

# Test Report



(Declaration of Conformity)

for

Electromagnetic Compatibility

of

Product : **AC-DC Switching Power Supply**

Trade Name : **TRACO<sup>®</sup>  
POWER**

Model Number : TXH 360-112; TXH 360-148; TXH 360-124

Prepared for

**Traco Electronic AG**

Jenatschstrasse 1 CH-8002 Zurich

Prepared by

**Interocean EMC Technology Corp.**

244 No.5-2, Lin 1, Tin-Fu Tsun, Lin-Kou Hsiang,

Taipei County, Taiwan, R.O.C.

TEL.: +886 2 2600 6861

FAX.: +886 2 2600 6859

**Remark:**

The test report consists of 46 pages in total. It shall not be reproduced except in full, without the written approval of IETC. This document may be altered or revised by IETC only, and shall be noted in the revision section of the document.  
The test results in the report only to the tested sample.

# Table of Contents

<b>1</b>	<b>General Information</b>	<b>6</b>
1.1	Description of Equipment Under Test	6
1.2	Specifications description	7
1.3	Details of Tested Supporting System	8
1.4	Test Facility	9
1.5	Summary of Test Results	10
1.6	Measurement Uncertainty	11
1.7	Measured Mode	12
1.8	Configuration of EUT Setup	12
1.9	Test Step of EUT	12
<b>2</b>	<b>Power Line Conducted Emission Measurement</b>	<b>13</b>
2.1	Instrument	13
2.2	Block Diagram of Test Configuration	13
2.3	Conducted Limits	13
2.4	Instrument configuration	14
2.5	Configuration of Measurement	14
2.6	Test Result	14
<b>3</b>	<b>Radiated Emission Measurement</b>	<b>17</b>
3.1	Instrument	17
3.2	Block Diagram of Test Configuration	17
3.3	Radiated Limits	17
3.4	Instrument configuration	18
3.5	Configuration of Measurement	18
3.6	Test Result	18
<b>4</b>	<b>Harmonic Current Emission Measurement (EN 61000-3-2)</b>	<b>21</b>
4.1	Instrument	21
4.2	Block Diagram of Test Configuration	21
4.3	Test Limits	22
4.4	Configuration of Measurement	23
4.5	Test Result	23
<b>5</b>	<b>Voltage Fluctuations and Flicker Measurement (EN 61000-3-3)</b>	<b>28</b>
5.1	Instrument	28
5.2	Block Diagram of Test Configuration	28
5.3	Test Limits	28
5.4	Configuration of Measurement	28
5.5	Test Result	28

<b>6</b>	<b>Performance Criterion of Immunity Test</b>	<b>31</b>
6.1	EN 55024	31
<b>7</b>	<b>Electrostatic Discharge Immunity Test (IEC 61000-4-2)</b>	<b>32</b>
7.1	Instrument	32
7.2	Block Diagram of Test Configuration	32
7.3	Test Levels	32
7.4	Test Requirement	32
7.5	Configuration of Measurement	33
7.6	Test Result	33
<b>8</b>	<b>Radio-frequency, Electromagnetic field Immunity Test (IEC 61000-4-3)</b>	<b>34</b>
8.1	Instrument	34
8.2	Block Diagram of Test Configuration	34
8.3	Test Levels	34
8.4	Test Requirement	34
8.5	Configuration of Measurement	35
8.6	Test Result	35
<b>9</b>	<b>Electrical Fast Transient/Burst Immunity Test (IEC 61000-4-4)</b>	<b>36</b>
9.1	Instrument	36
9.2	Block Diagram of Test Configuration	36
9.3	Test Levels	36
9.4	Test Requirement	37
9.5	Configuration of Measurement	37
9.6	Test Result	37
<b>10</b>	<b>Surge Immunity Test (IEC 61000-4-5)</b>	<b>38</b>
10.1	Instrument	38
10.2	Block Diagram of Test Configuration	38
10.3	Test Levels	38
10.4	Test Requirement	39
10.5	Configuration of Measurement	39
10.6	Test Result	39
<b>11</b>	<b>Radio-frequency, Conducted Disturbances Immunity Test (IEC 61000-4-6)</b>	<b>40</b>
11.1	Instrument	40
11.2	Block Diagram of Test Configuration	40
11.3	Test Levels	40
11.4	Test Requirement	41
11.5	Configuration of Measurement	41
11.6	Test Result	41

<b>12</b>	<b>Voltage Dips, Short Interruptions Immunity Test (IEC 61000-4-11)</b>	<b>42</b>
12.1	Instrument	42
12.2	Block Diagram of Test Configuration	42
12.3	Test Levels	42
12.4	Test Requirement	43
12.5	Configuration of Measurement	43
12.6	Test Result	43
<b>13</b>	<b>Photographs of Test</b>	<b>44</b>
13.1	Power Line Conducted Emission Measurement	44
13.2	Radiated Emission Measurement	45
<b>14</b>	<b>Photographs of EUT</b>	<b>46</b>
14.1	Model No.: TXH 360-112	46

## Statement of Compliance

**Applicant:** Traco Electronic AG  
**Product:** AC-DC Switching Power Supply  
**Model No.:** TXH 360-112; TXH 360-148; TXH 360-124  
**Tested Power Supply:** 230Vac, 50Hz  
**Date of Final Test:** Feb. 23, 2010  
**Revision of Report:** Rev.00

### Measurement Procedures and Standards Used :

#### Emission:

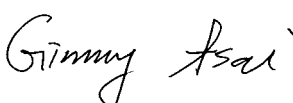
- ☒ EN 55022: 2006+A1: 2007
- ☒ EN 61000-3-2: 2006
- ☒ EN 61000-3-3: 2008


#### Immunity:

- ☒ EN 55024: 1998+A1: 2001+A2: 2003
- ☒ IEC 61000-4-2: 2008
- ☒ IEC 61000-4-3: 2006+A1: 2007
- ☒ IEC 61000-4-4: 2004
- ☒ IEC 61000-4-5: 2005
- ☒ IEC 61000-4-6: 2008
- ☒ IEC 61000-4-8: 1993+A1: 2000
- ☒ IEC 61000-4-11: 2004

The measurement results in this test report were performed at Interocean EMC Technology Corp. the responsibility of measurement result is only subject to the tested sample. This report shows the EUT is technically compliance with the above official standards. This report shall not be partial reproduced without written approval by Interocean EMC Technology Corporation.

Report Issued: 2010/12/27

Project Engineer:   
Gimmy Tsai

Approved:   
Benson Tsai

# 1 General Information

## 1.1 Description of Equipment Under Test

<b>Product</b>	: AC-DC Switching Power Supply
<b>Model Number</b>	: TXH 360-112; TXH 360-148; TXH 360-124
<b>Applicant</b>	: <b>Traco Electronic AG</b> Jenatschstrasse 1 CH-8002 Zurich
<b>Power Supply</b>	: Input: 90-264Vac, 50-60Hz Output: The detail specification, please see "Specifications Description" as below page.
<b>Date of Receipt of Sample</b>	: Jan. 07, 2010
<b>Date of Test</b>	: Jan. 07 ~ Feb. 23, 2010
<b>Additional Description</b>	: <ol style="list-style-type: none"><li>1. The models "<b>TXH 360-112</b>" are representative selected in the test and included in this report.</li><li>2. The difference for all models include in this report are only Model No. and Specifications, the rest parts are identical. The detail specification, please see "Specifications description" as below page.</li><li>3. For more detail specification about EUT, please refer to the user's manual.</li></ol>

**1.2 Specifications description**

<b>Model</b>	<b>Out power</b>
TXH 360-112	12 Vdc, 30 A
TXH 360-124	24 Vdc, 15 A
TXH 360-148	48 Vdc, 7.5 A

### 1.3 Details of Tested Supporting System

#### 1.3.1 LOAD (TXH 360-112)

FULL LOAD WATT : 360W (12Vdc, 30A)

#### 1.3.2 Power Cord

Power cord : ☒Non-shielded ☒Detachable, 1.8m ☒without core

## 1.4 Test Facility

- Site Description** : ☑Conduction 1 ☑OATS 1 ☑EMS Site
- Name of Firm** : Interocean EMC Technology Corp.
- Company web** : <http://www.ietc.com.tw>
- Site 1, 2, 3 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 (OATS 1 & 2)  
Registration No.: 518958 (OATS 3)  
Designation No.: TW1020
  - Voluntary Control Council for Interference by Information Technology Equipment (VCCI) – Japan  
Member No.: 1349  
Registration No. (Conducted Room): C-1094  
Registration No. (Conducted Room): T-1562  
Registration No. (OATS 1): R-1040; G-274  
Registration No. (OATS 2): R-1041
  - Industry Canada (IC)  
OUR FILE: 46405-4437 Submission: 130946  
Registration No. (OATS 1): 4437A-1  
Registration No. (OATS 2): 4437A-2  
Registration No. (OATS 3): 4437A-3
- Site Accreditation** :
- Bureau of Standards and Metrology and Inspection (BSMI) – Taiwan, R.O.C.  
Accreditation No.:  
SL2-IN-E-0026 for CNS13438 / CISPR22  
SL2-R1-E-0026 for CNS13439 / CISPR13  
SL2-R2-E-0026 for CNS13439 / CISPR13  
SL2-A1-E-0026 for CNS13783-1 / CISPR14-1  
SL2-L1-E-0026 for CNS 14115 / CISPR 15
  - Taiwan Accreditation Foundation (TAF)  
Accrditation No.: 1113
  - TÜV NORD  
Certificate No: TNTW0801R-02



## 1.5 Summary of Test Results

Emission test equipment intended	
<input type="checkbox"/>	Class A
<input checked="" type="checkbox"/>	Class B

### 1.5.1 Test program according EN 55022

Report Clause	Phenomenon	Application	Reference Clause(s)	Reference standard	Result
2	Power Line Conducted Emission	AC power port	5.1	--	PASS
	Telecommunication Ports Conducted Emission	Telecommunication	5.2	--	Not applicable
3	Radiated Emission (Below 1GHz)	Enclosure port	6.1	--	PASS
	Radiated Emission (Above 1GHz)	Enclosure port	6.2	--	Not applicable <sup>a</sup>
Note: <sup>a</sup> The highest frequency of the internal sources of the EUT is less than 108MHz; this measurement does not need to test					

### 1.5.2 Test program according EN 61000-3-2

Report Clause	Phenomenon	Application	Reference Clause	Reference standard	Result
4	Harmonic current emissions	AC power port	5	--	PASS

### 1.5.3 Test program according EN 61000-3-3

Report Clause	Phenomenon	Application	Reference Clause	Reference standard	Result
5	Voltage changes, voltage fluctuations and flicker	AC power port	5	--	PASS

### 1.5.4 Test program according EN 55024

Report Clause	Phenomenon	Application	Reference Clause(s)	Reference standard	Result
7	Electrostatic discharge (ESD)	Enclosure port	4.2.1	IEC 61000-4-2	PASS
8	EM field	Enclosure port	4.2.3.1	IEC 61000-4-3	PASS
9	Burst	AC power port	4.2.2	IEC 61000-4-4	PASS
10	Surges	AC power port	4.2.5	IEC 61000-4-5	PASS
11	Conducted RF	AC power port	4.2.3.2	IEC 61000-4-6	PASS
	Rated power frequency magnetic field	Enclosure port	4.2.4	IEC 61000-4-8	Not applicable
12	Voltage dips and Short interruptions	AC power port	4.2.6	IEC 61000-4-11	PASS

**1.6 Measurement Uncertainty**

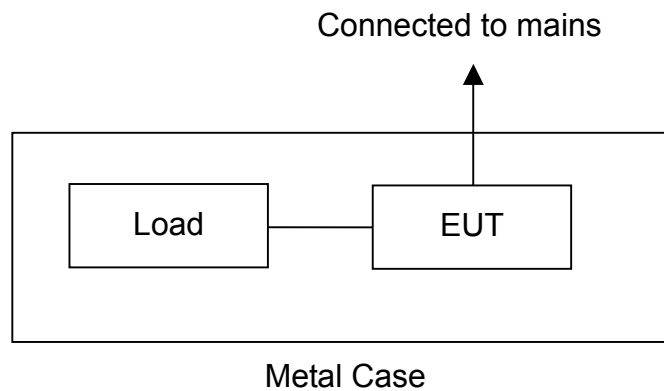
No.	Item	Value
1	Power Line Conducted Emission (Conduction 1)	2.4 dB
2	Power Line Conducted Emission (Conduction 2)	2.4 dB
3	Disturbance Power Emission (Conduction 2)	3.1 dB
4	Click disturbances Emission (Conduction 2)	2.4 dB
5	Radiated Electromagnetic disturbance (Loop Antenna)	4.8 dB
6	Radiated Emission Test (OATS 1)	4.2 dB
7	Radiated Emission Test (OATS 2)	4.2 dB
8	Radiated Emission Test (OATS 3)	4.2 dB
9	Radiated Emission Test (OATS 4)	4.2 dB
10	Radiated Emission Test (1GHz~18GHz)	3.2 dB
11	Radiated Emission Test (18GHz~40GHz)	3.4 dB
12	Conducted Immunity Test (CDN-M2)	1.3 dB
13	Conducted Immunity Test (CDN-M3)	1.3 dB
14	Conducted Immunity Test (EM Clamp)	3.2 dB

## 1.7 Measured Mode

The test mode for final test is as following:

- Mode 1: FULL LOAD (TXH 360-112)

## 1.8 Configuration of EUT Setup



## 1.9 Test Step of EUT

- 1.9.1 Setup the EUT and peripheral as above.
- 1.9.2 Connected the EUT with load at full load mode.
- 1.9.3 Executed the test.

Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
EMI Test Receiver	Rohde & Schwarz	ESCS 30	830245/027	2010/10/14
RF Cable	HARBOUR	RG400	CBL32	2010/03/16
L.I.S.N.	Schwarzbeck	NNLK8121	8121417	2010/07/21
L.I.S.N.	Rohde & Schwarz	ESH3-Z5	100176	2011/02/18

Frequency (MHz)	□ Class A (dB $\mu$ V)		☒ Class B (dB $\mu$ V)	
	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 Set the EMI test receiver frequency range from 150 kHz to 30 MHz.
- 2.4.2 Set the EMI test receiver bandwidth at 9kHz.
- 2.4.3 Set the EMI test receiver detector as Quasi-Peak (Q.P.) and Average (AV).

## **2.5 Configuration of Measurement**

- 2.5.1 The EUT was placed on a non-conductive table whose total height equaled 80cm and vertical conducting plane located 40cm to the rear of the EUT.
- 2.5.2 The EUT was connected to the main power through Line Impedance Stabilization Networks (LISN). This setup provided a 50ohm / 50 $\mu$ H coupling impedance for the measuring equipment. The auxiliary equipment was also connected to the main power through a LISN that provided a 50ohm/50 $\mu$ H coupling impedance with 50ohm termination. (Refer to the block diagram of the test setup and photographs.)
- 2.5.3 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.
- 2.5.4 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.

## **2.6 Test Result**

**PASS.**

The final test data is shown as following pages.

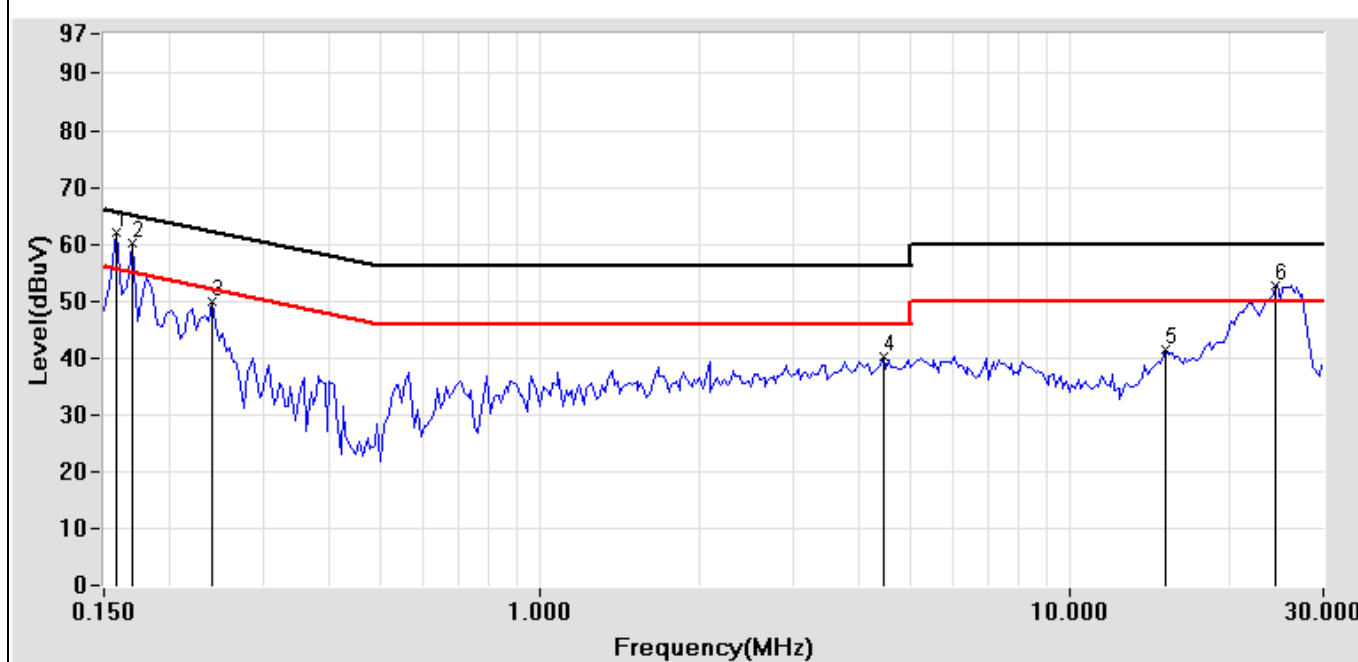
## Power Line Conducted Test Data

EUT: AC-DC Switching Power Supply	POLARITY: Line
CLIENT: Traco Electronic AG	DISTANCE:
MODEL: TXH 360-112	Serial No.:
RATING: 230V/50Hz	FILE/DATA#: TRACO POWER.emi/13
Temperature: 15.0 °C	OPERATOR: John
Humidity: 66 %	TEST SITE: Conduction1

Frequency (MHz)	Factor (dB)	Meter Reading (dBμV)		Emission Level (dBμV)		Limits (dBμV)		Margin (dB)	
		Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
0.158	0.11	60.40	50.70	60.51	50.81	65.57	55.57	-5.06	-4.76
0.170	0.11	56.59	49.55	56.70	49.66	64.96	54.96	-8.26	-5.30
0.240	0.16	47.30	41.42	47.46	41.58	62.10	52.10	-14.64	-10.52
4.439	0.31	35.29	29.06	35.60	29.37	56.00	46.00	-20.40	-16.63
15.162	0.70	33.35	28.11	34.05	28.81	60.00	50.00	-25.95	-21.19
24.431	1.11	45.03	38.43	46.14	39.54	60.00	50.00	-13.86	-10.46

**Remark:**

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



Test Mode: Mode 1: FULL LOAD (TXH 360-112)

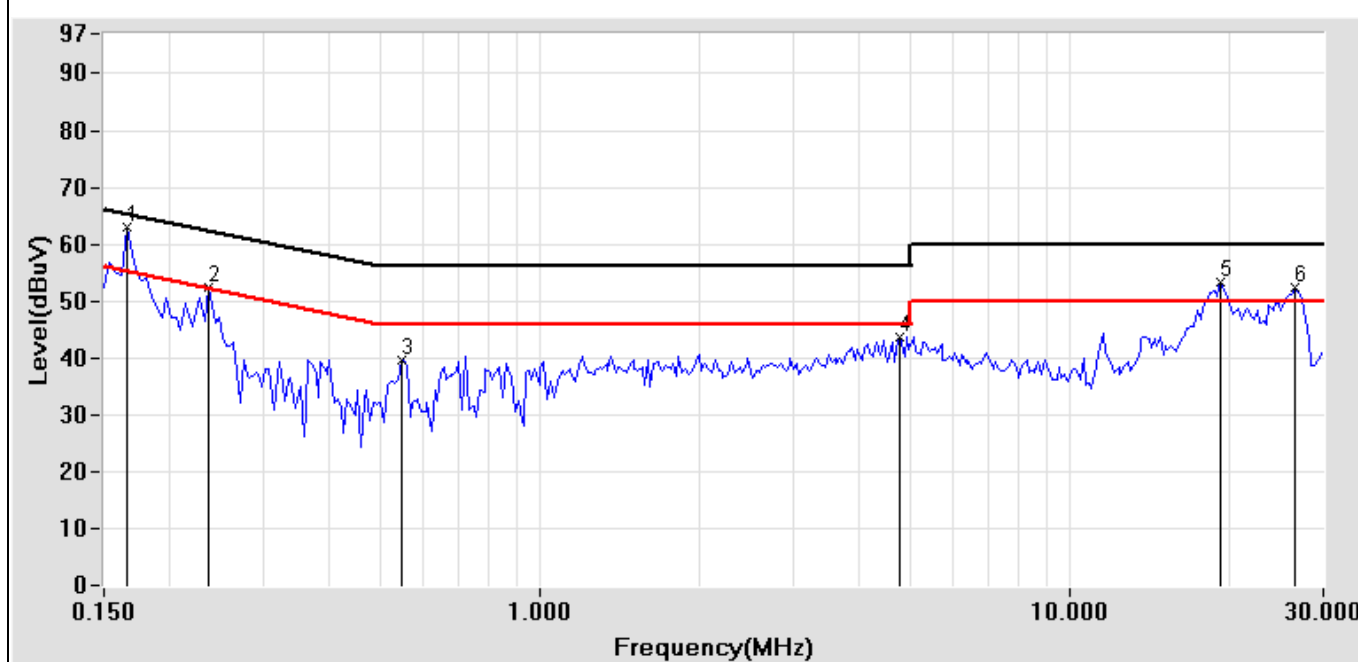
## Power Line Conducted Test Data

EUT: AC-DC Switching Power Supply	POLARITY: Neutral
CLIENT: Traco Electronic AG	DISTANCE:
MODEL: TXH 360-112	Serial No.:
RATING: 230V/50Hz	FILE/DATA#: TRACO POWER.emi/14
Temperature: 15.0 °C	OPERATOR: John
Humidity: 66 %	TEST SITE: Conduction1

Frequency (MHz)	Factor (dB)	Meter Reading (dBμV)		Emission Level (dBμV)		Limits (dBμV)		Margin (dB)	
		Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
0.159	0.11	61.00	51.90	61.11	52.01	65.52	55.52	-4.41	-3.51
0.236	0.16	48.30	42.30	48.46	42.46	62.24	52.24	-13.78	-9.78
0.548	0.10	35.83	27.74	35.93	27.84	56.00	46.00	-20.07	-18.16
4.775	0.23	39.01	28.36	39.24	28.59	56.00	46.00	-16.76	-17.41
19.154	0.68	35.35	28.82	36.03	29.50	60.00	50.00	-23.97	-20.50
26.470	1.02	45.30	39.00	46.32	40.02	60.00	50.00	-13.68	-9.98

**Remark:**

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



Test Mode: Mode 1: FULL LOAD (TXH 360-112)

### 3 Radiated Emission Measurement

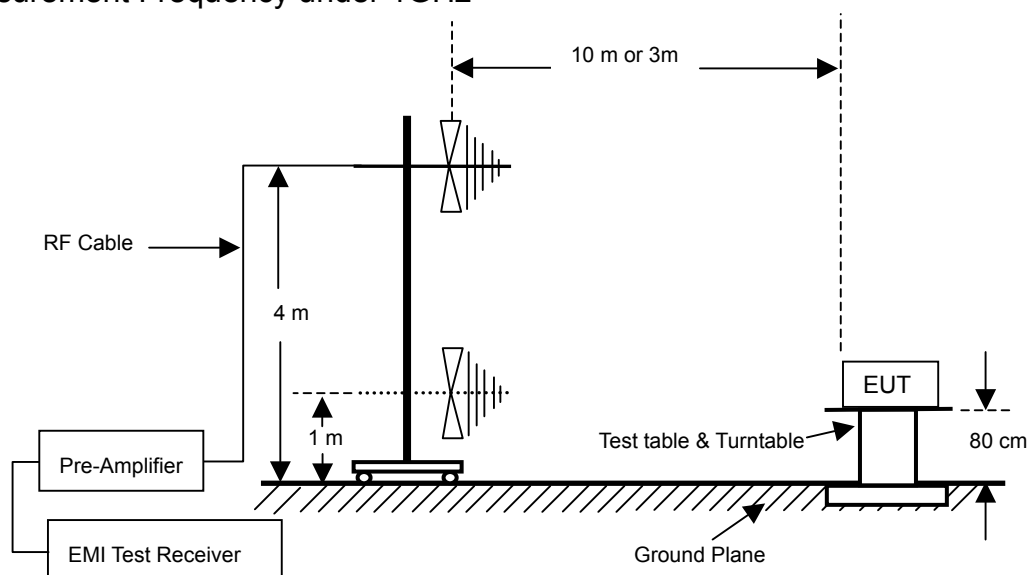
#### 3.1 Instrument

Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
EMI Test Receiver	Rohde & Schwarz	ESCS30	100135	2010/10/28
Biconical Antenna	Schwarzbeck	VHA 9103	2484	2010/10/09
Log Antenna	Schwarzbeck	UHALP 9108	A 0765	2010/10/09
Pre-Amplifier	Agilent	8447D	1937A01903	2010/12/07
RF Cable	IETC	CBL15	CBL15	2010/11/02

Note: The above equipments are within the valid calibration period.

#### 3.2 Block Diagram of Test Configuration

Measurement Frequency under 1GHz



#### 3.3 Radiated Limits

EN 55022

Frequency (MHz)	<input type="checkbox"/> Class A	<input checked="" type="checkbox"/> Class B
	Quasi-Peak dB( $\mu$ V/m)	Quasi-Peak dB( $\mu$ V/m)
30 ~ 230	40.0	30.0
230 ~ 1000	47.0	37.0

### **3.4 Instrument configuration**

- 3.4.1 Set the EMI test receiver frequency range from 30 MHz to 1000 MHz.
- 3.4.2 Set the EMI test receiver bandwidth at 120 kHz.
- 3.4.3 Set the EMI test receiver detector as Quasi-Peak (Q.P.).

### **3.5 Configuration of Measurement**

- 3.5.1 The EUT was placed 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.
- 3.5.2 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.
- 3.5.3 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.
- 3.5.4 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.

### **3.6 Test Result**

**PASS.**

The final test data is shown as following pages.

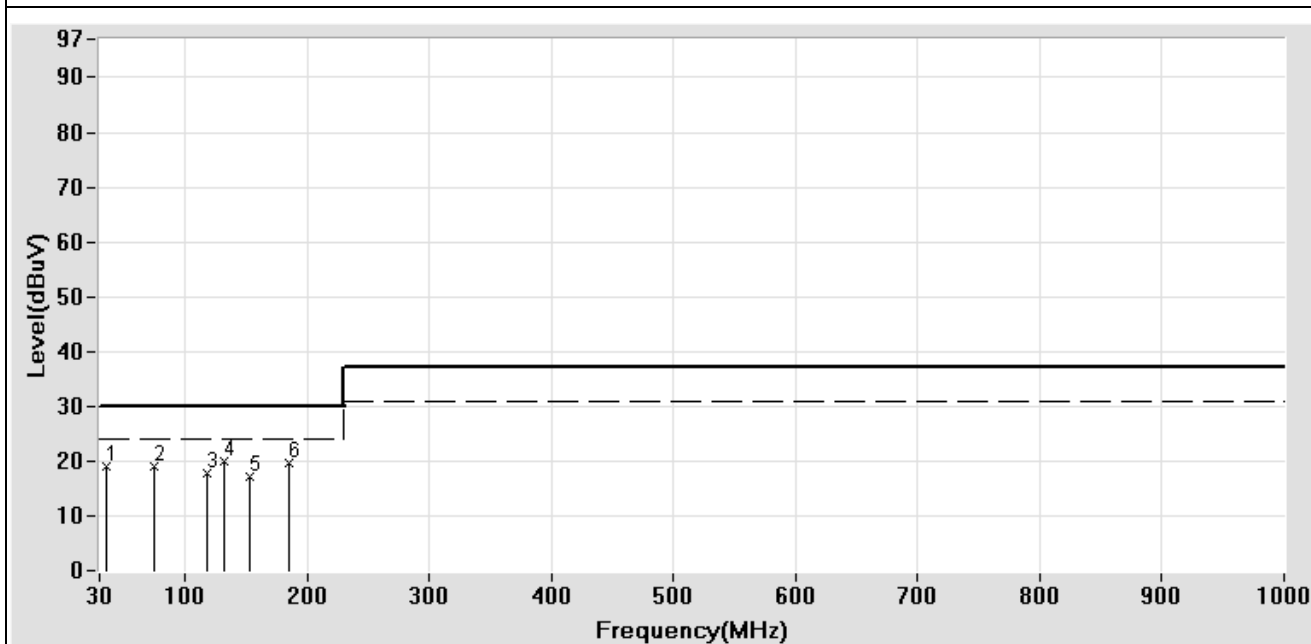
## Radiated Emission Measurement Data

EUT: AC-DC Switching Power Supply	POLARITY: Horizontal
CLIENT: Traco Electronic AG	DISTANCE: 10 m
MODEL: TXH 360-112	Serial No.:
RATING: 230V/50Hz	FILE/DATA#: TRACO POWER.emi/17
Temperature: 19.0 °C	OPERATOR: Terry
Humidity: 56 %	TEST SITE: OATS1

Frequency	Factor	Meter Reading	Emission Level	Limits	Margin
(MHz)	(dB)	(dB $\mu$ V)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
35.154 **	-11.85	31.03	19.18	30.00	-10.82
74.540 **	-22.03	41.05	19.02	30.00	-10.98
118.000 **	-15.57	33.21	17.64	30.00	-12.36
132.025 **	-14.22	34.24	20.02	30.00	-9.98
152.320 **	-13.10	30.31	17.21	30.00	-12.79
185.240 **	-11.61	31.35	19.74	30.00	-10.26

Remark:

1. " " Mark means readings are Peak Values.
2. " \*\* " Mark means readings are Quasi-Peak values.
3. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



Test Mode: Mode 1: FULL LOAD (TXH 360-112)

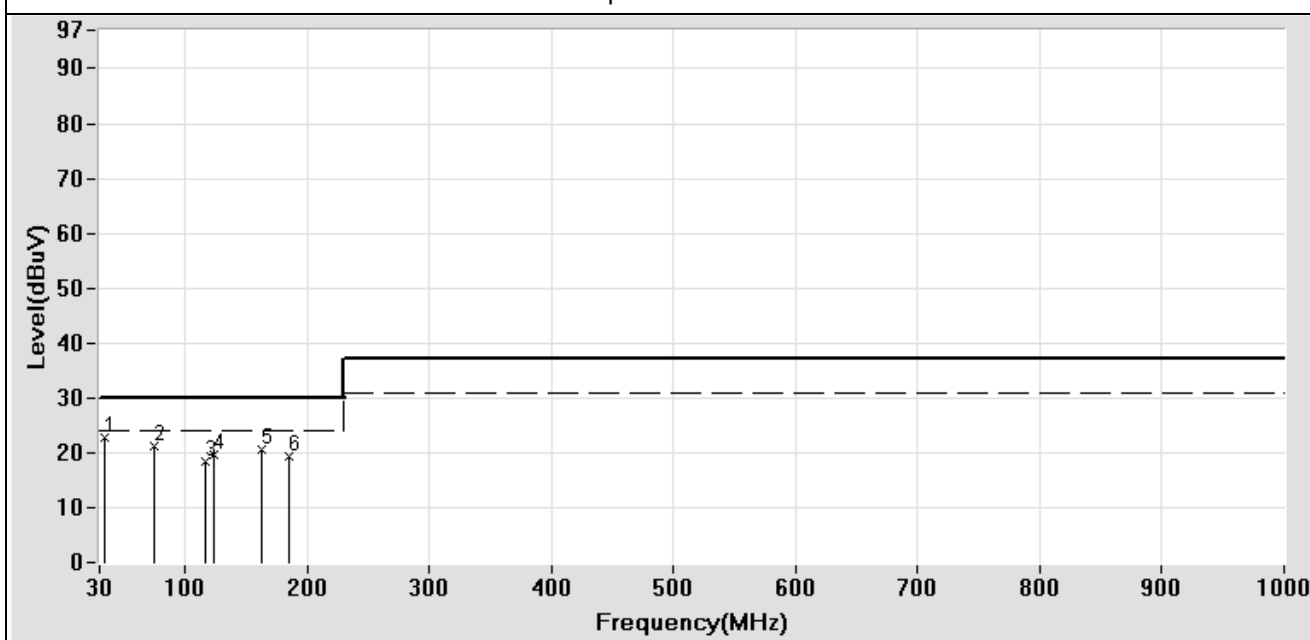
## Radiated Emission Measurement Data

EUT: AC-DC Switching Power Supply	POLARITY: Vertical
CLIENT: Traco Electronic AG	DISTANCE: 10 m
MODEL: TXH 360-112	Serial No.:
RATING: 230V/50Hz	FILE/DATA#: TRACO POWER.emi/16
Temperature: 19.0 °C	OPERATOR: Terry
Humidity: 56 %	TEST SITE: OATS1

Frequency	Factor	Meter Reading	Emission Level	Limits	Margin
(MHz)	(dB)	(dB $\mu$ V)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
34.154 **	-11.36	34.21	22.85	30.00	-7.15
74.560 **	-22.03	43.24	21.21	30.00	-8.79
116.254 **	-15.73	34.21	18.48	30.00	-11.52
124.050 **	-14.97	34.54	19.57	30.00	-10.43
163.150 **	-12.50	33.20	20.70	30.00	-9.30
184.540 **	-11.64	31.05	19.41	30.00	-10.59

### Remark:

1. " " Mark means readings are Peak Values.
2. " \*\* " Mark means readings are Quasi-Peak values.
3. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



Test Mode: Mode 1: FULL LOAD (TXH 360-112)

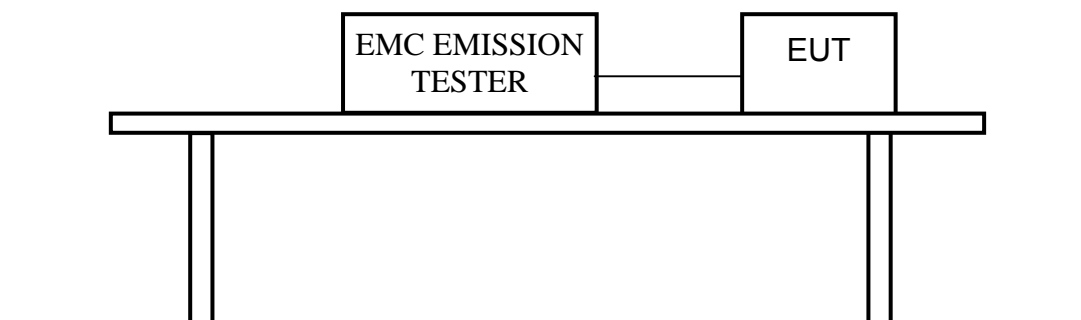
## 4 Harmonic Current Emission Measurement (EN 61000-3-2)

### 4.1 Instrument

Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
EMC EMISSION TESTER	EMC PARTMER	HARMONICS-1000	41	2010/04/21

Note: The above equipments are within the valid calibration period.

### 4.2 Block Diagram of Test Configuration



### 4.3 Test Limits

#### ☒ Class A Equipment

Harmonic order (n)	Maximum permissible harmonic current (A)
<b>Odd harmonics</b>	
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
$15 \leq n \leq 39$	$0.15 \cdot 15 / n$
<b>Even harmonics</b>	
2	1.08
4	0.43
6	0.30
$8 \leq n \leq 40$	$0.23 \cdot 8 / n$

#### ☐ Class B equipment

For Class B equipment, the harmonics of the input current shall not exceed the values given in Class A equipment multiplied by a factor of 1.5.

#### ☐ Class C equipment

Harmonic order (n)	Maximum permissible harmonic current expressed as a percentage of the input current at the fundamental frequency %
2	2
3	$30 \cdot \lambda^*$
5	10
7	7
9	5
$11 \leq n \leq 39$ (odd harmonics only)	3
* $\lambda$ is the circuit power factor	

#### ☐ Class D equipment

Harmonic order (n)	Maximum permissible harmonic current Per watt (mA/W)	Maximum permissible harmonic current (A)
3	3.4	2.30
5	1.9	1.14
7	1.0	0.77
9	0.5	0.40
11	0.35	0.33
$13 \leq n \leq 39$ (odd harmonics only)	$3.85/n$	See Class A equipment

#### **4.4 Configuration of Measurement**

- 4.4.1 The EUT with power analyzer was in series and supplied from a power source with the same nominal voltage and frequency as the rated supply voltage.
- 4.4.2 Set the output of the power analyzer to the rated voltage and frequency of EUT (230V, 50Hz).
- 4.4.3 The EUT was classified by clause 5. of EN 61000-3-2.

#### **4.5 Test Result**

**PASS.**

The measured result is shown as following pages.

## Harmonic Emission - IEC 61000-3-2 , EN 61000-3-2 , (EN60555-2)

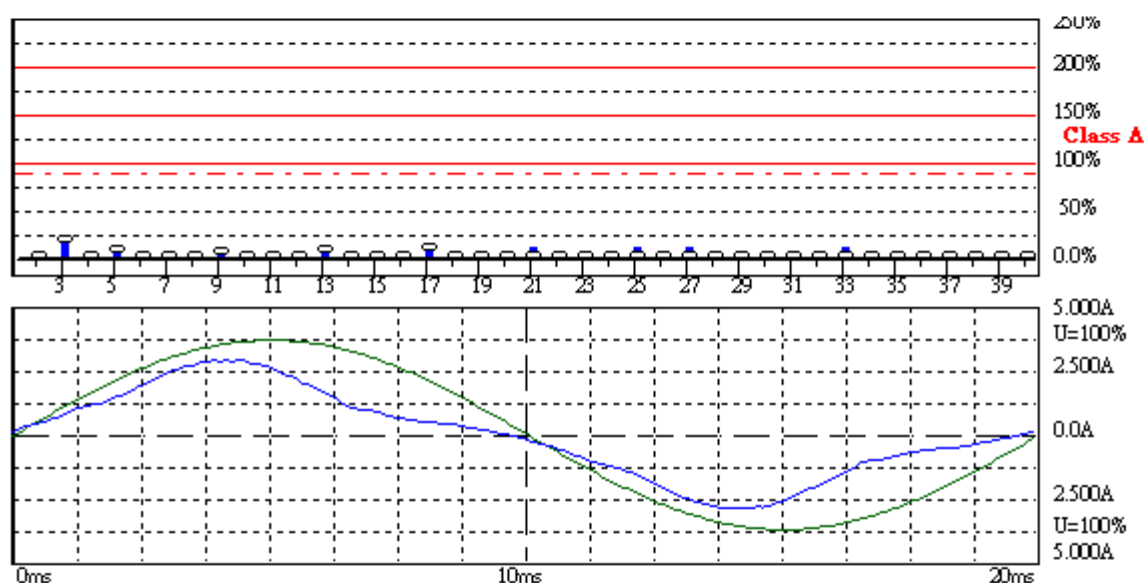
Comply: IEC 61000-3-2 Ed.3.0 - IEC 61000-4-7 Ed.2.0

### Traco Electronic AG

HARCS Setup File : [unnamed](#)

HARCS Report File : [unnamed](#)

Operator : Ivan  
 Unit : AC-DC Switching Power Supply  
 Serialnumber : M/N:TXH 360-112  
 Remarks : T:22'C & H:47%



#### Harmonic Emission - IEC 61000-3-2 , EN 61000-3-2 , (EN60555-2)

2010/1/19 下午 04:59

Urms = 228.3 V P = 357.7 W THC = 0.387 A  
 Irms = 1.660 A pf = 0.944

Range: 5 A  
 V-nom: 230 V  
 TestTime: 10 min (100%)

AC-DC Switching Power Supply  
 T:22'C & H:47%

**Test completed, Result: PASSED**

BAR-1000 EMC-Print

Full Bar : Actual Values  
 Empty Bar : Maximum Values  
 Blue : Current , Green : Voltage , Red : Failed

### Measurement

Date : 2010/1/19 PM: 04:59 V4.18

Urms = 228.3V Freq = 50.000 Range: 5 A  
 Irms = 1.660A Ipk = 2.930A cf = 1.765  
 P = 357.7W S = 379.1VA pf = 0.944  
 THDi = 23.3 % THDu = 0.10 % Class A

Test - Time : 10min ( 100 %)

Test completed, Result: PASSED

Order	Freq. [Hz]	Iavg [A]	Iavg%L [%]	Imax [A]	Imax%L [%]	Limit [A]	Status
1	50	1.6260		2.1722			
2	100	0.0000	0.0000	0.0089	0.8195	1.0800	
3	150	0.3779	16.430	0.3793	16.493	2.3000	
4	200	0.0000	0.0000	0.0031	0.7097	0.4300	
5	250	0.0843	7.3934	0.0851	7.4688	1.1400	
6	300	0.0000	0.0000	0.0015	0.5086	0.3000	
7	350	0.0000	0.0000	0.0085	1.1097	0.7700	
8	400	0.0000	0.0000	0.0015	0.6634	0.2300	
9	450	0.0201	5.0257	0.0208	5.1880	0.4000	
10	500	0.0000	0.0000	0.0012	0.6634	0.1840	
11	550	0.0000	0.0000	0.0073	2.2195	0.3300	
12	600	0.0000	0.0000	0.0012	0.7961	0.1533	
13	650	0.0131	6.2273	0.0143	6.8301	0.2100	
14	700	0.0000	0.0000	0.0015	1.1610	0.1314	
15	750	0.0000	0.0000	0.0085	5.6966	0.1500	
16	800	0.0000	0.0000	0.0012	1.0615	0.1150	
17	850	0.0131	9.9081	0.0140	10.607	0.1324	
18	900	0.0000	0.0000	0.0012	1.1942	0.1022	
19	950	0.0000	0.0000	0.0043	3.6079	0.1184	
20	1000	0.0000	0.0000	0.0012	1.3269	0.0920	
21	1050	0.0000	0.0000	0.0082	7.6904	0.1071	
22	1100	0.0000	0.0000	0.0009	1.0947	0.0836	
23	1150	0.0000	0.0000	0.0055	5.6152	0.0978	
24	1200	0.0000	0.0000	0.0009	1.1942	0.0767	
25	1250	0.0000	0.0000	0.0092	10.173	0.0900	
26	1300	0.0000	0.0000	0.0012	1.7249	0.0708	
27	1350	0.0000	0.0000	0.0073	8.7891	0.0833	
28	1400	0.0000	0.0000	0.0015	2.3220	0.0657	
29	1450	0.0000	0.0000	0.0034	4.3267	0.0776	
30	1500	0.0000	0.0000	0.0018	2.9854	0.0613	
31	1550	0.0000	0.0000	0.0040	5.4660	0.0726	
32	1600	0.0000	0.0000	0.0015	2.6537	0.0575	
33	1650	0.0000	0.0000	0.0067	9.8470	0.0682	
34	1700	0.0000	0.0000	0.0015	2.8196	0.0541	
35	1750	0.0000	0.0000	0.0034	5.2219	0.0643	
36	1800	0.0000	0.0000	0.0018	3.5825	0.0511	
37	1850	0.0000	0.0000	0.0031	5.0184	0.0608	
38	1900	0.0000	0.0000	0.0018	3.7815	0.0484	
39	1950	0.0000	0.0000	0.0024	4.2318	0.0577	
40	2000	0.0000	0.0000	0.0015	3.3171	0.0460	

## Calculation of Individual Harmonic Limits

Fixed Limits for Class A:

Order	Limits in Ampere			
	90%	100%	150%	200%
2	0.9720	1.0800	1.6200	2.1600
3	2.0701	2.3001	3.4502	4.6002
4	0.3870	0.4300	0.6450	0.8600
5	1.0261	1.1401	1.7102	2.2803

6	0.2700	0.3000	0.4500	0.6000
7	0.6930	0.7700	1.1549	1.5399
8	0.2071	0.2301	0.3452	0.4602
9	0.3601	0.4001	0.6001	0.8002
10	0.1656	0.1840	0.2760	0.3680
11	0.2969	0.3299	0.4948	0.6598
12	0.1379	0.1532	0.2298	0.3064
13	0.1890	0.2100	0.3149	0.4199
14	0.1184	0.1315	0.1973	0.2631
15	0.1351	0.1501	0.2252	0.3003
16	0.1035	0.1151	0.1726	0.2301
17	0.1192	0.1324	0.1987	0.2649
18	0.0920	0.1022	0.1534	0.2045
19	0.1066	0.1184	0.1776	0.2368
20	0.0827	0.0919	0.1378	0.1837
21 *	0.0964	0.1071	0.1607	0.2142
22	0.0753	0.0836	0.1254	0.1672
23 *	0.0882	0.0980	0.1469	0.1959
24	0.0689	0.0766	0.1149	0.1532
25 *	0.0810	0.0900	0.1350	0.1801
26	0.0637	0.0708	0.1062	0.1416
27 *	0.0750	0.0833	0.1250	0.1666
28	0.0591	0.0656	0.0984	0.1312
29 *	0.0698	0.0775	0.1163	0.1550
30	0.0552	0.0613	0.0920	0.1227
31 *	0.0654	0.0726	0.1089	0.1453
32	0.0516	0.0574	0.0861	0.1147
33 *	0.0612	0.0681	0.1021	0.1361
34	0.0486	0.0540	0.0810	0.1080
35 *	0.0580	0.0644	0.0966	0.1288
36	0.0459	0.0510	0.0764	0.1019
37 *	0.0547	0.0607	0.0911	0.1215
38	0.0437	0.0485	0.0728	0.0970
39 *	0.0519	0.0577	0.0865	0.1154
40	0.0415	0.0461	0.0691	0.0922

EUT is PASSED if:

- all Average values of the Individual Harmonic Currents (Iavg) are below 100% of the Individual Limits.
- all Maximum values of the Individual Harmonic Currents (Imax) are below 150% of the Individual Limits.

Exceptions:

**These exceptions are mutually exclusive and cannot be used together.**

- 1) All Maximum values of the Individual Harmonic Currents (Imax) are below 200% of the Individual Limits if :

EUT belongs to Class A

AND excursion beyond 150% lasts less than 10% of observation time with a maximum of 10 minutes

AND the average value of the corresponding harmonic current over the entire observation period is less than 90% of applicable limits

- 2)

- Average values of some Individual Harmonic Currents ( marked with "\*" ) may be up to 150% if the Partial Harmonic Current (PHC) is lower than the PHC which is calculated from the Limit Currents:

Actual PHC = 0.0000A

PHC calculated from Limit values = 0.2514A

- Individual Harmonic Currents less than 5mA or less than 0.6% of Irms ( which is  $0.006 \times 1.660 = 0.010A$  ) are disregarded.

## Definitions of Abbreviations

Urms	***	Actual total Voltage in Volt RMS
Irms	***	Actual total Current in Ampere RMS
Ipk	***	Actual Peak value of the Current in Ampere
cf	***	Actual Crest Factor (Ipk/Irms)
P	***	Actual Active Power in Watt
S	***	Actual Apparent Power in VA (Urms*Irms)
pf	***	Actual Power Factor (P/S)
THDi	***	Actual Total Harmonic Current Distortion in %
THDu	***	Actual Total Harmonic Voltage Distortion in %
THC	***	Actual Total Harmonic Current in Ampere
PHC	***	Actual Partial Harmonic Current in Ampere

Individual measurements for 2nd to 40th order:

Iavg	Average value of the Individual Harmonic Current in Ampere RMS
Iavg%L	Average value of the Individual Harmonic Current in percentage of the applicable Limit
Imax	Maximum Individual Harmonic Current in Ampere RMS
Imax%lim	Maximum Individual Harmonic Current in percentage of the applicable Limit
Limit Irms	Individual Limit (100%) for the selected Class in Ampere RMS

General :

- Maximum and Average values are calculated over the full test-time
- The values marked with "\*\*\*" are actual values which could vary during test-time and are taken at the time of protocol printout.
- The individual measurements are taken over every 200ms and smoothed with an 1,5second filter.

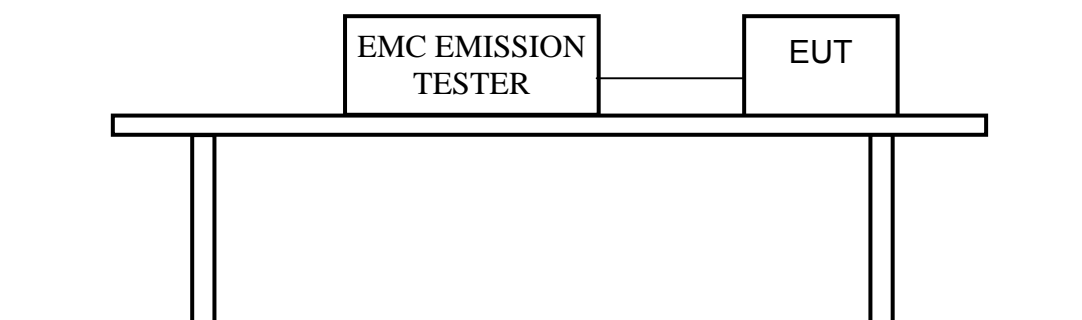
## 5 Voltage Fluctuations and Flicker Measurement (EN 61000-3-3)

### 5.1 Instrument

Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
EMC EMISSION TESTER	EMC PARTMER	HARMONICS-1000	41	2010/04/21

Note: The above equipments are within the valid calibration period.

### 5.2 Block Diagram of Test Configuration



### 5.3 Test Limits

The following limits apply:

- the value of  $P_{st}$  shall not be greater than 1.0;
- the value of  $P_{it}$  shall not be greater than 0.65;
- the relative steady-state voltage change,  $d_c$ , shall not exceed 3.3%;
- the maximum relative voltage change,  $d_{max}$ , shall not exceed 4%;
- the value of  $d(t)$  during a voltage change shall not exceed 3.3% for more than 500 ms.

### 5.4 Configuration of Measurement

- 5.4.1 The EUT with power analyzer is in series and supplied from a power source with the same nominal voltage and frequency as the rated supply voltage.
- 5.4.2 Set the output of the power analyzer to the rated voltage and frequency of EUT (230V, 50Hz).
- 5.4.3 Select the test time of observation period for short-term ( $T_p = 10$  min) and long-term ( $T_p = 2$  hrs). The test result was collected and analyzed by the computer.

### 5.5 Test Result

**PASS.**

The measured result is shown as following pages.

**Flicker Emission - IEC 61000-3-3 , EN 61000-3-3 , (EN60555-3)**

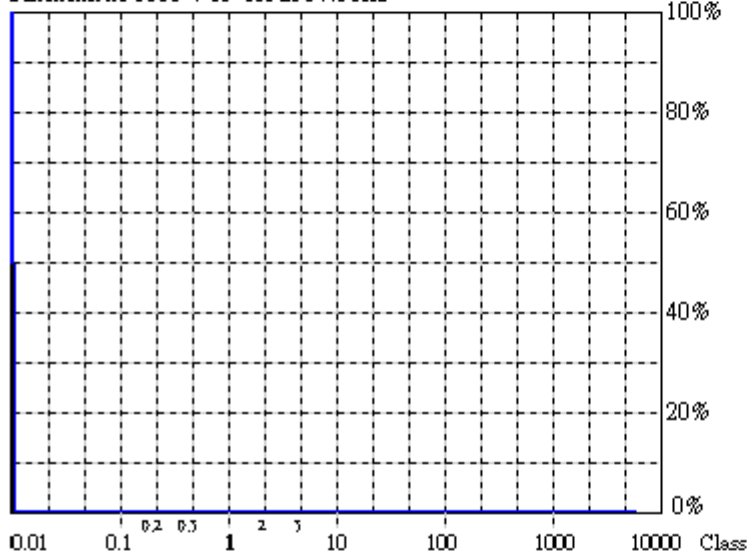
Comply: IEC 61000-3-3 Ed.1.2 - IEC 61000-4-15 Ed.1.1

Traco Electronic AG

HARCS Setup File : [unnamed](#)HARCS Report File : [unnamed](#)

Operator : Ivan  
 Unit : AC-DC Switching Power Supply  
 Serialnumber : M/N:TXH 360-112  
 Remarks : T:22'C & H:47%

Flickermeter 1000-4-15 for 230V/50Hz

**Actual Flicker (Fli): 0.00****Short-term Flicker (Pst): 0.07**

Limit (Pst): 1.00

**Long-term Flicker (Plt): 0.07**

Limit (Plt): 0.65

**Maximum Relative Volt. Change (dmax): 0.00%**

Limit (dmax): 4.00%

**Relative Steady-state Voltage Change (dc): 0.00%**

Limit (dc): 3.30%

**Maximum Interval exceeding 3.30% (dt): 0.00ms**

Limit (dt&gt;Lim): 500ms

**Flicker Emission - IEC 61000-3-3 , EN 61000-3-3 , (EN60555-3)**

2010/1/19 下午 05:11

Urms = 228.3 V P = 356.5 W

Range: 5 A

Irms = 1.655 A pf = 0.943

V-nom: 230 V

TestTime: 10 min (100%)

AC-DC Switching Power Supply

**Test completed, Result: PASSED**

T:22'C &amp; H:47%

BAR-1000 EMC-Printer

Full Bar : Actual Values  
 Empty Bar : Maximum Values  
 Circles : Average Values  
 Blue : Current , Green : Voltage , Red : Failed

**Measurement**

Date : 2010/1/19 PM: 05:11 V4.18

Urms = 228.3V Freq = 49.984 Range: 5 A  
 Irms = 1.655A IpK = 2.930A cf = 1.770  
 P = 356.5W S = 378.0VA pf = 0.943

Test - Time : 1 x 10min = 10min ( 100 %)

LIN (Line Impedance Network) : SLIN 0.24ohm +j0.15ohm N:0.16ohm +j0.10ohm

Limits :           Plt : 0.65       Pst : 1.00  
                  dmax : 4.00 %   dc : 3.30 %  
                  dtLim: 3.30 %   dt>Lim: 500ms

Test completed, Result: PASSED

1

---

## Definitions of Abbreviations

Urms	***	Actual total Voltage in Volt RMS
Irms	***	Actual total Current in Ampere RMS
Ipk	***	Actual Peak value of the Current in Ampere
cf	***	Actual Crest Factor (Ipk/Irms)
P	***	Actual Active Power in Watt
S	***	Actual Apparent Power in VA (Urms*Irms)
pf	***	Actual Power Factor (P/S)

Plt                   Long term Flicker over all Pst cycles

For every Pst-cycle:

General :

- The values marked with "\*\*\*\*" are actual values which could vary during test-time and are taken at the time of protocol printout.

## 6 Performance Criterion of Immunity Test

### 6.1 EN 55024

Criterion	Description
A	<p>The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the use may reasonably expect from the equipment if used as intended.</p>
B	<p>After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance.</p> <p>During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test.</p> <p>If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonable expect from the equipment if used as intended.</p>
C	<p>Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions.</p> <p>Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.</p>

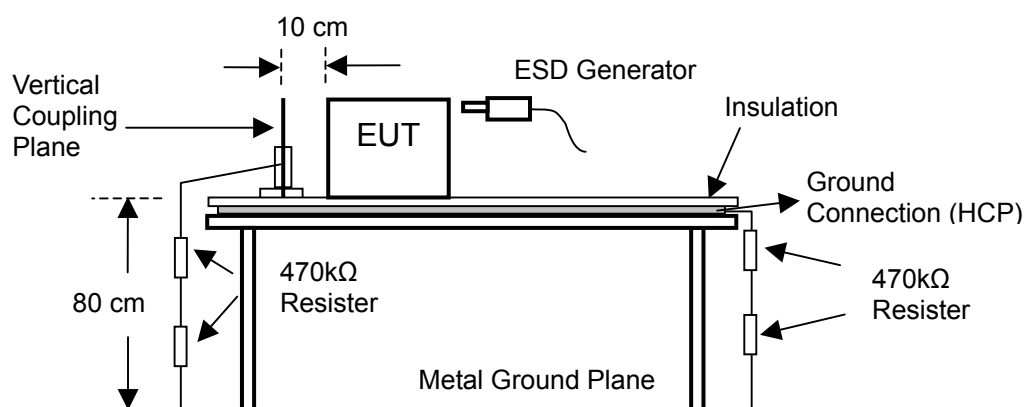
## 7 Electrostatic Discharge Immunity Test (IEC 61000-4-2)

### 7.1 Instrument

Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
ESD Simulator	EMC PARTNER	ESD3000	276	2010/10/25

Note: The above equipments are within the valid calibration period.

### 7.2 Block Diagram of Test Configuration



### 7.3 Test Levels

Level	Contact discharge (kV)	Air discharge (kV)
1	2	2
2	4	4
3	6	8
4	8	15
X	Special	Special

### 7.4 Test Requirement

IEC 61000-4-2 (EN 55024) require:

Air discharge:  $\pm 8$  kV

Contact discharge:  $\pm 4$  kV

Performance criterion: B

## 7.5 Configuration of Measurement

- 7.5.1 Static electricity discharges shall be applied only to those points and surfaces of the EUT which are expected to be touched during usual operation, including user access, as specified in the user manual, for example for ribbon and paper roll changes.
- 7.5.2 The discharges shall be applied in two ways:
- Contact discharges to the conductive surfaces and to coupling planes:  
The EUT shall be exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points (a minimum of 50 discharges at each point). One of the test points shall be subjected to at least 50 indirect discharges (contact) to the center of the front edge of the horizontal coupling plane (HCP), the remaining three test points shall each receive at least 50 direct contact discharges. If no direct contact test points are available, then at least 200 indirect discharges shall be applied in the indirect mode (see IEC 61000-4-2 for use of the Vertical Conducting Plane (VCP)). Tests shall be performed at a maximum repetition rate of one discharge per second.
  - Air discharge at slots and apertures, and insulating surfaces:  
On those parts of the EUT where it is not possible to perform contact discharge testing, the equipment should be investigated to identify user accessible points where breakdown may occur; examples are openings at edges of keys, or in the covers of keyboards and telephone handsets. Such points are tested using the air discharge method. See also IEC 61000-4-2 regarding painted surfaces. This investigation should be restricted to those areas normally handled by the user. A minimum of 10 single air discharges shall be applied to the selected test point for each such area.
- 7.5.3 The ESD generator (gun) was held perpendicular to the surface to which the discharge was applied. The application of electrostatic discharges to the contacts of open connectors is not required.

## 7.6 Test Result

Temperature: 25.1 °C ; Humidity: 45 % ; Atm pres: 101 Kpa ; Test Engineer: Ivan

**PASS.**

The performance criterion after tested EN 55024:

Air discharge  $\pm 2$  kV,  $\pm 4$  kV,  $\pm 8$  kV: ☒ A ☐ B ☐ C

Contact discharge  $\pm 2$  kV,  $\pm 4$  kV: ☒ A ☐ B ☐ C

Indirect discharge (HCP)  $\pm 2$  kV,  $\pm 4$  kV: ☒ A ☐ B ☐ C

Indirect discharge (VCP Front, Left, Back, Right)  $\pm 2$  kV,  $\pm 4$  kV:  
☒ A ☐ B ☐ C

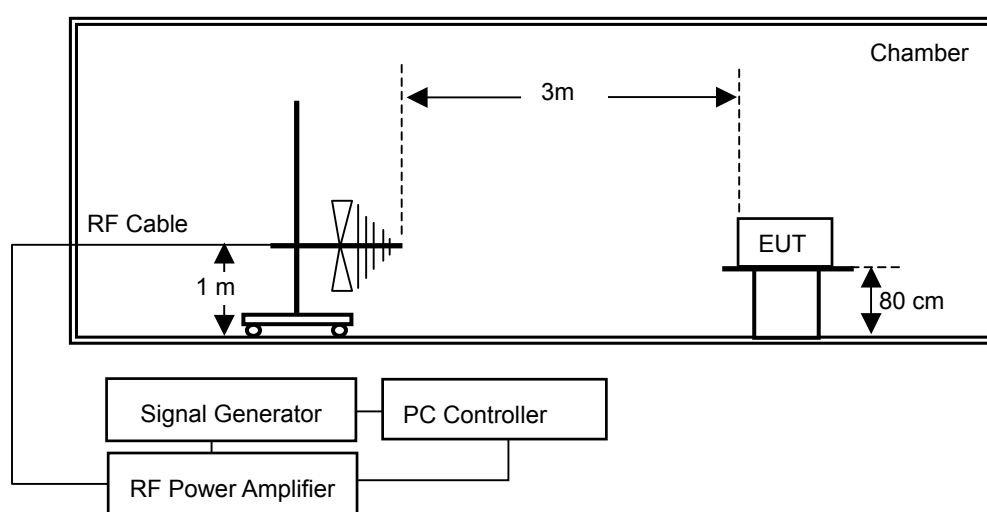
## 8 Radio-frequency, Electromagnetic field Immunity Test (IEC 61000-4-3)

### 8.1 Instrument

Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
Signal Generator	R&S	SM300	101279	2010/10/14
RF Power Amplifier	Frankonia	FLG-200B	1038	2010/02/21
RF Power Amplifier	Frankonia	FLG-50C	1013	2010/02/21
Bilog Antenna	Frankonia	BTA-M	06012M	2010/02/21

Note: The above equipments are within the valid calibration period.

### 8.2 Block Diagram of Test Configuration



### 8.3 Test Levels

Level	Test field strength (V/m)
1	1
2	3
3	10
4	30
X	Special

### 8.4 Test Requirement

IEC 61000-4-3 (EN 55024) require:

The frequency steps: 1%, Log sweep, Dwell time: 3.0 sec.

☒ Frequency range: 80 to 1000 MHz, Field strength: 3 V/m, 80%AM (1kHz),

Performance criterion: A

## 8.5 Configuration of Measurement

- 8.5.1 Before testing, the intensity of the established field strength was checked by placing the field sensor at a calibration grid point, and with the field generating antenna and cables in the same positions as used for the calibration, the forward and reverse power were measured. The forward power needed to give the calibrated field was evaluated.
- 8.5.2 The EUT was placed on a non-metallic table 0.8m above the reference ground plane (RGP) and was operated according to its specified operating mode.
- 8.5.3 Ferrite tiles/ absorbers were placed on the RGP between the EUT and the antenna to reduce the reflections from the RGP.
- 8.5.4 The distance between antenna and EUT is 3 meter.
- 8.5.5 During the test EUT performance has been monitoring by CCD camera.

## 8.6 Test Result

Temperature: 24.8 °C ; Humidity: 61 % ; Atm pres: 101 Kpa ; Test Engineer: Ivan

**PASS.**

The performance criterion after tested EN 55024:

☒ Frequency range: **80** to **1000** MHz, Field strength: **3** V/m, 80% AM (1kHz),

Performance criterion: ☒ **A** ☐ **B** ☐ **C**

## 9 Electrical Fast Transient/Burst Immunity Test (IEC 61000-4-4)

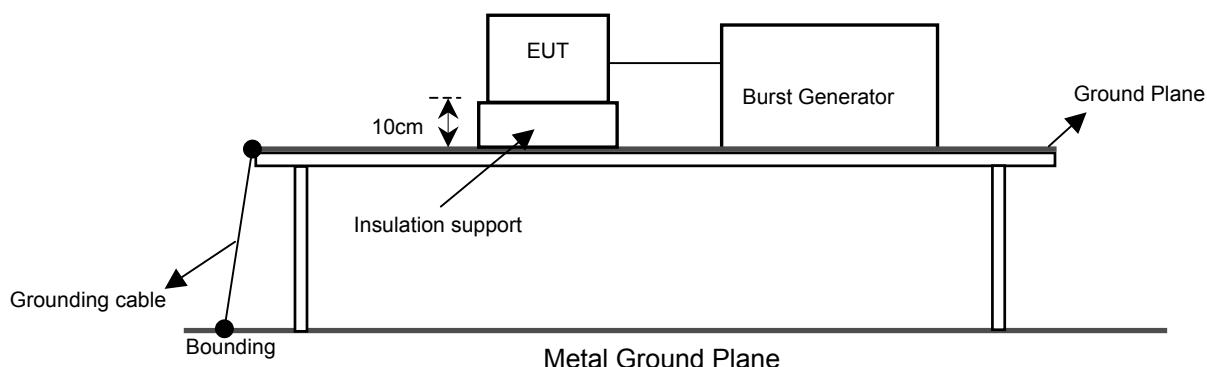
### 9.1 Instrument

Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
EMC Pro System	KeyTek	EMC Pro	0003231	2010/03/16

Note: The above equipments are within the valid calibration period.

### 9.2 Block Diagram of Test Configuration

For Power Ports.



### 9.3 Test Levels

Open circuit output test voltage and repetition rate of the impulses				
Level	On power port, PE		On I/O (input/output) signal, data and control ports	
	Voltage peak kV	Repetition rate kHz	Voltage peak kV	Repetition rate kHz
1	0,5	5 or 100	0,25	5 or 100
2	1	5 or 100	0,5	5 or 100
3	2	5 or 100	1	5 or 100
4	4	5 or 100	2	5 or 100
X <sup>a</sup>	Special	Special	Special	Special

NOTE 1: Use of 5 kHz repetition rates is traditional; however, 100 kHz is closer to reality. Product committees should determine which frequencies are relevant for specific products or product types.

NOTE 2: With some products, there may be no clear distinction between power ports and I/O ports, in which case it is up to product committees to make this determination for test purposes.

<sup>a</sup> "X" is an open level. The level has to be specified in the dedicated equipment specification.

#### 9.4 Test Requirement

IEC 61000-4-4 (EN 55024) require:

5 kHz Repetition frequency

☒  $\pm 1.0$  kV input AC power ports.

☐  $\pm 0.5$  kV for Signal, telecommunication

☐  $\pm 0.5$  kV input DC power ports.

Performance criterion: B

#### 9.5 Configuration of Measurement

- 9.5.1 The EUT and the auxiliary equipment were placed on a wooden table of 0.8 meters height. The size of ground plane is greater than 1m×1m and project beyond the EUT by at least 0.1m on all sides. The ground plane is connected to the protective earth.
- 9.5.2 The EUT was connected to the power mains through a coupling device that directly couples the EFT interference signal. Each of the Line, Neutral and Protective Earth (PE) conductors was impressed with burst noise for 1 minute. Both the voltage polarities were applied for each test level. The length of the signal and power lines between the coupling device and the EUT shall be 0.5m  $\pm$  0.05m.

#### 9.6 Test Result

Temperature: 24.6 °C ; Humidity: 51 % ; Atm pres: 101 Kpa ; Test Engineer: Ivan

**PASS.**

The performance criterion after tested EN 55024:

☒  $\pm 1.0$  kV input AC power port: Line + Neutral + PE

Performance criterion: ☒ **A**      ☐ **B**      ☐ **C**

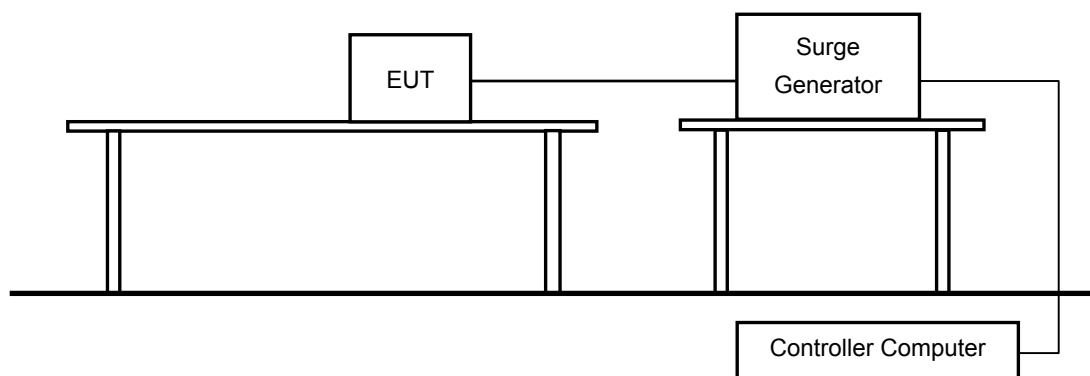
## 10 Surge Immunity Test (IEC 61000-4-5)

### 10.1 Instrument

Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
EMC Pro Systems	KeyTek	EMC Pro	0003234	2010/03/15

Note: The above equipments are within the valid calibration period.

### 10.2 Block Diagram of Test Configuration



### 10.3 Test Levels

Level	Open-circuit test voltage $\pm 10\%$ (kV)
1	0.5
2	1.0
3	2.0
4	4.0
X	Special

Note: X can be any level, above, below or in between the other levels.  
This level can be specified in the product standard.

## 10.4 Test Requirement

IEC 61000-4-5 (EN 55024) require:

- ☒ Input AC power ports: ☒ Line to line:  $\pm 1\text{kV}$  (peak), 1.2/50 (8/20) Tr/Th us
- ☒ Line to earth (ground):  $\pm 2\text{kV}$  (peak), 1.2/50 (8/20) Tr/Th us
- ☐ Input DC power ports:  $\pm 0.5\text{kV}$ (peak): line to earth, 1.2/50 (8/20) Tr/Th us
- ☐ Signal and telecommunication ports:  $\pm 1.0\text{kV}$ (peak): 1.2/50 (8/20) Tr/Th us

Performance criterion: **B**

## 10.5 Configuration of Measurement

- 10.5.1 The EUT and support units were located on a wooden table 0.8 m away from ground floor.
- 10.5.2 The EUT was connected to the power mains through a coupling device that directly couples the Surge interference signal. The surge noise was applied synchronized to the voltage phase at the zero crossing and the peak value of the AC voltage wave (positive and negative).
- 10.5.3 The surges were applied line to line and line(s) to earth. When testing line to earth the test voltage was applied successively between each of the lines and earth. Steps up to the test level specified increased the test voltage. All lower levels including the selected test level were tested. The polarity of each surge level included positive and negative test pulses.

## 10.6 Test Result

Temperature: 24.5 °C ; Humidity: 68 % ; Atm pres: 101 Kpa ; Test Engineer: Ivan

**PASS.**

The performance criterion after tested EN 55024:

- ☒  $\pm 0.5\text{ kV}$  (peak) Input AC power port: Line to line  
Performance criterion: ☒ **A** ☐ **B** ☐ **C**
- ☒  $\pm 1.0\text{ kV}$  (peak) Input AC power port: Line to line  
Performance criterion: ☒ **A** ☐ **B** ☐ **C**
- ☒  $\pm 0.5\text{ kV}$  (peak) Input AC power port: Line to earth (ground)  
Performance criterion: ☒ **A** ☐ **B** ☐ **C**
- ☒  $\pm 1.0\text{ kV}$  (peak) Input AC power port: Line to earth (ground)  
Performance criterion: ☒ **A** ☐ **B** ☐ **C**
- ☒  $\pm 2.0\text{ kV}$  (peak) Input AC power port: Line to earth (ground)  
Performance criterion: ☒ **A** ☐ **B** ☐ **C**

## 11 Radio-frequency, Conducted Disturbances Immunity Test (IEC 61000-4-6)

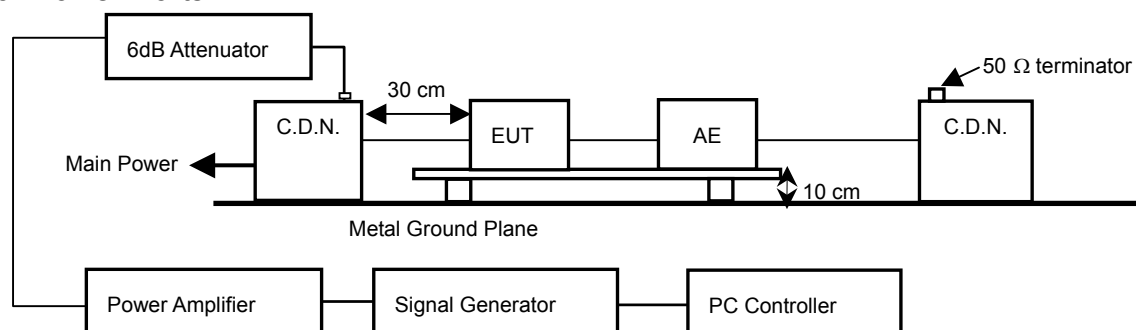
### 11.1 Instrument

Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
Signal Generator	R&S	SMY02	829846/013	2010/07/20
Power Amplifier	Frankonia	CIT-10	162D1278	2010/02/14
Attenuator	SCHAFFNER	ATN6075	22300	2010/02/14
C.D.N	FCC	FCC-801-M3-25A	2045	2010/02/14
C.D.N	SCHAFFNER	M216	16394	2010/02/14

Note: The above equipments are within the valid calibration period.

### 11.2 Block Diagram of Test Configuration

For Power Ports.



### 11.3 Test Levels

Level	Voltage Level (V)
1	1
2	3
3	10
X	Special

## 11.4 Test Requirement

IEC 61000-4-6 (EN 55024) require:

The frequency steps: 1%, Log sweep, Dwell time: 3 sec

Frequency Range is from 0.15 to 80MHz.

Field strength: **3 V**, 80% AM (1kHz)

☒ Input AC power ports.

☐ Signal and telecommunication ports.

☐ Input DC power ports.

Performance criterion: A

## 11.5 Configuration of Measurement

11.5.1 The EUT was placed on a table of is 0.1 m height. In Semi-Anechoic chamber A Ground reference plane was placed on the table and a 0.1meter insulating support was inserted between the EUT and Ground reference plane.

11.5.2 The EUT was connected to the power mains through a Coupling and Decoupling Networks (CDN).

11.5.3 The test was performed with the test generator connected to each of the coupling and decoupling devices in turn while the other non-excited RF input ports of the coupling devices were terminated by a 50  $\Omega$  terminator.

11.5.4 The frequency range was swept from 150kHz to 80MHz.using the signal levels established during the setting process, and without the disturbance signal 80% amplitude modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or to switch coupling devices as necessary. The rate of sweep was less than  $1.5 \times 10^{-3}$  decades/s. And the step size of the frequency sweep was also less than 1% of the start and thereafter 1% of the preceding frequency value. The dwell time at each frequency was more than the time necessary for the EUT to be excited, and able to respond.

11.5.5 The EUT was fully excised during the testing and all the selected excise modes were fully interrogated for susceptibility.

## 11.6 Test Result

Temperature: 24.9 °C ; Humidity: 55 % ; Atm pres: 101 Kpa ; Test Engineer: Ivan

**PASS.**

The performance criterion after tested EN 55024:

Frequency range: **0.15** to **80** MHz, Field strength: **3 V**, 80% AM (1kHz),

☒ Input AC power port.

Performance criterion: ☒ **A**      ☐ **B**      ☐ **C**

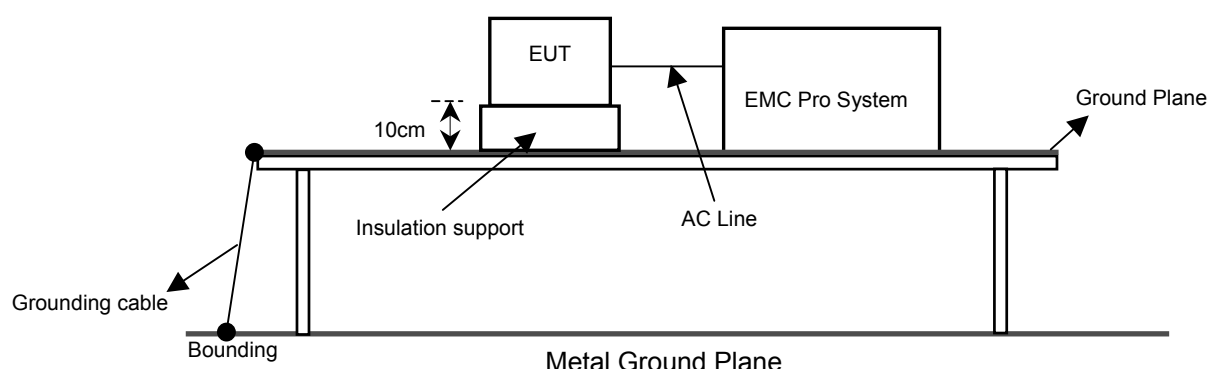
## 12 Voltage Dips, Short Interruptions Immunity Test (IEC 61000-4-11)

### 12.1 Instrument

Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
EMC Pro System	KeyTek	EMC Pro	0003231	2010/03/16

Note: The above equipments are within the valid calibration period.

### 12.2 Block Diagram of Test Configuration



### 12.3 Test Levels

#### Preferred test level and durations for voltage dips

Class <sup>a</sup>	Test level and durations for short interruptions ( $t_s$ ) (50 Hz/60 Hz)				
Class 1	Case-by-case according to the equipment requirements				
Class 2	0 % during 1/2 cycle	0 % during 1 cycle	70 % during 25/30 <sup>c</sup> cycles		
Class 3	0 % during 1/2 cycle	0 % during 1 cycle	40 % during 10/12 <sup>c</sup> cycles	70 % during 25/30 <sup>c</sup> cycles	80 % during 250/300 <sup>c</sup> cycles
Class X <sup>b</sup>	X	X	X	X	X

<sup>a</sup> Classes as per IEC 61000-2-4; see Annex B.

<sup>b</sup> To be defined by product committee. For equipment connected directly or indirectly to the public network, the levels must not be less severe than Class 2.

<sup>c</sup> "25/30 cycles" means "25 cycles for 50 Hz test" and "30 cycles for 60 Hz test".

#### Preferred test level and durations for short interruptions

Class <sup>a</sup>	Test level and durations for short interruptions ( $t_s$ ) (50 Hz/60 Hz)
Class 1	Case-by-case according to the equipment requirements
Class 2	0 % during 250/300 <sup>c</sup> cycles
Class 3	0 % during 250/300 <sup>c</sup> cycles
Class X <sup>b</sup>	X

<sup>a</sup> Classes as per IEC 61000-2-4; see Annex B.

<sup>b</sup> To be defined by product committee. For equipment connected directly or indirectly to the public network, the levels must not be less severe than Class 2.

<sup>c</sup> "250/300 cycles" means "250 cycles for 50 Hz test" and "300 cycles for 60 Hz test".

## 12.4 Test Requirement

IEC 61000-4-11 (EN 55024) require:

> 95% reduction (Voltage Dips), 0.5 period, Performance criterion: B

30% reduction (Voltage Dips), 25 period, Performance criterion: C

> 95% reduction (Voltage Interruptions), 250 period, Performance criterion: C

## 12.5 Configuration of Measurement

12.5.1 The power cord was used as supplied by the manufacturer. The EUT was connected to the line output of the Voltage Dips and Interruption Generator.

12.5.2 The EUT was tested for (I) > 95% voltage dip of supplied voltage with duration of 0.5 period (10ms), (II) 30% voltage dip of supplied voltage and duration 25 period (500ms). Both of the dip tests were carried out for a sequence of three voltage dips with intervals of 10 seconds. (III) > 95% voltage interruption of supplied voltage with duration of 250 period (5000ms) was followed, which was a sequence of three voltage interruptions with intervals of 10 seconds.

## 12.6 Test Result

Temperature: 24.8 °C ; Humidity: 50 % ; Atm pres: 101 Kpa ; Test Engineer: Ivan

**PASS.**

The performance criterion after tested EN 55024:

> 95% reduction (Voltage Dips), 0.5 period

☒ A ☐ B ☐ C

30% reduction (Voltage Dips), 25 period

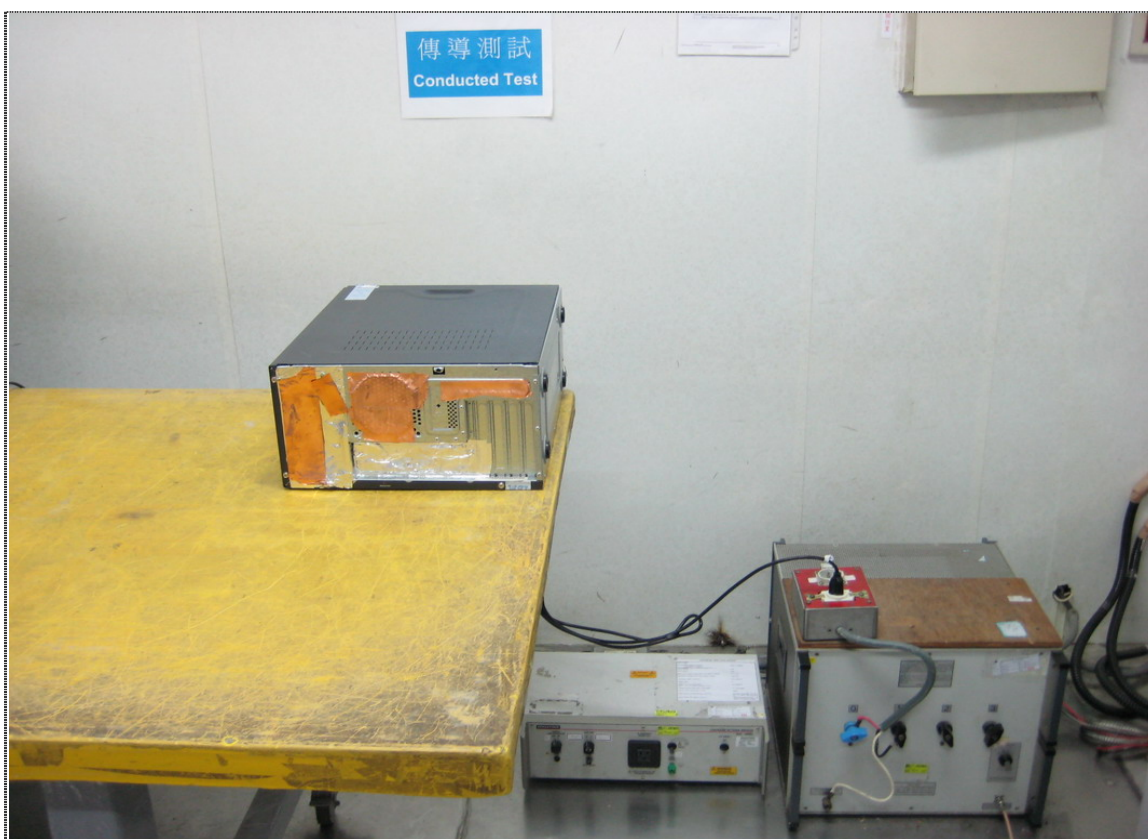
☒ A ☐ B ☐ C

> 95% reduction (Voltage Interruptions), 250 period

☐ A ☒ B ☐ C

## 13 Photographs of Test

### 13.1 Power Line Conducted Emission Measurement



Front View



Rear View

## 13.2 Radiated Emission Measurement



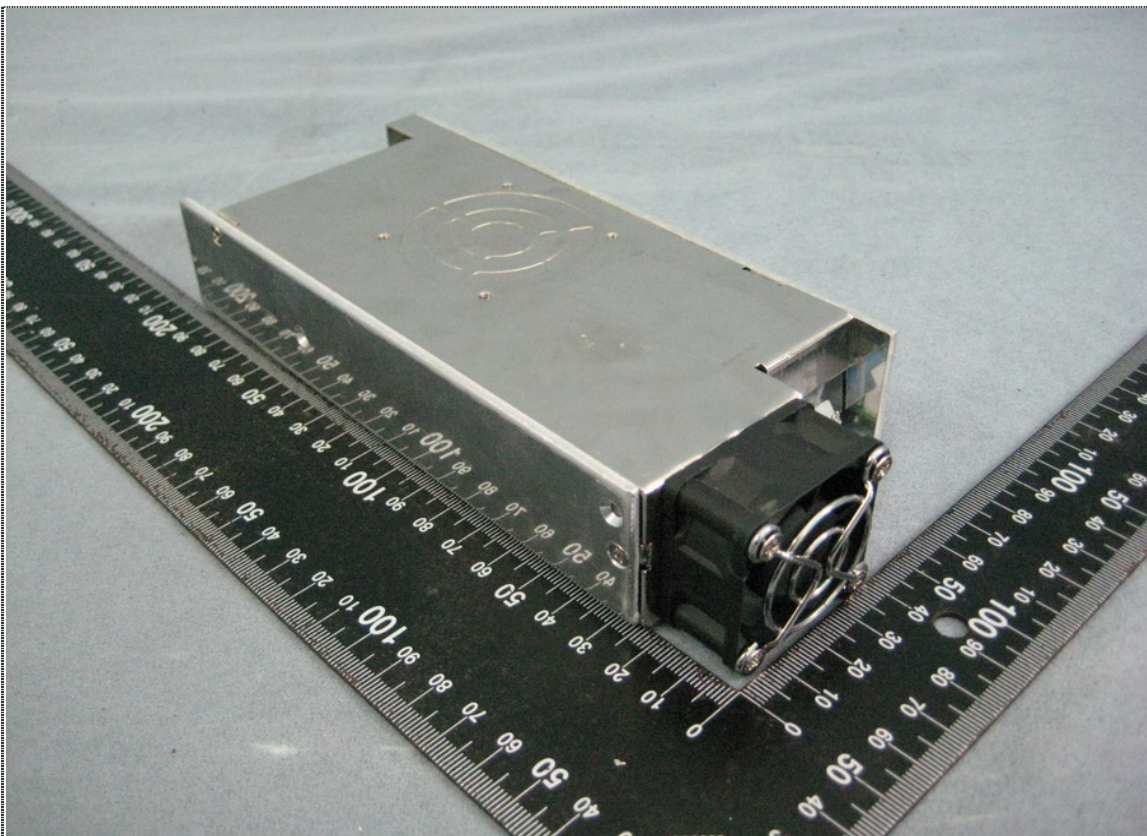
Front View



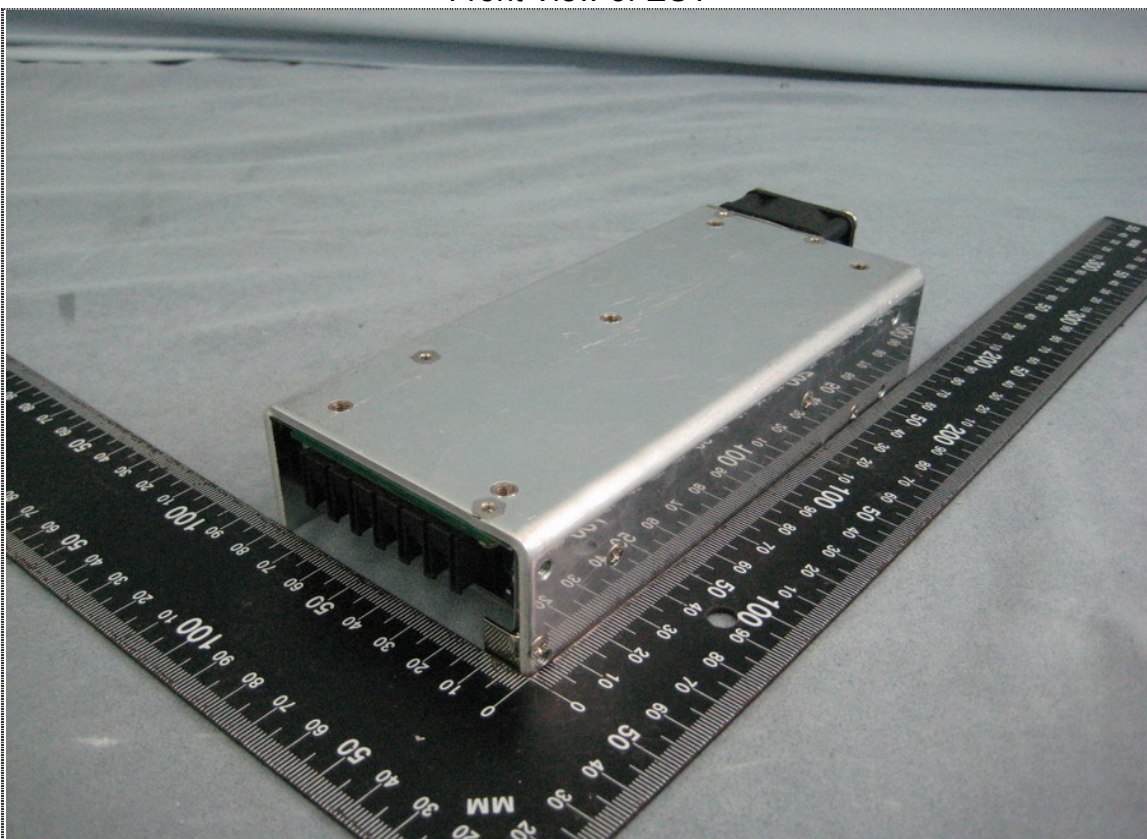
Rear View

## 14 Photographs of EUT

### 14.1 Model No.: TXH 360-112



Front View of EUT



Rear View of EUT