THRU Lab. & Engineering

FCC PART 15 CLASS B
EMI MEASUREMENT AND TEST REPORT

FOR

Darim Vision Co., Ltd.

Taejon Expo venture Town Visual Tech Bldg.
3-1 Doryong-dong, Yusung-gu,
Taejon,Korea (305-340)

Model Number :MG444

Issued Date: DEC 28, 2002
Report No.: THRU-F021228B

This Report Concerns:	Equipment Type:
☑ Original Report	MPEG Encoding Board.

Test Date: DEC 27, 2002

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Table of Contents

Table of Contents(cont'd)

EXHIBITS CONTANING:

1. General Information

1.1 Test Facility

The open area test site (OATS) used by Thru Lab. & Engineering to collect radiated and conducted emissions measurement data is located in the 389 JeArm-Rhi, HyangNam-Myun, HwaSung-Gun, KyungKi-Do, Korea.

Test sites at Thru Lab. & Engineering has been fully described in reports submitted to the Federal Communication Commission and the details of the reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules. The test facility also complies with the radiated and AC line conducted test site criterion in ANSI C63.4-1992. The Federal Communications Commission has the reports on file and is listed under Registration Number 92583. The scope of the accreditation covers the FCC Method - 47 CFR Part 15 or 18 of the Commission's Rules.

1.2 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-1992. All radiated and conducted emission measurements were performed at Thru Lab. & Engineering. The radiated testing was performed at an antenna-to-EUT distance of 10 meters for Class A devices and 3 meters for Class B devices.

1.3 Test Equipment List

Description	Model No.	Serial No.	Manufacturer	Cal. Due	Used
EMI Test Receiver	ESVS 10	830489/001	Rodhe&Schwarz	04/25/2003	RE
Biconical Antenna	94455-1	0977	Eaton	04/25/2003	RE
Log Periodic Antenna	3146	2051	EMCO	04/25/2003	RE
Spectrum Analyzer	8566B	2311A02394	Hewlett Packard	03/17/2003	RE
Spectrum Display	85662A	2542A12429	Hewlett Packard	03/17/2003	RE
Quasi-Peak Adapter	85650A	2521A00887	Hewlett Packard	03/17/2003	RE
RF Preselector	85685A	2648A00504	Hewlett Packard	03/17/2003	RE
Pre-Amplifier	8447D	1644A00978	Hewlett Packard	03/17/2003	
Horn Antenna	SAS-571	414	A.H. Systems	05/09/2003	
Dipole Antenna Set	TDA25/.1/.2	176/200/200	Electro Metrics	10/04/2003	
Signal Generator	SMS	872165/100	Rodhe&Schwarz	04/25/2003	
Spectrum Analyzer	R3261C	71720189	Advantest	04/25/2003	
LISN	KNW-242	8-923-2	Kyoritsu	N/A	
LISN	8012-50-R-24	8379121	Solar	N/A	
Plotter	7475A	2210A02802	Hewlett Packard	N/A	
Positioner Set	N/A	N/A	Dongsung Prec.	N/A	RE

1.4 Product Description for Equipment Under Test (EUT)

Darim Vision Co., Ltd's MG444 "EUT" as referred to in this report is Digital video security MPEG Encording Board. MG444 makes it possible to build up a digital video security system with ease using PC at home or small office. All the movement will be caught and recorded a high quality digital video by just connecting CCTV camera(or a camcorder or CCD camera)to the MG444 and run it,

MG444 adopted the sate-of-the-art algorithm that starts to record the video only when a motion is detected and compress it by high quality compression method(MPEG1)

Main Features of EUT are:

- Plug and Play
- Resolution 320x240, 160x120
- Capturing in MPEG 1 up to 15 Frame/sec
- Contrast, Hue, Saturation control
- 4 asynchronous NTSC/PAL

1.5 Support Equipment

Description	Model Number	Serial Number	Manufacturer	Remarks
Host Computer	ART586C	TRL0080730	Art Computer	ATX
MPEG Encoding Board.	MG444	-	Darim Vision Co., Ltd.	EUT
VGA Monitor	PN-17CT	P225HVER510534	Samsung Electronics	17"
Keyboard	BTC-5560	K71200885	BTC Korea	PS/2
Mouse	Mouse 2.0	02873445	Microsoft Corp.	PS/2
Printer	C2605	3221S66649	Hewlett Packard	300dpi
Modem	SM1200A1	71000230	Samsung Electronics	1200bps
Zip Drive	Z100USB	PSBL35F137	Iomega Corp.	USB
Pccamera	PST-320N	-	SinTech.	BNC
DC Adapter	JS-0960D	-	Qindao	9V

1.6 Host System Configuration

Description	Model Number	Serial Number	Manufacturer	Remarks
Power Supply	ST-250GL	S008016533	Seventeam Electronics	250W
Motherboard	Richmond AGP	LA700937	Sambo Computer	ATX
Video Card	PV-822	PV258729	Leotech	AGP
Hard Drive	PLS-31084A	JQXG917701	Samsung Electronics	30GB
Floppy Drive	SFD-321D/T	J2YD611113	Samsung Electronics	3.5"
CD-ROM Drive	SCR-831	63PH400104	Samsung Electronics	24X
CPU	Pentium MMX	none	Intel Corporation	233MHz
Memory	SDRAM	none	Samsung Electronics	128MB
Host Chassis	ART586C	TRL0080730	Art Computer	Middle Tower

1.7 External I/O Cabling

Description	Length (m)	Port/From	Port/To	Remarks
Video Cable	1.2	VGA/Host	Dsub/Monitor	Shielded
Keyboard Cable	1.8	Keyboard/Host	Keyboard	Shielded
Mouse Cable	2.0	Mouse/Host	Mouse	Shielded
Printer Cable	1.5	Parallel/Host	Printer/Centronics	Shielded
Modem Cable	2.0	Serial/Host	Modem/RS232	Shielded
USB Cable	1.0	USB/Host	Zip Drive/USB	Shielded
PC Camera	1.0	BNC/EUT	PC Camera/BNC	Shielded

2. System Test Configuration

2.1 Justification

The system was configured for testing in a typical fashion (as normally used by a typical user). The worst case conducted and radiated emissions are presented in section 3.5 and section 4.6 of this report.

The test was performed with a PC Camera for the final qualification test. It's connected to one of BNC ports provided by the EUT.

Video port (VGA/DB15), Keyboard/Mouse ports (PS/2), Parallel port (LPT/DB25), Serial port (COM/DB9),and USB port (Type A) provided by the host computer were also tested.

2.2 EUT Exercise

The EUT exercising program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The test software, supplied by the client, running on Windows 2000 operating system allowed watching Video programs.

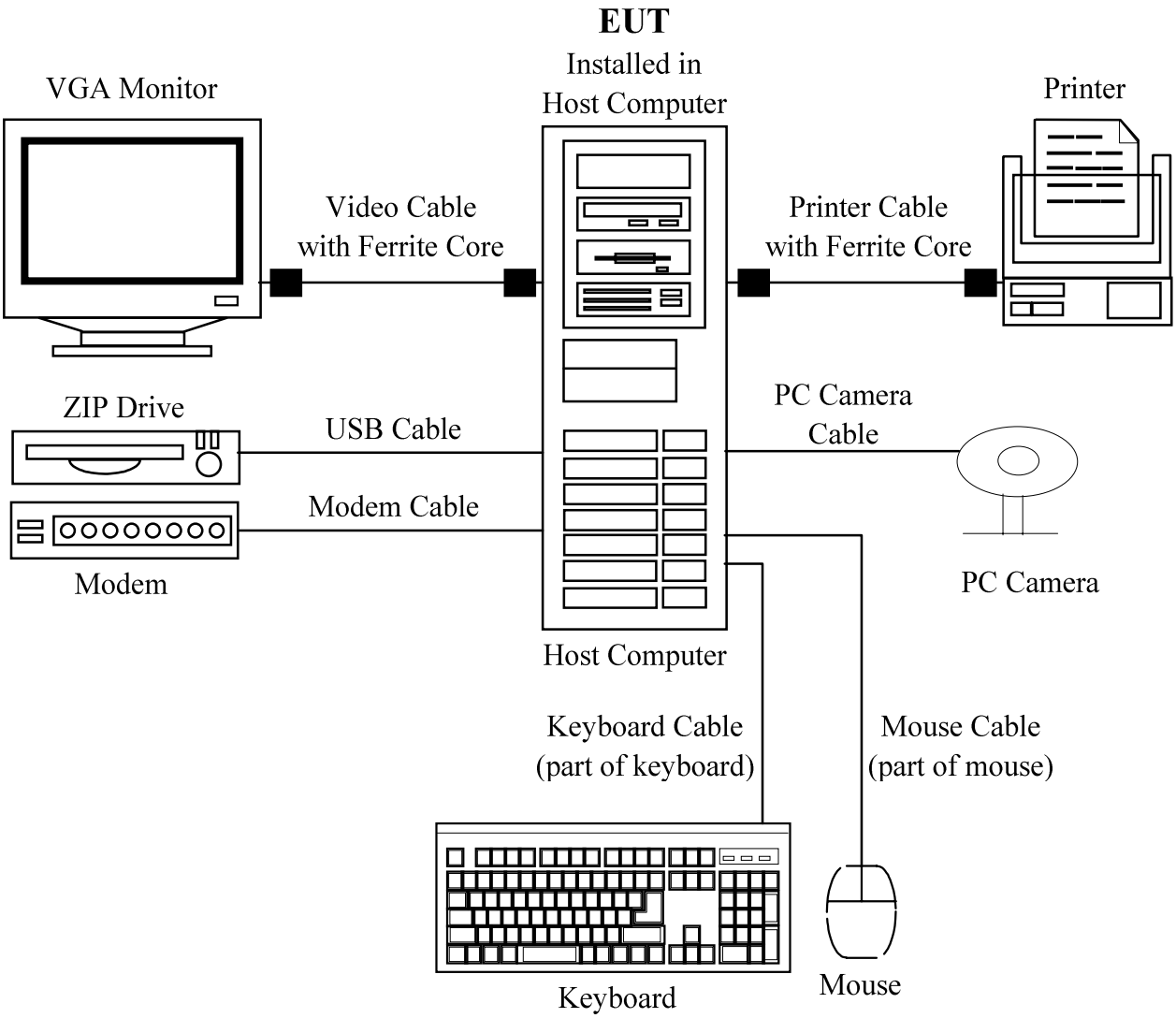
2.3 Special Accessories

As shown in section 2.5, all interface cables used for compliance testing are shielded as normally supplied or by use respective component manufacturers. The Printer, Modem and Monitor featured shielded metal connectors.

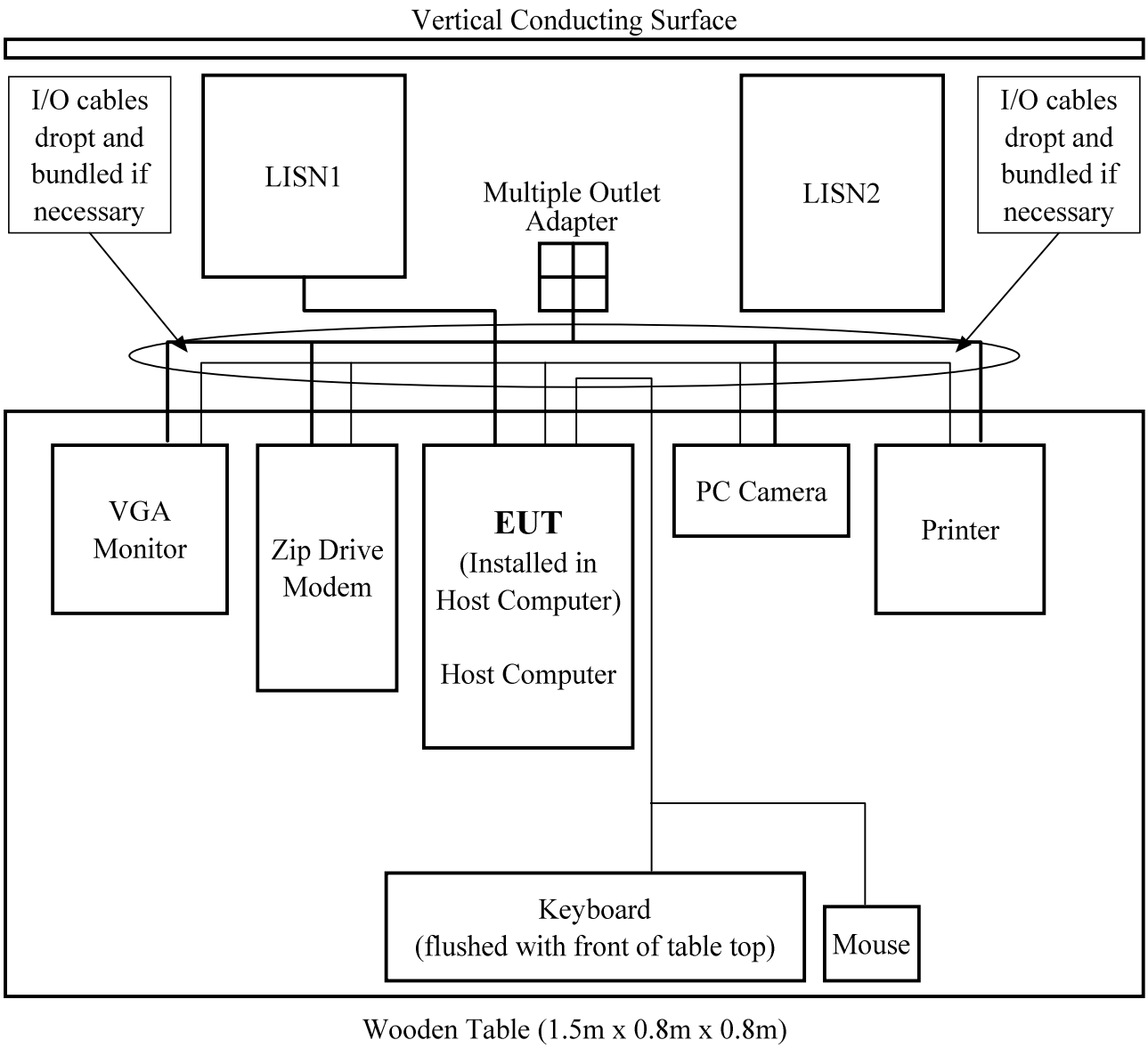
2.4 Schematics/Block Diagram

The EUT schematic or block diagram is presented in Appendix B as reference.

2.5 Configuration of Test System



2.6 Conducted Emission Test Setup Block Diagram



3. Conducted Emission Test

3.1 EUT Setup

The measurement was performed in the screen room of test site, using the setup in accordance with ANSI C63.4-1992 conducted emission measurement procedure.

The EUT was installed in a middle tower host computer. The host computer was placed on the center and back edge of the test table. The VGA monitor, modem, zip drive, placed on one side of the host computer with the printer and PC Camera on the other side. The rear of the host computer and all support equipments were flushed with the rear and sides of the tabletop. The keyboard was placed in front of the host computer, flushed with the front of the tabletop. The mouse was placed flushed with the back of the keyboard.

Spacing between the peripherals was approximately 10 centimeters.

3.2 Test Equipment Setup

The spectrum analyzer was configured during the conduction test in as follows:

Start Frequency	450kHz
Stop Frequency	30MHz
Resolution Bandwidth	9kHz
Sweep Time	Auto
Detector Mode	QP

3.3 Test Procedure

During the conducted emission test, the host computer power cord was connected to the auxiliary outlet of the LISN1 and all other peripherals power cords were connected to the multiple outlet adapter of the LISN2.

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance using all installation combination.

All data was recorded in the peak detection mode. Quasi-peak readings were only performed when an emission was found to be marginal (less than -4dBuV). Quasi-peak readings are distinguished with a "QP".

The conducted emission test was performed with EUT exercise program loaded, and the emissions were scanned between 0.45MHz to 30MHz on the LINE side and NEUTRAL side, herein referred to as L and N, respectively. The final test data for this test configuration is recorded in the table listed under section 3.5 of this report.

3.4 Summary of Test Results

According to the data in section 3.5, the EUT complied with the FCC Part 15 Class B standards, and had the worst margin reading of:

-11.8dB at 17.634MHz in the NEUTRAL side with the Seventeam Electronics, Model ST-250GL ATX power supply.

3.5 Conducted Emission Test Data

Line Conducted Emission				FCC Part15 Class B		
Frequency (MHz)	Amplitude (dBuV)	Detector Qp/Ave/Peak	Phase Line/Neutral	Limit (dBuV/m)	Limit (uV/m)	Margin (dB)
0.463	30.2	QP	H	48.0	250	-17.8
0.503	30.0	QP	N	48.0	250	-18.0
0.600	30.1	QP	H	48.0	250	-17.9
0.603	33.0	QP	N	48.0	250	-15.0
0.794	26.4	QP	H	48.0	250	-21.6
0.857	31.5	QP	H	48.0	250	-16.5
1.094	29.9	QP	H	48.0	250	-18.1
1.794	37.1	QP	N	48.0	250	-10.9
2.483	34.8	QP	H	48.0	250	-13.2
17.634	36.2	QP	H	48.0	250	-11.8
24.334	25.4	QP	N	48.0	250	-22.6
25.916	25.8	QP	H	48.0	250	-22.2

3.6 Plot of Conduc25.4ted Emission Test Data

Plot(s) of conducted emission test data for the Seventeam Electronics, Model ST-250GL ATX power supply is presented in Appendix A of this report as reference.

4. Radiated Emission Test

4.1 EUT Setup

The radiated emission tests were performed in the open area test site, using the setup in accordance with ANSI C63.4-1992 radiated emission measurement procedure.

The host computer was placed on the center of the test table. The VGA monitor and all peripherals were place on the test table same as section 3.1.

Spacing between the peripherals was approximately 10 centimeters.

4.2 Test Equipment Setup

During the radiated emission test, the EMI test receiver was set with the following configurations:

Start Frequency	30MHz
Stop Frequency	1000MHz
IF Bandwidth	120kHz
Sweep Time	10msec
Detector Mode	QP

4.3 Test Procedure

For the radiated emission test, the host computer and all support equipments power cords was connected to the AC floor outlet.

Maximizing procedure was performed on the six (6) highest emissions to verify that the EUT complied with all installation combination.

The radiated emission test was performed with EUT exercise program loaded, and the emissions were scanned between 30MHz to 1000MHz. At each frequency, the EUT was rotated 360 degrees, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum emission levels. Measurements were taken using both HORIZONTAL and VERTICAL antenna polarization. The final test data for this test configuration is recorded in the table listed under section 4.6 of this report.

4.4 Corrected Amplitude and Margin Calculation

The Corrected Amplitude is calculated by adding the antenna and cable Correction Factor from the Indicated Amplitude reading. The basic equation is as follows:

Corrected Amplitude = Indicated Amplitude + Antenna Factor + Cable Factor

The Margin column of the data table in section 4.6 indicates the degree of compliance with the applicable limit. The equation for margin calculation is as follows:

Margin = Corrected Amplitude - Applicable Limit

4.5 Summary of Test Results

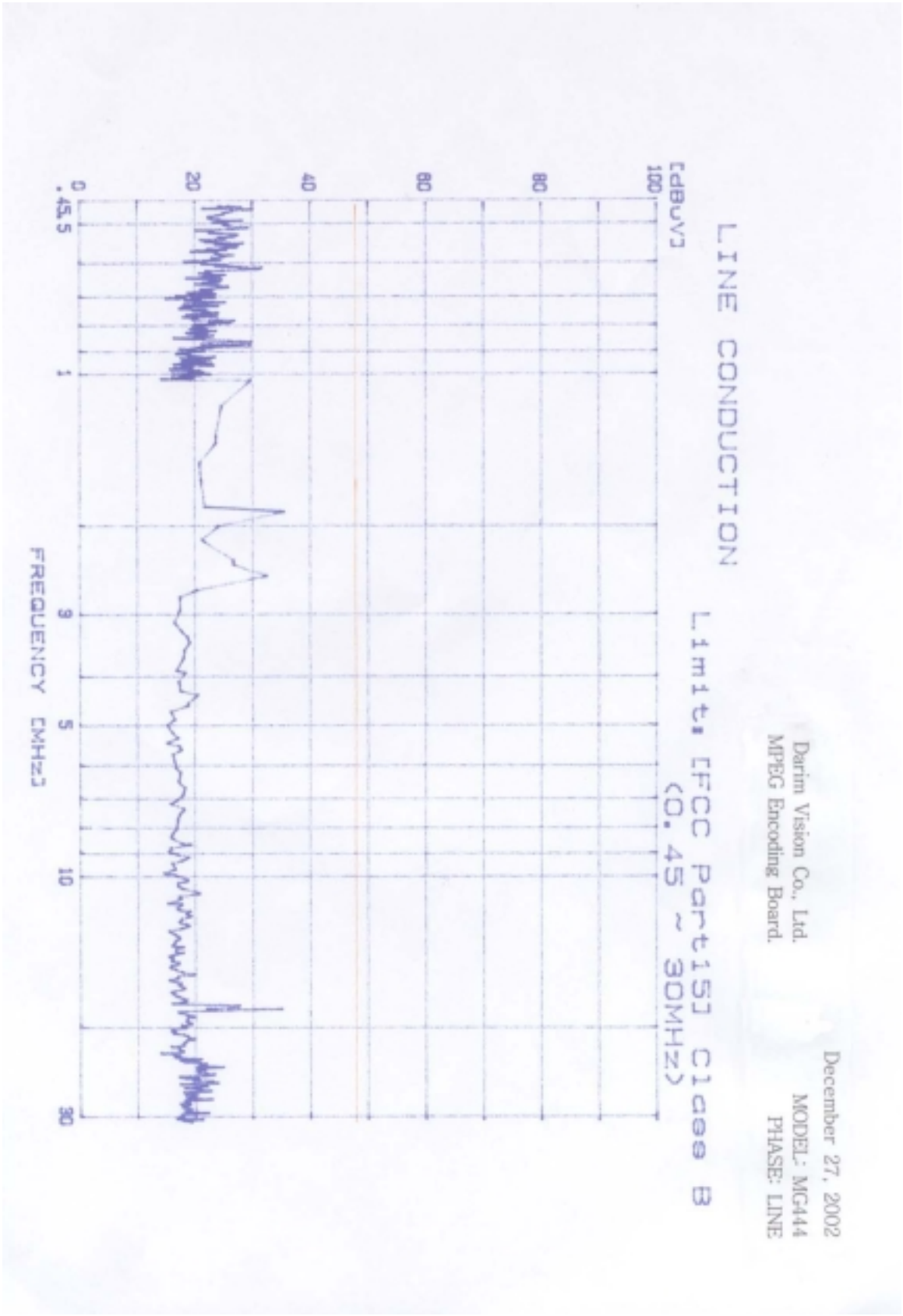
According to the data in section 4.6, the EUT complied with the FCC Part 15 Class B standards, and had the worst margin of:

-3.9dB at 295.8780MHz in the HORIZONTAL polarization at an antenna-to-EUT distance of 3 meters.

4.6 Radiated Emission Test Result Data

Indicated		Antenna		Table	Correction Factor		Corrected Amplitude	FCC Part15 Class B		
Freq. (MHz)	Ampl. (dBuV/m)	Polar. (H/V)	Height (m)	Angle (deg.)	Ant. (dB)	Cable (dB)	(dBuV/m)	Applicable Limit (dBuV/m)	Applicable Limit (uV/m)	Margin (dB)
32.119	14.9	H	3.1	130	13.0	0.7	28.6	40.0	100	-11.4
40.135	18.6	H	3.5	200	12.8	0.8	32.2	40.0	100	-7.8
51.614	11.8	H	4.0	210	10.3	1.0	23.1	40.0	100	-16.9
64.240	16.5	H	2.8	270	6.6	1.2	24.3	40.0	100	-15.7
77.438	14.6	H	2.7	300	7.4	1.3	23.3	40.0	100	-16.7
80.302	22.7	V	1.6	100	8.1	1.3	32.1	40.0	100	-7.9
137.737	7.6	H	2.4	130	14.5	2.0	24.1	43.5	150	-19.4
144.012	5.9	H	2.6	230	15.7	2.1	23.7	43.5	150	-19.8
171.812	16.2	H	3.0	280	15.8	2.3	34.3	43.5	150	-9.2
190.904	14.5	H	2.5	310	13.8	2.4	30.7	43.5	150	-12.8
199.256	10.7	H	3.3	180	16.0	2.5	29.2	43.5	150	-14.3
209.988	23.2	H	2.9	90	10.8	2.6	36.6	43.5	150	-6.9
295.878	21.9	V	1.0	30	16.8	3.4	42.1	46.0	200	-3.9
324.536	20.0	H	2.4	120	16.2	3.6	39.8	46.0	200	-6.2
343.610	20.2	H	3.1	160	15.4	3.8	39.4	46.0	200	-6.6
400.890	18.2	H	3.0	200	15.5	4.2	37.9	46.0	200	-8.1
448.614	13.8	H	2.9	190	16.4	4.5	34.7	46.0	200	-11.3
778.336	10.7	H	1.9	100	21.1	6.6	38.4	46.0	200	-7.6

Appendix A - Plot of Conducted Emission Test Data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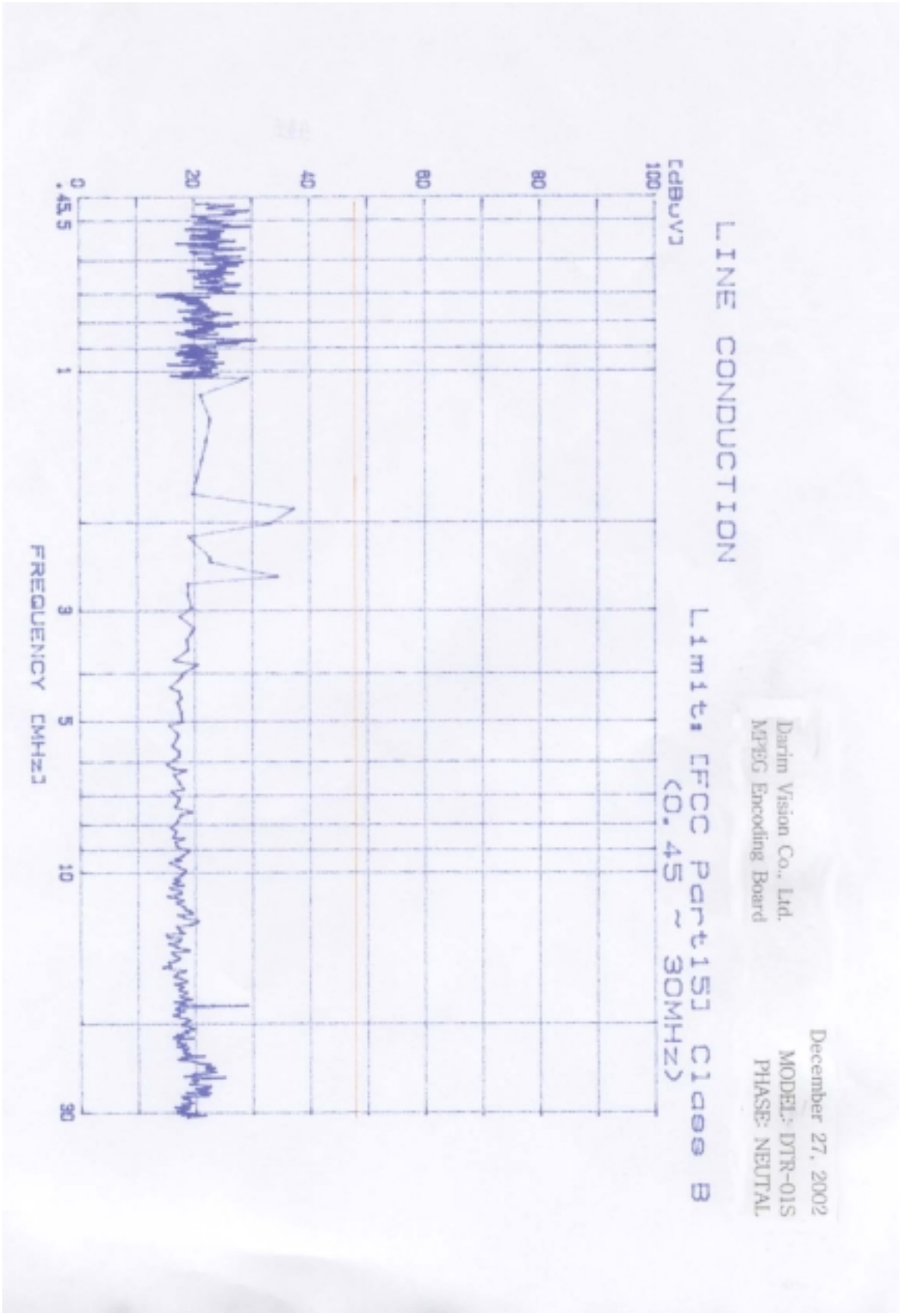
Darim Vision Co., Ltd.
MPEG Encoding Board.
December 27, 2002
MODEL: MG444
PHASE: LINE
[dBuV]
100
80
60
40
20
0
.45
.5
1
5
9
10
30
FREQUENCY [MHz]


LINE CONDUCTION
Limits (FCC Part15J Class B
(0.45 ~ 30MHz)
Darim Vision Co., Ltd.
MPEG Encoding Board
December 27, 2002
MODEL: DTR-01S
PHASE: NEUTAL
[dBuV]
100
80
60
40
20
0
.45
.5
1
3
5
10
30
FREQUENCY [MHz]