Test Report
Application for Certification
On Behalf Of

Great Computer Corp.

LaserPro MERCURY

Model Number : L-100, L-50, L-30, L-25, L-12

FCC ID: LO4MERCURY

Prepared for :
Great Computer Corp.
4F., No. 236, Fu-Te 2nd Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

Report By : Global EMC Standard Tech. Corp.
No.3 Pau-Tou-Tsuo Valley, Chia-Pau Tsuen, Lin Kou Hsiang, Taipei County, Taiwan, R.O.C.
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1. Test Report Certification

Applicant : **Great Computer Corp.**

Manufacturer : **Great Computer Corp.**

EUT Description : **LaserPro MERCURY**

(A) Model Number : L-100, L-50, L-30, L-25, L-12
(B) Serial Number : L-100:E09104, L-50:C09102
(C) FCC ID : LO4MERCURY
(D) Tested Power Supply : 110V/60Hz

MEASUREMENT PROCEDURE USED :

☒ CFR 47, Part 15 Radio Frequency Device Subpart B Unintentional Radiators Class **B** :1996
☐ CISPR 22 Limits and methods of measurement of radio disturbance characteristics of information technology equipment: 1993
☒ ANSI C63.4 Methods of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9kHz to 40GHz. :1992

THE MEASUREMENT SHOWN IN THE ATTACHMENT WERE MADE IN ACCORDANCE WITH THE PROCEDURES INDICATED, AND THE MAXIMUM ENERGY EMITTED BY THE EQUIPMENT WAS FOUND TO BE WITHIN THE ABOVE LIMITS APPLICABLE.

Sample Received Date : Feb. 04, 2000
Final Test Date : Feb. 24, 2000
Documented by : Betty Tseng

Test Engineer : Jeff Chen
JEFF CHEN

Approve & Authorized Signer :
TERRY CHUNG

This test data shown below is traceable to National or international standard such as NIST/USA, etc.
The laboratory's NVLAP accreditation in no way constitutes or implies product certification, approval, or endorsement by NVLAP or the United States government.

2. General Information

2.1 Production Description

Description : LaserPro MERCURY

Model Number : L-100, L-50, L-30, L-25, L-12

Serial Number : L-100:E09104, L-50:C09102

Applicant : Great Computer Corp.

Address : 4F., No. 236, Fu-Te 2nd Rd., Hsiis Chih, Taipei Hsien, Taiwan, R.O.C.

Manufacturer : Great Computer Corp.

Address : 4F., No. 236, Fu-Te 2nd Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

Power Cord : Non-Shielded, Detachable, 1.5m, 3pin.

Power Supply : 100-240Vac.

2.2 Results:

The EUT(s) met the FCC Part 15 Class B requirements.
This Class B digital apparatus complies with Canadian ICES-003.
The Worst Emission data was found as following,

	Worst Emission Frequency (MHz)	Emission Level	Limit	Height of Antenna, Angel of Turntable
Conduction Mode 2	11.86235	41.3 dBuV, Line 2 Q.P.	48.0 dBuV	N/A
Radiation Mode 2	118.596	39.12 [dB(uV/m)], Vertical	43.5 [dB(uV/m)]	1M, 27°

Test Mode:

Mode 1 (M/N:L-100) : 100W.

Mode 2 (M/N:L-50) : 50W.

Note:

1. The EUT is a LaserPro MERCURY, 16MB Butter; the max resolution 1000DPI, has print port and serial port for P.C.
2. The EUT has five model number(M/N:L-100, L-50, L-30, L-25, L-12), which difference as the following:

Model Number	L-12	L-25	L-30	L-50	L-100
Laser Power Supply	SP-300(1PCS) 32V/8A	SP-500(1PCS) 32V/16A	SP-500(1PCS) 32V/16A	SP-500(2PCS) 32V/32A	SP-500(4PCS) 48V/40A
Laser	Synrad 48-1W	Synrad 48-2W	Synrad 48-2W	Synrad 48-5W	Rofin-Sinar 100W
Cooling	Air Cooled DC-24V(FAN)*5	Air Cooled DC-24V(FAN)*5	Air Cooled DC-24V(FAN)*5	Water-Cooled	Water-Cooled DC-24V(FAN)*3
Laser Control Board	PC-00057B Laser Control	PC-00057B Laser Control	PC-00057B Laser Control	PC-00057B Laser Control	PC-00066A Laser Control
Laser Power Control Board	PC-00041C Laser Connector Board	PC-00041C Laser Connector Board	PC-00041C Laser Connector Board	PC-00043C Laser Connector Board	PC-00063C Laser Connector Board

3. The function are the same, only power different which the M/N:L-100, L-50 power more large.
4. All configurations had been tested to find the maximum emission condition and the data shown in this report reflect the worst.
5. The data shown in this test report reflects the worst-case data for each operation mode.

2.3 Tested System Details

The FCC IDs/Types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards, which have grants) are:

☒ **LaserPro MERCURY (EUT)**

Model Number	L-100	L-50
Mother Board	M/N:PC00054B	M/N:PC00054B
Motor Control Board (1)	M/N:PC00058B	M/N:PC00058B
(2)	M/N:PC00056B	M/N:PC00056B
(3)	M/N:PC00037A	M/N:PC00037A
Power Board	M/N:PC00039A	M/N:PC00039A
System Control Board	M/N:PC00061A	M/N:PC00061A
LASER Control Board	M/N:PC00066A	M/N:PC00057B
LASER Board		M/N:PC00043B
LED Board	M/N:P-S4A00T	M/N:P-S4A200T
S.P.S. Connect Board	M/N:PC00063A	
LASER (1)	ROFW SIAR, M/N:X10-OEM REV.C, S/N:OEM-10/2004	SYNRAD, M/N:J48-5S-A2934 Power In:30-32VDC
(2)	ROFW SIAR, M/N:422/COM REV.B, S/N:1693/8	
(3)	ROFW SIAR, M/N:RF1K-50 REV.B, S/N:RF01/1035	
S.P.S. (1)	MENA WELL, M/N:SP-500-48, S/N:C99552862	MENA WELL, M/N:SP-500-27, S/N:C99617802
(2)	MENA WELL, M/N:SP-500-48, S/N:C99552868	MENA WELL, M/N:SP-500-27, S/N:C99617805
(3)	MENA WELL, M/N:SP-500-48, S/N:C99552866	
(4)	MENA WELL, M/N:SP-500-48, S/N:C99552865	
S.P.S. Mother Board (1)	M/N:SP-500B-R6	M/N:SP-500B-R6
(2)	M/N:SP-500A-R5	M/N:SP-500A-R5
APPENDIX		
Turn Table	S/N:R992072	
Turn Table Mother Board	M/N:PC0048C	

☒ **P.C. System**

P.C. Chassis	: CHENBRO GROUP
Mother Board	: GIGA-BYTE, M/N:GA-6BXC Rev.:1.9
	S/N:N/A, FCC ID:FCC DoC
CPU	: Intel Pentium II 266MHz,Clock:66MHz
H.D.D.	: Quantum, M/N:2550AT, S/N:294717115684
F.D.D.	: Teac, M/N:FD-235HF, S/N:O423804
CD-ROM	: Matasushita, M/N:CR-585-B
	S/N:7703CSA92264, FCC ID:IUO9TB059CRB
RAM X1	: SDRAM, HITACHI, 32MB
Disk Control Card	: On board
I/O Card	: On board
USB	: On board
AGP VGA CARD	: PROTAC, M/N:AG110G, S/N:22009809017445
S. P. S.	: SEVENTEAM, M/ N:ST-200HRK
	S/N:N/A, FCC ID:FCC DoC
Power Cord	: Non-Shielded, Detachable, 1.5m

☒ **Monitor M01-010**

Model Number	: SyncMaster 700p
Serial Number	: H3MH903296Y
Manufacturer	: SAMSUNG
FCC ID	: A3LCGH760
BSMI No.	: 3872A230
Data Cable	: Shielded, Undetachable, 1.2m
Power Cord	: Non-Shielded, Detachable, 1.5m

☒ **Keyboard K01-037**

Model Number	: KB-5923
Serial Number	: 8060032203
FCC ID	: E8HKB-5923
Manufacturer	: TATUNG
BSMI No.	: 3862A177
Data Cable	: Sheiled, Undetachable, 2.0 m
Purchase Date	: 8/6/1998

☒ **Printer P01-011**

Model Number : C2642A(DJ-400)
Serial Number : MY7951C4J5
FCC ID : B94C2642X
Manufacturer : HP
Data Cable : Shielded, Detachable, 1.2m
Adaptor, Power Cord : Non-Shielded, Detachable, 1.5m

☒ **Mouse (PS2) M02-060**

Manufacturer : TARGA
Model Number : TM5PG
FCC ID : JKGMUS2SO1
Data Cable : Shielded, Undetachable, 1.5m

☒ **Modem M03-009**

Model Number : 1414
Serial Number : 960018052
FCC ID : IFAXDM1414
Manufacturer : ACEEX
Adaptor, Power Cord : Non-Shielded, Detachable, 1.5m
Data Cable : Shielded, Detachable, 1.2m

2.4 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.

2.5 Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	24-27
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

FCC Site Description : Aug. 10, 1995 /Aug. 25, 1998 File on
Federal Communication Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046
Reference 31040/SIT1300F2

NVLAP Lab Code : 200085-0
United Stated Department of commerce
National Institute of Standards and Technology
National Voluntary Laboratory Accreditation Program
Accreditation on NVLAP effective through Sep. 30, 1999
For CISPR22, FCC Method and AS/NZS 34548 Measurement.

Name of firm : Global EMC Standard Tech. Corp.

Site location : No. 3 Pau-Tou Valley, Chia-Pau Tsuen, Lin Kou Tsiang, Taipei Country, Taiwan, R.O.C.

3. Conducted Emission

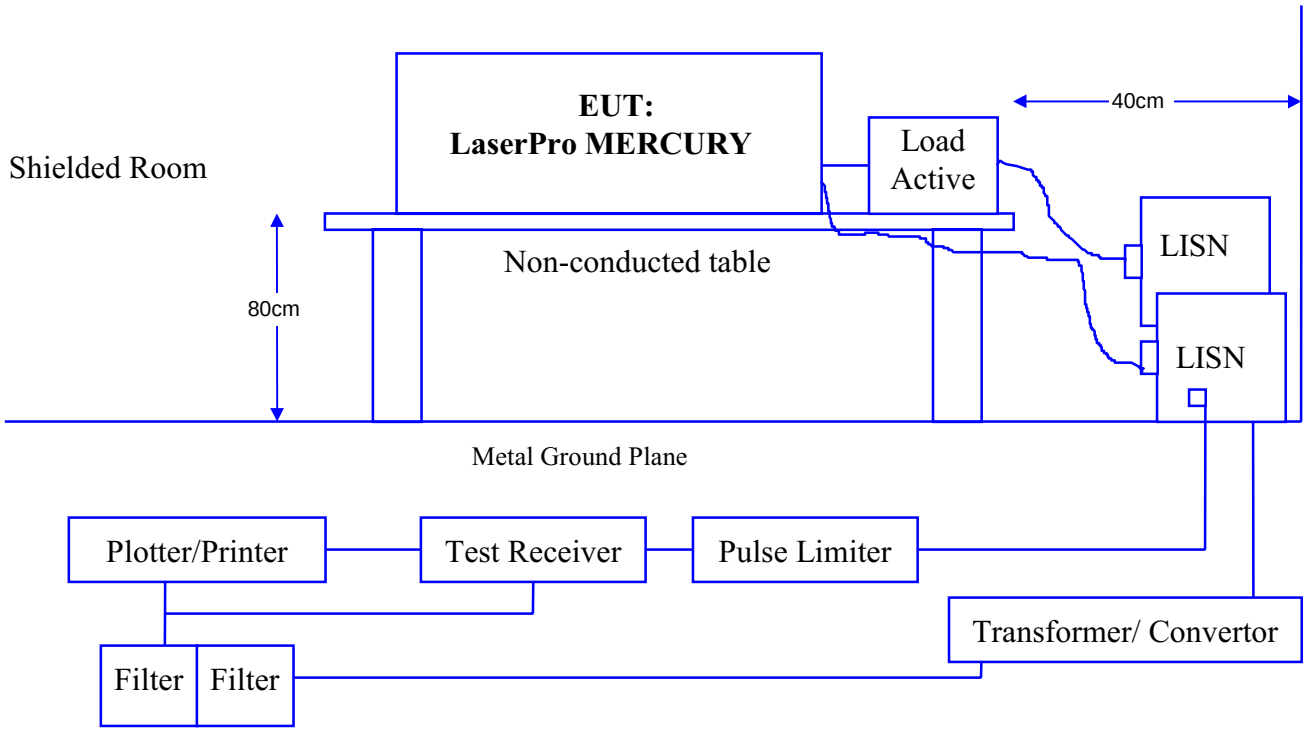
3.1 Test Equipments

The following test equipments are used during the conducted power line tests:

Item	Instrument	Manufacturer	Type / Serial No.	Last Cal. Date
1	Test Receiver	Rohde & Schwarz	ESHS 30 / 828109/010	Jan. 21, 2000
2	L.I.S.N.	Kyoritsu	KNW-407	Nov. 05, 1999
3	L.I.S.N.	Schwarzbeck	NNLK 8121/8121358	May. 27, 1999
4	Pulse Limiter	Rohde & Schwarz	ESH3-Z2/357.8810.52	Sep. 05, 1999
5	RF CABLE	GesTek	GTK-RF-C07	Sep. 05, 1999
6	50 Ohm Terminator	GesTek	GTK-RF-T01	Nov. 05, 1999
7	Shielded Room	GesTek	GTK-RF-S04	Sep. 05, 1999

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

3.2 Block Diagram of Test Setup



3.3 Conducted Emission Limit

3.3.1 FCC Limits

Frequency	Maximum RF Line Voltage			
	Class A		Class B	
MHz	uV	dBuV	uV	dBuV
0.45 - 1.705	1000	60.0	250	48.0
1.705 - 30	3000	69.5	250	48.0

Remarks : 1. RF Line Voltage (dBuV) = 20 log RF Line Voltage (uV)
2. In the Above Table, the tighter limit applies at the band edges.

3.3.2 CISPR Limits

Frequency	Maximum RF Line Voltage dB(uV)			
	Class A		Class B	
MHz	QUASI-PEAK	AVERAGE	QUASI-PEAK	AVERAGE
0.15 - 0.50	79	66	66-56	56-46
0.50-5.0	73	60	56	46
5.0 - 30	73	60	60	50

Remarks : In the Above Table, the tighter limit applies at the band edges.

3.4 EUT Configuration on Measurement

The equipments which is listed 3.2 are installed on Conducted Power Line Test to meet the Commission requirement and operating in a manner which tends to maximize its emission characteristics in a normal application.

The device under test, installed in a representative system as described in section 3.2, was placed on a non-conductive table whose total height equaled 80 cm. Powered from one L.I.S.N. which signal output to receiver, and the other peripherials was powered from another L.I.S.N. which signal output was terminated by 50Ω.

3.5 EUT Exercise Software

The EUT exercise program used during conducted testing was designed to exercise the EUT in a manner similar to a typical use. The exercise sequence is listed as below:

3.5.1 Setup the EUT and simulators as shown on 3.2

3.5.2 Turn on the power of all equipments.

3.5.3 Adjust to appropriate video Resolution.

3.5.4 Run windows 98 and to MS-DOS.

3.5.5 A:\ Type 11.prn>prn.

3.5.6 The data from Disk transfer to EUT.

3.5.7 Start test.

3.6 Conducted Emission Data

The measurement range of conducted emission which is from **0.15 MHz to 30 MHz** was investigated. All readings are quasi-peak and average values with a resolution Bandwidth of 9 KHz. The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range for all the test modes. Then the worst modes were reported the following data pages. The final measurement equal to Receiver reading plus Correction factor if available. When L.I.S.N. insertion loss bigger than 0.5dB then the receiver will add correction factor to reading level automatically.

The total uncertainty for this test is as follows:
• Uncertainty in the field strength measured: < ± 2.0 dB
The uncertainty is calculated in accordance with NAMAS document NIS 81, and is given as 2 standard deviations.

CONDUCTED EMISSION DATA

Date of Test	:	Feb. 22, 2000	Temperature	:	20.3 ℃
EUT	:	LaserPro MERCURY	Humidity	:	46 %
Test Mode	:	Mode 1	Display Pattern	:	H Pattern

FREQUENCY	READING LEVEL				LIMIT
	LINE 1		LINE 2		
MHz	dBuV	uV	dBuV	uV	uV
0.46628	26.3	20.6	20.2	10.2	250
3.81000	23.9	15.6	19.6	9.5	250
4.50872	27.6	23.9	20.3	10.3	250
** 11.86128	36.7	68.3	37.0	70.7	250
12.80000	33.1	45.1	33.8	48.9	250
19.45500	26.8	21.8	25.9	19.7	250

Remarks :

1. All readings are Quasi-peak and average values.
2. " * " means that the quasi-peak reading level is lower then the average limits, it is not necessary to measure the average level.
3. " ** " means that this data is the worse case emission level.
4. Final measurement = (Receiver reading) + (Correction factor if available)

Attached 2 individual pages of peak scan curve data sheets.

CONDUCTED EMISSION DATA

Date of Test	:	Feb. 22, 2000	Temperature	:	20.3 ℃
EUT	:	LaserPro MERCURY	Humidity	:	46 %
Test Mode	:	Mode 2	Display Pattern	:	H Pattern

FREQUENCY	READING LEVEL				LIMIT
	LINE 1		LINE 2		
MHz	dBuV	uV	dBuV	uV	uV
0.46000	27.2	22.9	32.0	39.8	250
0.50100	34.6	53.7	30.8	34.6	250
0.69872	36.9	69.9	31.3	36.7	250
** 11.86235	40.5	105.9	41.3	116.1	250
12.80128	33.6	47.8	34.1	50.7	250
19.77000	29.6	30.2	28.5	26.6	250

Remarks :

1. All readings are Quasi-peak and average values.
2. " * " means that the quasi-peak reading level is lower then the average limits, it is not necessary to measure the average level.
3. " ** " means that this data is the worse case emission level.
4. Final measurement = (Receiver reading) + (Correction factor if available)

Attached 2 individual pages of peak scan curve data sheets.

4. Radiation Emission

4.1 Test Equipment

The following test equipments are used during the radiated emission tests:

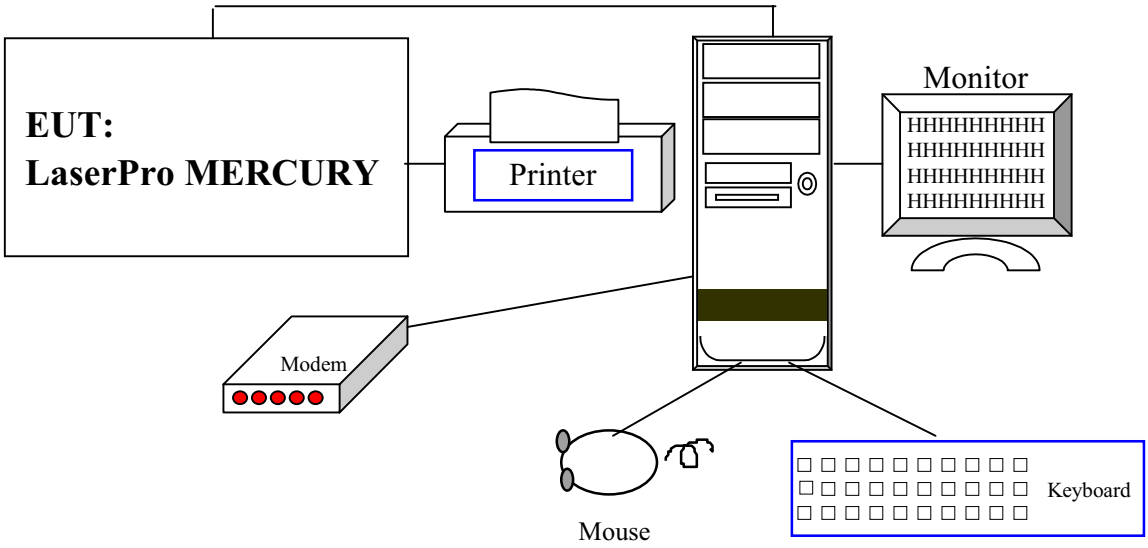
Radiated test was performed on Site #1.

Item	Instrument	Manufacturer	Type /Serial No.	Last Cal.
1	Test Receiver	Rohde & Schwarz	ESVS 30 / 829007/014	Jan. 18, 2000
2	Spectrum Analyzer	HP	8594E / 3543A02689	N/A
3	Pre-Amplifier	HP	8447D / 2944A08272	N/A
4	Pre Amplifier	HP	8347A / 3307A01401	N/A
5	Pre Amplifier	HP	8449B / 3008A01264	N/A
6	BILOG ANTENNA	Chase	CBL6112B/2417	May. 15,1999
7	Horn Antenna	Electro-Metrics	EM-6961 / 103318	Apr, 30, 1999
8	RF Cable	GesTek	GTK-RF-C01	Jan. 01, 2000
9	RF Cable	GesTek	GTK-RF-C02	Jan. 01, 2000
10	Open Site	GesTek	GTK-RF-SA1	Jan. 01, 2000
11	Test Program Software	GesTek	GTK-RF-P01	N/A

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

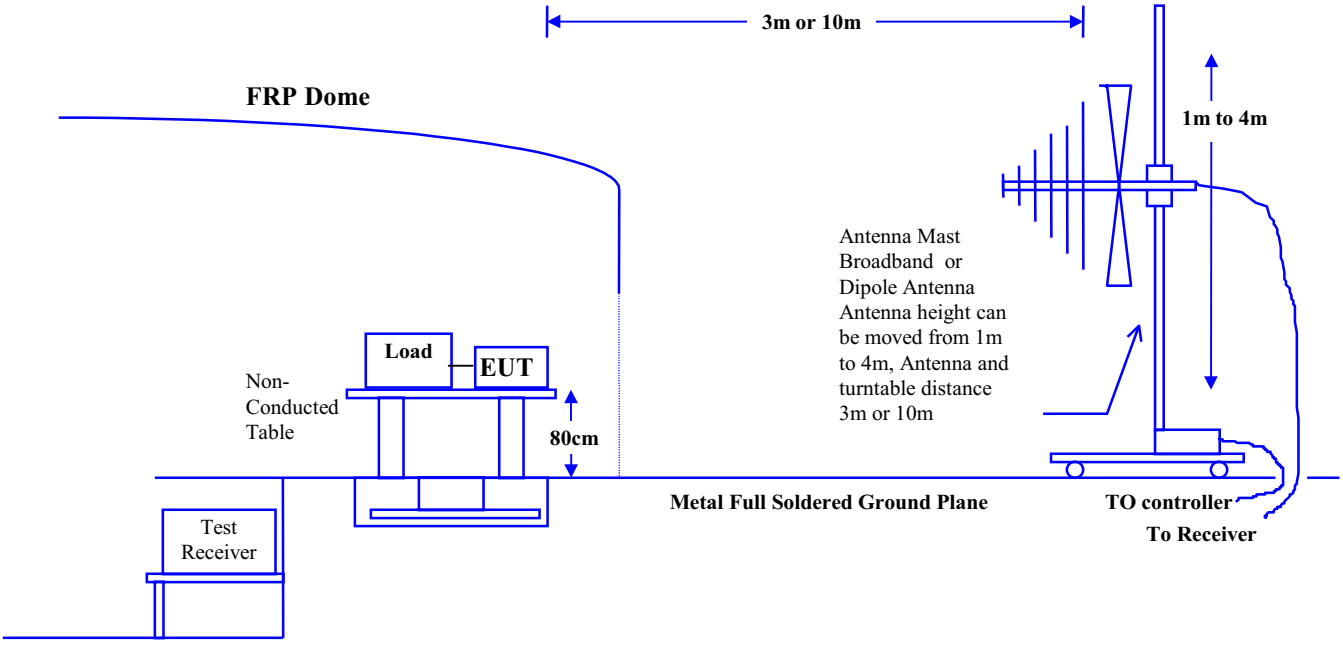
4.2 Test Setup

4.2.1 Block Diagram of Connections between EUT and simulators



4.2.2 Open Test Site Setup Diagram

Note: This is a representive setup diagram for Table-top EUT.
For Floor-standing EUT, the table will be removed with all others setup condition remain the same.



4.3 Radiated Emission Limit

4.3.1 FCC Class B Limits at 3m

Frequency	Distance	Field Strength	
MHz	Meter	uV/M	dBuV/M
30 - 88	3	100	40.0
88 - 216	3	150	43.5
216 -960	3	200	46.0
960 Above	3	500	54.0

4.3.2 CISPR Class B Limits at 10m

Frequency	Distance	Field Strength
MHz	Meter	dB(uV/M)
30 - 230	10	30
230 - 1000	10	37

Remark : 1. The tighter limit shall apply at the edge between two frequency bands.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

4.4 EUT Configuration

The equipments which is listed 4.2.1 are installed on Radiated Emission Test to meet the Commission requirement and operating in a manner which tends to maximize its emission characteristics in a normal application.

The device under test, installed in a representative system as described in section 4.2.2, was placed on a non-conductive table whose total height equaled 80 cm. This table can be rotated 360 degree. The measurement antenna was mounted to a non-conductive mast capable of moving the antenna vertically. Antenna height was varied from 1 meter to 4 meters and the system under test was rotated from 0 degree through 360 degrees relative to the antenna position and polarization (Horizontal and Vertical). Also the I/O cable position was investigated to find the maximum emission condition.

4.5 Operating Condition of EUT

Same as Conducted emission which is listed in 3.5.

4.6 Radiated Emission Data

The measurement range of radiated emission which is from **30 MHz to 1 GHz** was investigated. All readings are quasi-peak values with a resolution Bandwidth of 120 KHz. The initial step in collecting radiated emission data is a spectrum analyzer peak scan of the measurement range for all the test modes. Then the worst modes were reported the following data pages.

The total uncertainty for this test is as follows:
- Uncertainty in the field strength measured (3m antenna distance): $< \pm 4$ dB
- Uncertainty in the field strength measured (10m antenna distance): $< \pm 4$ dB

The uncertainty is calculated in accordance with NAMAS document NIS 81, and is given as 2 standard deviations.

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Radiated Emission Data

Date of Test :02-23,2000 Wed
EUT :LaserPro MERCURY
Working Cond.:Mode 1
Temperature :20 deg/C
Humidity :46 %RH
Display Pattern:H Pattern

	Frequency [MHz]	Cable Loss [dB]	Antenna Factor [dB/m]	Reading Level Horizontal [dB(uV)]	Emission Level Horizontal [dB(uV/m)]	[uV/m]	Limit (uV/m)
	42.463	1.30	14.14	13.69	29.13	28.61	100
	90.268	1.72	9.27	20.30	31.29	36.70	150
	180.347	2.30	9.30	22.36	33.96	49.89	150
*	233.865	2.70	11.64	26.32	40.66	107.89	200
	240.088	2.74	11.84	20.01	34.59	53.62	200
	264.209	2.83	12.39	15.83	31.05	35.69	200
	422.966	3.49	16.80	13.97	34.26	51.64	200

Remarks:
1. All Readings are Quasi-Peak.
2. " * ", means this data is worse case emission level.
3. Emission Level = Reading Level + Antenna Factor + Cable loss
4. Deviations from the specifications: None.

N0 3, Pau-Tou-Tsuo Valley, Chia-Pau Tsuen, Lin Kou Hsiang, Taipei County, Taiwan, R.O.C. Tel:886-2-2603-5321 Fax:886-2-2603-5325

Radiated Emission Data

Date of Test :02-23,2000 Wed
EUT :LaserPro MERCURY
Working Cond.:Mode 1
Temperature :20 deg/C
Humidity :46 %RH
Display Pattern:H Pattern

	Frequency [MHz]	Cable Loss [dB]	Antenna Factor [dB/m]	Reading Level Vertical [dB(uV)]	Emission Level Vertical [dB(uV/m)]	[uV/m]	Limit (uV/m)
	42.420	1.30	14.14	12.71	28.15	25.55	100
	90.260	1.72	9.27	15.97	26.96	22.29	150
	180.023	2.30	9.30	20.14	31.74	38.64	150
*	233.865	2.70	11.64	21.45	35.79	61.59	200
	240.040	2.74	11.84	18.98	33.56	47.62	200
	264.047	2.83	12.39	14.74	29.96	31.48	200
	422.963	3.49	16.80	12.04	32.33	41.35	200

Remarks:
1. All Readings are Quasi-Peak.
2. " * ", means this data is worse case emission level.
3. Emission Level = Reading Level + Antenna Factor + Cable loss
4. Deviations from the specifications: None.

Radiated Emission Data

Date of Test :02-23,2000 Wed
EUT :LaserPro MERCURY
Working Cond.:Mode 2
Temperature :20 deg/C
Humidity :46 %RH
Display Pattern:H Pattern

Frequency [MHz]	Cable Loss [dB]	Antenna Factor [dB/m]	Reading Level Horizontal [dB(uV)]	Emission Level Horizontal [dB(uV/m)]	(uV/m)	Limit (uV/m)
48.963	1.30	11.49	13.63	26.42	20.94	100
56.548	1.40	8.30	12.51	22.21	12.89	100
71.693	1.62	6.52	19.96	28.10	25.41	100
118.900	1.89	12.09	13.76	27.74	24.36	150
151.307	2.16	10.80	16.33	29.29	29.15	150
200.691	2.50	10.50	18.03	31.03	35.60	150
270.120	2.84	12.48	13.57	28.89	27.81	200
* 430.109	3.52	16.91	16.27	36.70	68.41	200

Remarks:
1. All Readings are Quasi-Peak.
2. " * ", means this data is worse case emission level.
3. Emission Level = Reading Level + Antenna Factor + Cable loss
4. Deviations from the specifications: None.

Radiated Emission Data

Date of Test :02-23,2000 Wed
EUT :LaserPro MERCURY
Working Cond.:Mode 2
Temperature :20 deg/C
Humidity :46 %RH
Display Pattern:H Pattern

Frequency [MHz]	Cable Loss [dB]	Antenna Factor [dB/m]	Reading Level Vertical [dB(uV)]	Emission Level Vertical [dB(uV/m)]	Emission Level Vertical (uV/m)	Limit (uV/m)
49.027	1.30	11.49	15.96	28.75	27.39	100
56.637	1.40	8.30	16.89	26.59	21.35	100
71.695	1.62	6.52	23.56	31.70	38.44	100
* 118.596	1.89	12.09	25.14	39.12	90.31	150
151.306	2.16	10.80	23.82	36.78	69.05	150
200.706	2.50	10.50	20.26	33.26	46.01	150
270.691	2.84	12.48	15.86	31.18	36.20	200
430.208	3.52	16.91	20.67	41.10	113.53	200

Remarks:
1. All Readings are Quasi-Peak.
2. " * ", means this data is worse case emission level.
3. Emission Level = Reading Level + Antenna Factor + Cable loss
4. Deviations from the specifications: None.