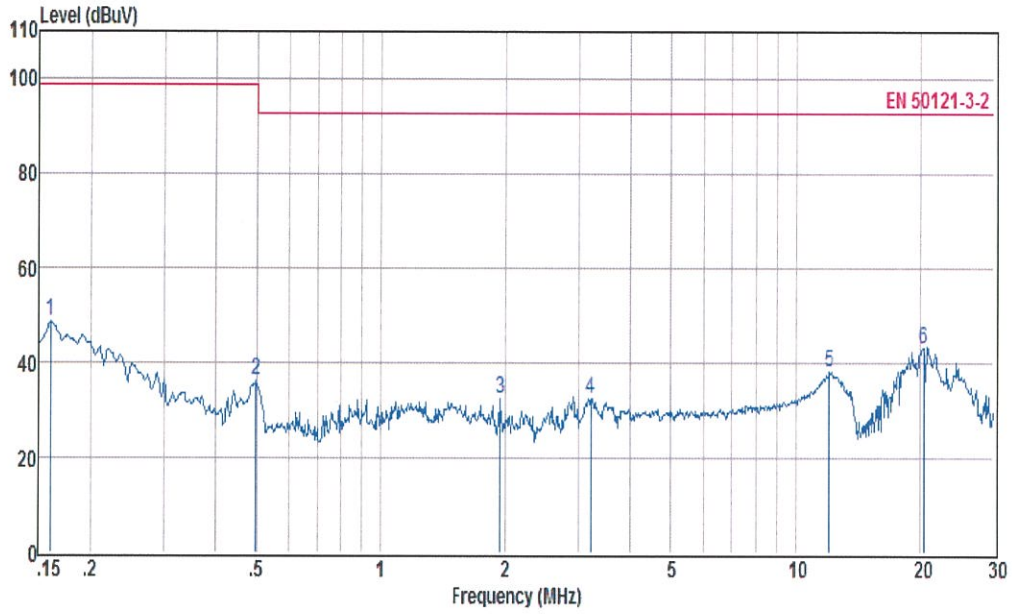
Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
EMI Test Receiver	R&S	ESCS 30	100117	2018-06-08	2019-06-07
LISN	R&S	ESH3-Z5	833874	2018-06-08	2019-06-07
Shielded Room	EMCT	8m*5m*3.3m	7561990029-02	2018-06-08	2019-06-07

2.1.3 Test Data

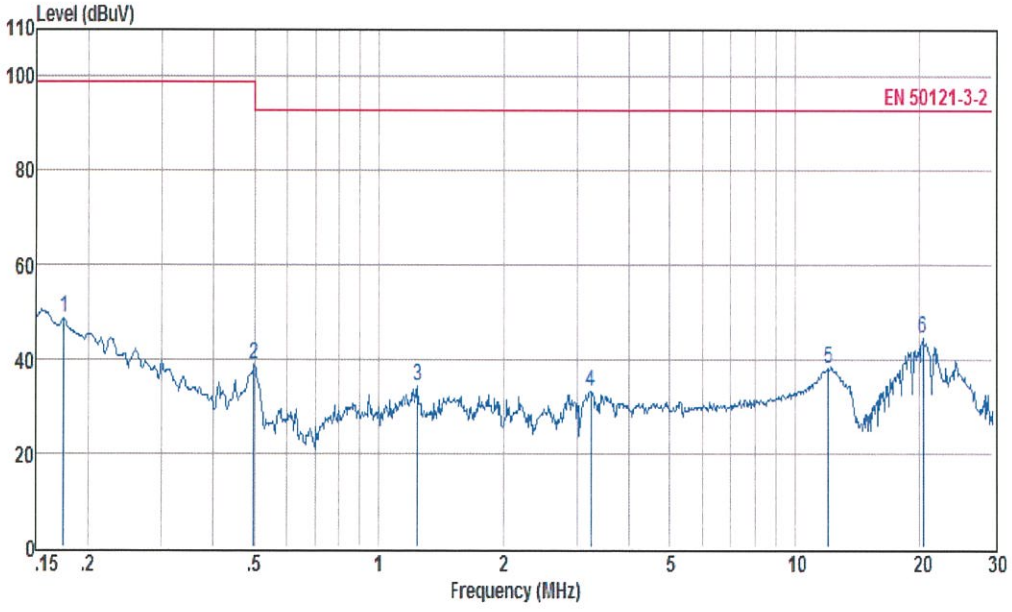
INPUT LINE (LINE)							
No.	**Frequency (MHz)**	**Corrected QP Level (DbμV)**	**Limits QP (dBμV)**	**Margin P (dB)**	**Corrected AVE Level (dBμV)**	**Limits AVE (dBμV)**	**Margin AVE (dB)**
1	0.160	48.8	99.0	50.2	/	/	/
2	0.499	36.3	99.0	62.7	/	/	/
3	1.949	32.5	93.0	60.5	/	/	/
4	3.224	32.6	93.0	60.4	/	/	/
5	12.06	38.1	93.0	54.9	/	/	/
6	20.38	43.1	93.0	49.9	/	/	/
INPUT LINE (NEUTRAL)							
No.	**Frequency (MHz)**	**Corrected QP Level (dBμV)**	**Limits QP (dBμV)**	**Margin P (dB)**	**Corrected AVE Level (dBμV)**	**Limits AVE (dBμV)**	**Margin AVE (dB)**
1	0.175	48.9	99.0	50.1	/	/	/
2	0.499	39.0	99.0	60.0	/	/	/
3	1.242	34.3	93.0	58.7	/	/	/
4	3.241	33.4	93.0	59.6	/	/	/
5	12.06	38.0	93.0	55.0	/	/	/
6	20.38	44.5	93.0	48.5	/	/	/

Note: The Corrected QP Level included The Cable attenuation.

2.1.4 Test curves



INPUT LINE (LINE) Conducted Emission Graph



INPUT LINE (NEUTRAL) 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 (30-1000MHz) Test Information

Temperature:	25 °C	**Humidity:**	52%RH
ATM Pressure:	101 k Pa	**Grounding:**	/
Test Voltage:	AC220V	**Tested Range:**	30MHz to 1000MHz
Tested by:	Wang Weifeng	**Date of test:**	2018.06.13
Test Reference:	EN 50155:2007		
Results:	The Radiated Emission (30-1000MHz) 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	ESCI	101020	2018-06-08	2019-06-07
Antenna	TDK	HLP-2006C	130884	2018-06-08	2019-06-07
Anechoic Chamber	EMCT	9.1m×6.1m×5.95m	7561990030	2018-06-08	2019-06-07

2.2.3 Test Data

Horizontal

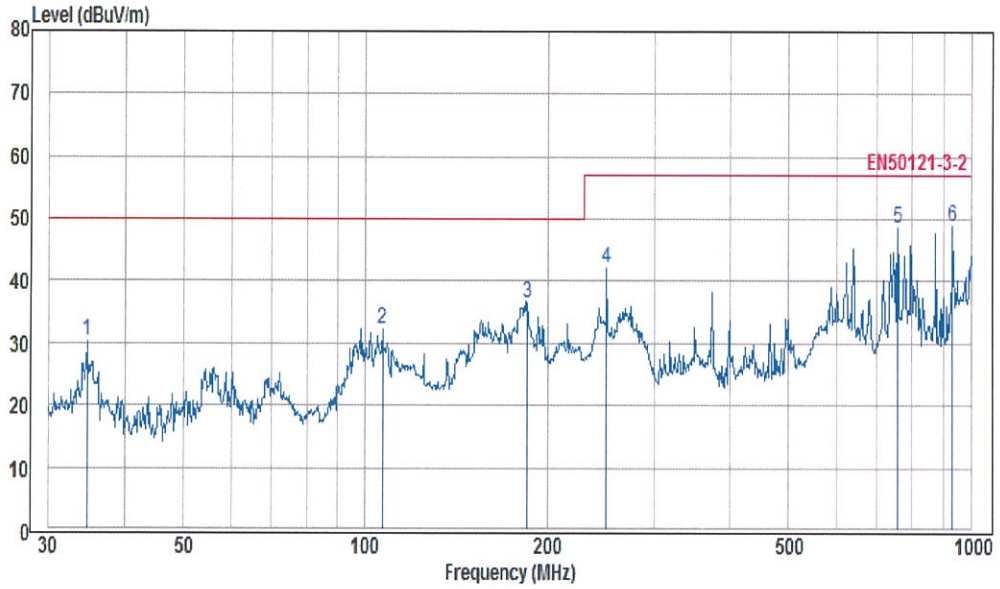
No.	Frequency (MHz)	Corrected QP Level dB(μV/m)	3 Meter Limits dB(μV/m)	Margin (dB)	Angle of Turner (degree)	Height of Tower (cm)
1	34.6	30.4	50.0	19.6	/	/
2	106.8	32.2	50.0	17.8	/	/
3	185.1	36.6	50.0	13.4	/	/
4	250.3	42.1	57.0	14.9	/	/
5	758.0	48.6	57.0	8.4	/	/
6	932.3	48.8	57.0	8.2	/	/

Vertical

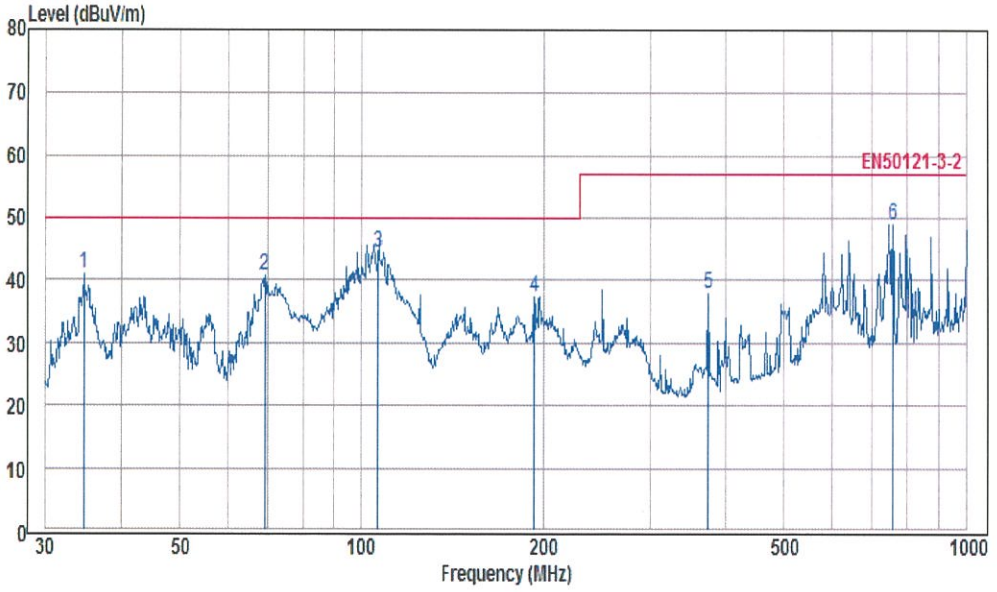
No.	Frequency (MHz)	Corrected QP Level dB(μV/m)	3 Meter Limits dB(μV/m)	Margin (dB)	Angle of Turner (degree)	Height of Tower (cm)
1	34.6	41.1	50.0	8.9	/	/
2	69.1	40.7	50.0	9.3	/	/
3	106.7	44.4	50.0	5.6	/	/
4	193.1	37.3	50.0	12.7	/	/
5	374.6	38.0	57.0	19.0	/	/
6	758.0	49.0	57.0	8.0	/	/

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

2.2.4 Test Curves



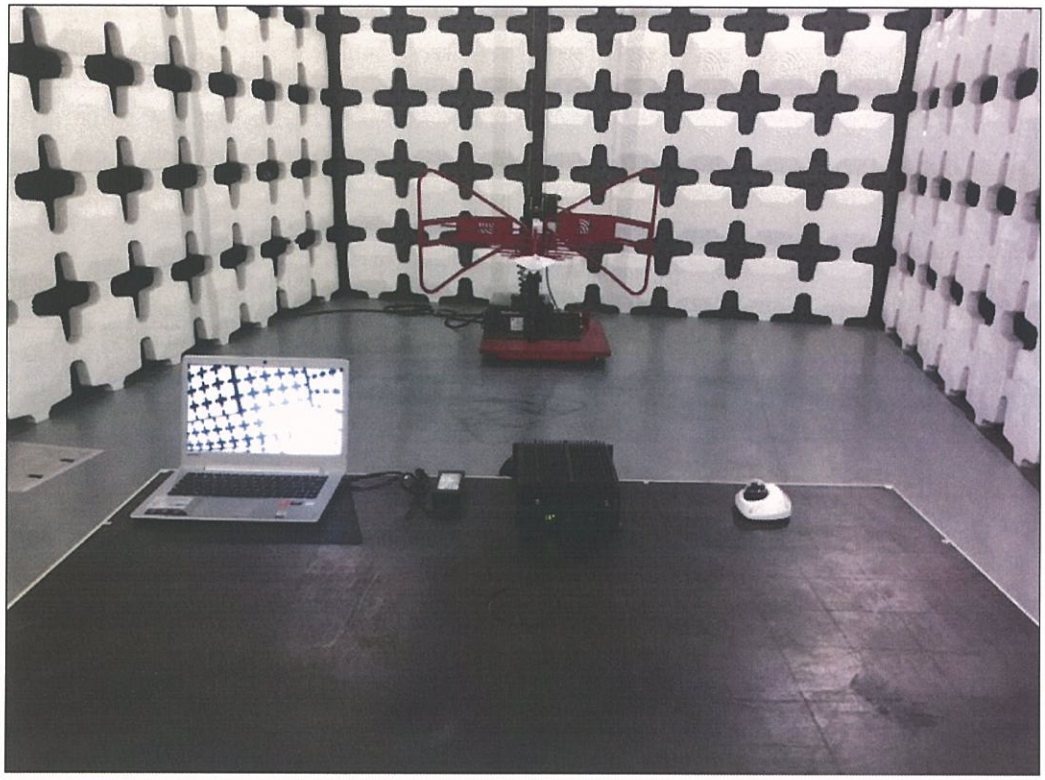
Horizontal Radiated Emission (30-1000MHz) Graph (Peak, Max Hold Mode)



Vertical Radiated Emission (30-1000MHz) Graph (Peak, Max Hold Mode)

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

2.2.5 Test Setup



Radiated Emission (30-1000MHz) 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

Temperature:	25 °C	**Humidity:**	57%RH
ATM Pressure:	101 k Pa	**Grounding:**	/
Test Voltage:	AC220V	**Date of test:**	2018.09.07
Tested by:	Wang Weifeng	**Test Reference:**	EN 50155:2007
Performance Criteria:	A		
Results:	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	1640/2112	2018-06-08	2019-06-07
EFT Coupling Clamp	TESEQ	CDN3425	1847	2018-06-08	2019-06-07

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				
		+/-	+/-	+/-	+/-				
L	5/50	/	/	P/P	/	5	60	A	PASS
N	5/50	/	/	P/P	/	5	60	A	PASS
PE	5/50	/	/	P/P	/	5	60	A	PASS
L+N	5/50	/	/	P/P	/	5	60	A	PASS
L+PE	5/50	/	/	P/P	/	5	60	A	PASS
N+PE	5/50	/	/	P/P	/	5	60	A	PASS
L+N+PE	5/50	/	/	P/P	/	5	60	A	PASS
Signal Line	5/50	/	/	P/P	/	5	60	A	PASS

Note:

Performance criterion A

: The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of f unction is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permiss ible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

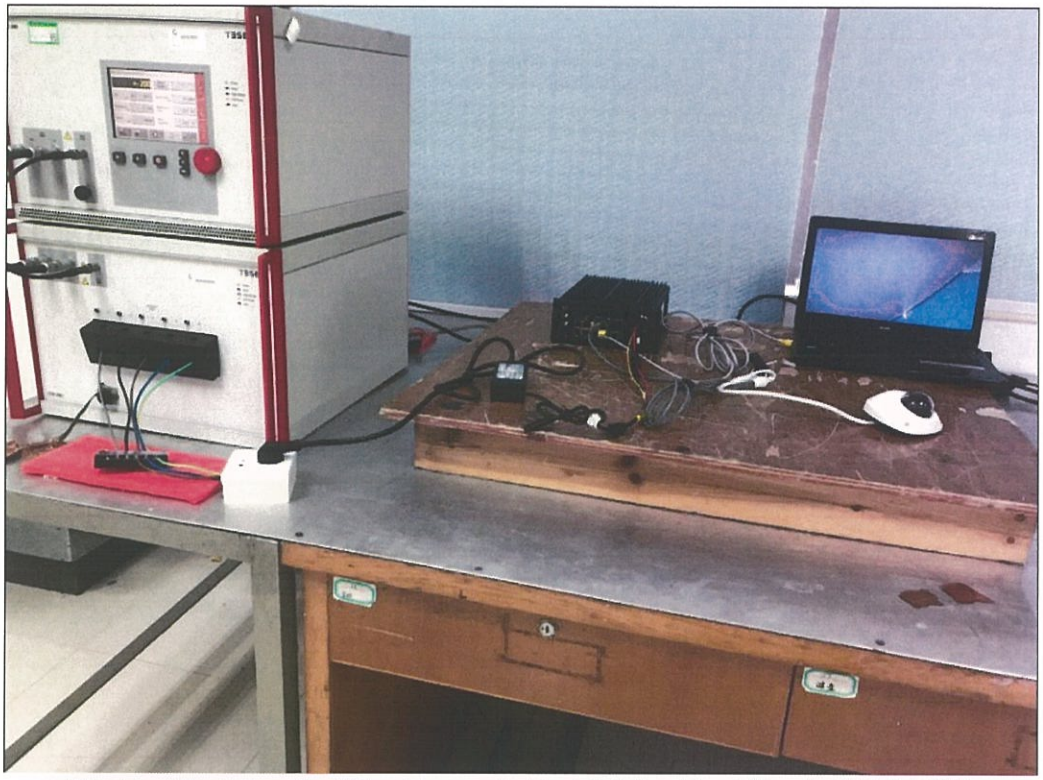
Performance criterion B

: The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is all owed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allow ed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product descrip tion and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

Performance criterion C

: Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls

3.1.4 Test Setup



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

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

3.2 Radio-frequency Electromagnetic Field Immunity

3.2.1 Radio-frequency Electromagnetic Field Immunity Test Information

Temperature:	25 °C	**Humidity:**	57%RH
ATM Pressure:	101 k Pa	**Grounding:**	/
Test Voltage:	AC220V	**Date of test:**	2018.09.07
Tested by:	Wang Weifeng	**Test Reference:**	EN 50155:2007
Performance Criteria:	A		
Results:	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	2018-06-08	2019-06-07
RF power Amplifier	AR	500W1000A	0326103	2018-06-08	2019-06-07
Broadband antenna	HL562	TDK	100644	2018-06-08	2019-06-07
Anechoic Chamber	EMCT	3.91m*6.1m*5.95m	7561990030	2018-06-08	2019-06-07

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:

Performance criterion A

: The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended . The performance level may be replaced by a permissible loss of performance. If the minimum performance level or th e permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

Performance criterion B

: The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function i s allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The perfor mance level may be replaced by a permissible loss of performance. During the test, degradation of performance is how ever allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product des cription and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

Performance criterion C

: Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of t he controls

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

Temperature:	25 °C	**Humidity:**	57%RH
ATM Pressure:	101 k Pa	**Grounding:**	/
Test Voltage:	AC220V	**Date of test:**	2018.09.07
Tested by:	Wang Weifeng	**Test Reference:**	EN 50155:2007
Performance Criteria:	A		
Results:	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	SMT06	7511990018	2018-06-08	2019-06-07
RF power Amplifier	AR	50S1G4A	7161990011-03	2018-06-08	2019-06-07
Broadband antenna	HL562	TDK	100644	2018-06-08	2019-06-07
Anechoic Chamber	EMCT	3.91m*6.1m*5.95m	7561990030	2018-06-08	2019-06-07

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:

Performance criterion A

: The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended . The performance level may be replaced by a permissible loss of performance. If the minimum performance level or th e permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

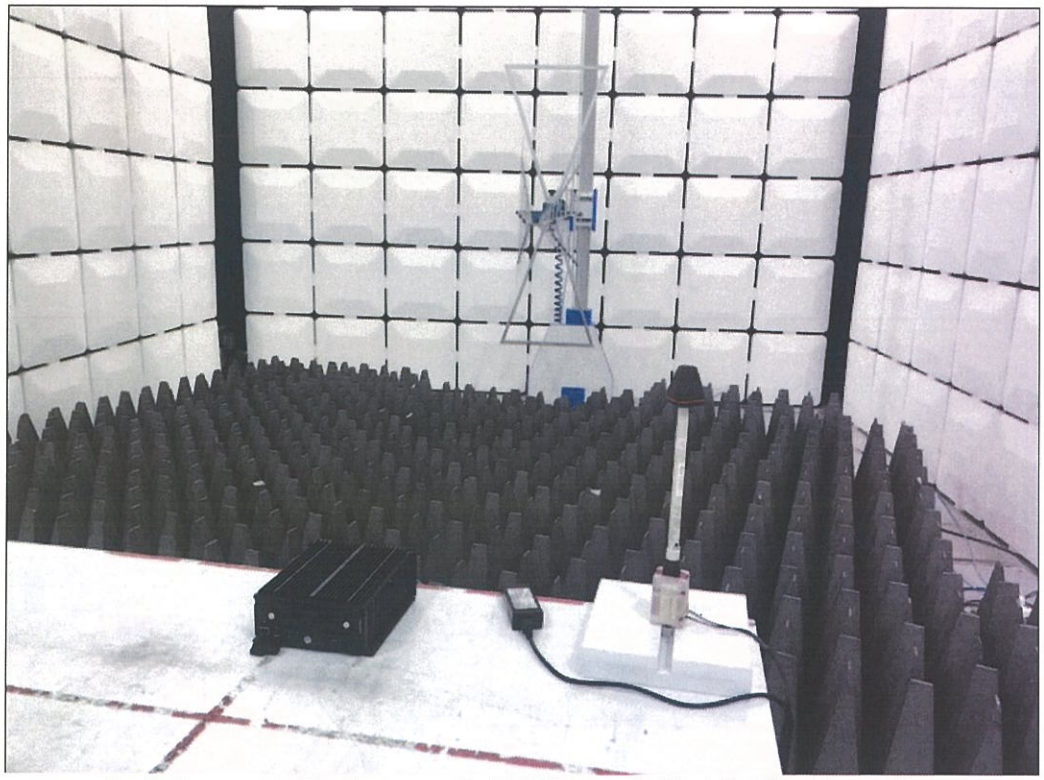
Performance criterion B

: The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function i s allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The perfor mance level may be replaced by a permissible loss of performance. During the test, degradation of performance is how ever allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product des cription and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

Performance criterion C

: Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of t he controls

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

Temperature:	25 °C	**Humidity:**	57%RH
ATM Pressure:	101 k Pa	**Grounding:**	/
Test Voltage:	AC220V	**Date of test:**	2018.09.07
Tested by:	Wang Weifeng	**Test Reference:**	EN 50155:2007
Performance Criteria:	A		
Results:	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	2018-06-08	2019-06-07
Electromagnetic Injection Clamp	EM	Liithi EM101	35607	2018-06-08	2019-06-07
CDN	EM	CDN M3	0302-03	2018-06-08	2019-06-07

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
Signal Line	0.15~80	10V	80	A	PASS

Note:

Performance criterion A

: The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended . The performance level may be replaced by a permissible loss of performance. If the minimum performance level or th e permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

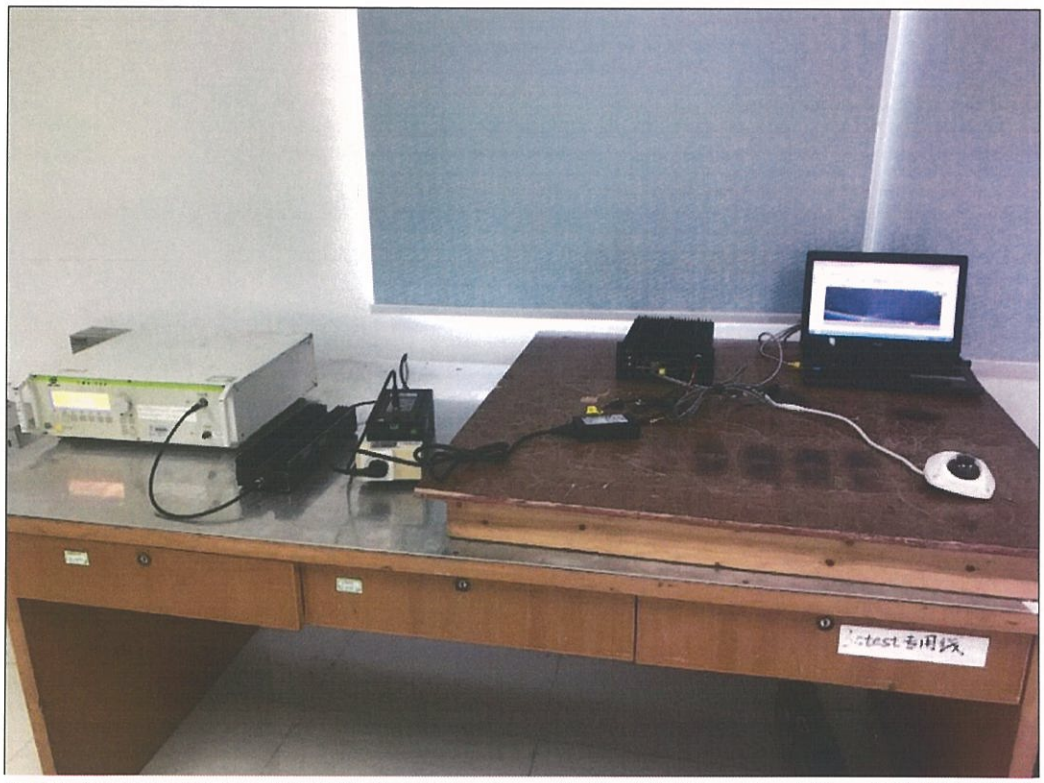
Performance criterion B

: The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function i s allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The perfor mance level may be replaced by a permissible loss of performance. During the test, degradation of performance is how ever allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product des cription and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

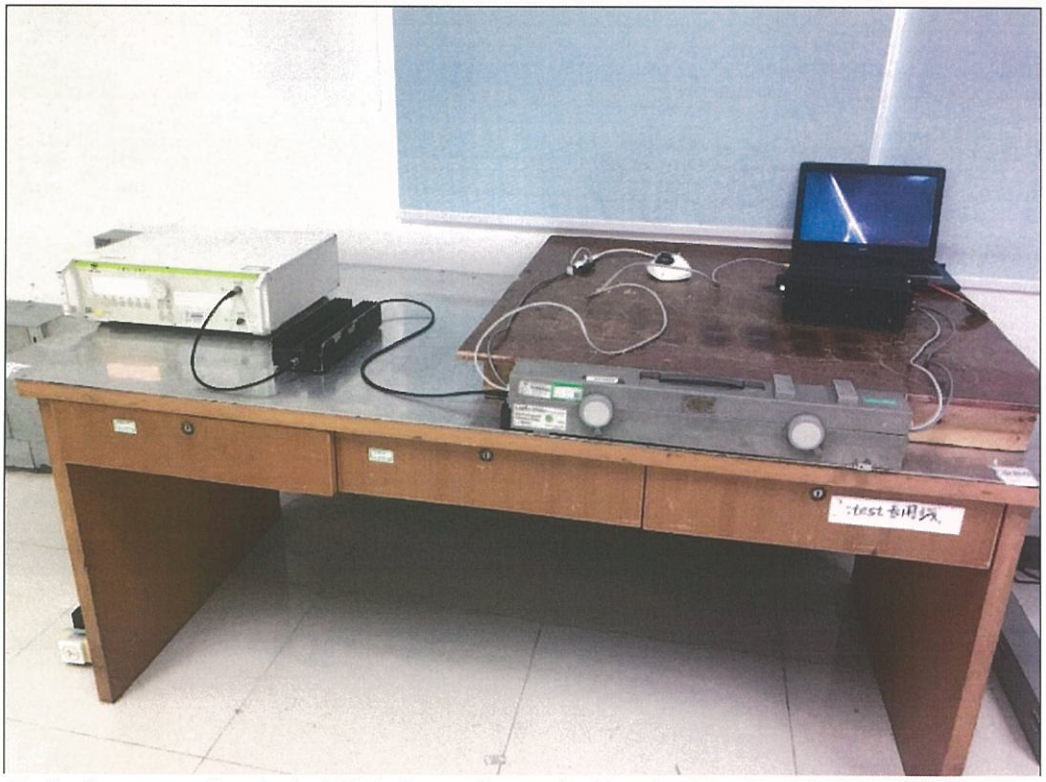
Performance criterion C

: Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of t he controls

3.3.4 Test Setup



Radio-frequency Conducted Disturbance Immunity Test Set-Up –Front View(POWER LINE)



Radio-frequency Conducted Disturbance Immunity Test Set-Up –Front View(SIGNAL LINE)

3.4 Surge Immunity

3.4.1 Surge Immunity Test Information

Temperature:	22 °C	**Humidity:**	62%RH
ATM Pressure:	101 k Pa	**Grounding:**	/
Test Voltage:	AC220V	**Date of test:**	2018-09-07
Tested by:	Wang Weifeng	**Test Reference:**	EN 50155:2007
Performance Criteria:	B		
Results:	The Surge Immunity of EUT Met the performance criteria B of the requirement of the standard EN 50155:2007.		

3.4.2 Measurement Equipment Used for Surge Immunity Test

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
EMS Testing system	TESEQ	NSG3060	1640/2112	2018-06-08	2019-06-07

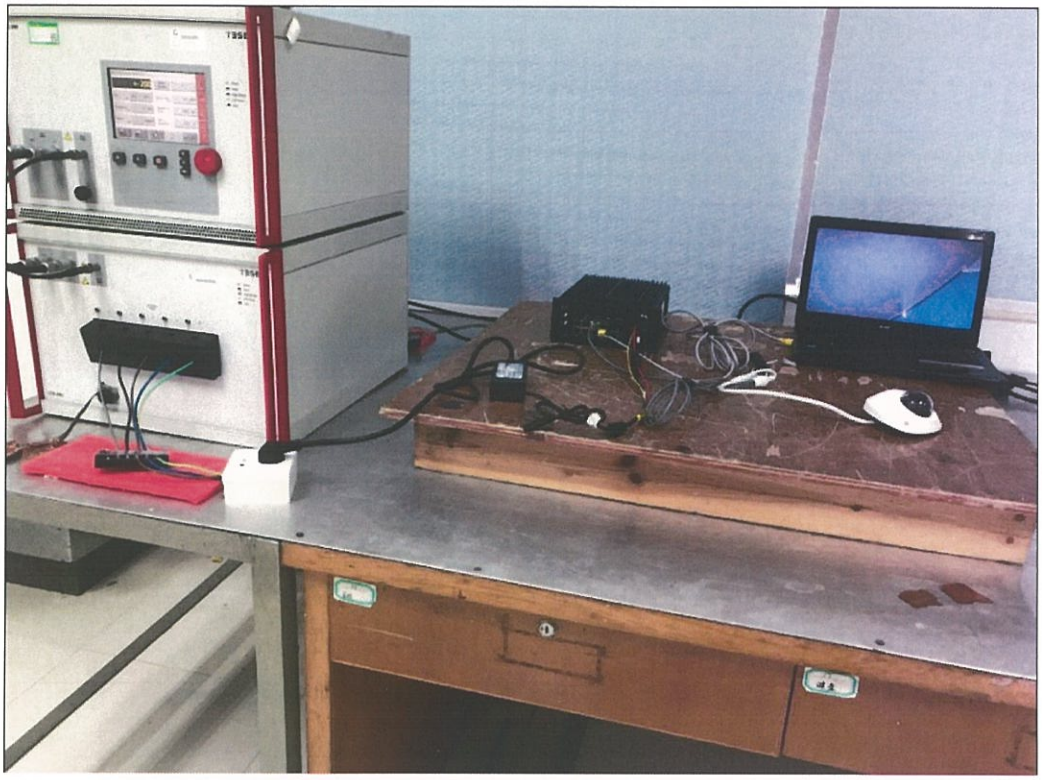
3.4.3 Test Data

Test position	Waveform Tr/Td μs	Test voltage kV				Test times at each polarity	Coupling phase	EUT performance comply to criteria	Result
		0.5	1	2	4				
		+/-	+/-	+/-	+/-				
L-N	1.2/50	/	P/P	/	/	5	0°,90°, 180°,270°	A	PASS
L-PE	1.2/50	/	/	P/P	/	5	0°,90°, 180°,270°	A	PASS
N-PE	1.2/50	/	/	P/P	/	5	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.

3.4.4 Test Setup



Surge Immunity Test Set-Up –Front View

/

3.5 Electrostatic Discharge Immunity

3.5.1 Electrostatic Discharge Immunity Test Information

Temperature:	25 °C	**Humidity:**	58%RH
ATM Pressure:	101 k Pa	**Grounding:**	/
Test Voltage:	AC220V	**Date of test:**	2018.09.07
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-AUTO	193	2018-06-08	2019-06-07

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:

Performance criterion A: The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product

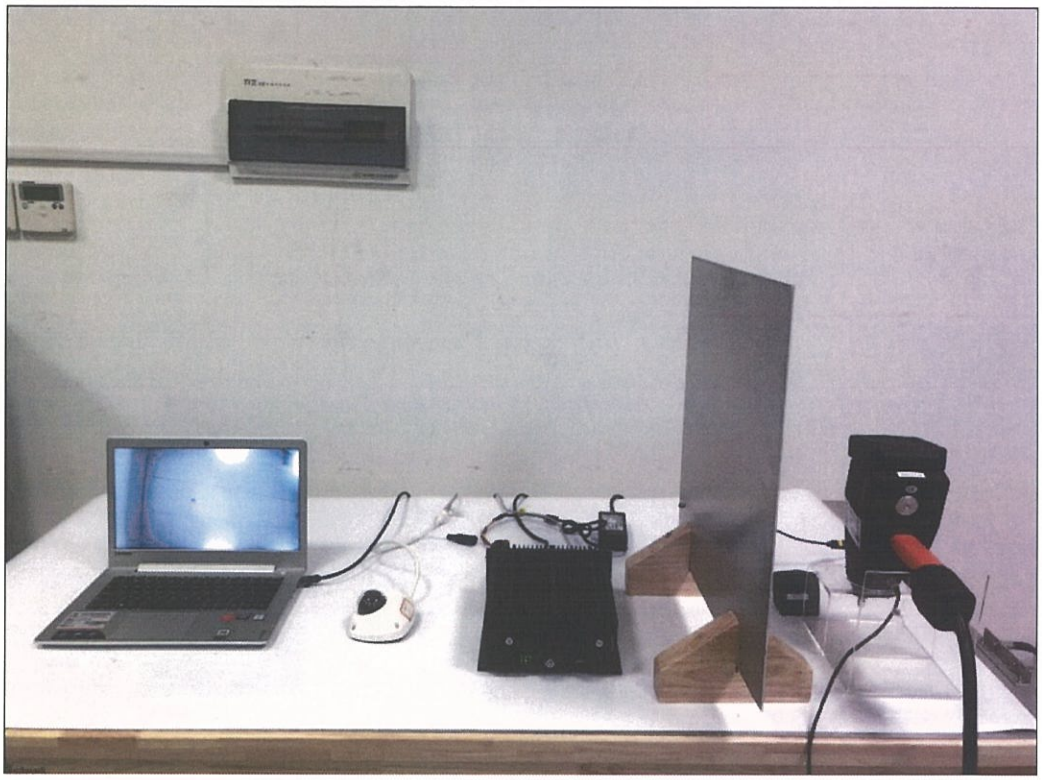
description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

Performance criterion B: The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the

permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

Performance criterion C: Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls

3.5.4 Test Setup



Electromagnetic Immunity 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: ≥50MΩ.

4.2.3 Dielectric Strength Test

Testmethod: All leads to shell of the sample applied 1500V/50Hz voltage within 60s.
Check standard: leakagecurrent≤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**	**Result**
1	Visual Inspection		no breakage, damage	no breakage, damage	PASS
2	Insulation Resistance	all lead - shell	≥50MΩ	＞250MΩ	PASS
3	Dielectric Strength	all lead - shell	≤1mA（1500V/50Hz）	＜1mA	PASS

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℃ 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.

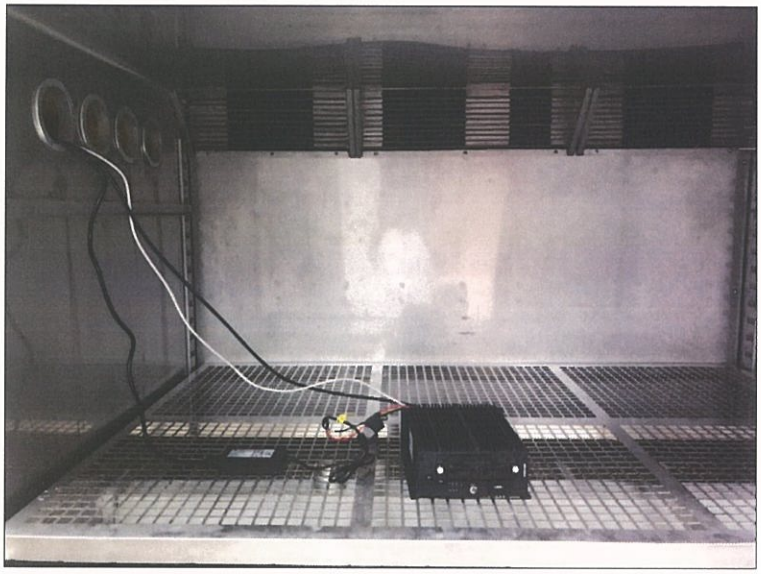


Figure 1: The mounting of the sample in the Environment Test Chamber.

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℃for 16h;

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

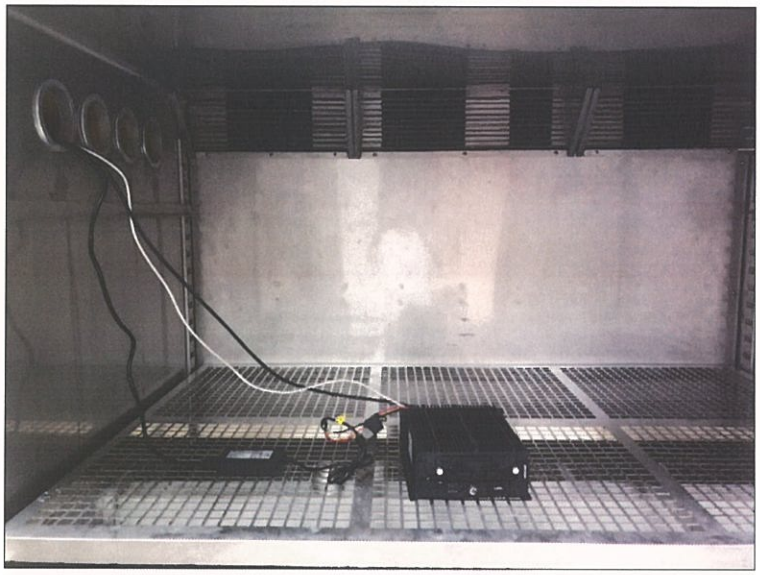


Figure 3: The mounting of the sample in the Environment Test Chamber.

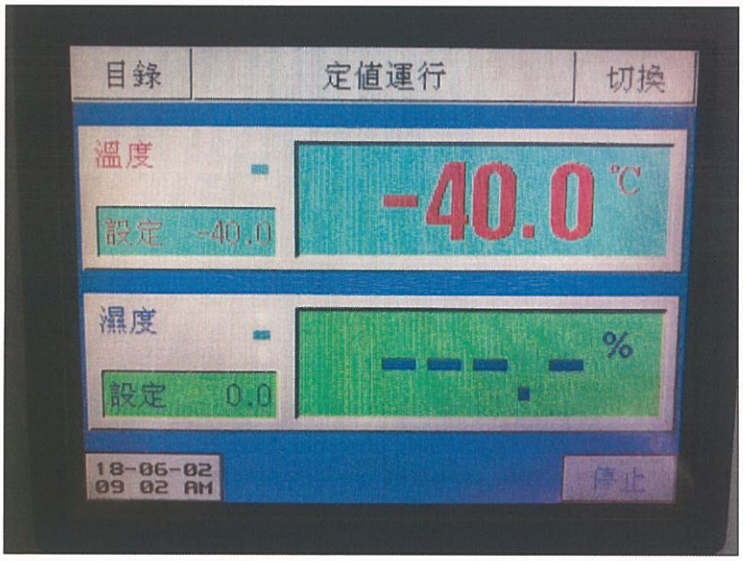


Figure 4: The actual running state of the Environment Test Chamber.

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℃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.

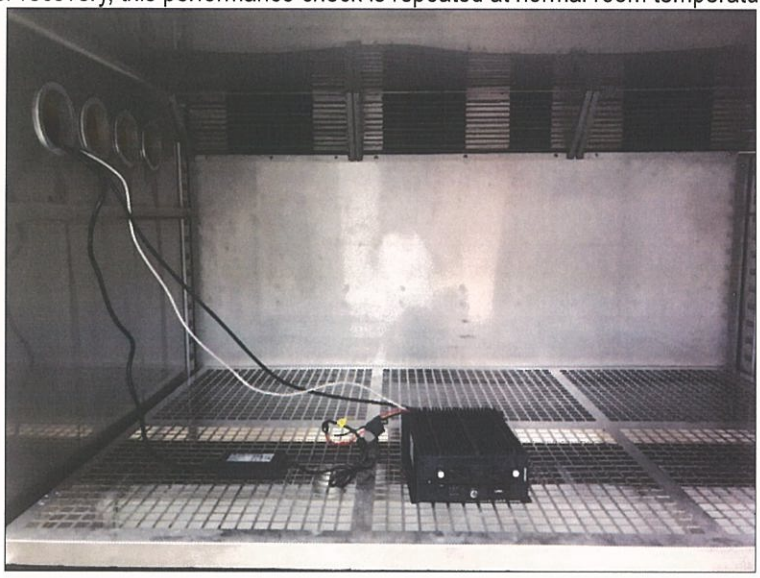


Figure 5: The mounting of the sample in the Environment Test Chamber.

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 Damp Heat Cyclic Test

Test Requirement:

The sample is placed in the Environment Test Chamber (the mounting see the Figure 9);

According to EN 60068-2-30, Test Db. Temperature: +55℃ and +25℃;

Number of cycle: 2; Time: 48 hours;

At the beginning of the second cycle, the sample shall be switched on and a performance check is carried out. At the end of test, insulation test and performance check is repeated. Test results referring to Table 2.

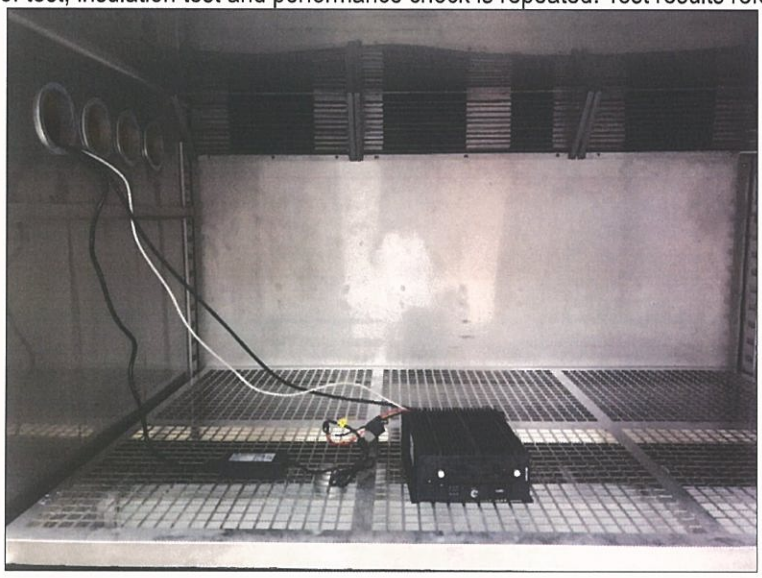


Figure 9: The mounting of the sample in the Environment Test Chamber.

Figure 10: The actual running state of the Environment Test Chamber.

Table 2: The performance of sample test results

NO	Test Item		Check standard	Test record	Result
1	Visual Inspection		no breakage, damage.	no breakage, damage	PASS
2	Insulation Resistance	all lead - shell	≥50MΩ	＞250MΩ	PASS
3	Dielectric Strength	all lead - shell	≤1mA（1500V/50Hz）	＜1mA	PASS

4.2.9 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 11).

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

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 (g2/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 3-2: vibration test conditions

Test conditions	Frequency (Hz)	PSD (g2/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 3-3: vibration test conditions

Test conditions	Frequency (Hz)	PSD (g2/Hz)	Slope(dB/oct)
	5	0.000298	/
	20	0.000298	/
	150	/	-6
vibration direction	Z direction (see the Figure 9-3)		
Test time	10min		

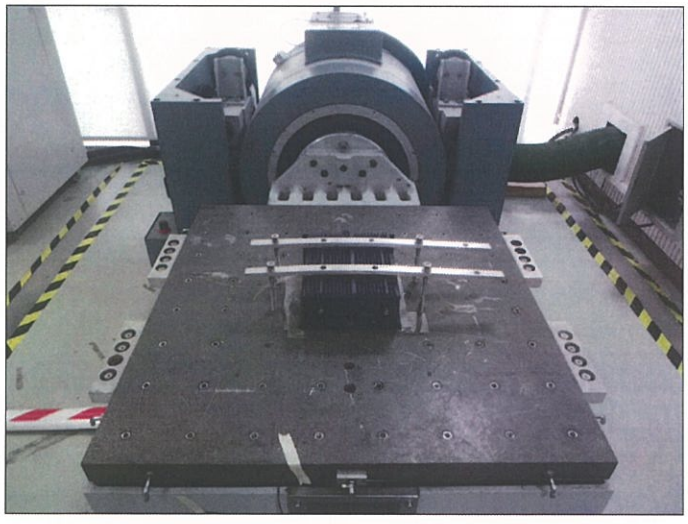


Figure 11-1: The mounting of the sample on the vibration platform in X axis.

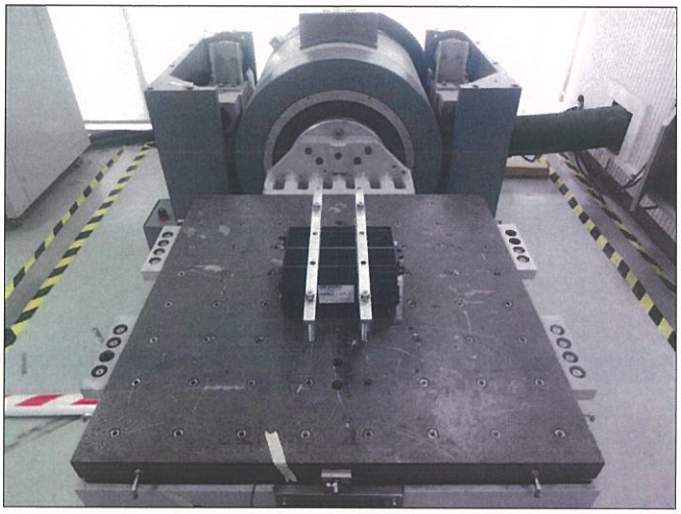


Figure 11-2: The mounting of the sample on the vibration platform in Y axis.

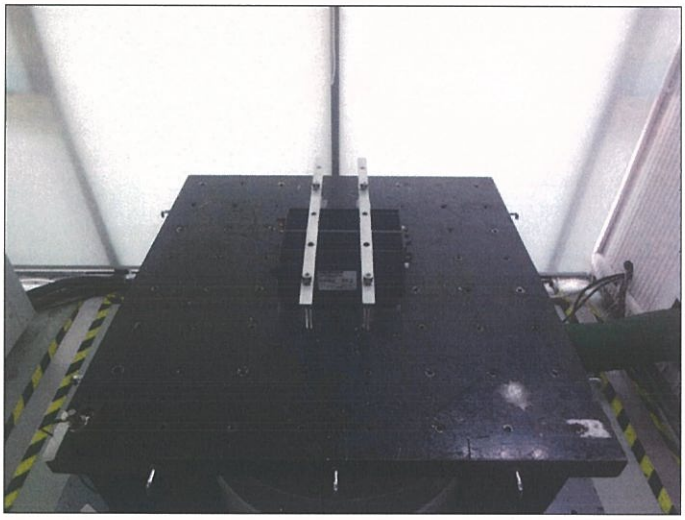


Figure 11-3: The mounting of the sample on the vibration platform in Z axis.

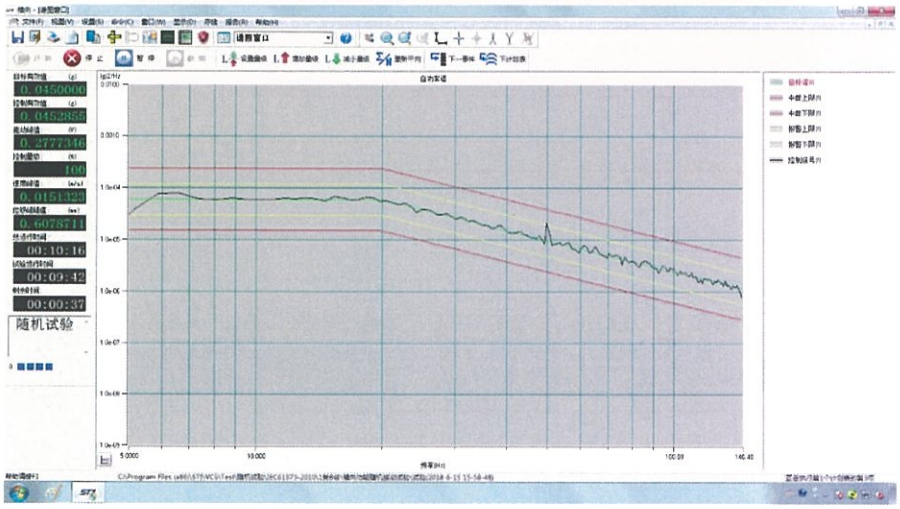


Figure 12-1: The vibration control spectrum in X axis.

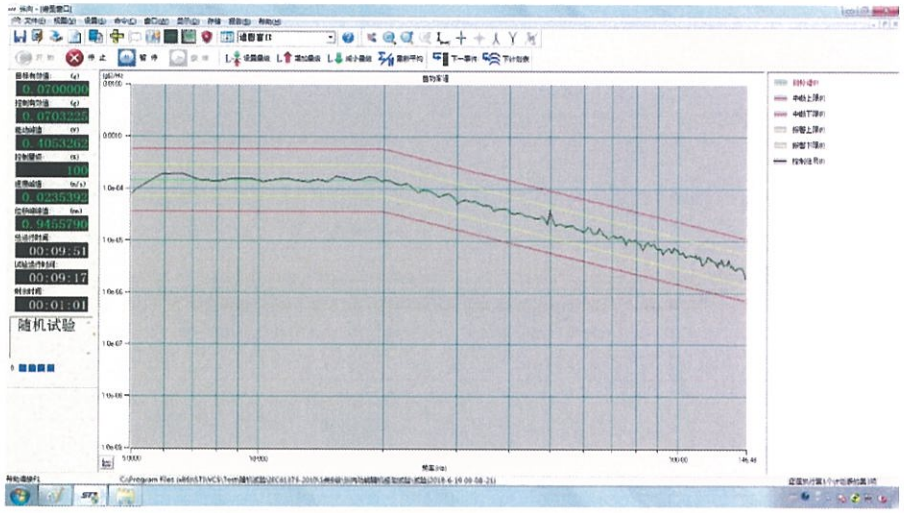


Figure 12-2: The vibration control spectrum in Y axis.

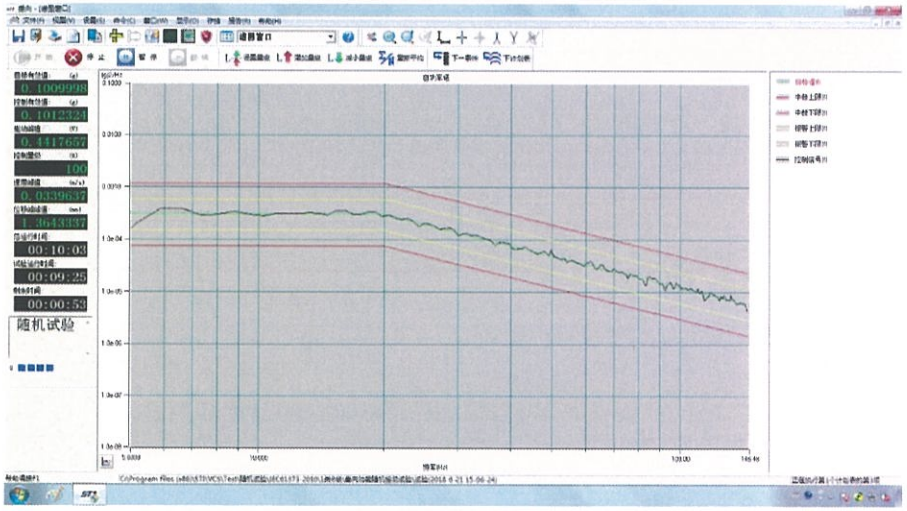


Figure 12-3: The vibration control spectrum in Z axis.

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

4.2.10 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 11).

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: vibration test conditions

	Frequency (Hz)	PSD (g2/Hz)	Slope(dB/oct)
Test conditions	5	0.00366	/
	20	0.00366	/
	150	/	-6
vibration direction	X direction (see the Figure 9-1)		
Test time	5hous		

Table 4-2: vibration test conditions

	Frequency (Hz)	PSD (g2/Hz)	Slope(dB/oct)
Test conditions	5	0.00901	/
	20	0.00901	/
	150	/	-6
vibration direction	Y direction (see the Figure 9-2)		
Test time	5hours		

Table 4-3: vibration test conditions

	Frequency (Hz)	PSD (g2/Hz)	Slope(dB/oct)
Test conditions	5	0.01857	/
	20	0.01857	/
	150	/	-6
vibration direction	Z direction (see the Figure 9-3)		
Test time	5hours		

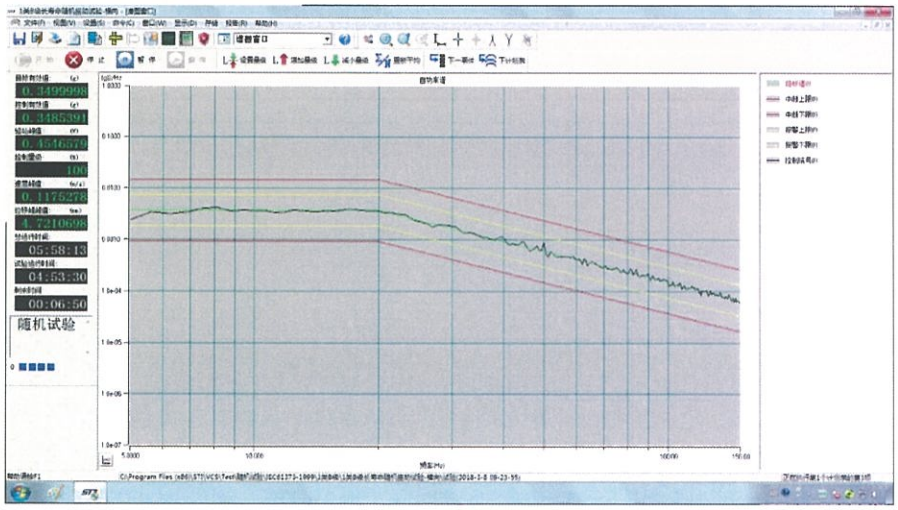


Figure 13-1: The vibration control spectrum in X axis.

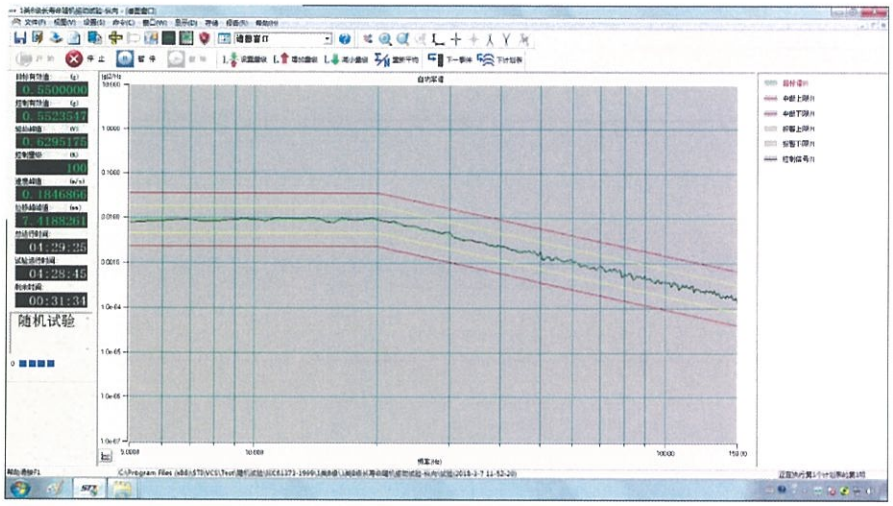


Figure 13-2: The vibration control spectrum in Y axis.

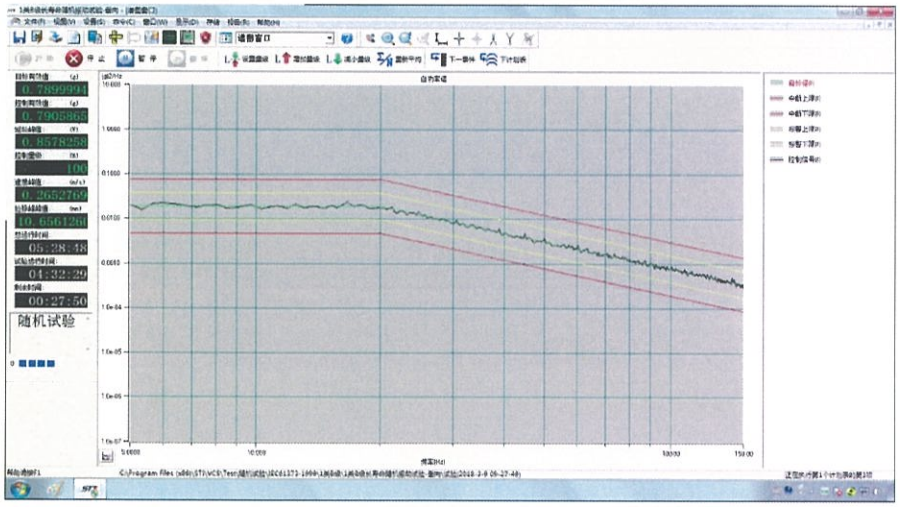


Figure 13-3: The vibration control spectrum in Z axis.

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

4.2.11 Mechanical Shock Test

TestRequirement:

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 11).

Do vibration test as following method referring to Table 5:

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

Table 5-1: 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 5-2: 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 5-3: 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		

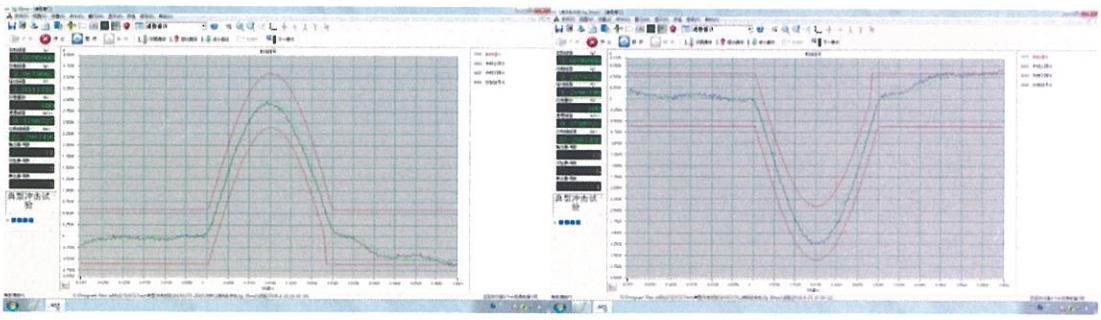


Figure 14-1: The control spectrum of Mechanical Shock Test (±3g 30ms).

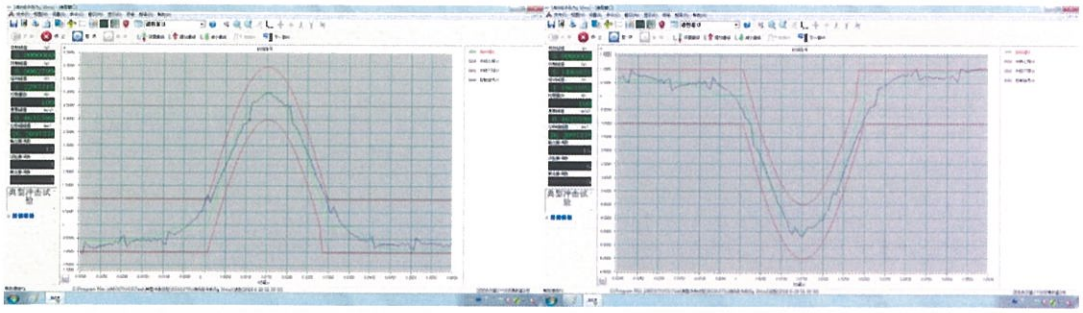


Figure 14-2: The control spectrum of Mechanical Shock Test (±5g 30ms).

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

END OF THE TEST REPORT