

EMC/IMMUNITY TEST REPORT

REPORT NO. : F87030608

MODEL NO. : CL500A

DATE OF TEST : Mar. 13, 1998



誠信科技股份有限公司

ADVANCE DATA TECHNOLOGY CORP.



EMC

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MODEL NO. : CL500A
DATE OF TEST : Mar. 13, 1998

PREPARED FOR: APAC MULTIMEDIA CORP.

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1. CERTIFICATION

Issue Date: June 4, 1998

Product : VGA CARD
Trade Name : APAC
Model No. : CL500A
Applicant : APAC MULTIMEDIA CORP.
Standard : FCC Part 15, Subpart B, Class B
ANSI C63.4-1992
CISPR 22: 1993 +A1+A2

We hereby certify that one sample of the designation has been tested in our facility on Mar. 13, 1998. The test record, data evaluation and Equipment Under Test (EUT) configurations represent herein are true and accurate representation of the measurements of the sample's EMC characteristics under the conditions herein specified.

The test results show that the EUT as described in this report is in compliance with the Class B limits of conducted and radiated emission of applicable standards

PREPARED BY: Sharon Hsiung, DATE: 6/4/98
(Sharon Hsiung)

TESTED BY: Alan Chang, DATE: 6/4/98
(Alan Chang)

APPROVED BY: Mike Su, DATE: 6/4/98
(Mike Su)

ADVANCE DATA TECHNOLOGY CORPORATION

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2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product	:	VGA CARD
Model No.	:	CL500A
Power Supply	:	DC (from PC)
Data Cable	:	N/A

Note: The EUT is a high-performance 64-bit 3D graphics card that supports PCI 2.1 interface. It incorporates integral True-Color 230MHz RAMDAC and supports 4MB/8MB frame buffer, using SGRAM.

For more detailed features, please refer to ATTACHMENT 1 - TECHNICAL DESCRIPTION OF EUT and User's Manual.



2.2 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories are used to form representative test configuration during the tests.

No	Product	Brand	Model No.	Serial No.	I/O Cable
1	PERSONAL COMPUTER	NTI	PII-233	P201095	Nonshielded Power (1.8m)
2	MONITOR	ADI	PD-959	730020U00100274	Shielded Signal (1.2m) Nonshielded Power (1.8m)
3	PRINTER	HP	2225C+	9236S56294	Shielded Signal (1.2m)
4	MODEM	DATATRONICS	1200CK	07-503066	Shielded Signal (1.2m)
5	MOUSE	COMPAQ	M-S34	LZA61013727	Shielded Signal (1.8m)
6	KEYBOARD	ACER	6311	K6353249710	Shielded Signal (1.8m)

2.3 TEST METHODOLOGY AND CONFIGURATION

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 10 m on an open area test site.

Please refer to the photos of test configuration in Item 5.



3. TEST INSTRUMENTS

3.1 TEST INSTRUMENTS (EMISSION)

RADIATED EMISSION MEASUREMENT

Description & Manufacturer	Model No.	Serial No.	Calibrated until
HP Spectrum Analyzer	8590L	3544A00941	Dec. 14, 1998
HP Pre-Amplifier	8447D	2944A08312	Sept. 10, 1998
HP Preamplifier	8347A	3307A01088	Sept. 4, 1998
R&S Receiver	ESVS10	844591/010	Sept. 23, 1998
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 28, 1998
CHASE BiLOG Antenna	CBL6111A	1500	Sept. 12, 1998
EMCO Double Ridged Guide Antenna	3115	9312-4192	March 21, 1998
EMCO Turn Table	1060-04	1196	N/A
EMCO Tower	1051	1264	N/A
Open Field Test Site	Site 1	ADT-R01	Sept. 5, 1998

Note: 1. The measurement uncertainty is less than +/- 3dB, which is calculated as per NAMA's document NIS81.

2. The calibration interval of the above test instruments is 12 months.
And the calibrations are traceable to NML/ROC and NIST/USA.

CONDUCTED EMISSION MEASUREMENT

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ROHDE & SCHWARZ Test Receiver	ESH3	893495/006	July 23, 1998
ROHDE & SCHWARZ Spectrum Monitor	EZM	893787/013	July 24, 1998
ROHDE & SCHWARZ Artificial Mains Network	ESH3-Z5	839135/006	Aug. 1, 1998
EMCO-L.I.S.N.	3825/2	9204-1964	July 22, 1998
Shielded Room	Site 2	ADT-C02	N/A

Note: 1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per NAMA's document NIS81.

2. The calibration interval of the above test instruments is 12 months.
And the calibrations are traceable to NML/ROC and NIST/USA.



3.2 LIMITS OF CONDUCTED AND RADIATED EMISSION

LIMIT OF RADIATED EMISSION OF CISPR 22

FREQUENCY (MHz)	Class A (at 10m)	Class B (at 10m)
	dBuV/m	dBuV/m
30 - 230	40	30
230 - 1000	47	37

LIMIT OF RADIATED EMISSION OF FCC PART 15, SUBPART B FOR FREQUENCY ABOVE 1000 MHz

FREQUENCY (MHz)	Class A (at 10m)		Class B (at 3m)	
	uV/m	dBuV/m	uV/m	dBuV/m
Above 1000	300	49.5	500	54.0

- Note: (1) The lower limit shall apply at the transition frequencies.
- (2) Emission level (dBuV/m) = 20 log Emission level (uV/m).
- (3) All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

LIMIT OF CONDUCTED EMISSION OF CISPR 22

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

- Note: (1) The lower limit shall apply at the transition frequencies.
- (2) The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz
- (3) All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.



4. TEST RESULTS (EMISSION)

4.1 RADIO DISTURBANCE

Frequency Range : 0.15 - 30 MHz (Conducted Emission)
30 - 2000 MHz (Radiated Emission)
Input Voltage : 120 Vac, 60 Hz
Temperature : 29 °C
Humidity : 58 %
Atmospheric Pressure : 1060 mbar

TEST RESULT	Remarks
PASS	Minimum passing margin of conducted emission: -13.2 dB at 0.154 MHz Minimum passing margin of radiated emission: -3.1 dB at 202.53 MHz

Note: The EUT was pretested under the following resolution & horizontal synchronization speed mode:

- * 1600x1200 mode (93.7kHz)
- * 1280x1024 mode (91.1kHz)
- * 640x480 mode (31.5kHz)

The worst emission levels were found in 1600x1200 (93.7kHz) mode and the data of only this mode is recorded in this report.

4.1.1 EUT OPERATION CONDITION

1. Turn on the power of all equipments.
2. PC runs a test program to enable all functions of EUT.
3. PC reads and writes from HDD and FDD.
4. PC sends "H" messages to monitor and monitor displays them on screen.
5. PC sends messages to printer, then printer prints them on paper.
6. PC sends messages to modem.
7. Repeat steps 3-7.



4.2 TEST DATA OF CONDUCTED EMISSION

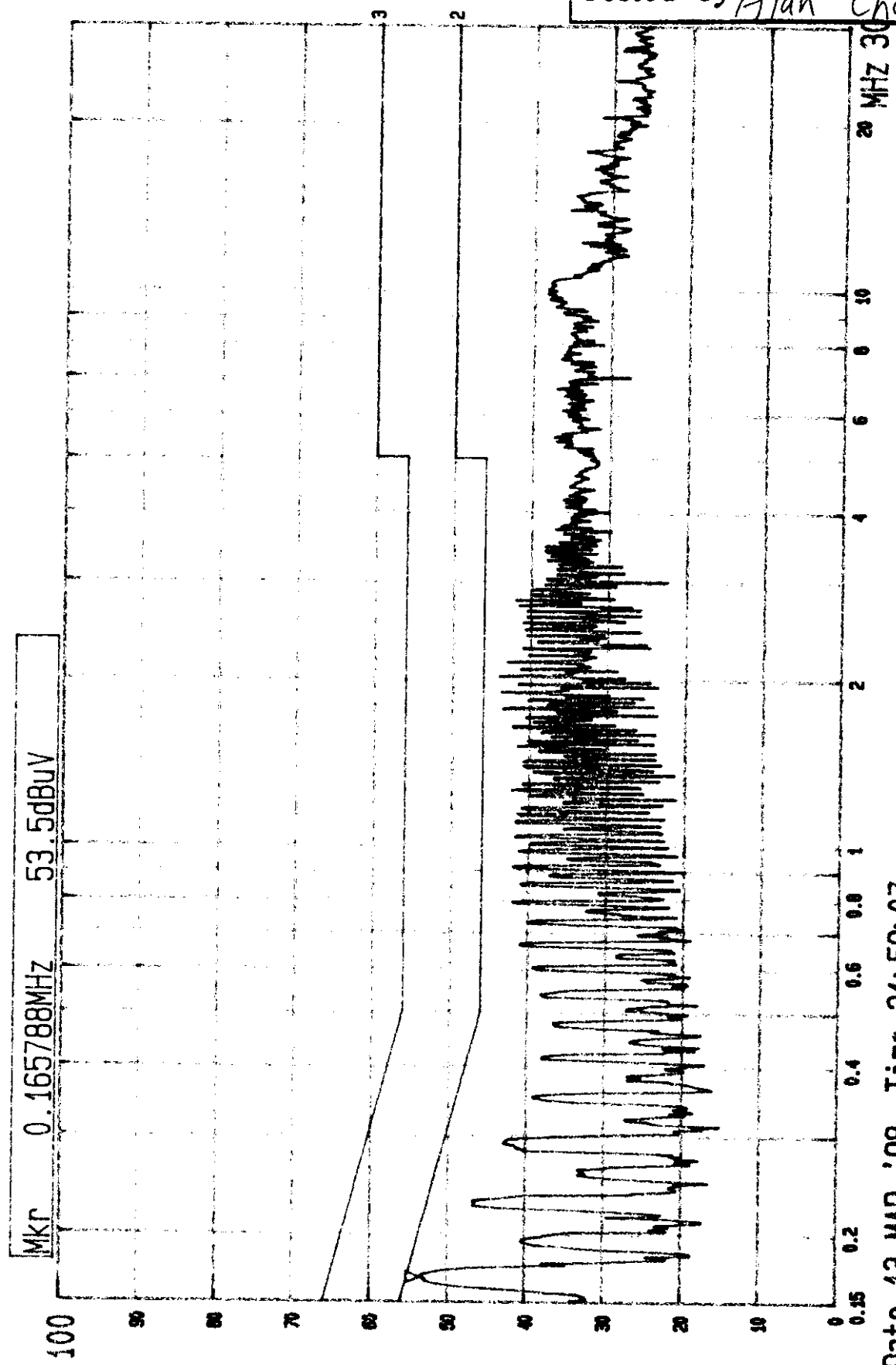
EUT: VGA CARDMODEL: CL500AMODE: 1600x1200 (93.7kHz)

6 dB Bandwidth: 10 kHz

TEST PERSONNEL: *Alan Chang*

Freq. [MHz]	L Level		N Level		Limit		Margin [dB (μV)]			
	[dB (μV)]		[dB (μV)]		[dB (μV)]		L		N	
	QP	AV	QP	AV	QP	AV	QP	AV	QP	AV
0.154	52.50	-	42.00	-	65.74	55.74	-13.2	-	-23.7	-
0.281	41.90	-	35.00	-	60.76	50.76	-18.9	-	-25.8	-
0.660	38.40	-	31.30	-	56.00	46.00	-17.6	-	-24.7	-
1.506	39.00	-	32.10	-	56.00	46.00	-17.0	-	-23.9	-
6.468	31.40	-	27.20	-	60.00	50.00	-28.6	-	-32.8	-
14.811	30.80	-	30.00	-	60.00	50.00	-29.2	-	-30.0	-

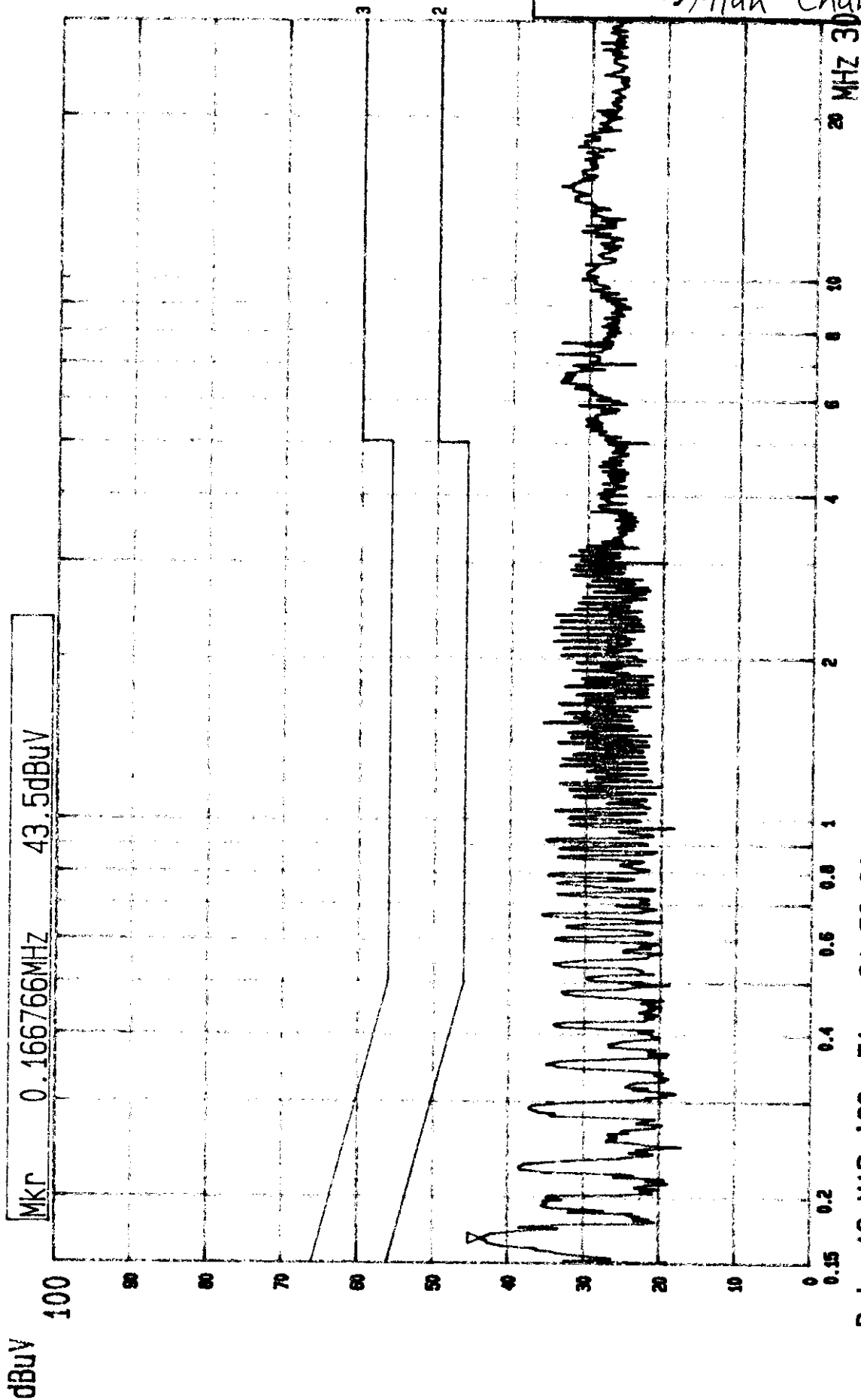
- Remarks:
1. "*": Undetectable
 2. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 3. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 4. The emission level of other frequencies were very low against the limit.
 5. Margin value = Emission level - Limit value



ADT CORP.
LISN: L

(PEAK VALUE)

---- Date 13.MAR.'98 Time 21:59:07
CISPR 22 CLASS B CONDUCTION TEST
MODEL: CL500A 1600X1200 93.7K 75HZ



ADT CORP.
LISN: N

(PEAK VALUE)

--- Date 13.MAR.'98 Time 21:52:30
CISPR 22 CLASS B CONDUCTION TEST
MODEL: CL500A 1600X1200 93.7K 75Hz



4.3 TEST DATA OF RADIATED EMISSION

EUT: **VGA CARD** MODEL: **CL500A** MODE: **1600x1200 (93.7 kHz)**

ANTENNA: CHASE BILOG CBL 6111A/EMCO Horn 3115

POLARITY: Horizontal

DETECTOR FUNCTION AND BANDWIDTH: Quasi peak, 120 kHz (30-1000 MHz)
Peak, 1 MHz (1000 MHz-2000 MHz)

FREQUENCY RANGE: 30-1000 MHz MEASURED DISTANCE: 10 M

FREQUENCY RANGE: 1000-2000 MHz MEASURED DISTANCE: 3 M

TEST PERSONNEL: *Alan Chang*

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
202.49	12.9	1.6	14.5	30.0	-15.5
263.28	16.0	5.6	21.6	37.0	-15.4
303.79	17.8	7.2	25.0	37.0	-12.0
465.78	23.4	7.0	30.4	37.0	-6.6
507.46	24.3	1.9	26.2	37.0	-10.8
567.01	26.01	1.9	28.0	37.0	- 9.0

- REMARKS :
1. Emission level (dBuV/m) = Correction Factor(dB/m) + Meter Reading (dBuV).
 2. Correction Factor(dB/m) = Ant. Factor(dB/m)+Cable loss(dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level - Limit value



TEST DATA OF RADIATED EMISSION

EUT: VGA CARD MODEL: CL500A MODE: 1600x1200 (93.7 kHz)

ANTENNA: CHASE BILOG CBL 6111A/EMCO Horn 3115

POLARITY: Vertical

DETECTOR FUNCTION AND BANDWIDTH: Quasi peak, 120 kHz (30-1000 MHz)
Peak, 1 MHz (1000 MHz-2000 MHz)

FREQUENCY RANGE: 30-1000 MHz MEASURED DISTANCE: 10 M

FREQUENCY RANGE: 1000-2000 MHz MEASURED DISTANCE: 3 M

TEST PERSONNEL: Alan Chang

Frequency (MHz)	Correction Factor (dB/m)	Reading Data dBuV	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
202.53	13.9	13.0	26.9	30.0	-3.1
263.27	17.8	8.2	26.0	37.0	-11.0
303.78	18.4	8.3	26.7	37.0	-10.3
405.02	22.4	4.7	27.1	37.0	-9.9
465.79	23.2	6.9	30.1	37.0	-6.9
506.29	24.4	3.9	28.3	37.0	-8.7
567.02	26.3	4.0	30.3	37.0	-6.7
607.55	26.5	2.2	28.7	37.0	-8.3

- REMARKS :
1. Emission level (dBuV/m) = Correction Factor(dB/m) + Meter Reading (dBuV).
 2. Correction Factor(dB/m) = Ant. Factor(dB/m)+Cable loss(dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level - Limit value



6. ATTACHMENT 1 - TECHNICAL DESCRIPTION OF EUT

Specifications:

Software Drivers	Resolution Supported	No. of Colors
Microsoft® Windows™	640 × 480, 800 × 600, 1024 × 768, 1280 × 1024, 1600 × 1200	256 (8 bit)
Microsoft® DCI Provider (display control interface).	640 × 480, 800 × 600, 1024 × 768, 1280 × 1024	65,536 (16 bit)
Microsoft® Windows® 95,	640 × 480, 800 × 600, 1024 × 768	16.8 million (24 bit)
Microsoft® DirectDraw™,	640 × 480, 800 × 600, 1024 × 768	16.8 million (32 bit)
Microsoft® Direct3D™	640 × 480, 800 × 600, 1024 × 768	16.8 million (32 bit)
Microsoft® Windows NT™	640 × 480, 800 × 600, 1024 × 768, 1280 × 1024, 1600 × 1200	256 (8 bit)
	640 × 480, 800 × 600, 1024 × 768, 1280 × 1024	65,536 (16 bit)
	640 × 480, 800 × 600, 1024 × 768	16.8 million (24 bit)
	640 × 480, 800 × 600, 1024 × 768	16.8 million (32 bit)
AutoCAD®, AutoShade® with Renderman™, 3D Studio™, MicroStation®	640 × 480, 800 × 600, 1024 × 768, 1280 × 1024, 1600 × 1200	256 (8 bit)
	640 × 480, 800 × 600, 1024 × 768, 1280 × 1024	65,536 (16 bit)
	640 × 480, 800 × 600, 1024 × 768	16.8 million (24 bit)
OS/2® v3.x, Warp	640 × 480, 800 × 600, 1024 × 768, 1280 × 1024	256 (8 bit)
	640 × 480, 800 × 600, 1024 × 768	65,536 (16 bit)
VPM™ (video port manager)	Resolution-independent	—
Apple™ PowerMAC®	640 × 480, 800 × 600, 1024 × 768, 1280 × 1024	16.8 million