

**April 2, 1998**

**WYSE Technology EN 55022-B Test Record**

**for**

**Pizza Box**

**Model Number: Winterm 2315SE**

**Tests performed by WYSE Technology**

**4399 Lick Mill Blvd. San Jose, CA**

**Test completed: April 2, 1998**

**Test Engineer: Rich Watkins**

**Approved by: Masood Abrishamcar**

April 2, 1998

## **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 **April 2, 1998** on the **WYSE WINTERM** model: **WINTERM 2315SE**.

### **1.2 Purpose**

Testing was performed to evaluate the emissions performance of the **WINTERM 2315SE** with respect to **EN 55022** Class **B**.

### **1.3 Summary**

The Power Adapter **WINTERM 2315SE** 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 550022**.

## **2.0 TEST ENVIRONMENT**

### **2.1 Test Sample Description**

**WINTERM 2315SE** 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 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.

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 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.

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.

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### 3.4 Test Results

A comparison of the measured data with the Class **B** limit of **CISPR** shows that Power Adapter **WINTERM 2315SE** was **6.50 dB** below the limits at the worst case frequency of **225.00 MHz** in a Vertical Polarization.

### 3.5 Product Specification

Model: **WINTERM 2315SE (Logic Board P/N 991305-01 Rev. 2)**

#### 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 = 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

**Audio Circuit:**

- 1) Y2: 16.934 MHz, P/N 391002-30
- 2) Y6: 24.5 MHz, P/N 390000-43
- 3) U4: Crystal, C54231A,KQ, P/N 205550-02

**Flash Memory: (Loaded to)**

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

**Crossover Board**

**Filter Circuit-**

- 1) C105, C109, C107, C106, C108, C101, C104, C103, C102, C110= 27pF
- 2) L101, L104, L103, L102, L105=0.9-1  $\mu$ H @ 100 KHz

Wyse Technology

San Jose

RADIATED EMISSIONS REPORT

Date: 4/2/98 1:17:28 p

RICH WATKINS

**E.U.T: WT2315SE AUDIO FILE# 040298#2**

**SERIAL NUMBER: PIZZA BOX# 20456, LOGIC# 20266, P/S# 20645, (MOUSE, KEY BOARD & MONITOR SEE MODIFICATION NOTES.**

SUPPORT DEVICES: HP BRIO SERVER IN TRAILER

ID NUMBER: CPU# 20106, MOUSE# 20599, KYBD# 20598, MONITOR# 20079

PRINTERS/CABLES: PARALLEL 2225C, SERIAL 2225D & 2ND SERIAL CABLE

SOFTWARE: 1024 X 768 256 BIT MODE H PATTERN & STEREO AUDIO LONG SONG RUNNING

MODIFICATIONS: REV C LOGIC BOARD, L1, L4 & L5 ARE 1.4UH. REMOVED R163 & R164 ZERO OHM, R166 INSTALLED. NO STUDS ON PIZZA BOX TO HOLD CROSS OVER BOARD, RGB FILTER CAPS ON NEW CROSS OVER BOARD ARE 27PF BEADS ARE 1.0UH. HP MONITOR 14 MODEL D2830A WITH VIDEO CABLE. HP KEYBOARD MODEL SK-2502. HP MOUSE M/N MS34. POWER SUPPLY DVE 20645. CRYSTAL 32C65 32 MHZ AND TXC 24 MHZ

REQUESTOR: MASOOD ABRISHAMCAR / KENNY CHAN

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: 4/2/98 1:17:28 p  
E.U.T: WT2315SE AUDIO FILE# 040298#2  
Serial Number: PIZZA BOX# 20456, LOGIC# 20266, P/S# 20645, (MOUSE, KEY  
BOARD & MONITOR SEE MODIFICATION NOTES.  
Software: 1024 X 768 256 BIT MODE H PATTERN & STEREO AUDIO LONG SONG R  
UNNING  
Gov: CISPR 10 METERS - B

TEST FREQ	TEST dBuV	ACTL dBuV	VS A	VS B	ANT TYPE	ANT HGHT	TT AZMT	SGNL
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Note: (Next)Changed Antenna to Bi-Log

45.01	30.00	16.80	-23.20	-13.20	B-V	100	0	VIDEO
56.24	37.40	21.65	-18.35	-8.35	B-V	100	162	VIDEO
67.52	33.90	16.95	-23.05	-13.05	B-V	100	199	MIXED
78.75	35.50	18.66	-21.34	-11.34	B-V	100	0	VIDEO
112.49	34.40	19.02	-20.98	-10.98	B-V	100	359	VIDEO
123.75	31.40	16.29	-23.71	-13.71	B-V	100	0	VIDEO
134.99	37.40	23.00	-17.00	-7.00	B-V	100	359	VIDEO
146.25	31.80	18.24	-21.76	-11.76	B-V	100	0	VIDEO
157.50	35.10	22.40	-17.60	-7.60	B-V	100	155	MIXED
168.76	27.20	15.23	-24.77	-14.77	B-V	100	0	VIDEO
180.01	34.80	21.80	-18.20	-8.20	B-V	100	153	VIDEO
191.25	27.00	14.44	-25.56	-15.56	B-V	100	359	VIDEO
202.50	28.60	16.45	-23.55	-13.55	B-V	100	359	MIXED
208.08	25.80	13.98	-26.02	-16.02	B-V	100	0	CLOCK
213.76	31.90	20.43	-19.57	-9.57	B-V	100	359	VIDEO
214.39	24.20	12.76	-27.24	-17.24	B-V	100	0	VIDEO
225.00	34.30	23.50	-16.50	-6.50	B-V	100	359	MIXED
240.07	25.80	15.72	-31.28	-21.28	B-V	100	0	MIXED
242.74	30.10	20.15	-26.85	-16.85	B-V	100	359	CLOCK
250.57	29.50	19.91	-27.09	-17.09	B-V	100	0	MIXED
258.76	34.40	24.94	-22.06	-12.06	B-V	100	359	VIDEO
264.50	28.90	19.53	-27.47	-17.47	B-V	100	0	VIDEO
270.00	26.30	17.02	-29.98	-19.98	B-V	100	359	VIDEO
276.59	25.00	15.88	-31.12	-21.12	B-V	100	359	CLOCK
281.26	26.50	17.63	-29.37	-19.37	B-V	100	0	MIXED
292.50	37.30	29.01	-17.99	-7.99	B-V	100	359	VIDEO

Note: (Next)Changed Antenna to Bi-Log

303.74	25.30	17.50	-29.50	-19.50	L-V	100	9	VIDEO
337.51	32.20	25.70	-21.30	-11.30	L-V	100	360	VIDEO
348.75	25.10	19.23	-27.77	-17.77	L-V	100	0	VIDEO
371.26	31.20	25.83	-21.17	-11.17	L-V	100	360	VIDEO
450.00	27.40	22.90	-24.10	-14.10	L-V	100	0	MIXED

Note: (Next)Changed Antenna to Bi-Log

112.49	36.40	21.02	-18.98	-8.98	B-H	300	359	VIDEO
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Date: 4/2/98 1:17:28 p  
 E.U.T: WT2315SE AUDIO FILE# 040298#2  
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 Gov: CISPR 10 METERS - B

TEST FREQ	TEST dBuV	ACTL dBuV	VS A	VS B	ANT TYPE	ANT HGHT	TT AZMT	SGNL
123.75	31.30	16.19	-23.81	-13.81	B-H	300	0	VIDEO
134.99	36.80	22.40	-17.60	-7.60	B-H	300	89	VIDEO
146.25	30.80	17.24	-22.76	-12.76	B-H	300	164	VIDEO
157.50	32.00	19.30	-20.70	-10.70	B-H	300	91	MIXED
168.76	29.40	17.43	-22.57	-12.57	B-H	300	359	VIDEO
180.01	31.20	18.20	-21.80	-11.80	B-H	300	0	VIDEO
191.25	25.60	13.04	-26.96	-16.96	B-H	300	359	VIDEO
208.08	25.40	13.58	-26.42	-16.42	B-H	300	0	CLOCK
258.76	31.10	21.64	-25.36	-15.36	B-H	300	359	VIDEO
264.50	27.60	18.23	-28.77	-18.77	B-H	300	0	VIDEO
270.00	25.10	15.82	-31.18	-21.18	B-H	300	359	VIDEO
281.26	27.40	18.53	-28.47	-18.47	B-H	300	0	MIXED
287.88	27.40	18.87	-28.13	-18.13	B-H	300	359	CLOCK
292.50	35.00	26.71	-20.29	-10.29	B-H	300	0	VIDEO

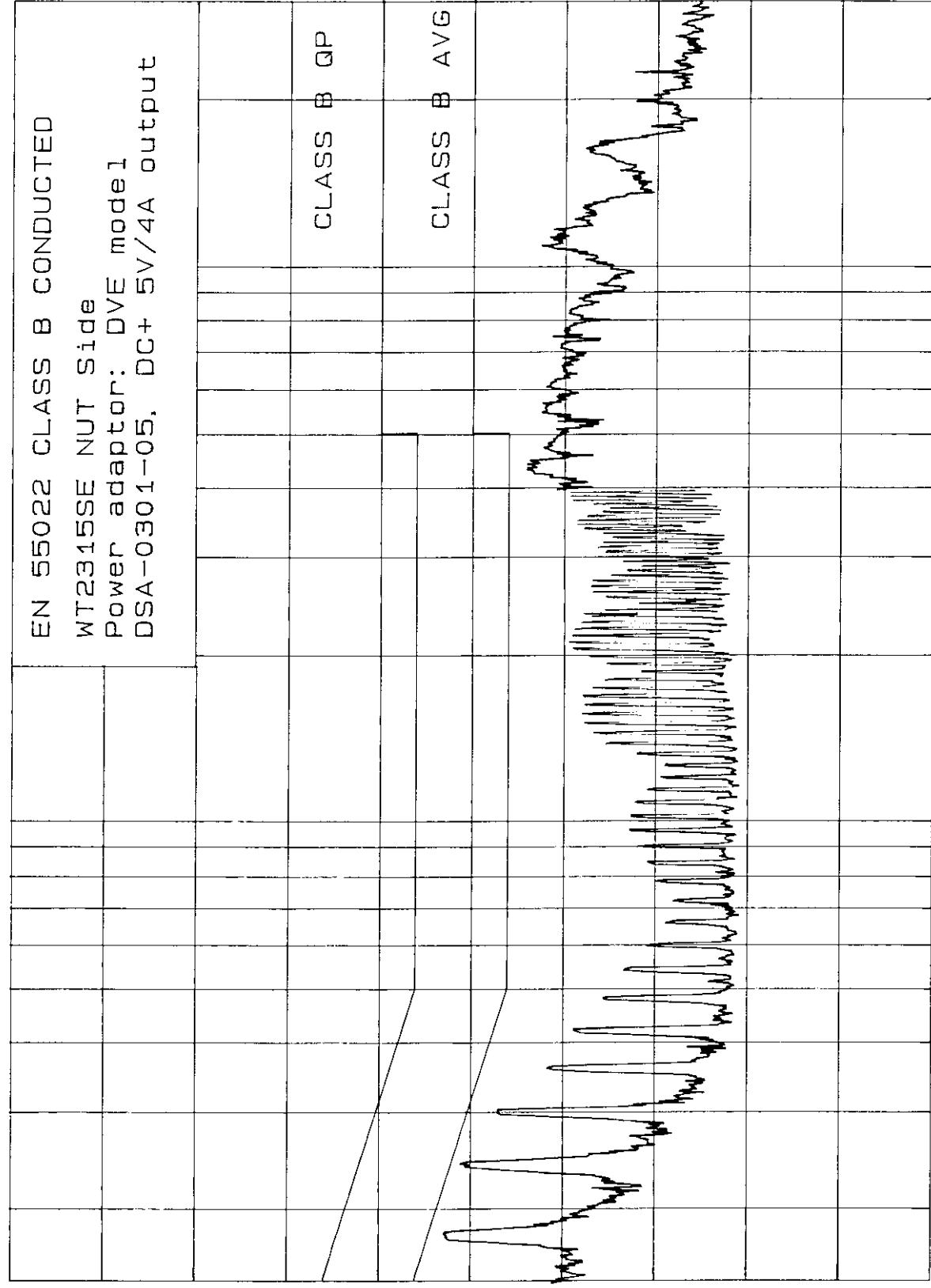
Note: (Next)Changed Antenna to Bi-Log

303.74	24.90	17.10	-29.90	-19.90	L-H	300	359	VIDEO
337.51	29.50	23.00	-24.00	-14.00	L-H	300	0	VIDEO
371.26	30.70	25.33	-21.67	-11.67	L-H	300	359	VIDEO



hp

100



15

1

10

30

FREQUENCY [MHz]

hp

100

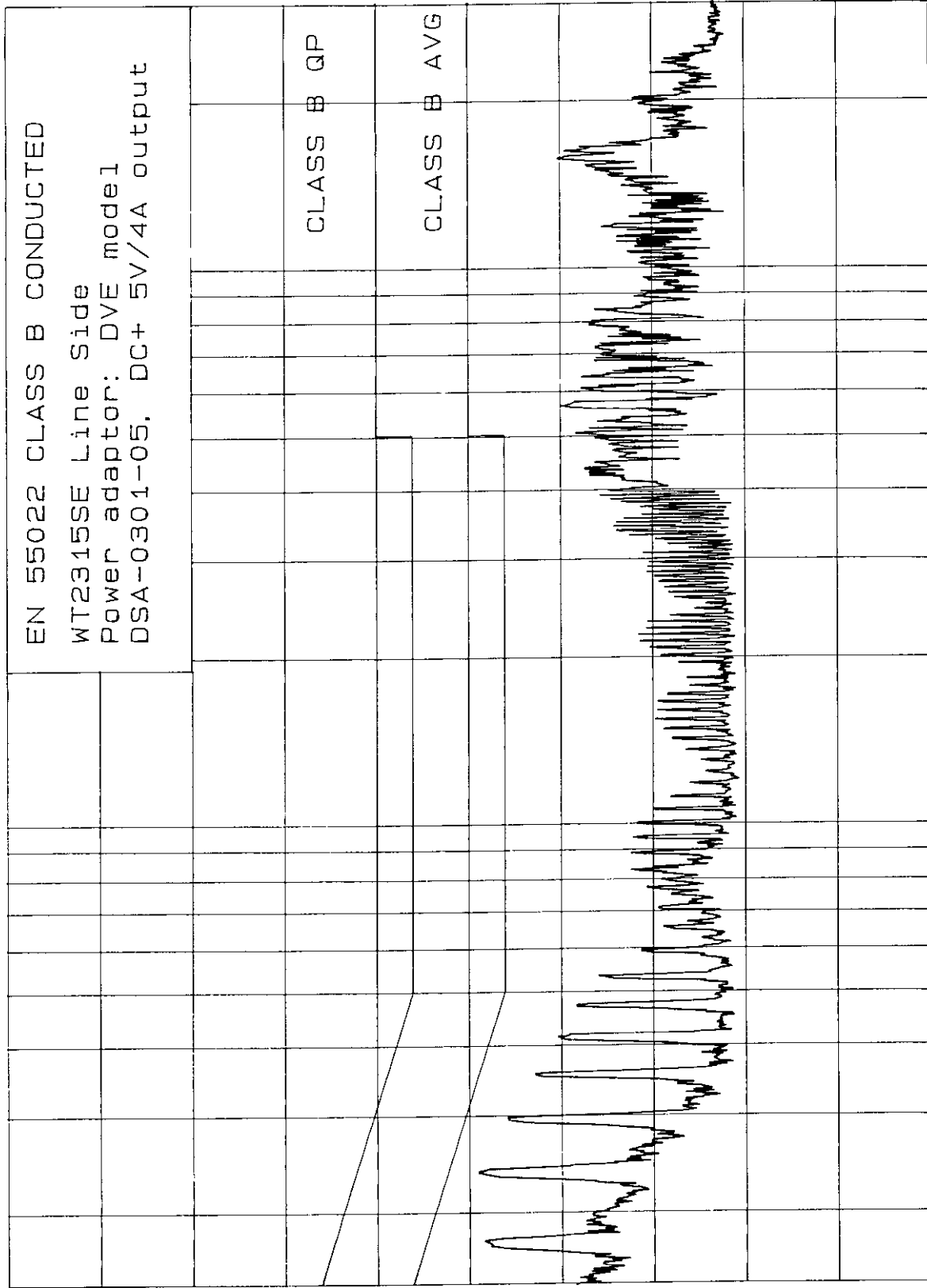
80

60

40

20

.15



30

10

FREQUENCY [MHz]