EMI TEST REPORT
FCC PART 15 CLASS B

for

Hunno Technologies Inc.
12F, Sewon Venture Town,
705-18, Yoksam-Dong, Kangnam-Ku,
Seoul 135-080, Korea

on the

Fingerprint ID Scanner
FCC ID: O9ZMS2600

Issued Date : Oct 10, 2002
Report Number : KSQ-FCC021010

Prepared By:

Test Date :	Oct 08, 2002	
Test Engineer :	K. P. Jin	Jin Ki Pyo
	Printed Name	Signature
Compliance Engineer	J. J. Ha	
	Printed Name	Signature

Korea Standard Quality Laboratories
Testing Laboratories for EMC and Safety Compliance
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1. General Information

1.1 Introduction

The EMI Test Report of Information Technology Equipment is prepared on behalf of named applicant in accordance with the ANSI C63.4-1992. The test results reported in this document relate only to the item that was tested.

The detailed description of the measurement facility was found to be in compliance with the requirement of Section 2.948 of the FCC Rules. The Federal Communications Commission has the reports on file and is listed under Registration Number 100384. The scope of the accreditation covers the FCC Method - 47 CFR Part 15 or 18 of the Commission's Rules.

All measurements contained in this report were conducted in accordance with ANSI C63.4-1992. The instrumentation utilized for the measurements conforms with CISPR16 Specification for Radio Disturbance and Immunity Measuring Apparatus and Methods. Some accessories are used to increase sensitivity and prevent overloading of the measuring instrument. Calibration checks are performed yearly on the instruments by a local calibration laboratories.

All radiated and conducted emission measurements are performed manually at Korea Standard Quality Laboratories (hereinafter referred to as "KSQLab"), #102, Jangduk-Dong, Hwasung-Shi, Kyunggi-Do, KOREA. The radiated emission measurements required by the FCC Rules were performed on 3 meter or 10 meter, Open Area Test Site, test range maintained by KSQLab. Complete ANSI 63.4-1992 description and site attenuation measurement data records are maintained at the test facility and have been placed on file with the Federal Communications Commission. The power line conducted emission measurements were performed in a shielded enclosure also located at the same facility. The KSQLab EMC test facility in Hwasung-Shi are designated testing laboratory according to ISO/IEC 17025 by Radio Research Laboratory (RRL), Ministry of Information and Communication.

1.2 Product Description for Equipment Under Test (EUT)

Hunno Technologies Inc.'s Fingerprint ID Scanner, Model: MS2600, or the "EUT" as referred to in this report is a most advanced optical scanner having Hunno-developed optical fingerprint module within the scanner. EUT improves network security because it eliminates the need to enter passwords. EUT essentially replaces password with something that can't be stolen or forgotten - a human fingerprint that is unique to every individual.

Main Features of EUT are:

* Windows Logon
* Screen Saver
* Folder/File Encryption Support
* Easy to install
* Boot Protection and Log Data Management

1.3 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	FCC ID
Fingerprint ID Scanner	MS2600	Prototype	Hunno Technologies Inc.	O9ZMS2600

1.4 Support Equipment

Description	Model Number	Serial Number	Manufacturer	FCC ID
Host Computer	JT4102	JT004000053	Jooyontech Computer	none
VGA Monitor	DP15LS	H1EK403730	Samsung Electronics	DoC(A3L)
Keyboard	SEM-DT35	22022689	Samsung Electro-Mecha	DoC(E2X)
Mouse	76FSERIAL9D	1005213	Microsoft Corp.	C3K
Printer	6XU2225C	3037S84200	Hewlett Packard	DSI
Joystick	DHA-2000	none	Dahwoon Electronics	none
Speaker	GL-2000	none	Comsources	none
Microphone	JPM601	none	Hi-sonic	none

1.5 External I/O Cabling

Description	Length (m)	Port/From	Port/To	Remarks
Video Cable	1.5	Dsub/Host	Monitor	Shielded
Keyboard Cable	2.0	PS2/Host	Keyboard	Shielded
Mouse Cable	2.0	Dsub/Host	Mouse	Shielded
Printer Cable	1.5	Dsub/Host	Printer	Shielded
USB Cable	2.0	USB/Host	EUT	Shielded
Joystick Cable	1.5	Dsub/Host	Joystick	Shielded
Speaker Cable	1.0	Jack/Host	Speaker	Shielded
Microphone Cable	2.0	Jack/Host	Microphone	Shielded

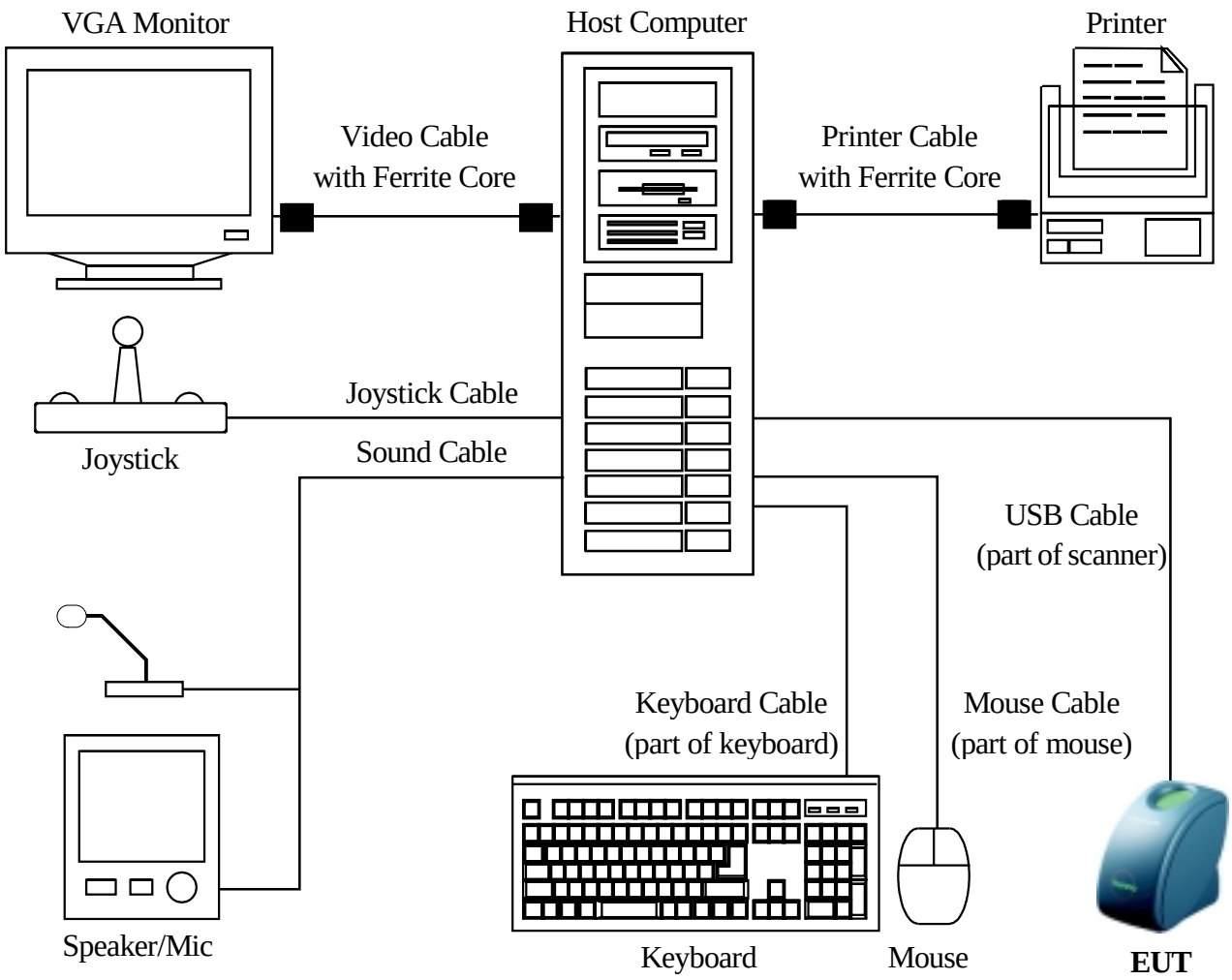
1.6 Special Accessories

As shown in section 1.7, all interface cables used for compliance testing are shielded as normally supplied or by use respective component manufacturers.

1.7 EUT Modifications

No modifications were made to the EUT in order to achieve and maintain compliance to the standards described in this report.

1.8 Configuration of Test System



2. Test Performed

2.1 Conducted Emission Measurements

2.1.1 Test Description

The power line conducted emission measurements were performed in a shielded enclosure, using the setup in accordance with ANSI C63.4-1992 conducted emission measurement procedure.

2.1.2 Test Equipments

Description	Manufacturer	Model Number	Serial Number	Cal. Due
Spectrum Analyzer	Advantest	3261A	21720240	10, 2003
LISN1	Electro Metrics	ANS-25/2	2535	10, 2003
LISN2	Kyoritsu	KNW-407	8-1010-14	10, 2003
Plotter	Hewlett Packard	7550B	3050A14513	n/a

2.1.3 Test Environments

Ambient Temperatures	Relative Humidity
15~35 °C	30~60 %

2.1.4 Test Limits

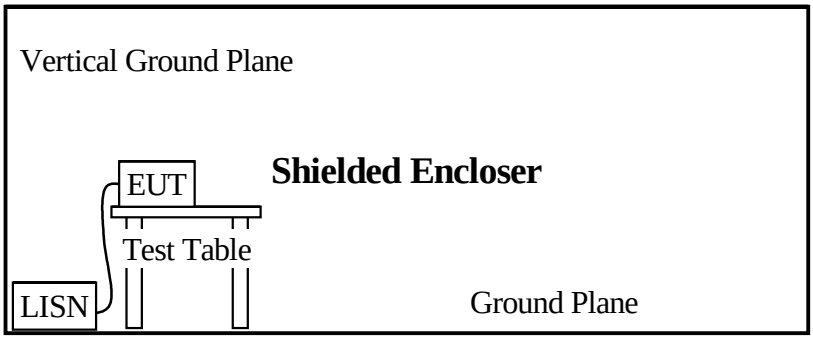
Frequency (MHz)	FCC Part 15 Limit			
	Class B		Class A	
	(dBuV)	(uV)	(dBuV)	(uV)
0.45 to 1.705	48.0	250	60.0	1000
1.705 to 30.00	48.0	250	69.5	3000

2.1.5 Test Procedure

Conducted emission levels were measured on each current-carrying line with the spectrum analyzer operating in the CISPR quasi-peak mode (or peak mode if applicable). The analyzer's 6dB bandwidth was set to 9kHz. The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. If the conducted emission exceed the average limit with the instrument set to the quasi-peak mode, the measurements are made in the average mode. The emission spectrum was scanned from 450kHz to 30MHz. The highest emission amplitudes relative to the appropriate limits were measured and have been recorded. Quasi-peak readings are distinguished with a "QP".

The conducted emission test was performed with the EUT exercise program loaded, and the emissions were scanned between 450kHz to 30MHz on the HOT side and NEUTRAL side, herein referred to as H and N, respectively.

2.1.6 Test Configuration



2.1.7 Test Results

According to the data in section 2.1.8, the EUT complied with the FCC Part 15 standards, and had the worst margin reading of:

-8.0dB at 21.98MHz in the NEUTRAL side.

2.1.8 Test Data

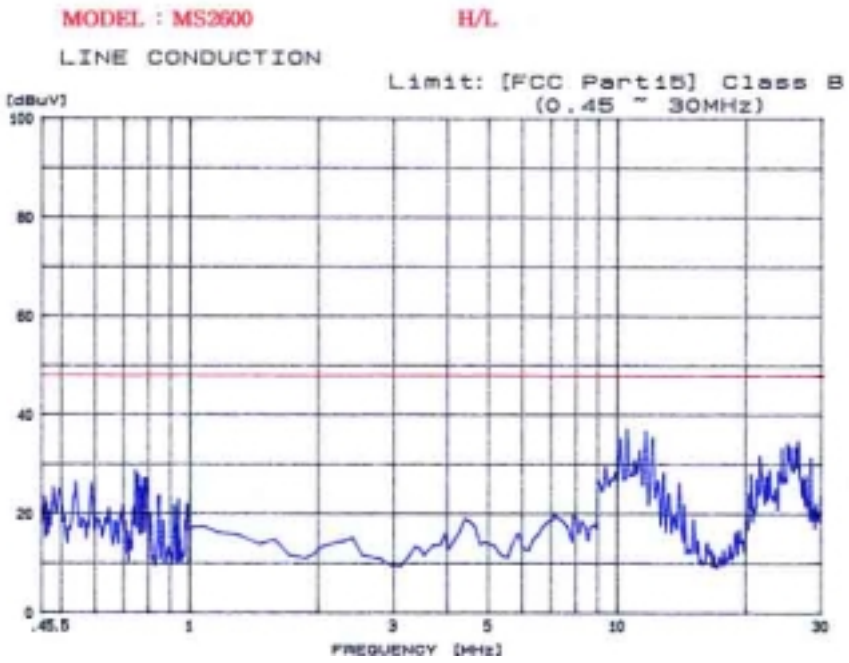
Line Conducted Emission				FCC Part 15 Class B		
Frequency (MHz)	Amplitude (dBuV)	Phase Hot/Neutral	Detector QP/AV/PK	Applicable Limit		Margin (dB)
				(dBuV)	(uV)	
0.47	25.9	H	PK	48.0	250	-22.1
0.52	26.8	H	PK	48.0	250	-21.2
0.57	26.6	H	PK	48.0	250	-21.4
0.72	29.0	H	PK	48.0	250	-19.0
0.76	27.2	H	PK	48.0	250	-20.8
0.82	23.8	H	PK	48.0	250	-24.2
4.15	23.5	N	PK	48.0	250	-24.5
7.02	26.2	N	PK	48.0	250	-21.8
10.04	37.1	H	PK	48.0	250	-10.9
10.72	36.9	H	PK	48.0	250	-11.1
21.98	40.0	N	PK	48.0	250	-8.0
22.92	37.1	N	PK	48.0	250	-10.9

PK = Peak; QP = Quasi-peak; AV = Average

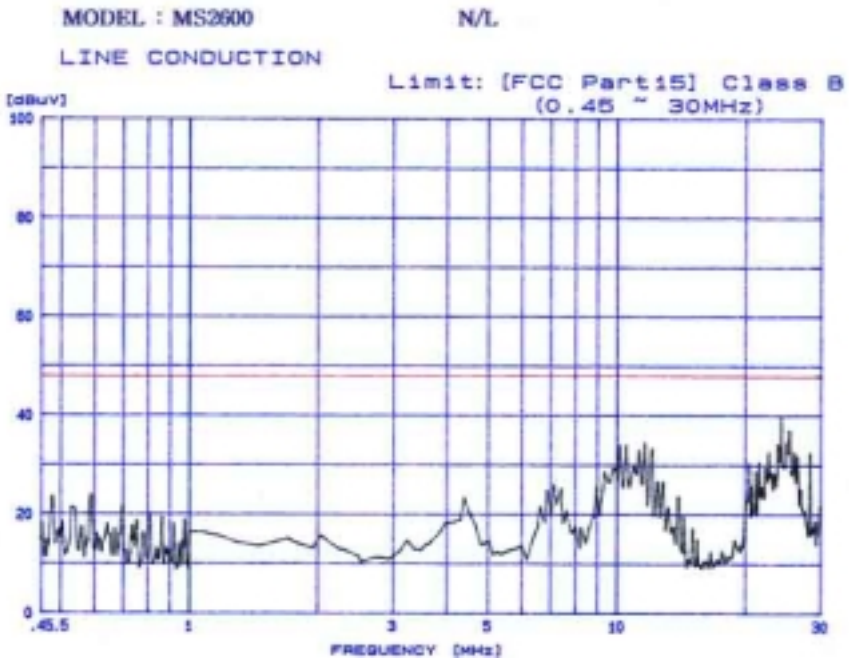
Temperature: 28 °C Humidity: 55 % Test Date: Oct 08, 2002 Tested by: K. P. Jin

2.1.9 Plots of Test Data

Polarization: HOT (LIVE)



Polarization: NEUTRAL



2.2 Radiated Emission Measurements

2.2.1 Test Description

The radiated emission measurements were performed in a Open Area Test Site (OATS), using the setup in accordance with ANSI C63.4-1992 radiated emission measurement procedure.

2.2.2 Test Equipments

Description	Manufacturer	Model Number	Serial Number	Cal. Due
Spectrum Analyzer	Hewlett Packard	8568B	3217A05629	08, 2003
Spectrum Display	Hewlett Packard	85682A	3144A20886	08, 2003
RF Preselector	Hewlett Packard	85685A	3221A01366	08, 2003
Quasi-Peak Adapter	Hewlett Packard	85650A	3145A01652	08, 2003
Biconical Antenna	Electro Metrics	BIA-30S	164	10, 2003
Log Periodic Antenna	Electro Metrics	LPA-30	387	10, 2003
Turn Table	KSQ	KSQ-T10	KSQ98121	n/a
Antenna Mast	KSQ	KSQ-A10	KSQ98122	n/a

2.2.3 Test Environments

Ambient Temperatures	Relative Humidity
15~35 °C	30~60 %

2.2.4 Test Limits

Frequency (MHz)	FCC Part 15 Limit			
	Class B @3m		Class A @10m	
	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)
30 to 88	40.0	100	39.5	90
88 to 216	43.5	150	43.5	150
216 to 960	46.0	200	46.5	210
above 960	54.0	500	49.5	300

2.2.5 Test Procedure

Before final measurements of radiated emission were made on the OATS, the EUT was scanned in semi-anechoic chamber in order to determine its emission spectrum signature. The physical arrangement of the test system and associated cabling was varied in order to determine the effect on the EUT's emission in amplitude, direction and frequency. This process was repeated during final radiated emission measurements on the OATS range, at each frequency, in order to ensure that maximum emissions amplitudes were attained.

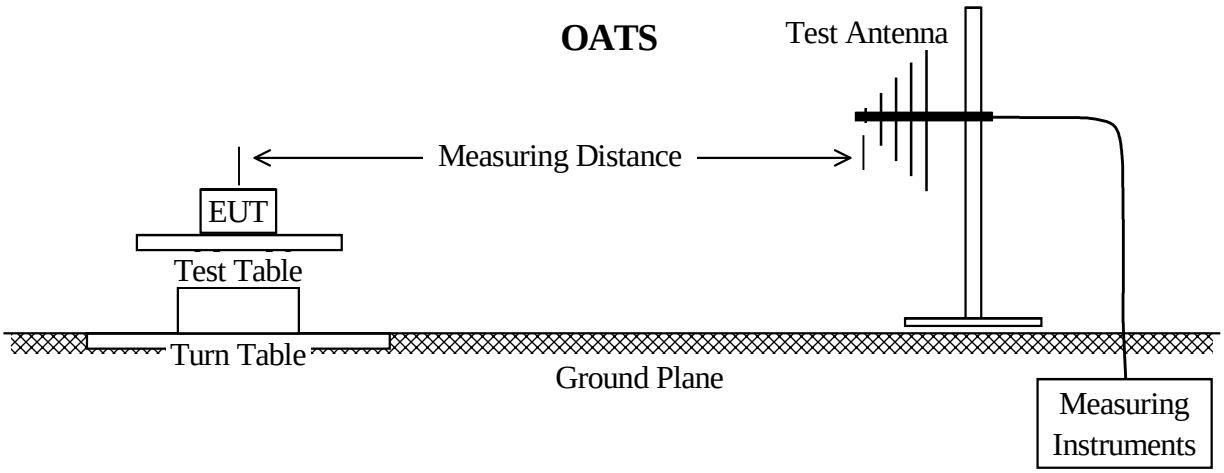
The radiated emission test was performed with EUT exercise program loaded, and the emissions were scanned between 30MHz to 1000MHz using a HP 8568B spectrum analyzer. The spectrum analyzer's 6dB bandwidth was set to 120kHz, and the analyzer was operated in the CISPR quasi-peak detection mode. Measurements were taken using both HORIZONTAL and VERTICAL antenna polarization, herein referred to as H and V, respectively.

2.2.6 Field Strength Calculation

The Field Strength (FS) is calculated by adding the Antenna Factor (AF) and Cable Factor (CF) from the Measured Reading (MR). The basic equation with a sample calculation is as follows:

FS(dBuV/m) = MR(dBuV) + [AF(dB/m) + CF(dB)]

2.2.7 Test Configuration



2.2.8 Test Results

According to the data in section 2.2.9, the EUT complied with the FCC Part 15 standards, and had the worst margin reading of:

-5.1dB at 191.98MHz in the HORIZONTAL antenna polarization.

2.2.9 Test Data

Indicated		Antenna		Correction Factor		Corrected Amplitude	FCC Part15 Class B		
Frequency (MHz)	Amplitude (dBuV/m)	Polar. (H/V)	Height (m)	Ant. (dB)	Cable (dB)	(dBuV/m)	Applicable Limit (dBuV/m)	Applicable Limit (uV/m)	Margin (dB)
44.16	19.0	H	2.5	11.6	1.1	31.7	40.0	100	-8.3
47.88	19.6	H	2.3	10.1	1.1	30.8	40.0	100	-9.2
71.10	18.9	H	2.4	6.0	1.5	26.4	40.0	100	-13.6
78.90	21.5	V	1.7	7.5	1.5	30.5	40.0	100	-9.5
82.08	25.1	H	2.1	8.1	1.6	34.8	40.0	100	-5.2
87.00	22.5	H	2.0	9.2	1.6	33.3	40.0	100	-6.7
91.32	24.9	V	1.6	10.0	1.6	36.5	43.5	150	-7.0
94.44	23.1	H	1.8	10.6	1.6	35.3	43.5	150	-8.2
96.06	20.7	H	1.8	10.9	1.6	33.2	43.5	150	-10.3
116.32	21.3	H	1.6	13.2	1.9	36.4	43.5	150	-7.1
120.00	21.9	V	1.5	13.6	1.9	37.4	43.5	150	-6.1
191.98	20.3	H	1.6	15.6	2.5	38.4	43.5	150	-5.1
239.98	18.5	H	1.5	10.9	2.8	32.2	46.0	200	-13.8
336.24	19.0	V	1.3	13.7	3.5	36.2	46.0	200	-9.8
432.08	18.4	V	1.2	15.6	4.2	38.2	46.0	200	-7.8
528.20	19.0	H	1.1	17.1	4.7	40.8	46.0	200	-5.2
575.99	16.5	H	1.1	17.9	5.0	39.4	46.0	200	-6.6
668.32	13.4	V	1.0	20.0	5.4	38.8	46.0	200	-7.2
-	-	-	-	-	-	-	54.0	500	-
-	-	-	-	-	-	-	54.0	500	-

Temperature: 28 °C Humidity: 55 % Test Date: Oct 08, 2002 Tested by: K. P. Jin