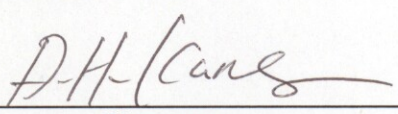
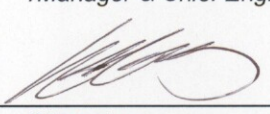




DAT-P-076/97-02

<b>Test Report No.:</b>	<b>SKTCEE-090820-152-A2</b>		
<b>Applicant :</b>	<b>STL SOLUTION CO.,LTD.</b>		
<b>Applicant Address :</b>	#10F/1010 Bucheon Techo Park Ssangyoung 3-cha 103, 36-1, Samjeong-dong, Ojeong-gu, Bucheon-si, Gyeonggi-do, 421-742, KOREA		
<b>Manufacturer:</b>	<b>STL SOLUTION CO.,LTD.</b>		
<b>Manufacturer Address :</b>	#10F/1010 Bucheon Techo Park Ssangyoung 3-cha 103, 36-1, Samjeong-dong, Ojeong-gu, Bucheon-si, Gyeonggi-do, 421-742, KOREA		
<b>Product:</b>	<b>DVR(Digital Video Recorder)</b>		
<b>Model No.:</b>	<b>KE-7000MX</b>	<b>Serial No.:</b>	<b>Prototype #1</b>
<b>Buyer Model/ Multi Model No.:</b>	<b>KE-7004MX, KE-7008MX, KE-7016MX, SM-7004MX, SM-7008MX, SM-7016MX Trium-SH5008, Trium-SH5016</b>		
<b>Receipt No.:</b>	<b>SKTEU09-0807</b>	<b>Date of receipt:</b>	<b>Aug. 5, 2009</b>
<b>Date of Issue:</b>	<b>Aug.20, 2009</b>	<b>Date of revised (Note 3)</b>	<b>Nov.16, 2010</b>
<b>Testing location:</b>	<b>SK TECH CO., LTD.</b> 820-2, Wolmoon-Ri, Wabu-Up, Namyangju-Si, Kyunggi-Do, Korea		
<b>Test Standards:</b>	<b>EN61000-3-2:2006</b> <b>EN61000-3-3:1995+A1:2001+A2 :2005</b> <b>EN55022:2006 Class A</b> <b>EN50130-4:1995+A1:1998+A2:2003</b> ( EN61000-4-2:1995+A1:1998+A2:2001) ( EN61000-4-3:2006) ( EN61000-4-4:2004) ( EN61000-4-5:2006) ( EN61000-4-6:2007) ( EN61000-4-11:2004)		
<b>Test Result:</b>	<b>The above mentioned product has been tested and passed.</b>		
<b>Tested by: D.H. Kang</b>	<b>Approved by: S.H. Yoon</b> /Manager & Chief Engineer		
 <b>Signature</b>	 <b>Signature</b>		
<b>Other Aspects :</b>	(Note 1): Reason for Applicant and Manufacturer name by buyer's request. Change of Company Address, and Name of Model no.(Original Report No: SKTCEE-090820-152) (Note 2): Reason for the change Applicant and Manufacturer's names and addresses by buyer's request. (Original Report No: SKTCEE-090820-152-1) (Note 3): Reason for Audio Signal 3m Test (R/E, EFT, C/S) and multi model no buyer's request. (Original Report No: SKTCEE-090820-152-A1)		
<b>Abbreviations :</b>	• OK, PASS = passed • Fail = failed • N/A = not applicable		
<ul style="list-style-type: none"> <li>• This test report is not permitted to copy partly and entirely without our permission.</li> <li>• This test result is dependent on only equipment to be used.</li> <li>• This test result is based on a single evaluation of one sample of the above mentioned.</li> <li>• This test report is the accredited testing items by Korea Laboratory Accreditation Scheme, which signed the ILAC-MRA.</li> </ul>			



## » » Contents « «

Contents	2
List of Tables	3
List of Supplements	3
List of Figures	3
List of Photographs	3
1. General	4
2. Test Site	4
2.1 Location	4
2.2 List of Test and Measurement Instruments	5
2.3 Test Date	7
2.4 Test Environment	7
3. Description of the tested samples	8
3.1 Rating and Physical Characteristics	8
3.2 Submitted Documents	9
4. Measurement Conditions	10
4.1 Modes of Operation	10
4.2 Additional Equipment	10
4.3 Type of Used Cables	11
4.4 Test Setup	12
4.5 Uncertainty	13
5. Test Results EMISSION	15
5.1 Limits concerning harmonic current	15
5.2 Limits concerning voltage fluctuations and flicker	17
5.3 Conducted Disturbance	19
5.4 Radiated Disturbance	25
6. Test Results IMMUNITY	27
6.1 Electrostatic discharge	27
6.2 Radiated radio-frequency electromagnetic field	30
6.3 Electrical fast transient/burst	32
6.4 Surge	34
6.5 Conducted disturbances, induced by radio-frequency fields	36
6.6 Voltage dips, Voltage interruptions	38
6.7 Mains supply voltage variations	39
7. Photographs of the Test Set-up	40



## » List of Tables

Table 1	List of test and measurement Equipment	5
Table 2	Test Data, Radiated Disturbance	26
Table 3	ESD, Positive/Negative Polarity	29
Table 4	Radiated radio-frequency electromagnetic field (AM)	31
Table 5	Radiated radio-frequency electromagnetic field (PM)	31
Table 6	Electrical fast transient, AC Power Lines, Positive/Negative Polarity	33
Table 7	Burst, other supply / signal lines, Positive / Negative Polarity	33
Table 8	Surge, AC Power lines, Positive/Negative Polarity	35
Table 9	Surge, other supply /signal lines, Positive/Negative Polarity	35
Table 10	Immunity-input and output AC power ports	37
Table 11	Immunity-ports for signal and control lines	37

## » List of Supplements

Supplement 1	Harmonic Test	16
Supplement 2	Flickermeter Test	18
Supplement 3	Test Data, Conducted Disturbance	20
Supplement 4	Spectral Diagram, LINE-PE	21
Supplement 5	Spectral Diagram, NEUTRAL-PE	22
Supplement 6	Test Data, Conducted Disturbance at telecommunication ports	23
Supplement 7	Spectral Diagram, conducted Disturbance at telecommunication ports	24

## » List of Figures

Figure 1	ESD, Discharged points	28
----------	------------------------	----

## » List of Photographs

Photograph 1	Setup for Limits concerning harmonic current/voltage fluctuations & Flicker	40
Photograph 2	Setup for Conducted Disturbance	41
Photograph 3	Setup for Radiated Disturbance	42
Photograph 4	Setup for Electrostatic discharge	43
Photograph 5	Setup for Radiated radio-frequency electromagnetic field	44
Photograph 6	Setup for Electrical fast transient/burst	45
Photograph 7	Setup for Surge/Signal surge	46
Photograph 8	Setup for Conducted disturbances, induced by radio-frequency fields	47
Photograph 9	Setup for Voltage dips, short interruptions	48
Photograph 10	Setup for Mains supply voltage variations.	49
Photographs of EUT		50-66



## 1. General

This equipment has been shown to be capable of compliance with the applicable technical standards and was tested in accordance with the measurement procedures as indicated in this report.

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

## 2. Test Site

SK TECH Co., Ltd.



### 2.1 Location

820-2, Wolmoon Ri, Wabu-Up, Namyangju-Si, Kyunggi-Do, Korea

The test site is in compliance with ISO/IEC 17025 for general requirements for the competence of testing and calibration laboratories. This laboratory is recognized as a Conformity Assessment Body(CAB) for CAB's Designation Number: **KR0007** by FCC, is accredited by NVLAP for NVLAP Lab. Code : **200220-0** and DATech for DAR-Registration No.:**DAT-P-076/97-02** and KOLAS for Accreditation No.:**KT191**.



## 2.2 List of Test and Measurement Instruments

Table 1 : List of Test and Measurement Equipment

### •Conducted Disturbance

Kind of Equipment	Type	S/N	Calibrated until
EMI Receiver	ESHS10	862970/019	07.2010
Artificial Mains Network	ESH2-Z5	834549/011	07.2010
Artificial Mains Network	ESH3-Z5	836679/018	07.2010
Impedance Stabilization Network	ISN T8	24806	09.2009

### •Radiated Disturbance

Kind of Equipment	Type	S/N	Calibrated until
EMI Receiver	ESVS10	834468/008	07.2010
Amplifier	8447F	3113A05153	07.2010
Trilog-Broadband Antenna	VULB9168	9168-230	07.2010
Antenna Turntable Driver	5907	91X518	N/A
Antenna Turntable controller	5906	91X519	N/A
EMI TEST RECEIVER	ESPI	101206	07.2010

### •Limits concerning Harmonic Current / Voltage Fluctuations and Flicker

Kind of Equipment	Type	S/N	Calibrated until
Reference Impedance Network	IMP555	IG147/1172	07.2010
Universal Power Analyzer	PM 6000	100006700207	12.2009

### •EN 61000-4-2 (Electrostatic discharge)

Kind of Equipment	Type	S/N	Calibrated until
ESD simulator	ESS-2000AX	ESS0898782	06.2010



**•EN 61000-4-3 (Radiated radio-frequency electromagnetic field)**

Kind 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	03.2010
Power Meter	NRVD	100496	07.2010
10V Insertion Unit	URV5-Z2	100166	07.2010
10V Insertion Unit	URV5-Z2	100167	07.2010
High Gain Log Periodic Antenna	HL046	100032	N/A
Signal Generator	SML03	100801	07.2010
Power Meter	NRVD	100495	07.2010
Function Generator	33120A	MY40019927	07.2010
10V Insertion Unit	URV5-Z2	100164	07.2010
10V Insertion Unit	URV5-Z2	100165	07.2010
RF Power Amplifier	FLG-50C	N/A	N/A
RF Power Amplifier	FLH-200/100	N/A	N/A
Switch unit	GTS1003	1287	N/A
Octave Bandwidth Pyramidal Horn Antenna (1G~2G)	3161-01	00032184	N/A

**•EN 61000-4-4 (Electrical fast transient/burst)**

Kind of Equipment	Type	S/N	Calibrated until
Ultra Compact Simulator	UCS 500 M6B	V0545100862	07.2010
Motor Variac	MV 2610	V0545100863	N/A
Capacitive Coupling Clamp	HFK	1205-11	07.2010

**•EN 61000-4-5 (Surge)**

Kind 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	07.2010
Motor Variac	MV 2610	V0545100863	N/A



•EN 61000-4-6 (Conducted disturbances, induced by radio-frequency fields)

Kind of Equipment	Type	S/N	Calibrated until
CDN	TSCDN-M3-25A	02009	07.2010
CDN	CDN S1/75	1105-31	07.2010
CDN	FCC-801-M2-25	1N	07.2010
Attenuator (6dB, 75W)	75-A-FFN-06	N/A	N/A
Conducted Immunity Test System	CIT-10/75	102C3202	07.2010
150Ω/50Ω adaptor	N/A	N/A	N/A
Terminations	F1428	MR737	N/A
CDN	TSCDN-T4	02001	07.2010
EM Clamp	KT-30	8-1315-2	03.2010

•EN 61000-4-11 (Voltage dips, Mains supply voltage variations)

Kind of Equipment	Type	S/N	Calibrated until
Ultra Compact Simulator	UCS 500 M6B	V0545100862	07.2010
Motor Variac	MV 2610	V0545100863	N/A

## 2.3 Test Date

Date of Application : Aug. 5, 2009

Date of Test : Aug. 11, 2009 ~ Aug. 13, 2009

## 2.4 Test Environment

See each test item's description.



### 3. Description of the tested samples

The EUT is a DVR(Digital Video Recorder)  
 KE-7000MX is Basic Model and 16CH DVR  
 KE-7004MX, KE-7008MX, KE-7016MX is Sorting by the type of Software Model  
 SM-7004MX, SM-7008MX, SM-7016MX is SSOMA OEM Model

#### 3.1 Ratings and Physical Characteristics

MODEL		4 Ch	8 Ch	16 Ch
Compression Algorithm		Video : MPEG-4 or H.264, Audio : G723.1		
HDD	Internal	2xHDD (Max) (1xHDD + 1xCD-RW/DVD)		
	External	External USB thumb drive(memory stick) via USB 2.0 port (For archiving)		
Operating System		Embedded Linux		
Video	Input	4 Ch	8 Ch	16 Ch
	Loop-Out	No	No	No
Video Mode		NTSC/PAL Selectable		
Display Speed (NTSC/ PAL)		120/100 fps (Real-Time Display)	240/200 fps (Real-Time Display)	480/400 fps (Real-Time Display)
Screen Modes for Live Display		1, 4 & PIP	1, 4, 9 & PIP	1, 4, 9, 16 & PIP
Monitor Output		Main Monitor Output (Composite, VGA) Spot Monitor Output (Composite)		
Max.Recording Speed (NTSC/ PAL)	352x240/288	120/100 fps	240/200 fps	240/200 fps
	720x240/288	120/100 fps	120/100 fps	120/100 fps
	720x480/576	60/50 fps	60/50 fps	60/50 fps
Recording Resolution		NTSC : 352x240, 720x240, 720x480, PAL : 352x288, 720x288, 720x576		
Recording Modes		Continuous, Scheduled, Sensor-Activated & Motion Detection Recording Pre & Post Alarm Recording, Emergency Recording		
Playback & Search	Speed	x1, x2, x4, x8, x16, x32		
	Function	1, 4, 9 & 16 Ch (Multi-Channel Playback) Intelli-Search by Time Bar, Calendar (Date & Time) and Event/system Search Oldest & Latest video search		
Audio Input / Output		1 Ch Input / 1 Ch Output		
Alarm I/O & Camera Connection		M : N Mapping		
Alarm Input / Output		4 Ch / 1 Ch	4 Ch / 1 Ch	4 Ch / 1 Ch
P/T/Z Control and Port		Virtual Joy-Stick Control on screen by mouse Pan/Tilt/Zoom/Focus/Iris, RS-485 Port		
LAN		10/100 Base-Tx Ethernet (RJ45) – Fixed IP, DHCP & DDNS		
Network	Function	Multi-to-Multi Connection, Multi-Channel Transmission Live Monitoring, Remote Playback and File Backup (Triplex-on-Remote) Remote & E-Mail Notification		
		Pan/Tilt/Zoom/Focus/Iris (World Famous PTZ Protocol are Available)		
Remote PTZ Control		Remote Configuration, Live Monitoring, Drag & Drop, Tree-structure		
Backup Device	Internal	CD-RW and DVD (Option)		
	External	USB thumb drive(memory stick)		
System Recovery after Power Failure		Auto-Reboot and Journaling File System Auto-Scan and Data Recovery		
Advanced Functions		Auto page-Sequencing by selection channels, Event Log Viewer & Extracting(txt file) Multi-layer passwords per function, LED Indicator for Various Status, 19"Rack-mountable** Configuration Import/Export, Quick setup, Temperature auto-checking & Alerting		
System Operation		Button on Front Panel, IR remote Controller, USB Mouse CCTV Keyboard (Option)		



MODEL	4 Ch	8 Ch	16 Ch
Storage Temperature and Humidity	-20~60℃ / 20~95 % RH		
Operating Temperature and Humidity	5~40℃ / 20~80 % RH		
Power	DC 12V, 5A, 50~60 Hz		
Remote Software	RMS-16 Ch (Remote Monitoring S/W), Web Browser		
Certifications	CE, FCC & MIC & WEEE, RoHS		

\*: The specifications are subject to change without prior notice

\*\* Dependent on model & chassis

## 3.2 Submitted Documents

-N/A





## 4. Measurement Conditions

Operating voltage of the EUT is supplied from AC 230V/50Hz.

(Input 100-240V~, 50-60Hz, 1.5A, Output 12V, 5.0A)

### 4.1 Modes of Operation

The was connected to the Color Video Monitor and LCD Monitor.

The Dome Camera's Image was displayed on the Color Video Monitor and LCD Monitor.

(Internal clock 250MHz)

### 4.2 Additional Equipments

Equipment	Manufacturer	Model No.	Serial No.
Color Video Monitor	HITRON SYSTEMS INC.	CVM1054X	M5020002
LCD Monitor	LG Electronics	L245WPQ	708KCWC51465
Dome Camera	N/A	N/A	N/A
AC Adapter (Dome Camera)	HUA JUNG COMP.CO., LTD.	HASU11FB42	N/A
Mouse(USB)	DONGGUAN PRIMAX ELECTRONICS LTD	MO28UOL	44X4966077
AC Adapter(EUT)	Sino-American	SA165A-1250V-3	N/A
Sensor Board	N/A	N/A	N/A
Memory Stick	N/A	N/A	N/A



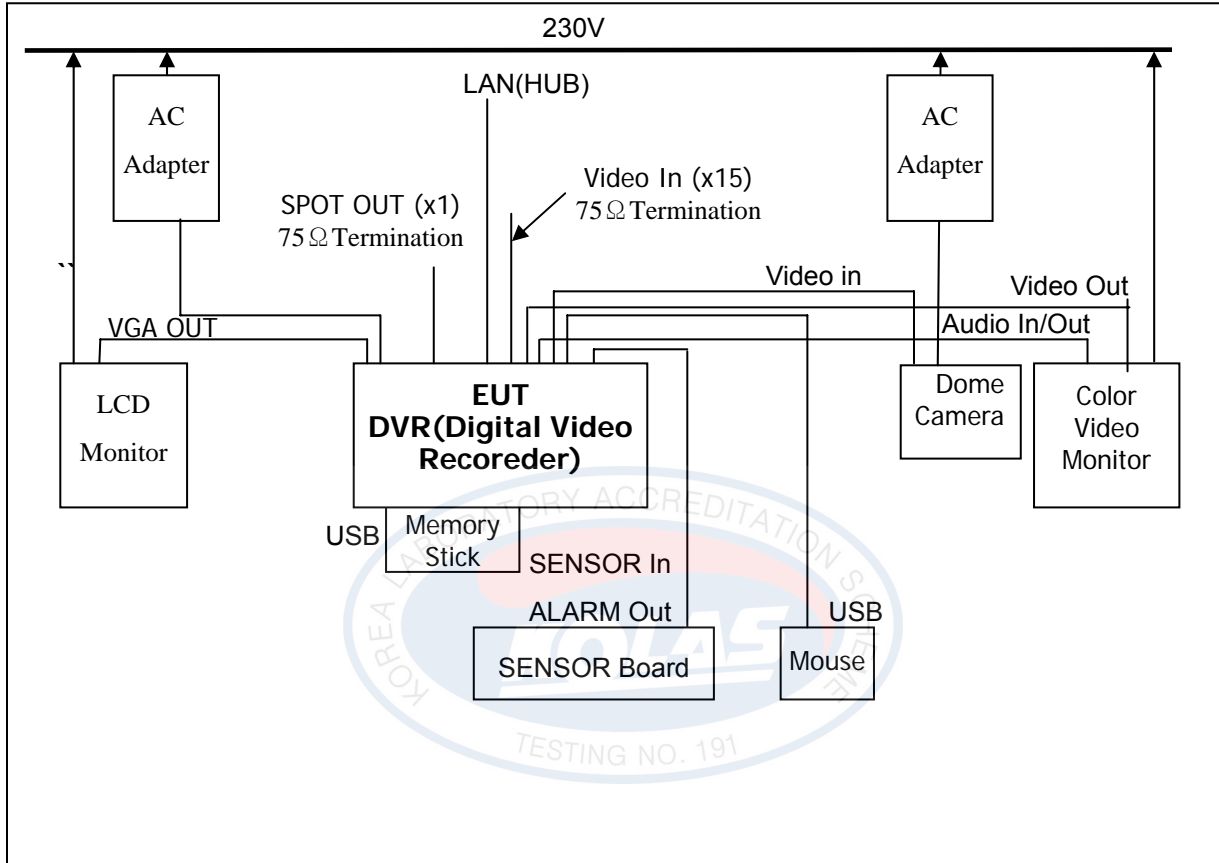
### 4.3 Type of Used Cables

#	START		END		Cable	
	Name	I/O Port	Name	I/O Port	Length	Shielded / Unshielded
1	EUT	Power	AC Adapter		2.0	Unshielded
2	"	AC Adapter	AC Line		1.6	Unshielded
3	"	Video In	Dome Camera		3.0	Shielded
4	"	Video Out	Color Video Monitor		3.0	Shielded
5	"	VGA Out	LCD Monitor		1.2	Shielded
6	"	Audio In/Out	Color Video Monitor		3.0	Unshielded
7	"	LAN	HUB		5.0	Unshielded
8	"	USB	Mouse		1.4	Unshielded
9	"	"	Memory Stick		-	-
10	"	Sensor In Alarm Out	Sensor Board		3.0	Unshielded
11	"	SPOT OUT (x1)	75 $\Omega$ Termination		-	-
12	"	Video In(x15)	75 $\Omega$ Termination		-	-
13	Dome Camera	Power	AC Adapter		1.5	Unshielded
14	"	AC Adapter	AC Line		1.5	Unshielded
15	LCD Monitor	Power	AC Line		1.6	Unshielded
16	Color Video Monitor	Power	AC Line		1.6	Unshielded



### 4.4 Test Setup

The test setup photographs (#page 40 ~ 49) showed the external supply connections and interfaces.



**[ System Block Diagram of Test Configuration ]**



## 4.5 Uncertainty

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

Expanded Uncertainty

$$U = k * U_c(xi) = 2 * 2.10 = 4.20dB$$

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

### 2) Conducted disturbance from 150 KHz to 30 MHz using a 50 $\Omega$ /50 $\mu$ H AMN

Expanded uncertainty

$$U = k * U_c(xi) = 2 * 1.57 = 3.14dB$$

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  $U_{lab}$  is less than or equal to  $U_{cispr}$

- 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  $U_{lab}$  is greater than  $U_{cispr}$

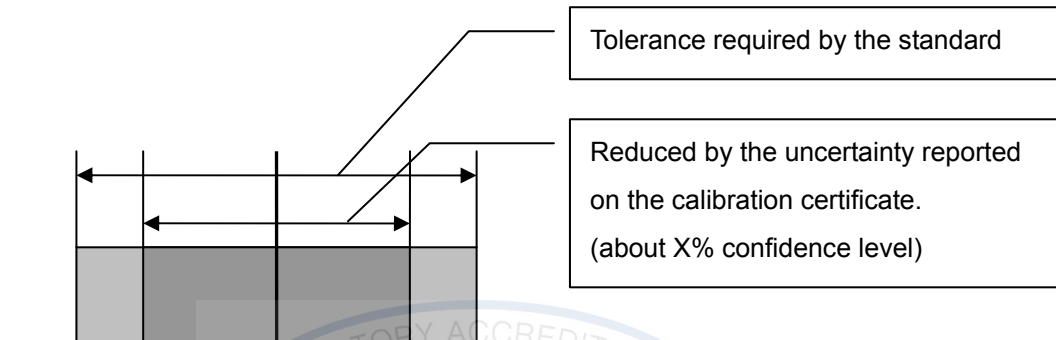
- compliance is deemed to occur if no measured disturbance, increased by  $(U_{lab} - U_{cispr})$ , exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance, increased by  $(U_{lab} - U_{cispr})$ , exceeds the disturbance limit.

※ 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):** At least a 95% confidence (k=2)
- **Radiated immunity (EN61000-4-3):** 2.59dB (k=1.64, confidence level is 90%)
- **EFT (EN61000-4-4):** At least a 95% confidence (k=2)
- **SURGE (EN61000-4-5):** At least a 95% confidence (k=2)
- **Conducted immunity (EN61000-4-6):** 1.34dB (k=1.64, confidence level is 90%)
- **Voltage dip (EN61000-4-11):** At least a 95% confidence (k=2)



## 5. Test Results EMISSION

### 5.1 Limits concerning harmonic current

#### Result

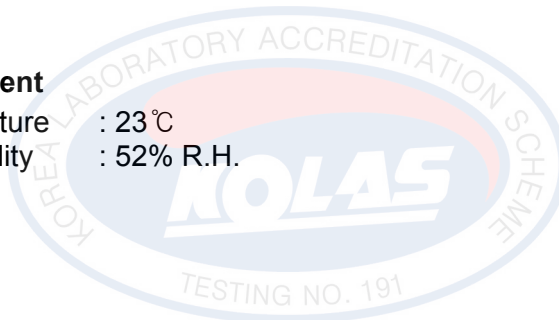
**PASS**

The harmonics on AC Mains in the frequency from 0 to 2kHz were measured in accordance to **EN61000-3-2:2006**.

The measurement was conducted with an automatic current harmonic analyzing system. This equipment is in compliance with the requirements of **EN61000-3-2:2006**. The Measurement showed that the equipment is classified into class A of **EN61000-3-2:2006**.

- **Test Environment**

Room temperature : 23 °C  
Relative Humidity : 52% R.H.



*\* Supplementing the flicker test data to next page.*





## 5.2 Limits concerning voltage fluctuations and flicker

### Result

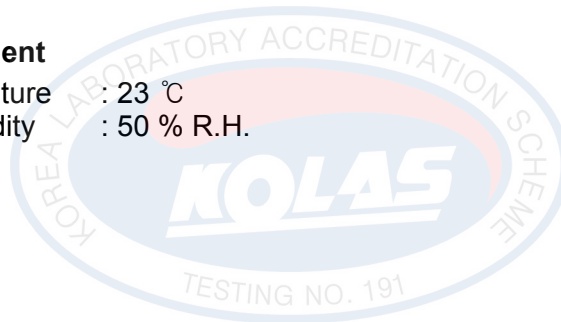
**PASS**

The voltage fluctuations on AC mains in the frequency range from 0 to 2kHz were measured in accordance to **EN61000-3-3:1995+A1:2001+A2:2005**.

The measurement was conducted with an automatic current harmonic analyzing system. This equipment is in compliance with the requirements of **EN61000-3-3:1995+A1:2001+A2:2005**.

- **Test Environment**

Room temperature : 23 °C  
Relative Humidity : 50 % R.H.



***\* Supplementing the flicker test data to next page.***



Supplement 2: Flickermeter Test – Table

<b>SK-TECH</b>	
Product: KE-7000MX	2009 Aug 11 5:59pm
Serial no:	Page 1 of 1
Description:	
Result Name: KE-7000MX	
Voltech IEC61000-3 Windows Software 1.13.05RC1	Test Date: 2009 Aug 11 3:53pm
Type of Test: Flickermeter Test - Table	
Power Analyzer: Voltech PM6000 SN: 100006700207 Firmware Version: v1.20.06RC3	
Channel(s):	
1. SN: 090015500797, 25 Adjusted Date: 7 NOV 2007. 2. SN:None Adjusted Date:None	
3. SN:None Adjusted Date:None 4. SN:None Adjusted Date:None	
5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None	
Shunt(s):	
1. SN: 091024300588, 4 Adjusted Date: 6 NOV 2007. 2. SN:None Adjusted Date:None	
3. SN:None Adjusted Date:None 4. SN:None Adjusted Date:None	
5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None	
AC Source: Mains / Manual Source	
Overall Result: <b>PASS</b>	Notes: Pit test duration 120 minutes Measurement method - Voltage

	Pit
Limit	0.650
Reading	0.089

	Pst	dc (%)	dmax (%)	d(t) > 3.3%(ms)
Limit	1.000	3.300	4.000	500
Reading 1	0.088	0.003	0.272	0
Reading 2	0.088	0.002	0.267	0
Reading 3	0.088	0.003	0.284	0
Reading 4	0.089	0.002	0.299	0
Reading 5	0.089	0.003	0.288	0
Reading 6	0.089	0.003	0.311	0
Reading 7	0.089	0.003	0.319	0
Reading 8	0.089	0.003	0.322	0
Reading 9	0.089	0.003	0.328	0
Reading 10	0.089	0.003	0.319	0
Reading 11	0.089	0.003	0.336	0
Reading 12	0.089	0.003	0.330	0



## 5.3 Conducted Disturbance

### Result

**PASS**

The continuous disturbance voltage of AC Mains in the frequency from 0.15 to 30 MHz was measured in accordance to **EN55022:2006 Class A**

The measurement setup was made according to **EN55022:2006 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 40cm from the EUT.

The distance from the EUT to other metal surfaces was at least 0.8m. 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 1.0m. The used line impedance stabilizing network (LISN) has a rated impedance of  $50\Omega/50\mu\text{H}$  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.

- **Test Environment**

Room temperature : 23 °C  
Relative Humidity : 56 % R.H.

**※ Supplementing the conduction test data and graphs at next 5 pages.**



### Supplement 3: Test Data, Conducted Disturbance

#### <Quasi-Peak>

Frequency (MHz)	Reading (dBuV)	Line	C/F (dB)	C/L (dB)	Actual (dBuV)	Limit (dBuV)	Margin (dB)
0.515	48.36	N	0.27	0.06	48.69	73.00	24.31
0.580	47.03	L	0.25	0.06	47.34	73.00	25.66
0.644	47.23	N	0.27	0.06	47.56	73.00	25.44
0.773	48.78	N	0.26	0.06	49.10	73.00	23.90
0.838	46.92	N	0.26	0.07	47.25	73.00	25.75
0.904	46.95	N	0.26	0.07	47.28	73.00	25.72

#### <Average>

Frequency (MHz)	Reading (dBuV)	Line	C/F (dB)	C/L (dB)	Actual (dBuV)	Limit (dBuV)	Margin (dB)
0.515	45.88	N	0.35	0.05	46.28	60.00	13.72
0.580	44.33	L	0.25	0.06	44.64	60.00	15.36
0.644	44.77	N	0.27	0.06	45.10	60.00	14.90
0.773	46.44	N	0.26	0.07	46.77	60.00	13.23
0.838	44.67	N	0.26	0.07	45.00	60.00	15.00
0.904	44.75	N	0.26	0.07	45.08	60.00	14.92

#### ► NOTE

\* C/F = Correction Factor

\* C/L = Cable Loss

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

\* Margin Calculation

$$\text{Margin(Q.P)} = \text{Limit} - \text{Actual}$$

$$[\text{Actual(Q.P)} = \text{Reading(Q.P)} + \text{C/F} + \text{C/L}]$$



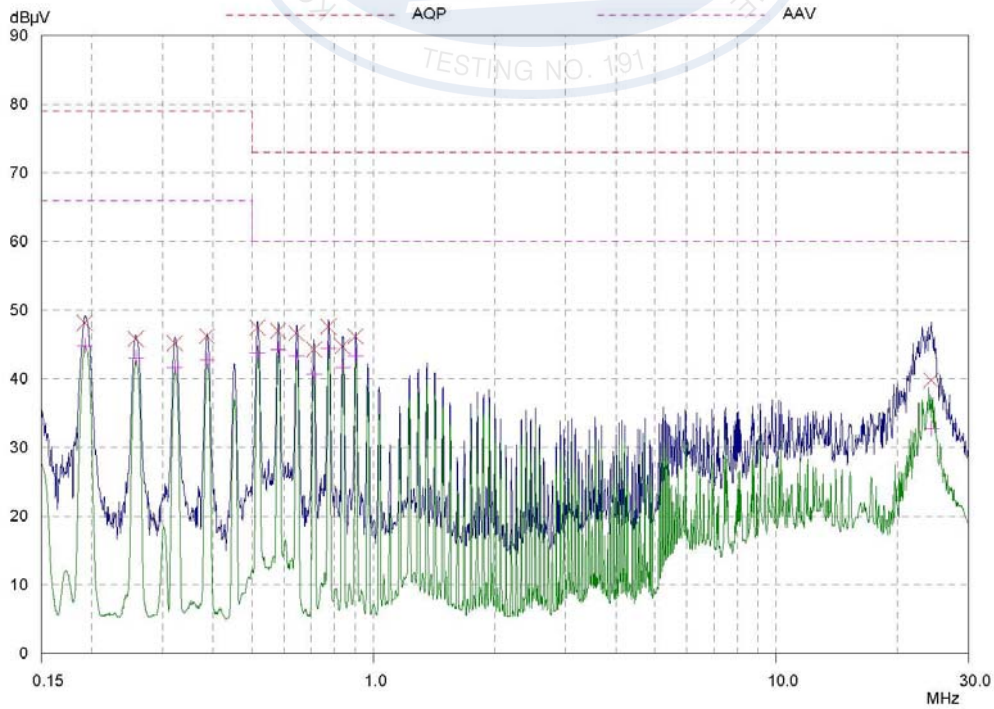
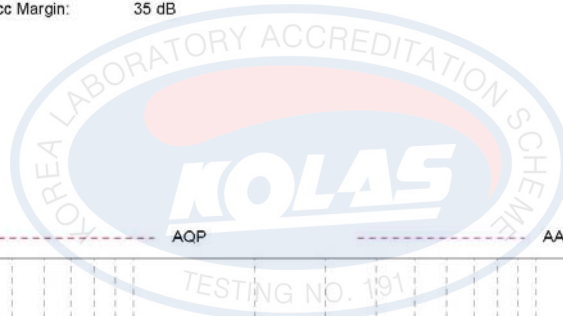
Supplement 4: Spectral Diagram, LINE – PE

SK TECH Co., Ltd.  
CONDUCTED DISTURBANCE  
EUT: KE-7000MX  
Manuf:  
Op Cond:  
Operator:  
Test Spec:  
Comment: LINE-PE  
AC 230V,50Hz  
Result File: STL12.dat : KE-7000MX-L

12 Aug 2009 10:50

Scan Settings (1 Range)			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	0.4%	10kHz	PK+AV	20msec	Auto	OFF	60dB

Final Measurement: Detectors: X QP / + AV  
Meas Time: 1sec  
Peaks: 8  
Acc Margin: 35 dB





Supplement 5: Spectral Diagram, NEUTRAL – PE

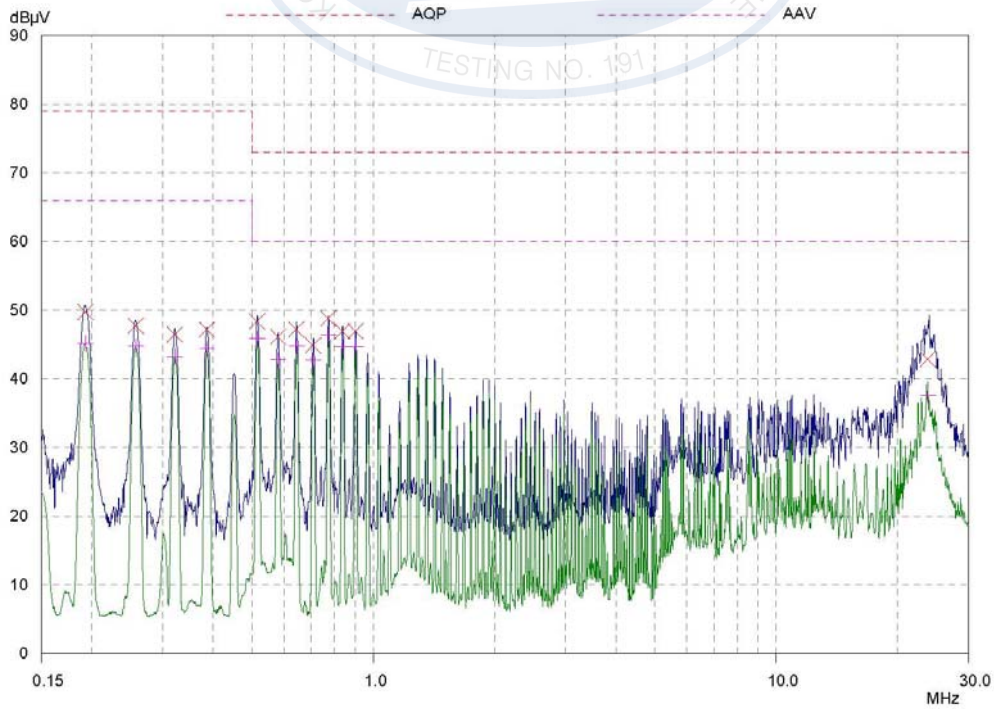
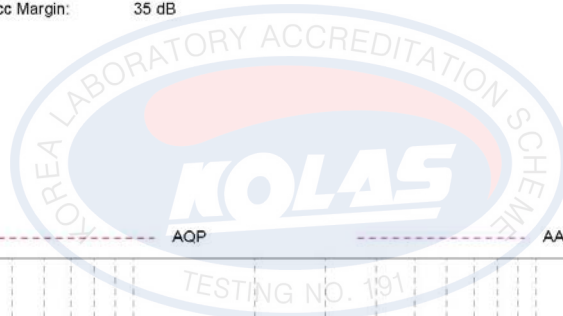
SK TECH Co., Ltd.  
CONDUCTED DISTURBANCE

12 Aug 2009 10:42

EUT: KE-7000MX  
Manuf:  
Op Cond:  
Operator:  
Test Spec:  
Comment: NEUTRAL-PE  
AC 230V,50Hz  
Result File: STL11.dat : KE-7000MX-N

Scan Settings (1 Range)			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	0.4%	10kHz	PK+AV	20msec	Auto	OFF	60dB

Final Measurement: Detectors: X QP / + AV  
Meas Time: 1sec  
Peaks: 8  
Acc Margin: 35 dB





### Supplement 6: Test Data, Conducted Disturbance at telecommunication ports

#### <Quasi-Peak>

Frequency (MHz)	Reading (dBUV)	ISN/F (dB)	C/L (dB)	Actual (dBUV)	Limit (dBUV)	Margin (dB)
0.151	64.35	10.28	0.05	74.68	96.90	22.22
0.301	56.66	10.28	0.05	67.01	91.20	24.19
0.604	51.32	10.35	0.06	61.73	87.00	25.27
0.755	48.02	10.35	0.07	58.44	87.00	28.56
1.060	47.69	10.36	0.09	58.14	87.00	28.86
19.710	49.70	10.34	0.29	60.33	87.00	26.67

#### <Average>

Frequency (MHz)	Reading (dBUV)	ISN/F (dB)	C/L (dB)	Actual (dBUV)	Limit (dBUV)	Margin (dB)
0.151	61.96	10.28	0.05	72.29	83.90	11.61
0.301	55.91	10.28	0.05	66.24	78.20	11.96
0.604	51.09	10.35	0.06	61.50	74.00	12.50
0.755	47.42	10.35	0.07	57.84	74.00	16.16
1.060	47.26	10.36	0.09	57.71	74.00	16.29
2.423	45.20	10.33	0.12	55.65	74.00	18.35

#### ► NOTE

\* ISN/F = ISN Voltage Division Factor

\* C/L = Cable Loss

\* Margin Calculation

Margin = Limit - Actual

[Actual = Reading + ISN/F + C/L]



**Supplement 7: Spectral Diagram, Conducted Disturbance at telecommunication ports**

**CONDUCTED COMMON MODE DISTURBANCE**  
**Conducted Disturbance At Telecom. Port**

12 Aug 2009 11:04

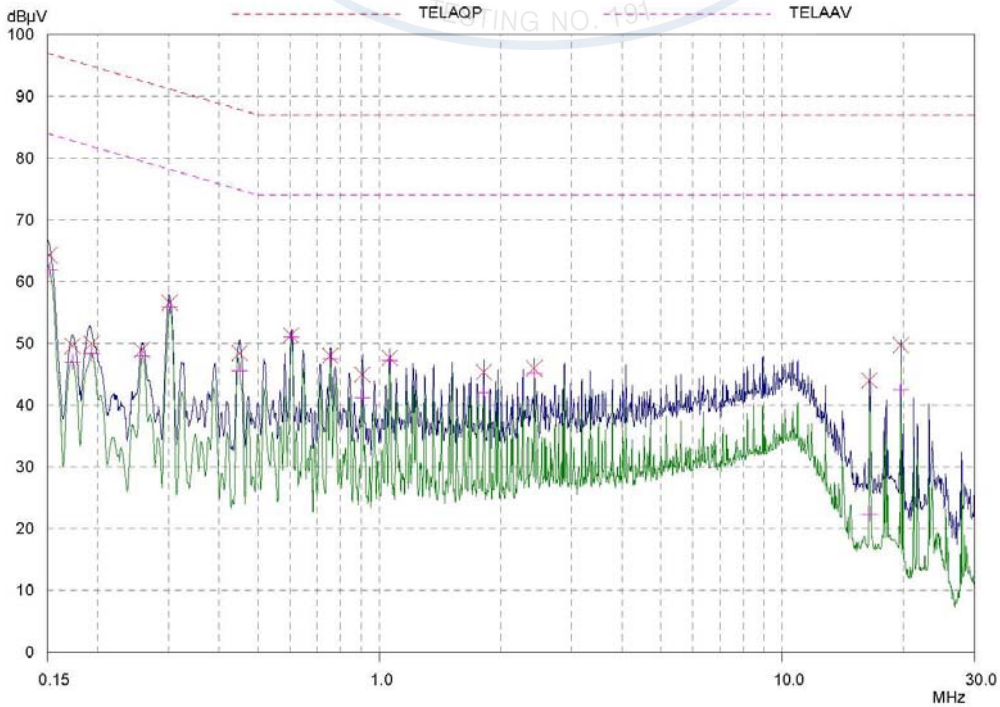
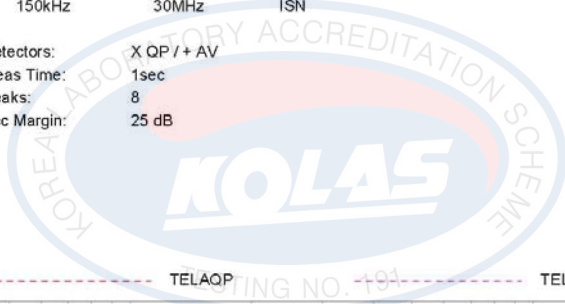
EUT: KE-7000MX  
 Manuf:  
 Op Cond:  
 Operator:  
 Test Spec:  
 Comment:

Result File: STL13.dat : KE-7000MX

Scan Settings (1 Range)			Receiver Settings						
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge	
150kHz	30MHz	0.4%	10kHz	PK+AV	20msec	Auto	OFF	60dB	

Transducer	No.	Start	Stop	Name
	1	150kHz	30MHz	ISN

Final Measurement: Detectors: X QP / + AV  
 Meas Time: 1sec  
 Peaks: 8  
 Acc Margin: 25 dB





## 5.4 Radiated Disturbance

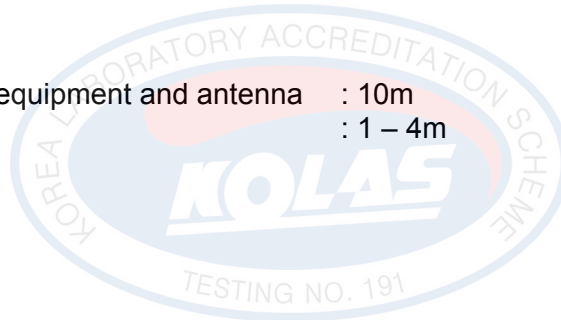
### Result

**PASS**

In the range of 30 MHz to 1 GHz the Electric Field strength was measured in accordance with **EN55022:2006 Class A**

The test setup was made according to **EN55022:2006 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.

Distance between equipment and antenna : 10m  
Height of antenna : 1 – 4m



- **Test Environment**

Room temperature : 20 °C  
Relative Humidity : 50 % R.H.

- **Test Environment [Audio Signal 3m]**

Room temperature : 8 °C  
Relative Humidity : 42 % R.H.



Table 2: Test Data, Radiated Disturbance

Frequency [MHz]	Reading [dBuV/m]	Pol.	Angle	Height [m]	Correction Factor		T-Fact [dB]	Data [dBuV/m]	Limits [dBuV/m]	Margin [dB]
					Antenna	Cable				
125.02	20.3	V	132	1.3	10.8	1.0	11.8	32.1	40.0	7.9
250.00	25.0	V	253	1.0	11.3	1.5	12.8	37.8	47.0	9.2
300.04	13.5	V	260	1.0	12.9	1.6	14.5	28.0	47.0	19.0
331.76	14.2	H	258	2.4	13.6	1.7	15.3	29.5	47.0	17.5
398.12	15.6	V	192	1.4	14.8	1.8	16.6	32.2	47.0	14.8
450.06	8.9	H	54	2.0	16.4	2.0	18.4	27.3	47.0	19.7
500.01	17.4	V	180	1.7	17.1	2.1	19.2	36.6	47.0	10.4

## [Audio Signal 3m]

Frequency [MHz]	Reading [dBuV/m]	Pol.	Angle	Height [m]	Correction Factor		T-Fact [dB]	Data [dBuV/m]	Limits [dBuV/m]	Margin [dB]
					Antenna	Cable				
225.02	9.7	V	342	1.0	11.2	1.6	12.8	22.4	40.0	17.6
250.01	25.7	V	314	1.0	12.6	1.7	14.3	40.0	47.0	7.0
269.57	20.0	V	249	1.1	12.6	1.7	14.3	34.3	47.0	12.7
375.02	12.3	V	342	1.0	13.5	2.0	15.5	27.8	47.0	19.2
398.14	13.2	H	87	2.0	13.8	2.1	15.9	29.1	47.0	17.9
500.01	14.8	H	332	3.3	15.8	2.3	18.1	32.9	47.0	14.1

Table. Radiated Measurements at 10-meters

**NOTES:**

1. All modes of operation were investigated and the worst-case emission are reported.
2. All other emission are non-significant.
3. Measurements using CISPR Quasi-Peak mode.
4. H = Horizontal, V = Vertical Polarization
5. Data = Real Reading + T – Factor (Antenna + Cable)
6. Margin = Limits – Data



## 6. Test Results IMMUNITY

### 6.1 Electrostatic discharge

**Result**

**PASS**

The immunity against electrostatic discharge was tested in accordance with **EN 55130-4:1995+A1:1998+A2:2003**. Test setup and ESD-Generator are according to **EN 61000-4-2:1995+A1:1998+A2:2001**.

<b>Severity level :</b>	<b>3 Contact</b> <b>3 Air Discharge</b>
<b>Charge voltage :</b>	±2.0 kV, ±4.0 kV, ±6.0 kV (Contact Discharge) ±2.0 kV, ±4.0 kV, ±8.0 kV (Air Discharge)
<b>Number of discharges :</b>	>10 per test point
<b>Performance criterion :</b>	There was no damage, malfunction or change of status during the test.
<b>Test Environment</b>	
Room temperature :	23 °C
Relative Humidity :	54 % R.H.
Barometric :	101.1 kPa



Figure 1: ESD, Discharged points





**Table 3: ESD, Positive / Negative Polarity**

# No.s are reference to the picture of 28 page.

No.	Position	Kind of Discharge	Result	Remarks
①	Enclosure (Front)	Air	PASS	Equipment operated as intended, No disturbance of function
②	Function Keys	Air	PASS	Equipment operated as intended, No disturbance of function
③	Enclosure (Rear, Left, Right, Top)	Contact	PASS	Equipment operated as intended, No disturbance of function
④	All Screw	Contact	PASS	Equipment operated as intended, No disturbance of function
⑤	HCP, VCP	Contact	PASS	Equipment operated as intended, No disturbance of function





## 6.2 Radiated radio-frequency electromagnetic field

### Result

**PASS**

The immunity against radio-frequency electromagnetic fields in the frequency range between 80 and 2000 MHz was tested in accordance to **EN 50130-4:2006**.

The test setup was made according to **EN 61000-4-3:2002+A1:2002** 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 3m. The tests have been performed with the antenna facing each of the four sides of the EUT.

<b>Severity level :</b>	<b>1, 2, 3</b>
<b>Field strength :</b>	1V/m,3V/m,10V/m
<b>Freq. Range :</b>	80 ~ 1000 MHz, 1000 MHz~2000 MHz
<b>Modulation :</b>	AM 80 % 1 kHz sine-wave PM, 1 Hz(0.5s ON : 0.5s OFF)
<b>Criterion for compliance:</b>	There was no damage, malfunction or change of status during the test.
<b>Step size :</b>	1 % of fundamental
<b>Sweep capability :</b>	$\leq 1.5 \times 10^{-3}$ decade/s
<b>Dwell time</b>	3 sec
<b>Test Environment</b>	
Room temperature :	24 °C
Relative Humidity :	58 % R.H.
Barometric :	100.8 kPa

**Table 4: Radiated radio-frequency electromagnetic field (AM)**

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

**Table 5: Radiated radio-frequency electromagnetic field (PM)**

Position	Result (PM)		Remarks
	Horizontal	Vertical	
Front Side	PASS	PASS	Equipment operated as intended. No disturbance of function.
Right Side	PASS	PASS	Equipment operated as intended. No disturbance of function.
Left Side	PASS	PASS	Equipment operated as intended. No disturbance of function.
Back Side	PASS	PASS	Equipment operated as intended. No disturbance of function.



### 6.3 Electrical fast transient/burst

#### Result

**PASS**

The immunity against fast transients was tested on the power line and all signal lines which length may exceed 3m according to the manufacturers specification in accordance to **EN 50130-4:1995+A1:1998+A2:2003**.

Test setup with capacitive clamp and fast transient noise generator was according to **EN 61000-4-4:2004**.

The un-used signal connector of the clamp has been terminated with a 50  $\Omega$  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.

<b>Severity level :</b>	<b>1, 2, 3</b>
<b>Test voltage :</b>	
a.c. mains supply lines (kV)	0.5, 1, 2
other supply/signal lines (kV)	0.25, 0.5, 1
<b>Polarity :</b>	Negative / positive
<b>Repetition frequency :</b>	5 kHz
<b>Criterion for compliance:</b>	There was no damage, malfunction or change of status during the test.
<b>Duration per application (sec)</b>	$\geq 60$ sec
<b>Test Environment</b>	
Room temperature :	23 $^{\circ}$ C
Relative Humidity :	54 % R.H.
Barometric :	101.1 kPa
<b>Test Environment [Audio Signal 3m]</b>	
Room temperature :	21 $^{\circ}$ C
Relative Humidity :	50 % R.H.
Barometric :	101.6 kPa


**Table 6: Electrical fast transient, AC Power Lines, Positive/Negative Polarity**

Line	Result		Remarks
L1	0.5 kV 1 kV 2 kV	PASS PASS PASS	Equipment operated as intended. No disturbance of function.
L2	0.5 kV 1 kV 2 kV	PASS PASS PASS	Equipment operated as intended. No disturbance of function.
L1 + L2	0.5 kV 1 kV 2 kV	PASS PASS PASS	Equipment operated as intended. No disturbance of function.
PE	0.5 kV 1 kV 2 kV	PASS PASS PASS	Equipment operated as intended. No disturbance of function.
L1 + PE	0.5 kV 1 kV 2 kV	PASS PASS PASS	Equipment operated as intended. No disturbance of function.
L2 + PE	0.5 kV 1 kV 2 kV	PASS PASS PASS	Equipment operated as intended. No disturbance of function.
L1 + L2 + PE	0.5 kV 1 kV 2 kV	PASS PASS PASS	Equipment operated as intended. No disturbance of function.

**Table 7: Burst, other supply / signal lines, Positive / Negative Polarity**

Line	Result		Remarks
Video In	250 V 500 V 1 kV	PASS PASS PASS	Equipment operated as intended. No disturbance of function.
Video Out	250 V 500 V 1 kV	PASS PASS PASS	Equipment operated as intended. No disturbance of function.
Alarm Out/ Sensor In	250 V 500 V 1 kV	PASS PASS PASS	Equipment operated as intended. No disturbance of function.
LAN	250 V 500 V 1 kV	PASS PASS PASS	Equipment operated as intended. No disturbance of function.
Audio In/Out	250 V 500 V 1 kV	PASS PASS PASS	Equipment operated as intended. No disturbance of function.



## 6.4 Surge

### Result

**PASS**

The Combination Wave Test Generator, the Coupling / Decoupling Network and the test set-up are in accordance with **EN 61000-4-5:2006**.

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 a 18uF 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 10Ω resistor and a 9uF 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 10cm 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.

<b>Severity level :</b>	<b>2(Normal Mode) 3(Common Mode)</b>
<b>Test voltage :</b>	
<b>a.c. mains supply lines (kV)</b>	0.5, 1, 2
<b>other supply/signal lines (kV)</b>	0.25, 0.5, 1
<b>Waveshape, open circuit voltage :</b>	Risetime 1.2us / Duration 50us
<b>Waveshape, short circuit current :</b>	Risetime 8us / Duration 20us
<b>Polarity</b>	Negative / positive
<b>Number of surges :</b>	5
<b>Criterion for compliance:</b>	There was no damage, malfunction or change of status during the test.

### Test Environment

Room temperature :	24 °C
Relative Humidity :	56 % R.H.
Barometric :	100.8 kPa



**Table 8: Surge, AC Power lines, Positive/Negative Polarity**

Line	Result	Remarks
L1	0.5 kV 1 kV PASS PASS PASS	Equipment operated as intended. No disturbance of function.
L2	0.5 kV 1 kV PASS PASS PASS	Equipment operated as intended. No disturbance of function.
L1+L2	0.5 kV 1 kV PASS PASS PASS	Equipment operated as intended. No disturbance of function.
PE	0.5 kV 1 kV PASS PASS PASS	Equipment operated as intended. No disturbance of function.
L1+PE	0.5 kV 1 kV 2 kV PASS PASS PASS	Equipment operated as intended. No disturbance of function.
L2+PE	0.5 kV 1 kV 2 kV PASS PASS PASS	Equipment operated as intended. No disturbance of function.
L1+L2+PE	0.5 kV 1 kV 2 kV PASS PASS PASS	Equipment operated as intended. No disturbance of function.

**Table 9: Surge, other supply /signal lines, Positive/Negative Polarity**

Line	Result	Remarks
Video In/Out	0.25 kV 0.5 kV 1 kV PASS PASS	Equipment operated as intended, No disturbance of function.
Alarm Out/ Sensor In	0.25 kV 0.5 kV 1 kV PASS PASS	Equipment operated as intended, No disturbance of function.



## 6.5 Conducted disturbances, induced by radio-frequency fields

### Result

**PASS**

The immunity to conducted radio frequency disturbances has been tested according to **EN 61000-4-6:1996+A1:2001**.

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 have been recorded before the test. The specified frequency range has been swept manually with a sweep rate smaller than  $1.5 \times 10^{-3}$  decade / sec.

<b>Severity level :</b>	<b>1, 2, 3</b>
<b>Applied voltage :</b>	1V, 3V, 10V
<b>Frequency range :</b>	0.15 MHz ~ 100 MHz
<b>Modulation :</b>	AM 80 %, 1 kHz sine-wave PM, 1 Hz(0.5s ON : 0.5s OFF)
<b>Step size :</b>	1 % of fundamental
<b>Sweep capability :</b>	$\leq 1.5 \times 10^{-3}$ decade/s
<b>Criterion for compliance:</b>	There was no damage, malfunction or change of status during the test.
<b>Dwell time</b>	3 sec
<b>Test Environment</b>	
Room temperature :	22 °C
Relative Humidity :	54 % R.H.
Barometric :	101.1 kPa
<b>Test Environment [Audio Signal 3m]</b>	
Room temperature :	22 °C
Relative Humidity :	54 % R.H.
Barometric :	100.2 kPa



**Table 10: Immunity – input and output AC power ports**

Port	Result (AM)	Remarks
AC mains	PASS	Equipment operated as intended, No disturbance of function.

Port	Result (PM)	Remarks
AC mains	PASS	Equipment operated as intended, No disturbance of function.

**Table 11: Immunity – ports for signal and control lines**

Line	Result (AM)	Remarks
Video In	PASS	Equipment operated as intended, No disturbance of function.
Video Out	PASS	Equipment operated as intended, No disturbance of function.
Sensor In/ Alarm Out	PASS	Equipment operated as intended, No disturbance of function.
LAN	PASS	Equipment operated as intended, No disturbance of function.
Audio In/Out	PASS	Equipment operated as intended, No disturbance of function.

Line	Result (PM)	Remarks
Video In	PASS	Equipment operated as intended, No disturbance of function.
Video Out	PASS	Equipment operated as intended, No disturbance of function.
Sensor In/ Alarm Out	PASS	Equipment operated as intended, No disturbance of function.
LAN	PASS	Equipment operated as intended, No disturbance of function.
Audio In/Out	PASS	Equipment operated as intended, No disturbance of function.



**6.6 Voltage dips, Voltage interruptions**

**Result**

**PASS**

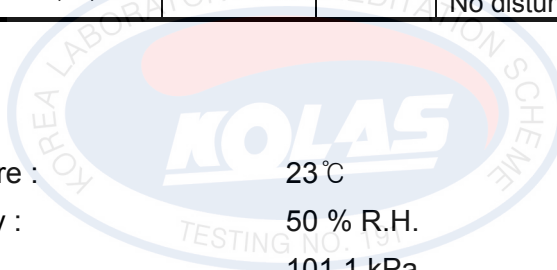
Voltage dips, short interruptions and Voltage Variation Immunity tests and it's test setup were carried out in accordance with **EN61000-4-11:2004**

**<EN 50130-4:1995+A1:1998+A2:2003>**

Test Level % Ut	Voltage dip and short interruptions % Ut	Duration of Reduction	Criteria	Result	Remark
70	30	0.5, 1, 5, 10	PASS	PASS	Equipment operated as intended, No disturbance of function.
40	60	0.5, 1, 5, 10	PASS	PASS	Equipment operated as intended, No disturbance of function.
0	100	0.5, 1, 5	PASS	PASS	Equipment operated as intended, No disturbance of function.

**· Test Environment**

Room temperature : 23°C  
 Relative Humidity : 50 % R.H.  
 Barometric : 101.1 kPa





## 6.7 Mains supply voltage variations

**Result**

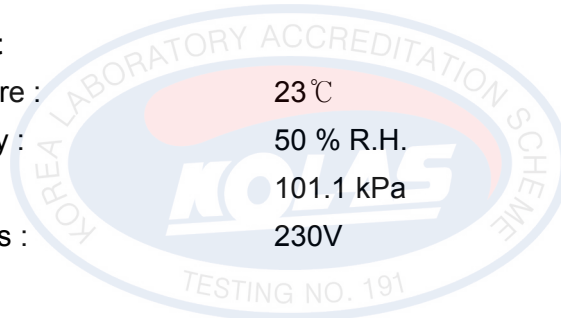
**PASS**

No reference of mains supply voltage variation immunity test can be made to an internationally accepted standard a resent.

Mains supply voltage conditions		Result
Supply voltage max (Umax)	Unom + 10%	Equipment operated as intended, No disturbance of function
Supply voltage min (Umin)	Unom - 15%	Equipment operated as intended, No disturbance of function

· **Test Environment**

Room temperature : 23°C  
 Relative Humidity : 50 % R.H.  
 Barometric : 101.1 kPa  
 Supplied voltages : 230V





## 7. Photograph of the Test Set-Up

**Photograph 1 : Setup for Limits concerning harmonic current/voltage  
Fluctuations & flicker**





**Photograph 2 : Setup for Conducted Disturbance**





**Photograph 3 : Setup for Radiated Disturbance**





**Photograph 4 : Setup for Electrostatic discharge**





**Photograph 5: Setup for Radiated radio-frequency electromagnetic field**





**Photograph 6 : Setup for Electrical fast transient / burst**





Photograph 7 : Setup for Surge/Signal surge





**Photograph 8 : Setup for Conducted disturbances, induced by radio-frequency fields**





**Photograph 9 : Setup for Voltage dips, Voltage interruptions**





**Photograph 10 : Setup for Mains supply voltage variations**





# Photographs of EUT

< Front >





# Photographs of EUT

< Rear >





# Photographs of EUT

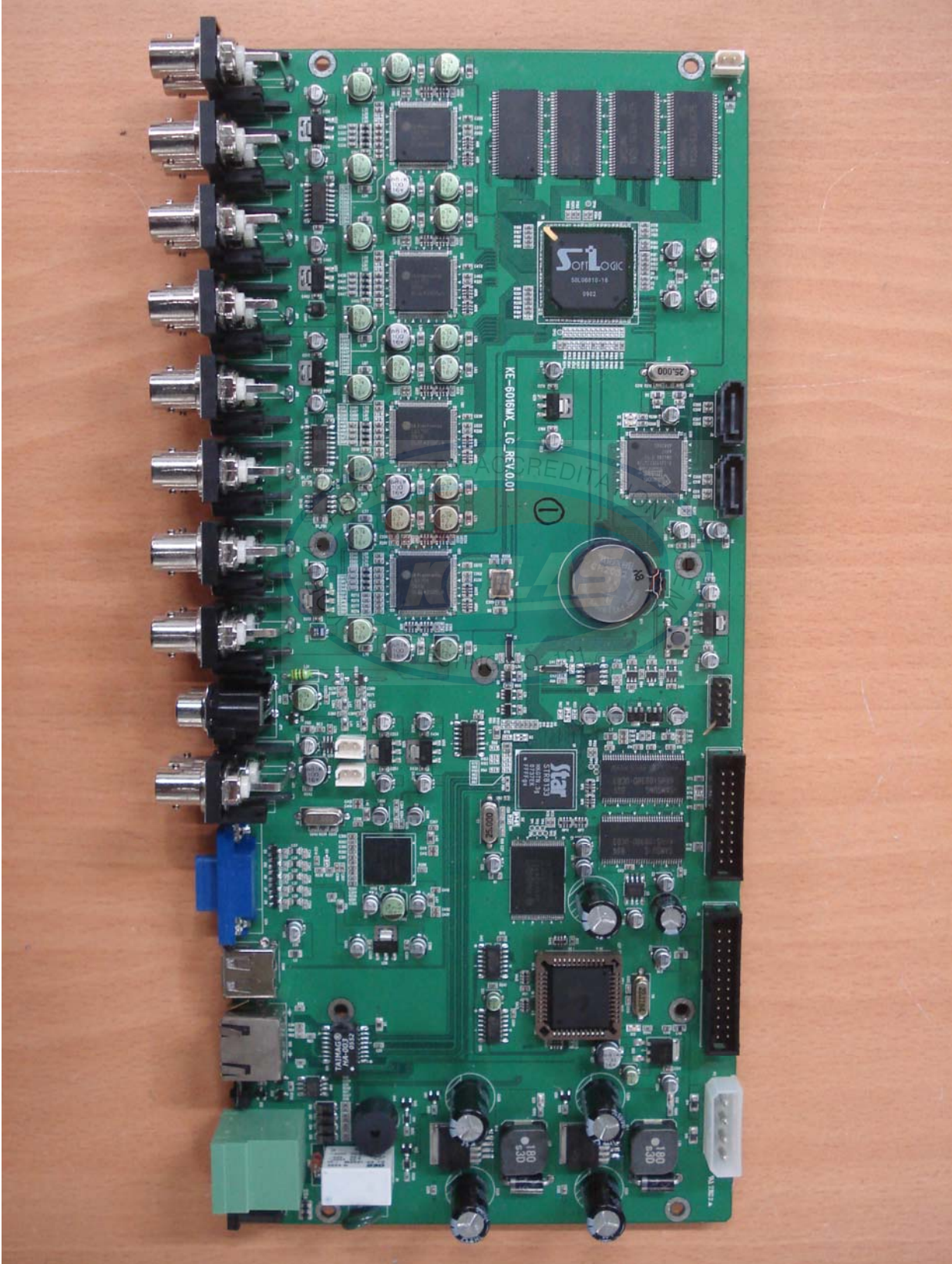
< Internal >





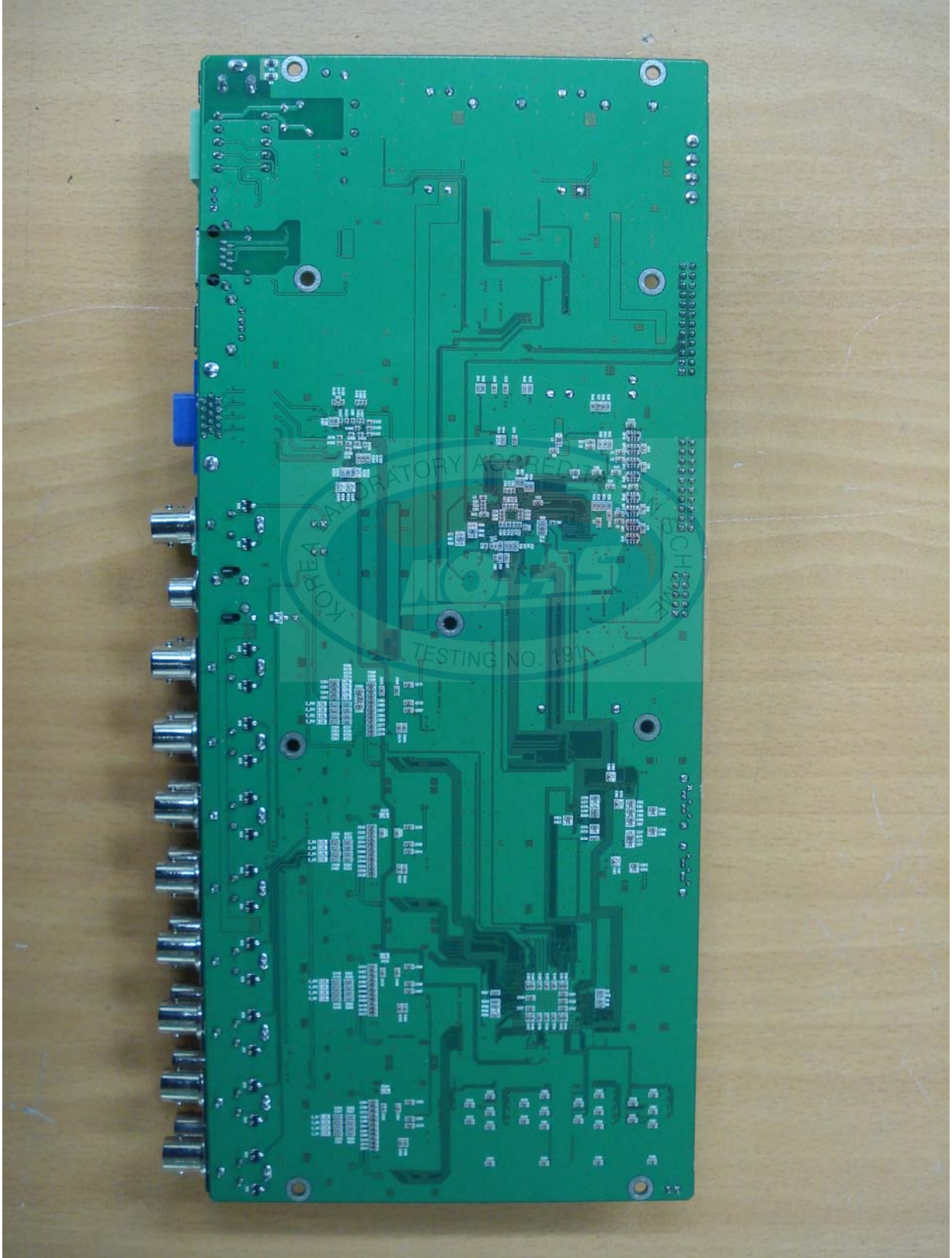
# Photographs of EUT

< Main Board Front >





### Photographs of EUT < Main Board Rear >





# Photographs of EUT < HDD Front >





# Photographs of EUT

< HDD Rear >





# Photographs of EUT

< DVD Writer Front >





**Photographs of EUT**  
**< DVD Writer Rear >**





# Photographs of EUT

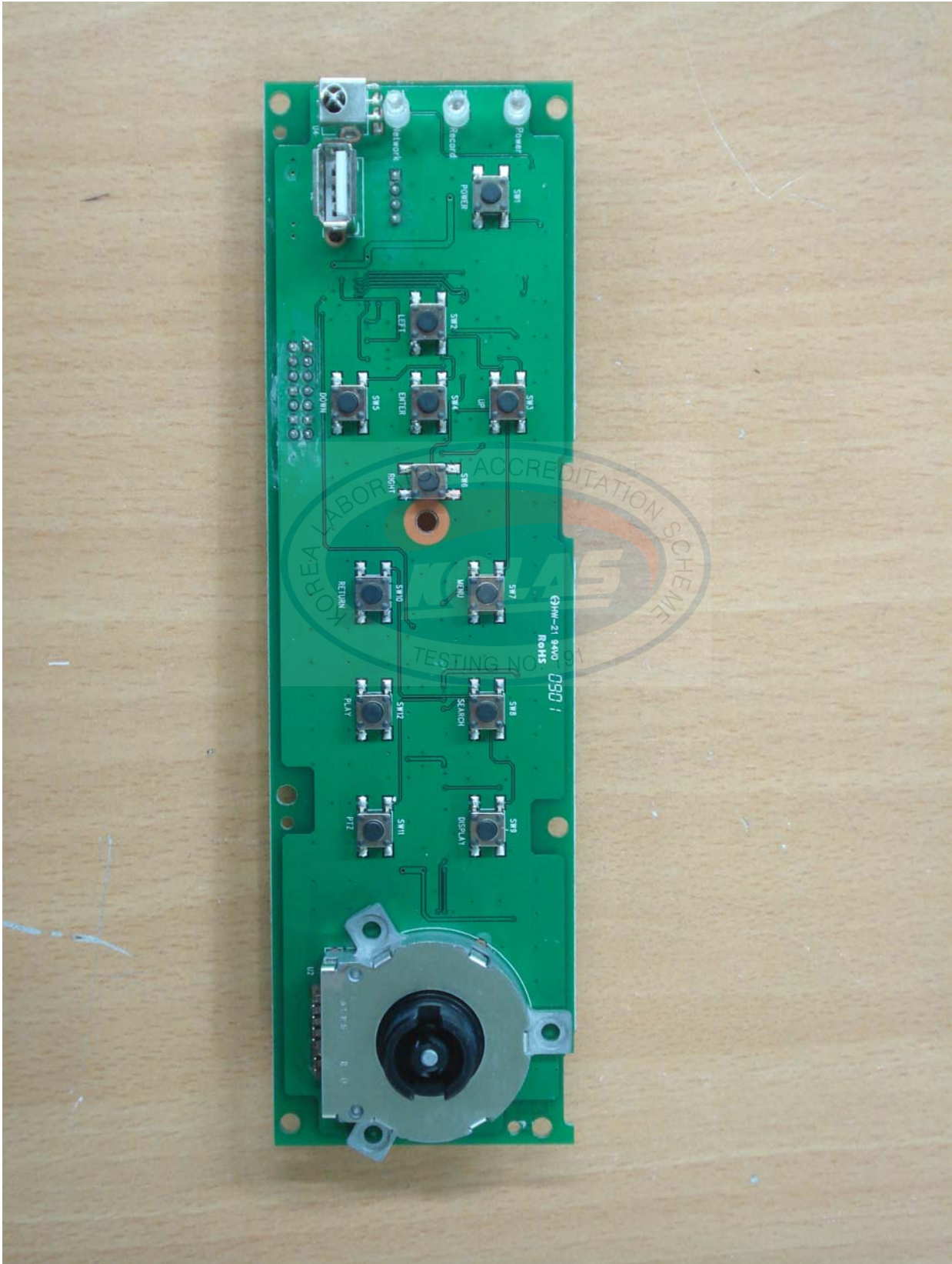
< Front Internal >





# Photographs of EUT

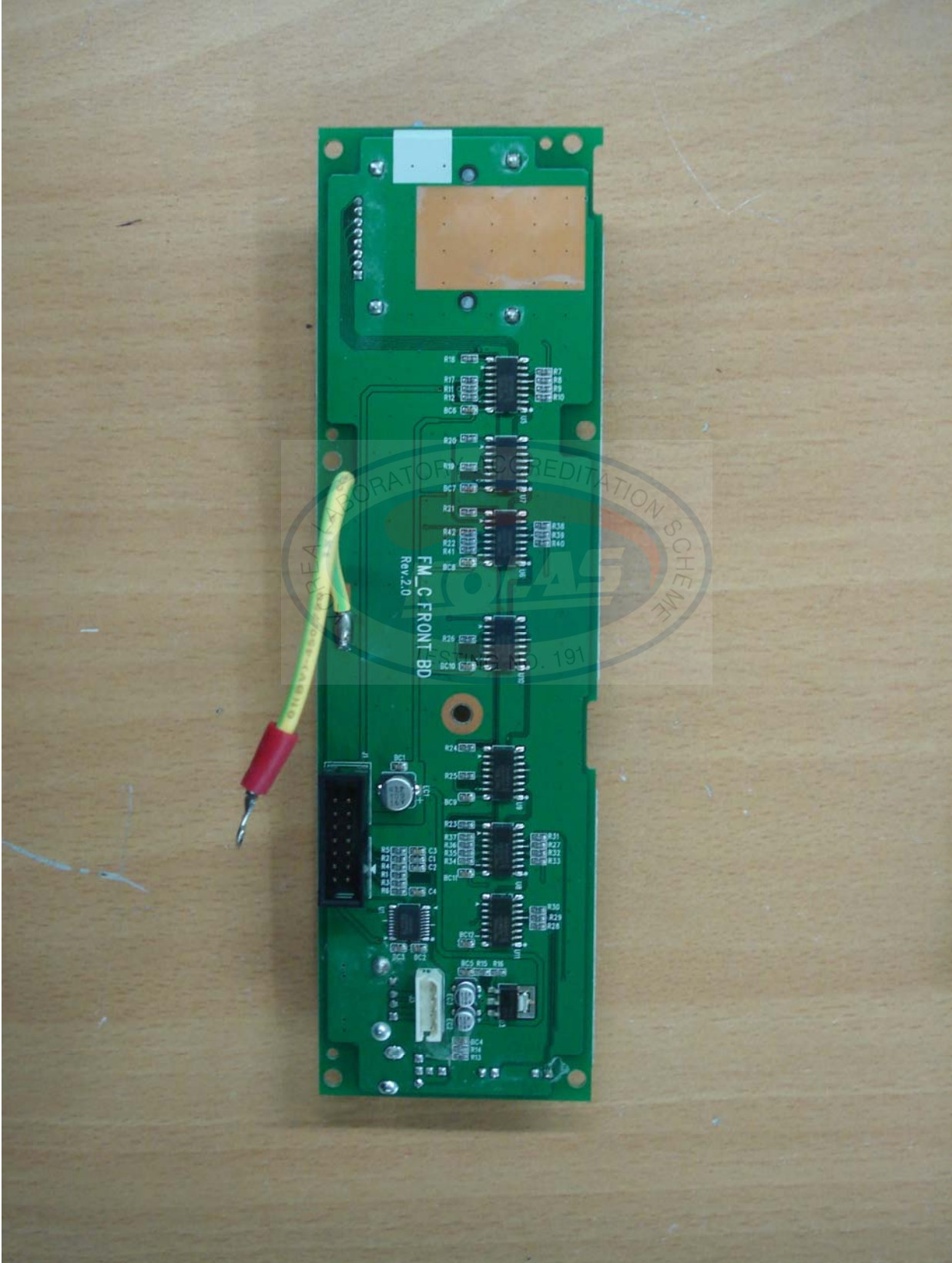
< Front Board Front >





# Photographs of EUT

< Front Board Rear >



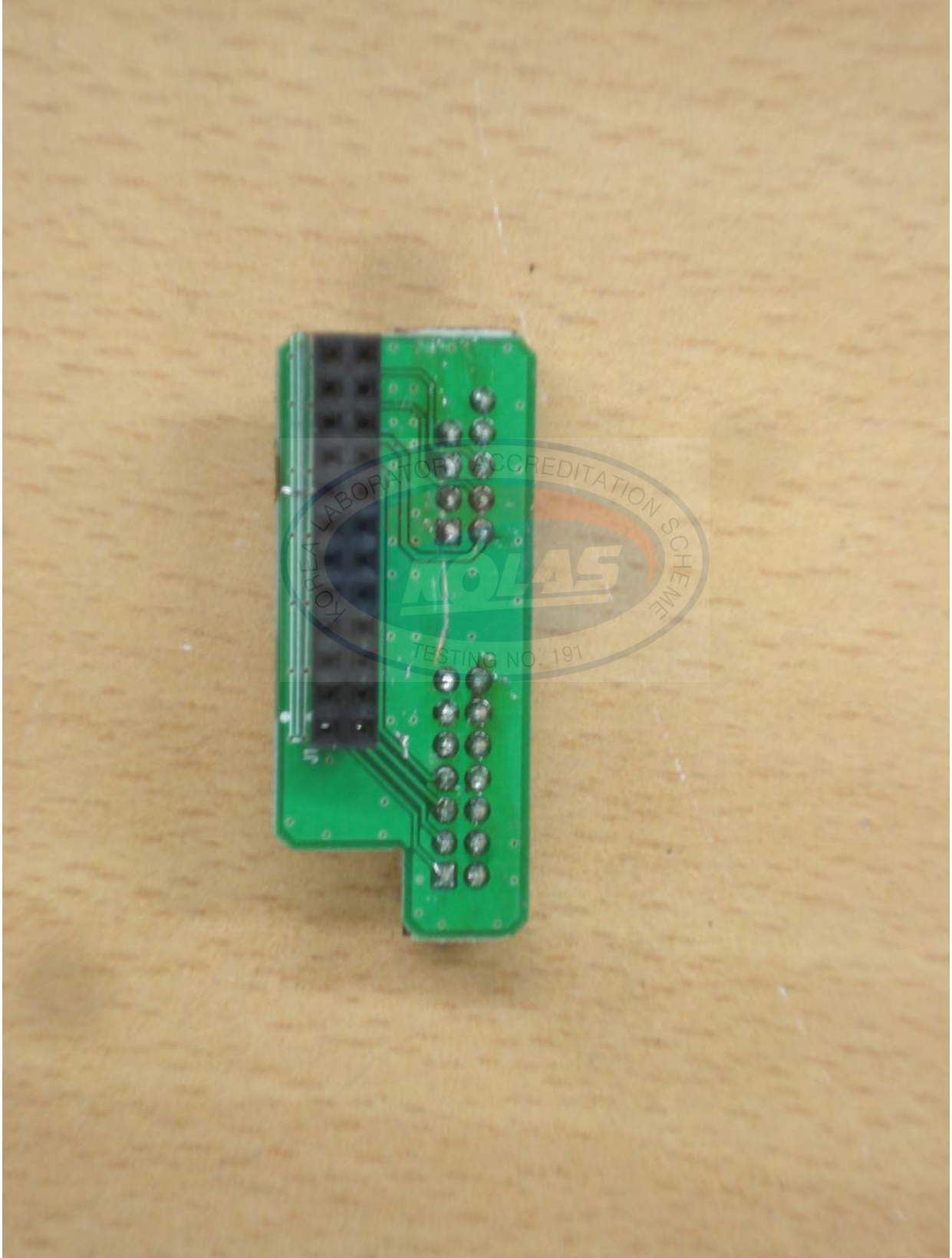


## Photographs of EUT < Sub Board Front >





## Photographs of EUT < Sub Board Rear >





**Photographs of EUT**  
**< AC Adapter Front >**





### Photographs of EUT < AC Adapter Rear >





### Photographs of EUT < AC Adapter Label >

