



Test Report for FCC

Test Report No.: STD-FCC-03006

EQUIPMENT: PC Dummy

Type/Model: ISR-110C

Rating: DC5V

Applicant: Insis Co.,Ltd

Test Standard: FCC Part15 Subpart B (Class B)

The above mentioned EUT had been tested by EMC Laboratory of Standard Engineering Company in order to confirm the compliance with the requirements of FCC rules and this test was executed in accordance with the measurement method specified in ANSI C63.4-1992

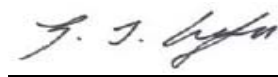
I hereby certify that the accuracy of test-data is true and correct with my best knowledge and belief. Also I prove this measurement was performed by qualified person,

Date of tested: April 11, 2003

Date of Issued: April 14, 2003

Tested by: 

H. J. Kim/Engineer

Approved by: 

Y. J. Lyu/Manager



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1. General Information

1.1 Product information

Description of EUT : Smart Card Reader/Writer
Model number : ISR-110C

Specification : Automatic 3V, 7MHz Clock Card power on
Terminal Power : Key board Power(DC5V)
Accepting Cards : IC Card
Display : LED2(Confirming of insert card & card data
Size : 62mm(W) × 70mm(H) × 12mm(D)

2.2 Client information

Applicant : Insis Co.,Ltd.
Address : #605, Shinnae Techno Town, 485, Sangbong-
dong, Jungrang-ku, Seoul, Korea

Phone No. : 82-2-3421-0800
Fax. No. : 82-2-3421-0805
Contact person : Nam-Joong Kim

Manufacturer : Insis Co.,Ltd.
Address : #605, Shinnae Techno Town, 485, Sangbong-
dong, Jungrang-ku, Seoul, Korea



2. Information of EMC Laboratory

Name of test laboratory

Standard Engineering Co. Ltd.

Location

377-17 Sinjang-Ri, Eumam-Myun, Seosan-Si Chungnam, Korea

Phone No. : 041-663-9436~7

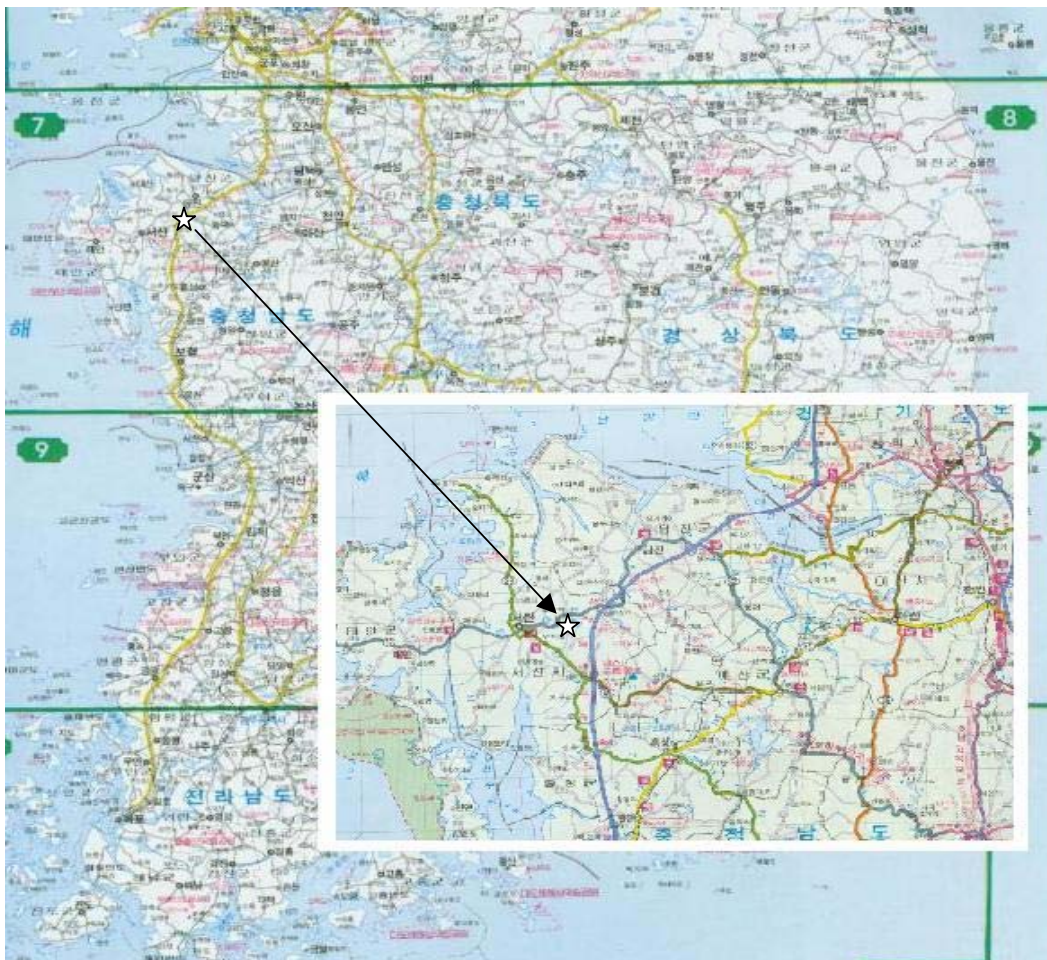
Fax. No. : 041-663-9434

FCC Filing Number : 284057

Environment of Laboratory

This location can keep accuracy in measuring more than anywhere because surrounding noise ambient is low and silent excellently to be suitable in EMI's measuring.

Map



3. Procedure of measurement

3.1 Conducted emission

3.1.1 Configuration of measurement

This measurement executed in shield-room and EUT was tested on 0.8m height wooden table located on the floor with 0.1m distance from the reference ground plane.

EUT's rear part had a distance from VCP(Vertical Conducted Plane) with 0.4m length and LISN placed on the grounded plane with 1m distance from EUT's side part .

Excess power cord and cables fixed in bundle style of 30~40Cm length with non-inductive material, and power line was connected to power source through LISN to detect maximum EMI without external RFI from aux. instruments.

Measuring equipments and EUT confirmed that warming-up was performed during enough time and calibration of antenna as well as calibration of measuring equipment also completed beforehand.

This measurement was performed on condition of worst-case emission.

3.1.2 List of measuring equipments

Name of equipment	Maker	Model No.	S/No.	Cal.. date
EMI Test Receiver	Rhode & Schwarz	ESIB7	100119	11/21/2002
EMI Test Receiver	Rhode & Schwarz	ESCS30	100171	11/21/2002
Artificial Mains	Rhode & Schwarz	ESH2-Z5	100064	12/03/2002
Artificial Mains	Rhode & Schwarz	ESH3-Z5	100204	11/29/2002
2 Wire ISN	Rhode & Schwarz	ENY22	10086	11/21/2002
4 Wire ISN	Rhode & Schwarz	ENY41	100095	11/21/2002
Pulse Limiter	Rhode & Schwarz	ESH3-Z2	100137	-
Attenuator	Rhode & Schwarz	DNF	100041	-

3.2 Radiated Emission

3.2.1 Configuration of measurement

Preliminary measurement was performed in 3 meter semi-anechoic chamber to detect correct EMI frequency.

For detecting the EMI frequency in semi-anechoic chamber, TRILOG antenna used on 30-1000MHz band

Final measurement was executed at 10 meters OATS(Open Area Test Site) using Quasi-peak detector, TRILOG antenna..

EUT was placed on 0.8m height wooden table located on the floor with 0.1m distance from the reference ground plane.

Excess power cord and other excess cables fixed in bundle style of 30~40Cm length with non-inductive material to detect maximum EMI emission from EUT.

Measuring equipments and EUT confirmed that warming-up was performed during enough time and calibration of antenna as well as calibration of measuring equipment also completed beforehand.

Measurement antenna height was varied 1 to 4 meters and set position in both horizontal and vertical plane to search maximum EMI emission frequency.

3.2.2 List of measuring equipments

Name of equipment	Maker	Model No.	S/No.	Cal. date
EMI Test Receiver	Rhode & Schwarz	ESIB7	100119	11/21/2002
EMI Test Receiver	Rhode & Schwarz	ESCS30	100171	11/21/2002
Signal Generator	Rhode & Schwarz	SML03	101003	11/18/2002
Absorbing Clamp	Rhode & Schwarz	MDS-21	100076	10/29/2002
TRILOG Antenna	Schwarzbeck	VULB9163	164	11/13/2002
Ferrite Clamp	Rhode & Schwarz	EZ-24	100002	6/29/2000

3.3 Method of Calculation

Emission level is calculated as follows;

Emission Level(dBuV/m)

= Reading Level + Ant. Factor + Cable Loss + Ant. Pad – Amp Gain

Margin Level is calculated as follows;

Margin(dBuV) = Limit Level – Emission Level

Example)

Standard limit = 40 dBuV/m,

Reading Level = 10 dBuV,

Ant. Factor = 15 dB,

Cable Loss= 1 dB

Ant. Pad= 0 dB

Amp Gain= 0 dB

Emission Level(dBuV/m) = 10 + 15 + 1 + 0 - 0 = 26 (dBuV/m)

Margin(dBuV) = 40 – 26 = 14 (dBuV)

4. Environments of measurement

4.1 Conditions of environment

Shield room	Temperature	20°C
	Humidity	55 %
	Pressure	998 hPa
OATS	Temperature	19°C
	Humidity	50%
	Pressure	998 hPa

4.2 Measurement uncertainty

All measurements, especially EUT's measurement includes uncertain level that can happen for the reason as following;

Variation of antenna factor by changes of height,center,polarization,directivity.

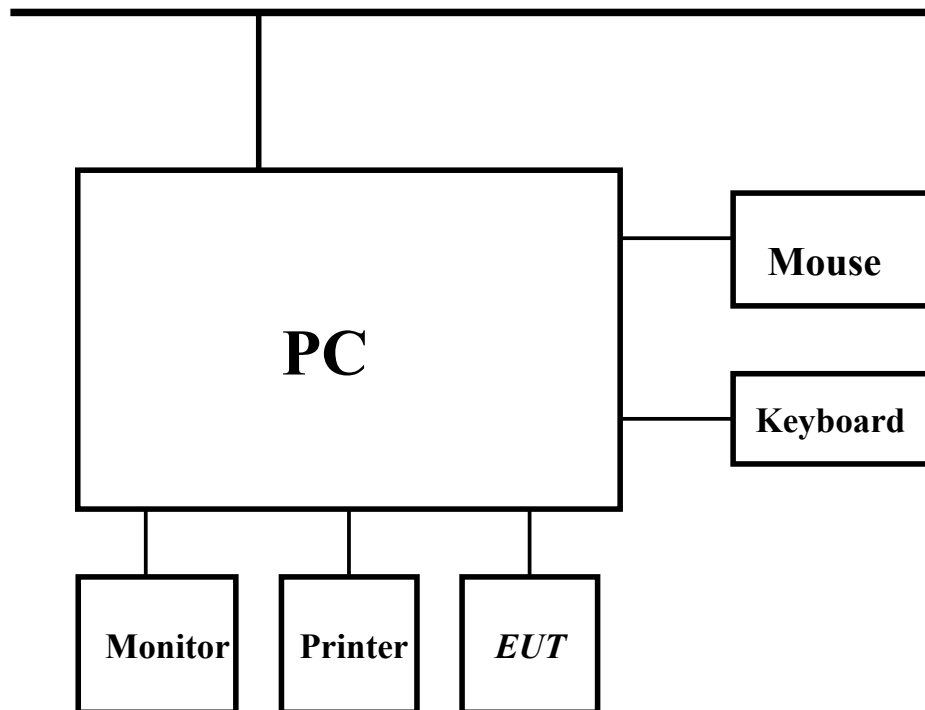
Uncertainty factor by change of measurement distance, site's imperfection.

Uncertainty of the measurement level satisfies accuracy of 95% based on NIS 80,81

4.3 Used Cables

Descriptions	Maker	Type	S/No.	Remarks
M/W Cable/2GHz 5m	H+Suhner	SF104/2x11BNC	14354	
M/W Cable/2GHz10m	H+Suhner	SF104/2x11BNC	14353	
M/W Cable/18GHz18m	H+Suhner	SF104/2x11N	6025	
M/W Cable/18GHz18m	H+Suhner	SF104/2x11N	6026	
M/W Cable/18GHz10m	H+Suhner	SF104/2x11N	6027	
M/W Cable/18GHz1m	H+Suhner	SF104/2x11N	6029	
M/W Cable/18GHz1m	H+Suhner	SF104/2x11N	6028	
M/W Cable/2GHz43m	THERMAX	MS-P400	-	

4.4 Configuration of EUT



Used Peripherals

Descriptions	Maker	Type	S/No.	Remarks
Personal Computer	COMPAQ	PL400	7946CTJ30058	
Monitor	COMPAQ	325901-K22	DP15H1CN211569	
Printer	EPSON	P730A	60H0187628	
Mouse	HP	PM4000-1	PM4F2X4033918	
Mouse	Logitech	M-UR69	LNA24404371	
Key-board	COMPAQ	386209-001	B0A090K39IEOTH	



Result of Measurement

5.1 Conducted Emission

5.1.1 Test data

1) Quasi-peak

Frequency [MHz]	Reading [dBuV]	Line	LISN Factor	Cable Loss	Limit [dBuV]	Result [dBuV]	Margin [dBuV]
7.455	37.52	L1	0.24	0.14	48	37.9	10.1
7.585	33.60	N	0.24	0.16	48	34.0	14.0
7.725	38.08	L1	0.24	0.18	48	38.5	9.5
7.925	38.66	L1	0.24	0.20	48	39.1	8.9
14.895	25.18	L1	0.45	0.17	48	25.8	22.2

5.1.2 Result

Complied





5.2 Radiated Emission

5.2.1 Test data

Frequency [MHz]	Pol [V/H]	Reading [dBuV]	Antenna Factor	Cable Loss	Limits [dBuV/m]	Result [dBuV/m]	Margin [dBuV/m]
45.5521	V	23.10	12.33	0.11	40.0	35.54	4.46
47.9269	H	17.90	12.12	0.19	40.0	30.21	9.79
117.9756	V	23.60	9.59	0.68	43.5	33.87	9.63
140.0955	H	31.20	7.28	0.90	43.5	39.38	4.12
184.3390	H	20.50	9.67	1.14	43.5	31.31	12.19
199.0862	H	23.90	10.31	1.24	43.5	35.45	8.05
206.4598	H	23.80	10.57	1.28	43.5	35.65	7.85
235.9526	H	26.80	11.90	1.41	46.0	40.11	5.89
288.0324	H	23.90	13.06	1.62	46.0	38.58	7.42
398.1758	V	23.50	15.58	2.02	46.0	41.10	4.90

* Antenna Pad : 0 dB

* Amp Gain : 0 dB

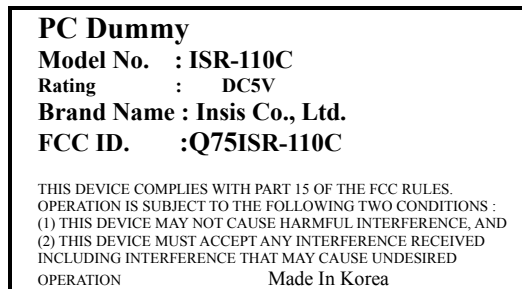
5.2.1 Result

Complied



6. Appendix

6.1 Sample Label



Label location



6.2 Photographs of EUT

Front View



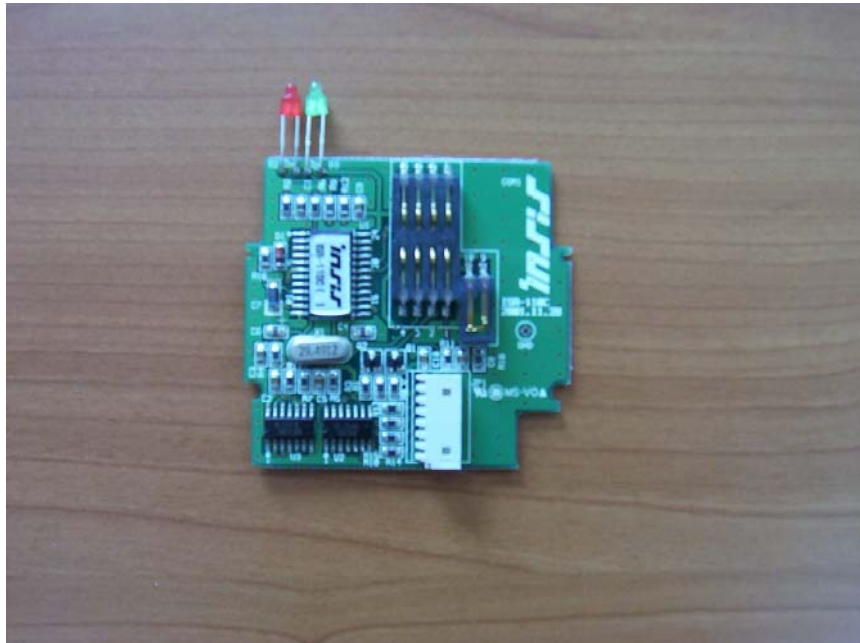
Rear View



Inside View



Main Board



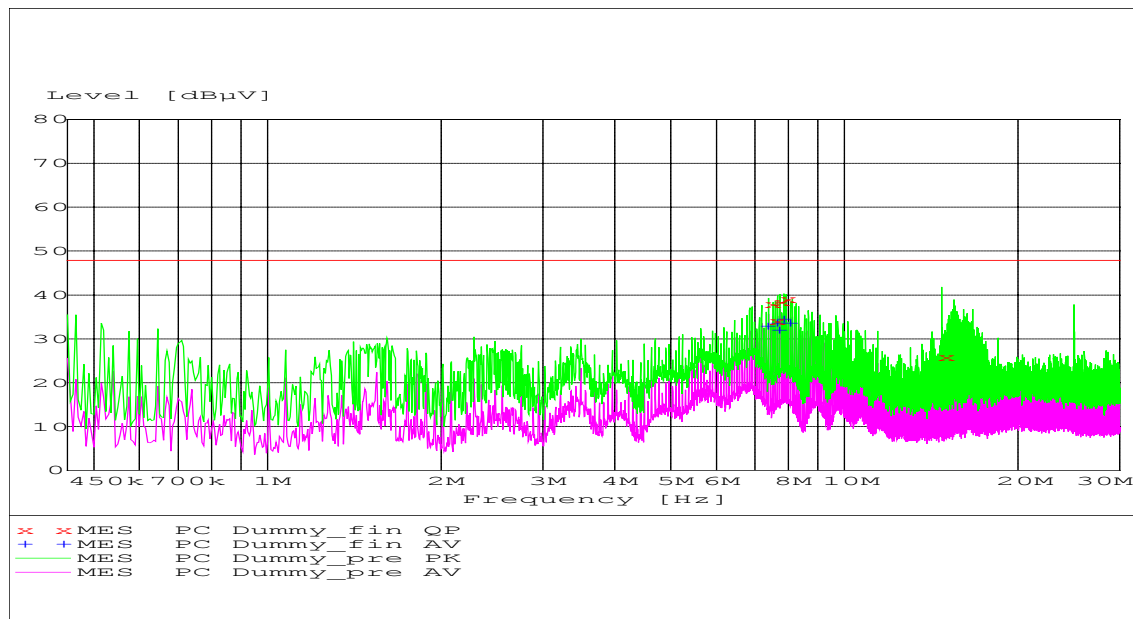
6.3 Conducted emission data

EUT: PC Dummy
 Manufacturer: Insis Co., Ltd.
 Operating Condition:
 Test Site: S/R
 Operator: H. J. Kim
 Test Specification: FCC Part15 Subpart B(Class B)
 Comment:
 Start of Test: 4/11/2003 / 3:00:48PM

SCAN TABLE: "FCC ClassB V"

Short Description: FCC ClassB Voltage

Start	Stop	Step	Detector	Meas.	IF	Transducer
Frequency	Frequency	Width		Time	Bandw.	
450.0 kHz	30.0 MHz	5.0 kHz	MaxPeak	1.0 ms	9 kHz	ESH3-Z5
Average						





MEASUREMENT RESULT: "PC Dummy_fin QP"

4/11/2003 3:10PM

Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dBμV	dB	dBμV	dB		
7.455000	37.90	10.1	48	10.0	L1	GND
7.585000	34.00	10.2	48	13.9	N	GND
7.725000	38.50	10.2	48	9.4	L1	GND
7.925000	39.10	10.2	48	8.8	L1	GND
14.895000	25.80	10.2	48	22.1	L1	GND



6.4 Photographs of Set-up

Conducted Emission





Radiated Emission





6.5 Block Diagram/Circuit





6.6 User's Manual

