MEASUREMENT/TECHNICAL REPORT

APPLICTNT: QTRONIX CORPORATION

MODEL NO.: ORION 90 USB

FCC ID: F2Q4NE90USB

This report concerns (check one) : **Original Grant** ✓
Class II Change _____

Equipment type: Joystick

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, #75, Sec, 1 Hsin Tai Wu Rd. Hsichih, Taipei Hsien, Taiwan, R. O. C.

Applicant Signature : _____
Ken Tian Director/Product Management and R&D Division

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 : Cathy Wu

Reviewed by : Andy Chiu

Approved by : George Yao

Issued Date : July 20, 1998

Report No. : NEI-FCCB-98095

Company Stamp :

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Table of Contents

1. GENERAL INFORMATION

1-1. Product Description

The QTRONIX CORPORATION. Model: ORION 90 USB (referred to as the EUT in this report) is an USB port interface connection PC game joystick. It has designed with analog technical for joystick incorporates four fire button and a dynamic four-way view controller.

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

Only the EUT model ORION 90 USB is: submitted for FCC ID filing.

1-2-2. Models Difference

N/A

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
ORION 90 USB	F2Q4NE90USB	Joystick	Shielded Data Cable
93V	ANO6282	PC	Un-Shielded Power Cord.
NE64	KFBNE64	Monitor	Shielded Data Cable(2) Un-Shielded Power Cord
SERIES2-7S	DZL6QBS2	Mouse	Shielded Data Cable
HP2225C+	DSI6XU2225	Printer	Shielded Data Cable Un-Shielded Power Cord
AT-1200CK	E2O5OV1200CK	Modem	Shielded Data Cable Un-Shielded Power Cord

Notes:

(1) EUT submitted for grant.
(2) Monitor's attached video cable without ferrite core.

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. 5, All 2, Lane 220, Kang Lo St., Nei Hwu, Taipei, Taiwan, R.O.C. of NEUTRON ENGINEERING INC. This site has been fully described in report dated Feb.4,1998, Submitted to your office, and accepted in a letter dated March 28, 1998 (31040/SIT-1300F2).

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 Joystick was connected to support equipment-personal computer. Peripherals of PC, such as monitor, keyboard, modem, mouse and printer were contained in this system in order to comply with the ANSI C63.4(1992)/CISPR22(1996) Rules requirement. The PC operating 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) the disk driver (HDD).
2. Send " H " pattern to the video port device (Monitor).
3. Send " H " pattern to the parallel port device (Printer).
4. Send " H " pattern to COM port device (Modem).
5. Repeated from 2 to 6 continuously.

As the Keyboard,Joystick 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 : Ken Tian Date : July 20,1998

Type/Printed Name : Ken Tian Director Position : Rroduct Management and R&D Division

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/Brand	Model/Type No.	Port Connected	FCC ID	Series No.	Note
E-1	Monitor	Chern-Yih	NE-64	VGA Port	KFBNE64		
E-2	PC	IBM	93V		ANO6282	960E200	
E-3	Joystick	QTRONIX	ORION 90 USB	USB Port	F2Q4NE90USB	N/A	EUT
E-4	Mouse PS/2	Logitech	Series2 -7S	PS/2 Port	DZL6QBS2	N/A	
E-5	Printer	HP	2225C Plus	Centronic Port	DSI6XU2225	2927S50245	
E-6	Modem	Datatronics	AT-1200CK	Com Port	E2O5OV1200CK	06-240088-07-317665	
E-7	Keyboard	Forward	FDA-102A	KB DIN Port	F4Z4K3FDA102A	20707	

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 equip ment(s) to the tested system.

Table B. - Informations Cable Information

Item	I/O Cable	Device Connected	Shielded	Ferrite Core	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-232C 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	PC-Joystick	Yes	No	Permarnently attached on Joystick	180 cm	※

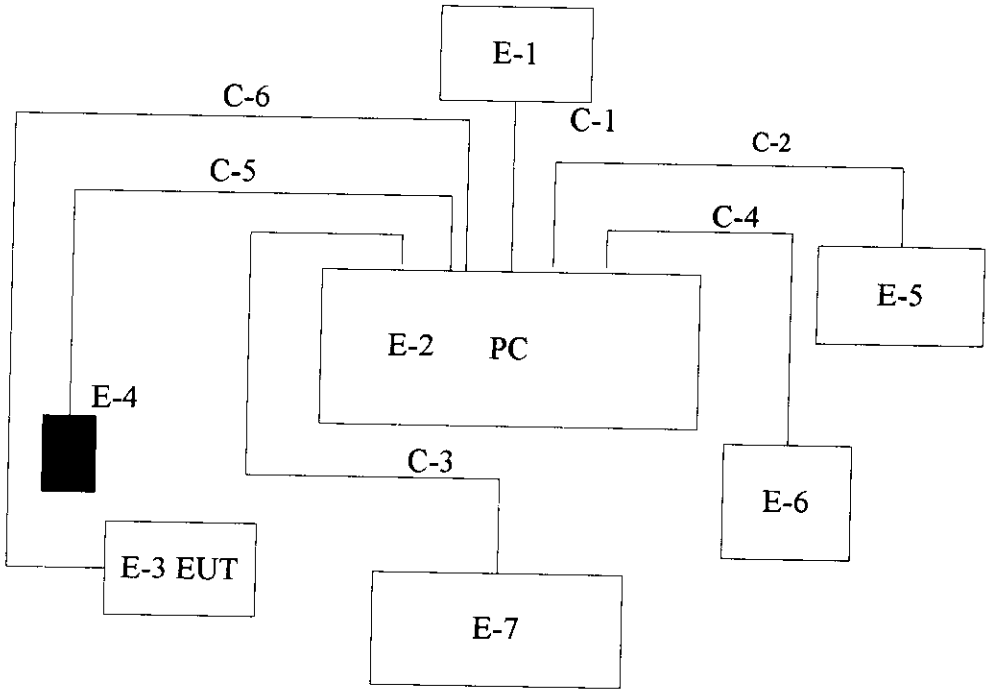
Note:

(1) Unless otherwise marked as ※ in 「Remark」 colum, 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.

Flgure 3.1 Configuration of Tested System

Fig. 3-1 Configuration of Tested System



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 **-12.39** dB in mode of Line terminal **0.50 MHz**

Freq.	Terminal	Measured(dBuV)		Limits(dBuV)		Safe Margins	
(MHz)	L/N	QP-Mode	AV-Mode	QP-Mode	AV-Mode	(dBuV)	Note
0.27	Line	45.14	*	61.03	51.03	-15.89	(QP)
0.35	Line	43.17	*	59.08	49.08	-15.91	(QP)
0.51	Line	42.76	*	56.00	46.00	-13.24	(QP)
10.51	Line	42.40	*	60.00	50.00	-17.60	(QP)
15.72	Line	33.63	*	60.00	50.00	-26.37	(QP)
0.27	Neutral	44.98	*	61.15	51.15	-16.17	(QP)
0.50	Neutral	43.61	*	56.00	46.00	-12.39	(QP)
0.63	Neutral	42.01	*	56.00	46.00	-13.99	(QP)
15.51	Neutral	41.53	*	60.00	50.00	-18.47	(QP)
15.72	Neutral	33.01	*	60.00	50.00	-26.99	(QP)

Remark :

(1) Reading inwhich marked as QP means measurements by using are Quasi-Peak Mode with Detector BW=9KHz ; SPA setting in RBW=100KHz,VBW =100KHz, Swp. Time = 0.3 sec./MHz ◦ Reading inwhich 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 colum 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 colum of Interference Voltage Measured ◦

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

Review : Test Personnel. : Date: July 10, 1998

7. Radiated Emission Datas

7.1 The following data lists the significant emission frequencise, 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 -3.56 dB in polarity of Horizontal 506.60 MHz

Freq. (MHz)	Polar. H/V	Reading(RA) (dBuV)	Corr.Factor. (dB)	Corrected F (dB)	Limits (QP) (dBuV/m)	Margins (dBuV/m)	Note (QP)
30.50	V	12.90	11.25	24.15	30.00	- 5.85	
47.30	H	13.60	12.04	25.64	30.00	- 4.36	
50.90	H	14.00	11.89	25.89	30.00	- 4.11	
125.70	H	10.30	13.30	23.60	30.00	- 6.40	
127.40	V	10.90	13.18	24.08	30.00	- 5.92	
154.10	V	11.20	13.49	24.69	30.00	- 5.31	
436.80	V	11.50	18.90	30.40	37.00	- 6.60	
464.00	V	11.00	19.93	30.93	37.00	- 6.07	
478.40	H	9.20	20.48	29.68	37.00	- 7.32	
484.80	V	11.60	20.72	32.32	37.00	- 4.68	
506.60	H	12.10	21.34	33.44	37.00	- 3.56	
646.40	H	9.80	23.42	33.22	37.00	- 3.78	

Remark :

(1) Reading inwhich 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 colum 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 ◦

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

Review : Test Personnel. : Ricker Hsu Date: July 10, 1998

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:

$$\mathbf{Log^{-1}\ [(32.0dBuV/m)/20\ ] = 39.8\ (uV/m)}$$

7-3. Correction Factor VS Frequency

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)
30.00	11.10	0.20
35.00	10.80	0.00
40.00	11.20	0.40
45.00	11.50	0.40
50.00	11.30	0.90
55.00	10.50	0.00
60.00	9.90	0.00
65.00	8.70	0.20
70.00	7.60	0.00
75.00	6.40	0.50
80.00	6.10	0.10
85.00	7.00	0.80
90.00	8.00	0.30
95.00	10.00	0.40
100.00	11.20	0.60
110.00	12.60	0.60
120.00	13.00	0.60
130.00	12.50	0.50
140.00	12.00	0.20
150.00	12.00	1.00
160.00	13.20	1.20
170.00	14.80	1.60
180.00	16.30	1.90
190.00	17.00	1.90
200.00	17.30	1.40
225.00	10.50	1.10
250.00	11.70	2.00
275.00	12.80	2.40
300.00	14.50	2.40
325.00	14.00	1.90
350.00	14.20	2.40
375.00	14.60	2.90
400.00	15.10	2.70
450.00	16.20	3.20
500.00	17.60	3.70
550.00	17.80	3.90
600.00	18.40	4.30
650.00	19.50	4.00
700.00	20.80	4.10
750.00	20.50	5.30
800.00	21.10	5.90
850.00	22.40	5.80
900.00	23.50	5.50
950.00	24.00	6.30
1000.00	24.80	5.20

8. Photos of Tested EUT:

Photo #	1	Front View
Photo #	2	Rear View
Photo #	3	Unit Partially disassembled
Photo #	4	Unit Partially disassembled
Photo #	5	Unit Partially disassembled
Photo #	6	Unit Partially disassembled
Photo #	7	Unit Partially disassembled
Photo #	8	Unit Partially disassembled
Photo #	9	Unit Partially disassembled