



EMC TEST REPORT

for

Multi-functional Data Cable

Model: US310

Other models see the list on Page 3 of the report

Prepared for: USR041
 China
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Report Number: EZT161026168ER
Date of Test: Oct.23,2016-Oct.27,2016
Date of Issue: Oct.27,2016

Tested By:

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Mark Dan

Reviewed By:

Steven

Steven



The results detailed in this test report relate only to the specific sample(s) tested. It is the Application's responsibility to ensure that all production units are manufactured with equivalent EMC characteristics. This report is not to be reproduced except in full, without written approval from EZT Testing Technology.



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1.0 General Information

1.1 Client Information

Application:	
Address of Application:	China
Manufacturer:	SHENZHEN R.U.P INDUSTRIAL CORPORATION LIMITED
Address of Manufacturer:	China

1.2 General Description of E.U.T.

Product Name:	Multi-functional Data Cable
Model:	US310
Additional Model:	AD120, AD180, ELR100, EL110, US300, LD150, US340, RE150, RE160, RE170, RE180, EL100, US330, TU130, T994, RE200
Trade Mark:	N/A
Power Supply:	DC5V
Model Difference:	All models above are identical in interior structure, electrical circuits and components, and just model names are different for the marketing requirement.

1.3 Test Facility:

Name of Test Lab:	Shenzhen EZT Testing Technology Co., Ltd
Address of Test Lab:	Room 912, Juntaihao Business Center, Yongfu Road 120, Fuyong Town, Baoan District, Shenzhen City.
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Report No.: EZT161026168ER

2.0 List of Measurement Equipment					
Name	Model No.	Serial No.	Manufacturer	Date of Cal.	Due Date
Conducted emission					
EMI Test Receiver	ESCS30	1102.4500.30	RS	Dec.07,2015	Dec.06,2016
LISN	LS16C	10010947251	AFJ	Dec.07,2015	Dec.06,2016
Radiated emission					
EMI Test Receiver	ESVD	1026.5506.10	RS	Dec.07,2015	Dec.06,2016
Spectrum Analyzer	FSEM	1079.8500.30	RS	Dec.07,2015	Dec.06,2016
Coaxial Switch	MP59B	M70585	ANRITSU	N/A	N/A
Amplifier	8447D	2727A05017	HP	Dec.07,2015	Dec.06,2016
Bilog Antenna	VULB9163	9163/340	Schwarebeck	Dec.07,2015	Dec.06,2016
Harmonic & Flicker					
Harmonics Flicker Test System	PACS-1	72305	CI	Dec.07,2015	Dec.06,2016
5K VA AC Power source	5001iX	56060	CI	Dec.07,2015	Dec.06,2016
Electrostatic Discharge					
Electrostatic Discharge Generator	ESD61002AG	PR12092502	Prima	Dec.07,2015	Dec.06,2016
Continuous radiated disturbances					
Signal Generator	2022D	119246/003	Maconi	Dec.07,2015	Dec.06,2016
Power Amplifier	A00181-1000	9801-112	M2S	Dec.07,2015	Dec.06,2016
Power Amplifier	AC8113/ 800-250A	9801-179	M2S	Dec.07,2015	Dec.06,2016
Power Antenna	CBL6140A	1204	SCHAFFNER	Dec.07,2015	Dec.06,2016
EFT/Surge/Dip					
Fast Transient Burst Simulator	EFT61004BG	PR12074375	Prima	Dec.07,2015	Dec.06,2016
Lightning Surge Generator	SUG61005BG	PR12125534	Prima	Dec.07,2015	Dec.06,2016
CYCLE SAG SIMULATOR	DRP61011AG	PR12106201	Prima	Dec.07,2015	Dec.06,2016
Continuous conducted disturbances					
Signal Generator	2022D	119246/003	Maconi	Dec.07,2015	Dec.06,2016
Power Amplifier	A00181-1000	9801-112	M2S	Dec.07,2015	Dec.06,2016
CDN	M3-8016	003683	MEB	Dec.07,2015	Dec.06,2016
Power-frequency Magnetic field					
Continuous Wave Simulator	UCS 500 M4	0304-42	EM TEST	Dec.07,2015	Dec.06,2016
Power Source Network	MV 2616	0104-14	EM TEST	Dec.07,2015	Dec.06,2016
Current Transformer	MC2630	--	EM TEST	Dec.07,2015	Dec.06,2016
Magnetic Coil	MS100	0304-42	EM TEST	Dec.07,2015	Dec.06,2016



3.0 Technical Details

3.1 Investigations Requested

Perform Electromagnetic Interference [EMI] & Electromagnetic Susceptibility [EMS] tests for CE Marking

3.2 Test Standards

EN 55022:2010	Limits and methods of measurement of radio disturbance characteristics for information technology equipment
EN 61000-3-2:2014	Electromagnetic compatibility(EMC)- Part 3-2:Limits-Limits for harmonic current emissions(equipment input current $\leq 16A$ per phase)
EN 61000-3-3:2013	Electromagnetic compatibility (EMC)- Part 3-3:Limits-Limitation of voltage changes, Voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current $\leq 16A$ per phase and not subject to conditional connection
EN 55024:2010	Information technology equipment - Immunity characteristics - Limits and methods of measurement

3.3 Performance Criteria

- Criterion A During and after the test the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed.
- Criterion B During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test.
- Criterion C During and after testing, temporary loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls or cycling of the power to the EUT by the user in accordance with the manufacturer' instructions.
Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.



3.4 Test standards and Results Summary Tables

Test Condition	Test Requirement	Test Method	Test Result
EMISSION Results Summary			
Conducted Emission on AC Mains, 150KHz to 30MHz	EN 55022:2010	EN 55022:2010	N/A
Conducted Emission on at telecommunication ports, 150KHz to 30MHz	EN 55022:2010	EN 55022:2010	N/A
Radiated Emissions, 30MHz to 1GHz	EN 55022:2010	EN 55022:2010	Pass
Harmonic Emissions on AC supply	EN 61000-3-2:2014	EN 61000-3-2:2014	N/A
Voltage fluctuations on AC supply	EN 61000-3-3:2013	EN 61000-3-3:2013	N/A
IMMUNITY Results Summary			
Electrostatic Discharge	EN 55024:2010	EN 61000-4-2:2009	Pass
RF field strength susceptibility	EN 55024:2010	EN 61000-4-3:2006 +A1:2008+A2:2010	Pass
Electrical Fast transients /Burst Immunity	EN 55024:2010	EN 61000-4-4:2012	N/A
Surge	EN 55024:2010	EN 61000-4-5:2006	N/A
Conducted susceptibility	EN 55024:2010	EN 61000-4-6:2009	N/A
Power-frequency Magnetic Field	EN 55024:2010	EN 61000-4-8:2010	N/A
Dips/Voltage Interruption Variation	EN 55024:2010	EN 61000-4-11:2004	N/A

Note: N/A=Not applicable

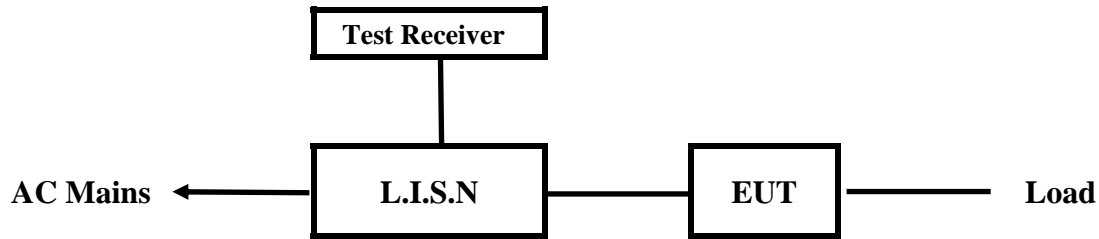
3.5 Measurement Uncertainty 95% confidence levels, k=2

No.	Item	MU
1.	Temperature	± 0.1 °C
2.	Humidity	± 1.0%
3.	Spurious emissions, conducted	± 3.70dB
4.	All emissions, radiated	± 4.50dB

4.0 Electromagnetic Interference Test results

4.1 Power Line Conducted Emission Test

4.1.1 Schematics of the test



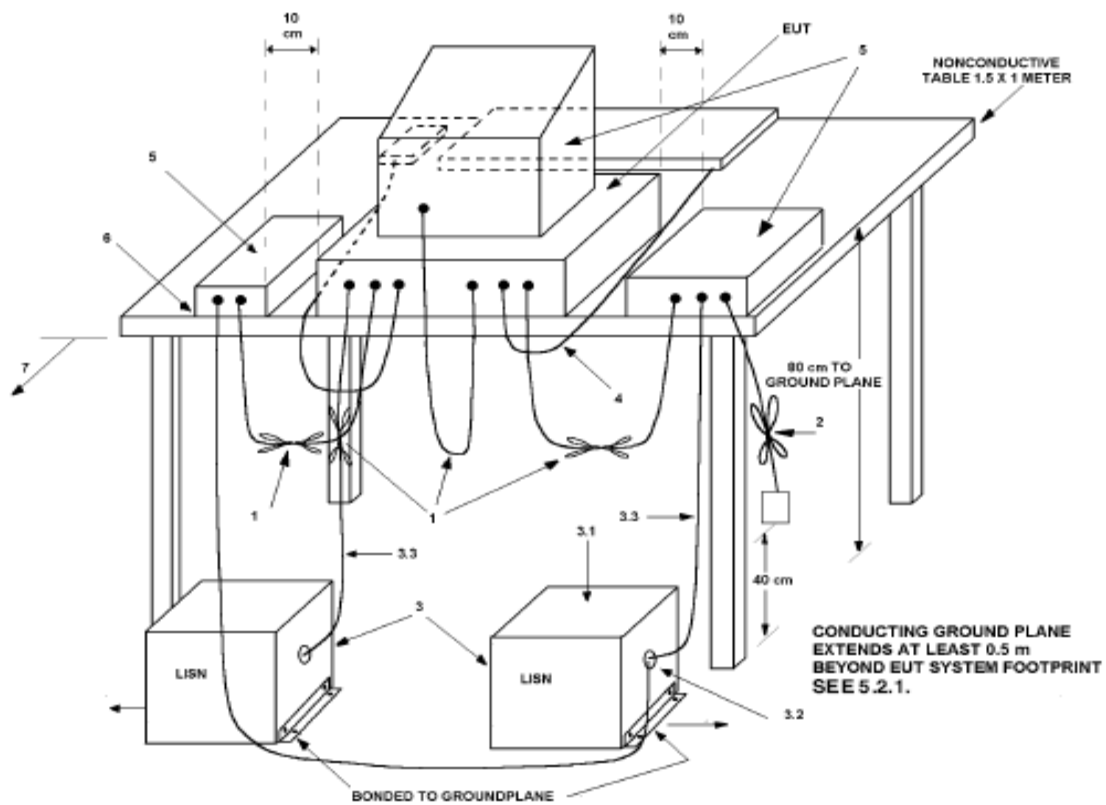
EUT: Equipment Under Test

4.1.2 Test Method and test Procedure

The test was performed in accordance with EN 55022:2010

Test Voltage: 230V~, 50Hz

Block diagram of Test setup





4.1.3 EUT Operating Condition

Operating condition is according to EN 55022:2010
Setup the EUT and simulators as shown on the following

4.1.4 Test Equipment

Please refer to the Section 2

4.1.5 Power line conducted Emission Limit

Frequency(MHz)	Class A Limits (dBμV)		Class B Limits (dBμV)	
	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level
0.15 ~ 0.50	79.0	66.0	66.0~56.0*	56.0~46.0*
0.50 ~ 5.00	73.0	60.0	56.0	46.0
5.00 ~ 30.00	73.0	60.0	60.0	50.0

Notes: 1. *Decreasing linearly with logarithm of frequency.
2. The tighter limit shall apply at the transition frequencies

4.1.7 Test specification:

Environmental conditions: Temperature: 26° C Humidity: 51% Atmospheric pressure: 103kPa

Frequency range: 0.15 MHz – 30 MHz

4.1.8 Test result:N/A

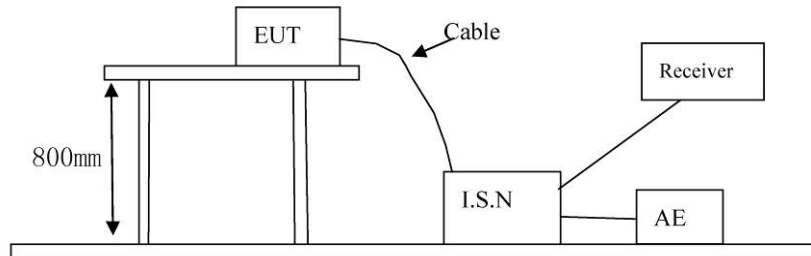
The requirements are fulfilled.

Remarks: According to the EN 55022:2010



4.2 Telecommunication ports Conducted Emission Test

4.2.1 Test Method: The test was performed in accordance with EN 55022:2010



4.2.2 EUT Operating Condition

Operating condition is according to EN 55022:2010

4.2.3 Test Equipment

Please refer to the Section 2

4.2.4 Power line conducted Emission Limit

Frequency(MHz)	Class A Limits (dBμV)		Class B Limits (dBμV)	
	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level
0.15 ~ 0.50	97 to 87	84 to 74	84 to 74	74 to 64
0.50 ~ 30.00	87	74	74	64

- Notes: 1. *Decreasing linearly with logarithm of frequency.
 2. The tighter limit shall apply at the transition frequencies

4.2.5 Test specification:

Environmental conditions: Temperature: 23° C Humidity: 50% Atmospheric pressure: 103kPa

Frequency range: 0.15 MHz – 30 MHz

4.2.6 Test result N/A

Remarks: According to the EN 55022:2010



A Conducted Emission on Telecommunication port (150kHz to 30MHz)

EUT Description: --
Operation Mode: --
Tested By: --
Test date: --
Test Result: N/A

Start Frequency Stop Frequency Step IF BW Detector Final M-Time
0.15MHz 30MHz 4.5KHz 10KHz QP+AV 1s

Frequency (MHz)	Port	Reading(dBμA)		Limit(dBμA)	
		Quasi-peak	Average	Quasi-peak	Average

Remark: The test item is not applicable.

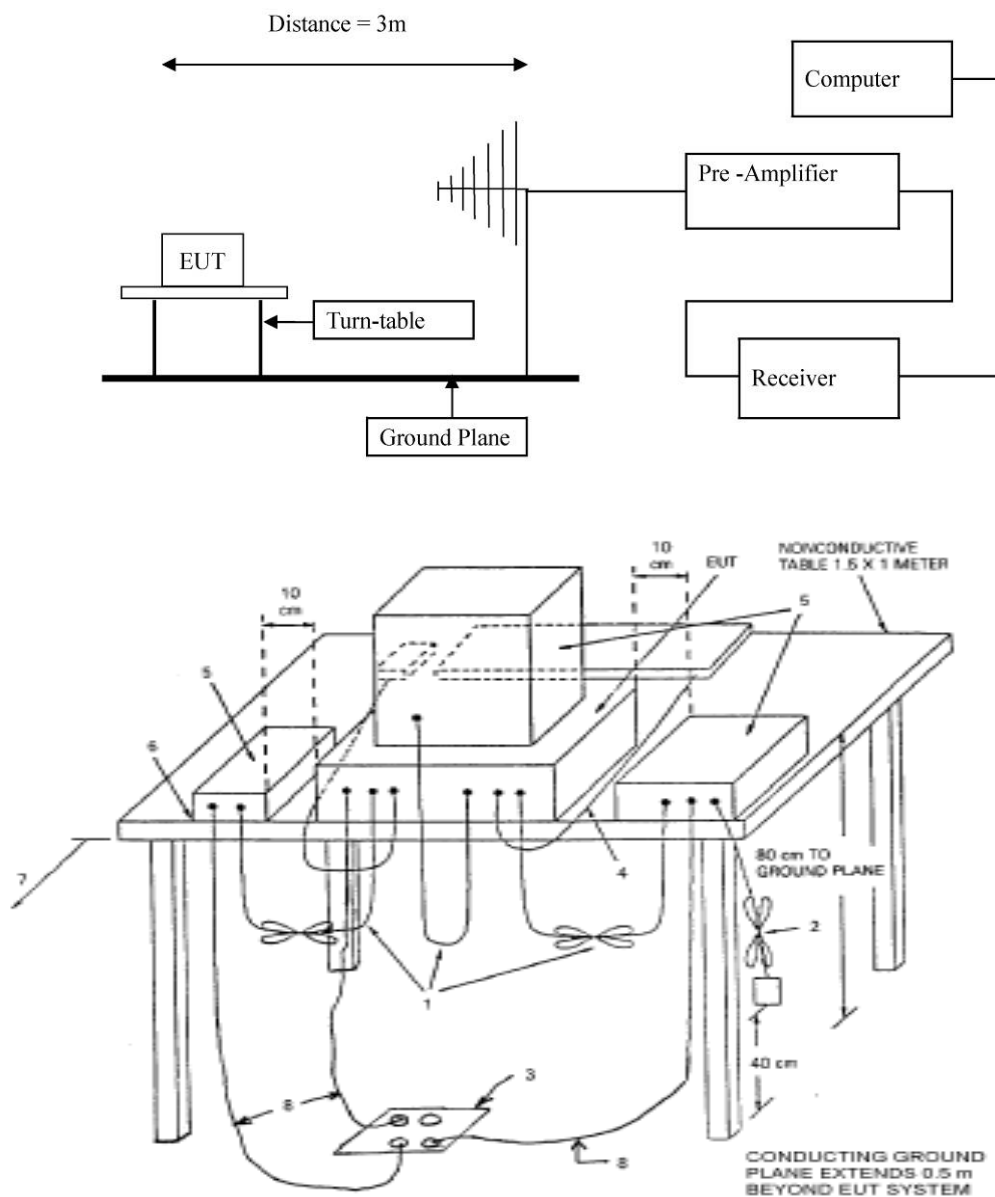
4.3 Radiated Emission Test

4.3.1 Schematics of the test



4.3.2 Test Method: The test was performed in accordance with EN 55022:2010

Block diagram of Test setup





4.3.3 EUT Operating Condition

Operating condition is according to EN 55022:2010

4.3.4 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

Frequency Range (MHz)	Distance (m)	Quasi-Peak limits (dB μ V/m)	
		Class A Limits	Class B Limits
30-230	3	50.00	40.00
230-1000	3	57.00	47.00

Note: 1) The lower limit shall apply at the transition frequencies
2) If measurement is not made at 3m distance, then F.S Limitation at 3m distance is adjusted by using the formula $Ld1 = Ld2 * (d2/d1)$

4.3.5 Photo documentation of the test set-up

Please refer to the Section 7

4.3.6 Test Equipment:

Please refer to the Section 2

4.3.7 Test specification:

Environmental conditions: Temperature 26° C Humidity: 55% Atmospheric pressure: 103kPa

4.3.8 Test result

The requirements are fulfilled.

Remarks: According to the EN 55022:2010

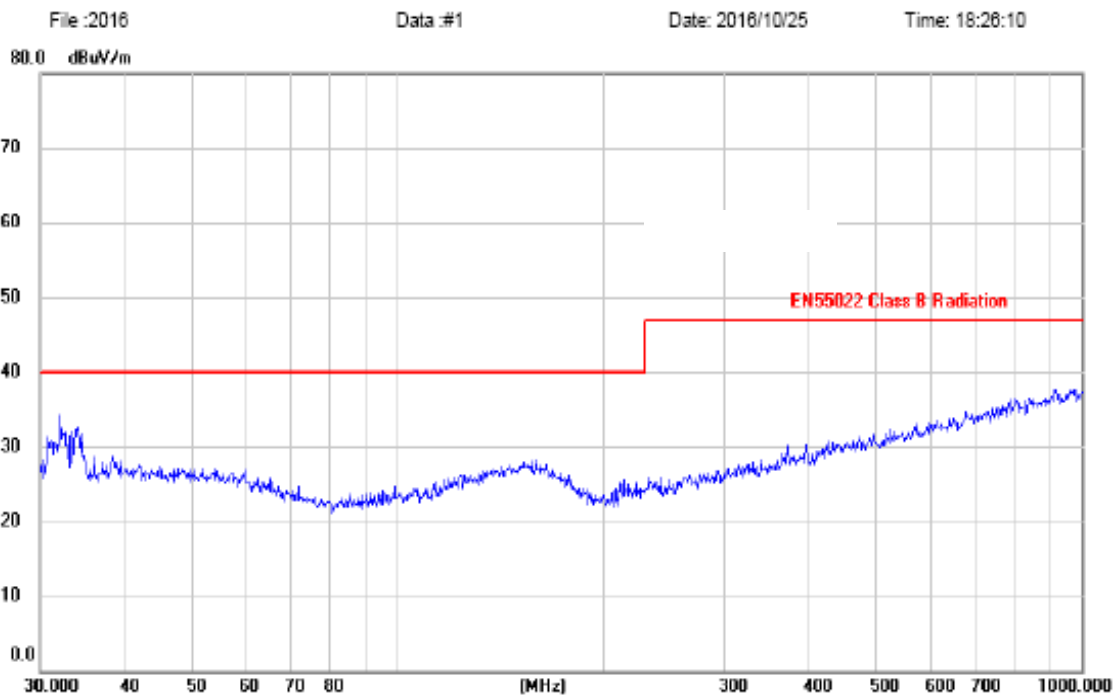


A. Radiated Emission In Vertical (30MHz---1000MHz)

Site LAB Polarization: *Vertical* Temperature: 26
 Limit: EN55022 Class B Radiation Power: Humidity: 60 %
 EUT: 数据线 Distance: 3m
 M/N:
 Mode:
 Note:

Engineer Signature:

Radiated Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree		



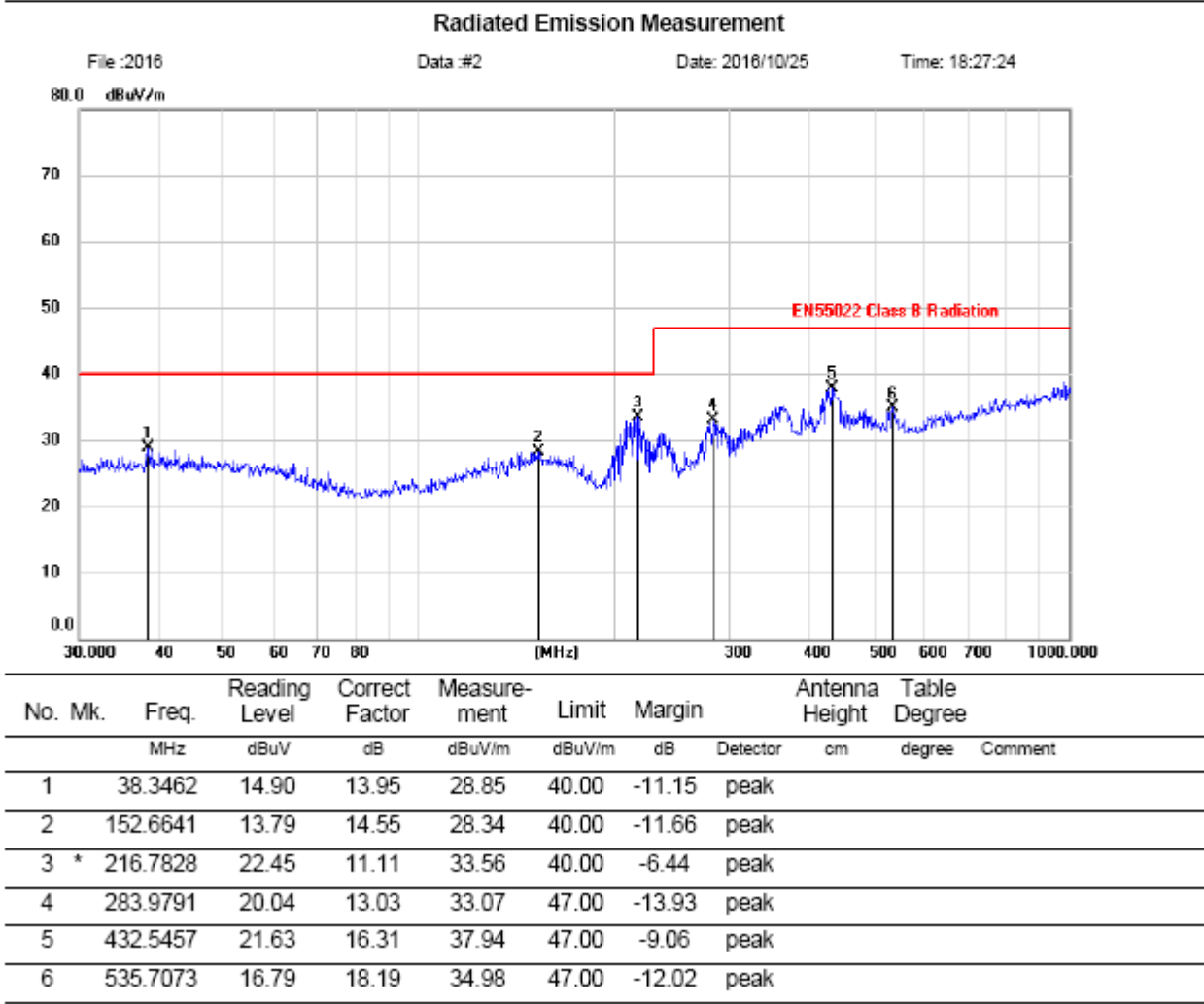
B. Radiated Emission In Horizontal (30MHz----1000MHz)

Site LAB
 Limit: EN55022 Class B Radiation
 EUT: 数据线
 M/N:
 Mode:
 Note:

Polarization: *Horizontal*
 Power:
 Distance: 3m

Temperature: 26
 Humidity: 60 %

Engineer Signature:



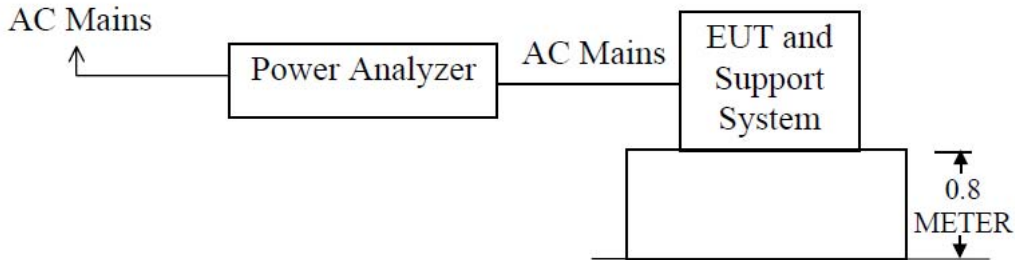


4.4 Harmonic Current Emissions

4.4.1 EUT Operating Mode

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4.4.2 Block Diagram of Test Setup.



This test was performed as per EMC Basic Standard EN61000-3-2 Class A

4.4.3 Test Equipment

Please refer to Section 2 this report.

4.4.4 Test specification:

Environmental conditions: Temperature: 23° C Humidity: 54% Atmospheric pressure: 103kPa

4.4.5 Results

Port	EUT Operating mode	Result (Passed / Failed)
AC Input	--	N/A

Remark: The test item is not applicable.

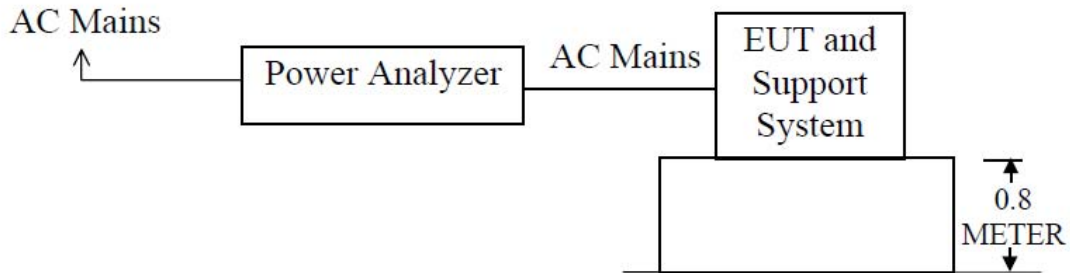


4.5 Flicker and Voltage Fluctuation

4.5.1 EUT Operating Mode

Full load

4.5.2 Block Diagram of Test Setup.



This test was performed as per EMC Basic Standard EN 61000-3-3

4.5.3 Limits of Voltage Fluctuation and Flicks Measurement

Test Item	Limit	Note
P_{st}	1.0	Pst means short-term flicker indicator
P_{lt}	0.65	Plt means long-term flicker indicator
T_{dt} (ms)	500	Tdt means maximum time that dt exceeds 3%.
d_{max} (%)	4	Dmax means maximum relative voltage change.
dc (%)	3.3	Dc means relative steady-state voltage change.

4.5.4 Test Equipment

Please refer to Section 2 this report.

4.5.5 Test specification:

Environmental conditions: Temperature: 22° C Humidity: 54% Atmospheric pressure: 103kPa

4.5.6 Results

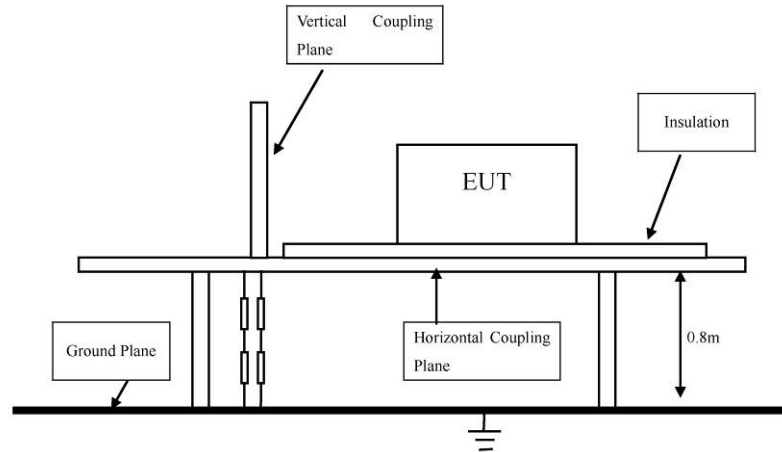
Port	EUT Operating mode	Result (Passed / Failed)
DC	Full load	N/A



5.0 Immunity Test

5.1 Electrostatic Discharge

5.1.1 Schematic of the test



5.1.2 Test method

The test was performed in accordance with EN 61000-4-2

5.1.3 Test severity

±4kV for direct & in-direct Contact Discharge

±8kV for air Discharge

Performance Criterion Require: **B**

5.1.4 Test Equipment

Please refer to Section 2 this report.

5.1.5 Test specification:

Environmental conditions: Temperature: 23° C Humidity: 54% Atmospheric pressure: 103kPa

5.1.6 Operation mode: Full load

5.1.7 Discharge location

- HCP
- VCP
- Shell

5.1.8 Test Result Pass



5.2 RF field strength susceptibility (80MHz----- 1000MHz)

5.2.1 Test Method:

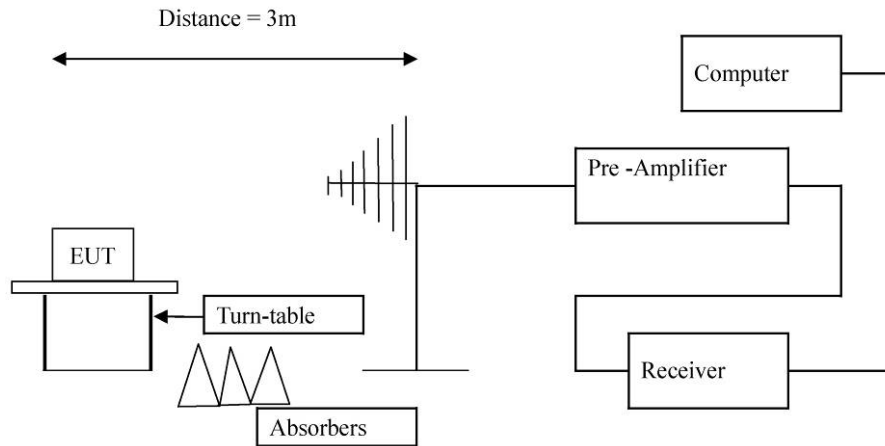
The test was performed in accordance with EN 61000-4-3

Severity: Level 2 (3V/m)

Modulation: 1 KHz 80% AM

Performance Criterion Require: A

Block diagram of Test setup



5.2.2 Test Equipment

Please refer to Section 2 this report.

5.2.3 Test specification:

Environmental conditions: Temperature: 25° C Humidity: 54% Atmospheric pressure: 103kPa

5.2.4 Operation mode: Full load

5.2.5 Test Result:

Please refer to the following table for individual results.

Frequency (MHz)	Radiation to	Polarity	Level (V/m)	Dwell Time(s)	Sweep Rate (%)	Results
80-1000	Front	Horizontal	3	1	1	Pass
80-1000	Rear	Horizontal	3	1	1	Pass
80-1000	Left	Horizontal	3	1	1	Pass
80-1000	Right	Horizontal	3	1	1	Pass
80-1000	Front	Vertical	3	1	1	Pass
80-1000	Rear	Vertical	3	1	1	Pass
80-1000	Left	Vertical	3	1	1	Pass
80-1000	Right	Vertical	3	1	1	Pass



5.3 Electrical Fast Transient/Burst (EFT/B) immunity test

5.3.1 Schematics of the test



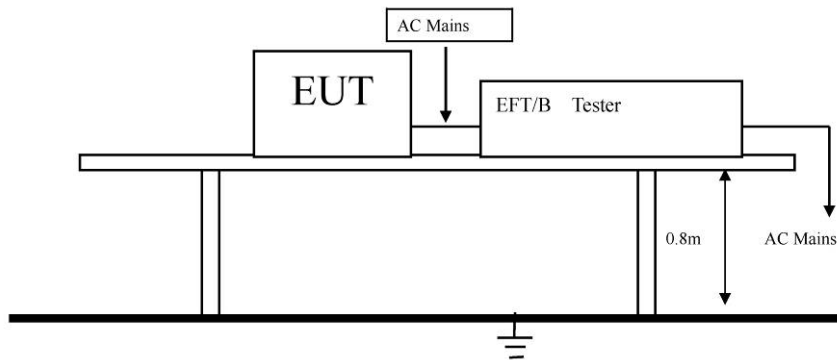
5.3.2 Test Method

The test was performed in accordance with EN 61000-4-4

Severity: Level 2 (1kV)

Performance Criterion Require: **B**

Block diagram of Test setup



5.3.3 Test Equipment

Please refer to Section 2 this report.

5.3.4 Test specification:

Environmental conditions: Temperature: 23° C Humidity: 54% Atmospheric pressure: 103kPa

5.3.5 Operation mode: Full load

5.3.6 Test Results

Inject location: AC mains

Inject Line	Voltage kV	Inject Times (s)	Method	Results
L	±1	120	Direct	N/A
N	±1	120	Direct	N/A
L、N	±1	120	Direct	N/A
E	±1	120	Direct	N/A
L、E	±1	120	Direct	N/A
N、E	±1	120	Direct	N/A
L、N、E	±1	120	Direct	N/A



Note: N/A=Not applicable

5.4 Surge test

5.4.1 Schematics of the test



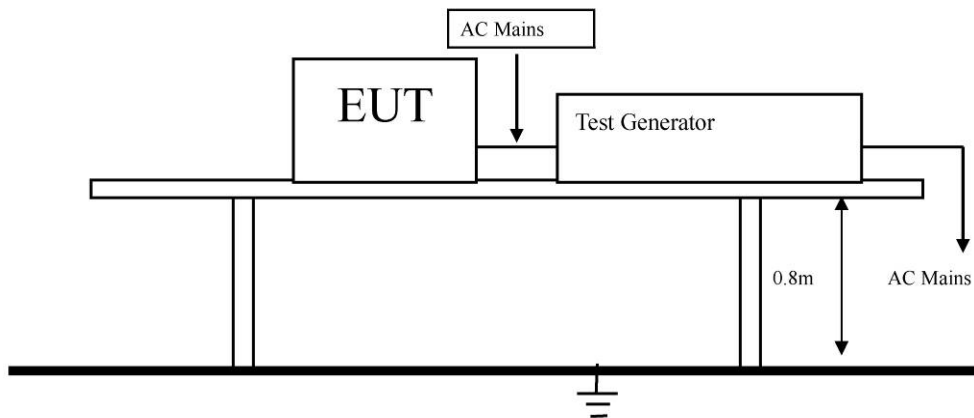
5.4.2 Test Method:

The test was performed in accordance with EN 61000-4-5

Severity: Level 2

Performance Criterion Require: B

Block diagram of Test setup



5.4.3 Test Equipment

Please refer to Section 2 this report.

5.4.4 Test specification:

Environmental conditions: Temperature: 22° C Humidity: 54% Atmospheric pressure: 103kPa

5.4.5 Operation mode: Full load

5.4.6 Test Results

5 pulses for each polarity and test voltage, and repetition rate is 1 per min.

Location	Polarity	0°	90°	180°	270°	Results
L-N	± 1 KV	n.r.r.	n.r.r.	n.r.r.	n.r.r.	N/A
L-PE	± 2 KV	N/A	N/A	N/A	N/A	N/A
N-PE	± 2 KV	N/A	N/A	N/A	N/A	N/A

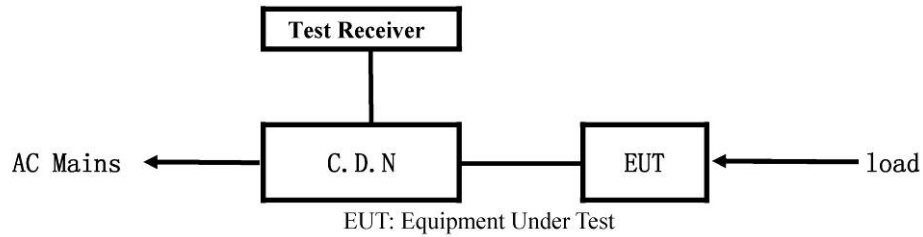
Remark: 1) n.r.r. = no reaction recognized, N/A = not applicable.

2) Performance Criteria A Observed.



5.5 Conducted Immunity test

5.5.1 Schematics of the test



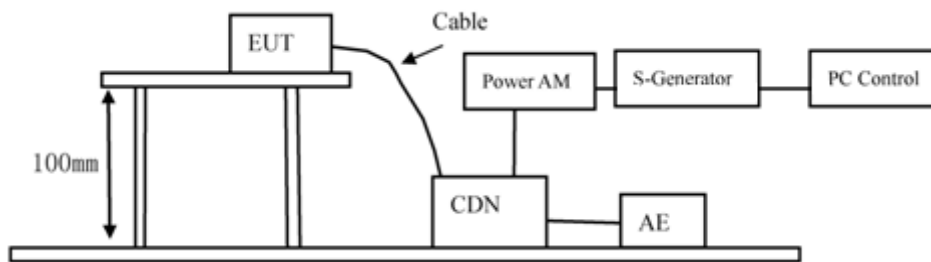
5.5.2 Test Method

The test was performed in accordance with EN 61000-4-6

Severity: Level 2 (3 V rms), 0.15MHz—80MHz

Performance Criterion Require: A

Block diagram of Test setup



5.5.3 Test Equipment

Please refer to Section 2 this report.

5.5.4 Test specification:

Environmental conditions: Temperature: 23° C Humidity: 54% Atmospheric pressure: 103kPa

5.5.5 Operation mode: Full load

5.5.6 Test Results:

Frequency Range (MHz)	Injected Position	Strength	Criterion	Result
0.15 - 80	AC Line	3V (rms) Unmodulated	A	N/A



5.6 Power-Frequency magnetic field test

5.6.1 Schematics of the test



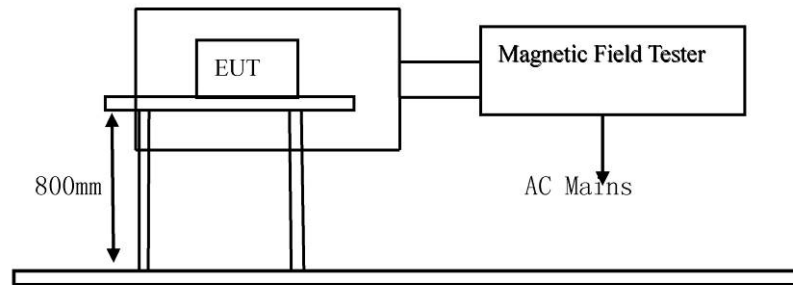
5.6.2 Test Method

The test was performed in accordance with EN 61000-4-8

Severity: Level 1 (1A/m),

Performance Criterion Require: A

Block diagram of Test setup



5.6.3 Test Equipment

Please refer to Section 2 this report.

5.6.4 Test specification:

Environmental conditions: Temperature: 21° C Humidity: 54% Atmospheric pressure: 103kPa

5.6.5 Operation mode: --

5.6.6 Test Results:

Test Level	Testing Duration	Coil Orientation	Criterion	Result
1A/m	5 Mins	X	A	N/A
1A/m	5 Mins	Y	A	N/A
1A/m	5 Mins	Z	A	N/A

Remark: The test item is not applicable.



5.7 Voltage Dips/Interruptions immunity test

5.7.1 Schematics of the test

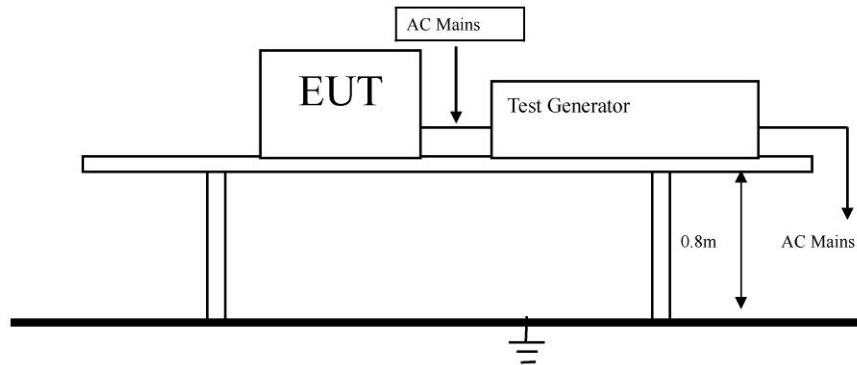


5.7.2 Test Method:

The test was performed in accordance with EN 61000-4-11

Performance Criterion Require: C&B

Block diagram of Test setup



5.7.3 Test Equipment

Please refer to Section 2 this report.

5.7.4 Test specification:

Environmental conditions: Temperature: 21° C Humidity: 54% Atmospheric pressure: 103kPa

5.7.5 Operation mode: Full load

5.7.6 Test Result:

Voltage Dip: Voltage Interceptions:

Test Level % Ut	Reduction	Duration (periods)	Phase Angle	Meet Criterion	Result
0	100	0.5	0° - 360°	B	N/A
70	30	25	0° - 360°	C	N/A
0	100	250	0° - 360°	C	N/A



6.0 CE Label

6.1 label specification

Text of the mark is black or white in color and is left justified. Labels are printed in indelible ink on permanent adhesive backing and shall be affixed at a conspicuous location on the EUT or silk-screened onto the EUT.



6.2 Mark Location: On the product body



7.0 Photos of Testing

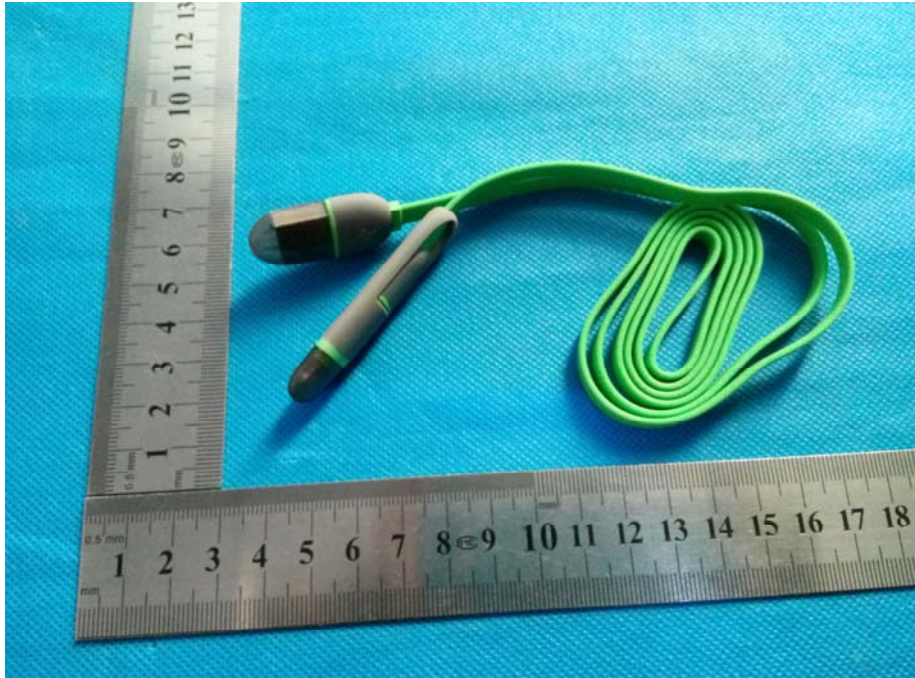
Radiated Emission Test View-charging





8.0 Photos of the EUT





*****END OF REPORT*****