

August 30, 2000

WYSE Technology EN 55022-B Test Record

for

Window Based Terminal

Model Number: WT8230LE

Tests performed by WYSE Technology

3471 N. First Street, San Jose, CA

Test completed: August 25, 2000

Test Engineer: Harinder Phul

Approved by: Jimmy Nguyen

August 30, 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 August 25, 2000 on the model WT8230LE.

1.2 Purpose

Testing was performed to evaluate the emissions performance of the WT8230LE with respect to EN 55022 Class B.

1.3 Summary

The Windows Terminal WT8230LE 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

WT8230LE 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.

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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.

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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 **WT8230LE** was **2.88 dB** below the limits at the worst case frequency of **573.0005647 MHz** in a Horizontal Polarization.

3.5 Product Specification

Model: **WT8230LE (Logic Board P/N 961347-01 Rev. A7)**

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 = 33pF, P/N 320313-25

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 μ H, 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, C5 = 33pF, P/N 320313-25

L2 = 200 Ohm, P/N 400032-25; C3, C6 = 33pF, P/N 320313-25

L3 = 200 Ohm, P/N 400032-25; 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 μ F, 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 μ F, 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 Oat

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

Test Description:

EUT: WT8230LE (10M OAT)

Serial No. 9B810800009

Part No. 901997-01

File No. 082500#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
619.494272	34.20	-2.80	---	---	150	96	Vert	
573.000564	36.07	-0.93	34.12	-2.88	235	103	Horz	

Configuration:

- 1) Fully configured
- 2) Video 1280 X 1024 @ 60Hz

Modifications:

- 1) *Installed Old Heat Sink*
- 2) *More holes on Top Cover*
- 3) *Nickel Plated bottom base*

Test Procedure Definition:

HP Spectrum Analyzer w/QP	8566B/85650A
Configuration	WYSE 10 Meter OAT
Frequency Range	30 - 1000 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) Pattern on monitor screen
- 2) Installed Ferrite Bead on 10/100 Base T
- 3) Install NT Software.

Test Engineer: Harinder S Phul

EUT:

Description	Part No.	Serial No.	FCC ID:
WT8230LE	901997-01	9B810800009	

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
D-Link 10/100Mbps	DSH-5	99101913	

Peripherals:

Description	Model No.	Serial No.	FCC ID:
Sony 21" Monitor	CPD-G500	2701749	DOC
HP Printer	C6411B	CN9AC1P11W	DOC
Wyse Keyboard	KU8933	OC13002151	DOC
Mouse Logitech	M-S34	LZE02505839	DZL211029
Microphone	None	None	
Headset	None	None	

Final Vertical [14/925]

WT8230LE (#00009) 10 meter OAT

Frequency MHz	Peak dBuV/m	DelLim-Pk dB	QP dBuV/m	DelLim-QP dB	Angle deg	Hgt cm	Pol
59.859732	19.80	-10.20	--.--	--.--	0	201	Vert
139.381633	28.75	-1.25	26.11	-3.89	157	201	Vert
154.765360	24.70	-5.30	--.--	--.--	157	201	Vert
159.902928	24.10	-5.90	--.--	--.--	157	201	Vert
168.343292	24.77	-5.23	--.--	--.--	---	---	----
185.882960	26.80	-3.20	--.--	--.--	358	201	Vert
216.819152	23.20	-6.80	--.--	--.--	237	96	Vert
294.374144	30.90	-6.10	--.--	--.--	0	96	Vert
402.740244	33.91	-3.09	--.--	--.--	---	---	----
446.052265	34.30	-2.70	31.89	-5.11	241	96	Vert
464.725610	32.77	-4.23	--.--	--.--	---	---	----
511.209632	32.90	-4.10	--.--	--.--	0	96	Vert
573.001047	36.57	-0.43	32.55	-4.45	161	96	Vert
619.494272	34.20	-2.80	--.--	--.--	150	96	Vert

Final Horizontal [14/925]

WT8230LE (#00009) 10 meter OAT

Frequency MHz	Peak dBuV/m	DelLim-Pk dB	QP dBuV/m	DelLim-QP dB	Angle deg	Hgt cm	Pol
59.809756	27.07	-2.93	--.--	--.--	---	---	----
139.377423	17.75	-12.25	--.--	--.--	319	399	Horz
154.854192	16.20	-13.80	--.--	--.--	23	193	Horz
160.003658	24.69	-5.31	--.--	--.--	---	---	----
168.343292	24.77	-5.23	--.--	--.--	---	---	----
185.861890	26.85	-3.15	26.27	-3.73	117	335	Horz
216.793266	25.01	-4.99	22.98	-7.02	173	193	Horz
294.384146	32.76	-4.24	--.--	--.--	---	---	----
402.652408	32.55	-4.45	30.75	-6.25	234	201	Horz
446.051587	23.83	-13.17	--.--	--.--	251	398	Horz
464.614048	30.30	-6.70	--.--	--.--	76	287	Horz
511.073138	35.73	-1.27	33.82	-3.18	235	103	Horz
573.000564	36.07	-0.93	34.12	-2.88	235	103	Horz
619.473024	31.00	-6.00	--.--	--.--	234	201	Horz



