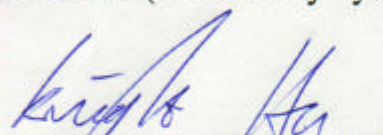
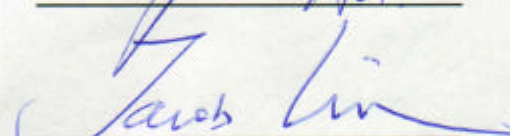
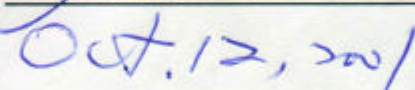


***EXHIBIT B***  
***Test Report***

Report No.	T5415462
FCC ID	OSCSU-CLASSIC500
Specifications	FCC Part 15.109(g), CISPR 22, Class B
Test Method	ANSI C63.4 1992
Applicant	TVS Electronics Limited
Applicant address	34, Developed plots, South Phase, Industrial Estate, Guindy, Chennai – 600 032.
Items tested	UPS (Sample # T54461)
Model No.	SU-CLASSIC 500
Results	<b>Compliance</b> (As detailed within this report)
Date	07/30/2001 (month / day / year)(Sample received) 09/27/2001 (month / day / year)(Tested)
Prepared by	 project engineer
Authorized by	 V. General Manager (Jacob Lin)
Issue date	 (month / day / year)
Modifications	None
Tested by	Training Research Co., Ltd.
Office at	2, Lane 194, Huan-Ho Street, Hsichih, Taipei Hsien 221, Taiwan
Open site at	No. 15, Lane 530, Pa-Lian RD., Sec. 1, Hsichih City, Taipei Hsien, Taiwan, R.O.C.

**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.*
- (3) *This test report, measurements made by TRC are traceable to the NIST only Conducted and Radiated Method.*

★ NVLAP LAB CODE: 200174-0

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## **Chapter 1 Introduction**

### **Description of EUT:**

The EUT specifications:

*Input frequency	: 50 ±5 Hz
*Input voltage window	: 140-300V AC
*Output frequency	: 50Hz ± 0.1 Hz in battery mode
*Output voltage mains mode	: 190-255V
*Output voltage inverter mode	: 230V±5% output load variation of 0-100%
*Wave form	: Quasi sine wave
*Transfer time	: 4msec typical
*Power factor	: 0.6
*Battery type	: Maintenance-free lead acid (12V-7Ah)
*Recharge time	: 8 hours typical from total discharge (UPS may be used immediately after discharge, but will Provide shorter backup time.
*Temperature	: -10 to 40 °C: operating -20 to 55 °C: transport/storage for limited time
*Relative humidity	: 0 to 95%, non-condensing

### **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.

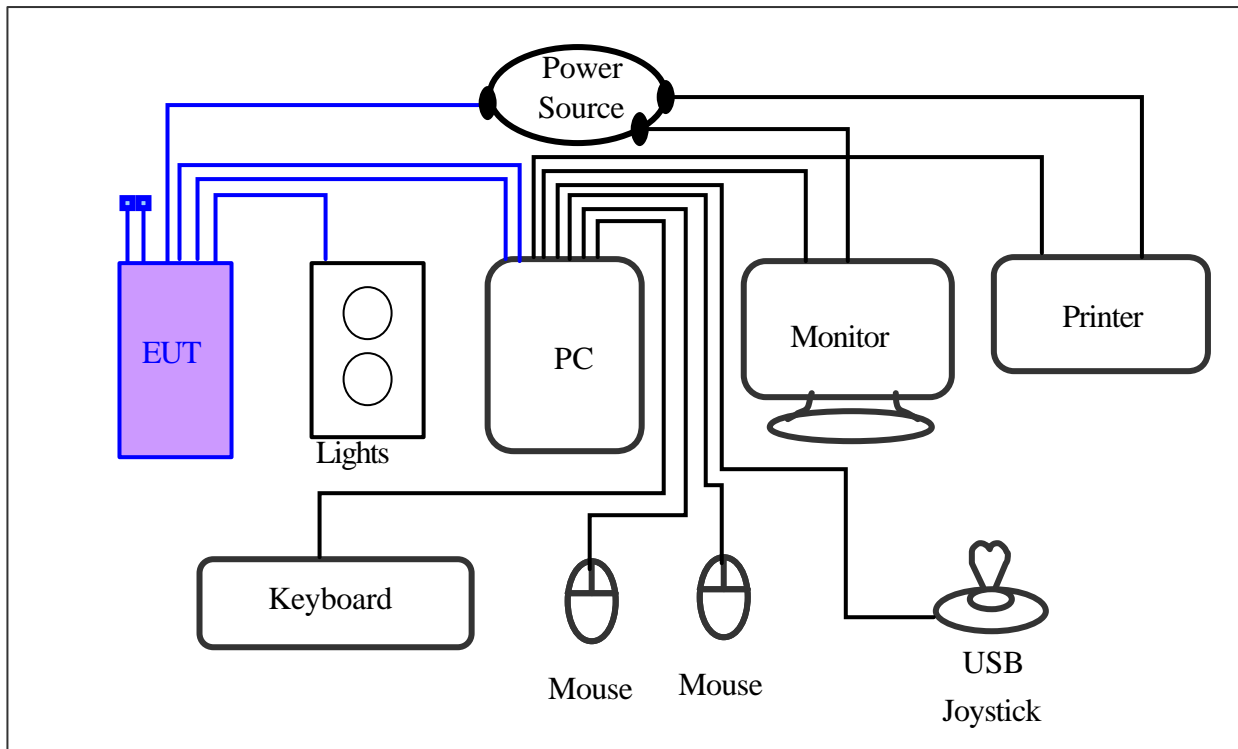
During the pretest, the following modes were tested:

1. Charging mode:
  - (a) at 50% power consumption.
  - (b) at 100% power consumption.
2. Discharging mode:
  - (a) at 50% power consumption.
  - (b) at 100% power consumption.

The test placement as the photographs showed is the worst case emission placed. And the worst case test data were recorded in the test report. (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 --- via a 76cm shielded RS-232 cable to EUT.
- \*Monitor Port --- a monitor with 1.5m length data cable.
- \*Keyboard Port --- a keyboard with 1.7m length data cable.
- \*Mouse Port --- a mouse with 1.8m long of data cable.
- \*Printer port --- a printer with 1.80m length data cable.
- \*USB Port A --- a joystick with 1.5m long, shielded and no ferrite bead data cable.
- \*USB Port B --- a mouse with 1.8m long of data cable.

(Each port on PC is connected with suitable device)

#### EUT:

- \*Power cable --- via a 1.60m long non-shielded, no ferrite bead power cable to the power source.
- \*AC Jack 1 --- via a 1.85m long non-shielded, no ferrite bead power cable to the PC.
- \*AC Jack 2~3--- via a 1.85m long non-shielded, no ferrite bead power cable that terminated.
- \*AC Jack 4 --- via a 1.85m long non-shielded, no ferrite bead power cable to the Lights.
- \*Serial Port --- via a 76cm shielded RS-232 cable to the PC.
- \*LAN IN --- with a 1.5m long, non-shielded, no ferrite bead, RJ-45 cable that terminated.
- \*LAN OUT --- with a 1.5m long, non-shielded, no ferrite bead, RJ-45 cable that terminated.

**List of support equipment**

**Conducted (Radiated) test:**

**PC** : **HP Brio 8410 6/350**  
Model No. : D6928A  
Serial No. : TW90400174  
FCC ID : Doc Approved  
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  
Power type : 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  
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  
Power type : By PC  
Power cord : Non-shielded, 1.80m long, No ferrite core

**Printer** : **EPSON**  
Model No. : P78PA  
Serial No. : 0EE0014030  
FCC ID : BKM9A8P70RA  
Power type : Linear  
Power cord : Non-shielded, 2m long, No ferrite core  
Data cable : Shielded, 1.8m long, No ferrite core

**USB Mouse** : **Logitech**  
Model No. : M-BA47  
Serial No. : LZE92250027  
FCC ID : Doc Approved  
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 : 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. The EUT is assembled on a wooden table that is 80 cm high, is placed 40 cm from the back-wall that 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 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***

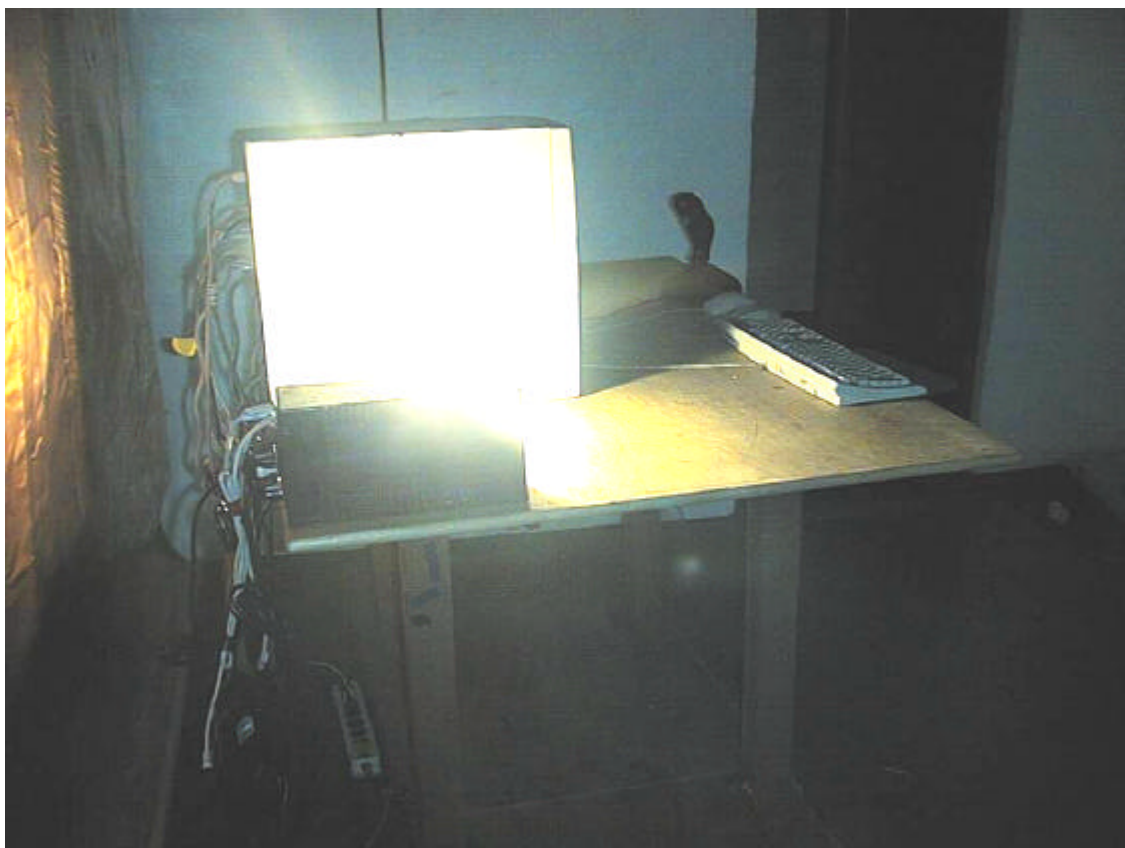
<u>Instrument Name</u>	<u>Model No.</u>	<u>Brand</u>	<u>Serial No.</u>	<u>Calibration Date</u>	
				<u>Last time</u>	<u>Next time</u>
Spectrum analyzer	8591EM	H P	3710A01203	02/22/01	02/22/02
Pre-selector (<30MHz)	AMP-01	TRC	REP-001	08/09/01	08/09/02
LISN (EUT)	TRC LISN01	TRC	LISN-01	08/21/01	08/21/02
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  $\pm 2.4$  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 measurement is made on a **10 - 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. The placement is according to CISPR 22.

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

The M.E. whole 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 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 that is made by TRC is used for improving sensitivity and precaution 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 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 shield room will be taken as the final data.

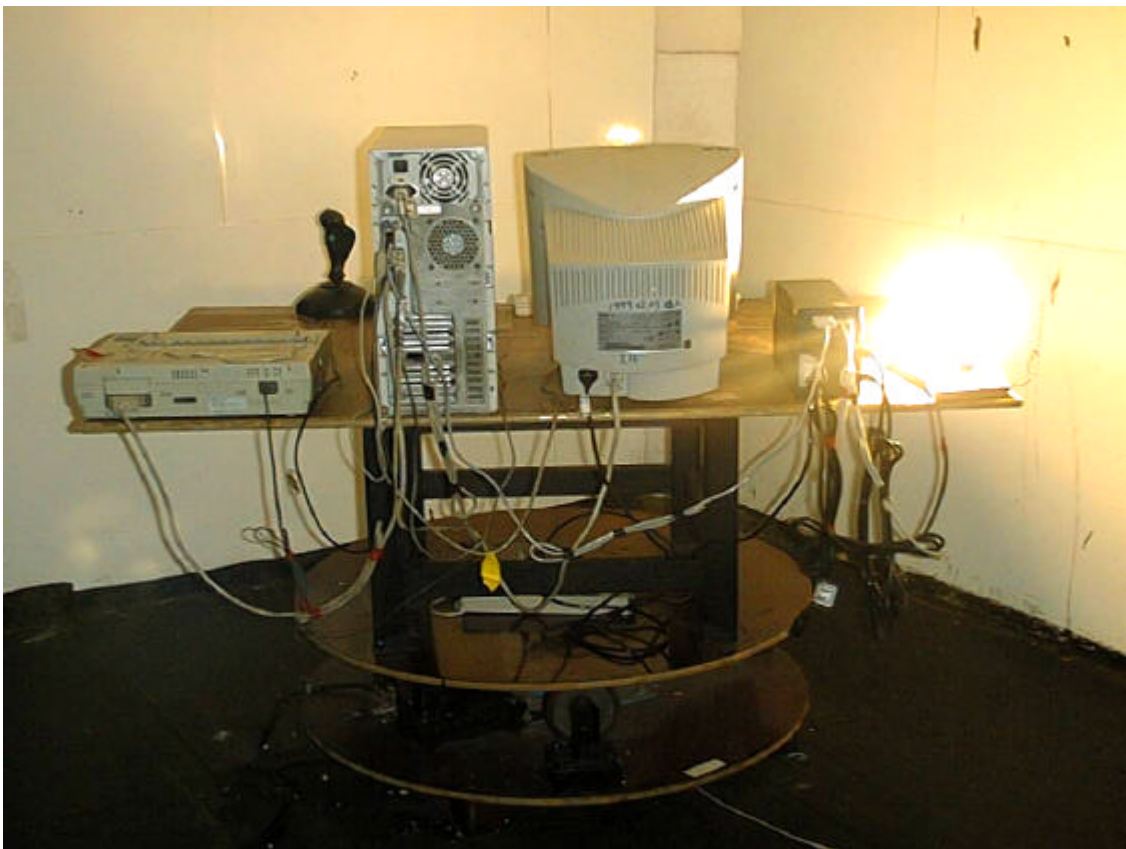
**List of test Instrument**

Instrument Name	Model No.	Brand	Serial No.	Calibration Date	
				Last time	Next time
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  $\pm 4.96$  dB .

**Test Result : Pass (Appendix B)**

***Radiated Test Placement: (Photographs)***



## Appendix A

### Conducted Emission Test Result: (Test Mode: 50% Charge)

Testing room:            Temperature : 20 ° C                            Humidity : 72 % RH

**Line 1**

Frequency (KHz)	READING AMPLITUDE			LIMIT		Margin (dB)
	Peak (dBmV/m)	Quasi-Peak (dBmV/m)	Average (dBmV/m)	Quasi-Peak (dBmV/m)	Average (dBmV/m)	
269.00	66.59	56.95	21.65	62.60	52.60	-5.65
280.00	66.62	57.43	21.31	62.29	52.29	-4.86
295.00	66.73	57.12	21.86	61.86	51.86	-4.74
302.00	66.79	57.09	20.95	61.66	51.66	-4.57
320.00	67.03	57.29	20.67	61.14	51.14	-3.85
329.00	66.94	57.37	20.31	60.89	50.89	-3.52
359.00	67.17	57.44	20.85	60.03	50.03	-2.59
385.00	64.23	56.63	23.90	59.29	49.29	-2.66
414.00	63.45	55.44	15.40	58.46	48.46	-3.02
430.00	62.97	54.05	17.20	58.00	48.00	-3.95

**Line 2**

Frequency (KHz)	READING AMPLITUDE			LIMIT		Margin (dB)
	Peak (dBmV/m)	Quasi-Peak (dBmV/m)	Average (dBmV/m)	Quasi-Peak (dBmV/m)	Average (dBmV/m)	
283.00	66.45	57.41	20.86	62.20	52.20	-4.79
301.00	66.54	57.05	20.93	61.69	51.69	-4.64
310.00	66.51	58.65	20.85	61.43	51.43	-2.78
322.00	66.35	56.88	20.62	61.09	51.09	-4.21
329.00	65.65	56.66	20.71	60.89	50.89	-4.23
340.00	66.21	56.54	21.07	60.57	50.57	-4.03
349.00	66.26	56.35	20.09	60.31	50.31	-3.96
366.00	65.02	56.40	18.53	59.83	49.83	-3.43
375.00	65.59	55.32	17.60	59.57	49.57	-4.25
392.00	64.78	54.68	19.00	59.09	49.09	-4.41

\*The reading amplitudes are all under limit.

**Conducted Emission Test Result: (Test Mode: 100% Charge)**

Testing room:            Temperature : 20 ° C                            Humidity : 72 % RH

**Line 1**

Frequency (KHz)	READING AMPLITUDE			LIMIT		Margin (dB)
	Peak (dBmV/m)	Quasi-Peak (dBmV/m)	Average (dBmV/m)	Quasi-Peak (dBmV/m)	Average (dBmV/m)	
285.00	66.49	56.92	22.53	62.14	52.14	-5.22
308.00	66.66	57.01	20.83	61.49	51.49	-4.48
322.00	66.74	57.23	20.44	61.09	51.09	-3.86
333.00	66.77	57.31	20.26	60.77	50.77	-3.46
347.00	66.82	57.13	20.58	60.37	50.37	-3.24
359.00	66.82	56.81	20.17	60.03	50.03	-3.22
378.00	66.32	56.27	19.49	59.49	49.49	-3.22
394.00	65.85	56.29	17.70	59.03	49.03	-2.74
427.00	63.60	53.14	16.28	58.09	48.09	-4.95
502.00	59.84	44.02	7.64	56.00	46.00	-11.98

**Line 2**

Frequency (KHz)	READING AMPLITUDE			LIMIT		Margin (dB)
	Peak (dBmV/m)	Quasi-Peak (dBmV/m)	Average (dBmV/m)	Quasi-Peak (dBmV/m)	Average (dBmV/m)	
264.00	66.59	57.00	21.09	62.74	52.74	-5.74
274.00	66.46	56.89	21.38	62.46	52.46	-5.57
285.00	66.35	56.96	27.50	62.14	52.14	-5.18
297.00	66.51	56.96	20.73	61.80	51.80	-4.84
312.00	66.42	60.61	20.59	61.37	51.37	-0.76
338.00	66.34	56.88	20.50	60.63	50.63	-3.75
354.00	64.03	56.39	19.06	60.17	50.17	-3.78
368.00	65.73	59.68	18.54	59.77	49.77	-0.09
383.00	63.29	55.69	17.72	59.34	49.34	-3.65
394.00	63.44	55.21	18.35	59.03	49.03	-3.82

\*The reading amplitudes are all under limit.

**Conducted Emission Test Result: (Test Mode: 50% Discharge)**

Testing room:            Temperature : 20 ° C                            Humidity : 73 % RH

**Line 1**

Frequency (KHz)	READING AMPLITUDE			LIMIT		Margin (dB)
	Peak (dBmV/m)	Quasi-Peak (dBmV/m)	Average (dBmV/m)	Quasi-Peak (dBmV/m)	Average (dBmV/m)	
280.00	65.56	57.43	21.31	62.29	52.29	-4.86
302.00	65.16	57.09	20.95	61.66	51.66	-4.60
312.00	64.79	57.65	20.85	61.37	51.37	-3.72
324.00	66.09	56.79	20.57	61.03	51.03	-4.24
342.00	65.71	56.27	20.18	60.51	50.51	-4.24
354.00	64.89	57.41	20.63	60.17	50.17	-2.76
380.00	65.49	56.60	23.82	59.43	49.43	-2.83
405.00	63.90	55.92	15.90	58.71	48.71	-2.79
416.00	62.66	55.41	15.40	58.40	48.40	-2.99
436.00	60.48	54.07	17.24	57.83	47.83	-3.76

**Line 2**

Frequency (KHz)	READING AMPLITUDE			LIMIT		Margin (dB)
	Peak (dBmV/m)	Quasi-Peak (dBmV/m)	Average (dBmV/m)	Quasi-Peak (dBmV/m)	Average (dBmV/m)	
163.00	64.87	50.27	24.08	65.63	55.63	-15.36
169.00	63.56	50.63	24.02	65.46	55.46	-14.83
189.00	64.94	51.00	23.47	64.89	54.89	-13.89
196.00	64.23	51.49	23.04	64.69	54.69	-13.20
205.00	63.52	52.66	22.63	64.43	54.43	-11.77
211.00	63.61	53.04	22.57	64.26	54.26	-11.22
251.00	62.19	56.54	21.16	63.11	53.11	-6.57
267.00	75.87	56.99	21.14	62.66	52.66	-5.67
291.00	75.12	57.31	21.05	61.97	51.97	-4.66
304.00	61.04	57.25	20.93	61.60	51.60	-4.35

\*The reading amplitudes are all under limit.



**Conducted Emission Test Result: (Test Mode: 100% Discharge)**

Testing room:            Temperature : 20 ° C                            Humidity : 72 % RH

**Line 1**

Frequency (KHz)	READING AMPLITUDE			LIMIT		Margin (dB)
	Peak (dBmV/m)	Quasi-Peak (dBmV/m)	Average (dBmV/m)	Quasi-Peak (dBmV/m)	Average (dBmV/m)	
299.00	68.45	57.00	21.43	61.74	51.74	-4.74
310.00	68.77	58.65	20.85	61.43	51.43	-2.78
322.00	68.37	56.88	20.62	61.09	51.09	-4.21
333.00	68.50	56.12	20.43	60.77	50.77	-4.65
349.00	69.09	56.35	20.09	60.31	50.31	-3.96
375.00	69.00	55.32	17.60	59.57	49.57	-4.25
387.00	68.44	56.61	23.90	59.23	49.23	-2.62
397.00	67.83	54.22	22.05	58.94	48.94	-4.72
419.00	66.22	55.53	15.40	58.31	48.31	-2.78
438.00	63.90	53.97	17.21	57.77	47.77	-3.80

**Line 21**

Frequency (KHz)	READING AMPLITUDE			LIMIT		Margin (dB)
	Peak (dBmV/m)	Quasi-Peak (dBmV/m)	Average (dBmV/m)	Quasi-Peak (dBmV/m)	Average (dBmV/m)	
154.00	65.11	49.88	24.83	65.89	55.89	-16.01
188.00	64.92	50.98	23.45	64.91	54.91	-13.93
218.00	63.33	53.92	22.62	64.06	54.06	-10.14
249.00	62.30	56.47	21.35	63.17	53.17	-6.70

\*The reading amplitudes are all under limit.

## Appendix B

### Radiated Emission Test Result:

Test Conditions:

Testing Room : Temperature : 26.80 ° C Humidity : 68 % RH

Testing site : Temperature : 30.00 ° C Humidity : 81 % RH

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

#### Horizontal

31.600	35.20	4.00	81	-15.67	19.53	30.00	-10.47
104.920	30.30	4.00	221	-13.86	16.44	30.00	-13.56
112.010	30.10	4.00	355	-13.02	16.08	30.00	-13.92
120.010	33.30	4.00	195	-12.30	21.00	30.00	-9.00
500.640	29.30	2.56	143	-3.28	26.02	37.00	-10.98
855.820	22.60	4.00	71	6.20	28.80	37.00	-8.20
***							

#### Vertical

37.490	35.60	1.00	148	-15.38	20.22	30.00	-9.78
64.010	37.60	1.00	283	-14.62	22.98	30.00	-7.02
72.010	33.50	2.56	12	-15.62	17.88	30.00	-12.12
74.010	32.80	2.56	40	-15.84	16.96	30.00	-13.04
80.010	40.10	1.00	311	-16.50	23.60	30.00	-6.40
88.010	38.70	4.00	210	-16.42	22.28	30.00	-7.72
104.830	37.40	2.56	273	-13.87	23.53	30.00	-6.47
120.010	36.70	4.00	333	-12.30	24.40	30.00	-5.60
***							

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)