

January 23, 1998

WYSE Technology EN 55022-B Test Record

for

Desk Top Terminal

Model Number: WINTERM 2710SE

Tests performed by WYSE Technology

4399 Lick Mill Blvd. San Jose, CA

Tests completed: January 15, 1998

Test Engineer: Rich Watkins

Approved by: Masood Abrishamcar

1.0 INTRODUCTION

January 23, 1998

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 January 15, 1998 on the WYSE WINTERM Model: WINTERM 2710SE.

1.2 Purpose

Testing was performed to evaluate the emissions performance of the WINTERM 2710SE with respect to EN 55022 Class B.

1.3 Summary

The Desk Top Terminal WINTERM 2710SE were 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

WINTERM 2710SE are 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 4399 Lick Mill Blvd. San Jose, California, USA. Conducted emission testing was performed inside a shielded enclosure (Screen Room) in the WYSE RFI laboratory. The description of screen room is in filed at WYSE Regulatory Engineering Department. The Screen Room is located at 3471 N. First Street, San Jose, California, USA.

2.3 Test Equipment

January 23, 1998

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

HP 8447d Amplifier	Serial #1937A02787
HP 85650A Quasi-Peak Adapter	Serial #2521A00635
HP 8568A Spectrum Analyzer	Serial #2134A02775
HP 85685 RF Preselector	Serial #2510A00103
EMCO Biconilog Antenna	Serial #9706-1201

SETUP:

In accordance with WYSE Technology test procedure.

PROCEDURE:

Biconilog antenna was used for frequency range 30MHz - 1 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 22:1985, 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 meter 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 0.4 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

January 23,1998

A comparison of the measured data with the Class **B** limit of **CISPR** shows that Terminal **WINTERM 2710SE** was **0.48 dB** below the limits at the worst case frequency of **141.74 MHz** in a Horizontal Polarization

3.5 Product Specification

Model: **WINTERM 2710SE**

Clock Circuit:

- 1) U1 = CPU, AMD, SC400-66, PC-AT, P/N=202036-50
- 2) Y5 = Crystal, 32.768 KHz, P/N=392013-01

PLL CLK filters-

- 3) C27 = 15uF, P/N=320310-17
- 4) C32 = 330uF, P/N=320310-49
- 5) C57 = 33pF, P/N=320310-25
- 6) C68, C28 = 470pF, P/N= 320310-53
- 7) C35 = 22pF, P/N=320310-21
- 8) C20 = 0.01uF, P/N=320333-01
- 9) C107 = 0.22uF, P/N=320316-49
- 10) R111, R101, R110, R102 = 4.7 Kohm, P/N=370461-65

CLK IO line-

- 11) Y7 = Crystal, 1.8432 MHz, P/N=390000-01
- 12) R74 = Zero ohm, P/N=370460-91
- 13) R41 = 2.2 Mohm, P/N=370462-33
- 14) C124 = 68uF, P/N=320310-33

Video Circuit:

- 1) U2 = Video chip, Cirrus Logic, CL-GD5440, P/N=205114-51
- 2) Y3 = OSC, 14.318 MHz, TTL, P/N=392007-01
- 3) C112 = 10pF, P/N=320310-13
- 4) R79 = 33 ohm, P/N=370456-13

VL_LCLK line-

- 5) R171, R173 = 33ohm, P/N=370456-13
- 6) C110, C188 = 10pF, P/N=320310-13

M CLKVDD line-

- 7) R108 = 33ohm, P/N=370456-13
- 8) C14 = 10uF, P/N=313080-13
- 9) C121 = 0.1uF, P/N=320021-33

V CLKVDD line-

- 10) R109 = 33 ohm, P/N=370456-13
- 11) C15 = 10uF, P/N=313080-13
- 12) C119 = 0.1uF, 320021-33

V FILTER line-

- 13) R1 = 127 ohm, P/N=370466-11
- 14) C122 = 0.1uF, P/N=320021-33

V RED, V GRN, V BLU lines-

- 15) L1, L4, L5 = 1.6uH, 43MTL, SMD type, P/N=400021-01
- 16) C21, C22, C23, C24, C25, C26 = 33pF, P/N=320310-25
- 17) R81, R82, R83 = 75 ohm, P/N=370461-22

VSYNC, HSYNC lines-

- 18) C72, C73 = 220uF, P/N=320310-45
- 19) R67, R68 = 22 ohm, P/N=370461-09

Network Circuit:

- 1) U3 = Controller, CS8900, P/N=205110-01
- 2) Y4 = Crystal, 20 MHz, P/N=391002-39
- 3) T1 = Transformer, PE65745, 10Base isolation, P/N=429075-50

Filter-

- 4) C45, C47, C48, C49, C53, C54, C55, C56 = 33pF, P/N=320310-25
- 5) C113, C114, C115, C116 = 0.1uF, P/N=320021-33
- 6) R85 = 100 ohm, P/N=370466-01

RXD, TXD lines-

- 7) R7, R8 = 24.3 ohm, P/N=370465-38
- 8) C96 = 68uf, P/N=320310-33

Flash Memory: (Loaded to)

- 1) U25, U27 = IC, 4LC1M16ES-7, 1MX16, EDO, P/N=194077-01

3.5.1 Modifications

PHoM 15" Color

Transformer: P/N= 421553-05

C101: 0.22 μ F, 250V, P/N=320670-02

C102: 4700 pf, 250V & C103: 4700 pf, 250V, P/N=320050-87

C104: 0.1 μ F, 250V, P/N=320670-01

C143: 0.01 μ F, 250V & C144: 0.01 μ F, 250V, P/N=320050-90

L101 & L102, P/N =424526-02

Modifications:

- 1) **Video Cable:** Shielded type provided with Ferrite Core type 47
size: 3.97mm (Thickness) x 9.5mm (ID) x 17.4mm (OD) x 28.2mm (Height)
P/N=941247-01
- 2) **DC Harness:** Provided with two turns on Donut Ferrite Core
size: 6.34mm (Thickness) x 18.5mm (ID) x 32mm (OD) x 15.9mm (Height)
P/N=941248-01
- 3) The length of the GND wire from right side of the CRT to AC Socket should be reduced to 10.5"-11.0".
- 4) The length of the GND wire from left side of the CRT to the first screw which connects the AC Socket bracket to Logic Housing (Metal Shield) should be 11".
Note: The GND wire must be connected to the first screw on the Socket bracket.
- 5) The length of the GND wire from CRT Shield to AC Socket should be 2.5" to 2.75".
- 6) DC Harness length should be 26". The DC Harness and the Brightness wire and turned twice around the ferrite bead.
- 7) 22 Ohm resistor should be added in series with Q208.

Wyse Technology

San Jose

RADIATED EMISSIONS REPORT

Date: 1/15/98 1:30:23 p

RICH WATKINS

E.U.T: WT2710SE FILE# 011598#2

**SERIAL NUMBER: PHOM# 20463, LOGIC# 20594, MOUSE# 20323, KEYBOARD# 2053
9**

SUPPORT DEVICES: HP BRIO SERVER IN TRAILER

ID NUMBER: CPU# 20601, MOUSE# 20599, KYBD# 20598, MONITOR# 20079

PRINTERS/CABLES: PARALLEL 2225C, SERIAL 2225D

SOFTWARE: H PATTERN 1024 X 768 256 BIT MODE

MODIFICATIONS: NEW MARS LOGIC BOARD NUMBER 20594.

REQUESTOR: MASOOD ABRISHAMCAR

GOVERNMENT: CISPR 10 METERS - B

OBJECTIVE: To determine if the unit meets CISPR requirements for class B computing devices.

CONCLUSIONS: This unit meets the requirements for class B computing devices

WYSE Technology
 San Jose
 Radiated Emissions
10 METERS Open Area Test Site
 Site Calibration Date: 30

This data is not valid for ECNs or deviations.

Date: 1/15/98 1:30:23 p
 E.U.T: WT2710SE FILE# 011598#2
 Serial Number: PHOM# 20463, LOGIC# 20594, MOUSE# 20323, KEYBOARD# 2053
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 Software: H PATTERN 1024 X 768 256 BIT MODE
 Gov: CISPR 10 METERS - B

TEST FREQ	TEST dBuV	ACTL dBuV	VS A	VS B	ANT TYPE	ANT HGT	TT AZMT	SGNL
<hr/>								
Note: (Next)Changed Antenna to Bi-Log								
Note: (Next)QP								
39.39	36.60	24.93	-15.07	-5.07	B-V	100	210	MIXED
41.50	37.50	25.21	-14.79	-4.79	B-V	100	298	BROAD
43.30	37.50	24.74	-15.26	-5.26	B-V	100	298	BROAD
Note: (Next)QP								
47.25	43.00	29.22	-10.79	-0.79	B-V	100	242	VIDEO
Note: (Next)QP								
63.00	43.10	26.42	-13.58	-3.58	B-V	100	312	VIDEO
70.84	41.60	24.53	-15.47	-5.47	B-V	100	138	MIXED
78.75	40.70	23.86	-16.14	-6.14	B-V	100	233	VIDEO
86.63	40.50	24.03	-15.97	-5.97	B-V	100	292	MIXED
110.26	40.50	25.10	-14.90	-4.90	B-V	100	358	VIDEO
Note: (Next)QP								
118.13	35.50	20.18	-19.82	-9.82	B-V	100	358	MIXED
Note: (Next)QP								
126.00	43.10	28.10	-11.90	-1.90	B-V	100	0	VIDEO
Note: (Next)QP								
141.74	40.60	26.72	-13.28	-3.28	B-V	100	0	VIDEO
149.64	37.40	24.07	-15.93	-5.93	B-V	100	185	MIXED
157.51	33.30	20.60	-19.40	-9.40	B-V	100	154	MIXED
165.38	38.30	26.12	-13.88	-3.88	B-V	100	154	MIXED
Note: (Next)QP								
173.25	40.80	28.54	-11.46	-1.46	B-V	100	253	VIDEO
189.02	34.60	21.96	-18.04	-8.04	B-V	100	57	VIDEO
196.89	36.90	24.51	-15.49	-5.49	B-V	100	189	MIXED
Note: (Next)QP								
204.76	38.50	26.49	-13.51	-3.51	B-V	100	175	VIDEO
Note: (Next)QP								

Date: 1/15/98 1:30:23 p
E.U.T: WT2710SE FILE# 011598#2

Serial Number: PHOM# 20463, LOGIC# 20594, MOUSE# 20323, KEYBOARD# 2053

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Software: H PATTERN 1024 X 768 256 BIT MODE

Gov: CISPR 10 METERS - B

TEST FREQ	TEST dBuV	ACTL dBuV	VS A	VS B	ANT TYPE	ANT HGBT	TT AZMT	SGNL
<hr/>								
228.37	32.20	21.56	-18.44	-8.44	B-V	100	193	MIXED
236.24	30.60	20.34	-26.66	-16.66	B-V	100	105	MIXED
Note: (Next) QP								
251.98	40.10	30.53	-16.47	-6.47	B-V	100	208	VIDEO
267.75	38.90	29.58	-17.42	-7.42	B-V	100	184	VIDEO
275.62	36.70	27.53	-19.47	-9.47	B-V	100	192	MIXED
283.49	37.60	28.84	-18.16	-8.16	B-V	100	140	VIDEO
299.26	38.40	30.46	-16.54	-6.54	B-V	100	92	VIDEO
Note: (Next) Changed Antenna to Bi-Log								
330.76	34.90	28.02	-18.98	-8.98	L-V	100	136	VIDEO
346.51	32.70	26.70	-20.30	-10.30	L-V	100	253	VIDEO
Note: (Next) Changed Antenna to Bi-Log								
41.50	28.40	16.11	-23.89	-13.89	B-H	300	359	BROAD
43.30	28.40	15.64	-24.36	-14.36	B-H	300	359	BROAD
47.25	30.40	16.62	-23.39	-13.39	B-H	300	246	MIXED
Note: (Next) QP								
63.00	44.30	27.62	-12.38	-2.38	B-H	300	293	VIDEO
70.89	38.60	21.53	-18.47	-8.47	B-H	300	291	MIXED
78.75	35.50	18.66	-21.34	-11.34	B-H	300	352	MIXED
86.63	33.60	17.13	-22.87	-12.87	B-H	300	203	MIXED
110.26	36.10	20.70	-19.30	-9.30	B-H	300	264	MIXED
118.13	33.80	18.48	-21.52	-11.52	B-H	300	91	MIXED
Note: (Next) QP								
126.00	38.50	23.50	-16.50	-6.50	B-H	300	108	VIDEO
Note: (Next) QP								
141.74	43.40	29.52	-10.48	-0.48	B-H	300	125	VIDEO
149.64	35.90	22.57	-17.43	-7.43	B-H	300	89	MIXED
165.38	35.20	23.02	-16.98	-6.98	B-H	300	239	MIXED
Note: (Next) QP								
173.25	39.00	26.74	-13.26	-3.26	B-H	300	138	VIDEO
189.02	37.30	24.66	-15.34	-5.34	B-H	300	163	VIDEO
196.89	36.30	23.91	-16.09	-6.09	B-H	300	163	MIXED
Note: (Next) QP								
204.76	35.90	23.89	-16.11	-6.11	B-H	300	145	VIDEO
228.37	34.60	23.96	-16.04	-6.04	B-H	300	96	MIXED
251.98	39.10	29.53	-17.47	-7.47	B-H	300	290	VIDEO
267.75	37.20	27.88	-19.12	-9.12	B-H	300	319	VIDEO

Date: 1/15/98 1:30:23 p
E.U.T: WT2710SE FILE# 011598#2

Serial Number: PHOM# 20463, LOGIC# 20594, MOUSE# 20323, KEYBOARD# 2053
9

Software: H PATTERN 1024 X 768 256 BIT MODE

Gov: CISPR 10 METERS - B

TEST FREQ	TEST dBuV	ACTL dBuV	VS A	VS B	ANT TYPE	ANT HGHT	TT AZMT	SGNL
275.62	33.90	24.73	-22.27	-12.27	B-H	300	168	MIXED
283.49	34.80	26.04	-20.96	-10.96	B-H	300	165	VIDEO
299.26	40.90	32.96	-14.04	-4.04	B-H	300	176	VIDEO
Note: (Next) Changed Antenna to Bi-Log								
330.76	38.30	31.42	-15.58	-5.58	L-H	300	119	VIDEO
346.51	36.40	30.40	-16.60	-6.60	L-H	300	119	VIDEO

1 May 1998 04:04:46

WYSE TECHNOLOGY
EMISSION LEVEL [ABLV]

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EN 55022 CLASS B CONDUCTED
WT2710SE Line Side



