

GTK99-F004

Test Report
Application for Certification
Class II Permissive Change
On Behalf Of
First International Computer Inc.
Notebook Computer

Model:Ruby 2.0 / DESIGNote 56XXXX /
DESIGNote 6 / 56XXXX / Legend 66 / StepNote SR /
friend V / Soliton / Soleil / AL300 Pentium II Model /
AL300 Pentium Model / CN600xxxxyyyzzz / ActionBook

FCC ID: EUNDESIGNOTE56

Prepared For:
First International Computer Inc.
6F., Formosa Plastics Rear Bldg 201, Tung-Hwa N. Road,
Taipei, 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.
Tel : (02) 2603-5321
Fax : (02) 2603-5325

Test results given in this report only relate to the specimen(s) tested, calibrated or measured.
This report shall not be reproduced other than in full without the written consent of Gestek.

TABLE OF CONTENTS

	Description	Page
1.	Test Report Certification	3
2.	General Information	4
2.1	Production Description	4
2.2	Results:.....	4
2.3	Tested System Details.....	6
2.4	Test Methodology	9
2.5	Test Facility	9
3.	Conducted Emission Test	10
3.1	Test Equipments.....	10
3.2	Block Diagram of Test Setup	10
3.3	Conducted Emission Limit	11
3.4	EUT Configuration on Measurement.....	11
3.5	EUT Exercise Software.....	12
3.6	Conducted Emission Data.....	12
4.	Radiation Emission Test	14
4.1	Test Equipment	14
4.2	Test Setup.....	15
4.3	Radiated Emission Limit	16
4.4	EUT Configuration	16
4.5	Operating Condition of EUT	17
4.6	Radiated Emission Data.....	17
5.	Photographs	20
5.1	Test Photographs.....	20
6.	EUT Detail Photographs	22
7.	EMI Reduction Method During Compliance Testing	28
	Appendix A	29
	Circuit (Block) Diagram	29
	Appendix B	30
	FCC ID.....	30

GTE99-F004

1. Test Report Certification

Applicant : First International Computer Inc.

Manufacturer : First International Computer Inc.

EUT Description : Notebook Computer

(A) Model No. : Ruby 2.0
(B) Serial No. : N/A
(C) Power : 110V/60Hz
(D) Rating DC-O/P : 20V

MEASUREMENT PROCEDURE / STANDARD USED :

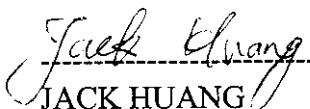
- ☒ CFR 47, Part 15 Radio Frequency Device Subpart B Unintentional Radiators Class B :1996
☐ CISPR 22 Limits and methods of measurement of radio disturbance characteristics of information technology equipment: 1993
☒ ANSI C63.4 Methods of Measurements of Radio-Noise Emissions from Low-Voltage Electrical 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.

NVLAP[®]

Sample Received Date : January 28, 1999
Final Test Date : February 05, 1999
Documented by : Joan Chein

Test Engineer :


JACK HUANG

Approve & Authorized Signer :


RAYMOND CHANG

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 : Notebook Computer
 Model Number : Ruby 2.0
 Serial Number : N/A
 Condition : Prototype
 Applicant : First International Computer Inc.
 Address : 6F., Formosa Plastics Rear Bldg 201, Tung-Hwa N. Road,
 Taipei, Taiwan, R.O.C.
 Manufacturer : First International Computer Inc.
 Address : 6F., Formosa Plastics Rear Bldg 201, Tung-Hwa N. Road,
 Taipei, Taiwan, R.O.C.
 CPU : Dixon 333MHz, Celeron 300MHz, Dixon 366MHz
 Clock: 66/66/66MHz
 Power Cord : 1.8m, Non-shielded

2.2 Results:

2.2.1 The EUT(s) met the FCC Part 15 Class B requirements.

The Worst Emission data was found as following,

	Worst Emission Frequency (MHz)	Emission Level	Limit	Height of Antenna, Angel of Turntable
Conduction Mode 1	4.51008	35.8 dBuV Line 2	48.00 dBuV	N/A
Radiation Mode 1	574.983	42.69[dB(uV/m)], Horional	46.00 [dB(uV/m)]	4 M, 172°

2.2.2 Test Mode:

2.2.3 Note:

Mode I			
1.	CPU Module	Dixon	333MHz
2.	Panel 14.1" TFT	LG	LP141X5-A
3.	4.3GB HDD	Fujitsu	MHF2043AT
4.	FDD 3.5"	NEC	FD-1238T-018
5.	DVD 4X	Toshiba	SD-C2202
6.	Battery	Panasonic	Ni-MH 3800mAh
7.	AC Adaptor	Lite-On	PA-1480-19

1. This Notebook computer can support different CPU/Clock frequency modes and can support different types of LCD panel. The test condition of 300/333/366MHz and all the components listed at section 2.3 were investigated. During the performance of the testing, peripherals were connected to all available ports.
2. This Notebook computer upgrade LCD panel ,Original panel is 12.1" ,this EUT's panel is 14.4", and this EUT added DVD-ROM. These change may be interfered EMI. So we tested again. The data shown in this test report reflects the worst-case data for each frequency/video resolution.
3. Model Name Designation for Ruby 2.0 as following,

OEM	EM	EM
LEO	DESIGNote 56XXXX	DESIGNote 5600, DESIGNote 6800
FIC	56XXXX	5600
Generic	56XXXX	5600
INCA	Legend 66	Legend 66
Everex	StepNote SR	StepNote SR
Hyun Ju	friend V	friend V
Elonex	Soliton	Soliton
Legen	Soleil	Soleil
Mitsubishi	AL300 Pentium II Model AL300 Pentium Model	
DAEWOO	CN600xxxxyyyzzz	
UMAX	ActionBook	

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:

☒ Notebook PC (EUT)

No.	Category	Manufacturer	Model No.
1.	CPU	Dixon 266 / 300/ 333/ 366MHz; Celeron 266/300MHz	
2.	LCD	LG 14.1" TFT	LP141X5-A
3.	HDD	Hitachi 3.2GB	DK238A-32
4.	HDD	IBM 3.2GB	DKLA-23240
5.	HDD	Hitachi 4.3GB	DK238A-43
6.	HDD	IBM 4.3GB	DKLA-24320
7.	HDD	Toshiba 4.3GB	MK4309MAT
8.	HDD	Fujitsu 4.3GB	MHF2043AT
9.	HDD	Fujitsu 6.4GB	MHE2064AT
10.	HDD	Hitachi 6.4GB	DK228A-65
11.	FDD	NEC 3.5"	FD-1238T-018
12.	DVD ROM 4X	Toshiba	SD-C2202
13.	LAN	CIS	FIC-D410
14.	AC Adaptor	Lite-On	PA-1480-19
15.	Battery	Panasonic	Ni-MH 3800mAh

☒ Monitor M01-012

Model Number : SyncMaster 700p

Serial Number : H3MH903257V

Manufacturer : SAMSUNG

FCC ID : A3LCGH760

BCIQ No. : 3872A230

Data Cable : Shielded, Undetachable, 1.5m

Power Cord : Non-Shielded, Detachable, 1.8m

☒ Keyboard K01-030

Model Number : KB-5923

Serial Number : 7L10500809

FCC ID : E8HKB-5923

Manufacturer : TATUNG

BCIQ 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, 1.5m
Adaptor & Power Cord :AC 110V, 60Hz To DC 30V
:Non-Shielded, Detachable, 1.8m

☒ Modem M03-003

Model Number :1414
Serial Number :960011400
FCC ID :IFAXDM1414
Manufacturer :ACEEX
Adaptor, Power Cord :Non-Shielded, Detachable, 1.5m
Data Cable :Non-Shielded, Detachable, 1.8m

☒ Microphone M04-011 ~ 018

Model Number :M02
Serial Number :N/A
FCC ID :N/A
Manufacturer :GALAXY
Data Cable :Non-Shielded, Undetachable, 1.2m

☒ Cassette Player R02-010 ~014

Model Number :HS-GS162
Serial Number :LYJ1084567
FCC ID :N/A
Manufacturer :AIWA CO., LTD
Power Cord :N/A (Battery)

☒ Scanner (USB) S02-001
Model Number : S-UA1
Serial Number : LTC74803633
FCC ID : DZL211089
Manufacturer : Logitech
Power, Data cable : Shielded, Undetachable, 1.5m with DC 5V

☒ Earphone E01-012~ 017
Model Number : FI-100HP
Serial Number : N/A
Manufacturer : SHINPO
Power Cord : N/A
Data Cable : Non-Shielded, Undetachable, 1.5 m
Purchase Date : 8/6/1998

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	22-26
Humidity (%RH)	25-75	50-60
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 States Department of commerce

National Institute of Standards and Technology

National Voluntary Laboratory Accreditation Program

Name of firm : Global EMC Standard Tech. Corp.

Site location : No. 3 Pau-Tou Valley, Chia-Pau Tsuen, Lin Kou

Hsiang, Taipei County, Taiwan, R.O.C.

3. Conducted Emission Test

3.1 Test Equipments

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

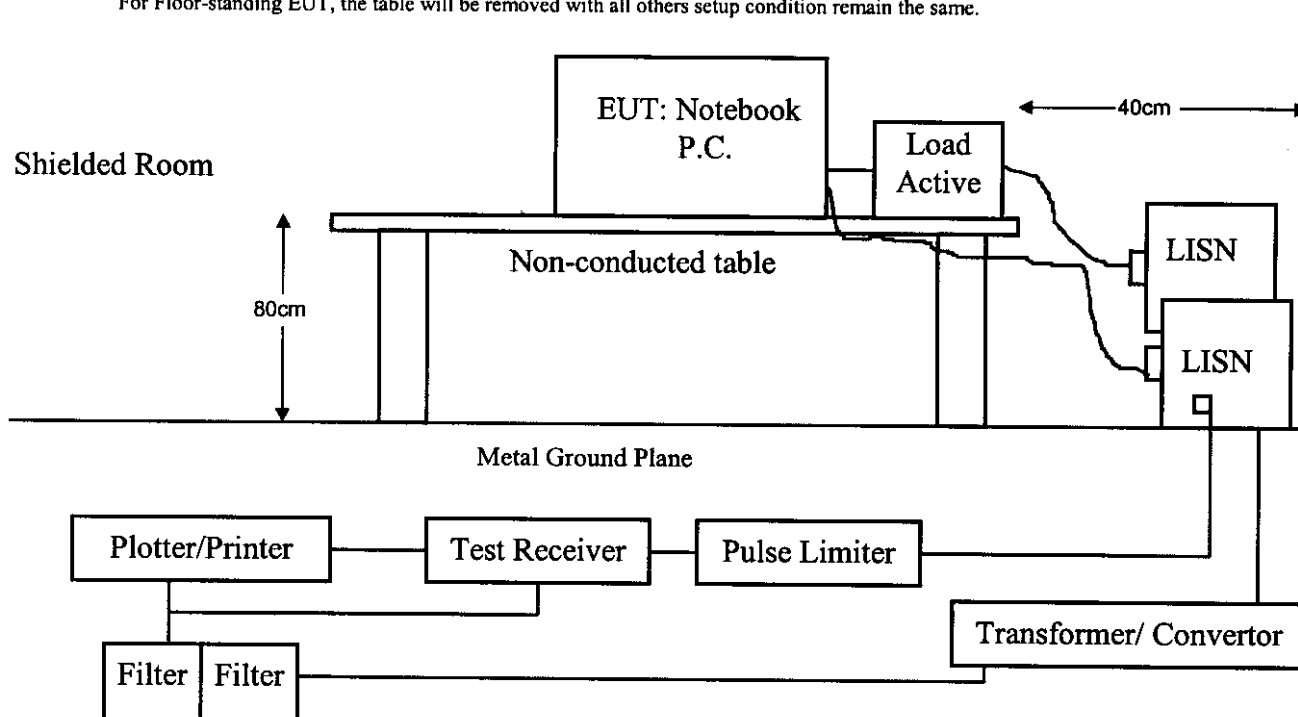
Instrument	Manufacturer	Type /Serial No.	Last Calibration	Location	C.E.
Test Receiver	Rohde & Schwarz	ESHS 30 / 828109/010	Dec. 15, 1998	Shield Room #1	✓
L.I.S.N.	Kyoritsu	KNW-407	Oct. 03, 1998	Shield Room #1	✓
L.I.S.N.	Solar	8012-50-R24 / 90038	Jun. 02, 1998	Shield Room #1	
L.I.S.N.	Rohde & Schwarz	ESH3-Z5 / 840567/002	Oct. 02, 1998	Shield Room #1	✓
L.I.S.N.	Schwarzbeck	NNLK 8121/8121358	Jun. 02, 1998	Shield Room #1	
Pulse Limiter	Rohde & Schwarz	ESH3-Z2/357.8810.52	Nov. 01, 1998	Shield Room #1	✓
Shielded Room	GesTek	GTK-RF-S04	Sep. 17, 1998	Shield Room #1	✓
RF CABLE	GesTek	GTK-RF-C07	Sep. 17, 1998	Shield Room #1	✓
50 Ohm Terminator	GesTek	GTK-RF-T01	Oct. 03, 1998	Shield Room #1	✓

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

3.2 Block Diagram of Test Setup

Note: This is a representative setup diagram for Table-top EUT.

For Floor-standing EUT, the table will be removed with all others setup condition remain the same.



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 LISN which signal output to receiver, and the other peripherals was powered from another LISN 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 Boot the PC from Hard Disk and Enter to windows 98,
exercise EMI.EXE test program to active all devices.
- 3.5.4 Play CD Disk audio in windows environment, read HDD and FDD data.
- 3.5.5 PC sent "H" Pattern to Both LCD Panel And Ext. Monitor.
- 3.5.6 PC sent "H" Pattern to Parallel (printer) port.
- 3.5.7 PC sent "H" Pattern to Serial port.
- 3.5.8 Repeat 3.5.4 to 3.5.7

3.6 Conducted Emission Data

The measurement range of conducted emission which is from **0.45 MHz to 30 MHz** was investigated. All readings are quasi-peak and average values with a resolution Bandwidth of 9 KHz, unless otherwise noted. The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range for all the test modes. The two different lines were each measured separately, and the worst modes datas were reported on the following data pages. The final measurement equal to Receiver reading plus Correction factor if available. When LISN 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: $< \pm 2.0 \text{ dB}$

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

CONDUCTED EMISSION DATA

Date of Test	: January 28, 1999	Temperature	: 21.3 °C
EUT	: Notebook PC	Humidity	: 63 %
Test Mode	: Mode 1	Display Pattern	: H Pattern

FREQUENCY	READING LEVEL				LIMIT
	LINE 1		LINE 2		
MHz	dBuV	uV	dBuV	uV	uV
0.47801	24.8	17.38	35.3	58.21	250
**4.51008	33.2	45.71	35.8	61.66	250
6.83779	24.1	16.03	27.8	24.55	250
10.52985	22.1	12.74	26.1	20.18	250
14.76894	22.1	12.74	26.1	20.18	250
26.99901	26.8	21.88	35.1	56.89	250

Remarks : 1. All readings are Quasi-peak.

2. “ ** ” means that this data is the worse case emission level.

3. Deviations from the specifications: None.

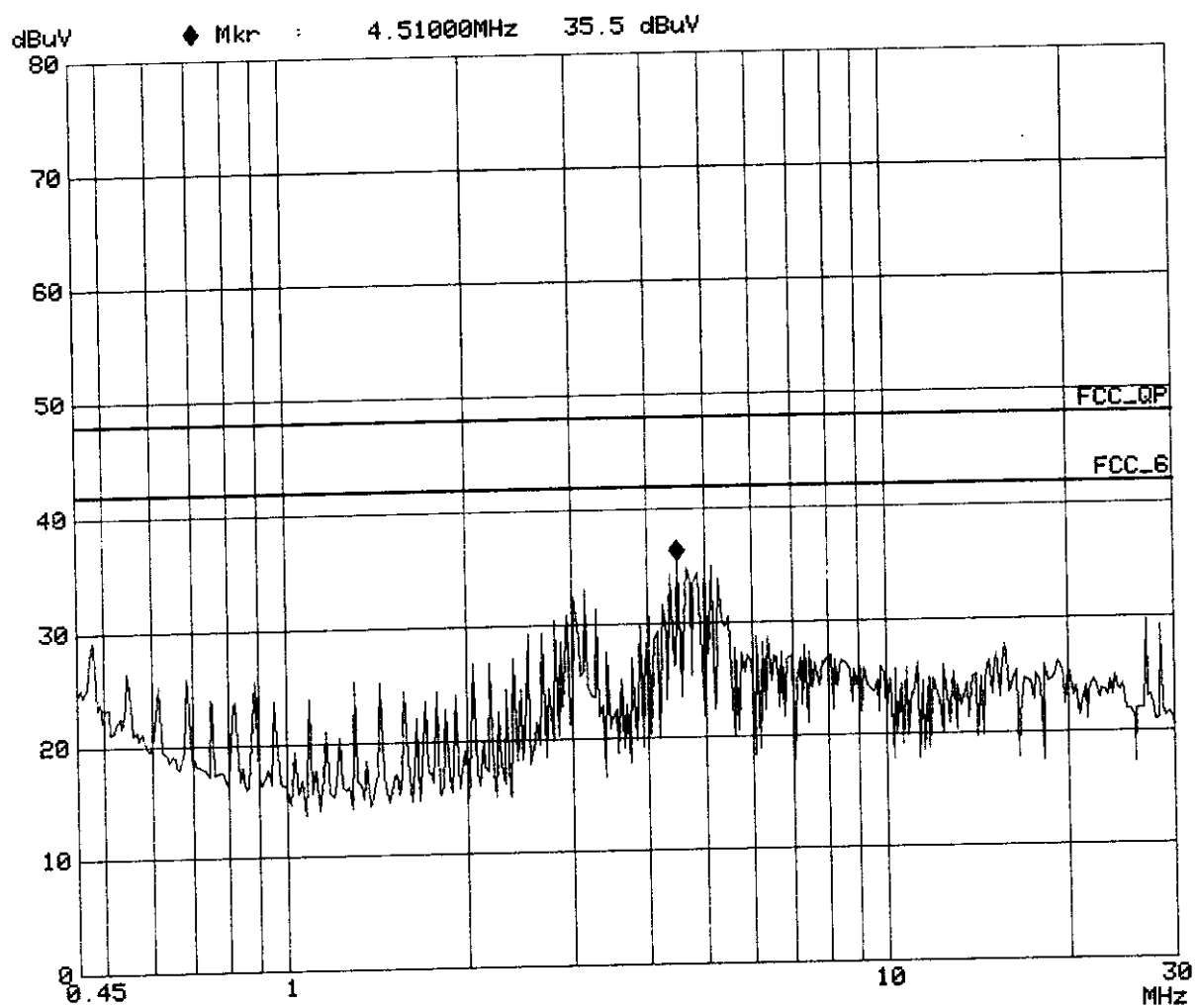
4. Final measurement = (Receiver reading) + (Correction factor if available)

Attached 2 individual pages of peak scan curve data sheets.

ROHDE & SCHWARZ ESHS 30

GesTek, PowerLine Conducted Emission

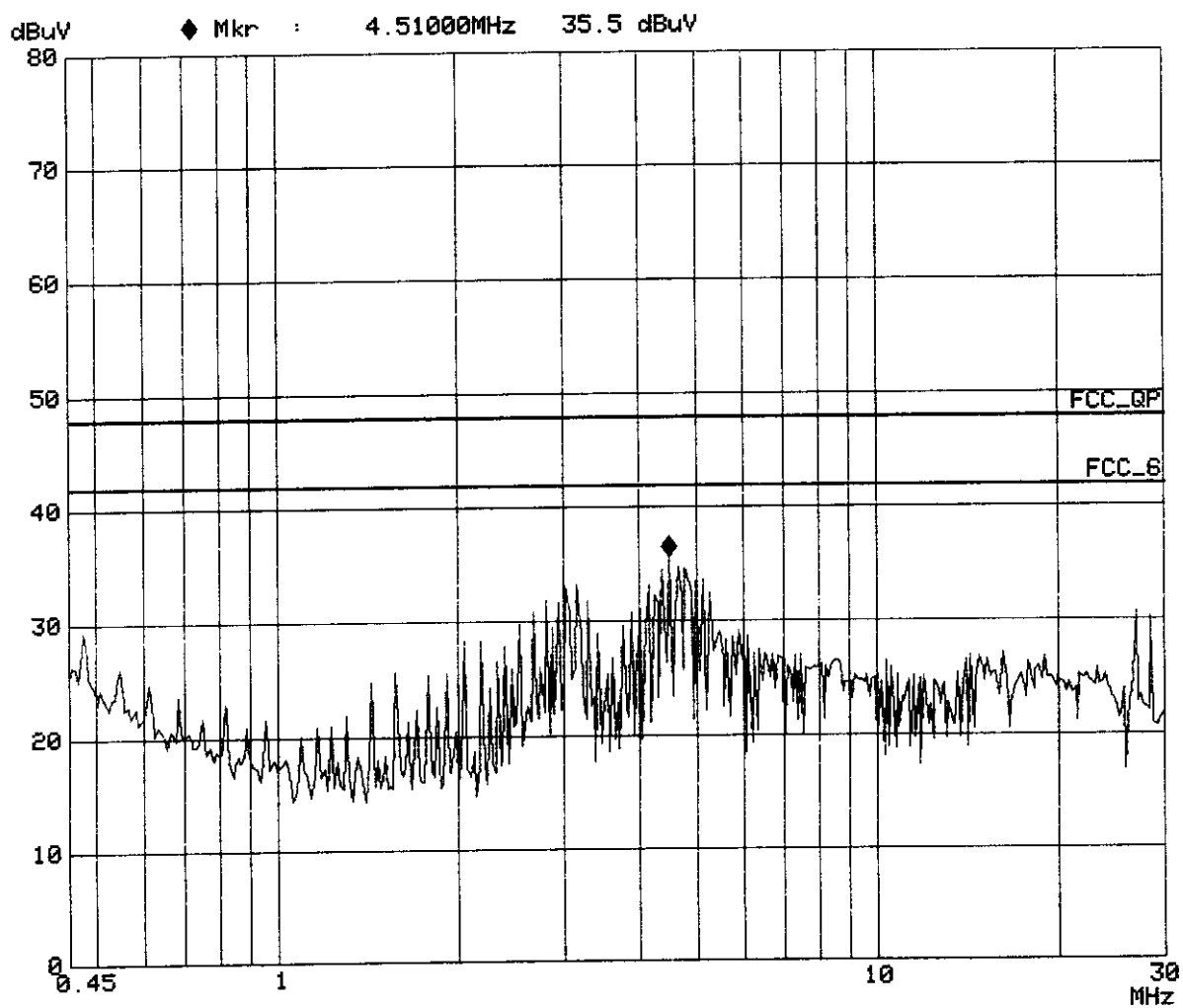
EUT: NOTEBOOK PC
Manuf: FIC
Operator: JACK HUANG
Test Spec: FCC CLASS B
Comment: Line 1
M/N: Ruby 2.0
Date: 28. Jan 99 21:40



ROHDE & SCHWARZ ESHS 30

GesTek, PowerLine Conducted Emission

EUT: NOTEBOOK PC
Manuf: FIC
Operator: JACK HUANG
Test Spec: FCC CLASS B
Comment: Line 2
M/N: Ruby 2.0
Date: 28. Jan 99 21:29



4. Radiation Emission Test

4.1 Test Equipment

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

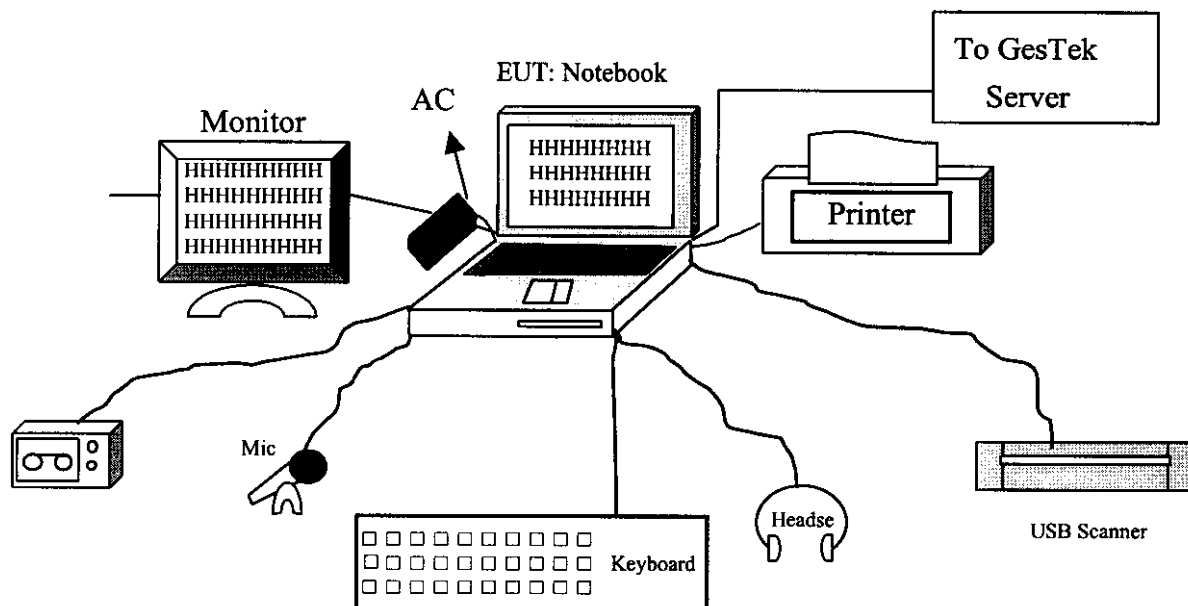
Radiated test was performed on : ☐ Site #1 ☒ Site #2

Instrument	Manufacturer	Type /Serial No.	Last Cal.	Site #1	Site #2
Test Receiver	Rohde & Schwarz	ESVS 10 / 842122/001	Dec. 16,1998	✓	
Spectrum Analyzer	HP	8594E / 3543A02689	N/A	✓	
Pre-Amplifier	HP	8447D / 2944A08272	N/A	✓	
Test Receiver	Rohde & Schwarz	ESCS 30/825022/003	Jul. 20,1998		✓
Spectrum Analyzer	HP	8591E/3543A05040	N/A		✓
Pre Amplifier	HP	8447D/2944A08273	N/A		✓
BILOG ANTENNA	Chase	CBL6112B/2417	May. 16,1998	✓	
BILOG ANTENNA	Chase	CBL6112B/2416	May. 16,1998		✓
Pre Amplifier	HP	8347A/3307A01401	N/A	✓	✓
Dipole Antenna	Schwarzbeck	VHAP/736,,737	May.19,1998	✓	✓
Dipole Antenna	Schwarzbeck	UHAP/719,,720	May.19,1998	✓	✓
Open Site	GesTek	GTK-RF-S01	Jul. 22, 1998	✓	
Open Site	GesTek	GTK-RF-S02	Jul. 03, 1998		✓
RF Cable	GesTek	GTK-RF-C01	May. 16,1998	✓	
RF Cable	GesTek	GTK-RF-C02	May. 16,1998	✓	
RF Cable	GesTek	GTK-RF-C03	May. 16,1998		✓
RF Cable	GesTek	GTK-RF-C04	May. 16,1998		✓
Test Program Software	GesTek	GTK-RF-P01	N/A	✓	
Test Program Software	GesTek	GTK-RF-P02	N/A		✓

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

4.2 Test Setup

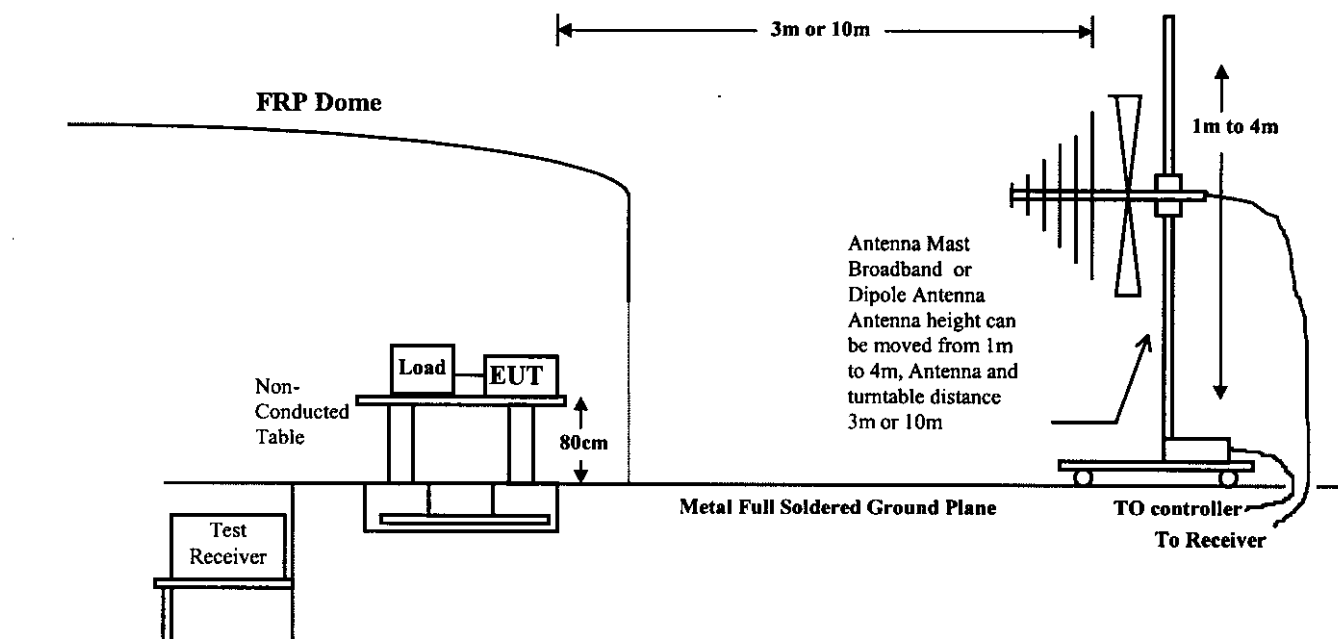
4.2.1 Block Diagram of Connections between EUT and simulators



4.2.2 Open Test Site Setup Diagram

Note: This is a representative 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 - 2000	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 2.3 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 Power Line Test which is listed in 3.5.

4.6 Radiated Emission Data

Radiated emission were investigated over the frequency range of **30 MHz to 2 GHz**. All readings below 1GHz are quasi-peak values with a resolution Bandwidth of 120 KHz, unless otherwise noted. From 1-2GHz was investigated use both peak and average detector use bandwidth 1MHz. 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 reading was measured use a test receiver and reported in the following data pages.

The total uncertainty for this test is as follows:

- Uncertainty in the field strength measured (3m antenna distance): $< \pm 4.0$ dB
- Uncertainty in the field strength measured (10m antenna distance): $< \pm 4.0$ dB

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

Radiated Emission Data

Date of Test :01-28,1999 Thu

Temperature :18 deg/C

EUT :NOTEBOOK P.C.

Humidity :68 %RH

Working Cond.:Mode 1

Display Pattern:H Pattern

Frequency	Cable	Antenna	Reading Level	Emission Level	Limit
	Loss	Factor	Horizontal	Horizontal	
[MHz]	[dB]	[dB/m]	[dB(uV)]	[dB(uV/m)] (uV/m)	(uV/m)
114.533	1.48	12.40	12.71	26.59 21.36	150
128.850	1.63	12.27	19.85	33.75 48.70	150
167.118	2.07	9.75	19.24	31.06 35.74	150
194.068	2.14	9.95	20.45	32.54 42.35	150
200.080	2.20	10.20	23.66	36.06 63.53	150
231.980	2.39	11.65	22.83	36.87 69.76	200
299.230	2.89	13.54	18.38	34.81 55.01	200
324.993	3.06	14.06	15.46	32.58 42.55	200
*574.983	4.35	19.14	19.21	42.69 136.33	200
599.983	4.50	19.40	14.70	38.60 85.08	200
624.983	4.60	19.71	7.78	32.09 40.22	200
674.985	4.90	20.00	8.73	33.63 48.04	200
759.983	5.46	20.50	13.12	39.08 89.92	200
952.388	6.31	22.29	10.82	39.42 93.54	200
999.980	6.50	22.00	10.16	38.66 85.70	500
1024.976	6.56	22.00	14.30	42.86 138.96	500 PK
1024.976	6.56	22.00	5.01	33.57 47.68	500 AV

Remarks: 1. All Readings below 1GHz 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.

5.For open case test mode, the limit extent 6dB more.

Radiated Emission Data

Date of Test :01-28,1999 Thu

Temperature :18.1 deg/C

EUT :NOTEBOOK P.C.

Humidity :68 %RH

Working Cond.:Mode 1

Display Pattern:H Pattern

Frequency	Cable	Antenna	Reading Level	Emission Level	Limit
	Loss	Factor	Vertical	Vertical	
[MHz]	[dB]	[dB/m]	[dB(uV)]	[dB(uV/m)]	(uV/m) (uV/m)
59.018	1.16	6.32	15.41	22.89	13.95 100
166.679	2.07	9.75	21.54	33.36	46.58 150
184.325	2.04	9.56	18.33	29.93	31.36 150
*231.800	2.39	11.65	28.17	42.21	129.00 200
298.700	2.89	13.54	17.59	34.02	50.22 200
574.990	4.35	19.14	19.07	42.55	134.15 200
759.988	5.46	20.50	12.80	38.76	86.66 200
1024.976	6.56	22.00	15.82	44.38	165.53 500 PK
1024.976	6.56	22.00	7.19	35.75	61.29 500 AV
1475.021	7.59	25.02	0.09	32.70	43.17 500 AV
1475.021	7.59	25.02	12.19	44.80	173.85 500 PK

Remarks: 1. All Readings below 1GHz 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.

5.For open case test mode, the limit extent 6dB more.