

Measurement Report

FCC ID:N96-U1-1HOUVWThis report concerns (check one) : ☒ Original Grant ☐ Class II Change

Issued Date : Aug. 31, 2004
Project No. : 04E0504
Equipment : ELECTRONIC BALLAST
Model No. : U1-1/HOUVW
Applicant : SUNPARK ELECTRONICS CORP.
6F-2, No.135, Sec.4, Pa-Teh Rd.,
Taipei, Taiwan, R.O.C.

Tested by :
Neutron Engineering Inc. EMC Laboratory
FCC Registration Number : 95335

Date of Test :
Aug. 18, 2004 ~ Aug. 26, 2004

Testing Engineer :

Technical Manager :

Authorized Signatory :

Alan Chiu
James Chen
Andy Chiu
James Chen
Andy Chiu

NEUTRON ENGINEERING INC.

No. 132-1, Lane 329, Sec. 2, Palain Rd.,
Shijr City, Taipei, Taiwan
TEL : (02) 2646-5426 FAX : (02) 2646-6815

Declaration

Neutron represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with the standards traceable to National Measurement Laboratory (**NML**) of **R.O.C.**, or National Institute of Standards and Technology (**NIST**) of **U.S.A.**

Neutron's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **Neutron** shall have no liability for any declarations , inferences or generalizations drawn by the client or others from **Neutron** issued reports.

Neutron's reports must not be used by the client to claim product endorsement by the authorities or any agency of the Government.

This report is the confidential property of the client. As a mutual protection to the clients, the public and **Neutron-self**, extracts from the test report shall not be reproduced except in full with **Neutron's** authorized written approval.

Neutron's laboratory quality assurance procedures are in compliance with the **ISO Guide 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

	Table of Contents	Page
1	General Information	5
1.1	Applicant	5
1.2	Manufacturer	5
1.3	Equipment Under Tested	5
1.4	OEM Brand/Model	5
1.5	Product Description	5
1.6	Products Covered	5
1.7	Model Difference (Series, Versions, if any)	5
1.8	EUT Modifications	5
1.9	Photos of EUT	5
2	RFI Emissions Measurement	6
2.1	Test Facility	6
2.2	Standard Compliance	6
2.3	Test Methodology	6
2.4	Deviations from Standard Test Method	6
2.5	Sample(s) Tested	6
2.6	Measurement Instruments	6
2.7	Environmental Condition	6
2.8	Tested System Set-Up/Configuration Details	6
	Table -1 Equipments Used in Tested System	7
	Diagram -1 Block diagram showing the configuration of system tested	8
	Table - 2 Equipments Used in Tested System	9
	Table - 3 Information of Interface Cable	9
2.9	Max.(Worst Case) RF Emission Evaluation	10
2.10	EUT Operation	10
3	Justification	11
3.1	Frequency Range of Measurement	11
	3.1.1 Power Line Conducted Emission	11
	3.1.2 Radiated Emission	11
3.2	Limitations	11
	3.2.1 Power Line Conducted Emission Limits	11
	3.2.2 Radiated Emission Limits	11
3.3	Measurement Justification	13
	3.3.1 Conducted Emission	13
	3.3.2 Radiated Emission	13
3.4	Measurement Data	13
	Table 4 Conducted Emission Data	14
	Table 5 Radiated Emission Data	16

Table of Contents

	Page
4 Attachment	18
A. EUT Modification Description	19
B. EUT Test Photos	20
C. EUT Photos	23
D. User's Manual	27
E. Product Labeling	28

1. General Information**1.1 Applicant**

Name SUNPARK ELECTRONICS CORP.
Address 6F-2, No.135, Sec.4, Pa-Teh Rd., Taipei, Taiwan, R.O.C.

1.2 Manufacturer

Name N/A
Address N/A

1.3 Equipment Under Tested

Name: ELECTRONIC BALLAST
Trade Name: SUNPARK
Model No.: U1-1/HOUVW

1.4 OEM Brand/Model (if applicable)

OEM Brand(s)/Model(s) except the basic model in sub-clause 1.3 is(are) the follow(s):
OEM Brand: ICP
Model No.: U1-1/HOUVW

1.5 Product Descriptions(Application/Features/Specification)

ISM Equipment Category: ELECTRONIC BALLAST
Nominal Operating Frequency: 46 +/- 1 KHz
Electrical Power: 120V-230V AC input
Power Cord: non-shielded type wire
More details of EUT technical specification, please refer to the User's Manual.

1.6 Products Covered (if applicable)

The sample tested including the following sub-system/module/accessory :

Sub-system/ Module/ Accessory	Model/Type No.	Int. Inst./ Ext. Cont.
N/A	N/A	N/A

1.7 Model Difference (Series, Versions, if any)

Except the basic model no. (model designation of the sample tested in this test report),
additional model no. covered is(are) :

N/A

1.8 EUT Modifications (if applicable)

Please refer to the Attachment – **A.**

1.9 Photos of EUT

Please refer to the Attachment – **C.**

2. RFI Emissions Measurement

2.1 Test Facility

The test facilities used to collect the test data in this report located at No.132-1, Lane 329, Sec. 2, Palain Road, Shijr City, Taipei, Taiwan. A description of this test facilities is already on file with the FCC as registration number of 95335.

2.2 Standard Compliance

The test Standard contained in this report relate only to the item(s) listed below :
FCC Part 18 , Section 18.305(C) and 18.307(C) , Consumer Equipment Limits

2.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (1992) / MP-5 (1986).

Radiated testing was performed at an antenna to EUT distance 1 meter by loop antenna used.

Test procedures according to the technical standards of :
FCC Rules Part 18, Subpart C.

2.4 Deviations from Standard Test Method

FCC Part 18, Section 18.305(b) Radiated Emission Limits ; “Any Non-ISM frequency” is adopted

2.5 Sample(s) Tested

The representative sample tested in this reports is(are): U1-1/HOUVW

Test results in this test report relate only to the sample(s) tested.

2.6 Measurement Instruments

Valid measurement instruments used in this report refer to **Table-1** enclosed.

2.7 Environmental Condition

Temperature 26 °C

Relative Humidity 60 %

2.8 Tested System Set-Up/Configuration Details

The system was configured for testing in a typical fashion (as a user would normally use) or in-accordance with the operating configuration specified in the user's manual. A Block Diagram(please refer to the Diagram - 1) and Photos(please refer to the attachment - **B**) showing the set-up/configuration of system tested. In addition, **Table-2** and **Table-3** provide a detail of all equipment items and cables information used in the system tested.

Table -1 Measurement Instruments List

Item	Instruments	Mfr/Brand	Model/Type No.	Serial No.	Calibrated Date	Next Cali. Date	Note
1	LISN	EMCO	3825/2	9605-2539	2004-06-12	2005-06-11	✓
2	LISN	Rolf Heine	NNB-2/16Z	98083	2003-10-31	2004-10-30	
3	LISN	Rolf Heine	NNB-2/16Z	98053	2003-12-15	2004-12-14	
4	4L-V-LISN	Rolf Heine	NNB-4/63TL	02/10040	2004-04-07	2005-04-06	
5	LISN	EMCO	4825/2	00028234	2003-10-01	2004-09-30	
6	Pulse Limiter	Electro-Metrics	EM-7600	112644	2003-12-08	2004-12-07	✓
7	50 Ω Terminator	N/A	N/A	N/A	2004-05-08	2005-05-07	✓
8	Test Cable	N/A	C01	N/A	2003-12-09	2004-12-08	✓
9	Log-Bicon Antenna	MESS-ELEKTRONIK	VULB 9160	3058	2003-10-21	2004-10-20	
10	Log-Bicon Antenna	MESS-ELEKTRONIK	VULB 9160	3115	2004-04-14	2005-04-13	
11	Log-Bicon Antenna	MESS-ELEKTRONIK	VULB 9161	4022	2004-07-13	2005-07-12	
12	Test Cable	N/A	10M_OS01	N/A	2003-12-09	2004-12-08	
13	Test Cable	N/A	OS01-1/-2	N/A	2003-12-09	2004-12-08	
14	Test Cable	N/A	10M_OS02	N/A	2003-12-09	2004-12-08	
15	Test Cable	N/A	OS02-1/-2/-3	N/A	2003-12-09	2004-12-08	
16	RF Switch	Anritsu	MP59B	M65982	2003-12-08	2005-12-07	
17	Quasi-Peak Adapter	HP	85650A	2521A00844	2004-03-16	2005-03-15	✓
18	RF Pre-Selector	HP	85685A	2648A00417	2004-03-16	2005-03-15	✓
19	Spectrum Analyzer	HP	85680B	2634A03025	2004-01-09	2005-01-08	✓
20	Spectrum Monitor	HP	85662B	2648A13616	2004-01-09	2005-01-08	✓
21	Pre-Amplifier	Anritsu	MH648A	M09961	2003-12-08	2004-12-07	
22	Spectrum Analyzer	ADVAN TEST	R3261C	81720298	2004-08-12	2005-08-11	
23	Test Receiver	R&S	ESH3	860156/018	2003-10-21	2004-10-21	
24	Test Receiver	R&S	ESVP	860687/009	2003-12-05	2004-12-04	
25	Test Receiver	PMM	PMM 9000	4310J01002	2003-10-03	2004-10-02	
26	Horn Antenna	EMCO	3115	9605-4803	2004-05-28	2005-05-27	
27	Test Receiver	R&S	ESMI	843977/005	2004-01-12	2005-01-11	
28	Absorbing Clamp	R&S	MDS-21	841077/011	2004-08-13	2005-08-12	
29	Voltage Probe	R&S	ESH2-Z3	841.800/023	2004-08-25	2005-08-24	
30	Signal Generator	HP	8648A	3426A01034	2002-10-11	2004-10-08	
31	Antenna Mast	Chance Most	CMTB-1.5	N/A	N/A	N/A	✓
32	Turn Table	Chance Most	CMTB-1.5	N/A	N/A	N/A	✓
33	Loop Ant	R&S	HFH2-Z2	830749/020	N/A	N/A	✓

Remark :

(1)" ✓" indicates the instrument used in Test Report.

(2)" N/A" denotes No Model No. / Serial No. and No Calibration specified.

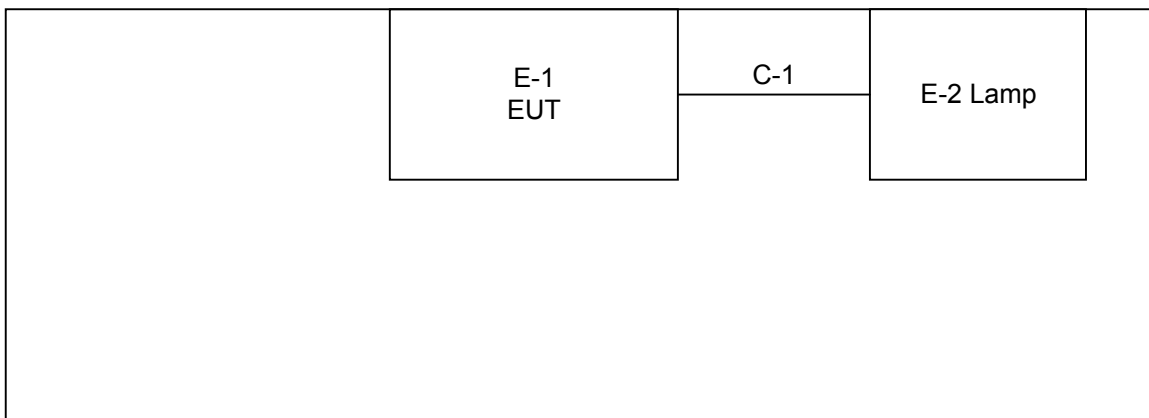
Diagram – 1**Block diagram showing the configuration of system tested**

Table - 2 Equipments Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Note
E-1	ELECTRONIC BALLAST	SUNPARK	U1-1/HOUVW	N96-U1-1/HOUVW	N/A	EUT
E-2	Lamp	N/A	RGTS24HO	N/A	N/A	

Note:

- (1) Unless otherwise denoted as EUT in 『Remark』 column , device(s) used in tested system is a support equipment.
- (2) Unless otherwise marked as ※ in 『Remark』 column, Neutron consigns the support equipment to the tested system.
- (3) The support equipment E-2 is a fluorescent lamp used as the load for EUT.

Table - 3 Information of Interface Cable

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	20cm	

Note:

- (1) Unless otherwise marked as ※ in 『Remark』 column, Neutron consigns the support equipment to the tested system.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

2.9 Max.(Worst Case) RF Emission Evaluation

- (a) Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (1992) and the FCC Measurement Procedure MP-5 (1986).
- (b) The system was configured for testing in a typical fashion (as a customer would normally use it).The lamp was connected to EUT as a customer would normally use it as possible to comply with the Rules or Standards requirement.
- (c) To investigate the maximum EMI emission characteristics, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively and used to collect the included data.

Mode 1 Lamp type: RGTS24HO (42W)

Mode 2 Lamp type: RGTS20HO (35W)

Mode 3 Lamp type: RGTS16HO (29W)

The EUT system operated Mode1, mentioned above was found to be the worst case during the pre-scanning test.

This operation mode was used for final testing and collecting test data included in this report.

2.10 EUT Operation

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively and used to collect the included data.

3. Justification

3.1 Frequency Range of Measurement

3.1.1 Power Line Conducted Emission

150KHz-30MHz

3.1.2 Radiated Emission

Frequency Band in which Device Operates (MHz)	Range of Frequency Measurements	
	Lowest Frequency	Highest Frequency
Below 1.705	Lowest freq. generated In the device, but not lower than 9KHz	30MHz
1.705 to 30	Lowest freq. generated In the device, but not lower than 9KHz	400MHz
30 to 500	Lowest freq. generated In the device or 25MHz, whichever is lower.	Tenth harmonic or 1000MHz, whichever is higher.
500 to 1000	Lowest freq. generated In the device or 100MHz, whichever is lower.	Tenth harmonic
Above 1000	Didtto	Tenth harmonic or highest detectable emission

3.2 Limitations

3.2.1 Power Line Conducted Emission (Frequency Range 150KHz-30MHz)

Frequency Range (MHz)	Non-consumer Equipment		Frequency Range (MHz)	Consumer Equipment	
	dBuV	uV		dBuV	uV
0.45 - 1.60	60.00	1000	0.45 - 2.51	48	250
1.60 - 30.0	69.50	3000	2.51 - 3.00	69.5	3000
			3.00 - 30.0	48	250

Notes : The tighter limit applies at the band edges.

3.2.2 Radiated Emission Limits (Frequency Range 30MHz-1000MHz)

Frequency (MHz)	F.S Limitation at 30m dist		F.S Limitation at 1m dist		Remark
	(uV/m)	(dBuV/m)	(uV/m)	(dBuV/m)	
30 - 88	30	29.54	900	59.08	Non-consumer Equipment
88 - 216	50	33.98	1500	63.52	
216 - 1000	70	36.90	2100	66.44	
30 - 88	10	20.00	300	49.54	Consumer Equipment
88 - 216	15	23.52	450	53.06	
216 - 1000	20	26.02	600	55.56	

Notes :

- (1). The tighter limit shall apply at the boundary between two frequency range.
- (2). Limitation expressed in dBuV/m is calculated by $20\log$ Emission Level (uV/m).
- (3). If measurement is made at 1m distance, then F.S Limitation at 1m distance is adjusted by using the formula of $L_{d1} = L_{d2} * (d_2/d_1)$.
Example:
F.S Limit at 30m distance is 30uV/m , then F.S Limitation at 1m distance is adjusted as $L_{d1} = L_1 = 30uV/m * (30/1) = 900 \text{ uV/m}$

- (4). Section 15.209 radiated emission limits and general requirement of FCC Part 15, Subpart B is adopted as the radiated emission field strength limitation for frequency range between 9KHz-30MHz. It is a deviation from standard justification specified in FCC Part-18 Section 18.305 (C).

FCC Part 18, Section 18.305(b) Radiated Emission Limits ; “Any Non-ISM frequency”

Equipment	Operating Frequency	RF Power generated by equipment (watts)	Field strength limitation (uV/m)	Distance (meters)
Medical diathermy	Any ISM frequency	Any	25	300
	Any Non-ISM frequency	Any	15	300

Notes :

- (1). The tighter limit shall apply at the boundary between two frequency range.
- (2). Limitation expressed in dBuV/m is calculated by $20\log$ Emission Level (uV/m).
- (3). If measurement is made at 1m distance, then F.S Limitation at 1m distance is adjusted by using the formula of $L_{d1} = L_{d2} * (d_2/d_1)^2$.

Example:

F.S Limit at 300m distance is 15uV/m , then F.S Limitation at 1m distance is adjusted as $L_{d1} = L_1 = 15\text{uV/m} * (300)^2 = 90000 * 15 \text{ uV/m}$

3.3 Measurement Justification

3.3.1 Conducted Emission

The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and these signals are then Quasi Peak detector mode re-measured.

Data of **Table - 4**. lists the significant emission frequencies, measured levels, limits and safe margins. All readings are Peak Mode measured unless otherwise stated as QP in column of "Remark".

If the Peak Mode measured value lower than both QP Mode Limit, EUT shall be deemed to compliance with both QP Limits and then no additional QP Mode measurement performed.

3.3.2 Radiated Emission

The initial step in collecting radiated emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.

Data of **Table - 5**. lists the significant emission frequencies, measured levels, limits and safe margins. All readings are Peak Mode measured unless otherwise stated as QP in column of "Remark".

If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.

3.4 Measurement Data

Table - 4. Conducted Emission Data

Table - 5. Radiated Emission Data

Table 4 Conducted Emission Data

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable)

Judgment : Passed by -3.81 dB at 7.73 MHz, QP Mode, Consumer Equipment , Neutral

Freq. (MHz)	Terminal L/N	Measured (dBuV)	Limits		Safe Margins		Remark C
			(dBuV)	(uV)	(dBuV)	Note	
0.45	Line	30.24	48.00	250	-17.76	(QP)	
0.70	Line	35.87	48.00	250	-12.13	(QP)	
1.81	Line	40.43	48.00	250	-7.57		
5.16	Line	42.30	48.00	250	-5.70	(QP)	
7.73	Line	44.19	48.00	250	-3.81		
19.22	Line	42.09	48.00	250	-5.91		
0.45	Neutral	35.20	48.00	250	-12.80	(QP)	
0.69	Neutral	34.10	48.00	250	-13.90	(QP)	
1.19	Neutral	40.49	48.00	250	-7.51		
5.04	Neutral	45.10	48.00	250	-2.90	(QP)	
7.63	Neutral	43.75	48.00	250	-4.25		
18.90	Neutral	41.52	48.00	250	-6.48		

Remark :

- (1) Reading was measured by using are Quasi-Peak Mode with Detector BW=9KHz ; SPA setting in RBW=10KHz,VBW =10KHz, SWP Time = 0.3 sec./ MHz ◦
- (2) All readings are QP Mode value unless otherwise stated Peak in column of 『 Note 』 .
- (3) Measuring frequency range from 450KHz to 30MHz ◦
- (4) Remark C denotes the Consumer Equipment limitation used for judgment.
- (5) Remark NC denotes the Non-Consumer Equipment limitation used for judgment.

Table 5 Radiated Emission Data

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable)

FCC Part 18, Section 18.305(b) Radiated Emission Limits ; “Any Non-ISM frequency”

Judgment : Passed by -53.69 dB at 46.70 KHz

Freq. (KHz)	Receiver Reading in dBuV/m	Factor (dB) Cable loss	Field Strength Limit (uV/m)	Required Measurement Distance(m)	Limitation Converted 1 m dist. (dBuV/m)	Over Limit
46.70	79.51	0.10	15.00	300.00	122.60	-42.99
83.00	52.29	0.10	15.00	300.00	122.60	-70.21
143.20	60.13	0.10	15.00	300.00	122.60	-62.37
205.20	32.86	0.10	15.00	300.00	122.60	-89.64
239.30	49.85	0.20	15.00	300.00	122.60	-72.55
289.70	31.18	0.20	15.00	300.00	122.60	-91.22
332.90	45.25	0.20	15.00	300.00	122.60	-77.15
373.30	28.59	0.30	15.00	300.00	122.60	-93.71
428.10	38.68	0.30	15.00	300.00	122.60	-83.62
462.10	26.92	0.30	15.00	300.00	122.60	-95.38

Remark :

- (1) All receiver readings (the measured field strength levels) are measured from loop antenna directly ◦
- (2) The emission limits shown in the above table are base on measurements employing a quasi-peak detector except for the frequency bands 9-90 KHz, 110-490 KHz and above 1000MHz. Radiated emission limits in these three bands are based on measurements employing an average detector ◦
- (3) The tighter limit applies at the band edges ◦
- (4) **Remark:** “ ** ” means that the noise emission is too low to detect by Test Receiver ◦

Attachment

Table Contents

- A. EUT Modification Description
- B. EUT Test Photos
- C. EUT Photos

Attachment - A.

EUT Modification Description

No any modification required for the EUT to comply with the standards.

Attachment - B.

EUT Test Photos

- 1. Conducted Measurement Photos**
- 2. Radiated Measurement Photos**

Attachment – C

EUT Photos

- 1. Photo # 1 Front View**
- 2. Photo # 2 Unit Partially Disassembled**
- 3. Photo # 3 Unit Partially Disassembled**

Attachment – D

User's Manual

Attachment - E

Product Labeling