January 14, 1998

WYSE Technology EN 55022-B Test Record

for

Desk Top LCD Winterm

Model Number: WINTERM 2610SE

Tests performed by WYSE Technology

4399 Lick Mill Blvd. San Jose, CA

Test completed: January 14, 1998

Test Engineer: Richard Watkins

Approved by: Masood Abrishamcar

1.0 INTRODUCTION

January 14, 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 14, 1998** on the **WYSE WINTERM** model: **WINTERM 2610SE**.

1.2 Purpose

Testing was performed to evaluate the emissions performance of the **WINTERM 2610SE** with respect to **EN 55022** Class **B**.

1.3 Summary

The Desk Top Terminal **WINTERM 2610** 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

WINTERM 2610SE 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 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 14, 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
Schwarzbeck Biconical Antenna	Serial #3005
Log Periodic Antenna	Serial #1180

SETUP:

In accordance with WYSE Technology test procedure.

PROCEDURE:

30 MHz - 199 MHz biconical antenna was used. 200 MHz - 1 GHz the log periodic antenna was Used. 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 14, 1998

A comparison of the measured data with the Class **B** limit of **CISPR** shows that Terminal **WINTERM 2610SE** was **2.34 dB** below the limits at the worst case frequency of **215.98 MHz** in a Vertical Polarization.

3.5 Product Specification

Model: **WINTERM 2610SE (Video Board)**

Clock Circuit:

1) U75 = AV9173, P/N = 205556-50
2) R75 = 68 Ohm, P/N = 370461-21
3) C77 = 22 pF, P/N = 320310-21
4) L7, P/N = 400021-01
5) R831 = 75 Ohm, P/N = 370461-09
6) C830 = 22 pF, P/N = 320310-21
7) U450 = EPM7192SQC-15, P/N = 194075-51
8) R450, R451 = 0 Ohm, P/N = 370460-91
9) C450 = 30 pF, P/N = 320310-24
10) C451 = 22 pF, P/N = 320310-21

Video Chip:

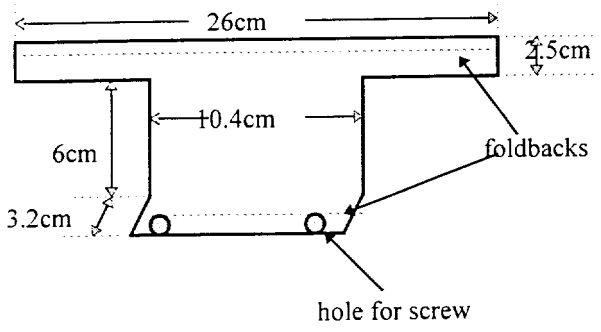
1) U501, U601, U701 = HI5714, P/N = 222011-50
2) U830, U831, U832, U833, U834 = 74F257, P/N = 171319-50
3) R835, R836, R837, R838, R839, R840 (Blue video lines); R841, R842, R843, R844, R845, R846 (Green video lines); R847, R848, R849, R850, R851, R852 (Red video lines) = 22 Ohm; P/N = 370461-09

LCD Harness / Video Cable:

Provided with ferrite core, type 47, Rated 3.6mH at 100Khz, P/N: 941324-01
size: 6.4mm (ID) x 14.2mm (OD) x 28.5mm (Length)

Ground Strap:

Aluminum foil material with insulator backing, in the shape of a **T** with fold-backs on top and bottom edges for conductive contacts. Horizontal bar measuring 26cm (width) x 2.5cm (height), Vertical bar measuring 10.4cm (width) x 9.2 (height). The ground strap connects between the mounting bracket of LCD board secured by clips, and the mounting bracket above interconnect board secured by two screws. Refer to drawing below:



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Model: **WINTERM 2610SE (Logic Board)**

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

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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

Wyse Technology

San Jose

RADIATED EMISSIONS REPORT

Date: 1/14/98 7:13:30 a RICH WATKINS

E.U.T: WT-2610SE FLASH/MARS FILE 011498#1
SERIAL NUMBER: PHOM# 20608, LOGIC# 20609, P/S# 20407, KYBD# 20539, MOU SE# 20323

SUPPORT DEVICES: HP BRIO SERVER IN TRAILER
ID NUMBER: CPU# 20601, MOUSE# 20599, KYBD# 20598, MONITOR# 20079

PRINTERS/CABLES: N/A

SOFTWARE: H PATTERN 800 X 600 256 BIT MODE

MODIFICATIONS: ADDED C830=22PF AND R831=75 OHMS

REQUESTOR: MASOOD ABRISHAMCAR / BOB HYMES

GOVERNMENT: CISPR 10 METERS - B

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

CONCLUSIONS: This unit meets the requirments for class B computing dev ices

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

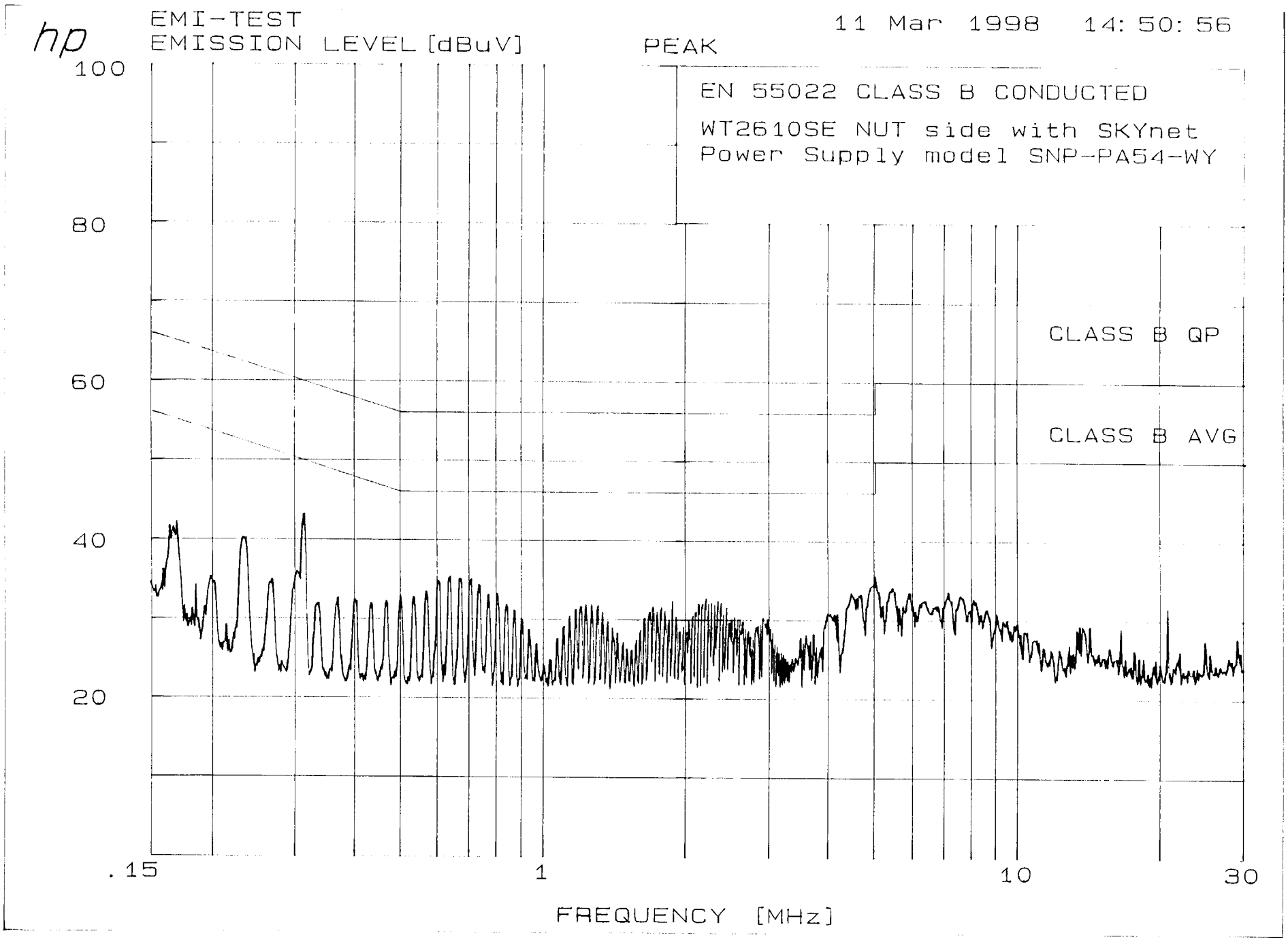
This data is not valid for ECNs or deviations.

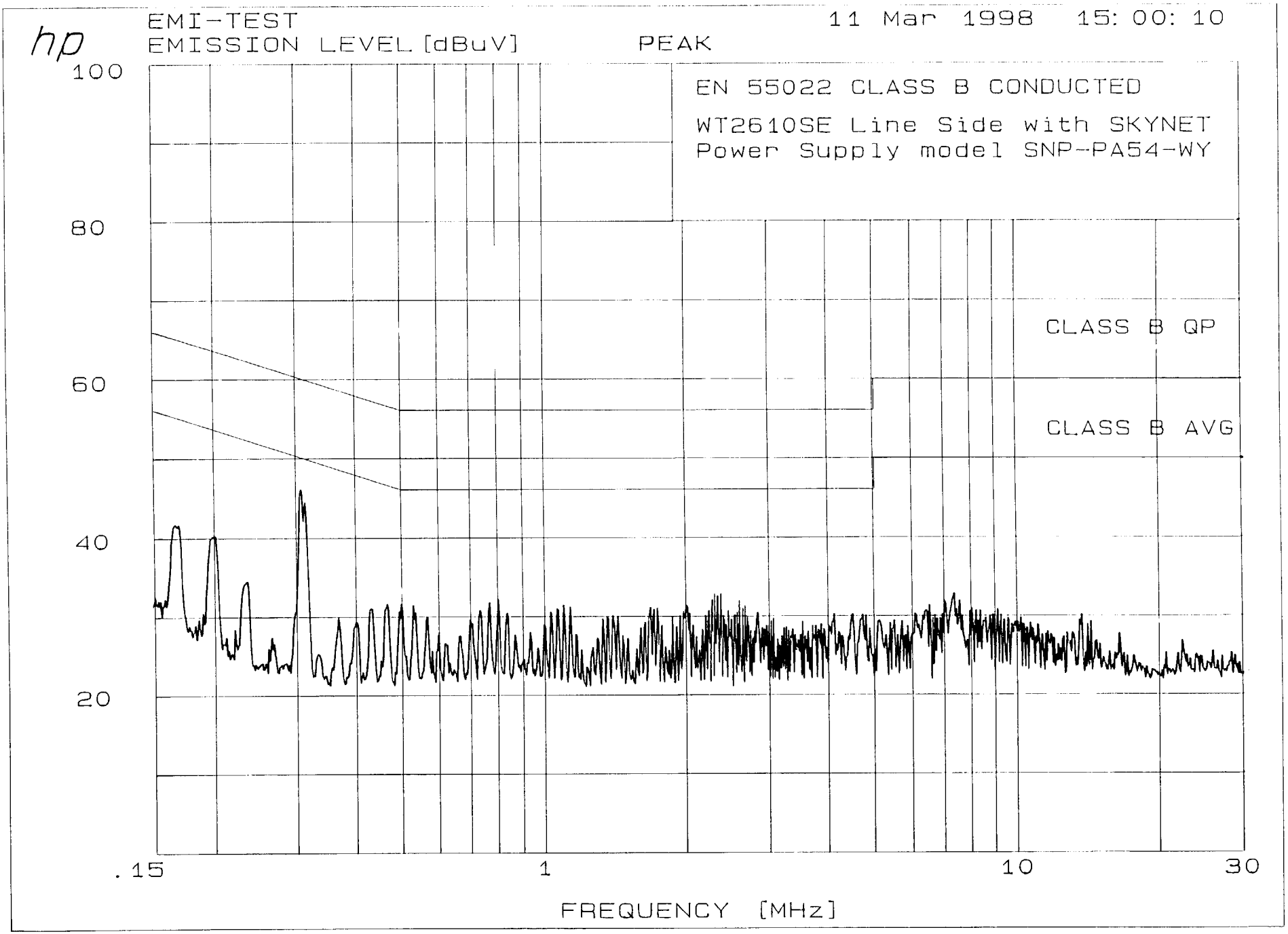
Date: 1/14/98 7:13:30 a
E.U.T: WT-2610SE FLASH/MARS FILE 011498#1
Serial Number: PHOM# 20608, LOGIC# 20609, P/S# 20407, KYBD# 20539, MOU SE# 20323
Software: H PATTERN 800 X 600 256 BIT MODE
Gov: CISPR 10 METERS - B

TEST FREQ	TEST dBuV	ACTL dBuV	VS A	VS B	ANT TYPE	ANT HGHT	TT AZMT	SGNL
Note: (Next)Changed Antenna to Bi-Log								
Note: (Next)ALL QP								
44.00	35.40	22.46	-17.54	-7.54	B-V	100	0	VIDEO
48.00	39.90	25.92	-14.08	-4.08	B-V	100	0	VIDEO
55.99	41.00	25.30	-14.70	-4.70	B-V	100	0	MIXED
63.99	40.20	23.46	-16.54	-6.54	B-V	100	0	VIDEO
79.98	35.10	18.30	-21.70	-11.70	B-V	100	359	MIXED
83.99	35.20	18.60	-21.40	-11.40	B-V	100	359	VIDEO
111.98	39.30	23.92	-16.08	-6.08	B-V	100	0	VIDEO
119.97	38.40	23.10	-16.90	-6.90	B-V	100	0	MIXED
123.97	38.20	23.10	-16.90	-6.90	B-V	100	0	VIDEO
127.97	41.00	26.10	-13.90	-3.90	B-V	100	0	VIDEO
135.98	33.80	19.48	-20.52	-10.52	B-V	100	0	VIDEO
143.98	35.50	21.78	-18.22	-8.22	B-V	100	0	VIDEO
151.98	31.20	18.06	-21.94	-11.94	B-V	100	0	VIDEO
159.98	32.90	20.40	-19.60	-9.60	B-V	100	0	MIXED
167.98	36.80	24.78	-15.22	-5.22	B-V	100	0	VIDEO
175.98	38.40	25.84	-14.16	-4.16	B-V	100	133	MIXED
179.98	36.20	23.20	-16.80	-6.80	B-V	100	95	MIXED
183.98	36.90	24.06	-15.94	-5.94	B-V	100	0	VIDEO
191.98	36.30	23.76	-16.24	-6.24	B-V	100	0	VIDEO
207.98	29.40	17.58	-22.42	-12.42	B-V	100	0	VIDEO
215.98	39.00	27.66	-12.34	-2.34	B-V	100	122	VIDEO
231.95	39.00	28.53	-18.47	-8.47	B-V	100	192	VIDEO
239.95	40.30	30.22	-16.78	-6.78	B-V	100	133	MIXED
247.95	38.70	29.00	-18.00	-8.00	B-V	100	204	VIDEO
251.95	29.30	19.73	-27.27	-17.27	B-V	100	182	MIXED
255.95	32.60	23.10	-23.90	-13.90	B-V	100	180	VIDEO
271.95	33.50	24.25	-22.75	-12.75	B-V	100	188	VIDEO
279.95	32.90	23.96	-23.04	-13.04	B-V	100	181	MIXED
287.95	31.10	22.57	-24.43	-14.43	B-V	100	40	MIXED
295.95	30.90	22.79	-24.21	-14.21	B-V	100	78	VIDEO
Note: (Next)Changed Antenna to Bi-Log								
311.94	32.80	25.23	-21.77	-11.77	L-V	100	104	VIDEO
319.94	29.60	22.26	-24.74	-14.74	L-V	100	147	MIXED
359.93	33.60	28.00	-19.00	-9.00	L-V	100	121	MIXED

Date: 1/14/98 7:13:30 a
E.U.T: WT-2610SE FLASH/MARS FILE 011498#1
Serial Number: PHOM# 20608, LOGIC# 20609, P/S# 20407, KYBD# 20539, MOU
SE# 20323
Software: H PATTERN 800 X 600 256 BIT MODE
Gov: CISPR 10 METERS - B

TEST FREQ	TEST dBuV	ACTL dBuV	VS A	VS B	ANT TYPE	ANT HGHT	TT AZMT	SGNL
399.92	35.70	30.60	-16.40	-6.40	L-V	100	275	MIXED
439.92	36.10	31.44	-15.56	-5.56	L-V	100	157	MIXED
479.91	33.10	29.54	-17.46	-7.46	L-V	100	144	MIXED
Note: (Next)Changed Antenna to Bi-Log								
111.98	38.20	22.82	-17.18	-7.18	B-H	300	101	VIDEO
119.98	35.10	19.80	-20.20	-10.20	B-H	300	118	MIXED
127.98	32.00	17.10	-22.90	-12.90	B-H	300	118	VIDEO
135.98	33.70	19.38	-20.62	-10.62	B-H	300	326	VIDEO
143.98	33.70	19.98	-20.02	-10.02	B-H	300	326	VIDEO
151.98	32.60	19.46	-20.54	-10.54	B-H	300	326	VIDEO
159.98	33.50	21.00	-19.00	-9.00	B-H	300	359	MIXED
167.98	28.90	16.88	-23.12	-13.12	B-H	300	212	VIDEO
175.98	34.50	21.94	-18.06	-8.06	B-H	300	234	VIDEO
183.98	37.80	24.96	-15.04	-5.04	B-H	300	157	VIDEO
191.98	36.60	24.06	-15.94	-5.94	B-H	300	201	VIDEO
207.98	29.10	17.28	-22.72	-12.72	B-H	300	217	VIDEO
215.98	36.50	25.16	-14.84	-4.84	B-H	300	86	VIDEO
223.98	32.80	21.94	-18.06	-8.06	B-H	300	88	VIDEO
231.96	37.50	27.03	-19.97	-9.97	B-H	300	128	VIDEO
239.96	42.00	31.92	-15.08	-5.08	B-H	300	128	MIXED
247.96	37.50	27.80	-19.20	-9.20	B-H	300	148	MIXED
255.96	28.10	18.60	-28.40	-18.40	B-H	300	187	VIDEO
263.96	33.70	24.32	-22.68	-12.68	B-H	300	164	MIXED
271.93	28.90	19.65	-27.35	-17.35	B-H	300	143	MIXED
279.94	32.90	23.96	-23.04	-13.04	B-H	300	188	VIDEO
295.94	36.20	28.09	-18.91	-8.91	B-H	300	190	MIXED
Note: (Next)Changed Antenna to Bi-Log								
319.94	33.50	26.16	-20.84	-10.84	L-H	300	194	MIXED
359.93	32.40	26.80	-20.20	-10.20	L-H	300	207	MIXED
399.93	31.90	26.80	-20.20	-10.20	L-H	300	318	MIXED
439.91	32.10	27.44	-19.56	-9.56	L-H	300	77	MIXED


hp
EMI-TEST
EMISSION LEVEL [dBuV]
11 Mar 1998 14:50:56
PEAK
EN 55022 CLASS B CONDUCTED
WT2610SE NUT side with SKYnet
Power Supply model SNP-PA54-WY
CLASS B QP
CLASS B AVG
100
80
60
40
20
.15
1
10
30
FREQUENCY [MHz]


hp
EMI-TEST
EMISSION LEVEL [dBuV]
PEAK
11 Mar 1998 15: 00: 10
EN 55022 CLASS B CONDUCTED
WT2610SE Line Side with SKYNET
Power Supply model SNP-PA54-WY
CLASS B QP
CLASS B AVG
100
80
60
40
20
.15
1
10
30
FREQUENCY [MHz]