

# TEST REPORT

Report No: KST-FCR-110002

<b>Applicant</b>	Name	Demco corp.
	Address	#919, Doosan Venturedigm, 126-1, Pyungchon-dong, Dongan-ku, Anyang-si, Kyungki-do, South Korea
<b>Manufacturer</b>	Name	BKLCD Co.,Ltd.
	Address	#272-2 Gyereuk-Ri, Miyang-Myeon, Anseong-Si, Gyeonggi-Do, Korea
<b>Equipment</b>	Name	POS TERMINAL COUNTERTOP
	Model No	SP7-V1
	Serial No.	Proto type
	FCC ID	ZLRSP7-V1J08
<b>Test Standard</b>	FCC CFR 47, Part 15. Subpart C-15.225 and 15.209: 2009.	
<b>Test Date(s)</b>	2011. 05. 06 ~ 2009. 05. 11	
<b>Issue Date</b>	2011. 05. 12	
<b>Test Result</b>	Compliance	

## Supplementary Information

The device bearing the brand name and FCC ID specified above has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with measurement procedures specified in ANSI C 63.4-2003.

We attest to the accuracy of data and all measurements reported herein were performed by KOSTEC 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.

Tested by Mi Young, Lee

Approved by Gyeong Hyeon, Park

Signature



Signature



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## 1. GENERAL INFORMATION

### 1.1 Test Facility

#### Test laboratory and address

KOSTEC Co., Ltd.

180-254, Annyeong-dong, Hwaseong-si, Gyeonggi-do, South Korea

The open area field test site and conducted measurement facility are used for these testing. This site at was fully described in a reports submitted to the Federal Communications Commission (FCC).

The details of these reports have been found to be in complies with the requirements of Section 2.948 of the FCC Rules on November 14, 2002. The facility also complies with the radiated and conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission (FCC) has the reports on file and KOSTEC Co., Ltd. is listed under FCC Registration No.525762. The test site has been approved by the FCC for public use and is List in the FCC Public Access Link CORES (Commission Registration System)

#### Registration information

KCC (Korea Communications Commission) Number : KR0041

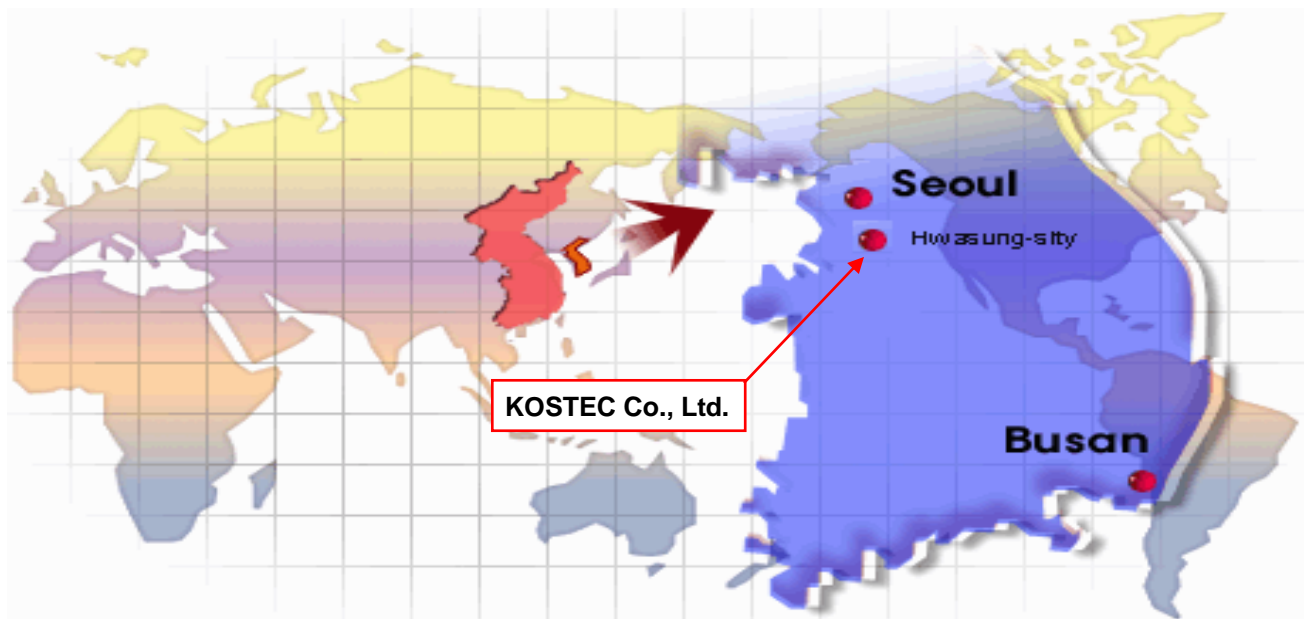
KOLAS(Korea laboratory accreditation Scheme) Number : 232

FCC Registration Number(FRN) : 525762

IC Company Number(C,N) : 8305A

VCCI Registration Number : R-1657 / C -1763

### 1.2 Location



## 2. EQUIPMENT DESCRIPTION

The product specification described herein was declared by manufacturer. and refer to user's manual for the details.

1) Equipment Name	POS TERMINAL COUNTERTOP
2) Model No	SP7-V1
3) Usage	Credit card counter market
4) Serial Number	Proto type
5) Oscillation type	X-TAL (Crystal)
6) Data connection type	RFID (Radio Frequency Identification)
7) ITU emission type	Not required (because it is unlicensed devices)
8) Modulation type	ASK
9) Operated Frequency	13.560 MHz
10) Field Strength	29.97 dB $\mu$ V/m @ 30 meter**
11) Number of channel	1 Ch
12) Communication type	Half duplex
13) Microprocessor	MIPS 4KSD
14) Display	128 x 64 Graphic LCD with icons
15) Security	PCI-PED approved DES/3DES, RSA, MK/SK, DUKPT
16) SAM	2 SAM readers, ISO 7816 T0/T1 support
17) Weight / Dimension	420g / 190(L) mm x 75(W) mm x 75(H) mm
18) Operation temperature	- 40 °C ~ + 80 °C
19) Power Source	9.0 Vdc, 2.5 A (Supplied by external adaptor)
20) Antenna Description	Type: Loop antenna, Built-in on PCB type, Size: 42.5 mm x 35 mm, 4 Turn Manufacturer: SCS pro Co.,LTD.

\*\* Above Field strength is applied to extrapolation distance factor according to required standard.

### 3. SYSTEM CONFIGURATION FOR TEST

#### 3.1 Characteristics of equipment

This device is named RFID(Radio Frequency Identification) used mainly Credit card counter market and close by credit card.

The credit card by radio frequency energy of RF Reader. it's frequency is 13.560 MHz and supplied 9 Vdc from external adaptor. the other detailed explanation is referred to the user manual

#### 3.2 Configuration of EUT

Description	Manufacturer	Model / Part No.	Serial Number	Remark
Keypad Board	Demco corp.	SP7 KETPAD	SGKCIG2790114	
Display Board	GEM-TECH	GTK-327	None	
SECURITY Board	Demco corp.	None	SGPCIG2790470	
Main Board	Demco corp.	SP7 MAIN BOARD	SGMCIG2790404	
Antenna Board	Demco corp.	DEM-RFM1v0	None	
Antenna Main Board	Demco corp.	DEM-RFM1v0 Main	11DEM1-01-0048	

#### 3.3 EUT used Cable

Description	Length (m)	Connector	Connection	Connection	Remark
DC IN	1.8	Din	E.U.T.	Adaptor	

#### 3.4 Used peripherals

Description	Model No.	Serial No.	Manufacture	Remark
POS TERMINAL COUNTERTOP	SP7-V1	Prototype	Demco corp.	
Adaptor	KSAFF0900250W1US	None	I.T.E PWER SUPPLY	

#### 3.5 Product Modification

N/A

#### 3.6 Operating Mode

When in-band fundamental level is measurement that were intended to emit maximum RF continuously signal from EUT. and then power supply in EUT

### 3.7 Used Test Equipment List

No.	Instrument	Model	Serial No.	Manufacturer	Due to Cal. Date	Used
1	Temperature & Humidity Chamber	EY-101	90E14260	TABAI ESPEC	2011.12.02	<input checked="" type="checkbox"/>
2	Spectrum Analyzer	8563E	3846A10662	Agilent Technology	2012.01.29	<input checked="" type="checkbox"/>
3	Spectrum Analyzer	FSP	100083	Rohde & Schwarz	2012.03.03	<input checked="" type="checkbox"/>
4	Vector signal Analyzer	89441A	3416A02620	Agilent Technology	2012.05.20	<input type="checkbox"/>
5	Test Receiver	ESPI3	100109	Rohde & Schwarz	2012.03.03	<input checked="" type="checkbox"/>
6	LISN	ESH2-Z5	100044	Rohde & Schwarz	2012.03.14	<input checked="" type="checkbox"/>
7	LISN	ESH3-Z5	100147	Rohde & Schwarz	2012.05.20	<input checked="" type="checkbox"/>
8	Modulation analyzer	8901A	3538A07071	Agilent Technology	2012.05.20	<input type="checkbox"/>
9	Audio analyzer	8903B	3514A16919	Agilent Technology	2012.05.20	<input type="checkbox"/>
10	EPM Series Power meter	E4418B	GB39512547	Agilent Technology	2012.05.20	<input type="checkbox"/>
11	RF Power Sensor	ECP-E18A	US37181768	Agilent Technology	2012.05.20	<input type="checkbox"/>
12	Microwave Frequency Counter	5352B	2908A00480	Agilent Technology	2012.05.20	<input type="checkbox"/>
13	Digital Signal Generator	E4436B	US39260458	H.P	2012.05.20	<input checked="" type="checkbox"/>
14	RF signal Generator	8657D	3342A00616	Agilent Technology	2012.05.20	<input type="checkbox"/>
15	Tracking CW Signal Source	85645A	070521-A1	H.P	2012.05.20	<input type="checkbox"/>
16	Ultra broad band Antenna	HL562	100075	Rohde & Schwarz	2012.03.30	<input checked="" type="checkbox"/>
17	Ultra broad band Antenna	HL562	100076	Rohde & Schwarz	2012.03.30	<input type="checkbox"/>
18	Dipole Antenna	HZ-12	100005	Rohde & Schwarz	2012.04.05	<input type="checkbox"/>
19	Dipole Antenna	HZ-13	100007	Rohde & Schwarz	2012.04.05	<input type="checkbox"/>
20	Horn Antenna	3115	2996	EMCO	2012.06.13	<input type="checkbox"/>
21	Loop Antenna	6502	9203-0493	EMCO	2011.06.11	<input checked="" type="checkbox"/>
22	Dummy Load Antenna	8173	3780	Bird Electronic	2012.05.20	<input type="checkbox"/>
23	RF Power Amplifier	8347A	3307A01571	H.P	2012.05.20	<input type="checkbox"/>
24	Microwave Amplifier	8349B	2627A01037	H.P	2012.05.20	<input type="checkbox"/>
25	Attenuator	8498A	3318A09485	H.P	2012.05.20	<input checked="" type="checkbox"/>
26	Attenuator	50FH-030-500	1404109433	JEW Industries Inc.	2012.05.20	<input type="checkbox"/>
27	DC Power supply	E3610A	KR24104505	Agilent Technology	2012.05.20	<input checked="" type="checkbox"/>
28	Antenna Master	-	-	Daeil EMC	-	<input checked="" type="checkbox"/>
29	Turn Table	-	-	Daeil EMC	-	<input checked="" type="checkbox"/>

## 4. SUMMARY TEST RESULTS

Description of Test	FCC Rule	Reference Clause	Used	Test Result
Carrier frequency tolerance	15.225(e)	Clause 5.1	<input checked="" type="checkbox"/>	Compliance
Field strength of radiated emission	15.225(a) ~ (d)	Clause 5.2	<input checked="" type="checkbox"/>	Compliance
AC Power line Conducted emission	15.207(a)	Clause 5.3	<input checked="" type="checkbox"/>	Compliance
General requirement	15.203, 15.19	Clause 5.4	<input checked="" type="checkbox"/>	Compliance
Compliance : The EUT complies with the essential requirements in the standard. Not Compliance : The EUT does not comply with the essential requirements in the standard. N/A : The test was not applicable in the standard.				

## 5. MEASUREMENT RESULTS

### 5.1 Carrier Frequency tolerance

#### 5.1.1 Standard Applicable [FCC §15.225(e)]

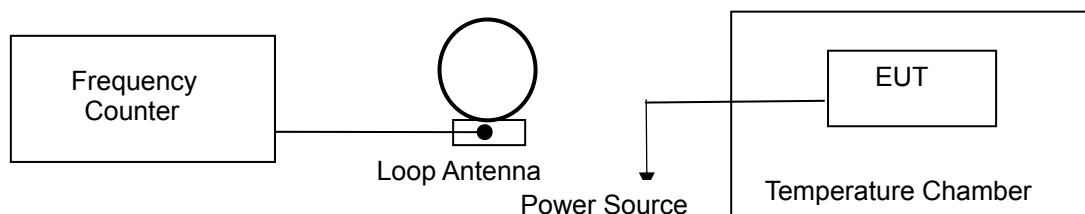
The frequency tolerance of the carrier signal shall be maintained within  $\pm 0.01\%$  of the operating frequency Over a temperature variation of  $-20$  degrees to  $+50$  degrees C at normal supply voltage, and for a variation In the primary supply from  $85\%$  to  $115\%$  of the rated supply voltage at a temperature of  $20$  degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

#### 5.1.2 Measurement Procedure

Before measurements are made the equipment shall have reached thermal balance in the Test chamber The equipment with radio frequency powered tags shall be switched off during the temperature stabilizing period. and then it is normal operating for about 15 minutes after thermal balance has been reached. For tests at the extreme temperature, the equipment shall be left in the test chamber until thermal balance is attained, then the standby or receive condition for a period of a few minute after which the equipment shall meet the specified requirements.

The test data sheet recorded measured value by frequency counter

#### 5.1.3 Test Setup Layout



\* Note: The impedance is made matching from between EUT and attenuator

#### 5.1.4 Test environment conditions

- Normal temperature :  $23^{\circ}\text{C}$
- Relative humidity :  $(45 \sim 47) \% \text{ R.H.}$
- Pressure :  $100.0 \text{ kPa}$



### 5.1.5 Measurement Result

Frequency (13.56 MHz)		Measured frequency [Hz]	Frequency Tolerance	
			%	Hz
T <sub>NOM</sub> + 23 °C	V <sub>NOM</sub> 9.00 Vdc	13.560 096	0.00071	+ 96
	V <sub>MIN</sub> 7.65 Vdc	13.560 097	0.00072	+ 97
	V <sub>MAX</sub> 10.35 Vdc	13. 560 095	0.00070	+ 95
T <sub>MIN</sub> - 20 °C	V <sub>NOM</sub> 9.00 Vdc	13. 560 105	0.00077	+ 105
T <sub>MAX</sub> + 55 °C	V <sub>NOM</sub> 9.00 Vdc	13. 560 110	<u>0.00081</u>	+ <u>110</u>
LIMIT		Within in (±) 0.01 % or (±) 1 356 Hz		
Max. Tolerance		0.00081 %, (±) 110 Hz		
Result		Pass		

\* Underline is Max measured value

## 5.2 Field strength of radiated emissions

### 5.2.1 Standard Applicable [FCC §15.225 (a) ~ (d)]

(a) The Field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 $\mu$ V/m at 30 meter

(b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 micro volts/meter at 30 meter

(c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz, the field strength of any emissions shall not exceed 106 micro volts/meter at 30 meter

(d) The Field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed The general radiated emission limits in §15.209

Above required standard (a ~ c) and (d) is brief describe table as follows

#### § 15.225 [(a) ~ (c)] : Limit for in-band field strength

Frequency Band (MHz)	Limit		Measurement distance (meter)
	( $\mu$ V/m)	(dB $\mu$ V/m)	
13.553 – 13.567	15,848	84.00	30
13.410 – 13.553 13.567 – 13.710	334	50.47	30
13.110 – 13.410 13.710 – 14.010	106	40.50	30

#### §15.209. limits for radiated emissions measurements (distance at 30 m)

Frequency Band	Limit [ $\mu$ V/m]	Limit [dB $\mu$ V/m]	Detector
0.009 – 0.490	2 400/F (kHz)	-	
0.490 – 1.705	2 4000/F (kHz)	-	
1.705 – 30.0	30	29.54	Quasi peak
30 - 88	100 **	40.0	Quasi peak
88 - 216	150 **	43.5	Quasi peak
216 - 960	200 **	46.0	Quasi peak
Above 960	500	54.0	Peak & Average

\*\* fundamental emissions from intentional radiators operation under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz, or 470-806 MHz. However, operation within these Frequency bands is permitted under other sections of this Part Section 15.231 and 15.241

§15.205. [Table 1] : Restrict Band of Operation

Only spurious emissions are permitted in any of the frequency bands listed below ;

[MHz]	[MHz]	[MHz]	[GHz]
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
0.495 - 0.505**	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	Above 38.6

\*\* Until February 1, 1999, this restricted band shall be 0.490-0.510

## 5.2.2 Measurement Procedure

- ① As below test setup figure, for frequencies measured below and above 30 MHz respectively. Turn on EUT and make sure that it is test mode function. Also was placed on a non-metallic table height of 0.8 m above the reference ground plane. If EUT is connected to cables, that were fixed to cause maximum emission. antenna was used to Broadband antenna for above 30 MHz and Loop antenna below 30 MHz. it made with the antenna positioned in both the horizontal and vertical planes of polarization.  
(The loop antenna was rotated during the test for maximized the emission measurement)
- ② For emission frequencies measured each below and above 30 MHz, a pre-scan is performed in a Shield chamber to determine the accurate frequencies before final test, after maximum emissions level will be checked on a open test site and measuring distance is 3 m or 10 meter from EUT to receiver antenna.
- ③ For emission frequencies measured below 30 MHz, set the Test Receiver on a 9KHz resolution bandwidth using measurement instrumentation employing a CISPR quasi-peak detector. and for above 30 MHz, set the spectrum analyzer on a 120 KHz resolution bandwidth with quasi-peak detector for each frequency measured in step② and then EUT is located Position X,Y,Z on turn table
- ④ The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from 0° to 360° with a speed as slow as possible, and keep the highest emission is indicated on the spectrum analyzer. Vary the antenna position again and record the highest value as a final reading.
- ⑤ Repeat step④ until all frequencies to be measured were complete.
- ⑥ Repeat step⑤ with search antenna in vertical polarized orientations.  
(The loop antenna was rotated during the test for maximized the emission measurement)
- ⑦ Check the frequencies of highest emission with varying the placement of cables (if any) associated with EUT to obtain the worst case and record the result.

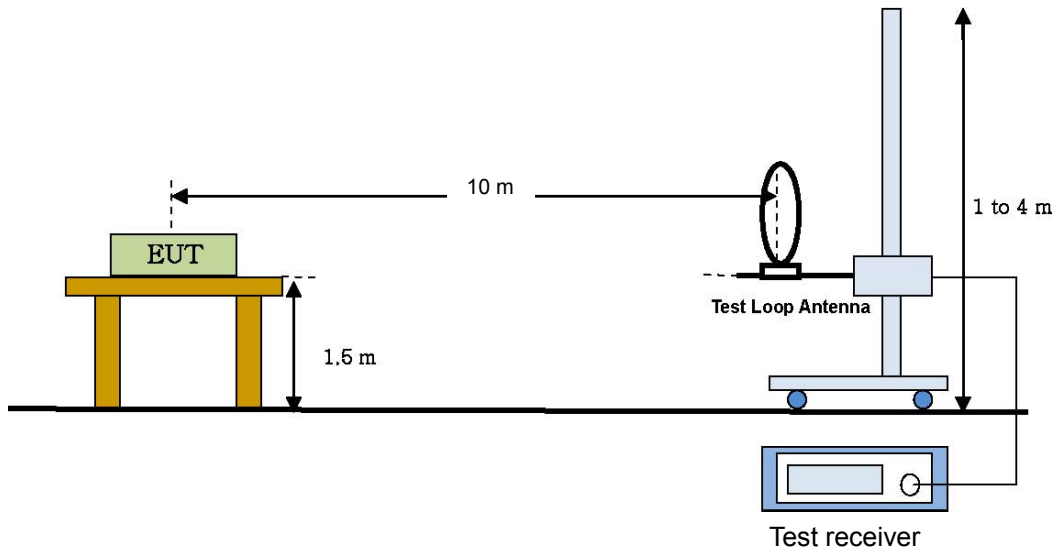
The measurement results are obtained as described below:

$$\text{Result(dB } \mu\text{V/m)} = \text{Reading(dB } \mu\text{V/m)} + \text{Antenna factor(dB/m)} + \text{CL(dB)} + \text{other applicable factor (dB)}$$

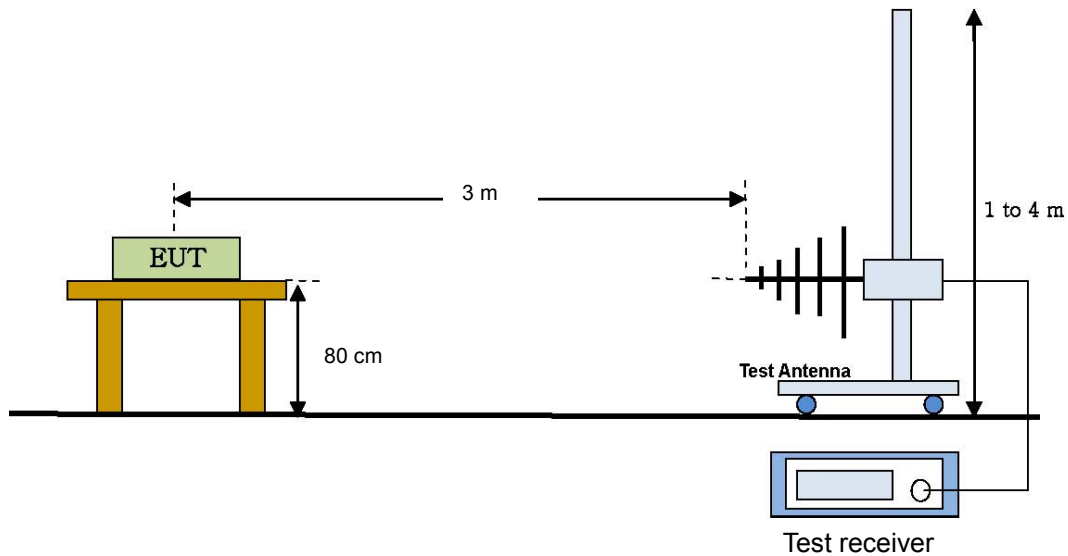
## 5.2.3 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are test receiver, Cable loss, Antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, Antenna frequency interpolation, measurement distance variation, Site imperfection, mismatch, and system repeatability based on NIS 80,81, The measurement uncertainty level with a 95 % confidence level were apply to Uncertainty of a radiation emissions measurement at OATS (Open Area Test Site) of KOSTEC is  $\pm 4.0$  dB

## 5.2.4 Test Configuration



[ Field Strength of In-band radiated emission setup ]



[ Field Strength of out-band radiated emission setup ]

### 5.2.5 Measurement Result (In-band frequency)

Measured frequency (MHz)	Reading (dB $\mu$ V/m)	Table (Deg)	Pstn (axis)	Antenna			Cbl (dB)	Distn factor (dB)	Meas Result (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Mgn (dB)	Result
				Height (m)	Pol. (H/V)	Fctr. (dB/m)						
13.560*	41.30	80	Z	1.60	-	9.85	2.10	-19.08	29.97	84.00	54.03	Pass
13.569	9.83	110	Y	1.75	-	9.85	2.10	-19.08	-1.50	50.47	51.97	Pass

\*It is fundamental frequency

Note1: above measured frequency have been done at 10 m distance and corrected according to required FCC 15.209. e)  
 $\therefore$  Extrapolation distance factor :  $40 \log (10/30) = -19.08$  dB

•additional explanation: If Measurement distance is 10 m and Mandatory requirement distance is 30 m at 30 MHz or less, extrapolation distance factor(dB) is  $40 / \text{decade} = 40 \log_{10}^{(MRD/MD)}$

above MRD is Mandatory requirement distance and MD is Measured distance

Note2: above measured frequencies is apply required standard FCC Part 15.225

Freq.(MHz) : Measurement frequency, Reading(dB $\mu$ V/m) : Indicated value for test receiver,  
 Table (Deg) : Directional degree of Turn table, Pstn(axis) : Location axis of EUT  
 Antenna (Height, Pol, Fctr) : Antenna Height, Polarization and Factor  
 Cbl(dB) : Cable loss, Distn factor(dB) : distance correction factor [40 dB/decade as per § 15.31f (2)]  
 Meas Result (dB $\mu$ V/m) : Reading(dB $\mu$ V/m)+ Antenna factor.(dB/m) + CL(dB) + Distn factor(dB)  
 Limit(dB $\mu$ V/m): Limit value specified with FCC Rule, Mgn(dB) : FCC Limit (dB $\mu$ V/m) – Meas Result(dB $\mu$ V/m),

### 5.2.6 Measurement Result (Out-band frequency)

Measured frequency (MHz)	Reading (dB $\mu$ /m)	Table (Deg)	Pstn (axis)	Antenna			Cbl (dB)	Meas Result (dB $\mu$ /m)	Limit (dB $\mu$ /m)	Mgn (dB)	Result	Meas Distn (m)
				Height (m)	Pol. (H/V)	Fctr. (dB/m)						
Above 30	Nil emission (Below 20 dB limit)											

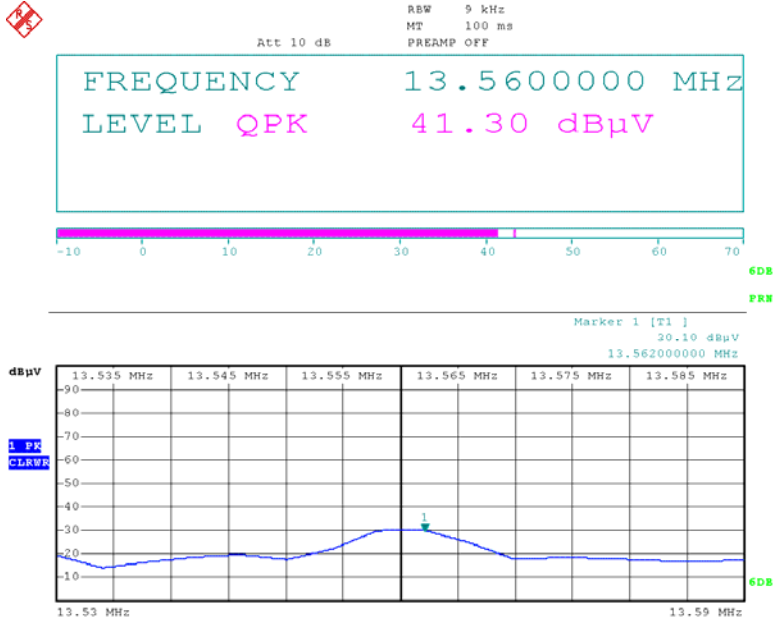
Note1: above 30 MHz listed a few emissions is falling in the restricted bands of 15.205 and have been done at 3 m distance

Note2: above frequencies is apply for required standard FCC Part 15.209

Freq.(MHz) : Measurement frequency, Reading(dB $\mu$ V/m) : Indicated value for test receiver,  
 Table (Deg) : Directional degree of Turn table, Pstn(axis) : Location axis of EUT  
 Antenna (Height, Pol, Fctr) : Antenna Height, Polarization and Factor, Cbl(dB) : Cable loss,  
 Meas Result (dB $\mu$ V/m) : Reading(dB $\mu$ V/m)+ Antenna factor.(dB/m) + CL(dB)  
 Limit(dB $\mu$ V/m): Limit value specified with FCC Rule, Mgn(dB) : FCC Limit (dB $\mu$ V/m) – Meas Result(dB $\mu$ V/m),  
 Meas Distn(m) : Measurement distance from EUT

## 5.2.7 Test Plot

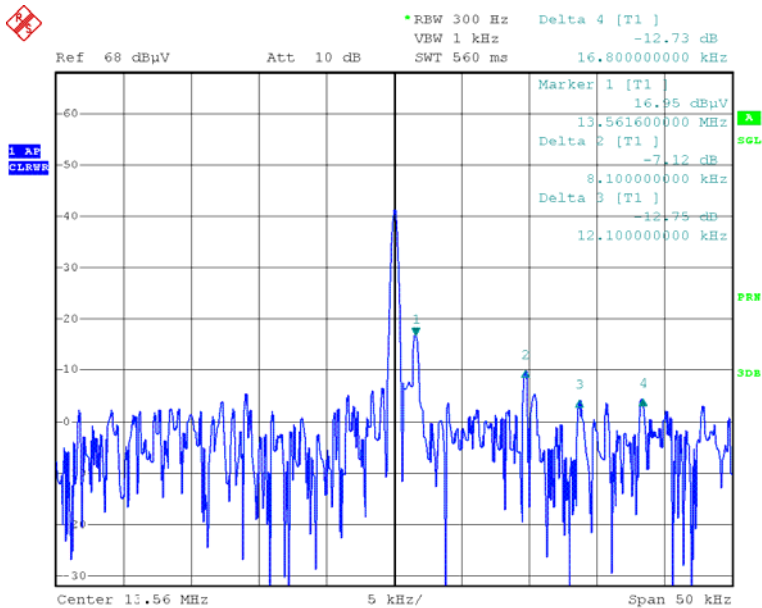
⇒ Measured fundamental frequency level



Date: 11.MAY.2011 18:06:15

\*above level is measured by ESPI Receiver

⇒ Measured In-band frequency level



Date: 11.MAY.2011 18:19:24

## 5.3 AC Power Line Conducted emissions

### 5.3.1 Standard Applicable [FCC §15.207(a)]

For intentional radiator that is designed to be connected to the public utility(AC)power line, the radio frequency Voltage that is conducted back onto the AC power line on any frequencies or frequency within the band 150kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50uH/50 ohms line Impedance stabilization network(LISN). Compliance with the provisions of this paragraph shall be based on The measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

§15.207 limits for AC line conducted emissions;

Frequency of Emission(MHz)	Conducted Limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

\* Decreases with the logarithm of the frequency

### 5.3.2 Configuration of EUT

Description	Manufacturer	Model / Part No.	Serial Number	Remark
Keypad Board	Demco corp.	SP7 KETPAD	SGKCIG2790114	
Display Board	GEM-TECH	GTK-327	None	
SECURITY Board	Demco corp.	None	SGPCIG2790470	
Main Board	Demco corp.	SP7 MAIN BOARD	SGMCIG2790404	
Antenna Board	Demco corp.	DEM-RFM1v0	None	
Antenna Main Board	Demco corp.	DEM-RFM1v0 Main	11DEM1-01-0048	

### 5.3.3 EUT used cable

Cable Type	Shield	Length (m)	Ferrite	Connector	Connection (Point 1)	Connection (Point 2)
DC IN	N	1.8	N	DIN	EUT	Adaptor
RJ-45	N	1.5	N	RJ45	EUT	PC
RJ-45 (LAN)	N	1.2	Y	RS232C	EUT	PC
USB (USB)	Y	1.6	N	USB	EUT	PC
USB (RS232C)	N	1.2	Y	-	EUT	-
IC CARD Slot	-	-	-	IC Card Slot Type	EUT	IC CARD
PS/2	Y	1.3	N	Din	PC	Keyboard
USB	Y	1.8	N	USB	PC	Mouse
USB	Y	1.6	Y	USB	PC	Printer
RGB	Y	1.6	Y	D-sub	PC	LCD Monitor



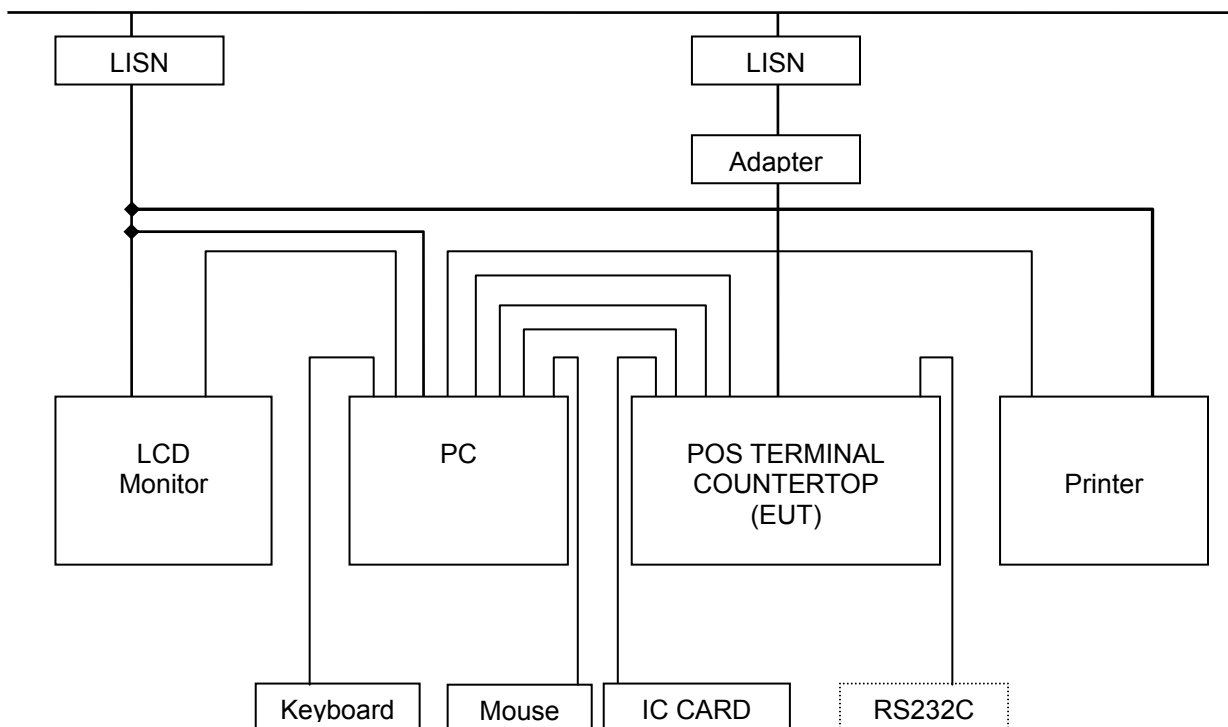
### 5.3.4 Operating conditions

After setting, each port of EUT connected to the adapter and PC, IC CARD. and then, it has been tested as HyperTerminal and Ping Test, EUT in the print mode has been tested continuously while printing.

### 5.3.5 Used Peripherals

No.	Description	Manufacturer	Model / Part No.	Serial Number
1	EUT	Demco corp.	SP7-V1	None
2	PC	Dell Asia pacific sdn	DMC	BBJBD1S
3	LCD Monitor	Dell Inc	1908FPc	CN-OG438H-64180-88K-288L-AOO
4	Keyboard	Gold land Electronics Co.,Ltd.	ST-220	060409533
5	Mouse	LOGITECH	M-BJ58	None
6	Printer	CANON HI-TECH	K10193	CME010800428
7	Adapter	I.T.E PWER SUPPLY	KSAFF0900250W1US	None
8	IC Card	None	None	None

### 5.3.6 EUT Test Configuration



### 5.3.7 Measurement Procedure

EUT was placed on a non-metallic table height of 0.8 m above the reference ground plane.

Cables connected to EUT were fixed to cause maximum emission.

Test was made with the antenna positioned in both the horizontal and vertical planes of polarization.

The measurement antenna was varied in height above the conducting ground plane to obtain the Maximum signal strength.

### 5.3.8 Test environment conditions

- Normal temperature : 22 °C
- Relative humidity : (44 ~ 45) % R.H.
- Pressure : 102.5 kPa

### 5.3.9 Test Data

#### < Class B >

Freq.	Factor		Pol	QP			AV		
				Limit	Reading	Result	Limit	Reading	Result
[MHz]	LISN	CABLE		[dB $\mu$ V]	[dB $\mu$ V]	[dB $\mu$ V]	[dB $\mu$ V]	[dB $\mu$ V]	[dB $\mu$ V]
0.17	0.12	0.0	L	64.79	37.89	38.04	54.79	24.05	24.20
0.18	0.12	0.0	N	64.61	39.28	39.43	54.61	22.98	23.13
0.19	0.12	0.0	L	64.25	35.42	35.57	54.25	17.71	17.86
0.22	0.12	0.0	N	62.81	35.46	35.61	52.81	18.83	18.98
0.23	0.12	0.0	L	62.52	34.12	34.27	52.52	16.45	16.60
0.27	0.12	0.0	L	61.08	33.63	33.79	51.08	16.11	16.27
2.77	0.21	0.1	L	56.00	35.07	35.41	46.00	26.00	26.34
3.24	0.22	0.1	L	56.00	34.93	35.30	46.00	24.53	24.90
3.69	0.24	0.2	L	56.00	34.38	34.79	46.00	24.60	25.01
4.09	0.25	0.2	L	56.00	34.82	35.26	46.00	25.15	25.59
4.38	0.25	0.2	L	56.00	34.56	35.01	46.00	25.01	25.46
4.58	0.26	0.2	L	56.00	34.70	35.17	46.00	25.07	25.54
5.40	0.28	0.2	L	60.00	34.93	35.45	50.00	25.61	26.13
6.24	0.31	0.3	L	60.00	34.65	35.23	50.00	25.79	26.37
6.72	0.32	0.3	L	60.00	34.51	35.12	50.00	25.25	25.86
8.16	0.34	0.3	L	60.00	33.25	33.89	50.00	24.38	25.02
8.70	0.35	0.3	L	60.00	33.44	34.09	50.00	24.99	25.64
11.52	0.42	0.3	L	60.00	33.98	34.73	50.00	26.60	27.35

\* Note: Measurement uncertainty ;  $\pm 2.4$  dB (Confidency 95 %,  $k=2$ )

\* LISN: LISN insertion Loss

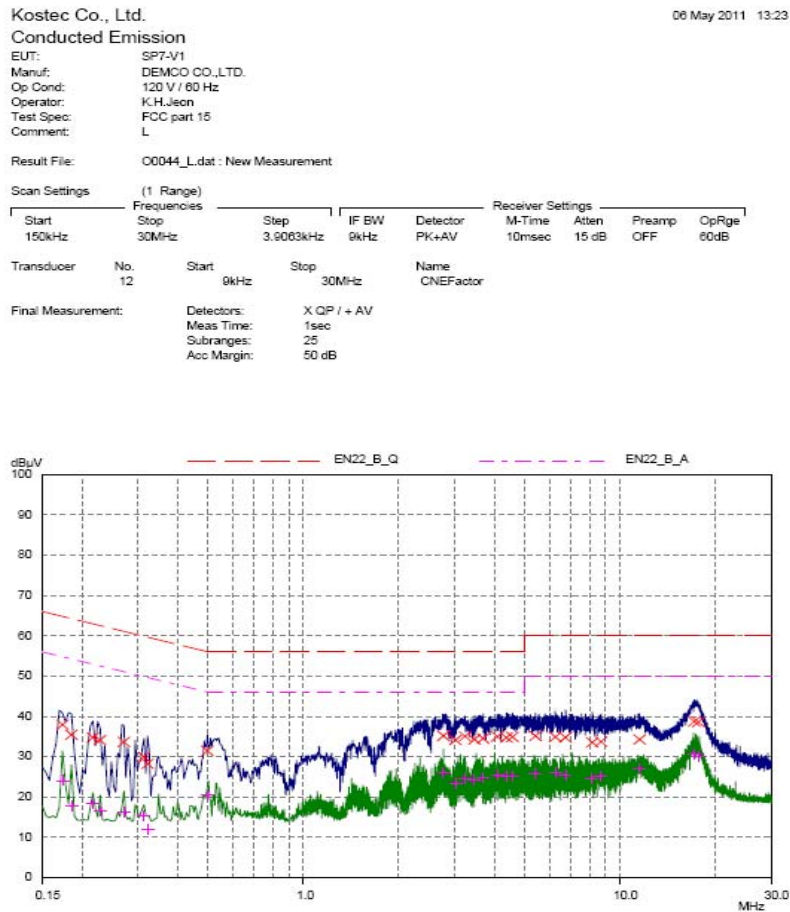
\* Cable: Cable Loss

\* Reading: test receiver reading value

\* Result = LISN + Cable + Reading

## ■ Conducted Emission test graph

### Live line



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## Neutral line

Kostec Co., Ltd.

06 May 2011 13:13

### Conducted Emission

EUT: SP7-V1  
 Manuf: DEMCO CO.,LTD.  
 Op Cond: 120 V / 60 Hz  
 Operator: K.H.Jeon  
 Test Spec: FCC part 15  
 Comment: N

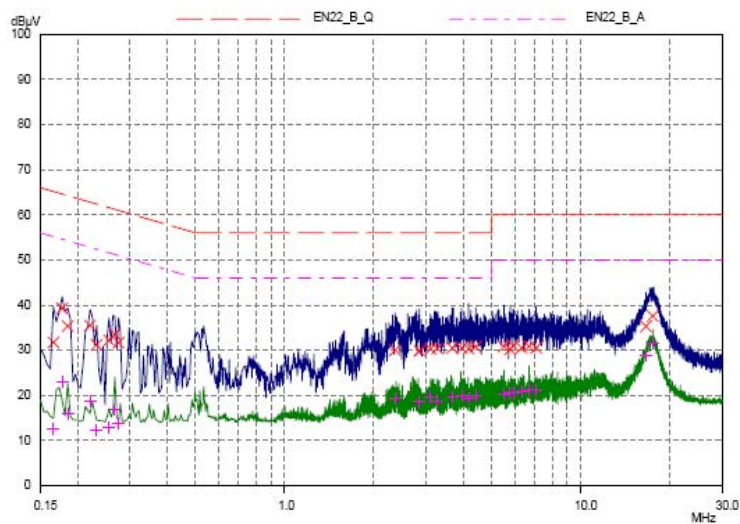
Result File: C0044\_N.dat : New Measurement

#### Scan Settings (1 Range)

Frequencies		Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
Start	Stop							
150kHz	30MHz	3.9063kHz	9kHz	PK+AV	10msec	15 dB	OFF	60dB

Transducer	No.	Start	Stop	Name
	12	9kHz	30MHz	CNEFactor

Final Measurement: Detectors: X QP / + AV  
 Meas Time: 1sec  
 Subranges: 25  
 Acc Margin: 50 dB



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## 5.4 General requirement

### 5.4.1 Antenna requirement [FCC §15.203]

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than furnished by responsible party shall be used with the device.

The use of a permanently attached antenna or of an antenna that user a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

The manufacturer may design the unit so that broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

According to above requirement standards. This product's antenna type is a loop type and Built-in on PCB between transmitter to antenna. So this antenna is meet to standard requirement

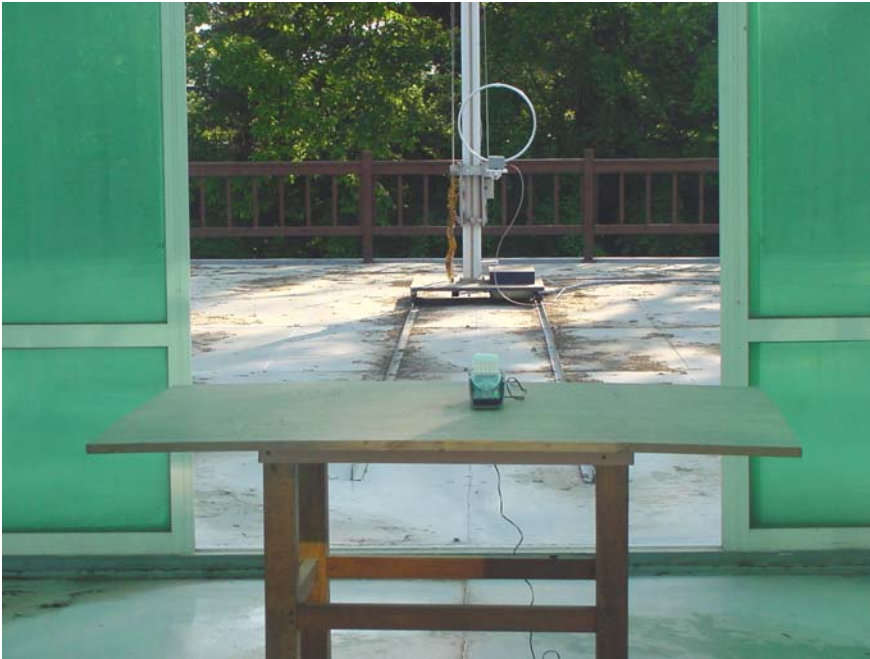
### 5.4.2 User information [FCC §15.21]

For intentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. In cases where the manual is provided only in a form other than paper, such as on a computer disk or over the internet, the information required by this section may be included in the manual in that alternative form, provided the user can reasonably be expected to have the capability to access information in that form.

According to above requirement standards. this warning statement is described on user manual

## Appendix. Test Set-up photos

### ■ In band Field strength measurement



### ■ Out band Field strength measurement





■ AC Power line conducted emission measurement

Conducted emission (Front)



Conducted emission (Rear)

