Test Report

(Declaration of Conformity)

for

Electromagnetic Interference

of

E.U.T.： **Adaptor**
Trade Name： Cincon Electronics Co., Ltd.
Model Number： TR70A12-1 / TR70A12-3 / TR70A12
TR70A15 / TR70A18 / TR70A19
TR70A24 / TR70A48 / TR45A05
TR45A12 / TR45A15 / TR45A18
TR45A19 / TR45A24 / TR45A48

Prepared for

Cincon Electronics Co., Ltd.
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Prepared by

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NVLAP LAB. Code: 200458-0

Table of Contents

Certification of Compliance

Applicant：	Cincon Electronics Co., Ltd.
Manufacturer：	Cincon Electronics Co., Ltd.
EUT Description：	Adaptor
Model No.：	TR70A12-1 / TR70A12-3 / TR70A12 TR70A15 / TR70A18 / TR70A19 TR70A24 / TR70A48 / TR45A05 TR45A12 / TR45A15 / TR45A18 TR45A19 / TR45A24 / TR45A48
Serial No.：	N/A
Tested Power Supply：	120Vac, 60Hz
Date of Final Test：	Dec. 3, 2000

Measurement Procedures and Standards Used：

☒ CFR 47, Part 15
☒ ANSI C63.4: 1992
☒ CISPR 22: 1997

The device described above was tested by Interocean EMC Technology Corporation to determine the maximum emission levels emanated from the device and severity levels of the device endure and its performance criterion. The measurement results are contained in this test report and Interocean EMC Technology Corp assumes full responsibility for the accuracy and completeness of these measurements. This report shows the EUT is technically compliant with the Part 15 class B and ANSI C63.4 official requirements. This report applies to the above sample only and shall not be reproduced in part without written approval of Interocean EMC Technology Corporation.

Report Issued: 2000/12/13

Test Engineer: Jackal Yang Checked: Tomy Hu

Approved: Kent J.K. Hsu

1 General Information

1.1 Description of Equipment Under Test

Equipment Under Test	:	Adaptor
Model Number	:	TR70A12-1 / TR70A12-3 / TR70A12 TR70A15 / TR70A18 / TR70A19 TR70A24 / TR70A48 / TR45A05 TR45A12 / TR45A15 / TR45A18 TR45A19 / TR45A24 / TR45A48
Serial Number	:	N/A
Type of Sample Tested	:	☒Proto-type ☐Pre-Production ☐Mass Production
Applicant	:	Cincon Electronics Co., Ltd. No.8-1 Fu Kung RD. Fu Hsing Park, Fu Hsing Hsiang, Chang Hua Hsien, Taiwan, R.O.C.
Manufacturer	:	Cincon Electronics Co., Ltd. No.8-1 Fu Kung RD. Fu Hsing Park, Fu Hsing Hsiang, Chang Hua Hsien, Taiwan, R.O.C.
Power Supply	:	Cincon, M/N: **TR70A12-1** Input: 90-264Vac, 1A, 47-63Hz Power core: ☒Non-Shielded ☒Detachable 1.6m Output: 12Vdc, 5.5A, Max. 66W Power core: ☒Non-Shielded ☒Un-detachable, 1.7m Cincon, M/N: **TR70A48** Input: 90-264Vac, 1A, 47-63Hz Power core: ☒Non-Shielded ☒Detachable 1.6m Output: 48Vdc, 1.5A, Max. 72W Power core: ☒Non-Shielded ☒Un-detachable, 1.7m Cincon, M/N: **TR45A48** Input: 90-264Vac, 1A, 47-63Hz Power core: ☒Non-Shielded ☒Detachable 1.6m Output: 48Vdc, 1A, Max. 48W Power core: ☒Non-Shielded ☒Un-detachable, 1.7m
Data Cable	:	☒N/A
Date of Receipt of Sample	:	Nov. 15, 2000
Date of Test	:	Nov. 20 ~ Dec. 3, 2000
Description of E.U.T.	:	Theses EUT are Adaptor. There are specification description as following:

MODEL	OUTPUT VOLTAGE	OUTPUT CURRENT
TR70A12-1	12Vdc	5.50A
TR70A12-3	12Vdc	5.50A
TR70A12	12Vdc	5.50A
TR70A15	15Vdc	4.60A
TR70A18	18Vdc	3.90A
TR70A19	19Vdc	3.70A
TR70A24	24Vdc	3.00A
TR70A48	48Vdc	1.50A
TR45A05	5Vdc	6.00A
TR45A12	12Vdc	3.75A
TR45A15	15Vdc	3.00A
TR45A18	18Vdc	2.50A
TR45A19	19Vdc	2.37A
TR45A24	24Vdc	1.88A
TR45A48	48Vdc	1.00A

1.2 Tested Supporting System Detail

1.2.1 LOAD (TR70A12-1)

WATT : 66W (12Vdc, 5.5A, 2.18Ω) FULL LOAD

33W (12Vdc, 2.75A, 4.36Ω) HALF LOAD

1.2.2 LOAD (TR70A48)

WATT : 72W (48Vdc, 1.5A, 32Ω) FULL LOAD

36W (48Vdc, 0.75A, 64Ω) HALF LOAD

1.2.3 LOAD (TR45A48)

WATT : 48W (48Vdc, 1A, 48Ω) FULL LOAD

24W (48Vdc, 0.5A, 96Ω) HALF LOAD

1.3 Test Facility

Site Description : ☐OATS 1 ☒OATS 2

Name of Firm : Interocean EMC Technology Corp.

Site Location : No.5-2, Lin 1, Tin-Fu Tsun, Lin-Kou Hsiang,
Taipei County, Taiwan, R.O.C.

Site Filing :
- Federal Communication Commissions – USA
  Registration No.: 96399
- Voluntary Control Council for Interference by Information Technology Equipment (VCCI) – Japan
  Registration No. (Conducted Room): C-1094
  Registration No. (OATS 1): R-1040
  Registration No. (OATS 2): R-1041

Site Accreditation :
- Bureau of Standards and Metrology and Inspection (BSMI) – Taiwan, R.O.C.
  Accreditation No.:
  SL2-IN-E-0026 for CNS13438 / CISPR22
  SL2-A1-E-0026 for CNS13783-1 / CISPR14
- National Voluntary Laboratory Accreditation Program (NVLAP) - USA
  Lab Code: 200458-0
- Nemko AS
  Authorization No.: ELA 181

1.3.1 Test Methodology

Both conducted and Radiated Emission Measurement was performed according to the procedures in ANSI C63.4-1992 and CISPR 22:1997. Radiated Emission Measurement was performed at 10 meters distance from antenna to EUT.

1.3.2 Measurement Uncertainty

The uncertainty is calculated in accordance with NAMAS document NIS 81.
Conducted Uncertainty Uc = ±2.96dB.
Radiated Uncertainty Uc = ±3.67dB.

2 Power Line Conducted Emission Measurement

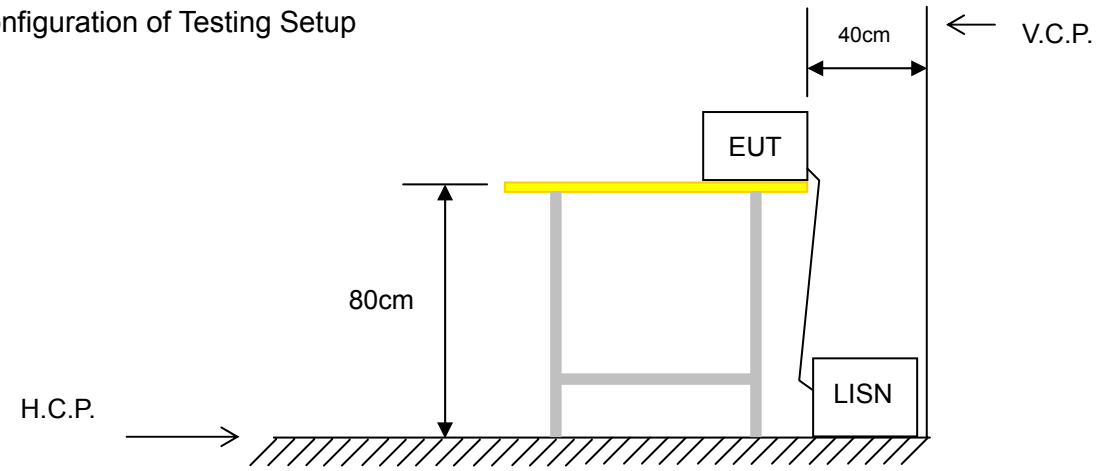
2.1 Instrument

Instrument	Manufacturer	Model	Serial No.	Last Calibration
EMI Test Receiver	Rohde & Schwarz	ESCS 30	830245/027	2000/07/26
L.I.S.N.	Schwarzbeck	NNLK8121	8121417	2000/09/08
L.I.S.N.	Rohde & Schwarz	ESH3-Z5	829996/016	2000/06/16
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	830836/026	2000/07/29
RF Cable	IETC	CBL04	N/A	2000/10/11

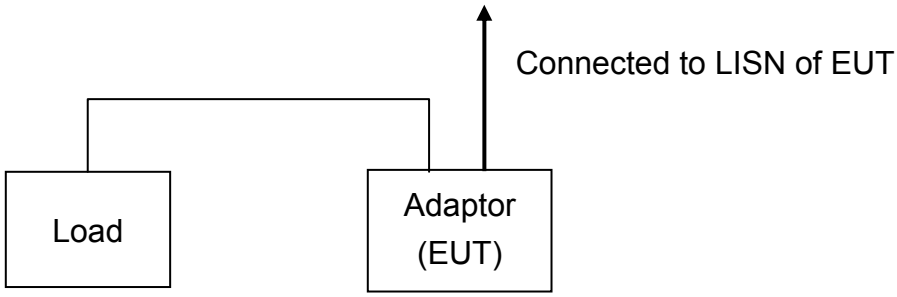
Note: All instrument upon which need to calibrated are with calibration period of 1 year.

2.2 Block Diagram of Test Configuration

Configuration of Testing Setup



Configuration of EUT Setup



2.3 Conducted Limit

☐ FCC Part 15

Frequency (MHz)	☐ Class A		☐ Class B	
	uV	dBuV	uV	dBuV
0.45 ~ 1.705	1000	60.0	250	48
1.705 ~ 30	3000	69.5	250	48

☒ CISPR 22

Frequency (MHz)	☐ Class A		☒ Class B	
	Q.P. (Quasi-Peak)	A.V. (Average)	Q.P. (Quasi-Peak)	A.V. (Average)
0.15 ~ 0.50	79	66	66 to 56	56 to 46
0.50 ~ 5.0	73	60	56	46
5.0 ~ 30	73	60	60	50

2.4 Instrument configuration

2.4.1 The EMI test receiver frequency range set from 150 KHz to 30 MHz.

2.4.2 The EMI test receiver bandwidth set at 9kHz.

2.4.3 The EMI test receiver detector set as Quasi-Peak (Q.P.) and Average (AV).

2.5 Measured Mode

2.5.1 The test mode for preliminary test as following:

- Mode 1: FULL LOAD (TR70A12-1)
- Mode 2: HALF LOAD (TR70A12-1)
- Mode 3: FULL LOAD (TR70A48)
- Mode 4: HALF LOAD (TR70A48)
- Mode 5: FULL LOAD (TR45A48)
- Mode 6: HALF LOAD (TR45A48)

2.5.2 Selected the worst case mode when after preliminary test for final test, the mode as following:

Mode 1: FULL LOAD (TR70A12-1)
Mode 2: HALF LOAD (TR70A12-1)
Mode 3: FULL LOAD (TR70A48)
Mode 4: HALF LOAD (TR70A48)
Mode 5: FULL LOAD (TR45A48)
Mode 6: HALF LOAD (TR45A48)

2.6 Configuration of Measurement

2.6.1 The EUT was place on a non-conductive table whose total height equaled 80cm and vertical conducting plane located 40cm to the rear of the EUT.

2.6.2 The EUT was connected to the main power through Line Impedance Stabilization Networks (LISN). This setup provided a 50ohm/50μH coupling impedance for the measuring equipment. The auxiliary equipment was also connected to the main power

through a LISN that provided a 50ohm/50μH coupling impedance with 50ohm termination. (Refer to the block diagram of the test setup and photographs.)

2.6.3 The conducted disturbance was measured between the phase lead and the reference ground, and between the neutral lead and reference ground. The initial testing identified the frequency that has the highest disturbance relative to the limit while operating the EUT in typical modes of operation and cable positions in a test setup representative of typical system configuration.

2.6.4 The identification of the frequency of highest disturbance with respect to the limit was found by investigating disturbances at a number of significant frequencies. The probable frequency of maximum disturbance had been found and that the associated cable and EUT configuration and mode of operation had been identified.

2.7 Configuration of EUT

2.7.1 Setup the EUT and simulators as shown section 2.2.

2.7.2 Connected the EUT with full load mode.

2.7.3 Turn on the power of all equipment.

2.7.4 Measured the Line phase and record value.

2.7.5 Changed into Neutral phase and record value.

2.7.6 Changed the EUT load to half load and repeated step 2.7.3 to 2.7.5.

2.8 Test Result

PASS

The final tests data as shown on following page. It is test waveform as shown on Appendix 1

Power Line Conducted Test Data

Date of Tested : Dec. 3, 2000 Power Line : Line

Temperature : 27℃ Humidity : 68%

Tested Mode : FULL LOAD (TR70A12-1)

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)		Emission Level (dBuV)		Limits (dBuV/m)		Margin (dB)	
		Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
0.150	1.70	53.00	49.00	54.70	50.70	66.00	56.00	-11.30	-5.30
0.249	1.27	42.00	37.60	43.27	38.87	63.70	53.70	-20.43	-14.83
1.152	0.80	25.00	23.30	25.80	24.10	56.00	46.00	-30.20	-21.90
3.494	1.14	30.60	22.00	31.74	23.14	56.00	46.00	-24.26	-22.86
5.900	1.28	27.40	23.80	28.68	25.08	60.00	50.00	-31.32	-24.92
20.445	1.61	27.40	22.30	29.01	23.91	60.00	50.00	-30.99	-26.09

Remark：

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss
3. “*” Means emission level un-detectable.
4. “--“ Means do not need detect.

Power Line Conducted Test Data

Date of Tested : Dec. 3, 2000 Power Line : Neutral
Temperature : 27℃ Humidity : 68%
Tested Mode : FULL LOAD (TR70A12-1)

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)		Emission Level (dBuV)		Limits (dBuV/m)		Margin (dB)	
		Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
0.151	1.70	53.50	47.40	55.20	49.10	65.97	55.97	-10.77	-6.87
0.201	1.48	49.40	45.30	50.88	46.78	64.54	54.54	-13.66	-7.76
0.219	1.40	44.30	21.50	45.70	22.90	64.03	54.03	-18.33	-31.13
1.552	0.69	36.20	34.40	36.89	35.09	56.00	46.00	-19.11	-10.91
2.863	0.55	37.20	34.20	37.75	34.75	56.00	46.00	-18.25	-11.25
21.505	1.60	34.40	33.00	36.00	34.60	60.00	50.00	-24.00	-15.40

Remark：

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss
3. “*” Means emission level un-detectable.
4. “--“ Means do not need detect.

Power Line Conducted Test Data

Date of Tested : Dec. 3, 2000 Power Line : Line

Temperature : 27℃ Humidity : 68%

Tested Mode : HALF LOAD (TR70A12-1)

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)		Emission Level (dBuV)		Limits (dBuV/m)		Margin (dB)	
		Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
0.150	1.70	50.60	43.30	52.30	45.00	66.00	56.00	-13.70	-11.00
0.252	1.27	41.00	36.10	42.27	37.37	63.09	53.09	-20.82	-15.72
0.503	0.65	40.80	40.30	41.45	40.95	56.00	46.00	-14.55	-5.05
2.060	0.75	34.30	30.20	35.05	30.95	56.00	46.00	-20.95	-15.05
3.115	0.61	32.60	25.60	33.21	26.21	56.00	46.00	-22.79	-19.79
21.505	1.60	31.60	30.80	33.20	32.40	60.00	50.00	-26.80	-17.60

Remark：

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss
3. “*” Means emission level un-detectable.
4. “--“ Means do not need detect.

Power Line Conducted Test Data

Date of Tested : Dec. 3, 2000 Power Line : Neutral
Temperature : 27℃ Humidity : 68%
Tested Mode : HALF LOAD (TR70A12-1)

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)		Emission Level (dBuV)		Limits (dBuV/m)		Margin (dB)	
		Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
0.150	1.70	51.80	45.90	53.50	47.60	66.00	56.00	-12.50	-8.40
0.160	1.66	49.20	25.40	50.86	27.06	65.71	55.71	-14.85	-28.65
0.176	1.59	47.20	20.80	48.79	22.39	65.26	55.26	-16.47	-32.87
0.189	1.53	46.40	21.90	47.93	23.43	64.89	54.89	-16.96	-31.46
0.251	1.27	44.50	41.80	45.77	43.07	63.11	53.11	-17.34	-10.04
3.115	0.61	39.40	33.70	40.01	34.31	56.00	46.00	-15.99	-11.69

Remark：

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss
3. “*” Means emission level un-detectable.
4. “--“ Means do not need detect.

Power Line Conducted Test Data

Date of Tested : Dec. 3, 2000 Power Line : Line
Temperature : 27℃ Humidity : 68%
Tested Mode : FULL LOAD (TR70A48)

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)		Emission Level (dBuV)		Limits (dBuV/m)		Margin (dB)	
		Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
0.158	1.66	50.30	20.90	51.96	22.56	65.77	55.77	-13.81	-33.21
0.195	1.51	50.50	39.20	52.01	40.71	64.71	54.71	-12.70	-14.00
0.226	1.38	42.80	13.90	44.18	15.28	63.83	53.83	-19.65	-38.55
1.830	0.84	28.00	23.40	28.84	24.24	56.00	46.00	-27.16	-21.76
4.831	1.10	33.20	17.40	34.30	18.50	56.00	46.00	-21.70	-27.50
17.591	1.50	37.20	31.40	38.70	32.90	60.00	50.00	-21.30	-17.10

Remark：

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss
3. “*” Means emission level un-detectable.
4. “--“ Means do not need detect.

Power Line Conducted Test Data

Date of Tested : Dec. 3, 2000 Power Line : Neutral
Temperature : 27℃ Humidity : 68%
Tested Mode : FULL LOAD (TR70A48)

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)		Emission Level (dBuV)		Limits (dBuV/m)		Margin (dB)	
		Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
0.150	1.70	52.70	23.30	54.40	25.00	66.00	56.00	-11.60	-31.00
0.193	1.51	48.20	35.10	49.71	36.61	64.77	54.77	-15.06	-18.16
0.199	1.49	48.80	39.80	50.29	41.29	64.60	54.60	-14.31	-13.31
1.258	0.58	31.60	27.60	32.18	28.18	56.00	46.00	-23.82	-17.82
4.833	1.10	39.20	27.20	40.30	28.30	56.00	46.00	-15.70	-17.70
17.812	1.56	38.40	34.20	39.96	35.76	60.00	50.00	-20.04	-14.24

Remark：

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss
3. “*” Means emission level un-detectable.
4. “--“ Means do not need detect.

Power Line Conducted Test Data

Date of Tested : Dec. 3, 2000 Power Line : Line

Temperature : 27℃ Humidity : 68%

Tested Mode : HALF LOAD (TR70A48)

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)		Emission Level (dBuV)		Limits (dBuV/m)		Margin (dB)	
		Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
0.150	1.70	50.30	21.50	52.00	23.20	66.00	56.00	-14.00	-32.80
0.178	1.58	46.30	17.00	47.88	18.58	65.20	55.20	-17.32	-36.62
0.199	1.49	45.20	37.20	46.69	38.69	64.60	54.60	-17.91	-15.91
1.330	0.51	29.80	29.30	30.31	29.81	56.00	46.00	-25.69	-16.19
4.926	1.18	32.30	22.20	33.48	23.38	56.00	46.00	-22.52	-22.62
17.810	1.56	30.60	29.30	32.16	30.86	60.00	50.00	-27.84	-19.14

Remark：

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss
3. “*” Means emission level un-detectable.
4. “--“ Means do not need detect.

Power Line Conducted Test Data

Date of Tested : Dec. 3, 2000 Power Line : Neutral
Temperature : 27℃ Humidity : 68%
Tested Mode : HALF LOAD (TR70A48)

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)		Emission Level (dBuV)		Limits (dBuV/m)		Margin (dB)	
		Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
0.150	1.70	51.20	21.80	52.90	23.50	66.00	56.00	-13.10	-32.50
0.158	1.66	50.20	21.10	51.86	22.76	65.77	55.77	-13.91	-33.01
0.177	1.59	48.20	18.50	49.79	20.09	65.23	55.23	-15.44	-35.14
0.215	1.42	43.30	16.70	44.72	18.12	64.14	54.14	-19.42	-36.02
4.779	1.11	36.20	22.80	37.31	23.91	56.00	46.00	-18.69	-22.09
19.442	1.60	32.80	29.00	34.40	30.60	60.00	50.00	-25.60	-19.40

Remark：

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss
3. “*” Means emission level un-detectable.
4. “--“ Means do not need detect.

Power Line Conducted Test Data

Date of Tested : Dec. 3, 2000 Power Line : Line
Temperature : 27℃ Humidity : 68%
Tested Mode : FULL LOAD (TR45A48)

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)		Emission Level (dBuV)		Limits (dBuV/m)		Margin (dB)	
		Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
0.178	1.58	43.60	18.40	45.18	19.98	65.20	55.20	-20.02	-35.22
0.201	1.48	50.00	43.30	51.48	44.78	64.54	54.54	-13.06	-9.76
0.268	1.25	45.40	38.00	46.65	39.25	62.63	52.63	-15.98	-13.38
4.752	1.11	38.90	27.10	40.01	28.21	56.00	46.00	-15.99	-17.79
13.615	1.44	43.60	35.30	45.04	36.74	60.00	50.00	-14.96	-13.26
19.608	1.60	31.50	25.30	33.10	26.90	60.00	50.00	-26.90	-23.10

Remark：

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss
3. “*” Means emission level un-detectable.
4. “--“ Means do not need detect.

Power Line Conducted Test Data

Date of Tested : Dec. 3, 2000 Power Line : Neutral
Temperature : 27℃ Humidity : 68%
Tested Mode : FULL LOAD (TR45A48)

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)		Emission Level (dBuV)		Limits (dBuV/m)		Margin (dB)	
		Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
0.150	1.70	46.80	21.90	48.50	23.60	66.00	56.00	-17.50	-32.40
0.199	1.49	51.40	41.00	52.89	42.49	64.60	54.60	-11.71	-12.11
0.266	1.25	44.40	34.40	45.65	35.65	62.69	52.69	-17.04	-17.04
2.127	0.62	32.50	31.40	33.12	32.02	56.00	46.00	-22.88	-13.98
4.850	1.10	36.20	22.30	37.30	23.40	56.00	46.00	-18.70	-22.60
13.650	1.45	37.10	30.60	38.55	32.05	60.00	50.00	-21.45	-17.95

Remark：

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss
3. “*” Means emission level un-detectable.
4. “--“ Means do not need detect.

Power Line Conducted Test Data

Date of Tested : Dec. 3, 2000 Power Line : Line
Temperature : 27℃ Humidity : 68%
Tested Mode : HALF LOAD (TR45A48)

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)		Emission Level (dBuV)		Limits (dBuV/m)		Margin (dB)	
		Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
0.166	1.63	43.80	20.30	45.43	21.93	65.54	55.54	-20.11	-33.61
0.202	1.48	48.80	39.50	50.28	40.98	64.51	54.51	-14.23	-13.53
0.336	1.16	40.20	35.50	41.36	36.66	60.69	50.69	-19.33	-14.03
4.502	1.21	29.40	21.60	30.61	22.81	56.00	46.00	-25.39	-23.19
13.615	1.44	42.80	35.20	44.24	36.64	60.00	50.00	-15.76	-13.36
17.564	1.50	24.20	19.30	25.70	20.80	60.00	50.00	-34.30	-29.20

Remark：

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss
3. “*” Means emission level un-detectable.
4. “--“ Means do not need detect.

Power Line Conducted Test Data

Date of Tested : Dec. 3, 2000 Power Line : Neutral
Temperature : 27℃ Humidity : 68%
Tested Mode : HALF LOAD (TR45A48)

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)		Emission Level (dBuV)		Limits (dBuV/m)		Margin (dB)	
		Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
0.166	1.63	42.60	19.40	44.23	21.03	65.54	55.54	-21.31	-34.51
0.202	1.48	47.10	38.20	48.58	39.68	64.51	54.51	-15.93	-14.83
0.270	1.25	39.50	31.80	40.75	33.05	62.57	52.57	-21.82	-19.52
4.851	1.10	31.00	21.20	32.10	22.30	56.00	46.00	-23.90	-23.70
13.615	1.44	42.90	33.00	44.34	34.44	60.00	50.00	-15.66	-15.56
17.752	1.50	36.20	29.10	37.70	30.60	60.00	50.00	-22.30	-19.40

Remark：

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss
3. “*” Means emission level un-detectable.
4. “--“ Means do not need detect.

3 Radiated Emission Measurement

3.1 Instrument

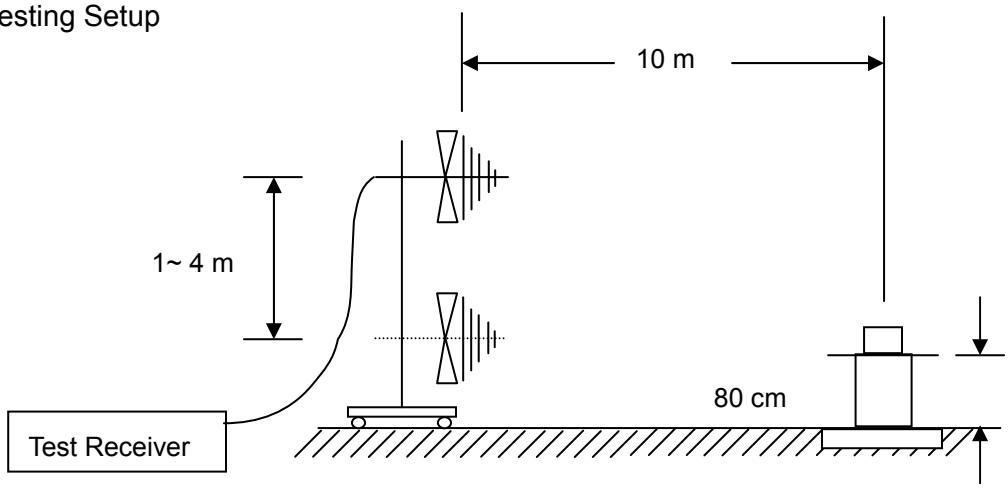
☒OATS 2

Instrument	Manufacturer	Model	Serial No.	Last Calibration
EMI Test Receiver	Rohde & Schwarz	ESVS 10	826148/011	2000/07/28
Spectrum	ADVANTEST	R3261C	81720472	2000/07/01
Antenna	Schaffner	CBL6112B	2610	2000/01/21
Pre-Amplifier	Schaffner	CPA9231A/4	3350	2000/10/11
RF Cable	IETC	CBL02	N/A	2000/10/11

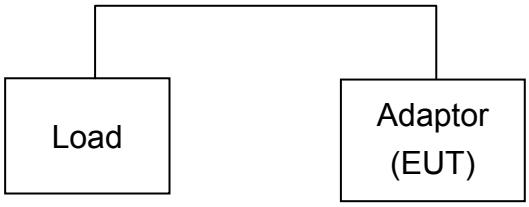
Note: All instrument upon which need to calibrated are with calibration period of 1 year.

3.2 Block Diagram of Test Configuration

Configuration of Testing Setup



Configuration of EUT Setup



3.3 Radiated Limit

☐ FCC Part 15

	☐ Class A (10m)		☐ Class B (3m)	
Frequency (MHz)	Field Strength (uV/m)	Quasi-Peak (dBuV/m)	Field Strength (uV/m)	Quasi-Peak (dBuV/m)
30 ~ 88	90	39.08	100	40.00
88 ~ 216	150	43.52	150	43.52
216 ~ 960	210	46.44	200	46.02
960 above	300	49.54	500	53.98

☒ CISPR 22

	☐ Class A	☒ Class B
Frequency (MHz)	Quasi-Peak (dBuV/m)	Quasi-Peak (dBuV/m)
30 ~ 230	40.0	30.0
230 ~ 1000	47.0	37.0

3.4 Instrument configuration

3.4.1 The EMI test receiver frequency range set from 30 MHz to 1000 MHz.

3.4.2 The EMI test receiver bandwidth set at 120 kHz.

3.4.3 The EMI test receiver detector set as Quasi-Peak (Q.P.).

3.5 Measured Mode

3.5.1 The test mode for preliminary test as following:

- Mode 1: FULL LOAD (TR70A12-1)
- Mode 2: HALF LOAD (TR70A12-1)
- Mode 3: FULL LOAD (TR70A48)
- Mode 4: HALF LOAD (TR70A48)
- Mode 5: FULL LOAD (TR45A48)
- Mode 6: HALF LOAD (TR45A48)

3.5.2 Selected the worst case mode when after preliminary test for final test, the mode as following:

Mode 1: FULL LOAD (TR70A12-1)
Mode 2: HALF LOAD (TR70A12-1)
Mode 3: FULL LOAD (TR70A48)
Mode 4: HALF LOAD (TR70A48)
Mode 5: FULL LOAD (TR45A48)
Mode 6: HALF LOAD (TR45A48)

3.6 Configuration of Measurement

3.6.1 The EUT was place on a non-conductive table whose total height equaled 80cm. The turntable can rotate 360 degree to determine the position of the maximum emission level.

3.6.2 The EUT was set 10 meters away from the receiving antenna that was mounted on a non-conductive mast. The antenna can move up and down between 1 to 4 meters to find out the maximum emission level.

3.6.3 The initial testing identified the frequency that has the highest disturbance relative to the limit while operating the EUT in typical modes of operation and cable positions in a test setup representative of typical system configuration.

3.6.4 The identification of the frequency of highest emission with respect to the limit was found by investigating emissions at a number of significant frequencies. The probable frequency of maximum emission had been found and that the associated cable and EUT configuration and mode of operation had been identified.

3.7 Configuration of EUT

3.7.1 Setup the EUT and simulators as shown section 3.2.

3.7.2 Connected the EUT with full load mode.

3.7.3 Turn on the power of all equipment.

3.7.4 Measured the horizontal polarization and record the value.

3.7.5 Changed into vertical polarization and record the value.

3.7.6 Changed the EUT load to half load and repeated step 3.7.3 to 3.7.5.

3.8 Test Result

PASS.

The final tests data as shown on following page.

Radiated Emission Measurement Data

Date of Tested : Nov. 22, 2000 Polarization : Horizontal
Temperature : 18℃ Humidity : 70%
Tested Mode : FULL LOAD (TR70A12-1)

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV/m)	Margin (dB)
57.424	8.06	10.46	18.52	30.00	-11.48
115.595	14.34	3.00	17.34	30.00	-12.66
172.000	12.12	2.26	14.38	30.00	-15.62
233.900	13.34	-0.84	12.50	37.00	-24.50
245.640	14.65	5.43	20.08	37.00	-16.92
255.900	16.24	0.13	16.37	37.00	-20.63

Remark：

1. All readings are Quasi-Peak values.
2. Factor = Antenna Factor + Cable Loss.
3. The worst emission was detected at 57.424 MHz with corrected signal level of 18.52 dBuV/m (limit is 30 dBuV/m) when the antenna was at horizontal polarization and was at 4 m high and the turntable was at 180°.
4. 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

Radiated Emission Measurement Data

Date of Tested : Nov. 22, 2000 Polarization : Vertical
Temperature : 18℃ Humidity : 70%
Tested Mode : FULL LOAD (TR70A12-1)

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV/m)	Margin (dB)
60.450	7.43	9.45	16.88	30.00	-13.12
65.540	7.79	10.55	18.34	30.00	-11.66
110.565	13.56	5.40	18.96	30.00	-11.04
154.453	12.94	4.34	17.28	30.00	-12.72
180.416	11.81	1.05	12.86	30.00	-17.14
224.634	12.44	4.47	16.91	30.00	-13.09
265.215	16.49	-3.72	12.77	37.00	-24.23

Remark：

1. All readings are Quasi-Peak values.
2. Factor = Antenna Factor + Cable Loss.
3. The worst emission was detected at 110.565 MHz with corrected signal level of 18.96 dBuV/m (limit is 30 dBuV/m) when the antenna was at horizontal polarization and was at 1 m high and the turntable was at 172°.
4. 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

Radiated Emission Measurement Data

Date of Tested : Nov. 22, 2000 Polarization : Horizontal
Temperature : 18℃ Humidity : 70%
Tested Mode : HALF LOAD (TR70A12-1)

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV/m)	Margin (dB)
59.070	7.64	1.26	8.90	30.00	-21.10
82.656	9.11	0.75	9.86	30.00	-20.14
125.900	14.78	5.83	20.61	30.00	-9.39
162.700	12.67	-0.92	11.75	30.00	-18.25
185.900	12.03	-2.75	9.28	30.00	-20.72
225.195	12.53	-2.53	10.00	30.00	-20.00
256.700	16.36	-1.01	15.35	37.00	-21.65

Remark：

1. All readings are Quasi-Peak values.
2. Factor = Antenna Factor + Cable Loss.
3. The worst emission was detected at 125.900 MHz with corrected signal level of 20.61 dBuV/m (limit is 30 dBuV/m) when the antenna was at horizontal polarization and was at 4 m high and the turntable was at 202.5°.
4. 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

Radiated Emission Measurement Data

Date of Tested : Nov. 22, 2000 Polarization : Vertical
Temperature : 18℃ Humidity : 70%
Tested Mode : HALF LOAD (TR70A12-1)

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV/m)	Margin (dB)
59.832	6.86	12.30	19.16	30.00	-10.84
125.900	14.06	8.83	22.89	30.00	-7.11
162.700	11.77	-0.92	10.85	30.00	-19.15
185.900	11.11	-2.75	8.36	30.00	-21.64
225.195	11.63	-2.53	9.10	30.00	-20.90
256.700	15.04	-1.01	14.03	37.00	-22.97

Remark：

1. All readings are Quasi-Peak values.
2. Factor = Antenna Factor + Cable Loss.
3. The worst emission was detected at 125.900 MHz with corrected signal level of 22.89 dBuV/m (limit is 30 dBuV/m) when the antenna was at horizontal polarization and was at 1 m high and the turntable was at 180°.
4. 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

Radiated Emission Measurement Data

Date of Tested : Nov. 22, 2000 Polarization : Horizontal
Temperature : 18℃ Humidity : 70%
Tested Mode : FULL LOAD (TR70A48)

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV/m)	Margin (dB)
72.480	7.74	8.30	16.04	30.00	-13.96
142.420	12.94	2.50	15.44	30.00	-14.56
144.590	12.79	1.10	13.89	30.00	-16.11
155.770	12.14	1.80	13.94	30.00	-16.06
218.400	11.18	2.20	13.38	30.00	-16.62
223.900	11.53	1.50	13.03	30.00	-16.97

Remark：

1. All readings are Quasi-Peak values.
2. Factor = Antenna Factor + Cable Loss.
3. The worst emission was detected at 72.480 MHz with corrected signal level of 16.04 dBuV/m (limit is 30 dBuV/m) when the antenna was at horizontal polarization and was at 4 m high and the turntable was at 158°.
4. 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

Radiated Emission Measurement Data

Date of Tested : Nov. 22, 2000 Polarization : Vertical
Temperature : 18℃ Humidity : 70%
Tested Mode : FULL LOAD (TR70A48)

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV/m)	Margin (dB)
72.770	7.75	19.54	27.29	30.00	-2.71
74.860	7.81	16.27	24.08	30.00	-5.92
151.910	12.33	8.40	20.73	30.00	-9.27
139.380	13.16	9.10	22.26	30.00	-7.74
149.090	12.48	7.43	19.91	30.00	-10.09
212.100	11.04	1.84	12.88	30.00	-17.12

Remark：

1. All readings are Quasi-Peak values.
2. Factor = Antenna Factor + Cable Loss.
3. The worst emission was detected at 72.770 MHz with corrected signal level of 27.29 dBuV/m (limit is 30 dBuV/m) when the antenna was at horizontal polarization and was at 1.3 m high and the turntable was at 150°.
4. 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

Radiated Emission Measurement Data

Date of Tested : Nov. 22, 2000 Polarization : Horizontal
Temperature : 18℃ Humidity : 70%
Tested Mode : HALF LOAD (TR70A48)

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV/m)	Margin (dB)
68.490	7.54	3.57	11.11	30.00	-18.89
72.770	7.75	4.70	12.45	30.00	-17.55
145.240	12.74	4.40	17.14	30.00	-12.86
139.130	13.18	2.60	15.78	30.00	-14.22
151.440	12.35	1.60	13.95	30.00	-16.05
225.590	11.66	2.20	13.86	30.00	-16.14

Remark：

1. All readings are Quasi-Peak values.
2. Factor = Antenna Factor + Cable Loss.
3. The worst emission was detected at 145.240 MHz with corrected signal level of 17.14 dBuV/m (limit is 30 dBuV/m) when the antenna was at horizontal polarization and was at 4 m high and the turntable was at 158°.
4. 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

Radiated Emission Measurement Data

Date of Tested : Nov. 22, 2000 Polarization : Vertical
Temperature : 18℃ Humidity : 70%
Tested Mode : HALF LOAD (TR70A48)

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV/m)	Margin (dB)
72.680	7.74	7.10	14.84	30.00	-15.16
139.000	13.19	5.35	18.54	30.00	-11.46
144.320	12.81	6.56	19.37	30.00	-10.63
151.030	12.37	6.64	19.01	30.00	-10.99
172.740	11.24	1.50	12.74	30.00	-17.26
217.990	11.17	1.20	12.37	30.00	-17.63

Remark：

1. All readings are Quasi-Peak values.
2. Factor = Antenna Factor + Cable Loss.
3. The worst emission was detected at 144.320 MHz with corrected signal level of 19.37 dBuV/m (limit is 30 dBuV/m) when the antenna was at horizontal polarization and was at 1 m high and the turntable was at 202.5°.
4. 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

Radiated Emission Measurement Data

Date of Tested : Nov. 22, 2000 Polarization : Horizontal
Temperature : 18℃ Humidity : 70%
Tested Mode : FULL LOAD (TR45A48)

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV/m)	Margin (dB)
59.000	7.65	4.13	11.78	30.00	-18.22
62.800	7.60	8.62	16.22	30.00	-13.78
119.173	14.81	-2.11	12.70	30.00	-17.30
179.173	11.83	-2.00	9.83	30.00	-20.17
191.920	12.20	3.20	15.40	30.00	-14.60
204.175	12.07	-2.83	9.24	30.00	-20.76
252.800	15.61	-2.17	13.44	37.00	-23.56

Remark：

1. All readings are Quasi-Peak values.
2. Factor = Antenna Factor + Cable Loss.
3. The worst emission was detected at 62.800 MHz with corrected signal level of 16.22 dBuV/m (limit is 30 dBuV/m) when the antenna was at horizontal polarization and was at 4 m high and the turntable was at 258°.
4. 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

Radiated Emission Measurement Data

Date of Tested : Nov. 22, 2000 Polarization : Vertical
Temperature : 18℃ Humidity : 70%
Tested Mode : FULL LOAD (TR45A48)

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV/m)	Margin (dB)
59.000	7.65	9.08	16.73	30.00	-13.27
115.000	14.26	0.39	14.65	30.00	-15.35
156.300	12.86	0.66	13.52	30.00	-16.48
194.200	12.21	-0.95	11.26	30.00	-18.74
245.900	14.68	-2.40	12.28	37.00	-24.72
294.900	16.56	-1.20	15.36	37.00	-21.64

Remark：

1. All readings are Quasi-Peak values.
2. Factor = Antenna Factor + Cable Loss.
3. The worst emission was detected at 59.000 MHz with corrected signal level of 16.73 dBuV/m (limit is 30 dBuV/m) when the antenna was at horizontal polarization and was at 1.2 m high and the turntable was at 275°.
4. 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

Radiated Emission Measurement Data

Date of Tested : Nov. 22, 2000 Polarization : Horizontal
Temperature : 18℃ Humidity : 70%
Tested Mode : HALF LOAD (TR45A48)

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV/m)	Margin (dB)
66.500	7.86	10.00	17.86	30.00	-12.14
72.430	8.37	9.00	17.37	30.00	-12.63
115.300	14.30	4.07	18.37	30.00	-11.63
157.453	12.86	5.00	17.86	30.00	-12.14
184.200	12.04	3.00	15.04	30.00	-14.96
228.900	12.97	0.11	13.08	30.00	-16.92
261.900	16.72	1.47	18.19	37.00	-18.81

Remark：

1. All readings are Quasi-Peak values.
2. Factor = Antenna Factor + Cable Loss.
3. The worst emission was detected at 115.300 MHz with corrected signal level of 18.37 dBuV/m (limit is 30 dBuV/m) when the antenna was at horizontal polarization and was at 4 m high and the turntable was at 275°.
4. 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

Radiated Emission Measurement Data

Date of Tested : Nov. 22, 2000 Polarization : Vertical
Temperature : 18℃ Humidity : 70%
Tested Mode : HALF LOAD (TR45A48)

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV/m)	Margin (dB)
65.972	7.82	7.13	14.95	30.00	-15.05
69.400	8.27	11.81	20.08	30.00	-9.92
115.038	14.27	7.84	22.11	30.00	-7.89
152.838	13.09	0.28	13.37	30.00	-16.63
165.222	12.33	3.80	16.13	30.00	-13.87
201.707	12.17	0.99	13.16	30.00	-16.84
225.993	12.65	2.38	15.03	30.00	-14.97

Remark：

1. All readings are Quasi-Peak values.
2. Factor = Antenna Factor + Cable Loss.
3. The worst emission was detected at 115.038 MHz with corrected signal level of 22.11 dBuV/m (limit is 30 dBuV/m) when the antenna was at horizontal polarization and was at 1 m high and the turntable was at 158°.
4. 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

4 Photographs of Measurement

4.1 Power Line Conducted Emission Measurement

Front View (TR70A12-1)

Rear View (TR70A12-1)

Front View (TR70A48)

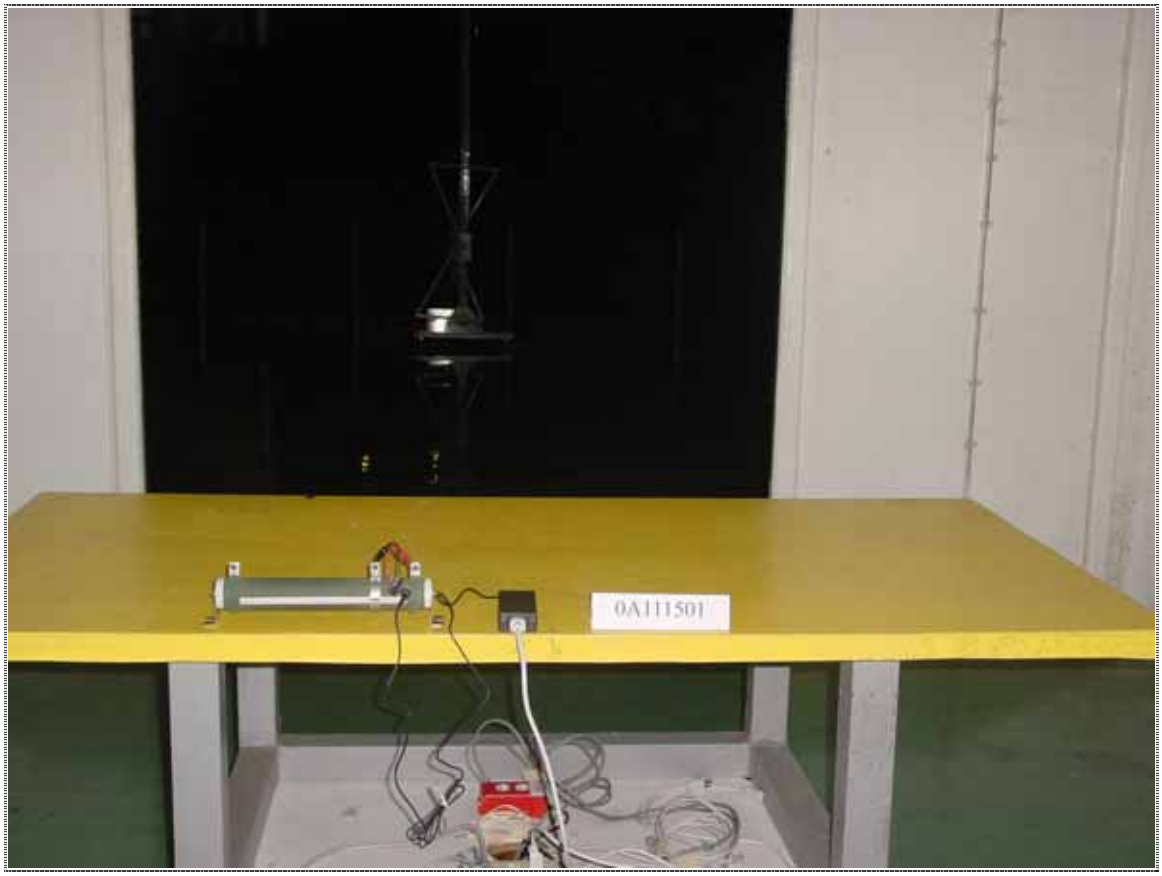
Rear View (TR70A48)

Front View (TR45A48)

Rear View (TR45A48)

4.2 Radiated Emission Measurement

Front View (TR70A12-1)



Rear View (TR70A12-1)

Front View (TR70A48)

Rear View (TR70A48)

Front View (TR45A48)

Rear View (TR45A48)

Worst Point of Vertical Polarization (TR70A48)

5 Photographs of EUT

Front View of Appearance (TR70A12-1)

Rear View of Appearance (TR70A12-1)

Front View of Appearance (TR70A48)

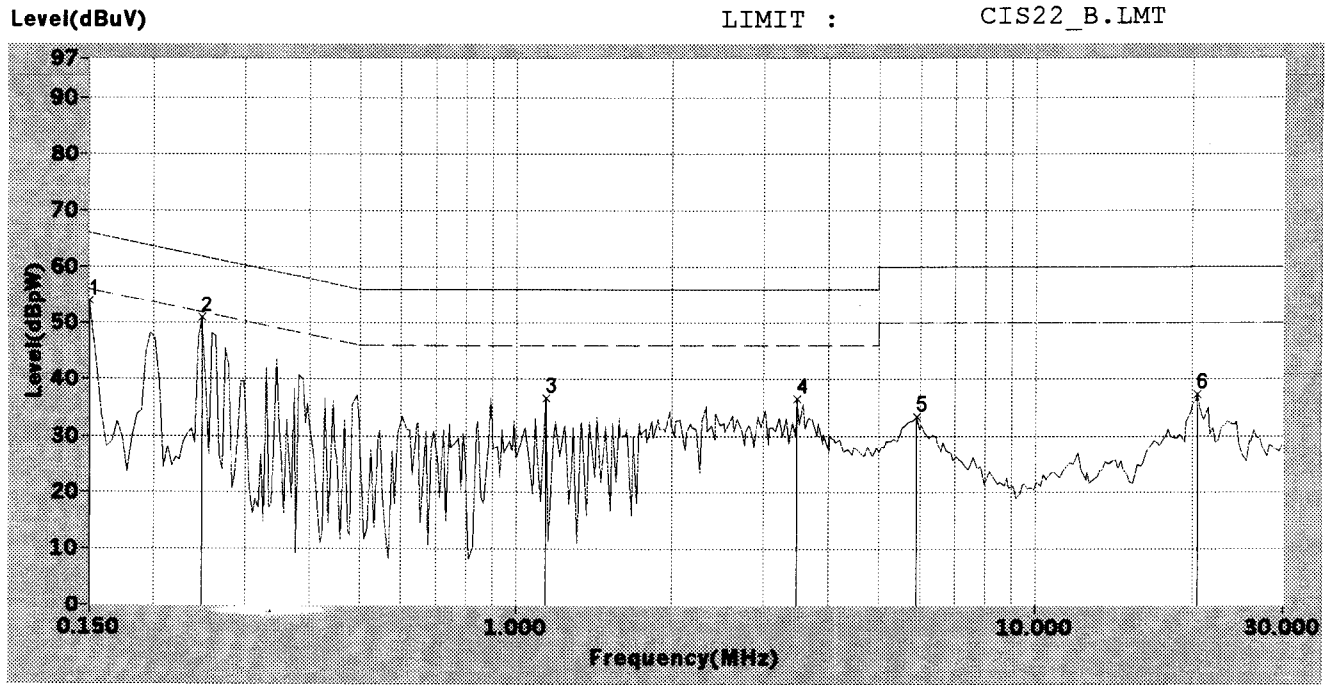
Rear View of Appearance (TR70A48)

Front View of Appearance (TR45A48)

Rear View of Appearance (TR45A48)

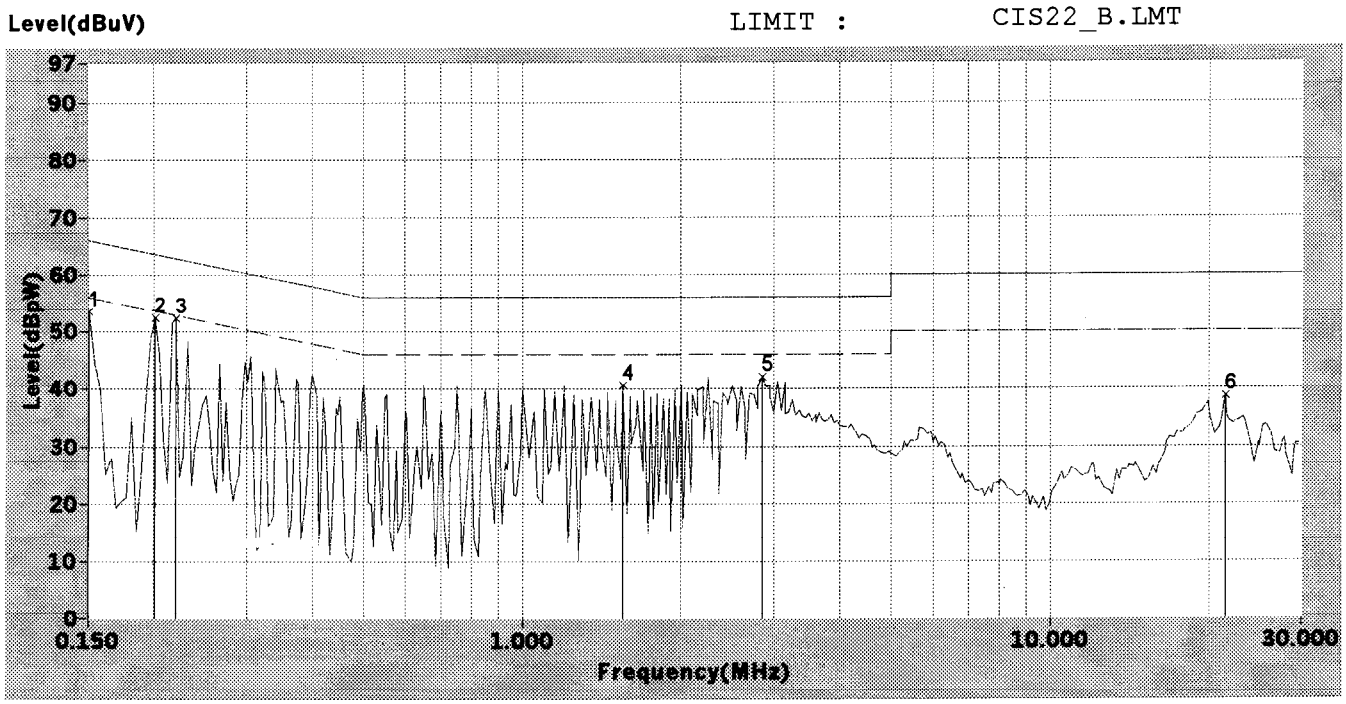
Appendix 1 – Power Line Conducted Test Waveform

A1.1 Mode 1: FULL LOAD (TR70A12-1)



COMMENT: FULL LOAD

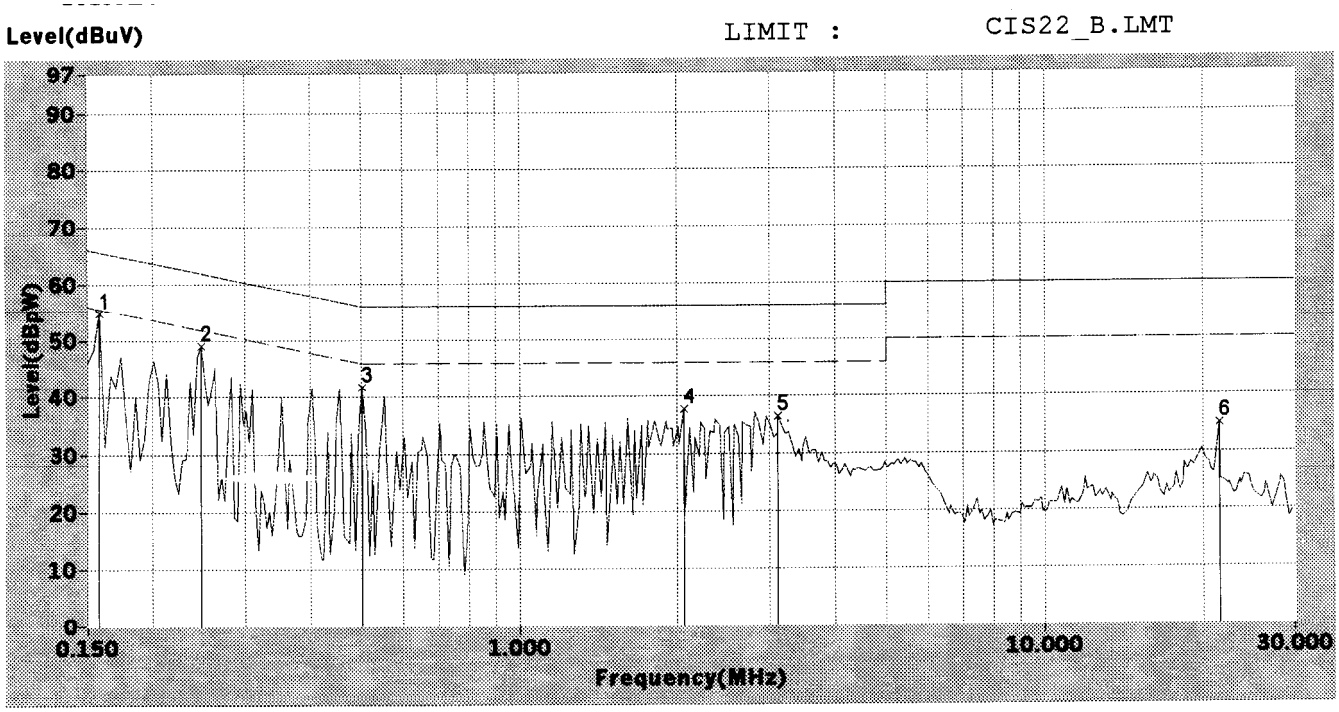
Line



COMMENT: FULL LOAD

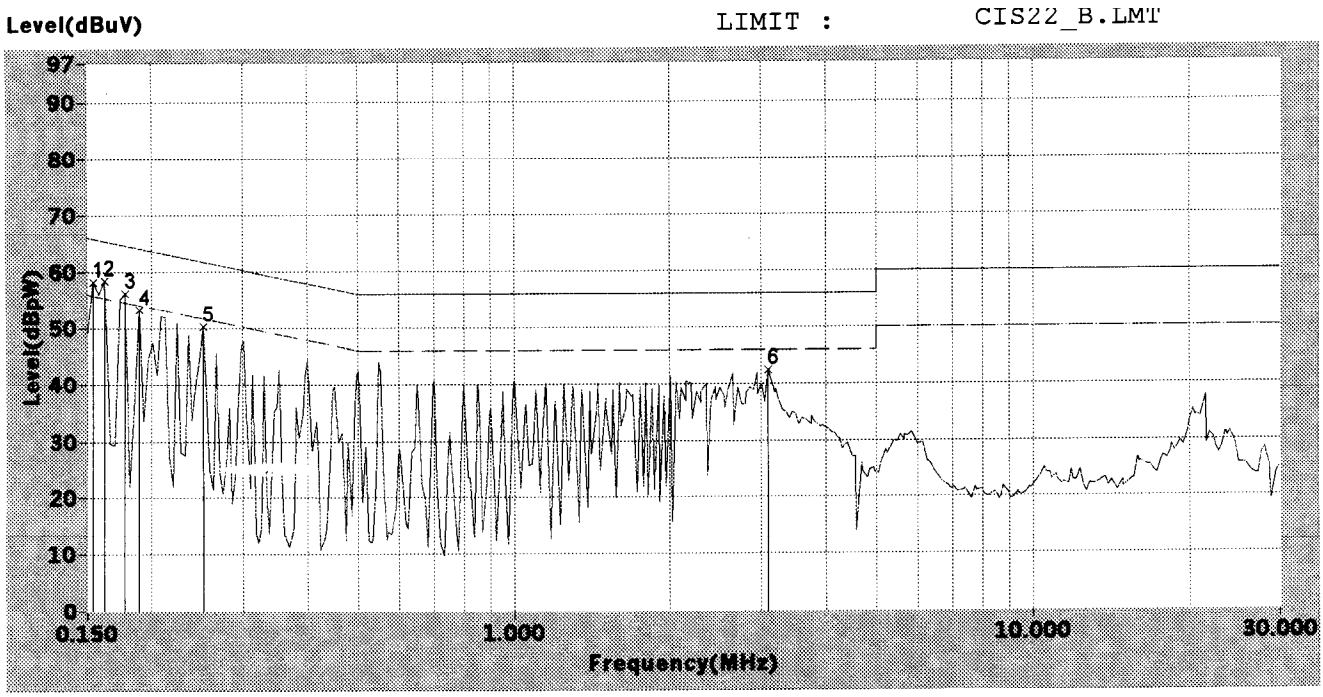
Neutral

A1.2 Mode 2: HALF LOAD (TR70A12-1)



COMMENT: HALF LOAD

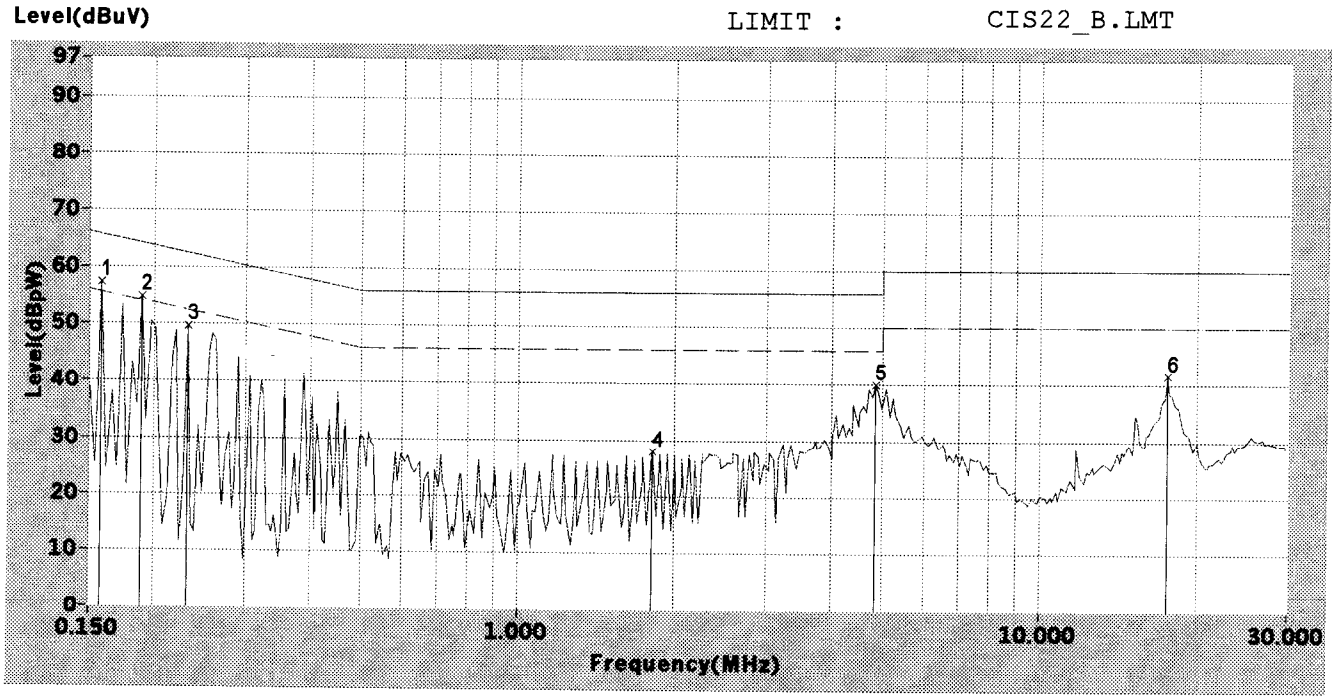
Line



COMMENT: HALF LOAD

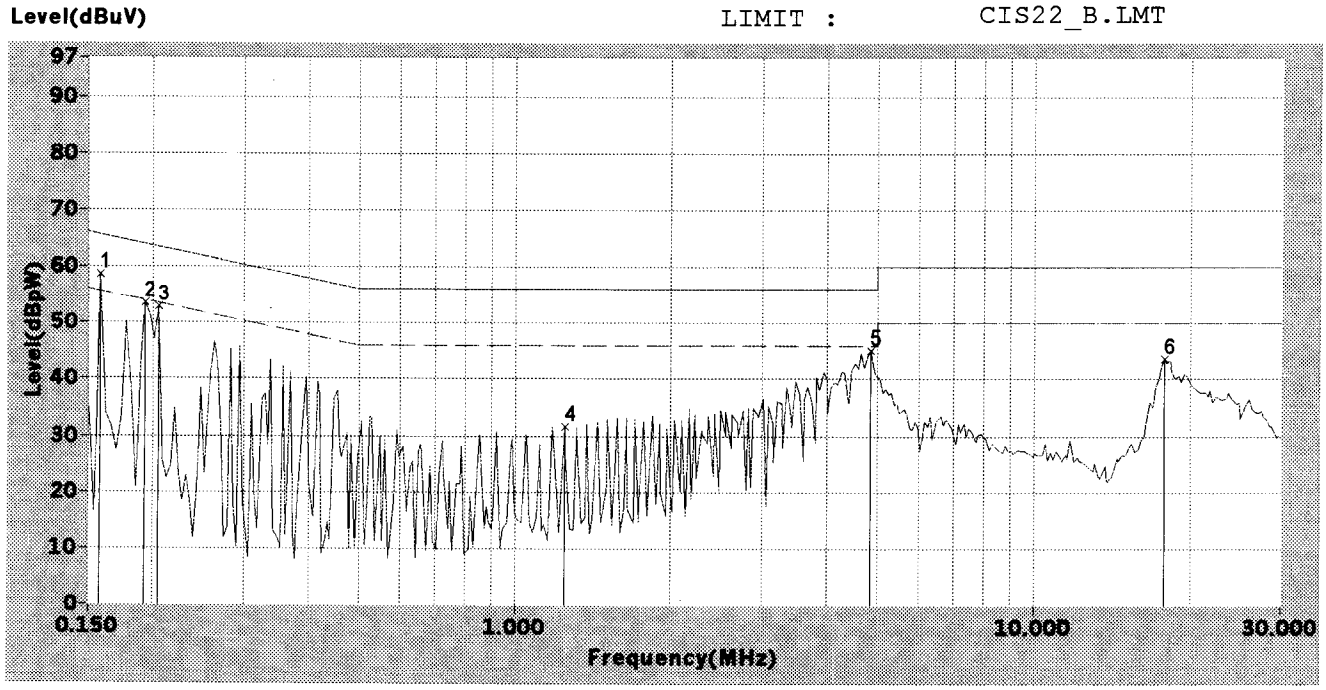
Neutral

A1.3 Mode 3: FULL LOAD (TR70A48)



COMMENT: FULL LOAD

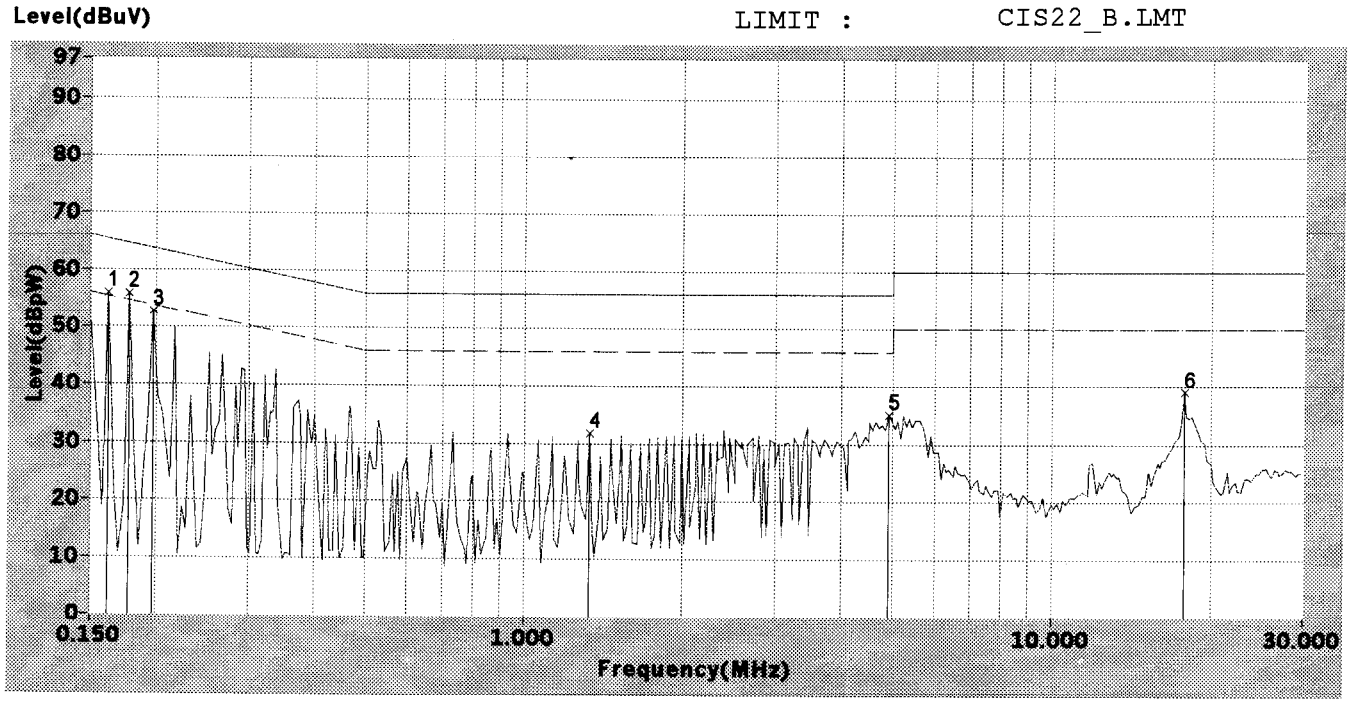
Line



COMMENT: FULL LOAD

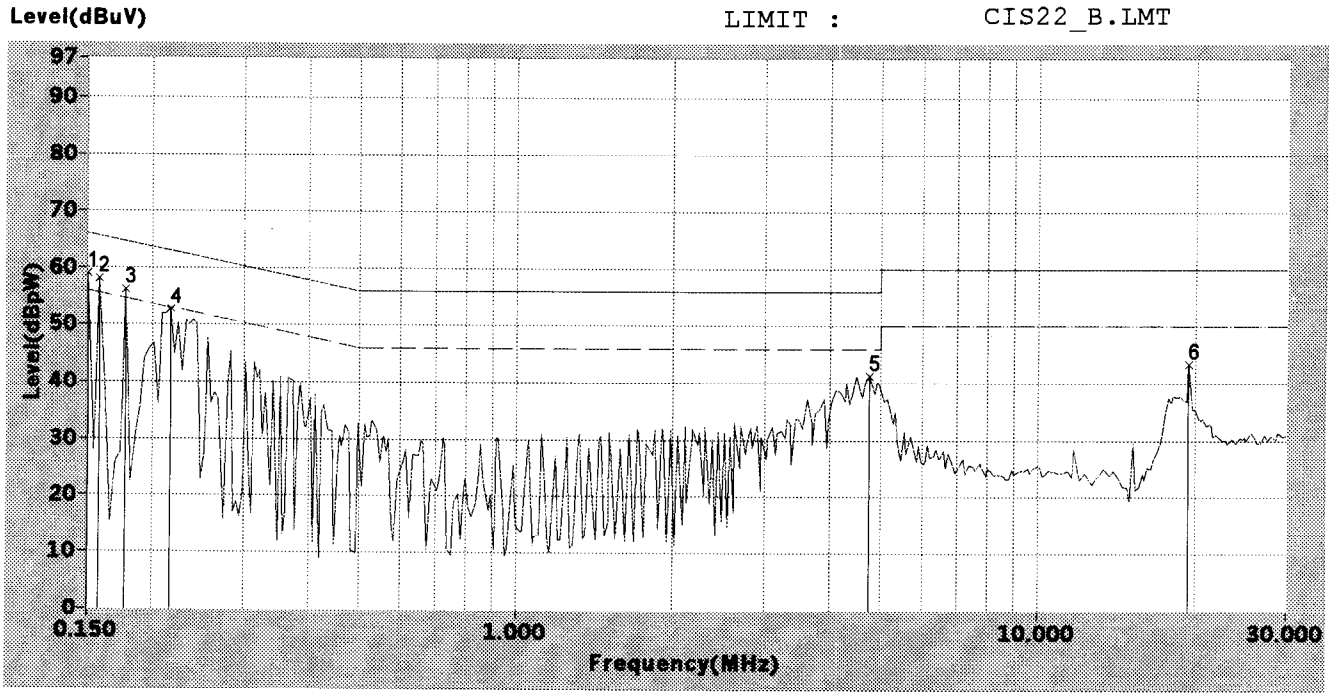
Neutral

A1.4 Mode 4: HALF LOAD (TR70A48)



COMMENT: HALF LOAD

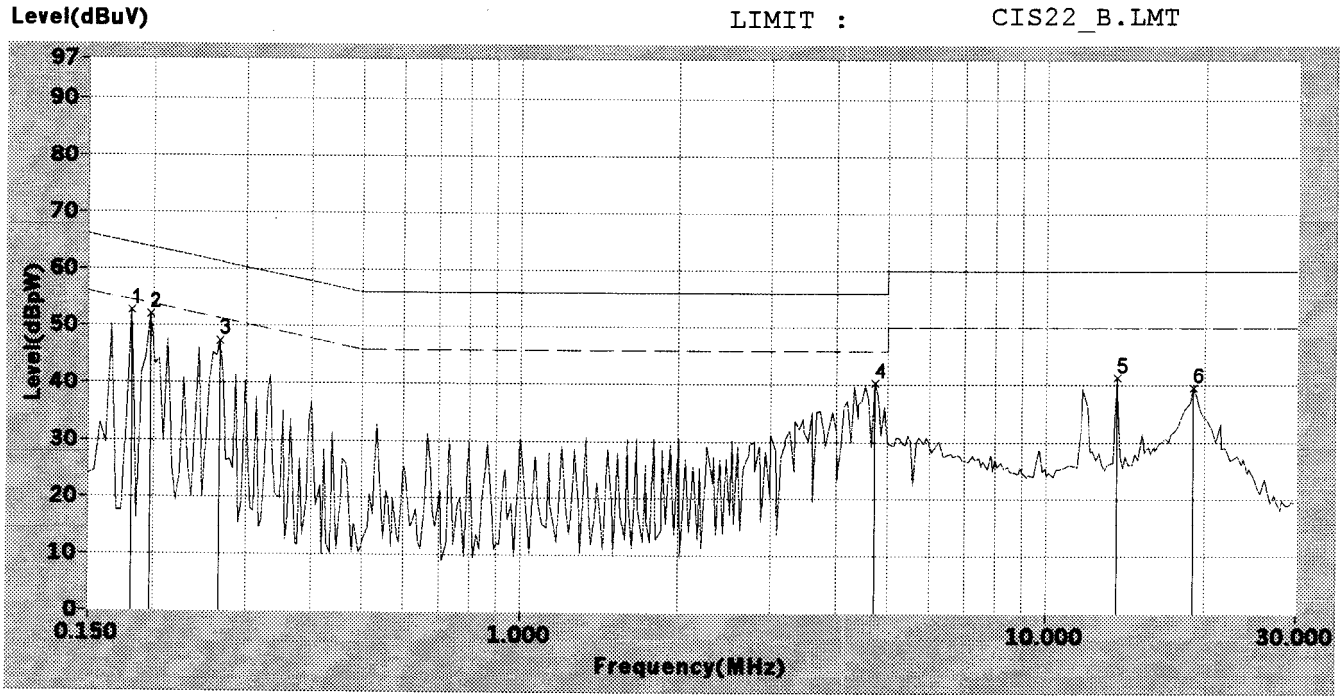
Line



COMMENT: HALF LOAD

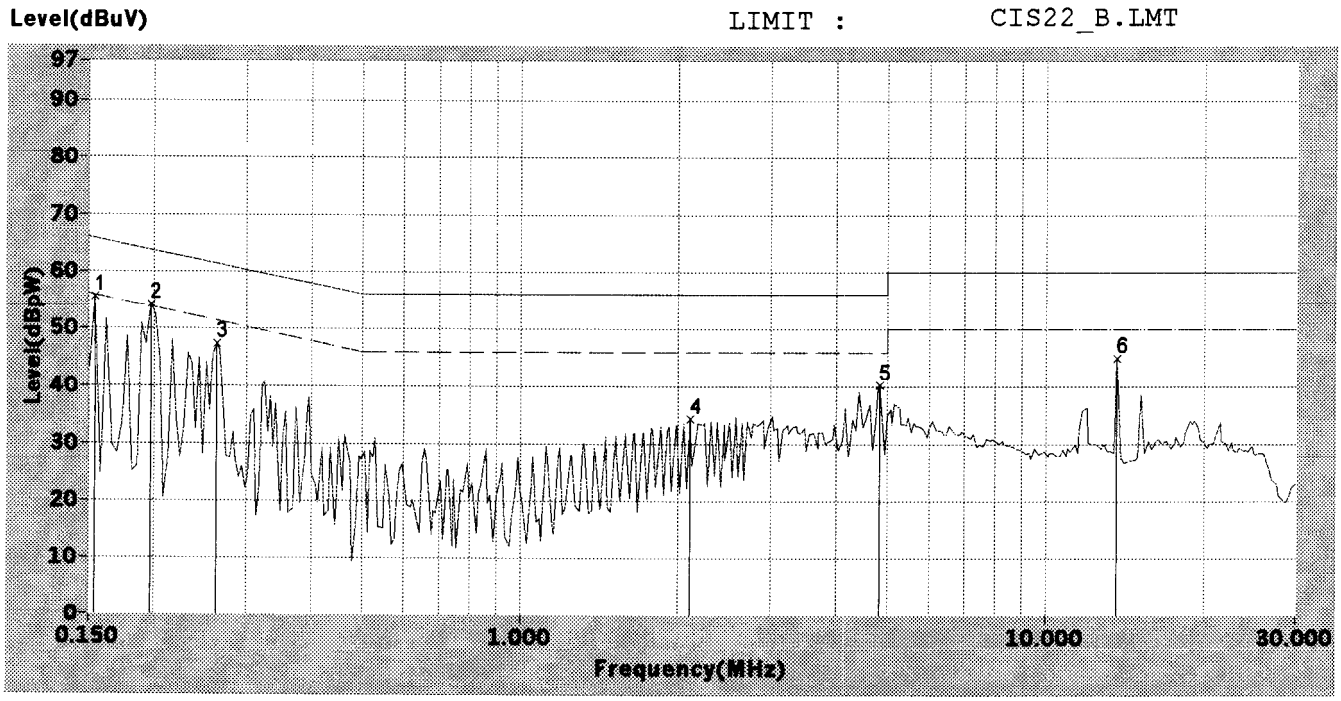
Neutral

A1.5 Mode 5: FULL LOAD (TR45A48)



COMMENT: FULL LOAD

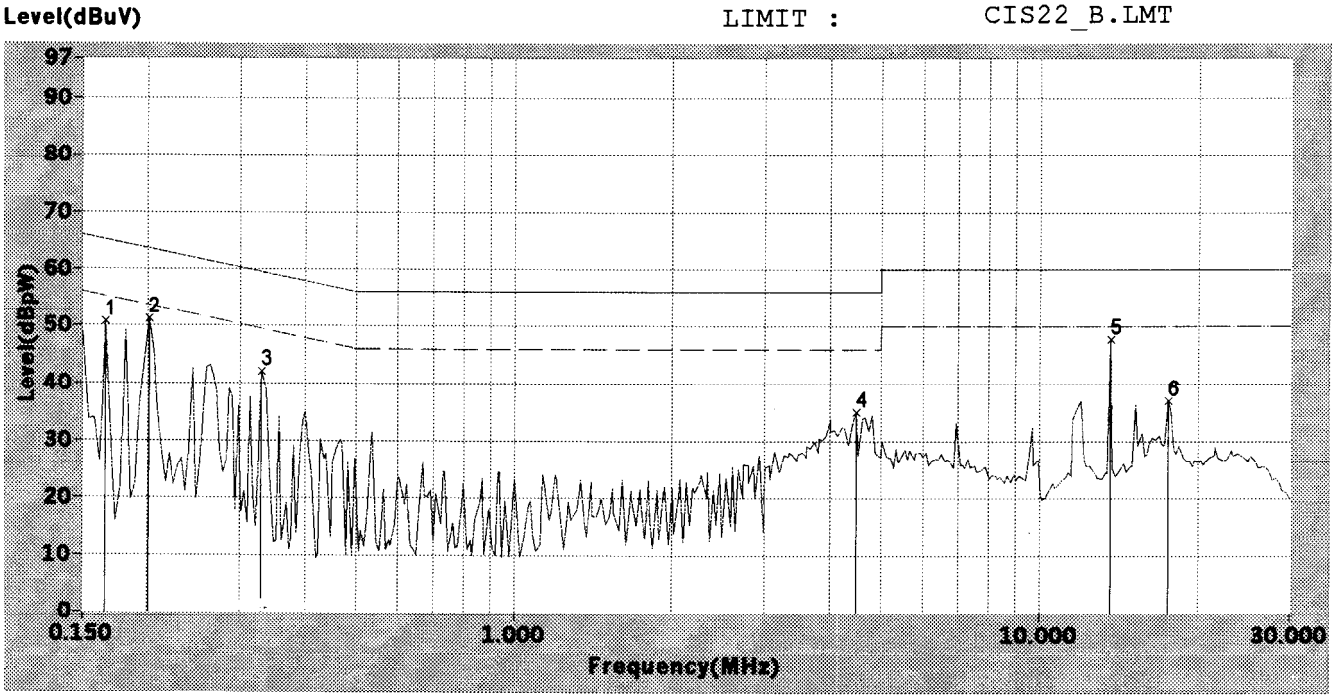
Line



COMMENT: FULL LOAD

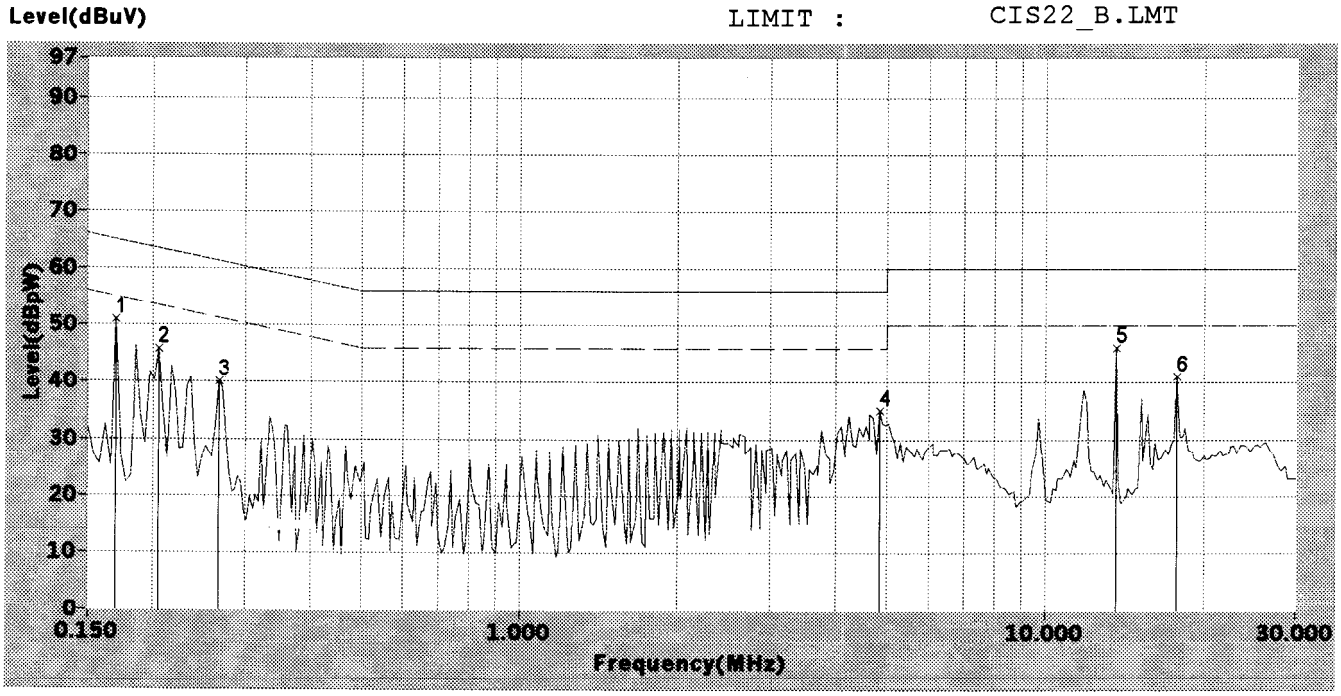
Neutral

A1.6 Mode 6: HALF LOAD (TR45A48)



COMMENT: HALF LOAD

Line



COMMENT: HALF LOAD

Neutral