

**Test Report  
Application for Certification  
On Behalf Of**

**First International Computer Inc.**

**Notebook P.C.**

**Model Name : S220**

**Prepared for :  
First International Computer Inc.  
6F.,Formosa Plastics Rear Bldg 201-24,Tun-Hwa N. Road,  
Taipei, Taiwan, R.O.C.**

**Report By : Global EMC Standard Tech. Corp.  
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# 1. STATEMENT OF RESULTS:

**Applicant** : **First International Computer Inc.**

EUT Description : Notebook P.C.

Model Name : S220

Serial Number : N/A

FCC ID : EUNS220

Tested Power Supply : 110V/60Hz

## MEASUREMENT PROCEDURES USED:

- CFR 47, Part 15** Radio Frequency Device Subpart B Unintentional Radiators ClassB: 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 : September 29, 2000

Final Test Date : October 09, 2000

In order to ensure the quality and accuracy of this document, the contents have been thoroughly reviewed by the following qualified personnel from GesTek Lab.

**Documented By :**

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**Approved By :**

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Ivan Chiang / eng. Dept. Supervisor

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Terry Chung / Manager

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 P.C.  
 Model Name : S220  
 Serial Number : N/A  
 FCC ID : EUNS220  
 Applicant : First International Computer Inc.  
 Address : 6F.,Formosa Plastics Rear Bldg 201-24,Tun-Hwa N. Road, Taipei, Taiwan, R.O.C.  
 Manufacturer : First International Computer Inc.  
 Address : 122, Nan-Lin Rd., Taishan Hsiang, 243 , Taipei, Taiwan, R.O.C.  
 Power Supply : AC Input: 100-240V, 50-60Hz, 1.5A  
 DC Output: 19V, 3.16A  
 Power Cord : Non-Shielded, Detachable, 1.8m, 3Pin

### 2.2 Results:

The EUT(s) met the FCC Part 15 / CISPR 22 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 1)	0.89327	26.7 dB $\mu$ V Line 1, AV	46.00 dB $\mu$ V	N/A
Radiation (Mode 1)	116.080	26.64 [dB( $\mu$ V/m)] Horizontal	30.00 [dB( $\mu$ V/m)]	4M 106°

**Tested Engineer By:** \_\_\_\_\_ **(Steven Lee)**

\_\_\_\_\_ **(Gavin Tsai)**

- The EUT did not require modification during testing to achieve compliance.
- The EUT required modification during testing in order to achieve compliance. Please refer to attached section of this report for details.

**Test Mode :**

	<b>Mode 1</b>
<b>CPU</b>	Intel Pentium III 600MHz, Clock:100MHz
<b>12.1" TFT Panel</b>	ADI, M/N:AA121SJ23 (SVGA)
<b>H.D.D.</b>	Fujitsu, M/N:MHM2100AT
<b>FDD/CD-ROM COMBO</b>	Addonic, M/N:CF-2405
<b>3-in-1 Port Bar</b>	Addonic, M/N:S220-PB
<b>Li-Ion Battery</b>	SMP/GS, M/N:S220-A
<b>External Li-Ion Battery</b>	SMP/GS, M/N:S220-B
<b>Modem Board</b>	Askey, M/N:1456VQL19S
<b>Modem Jack</b>	FIC, M/N:80-319W235-1
<b>Glide Pad</b>	Synaptics, M/N:TM-41PDC-220-2
<b>Main Board</b>	FIC, M/N:S220MB
<b>DC/DC/Charger Board</b>	FIC, M/N:50-70475-05
<b>Inverter</b>	Sumida, M/N:IV14145/T
<b>Adapter</b>	LI-Shin, M/N:LSE-9802A1660, 3Pin
<b>Resolution</b>	800 x 600, H-Sync:38KHz, V-Sync:60Hz

**Note:**

1. This is an series report. Original report number is GesTek#0007031F, Because of CPU upgrade to 600MHz and added items at section 2.3, it may be interfered EMI test result, so we tested again.
2. The data shown in this test report reflects the worst-case data for each operation mode.

### 2.3 Configuration of the Tested System

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

No.	CATEGORY	MODEL NO.	VENDOR
1.	CPU	Pentium III 600 MHz	Intel
2.	H.D.D.	DK23BA-10	Hitachi
3.	H.D.D.	MHM2100AT	Fujitsu
4.	H.D.D.	DK23BA-20	Hitachi
5.	H.D.D.	MHM2200AT	Fujitsu
6.	DC/DC/Charger Board	50-70475-05	FIC

**Electronic Private Automatic Branch Exchange O01-003**

Model Number : EASYSWITCH PX-4  
 Serial Number : 95030015  
 FCC ID : N/A  
 Manufacturer : VIDAR CO., LTD.  
 Power Cord : Non-Shielded, Detachable, 1.5m  
 Data Cable : Non-Shielded, Detachable, 1.5m

**Monitor M01-010**

Model Number : SyncMaster 700p  
 Serial Number : H3MH903296Y  
 Manufacturer : SAMSUNG  
 FCC ID : A3LCGH760  
 BSMI ID : 3872A230  
 Data Cable : Shielded, Undetachable, 1.5m  
 Power Cord : Non-Shielded, Detachable, 1.8m

**Modem M03-020**

Model Number : 1414V  
 Serial Number : 0046173  
 Manufacturer : ACEEX  
 Adaptor, Power Cord : Non-Shielded, Detachable, 1.8m  
 Data Cable : Shielded, Detachable, 1.5m

**Mouse #1 M02-101 (USB)**

Model Number : M-UB48  
Serial Number : LZE93651691  
FCC ID : DZL211137  
Manufacturer : Logitech Inc  
Data Cable : Shielded, Undetachable, 1.5m

 **Mouse #2 M02-096 (USB)**

Model Number : M-UB48  
Serial Number : LZE93651302  
FCC ID : DZL211137  
Manufacturer : Logitech Inc  
Data Cable : Shielded, Undetachable, 1.5m

 **Keyboard K01-041**

Model Number : 5123W  
Serial Number : 6005410233  
FCC ID : E5XKBP104M10  
Manufacturer : Behavior Tech  
Data Cable : Sheiled, Undetachable, 1.5 m

 **Printer P01-017**

Model Number : 2225C  
Serial Number : 2608S30068  
FCC ID : BS46XU2225C  
Manufacturer : HP  
Power Cord : Non-Shielded, Detachable, 1.8m  
Data Cable : Shielded, Detachable, 1.5m

 **Headset & Microphone E01-033**

Model Number : SX-M1  
Serial Number : N/A  
Manufacturer : TOKYO  
Power Cord : N/A  
Data Cable : Non-Shielded, Undetachable, 1.8 m  
Purchase Date : 2/22/1999

## 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 10 meters.

(For frequencies below 1000MHz)

Radiated testing was performed at an antenna to EUT distance of 3 meters.

(For frequencies above 1000MHz)

## 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 States Department of commerce  
National Institute of Standards and Technology  
National Voluntary Laboratory Accreditation Program  
Accreditation on NVLAP effective through Sep. 30, 2000  
For CISPR22, FCC Method and AS/NZS 3548 Measurement.

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. Conduction Emission Test

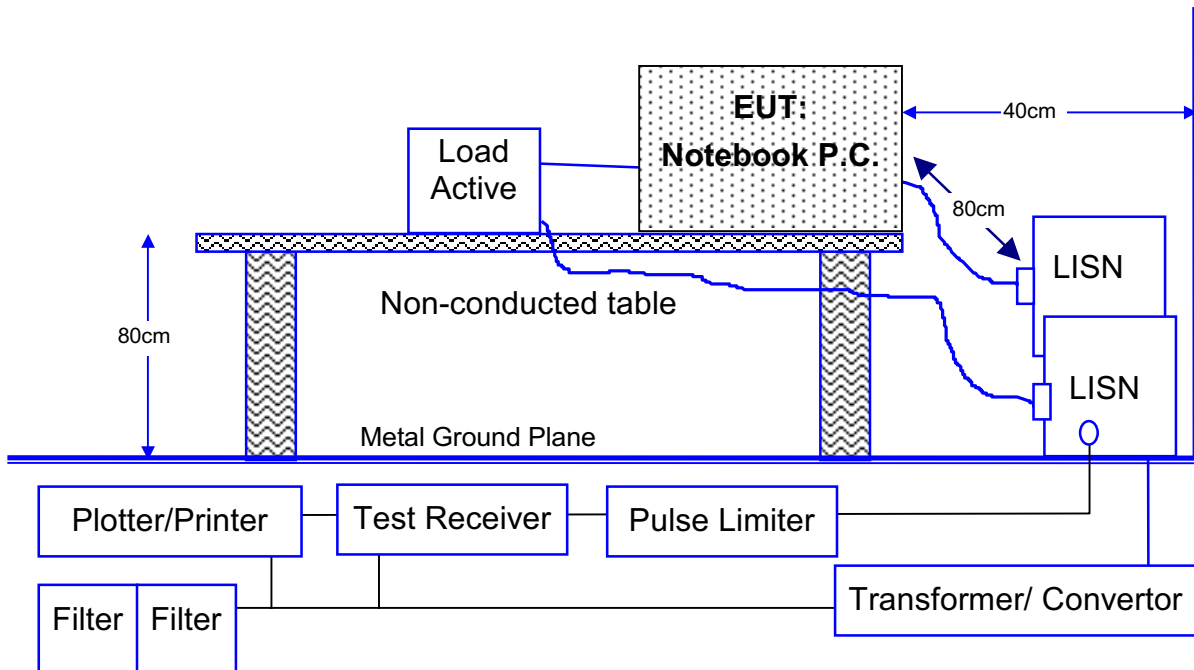
#### 3.1 Test Equipments

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. 10, 2000
4	Pulse Limiter	Rohde & Schwarz	ESH3-Z2/357.8810.52	Aug. 30, 2000
5	RF CABLE	GesTek	GTK-RF-C07	Aug. 30, 2000
6	50 Ohm Terminator	GesTek	GTK-RF-T01	Nov. 05, 1999
7	Shielded Room	GesTek	GTK-RF-S04	Aug. 30, 2000

Note: All measurement critical items of test instrumentation were within their 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

FCC Limit

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

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

CISPR Limit

Frequency	Maximum RF Line Voltage dB(μV)			
	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 equal to 80cm. Powered from one L.I.S.N. which signal output to receiver, and the other peripherals 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:

1. Setup the EUT and simulators as shown on 3.2
2. Turn on the power of all equipments.
3. Adjust to appropriate video resolution.
4. Connected the modem and dial repeatedly.
5. The EUT exchange the information with the network via and telephone exchange.
6. Run "EMITEST.EXE" test program under Windows 98 OS.
7. P.C. sent "H" pattern to monitor, make the "H" pattern full in the screen.
8. P.C. sent "H" pattern to printer, modem port.
9. P.C. sent "H" pattern to com port, serial port.
10. Repeat above steps.

### 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 total uncertainty for this test is as follows:

- Uncertainty in the field strength measured:  $< \pm 2.0$  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 : October 02, 2000      Temperature : 25.6 °C  
 EUT : Notebook P.C.      Humidity : 48 %  
 Test Mode : Mode 1      Display Pattern : H Pattern

FREQUENCY MHz	READING LEVEL dBuV				LIMIT	
	LINE1 QP	LINE1 AV	LINE2 QP	LINE2 AV	QP	AV
0.17555	34.5	25.5	35.3	27.3	64.7	54.7
0.23682	29.3	21.2	27.2	19.8	62.2	52.2
0.29815	30.4	24.5	26.3	21.5	60.2	50.2
0.41522	29.8	27.2	26.2	21.3	57.5	47.5
** 0.89327	29.4	26.7	27.2	20.7	56.0	46.0
21.74658	28.7	27.8	27.8	26.8	60.0	50.0

Remarks :

1. All readings are Quasi-peak.
2. “ \* ” means that the quasi-peak reading level is lower than 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 Site #2 Site #3 Site #4

Item	Instrument	Manufacturer	Type / Serial No.	Last Cal. Date
1	Test Receiver	Rohde & Schwarz	ESCS 30 / 849650/023	Nov. 19,1999
2	Spectrum Analyzer	ADVANTEST	R3272 / 82420232	N/A
3	Pre-Amplifier	HP	8447D / 2944A08610	N/A
4	Pre Amplifier	HP	8347A / 3307A01401	N/A
6	BILOG ANTENNA	Chase	CBL6112B/2580	June 10, 2000
7	RF Cable	GesTek	GTK-RF-C15	Nov. 27,1999
8	Open Site	GesTek	GTK-RF-SB1	Nov. 27, 1999
9	Test Program Software	GesTek	GTK-RF-P07	N/A

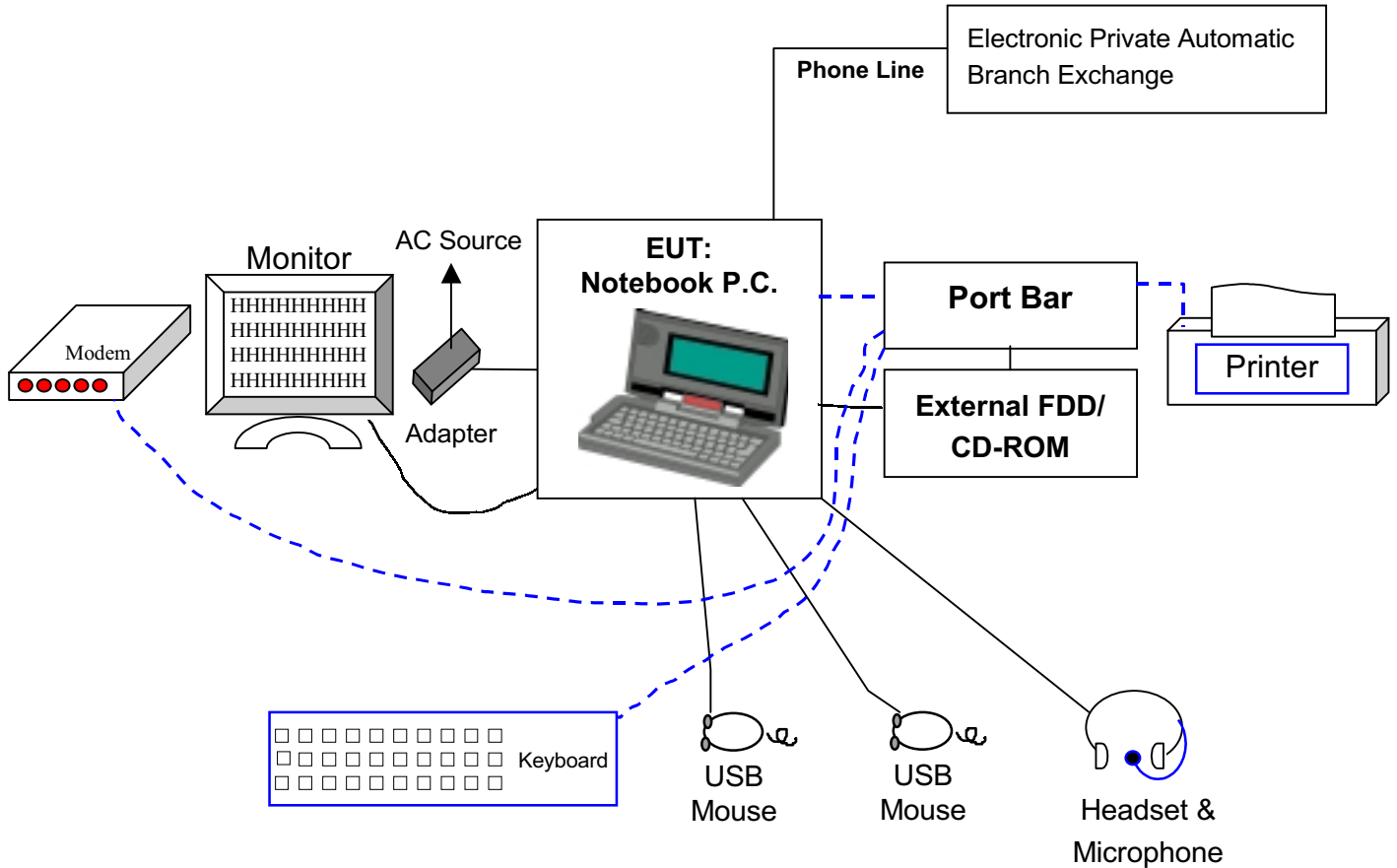
Note: All measurement critical items of test instrumentation were within their calibration period of 1 year.

## 4.2 Test Setup

### 4.2.1 Block Diagram of Connections between EUT and simulators

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

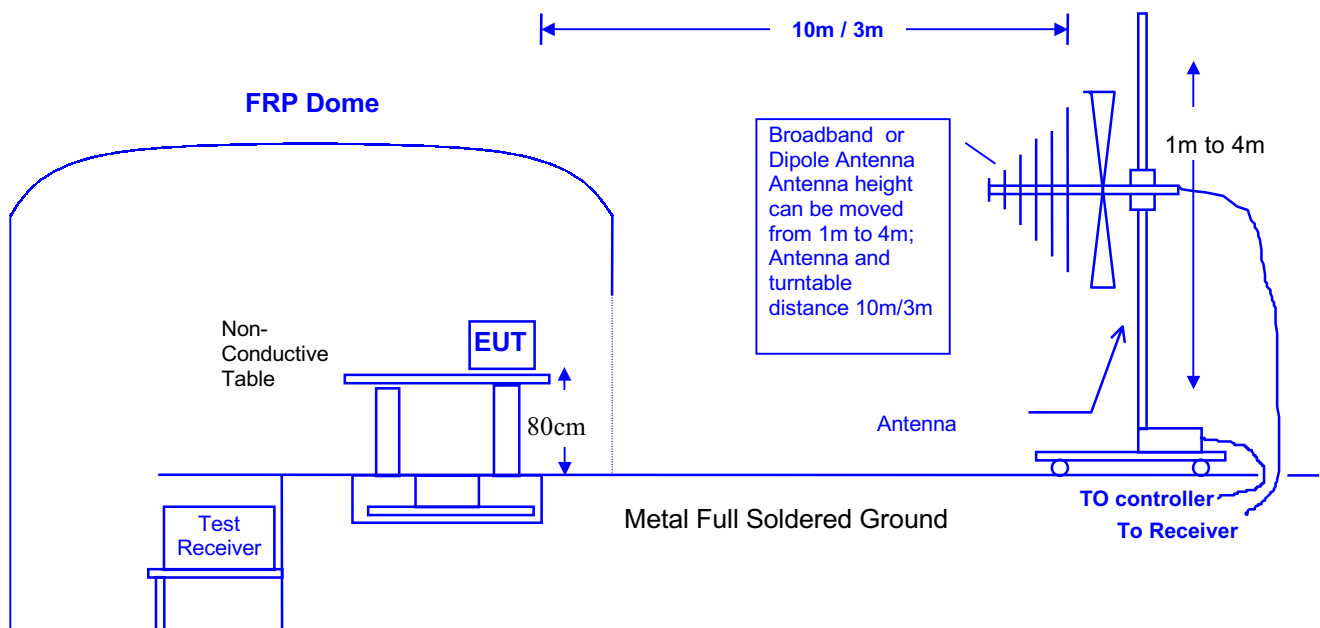
For Floor-standing EUT, the table will be removed with all others setup condition remain the same.



### 4.2.2 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

#### FCC Class B Limit at 3m

Frequency	Distance	Field Strength	
MHz	Meter	$\mu\text{V}/\text{M}$	$\text{dB}\mu\text{V}/\text{M}$
30 - 88	3	100	40.0
88 - 216	3	150	43.5
216 -960	3	200	46.0
Above 960	3	500	54.0

Note: The frequencies above 1000MHz, as measured using instrumentation with a peak detector function was corresponding to 20dB above the maximum permitted average limit. (refer 47CFR Ch. 1 (10-1-98 Edition §15.35(b)))

#### FCC Class A Limit at 10m

Frequency	Distance	Field Strength	
MHz	Meter	$\mu\text{V}/\text{M}$	$\text{dB}\mu\text{V}/\text{M}$
30 - 88	10	90	39.0
88 - 216	10	150	43.5
216 -960	10	210	46.4
Above 960	10	300	49.5

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.

#### CISPR Class B Limit at 10m

Frequency	Distance	Field Strength
MHz	Meter	$\text{dB}(\mu\text{V}/\text{M})$
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 equipment 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 Test which are listed in 3.5.

## 4.6 Radiated Emission Data

The measurement range of radiated emission, which is from **30 MHz to 5 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 and then use test receiver for final measurement. Then the worst modes were reported the following data pages.

The total uncertainty for this test is as follows:

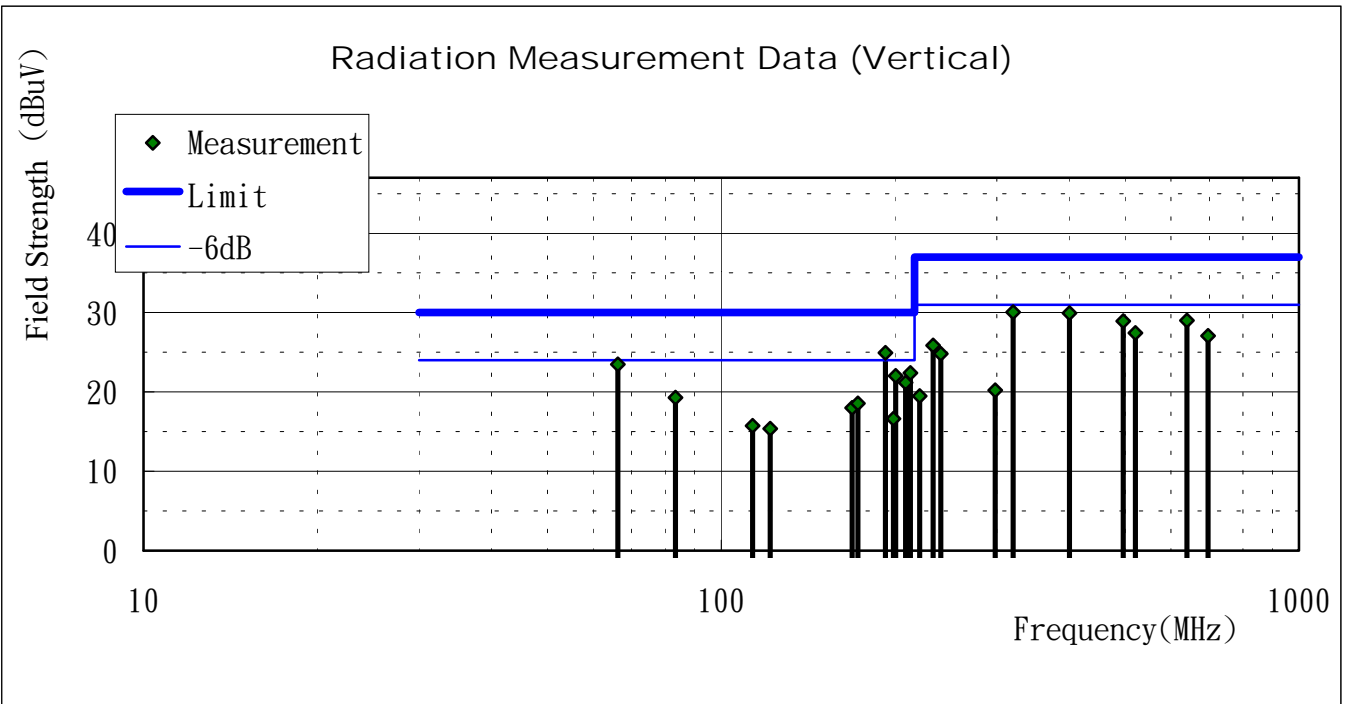
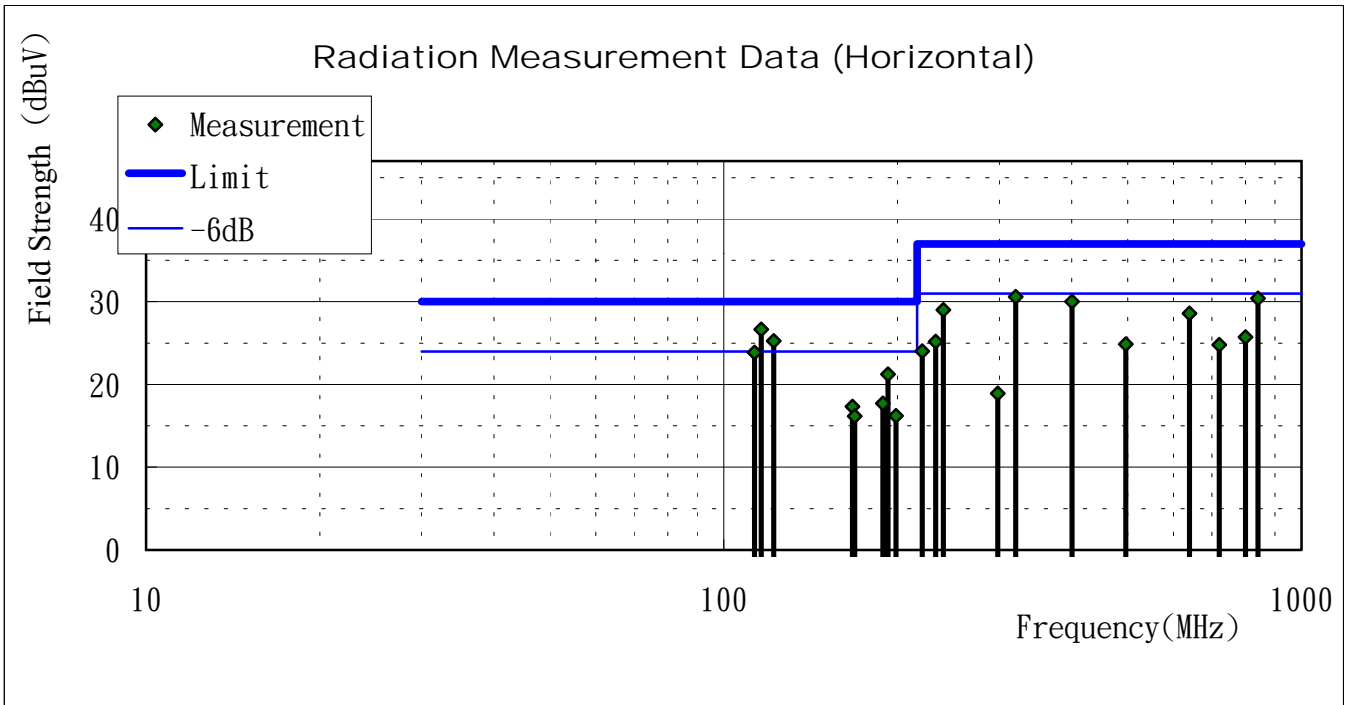
- Uncertainty in the field strength measured (3m antenna distance):  $< \pm 4$  dB
- Uncertainty in the field strength measured (10m antenna distance):  $< \pm 4$  dB

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





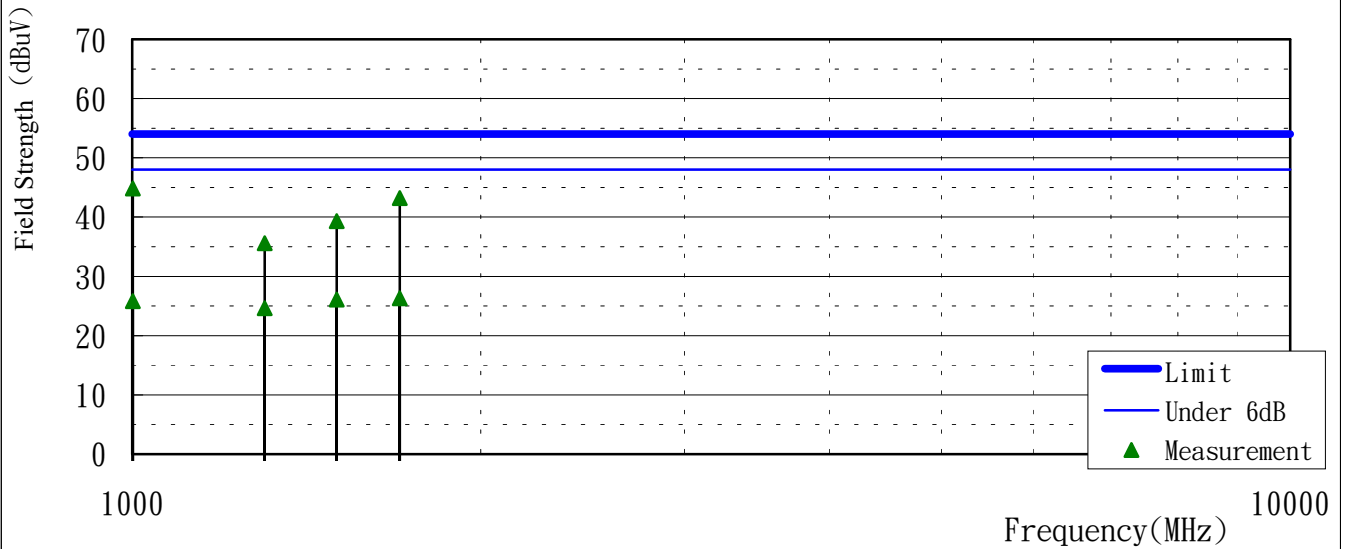




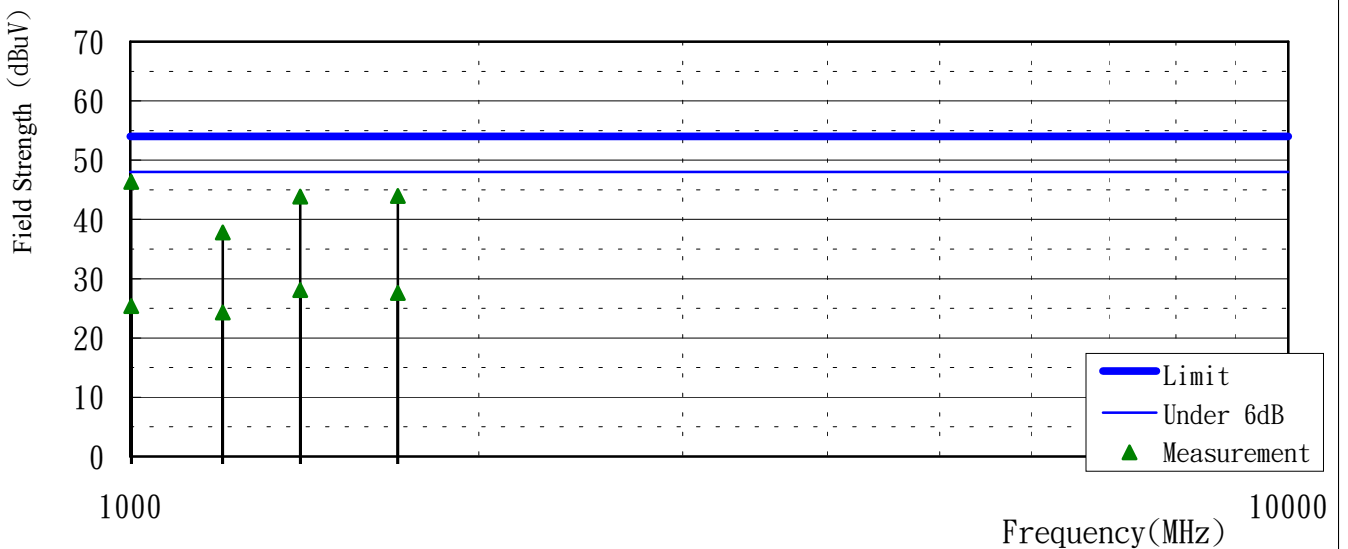




### Radiation Measurement Data(Horizontal)



### Radiation Measurement Data(Vertical)



The following test photographs shown maximum emission configuration condition for each test mode.

## 5. Photographs

### 5.1 Test Photographs

1. Front View Of Conducted Test Setup (Mode 1)
2. Back View Of Conducted Test Setup (Mode 1)



- 3. Front View Of Radiated Test Setup (Mode 1)
- 4. Back View Of Radiated Test Setup (Mode 1)





## 6. EMI Reduction Method During Compliance Testing

1. Added 2 Gasket between PCMCIA part & M/B.
2. Added 1 Gaskets between IrAA & M/B.
3. Added 1 Gasket between SB Port & M/B.
4. Added 1 Gasket at the right side of the H.D.D. top cover.
5. Added three copper foil on the rear side of K/B.
6. Added 1 core & Modem cable is in jack.
7. The Li-Shin Adapter DC output bounded a ferrite core at the jack end.
8. the Delta Adapter DC output bounded a ferrite core at the jack end.