MEASUREMENT/TECHNICAL REPORT

APPLICTNT: QTRONIX CORPORATION

MODEL NO.: SCORPIUS 980NH Plus, SCORPIUS 980H

FCC ID: F2Q4NE980NH

This report concerns (check one) **:** **Original Grant** ✓

Class II Change _____

Equipment type : USB Keyboard

Deferred grant requested per 47CFR 0.457(d)(1)(ii)?

Yes _____ No ✓ If yes, defer until: _____ (date)

We, the undersigned, agree to notify the Commission by (date) _____ / _____ / ___ of the intended date of announce ment of the product so that the grant can be issued on that date.

Transiyion Rules Request per 15.37? Yes ____ No ✓

If no, assumed Part 15, Subpart B for unintentional radiator the new 47 CFR (10-1-90 Edition) provision.

Report Prepared

by Testing House : **Neutron Engineering Inc.**

for Company Name : QTRONIX CORPORATION

Address: 9F, No. 75, Sec. 1, Hsin Tai Wu Rd. Hsichih, Taipei Hsien, Taiwan, R. O. C.

Applicant Signature : _____

Allan Hsu / Electronic Chief R&D

CERTIFICATION

We hereby certify that :

The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (1992) /CISPR22(1996) and the energy emitted by the sample EUT tested as described in this report is in compliance with CLASS B conducted and radiated emission limits of FCC Rules Part 15, Subpart B/CISPR22(1996).

Prepared by : Carol Chen

Reviewed by : Andy Chiu

Approved by: George Yao

Issued Date : Jan. 24, 2000

Report No. : NEI-FCCB-99200

Company Stamp :

NEUTRON ENGINEERING INC.
20, Alley 50, Lane 119, Dong Hwu Rd.,
P.O. Box 6-158, Nei Hwu,
Taipei, Taiwan
TEL : (02) 2646-5426 FAX : (02) 2646-6815

Table of Contents

1. GENERAL INFORMATION

1-1. Product Description

The QTRONIX CORPORATION. Model: SCORPIUS 980NH Plus, SCORPIUS 980H (referred to as the EUT in this report) is an USB port interface standard keyboard designed for compatible with Microsoft Win95 system.

A more detailed and/or technical description of EUT is attached in User' s Manual.

1-2. Related Submittal(s) / Grant (s)

1-2-1. Models Covered

Models Covered in this test report submitted for FCC ID filing and model SCORPIUS 980NH plus and SCORPIUS 980H.

1-2-2. Models Difference

Model: SCORPIUS 980NH plus is identical to Model: SCORPIUS 980H except the multimedia function keys designation.

1-3. Tested System Details

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

Model No.	FCC ID	Equipment	Cable
SCORPIUS 980NH Plus	F2Q4NE980NH	USB Keyboard	Shielded Data Cable
CM753ET	N/A (3)	Monitor	Shielded Data Cable(2) Un-Shielded Power Cord
444	N/A (3)	PC	Un-Shielded Power Cord.
DPU-414	N/A (3)	Printer	Shielded Data Cable Un-Shielded Power Cord
DM-1414V	N/A (3)	Modem	Shielded Data Cable Un-Shielded Power Cord
M-S34	DZL211029	PS/2 Mouse	Shielded Data Cable
MUSXT	N/A (3)	USB Mouse	Shielded Data Cable

Notes:

(1) EUT submitted for grant.
(2) Monitor's attached video cable without ferrite core.
(3) The support equipment was authorized by Declaration of Conformity.

1-4. Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (1992)/CISPR22 (1996). Radiated testing was performed at an antenna to EUT distance 10 meters.

1-5. Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on the address of No. 132-1, Lane 329, Sec. 2, Palain Road, Shijr 221, Taipei, Taiwan, R.O.C. of NEUTRON ENGINEERING INC. This site has been fully described in report dated Jun. 25, 1999 Submitted to your office, and accepted in a letter dated Sep. 02, 1999 (Reg. No. 95335).

3. System Test Configuration

3-1. Justification

The system was configured for testing in a typical fashion (as a customer would normally use it). The USB keyboard was connected to support equipment-personal computer. Peripherals of PC, such as monitor, printer, mouse, and modem except peripherals of EUT, such as USB mouse were contained in this system in order to comply with the CISPR 22 (1996) Rules requirement. The PC operated in the default 640X480/31.5KHz VGA Graphic mode. This operated condition was tested and used to collect the included data.

3-2. EUT Exercise Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The software, contained on a 3-1/2 inch disk, was inserted into driver A and is auto-starting on power-up. Once loaded, the program sequentially exercises each system component in turn. The sequence used is:

1. Read(write) from(to) mass storage device (Disk).
2. Send " H " pattern to video port device (Monitor).
3. Send " H " pattern to parallel port device (Printer).
4. Send " H " pattern to COM1 port device (Modem).
5. Repeated from 2 to 4 continuously.

As the USB Keyboard and mouse are strictly input devices, no data is transmitted to (from) them during test. They are, however, continuously scanned for data input activity.

3-3. Special Accessories

No any other special accessory used for compliance testing.

3-4. Equipment Modifications

In order to achieve in compliance with Class B levels, the following change(s) were made by NEUTRON test house during the compliance testing:

Please refer to the next page as the modifications described and cross reference of photos of tested EUT.

The above modifications will be implemented in all product models of this equipment.

Applicant Signature	:	Alan Hsu	Date	:	Jan. 14, 2000
Type/Printed Name	:	Allan Hsu	Position	:	Electronic Chief R&D

QTRONIX
Qtronix Corporation
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Modification Report

Company: QTRONIX Corporation

Model No.: SCORPIUS 980NH PLUS, SCORPIUS 980H

FCC ID: F2Q4NE98ØNH

Date: Jan. 28, 2000

A. Add ground lines to connect digital and chassis ground.

All the above modification will be implemented and relayout in the mass production to meer the FCC Class B requirements.

QTRONIX CORPORATION

Allan Hsu

Electronic Chief R&D

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3.5 Configuration of Tested System

The configuration of tested system is described as the block diagram shown in next page Figure 3.1 and details information of I/O cable an power cord connection are tabulated as Table A and B. The monitor is powered from a floor mounted receptacle (referred to as the wall outlet in the previous described)was tested.

TABLE A - Test Equipment

Item	Equipment	Mfr.	Model/Type No.	I/O Port	FCC ID	Remark
E-1	USB Keyboard	QTRONIX	SCORPIUS 980NH Plus SCORPIUS 980H	USB Port	FZQ4NE980NH	EUT
E-2	Monitor	Hitachi	CM753ET	VGA Port	N/A (3)	
E-3	PC	IBM	444		N/A (3)	
E-4	Printer	SII	DPU-414	Printer Port	N/A (3)	
E-5	Modem	ACEEX	DM-1414V	COM Port	N/A (3)	
E-6	Keyboard	Forward	FDA-104GA	PS/2 Port	F42FDA-104G	
E-7	PS/2 Mouse	HP	M-S34	PS/2 Port	DZL211029	
E-8	USB Mouse x2	PRIMA	MUSXT	USB Port	N/A	

Note:

(1) Unless otherwise denoted as EUT in (Remark) column, device(s) used in tested system is a support equipment.
(2) Unless otherwise marked as * in (Remark) column, Neutron consigns the support equipment(s) to the tested system.
(3) The support equipment was authorized by Declaration of Conformity.

Table B. - Informations Cable Information

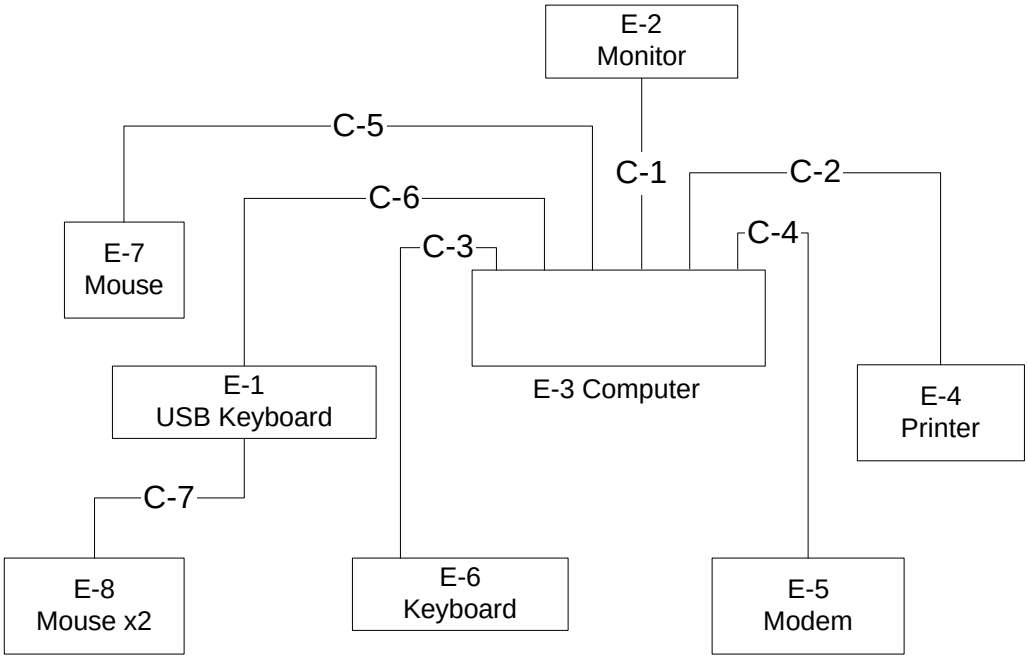
Item	I/O Cable	Device Connected	Shielded	Ferrite	Detachable / Permanently	Length	Note
C-1	Video Cable	PC-Monitor	Yes	No	Permanently attached on Monitor	150 cm	
C-2	Centronics Cable	PC-Printer	Yes	No	Part of Printer, Detachable	200 cm	
C-3	Keyboard Cable	PC-Keyboard	Yes	No	Permanently attached on KB	200 cm	
C-4	RS-232 Cable	PC-Modem	Yes	No	Part of Modem, Detachable	175 cm	
C-5	Mouse Cable	PC-Mouse	Yes	No	Permanently attached on Mouse	280 cm	
C-6	USB Cable	EUT-PC	Yes	No	Permanently attached on K/B	280 cm	
C-7	USB Cable x 2	EUT- Mouse	Yes	No	Permanently attached on Mouse	200 cm	

Note:

(1) Unless otherwise marked as * in (Remark) column, Neutron consigns the supporting equipment(s) to the tested system.

(2) For detachable type I/O cable should be specified the length in cm in (Length) column.

Fig. 3-1 Configuration of Tested System

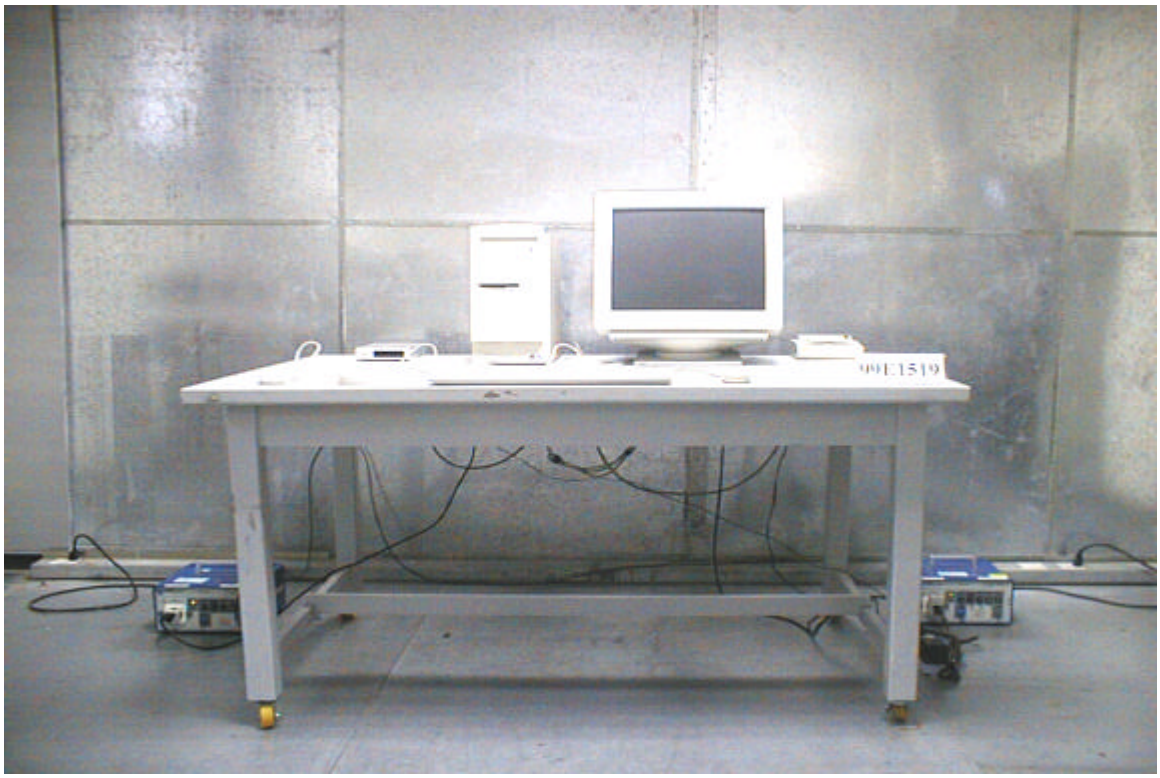


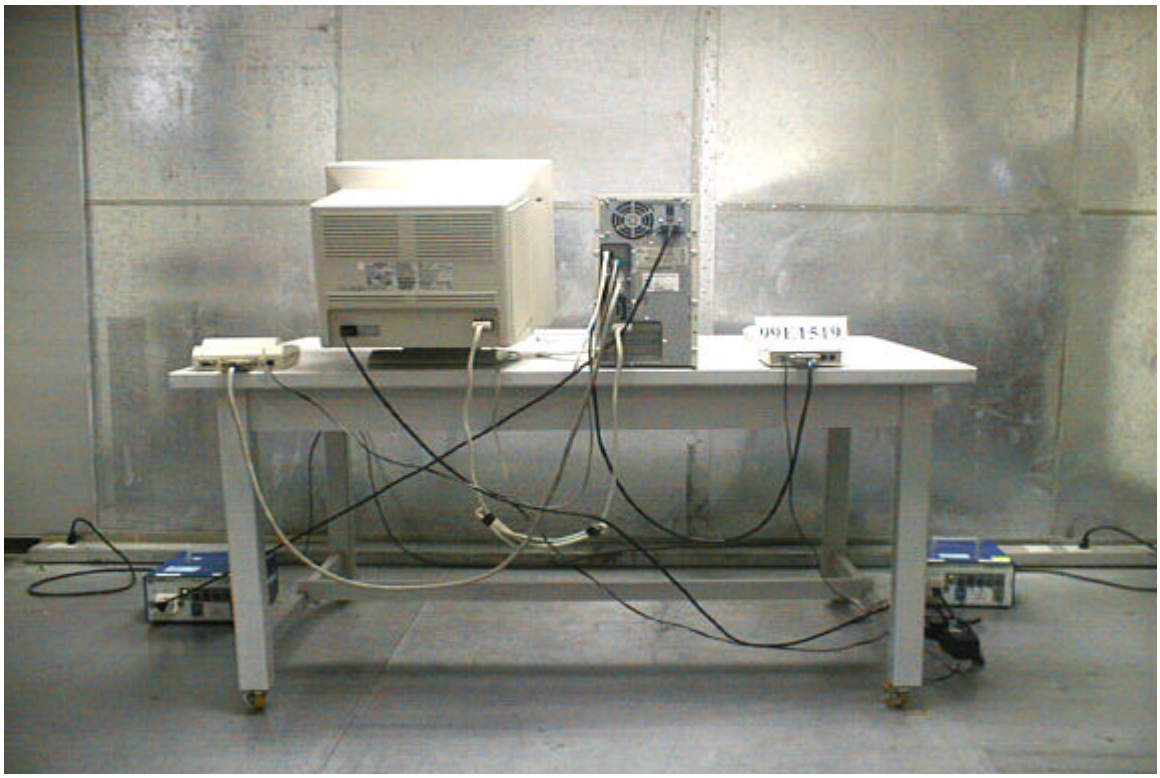
4. Block Diagram(s)

Figure 4.1 Block diagram of system, Page 13.A

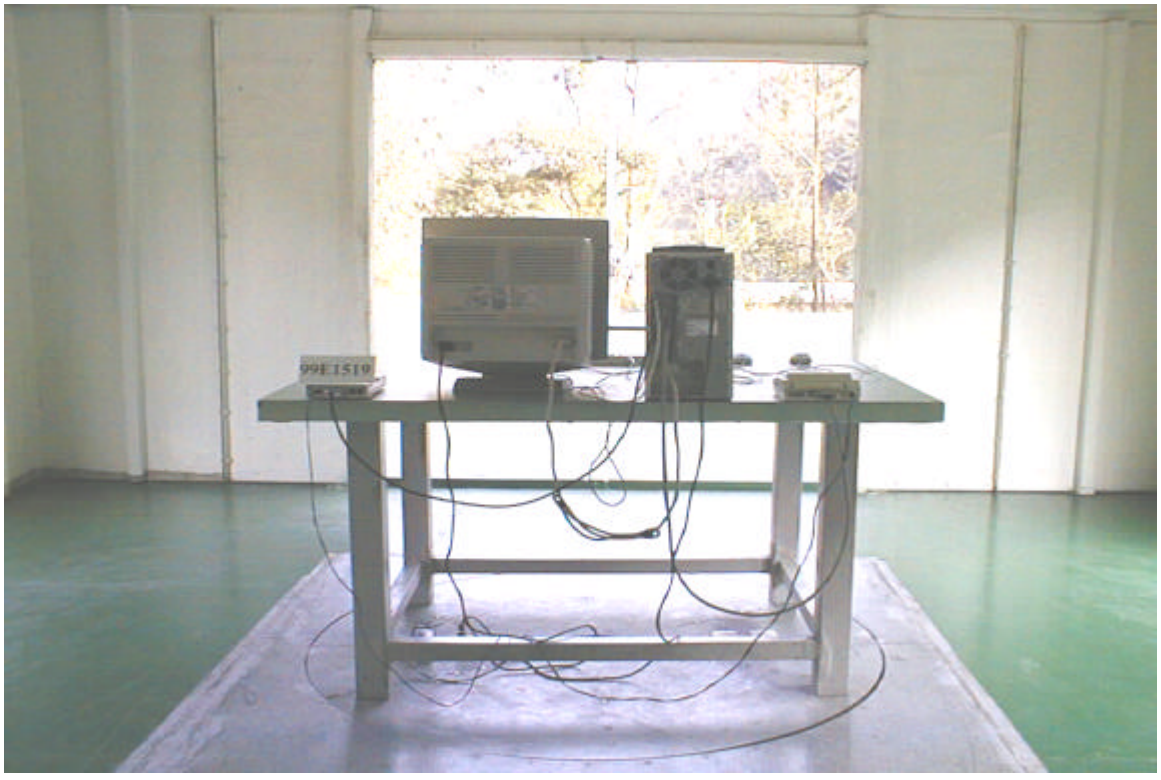
5. Conducted and Radiated Measurement Photos

5-1. Conducted Measurement Photos





5-2. Radiated Measurement Photos



6. Conducted Emission Datas

6.1 The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Judgement: Passed by **-2.56** dB in mode of Line terminal **15.89** **MHz**

Freq.	Terminal	Measured(dBuV)		Limits(dBuV)		Safe	Margins
(MHz)	L/N	QP-Mode	AV-Mode	QP-Mode	AV-Mode	(dBuV)	Note
0.16	Line	45.91	*	65.67	55.67	-19.76	(QP)
3.49	Line	37.57	*	56.00	46.00	-18.43	(QP)
7.29	Line	44.35	*	60.00	50.00	-15.65	(QP)
15.89	Line	49.44	47.44	60.00	50.00	-2.56	(AV)
19.43	Line	46.36	*	60.00	50.00	-13.64	(QP)
0.16	Netral	47.91	*	65.67	55.67	-17.76	(QP)
0.49	Netral	35.57	*	56.19	46.19	-20.62	(QP)
7.41	Netral	48.75	46.95	60.00	50.00	-3.05	(AV)
15.89	Netral	49.44	47.30	60.00	50.00	-2.70	(AV)
19.33	Netral	46.76	*	60.00	50.00	-13.24	(QP)

Remark :

(1) Reading in which marked as QP means measurements by using are Quasi-Peak Mode with Detector BW=9KHz¡ ESPA setting in RBW=100KHz,VBW =100KHz, Swp. Time = 0.3 sec./MHz. Reading in which marked as AV means measurements by using are Average Mode with instrument setting in RBW=1MHz,VBW=10Hz, Swp. Time =0.3 sec./MHz.

(2) All readings are QP Mode value unless otherwise stated AVG in column of (Note). If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemd to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn‘ t perform. In this case, a “ * ” marked in AVG Mode column of Interference Voltage Measured.

(3) Measuring frequency range from 150KHz to 30MHz.

Review : Andy Chiu Test Personnel. : David Date: Jan. 14, 2000

7. Radiated Emission Datas

7.1 The following data lists the significant emission frequencies, measured levels, correction factor (includes cable and antenna corrections), the corrected reading, as well as the limit. Explanation of the Correction Factor is given in paragraph 7.2.

Judgement: Passed by **-2.02** dB in polarity of Horizontal **205.67** MHz

Freq. (MHz)	Polar. H/V	Reading(RA) (dBuV)	Corr.Factor. (dB)	Corrected FS (dB)	Limits (QP) (dBuV/m)	Margins (dBuV/m)	Note (QP)
48.01	V	39.80	- 15.24	24.56	30.00	- 5.44	
49.18	H	42.80	- 15.19	27.61	30.00	- 2.39	
65.00	V	41.10	- 16.34	24.76	30.00	- 5.24	
72.09	H	43.80	- 17.51	26.29	30.00	- 3.71	
82.90	V	41.50	- 18.44	23.06	30.00	- 6.94	
181.48	H	40.70	- 14.44	26.26	30.00	- 3.74	
205.67	H	43.50	- 15.52	27.98	30.00	- 2.02	
217.76	H	38.60	- 15.01	23.59	30.00	- 6.41	
288.00	H	43.50	- 12.27	31.23	37.00	- 5.77	
317.60	V	42.80	- 11.60	31.20	37.00	- 5.80	
334.40	V	43.00	- 10.89	32.11	37.00	- 4.89	
439.20	V	38.40	- 7.56	30.84	37.00	- 6.16	

Remark :

(1) Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Mode or Peak Mode with Detector BW=120KHz¡ SPA setting in RBW=1MHz, VBW =1MHz, Swp. Time = 0.3 sec./MHz.

(2) All readings are Peak unless otherwise stated QP in column of (Note). Peak denotes
that the Peak reading compliance with the QP Limits and then QP Mode measure-ment didn‘ t perform.

(3) Measuring frequency range from 30MHz to 1000MHz.

(4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table.

Review : Andy Chu Test Personnel. : David Date: Jan. 10, 2000

7-2. Field Strength Calculation

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

FS = RA + AF + CL - AG

Where FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor (1)

CL = Cable Attenuation Factor (1)

AG = Amplifier Gain (1) (2)

Remark :

(1) The Correction Factor = AF + CL - AG, as shown in the data tables' Correction Factor column.

(2) AG is not available for Neutron's Open Site Facility

Example of Calculation:

Assume a Receiver Reading of 23.7 dBuV is obtained with an Antenna Factor of 7.2 dB and a Cable Factor of 1.1 dB. Then:

1. The Correction Factor will be caculated by

Correction Factor = AF + CL - AG = 7.2 + 1.1 - 0 = 8.3 (dB)

as shown in the data tables' Correction Factor column.

2. The Field Strength will be calculated by

FS = RA + Correction Factor = 23.7 + 8.3 = 32 (dBuV/m).

FS is the value shown in the data tables' Corrected Reading column and RA is the value shown in

the data tables' Receiver Reading column. The 32 dBuV/m value was mathematically converted

to its corresponding level in uV/m as:

Log^{-1}[{32.0dBuV/m}/20]¡ ×39.8 (uV/m)

7-3. Correction Factor VS Frequency

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)
30.00	11.10	0.90
35.00	10.80	0.50
40.00	11.20	1.00
45.00	11.50	0.80
50.00	11.30	1.00
55.00	10.50	1.30
60.00	9.90	1.00
65.00	8.70	1.50
70.00	7.60	1.20
75.00	6.40	1.40
80.00	6.10	1.30
85.00	7.00	1.40
90.00	8.00	1.70
95.00	10.00	1.50
100.00	11.20	1.90
110.00	12.60	2.00
120.00	13.00	1.80
130.00	12.50	1.80
140.00	12.00	2.00
150.00	12.00	2.20
160.00	13.20	2.40
170.00	14.80	2.50
180.00	16.30	2.50
190.00	17.00	2.50
200.00	17.30	2.40
225.00	10.50	2.70
250.00	11.70	3.10
275.00	12.80	3.70
300.00	14.50	4.00
325.00	14.00	4.50
350.00	14.20	4.50
375.00	14.60	4.60
400.00	15.10	4.80
450.00	16.20	5.40
500.00	17.60	6.50
550.00	17.80	7.00
600.00	18.40	7.10
650.00	19.50	7.10
700.00	20.80	7.20
750.00	20.50	7.50
800.00	21.10	8.00
850.00	22.40	8.60
900.00	23.50	8.90
950.00	24.00	9.70
1000.00	24.80	10.30

8. Photos of Tested EUT:

Photo #	1	Front View
Photo #	2	Rear View
Photo #	3	Front View
Photo #	4	Rear View
Photo #	5	Side View
Photo #	6	Unit Partially disassembled
Photo #	7	Unit Partially disassembled
Photo #	8	Unit Partially disassembled
Photo #	9	Unit Partially disassembled
Photo #	10	Unit Partially disassembled
Photo #	11	Unit Partially disassembled
Photo #	12	Unit Partially disassembled
Photo #	13	Unit Partially disassembled
Photo #	14	Front View
Photo #	15	Rear View
Photo #	16	Side View

Attachment

User's Manual