



Aerospace Testing Technology (Shenzhen) Co., Ltd.

101, Block A4, No. 5, 8th Road, Shapu Yangyong Industrial Park,
Songgang Street, Bao'an District, Shenzhen, Guangdong, China

EMC TEST REPORT

Report No : AST2207202001

Product Name : Hippo-M X Series

Product Model : Hippo-M X Series

Applied Standard : EN IEC 55015:2019/A11:2020
EN 61547:2009

Test Result : PASS

Issue Date : Jul. 07, 2022

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Product Name	: Hippo-M X Series
Tested Model	: Hippo-M X Series
Attached Model	: /
Trademark	: /
Applicant	: Shenzhen Qi Jie Electronics Co.,Ltd
Address	: 2F,1,Buiding 21th,Chuangye RD,Shilongzai Industrial Park saiyan,Baoan District,Shenzhen,GD,China
Manufacturer	: Shenzhen Qi Jie Electronics Co.,Ltd
Address	: 2F,1,Buiding 21th,Chuangye RD,Shilongzai Industrial Park saiyan,Baoan District,Shenzhen,GD,China
Factory	: Shenzhen Qi Jie Electronics Co.,Ltd
Address	: 2F,1,Buiding 21th,Chuangye RD,Shilongzai Industrial Park saiyan,Baoan District,Shenzhen,GD,China
Test date	: Jul. 03, 2022 to Jul. 06, 2022
Remark:	<i>This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Aerospace Testing Technology (Shenzhen) Co., Ltd.</i>

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1. Test Laboratory

Test Site1	
Name	: Aerospace Testing Technology (Shenzhen) Co., Ltd.
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Test Site2	
Name	: Shenzhen Supersonic Measurement And Control Technology Co.,Ltd.
Address	: B2 Building 101, Jinweiyuan Industrial Plant Area, Julongshan District, Longtian Street Industrial Zone, Pingshan District, Shenzhen, Guangdong, China.
Phone	: + 086 0755-84636042
E-mail	: ranguangfu@supersonic-mc.com
Test Site3	
Name	: Shenzhen Academy of Metrology & Quality Inspection
Address	: No.4 Tongfa Road Xili Street Nanshan District, Shenzhen, Guangdong, China.
Phone	: +86 0755-26001833
E-mail	: qiubo@smq.com.cn
Test Report Form	: ASTCX-31-JL03-EN55015 EMC Test Report Ver.1.0
TRF Originator	: Aerospace Testing Technology (Shenzhen) Co., Ltd.
Master TRF	: Jul. 1, 2021

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2. Summary of test result

Test Items	Test site	Result
<u>Radiated Emissions (RE) 9kHz-30MHz</u> <input type="checkbox"/> Enclosure Port	Site 3	N/A
<u>Radiated Emissions (RE) 30MHz-1000MHz</u> <input checked="" type="checkbox"/> Enclosure Port	Site 1	Pass
<u>Radiated Emissions (RE)1000MHz-6000MHz</u> <input type="checkbox"/> Enclosure Port	Site 1	N/A
<u>Conducted Emission (CE)</u> <input type="checkbox"/> Electric power supply interface <input type="checkbox"/> Wired network interfaces other than power supply <input type="checkbox"/> Local wired electric power supply interface of not-restricted ELV lamps <input type="checkbox"/> Local wired port other than electric power supply interface of ELV lamps	Site 1	N/A
<u>Electrostatic Discharge (ESD)</u> <input type="checkbox"/> Enclosure Port	Site 2	N/A
<u>RF Electromagnetic Field (RS)</u> <input type="checkbox"/> Enclosure Port	Site 2	N/A
<u>Power frequency magnetic fields (PMF)</u> <input type="checkbox"/> Enclosure Port	Site 2	N/A
<u>Fast Transients Common mode (EFT)</u> <input type="checkbox"/> AC Power ports <input type="checkbox"/> DC Power ports <input type="checkbox"/> Signal and control lines	Site 2	N/A
<u>RF Common mode (CS)</u> <input type="checkbox"/> AC Power ports <input type="checkbox"/> DC Power ports <input type="checkbox"/> Signal and control lines	Site 2	N/A
<u>Surges</u> <input type="checkbox"/> AC Power ports	Site 2	N/A
<u>Voltage Dips and Interruptions (AC DIP)</u> <input type="checkbox"/> AC Power ports	Site 2	N/A

Note:

- test case does not apply to the test object.....: N/A
- test object does meet the requirement.....: Pass
- test object does not meet the requirement: Fail

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3. Equipment Under Test information

Rating Voltage	: 24.0V $\overline{\text{---}}$ 5.0A
Rating Current	: /
Test Voltage	: 24Vdc
The difference of the models	: /

Table 3-1 Test Mode List

Test Mode	Describe
TM1	Normal Working
/	/
/	/



Figure 1-1 Test configuration

Table 3-2 Associated Equipment used during test

Name	Model	Manufacturer	S/N	Cal Due Date
Lamp with	/	Provided by entrusting Party	/	/

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4. Test Condition

4.1 Environmental conditions

- Temperature : 23°C
- Relative humidity: 60%

4.2 Measurement uncertainty

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

Table 4-1 measurement uncertainty

Test Site	Measurement Frequency Range	U (dB)
SR843-1	9 kHz ~ 30MHz	2.9
	150 kHz ~ 30MHz	3.2
SAC966-1	9 kHz ~ 30MHz	3.1
	30MHz ~ 1000MHz	3.4
	1000MHz ~ 6000MHz	3.2

5. Electromagnetic Interference (EMI)

5.1 Radiated Disturbance 9kHz to 30MHz

5.1.1 Test procedure

The EUT was configured as described in section 1 for this test and the test performed at worst emission state.

The set-up and test methods were according to CISPR 16-2-3.

5.1.2 Test setup

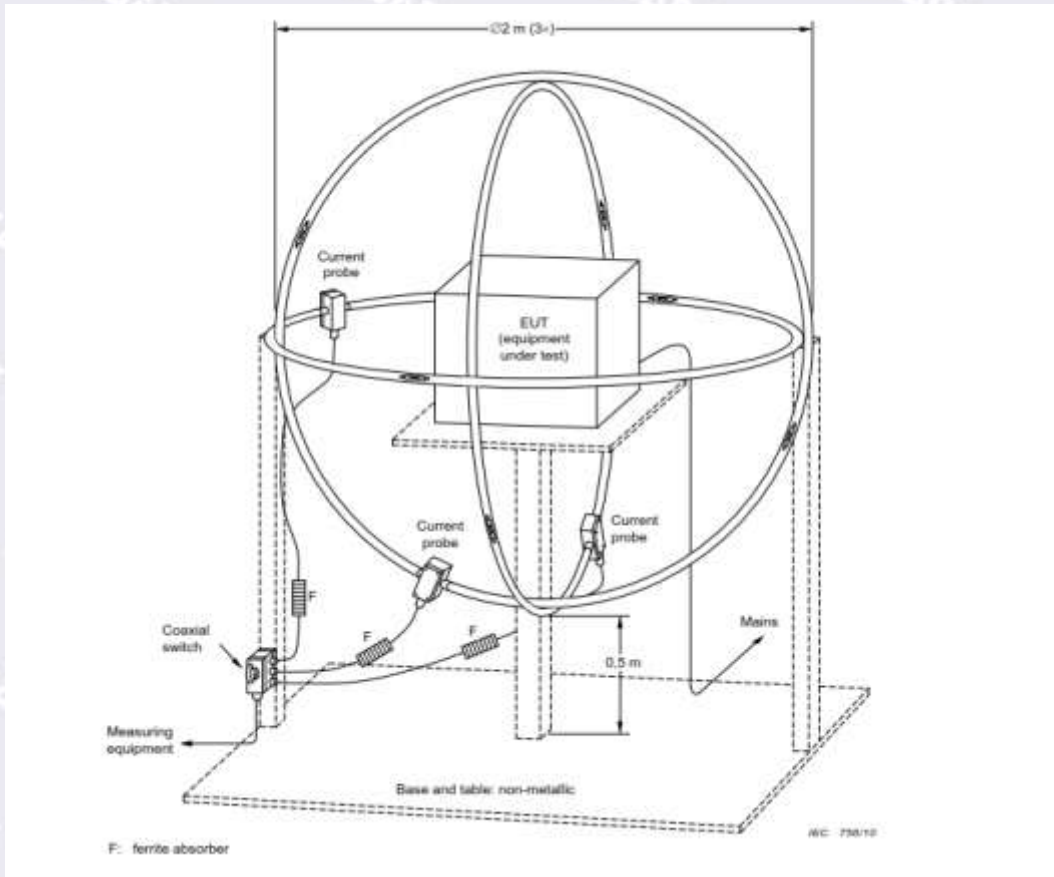


Figure 5-1 Test set-up of magnetic field test

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5.1.3 Test limits

Table 5-1 Test Limits of Radiated Disturbance 9kHz to 30MHz

Frequency range	Limit dB μ A	
	Horizontal component Quasi-peak	Vertical component Quasi-peak
9 kHz to 70 kHz	88	88
70 kHz to 150 kHz	88 to 58	88 to 58
150 kHz to 3 MHz	58 to 22	58 to 22
3MHz to 30MHz	22	22

Note: The three loop diameters is 2m.

5.1.4 Test results

Remark:

Level= Reading Level + Factor.

Correction Factor= Loop Antenna Factor + Cable Loss.

(The Reading Level is recorded by software which is not shown in the sheet).

Margin=Limit – Level.

N/A

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5.2 Radiated Disturbance 30MHz to 1000MHz

5.2.1 Test procedure

The EUT was configured as described in section 1 for this test. The enclosure port was tested.

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.4 and CISPR 16-1-4. The test distance was 3m for 30~1GHz.

The set-up and test methods were according to CISPR 16-2-3.

A preliminary scan and a final scan of the emissions were made from 30MHz to 1GHz by using test script of software; the emissions were measured using Quasi-Peak Detector. The maximal emission value was acquired by adjusting the antenna height, polarization and turntable azimuth in accordance with the software setup. Normally, the height range of antenna was 1m to 4m, the azimuth range of turntable was 0° to 360°, The receive antenna has two polarizations V and H.

5.2.2 Test method

- a) According as the EUT information, Configured the ports and powered the EUT with the normal voltage.
- b) The EUT was placed on the top of a table 0.8 meters above the ground at 3-meter SAC as figure 5-2 or 0.12m above the ground at 3-meter SAC as figure 5-3.
- c) The measuring distance of at 3m shall be used for measurements at frequency up to 1GHz.
- d) The polarizations of the antenna were set to horizontal.
- e) The height of the test antenna was 1m.
- f) The turn table was rotating from 0° to 360° and the test receiver pre-scan.
- g) Change the height of the test antenna from 1m to 4m, then repeated f) and recorded and save the maximum value.
- h) Select six points have little margin from limit and finally reading.
- i) Recording the maximum value, and the deg. and the height of the test antenna.
- j) Change the polarizations to vertical and repeated the e) to i).

5.2.3 Test setup

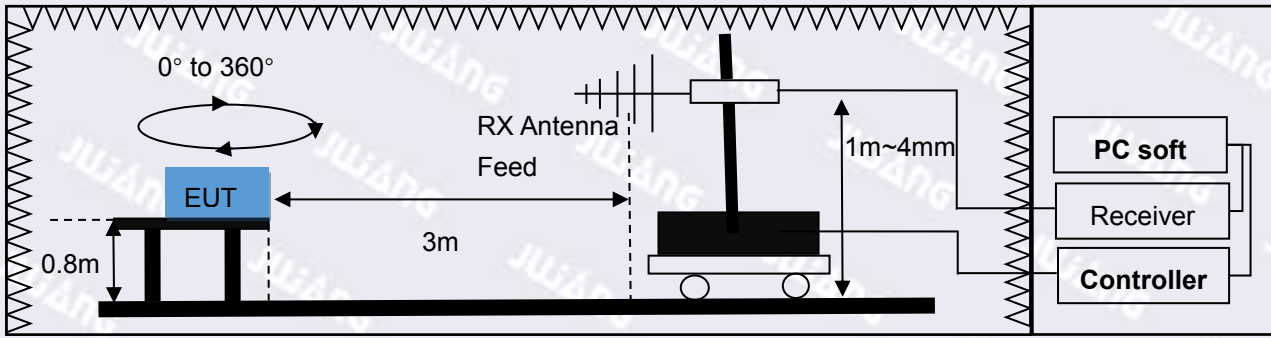


Figure 5-2 Test set-up of radiated disturbance(30MHz-1GHz)

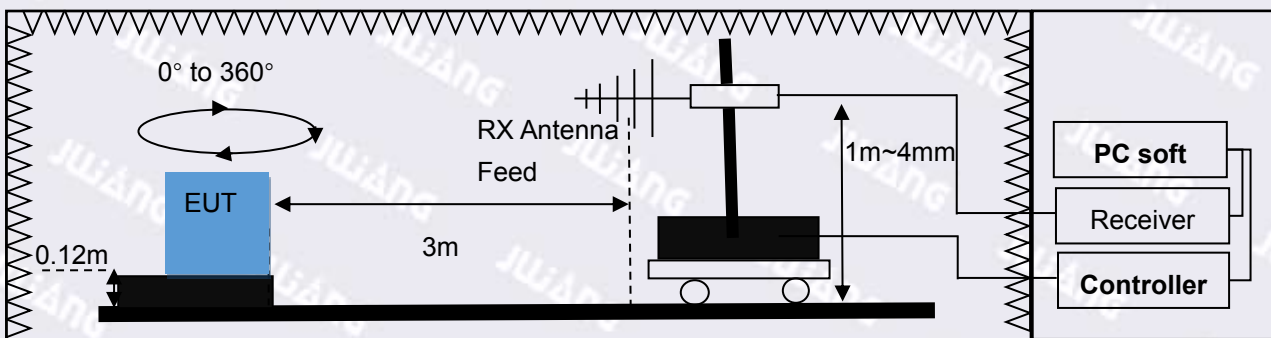


Figure 5-3 Test set-up of radiated disturbance(30MHz-1GHz)

5.2.4 Test limits

Table 5-2 RE test limits 30MHz to 1000MHz

Frequency (MHz)	QP dB μ V/m
30 to 230	40
230 to 1000	47

Note 1: Test distance is 3m.
 Note 2: The lower limit shall apply at the transition frequency.

5.2.5 Test results

The EUT has met requirements for Radiated disturbance. The test data as follow:

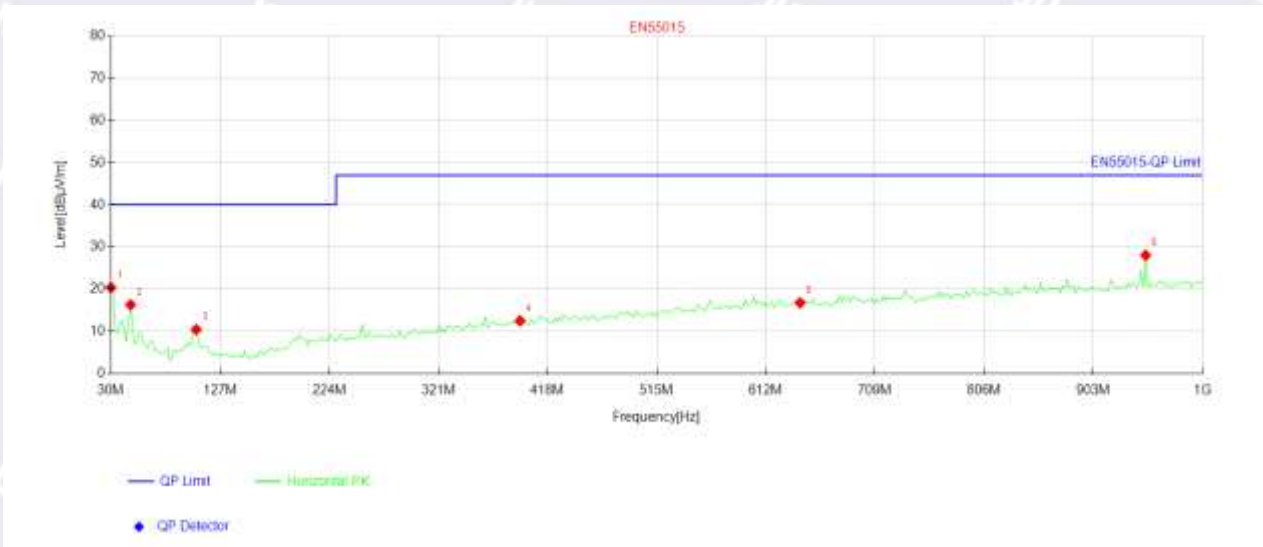
Remark:

Level= Reading Level + Factor,

Factor= Cable Loss +Antenna Factor – Amplifier,

(The Level is recorded by software which is not shown in the sheet).

Margin=Limit – Level.



Suspected Test Data									
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Factor [dB]	Height [cm]	Angle [°]	Polarity	Result
1	30	20.37	40.00	19.63	-33.17	200	252	Horizontal	PASS
2	47.495	16.30	40.00	23.70	-31.34	200	22	Horizontal	PASS
3	105.8116	10.42	40.00	29.58	-32.75	100	359	Horizontal	PASS
4	393.507	12.48	47.00	34.52	-27.00	200	344	Horizontal	PASS
5	642.3246	16.75	47.00	30.25	-21.87	100	358	Horizontal	PASS
6	949.4589	28.02	47.00	18.98	-17.12	100	204	Horizontal	PASS

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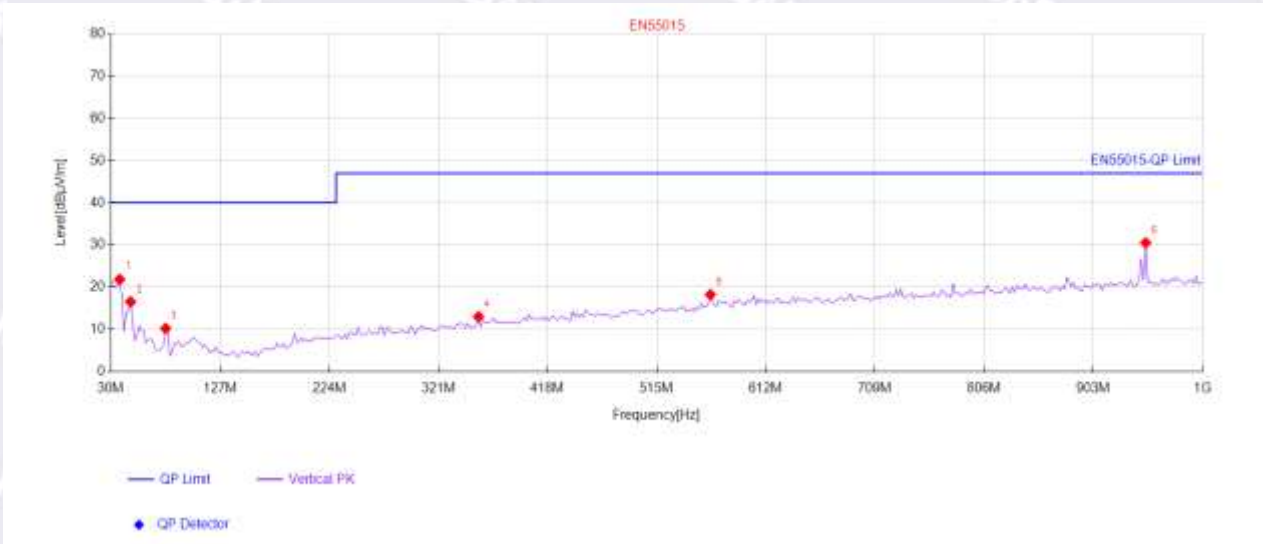
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Suspected Test Data									
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Factor [dB]	Height [cm]	Angle [°]	Polarity	Result
1	37.7756	21.81	40.00	18.19	-32.41	100	356	Vertical	PASS
2	47.495	16.52	40.00	23.48	-31.34	100	322	Vertical	PASS
3	78.5972	10.20	40.00	29.80	-36.23	100	360	Vertical	PASS
4	356.5731	13.00	47.00	34.00	-27.99	100	86	Vertical	PASS
5	562.6253	18.22	47.00	28.78	-23.23	100	360	Vertical	PASS
6	949.4589	30.50	47.00	16.50	-17.12	200	156	Vertical	PASS

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5.3 Radiated Disturbance 1000MHz to 6000MHz

5.3.1 Test procedure

The EUT was configured as described in section 1 for this test. The enclosure port was tested.

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.4 and CISPR 16-1-4. The test distance was 3m for 1000MHz~6000MHz.

The set-up and test methods were according to CISPR 16-2-3.

A preliminary scan and a final scan of the emissions were made from 1000MHz to 6000MHz by using test script of software; the emissions were measured using Quasi-Peak Detector. The maximal emission value was acquired by adjusting the antenna height, polarization and turntable azimuth in accordance with the software setup. Normally, the height range of antenna was 1m to 4m, the azimuth range of turntable was 0° to 360°, The receive antenna has two polarizations V and H.

5.3.2 Test method

- a) According as the EUT information, Configured the ports and powered the EUT with the normal voltage.
- b) The EUT was placed on the top of a table 0.8 meters above the ground at 3-meter SAC as figure 5-4 or 0.12m above the ground at 3-meter SAC as figure 5-5.
- c) The measuring distance of at 3m shall be used for measurements at frequency 1000MHz-6000MHz.
- d) The polarizations of the antenna were set to horizontal.
- e) The height of the test antenna was 1m.
- f) The turn table was rotating from 0° to 360° and the test receiver pre-scan.
- g) Change the height of the test antenna from 1m to 4m, then repeated f) and recorded and save the maximum value.
- h) Select six points have little margin from limit and finally reading.
- i) Recording the maximum value, and the deg. and the height of the test antenna.
- j) Change the polarizations to vertical and repeated the e) to i).

5.3.3 Test setup

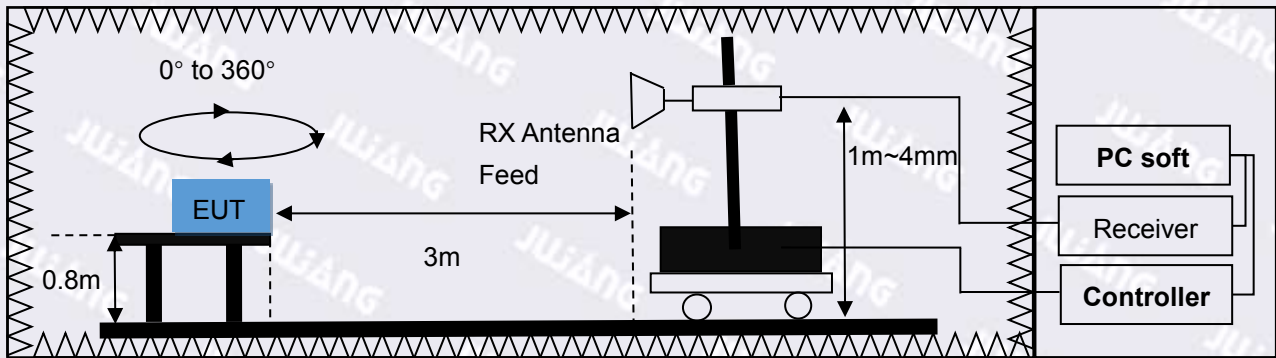


Figure 5-4 Test set-up of radiated disturbance(1000MHz-6000MHz)

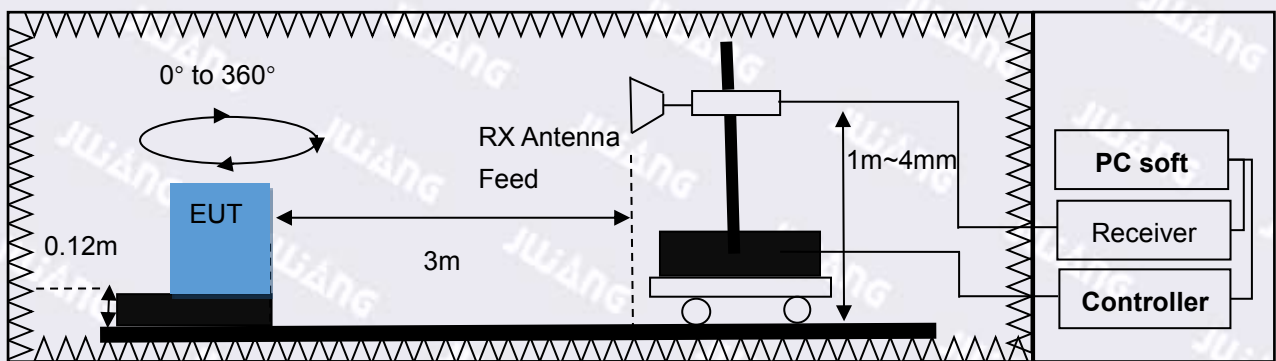


Figure 5-5 Test set-up of radiated disturbance(1000MHz-6000MHz)

5.3.4 Test limits

Table 5-3 RE test limits 1000MHz to 6000MHz

Frequency (MHz)	Peak dB μ V/m	Average dB μ V/m
1000 to 3000	70	50
3000 to 6000	74	54

Note 1: Test distance is 3m.

Note 2: The lower limit shall apply at the transition frequency.

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5.3.5 Test results

The EUT has met requirements for Radiated disturbance. The test data as follow:

Remark:

Level= Reading Level + Factor,

Factor= Cable Loss +Antenna Factor – Amplifier,

(The Level is recorded by software which is not shown in the sheet).

Margin=Limit – Level.

N/A

5.4 Conducted Disturbance 9 kHz to 30MHz

5.4.1 Test procedure

The EUT was configured as described in section 1 for this test. The mains cable of the EUT being measured shall be connected to LISN, The LISN shall be placed 0.8m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8m from the LISN.

All telecommunication and signal ports must be correctly terminated using either appropriate associated equipment or a representative termination during the measurement of the conducted disturbances at the mains.

Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of same length as the mains cable and run parallel to the mains connection at a separation distance of not more than 0.1m.

The set-up and test methods were according to CISPR 16-2-3.

5.4.2 Test setup

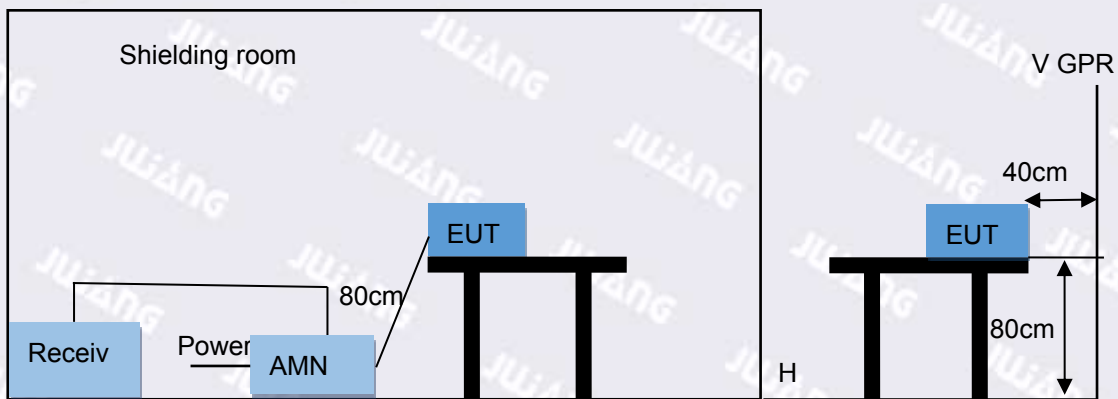


Figure 5-6 Test set-up of conducted disturbance for power port

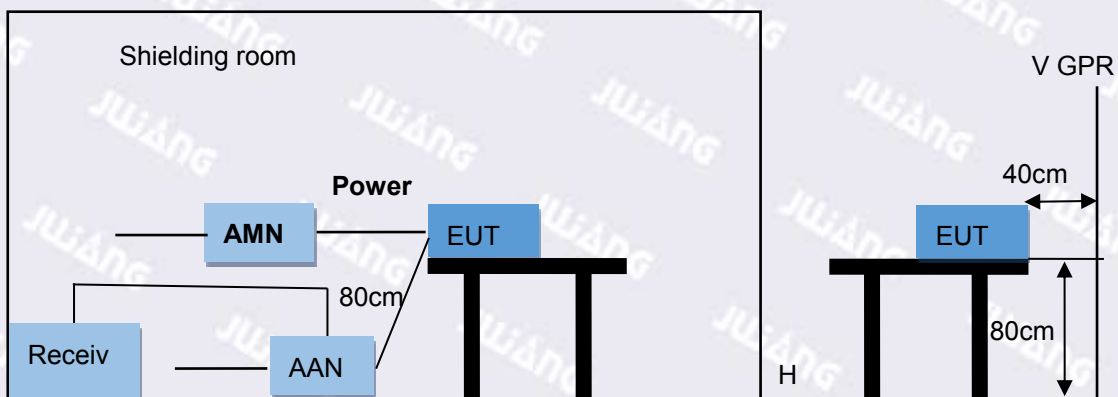


Figure 5-7 Test set-up of conducted disturbance for wired network ports

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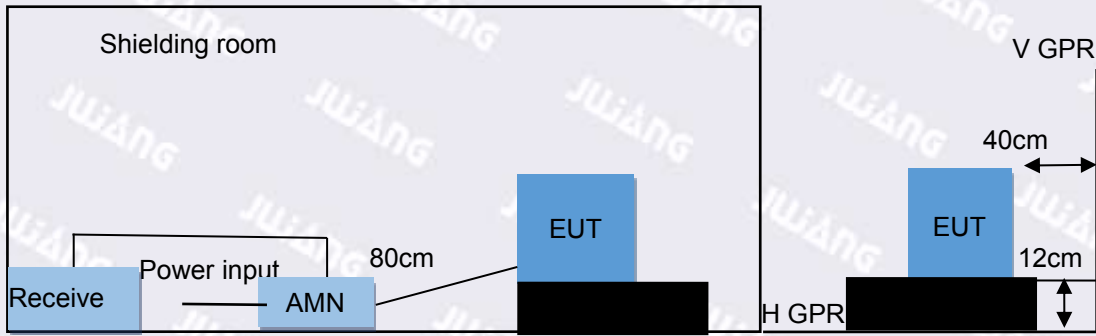


Figure 5-6 Test set-up of conducted disturbance for power port

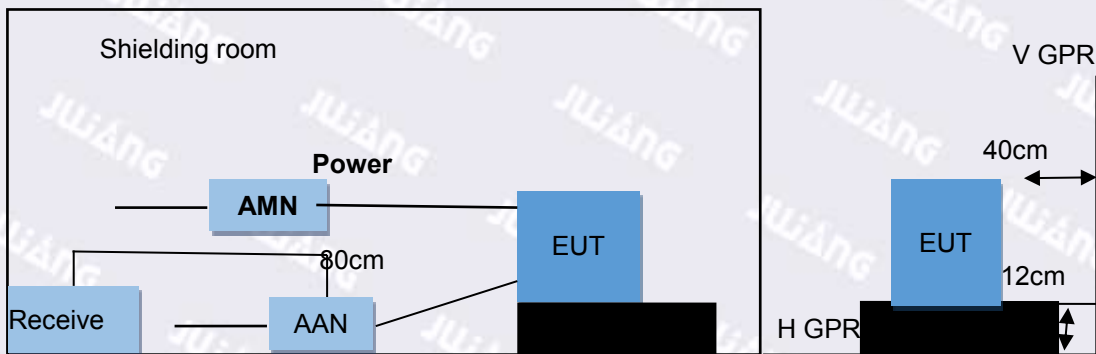


Figure 5-7 Test set-up of conducted disturbance for wired network ports

5.4.3 Test limits

Table 5-4 Test Limit of Electric power supply interface

Frequency range	Voltage limits	
	QP	AV
9 kHz to 50 kHz	110dBuV	--
50 kHz to 0.15MHz	90-80dBuV	--
0.15MHz~0.5MHz	66-56dBuV	56-46dBuV
0.5MHz~5MHz	56dBuV	46dBuV
5MHz~30MHz	60dBuV	50dBuV

Table 5-5 Test Limit of Wired network interfaces other than power supply

Frequency range	Voltage limits		Current limits	
	QP	AV	QP	AV
0.15MHz~0.5MHz	84-74dBuV	74-64dBuV	40-30 dB μ A	30-20 dB μ A
0.5MHz~30MHz	74dBuV	64dBuV	30 dB μ A	20 dB μ A

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Table 5-6 Test Limit of Local wired electric power supply interface of not-restricted ELV lamps

Frequency range	Voltage limits	
	QP	AV
9 kHz to 50 kHz	136dBuV	--
50 kHz to 0.15MHz	116-106dBuV	--
0.15MHz~0.5MHz	92-82dBuV	82-72dBuV
0.5MHz~5MHz	82dBuV	72dBuV
5MHz~30MHz	86dBuV	76dBuV

Table 5-7 Test Limit of Local wired port other than electric power supply interface of ELV lamps

Frequency range	Voltage limits		Current limits	
	QP	AV	QP	AV
0.15MHz~0.5MHz	80dBuV	70dBuV	40-30 dB μ A	30-20 dB μ A
0.5MHz~30MHz	74dBuV	64dBuV	30 dB μ A	20 dB μ A
0.5MHz~30MHz	74dBuV		64dBuV	

5.4.4 Test results

Remark:

Level= Reading Level + Correction Factor

Factor= Cable Loss + Factor

(The Reading Level is recorded by software which is not shown in the sheet)

Margin=Limit – Level.

N/A

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6. Electromagnetic Susceptibility (EMS)

6.1 Performance criteria

Performance criterion A:

During the test, no change of the luminous intensity shall be observed and the regulating control, if any, shall operate during the test as intended.

Performance criterion B:

During the test, the luminous intensity may change to any value. After the test, the luminous intensity shall be restored to its initial value within 1 min. Regulating controls need not function during the test, but after the test, the mode of the control shall be the same as before the test provided that during the test no mode changing commands were given.

Performance criterion C:

During and after the test, any change of the luminous intensity is allowed and the lamp(s) may be extinguished. After the test, within 30 min, all functions shall return to normal, if necessary by temporary interruption of the mains supply and/or operating the regulating control.

Additional requirement for lighting equipment incorporating a starting device: After the test, the lighting equipment is switched off. After half an hour, it is switched on again. The lighting equipment shall start and operate as intended.

6.2 Immunity to Electrostatic Discharge

6.2.1 Test procedure

The EUT was configured as described in section 1 for this test. The set-up and test methods were according to IEC 61000-4-2. Twenty discharges (10 with positive and 10 with negative polarity) were be applied on each accessible metallic part of the enclosure (terminals were excluded). Air discharges were used where contact discharges cannot be applied. Discharges were applied on the horizontal or vertical coupling planes.

6.2.2 Test setup

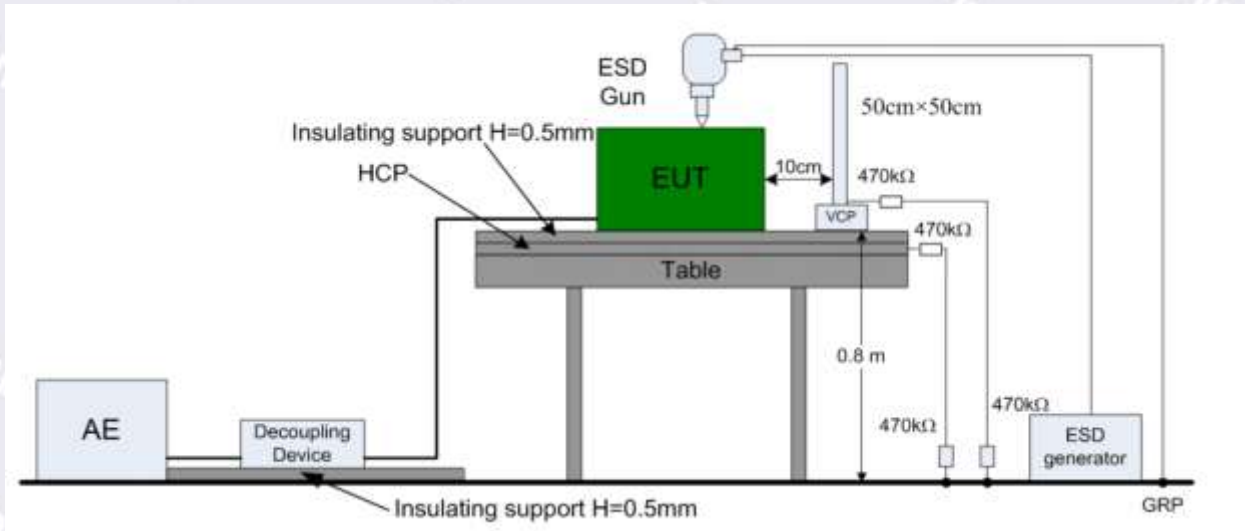


Figure 6-1 Test set-up of electrostatic discharge

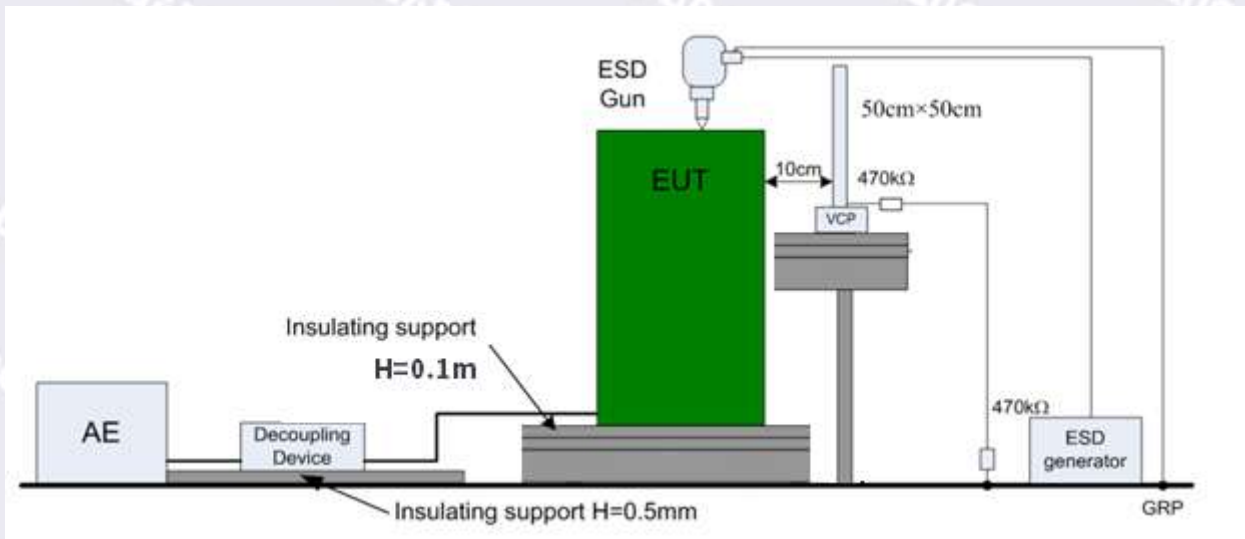


Figure 6-2 Test set-up of electrostatic discharge

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6.2.3 Test levels

Table 6-1 Electrostatic discharges levels

Characteristics	Test levels	Performance Criterion
Contact discharge	±4kV	B
Air discharge	±8kV	B

6.2.4 Test results

Details of the points tested were presented in below:

Test Results						
Test Points	Specification Level				Criterion	Conclusion
	±2kV, ±4 kV Contact Discharges		±2 kV, ±4 kV, ±8 kV Air Discharges			
	Positive	Negative	Positive	Negative		
Indirect Contact						
Indirect Contact, HCP (left, right, front, rear)	√	√	N/A	N/A	B	Pass
Indirect Contact, VCP (left, right, front, rear)	√	√	N/A	N/A	B	Pass
Direct Contact/ Air Contact						
Housing	√	√	√	√	B	Pass
Gaps	N/A	N/A	√	√	B	Pass
Buttons	√	√	N/A	N/A	B	Pass
Note: <input checked="" type="checkbox"/> The EUT's performance was paired at this test point when the ESD pulse was applied.						

6.3 Immunity to Radiated Electric Fields 80MHz to 1000MHz

6.3.1 Test procedure

The EUT was configured as described in section 1 for this test. The set-up and test methods were according to IEC 61000-4-3. All sides of the EUT (front, rear, left and right) were tested by antenna with vertical and horizontal polarization.

6.3.2 Test setup

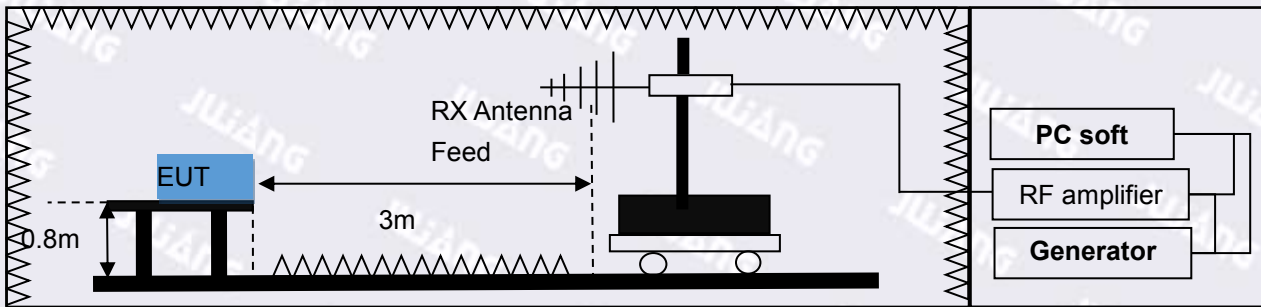


Figure 6-3 Test set-up of Immunity to Radiated Electric Fields (80MHz-1000MHz)

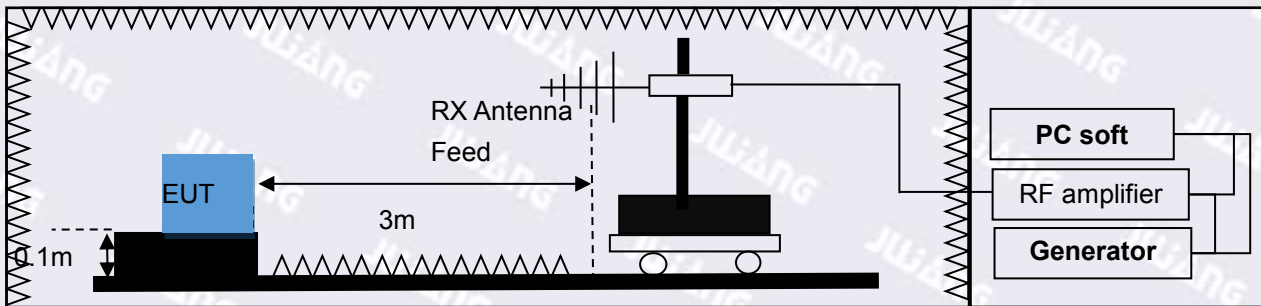


Figure 6-4 Test set-up of Immunity to Radiated Electric Fields (80MHz-1000MHz)

6.3.3 Test levels

Table 6-2 Radiated Electric Fields levels

Characteristics	Test levels	Performance Criterion
Frequency range	80MHz to 1000MHz	A
Test level	3V/m (unmodulated)	
Modulation	1 kHz, 80% AM, sine wave	

6.3.4 Test results

Test Results	
Test side of EUT	Front, Rear, Left, Right
Criterion	A
Frequency range	80MHz –1000MHz
Test Level	3 V/m(Unmodulated, rms.)
Modulation	80% AM, 1kHz
Conclusion	Pass

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6.4 Immunity of Power frequency magnetic fields

6.4.1 Test procedure

The EUT was configured as described in section 1 for this test. The set-up and test methods were according to IEC 61000-4-8 and need only to be applied to equipment containing components susceptible to magnetic fields, such as Hall elements or magnetic field sensors. In case of mains-operated devices, the test frequency shall be locked to the mains frequency. All sides of the EUT (front, rear, left and right) were tested by antenna with vertical and horizontal polarization.

6.4.2 Test setup

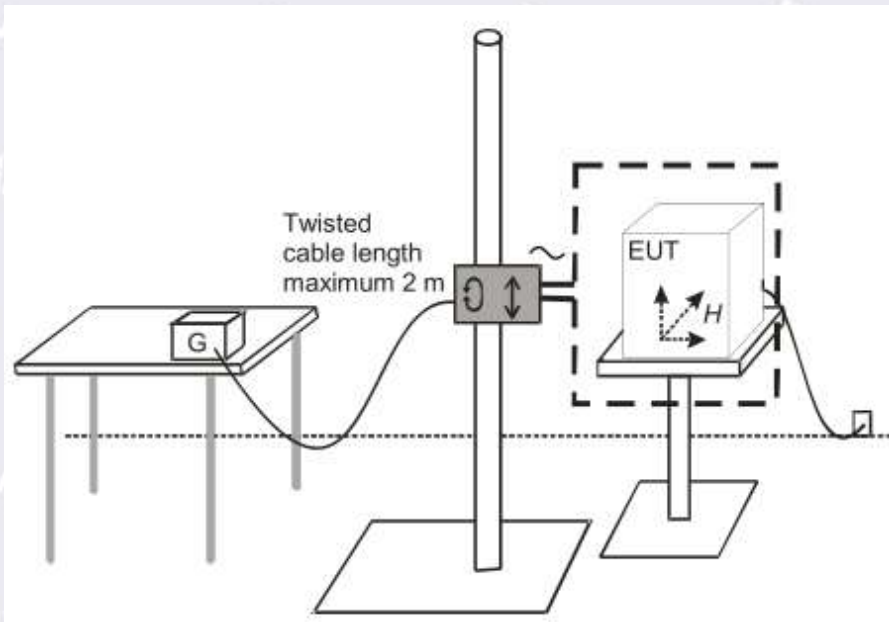


Figure 6-5 Test set-up of Immunity of Power frequency magnetic fields

6.4.3 Test levels

Table 5-3 Power frequency magnetic fields levels

Characteristics	Test levels
Field Frequency	50Hz/60Hz
Antenna Polarization	vertical and horizontal
Performance Criterion	A
Test level	3A/m

6.4.4 Test results

Test Results of Radiated Electric Fields	
Test side of EUT	Front, Rear, Left, Right
Antenna Polarization	vertical and horizontal
Criterion	A
Field Frequency	50Hz/60Hz
Test level	3A/m
Conclusion	Pass

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6.5 Immunity to Electrical Fast Transient Bursts

6.5.1 Test procedure

The EUT was configured as described in section 1 for this test. A series of Fast Transient Bursts meeting the specification were applied for a period of 120 seconds. The Transient Bursts were applied for both Positive and Negative Burst Trains to Power Port. The set-up and test methods were according to IEC 61000-4-4.

6.5.2 Test setup

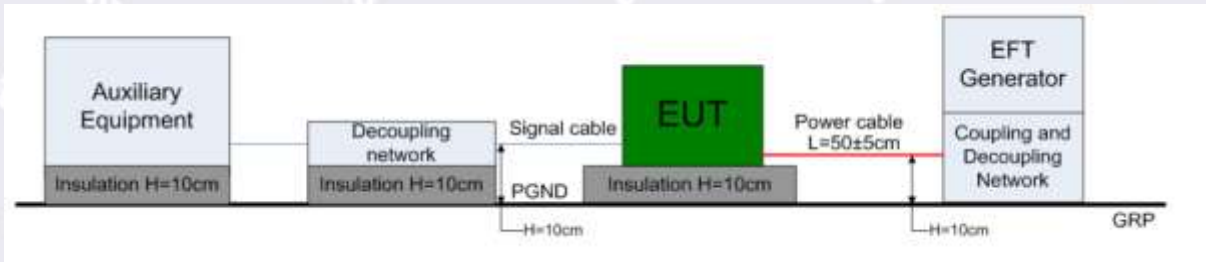


Figure 6-6 Test set-up of immunity to electrical fast transient bursts

6.5.3 Test levels

Table 6-4 Fast transients test levels for AC power ports

Characteristics	Test levels
Test Level	$\pm 1\text{kV}$ (peak)
Rise time/hold time	5/50 ns
Repetition frequency	5kHz
Performance Criterion	B

Table 6-5 Fast transients test levels for DC power ports

Characteristics	Test levels
Test Level	$\pm 0.5\text{kV}$ (peak)
Rise time/hold time	5/50 ns
Repetition frequency	5kHz
Performance Criterion	B

Table 6-6 Fast transients test levels for signal and control lines

Characteristics	Test levels
Test Level	$\pm 0.5\text{kV}$ (peak)
Rise time/hold time	5/50 ns
Repetition frequency	5kHz
Performance Criterion	B

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6.5.4 Test results

Test Results of Electrical Fast Transient Bursts				
Ports	Measuring condition Couple mode	Description	Criterion	Conclusion
AC Power Port	L-Ref G, N-Ref G, L+N-Ref G Level: $\pm 1.0\text{kV}$, Tr/ Th: 5/50ns, 5kHz Test Duration: 120 seconds	No fail detected	B	Pass
DC Power Port	(DC+) - Ref G, (DC-) - Ref G, (DC+) + (DC-) - Ref G Level: $\pm 0.5\text{kV}$, Tr/ Th: 5/50ns, 5kHz Test Duration: 120 seconds	N/A	B	N/A
Signal and control lines	Lines-Ref G Level: $\pm 0.5\text{kV}$, Tr/ Th: 5/50ns, 5kHz Test Duration: 120 seconds	N/A	B	N/A

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6.6 Immunity to Continuous Conducted Interference 0.15MHz to 80MHz

6.6.1 Test procedure

The EUT was configured as described in section 1 for this test. The applied level was Amplitude Modulated by a 1 kHz sinusoidal signal to a modulation depth of 80%. The set-up and test methods were according to IEC 61000-4-6.

6.6.2 Test setup

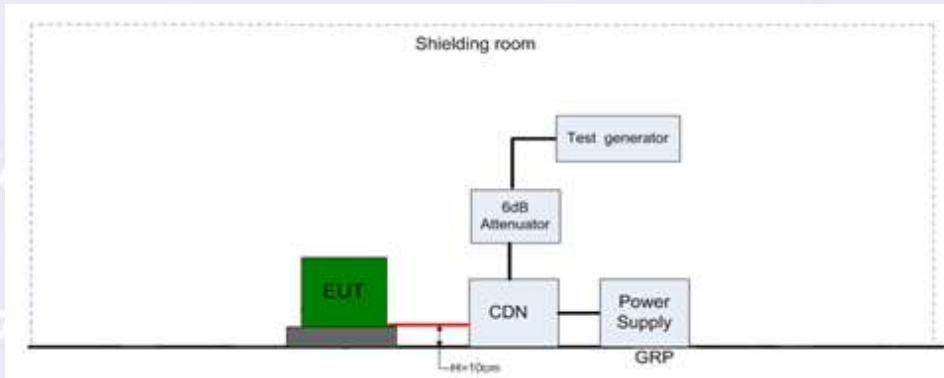


Figure 6-7 Test set-up of immunity to continuous conducted interference

6.6.3 Test levels

Table 6-7 Continuous Conducted Interference

Characteristics	Test levels
Frequency range	0.15MHz to 80MHz
Test levels	3V r.m.s. (unmodulated)
Modulation	1kHz, 80% AM, sine wave
Source impedance	150Ω
Performance Criterion	A

6.6.4 Test results

Test Results of Continuous Conducted Interference					
Ports	Measuring condition	Inject method	Description	Criterion	Conclusion
AC Power Port	Frequency range: 0.15 MHz to 80 MHz Induced voltage :3 V (r.m.s.)	CDN M3	No fail detected	A	Pass
DC Power Port	Frequency range: 0.15 MHz to 80 MHz Induced voltage :3 V (r.m.s.)	CDN M2	N/A	A	N/A
Signal and control lines	Frequency range: 0.15 MHz to 80 MHz Induced voltage :3 V (r.m.s.)	EM Clamp	N/A	A	N/A

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6.7 Immunity to Surges

6.7.1 Test procedure

The EUT was configured as described in section 1 for this test. A series of High Energy Surges were applied to Power Port. The set-up and test methods were according to IEC 61000-4-5. Five positive polarity pulses at the 90° phase angle, five negative polarity pulses at the 270° phase angle.

6.7.2 Test setup

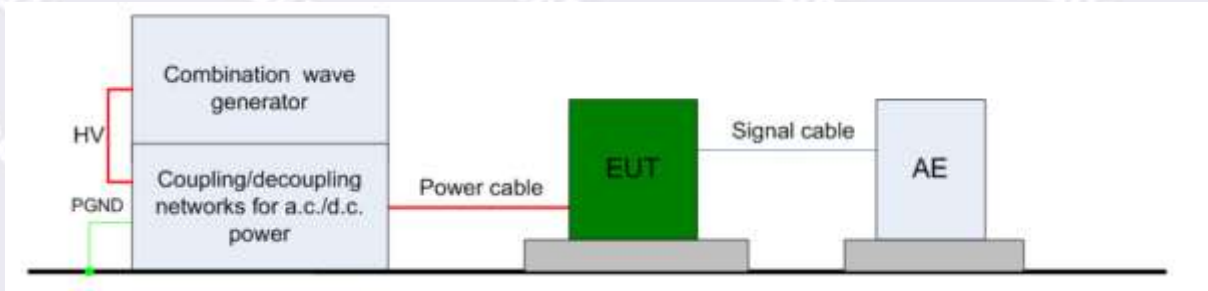


Figure 6-8 Test set-up of immunity to surge

6.7.3 Test levels

Table 6-8 Surge test levels for AC power ports

Test line	Test levels			Wave shape	Performance Criterion
	Self-ballasted lamps and semi-luminaires	Luminaires and independent auxiliaries			
		≤25W	>25W		
Line to Line	±0.5kV	±0.5kV	±1kV	1.2/50us	B
Line to ground	±1kV	±1kV	±2kV	1.2/50us	B

6.7.4 Test results

Test Results of Surges				
Ports	Measuring condition	Description	Criterion	Conclusion
AC Power Port	Line to Line: L-N Level:±1.0kV, Tr/Th:1.2/50µs Interval: 60 seconds Phase: Sync	No fail detected	B	Pass
	Line to ground: L- Ref G,N- Ref G, L+N- Ref G Level:±2.0kV, Tr/Th:1.2/50µs Interval: 60 seconds Phase: Sync	No fail detected	B	Pass

6.8 Immunity to Voltage Dips and Short Interruption of AC Power Port

6.8.1 Test procedure

The EUT was configured as described in section 1 for this test. The set-up and test methods were according to IEC 61000-4-11. Changes to the voltage level shall occur at a zero crossing point in the AC voltage waveform.

6.8.2 Test setup

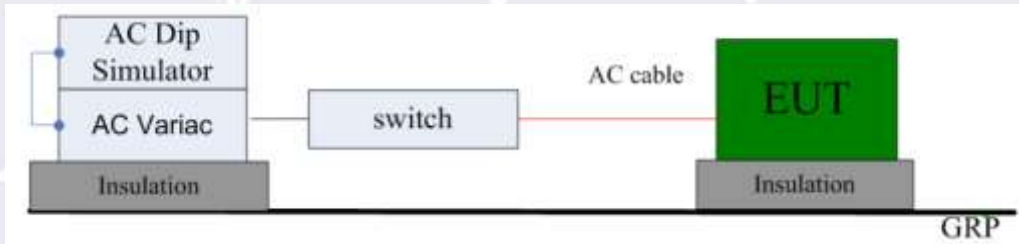


Figure 6-9 test set-up of Voltage Dips and Short Interruption of AC Power Port

6.8.3 Test levels

Table 6-9 Voltage dips

Ports	Test levels	Number of periods	Performance Criterion
AC Power Port	0%	0.5	B
	70%	10	C

6.8.4 Test results

In the case where the equipment is fitted with or connected to a battery back-up, the performance criteria for transient phenomena shall apply.

In the case where the equipment is powered solely from the AC mains supply (without the use of a parallel battery back-up) volatile user data may have been lost and if applicable the communication link need not to be maintained and lost functions should be recoverable by user or operator; no unintentional responses shall occur at the end of the test.

Test Results of Voltage Dips and Short Interruption				
Ports	Measuring condition	Performance Criterion	Description	Conclusion
AC Power Port	Voltage dip: 0 % residual voltage for 0.5 cycles	B	No fail detected	Pass
	Voltage dip: 70 % residual voltage for 10 cycles	C	No fail detected	Pass

7. Measurement Instruments

Table 7-1 RE instruments

Item	Kind of Equipment	Manufacturer	Type No.	Calibrated until
1	EMI Test Receiver	R&S	ESU8	Aug. 24, 2022
2	Bilog Antenna	SCHWARZBECK	VULB 9163	Aug. 24, 2022
3	Horn Antenna	SCHWARZBECK	BBHA9120D	Aug. 24, 2022
4	Amplifier	Tonscend	TAP-9E6343	Aug. 24, 2022
5	Amplifier	Tonscend	TAP-051841	Aug. 24, 2022
6	Triple-Loop Antenna	Daze	ZN30401	Aug. 24, 2022

Table 7-2 CE instruments

Item	Kind of Equipment	Manufacturer	Type No.	Calibrated until
1	EMI Test Receiver	R&S	ESRP3	Aug. 24, 2022
2	LISN	Schwarzbeck	NNLK 8121	Aug. 24, 2022
3	Amplitude limiter	Schwarzbeck	VTSD 9561 F	Aug. 24, 2022

Table 7-3 ESD instruments

Item	Kind of Equipment	Manufacturer	Type No.	Calibrated until
1	ESD TEST GENERATOR	3CTest	EDS 30V	Aug. 24, 2022

Table 7-4 RS instruments

Item	Kind of Equipment	Manufacturer	Type No.	Calibrated until
1	Signal Generator	Keysight	N5181A	Aug. 24, 2022
2	Power Amplifier	Mic-top	MPA-80-1000-1000	Aug. 24, 2022
3	Power meter	Keysight	E4419A	Aug. 24, 2022
3	Power probe	Keysight	E9304A	Aug. 24, 2022
4	Power Amplifier	AR	25S1G4A	Aug. 24, 2022
5	Antenna	Schwarzbeck	STLP9149	Aug. 24, 2022

Table 7-5 EFT, AC-DIP and SURGE instruments

Item	Kind of Equipment	Manufacturer	Type No.	Calibrated until
1	Immunity test	3CTest	CCS 600	Aug. 24, 2022
2	Coupling clamp	3CTest	CCC100	Aug. 24, 2022
3	CDN	3CTest	SEPN3832T	Aug. 24, 2022
4	Voltage regulator	3CTest	VVT2216	Aug. 24, 2022

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8. Photos of the EUT



Figure 8-1 EUT

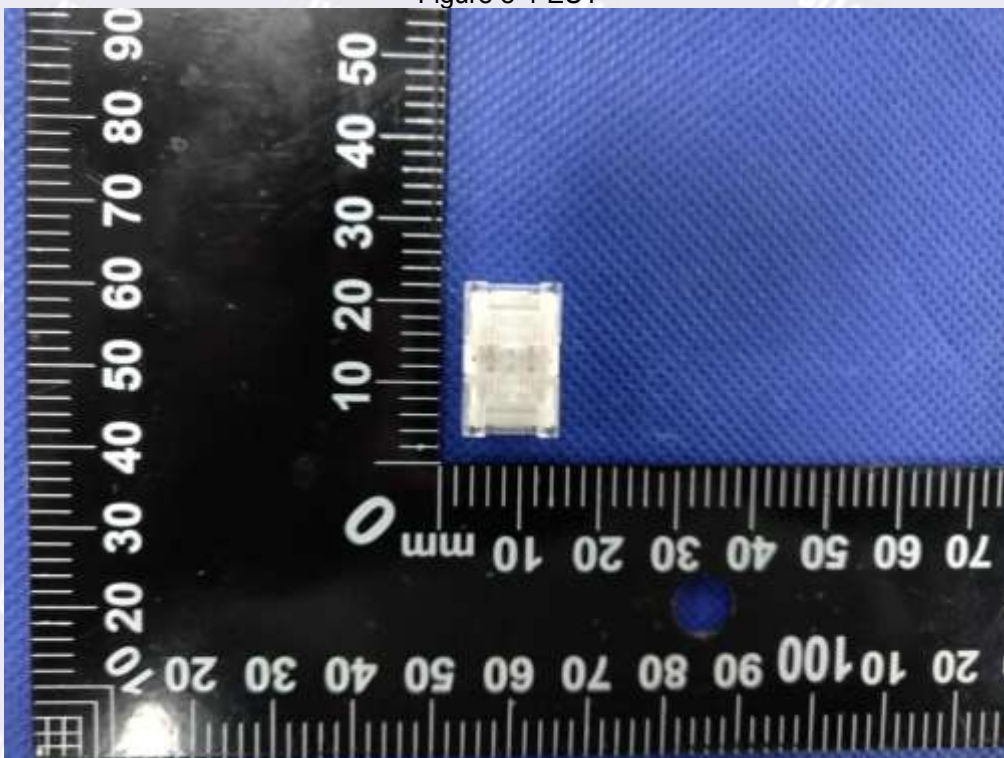


Figure 8-2 EUT

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9. Photos of test setup



Figure 9-1 RE test setup

===== The End of Report =====