

# CE EMC TEST REPORT

for

**Pipette Aid (APC)**

**MODEL:**

**AriseAid, BasicPipette**

Test Report Number:

80630006-E

Issued for

**ARISE BIOTECH CORP.**

3F.,No.5,Alley 2,Sih-Wei Lane, Jhong-jheng Rd.,  
Sin-dian City, Taipei County,231,Taiwan(R.O.C.)

Issued By:

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Issued Date: July 17, 2008



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**Revision History**

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	July 17, 2008	Initial Issue	ALL	Jessica Ho



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# 1 TEST CERTIFICATION

<b>Product:</b>	Pipette Aid (APC)	
<b>Model:</b>	AriseAid, BasicPipette	
<b>Brand:</b>	Arise, Basic life	
<b>Applicant:</b>	<b>ARISE BIOTECH CORP.</b> 3F.,No.5,Alley 2,Sih-Wei Lane, Jhong-jheng Rd., Sin-dian City, Taipei County,231,Taiwan(R.O.C.)	
<b>Manufacturer:</b>	<b>ARISE BIOTECH CORP.</b> 3F.,No.5,Alley 2,Sih-Wei Lane, Jhong-jheng Rd., Sin-dian City, Taipei County,231,Taiwan(R.O.C.)	
<b>Tested:</b>	July 1 ~ 3, 2008	
<b>Test Voltage:</b>	230VAC, 50Hz	
<b>Applicable Standards:</b>	<b>EN 61000-6-3: 2007</b> EN 61000-3-2: 2006, Class D EN 61000-3-3: 1995 + A1: 2001 + A2: 2005	<b>EN 61000-6-1: 2007</b> IEC 61000-4-2: 1995 + A1: 1998 + A2: 2000 IEC 61000-4-3: 2002 + A1: 2002 IEC 61000-4-4: 2004 IEC 61000-4-5: 1995 + A1: 2000 IEC 61000-4-6: 1996 + A1: 2000 IEC 61000-4-8: 1993 + A1: 2000 IEC 61000-4-11: 2004

### Deviation from Applicable Standard

The radiated emissions test items was tested at Compliance Certification Services Inc. (Linkou Lab.)  
The test equipments were listed in page 18 and the test data, please refer page 21-22.

The above equipment has been tested by Compliance Certification Services Inc., and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

**Approved by:**

**Reviewed by:**

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Rex Lai  
Section Manager

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Amanda Wu  
Section Manager



## 2 TEST RESULT SUMMARY

EMISSION [ EN 61000-6-3: 2007 ]			
Standard	Item	Result	Remarks
EN 61000-6-3: 2007	Conducted (Main Port)	PASS	Meet Class D limit
	Radiated	PASS	Meet Class D limit
EN 61000-3-2: 2007	Harmonic current emissions	PASS	Meet Class D limit
EN 61000-3-3: 1995+ A1: 2001 + A2: 2005	Voltage fluctuations & flicker	PASS	Meet Class D limit

IMMUNITY [ EN 61000-6-1: 2007 ]			
Standard	Item	Result	Remarks
IEC 61000-4-2: 1995 + A1: 1998 + A2: 2000	ESD	PASS	Meets the requirements of Performance Criterion B
IEC 61000-4-3: 2002 + A1: 2002	RS	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-4: 2004	EFT	PASS	Meets the requirements of Performance Criterion B
IEC 61000-4-5: 1995 + A1: 2000	Surge	PASS	Meets the requirements of Performance Criterion B
IEC 61000-4-6: 1996 + A1: 2000	CS	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-8:1993 + A1: 2000	PFMF	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-11: 2004	Voltage dips & voltage variations	PASS	Meets the requirements of <b>Voltage Dips:</b> 1) 30% reduction Performance Criterion B 2) 60% reduction Performance Criterion C <b>Voltage Interruptions:</b> 1) >95% reduction Performance Criterion C

**Note:** (1). The test result judgment is decided by the limit of test standard  
 (2). The information of measurement uncertainty is available upon the customer's request.



### 3 EUT DESCRIPTION

<b>Product</b>	Pipette Aid (APC)		
<b>Model</b>	AriseAid, BasicPipette		
<b>Brand Name</b>	Arise, Basic life		
<b>Applicant</b>	ARISE BIOTECH CORP.		
<b>Serial Number</b>	80630006		
<b>Received Date</b>	June 30, 2008		
<b>EUT Power Rating</b>	1. VDC from Power Adapter 2. Battery: 3.7V		
<b>Power Adapter Manufacturer</b>	N/A	<b>Model</b>	TK Series
	ENG	<b>Model</b>	3A-041WU05
	ENG	<b>Model</b>	3A-041WU06
<b>Power Adapter Power Rating</b>	<b>For TK Series</b> I/P: 100-240VAC O/P: DC 6V, 400mA		
	<b>For 3A-041WU05</b> I/P: 100-240, 50-60Hz, 0.2A O/P: 5V, 1.0A		
	<b>For 3A-041WU06</b> I/P: 100-240, 50-60Hz, 0.2A O/P: DC 6V, 0.85A		
<b>AC Power Cord Type</b>	Unshielded, 1.5m (Detachable)		

**Remark:** 1. Difference between of the two model numbers (listed on this report) is identical, just for marketing purpose only.  
2. Client consigns only one sample to test (model number: AriseAid). Therefore, the testing Lab. just guarantees the unit, which has been tested.

## 4 TEST METHODOLOGY

### 4.1. DECISION OF FINAL TEST MODE

1. The following test mode(s) were scanned during the preliminary test:

Pre-Test Mode
<b>Mode 1:</b> EUT + Power Adapter (TK Serics) Operating
<b>Mode 2:</b> EUT + Power Adapter (3A-041WU05) Operating
<b>Mode 3:</b> EUT + Power Adapter (3A-041WU06) Operating

2. After the preliminary scan, the following test mode was found to produce the highest emission level.

Final Test Mode		
Emission	Conducted Emission	<b>Mode 1</b>
	Radiated Emission	<b>Mode 1</b>
Immunity		<b>Mode 1</b>

Then, the above highest emission mode of the configuration of the EUT and cable was chosen for all final test items.

### 4.2. EUT SYSTEM OPERATION

The EUT with AC adaptor during all testing.

**Note:** Test program is self-repeating throughout the test.



## 5 SETUP OF EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

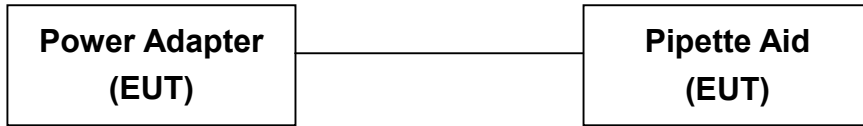
No.	Equipment	Model No.	Serial No.	FCC ID	Trade Name	Data Cable	Power Cord
	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**Note:** Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.



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## 5.2. CONFIGURATION OF SYSTEM UNDER TEST





## **6 FACILITIES AND ACCREDITATIONS**

### **6.1. FACILITIES**

All measurement facilities used to collect the measurement data are located at:

- No. 81-1, Lane 210, Pa-De 2nd Rd., Luchu Hsiang, Taoyuan Shien, Taiwan.
- No.11, Wugong 6th Rd., Wugu Industrial Park, Taipei Hsien 248, Taiwan

The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. All receiving equipment conforms to CISPR 16-1-1, CISPR 16-1-2, CISPR 16-1-3, CISPR 16-1-4, CISPR 16-1-5.

### **6.2. ACCREDITATIONS**

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

<b>USA</b>	FCC, A2LA
<b>Canada</b>	INDUSTRY CANADA
<b>Taiwan</b>	TAF, NCC

Copies of granted accreditation certificates are available for downloading from our web site, <http://www.ccsemc.com>

### 6.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Uncertainty
Conducted emissions	9kHz~30MHz	+/-2.81 dB
Radiated emissions # 3	30~200MHz	+/-4.02 dB
	200~1000MHz	+/-3.87 dB

*This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.*

*Consistent with industry standard (e.g. CISPR 22: 2006, clause 11, Measurement Uncertainty) determining compliance with the limits shall be base on the results of the compliance measurement. Consequently the measure emissions being less than the maximum allowed emission result in this be a compliant test or passing test.*

*The acceptable measurement uncertainty value without requiring revision of the compliance statement is base on conducted and radiated emissions being less than UCISPR which is 3.6dB and 5.2dB respectively. CCS values (called ULab in CISPR 16-4-2) is less than UCISPR as shown in the table above. Therefore, MU need not be considered for compliance.*



## 7 EMISSION TEST

### 7.1. CONDUCTED EMISSION MEASUREMENT

#### 7.1.1. LIMITS

##### Maximum permissible level of Line Conducted Emission for AC mains

Frequency (MHz)	EN 61000-6-3 (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

- Note:** (1). The lower limit shall apply at the transition frequencies.  
 (2). The limit decreases in line with the logarithm of the frequency in the range 0.15 to 0.50 MHz.  
 (3). All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

##### Maximum permissible level of Line Conducted Emission for DC mains

Frequency (MHz)	Class B (dBuA)	
	Quasi-peak	Average
0.15 - 0.5	40 - 30	30 - 20
0.50 - 30.0	30	20

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

#### 7.1.2. TEST INSTRUMENTS

Conducted Emission Room				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver 9kHz-30MHz	Rohde & Schwarz	ESHS30	828144/003	11/18/2009
Two-Line V-Network 9kHz-30MHz	Schaffner	NNB41	03/10013	06/11/2009
LISN 10kHz-100MHz	EMCO	3825/2	9106-1809	04/09/2009
ISN 9kHz-30MHz	FCC	FCC-TLISN-T4	20167	09/14/2008
Test S/W	LABVIEW (V 6.1)			

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

**7.1.3. TEST PROCEDURES** (please refer to measurement standard or CCS SOP PA-031)**For AC Mains**

- The EUT was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per CISPR 22 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- Support equipment, if needed, was placed as per CISPR 22.
- All I/O cables were positioned to simulate typical actual usage as per CISPR 22.
- The test equipment EUT installed received AC power, 230VAC/50Hz, through a Line Impedance Stabilization Network (LISN), which supplied power source and was grounded to the ground plane.
- All support equipment received power from a second LISN.
- The EUT test program was started. Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.
- The Receiver scanned from 150kHz to 30MHz for emissions in each of the test modes.
- During the above scans, the emissions were maximized by cable manipulation.
- The test mode(s) described in Item 3.2 were scanned during the preliminary test.
- After the preliminary scan, we found the test mode described in Item 3.2 producing the highest emission level.
- The EUT configuration and cable configuration of the above highest emission level were recorded for reference of the final test.

**Procedure of Final Test**

- EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.
- A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.
- The test data of the worst-case condition(s) was recorded.



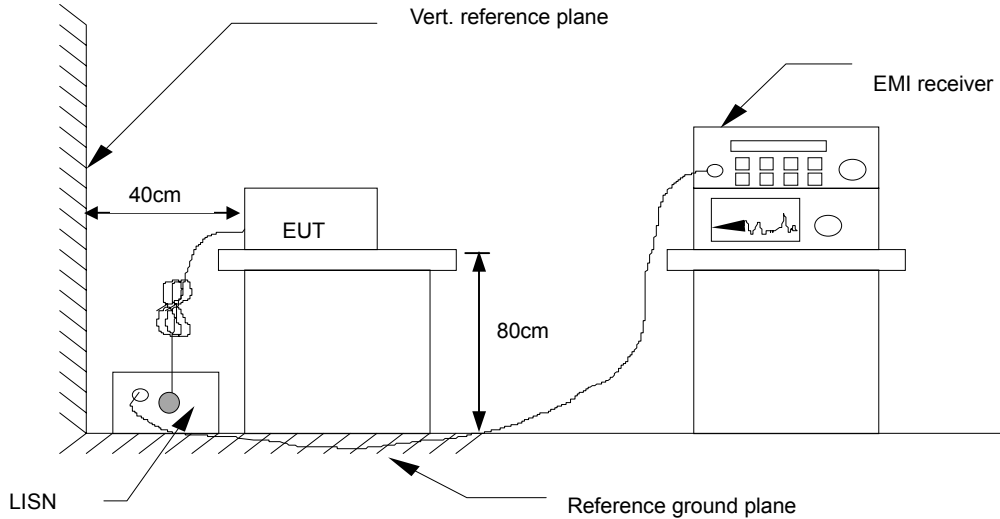
**For DC Mains**

- The EUT was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per CISPR 22 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- Support equipment, if needed, was placed as per CISPR 22.
- All I/O cables were positioned to simulate typical actual usage as per CISPR 22.
- The test equipment EUT installed received DC power, 12VDC, through a Power Line Coupling Decoupling Network (CDN), which supplied power source and was grounded to the ground plane.
- All support equipment received power from a second LISN.
- The EUT test program was started. Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the current probe powering the EUT.
- The Receiver scanned from 150kHz to 30MHz for emissions in each of the test modes.
- During the above scans, the emissions were maximized by cable manipulation.
- The test mode(s) described in Item 3.2 were scanned during the preliminary test.
- After the preliminary scan, we found the test mode described in Item 3.2 producing the highest emission level.
- The EUT configuration and cable configuration of the above highest emission level were recorded for reference of the final test.

**Procedure of Final Test**

- EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.
- A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.
- The test data of the worst-case condition(s) was recorded.

**7.1.4. TEST SETUP**



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

**7.1.5. DATA SAMPLE**

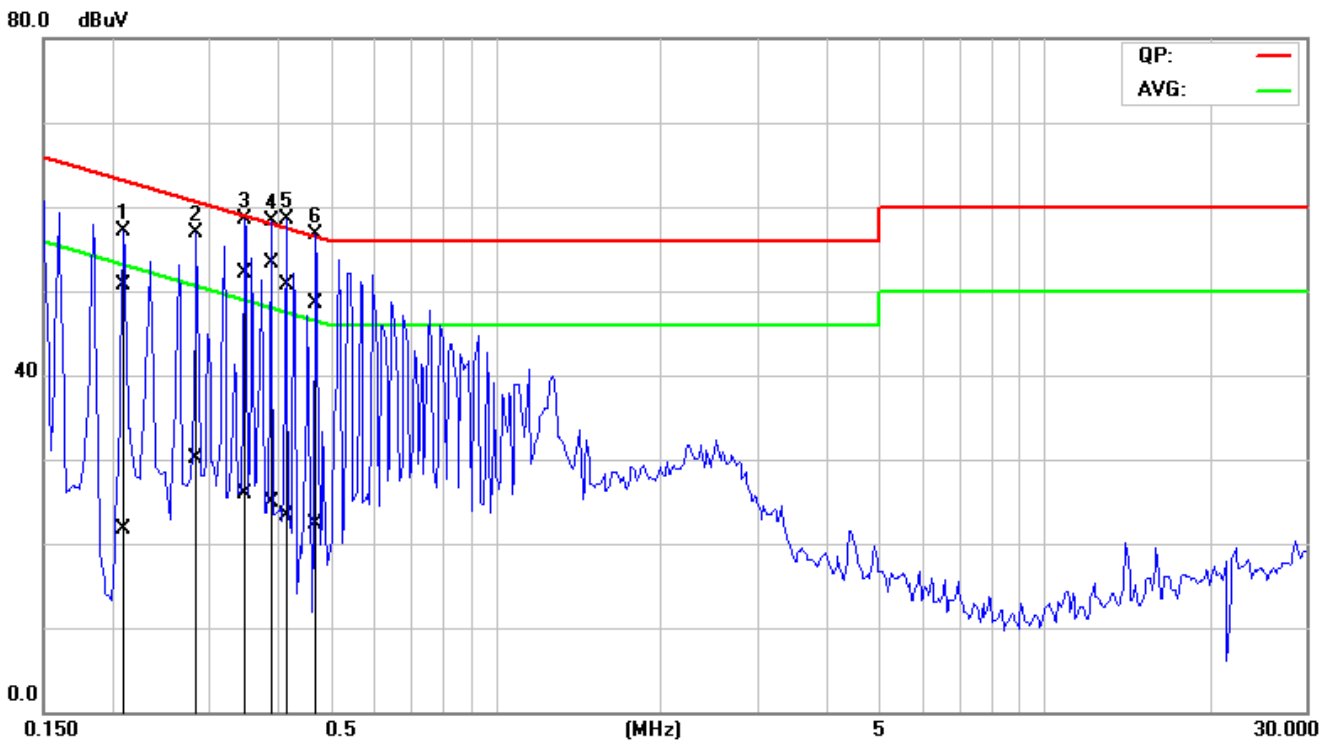
Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
x.xx	43.95	33.00	10.00	53.95	43.00	56.00	46.00	-2.05	-3.00	Pass

Frequency (MHz) = Emission frequency in MHz  
 Reading (dBuV) = Uncorrected Analyzer/Receiver reading + Insertion loss of LISN, if it > 0.5 dB  
 Correction Factor (dB) = LISN Factor + Cable loss  
 Result (dBuV) = Raw reading converted to dBuV and CF added  
 Limit (dBuV) = Limit stated in standard  
 Margin (dB) = Result (dBuV) – Limit (dBuV)



7.1.6. TEST RESULTS

Job No.:	80630006	Line:	L1
Standard:	CISPR 22 Class B		
Test Item:	Conduction Emission	Date:	2008/7/1
Temp.(°C)/Hum.(%RH):	22°C/45%RH	Time:	PM 01:54:49
Company:	ARISE BIOTECH CORP.	Tested By:	Leo Shi
Model:	AriseAid	Test Mode:	Mode 1



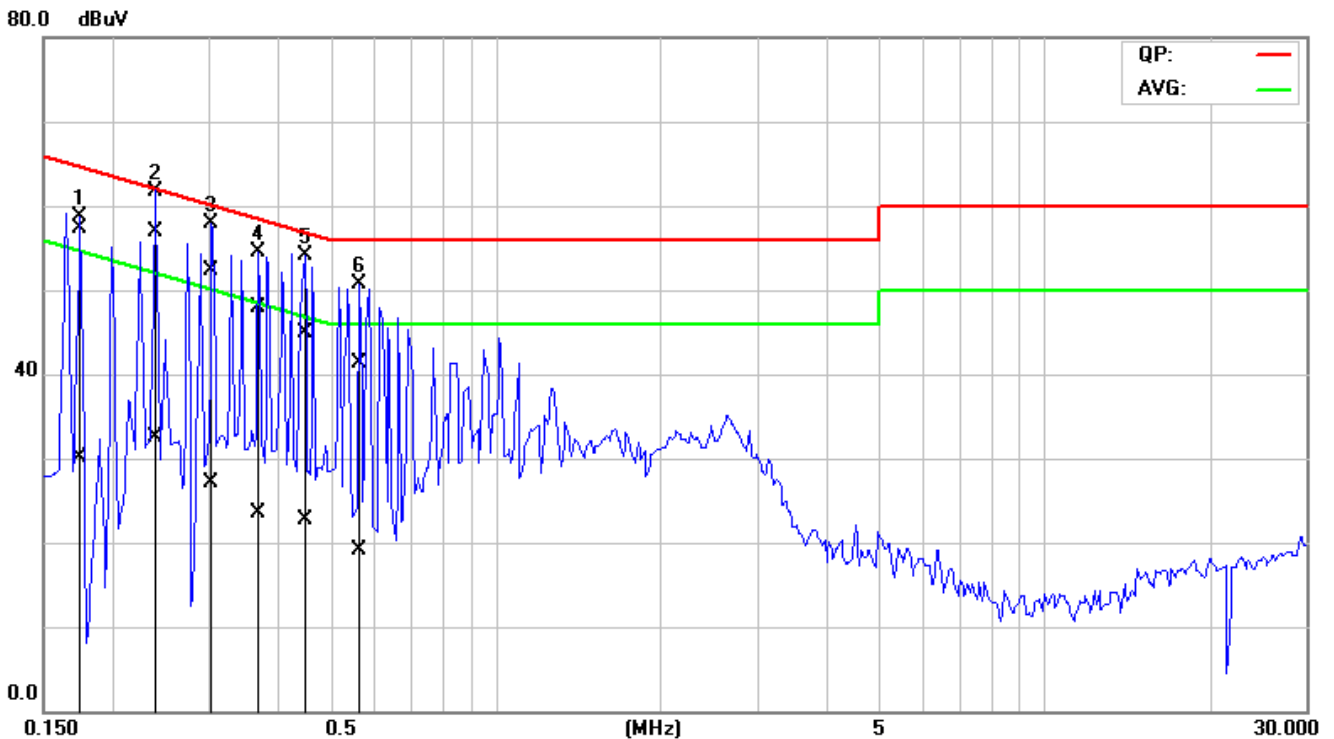
NO.	Frequency (MHz)	Quasi Peak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	Quasi Peak result (dBuV)	Average result (dBuV)	Quasi Peak limit (dBuV)	Average limit (dBuV)	Quasi Peak margin (dB)	Average margin (dB)	Remark
1	0.2100	50.54	21.64	0.16	50.70	21.80	63.21	53.21	-12.51	-31.41	Pass
2	0.2850	56.78	29.98	0.12	56.90	30.10	60.67	50.67	-3.77	-20.57	Pass
3	0.3500	52.10	25.90	0.10	52.20	26.00	58.96	48.96	-6.76	-22.96	Pass
4	0.3900	53.22	24.92	0.08	53.30	25.00	58.06	48.06	-4.76	-23.06	Pass
5	0.4150	50.73	23.23	0.07	50.80	23.30	57.55	47.55	-6.75	-24.25	Pass
6	0.4700	48.46	22.26	0.04	48.50	22.30	56.51	46.51	-8.01	-24.21	Pass

REMARKS: L1 = Line One (Live Line)





Job No.:	80630006	Line:	L2
Standard:	CISPR 22 Class B		
Test Item:	Conduction Emission	Date:	2008/7/1
Temp.(°C)/Hum.(%RH):	22°C/45%RH	Time:	PM 02:13:14
Company:	ARISE BIOTECH CORP.	Tested By:	Leo Shi
Model:	AriseAid	Test Mode:	Mode 1



NO.	Frequency (MHz)	Quasi Peak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	Quasi Peak result (dBuV)	Average result (dBuV)	Quasi Peak limit (dBuV)	Average limit (dBuV)	Quasi Peak margin (dB)	Average margin (dB)	Remark
1	0.1750	57.23	30.03	0.17	57.40	30.20	64.72	54.72	-7.32	-24.52	Pass
2	0.2400	56.87	32.47	0.13	57.00	32.60	62.10	52.10	-5.10	-19.50	Pass
3	0.3050	52.29	27.09	0.11	52.40	27.20	60.11	50.11	-7.71	-22.91	Pass
4	0.3700	47.82	23.42	0.08	47.90	23.50	58.50	48.50	-10.60	-25.00	Pass
5	0.4500	44.85	22.75	0.05	44.90	22.80	56.88	46.88	-11.98	-24.08	Pass
6	0.5650	41.37	19.07	0.03	41.40	19.10	56.00	46.00	-14.60	-26.90	Pass

REMARKS: L2 = Line One (Live Line)



**7.2. RADIATED EMISSION MEASUREMENT**

**7.2.1. LIMITS**

Frequency (MHz)	dBuV/m (At 10m)
	Class B
30 ~ 230	30
230 ~ 1000	37

**Note:** (1). The lower limit shall apply at the transition frequencies.  
 (2). Emission level (dBuV/m) = 20 log Emission level (uV/m).

**7.2.2. TEST INSTRUMENTS**

Open Area Test Site # 3				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilnet	E4411B	MY41440314	N.C.R
Spectrum Analyzer	R&S	FSP30	100112	10/14/2008
EMI Test Receiver	R&S	ESVS30	828488/004	03/20/2009
Pre-Amplifier	Mini-Circuits	ZKL-2R5	83153007374	04/02/2009
Pre-Amplifier	Agilent	8449B	3008A01738	03/28/2009
Bilog Antenna	Sunol Sciences	JB1	A031605	04/03/2009
Horn Antenna	EMCO	3115	00022250	05/08/2009
Loop Antenna	EMCO	6502	2356	05/28/2010
Turn Table	Chance Most	CM-T003-1	T807-6	N.C.R
Antenna Tower	Chance Most	CM-A003-1	A807-6	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R
RF Switch	ANRITSU	MP59B	M53867	N.C.R
Site NSA	CCS	N/A	N/A	05/09/2009
Test S/W	LabVIEW 6.1 (CCS OATS EMI SW V2.6)			

**Note:** (1). The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
 (2). N.C.R = No Calibration Request.

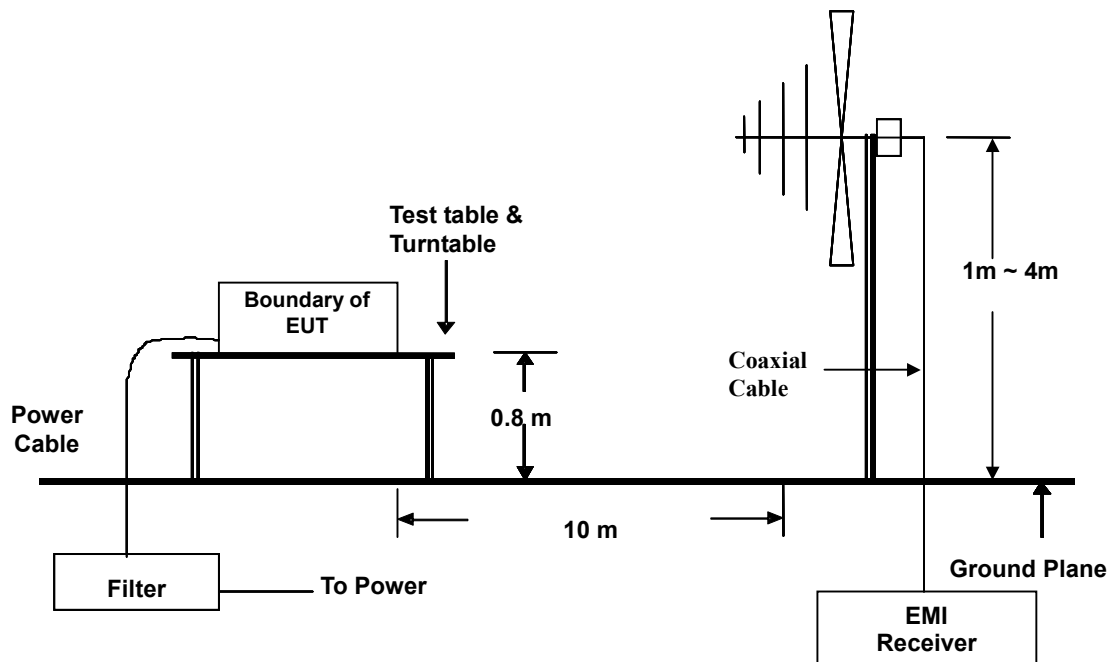
**7.2.3. TEST PROCEDURE** (please refer to measurement standard or CCS SOP PA-031)**Procedure of Preliminary Test**

- The equipment was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane. When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- Support equipment, if needed, was placed as per CISPR 22.
- All I/O cables were positioned to simulate typical usage as per CISPR 22.
- The EUT received AC power source, 230VAC/50Hz, from the outlet socket under the turntable. All support equipment received power from another socket under the turntable.
- For EUT powering on 12V DC power source, connect the EUT to battery directly.
- The antenna was placed at 10 meter away from the EUT as stated in CISPR 22. The antenna connected to the Spectrum Analyzer via a cable and at times a pre-amplifier would be used.
- The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- The test mode(s) described in Item 3.2 were scanned during the preliminary test:
- After the preliminary scan, we found the test mode described in Item 3.2 producing the highest emission level.
- The EUT and cable configuration, antenna position, polarization and turntable position of the above highest emission level were recorded for the final test.

**Procedure of Final Test**

- EUT and support equipment were set up on the turntable as per the configuration with highest emission level in the preliminary test.
- The Analyzer / Receiver scanned from 30MHz to 1000MHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and only Q.P. reading is presented.
- The test data of the worst-case condition(s) was recorded.

**7.2.4. TEST SETUP**



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

**7.2.5. DATA SAMPLE**

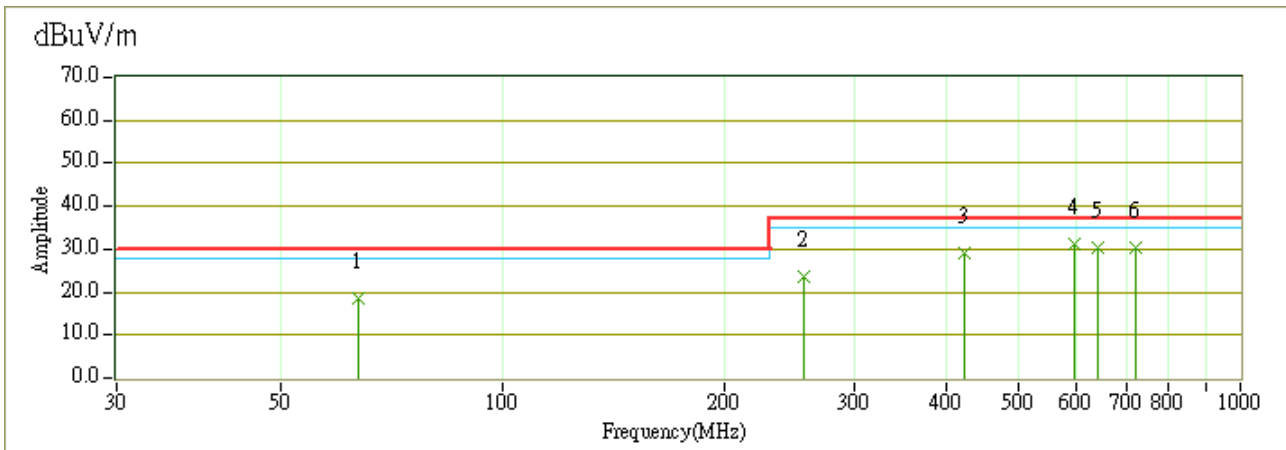
Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
xx.xx	16.49	9.86	26.35	30.00	-3.65	116.00	101.00	QP

Frequency (MHz) = Emission frequency in MHz  
 Reading (dBuV) = Uncorrected Analyzer / Receiver reading  
 Correction Factor (dB/m) = Antenna factor + Cable loss – Amplifier gain  
 Result (dBuV/m) = Reading (dBuV) + Corr. Factor (dB/m)  
 Limit (dBuV/m) = Limit stated in standard  
 Margin (dB) = Result (dBuV/m) – Limit (dBuV/m)  
 Q.P. = Quasi-Peak

**7.2.6. TEST RESULTS**

**CCS Radiated Test OATS 3**

Job No.:	80630006	Ant. Polar.:	Ver.
Standard:	CISPR 22 Class B	Tested Distance:	10m
Test Item:	Radiated Emission	Date:	2008/7/3
Temp.(°C)/Hum.(%RH):	24°C/45%RH	Time:	PM 03:23
Company:	ARISE BIOTECH CORP.	Tested By:	Eddy Chung
Model:	AriseAid	Tested Mode:	1



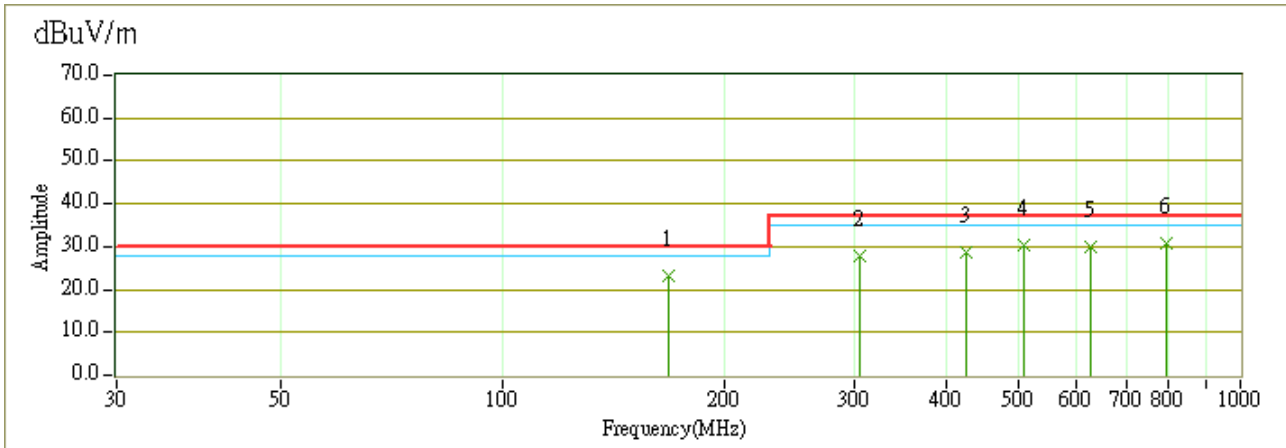
No.	Frequency (MHz)	Reading (dBuV)	Correction Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	63.95	10.20	8.41	18.61	30.00	-11.39	QP
2	255.53	9.60	13.98	23.58	37.00	-13.42	QP
3	422.85	10.10	18.85	28.95	37.00	-8.05	QP
4	597.45	9.10	22.06	31.16	37.00	-5.84	QP
5	641.10	6.90	23.66	30.56	37.00	-6.44	QP
6	721.30	6.20	24.07	30.27	37.00	-6.73	QP

**Note:** The other emission levels were very low against the limit.



### CCS Radiated Test OATS 3

Job No.:	80403005	Ant. Polar.:	Hor.
Standard:	CISPR 22 Class B	Tested Distance:	10m
Test Item:	Radiated Emission	Date:	2008/7/3
Temp.(°C)/Hum.(%RH):	24°C/45%RH	Time:	PM 03:27
Company:	ARISE BIOTECH CORP.	Tested By:	Eddy Chung
Model:	AriseAid	Tested Mode:	1



No.	Frequency (MHz)	Reading (dBuV)	Correction Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	168.30	9.10	14.09	23.19	30.00	-6.81	QP
2	304.20	12.00	16.02	28.02	37.00	-8.98	QP
3	425.60	9.60	18.91	28.51	37.00	-8.49	QP
4	510.13	8.50	21.93	30.43	37.00	-6.57	QP
5	626.30	6.80	23.10	29.90	37.00	-7.10	QP
6	793.20	5.50	25.47	30.97	37.00	-6.03	QP

**Note:** The other emission levels were very low against the limit.

### 7.3. HARMONICS CURRENT MEASUREMENT

#### 7.3.1. LIMITS OF HARMONICS CURRENT MEASUREMENT

Limits for Class A equipment		Limits for Class D equipment		
Harmonics Order n	Max. permissible harmonics current A	Harmonics Order n	Max. permissible harmonics current per watt mA/W	Max. permissible harmonics current A
Odd harmonics		Odd Harmonics only		
3	2.30	3	3.4	2.30
5	1.14	5	1.9	1.14
7	0.77	7	1.0	0.77
9	0.40	9	0.5	0.40
11	0.33	11	0.35	0.33
13	0.21	13	0.30	0.21
15<=n<=39	0.15x15/n	15<=n<=39	3.85/n	0.15x15/n
Even harmonics				
2	1.08			
4	0.43			
6	0.30			
8<=n<=40	0.23x8/n			

- Note:** (1). Class A and Class D are classified according to item 7.4.3.  
 (2). According to section 7 of IEC 61000-3-2, the above limits for all equipment except for lighting equipment having an active input power > 75 W and no limits apply for equipment with an active input power up to and including 75 W.

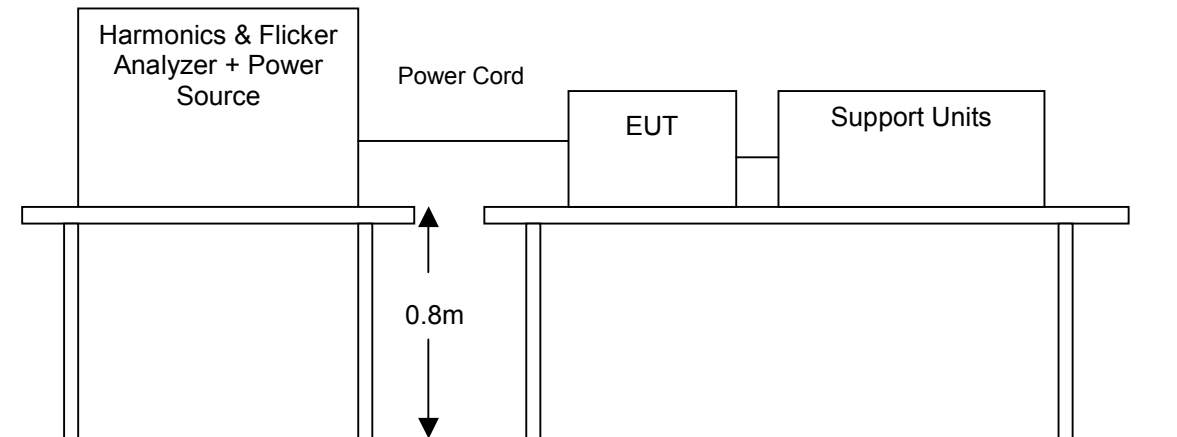
#### 7.3.2. TEST INSTRUMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Harmonic & Flicker Tester	EMC-Partner	HAR1000-1P	107	05/20/2009
Test S/W	HARCS (Ver. 4.16)			

**NOTE:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

**7.3.3. TEST PROCEDURE** (please refer to measurement standard or CCS SOP PA-029)

- The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn.
- The classification of EUT is according to section 5 of IEC 61000-3-2.
- The EUT is classified as follows:  
Class A: Balanced three-phase equipment, Household appliances excluding equipment as Class D, Tools excluding portable tools, Dimmers for incandescent lamps, audio equipment, equipment not specified in one of the three other classes.  
Class B: Portable tools; Arc welding equipment which is not professional equipment.  
Class C: Lighting equipment.  
Class D: Equipment having a specified power less than or equal to 600 W of the following types: Personal computers and personal computer monitors and television receivers.
- The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the time necessary for the EUT to be exercised.

**7.3.4. TEST SETUP**

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



**7.3.5. TEST RESULTS**

<b>Power Consumption</b>	3.485W	<b>Test Results</b>	PASS
<b>Environmental Conditions</b>	25deg.C, 55% RH	<b>Limits</b>	Class <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D
<b>Test Mode</b>	Mode 1	<b>Tested by</b>	Leo Shi

**Harmonic Emission - IEC 61000-3-2 , EN 61000-3-2 , (EN60555-2)**

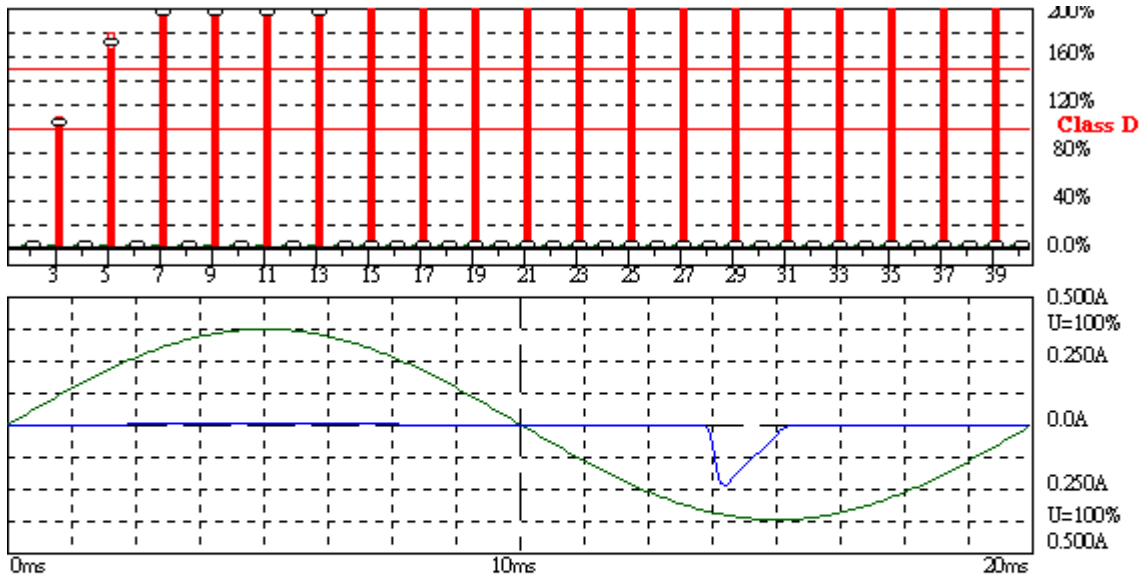
Comply: IEC 61000-3-2 Ed.3.0 - IEC 61000-4-7 Ed.2.0

Pipette Aid

AriseAid

Leo Sh

Remarks : Temp : 25°C Humidity : 55% RH



**Harmonic Emission - IEC 61000-3-2 , EN 61000-3-2 , (EN60555-2)**

2008/7/1 AM 02:45:01

U<sub>rms</sub> = 229.9 V P = 3.485 W THC = 0.087 A Range: 0.5 A  
 I<sub>rms</sub> = 0.041 A pf = 0.374 P<sub>max</sub> = 3.749 W V<sub>nom</sub>: 230 V  
 TestTime: 5 min (100%)

##

Temp : 25°C Humidity : 55% RH

BAR-1000 EMC-Form

Full Bar : Actual Values

Empty Bar : Maximum Values

Blue : Current , Green : Voltage , Red : Failed

**Note:** According to clause 7 of IEC 61000-3-2, equipment with a rated power of 75W or less, no limits apply.



## 7.4. VOLTAGE FLUCTUATION AND FLICKS MEASUREMENT

### 7.4.1. LIMITS OF VOLTAGE FLUCTUATION AND FLICKS MEASUREMENT

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

### 7.4.2. TEST INSTRUMENTS

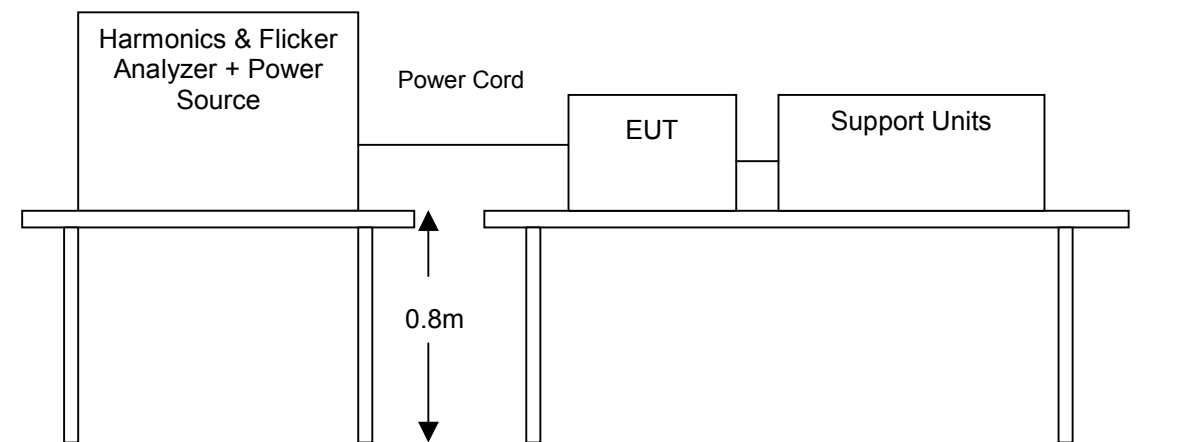
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Harmonic & Flicker Tester	EMC-Partner	HAR1000-1P	107	05/20/2009
Test S/W	HARCS (Ver. 4.16)			

**NOTE:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

**7.4.3. TEST PROCEDURE** (please refer to measurement standard or CCS SOP PA-030)

- The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the most unfavorable sequence of voltage changes under normal operating conditions.
- During the flick measurement, the measure time shall include that part of whole operation cycle in which the EUT produce the most unfavorable sequence of voltage changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.

**7.4.4. TEST SETUP**



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



7.4.5. TEST RESULTS

Observation Period (Tp)	10mins	Test Mode	Mode 1
Environmental Conditions	25deg.C, 55% RH	Tested by	Leo Shi

Test Parameter	Measurement Value	Limit	Remark
P <sub>st</sub>	0.072	1.0	PASS
P <sub>It</sub>	0.072	0.65	PASS
T <sub>dt</sub> (ms)	0	500	PASS
d <sub>max</sub> (%)	0%	4%	PASS
dc (%)	0%	3.3%	PASS

**Note:** d<sub>max</sub> (%) limit classified: (1). 6% for equipment which is switched manually or switched automatically more frequently than twice per day.  
(2). 7% for equipment which is attended whilst use or switched on automatically no more than twice per day.



Measurement

Date : 2008/7/1 AM 03:01:52 V4.16

Pipette Aid  
AriseAid  
Leo Sh

Remarks : Temp : 25'C Humidity : 55% RH

Urms = 229.9V Freq = 49.974 Range: 0.25 A  
Irms = OFL Ipk = OFL cf = 6.437  
P = OFL S = OFL pf = ---

Test - Time : 1 x 10min = 10min ( 100 %)

LIN (Line Impedance Network) : L: 0.24ohm +j0.15ohm N: 0.16ohm +j0.10ohm

Limits : Plt : 0.65 Pst : 1.00  
dmax : 4.00 % dc : 3.30 %  
dtLim: 3.30 % dt>Lim: 500ms

Test completed, Result: PASSED

Plt = 0.072

	Pst	P50s	P10s	P3s	P1s	P0.1s	Fli	dmax	dc	
	dt>Lim							[%]	[%]	[ms]
1	0.072	0.010	0.010	0.010	0.010	0.010	0.002	0.000	0.000	
	0.000									

## 8 IMMUNITY TEST

### 8.1. GENERAL DESCRIPTION

Product Standard	EN 61000-6-1: 2001	
	Test Type	Minimum Requirement
<b>Basic Standard, Specification, and Performance Criterion required</b>	IEC 61000-4-2	Electrostatic Discharge - ESD: 8kV air discharge, 4kV Contact discharge, Performance Criterion B
	IEC 61000-4-3	Radio-Frequency Electromagnetic Field Susceptibility Test - RS: 80 ~1000 MHz, 1000 ~ 2700 MHz 3V/m, 80% AM(1kHz), Performance Criterion A
	IEC 61000-4-4	Electrical Fast Transient/Burst - EFT, AC Power Port: 1kV DC Power Port: 0.5kV Signal Ports and Telecommunication Ports: 0.5kV Performance Criterion B
	IEC 61000-4-5	Surge Immunity Test: 1.2/50 us Open Circuit Voltage, 8 /20 us Short Circuit Current, AC Power Port ~ line to line: 1kV, line to earth (ground): 2kV DC Power Port ~ line to earth: 0.5kV Performance Criterion B
	IEC 61000-4-6	Conducted Radio Frequency Disturbances Test - CS: 0.15 ~ 80 MHz, 3Vrms, 80% AM, 1kHz, Performance Criterion A
	IEC 61000-4-8	Power frequency magnetic field immunity test 50 Hz, 3A/m Performance Criterion A
	IEC 61000-4-11	<b>Voltage Dips:</b> i) >95% reduction for 0.5 period, Performance Criterion B ii) 30% reduction for 25 period, Performance Criterion C <b>Voltage Interruptions:</b> >95% reduction for 250 period Performance Criterion C

**8.2. GENERAL PERFORMANCE CRITERIA DESCRIPTION**

<p><b>Criteria A:</b></p>	<p>The equipment shell continues 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 manufacturer does not specify the minimum performance level or the permissible performance loss, 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.</p>
<p><b>Criteria B:</b></p>	<p>After test, the equipment shell continues to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomenon 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.</p> <p>During the test, degradation of performance is however allowed. However, no change of operating state if stored data is allowed to persist after the test.</p> <p>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.</p>
<p><b>Criteria C:</b></p>	<p>Loss of function is allowed, provided the functions is self-recoverable or can be restored by the operation of controls by the user in accordance with the manufacturer instructions.</p> <p>Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.</p>



### 8.3. ELECTROSTATIC DISCHARGE (ESD)

#### 8.3.1. TEST SPECIFICATION

<b>Basic Standard:</b>	IEC 61000-4-2
<b>Discharge Impedance:</b>	330 ohm / 150 pF
<b>Discharge Voltage:</b>	Air Discharge: 2; 4; 8 kV (Direct) Contact Discharge: 2; 4 kV (Direct/Indirect)
<b>Polarity:</b>	Positive & Negative
<b>Number of Discharge:</b>	Air Discharge: min. 10 times at single test point for each negative and positive polarity Contact Discharge: min. 200 times in total
<b>Discharge Mode:</b>	Single Discharge 1 second minimum

#### 8.3.2. TEST INSTRUMENT

IMMUNITY SHIELDED ROOM				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
ESD Simulator	NoiseKen	ESS-2002	ESS0463036	07/26/2008

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.



**8.3.3. TEST PROCEDURE** (please refer to measurement standard or CCS SOP PA-022)

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 (HCP)**. The remaining three test points shall each receive at least 50 direct contact discharges. If no direct contact test points are available, then at least 200 indirect discharges shall be applied in the indirect mode. Test shall be performed at a maximum repetition rate of one discharge per second.

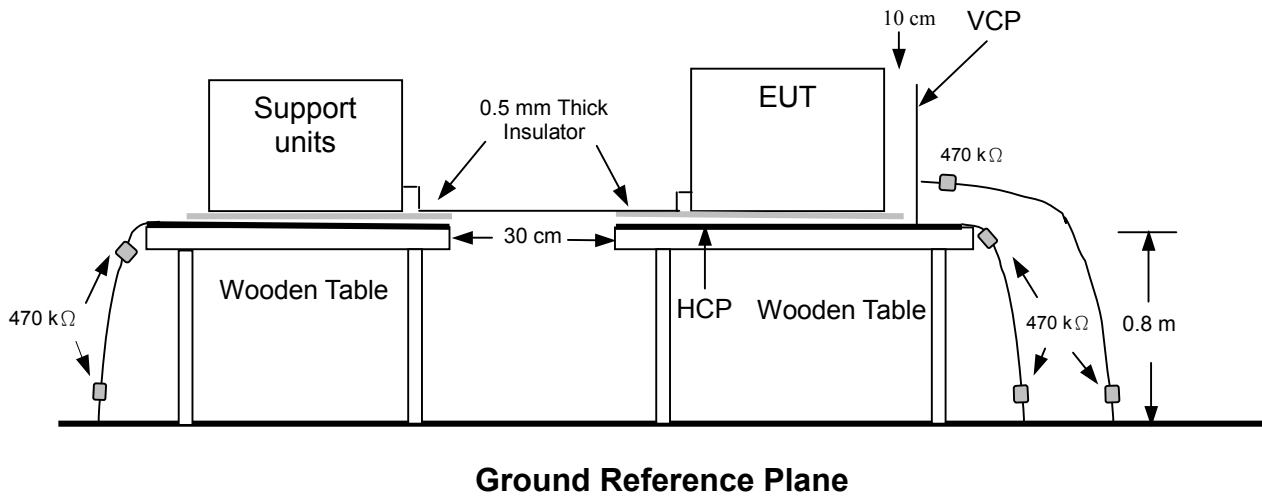
b) Air discharges at slots and apertures and insulating surfaces:

On those parts of the EUT where it is not possible to perform contact discharge testing, the equipment should be investigated to identify user accessible points where breakdown may occur. Such points are tested using the air discharge method. This investigation should be restricted to those area normally handled by the user. A minimum of 10 single air discharges shall be applied to the selected test point for each such area.

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

- a) The EUT was located 0.1 m minimum from all side of the **HCP** (dimensions 1.6m x 0.8m).
- b) The support units were located another table 30 cm away from the EUT, but direct support unit was/were located at same location as EUT on the HCP and keep at a distance of 10 cm with EUT.
- c) The time interval between two successive single discharges was at least 1 second.
- d) Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
- e) 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 complete.
- f) At least ten single discharges (in the most sensitive polarity) were applied at the front edge of each **HCP** opposite the center point of each unit of the EUT and 0.1 meters from the front of the EUT. The long axis of the discharge electrode was in the plane of the **HCP** and perpendicular to its front edge during the discharge.
- g) At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the **Vertical Coupling Plane (VCP)** in sufficiently different positions that the four faces of the EUT were completely illuminated. The **VCP** (dimensions 0.5m x 0.5m) was placed vertically to and 0.1 meters from the EUT.

**8.3.4. TEST SETUP**



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

**NOTE:**

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table 0.8 meters high standing on the **Ground Reference Plane**. The **GRP** consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A **Horizontal Coupling Plane** (1.6m x 0.8m) was placed on the table and attached to the **GRP** by means of a cable with 940kΩ total impedance. The equipment under test, was installed in a representative system as described in section 7 of IEC 61000-4-2, and its cables were placed on the **HCP** and isolated by an insulating support of 0.5mm thickness. A distance of 1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

FLOOR-STANDING EQUIPMENT

The equipment under test was installed in a representative system as described in section 7 of IEC 61000-4-2, and its cables were isolated from the Ground Reference Plane by an insulating support of 0.1-meter thickness. The GRP consisted of a sheet of aluminum that is at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.

**8.3.5. TEST RESULTS**

<b>Temperature</b>	25°C	<b>Humidity</b>	50% RH
<b>Pressure</b>	1010mbar	<b>Tested by</b>	Leo Shi
<b>Required Passing Performance</b>		<b>Criterion B</b>	

Air Discharge												
Test Points	Test Levels						Results					
	± 2 kV	Performance Criterion		± 4 kV	Performance Criterion		± 8 kV	Performance Criterion		Pass	Fail	Observation
Front	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Note 1
Back	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Note 1
Left	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Note 1
Right	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Note 1
Top	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Note 1
Bottom	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Note 1

Contact Discharge												
Test Points	Test Levels						Results					
	± 2 kV	Performance Criterion		± 4 kV	Performance Criterion		± 8 kV	Performance Criterion		Pass	Fail	Observation
Front	<input type="checkbox"/>	<input type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/>	<input type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/>	<input type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/>	<input type="checkbox"/>	Note 2
Back	<input type="checkbox"/>	<input type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/>	<input type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/>	<input type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/>	<input type="checkbox"/>	Note 2
Left	<input type="checkbox"/>	<input type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/>	<input type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/>	<input type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/>	<input type="checkbox"/>	Note 2
Right	<input type="checkbox"/>	<input type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/>	<input type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/>	<input type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/>	<input type="checkbox"/>	Note 2
Top	<input type="checkbox"/>	<input type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/>	<input type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/>	<input type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/>	<input type="checkbox"/>	Note 2
Bottom	<input type="checkbox"/>	<input type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/>	<input type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/>	<input type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/>	<input type="checkbox"/>	Note 2

For the tested points to EUT, please refer to attached page. (Red arrow mark for Air Discharge)

Discharge To Horizontal Coupling Plane								
Side of EUT	Test Levels				Results			
	± 2 kV	± 4 kV	± 8 kV	Pass	Fail	Performance Criterion		Observation
Front	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	Note 1
Back	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	Note 1
Left	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	Note 1
Right	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	Note 1

Discharge To Vertical Coupling Plane								
Side of EUT	Test Levels				Results			
	± 2 kV	± 4 kV	± 8 kV	Pass	Fail	Performance Criterion		Observation
Front	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	Note 1
Back	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	Note 1
Left	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	Note 1
Right	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	Note 1

**Note:** (1). There was no change compared with initial operation during the test.  
 (2). Means that no discharge point had been occurred during that particular coupling method.

***The Tested Points of EUT***

***Photo 1 of 1***





## **8.4. RADIATED, RADIO-FREQUENCY, ELECTROMAGNETIC FIELD (RS)**

### **8.4.1. TEST SPECIFICATION**

**Basic Standard:** IEC 61000-4-3

**Frequency Range:** 80 MHz ~1000 MHz, 1400 ~ 2000 MHz, 2000 ~ 2700 MHz

**Field Strength:** 3 V/m

**Modulation:** 1kHz Sine Wave, 80%, AM Modulation

**Frequency Step:** 1 % of preceding frequency value

**Polarity of Antenna:** Horizontal and Vertical

**Test Distance:** 3 m

**Antenna Height:** 1.5m



**8.4.2. TEST INSTRUMENT**

Immunity Shield Room				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Pulse Generator	Agilent	81101A	DE41B01423	06/11/2009
Signal Generator (250kHz-40GHz)	Agilent	E8257C	US42340383	07/19/2008
500 Watt 10kHz Amplifier	Amplifier Research	500A100A	300299	N.C.R
500 Watts 80-1000MHz Amplifier	Amplifier Research	500W 1000A	320994	N.C.R.
250 Watts 1-2.5GHz Amplifier	Amplifier Research	250T1G3M1	320245	N.C.R.
300 Watts 2.5-7.5GHz Amplifier	Amplifier Research	300T2G8M1	320255	N.C.R.
250 Watts 7.5-18GHz Amplifier	Amplifier Research	250T8G18M1	320246	N.C.R.
RF Test System Controller	Amplifier Research	SC1000M3	306666	N.C.R.
Power Meter	Boonton	4232A-01-02	98601	09/15/2008
Power Sensor	Boonton	51013-4E	34242	09/04/2008
Power Sensor	Boonton	51013-4E	34241	09/04/2008
Bi-log Antenna	SCHWAZBECK	VULB9166	9166-1093	N.C.R
Log-Periodic Antenna	Amplifier Research	AT1080	306709	N.C.R.
Horn	SCHWAZBECK	BBHA 9120D	530	N.C.R.
Field Probe (3M-18GHz)	Amplifier Research	FP7018	311430	05/21/2009
Dual Directional Coupler (80-1000MHz)	Amplifier Research	DC6180A	320285	N.C.R.
Dual Directional Coupler (0.8-4.2GHz)	Amplifier Research	DC7144A	313674	N.C.R.
Dual Directional Coupler (2-8GHz)	Amplifier Research	DC7280A	320524	N.C.R.
Dual Directional Coupler (7.5-18GHz)	Amplifier Research	DC7450M1	0320073	N.C.R.
Antenna Tower	Amplifier Research	TP2000	N/A	N.C.R.
Probe Stand	Amplifier Research	PS2000	N/A	N.C.R.
LISN	FCC	FCC-LISN-5-50-1-01-CISPR 25	06038	03/27/2009
LISN	FCC	FCC-LISN-5-50-1-01-CISPR 25	06039	03/27/2009
Software	SW1006			

**Note:** (1). The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

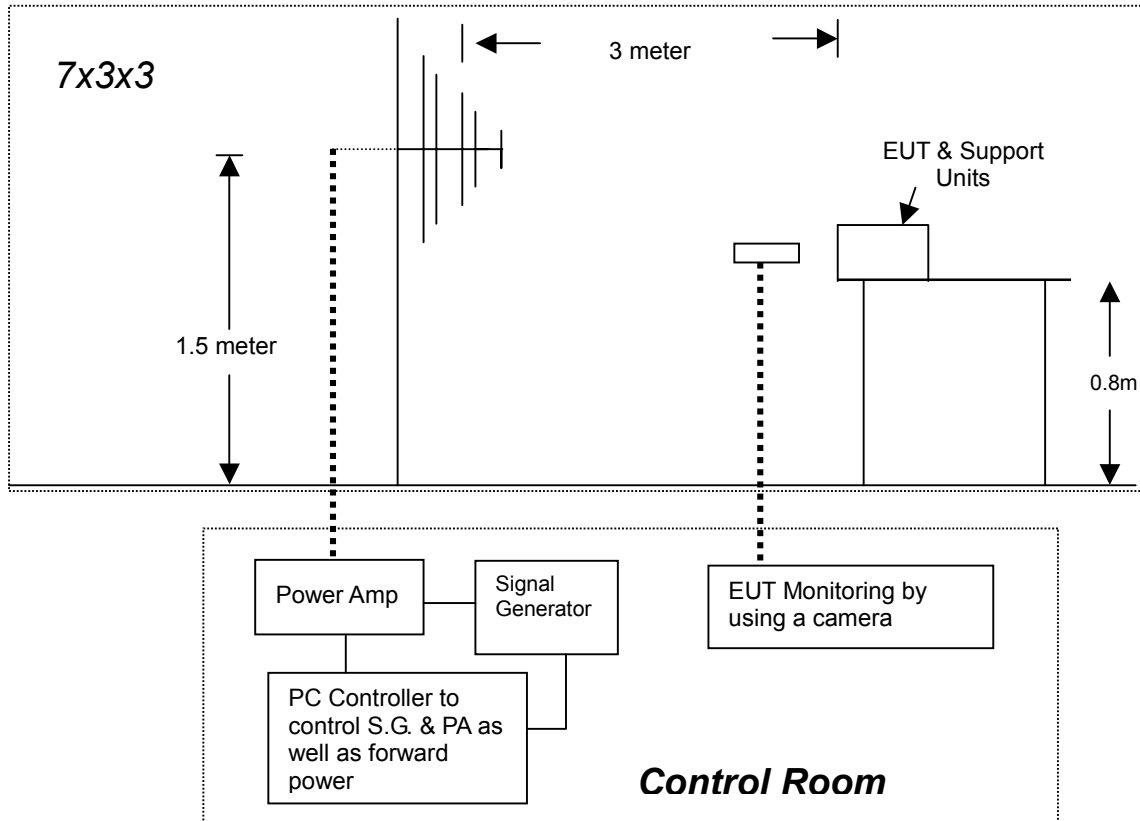
(2). N.C.R.= No Calibration required.

**8.4.3. TEST PROCEDURE** (please refer to measurement standard or CCS SOP PA-023)

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 1000 MHz, with the signal 80% amplitude modulated with a 1kHz sine-wave. The rate of sweep did not exceed  $1.5 \times 10^{-3}$  decade/s, where the frequency range is swept incrementally, the step size was 1% of preceding frequency value.
- c) The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- e) The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

**8.4.4. TEST SETUP**



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

**NOTE:**

TABLETOP EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

FLOOR STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC 61000-4-3 was placed on a non-conductive wood support 0.1 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.





8.4.5. TEST RESULTS

<b>Temperature</b>	25°C	<b>Humidity</b>	50% RH
<b>Pressure</b>	1010mbar	<b>Dwell Time</b>	3 sec.
<b>Tested by</b>	Leo Shi	<b>Required Passing Performance</b>	<b>Criterion A</b>

Frequency (MHz)	Polarity	Azimuth	Field Strength (V/m)	Performance Criterion	Observation	Result
80 ~ 1000	V&H	0	3	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note 1	PASS
80 ~ 1000	V&H	90	3	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note 1	PASS
80 ~ 1000	V&H	180	3	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note 1	PASS
80 ~ 1000	V&H	270	3	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note 1	PASS
1400 ~ 2000	V&H	0	3	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note 1	PASS
1400 ~ 2000	V&H	90	3	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note 1	PASS
1400 ~ 2000	V&H	180	3	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note 1	PASS
1400 ~ 2000	V&H	270	3	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note 1	PASS
2000 ~ 2700	V&H	0	1	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note 1	PASS
2000 ~ 2700	V&H	90	1	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note 1	PASS
2000 ~ 2700	V&H	180	1	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note 1	PASS
2000 ~ 2700	V&H	270	1	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note 1	PASS

Note: (1). There was no change compared with the initial operation during the test.



### 8.5. ELECTRICAL FAST TRANSIENT (EFT)

#### 8.5.1. TEST SPECIFICATION

<b>Basic Standard:</b>	IEC 61000-4-4
<b>Test Voltage:</b>	<input checked="" type="checkbox"/> AC Power Port: 1kV <input type="checkbox"/> DC Power Port: 0.5kV <input type="checkbox"/> Signal Ports and Telecommunication Ports: 0.5kV
<b>Polarity:</b>	Positive & Negative
<b>Impulse Frequency:</b>	5 kHz
<b>Impulse Wave-shape:</b>	5/50 ns
<b>Burst Duration:</b>	15 ms
<b>Burst Period:</b>	3 Hz
<b>Test Duration:</b>	Not less than 1 min.

#### 8.5.2. TEST INSTRUMENT

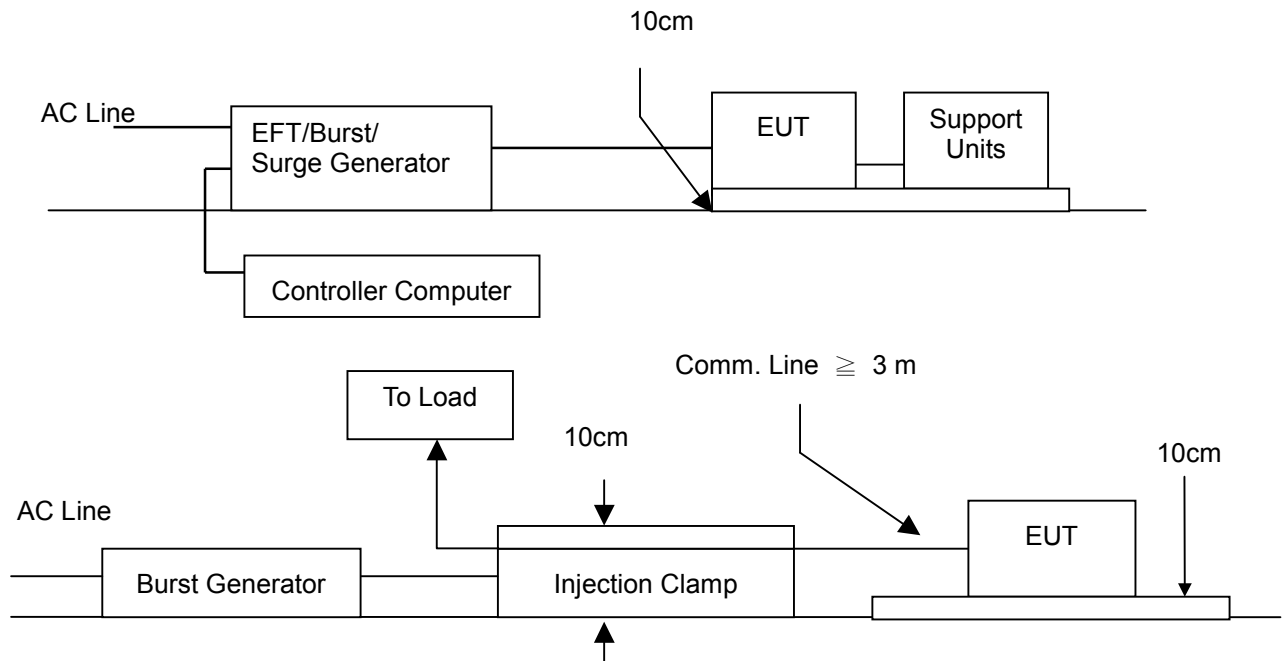
Immunity Shield Room				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
ECAT Control Center	KeyTek	E-Class Series 100	9502325	04/10/2009
Capacitor Clamp	KeyTek	CCL-4	9503290	N.C.R.
Test S/W	E400 Burstware (V4.19 (c))			

**Note:** (1). The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
(2). N.C.R.= No Calibration required.

#### 8.5.3. TEST PROCEDURE (please refer to measurement standard or CCS SOP PA-024)

- a) Both positive and negative polarity discharges were applied.
- b) The length of the “hot wire” from the coaxial output of the EFT generator to the terminals on the EUT should not exceed 1 meter.
- c) The duration time of each test sequential was 1 minute.
- d) The transient/burst waveform was in accordance with IEC 61000-4-4, 5/50ns.

**8.5.4. TEST SETUP**



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

**NOTE:**

TABLETOP EQUIPMENT

The configuration consisted of a wooden table (0.8m high) standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system. A minimum distance of 0.5m was provided between the EUT and the walls of the laboratory or any other metallic structure.

FLOOR STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC 61000-4-4 and its cables, were isolated from the Ground Reference Plane by an insulating support that is 0.1-meter thick. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system.



8.5.5. TEST RESULTS

<b>Temperature</b>	24°C	<b>Humidity</b>	50% RH
<b>Pressure</b>	1010mbar	<b>Tested by</b>	Leo Shi
<b>Required Passing Performance</b>		<b>Criterion B</b>	

Test Point	Polarity	Test Level (kV)	Performance Criterion	Observation	Result
L	+/-	1	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note 1	PASS
N	+/-	1	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note 1	PASS
PE	+/-	1	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note 1	PASS
L+N	+/-	1	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note 1	PASS
L +PE	+/-	1	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note 1	PASS
N + PE	+/-	1	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note 1	PASS
L +N +PE	+/-	1	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note 1	PASS

Note: (1). There was no change compared with initial operation during the test.



### 8.6. SURGE IMMUNITY TEST

#### 8.6.1. TEST SPECIFICATION

<b>Basic Standard:</b>	IEC 61000-4-5
<b>Wave-Shape:</b>	Combination Wave 1.2/50 us Open Circuit Voltage 8/20 us Short Circuit Current
<b>Test Voltage:</b>	<input checked="" type="checkbox"/> AC Power Port ~ line to line: 1kV, line to earth (ground): 2kV <input type="checkbox"/> DC Power Port ~ line to earth: 0.5kV
<b>Surge Input/Output:</b>	<input checked="" type="checkbox"/> AC Power Port: L-N / L-PE / N-PE <input type="checkbox"/> DC Power Port: L-PE
<b>Generator Source Impedance:</b>	2 ohm between networks 12 ohm between network and ground
<b>Polarity:</b>	Positive/Negative
<b>Phase Angle:</b>	0 / 90 / 180 / 270
<b>Pulse Repetition Rate:</b>	1 time / min. (maximum)
<b>Number of Tests:</b>	5 positive and 5 negative at selected points

#### 8.6.2. TEST INSTRUMENT

Immunity Shield Room				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
ECAT Control Center	KeyTek	E-Class Series 100	9502325	04/10/2009
External Coupler / Decoupler For Telecom Lines	KeyTek	CM-TELCD	0104399	N.C.R.
I/O Signal Line Coupler / Decoupler	KeyTek	CM-I / OCD	0103234	N.C.R.
Test S/W	E500 Surgeware (V4.19cc)			

**Note:** (1). The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
(2). N.C.R.= No Calibration required.

**8.6.3. TEST PROCEDURE** (please refer to measurement standard or CCS SOP PA-025)

a) For EUT power supply:

The surge is applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines, and to provide sufficient decoupling impedance to the surge wave. The power cord between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.

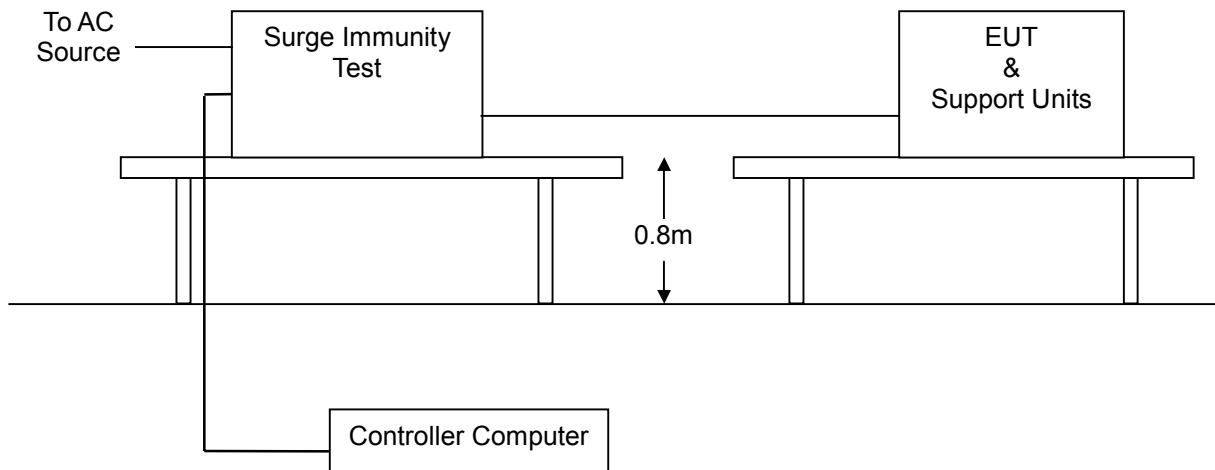
b) For test applied to unshielded un-symmetrically operated interconnection lines of EUT:

The surge was applied to the lines via the capacitive coupling. The coupling / decoupling networks didn't influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.

c) For test applied to unshielded symmetrically operated interconnection / telecommunication lines of EUT:

The surge was applied to the lines via gas arrestors coupling. Test levels below the ignition point of the coupling arrestor were not specified. The interconnection line between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.

**8.6.4. TEST SETUP**



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



**8.6.5. TEST RESULTS**

<b>Temperature</b>	25°C	<b>Humidity</b>	50% RH
<b>Pressure</b>	1010mbar	<b>Tested by</b>	Leo Shi
<b>Required Passing Performance</b>		<b>Criterion B</b>	

Test Point	Polarity	Test Level (kV)	Performance Criterion	Observation	Result
L - N	+/-	1	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note 1	PASS
L - PE	+/-	2	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note 1	PASS
N - PE	+/-	2	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note 1	PASS

**Note:** (1) There was no change compared with initial operation during the test.



## 8.7. CONDUCTED RADIO FREQUENCY DISTURBANCES (CS)

### 8.7.1. TEST SPECIFICATION

<b>Basic Standard:</b>	IEC 61000-4-6
<b>Frequency Range:</b>	0.15 MHz ~ 80 MHz
<b>Field Strength:</b>	3 Vrms
<b>Modulation:</b>	1kHz Sine Wave, 80%, AM Modulation
<b>Frequency Step:</b>	1 % of preceding frequency value
<b>Coupled cable:</b>	Power Mains, Unshielded
<b>Coupling device:</b>	<input type="checkbox"/> CDN-M2 (2 wires) <input checked="" type="checkbox"/> CDN-M3 (3 wires)





8.7.2. TEST INSTRUMENT

Immunity Shield Room				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Signal Generator	Agilent	8648C	4108A05773	09/19/2008
Power Amplifier	ar	500A100A	300299	N.C.R.
High Power Attenuator	Narda	769-6	02541	N.C.R.
Power Meter	Boonton	4232A-01-02	98501	09/20/2008
Power Sensor	Boonton	51011-EMC	32862	09/20/2008
Power Sensor	Boonton	51011-EMC	32864	09/20/2008
Power Line Coupling Decoupling Network	Fischer Custom Communications, Inc.	FCC-801-M2-16A	03026	09/21/2008
Power Line Coupling Decoupling Network	Fischer Custom Communications, Inc.	FCC-801-M3-16A	03027	09/21/2008
Signal Line Coupling Decoupling Network	Fischer Custom Communications, Inc.	FCC-801-T2	03016	09/21/2008
Signal Line Coupling Decoupling Network	Fischer Custom Communications, Inc.	FCC-801-T4	03017	09/21/2008
EM Injection Clamp	Fischer Custom Communications, Inc.	F-203I-23mm	421	09/21/2008
Passive Impedance Adapters	Fischer Custom Communications, Inc.	FCC-801-150-50-CDN	03053&03054	09/21/2008
Calibration Fixture	Fischer Custom Communications, Inc.	F-203I-CF-23mm	408	09/21/2008
Signal Line Coupling Decoupling Network	Fischer Custom Communications, Inc.	FCC-801-T8-RJ45	04024	09/21/2008
Attenuator	Amplifier Research	HFP-575-3/6-NM	NF201875106	N.C.R.
Coupler	Amplifier Research	DC2600A	306621	N.C.R.
Test SW	SW1005 (Release 1.4)			

**Note:** (1). The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
(2). N.C.R.= No Calibration required.



**8.7.3. TEST PROCEDURE** (please refer to measurement standard or CCS SOP PA-026)

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

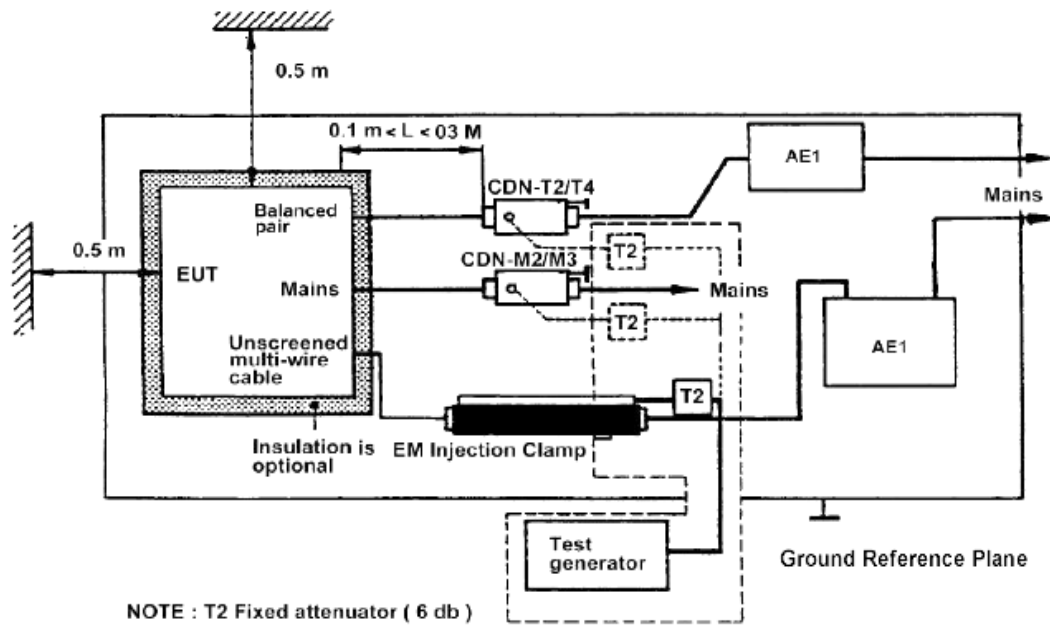
The test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn, while the other non-excited RF input ports of the coupling devices are terminated by a 50-ohm load resistor.

The frequency range was 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 was modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or the switch coupling devices as necessary. The sweep rate was  $1.5 \times 10^{-3}$  decades/s. Where the frequency range is swept incrementally, the step size was 1 % of preceding frequency value from 150 kHz to 80 MHz.

The dwell time at each frequency was less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies such as clock frequency(ies) and harmonics or frequencies of dominant interest, was analyzed separately.

Attempts were made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility.

8.7.4. TEST SETUP



- Note:** (1). The EUT is setup 0.1m above Ground Reference Plane  
 (2). The CDNs and / or EM clamp used for real test depends on ports and cables configuration of EUT.

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

**NOTE:**

TABLE-TOP AND FLOOR-STANDING EQUIPMENT

The equipment to be tested was placed on an insulating support of 0.1 meters height above a ground reference plane. All relevant cables shall be provided with the appropriate coupling and decoupling devices at a distance between 0.1 meters and 0.3 meters from the projected geometry of the EUT on the ground reference plane.



8.7.5. TEST RESULTS

<b>Temperature</b>	25°C	<b>Humidity</b>	50% RH
<b>Pressure</b>	1010mbar	<b>Tested by</b>	Leo Shi
<b>Required Passing Performance</b>		<b>Criterion A</b>	

Frequency Band (MHz)	Field Strength (Vrms)	Cable	Injection Method	Performance Criterion	Observation	Result
0.15 ~ 80	3	Power Line	CDN-M3	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	<b>Note 1</b>	PASS

Note: (1). There was no change compared with initial operation during the test.



### 8.8. POWER FREQUENCY MAGNETIC FIELD

#### 8.8.1. TEST SPECIFICATION

<b>Basic Standard:</b>	IEC 61000-4-8
<b>Frequency Range:</b>	50Hz,
<b>Field Strength:</b>	3 A/m
<b>Observation Time:</b>	1 minute
<b>Inductance Coil:</b>	Rectangular type, 1mx1m

#### 8.8.2. TEST INSTRUMENT

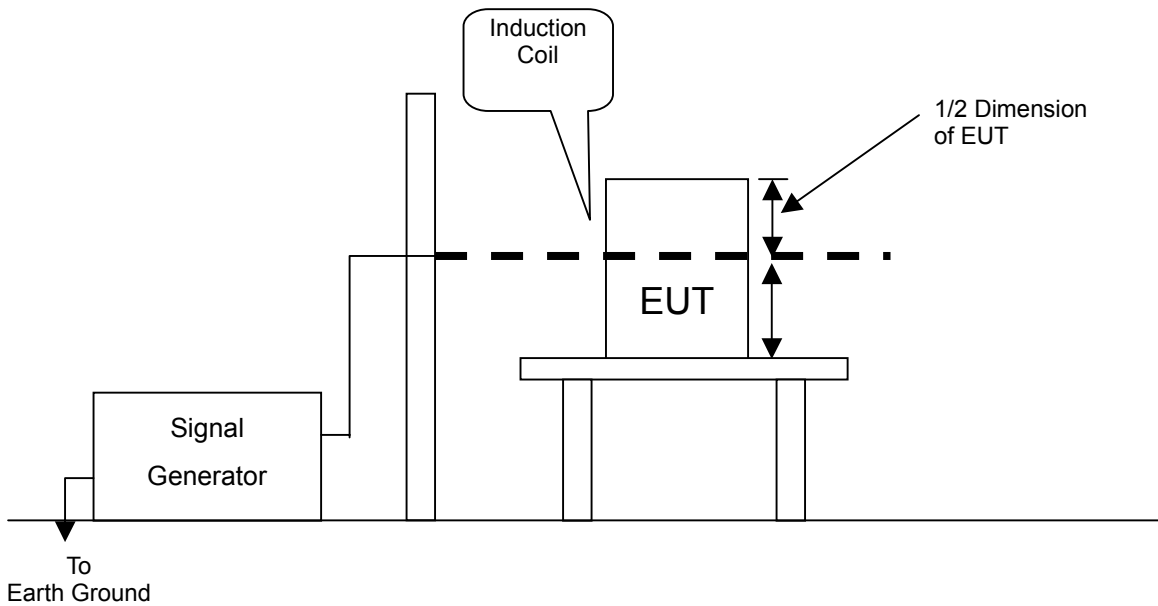
Immunity Shield Room				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Magnetic Field Tester	Haefely Trench	MAG100.1	081436-02	N.C.R.
Frequency Converter	Extech Electronics	CFC-105	810390	N.C.R.
Digital Multimeter	DHA	CM-312A	ET93C-06-208-01	05/30/2009
EMF Tester Electromagnetic Field	TES	1390	020401598	05/15/2009

**Note:** (1). The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
 (2) N.C.R.= No Calibration required.

#### 8.8.3. TEST PROCEDURE (please refer to measurement standard or CCS SOP PA-027)

- a) The equipment was configured and connected to satisfy its functional requirements. It shall be placed on the GRP with the interposition of a 0.1m-thick insulating support.
- b) The equipment cabinets shall be connected to the safety earth directly on the GRP via the earth terminal of the EUT.
- c) The power supply, input and output circuits shall be connected to the sources of power supply, control and signal.
- d) The cables supplied or recommended by the equipment manufacturer shall be used. 1 meter of all cables used shall be exposed to the magnetic field.

**8.8.4. TEST SETUP**



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

**NOTE:**

TABLETOP EQUIPMENT

The equipment shall be subjected to the test magnetic field by using the induction coil of standard dimension (1 m x 1 m). The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.

FLOOR-STANDING EQUIPMENT

The equipment shall be subjected to the test magnetic field by using induction coils of suitable dimensions. The test shall be repeated by moving and shifting the induction coils, in order to test the whole volume of the EUT for each orthogonal direction. The test shall be repeated with the coil shifted to different positions along the side of the EUT, in steps corresponding to 50 % of the shortest side of the coil. The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.



8.8.5. TEST RESULTS

<b>Temperature</b>	25°C	<b>Humidity</b>	50% RH
<b>Pressure</b>	1010mbar	<b>Tested by</b>	Leo Shi
<b>Required Passing Performance</b>		<b>Criterion A</b>	

DIRECTION	Field Strength (A/m)	Performance Criterion	OBSERVATION	RESULTS
X	3	A	<b>Note 1</b>	Pass
Y	3	A	<b>Note 1</b>	Pass
Z	3	A	<b>Note 1</b>	Pass

**Note:** (1). There was no change compared with the initial operation during the test.



### 8.9. VOLTAGE DIP & VOLTAGE INTERRUPTIONS

#### 8.9.1. TEST SPECIFICATION

<b>Basic Standard:</b>	IEC 61000-4-11
<b>Test duration time:</b>	Minimum three test events in sequence
<b>Interval between event:</b>	Minimum 10 seconds
<b>Angle:</b>	0~360 degree
<b>Step:</b>	45 degree

#### 8.9.2. TEST INSTRUMENT

Immunity shielded room				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Dips/Interruption and Variations Simulator	Haefely Trench	PLINE 1610	081568-06	08/06/2008
Test S/W	WinPATS (V. 3.26)			

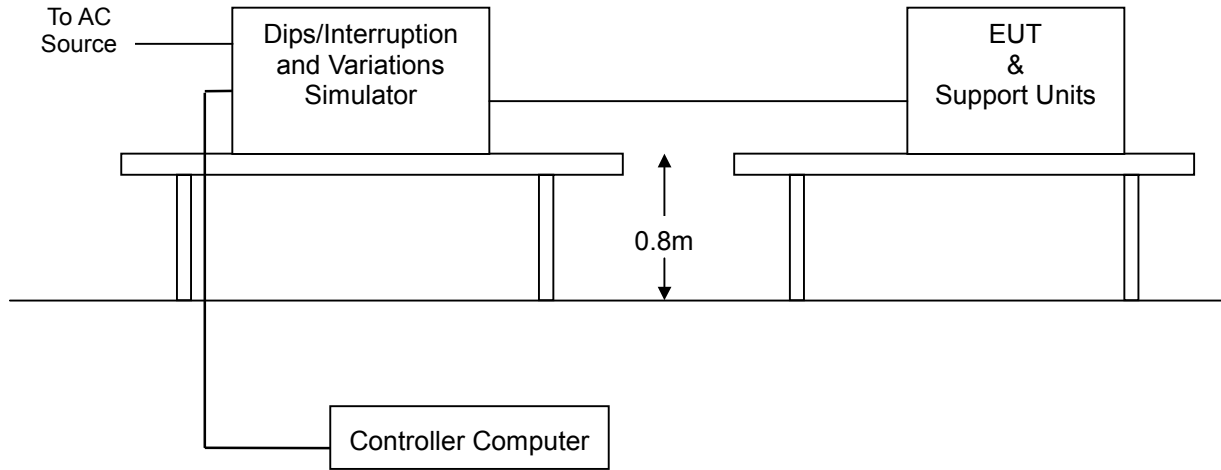
**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

#### 8.9.3. TEST PROCEDURE (please refer to measurement standard or CCS SOP PA-028)

1. The EUT and support units were located on a wooden table, 0.8 m away from ground floor.
2. Setting the parameter of tests and then perform the test software of test simulator.
3. Conditions changes to occur at 0 degree crossover point of the voltage waveform.
4. Recording the test result in test record form.
5. Removes the Pipette Aid to test if any.



### 8.9.4. TEST SETUP



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



8.9.5. TEST RESULTS

Temperature	25°C	Humidity	50% RH
Pressure	1010mbar	Tested by	Leo Shi
Required Passing Performance	<b>Criterion B: 0% residual voltage 0.5 cycle</b> <b>Criterion B: 0% residual voltage 1 cycle</b> <b>Criterion C: 70% residual voltage 25 cycle &amp; 0% residual voltage 250 cycle</b>		

Test Power: 230Vac, 50Hz				
Voltage (% residual voltage)	Duration (Cycle)	Performance Criterion	Observation	Test Result
0	0.5	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C	Note 1	PASS
0	1	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C	Note 1	PASS
70	25	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C	Note 1	PASS
0	250	<input type="checkbox"/> A <input checked="" type="checkbox"/> B <input type="checkbox"/> C	Note 2	PASS

- Note:** (1). There was no change compared with initial operation during and after the test. No unintentional response was found during the test.  
(2). The EUT shut down, but can be recovered automatically as the events disappeared.

## 9 PHOTOGRAPHS OF THE TEST CONFIGURATION CONDUCTED EMISSION TEST



**RADIATED EMISSION TEST**



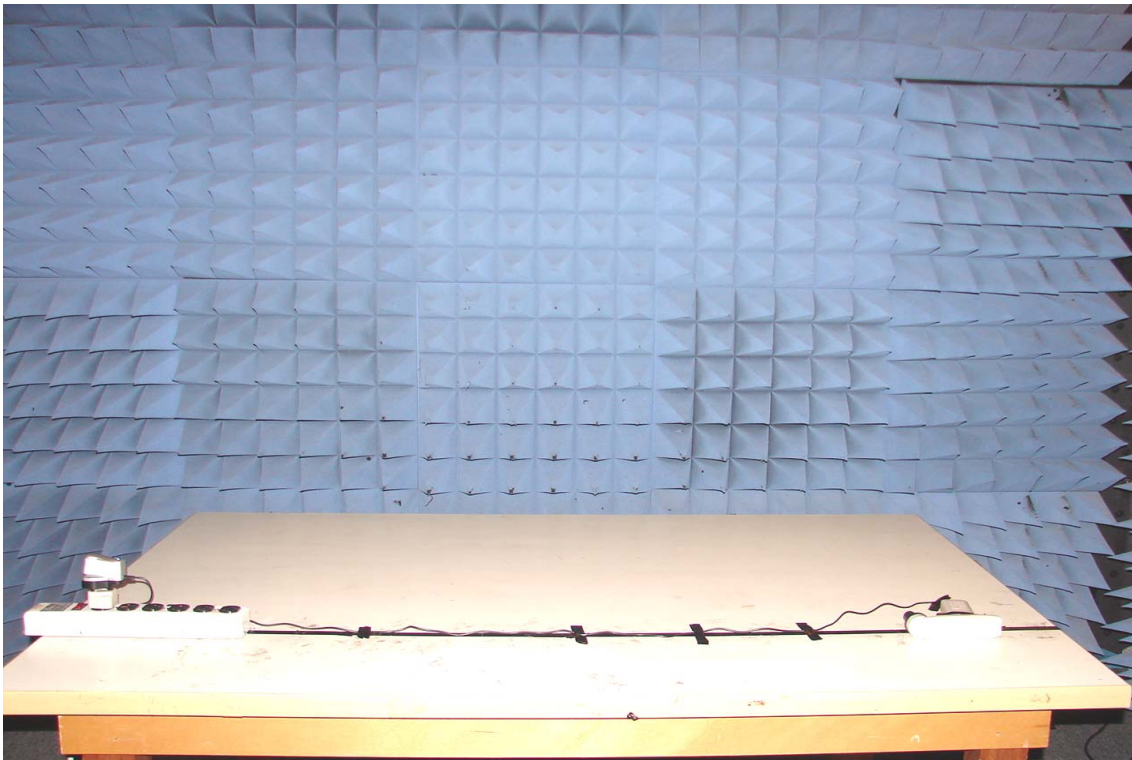
**POWER HARMONIC & VOLTAGE FLUCTUATION / FLICKER TEST**



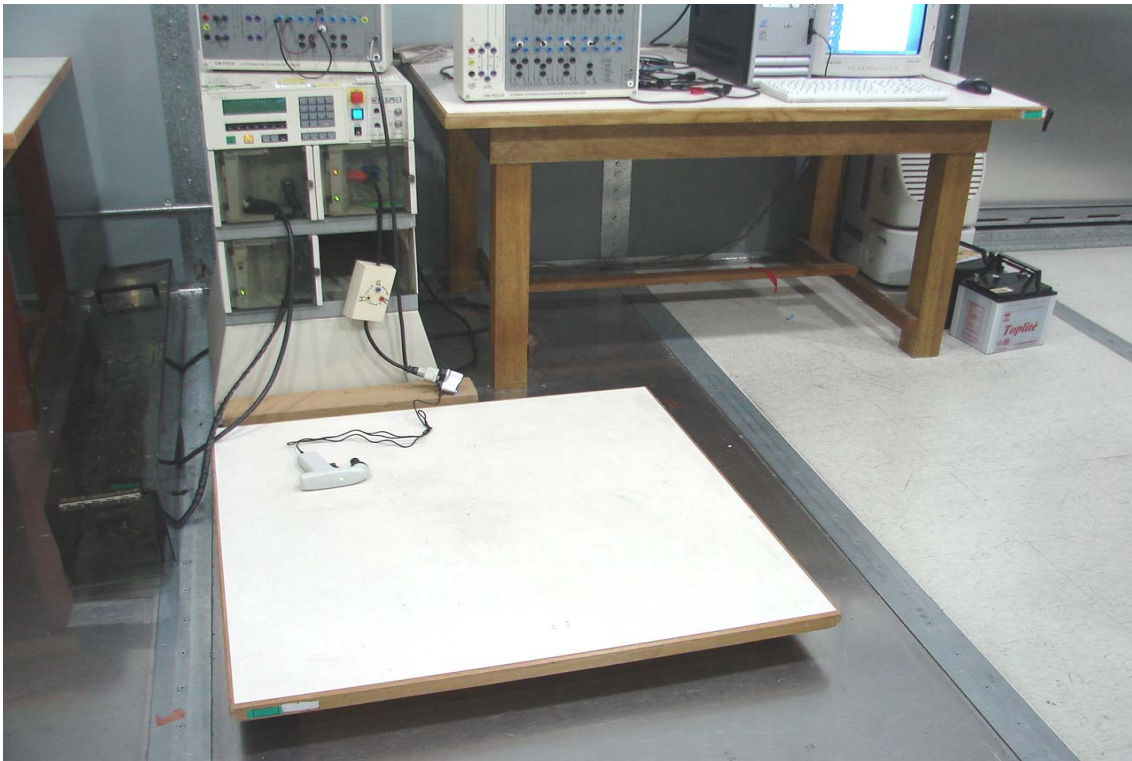
**ELECTROSTATIC DISCHARGE TEST**



**RADIATED ELECTROMAGNETIC FIELD TEST**



**FAST TRANSIENTS/BURST TEST**



**SURGE IMMUNITY TEST**



**CONDUCTED DISTURBANCE, INDUCED BY RADIO-FREQUENCY FIELDS TEST (Power Line)**



**POWER FREQUENCY MAGNETIC FIELD IMMUNITY TEST**





**VOLTAGE DIPS / INTERRUPTION TEST**

