

Query No.:UHACH6E6


Product Testing

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1 General Information

1.1 Description of EUT

Product:	Elevator Control Cabinet
Model No.:	SJT-WVF5
Brand Name:	/
Serial No.:	K1801001
Rating:	Power: 75kW Input: AC3Ph 380, 50/60Hz, 190A Output: 0-380V, 0-60Hz, 165A
Accessories:	/

NOTE:

1. For a more detailed features description about the EUT, please refer to User's Manual.

1.2 Objective

Perform ElectroMagnetic Interference (EMI) and ElectroMagnetic Susceptibility (EMS) tests for CE Marking.

1.3 Test Date

Emission: 2018.01.13 ~ 2018.01.14

Immunity: 2018.01.15 ~ 2018.01.22

1.4 Test Standards and Results

The EUT has been tested according to the following specifications:

EMISSION		
Standard	**Test Type**	**Result**
EN 12015:2014	Mains terminal disturbance voltage	PASS
	Radiated disturbance	PASS
	Impulse noise	PASS
	Voltage fluctuations	
	Mains supply current harmonics	
IMMUNITY		
Basic Standard	**Test Type**	

1.5 List of Equipment Used

Description	Manufacturer	Model No.	Calibration due date	Serial No.
Test Receiver	ROHDE&SCHWARZ	ESCI	Jun.04, 2018	A130901474
LISN	SCHWARZBECK	NNLK8130	Jun. 04, 2018	A131001541

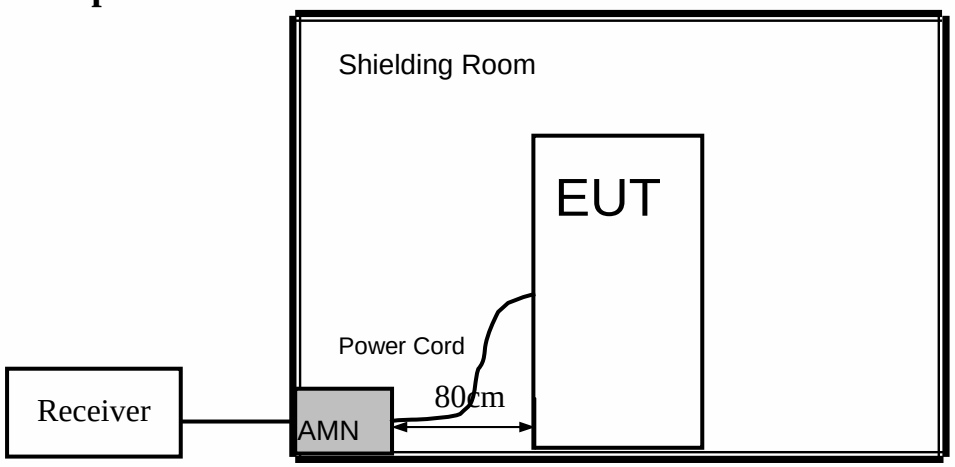
2 Emission Test

2.1 EUT Setup and Operating Conditions

The EUT was powered by 380V AC Mains and connected to a motor with no load. The EUT operated in SVC control and max carrier frequency mode.

2.2 Mains Terminal Disturbance Voltage Measurement

2.2.3 Test Setup



For the actual test configuration, please refer to the related item - Photographs of the Test Configuration.

2.2.4 Test Result

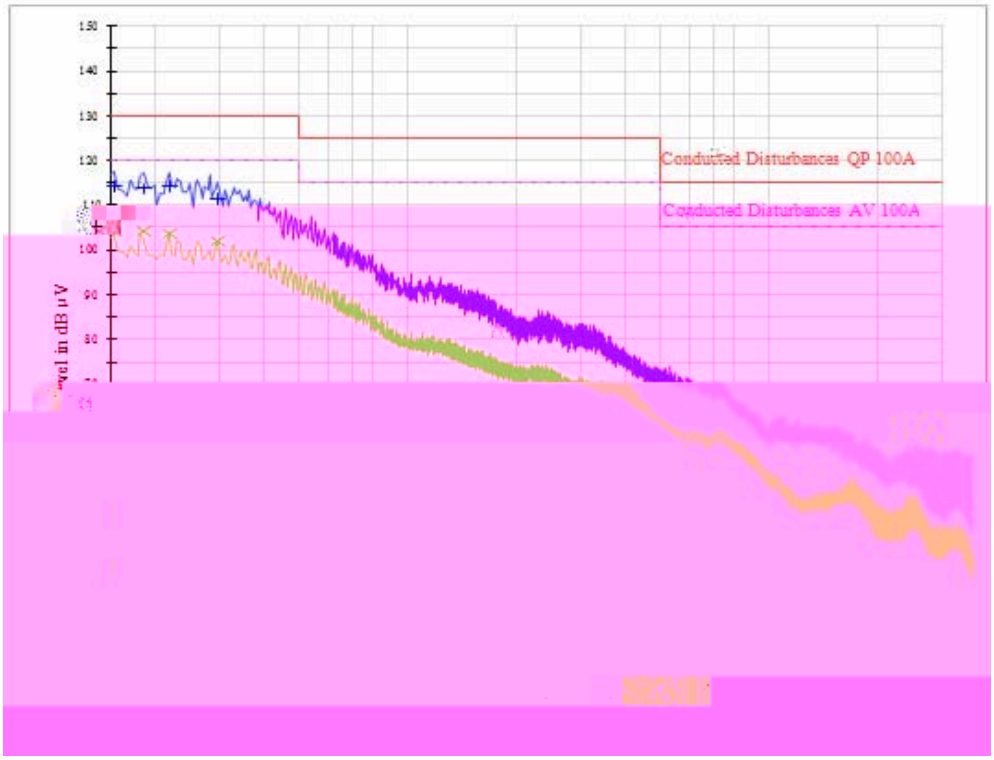
No.	Freq. (MHz)	Limit Value (dBμV)		Emission Level (dBμV)	
		QP	AV	QP	AV
1	0.1540	114.2	104.1	130	120
2	0.1820	115.0	104.5	130	120
3	0.2180	114.3	103.7	130	120
4	0.2300	113.7	101.9	130	120
5	0.2660	112.7	102.6	130	120
6	0.2980	111.4	102.0	130	120

NOTE:

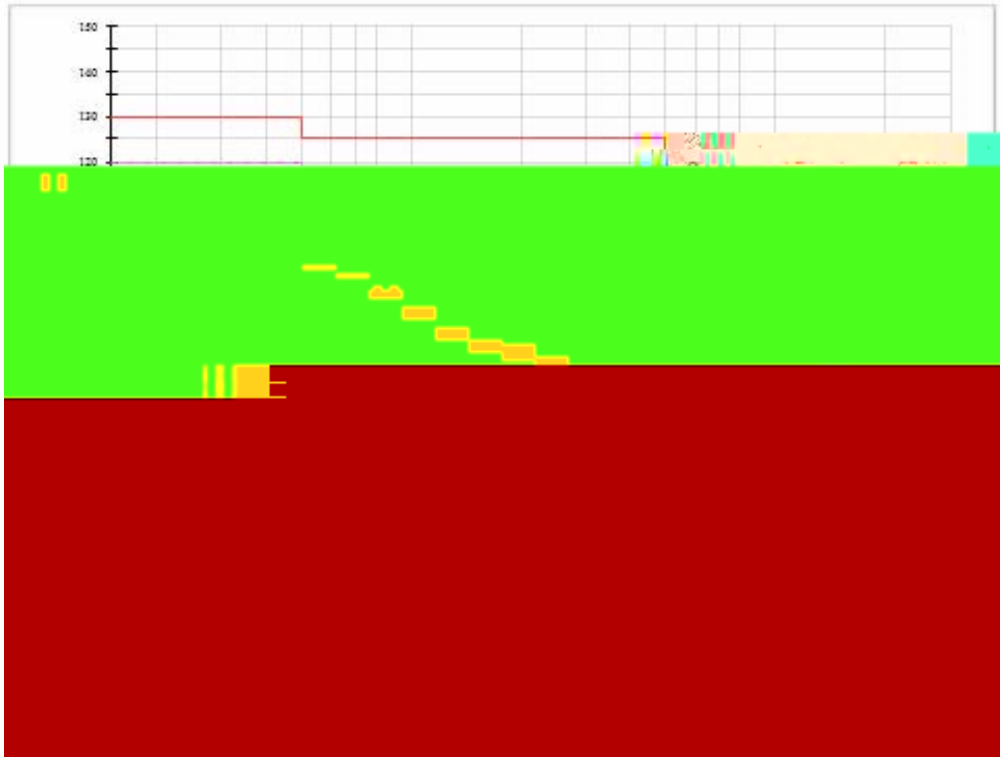
1. QP and AV are abbreviations of the quasi-peak and average individually.
2. If the emission levels measured with QP detector are lower than AV limits, there is unnecessary to measure with AV detector.
3. The emission levels recorded above is the larger ones of each phase.

Measurement Plots

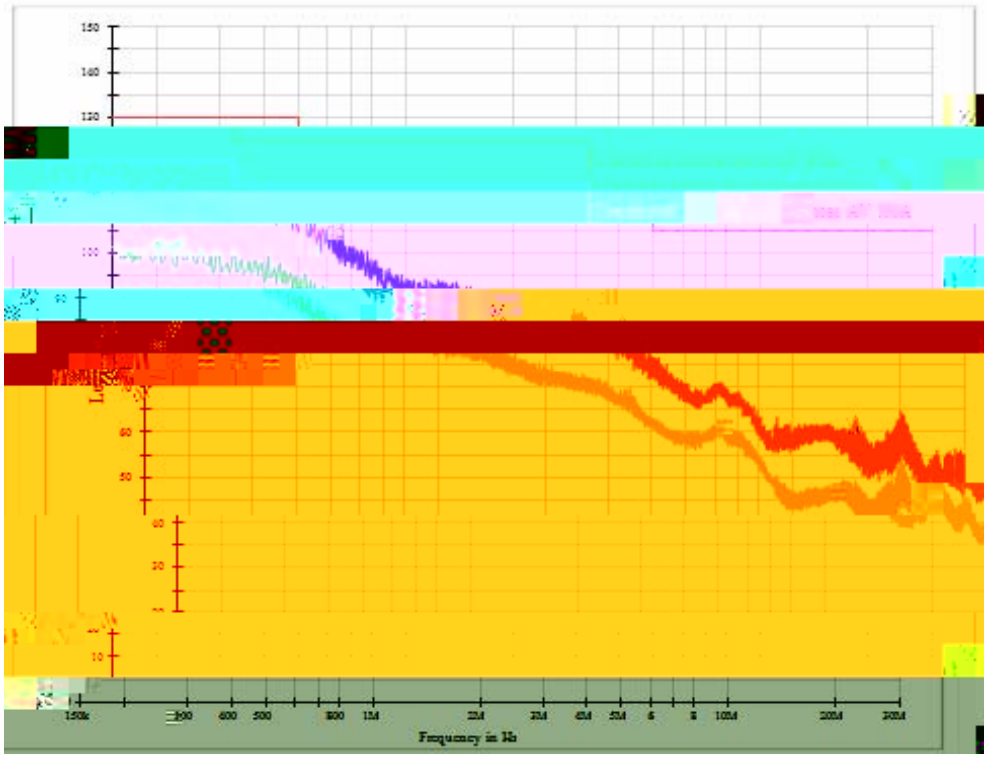
1. Mains terminal disturbance voltage L1 phase



2. Mains terminal disturbance voltage L2 phase



3. Mains terminal disturbance voltage L3 phase

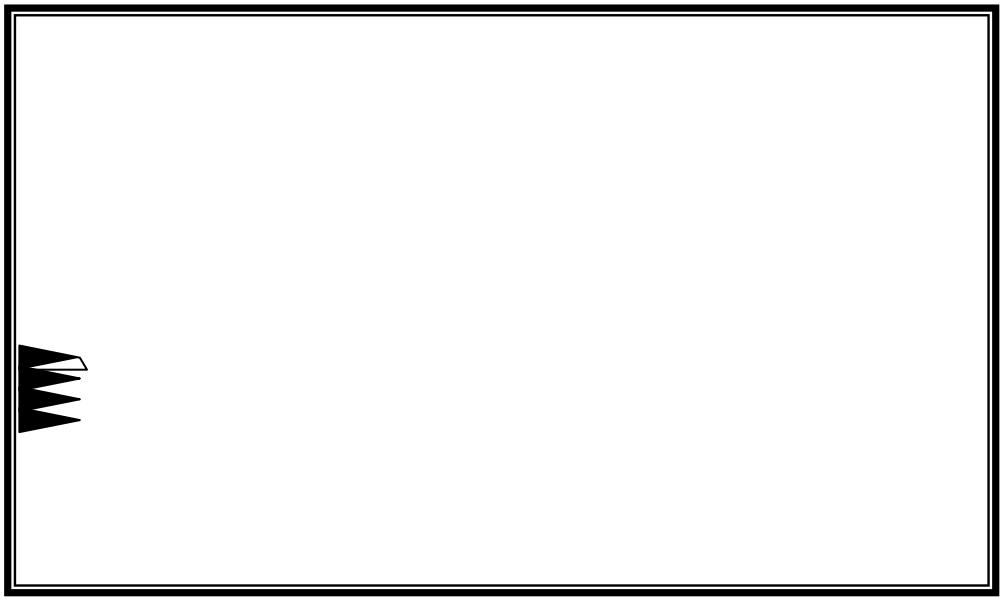


2.3 Radiated Disturbance Measurement

2.3.1 Limits of Radiated Disturbance

	Quasi peak limits(dBμV/m), at 10m measurement distance

2.3.3 Test Setup



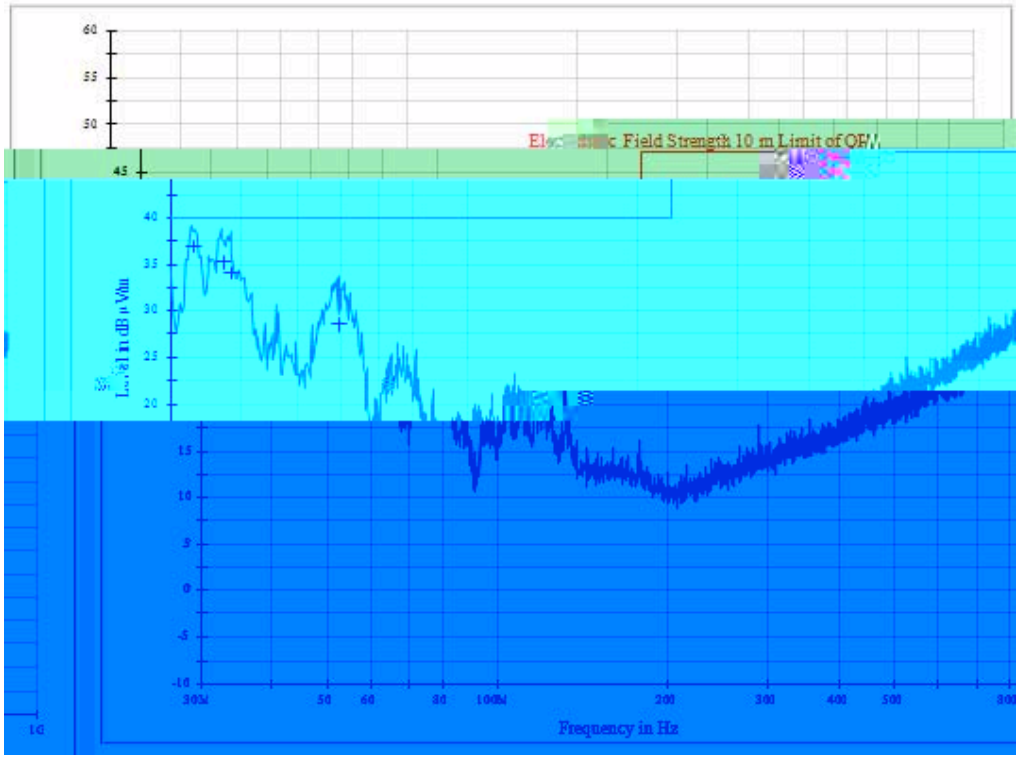
For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

2.3.4 Test Result

No.	Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Table Angle (Degree)	QP Limits (dBμV/m)	Emission Level (dBμV/m)
1	32.92	H	400	0	40	24.3
2	37.28	H	400	0	40	22.5
3	60.04	H	400	0	40	18.5
4	33.00	V	100	0	40	37.0
5	37.24	V	100	0	40	35.3
6	38.24	V	100	6	40	34.0
7	59.60	V	100	0	40	28.5

Measurement Plots

1. Electromagnetic radiation disturbances, max peak detector, antenna polarization: Vertical



2.4.4 Test Result

	Test Frequency	150kHz	500 kHz	1.4MHz	30MHz
First Test	Sensitive (dB V)	100	86	86	70
	Short click number, n1(≤ 10ms)	1	1	0	0
	Long click number, n2(10ms-200ms)	0	0	0	0
	Total click number, n_1=(n1+n2)	1	1	0	0
	Continuous disturbance (>200ms)	0	0	0	0
	Switching operation number, n_2	1			
	Duration limit, T(min)	120			
	Click rate, N=n/T	0.01	0.01	0	0
	Click limit, Lq(dB V)	110	100	100	104
	Allowable number of click exceeding the limit Lq (n/4)	/	/	/	/
Second Test	Sensitive (dB V)	/	/	/	/
	Short click number, n1(≤ 10ms)	/	/	/	/
	Long click number, n2(10ms-200ms)	/	/	/	/
	Total click number, n=(n1+n2)	/	/	/	/
	Number of click exceeding the limit Lq	/	/	/	/

NOTE:

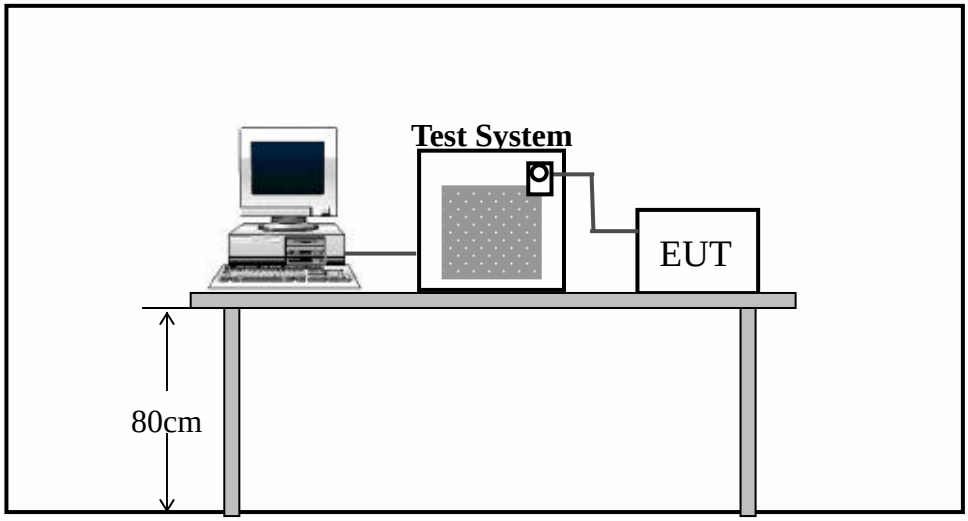
1. No click was detected during the first test, so it’s no need to perform the second test.

2.5 Harmonic Current Measurement

2.5.1 Limits of Harmonic Current

Environmental phenomena	Test set-up	Units %	Limits for permanent emission[a]
Harmonic distortion	EN 61000-3-12:2005	I_5/I_1 I_7/I_1 I_{11}/I_1 I_{13}/I_1	31 20 12 7
Harmonic distortion factor	EN 61000-3-12:2005	THD PWHD	37 38
The relative value of even harmonics up to order 12 shall not exceed 16/n[%]. Even harmonics above order 12 are taken into account in THD and PWHD in the same way as odd order harmonics.			
[a] The given limits are based on EN 61000-3-12:2005 for Rsce = 250 (balanced three phase equipment).			

2.5.2 Test Setup



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

2.5.3 Test Result

Test Specification

Test Frequency:	50Hz	Test Voltage:	380Vac
Waveform:	Sine	Test Time:	2.5min

Test ResultÖ

Environmental phenomena	Units %	Measurement Value			Limits for permanent emission	Remarks
		L1	L2	L3		
Harmonic distortion	I_5/I_1	23.4	24.1	23.1	31	PASS
	I_7/I_1	18.1	18.8	17.5	20	PASS
	I_{11}/I_1	4.8	5.1	5.7	12	PASS
	I_{13}/I_1	2.3	2.4	4.3	7	PASS
Harmonic distortion factor	THD	31.0	32.4	33.2	37	PASS
	PWHD	31.9	33.1	34.2	38	PASS

2.6 Voltage Fluctuation and Flick Measurement

2.6.1 Limits of Voltage Fluctuation and Flick

Test Item	Lim	
P_{st}	1.0	rm flicker indicator
P_{lt}	0.65	m flicker indicator
T_{dt}	500	m time that d_t exceeds 3%
d_{max}(%)	4%	um relative voltage change.
d_c(%)	3.3%	steady-state voltage change.

2.6.2 Test Procedur

a. The EUT was placed meters above the ground and operated to produce the most uni ges under normal conditions

b. During the flick me ll include that part of whole operation changes. The obse icker indicator is 10 minutes and the observation period fo ours.

2.6.3 Test Result

Test Specification

Test Frequency:	380Vac
Waveform:	10 minutes(P_{st}); 2 hours (P_{lt})

Test Result

Test Parameter	L1	L2	L3	Limit	Remarks
P_{st}	0.236	0.218	0.227	1.0	Pass
P_{lt}	0.236	0.218	0.227	0.65	Pass
$T_{dt(s)}$	0.0	0.0	0.0	500mS	Pass
d_{max}(%)	0.415	0.416	0.409	4%	Pass
d_c(%)	0.067	0.061	0.071	3.3%	Pass

3.2 Immunity tests to high-frequency disturbance

3.2.1 EUT Setup and Operating Conditions

The EUT was powered by 380V AC Mains and connected to a motor with no load. The EUT operated in SVC control and max carrier frequency mode.

3.2.2 Electrostatic Discharge Immunity Test

3.2.2.1 Test Specification

Ports:	All Circuits	Safety circuits
Basic Standard:	IEC 61000-4-2	
Discharge Impedance	330Ω / 150 pF	
Discharge Voltage:	Air Discharge: 8 kV Contact Discharge: 4 kV	Air Discharge: 15 kV Contact Discharge: 6 kV
Polarity:	Positive / Negative	
Number of Discharge:	Minimum 20 times at each test point	
Discharge Mode:	Single discharge	
Discharge Period:	1-second minimum	
Criteria	B	D

3.3.2.2 Test Procedure

The discharges shall be applied in two ways:

a. Contact discharges to the conductive surfaces and coupling planes:

The EUT shall be exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points. One of the test points shall be subjected to at least 50 indirect discharges to the center of the front edge of the horizontal coupling plane. The remaining three contact test points shall each receive at least 50 direct contact discharges. If no direct contact test points are available, at least 200 indirect discharges shall be applied in the indirect mode. Test shall be perf7rj4.3(har)10902 T19.39.64S(con..50 d)-27m

restricted to those area normally handled selected test point for each such area.

The basic test procedure was in accordance with IEC 61000-4-2:

a. Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation.

b. The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.

c. The time interval between two successive single discharges was at least 1 second.

d. The ESD generator was held perpendicularly to the surface to which the discharge was applied and the return cable was at least 0.2 meters from the EUT.

e. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.

f. Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were completed.

g. At least ten single discharges (in the most sensitive polarity) were applied to the Horizontal Coupling Plane at points on each side of the EUT. The ESD generator was positioned vertically at a distance of 0.1 meters from the EUT with the discharge electrode touching the HCP.

h. At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the Vertical Coupling Plane in sufficiently different positions that the four faces of the EUT were completely illuminated. The VCP (dimensions 0.5m × 0.5m) was placed vertically to and 0.1 meters from the EUT.

3.3.2.3 Test Setup

For the actual test configuration, please refer to Appendix II: Photographs of the Test Configuration.

3.3.2.4 Test Result

Test Points	Discharge Level (kV)	Discharge Mode	Observation	Comply with

3.3.3 Radiated, Radio Frequency Electromagnetic Field Immunity Test

3.3.3.1 Test Specification

Ports:	All Circuits	Safety circuits
Basic Standard:	IEC 61000-4-3	
Frequency Range & Field Strength:	80 – 166 MHz, 10V/m; 166 – 1000 MHz, 10V/m; 1429 – 1516 MHz, 10V/m; 1710 – 1785 MHz, 10V/m; 1840 – 2170 MHz, 10V/m; 2300 – 2655 MHz, 10V/m;	80 – 166 MHz, 10V/m; 166 – 1000 MHz, 30V/m; 1429 – 1516 MHz, 30V/m; 1710 – 1785 MHz, 30V/m; 1840 – 2170 MHz, 10V/m; 2300 – 2655 MHz, 10V/m;
Modulation:	1kHz sine wave, 80%, AM modulation	
Frequency Step:	1% of fundamental	
Polarity of Antenna	Horizontal and Vertical	
Test Distance:	3m	
Antenna Height:	1.5m	
Dwell Time:	3 seconds	
Criteria	A	D

3.3.3.2 Test Procedure

The test procedure was in accordance with IEC 61000-4-3.

a. The testing was performed in a fully anechoic chamber. The transmit antenna was located at a distance of 3 meters from the EUT.

b. The frequency range is swept from 80 MHz to 2655 MHz with the signal 80% amplitude modulated with a 1 kHz sine wave. The rate of sweep did not exceed 1.5×10^{-3} decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.

c. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.

d. The field strength level was 10V/m and 30V/m.

e. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

3.3.3.3 Test Setup

For the actual test configuration, please refer to Appendix II: Photographs of the Test Configuration.

For the actual test configuration, please refer to Appendix II: Photographs of the Test Configuration.

3.3.4.4 Test Result

Test Point Power port	Polarity	Test Level (kV)	Observation	Comply with Criterion
a.c. power port	+/-	1, 2, 4	Note (1)	A
Signal port	+/-	0.5, 1, 2	Note (1)	A

NOTE:

(1). The EUT continued to operate as intended. No degradation of performance was observed..

3.3.5 Surge Immunity Test

3.3.5.1 Test Specification

Ports:	All Circuits	Safety circuits
Basic Standard:	IEC 61000-4-5	
Waveform:	Voltage 1.2/50 μs; Current 8/20 μs	
Test Voltage:	line to line 1 kV, line to earth 2kV	line to line 1 kV, line to earth 2kV
Polarity:	Positive/Negative	
Phase Angle:	0 ° , 90 ° , 180 ° , 270 °	
Repetition Rate:	60sec	
Times:	5 time/each condition.	
Criteria	B	D

3.3.5.2 Test Procedure

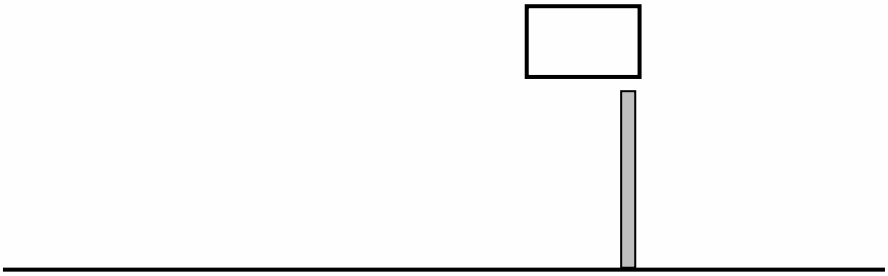
a. The EUT and the auxiliary equipment were placed on a table of 0.8m heights above a metal ground reference plane. The size of ground plane is greater than 1m×1m and project beyond the EUT by at least 0.1m on all sides. The ground plane is connected to the protective earth. The length of power cord between the coupling device and the EUT was less than 2 meters (provided by the manufacturer).

b. The EUT was connected to the power mains through a coupling device that directly couples the surge interference signal. The surge noise was applied synchronized to the voltage phase at the zero crossing and the peak value of the AC voltage wave (positive and negative).

c. The surges were applied line to line and line(s) to earth. When testing line to earth the test voltage was applied successively between each of the lines and earth. Steps up to the test level

specified increased the test voltage. All lower levels including the selected test level were tested. The polarity of each surge level included positive and negative test pulses.

3.3.5.3 Test Setup



For the actual test configuration, please refer to Appendix II: Photographs of the Test Configuration.

3.3.5.4 Test Result

Coupling Line	Polarity	Voltage (kV)	Observation	Comply with Criterion
a.c. power, Line to earth	+/-	2	Note (1)	A
a.c. power, Line to line	+/-	1	Note (1)	A

NOTE:

(1). The EUT continued to operate as intended. No degradation of performance was observed.

3.3.6 Immunity to Conducted Disturbances Induced by RF Fields

3.3.6.1 Test Specification

Ports:	All Circuits	Safety circuits
Basic Standard:	IEC 61000-4-6	
Frequency Range:	0.15 MHz – 80 MHz	
Field Strength:	3V	10V
Modulation:	1 kHz Sine Wave, 80%, AM Modulation	
Frequency Step:	1% of fundamental	
Coupled Cable:	a.c. power line, signal port	
Coupling Device:	Capacitive Clamp-F2301	
Criteria	A	D

3.3.6.2 Test Procedure

a. The EUT shall be tested within its intended operating and climatic conditions.

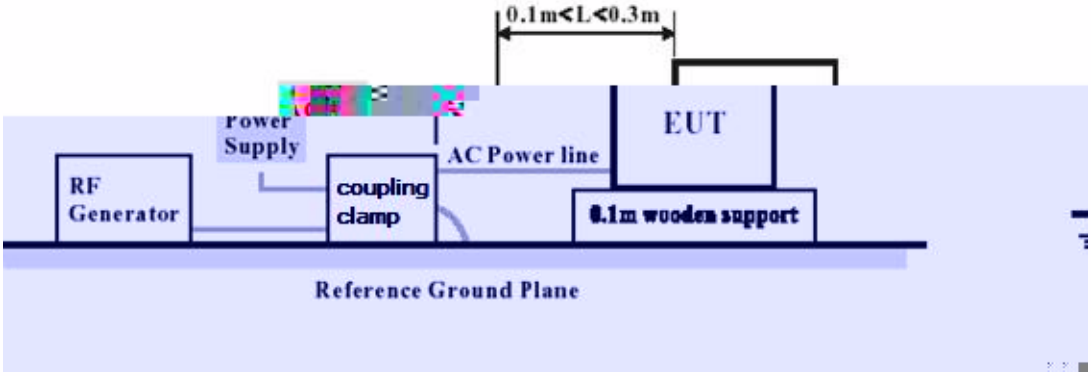
b. The test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn, while the other non-excited RF input ports of the coupling devices are terminated by a 50-ohm load resistor.

c. The frequency range is swept from 150 kHz to 80 MHz, using the signal level established during the setting process and with a disturbance signal of 80% amplitude. The signal is modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or the switch coupling devices as necessary. The sweep rate shall not exceed 1.5×10^{-3} decades/s. The step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value where the frequency is swept incrementally.

d. 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 such as clock frequencies and harmonics or frequencies of dominant interest, shall be analyzed separately.

e. Attempts should be made to fully exercise the EUT during test, and to fully interrogate all exercise modes selected for susceptibility.

3.3.6.3 Test Setup



3.3.6.4 Test Result

Test Point	Frequency	Field Strength (Vrms)	Observation	Comply with criterion
a.c. power line	0.15 -80 MHz	10	Note(1)	A
Signal port	0.15 -80 MHz	10	Note(1)	A

NOTE:

(1). The EUT continued to operate as intended. No degradation of performance was observed.

3.3.7 Voltage Dips and Short Interruptions Immunity Test

3.3.7.1 Test Specification

Ports:	All Circuits	Safety circuits
Basic Standard:	IEC 61000-4-11	
Voltage Dips:	40% residual, 10 period; 70% residual, 25 period; 0% residual, 1 period	70% residual, 0.5 to 5 in 0.5 period steps; 40% reduction, 10 to 50 in 5 period steps
Voltage Interruptions:	0% residual, 250 period	0% residual, 250 period
Voltage Phase Angle:	0 °	
Criteria	C, C, B, C	D

3.3.7.2 Test Procedure

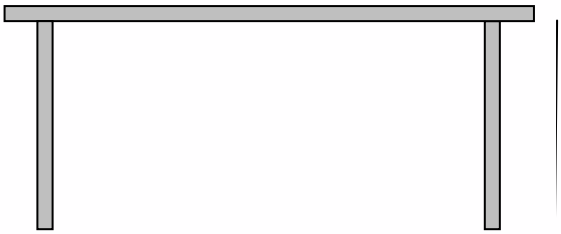
a. The power cord was used as supplied by the manufacturer. The EUT was connected to the line output of the Voltage Dips and Interruption Generator.

b. The EUT was tested for (I) 60% voltage dip of supplied voltage with duration of 200ms, (II)30% voltage dip of supplied voltage and duration 500ms, (R)100% voltage dip of supplied voltage and duration 20ms.

c. 100% voltage interruption of supplied voltage with duration of 5000ms was followed, which was a sequence of three voltage interruptions with intervals of 10 seconds.

d. Voltage reductions occur at 0 degree crossover point of the voltage waveform. The performance of the EUT was checked after the voltage dip or interruption.

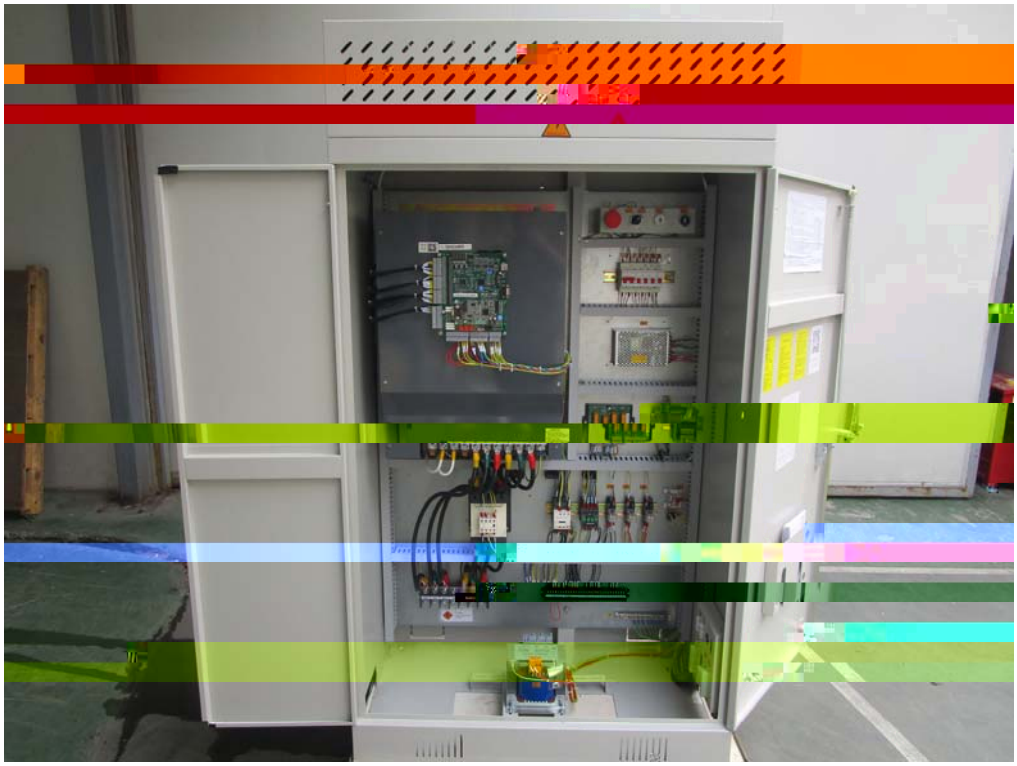
3.3.7.3 Test Setup

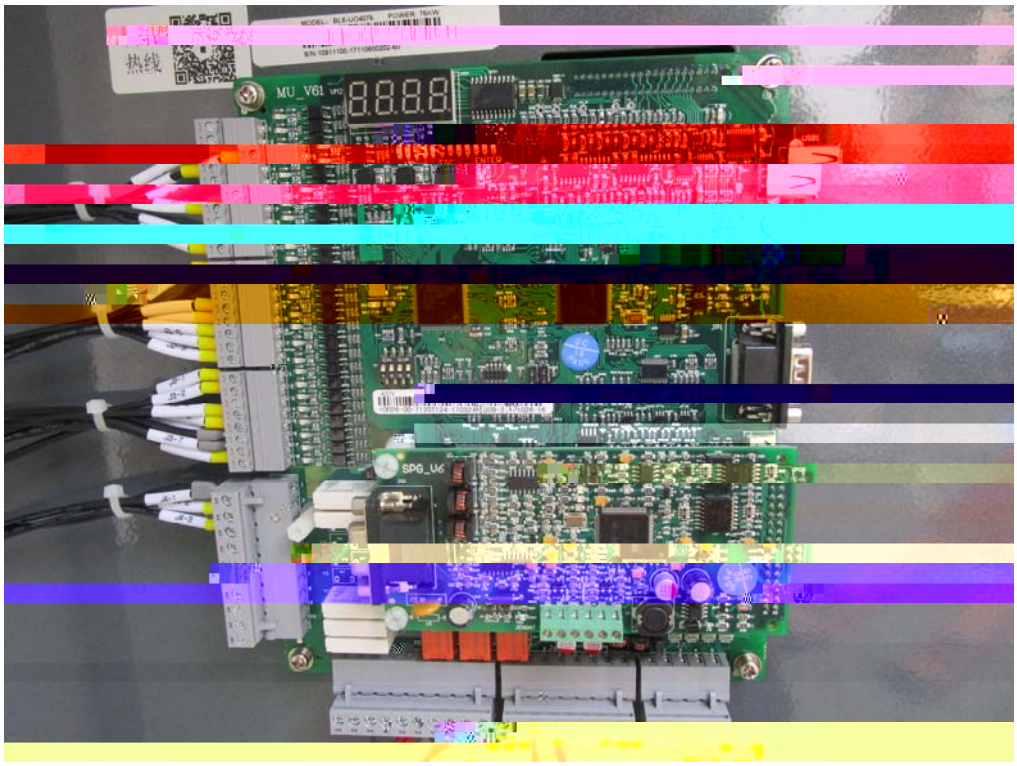


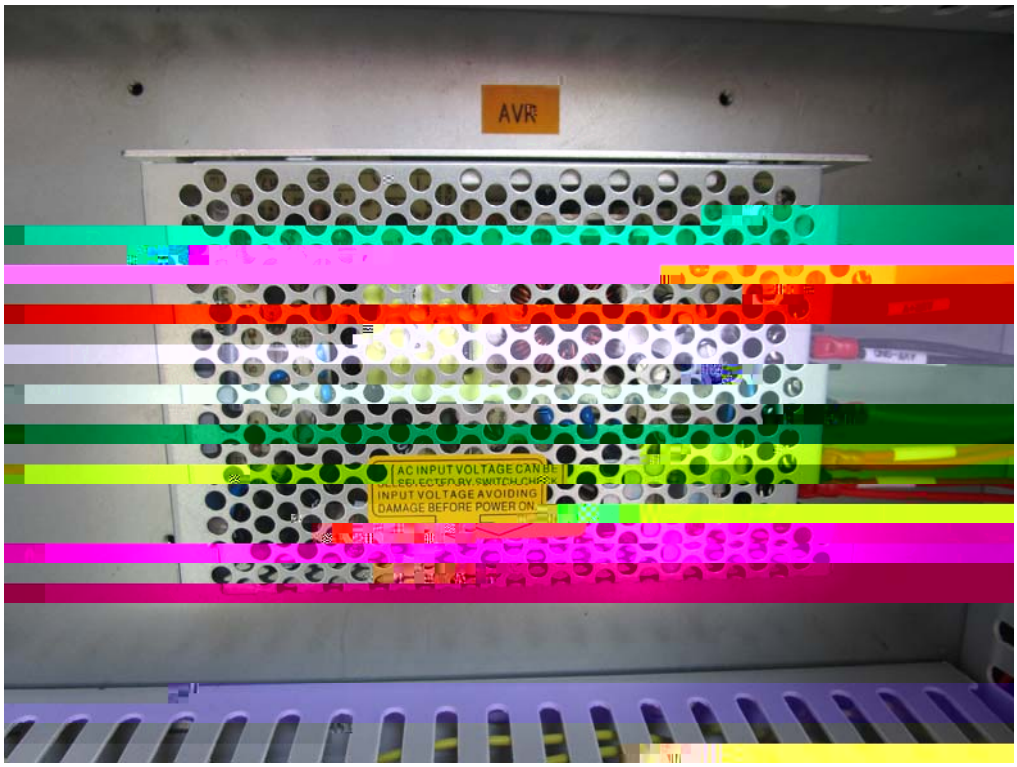
For the actual test configuration, please refer to Appendix II: Photographs of the Test Configuration.

3.3.7.4 Test Result

Test Mode	Voltage Reduction	Duration (ms)	Times	Interval (Sec)	Observation	Comply with Criterion
Voltage dips	60%	200	3	10	Note (1)	A
	30%	500	3	10	Note (1)	A
	100%	20	3	10	Note (1)	A
Voltage interruptions	100%	5000	3	10	Note (3)	C

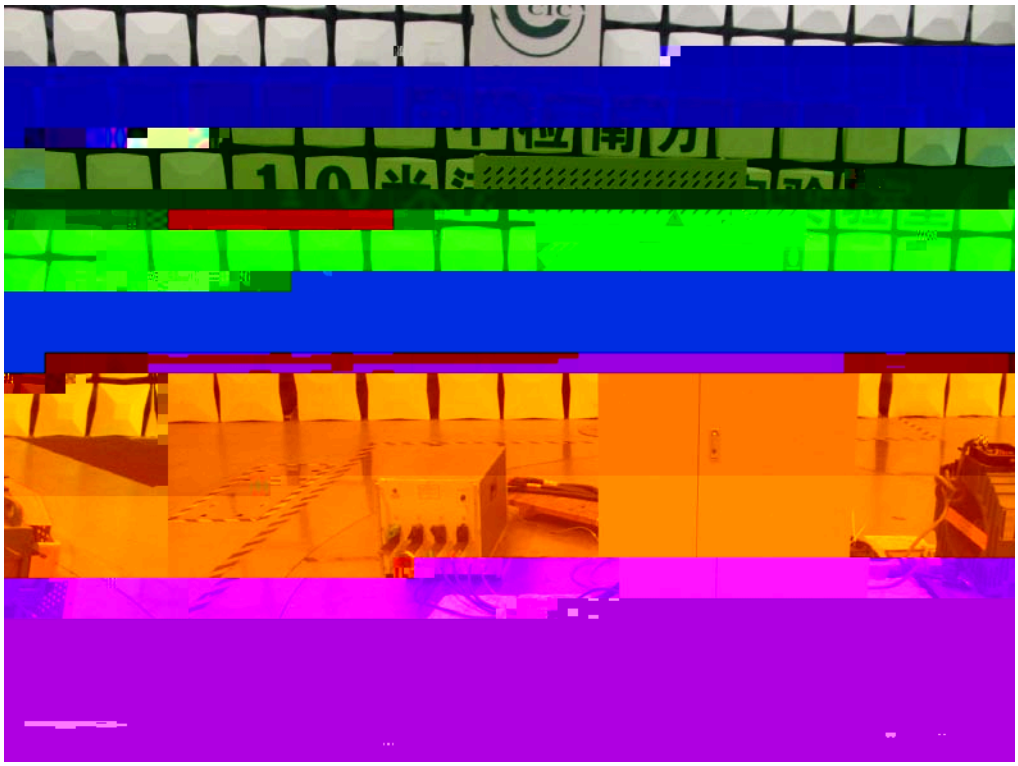



热线
MU_V61
SPG_U6

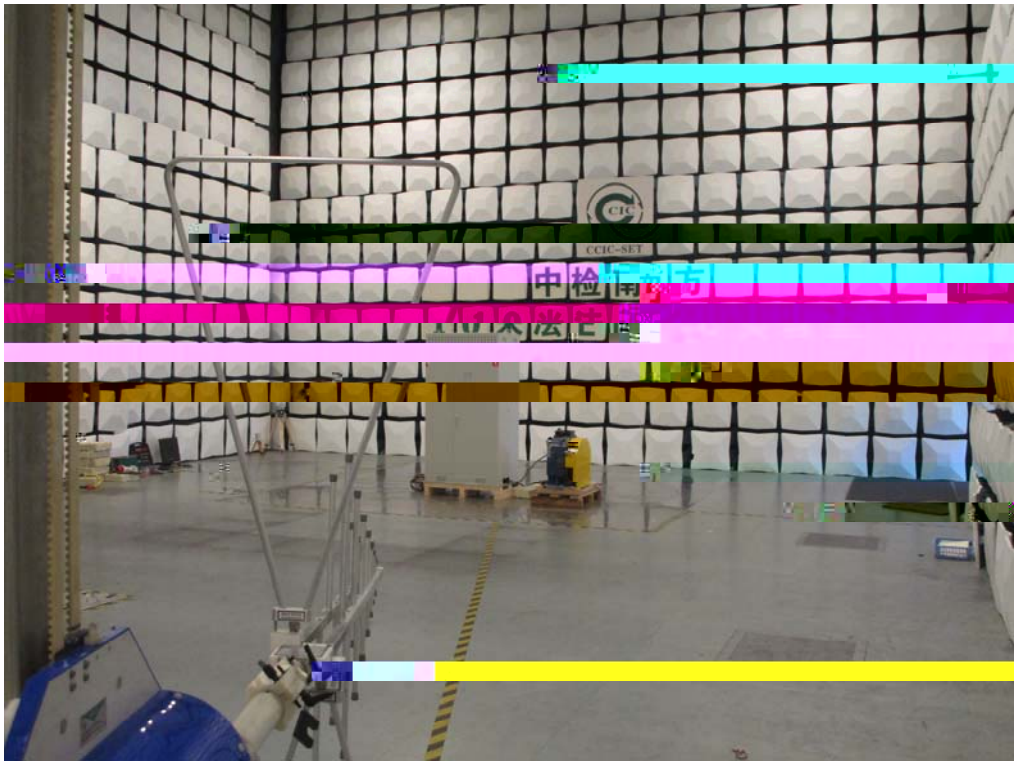

AVR
AC INPUT VOLTAGE CAN BE
INPUT VOLTAGE AVOIDING
DAMAGE BEFORE POWER ON.

Appendix II Photographs of EMC Test Configuration

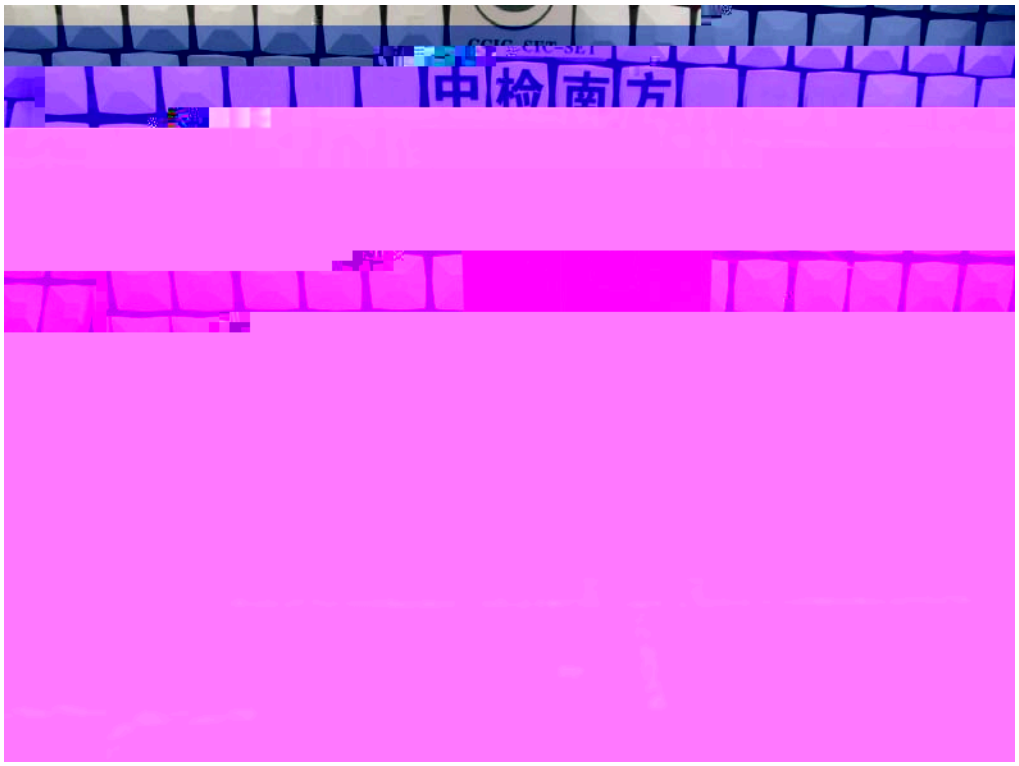
1. Mains Terminal Disturbance Voltage Measurement



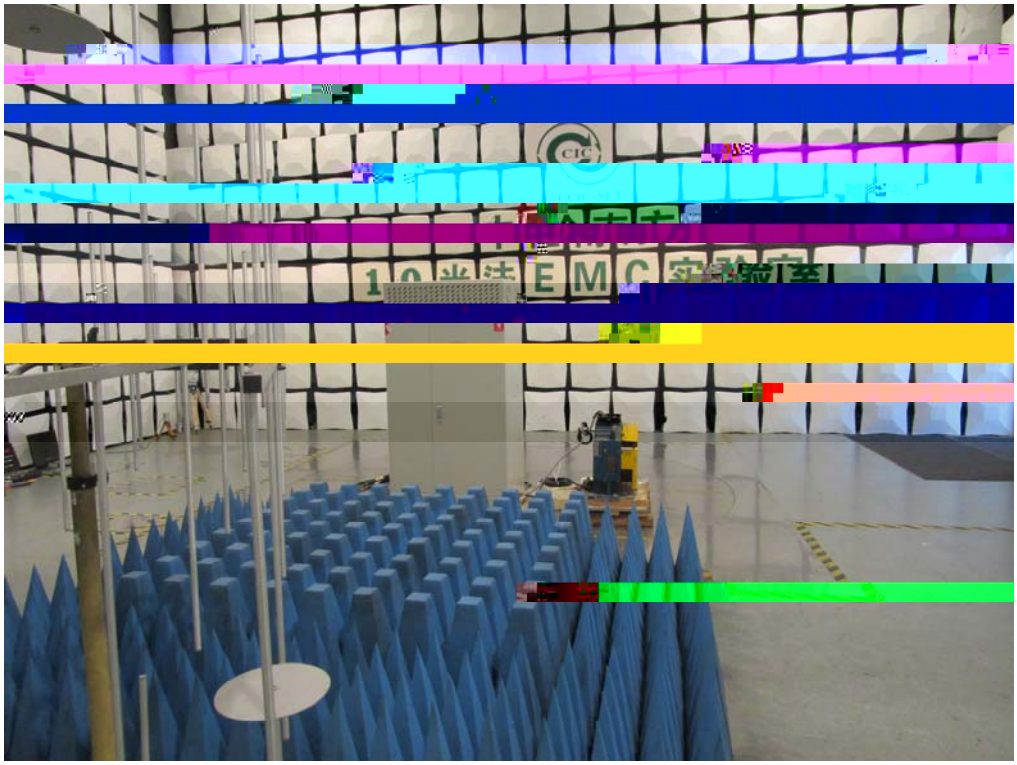
2. Radiated Field Strength Measurement



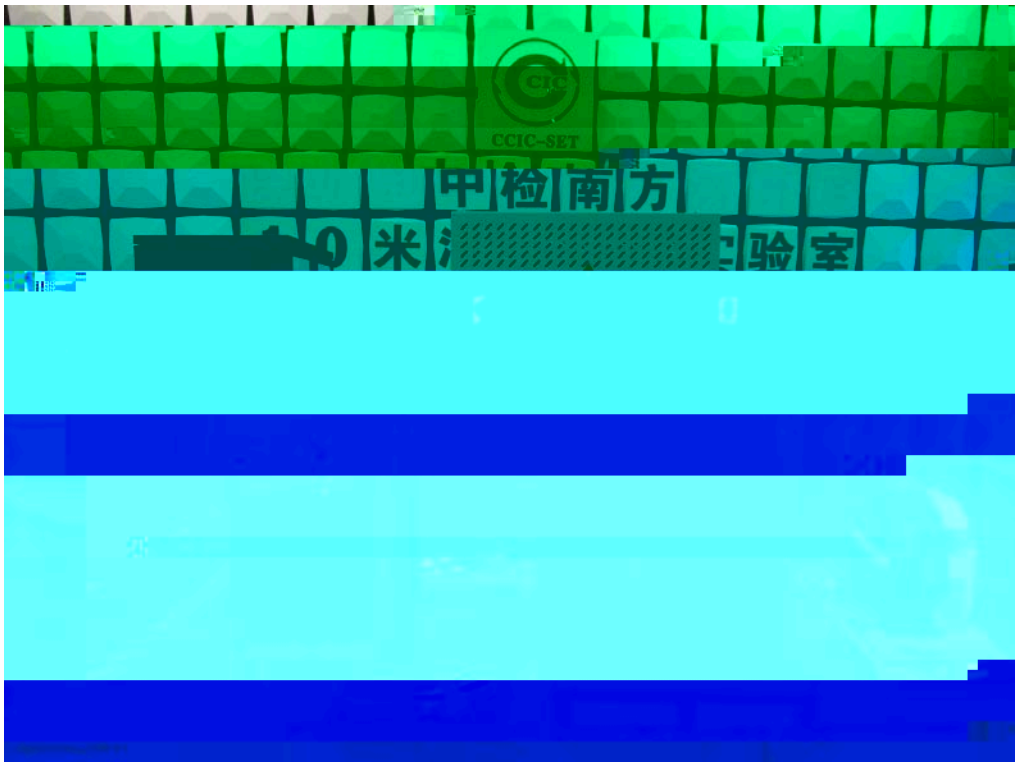
3. Electrostatic Discharge Immunity Test



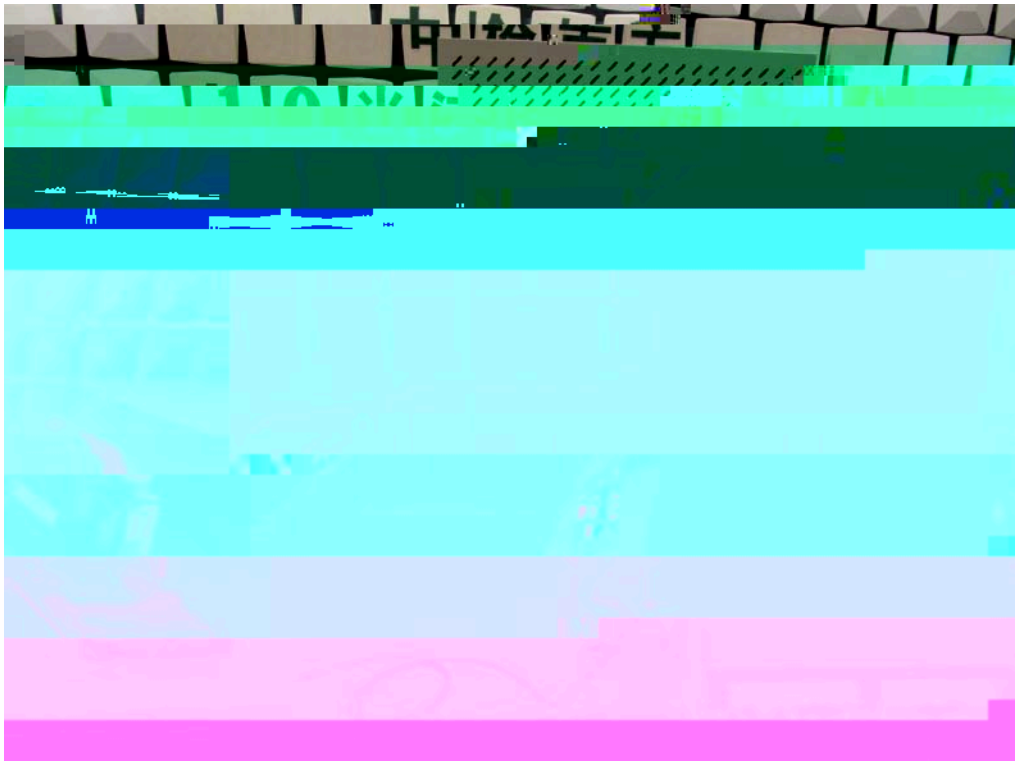
4. Radiated, Radio Frequency Electromagnetic Field Immunity Test



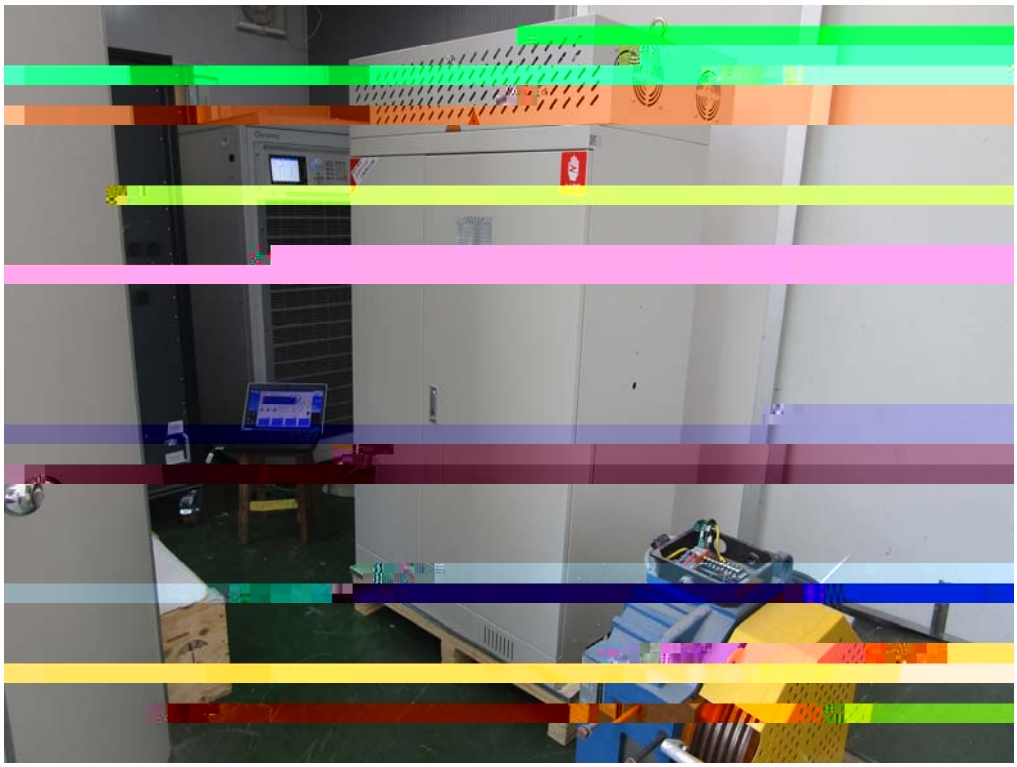
5. Electrical Fast Transient/Burst Immunity Test, Surge Immunity Test



7. Immunity to conducted disturbances induced by RF fields



8. Voltage Dips and Short Interruptions Immunity Test



9. Harmonics Current Measurement and Voltage Fluctuation and Flick Measurement



10. Discontinuous Disturbance, Click



End of report