



**ESTECH Co., Ltd.**  
3rd Fl., Chungdam Bldg.,  
119-1 Chungdam-dong,  
Kangnamgu, Seoul



**Electromagnetic  
Interference  
Test Report**

## Compliance Test Report for FCC

Report Number		ESTF150302-002				
Applicant	Company name	HANOOL ROBOTICS CORP.				
	Address	TBI CENTER 506, KAERI, 150, Dukjindong, Yusongku, Daejon, 305-353, KOREA				
	Telephone	82-42-360-6791				
Product	Product name	USB-KEY				
	Model No.	HWR-USB-K2	Manufacturer	HANOOL ROBOTICS CORP.		
	Serial No.	NONE	Country of origin	KOREA		
Test date	2003-02-21	~	2003-02-21	Date of issue		
Testing location	ESTECH. Co., Ltd. 97-1 Hoiuk-Ri Majang-Myon, Icheon-city, KyungKi-Do, Korea					
Standard	FCC PART 15 2002 , ANSI C 63.4 2001					
Test item	■ Conducted Emission	<input type="checkbox"/> Class A	<input checked="" type="checkbox"/> Class B	Test result		
	■ Radiated Emission	<input type="checkbox"/> Class A	<input checked="" type="checkbox"/> Class B	Test result		
Measurement facility registration number		94696				
Tested by	Senior Engineer J.M. Yang		(Signature)			
Reviewed by	Director T.K. Lee		(Signature)			
Abbreviation	OK, Pass = Passed, Fail = Failed, N/A = not applicable					
<p>* Note</p> <ul style="list-style-type: none"><li>- This test report is not permitted to copy partly without our permission</li><li>- This test result is dependent on only equipment to be used</li><li>- This test result based on a single evaluation of one sample of the above mentioned</li></ul>						



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## 1. Laboratory Information

### 1.1 General

This EUT (Equipment Under Test) has been shown to be capable of compliance with the applicable technical standards and is tested in accordance with the measurement procedures as indicated in this report.

ESTECH Lab attests to accuracy of test data. All measurement reported herein were performed by ESTECH Co., Ltd.

ESTECH Lab assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

### 1.2 Test Lab.

Corporation Name : ESTECH Co. Ltd

Head Office : 3 rd Fl., Chungdam Bldg., 119-1 Chungdam-dong Kangnam-gu , Seoul, Korea  
(Safety & Telecom. Test Lab)

EMC Test Lab : 58-1 Osan-Ri, GaNam-Myon, YeoJoo-Gun, KyungKi-Do, Korea  
97-1 Hoiuk-Ri Majang-Myon, Icheon-city, KyungKi-Do, Korea

Branch Office : USA-ESTECH INC.  
21801 Stevens Creek Blvd. Suite 2A Cupertino, CA95014

### 1.3 Official Qualification(s)

MIC : Granted Accreditation from Ministry of Information & Communication for EMC, Safety and Telecommunication

KOLAS : Accredited Lab By Korea Laboratory Accreditation Schema base on CENELEC requirements

FCC : Filed Laboratory at Federal Communications Commission

VCCI : Granted Accreditation from Voluntary Control Council for Interference from ITE

## 2. Description of EUT

### 2.1 Summary of Equipment Under Test

Product : USB-KEY  
 Model Number : HWR-USB-K2  
 Serial Number : NONE  
 Manufacturer : HANOOI ROBOTICS CORP.  
 Country of origin : KOREA  
 Rating : PC Power using  
 Receipt Date : 2003-02-04

### 2.2 General descriptions of EUT

- The USB KEY was developed as The security storing device for safe and convenient e-commerce for general users without any needs of additional equipment and leaving no security data on The PC.
- It is easy to install and use due to The P&P and Hot Plug-In features of The USB
- There is no need for external power to active The Key. Personal information is not left on The Internet or The PC, but is stored In The HWR-USB-K2 and is carried by The individual. User authentication is processed only through The HWR-USB-K2, therefore nobody except The owner can be authenticated.
- It is possible to be authenticated on a different PC as well.



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### 3. Test Standards

Test Standard : FCC PART 15 (2002)

This Standard sets out the regulations under which an intentional, unintentional, or incidental radiator may be operated without an individual license. It also contains the technical specifications, administrative requirements and other conditions relating to the marketing of Part 15 devices.

Test Method : ANSI C 63.4 (2001)

This standard sets forth uniform methods of measurement of radio-frequency (RF) signals and noise emitted from both unintentional and intentional emitters of RF energy in the frequency range 9 kHz to 40 GHz. Methods for the measurement of radiated and AC power-line conducted radio noise are covered and may be applied to any such equipment unless otherwise specified by individual equipment requirements. These methods cover measurement of certain devices that deliberately radiate energy, such as intentional emitters, but does not cover licensed transmitters. This standard is not intended for certification/approval of avionic equipment or for industrial, scientific, and medical (ISM) equipment. These methods apply to the measurement of individual units or systems comprised of multiple units.



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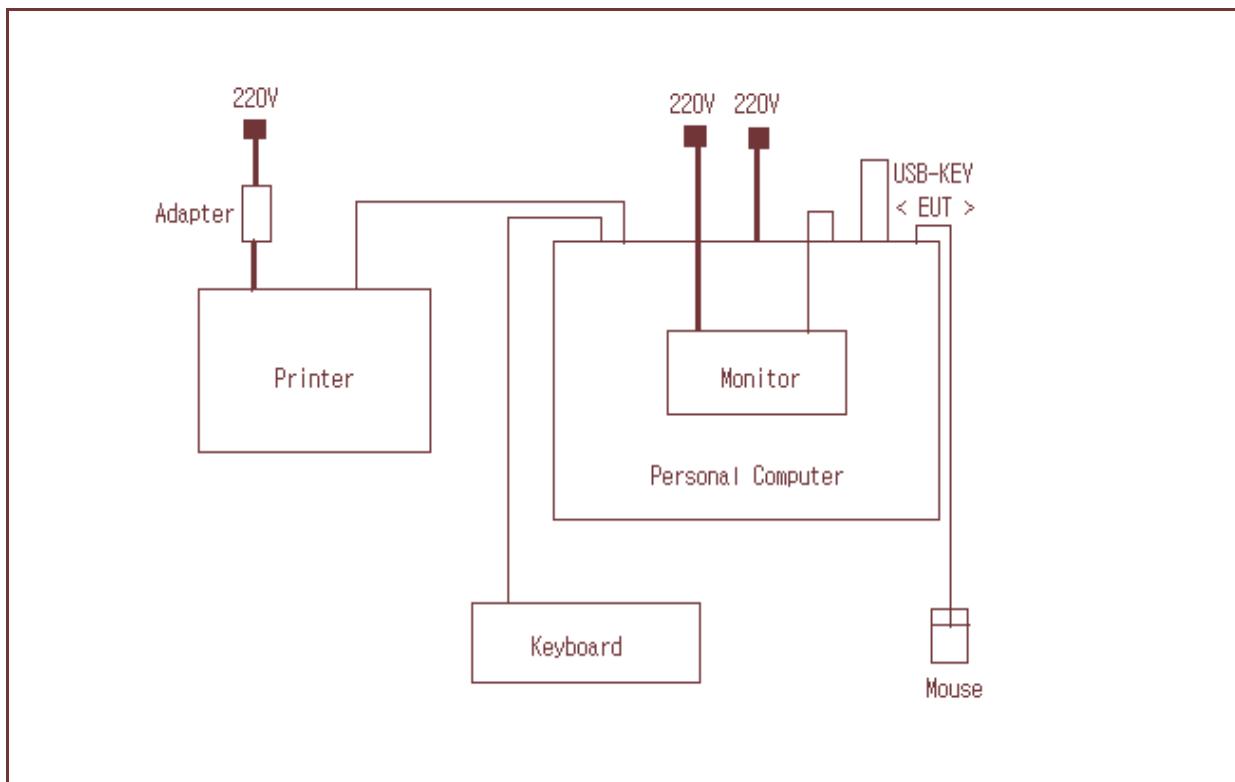
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## 4. Measurement Condition

### 4.1 EUT Operation.

- \* The EUT was in the following operation mode during all testing
- \* The operational conditions of the EUT was determined by the manufacturer according to the typical use of the EUT with respect to the expected highest level of emission
- \* The test using the self test program

### 4.2 Configuration and Peripherals



#### 4.3 EUT and Support equipment

Equipment Name	Model Name	S/N	Manufacturer	Remark (FCC ID)
USB-KEY	HWR-USB-K2	NONE	HANOOI ROBOTICS CORP.	EUT
Personal Computer	M6030	ERA00237	Samsung Electronics Co., Ltd.	–
Printer	C6414J	TH18M149P2	H.P	–
Monitor	D8897	CN11104168	H.P	–
Keyboard	SEM-DT35	18661447	Samsung Electro-Mechanics Ltd.	–
Mouse	X05-51692	6444127-10000	Microsoft	–
Adapter	C6409-60152	C1H14B	YOKOGAWA	–

#### 4.4 Cable Connecting

Start Equipment		End Equipment		Cable Standard		Remark
Name	I/O port	Name	I/O port	Length	Shielded	
USB-KEY	USB	Personal Computer	USB	0.0	Y	–
Personal Computer	Parallel	Printer	Parallel	2.0	Y	–
Personal Computer	Video	Monitor	Video	2.0	Y	–
Personal Computer	PS/2 Keyboard	Keyboard	PS/2 Keyboard	2.0	N	–
Personal Computer	PS/2 Mouse	Mouse	PS/2 Mouse	2.0	N	–
Printer	Power	Adpater	Power	2.0	N	–

## 5. Measurement of radiated disturbance

Above 30 MHz Electric Field strength was measured in accordance with FCC Part 15 (2002) & ANSI C 63.4 (2001). The test setup was made according to FCC Part 15 (2002) & ANSI C 63.4 (2001) on an open test site, which allows a 3m distance measurement. The EUT was placed in the center of wooden turntable. The height of this table was 0.8m. The measurement was conducted with both horizontal and vertical antenna polarization. The turntable has fully rotated. For further description of the configuration refer to the picture of the test set-up.

### 5.1 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
Receiver	ESPC	Rohde & Schwarz	845296/021	2003.6.21
Spectrum Analyzer	R3261B	ADVANTEST	1720302	2004.2.7
LogBicon Antenna	VULB 9160	S/B	3107	2003.6.7
Turn Table	2087	EMCO	2129	–
Antenna Mast	2070-01	EMCO	9702-203	–
Amplifier	310N	Sonoma Instrument	185817	–
ANT Mast Controller	2090	EMCO	1535	–
Turn Table Controller	2090	EMCO	1535	–

### 5.2 Environmental Condition

Test Place : Open site(3m)  
 Temperature (°C) : 16 °C  
 Humidity (%) : 50 %



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## 5.3 Test data

Measurement Distance : 3 m



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## 6. Measurement of conducted disturbance

The continuous disturbance voltage of AC Mains in the frequency from 0.15 to 30 MHz was measured in accordance to FCC Part 15 (2002) & ANSI C 63.4 (2001). The test setup was made according to FCC Part 15 (2002) & ANSI C 63.4 (2001) in a shielded. The EUT was placed on a non-conductive table at least 80 above the ground plan. 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 test receiver with Quasi Peak detector complies with CISPR 16.

### 6.1 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
LISN	ESH3-Z5	Rohde & Schwarz	838979/010	2004. 2. 7
LISN	NNLA8120A	Schwarzbeck	NONE	2004. 2. 7
TEST Receive	ESPC	Rohde & Schwarz	845296/021	2003.6.21
Pulse Limiter	ESH3Z2	Rohde & Schwarz	NONE	2003.7.4

### 6.2 Environmental Condition

Test Place : Shield Room

Temperature (°C) : 19°C

Humidity (%) : 48 %

### 6.3 Test data

Frequency (MHz)	Correction Factor		Line (H/N)	Quasi-Peak			Average		
	Lisn (dB)	Cable (dB)		Limit (dB $\mu$ V)	Reading (dB $\mu$ V)	Result (dB $\mu$ V)	Limit (dB $\mu$ V)	Reading (dB $\mu$ V)	Result (dB $\mu$ V)
0.150	0.07	0.0	H	66.00	43.92	43.99	56.00		
0.195	0.07	0.0	N	63.82	41.58	41.68	53.82		
0.258	0.07	0.1	H	61.50	39.88	40.02	51.50		
0.293	0.07	0.1	N	60.44	38.96	39.13	50.44		
0.390	0.07	0.1	H	58.06	40.07	40.29	48.06		
0.488	0.07	0.2	N	56.21	41.42	41.68	46.21		
0.586	0.08	0.2	N	56.00	37.64	37.92	46.00		
0.682	0.08	0.2	N	56.00	41.55	41.83	46.00		
0.880	0.09	0.2	N	56.00	39.58	39.87	46.00		
1.760	0.11	0.3	N	56.00	39.90	40.28	46.00		
1.952	0.11	0.3	N	56.00	37.56	37.96	46.00		
4.399	0.18	0.3	N	56.00	38.42	38.90	46.00		
5.284	0.21	0.3	N	60.00	33.44	33.97	50.00		
6.552	0.26	0.4	N	60.00	36.00	36.64	50.00		
7.039	0.28	0.4	N	60.00	33.47	34.15	50.00		
9.529	0.35	0.6	H	60.00	33.55	34.47	50.00		
13.105	0.52	0.7	H	60.00	33.12	34.36	50.00		
13.638	0.54	0.7	N	60.00	33.63	34.92	50.00		
Remark		H : Hot Line, N : Neutral Line							



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## 7. Photographs of test setup

### 7.1 Setup for Radiated Test : 30 ~ 1000 MHz

[ Front ]



[ Rear ]





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## 7.2 Setup for Conducted Test : 0.15 ~ 30 MHz

[ Front ]



[ Rear ]





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## 8. Photographs of EUT

[ Front ]

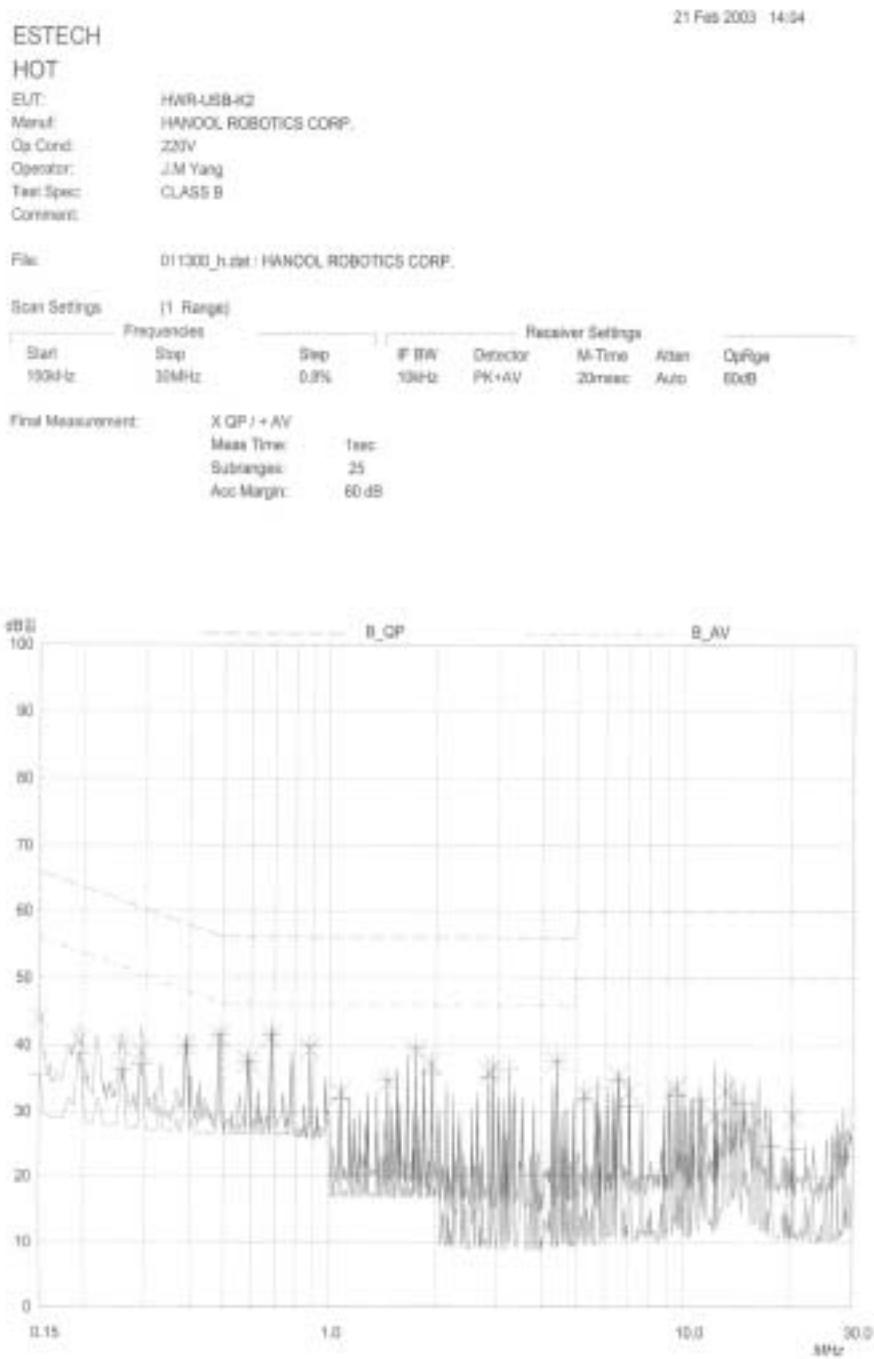


[ Rear ]



## Appendix 1. Spectral diagram

\*HOT



\*NETRUL

21 Feb 2003 13:56

ESTECH

NEUTRAL

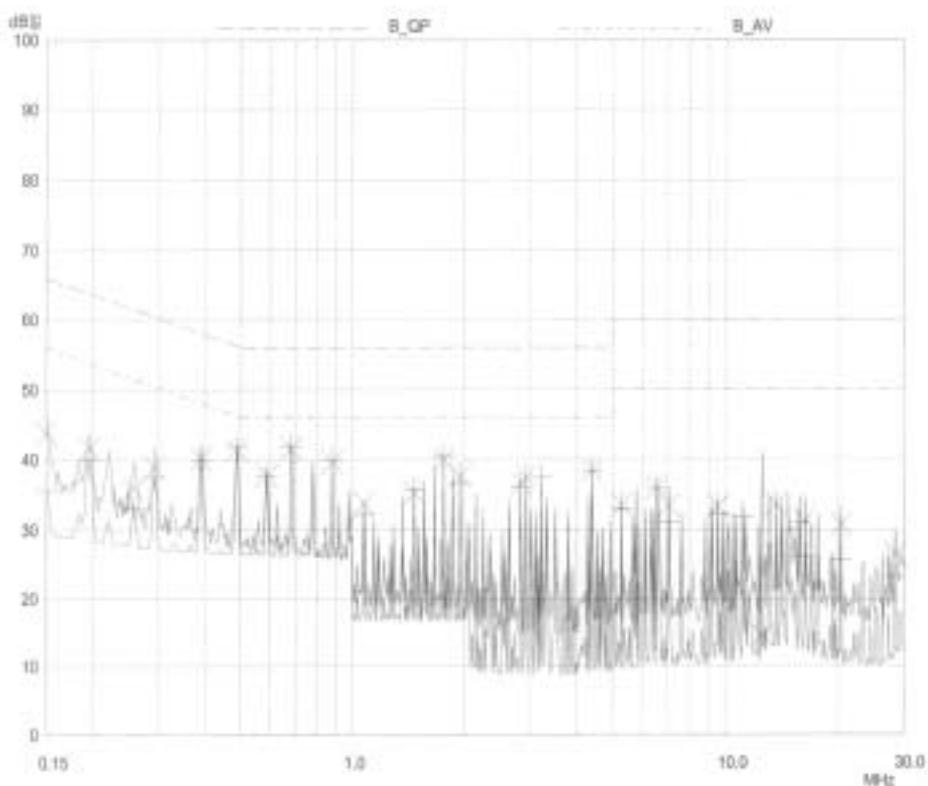
EUT: HWR-USB-K2  
Manuf: HANOOL ROBOTICS CORP.  
Op. Cond: 220V  
Operator: J.M.Yang  
Test Spec: CLASS B  
Comment:

File: 011300\_n.dat ; HANOOL ROBOTICS CORP.

Scan Settings (1 Range)

Frequencies		Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	OpPge
150MHz	30MHz	0.01%	10kHz	PK+AV	20msec	Auto	60dB

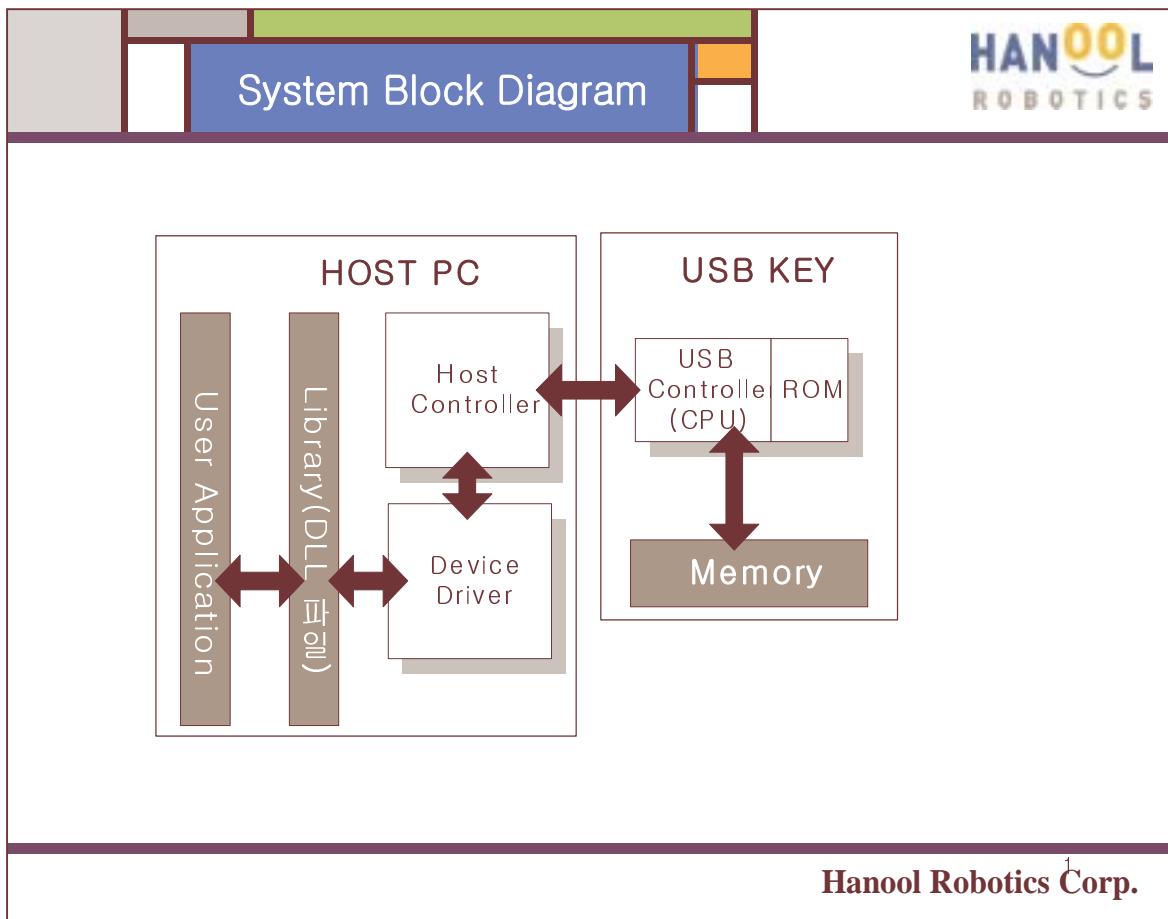
Final Measurement: X\_QP\_J + AV  
Meas Time: 1sec  
Subranges: 25  
Acc Margin: 60 dB



## Appendix 2. Phorographs of EUT in side PCB



### Appendix 3. Block diagram of EUT



## Appendix 4. Circuit Diagram

