

CE-EMC TEST REPORT

Based On Test Report No. : E7/2017/80011

Applicant : TRACO ELECTRONIC AG

Address : Sihlbruggstrasse 111 CH-6340 Baar Switzerland

Manufacturer : TRACO ELECTRONIC AG

Address : SIHLBRUGGSTASSE 111 CH-6340 BAAR SWITZERLAND

Equipment Under Test (EUT) :

Name : AC-DC Power Supply

Brand Name :



Model No.: TPP 15-105A-J; TPP 15-105BA-J

Added Model(s) : Please refer to Section 1.1

Standards:

EN 55014-1 : 2006+A1:2009+A2:2011	CISPR 16-2-3 : 2010+A1:2010+A2:2014
EN 61000-3-2 : 2014	EN 61000-3-3 : 2013
EN 55014-2 : 2015, Category IV	
IEC 61000-4-2 : 2008	IEC 61000-4-3 : 2006+A1:2007+A2:2010
IEC 61000-4-4 : 2012	IEC 61000-4-5 : 2014
IEC 61000-4-6 : 2013	IEC 61000-4-11 : 2004

In the configuration tested, the EUT complied with the standards specified above.

Date of Receipt : Jan. 12, 2018

Date of Issue : Jun. 27, 2018

Remarks:

This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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Approved By:

Date:

Jun. 27, 2018

Bill Cheng (Section Manager)



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Version

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1. General Description

1.1 General Description of EUT

Name of EUT	: AC-DC Power Supply
Brand Name	: 
Model No.(s)	: TPP 15-105A-J; TPP 15-105BA-J
Added Model(s)	: TPP 15-103A-J; TPP 15-107A-J; TPP 15-109A-J; TPP 15-112A-J; TPP 15-115A-J; TPP 15-118A-J; TPP 15-124A-J; TPP 15-128A-J; TPP 15-136A-J; TPP 15-148A-J; TPP 15-153A-J; TPP 15-103-J; TPP 15-105-J; TPP 15-107-J; TPP 15-109-J; TPP 15-112-J; TPP 15-115-J; TPP 15-118-J; TPP 15-124-J; TPP 15-128-J; TPP 15-136-J; TPP 15-148-J; TPP 15-153-J; TPP 15-103BA-J; TPP 15-107BA-J; TPP 15-109BA-J; TPP 15-112BA-J; TPP 15-115BA-J; TPP 15-118BA-J; TPP 15-124BA-J; TPP 15-128BA-J; TPP 15-136BA-J; TPP 15-148BA-J; TPP 15-153BA-J; TPP 15-103B-J; TPP 15-105B-J; TPP 15-107B-J; TPP 15-109B-J; TPP 15-112B-J; TPP 15-115B-J; TPP 15-118B-J; TPP 15-124B-J; TPP 15-128B-J; TPP 15-136B-J; TPP 15-148B-J; TPP 15-153B-J; TPP 15-103A; TPP 15-105A; TPP 15-107A; TPP 15-109A; TPP 15-112A; TPP 15-115A; TPP 15-118A; TPP 15-124A; TPP 15-128A; TPP 15-136A; TPP 15-148A; TPP 15-153A; TPP 15-103; TPP 15-105; TPP 15-107; TPP 15-109; TPP 15-112; TPP 15-115; TPP 15-118; TPP 15-124; TPP 15-128; TPP 15-136; TPP 15-148; TPP 15-153; TPP 15-103BA; TPP 15-105BA; TPP 15-107BA; TPP 15-109BA; TPP 15-112BA; TPP 15-115BA; TPP 15-118BA; TPP 15-124BA; TPP 15-128BA; TPP 15-136BA; TPP 15-148BA; TPP 15-153BA; TPP 15-103B; TPP 15-105B; TPP 15-107B; TPP 15-109B; TPP 15-112B; TPP 15-115B; TPP 15-118B; TPP 15-124B; TPP 15-128B; TPP 15-136B; TPP 15-148B; TPP 15-153B; TPP 15-103A-M; TPP 15-105A-M; TPP 15-107A-M; TPP 15-109A-M; TPP 15-112A-M; TPP 15-115A-M; TPP 15-118A-M; TPP 15-124A-M; TPP 15-128A-M; TPP 15-136A-M; TPP 15-148A-M; TPP 15-153A-M; TPP 15-103-M; TPP 15-105-M; TPP 15-107-M; TPP 15-109-M; TPP 15-112-M; TPP 15-115-M; TPP 15-118-M; TPP 15-124-M; TPP 15-128-M; TPP 15-136-M; TPP 15-148-M; TPP 15-153-M; TPP 15-103BA-M; TPP 15-105BA-M;

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Added Model(s)	: TPP 15-107BA-M; TPP 15-109BA-M; TPP 15-112BA-M; TPP 15-115BA-M; TPP 15-118BA-M; TPP 15-124BA-M; TPP 15-128BA-M; TPP 15-136BA-M; TPP 15-148BA-M; TPP 15-153BA-M; TPP 15-103B-M; TPP 15-105B-M; TPP 15-107B-M; TPP 15-109B-M; TPP 15-112B-M; TPP 15-115B-M; TPP 15-118B-M; TPP 15-124B-M; TPP 15-128B-M; TPP 15-136B-M; TPP 15-148B-M; TPP 15-153B-M; TPP 15-103A-D; TPP 15-105A-D; TPP 15-107A-D; TPP 15-109A-D; TPP 15-112A-D; TPP 15-115A-D; TPP 15-118A-D; TPP 15-124A-D; TPP 15-128A-D; TPP 15-136A-D; TPP 15-148A-D; TPP 15-153A-D; TPP 15-103-D; TPP 15-105-D; TPP 15-107-D; TPP 15-109-D; TPP 15-112-D; TPP 15-115-D; TPP 15-118-D; TPP 15-124-D; TPP 15-128-D; TPP 15-136-D; TPP 15-148-D; TPP 15-153-D
Variant Description	: See the following note

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Note: 1. The different between of model numbers are list as below.

Model Name	Output Voltage (Vdc)	Output Current (mA)	Max Output Power (W)	Case	GND
TPP 15-103BA-J	3.3	4000	13.2	Type 1	Y
TPP 15-105BA-J	5	3000	15	Type 1	Y
TPP 15-107BA-J	7.5	2000	15	Type 1	Y
TPP 15-109BA-J	9	1670	15.03	Type 1	Y
TPP 15-112BA-J	12	1250	15	Type 1	Y
TPP 15-115BA-J	15	1000	15	Type 1	Y
TPP 15-118BA-J	18	834	15.012	Type 1	Y
TPP 15-124BA-J	24	625	15	Type 1	Y
TPP 15-128BA-J	28	536	15.008	Type 1	Y
TPP 15-136BA-J	36	417	15.012	Type 1	Y
TPP 15-148BA-J	48	313	15.024	Type 1	Y
TPP 15-153BA-J	53	284	15.052	Type 1	Y
TPP 15-103BA-M	3.3	4000	13.2	Type 1	Y
TPP 15-105BA-M	5	3000	15	Type 1	Y
TPP 15-107BA-M	7.5	2000	15	Type 1	Y
TPP 15-109BA-M	9	1670	15.03	Type 1	Y
TPP 15-112BA-M	12	1250	15	Type 1	Y
TPP 15-115BA-M	15	1000	15	Type 1	Y
TPP 15-118BA-M	18	834	15.012	Type 1	Y
TPP 15-124BA-M	24	625	15	Type 1	Y
TPP 15-128BA-M	28	536	15.008	Type 1	Y
TPP 15-136BA-M	36	417	15.012	Type 1	Y
TPP 15-148BA-M	48	313	15.024	Type 1	Y
TPP 15-153BA-M	53	284	15.052	Type 1	Y
TPP 15-103BA	3.3	4000	13.2	Type 1	Y
TPP 15-105BA	5	3000	15	Type 1	Y
TPP 15-107BA	7.5	2000	15	Type 1	Y
TPP 15-109BA	9	1670	15.03	Type 1	Y
TPP 15-112BA	12	1250	15	Type 1	Y
TPP 15-115BA	15	1000	15	Type 1	Y
TPP 15-118BA	18	834	15.012	Type 1	Y
TPP 15-124BA	24	625	15	Type 1	Y
TPP 15-128BA	28	536	15.008	Type 1	Y
TPP 15-136BA	36	417	15.012	Type 1	Y
TPP 15-148BA	48	313	15.024	Type 1	Y
TPP 15-153BA	53	284	15.052	Type 1	Y

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Model Name	Output Voltage (Vdc)	Output Current (mA)	Max Output Power (W)	Case	GND
TPP 15-103B-J	3.3	4000	13.2	Type 2	Y
TPP 15-105B-J	5	3000	15	Type 2	Y
TPP 15-107B-J	7.5	2000	15	Type 2	Y
TPP 15-109B-J	9	1670	15.03	Type 2	Y
TPP 15-112B-J	12	1250	15	Type 2	Y
TPP 15-115B-J	15	1000	15	Type 2	Y
TPP 15-118B-J	18	834	15.012	Type 2	Y
TPP 15-124B-J	24	625	15	Type 2	Y
TPP 15-128B-J	28	536	15.008	Type 2	Y
TPP 15-136B-J	36	417	15.012	Type 2	Y
TPP 15-148B-J	48	313	15.024	Type 2	Y
TPP 15-153B-J	53	284	15.052	Type 2	Y
TPP 15-103B	3.3	4000	13.2	Type 2	Y
TPP 15-105B	5	3000	15	Type 2	Y
TPP 15-107B	7.5	2000	15	Type 2	Y
TPP 15-109B	9	1670	15.03	Type 2	Y
TPP 15-112B	12	1250	15	Type 2	Y
TPP 15-115B	15	1000	15	Type 2	Y
TPP 15-118B	18	834	15.012	Type 2	Y
TPP 15-124B	24	625	15	Type 2	Y
TPP 15-128B	28	536	15.008	Type 2	Y
TPP 15-136B	36	417	15.012	Type 2	Y
TPP 15-148B	48	313	15.024	Type 2	Y
TPP 15-153B	53	284	15.052	Type 2	Y
TPP 15-103B-M	3.3	4000	13.2	Type 2	Y
TPP 15-105B-M	5	3000	15	Type 2	Y
TPP 15-107B-M	7.5	2000	15	Type 2	Y
TPP 15-109B-M	9	1670	15.03	Type 2	Y
TPP 15-112B-M	12	1250	15	Type 2	Y
TPP 15-115B-M	15	1000	15	Type 2	Y
TPP 15-118B-M	18	834	15.012	Type 2	Y
TPP 15-124B-M	24	625	15	Type 2	Y
TPP 15-128B-M	28	536	15.008	Type 2	Y
TPP 15-136B-M	36	417	15.012	Type 2	Y
TPP 15-148B-M	48	313	15.024	Type 2	Y
TPP 15-153B-M	53	284	15.052	Type 2	Y

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Model Name	Output Voltage (Vdc)	Output Current (mA)	Max Output Power (W)	Case	GND
TPP 15-103A-J	3.3	4000	13.2	Type 1	N
TPP 15-105A-J	5	3000	15	Type 1	N
TPP 15-107A-J	7.5	2000	15	Type 1	N
TPP 15-109A-J	9	1670	15.03	Type 1	N
TPP 15-112A-J	12	1250	15	Type 1	N
TPP 15-115A-J	15	1000	15	Type 1	N
TPP 15-118A-J	18	834	15.012	Type 1	N
TPP 15-124A-J	24	625	15	Type 1	N
TPP 15-128A-J	28	536	15.008	Type 1	N
TPP 15-136A-J	36	417	15.012	Type 1	N
TPP 15-148A-J	48	313	15.024	Type 1	N
TPP 15-153A-J	53	284	15.052	Type 1	N
TPP 15-103A-M	3.3	4000	13.2	Type 1	N
TPP 15-105A-M	5	3000	15	Type 1	N
TPP 15-107A-M	7.5	2000	15	Type 1	N
TPP 15-109A-M	9	1670	15.03	Type 1	N
TPP 15-112A-M	12	1250	15	Type 1	N
TPP 15-115A-M	15	1000	15	Type 1	N
TPP 15-118A-M	18	834	15.012	Type 1	N
TPP 15-124A-M	24	625	15	Type 1	N
TPP 15-128A-M	28	536	15.008	Type 1	N
TPP 15-136A-M	36	417	15.012	Type 1	N
TPP 15-148A-M	48	313	15.024	Type 1	N
TPP 15-153A-M	53	284	15.052	Type 1	N
TPP 15-103A-D	3.3	4000	13.2	Type 1	N
TPP 15-105A-D	5	3000	15	Type 1	N
TPP 15-107A-D	7.5	2000	15	Type 1	N
TPP 15-109A-D	9	1670	15.03	Type 1	N
TPP 15-112A-D	12	1250	15	Type 1	N
TPP 15-115A-D	15	1000	15	Type 1	N
TPP 15-118A-D	18	834	15.012	Type 1	N
TPP 15-124A-D	24	625	15	Type 1	N
TPP 15-128A-D	28	536	15.008	Type 1	N
TPP 15-136A-D	36	417	15.012	Type 1	N
TPP 15-148A-D	48	313	15.024	Type 1	N
TPP 15-153A-D	53	284	15.052	Type 1	N

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TPP 15-105A	5	3000	15	Type 1	N
TPP 15-107A	7.5	2000	15	Type 1	N
TPP 15-109A	9	1670	15.03	Type 1	N
TPP 15-112A	12	1250	15	Type 1	N
TPP 15-115A	15	1000	15	Type 1	N
TPP 15-118A	18	834	15.012	Type 1	N
TPP 15-124A	24	625	15	Type 1	N
TPP 15-128A	28	536	15.008	Type 1	N
TPP 15-136A	36	417	15.012	Type 1	N
TPP 15-148A	48	313	15.024	Type 1	N
TPP 15-153A	53	284	15.052	Type 1	N
TPP 15-103-J	3.3	4000	13.2	Type 2	N
TPP 15-105-J	5	3000	15	Type 2	N
TPP 15-107-J	7.5	2000	15	Type 2	N
TPP 15-109-J	9	1670	15.03	Type 2	N
TPP 15-112-J	12	1250	15	Type 2	N
TPP 15-115-J	15	1000	15	Type 2	N
TPP 15-118-J	18	834	15.012	Type 2	N
TPP 15-124-J	24	625	15	Type 2	N
TPP 15-128-J	28	536	15.008	Type 2	N
TPP 15-136-J	36	417	15.012	Type 2	N
TPP 15-148-J	48	313	15.024	Type 2	N
TPP 15-153-J	53	284	15.052	Type 2	N
TPP 15-103-D	3.3	4000	13.2	Type 2	N
TPP 15-105-D	5	3000	15	Type 2	N
TPP 15-107-D	7.5	2000	15	Type 2	N
TPP 15-109-D	9	1670	15.03	Type 2	N
TPP 15-112-D	12	1250	15	Type 2	N
TPP 15-115-D	15	1000	15	Type 2	N
TPP 15-118-D	18	834	15.012	Type 2	N
TPP 15-124-D	24	625	15	Type 2	N
TPP 15-128-D	28	536	15.008	Type 2	N
TPP 15-136-D	36	417	15.012	Type 2	N
TPP 15-148-D	48	313	15.024	Type 2	N
TPP 15-153-D	53	284	15.052	Type 2	N

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Model Name	Output Voltage (Vdc)	Output Current (mA)	Max Output Power (W)	Case	GND
TPP 15-103	3.3	4000	13.2	Type 2	N
TPP 15-105	5	3000	15	Type 2	N
TPP 15-107	7.5	2000	15	Type 2	N
TPP 15-109	9	1670	15.03	Type 2	N
TPP 15-112	12	1250	15	Type 2	N
TPP 15-115	15	1000	15	Type 2	N
TPP 15-118	18	834	15.012	Type 2	N
TPP 15-124	24	625	15	Type 2	N
TPP 15-128	28	536	15.008	Type 2	N
TPP 15-136	36	417	15.012	Type 2	N
TPP 15-148	48	313	15.024	Type 2	N
TPP 15-153	53	284	15.052	Type 2	N
TPP 15-103-M	3.3	4000	13.2	Type 2	N
TPP 15-105-M	5	3000	15	Type 2	N
TPP 15-107-M	7.5	2000	15	Type 2	N
TPP 15-109-M	9	1670	15.03	Type 2	N
TPP 15-112-M	12	1250	15	Type 2	N
TPP 15-115-M	15	1000	15	Type 2	N
TPP 15-118-M	18	834	15.012	Type 2	N
TPP 15-124-M	24	625	15	Type 2	N
TPP 15-128-M	28	536	15.008	Type 2	N
TPP 15-136-M	36	417	15.012	Type 2	N
TPP 15-148-M	48	313	15.024	Type 2	N
TPP 15-153-M	53	284	15.052	Type 2	N

2. There are two types of appearance for sales. The difference of two types is with/without case. Please refer to the following table and external photograph for detail information.

Type	Case
Type 1	○
Type 2	X

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1.2 Details of EUT

Power Supply	: AC 100~240V, 50~60Hz
Modes/Function	: Mode 1: TPP 15-105A-J / Operation(Full Load) Mode 2: TPP 15-105BA-J / Operation(Full Load) + ground Mode 3: TPP 15-105-J / Operation(Full Load)
Highest operate description	: <108MHz

1.3 Description of Support Units

Mode 1~2:

PRODUCT	MANUFACTURER	MODEL NO.	SERIAL NO.
Load	SGS	N/A	N/A

Support Equipment Used in Tested Cable

Mode 1~2:

Cable Type	Core	Length	Shielding/Non-shielding
N/A	N/A	N/A	N/A

1.4 Operation Procedure

Mode 1~2:

1. EUT link to power and load
2. Begin the test.

1.5 The worst case of the EUT

EUT will be carried out in the worst case as followings:

Worst Case	
CE	Mode 1~2
RE	Mode 1~2

1.6 Modification List

No modification by SGS Taiwan Electronics & Communication Laboratory.

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1.7 Configuration of Tested System

Mode 1~2:



1.8 Accessories Cable List

Cable Type	Core	Length	Shielding/Non-shielding
N/A	N/A	N/A	N/A

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1.9 Summary of Results

Highest Emission					
Standard	Test Type	Result	Phase/Pol.	Frequency(MHz)	Margin(dB)
EN 55014-1: 2006+A1:2009 +A2:2011	Conducted Emission	Pass	Line	0.4300	-5.91 (QP)
			Neutral	3.7780	-9.63 (AVG)
	Disturbance Power	N/A	N/A	N/A	N/A
	Radiated Emission	Pass	Ver.	40.1100	-9.60 (QP)
EN 61000-3-2 : 2014	Harmonic current emissions	Pass	Meet the requirements		
EN 61000-3-3 : 2013	Voltage changes, voltage fluctuations & flicker	Pass	Meet the requirements		

Immunity(EN 55014-2:2015, Category IV)				
Standard	Test Type	Result	Performance Criteria	Test Judgment
IEC 61000-4-2:2008	ESD test	Pass	Criterion B	Meets the requirements of Performance Criterion A
IEC 61000-4-3: 2006+A1:2007 +A2:2010	RS test	Pass	Criterion A	Meets the requirements of Performance Criterion A
IEC 61000-4-4:2012	EFT test	Pass	Criterion B	Meets the requirements of Performance Criterion A
IEC 61000-4-5:2014	Surge test	Pass	Criterion B	Meets the requirements of Performance Criterion A
IEC 61000-4-6:2013	CS test	Pass	Criterion A	Meets the requirements of Performance Criterion A
IEC 61000-4-11:2004	Dip test	Pass	Test level in % Ut 1. 0% residual- Performance Criterion C 2. 40% residual- Performance Criterion C 3. 70% residual- Performance Criterion C	Test level in % Ut 1. 0% residual- Performance Criterion A 2. 40% residual- Performance Criterion A 3. 70% residual- Performance Criterion A

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2. EMISSION

EN 55014-1 : 2006+A1:2009+A2:2011

2.1 Test Results

EN 55014-1	Result
Conducted Emission	Pass
Disturbance Power	N/A
Radiated Emission(CISPR 16-2-3)	Pass

2.2 Frequency Range

Conducted Emission: 150 kHz - 30 MHz

Disturbance Power : 30 MHz - 300 MHz

Radiated Emission : 30 MHz - 1000 MHz

2.3 Methods and Procedures

Standard	Edition	Description
EN 55014-1	2006+A1:2009 +A2:2011	Limits and methods of measurement of radio disturbance characteristics of electrical motor-operated and thermal appliances for household and similar purposes, electric tools and similar electric apparatus.
CISPR 16-2-3	2010+A1:2010 +A2:2014	Specification for radio disturbance and immunity measuring apparatus and methods-part 2-3 : Methods of measurement of disturbance and immunity-Radiated disturbance measurements.

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2.4. Test of Conducted Emission

2.4.1 Test Instruments

SGS Conducted Emission HWAYA Conducted Room No.A EMC					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
EMI Test Receiver	R&S	ESCI 3	101311	2017/6/23	2018/6/22
Coaxial Cables	EMC Instruments Corp	EMCRG58-BM-BM-3000	160812	2017/8/30	2018/8/29
LISN	SCHWARZBECK	NSLK 8127	8127-648	2017/6/18	2018/6/17
Pulse Limiter	Narda S.T.S.	PMM PL01	1110X30602	2017/8/12	2018/8/11
LISN	Schwarzbeck	NSLK 8128	NSLK8128-300	2017/9/4	2018/9/3
Test S/W	Farad	EZ-EMC	Ver. SGS-03A2	N.C.R.	N.C.R.
SGS Taiwan LTD. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) Measurement Uncertainty of Conducted Emission Expanded uncertainty (K=2) of conducted emission is 2.25 dB Expanded uncertainty (K=2) of ISN conducted emission is 2.57 dB					

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2.4.2 EUT Operating Condition

Environment :

Temperature	Humidity
25 °C	64 %RH

Test setup : Please refer to photo of CE testing setup

2.4.3 Measurement Level Calculation

Factor = LISN insertion loss + Cable loss

Measurement Level = Reading Level + Factor

Over (Margin) = Measurement Level – Limit

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2.4.4 Measurement Data

Model No.: TPP 15-105A-J

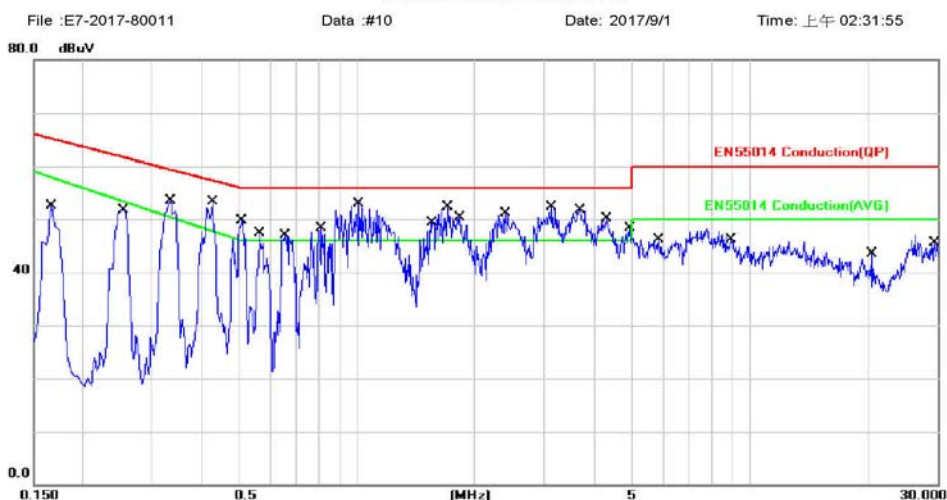
Mode_1_L

Site : Conduction Room
Limit: EN55014 Conduction(QP)
Mode: Mode 1
Note:

Phase: L1
Power: AC 230V/50Hz

Temperature: 25 °C
Humidity: 64 %

Conducted Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1660	47.80	0.34	48.14	65.16	-17.02	QP	
2		0.1660	40.20	0.34	40.54	57.91	-17.37	AVG	
3		0.2536	48.80	0.33	49.13	61.64	-12.51	QP	
4		0.2536	38.90	0.33	39.23	53.33	-14.10	AVG	
5		0.2540	48.60	0.33	48.93	61.63	-12.70	QP	
6		0.2540	38.20	0.33	38.53	53.31	-14.78	AVG	
7		0.3340	50.70	0.34	51.04	59.35	-8.31	QP	
8		0.3340	40.20	0.34	40.54	50.36	-9.82	AVG	
9 *		0.4260	50.30	0.34	50.64	57.33	-6.69	QP	
10		0.4260	37.60	0.34	37.94	47.73	-9.79	AVG	
11		0.5086	45.70	0.35	46.05	56.00	-9.95	QP	
12		0.5086	33.20	0.35	33.55	46.00	-12.45	AVG	
13		0.5100	45.60	0.35	45.95	56.00	-10.05	QP	

*:Maximum data x:Over limit !:over margin

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No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
14		0.5100	32.80	0.35	33.15	46.00	-12.85	AVG	
15		0.5620	44.50	0.35	44.85	56.00	-11.15	QP	
16		0.5620	31.30	0.35	31.65	46.00	-14.35	AVG	
17		0.6540	44.10	0.35	44.45	56.00	-11.55	QP	
18		0.6540	31.60	0.35	31.95	46.00	-14.05	AVG	
19		0.8100	44.00	0.36	44.36	56.00	-11.64	QP	
20		0.8100	29.70	0.36	30.06	46.00	-15.94	AVG	
21		1.0060	48.30	0.37	48.67	56.00	-7.33	QP	
22		1.0060	34.40	0.37	34.77	46.00	-11.23	AVG	
23		1.5343	44.80	0.41	45.21	56.00	-10.79	QP	
24		1.5343	33.00	0.41	33.41	46.00	-12.59	AVG	
25		1.6940	46.00	0.42	46.42	56.00	-9.58	QP	
26		1.6940	35.80	0.42	36.22	46.00	-9.78	AVG	
27		1.8283	45.40	0.43	45.83	56.00	-10.17	QP	
28		1.8283	33.40	0.43	33.83	46.00	-12.17	AVG	
29		2.3780	46.10	0.47	46.57	56.00	-9.43	QP	
30		2.3780	37.20	0.47	37.67	46.00	-8.33	AVG	
31		3.1100	46.20	0.52	46.72	56.00	-9.28	QP	
32		3.1100	37.90	0.52	38.42	46.00	-7.58	AVG	
33		3.6940	46.50	0.56	47.06	56.00	-8.94	QP	
34		3.6940	38.40	0.56	38.96	46.00	-7.04	AVG	
35		4.3100	43.60	0.59	44.19	56.00	-11.81	QP	
36		4.3100	35.20	0.59	35.79	46.00	-10.21	AVG	
37		4.9060	42.70	0.61	43.31	56.00	-12.69	QP	
38		4.9060	32.10	0.61	32.71	46.00	-13.29	AVG	
39		5.8475	39.00	0.64	39.64	60.00	-20.36	QP	
40		5.8475	30.10	0.64	30.74	50.00	-19.26	AVG	
41		9.0373	38.40	0.86	39.26	60.00	-20.74	QP	
42		9.0373	29.00	0.86	29.86	50.00	-20.14	AVG	
43		20.4697	32.50	1.00	33.50	60.00	-26.50	QP	
44		20.4697	20.80	1.00	21.80	50.00	-28.20	AVG	
45		29.5260	35.40	1.27	36.67	60.00	-23.33	QP	
46		29.5260	22.30	1.27	23.57	50.00	-26.43	AVG	

*:Maximum data x:Over limit l:over margin

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Mode_1_N

Site : Conduction Room
Limit: EN55014 Conduction(QP)
Mode: Mode 1
Note:

Phase: N
Power: AC 230V/50Hz

Temperature: 25 °C
Humidity: 64 %

Conducted Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1660	47.30	0.42	47.72	65.16	-17.44	QP	
2		0.1660	36.80	0.42	37.22	57.91	-20.69	AVG	
3		0.2417	45.90	0.41	46.31	62.04	-15.73	QP	
4		0.2417	33.00	0.41	33.41	53.85	-20.44	AVG	
5		0.3340	46.60	0.42	47.02	59.35	-12.33	QP	
6		0.3340	35.70	0.42	36.12	50.36	-14.24	AVG	
7 *		0.4220	45.70	0.42	46.12	57.41	-11.29	QP	
8		0.4220	34.00	0.42	34.42	47.83	-13.41	AVG	
9		0.5100	41.00	0.42	41.42	56.00	-14.58	QP	
10		0.5100	28.30	0.42	28.72	46.00	-17.28	AVG	
11		0.8980	42.00	0.43	42.43	56.00	-13.57	QP	
12		0.8980	28.70	0.43	29.13	46.00	-16.87	AVG	
13		1.0470	43.30	0.43	43.73	56.00	-12.27	QP	

*:Maximum data x:Over limit !:over margin

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No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
14		1.0470	30.20	0.43	30.63	46.00	-15.37	AVG	
15		1.1220	43.10	0.43	43.53	56.00	-12.47	QP	
16		1.1220	29.40	0.43	29.83	46.00	-16.17	AVG	
17		1.2741	38.60	0.44	39.04	56.00	-16.96	QP	
18		1.2741	25.50	0.44	25.94	46.00	-20.06	AVG	
19		1.7740	42.00	0.45	42.45	56.00	-13.55	QP	
20		1.7740	32.10	0.45	32.55	46.00	-13.45	AVG	
21		1.8185	40.20	0.45	40.65	56.00	-15.35	QP	
22		1.8185	29.20	0.45	29.65	46.00	-16.35	AVG	
23		2.4820	41.60	0.45	42.05	56.00	-13.95	QP	
24		2.4820	32.70	0.45	33.15	46.00	-12.85	AVG	
25		3.2020	43.10	0.46	43.56	56.00	-12.44	QP	
26		3.2020	34.20	0.46	34.66	46.00	-11.34	AVG	
27		3.8820	41.00	0.47	41.47	56.00	-14.53	QP	
28		3.8820	32.60	0.47	33.07	46.00	-12.93	AVG	
29		4.5140	40.30	0.48	40.78	56.00	-15.22	QP	
30		4.5140	31.80	0.48	32.28	46.00	-13.72	AVG	
31		5.4000	37.50	0.49	37.99	60.00	-22.01	QP	
32		5.4000	27.20	0.49	27.69	50.00	-22.31	AVG	
33		9.0854	35.00	0.65	35.65	60.00	-24.35	QP	
34		9.0854	25.70	0.65	26.35	50.00	-23.65	AVG	
35		20.7985	28.50	0.77	29.27	60.00	-30.73	QP	
36		20.7985	18.70	0.77	19.47	50.00	-30.53	AVG	
37		29.3695	32.40	1.05	33.45	60.00	-26.55	QP	
38		29.3695	21.50	1.05	22.55	50.00	-27.45	AVG	

*:Maximum data x:Over limit l:over margin

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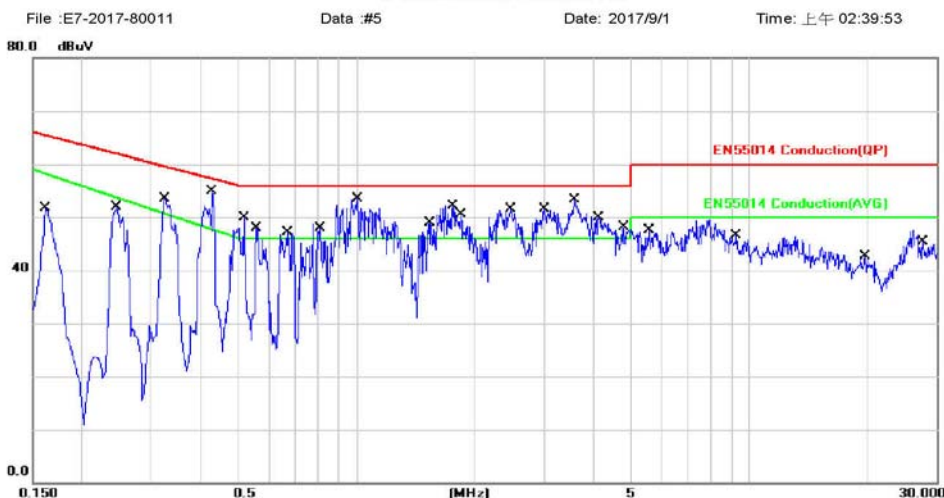
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Model No.: TPP 15-105BA-J

Mode_2_L

Site : Conduction Room
Limit: EN55014 Conduction(QP)
Mode: Mode 2
Note:Phase: L1
Power: AC 230V/50HzTemperature: 25 °C
Humidity: 64 %

Conducted Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1615	47.90	0.34	48.24	65.39	-17.15	QP	
2		0.1615	38.30	0.34	38.64	58.20	-19.56	AVG	
3		0.2460	49.00	0.33	49.33	61.89	-12.56	QP	
4		0.2460	39.80	0.33	40.13	53.66	-13.53	AVG	
5		0.3260	51.00	0.34	51.34	59.55	-8.21	QP	
6		0.3260	40.60	0.34	40.94	50.62	-9.68	AVG	
7 *		0.4300	51.00	0.34	51.34	57.25	-5.91	QP	
8		0.4300	35.80	0.34	36.14	47.63	-11.49	AVG	
9		0.5180	44.20	0.35	44.55	56.00	-11.45	QP	
10		0.5180	27.90	0.35	28.25	46.00	-17.75	AVG	
11		0.5580	48.30	0.35	48.65	56.00	-7.35	QP	
12		0.5580	38.40	0.35	38.75	46.00	-7.25	AVG	
13		0.6660	45.00	0.35	45.35	56.00	-10.65	QP	

*:Maximum data x:Over limit !:over margin

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No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
14		0.6660	32.40	0.35	32.75	46.00	-13.25	AVG	
15		0.8060	45.00	0.36	45.36	56.00	-10.64	QP	
16		0.8060	30.80	0.36	31.16	46.00	-14.84	AVG	
17		1.0060	49.00	0.37	49.37	56.00	-6.63	QP	
18		1.0060	35.10	0.37	35.47	46.00	-10.53	AVG	
19		1.5262	45.80	0.41	46.21	56.00	-9.79	QP	
20		1.5262	33.10	0.41	33.51	46.00	-12.49	AVG	
21		1.7580	46.90	0.42	47.32	56.00	-8.68	QP	
22		1.7580	36.50	0.42	36.92	46.00	-9.08	AVG	
23		1.8478	44.80	0.43	45.23	56.00	-10.77	QP	
24		1.8478	35.70	0.43	36.13	46.00	-9.87	AVG	
25		2.4620	45.90	0.47	46.37	56.00	-9.63	QP	
26		2.4620	37.70	0.47	38.17	46.00	-7.83	AVG	
27		3.0060	47.60	0.51	48.11	56.00	-7.89	QP	
28		3.0060	37.90	0.51	38.41	46.00	-7.59	AVG	
29		3.5790	46.70	0.55	47.25	56.00	-8.75	QP	
30		3.5790	38.20	0.55	38.75	46.00	-7.25	AVG	
31		4.1180	43.20	0.58	43.78	56.00	-12.22	QP	
32		4.1180	33.50	0.58	34.08	46.00	-11.92	AVG	
33		4.7820	41.80	0.61	42.41	56.00	-13.59	QP	
34		4.7820	30.40	0.61	31.01	46.00	-14.99	AVG	
35		5.5453	39.40	0.63	40.03	60.00	-19.97	QP	
36		5.5453	29.10	0.63	29.73	50.00	-20.27	AVG	
37		9.2804	37.90	0.86	38.76	60.00	-21.24	QP	
38		9.2804	29.00	0.86	29.86	50.00	-20.14	AVG	
39		19.9335	33.40	0.99	34.39	60.00	-25.61	QP	
40		19.9335	22.70	0.99	23.69	50.00	-26.31	AVG	
41		27.7036	36.10	1.21	37.31	60.00	-22.69	QP	
42		27.7036	23.80	1.21	25.01	50.00	-24.99	AVG	

*:Maximum data x:Over limit l:over margin

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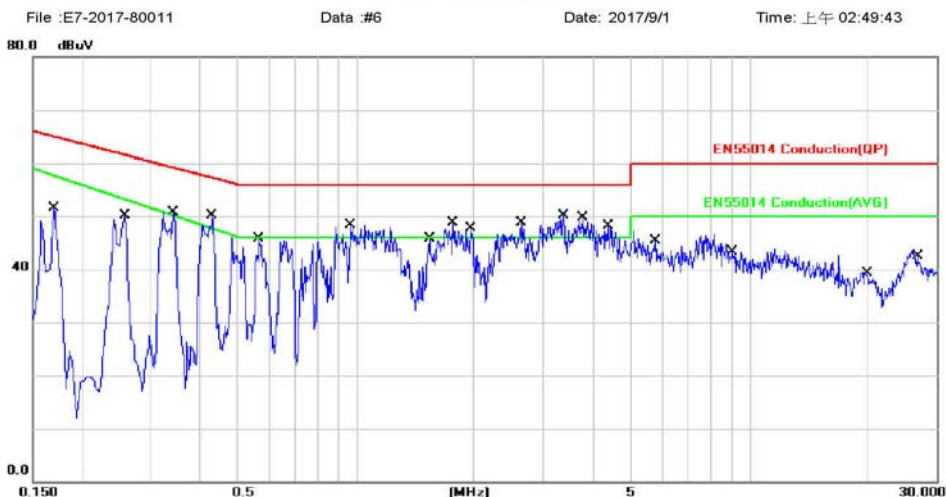
Mode_2_N

Site : Conduction Room
Limit: EN55014 Conduction(QP)
Mode: Mode 2
Note:

Phase: N
Power: AC 230V/50Hz

Temperature: 25 °C
Humidity: 64 %

Conducted Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1693	47.50	0.42	47.92	64.99	-17.07	QP	
2		0.1693	36.30	0.42	36.72	57.69	-20.97	AVG	
3		0.2576	45.80	0.41	46.21	61.51	-15.30	QP	
4		0.2576	31.90	0.41	32.31	53.16	-20.85	AVG	
5		0.3420	47.40	0.42	47.82	59.15	-11.33	QP	
6		0.3420	34.20	0.42	34.62	50.10	-15.48	AVG	
7		0.4300	46.60	0.42	47.02	57.25	-10.23	QP	
8		0.4300	31.20	0.42	31.62	47.63	-16.01	AVG	
9		0.5660	41.90	0.42	42.32	56.00	-13.68	QP	
10		0.5660	29.40	0.42	29.82	46.00	-16.18	AVG	
11		0.9660	44.20	0.43	44.63	56.00	-11.37	QP	
12		0.9660	30.70	0.43	31.13	46.00	-14.87	AVG	
13		1.5343	39.80	0.44	40.24	56.00	-15.76	QP	

*:Maximum data x:Over limit l:over margin

File : E7-2017-80011>Data : #6

Page: 1

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No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
14		1.5343	29.30	0.44	29.74	46.00	-16.26	AVG	
15		1.7620	43.60	0.45	44.05	56.00	-11.95	QP	
16		1.7620	33.20	0.45	33.65	46.00	-12.35	AVG	
17		1.9590	41.00	0.45	41.45	56.00	-14.55	QP	
18		1.9590	30.20	0.45	30.65	46.00	-15.35	AVG	
19		2.6100	43.00	0.46	43.46	56.00	-12.54	QP	
20		2.6100	32.40	0.46	32.86	46.00	-13.14	AVG	
21		3.3580	41.70	0.46	42.16	56.00	-13.84	QP	
22		3.3580	32.80	0.46	33.26	46.00	-12.74	AVG	
23		3.7780	43.50	0.47	43.97	56.00	-12.03	QP	
24	*	3.7780	35.90	0.47	36.37	46.00	-9.63	AVG	
25		4.3420	41.60	0.48	42.08	56.00	-13.92	QP	
26		4.3420	33.70	0.48	34.18	46.00	-11.82	AVG	
27		5.7552	37.30	0.50	37.80	60.00	-22.20	QP	
28		5.7552	28.50	0.50	29.00	50.00	-21.00	AVG	
29		9.0854	35.00	0.65	35.65	60.00	-24.35	QP	
30		9.0854	26.20	0.65	26.85	50.00	-23.15	AVG	
31		20.0396	31.00	0.74	31.74	60.00	-28.26	QP	
32		20.0396	21.30	0.74	22.04	50.00	-27.96	AVG	
33		27.1215	33.50	0.97	34.47	60.00	-25.53	QP	
34		27.1215	23.60	0.97	24.57	50.00	-25.43	AVG	

*:Maximum data x:Over limit l:over margin

File :E7-2017-80011\Data :#6

Page: 2

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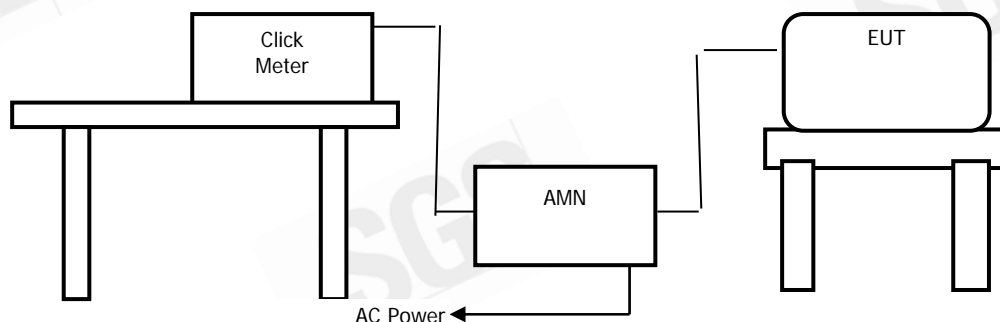
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2.5 Discontinuous Disturbance Voltage (Click)

2.5.1 Operating Environment

Temperature:	N/A	Atmospheric Pressure:	N/A
Relative Humidity:	N/A	Test Voltage:	N/A

2.5.2 Test Procedure



The mains terminal disturbance voltage was measured with the equipment under test (EUT) in a screened room. The EUT was connected to an artificial mains network (AMN) and was placed on a non-metallic table 0.4 meter above a metallic grounded floor. The EUT was placed 0.4 meter from the reference ground plane (RGP) wall and 0.8 meters from the AMN.

The click meter designed according to the standard and controlled by a computer. It was connected to the AMN. The disturbance of the frequency 150kHz, 500kHz, 1.4MHz and 30MHz, and the click numbers which over the limit were counted and analyzed by the click meter.

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2.5.3 Test equipment

SGS Click HWAYA EMC					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
EMI Test Receiver	R&S	ESCI 3	101311	2017/6/23	2018/6/22
LISN	Schwarzbeck	NSLK 8127	8127-648	2017/6/18	2018/6/17
LISN	FCC	FCC-LISN-50/250-25-2-01	4034	2017/3/19	2018/3/18
Coaxial Cables	EMC Instruments Corp.	EMCRG58-BM-BM-3000	160812	2017/8/30	2018/8/29
Test Software	R&S	V1.7	22.01.2009	N.C.R.	N.C.R.

SGS Taiwan LTD. Electronics & Communication Laboratory
No.2, Keji 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)

2.5.4 Test Results

N/A

No click consideration for these products.

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2.6 Disturbance Power EN 55014-1 : 2006+A1:2009+A2:2011**2.6.1 Test Instruments**

SGS RP (Disturbance Power) HWAYA EMC					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
EMI Test Receiver	R&S	ESCI 3	101311	2017/6/23	2018/6/22
Coaxial Cables	N/A	RP Cable	N/A	2016/11/26	2017/11/25
Absorbing Clamp	Rolf-Heine	MWZ-1000	03/10008	2017/3/24	2018/3/23
Test S/W	Farad	EZ-EMC	Ver. SGS-03A2	N.C.R.	N.C.R.
SGS Taiwan LTD. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) Measurement Uncertainty of Radiated Power Expanded uncertainty (K=2) of Radiated Power is 2.28 dB.					

2.6.2 EUT Operating ConditionEnvironment :

Temperature	Humidity
N/A °C	N/A %RH

Test setup : Please refer to photo of RP testing setup**2.6.3 Measurement Level Calculation**

Factor = Clamp Insertion loss + Cable loss

Measurement Level = Reading Level + Factor

Over (Margin) = Measurement Level – Limit

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2.6.4 Measurement Data

N/A

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2.7 Test of Radiated Emission

2.7.1 Test Instruments

Below 1GHz

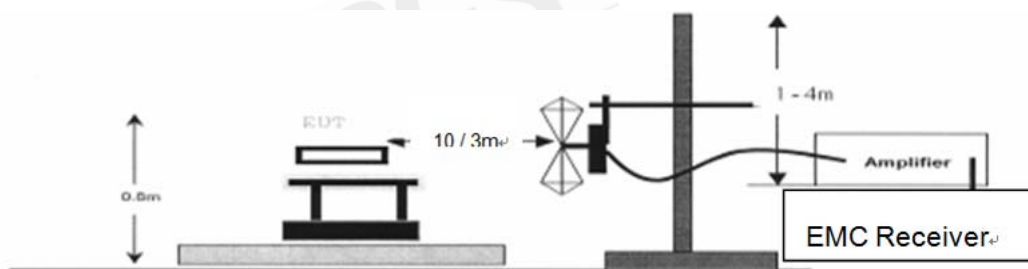
SGS Radiated Below 1GHz HWAYA 10m EMC					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
EMI Test Receiver	R&S	ESCI 7	100924	2016/9/30	2017/9/29
EMI Test Receiver	R&S	ESCI 3	101343	2016/12/21	2017/12/20
Broadband Antenna	SCHWAZBECK	VULB9168	9168-628	2016/9/22	2017/9/21
Broadband Antenna	SCHWAZBECK	VULB9168	9168-629	2016/9/22	2017/9/21
Pre Amplifier	EMC Instruments Corp.	EMC330	980178	2017/3/31	2018/3/30
Pre Amplifier	EMC Instruments Corp.	EMC330	980179	2017/3/31	2018/3/30
Coaxial Cable	EMC Instruments	EMCCFD400-NM-NM	150917	2016/9/18	2017/9/17
Coaxial Cable	EMC Instruments	EMCCFD400-NM-NM	150919	2016/9/18	2017/9/17
Coaxial Cable	EMC Instruments	EMCCFD400-NM-NM	150820	2016/9/18	2017/9/17
Coaxial Cable	EMC Instruments	EMCCFD400-NM-NM	150918	2016/9/18	2017/9/17
Coaxial Cable	EMC Instruments	EMCCFD400-NM-NM	150821	2016/9/18	2017/9/17
Coaxial Cable	EMC Instruments	EMCCFD400-NM-NM	150822	2016/9/18	2017/9/17
Controller	MF	MF-7802	N/A	N.C.R.	N.C.R.
Controller	MF	MF-7802	N/A	N.C.R.	N.C.R.
Antenna Master	MF	N/A	N/A	N.C.R.	N.C.R.
Antenna Master	MF	N/A	N/A	N.C.R.	N.C.R.
Antenna Master	MF	N/A	N/A	N.C.R.	N.C.R.
Turn Table	MF	N/A	N/A	N.C.R.	N.C.R.
Site NSA	Chance Most	10M Chamber	10M SAC	2016/12/31	2017/12/31
Test S/W	Farad	EZ-EMC	Ver. SGS-03A2	N.C.R.	N.C.R.
SGS Taiwan LTD. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) Measurement Uncertainty of Radiated Emission Expanded uncertainty of radiated emission is 4.09 dB. (30MHz ~ 1000MHz)					

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2.7.2 Test Setup



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2.7.3 Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 10 / 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on Measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to CISPR 16-2-3 : 2010+A1:2010+A2:2014 on radiated measurement.

Radiated emissions were investigated over the frequency range from 30MHz to 1 GHz using a receiver bandwidth of 120kHz. Radiated was performed at an antenna to EUT distance of 10 / 3 meters.

2.7.4 EUT Operating Condition

Environment :

Temperature	Humidity
22 °C	70 %RH

Test setup : Please refer to photo of RE testing setup

2.7.5 Measurement Level Calculation

Correction Factor = Antenna Factor + Cable loss- Amplifier Gain

Measurement Level = Reading Level + Correction Factor

Over (Margin) = Measurement Level – Limit

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2.7.6 Measurement Data

Below 1GHz

Model No.: TPP 15-105A-J

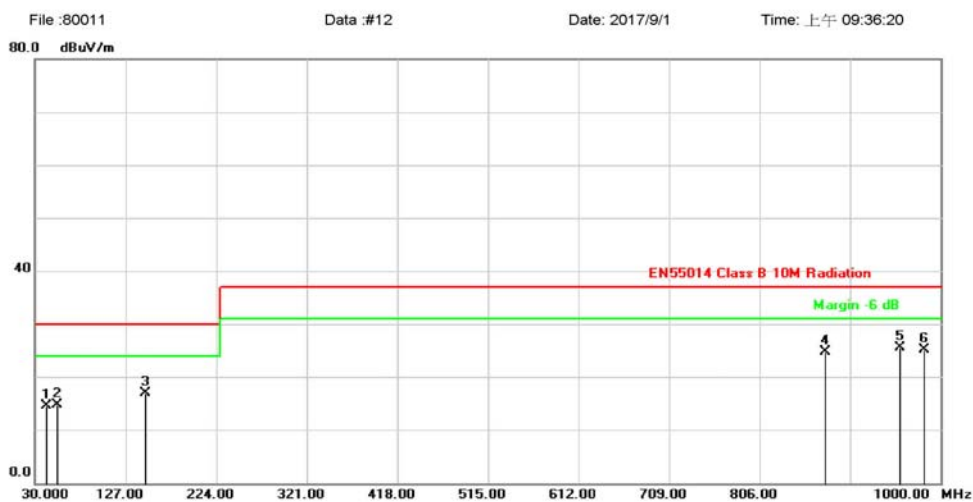
Mode_1_H

Site: SGS 10m Chamber
Limit: EN55014 Class B 10M Radiation
Mode: Full Load
Note: Mode 1

Polarization: **Horizontal**
Power: AC 230V/50Hz
Distance:

Temperature: 22 °C
Humidity: 70 %

Radiated Emission



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over		
		MHz	Level	Factor	ment			Detector	Comment
			dBuV	dB/m	dBuV/m	dBuV/m	dB		
1		41.6400	26.58	-12.00	14.58	30.00	-15.42	QP	
2		53.2800	26.59	-11.90	14.69	30.00	-15.31	QP	
3		148.7500	29.19	-12.37	16.82	30.00	-13.18	QP	
4		875.8400	24.90	-0.14	24.76	37.00	-12.24	QP	
5	*	956.3500	24.87	0.73	25.60	37.00	-11.40	QP	
6		982.5400	24.80	0.40	25.20	37.00	-11.80	QP	

*:Maximum data x:Over limit !:over margin

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Mode_1_V

Site: SGS 10m Chamber
Limit: EN55014 Class B 10M Radiation
Mode: Full Load
Note: Mode 1

Polarization: **Vertical**
Power: AC 230V/50Hz
Distance:

Temperature: 22 °C
Humidity: 70 %

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1	*	40.1100	32.49	-12.09	20.40	30.00	-9.60	QP	
2		54.2500	31.81	-11.96	19.85	30.00	-10.15	QP	
3		149.4300	31.44	-12.33	19.11	30.00	-10.89	QP	
4		898.1500	23.98	0.08	24.06	37.00	-12.94	QP	
5		929.5100	22.67	0.51	23.18	37.00	-13.82	QP	
6		987.3900	23.57	0.36	23.93	37.00	-13.07	QP	

*:Maximum data x:Over limit !:over margin

File :80011\Data :#11

Page: 1

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Model No.: TPP 15-105BA-J

Mode_2_H

Site: SGS 10m Chamber
Limit: EN55032 Class B 10M Radiation
Mode: Full Load
Note: Mode 2

Polarization: **Horizontal**
Power: AC 230V/50Hz
Distance: 10m

Temperature: 25 °C
Humidity: 65 %

Radiated Emission



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over		
		MHz	Level	Factor	ment			Detector	Comment
			dBuV	dB/m	dBuV/m	dBuV/m	dB		
1		41.6400	24.49	-11.60	12.89	30.00	-17.11	QP	
2		53.2800	24.78	-11.67	13.11	30.00	-16.89	QP	
3		148.7500	27.84	-11.95	15.89	30.00	-14.11	QP	
4		875.8400	23.65	0.46	24.11	37.00	-12.89	QP	
5	*	956.3500	23.33	1.89	25.22	37.00	-11.78	QP	
6		982.5400	23.29	1.84	25.13	37.00	-11.87	QP	

*:Maximum data x:Over limit !:over margin

File :80011\Data :#14

Page: 1

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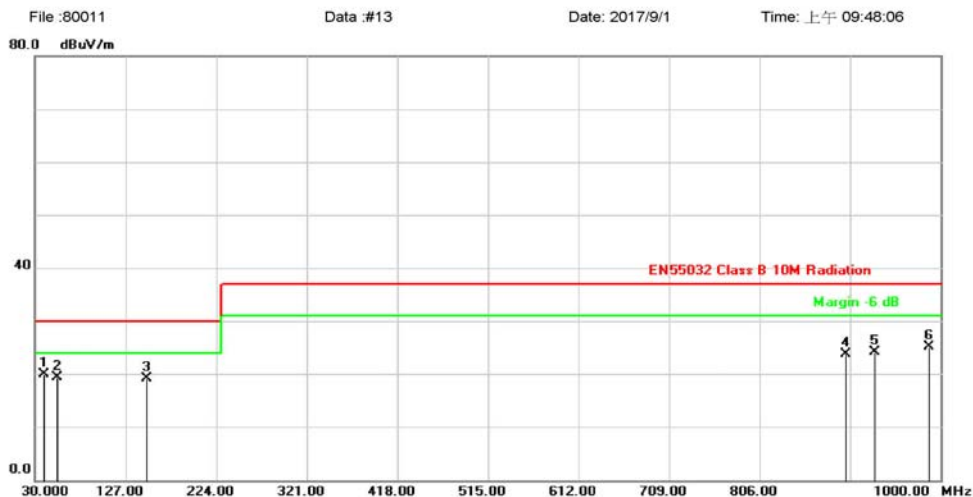
Mode_2_V

Site: SGS 10m Chamber
Limit: EN55032 Class B 10M Radiation
Mode: Full Load
Note: Mode 2

Polarization: **Vertical**
Power: AC 230V/50Hz
Distance: 10m

Temperature: 25 °C
Humidity: 65 %

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1	*	40.1100	31.31	-11.49	19.82	30.00	-10.18	QP	
2		54.2500	30.62	-11.35	19.27	30.00	-10.73	QP	
3		149.4300	30.42	-11.31	19.11	30.00	-10.89	QP	
4		898.1500	22.70	0.97	23.67	37.00	-13.33	QP	
5		929.5100	22.94	1.17	24.11	37.00	-12.89	QP	
6		987.3900	23.30	1.75	25.05	37.00	-11.95	QP	

*:Maximum data x:Over limit !:over margin

File :80011\Data :#13

Page: 1

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3. Harmonics

EN 61000-3-2 : 2014

3.1 Test Results

EN 61000-3-2 : 2014

Pass

3.2 Methods and Procedures

Standard	Edition	Description
EN 61000-3-2	2014	Limits - Limits for harmonic current emissions (equipment input current up to and including 16 A per phase)

3.3 Test Instruments

SGS Harmonic EN61000-3-2 HWAYA EMC					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
Power Analyzer	TESEQ	CCN 1000-1	1504A02654	2017/3/20	2018/3/19
AC Power Source	TESEQ	NSG 1007	1504A02654	2017/3/20	2018/3/19
Test Software	TESEQ	Win2100 V4	Ver. 4.5.8	N.C.R.	N.C.R.
SGS Taiwan LTD. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)					

3.4 EUT Operating Condition

Environment :

Temperature	Humidity
25 °C	64 %RH

Test setup : Please refer to photo of HARMONIC testing setup

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3.5 Measurement Data

Model No.: TPP 15-105A-J

Mode_1

Teseq Profline
4542 Luterbach, Switzerland9/1/2017
1:08 AM

Harmonics – Class-A per Ed. 4.0 (2014)(Run time)

EUT:

Test category: Class-A per Ed. 4.0 (2014) (European limits)

Test date: 2017/8/31

Test duration (min): 10

Comment:

Customer:

Tested by:

Test Margin: 100

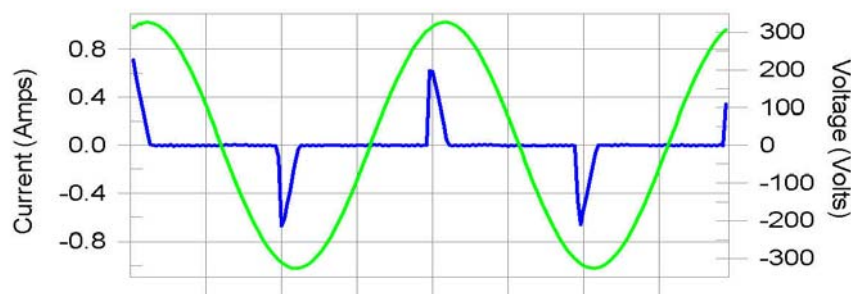
Start time: 下午 11:55:51

End time: 上午 12:06:02

Data file name: H-000073.cts_data

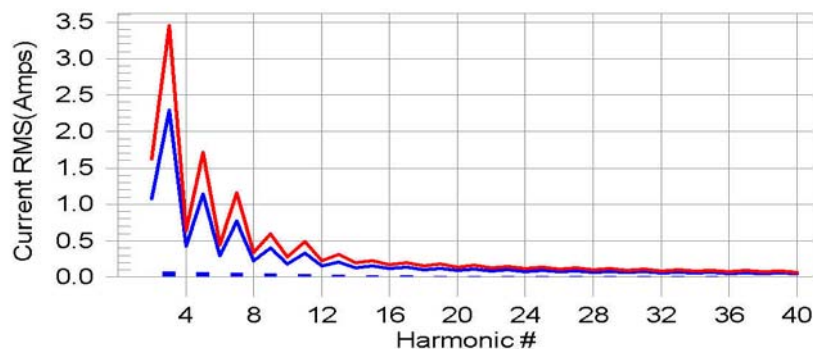
Test Result: Pass Source qualification: Normal

Current & voltage waveforms



Harmonics and Class A limit line

European Limits



Test result: Pass Worst harmonics H25-10.2% of 150% limit, H25-15.2% of 100% limit

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Teseq Profile
4542 Luterbach, Switzerland9/1/2017
1:08 AM

Current Test Result Summary (Run time)

EUT: Test category: Class-A per Ed. 4.0 (2014) (European limits) Tested by:
 Test date: 2017/8/31 Start time: 下午 11:55:51 Test Margin: 100
 Test duration (min): 10 Data file name: H-000073.cts_data End time: 上午 12:06:02
 Comment:
 Customer:

Test Result: Pass Source qualification: Normal
 THC(A): 0.139 I-THD(%): 190.8 POHC(A): 0.034 POHC Limit(A): 0.251

Highest parameter values during test:

V_RMS (Volts): 230.76 Frequency(Hz): 50.00
 I_Peak (Amps): 0.724 I_RMS (Amps): 0.158
 I_Fund (Amps): 0.073 Crest Factor: 4.596
 Power (Watts): 16.4 Power Factor: 0.453

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.000	1.080	N/A	0.000	1.620	N/A	Pass
3	0.070	2.300	3.0	0.070	3.450	2.0	Pass
4	0.000	0.430	N/A	0.000	0.645	N/A	Pass
5	0.065	1.140	5.7	0.065	1.710	3.8	Pass
6	0.000	0.300	N/A	0.000	0.450	N/A	Pass
7	0.057	0.770	7.4	0.057	1.155	5.0	Pass
8	0.000	0.230	N/A	0.000	0.345	N/A	Pass
9	0.048	0.400	12.1	0.048	0.600	8.1	Pass
10	0.000	0.184	N/A	0.000	0.276	N/A	Pass
11	0.039	0.330	11.8	0.039	0.495	7.9	Pass
12	0.000	0.153	N/A	0.000	0.230	N/A	Pass
13	0.030	0.210	14.3	0.030	0.315	9.6	Pass
14	0.000	0.131	N/A	0.000	0.197	N/A	Pass
15	0.023	0.150	15.1	0.023	0.225	10.1	Pass
16	0.000	0.115	N/A	0.000	0.173	N/A	Pass
17	0.018	0.132	13.3	0.018	0.198	8.9	Pass
18	0.000	0.102	N/A	0.000	0.153	N/A	Pass
19	0.015	0.118	12.7	0.015	0.178	8.6	Pass
20	0.000	0.092	N/A	0.000	0.138	N/A	Pass
21	0.014	0.107	13.5	0.015	0.161	9.1	Pass
22	0.000	0.084	N/A	0.000	0.125	N/A	Pass
23	0.014	0.098	14.6	0.014	0.147	9.8	Pass
24	0.000	0.077	N/A	0.000	0.115	N/A	Pass
25	0.014	0.090	15.2	0.014	0.135	10.2	Pass
26	0.000	0.071	N/A	0.000	0.107	N/A	Pass
27	0.012	0.083	15.0	0.013	0.125	10.1	Pass
28	0.000	0.066	N/A	0.000	0.099	N/A	Pass
29	0.011	0.078	14.0	0.011	0.116	9.5	Pass
30	0.000	0.061	N/A	0.000	0.092	N/A	Pass
31	0.009	0.073	12.8	0.009	0.109	8.7	Pass
32	0.000	0.058	N/A	0.000	0.086	N/A	Pass
33	0.008	0.068	11.9	0.008	0.102	8.1	Pass
34	0.000	0.054	N/A	0.000	0.081	N/A	Pass
35	0.007	0.064	11.6	0.008	0.096	7.9	Pass
36	0.000	0.051	N/A	0.000	0.077	N/A	Pass
37	0.007	0.061	11.9	0.007	0.091	8.1	Pass
38	0.000	0.048	N/A	0.000	0.073	N/A	Pass
39	0.007	0.058	12.2	0.007	0.087	8.3	Pass
40	0.000	0.046	N/A	0.000	0.069	N/A	Pass

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Teseq Profile
4542 Luterbach, Switzerland9/1/2017
1:08 AM

Voltage Source Verification Data (Run time)

EUT: Tested by:
Test category: Class-A per Ed. 4.0 (2014) (European limits) Test Margin: 100
Test date: 2017/8/31 Start time: 下午 11:55:51 End time: 上午 12:06:02
Test duration (min): 10 Data file name: H-000073.cts_data
Comment:
Customer:

Test Result: Pass Source qualification: Normal

Highest parameter values during test:

Voltage (Vrms):	230.76	Frequency(Hz):	50.00
I _{Peak} (Amps):	0.724	I _{RMS} (Amps):	0.158
I _{Fund} (Amps):	0.073	Crest Factor:	4.596
Power (Watts):	16.4	Power Factor:	0.453

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.021	0.461	4.62	OK
3	0.451	2.077	21.73	OK
4	0.020	0.461	4.28	OK
5	0.047	0.923	5.12	OK
6	0.017	0.461	3.77	OK
7	0.042	0.692	6.00	OK
8	0.014	0.461	2.97	OK
9	0.018	0.461	3.84	OK
10	0.012	0.461	2.54	OK
11	0.027	0.231	11.79	OK
12	0.009	0.231	3.88	OK
13	0.014	0.231	5.99	OK
14	0.004	0.231	1.77	OK
15	0.023	0.231	10.02	OK
16	0.004	0.231	1.79	OK
17	0.015	0.231	6.65	OK
18	0.009	0.231	4.09	OK
19	0.015	0.231	6.56	OK
20	0.015	0.231	6.45	OK
21	0.015	0.231	6.54	OK
22	0.004	0.231	1.64	OK
23	0.015	0.231	6.53	OK
24	0.003	0.231	1.36	OK
25	0.016	0.231	6.89	OK
26	0.002	0.231	0.91	OK
27	0.012	0.231	5.07	OK
28	0.003	0.231	1.09	OK
29	0.017	0.231	7.28	OK
30	0.003	0.231	1.36	OK
31	0.014	0.231	5.97	OK
32	0.002	0.231	0.82	OK
33	0.013	0.231	5.56	OK
34	0.002	0.231	0.80	OK
35	0.011	0.231	4.90	OK
36	0.002	0.231	1.01	OK
37	0.011	0.231	4.72	OK
38	0.002	0.231	0.92	OK
39	0.013	0.231	5.65	OK
40	0.013	0.231	5.64	OK

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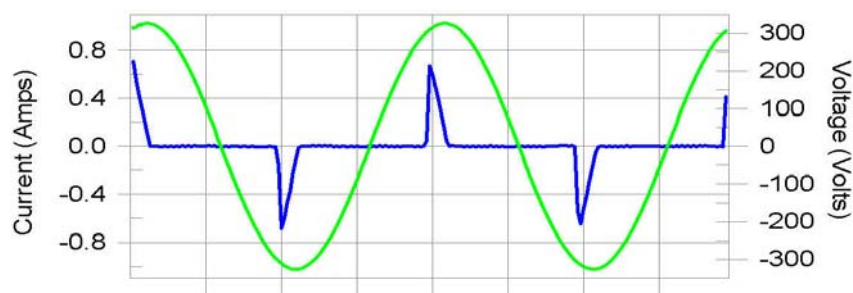
Model No.: TPP 15-105BA-J
Mode_2Teseq Profile
4542 Luterbach, Switzerland9/1/2017
1:08 AM

Harmonics – Class-A per Ed. 4.0 (2014)(Run time)

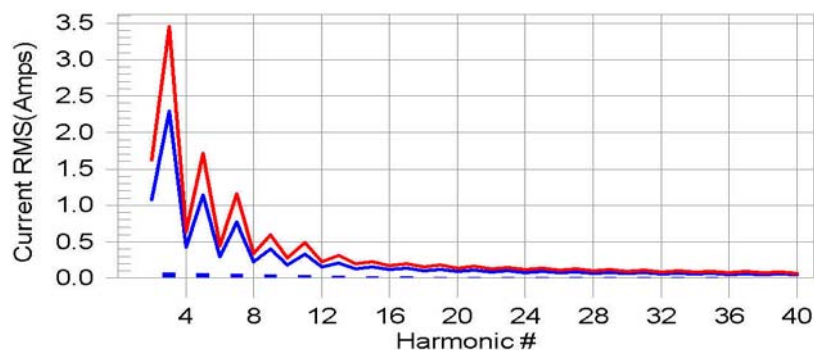
EUT:
Test category: Class-A per Ed. 4.0 (2014) (European limits) Tested by:
Test date: 2017/9/1 Start time: 上午 12:40:15 Test Margin: 100
Test duration (min): 10 Data file name: H-000076.cts_data End time: 上午 12:50:27
Comment:
Customer:

Test Result: Pass Source qualification: Normal

Current & voltage waveforms



Harmonics and Class A limit line European Limits



Test result: Pass Worst harmonics H25-10.3% of 150% limit, H25-15.1% of 100% limit

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Teseq Profile
4542 Luterbach, Switzerland9/1/2017
1:08 AM

Current Test Result Summary (Run time)

EUT: Tested by:
 Test category: Class-A per Ed. 4.0 (2014) (European limits) Test Margin: 100
 Test date: 2017/9/1 Start time: 上午 12:40:15 End time: 上午 12:50:27
 Test duration (min): 10 Data file name: H-000076.cts_data
 Comment:
 Customer:

Test Result: Pass Source qualification: Normal
 THC(A): 0.139 I-THD(%): 190.6 POHC(A): 0.034 POHC Limit(A): 0.251

Highest parameter values during test:

V_RMS (Volts): 230.75 Frequency(Hz): 50.00
 I_Peak (Amps): 0.729 I_RMS (Amps): 0.158
 I_Fund (Amps): 0.073 Crest Factor: 4.630
 Power (Watts): 16.4 Power Factor: 0.456

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.000	1.080	N/A	0.000	1.620	N/A	Pass
3	0.070	2.300	3.0	0.070	3.450	2.0	Pass
4	0.000	0.430	N/A	0.000	0.645	N/A	Pass
5	0.065	1.140	5.7	0.065	1.710	3.8	Pass
6	0.000	0.300	N/A	0.000	0.450	N/A	Pass
7	0.057	0.770	7.4	0.057	1.155	4.9	Pass
8	0.000	0.230	N/A	0.000	0.345	N/A	Pass
9	0.048	0.400	12.1	0.048	0.600	8.1	Pass
10	0.000	0.184	N/A	0.000	0.276	N/A	Pass
11	0.039	0.330	11.8	0.039	0.495	7.9	Pass
12	0.000	0.153	N/A	0.000	0.230	N/A	Pass
13	0.030	0.210	14.3	0.030	0.315	9.6	Pass
14	0.000	0.131	N/A	0.000	0.197	N/A	Pass
15	0.023	0.150	15.1	0.023	0.225	10.1	Pass
16	0.000	0.115	N/A	0.000	0.173	N/A	Pass
17	0.017	0.132	13.2	0.018	0.198	8.9	Pass
18	0.000	0.102	N/A	0.000	0.153	N/A	Pass
19	0.015	0.118	12.7	0.015	0.178	8.6	Pass
20	0.000	0.092	N/A	0.000	0.138	N/A	Pass
21	0.014	0.107	13.5	0.015	0.161	9.1	Pass
22	0.000	0.084	N/A	0.000	0.125	N/A	Pass
23	0.014	0.098	14.5	0.014	0.147	9.8	Pass
24	0.000	0.077	N/A	0.000	0.115	N/A	Pass
25	0.014	0.090	15.1	0.014	0.135	10.3	Pass
26	0.000	0.071	N/A	0.000	0.107	N/A	Pass
27	0.012	0.083	14.9	0.013	0.125	10.1	Pass
28	0.000	0.066	N/A	0.000	0.099	N/A	Pass
29	0.011	0.078	13.9	0.011	0.116	9.5	Pass
30	0.000	0.061	N/A	0.000	0.092	N/A	Pass
31	0.009	0.073	12.7	0.009	0.109	8.7	Pass
32	0.000	0.058	N/A	0.000	0.086	N/A	Pass
33	0.008	0.068	11.8	0.008	0.102	8.1	Pass
34	0.000	0.054	N/A	0.000	0.081	N/A	Pass
35	0.007	0.064	11.6	0.008	0.096	8.0	Pass
36	0.000	0.051	N/A	0.000	0.077	N/A	Pass
37	0.007	0.061	11.9	0.007	0.091	8.1	Pass
38	0.000	0.048	N/A	0.000	0.073	N/A	Pass
39	0.007	0.058	12.2	0.007	0.087	8.3	Pass
40	0.000	0.046	N/A	0.000	0.069	N/A	Pass

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Teseq Profile
4542 Luterbach, Switzerland

9/1/2017
1:08 AM

Voltage Source Verification Data (Run time)

EUT: Test category: Class-A per Ed. 4.0 (2014) (European limits) Tested by:
Test date: 2017/9/1 Start time: 上午 12:40:15 Test Margin: 100
Test duration (min): 10 Data file name: H-000076.cts_data End time: 上午 12:50:27
Comment:
Customer:

Test Result: Pass Source qualification: Normal

Highest parameter values during test:

Voltage (Vrms): 230.75	Frequency(Hz): 50.00
I _{Peak} (Amps): 0.729	I _{RMS} (Amps): 0.158
I _{Fund} (Amps): 0.073	Crest Factor: 4.630
Power (Watts): 16.4	Power Factor: 0.456

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.022	0.461	4.69	OK
3	0.452	2.077	21.75	OK
4	0.021	0.461	4.47	OK
5	0.047	0.923	5.13	OK
6	0.017	0.461	3.67	OK
7	0.041	0.692	5.94	OK
8	0.014	0.461	3.07	OK
9	0.018	0.461	3.84	OK
10	0.012	0.461	2.61	OK
11	0.027	0.231	11.83	OK
12	0.009	0.231	4.11	OK
13	0.014	0.231	6.05	OK
14	0.004	0.231	1.69	OK
15	0.023	0.231	9.98	OK
16	0.004	0.231	1.72	OK
17	0.015	0.231	6.50	OK
18	0.011	0.231	4.56	OK
19	0.015	0.231	6.65	OK
20	0.015	0.231	6.41	OK
21	0.015	0.231	6.40	OK
22	0.004	0.231	1.56	OK
23	0.015	0.231	6.58	OK
24	0.003	0.231	1.37	OK
25	0.016	0.231	6.88	OK
26	0.002	0.231	0.86	OK
27	0.012	0.231	5.16	OK
28	0.003	0.231	1.09	OK
29	0.017	0.231	7.28	OK
30	0.003	0.231	1.38	OK
31	0.013	0.231	5.85	OK
32	0.002	0.231	0.87	OK
33	0.013	0.231	5.68	OK
34	0.002	0.231	0.85	OK
35	0.011	0.231	4.91	OK
36	0.002	0.231	1.02	OK
37	0.011	0.231	4.84	OK
38	0.002	0.231	0.96	OK
39	0.013	0.231	5.69	OK
40	0.013	0.231	5.65	OK

Note : Equipment with a rated power of 75 W or less other than lighting equipment, the limits are not specified in this edition of the standard.

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4. Flicker

EN 61000-3-3 : 2013

4.1 Test Results

EN 61000-3-3 : 2013

Pass

4.2 Methods and Procedures

Standard	Edition	Description
EN 61000-3-3	2013	Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection

4.3 Test Instruments

SGS Flicker EN61000-3-3 HWAYA EMC					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
Power Analyzer	TESEQ	CCN 1000-1	1504A02654	2017/3/20	2018/3/19
AC Power Source	TESEQ	NSG 1007	1504A02654	2017/3/20	2018/3/19
Test Software	TESEQ	Win2100 V4	Ver. 4.5.8	N.C.R.	N.C.R.
SGS Taiwan LTD. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)					

4.4 EUT Operating Condition

Environment :

Temperature	Humidity
26 °C	60 %RH

Test setup : Please refer to photo of FLICKER testing setup

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4.5 Measurement Data

Model No.: TPP 15-105A-J

Mode_1

Teseq Profile
4542 Luterbach, Switzerland9/1/2017
1:07 AM

Flicker Test Summary per EN/IEC61000-3-3 Ed. 3.0 (2013) (Run time)

EUT:
Test category: All parameters (European limits)
Test date: 2017/9/1
Test duration (min): 10
Comment:
Customer:

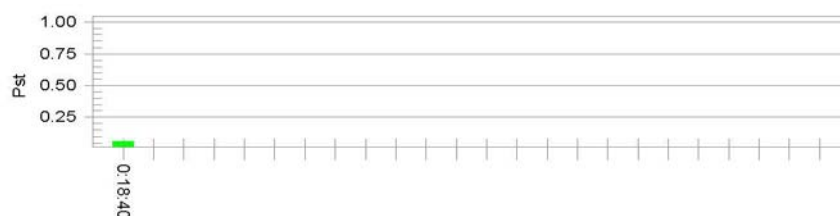
Tested by:
Test Margin: 100
Start time: 上午 12:08:19
End time: 上午 12:18:46
Data file name: F-000074.cts_data

Test Result: Pass

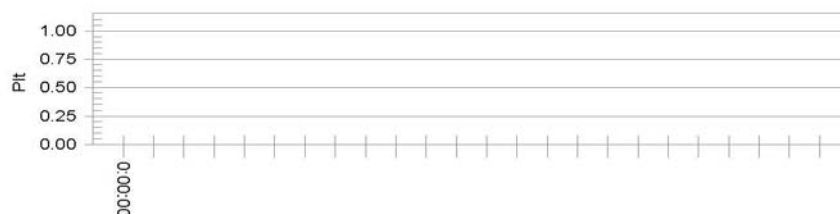
Status: Test Completed

Pst and limit line

European Limits



Pit and limit line



Parameter values recorded during the test:

Vrms at the end of test (Volt):	230.69		
Highest dt (%):	0.00	Test limit (%):	N/A
T-max (mS):	0	Test limit (mS):	500.0
Highest dc (%):	0.00	Test limit (%):	3.30
Highest dmax (%):	0.00	Test limit (%):	4.00
Highest Pst (10 min. period):	0.064	Test limit:	1.000
Highest Pit (2 hr. period):	0.028	Test limit:	0.650

Teseq AG Win2100 V4.14.0

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Model No.: TPP 15-105BA-J

Mode_2

Teseq Profline
4542 Luterbach, Switzerland

9/1/2017
1:08 AM

Flicker Test Summary per EN/IEC61000-3-3 Ed. 3.0 (2013) (Run time)

EUT:
Test category: All parameters (European limits)
Test date: 2017/9/1
Test duration (min): 10
Comment:
Customer:

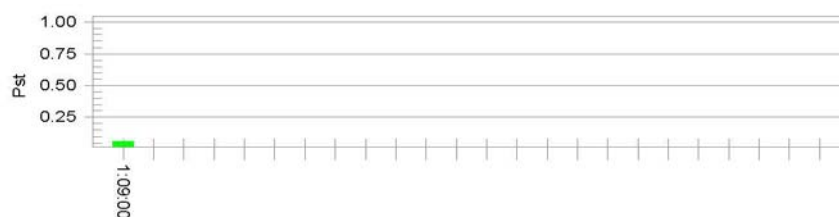
Tested by:
Test Margin: 100
Start time: 上午 12:58:39
End time: 上午 01:09:06
Data file name: F-000077.cts_data

Test Result: Pass

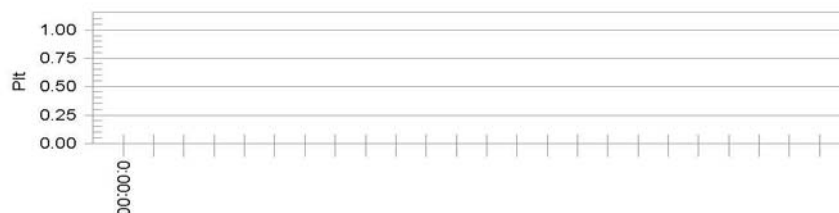
Status: Test Completed

Pst and limit line

European Limits



Plt and limit line



Parameter values recorded during the test:

Vrms at the end of test (Volt):	230.70		
Highest dt (%):	0.00	Test limit (%):	N/A
T-max (mS):	0	Test limit (mS):	500.0
Highest dc (%):	0.00	Test limit (%):	3.30
Highest dmax (%):	0.00	Test limit (%):	4.00
Highest Pst (10 min. period):	0.064	Test limit:	1.000
Highest Plt (2 hr. period):	0.028	Test limit:	0.650

Teseq AG Win2100 V4.14.0

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5. IMMUNITY

EN 55014-2 : 2015, Category IV

5.1 Test Results

Test Standard	Performance Criteria	Result
IEC 61000-4-2 : 2008	B	Pass
IEC 61000-4-3 : 2006+A1:2007+A2:2010	A	Pass
IEC 61000-4-4 : 2012	B	Pass
IEC 61000-4-5 : 2014	B	Pass
IEC 61000-4-6 : 2013	A	Pass
IEC 61000-4-11 : 2004	C/C/B	Pass

5.2 Performance Criteria Description

Criterion A - The apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.

Criterion B - The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.

Criterion C - Temporary loss of function is allowed, provided the function is self recoverable or can be restored by the operation of the controls.

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5.3 Test of IEC 61000-4-2

5.3.1 Methods and Procedures

Standard	Edition	Description
IEC 61000-4-2	2008	Electrostatic Discharge (ESD)

5.3.2 Test Instruments

SGS ESD EN61000-4-2 HwaYa No.1 EMC					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
ESD Simulator	Thermo	MiniZap	612312	2017/6/16	2018/6/15
HCP	N/A	1.6 x 0.8 m	N/A	N.C.R.	N.C.R.
VCP	N/A	0.5 x 0.5 m	N/A	N.C.R.	N.C.R.
SGS Taiwan LTD. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)					

5.3.3 EUT Operating Condition

Environment :

Temperature	Humidity
21 °C	45 %RH

Test setup : Please refer to photo of ESD testing setup

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5.3.4 Results of Electrostatic Discharge Test (ESD)

Model No.: TPP 15-105A-J; TPP 15-105BA-J

Test Mode	: Mode 1~2
Basic Standard	: IEC 61000-4-2
Discharge Impedance	: 330 ohm / 150 pF
Discharge Voltage	: Air Discharge +/- 2, 4, 8, 15 kV Contact Discharge +/- 2, 4, 6, 8 kV HVP/VCP +/- 8 kV
Polarity	: Positive/Negative
Number of Discharge	: 10 times at each test point
Discharge Mode	: Single Discharge
Discharge Period	: 1 second

A. Observations :

Test points: N/A

Direct Application			Test Results	
Discharge Level (kV)	Polarity (+/-)	Test Point	Contact Discharge	Air Discharge
2, 4, 8, 15(Air)	+/-	N/A	N/A	A*
2, 4, 6, 8(Cont.)	+/-	N/A	A*	N/A

Remark: A : No degradation of performance or loss of function.

*No any discharge events occurred on the test.

N/A : Not Applicable.

B. Observations :

Test points: 1. Front side. 2. Rear side. 3. Left side. 4. Right side.

Indirect Application			Test Results	
Discharge Level (kV)	Polarity (+/-)	Test Point	Horizontal Coupling	Vertical Coupling
2, 4, 6, 8	+/-	1 ~ 4	A	A

Remark: A : No degradation of performance or loss of function.

N/A : Not Applicable.

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5.4 Test of IEC 61000-4-3

5.4.1 Methods and Procedures

Standard	Edition	Description
IEC 61000-4-3	2006+A1:2007 +A2:2010	Radio-Frequency Electromagnetic Field Susceptibility Test, RS

5.4.2 Test Instruments

SGS RS EN61000-4-3 HWAYA SAC-B EMC					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
RS Test Site	Chance Most	9X6X6	SAC-B	2016/12/13	2017/12/12
Signal Generator	R&S	SMJ 100A	101258	2016/9/19	2017/9/18
Power Sensor	R&S	NRP-Z11	111682	2017/3/29	2018/3/28
Power Sensor	R&S	NRP-Z11	112186	2017/3/21	2018/3/20
Power Amplifier	R&S	BBA100	101075	N.C.R.	N.C.R.
Power Amplifier	R&S	BBA100	101021	N.C.R.	N.C.R.
E-Field Generating Antenna	ifi	EFG-3	U2137-0217	N.C.R.	N.C.R.
High Gain Log-Per. Antenna	R&S	HL046E	9149-151	N.C.R.	N.C.R.
Calibrated Broadband Log-Per. Test-Antenna	Schwarzbeck	STLP 9149	9149-151	N.C.R.	N.C.R.
Field Probes	Narda	NBM-550	V8.F-0375	2017/1/17	2018/1/16
Test Software	R&S	EMC 32	V9.21.00	N.C.R.	N.C.R.
SGS Taiwan LTD. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)					

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5.4.3 EUT Operating Condition

Environment :

Temperature	Humidity
21 °C	45 %RH

Test setup : Please refer to photo of RS testing setup

5.4.4 Results of Radiated Radio Frequency Electromagnetic (RS)

Model No.: TPP 15-105A-J; TPP 15-105BA-J

Test Mode : Mode 1~2

Basic Standard : IEC 61000-4-3

Frequency range : 80 MHz - 1000 MHz

Field strength : 20 V/m

Modulation : 80% AM (1KHz)

Frequency step : 1 % of fundamental

Dwell Time : 3 seconds

Test distance : 3 m

No.	Frequency (MHz)	Antenna Orientation	Observation	EUT Orientation
1	80 - 1000	Vertical/Horizontal	A	0 degree
2	80 - 1000	Vertical/Horizontal	A	90 degree
3	80 - 1000	Vertical/Horizontal	A	180 degree
4	80 - 1000	Vertical/Horizontal	A	270 degree

Remark: A : No degradation of performance or loss of function.

N/A : Not Applicable.

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5.5 Test of IEC 61000-4-4

5.5.1 Methods and Procedures

Standard	Edition	Description
IEC 61000-4-4	2012	Electrical fast transient/burst requirements

5.5.2 Test Instruments

SGS EFT EN61000-4-4 HWAYA EMC					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
Burst Generator	TESEQ	NSG 3025	35177	2016/12/6	2017/12/5
EFT Clamp	Thermo	CCL	612359	2016/12/6	2017/12/5
SGS Taiwan LTD. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)					

5.5.3 EUT Operating Condition

Environment :

Temperature	Humidity
21 °C	45 %RH

Test setup : Please refer to photo of EFT testing setup

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5.5.4 Results of Electrical Fast Transient (EFT)

Model No.: TPP 15-105A-J; TPP 15-105BA-J

Test Mode : Mode 1~2

Basic Standard : IEC 61000-4-4

Test Voltage : AC Input/Output : ± 2 kV, DC Input/Output : ± 0.5 kV, Signal port : ± 0.5 kV

Polarity : Positive/Negative

Impulse Frequency: 5 kHz

Tr/Tn : 5/50ns

Burst : 15ms/300ms

Observation :

Test Point	Polarity	Test Level (kV)	Results
AC Input	+/-	2	A
DC Input	+/-	0.5	N/A
Signal/Comm.	+/-	0.5	N/A

Remark: A : No degradation of performance or loss of function.

N/A : Not Applicable.

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5.6 Test of IEC 61000-4-5

5.6.1 Methods and Procedures

Standard	Edition	Description
IEC 61000-4-5	2014	Surge immunity test

5.6.2 Test Instruments

SGS Surge EN61000-4-5 HWAYA EMC					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
Surge Tester	EMC Partner	MIG0603IN2 S-T	1515	2017/5/16	2018/5/15
Universal Surge CDN	EMC Partner	CDN-UTP8	CDN-UTP8-1516	2017/5/19	2018/5/18
SGS Taiwan LTD. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)					

5.6.3 EUT Operating Condition

Environment :

Temperature	Humidity
21 °C	45 %RH

Test setup : Please refer to photo of SURGE testing setup

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5.6.4 Results of Surge Test

Model No.: TPP 15-105A-J

Test Mode : Mode 1
 Test Rate : 1 pulse every minute
 No. of Tests : 5 positive and 5 negative pulses
 Waveform : 1.2/50 μ s (8/20 μ s)

Observation Description

AC Power line:

Test Point	Phase Angle (degree)	Polarity (+/-)	Test Level (kV)	Observation
L – N	0, 90, 180, 270	+/-	1	A
L – PE	0, 90, 180, 270	+/-	2	N/A
N – PE	0, 90, 180, 270	+/-	2	N/A

Remark: A : No degradation of performance or loss of function.

N/A : Not Applicable.

DC Power line:

Test Point	Phase Angle (degree)	Polarity (+/-)	Test Level (kV)	Observation
DC input	N/A	+/-	0.5	N/A

Remark: N/A : Not Applicable.

Signal line:

Test Rate : 1 pulse every minute
 No. of Tests : 5 positive and 5 negative pulses
 Waveform : 10/700 μ s

Observation Description

Telecommunication line:

Test Point	Phase Angle (degree)	Polarity (+/-)	Test Level (kV)	Observation
Signal I/O	N/A	+/-	1	N/A
POE LAN	N/A	+/-	1	N/A

Remark: N/A : Not Applicable.

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Model No.: TPP 15-105BA-J

Test Mode : Mode 2
 Test Rate : 1 pulse every minute
 No. of Tests : 5 positive and 5 negative pulses
 Waveform : 1.2/50 μ s (8/20 μ s)

Observation Description

AC Power line:

Test Point	Phase Angle (degree)	Polarity (+/-)	Test Level (kV)	Observation
L – N	0, 90, 180, 270	+/-	1	A
L – PE	0, 90, 180, 270	+/-	2	A
N – PE	0, 90, 180, 270	+/-	2	A

Remark: A : No degradation of performance or loss of function.
 N/A : Not Applicable.

DC Power line:

Test Point	Phase Angle (degree)	Polarity (+/-)	Test Level (kV)	Observation
DC input	N/A	+/-	0.5	N/A

Remark: N/A : Not Applicable.

Signal line:

Test Rate : 1 pulse every minute
 No. of Tests : 5 positive and 5 negative pulses
 Waveform : 10/700 μ s

Observation Description

Telecommunication line:

Test Point	Phase Angle (degree)	Polarity (+/-)	Test Level (kV)	Observation
Signal I/O	N/A	+/-	1	N/A
POE LAN	N/A	+/-	1	N/A

Remark: N/A : Not Applicable.

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5.7 Test of IEC 61000-4-6

5.7.1 Methods and Procedures

Standard	Edition	Description
IEC 61000-4-6	2013	Immunity to conducted disturbances, induced by radio-frequency fields.

5.7.2 Test Instruments

SGS CS EN61000-4-6 HWAYA SR-D EMC					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
Signal Generator	Agilent	8648C	4108A05772	2017/3/4	2018/3/3
Power Sensor	R&S	NRVD	837794/029	2017/8/10	2018/8/9
Power Sensor	R&S	URV5-Z2	835640/015	2017/8/10	2018/8/9
Power Sensor	R&S	URV5-Z2	835640/016	2017/8/10	2018/8/9
Dual Directional Coupler	OSR	C21A8	33	N.C.R.	N.C.R.
Conducted Immunity System	Frankonia	CIT-10	102D3226	N.C.R.	N.C.R.
CDN	TESEQ	CDN M116	37673	2017/4/24	2018/4/23
CDN	TESEQ	CDN M016	35853	2016/11/3	2017/11/2
CDN	TESEQ	CDN T8-10	37212	2017/4/24	2018/4/23
CDN	TESEQ	CDN ST08A	30191	2017/2/24	2018/2/23
EM Injection Clamp	TESEQ	KEMZ 801A	33430	2017/5/12	2018/5/11
Test Software	ar	emcware	V3.4.0	N.C.R.	N.C.R.
SGS Taiwan LTD. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)					

5.7.3 EUT Operating Condition

Environment :

Temperature	Humidity
21 °C	45 %RH

Test setup : Please refer to photo of CS testing setup

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5.7.4 Results of Immunity to Conducted Disturbances (CS)

Model No.: TPP 15-105A-J

Test Mode : Mode 1
Basic Standard : IEC 61000-4-6
Frequency range : 0.15 MHz - 80 MHz
Field strength : 20 Vrms
Modulation : 80% AM, 1 kHz Sinewave
Frequency step : 1 % of fundamental
Dwell Time : 3 seconds
Coupling Method : CDN 2 Lines

Cable Description	Frequency (MHz)	Observation
AC input	0.15 – 80	A
DC input	0.15 – 80	N/A
Signal/Comm.	0.15 – 80	N/A

Remark: A : No degradation of performance or loss of function.

N/A : Not Applicable.

Model No.: TPP 15-105BA-J

Test Mode : Mode 2
Basic Standard : IEC 61000-4-6
Frequency range : 0.15 MHz - 80 MHz
Field strength : 20 Vrms
Modulation : 80% AM, 1 kHz Sinewave
Frequency step : 1 % of fundamental
Dwell Time : 3 seconds
Coupling Method : CDN 3 Lines

Cable Description	Frequency (MHz)	Observation
AC input	0.15 – 80	A
DC input	0.15 – 80	N/A
Signal/Comm.	0.15 – 80	N/A

Remark: A : No degradation of performance or loss of function.

N/A : Not Applicable.

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5.8 Test of IEC 61000-4-11

5.8.1 Methods and Procedures

Standard	Edition	Description
IEC 61000-4-11	2004	Voltage dips, short interruptions and voltage variations immunity tests

5.8.2 Test Instruments

SGS DIP EN61000-4-11 HWAYA EMC					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
EMS Multi-Tester	EMC Partner	TRANSIENT 3000D	D-1500	2017/5/5	2018/5/4
SGS Taiwan LTD. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)					

5.8.3 EUT Operating Condition

Environment :

Temperature	Humidity
21 °C	45 %RH

Test setup : Please refer to photo of DIP testing setup

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5.8.4 Results of Voltage Dips Immunity Test

Model No.: TPP 15-105A-J; TPP 15-105BA-J

Test Mode : Mode 1~2

EUT Rated Voltage: AC 230V/50Hz

Voltage : 0, 40, 70 % Ut

Phase Angle : 0, 90, 180, 270 degree

Total events : 3 dropouts

Event interval : 10 seconds

Environmental phenomena		Test level in % Ut	Duration (in periods of the rated frequency)	Observation
Voltage dips in % Ut	100	0	0.5	A
	60	40	10	A
	30	70	25	A

Remark: A : No degradation of performance or loss of function.

N/A : Not Applicable.

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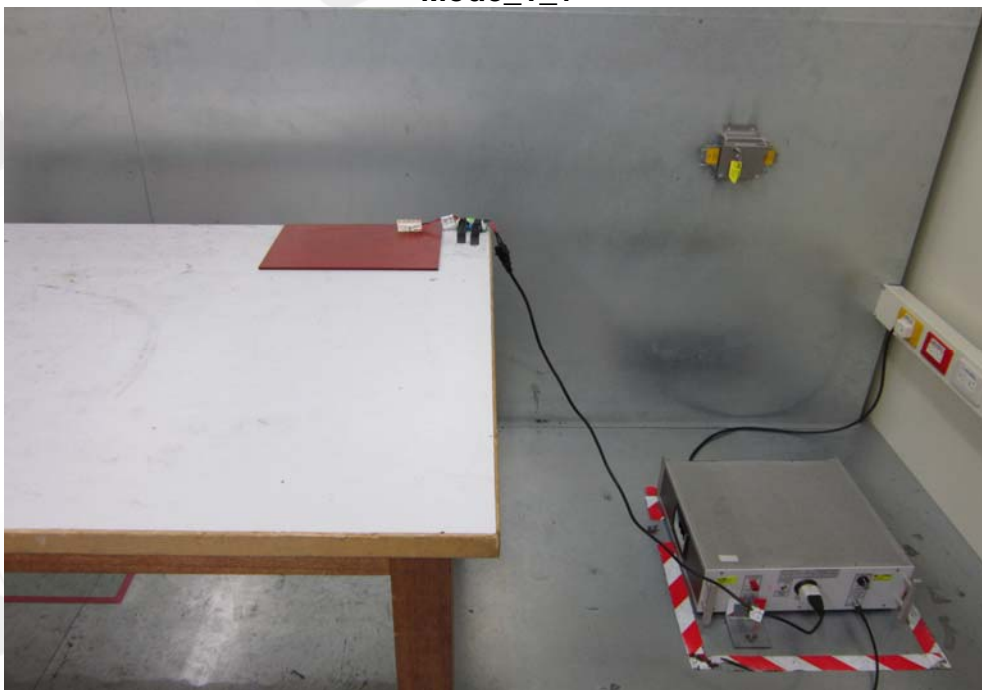
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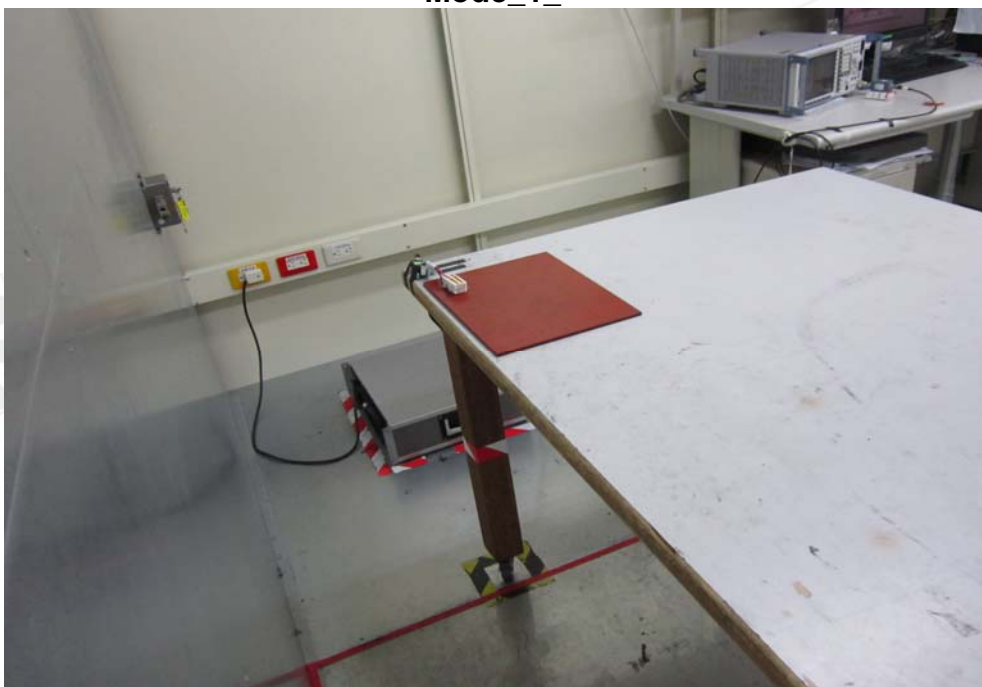
Photography of General Testing Set-up CE Testing Set-up

Model No.: TPP 15-105A-J

Mode_1_+



Mode_1_-



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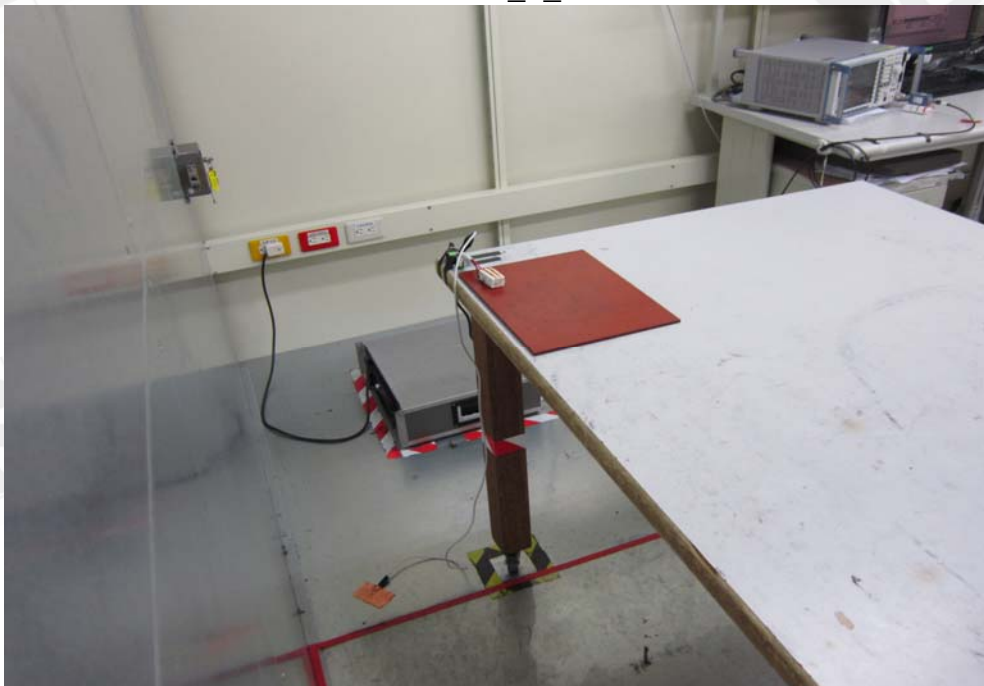
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Model No.: TPP 15-105BA-J

Mode_2_+



Mode_2_-



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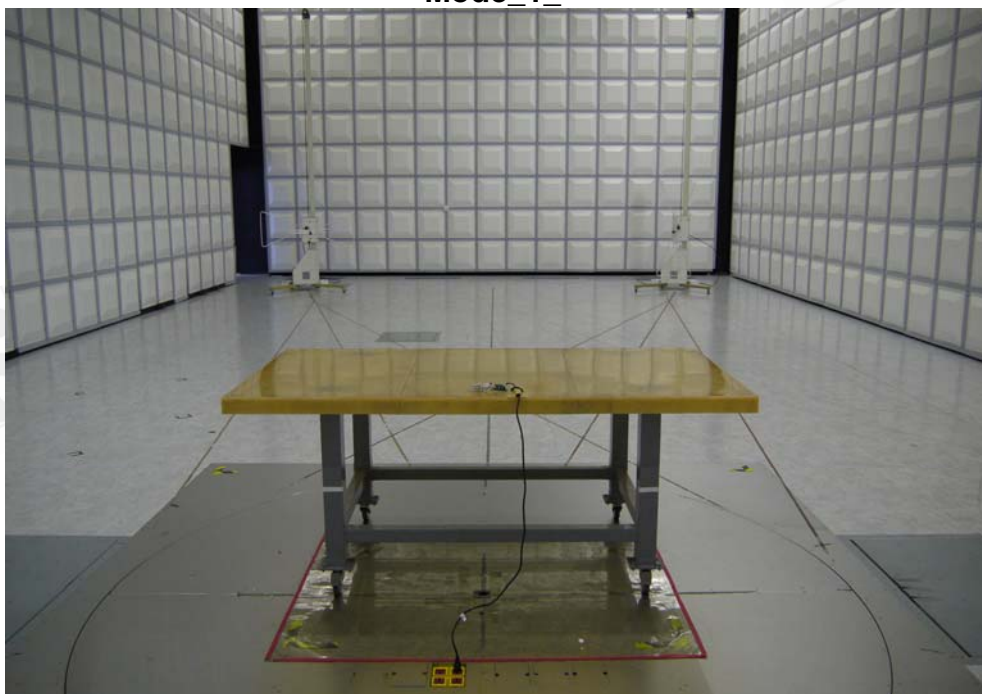
RE Testing Set-up Below 1GHz

Model No.: TPP 15-105A-J

Mode_1_+



Mode_1_-



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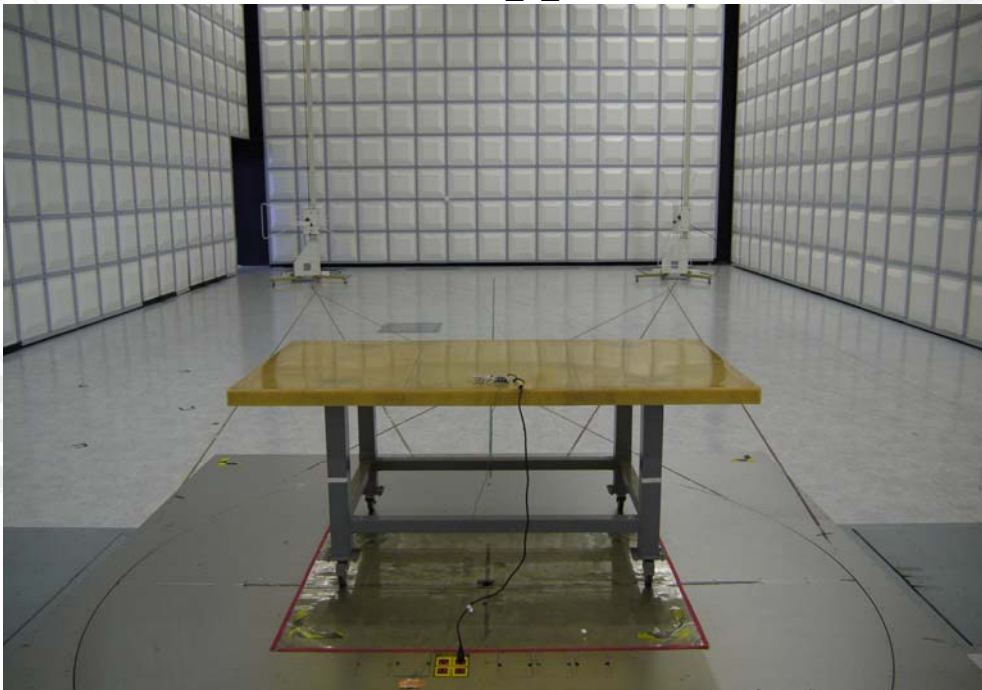
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Model No.: TPP 15-105BA-J

Mode_2_+



Mode_2_-



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HARMONIC Testing Set-up

Model No.: TPP 15-105A-J

Mode_1



Model No.: TPP 15-105BA-J

Mode_2



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FLICKER Testing Set-up

Model No.: TPP 15-105A-J

Mode_1



Model No.: TPP 15-105BA-J

Mode_2



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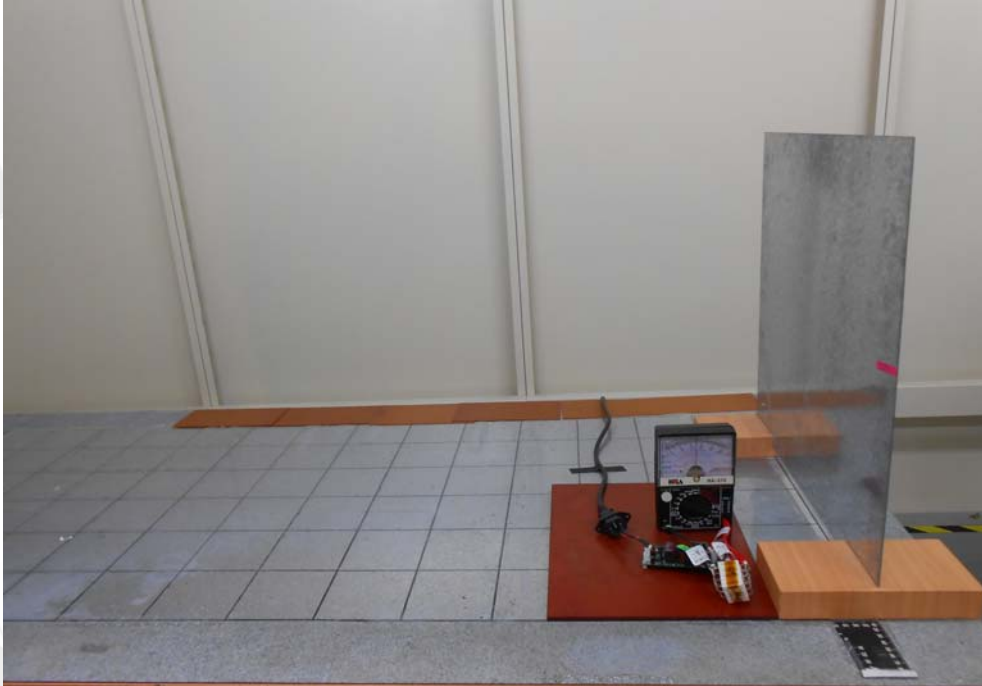
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Model No.: TPP 15-105A-J

Mode_1



Model No.: TPP 15-105BA-J

Mode_2



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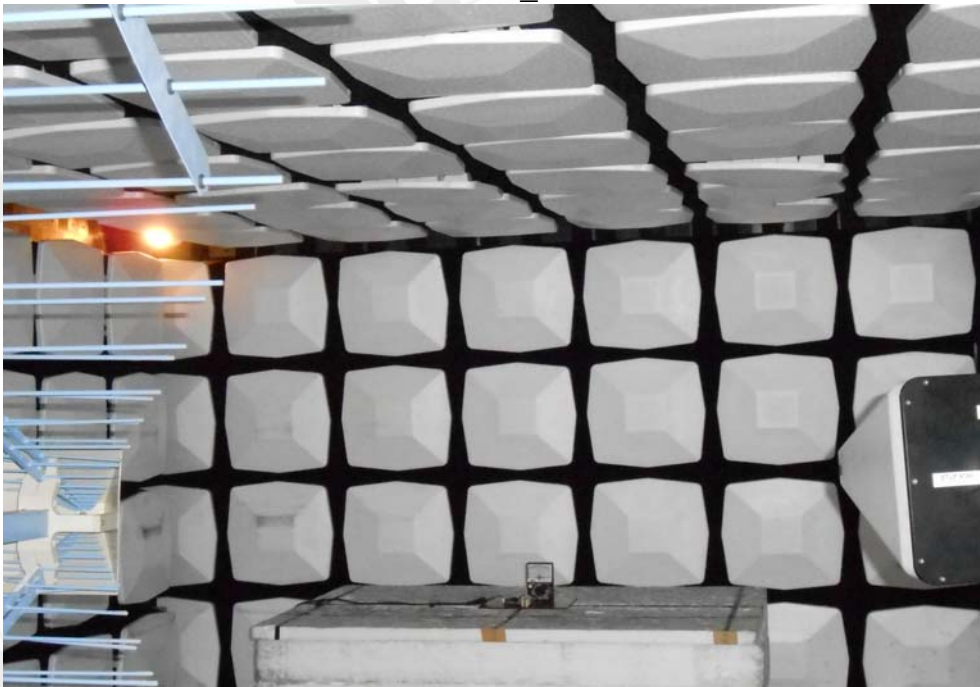
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Model No.: TPP 15-105A-J

Mode_1



Model No.: TPP 15-105BA-J

Mode_2



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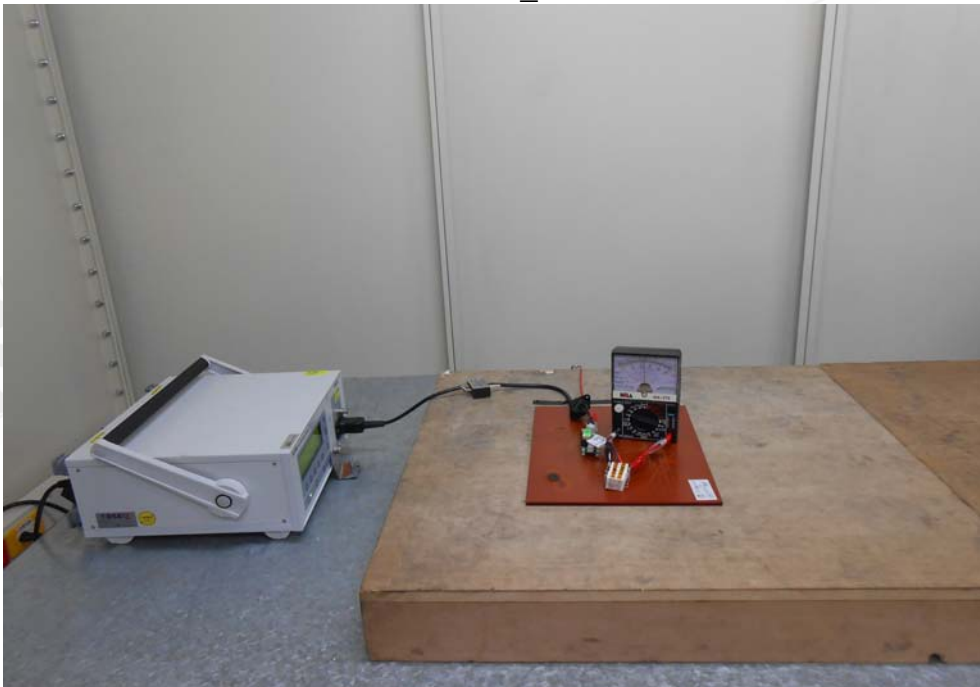
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Mode_1



Model No.: TPP 15-105BA-J

Mode_2

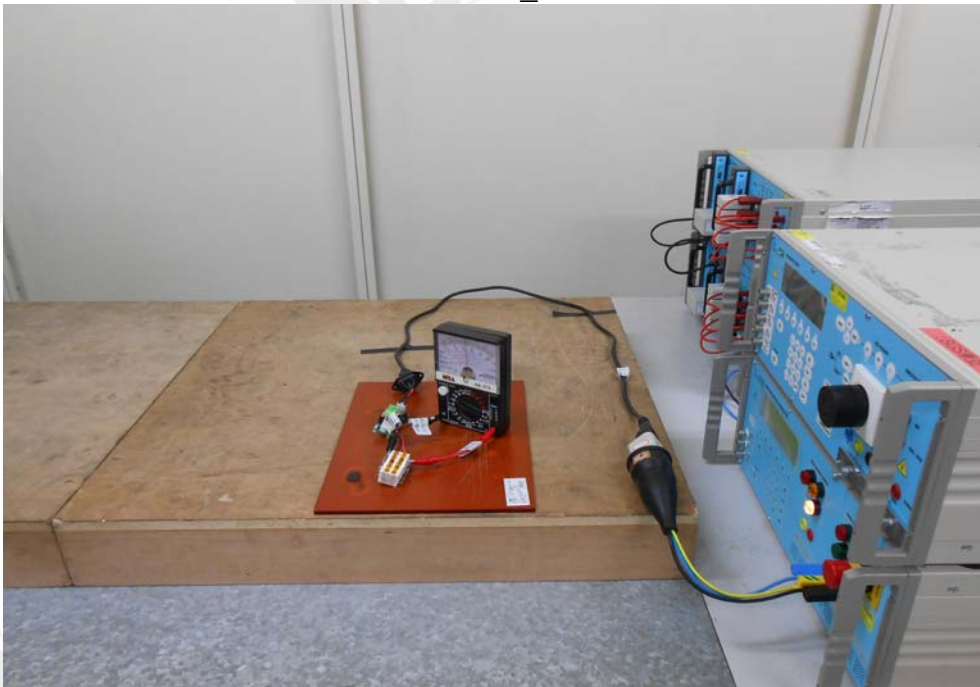


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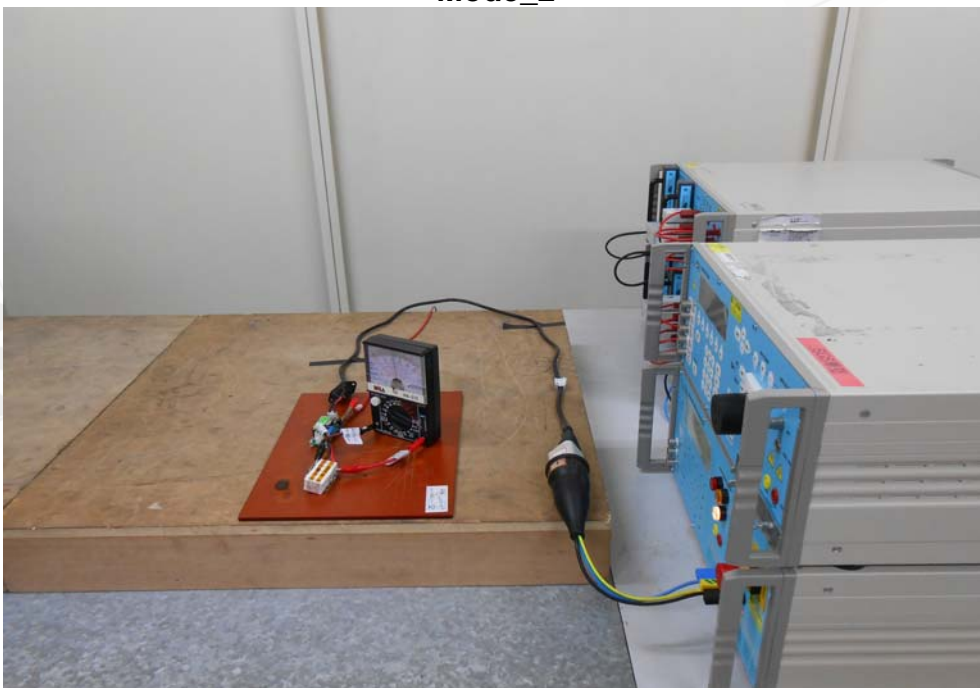
Model No.: TPP 15-105A-J

Mode_1



Model No.: TPP 15-105BA-J

Mode_2

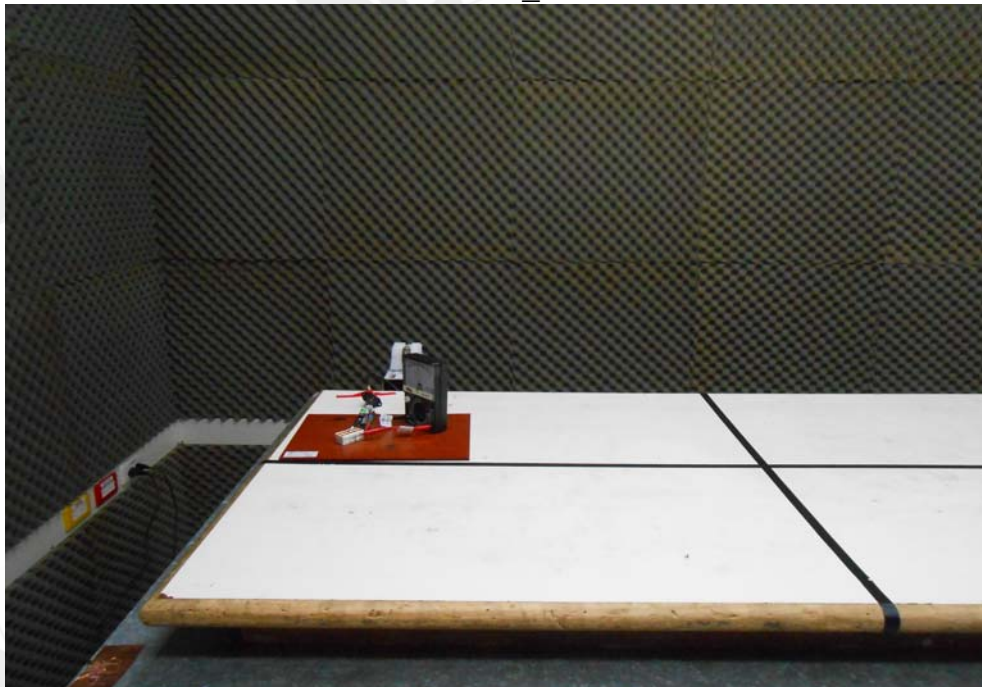


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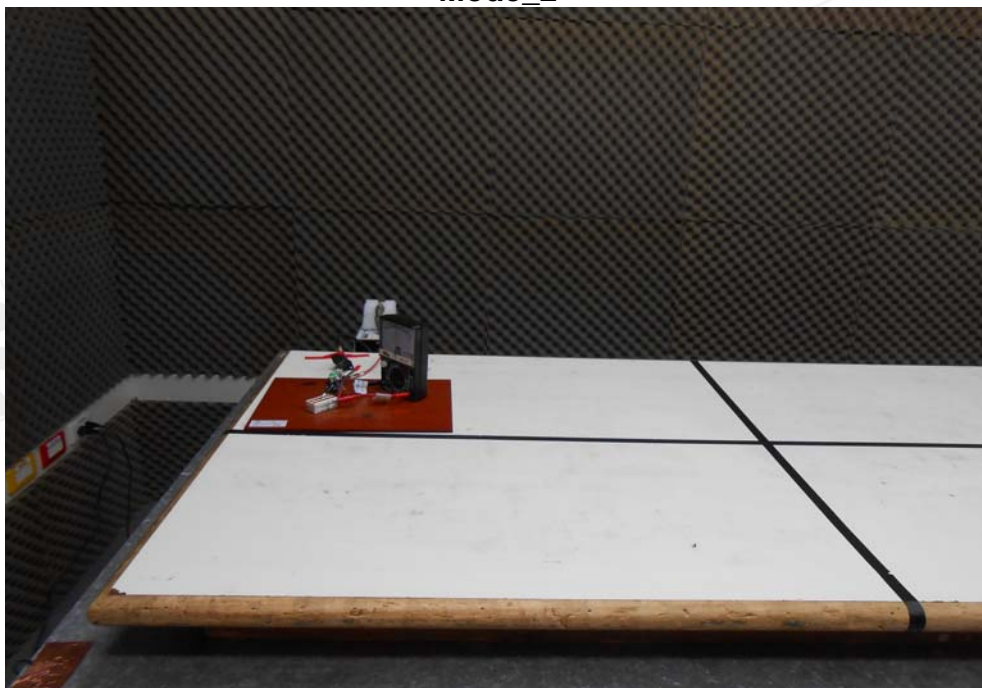
Model No.: TPP 15-105A-J

Mode_1



Model No.: TPP 15-105BA-J

Mode_2



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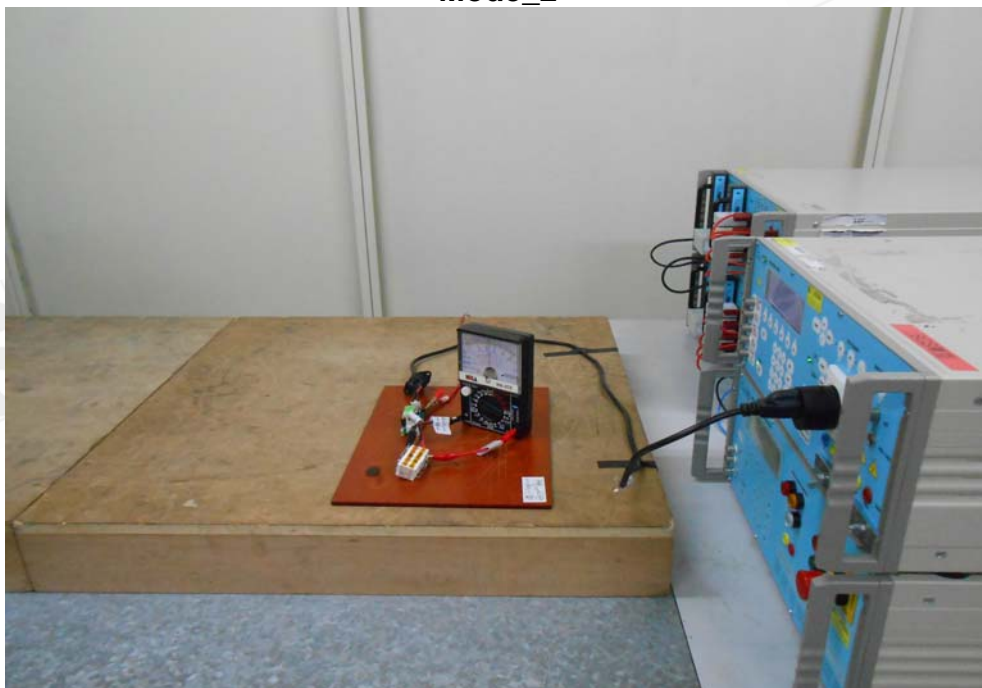
Model No.: TPP 15-105A-J

Mode_1



Model No.: TPP 15-105BA-J

Mode_2

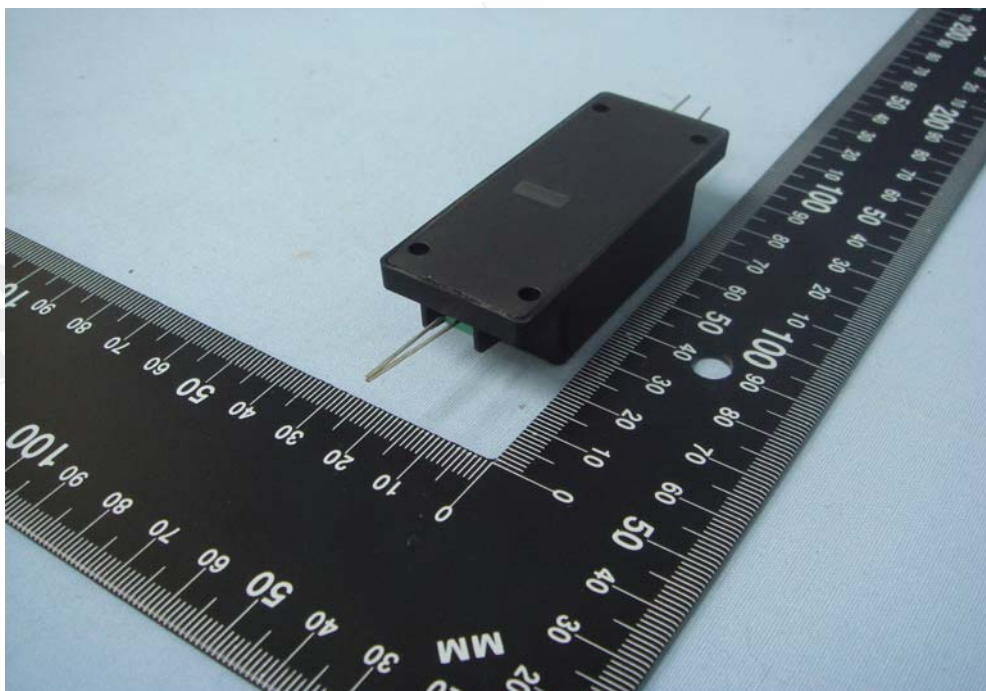
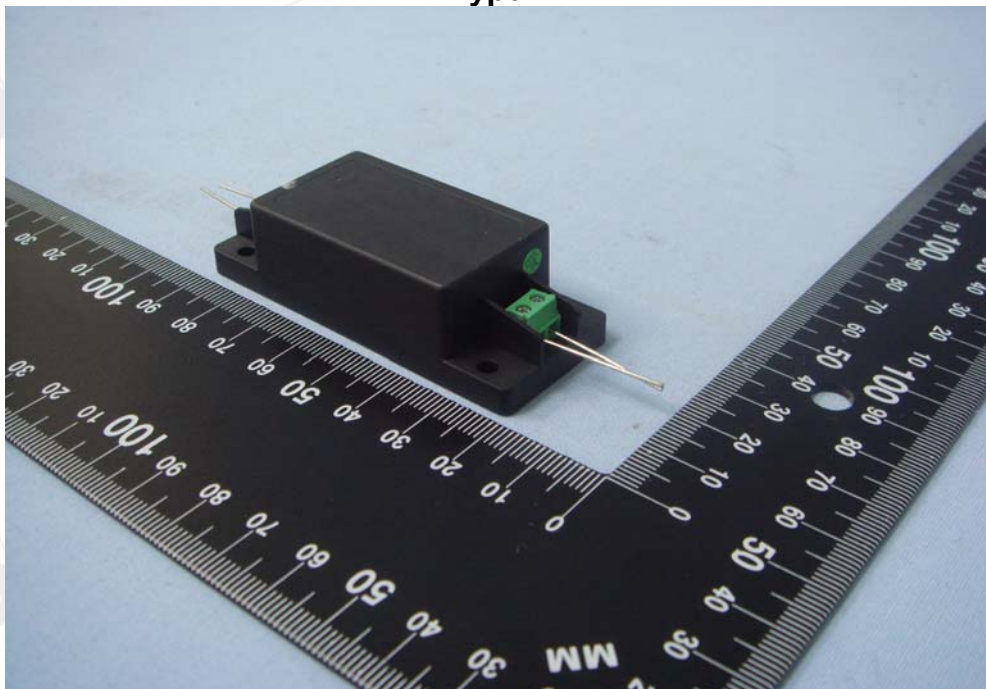


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Photographs of Product Exterior

Type 1



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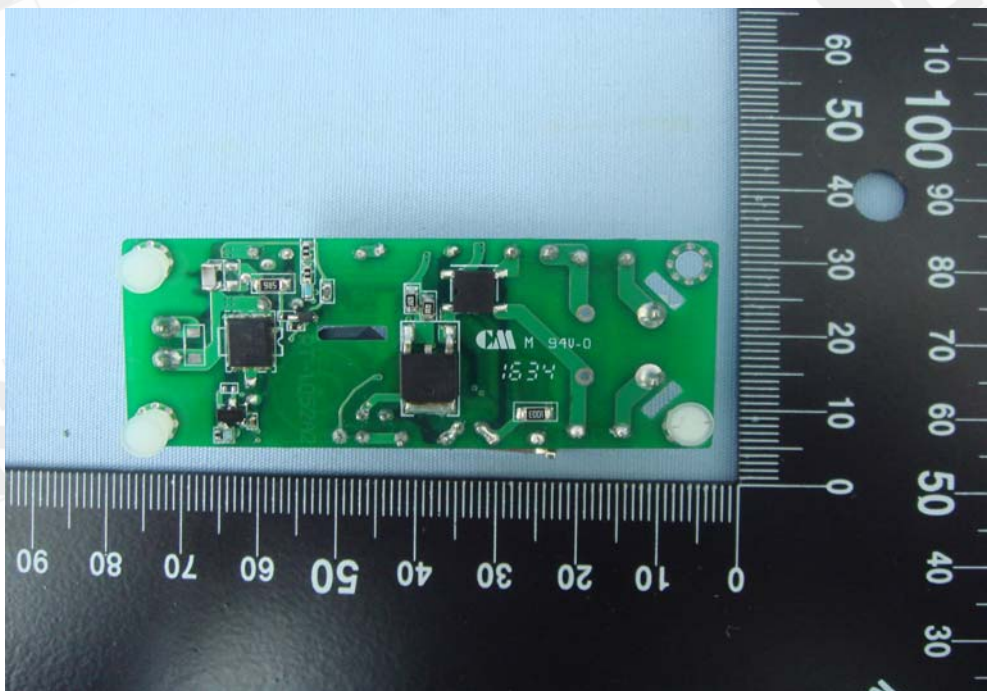
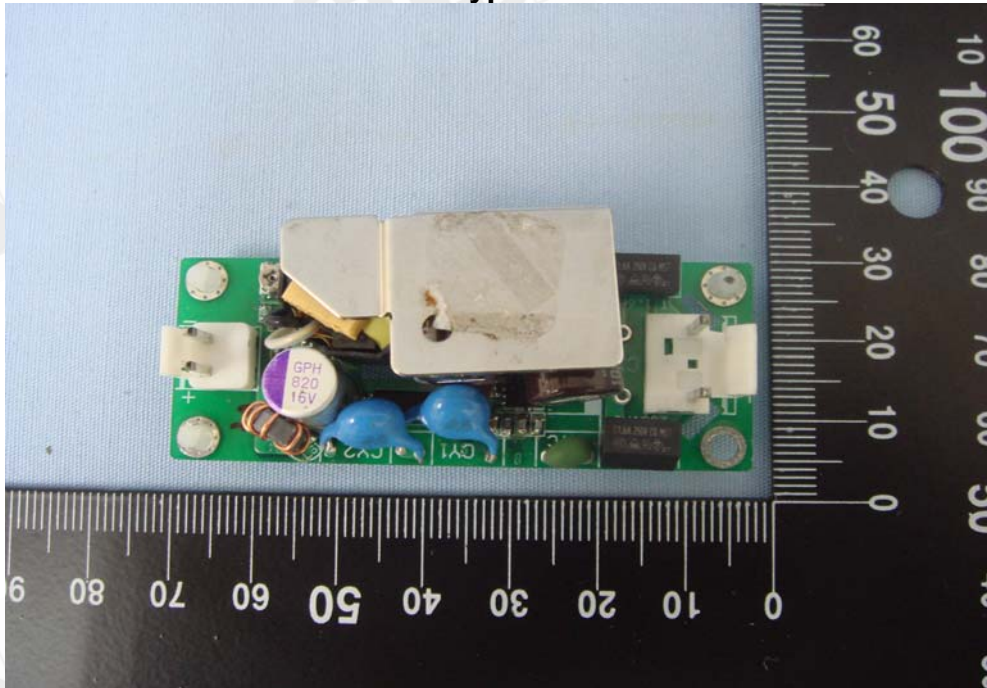
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Type 2



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