

FCC TEST REPORT

for

PART 15, SUBPART B CLASS B

EQUIPMENT : APOLLO MEDIA II AGP

MODEL NO. : JY-3DVDA

F C C I D : FQI3DVDAGP1

FILING TYPE : Original

APPLICANT : JOYTECH COMPUTER CO., LTD
3F, No. 1, Alley 2, Szu-Wei Lane, Chung Cheng Rd.,
Hsin Tien City, Taipei Hsien, Taiwan, R.O.C.

- The test result refers exclusively to the test presented test model / sample.
- Without the written authorization of the test lab., the Test Report may not be copied.

SPORTON INTERNATIONAL INC.

6F, No. 106, Hsin Tai Wu Rd., Sec. 1, Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

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2. TEST CONFIGURATION OF EQUIPMENT UNDER TEST

2.1. TEST MANNER

- a. The EUT has been associated with personal computer and peripherals pursuant to ANSI C63.4-1992 and configuration operated in a manner which tended to maximize its emission characteristics in a typical application.
- b. The SONY monitor, HP printer, ACEEX modem, DELL keyboard, PRIMAX mouse, J-S speaker and EUT were connected to the FIC P.C. for EMI test.
- c. The following display resolution were investigated during the compliance test :
 - 1. Horizontal frequency : 640 x 480 to 1280 x 1024, 31.47KHz to 80KHz.
 - 2. Vertical frequency : 60Hz to 85Hz
- d. According to the above tests, we listed the following display modes as the worst cases :
 - 1. 1280x1024, 75Hz, 80KHz.
 - 2. 1024x768, 85Hz, 69KHz.
- e. The data cable connected from SPDIF (Digital Audio Output) jack was floating because the peripheral haven't be developed.
- f. Frequency range investigated: Conduction 450 KHz to 30 MHz, Radiation 30 MHz to 2000MHz.

2.2. DESCRIPTION OF TEST SYSTEM

Support Device 1. --- KEYBOARD (DELL)

FCC ID : GYUM92SK
Model No. : AT101
Serial No. : SP1009
Data Cable : Shielded, 360 degree via metal backshells, 1.9M

Support Device 2. --- PRINTER (HP)

FCC ID : B94C2642X
Model No. : DESKJET 400
Serial No. : SP0015
Data Cable : Shielded, 360 degree via metal backshells, 135M
Power Supply Type : Linear

SUPPORT UNIT 3. -- MODEM (ACCEX)

FCC ID : IFAXDM1414
Model No. : DM1414
Power Supply Type : Linear, AC Adapter
Power Cord : Non-shielded
Serial No. : SP1056
Data Cable : Shielded, 1.15M

Support Device 4. --- MONITOR (SONY)

FCC ID : AK8GDM17SE2T
Model No. : GDM-17SE2T
Serial No. : SP1006
Data Cable : Shielded, 360 degree via metal backshells, 1.7M
Power Supply Type : Switching
Power Cord : Non-shielded

Support Device 5. --- PC (FIC)

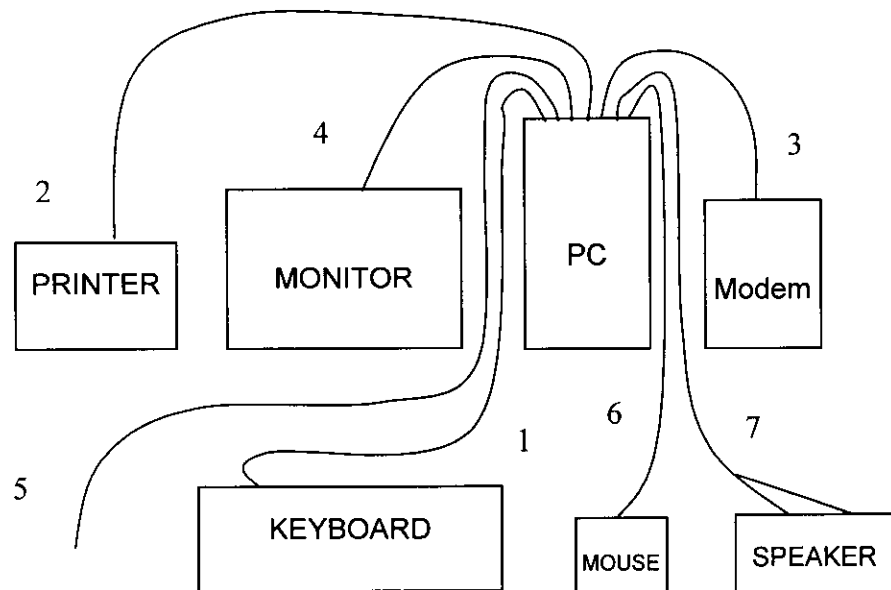
FCC ID : DoC
Model No. : P2L97
Serial No. : SP1050
Data Cable : Shielded
Power Cord : Non-shielded
Power Supply Type : Switching

Support Device 6. -- MOUSE (PRIMAX)

Model No. : MUS9J
Data Cable : Shielded, 1.7M
FCC ID : EMJMUJQ

Support Device 7 -- SPEAKER (J-S)

Model No. : H-008
Data Cable : Non-shielded

2.3. CONNECTION DIAGRAM OF TEST SYSTEM

1. The I/O cable was connected to the support device 1.
2. The I/O cable was connected to the support device 2.
3. The I/O cable was connected to the support device 3.
4. The I/O cable was connected from the VGA port of the EUT to the support device 4.
5. The I/O cable was floating.
6. The I/O cable was connected to the support device 6.
7. The I/O cable was connected from the speaker jack of the EUT to the support device 7.

3. TEST SOFTWARE

An executive program, FCC.EXE, which generates a complete line of continuously repeating " H " pattern is used as the test software.

The program was executed as follows :

- a. Turn on the power of all equipment.
- b. The PC reads the test program from the floppy disk drive and runs it.
- c. The PC sends " H " messages to the monitor, and the monitor displays " H " patterns on the screen.
- d. The PC sends " H " messages to the printer, and the printer prints " H " patterns on the paper.
- e. The PC sends " H " messages to the modem.
- f. The PC sends " H " messages to the internal Hard Disk, and the Hard Disk reads and writes the message
- g. Repeats the steps from b. to f.

4. GENERAL INFORMATION OF TEST

4.1. TEST FACILITY

This test was carried out by SPORTON INTERNATIONAL INC. in an openarea test site.

Openarea Test Site Location : No. 30-1, Lin 6, Diing-Fwu Tsuen, Lin-Kou-Hsiang,
Taipei Hsien, Taiwan, R.O.C.

TEL : 886-2-2601-1640

FAX : 886-2-2601-1695

4.2. STANDARD FOR METHODS OF MEASUREMENT

ANSI C63.4-1992

4.3 .TEST IN COMPLIANCE WITH

FCC PART 15, SUBPART B CLASS B

4.4. FREQUENCY RANGE INVESTIGATED

a. Conduction : from 450 KHz to 30 MHz

b. Radiation : from 30 MHz to 2000 MHz.

4.5. TEST DISTANCE

The test distance of radiated emission from antenna to EUT is 3M.

5. TEST OF CONDUCTED POWERLINE

Conducted Emissions were measured from 450 KHz to 30 MHz with a bandwidth of 9 KHz on the 115 VAC power and return leads of the EUT according to the methods defined in ANSI C63.4-1992 Section 3.1. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in Figure 5-3. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

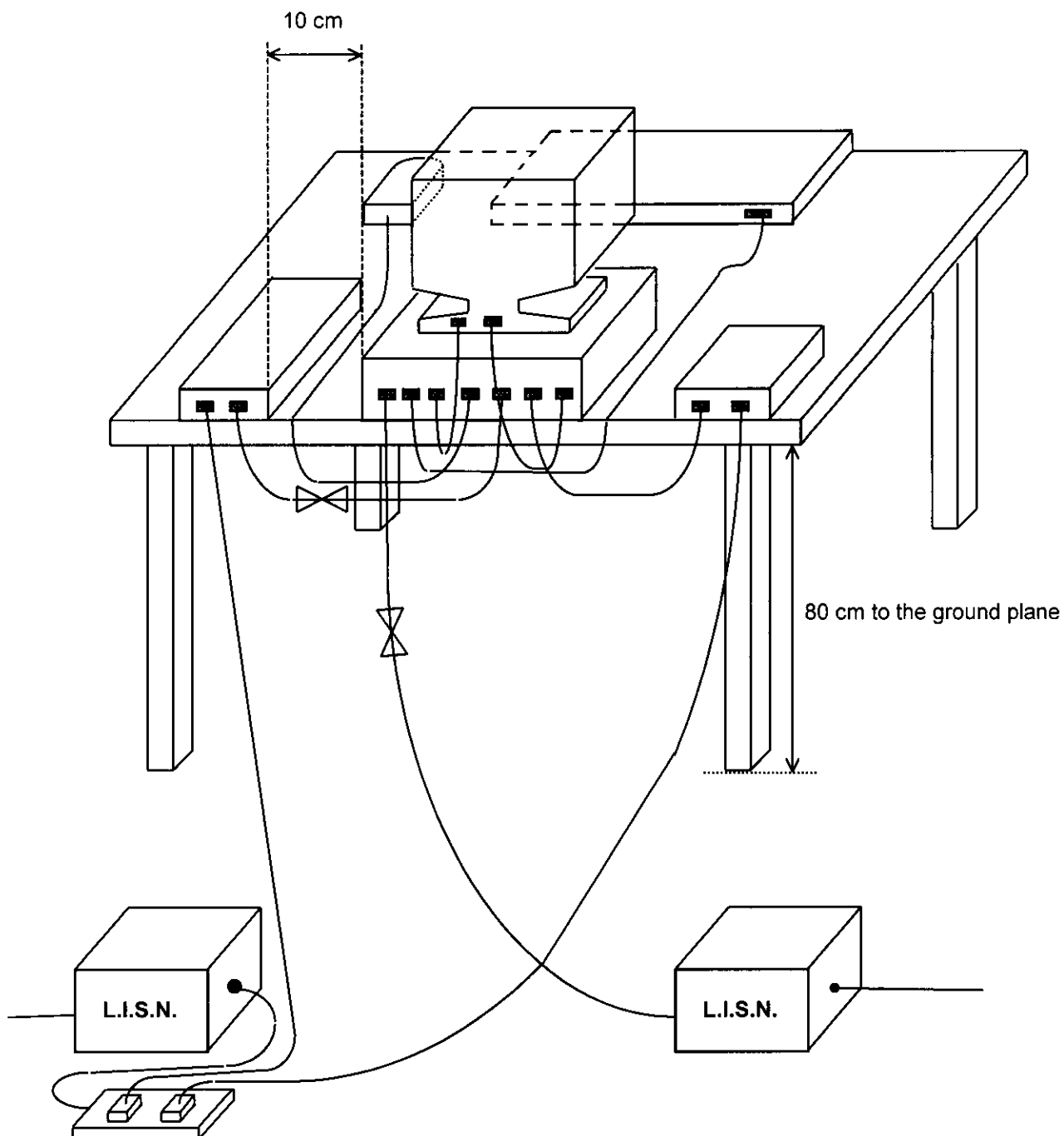
5.1. MAJOR MEASURING INSTRUMENTS

• Test Receiver	(HP 85462A)
Attenuation	0 dB
Start Frequency	0.45 MHz
Stop Frequency	30 MHz
Step MHz	0.007 MHz
IF Bandwidth	9 KHz

5.2. TEST PROCEDURES

- a. The EUT was placed 0.4 meter from the conducting wall of the shielding room and was kept at least 80 centimeters from any other grounded conducting surface.
- b. Connect EUT to the power mains through a line impedance stabilization network (LISN).
- c. All the support units are connect to the other LISN.
- d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
- e. The FCC states that a 50 ohm , 50 microhenry LISN should be used.
- f. Both sides of AC line were checked for maximum conducted interference.
- g. The frequency range from 450 KHz to 30 MHz was searched.
- h. Set the test-receiver system (HP receiver 85462A) to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- i. If the emission level of the EUT in peak mode was 6 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported otherwise the emissions which do not have 6 dB margin will be retested on by one using the quasi-peak method and reported.

5.3. TYPICAL TEST SETUP LAYOUT OF CONDUCTED POWERLINE



5.4. TEST RESULT OF AC POWERLINE CONDUCTED EMISSION**5.4.1. TEST MODE : 1280 x 1024, 75Hz, 80KHz**

- Frequency Range of Test : from 0.45 MHz to 30 Mhz
- All emissions not reported here are more than 10 dB below the prescribed limit.
- Temperature : 23 °C
- Relative Humidity : 41 % RH
- Test Date : April 17, 1998

The Conducted Emission test was passed at Neutral 3.59 MHz / 36.1 dBuV.

Frequency (MHz)	Line / Neutral	Meter Reading		Limits		Margin (dB)
		(dBuV)	(uV)	(dBuV)	(uV)	
0.57	L	34.90	55.59	48.00	251.19	-13.10
0.87	L	34.90	55.59	48.00	251.19	-13.10
0.87	N	35.20	57.54	48.00	251.19	-12.80
1.47	N	35.10	56.89	48.00	251.19	-12.90
3.59	N	36.10	63.83	48.00	251.19	-11.90
27.08	N	34.50	53.09	48.00	251.19	-13.50

Test Engineer : *Alex*

5.4.2.TEST MODE : 1024 x 768, 85Hz, 69KHz

- Frequency Range of Test : from 0.45 MHz to 30 Mhz
- All emissions not reported here are more than 10 dB below the prescribed limit.
- Temperature : 23 °C
- Relative Humidity : 41 % RH
- Test Date : April 17, 1998

The Conducted Emission test was passed at Neutral 8.67 MHz / 36.4 dBuV.

Frequency (MHz)	Line / Neutral	Meter Reading		Limits		Margin
		(dBuV)	(uV)	(dBuV)	(uV)	(dB)
0.69	L	35.00	56.23	48.00	251.19	-13.00
8.67	L	36.40	66.07	48.00	251.19	-11.60
19.75	L	20.80	10.96	48.00	251.19	-27.20
0.87	N	35.20	57.54	48.00	251.19	-12.80
8.73	N	36.00	63.10	48.00	251.19	-12.00
19.75	N	36.20	64.57	48.00	251.19	-11.80

Test Engineer : *Alex*

6. TEST OF RADIATED EMISSION

Radiated emissions from 30 MHz to 2000 MHz were measured with a bandwidth of 120 KHz according to the methods defines in ANSI C63.4-1992. The EUT was placed on a nonmetallic stand in the open-field site, 0.8 meter above the ground plane, as shown in Figure 6-3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions.

6.1. MAJOR MEASURING INSTRUMENTS

- RF Preselector

Attenuation	0 dB
RF Gain	20 dB
Signal Input	Input 2 (for 20 MHz to 2 GHz)

- Spectrum Analyzer 8568B/8594A

Attenuation	0 dB
Start Frequency	30 MHz
Stop Frequency	2000 MHz
Resolution Bandwidth	1 MHz
Video Bandwidth	1 MHz
Signal Input	Input 1 (for 9 KHz to 2.9 GHz)

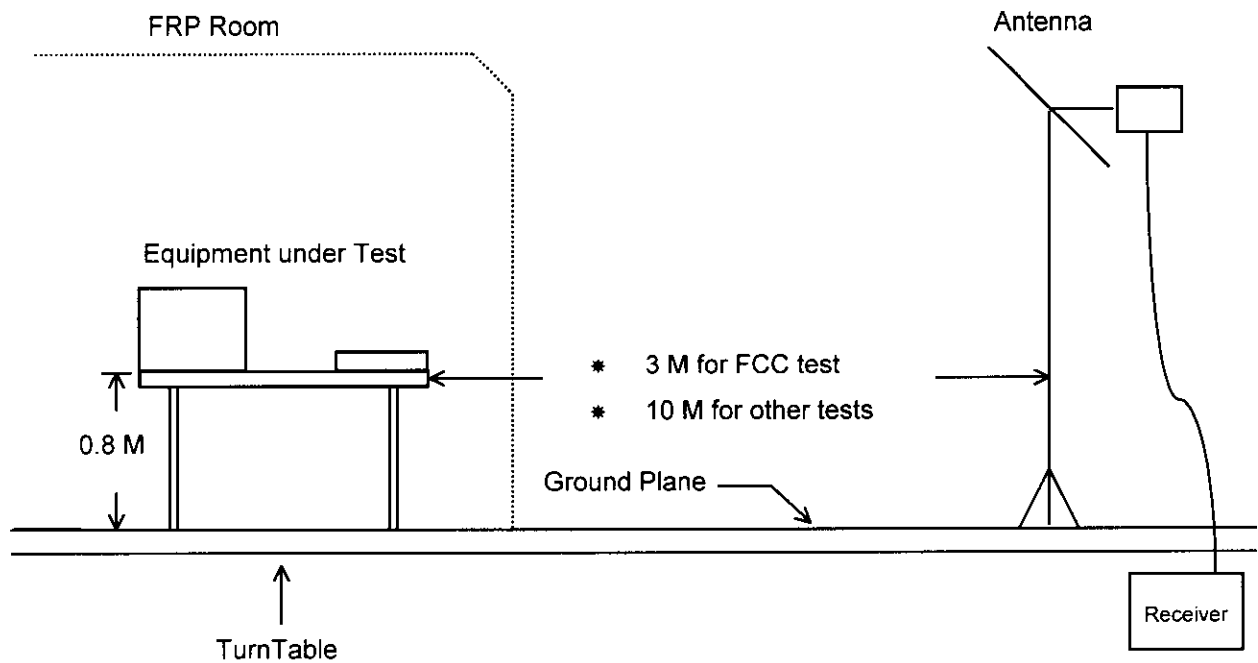
- Quasi-Peak Adapter

Resolution Bandwidth	120 KHz
Frequency Band	30 MHz to 1 GHz
Quasi-Peak Detector	ON for Quasi-Peak Mode OFF for Peak Mode

6.2. TEST PROCEDURES

- a. The EUT was placed on a rotatable table top 0.8 meter above ground.
- b. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The antenna is a half wave dipole and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- f. Set the test-receiver system (HP 8568B) to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 6 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported otherwise the emissions which do not have 6 dB margin will be repeated one by one using the quasi-peak method and reported.

6.3. TYPICAL TEST SETUP LAYOUT OF RADIATED EMISSION



6.4. TEST RESULT OF RADIATED EMISSION**6.4.1 TEST MODE : 1280 x 1024, 75Hz, 80KHz**

- Equipment meets the technical specifications of 15.109
- Frequency Range of Test : from 30 MHz to 2000 MHz
- Test Distance : 3 M
- Temperature : 23
- Relative Humidity : 52 RH
- Test Date : March 30, 1998
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Sample Calculation at 200.04 MHz
Corrected Reading = 14.05 + 2.4 + 18.53 = 34.98 (dBuV/m)

The Radiated Emission test was passed at

500.8 MHz / 41.24 dBuV (Horizontal)

Antenna Height 1 Meter , Turntable Degree 186°.

Frequency	Antenna	Cable	Reading	Limits	Emission	Level	Margin
	Polarity	Factor	Loss				
(MHz)		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dB)
200.04	V	14.05	2.40	18.53	43.50	150	34.98 56.10 -8.52
201.02	V	14.06	2.40	18.29	43.50	150	34.75 54.64 -8.75
501.19	V	22.34	4.11	14.39	46.00	200	40.84 110.15 -5.16
66.60	H	5.28	1.20	28.14	40.00	100	34.62 53.83 -5.38
500.80	H	22.33	4.10	14.81	46.00	200	41.24 115.35 -4.76
600.80	H	24.03	4.61	12.29	46.00	200	40.92 111.17 -5.08

Test Engineer : *Terry Cheng*

6.4.2. TEST MODE : 1024 x 768, 85Hz, 69KHz

- Equipment meets the technical specifications of 15.109
- Frequency Range of Test : from 30 MHz to 2000 MHz
- Test Distance : 3 M
- Temperature : 23
- Relative Humidity : 52 RH
- Test Date : March 30, 1998
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Sample Calculation at 33.6 MHz
Corrected Reading = -1.12 + 0.81 + 34.18 = 33.87 (dBuV/m)

The Radiated Emission test was passed at

600.80 MHz / 40.42 dBuV (Horizontal)

Antenna Height 1.4 Meter , Turntable Degree 120°.

Frequency (MHz)	Antenna Polarity	Cable Factor (dB/m)	Reading Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	Emission (uV/m)	Level (dBuV/m)	Margin (uV/m)	(dB)
33.60	H	-1.12	0.81	34.18	40.00	100	33.87	49.37	-6.13
114.80	H	10.25	1.65	19.69	43.50	150	31.59	37.98	-11.91
391.20	H	22.08	3.51	12.67	46.00	200	38.26	81.85	-7.74
65.70	V	5.20	1.20	26.50	40.00	100	32.90	44.16	-7.10
122.50	V	10.49	1.73	19.82	43.50	150	32.04	39.99	-11.46
600.80	V	24.03	4.61	11.79	46.00	200	40.42	104.95	-5.58

Test Engineer :

Terry Chung

7. ANTENNA FACTOR AND CABLE LOSS

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)
30	-1.91	0.90
35	-0.50	0.92
40	0.61	1.04
45	1.40	1.28
50	2.39	1.10
55	3.54	1.11
60	4.40	1.30
65	4.84	1.40
70	5.59	1.37
75	6.21	1.24
80	7.60	1.51
85	7.73	1.60
90	8.22	1.60
95	8.90	1.70
100	9.36	1.70
110	10.01	1.70
120	10.41	1.90
130	10.84	1.90
140	11.42	1.91
150	11.91	2.01
160	12.25	2.11
170	12.72	2.21
180	13.02	2.30
190	13.50	2.30
200	14.05	2.40
220	15.11	2.50
240	16.81	2.60
260	17.51	2.71
280	17.70	2.90
300	17.89	2.91
320	18.00	3.10
340	18.33	3.20
360	19.44	3.30
380	20.31	3.40
400	21.19	3.50
450	21.10	3.70
500	22.21	4.10
550	23.42	4.30
600	24.01	4.50
650	25.11	4.70
700	26.00	4.90
750	26.41	5.11
800	27.10	5.50
850	27.51	5.60
900	27.90	5.80
950	28.01	5.90

8. LIST OF MEASURING EQUIPMENT USED

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Receiver RF Section	HP	85462A	3325A00108	9 KHz - 6.5 GHz	Oct. 22, 1997	Conduction
RF Filter Section	HP	85460A	3308A00104	9 KHz - 6.5 GHz	Oct. 22, 1997	Conduction
LISN	EMCO	3850/2	1035	50 ohm / 50 uH	Oct. 27, 1997	Conduction
LISN	KYORITSU	KNW-407	8-693-10	50 ohm / 50 uH	Oct. 04, 1997	Conduction
EMI Filter	CORCOM	MRI-2030	N/A	480 VAC / 30 A	N/A	Conduction
Quasi-Peak Adapter (site 1)	HP	85650A	2811A01116	9KHz - 1000KHz	Jun 17, 1997	Radiation
Spectrum Analyzer (site 1)	HP	8568B	2732A04100	100Hz - 1500KHz	Jun 17, 1997	Radiation
Spectrum Analyzer display (site 1)	HP	N/A	2816A16464	100Hz - 1500KHz	Jun 17, 1997	Radiation
Spectrum	HP	8594A	2741A0311	9KHz - 2.9GHz	Apr. 17, 1998	Radiation
Bilog Antenna (Site 1)	CHASE	CBL6111	1378	30MHz -1 GHz	Aug. 12, 1997	Radiation
Half-wave dipole antenna (site 1)	EMCO	3121C	9705-1285	28 M - 1GHz	May 19, 1997	Radiation
Turn Table (site 1)	EMCO	1060-1.211	9507-1805	0 ~ 360 degree	N/A	Radiation
Antenna Mast (site 1)	EMCO	1051-1.2	9502-1868	1 m - 4 m	N/A	Radiation