July 12, 2000

WYSE Technology EN 55022-B Test Record

for

Window Based Terminal

Model Number: IT7200

Tests performed by WYSE Technology

3471 N. First Street, San Jose, CA

Test completed: July 11, 2000

Test Engineer: Benton Ng

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 **July 11, 2000** on the model **IT7200**.

1.2 Purpose

Testing was performed to evaluate the emissions performance of the **IT7200** with respect to **EN 55022** Class **B**.

1.3 Summary

The Windows Terminal **IT7200** 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

IT7200 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 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 0.8 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 **IT7200** was **3.63 dB** below the limits at the worst case frequency of **161.977537 MHz** in a Horizontal Polarization.

3.5 Product Specification

Model: **IT7200 (Logic Board P/N 961347-01 Rev. A7)**

Clock Circuit:

U5 = MK1492-03, P/N 205565-50

Filters:

33 MHZ CLK Line:

R35 = 33 Ohm, P/N 370513-13; C176 = 15pF (not loaded)
R36 = 33 Ohm, P/N 370513-13; C173 = 15pF (not loaded)
R37 = 33 Ohm, P/N 370513-13; C177 = 15pF (not loaded)

14 MHZ CLK Line:

R34 = 33 Ohm, P/N 370513-13; C172 = 15pF (not loaded)

48 MHZ CLK Line:

R33 = 33 Ohm, P/N 370513-13; C174 = 33pF, P/N 320313-25

24 MHZ (Audio) CLK Line:

R32 = 33 Ohm, P/N 370513-13; C175= 15pF (not loaded)

U2 = GX1-200, P/N 200064-50

Power Filter

U1 = CS5530, P/N 205122-50

Filters:

R4 = 68 Ohm, P/N 370513-21; C146 = 15pF (not loaded)
R5 = 68 Ohm, P/N 370513-21; C147 = 15pF (not loaded)
L17, L18 = 70 Ohm, P/N 400040-04
RP 3-7 = 75 Ohm, P/N 371338-12
L19B = 22 μH, P/N 410032-09

July 11, 2000

Video Circuit:

U1 = CS5530, P/N 205122-50

Filters:

L1 = 200 Ohm, P/N 400032-25; C4, C5 = 33pF, P/N 320313-25
L2 = 200 Ohm, P/N 400032-25; C3, C6 = 33pF, P/N 320313-25
L3 = 200 Ohm, P/N 400032-25; C2, C7 = 33pF, P/N 320313-25

Termination:

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

Audio Circuit:

U9 = LM4546, P/N 205123-53

Filters:

C431 = 0.1 µF, P/N 320338-24
L24, L25 = 43MTL, P/N 400021-01

Driving Transistor:

CR4, CR5 = MMBT3904, P/N 270010-50

Network:

U3 = DP83815, P/N 205127-50

Filters:

R70, R71 = 49.9 Ohm, P/N 370508-68

U14 = Transformer, Pulse Type '68515,' P/N 429099-51

Filters:

C82, C83, C85 = .1 uF, P/N 320338-24
R113, R112, R111, R110 = 75 Ohm, P/N 370513-22

Ground Jumper Setting:

L19, L30 = 400 Ohm, P/N 400032-26

Radiated Emission Test

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

Test Description:

EUT: IT7200 (Tested at 10 meter OATS)
Serial No.: 98210506587
Part No.: 901998-01
File No.: 071100#3

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
148.110383	**29.25**	**-0.75**	**26.11**	**-3.89**	**206**	**148**	**Vert**
161.977537	**28.55**	**-1.45**	**26.37**	**-3.63**	**266**	**369**	**Horz**
350.969322	**34.93**	**-2.07**	**33.01**	**-3.99**	**230**	**304**	**Horz**

Configuration:

1) Fully configured.
2) Video 1024 X 786 @ 85Hz

Modifications:

1) None

Test Procedure Definition:

HP Spectrum Analyzer/QP adp.	8566B/85650A
Configuration	WYSE 10M OATS
Frequency Rang	30 - 2000 MHz
Operation to perform	Maximize & Measure
Initial Setting	Table angle: 0 degree
	Tower Height: 100 cm – 400 cm
	Antenna Polarity: Vertical and Horizontal

Comment:

1) H Pattern on Sony 21" monitor screen.
2) Install clamp-on ferrite bead at network cable

Test Engineer: Benton Ng

EUT:

Description	Part No.	Serial No.
IT7200	901998-01	98210506587
Power Supply DVE	DSA-D151D-12	20841

Supporting Devices:

Description	Model	Serial No.	FCC ID
Server HP Brio Computer	81XX	US74852369	DOC
HP keyboard	SK-2501K	M970814311	GYUR387SK
HP mouse	M-S34	LZA72737431	DZL211029
3 Com Hub	TP400	7YPR021705	

Peripherals:

Discription	Model No.	Serial No.	
Sony 21" Monitor	CPD-G500	2701749	DOC
HP USB Printer	C6411B	CN9AC1P11W	DOC
Keyboard	KU8933	OC13002737	DOC
HP Mouse	M-S34	LZC94852914	DZL211029
Microphone	None	None	
Headset speaker	None	None	

Final vertical [11/849]

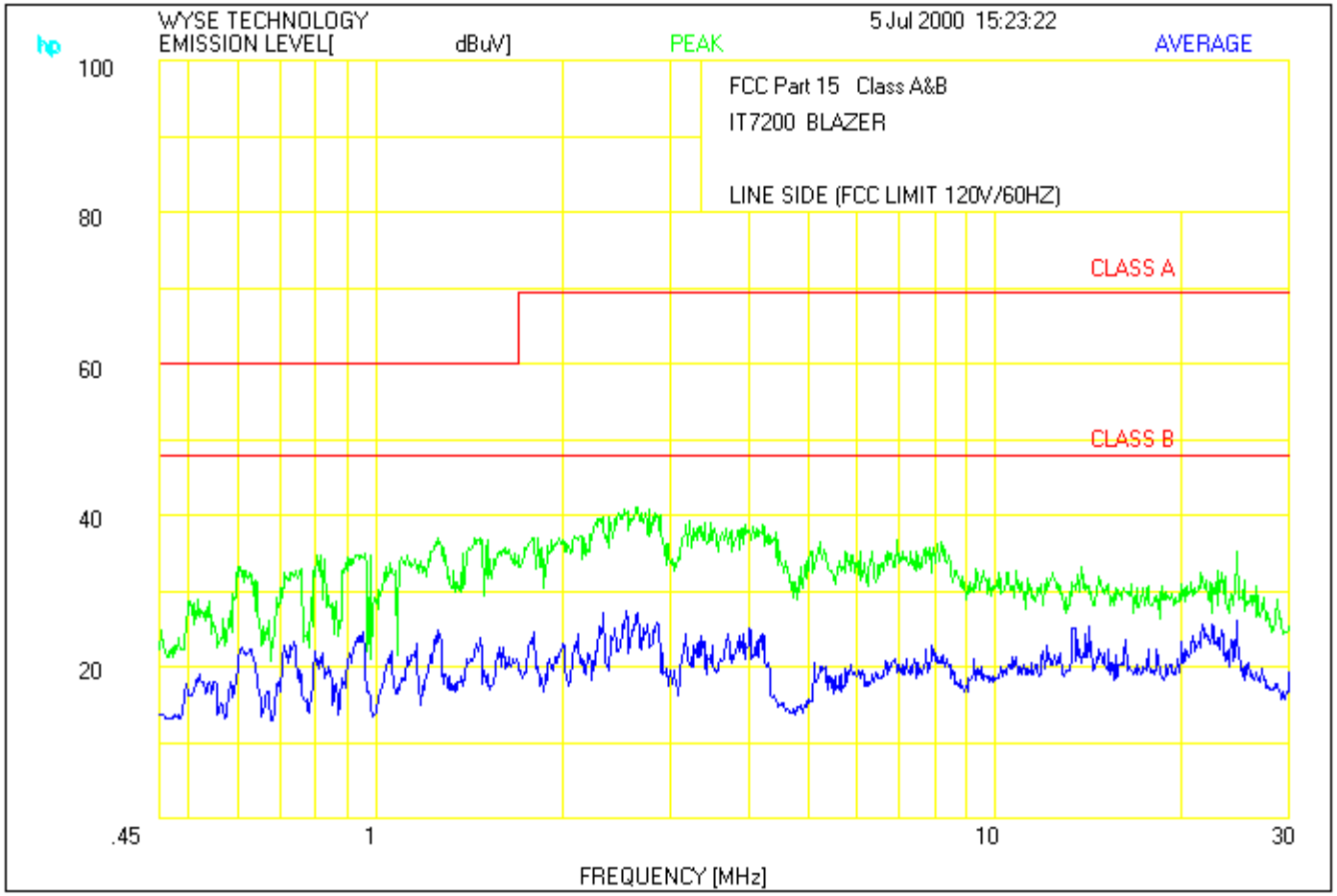
IT7200 (Tested at 10 meter OATS)

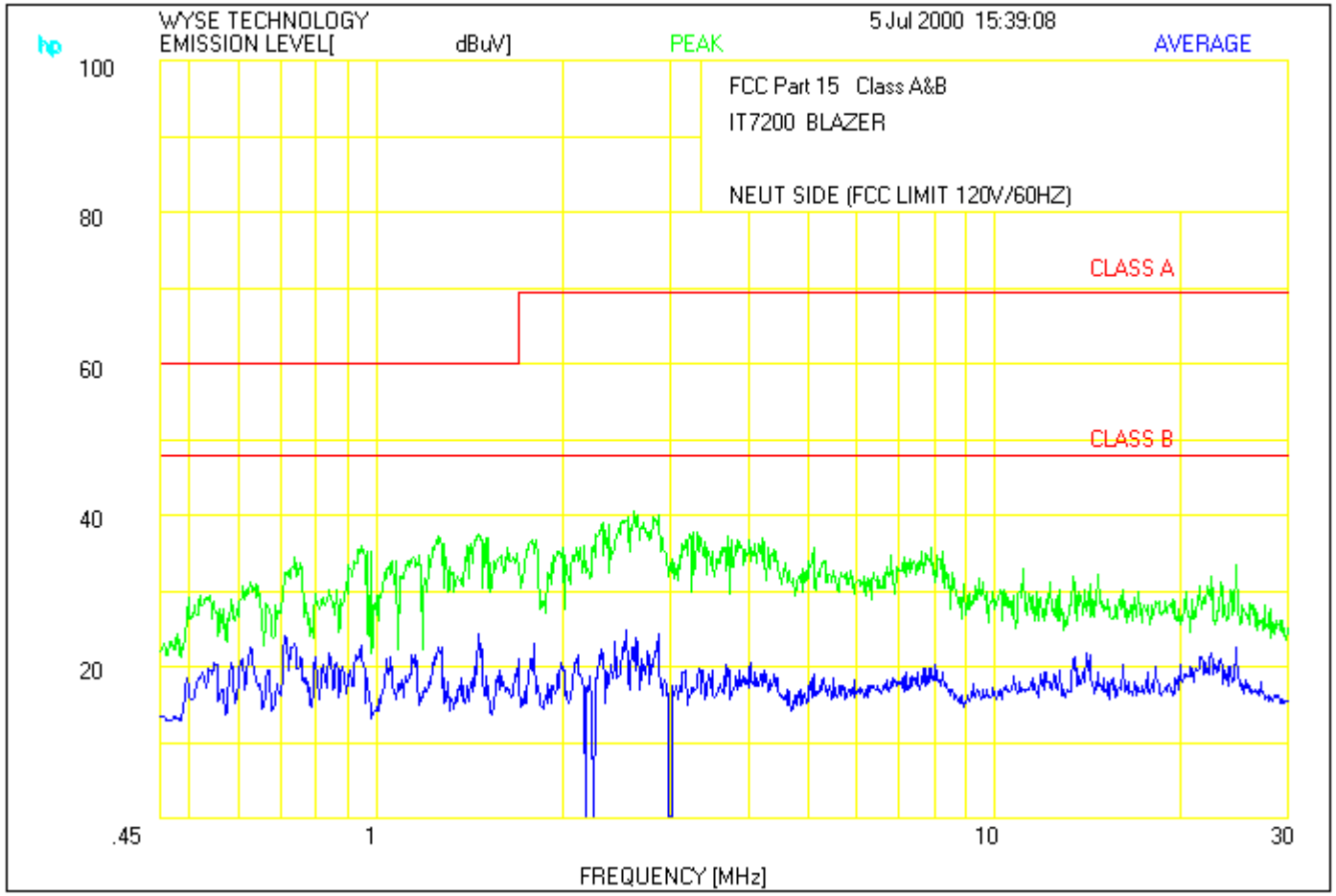
Frequency MHz	Peak dBuV/m	DelLim-Pk dB	QP dBuV/m	DelLim-QP dB	Angle deg	Hgt cm	Pol
36.952170	33.91	3.91	26.01	-3.99	357	317	Vert
43.992557	31.04	1.04	25.76	-4.24	133	101	Vert
148.110383	29.25	-0.75	26.11	-3.89	206	148	Vert
229.669794	29.58	-0.42	21.39	-8.61	0	347	Vert
256.545998	33.80	-3.20	31.62	-5.38	334	94	Vert
337.474867	29.70	-7.30	--.--	--.--	69	237	Vert
350.953512	36.63	-0.37	31.24	-5.76	306	107	Vert
377.941713	28.86	-8.14	--.--	--.--	48	238	Vert
432.048652	30.61	-6.39	25.07	-11.93	304	251	Vert
843.305369	35.53	-1.47	30.16	-6.84	24	113	Vert

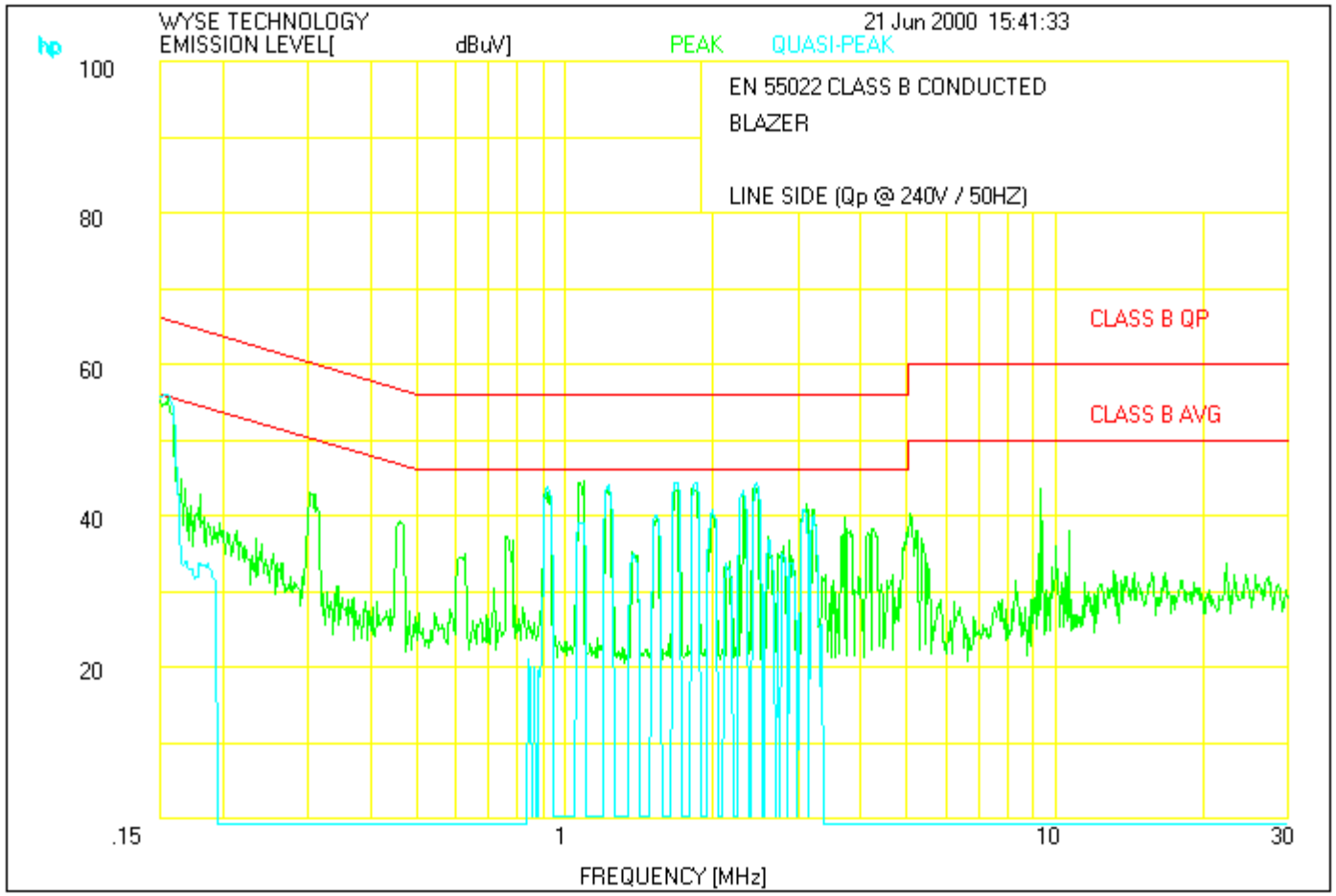
Final Horizontal [12/849]

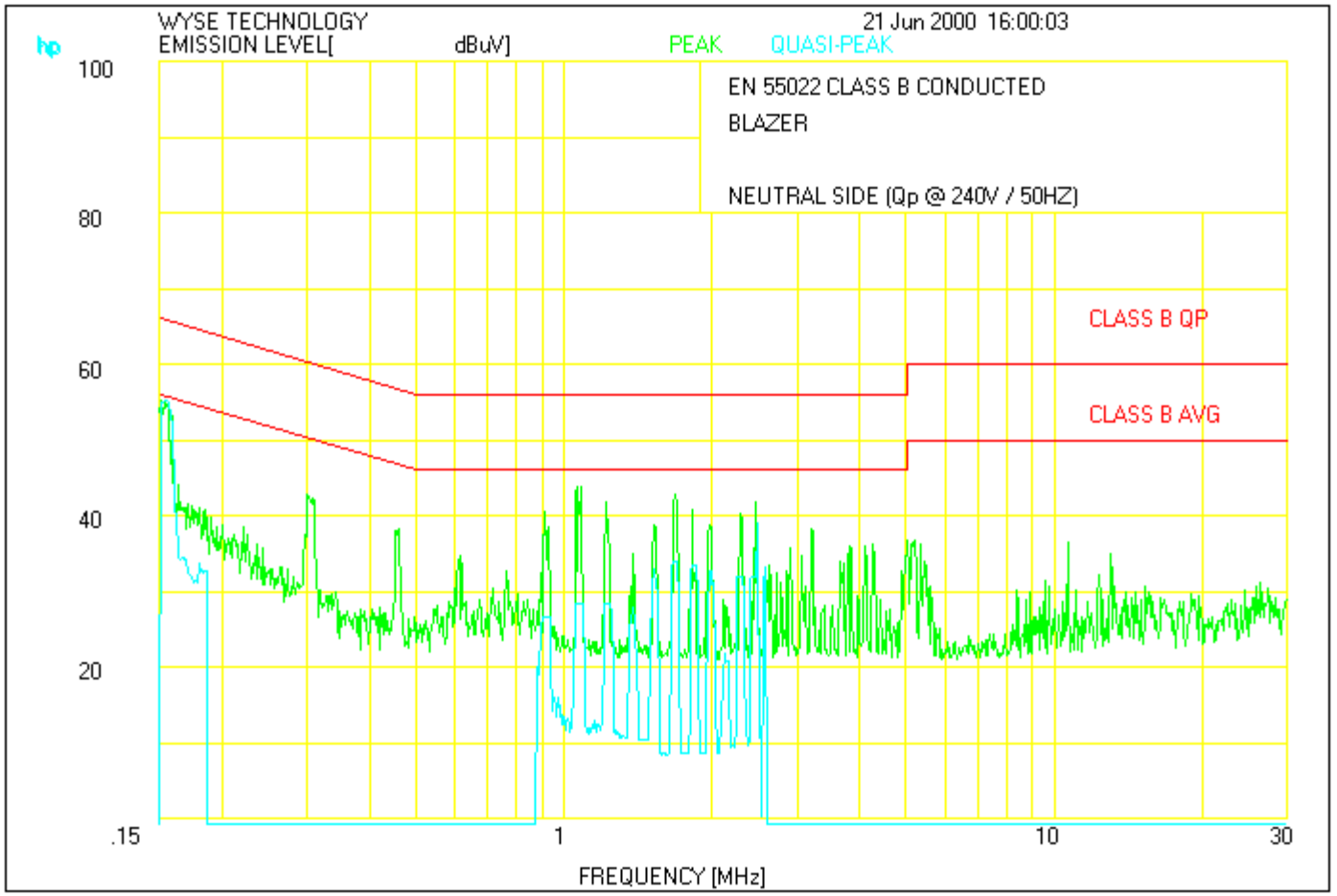
IT7200 (Tested at 10 meter OATS)

Frequency MHz	Peak dBuV/m	DelLim-Pk dB	QP dBuV/m	DelLim-QP dB	Angle deg	Hgt cm	Pol
37.026643	25.61	-4.39	15.26	-14.74	336	400	Horz
43.954993	23.44	-6.56	22.50	-7.50	38	400	Horz
49.217446	20.28	-9.72	--.--	--.--	348	124	Horz
121.510667	28.12	-1.88	25.55	-4.45	24	400	Horz
161.977537	28.55	-1.45	26.37	-3.63	266	369	Horz
256.478242	30.30	-6.70	27.76	-9.24	168	400	Horz
337.496856	28.40	-8.60	--.--	--.--	314	286	Horz
350.969322	34.93	-2.07	33.01	-3.99	230	304	Horz
431.985518	28.71	-8.29	--.--	--.--	288	173	Horz
634.481992	35.10	-1.90	31.09	-5.91	254	400	Horz
843.317860	32.83	-4.17	26.72	-10.28	247	344	Horz


WYSE TECHNOLOGY
EMISSION LEVEL[dBuV]
5 Jul 2000 15:23:22
PEAK
AVERAGE
FCC Part 15 Class A&B
IT7200 BLAZER
LINE SIDE (FCC LIMIT 120V/60HZ)
CLASS A
CLASS B
100
80
60
40
20
.45
1
10
30
FREQUENCY [MHz]


WYSE TECHNOLOGY
EMISSION LEVEL[dBuV]
5 Jul 2000 15:39:08
PEAK
AVERAGE
FCC Part 15 Class A&B
IT7200 BLAZER
NEUT SIDE (FCC LIMIT 120V/60HZ)
CLASS A
CLASS B
100
80
60
40
20
.45
1
10
30
FREQUENCY [MHz]


WYSE TECHNOLOGY
EMISSION LEVEL[dBuV]
21 Jun 2000 15:41:33
PEAK
QUASI-PEAK
EN 55022 CLASS B CONDUCTED
BLAZER
LINE SIDE (Qp @ 240V / 50HZ)
CLASS B QP
CLASS B AVG
100
80
60
40
20
.15
1
10
30
FREQUENCY [MHz]


WYSE TECHNOLOGY
21 Jun 2000 16:00:03
EMISSION LEVEL[dBuV]
PEAK
QUASI-PEAK
EN 55022 CLASS B CONDUCTED
BLAZER
NEUTRAL SIDE (Qp @ 240V / 50HZ)
CLASS B QP
CLASS B AVG
100
80
60
40
20
.15
1
10
30
FREQUENCY [MHz]