



ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR FCC CLASS B CERTIFICATION

Test report file number : E023R-022

Applicant : ITM INC.

Address : 880-3, Kwanyang-Dong, Dongan-Ku, Anyang-City, Kyunggi-Do, 431-060, Korea

Manufacturer : ITM INC.

Address : 880-3, Kwanyang-Dong, Dongan-Ku, Anyang-City, Kyunggi-Do, 431-060, Korea

Type of Equipment : 4 Wire Analog Resistive Touch Screen (Class B Computing Device Peripheral)

FCC ID : P9ATPMA111

Model / Type No. : TP-MA111

Multiple Model/ Type No. : N/A

Serial number : N/A

Total page of Report : 13 pages (including this page)

Date of Incoming : February 19, 2001

Date of Issuing : March 08, 2002

SUMMARY

The equipment complies with the requirements of **FCC CFR 47 PART 15 SUBPART B, Class B.**

This test report contains only the results of a single test of the sample supplied for the examination. It is not a general valid assessment of the features of the respective products of the mass-production.

Prepared by: G. W. Lee
G. W. Lee/ Assistant Chief Engineer

Reviewed by: Y. K. Kwon
Y. K. Kwon/ Chief Engineer

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FCC-003 (Rev.0)

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1. VERIFICATION OF COMPLIANCE

-. APPLICANT : ITM INC.
 -. ADDRESS : 880-3, Kwanyang-Dong, Dongan-Ku, Anyang-City, Kyunggi-Do, 431-060, Korea
 -. CONTACT PERSON : Mr. Tae-Hyoo, Oh / Deputy Manager
 -. TELEPHONE NO : +82-31-424-6113
 -. FCC ID : P9ATPMA111
 -. MODEL NO/NAME : TP-MA111
 -. SERIAL NUMBER : N/A
 -. DATE : March 08, 2002

DEVICE TYPE	Class B Computing Device Peripheral - Unintentional Radiator
E.U.T. DESCRIPTION	4 Wire Analog Resistive Touch Screen
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	ANSI C63.4/1992
TYPE OF EQUIPMENT TESTED	PRE-PRODUCTION
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	CERTIFICATION
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15, SECTION 15.101
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	No
FINAL TEST WAS CONDUCTED ON	3 METER OPEN AREA TEST SITE

The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

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2. GENERAL INFORMATION

2.1 Product Description

The ITM INC., Model TP-MA111 (referred to as the EUT in this report) is a 4 Wire Analog Resistive Touch Screen that is interfaced to personal computer via RS-232 port for Signal and USB port for power. Product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Touch panel + PCB type without housing
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz)	11.0592 MHz
POWER REQUIREMENT	DC 5V, 30mA from PC
NUMBER OF LAYERS	4 Layers
EXTERNAL CONNECTOR	RS-232C, DC In

Model Differences:

The difference(s) compared to the EUT is as follows: none

2.2 Related Submittal(s) / Grant(s)

Original submittal only

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2.3 Test System Details

The model numbers for all the equipments that were used in the tested system is:

Model	Manufacturer	FCC ID.	Description	Connected to
TP-MA111	ITM INC.	P9ATPMA111	4 Wire Analog Resistive Touch Screen(EUT)	PC
DCM	DELL Computer	DOC	PERSONAL COMPUTER	-
NF-1500MAE	BTC	DOC	LCD MONITOR	PC
LSE9802B1240	LI SHIN	N/A	AC/DC ADAPTER	LCD Monitor
BTC-5360	BTC	DOC	KEYBOARD	PC
OK-720	A4-Tech	DOC	MOUSE	PC
2225C	HP	DSI6XU2225	PRINTER	PC
020-0470	CARDINAL	GDE0196	MODEM	PC

2.4 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4/1992. Radiated testing was performed at a distance of 3 meters from EUT to the antenna.

2.5 Test Facility

The open area test site and conducted measurement facilities are located on at 426-1 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-080 Korea. Description details of test facilities were submitted to the Commission on January 18, 2002. (Registration Number: 92819)

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3. SYSTEM TEST CONFIGURATION

3.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
Controller Board	ITM INC.	MA-111-01-A	N/A
Touch Panel	N/A	TG15100S	N/A

3.2 EUT exercise Software

After the EUT installed on LCD monitor for function of touch screen, all test was performed at standby mode, but the EUT was continuously scanned for data input activity.

3.3 Cable Description

	Power Cord Shielded (Y/N)	I/O cable Shielded (Y/N)	Length (M)
4 Wire Analog Resistive Touch Screen (EUT)	N	N	0.3 (P), 0.3 (D)
PERSONAL COMPUTER	N	-	1.5(P)
LCD MONITOR	N	Y	1.5(P), 1.5(D)
AC/DC ADAPTER	N	N	1.5(P), 1.2(D)
KEYBOARD	N/A	Y	1.2(D)
MOUSE	N/A	Y	1.2(D)
PRINTER	N	Y	1.5(P), 1.5(D)
MODEM	N	Y	1.5(P), 1.5(D)

* The marked "(P)" means the Power Cable and "D" means the I/O Cable.

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3.4 Noise Suppression Parts on Cable

	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
4 Wire Analog Resistive Touch Screen (EUT)	N	N/A	Y	PC END
PC	-	-	-	-
LCD MONITOR	Y	BOTH END	Y	BOTH END
AC/DC ADAPTER	Y	MONITOR END	Y	MONITOR END
KEYBOARD	N	N/A	Y	PC END
MOUSE	N	N/A	Y	PC END
MODEM	N	N/A	Y	BOTH END
PRINTER	N	N/A	Y	BOTH END

3.5 Equipment Modifications

To achieve compliance to CLASS B levels, the following change(s) was made by ONETECH Corp. during compliance testing:

“There was no Modified items during EMI test”

3.6 Configuration of Test System

Line Conducted Test : The EUT was connected to personal computer and the personal computer was connected to LISN. All supporting equipments were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.4/1992 7.2.3 to determine the worse operating conditions.

Radiated Emission Test : Preliminary radiated emission test was conducted using the procedure in ANSI C63.4/1992 8.3.1.1 to determine the worse operating conditions. Final radiated emission test was conducted at 3 meters open area test site.

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4. PRELIMINARY TEST

4.1 AC Power line Conducted Emission Test

During Preliminary Test, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
Continuously scanned data input activity.	X

4.2 Radiated Emission Test

During Preliminary Test, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
Continuously scanned data input activity.	X

document property name.

5. FINAL RESULT OF MEASUREMENT

Preliminary test was done in normal operation mode. And the final measurement was selected for the maximized emission level

5.1 Conducted Emission Test

Humidity Level : 48 % Temperature : 19 °C
 Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.107
 Type of Test : CLASS B
 Result : PASSED BY -9.04 dB at 1.73 MHz

EUT : 4 Wire Analog Resistive Touch Screen Date: February 19, 2002
 Operating Condition : Continuously scanned data input activity.
 Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)

Power Line Conducted Emission			FCC CLASS B	
Frequency (MHz)	Amplitude (dBuV)	Conductor	Limit (dBuV)	Margin (dB)
1.12	37.86	HOT	48.00	-10.14
1.42	37.60	HOT	48.00	-10.40
1.73	38.96	HOT	48.00	-9.04
2.03	38.70	NEUTRAL	48.00	-9.30
4.88	37.61	NEUTRAL	48.00	-10.39
6.20	38.15	HOT	48.00	-9.85

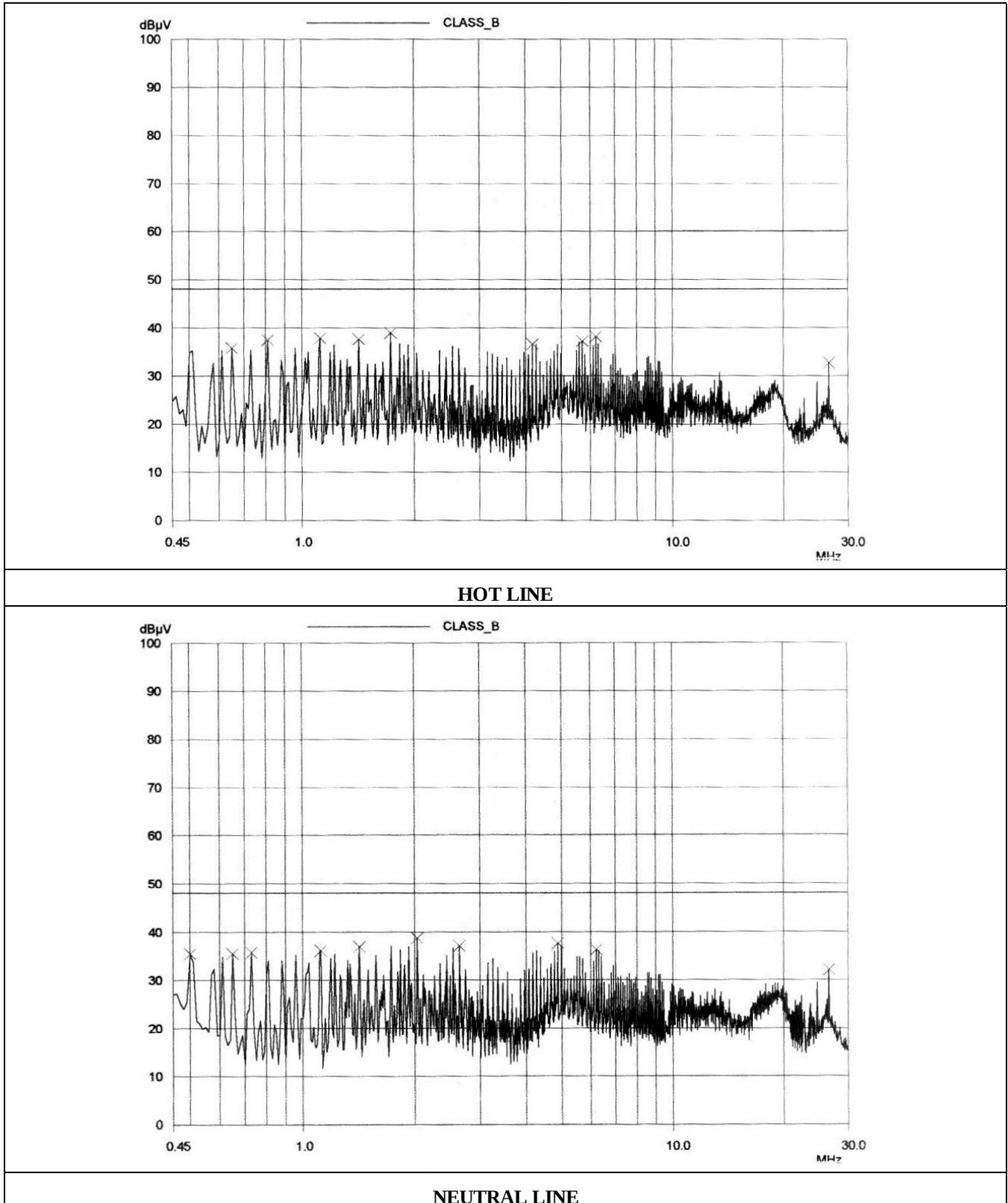
Line Conducted Emission Tabulated Data



Tested by: Sue-Yong, Lee / Test Engineer



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5.2 Radiated Emission Test

The following table shows the highest levels of radiated emission on both polarizations of horizontal and vertical.

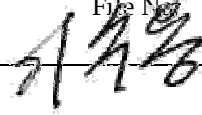
Humidity Level : 51 % Temperature : 16 °C
 Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.109
 Type of Test : CLASS B
 Result : PASSED BY -6.08 dB at 488.40 MHz

EUT : 4 Wire Analog Resistive Touch Screen Date: February 19, 2002
 Operating Condition : Continuously scanned data input activity.
 Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)
 Distance : 3 Meter

Radiated Emissions		Ant	Correction Factors		Total	FCC CLASS B	
Freq. (MHz)	Amp. (dBuV)	Pol.	Ant. (dBuV/m)	Cable (dB)	Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
66.85	16.00	V	8.38	1.00	25.38	40.00	-14.62
77.41	13.40	V	6.71	1.00	21.11	40.00	-18.89
121.65	8.50	H	13.25	1.24	22.99	43.50	-20.51
122.93	12.70	V	13.30	1.24	27.24	43.50	-16.26
144.03	11.20	V	13.29	1.33	25.82	43.50	-17.68
165.17	12.80	V	15.36	1.41	29.57	43.50	-13.93
167.10	12.80	V	15.48	1.42	29.70	43.50	-13.80
225.80	13.90	H	10.72	1.70	26.32	46.00	-19.68
230.80	15.70	H	10.94	1.73	28.37	46.00	-17.63
236.60	21.70	V	11.21	1.76	34.67	46.00	-11.33
239.80	18.80	H	11.35	1.78	31.93	46.00	-14.07
299.40	15.30	H	14.55	2.00	31.85	46.00	-14.15
320.20	16.10	V	14.30	2.12	32.52	46.00	-13.48
429.20	10.50	H	16.02	2.49	29.01	46.00	-16.99
488.40	19.90	H	17.38	2.64	39.92	46.00	-6.08

Radiated Emissions Tabulated Data

Remark: "H": Horizontal, "V": Vertical



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Tested by: Sue-Yong, Lee / Test Engineer

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6. FIELD STRENGTH CALCULATION

Meter readings are compared to the specification limit correcting for antenna and cable losses

$$\begin{aligned}
 &+ \text{ Meter reading} && (\text{dBuV}) \\
 &+ \text{ Cable Loss} && (\text{dB}) \\
 &+ \text{ Antenna Factor (Loss)} && (\text{dB/meter}) \\
 \hline
 &= \text{ Corrected Reading} && (\text{dBuV/meter}) \\
 &- \text{ Specification Limit} && (\text{dBuV/meter}) \\
 &= \text{ dB Relative to Spec} && (+/- \text{ dB})
 \end{aligned}$$

document property name.

7. LIST OF TEST EQUIPMENT

No.	EQUIPMENTS	MFR.	MODEL	SER. NO.	LAST CAL	DUE CAL	USE
1.	Test receiver	R/S	ESVS 10	827864/005	OCT/01	12MONTH	■
2.	Test receiver	R/S	ESHS 10	834467/007	APR/01	12MONTH	■
3.	Spectrum analyzer	HP	8568B	3109A05456	APR/01	12MONTH	■
4.	RF preselector	HP	85685A	3107A01264	APR/01	12MONTH	■
5.	Quasi-Peak Adapter	HP	85650A	3107A01542	APR/01	12MONTH	■
6.	Biconical antenna	EMCO	3104C	9109-4441 9109-4443 9109-4444	APR/01	12MONTH	■
7.	Log Periodic antenna	EMCO	3146	9109-3213 9109-3214 9109-3217	APR/01	12MONTH	■
8.	LISN	EMCO	3825/2	9109-1867 9109-1869	JUL/01	12MONTH	■
9.	Computer System	HP	98581C	98543A	N/A	N/A	■
	Hard disk drive		9153C	CMC762Z9153	N/A	N/A	■
10.	Position Controller	EMCO	1090	9107-1038	N/A	N/A	■
11.	Turn Table	EMCO	1080-1.21	9109-1576	N/A	N/A	■
12.	Antenna Master	EMCO	1070-1	9109-1624	N/A	N/A	■