MEASUREMENT/TECHNICAL REPORT

APPLICTNT: QTRONIX CORPORATION

MODEL NO.: LYNX 96 USB

FCC ID: F2Q4NE96USB

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

Equipment type: Mouse

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 / 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)/CISPR 22(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 Part 15, Subpart B/CISPR 22(1996).

Prepared by : Judy Hu

Reviewed by : Andy Chiu

Approved by : George Yao

Issued Date : JULY 14, 1998

Report No. : NEI-FCCB-98096

Company Stamp :

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Table of Contents

1. GENERAL INFORMATION

1-1. Product Description

The QTRONIX CORPORATION model: LYNX 96 USB (referred to as the EUT in this report) is an USB port standard compatible mouse designed for Microsoft Win95 system.

The Summarized feature of EUT are described as following:

(1). Oscillator Frequency: 6 MHz

(2). Power Consumption: 500mW, at 5 Vdc Supply, in average.

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

1-2-1. Models Covered

Models covered in this test report intended for FCC ID filing is LYNX 96 USB.

1-2-2. Models Difference

The mouse are designed at the same circuit and enclosure. The model difference is described as follows:

Model No.	Feature
LYNX 96 USB	Two Key
LYNX96 USB	Three Key

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
LYNX 96 USB	F2Q4NE96USB	Mouse	Shielded Data Cable
NE64	KFBNE64	Monitor	Shielded Data Cable(2) Shielded Power Cord
93V	ANO6282	PC	Unshielded Power Cord
HP2225C+	DSI6XU2225	Printer, Parallel I/F	Shielded Parallel Data Cable Un-Shielded Power Cord
AT-1200CK	E2O5OV1200CK	Modem, Serial I/F	Shielded Serial Data Cable Un-Shielded Power Cord
FDA-102A	F4Z4K3FDA-102A	Keyboard	Shielded Data Cable
SERIES 2-7S	DZL6QBS2	Mouse	Shielded Data Cable

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)/CISPR 22 (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 Mouse was inserted to support equipment-personal computer. Peripherals of PC, such as monitor, keyboard, modem and printer were contained in this ststem in order to comply with the CISPR22 requirement. The PC operated in the default 640x480/31.5KHz VGA Graphic mode. This 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) 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 5 continuously.

As the 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

Not available for this EUT intended for grant.

3-4. Equipment Modifications

Not available for this EUT intended for grant.

Applicant Signature : Ken Tian **Date** : July. 18. 1998

Type/Printed Name : Ken Tian **Position** : Product 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 tablized as Table A and B. The monitor is powered from a floor mounted receptale (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	Mouse	QTRONIX	LYNX 96 USB	USB Port	F2Q4NE96USB	EUT
E-2	Monitor	Chern-Yih	NE64	VGA Port	KFBNE64	
E-3	PC	IBM	93V		ANO6282	
E-4	Printer	HP	HP2225C+	Centronic Port	DSI6XU2225	
E-5	Modem	Datatronics	AT-1200CK	Com 2 Port	E2O5OV1200CK	
E-6	Keyboard	Forward	FDA-102A	KB DIN Port	F4Z4K3FDA-102A	
E-7	Mouse	Logitech	SERIES 2-7S	PS/2 Port	DZL6QBS2	

Remark:

(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 supporting equipment(s) to the tested system.

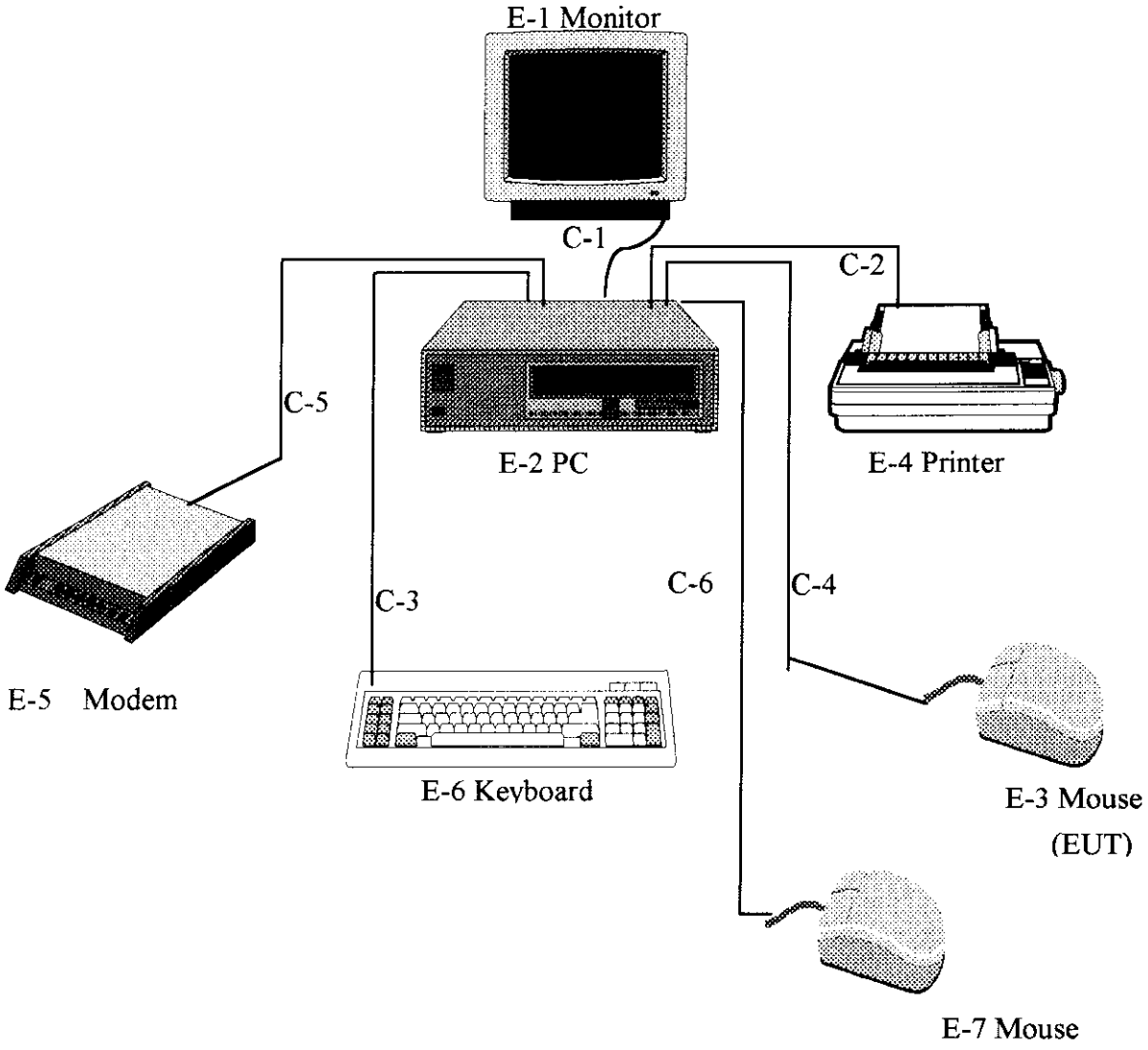
Table B. - Informations Cable Information

Item	I/O Cable	Device Connected	Shielded	Ferrite Core	Detachable/Permanently	Note
C-1	Video Cable	PC-Monitor	Yes	No	Permanently attached on Monitor	
C-2	Centronics Cable	PC-Printer	Yes	No	Part of Printer, Detachable	
C-3	Keyboard Cable	PC-Keyboard	Yes	No	Permanently attached on Keyboard	
C-4	Mouse Cable	PC-EUT	Yes	No	Permanently attached on Mouse	※
C-5	RS-232C Cable	PC-Modem	Yes	No	Part of Modem, Detachable	
C-6	Mouse Cable	PC-Mouse	Yes	No	Permanently attached on Mouse	

Note:

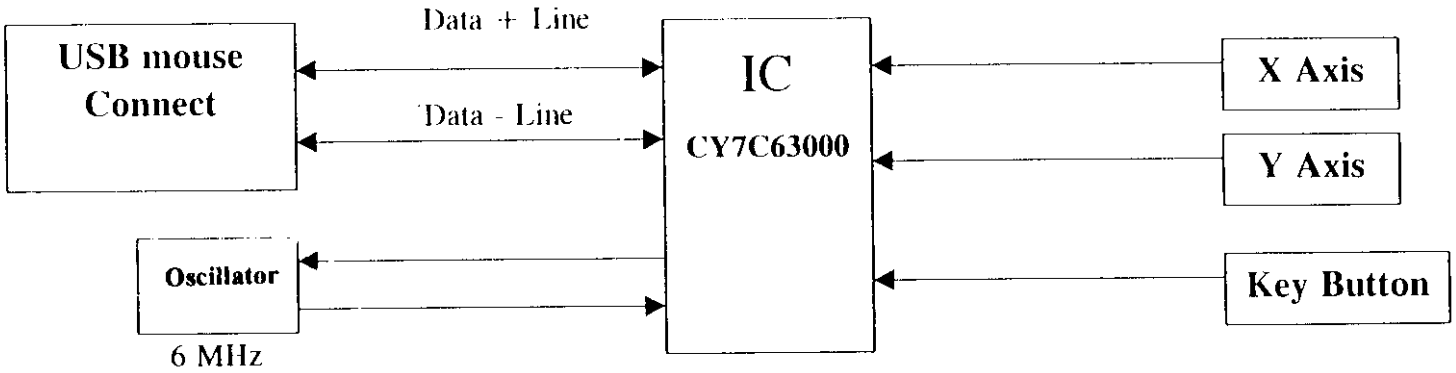
(1) Unless otherwise marked as ※ in 「Remark」 colum, Neutron consigns the supporting equipment(s) to the tested system.

Figure 3.1 Configuration of Tested System



4. Block Diagram(s)

Figure 4.1 Block diagram of system, Page 13.A



Lynx 96 USB mouse

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 **-11.21** **dB** in mode of **Neutral** terminal **0.51** **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	44.77	*	61.12	51.12	-16.35	(QP)
0.43	Line	41.45	*	57.23	47.23	-15.78	(QP)
0.51	Line	44.65	*	56.00	46.00	-11.35	(QP)
0.67	Line	39.80	*	56.00	46.00	-16.20	(QP)
15.80	Line	39.94	*	60.00	50.00	-20.06	(QP)
0.27	Neutral	46.22	*	61.03	51.03	-14.81	(QP)
0.38	Neutral	42.10	*	58.30	48.30	-16.20	(QP)
0.51	Neutral	44.79	*	56.00	46.00	-11.21	(QP)
0.63	Neutral	40.23	*	56.00	46.00	-15.77	(QP)
15.80	Neutral	38.26	*	60.00	50.00	-21.74	(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: JUNE 8,1998

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 **-5.09 dB** in polarity of **Horizon 332.37 MHz**

Freq. (MHz)	Polar. H/V	Reading(RA) (dBuV)	Corr.Factor. (dB)	Corrected F (dB)	Limits (QP) (dBuV/m)	Margins (dBuV/m)	Note (QP)
34.10	V	12.80	10.89	23.69	30.00	- 6.31	
63.50	V	14.70	9.20	23.90	30.00	- 6.10	
73.70	V	16.20	7.08	23.28	30.00	- 6.72	
142.00	V	11.50	12.32	23.82	30.00	- 6.18	
150.00	V	10.90	13.00	23.90	30.00	- 6.10	
154.10	V	9.90	13.49	23.39	30.00	- 6.61	
215.20	H	11.20	11.91	23.11	30.00	- 6.89	
215.20	H	12.80	11.91	24.71	30.00	- 5.29	
284.80	H	14.20	15.87	30.07	37.00	- 6.93	
332.36	H	15.30	16.11	31.41	37.00	- 5.59	
332.37	H	15.80	16.11	31.91	37.00	- 5.09	
396.80	H	12.60	17.76	30.36	37.00	- 6.64	

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.： Date: JUNE 8, 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(Cable Loss) (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 mathe matically 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 Front View

Photo # 8 Rear View

Photo # 9 Unit Partially Disassembled

Photo # 10 Unit Partially Disassembled

Photo # 11 Unit Partially Disassembled

Photo # 12 Unit Partially Disassembled