SAMSUNG ELECTRONICS

EMI TEST REPORT

According to FCC Part 15 Subpart B/Class B

Product : Notebook PC
Model No. : Transport VN

FCC ID : A3LSV10

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   All tests necessary to show compliance to the requirements were and these results met the specifications requirement.

Date of test : January 18, 2002

Issued Date : January 21, 2002

Tested by: I. K. Bae
Il Kwon, BAE / Test Engineer

Reviewed by: Yang S. Kim
Yang Soo, KIM / Manager of EMC Lab.

Authorised by: K. B. Chung
Kyu Baek, CHUNG / Chief of EMC Lab.

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NVLAP Code: 200447

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CS Management Center, EMC Laboratory	1 original
Computer Division	1 copy

1. General Information

Applicant	:	Samsung Electronics Co., Ltd. CS Management Center EMC Test Laboratory Tel.: +81-(0)31-200-2135 Fax.: +81-(0)31-200-2189
Full Address	:	416 Maetan 3 Dong, Paldal-Ku, Suwon City, Kyungki Do, Korea, 442-742
Kind of Product	:	**Notebook PC**
FCC ID	:	**A3LSV10**
Project Name	:	**Carina**
Model & Variant Names	:	**Transport VN** (Brand Name: Micronpc)
Test Report Produced by	:	Il Kwon, BAE / Test Engineer

1.1 Product Description

1) Justification

The system was configured for testing in typical fashion use. Cable were attached to each of the available I/O Ports. Where applicable, peripherals were attached to the I/O cables. The mode of operation utilized for testing was selected to best simulate typical EUT use.

The system was pre-tested using the below additional components, and we found worst emission level for the components, were selected as the final components for the test.

Component	Brand and Model Name	Remark
FDD	- Teac, FD-05HG-7765, FDD001246	Worst Case
CD-ROM	- Samsung, SN-124Q, CDI001369	
CD-ROM	- Teac, CD-232E, CDI001375	
CD-RW	- Matsushita, UJDA-330A, CDI001372	
DVD	- Toshiba, SD-C2502, DVD001144	
DVD_CDRW_Combo	- Toshiba, SD-R2102, CDI001370	Worst Case

In each test mode, Finally we found worst case emission that is the Worst Case components (in the above table). So, the DATA of the maximum(worst case) EUT operation was reported.

Further details of cabling and configuration are shown in the test system configuration.

2) Operating Frequency :

1266MHz(CPU Speed), 133MHz(Host Clock), 133MHz(SDRAM Clock),
33.3MHz(PCI Clock), 14.318MHz(Ref. OSC), 49.152MHz(Audio Clock), 25M(Network)
12.288MHz(Audio Bit Clock), 24.576MHz(Audio C24), 66.6MHz(VCH/ICH Clock)
10MHz(Micom Clock), 48MHz(USB Clock), 65MHz(LCD Clock), 66.6(Hub)

3) Description of Testing operating mode

Operating Mode	Operating section of EUT
"H" Pattern display & Read / Write	LCD Screen
	LCD Monitor
	Hard disk drive & DVD-CDRW drive
	LPT1 to Printer
Network	Media Player Playing through Video CD in Network Server
Audio Output	Audio out to Head Set

4) Tested Resolution :

Tested Video mode	Resolutions	Refresh rates	Colors
LCD(14.1")	1024 X 768	60Hz	32bits
Ext. Monitor	1024 X 768	60Hz	32bits

5) Assemble Parts

Item	Specification	Remark
CPU	Intel Pentium-III 1266MHz	PSB 133 uFCPGA2, Cache 512KB
Main Memory (RAM)	SEC, PC133, 512MB (256MB x 2EA) Max. 1GB (512MB x 2EA)	M464S3254 x 2EA M464S6453 x 2EA
Video Controller	IGD(Internal Graphics Device) in GMCH-M 16MB, 400MHz DRDRAM Graphics Memory	 Support Composite Video out
Video Display	SEC, LCD 14.1" TFT, LTN141XU-L02 Upto 1024x768 Pixels; 18-bit colors	
Swap Bay	Toshiba DVD_CDRW COMBO Drive SD-R2102, 8x(CDR),8x(CD-RW), 8x (DVD),24x(CD)	
FDD	Teac, FD-05HG-7765, 3.5", 1.44MB	
HDD	Toshiba 30GB , MK3017GAP	User-removable ; 2.5", 9.5mmH
LAN	10/100 Base-T Ethernet support	
Modem	SEC, SEM-2400iC, V.90 compliant / V92 ready , 56Kbps	AC-Link (Conexant SmartMCII)
Wireless LAN	Agere, MPCI3A-20, Mini-PCI Type IIIA	IEEE 802.11b(11MBPS), Mini PCI
Input Devices	Keyboard, 19mm pitch, 2.5mmH travel length Pointing Device, PS/2 Touchpad w/ 4 button	 Synaptics TM41P-351
Battery	Toshiba, Removable 8-cell Li-Ion Smart, 58.46Wh	
AC Adapter	SEC, 60-Watts, AC 100~240V FREE-VOLTAGE	AD-6019
Ports	2 USB, SIO, PIO, PS/2, RJ-11, RJ-45, DC IN, EXT. MONITOR, MIC-IN, LINE-IN,HEADPHONE- OUT, Card bus slot. Etc	

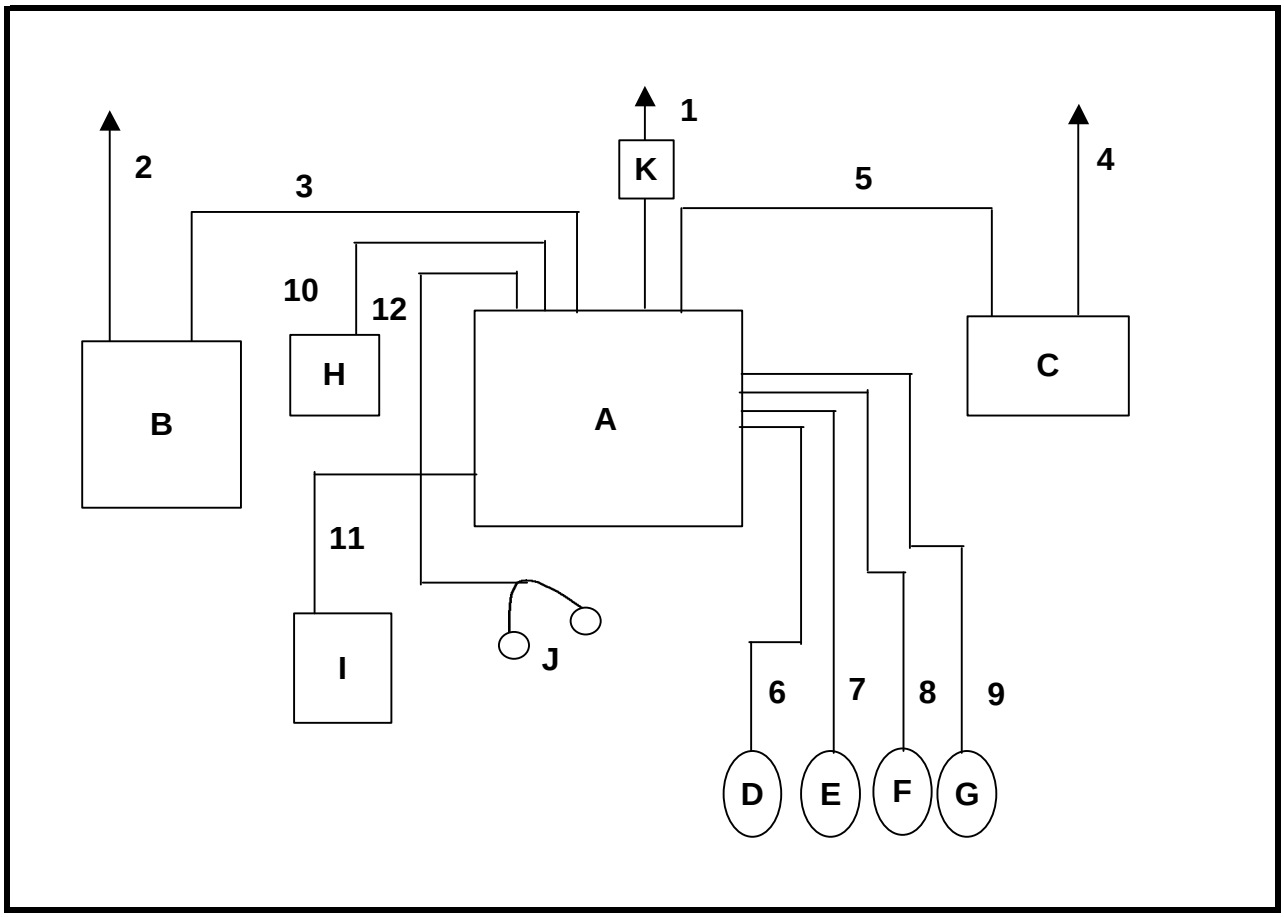
1.2 Configuration of EUT and peripherals

Mark	Item	Model No.	Serial No.	Manufacturer	FCC ID
A	Notebook PC	Transport VN	-	Samsung	A3LSV10
B	External Monitor	TFT7010	147CK23DA274	COMPAQ	Doc
C	Printer	LQ-580H	CG2Y014504	EPSON	Doc
D	USB Mouse	M-U48a	LZC11304011	LOGITECH	JNZ211360
E	USB Mouse	M-U48a	LZE12702570	LOGITECH	JNZ211360
F	PS/2 Mouse	NICHE MOUSE	-	KEY SYSTEM	Doc
G	Serial Mouse	M-M35	LZA71452614	LOGITECH	Doc
H	Portable Cassette	MY-250	160KB00620	Samsung	-
I	Telephone	SSP-2300	42051841	Samsung	-
J	Head Set	BA59-00228A	-	-	-
K	Adapter	AD-6019	-	Samsung	-

1.3 Used Cable Description

No.	Item	Length[m]	Shielded (Y/N)	Remark
1	Power Cable for EUT	3.52	N	AC Mains
2	Power Cable for Monitor	1.82	N	
3	Monitor Cable	1.85	Y	
4	Power Cable for Printer	1.85	N	
5	Printer Cable	1.6	Y	
6	USB Mouse Cable	1.8	Y	
7	USB Mouse Cable	1.8	Y	
8	PS/2 Mouse Cable	1.8	Y	
9	Serial Mouse Cable	1.82	Y	
10	Audio Device Cable	1.9	N	
11	Telephone Cable	1.9	N	
12	Head Set Cable	2.7	N	

1.4 System Block Diagram of Test Configuration



1.5 Test Facility

All test described in this report were performed by :

SAMSUNG ELECTRONICS CO., LTD.
EMC TESTING LABORATORY
416 Maetan 3 Dong, Paldal-Ku, Suwon City, Kyungki Do, Korea, 442-742
Semi Anechoic Chamber #1(Registration Number:98856) and Shielded Room.

This test facility has been filed in FCC under the criteria in ANSI C63.4-1992.

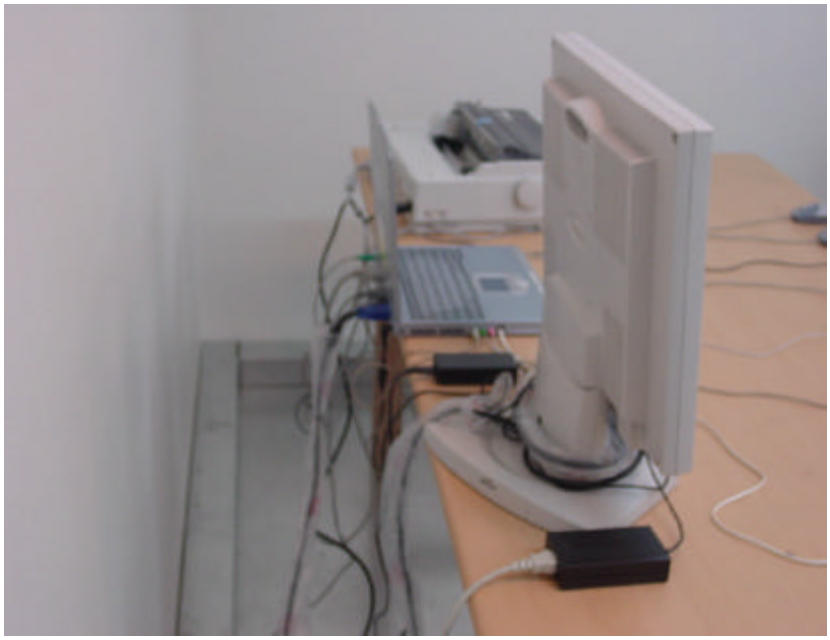
2. System Test Configuration

2.1 Configuration of Radiated and Conducted Interference Measurement

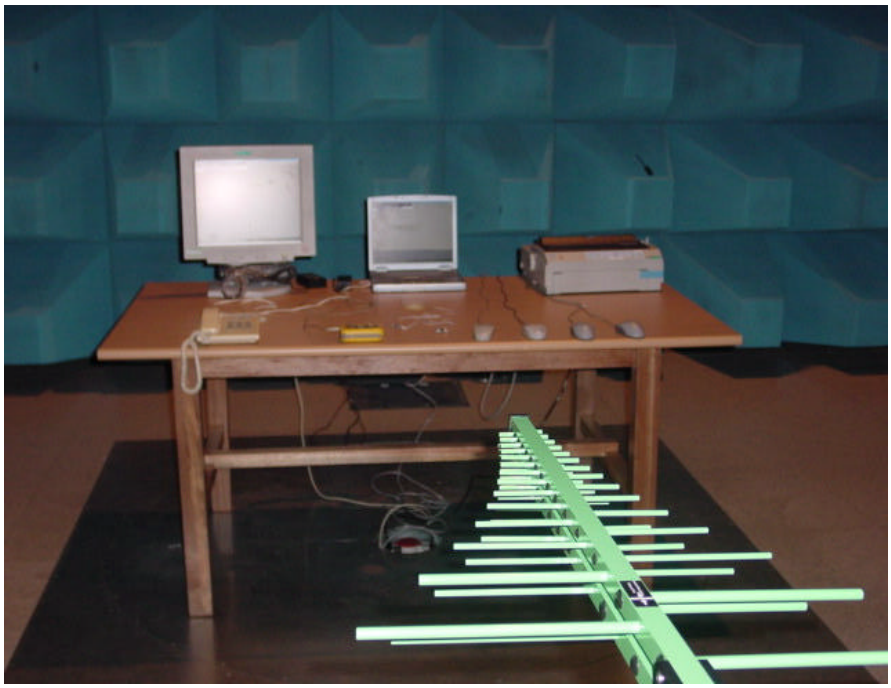
* Cabling was taken into consideration and test data was taken under worse case conditions.

1)Conduction(Front View)

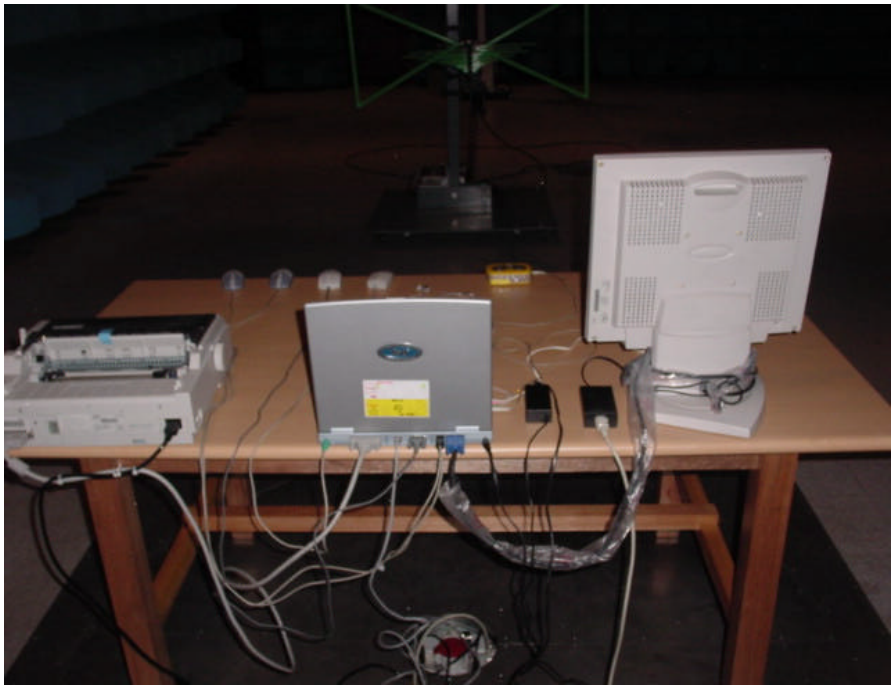
2)Conduction(Rear View)



3) Radiation(Front View)



4) Radiation(Rear View)



2.2 Operation Environment

	Conduction	Radiation
Temperature [C] :	23C	23C
Humidity [%] :	63C	63C
Power supply :	AC120V/60Hz	AC120V/60Hz

2.3 Test Procedure

2.3.1 Conducted Emissions

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane. The rear of tabletop was located 40cm to the vertical conducting ground plane.
The rear of EUT,including peripherals was aligned and flush with rear of tabletop.
All other surfaces of tabletop was at least 80cm from any other grounded conducting surface. I/O cables and AC cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane.
Each EUT current-carrying power lead,except the ground(safety) lead, were individually connected through a LISN to the input power source.
All unused 50 ohm connectors of the LISN were resistively terminated in 50 ohm when not connected to the measuring equipment.

The EUT was switched on and allowed to warm up to its normal operating condition.
A quick scan, from 450kHz to 30MHz, was made on the L1 & L2 line by LISN.
High peaks, relative to the limit line, over the frequency range were then selected.
The EMI TEST RECEIVER was then tuned to the selected frequencies.
CISPR quasi-peak measurements with a receiver bandwidth setting of 10kHz, were taken.

2.3.2 Radiated Emissions

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane.
The rear of EUT,including peripherals was aligned and flush with rear of tabletop.
I/O cables that were connected to the peripherals were bundle in center.
They were folded back and forth forming a bundle 30cm to 40cm long and were hanged 40cm height to the ground plane.

The system configuration, clock speed, mode of operation or video resolution, turntable azimuth with respect to the antenna were noted for each frequency found.
The spectrum was scanned from 30 to 2000 MHz using biconiLog antenna.
Also, the EMI TEST RECEIVER was scanned from 1000 to 18000MHz using linearly polarized double ridge horn antennas were used.

Each emission was maximized by: varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and/or support equipment; powering the monitor from the floor mounted outlet box and the computer aux AC outlet if applicable, and changing the polarity of the antenna; whichever determined the worst-case emission.

The explanation of measuring instrument setup when respective function is used in any frequency band is as following:

Frequency Band [MHz]	Instrument	Detector fuction	resolution Bandwidth	Video Bandwidth
30 to 1000	Spectrum analyzer	Peak	1MHz	1MHz
	EMI Test receiver	Quasi-Peak	120kHz	-
Above 1000	EMI Test receiver	Average	1MHz	-

3. Conducted Emission Test Data

O Test Data Sheet

Frequency	Meter Reading [a]	LISN Pol.	Total Loss [b]	Results [a+b]	Limits	Margin (Limit - Result)
[MHz]	[dBuV]	[L,N]	[dB]	[dBuV]	[dBuV]	[dB]
0.45	41.0	N	0.2	41.2	**48.0**	6.9
0.52	38.7	L	0.2	38.9	**48.0**	9.2
0.72	37.7	N	0.2	37.9	**48.0**	10.1
0.85	42.8	N	0.2	43.0	**48.0**	5.0
0.91	43.7	L	0.2	43.9	**48.0**	4.1
1.04	38.3	L	0.2	38.5	**48.0**	9.6
5.16	35.9	L	0.0	35.9	**48.0**	12.1
6.59	34.7	N	0.0	34.7	**48.0**	13.3
6.72	35.9	L	-0.1	35.8	**48.0**	12.2
7.04	35.4	N	-0.1	35.3	**48.0**	12.7
29.98	34.7	N	-0.1	34.6	**48.0**	13.4

* Results = Meter Reading(QP) + Total Loss(LISN Insertion loss + Cable loss)
* Measurement detector function and bandwidth
  Detector function : CISPR quasi-peak
  Bandwidth : 10kHz

4. Radiated Emission Test Data

Frequency Range [MHz]	Tested Frequency [MHz]	ANT Pol.	Meter Reading [A] [dBuV/m]	Total Loss [B] [dB]	Antenna Height [Cm]	Turn table Degree [Deg]	Results [A+B] [dBuV/m]	Limits at 3m [dBuV/m]	Margin (Limit-Result) [dB]
30 - 88	36.183	V	18.4	16.1	100	0	34.5	**40.0**	5.5
	43.221	H	18.0	12.6	100	0	30.6	**40.0**	9.4
	67.611	H	20.3	6.8	100	0	27.1	**40.0**	12.9
	76.511	H	21.8	8.2	100	0	30.0	**40.0**	10.0
	86.412	H	20.4	8.1	100	0	28.5	**40.0**	11.5
88 - 216	96.352	H	21.6	12.1	100	0	33.7	**43.5**	9.8
	117.942	H	21.4	13.9	100	0	35.3	**43.5**	8.2
	150.321	H	18.1	12.5	100	0	30.6	**43.5**	12.9
	177.154	V	16.5	11.6	100	0	28.1	**43.5**	15.4
	199.215	V	18.7	11.8	100	0	30.5	**43.5**	13.0
216 - 960	306.457	H	19.0	16.8	100	0	35.8	**46.0**	10.2
	322.335	H	21.0	17.4	100	0	38.4	**46.0**	7.6
	399.789	H	21.7	20.1	100	0	41.8	**46.0**	4.2
	859.063	H	12.8	26.9	100	202	39.7	**46.0**	6.3
	933.751	V	15.7	27.4	100	0	43.1	**46.0**	2.9
960 - 7000	1333.0	V	12.4	29.6	100	0	42.0	**54.0**	12.0
	2667.2	V	8.5	36.5	100	0	45.0	**54.0**	9.0
	4001.1	V	6.4	43.3	100	0	49.7	**54.0**	4.3
	5320.8	V	4.8	46.0	100	0	50.8	**54.0**	3.2

** "<" Means equal or less then 5dB*

** Receiving Antenna Mode :* ***Horizontal, Vertical***

** Results = Meter Reading + Total Loss(Antenna factor + Cable loss)*

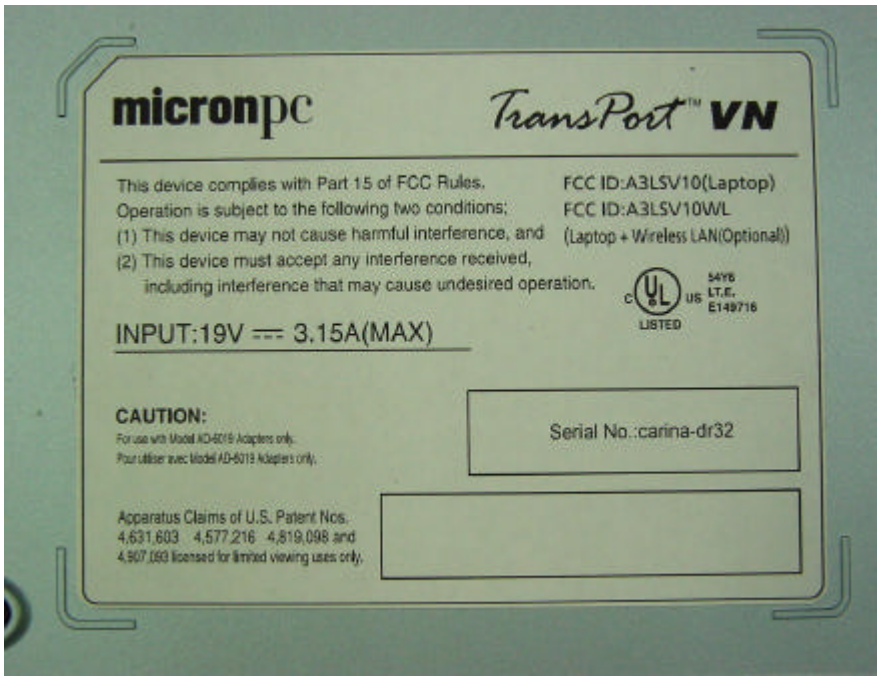
* Measurement detector function and bandwidth

Detector function : CISPR quasi-peak(Above 1000MHz: Average)

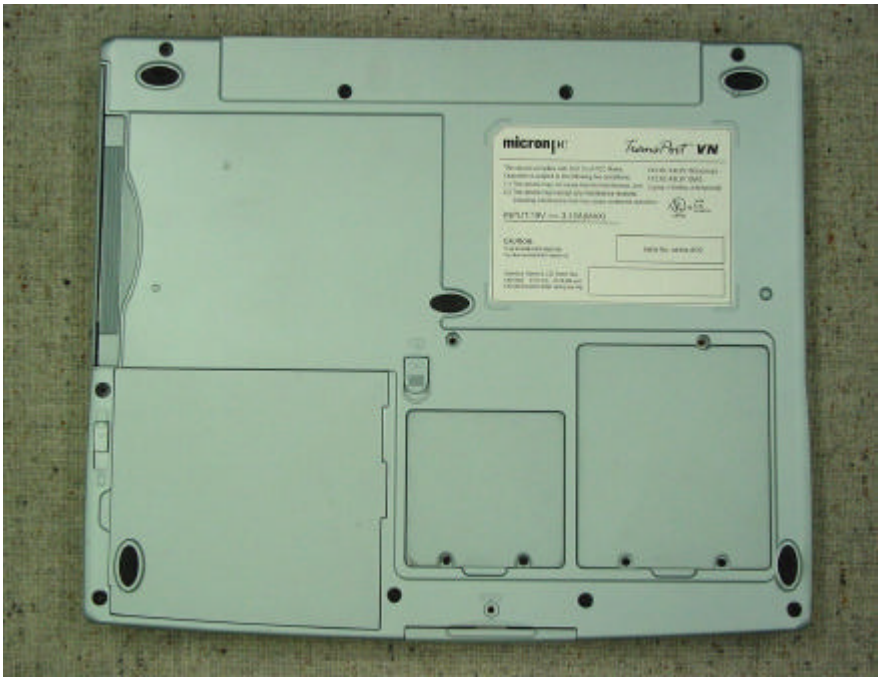
Resolution Bandwidth : 120kHz(Above 1000MHz: 1MHz)

5. FCC Label Configuration and Location

5.1 Label Configulation



5.2 Location of Label



6. Test Equipment Used

Equipment	Model No.	Serial No.	Makers	Calibration Last calibration and Interval
Spectrum analyzer	8566B	3340A21744	H.P	01/ 03/ 20, 12Months
	Firmware versions : Rev.29.9.86			
Quasi-peak adapter	85650A	2521A00687	H.P	01/ 10/ 10, 12Months
RF Preselector	85685A	2602A00224	H.P	01/ 10/ 10, 12Months
Field strength meter	ESCS30	839809/022	R & S	01/ 06/ 18, 12Months
	Firmware versions : Main 1.08, OTP 02.01, GRA 02.03			
Field strength meter	ESI 26	832692/002	R & S	01/ 06/ 18, 12Months
	Firmware versions : BIOS 3.3, Analyzer 2.09.2			
L.I.S.N	3825-2	9208-1981	EMCO	01/ 03/ 23, 12Months
Double Ridged Guide Antenna	3115	9505-4441	EMCO	01/ 06/ 03, 12Months
Bi-Log Antenna	CBL6112B	2767	SCHAFFNER	01/ 01/ 02, 12Months