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# **FCC TEST REPORT**

for

## **PART 15, SUBPART B CLASS B**

**EQUIPMENT** : Sound Card

**MODEL NO.** : 9810-10A

**F C C I D** : JDFAUD-GW810

**FILING TYPE** : ORIGINAL

**APPLICANT** : **T. N. C. INDUSTRIAL CO., LTD**  
3F, 8, LANE 235, BAO CHIAO 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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FCC TEST REPORT

REPORT NO. : F881702

CERTIFICATE NO. : F881702

## CERTIFICATE OF COMPLIANCE

for

**FCC PART 15, SUBPART B CLASS B**

EQUIPMENT : Sound Card

MODEL NO. : 9810-10A

FCC ID : JDFAUD-GW810

APPLICANT : T. N. C. INDUSTRIAL CO., LTD  
3F, 8, LANE 235, BAO CHIAO RD., HSIN TIEN CITY,  
TAIPEI HSIEN, TAIWAN, R.O.C.

### I HEREBY CERTIFY THAT :

The measurement shown in this report were made in accordance with the procedures given in **ANSI C63.4 -1992** and the energy emitted by this equipment was **passed** both radiated and conducted emissions **Class B** limits. Testing was carried out on **Aug. 18, 1998** at **SPORTON International Inc. LAB.**

  
W. L. Huang  
General Manager

**SPORTON INTERNATIONAL INC.**

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

## **1. GENERAL DESCRIPTION OF EQUIPMENT UNDER TEST**

### **1.1. APPLICANT**

**T. N. C. INDUSTRIAL CO., LTD**

3F, 8, LANE 235, BAO CHIAO RD., HSIN TIEN CITY,  
TAIPEI HSIEN, TAIWAN, R.O.C.

### **1.2. MANUFACTURER :**

Same as 1.1.

### **1.3. BASIC DESCRIPTION OF EQUIPMENT UNDER TEST**

EQUIPMENT : Sound Card

MODEL NO. : 9810-10A

FCC ID : JDFAUD-GW810

TRADE NAME : T. N. C.

Microphone, Speaker, Joystick, Stereo Cassette Player DATA CABLE : Non-shielded

POWER SUPPLY TYPE : N/A

POWER CORD : N/A

### **1.4. FEATURE OF EQUIPMENT UNDER TEST**

- AC'97 Compatible
- 18-bit Stereo Full-duplex Codec with fixed 48 KHz Sampling Rate
- Full DOS Games Compatibility vis PC/PCI, DDM, and CrystalClear Legacy Support™
- 255 MIP SLIMD™ DSP Architecture
- DirectX™ 5.0 3D Positional Audio
- Hardware Aureal A3D Acceleration
- Fat Labs Approved 64-Voice Wavetable Synthesis with Effects
- NetMeeting™ AEC (Acoustic ECHO Cancellation) Hardware Acceleration
- High Quality Hardware Sample Rate Conversion (90+dB Dynamic Range)
- PCI Version 2.1 Bus Master
- PCI Power management (D0 through D3 Hot), AMP 1,2, and ACPI 1.0 Support
- Four Analog Line-level Stereo Inputs for Connection From LINE IN, CD, VIDEO And AUX.

**FCC TEST REPORT****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 DELL keyboard, SONY monitor, HP printer, ACEEX modem, KOKA microphone, DATATEK joystick, PRIMAX PS/2 mouse, KOKA stereo cassette player, JUSTER speaker and EUT were connected to the FIC P.C. for EMI test.
- c. Frequency range investigated: Conduction 450 KHz to 30 MHz, Radiation 30 MHz to 1000 MHz.

**2.2. DESCRIPTION OF TEST SYSTEM****Support Device 1. — 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 2. — KEYBOARD (DELL)**

FCC ID : GYUM92SK  
Model No. : AT101 (DE8M)  
Serial No. : SP1009  
Data Cable : Shielded, 360 degree via metal backshells, 1.9m

**Support Device 3. — PS/2 MOUSE (PRIMAX)**

FCC ID : EMJMUSJQ  
Model No. : MUS9J  
Serial No. : SP1012  
Data Cable : Shielded, 1.7m

**Support Device 4. -- PRINTER (HP)**

FCC ID : B94C2642X  
Model No. : DESK JET 400  
Serial No. : SP0037  
Data Cable : Shielded, 360 degree via metal backshells, 1.35m  
Power Supply Type : Linear, Adapter  
Power Cord : Non-shielded

**Support Device 5. -- MODEM (ACEEX)**

FCC ID : IFAXDM1414  
Model No. : DM1414  
Power Supply Type : Linear, AC Adapter  
Power Cord : Non-shielded  
Serial No. : SP1019  
Data Cable : Shielded, 360 degree via metal backshells, 1.15m

**Support Device 6. -- MICROPHONE (KOKA)**

FCC ID : N/A  
Model No. : SRM02  
Serial No. : SP1031  
Data Cable : Non-shielded, 2.1m

**Support Device 7. -- JOYSTICK (DATATEK)**

FCC ID : N/A  
Model No. : RXT-10E  
Serial No. : SP1026  
Data Cable : Non-shielded, 1.35m

**Support Device 8. -- STEREO CASSETTE PLAYER (KOKA)**

FCC ID : N/A  
Model No. : KW-247  
Serial No. : SP1032  
Data Cable : Non-shielded, 1.7m

**FCC TEST REPORT****REPORT NO. : F881702****Support Device 9. — SPEAKER (JUSTER)**

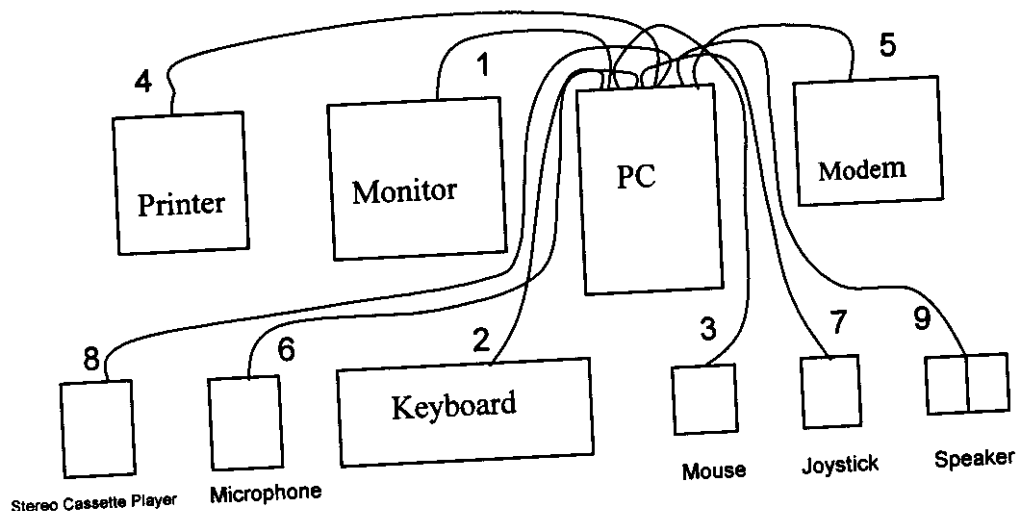
FCC ID : N/A  
Model No. : SP-480  
Serial No. : SP1039  
Data Cable : Non-shielded, 2.2m

**Support Device 10. — P.C. (FIC)**

FCC ID : N/A  
Model No. : P55T2P4  
Serial No. : SP1003  
Data Cable : Shielded  
Power Cord : Non-shielded  
Power Supply Type : Switching

( Remark : This support device was tested to comply with FCC standards and  
authorized under a declaration of conformity.)

## 2.3. CONNECTION DIAGRAM OF TEST SYSTEM



1. The I/O cable is connected to the support device 1.
2. The I/O cable is connected to the support device 2.
3. The I/O cable is connected to the support device 3.
4. The I/O cable is connected to the support device 4.
5. The I/O cable is connected to the support device 5.
6. The I/O cable is connected from the EUT to the support device 6.
7. The I/O cable is connected from the EUT to the support device 7.
8. The I/O cable is connected from the EUT to the support device 8.
9. The I/O cable is connected from the EUT to the support device 9.

### **3. TEST SOFTWARE**

An executive program, EMITEST.EXE & Media Player Program under WIN 98, which generate a complete line of continuously repeating " H " pattern were used as the test software.

- a. Turn on the power of all equipment.
- b. The PC transmits the " H " character to the EUT.
- c. The monitor then displaying the " H " characters on the screen continuously and repeatedly.
- d. The PC sends " H " messages to the printer, then the printer prints it on the paper.
- e. The PC sends " H " messages to the modem.
- f. The PC sends " H " messages to the internal Hard Disk, then the hard disk reads and writes the message.
- g. Repeat the steps from b to f.

## **4. GENERAL INFORMATION OF TEST**

### **4.1. TEST FACILITY**

This test was carried out by SPORTON INTERNATIONAL INC.

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 1000 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.

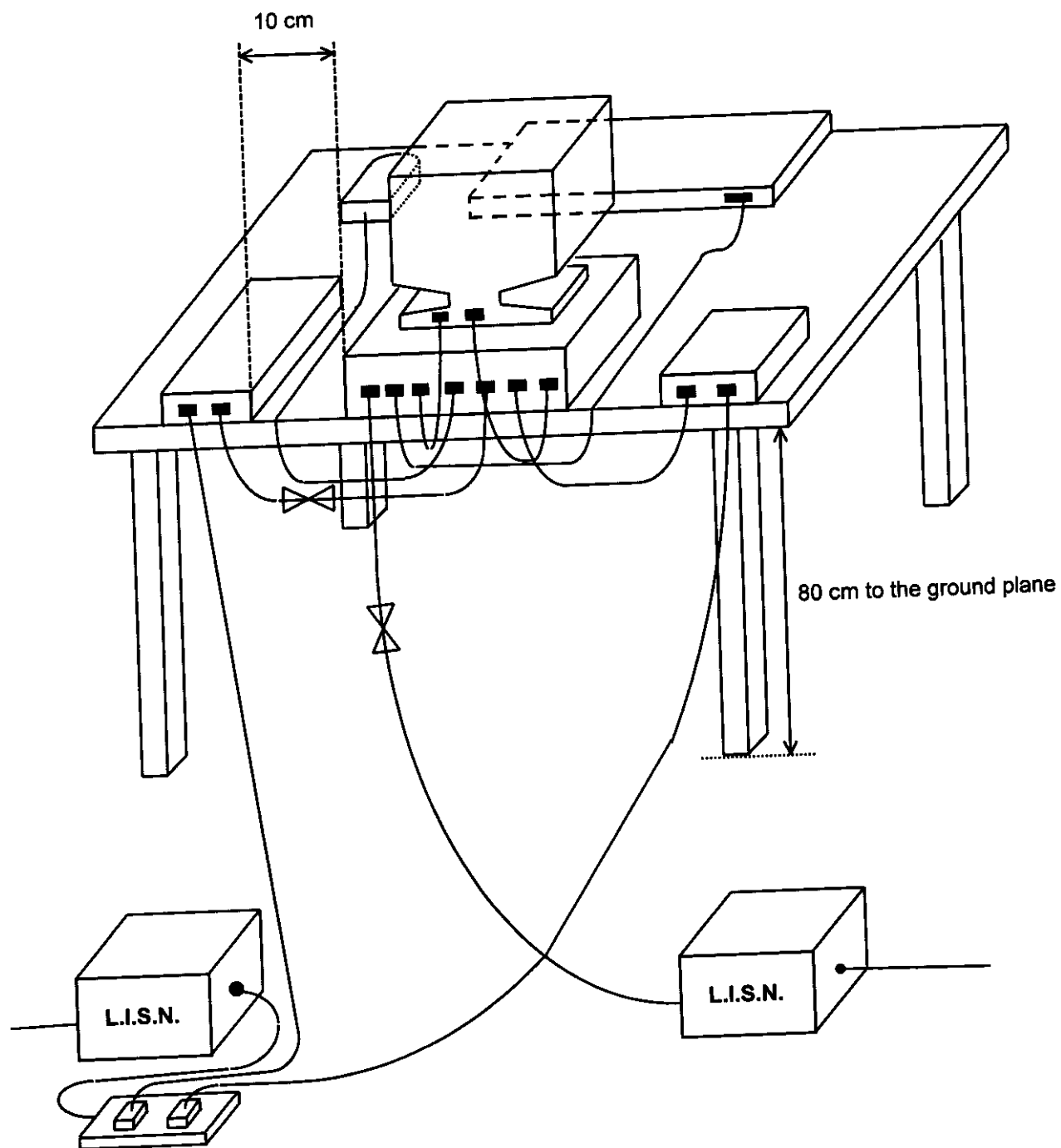
### **5.1. MAJOR MEASURING INSTRUMENTS**

- Test Receiver ( HP 8591EM )
  - 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 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

- 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 : 31°C
- Relative Humidity : 40 % RH
- Test Date : Aug. 18, 1998

The Conducted Emission test was passed at **Neutral 16.96 MHz/ 33.20 dBuV.**

Frequency ( MHz )	Line / Neutral	Meter Reading		Limits		Margin
		( dBuV )	( uV )	( dBuV )	( uV )	( dB )
0.78	L	24.70	17.18	48.00	251.19	-23.30
16.96	L	32.30	41.21	48.00	251.19	-15.70
19.80	L	22.30	13.03	48.00	251.19	-25.70
0.78	N	24.40	16.60	48.00	251.19	-23.60
16.96	N	33.20	45.71	48.00	251.19	-14.80
19.74	N	22.60	13.49	48.00	251.19	-25.40

Test Engineer: Kenny Chuang

Kenny Chuang

## **6. TEST OF RADIATED EMISSION**

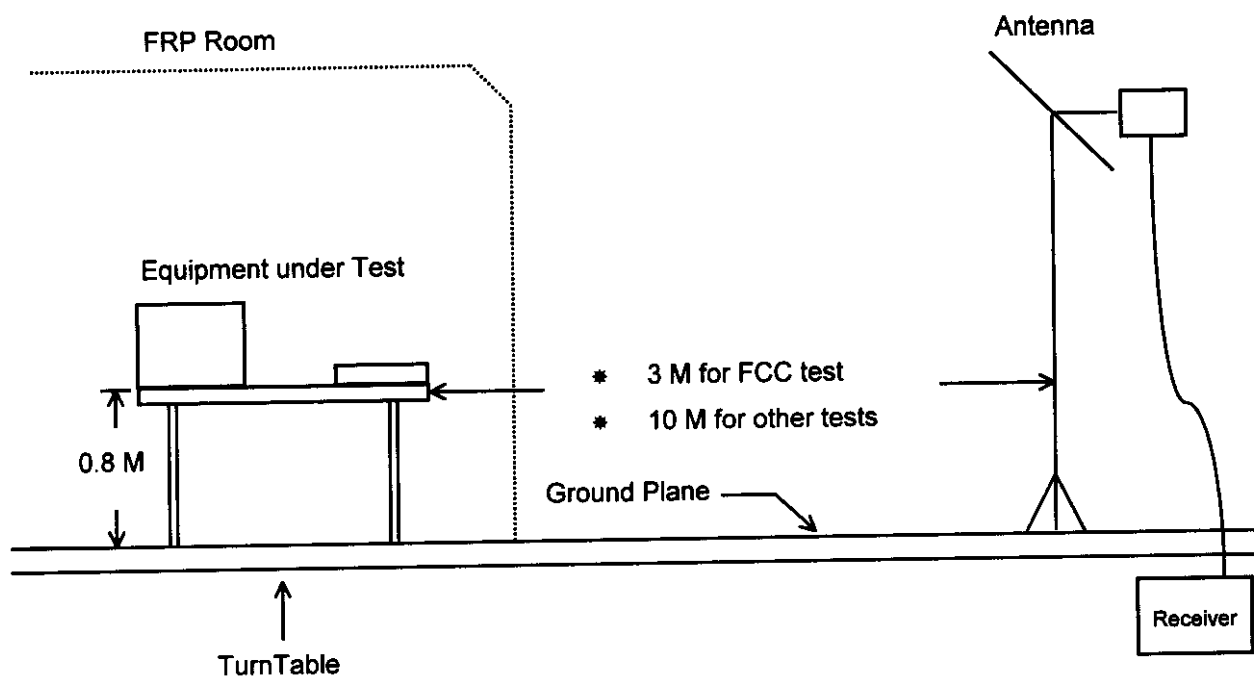
Radiated emissions from 30 MHz to 1000 MHz were measured with a bandwidth of 120 KHz according to the methods defines in ANSI C63.4-1992. The EUT was placed on a nonmetallic stand in the open-field site, 0.8 meter above the ground plane, as shown in Figure 6-3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions.

### **6.1. MAJOR MEASURING INSTRUMENTS**

- Amplifier ( HP 8447D )
  - Attenuation 0 dB
  - RF Gain 25 dB
  - Signal Input 0.1 MHz to 1.3 GHz
  
- Spectrum Analyzer ( HP 8568B )
  - Attenuation 0 dB
  - Start Frequency 30 MHz
  - Stop Frequency 1000 MHz
  - Resolution Bandwidth 1 MHz
  - Video Bandwidth 1 MHz
  - Signal Input 100 Hz to 1.5 GHz
  
- Quasi-Peak Adapter ( HP 85650A )
  - 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 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

- Equipment meets the technical specifications of 15.109
- Frequency Range of Test : from 30 MHz to 1000 MHz
- Test Distance : 3 M
- Temperature : 34 °C
- Relative Humidity : 51 % RH
- Test Date : Aug. 17, 1998
- Emission level ( dBuV/m ) = 20 log Emission level ( uV/m )
- Sample Calculation at 399.49 MHz  
Corrected Reading = 22.28 + 3.59 + 16.61 = 42.48 (dBuV/m )

The Radiated Emission test was passed at

Vertical 36.92 MHz / 35.74 dBuV

Antenna Height 1.8 Meter , Turntable Degree 247 °.

Frequency	Antenna	Cable	Reading	Limits	Emission	Level	Margin
Polarity	Factor	Loss					
( MHz )	( dB )	( dB )	( dBuV )	( dBuV )	( uV )	( dBuV )	( uV ) ( dB )
36.92	V	-0.24	0.87	35.11	40.00	100	35.74 61.24 -4.26
133.80	V	11.00	1.84	20.60	43.50	150	33.44 46.99 -10.06
356.02	V	19.94	3.28	18.30	46.00	200	41.52 119.12 -4.48
399.49	V	22.28	3.59	16.61	46.00	200	42.48 133.05 -3.52
36.57	H	-0.32	0.86	34.64	40.00	100	35.18 57.41 -4.82
61.66	H	4.65	1.20	28.26	40.00	100	34.11 50.76 -5.89

Test Engineer : Terry Chang  
Terry Chang

## 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
EMC Receiver (site 2)	HP	8591EM	3710A01187	9 KHz - 18 GHz	Sep. 29, 1997	Conduction
LISN (EUT) (site 2)	Telemeter	NNB-2/16Z	98009	50 ohm / 50 uH	Jan. 29, 1998	Conduction
LISN (Support Unit) (site 2)	EMCO	3810/2NM	9703-1839	50 ohm / 50 uH	Mar. 06, 1998	Conduction
Quasi-peak Adapter (site 5)	HP	85650A	2521A00821	9KHz -1 GHz	Nov. 12, 1997	Radiation
Spectrum Analyzer (Site 5)	HP	8568B	2634A03000	100Hz - 1.5GHz	Nov. 12, 1997	Radiation
Amplifier (Site 5)	HP	8447D	2944A09073	0.1MHz -1.3GHz	Sep. 17, 1997	Radiation
Bilog Antenna (Site 5)	CHASE	CBL6112A	2287	30MHz -2GHz	Jan. 27, 1998	Radiation
Half-wave dipole antenna (Site 5)	EMCO	3121C	9705-1285	28 M - 1GHz	May 19, 1998	Radiation
Turn Table (site 5)	EMCO	2080	9711-2021	0 ~ 360 degree	N/A	Radiation
Antenna Mast (site 5)	EMCO	2075	9711-2115	1 m- 4 m	N/A	Radiation