March 13, 2000

WYSE Technology EN 55022-B Test Record

for

Window Based Terminal

Model Number: WT3200LE

Tests performed by WYSE Technology

3471 N. First Street, San Jose, CA

Test completed: March 13, 2000

Test Engineer: Harinder Phul

Approved by: Masood Abrishamcar

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 **March 13, 2000** on the model **WT3200LE**.

1.2 Purpose

Testing was performed to evaluate the emissions performance of the **WT3200LE** with respect to **EN 55022** Class **B**.

1.3 Summary

The Windows Terminal **WT3200LE** 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

WT3200LE 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 is 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 **WT3200LE** was **6.77 dB** below the limits at the worst case frequency of **634.74 MHz** in a Vertical Polarization.

3.5 Product Specification

Model: **WT3200LE (Logic Board P/N 961347-01 Rev. 5)**

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

24 MHZ (Audio) CLK Line:

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

U2 = GXLV166, P/N 200062-51

Power Filter

U1 = CX5530, P/N 205122-51

Filters:

R4 = 47 Ohm, P/N 370513-21; C146 = 15pF (not loaded)
R5 = 47 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

March 13, 2000

Video Circuit:

U1 = CX5530, P/N 205122-51

Filters:

L1 = 400 Ohm, P/N 400032-26; C4, C5 = 33pF, P/N 320313-25
L2 = 400 Ohm, P/N 400032-26; C3, C6 = 33pF, P/N 320313-25
L3 = 400 Ohm, P/N 400032-26; C2, C7 = 33pF, P/N 320313-25

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, L28, L30 = 400 Ohm, P/N 400032-26

Radiated Emission Test

10 meter OAT

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

Test Description:

EUT: WT3200LE MLB Rev. 3 (mouse cable shielded)
Serial No. Engineering Proto
Part No. None
R.E No. 20839
File No. 031300#2

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
634.741569	34.43	-2.57	30.23	-6.77	1	399	Vert

Configuration:

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

Modifications:

1) None

Test Procedure Definition:

HP EMI Receiver	8546A @ 10 Meter OAT
Configuration	WYSE OAT 10 meter
Frequency Rang	30 - 2000 MHz
Operation to perform	Maximize & Measure
Initial Setting	Table angle: 0 degree to 360 degree
	Tower Height: 100 meter - 400 meter
	Antenna Polarity: Vertical and Horizontal

Comment:

1) H Pattern on monitor screen

Test Engineer: Harinder S Phul

EUT:

Description	Part No.	Serial No.	FCC ID:
WT3200LE	20839		
Power Supply DVE	DSA-D151D-12	20841	

Supporting Devices:

Description	Model No.	Serial No.	FCC ID:
Server HP Brio Computer	81XX	US74852369	DOC
Keyboard	SK-2501K	M970814311	GYUR38SK
Mouse	M-S34	LZA72737431	DZL211029

Peripherals:

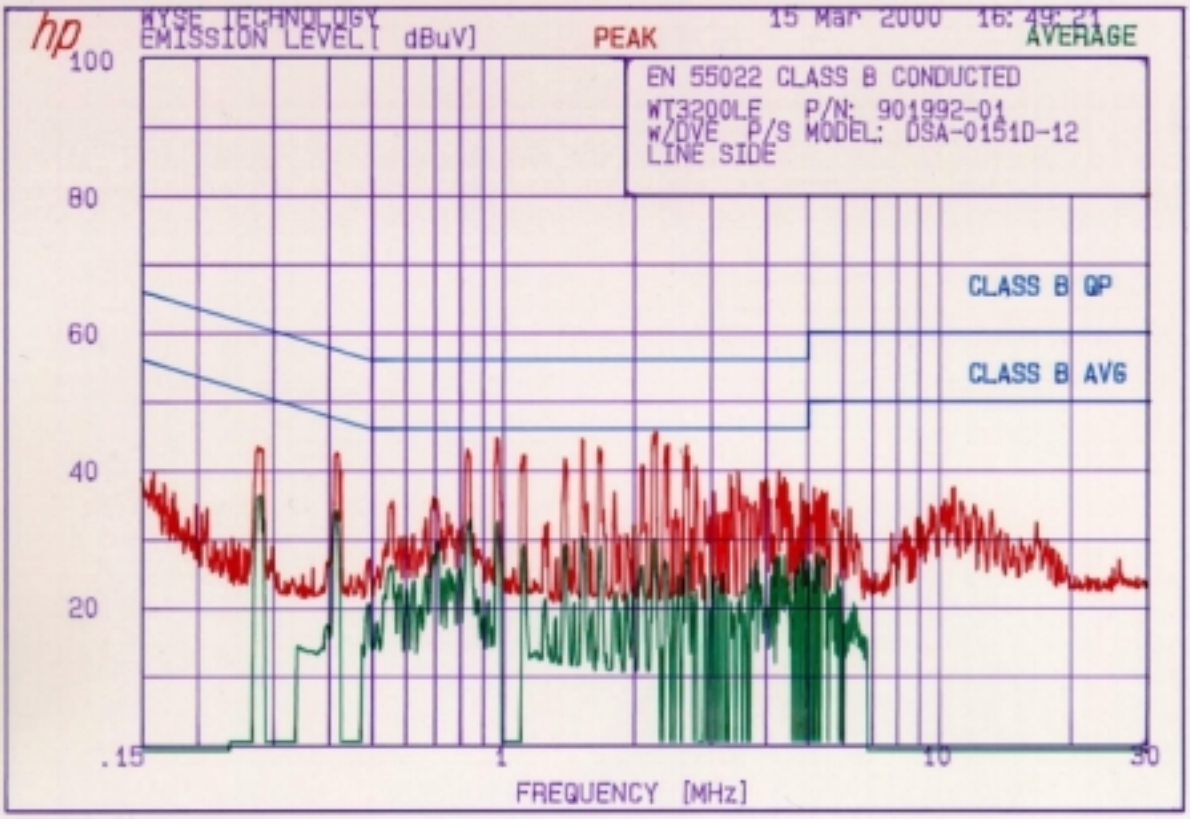
Description	Model No.	Serial No.	FCC ID:
Sony 21" Monitor	CPD-G500	2701749	DOC
HP USB Printer	C6411B	CN9AC1P11W	DOC
Keyboard	KU8933	0B13400445	DOC
Mouse	M-S34	LZE93750029	DZL211029
Microphone	None	None	
Headset	None	None	

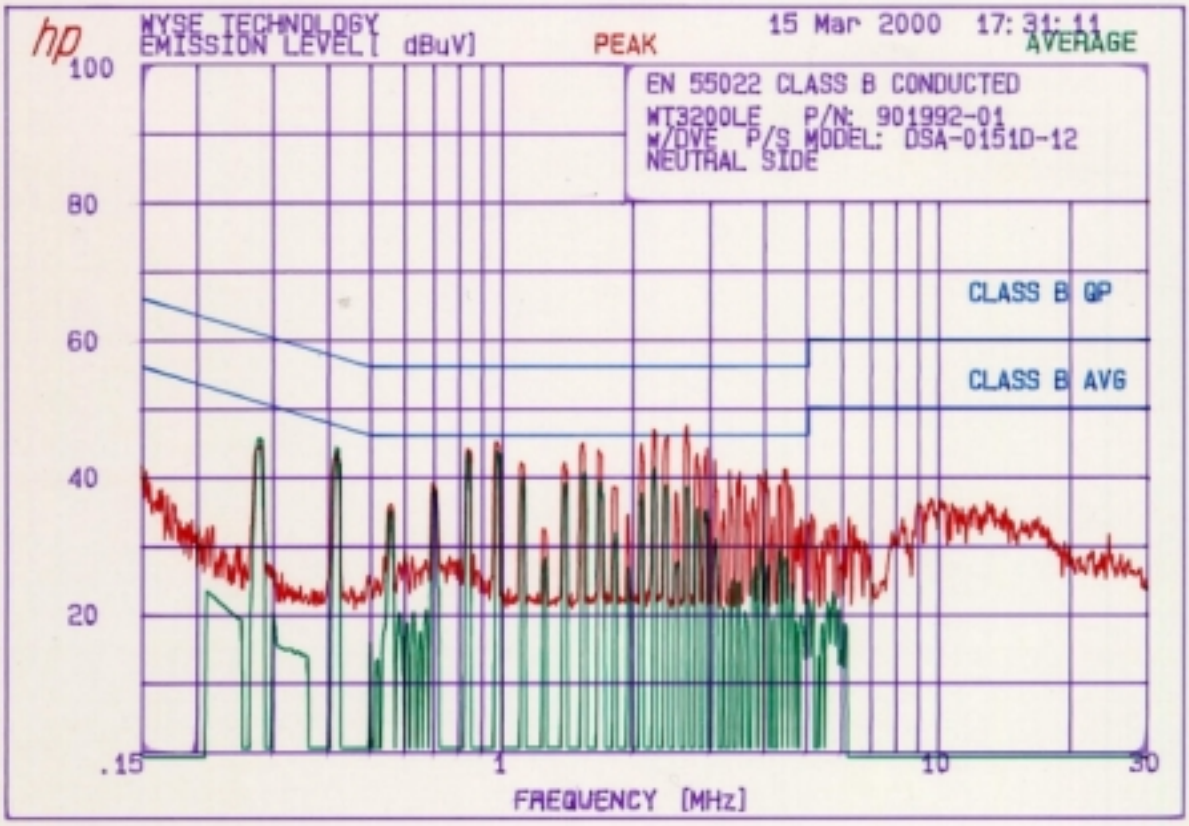
Final vertical [9/849]

Frequency MHz	Peak dBuV/m	DelLim-Pk dB	QP dBuV/m	DelLim-QP dB	Angle deg	Hgt cm	Pol
36.869556	28.62	-1.38	22.96*	-7.04	357	141	Vert
337.501829	14.62	-22.38	--.--	--.--	1	249	Vert
351.026854	15.70	-21.30	--.--	--.--	357	239	Vert
634.741569	34.43	-2.57	30.23	-6.77	1	399	Vert
661.908544	28.12	-8.88	--.--	--.--	0	101	Vert
715.507621	23.90	-13.10	--.--	--.--	140	399	Vert
756.003852	26.80	-10.20	--.--	--.--	190	399	Vert
818.116587	26.97	-10.03	--.--	--.--	141	101	Vert
850.476897	25.27	-11.73	--.--	--.--	172	399	Vert

Final Horizontal [9/849]

Frequency MHz	Peak dBuV/m	DelLim-Pk dB	QP dBuV/m	DelLim-QP dB	Angle deg	Hgt cm	Pol
36.869556	10.66	-19.34	--.--	--.--	357	329	Horz
337.501829	15.16	-21.84	--.--	--.--	95	399	Horz
351.017462	14.67	-22.33	--.--	--.--	306	101	Horz
634.654208	26.44	-10.56	--.--	--.--	357	399	Horz
661.902344	24.85	-12.15	--.--	--.--	357	195	Horz
715.498260	26.77	-10.23	--.--	--.--	0	386	Horz
756.000721	26.26	-10.74	--.--	--.--	358	338	Horz
818.119718	23.40	-13.60	--.--	--.--	0	267	Horz
850.483158	24.46	-12.54	--.--	--.--	357	236	Horz


hp
WYSE TECHNOLOGY
EMISSION LEVEL[dBuV]
PEAK
15 Mar 2000 16:49:21
AVERAGE
EN 55022 CLASS B CONDUCTED
WT3200LE P/N: 901992-01
W/DVE P/S MODEL: DSA-0151D-12
LINE SIDE
CLASS B QP
CLASS B AVG
100
80
60
40
20
.15
1
10
30
FREQUENCY [MHz]


hp
WYSE TECHNOLOGY
EMISSION LEVEL[dBuV]
PEAK
15 Mar 2000 17:31:11
AVERAGE
EN 55022 CLASS B CONDUCTED
WT3200LE P/N: 901992-01
W/DVE P/S MODEL: DSA-0151D-12
NEUTRAL SIDE
CLASS B QP
CLASS B AVG
100
80
60
40
20
.15
1
10
30
FREQUENCY [MHz]