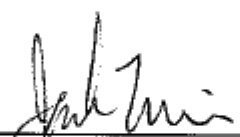
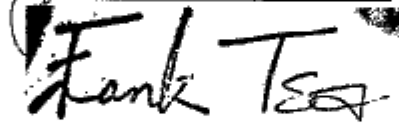


Report No.	T5415396	
Specifications	FCC Part 15.109(g), CISPR 22, Class B	
Test Method	ANSI C63.4 1992	
Applicant address	Plot No.34, Developed Plots, South Phase Industrial Estate, Guindy, Chennai, Tamilnadu, India 600 032	
Applicant	TVS ELECTRONICS LTD.	
Items tested	Printer	
Model No.	MSP245 (Sample # T54436)	
Results	Compliance (As detailed within this report)	
Date	07/26/2001 (month / day / year) (Sample received) 09/29/2001 (month / day / year) (Test)	
Prepared by		Project Engineer
Authorized by		General Manager (Frank Tsai)
Issue date	October 3, 2001	(month / day / year)
Modifications	Appendix C	
Tested by	Training Research Co., Ltd.	
Office at	2, Lane 194, Huan-Ho Street, Hsichih, Taipei Hsien 221, Taiwan	
Open site at	No. 5-3, Lane 21, Yen Chiu Yuan Rd., Sec. 4, Taipei, Taiwan	

Conditions of issue :

- (1) This test report shall not be reproduced except in full, without written approval of TRC. And the test result contained within this report only relate to the sample submitted for testing.
- (2) This report must not be used by the client to claim product endorsement by NVLAP or any agency of U.S. Government.

★ FCC ID : OSCMSP-245

Contents

CHAPTER 1	INTRODUCTION	3
	Description of EUT.....	3
	Connections of EUT	3
	Test method	3
	Configuration of Test Setup.....	4
	Connections	5
	List of Support Equipment.....	6
CHAPTER 2	CONDUCTED EMISSION TEST.....	8
	Test condition and setup	8
	List of test Instrument.....	8
	Conducted Test Placement: (Photographs).....	9
CHAPTER 3	RADIATED EMISSION TEST.....	10
	Test condition and setup	10
	List of test Instrument.....	11
	Radiated Test Placement: (Photographs).....	12
APPENDIX A.....		13
	Conducted Emission Test Result	13
APPENDIX B		14
	Radiated Emission Test Result (Horizontal)	14
	Radiated Emission Test Result (Vertical).....	15
APPENDIX C.....		16
	List of Modifications	16

Chapter 1 Introduction

Description of EUT

This device is printing data equipment. It is designed to connect with a compatible computer via parallel interface.

Connections of EUT

- (1)The power port of EUT is connected with the AC power source via a power cable.
- (2)The parallel port of EUT is connected with the parallel port of personal computer.

Test method

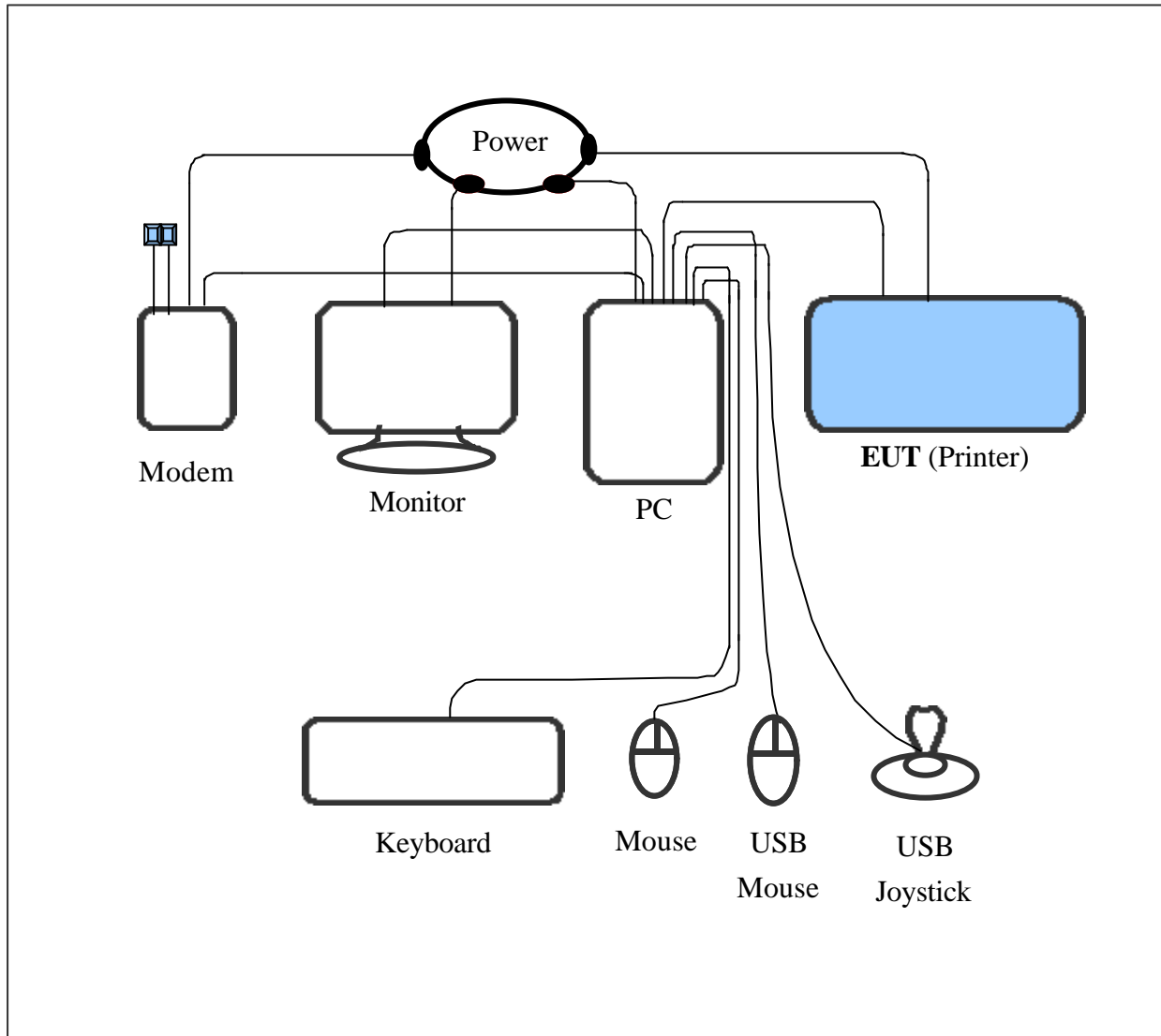
Pretest was found that the emission of operating mode is worse than standby mode. So, The final test is made at the operating mode.

During testing, the EUT was operated at printing mode continuously.

The test placement as the photographs showed is the worst case emission placed. (If the emission is close to the ambient, the resolution BW and view resolution will be reduced and the data will be recorded by detection of maximum hold peak mode.)

The testing configuration of test setup is showing in the next page.

Configuration of Test Setup



Connections

PC:

*Serial Port --- an external modem

*Printer Port --- **EUT**

*Monitor Port --- a monitor

*Keyboard Port --- a keyboard

*Mouse Port --- a mouse

*USB A Port --- a USB mouse

*USB B Port --- a USB joystick

(Each port on PC is connected with suitable device)

EUT:

*Power cable x 1

--- 223cm long, non-shielded, no ferrite core

*Data Cable x 1

--- 142cm long, shielded, no ferrite core

List of Support Equipment

Conducted (Radiated) test:

PC : **HP Brio 8410 6/350**
Model No. : D6928A
Serial No. : TW90400174
FCC ID : N/A (Doc Approved)
檢磁 : 3872H013
Power type : 100 ~ 230VAC / 50 ~ 60Hz, 5A, Switching
Power cord : Non-shielded, 2.30m long, Plastic, No ferrite core

Monitor : **ACER 15' Color Display**
Model No. : 1555
Serial No. : 917160230583601429P5C431
FCC ID : JVP7254E
檢磁 : 4872A030
Power type : 110 ~ 240 VAC / 50 ~ 60 Hz, Switching
Power cord : Shielded, 1.80m long, No ferrite core
Data cable : Shielded, 1.34m long, with ferrite core

Keyboard : **HP**
Model No. : SK-2501K
Serial No. : M981216213
FCC ID : GYUR38SK
檢磁 : 3862A621
Power type : By PC
Data cable : Shielded, 1.70m long, with ferrite core

Mouse : HP
Model No. : M-S34
Serial No. : LZC84446151
FCC ID : DZL211029
檢磁 : 4862A011
Power type : By PC
Power cord : Non-shielded, 1.80m long, No ferrite core

Modem : ACEEX
Model No. : XDM-56V14
FCC ID : IFAXDM-56V14
Power type : Linear
Power cord : Non-shielded, 1.9m long, No ferrite cord
Data cable : RS232, Shielded, 1.2m long, No ferrite core
RJ11C x 2, 7' long non-shielded, No ferrite core

USB Mouse : Logitech
Model No. : M-BA47
Serial No. : LZE92250027
FCC ID : N/A, Doc Approved
檢磁 : 4872A220
Power type : Powered by PC
Power Cable : Shielded, 1.5m long, Plastic hoods, No ferrite bead

USB Joystick : Padix
Model No. : QF-305U
Serial No. : 8100848
FCC ID : N/A, Doc Approval
Power type : Powered by PC
Power Cable : Shielded, 1.5m long, No ferrite bead data cable

Chapter 2 Conducted Emission Test

Test condition and setup

All the equipment is placed and setup according to the CISPR 22.

Power Line: The EUT is assembled on a wooden table, which is 80 cm high, is placed 40 cm from the back-wall, which is a vertical conducting plane. One LISN is for EUT, the other LISN is for support equipment. They are all placed on the conductive ground. The EUT's LISN connect a line switch box for selecting L1 or L2, then connect to a preamplifier and spectrum.

The spectrum scans from 150KHz to 30MHz. Conducted emission levels are detected at max. peak mode . But if the max. peak mode failed or over average limit, it will be measured by average detection mode.

While testing, there is the worst-emission plot printed at peak detection mode, and there are more than 6 highest emissions relative to limit recorded. The plot is kept as the original data, not included in test report.

List of test Instrument

<u>Instrument Name</u>	<u>Model No.</u>	<u>Brand</u>	<u>Serial No.</u>	<u>Calibration Date</u>	
				<u>Last time</u>	<u>Next time</u>
Spectrum analyzer	8591EM	H P	3710A01203	02/22/01	02/22/02
Pre-selector (<30MHz)	AMP-01	TRC	REP-001	08/09/01	08/09/02
LISN (EUT)	TRC LISN01	TRC	LISN-01	08/21/01	08/21/02
LISN (Support E.)	LISN01	TRC	9912-01, 02	12/18/00	12/18/01

The level of confidence of 95%, the uncertainty of measurement of conducted emission is ± 2.4 dB.

Test Result: Pass (Appendix A)

Conducted Test Placement: (Photographs)



Chapter 3 Radiated Emission Test

Test condition and setup

Pretest: Prior to the final test (OATS test), the EUT is placed in a shielded enclosure, and scan from 30MHz to 1GHz. This is done to ensure the radiation is exactly emitted from the EUT.

Final test: Final radiation measurements is made on a **10 – meter**, open-field test site. The EUT is placed on a nonconductive table, which is 0.8m height, the top surface is 1.0 x 1.5 meter. All the placement is according to CISPR 22.

The spectrum is examined from 30 MHz to 1000 MHz measured by HP spectrum.

The range Antenna is used to measure frequency from 30 MHz to 1GHz. The final test is used the spectrum analyzer.

Measure more than six top marked frequencies generated form pretest by computer step by step at each frequency. The EUT is rotated 360 degrees, and antenna is raised and lowered from 1 to 4 meters to find the maximum emission levels. The antenna is used with both horizontal and vertical polarization.

Appropriated preamplifier which is made by TRC is used for improving sensitivity and precautions is taken to avoid overloading .The spectrum analyzer's 6dB bandwidth is set to 120 K Hz , and the EUT is measured at quasi-peak mode.

If the emission is close to the frequency band of ambient, the tester will recheck the data and the corrected data will be written in the test data sheet. If the emission is just within the ambient, the data from shielded room will be taken as the final data.

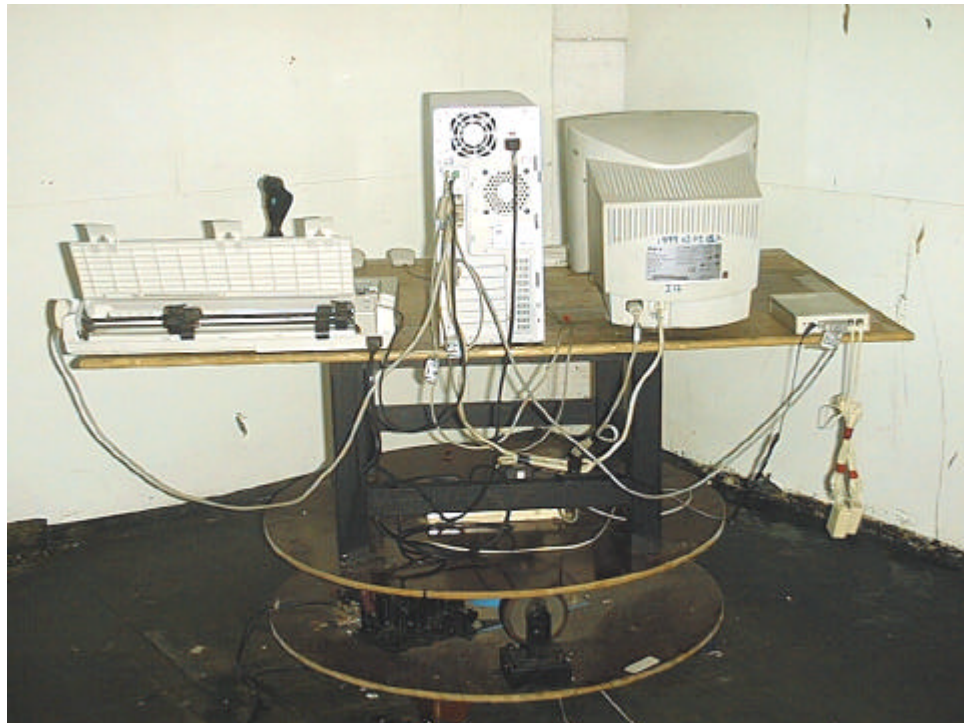
List of test Instrument

<u>Instrument Name</u>	<u>Model No.</u>	<u>Brand</u>	<u>Serial No.</u>	Calibration Date	
				<u>Last time</u>	<u>Next time</u>
Spectrum analyzer	8591EM	H P	3619A01203	02/22/01	02/22/02
Pre-selector (>30MHz)	AMP-01	TRC	REP-001	10/02/00	10/02/01
Spectrum analyzer	8568B	H P	3004A18617	06/04/01	06/04/02
Quasi-peak Adapter	85650A	H P	2521A00984	06/04/01	06/04/02
RF Pre-selector	85685A	H P	2947A01011	06/05/01	06/05/02
RF Pre-selector	AMP-01	TRC	REP-002	10/02/00	10/02/01
Bi-log Antenna	VULB9160	M. E.	3064	07/12/01	07/12/02
Antenna (30M-2GHz)	3142	EMCO	9610-1094	10/02/00	10/02/01
Open test side (Antenna, Amplify, cable calibrated together)				05/20/01	05/20/02

The level of confidence of 95% , the uncertainty of measurement of radiated emission is ± 4.96 dB .

Test Result: Pass (Appendix B)

Radiated Test Placement: (Photographs)



Appendix A

Conducted Emission Test Result

Testing room : Temperature : 27 ° C Humidity : 68 % RH

Line 1

<i>Frequency (KHz)</i>	<i>READING AMPLITUDE</i>			<i>LIMIT</i>		<i>Margin (dB)</i>
	<i>Peak (dBmV/m)</i>	<i>Quasi-Peak (dBmV/m)</i>	<i>Average (dBmV/m)</i>	<i>Quasi-Peak (dBmV/m)</i>	<i>Average (dBmV/m)</i>	
151.00	47.26	---	---	65.97	55.97	-8.71
597.00	39.27	---	---	56.00	46.00	-6.73
675.00	40.53	---	---	56.00	46.00	-5.47
749.00	40.60	---	---	56.00	46.00	-5.40
904.00	39.09	---	---	56.00	46.00	-6.91
1127.00	39.39	---	---	56.00	46.00	-6.61
1507.00	37.44	---	---	56.00	46.00	-8.56
1948.00	37.26	---	---	56.00	46.00	-8.74
3280.00	37.26	---	---	56.00	46.00	-8.74
30000.00	23.53	---	---	60.00	50.00	-26.47

Line 2

<i>Frequency (KHz)</i>	<i>READING AMPLITUDE</i>			<i>LIMIT</i>		<i>Margin (dB)</i>
	<i>Peak (dBmV/m)</i>	<i>Quasi-Peak (dBmV/m)</i>	<i>Average (dBmV/m)</i>	<i>Quasi-Peak (dBmV/m)</i>	<i>Average (dBmV/m)</i>	
1048.00	37.22	---	---	56.00	46.00	-8.78
1127.00	36.80	---	---	56.00	46.00	-9.20
2390.00	37.77	---	---	56.00	46.00	-8.23
2460.00	37.48	---	---	56.00	46.00	-8.52
4330.00	35.92	---	---	56.00	46.00	-10.08
4810.00	37.58	---	---	56.00	46.00	-8.42
14110.00	39.88	---	---	60.00	50.00	-10.12
16150.00	40.33	---	---	60.00	50.00	-9.67
19490.00	40.18	---	---	60.00	50.00	-9.82
23350.00	42.45	---	---	60.00	50.00	-7.55

****The reading amplitudes are all under limit.***

Appendix B

Radiated Emission Test Result (Horizontal)

Test Conditions:

Testing room : Temperature : 27 ° C Humidity : 68 % RH
 Testing site : Temperature : 31 ° C Humidity : 81 % RH

Frequency	Reading Amplitude	Ant. Height	Table	Correction Factors	Corrected Amplitude	Class B Limit	Margin
MHz	dBμV	m	degree	dB/m	dBμV/m	dBμV/m	dB
269.890	33.30	4.00	3	-10.43	22.87	37.00	-14.13
289.881	36.70	2.56	78	-9.30	27.40	37.00	-9.60
299.877	32.10	4.00	255	-9.00	23.10	37.00	-13.90
306.541	39.30	4.00	77	-8.83	30.47	37.00	-6.53
313.206	36.80	4.00	10	-8.66	28.14	37.00	-8.86
480.000	26.60	1.00	75	-3.40	23.20	37.00	-13.80
498.831	27.20	2.56	59	-3.31	23.89	37.00	-13.11
528.000	26.70	4.00	4	-2.29	24.41	37.00	-12.59

Note:

1. Margin = Amplitude – limit, *if margin is minus means under limit.*
2. Corrected Amplitude = Reading Amplitude + Correction Factors
3. Correction factor = Antenna factor + (Cable Loss – Amplitude gain)
 (For example: 30MHz correction factor = 15.5 + (-15.26) = 0.24 dB/m)

Radiated Emission Test Result (Vertical)

Frequency	Reading Amplitude	Ant. Height	Table	Correction Factors	Corrected Amplitude	Class B Limit	Margin
MHz	dBμV	m	degree	dB/m	dBμV/m	dBμV/m	dB
34.810	38.70	4.00	100	-15.64	23.06	30.00	-6.94
66.647	37.30	1.00	142	-14.96	22.34	30.00	-7.66
89.967	37.10	4.00	196	-16.40	20.70	30.00	-9.30
123.284	31.30	2.54	114	-12.17	19.13	30.00	-10.87
139.948	29.10	1.00	302	-11.70	17.40	30.00	-12.60
179.926	30.70	1.00	257	-12.29	18.41	30.00	-11.59
223.248	37.00	1.00	297	-13.81	23.19	30.00	-6.81
240.000	39.80	1.00	266	-12.10	27.70	37.00	-9.30
269.900	39.30	1.00	7	-10.43	28.87	37.00	-8.13

Appendix C

List of Modifications

1. PCB Re-layout.
2. Replace C16 and C17 with 1000pF / 25V \pm 5%, 0805 size capacitor.
3. The metal enclosure and piece of tin is connected by copper piece for contacted.

Please refer to the photograph of EUT

Statement of Applicant:

I acknowledge that the modifications made to the EUT for compliance during testing will be incorporated into mass production units.