

## MEASUREMENT/TECHNICAL REPORT

APPLICANT: QTRONIX CORPORATION

**MODEL NO.:** SCORPIUS 980TP plus,  
SCORPIUS 980TPM plus

**FCC ID:** F2Q4NE980TPM

This report concerns ( check one ) :		<b>Original Grant</b>	✓
		<b>Class II Change</b>	
<b>Equipment type:</b>		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 announcement 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.	

## 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).

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*Sherry Kuo*

**Reviewed** by: Andy Chiu

*Andy Chiu*

**Approved** by: George Yao

*George Yao*

**Issued Date** : Dec. 9, 1999

**Report No.** : NEI-FCCB-99201



**Company Stamp:**

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## 1. GENERAL INFORMATION

### 1-1. Product Description

The QTRONIX CORPORATION Model: SCORPIUS 980TP plus, SCORPIUS 980TPM plus (referred to as the EUT in this report) has an enhanced slim design and can work with any IBM PC AT&PS/2 compatible computer. The summarized feature of EUT are described as following:

- Easily “plug and play” and compatible with IBM PC which supports PS/2 ports and Com port.
- Featuring with 20 hot key to quick access Internet browser and multimedia applications.
- 10 of the 20 hot keys are programmable which can be re-defined by user’s command after installing the included software.
- Multimedia functions support five DVD players: ATI, Creative, Realmagic, Win DVD and Power DVD
- Support three Windows ® 98 ACPI keys
- Built-in trackball with scroll-in-mouse program activate Scrolling and Zoom functions.
- Sleek style with detachable ergonomic wrist pad
- Adjustable tilt mechanism.
- High quality rubber membrane key switches.
- Permanently attached coiled cord.
- Tactile key stroke.
- N-key-roll-over.
- 20,000,000 lift cycles per switch.

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 are model SCORPIUS 980TP plus and SCORPIUS 980TPM plus

#### 1-2-2. Models Difference

Model: SCORPIUS 980TPM plus is identical to Model: SCORPIUS 980TP plus except the cable designation. SCORPIUS 980TP plus has an Y-Cable with 2 PS/2 ports. SCORPIUS 980TPM plus has an Y-Cable with 2 PS/2 ports and a serial-adapter.

### 1-3. Tested System Details

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

Model No.	FCC ID	Equipment	Cable
SCORPIUS 980TPM plus	F2Q4NE980TPM	Keyboard	Shielded Data Cable
444	N/A <sup>(3)</sup>	PC	Un-Shielded Power Cord.
NE64	KFBNE64	Monitor	Shielded Data Cable <sup>(2)</sup> Un-Shielded Power Cord
DPU-414	N/A <sup>(3)</sup>	Printer	Shielded Data Cable Un-Shielded Power Cord
DM-1414V	N/A <sup>(3)</sup>	Modem	Shielded Data Cable Un-Shielded Power Cord

Notes:

- (1) EUT submitted for grant.
- (2) Monitor's attached video cable without ferrite core.
- (3) The support equipment was passed 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 Jen 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).

## **2. System Test Configuration**

### **2-1. Justification**

The system was configured for testing in a typical fashion (as a customer would normally use it). The EUT was connected to support equipment-personal computer. Peripherals of PC, such as monitor, modem and printer were contained in this system in order to comply with the CISPR22 (1996) Rules requirement. The PC operated in the default 640 x 480 / 31.5 KHz VGA Graphic mode. This operating condition was tested and used to collect the included data.

### **2-2. 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 serial port device (Modem).
5. Repeated from 2 to 4 continuously.

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

**2-3. Special Accessories**

No any other special accessory used for compliance testing.

**2-4. Equipment Modifications**

Not available for this EUT intended for grant.

**Applicant Signature:**



**Date:**

Dec. 9, 1999

**Type/Printed Name:**

Alan Hsu

**Position:** Electronic Chief R&D

## 2.5 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 and 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	Keyboard	QTRONIX	SCORPIUS 980TPM	PS/2 Port or Serial Port	F2Q4NE980TPM	EUT
E-2	Monitor	Chern-Yih	NE64	VGA Port	KFBNE64	
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)	

Note:

- (1) Unless otherwise denoted as EUT in 'Remark ' colum , device(s) used in tested system is a support equipment.
- (2) Unless otherwise marked as \* in Remark ' colum, Neutron consigns the support equipment(s) to the tested system.
- (3) The support equipment was passed by Declaration of confirmation.

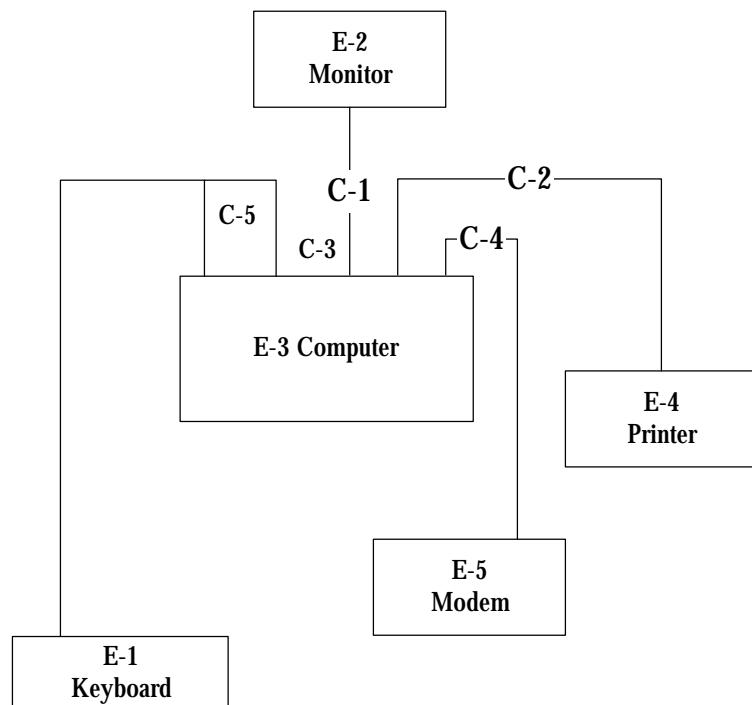
**Table B. - Informations Cable Information**

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-EUT	Yes	No	Permanently attached on EUT	200 cm	*
C-4	RS-232 Cable	PC-Modem	Yes	No	Part of Modem, Detachable	175 cm	
C-5	Mouse Cable	PC-EUT	Yes	No	Permanently attached on EUT	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. 2-1 Configuration of Tested System



### 3. Conducted and Radiated Measurement Photos

#### 3-1 Conducted Measurement Photos (PS/2 Port)



### 3. Conducted and Radiated Measurement Photos

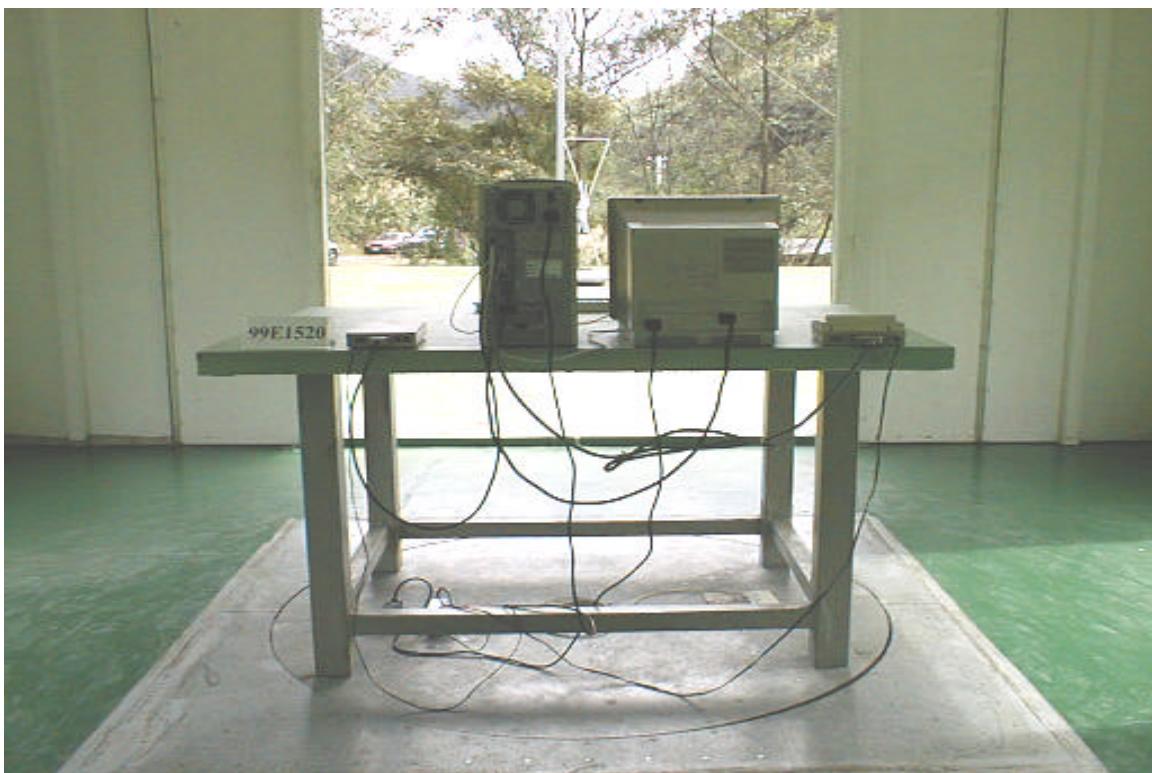
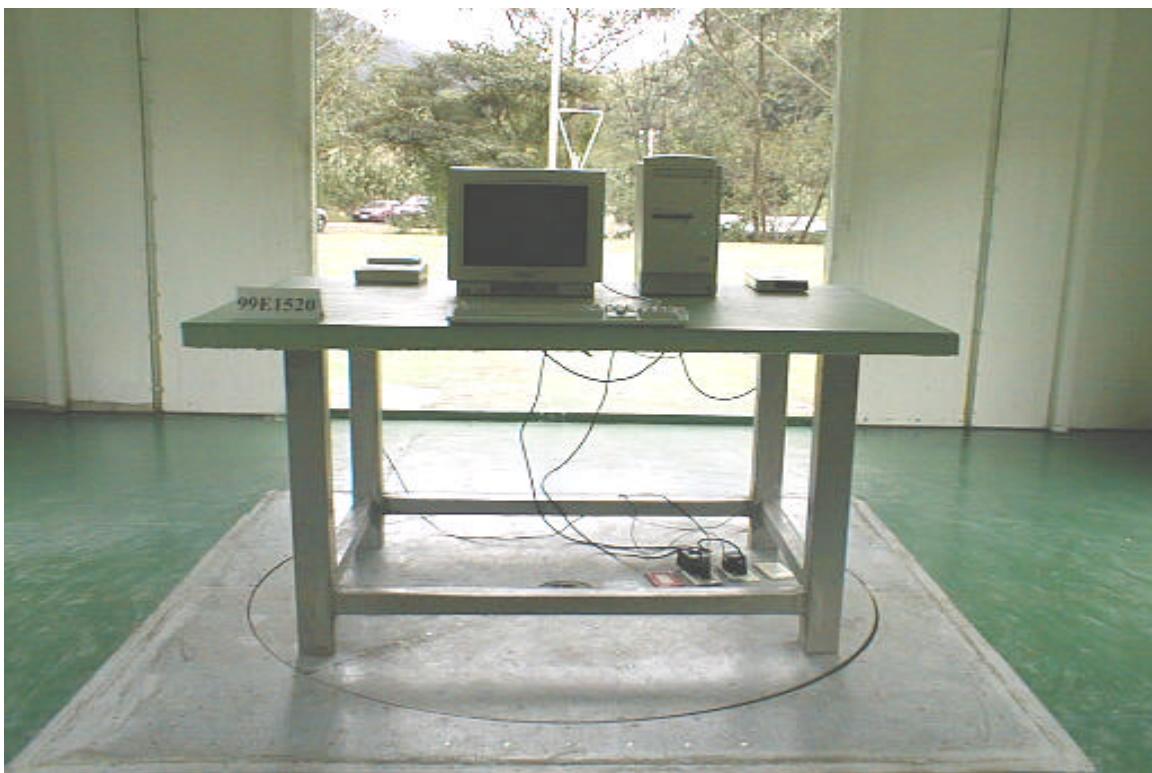
#### 3-1 Conducted Measurement Photos (Serial Port)



**3-2. Radiated Measurement Photos (PS/2 Port)**



**3-2. Radiated Measurement Photos (Serial Port)**



#### 4. Conducted Emission Data

**4.1** 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.

**Test mode: PS/2 Port**

**Judgement:** Passed by **-15.67 dB** in mode of **Neutral terminal 6.91 MHz**

Freq. (MHz)	Terminal	Measured(dBuV)		Limits(dBuV)		Safe Margins	
		L/N	QP-Mode	AV-Mode	QP-Mode	AV-Mode	(dBuV)
0.17	L		43.53	*	65.01	55.01	-21.48 (QP)
0.34	L		36.75	*	59.13	49.13	-22.38 (QP)
7.18	L		39.14	*	60.00	50.00	-20.86 (QP)
12.06	L		42.92	*	60.00	50.00	-17.08 (QP)
16.23	L		40.86	*	60.00	50.00	-19.14 (QP)
0.16	N		43.11	*	65.26	55.26	-22.15 (QP)
0.34	N		35.55	*	59.13	49.13	-23.58 (QP)
0.54	N		38.17	*	56.00	46.00	-17.83 (QP)
6.91	N		44.33	*	60.00	50.00	-15.67 (QP)
12.06	N		42.92	*	60.00	50.00	-17.08 (QP)

Remark:

- (1) Reading in which marked as QP means measurements by using are Quasi-Peak Mode with Detector BW=9KHz; EPA 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 deemed 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 Hie*

Test Personnel.:

*David*

Date: Dec. 1, 1999

#### 4. Conducted Emission Data

**4.1** 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.

**Test mode: Serial Port**

**Judgement:** Passed by **-15.65** dB in mode of **Neutral terminal 7.25 MHz**

Freq. (MHz)	Terminal	Measured(dBuV)		Limits(dBuV)		Safe Margins	
		L/N	QP-Mode	AV-Mode	QP-Mode	AV-Mode	(dBuV)
0.17	L		44.53	*	65.06	55.06	-20.53 (QP)
7.85	L		38.97	*	60.00	50.00	-21.03 (QP)
14.67	L		39.61	*	60.00	50.00	-20.39 (QP)
18.14	L		43.32	*	60.00	50.00	-16.68 (QP)
24.27	L		42.49	*	60.00	50.00	-17.51 (QP)
0.15	N		43.31	*	66.00	56.00	-22.69 (QP)
7.25	N		44.35	*	60.00	50.00	-15.65 (QP)
14.36	N		41.40	*	60.00	50.00	-18.60 (QP)
18.14	N		42.92	*	60.00	50.00	-17.08 (QP)
24.27	N		42.09	*	60.00	50.00	-17.91 (QP)

**Remark:**

- (1) Reading in which marked as QP means measurements by using are Quasi-Peak Mode with Detector BW=9KHz; SPA setting in RBW=100KHz, VBW =100KHz, Sweep 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, Sweep 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 deemed 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; C

Review:

*Andy Liu*

Test Personnel.:

*David*

Date: Dec. 1, 1999

## 5. Radiated Emission Data

**5.1** 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.

**Test mode: PS/2 Port**

**Judgement:** Passed by **-2.15 dB** in polarity of **Vertical 72.18 MHz**

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Safe Margins (dBuV/m)	Note
42.34	V	42.00	- 14.56	27.44	30.00	- 2.56	
59.10	H	41.90	- 15.52	26.38	30.00	- 3.62	
71.59	H	44.20	- 16.79	27.41	30.00	- 2.59	
72.18	V	44.70	- 16.85	27.85	30.00	- 2.15	
84.19	V	45.00	- 17.76	27.24	30.00	- 2.76	
114.70	H	39.00	- 14.43	24.57	30.00	- 5.43	
203.20	H	39.40	- 14.65	24.75	30.00	- 5.25	
224.80	H	36.80	- 13.78	23.02	30.00	- 6.98	
226.40	V	36.90	- 13.74	23.16	30.00	- 6.84	
334.40	H	35.50	- 9.95	25.55	37.00	- 11.45	
354.40	V	39.00	- 9.47	29.53	37.00	- 7.47	
400.80	V	35.00	- 8.14	26.86	37.00	- 10.14	

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 complies with the QP Limits and then QP Mode measurement 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 Liu

Test Personnel.:

David

Date: Dec. 1, 1999

## 5. Radiated Emission Data

**5.1** 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.

**Test mode: Serial Port**

**Judgement:** Passed by **-2.69 dB** in polarity of **Vertical 60.10 MHz**

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Safe Margins (dBuV/m)	Note
60.10	V	42.90	- 15.59	27.31	30.00	- 2.69	
71.87	V	43.80	- 16.82	26.98	30.00	- 3.02	
87.50	H	44.80	- 17.54	27.26	30.00	- 2.74	
118.60	V	38.60	- 13.84	24.76	30.00	- 5.24	
135.40	H	36.80	- 12.90	23.90	30.00	- 6.10	
138.30	H	37.90	- 12.78	25.12	30.00	- 4.88	
203.20	H	41.00	- 14.65	26.35	30.00	- 3.65	
203.20	V	40.60	- 14.65	25.95	30.00	- 4.05	
224.80	H	36.90	- 13.78	23.12	30.00	- 6.88	
226.40	V	38.50	- 13.74	24.76	30.00	- 5.24	
334.40	H	39.00	- 9.95	29.05	37.00	- 7.95	
334.40	V	43.70	- 9.95	33.75	37.00	- 3.25	

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 measurement didn't perform.
- (3) Measuring frequency range from 30MHz to 1000MHz; C
- (4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table.

Review:

*Andy Liu*

Test Personnel.:

*David*

Date: Dec. 1, 1999

## 5-2. 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 calculated by

$$\text{Correction Factor} = AF + CL - AG = 7.2 + 1.1 - 0 = 8.3 \text{ (dB)}$$

as shown in the data tables' Correction Factor column.

2. The Field Strength will be calculated by

$$FS = RA + \text{Correction Factor} = 23.7 + 8.3 = 32 \text{ (dBuV/m).}$$

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:

$$\text{Log}^{-1} \left( \frac{32.0 \text{ dBuV/m}}{20} \right) \times 39.8 \text{ (uV/m)}$$

## 5-3. Correction Factor VS Frequency

(dB)	Frequency (MHz)	Antenna Factor (dB)	Cable Loss
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

