

EXHIBIT B

Test Report

Report No.	T5415787	
Specifications Test Method	FCC Part 15, Class B ANSI C63.4 1992	
Applicant address	34, Developed Plots, South Phase Industrial Estate, Guindy, Chennai-600 032	
Applicant Items tested Model No.	TVS Electronics Limited Tamil / English Keyboard TVS GOLD MODEL 104 (Sample # T54787)	
Results Sample received date	Compliance (As detailed within this report) 09/16/99 (month / day / year)	
Prepared by		project engineer
Authorized by		General Manager (Frank Tsai)
Issue date	Oct. 25, 1999	(month / day / year)
Modifications	None	
Tested by	Training Research Co., Ltd.	
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Open site at	No. 5-3, Lane 21, Yen Chiu Yuan Rd., Sec. 4, Taipei, Taiwan	

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★ **FCC ID: OSCTVSGOLD104**

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Chapter 1 Introduction

Description of EUT:

The EUT is designed to be connected with the PS/2 keyboard port of PC.

The EUT offers substantially greater life and enhanced handling comfort along with a string of other value added benefits. In addition to the EUT, the bi-lingual feature is also available in 7 other languages.

Connections of EUT:

- (1) The PS/2 plug of EUT is connected with the keyboard port of PC.

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.

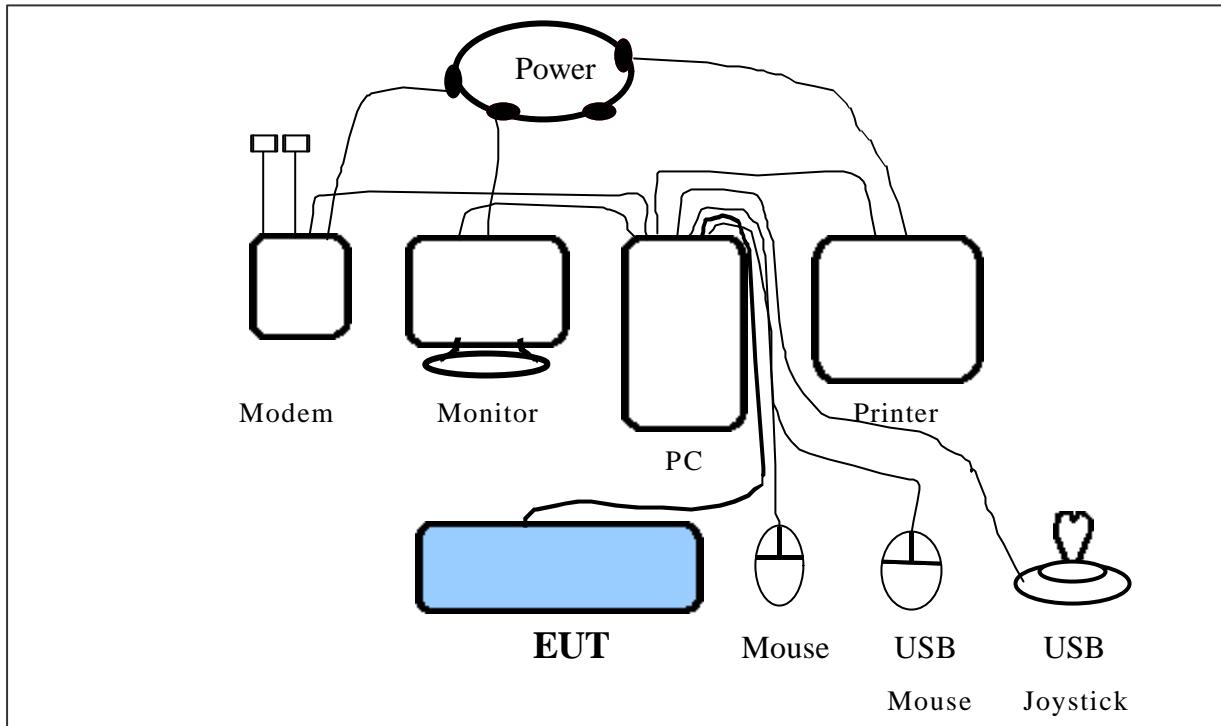
During testing, the EUT was depressed one key continuously. This was done in order to ensure that maximum emission levels were attained.

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 A port --- via a 76 cm shielded RS232 to an external modem
- *Printer port --- a printer with 1.2m length data cable
- *Keyboard port --- EUT
- *Mouse port --- a mouse with 1m length data cable
- *Monitor port --- a monitor with 0.7m long of data cable
- *USB port A --- a joystick with 1.5m long, shielded and no ferrite bead data cable
- *USB port B --- a mouse with 1.5m long, shielded and no ferrite bead data cable

(Each port on PC is connected with suitable device)

EUT:

- *PS/2 plug --- via 135cm long, shielded, no ferrite bead, data cable to the keyboard port of PC.

List of support equipment

Conducted (Radiated) test:

PC : **HP Brio 85xx 6/350**
Model No. : D6928A
Serial No. : SG91801443 (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 : **HP 15' Color Monitor**
Model No. : D2827A (D2832A)
Serial No. : KR91161716 (MY90615892)
FCC ID : C5F7NFCMC1518X (N/A, Doc Approved)
檢磁 : 3872B039 (4872A167)
Power type : 110 ~ 240 VAC / 50 ~ 60 Hz, Switching
Power cord : Shielded, 1.80m long, No ferrite core
Data cable : Shielded, 1.50m long, with two ferrite cores

Mouse : **HP**
Model No. : M-S34
Serial No. : LZC84446151 (LZB90910462)
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-9624
FCC ID : IFAXDM-9624
Power type : 110VAC, 60Hz / 9VAC, 1A
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

Printer : **EPSON**
Model No. : P78PA (P70RA)
Serial No. : 0EE0014030 (10010386)
FCC ID : BKM9A8P70RA
Power type : 110VAC, 60Hz
Power cord : Non-shielded, 2m long, no ferrite core
Data cable : Shielded, 1.84m (1.7m) long, no ferrite core

USB Joystick : **Padix**

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

USB Mouse : **Logitech (Chic)**

Model No. : M-BA47 (CM-USB)
Serial No. : LZE92250027 (N/A)
FCC ID : N/A, Doc Approved
檢磁 : 4872A220 (N/A)
Power type : Powered by PC
Power Cable : Shielded, 1.8m (1.5m) long, Plastic hoods, No ferrite bead

Chapter 2 Conducted emission test

Test condition and setup:

All the equipment is placed and setup according to the ANSI C63.4 - 1992.

The EUT is assembled on a wooden table that 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 450KHz to 30MHz. Conducted emission levels are detected at max. peak mode . But if the max. peak mode failed ,it will be measured by CISPR's quasi-peak 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:

Instrument Name	Model No.	Brand	Serial No.	<u>Calibration Date</u>	
				Last time	Next time
Spectrum analyzer	8591EM	H P	3619A00821	10/29/98	10/29/99
LISN (EUT)	3825/2	EMCO	9411-2284	05/20/99	05/20/00
LISN (Support E.)	3825/2	EMCO	9210-2007	05/20/99	05/20/00
Preamplifier	8447F	H P	2944A03706	05/20/99	05/20/00
Line switch box	AC1-003	TRC	-----	05/20/99	05/20/00
Line selector	AC1-002	TRC	-----	05/20/99	05/20/00

The level of confidence of 95% , the uncertainty of measurement of conducted emission is \pm 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 exactly emits from the EUT.

Final test: Final radiation measurements are made on a **3 - meter**, open-field test site. The EUT is placed on a nonconductive table that is 0.8m height, the top surface is 1.0 x 1.5 meter. All placement is according to ANSI C63.4 - 1992.

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

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

Measure more than six top marked frequencies generated from 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 KHz, and the EUT is measured at quasi-peak mode.

If the emission is close to the frequency band of ambient, the data will be rechecked by the tester and the corrected data will be written in the test data sheet. If the emission is just within the ambient, the data from anechoic chamber 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>	<u>Calibration Date</u>	
				<u>Last time</u>	<u>Next time</u>
Spectrum analyzer	8591EM	H P	3710A01203	01/29/99	01/29/00
Spectrum analyzer	8568B	H P	3004A18617	05/18/99	05/18/00
Quasi-peak Adapter	85650A	H P	2521A00984	05/18/99	05/18/00
RF Pre-selector	85685A	H P	2947A01011	05/18/99	05/18/00
Antenna (30M-1.5G Hz)VULB 9160	M.E.		3064	01/20/99	01/20/00
Open test side (Antenna, Amplify, cable calibrated together)				05/20/99	05/20/00

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 : 23 ° C Humidity : 64 % RH

Line 1

Frequency (KHz)	Peak Amptd (dBmV/m)	QP Amptd (dBmV/m)	Avg Amptd (dBmV/m)	QP Amptd (dBmV/m) ★	QP Limit (dBmV/m)	QP Margin (dBmV/m)
851.00	28.82	***	***	***	48.00	-19.18
1583.00	28.31	***	***	***	48.00	-19.69
2580.00	29.07	***	***	***	48.00	-18.93
14860.00	28.33	***	***	***	48.00	-19.67
15490.00	47.57	***	***	***	48.00	-0.43
16800.00	33.46	***	***	***	48.00	-14.54
19360.00	32.39	***	***	***	48.00	-15.61
23200.00	37.09	***	***	***	48.00	-10.91
26050.00	29.75	***	***	***	48.00	-18.25
27090.00	35.34	***	***	***	48.00	-12.66

Line 2

Frequency (KHz)	Peak Amptd (dBmV/m)	QP Amptd (dBmV/m)	Avg Amptd (dBmV/m)	QP Amptd (dBmV/m)★	QP Limit (dBmV/m)	QP Margin (dBmV/m)
1091.00	29.35	***.**	***.**	***	48.00	-18.65
15490.00	51.10	50.48	30.39	37.48	48.00	-10.52
15930.00	34.60	***.**	***.**	***	48.00	-13.40
16370.00	34.89	***.**	***.**	***	48.00	-13.11
16800.00	36.21	***.**	***.**	***	48.00	-11.79
17820.00	31.21	***.**	***.**	***	48.00	-16.79
19360.00	34.03	***.**	***.**	***	48.00	-13.97
23200.00	35.71	***.**	***.**	***	48.00	-12.29
22050.00	30.27	***.**	***.**	***	48.00	-17.73
27090.00	35.67	***.**	***.**	***	48.00	-12.33

★ Note: According to 15.107(d)

When measured using instrumentation employing a quasi-peak detector function: if the level of the emission measured using the quasi-peak instrumentation is a 6dB, or more, higher than the level of the same emission measured with instrumentation having an average detector and a 9KHz minimum bandwidth, that emission is considered broadband and the level obtained with the quasi-peak detector may be reduced by 13 dB for comparison to the limits.

Appendix B

Radiated Emission Test Result : (Horizontal)

Test Conditions:

Testing room :	Temperature : 30 ° C	Humidity : 64 % RH
Testing site :	Temperature : 32 ° C	Humidity : 80 % RH

Frequency	Reading Amplitude	Ant. Height	Table	Correction Factors	Corrected Amplitude	Class B Limit	Margin
MHz	dB μ V	m	degree	dB/m	dB μ V/m	dB μ V/m	dB

31.330	35.70	4.00	30	-15.32	20.38	40.00	-19.62
54.520	39.20	4.00	67	-13.83	25.37	40.00	-14.63
116.830	39.80	2.56	267	-12.92	26.88	43.50	-16.62
148.020	40.40	2.56	42	-10.72	29.68	43.50	-13.82
163.550	37.10	2.56	204	-10.85	26.25	43.50	-17.25
171.360	39.20	2.56	108	-11.54	27.66	43.50	-15.84
177.730	38.70	4.00	319	-12.22	26.48	43.50	-17.02
186.360	42.00	2.56	24	-12.90	29.10	43.50	-14.40
384.000	32.30	1.00	255	-6.10	26.20	46.00	-19.80

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	Ant.	Table	Correction	Corrected	Class B	Margin
	Amplitude	Height		Factors	Amplitude	limit	
MHz	dB μ V	m	degree	dB/m	dB μ V/m	dB μ V/m	dB

31.330	52.50	1.00	90	-15.32	37.18	40.00	-2.82
40.410	45.80	1.00	35	-13.95	31.85	40.00	-8.15
43.090	46.20	1.00	245	-14.00	32.20	40.00	-7.80
46.980	44.60	1.00	100	-13.94	30.66	40.00	-9.34
50.920	42.70	4.00	311	-13.80	28.90	40.00	-11.10
54.820	44.30	1.00	126	-13.83	30.47	40.00	-9.53
147.170	45.20	4.00	178	-10.79	34.41	43.50	-9.09
384.000	36.10	1.00	36	-6.10	30.00	46.00	-16.00
748.230	28.60	2.57	29	3.58	32.18	46.00	-13.82

Final statement:

This test report, measurements made by TRC are traceable to the NIST.