



TEST REPORT

**FOR
Internal Power, AC to DC**

MODEL : TPP 450-136BA-MB4, TPP 450-124BA-MB4

SERIES MODEL : Rrefer to item 5.1 for more details

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Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	Sep. 2, 2019	Initial Issue	Cindy Hsin

Summary of Test Results				
EMISSION (IEC 60601-1-2:2014, EN 60601-1-2:2015 standards)				
Standard	Test Item	Limit	Result	Remark
CISPR 11 Ed 5.1 EN55011: 2009+A1 : 2010	Conducted disturbance at mains terminals ports	Class B (Note 5)	PASS	N/A
	Patient-coupled cable conducted emission	24dBuA	N/A	Note 1
	Radiated disturbance below 1GHz	Class A (Note 5)	PASS	N/A
	Radiated disturbance above 1 GHz	Class A	N/A	Note 2
IEC 61000-3-2:2014	Harmonic current disturbance	Class A & D (Note 5)	PASS	Note 3
IEC 61000-3-3:2013	Voltage Fluctuations & Flicker	Refer to chapter 6.4.1	PASS	Note 4

Note: (1) There is no patient-coupled cable, so the test is unnecessary.

Note: (2) For Group 1, in the frequency range 1 to 18GHz limits are not specified.

Note: (3) Systems with RATED input voltage less than 220 V a.c. are exempt from this requirement because, according to the scope of IEC 61000-3-2, "the limits have not yet been considered."

Note: (4) Systems with RATED input voltage less than 220 V a.c. are exempt from this requirement, as justified by the following note from the scope of IEC 61000-3-3

Note: (5) The test performed of laboratory was according to the client requirements

Summary of Test Results					
IMMUNITY (IEC 60601-1-2:2014, EN 60601-1-2:2015 standards)					
Professional healthcare facility environment					
Basic Standard	Test Item	Test Level	Criteria	Result	
IEC 61000-4-2:2008	Electrostatic discharge immunity	Contact ±8 kV Air ±15 kV	Clause 7.1	PASS	
IEC 61000-4-3:2006	Radiated, radio frequency electromagnetic field immunity	3V/m 80%, 1kHz, AM 80MHz~2.7GHz	Clause 7.1	PASS	
IEC 61000-4-3:2006	Proximity fields from RF wireless communications equipment	See page 6	Clause 7.1	PASS	
IEC 61000-4-4:2012	Electrical fast transient/burst immunity	2.0kV(AC Mains) 1kV(Signal Lines) 5/50ns, 100kHz	Clause 7.1	PASS	
IEC 61000-4-5:2005	Surge immunity	2.0kV(Common) 1.0kV(Differential) 1.2/50us	Clause 7.1	PASS	
IEC 61000-4-6:2013	Immunity to conducted disturbances, induced by radio-frequency fields	3V(rms) 80%, 1kHz AM. 0.15MHz~80MHz 6 V(rms) in ISM bands between 0,15 MHz and 80 MHz.(Note1)	Clause 7.1	PASS	
IEC 61000-4-8:2009	Power frequency magnetic field immunity	50Hz, 30 A/m	Clause 7.1	PASS	
IEC 61000-4-11:2004	Voltage dips, short interruptions and voltage variations immunity	Voltage dips, 0% residual for 0.5 cycle (Note 3)	Clause 7.1	PASS	
		Voltage dips, 0% residual for 1 cycle (Note 3)	Clause 7.1		
		Voltage dips, 70% residual for 25/30 cycle (Note 2,3)	Clause 7.1		
		Voltage interruptions For 250/300 cycle (NOTE 2,3)	Clause 7.1		

Note: (1) The ISM (industrial, scientific and medical) bands between 0,15 MHz 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. The amateur radio bands between 0,15 MHz and 80 MHz are 1,8 MHz to 2,0 MHz, 3,5 MHz to 4,0 MHz, 5,3 MHz to 5,4 MHz, 7 MHz to 7,3 MHz, 10,1 MHz to 10,15 MHz, 14 MHz to 14,2 MHz, 18,07 MHz to 18,17 MHz, 21,0 MHz to 21,4 MHz, 24,89 MHz to 24,99 MHz, 28,0 MHz to 29,7 MHz and 50,0 MHz to 54,0 MHz.

Note: (2) 25/30 or 250/300 means 25 or 250 periods at 50 Hz or 30 or 300 periods at 60 Hz.

Note: (3) For ME EQUIPMENT and ME SYSTEMS that have multiple voltage settings or auto ranging voltage capability, the test shall be performed at the minimum and maximum RATED input voltage. ME EQUIPMENT and ME SYSTEMS with a RATED input voltage range of less than 25 % of the highest RATED input voltage shall be tested at one RATED input voltage within the range.

Test specifications for ENCLOSURE PORT IMMUNITY to RF wireless communications equipment						
Test frequency	Band	Service	Modulation	Maximum power	Distance	IMMUNITY TEST LEVEL
385	380 – 390	TETRA 400	Pulse modulation 18 Hz	1,8	0,3	27
450	430 – 470	GMRS 460, FRS 460	FM \pm 5 kHz deviation 1 kHz sine	2	0,3	28
710	704 – 787	LTE Band 13, 17	Pulse modulation 217 Hz	0,2	0,3	9
745						
780						
810	800 – 960	GSM 800/900, TETRA 800, iDEN 820, CDMA 850, LTE Band 5	Pulse modulation 18 Hz	2	0,3	28
870						
930						
1720	1700 – 1990	GSM 1800; CDMA 1900; GSM 1900; DECT; LTE Band 1, 3, 4, 25; UMTS	Pulse modulation 217 Hz	2	0,3	28
1845						
1970						
2450	2400 – 2570	Bluetooth, WLAN,802.11 b/g/n, RFID 2450, LTE Band 7	Pulse modulation 217 Hz	2	0,3	28
5240	5100 – 5800	WLAN 802.11 a/n	Pulse Modulation 217 Hz	0,2	0,3	9
5500						
5785						
NOTE: If necessary to achieve the IMMUNITY TEST LEVEL, the distance between the transmitting antenna and the ME EQUIPMENT or ME SYSTEM may be reduced to 1 m. The 1 m test distance is permitted by IEC 61000-4-3.						

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: TRACO ELECTRONIC AG
Sihlbruggstrasse 111 CH-6340 Baar Switzerland

EUT DESCRIPTION: Internal Power, AC to DC

MODEL: TPP 450-136BA-MB4, TPP 450-124BA-MB4

SERIES MODEL: Rrefer to item 5.1 for more details

DATE of Sample Received: Jul. 10, 2019

DATE of TESTED: Jul. 10, 2019 ~ Jul. 26, 2019

APPLICABLE STANDARDS	
STANDARDS	TEST RESULTS
IEC 60601-1-2:2014 EN 60601-1-2:2015	PASS

Underwriters Laboratories Taiwan Co., Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by Underwriters Laboratories Taiwan Co., Ltd. based on interpretations and/or observations of test results. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Underwriters Laboratories Taiwan Co., Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Underwriters Laboratories Taiwan Co., Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Prepared By:



Cindy Hsin Date : Sep. 2, 2019
Project Handler

Approved and Authorized By:



Roy Chen Date : Sep. 2, 2019
Operations Manager

2. TEST METHODOLOGY

All tests were performed in accordance with the procedures documented in the reference standards listed in summary of test results page.3 and page4.

3. FACILITIES AND ACCREDITATION

Test Location	Underwriters Laboratories Taiwan Co., Ltd.,
Address	Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan
Description	All measurement facilities use to collect the measurement data are located at Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

4. CALIBRATION AND UNCERTAINTY

4.1. Measuring Instrument Calibration

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Electromagnetic interference:

Test Item	Measurement Frequency Range	K	U(dB)
Conducted disturbance at mains terminals ports	0.15MHz ~ 30MHz	2	1.7
Conducted disturbance at telecom terminals ports (Current Probe)	0.15MHz ~ 30MHz	2	2.0
966-1 Test Site			
Radiated disturbance below 1 GHz	30MHz ~ 1000MHz	2	5.2
Test Item	K	Voltage(%)	Current(%)
Harmonic&Flicker	2	0.1	0.15

Electromagnetic sensitivity:

Test Item	Measurement Frequency Range	K	U(dB)
Radiated, radio frequency electromagnetic field immunity	80MHz ~ 6000MHz	2	2.8
Immunity to conducted disturbances, induced by radio-frequency fields (CDN)	0.15MHz ~ 80MHz	2	2.2

Test Item	K	Voltage(%)	Rise Time(%)	First Peak Current (%)	Current @ 30ns (%)	Current @ 60ns (%)
Electrostatic discharge immunity	2	1.9	6.9	4.0	4.2	4.1

Test Item	K	Peak Voltage(%)	Pulse width(%)	Rise Time(%)
Electrical fast transient/burst immunity	2	6.0	5.1	5.5

Test Item	K	Voltage(%)	Current(%)	Front & Rise Time,Duration(For waveform of the surge voltage)(%)	Front & Rise Time,Duration(For waveform of the surge current)(%)
Surge immunity	2	5.6	4.8	4.6	3.4

Test Item	K	Magnetic field Strength(%)	Current (mA/A)
Power Frequency Magnetic Field Immunity Test	2	1.0	31

Test Item	K	Voltage(mV/V)	Time (%)
Voltage dips, short interruptions and voltage variations immunity	2	17.0	2.8%

5. EQUIPMENT UNDER TEST

5.1. Description of EUT

EUT Name:	Internal Power, AC to DC
Model:	TPP 450-136BA-MB4, TPP 450-124BA-MB4
Series Model:	TPP 450-112BA-MB4, TPP 450-115BA-MB4, TPP 450-118BA-MB4, TPP 450-124BA-MB4, TPP 450-128BA-MB4, TPP 450-136BA-MB4, TPP 450-136BA-MC2, TPP 450-142BA-MB4, TPP 450-148BA-MB4, TPP 450-153BA-MB4, TPP 450-112BA-M, TPP 450-115BA-M, TPP 450-118BA-M, TPP 450-124BA-M, TPP 450-128BA-M, TPP 450-136BA-M, TPP 450-142BA-M, TPP 450-148BA-M, TPP 450-153BA-M, TPP 450-112B-MB5, TPP 450-115B-MB5, TPP 450-118B-MB5, TPP 450-124B-MB5, TPP 450-128B-MB5, TPP 450-136B-MB5, TPP 450-142B-MB5, TPP 450-148B-MB5, TPP 450-153B-MB5, TPP 450-112B-MB6, TPP 450-115B-MB6, TPP 450-118B-MB6, TPP 450-124B-MB6, TPP 450-128B-MB6, TPP 450-136B-MB6, TPP 450-142B-MB6, TPP 450-148B-MB6, TPP 450-153B-MB6, TPP 450-112B-MB3, TPP 450-115B-MB3, TPP 450-118B-MB3, TPP 450-124B-MB3, TPP 450-128B-MB3, TPP 450-136B-MB3, TPP 450-142B-MB3, TPP 450-148B-MB3, TPP 450-153B-MB3, TPP 450-112B-MB1, TPP 450-115B-MB1, TPP 450-118B-MB1, TPP 450-124B-MB1, TPP 450-128B-MB1, TPP 450-136B-MB1, TPP 450-142B-MB1, TPP 450-148B-MB1, TPP 450-153B-MB1, TPP 450-112B-MB2, TPP 450-115B-MB2, TPP 450-118B-MB2, TPP 450-124B-MB2, TPP 450-128B-MB2, TPP 450-136B-MB2, TPP 450-142B-MB2, TPP 450-148B-MB2, TPP 450-153B-MB2, TPP 450-112B-M, TPP 450-115B-M, TPP 450-118B-M, TPP 450-124B-M, TPP 450-128B-M, TPP 450-136B-M, TPP 450-142B-M, TPP 450-148B-M, TPP 450-153B-M
Power Rating :	For TPP 450-136BA-MB4 : I/P: 85 – 264 Vac, O/P: 36 Vdc, 8.9A For TPP 450-124BA-MB4 : I/P: 85 – 264 Vac, O/P: 24 Vdc, 13.3A
Group :	Group 1
Environments:	Professional healthcare facility environment
Condition of EUT:	Pre-Production

5.2. Test Mode

The Pre-test modes:

Mode	Description	Conducted Emission	Radiated Emission
Mode 1	TPP 450-136BA-MB4	v	v
Mode 2	TPP 450-124BA-MB4	v	v

There are some DC output voltage, current and market segmentation between the serials model no. show as 5.1, others PCB layout and enclosure are the same. So client only provided TPP 450-136BA-MB4 and TPP 450-124BA-MB4 for lab test.

After pre-testing, the final test mode was displayed as below table.

Test Items		Test Mode
Emission	Conducted Emission	Mode 1,2
	Radiated Emission	Mode 1,2
	Harmonic & Flicker	Mode 1,2
Immunity	Electrostatic Discharge	Mode 1
	Radio Frequency Electromagnetic Field	Mode 1
	Electrical Fast Transients	Mode 1
	Surge immunity	Mode 1
	Conducted disturbances immunity	Mode 1
	Power frequency magnetic field	Mode 1
	Voltage Dip and Short interruption	Mode 1

5.3. EUT Configuration Test Setup

Mode 1~2:

- a. The EUT was linked to resistance load with full load and the resistance load was connected with a meter during the testing.

5.4. Monitoring of EUT for All Immunity Test

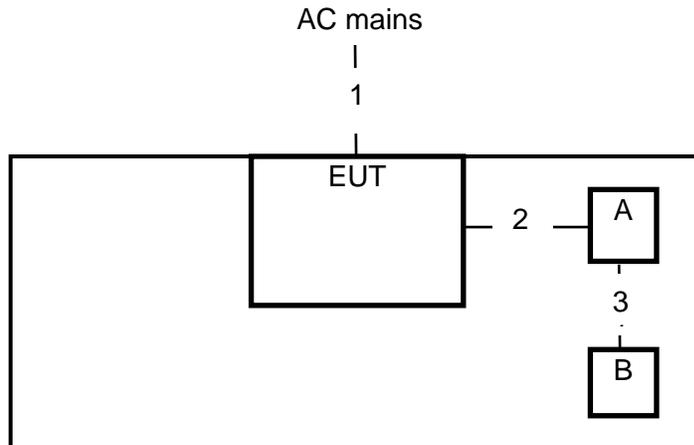
Audio	N/A
Visual	Monitor the output voltage through the power meter.

5.5. Accessory

Item	Accessory	Brand Name	Model Name	Note
-	N/A	N/A	N/A	N/A

5.6. Block diagram showing the configuration of system tested B

Mode 1~2



5.7. Description of support units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	FCC ID	Note
A	Load	N/A	N/A	N/A	N/A	Supported by the client
B	Meter	N/A	N/A	N/A	N/A	N/A

Item	Connection	Shielded Type	Length	Note
1	Power cable	Non-Shielded	2.1 m	Supported by the client
2	Power cable	Non-Shielded	0.1 m	Supported by the client
3	Power Wire	Non-shielded	1.4 m	N/A

Note (1)

For detachable type I/O cable should be specified the length in m in 『Length』 column.

5.8. Measuring Instrument List

Instrument						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Expired date
Conducted Disturbance						
<input checked="" type="checkbox"/>	EMI Test Receiver	R&S	ESR 7	101753	2018/11/14	2019/11/13
<input checked="" type="checkbox"/>	Two-Line V-Network	R&S	ENV216	102136	2018/8/5	2019/8/4
<input type="checkbox"/>	RF Current Probe	FCC	F-52	171502	2018/1/9	2019/1/8
<input checked="" type="checkbox"/>	Impuls-Begrenzer Pulse Limiter	Rohde & Schwarz	ESH3-Z2	102219-Qt	2018/8/2	2019/8/1
<input checked="" type="checkbox"/>	Measurement Software	Farad	EZ-EMC Ver: EMEC-3A1	N/A	N/A	N/A
Radiated Disturbance						
<input checked="" type="checkbox"/>	EMI Test Receiver	R&S	ESR 7	101755	2018/11/27	2019/11/26
<input checked="" type="checkbox"/>	Trilog-Broadband Antena with 5dB Attenuator	SCHWARZ BECK	VULB 9168 & N-6-05	9168-773 & AT-N0539	2018/2/12	2019/2/11
<input type="checkbox"/>	Double Ridged Guide Horn Antenna	SCHWARZ BECK	BBHA 9120 D	1686	2018/1/23	2019/1/22
<input checked="" type="checkbox"/>	Preamplifier	EMC Instrument	EMC330E	980404	2019/1/8	2020/1/7
<input type="checkbox"/>	Preamplifier	EMC Instrument	EMC051835BE	980407	2018/1/10	2019/1/9
<input checked="" type="checkbox"/>	Measurement Software	Farad	EZ-EMC Ver: EMEC-3A1	N/A	N/A	N/A
Harmonic Current Disturbance / Voltage Fluctuations & Flicker						
<input checked="" type="checkbox"/>	Harmonic&Flicker Tester	TESEQ	CCN 1000-1	1652A0127 0	2018/3/15	2019/3/14
<input checked="" type="checkbox"/>	AC Power Source	TESEQ	NSG 1007	1652A0076 0	2018/3/15	2019/3/14
<input checked="" type="checkbox"/>	Measurement Software	TESEQ	WIN2100(V4)	N/A	N/A	N/A
Electrostatic discharge						
<input checked="" type="checkbox"/>	ESD Generator	TESEQ	NSG 437	1125	2018/12/6	2019/12/5

Instrument						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Expired date
Radio frequency electromagnetic field immunity						
<input checked="" type="checkbox"/>	RF and Microwave Signal Generator	Rohde & Schwarz	SMB100A	113793	2018/2/21	2019/2/20
<input checked="" type="checkbox"/>	Power amplifier	Milmega	80RF1000-300	1077558	N/A	N/A
<input checked="" type="checkbox"/>	Power amplifier	Milmega	AS0860B	1077559	N/A	N/A
<input checked="" type="checkbox"/>	Directional coupler	Werlatone	C10117-10	111786	N/A	N/A
<input checked="" type="checkbox"/>	Directional coupler	Werlatone	C8719-20	111759	N/A	N/A
<input checked="" type="checkbox"/>	Antenna	AR	ATR80M6G	346008	N/A	N/A
<input checked="" type="checkbox"/>	Antenna	SCHWARZ BECK	STLP 9149	00441	N/A	N/A
<input checked="" type="checkbox"/>	Power Meter	Rohde & Schwarz	NRP2	105524	2018/10/19	2019/10/18
<input checked="" type="checkbox"/>	Power Sensor	Rohde & Schwarz	NRP-Z91	103732	2018/10/19	2019/10/18
<input checked="" type="checkbox"/>	Power Sensor	Rohde & Schwarz	NRP-Z91	103733	2018/10/19	2019/10/18
<input checked="" type="checkbox"/>	Measurement Software	Rohde & Schwarz	EMC32, VER.10.01.00	N/A	N/A	N/A
Electrical fast transient						
<input checked="" type="checkbox"/>	Ultra Compact Simulator	EM TEST	UCS 500N7	P16281802 75	2018/12/18	2019/12/17
<input type="checkbox"/>	Capacitive Coupling Clamp	EM TEST	HFK	P16421857 90	2018/11/23	2019/11/22
<input checked="" type="checkbox"/>	Measurement Software	TESEQ	IEC.control, VER.6.0.2	N/A	N/A	N/A
Surge						
<input checked="" type="checkbox"/>	Ultra Compact Simulator	EM TEST	UCS 500N7	P16281802 75	2018/12/18	2019/12/17
<input checked="" type="checkbox"/>	Measurement Software	TESEQ	IEC.control, VER.6.0.2	N/A	N/A	N/A
Immunity to conducted disturbances, induced by radio-frequency fields						
<input checked="" type="checkbox"/>	Signal Generator	Rohde & Schwarz	SMC100A	105811	2018/10/25	2019/10/24
<input checked="" type="checkbox"/>	Power amplifier	Rohde & Schwarz	BBA150-A125B125	102340	N/A	N/A
<input checked="" type="checkbox"/>	Coupling and Decoupling Network	TESEQ	CDN M016	48080	2018/10/19	2019/10/18
<input type="checkbox"/>	EM Injection Clamp	TESEQ	CAL 801A & KEMZ 801A	75454.1, 75454.2 & 45181	2019/3/18	2020/3/16
<input checked="" type="checkbox"/>	Power - Sensor	Rohde & Schwarz	NRP-Z91	103730	2018/12/3	2019/12/2
<input checked="" type="checkbox"/>	Power - Sensor	Rohde & Schwarz	NRP-Z91	103731	2018/12/3	2019/12/2
<input checked="" type="checkbox"/>	Measurement Software	Rohde & Schwarz	EMC32, VER.10.01.00	N/A	N/A	N/A

Instrument						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Expired date
Power frequency magnetic field immunity						
<input checked="" type="checkbox"/>	Ultra Compact Simulator	EM TEST	UCS 500N7	P16281802 75	2018/12/18	2019/12/17
<input checked="" type="checkbox"/>	Magnetic Field Antenna	EM TEST	MC 2630	P16441867 73	2018/11/20	2019/11/19
<input checked="" type="checkbox"/>	Current Transformer	EM TEST	MS 100N	P16271813 24	2018/11/20	2019/11/19
<input checked="" type="checkbox"/>	Measurement Software	Rohde & Schwarz	IEC.control, VER.6.0.2	N/A	N/A	N/A
Voltage dips and interruptions						
<input checked="" type="checkbox"/>	Ultra Compact Simulator	EM TEST	UCS 500N7	P16281802 75	2018/12/18	2019/12/17
<input checked="" type="checkbox"/>	Motorized Variac	EM TEST	MV 2616 (varic NX1-260-16)	P16431864 26	2018/12/18	2019/12/17
<input checked="" type="checkbox"/>	Measurement Software	TESEQ	IEC.control, VER.6.0.2	N/A	N/A	N/A

6. EMISSION TEST

6.1. Conducted Disturbance Measurement

6.1.1. Limits of conducted disturbance voltage and common mode disturbance.

AC mains port:

FREQUENCY (MHz)	<input type="checkbox"/> Group 1 Class A (dB μ V) ≤ 20 kVA		<input checked="" type="checkbox"/> Group 1 Class B (dB μ V)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79	66	66 - 56 *	56 - 46*
0.50 -5.0	73	60	56	46
5.0 -30.0	73	60	60	50

FREQUENCY (MHz)	<input type="checkbox"/> Group 2 Class A (dB μ V) ≤ 75 kVA		<input type="checkbox"/> Group 2 Class B (dB μ V)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	100	90	66 - 56 *	56 - 46*
0.50 -5.0	86	76	56	46
5.0 -30.0	90 - 73 *	80 - 60 *	60	50

Limit of patient-couple port cable emission :

Frequency (MHz)	Peak Current (dBuA)
1-30	24

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.
- (3) The test result calculated as following:
 Measurement Value = Reading Level + Correct Factor
 Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor(if use)
 Margin Level = Measurement Value - Limit Value

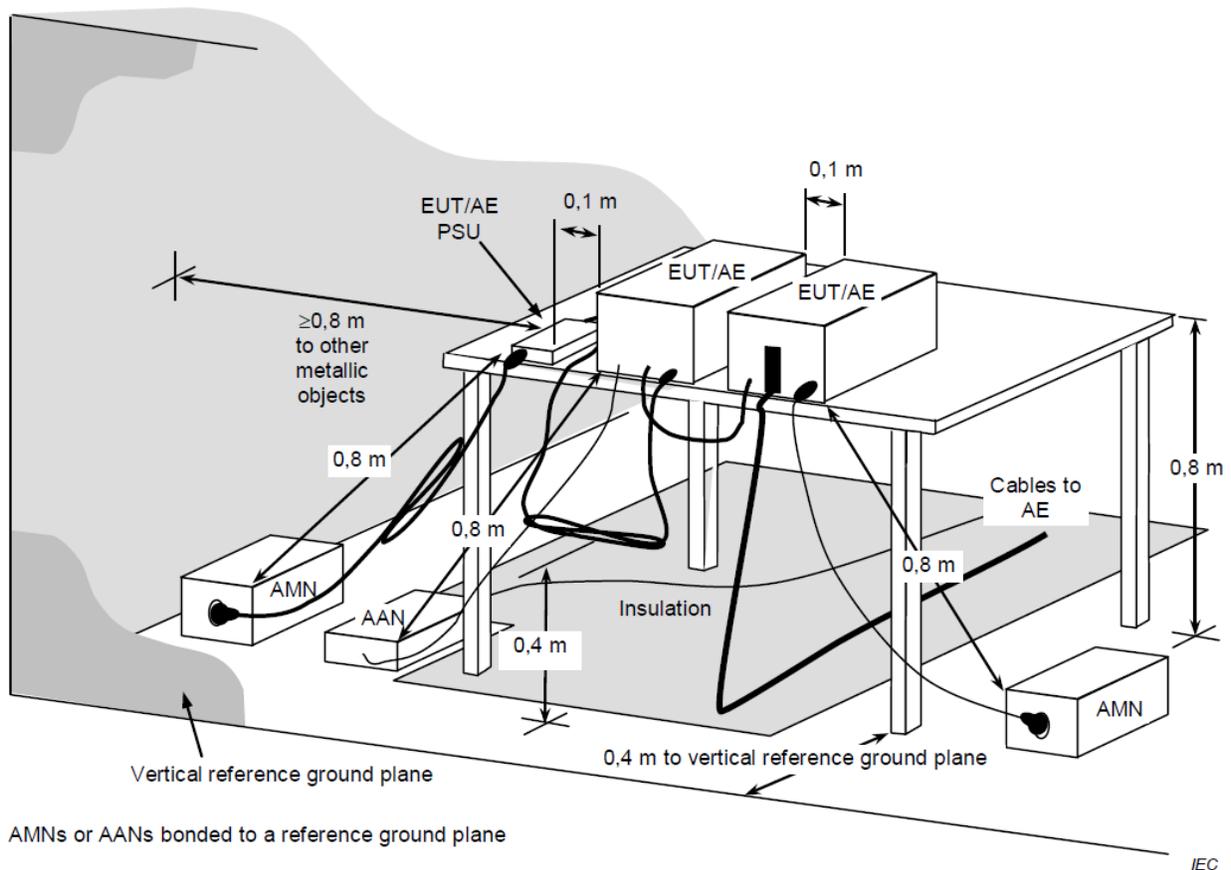
The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

6.1.2. Test Procedure

- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall at least 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item:EUT Test Photos.

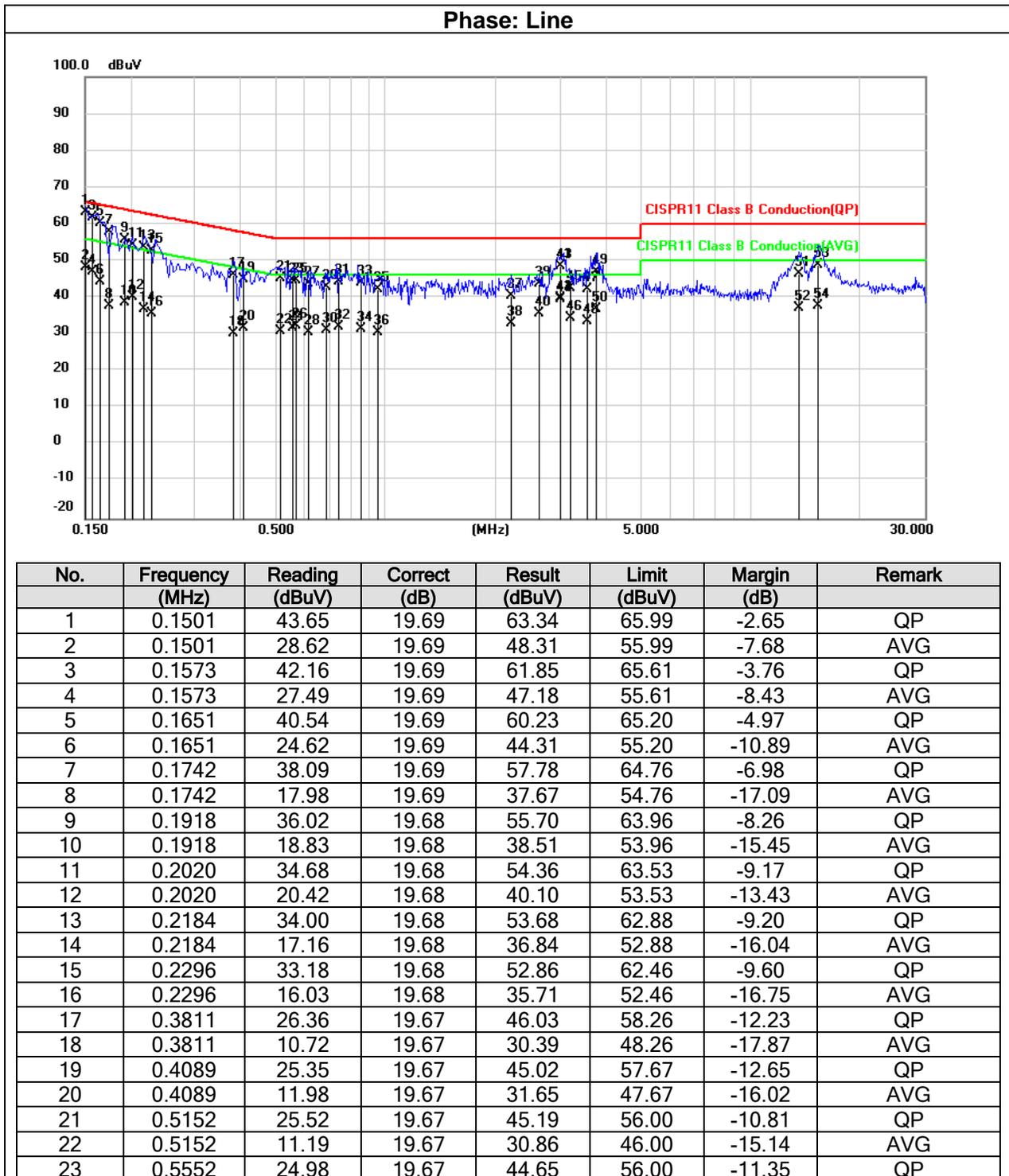
6.1.3. Test Setup and Configuration :



The 0,8 m distance specified between EUT/AE/PSU and AMN/AAN, is applicable only to the EUT being measured. If the device is AE then it shall be $\geq 0,8$ m.

6.1.4. Test Result

Test Mode:	Mode 1	Temperature:	23°C
Test Voltage:	AC 230V/50Hz	Humidity:	60%RH
Tested By:	Eric T. Fan	Test Date:	Jul. 11, 2019



24	0.5552	11.96	19.67	31.63	46.00	-14.37	AVG
25	0.5677	25.02	19.67	44.69	56.00	-11.31	QP
26	0.5677	12.71	19.67	32.38	46.00	-13.62	AVG
27	0.6167	24.19	19.67	43.86	56.00	-12.14	QP
28	0.6167	10.97	19.67	30.64	46.00	-15.36	AVG
29	0.6881	23.25	19.67	42.92	56.00	-13.08	QP
30	0.6881	11.40	19.67	31.07	46.00	-14.93	AVG
31	0.7471	24.77	19.68	44.45	56.00	-11.55	QP
32	0.7471	12.31	19.68	31.99	46.00	-14.01	AVG
33	0.8567	24.36	19.68	44.04	56.00	-11.96	QP
34	0.8567	11.89	19.68	31.57	46.00	-14.43	AVG
35	0.9537	22.70	19.68	42.38	56.00	-13.62	QP
36	0.9537	10.90	19.68	30.58	46.00	-15.42	AVG
37	2.2000	20.82	19.69	40.51	56.00	-15.49	QP
38	2.2000	13.40	19.69	33.09	46.00	-12.91	AVG
39	2.6416	23.98	19.70	43.68	56.00	-12.32	QP
40	2.6416	16.08	19.70	35.78	46.00	-10.22	AVG
41	3.0114	28.94	19.71	48.65	56.00	-7.35	QP
42	3.0114	20.02	19.71	39.73	46.00	-6.27	AVG
43	3.0116	28.72	19.71	48.43	56.00	-7.57	QP
44	3.0116	19.96	19.71	39.67	46.00	-6.33	AVG
45	3.2169	22.77	19.72	42.49	56.00	-13.51	QP
46	3.2169	14.82	19.72	34.54	46.00	-11.46	AVG
47	3.5601	22.41	19.73	42.14	56.00	-13.86	QP
48	3.5601	13.88	19.73	33.61	46.00	-12.39	AVG
49	3.7653	27.44	19.73	47.17	56.00	-8.83	QP
50	3.7653	17.02	19.73	36.75	46.00	-9.25	AVG
51	13.5713	26.75	19.83	46.58	60.00	-13.42	QP
52	13.5713	17.26	19.83	37.09	50.00	-12.91	AVG
53	15.4106	29.00	19.83	48.83	60.00	-11.17	QP
54	15.4106	18.06	19.83	37.89	50.00	-12.11	AVG

Remark:

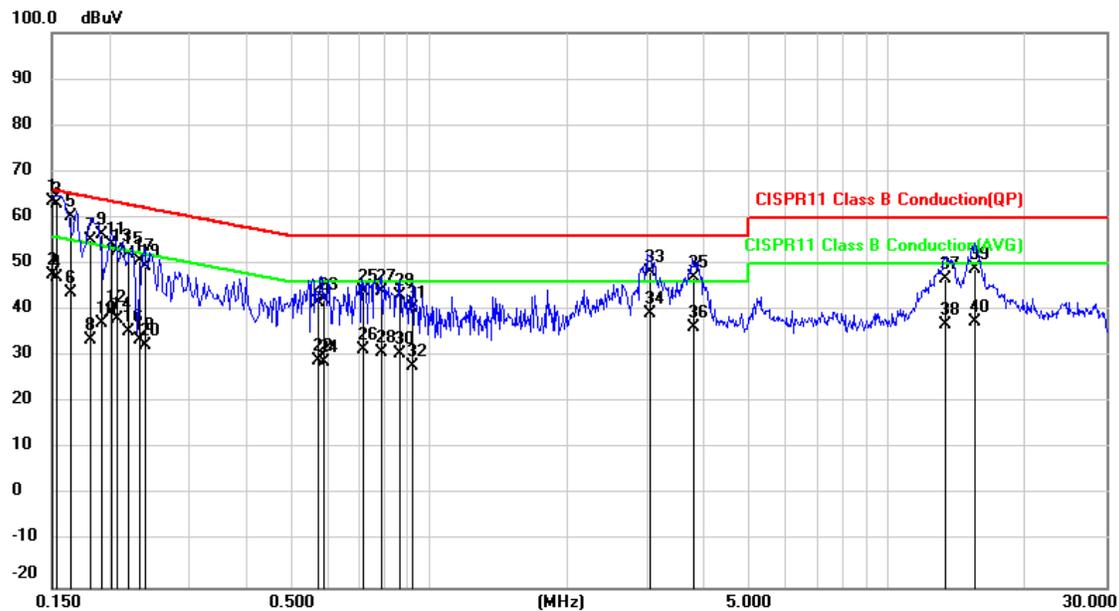
Result = Reading +Correct

Correct = Insertion Loss + Cable Loss + Attenuator factor

Margin = Result – Limit

Test Mode:	Mode 1	Temperature:	23°C
Test Voltage:	AC 230V/50Hz	Humidity:	60%RH
Tested By:	Eric T. Fan	Test Date:	Jul. 11, 2019

Phase: Neutral



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1502	43.81	19.68	63.49	65.99	-2.50	QP
2	0.1502	28.04	19.68	47.72	55.99	-8.27	AVG
3	0.1532	43.14	19.68	62.82	65.82	-3.00	QP
4	0.1532	27.40	19.68	47.08	55.82	-8.74	AVG
5	0.1652	40.52	19.68	60.20	65.20	-5.00	QP
6	0.1652	24.03	19.68	43.71	55.20	-11.49	AVG
7	0.1824	35.52	19.68	55.20	64.38	-9.18	QP
8	0.1824	13.84	19.68	33.52	54.38	-20.86	AVG
9	0.1930	36.77	19.68	56.45	63.91	-7.46	QP
10	0.1930	17.34	19.68	37.02	53.91	-16.89	AVG
11	0.2017	34.67	19.68	54.35	63.54	-9.19	QP
12	0.2017	19.74	19.68	39.42	53.54	-14.12	AVG
13	0.2094	33.17	19.68	52.85	63.23	-10.38	QP
14	0.2094	18.46	19.68	38.14	53.23	-15.09	AVG
15	0.2214	32.42	19.68	52.10	62.77	-10.67	QP
16	0.2214	15.67	19.68	35.35	52.77	-17.42	AVG
17	0.2334	30.85	19.68	50.53	62.33	-11.80	QP
18	0.2334	13.99	19.68	33.67	52.33	-18.66	AVG
19	0.2412	29.90	19.68	49.58	62.05	-12.47	QP
20	0.2412	12.78	19.68	32.46	52.05	-19.59	AVG
21	0.5707	21.94	19.67	41.61	56.00	-14.39	QP
22	0.5707	9.32	19.67	28.99	46.00	-17.01	AVG
23	0.5924	22.55	19.67	42.22	56.00	-13.78	QP
24	0.5924	9.11	19.67	28.78	46.00	-17.22	AVG

25	0.7210	24.24	19.68	43.92	56.00	-12.08	QP
26	0.7210	11.65	19.68	31.33	46.00	-14.67	AVG
27	0.7864	24.30	19.68	43.98	56.00	-12.02	QP
28	0.7864	11.30	19.68	30.98	46.00	-15.02	AVG
29	0.8592	23.46	19.68	43.14	56.00	-12.86	QP
30	0.8592	10.81	19.68	30.49	46.00	-15.51	AVG
31	0.9254	20.63	19.68	40.31	56.00	-15.69	QP
32	0.9254	8.16	19.68	27.84	46.00	-18.16	AVG
33	3.0321	28.61	19.72	48.33	56.00	-7.67	QP
34	3.0321	19.59	19.72	39.31	46.00	-6.69	AVG
35	3.7855	27.35	19.74	47.09	56.00	-8.91	QP
36	3.7855	16.58	19.74	36.32	46.00	-9.68	AVG
37	13.3967	26.74	19.88	46.62	60.00	-13.38	QP
38	13.3967	17.00	19.88	36.88	50.00	-13.12	AVG
39	15.5038	28.83	19.90	48.73	60.00	-11.27	QP
40	15.5038	17.56	19.90	37.46	50.00	-12.54	AVG

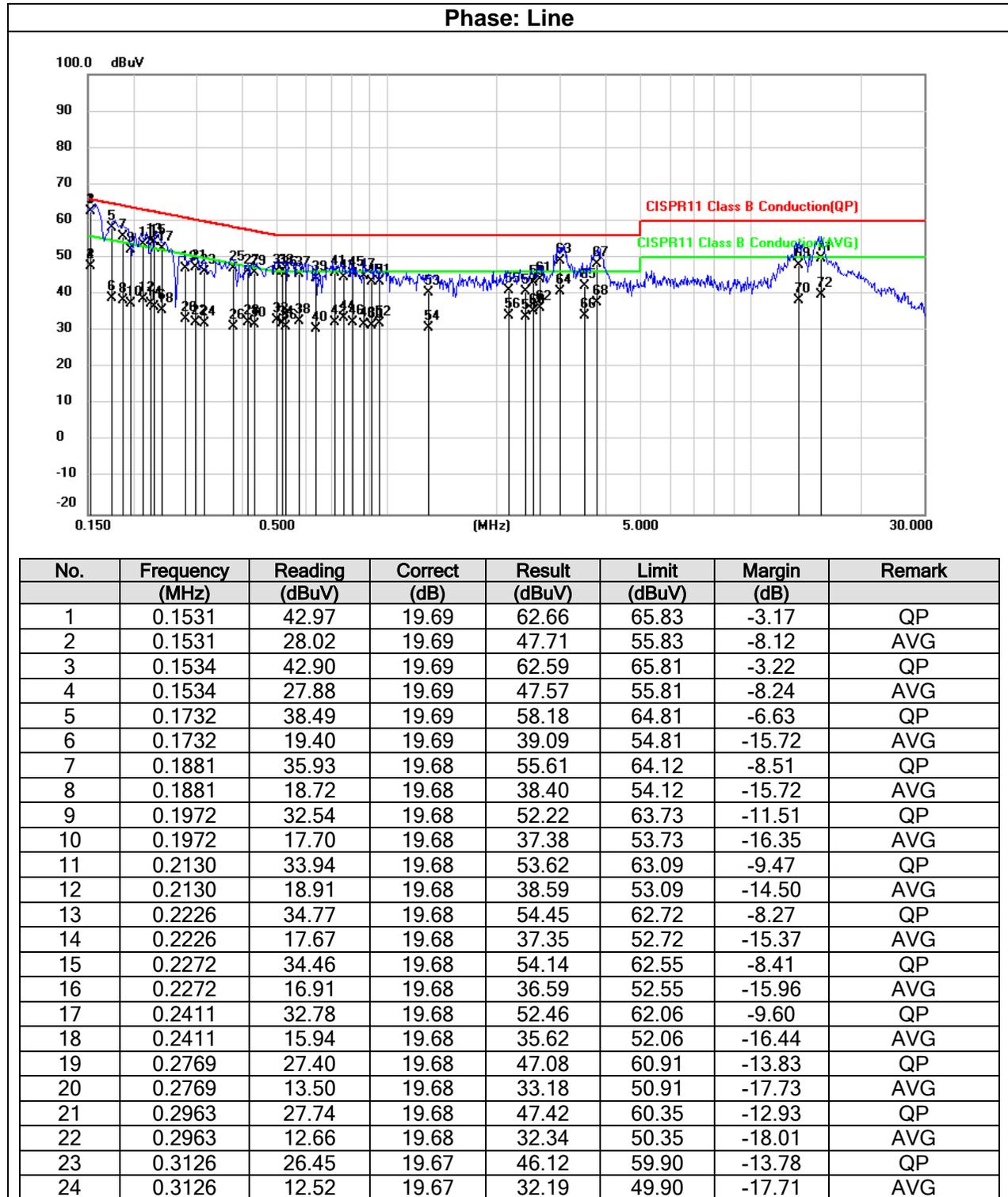
Remark:

Result = Reading +Correct

Correct = Insertion Loss + Cable Loss + Attenuator factor

Margin = Result – Limit

Test Mode:	Mode 2	Temperature:	23°C
Test Voltage:	AC 230V/50Hz	Humidity:	60%RH
Tested By:	Eric T. Fan	Test Date:	Jul. 11, 2019



25	0.3788	27.34	19.67	47.01	58.31	-11.30	QP
26	0.3788	11.37	19.67	31.04	48.31	-17.27	AVG
27	0.4109	26.48	19.67	46.15	57.63	-11.48	QP
28	0.4109	12.69	19.67	32.36	47.63	-15.27	AVG
29	0.4337	26.10	19.67	45.77	57.18	-11.41	QP
30	0.4337	12.18	19.67	31.85	47.18	-15.33	AVG
31	0.4962	26.52	19.67	46.19	56.06	-9.87	QP
32	0.4962	13.14	19.67	32.81	46.06	-13.25	AVG
33	0.5167	26.43	19.67	46.10	56.00	-9.90	QP
34	0.5167	12.31	19.67	31.98	46.00	-14.02	AVG
35	0.5273	25.99	19.67	45.66	56.00	-10.34	QP
36	0.5273	11.48	19.67	31.15	46.00	-14.85	AVG
37	0.5701	25.82	19.67	45.49	56.00	-10.51	QP
38	0.5701	13.02	19.67	32.69	46.00	-13.31	AVG
39	0.6348	24.55	19.67	44.22	56.00	-11.78	QP
40	0.6348	10.90	19.67	30.57	46.00	-15.43	AVG
41	0.7178	26.29	19.68	45.97	56.00	-10.03	QP
42	0.7178	12.81	19.68	32.49	46.00	-13.51	AVG
43	0.7626	25.06	19.68	44.74	56.00	-11.26	QP
44	0.7626	13.80	19.68	33.48	46.00	-12.52	AVG
45	0.8049	25.74	19.68	45.42	56.00	-10.58	QP
46	0.8049	12.68	19.68	32.36	46.00	-13.64	AVG
47	0.8636	25.26	19.68	44.94	56.00	-11.06	QP
48	0.8636	12.22	19.68	31.90	46.00	-14.10	AVG
49	0.9078	23.82	19.68	43.50	56.00	-12.50	QP
50	0.9078	11.80	19.68	31.48	46.00	-14.52	AVG
51	0.9575	23.68	19.68	43.36	56.00	-12.64	QP
52	0.9575	12.37	19.68	32.05	46.00	-13.95	AVG
53	1.3004	20.91	19.68	40.59	56.00	-15.41	QP
54	1.3004	11.06	19.68	30.74	46.00	-15.26	AVG
55	2.1697	21.46	19.69	41.15	56.00	-14.85	QP
56	2.1697	14.46	19.69	34.15	46.00	-11.85	AVG
57	2.3959	21.19	19.69	40.88	56.00	-15.12	QP
58	2.3959	14.24	19.69	33.93	46.00	-12.07	AVG
59	2.5189	23.37	19.70	43.07	56.00	-12.93	QP
60	2.5189	15.69	19.70	35.39	46.00	-10.61	AVG
61	2.6423	24.22	19.70	43.92	56.00	-12.08	QP
62	2.6423	16.51	19.70	36.21	46.00	-9.79	AVG
63	3.0116	29.47	19.71	49.18	56.00	-6.82	QP
64	3.0116	20.94	19.71	40.65	46.00	-5.35	AVG
65	3.4994	22.63	19.72	42.35	56.00	-13.65	QP
66	3.4994	14.58	19.72	34.30	46.00	-11.70	AVG
67	3.7653	28.45	19.73	48.18	56.00	-7.82	QP
68	3.7653	17.99	19.73	37.72	46.00	-8.28	AVG
69	13.5805	28.05	19.83	47.88	60.00	-12.12	QP
70	13.5805	18.64	19.83	38.47	50.00	-11.53	AVG
71	15.5320	29.93	19.83	49.76	60.00	-10.24	QP
72	15.5320	19.90	19.83	39.73	50.00	-10.27	AVG

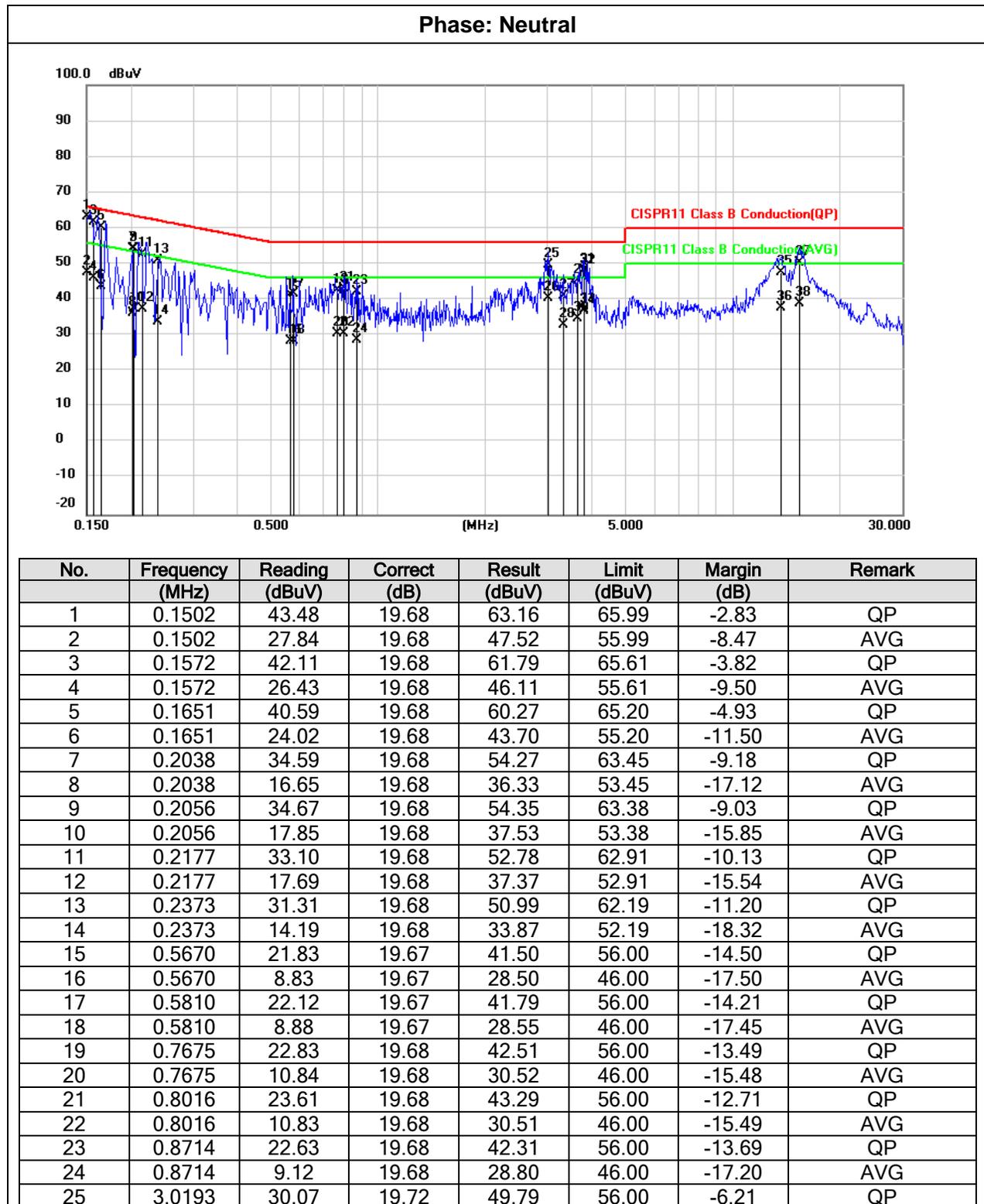
Remark:

Result = Reading +Correct

Correct = Insertion Loss + Cable Loss + Attenuator factor

Margin = Result – Limit

Test Mode:	Mode 2	Temperature:	23°C
Test Voltage:	AC 230V/50Hz	Humidity:	60%RH
Tested By:	Eric T. Fan	Test Date:	Jul. 11, 2019



26	3.0193	20.75	19.72	40.47	46.00	-5.53	AVG
27	3.3402	21.47	19.72	41.19	56.00	-14.81	QP
28	3.3402	13.24	19.72	32.96	46.00	-13.04	AVG
29	3.6628	25.61	19.74	45.35	56.00	-10.65	QP
30	3.6628	15.07	19.74	34.81	46.00	-11.19	AVG
31	3.8060	28.49	19.74	48.23	56.00	-7.77	QP
32	3.8060	28.31	19.74	48.05	56.00	-7.95	QP
33	3.8060	17.32	19.74	37.06	46.00	-8.94	AVG
34	3.8060	17.00	19.74	36.74	46.00	-9.26	AVG
35	13.6232	27.71	19.88	47.59	60.00	-12.41	QP
36	13.6232	17.79	19.88	37.67	50.00	-12.33	AVG
37	15.4913	30.46	19.90	50.36	60.00	-9.64	QP
38	15.4913	19.08	19.90	38.98	50.00	-11.02	AVG

Remark:

Result = Reading +Correct

Correct = Insertion Loss + Cable Loss + Attenuator factor

Margin = Result – Limit

6.2. Radiated Disturbance Measurement

6.2.1. Limits of radiated disturbance measurement

FREQUENCY (MHz)	<input checked="" type="checkbox"/> Group 1 Class A ≤ 20 kVA		<input type="checkbox"/> Group 1 Class B	
	<input type="checkbox"/> At 10m	<input checked="" type="checkbox"/> At 3m	<input type="checkbox"/> At 10m	<input type="checkbox"/> At 3m
	Quasi-peak dB μ V/m	Quasi-peak dB μ V/m	Quasi-peak dB μ V/m	Quasi-peak dB μ V/m
30 – 230	40	50	30	40
230 – 1000	47	57	37	47

FREQUENCY (MHz)	<input type="checkbox"/> Group 2 Class A ≤ 20 kVA		FREQUENCY (MHz)	<input type="checkbox"/> Group 2 Class B		
	<input type="checkbox"/> At 3m			<input checked="" type="checkbox"/> At 3m		
	Magnetic Field Quasi-peak* dB μ A/m	Electric Field Quasi-peak* dB μ V/m		Magnetic Field Quasi-peak* dB μ A/m	Electric Field	
				Quasi-peak* dB μ V/m	Average* dB μ V/m	
0.15 – 0.49	57.5	-	0.15 - 30	39 - 3	-	-
0.49 – 1.705	47.5	-				
1.705 – 2.194	52.5	-				
2.194 – 3.95	43.5	-				
3.95 – 20	18.5	-				
20 – 30	8.5	-				
30 - 47	-	68	30 – 80.872	-	40	35
47 – 53.91	-	50				
53.91 – 54.56	-	50				
54.56 – 68	-	50				
68 – 80.872	-	63				
80.872 – 81.848	-	78				
81.848 – 87	-	63	81.848 – 134.786	-	40	35
87 – 134.786	-	60	134.786 – 136.414	-	60	55
134.786 – 136.414	-	70	136.414 – 230	-	40	35
136.414 – 156	-	60				
156 – 174	-	74				
174 – 188.7	-	50				
188.7 – 190.979	-	60				
190.979 – 230	-	50				
230 – 400	-	60	230 - 1000	-	47	42
400 – 470	-	63				
470 – 1000	-	60				

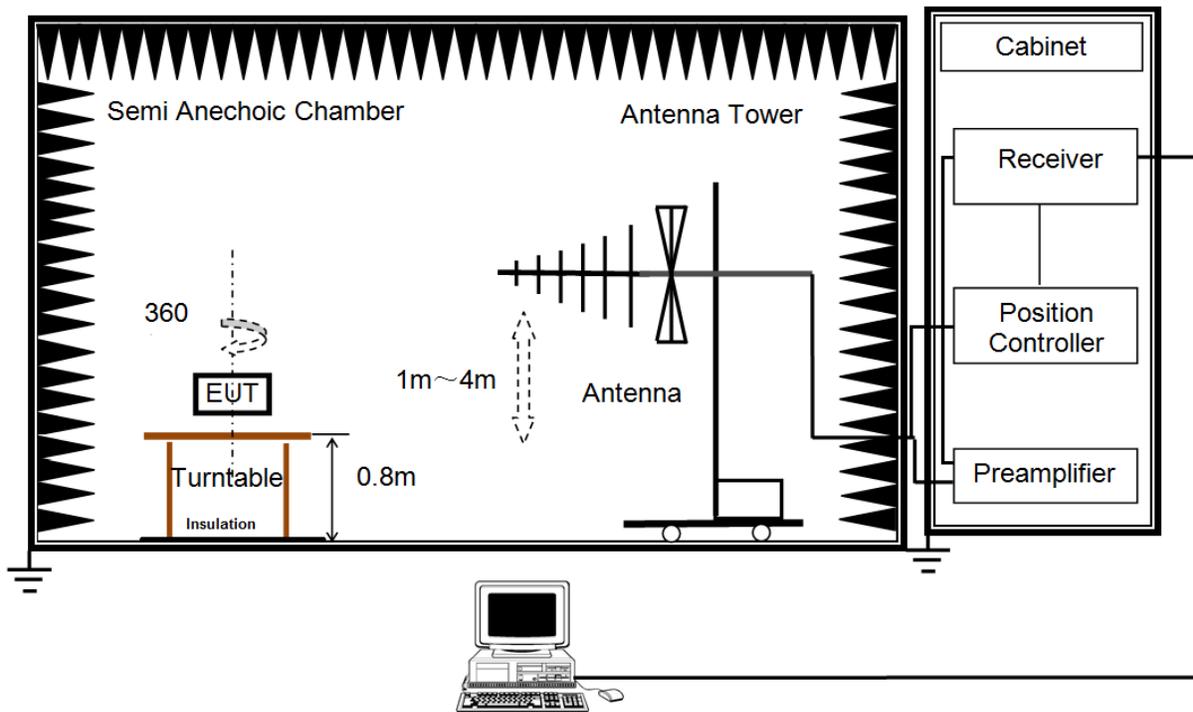
NOTE:

- (1) The limit for radiated test was performed according to EN55011.
- (2) The tighter limit applies at the band edges.
- (3) The test result calculated as following:
Measurement Value = Reading Level + Correct Factor,
Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain(if use),
Margin Level = Measurement Value - Limit Value.
- (4) For Group 2 at 3m distance radiated magnetic field test, EUT shall be meet the small equipment requirement.
- (5) The average limits apply to magnetron driven equipment only. If magnetron driven equipment exceeds the quasi-peak limit at certain frequencies, then the measurement shall be repeated at these frequencies with the average detector, and the average limits specified in this table apply.

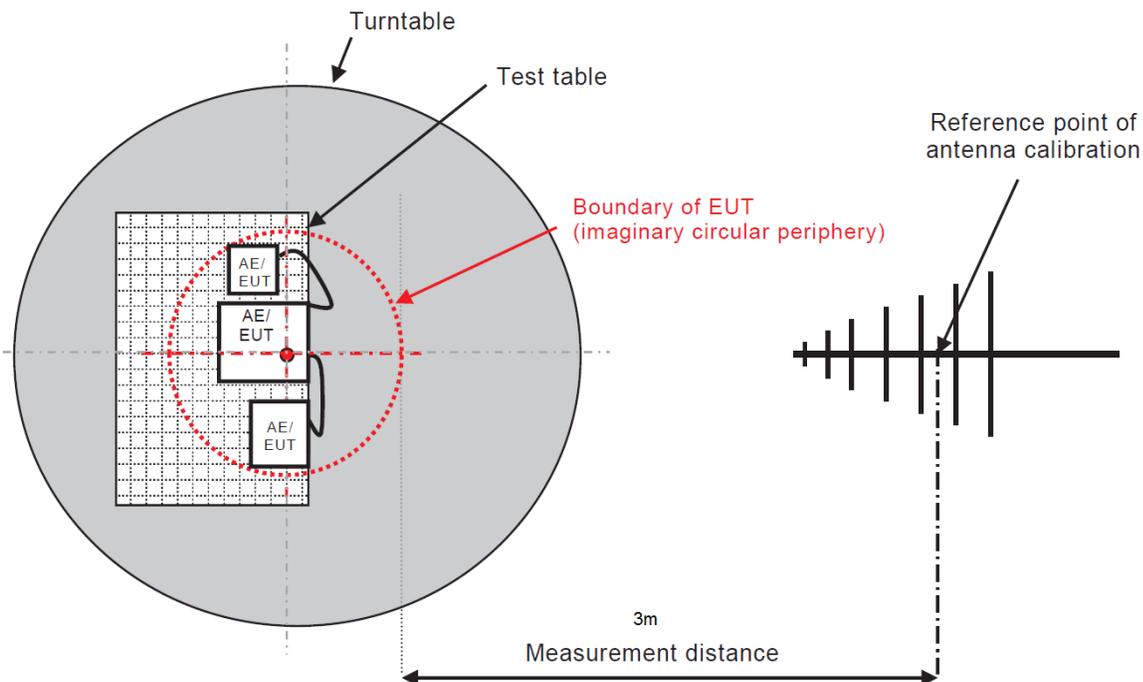
6.2.2. Test Procedure

- a. The measuring distance of at 3m shall be used for measurements at frequency from 30 to 1000MHz.
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment shall be set at 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting radiated emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item:EUT Test Photos.

6.2.3. Test Setup and Configuration

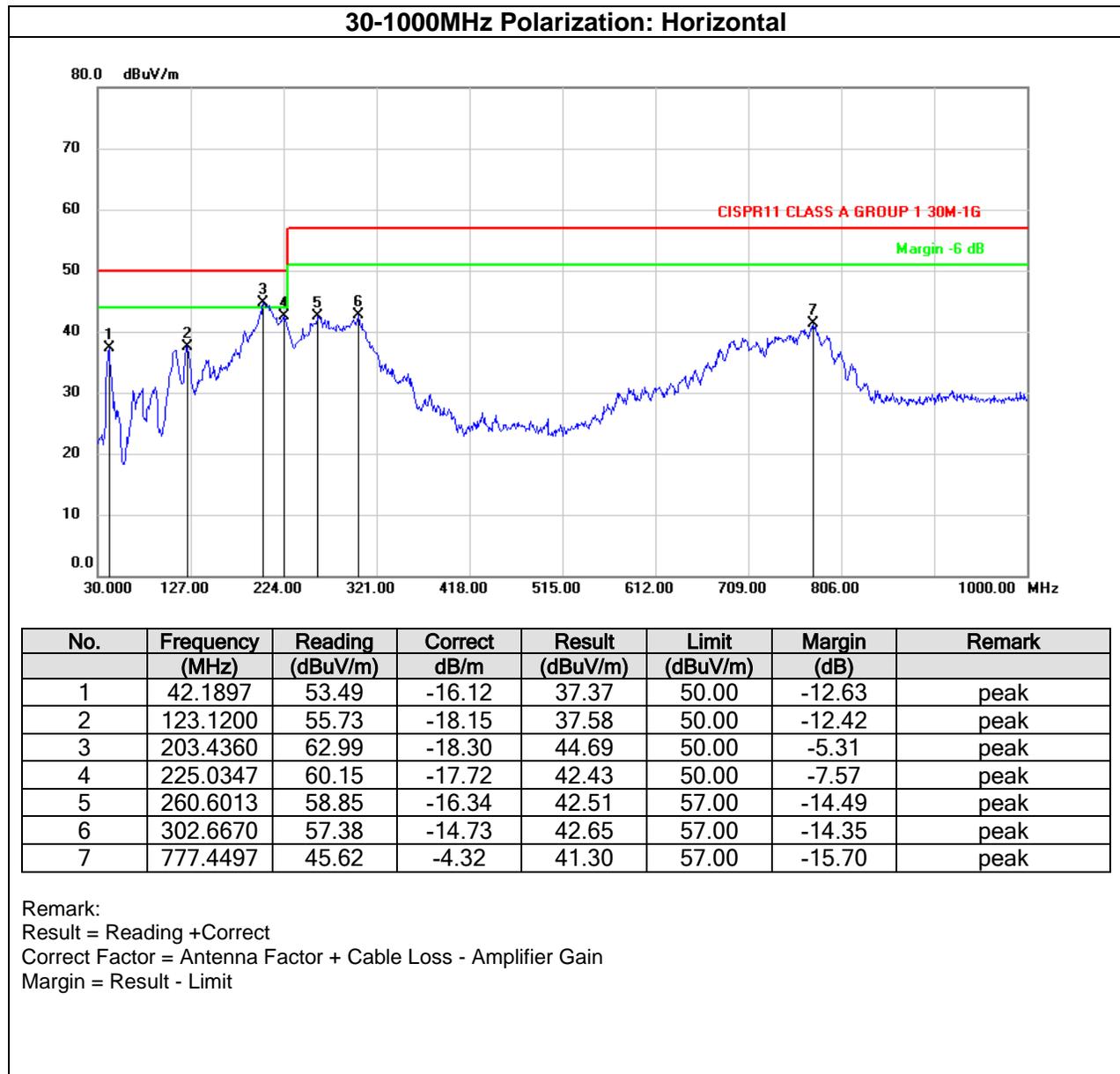


For the actual test configuration, please refer to Appendix I: Photographs of the Test Configuration.

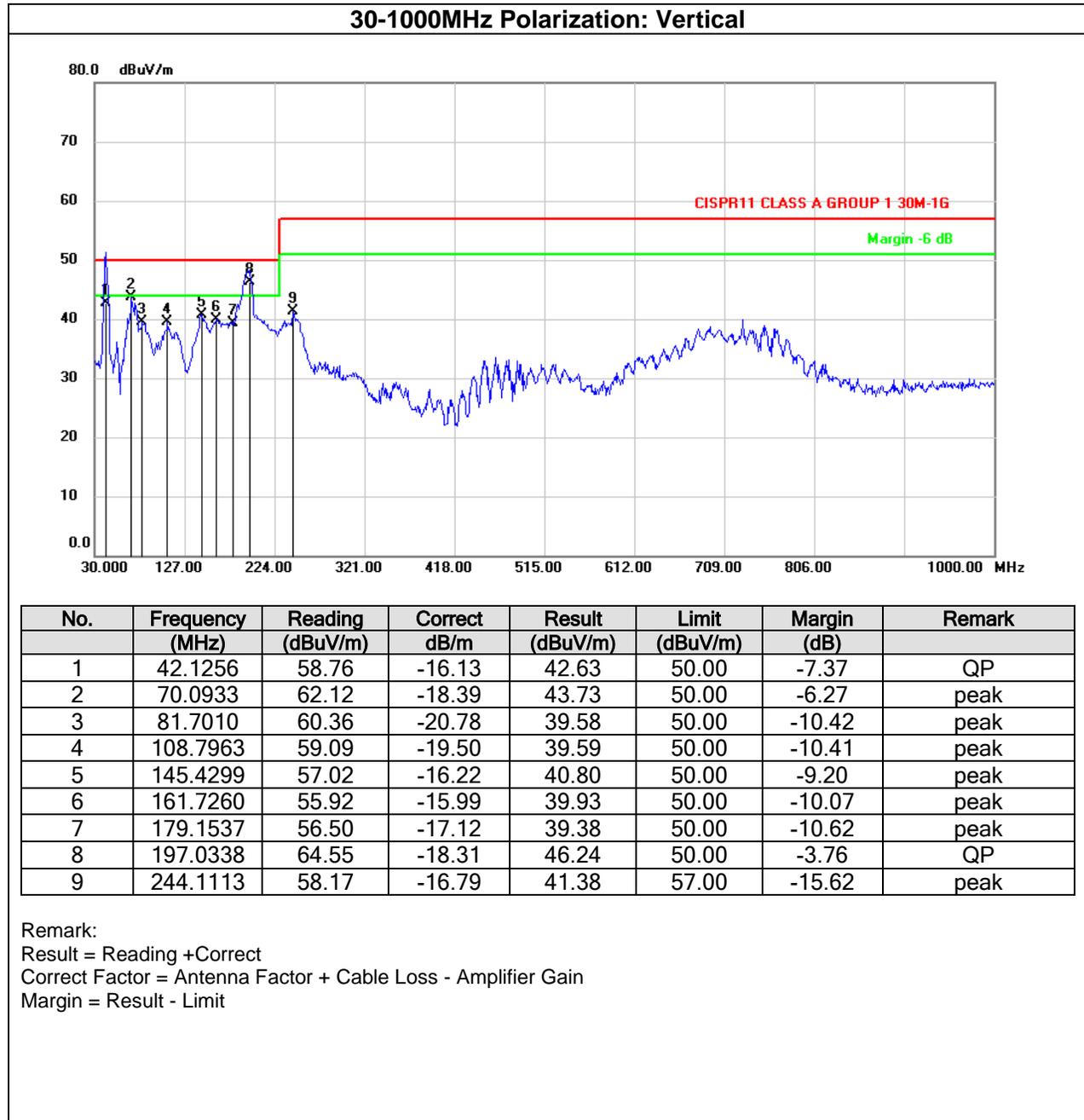


6.2.4. Test Result

Test Mode:	Mode 1	Temperature:	25°C
Test Voltage:	AC 230V/50Hz	Humidity:	52%RH
Tested By:	Eric T. Fan	Test Date:	Jul. 10, 2019



Test Mode:	Mode 1	Temperature:	25°C
Test Voltage:	AC 230V/50Hz	Humidity:	52%RH
Tested By:	Eric T. Fan	Test Date:	Jul. 10, 2019



Test Mode:	Mode 2	Temperature:	25°C
Test Voltage:	AC 230V/50Hz	Humidity:	52%RH
Tested By:	Eric T. Fan	Test Date:	Jul. 10, 2019

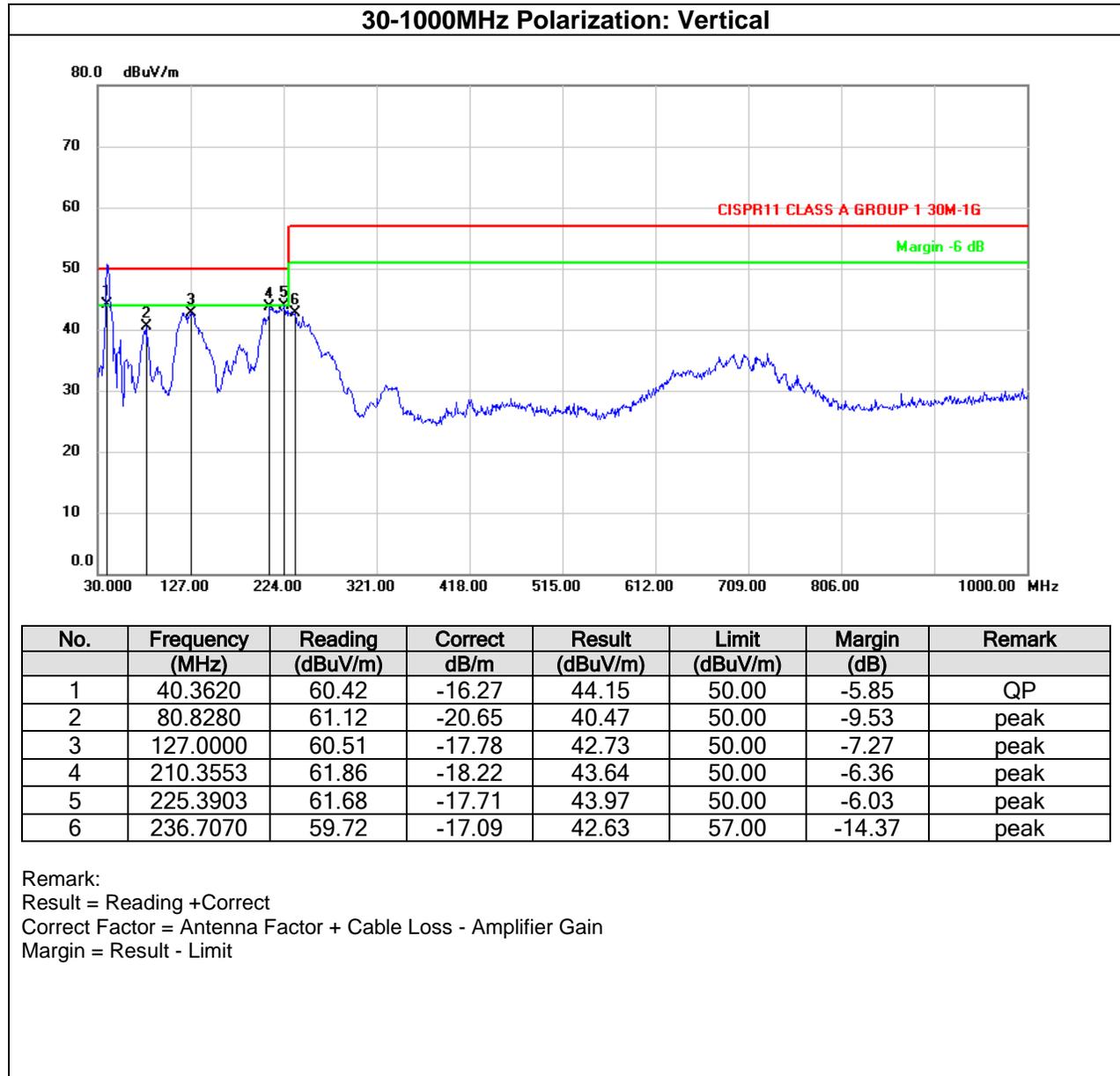
30-1000MHz Polarization: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	40.9287	54.74	-16.22	38.52	50.00	-11.48	peak
2	152.9960	55.71	-16.08	39.63	50.00	-10.37	peak
3	209.9027	61.95	-18.24	43.71	50.00	-6.29	peak
4	224.3880	62.70	-17.75	44.95	50.00	-5.05	peak
5	255.8483	60.96	-16.48	44.48	57.00	-12.52	peak
6	280.3893	59.69	-15.36	44.33	57.00	-12.67	peak

Remark:
 Result = Reading +Correct
 Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain
 Margin = Result - Limit

Test Mode:	Mode 2	Temperature:	25°C
Test Voltage:	AC 230V/50Hz	Humidity:	52%RH
Tested By:	Eric T. Fan	Test Date:	Jul. 10, 2019



6.3. Harmonic Current Disturbance Measurement

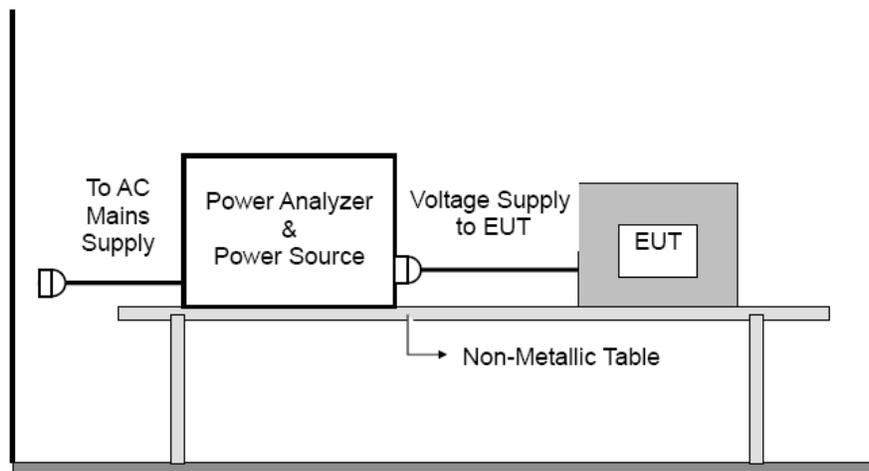
6.3.1. Limits of Harmonic Current

EN 61000-3-2/IEC 61000-3-2						
Equipment Category	Harmonic Order	Max. Permissible Harmonic Current	Equipment Category	Harmonic Order	Max. Permissible Harmonic Current	
	n	A		n	A mA/w	
Class A	Odd Harmonics		Class D	Odd Harmonics only		
	3	2.30		3	2.30	3.4
	5	1.14		5	1.14	1.9
	7	0.77		7	0.77	1.0
	9	0.40		9	0.40	0.5
	11	0.33		11	0.33	0.35
	13	0.21		13	0.21	0.30
	15 ≤ n ≤ 39	0.15 x 15/n		15 ≤ n ≤ 39	0.15 x 15/n	3.85/n
	Even Harmonics					
	2	1.08				
	4	0.43				
	6	0.30				
	8 ≤ n ≤ 40	0.23 x 8/n				

6.3.2. Test Procedure

- a. The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce under normal conditions
- b. Tests was performed according to the Test the measured values of the harmonics components of the input current in Clause 7 of IEC/EN 61000-3-2 depend on which standard adopted for compliance measurement.

6.3.3. Test Setup and Configuration



For the actual test configuration, please refer to Appendix I: Photographs of the Test Configuration.

6.3.4. Test Condition

Test Mode:	Mode 1	Temperature:	23°C
Test Voltage:	230V/50Hz	Humidity:	60%RH
Tested By:	Eric T. Fan	Test Date:	July 15, 2018

Test Mode:	Mode 2	Temperature:	23°C
Test Voltage:	230V/50Hz	Humidity:	60%RH
Tested By:	Eric T. Fan	Test Date:	July 16, 2018

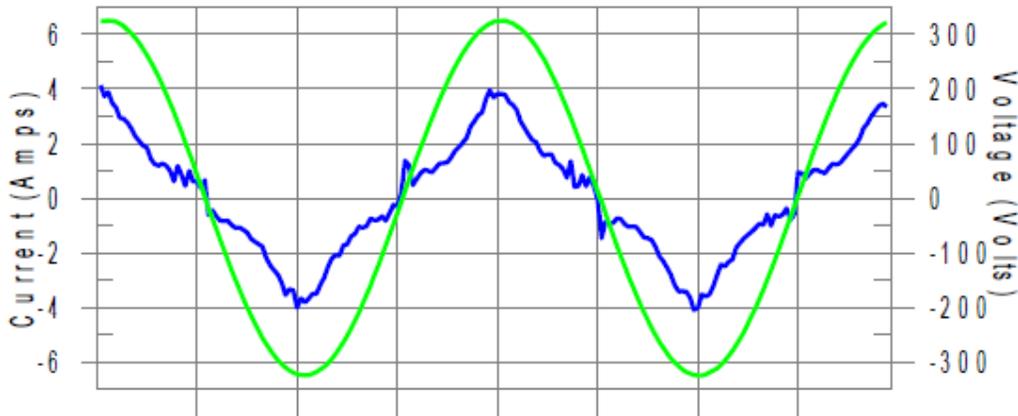
6.3.5. Test Result

Mode 1 :

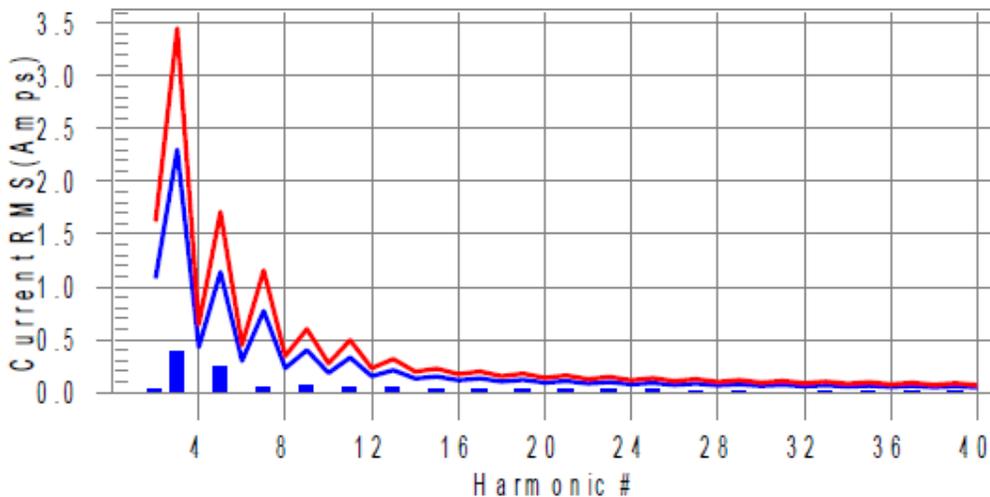
Harmonics – Class-A per Ed. 4.0 (2014)(Run time) incl. inter-harmonics

Test Result: Pass Source qualification: Normal

Current & voltage waveforms



Harmonics and Class A limit line European Limits



Test result: Pass Worst harmonics H37-23.5% of 150% limit, H39-28.4% of 100% limit

CURRENT TEST RESULT SUMMARY (RUN TIME)

Test Result: Pass Source qualification: Normal
 THC(A): 0.474 I-THD(%): 22.9 POHC(A): 0.062 POHC Limit(A): 0.251

Highest parameter values during test:

V_RMS (Volts): 229.97	Frequency(Hz): 50.00
I_Peak (Amps): 4.437	I_RMS (Amps): 2.134
I_Fund (Amps): 2.075	Crest Factor: 2.130
Power (Watts): 475.7	Power Factor: 0.970

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.033	1.080	3.0	0.037	1.620	2.3	Pass
3	0.384	2.300	16.7	0.390	3.450	11.3	Pass
4	0.010	0.430	N/A	0.013	0.645	N/A	Pass
5	0.242	1.140	21.2	0.251	1.710	14.7	Pass
6	0.009	0.300	N/A	0.011	0.450	N/A	Pass
7	0.042	0.770	5.5	0.049	1.155	4.2	Pass
8	0.010	0.230	N/A	0.012	0.345	N/A	Pass
9	0.063	0.400	15.8	0.070	0.600	11.6	Pass
10	0.010	0.184	N/A	0.012	0.276	N/A	Pass
11	0.040	0.330	12.2	0.044	0.495	8.9	Pass
12	0.010	0.153	N/A	0.012	0.230	N/A	Pass
13	0.044	0.210	20.8	0.050	0.315	15.8	Pass
14	0.010	0.131	N/A	0.012	0.197	N/A	Pass
15	0.025	0.150	16.5	0.031	0.225	13.7	Pass
16	0.010	0.115	N/A	0.013	0.173	N/A	Pass
17	0.032	0.132	23.9	0.034	0.198	17.3	Pass
18	0.010	0.102	N/A	0.013	0.153	N/A	Pass
19	0.024	0.118	20.2	0.029	0.178	16.1	Pass
20	0.010	0.092	N/A	0.012	0.138	N/A	Pass
21	0.029	0.107	26.7	0.033	0.161	20.3	Pass
22	0.011	0.084	N/A	0.014	0.125	N/A	Pass
23	0.022	0.098	22.5	0.025	0.147	16.9	Pass
24	0.011	0.077	N/A	0.013	0.115	N/A	Pass
25	0.023	0.090	25.5	0.027	0.135	19.8	Pass
26	0.011	0.071	N/A	0.014	0.107	N/A	Pass
27	0.016	0.083	19.2	0.019	0.125	15.6	Pass
28	0.011	0.066	N/A	0.014	0.099	N/A	Pass
29	0.020	0.078	25.6	0.022	0.116	19.3	Pass
30	0.011	0.061	N/A	0.014	0.092	N/A	Pass
31	0.014	0.073	19.0	0.018	0.109	16.5	Pass
32	0.012	0.058	N/A	0.014	0.086	N/A	Pass
33	0.016	0.068	24.1	0.020	0.102	19.5	Pass
34	0.011	0.054	N/A	0.014	0.081	N/A	Pass
35	0.018	0.064	27.2	0.020	0.096	20.8	Pass
36	0.011	0.051	N/A	0.016	0.077	N/A	Pass
37	0.017	0.061	28.2	0.021	0.091	23.5	Pass
38	0.012	0.048	N/A	0.015	0.073	N/A	Pass
39	0.016	0.058	28.4	0.019	0.087	22.5	Pass
40	0.008	0.046	N/A	0.011	0.069	N/A	Pass

Voltage Source Verification Data (Run time)

Test Result: Pass Source qualification: Normal

Highest parameter values during test:

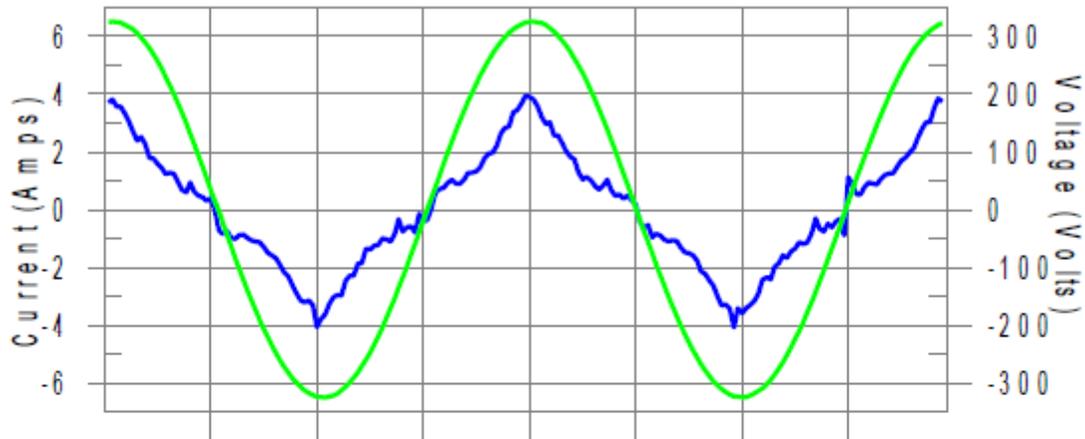
Voltage (Vrms): 229.97	Frequency(Hz): 50.00
I _{Peak} (Amps): 4.437	I _{RMS} (Amps): 2.134
I _{Fund} (Amps): 2.075	Crest Factor: 2.130
Power (Watts): 475.7	Power Factor: 0.970

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.041	0.460	8.87	OK
3	0.420	2.069	20.30	OK
4	0.021	0.460	4.49	OK
5	0.042	0.920	4.56	OK
6	0.022	0.460	4.86	OK
7	0.018	0.690	2.66	OK
8	0.016	0.460	3.37	OK
9	0.028	0.460	5.99	OK
10	0.018	0.460	3.89	OK
11	0.022	0.230	9.58	OK
12	0.017	0.230	7.48	OK
13	0.032	0.230	13.75	OK
14	0.015	0.230	6.36	OK
15	0.025	0.230	11.05	OK
16	0.010	0.230	4.53	OK
17	0.019	0.230	8.41	OK
18	0.017	0.230	7.26	OK
19	0.019	0.230	8.07	OK
20	0.015	0.230	6.56	OK
21	0.027	0.230	11.70	OK
22	0.014	0.230	6.03	OK
23	0.023	0.230	9.79	OK
24	0.012	0.230	5.00	OK
25	0.026	0.230	11.47	OK
26	0.013	0.230	5.65	OK
27	0.018	0.230	7.74	OK
28	0.013	0.230	5.52	OK
29	0.021	0.230	9.14	OK
30	0.012	0.230	5.33	OK
31	0.021	0.230	9.12	OK
32	0.014	0.230	6.03	OK
33	0.019	0.230	8.22	OK
34	0.013	0.230	5.71	OK
35	0.024	0.230	10.57	OK
36	0.012	0.230	5.26	OK
37	0.023	0.230	10.11	OK
38	0.015	0.230	6.35	OK
39	0.023	0.230	9.99	OK
40	0.015	0.230	6.72	OK

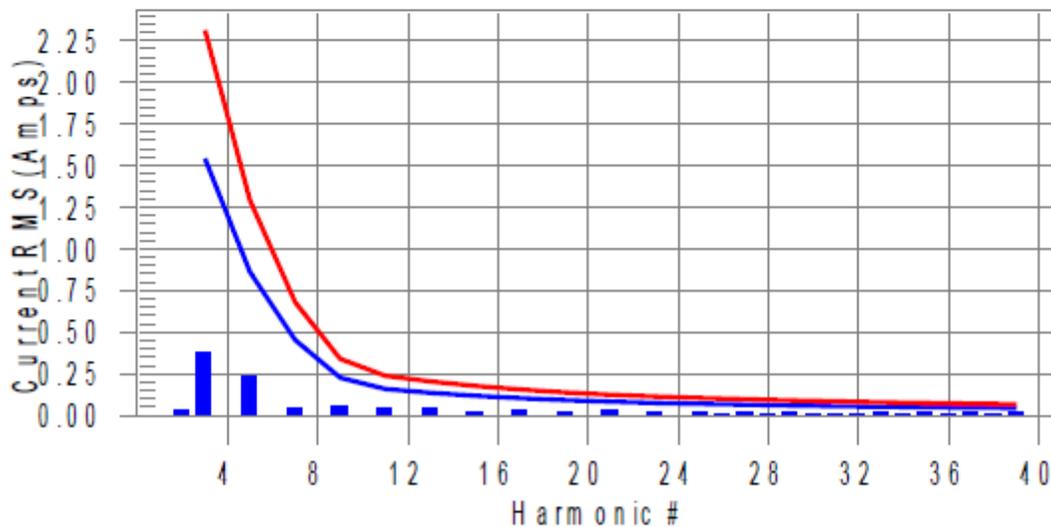
Harmonics – Class-D per Ed. 4.0 (2014)(Run time) incl. inter-harmonics

Test Result: Pass Source qualification: Normal

Current & voltage waveforms



Harmonics and Class D limit line European Limits



Test result: Pass Worst harmonics H39-27.2% of 150% limit, H35-34.8% of 100% limit

Current Test Result Summary (Run time)

Test Result: Pass Source qualification: Normal
 THC(A): 0.465 I-THD(%): 23.6 POHC(A): 0.058 POHC Limit(A): 0.195

Highest parameter values during test:

V _{RMS} (Volts): 229.97	Frequency(Hz): 50.00
I _{Peak} (Amps): 4.263	I _{RMS} (Amps): 2.036
I _{Fund} (Amps): 1.976	Crest Factor: 2.113
Power (Watts): 453.4	Power Factor: 0.969

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.032	0.000	N/A	0.036	0.000	N/A	Pass
3	0.381	1.542	24.7	0.382	2.312	16.5	Pass
4	0.010	0.000	N/A	0.012	0.000	N/A	Pass
5	0.235	0.861	27.3	0.238	1.292	18.4	Pass
6	0.009	0.000	N/A	0.011	0.000	N/A	Pass
7	0.038	0.453	8.5	0.041	0.680	6.0	Pass
8	0.009	0.000	N/A	0.013	0.000	N/A	Pass
9	0.060	0.227	26.3	0.063	0.340	18.6	Pass
10	0.009	0.000	N/A	0.012	0.000	N/A	Pass
11	0.038	0.159	24.3	0.041	0.238	17.3	Pass
12	0.009	0.000	N/A	0.011	0.000	N/A	Pass
13	0.040	0.136	29.2	0.043	0.204	21.0	Pass
14	0.010	0.000	N/A	0.011	0.000	N/A	Pass
15	0.022	0.118	19.0	0.027	0.177	15.1	Pass
16	0.009	0.000	N/A	0.012	0.000	N/A	Pass
17	0.030	0.104	28.7	0.033	0.156	21.3	Pass
18	0.010	0.000	N/A	0.013	0.000	N/A	Pass
19	0.022	0.092	23.9	0.026	0.138	18.7	Pass
20	0.009	0.000	N/A	0.012	0.000	N/A	Pass
21	0.027	0.083	32.3	0.029	0.124	23.6	Pass
22	0.010	0.000	N/A	0.013	0.000	N/A	Pass
23	0.021	0.076	28.2	0.024	0.114	20.8	Pass
24	0.010	0.000	N/A	0.013	0.000	N/A	Pass
25	0.021	0.070	29.6	0.023	0.105	22.4	Pass
26	0.011	0.000	N/A	0.013	0.000	N/A	Pass
27	0.015	0.065	23.2	0.018	0.097	18.1	Pass
28	0.011	0.000	N/A	0.015	0.000	N/A	Pass
29	0.019	0.060	31.6	0.022	0.090	23.9	Pass
30	0.011	0.000	N/A	0.013	0.000	N/A	Pass
31	0.013	0.056	22.6	0.016	0.084	18.7	Pass
32	0.011	0.000	N/A	0.014	0.000	N/A	Pass
33	0.016	0.053	30.4	0.019	0.079	24.1	Pass
34	0.011	0.000	N/A	0.013	0.000	N/A	Pass
35	0.017	0.050	34.8	0.019	0.075	26.0	Pass
36	0.012	0.000	N/A	0.014	0.000	N/A	Pass
37	0.016	0.047	34.6	0.018	0.071	26.1	Pass
38	0.012	0.000	N/A	0.014	0.000	N/A	Pass
39	0.015	0.045	34.5	0.018	0.067	27.2	Pass
40	0.008	0.000	N/A	0.011	0.000	N/A	Pass

Voltage Source Verification Data (Run time)**Test Result: Pass Source qualification: Normal****Highest parameter values during test:**

Voltage (Vrms):	229.97	Frequency(Hz):	50.00
I Peak (Amps):	4.263	I RMS (Amps):	2.036
I Fund (Amps):	1.976	Crest Factor:	2.113
Power (Watts):	453.4	Power Factor:	0.969

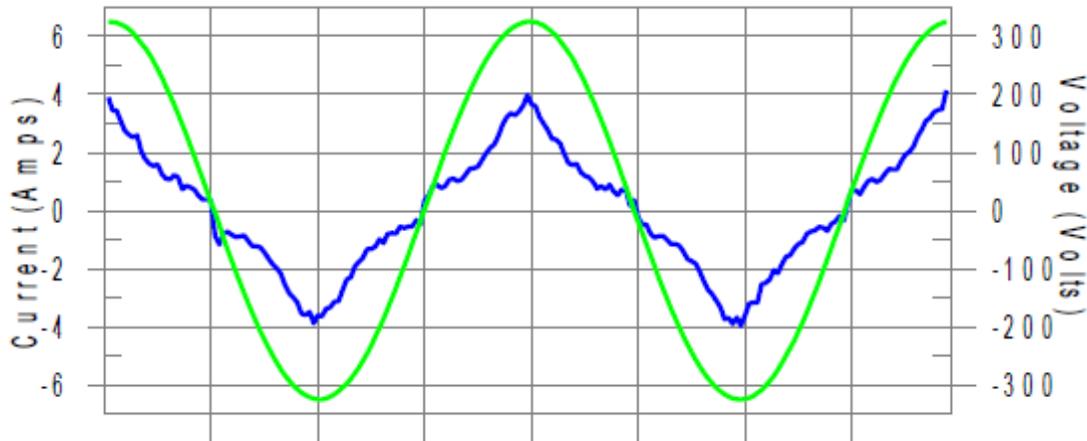
Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.039	0.460	8.45	OK
3	0.420	2.069	20.32	OK
4	0.020	0.460	4.37	OK
5	0.043	0.920	4.66	OK
6	0.020	0.460	4.37	OK
7	0.019	0.690	2.75	OK
8	0.015	0.460	3.37	OK
9	0.031	0.460	6.76	OK
10	0.014	0.460	3.06	OK
11	0.026	0.230	11.37	OK
12	0.018	0.230	7.87	OK
13	0.032	0.230	13.99	OK
14	0.012	0.230	5.10	OK
15	0.026	0.230	11.28	OK
16	0.010	0.230	4.41	OK
17	0.021	0.230	9.04	OK
18	0.014	0.230	5.89	OK
19	0.018	0.230	7.93	OK
20	0.013	0.230	5.46	OK
21	0.031	0.230	13.29	OK
22	0.011	0.230	4.72	OK
23	0.022	0.230	9.73	OK
24	0.011	0.230	4.72	OK
25	0.022	0.230	9.70	OK
26	0.010	0.230	4.55	OK
27	0.018	0.230	7.85	OK
28	0.011	0.230	4.58	OK
29	0.023	0.230	9.99	OK
30	0.012	0.230	5.22	OK
31	0.017	0.230	7.39	OK
32	0.013	0.230	5.66	OK
33	0.021	0.230	9.11	OK
34	0.012	0.230	5.26	OK
35	0.024	0.230	10.60	OK
36	0.012	0.230	5.16	OK
37	0.021	0.230	9.30	OK
38	0.014	0.230	5.92	OK
39	0.025	0.230	10.81	OK
40	0.016	0.230	7.03	OK

Mode 2 :

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

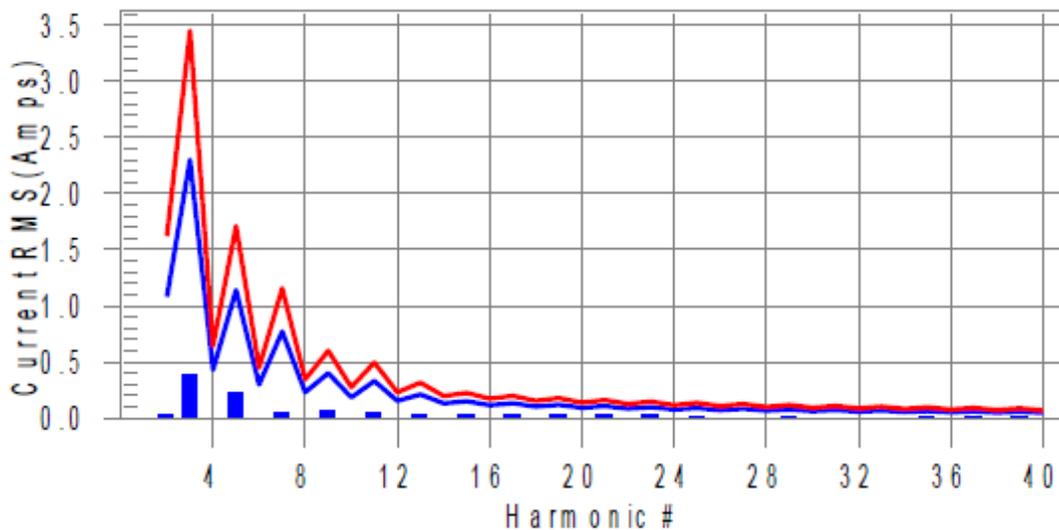
Test Result: Pass Source qualification: Normal

Current & voltage waveforms



Harmonics and Class A limit line

European Limits



Test result: Pass Worst harmonics H39-21.1% of 150% limit, H39-27.9% of 100% limit

Current Test Result Summary (Run time)

Test Result: Pass **Source qualification: Normal**
THC(A): 0.461 **I-THD(%): 22.9** **POHC(A): 0.057** **POHC Limit(A): 0.251**

Highest parameter values during test:

V_{RMS} (Volts): 229.97	Frequency(Hz): 50.00
I_{Peak} (Amps): 4.259	I_{RMS} (Amps): 2.068
I_{Fund} (Amps): 2.011	Crest Factor: 2.065
Power (Watts): 461.4	Power Factor: 0.971

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.035	1.080	3.3	0.037	1.620	2.3	Pass
3	0.378	2.300	16.4	0.380	3.450	11.0	Pass
4	0.010	0.430	N/A	0.011	0.645	N/A	Pass
5	0.232	1.140	20.4	0.235	1.710	13.7	Pass
6	0.010	0.300	N/A	0.012	0.450	N/A	Pass
7	0.042	0.770	5.4	0.044	1.155	3.8	Pass
8	0.011	0.230	N/A	0.013	0.345	N/A	Pass
9	0.056	0.400	14.1	0.058	0.600	9.7	Pass
10	0.010	0.184	N/A	0.012	0.276	N/A	Pass
11	0.039	0.330	11.8	0.041	0.495	8.3	Pass
12	0.009	0.153	N/A	0.010	0.230	N/A	Pass
13	0.036	0.210	17.0	0.038	0.315	12.1	Pass
14	0.010	0.131	N/A	0.012	0.197	N/A	Pass
15	0.024	0.150	15.8	0.025	0.225	11.3	Pass
16	0.010	0.115	N/A	0.011	0.173	N/A	Pass
17	0.029	0.132	22.1	0.031	0.198	15.4	Pass
18	0.010	0.102	N/A	0.012	0.153	N/A	Pass
19	0.022	0.118	18.2	0.023	0.178	13.0	Pass
20	0.009	0.092	N/A	0.011	0.138	N/A	Pass
21	0.028	0.107	26.0	0.029	0.161	18.3	Pass
22	0.010	0.084	N/A	0.012	0.125	N/A	Pass
23	0.021	0.098	21.3	0.024	0.147	16.1	Pass
24	0.010	0.077	N/A	0.012	0.115	N/A	Pass
25	0.018	0.090	20.5	0.020	0.135	15.1	Pass
26	0.010	0.071	N/A	0.012	0.107	N/A	Pass
27	0.014	0.083	17.1	0.016	0.125	12.7	Pass
28	0.010	0.066	N/A	0.012	0.099	N/A	Pass
29	0.016	0.078	21.2	0.018	0.116	15.8	Pass
30	0.011	0.061	N/A	0.014	0.092	N/A	Pass
31	0.014	0.073	19.0	0.016	0.109	14.7	Pass
32	0.011	0.058	N/A	0.012	0.086	N/A	Pass
33	0.015	0.068	22.3	0.019	0.102	18.6	Pass
34	0.011	0.054	N/A	0.012	0.081	N/A	Pass
35	0.016	0.064	25.3	0.018	0.096	18.4	Pass
36	0.010	0.051	N/A	0.012	0.077	N/A	Pass
37	0.017	0.061	27.7	0.019	0.091	20.6	Pass
38	0.012	0.048	N/A	0.013	0.073	N/A	Pass
39	0.016	0.058	27.9	0.018	0.087	21.1	Pass
40	0.007	0.046	N/A	0.009	0.069	N/A	Pass

Voltage Source Verification Data (Run time)**Test Result: Pass** **Source qualification: Normal****Highest parameter values during test:**

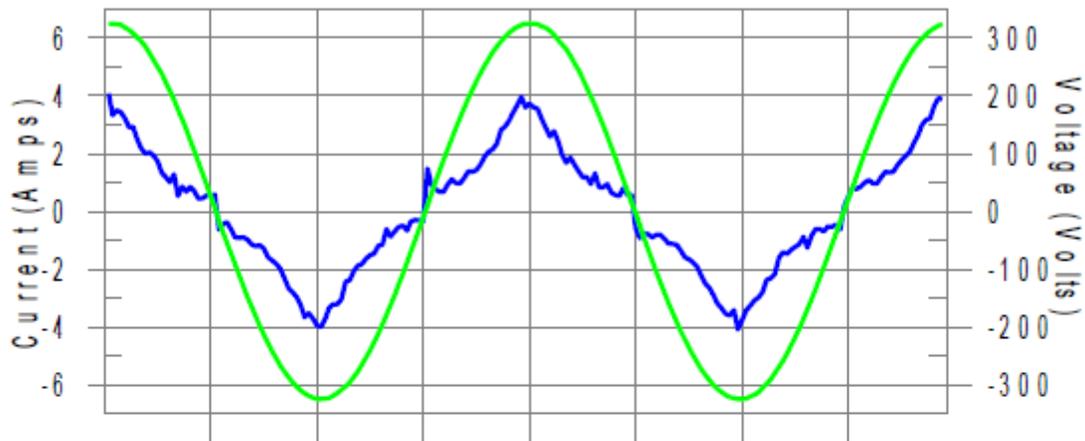
Voltage (Vrms):	229.97	Frequency(Hz):	50.00
I_Peak (Amps):	4.259	I_RMS (Amps):	2.068
I_Fund (Amps):	2.011	Crest Factor:	2.065
Power (Watts):	461.4	Power Factor:	0.971

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.026	0.460	5.72	OK
3	0.428	2.070	20.69	OK
4	0.020	0.460	4.31	OK
5	0.045	0.920	4.91	OK
6	0.019	0.460	4.06	OK
7	0.016	0.690	2.33	OK
8	0.019	0.460	4.22	OK
9	0.025	0.460	5.40	OK
10	0.013	0.460	2.77	OK
11	0.028	0.230	12.08	OK
12	0.021	0.230	9.07	OK
13	0.025	0.230	10.91	OK
14	0.012	0.230	5.08	OK
15	0.025	0.230	11.06	OK
16	0.011	0.230	4.67	OK
17	0.020	0.230	8.72	OK
18	0.016	0.230	6.84	OK
19	0.017	0.230	7.56	OK
20	0.014	0.230	5.96	OK
21	0.024	0.230	10.25	OK
22	0.011	0.230	4.73	OK
23	0.032	0.230	14.07	OK
24	0.010	0.230	4.54	OK
25	0.026	0.230	11.31	OK
26	0.010	0.230	4.16	OK
27	0.018	0.230	8.00	OK
28	0.008	0.230	3.56	OK
29	0.016	0.230	6.76	OK
30	0.011	0.230	4.93	OK
31	0.016	0.230	6.90	OK
32	0.011	0.230	4.87	OK
33	0.018	0.230	7.68	OK
34	0.010	0.230	4.34	OK
35	0.023	0.230	10.19	OK
36	0.009	0.230	3.85	OK
37	0.026	0.230	11.34	OK
38	0.014	0.230	5.92	OK
39	0.030	0.230	13.24	OK
40	0.015	0.230	6.52	OK

Harmonics – Class-D per Ed. 4.0 (2014)(Run time) incl. inter-harmonics

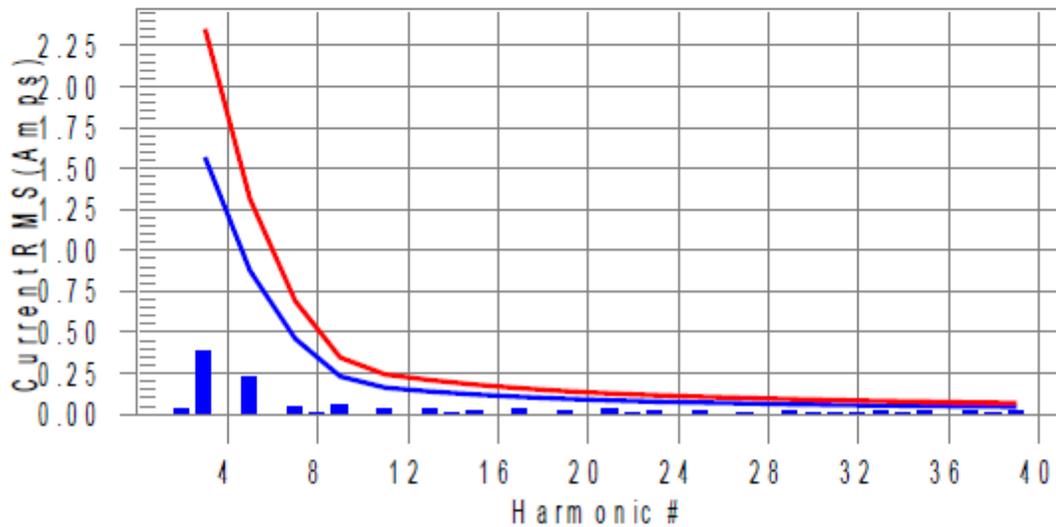
Test Result: Pass Source qualification: Normal

Current & voltage waveforms



Harmonics and Class D limit line

European Limits



Test result: Pass Worst harmonics H39-29.2% of 150% limit, H39-33.8% of 100% limit

Current Test Result Summary (Run time)

Test Result: Pass **Source qualification: Normal**
THC(A): 0.462 **I-THD(%): 23.0** **POHC(A): 0.056** **POHC Limit(A): 0.198**

Highest parameter values during test:

V RMS (Volts):	229.97	Frequency(Hz):	50.00
I Peak (Amps):	4.269	I RMS (Amps):	2.066
I Fund (Amps):	2.009	Crest Factor:	2.072
Power (Watts):	461.1	Power Factor:	0.971

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.035	0.000	N/A	0.037	0.000	N/A	Pass
3	0.380	1.568	24.2	0.383	2.352	16.3	Pass
4	0.010	0.000	N/A	0.012	0.000	N/A	Pass
5	0.231	0.876	26.4	0.233	1.314	17.8	Pass
6	0.010	0.000	N/A	0.013	0.000	N/A	Pass
7	0.040	0.461	8.8	0.043	0.692	6.2	Pass
8	0.011	0.000	N/A	0.014	0.000	N/A	Pass
9	0.056	0.231	24.1	0.058	0.346	16.8	Pass
10	0.010	0.000	N/A	0.012	0.000	N/A	Pass
11	0.038	0.161	23.7	0.040	0.242	16.7	Pass
12	0.009	0.000	N/A	0.011	0.000	N/A	Pass
13	0.035	0.138	25.1	0.037	0.208	17.9	Pass
14	0.011	0.000	N/A	0.013	0.000	N/A	Pass
15	0.023	0.120	19.5	0.025	0.180	14.1	Pass
16	0.010	0.000	N/A	0.012	0.000	N/A	Pass
17	0.029	0.106	27.2	0.031	0.159	19.3	Pass
18	0.009	0.000	N/A	0.011	0.000	N/A	Pass
19	0.021	0.094	22.2	0.023	0.140	16.1	Pass
20	0.008	0.000	N/A	0.012	0.000	N/A	Pass
21	0.028	0.084	32.7	0.029	0.127	23.0	Pass
22	0.011	0.000	N/A	0.013	0.000	N/A	Pass
23	0.020	0.077	26.2	0.023	0.116	19.9	Pass
24	0.010	0.000	N/A	0.012	0.000	N/A	Pass
25	0.019	0.071	26.5	0.020	0.107	19.2	Pass
26	0.010	0.000	N/A	0.011	0.000	N/A	Pass
27	0.013	0.066	19.9	0.016	0.099	16.2	Pass
28	0.009	0.000	N/A	0.013	0.000	N/A	Pass
29	0.016	0.061	25.7	0.018	0.092	19.2	Pass
30	0.012	0.000	N/A	0.013	0.000	N/A	Pass
31	0.013	0.057	23.2	0.017	0.086	20.2	Pass
32	0.011	0.000	N/A	0.013	0.000	N/A	Pass
33	0.016	0.053	29.0	0.018	0.080	22.1	Pass
34	0.011	0.000	N/A	0.012	0.000	N/A	Pass
35	0.017	0.051	33.1	0.021	0.076	27.0	Pass
36	0.010	0.000	N/A	0.014	0.000	N/A	Pass
37	0.015	0.048	32.2	0.019	0.072	25.7	Pass
38	0.011	0.000	N/A	0.013	0.000	N/A	Pass
39	0.015	0.046	33.8	0.020	0.068	29.2	Pass
40	0.007	0.000	N/A	0.008	0.000	N/A	Pass

Voltage Source Verification Data (Run time)**Test Result: Pass** **Source qualification: Normal****Highest parameter values during test:**

Voltage (Vrms):	229.97	Frequency(Hz):	50.00
I _{Peak} (Amps):	4.269	I _{RMS} (Amps):	2.066
I _{Fund} (Amps):	2.009	Crest Factor:	2.072
Power (Watts):	461.1	Power Factor:	0.971

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.026	0.460	5.71	OK
3	0.428	2.069	20.69	OK
4	0.020	0.460	4.31	OK
5	0.045	0.920	4.93	OK
6	0.017	0.460	3.69	OK
7	0.015	0.690	2.23	OK
8	0.025	0.460	5.49	OK
9	0.029	0.460	6.34	OK
10	0.013	0.460	2.89	OK
11	0.031	0.230	13.42	OK
12	0.020	0.230	8.80	OK
13	0.025	0.230	11.01	OK
14	0.011	0.230	4.76	OK
15	0.025	0.230	10.77	OK
16	0.017	0.230	7.39	OK
17	0.023	0.230	9.94	OK
18	0.015	0.230	6.31	OK
19	0.016	0.230	6.89	OK
20	0.016	0.230	7.04	OK
21	0.024	0.230	10.55	OK
22	0.010	0.230	4.37	OK
23	0.032	0.230	14.12	OK
24	0.014	0.230	6.24	OK
25	0.029	0.230	12.51	OK
26	0.010	0.230	4.47	OK
27	0.020	0.230	8.64	OK
28	0.013	0.230	5.76	OK
29	0.014	0.230	6.12	OK
30	0.011	0.230	4.71	OK
31	0.017	0.230	7.51	OK
32	0.013	0.230	5.68	OK
33	0.015	0.230	6.31	OK
34	0.010	0.230	4.47	OK
35	0.032	0.230	13.78	OK
36	0.013	0.230	5.71	OK
37	0.024	0.230	10.40	OK
38	0.011	0.230	4.89	OK
39	0.033	0.230	14.30	OK
40	0.014	0.230	6.13	OK

6.4. Voltage Fluctuation and Flick Measurement

6.4.1. Limits of Voltage Fluctuation and Flick

Test items	Limits	Descriptions
P_{st}	$\leq 1.0, T_p=10\text{min}$	short-term flicker indicator
P_{lt}	$\leq 0.65, T_p=2\text{h}$	long-term flicker indicator
d_c	$\leq 3.3\%$	relative steady-state voltage change
d_{max}	$\leq 4\%$ (or 6% ^{Note(1)} , 7% ^{Note(2)})	maximum relative voltage change:
$d_{(t)}$	$\leq 3.3\%$, more than 500ms	relative voltage change characteristic

Note:

(1)6 % for equipment which is:

- a. switched manually, or
- b. switched automatically more frequently than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds), or manual restart, after a power supply interruption.

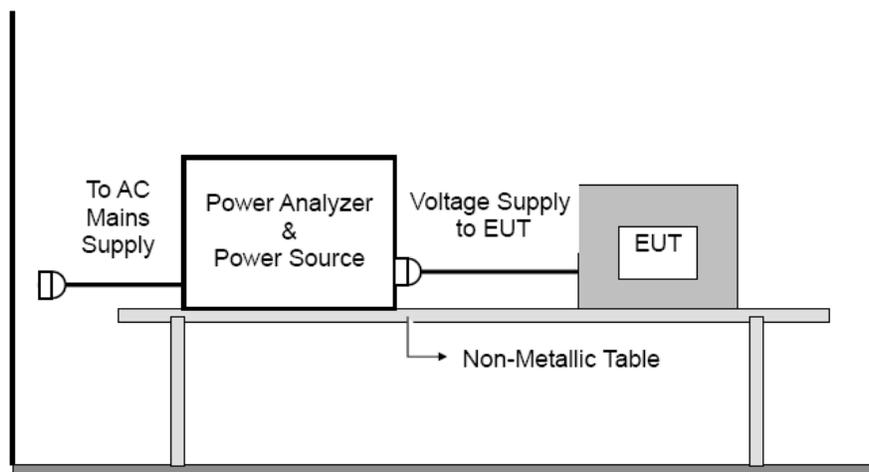
(2)7 % for equipment which is

- a. attended whilst in use (for example: hair dryers, vacuum cleaners, kitchen equipment such as mixers, garden equipment such as lawn mowers, portable tools such as electric drills), or
- b. switched on automatically, or is intended to be switched on manually, no more than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds) or manual restart, after a power supply interruption.

6.4.2. Test Procedure

- a. The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the most unfavorable sequence of voltage changes under normal conditions
- b. During the flick measurement, the measure time shall include that part of whole operation changes according to IEC/EN 61000-3-3 Annex A for each product type has different requirement.
- c. Tests was performed according to the Test Conditions/Assessment of Voltage Fluctuations specified in Clause 6.0/4.0 of IEC/EN 61000-3-3 depend on which standard adopted for compliance measurement.
- d. All types of harmonic current and/or voltage fluctuation in this report are assessed by direct measurement using flicker-meter.

6.4.3. Test Setup and Configuration



For the actual test configuration, please refer to Appendix I: Photographs of the Test Configuration.

6.4.4. Test Condition

Test Mode:	Mode 1	Temperature:	23°C
Test Voltage:	230V/50Hz	Humidity:	60%RH
Tested By:	Eric T. Fan	Test Date:	Jul. 15, 2019

Test Mode:	Mode 2	Temperature:	23°C
Test Voltage:	230V/50Hz	Humidity:	60%RH
Tested By:	Eric T. Fan	Test Date:	Jul. 16, 2019

6.4.5. Test Result

Mode 1:

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

Test Result: Pass

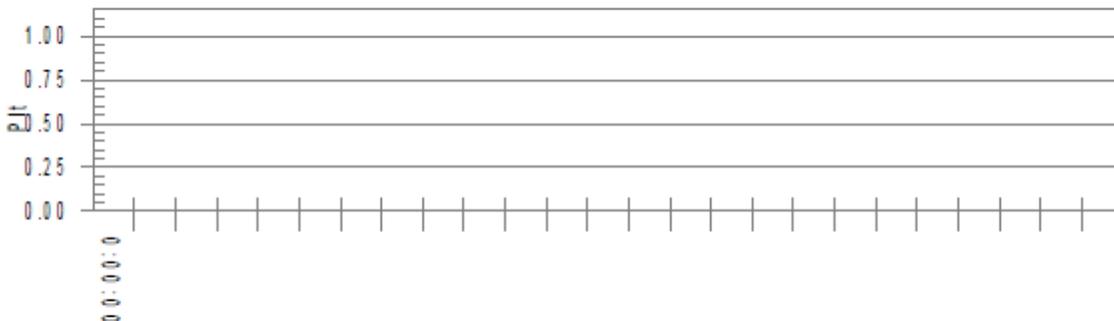
Status: Test Completed

Pst_t and limit line

European Limits



Plt and limit line



Parameter values recorded during the test:

Vrms at the end of test (Volt):	229.13		
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

Mode 2:

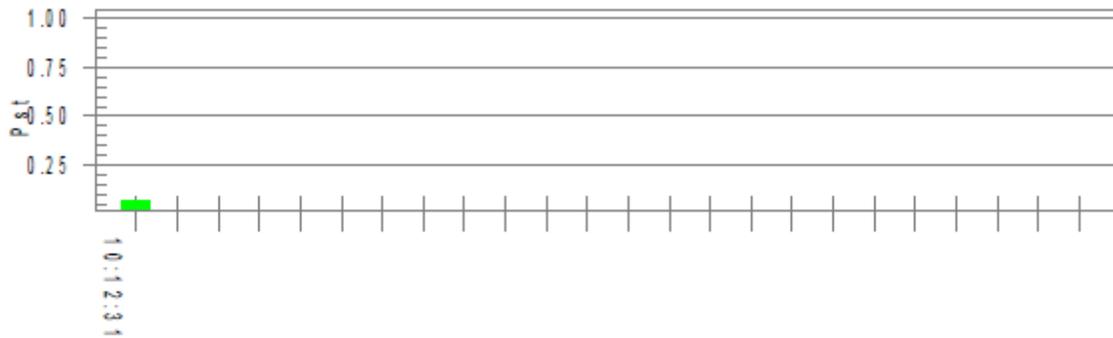
Flicker Test Summary per EN/IEC61000-3-3 Ed. 3.0 (2013) (Run time)

Test Result: Pass

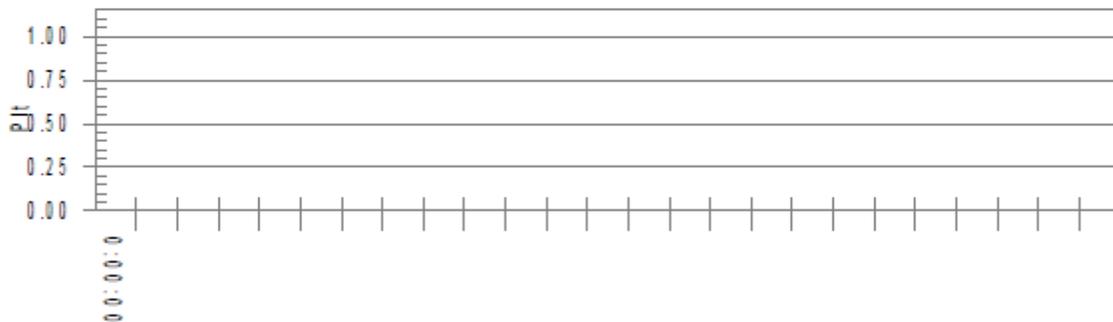
Status: Test Completed

Pst_t and limit line

European Limits



Plt and limit line



Parameter values recorded during the test:

Vrms at the end of test (Volt):	228.99		
Highest dt (%):	0.00	Test limit (%):	N/A N/A
T-max (mS):	0	Test limit (mS):	500.0 Pass
Highest dc (%):	0.00	Test limit (%):	3.30 Pass
Highest dmax (%):	0.00	Test limit (%):	4.00 Pass
Highest Pst (10 min. period):	0.064	Test limit:	1.000 Pass
Highest Plt (2 hr. period):	0.028	Test limit:	0.650 Pass

7. IMMUNITY TEST

7.1. Performance Criteria

According to EN 60601-1-2 standard, the general performance criteria as following:

Type of test	Reaction of ME EQUIPMENT or ME SYSTEM during test	How to continue with testing
Transient(a)	The ME EQUIPMENT or ME SYSTEM is permanently damaged. However, BASIC SAFETY and ESSENTIAL PERFORMANCE continue to be provided.	The test sequence shall be repeated two times with this IMMUNITY TEST LEVEL and polarity. The ME EQUIPMENT or ME SYSTEM passes the test if it continues to provide its BASIC SAFETY and ESSENTIAL PERFORMANCE. If any equipment is damaged, it can continue to be used for the IMMUNITY test for this specific phenomenon, as long as it can be proven (e.g. by RISK MANAGEMENT, engineering analysis, experience, redundancy) that the ability of the ME EQUIPMENT or ME SYSTEM to provide its BASIC SAFETY and ESSENTIAL PERFORMANCE can still be determined while using the damaged equipment. If a PORT of the ME EQUIPMENT or ME SYSTEM is damaged and the ME EQUIPMENT or ME SYSTEM has multiple identical ports, the test shall not be repeated on any of the identical ports. To test the next non-identical PORT, the ME EQUIPMENT or ME SYSTEM shall be restored to normal operation. To continue with the IMMUNITY test of the next EM phenomenon, the ME EQUIPMENT or ME SYSTEM shall be restored to normal operation.
	The ME EQUIPMENT or ME SYSTEM is permanently damaged. BASIC SAFETY or ESSENTIAL PERFORMANCE does not continue to be provided.	The ME EQUIPMENT or ME SYSTEM has failed the test.
Continuous(b)	The ME EQUIPMENT or ME SYSTEM is permanently damaged. However, BASIC SAFETY and ESSENTIAL PERFORMANCE continue to be provided.	The test sequence shall be repeated two times with this IMMUNITY TEST LEVEL and polarity or frequency. BASIC SAFETY and ESSENTIAL PERFORMANCE shall continue to be provided. To continue with the next frequency step the ME EQUIPMENT or ME SYSTEM shall be restored to normal operation.
	The ME EQUIPMENT or ME SYSTEM is permanently damaged. BASIC SAFETY or ESSENTIAL PERFORMANCE does not continue to be provided.	The ME EQUIPMENT or ME SYSTEM has failed the test.
(a) Tests according to IEC 61000-4-2, IEC 61000-4-4, IEC 61000-4-5 and IEC 61000-4-11		
(b) Tests according to IEC 61000-4-3, IEC 61000-4-6 and IEC 61000-4-8		

7.2. Electrostatic Discharge Immunity Test

7.2.1. Test Specification

Standard:	IEC 60601-1-2、 EN 60601-1-2 (refer to IEC 61000-4-2)
Colleteral Standard:	N/A
Discharge Impedance:	330(1±10%)Ω / 150(1±10%)pF
Discharge Voltage:	Air Discharge: ±2kV/±4kV/±8kV/±15kV (Direct)
Polarity:	Contact Discharge: ±2kV/±4kV/±8kV (Direct/Indirect)
	10 times each polarity
Discharge mode of operation:	Single discharges
Discharge Period:	1 second minimum
Repeat test time:	1 times (Note 1)

Note: (1) The test performed of laboratory was according to the client requirements

7.2.2. Test Procedure

The test generator necessary to perform direct and indirect application of discharges to the EUT in the following manner:

- a. Contact discharge was applied to conductive surfaces and coupling planes of the EUT. During the test, it was performed with single discharges. For the single discharge time between successive single discharges was at least 1 second. On each pre-selected point at least 25 single discharges (in the most sensitive polarity) shall be applied. Test shall be performed at a maximum repetition rate of one discharge per second.

Vertical Coupling Plane (VCP):

The coupling plane, of dimensions 0.5m x 0.5m, is placed parallel to, and positioned at a distance 0.1m from, the EUT, with the Discharge Electrode touching the coupling plane. The four faces of the EUT will be performed with electrostatic discharge.

Horizontal Coupling Plane (HCP):

The coupling plane is placed under to the EUT. The generator shall be positioned vertically at a distance of 0.1m from the EUT, with the Discharge Electrode touching the coupling plane. The four faces of the EUT will be performed with electrostatic discharge.

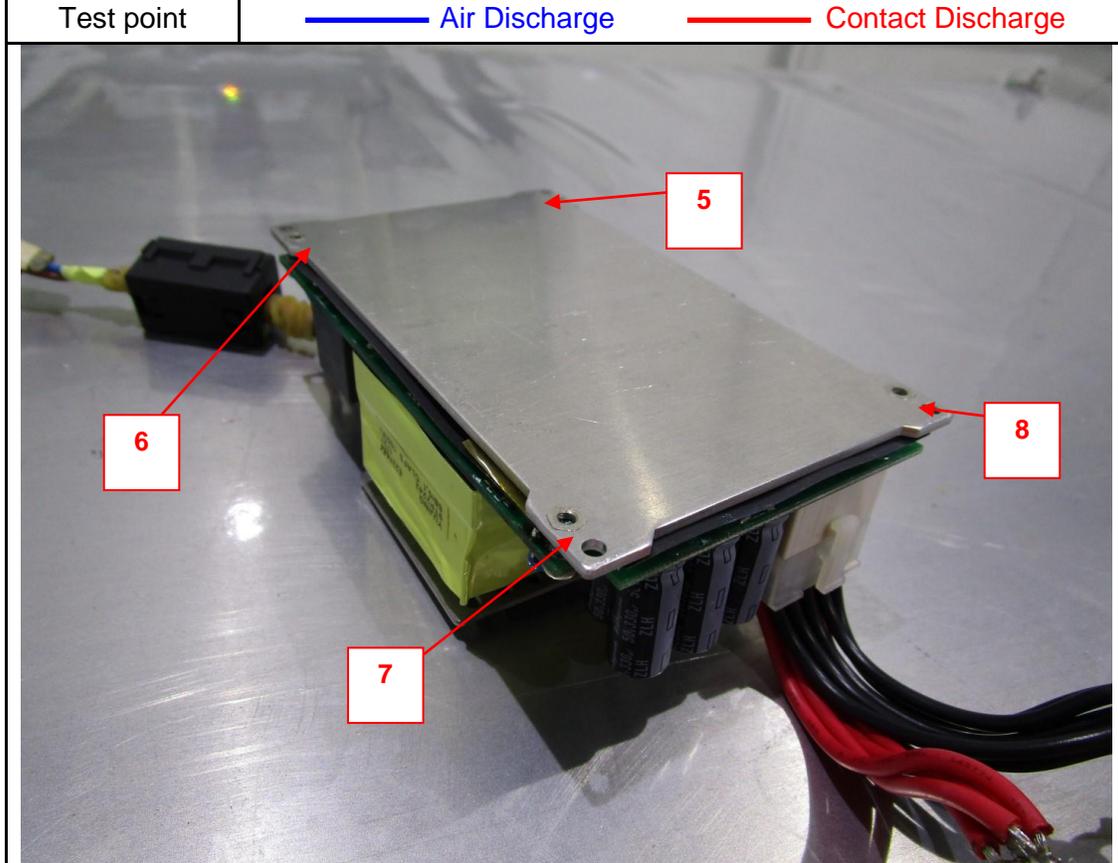
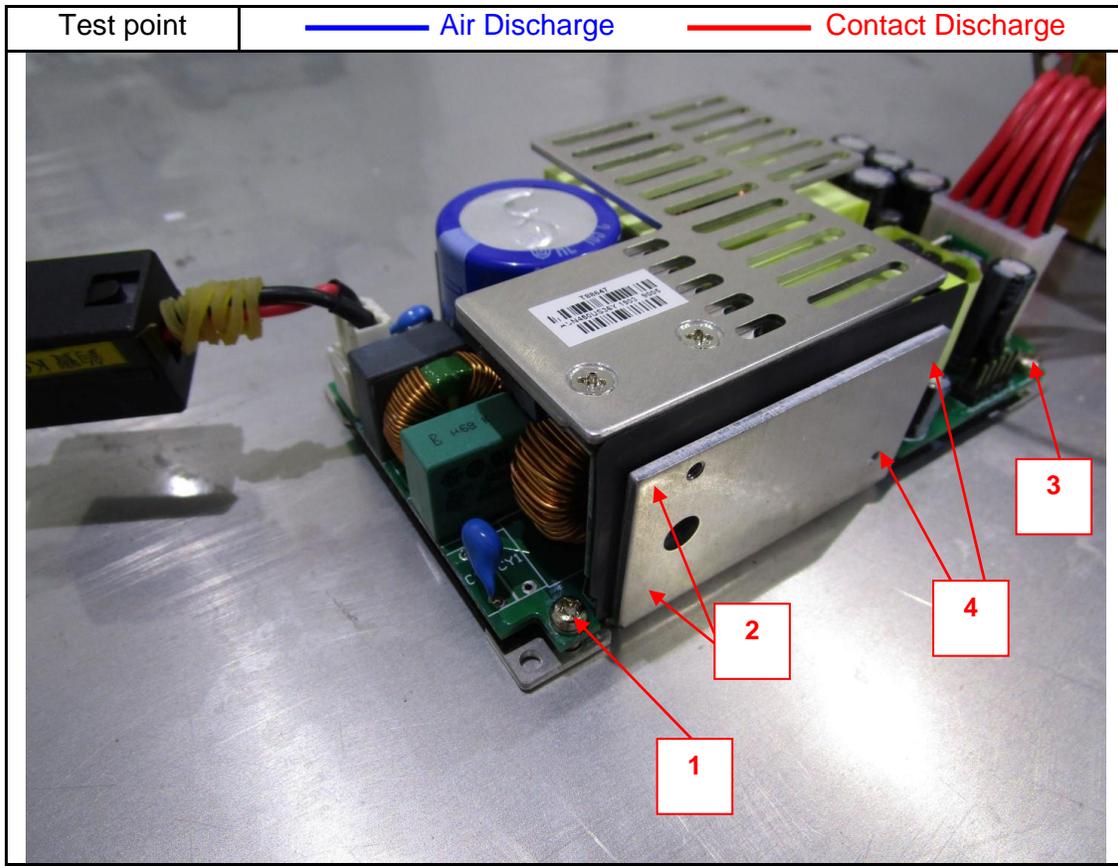
- b. Air discharges at insulation surfaces of the EUT.
It was at least 10 single discharges with positive and negative at the same selected point.
- c. For the actual test configuration, please refer to the related Item :EUT Test Photos.

7.2.4. Test Result

Test Mode:	Mode 1	Temperature:	25°C
Test Voltage:	230V/50Hz	Humidity:	46%RH
Discharge of times:	Air: 10 times Contact: 10 times	ATM pressure:	1018 hpa
Tested By:	Eric T. Fan	Test Date:	Jul. 16, 2019

Mode	Air Discharge								Contact Discharge							
	2kV		4kV		8kV		15kV		2kV		4kV		8kV		-kV	
Location	+	-	+	-	+	-	+	-	+	-	+	-	+	-	-	-
1~8	-	-	-	-	-	-	-	-	Pass	Pass	Pass	Pass	Pass	Pass	-	-
Criteria	Please refer to 7.1															
Result	PASS															
Note	There was no abnormal situation during the test compared with initial operation.															

Mode	HCP Discharge								VCP Discharge							
	2kV		4kV		8kV		-kV		2kV		4kV		8kV		-kV	
Location	+	-	+	-	+	-	-	-	+	-	+	-	+	-	-	-
front	Pass	Pass	Pass	Pass	Pass	Pass	-	-	Pass	Pass	Pass	Pass	Pass	Pass	-	-
rear	Pass	Pass	Pass	Pass	Pass	Pass	-	-	Pass	Pass	Pass	Pass	Pass	Pass	-	-
left	Pass	Pass	Pass	Pass	Pass	Pass	-	-	Pass	Pass	Pass	Pass	Pass	Pass	-	-
right	Pass	Pass	Pass	Pass	Pass	Pass	-	-	Pass	Pass	Pass	Pass	Pass	Pass	-	-
Criteria	Please refer to 7.1															
Result	PASS															
Note	There was no abnormal situation during the test compared with initial operation.															



7.3. Radio Frequency Electromagnetic Field Immunity Test

7.3.1. Test Specification

Standard:	IEC 60601-1-2、 EN 60601-1-2 (refer to IEC 61000-4-3)
Colleteral Standard:	N/A
Frequency Range:	80 MHz to 2700MHz
Field Strength:	3V/m (unmodulated)
Modulation:	80%, AM(1 KHz)
Frequency Step:	1% of fundamental
Polarity of Antenna	Vertical and Horizontal
Test Distance:	3 meters
Antenna Height:	1.5 meters
Dwell Time:	3 s
Repeat test time:	1 times (Note 1)

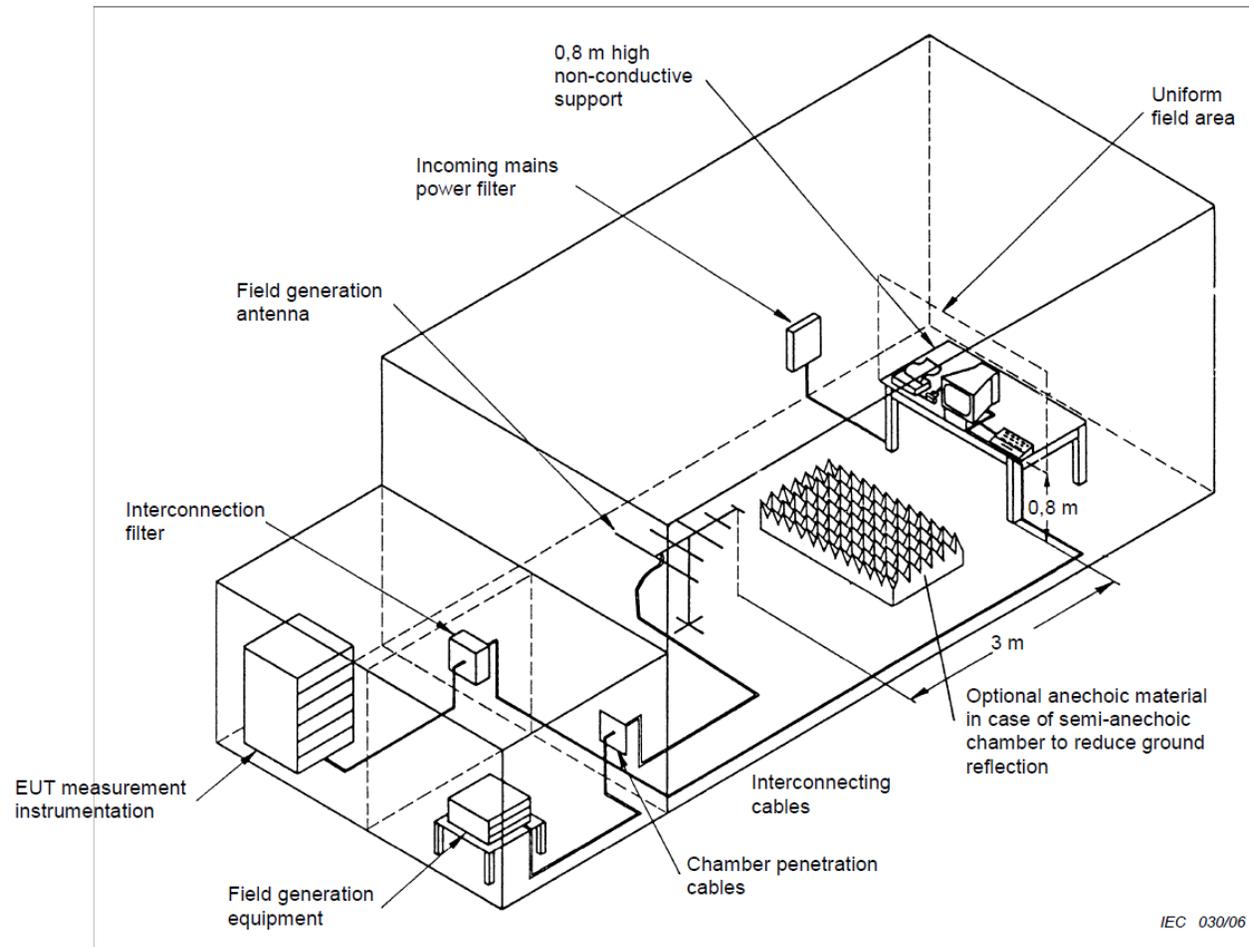
Note: (1) The test performed of laboratory was according to the client requirements

7.3.2. Test Procedure

The test procedure was in accordance with IEC/EN 61000-4-3.

- a. The testing was performed in a fully anechoic chamber. The transmit antenna was located at a distance of 3 meters from the EUT.
- b. The frequency range is swept from 80 MHz to 2700MHz with the signal 80% amplitude modulated with a 1 KHz sine wave. The rate of sweep did not exceed 1.5×10^{-3} decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
- c. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- d. The field strength level 80 MHz to 2700MHz was 3V/m.
- e. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

7.3.3. Test Setup and Configuration



For the actual test configuration, please refer to Appendix I: Photographs of the Test Configuration.

7.3.4. RS proximity fields from RF Wireless Communication Test Specification

Standard:	IEC 60601-1-2、 EN 60601-1-2 (refer to IEC 61000-4-3)
Colleteral Standard:	N/A
Frequency Range:	See page 5
Field Strength:	
Modulation:	
Polarity of Antenna	Vertical and Horizontal
Test Distance:	3 meters
Dwell Time:	3 s

7.3.5. Test Procedure

The test procedure was in accordance with IEC/EN 61000-4-3.

- a. The testing was performed in a fully anechoic chamber. The transmit antenna was located at a distance of 3 meters from the EUT.
- b. The test frequency is according to page 5 table
- c. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- d. The field strength and modulation are according to page 5 table.
- e. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

7.3.6. Test Setup and Configuration

Please refer to Clause 7.3.3.

7.3.7. Test Result

Test Mode:	Mode 1	Temperature:	25°C
Test Voltage:	230V/50Hz	Humidity:	58%RH
Tested By:	Eric T. Fan	Test Date:	Jul. 16, 2019

Freq. Range (MHz)	Position (Face)	Polarity (H & V)	Field Strength (V/m)	Criterion	Results
80~2700	Front/ Left/ Rear/ Right	H&V	3V/m	Please refer to 7.1	PASS
385	Front/ Left/ Rear/ Right	H&V	27V/m	Please refer to 7.1	PASS
450	Front/ Left/ Rear/ Right	H&V	28V/m	Please refer to 7.1	PASS
710	Front/ Left/ Rear/ Right	H&V	9V/m	Please refer to 7.1	PASS
745	Front/ Left/ Rear/ Right	H&V	9V/m	Please refer to 7.1	PASS
780	Front/ Left/ Rear/ Right	H&V	9V/m	Please refer to 7.1	PASS
810	Front/ Left/ Rear/ Right	H&V	28V/m	Please refer to 7.1	PASS
870	Front/ Left/ Rear/ Right	H&V	28V/m	Please refer to 7.1	PASS
930	Front/ Left/ Rear/ Right	H&V	28V/m	Please refer to 7.1	PASS
1720	Front/ Left/ Rear/ Right	H&V	28V/m	Please refer to 7.1	PASS
1845	Front/ Left/ Rear/ Right	H&V	28V/m	Please refer to 7.1	PASS
1970	Front/ Left/ Rear/ Right	H&V	28V/m	Please refer to 7.1	PASS
2450	Front/ Left/ Rear/ Right	H&V	28V/m	Please refer to 7.1	PASS
5240	Front/ Left/ Rear/ Right	H&V	9V/m	Please refer to 7.1	PASS
5500	Front/ Left/ Rear/ Right	H&V	9V/m	Please refer to 7.1	PASS
5785	Front/ Left/ Rear/ Right	H&V	9V/m	Please refer to 7.1	PASS
Note	There was no abnormal situation during the test compared with initial operation.				

7.4. Electrical Fast Transient/Burst Immunity Test

7.4.1. Test Specification

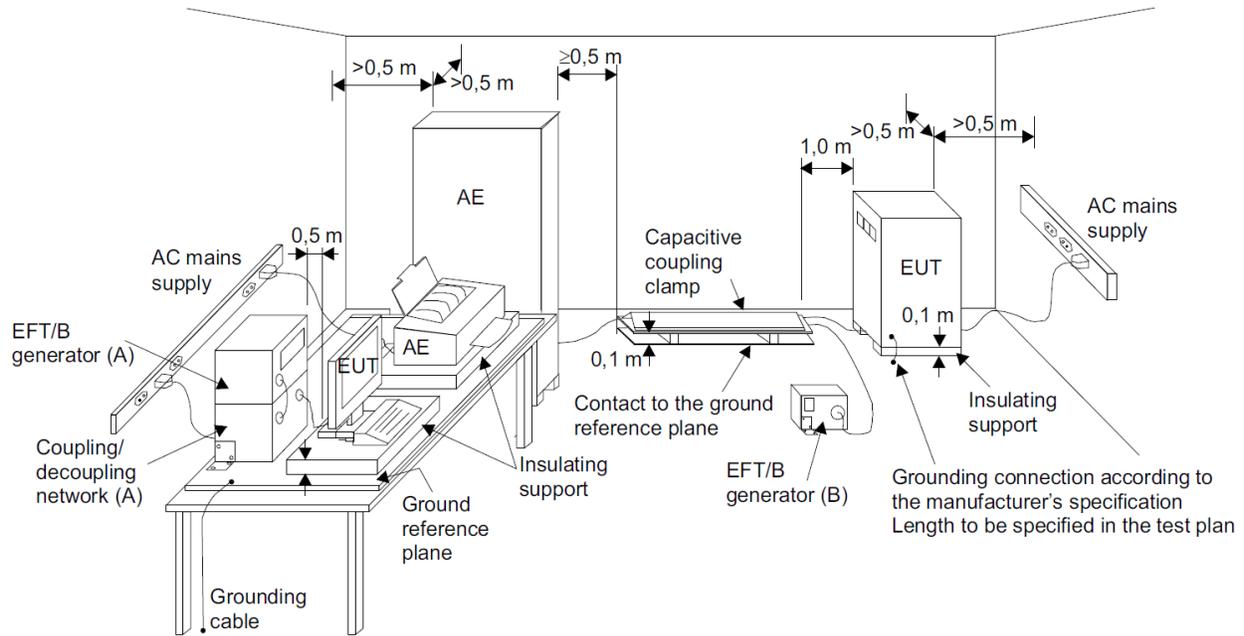
Standard:	IEC 60601-1-2、 EN 60601-1-2 (refer to IEC 61000-4-4)
Colleteral Standard:	N/A
Test Voltage:	2 KV for AC Mains, 1kV for signal
Polarity:	Positive and Negative
Impulse Frequency:	100 KHz
Impulse wave shape:	5/50 Tr/Th ns
Burst Duration:	0.75ms
Burst Period:	300ms
Test Duration:	1 Minute
Repeat test time:	1 times (Note 1)

Note: (1) The test performed of laboratory was according to the client requirements

7.4.2. Test Procedure

- a. The EUT was tested with 1000 volt discharges to the AC power input leads, 500 volt discharges to the signal/control ports.
- b. Both positive and negative polarity discharges were applied.
- c. Table-top equipment and equipment normally mounted on ceilings or walls as well as built-in equipment shall be tested with the EUT located $(0,1 \pm 0,01)$ m above the ground reference plane.
- d. The EUT and the auxiliary equipment were placed on a table of 0.8 m heights above a metal ground reference plane. The size of ground plane is greater than $0.8\text{m} \times 1\text{m}$ and project beyond the EUT by at least 0.1m on all sides. The ground plane is connected to the protective earth. The minimum distance between the EUT and all other conductive structures (including the generator, AE and the walls of a shielded room), except the ground reference plane, shall be more than 0,5 m.
- e. The duration time of each test sequential was 1 minute.
- f. The transient/burst waveform was in accordance with IEC/EN 61000-4-4, 5/50ns.

7.4.3. Test Setup and Configuration



IEC 645/12

- (A) location for supply line coupling
- (B) location for signal lines coupling

For the actual test configuration, please refer to Appendix I: Photographs of the Test Configuration.

7.4.4. Test Result

Test Mode:	Mode 1	Temperature:	25°C
Test Voltage:	230V/50Hz	Humidity:	58%RH
Tested By:	Eric T. Fan	Test Date:	Jul. 16, 2019

Test Port		Test Levels (kV)						Criteria	Result
		+0.5	-0.5	+1.0	-1.0	+2.0	-2.0		
AC Power Port	L	-	-	-	-	PASS	PASS	Please refer to 7.1	PASS
	N	-	-	-	-	PASS	PASS	Please refer to 7.1	PASS
	L + N	-	-	-	-	PASS	PASS	Please refer to 7.1	PASS
Note		There was no abnormal situation during the test compared with initial operation.							

7.5. Surge Immunity Test

7.5.1. Test Specification

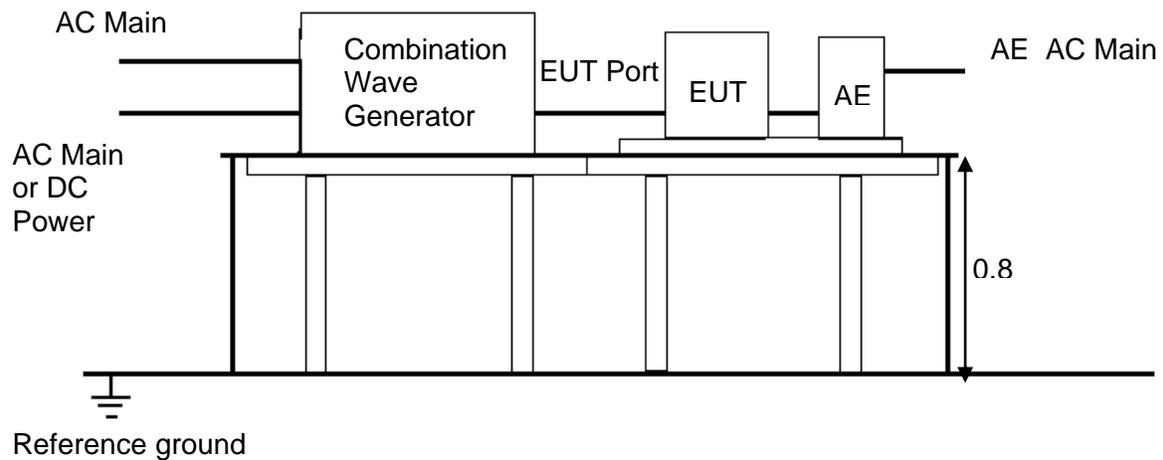
Standard:	IEC 60601-1-2、 EN 60601-1-2 (refer to IEC 61000-4-5)
Colleteral Standard:	N/A
Waveform:	1.2/50 (8/20) Tr/Th μ s
Test Voltage:	0.5 KV (Signal), 1 KV (Differential), 2 KV (Common)
Polarity:	Positive and Negative
Phase Angle:	0°/90°/180°/270°
Repetition Rate:	1 per minute
Discharge Times:	5
Repeat test time:	1 times (Note 1)

Note: (1) The test performed of laboratory was according to the client requirements

7.5.2. Test Procedure

- a. The EUT and the auxiliary equipment were placed on a table of 0.8m heights above a metal ground reference plane. The size of ground plane is greater than 1m×1m and project beyond the EUT by at least 0.1m on all sides. The ground plane is connected to the protective earth. The length of power cord between the coupling device and the EUT shall not exceed 2 meters (provided by the manufacturer).
- b. The EUT was connected to the power mains through a coupling device that directly couples the surge interference signal. The surge noise was applied synchronized to the voltage phase at the zero crossing and the peak value of the AC voltage wave (positive and negative).
- c. 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.
- d. If EUT was included telecom port and connected to outdoor directly, test shall be applied to line to earth test using 10/700 surge wave form. If the wave form affects the functioning of high speed data port, the test shall be carried out using 1.2/50 wave form do the test.

7.5.3. Test Setup and Configuration



For the actual test configuration, please refer to Appendix I: Photographs of the Test Configuration.

7.5.4. Test Result

Test Mode:	Mode 1	Temperature:	25°C
Test Voltage:	230V/50Hz	Humidity:	58%RH
Tested By:	Eric T. Fan	Test Date:	Jul. 16, 2019

Wave Form EUT Ports Tested	1.2/50(8/20)Ti/Th us						Criteria	Results
	Polarity	Phase	Voltage					
			0.5kV	1kV	2kV	-kV		
L - N	+	0	PASS	PASS	-	-	Please refer to 7.1	PASS
	-		PASS	PASS	-	-		
	+	90	PASS	PASS	-	-		
	-		PASS	PASS	-	-		
	+	180°	PASS	PASS	-	-		
	-		PASS	PASS	-	-		
	+	270°	PASS	PASS	-	-		
	-		PASS	PASS	-	-		
Note	There was no abnormal situation during the test compared with initial operation.							

7.6. Immunity to Conducted Disturbances Induced by RF Fields

7.6.1. Test Specification

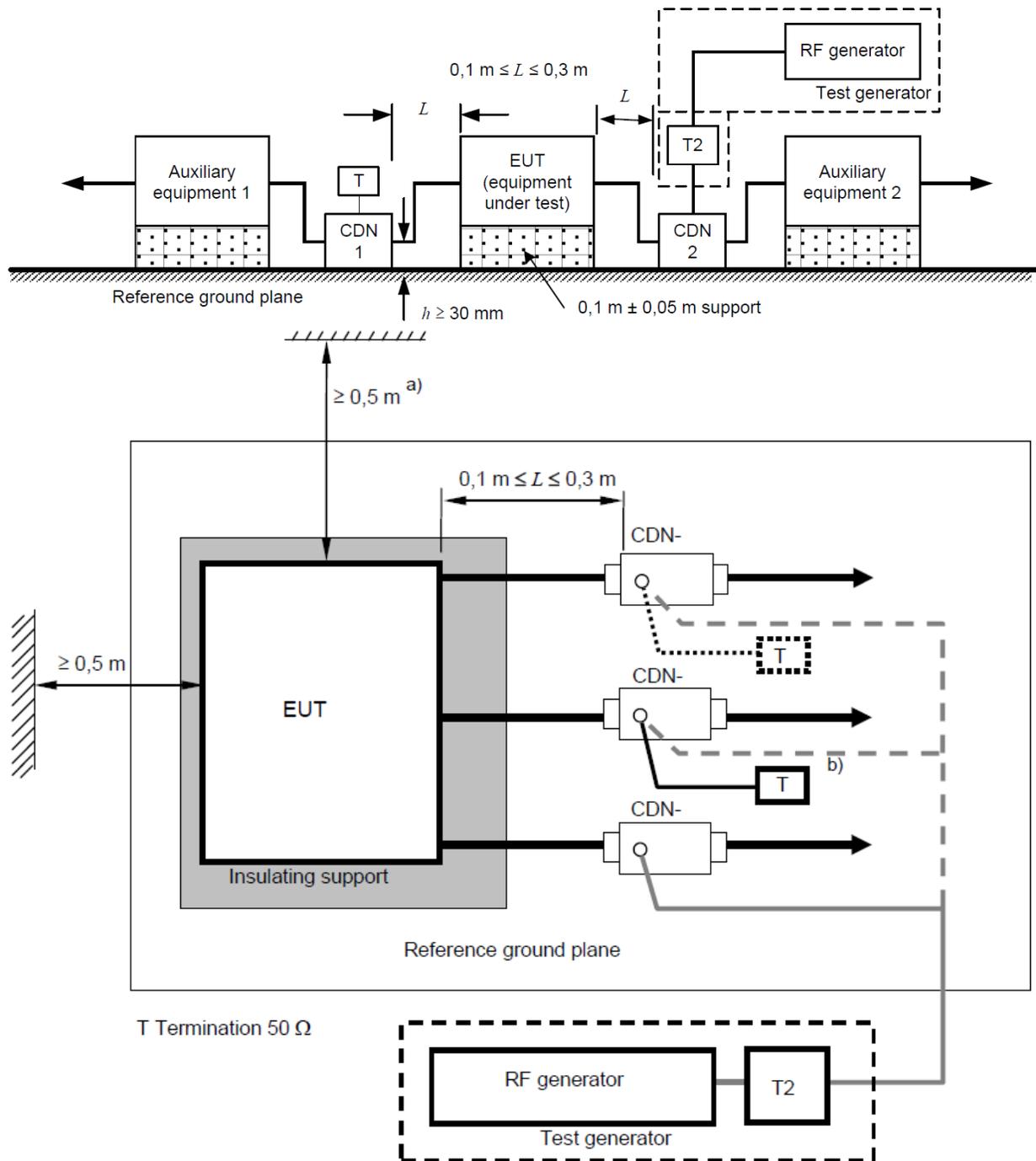
Standard:	IEC 60601-1-2、 EN 60601-1-2 (refer to IEC 61000-4-6)
Colleteral Standard:	N/A
Frequency Range:	0.15-80MHz
Field Strength:	3V, 6V (unmodulated, r.m.s.)
Modulation:	80% AM (1 kHz)
Frequency Step:	1% of fundamental
Dwell Time:	3 s
Repeat test time:	1 times (Note 1)

Note: (1) The test performed of laboratory was according to the client requirements

7.6.2. Test Procedure

- a. The EUT shall be tested within its intended operating and climatic conditions.
- b. The test shall be 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 are terminated by a 50-ohm load resistor.
- c. The frequency range is swept from 150 kHz to 80 MHz, using the signal level established during the setting process and with a disturbance signal of 80% amplitude. The signal is modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or the switch coupling devices as necessary. The step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value where the frequency is swept incrementally.
- d. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies such as clock frequencies and harmonics or frequencies of dominant interest, shall be analyzed separately.
- e. For professional healthcare environment shall be test additional 6V ISM band which test spot frequency as state in the report page 4.
- f. Attempts should be made to fully exercise the EUT during test, and to fully interrogate all exercise modes selected for susceptibility.

7.6.3. Test Setup and Configuration



- a) The EUT clearance from any metallic objects other than test equipment shall be at least 0,5 m.
- b) Only one of the CDNs not used for injection shall be terminated with 50 Ω, providing only a return path. All other CDNs shall be configured as decoupling networks.

For the actual test configuration, please refer to Appendix I: Photographs of the Test Configuration.

7.6.4. Test Result

Test Mode:	Mode 1	Temperature:	25°C
Test Voltage:	AC 230V/50Hz	Humidity:	58%RH
Tested By:	Eric T. Fan	Test Date:	Jul 26, 2019

Test Ports (Mode)	Freq. Range (MHz)	Field Strength	CDN	Criteria	Results
AC. Power Port	0.15 ---80	3V(rms) AM Modulated 1000Hz, 80%	M016(M2)	Please refer to 7.1	PASS
AC. Power Port	ISM bands	6V(rms) AM Modulated 1000Hz, 80%	M016(M2)	Please refer to 7.1	PASS
Note	There was no abnormal situation during the test compared with initial operation.				

Customer request:

Test Ports (Mode)	Freq. Range (MHz)	Field Strength	CDN	Criteria	Results
AC. Power Port	0.15 ---80	20V(rms) AM Modulated 1000Hz, 80%	M016(M2)	Please refer to 7.1	PASS
Note	The test performed of laboratory was according to the client requirements				

7.7. Power frequency magnetic field immunity Test

7.7.1. Test Specification

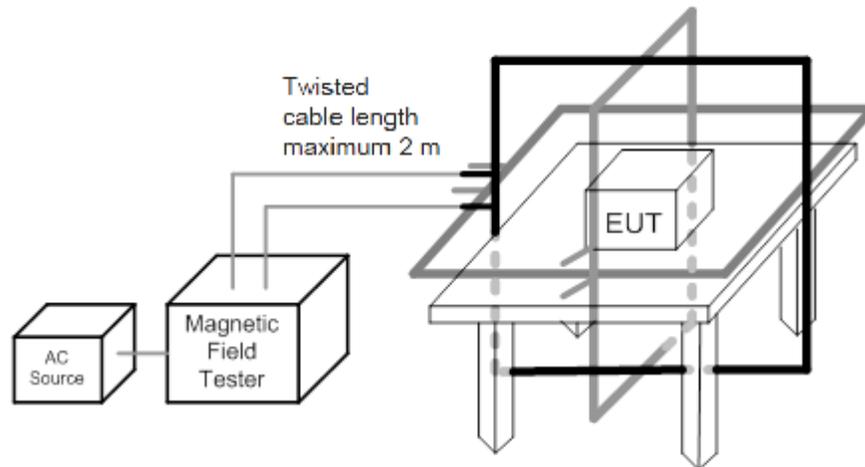
Standard:	IEC 60601-1-2、 EN 60601-1-2 (refer to IEC 61000-4-8)
Collateral Standard:	N/A
Frequency Range:	50 or 60Hz
Field Strength:	30 A/m
Axis:	X, Y, Z
Observation Time:	1 minute
Inductance Coil:	Rectangular type, 1mx1m
Repeat test time:	1 times (Note 1)

Note: (1) The test performed of laboratory was according to the client requirements

7.7.2. Test Procedure

- a. The EUT and support equipment, are placed on a table that is 0.8 meter above a metal ground plane measured 1m*1m min. and 0.65mm thick min.
- b. The equipment cabinets shall be connected to the safety earth directly on the GRP via the earth terminal of the EUT.
- c. The cables supplied or recommended by the equipment manufacturer shall be used 1 meter of all cables used shall be exposed to the magnetic field.
- d. The EUT with coil shall be leave all magnetic material and wall 1m away in any axis during the test.
- e. The cable length from generator to coil shall be less than 2m
- f. The background noise shall be 20dB less than test field strength.
- g. Test shall be applied to three axis X, Y, Z and disturbance over 1 minute.
- h. All cables shall be exposed to the magnetic field for 1m of their length.

7.7.3. Test Setup and Configuration



Note:

TABLE-TOP EQUIPMENT

The equipment shall be subjected to the test magnetic field by using the induction coil of standard dimension (1 m x 1 m). The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.

FLOOR-STANDING EQUIPMENT

The equipment shall be subjected to the test magnetic field by using induction coils of suitable dimensions. The test shall be repeated by moving and shifting the induction coils, in order to test the whole volume of the EUT for each orthogonal direction. The test shall be repeated with the coil shifted to different positions along the side of the EUT, in steps corresponding to 50% of the shortest side of the coil. The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.

7.7.4. Test Results

Test Mode:	Mode 1	Temperature:	25°C
Test Voltage:	230V/50Hz	Humidity:	58%RH
Tested By:	Eric T. Fan	Test Date:	Jul. 16, 2019

Level	Magnetic Field Strength (A/m)	Criteria	Results		
			X	Y	Z
1	1	-	-	-	-
2	3	-	-	-	-
3	10	-	-	-	-
4	30	Please refer to 7.1	PASS	PASS	PASS
5	100	-	-	-	-
X	Special	-	-	-	-
Note	There was no abnormal situation during the test compared with initial operation.				

7.8. Voltage Dips and Short Interruptions Immunity Test

7.8.1. Test Specification

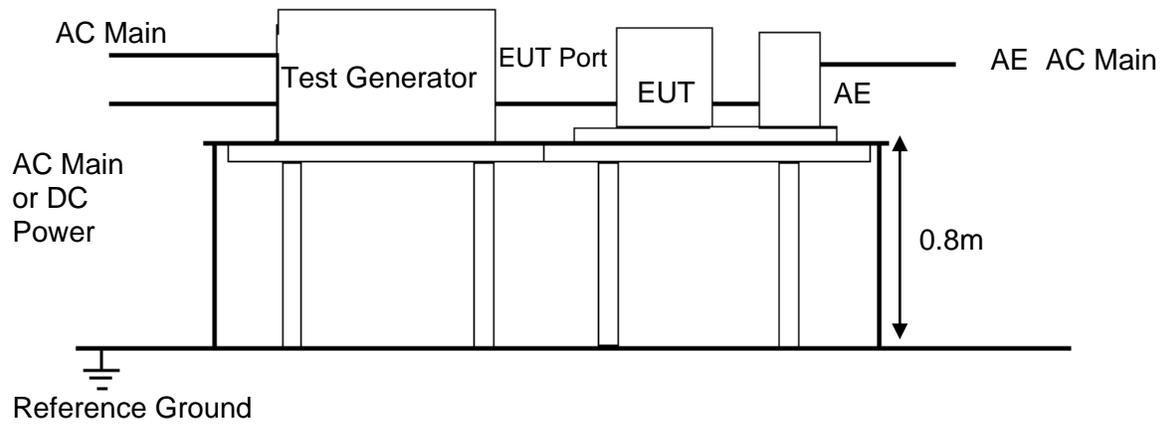
Standard:	IEC 60601-1-2、 EN 60601-1-2 (refer to IEC 61000-4-11)
Voltage Dips:	0% residual(0.5 & 1cycles) ; 70% residual (25/30 cycles with 50/60Hz)
Voltage Interruptions:	0% residual (250/300 cycles with 50/60Hz)
Voltage Phase Angle:	0°/45°/90°/135°/180°/225°/270°/315°
Test Voltage:	100V/60Hz and 250V/50Hz
Repeat test time:	1 times (Note 1)

Note: (1) The test performed of laboratory was according to the client requirements

7.8.2. Test Procedure

- a. 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.
- b. For voltage dips, changes in supply voltage shall occur at zero crossings of the voltage, and at additional angles considered critical by product committees or individual product specifications preferably selected from 45°, 90°, 135°, 180°, 225°, 270° and 315° on each phase.
- c. For short interruptions, the angle shall be defined by the product committee as the worst case. In the absence of definition, it is recommended to use 0° for one of the phases.

7.8.3. Test Setup and Configuration



For the actual test configuration, please refer to Appendix I: Photographs of the Test Configuration.

7.8.4. Test Result

Test Mode:	Mode 1	Temperature:	25°C
Test Voltage:	AC 100V/ 240V, 50Hz	Humidity:	58%RH
Tested By:	Eric T. Fan	Test Date:	Jul. 16, 2019

100V/50Hz				
Interruption & Dips	Duration (T)	Residual voltage	Perform Criteria	Results
Voltage dips	0.5	0%	Please refer to 7.1	PASS
	1	0%	Please refer to 7.1	PASS
	30	70%	Please refer to 7.1	PASS
Voltage interruptions	300	0%	Please refer to 7.1	PASS
Note	Voltage dips: There was no abnormal situation during the test compared with initial operation. Voltage interruptions: The EUT was shut down during the test, but it will automatically return to normal conditions after the test.			

240V/50Hz				
Interruption & Dips	Duration (T)	Residual voltage	Perform Criteria	Results
Voltage dips	0.5	0%	Please refer to 7.1	PASS
	1	0%	Please refer to 7.1	PASS
	25	70%	Please refer to 7.1	PASS
Voltage interruptions	250	0%	Please refer to 7.1	PASS
Note	Voltage dips: There was no abnormal situation during the test compared with initial operation. Voltage interruptions: The EUT was shut down during the test, but it will automatically return to normal conditions after the test.			

Note:

The test shall be carried out at the frequencies appropriate to the power supply frequency. Equipment intended to be used in regions where only one of these frequencies is applied needs to be tested at this specific frequency only. 25/30 or 250/300 at 50/60 Hz.

Appendix I: Photographs of EMC Test Configuration

Please refer to the attachment of Appendix I_Photographs of EMC Test Configuration_TPP 450-136BA-MB4, TPP 450-124BA-MB4.

Appendix II: Photographs of the EUT

Please see the photographs of EUT in the test report no.: 4789043511-EP.

Appendix III: Test Plan

Please refer to finalize test plan as attached.

END OF REPORT