September 21, 2000

WYSE Technology EN 55022-B Test Record

for

Window Based Terminal

Model Number: WT3730LE

Tests performed by WYSE Technology

3471 N. First Street, San Jose, CA

Test completed: September 15, 2000

Test Engineer: Harinder Phul

Approved by: Jimmy Nguyen

September 21, 2000

1.0 INTRODUCTION

1.1 Scope

This record is intended to document conformance with **the EMC Directive (89/336/EEC)** and details the results of testing performed on **September 15, 2000** on the model **WT3730LE**.

1.2 Purpose

Testing was performed to evaluate the emissions performance of the **WT3730LE** with respect to **EN 55022** Class **B**.

1.3 Summary

The Windows Terminal **WT3730LE** was found to be compliant to **EN 55022** Class **B** Emission Requirements.

1.4 Testing Requirements

Testing was performed using procedures and criteria contained in **EN 55022**.

2.0 TEST ENVIRONMENT

2.1 Test Sample Description

WT3730LE is designed to communicate with a host system via **Twisted Pair LAN** interface on NT Windows Server.

Test Software

The software used during the test was a continuous loop batch file on Windows NT station. The program creates an entire page of "H"'s and writes the entire page to the screen, and it also prints to the serial and parallel devices as used in the test setup. The cables were moved around to find the maximum emission from the EUT.

2.2 Test Facilities

2.2.1 Emissions Test Site

Radiated emissions testing was performed on a weather protected Open Area Test Site. The description of **OATS** is filed at the WYSE Regulatory Engineering Department. The **OATS** is located at 3471 N. First Street, San Jose, California, USA. Conducted emission testing was performed inside a shielded enclosure (**Screen Room**) in the WYSE RFI laboratory. The description of the screen room is filed at WYSE Regulatory Engineering Department. The Screen Room is located at 3471 N. First Street, San Jose, California, USA.

2.3 Test Equipment

The following are the list of equipment used during the radiation and conducted testing.

Radiated:
HP Receiver model 84560A (RES BW: 30 KHz-100KHz, VBW: 10KHz – 30KHz)

Conducted:
HP 85650A Quasi-Peak Adapter
HP 8566B Spectrum Analyzer (RES BW: 30KHz –100KHz, VBW: 10KHz – 30KHz)

SETUP:

In accordance with WYSE Technology test procedure.

PROCEDURE:

Biconilog antenna was used for frequency range 30MHz - 2 GHz. The frequency range was checked for signals strength. The antenna was then raised and lowered for final maximization. The frequency range was checked with antennas in the horizontal and vertical polarization.

3.0 TEST RESULTS

3.1 Test Description

CISPR Publication 22:1997, limits and methods of measurements of radio interface of information technology equipment, was the guiding document for the test. The product's radiated emissions from 30 MHz to 1000 MHz and its power mains conducted emissions from 150 KHz to 30 MHz were measured.

3.2 Test Configuration

The EUT was configured with a typical mix of available peripherals which fully configured all types of communications ports of the EUT and exercised it in a typical manner.

3.3 Test Procedure

For radiated emissions testing, the equipment is installed on a 0.8 meter high non-conductive turntable 10 meters from the receiving antenna mast. The EUT is fully exercised during the test to maximize emissions. The receiving antenna is scanned over the height range of 1 to 4 meters in both polarities and the turntable is rotated with emissions level observed at each frequency. During the process the equipment configuration is also modified by moving the interconnecting cables to find the typical configuration that maximizes emissions at each frequency.

The frequency range from 30 MHz to 1000 MHz is explored. Measurement data is compared to Class **B** limit.

For conducted emissions testing the equipment is moved to a 0.8 meter high platform and the EUT and Configurations equipment are powered from a different LISNs. Both sides of the AC line are measured and the results compared to the Class **B** limit.

3.4 Test Results

A comparison of the measured data with the Class **B** limit of **CISPR** shows that Windows Terminal **WT3730LE** was **3.14 dB** below the limits at the worst case frequency of **593.980933 MHz** in a Horizontal Polarization.

3.5 Product Specification

Model: **WT3730LE (Logic Board P/N 961370-01 Rev. A)**

Clock Circuit:

U5 = MK1492-03, P/N 205565-50

Filters:

33 MHZ CLK Line:

R35 = 33 Ohm, P/N 370513-13; C176 = 15pF (not loaded)
R36 = 33 Ohm, P/N 370513-13; C173 = 15pF (not loaded)
R37 = 33 Ohm, P/N 370513-13; C177 = 15pF (not loaded)

14 MHZ CLK Line:

R34 = 33 Ohm, P/N 370513-13; C172 = 15pF (not loaded)

48 MHZ CLK Line:

R33 = 33 Ohm, P/N 370513-13; C174 = 15pF (not loaded)

24 MHZ (Audio) CLK Line:

R32 = 33 Ohm, P/N 370513-13; C175= 15pF (not loaded)

U2 = GX1-300, P/N 200064-52

Power Filter

U1 = CS5530, P/N 205122-50

Filters:

R4 = 68 Ohm, P/N 370513-21; C146 = 15pF (not loaded)
R5 = 68 Ohm, P/N 370513-21; C147 = 15pF (not loaded)
L17, L18 = 70 Ohm, P/N 400040-04
RP 3-7 = 75 Ohm, P/N 371338-12
L19B = 22 μH, P/N 410032-09

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Video Circuit:

U1 = CS5530, P/N 205122-50

Filters:

L1 = 200 Ohm, P/N 400032-25; C4 = 15pF, P/N 320313-17;
C5 = 47pF, P/N 320313-29

L2 = 200 Ohm, P/N 400032-25; C3 = 15pF, P/N 320313-17;
C6 = 47pF, P/N 320313-29

L3 = 200 Ohm, P/N 400032-25; C2 = 15pF, P/N 320313-17;
C7 = 47pF, P/N 320313-29

Termination:

R8, R9, R10 = 75 Ohm, P/N 370508-85

Audio Circuit:

U9 = LM4546, P/N 205123-53

Filters:

C431 = 0.1 µF, P/N 320338-24

L24, L25 = 43MTL, P/N 400021-01

Driving Transistor:

CR4, CR5 = MMBT3904, P/N 270010-50

Network:

U3 = DP83815, P/N 205127-50

Filters:

R70, R71 = 49.9 Ohm, P/N 370508-68

U14 = Transformer, Pulse Type '68515,' P/N 429099-51

Filters:

C82, C83, C85 = .1 uF, P/N 320338-24

R113, R112, R111, R110 = 75 Ohm, P/N 370513-22

Ground Jumper Setting:

L19, L30 = 400 Ohm, P/N 400032-26

Radiated Emission Test

10 meter OATS

WYSE Technology Inc.
3471 North 1st Street
San Jose Ca 95134

Test Description:

EUT: WT3730LE Test at 10 meter OATS
Serial No. 1CT10900001
Part No. 901892-01
File No. 091500#1

Test Type:

EN55022 **EN55022**
FCC-A { } FCC-B { } CISPR-A { } CISPR-B {**X**}
PASS: **X** FAIL: Debug:

Frequency MHz	Peak dBuV/m	DelLim-Pk dB	QP dBuV/m	DelLim-QP dB	Angle deg	Hgt cm	Pol	Comment
188.900062	26.33	-3.67	--.--	--.--	210	101	Vert	
593.980933	33.86	-3.14	32.12	-4.88	129	185	Horz	

Configuration:

1) Fully configured
2) Video 1024 X 768 @ 85Hz

Modifications:

1) Rerouted wire away from Monitor Pwr Supply Transformer.
2) Removed braided wire & add clip on bead
3) Add metal bottom cover

Test Procedure Definition:

HP EMI Receiver	85460A
Configuration	WYSE 10M OATS
Frequency Rang	30 - 2000 MHz
Operation to perform	Maximize & Measure
Initial Setting	Table angle: 0 degree to 360 degree
	Tower Height: 1meter - 4meter (Steps 1M)
	Antenna Polarity: Vertical and Horizontal

Comment:

1) H Pattern on monitor screen
4) Installed Ferrite Bead on 10/100 Base T
5) Window Base CE Software.

EUT:

Description	Part No.	Serial No.
WT3730LE	901892-01	1CT10900001

Supporting Devices:

Description	Model No.	Serial No.	FCC ID:
Server HP Brio Computer	81XX	US74852369	DOC
HP Key Board	SK-2501K	M970814311	GYUR38SK
HP Mouse	M-S34	LZA72737431	DZL211029
3Com LanPro	3C16701	7WBV00974A	5390S170300133

Peripherals:

Description	Model No.	Serial No.	FCC ID:
HP Printer	C6411B	CN9AC1P11W	DOC
Wyse KB	KU8933	OC02701153	DOC
Mouse Logitech (4 wire shielded)	M-S34(AW)	LZE94740219	DZL211029
Microphone	None	None	
Headset	None	None	

Final vertical [10/925]

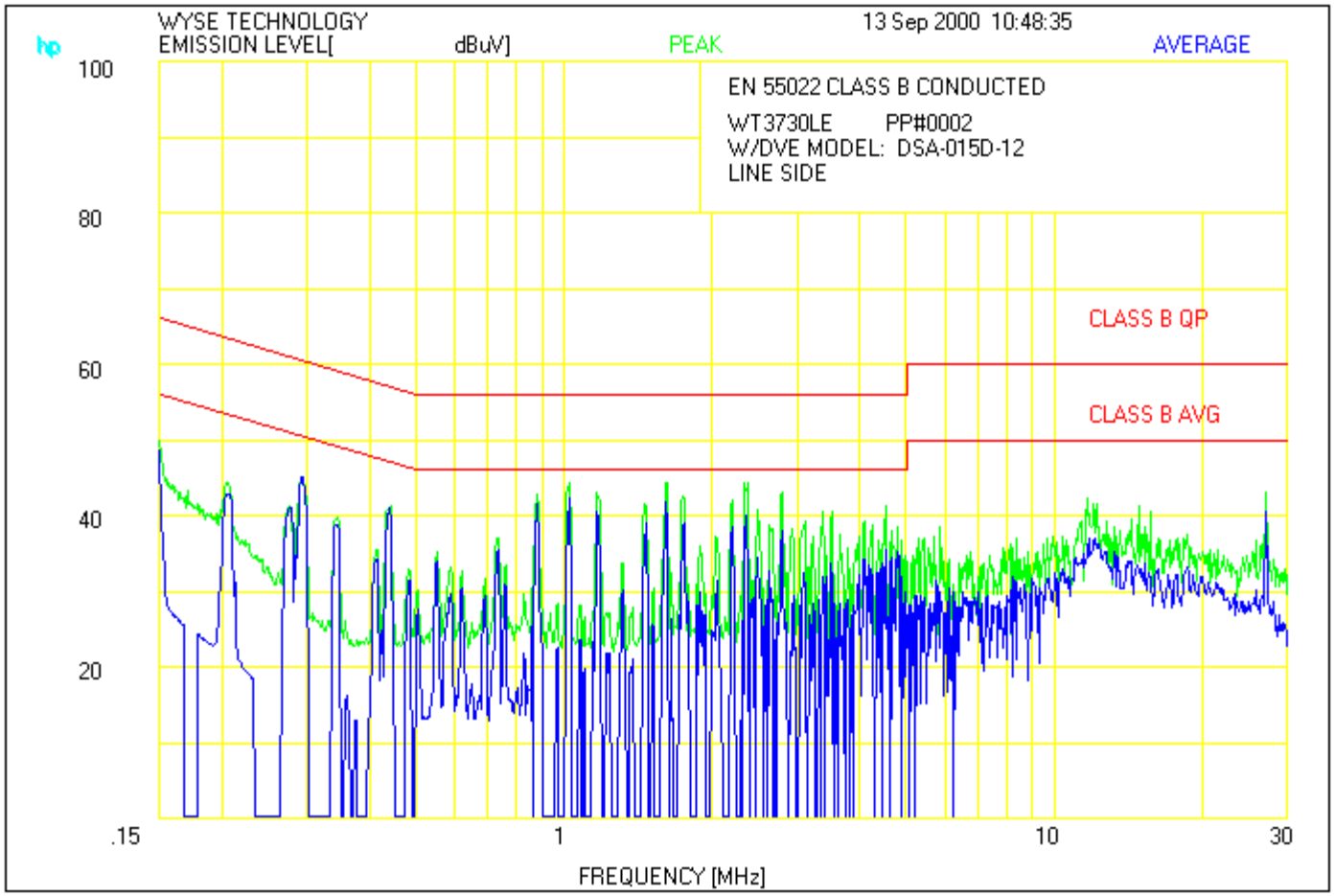
WT3730LE (Test at 10 meter OATS)

Frequency MHz	Peak dBuV/m	DelLim-Pk dB	QP dBuV/m	DelLim-QP dB	Angle deg	Hgt cm	Pol
50.334344	25.70	-4.30	--.--	--.--	113	100	Vert
66.813516	25.30	-4.70	--.--	--.--	37	100	Vert
67.561424	25.10	-4.90	--.--	--.--	192	96	Vert
161.421008	25.00	-5.00	--.--	--.--	15	100	Vert
188.900062	26.33	-3.67	--.--	--.--	210	101	Vert
267.012272	29.40	-7.60	--.--	--.--	192	96	Vert
473.833632	30.30	-6.70	--.--	--.--	192	96	Vert
499.734102	33.70	-3.30	--.--	--.--	58	100	Vert
594.084172	28.36	-8.64	--.--	--.--	83	100	Vert
620.968431	35.72	-1.28	33.01	-3.99	177	96	Vert

Final Horizontal [9/925]

WT3730LE (Test at 10 meter OATS)

Frequency MHz	Peak dBuV/m	DelLim-Pk dB	QP dBuV/m	DelLim-QP dB	Angle deg	Hgt cm	Pol
50.292192	23.90	-6.10	--.--	--.--	0	---	----
66.855172	25.60	-4.40	--.--	--.--	297	100	Horz
67.559424	24.20	-5.80	--.--	--.--	358	142	Horz
188.981520	24.80	-5.20	--.--	--.--	207	257	Horz
267.097392	27.00	-10.00	--.--	--.--	217	302	Horz
473.831616	31.30	-5.70	--.--	--.--	358	96	Horz
593.980933	33.86	-3.14	32.12	-4.88	129	185	Horz
634.611008	28.90	-8.10	--.--	--.--	166	193	Horz
918.035712	31.30	-5.70	--.--	--.--	166	193	Horz


WYSE TECHNOLOGY
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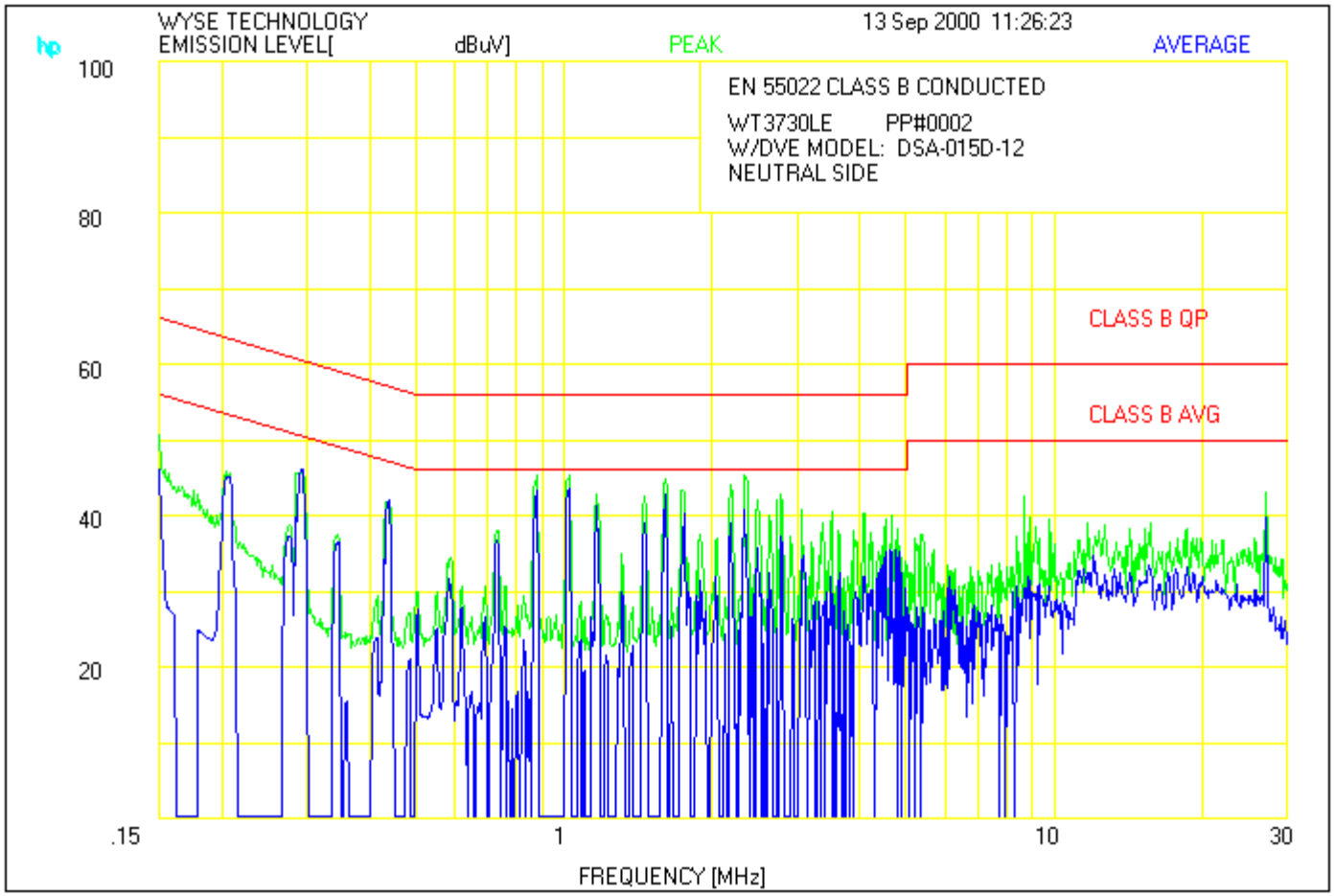
PEAK
AVERAGE
EN 55022 CLASS B CONDUCTED
WT3730LE PP#0002
W/DVE MODEL: DSA-015D-12
LINE SIDE
CLASS B QP
CLASS B AVG
100
80
60
40
20
.15
1
10
30
FREQUENCY [MHz]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EMISSION LEVEL[dBuV]
13 Sep 2000 11:26:23
PEAK
AVERAGE
EN 55022 CLASS B CONDUCTED
WT3730LE PP#0002
W/DVE MODEL: DSA-015D-12
NEUTRAL SIDE
CLASS B QP
CLASS B AVG
100
80
60
40
20
.15
1
10
30
FREQUENCY [MHz]