

# **FCC TEST REPORT**

for

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

**EQUIPMENT** : 2D+3D VGA Card

**MODEL NO.** : Vulcan B

**F C C I D** : ILL165

**FILING TYPE** : Original Grant

**APPLICANT** : **BRITEK ELECTRONICS CO., LTD.**  
8F-2, No. 146, Sung Chiang Road,  
Taipei , 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. : F802912**

CERTIFICATE NO. : F802912

## CERTIFICATE OF COMPLIANCE

for

### FCC PART 15, SUBPART B CLASS B

EQUIPMENT : 2D+3D VGA Card

MODEL NO. : Vulcan B

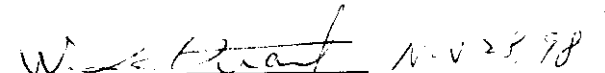
F C C I D : ILL165

APPLICANT : **BRITEK ELECTRONICS CO., LTD.**  
8F-2, No. 146, Sung Chiang Road,  
Taipei , 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 **Nov. 05, 1998** at **SPORTON International Inc.**

  
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**

**BRITEK ELECTRONICS CO., LTD.**

8F-2, No. 146, Sung Chiang Road,

Taipei , Taiwan, R.O.C.

### **1.2. MANUFACTURER :**

Same as 1.1

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

EQUIPMENT : 2D+3D VGA Card

MODEL NO. : Vulcan B

FCC ID : ILL165

TRADE NAME : BRITEK

DATA CABLE : Shielded

POWER SUPPLY TYPE : N/A

POWER CORD : N/A

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

- Fully integrated 128-bit VGA/2D/3D/Video Accelerator.
- Ultimate 3D experience with **100 Mpixels/sec** and **4 Million triangles/sec** 3D performance.
- No-compromise 3D image quality at frame rates.
- Optimized for software DVD acceleration.
- Full VMI interface (including a host port) for optional :  
⇒ Full hardware DVD decoding, Video capturing.
- High-resolution 1600 ×1200 85Hz with a 230MHz RAMDAC.
- Supports 16MB SGRAM frame buffer.
- PC97 and PC98 rev 1.0 compliant.
- VESA DDC2B support.

## 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 HITACHI monitor, DELL keyboard, LOGITECH RS232 mouse, HP printer, ACEEX modem 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 1600 x 1200, 31.5KHz to 106KHz )
  2. Vertical frequency ( 60Hz to 85Hz)
- d. According to the above tests, we listed the following display modes as the worst cases:
  1. 1600 x 1200, 106KHz, 85Hz
  2. 1280 x 1024, 91KHz, 85Hz
- e. Frequency range investigated: Conduction 450 KHz to 30 MHz, Radiation 30 MHz to 2000 MHz.

### 2.2. DESCRIPTION OF TEST SYSTEM

#### Support Device 1. --- MONITOR (HITACHI)

FCC ID : M9U9705C97BMD  
Model No. : CM803ET  
Serial No. : SP1019  
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. --- PRINTER (HP)

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

## Support Device 4. -- 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 5. -- RS232 MOUSE (LOGITECH)

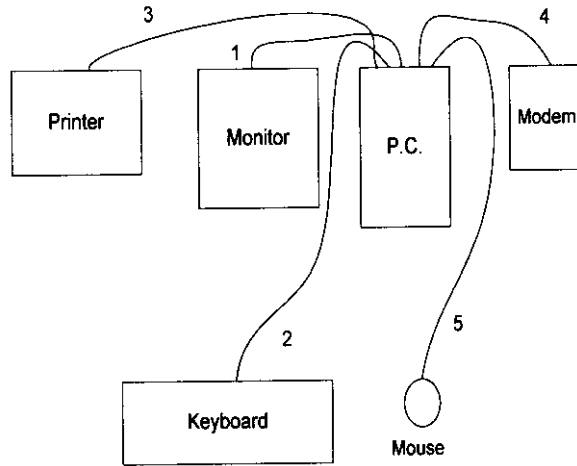
FCC ID : DZL210365  
Model No. : M-M35  
Serial No. : SP1017  
Data Cable : Non-shielded, 1.9m

## Support Device 6. --- P.C. (FIC)

FCC ID : N/A  
Model No. : P2L97  
Serial No. : SP1005  
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 was connected from the PC to the support device 1.
2. The I/O cable was connected from the PC to the support device 2.
3. The I/O cable was connected from the PC to the support device 3.
4. The I/O cable was connected from the PC to the support device 4.
5. The I/O cable was connected from the PC to the support device 5.

### **3. TEST SOFTWARE**

An executive program, WINFCC.EXE under WIN 98, which generates a complete line of continuously repeating " H " pattern was 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, then the printer prints them 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. 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 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.

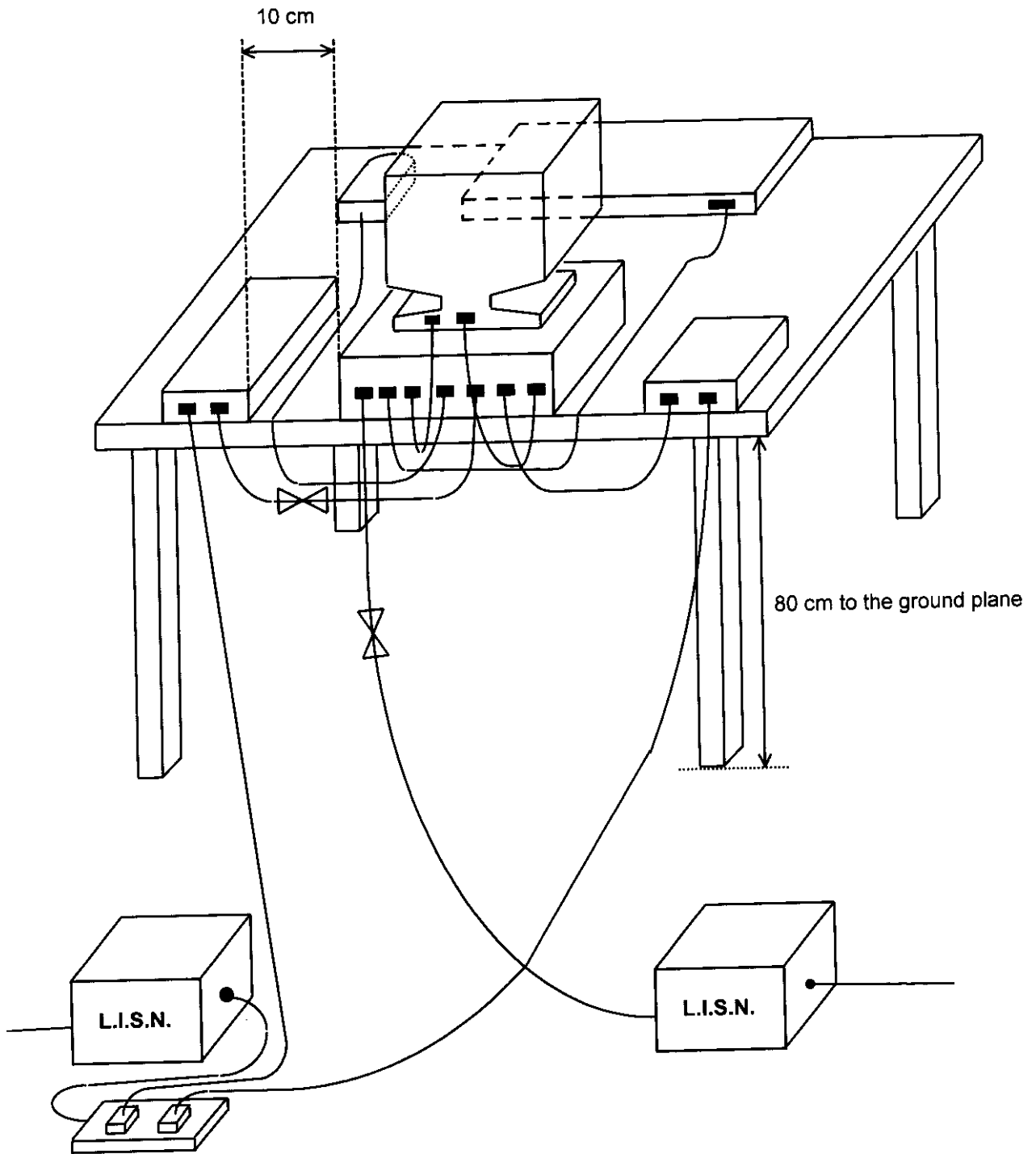
### **5.1. MAJOR MEASURING INSTRUMENTS**

- Test Receiver ( HP 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

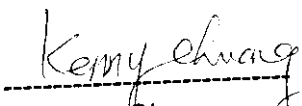


**5.4. TEST RESULT OF AC POWERLINE CONDUCTED EMISSION**

- 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 : 22°C
- Relative Humidity : 51% RH
- Test Mode : **1600 x 1200, 85Hz, 106K**
- Test Date : Nov. 05, 1998

**The Conducted Emission test was passed at Line 8.00 MHz / 37.450 dBuV.**

Frequency ( MHz )	Line / Neutral	Meter Reading		Limits		Margin ( dB )
		( dBuV )	( uV )	( dBuV )	( uV )	
8.00	Line	37.40	74.13	48.00	251.19	-10.60
22.57	Line	33.70	48.42	48.00	251.19	-14.30
27.46	Neutral	34.50	53.09	48.00	251.19	-13.50
8.00	Neutral	37.40	74.13	48.00	251.19	-10.60
22.57	Neutral	35.20	57.54	48.00	251.19	-12.80
27.46	Neutral	34.50	53.09	48.00	251.19	-13.50

Test Engineer :   
 \_\_\_\_\_  
 Kenny Chuang

**5.4.1. 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 : 22°C
- Relative Humidity : 51% RH
- Test Mode : **1280 x 1024, 85Hz, 91K**
- Test Date : Nov. 05, 1998

**The Conducted Emission test was passed at Neutral 8.00 MHz / 37.60 dBuV.**

Frequency ( MHz )	Line / Neutral	Meter Reading		Limits		Margin ( dB )
		( dBuV )	( uV )	( dBuV )	( uV )	
11.77	Line	32.70	43.15	48.00	251.19	-15.30
23.53	Line	32.90	44.16	48.00	251.19	-15.10
27.46	Neutral	34.50	53.09	48.00	251.19	-13.50
8.00	Neutral	37.60	75.86	48.00	251.19	-10.40
22.57	Neutral	34.70	54.33	48.00	251.19	-13.30
27.46	Neutral	33.50	47.32	48.00	251.19	-14.50

Test Engineer :

*Kenny Chuang*  
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 Kenny Chuang

## 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

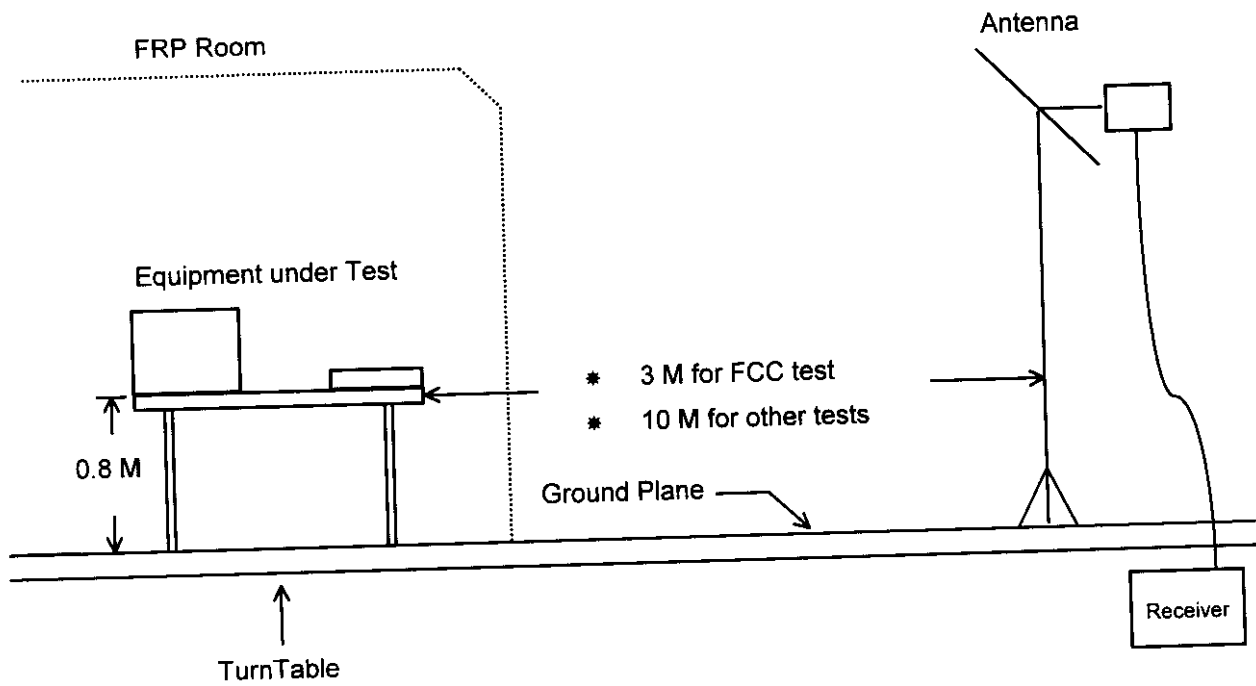
- Amplifier ( HP 87405A )
  - Attenuation 0 dB
  - RF Gain 25 dB
  - Signal Input 10 MHz to 3 GHz
  
- Spectrum Analyzer ( HP 8560E )
  - Attenuation 0 dB
  - Start Frequency 30 MHz
  - Stop Frequency 2000 MHz
  - Resolution Bandwidth 1 MHz
  - Video Bandwidth 1 MHz
  - Signal Input 30 Hz to 2.9 GHz
  
- Test Receiver ( R&S ESCS30 )
  - 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**

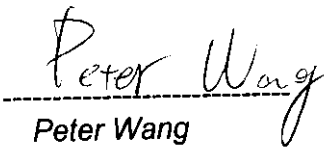
- Equipment meets the technical specifications of 15.109
- Frequency Range of Test : from 30 MHz to 2000 MHz
- Test Distance : 3 M
- Temperature : 26°C
- Relative Humidity : 81 % RH
- Test Mode : **1600 x 1200, 85Hz, 106K**
- Test Date : Nov. 03, 1998
  
- Emission level ( dBuV/m ) = 20 log Emission level ( uV/m )
- Sample Calculation at 224.80 MHz  
Corrected Reading = 14.50 + 2.42 + 13.41 = 30.34 (dBuV/m )

**The Radiated Emission test was passed at minimum margin**

**Vertical 57.37 MHz / 34.28 dBuV**

**Antenna Height 1.0 Meter , Turntable Degree 195°.**

Frequency ( MHz )	Polarity	Antenna Factor ( dB )	Cable Loss ( dB )	Reading ( dBuV )	Limits ( dBuV )	( uV )	Emission Level ( dBuV )	( uV )	Margin ( dB )
224.80	H	14.50	2.42	13.41	46.00	200	30.34	32.89	-15.66
36.46	V	-0.35	0.86	30.35	40.00	100	30.86	34.91	-9.14
57.37	H	3.74	1.15	29.39	40.00	100	34.28	51.76	-5.72
86.10	V	7.68	1.40	22.29	40.00	100	31.37	37.03	-8.63
172.12	V	12.39	2.23	17.82	43.50	150	32.44	41.88	-11.06
226.40	V	14.57	2.43	17.24	46.00	200	34.24	51.52	-11.76

Test Engineer :   
Peter Wang

**6.4.1. TEST RESULT OF RADIATED EMISSION**

- Equipment meets the technical specifications of 15.109
- Frequency Range of Test : from 30 MHz to 2000 MHz
- Test Distance : 3 M
- Temperature : 26°C
- Relative Humidity : 81 % RH
- Test Mode : **1280 x 1024, 85Hz, 91K**
- Test Date : Nov. 03, 1998
  
- Emission level ( dBuV/m ) = 20 log Emission level ( uV/m )
- Sample Calculation at 226.40 MHz  
Corrected Reading = 14.57 + 2.43 + 15.41 = 32.41 (dBuV/m)

**The Radiated Emission test was passed at minimum margin**

**Vertical 354.40 MHz / 38.96 dBuV**

**Antenna Height 1.0 Meter , Turntable Degree 250°.**

Frequency ( MHz )	Antenna Polarity	Cable Factor ( dB )	Reading Loss ( dB )	Reading ( dBuV )	Limits ( dBuV )	Emission ( uV )	Level ( dBuV )	Level ( uV )	Margin ( dB )
226.40	H	14.57	2.43	15.41	46.00	200	32.41	41.73	-13.59
37.14	V	-0.18	0.87	30.45	40.00	100	31.14	36.06	-8.86
56.52	V	3.52	1.14	28.27	40.00	100	32.93	44.31	-7.07
226.40	V	14.57	2.43	17.24	46.00	200	34.24	51.52	-11.76
354.40	V	19.86	3.27	15.83	46.00	200	38.96	88.72	-7.04
392.80	V	22.12	3.53	11.96	46.00	200	37.61	75.95	-8.39

Test Engineer :

*Peter Wang*  
Peter Wang

7. ANTENNA FACTOR AND CABLE LOSS

Frequency ( MHz )	Antenna Factor ( dB )	Cable Loss ( dB )
30	18.1	1.2
35	15.2	1.3
40	12.6	1.3
45	9.9	1.5
50	7.5	1.5
55	5.8	1.5
60	5.0	1.6
65	4.8	1.6
70	5.1	1.8
75	5.7	1.8
80	6.7	1.8
85	7.8	1.7
90	8.8	1.9
95	9.3	1.9
100	10.0	2.1
110	11.2	2.0
120	11.3	2.2
130	11.3	2.5
140	10.7	2.5
150	9.9	2.5
160	9.3	2.6
170	8.5	2.6
180	8.4	2.8
190	8.2	2.8
200	8.3	2.7
220	8.4	2.9
240	10.9	3.0
260	13.0	3.3
280	12.4	3.6
300	12.8	3.6
320	13.3	3.9
340	13.8	4.0
360	14.4	4.2
380	15.0	4.4
400	15.5	4.4
450	16.2	4.9
500	17.4	4.8
550	19.1	5.3
600	18.4	5.4
650	18.9	6.0
700	18.9	6.1
750	19.7	6.6
800	19.7	6.5
850	20.4	6.5
900	20.5	6.8
950	20.9	7.5
1000	21.2	7.3
2000	26.4	9.7

## 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. 15, 1998	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	Jul. 06, 1998	Conduction
Amplifier (Site 1)	HP	87405A	3207A01437	10MHz -3.0GHz	June 26, 1998	Radiation
Spectrum Analyzer (site 1)	HP	8560E	3728A03185	30Hz - 2.9GHz	Sep. 24, 1998	Radiation
Receiver (Site 1)	R&S	ESCS30	70-213-4258	9KHz - 2.75GHz	Dec. 19, 1997	Radiation
Bilog Antenna (Site 1)	CHASE	CBL6112A	2442	30MHz -2GHz	Jun. 22, 1998	Radiation
Half-wave dipole antenna (site 1)	EMCO	3121C	9705-1285	28 M - 1GHz	May 19, 1998	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