

MEASUREMENT/TECHNICAL REPORT

ETL EMC LAB.

MODEL : IM-784F

This report concerns(check one) : Original grant Class change

Equipment type : COLOR MONITOR

Deferred grant requested per 47 CFR 0.457(d)(1)()? yes no

If yes, defer until:

agrees to notify the Commission by

of the intended date of announcement of the product so that the grant can be issued on that date.

Transition Rules Request per 15.37? yes no

If no, assumed Part 15, Subpart B for unintentional radiators - the new 47 CFR [10-1-91 Edition] provision.

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| ATTACHMENT A | ID Label / Location Info. |
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1. GENERAL INFORMATION

1.1 Product Description

| | |
|--|---|
| CHASSIS TYPE | PLASTIC |
| LIST OF EACH OSC. OR XTAL. FREQ.(FREQ. 1MHz) | MAX PIXEL CLOCK 202.5MHz X-TAL: 12MHz |
| CHIPSET BRAND AND PART NO. | WT62P1 938000H - WELTREND 843000 M52743ASP - WELTREND MTV030N-0 – MYSON 9950EHC072 – MYSON TDA4856 052640 – PHILIPS OSD 992602 – PHILIPS |
| POWER REQUIREMENT | 100 – 240 VAC 1.6A~0.8A 60/50 Hz |
| NUMBER OF LAYERS | MAIN BOARD 1 LAYER CRT B/D 2 LAYER SUB B/D: 1 LAYER |
| MAX. RESOLUTION | NON-INTERLACED (@ 93.6 kHz/75Hz) |
| H-SYNC FREQUENCY RANGE | 30 kHz 95 kHz |
| V-SYNC FREQUENCY RANGE | 50 Hz 150 Hz |
| TFT LCD SIZE | 17" LG M41QBF423X11 |
| VIDEO CONNECTOR TYPE | D-SUB 15-PIN |

1.2 Related Submittal(s) / Grant(s)

ORIGINAL SUBMITTAL ONLY

1.3 Tested System Details

The Model names for all equipment, plus descriptions used in the tested system (including inserted cards) are:

| DEVICE TYPE | MANUFACTURER | MODEL NUMBER | FCC ID / DoC | CONNECTED TO |
|---------------------|--------------|--------------|--------------|--------------|
| Color Monitor (EUT) | IMRI | IM-784F | OMNIM784F | HOST |
| PC(HOST) | H/P | VECTRA 500 | DoC | N/A |
| KEYBOARD | H/P | SKR-2133 | DoC | HOST |
| MOUSE | H/P | M-S34 | DZL211029 | HOST |
| PRINTER | H/P | C6410 | DoC | HOST |

1.4 Test Methodology

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

1.5 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data are located at the 584,SANGWHAL-RI,KANAM-MYUN, YOJU-KUN, KYOUNGKI-DO, 469-880,KOREA. The site is constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted by Commission.

2.SYSTEM TEST CONFIGURATION

2.1 Justification

The device was configured for testing in a typical fashion (as a customer would normally use it). During the tests, the following components and I/O cards inside the E.U.T were used.

| DEVICE TYPE | MANUFACTURE | MODEL/PART NUMBER |
|-------------|-------------|-------------------|
| M/N | D-TECH | FT79 |
| CRT | IMRI | REV. 1 |

2.2 EUT exercise Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The software, contained on a 3-1/2 inch disc, was inserted into drive A and is auto starting on power-up. Once loaded, the program sequentially exercises each system component in turn. The sequence used is :(1) Display test, (2) RS 232 test (3) Key board test,(4) Printer test,(5) FDD test,(6) HDD test. The complete cycle takes about 20 seconds and is repeated continuously. As the keyboard and mouse are strictly input devices, no data is transmitted to them during test. They are however, continuously scanned for data input activity. The video resolution modes setup and change program was used during the radiated and conducted emission testing.

2.3 Cable Description

| | Power Cord Shielded (Y/N) | I/O Cable Shielded (Y/N) | Length (M) |
|------------------------|------------------------------|-----------------------------|----------------|
| PC(HOST) | N | N/A | 1.5(P) |
| COLOR MONITOR (EUT) | N | Y | 1.5(P), 1.5(D) |
| PARALLEL | N | Y | 1.5(P), 1.5(D) |
| KEYBOARD | N/A | Y | 1.0(D) |
| SERIAL | N | Y | 1.5(P), 1.5(D) |
| MOUSE(PS/2) | N/A | Y | 1.8(D) |

The marked "(D)" means the Data Cable and "(P)" means the Power Cable.

2.4 Noise Suppression Parts on Cable.

| | Ferrite Bead (Y/N) | Location | Metal Hood (Y/N) | Location |
|------------------------|-----------------------|----------|---------------------|----------|
| PC(HOST) | N | N/A | N | N/A |
| COLOR MONITOR (EUT) | Y | PC END | Y | BOTH END |
| KEYBOARD | Y | N/A | Y | PC END |
| PARALLEL | N | N/A | Y | BOTH END |
| SERIAL | N | N/A | Y | N/A |
| MOUSE(PS/2) | N | N/A | Y | PC END |

2.5 Equipment Modifications

N/A

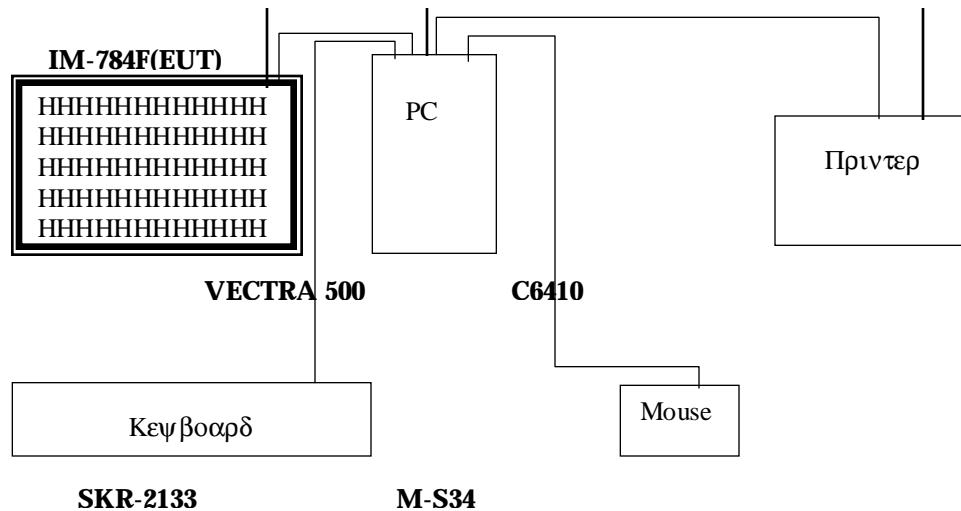
2.6 Configuration of Test system

Line Conducted Test : EUT was connected to LISN, all other supporting equipment were connected to another LISN.

Preliminary Power line Conducted Emission tests were performed by using the procedure in ANSI C63.4/1992 7.2.3 to determine the worse operating conditions.

Radiated Emission Test : Preliminary Radiated Emissions tests were conducted using the procedure in ANSI C63.4/1992 8.3.1.1 to determine the worse operating condition. Final Radiated Emission tests were conducted at 3 meter open area test site.

[Configuration of Tested System]



3. PRELIMINARY TESTS

3.1 AC Power line Conducted Emission Tests

During Preliminary Tests, the following operating mode were investigated

| Processor Speed (MHz) | Video Resolution (w/max) | The worst operating condition |
|-----------------------|--|-------------------------------|
| Pentium 75 MHz | 1600 x 1200 Non-Interlaced (93.7 KHz/75.0Hz) | X |
| Pentium 75 MHz | 1280 x 1024 Non-Interlaced (91.1 kHz/85.0Hz) | |
| Pentium 75 MHz | 800 x 600 Non-Interlaced (54.0 KHz/85.0Hz) | |
| Pentium 75 MHz | 640 x 480 Non-Interlaced (64.0 KHz/120.0Hz) | |

3.2 Radiated Emission Tests

During Preliminary Tests, the following operating mode were investigated

| Processor Speed (MHz) | Video Resolution (w/max) | The worst operating condition |
|-----------------------|--|-------------------------------|
| Pentium 75 MHz | 1600 x 1200 Non-Interlaced (93.7 KHz/75.0Hz) | X |
| Pentium 75 MHz | 1280 x 1024 Non-Interlaced (91.1 kHz/85.0Hz) | |
| Pentium 75 MHz | 800 x 600 Non-Interlaced (54.0 KHz/85.0Hz) | |
| Pentium 75 MHz | 640 x 480 Non-Interlaced (64.0 KHz/120.0Hz) | |

Tested by Yo Han, Park

Date : JULY 28, 2000

4. FINAL CONDUCTED AND RADIATED EMISSION TESTS SUMMARY

4.1 Conducted Emissions Tests

The following table shows the highest levels of conducted emissions on both polarization of hot and neutral line.

Humidity Level : 57% Temperature : 27
 Limit apply to : FCC CFR 47, PART 15, SUBPART B
 Type of Tests : CLASS B
 Date : JULY 26, 2000
 Result : PASSED BY 8.93 dB

EUT : COLOR MONITOR
 Operating Condition : 1600 X 1200 Non-Interlaced (Hf : 93.7KHz, Vf : 75Hz)
 Detector : CISPR Quasi-Peak (6 dB Bandwidth : 9 KHz)

| Power Line Conducted Emissions | | | FCC Class B | |
|--------------------------------|------------------|----------------------------|--------------|-------------|
| Frequency (MHz) | Amplitude (dBuV) | Polarization (Hot/Neutral) | Limit (dBuV) | Margin (dB) |
| 0.580 | 44.70 | NEUTRAL | 48 | -3.30 |
| 2.730 | 45.00 | NEUTRAL | 48 | -3.00 |
| 7.160 | 41.47 | HOT | 48 | -6.53 |
| 12.440 | 43.17 | HOT | 48 | -4.83 |
| 13.280 | 43.32 | NEUTRAL | 48 | -4.68 |
| 19.660 | 42.50 | HOT | 48 | -5.50 |
| 22.230 | 42.80 | HOT | 48 | -5.20 |

Line Conducted Emissions Tabulated Data

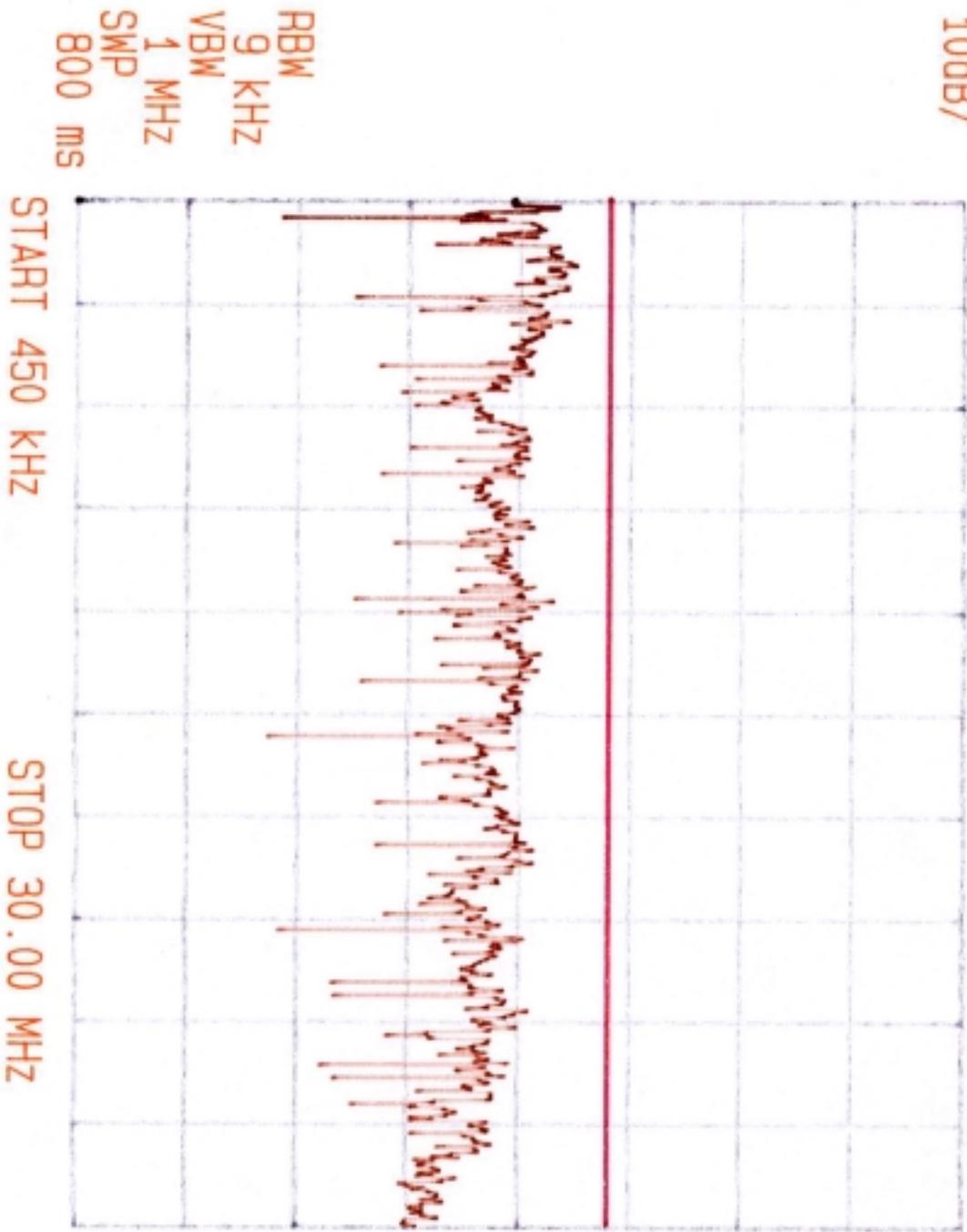
NOTE:

1. All video modes and resolutions were investigated and the worst-case emissions are reported
Other video modes & resolution were tested and found to be in compliance.
2. The limit for Class B device is 250 uV from 450 kHz to 30 MHz.

Measured by : Yo Han, Park / Engineer

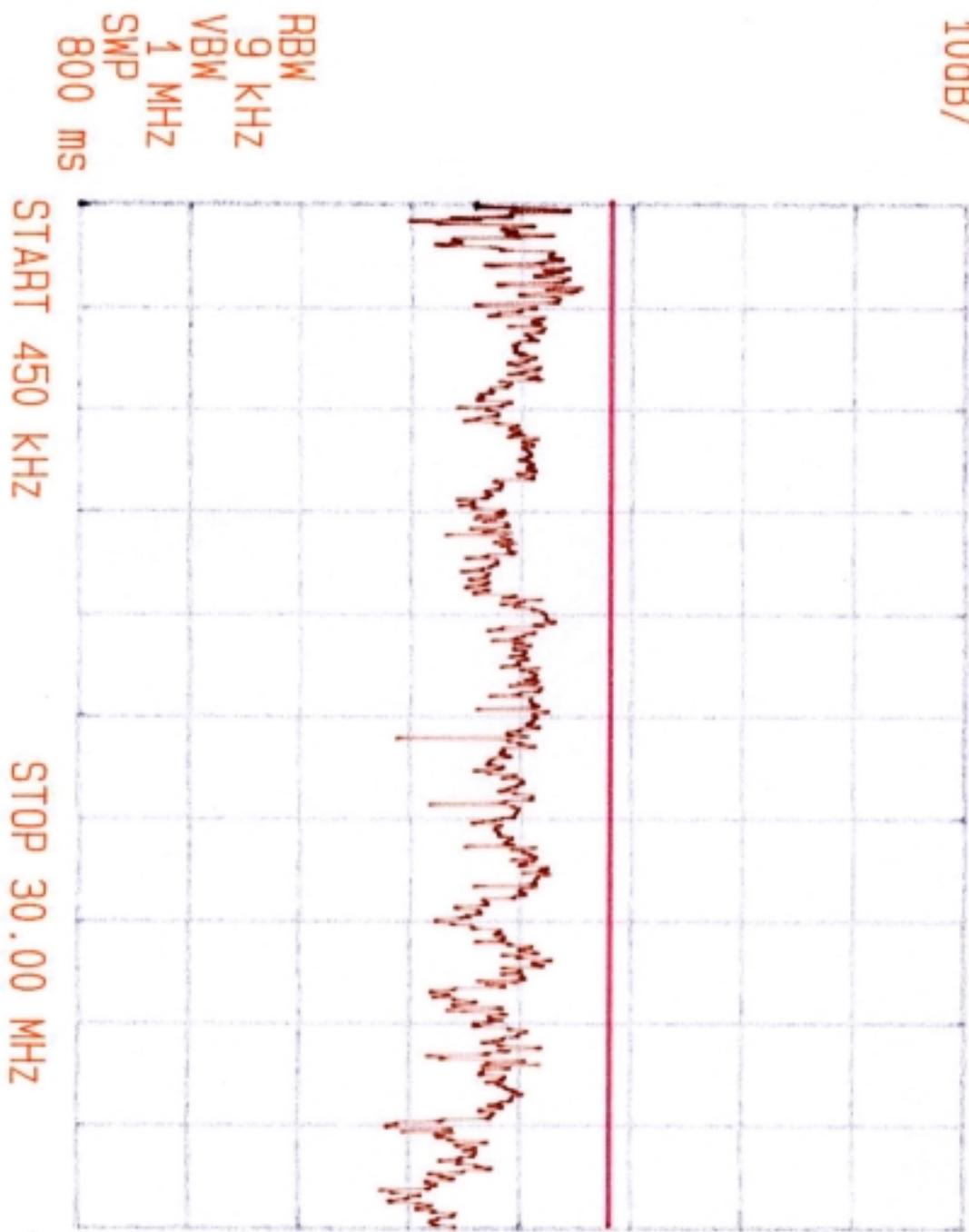
LINE POLARIZATION : HOT

CONDUCTED TEST/E-RAE. T.L
REF 80.0 dB μ V
10dB/
A_view B_view



LINE POLARIZATION : NEUTRAL

CONDUCTED TEST/E-RAE. T. L
REF 80.0 dB μ V
10dB/
A_view B_view



4.2 Radiated Emissions Tests

The following table shows the highest levels of Radiated Emissions on both polarization of horizontal and vertical.

Humidity Level : 50 % Temperature : 26
 Limit apply to : FCC CFR 47, PART 15, SUBPART B
 Type of Tests : CLASS B
 Date : JULY 27, 2000
 Result : PASSED BY 4.5 dB

EUT : COLOR MONITOR

Operating Condition : 1600X 1200 Non-Interlaced (Hf : 93.6 KHz, Vf : 75 Hz)

Detector : CISPR Quasi-Peak (6 dB Bandwidth : 120 KHz)

| Radiated Emissions | | Ant. | Correction Factors | Total | FCC Class B | |
|--------------------|-----------------|------|--------------------------------|-------------------|-------------------|----------------|
| Freq. (MHz) | Ampl. (dBuV) | Pol. | Antenna & Cable Loss (dB/m) | Ampl. (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
| 36.80 | 23.00 | V | 13.61 | 36.61 | 40.0 | -3.39 |
| 55.30 | 24.90 | V | 11.81 | 36.71 | 40.0 | -3.29 |
| 129.00 | 23.70 | H | 16.49 | 40.19 | 43.5 | -3.31 |
| 147.40 | 23.00 | H | 16.31 | 39.31 | 43.5 | -4.19 |
| 202.70 | 22.90 | H | 15.05 | 37.95 | 43.5 | -5.55 |
| 221.10 | 27.70 | H | 14.90 | 42.60 | 46.0 | -3.40 |
| 294.80 | 23.90 | H | 18.28 | 42.20 | 46.0 | -3.80 |
| 368.60 | 23.10 | H | 19.12 | 42.22 | 46.0 | -3.78 |
| 608.20 | 17.50 | H | 24.68 | 42.18 | 46.0 | -3.82 |
| 626.50 | 15.70 | H | 25.76 | 41.46 | 46.0 | -3.54 |

NOTE:

- 1.All video modes and resolutions were investigated and the worst-case emissions are reported.
- 2.Other video modes & resolution were tested and found to be in compliance.

Measured by : Yo Han, Park / Engineer

5. Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor.

The basic equation with a sample calculation is as follows:

$$\mathbf{FS = RA + AF + CF}$$

where FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor

CF = Cable Attenuation Factor

Assume a receiver reading of 24.90 dBuV is obtained. The Antenna Factor of 10.11 and a Cable Factor of 1.70 is added. The 36.71 dBuV/m value was mathematically converted to its corresponding level in uV/m.

$$\mathbf{FS = 24.90 + 10.11 + 1.70 = 36.71 \text{ dBuV/m}}$$

$$\mathbf{\text{Level in uV/m} = \text{Common Antilogarithm} [(36.71 \text{ dBuV/m})/20] = 68.47 \text{ uV/m}}$$