

2.2 Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards, which have grants) are:

2.2.1 The types for all peripheral devices

☒ Host Notebook Computer

Model Number : N/N-50XXA
Serial Number : N/A
FCC ID : MAU003
Manufacturer : Matic
CPU : Intel 233MHz
FDD : Panasonic, JU-227A031F
HDD : Toshiba, HDD2718C
S/N: 68L38316P LLO EC,A
Main Board : Matic
M/N:411110600001

☒ Printer

Model Number : C2642A
Serial Number : MY75N1D2BC
FCC ID : B94C2642X
Manufacturer : HP

☒ Modem

Model Number : 1414
Serial Number : 980033039
FCC ID : IFAXDM1414
Manufacturer : ACEEX

☒ Modem

Model Number : 1414
Serial Number : 980033036
FCC ID : IFAXDM1414
Manufacturer : ACEEX

2.2.2 Description of the used cable in tested system

No.	Name	Shielded	Shielded Connector	Detachable	Length	Port Name	
						From	TO
1.	EUT (PC) power cord	Yes	No	Yes	1.5m	EUT	Ac 120V
2	Modem 1 power	No	No	Yes	1.5m	Modem1	AC 120V
3	Modem1 data cable	Yes	Yes	Yes	1.5m	Modem1	EUT/com1
4	Modem2 power adapter	No	No	Yes	1.5m	Modem2	AC 120V
5	Modem2 dada Cable	Yes	Yes	Yes	1.5m	Modem1	EUT/com2
6	Printer power cable	No	No	Yes	1.5m	Printer	AC 120V
7	Printer data cable	No	No	Yes	1.5m	Printer	EUT/parallel
8	Adapter	No	No	Yes	1.5m	Adapter	AC 120V

2.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4-1992.

Radiated testing was performed at an antenna to EUT distance of 10 meters.

2.4 Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	24-27
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

Site Description : November 3, 1998File on
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046
Reference 31040/SIT1300F2

Name of firm : QuieTek Corporation

Site location : No.75-1, Wang-Yeh Valley, Yung-Hsing, Chiung-Lin,
Hsin-Chu County, Taiwan, R.O.C.

3. Conducted Power Line Test

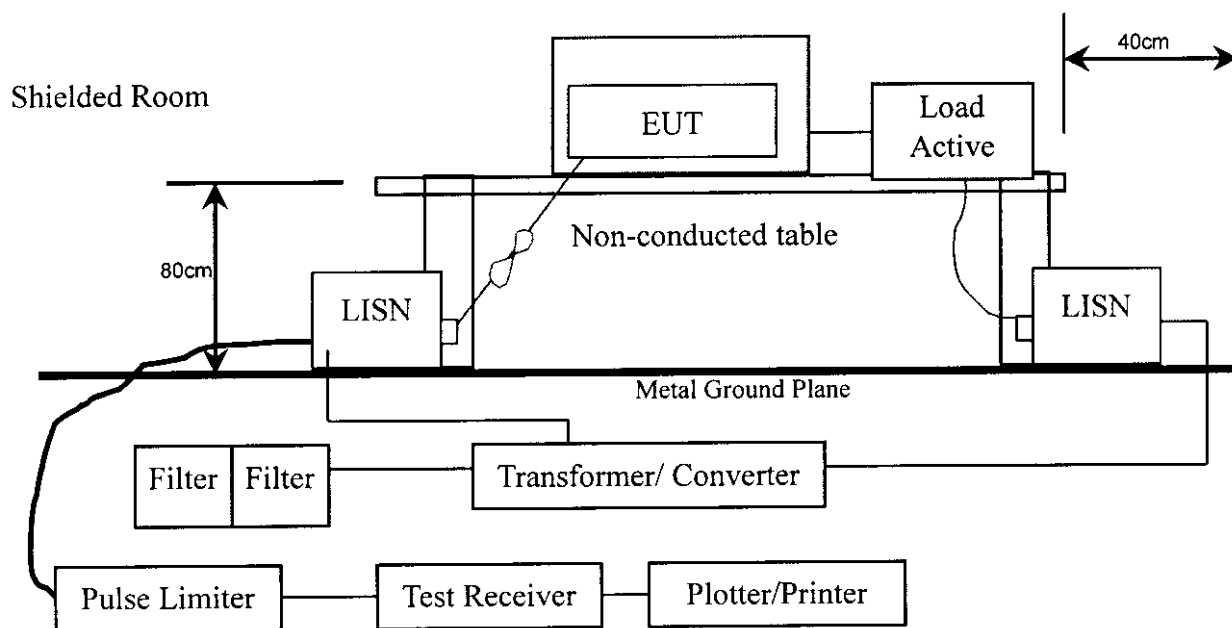
3.1 Test Equipments

The following test equipments are used during the conducted power line tests:

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal..	Remark
1	Test Receiver	R & S	ESCS 30/825442/17	May, 1998	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 1998	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 1998	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	N/A	
5	N0.2 Shielded Room			N/A	

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

3.2 Block Diagram of Test Setup



3.3 Conducted Powerline Emission Limit

[] CISPR 22 Limits

Frequency MHz	Maximum RF Line Voltage dB(uV)			
	Class A		Class B	
	QUASI-PEAK	AVERAGE	QUASI-PEAK	AVERAGE
0.15 - 0.50	79	66	66-56	56-46
0.50-5.0	73	60	56	46
5.0 - 30	73	60	60	50

Remarks : In the Above Table, the tighter limit applies at the band edges.

3.4 EUT Configuration on Measurement

The equipments which is listed 3.2 are installed on Conducted Power Line Test to meet the Commission requirement and operating in a manner which tends to maximize its emission characteristics in a normal application.

3.5 EUT Exercise Software

The EUT exercise program used during conducted testing was designed to exercise the EUT in a manner similar to a typical use. The exercise sequence is listed as below:

- 3.5.1 Setup the EUT and simulators as shown on 3.2
- 3.5.2 Turn on the power of all equipment.
- 3.5.3 Notebook (EUT) reads data from disk.
- 3.5.4 Notebook (EUT) sends "H" pattern to printer, the printer will print "H" pattern on paper.
- 3.5.5 Notebook (EUT) reads and writes data into and from modem.
- 3.5.6 Notebook (EUT) will read data from floppy disk and then writes the data into floppy disk , same operation for hard disk.
- 3.5.7 Repeat the above procedure 3.5.4 to 3.5.6

3.6 Test Procedure

The EUT is connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables must be changed according to ANSI C63.4-1992 on conducted measurement.

The bandwidth of the field strength meter (R & S Test Receiver ESCS 30) is set at 10Khz.

The frequency range from **0.15 MHz to 30 MHz** is checked.

3.7 Conducted Emission Data

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range for all the test modes. Then the worst modes were reported the following data pages.

The uncertainty is calculated in accordance with NAMAS NIS 81. The total uncertainty for this test is as follows:

- Uncertainty in the field strength measured: $< \pm 2.0$ dB

CONDUCTED EMISSION DATA

Date of Test	:	Oct. 26, 1998	Temperature	:	26 °C
EUT	:	Notebook PC	Humidity	:	52 %
Test Mode	:	Normal	Display Pattern	:	H Pattern
Detector Mode	:	Quasi-Peak & Average			

Frequency	Cable	LISN	Reading Level	Measurement Level	Limits
MHz	Loss	Factor	Line1	Line1	
	dB	dB	dBuV	dBuV	dBuV
0.180	0.01	0.10	33.11	33.22	64.49
0.358	0.05	0.10	31.95	32.10	58.77
0.587	0.07	0.10	34.22	34.39	56.00
2.659	0.16	0.14	40.74	41.04	56.00
* 3.837	0.18	0.16	40.80	41.14	56.00
5.020	0.20	0.17	39.51	39.88	60.00

Average:

The Quasi-Peak value are lower than the average limits,
According to the CISPR22 requirements,It is not necessary
to measure average value.

Remarks :

1. “ * ” means that this data is the worse emission level.
2. Attached Scan Curve Data sheet for Conducted Test

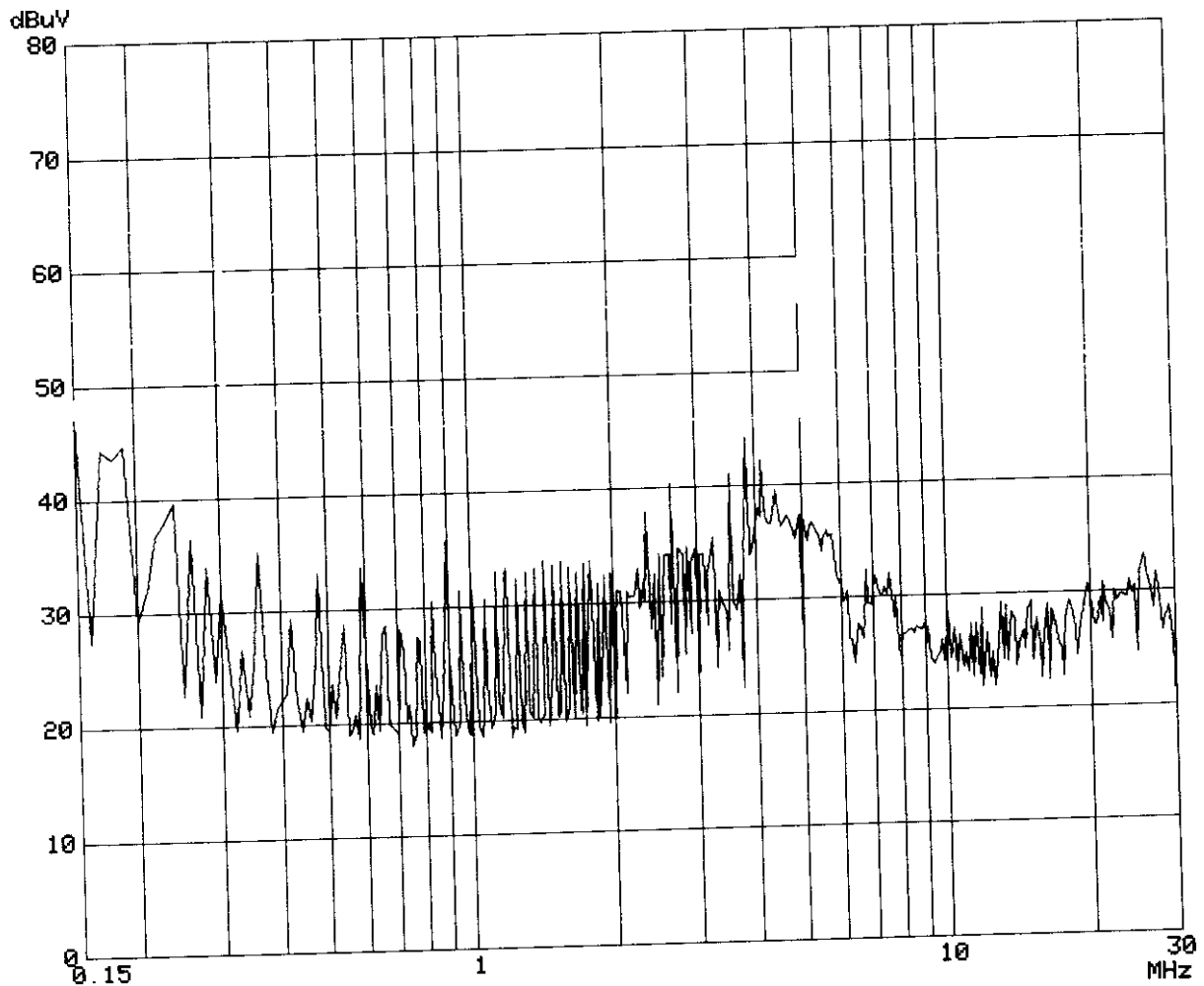
Attached individual pages of peak scan curve datasheets.

EUT: NOTEBOOK N/I-50XXA
Manuf: Mitac
Operator: Rico
Test Spec: 110V/60Hz
Comment: L1
File name: BCIQ22B.SPC
Date: 30. Sep 98 08:53

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	30M	10k	9k	PK	1ms	10dBLN	OFF

Final Measurement: x QP
Meas Time: 1 s



CONDUCTED EMISSION DATA

Date of Test	:	Oct. 26, 1998	Temperature	:	26 °C
EUT	:	Notebook PC	Humidity	:	52 %
Test Mode	:	Normal	Display Pattern	:	H Pattern
Detector Mode	:	Quasi-Peak & Average			

Frequency	Cable	LISN	Reading Level	Measurement Level	Limits
MHz	Loss	Factor	Line2	Line2	
	dB	dB	dBuV	dBuV	dBuV
0.180	0.01	0.10	32.57	32.68	64.49
2.660	0.16	0.14	38.58	38.88	56.00
* 3.842	0.18	0.16	44.44	44.78	56.00
5.020	0.20	0.17	38.53	38.90	60.00
21.500	0.36	0.48	33.16	34.00	60.00
25.990	0.38	0.55	32.13	33.06	60.00

Average:

The Quasi-Peak value are lower than the average limits,
According to the CISPR22 requirements,It is not necessary
to measure average value.

Remarks :

1. " * " means that this data is the worse emission level.
- 2.. Attached Scan Curve Data sheet for Conducted Test

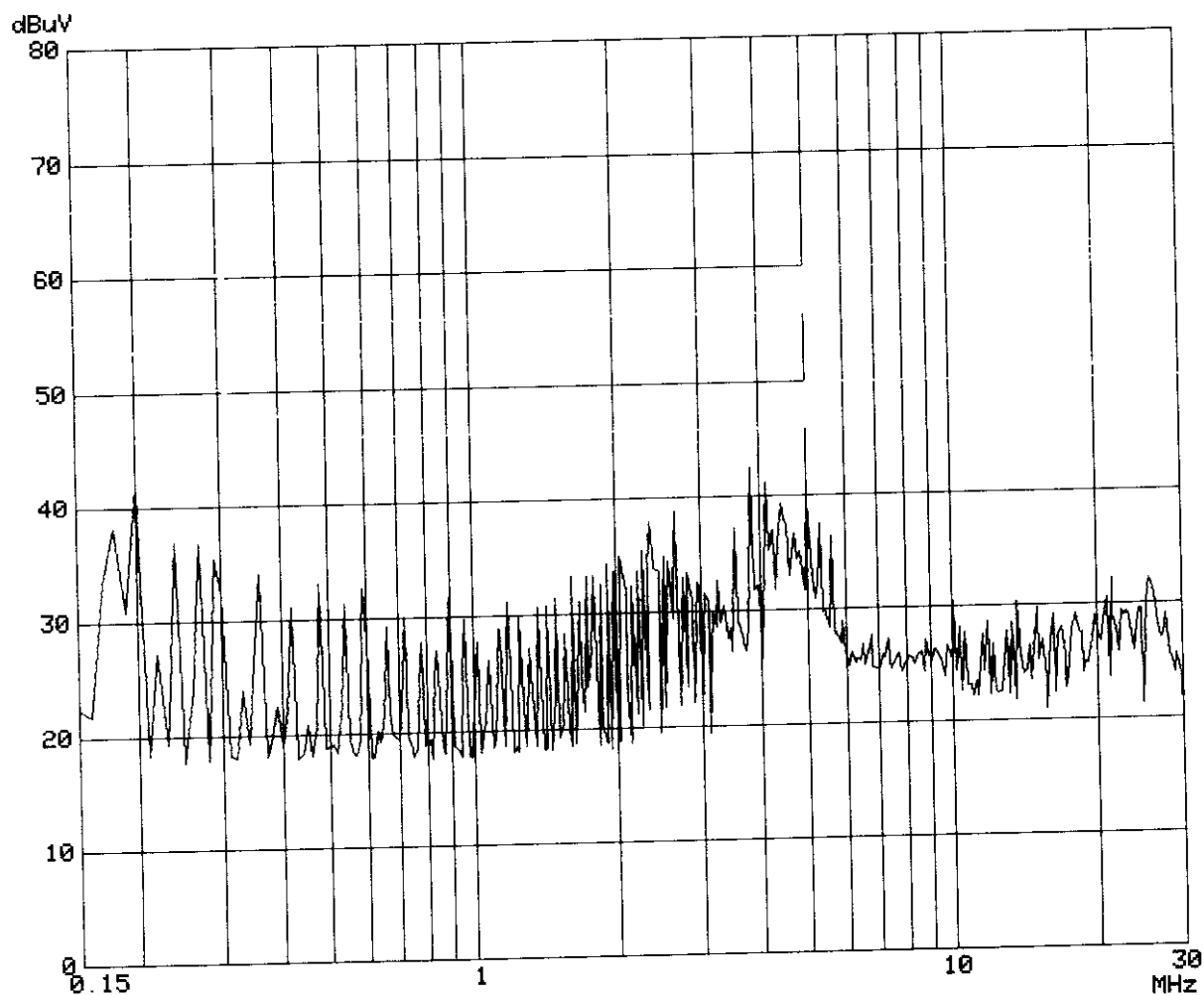
Attached individual pages of peak scan curve data sheets.

EUT: NOTEBOOK N/I-50XXA
Manuf: Mitac
Operator: Rico
Test Spec: 110V/60Hz
Comment: L2
File name: BCIQ22B.SPC
Date: 30. Sep 98 09:32

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	30M	10k	9k	PK	1ms	10dBLN	OFF

Final Measurement: x QP
Meas Time: 1 s



QTK98-F007

4. Radiation Emission Test

4.1 Test Equipment

The following test equipments are used during the radiated emission tests:

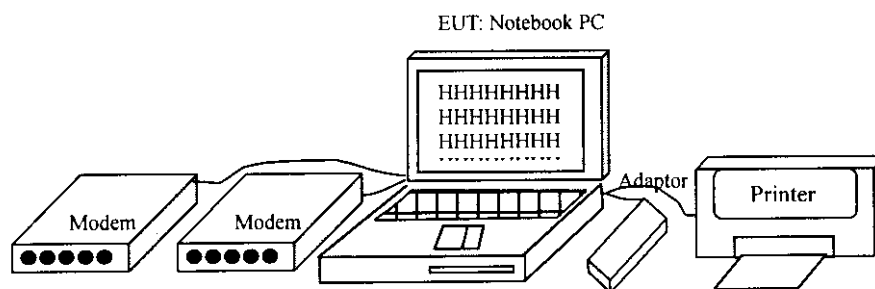
Test Site	Equipment	Manufacturer	Model No./Serial No.	Last Cal.	Remark
SITE # 1	Test Receiver	R & S	ESCS 30 / 825442/14	May, 1998	
	Spectrum Analyzer	Advantest	R3261C / 71720140	May, 1998	
	Pre-Amplifier	HP	8447D/3307A01812	May, 1998	
	Bilog Antenna	Chase	CBL6112B / 12452	Sep., 1998	
	Horn Antenna	EM	EM6917 / 103325	May, 1998	
	Dipole Antenna	Schwarzbeck	VHAP/866,UHAP/543	May, 1998	
SITE # 2	Test Receiver	R & S	ESCS 30 / 825442/17	May, 1998	
	Spectrum Analyzer	Advantest	R3261C / 71720609	May, 1998	
	Pre-Amplifier	HP	8447D/3307A01814	May, 1998	
	Bilog Antenna	Chase	CBL6112B / 2455	Sep., 1998	
	Horn Antenna	EM	EM6917 / 103325	May, 1998	
	Dipole Antenna	Schwarzbeck	VHAP/866,UHAP/543	May, 1998	

Note: 1. All equipment upon which need to calibrated are with calibration period of 1 year.

2. Test Site : ☒ Site #1 , ☐ Site #2

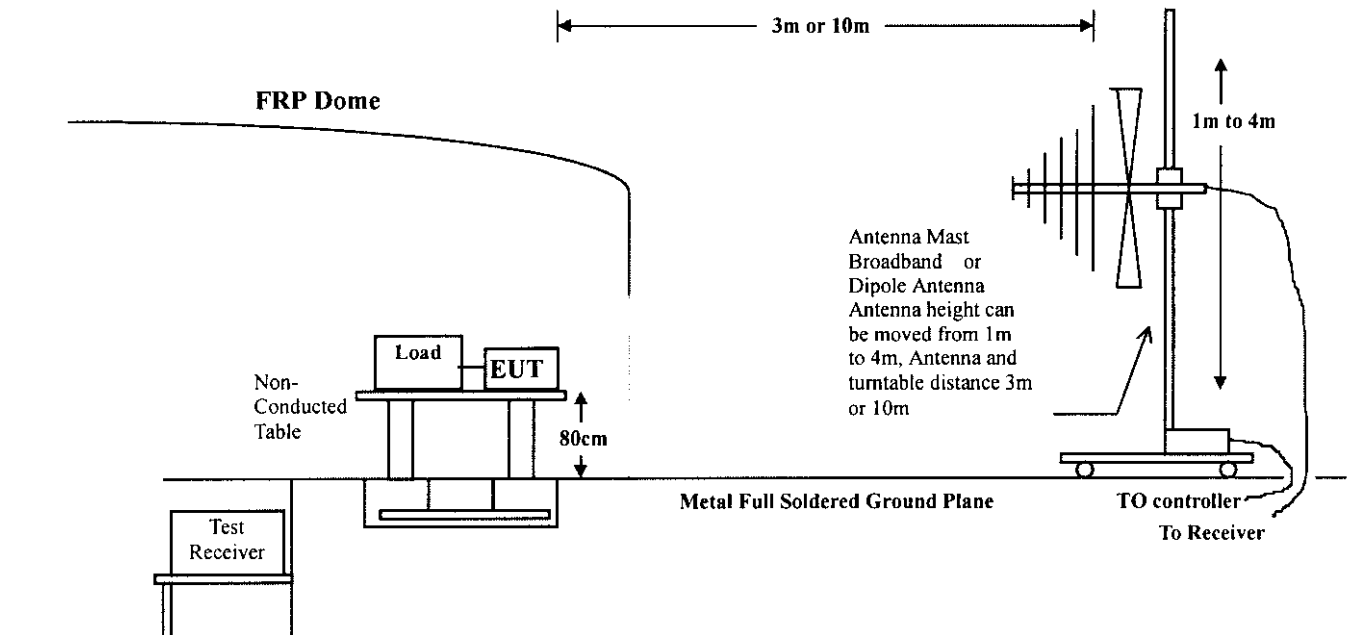
4.2 Test Setup

4.2.1 Block Diagram of Connections between EUT and simulators



Note: Notebook Computer HAS NO KEYBOARD OR VIDEO OUTPUT PORTS.

4.2.2 Open Test Site Setup Diagram



4.3 Radiated Emission Limit

[] CISPR 22 Limits:

Frequency MHz	Class A		Class B	
	Distance (m)	Limits (dBuV/m)	Distance (m)	Limits (dBuV/m)
30 – 230	10	40	10	30
230 – 1000	10	47	10	37

Remark: 1. The tighter limit shall apply at the edge between two frequency bands.

2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

4.4 EUT Configuration

The equipments which is listed 4.2.1 are installed on Radiated Emission Test to meet the Commission requirement and operating in a manner which tends to maximize its emission characteristics in a normal application.

4.5 Operating Condition of EUT

Same as Conducted Power Line Test which is listed in 3.5.

4.6 Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 10 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Broadband antenna (calibrated bi-log and horn antenna) are used as a receiving antenna. Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4-1992 on radiated measurement.

The bandwidth below 1Ghz setting on the field strength meter (R&S Test Receiver ESCS 30) is 120 KHz, above 1Ghz are 1 MHz.

The frequency range from 30Mhz to 1000Mhz is checked.

4.7 Radiated Emission Data

The initial step in collecting radiated data is a spectrum analyzer peak scan of the measurement range for all the test modes. Then the worst modes were reported the following data pages.

The uncertainty is calculated in accordance with Nemas NIS 81. The total uncertainty for this test is as follows:

- Uncertainty in the field strength measured: $< \pm 4.0$ dB

Radiated Emission Data

Test of Mode	:	Oct. 26, 1998	Temperature	:	26 °C
EUT	:	Notebook PC	Humidity	:	56 %
Test Mode	:	Normal	Display Pattern	:	H Pattern

Frequency	Cable	Ant	Reading Level	Emission Level	Limits	Ant	Table
	Loss	Factor	Horizontal	Horizontal		Pos	Pos
MHz	dB	dB/m	dBuV/m	dBuV/m	dBuV/m	cm	deg
47.890	1.32	8.93	12.54	22.79	30.00	101	185
199.250	2.78	8.97	9.04	20.79	30.00	399	117
*360.855	4.07	15.48	12.92	32.46	37.00	193	131
384.912	4.20	15.40	8.10	27.69	37.00	271	201
466.100	4.62	17.02	9.31	30.95	37.00	101	201
842.422	6.58	19.57	4.49	30.64	37.00	101	187

Remarks:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. “ * ”, means this data is the worse emission level.
3. Emission Level = Reading Level + Antenna Factor + Cable loss

Radiated Emission Data

Test of Mode	:	Oct. 26, 1998	Temperature	:	26 °C
EUT	:	Notebook PC	Humidity	:	56 %
Test Mode	:	Normal	Display Pattern	:	H Pattern

Frequency	Cable	Ant	Reading Level	Emission Level	Limits	Ant	Table
	Loss	Factor	Vertical	Vertical		Pos	Pos
MHz	dB	dB/m	dBuV/m	dBuV/m	dBuV/m	cm	deg
* 48.013	1.33	8.03	17.14	26.50	30.00	100	43
160.380	2.40	10.28	13.81	26.49	30.00	101	54
192.457	2.71	8.88	11.33	22.92	30.00	101	175
200.477	2.79	9.20	14.26	26.25	30.00	101	195
384.912	4.20	15.40	7.07	26.66	37.00	399	201
467.969	4.63	17.35	5.59	27.57	37.00	197	86
855.820	6.65	19.64	5.10	31.39	37.00	199	191

Remarks:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. " * ", means this data is the worse emission level.
3. Emission Level = Reading Level + Antenna Factor + Cable loss

5. Summarization of Test Results

The test results in the conducted and radiated emission were performed according to the requirements of measurement standard and process. QuieTek Corporation is assumed full responsibility for the accuracy and completeness of these measurements. The summarization of the worst value of conducted and radiated emission test is described as below:

☐ The worse value of Conducted Emission Test

Frequency (MHz)	Line	Measurement Level dB(uV)	Limit Level dB(uV)	Comment
3.837	L1	41.14	56	Pass
3.842	L2	44.78	56	Pass

☐ The worse value of Radiated Emission Test

Frequency (MHz)	Polarization	Measurement Level dB(uV)	Limit Level dB(uV)	Comment
360.855	H	32.46	37	Pass
48.013	V	26.50	30	Pass

6. EMI Reduction Method During Compliance Testing

No modification was made during testing.