July 26, 2001

WYSE Technology EN 55022-B Test Record

for

Window Based Terminal

Model Number: WT3235LE

Tests performed by WYSE Technology

3471 N. First Street, San Jose, CA

Test completed: July 20, 2001

Test Engineer: Harinder Phul

Approved by: Jimmy Nguyen

July 26, 2001

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 **July 20, 2001** on the model **WT3235LE**.

1.2 Purpose

Testing was performed to evaluate the emissions performance of the **WT3235LE** with respect to **EN 55022** Class **B**.

1.3 Summary

The Windows Terminal **WT3235LE** 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

WT3235LE 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 85460A (RES BW: 30 KHz-100KHz, VBW: 10KHz – 30KHz)

Conducted:
HP 85650A Quasi-Peak Adapter
HP 85680B 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 **WT3235LE** was **2.73 dB** below the limits at the worst case frequency of **224.966521 MHz** in a Vertical Polarization.

3.5 Product Specification

Model: **WT3235LE (Logic Board P/N 961401-00, Rev. 3)**

Clock Circuit:

U16 = MK1492-03, P/N 205565-50

Filters:

33 MHZ CLK Line:

RP29 = 33 Ohm, P/N 371338-02; C45, C46, C47 = 15pF (not loaded)

14 MHZ CLK Line:

R59 = 33 Ohm, P/N 370513-13; C44 = 15pF (not loaded)

48 MHZ CLK Line:

R60 = 33 Ohm, P/N 370513-13; C43= 15pF(not loaded)

24 MHZ (Audio) CLK Line:

R61 = 33 Ohm, P/N 370513-13; C42= 15pF (not loaded)

U1 = GX1-300, P/N 20064-55

Power Filter

U2 = CS5530A, P/N 205122-52

Filters:

R4 = 33 Ohm, P/N 370513-13; C2 = 15pF (not loaded)
R5 = 33 Ohm, P/N 370513-13; C3 = 15pF (not loaded)
L21 = 22 µH, P/N 410032-09
L20 = 44MTL, P/N 400021-04
L22 = 43MTL, P/N 400021-01
RP 1-7 = 75 Ohm, P/N 371338-12

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Video Circuit:

U2 = CS5530A, P/N 205122-52

Filters:

L1 = 0.47 µH, P/N 410038-02; C7, C10 = 22pF, P/N 320313-21
L2 = 0.47 µH, P/N 410038-02; C6, C9 = 22pF, P/N 320313-21
L3 = 0.47 µH, P/N 410038-02; C5, C8 = 22pF, P/N 320313-21

Termination:

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

Audio Circuit:

U14 = LM4546, P/N 205123-53

Filters:

C431 = 0.1 µF, P/N 320338-24
L25, L26 = 50 Ohm, P/N 400040-03

Driving Transistor:

Q3, Q4 = MMBT3904, P/N 270010-50

Network:

U3 = DP83815, P/N 205127-51

Filters:

R67, R68 = 49.9 Ohm, P/N 370508-68

J10 = RJ45 Connector w/ transformer built in, P/N 563680-01

Filters:

C37, C38, C39 = .1 uF, P/N 320338-24
R65, R66 = 54.9 Ohm, P/N 370508-72
R67, R68 = 49.9 Ohm, P/N 370508-68

Ground Jumper Setting:

R165, R166 = 0 Ohm, P/N 370514-99

Radiated Emission Test

10m OATS

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

Test Description:

EUT: WT3235LE

Serial No. 9GY1A600147
Part No. 902024-01
File No. 072001#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
224.966521	28.60	-1.40	27.27	-2.73	138	98	Vert
269.980408	35.40	-1.60	34.12	-2.88	248	397	Horz

Configuration:
1) Fully configured
2) Video 1280 X 1024 @ 85Hz

Modifications:

Test Procedure Definition:

Spectrum Analyzer	Model: 8566B (Cal Date: Apr. 24 2001)
	SN: 2320A02446 (Cal Due Date: Oct. 24 2001)
	Model: 85662A (Cal Date: Apr. 24 2001)
	SN: 2403A09080 (Cal Due Date: Oct. 24 2001)
Quasi Peak Adapter	Model: 85650A (Cal Date: Apr. 24 2001)
	SN: 2043A00331 (Cal Due Date: Oct. 24 2001)
Emco Biog Ant. (Type2)	Model: 3142 (Cal Date: Sept. 22 2000)
	SN: 1201 (Cal Due Date: Sept. 22 2001)
Configuration	WYSE OATS 10 meter
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
2) Installed Ferrite Bead on 10/100 Base T

EUT:

Description	Part No.	Serial No.	FCC ID:
WT3235LE	902024-01	9GY1A600147	N/A

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

Peripherals:

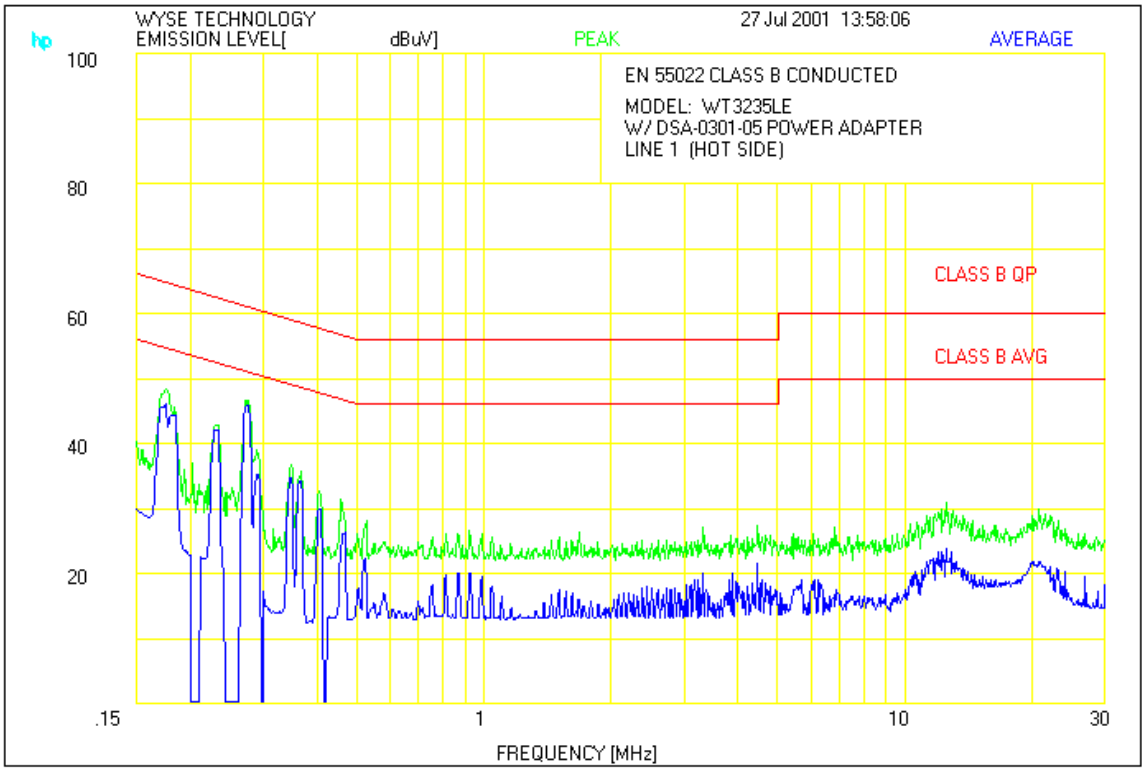
Description	Model No.	Serial No.	FCC ID:
Sony 21" Monitor	CPD-G500	2701749	DOC
HP PRINTER	C6411	CN9AC1P11W	DOC
Wyse KB	KU8933	1B03205403	DOC
Mouse Logitech	M-S34(AW)	HCA10602513	DZL211029
Microphone and Headset	None	None	

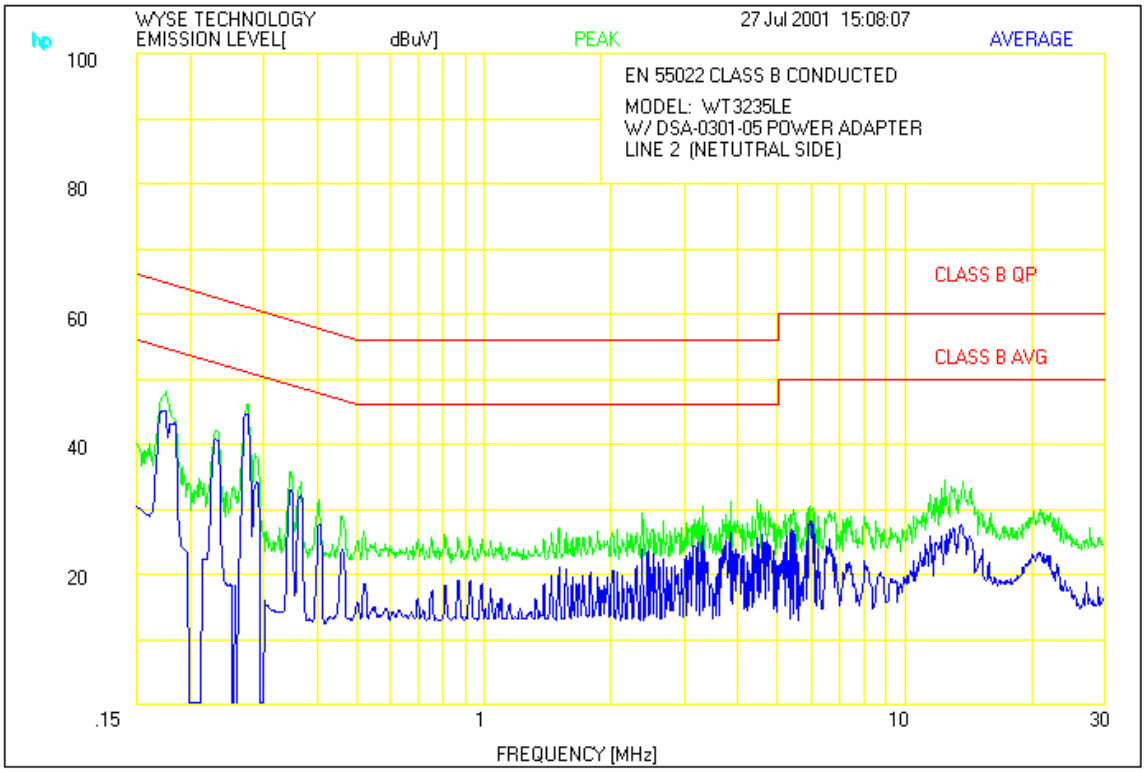
Final vertical [10/849]
WT3235LE

Frequency MHz	Peak dBuV/m	DelLim-Pk dB	QP dBuV/m	DelLim-QP dB	Angle deg	Hgt cm	Pol
45.025752	25.40	-4.60	--.--	--.--	23	198	Vert
60.427608	14.20	-15.80	--.--	--.--	23	198	Vert
112.523444	25.37	-4.63	--.--	--.--	128	199	Vert
124.973839	28.38	-1.62	25.73	-4.27	182	102	Vert
157.477968	25.80	-4.20	--.--	--.--	300	101	Vert
200.365440	21.30	-8.70	--.--	--.--	300	101	Vert
224.966521	28.60	-1.40	27.27	-2.73	138	98	Vert
269.986259	35.90	-1.10	34.05	-2.95	69	102	Vert
427.458105	34.51	-2.49	31.07	-5.93	2	101	Vert
585.253568	32.60	-4.40	--.--	--.--	111	96	Vert

Final Horizontal [10/849]
WT3235LE

Frequency MHz	Peak dBuV/m	DelLim-Pk dB	QP dBuV/m	DelLim-QP dB	Angle deg	Hgt cm	Pol
45.352576	21.20	-8.80	--.--	--.--	184	141	Horz
60.472996	25.20	-4.80	--.--	--.--	357	331	Horz
112.493455	27.28	-2.72	25.88	-4.12	255	398	Horz
125.093267	20.98	-9.02	--.--	--.--	262	399	Horz
157.517200	22.20	-7.80	--.--	--.--	357	331	Horz
200.112016	24.10	-5.90	--.--	--.--	0	96	Horz
224.173452	22.55	-7.45	17.50	-12.50	0	372	Horz
269.980408	35.40	-1.60	34.12	-2.88	248	397	Horz
427.463916	34.81	-2.19	31.11	-5.89	195	400	Horz
585.252645	35.71	-1.29	32.62	-4.38	352	400	Horz


WYSE TECHNOLOGY
EMISSION LEVEL[dBuV]
27 Jul 2001 13:58:06
PEAK
AVERAGE
EN 55022 CLASS B CONDUCTED
MODEL: WT3235LE
W/ DSA-0301-05 POWER ADAPTER
LINE 1 (HOT SIDE)
CLASS B QP
CLASS B AVG
100
80
60
40
20
.15
1
10
30
FREQUENCY [MHz]


WYSE TECHNOLOGY
EMISSION LEVEL[dBuV]
27 Jul 2001 15:08:07
PEAK
AVERAGE
EN 55022 CLASS B CONDUCTED
MODEL: WT3235LE
W/ DSA-0301-05 POWER ADAPTER
LINE 2 (NETUTRAL SIDE)
CLASS B QP
CLASS B AVG
100
80
60
40
20
.15
1
10
30
FREQUENCY [MHz]