



# SGS

## VERIFICATION OF EMC COMPLIANCE

No.: SHEMO10030028101ITC

Applicant: Beijing StrongLink Technology Co., Ltd.  
RM 3-105, Building A, No.170 Beiyuan Road, Chaoyang District,  
Beijing 100101, China

Manufacturer: Beijing StrongLink Technology Co., Ltd.  
RM 3-105, Building A, No.170 Beiyuan Road, Chaoyang District,  
Beijing 100101, China

Product Description: Mifare Module

Model No: SL030, SL031, SL032

Technical Data: DC 2.5-3.6V

Sufficient samples of the product have been tested and found to be in conformity with

Test Standard: EN 55022:2006+A1:2007  
EN 55024:1998+A1:2001+A2:2003  
EN 61000-3-2:2006  
EN 61000-3-3:2008

as shown in the

Test Report Number(s): SHEMO10030028101

This verification of EMC Compliance has been granted to the applicant based on the results of the tests, performed by laboratory of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. on the sample of the above-mentioned product in accordance with the provisions of the relevant specific standards and Directive 2004/108/EC. The affixing of the CE marking presumes in addition that the conditions in annexes III and V of the Directive are fulfilled.



  
Tino Pan  
E&E Section Manager  
SGS-CSTC

March 24, 2010

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09938408





**SGS-CSTC Standards  
Technical Services  
(Shanghai)Co., Ltd.**

588 West Jindu Road, Songjiang District, Shanghai, China

Telephone: +86 (0) 21 6191 5666

Fax: +86 (0) 21 6191 5655

Tino.Pan@sgs.com

Report No.: SHEMO10030028101

Page 1 of 20

## ***EMC TEST REPORT***

**Application No.:** SHEMO10030028101

**Applicant:** Beijing StrongLink Technology Co., Ltd.

**Equipment Under Test (EUT):**

**NOTE:** The following sample(s) submitted was/were identified on behalf of the client as

**EUT Name:** Mifare Module

**Model No.:** SL030, SL031, SL032

**Serial No.:** Not supplied by the client

**Standards:** EN 55022 :2006/A1:2007

EN 55024 :1998 / A1: 2001 /A2: 2003

EN 61000-3-2: 2006

EN 61000-3-3:2008

**Date of Receipt:** March 18, 2010

**Date of Test:** March 23, 2010 to March 24, 2010

**Date of Issue:** March 24, 2010

<b>Test Result :</b>	<b>PASS</b>
----------------------	-------------

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EC Directives.

Tino Pan  
E&E Section Manager  
SGS-CSTC (Shanghai)Co., Ltd.



Jack Wu  
E&E Project Engineer  
SGS-CSTC (Shanghai)Co., Ltd.

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## 2 Test Summary

Test	Test Requirement	Test Method	Class / Severity	Result
Radiated Emission	EN 55022 :2006/A1:2007	EN 55022 :2006/A1:2007	Class B	PASS
Conducted Emission	EN 55022 :2006/A1:2007	EN 55022 :2006/A1:2007	Class B	N/A
Harmonic Current Emission on AC, up to 2kHz	EN 61000-3-2: 2006	EN 61000-3-2: 2006	Clause 7 of EN61000-3-2	N/A
Flicker on AC	EN 61000-3-3 :2008	EN 61000-3-3 :2008	Clause 5 of EN61000-3-3	N/A
ESD	EN 55024 :1998 / A1: 2001 /A2: 2003	IEC 61000-4-2:2001	±4 kV Contact ±8 kV Air	PASS
Radiated Immunity (80MHz to 1GHz)	EN 55024 :1998 / A1: 2001 /A2: 2003	IEC 61000-4-3:2008	3V/m, 80%, 1kHz, Amp. Mod.	PASS
Fast transients on DC ports	EN 55024 :1998 / A1: 2001 /A2: 2003	IEC 61000-4-4:2004	±0.5kV	PASS
Surges	EN 55024 :1998 / A1: 2001 /A2: 2003	IEC 61000-4-5 :2005	1kV Line to Line AC port 2kV Line to Earth AC port	N/A
Continuous conducted disturbances	EN 55024 :1998 / A1: 2001 /A2: 2003	IEC 61000-4-6:2006	150KHz to 80MHz 3Vrms (emf), 80%, 1kHz, Amp. Mod.	PASS
Power frequency magnetic field	EN 55024 :1998 / A1: 2001 /A2: 2003	IEC 61000-4-8:2001	1A/m, 50Hz	N/A
Voltage dips and interruptions on AC ports	EN 55024 :1998 / A1: 2001 /A2: 2003	IEC 61000-4-11 :2004	0 % $U_T^*$ for 0.5 per 0 % $U_T^*$ for 250 per 70 % $U_T^*$ for 25 per	N/A

Note: Selected test(s) as requested by applicant

There are three models mentioned in this report, and they are the same in electrical and electronic characters. So we just have the model SL030 tested.

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### 3 Contents

	Page
1 COVER PAGE .....	1
2 TEST SUMMARY .....	2
3 CONTENTS .....	3
4 GENERAL INFORMATION .....	4
4.1 CLIENT INFORMATION .....	4
4.2 GENERAL DESCRIPTION OF E.U.T. ....	4
4.3 DETAILS OF E.U.T. ....	4
4.4 DESCRIPTION OF SUPPORT UNITS .....	4
4.5 STANDARDS APPLICABLE FOR TESTING .....	4
4.6 DEVIATION FROM STANDARDS .....	5
4.7 ABNORMALITIES FROM STANDARD CONDITIONS .....	5
4.8 MONITORING OF EUT FOR ALL IMMUNITY TEST .....	5
4.9 TEST LOCATION .....	6
4.10 TEST CONFIDENT LEVEL .....	6
5 EQUIPMENTS USED DURING TEST .....	7
6 EMISSION TEST RESULTS .....	9
6.1 RADIATED EMISSION 30MHZ TO 1GHZ .....	9
6.1.1 E.U.T. Operation .....	9
6.1.2 Measurement Data .....	9
7 IMMUNITY TEST RESULTS .....	12
7.1 PERFORMANCE CRITERIA DESCRIPTION IN CLAUSE 7 OF EN 55024: 1998/A1:2001/A2: 2003 .....	12
7.2 ESD .....	12
7.2.1 E.U.T. Operation .....	13
7.2.2 Direct Application Test Results .....	13
7.3 RADIATED IMMUNITY ( 80MHZ-1GHZ ) .....	14
7.3.1 E.U.T. Operation .....	14
7.3.2 Test Results .....	14
7.4 ELECTRICAL FAST TRANSIENTS (EFT) .....	15
7.4.1 E.U.T. Operation .....	15
7.4.2 Test Results On AC Supply: .....	15
7.5 CONDUCTED IMMUNITY 0.15MHZ TO 80MHZ .....	16
7.5.1 E.U.T. Operation .....	16
7.5.2 Test Results: .....	16
8 PHOTOGRAPHS .....	17
8.1 RADIATED EMISSION TEST SETUP .....	17
8.2 ESD TEST SETUP .....	18
8.3 RADIATED IMMUNITY TEST SETUP .....	18
8.4 EFT TEST SETUP .....	19
8.5 CONDUCTED IMMUNITY TEST SETUP .....	19
8.6 EUT CONSTRUCTIONAL DETAILS .....	20

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## 4 General Information

### 4.1 Client Information

Applicant: Beijing StrongLink Technology Co.,Ltd.  
Address of Applicant: RM 3-105,Building A, No.170 Beiyuan Road,Chaoyang District,  
Beijing 100101,China

### 4.2 General Description of E.U.T.

EUT Name: Mifare Module  
Model No.: SL030,SL031,SL032

### 4.3 Details of E.U.T.

Power Supply: DC 2.5-3.6V  
Power Cord: N/A

### 4.4 Description of Support Units

Name / Function	Model No.	Remark
DC Power	PMC35-3	Manufacturer : KIKUSUI

### 4.5 Standards Applicable for Testing

The customer requested EMC tests for Mifare Module.

The standards used were EN 55022 :2006/A1:2007, EN 55024 :1998 / A1: 2001 /A2: 2003,  
EN 61000-3-2: 2006, EN 61000-3-3: 2008

**Table 1 : Tests Carried Out Under EN 55022 :2006/A1:2007**

Standard	Status
EN 55022 :2006/A1:2007 Radiated Electromagnetic Disturbance	√
EN 55022 :2006/A1:2007 Conducted Emissions	×

× Indicates that the test is not applicable  
√ Indicates that the test is applicable

**Table 2: Tests Carried Out Under EN 61000-3-2: 2006 & EN 61000-3-3: 2008**

Standard		Status
EN 61000-3-2: 2006	Harmonic Current Emissions on AC	×
EN 61000-3-3:2008	Flicker on AC	×

× Indicates that the test is not applicable

**Table 3: Tests carried out under EN 55024 :1998 / A1: 2001 /A2: 2003**

Standard		Status
IEC 61000-4-2:2001	Electrostatic discharge test	√
IEC 61000-4-3: 2008	Radiated, radio-frequency electromagnetic field electromagnetic field test	√
IEC 61000-4-4: 2004	Electrical fast transients/burst test	√
IEC 61000-4-5: 2005	Surges	×
IEC 61000-4-6: 2006	Immunity to conducted disturbances, induced by radio-frequency fields	√
IEC 61000-4-8: 2001	Power-frequency magnetic field test	×
IEC 61000-4-11: 2004	Voltage dips, short interruptions and voltage variations tests	×

× Indicates that the test is not applicable

√ Indicates that the test is applicable

#### 4.6 Deviation from Standards

None.

#### 4.7 Abnormalities from Standard Conditions

None.

#### 4.8 Monitoring of EUT for All Immunity Test

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#### 4.9 Test Location

All the tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.  
No.588 West Jindu Road, Songjiang District, Shanghai, China. 201612.  
Tel: +86 21 6191 5666 Fax: +86 21 6191 5655

#### 4.10 Test Confident level

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing. Date of expiry: 2011-07-29.

- **FCC – Registration No.: 402683**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered and fully described in a report filed with the Federal Communications Commission (FCC). The acceptance letter from the FCC is maintained in our files. Registration No.: 402683, Expiry Date: 2012-03-17.

- **Industry Canada (IC) – IC Assigned Code: 8617A**

The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 8617A. Expiry Date: 2011-09-29.

- **VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: **R-3172** and **C-3514** respectively. Date of Registration: 2009-11-30. Date of Expiry: 2012-03-17.

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## 5 Equipments Used during Test

### Radiated Emission

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due date
1	EMI test receiver	Rohde & Schwarz	ESU40	100109	2009-06-04	2010-06-03
2	Antenna	SCHWARZBECK	VULB9168	9168-313	2009-06-04	2010-06-03
3	CONTROLLER	INNCO	CO200	474	/	/

### Electrostatic Discharge Test

Item	Test Equipment	Manufacturer	Model No.	Series No.	Cal. Date	Cal. Due date
1	Electrostatic Discharge Simulator	KIKUSUI	KES4021	LL004261	2009-04-25	2010-4-24

### Radiated Immunity

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due date
1	Ultra broadband antenna	Rohde & Schwarz	HL562	100227	2009-10-9	2010-10-8
2	amplifier	AR	30W1000B	0327284	--	--
3	amplifier	AR	30S1G3	0324978	--	--
4	power meter	Rohde & Schwarz	NRP	101641	2009-05-05	2010-05-04
5	Single generator	Rohde & Schwarz	SMR40	100555	2009-06-04	2010-06-03

### EFT Test

Item	Test Equipment	Manufacturer	Model No.	Series No.	Cal. Date	Cal. Due date
1	Ultra-compact simulator	EM test	UCS500M4	V0507100122	2009-06-11	2010-06-10

### Injected Currents test

Item	Test Equipment	Manufacturer	Model No.	Series No.	Cal. Date	Cal. Due date
1	AM/FM signal generator	AEROFLEX	2023A	202306/528	2009-04-22	2010-04-21
2	PAMP Conducted RF test system	HAEFFLY	PAMP250	151708	2009-04-23	2010-04-22
3	CDN impedance and K-factor	LUTHI	L-801 M2/M3	2117	/	/

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**General Equipment**

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal.Due date
1	Atmosphere pressure meter	Shanghai ZhongXuan Electronic Co;Ltd	BY—2003P	/	2009-10-15	2010-10-14
2	CLAMP METER	FLUKE	316	86080010	2009-04-27	2010-04-26
3	Thermo-Hygrometer	ZHICHEN	ZC1-2	01050033	2009-10-21	2010-10-20

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## 6 Emission Test Results

### 6.1 Radiated Emission 30MHz to 1GHz

Test Requirement: EN 55022 :2006/A1:2007  
Test Method: EN 55022 :2006/A1:2007  
Test Date: March 23,2010  
Measurement distance: 3m  
Frequency Range: 30M Hz to 1GHz  
Quasi-Peak if maximised peak within 10dB of limit  
Result: **PASS**

#### 6.1.1 E.U.T. Operation

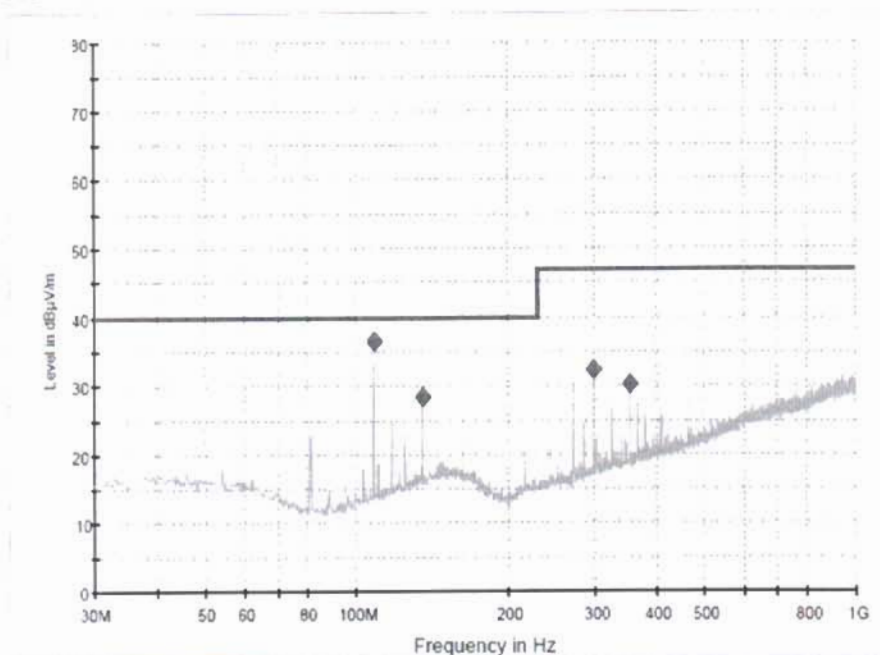
Operating Environment:  
Temperature: 23.0 °C Humidity: 45 % RH Atmospheric Pressure: 1014 mbar  
EUT Operation: The EUT is in representative work mode.

#### 6.1.2 Measurement Data

An initial pre-scan was performed in peak detection mode. Quasi-Peak was performed at the frequencies with maximized peak emission were detected.



Horizontal:



## Final Result 1

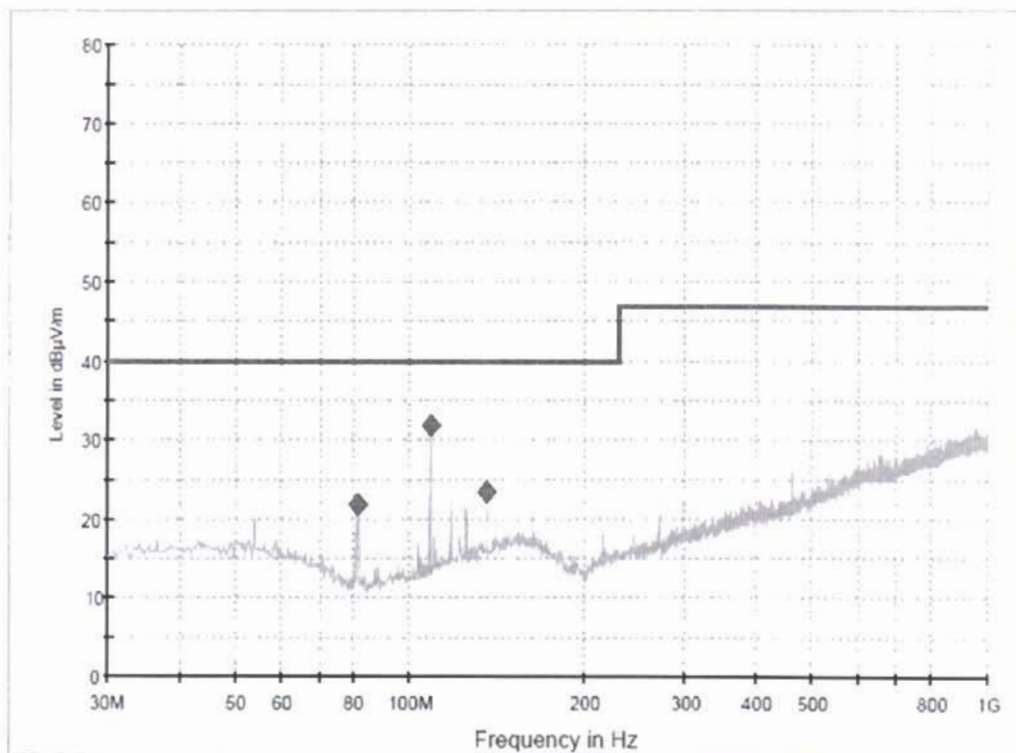
Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)
108.496960	36.3	1000.000	120.000	250.0	H	13.0	-11.5	3.70
135.619520	28.3	1000.000	120.000	229.0	H	20.0	-9.1	11.70
298.366400	32.4	1000.000	120.000	111.0	H	330.0	-7.6	14.60
352.602880	30.2	1000.000	120.000	112.0	H	336.0	-6.4	16.80

(continuation of the "Final Result 1" table from column 9 ...)

Frequency (MHz)	Limit (dBµV/m)	Comment
108.496960	40.00	
135.619520	40.00	
298.366400	47.00	
352.602880	47.00	

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Vertical:



## Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)
81.383040	21.6	1000.000	120.000	100.0	V	137.0	-13.2	18.40
108.488320	31.8	1000.000	120.000	100.0	V	0.0	-11.5	8.20
135.619520	23.5	1000.000	120.000	112.0	V	334.0	-9.1	16.50

(continuation of the "Final Result 1" table from column 9 ...)

Frequency (MHz)	Limit (dBµV/m)	Comment
81.383040	40.00	
108.488320	40.00	
135.619520	40.00	

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## 7 Immunity Test Results

### 7.1 Performance Criteria Description in Clause 7 of EN 55024: 1998/A1:2001/A2: 2003

- Criterion A: The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment 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, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
- Criterion B: After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
- Criterion C: Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

### 7.2 ESD

Test Requirement:	EN 55024: 1998/A1:2001/A2: 2003	
Test Method:	IEC 61000-4-2: 2001	
Test Date:	March 23, 2010	
Discharge Impedance:	330 $\Omega$ / 150 pF	
Discharge Voltage:	Air Discharge:	$\pm 8$ kV
	Contact Discharge:	$\pm 4$ kV
	HCP:	$\pm 4$ kV
	VCP:	$\pm 4$ kV
Polarity:	Positive & Negative	
Number of Discharge:	Minimum 50 times at each test point for Contact and VCP Discharge;	
	Minimum 10 times at each test point for Air Discharge	
Discharge Mode:	Single Discharge	
Discharge Period:	1 second minimum	
Result:	<b>PASS</b>	

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### 7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 23.0 °C      Humidity: 45% RH      Atmospheric Pressure: 1011 mbar

EUT Operation: The EUT is in representative work mode.

### 7.2.2 Direct Application Test Results

Observations:      Test Point:

1. All insulated enclosure & seams around EUT.
2. All touchable metal material of EUT

Direct Application			Test Results	
Discharge Level (kV)	Polarity (+/-)	Test Points	Contact Discharge	Air Discharge
8	+/-	1	N/A	A
4	+/-	2	A	N/A

### Indirect Application Test Results

Observations:      Test Point: 1. All sides.

Indirect Application			Test Results	
Discharge Level (kV)	Polarity (+/-)	Test Point	Horizontal Coupling	Vertical Coupling
4	+/-	1	A	A

### Results:

N/A: Not applicable (not required in the standard or floor mounted the EUT)



### 7.3 Radiated Immunity ( 80MHz-1GHz )

Test Requirement: EN 55024: 1998/A1:2001/A2: 2003  
Test Method: IEC 61000-4-3:2008  
Test Date: March 23,2010  
Frequency Range: 80MHz-1GHz  
Test level: 3V/m on enclosure  
Modulation: 80%, 1kHz Amplitude Modulation  
Criteria: Performance criteria A  
Result: PASS

#### 7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 23 °C Humidity: 45% RH Atmospheric Pressure: 1011 mbar

EUT Operation: The EUT is in representative work mode.

#### 7.3.2 Test Results

Pass

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#### 7.4 Electrical Fast Transients (EFT)

Test Requirement: EN 55024: 1998/A1:2001/A2: 2003  
Test Method: IEC 61000-4-4:2004  
Test Date: March 24,2010  
Test Level:  $\pm 0.5\text{kV}$  on DC  
Polarity: Positive & Negative  
Repetition Frequency: 5kHz  
Burst Period: 300ms  
Test Duration: 2 minute per level & polarity

##### 7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 24 °C Humidity: 45% RH Atmospheric Pressure: 1011 mbar

EUT Operation: The EUT is in representative work mode.

##### 7.4.2 Test Results On AC Supply:

Lead under Test	Level ( $\pm\text{kV}$ )	Coupling Direct/Clamp	EUT operating mode	Observations (Performance Criterion)
Positive line,Negative Line	$\pm 0.5$	Direct	On mode	Criterion A

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## 7.5 Conducted Immunity 0.15MHz to 80MHz

Test Requirement: EN 55024: 1998/A1:2001/A2: 2003  
Test Method: IEC 61000-4-6:2006  
Test Date: March 24,2010  
Frequency Range: 0.15MHz to 80MHz  
Test level: 3V rms on DC Ports (unmodulated emf into 150 Ω)  
Modulation: 80%, 1kHz Amplitude Modulation

### 7.5.1 E.U.T. Operation

Operating Environment:  
Temperature: 24 °C Humidity: 45 % RH Atmospheric Pressure: 1011 mbar  
EUT Operation: The EUT is in representative work mode.

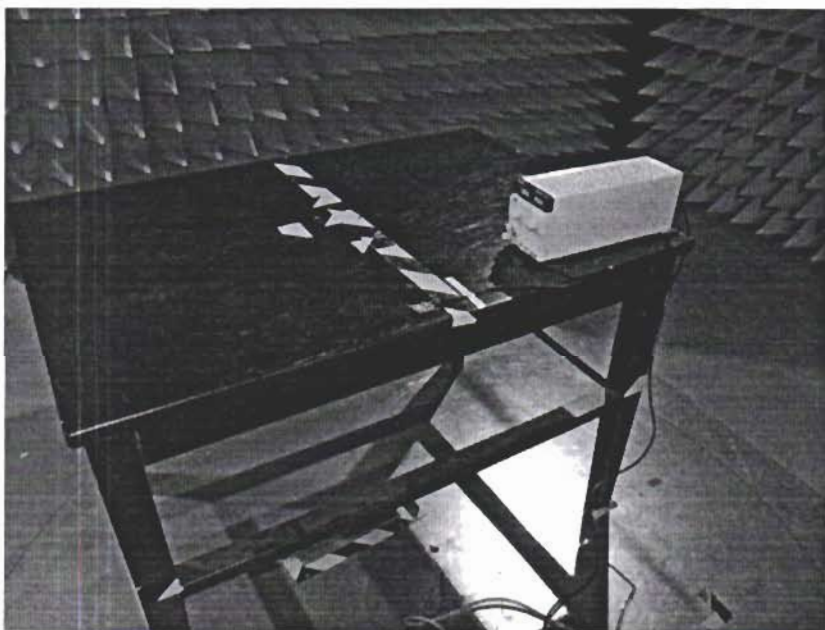
### 7.5.2 Test Results:

Frequency	Line	Test Level	Modulation	Step Size	Dwell Time	Observation (Performance Criterion)
150kHz to 80MHz	DC Supply Cable	3Vrms	80%, 1kHz Amp. Mod.	1%	3S	Criterion A



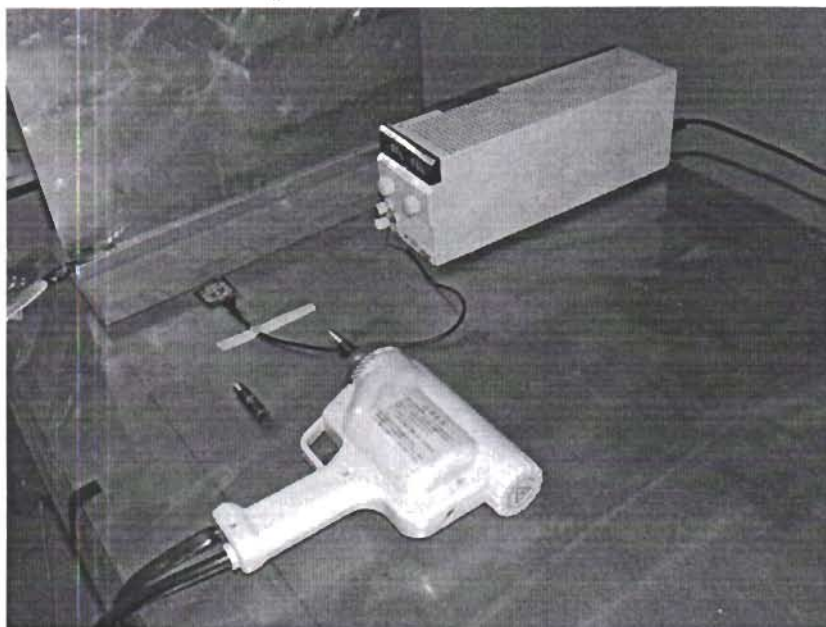
## 8 Photographs

### 8.1 Radiated Emission Test Setup



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## 8.2 ESD Test Setup



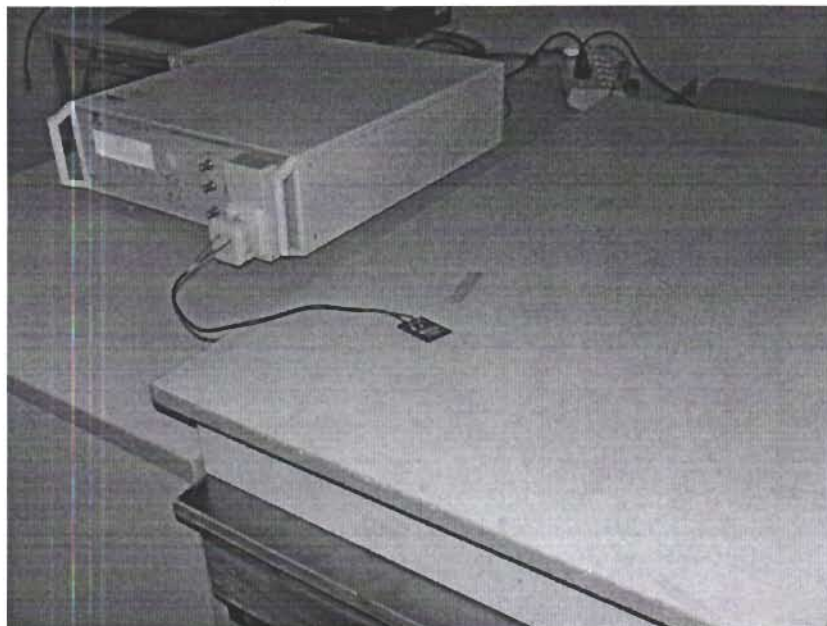
## 8.3 Radiated Immunity Test Setup



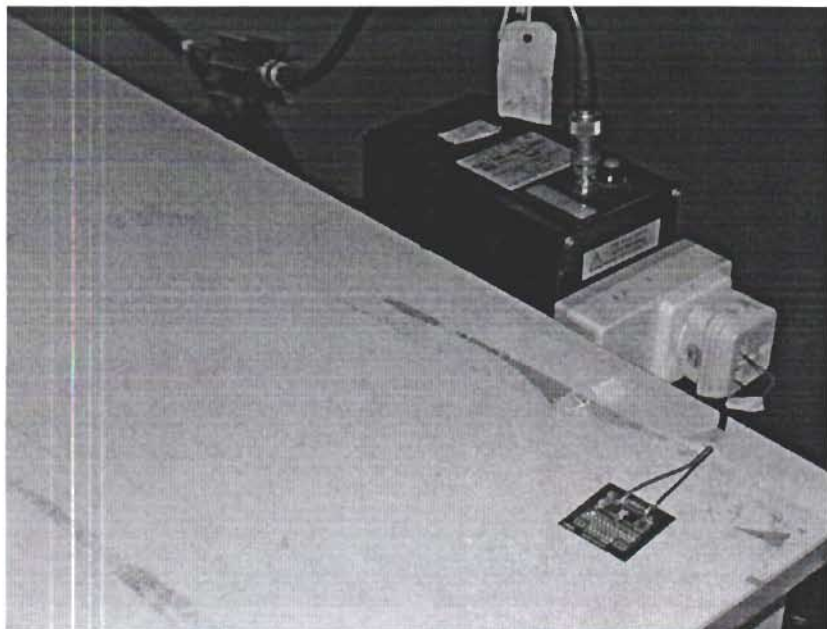
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## 8.4 EFT Test Setup



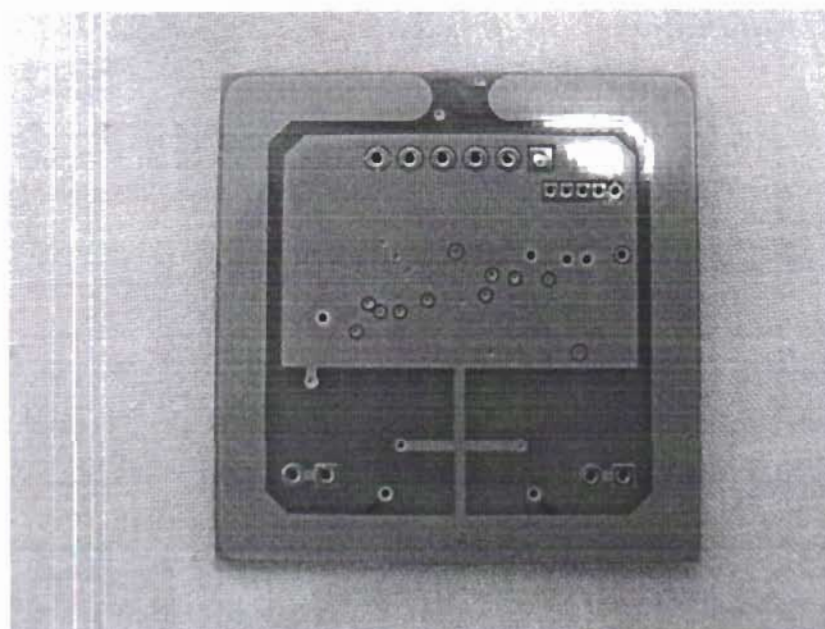
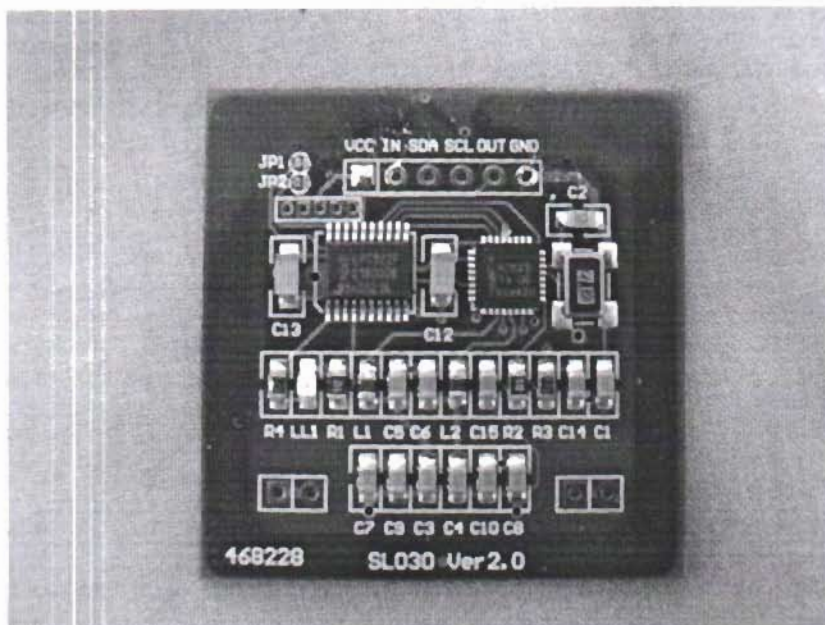
## 8.5 Conducted Immunity Test Setup



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## 8.6 EUT Constructional Details



*The end of report*

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