



## Test Report

# EN 60601-1-2: 2015

for

Electromagnetic Compatibility

of

Product : **AC/DC Converter**

Trade Name :



Model Number : Please refer to section 1.2

Prepared for

**TRACO ELECTRONIC AG**

Sihlbruggstrasse 111 CH-6340 Baar Switzerland

Prepared by

**Interocean EMC Technology Corp.**

**Interocean EMC Technology Tin-Fu Laboratory**

No. 5-2, Lin 1, Tin-Fu, Lin-Kou Dist., New Taipei City,

Taiwan 244, R.O.C.

TEL.: +886 2 2600 6861

FAX.: +886 2 2600 6859

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# Statement of Compliance

**Applicant:** TRACO ELECTRONIC AG  
**Manufacturer:** TRACO ELECTRONIC AG  
**Product:** AC/DC Converter  
**Model No.:** Please refer to section 1.2  
**Test Power Voltage** 230 Vac, 50 Hz  
**Date of Final Test:** Sep. 28, 2019  
**Revision of Report:** Rev. 01

### Measurement Procedures and Standards Used :

EN 60601-1-2: 2015

### Reference Basic Standards :

#### Emission:

- EN 55011: 2009+A1: 2010
- IEC 61000-3-2: 2014
- IEC 61000-3-3: 2013

#### Immunity:

- IEC 61000-4-2: 2008
- IEC 61000-4-3: 2006+A1: 2007+A2: 2010
- IEC 61000-4-4: 2012
- IEC 61000-4-5: 2014+A1: 2017
- IEC 61000-4-6: 2013+COR1: 2015
- IEC 61000-4-8: 2009
- IEC 61000-4-11: 2004+A1: 2017

The measurement results in this test report were performed at Interocean EMC Technology Corp. the responsibility of measurement result is only subjected to the test 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: 2020/11/04

Project Engineer: Scott Chang  
 Scott Chang

Approved: Edison Lee  
 Edison Lee



## 1 General Information

### 1.1 Description of Equipment Under Test

- Product** : AC/DC Converter
- Model Number** : Please refer to section 1.2
- Applicant** : **TRACO ELECTRONIC AG**  
Sihlbruggstrasse 111 CH-6340 Baar Switzerland
- Manufacturer** : **TRACO ELECTRONIC AG**  
Sihlbruggstrasse 111 CH-6340 Baar Switzerland
- Power Supply** : Please refer to section 1.3
- Date of Test** : Aug. 20 ~ Sep. 01, 2015 (For Other Tests)  
Sep. 28, 2019 (For RF Wireless Communications Equipment Immunity Test to 5.8 G)
- Additional Description** : 1) The test models are "**TPP 65-124BA; TPP 65-221BA; TPP 65-321M2BA**", designated by the applicant and included in this report.
- 2) The differences of all models in this report are provided by the applicant, please refer to section 1.3 "Specifications Description".
- 3) All the test data presented in this report are the test data of the original file No.: 15A081204E-E1; 19A092002E-E
- 4) For more detail specification about EUT, please refer to the user's manual.

**1.2 Model Number List**

TPP 65-105E-D	TPP 65-105BE-D	TPP 65-107E-D	TPP 65-107BE-D
TPP 65-109E-D	TPP 65-109BE-D	TPP 65-112E-D	TPP 65-112BE-D
TPP 65-115E-D	TPP 65-115BE-D	TPP 65-118E-D	TPP 65-118BE-D
TPP 65-124E-D	TPP 65-124BE-D	TPP 65-124E-DB1	TPP 65-124BE-DB1
TPP 65-128E-D	TPP 65-128BE-D	TPP 65-128E-DB1	TPP 65-128BE-DB1
TPP 65-136E-D	TPP 65-136BE-D	TPP 65-148E-D	TPP 65-148BE-D
TPP 65-153E-D	TPP 65-153BE-D	TPP 65-105BA	TPP 65-105BU
TPP 65-105B	TPP 65-105BD	TPP 65-105A	TPP 65-105U
TPP 65-105	TPP 65-105D	TPP 65-107BA	TPP 65-107BU
TPP 65-107B	TPP 65-107BD	TPP 65-107A	TPP 65-107U
TPP 65-107	TPP 65-107D	TPP 65-109BA	TPP 65-109BU
TPP 65-109B	TPP 65-109BD	TPP 65-109A	TPP 65-109U
TPP 65-109	TPP 65-109D	TPP 65-112BA	TPP 65-112BU
TPP 65-112B	TPP 65-112BD	TPP 65-112A	TPP 65-112U
TPP 65-112	TPP 65-112D	TPP 65-115BA	TPP 65-115BU
TPP 65-115B	TPP 65-115BD	TPP 65-115A	TPP 65-115U
TPP 65-115	TPP 65-115D	TPP 65-118BA	TPP 65-118BU
TPP 65-118B	TPP 65-118BD	TPP 65-118A	TPP 65-118U
TPP 65-118	TPP 65-118D	TPP 65-124BA	TPP 65-124BU
TPP 65-124B	TPP 65-124BD	TPP 65-124A	TPP 65-124U
TPP 65-124	TPP 65-124D	TPP 65-1L24BA	TPP 65-1L24BU
TPP 65-1L24B	TPP 65-1L24BD	TPP 65-1L24A	TPP 65-1L24U
TPP 65-1L24	TPP 65-1L24D	TPP 65-128BA	TPP 65-128BU
TPP 65-128B	TPP 65-128BD	TPP 65-128A	TPP 65-128U
TPP 65-128	TPP 65-128D	TPP 65-1L28BA	TPP 65-1L28BU
TPP 65-1L28B	TPP 65-1L28BD	TPP 65-1L28A	TPP 65-1L28U
TPP 65-1L28	TPP 65-1L28D	TPP 65-136BA	TPP 65-136BU
TPP 65-136B	TPP 65-136BD	TPP 65-136A	TPP 65-136U
TPP 65-136	TPP 65-136D	TPP 65-148BA	TPP 65-148BU
TPP 65-148B	TPP 65-148BD	TPP 65-148A	TPP 65-148U
TPP 65-148	TPP 65-148D	TPP 65-153BA	TPP 65-153BU
TPP 65-153B	TPP 65-153BD	TPP 65-153A	TPP 65-153U
TPP 65-153	TPP 65-153D	TPP 65-210BA	TPP 65-210BU
TPP 65-210B	TPP 65-210BD	TPP 65-210A	TPP 65-210U
TPP 65-210	TPP 65-210D	TPP 65-220BA	TPP 65-220BU
TPP 65-220B	TPP 65-220BD	TPP 65-220A	TPP 65-220U
TPP 65-220	TPP 65-220D	TPP 65-221BA	TPP 65-221BU
TPP 65-221B	TPP 65-221BD	TPP 65-221A	TPP 65-221U
TPP 65-221	TPP 65-221D	TPP 65-231BA	TPP 65-231BU
TPP 65-231B	TPP 65-231BD	TPP 65-231A	TPP 65-231U
TPP 65-231	TPP 65-231D	TPP 65-251BA	TPP 65-251BU
TPP 65-251B	TPP 65-251BD	TPP 65-251A	TPP 65-251U
TPP 65-251	TPP 65-251D	TPP 65-310M1BA	TPP 65-310M1BU
TPP 65-310M1B	TPP 65-310M1BD	TPP 65-310M1A	TPP 65-310M1U
TPP 65-310M1	TPP 65-310M1D	TPP 65-3102BA	TPP 65-3102BU
TPP 65-3102B	TPP 65-3102BD	TPP 65-3102A	TPP 65-3102U



TPP 65-3102	TPP 65-3102D	TPP 65-310M2BA	TPP 65-310M2BU
TPP 65-310M2B	TPP 65-310M2BD	TPP 65-310M2A	TPP 65-310M2U
TPP 65-310M2	TPP 65-310M2D	TPP 65-321M1BA	TPP 65-321M1BU
TPP 65-321M1B	TPP 65-321M1BD	TPP 65-321M1A	TPP 65-321M1U
TPP 65-321M1	TPP 65-321M1D	TPP 65-321M2BA	TPP 65-321M2BU
TPP 65-321M2B	TPP 65-321M2BD	TPP 65-321M2A	TPP 65-321M2U
TPP 65-321M2	TPP 65-321M2D	TPP 65-3201BA	TPP 65-3201BU
TPP 65-3201B	TPP 65-3201BD	TPP 65-3201A	TPP 65-3201U
TPP 65-3201	TPP 65-3201D	TPP 65-320M2BA	TPP 65-320M2BU
TPP 65-320M2B	TPP 65-320M2BD	TPP 65-320M2A	TPP 65-320M2U
TPP 65-320M2	TPP 65-320M2D	TPP 65-331M3BA	TPP 65-331M3BU
TPP 65-331M3B	TPP 65-331M3BD	TPP 65-331M3A	TPP 65-331M3U
TPP 65-331M3	TPP 65-331M3D	TPP 65-3512BA	TPP 65-3512BU
TPP 65-3512B	TPP 65-3512BD	TPP 65-3512A	TPP 65-3512U
TPP 65-3512	TPP 65-3512D	TPP 65-351M2BA	TPP 65-351M2BU
TPP 65-351M2B	TPP 65-351M2BD	TPP 65-351M2A	TPP 65-351M2U
TPP 65-351M2	TPP 65-351M2D		

**1.3 Specifications Description**

Model Number	Output	
	Voltage (VDC)	Current (A)
TPP 65-105E-D	5	10
TPP 65-105BE-D		
TPP 65-107E-D	7.5	8.67
TPP 65-107BE-D		
TPP 65-109E-D	9	7.23
TPP 65-109BE-D		
TPP 65-112E-D	12	5.42
TPP 65-112BE-D		
TPP 65-115E-D	15	4.34
TPP 65-115BE-D		
TPP 65-118E-D	18	3.62
TPP 65-118BE-D		
TPP 65-124E-D	24	2.71
TPP 65-124BE-D		
TPP 65-124E-DB1	24	2.71
TPP 65-124BE-DB1		
TPP 65-128E-D	28	2.33
TPP 65-128BE-D		
TPP 65-128E-DB1	28	2.33
TPP 65-128BE-DB1		
TPP 65-136E-D	36	1.81
TPP 65-136BE-D		
TPP 65-148E-D	48	1.36
TPP 65-148BE-D		
TPP 65-153E-D	53	1.24
TPP 65-153BE-D		

1. All models may be followed by any number of alphanumeric or - or suffixes.  
2. Connector option : -J, -D, -M, -T or J, D, M, T  
3. Package option : -D1 or D1  
3. All the model's rated voltage is 100 ~ 240 Vac ; input range is 85 ~ 264 Vac.  
4. The difference in model number with suffix "B" and without suffix "B" is only for different market.



Package Code				Output	
A	U	E	D	Voltage (VDC)	Current (A)
TPP 65-105BA	TPP 65-105BU	TPP 65-105B	TPP 65-105BD	5	10
TPP 65-105A	TPP 65-105U	TPP 65-105	TPP 65-105D		
TPP 65-107BA	TPP 65-107BU	TPP 65-107B	TPP 65-107BD	7.5	8.67
TPP 65-107A	TPP 65-107U	TPP 65-107	TPP 65-107D		
TPP 65-109BA	TPP 65-109BU	TPP 65-109B	TPP 65-109BD	9	7.23
TPP 65-109A	TPP 65-109U	TPP 65-109	TPP 65-109D		
TPP 65-112BA	TPP 65-112BU	TPP 65-112B	TPP 65-112BD	12	5.42
TPP 65-112A	TPP 65-112U	TPP 65-112	TPP 65-112D		
TPP 65-115BA	TPP 65-115BU	TPP 65-115B	TPP 65-115BD	15	4.34
TPP 65-115A	TPP 65-115U	TPP 65-115	TPP 65-115D		
TPP 65-118BA	TPP 65-118BU	TPP 65-118B	TPP 65-118BD	18	3.62
TPP 65-118A	TPP 65-118U	TPP 65-118	TPP 65-118D		
TPP 65-124BA	TPP 65-124BU	TPP 65-124B	TPP 65-124BD	24	2.71
TPP 65-124A	TPP 65-124U	TPP 65-124	TPP 65-124D		
TPP 65-1L24BA	TPP 65-1L24BU	TPP 65-1L24B	TPP 65-1L24BD	24	2.71
TPP 65-1L24A	TPP 65-1L24U	TPP 65-1L24	TPP 65-1L24D		
TPP 65-128BA	TPP 65-128BU	TPP 65-128B	TPP 65-128BD	28	2.33
TPP 65-128A	TPP 65-128U	TPP 65-128	TPP 65-128D		
TPP 65-1L28BA	TPP 65-1L28BU	TPP 65-1L28B	TPP 65-1L28BD	28	2.33
TPP 65-1L28A	TPP 65-1L28U	TPP 65-1L28	TPP 65-1L28D		
TPP 65-136BA	TPP 65-136BU	TPP 65-136B	TPP 65-136BD	36	1.81
TPP 65-136A	TPP 65-136U	TPP 65-136	TPP 65-136D		
TPP 65-148BA	TPP 65-148BU	TPP 65-148B	TPP 65-148BD	48	1.36
TPP 65-148A	TPP 65-148U	TPP 65-148	TPP 65-148D		
TPP 65-153BA	TPP 65-153BU	TPP 65-153B	TPP 65-153BD	53	1.24
TPP 65-153A	TPP 65-153U	TPP 65-153	TPP 65-153D		

1. All models may be followed by any number of alphanumeric or - or suffixes.
2. Package Code: A: Open type; U: U chassis type; E: Enclosed type; D: Din rail type.  
The difference of all "package code" is only for different way package.
3. All the models's rated voltage is 100 ~ 240 Vac; input range is 85 ~ 264 Vac.
4. The difference in model number with suffix "B" and without suffix "B" is only for different market.



Package Code				Output 1		Output 2	
A	U	E	D	Voltage (VDC)	Current (A)	Voltage (VDC)	Current (A)
TPP 65-210BA	TPP 65-210BU	TPP 65-210B	TPP 65-210BD	5	6	3.3	0-6
TPP 65-210A	TPP 65-210U	TPP 65-210	TPP 65-210D				
TPP 65-220BA	TPP 65-220BU	TPP 65-220B	TPP 65-220BD	12	3	3.3	0-6
TPP 65-220A	TPP 65-220U	TPP 65-220	TPP 65-220D				
TPP 65-221BA	TPP 65-221BU	TPP 65-221B	TPP 65-221BD	12	3	5	0-6
TPP 65-221A	TPP 65-221U	TPP 65-221	TPP 65-221D				
TPP 65-231BA	TPP 65-231BU	TPP 65-231B	TPP 65-231BD	15	2.4	5	0-6
TPP 65-231A	TPP 65-231U	TPP 65-231	TPP 65-231D				
TPP 65-251BA	TPP 65-251BU	TPP 65-251B	TPP 65-251BD	24	1.5	5	0-6
TPP 65-251A	TPP 65-251U	TPP 65-251	TPP 65-251D				

1. All models may be followed by any number of alphanumeric or - or suffixes.
2. Package Code: A: Open type; U: U chassis type; E: Enclosed type; D: Din rail type.  
The difference of all "package code" is only for different way package.
3. All the models's rated voltage is 100 ~ 240 Vac; input range is 85 ~ 264 Vac.
4. The difference in model number with suffix "B" and without suffix "B" is only for different market.



Package Code				Output 1		Output 2		Output 3	
A	U	E	D	Voltage (VDC)	Current (A)	Voltage (VDC)	Current (A)	Voltage (VDC)	Current (A)
TPP 65-310M1BA	TPP 65-310M1BU	TPP 65-310M1B	TPP 65-310M1BD	5	6	3.3	6	-5	0.6
TPP 65-310M1A	TPP 65-310M1U	TPP 65-310M1	TPP 65-310M1D						
TPP 65-3102BA	TPP 65-3102BU	TPP 65-3102B	TPP 65-3102BD	5	6	3.3	6	12	0.6
TPP 65-3102A	TPP 65-3102U	TPP 65-3102	TPP 65-3102D						
TPP 65-310M2BA	TPP 65-310M2BU	TPP 65-310M2B	TPP 65-310M2BD	5	6	3.3	6	-12	0.6
TPP 65-310M2A	TPP 65-310M2U	TPP 65-310M2	TPP 65-310M2D						
TPP 65-321M1BA	TPP 65-321M1BU	TPP 65-321M1B	TPP 65-321M1BD	12	3	5	6	-5	0.6
TPP 65-321M1A	TPP 65-321M1U	TPP 65-321M1	TPP 65-321M1D						
TPP 65-321M2BA	TPP 65-321M2BU	TPP 65-321M2B	TPP 65-321M2BD	12	3	5	6	-12	0.6
TPP 65-321M2A	TPP 65-321M2U	TPP 65-321M2	TPP 65-321M2D						
TPP 65-3201BA	TPP 65-3201BU	TPP 65-3201B	TPP 65-3201BD	12	3	3.3	6	5	0.6
TPP 65-3201A	TPP 65-3201U	TPP 65-3201	TPP 65-3201D						
TPP 65-320M2BA	TPP 65-320M2BU	TPP 65-320M2B	TPP 65-320M2BD	12	3	3.3	6	-12	0.6
TPP 65-320M2A	TPP 65-320M2U	TPP 65-320M2	TPP 65-320M2D						
TPP 65-331M3BA	TPP 65-331M3BU	TPP 65-331M3B	TPP 65-331M3BD	15	2.4	5	6	-15	0.6
TPP 65-331M3A	TPP 65-331M3U	TPP 65-331M3	TPP 65-331M3D						
TPP 65-3512BA	TPP 65-3512BU	TPP 65-3512B	TPP 65-3512BD	24	1.5	5	6	12	0.6
TPP 65-3512A	TPP 65-3512U	TPP 65-3512	TPP 65-3512D						
TPP 65-351M2BA	TPP 65-351M2BU	TPP 65-351M2B	TPP 65-351M2BD	24	1.5	5	6	-12	0.6
TPP 65-351M2A	TPP 65-351M2U	TPP 65-351M2	TPP 65-351M2D						

1. All models may be followed by any number of alphanumeric or - or suffixes.
2. Package Code: A: Open type; U: U chassis type; E: Enclosed type; D: Din rail type.  
The difference of all "package code" is only for different way package.
3. All the models's rated voltage is 100 ~ 240 Vac; input range is 85 ~ 264 Vac.
4. The difference in model number with suffix "B" and without suffix "B" is only for different market.



## 1.4 Details of Tested Supporting System

### 1.4.1 Load (Model No.: TPP 65-124BA)

Full Load : 65.04 W (24 V, 2.71 A)

### 1.4.2 Load (Model No.: TPP 65-221BA)

Full Load : 36 W (12 V, 3 A)

Full Load : 30 W (5 V, 6 A)

### 1.4.3 Load (Model No.: TPP 65-321M2BA)

Full Load : 27.79 W (12 V, 2.316 A)

Full Load : 30 W (5 V, 6 A)

Full Load : 7.2 W (-12 V, 0.6 A)

### 1.4.4 Test Cable

Output Cable : Non-shielded, Detachable, 0.1 m, w/o core

Power Cord : Non-shielded, Detachable, 1.0 m, w/o core



## 1.5 Test Facility

- Site Description** : ☒Conducted 1 ☒OATS 1 ☒EMS Room
- Name of Firm** : Interocean EMC Technology Corp.
- Company web** : <http://www.ietc.com.tw>
- Location** : No. 5-2, Lin 1, Tin-Fu, Lin-Kou Dist., New Taipei City, Taiwan 244, R.O.C.
- Site Filing** :
- Federal Communication Commissions – USA  
Designation No.: TW1020 (Test Firm Registration #: 651092)  
Designation No.: TW1113 (Test Firm Registration #: 959554)
  - Innovation, Science and Economic Development Canada (ISED)  
CAB identifier: TW1113 (Ref. No 14962756)
  - Voluntary Control Council for Interference by Information Technology Equipment (VCCI) – Japan  
Member No.: 1349  
Registration No. (Conducted Room): C-11094  
Registration No. (Conducted Room): T-11562  
Registration No. (OATS 1): R-11040  
Registration No. (Chamber 3): G-20080
- Site Accreditation** :
- Bureau of Standards and Metrology and Inspection (BSMI) – Taiwan, R.O.C.  
Accreditation No.:  
SL2-IN-E-0026 for CNS 13438 / CISPR 22  
SL2-R1-E-0026 for CNS 13439 / CISPR 13  
SL2-R2-E-0026 for CNS 13439 / CISPR 13  
SL2-L1-E-0026 for CNS 14115 / CISPR 15
  - Taiwan Accreditation Foundation (TAF)  
Accreditation No.: 1113
  - American Association for Laboratory Accreditation (A2LA)  
Certificate Number: 4891.01
  - Vehicle Safety Certification Center (VSCC)  
Approval No.: TW16-11

**1.6 Measurement Uncertainty**

Item	Value
<b>Conduction 1:</b>	
Conducted Emission - AMN (9 kHz to 30 MHz)	2.98 dB
Conducted Emission - AAN (ISN-T4) (150 kHz to 30 MHz)	3.70 dB
Conducted Emission - AAN (ISN-T8) (150 kHz to 30 MHz)	3.70 dB
Conducted Emission - CP (9 kHz to 30 MHz)	3.06 dB
Conducted Emission - VP (9 kHz to 30 MHz)	2.42 dB
Radiated Emission - LAS (2 m Loop) (9 kHz to 30 MHz)	3.26 dB
<b>Conduction 2:</b>	
Disturbance Power (30 MHz to 300 MHz)	4.04 dB
<b>OATS 1:</b>	
Radiated Emission Test (30 MHz to 1 GHz)	4.84 dB
Radiated Emission Test (1 GHz to 6 GHz)	4.84 dB
<b>OATS 3:</b>	
Radiated Emission Test (30 MHz to 1 GHz)	4.70 dB
<b>OATS 5:</b>	
Radiated Emission Test (30 MHz to 1 GHz)	4.70 dB
<b>Chamber 3:</b>	
Radiated Emission Test (9 kHz to 30 MHz)	3.12 dB
Radiated Emission Test (30 MHz to 1 GHz)	4.86 dB
Radiated Emission Test (1 GHz to 6 GHz)	4.78 dB
Induced Current Density (20 kHz to 10 MHz)	1.82 dB
<b>Conducted Immunity Room:</b>	
Conducted Immunity Test / CDN-M2	1.30 dB
Conducted Immunity Test / CDN-M3	1.30 dB
Conducted Immunity Test / EM Clamp	3.16 dB
The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%	

**1.7 Summary of Test Results****1.7.1 Test program according EN 60601-1-2 (Emissions Test)**

<b>Emission test equipment intended</b>	
<input type="checkbox"/>	CISPR 11, Group 1, Class A
<input checked="" type="checkbox"/>	CISPR 11, Group 1, Class B
<input type="checkbox"/>	CISPR 14-1
<input type="checkbox"/>	CISPR 32, Class A
<input type="checkbox"/>	CISPR 32, Class B

<b>Report Clause</b>	<b>Phenomenon</b>	<b>Application</b>	<b>Reference Clause(s)</b>	<b>Reference Standard</b>	<b>Result</b>
2	Conducted Emissions	Mains Power Port	7.3	CISPR 11	PASS
3	Radiated Emissions (Below 1 GHz)	Enclosure Port	7.3	CISPR 11	PASS
	Harmonic Current Emissions	AC Power Port	7.3	IEC 61000-3-2	PASS <sup>a</sup>
4	Voltage Fluctuations and Flicker Measurement	AC Power Port	7.3	IEC 61000-3-3	PASS

Note: "a" This rated power of EUT is  $\leq 75$  W, therefore according to EN 61000-3-2 "clause 7 Harmonic current limits" & "Figure 1 – Flowchart for determining conformity" regulation, the product no longer need be tested.



## 1.7.2 Test program according EN 60601-1-2 (Immunity Test)

Immunity test equipment intended	
<input checked="" type="checkbox"/>	Professional healthcare facility environment
<input type="checkbox"/>	HOME HEALTHCARE ENVIRONMENT

Report Clause	Phenomenon	Application	Reference Clause(s)	Reference Standard	Result
6	Electrostatic Discharge	Enclosure Port	8	IEC 61000-4-2	PASS
7	Radiated RF EM Fields	Enclosure Port	8	IEC 61000-4-3	PASS
8	RF Wireless Communications Equipment	Enclosure Port	8		PASS
9	Electrical Fast Transients / Bursts	AC Power Port	8	IEC 61000-4-4	PASS
10	Surges	AC Power Port	8	IEC 61000-4-5	PASS
11	Conducted Disturbances Induced by RF Fields	AC Power Port	8	IEC 61000-4-6	PASS
12	RATED Power Frequency Magnetic Fields	Enclosure Port	8	IEC 61000-4-8	PASS
13	Voltage Dips and Interruptions	AC Power Port	8	IEC 61000-4-11	PASS
	Transient Conduction Along Supply Lines	DC Power Port	8	ISO 7637-2	Not Applicable



## 1.8 Measured Mode

1.8.1 The test modes for preliminary test are as following:

- Mode 1: Full Load (Model No.: TPP 65-124BA)
- Mode 2: Full Load (Model No.: TPP 65-221BA)
- Mode 3: Full Load (Model No.: TPP 65-321M2BA)

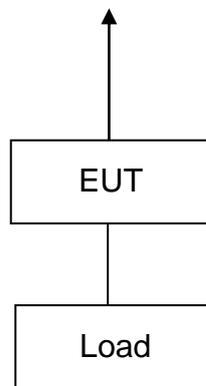
1.8.2 After preliminary test, EUT was selected the worst-case for the final testing.

The test modes are:

- For Emission: Mode 1 ~ 3
- For Immunity: Mode 1 & 2

## 1.9 Configuration of EUT Setup

Connected to Mains



## 1.10 Test Step of EUT

1.10.1 Set the EUT and peripheral as above.

1.10.2 Turn on the power of EUT.

1.10.3 Execute the test.

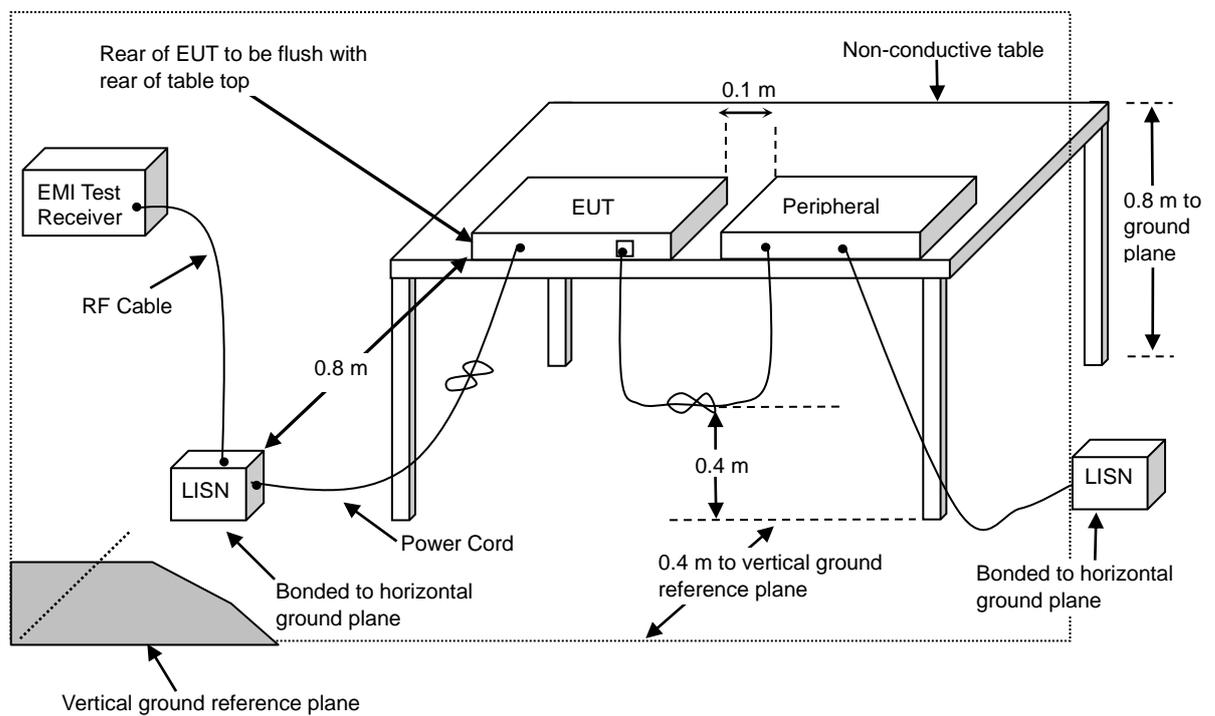
## 2 Conducted Emissions Measurement

### 2.1 Instrument

Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
EMI Test Receiver	Rohde & Schwarz	ESCS 30	100127	2015/10/20
RF Cable	HARBOUR	RG58/U	CBL48	2016/07/27
L.I.S.N.	Schwarzbeck	NNLK8121	8121417	2015/08/27
L.I.S.N.	Schaffner	MN2050D	1597	2016/08/06

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

### 2.2 Block Diagram of Test Configuration



### 2.3 Conducted Limit

CISPR 11

Frequency (MHz)	□ Group 1, Class A (dB $\mu$ V)		☒ Group 1, Class B (dB $\mu$ V)	
	Q.P. (Quasi-Peak)	A.V. (Average)	Q.P. (Quasi-Peak)	A.V. (Average)
0.15 to 0.50	79	66	66 to 56	56 to 46
0.50 to 5.0	73	60	56	46
5.0 to 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 9 kHz.
- 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 80 cm and vertical conducting plane located 40 cm 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 50 ohm / 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 50 ohm/50  $\mu$ H coupling impedance with 50 ohm 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 on as following pages.

Factor = Insertion Loss + Cable Loss

Level = Reading + Factor

Margin = Level - Limit



### Power Line Conducted Test Data

CLIENT: TRACO ELECTRONIC AG

EUT: AC/DC Converter

MODEL: TPP 65-124BA

RATING: 230 Vac / 50 Hz

COMMENT: Test Mode: Mode 1: Full Load (Model No.: TPP 65-124BA)

OPERATOR: Vic

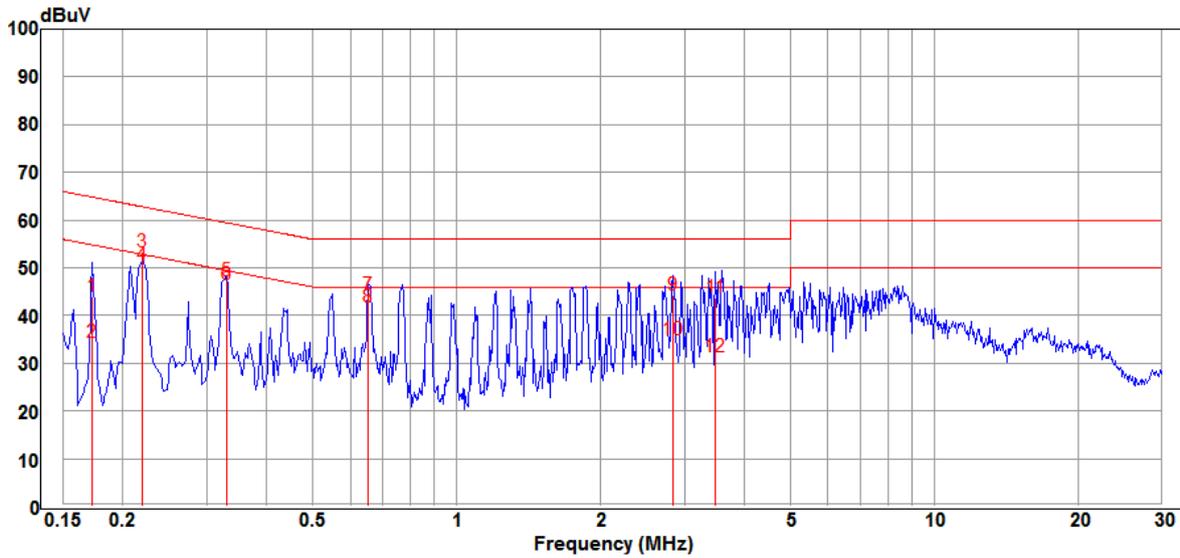
TEST SITE: Conducted 1

POLARIZATION: Line

TEMP/HUM: 28.8 °C / 58 %

Data:8

2015-08-21



Item Mark	Freq. MHz	Reading dBuV	Factor dB	Level dBuV	Limit dBuV	Margin dB	Remark
1	0.173	43.70	0.28	43.98	64.81	-20.83	QP
2	0.173	34.12	0.28	34.40	54.81	-20.41	Average
3	0.221	52.98	0.28	53.26	62.79	-9.53	QP
4	0.221	50.40	0.28	50.68	52.79	-2.11	Average
5	0.330	47.07	0.28	47.35	59.44	-12.09	QP
6	0.330	46.05	0.28	46.33	49.44	-3.11	Average
7	0.654	43.89	0.29	44.18	56.00	-11.82	QP
8	0.654	41.62	0.29	41.91	46.00	-4.09	Average
9	2.839	43.75	0.37	44.12	56.00	-11.88	QP
10	2.839	34.41	0.37	34.78	46.00	-11.22	Average
11	3.491	43.24	0.37	43.61	56.00	-12.39	QP
12	3.491	31.09	0.37	31.46	46.00	-14.54	Average



# Power Line Conducted Test Data

CLIENT: TRACO ELECTRONIC AG

EUT: AC/DC Converter

MODEL: TPP 65-124BA

RATING: 230 Vac / 50 Hz

COMMENT: Test Mode: Mode 1: Full Load (Model No.: TPP 65-124BA)

OPERATOR: Vic

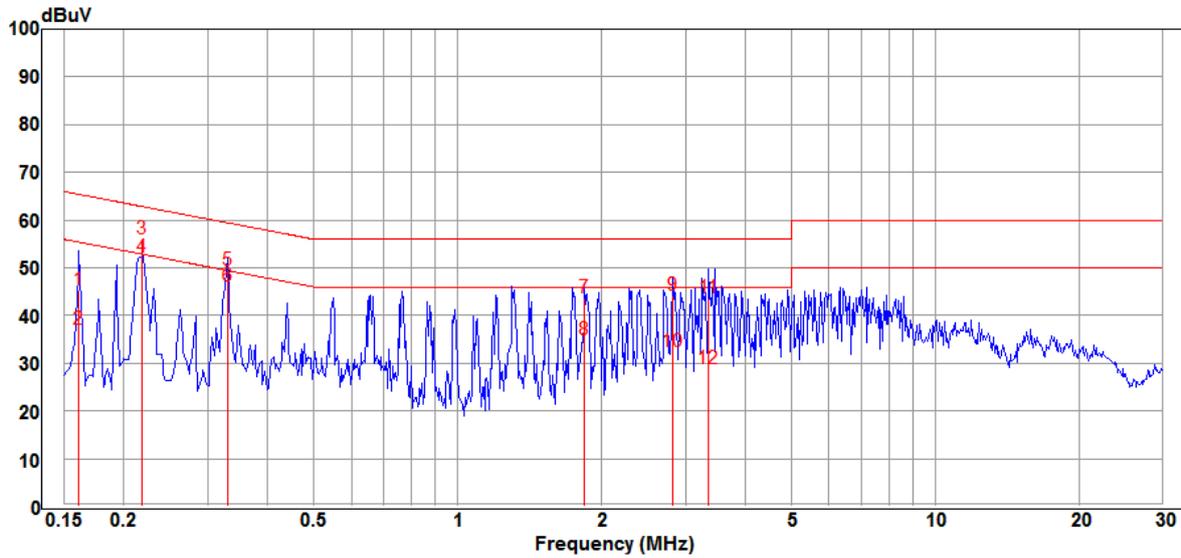
TEST SITE: Conducted 1

POLARIZATION: Neutral

TEMP/HUM: 28.8 °C / 58 %

Data:7

2015-08-21



Item Mark	Freq. MHz	Reading dBuV	Factor dB	Level dBuV	Limit dBuV	Margin dB	Remark
1	0.162	45.11	0.27	45.38	65.38	-20.00	QP
2	0.162	36.85	0.27	37.12	55.38	-18.26	Average
3	0.219	55.67	0.27	55.94	62.88	-6.94	QP
4	0.219	52.07	0.27	52.34	52.88	-0.54	Average
5	0.330	49.10	0.27	49.37	59.44	-10.07	QP
6	0.330	45.77	0.27	46.04	49.44	-3.40	Average
7	1.848	43.40	0.33	43.73	56.00	-12.27	QP
8	1.848	34.70	0.33	35.03	46.00	-10.97	Average
9	2.824	43.98	0.37	44.35	56.00	-11.65	QP
10	2.824	32.09	0.37	32.46	46.00	-13.54	Average
11	3.364	43.20	0.38	43.58	56.00	-12.42	QP
12	3.364	28.60	0.38	28.98	46.00	-17.02	Average



### Power Line Conducted Test Data

CLIENT: TRACO ELECTRONIC AG

EUT: AC/DC Converter

MODEL: TPP 65-221BA

RATING: 230 Vac / 50 Hz

COMMENT: Test Mode: Mode 2: Full Load (Model No.: TPP 65-221BA)

OPERATOR: Vic

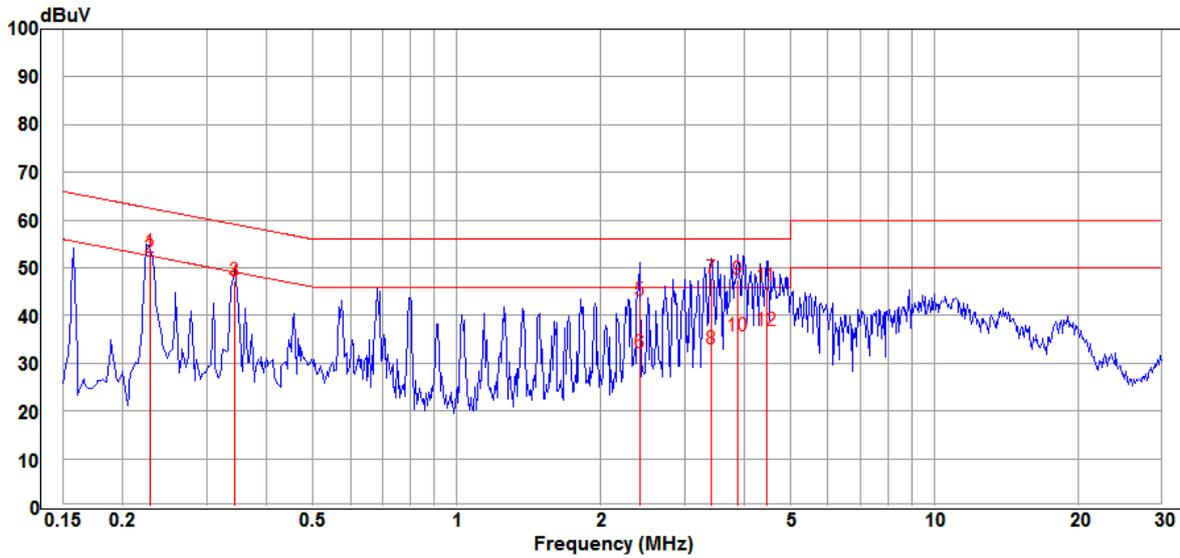
TEST SITE: Conducted 1

POLARIZATION: Line

TEMP/HUM: 28.8 °C / 58 %

Data:16

2015-08-21



Item Mark	Freq. MHz	Reading dBuV	Factor dB	Level dBuV	Limit dBuV	Margin dB	Remark
1	0.229	53.10	0.28	53.38	62.49	-9.11	QP
2	0.229	51.90	0.28	52.18	52.49	-0.31	Average
3	0.345	47.02	0.28	47.30	59.09	-11.79	QP
4	0.345	46.38	0.28	46.66	49.09	-2.43	Average
5	2.422	42.78	0.35	43.13	56.00	-12.87	QP
6	2.422	31.71	0.35	32.06	46.00	-13.94	Average
7	3.417	47.34	0.37	47.71	56.00	-8.29	QP
8	3.417	32.50	0.37	32.87	46.00	-13.13	Average
9	3.881	47.29	0.38	47.67	56.00	-8.33	QP
10	3.881	35.46	0.38	35.84	46.00	-10.16	Average
11	4.454	45.63	0.40	46.03	56.00	-9.97	QP
12	4.454	36.30	0.40	36.70	46.00	-9.30	Average



### Power Line Conducted Test Data

CLIENT: TRACO ELECTRONIC AG

EUT: AC/DC Converter

MODEL: TPP 65-221BA

RATING: 230 Vac / 50 Hz

COMMENT: Test Mode: Mode 2: Full Load (Model No.: TPP 65-221BA)

OPERATOR: Vic

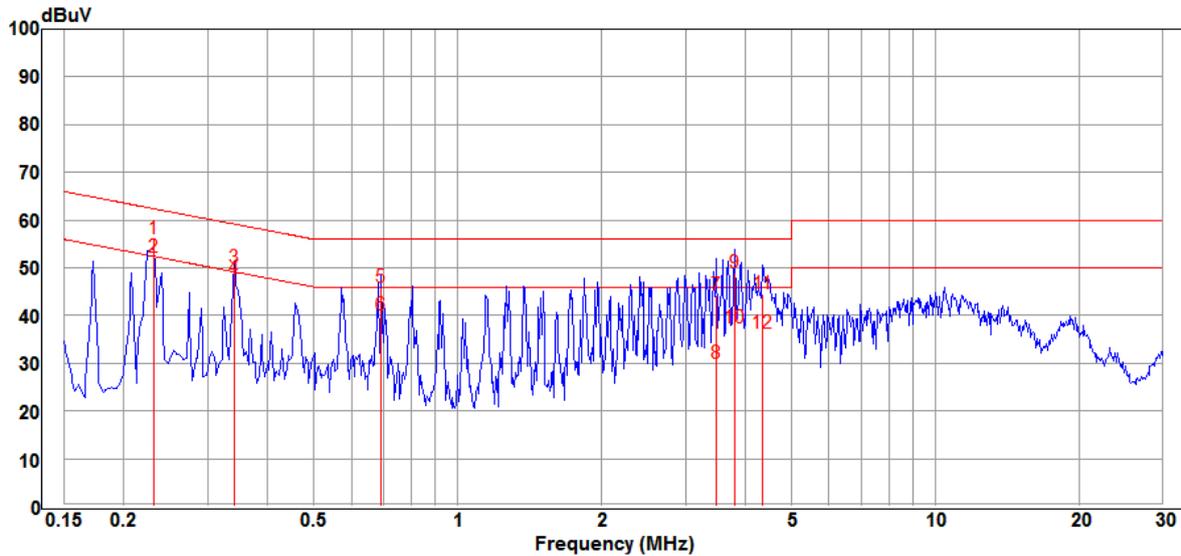
TEST SITE: Conducted 1

POLARIZATION: Neutral

TEMP/HUM: 28.8 °C / 58 %

Data:15

2015-08-21



Item Mark	Freq. MHz	Reading dBuV	Factor dB	Level dBuV	Limit dBuV	Margin dB	Remark
1	0.232	55.84	0.27	56.11	62.39	-6.28	QP
2	0.232	52.00	0.27	52.27	52.39	-0.12	Average
3	0.341	49.63	0.27	49.90	59.18	-9.28	QP
4	0.341	47.46	0.27	47.73	49.18	-1.45	Average
5	0.694	45.71	0.28	45.99	56.00	-10.01	QP
6	0.694	39.92	0.28	40.20	46.00	-5.80	Average
7	3.491	43.91	0.38	44.29	56.00	-11.71	QP
8	3.491	29.50	0.38	29.88	46.00	-16.12	Average
9	3.799	48.65	0.39	49.04	56.00	-6.96	QP
10	3.799	37.01	0.39	37.40	46.00	-8.60	Average
11	4.361	44.03	0.41	44.44	56.00	-11.56	QP
12	4.361	35.96	0.41	36.37	46.00	-9.63	Average



### Power Line Conducted Test Data

CLIENT: TRACO ELECTRONIC AG

EUT: AC/DC Converter

MODEL: TPP 65-321M2BA

RATING: 230 Vac / 50 Hz

COMMENT: Test Mode: Mode 3: Full Load (Model No.: TPP 65-321M2BA)

OPERATOR: Vic

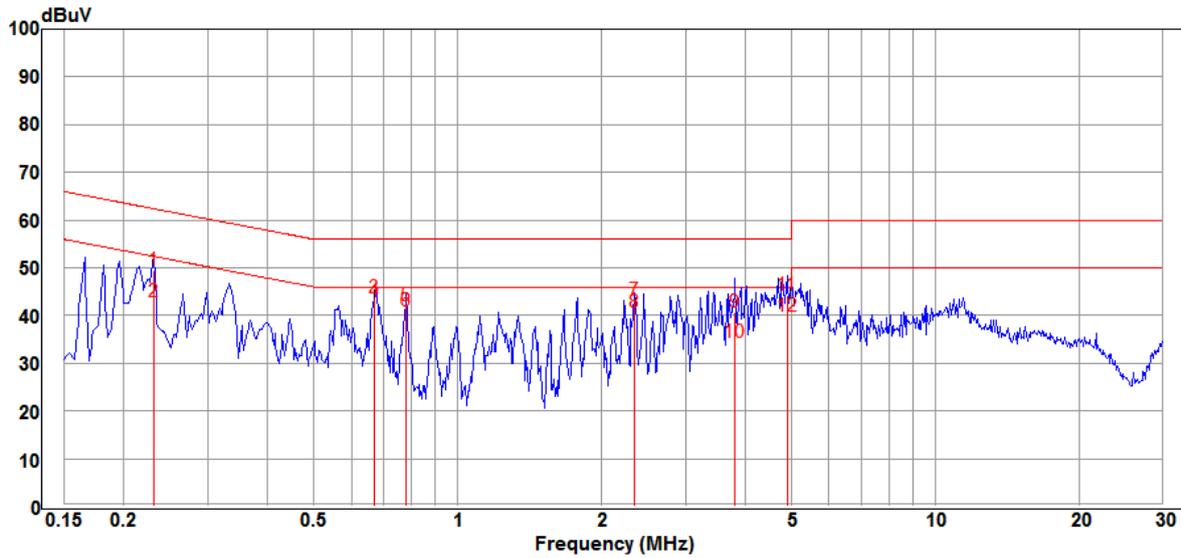
TEST SITE: Conducted 1

POLARIZATION: Line

TEMP/HUM: 28.8 °C / 58 %

Data:32

2015-08-21



Item Mark	Freq. MHz	Reading dBuV	Factor dB	Level dBuV	Limit dBuV	Margin dB	Remark
1	0.232	49.20	0.28	49.48	62.39	-12.91	QP
2	0.232	42.67	0.28	42.95	52.39	-9.44	Average
3	0.672	43.30	0.29	43.59	56.00	-12.41	QP
4	0.672	42.69	0.29	42.98	46.00	-3.02	Average
5	0.783	41.81	0.29	42.10	56.00	-13.90	QP
6	0.783	40.74	0.29	41.03	46.00	-4.97	Average
7	2.346	42.74	0.35	43.09	56.00	-12.91	QP
8	2.346	40.26	0.35	40.61	46.00	-5.39	Average
9	3.820	40.31	0.38	40.69	56.00	-15.31	QP
10	3.820	33.85	0.38	34.23	46.00	-11.77	Average
11	4.900	43.85	0.42	44.27	56.00	-11.73	QP
12	4.900	39.47	0.42	39.89	46.00	-6.11	Average



### Power Line Conducted Test Data

CLIENT: TRACO ELECTRONIC AG

EUT: AC/DC Converter

MODEL: TPP 65-321M2BA

RATING: 230 Vac / 50 Hz

COMMENT: Test Mode: Mode 3: Full Load (Model No.: TPP 65-321M2BA)

OPERATOR: Vic

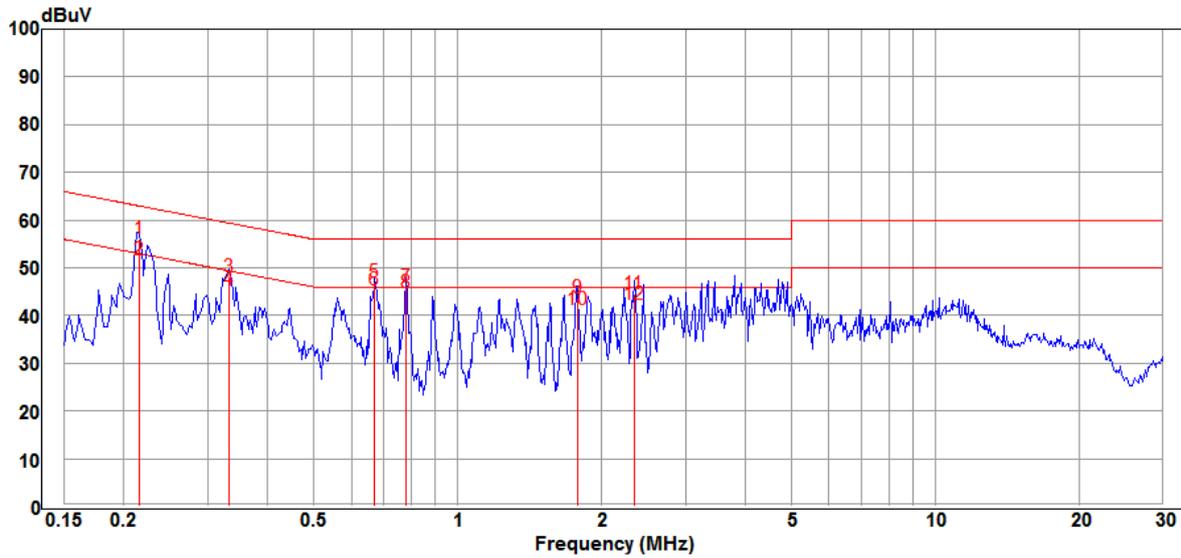
TEST SITE: Conducted 1

POLARIZATION: Neutral

TEMP/HUM: 28.8 °C / 58 %

Data:31

2015-08-21



Item Mark	Freq. MHz	Reading dBuV	Factor dB	Level dBuV	Limit dBuV	Margin dB	Remark
1	0.216	55.85	0.27	56.12	62.96	-6.84	QP
2	0.216	51.28	0.27	51.55	52.96	-1.41	Average
3	0.334	47.71	0.27	47.98	59.35	-11.37	QP
4	0.334	45.04	0.27	45.31	49.35	-4.04	Average
5	0.672	46.83	0.28	47.11	56.00	-8.89	QP
6	0.672	45.09	0.28	45.37	46.00	-0.63	Average
7	0.783	45.69	0.28	45.97	56.00	-10.03	QP
8	0.783	44.56	0.28	44.84	46.00	-1.16	Average
9	1.781	43.26	0.33	43.59	56.00	-12.41	QP
10	1.781	41.00	0.33	41.33	46.00	-4.67	Average
11	2.346	44.27	0.35	44.62	56.00	-11.38	QP
12	2.346	41.97	0.35	42.32	46.00	-3.68	Average

### 3 Radiated Emissions Measurement

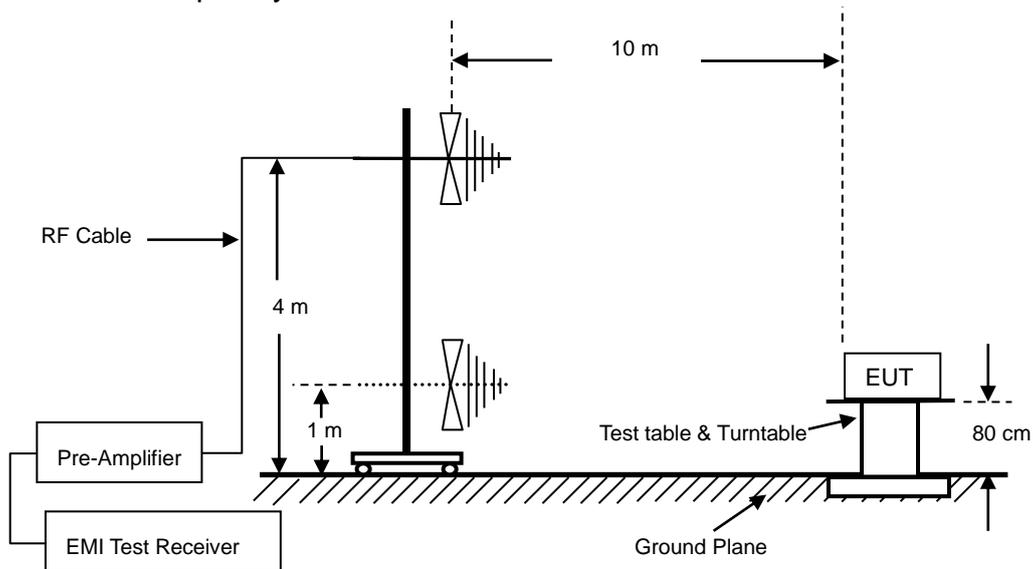
#### 3.1 Instrument

Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
EMI Test Receiver	Rohde & Schwarz	ESVS10	826148/011	2015/10/29
Biconical Antenna	Schwarzbeck	VHA 9103 & BBA 9106	VHA 9103-2418	2016/07/05
Log Antenna	Schwarzbeck	UHALP 9108-A	9108-A 0739	2016/07/19
Pre-Amplifier	Agilent	8447D	2944A09703	2016/04/28
RF Cable	EMCI	EMC8D-NM-NM-25000	140105	2016/02/15
RF Cable	Mini-Circuits	CBL-3FL-NMNM	CBL56	2015/08/29
RF Cable	Insulated Wire	CBL59	CBL59	2016/01/21

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

#### 3.2 Block Diagram of Test Configuration

Measurement Frequency under 1GHz



#### 3.3 Radiated Limit

CISPR 11

Frequency (MHz)	<input type="checkbox"/> Group 1, Class A	<input checked="" type="checkbox"/> Group 1, Class B
	Quasi-Peak dB(μV/m)	Quasi-Peak dB(μV/m)
30 to 230	40.0	30.0
230 to 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 80 cm. 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 on as following pages.

Factor = Antenna Factor + Cable Loss - Preamplifier Gain

Level = Reading + Factor

Margin = Level - Limit



### Radiated Emission Measurement Data

CLIENT: TRACO ELECTRONIC AG

EUT: AC/DC Converter

MODEL: TPP 65-124BA

RATING: 230 Vac / 50 Hz

COMMENT: Test Mode: Mode 1: Full Load (Model No.: TPP 65-124BA)

OPERATOR : Ceres

TEST SITE : OATS 1

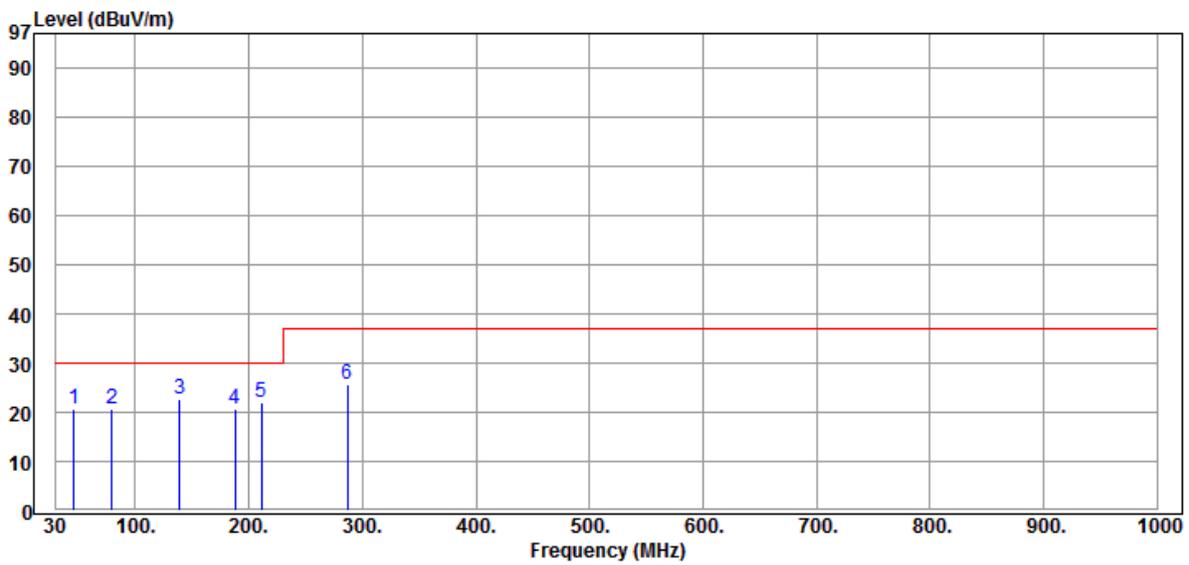
TEST DISTANCE : 10 m

POLARIZATION : HORIZONTAL

TEMP/HUM : 27.1 °C / 57 %

Data:7

2015-08-20



Item Mark	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark
1	45.870	39.50	-18.76	20.74	30.00	-9.26	QP
2	79.520	45.19	-24.49	20.70	30.00	-9.30	QP
3	138.960	38.60	-15.88	22.72	30.00	-7.28	QP
4	187.520	34.49	-13.71	20.78	30.00	-9.22	QP
5	210.970	35.20	-13.17	22.03	30.00	-7.97	QP
6	287.140	35.60	-9.86	25.74	37.00	-11.26	QP



### Radiated Emission Measurement Data

CLIENT: TRACO ELECTRONIC AG

EUT: AC/DC Converter

MODEL: TPP 65-124BA

RATING: 230 Vac / 50 Hz

COMMENT: Test Mode: Mode 1: Full Load (Model No.: TPP 65-124BA)

OPERATOR : Ceres

TEST SITE : OATS 1

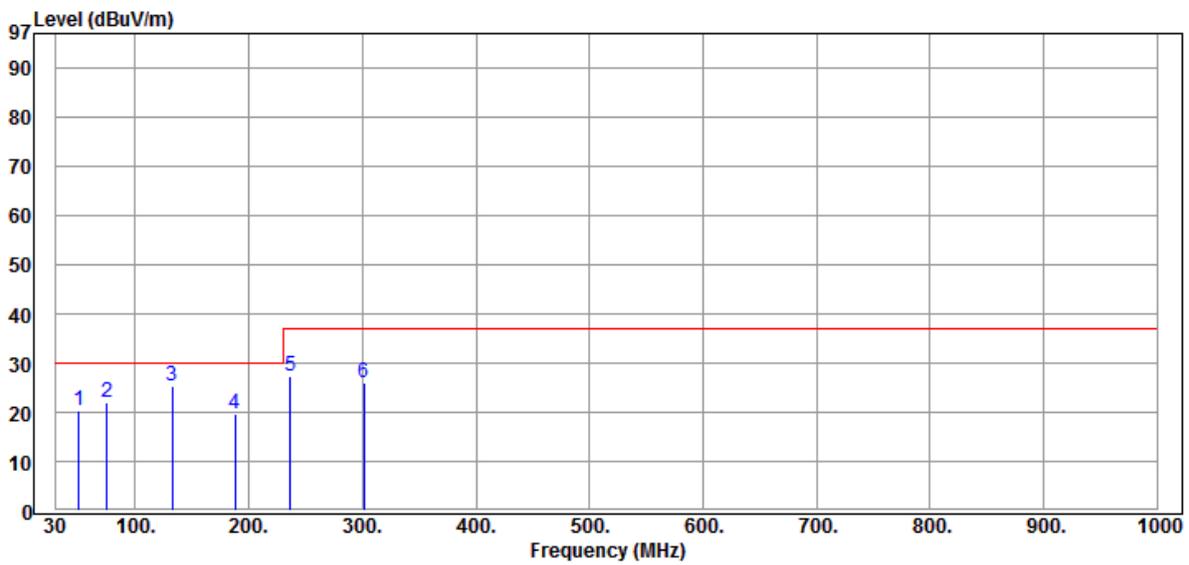
TEST DISTANCE : 10 m

POLARIZATION : VERTICAL

TEMP/HUM : 27.1 °C / 57 %

Data:8

2015-08-20



Item Mark	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark
1	50.210	40.51	-20.27	20.24	30.00	-9.76	QP
2	75.210	46.34	-24.45	21.89	30.00	-8.11	QP
3	132.870	41.51	-16.27	25.24	30.00	-4.76	QP
4	187.520	33.49	-13.71	19.78	30.00	-10.22	QP
5	236.520	39.60	-12.26	27.34	37.00	-9.66	QP
6	301.520	41.50	-15.40	26.10	37.00	-10.90	QP



### Radiated Emission Measurement Data

CLIENT: TRACO ELECTRONIC AG

EUT: AC/DC Converter

MODEL: TPP 65-221BA

RATING: 230 Vac / 50 Hz

COMMENT: Test Mode: Mode 2: Full Load (Model No.: TPP 65-221BA)

OPERATOR : Ceres

TEST SITE : OATS 1

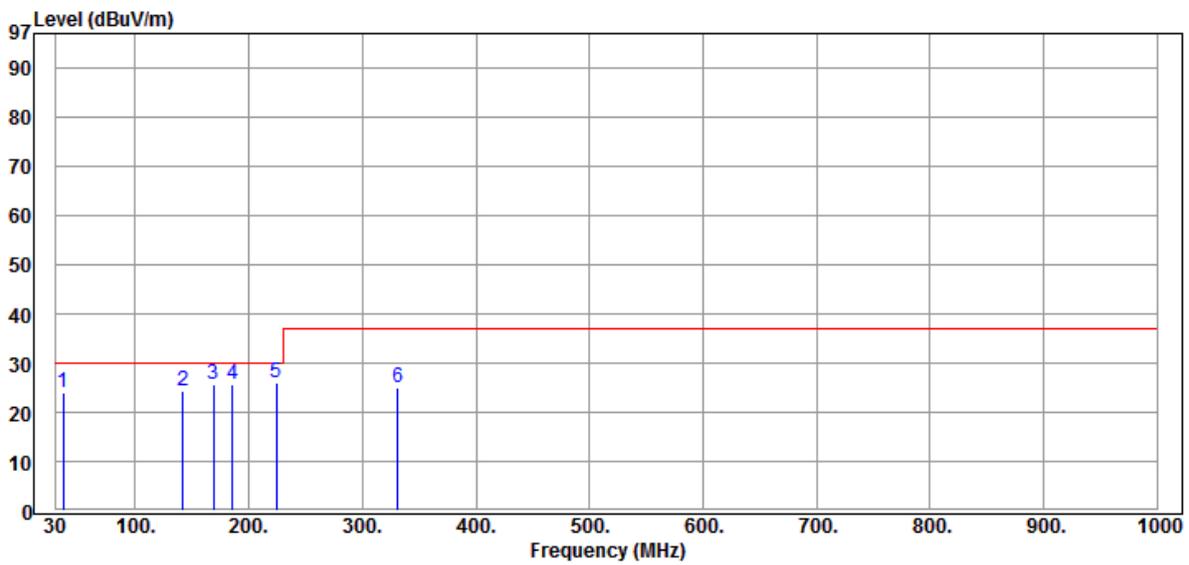
TEST DISTANCE : 10 m

POLARIZATION : HORIZONTAL

TEMP/HUM : 27.1 °C / 57 %

Data:14

2015-08-20



Item Mark	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark
1	36.560	39.51	-15.38	24.13	30.00	-5.87	QP
2	141.650	40.19	-15.73	24.46	30.00	-5.54	QP
3	168.980	40.20	-14.53	25.67	30.00	-4.33	QP
4	185.650	39.50	-13.81	25.69	30.00	-4.31	QP
5	224.560	38.60	-12.71	25.89	30.00	-4.11	QP
6	331.560	39.50	-14.35	25.15	37.00	-11.85	QP



### Radiated Emission Measurement Data

CLIENT: TRACO ELECTRONIC AG

EUT: AC/DC Converter

MODEL: TPP 65-221BA

RATING: 230 Vac / 50 Hz

COMMENT: Test Mode: Mode 2: Full Load (Model No.: TPP 65-221BA)

OPERATOR : Ceres

TEST SITE : OATS 1

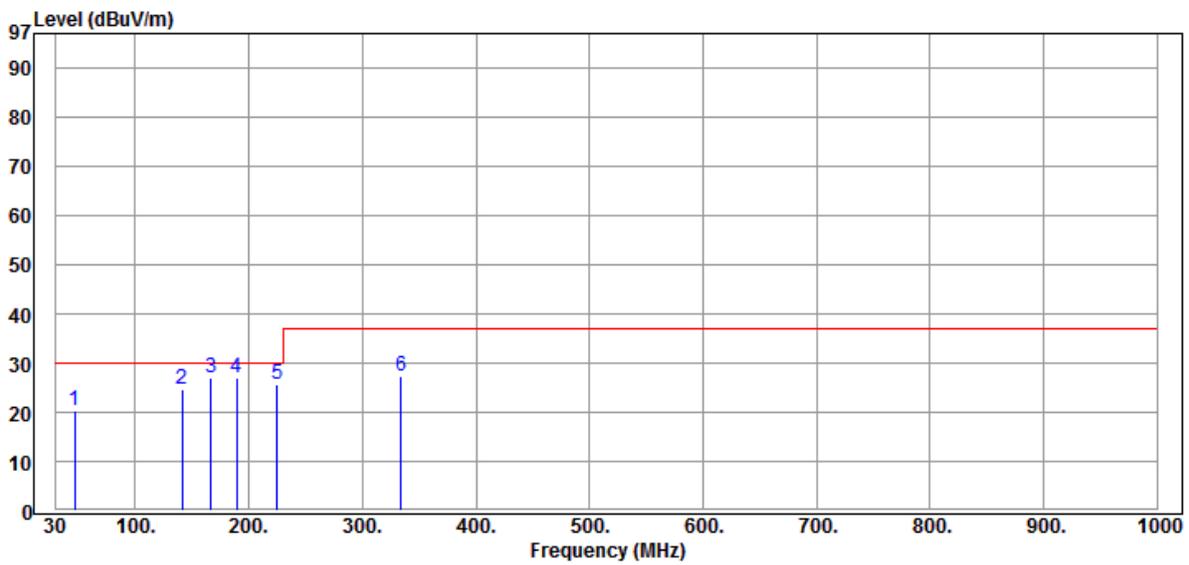
TEST DISTANCE : 10 m

POLARIZATION : VERTICAL

TEMP/HUM : 27.1 °C / 57 %

Data:13

2015-08-20



Item Mark	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark
1	46.650	39.49	-19.03	20.46	30.00	-9.54	QP
2	141.560	40.50	-15.74	24.76	30.00	-5.24	QP
3	166.590	41.50	-14.64	26.86	30.00	-3.14	QP
4	188.980	40.50	-13.65	26.85	30.00	-3.15	QP
5	224.650	38.49	-12.70	25.79	30.00	-4.21	QP
6	334.000	41.51	-14.30	27.21	37.00	-9.79	QP



### Radiated Emission Measurement Data

CLIENT: TRACO ELECTRONIC AG

EUT: AC/DC Converter

MODEL: TPP 65-321M2BA

RATING: 230 Vac / 50 Hz

COMMENT: Test Mode: Mode 3: Full Load (Model No.: TPP 65-321M2BA)

OPERATOR : Ceres

TEST SITE : OATS 1

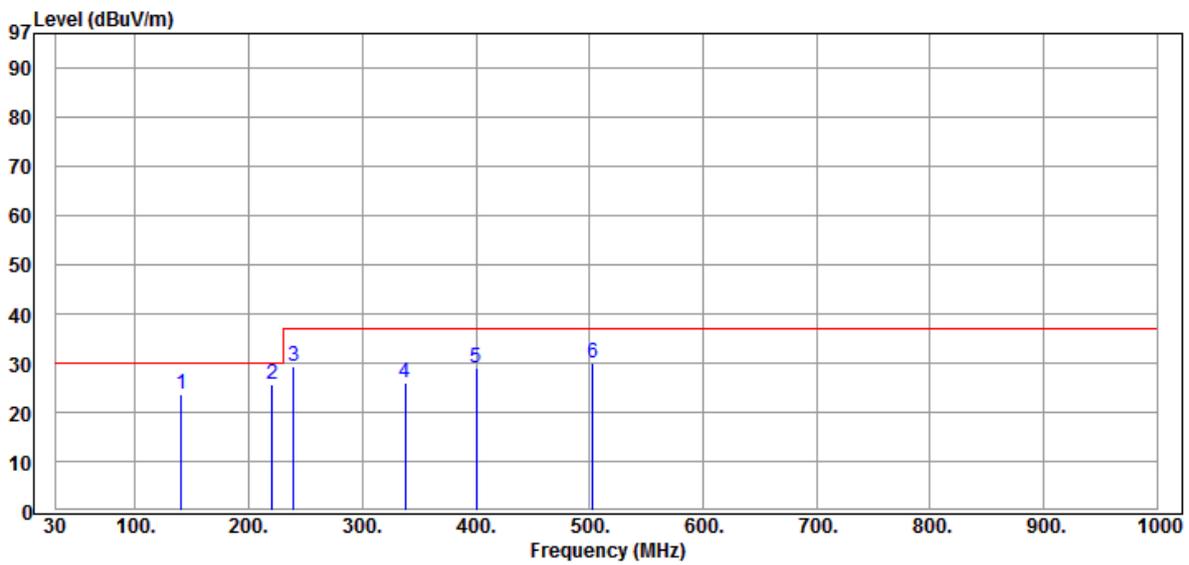
TEST DISTANCE : 10 m

POLARIZATION : HORIZONTAL

TEMP/HUM : 27.1 °C / 57 %

Data:26

2015-08-20



Item Mark	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark
1	140.560	39.51	-15.80	23.71	30.00	-6.29	QP
2	220.680	38.50	-13.00	25.50	30.00	-4.50	QP
3	239.650	41.59	-12.21	29.38	37.00	-7.62	QP
4	337.890	40.19	-14.19	26.00	37.00	-11.00	QP
5	400.560	41.20	-12.13	29.07	37.00	-7.93	QP
6	502.650	40.20	-10.30	29.90	37.00	-7.10	QP



### Radiated Emission Measurement Data

CLIENT: TRACO ELECTRONIC AG

EUT: AC/DC Converter

MODEL: TPP 65-321M2BA

RATING: 230 Vac / 50 Hz

COMMENT: Test Mode: Mode 3: Full Load (Model No.: TPP 65-321M2BA)

OPERATOR : Ceres

TEST SITE : OATS 1

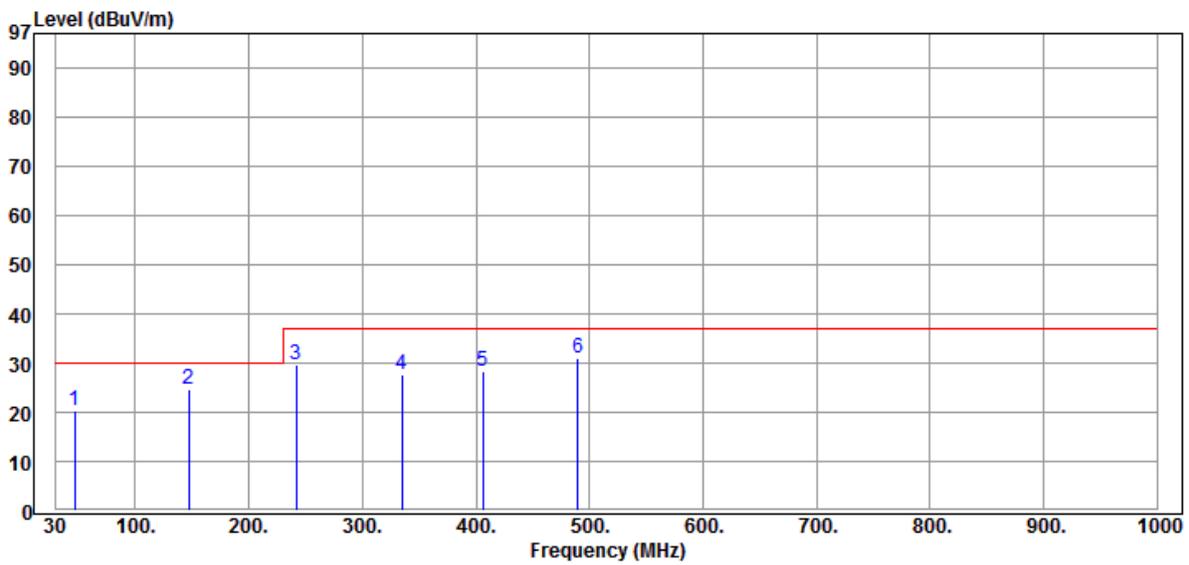
TEST DISTANCE : 10 m

POLARIZATION : VERTICAL

TEMP/HUM : 27.1 °C / 57 %

Data:25

2015-08-20



Item Mark	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark
1	46.560	39.49	-19.00	20.49	30.00	-9.51	QP
2	146.980	40.20	-15.48	24.72	30.00	-5.28	QP
3	241.560	41.89	-12.15	29.74	37.00	-7.26	QP
4	334.560	41.80	-14.28	27.52	37.00	-9.48	QP
5	406.500	40.30	-12.01	28.29	37.00	-8.71	QP
6	490.000	41.49	-10.37	31.12	37.00	-5.88	QP



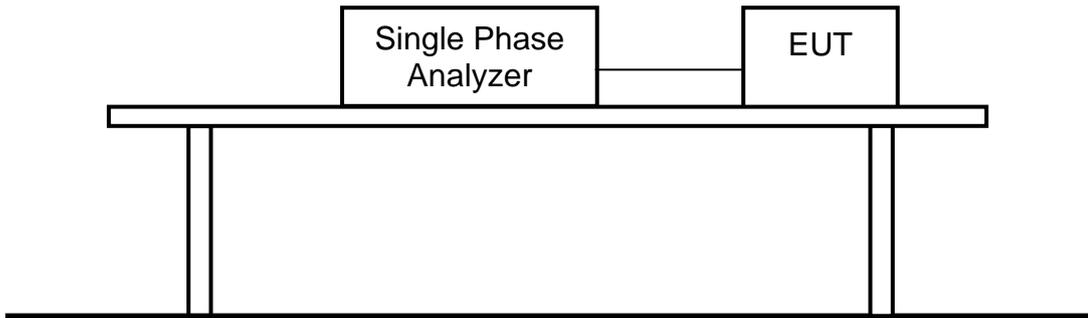
## 4 Voltage Fluctuations and Flicker Measurement (IEC 61000-3-3)

### 4.1 Instrument

Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
Single Phase Analyzer	N4L	PPA5511	162-04145	2015/12/11

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

### 4.2 Block Diagram of Test Configuration



### 4.3 Test Limit

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.

### 4.4 Configuration of Measurement

- 4.4.1 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.
- 4.4.2 Set the output of the power analyzer to the rated voltage and frequency of EUT (230V, 50Hz).
- 4.4.3 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.

### 4.5 Test Result

**PASS.**

The measured result is shown on as following pages.



**For Mode 1: Full Load (Model No.: TPP 65-124BA)**

21st August 2015 - 15:56:32		Page 1/3		IEC Soft V2.2d	
		<b>IEC61000-3-3:2013 Ed.3.0</b> <b>Flickermeter</b>			
<b>Instrument Details</b>					
Instrument Model	PPA5511				
Instrument Serial	162-04145				
Instrument Firmware	2.124				
Instrument Last Calibrated	12th December 2014				
Instrument Version	Low Current				
<b>Test Settings</b>					
Class	Voltage				
Mode	Normal - 4%				
Minimum Current	300mA				
PST	10.00 minutes				
PLT	1 PSTs				
<b>Equipment Under Test</b>					
Model	TPP 65-124BA				
Serial	N/A				
Impedance Network ID	N/A				
<b>Test Conditions</b>					
	<b>User Entered</b>		<b>Measured</b>		
Rated Voltage	N/A		230.756 V		
Rated Current	N/A		N/A		
Rated Frequency	N/A		50.000 Hz		
Rated Power	N/A		N/A		
D max	0.0197% (Limit: 4%)				
T max	0.0000 s (Limit: 0.5 s)				
DC max	0.0015% (Limit: 3.3%)				
<b>Additional Test Details</b>					
Operator	Ceres				
Lab Name	N/A				
Location	N/A				
Notes	T:24.6°C H:27%				
Signature					
<b>Results</b>		<b>Phase1: PASS</b>			

21st August 2015 - 15:56:32		Ph:1 Page 2/3		IEC Soft V2.2d				
IEC61000-3-3:2013 Ed.3.0 Flickermeter								
<b>Instrument Details</b>								
Instrument Model	PPA5511							
Instrument Serial	162-04145							
Instrument Firmware	2.124							
<b>Equipment Under Test</b>								
Model	TPP 65-124BA							
Serial	N/A							
<b>Flicker Test Results</b>								
PST no.	Status	DC (%)	Dmax (%)	Tmax (s)	PST	PST Lim	PLT	PLT Lim
1	Phase1: PASS	0.00145	0.019741	0	0.08226	1	0.08226	0.65



21st August 2015 - 15:56:32 Ph:1 Page 3/3 IEC Soft V2.2d

IEC61000-3-3:2013 Ed.3.0 Flickermeter

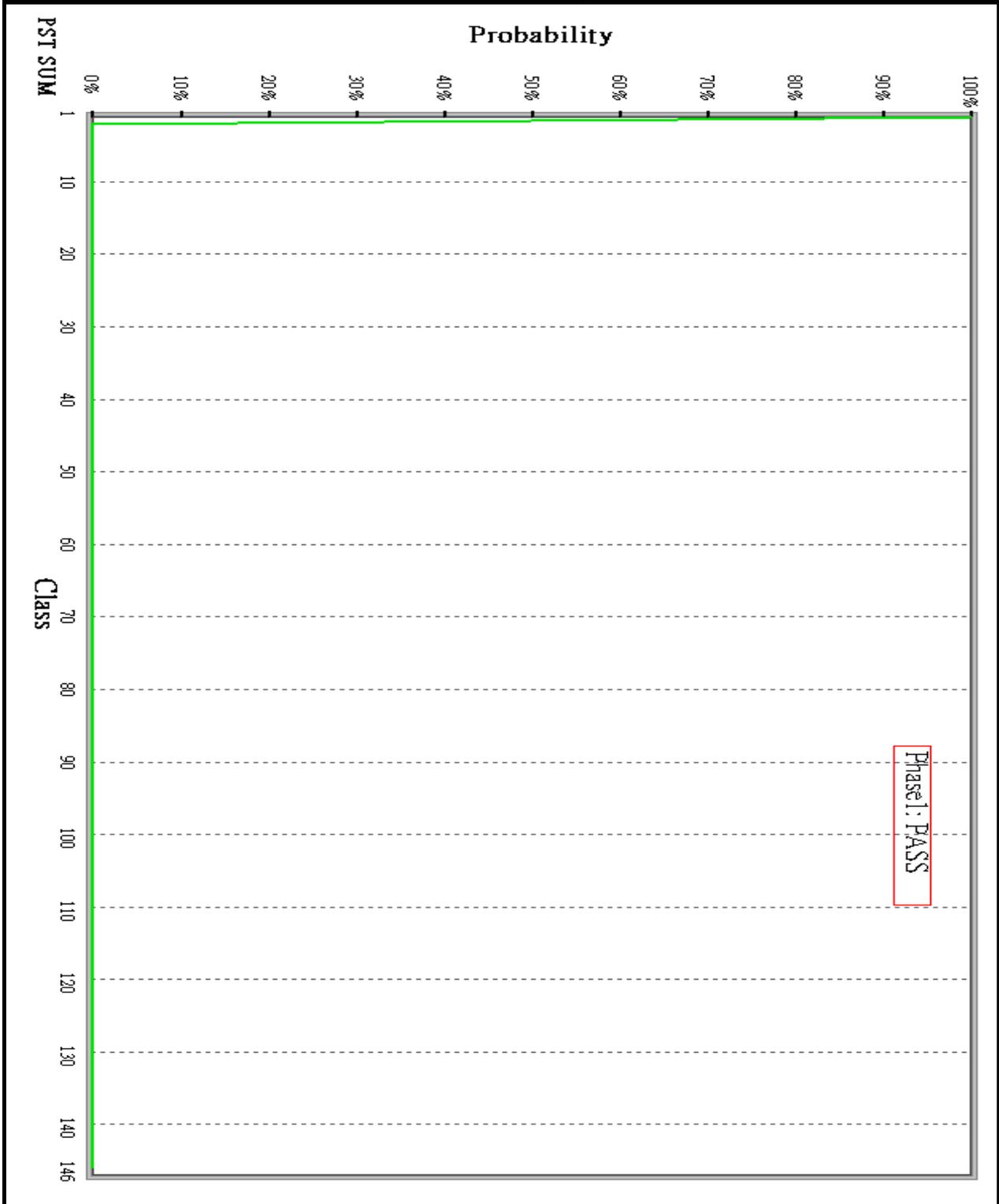
Instrument Details

Instrument Model	PPA5511
Instrument Serial	162-04145
Instrument Firmware	2.124

Equipment Under Test

Model	TPP 65-124BA
Serial	N/A

Flicker PST Sum Graph





**Mode 2: Full Load (Model No.: TPP 65-221BA)**

21st August 2015 - 17:05:15		Page 1/3		IEC Soft V2.2d	
		<b>IEC61000-3-3:2013 Ed.3.0</b>			
		<b>Flickermeter</b>			
<b>Instrument Details</b>					
Instrument Model	PPA5511				
Instrument Serial	162-04145				
Instrument Firmware	2.124				
Instrument Last Calibrated	12th December 2014				
Instrument Version	Low Current				
<b>Test Settings</b>					
Class	Voltage				
Mode	Normal - 4%				
Minimum Current	300mA				
PST	10.00 minutes				
PLT	1 PSTs				
<b>Equipment Under Test</b>					
Model	TPP 65-221BA				
Serial	N/A				
Impedance Network ID	N/A				
<b>Test Conditions</b>					
	<b>User Entered</b>		<b>Measured</b>		
Rated Voltage	N/A		229.965 V		
Rated Current	N/A		N/A		
Rated Frequency	N/A		50.000 Hz		
Rated Power	N/A		N/A		
D max	0.2534% (Limit: 4%)				
T max	0.0000 s (Limit: 0.5 s)				
DC max	0.0049% (Limit: 3.3%)				
<b>Additional Test Details</b>					
Operator	Ceres				
Lab Name	N/A				
Location	N/A				
Notes	T:24.4'C H:30%				
Signature					
<b>Results</b>		<b>Phase1: PASS</b>			

21st August 2015 - 17:05:15		Ph:1 Page 2/3		IEC Soft V2.2d				
<b>IEC61000-3-3:2013 Ed.3.0 Flickermeter</b>								
<b>Instrument Details</b>								
Instrument Model	PPA5511							
Instrument Serial	162-04145							
Instrument Firmware	2.124							
<b>Equipment Under Test</b>								
Model	TPP 65-221BA							
Serial	N/A							
<b>Flicker Test Results</b>								
PST no.	Status	DC (%)	Dmax (%)	Tmax (s)	PST	PST Lim	PLT	PLT Lim
1	Phase1: PASS	0.00488	0.253433	0	0.08226	1	0.08226	0.65



21st August 2015 - 17:05:15 Ph:1 Page 3/3 IEC Soft V2.2d

IEC61000-3-3:2013 Ed.3.0 Flickermeter

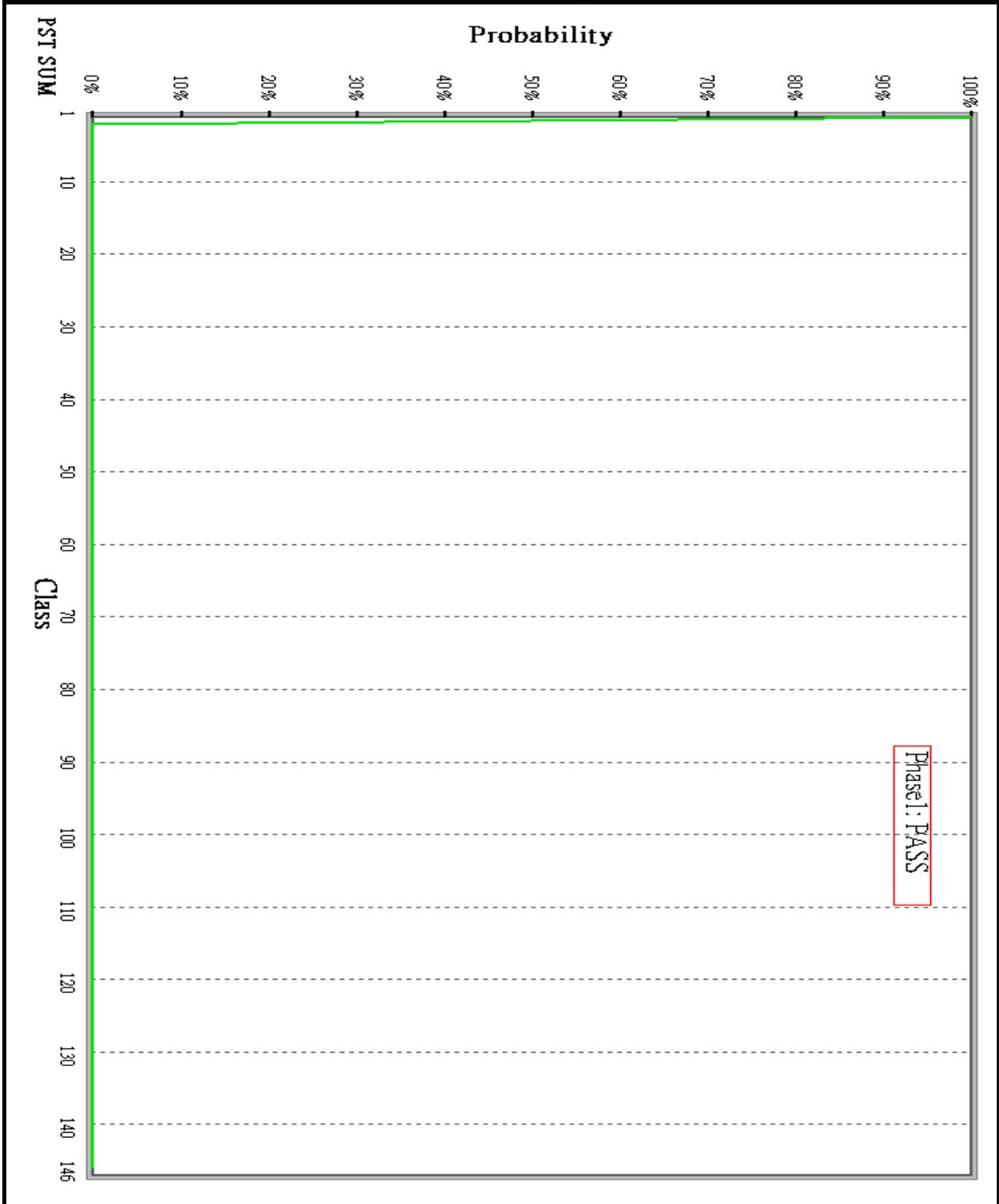
Instrument Details

Instrument Model	PPA5511
Instrument Serial	162-04145
Instrument Firmware	2.124

Equipment Under Test

Model	TPP 65-221BA
Serial	N/A

Flicker PST Sum Graph





**Mode 3: Full Load (Model No.: TPP 65-321M2BA)**

24th August 2015 - 15:31:10		Page 1/3		IEC Soft V2.2d	
		<b>IEC61000-3-3:2013 Ed.3.0</b>			
		<b>Flickermeter</b>			
<b>Instrument Details</b>					
Instrument Model	PPA5511				
Instrument Serial	162-04145				
Instrument Firmware	2.124				
Instrument Last Calibrated	12th December 2014				
Instrument Version	Low Current				
<b>Test Settings</b>					
Class	Voltage				
Mode	Normal - 4%				
Minimum Current	1A				
PST	10.00 minutes				
PLT	1 PSTs				
<b>Equipment Under Test</b>					
Model	TPP 65-321M2BA				
Serial	N/A				
Impedance Network ID	N/A				
<b>Test Conditions</b>					
	<b>User Entered</b>		<b>Measured</b>		
Rated Voltage	N/A		230.806 V		
Rated Current	N/A		N/A		
Rated Frequency	N/A		50.000 Hz		
Rated Power	N/A		N/A		
D max	0.0180% (Limit: 4%)				
T max	0.0000 s (Limit: 0.5 s)				
DC max	0.0005% (Limit: 3.3%)				
<b>Additional Test Details</b>					
Operator	Boris				
Lab Name	N/A				
Location	N/A				
Notes	T28.8'C H46%				
Signature					
<b>Results</b>		<b>Phase1: PASS</b>			

24th August 2015 - 15:31:10		Ph:1 Page 2/3		IEC Soft V2.2d				
<b>IEC61000-3-3:2013 Ed.3.0 Flickermeter</b>								
<b>Instrument Details</b>								
Instrument Model	PPA5511							
Instrument Serial	162-04145							
Instrument Firmware	2.124							
<b>Equipment Under Test</b>								
Model	TPP 65-321M2BA							
Serial	N/A							
<b>Flicker Test Results</b>								
PST no.	Status	DC (%)	Dmax (%)	Tmax (s)	PST	PST Lim	PLT	PLT Lim
1	Phase1: PASS	0.00054	0.017965	0	0.08226	1	0.08226	0.65



24th August 2015 - 15:31:10 Ph:1 Page 3/3 IEC Soft V2.2d

IEC61000-3-3:2013 Ed.3.0 Flickermeter

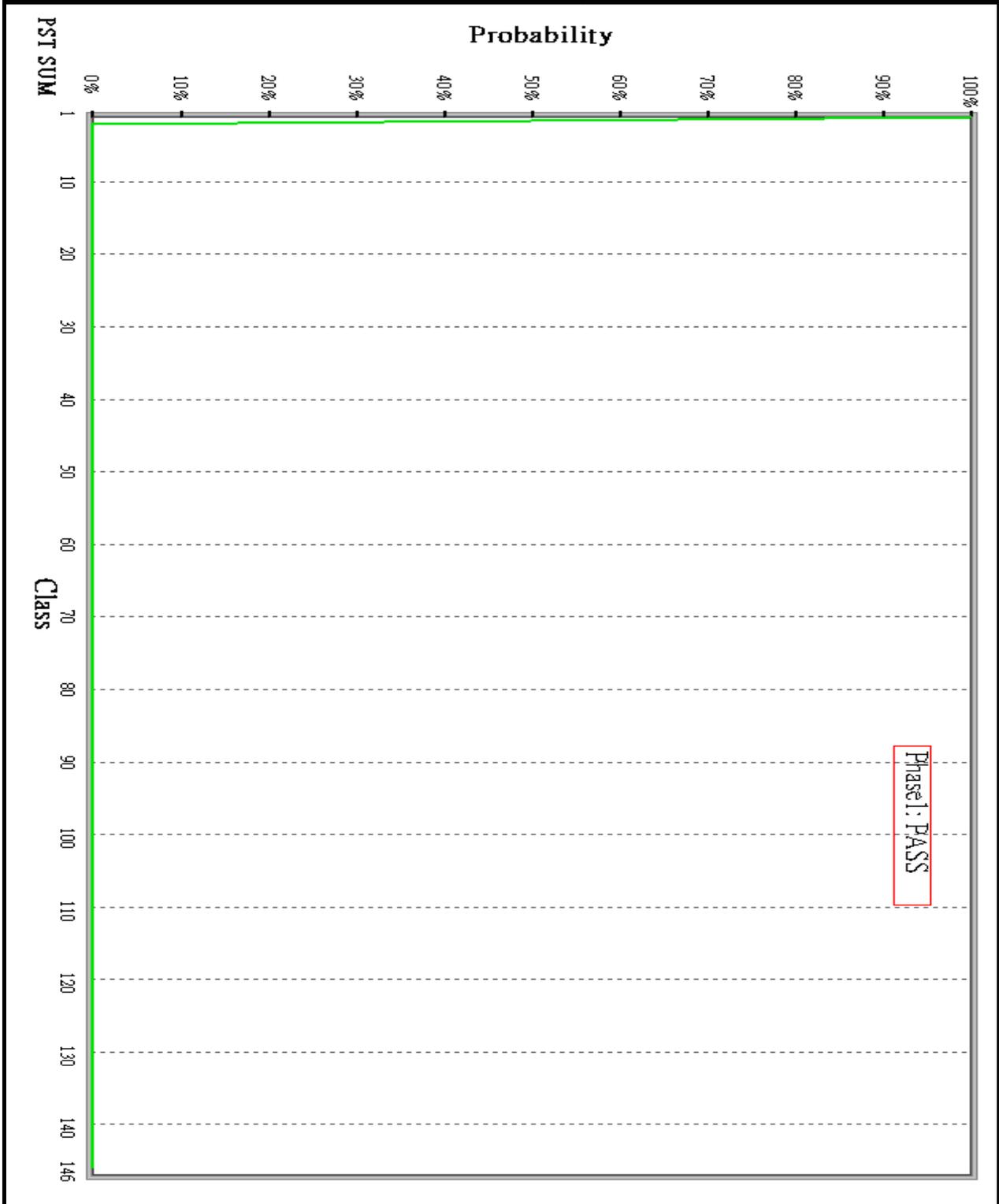
Instrument Details

Instrument Model	PPA5511
Instrument Serial	162-04145
Instrument Firmware	2.124

Equipment Under Test

Model	TPP 65-321M2BA
Serial	N/A

Flicker PST Sum Graph





## 5 Performance Criteria of Immunity Test

Before IMMUNITY testing begins, the MANUFACTURER shall determine specific, detailed IMMUNITY pass/fail criteria, based on applicable part two standards or RISK MANAGEMENT, for BASIC SAFETY and ESSENTIAL PERFORMANCE with regard to EM DISTURBANCES. The MANUFACTURER shall also determine how the ME EQUIPMENT or ME SYSTEM will be monitored during the tests to check for compliance with the specific pass/fail criteria. These pass/fail criteria and this monitoring specification should be included in the test plan and shall be included in the test report and the RISK MANAGEMENT FILE.

ME EQUIPMENT and ME SYSTEMS shall meet the IMMUNITY pass/fail criteria during and after the IMMUNITY tests. For transient phenomena for which it might not be practical to assess performance during the application of the transient, assessing performance before and after the test is acceptable.

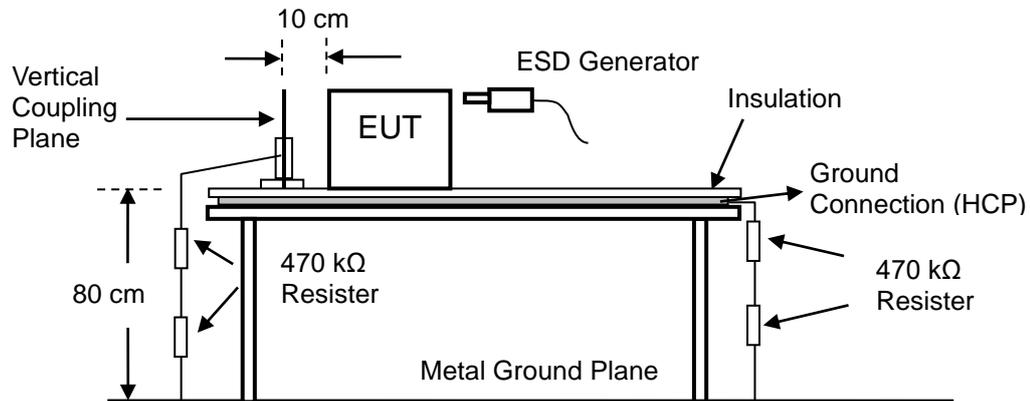
## 6 Electrostatic Discharge Immunity Test (IEC 61000-4-2)

### 6.1 Instrument

Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
ESD Simulator	EMC PARTNER	ESD3000	276	2016/04/24

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

### 6.2 Block Diagram of Test Configuration



### 6.3 Test Requirement

IEC 61000-4-2 (EN 60601-1-2) require:

Professional healthcare facility environment:

Enclosure Port

Patient Coupling Port

Signal input/output parts Port

Air discharge:  $\pm 2$  kV;  $\pm 4$  kV;  $\pm 8$  kV;  $\pm 15$  kV

Contact discharge:  $\pm 8$  kV

Performance criterion: **PASS**

HOME HEALTHCARE ENVIRONMENT:

Enclosure Port

Patient Coupling Port

Signal input/output parts Port

Air discharge:  $\pm 2$  kV;  $\pm 4$  kV;  $\pm 8$  kV;  $\pm 15$  kV

Contact discharge:  $\pm 8$  kV

Performance criterion: **PASS**

### 6.4 Configuration of Measurement

6.4.1 The test setup consists of the test generator, EUT and auxiliary instrumentation necessary to perform direct and indirect application of discharges to the EUT in the following manner:

a) Contact discharge to the conductive surfaces and to coupling planes;

b) Air discharge at insulating surfaces.

6.4.2 The EUT shall be arranged in accordance with the manufacturer's instructions for installation.



## 6.5 Test Result

**PASS.**

The performance criterion after tested EN 60601-1-2:

Temperature: 26.7 °C ; Humidity: 48 % ; Atm pres: 986 hPa ; Test Engineer: Boris

### **Mode 1: Full Load (Model No.: TPP 65-124BA)**

Air discharge  $\pm 2$  kV,  $\pm 4$  kV,  $\pm 8$  kV,  $\pm 15$  kV

Contact discharge  $\pm 2$  kV,  $\pm 4$  kV,  $\pm 6$  kV,  $\pm 8$  kV

Indirect discharge (HCP)  $\pm 2$  kV,  $\pm 4$  kV,  $\pm 6$  kV,  $\pm 8$  kV

Indirect discharge (VCP)  $\pm 2$  kV,  $\pm 4$  kV,  $\pm 6$  kV,  $\pm 8$  kV

Performance criterion: **PASS**

### **Mode 2: Full Load (Model No.: TPP 65-221BA)**

Air discharge  $\pm 2$  kV,  $\pm 4$  kV,  $\pm 8$  kV,  $\pm 15$  kV

Contact discharge  $\pm 2$  kV,  $\pm 4$  kV,  $\pm 6$  kV,  $\pm 8$  kV

Indirect discharge (HCP)  $\pm 2$  kV,  $\pm 4$  kV,  $\pm 6$  kV,  $\pm 8$  kV

Indirect discharge (VCP)  $\pm 2$  kV,  $\pm 4$  kV,  $\pm 6$  kV,  $\pm 8$  kV

Performance criterion: **PASS**

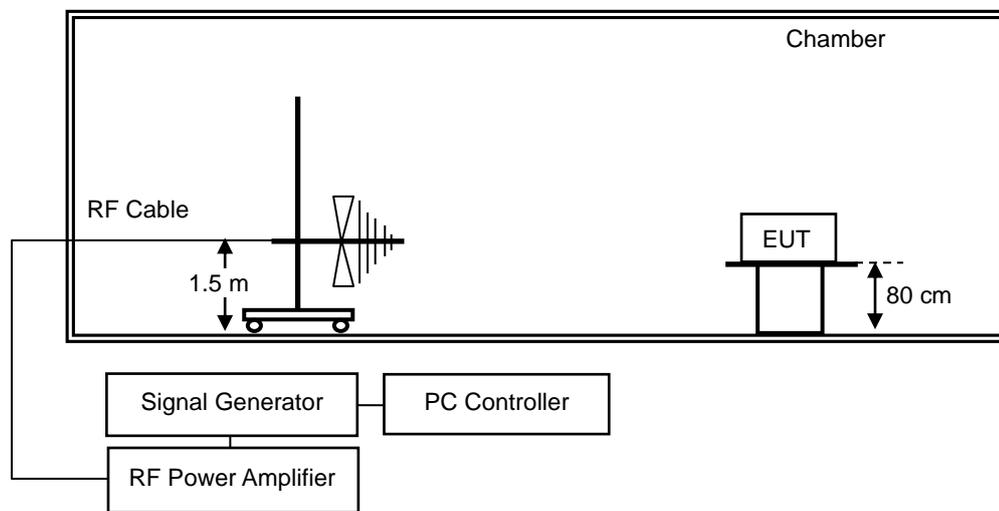
## 7 Radiated RF EM Fields Immunity Test (IEC 61000-4-3)

### 7.1 Instrument

Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
Signal Generator	R&S	SMC100A	104370	2016/03/18
Power Amplifier	R&K	A080M102-5555R	B30850	2016/04/29
Power Amplifier	R&K	A701M402-4747R	B30850	2016/04/29
Log Antenna	Schwarzbeck	VULP 9118 G Special	9118GS912	2016/04/29
Horn Antenna	Schwarzbeck	BBHA 9120 E	BBHA9120E 586	2016/04/29

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

### 7.2 Block Diagram of Test Configuration



### 7.3 Test Requirement

#### 7.3.1 IEC 61000-4-3 (EN 60601-1-2) require:

Professional healthcare facility environment:

Enclosure Port

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

Frequency range: **80** to **2700** MHz, Field strength: **3** V/m, 80% AM (1 kHz)

Performance criterion: **PASS**

HOME HEALTHCARE ENVIRONMENT:

Enclosure Port

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

Frequency range: **80** to **2700** MHz, Field strength: **10** V/m, 80 % AM (1 kHz)

Performance criterion: **PASS**

#### 7.3.2 According to special request by client:

Professional healthcare facility environment:

Enclosure Port

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

Frequency range: **80** to **2700** MHz, Field strength: **20** V/m, 80 % AM (1 kHz)

Performance criterion: **PASS**



## 7.4 Configuration of Measurement

- 7.4.1 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.
- 7.4.2 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.
- 7.4.3 Ferrite tiles/ absorbers were placed on the RGP between the EUT and the antenna to reduce the reflections from the RGP.
- 7.4.4 The distance between antenna and EUT is 1 meter.
- 7.4.5 During the test EUT performance has been monitoring by CCD camera.

## 7.5 Test Result

**PASS.**

The performance criterion after tested EN 60601-1-2:

Temperature: 25.4 °C ; Humidity: 47 % ; Atm pres: 986 hPa ; Test Engineer: Boris

### Mode 1: Full Load (Model No.: TPP 65-124BA)

- Frequency range: **80** to **1000** MHz, Field strength: **20** V/m, 80 % AM (1 kHz),  
Performance criterion: **PASS**
- Frequency range: **1000** to **2700** MHz, Field strength: **20** V/m, 80 % AM (1 kHz),  
Performance criterion: **PASS**

### Mode 2: Full Load (Model No.: TPP 65-221BA)

- Frequency range: **80** to **1000** MHz, Field strength: **20** V/m, 80 % AM (1 kHz),  
Performance criterion: **PASS**
- Frequency range: **1000** to **2700** MHz, Field strength: **20** V/m, 80 % AM (1 kHz),  
Performance criterion: **PASS**

## 8 RF Wireless Communications Equipment Immunity Test (IEC 61000-4-3)

### 8.1 Instrument

(For Test frequency 5240MHz~5785 MHz )

Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
Signal Generator	KEYSIGHT	N5171B	MY53051802	2020/03/18
Power Amplifier	R&K	A080M102-5555R	B30850	2020/04/25
Power Amplifier	R&K	A701M402-4747R	B35850	2020/04/25
Power Amplifier	R&K	GA252M602-4747R	B60243	2020/04/25
Log Antenna	Schwarzbeck	VULP 9118 G Special	9118GS912	2020/04/25
Horn Antenna	Schwarzbeck	BBHA 9120 E	BBHA9120E 586	2020/04/25

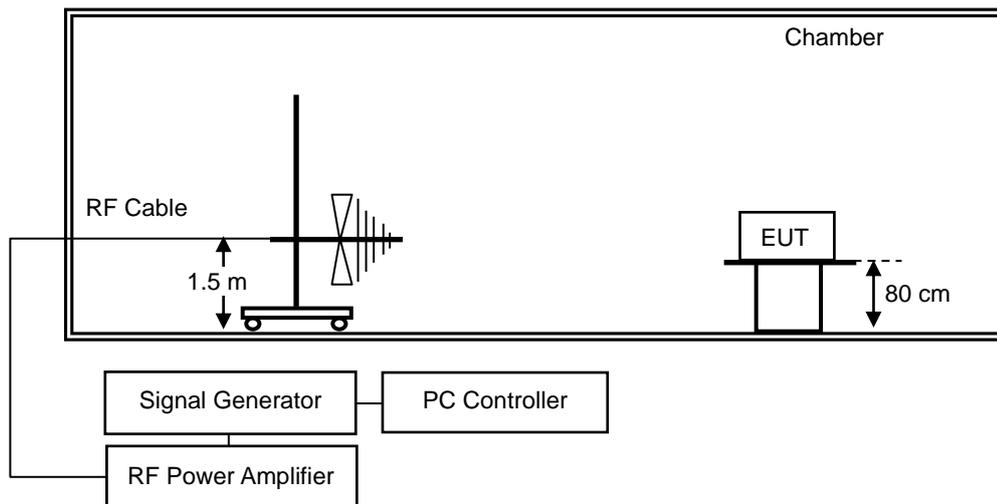
Note: The above equipments are within the valid calibration period.

(For Test frequency 385 MHz~2450 MHz )

Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
Signal Generator	R&S	SMC100A	104370	2016/03/18
Power Amplifier	R&K	A080M102-5555R	B30850	2016/04/29
Power Amplifier	R&K	A701M402-4747R	B30850	2016/04/29
Log Antenna	Schwarzbeck	VULP 9118 G Special	9118GS912	2016/04/29
Horn Antenna	Schwarzbeck	BBHA 9120 E	BBHA9120E 586	2016/04/29

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

### 8.2 Block Diagram of Test Configuration





### 8.3 Test Requirement

IEC 61000-4-3 (EN 60601-1-2) require:

Test frequency (MHz)	Band (MHz)	Service	Modulation	Immunity Test Level (V/m)
<input checked="" type="checkbox"/> 385	380 - 390	TETRA 400	Pulse modulation 18 Hz	27
<input checked="" type="checkbox"/> 450	430 - 470	GMRS 460, FRS 460	FM $\pm$ 5 kHz deviation 1 kHz sine	28
<input checked="" type="checkbox"/> 710	704 - 787	LTE Band 13, 17	Pulse modulation 217 Hz	9
<input checked="" type="checkbox"/> 745				
<input checked="" type="checkbox"/> 780				
<input checked="" type="checkbox"/> 810	800 - 960	GSM 800/900, TETRA 800, iDEN 820, CDMA 850, LTE Band 5	Pulse modulation 18 Hz	28
<input checked="" type="checkbox"/> 870				
<input checked="" type="checkbox"/> 930				
<input checked="" type="checkbox"/> 1720	1700 - 1990	GSM 1800; CDMA 1900; GSM 1900; DECT; LTE Band 1, 3, 4, 25; UMTS	Pulse modulation 217 Hz	28
<input checked="" type="checkbox"/> 1845				
<input checked="" type="checkbox"/> 1970				
<input checked="" type="checkbox"/> 2450	2400 - 2570	Bluetooth, WLAN, 802.11 b/g/n, RFID 2450, LTE Band 7	Pulse modulation 217 Hz	28
<input checked="" type="checkbox"/> 5240	5100 - 5800	WLAN 802.11 a/n	Pulse modulation 217 Hz	9
<input checked="" type="checkbox"/> 5500				
<input checked="" type="checkbox"/> 5785				
Performance criterion: <b>PASS</b>				

### 8.4 Configuration of Measurement

- 8.4.1 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.
- 8.4.2 The EUT was placed on a non-metallic table 0.8 m above the reference ground plane (RGP) and was operated according to its specified operating mode.
- 8.4.3 Ferrite tiles/ absorbers were placed on the RGP between the EUT and the antenna to reduce the reflections from the RGP.
- 8.4.4 The distance between antenna and EUT is 1 meter.
- 8.4.5 During the test EUT performance has been monitoring by CCD camera.

**8.5 Test Result****PASS.**

The performance criterion after tested EN 60601-1-2:

Temperature: 25.4 °C ; Humidity: 47 % ; Atm pres: 986 hPa ; Test Engineer: Boris

**Mode 1: Full Load (Model No.: TPP 65-124BA)**

Frequency Range (MHz)	E.U.T. Position (Angle)	Ant. Polarity (Hor. or Ver.)	Modulate	Field Strength (Modulated)		Results (Criterion)
385	0°, 90°, 180°, 270°	H · V	PM 18 Hz	27	(V/m)	<b>PASS</b>
450	0°, 90°, 180°, 270°	H · V	FM	28	(V/m)	<b>PASS</b>
710, 745, 780	0°, 90°, 180°, 270°	H · V	PM 217 Hz	9	(V/m)	<b>PASS</b>
810, 870, 930	0°, 90°, 180°, 270°	H · V	PM 18 Hz	28	(V/m)	<b>PASS</b>
1720, 1845, 1970, 2450	0°, 90°, 180°, 270°	H · V	PM 217 Hz	28	(V/m)	<b>PASS</b>

**Mode 2: Full Load (Model No.: TPP 65-221BA)**

Frequency Range (MHz)	E.U.T. Position (Angle)	Ant. Polarity (Hor. or Ver.)	Modulate	Field Strength (Modulated)		Results (Criterion)
385	0°, 90°, 180°, 270°	H · V	PM 18 Hz	27	(V/m)	<b>PASS</b>
450	0°, 90°, 180°, 270°	H · V	FM	28	(V/m)	<b>PASS</b>
710, 745, 780	0°, 90°, 180°, 270°	H · V	PM 217 Hz	9	(V/m)	<b>PASS</b>
810, 870, 930	0°, 90°, 180°, 270°	H · V	PM 18 Hz	28	(V/m)	<b>PASS</b>
1720, 1845, 1970, 2450	0°, 90°, 180°, 270°	H · V	PM 217 Hz	28	(V/m)	<b>PASS</b>

The performance criterion after tested EN 60601-1-2:

Temperature: 25.3 °C ; Humidity: 63 % ; Atm pres: 996 hPa ; Test Engineer: Scott

**Mode 1: Full Load (Model No.: TPP 65-124BA)**

Frequency Range (MHz)	E.U.T. Position (Angle)	Ant. Polarity (Hor. or Ver.)	Modulate	Field Strength (Modulated)		Results (Criterion)
5240, 5500, 5785	0°, 90°, 180°, 270°	H · V	PM 217 Hz	9	(V/m)	<b>PASS</b>

**Mode 2: Full Load (Model No.: TPP 65-221BA)**

Frequency Range (MHz)	E.U.T. Position (Angle)	Ant. Polarity (Hor. or Ver.)	Modulate	Field Strength (Modulated)		Results (Criterion)
5240, 5500, 5785	0°, 90°, 180°, 270°	H · V	PM 217 Hz	9	(V/m)	<b>PASS</b>

## 9 Electrical Fast Transients / Bursts Immunity Test (IEC 61000-4-4)

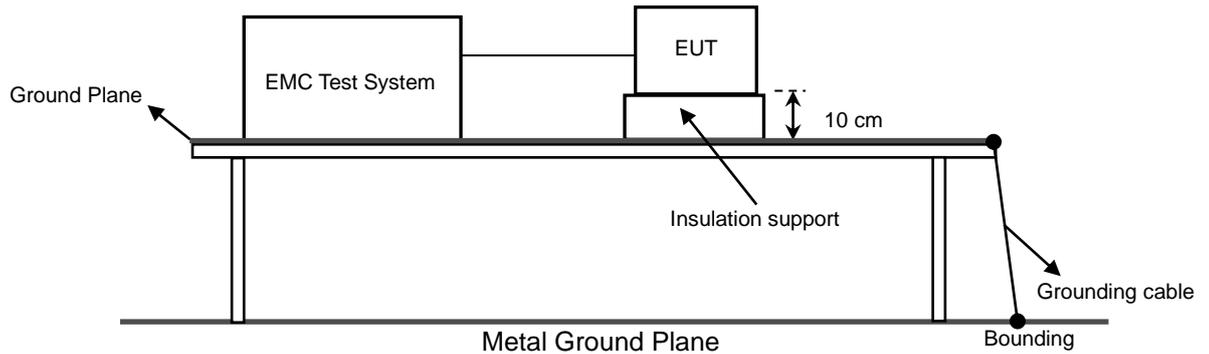
### 9.1 Instrument

Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
EMC Test System	EMC PARTNER	TRANSIENT-2000	812	2015/09/16

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

### 9.2 Block Diagram of Test Configuration

For Power Ports.



### 9.3 Test Requirement

IEC 61000-4-4 (EN 60601-1-2) require:

100 kHz Repetition frequency

$\pm 2.0$  kV input AC power port.

$\pm 2.0$  kV input DC power port.

$\pm 1.0$  kV signal input/output parts port.

Performance criterion: **PASS**

### 9.4 Configuration of Measurement

9.4.1 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 1 m $\times$ 1 m and project beyond the EUT by at least 0.1 m on all sides.

9.4.2 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 0.5 m  $\pm$  0.05 m.



## 9.5 Test Result

### PASS.

The performance criterion after tested EN 60601-1-2:

Temperature: 27.5 °C ; Humidity: 50 % ; Atm pres: 986 hPa ; Test Engineer: Boris

#### Mode 1: Full Load (Model No.: TPP 65-124BA)

- ± 2.0 kV input AC power port: Line  
Performance criterion: **PASS**
- ± 2.0 kV input AC power port: Neutral  
Performance criterion: **PASS**
- ± 2.0 kV input AC power port: PE  
Performance criterion: **PASS**
- ± 2.0 kV input AC power port: Line + Neutral  
Performance criterion: **PASS**
- ± 2.0 kV input AC power port: Line + PE  
Performance criterion: **PASS**
- ± 2.0 kV input AC power port: Neutral + PE  
Performance criterion: **PASS**
- ± 2.0 kV input AC power port: Line + Neutral + PE  
Performance criterion: **PASS**

#### Mode 2: Full Load (Model No.: TPP 65-221BA)

- ± 2.0 kV input AC power port: Line  
Performance criterion: **PASS**
- ± 2.0 kV input AC power port: Neutral  
Performance criterion: **PASS**
- ± 2.0 kV input AC power port: PE  
Performance criterion: **PASS**
- ± 2.0 kV input AC power port: Line + Neutral  
Performance criterion: **PASS**
- ± 2.0 kV input AC power port: Line + PE  
Performance criterion: **PASS**
- ± 2.0 kV input AC power port: Neutral + PE  
Performance criterion: **PASS**
- ± 2.0 kV input AC power port: Line + Neutral + PE  
Performance criterion: **PASS**

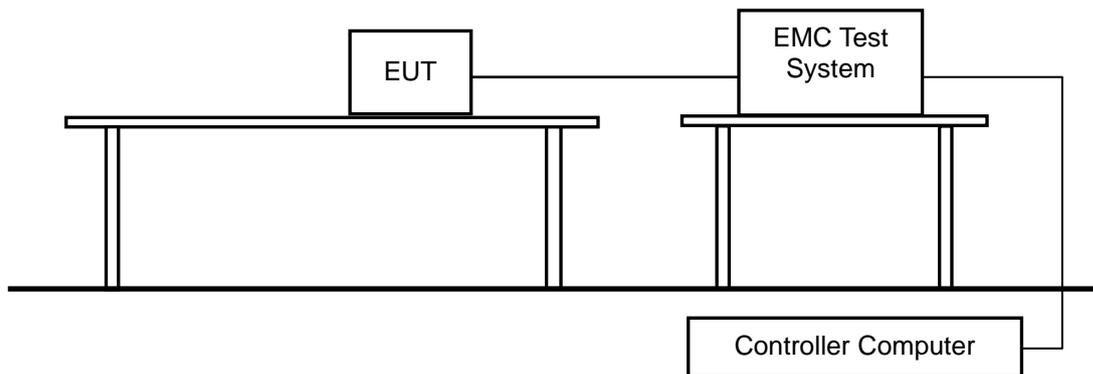
## 10 Surges Immunity Test (IEC 61000-4-5)

### 10.1 Instrument

Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
EMC Test System	EMC PARTNER	TRANSIENT-2000	812	2015/09/16

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

### 10.2 Block Diagram of Test Configuration



### 10.3 Test Requirement

IEC 61000-4-5 (EN 60601-1-2) require:

- Input AC power port:  Line to line:  $\pm 1.0\text{kV}$  (peak), 1.2/50 (8/20) Tr/Th $\mu\text{s}$   
 Line to ground:  $\pm 2.0\text{kV}$  (peak), 1.2/50 (8/20) Tr/Th $\mu\text{s}$
- Input DC power port:  Line to line:  $\pm 1.0\text{kV}$  (peak), 1.2/50 (8/20) Tr/Th $\mu\text{s}$   
 Line to ground:  $\pm 2.0\text{kV}$  (peak), 1.2/50 (8/20) Tr/Th $\mu\text{s}$
- Signal input/output parts Port: Line to ground:  $\pm 2.0\text{kV}$  (peak), 1.2/50 (8/20) Tr/Th $\mu\text{s}$

Performance criterion: **PASS**

### 10.4 Configuration of Measurement

- 10.4.1 The EUT and support units were located on a wooden table 0.8 m away from ground floor.
- 10.4.2 The EUT was connected to the power mains through a coupling device that directly couples the Surge interference signal.
- 10.4.3 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.



## 10.5 Test Result

**PASS.**

The performance criterion after tested EN 60601-1-2:

Temperature: 27.9 °C ; Humidity: 46 % ; Atm pres: 986 hPa ; Test Engineer: Boris

### Mode 1: Full Load (Model No.: TPP 65-124BA)

- ± 0.5 kV (peak) Input AC power port: Line to line  
Performance criterion: **PASS**
- ± 1.0 kV (peak) Input AC power port: Line to line  
Performance criterion: **PASS**
- ± 0.5 kV (peak) Input AC power port: Line to earth (ground)  
Performance criterion: **PASS**
- ± 1.0 kV (peak) Input AC power port: Line to earth (ground)  
Performance criterion: **PASS**
- ± 2.0 kV (peak) Input AC power port: Line to earth (ground)  
Performance criterion: **PASS**

### Mode 2: Full Load (Model No.: TPP 65-221BA)

- ± 0.5 kV (peak) Input AC power port: Line to line  
Performance criterion: **PASS**
- ± 1.0 kV (peak) Input AC power port: Line to line  
Performance criterion: **PASS**
- ± 0.5 kV (peak) Input AC power port: Line to earth (ground)  
Performance criterion: **PASS**
- ± 1.0 kV (peak) Input AC power port: Line to earth (ground)  
Performance criterion: **PASS**
- ± 2.0 kV (peak) Input AC power port: Line to earth (ground)  
Performance criterion: **PASS**

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

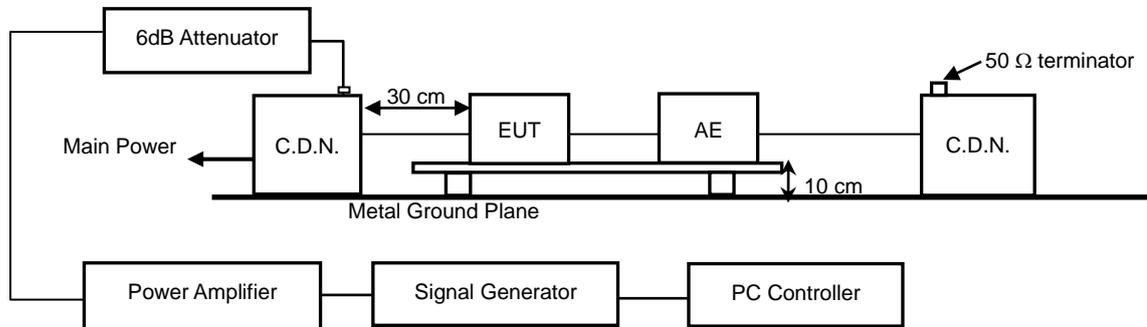
### 11.1 Instrument

Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
Signal Generator	Marconi Instruments	2024	112246/087	2016/04/15
RF Power Amplifier	R&K	A009K101-5050R	B30850	2016/02/06
Attenuator	Microwave Device Inc.	MA-5250/6N	001052	2016/02/06
C.D.N	FCC	FCC-801-M3-25A	2045	2016/02/06
C.D.N	SCHAFFNER	M216	16394	2016/02/06

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

### 11.2 Block Diagram of Test Configuration

For Power Ports.



### 11.3 Test Requirement

11.3.1 IEC 61000-4-6 (EN 60601-1-2) require:

Professional healthcare facility environment:

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

Frequency Range is from **0.15 to 80** MHz, Field strength: **3 V**, 80 % AM (1 kHz);

In ISM bands between **0.15 and 80** MHz, Field strength: **6 V**, 80 % AM (1 kHz)

Input AC power port.

Input DC power port.

Patient Coupling port.

Signal input/output parts port.

Performance criterion: **PASS**

HOME HEALTHCARE ENVIRONMENT:

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

Frequency Range is from **0.15 to 80** MHz, Field strength: **3 V**, 80 % AM (1 kHz);

In ISM and amateur radio bands between **0.15 and 80** MHz, Field strength: **6 V**, 80 % AM (1 kHz)

Input AC power port.

Input DC power port.

Patient Coupling port.

Signal input/output parts port.

Performance criterion: **PASS**



11.3.2 According to special request by client:

Professional healthcare facility environment:

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

Frequency Range is from **0.15 to 80** MHz, Field strength: **20** V, 80 % AM (1 kHz);

In ISM bands between **0.15 and 80** MHz, Field strength: **20** V, 80 % AM (1 kHz)

Input AC power port.

Performance criterion: **PASS**

#### 11.4 Configuration of Measurement

- 11.4.1 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 0.1 meter insulating support was inserted between the EUT and Ground reference plane.
- 11.4.2 The EUT was connected to the power mains through a Coupling and Decoupling Networks (CDN).
- 11.4.3 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.
- 11.4.4 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.
- 11.4.5 The EUT was fully excised during the testing and all the selected excise modes were fully interrogated for susceptibility.



## 11.5 Test Result

### PASS.

The performance criterion after tested EN 60601-1-2:

Temperature: 27.5 °C ; Humidity: 47 % ; Atm pres: 986 hPa ; Test Engineer: Boris

#### Mode 1: Full Load (Model No.: TPP 65-124BA)

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

Input AC power port.

Performance criterion: **PASS**

Frequency range: 0.15 to 80 MHz, Field strength: 20 V, 80 % AM (1 kHz),

Input AC power port.

Performance criterion: **PASS**

In ISM bands between 0.15 and 80 MHz, Field strength: 6 V, 80 % AM (1 kHz),

(The ISM (industrial, scientific and medical) bands between 150 kHz and 80 MHz are 6.765 MHz to 6.795 MHz; 13.553 MHz to 13.567 MHz; 26.957 MHz to 27.283 MHz; and 40.66 MHz to 40.70 MHz.)

Input AC power port.

Performance criterion: **PASS**

In ISM bands between 0.15 and 80 MHz, Field strength: 20 V, 80 % AM (1 kHz),

(The ISM (industrial, scientific and medical) bands between 150 kHz and 80 MHz are 6.765 MHz to 6.795 MHz; 13.553 MHz to 13.567 MHz; 26.957 MHz to 27.283 MHz; and 40.66 MHz to 40.70 MHz.)

Input AC power port.

Performance criterion: **PASS**

#### Mode 2: Full Load (Model No.: TPP 65-221BA)

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

Input AC power port.

Performance criterion: **PASS**

Frequency range: 0.15 to 80 MHz, Field strength: 20 V, 80 % AM (1 kHz),

Input AC power port.

Performance criterion: **PASS**

In ISM bands between 0.15 and 80 MHz, Field strength: 6 V, 80 % AM (1 kHz),

(The ISM (industrial, scientific and medical) bands between 150 kHz and 80 MHz are 6.765 MHz to 6.795 MHz; 13.553 MHz to 13.567 MHz; 26.957 MHz to 27.283 MHz; and 40.66 MHz to 40.70 MHz.)

Input AC power port.

Performance criterion: **PASS**

In ISM bands between 0.15 and 80 MHz, Field strength: 20 V, 80 % AM (1 kHz),

(The ISM (industrial, scientific and medical) bands between 150 kHz and 80 MHz are 6.765 MHz to 6.795 MHz; 13.553 MHz to 13.567 MHz; 26.957 MHz to 27.283 MHz; and 40.66 MHz to 40.70 MHz.)

Input AC power port.

Performance criterion: **PASS**

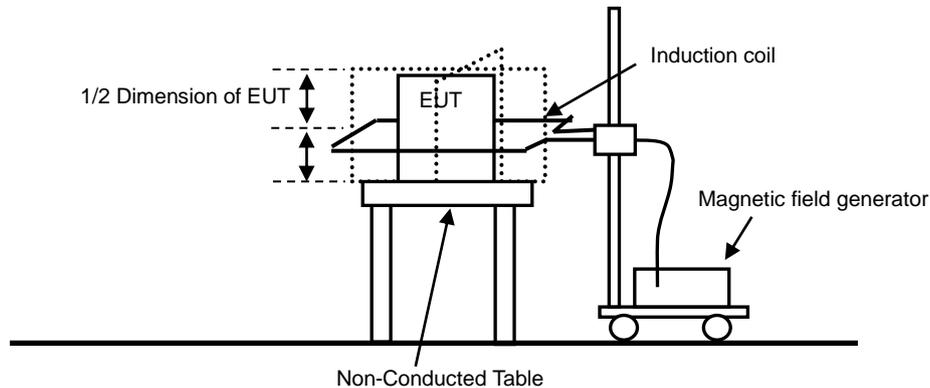
## 12 Power Frequency Magnetic Fields Immunity Test (IEC 61000-4-8)

### 12.1 Instrument

Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
Magnetic field generator	PMM	PMM1008	0000J00301	2016/06/21

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

### 12.2 Block Diagram of Test Configuration



### 12.3 Test Requirement

IEC 61000-4-8 (EN 60601-1-2) require:

Power Frequency is **50** or **60** Hz.

Magnetic field strength: **30** A/m

Performance criterion: **PASS**

### 12.4 Configuration of Measurement

12.4.1 The equipment is configured and connected to satisfy its functional requirements.

12.4.2 All cables shall be exposed to the magnetic field for 1m of their length.

12.4.3 Different induction coils may be selected for testing in the different orthogonal directions.

### 12.5 Test Result

**PASS.**

The performance criterion after tested EN 60601-1-2:

Temperature: 27.5 °C ; Humidity: 50 % ; Atm pres: 986 hPa ; Test Engineer: Boris

#### Mode 1: Full Load (Model No.: TPP 65-124BA)

Power Frequency is **50** Hz, Magnetic field strength: **30** A/m

Observation time: 1 minute

#### Direction X:

Performance criterion: **PASS**

#### Direction Y:

Performance criterion: **PASS**

#### Direction Z:

Performance criterion: **PASS**



**Mode 2: Full Load (Model No.: TPP 65-221BA)**

Power Frequency is **50** Hz, Magnetic field strength: **30** A/m

Observation time: 1 minute

**Direction X:**

Performance criterion: **PASS**

**Direction Y:**

Performance criterion: **PASS**

**Direction Z:**

Performance criterion: **PASS**

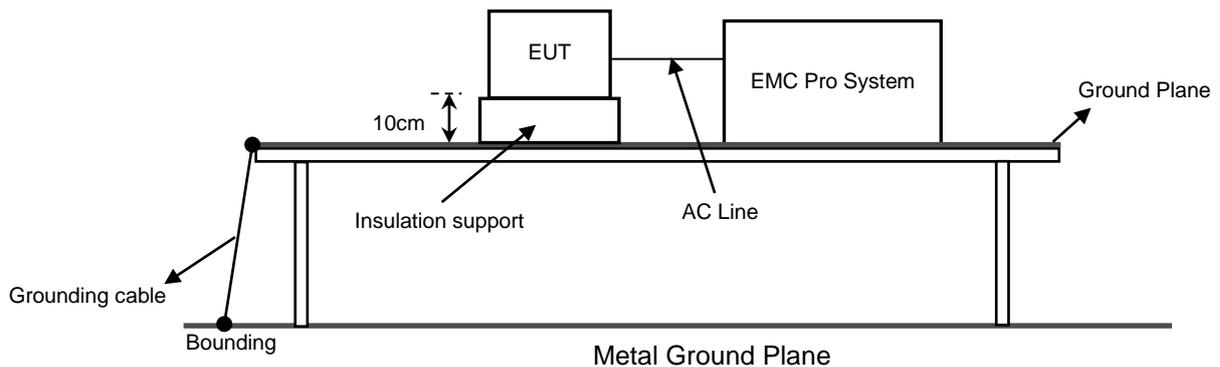
## 13 Voltage Dips and Interruptions Immunity Test (IEC 61000-4-11)

### 13.1 Instrument

Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
EMC Pro System	KeyTek	EMC Pro	0003231	2016/05/31

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

### 13.2 Block Diagram of Test Configuration



### 13.3 Test Requirement

IEC 61000-4-11 (EN 60601-1-2) require:

Voltage Dips: **0** %  $U_T$ , 0.5 cycle, At  $0^\circ$ ,  $45^\circ$ ,  $90^\circ$ ,  $135^\circ$ ,  $180^\circ$ ,  $225^\circ$ ,  $270^\circ$  and  $315^\circ$

Voltage Dips: **0** %  $U_T$ , 1 cycle, Single phase: At  $0^\circ$

Voltage Dips: **70** %  $U_T$ , 25 cycle (50 Hz) or 30 cycle (60 Hz), Single phase: At  $0^\circ$

Short Interruptions: **0** %  $U_T$ , 250 cycle (50 Hz) or 300 cycle (60 Hz)

Performance criterion: **PASS**

### 13.4 Configuration of Measurement

13.4.1 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.

13.4.2 According to EN 60601-1-2, the EUT was tested for (I) 100% voltage dip of supplied voltage with duration of 0.5 Cycle, (II) 100% voltage dip of supplied voltage and duration 1 Cycle, (III) 30% voltage dip of supplied voltage and duration 25 Cycle. All of the dip tests were carried out for a sequence of three voltage dips with intervals of 10 seconds, (VI) 100% voltage interruption of supplied voltage with duration of 250 Cycle was followed, which was a sequence of three voltage interruptions with intervals of 10 seconds.



### 13.5 Test Result

**PASS.**

The performance criterion after tested EN 60601-1-2:

Temperature: 27.5 °C ; Humidity: 50 % ; Atm pres: 986 hPa ; Test Engineer: Boris

#### Mode 1: Full Load (Model No.: TPP 65-124BA)

##### Input Voltage: 100Vac, 50Hz

The performance criterion after tested EN 60601-1-2:

- Voltage Dips: **0** %  $U_T$ , 0.5 cycle  
Performance criterion: **PASS**
- Voltage Dips: **0** %  $U_T$ , 1 cycle  
Performance criterion: **PASS**
- Voltage Dips: **70** %  $U_T$ , 25 cycle  
Performance criterion: **PASS**
- Short Interruptions: **0** %  $U_T$ , 250 cycle  
Performance criterion: **PASS** *(Note 1)*

Note 1: During voltage Interruptions the output voltage reset and auto recover after Interruptions.

##### Input Voltage: 240 Vac, 50 Hz

The performance criterion after tested EN 60601-1-2:

- Voltage Dips: **0** %  $U_T$ , 0.5 cycle  
Performance criterion: **PASS**
- Voltage Dips: **0** %  $U_T$ , 1 cycle  
Performance criterion: **PASS**
- Voltage Dips: **70** %  $U_T$ , 25 cycle  
Performance criterion: **PASS**
- Short Interruptions: **0** %  $U_T$ , 250 cycle  
Performance criterion: **PASS** *(Note 2)*

Note 2: During voltage Interruptions the output voltage reset and auto recover after Interruptions.



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**Mode 2: Full Load (Model No.: TPP 65-221BA)**

**Input Voltage: 100Vac, 50Hz**

The performance criterion after tested EN 60601-1-2:

- Voltage Dips: **0** %  $U_T$ , 0.5 cycle  
Performance criterion: **PASS**
- Voltage Dips: **0** %  $U_T$ , 1 cycle  
Performance criterion: **PASS**
- Voltage Dips: **70** %  $U_T$ , 25 cycle  
Performance criterion: **PASS**
- Short Interruptions: **0** %  $U_T$ , 250 cycle  
Performance criterion: **PASS** *(Note 1)*

Note 1: During voltage Interruptions the output voltage reset and auto recover after Interruptions.

**Input Voltage: 240 Vac, 50 Hz**

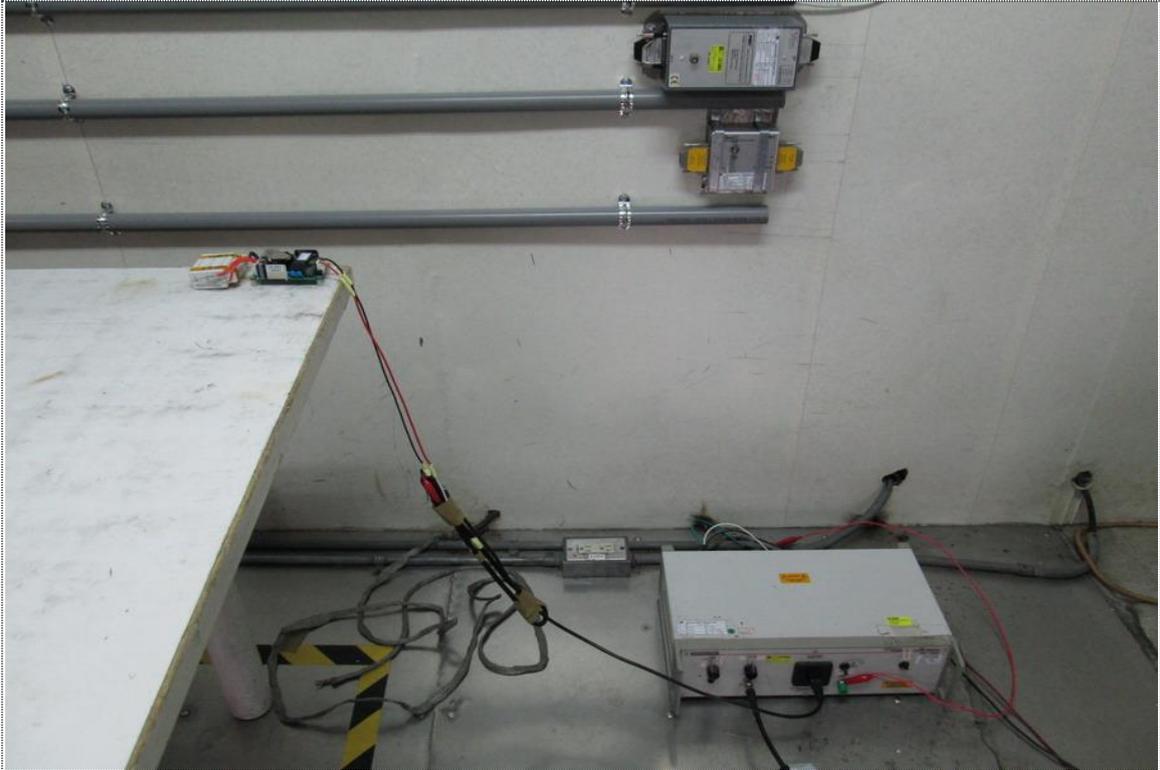
The performance criterion after tested EN 60601-1-2:

- Voltage Dips: **0** %  $U_T$ , 0.5 cycle  
Performance criterion: **PASS**
- Voltage Dips: **0** %  $U_T$ , 1 cycle  
Performance criterion: **PASS**
- Voltage Dips: **70** %  $U_T$ , 25 cycle  
Performance criterion: **PASS**
- Short Interruptions: **0** %  $U_T$ , 250 cycle  
Performance criterion: **PASS** *(Note 2)*

Note 2: During voltage Interruptions the output voltage reset and auto recover after Interruptions.

## 14 Photographs of Test

### 14.1 Conducted Emission Measurement



Front View



Rear View



## 14.2 Radiated Emission Measurement



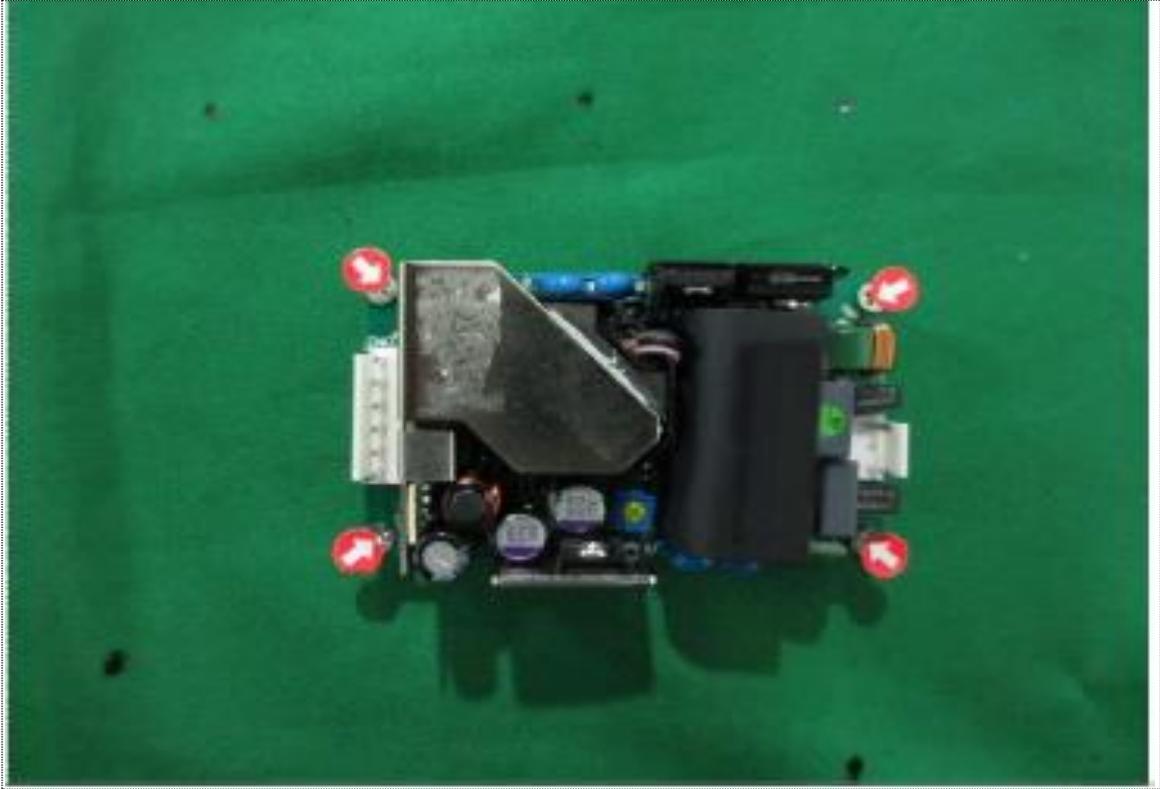
Front View



Rear View

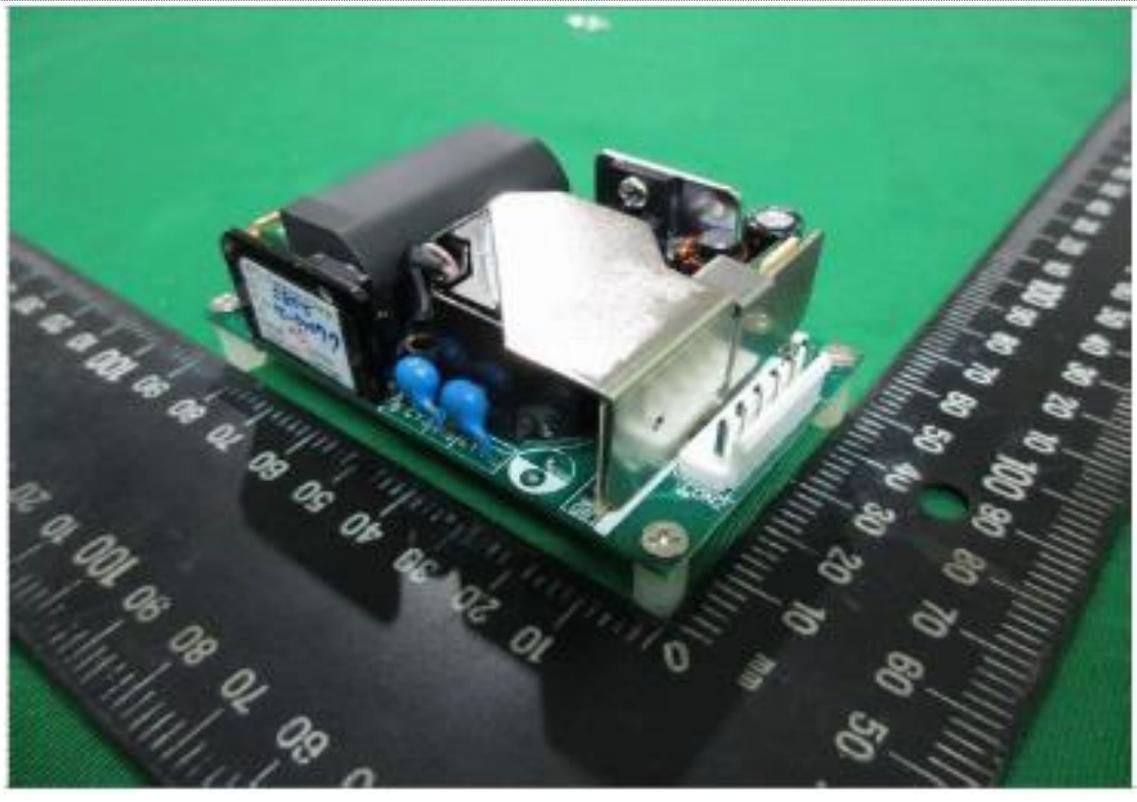


### 14.3 Electrostatic Discharge Test Point

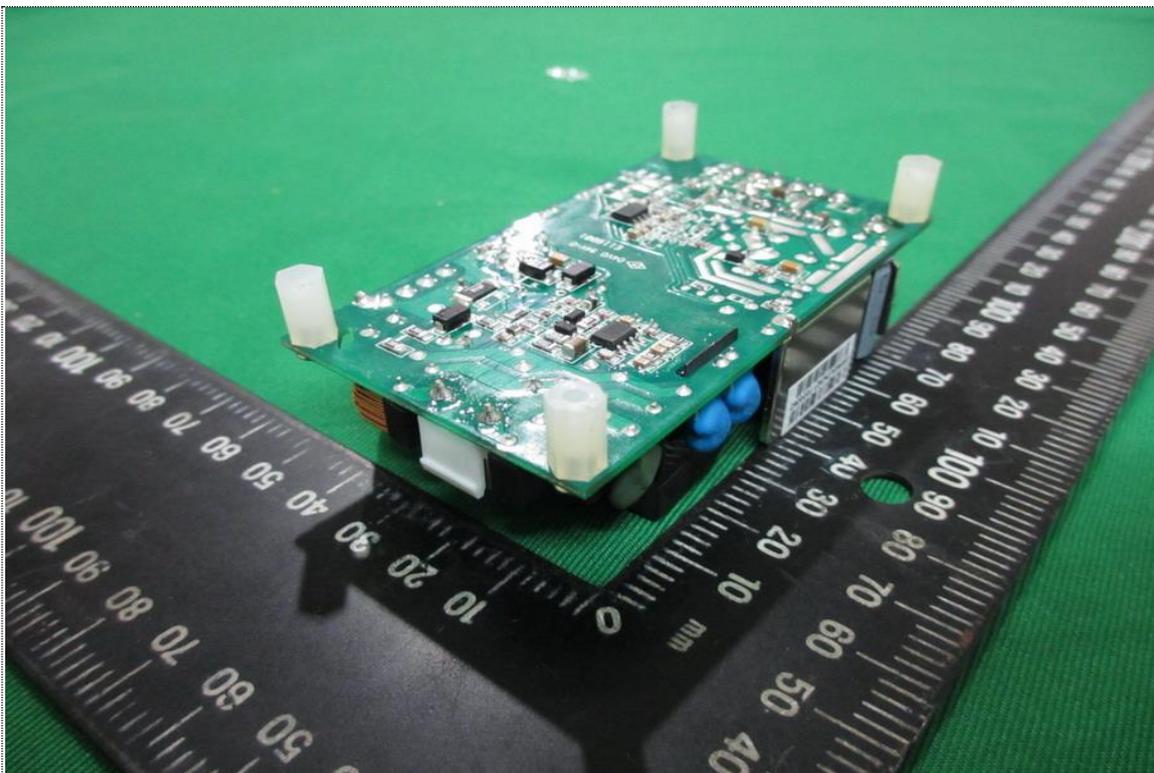


View of Discharge Point (Red: Contact Discharge)

## 15 Photographs of EUT



Front View of EUT



Rear View of EUT