TEST REPORT

Applicant	:	**CAS Corporation**
Applicant's Address	:	#19 Ganap-Ri, Gwangjeok-Myeon, Yangju-Si, Gyeonggi-Do, Rep. of Korea
Manufacturer	:	**CAS Corporation**
Manufacturer's Address	:	#19 Ganap-Ri, Gwangjeok-Myeon, Yangju-Si, Gyeonggi-Do, Rep. of Korea
EUT		
Type of Product	:	Platform Scale
Model	:	CI-200A/**HFS****
Buyer Model/ Multi Model	:	N/A
Serial Number	:	Proto type
Applicable EC Directives	:	EMC Directive: 2004/108/EC
Applicable Standards	:	EN 61326-1:2006(Basic Immunity test requirements) EN 61326-2-1:2006
Test Date(s)	:	Jan. 03, 2011 ~ Jan. 07, 2011
Test Report	:	SKTECE-110110-006
Date of Issue	:	Jan. 10, 2011
Overall Test Result	:	**Compliance**

The above equipment was tested by SK Tech Co., Ltd. for compliance with the requirements set forth in EMC Directive: 2004/108/EC and the technical standards mentioned above. The test results show the maximum emission levels emanating from the equipment and the level of the immunity endurance of the equipment are within the compliance requirements. The test results of this report only apply to the specific sample tested under stated test conditions.

W.S. Ham **/Test Engineer**

S.H. Yoon **/Technical Manager**

REVISION HISTORY

Rev. #	Changes of Content	Section Affected	Reviewed by	Date
0	Original Release	All	S.H.Yoon	Jan. 10, 2011

SUMMARY OF TEST RESULT

EMISSION			
STANDARD	**ITEM**	**CLASS/SEVERITY**	**RESULT**
CISPR 11:2003+A1:2004 Class A	Conducted Emissions (Main Port)	Meets Class A limits and minimum passing margin is 12.90 dB at 0.580 MHz.	PASS
	Conducted Emissions (Telecommunication Port)	-	N/A
	Radiated Emissions	Meets Class A limits and minimum passing margin is 6.37 dB at 87.61 MHz.	PASS
IEC 61000-3-2: 2005+A2:2009	Harmonic Current Emissions	N/A	N/A
IEC 61000-3-3:2008	Voltage Fluctuations & Flicker	Meets the requirements.	PASS

IMMUNITY			
STANDARD	**ITEM**	**CLASS/SEVERITY**	**RESULT**
IEC 61000-4-2:2008	Electrostatic Discharge(ESD)	±4 kV Contact ±4 kV Air	PASS
IEC 61000-4-3: 2006+A1:2007	Radiated Immunity	80 MHz to 1 GHz 1.4 GHz to 2 GHz 80 % AM @1 kHz 3 V/m	PASS
		2.0 GHz to 2.7 GHz 80 % AM @1 kHz 1 V/m	PASS
IEC 61000-4-4: 2004+A1:2010	EFT on AC and DC	AC ±0.5, 1.0 kV DC ±0.5 kV	PASS
IEC 61000-4-5:2005	Surge Immunity on AC	±0.5 kV D.M. ±1.0 kV C.M.	PASS
IEC 61000-4-6:2008	Injected Current on AC and DC	0.15 MHz to 80 MHz 80 % AM @1 kHz 3 Vrms	PASS
IEC 61000-4-11:2004	Voltage Dips & Interruptions on AC	>95 reduction, 0.5 period >95 reduction, 1.0 period 30 reduction, 25 period >95 reduction, 250 period	PASS

》 Table of Contents 《

1. General

The tests listed in this report have been performed and the results recorded by SK Tech Co., Ltd. in accordance with the procedures stated in each test requirement and specification. As a result, the subject product has been verified to comply with each test specification. The test results relate only to the items tested.

We attest to the accuracy of data. All measurements reported herein were performed by SK TECH Co., Ltd. and were made under Technical Manager's supervision. We assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

2. Facilities and Accreditations

2.1 Facilities

All of the measurements described in this report were performed at SK Tech Co., Ltd located in 820-2, Wolmoon Ri, Wabu-Up, Namyangju-Si, Kyunggi-Do, Korea.

The test site is constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. It complies with the Normalized Site Attenuation requirements given in ANSI/IEEE C63.4. The measuring equipment conforms to CISPR 16 requirements for Electromagnetic Noise and Field Strength Instrumentation.

2.2 Accreditations

Our testing laboratories are accredited by the following accreditation bodies in accordance with ISO/IEC 17025 for general requirements for the competence of testing and calibration laboratories.

Korea : KOLAS No.191
Germany : DAKKS DAT-P-076/97-02
USA : NVLAP Lab Code: 200220-0

The laboratories have been also notified to FCC by RRL as a Conformity Assessment Body, and designated to perform compliance testing on equipment subject to Declaration of Conformity (DOC) and Certification under Parts 15 and 18 of the FCC Rules.

2.3 Test and Measurement Instruments Used

- **Conducted Disturbance**

Name of Equipment	Type	S/N	Calibrated until
EMI Receiver	ESHS10	862970/019	07.2011
Artificial Mains Network	ESH2-Z5	834549/011	07.2011
Artificial Mains Network	ESH3-Z5	836679/018	07.2011
Impedance Stabilization Network	ISN T8	24806	09.2011

- **Radiated Disturbance**

Name of Equipment	Type	S/N	Calibrated until
EMI Receiver	ESVS10	834468/008	07.2011
Amplifier	8447F	3113A05153	07.2011
Trilog-Broadband Antenna	VULB9168	9168-230	07.2011
Antenna Turntable Driver	5907	91X518	N/A
Antenna Turntable controller	5906	91X519	N/A
EMI TEST RECEIVER	ESPI7	101206	07.2011
Horn Antenna (1G~18G)	3115	00040723	04.2011
Pre-Amplifier	AFS44-00101800-25-10P-44	1116321	10.2011

- **Harmonic Current / Voltage Fluctuations and Flicker**

Name of Equipment	Type	S/N	Calibrated until
Reference Impedance Network	IMP555	IG147/1172	07.2011
Universal Power Analyzer	PM 6000	100006700207	12.2011

- **Electrostatic discharge**

Name of Equipment	Type	S/N	Calibrated until
ESD Equipment	ESS-2000AX	ESS0898782	06.2011

- **Radiated radio-frequency electromagnetic field**

Name of Equipment	Type	S/N	Calibrated until
Wideband Amplifier	CMX10001	1045-0995	N/A
Wideband Amplifier	SMCC100	1047-0995	N/A
Wideband Amplifier	M5300	1046-0995	N/A
Signal Generator	SMY01	71400091	03.2011
Power Meter	NRVD	100496	07.2011
10V Insertion Unit	URV5-Z2	100166	07.2011
10V Insertion Unit	URV5-Z2	100167	07.2011
High Gain Log Periodic Antenna	HL046	100032	N/A
Electric Fielded Probe	2244/90.20	AR-0011	07.2011
MXG Analog Signal Generator	N5181A	MY49061394	03.2011
USB Power Sensor	U2004A	MY50000190	04.2011
USB Power Sensor	U2004A	MY50000189	04.2011
RF Relay Matrix	RFM-S3A3CIL	N/A	N/A
RF Power Amplifier(1G~3G)	FLG-50C	N/A	N/A
RF Power Amplifier	FLH-200/100	N/A	N/A
RF Power Amplifier(2G~6G)	5192R	1005	N/A
Interlock Unit	N/A	N/A	N/A
Broad-Band Horn Antenna (1G~18G)	BBHA 9120D	9120D-816	03.2011
Isotropic Electric Fielded Probe	HI-6005	00105794	N/A

- **Electrical fast transient/burst**

Name of Equipment	Type	S/N	Calibrated until
Ultra Compact Simulator	UCS 500 M6B	V0545100862	06.2011
Motor Variac	MV 2616	V0545100863	N/A
EFT/B Simulator	5555	S1004	07.2011
Capacitive Coupling Clamp	PN5055	1002	N/A

- **Surge**

Name of Equipment	Type	S/N	Calibrated until
I/O Signal Line Coupler/Decoupler	CM-I/OCD	0005192	N/A
Ultra Compact Simulator	UCS 500 M6B	V0545100862	06.2011
Motor Variac	MV 2616	V0545100863	N/A

- **Conducted disturbances, induced by radio-frequency fields**

Name of Equipment	Type	S/N	Calibrated until
CDN	TSCDN-M3-25A	02009	03.2011
CDN	CDN S1/75	1105-31	07.2011
CDN	FCC-801-M2-25	17	03.2011
Attenuator (6dB, 75W)	75-A-FFN-06	N/A	N/A
Conducted Immunity Test System	CIT-10/75	102C3202	07.2011
150Ω/50Ω adaptor	N/A	N/A	N/A
Terminations	F1428	MR737	N/A
CDN	TSCDN-T4	02001	07.2011
EM Clamp	KT-30	8-1315-2	03.2011

- **Power Frequency Magnetic Field**

Name of Equipment	Type	S/N	Calibrated until
Magnetic Antenna	MS100	1205-01	N/A
Motor Variac	MV 2616	V0545100863	N/A

- **Voltage dips, Mains supply voltage variations**

Name of Equipment	Type	S/N	Calibrated until
Ultra Compact Simulator	UCS 500 M6B	V0545100862	06.2011
Motor Variac	MV 2616	V0545100863	N/A
Voltage Swell/Dip/Interrupt Source	EP61	9601447	07.2011

3. EUT Description

The following information has been supplied by the applicant.

※ Analog and A/D Conversion

Applied voltage for load cell	DC 5V (350Ω maximum 8 possible connections)
Zeroing range	0 ~ 2mV/V
Input sensitivity	2 Uv / D (OIML,)Ntep, KS
	0.5 uV / D (Non OIML,)Ntep, KS
Non-straightness	0.01% Full Scale
A/D internal resolution	1 / 520,000
A/D external resolution	1 / 10,000 (NTEP,)OIML, KS
	1 / 20,000 (Non NTEP,)OIML, KS (Possible with the use of sufficient output at 2mV/V L/C)
A/D conversion speed	Maximum 80 rounds/second
Weight setup	Full Digital Calibration : SPACTM (Automatic weight setup at once)

※ Digital and Display

* Communication (RS 232/422) ensures the free setup of independent use.

Weight display	CI-200A, CI-200S, CI-200SC	LED (6 digit)
	CI-201A	LCD (6 digit + Sign)
Character size	CI-200A	25 mm (Height)
	CI-201A	24 mm (height)
Sign below zero point	"-" minus sign	
Sign for status	ZERO, TARE, GROSS, NET, STABLE, HOLD, UNIT(kg)	

※ General Specifications

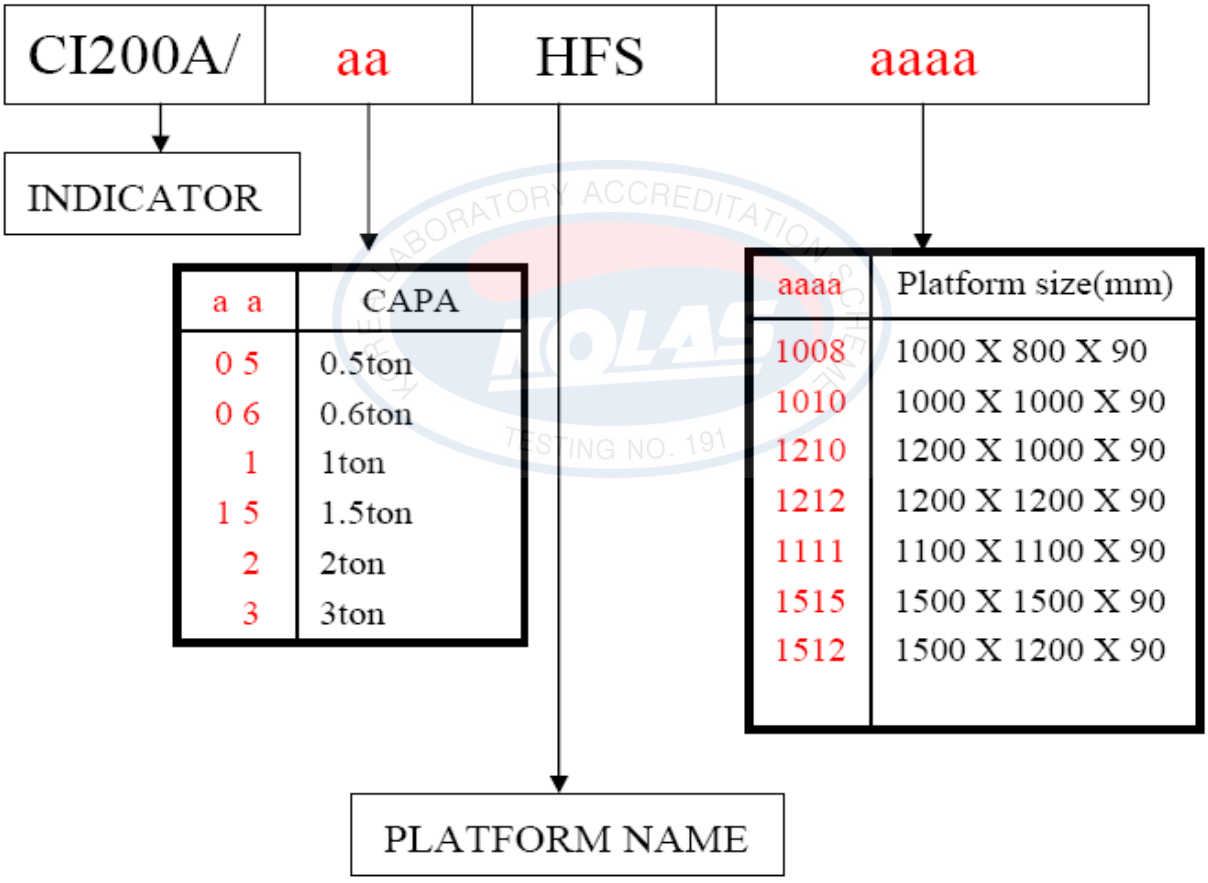
AC Adapter		AC 100~240 V (DC 12V, 1.25A)
Operating temperature		-10℃ ~ 40℃
Product size	**CI-200A CI-201A**	139mm(H) x 206mm(L) x 91.05mm(W)
	CI-200S CI-200SC	169.5mm(H) x 250mm(L) x 83mm(W)
Product weight	**CI-200A CI-201A**	About 1.3kg
	CI-200S CI-200SC	About 1.5kg

※ **Communication and Option**

Basic	COM1 (RS-232 Printer & PC Interface)
Optional	COM2 (RS-232 Printer & Auxiliary Display)
	RS-485 Multi Drop Interface

* COM2 can be selectively used for a printer (RS-232).

* M/L Listed Model : CI200A/HFS
* Model Name to be changed : CI200A/aaHFSaaaa



a a	CAPA
0 5	0.5ton
0 6	0.6ton
1	1ton
1 5	1.5ton
2	2ton
3	3ton

aaaa	Platform size(mm)
1008	1000 X 800 X 90
1010	1000 X 1000 X 90
1210	1200 X 1000 X 90
1212	1200 X 1200 X 90
1111	1100 X 1100 X 90
1515	1500 X 1500 X 90
1512	1500 X 1200 X 90

4. EUT Operating Conditions

During testing, the EUT was powered with, 230 Vac/50 Hz. The worst case test configuration and mode of operation was used all testing. Unless otherwise noted elsewhere in this report, this selection will apply to all testing.

4.1 EUT Operation Modes

Put the weight(10 kg) on the load cell, and check the weight on the screen of the EUT.

4.2 Ancillary Equipment

The EUT was tested while connected to the following representative configuration of ancillary equipment necessary to exercise the ports during tests.

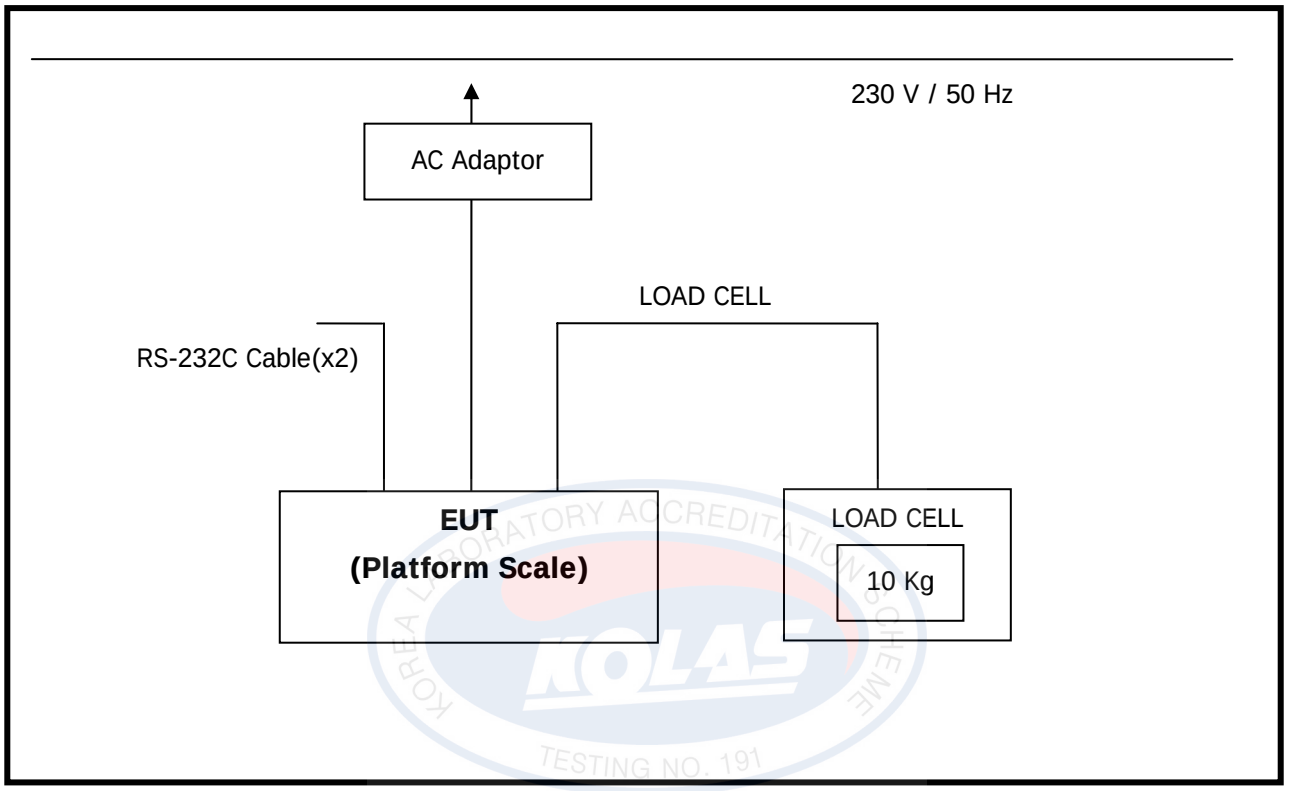
#	Equipment	Manufacturer	Model No.	Serial No.
1	AC Adaptor	Perfect Power Co., Ltd.	PA-120150SN	7562P121000B
2	Weight (10Kg)	N/A	N/A	N/A
3	LOAD CELL	N/A	N/A	N/A

4.3 Interconnection and I/O cables

#	START		END		Cable	
	Name	I/O Port	Name	I/O Port	Length(m)	Shielded/ Unshielded
1	EUT	Power	AC Adaptor		1.6	Unshielded
2	〃	RS-232C(x2)	-		1.4	Unshielded
3	〃	LOAD CELL	LOAD CELL		1.8	Unshielded

4.4 Test Configuration

For the actual test configuration, please refer to the related item-photographs of the test setup.



4.5 Uncertainty

1) Radiated disturbances from 30 MHz to 1000 MHz at a distance of 3 m and 10 m Expanded Uncertainty

U = k * Uc(xi) = 2 * 2.10 = 4.20 dB

The coverage factor k =2 yields approximately a 95% level of confidence.

2) Conducted disturbance from 150 kHz to 30 MHz using a 50 Ω/50 μH AMN Expanded uncertainty

U= k * Uc(xi) = 2 * 1.57 = 3.14 dB

The coverage factor k =2 yields approximately a 95% level of confidence.

※ When the measured emission is positioned within the range of the uncertainty of measurement from the emission limit, the uncertainty of measurement shall be concerned as follow.

Compliance or non-compliance with a disturbance limit shall be determined in the following manner.

If Ulab is less than or equal to Ucispr

- Compliance is deemed to occur if no measured disturbance exceeds the disturbance limit;
- Non-compliance is deemed to occur if any measured disturbance exceeds the disturbance limit.

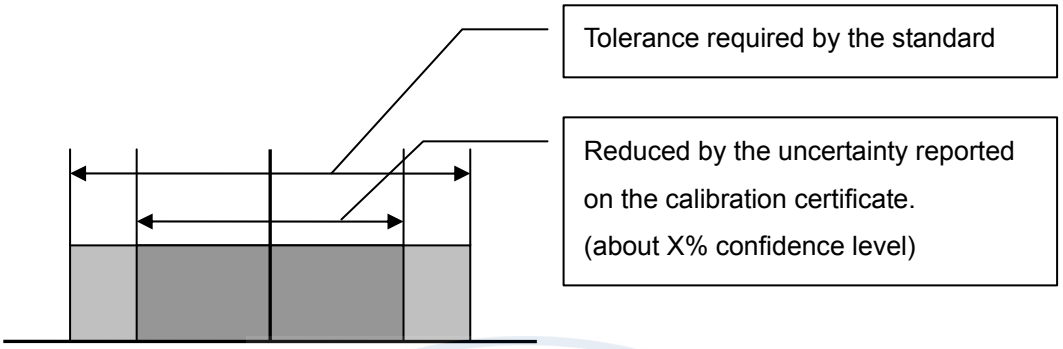
If Ulab is greater than Ucispr

- Compliance is deemed to occur if no measured disturbance, increased by (Ulab - Ucispr), exceeds the disturbance limit;
- Non-compliance is deemed to occur if any measured disturbance, increased by (Ulab - Ucispr), exceeds the disturbance limit.

※ If the measurement value is lower or equal to the limit, the EUT is considered to pass the test.

3) EMS UNCERTAINTY

All parameters are within the tolerances required by the standard, reduced by the tolerances required on the calibration certificate, so this laboratory has confidence that the EMS Test equipment is in compliance with the standard with X% confidence level.



● **ESD (EN61000-4-2):** 95% (k=2, confidence level is 95%)

● **Radiated immunity (EN61000-4-3):** 2.64 dB (k=1.65, confidence level is 90%)
3.16 dB (k=2, confidence level is 95%)

● **EFT (EN61000-4-4):** 95% (k=2, confidence level is 95%)

● **SURGE (EN61000-4-5):** 95% (k=2, confidence level is 95%) except following parameters
- L1-L2 (Open Circuit, 1.2 μs/50 μs, 2Ω) → positive; 500 V (k=1.29, confidence level is 80 %)
- L1-L2 (Open Circuit, 1.2 μs/50 μs, 2Ω) → negative; 1 kV&2 kV (k=1.44, confidence level is 85 %)
- L1-PE (Open Circuit, 1.2 μs/50 μs, 2Ω)→ positive; 1 kV (k=1.44, confidence level is 85 %)

● **Conducted immunity (EN61000-4-6):** 1.34 dB (k=1.65, confidence level is 90%)
1.67 dB (k=2, confidence level is 95%)

● **Voltage dip (EN61000-4-11):** 95% (k=2, confidence level is 95%)

5. Test Results EMISSION

5.1 Harmonic current

Result		**N/A**

Test Environment	**Temperature**	19 ℃
	Humidity	18 % R.H.

Test Procedure	The harmonics on AC Mains in the frequency from 0 to 2 kHz were measured in accordance to **IEC 61000-3-2:2005+A2:2009**. The measurement was conducted with an automatic current harmonic analyzing system. This equipment is in compliance with the requirements of **IEC 61000-3-2:2005+A2:2009**. The Measurement showed that the equipment is classified into class A of **IEC 61000-3-2:2005+A2:2009**.

※ The harmonic test data is shown on the next pages.

Harmonic Test Data

Product:	CI-200A/**HFS****	2011 Jan 3 3:14pm
Serial no:		Page 1 of 1
Description:		
Test Date:	2011 Jan 3 3:10pm	
Result Name:	CI-200A/**HFS****	
Type of Test:	EN61000:2006 Harmonics inc. interharmonics to EN61000-4-7:2002	
Limits:	Class A	
Power Analyzer:	Voltech PM6000 SN: 200006700273 Firmware version: v1.20.06RC4	
	Channel(s):	
	1. SN: 090015500524, 26 Adjusted Date: 30 JAN 2009.	2. SN: 090015500600, 26 Adjusted Date: 31 JAN 2009.
	3. SN: 090015500606, 26 Adjusted Date: 2 FEB 2009.	4. SN: 090015500746, 26 Adjusted Date: 3 FEB 2009.
	5. SN: 090015500749, 26 Adjusted Date: 3 FEB 2009.	6. SN: 090015501138, 26 Adjusted Date: 12 FEB 2009.
	Shunt(s):	
	1. SN: 091024300793, 4 Adjusted Date: 11 FEB 2009.	2. SN: 091024300794, 4 Adjusted Date: 11 FEB 2009.
	3. SN: 091024300795, 4 Adjusted Date: 10 FEB 2009.	4. SN: 091024300796, 4 Adjusted Date: 10 FEB 2009.
	5. SN: 091024300797, 4 Adjusted Date: 10 FEB 2009.	6. SN: 091024300798, 4 Adjusted Date: 10 FEB 2009.
AC Source:	Mains / Manual Source	

Harmonic Results Against Chosen Limits:	**Notes:**
N/A	Minimum power is greater than maximum

Test Parameter Details	**User Entered**	**Measured**
Operating Frequency:	50	49.9840
Operating Voltage:	230	228.9277
Specified Power:	0.0000	5.0084
Fundamental Current:	0.0000	0.0218
Power Factor:	0.0000	0.4000
Average Input Current:		0.0544
Maximum POHC:		0.0100
POHC Limit:		0.2514
Maximum THC:		0.0500
Minimum Power:	75	
Class Multiplier:	1.0000	
Test Duration:	00:02:30	

5.2 Voltage fluctuations and flicker

Result		**PASS**

Test Environment	**Temperature**	19 ℃
	Humidity	18 % R.H.

Test Procedure	The voltage fluctuations on AC mains in the frequency range from 0 to 2 kHz were measured in accordance to **IEC 61000-3-3:2008.** The measurement was conducted with an automatic current harmonic analyzing system. This equipment is in compliance with the requirements of **IEC 61000-3-3:2008.**

※ The Voltage fluctuations test data is shown on the next page.

Flicker meter Test – Table

SK-TECH

Product:	CI-200A/**HFS****	2011 Jan 3 5:22pm
Serial no:		Page 1 of 1
Description:		
Result Name:	CI-200A/**HFS****	
Voltech IEC61000-3 Windows Software 1.13.05RC1		Test Date: 2011 Jan 3 3:15pm
Type of Test:	Flickermeter Test - Table	
Power Analyzer:	Voltech PM6000 SN: 200006700273 Firmware Version: v1.20.06RC4	

Channel(s):

1. SN: 090015500524, 26 Adjusted Date: 30 JAN 2009. 2. SN: 090015500600, 26 Adjusted Date: 31 JAN 2009.
3. SN: 090015500606, 26 Adjusted Date: 2 FEB 2009. 4. SN: 090015500746, 26 Adjusted Date: 3 FEB 2009.
5. SN: 090015500749, 26 Adjusted Date: 3 FEB 2009. 6. SN: 090015501138, 26 Adjusted Date: 12 FEB 2009.

Shunt(s):

1. SN: 091024300793, 4 Adjusted Date: 11 FEB 2009. 2. SN: 091024300794, 4 Adjusted Date: 11 FEB 2009.
3. SN: 091024300795, 4 Adjusted Date: 10 FEB 2009. 4. SN: 091024300796, 4 Adjusted Date: 10 FEB 2009.
5. SN: 091024300797, 4 Adjusted Date: 10 FEB 2009. 6. SN: 091024300798, 4 Adjusted Date: 10 FEB 2009.

AC Source:	Mains / Manual Source
Overall Result: **PASS**	Notes: Plt test duration 120 minutes Measurement method - Voltage

	Plt
Limit	0.650
Reading	0.086

	Pst	dc (%)	dmax (%)	d(t) > 3.3%(ms)
Limit	1.000	3.300	4.000	500
Reading 1	0.086	0.003	0.166	0
Reading 2	0.086	0.002	0.150	0
Reading 3	0.086	0.002	0.151	0
Reading 4	0.086	0.002	0.163	0
Reading 5	0.086	0.002	0.136	0
Reading 6	0.086	0.002	0.146	0
Reading 7	0.086	0.002	0.154	0
Reading 8	0.086	0.002	0.134	0
Reading 9	0.086	0.002	0.159	0
Reading 10	0.086	0.002	0.165	0
Reading 11	0.086	0.002	0.148	0
Reading 12	0.086	0.002	0.153	0

5.3 Conducted Disturbance at mains terminals

Result		**PASS**

Test Environment	**Temperature**	21 ℃
	Humidity	18 % R.H.

Test Procedure	The continuous disturbance voltage of AC Mains in the frequency from 0.15 to 30 MHz was measured in accordance to **CISPR 11:2003+A1:2004 Class A.** The measurement setup was made according to **CISPR 11:2003+A1:2004 Class A** in a shielded room. The EUT was placed on a non-conductive table at least 80 cm above the ground plane. A grounded vertical reference plane was positioned in a distance of 40 cm from the EUT. The distance from the EUT to other metal surfaces was at least 0.8 m. The EUT was only earthen by its power cord through the line impedance stabilizing network. The power cord has been bundled to a length of 1.0 m. The used line impedance stabilizing network (LISN) has a rated impedance of 50 Ω/50 μH as specified in CISPR 16. The test receiver with Quasi Peak and Average detector complies with CISPR 16. If the result of the measurement with the Quasi Peak detector is below the average limit, the measurement with average detector has been omitted.

Conducted Disturbance Test data

<Quasi-Peak>

Frequency (MHz)	Reading (dBµV)	Line	C/F (dB)	C/L (dB)	Actual (dBµV)	Limit (dBµV)	Margin (dB)
0.310	52.31	L	0.12	0.02	52.45	79.00	26.55
0.580	56.48	L	0.13	0.04	56.65	73.00	16.35
1.160	50.38	L	0.14	0.07	50.59	73.00	22.41
1.980	49.29	L	0.18	0.09	49.56	73.00	23.44
2.790	48.96	L	0.24	0.14	49.34	73.00	23.66
4.410	48.63	L	0.28	0.17	49.08	73.00	23.92

<Average>

Frequency (MHz)	Reading (dBµV)	Line	C/F (dB)	C/L (dB)	Actual (dBµV)	Limit (dBµV)	Margin (dB)
0.310	43.79	L	0.12	0.02	43.93	66.00	22.07
0.580	46.93	L	0.13	0.04	47.10	60.00	12.90
1.980	39.53	L	0.18	0.09	39.80	60.00	20.20
2.790	39.14	L	0.24	0.14	39.52	60.00	20.48
4.410	39.36	L	0.28	0.17	39.81	60.00	20.19
6.790	38.36	N	0.41	0.19	38.96	60.00	21.04

▶ NOTE

*** C/F = Correction Factor**

*** C/L = Cable Loss**

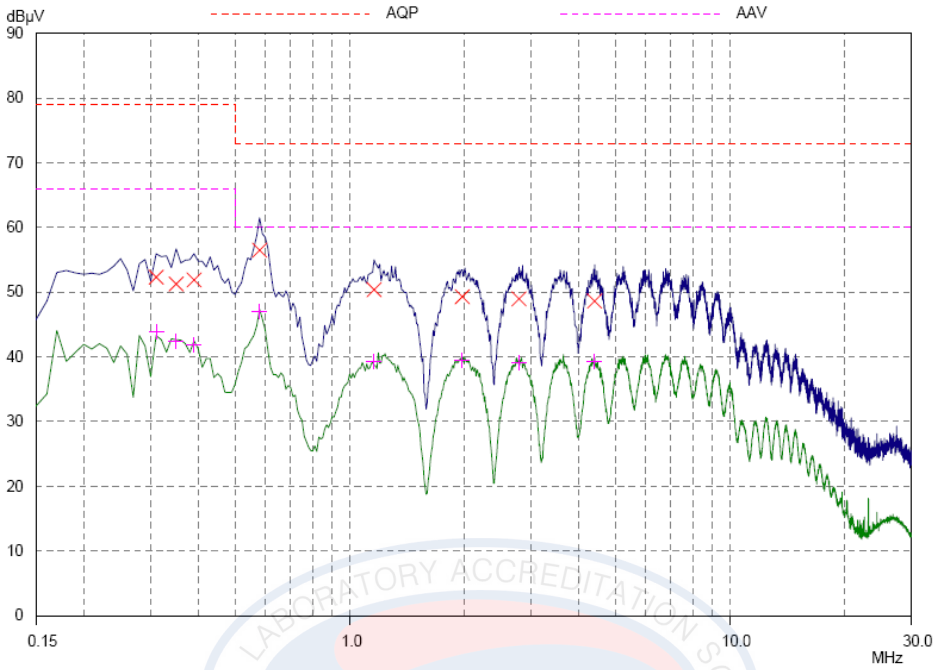
*** LINE: L = Line-PE, N = Neutral-PE**

*** Margin Calculation**

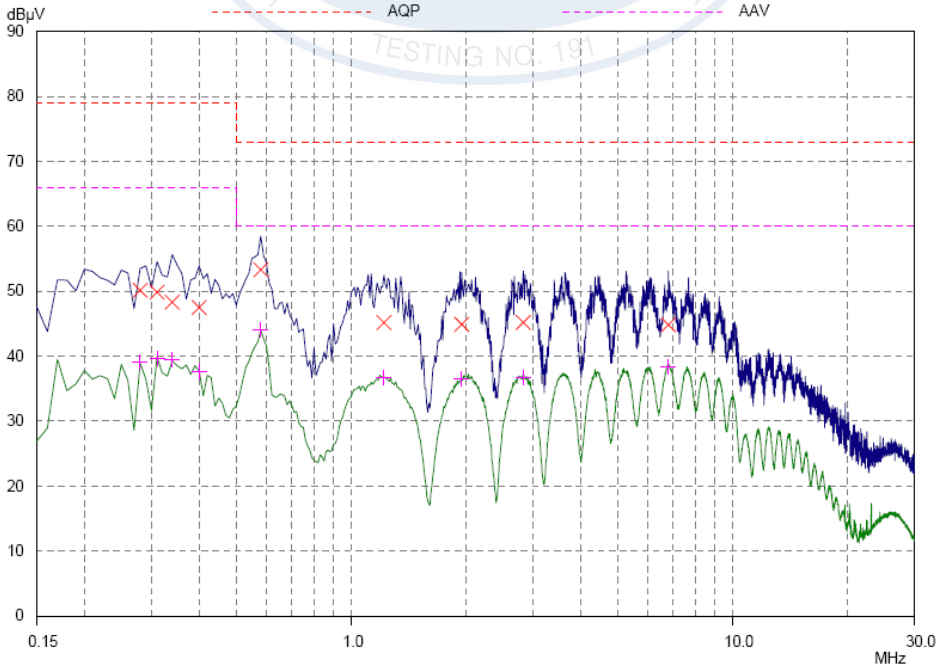
Margin (Q.P) = Limit - Actual

[Actual (Q.P) = Reading (Q.P) + C/F + C/L]

Spectral Diagram, LINE – PE



Spectral Diagram NEUTRAL – PE



5.4 Radiated Disturbance

Result		**PASS**

Test Environment	**Temperature**	3 ℃
	Humidity	21 % R.H.

Test Procedure	In the range of 30 MHz to 1 GHz the Electric Field strength was measured in accordance with **CISPR 11:2003+A1:2004 Class A** The test setup was made according to **CISPR 11:2003+A1:2004 Class A** on an open test site, which allows a 10 m distance measurement. The EUT was placed in the center of a wooden turntable. The height of this table was 0.8 m. The measurement was conducted with both horizontal and vertical antenna polarization. The turntable has been fully rotated. The highest radiation of the equipment has been recorded. By varying the configuration of the test sample and the cable routing it was attempted to maximize the emission. For further description of the configuration refer to the picture of the test set-up.

Radiated Disturbance Test data

Frequency [MHz]	Reading [dBμV]	Pol.	Height [m]	Amp Gain [dB]	Correction Factor		Data [dBμV / m]	Limits [dBμV /m]	Margin [dB]
					Antenna	Cable			
87.61	52.17	H	4.00	28.33	8.84	0.95	33.63	40.00	6.37

*** The rest of test Results were under required limit with 20dB margin or more.**

NOTES:

1. All other emission is non-significant.
2. Measurements using CISPR Quasi-Peak mode.
   (Resolution bandwidth: 120 kHz)
3. H = Horizontal, V = Vertical Polarization.
4. Data = Real Reading – Amp Gain + Correction Factor (Antenna + Cable)
5. Margin = Limits - Data
6. Radiated Measurements at 10-meters.

6. Test Results IMMUNITY

6.1 Performance Criteria

The general principles (performance criteria) for the evaluation of the immunity test results are the following.

Performance criterion A: During testing, normal performance within the specification limits.

- If electronic equipment is required to work with high reliability, the EUT shall operate without any apparent degradation from the manufacturer's specification.

Performance criterion B: During testing, temporary degradation, or loss of function or performance which is self-recovering.

- A data transfer is controlled/checked by parity check or by other means. In the case of malfunctioning, such as caused by a lightning strike, the data transfer will be repeated automatically. The reduced data transfer rate at this time is acceptable.
- During testing, an analogue function value may deviate. After the test, the deviation vanishes.
- In the case of a monitor used only for man-machine monitoring, it is acceptable that some degradation takes place for a short time, such as flashes during the burst application.

Performance criterion C: During testing, temporary degradation, or loss of function or performance which requires operator intervention or system reset occurs.

- In the case of an interruption in the mains longer than the specified buffer time, the power supply unit of the equipment is switched off. The switch-on may be automatic or carried out by the operator.
- After a programme interruption caused by a disturbance, the processor functions of the equipment stops at a defined position and is not left in a "crashed state". The operator's decision prompts may be necessary.
- The test results in an opening of an over-current protection device that is replaced or reset by the operator.

6.2 Electrostatic discharge

Result		**PASS**

Test Environment	**Temperature**	22 ℃
	Humidity	49 % R.H.
	Barometric	100.8 kPa

Test Procedure	The immunity against electrostatic discharge was tested in accordance with **EN 61326-1: 2006.** Test setup and ESD-Generator are according to **IEC 61000-4-2:2008.**

Severity level : **2 (Contact discharge)**
2 (Air Discharge)

Test voltages : ±2.0 kV, ±4.0 kV (Contact Discharge)
±2.0 kV, ±4.0 kV (Air Discharge)

Number of discharges : Air : ±10 per test point
Contact: ±25 test point

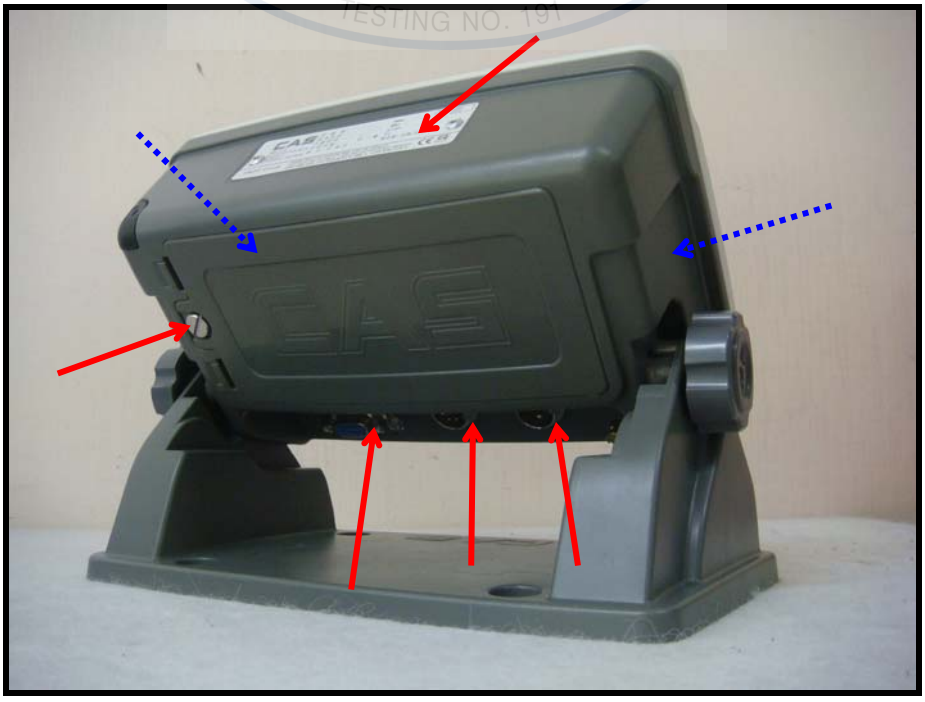
Criterion for compliance: B

ESD Test data - Positive / Negative Polarity

Position	Kind of Discharge	Result	Remarks
Enclosure (Front,Rear,Left,Right)	Air	A	Equipment operated as intended, No disturbance of function
Function Keys	Air	A	Equipment operated as intended, No disturbance of function
LED	Air	A	Equipment operated as intended, No disturbance of function
Rear Ports	Contact	A	Equipment operated as intended, No disturbance of function
Label Plate	Contact	A	Equipment operated as intended, No disturbance of function
All Screws	Contact	A	Equipment operated as intended, No disturbance of function
HCP/ VCP	Contact	A	Equipment operated as intended, No disturbance of function

ESD, Discharged points

Air
Contact



6.3 Radiated radio-frequency electromagnetic field

Result		PASS

Test Environment	**Temperature**	15 ℃
	Humidity	33 % R.H.
	Barometric	101.3 kPa

Test Procedure	The immunity against radio-frequency electromagnetic fields in the frequency range between 80 and 2700 MHz was tested in accordance to **EN 61326-1: 2006.** The test setup was made according to **IEC 61000-4-3:2006+A1:2007** in an anechoic chamber. The EUT has been placed in the center of a wooden turntable. The height of this table was 0.8 m. The field strength was monitored by an isotropic sensor during the complete test. The isotropic sensor was located beside the equipment. The antenna has been orientated for both horizontal and vertical polarization. The distance between antenna and the equipment under testing was at least 3 m. The tests have been performed with the antenna facing each of the four sides of the EUT.

Severity level :	**1, 2 & 3**
Freq. Range and Field strength :	80 ~ 1000 MHz : 3 V/m 1.4GHz ~ 2GHz : 3 V/m 2.0GHz ~ 2.7GHz : 1V/m
Modulation :	AM, 80 %, 1 kHz, sine-wave
Criterion for compliance:	A
Step size :	1 % of fundamental
Sweep capability :	$\leq 1.5 \times 10^{-3}$ decade/s
Dwell Time	3 sec

Radiated radio-frequency electromagnetic field Test data

Position	Result		Remarks
	Horizontal	Vertical	
Front Side	A	A	Equipment operated as intended, No disturbance of function.
Right Side	A	A	Equipment operated as intended, No disturbance of function.
Left Side	A	A	Equipment operated as intended, No disturbance of function.
Rear Side	A	A	Equipment operated as intended, No disturbance of function.

6.4 Electrical fast transient/burst

Result		PASS

Test Environment	**Temperature**	22 ℃
	Humidity	25 % R.H.
	Barometric	102.0 kPa

Test Procedure	The immunity against fast transients was tested on the power line and all signal lines which length may exceed 3 m according to the manufacturer's specification in accordance to **EN61326-1: 2006.** Test setup with capacitive clamp and fast transient noise generator was according to **IEC 61000-4-4:2004 +A1:2010.** The un-used signal connector of the clamp has been terminated with a 50 Ω resistor. The distance between the EUT and all other conductive structures, except the ground plane beneath the EUT, was more than 50 cm. The distance between clamp and EUT was about 30 cm.

Severity level : **1 & 2**

Test voltage :

AC mains supply lines (kV) 0.5, 1

Other supply / signal lines (kV) 0.5

Polarity : Negative / positive

Repetition frequency : 5 kHz

Criterion for compliance: B

Test duration : ≥60sec

Electrical fast transient Test data - AC Power lines, Positive/Negative Polarity

Line	Result		Remarks
L1	0.5 kV 1 kV	A A	Equipment operated as intended, No disturbance of function.
L2	0.5 kV 1 kV	A A	Equipment operated as intended, No disturbance of function.
L1 + L2	0.5 kV 1 kV	A A	Equipment operated as intended, No disturbance of function.

6.5 Surge

Result		PASS

Test Environment	**Temperature**	16 ℃
	Humidity	30 % R.H.
	Barometric	102.1 kPa

Test Procedure	The Combination Wave Test Generator, the Coupling / Decoupling Network and the test set-up are in accordance with **IEC 61000-4-5:2005.** For line to line coupling the ground output of the pulse generator has been connected directly to one power line. The signal output of the pulse generator has been connected via an 18 μH capacitor. For line to ground coupling the ground output of the generator has been connected to the PE line of the EUT. The signal output of the generator has been coupled by a 10 Ω resistor and a 9 μH capacitor to each power line of the EUT. For all tests both power lines have not been connected with PE or the reference ground plane. The EUT has been placed on a wooden table 10 cm above the reference ground plane. The reference ground plane exceeded the projected geometry of the EUT and the backfilter by more than 20 cm. The backfilter has been placed directly on a separated reference ground plane about 10 cm above the main reference ground plane. Both ground planes were connected together. The ground terminal of the backfilter has been connected directly with its reference ground plane.

Severity level :	**1(Normal Mode)**
Test voltage :	
AC mains supply lines (kV)	0.5, 1
Other supply/signal lines (kV)	0.5, 1
Waveshape, open circuit voltage :	Risetime 1.2 μs / Duration 50 μs
Waveshape, short circuit current :	Risetime 8 μs / Duration 20 μs
Polarity & Phase	Negative / positive 0˚,90˚,180˚,270˚
Number of surges :	5
Criterion for compliance:	B

Surge Test data - AC Power lines, Positive/Negative Polarity

Line	Result		Remarks
AC Input L1 to L2	0.5 kV	A	Equipment operated as intended. No disturbance of function.

6.6 Conducted disturbances, induced by radio-frequency fields

Result		PASS

Test Environment	**Temperature**	16 ℃
	Humidity	31 % R.H.
	Barometric	102.1 kPa

Test Procedure	The immunity to conducted radio frequency disturbances has been tested according to **IEC 61000-4-6:2008.** The EUT has been placed on a wooden table 10 cm above the reference ground plane. The reference ground plane exceeded the projected geometry of the EUT and the Coupling / Decoupling Network (CDN) by more than 20 cm. The CDN has been placed directly on the reference ground plane. The ground terminal of the CDN has been connected directly with the reference ground plane. The cable between CDN and EUT has a length of 20 cm. The distance between this cable and the reference ground plane was kept between 3 and 5 cm as long as possible. The EUT has no dedicated ground terminal. The coupling factor of the RF amplifier, cables and the CDN has been recorded before the test. The specified frequency range has been swept manually with a sweep rate smaller than 1.5 x 10^{-3} decade / sec.

Severity level : **2**

Applied voltage : 3 V

Frequency range : 0.15 MHz ~ 80 MHz

Modulation : AM ,80 %, 1kHz sine-wave

Step size : 1% of fundamental

Sweep capability : ≤1.5x10^{-3} decade/s

Criterion for compliance: A

Dwell Time 3 sec

Immunity – input and output AC power ports

Port	Result (AM)	Remarks
AC Main	A	Equipment operated as intended. No disturbance of function.

6.7 Voltage dips, short interruptions

Result		PASS

Test Environment	Temperature	16 ℃
	Humidity	30 % R.H.
	Barometric	102.1 kPa

Test Procedure	Voltage dips, short interruptions and Voltage Variation Immunity tests and its test setup were carried out in accordance with **IEC 61000-4-11:2004.**

· Voltage dips

Test specification	Units	Performance criteria	Result
>95 0.5	% reduction period	B	A
>95 1.0	% reduction period	B	A
30 25	% reduction periods	C	A

· Voltage interruptions

Test specification	Units	Performance criteria	Result
>95 250	% reduction periods	C	A

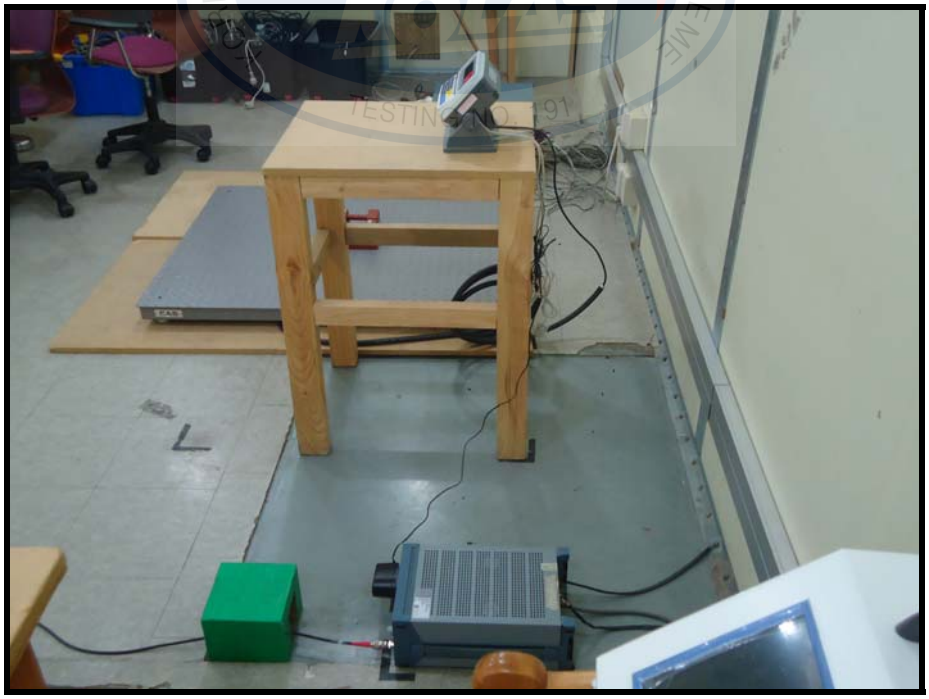
* Changes to occur at 0 degree crossover point of the voltage waveform.

Appendices

A1: Photograph of test set-Up

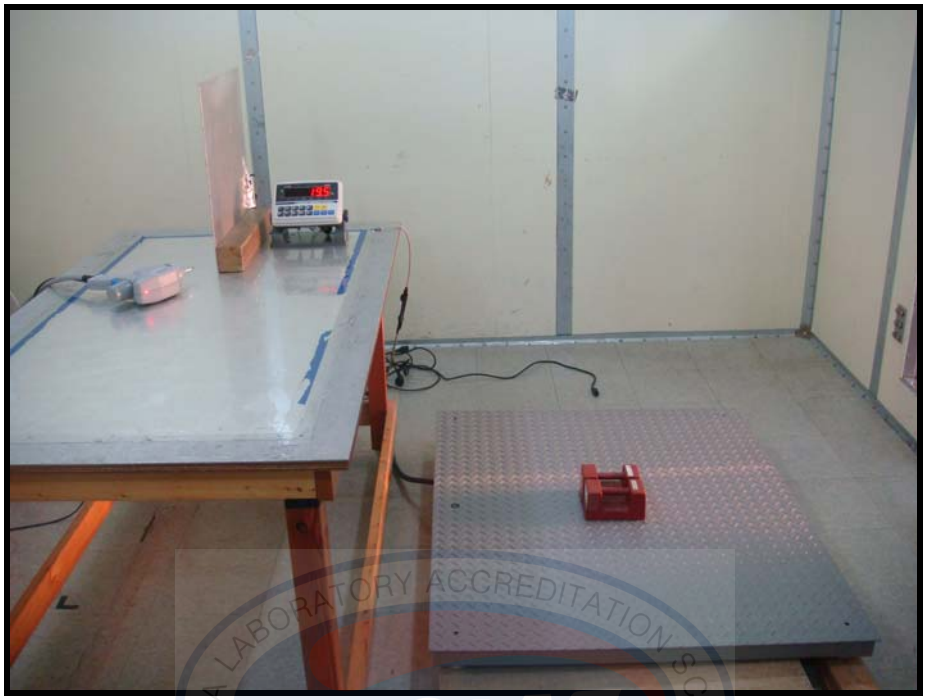
A1.1: harmonic current/voltage Fluctuations & flicker

A1.2: Conducted Disturbance



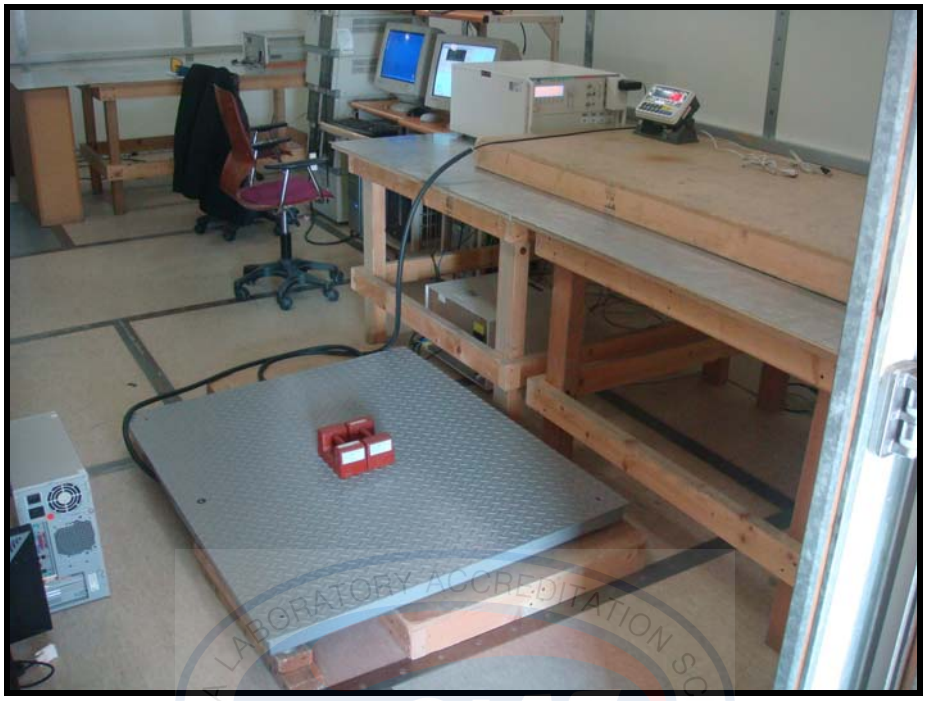
A1.3: Radiated Disturbance

A1.4: Electrostatic discharge

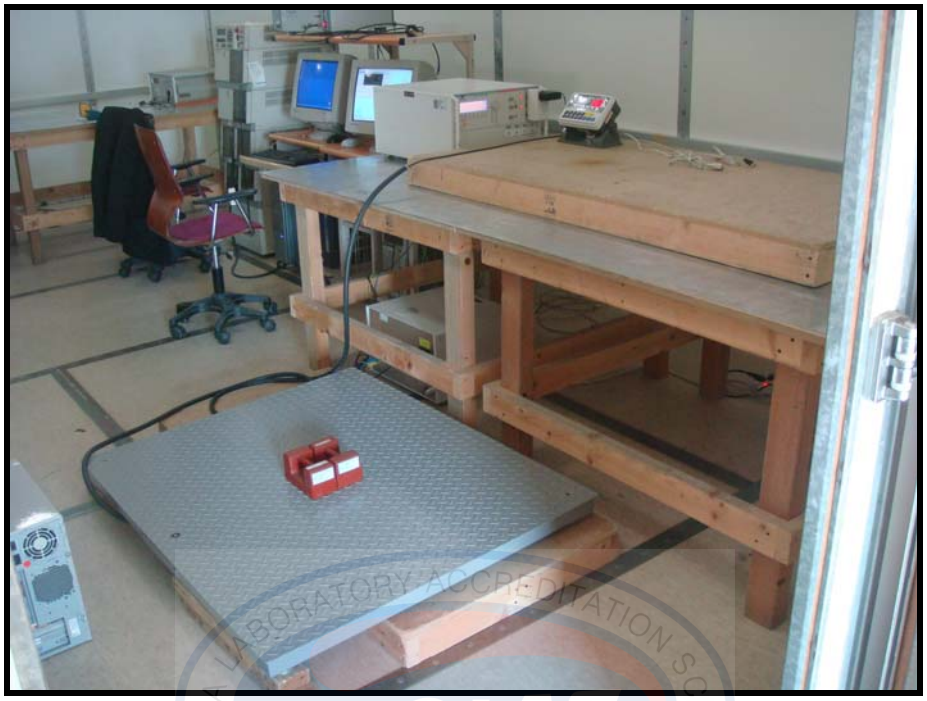


A1.5: Radiated radio-frequency electromagnetic field

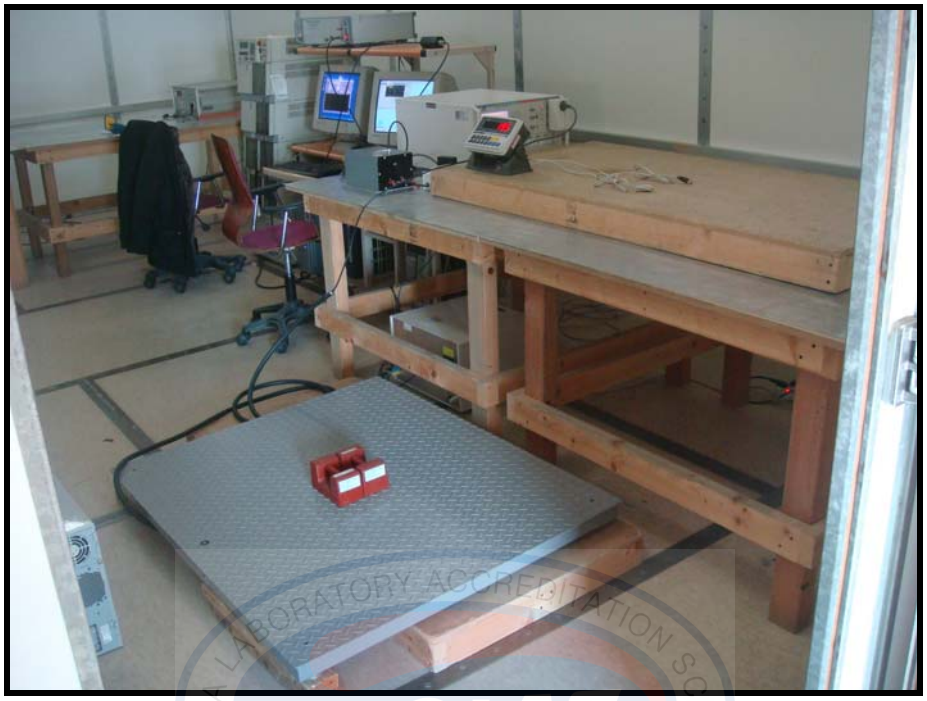
A1.6: Electrical fast transient/burst



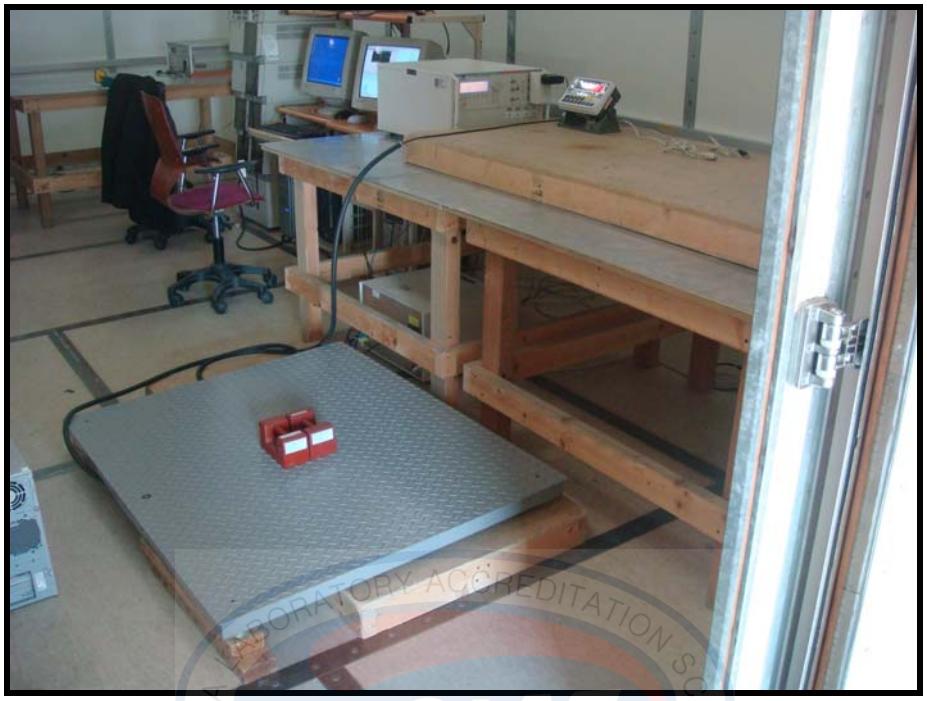
A1.7: Surge



A1.8: Conducted disturbances, induced by radio-frequency fields



A1.9: Voltage dips, short interruptions

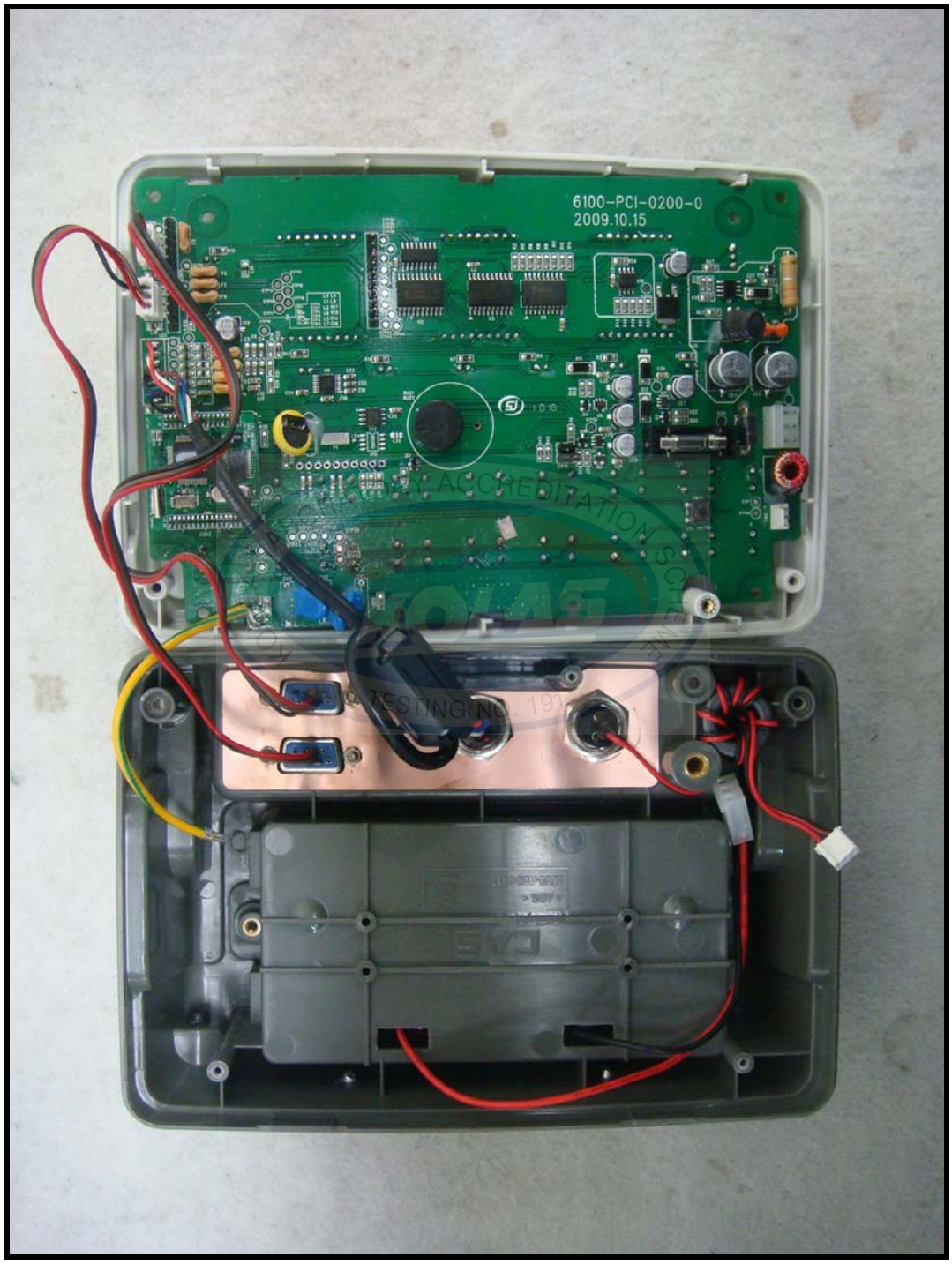


A2: EUT Photographs

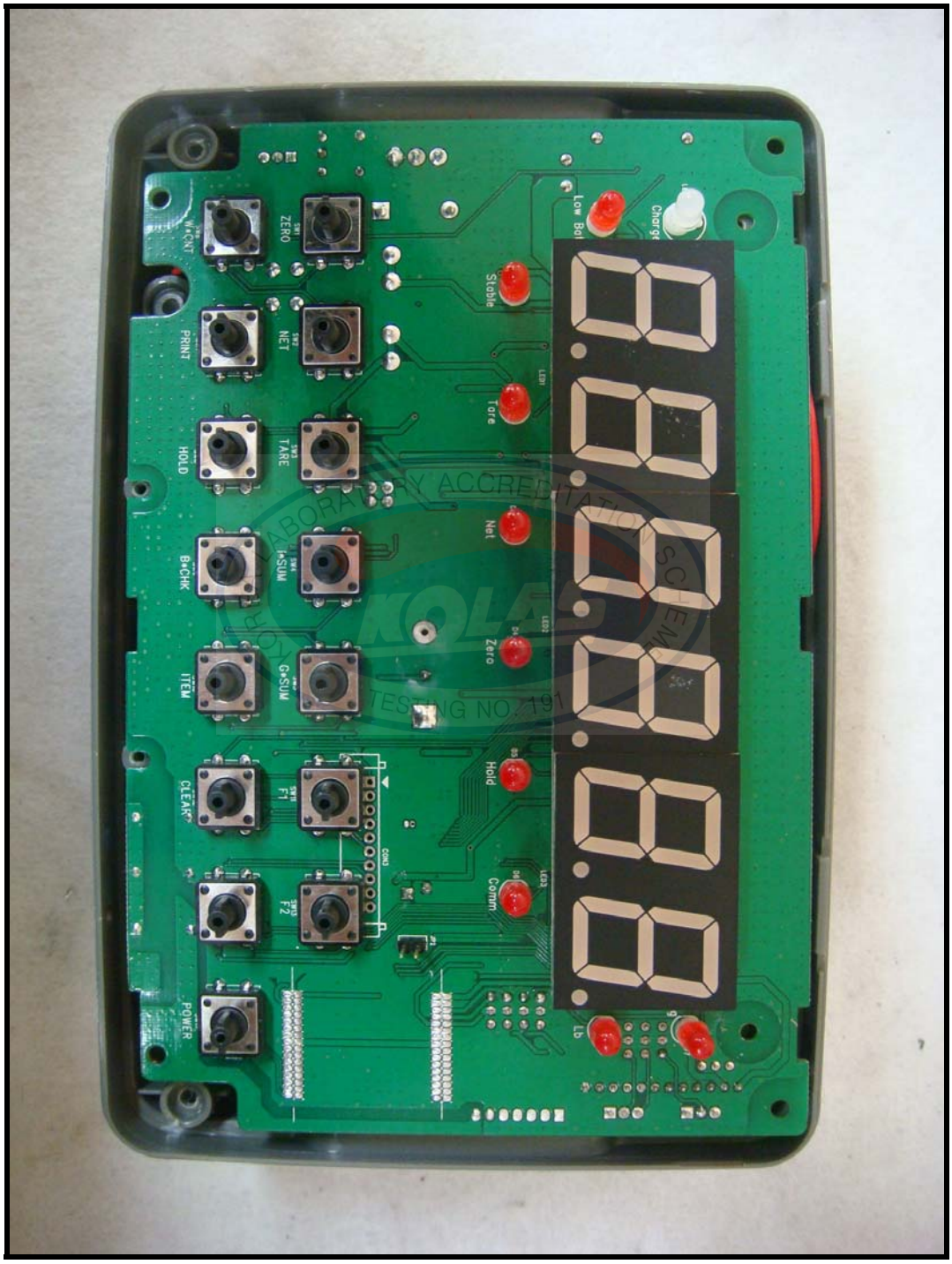
A2.1: <Front view>

A2.2: <Rear view>

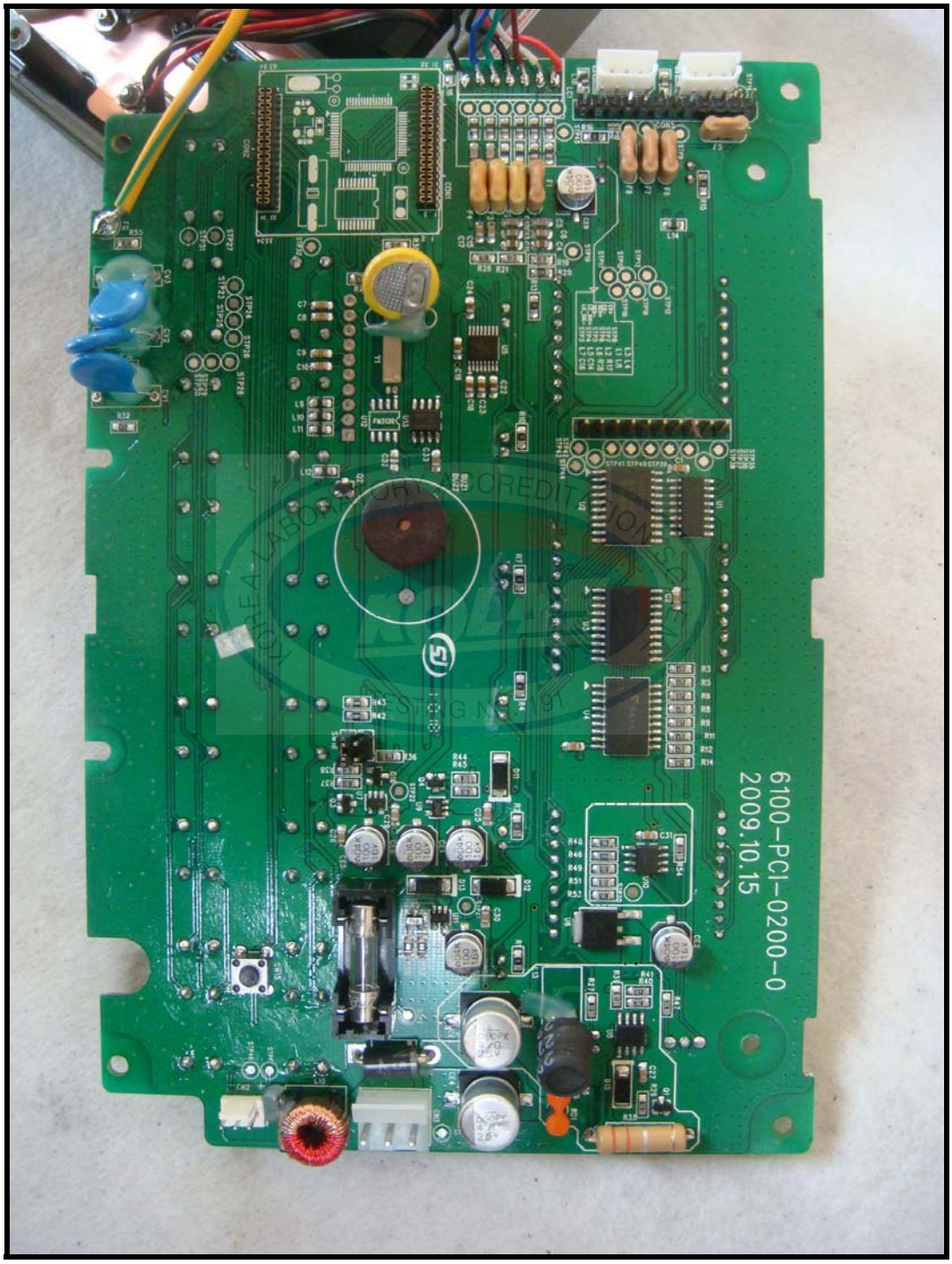
A2.3: <Internal view>



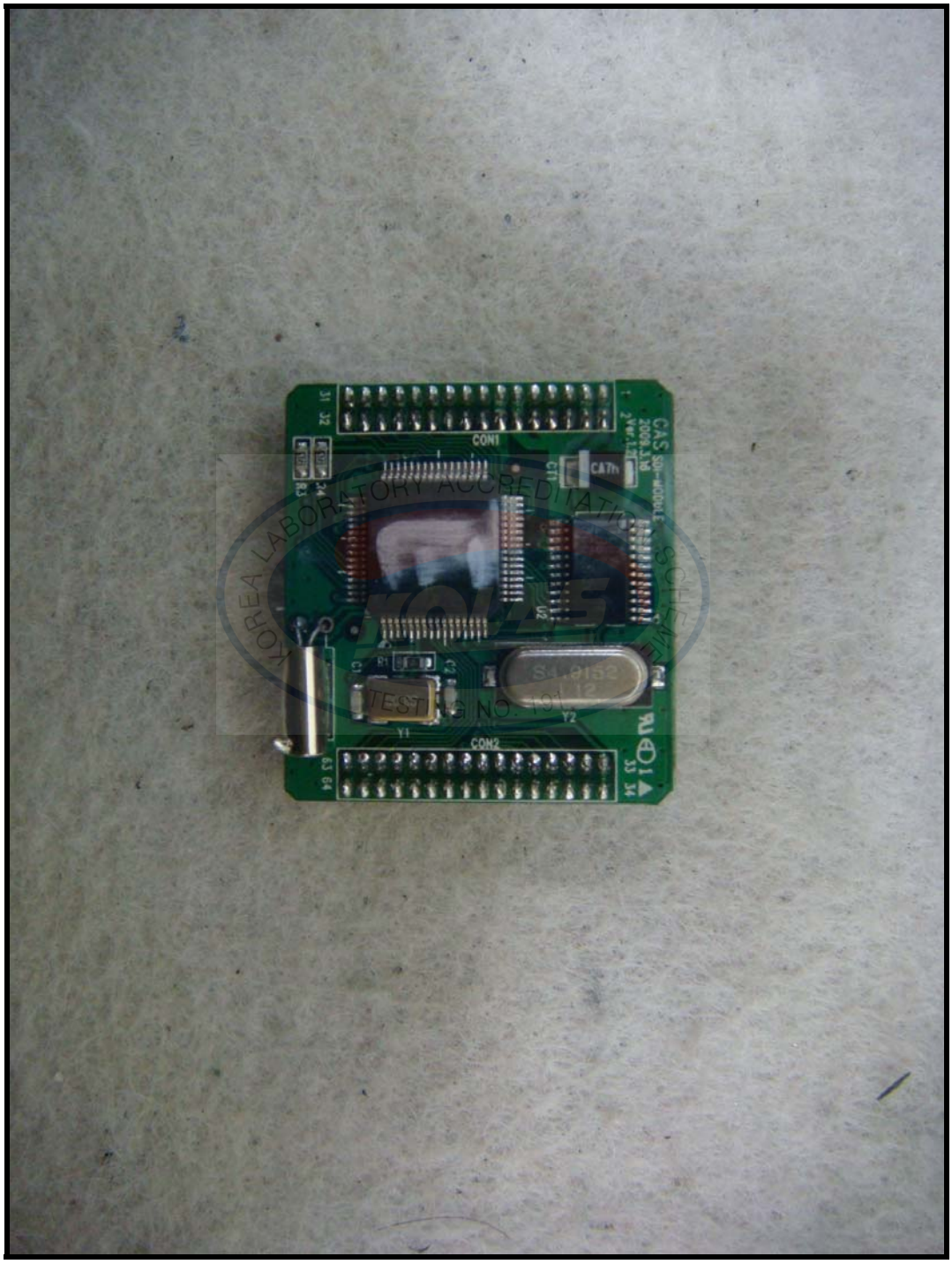
A2.4: <Main board front view>



A2.5: <Main board rear view>



A2.6: <SDI-MODULE front view>



A2.7: <SDI-MODULE rear view>

A2.8: <Battery front view>

A2.9: <Battery rear view>

A2.10: <Adaptor front view>

A2.11: <Adaptor rear view>

A2.12: <Adaptor label view>