Korea Technology Institute Co., Ltd.

Certificate of Compliance

Test Report No.:	KTI01E-F0625		
Registration No.:	99058		
Applicant:	Supermicro System Corp.		
Applicant Address:	332-9, Sawoo-Dong, Kimpo , Kyunggi-Do, Korea		
Product:	MULTI-MEDIA GRAPHIC CARD		
FCC ID:	O7IGEFORCE3	Model No.	GEFORCE3
Receipt No.:	KTI20010615	Date of receipt:	June, 15, 2001
Date of Issue:	June, 15, 2001		
Testing location	Korea Technology Institute Co., Ltd. 51-19, Sanglim3-Ri, Docheok-Myeun, Gwangju-Shi, Gyeungki-Do, Korea		
Test Standards:	ANSI. C63.4 : 1992		
Rule Parts:	FCC Part 15, Subpart B		
Equipment Class:	Class B		
Test Result:	The above mentioned product has been tested and passed.		

Prepare by: J. H. Lee	Tested by: S. B. Kim/ Engineer	Approved by: G. C. Min/ President
Signature Date	**Signature Date**	**Signature Date**

Other Aspects :	
Abbreviations :	• OK, Pass=passed • Fail=failed • N/A=not applicable

- This test report is not permitted to copy partly without our permission.
- This test result is dependent on only equipment to be used.
- This test result is based on a single evaluation of one sample of the above mentioned.
- This test report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S Government.
- We certify this test report has been based on the measurement standards that is traceable to the national or international standards.

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1. General

This equipment has been shown to be capable of compliance with the applicable technical standards and was tested in accordance with the measurement procedures as indicated in this report.

We attest to the accuracy of data. All measurements reported herein were performed by Korea Technology Institute Co., LTD. And were made under Chief Engineer's supervision.
We assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

2. Test Site

Korea Technology Institute Co., LTD

2.1 Location

51-19, Sanglim3-Ri, Docheok-Myeun, Gwangju-Shi, Gyeungki-Do, Korea

The Test Site is in compliance with ANSI C63.4/1992 for measurement of radio Interference.

2.2 List of Test and Measurement Instruments

Table 1 : List of Test and Measurement Equipment

- **Conducted Emissions**

Kind of Equipment	Type	S/N	Calibrated until
Spectrum Analyzer	R3261C	61720427	11.2001
Field Strength Meter	ESPC	832827/011	11.2001
LISN	ESH3-Z5	8254601019	5.2002
LISN	KNW407	8-1097-7	11.2001
Pulse limiter	ESH3Z2	357.8810.52	11.2001
Conducted Cable	N/A	N/A	11.2001

- **Radiated Emissions**

Kind of Equipment	Type	S/N	Calibrated until
Field Strength Meter	ESPC	832827/011	11.2001
Spectrum Analyzer	R3261C	61720427	11.2001
Pre Amplifier	8447D	2944A06874	11.2001
Log Periodic Antenna	3146	9105-1343	11.2001
Biconical Antenna	3110	9105-3100	11.2001
Open Site Cable	N/A	N/A	11.2001
Antenna Mast	DETT-03	N/A	N/A
Antenna & Turntable controller	DETT-03	91X519	N/A

2.3 Test Date

Date of Application : June. 15, 2001

Date of Test : Jun. 27, 2001

2.4 Test Environment

See each test item's description.

3. Description of the tested samples

The EUT is MULTI-MEDIA GRAPHIC CARD.

3.1 Rating and Physical Characteristics

- CPU : Pentium II 233MHz or higher
  (Pentium III or AMD K7 recommended)
- Memory : 64MB (128MB or more recommended)
- Mother Board : AGP 2x / 4x slot
- Monitor : 15” 75MHz (17” or larger recommended)
- Power Supply : at least 250W of real power-out
- CDROM or DVDROM available

3.2 Submitted Documents

- User’s Guide
- Block Diagram

4. Measurement Conditions

Testing Input Voltage: AC 220V.

4.1 Modes of Operation

The EUT was in the following operation mode during all testing;

4.2 Additional Equipment

DEVICE TYPE	Manufacturer	M/N	S/N	FCC ID
PC	Atech Co., Ltd.	Att	None	-
Monitor	Samsung Electonics	750P(T)	P015H2GN503475	-
Keyboard	Solid Year Co., Ltd	TRI-270	910090345	-
Mouse	Microsoft	ITE78CJ	1048611-5	-
Mouse	Sejin	SMB-400	0CIM004047	-
Printer	Hewlett Packard	C4569A	SG78M1H0CF	-

4.3 Uncertainty

1) Radiated disturbance

UC (Combined standard Uncertainty) = ± 1.8dB

Expanded uncertainty U=Kuc

K = 2

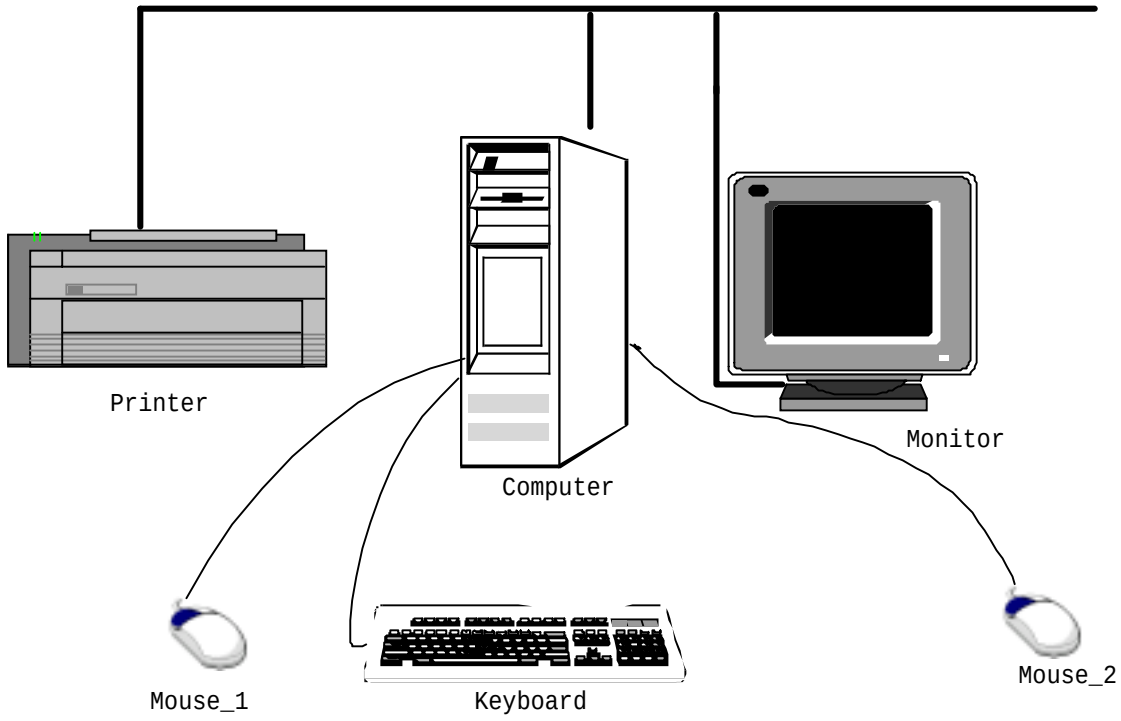
- U = ± 3.6dB

2) Conducted disturbance

UC = ± 0.88dB

U = Kuc=2xUc = ± 1.8dB

4.4 Test setup



5. EMISSION Test

5.1 Conducted Emissions

Result : **Pass**

The line-conducted facility is located inside a 2.3M x 3.5M x 5.5M shielded closure.
The shielding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 605-05.
A 1m x 1.5m wooden table 80cm. High is placed 80cm away from the vertical wall and 1.5m away from the side wall of the shielded room. R&S Model ESH3-Z5(10kHz-30MHz)
50ohm/50 uH line-Impedance Stabilization Networks(LISN) are bonded to the shielded room.
The EUT is powered from the R&S LISN and the support equipment is powered from the Kyoritsu LISN.
Power to the LISN are filtered by a high-current high-insertion loss shield enclosures power line filters(100dB 14kHz-1Ghz).
The purpose of the filter is to attenuate ambient signal interference and this filter is also bonded to the shielded enclosure.
All electrical cables are shielded by braided tinned copper zipper tubing with inner diameter of 1/2”.
If the EUT is a DC-Powered device, power will be derived from the source power supply it normally will be powered from and this supply lines will be connected to the Kyoritsu LISN.
All interconnecting cables more than 1 meter were shortened by non-inductive bundling (serpentine fashion) to a 1-meter length.
Sufficient time for the EUT, Support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer to determine the frequency producing the maximum EME from the EUT.
The spectrum was scanned from 450kHz to 30MHz with 100sec. sweep time.
The frequency producing the maximum level was reexamined using EMI field Intensity meter (ESPC)and Quasi-Peak adapter. The detector function was set to CISPR Q.P. mode.
The bandwidth of the receiver was set to 10kHZ. The EUT, support equipment, and interconnecting each emission was maximized by: switching power lines; varying the mode of operation or resolution; clock or data exchange speed; if applicable; whichever determined the worst-case emission.
Photographs of the worst-case emission can be seen in photograph of conducted test.
Each EME reported was calibrated using self-calibrating mode.

Figure 1 : Spectral Diagram, LINE – PE

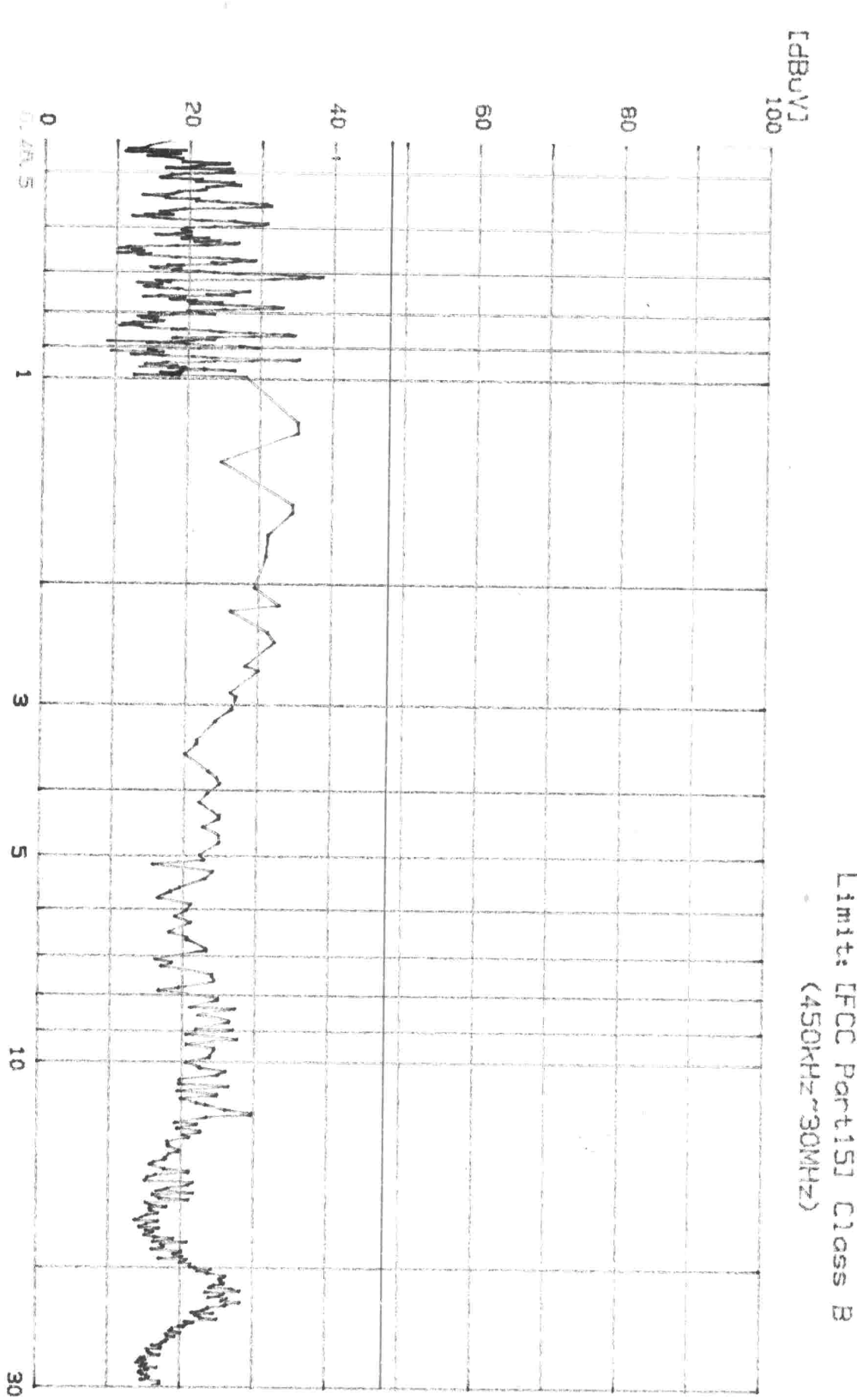


Figure 2 : Spectral Diagram, NEUTRAL – PE

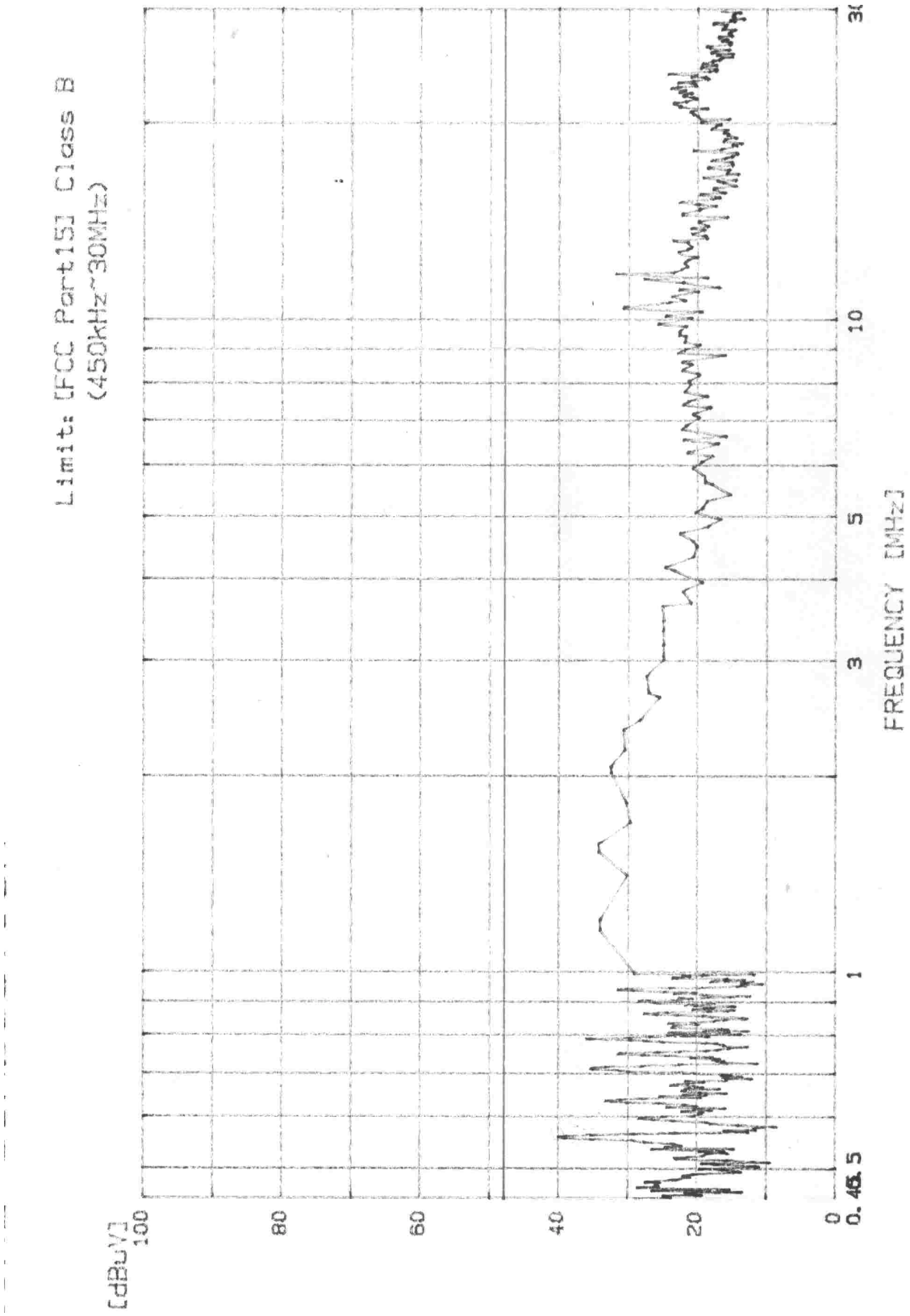


Table 2 : Test Data, Conducted Emissions

Frequency (MHz)	(1)Reading (dB•V)	Line	(2)Limit (dB•V)	(3)Margin (dB)
0.563	40.1	B	48.00	7.9
0.712	39.1	A		8.9
0.792	37.2	B		10.8
0.868	35.3	A		12.7
0.927	35.8	A		12.2
1.276	36.2	A		11.8
1.634	36.0	B		12.0
2.166	32.7	A		15.3
2.483	32.4	A		15.6
10.862	30.7	B		17.3
12.326	31.8	B		16.2

NOTES:

1. All modes of operation were investigated
   And the worst-case emission are reported.
2. All other emissions are non-significant.
3. All readings are calibrated by self-mode in receiver.
4. Measurements using CISPR quasi-peak mode.
5. Line H = LINE-PE, Line N = NEUTRAL-PE
6. C/F = Correction Factor
7. C/L = Cable Loss
8. The limit for Class B digital device is 250 uV (48dBuV)

from 450KHz to 30MHz

- **Margin Calculation**

(6)Margin = (2)Limit – (1)Reading

5.2Radiated Emissions

Result: **Pass**

Preliminary measurements were made indoors at 3 meter using B.C & Loop antennas, broadband Amplifier, and spectrum analyzer to determine the frequency producing the maximum EME.
Appropriate precaution was taken to ensure that all EME from the EUT were maximized and Investigated. The system configurations, 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 300 MHz using biconical antenna and from 300 to 1000 MHz using log-periodic antenna. Above 1 GHz, linearly polarized double ridge horn antennas were used.

Final measurements were made outdoors at 3-meter test range using EMCO antennas. The test equipment was placed on a wooden table situated on a 4x4 meter area adjacent to the measurement area. Turntable was to protect from weather in the dome that made with Polyethylene film. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. Each frequency found during pre-scan measurements was re-examined and investigated using EMI/Field Intensity Meter (ESPC) R & S. The detector function was set to CISPR quasi-peak mode and the bandwidth of the receiver was set to 120kHz or 1 MHz depending on the frequency or type or signal.

The EUT, support equipment and interconnecting cables were re-configured to the set-up producing the maximum emission for the frequency and were placed on top of a 0.8meter high non-metallic 1 x 1.5 meter table.
The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each EME emission. The turntable containing the system was rotated; the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the maximum emission. Each emission was maximized by: varying the mode of operation or resolution; clock or data exchange speed, and/or support equipment, if applicable; and changing the polarity of the antenna, whichever determined the worst-case emission.
Photographs of the worst-case emission can be seen in photograph of radiated emission test.
Each EME reported was calibrated using self-calibrating mode.

Table 3 : Test Data, Radiated Emissions

Frequency (MHz)	Pol.	Height [m]	Angle [°]	(1) Reading (dB•V)	(2) AFCL (dB/m)	(3) Actual ((dB•V/m)	(4) Limit (dB•V/m)	(5) Margin (dB)
61.7	H	2.887	117	11.1	10.26	21.36	40	18.64
71.55	H	2.505	83	13.6	8.51	22.11		17.89
75.3	H	2.30	94	13.5	8.50	22.00		18.00
134.2	H	2.38	314	16.1	17.61	33.71	43.5	19.79
168.05	H	2.02	248	6.6	18.56	25.16		18.34
179.55	H	3.03	84	5.0	19.37	24.37		19.13
468.6	H	1.18	307	5.2	23.75	28.95	46	17.05
471.85	H	1.66	166	6.7	23.75	30.45		15.55
478.55	H	1.473	2	7.7	23.75	31.45		14.55
744.65	H	1.355	51	3.6	30.02	33.62		12.38

Table. Radiated Measurements at 3-meters

Notes:

1.All modes of operation were investigated
And the worst-case emission are reported.
2.All other emission are non-significant.
3.All readings are calibrated by self-mode in receiver.
4.Measurements using CISPR quasi-peak mode.
5.AFCL = Antenna factor and cable loss
6.H = Horizontal, V = Vertical Polarization
7.The limit for Class B digital device is 100uV(40dBuV) from 30MHz to 88MHz, 150 uV (43.5dBuV) from 88MHz to 216MHz, 200uV(46dBuV) from 216MHz to 960MHz and 500 uV (54dBuV) from above 960MHz.

- **Margin Calculation**

(5)Margin = (4)Limit – (3)Actual

[(3)Actual = (1)Reading + (2)AFCL]