

MEASUREMENT/TECHNICAL REPORT

APPLICANT: Sunpark Electronics (Taiwan) Corporation

MODEL NO.: LC12010; LC12010T;
LC12011; LC12011T;
LC12012; LC12012T;
LC12013; LC12013T;
LC12014; LC12014T;
LC12015; LC12015T

FCC ID: N96-LC1201x

This report concerns (check one) : **Original Grant** **Class II Change**

Equipment type: ELECTRONIC BALLAST

Deferred grant requested per 47CFR 0.457(d)(1)(ii)?

Yes No If yes, defer until: _____ (date)

We, the undersigned, agree to notify the Commission by (date) _____ / _____ / _____ of the intended date of announcement of the product so that the grant can be issued on that date.

Transition Rules Request per 15.37?

Yes No

If no, assumed Part 18, Consumer equipment of RF lighting device for new 47 CFR (10-1-90 Edition) provision.

Report Prepared

by Testing House : Neutron Engineering Inc.

for Company Name: Sunpark Electronics (Taiwan) Corporation

Address: No. 1, Lane 392, Futeh 1st Road, Hsichih, Taipei County, Taiwan, R.O.C.

Applicant Signature :



Jim C.F. Chao / President

CERTIFICATION

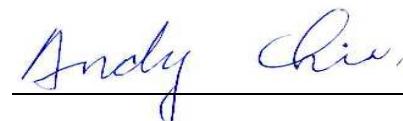
We hereby certify that:

The test data , data evaluation , test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (1992) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 18, Subpart C. Consumer Class.

Prepared by : Carol Chen



Reviewed by : Andy Chiu



Approved by : George Yao



Issued Date : Jul. 31, 2002

Report No. : NEI-FCCB-02158

Company Stamp :



NEUTRON ENGINEERING INC.

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1. GENERAL INFORMATION

1-1. Product Description

The Sunpark Electronics (Taiwan) Corporation Model: LC12010; LC12010T; LC12012; LC1202T; LC12013; LC12013T; LC12014; LC12014T; LC12015; LC12015T (referred to as the EUT in this report) is a electronic ballasts are suitable for residential lighting fixtures. It performs rapid start to optimize lamp life.

Operating frequency : 50-70KHz.

1-2. Related Submittal(s) / Grant (s)

1-2-1. Models Covered

Models covering in this test report is : LC12010

1-2-2. Models Difference

Model : LC1201x series is identical to Model LC1201xT and the models with " T" ended, they are potted for outdoor use. The detail list please refer to the following:

Model	Lamp	Lamp	Line	Input	Line	Power	Min Start	Case
Number	Type	Wattage	Voltage	Watts	Amps	Factor	Temp.F	Type
LC12010	CFQ13W,Quad	13	120	13	0.22	>0.5	-10	#5
LC12011	CFQ18W,Quad F17 T8	18 17	120 120	18 17	0.30 0.28	>0.5 >0.5	-10 -10	#5 #5
LC12012	FC8T8, 22W Circline CFQ26W, Quad. CFM26W,Triple F32 T8	22 26 32	120 120 120	21 25 32	0.35 0.42 0.53	>0.5 >0.5 >0.5	-10 -10 -10	#5 #5 #5
LC12013	CFM32W, Triple CFM42W, Triple	32 42	120 120	31 40	0.52 0.67	>0.5 >0.5	-10 -10	#5 #5
LC12014	FC12T9, 30W Circline FC12T9, 32W Circline FC16T9, 40W Circline F40 T12	30 32 40 40	120 120 120 120	28 34 40 40	0.47 0.57 0.67 0.67	>0.5 >0.5 >0.5 >0.5	-10 -10 -10 -10	#5 #5 #5 #5
LC12015	2D 55W 2C 55W	55 55	120 120	56 56	0.93 0.93	>0.5 >0.5	-10 -10	#5 #5

Model	Lamp	Lamp	Line	Input	Line	Power	Min Start	Case
Number	Type	Wattage	Voltage	Watts	Amps	Factor	Temp.F	Type
LC12010T	CFQ13W,Quad	13	120	13	0.22	>0.5	-10	#5
LC12011T	CFQ18W,Quad F17 T8	18 17	120 120	18 17	0.30 0.28	>0.5 >0.5	-10 -10	#5 #5
LC12012T	FC8T8, 22W Circline CFQ26W, Quad. CFM26W,Triple F32 T8	22 26 32	120 120 120	26 32 22	0.43 0.53 0.37	>0.5 >0.5 >0.5	-10 -10 -10	#5 #5 #5
LC12013T	CFM32W, Triple CFM42W, Triple	32 42	120 120	32 42	0.53 0.70	>0.5 >0.5	-10 -10	#5 #5
LC12014T	FC12T9, 30W Circline FC12T9, 32W Circline FC16T9, 40W Circline F40 T12	30 32 40 40	120 120 120 120	28 32 42 40	0.47 0.53 0.70 0.67	>0.5 >0.5 >0.5 >0.5	-10 -10 -10 -10	#5 #5 #5 #5
LC12015T	2D 55W 2C 55W	55 55	120 120	55 55	0.92 0.92	>0.5 >0.5	-10 -10	#5 #5

Engineering BOM for 1 lamp LCEB
Model: LC12010, -11, -12, -13, -14, -15

Part No	Description	Designation	Q'ty	12010	12011	12012	12013	12014	12015
	Res, CF, 220K, 1/2W, J	R1	1	v	v	v	v	v	v
	Res, CF, 470K, 1/2W, J	R2	1	v	v	v	v	v	v
	Res, MOF, 2.2, 1/2W, J, mini	R3,4	2	v	v	v	v	v	v
	Res, CF, 220K, 1/4W, J	R5	1	v	v	v	v	v	v
	Res, MOF, 0.22, 1/2W, J, mini	R6,7	2	v	v	v	v	v	v
	Res, CF, 100K, 1/4W, J	R10	1	v	v	v	v	v	v
	Res, CF, 1M, 1/4W, J	R13	1	v	v	v	v	v	v
KMG/NCC	Cap, Elec, 10uF/200V, M, 105C/2000hr	C2A, C2B	2	v					
KMG/NCC	Cap, Elec, 22uF/200V, M, 105C/2000hr	C2A, C2B	2		v	v			
KMG/NCC	Cap, Elec, 33uF/200V, M, 105C/2000hr	C2A, C2B	2				v		
KMG/NCC	Cap, Elec, 47uF/200V, M, 105C/2000hr	C2A, C2B	2					v	v
	Cap, Cer, 3.3nF/3KV, M, 10mm	C3,4	2	v	v	v	v	v	v
	Jumper, 15mm	C5	1	v	v	v	v	v	v
	CAP, L, 0.047uF/50V, J, 5mm	C6,10,11,15	4	v	v	v	v	v	v
	CAP, MD, 0.1uF/250V, J, 10mm	C7,9	2	v	v	v	v	v	v
	CAP, PDS, 0.0047uF/630V, J, 15mm	C8	1	v	v	v	v		
	CAP, PDS, 0.0056uF/630V, J, 15mm	C8	1					v	v
	Cap, Cer, 22pF/2KV, K	C13	1	v	v	v	v	v	v
	Cap, Elec, 2.2uF/50V, M	C14	1	v	v	v	v	v	v
	CAP, PDS, 0.0027uF/630V, J, 15mm	C16	1	v	v	v	v		
	Dio, 1N4004	D1,2,3,4	4	v	v	v	v	v	v
	Dio, FR107	D5,6,7,11,12,14	6	v	v	v	v	v	v
	Dio, DIAC, 28-36V, DB3	D8	1	v	v	v	v	v	v
	Dio, Zener, 1/2W, 6.8V	Z2	1	v	v	v	v	v	v
	Fuse, 1A/125V	F1	1	v	v	v	v	v	v
	Jumper, 10mm	J1	1	v	v	v	v	v	v
	Choke, EE1915, 2.3mH	L1	1	v					
24-2K140	Choke, EE1915, 2.00mH	L1	1		v				
24-2K147	Choke, EE1915, 1.25mH	L1	1			v			
24-2K146	Choke, EE1915, 1.20mH	L1	1				v		
24-2K158	Choke, EE1915, 0.9mH	L1	1					v	
24-2K159	Choke, EE25, 0.55mH	L1	1						v
	Common mode, UT20, 20mH	L3	1	v	v	v	v	v	v
	NIL	PTC							
	Transistor, 4A/400V, PHE13005	Q1,2	2	v	v	v	v	v	v
	Driver, MZ4, T953 N=1:7:1	T1	1	v	v	v	v	v	v
	SCR, 0.85A/400V, BT169D	TH1	1	v	v	v	v	v	v
LCEB-LB05	CEM-1, 94V-0, 73*46mm	PCB	1	v	v	v	v	v	v
	LEAD WIRE, AWG#18,1015, BLK, 140mm	P1	1	v	v	v	v	v	v
	LEAD WIRE, AWG#18,1015, WHT, 150mm	P2	1	v	v	v	v	v	v
	LEAD WIRE, AWG#18,1015, BLU, 275mm	P3,4	2	v	v	v	v	v	v
	LEAD WIRE, AWG#18,1015, RED, 275mm	P7,8	2	v	v	v	v	v	v
	LEAD WIRE, AWG#18,1015, GRN, 260mm w/ terminal	GRN	1	v	v	v	v	v	v
	Heatsink, TO-220		2						v

Part No	Description	Designation	Q'ty	12010	12011	12012	12013	12014	12015
	Insulation Paper, Mylar, ??x??mm		1	v	v	v	v	v	v
	Retainer, 1015-2H		3	v	v	v	v	v	v
	Retainer, 1015-1H		1	v	v	v	v	v	v
	LCEB Chassis		1	v	v	v	v	v	v
	LCEB Cover		1	v	v	v	v	v	v
	Label, LC12010		1	v					
	Label, LC12011		1		v				
	Label, LC12012		1			v			
	Label, LC12013		1				v		
	Label, LC12014		1					v	
	Label, LC12015		1						v

1-3. Tested System Details

The FCC IDs for all equipment, plus descriptions of all cables used in the tested system (including inserted cards, which have grants) are:

Model No.	FCC ID	Equipment	Cable
LC12010;LC12011; LC12012;LC12013 LC12014;LC12015	N96-LC1201x	ELECTRONIC BALLAST	Un-Shielded Data Cable AC Power Cable.

Notes:

- (1) EUT submitted for grant.
- (2) The support equipment was authorized by Declaration of Conformity.

1-4. 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 **3 meter (30MHz-1000MHz)** and **1 meter (0.009MHz-30MHz)**.

1-5. Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on the address of No. 132-1, Lane 329, Sec. 2, Palain Road, Shijr 221, Taipei, Taiwan, R.O.C. of NEUTRON ENGINEERING INC. This site has been fully described in report dated Jun. 25, 1999 Submitted to your office, and accepted in a letter dated Sep. 02, 1999 (Reg. No. 95335).

3. System Test Configuration

3-1. EUT Configuration

The EUT was placed on a turn table which is 0.8m above round plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m **or 1m** away from the receiving antenna which varied from 1m to 4m to find out the highest emissions. And also. Each emission was to the maximized by changing the polarization of receiving antenna both horizontal and vertical.

3-2. EUT Exercise

The EUT (Transmitter) was operated continuously in its normal operating mode for the purpose of the measurements.

3-3. Test Procedure

3-3-1 Conducted Emissions

Conduced emissions from the EUT measured in the Frequency range between 0.45MHz and 30MHz were made with a Spectrum Analyzer, HP Model 8568B, using CISPR Quasi-Peak detector mode and appropriate broadband linearly polarized antenna.

3-3-2. Radiated Emissions

Radiated emissions from the EUT measured in the **frequency range between 25MHz and 1000MHz** were made with a **Spectrum Analyzer, HP Model 8568B, using CISPR Quasi-Peak detector mode** and appropriate broadband linearly polarized antenna.

Radiated emissions measurement for **frequency above 1000MHz** were made with a **Test Receiver, R&S model ESMI**, plus a **Pre-amplifier R&S model ESMI-Z7**, and a **Horn Antenna, EMCO model 3115** to measure its **Peak detector Mode** level and **Average Detector Mode** level.

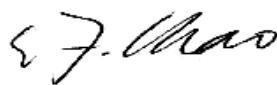
3-3. Special Accessories

Not available for this EUT intended for grant.

3-4. Equipment Modifications

Not available for this EUT intended for grant.

Applicant Signature :



Date:

Jul. 25, 2002

Type/Printed Name:

Jim C.F. Chao

Position:

President

3.5 Configuration of Tested System

The configuration of tested system is described as the block diagram shown in next page Figure 3.1 and details information of I/O cable and power cord connection are tabulated as Table A and B. The monitor is powered from a floor mounted receptacle (referred to as the wall outlet in the previous described) was tested.

TABLE A - Test Equipment

Remark:

- (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 supporting equipment(s) to the tested system.
- (3) The support equipment was authorized by Declaration of Conformity.

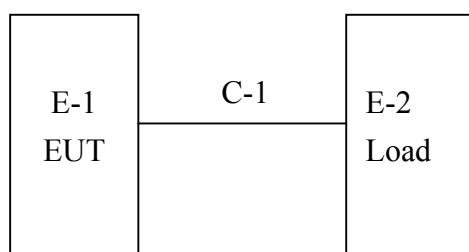
Table B. - Informations Cable Information

Item	I/O Cable	Device Connected	Shielded Type	Ferrite Core	Detachable/ Permanently	Length	Note
C-1	Power line	EUT-Load	N/A	N/A	Permanently	10cm	

Note:

(1) Unless otherwise marked as **※** in (Remark) column, Neutron consigns the supporting equipment(s) to the tested system.

Figure 3.1 Configuration of Tested System



3-2 Test Equipment

Item	Instruments	Mfr/Brand	Model/Type No.	Serial No.	Calibrated Date	Next Cali. Date	Note
1	LISN	EMCO	3825/2	9605-2539	2002-05-20	2003-05-19	
2	LISN	Rolf Heine	NNB-2/16Z	98083	2001-10-20	2002-10-19	✓
3	LISN	Rolf Heine	NNB-2/16Z	98053	2001-11-22	2002-11-21	
4	Pulse Limiter	Electro-Metrics	EM-7600	112644	2001-12-10	2002-12-19	✓
5	50Ω Terminator	N/A	N/A	N/A	2002-05-10	2003-05-09	
6	Test Cable	N/A	C01	N/A	2001-12-08	2002-12-07	✓
7	Log-Bicon Antenna	MESS-ELEKTRONIK	VULB 9160	3058	2001-10-27	2002-10-26	✓
8	Log-Bicon Antenna	MESS-ELEKTRONIK	VULB 9160	3060	2001-10-20	2002-10-19	
9	Log-Bicon Antenna	MESS-ELEKTRONIK	VULB 9161	4022	2001-07-04	2002-07-03	
10	Test Cable	N/A	10M_OS01	N/A	2001-12-08	2002-12-07	✓
11	Test Cable	N/A	OS01-1/-2	N/A	2001-12-08	2002-12-07	✓
12	Test Cable	N/A	10M_OS02	N/A	2001-12-08	2002-12-07	
13	Test Cable	N/A	OS02-1/-2/-3	N/A	2001-12-08	2002-12-07	
14	RF Switch	Anritsu	MP59B	M65982	2001-12-10	2002-12-09	
15	Quasi-Peak Adapter	HP	85650A	2521A00844	2002-04-08	2002-10-07	
16	RF Pre-Selector	HP	85685A	2648A00417	2002-04-08	2002-10-07	
17	Spectrum Analyzer	HP	85680B	2634A03025	2002-04-08	2002-10-07	
18	Spectrum Monitor	HP	85662B	2648A13616	2002-04-08	2002-10-07	
19	Pre-Amplifier	Anritsu	MH648A	M09961	2001-12-10	2002-12-09	✓
20	Spectrum Analyzer	ADVAN TEST	R3261C	81720298	2001-08-17	2002-08-16	✓
21	Test Receiver	R&S	ESH3	860156/018	2001-10-23	2002-10-22	
22	Test Receiver	R&S	ESVP	860687/009	2001-10-23	2002-10-22	
23	Test Receiver	MEB	SMV41	130	2001-12-05	2002-12-04	✓
24	Test Receiver	PMM	PMM 9000	4310J01002	2001-12-31	2002-12-30	
25	Horn Antenna	EMCO	3115	9605-4803	2001-05-09	2002-05-08	
26	Test Receiver	R&S	ESMI	843977/005	2001-11-14	2002-11-05	
27	Pre-Amplifier	R&S	ESMI-Z7	1045.5020	2001-05-21	2002-05-20	
28	Absorbing Clamp	R&S	MDS-21	841077/011	2001-08-18	2002-08-17	
29	Voltage Probe	R&S	ESH2-Z3	841.800/023	2001-08-20	2002-08-19	
30	Signal Generator	HP	8648A	3426A01034	2000-02-10	2003-09-23	
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	✓

Remark :

- (1) ✓ indicates the instrument used in Test Report.
- (2) N/A denotes No Model No. / Serial No. and No Calibration specified.

4. Block Diagram(s)

Figure 4.1 Block diagram of system, Page 13.A

6. Conducted Emission Data

6.1 Standard Applicable

According to 18.307(C), Consumer equipment for conduction limits.

6.2 The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Judgement: Passed by **-12.14 dB** in mode of **Neutral** terminal **1.88 MHz**
Test Mode : LC12010

Freq. (MHz)	Terminal L/N	Measured(dBuV)		Safe Margins	
		QP-Mode	Limits(dBuV)	(dBuV)	Note
0.46	Line	29.01	48.00	-18.99	(QP)
1.06	Line	31.60	48.00	-16.40	(QP)
1.55	Line	33.12	48.00	-14.88	(QP)
1.73	Line	34.69	48.00	-13.31	(QP)
1.88	Line	35.86	48.00	-12.14	(QP)
2.55	Line	35.40	48.00	-12.60	(QP)
0.46	Neutral	32.61	48.00	-15.39	(QP)
0.96	Neutral	33.01	48.00	-14.99	(QP)
1.45	Neutral	33.74	48.00	-14.26	(QP)
1.63	Neutral	34.31	48.00	-13.69	(QP)
2.14	Neutral	33.43	48.00	-14.57	(QP)
2.26	Neutral	33.03	48.00	-14.97	(QP)

Remark :

- (1) Reading in which marked as QP means measurements by using are Quasi-Peak Mode with Detector BW=9KHz ; SPA setting in RBW=10KHz, VBW =10KHz, Swp. Time = 0.3 sec./MHz.
- (2) Measuring frequency range from 450KHz to 30MHz.

Review:

Andy Liu

Test Engr.:

James

Test Date : Jul. 03, 2002

6. Conducted Emission Data

6.1 Standard Applicable

According to 18.307(C), Consumer equipment for conduction limits.

6.2 The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Judgement: Passed by **-14.39 dB** in mode of **Neutral** terminal **0.47 MHz**
Test Mode : LC12011

Freq. (MHz)	Terminal	Measured(dBuV)		Safe Margins	
		QP-Mode	QP-Mode	(dBuV)	Note
0.48	Line	29.41	48.00	-18.59	(QP)
1.43	Line	31.94	48.00	-16.06	(QP)
1.54	Line	30.52	48.00	-17.48	(QP)
1.83	Line	30.48	48.00	-17.52	(QP)
2.05	Line	29.04	48.00	-18.96	(QP)
2.57	Line	29.19	48.00	-18.81	(QP)
0.47	Neutral	33.61	48.00	-14.39	(QP)
0.58	Neutral	32.01	48.00	-15.99	(QP)
1.32	Neutral	28.96	48.00	-19.04	(QP)
1.67	Neutral	30.30	48.00	-17.70	(QP)
2.03	Neutral	29.65	48.00	-18.35	(QP)
2.65	Neutral	29.59	48.00	-18.41	(QP)

Remark :

- (1) Reading in which marked as QP means measurements by using are Quasi-Peak Mode with Detector BW=9KHz ; SPA setting in RBW=10KHz,VBW =10KHz, Swp. Time = 0.3 sec./MHz.
- (2) Measuring frequency range from 450KHz to 30MHz.

Review:

Analy Chiu.

Test Engr.:

James

Test Date : Jul. 03, 2002

6. Conducted Emission Data

6.1 Standard Applicable

According to 18.307(C), Consumer equipment for conduction limits.

6.2 The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Judgement: Passed by **-11.19 dB** in mode of **Neutral** terminal **0.76 MHz**
Test Mode : LC12012

Freq. (MHz)	Terminal	Measured(dBuV)		Safe Margins	
		QP-Mode	QP-Mode	(dBuV)	Note
0.52	Line	33.21	48.00	-14.79	(QP)
0.75	Line	35.21	48.00	-12.79	(QP)
0.98	Line	35.21	48.00	-12.79	(QP)
1.21	Line	34.78	48.00	-13.22	(QP)
1.67	Line	36.70	48.00	-11.30	(QP)
1.88	Line	34.87	48.00	-13.13	(QP)
0.52	Neutral	36.61	48.00	-11.39	(QP)
0.64	Neutral	36.21	48.00	-11.79	(QP)
0.76	Neutral	36.81	48.00	-11.19	(QP)
1.24	Neutral	33.97	48.00	-14.03	(QP)
1.67	Neutral	34.10	48.00	-13.90	(QP)
2.53	Neutral	32.39	48.00	-15.61	(QP)

Remark :

- (1) Reading in which marked as QP means measurements by using are Quasi-Peak Mode with Detector BW=9KHz ; SPA setting in RBW=10KHz,VBW =10KHz, Swp. Time = 0.3 sec./MHz.
- (2) Measuring frequency range from 450KHz to 30MHz.

Review:

Andy Liu

Test Engr.:

James

Test Date : Jul. 03, 2002

6. Conducted Emission Data

6.1 Standard Applicable

According to 18.307(C), Consumer equipment for conduction limits.

6.2 The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Judgement: Passed by **-9.85 dB** in mode of **Neutral** terminal **1.34 MHz**
Test Mode : LC12013

Freq. (MHz)	Terminal	Measured(dBuV)		Safe Margins	
		QP-Mode	Limits(dBuV)	(dBuV)	Note
0.48	Line	35.01	48.00	-12.99	(QP)
0.56	Line	36.61	48.00	-11.39	(QP)
0.79	Line	36.81	48.00	-11.19	(QP)
1.34	Line	38.15	48.00	-9.85	(QP)
1.70	Line	36.70	48.00	-11.30	(QP)
2.30	Line	34.62	48.00	-13.38	(QP)
0.56	Neutral	35.21	48.00	-12.79	(QP)
0.81	Neutral	37.01	48.00	-10.99	(QP)
0.93	Neutral	36.61	48.00	-11.39	(QP)
1.19	Neutral	37.38	48.00	-10.62	(QP)
1.79	Neutral	35.48	48.00	-12.52	(QP)
1.92	Neutral	34.86	48.00	-13.14	(QP)

Remark :

- (1) Reading in which marked as QP means measurements by using are Quasi-Peak Mode with Detector BW=9KHz ; SPA setting in RBW=10KHz, VBW =10KHz, Swp. Time = 0.3 sec./MHz.
- (2) Measuring frequency range from 450KHz to 30MHz.

Review:

Andy Liu

Test Engr.:

James

Test Date : Jul. 03, 2002

6. Conducted Emission Data

6.1 Standard Applicable

According to 18.307(C), Consumer equipment for conduction limits.

6.2 The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Judgement: Passed by **-9.85 dB** in mode of **Neutral** terminal **1.34 MHz**
Test Mode : LC12014

Freq. (MHz)	Terminal	Measured(dBuV)		Safe Margins	
		QP-Mode	Limits(dBuV)	(dBuV)	Note
0.52	Line	41.01	48.00	-6.99	(QP)
0.64	Line	41.20	48.00	-6.80	(QP)
0.76	Line	37.60	48.00	-10.40	(QP)
1.14	Line	34.40	48.00	-13.60	(QP)
12.58	Line	40.27	48.00	-7.73	(QP)
29.13	Line	40.40	48.00	-7.60	(QP)
0.52	Neutral	39.40	48.00	-8.60	(QP)
0.64	Neutral	41.10	48.00	-6.90	(QP)
0.75	Neutral	37.10	48.00	-10.90	(QP)
1.13	Neutral	34.50	48.00	-13.50	(QP)
1.59	Neutral	40.51	48.00	-7.49	(QP)
29.25	Neutral	26.70	48.00	-21.30	(QP)

Remark :

- (1) Reading in which marked as QP means measurements by using are Quasi-Peak Mode with Detector BW=9KHz ; SPA setting in RBW=10KHz, VBW =10KHz, Swept Time = 0.3 sec./MHz.
- (2) Measuring frequency range from 450KHz to 30MHz.

Review:

Analy Chiu

Test Engr.:

James

Test Date : Jul. 03, 2002

6. Conducted Emission Data

6.1 Standard Applicable

According to 18.307(C), Consumer equipment for conduction limits.

6.2 The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Judgement: Passed by **-2.40 dB** in mode of **Neutral** terminal **1.27 MHz**

Test Mode : LC12015

Freq. (MHz)	Terminal	Measured(dBuV)		Safe Margins	
		QP-Mode	Limits(dBuV)	(dBuV)	Note
0.52	Line	43.80	48.00	-4.20	(QP)
0.82	Line	36.10	48.00	-11.90	(QP)
0.96	Line	37.00	48.00	-11.00	(QP)
1.29	Line	34.10	48.00	-13.90	(QP)
1.59	Line	30.20	48.00	-17.80	(QP)
29.25	Line	40.09	48.00	-7.91	(QP)
0.52	Neutral	43.90	48.00	-4.10	(QP)
0.95	Neutral	44.10	48.00	-3.90	(QP)
1.27	Neutral	45.60	48.00	-2.40	(QP)
1.42	Neutral	43.80	48.00	-4.20	(QP)
1.85	Neutral	44.70	48.00	-3.30	(QP)
29.01	Neutral	41.69	48.00	-6.31	(QP)

Remark :

- (1) Reading in which marked as QP means measurements by using are Quasi-Peak Mode with Detector BW=9KHz ; SPA setting in RBW=10KHz, VBW =10KHz, Swept Time = 0.3 sec./MHz.
- (2) Measuring frequency range from 450KHz to 30MHz.

Review:

Andy Liu

Test Engr.:

James

Test Date : Jul. 03, 2002

7. Radiated Emission Datas

7.1 Standard Applicable

According to 18.305(c). Consumer equipment for Field Strength limits.

7.2 The following data lists the significant emission frequencies, measured levels, correction factor (includes cable and antenna corrections), the corrected reading, as well as the limit. Explanation of the Correction Factor is given in paragraph 7.3.1

Judgement: Passed by **-10.51 dB** in polarity of **Vertical 30.58 MHz**
Test Mode : LC12010

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Safe Margins (dBuV/m)	Note
30.58	V	43.95	- 14.46	29.49	40.00	- 10.51	
33.48	H	40.45	- 14.06	26.39	40.00	- 13.61	
43.26	H	39.85	- 13.48	26.37	40.00	- 13.63	
44.91	V	38.90	- 13.44	25.46	40.00	- 14.54	
66.95	H	35.40	- 14.10	21.30	40.00	- 18.70	
70.10	V	38.87	- 14.57	24.30	40.00	- 15.70	
203.93	V	38.25	- 12.88	25.37	43.50	- 18.13	
204.07	H	39.57	- 18.23	21.34	43.50	- 22.16	
249.07	V	34.52	- 10.68	23.84	46.00	- 22.16	
274.07	V	33.45	- 9.60	23.85	46.00	- 22.15	
282.00	H	37.15	- 15.71	21.44	46.00	- 24.56	
292.79	H	32.55	- 15.58	16.97	46.00	- 29.03	

Remark :

- (1) Test Spectrum Analyzer measurement condition setting are RBW=100KHz, Video BW =100KHz , Sweep. Time = 0.2 sec; Receiver setting. RBW, VBW=120KHz.Sweep time=0.2 sec.
- (2) All readings are Peak unless otherwise stated QP in column of 『Note』
- (3) Measuring frequency range from 30MHz to 1000MHz.
- (4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table.
- (5) If the peak scan value lower limit less than 20dB, then this signal data will be listed. But if these signal datas more than 10 frequencies, then only the Top 10 be listed.

Review: Andy Chiu Test Engr.: James Test Date : Jul. 03, 2002

7. Radiated Emission Datas

7.1 Standard Applicable

According to 18.305(c). Consumer equipment for Field Strength limits.

7.2 The following data lists the significant emission frequencies, measured levels, correction factor (includes cable and antenna corrections), the corrected reading, as well as the limit. Explanation of the Correction Factor is given in paragraph 7.3.1

Judgement: Passed by **-11.66 dB** in polarity of **Horizontal 30.66 MHz**
Test Mode : LC12011

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Safe Margins (dBuV/m)	Note
30.66	H	46.30	- 14.46	31.84	43.50	- 11.66	
31.16	V	39.85	- 14.40	25.45	40.00	- 14.55	
37.04	H	44.10	- 13.70	30.40	43.50	- 13.10	
51.05	V	36.65	- 13.06	23.59	40.00	- 16.41	
59.66	H	34.67	- 13.13	21.54	46.00	- 24.46	
72.01	V	38.82	- 14.97	23.85	40.00	- 16.15	
204.00	V	34.77	- 12.86	21.91	40.00	- 18.09	
204.03	H	38.25	- 18.23	20.02	40.00	- 19.98	
205.70	H	35.05	- 18.24	16.81	46.00	- 29.19	
244.07	V	33.60	- 10.87	22.73	40.00	- 17.27	
274.31	V	33.80	- 9.60	24.20	46.00	- 21.80	
488.00	H	29.80	- 12.27	17.53	46.00	- 28.47	

Remark :

- (1) Test Spectrum Analyzer measurement condition setting are RBW=100KHz, Video BW =100KHz , Sweep. Time = 0.2 sec; Receiver setting. RBW, VBW=120KHz.Sweep time=0.2 sec.
- (2) All readings are Peak unless otherwise stated QP in column of 『Note』
- (3) Measuring frequency range from 30MHz to 1000MHz.
- (4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table.
- (5) If the peak scan value lower limit less than 20dB, then this signal data will be listed. But if these signal datas more than 10 frequencies, then only the Top 10 be listed.

Review:

Analy chiu

Test Engr.:

James

Test Date :

Jul. 03, 2002

7. Radiated Emission Datas

7.1 Standard Applicable

According to 18.305(c). Consumer equipment for Field Strength limits.

7.2 The following data lists the significant emission frequencies, measured levels, correction factor (includes cable and antenna corrections), the corrected reading, as well as the limit. Explanation of the Correction Factor is given in paragraph 7.3.1

Judgement: Passed by **-11.27 dB** in polarity of **Horizontal 31.24 MHz**
Test Mode : LC12012

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Safe Margins (dBuV/m)	Note
31.24	H	43.10	- 14.37	28.73	40.00	- 11.27	
33.65	V	40.02	- 14.03	25.99	40.00	- 14.01	
44.42	H	38.50	- 13.48	25.02	40.00	- 14.98	
44.67	V	40.20	- 13.45	26.75	40.00	- 13.25	
71.76	H	37.77	- 14.90	22.87	40.00	- 17.13	
71.93	V	40.20	- 14.93	25.27	40.00	- 14.73	
204.00	H	39.50	- 18.23	21.27	43.50	- 22.23	
225.07	V	33.90	- 11.80	22.10	43.50	- 21.40	
244.07	V	34.70	- 10.87	23.83	46.00	- 22.17	
264.57	H	35.57	- 16.41	19.16	46.00	- 26.84	
275.71	V	34.30	- 9.50	24.80	46.00	- 21.20	
276.57	H	32.20	- 15.82	16.38	46.00	- 29.62	

Remark :

- (1) Test Spectrum Analyzer measurement condition setting are RBW=100KHz, Video BW =100KHz , Sweep. Time = 0.2 sec; Receiver setting. RBW, VBW=120KHz.Sweep time=0.2 sec.
- (2) All readings are Peak unless otherwise stated QP in column of 『Note』
- (3) Measuring frequency range from 30MHz to 1000MHz.
- (4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table.
- (5) If the peak scan value lower limit less than 20dB, then this signal data will be listed. But if these signal datas more than 10 frequencies, then only the Top 10 be listed.

Review:

Andy Liu

Test Engr.:

James

Test Date :

Jul. 25, 2002

7. Radiated Emission Datas

7.1 Standard Applicable

According to 18.305(c). Consumer equipment for Field Strength limits.

7.2 The following data lists the significant emission frequencies, measured levels, correction factor (includes cable and antenna corrections), the corrected reading, as well as the limit. Explanation of the Correction Factor is given in paragraph 7.3.1

Judgement: Passed by **-16.84 dB** in polarity of **Vertical 36.38 MHz**
Test Mode : LC12013

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Safe Margins (dBuV/m)	Note
31.57	H	33.90	- 14.33	19.57	40.00	- 20.43	
36.38	V	36.92	- 13.76	23.16	40.00	- 16.84	
44.50	H	32.08	- 13.47	18.61	40.00	- 21.39	
44.91	V	33.93	- 13.44	20.49	40.00	- 19.51	
70.19	V	35.47	- 14.60	20.87	40.00	- 19.13	
71.68	H	34.29	- 14.90	19.39	40.00	- 20.61	
203.77	H	39.90	- 18.22	21.68	43.50	- 21.82	
204.37	V	27.96	- 12.86	15.10	43.50	- 28.40	
217.70	V	24.41	- 12.29	12.12	46.00	- 33.88	
244.23	V	24.51	- 10.87	13.64	46.00	- 32.36	
249.29	H	33.52	- 17.08	16.44	46.00	- 29.56	
342.89	H	32.45	- 16.86	15.59	46.00	- 30.41	

Remark :

- (1) Test Spectrum Analyzer measurement condition setting are RBW=100KHz, Video BW =100KHz , Sweep. Time = 0.2 sec; Receiver setting. RBW, VBW=120KHz.Sweep time=0.2 sec.
- (2) All readings are Peak unless otherwise stated QP in column of 『Note』
- (3) Measuring frequency range from 30MHz to 1000MHz.
- (4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table.
- (5) If the peak scan value lower limit less than 20dB, then this signal data will be listed. But if these signal datas more than 10 frequencies, then only the Top 10 be listed.

Review: Andy Liu Test Engr.: James Test Date : Jul. 25, 2002

7. Radiated Emission Datas

7.1 Standard Applicable

According to 18.305(c). Consumer equipment for Field Strength limits.

7.2 The following data lists the significant emission frequencies, measured levels, correction factor (includes cable and antenna corrections), the corrected reading, as well as the limit. Explanation of the Correction Factor is given in paragraph 7.3.1

Judgement: Passed by **-12.13 dB** in polarity of **Vertical 32.90 MHz**
Test Mode : LC12014

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Safe Margins (dBuV/m)	Note
31.91	H	39.11	- 14.28	24.83	40.00	- 15.17	
32.90	V	42.00	- 14.13	27.87	40.00	- 12.13	
37.21	H	38.53	- 13.68	24.85	40.00	- 15.15	
41.85	V	34.24	- 13.44	20.80	40.00	- 19.20	
42.10	H	33.85	- 13.45	20.40	40.00	- 19.60	
72.17	V	36.22	- 15.00	21.22	40.00	- 18.78	
203.73	V	29.27	- 12.88	16.39	43.50	- 27.11	
203.73	H	31.85	- 12.88	18.97	43.50	- 24.53	
204.54	H	23.19	- 12.86	10.33	43.50	- 33.17	
254.47	H	24.28	- 10.45	13.83	46.00	- 32.17	
485.81	V	19.67	- 3.00	16.67	46.00	- 29.33	
506.86	V	22.45	- 2.50	19.95	46.00	- 26.05	

Remark :

- (1) Test Spectrum Analyzer measurement condition setting are RBW=100KHz, Video BW =100KHz , Sweep. Time = 0.2 sec; Receiver setting. RBW, VBW=120KHz.Sweep time=0.2 sec.
- (2) All readings are Peak unless otherwise stated QP in column of 『Note』
- (3) Measuring frequency range from 30MHz to 1000MHz.

(4) If the peak scan value lower limit more than 20dB, then this signal data does not show.

- (5) If the peak scan value lower limit less than 20dB, then this signal data will be listed. But if these signal data more than 10 frequencies, then only the Top 10 be listed.

Review:

Andy Chiu

Test Engr.:

James

Test Date :

Jul. 25, 2002

7. Radiated Emission Datas

7.1 Standard Applicable

According to 18.305(c). Consumer equipment for Field Strength limits.

7.2 The following data lists the significant emission frequencies, measured levels, correction factor (includes cable and antenna corrections), the corrected reading, as well as the limit. Explanation of the Correction Factor is given in paragraph 7.3.1

Judgement: Passed by **-11.13 dB** in polarity of **Vertical 32.73 MHz**
Test Mode : LC12015

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Safe Margins (dBuV/m)	Note
30.26	H	38.79	- 14.50	24.29	40.00	- 15.71	
32.23	H	35.30	- 14.24	21.06	40.00	- 18.94	
32.73	V	43.03	- 14.16	28.87	40.00	- 11.13	
44.23	H	33.29	- 13.49	19.80	40.00	- 20.20	
44.67	V	34.22	- 13.45	20.77	40.00	- 19.23	
72.75	V	36.26	- 15.10	21.16	40.00	- 18.84	
202.70	V	26.86	- 12.89	13.97	43.50	- 29.53	
203.73	V	28.40	- 12.88	15.52	43.50	- 27.98	
210.16	H	24.20	- 12.77	11.43	43.50	- 32.07	
224.99	H	25.82	- 11.80	14.02	46.00	- 31.98	
244.06	H	24.93	- 10.87	14.06	46.00	- 31.94	
244.19	V	26.11	- 10.87	15.24	46.00	- 30.76	

Remark :

- (1) Test Spectrum Analyzer measurement condition setting are RBW=100KHz, Video BW =100KHz , Sweep. Time = 0.2 sec; Receiver setting. RBW, VBW=120KHz.Sweep time=0.2 sec.
- (2) All readings are Peak unless otherwise stated QP in column of 『Note』
- (3) Measuring frequency range from 30MHz to 1000MHz.
- (4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table.
- (5) If the peak scan value lower limit less than 20dB, then this signal data will be listed. But if these signal datas more than 10 frequencies, then only the Top 10 be listed.

Review:

Andy Liu

Test Engr.:

James

Test Date :

Jul. 25, 2002

7. Radiated Emission Data

7.1 Standard Applicable

According to 18.309. Consumer equipment for Field Strength limits.

7.2 The following data lists the significant emission frequencies, measured levels, plus the limit. Explanation of field strength limit calculation is given in paragraph 7-3.2.

Condition : Test Distance : 1 meter Test Mode : LC12010

Type of Antenna: Loop Antenna

Freq. (KHz)	Receiver* Reading in dBuV/m	Factor (dB) Cable Loss	Field Strength (uV/m)	Required Measurement Distance(m)	Limitation Converted 1 m dist. (dBuV/m)	Over Limit
51.88	58.19	0.1	46.26	300	132.39	-74.10
103.76	*	0.1	23.13	300	126.37	*
155.64	33.79	0.1	15.42	300	122.85	-88.96
207.52	30.54	0.1	11.57	300	120.35	-89.71
259.40	31.38	0.2	9.25	300	118.41	-86.83
311.28	*	0.2	7.71	300	116.83	*
363.16	24.70	0.2	6.61	300	115.49	-90.59
415.04	*	0.3	5.78	300	114.33	*
466.92	*	0.3	5.14	300	113.30	*
518.80	*	0.3	46.26	30	92.39	*

- * All receiver readings (the measured field strength levels) are measured from loop antenna directly.
- * 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.
- * The tighter limit applies at the band edges.
- * **Remark:** “**” means that the noise emission is too low to detect by Field Strength Meter.

Review : Andy Liu

Test Personnel :

James

Date:

Aug. 13, 2002

7. Radiated Emission Data

7.1 Standard Applicable

According to 18.309. Consumer equipment for Field Strength limits.

7.2 The following data lists the significant emission frequencies, measured levels, plus the limit. Explanation of field strength limit calculation is given in paragraph 7-3.2.

Condition : Test Distance : 1 meter Test Mode : LC12011

Type of Antenna: Loop Antenna

Freq. (KHz)	Receiver* Reading in dBuV/m	Factor (dB) Cable Loss	Field Strength (uV/m)	Required Measurement Distance(m)	Limitation Converted 1 m dist. (dBuV/m)	Over Limit
53.12	48.11	0.1	45.18	300	132.18	-83.97
106.24	*	0.1	22.59	300	126.16	*
159.36	23.10	0.1	15.06	300	122.64	-99.44
212.48	*	0.1	11.30	300	120.14	*
265.60	*	0.2	9.04	300	118.20	*
318.72	*	0.2	7.53	300	116.62	*
371.84	*	0.2	6.45	300	115.28	*
424.96	*	0.3	5.65	300	114.12	*
478.08	*	0.3	5.02	300	113.10	*
531.20	*	0.3	45.18	30	92.18	*

- * All receiver readings (the measured field strength levels) are measured from loop antenna directly.
- * 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.
- * The tighter limit applies at the band edges.
- * **Remark:** “**” means that the noise emission is too low to detect by Field Strength Meter.

Review : Andy Liu

Test Personnel :

James

Date:

Aug. 13, 2002

7. Radiated Emission Data

7.1 Standard Applicable

According to 18.309. Consumer equipment for Field Strength limits.

7.2 The following data lists the significant emission frequencies, measured levels, plus the limit. Explanation of field strength limit calculation is given in paragraph 7-3.2.

Condition : Test Distance : 1 meter Test Mode : LC12012

Type of Antenna: Loop Antenna

Freq. (KHz)	Receiver* Reading in dBuV/m	Factor (dB) Cable Loss	Field Strength (uV/m)	Required Measurement Distance(m)	Limitation Converted 1 m dist. (dBuV/m)	Over Limit
57.39	56.95	0.1	41.82	300	131.51	-74.46
114.78	25.28	0.1	20.91	300	125.49	-100.11
172.17	28.02	0.1	13.94	300	121.97	-93.85
229.56	14.26	0.1	10.45	300	119.47	-105.11
286.95	28.58	0.2	8.36	300	117.53	-88.75
344.34	25.79	0.2	6.97	300	115.95	-89.96
401.73	*	0.2	5.97	300	114.61	*
459.12	*	0.3	5.23	300	113.45	*
516.51	*	0.3	46.47	300	92.43	*
573.90	*	0.3	41.82	30	91.51	*

- * All receiver readings (the measured field strength levels) are measured from loop antenna directly.
- * 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.
- * The tighter limit applies at the band edges.
- * **Remark:** “**” means that the noise emission is too low to detect by Field Strength Meter.

Review : Andy Liu

Test Personnel :

James

Date: Aug. 13, 2002

7. Radiated Emission Data

7.1 Standard Applicable

According to 18.309. Consumer equipment for Field Strength limits.

7.2 The following data lists the significant emission frequencies, measured levels, plus the limit. Explanation of field strength limit calculation is given in paragraph 7-3.2.

Condition : Test Distance : 1 meter Test Mode : LC12013

Type of Antenna: Loop Antenna

Freq. (KHz)	Receiver* Reading in dBuV/m	Factor (dB) Cable Loss	Field Strength (uV/m)	Required Measurement Distance(m)	Limitation Converted 1 m dist. (dBuV/m)	Over Limit
61.17	64.90	0.1	39.23	300	130.96	-65.96
122.34	26.07	0.1	19.62	300	124.94	-98.77
183.51	35.03	0.1	13.08	300	121.42	-86.29
244.68	28.76	0.1	9.81	300	118.92	-90.06
305.85	28.87	0.2	7.85	300	116.98	-87.91
367.02	22.59	0.2	6.54	300	115.40	-92.61
428.19	*	0.2	5.60	300	114.06	*
489.36	*	0.3	4.90	300	112.90	*
550.53	*	0.3	43.59	300	91.87	*
611.70	*	0.3	39.23	30	90.96	*

- * All receiver readings (the measured field strength levels) are measured from loop antenna directly.
- * 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.
- * The tighter limit applies at the band edges.
- * **Remark:** “**” means that the noise emission is too low to detect by Field Strength Meter.

Review : Andy Liu

Test Personnel :

James

Date:

Aug. 13, 2002

7. Radiated Emission Data

7.1 Standard Applicable

According to 18.309. Consumer equipment for Field Strength limits.

7.2 The following data lists the significant emission frequencies, measured levels, plus the limit. Explanation of field strength limit calculation is given in paragraph 7-3.2.

Condition : Test Distance : 1 meter Test Mode : LC12014

Type of Antenna: Loop Antenna

Freq. (KHz)	Receiver* Reading in dBuV/m	Factor (dB) Cable Loss	Field Strength (uV/m)	Required Measurement Distance(m)	Limitation Converted 1 m dist. (dBuV/m)	Over Limit
59.28	77.69	0.1	40.49	300	131.23	-53.44
118.56	21.60	0.1	20.24	300	125.21	-103.51
177.84	48.77	0.1	13.50	300	121.69	-72.82
237.12	18.53	0.1	10.12	300	119.19	-100.56
296.40	30.16	0.2	8.10	300	117.25	-86.89
355.68	*	0.2	6.75	300	115.67	*
414.96	27.90	0.2	5.78	300	114.33	-86.23
474.24	*	0.3	5.06	300	113.17	*
533.52	35.62	0.3	44.98	300	92.15	-56.23
592.80	*	0.3	40.49	30	91.23	*

- * All receiver readings (the measured field strength levels) are measured from loop antenna directly.
- * 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.
- * The tighter limit applies at the band edges.
- * **Remark:** “**” means that the noise emission is too low to detect by Field Strength Meter.

Review : Andy Liu

Test Personnel :

James

Date: Aug. 13, 2002

7. Radiated Emission Data

7.1 Standard Applicable

According to 18.309. Consumer equipment for Field Strength limits.

7.2 The following data lists the significant emission frequencies, measured levels, plus the limit. Explanation of field strength limit calculation is given in paragraph 7-3.2.

Condition : Test Distance : 1 meter Test Mode : LC12015

Type of Antenna: Loop Antenna

Freq. (KHz)	Receiver* Reading in dBuV/m	Factor (dB) Cable Loss	Field Strength (uV/m)	Required Measurement Distance(m)	Limitation Converted 1 m dist. (dBuV/m)	Over Limit
68.04	79.73	0.1	35.27	300	130.03	-50.20
136.08	27.90	0.1	17.64	300	124.01	-96.01
204.12	52.20	0.1	11.76	300	120.49	-68.19
272.16	31.25	0.1	8.82	300	117.99	-86.64
340.20	32.77	0.2	7.05	300	116.05	-83.08
408.24	*	0.2	5.88	300	114.47	*
476.28	30.16	0.2	5.04	300	113.13	-82.77
544.32	28.61	0.3	44.09	300	91.97	-63.06
612.36	*	0.3	39.19	300	90.95	*
680.40	*	0.3	35.27	30	90.03	*

- * All receiver readings (the measured field strength levels) are measured from loop antenna directly.
- * 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.
- * The tighter limit applies at the band edges.
- * **Remark:** “**” means that the noise emission is too low to detect by Field Strength Meter.

Review : Andy Liu

Test Personnel :

James

Date: Aug. 13, 2002

7-3.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where **FS = Field Strength**

RA = Receiver Amplitude

AF = Antenna Factor (1)

CL = Cable Attenuation Factor (1)

AG = Amplifier Gain (1) (2)

Remark :

(1) The Correction Factor = AF + CL - AG, as shown in the data tables' Correction Factor column.

(2) AG is not available for Neutron's Open Site Facility

Example of Calculation:

Assume a Receiver Reading of 23.7 dBuV is obtained with an Antenna Factor of 7.2 dB and a Cable Factor of 1.1 dB. Then:

1. The Correction Factor will be calculated by

$$\text{Correction Factor} = AF + CL - AG = 7.2 + 1.1 - 0 = 8.3 \text{ (dB)}$$

as shown in the data tables' Correction Factor column.

2. The Field Strength will be calculated by

$$FS = RA + \text{Correction Factor} = 23.7 + 8.3 = 32 \text{ (dBuV/m).}$$

FS is the value shown in the data tables' Corrected Reading column and RA is the value shown in

the data tables' Receiver Reading column. The 32 dBuV/m value was mathematically converted

to its corresponding level in uV/m as:

$$\text{Log}^{-1}\{(32.0 \text{ dBuV/m})/20\} = 39.8 \text{ (uV/m)}$$

7-3.2 Field Strength Limits Calculation

The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 - 0.490	2400/F (KHz)	300
0.490 - 1.705	24000/F (KHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
above 960	500	3

As the Test Methodology mentioned in Section 1-4, the measurement distance between the EUT and Loop Antenna was selected by 1 meter, the Field strength Limits of each frequency band are calculated by the following equation to convert its corresponding distance to 1 meter:

$$Ed2 / Ed1 = (d2/d1) \text{ square} \dots \text{equation (1)}$$

where **d1** will be 1 meter, then

$$E1 = Ed2 * (d2) / 1m \text{ square} \dots \text{equation (2)}$$

where **E1** denotes the field strength limit at measurement distance 1 meter.

The measured field strength levels are read from receiver directly in dBuv/m unit. For easy to compare with field strength limits, taking command logarithm both side of equation (2), then it will be calculated as equation (3) in dBuV/m unit.

$$20 \log (E1) = 20 \log [(Ed2) * (d2) \text{ square}], \text{ then}$$

$$20 \log (E1) = 20 \log (Ed2) + 40 \log (d2) \dots \text{equation (3)}$$

6-2-2 Example for calculation

1. Frequency located in band of 0.009-0.490 MHz, the field strength limit of each frequency be calculated as

$$20 \log 2400 / F (\text{KHz}) + 40 \log 300$$

Assume a frequency of 120 KHz be calculated, then the Field strength Limit in dBuV will be obtained

$$20 \log (2400 / 120) + 40 \log 300 = 125.1 \text{ dBuV/m}$$

2. Frequency located in band of 0.490 – 1.705 MHz, the field strength limit of each frequency be calculated as

$$20 \log 24000 / F (\text{KHz}) + 40 \log 30$$

Assume a frequency of 600KHz recalculated, then the Field Strength Limit in dBuV will be obtained

$$20 \log (24000 / 600) + 40 \log 30 = 91.1 \text{ dBuV/m}$$

3. Frequency located in band of 30-88 MHz, the field strength limit of each frequency be calculated as

$$20 \log 30 + 40 \log 30$$

Assume a frequency of 6 MHz be calculated, then the Field Strength Limit in dBuV will be obtained

$$20 \log 30 + 40 \log 30 = 88.6 \text{ dBuV/m}$$

4. Frequency located in band of 30-88 MHz, the field strength limit of each frequency be calculated as

$$20 \log 100 + 40 \log 3$$

Assume a frequency of 60 MHz be calculated, then the Field Strength Limit in dBuV will be obtained

$$20 \log 100 + 40 \log 3 = 59.1 \text{ dBuV/m}$$

8. Photos of Tested EUT:

- 1. Photo # 1 Front View, Rear View**
- 2. Photo # 2-11 Unit Partially Disassembled**

Attachment

User's Manual