

MEASUREMENT/TECHNICAL REPORT

APPLICANT: SOMAPA Information Technology Co., Ltd.

MODEL NO.: SN-3450,SN-3500,SN-3550,SN-3600

FCC ID: OSJSONIXPC

This report concerns (check one) : **Original Grant** **Class II Change**

Equipment type: PC

Deferred grant requested per 47CFR 0.457(d)(1)(ii)?

Yes No If yes, defer until: _____ (date)

We, the undersigned, agree to notify the Commission by (date) _____ / _____ / _____ of the intended date of announcement of the product so that the grant can be issued on that date.

Transiyion Rules Request per 15.37? Yes No

If no, assumed Part 15, Subpart B for unintentional radiator the new 47 CFR (10-1-90 Edition) provision.

Report Prepared

by Testing House : Neutron Engineering Inc.

for Company Name : SOMAPA Information Technology Co., Ltd.

Address: 51/6-7 Navamintara Rd., Klongkum, Buengkum, Bangkok 10240
Thailand.

Applicant Signature :



Namchoke Somapa / Managing Director

CERTIFICATION

We hereby certify that:

The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (1992)/CISPR 22(1996) and the energy emitted by the sample EUT tested as described in this report is in compliance with CLASS B conducted and radiated emission limits of FCC Rules Part 15, Subpart B/CISPR 22(1996).

Prepared by : Carol Chen**Reviewed by :** Andy Chiu**Approved by :** George Yao**Issued Date :** Oct. 02, 1999**Report No. :** NEI-FCCB-99142**Company Stamp :**

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1. GENERAL INFORMATION

1-1. Product Description

The **SOMAPA Information Technology Co., Ltd.** Model : **SN-3450,SN-3500,SN-3550,SN-3600**(referred to as the EUT in this report) is a person computer. It is designed base on the Intel Pentium III series of processors.

A. The summarized features of the EUT are described as follows:

- ATX form factor of 12x7.75 inches with seven mounting screw holes
- Support for Intel Pentium III processor
- Three DIMM sockets
 - Supports up to 384 MB of synchronous DRAM(SDRAM)memory
- Intel 82440BX AGP set
 - PCI/AGP controller(PAC)
 - PCI ISA IDE Xcelerator(PIIX4E)
- I/O controller
- Two USB ports
- Intel/Phoenix Basic Input/Output System(BIOS)
- Single-jumper configuration
- Accelerated Graphics Port(AGP)connector
-

B. Product Covered

The equipment under test covered in this test report includes the following sub-system, module, and/or accessory:

Sub-system, Module, and/or Accessory	Model/Type No.	Int. Inst./ Ext. Connection
HDD Drive	MPD3064AT	Int. Inst.
FDD Drive	MPF920-1	Int. Inst.
AGP VGA Card	AGP-V3000	Int. Inst.

C. Power Supply

Rating : AC 100-120/200-240V-7/4A,60/50Hz

A non-Shielded, detachable type Power cord, approximun1.5mm, provided.

D. I/O Interface Ports

- Serial Ports : Two provided for Mouse/Modem.
- Parallel Port : One provided for centronics printer.
- KB/Mouse Ports : Two Din connectors provided for KB and Mouse.
- USB Ports : Two provided for USB devices.
- Game Port : One provided for Joystick. It is not available during this report measurement.
- Audio Port : Three provided for audio In/Out devices. It is not available during this report measurement.

1-2. Related Submittal(s) / Grant (s)**1-2-1. Models Covered**

Models covered in this test report for FCC ID filing are:SN-3450,SN-3500,SN-3550,SN-3600.

1-2-2. Models Difference

Model difference between each other is the CPU type no. designation. They are:

Model	CPU Type No.
SN-3450	Pentium III-450
SN-3500	Pentium III-500
SN-3550	Pentium III-550
SN-3600	Pentium III-600

1-3. CPU Information

The EUT is designed to accept interchangeable CPU Processor which the user may purchase either together with a system or separately. At the time of testing, only PentiumIII-600 of CPU were available for model SN-3600 Computer System.

CPU Processor	CPU Speed	Clock Speed / Osc.Freq.
Pentium III-450	450MHz	100MHz
Pentium III-500	500MHz	100MHz
Pentium III-550	550MHz	100MHz
Pentium III-600	600MHz	100MHz

1-4. Tested System Details

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

Notes:

- (1) EUT submitted for grant.
- (2) Monitor's attached video cable without ferrite core.
- (3) The support equipment was Authorized by Declaration of Conformity.

1-5. Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (1992) and CISPR22(1996). Radiated testing was performed at an antenna to EUT distance 10 meters.

1-6. Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on the address of **No. 132-1, Lane 329, Sec. 2, Palain Road, Shijr 221, Taipei, Taiwan, R.O.C.** of NEUTRON ENGINEERING INC. This site has been fully described in report dated **Jun. 25, 1999** Submitted to your office, and accepted in a letter dated **Sep. 02, 1999 (Reg. No. 95335)**.

3. System Test Configuration

3-1. Justification

The system was configured for testing in a typical fashion (as a customer would normally use it). Peripherals of EUT such as keyboard, modem, printer, monitor and, mouse. were also contained in this system in order to comply with the ANSI C63.4/CISPR 22 Rules requirement.

Moreover, the EUT provides two USB ports for interface with the USB interface protocols devices, two USB devices (such as KB and Mouse) were connected respectively [during the measuring](#).

The only inserted I/O Card is the AGP-V3000 Video display card. The system was tested in the default 640x480/31.5KHz mode and in the highest resolution mode of 1600x1200/106KHz. Since the highest graphic mode of 1600x1200/106KHz was found to be the worst case, this mode was used to collect the included data.

In addition, the EUT is designed to accept interchangeable CPU processor, the VGA resolution mode set to highest one being used and perform pre-scanning for each separate CPU Speed utilized in the EUT. The CPU speed at 600MHz/100MHz external clocks in conjunction with the highest video resolution mode was selected for final measurements.

3-2. EUT Exercise Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The software, contained on a 3-1/2 inch disk, was inserted into driver A and is auto-starting on power-up. Once loaded, the program sequentially exercises each system component in turn. The sequence used is:

1. Read (write) from (to) mass storage device (Disk).
2. Send "H" pattern to video port device (Monitor).
3. Send " H " pattern to parallel port device (Printer).
4. Send " H " pattern to COM port device (Modem).
5. Repeated from 1 to 4 continuously.

As the, Keyboard/USB Keyboard and mouse/USB mouse are strictly input devices, no data is transmitted to (from) them during test. They are, however, continuously scanned for data input activity.

3-3. Special Accessories

N/A

3-4. Equipment Modifications

Not available for this EUT intended for grant.

Applicant Signature : Namchoke Somapa. **Date :** Sep. 06, 1999
Type/Printed Name : Namchoke Somapa **Position :** Managing Director

3.5 Configuration of Tested System

The configuration of tested system is described as the block diagram shown in next page Figure 3.1 and details information of I/O cable an power cord connection are tablized as Table A and B. The monitor is powered from a floor mounted receptale(referred to as the wall outlet in the previous described)was tested.

TABLE A - Test Equipment

Item	Equipment	Mfr.	Model/Type No.	I/O Port	FCC ID	Remark
E-1	PC	SOMAPA	SN-3600		OSJSONIXPC	EUT
E-2	Monitor	HITCAHI	CM753ET	VGA Port	N/A (3)	
E-3	Printer	SII	DPU-414	Centronic Port	N/A (3)	
E-4	Modem	ACEEX	DM-1414V	Com Port	N/A (3)	
E-5	Keyboard	Forward	FDA-104GA	PS/2 Port	F42FDA-104G	
E-6	Mouse	HP	M-S34	PS/2 Port	DZL211029	
E-7	USB K/B	BTC	BTC7932	USB Port	N/A (3)	
E-8	USB Mouse	PRIMAX	MOSUU	USB Port	N/A (3)	

Remark:

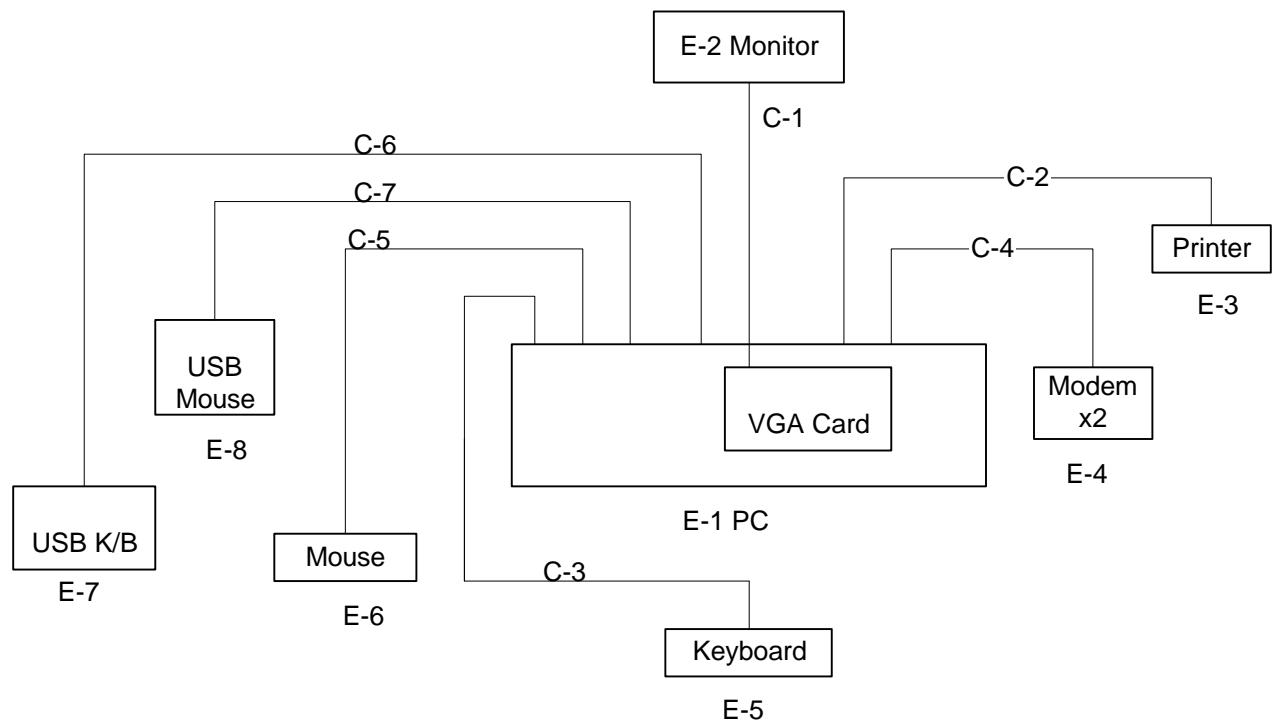
- (1) Unless otherwise denoted as EUT in **Remark** column , device(s) used in tested system is a support equipment.
- (2) Unless otherwise marked as **°** in **Remark** column, Neutron consigns the supporting equipment(s) to the tested system.
- (3) The support equipment was Authorized by Declaration of Conformity.

Table B. - Informations Cable Information

Item	I/O Cable	Device Connected	Shieded	Ferrite	Detachable/Permanently	Note
C-1	Video Cable	EUT-Monitor	Yes	No	Permanently attached	
C-2	Centronics Cable	EUT -Printer	Yes	No	Detachable type	
C-3	Keyboard Cable	EUT - Keyboard	Yes	No	Permanently attached	
C-4	RS-232C Cable	EUT- Modem	Yes	No	Detachable type	
C-5	Mouse Cable	EUT- Mouse	Yes	No	Permanently attached	
C-6	USB K/B Cable	EUT- USB K/B	Yes	No	Permanently attached	
C-7	USB Mouse Cable	EUT- USB Mouse	Yes	No	Permanently attached	

Note:

(1) Unless otherwise marked as * in (Remark) column, Neutron consigns the supporting equipment(s) to the tested system.

Figure 3.1 Configuration of Tested System

4. Block Diagram(s)

Figure 4.1 Block diagram of system, Page 14.A

5. Conducted and Radiated Measurement Photos

5-1. Conducted Measurement Photos



5-2. Radiated Measurement Photos



6. Conducted Emission Data

6.1 The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

EUT Operation/Configuration Mode : Model: SN-3600

Test Mode : 1600x1200/85Hz/107KHz

Judgement : Passed by **-13.26 dB** in mode of **Line** terminal **0.26 MHz**

Freq. (MHz)	Terminal	Measured(dBuV)		Limits(dBuV)		Safe Margins	
		L/N	QP-Mode	AV-Mode	QP-Mode	AV-Mode	(dBuV)
0.26	Line		48.20	*	61.46	51.46	-13.26 (QP)
0.29	Line		45.80	*	60.41	50.41	-14.61 (QP)
4.14	Line		26.40	*	56.00	46.00	-29.60 (QP)
8.87	Line		35.20	*	60.00	50.00	-24.80 (QP)
13.13	Line		28.82	*	60.00	50.00	-31.18 (QP)
0.26	Neutral		48.20	*	61.46	51.46	-13.26 (QP)
0.29	Neutral		45.80	*	60.41	50.41	-14.61 (QP)
4.14	Neutral		26.20	*	56.00	46.00	-29.80 (QP)
8.92	Neutral		35.20	*	60.00	50.00	-24.80 (QP)
13.27	Neutral		28.02	*	60.00	50.00	-31.98 (QP)

Remark :

- (1) Reading in which marked as QP means measurements by using are Quasi-Peak Mode with Detector BW=9KHz ; SPA setting in RBW=100KHz,VBW =100KHz, Swp. Time = 0.3 sec./MHz. Reading in which marked as AV means measurements by using are Average Mode with instrument setting in RBW=1MHz,VBW=10Hz, Swp. Time =0.3 sec./MHz.
- (2) All readings are QP Mode value unless otherwise stated AVG in column of (Note). If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform. In this case, a “*” marked in AVG Mode column of Interference Voltage Measured.
- (3) Measuring frequency range from 150KHz to 30MHz.

Review : Andy Liu Test Personnel. : David Date: Sep. 04, 1999

7. Radiated Emission Datas

7.1 The following data lists the significant emission frequencies, measured levels, correction factor (includes cable and antenna corrections), the corrected reading, as well as the limit. Explanation of the Correction Factor is given in paragraph 7.2.

EUT Operation/Configuration Mode : Model : SN-3600

Test Mode : 1600x1200/85Hz/107KHz

Judgement : Passed by **-3.08 dB** in mode of **Vertical** terminal **428.00 MHz**

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Safe Margins (dBuV/m)	Note
108.31	H	36.30	-15.88	20.42	30.00	-	9.58
108.34	V	39.60	-15.88	23.72	30.00	-	6.28
174.51	H	34.20	-13.98	20.22	30.00	-	9.78
180.51	V	40.90	-14.33	26.57	30.00	-	3.43
198.59	H	39.00	-15.34	23.66	30.00	-	6.34
198.61	V	41.70	-15.34	26.36	30.00	-	3.64
200.00	V	40.60	-15.43	25.17	30.00	-	4.83
203.20	H	39.00	-15.33	23.67	30.00	-	6.33
209.60	H	37.30	-15.05	22.25	30.00	-	7.75
400.80	H	37.90	-7.94	29.96	37.00	-	7.04
400.88	V	41.50	-7.94	33.56	37.00	-	3.44
428.00	V	41.10	- 7.18	33.92	37.00	-	3.08

Remark :

- (1) Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Mode or Peak Mode with Detector BW=120KHz; SPA setting in RBW=1MHz, VBW =1MHz, Swp. Time = 0.3 sec./MHz.
- (2) All readings are Peak unless otherwise stated QP in column of (Note). Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform.
- (3) Measuring frequency range from 30MHz to 1000MHz.
- (4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table.

Review : Andy Chee Test Personnel. : David Date: Sep. 06, 1999

7. Radiated Emission Datas (1GHz~6GHz)

7.1 The following data lists the significant emission frequencies, measured levels, correction factor (includes cable and antenna corrections), the corrected reading, as well as the limit. Explanation of the Correction Factor is given in paragraph 7.2.

EUT Operation/Configuration Mode : Model : SN-3600

Test Mode :1600x1200/85Hz/107KHz

Judgement : Passed by **-5.25** in mode of **Horizontal** terminal **1200.00 MHz**

Freq. (MHz)	Polar. H/V	Reading(RA) (dBuV)	Corr.Factor. (dB)	Corrected FS (dBuV)	Limits (QP) (dBuV/m)	Margins (dBuV/m)	Note (AV)
1200.00	H	40.35	8.40	48.75	54.00	- 5.25	
1268.00	V	28.82	8.83	37.65	54.00	-16.35	
1268.00	H	27.51	8.83	36.34	54.00	-17.66	
1408.00	H	23.57	9.62	33.19	54.00	-20.81	
1508.00	V	23.96	9.88	33.84	54.00	-20.16	
1800.00	V	27.14	11.44	38.58	54.00	-15.42	
1800.00	H	25.70	11.44	37.14	54.00	-16.86	
1896.00	V	23.40	12.28	35.68	54.00	-18.32	
1896.00	H	22.82	12.28	35.10	54.00	-18.90	
2400.00	V	22.77	13.92	36.69	54.00	-17.31	
2464.00	V	25.10	14.03	39.13	54.00	-14.87	
2480.00	H	22.86	14.12	36.98	54.00	-17.02	

Remark :

- (1) Reading in which marked as Peak means measurements by using are Peak Mode with instrument setting in RBW=1 MHz ,VBW =1MHz, Swp. Time = 0.3 sec./MHz.
- (2) Reading in which marked as AV means measurements by using are Average Mode with instrument setting in RBW=1MHz,VBW=10Hz, Swp. Time =0.3 sec./MHz.
- (3) Measuring frequency range from 1000MHz to 6000MHz.
- (4) All readings are Peak unless otherwise stated AV in column of (Note). * marked denotes that the Peak reading compliance with the Average Limits in FCC 15.109 and then the AV Mode measurement didn't perform.
- (5) If the peak scan value lower limit more than 20dB, then this signal data does not show in table

Review i G *Andy Che*

Test Personnel. i G *David*

Date: *Sep. 16, 1999*

7-2. Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$\mathbf{FS = RA + AF + CL - AG}$$

Where **FS = Field Strength**

RA = Receiver Amplitude

AF = Antenna Factor (1)

CL = Cable Attenuation Factor (1)

AG = Amplifier Gain (1) (2)

Remark :

(1) The Correction Factor = AF + CL - AG, as shown in the data tables' Correction Factor column.

(2) AG is not available for Neutron's Open Site Facility

Example of Calculation:

Assume a Receiver Reading of 23.7 dBuV is obtained with an Antenna Factor of 7.2 dB and a Cable Factor of 1.1 dB Then:

1. The Correction Factor will be calculated by

$$\mathbf{Correction Factor = AF + CF - AG = 7.2 + 1.1 - 0 = 8.3 (dB)}$$

as shown in the data tables' Correction Factor column.

2. The Field Strength will be calculated by

$$\mathbf{FS = RA + Correction Factor = 23.7 + 8.3 = 32 (dBmV/m).}$$

FS is the value shown in the data tables' Corrected Reading column and RA is the value shown in

the data tables' Receiver Reading column. The 32 dBuV/m value was mathematically converted

to its corresponding level in uV/m as:

$$\mathbf{Log^{-1}\{(32.0dBuV/m)/20\} = 39.8 (uV/m)}$$

7-3. Correction Factor VS Frequency

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)
30.00	11.10	0.90
35.00	10.80	0.50
40.00	11.20	1.00
45.00	11.50	0.80
50.00	11.30	1.00
55.00	10.50	1.30
60.00	9.90	1.00
65.00	8.70	1.50
70.00	7.60	1.20
75.00	6.40	1.40
80.00	6.10	1.30
85.00	7.00	1.40
90.00	8.00	1.70
95.00	10.00	1.50
100.00	11.20	1.90
110.00	12.60	2.00
120.00	13.00	1.80
130.00	12.50	1.80
140.00	12.00	2.00
150.00	12.00	2.20
160.00	13.20	2.40
170.00	14.80	2.50
180.00	16.30	2.50
190.00	17.00	2.50
200.00	17.30	2.40
225.00	10.50	2.70
250.00	11.70	3.10
275.00	12.80	3.70
300.00	14.50	4.00
325.00	14.00	4.50
350.00	14.20	4.50
375.00	14.60	4.60
400.00	15.10	4.80
450.00	16.20	5.40
500.00	17.60	6.50
550.00	17.80	7.00
600.00	18.40	7.10
650.00	19.50	7.10
700.00	20.80	7.20
750.00	20.50	7.50
800.00	21.10	8.00
850.00	22.40	8.60
900.00	23.50	8.90
950.00	24.00	9.70
1000.00	24.80	10.30

8. Photos of Tested EUT:

1. Photo # 1 Front View Rear View
2. Photo # 2 Rear View
3. Photo # 3 Unit Partially Disassembled
4. Photo # 4 Unit Partially Disassembled
5. Photo # 5 Unit Partially Disassembled
6. Photo # 6 Unit Partially Disassembled
7. Photo # 7 Unit Partially Disassembled
8. Photo # 8 Unit Partially Disassembled
9. Photo # 9 Unit Partially Disassembled
10. Photo #10 Unit Partially Disassembled
11. Photo #11 Unit Partially Disassembled
12. Photo #12 Unit Partially Disassembled

Attachment

User's Manual

