

January 13, 2003

WYSE Technology FCC 3M Class B Test Record

for

Window Based Terminal

Model Number: WT9455XL

Tests performed by WYSE Technology

3471 N. First Street, San Jose, CA

Test completed: January 13, 2003

Test Engineer: Jimmy Nguyen

January 13, 2003

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 January 13, 2003 on the model WT9455XL.

1.2 Purpose

Testing was performed to evaluate the emissions performance of the WT9455XL with respect to FCC 3m Class B.

1.3 Summary

The Windows Terminal WT9455XL was found to be compliant to FCC 3m Class B Emission Requirements.

1.4 Testing Requirements

Testing was performed using procedures and criteria contained in FCC 3m.

2.0 TEST ENVIRONMENT

2.1 Test Sample Description

WT9455XL 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 in a 3m Semi-Anechoic Chamber. The description of the **3m Chamber** is filed at the WYSE Regulatory Engineering Department. The Chamber 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.

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2.3 Test Equipment

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

Radiated:

HP Receiver model 85460A (RES BW: 30 KHz-100KHz, VBW: 10KHz – 30KHz)

Conducted:

HP 85650A Quasi-Peak Adapter

HP 85680B 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 2000 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 3 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 2000 MHz is explored. Measurement data is compared to Class **B** limit.

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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 **FCC (3M)** shows that Windows Terminal **WT9455XL** was **2.94 dB** below the limits at the worst case frequency of **35.34 MHz** in a Vertical Polarization.

3.5 Product Specification

Model: WT9455XL (Logic Board P/N 770394-01)

Clock Circuit:

U16 = ICS C9725-198

Filters:

33 MHZ CLK Line:

R215-217 = 33 ohms

14 MHZ CLK Line:

C164, 173 = 22 pF

48 MHZ CLK Line:

R240 = 22 ohms

U15 = VIA C3 CPU, 533 EBGA

C61, 72, 59, 65 = 47 pF

R117, 106 124, 122 = 27 ohms

C56, 68 = 27 pF

R120, 126, 113, 119 = 15 Kohms

L12, L17 = BLM1IP 300S

Main Power Filters:

U17 = ISL6524

PL1 = 2uH Choke

C188, C169, 168 = 10 uF Aluminum cap

Video Circuit:

U12 = IC,8601,NORTH BRIDGE

Filters:

L19, 20, 24, 25, 35, 32, 31 = BLM11P600S

C119 = 1 uF

C114 = 1000 pF

B38 = 0.1 uF

CT23 = 10 uF 16V

L40, 41 = BLM11A121S

C187, 192 = 1000 pF

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Termination:

R149, 140, 141, 70, 138, 146, 151 = 22.5 ohms
R242, 233 = 47 ohms

Audio Circuit:

U13 = VIA VT1621A AC97 CODEC and Audio

Filters:

L2, 8, 7, 3, 10, 1 = BLM11P600S
B2, 9, 6, 7, 25, 30, C11, 32, 33 = 0.1 uF
B16, B17 = 0.01 uF
C26, 28, 24, 23, 25 = 0.22 uF
C8, 9 = 27 pF
C7, 6, 22 = 22 pF

Network:

U11 = VIA VT6103 LAN

Filters:

C77, 83, 79, 75, 86 = 0.1 uF
C266, 267 = 47 pF
C73, 74 = 22 pF
R171, 175 = 330 ohms
R156, 159 = 49.9 ohms
CN3B = Conn, RJ45, 8P

Radiated Emission Test

3m Chamber

WYSE Technology Inc.

3471 North 1st Street

San Jose Ca 95134

Test Description:

EUT: WT9455XL

Serial No. PP#1

Part No. 902064-01

File No. 011303#1

Test Type:

EN55022

EN55022

FCC-A { } FCC-B { x } CISPR-A { } CISPR-B { }

PASS: X

FAIL:

Debug:

Frequency MHz	Peak dV/m	DelLim-Pk dB	QP dBuV/m	DelLim-QP dB	Angle deg	Hgt cm	Pol
34.633790	39.55	-0.45	36.17	-3.83	106	357	Vert
35.347167	38.77	-1.23	37.06	-2.94	100	357	Vert

Configuration:

1) Fully configured (HD, PCI card and CD-ROM)

2) Video 1024X768 @ 85Hz

Modifications:

1. Adding GND cable to chassis and 0.1UF from Pwr to GND
2. GND front USB connector top to Chassis GND
3. Using shielded cable for USB wires

Test Procedure Definition:

EMI Receiver	Model: 85460A	(Cal. Date: 09 May 2002)
	SN: 3807A11445	(Cal. Due Date: 09 May 2003)
Emco Biog Ant. (Type2)	Model: 3142	(Cal Date: Aug. 19 2002)
	SN: 1048	(Cal Due Date: Aug. 19 2003)
Configuration	WYSE 3M Chamber	
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) Installed Bead On 10/100 Base T

EUT:

Description	Part No.	Serial No.	FCC ID:
WT9455XL Power adapter	902064-01 LSE9802A1255	TBA RD0223000007	TBA

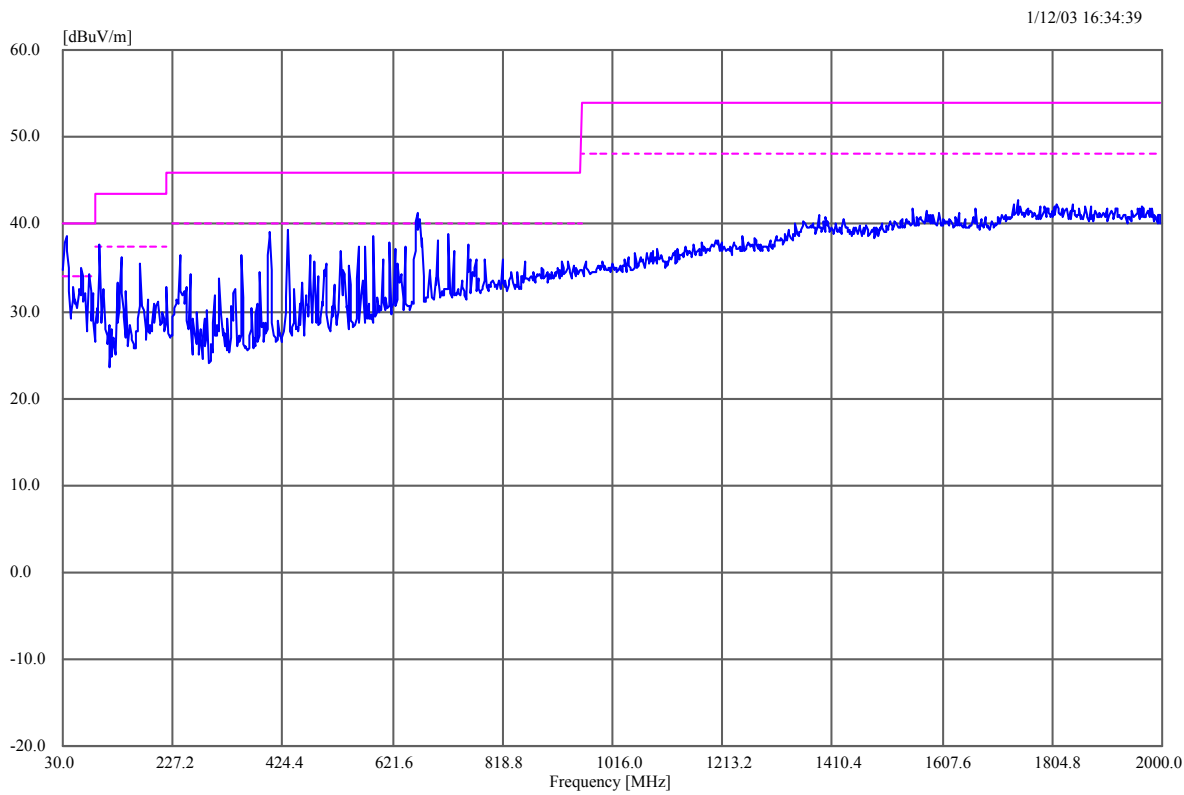
Supporting Devices:

Description	Part 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

Peripherals:

Description	Part No.	Serial No.	FCC ID:
Sony 21" Monitor	CPD-G500	CN9AC1811W	DOC
HP Parallel Printer	812C	MX97GW196	DOC
US ROBOTICS-Serial port	144000 MODEM	0002680214407879	CJE0265
Wyse Keyboard (PS2)	KU-3923	1F11100209	E8HKB5923
Wyse mouse (PS2)	M-S48A	HCA23504935	JNZ201213
Compaq Mouse (USB Wheel)	M-U48A	F29690AMSN205L0	JNZ211360
Compaq Mouse (USB Wheel)	M-U48A	F29690AMSNA0EK8	JNZ211360
Compaq Mouse (USB Wheel)	M-U48A	F29690AMSN503L0	JNZ211360
Compaq Mouse (USB)	M-U34	F48920A5BNF01BK	JNZ211374
Headset and Microphone	None	None	

Composite Trace

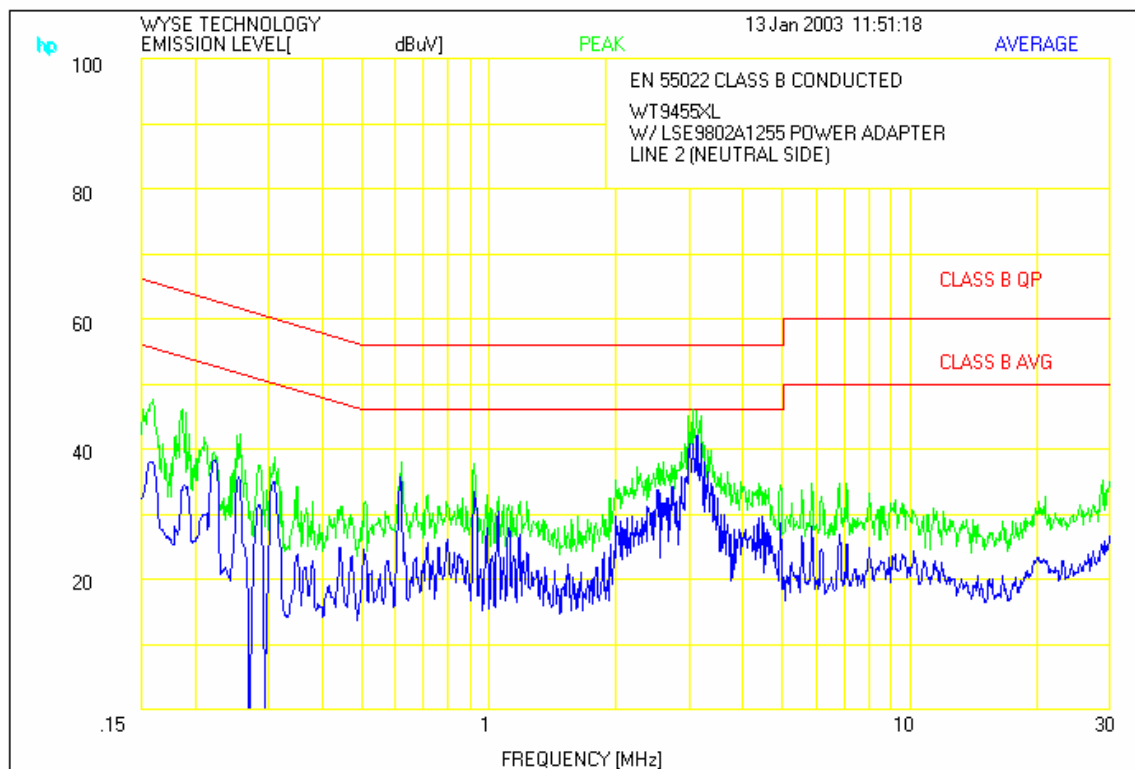
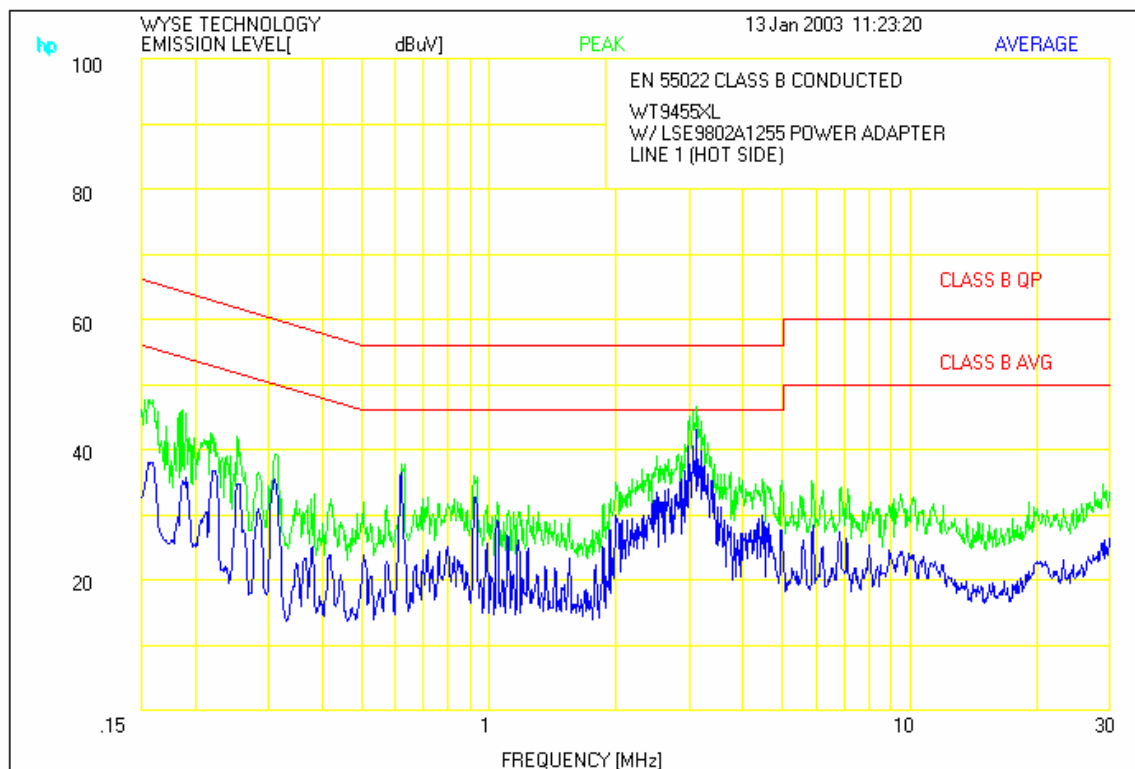


Final Data [129/849]

Frequency MHz	Peak dBuV/m	DelLim-Pk dB	QP dBuV/m	DelLim-QP dB	Hgt cm	Angle deg	Pol
34.633790	39.55	-0.45	36.17	-3.83	106	357	Vert
35.347167	38.77	-1.23	37.06	-2.94	100	357	Vert
37.189595	30.98	-9.02	--.--	--.--	104	358	Vert
37.653966	31.48	-8.52	--.--	--.--	114	358	Vert
47.089055	29.45	-10.55	--.--	--.--	148	358	Vert
47.817694	30.21	-9.79	--.--	--.--	127	358	Vert
48.478024	26.93	-13.07	--.--	--.--	148	358	Vert
51.665819	28.82	-11.18	--.--	--.--	127	358	Vert
53.532957	30.15	-9.85	--.--	--.--	100	358	Vert
58.743324	33.16	-6.84	--.--	--.--	102	186	Vert
61.648225	32.83	-7.17	--.--	--.--	102	65	Vert
62.237449	37.00	-3.00	31.80	-8.20	102	2	Vert
62.499994	36.24	-3.76	31.48	-8.52	163	-1	Vert
62.918127	36.44	-3.56	31.32	-8.68	102	31	Vert
63.727521	33.73	-6.27	--.--	--.--	102	200	Vert
64.308501	33.64	-6.36	--.--	--.--	102	263	Vert
64.767170	32.52	-7.48	--.--	--.--	102	44	Vert
66.265487	30.58	-9.42	--.--	--.--	102	144	Vert
68.436517	32.96	-7.04	--.--	--.--	102	179	Vert
69.785692	31.07	-8.93	--.--	--.--	102	3	Vert
70.202865	29.57	-10.43	--.--	--.--	118	3	Vert
70.828625	28.85	-11.15	--.--	--.--	190	3	Vert
75.991142	31.00	-9.00	--.--	--.--	118	3	Vert
76.564755	33.87	-6.13	--.--	--.--	201	3	Vert
77.216588	31.65	-8.35	--.--	--.--	102	3	Vert
81.467695	29.56	-10.44	--.--	--.--	102	158	Vert
82.061235	31.69	-8.31	--.--	--.--	102	130	Vert
82.714128	29.54	-10.46	--.--	--.--	102	165	Vert
84.554101	30.32	-9.68	--.--	--.--	398	84	Horz
90.608205	31.72	-11.78	--.--	--.--	102	249	Vert
93.605170	22.88	-20.62	--.--	--.--	124	-3	Vert
94.390232	27.30	-16.20	--.--	--.--	103	-3	Vert
96.018509	35.27	-8.23	--.--	--.--	102	92	Horz
98.402772	23.34	-20.16	--.--	--.--	135	-3	Vert
100.583500	24.17	-19.33	--.--	--.--	103	-3	Vert
101.135951	28.15	-15.35	--.--	--.--	225	358	Horz
101.804708	31.82	-11.68	--.--	--.--	103	-3	Vert
102.037319	24.51	-18.99	--.--	--.--	114	-3	Vert
102.560693	26.87	-16.63	--.--	--.--	285	358	Horz
105.059861	26.55	-16.95	--.--	--.--	191	-3	Horz
106.727284	28.06	-15.44	--.--	--.--	102	114	Vert
108.734367	27.35	-16.15	--.--	--.--	162	69	Horz
110.803206	25.10	-18.40	--.--	--.--	102	185	Vert
111.606039	27.41	-16.09	--.--	--.--	102	241	Vert
114.755616	28.50	-15.00	--.--	--.--	398	76	Horz
116.748308	22.72	-20.78	--.--	--.--	102	148	Horz
120.029715	25.30	-18.20	--.--	--.--	102	78	Horz
121.518756	28.45	-15.05	--.--	--.--	104	-2	Vert
125.020762	33.64	-9.86	--.--	--.--	98	-2	Vert
131.528728	33.89	-9.61	--.--	--.--	144	-2	Horz
131.707037	33.13	-10.37	--.--	--.--	211	-2	Horz
132.878782	36.74	-6.76	--.--	--.--	182	-2	Horz
133.057091	35.28	-8.22	--.--	--.--	153	-2	Horz
133.464654	35.48	-8.02	--.--	--.--	133	-2	Horz

133.897691	34.75	-8.75	--.--	--.--	182	-2	Horz
134.101472	32.93	-10.57	--.--	--.--	192	-2	Horz
138.890343	28.15	-15.35	--.--	--.--	221	-2	Horz
144.019434	31.69	-11.81	--.--	--.--	102	269	Horz
145.989595	25.58	-17.92	--.--	--.--	102	113	Horz
148.555989	23.72	-19.78	--.--	--.--	102	77	Horz
149.411454	23.98	-19.52	--.--	--.--	99	-3	Vert
151.822308	24.40	-19.10	--.--	--.--	102	325	Horz
163.813413	27.09	-16.41	--.--	--.--	102	332	Vert
166.009510	27.92	-15.58	--.--	--.--	102	358	Vert
166.899819	27.45	-16.05	--.--	--.--	102	312	Vert
167.582390	28.69	-14.81	--.--	--.--	102	358	Vert
169.333332	31.32	-12.18	--.--	--.--	117	-2	Horz
169.570747	30.58	-12.92	--.--	--.--	196	-2	Horz
172.122968	27.78	-15.72	--.--	--.--	102	340	Vert
173.280370	26.89	-16.61	--.--	--.--	102	347	Vert
174.302954	30.27	-13.23	--.--	--.--	102	140	Horz
180.935800	31.66	-11.84	--.--	--.--	130	358	Horz
192.611378	33.16	-10.34	--.--	--.--	136	-2	Horz
199.247041	28.51	-14.99	--.--	--.--	204	-2	Horz
200.622727	23.24	-20.26	--.--	--.--	399	196	Horz
215.987914	34.30	-9.20	--.--	--.--	102	312	Horz
240.008817	36.71	-9.29	--.--	--.--	107	-2	Horz
240.323605	26.87	-19.13	--.--	--.--	150	-2	Horz
250.019078	29.43	-16.57	--.--	--.--	102	161	Vert
256.475716	32.47	-13.53	--.--	--.--	102	255	Horz
268.608305	21.90	-24.10	--.--	--.--	399	288	Horz
283.438027	27.67	-18.33	--.--	--.--	102	55	Horz
288.021184	30.95	-15.05	--.--	--.--	102	304	Horz
299.973270	27.84	-18.16	--.--	--.--	105	-3	Horz
310.510755	38.12	-7.88	--.--	--.--	102	289	Horz
335.987724	28.64	-17.36	--.--	--.--	399	254	Horz
337.450356	29.94	-16.06	--.--	--.--	134	-3	Horz
350.989011	40.70	-5.30	38.83	-7.17	102	184	Horz
384.146055	29.10	-16.90	--.--	--.--	104	358	Horz
398.448247	41.76	-4.24	36.83	-9.17	102	59	Horz
399.080578	39.53	-6.47	--.--	--.--	102	44	Horz
399.602608	39.58	-6.42	--.--	--.--	102	30	Horz
400.026757	38.89	-7.11	--.--	--.--	102	186	Horz
400.441556	42.85	-3.15	38.18	-7.82	102	189	Horz
400.956464	42.57	-3.43	37.65	-8.35	102	55	Horz
401.654695	42.95	-3.05	38.11	-7.89	102	202	Horz
402.294321	35.26	-10.74	--.--	--.--	102	51	Horz
432.060763	38.55	-7.45	--.--	--.--	104	1	Horz
445.487606	33.82	-12.18	--.--	--.--	102	332	Horz
458.154040	33.68	-12.32	--.--	--.--	104	-3	Horz
472.487310	36.82	-9.18	--.--	--.--	102	303	Horz
474.998351	29.83	-16.17	--.--	--.--	102	64	Horz
480.122924	34.36	-11.64	--.--	--.--	102	126	Horz
486.803670	32.91	-13.09	--.--	--.--	102	332	Vert
499.388224	34.01	-11.99	--.--	--.--	102	323	Horz
501.086401	37.79	-8.21	--.--	--.--	102	314	Horz
501.552802	34.96	-11.04	--.--	--.--	102	314	Horz
528.106697	35.62	-10.38	--.--	--.--	102	183	Vert
531.323536	34.24	-11.76	--.--	--.--	102	190	Vert
544.054642	34.27	-11.73	--.--	--.--	102	170	Horz
558.382401	37.33	-8.67	--.--	--.--	102	319	Vert
572.710159	38.11	-7.89	--.--	--.--	102	214	Horz
587.018351	39.57	-6.43	--.--	--.--	102	21	Vert
601.319295	35.39	-10.61	--.--	--.--	113	-3	Vert

615.681588	38.70	-7.30	--.--	--.--	131	358	Vert
624.109988	37.58	-8.42	--.--	--.--	102	1	Vert
644.276028	36.64	-9.36	--.--	--.--	102	261	Horz
662.527866	36.12	-9.88	--.--	--.--	102	232	Vert
663.153360	38.52	-7.48	--.--	--.--	152	358	Vert
663.325910	38.96	-7.04	--.--	--.--	152	358	Vert
664.037679	39.20	-6.80	--.--	--.--	152	358	Vert
664.598466	38.61	-7.39	--.--	--.--	171	358	Vert
664.965135	38.60	-7.40	--.--	--.--	152	358	Vert
666.194554	37.08	-8.92	--.--	--.--	171	358	Vert
668.718098	37.98	-8.02	--.--	--.--	191	358	Vert
672.938792	36.98	-9.02	--.--	--.--	102	183	Horz
701.560791	34.71	-11.29	--.--	--.--	230	358	Vert
720.214028	37.94	-8.06	--.--	--.--	102	347	Horz
755.983283	31.39	-14.61	--.--	--.--	102	221	Vert



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2. CONDUCTED no Preselector

2.3 EN 55022 (1995)

Class B

WT9455XL

LINE 1 (HOT SIDE)

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10 highest Avg Peaks above -15 dB of Limit Line #2
peak criteria = 6 dB

PEAK#	FREQ (MHz)	(dBuV)	DELTA
1	3.114	43	-3.0
2	2.985	40.6	-5.4
3	3.048	40.4	-5.6
4	.6197	36.4	-9.6
5	2.861	35.5	-10.5
6	2.671	33.9	-12.1
7	2.506	33.4	-12.6
8	2.533	32.8	-13.2
9	.9265	32.6	-13.4
10	.3114	35.4	-14.5

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2. CONDUCTED no Preselector

2.3 EN 55022 (1995)

Class B

WT9455XL

LINE 2 (NEUTRAL SIDE)

=====

10 highest Avg Peaks above -15 dB of Limit Line #2
peak criteria = 6 dB

PEAK#	FREQ (MHz)	(dBuV)	DELTA
1	3.114	42	-4.0
2	3.248	37.9	-8.1
3	.6164	35.6	-10.4
4	2.742	34.3	-11.7
5	2.506	33.7	-12.3
6	.9265	33.4	-12.6
7	2.642	32.4	-13.6
8	.2219	38.3	-14.4