June 6, 2001

WYSE Technology EN 55022-B Test Record

for

Window Based Terminal

Model Number: T20

Tests performed by WYSE Technology

3471 N. First Street, San Jose, CA

Test completed: May 30, 2001

Test Engineer: Harinder Phul

Approved by: Jimmy Nguyen

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 **June 6, 2001** on the model **T20**.

1.2 Purpose

Testing was performed to evaluate the emissions performance of the **T20** with respect to **EN 55022** Class **B**.

1.3 Summary

The Windows Terminal **T20** 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

T20 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 **T20** was **4.95 dB** below the limits at the worst case frequency of **224.971365 MHz** in a Vertical Polarization.

3.5 Product Specification

Model: **T20 (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: T20
Serial No. 9GV1A500022
Part No. 902021-01
File No. 053001#3

Test Type: **EN55022** **EN55022**
FCC-A { } FCC-B { X } 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
224.971365	28.00	-2.00	25.05	-4.95	183	101	Vert
360.214024	33.80	-3.20	--.--	--.--	309	198	Vert
404.920514	34.00	-3.00	31.43	-5.57	262	273	Horz
826.776064	30.50	-6.50	--.--	--.--	32	397	Horz

Configuration:

1) Fully configured
2) Video 1280X1024 @ 85Hz

Modifications:

None

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) CE 2.12 window base software.
3) Ver. 3.5 (Build 422)

Test Engineer : Harinder S Phul

EUT:

Description	Part No.	Serial No.	FCC ID:
T20	902021-01	9GV1A500022	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
D-Link	DSH-5/A	9006921750	

Peripherals:

Description	Model No.	Serial No.	FCC ID:
Sony 21" Monitor	CPD-G500 2701749		DOC
CPQ/Chicony Key Board	KU-3923	B4A390AGALU037	DOC
CPQ/Logitech Mouse	M-U34	F48920A5BLS007Q	JN2211374
Gen. Spkr	AMX2000	None	
Gen. Microphone	None	None	

Final Horizontal [12/849]

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Frequency MHz	Peak dBuV/m	DelLim-Pk dB	QP dBuV/m	DelLim-QP dB	Angle deg	Hgt cm	Pol
35.995003	27.38	-2.62	20.74	-9.26	315	102	Horz
37.713628	15.38	-14.62	--.--	--.--	103	101	Horz
39.021278	14.49	-15.51	--.--	--.--	358	270	Horz
44.996344	20.80	-9.20	--.--	--.--	257	404	Horz
50.478778	23.15	-6.85	--.--	--.--	24	101	Horz
63.025987	17.13	-12.87	--.--	--.--	358	377	Horz
112.545056	19.57	-10.43	--.--	--.--	118	401	Horz
157.486268	26.65	-3.35	--.--	--.--	113	298	Horz
202.515194	26.60	-4.40	--.--	--.--	54	202	Horz
269.955322	38.40	-5.63	--.--	--.--	236	199	Horz
404.920514	34.00	-3.00	31.43	-5.57	262	273	Horz
826.776064	30.50	-6.50	--.--	--.--	32	397	Horz

Final vertical [8/849]

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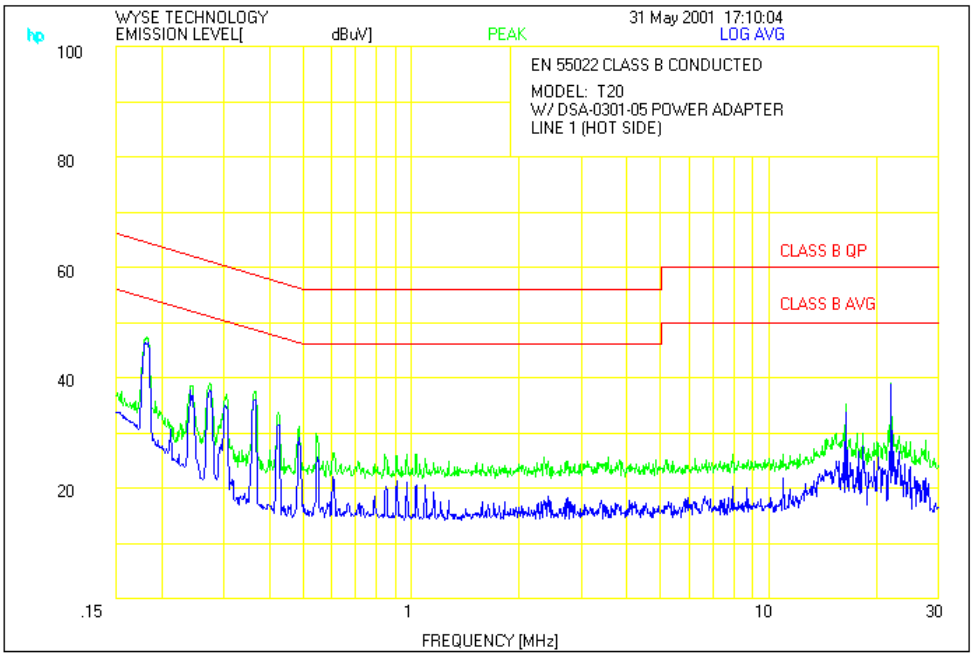
Frequency MHz	Peak dBuV/m	DelLim-Pk dB	QP dBuV/m	DelLim-QP dB	Angle deg	Hgt cm	Pol
45.663272	19.80	-10.20	--.--	--.--	178	99	Vert
62.876893	22.14	-7.86	--.--	--.--	178	99	Vert
112.483248	23.50	-6.50	--.--	--.--	353	103	Vert
157.564496	24.70	-5.30	--.--	--.--	32	103	Vert
224.971365	28.00	-2.00	25.05	-4.95	183	101	Vert
360.214024	33.80	-3.20	--.--	--.--	309	198	Vert
404.915002	35.30	-2.30	32.17	-4.83	115	99	Vert



826.976896 25.90 -11.10 --.-- --.-- 316 197 Vert