CE

CISPR 22 :1997 / EN 55022:1998

TEST REPORT

FOR

Industrial PC

MODEL: SBC-659 (N)

REPORT NUMBER: 01E9417

ISSUE DATE: April 27, 2001

Prepared for
AAEON TECHNOLOGY INC.
5F, NO. 135, LANE 235, PAO CHIAO RD.,
HSIN-TIEN CITY, TAIPEI, TAIWAN, R. O. C.

Prepared by
COMPLIANCE ENGINEERING SERVICES, INC.
No. 199, CHUNG SHENG ROAD
HSIN TIEN CITY, TAIPEI, TAIWAN R.O.C.
TEL: (02) 2217-0894
FAX: (02) 2217-1254

NVLAP®

COMPLIANCE
Engineering Services, Inc.

FCC, VCCI, CISPR, CE
UL, CSA, TÜV, VDE

U.S.A. : P.O.BOX 612650, SAN JOSE, CA 95161-2650
TAIPEI : P.O.BOX 17-82, HSIN TIEN, TAIWAN, R.O.C.

TABLE OF CONTENTS **PAGE**

COMPLIANCE ENGINEERING SERVICES, INC. DOCUMENT NO:CCSTP4003C
NO.199, CHUNG SHENG ROAD, HSIN TIEN, TAIPEI, TAIWAN R.O.C. TEL:(02)2217-0894/FAX:2217-1254

1. VERIFICATION OF COMPLIANCE

NVLAP LAB CODE: 200065-0

COMPANY NAME: AAEON TECHNOLOGY INC.
5F, NO. 135, LANE 235, PAO CHIAO RD.,
HSIN-TIEN CITY, TAIPEI, TAIWAN, R. O. C.

CONTACT PERSON: MILO WANG / R & D DIVISION

TELEPHONE NO: +886-2-8919-1234

MODEL NO/NAME: SBC-659 (N)

SERIAL NUMBER: N/A

DATE TESTED: April 27 and May 8, 2001

TYPE OF EQUIPMENT:	INFORMATION TECHNOLOGY EQUIPMENT (ITE)
MEASUREMENT DISTANCE:	( ) 3 METER (X) 10 METER
TECHNICAL LIMIT:	CLASS A
STANDARD:	EN 55022:1998 / CISPR 22:1997
MODIFICATIONS MADE ON EUT	☐ YES ☒ NO
DEVIATIONS FROM MEASUREMENT STANDARD	☐ YES (refer to section 21 for comments) ☒ NO
RADIATED EMISSION TEST RESULT	-2.05 dB @ 166.171MHz / HORIZONTAL
CONDUCTED EMISSION TEST RESULT	-33.97 dB @ 22.063MHz
CONDUCTED EMISSION TEST RESULT	-18.60 dB @ 13.479MHz / ISN-LAN

The above equipment was tested by Compliance Engineering Services, Inc. for compliance with the requirements set forth in the European Standard EN 55022:1998/CISPR 22:1997. The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved By

Rick Yeo

RICK YEO / EMC MANAGER
COMPLIANCE ENGINEERING SERVICES

Acknowledged By

MILO WANG / R & D DIVISION
AAEON TECHNOLOGY INC.

2. PRODUCT DESCRIPTION

CHASSIS TYPE	METAL
LIST OF EACH OSC. OR XTAL. FREQ. (FREQ.>=1 MHz)	Y1=25MHz; Y2=14.318MHz Y3=25MHz; Y5=14.318MHz
CPU SPEEDS TESTED	PENTIUM-III 933MHz (133MHz X 7)
POWER REQUIREMENTS	INPUT: 100-127V; 5A; 60Hz OUTPUT: 3.3/5/12V
POWER SUPPLY/NAME/MODEL/S.N.	ENHANCE / ENP-1815

3. TESTED SYSTEM DETAILS

The Model names for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Host Computer (EUT)

Device Type	Manufacturer	Model Number	Serial Number	FCC ID / DoC
HDD	QUANTUM	FIREBALL	N/A	N/A
USB CARD	N/A	N/A	N/A	N/A
USB + AUDIO CARD	N/A	PCM-3533	1907353300	N/A
RAM	NEC	SD-64M	N/A	N/A
MAIN-BOARD	UNIC	94V-0	N/A	N/A
CPU	INTEL	PENTIUM-III	N/A	N/A
BACK PLANE	N/A	BP-204SS-P4C	N/A	N/A
CHASSIS	N/A	AEC-204	N/A	N/A

COMPLIANCE ENGINEERING SERVICES, INC. DOCUMENT NO:CCSTP4003C
NO.199, CHUNG SHENG ROAD, HSIN TIEN, TAIPEI, TAIWAN R.O.C. TEL:(02)2217-0894/FAX:2217-1254

External Peripheral Devices

Device Type	**Manufacturer**	**Model Number**	**Serial No.**	**FCC ID / DoC**
SPEAKER	SINGVOX	SP-362	N/A	N/A
PLAYER	PANASONIC	RQ-L309GT	N/A	N/A
MICROPHONE	KOKA	DM-510	N/A	N/A
PRINTER	PANASONIC	KX-P1080i	N/A	ACJ5ZL6KX-PI080I
KEYBOARD	CHERRY	MY3000	000659	DoC
USB MOUSE	LOGITECH	M-BB48	LZE93851294	DoC
USB MOUSE	LOGITECH	M-BB48	LZA00354416	DoC
USB MOUSE	LOGITECH	M-BB48	LZA00354333	DoC
PS/2 MOUSE	LOGITECH	M-S34	LZE92901135	DZL211029
MODEM	ACEEX	1414	N/A	IFAXDM1414
MODEM	HAYES	231AA	N/A	DoC
SERVER PC	TOSHIBA	PS253L	31012396J	N/A
MONITOR	SAMSUNG	77BDF	N/A	DoC

4. TEST FACILITY

The open area test sites and conducted measurement facilities used to collect the radiated data are located at No. 199, Chung Sheng Road, Hsin Tien City, Taipei, Taiwan R.O.C. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

5. ACCREDITATION AND LISTING

The test facilities used to perform radiated and conducted emissions tests were accredited by National Voluntary Laboratory Accreditation Program for the specific scope CISPR 22 of accreditation under Lab Code SL2-IN-E-0005. No part of this report may be used to claim or imply product endorsement by BSMI or any other agency of the U.S. Government. In addition, these test facilities are listed with the Federal Communications Commission (reference no:31040/SIT(1300F2)).

COMPLIANCE ENGINEERING SERVICES, INC. DOCUMENT NO:CCSTP4003C
NO.199, CHUNG SHENG ROAD, HSIN TIEN, TAIPEI, TAIWAN R.O.C. TEL:(02)2217-0894/FAX:2217-1254

6. MEASUREMENT INSTRUMENTATION

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, ridged waveguide, liner horn. EMI receivers were used for line conducted readings; spectrum analyzers with pre-selectors and quasi-peak detectors were used to perform radiated measurements. Receiving equipment (i.e., receiver, analyzer, quasi-peak adapter, pre-selector) and LISNs conform to CISPR specifications for "Radio Interference Measuring Apparatus and Measurement Methods," Publication 16.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements

7. MEASURING INSTRUMENT CALIBRATION

The measuring equipment which was utilized in performing the tests documented herein has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment which is traceable to recognized national standards.

8. UNITS OF MEASUREMENT

Measurements of radiated interference are reported in terms of dB(uV/m) at a specified distance. The indicated readings on the spectrum analyzer were converted to dB(uV/m) by use of appropriate conversion factors. Measurements of conducted interference are reported in terms of dB(uV).

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

FS = RA + AF + CF - AG

WhereFS = Field Strength
RA = Receiver Amplitude
AF = Antenna Factor
CF = Cable Attenuation Factor
AG = Amplifier Gain

Assume a receiver reading of 52.5 dBuV is obtained. The Antenna Factor of 7.4dB/m and a Cable Factor of 1.1dB is added. The Amplifier Gain of 29 dB is subtracted, giving a field strength of 32 dBuV/m. The 32 dBuV/m value was mathematically converted to its corresponding level in uV/m.

FS = 52.5 + 7.4 + 1.1 - 29 = 32 dBuV/m

Level in uV/m = Common Antilogarithm [(32 dBuV/m)/20] = 39.8 uV/m

9. ANTENNAS

The calibrated antennas used to sample the radiated field strength are mounted on a non-conductive, motorized antenna mast 10 meters from the leading edge of the turn table.

10. CLASSIFICATION OF ITE

Class B is a category for an apparatus which satisfies the Class B ITE disturbance limits. Class B ITE is intended primarily for use in the domestic environment and may include:

- equipment with no fixed place of use; for example, portable equipment powered by built-in batteries;
- telecommunication terminal equipment powered by a telecommunication network;
- personal computers and auxiliary connected equipment.

Note - The domestic environment is an environment where the use of broadcast radio and television receivers may be expected within a distance of 10 m of the apparatus concerned.

Class A is a category for all other ITE which satifies the Class A ITE limits but not the Class B ITE limits. Such equipment should not be restricted in its sale but the following warning shall be included in the instructions for use:

Warning

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

COMPLIANCE ENGINEERING SERVICES, INC. DOCUMENT NO:CCSTP4003C
NO.199, CHUNG SHENG ROAD, HSIN TIEN, TAIPEI, TAIWAN R.O.C. TEL:(02)2217-0894/FAX:2217-1254

11. LIMITS FOR CONDUCTED DISTURBANCE

☒ **Table 1**
Limits for conducted disturbance at the mains ports of Class A ITE

Frequency range MHz	Limits dB(uV)	
	Quasi-peak	**Average**
0.15 to 0.50	**79**	**66**
0.5 to 30	**73**	**60**
Note- The lower limit shall apply at the transition frequency.		

☐ **Table 2**
Limits of Conducted disturbance at the mains ports of Class B ITE

Frequency range MHz	Limits dB(uV)	
	Quasi-peak	**Average**
0.15 to 0.50	**66 to 56**	**56 to 46**
0.50 to 5	**56**	**46**
5 to 30	**60**	**50**
Note 1.The lower limit shall apply at the transition frequencies 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

☒ **Table 3**
Limits of common mode conducted emission at telecommunication ports for Class A equipment

Frequency range MHz	Voltage Limits dB(uV)		Current Limits dB(uV)	
	Quasi-peak	**Average**	**Quasi-peak**	**Average**
0.15 to 0.50	**97 to 87**	**84 to 74**	**53 to 43**	**40 to 30**
5 to 30	**87**	**74**	**43**	**30**
Note 1.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz. 2.The current and voltage disturbance limits are derived for use with an impedance stabillzation network (ISN) which presents a common mode (asym metric mode) impedance of 150Ω to the telecommunication port under test (conversion factor is 20log 150/1 = 44 dB).				

☐ **Table 4**
Limits of common mode conducted emission
at telecommunication ports for Class B equipment

Frequency range	Voltage Limits dB(uV)		Current Limits dB(uV)	
MHz	**Quasi-peak**	**Average**	**Quasi-peak**	**Average**
0.15 to 0.50	**84 to 74**	**74 to 64**	**40 to 30**	**30 to 20**
5 to 30	**74**	**64**	**30**	**20**

Note
1.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.
2.The current and voltage disturbance limits are derived for use with an impedance stabillzation network (ISN) which presents a common mode (asymmetric mode) impedance of 150Ω to the telecommunication port under test (conversion factor is 20log 150/1 = 44 dB).
3.Provisionally a relaxation of 10dB over the frequency range of 6MHz to 30MHz is allowed for high-speed services having significant spectral density in this band. However, this relaxation is restricted to the common mode disturbance converted by the cable from the wanted signal. The provisional relaxation of 10dB will be reviewed no later than three years after the date of withdrawal based on the results and interference cases seen in this period. Wherever possible it is recommended to comply with the limits without the provisional relaxation.

12. LIMITS FOR RADIATED DISTURBANCE

☒ **Table 5**
Limits for radiated disturbance of Class A ITE at
measuring distance of 10 m

Frequency range MHz	Quasi-peak limits dB(uV/m)
30 to 230	**40**
230 to 1000	**47**

NOTES
1. The lower limit shall apply at the transition frequency.
2. Additional provisions may be required for cases where interference occurs.

☐ **Table 6**
Limits for radiated disturbance of Class B ITE at
measuring distance of 10 m

Frequency range MHz	Quasi-peak limits dB(uV/m)
30 to 230	**30**
230 to 1000	**37**

NOTES
1. The lower limit shall apply at the transition frequency.
2. Additional provisions may be required for cases where interference occurs.

COMPLIANCE ENGINEERING SERVICES, INC. DOCUMENT NO:CCSTP4003C
NO.199, CHUNG SHENG ROAD, HSIN TIEN, TAIPEI, TAIWAN R.O.C. TEL:(02)2217-0894/FAX:2217-1254

13. MAINS PORTS CONDUCTED EMISSION TEST PROCEDURE

The EUT is located so that the distance between the boundary of the EUT and the closest surface to the LISN is 0.8m.

The supplied power cord shall be 1 meter long, but if it is longer, the excess cable shall be folded back and forth as far as possible to form a bundle not exceeding 0.4 meter in length.
Conducted disturbance shall be measured between the phase lead and the ground, and between the neutral lead and the ground. The frequency 0.15 - 30 MHz shall be investigated.

Set the EMI receiver to PEAK detector setting and sweep continuously over the frequency range to be investigated. Set resolution bandwidth to 9kHz minimum. Connect EMI receiver input cable to LINE 1 RF measurement connection on the LISN. Connect a 50ohm terminator to the unused RF connection on the LISN. For each mode of EUT operation, maximize emissions readings by manipulating cable and wire positions. Record the configuration for each EUT power cord which produces emissions closest to the limit. Repeat the same procedure for LINE 2 of each EUT power cord.

If PEAK readings are less than the QUASI-PEAK and AVERAGE limits within a 2dB or more margin, the EUT passes the test. If the PEAK readings are closer than 2dB to the QUASI-PEAK limits, set EMI receiver detector mode to QUASI-PEAK. If the emissions so measured are below the published QUASI-PEAK and AVERAGE limts, the EUT passes the test. For those emissions that passed QUASI-PEAK limits when measured with QUASI-PEAK detector but did not pass AVERAGE limits, set the EMI receiver detector mode to AVERAGE. If emissions now are all below published AVERAGE limit, the EUT passes the test.

14. COMMON MODE CONDUCTED EMISSION MEASUREMENT PROCEDURE

1) Selecting ISN for unscreened cable or a current probe for screened cable to take measurement.

2) The port of the EUT was connected to the remote side support equipment through the ISN/Current Probe and communication in normal condition.

3) Making a overall range scan by using the test receiver controlled by controller and record at least six highest emissions for showing in the test report.

COMPLIANCE ENGINEERING SERVICES, INC. DOCUMENT NO:CCSTP4003C
NO.199, CHUNG SHENG ROAD, HSIN TIEN, TAIPEI, TAIWAN R.O.C. TEL:(02)2217-0894/FAX:2217-1254

4) Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.

5) In case of measuring on the screened cable, the current limit shall be applied, otherwise the voltage limit should be applied.

6) The test data of the worst case condition(s) was reported on the Summary Data page.

15. RADIATED EMISSION TEST PROCEDURE

The EUT and all other support equipment are placed on a wooden table 80 cm above the ground screen. Antenna to EUT distance is 10 meters. During the test, the table is rotated 360 degrees to maximize emissions, while the antenna is positioned between 1 to 4 meters above the ground screen to further maximize emissions. The antenna is polarized in both vertical and horizontal positions.

Monitor the frequency range of interest at a fixed antenna height and EUT azimuth. Frequency span should be small enough to easily differentiate between broadcast stations and intermittent ambients. Rotate the EUT 360 degrees to maximize emissions received from EUT. If emission increases by more than 1 dB, or if another emission appears that is greater by 1 dB, return to azimuth where maximum measurement occurred and perform additional cable manipulation to further maximize received emissions.

Move antenna up and down to further maximize suspected highest amplitude signal. If emission increased by 1 dB or more, or if another emission appears that is greater by 1dB or more, return to antenna height where maximum signal was observed and manipulate cables to produce highest emissions, noting frequency and amplitude.

16. AMBIENT CONDITIONS

The ambient conditions at the time of final tests were as follows:

	Radiated Emission	Conducted (Mains Ports)	Conducted (Common Mode)
Temperature	**22** ℃	**21** ℃	**21** ℃
Humidity	**85** %	**84** %	**84** %

COMPLIANCE ENGINEERING SERVICES, INC. DOCUMENT NO:CCSTP4003C
NO.199, CHUNG SHENG ROAD, HSIN TIEN, TAIPEI, TAIWAN R.O.C. TEL:(02)2217-0894/FAX:2217-1254

17. SYSTEM TEST CONFIGURATION

The equipment under test was configured and operated in a manner which tended to maximize its emission characteristics in a typical application. Power and signal distribution, ground, interconnecting cabling and physical placement of equipment simulated the typical application and usage insofar as practicable.

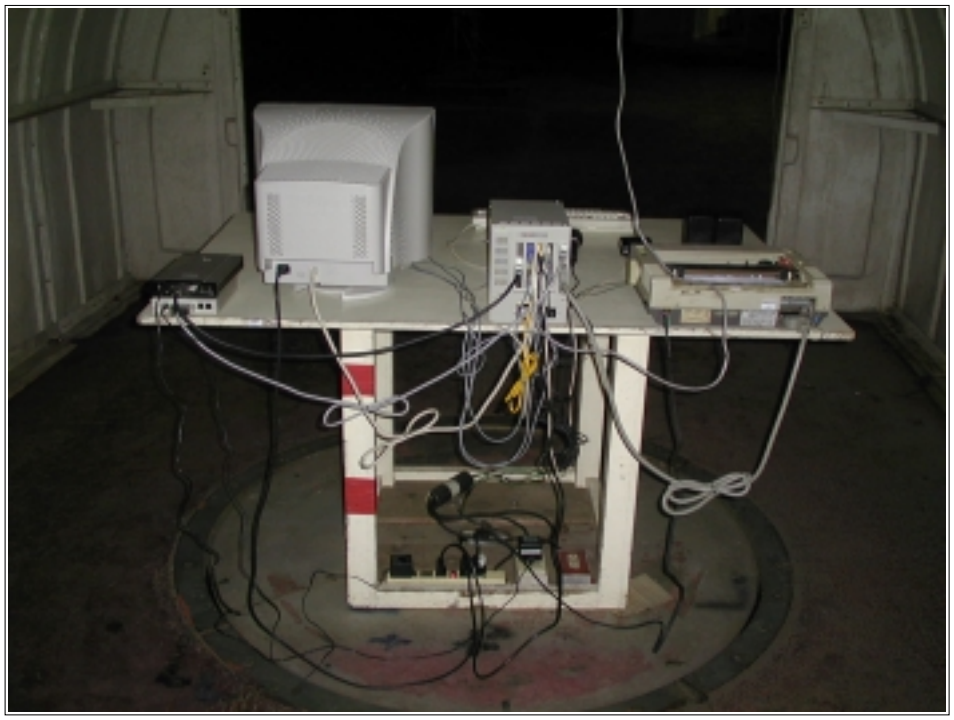
SOFTWARE USED DURING THE TESTS	
Operating System	WINDOWS 98
File Name	EMITEST.EXE
Program Sequence	1. WINDOWS 98 BOOTS SYSTEM. 2. RUN EMITEST.EXE TO ACTIVATE ALL PERIPHERALS AND DISPLAY "H" PATTERN ON MONITOR SCREEN.

18. EQUIPMENT MODIFICATIONS

To achieve compliance to CLASS A levels, the following change(s) were made during compliance testing:

NOT APPLICABLE

19. EUT SETUP PHOTOS



Radiated Emission Setup Photos (Worst Emission Position)

Conducted Emission Setup Photos (Mains Ports)

Conducted Emission Setup Photos (ISN FOR Lan Port)

20. TEST EQUIPMENT LIST

Equipment	Manuf.	Model No.	Serial No.	Site	Cal Date	Due Date
EMI TEST DISPLAY	**ROHDE & SCHWARZ**	**DSAI-D 804.8932.52**	**827832/001**	**D**	**11/00**	**11/01**
EMI TEST RF UNIT	**ROHDE & SCHWARZ**	**ESBI-RF/1005.4300.52**	**827832/003**	**D**	**11/00**	**11/01**
AMPLIFIER	**T.E.C.**	**PA-102**	**43685**	**D**	**05/00**	**05/01**
ANTENNA	**EMCO**	**3142**	**1310**	**D**	**06/00**	**06/01**
LISN	**FISHER CUSTOM**	**FCC-LISN-50/250-25-2**	**107**	**D**	**07/00**	**07/01**
LISN(EUT)	**EMCO**	**3825/2**	**1435**	**D**	**01/01**	**01/02**
CABLE	**TIME MICROWAVE**	**LMR-400**	**N-TYPE02**	**D**	**12/00**	**12/01**
SPECTRUM ANALYZER	**H.P.**	**8566B**	**2937A06102**	**E**	**12/00**	**12/01**
SPECTRUM DISPLAY	**H.P.**	**85662A**	**2848A18276**	**E**	**12/00**	**12/01**
QUASI-PEAK DETECTOR	**H.P.**	**85650A**	**2811A01439**	**E**	**12/00**	**12/01**
AMPLIFIER	**H.P.**	**8447D B**	**1644A02328**	**E**	**05/00**	**05/01**
ANTENNA	**EMCO**	**3142**	**1212**	**E**	**09/00**	**09/01**
TEST RECEIVER	**ROHDE & SCHWARZ**	**ESHS20**	**840455/006**	**E**	**03/01**	**03/02**
LISN	**SOLAR**	**8012-50-R-24-BNC**	**8305114**	**E**	**07/00**	**07/01**
LISN(EUT)	**EMCO**	**3825/2**	**1842**	**E**	**01/01**	**01/02**
CABLE	**TIME MICROWAVE**	**LMR-400**	**N-TYPE01**	**E**	**12/00**	**12/01**
ANTENNA (1-18GHz)	**EMCO**	**3115**	**5761**	**D/E**	**02/01**	**02/02**
AMPLIFIER (1-26GHz)	**MITEQ**	**NSP2600-44**	**646455**	**D/E**	**02/01**	**02/02**
CABLE (1-26.5G)	**FLEXCO**	**FC195**	**N/A**	**D/E**	**02/01**	**02/02**

COMPLIANCE ENGINEERING SERVICES, INC. DOCUMENT NO:CCSTP4003C
NO.199, CHUNG SHENG ROAD, HSIN TIEN, TAIPEI, TAIWAN R.O.C. TEL:(02)2217-0894/FAX:2217-1254

21. CORRECTION FACTOR

OATS NO. E

	ANTENNA 3 METER			ANTENNA 10 METER			SITE E
FREQ (MHZ)	HORI.	VERT.	CABLE LOSS (dB)	HORI.	VERT.	CABLE LOSS (dB)	AMP GAIN (dB)
30	19.01	19.01	0.92	**17.9**	**17.9**	0.92	**27.41**
35	15.92	15.92	0.94	**14.6**	**14.6**	0.94	**27.42**
40	12.70	12.70	1.04	**12.0**	**12.0**	1.04	**27.36**
45	10.20	10.20	1.06	**9.9**	**9.9**	1.06	**27.36**
50	8.70	8.70	1.08	**8.5**	**8.5**	1.08	**27.39**
60	7.20	7.20	1.15	**7.4**	**7.4**	1.15	**27.36**
70	6.95	6.95	1.22	**5.9**	**5.9**	1.22	**27.34**
80	7.63	7.63	1.31	**4.6**	**4.6**	1.31	**27.34**
90	8.52	8.52	1.45	**5.8**	**5.8**	1.45	**27.28**
100	9.05	9.05	1.50	**8.5**	**8.5**	1.50	**27.42**
120	7.65	7.65	1.69	**7.3**	**7.3**	1.69	**27.26**
125	7.70	7.70	1.70	**6.9**	**6.9**	1.70	**27.31**
140	8.32	8.32	1.82	**6.9**	**6.9**	1.82	**27.21**
150	9.21	9.21	1.84	**8.6**	**8.6**	1.84	**27.24**
160	9.65	9.65	1.92	**9.9**	**9.9**	1.92	**27.08**
175	9.86	9.86	2.02	**11.1**	**11.1**	2.02	**27.00**
180	10.10	10.10	2.04	**11.3**	**11.3**	2.04	**27.04**
200	10.30	10.30	2.22	**11.0**	**11.0**	2.22	**26.93**
250	12.85	12.85	2.51	**12.3**	**12.3**	2.51	**26.94**
300	14.10	14.10	2.72	**13.1**	**13.1**	2.72	**26.85**
400	16.55	16.55	3.29	**15.5**	**15.5**	3.29	**27.26**
500	18.75	18.75	3.85	**18.1**	**18.1**	3.85	**27.34**
600	20.85	20.85	4.32	**20.4**	**20.4**	4.32	**27.23**
700	22.86	22.86	4.73	**21.6**	**21.6**	4.73	**26.83**
800	23.10	23.10	5.10	**21.9**	**21.9**	5.10	**26.58**
900	24.31	24.31	5.58	**23.2**	**23.2**	5.58	**26.55**
1000	25.01	25.01	5.74	**23.9**	**23.9**	5.74	**26.85**
1100	25.64	25.64		**25.0**	**25.0**		**27.82**
1200	26.56	26.56		**26.3**	**26.3**		**27.70**
1300	26.75	26.75		**26.3**	**26.3**		
1400	27.85	27.85		**27.4**	**27.4**		
1500	28.12	28.12		**27.6**	**27.6**		
1600	29.25	29.25		**28.7**	**28.7**		
1700	29.75	29.75		**28.3**	**28.3**		
1800	29.90	29.90		**29.7**	**29.7**		
1900	29.95	29.95		**29.0**	**29.0**		
2000	31.52	31.52		**30.8**	**30.8**		

COMPLIANCE ENGINEERING SERVICES, INC. DOCUMENT NO:CCSTP4003C
NO.199, CHUNG SHENG ROAD, HSIN TIEN, TAIPEI, TAIWAN R.O.C. TEL:(02)2217-0894/FAX:2217-1254

22. TEST RESULT SUMMARY

Preliminary Radiated Emission Tests were performed at the 10 meter open area test site. The test procedure listed in EN55022:1998/CISPR22:1997 were used. The following preliminary tests were conducted to determine the worst mode of operation and configuration.

Preliminary Radiated Emission Test			
Frequency Range Investigated		30 MHz TO 5000 MHz	
Mode of operation	Date	Data Report No.	Worst Mode
NORMAL MODE	04/27/01	9417F# (12, 15)	☒

Final Radiated Emission Test was conducted by operating the worst mode as indicated above.

OATS No:	Data Report No.	Date	Tested By:
E / 10 M	**9417F# (12, 15)**	**04/27/01**	**MICHAEL HUNG**

Six Highest Radiated Emission Readings							
Frequency Range Investigated				30 MHz TO 5000 MHz			
Freq (MHz)	Meter Reading (dBuV)	C.F. (dB/m)	Corrected Reading (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading Type P/Q/A	Pol. H/V
166.170	**47.20**	**-11.75**	**35.45**	**40.00**	**-4.55**	**Q**	**V**
186.830	**44.10**	**-10.68**	**33.42**	**40.00**	**-6.58**	**P**	**V**
199.997	**48.60**	**-10.69**	**37.91**	**40.00**	**-2.09**	**Q**	**V**
232.690	**50.70**	**-9.76**	**40.94**	**47.00**	**-6.06**	**P**	**V**
166.171	**49.70**	**-11.75**	**37.95**	**40.00**	**-2.05**	**P**	**H**
224.990	**43.50**	**-10.00**	**33.51**	**40.00**	**-6.49**	**P**	**H**

C.F.(Correction Factor)=Antenna Factor + Cable Loss + Attenuator(3dB) - Amplifier Gain
Corrected Reading = Metering Reading + C.F.
Margin=Corrected Reading - Limits
P=Peak Reading H=Horizontal Polarization/Antenna
Q=Quasi-peak V=Vertical Polarization/Antenna
A=Average Reading

Comments: **N/A**

COMPLIANCE ENGINEERING SERVICES, INC. DOCUMENT NO:CCSTP4003C
NO.199, CHUNG SHENG ROAD, HSIN TIEN, TAIPEI, TAIWAN R.O.C. TEL:(02)2217-0894/FAX:2217-1254

Preliminary Conducted Emission Tests for Mains Ports were performed according to EN55022:1998 /CISPR22:1997. The following preliminary tests were conducted to determine the worst mode of operation.

Preliminary Conducted Emission Test			
Frequency Range Investigated		150 kHz TO 30 MHz	
Mode of operation	Date	Data Report No.	Worst Mode
NORMAL MODE	04/27/01	9417E# (24, 32)	☒

Final Conducted Emission Test was conducted by operating the worst mode as indicated above.

Conducted Room	Plot No **9417E# (24, 32)**	Date **04/27/01**	Tested By: **MICHAEL HUNG**

Six Highest Conducted Emission Readings							
Frequency Range Investigated				150 kHz TO 30 MHz			
Freq (MHz)	Meter Reading (dBuV)	C.F. (dB)	Corrected Reading (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading Type (P/Q/A)	Line (L1/L2)
21.035	**38.00**	**0.49**	**38.49**	**73.00**	**-34.51**	**P**	**L1**
13.479	**38.06**	**0.36**	**38.42**	**73.00**	**-34.58**	**P**	**L2**
20.924	**38.27**	**0.49**	**38.76**	**73.00**	**-34.24**	**P**	**L2**
22.063	**38.54**	**0.49**	**39.03**	**73.00**	**-33.97**	**P**	**L2**
22.775	**37.99**	**0.50**	**38.49**	**73.00**	**-34.51**	**P**	**L2**
24.015	**37.81**	**0.50**	**38.31**	**73.00**	**-34.69**	**P**	**L2**

C.F.(Correction Factor)=Insertion Loss + Cable Loss
Corrected Reading = Metering Reading + C.F.
Margin=Corrected Reading - Limits
P=Peak Reading L1=Hot
Q=Quasi-peak L2=Neutral
A=Average Reading

Comments: **N/A**

Preliminary Conducted Emission Tests for Common Mode were performed according to EN55022:1998 /CISPR22:1997. The following preliminary tests were conducted to determine the worst mode of operation.

Preliminary Conducted Emission Test			
Frequency Range Investigated		150 kHz TO 30 MHz	
Mode of operation	Date	Data Report/Plot No.	Worst Mode
LAN PORT #1	05/18/01	9417E# (40)	☒
LAN PORT #2	05/18/01	9417E# (48)	☐

Final Conducted Emission Test was conducted by operating the worst mode as indicated above.

Conducted Room	Plot No **9417E# (40)**	Date **05/18/01**	Tested By: **MICHAEL HUNG**

Six Highest Conducted Emission Readings						
Frequency Range Investigated			150 kHz TO 30 MHz			
Freq (MHz)	Meter Reading (dBuV)	C.F. (dB)	Corrected Reading (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading Type (P/Q/A)
10.072	**54.31**	**9.84**	**64.15**	**87.00**	**-22.85**	**P**
12.188	**56.25**	**9.87**	**66.12**	**87.00**	**-20.88**	**P**
13.479	**58.52**	**9.88**	**68.40**	**87.00**	**-18.60**	**P**
15.635	**56.61**	**9.91**	**66.52**	**87.00**	**-20.48**	**P**
16.928	**55.33**	**9.92**	**65.25**	**87.00**	**-21.75**	**P**
27.271	**54.33**	**10.02**	**64.35**	**87.00**	**-22.65**	**P**

C.F.(Correction Factor)=ISN Factor (9.5dB) + Cable Loss
Corrected Reading = Metering Reading + C.F.
Margin=Corrected Reading - Limits
P=Peak Reading
Q=Quasi-peak
A=Average Reading

Comments: **N/A**

APPENDICES

EXTERNAL I/O CABLE CONSTRUCTION DESCRIPTION

CONFIGURATION BLOCK DIAGRAM

CONDUCTED EMISSION PLOT

RADIATED EMISSION DATA

COMPLIANCE ENGINEERING SERVICES, INC. DOCUMENT NO:CCSTP4003C
NO.199, CHUNG SHENG ROAD, HSIN TIEN, TAIPEI, TAIWAN R.O.C. TEL:(02)2217-0894/FAX:2217-1254

External I/O Cable Construction Description

NO: **1**	CABLE Name: **9**	Number of I/O ports of this type: **1**
I/O Port: **PS/2 MOUSE**		Type of Cable used: **Un-Shielded**
Cable Connector Type: **Molded**		Data Traffic Generated: **Yes**
Bundled During Tests: **No**		Cable Length: **1.8 M**
Remarks: **N/A**		

NO: **2~4**	CABLE Name: **7, 5, 69**	Number of I/O ports of this type: **3**
I/O Port: **USB MOUSE**		Type of Cable used: **Un-Shielded**
Cable Connector Type: **Molded**		Data Traffic Generated: **Yes**
Bundled During Tests: **No**		Cable Length: **1.8 M**
Remarks: **N/A**		

NO: **5**	CABLE Name: **13**	Number of I/O ports of this type: **1**
I/O Port: **USB KEYBOARD**		Type of Cable used: **Shielded**
Cable Connector Type: **Molded**		Data Traffic Generated: **Yes**
Bundled During Tests: **No**		Cable Length: **1.8 M**
Remarks: **N/A**		

NO: **6**	CABLE Name: **27**	Number of I/O ports of this type: **1**
I/O Port: **MICROPHONE**		Type of Cable used: **Un-Shielded**
Cable Connector Type: **Molded**		Data Traffic Generated: **Yes**
Bundled During Tests: **Yes**		Cable Length: **2.8 M**
Remarks: **N/A**		

NO: **7**	CABLE Name: **24**	Number of I/O ports of this type: **1**
I/O Port: **PLAYER**		Type of Cable used: **Un-Shielded**
Cable Connector Type: **Molded**		Data Traffic Generated: **Yes**
Bundled During Tests: **No**		Cable Length: **1.5 M**
Remarks: **N/A**		

NO: **8**	CABLE Name: **42**	Number of I/O ports of this type: **1**
I/O Port: **SPEAKER**		Type of Cable used: **Un-Shielded**
Cable Connector Type: **Molded**		Data Traffic Generated: **Yes**
Bundled During Tests: **No**		Cable Length: **1.1 M**
Remarks: **N/A**		

NO: **9**	CABLE Name: **50**	Number of I/O ports of this type: **1**
I/O Port: **SERIAL MODEM**		Type of Cable used: **Shielded**
Cable Connector Type: **Metal**		Data Traffic Generated: **Yes**
Bundled During Tests: **Yes**		Cable Length: **1.4 M**
Remarks: **N/A**		

NO: **10**	CABLE Name: **N/A**	Number of I/O ports of this type: **1**
I/O Port: **SERIAL MODEM**		Type of Cable used: **Shielded**
Cable Connector Type: **Metal**		Data Traffic Generated: **Yes**
Bundled During Tests: **No**		Cable Length: **1 M**
Remarks: **N/A**		

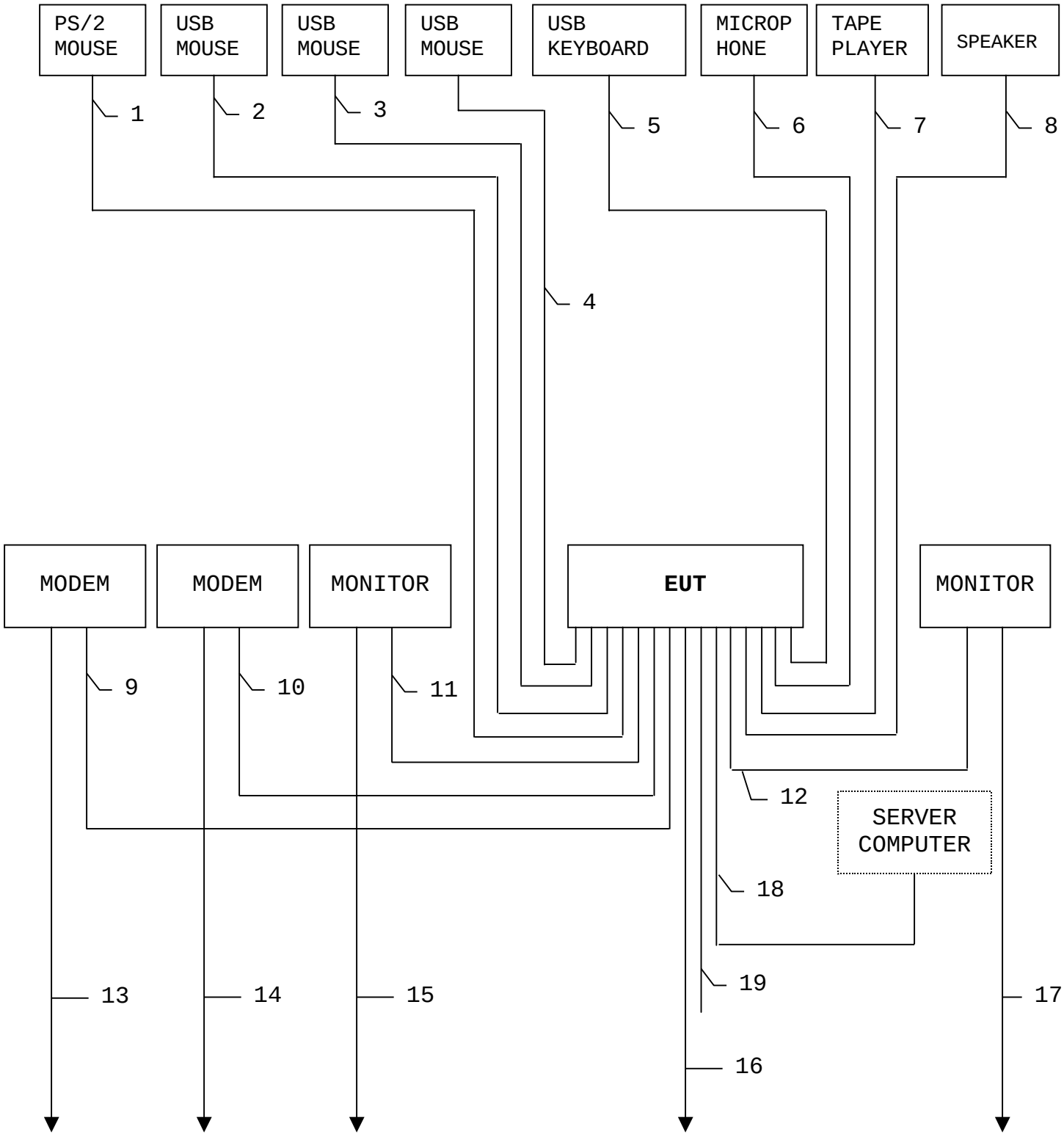
NO: **11**	CABLE Name: **N/A**	Number of I/O ports of this type: **1**
I/O Port: **MONITOR**		Type of Cable used: **Shielded**
Cable Connector Type: **Molded**		Data Traffic Generated: **Yes**
Bundled During Tests: **Yes**		Cable Length: **1.5 M**
Remarks: **A Ferrite bead on the cable of EUT end**		

NO: **12**	CABLE Name: **60**	Number of I/O ports of this type: **1**
I/O Port: **PARALLEL PRINTER**		Type of Cable used: **Shielded**
Cable Connector Type: **Molded**		Data Traffic Generated: **Yes**
Bundled During Tests: **Yes**		Cable Length: **1.9 M**
Remarks: **N/A**		

NO: **13~17**	CABLE Name: **N/A**	Number of I/O ports of this type: **5**
I/O Port: **AC Power Cord**		Type of Cable used: **Un-Shielded**
Cable Connector Type: **Molded**		Cable Length: **1.8 M**
Bundled During Tests: **No (Radiation), Yes (Line Conduction)**		
Remarks: **N/A**		

NO: **18, 19**	CABLE Name: **N/A**	Number of I/O ports of this type: **2**
I/O Port: **LAN CABLE / CABLE LOAD**		Type of Cable used: **Un-Shielded**
Cable Connector Type: **Molded**		Cable Length: **30/1 M**
Bundled During Tests: **18: NO, 19: YES**		
Remarks: **N/A**		

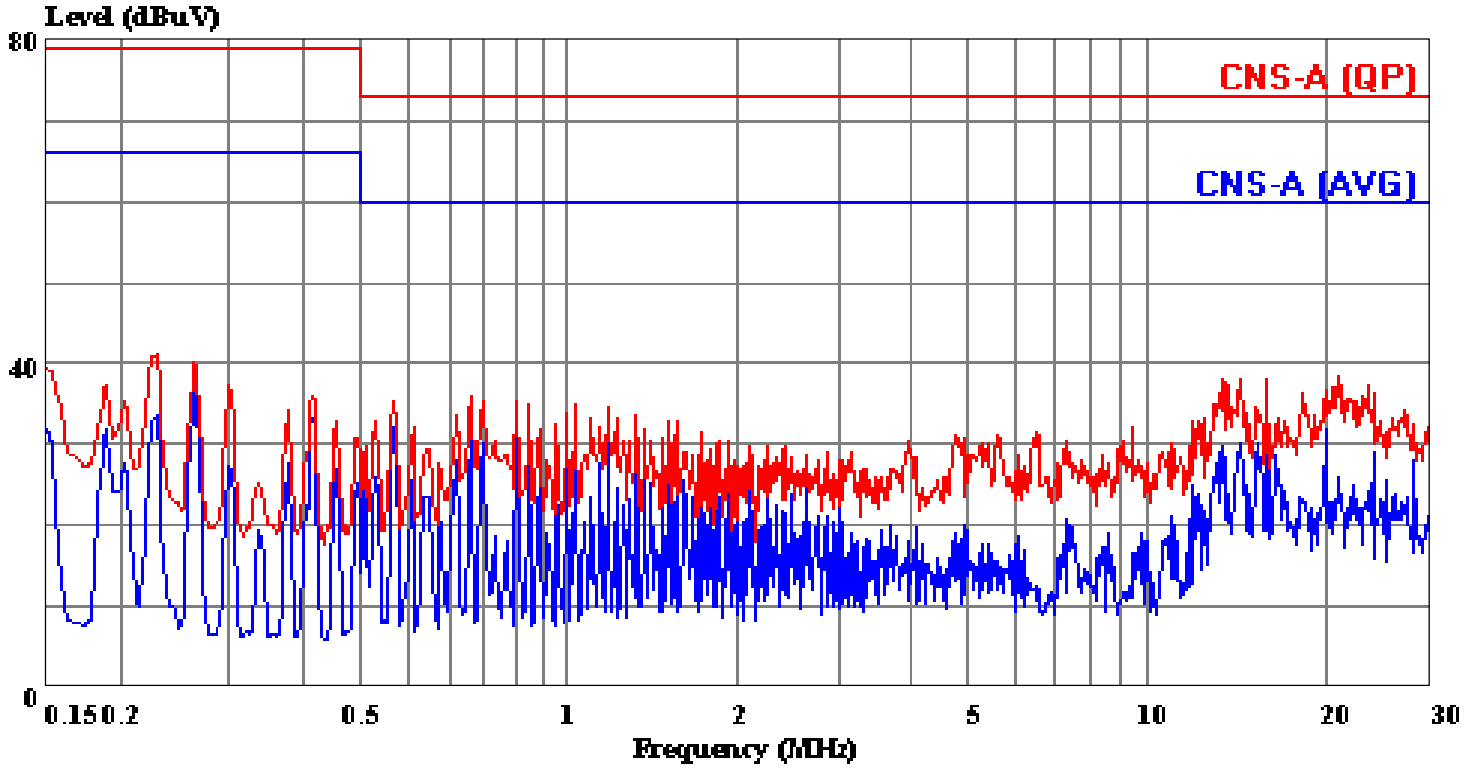
Configuration Block Diagram



COMPLIANCE
Engineering Service, Inc.
FCC,VCCI,CISPR,CE
UL,CSA,TUV

No. 199, Chung Sheng Road,
Hsin Tien City, Taipei,
Taiwan, R.O.C.
Tel:02-2217-0894 Fax:02-2217-1254

Data#: 24 File#: 9417e.emi Date: 04-27-2001 Time: 21:46:52



(CCS E-Site)

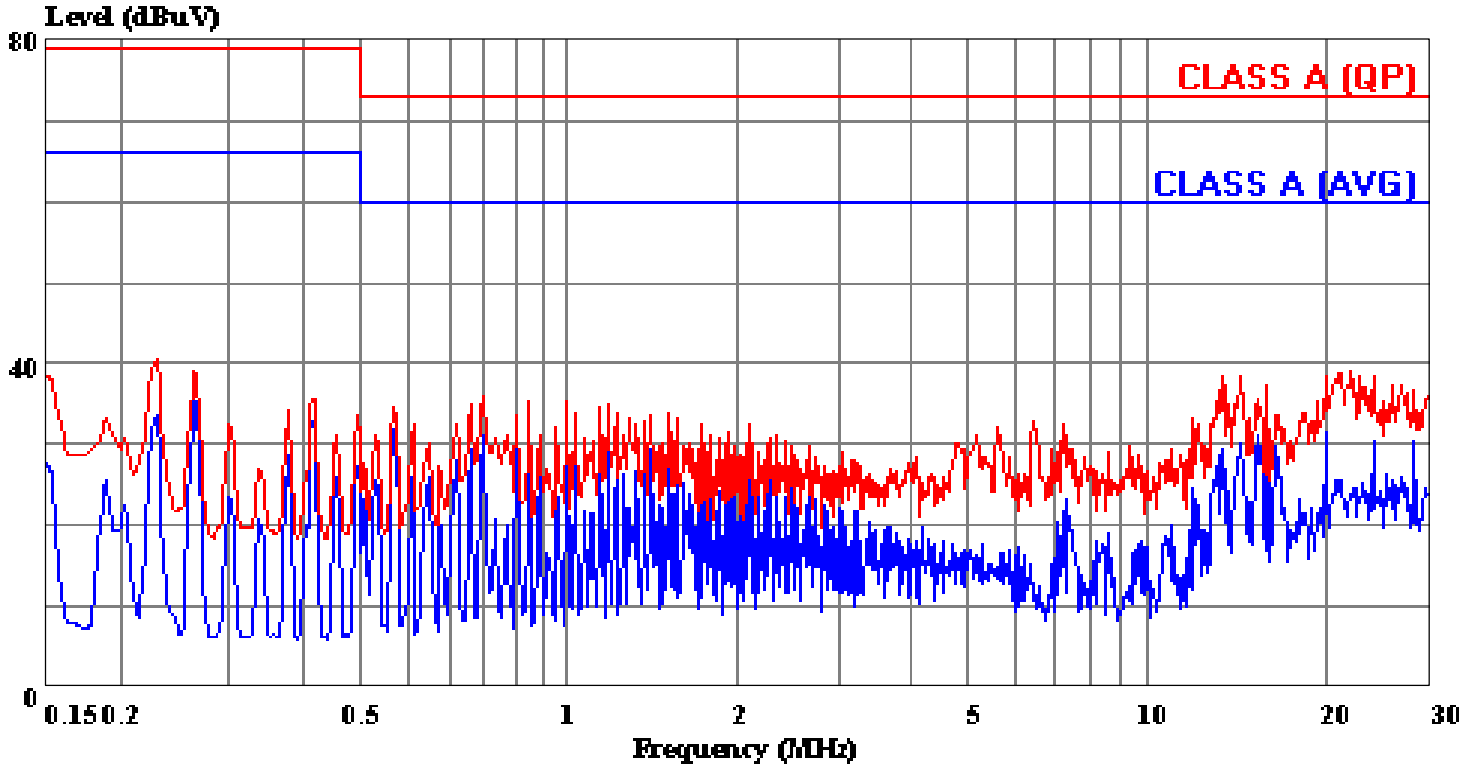
Trace: 23 Ref Trace:

Condition: LINE
Report No. : 01E9417
Test Engr. : MICHAEL HUNG
Company   : AAEON TECHNOLOGY INC.
EUT   : SBC-659(N)
Test Config : EUT/ALL PERIPHERALS
Type of Test: EN55022 CLASS A
Mode of Op. : INTEL P-III 933MHZ/133MHZ

COMPLIANCE
Engineering Service, Inc.
FCC,VCCI,CISPR,CE
UL,CSA,TUV

No. 199, Chung Sheng Road,
Hsin Tien City, Taipei,
Taiwan, R.O.C.
Tel:02-2217-0894 Fax:02-2217-1254

Data#: 32 File#: 9417e.emi Date: 04-27-2001 Time: 21:53:32



(CCS E-Site)

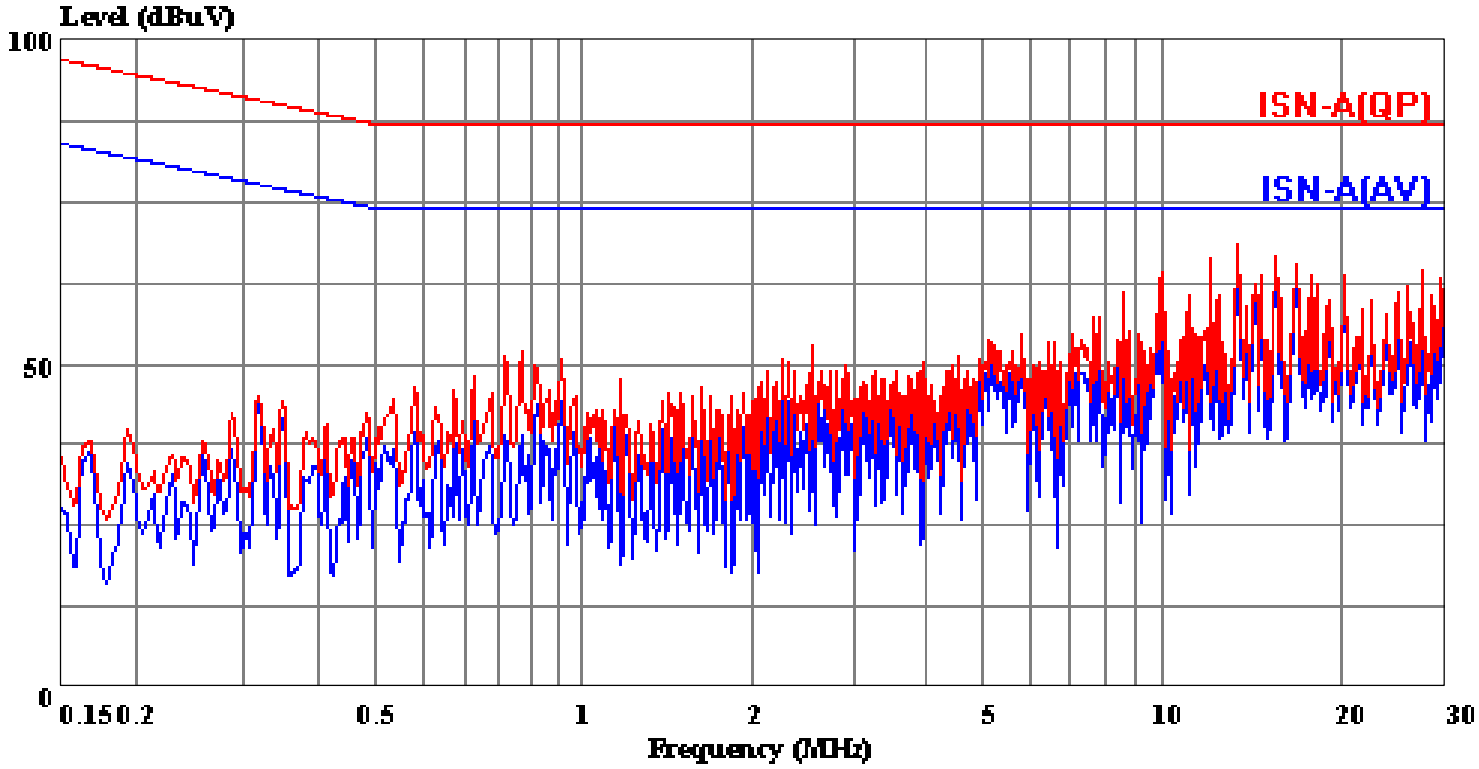
Trace: 31 Ref Trace:

Condition: NEUTRAL
Report No. : 01E9417
Test Engr. : MICHAEL HUNG
Company   : AAEON TECHNOLOGY INC.
EUT   : SBC-659(N)
Test Config : EUT/ALL PERIPHERALS
Type of Test: EN55022 CLASS A
Mode of Op. : INTEL P-III 933MHZ/133MHZ

COMPLIANCE
Engineering Service, Inc.
FCC,VCCI,CISPR,CE
UL,CSA,TUV

No. 199, Chung Sheng Road,
Hsin Tien City, Taipei,
Taiwan, R.O.C.
Tel:02-2217-0894 Fax:02-2217-1254

Data#: 40 File#: 9417e.emi Date: 05-08-2001 Time: 17:19:02



(CCS E-Site)

Trace: 39 Ref Trace:

Condition: ISN
Report No. : 01E9417
Test Engr. : MICHAEL HUNG
Company : AAEON TECHNOLOGY INC.
EUT : SBC-659(N)
Test Config : EUT/ALL PERIPHERALS
Type of Test: EN55022 CLASS A
Mode of Op. : LAN PORT #1

COMPLIANCE Engineering Service, Inc.
FCC,VCCI,CISPR,CE
UL,CSA,TUV

No. 199, Chung Sheng Road,
Hsin Tien City, Taipei,
Taiwan, R.O.C.
Tel:02-2217-0894 Fax:02-2217-1254

Data#: 12 File#: 9417f.emi Date: 2001-4-27 Time: 22:52:38
CCS E-Site

Condition: VERTICAL
Report No. : 01E9417
Test Engr. : MICHAEL HUNG
Company   : AAEON TECHNOLOGY INC.
EUT   : SBC-659 (N)
Test Config : EUT/ALL PERIPHERALS
Type of Test: EN55022 CLASS A
Mode of Op. : INTEL P-III
            : CPU=933MHZ/133MHZ

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	30.460	36.50	-5.59	30.91	40.00	-9.09	Peak
2	37.600	39.80	-9.48	30.32	40.00	-9.68	Peak
3	49.550	44.20	-14.81	29.39	40.00	-10.61	Peak
4	61.260	43.00	-16.11	26.89	40.00	-13.11	Peak
5	77.680	49.70	-18.31	31.39	40.00	-8.61	Peak
6	110.590	43.30	-14.82	28.48	40.00	-11.52	Peak
7	132.944	43.10	-15.62	27.48	40.00	-12.52	Peak
8	150.020	47.10	-13.80	33.30	40.00	-6.70	Peak
9	166.170	47.20	-11.75	35.45	40.00	-4.55	QP
10	176.940	42.20	-10.84	31.36	40.00	-8.64	Peak
11	186.570	42.20	-10.68	31.52	40.00	-8.48	Peak
12	186.830	44.10	-10.68	33.42	40.00	-6.58	Peak
13	199.997	48.60	-10.69	37.91	40.00	-2.09	QP
14	211.290	43.50	-10.38	33.12	40.00	-6.88	Peak
15	232.690	50.70	-9.76	40.94	47.00	-6.06	Peak
16	249.990	45.90	-9.16	36.74	47.00	-10.26	Peak
17	287.510	40.80	-8.31	32.49	47.00	-14.51	Peak
18	300.000	46.40	-8.03	38.37	47.00	-8.63	Peak
19	325.060	37.10	-7.27	29.83	47.00	-17.17	Peak
20	332.340	42.00	-7.09	34.91	47.00	-12.09	Peak
21	350.100	41.90	-6.63	35.27	47.00	-11.73	Peak
22	399.997	32.90	-5.47	27.43	47.00	-19.57	Peak
23	498.527	39.30	-2.45	36.85	47.00	-10.15	Peak
24	565.006	37.70	-0.46	37.24	47.00	-9.76	Peak
25	664.718	35.00	1.86	36.86	47.00	-10.14	Peak
26	764.430	33.70	3.23	36.93	47.00	-10.07	Peak

COMPLIANCE Engineering Service, Inc.
FCC,VCCI,CISPR,CE
UL,CSA,TUV

No. 199, Chung Sheng Road,
Hsin Tien City, Taipei,
Taiwan, R.O.C.
Tel:02-2217-0894 Fax:02-2217-1254

Data#: 15 File#: 9417f.emi Date: 2001-4-27 Time: 23:28:21
CCS E-Site

Condition: HORIZONTAL
Report No. : 01E9417
Test Engr. : MICHAEL HUNG
Company   : AAEON TECHNOLOGY INC.
EUT   : SBC-659 (N)
Test Config : EUT/ALL PERIPHERALS
Type of Test: EN55022 CLASS A
Mode of Op. : INTEL P-III
            : CPU=933MHZ/133MHZ

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	50.360	41.20	-14.81	26.39	40.00	-13.61	Peak
2	68.800	42.00	-17.11	24.89	40.00	-15.11	Peak
3	80.920	45.30	-18.19	27.11	40.00	-12.89	Peak
4	120.000	44.70	-15.24	29.46	40.00	-10.54	Peak
5	150.100	46.30	-13.80	32.50	40.00	-7.50	Peak
6	166.171	49.70	-11.75	37.95	40.00	-2.05	Peak
7	224.990	43.50	-10.00	33.51	40.00	-6.49	Peak
8	250.030	47.10	-9.16	37.94	47.00	-9.06	Peak
9	265.880	48.60	-8.77	39.83	47.00	-7.17	Peak
10	324.990	39.90	-7.27	32.63	47.00	-14.37	Peak
11	365.610	43.80	-6.36	37.44	47.00	-9.56	Peak
12	450.030	35.70	-3.60	32.11	47.00	-14.90	Peak
13	465.290	35.80	-3.23	32.57	47.00	-14.43	Peak
14	565.010	37.80	-0.46	37.34	47.00	-9.66	Peak
15	627.910	36.20	0.97	37.17	47.00	-9.83	Peak
16	830.891	34.50	3.78	38.28	47.00	-8.72	Peak