

# EMC TEST REPORT



## For Electromagnetic Interference of

Report Reference No. ....: EA1808069E 03001

Engineer (name + signature) .....: Poal Chen 

Approved by (name + signature).....: Fred Zhu 

Date of issue .....: Dec. 19, 2018

Testing Laboratory.....: Dong Guan Anci Electronic Technology Co., Ltd

Address .....: 1-2 Floor, Building A, No.11, Headquarters 2 Road, Songshan Lake  
Hi-tech Industrial Development Zone, Dongguan City, Guangdong  
Pr., China.

Applicant's name .....: Huizhou Guoaotong Technology Co., Ltd

Address .....: 4, 5F (PLANT B) NO.2 RUNZE RD SOUTH HIGHTECH  
INDUSTRIAL PARK HUIAO AVENUE HUIZHOU GUANGDONG PR  
516000 CHINA

Manufacturer .....: Huizhou Guoaotong Technology Co., Ltd

Address .....: 4, 5F (PLANT B) NO.2 RUNZE RD SOUTH HIGHTECH  
INDUSTRIAL PARK HUIAO AVENUE HUIZHOU GUANGDONG PR  
516000 CHINA

Test specification:

Test item description .....: Power Adapter

Trade Mark .....: N/A

Model/Type reference .....: GA-xxxxyyyV(xxx, yyyy are variable, xxx=030-240,  
yyyy=0100-3000, see model list for details)

Input Ratings .....: AC 100-240V, 0.6A, 50/60Hz

Output Ratings .....: 3.0-24.0Vdc, 0.1-3.0A

<b>Table of Contents</b>	<b>Page</b>
<b>1. GENERAL INFORMATION</b>	<b>5</b>
1.1 CERTIFICATION	5
1.2 PRODUCT INFORMATION	6
1.3 DETAILS ABOUT THE TEST LABORATORY	7
<b>2. SUMMARY OF TEST RESULTS</b>	<b>8</b>
2.2 DESCRIPTION OF TEST MODES	9
2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	9
<b>3. EMISSION TEST</b>	<b>10</b>
3.1 CONDUCTED EMISSION MEASUREMENT	10
3.1.1 LIMITS OF CONDUCTED EMISSION(MAINS PORT)	10
3.1.2 MEASUREMENT INSTRUMENTS LIST	10
3.1.3 TEST PROCEDURE	10
3.1.4 DEVIATION FROM TEST STANDARD	10
3.1.5 TEST SETUP	11
3.1.6 EUT OPERATING CONDITIONS	11
3.1.7 TEST RESULTS	12
3.2 RADIATED EMISSION MEASUREMENT	19
3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT	19
3.2.2 MEASUREMENT INSTRUMENTS LIST	19
3.2.3 TEST PROCEDURE	20
3.2.4 DEVIATION FROM TEST STANDARD	20
3.2.5 TEST SETUP	21
3.2.6 EUT OPERATING CONDITIONS	21
3.2.7 TEST RESULTS	22
3.3 HARMONICS CURRENT MEASUREMENT	29
3.3.1 LIMITS OF HARMONICS CURRENT MEASUREMENT	29
3.3.2 MEASUREMENT INSTRUMENTS LIST	30
3.3.3 TEST PROCEDURE	30
3.3.4 DEVIATION FROM TEST STANDARD	30
3.3.5 TEST SETUP	30
3.3.6 EUT OPERATING CONDITIONS	30
3.3.7 TEST RESULTS	30
3.4 VOLTAGE FLUCTUATION AND FLICKS MEASUREMENT	31
3.4.1 LIMITS OF VOLTAGE FLUCTUATION AND FLICKSMEASUREMENT	31

<b>Table of Contents</b>	<b>Page</b>
3.4.2 MEASUREMENT INSTRUMENTS LIST	31
3.4.3 TEST PROCEDURE	31
3.4.4 DEVIATION FROM TEST STANDARD	31
3.4.5 TEST SETUP	32
<b>4. IMMUNITY TEST</b>	<b>33</b>
4.1 STANDARD COMPLIANCE/SERVRITY LEVEL/CRITERIA	33
4.2 GENERAL PERFORMANCE CRITERIA	34
4.3 GENERAL PERFORMANCE CRITERIA TEST SETUP	34
4.4 ESD TESTING	35
4.4.1 TEST SPECIFICATION	35
4.4.2 MEASUREMENT INSTRUMENTS	35
4.4.3 TEST PROCEDURE	35
4.4.4 DEVIATION FROM TEST STANDARD	36
4.4.5 TEST SETUP	36
4.4.6 TEST RESULTS	37
4.5 RS TESTING2	38
4.5.1 TEST SPECIFICATION	38
4.5.2 MEASUREMENT INSTRUMENTS	38
4.5.3 TEST PROCEDURE	38
4.5.4 DEVIATION FROM TEST STANDARD	39
4.5.5 TEST SETUP	40
4.5.6 TEST RESULTS	41
4.6 EFT/BURST TESTING	42
4.6.1 TEST SPECIFICATION	42
4.6.2 MEASUREMENT INSTRUMENTS	42
4.6.3 TEST PROCEDURE	42
4.6.4 DEVIATION FROM TEST STANDARD	42
4.6.5 TEST SETUP	43
4.6.6 TEST RESULTS	44
4.7 SURGE TESTING	45
4.7.1 TEST SPECIFICATION	45
4.7.2 MEASUREMENT INSTRUMENTS	45
4.7.3 TEST PROCEDURE	45
4.7.4 DEVIATION FROM TEST STANDARD	46
4.7.5 TEST SETUP	46
4.7.6 TEST RESULTS	47
4.8 INJECTION CURRENT TESTING	48

<b>Table of Contents</b>	<b>Page</b>
4.8.1 TEST SPECIFICATION	48
4.8.2 MEASUREMENT INSTRUMENTS	48
4.8.3 TEST PROCEDURE	48
4.8.4 DEVIATION FROM TEST STANDARD	48
4.8.5 TEST SETUP	49
4.8.6 TEST RESULTS	50
4.9 VOLTAGE INTERRUPTION/DIPS TESTING	51
4.9.1 TEST SPECIFICATION	51
4.9.2 MEASUREMENT INSTRUMENTS	51
4.9.3 TEST PROCEDURE	51
4.9.4 DEVIATION FROM TEST STANDARD	51
4.9.5 TEST SETUP	52
4.9.6 TEST RESULTS	52
4.10.1 MEASUREMENT INSTRUMENTS	53
4.10.2 TEST LEVEL AND PERFORMANCE CRITERION	53
4.10.3 TEST PROCEDURE	53
4.10.4 DEVIATION FROM TEST STANDARD	53
4.10.5 TEST SETUP	54
4.10.6 TEST RESULTS	54
5. ATTACHMENT	55
5.1 EUT TEST PHOTO	55
5.2 EUT PHOTO	58



**1. GENERAL INFORMATION**

**1.1 CERTIFICATION**

Testing Laboratory ..... : DongGuan Anci Electronic Technology Co., Ltd.

Address ..... : 1-2 Floor, Building A, No.11, Headquarters 2 Road, Songshan Lake Hi-tech Industrial Development Zone, Dongguan City, Guangdong Pr., China.

Applicant's name ..... : Huizhou Guoaotong Technology Co., Ltd

Address ..... : 4, 5F (PLANT B) NO.2 RUNZE RD SOUTH HIGHTECH INDUSTRIAL PARK HUIAO AVENUE HUIZHOU GUANGDONG PR 516000 CHINA

Manufacturer ..... : Huizhou Guoaotong Technology Co., Ltd

Address..... : 4, 5F (PLANT B) NO.2 RUNZE RD SOUTH HIGHTECH INDUSTRIAL PARK HUIAO AVENUE HUIZHOU GUANGDONG PR 516000 CHINA

First Factory's name..... : Huizhou Guoaotong Technology Co., Ltd

Address..... : 4, 5F (PLANT B) NO.2 RUNZE RD SOUTH HIGHTECH INDUSTRIAL PARK HUIAO AVENUE HUIZHOU GUANGDONG PR 516000 CHINA

**Test specification:**

Test item description..... : Power Adapter

Trade Mark ..... : N/A

Model/Type reference ..... : GA-xxxxyyyV(xxx, yyyy are variable, xxx=030-240, yyyy=0100-3000, see model list for details)

Test Sample..... : GA-0503000V, GA-2401000V, GA-1202000V

Input Ratings ..... : AC 100-240V, 0.6A, 50/60Hz

Output Ratings ..... : 3.0-24.0Vdc, 0.1-3.0A

Tested Power..... : I/P: 230Vac, 50Hz

Standards ..... : EN 55032: 2015  
EN 55035: 2017  
EN 61000-3-2:2014  
EN 61000-3-3:2013

The device described above was tested by Dong Guan Anci Electronic Technology Co., Ltd. to determine the maximum emission levels emanated from the device and severity levels of the device endure and its performance criterion. The measurement results are contained in this test report and Dong Guan Anci Electronic Technology Co., Ltd. assumes full responsibility for the accuracy and completeness of these measurements. This report shows the EUT is technically compliance with the above official standards. This report applies to the above sample only and shall not be reproduced in part without written approval of Dong Guan Anci Electronic Technology Co., Ltd.

## 1.2 PRODUCT INFORMATION

The equipment with model in this report is Power Adapter for the use with Information Technology Equipment.

Model list:

Table A : Definition of Variables		
xxx	030-240	3 digits code indicates output voltage range from 3.0V-24.0V, minimum step by 0.1V. e.g.:030=3.0Vdc, 240=24.0Vdc.
yyyy	0100-3000	4 digits code indicate output current from 0.1A to 3.0A, the rising step is 0.01A. e.g.: 0100 = 0.1A, 3000=3.0A

Table B: model list				
MODEL	Output Voltage (Vdc)	Output Current(A)	Max. Output Power(W)	Transformer (T1)
GA-xxxyyyyyV	3.0-5.0	0.1-3.0	15	EF20-5V
	5.1-12.0	0.1-2.0	24	EF20-12V
	12.1-24.0	0.1-1.0	24	EF20-24V

All tests was performed on model GA-0503000V, GA-2401000V and GA-1202000V.

The EUT passed the test.

**1.3 DETAILS ABOUT THE TEST LABORATORY**

**Test Site 1 (Issue certificate: CNAS number L6214):**

Company name: Dongguan Anci Electronic Technology Co., Ltd.

Address: 1-2 Floor, Building A, No.11, Headquarters 2 Road, Songshan Lake  
Hi-tech Industrial Development Zone, Dongguan City,  
Guangdong Pr., China.

**Test Site 2 (Subcontract test: CNAS number L0468):**

Company name: Guangdong Dongguan Quality Supervision Testing Center

Address: No.2 South Industry Road, Dongguan Songshan Lake  
Sci.&Tech. Industrial Park, Guangdong Province, China

Standard	Test Item	Test Site
EN 55032: 2015	Conducted Emission	1
	Radiated Emission Below 1 GHz	1
	Radiated Emission Above 1 GHz	N/A
EN 61000-3-2:2014	Harmonic Current Emission	N/A
EN 61000-3-3:2013	Voltage Fluctuations & Flicker	2
EN 61000-4-2:2009	Electrostatic Discharge	1
EN 61000-4-3:2006 +A1:2008+A2: 2010	RF electromagnetic field	2
EN 61000-4-4:2012	Fast transients	1
EN 61000-4-5:2014	Surges	1
EN 61000-4-6:2014	Injected Current	2
EN 61000-4-8:2010	Power Frequency Magnetic Field	N/A
EN 61000-4-11:2004	Volt. Interruptions Volt. Dips	1

## 2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

Emission					
Standard	Test Item	Limit	Judgment	Remark	Test Site
EN 55032: 2015	Conducted Emission	Class B	PASS		1
	Radiated Emission Below 1 GHz	Class B	PASS		1
	Radiated Emission Above 1 GHz	Class B	N/A	<b>NOTE (1) NOTE (3)</b>	N/A
EN 61000-3-2:2014	Harmonic Current Emission	Class A	N/A	<b>NOTE (2)</b>	2
EN 61000-3-3:2013	Voltage Fluctuations & Flicker	Clause 5	PASS		2
Immunity (EN 55035: 2017)					
Section	Test Item	Performance Criteria	Judgment	Remark	Test Site
EN 61000-4-2:2009	Electrostatic Discharge	B	PASS		1
EN 61000-4-3:2006 +A1:2008+A2: 2010	RF electromagnetic field	A	PASS		2
EN 61000-4-4: 2004+A1:2010	Fast transients	B	PASS		1
EN 61000-4-5:2006	Surges	B	PASS		1
EN 61000-4-6:2009	Injected Current	A	PASS		2
EN 61000-4-8:2010	Power Frequency Magnetic Field	A	PASS		2
EN 61000-4-11:2004	Volt. Interruptions Volt. Dips	B / C / C <b>NOTE (3)</b>	PASS		1

NOTE:

- (1) "N/A" denotes test is not applicable in this Test Report
- (2) The power consumption of EUT is less than 75W and no Limits apply.
- (3) If the highest frequency of the internal sources of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz. If the highest frequency of the internal sources of the EUT is between 108 MHz and 500 MHz, the measurement shall only be made up to 2GHz. If the highest frequency of the internal sources of the EUT is between 500 MHz and 1GHz, measurement shall only be made up to 5 GHz. If the highest frequency of the internal sources of the EUT is above 1 GHz, the measurement shall be made up to 5 times the highest frequency or 40 GHz, whichever is less.



## 2.2 DESCRIPTION OF TEST MODES

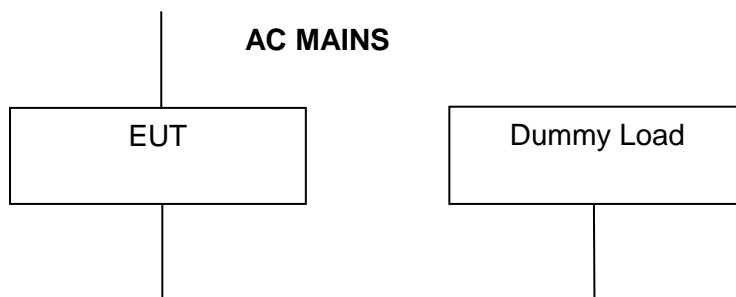
To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Conducted Emission Test	
Pretest Mode	Description
Mode	Full Load

For Radiated Test	
Final Test Mode	Description
Mode	Full Load

For EMS Test	
Final Test Mode	Description
Mode	Full Load

## 2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



### 3. EMISSION TEST

#### 3.1 CONDUCTED EMISSION MEASUREMENT

##### 3.1.1 LIMITS OF CONDUCTED EMISSION(MAINS PORT) (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *
0.50 -5.0	73.00	60.00	56.00	46.00
5.0 -30.0	73.00	60.00	60.00	50.00

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 limit for radiated test was performed according to as following:  
EN 55032/CISPR 32

##### 3.1.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	LISN	Schwarzbeck	NSLK 8127	8127-669	2019-05-14
2	10 db attenuator	JFW	50FP-010-H4	43608 46-427-1	2019-05-14
3	RF Cable	N/A	N/A	2#	2019-05-14
4	EMI Test Receiver	Rohde & Schwarz	ESCI	101358	2019-05-14

Remark: " N/A" denotes No Model No. , Serial No. or No Calibration specified.

##### 3.1.3 TEST PROCEDURE

aThe EUT was placed 0.4 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.

bInterconnecting 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.

cI/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 not exceed 1 m.

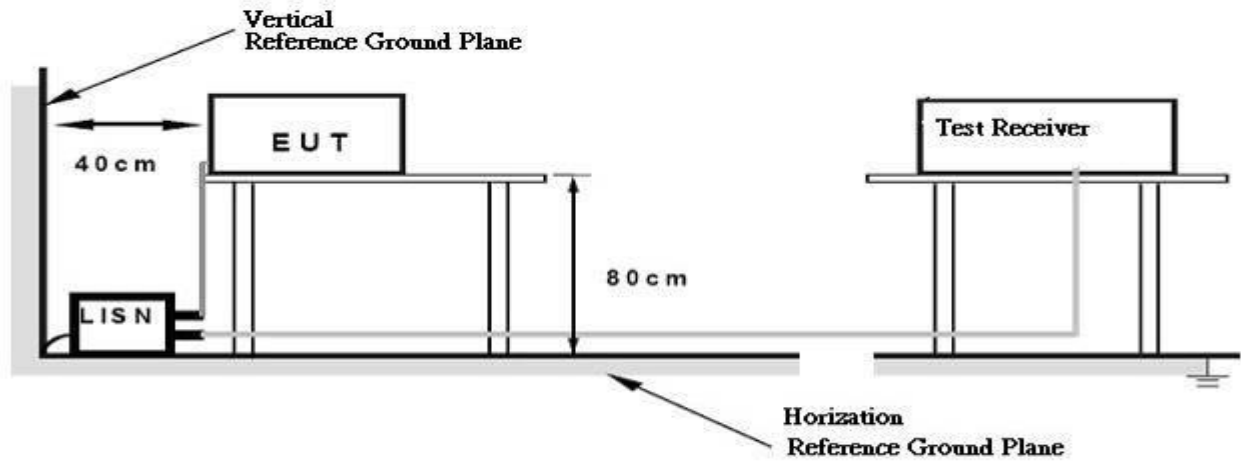
dLISN at least 80 cm from nearest part of EUT chassis.

eFor the actual test configuration, please refer to the related Item –EUT Test Photos.

##### 3.1.4 DEVIATION FROM TEST STANDARD

No deviation

### 3.1.5 TEST SETUP



### 3.1.6 EUT OPERATING CONDITIONS

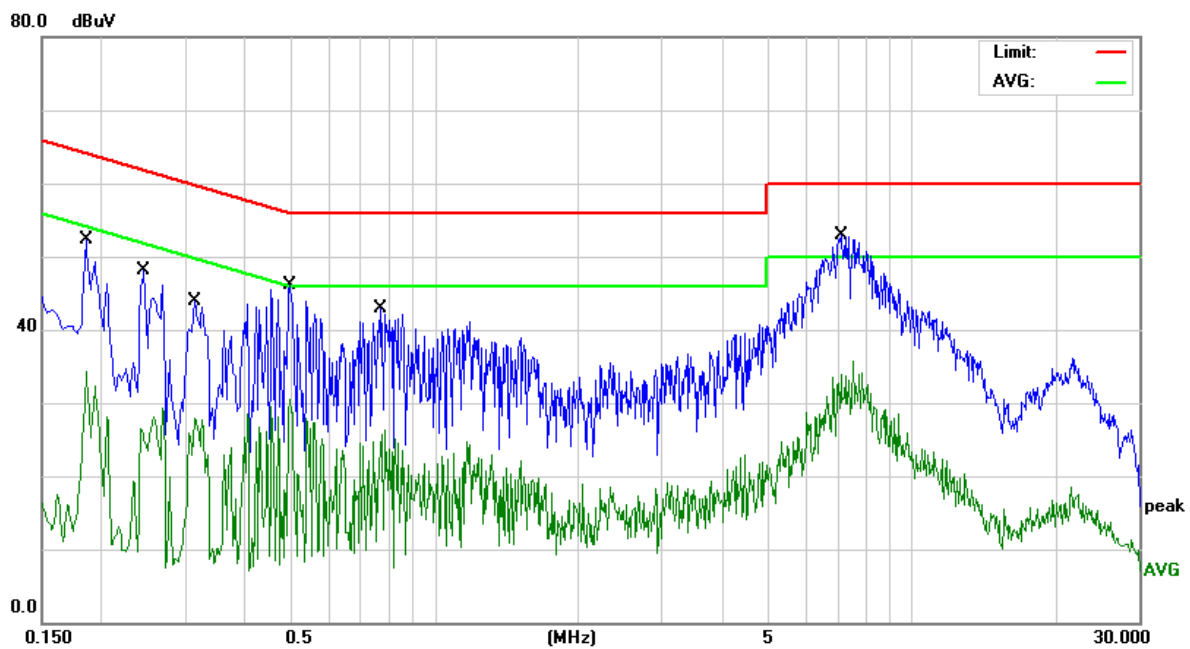
The EUT exercise program used during radiated and/or conducted emission measurement was designed to exercise the various system components in a manner similar to a typical use.

**3.1.7 TEST RESULTS**

<b>EUT:</b>	Power Adapter	<b>Model No.:</b>	GA-0503000V, GA-2401000V, GA-1202000V
<b>Temperature:</b>	30°C	<b>Relative Humidity:</b>	60 %
<b>Pressure:</b>	1008 hPa	<b>Test Power :</b>	AC 230V/50Hz
<b>Test Mode :</b>	Full load		

**Remark:**

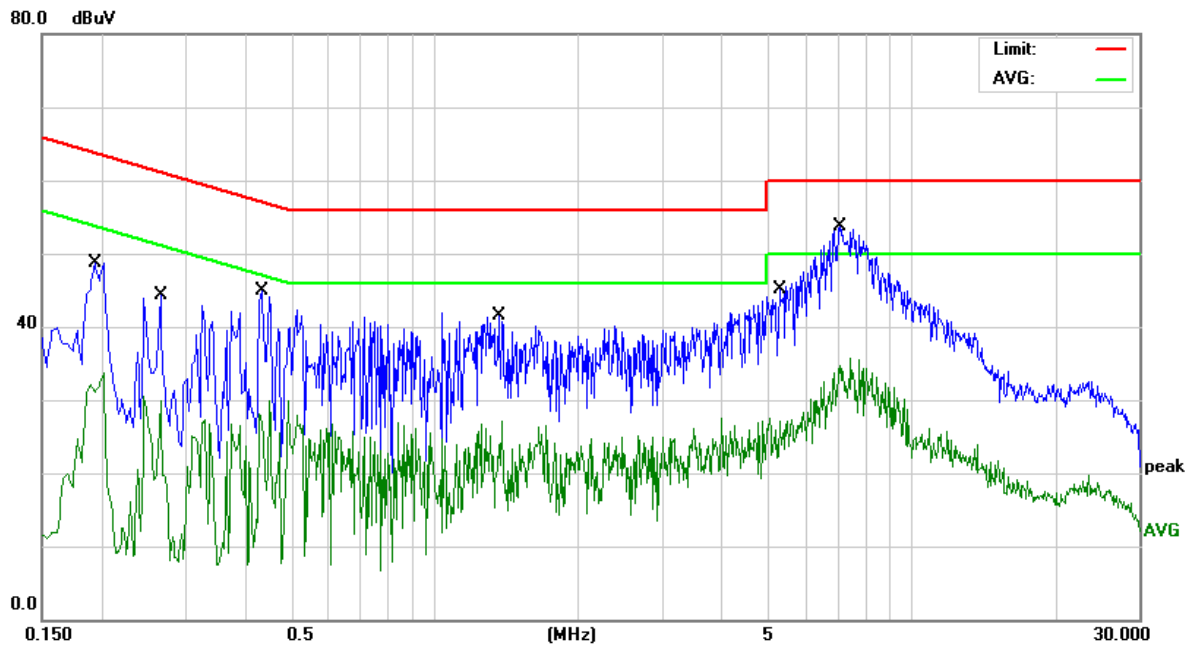
- (1) Reading in which marked as QP means measurements by using Quasi-Peak Detector ,and AV means measurements by using Average Detector.
- (2) All readings are QP Mode value unless otherwise stated AVG in column of 『Note』 . If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform. In this case, a “ \* ” marked in AVG Mode column of Interference Voltage Measured.
- (3) Measuring frequency range from 150KHz to 30MHz.



<b>Site:</b>	<b>843</b>	<b>Phase:</b>	<b>N</b>	<b>Temperature(C):</b>	<b>30(C)</b>
<b>Limit:</b>	<b>EN55032 Class B Conduction(QP)</b>			<b>Humidity(%):</b>	<b>60%</b>
<b>EUT:</b>	<b>Power Adapter</b>	<b>Test Time:</b>	<b>2018-12-03</b>		
<b>M/N.:</b>	<b>GA-0503000V</b>	<b>Power Rating:</b>	<b>AC 230V/50Hz</b>		
<b>Mode:</b>	<b>Full load</b>	<b>Test Engineer:</b>	<b>Jack</b>		
<b>Note:</b>					

No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Measurement(dBuV)	Limit (dBuV)	Over (dB)	Detector	Comment
1	0.1860	35.36	10.69	46.05	64.21	-18.16	QP	
2	0.1860	16.34	10.69	27.03	54.21	-27.18	AVG	
3	0.2460	31.66	10.65	42.31	61.89	-19.58	QP	
4	0.2460	11.37	10.65	22.02	51.89	-29.87	AVG	
5	0.3140	27.30	10.62	37.92	59.86	-21.94	QP	
6	0.3140	8.27	10.62	18.89	49.86	-30.97	AVG	
7 *	0.4980	30.44	10.56	41.00	56.03	-15.03	QP	
8	0.4980	10.49	10.56	21.05	46.03	-24.98	AVG	
9	0.7700	27.14	10.61	37.75	56.00	-18.25	QP	
10	0.7700	6.80	10.61	17.41	46.00	-28.59	AVG	
11	7.1340	33.80	10.51	44.31	60.00	-15.69	QP	
12	7.1340	15.06	10.51	25.57	50.00	-24.43	AVG	

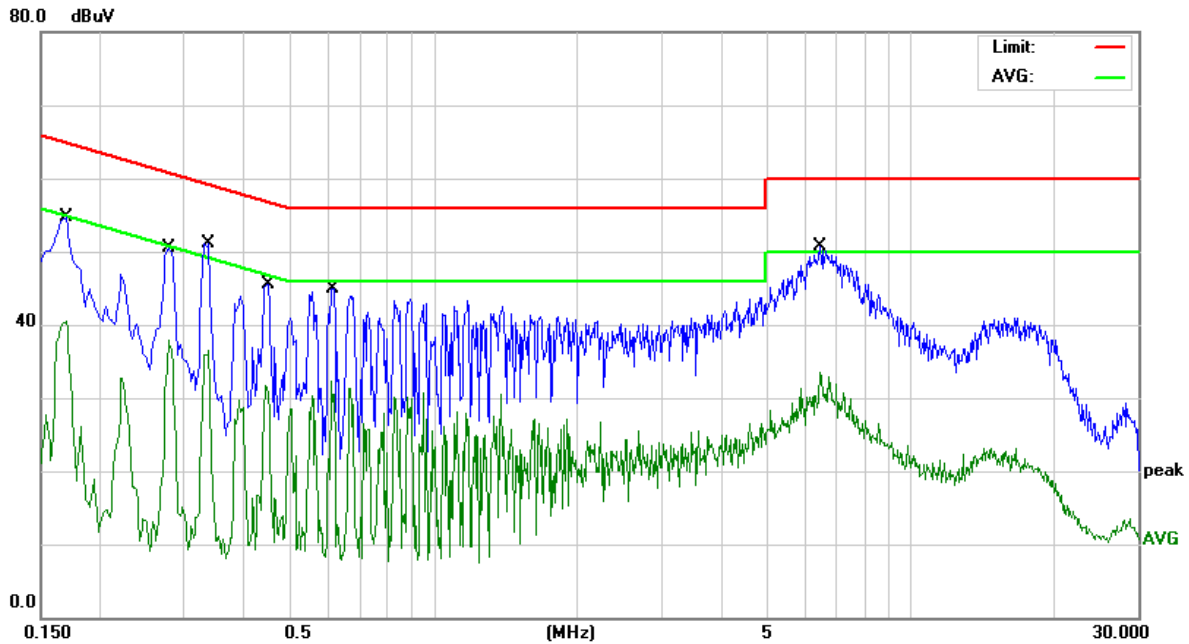
\*:Maximum data x:Over limit !:over margin



<b>Site:</b>	843	<b>Phase:</b> L1	<b>Temperature(C):</b> 30(C)
<b>Limit:</b>	EN55032 Class B Conduction(QP)		<b>Humidity(%):</b> 60%
<b>EUT:</b>	Power Adapter	<b>Test Time:</b>	2018-12-03
<b>M/N.:</b>	GA-0503000V	<b>Power Rating:</b>	AC 230V/50Hz
<b>Mode:</b>	Full load	<b>Test Engineer:</b>	Jack
<b>Note:</b>			

No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Measurement(dBuV)	Limit (dBuV)	Over (dB)	Detector	Comment
1	0.1940	32.69	10.67	43.36	63.86	-20.50	QP	
2	0.1940	18.06	10.67	28.73	53.86	-25.13	AVG	
3	0.2660	26.45	10.64	37.09	61.24	-24.15	QP	
4	0.2660	10.70	10.64	21.34	51.24	-29.90	AVG	
5	0.4340	29.29	10.58	39.87	57.18	-17.31	QP	
6	0.4340	11.28	10.58	21.86	47.18	-25.32	AVG	
7	1.3619	25.87	10.61	36.48	56.00	-19.52	QP	
8	1.3619	9.60	10.61	20.21	46.00	-25.79	AVG	
9	5.2900	26.72	10.53	37.25	60.00	-22.75	QP	
10	5.2900	8.67	10.53	19.20	50.00	-30.80	AVG	
11 *	7.0860	37.29	10.51	47.80	60.00	-12.20	QP	
12	7.0860	19.42	10.51	29.93	50.00	-20.07	AVG	

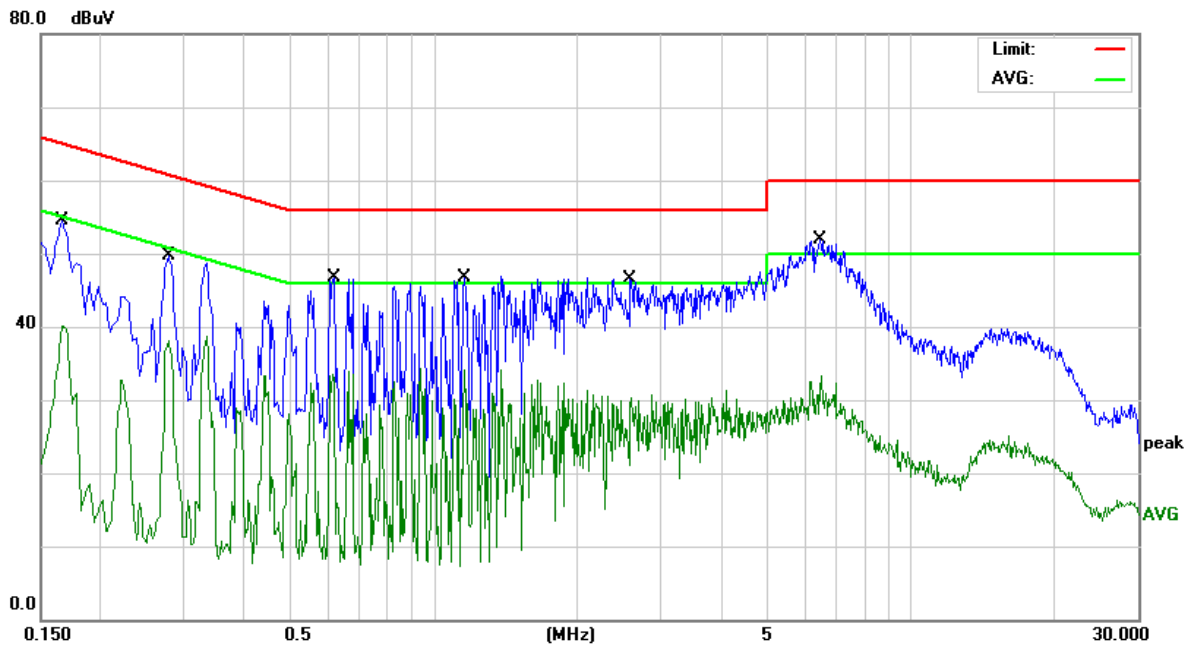
\*:Maximum data x:Over limit !:over margin



<b>Site:</b>	<b>843</b>	<b>Phase:</b>	<b>N</b>	<b>Temperature(C):</b>	<b>30(C)</b>
<b>Limit:</b>	<b>EN55032 Class B Conduction(QP)</b>			<b>Humidity(%):</b>	<b>60%</b>
<b>EUT:</b>	<b>Power Adapter</b>	<b>Test Time:</b>	<b>2018-12-03</b>		
<b>M/N.:</b>	<b>GA-2401000V</b>	<b>Power Rating:</b>	<b>AC 230V/50Hz</b>		
<b>Mode:</b>	<b>Full load</b>	<b>Test Engineer:</b>	<b>Jack</b>		
<b>Note:</b>					

No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Measurement(dBuV)	Limit (dBuV)	Over (dB)	Detector	Comment
1	0.1700	42.09	10.70	52.79	64.96	-12.17	QP	
2	0.1700	28.06	10.70	38.76	54.96	-16.20	AVG	
3	0.2779	38.28	10.63	48.91	60.88	-11.97	QP	
4	0.2779	26.30	10.63	36.93	50.88	-13.95	AVG	
5 *	0.3379	38.79	10.61	49.40	59.25	-9.85	QP	
6	0.3379	24.72	10.61	35.33	49.25	-13.92	AVG	
7	0.4500	32.94	10.57	43.51	56.87	-13.36	QP	
8	0.4500	17.94	10.57	28.51	46.87	-18.36	AVG	
9	0.6140	32.02	10.58	42.60	56.00	-13.40	QP	
10	0.6140	19.22	10.58	29.80	46.00	-16.20	AVG	
11	6.4620	32.09	10.51	42.60	60.00	-17.40	QP	
12	6.4620	17.49	10.51	28.00	50.00	-22.00	AVG	

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

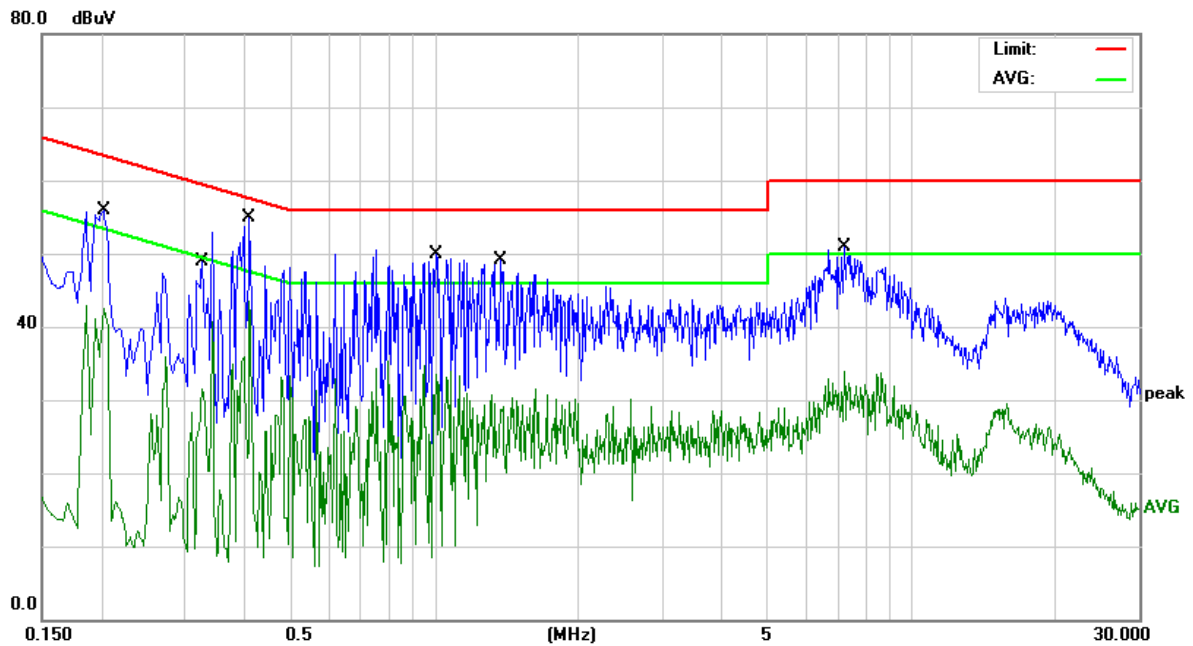


<b>Site:</b>	843	<b>Phase:</b> L1	<b>Temperature(C):</b> 30(C)
<b>Limit:</b>	EN55032 Class B Conduction(QP)		<b>Humidity(%):</b> 60%
<b>EUT:</b>	Power Adapter	<b>Test Time:</b>	2018-12-03
<b>M/N.:</b>	GA-2401000V	<b>Power Rating:</b>	AC 230V/50Hz
<b>Mode:</b>	Full load	<b>Test Engineer:</b>	Jack
<b>Note:</b>			

No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Measurement(dBuV)	Limit (dBuV)	Over (dB)	Detector	Comment
1	0.1660	40.20	10.70	50.90	65.15	-14.25	QP	
2	0.1660	29.54	10.70	40.24	55.15	-14.91	AVG	
3	0.2779	36.60	10.63	47.23	60.88	-13.65	QP	
4	0.2779	27.63	10.63	38.26	50.88	-12.62	AVG	
5	0.6180	31.26	10.58	41.84	56.00	-14.16	QP	
6	0.6180	14.86	10.58	25.44	46.00	-20.56	AVG	
7 *	1.1620	34.38	10.63	45.01	56.00	-10.99	QP	
8	1.1620	20.95	10.63	31.58	46.00	-14.42	AVG	
9	2.5860	29.63	10.55	40.18	56.00	-15.82	QP	
10	2.5860	13.29	10.55	23.84	46.00	-22.16	AVG	
11	6.4660	37.45	10.51	47.96	60.00	-12.04	QP	
12	6.4660	19.06	10.51	29.57	50.00	-20.43	AVG	

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

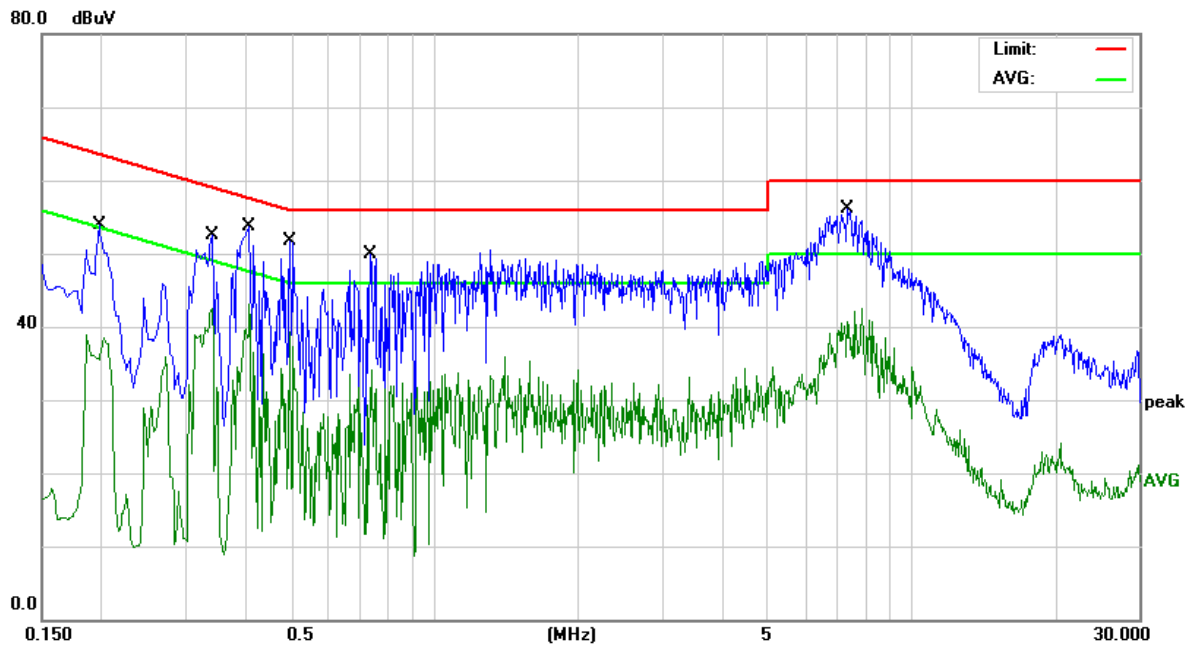




<b>Site:</b>	<b>843</b>	<b>Phase:N</b>	<b>Temperature(C):30(C)</b>
<b>Limit:</b>	<b>EN55032 Class B Conduction(QP)</b>		<b>Humidity(%):60%</b>
<b>EUT:</b>	<b>Power Adapter</b>	<b>Test Time:</b>	<b>2018-12-03</b>
<b>M/N.:</b>	<b>GA-1202000V</b>	<b>Power Rating:</b>	<b>AC 230V/50Hz</b>
<b>Mode:</b>	<b>Full load</b>	<b>Test Engineer:</b>	<b>Jack</b>
<b>Note:</b>			

No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Measurement(dBuV)	Limit (dBuV)	Over (dB)	Detector	Comment
1	0.2020	42.79	10.67	53.46	63.52	-10.06	QP	
2	0.2020	26.90	10.67	37.57	53.52	-15.95	AVG	
3	0.3260	39.49	10.62	50.11	59.55	-9.44	QP	
4	0.3260	21.07	10.62	31.69	49.55	-17.86	AVG	
5 *	0.4100	41.98	10.58	52.56	57.65	-5.09	QP	
6	0.4100	22.76	10.58	33.34	47.65	-14.31	AVG	
7	1.0060	35.84	10.65	46.49	56.00	-9.51	QP	
8	1.0060	18.16	10.65	28.81	46.00	-17.19	AVG	
9	1.3779	32.22	10.61	42.83	56.00	-13.17	QP	
10	1.3779	17.68	10.61	28.29	46.00	-17.71	AVG	
11	7.2140	31.64	10.51	42.15	60.00	-17.85	QP	
12	7.2140	16.35	10.51	26.86	50.00	-23.14	AVG	

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



<b>Site:</b>	843	<b>Phase:</b> L1	<b>Temperature(C):</b> 30(C)
<b>Limit:</b>	EN55032 Class B Conduction(QP)		<b>Humidity(%):</b> 60%
<b>EUT:</b>	Power Adapter	<b>Test Time:</b>	2018-12-03
<b>M/N.:</b>	GA-1202000V	<b>Power Rating:</b>	AC 230V/50Hz
<b>Mode:</b>	Full load	<b>Test Engineer:</b>	Jack
<b>Note:</b>			

No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Measurement(dBuV)	Limit (dBuV)	Over (dB)	Detector	Comment
1	0.1980	38.31	10.67	48.98	63.69	-14.71	QP	
2	0.1980	25.90	10.67	36.57	53.69	-17.12	AVG	
3	0.3420	37.93	10.61	48.54	59.15	-10.61	QP	
4	0.3420	20.76	10.61	31.37	49.15	-17.78	AVG	
5 *	0.4100	39.58	10.58	50.16	57.65	-7.49	QP	
6	0.4100	22.14	10.58	32.72	47.65	-14.93	AVG	
7	0.4980	36.74	10.56	47.30	56.03	-8.73	QP	
8	0.4980	16.36	10.56	26.92	46.03	-19.11	AVG	
9	0.7340	34.20	10.60	44.80	56.00	-11.20	QP	
10	0.7340	15.17	10.60	25.77	46.00	-20.23	AVG	
11	7.3500	36.15	10.52	46.67	60.00	-13.33	QP	
12	7.3500	21.28	10.52	31.80	50.00	-18.20	AVG	

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

### 3.2 RADIATED EMISSION MEASUREMENT

(Below 1000MHz)

#### 3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

FREQUENCY (MHz)	Class A (at 3m)	Class B (at 3m)
	dBuV/m	dBuV/m
30 – 230	50	40
230 – 1000	57	47

Notes:

- (1) The limit for radiated test was performed according to as following:  
EN 55032/CISPR 32
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (GHz)	Class A (dBuV/m) (at 3m)		Class B (dBuV/m) (at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
1 ~ 3	76	56	74	54
3 ~ 6	80	60	70	50

Notes:

- (1) The limit for radiated test was performed according to  
EN 55032/CISPR 32
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

#### 3.2.2 MEASUREMENT INSTRUMENTS LIST

##### 3m Radiated Emission Measurement 30M-1G

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EMI Test Receiver	Rohde & Schwarz	ESPI	100502	2019-01-07
2	Pre-Amplifier	HP	8447D	2727A06172	2019-01-07
3	Bilog Antenna	Schwarzbeck	VULB9163	VULB9163-588	2019-05-23
4	RF Cable	N/A	N/A	6#	2019-05-23
5	RF Cable	N/A	N/A	1-1#	2019-05-23

**3m Radiated Emission Measurement 1G-18G**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	Agilent	E4407B	US40240623	2019-05-23
2	Low noise Amplifiers	A-INFO	LA1018N400 9	J101313052400 1	2019-05-23
3	Horn antenna	A-INFO	LB-10180-SF	J203109061212 3	2019-05-11
4	RF Cable	N/A	N/A	1-2#	2019-05-23
5	RF Cable	N/A	N/A	7#	2019-05-23

Remark: " N/A" denotes No Model No. / Serial No. and No Calibration specified.

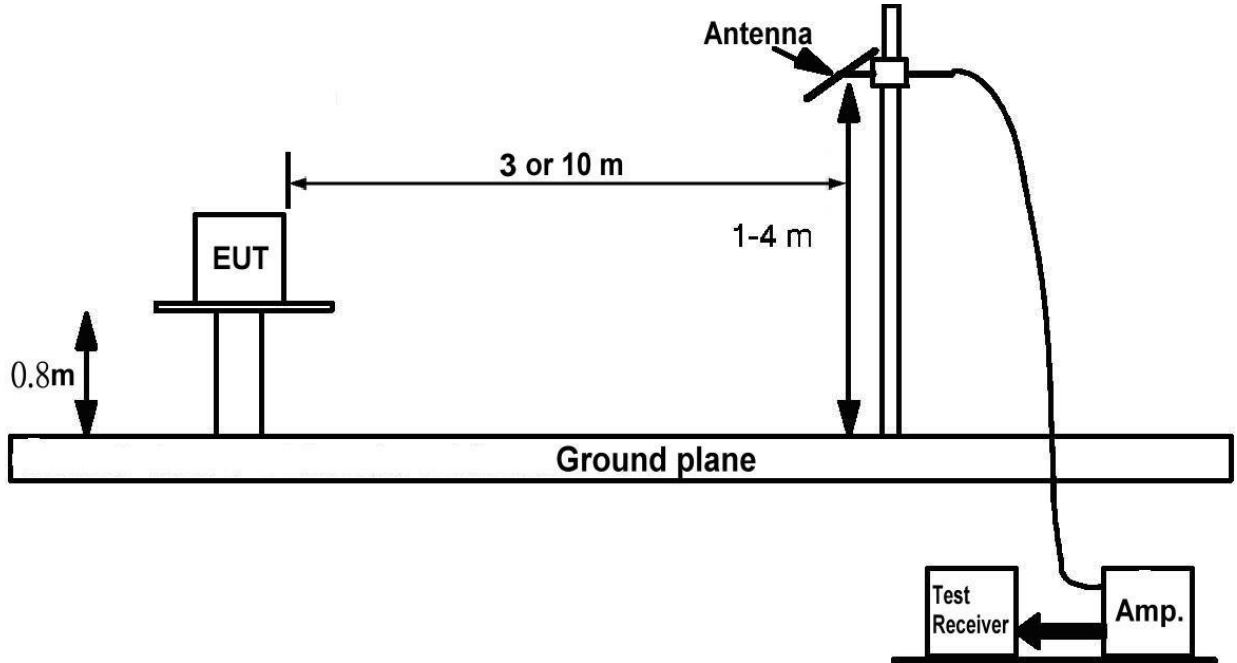
**3.2.3 TEST PROCEDURE**

- a. The measuring distance of at 3m or 10 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3m or 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 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 conducted 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.

**3.2.4 DEVIATION FROM TEST STANDARD**

No deviation

### 3.2.5 TEST SETUP



### 3.2.6 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 3.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

**3.2.7 TEST RESULTS**

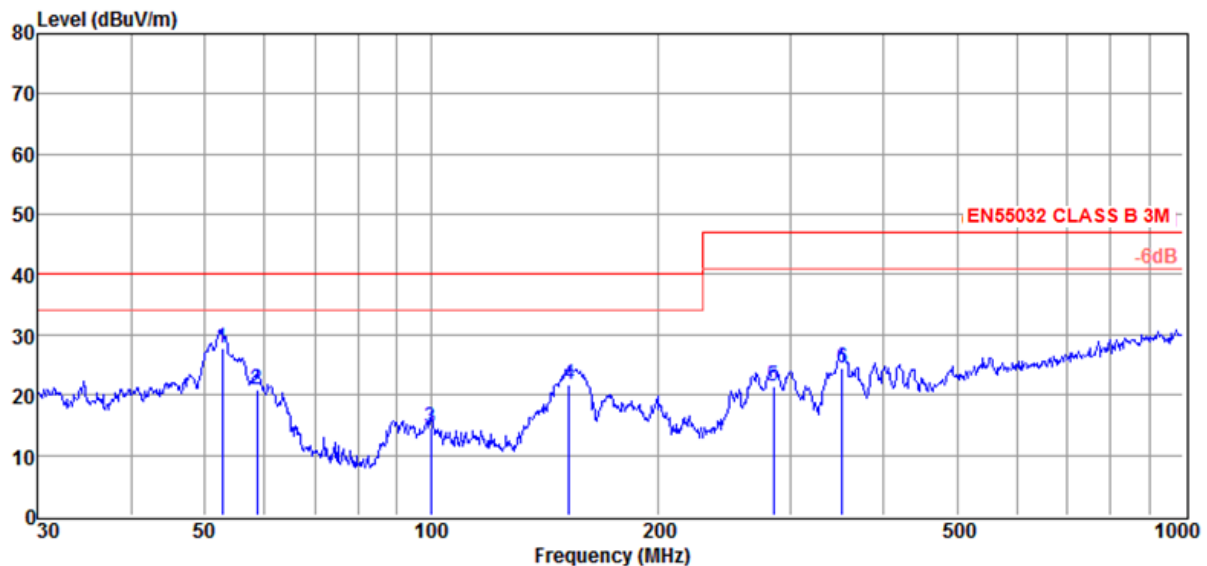
<b>EUT:</b>	Power Adapter	<b>Model No.:</b>	GA-0503000V, GA-2401000V, GA-1202000V
<b>Temperature:</b>	30°C	<b>Relative Humidity:</b>	55 %
<b>Pressure:</b>	1008 hPa	<b>Test Power :</b>	AC 230V/50Hz
<b>Test Mode :</b>	Full load		

## Remark:

- (1) Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Detector or Peak Detector.
- (2) All readings are Peak unless otherwise stated QP in column of 『Note』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform.
- (3) Measuring frequency range from 30MHz to 1000MHz.
- (4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table.

## Radiated Emission Test Result

**Test Site** : 966 Chamber  
**Test Date** : 2018-12-03      **Tested By** : Ace  
**EUT** : Power Adapter      **Model Number** : GA-0503000V  
**Power Rating** : AC 230V/50Hz      **Test Mode** : Full load  
**Condition** : Temp:30°C, Humi:55% **Antenna/Distance** : VULB9163-1(2018)/(3m)  
**Memo** : Vertical

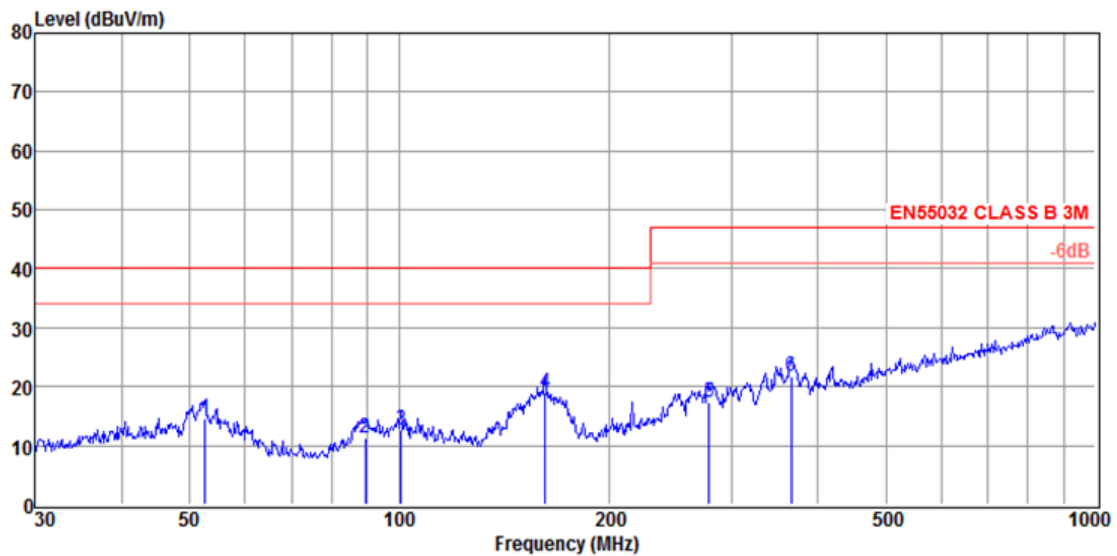


Item (Mark)	Freq (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Detector	Polarization
1	52.76	40.62	11.89	26.09	1.47	27.89	40.00	-12.11	QP	VERTICAL
2	58.61	33.77	11.65	26.07	1.46	20.81	40.00	-19.19	QP	VERTICAL
3	99.88	25.83	12.37	25.90	2.16	14.46	40.00	-25.54	QP	VERTICAL
4	152.66	36.17	8.80	25.98	2.76	21.75	40.00	-18.25	QP	VERTICAL
5	284.98	30.36	13.25	26.09	3.80	21.32	47.00	-25.68	QP	VERTICAL
6	351.71	31.75	14.72	26.16	4.29	24.60	47.00	-22.40	QP	VERTICAL

Note: 1. Result Level = Read Level+ Antenna Factor+ Cable Loss- PRM Factor  
 2. If PK Result complies with QP limit, QP Result is deemed to comply with QP limit  
 3.RBW 120KHz

## Radiated Emission Test Result

**Test Site** : 966 Chamber  
**Test Date** : 2018-12-03      **Tested By** : Ace  
**EUT** : Power Adapter      **Model Number** : GA-0503000V  
**Power Rating** : AC 230V/50Hz      **Test Mode** : Full load  
**Condition** : Temp:30°C,Humi:55% **Antenna/Distance** : VULB9163-1(2018)/(3m)  
**Memo** : Horizontal



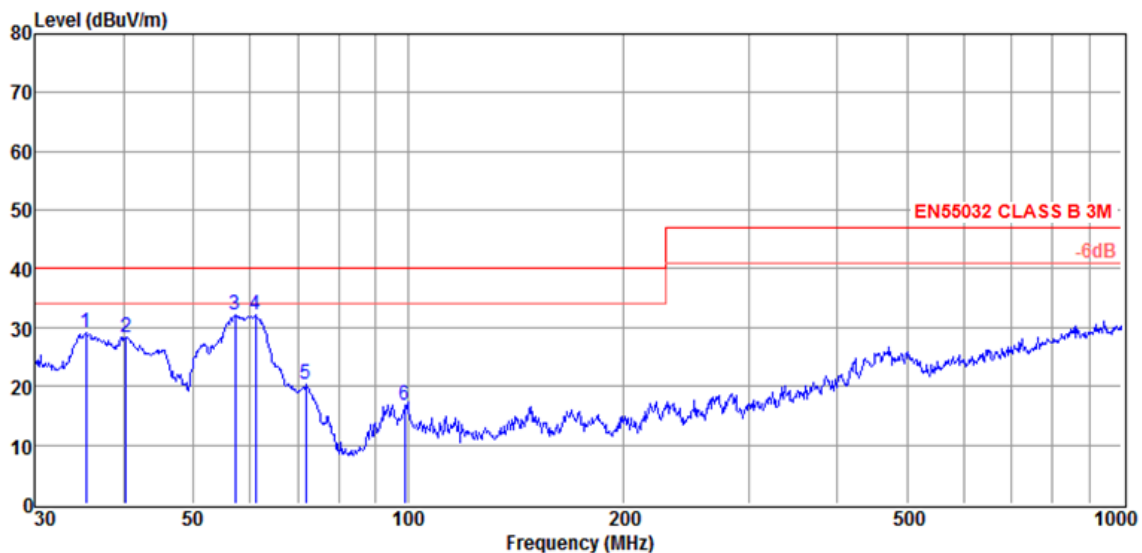
Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	52.58	27.18	11.89	26.09	1.47	14.45	40.00	-25.55	QP	HORIZONTAL
2	89.28	25.30	9.93	25.95	1.93	11.21	40.00	-28.79	QP	HORIZONTAL
3	100.58	23.98	12.35	25.90	2.17	12.60	40.00	-27.40	QP	HORIZONTAL
4	162.04	32.82	9.16	25.99	2.85	18.84	40.00	-21.16	QP	HORIZONTAL
5	279.04	26.59	13.14	26.09	3.76	17.40	47.00	-29.60	QP	HORIZONTAL
6	365.54	28.60	14.86	26.18	4.38	21.66	47.00	-25.34	QP	HORIZONTAL

Note: 1. Result Level = Read Level+ Antenna Factor+ Cable Loss- PRM Factor  
 2. If PK Result complies with QP limit, QP Result is deemed to comply with QP limit  
 3.RBW 120KHz



## Radiated Emission Test Result

**Test Site** : 966 Chamber  
**Test Date** : 2018-12-03      **Tested By** : Ace  
**EUT** : Power Adapter      **Model Number** : GA-2401000V  
**Power Rating** : AC 230V/50Hz      **Test Mode** : Full load  
**Condition** : Temp:30°C,Humi:55% **Antenna/Distance** : VULB9163-1(2018)/(3m)  
**Memo** : Vertical

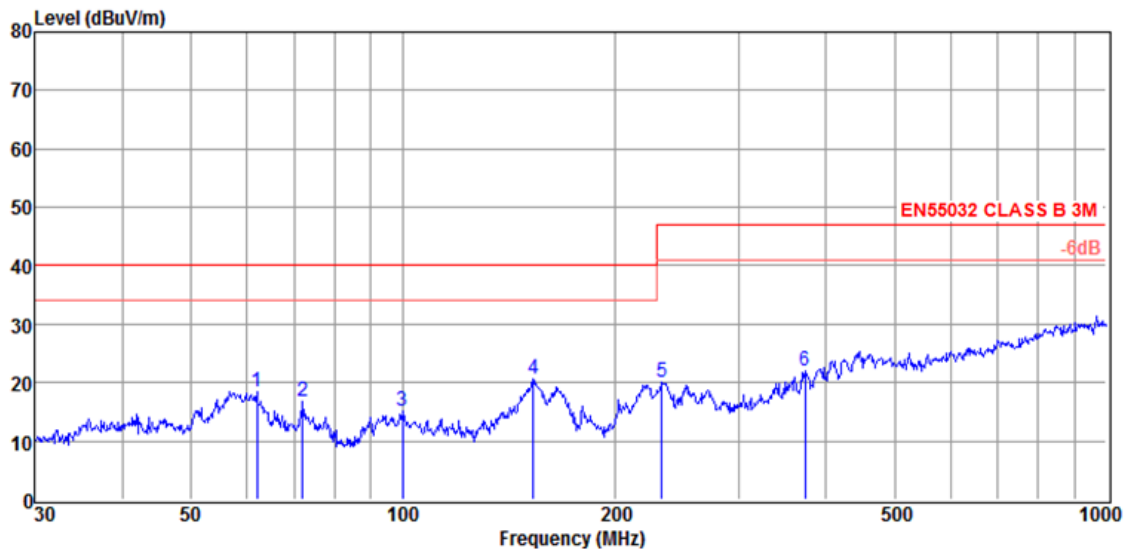


Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	35.38	42.88	11.20	26.16	1.24	29.16	40.00	-10.84	Peak	VERTICAL
2	40.28	40.96	12.29	26.14	1.33	28.44	40.00	-11.56	Peak	VERTICAL
3	57.19	45.04	11.71	26.07	1.46	32.14	40.00	-7.86	Peak	VERTICAL
4	61.13	45.66	11.09	26.06	1.46	32.15	40.00	-7.85	Peak	VERTICAL
5	71.83	36.70	8.29	26.02	1.50	20.47	40.00	-19.53	Peak	VERTICAL
6	98.83	28.50	12.13	25.91	2.14	16.86	40.00	-23.14	Peak	VERTICAL

Note: 1. Result Level = Read Level+ Antenna Factor+ Cable Loss- PRM Factor  
 2. If PK Result complies with QP limit, QP Result is deemed to comply with QP limit  
 3.RBW 120KHz

## Radiated Emission Test Result

**Test Site** : 966 Chamber  
**Test Date** : 2018-12-03      **Tested By** : Ace  
**EUT** : Power Adapter      **Model Number** : GA-2401000V  
**Power Rating** : AC 230V/50Hz      **Test Mode** : Full load  
**Condition** : Temp:30°C, Humi:55% **Antenna/Distance** : VULB9163-1(2018)/(3m)  
**Memo** : Horizontal

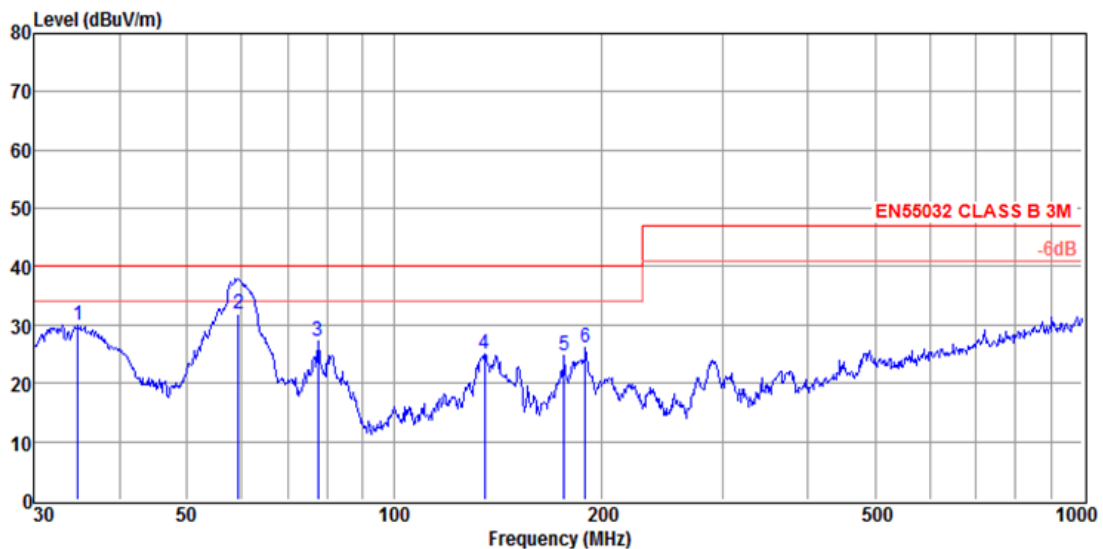


Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	62.00	32.36	10.70	26.05	1.46	18.47	40.00	-21.53	Peak	HORIZONTAL
2	72.08	33.09	8.23	26.02	1.51	16.81	40.00	-23.19	Peak	HORIZONTAL
3	99.88	26.61	12.37	25.90	2.16	15.24	40.00	-24.76	Peak	HORIZONTAL
4	153.20	34.96	8.82	25.98	2.77	20.57	40.00	-19.43	Peak	HORIZONTAL
5	233.35	30.66	11.92	26.05	3.43	19.96	47.00	-27.04	Peak	HORIZONTAL
6	373.31	28.85	14.94	26.19	4.43	22.03	47.00	-24.97	Peak	HORIZONTAL

Note: 1. Result Level = Read Level+ Antenna Factor+ Cable Loss- PRM Factor  
 2. If PK Result complies with QP limit, QP Result is deemed to comply with QP limit  
 3.RBW 120KHz

## Radiated Emission Test Result

**Test Site** : 966 Chamber  
**Test Date** : 2018-12-03      **Tested By** : Ace  
**EUT** : Power Adapter      **Model Number** : GA-1202000V  
**Power Rating** : AC 230V/50Hz      **Test Mode** : Full load  
**Condition** : Temp:30°C, Humi:55% **Antenna/Distance** : VULB9163-1(2018)/(3m)  
**Memo** : Vertical

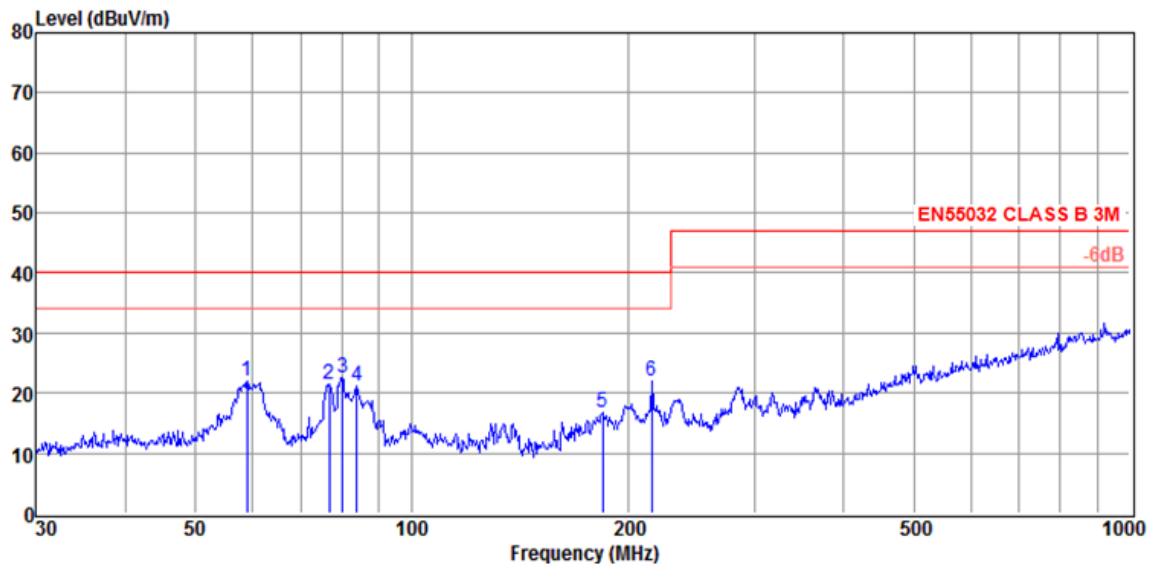


Item (Mark)	Freq (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Detector	Polarization
1	34.76	43.87	11.09	26.17	1.23	30.02	40.00	-9.98	Peak	VERTICAL
2	59.44	45.00	11.62	26.06	1.46	32.02	40.00	-7.98	QP	VERTICAL
3	77.59	44.04	7.49	26.01	1.65	27.17	40.00	-12.83	Peak	VERTICAL
4	135.51	38.69	9.63	25.96	2.59	24.95	40.00	-15.05	Peak	VERTICAL
5	176.89	37.99	9.67	26.00	2.97	24.63	40.00	-15.37	Peak	VERTICAL
6	189.74	39.01	10.09	26.02	3.07	26.15	40.00	-13.85	Peak	VERTICAL

Note: 1. Result Level = Read Level+ Antenna Factor+ Cable Loss- PRM Factor  
 2. If PK Result complies with QP limit, QP Result is deemed to comply with QP limit  
 3.RBW 120KHz

## Radiated Emission Test Result

**Test Site** : 966 Chamber  
**Test Date** : 2018-12-03      **Tested By** : Ace  
**EUT** : Power Adapter      **Model Number** : GA-1202000V  
**Power Rating** : AC 230V/50Hz      **Test Mode** : Full load  
**Condition** : Temp:30°C,Humi:55% **Antenna/Distance** : VULB9163-1(2018)/(3m)  
**Memo** : Horizontal



Item (Mark)	Freq (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Detector	Polarization
1	59.03	34.85	11.64	26.06	1.46	21.89	40.00	-18.11	Peak	HORIZONTAL
2	76.78	38.38	7.53	26.01	1.63	21.53	40.00	-18.47	Peak	HORIZONTAL
3	80.08	39.51	7.40	26.00	1.72	22.63	40.00	-17.37	Peak	HORIZONTAL
4	83.82	37.81	7.63	25.98	1.81	21.27	40.00	-18.73	Peak	HORIZONTAL
5	184.49	29.71	9.92	26.01	3.03	16.65	40.00	-23.35	Peak	HORIZONTAL
6	216.02	33.47	11.16	26.04	3.29	21.88	40.00	-18.12	Peak	HORIZONTAL

Note: 1. Result Level = Read Level+ Antenna Factor+ Cable Loss- PRM Factor  
 2. If PK Result complies with QP limit, QP Result is deemed to comply with QP limit  
 3.RBW 120KHz

### 3.3 HARMONICS CURRENT MEASUREMENT

#### 3.3.1 LIMITS OF HARMONICS CURRENT MEASUREMENT

**Table 1 – Limits for Class A equipment**

Harmonic order n	Maximum permissible harmonic current A
<b>Odd harmonics</b>	
3	2,30
5	1,14
7	0,77
9	0,40
11	0,33
13	0,21
$15 \leq n \leq 39$	$0,15 \frac{15}{n}$
<b>Even harmonics</b>	
2	1,08
4	0,43
6	0,30
$8 \leq n \leq 40$	$0,23 \frac{8}{n}$

**Table 2 – Limits for Class C equipment**

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

\*  $\lambda$  is the circuit power factor

**Table 3 – Limits for Class D equipment**

Harmonic order n	Maximum permissible harmonic current per watt mA/W	Maximum permissible harmonic current A
3	3,4	2,30
5	1,9	1,14
7	1,0	0,77
9	0,5	0,40
11	0,35	0,33
$13 \leq n \leq 39$ (odd harmonics only)	$\frac{3,85}{n}$	See Table 1

**3.3.2 MEASUREMENT INSTRUMENTS LIST**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	HARMONICS	California Instruments	500IIXCTS-400 -413/PACS-1	1337A01345	2019-11-25

Remark: " N/A" denotes No Model No. / Serial No. and No Calibration specified.

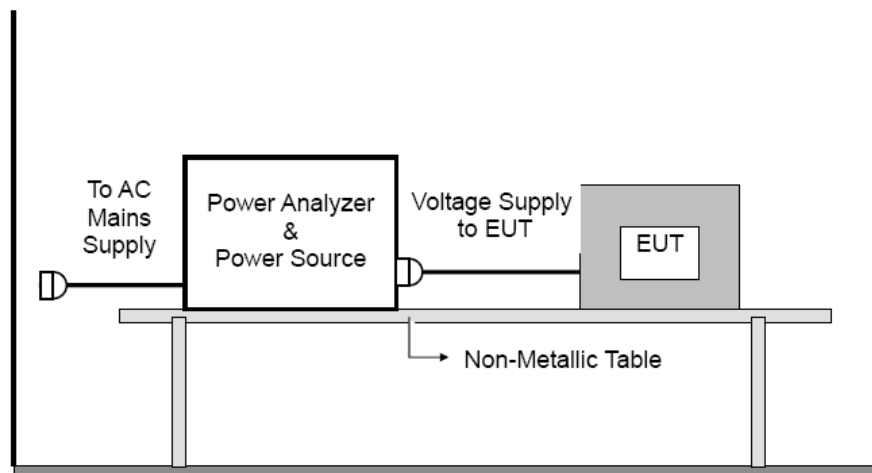
**3.3.3 TEST PROCEDURE**

- a. Test was performed according to the procedures specified in Clause 5.0 of IEC555-2 and/or Sub-clause 6.2 of IEC/EN 61000-3-2 depend on which standard adopted for compliance measurement.
- b. All types of harmonic current and/or voltage fluctuation in this report are assessed by direct measurement using flicker-meter.
- c. For the actual test configuration, please refer to the related Item –EUT Test Photos.

**3.3.4 DEVIATION FROM TEST STANDARD**

No deviation

**3.3.5 TEST SETUP**



**3.3.6 EUT OPERATING CONDITIONS**

The EUT tested system was configured as the statements of 3.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

**3.3.7 TEST RESULTS**

The power consumption is less than 75W, so no limit is applicable.

### 3.4 VOLTAGE FLUCTUATION AND FLICKS MEASUREMENT

#### 3.4.1 LIMITS OF VOLTAGE FLUCTUATION AND FLICKSMEASUREMENT

Tests	Limits		Descriptions
	IEC555-3	IEC/EN 61000-3-2	
Pst	≤ 1.0, Tp= 10 min.	≤ 1.0, Tp= 10 min.	Short Term Flicker Indicator
Plt	N/A	≤ 0.65, Tp=2 hr.	Long Term Flicker Indicator
dc	≤ 3 %	≤ 3.3 %	Relative Steady-State V-Chang
dmax	≤ 4 %	≤ 4 %	Maximum Relative V-change
d (t)	N/A	≤ 3.3% for > 500 ms	Relative V-change characteristic

#### 3.4.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	HARMONICS	California Instruments	500IIXCTS-400 -413/PACS-1	1337A01345	2019-11-25

Remark: " N/A" denotes No Model No. / Serial No. and No Calibration specified.

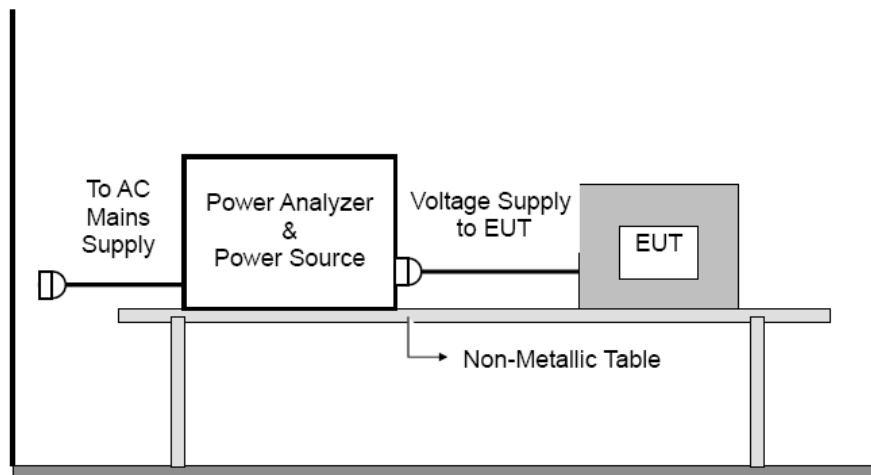
#### 3.4.3 TEST PROCEDURE

- a. Harmonic Current Test:  
Test was performed according to the procedures specified in Clause 5.0 of IEC555-2 and/or Sub-clause 6.2 of IEC/EN 61000-3-2 depend on which standard adopted for compliance measurement.
- b. Fluctuation and Flickers Test:  
Tests was performed according to the Test Conditions/Assessment of Voltage Fluctuations specified in Clause 5.0/6.0 of IEC555-3 and/or Clause 6.0/4.0 of IEC/EN 61000-3-3 depend on which standard adopted for compliance measurement.
- c. All types of harmonic current and/or voltage fluctuation in this report are assessed by direct measurement using flicker-meter.
- d. For the actual test configuration, please refer to the related Item –EUT Test Photos.

#### 3.4.4 DEVIATION FROM TEST STANDARD

No deviation

### 3.4.5 TEST SETUP



### 3.4.6 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 3.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

### 3.4.7 TEST RESULTS

According EN61000-3-3 Clause 6, for voltage changes caused b manual switching ,equipment is deemed to comply without further testing if the maximum r.m.s input current(including inrush current)evaluated over each 10 ms half-period between zero-crossings does not exceed 20A,and the supply current after inrush is within a variation band of 1.5A.



#### 4. IMMUNITY TEST

##### 4.1 STANDARD COMPLIANCE/SERVRITY LEVEL/CRITERIA

Tests Standard No.	Test Specification	Test Mode Test Ports	Perform. Criteria	Remark
1. ESD IEC/EN 61000-4-2	8KV air discharge 4KV contact discharge	Direct Mode	B	PASS
	4KV HCP discharge 4KV VCP discharge	Indirect Mode	B	PASS
2. RS IEC/EN 61000-4-3	80 MHz to 1000 MHz 3V/m(rms), 1 KHz, 80%, AM modulated	Enclosure	A	PASS
3. EFT/Burst IEC/EN 61000-4-4	1.0KV(peak) 5/50ns Tr/Th 5KHz Repetition Freq.	AC Power Port	B	PASS
	0.5 KV(peak) 5/50ns Tr/Th 5KHz Repetition Freq.	CTL/Signal Data Line Port	B	N/A
4. Surges IEC/EN 61000-4-5	1 KV(5P/5N) 1.2/50(8/20) Tr/Th us	L-N	B	PASS
	2 KV(5P/5N) 1.2/50(8/20) Tr/Th us	L-PE N-PE	B	N/A
5 Injected Current IEC/EN 61000-4-6	0.15 MHz to 80 MHz 3V(rms), 1KHz 80%, AM Modulated 150Ω source impedance	CTL/Signal Port	A	N/A
	0.15 MHz to 80 MHz 3V(rms), 1KHz 80%, AM Modulated 150Ω source impedance	AC Power Port	A	PASS
	0.15 MHz to 80 MHz 3V(rms), 1KHz 80%, AM Modulated 150Ω source impedance	DC Power Port	A	N/A
6. Power Frequency Magnetic Field IEC/EN 61000-4-8	50 Hz, 1A/m	Enclosure	A	PASS
7. Volt. Interruptions Volt. Dips IEC/EN 61000-4-11	Voltage dip >95% / 30% Interruption >95%	AC Power Port	B / C C	PASS
				See Remark(2)

\* Remark:

- (1) "N/A": denotes test is not applicable in this Test Report.
- (2) Voltage dip: >95% reduction – Performance Criteria **B**  
 Voltage dip: 30% reduction – Performance Criteria **C**  
 Voltage Interruption: >95% reduction – Performance Criteria **C**

#### 4.2 GENERAL PERFORMANCE CRITERIA

According to **EN55035: 2017** standard, the general performance criteria as following:

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

#### 4.3 GENERAL PERFORMANCE CRITERIA TEST SETUP

The EUT tested system was configured as the statements of **3.1.6** Unless otherwise a special operating condition is specified in the follows during the testing.

#### 4.4 ESD TESTING

##### 4.4.1 TEST SPECIFICATION

<b>Basic Standard:</b>	IEC/EN 61000-4-2
<b>Discharge Impedance:</b>	330 ohm / 150 pF
<b>Required Performance</b>	B
<b>Discharge Voltage:</b>	Air Discharge: 2kV/4kV/8kV (Direct) Contact Discharge: 2kV/4kV (Direct/Indirect)
<b>Polarity:</b>	Positive & Negative
<b>Number of Discharge:</b>	Air Discharge: min. 20 times at each test point Contact Discharge: min. 200 times in total
<b>Discharge Mode:</b>	Contact and Air
<b>Discharge Period:</b>	1 second minimum

##### 4.4.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	ESD Simulator	Prima	ESD61002B	PR13012530	2019-05-11

Remark: " N/A" denotes No Model No. / Serial No. and No Calibration specified.

##### 4.4.3 TEST PROCEDURE

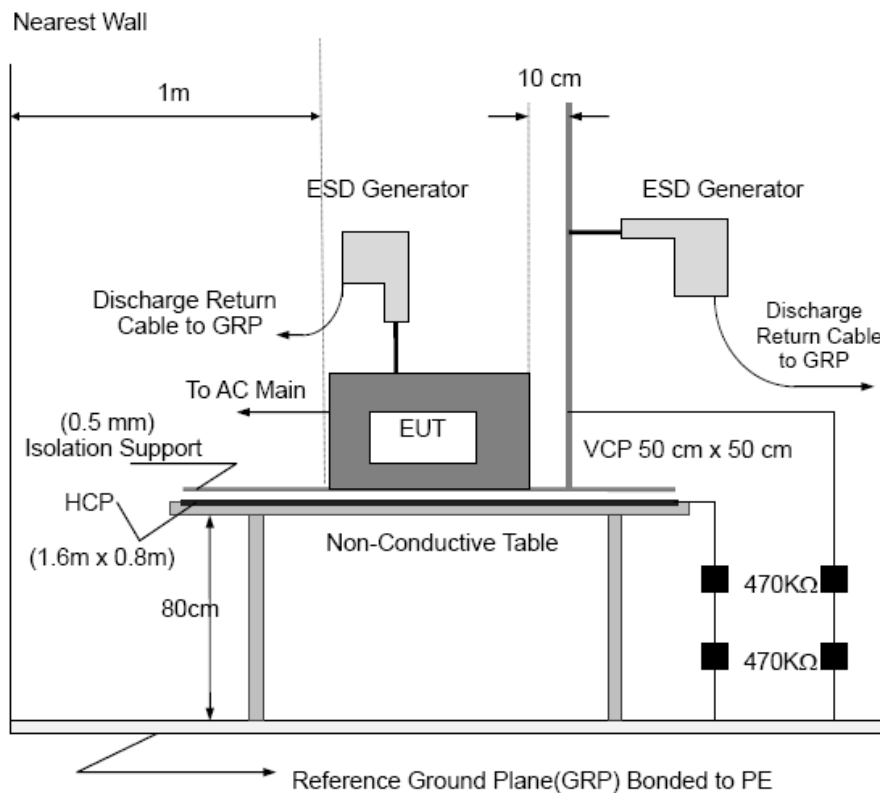
The test generator necessary to perform direct and indirect application of discharges to the EUT in the following manner:

- 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. The EUT shall be exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points. One of the test points shall be subjected to at least 50 indirect discharges to the center of the front edge of the horizontal coupling plane. The remaining three test points shall each receive at least 50 direct contact discharges.  
If no direct contact test points are available, then at least 200 indirect discharges shall be applied in the indirect mode. 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 ten 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.

**4.4.4 DEVIATION FROM TEST STANDARD**

No deviation

**4.4.5 TEST SETUP**



Note:

**TABLE-TOP EQUIPMENT**

The configuration consisted of a wooden table 0.8 meters high standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A Horizontal Coupling Plane (1.6m x 0.8m) was placed on the table and attached to the GRP by means of a cable with 940k total impedance. The equipment under test, was installed in a representative system as described in section 7 of IEC /EN 61000-4-2, and its cables were placed on the HCP and isolated by an insulating support of 0.5mm thickness. A distance of 1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

**FLOOR-STANDING EQUIPMENT**

The equipment under test was installed in a representative system as described in section 7 of IEC/EN 61000-4-2, and its cables were isolated from the Ground Reference Plane by an insulating support of 0.1-meter thickness. The GRP consisted of a sheet of aluminum that is at least 0.25mm thick, and 2.5meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.



## 4.5 RS TESTING2

### 4.5.1 TEST SPECIFICATION

<b>Basic Standard:</b>	IEC/EN 61000-4-3
<b>Required Performance</b>	A
<b>Frequency Range:</b>	80 MHz - 1000 MHz
<b>Field Strength:</b>	3 V/m
<b>Modulation:</b>	1kHz Sine Wave, 80%, AM Modulation
<b>Frequency Step:</b>	1 % of fundamental
<b>Polarity of Antenna:</b>	Horizontal and Vertical
<b>Test Distance:</b>	3 m
<b>Antenna Height:</b>	1.5 m
<b>Dwell Time:</b>	at least 3 seconds

### 4.5.2 MEASUREMENT INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
Signal Generator	Agilent	N517113-50B	MY53050160	2019-10-21
Amplifier	A&R	150W1000M3	313157	2019-10-18
Amplifier	A&R	50SIG6M2	0342835	2019-11-07
Log-periodic Antenna	SCHWARZBECK	STLP 9128E	9128E-012	2019-01-19
Microwave log-periodic antenna	SCHWARZBECK	STLP 9149	9149.222	2019-12-13
Isotropic Field Probe	A&R	FL700	0342652	2019-09-11
10 meter anechoic chamber	Albatross	10m	/	2020-06-26

Remark: " N/A" denotes No Model No. / Serial No. and No Calibration specified.

### 4.5.3 TEST PROCEDURE

The EUT and support equipment, which are placed on a table that is 0.8 meter above ground and the testing was performed in a fully-anechoic chamber.

The testing distance from antenna to the EUT was 3 meters.

The other condition as following manner:

- a. The field strength level was 3V/m.
- b. The frequency range is swept from 80 MHz to 1000 MHz, with the signal 80%amplitude modulated with a 1kHz sine wave. The rate of sweep did not exceed  $1.5 \times 10^{-3}$  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.

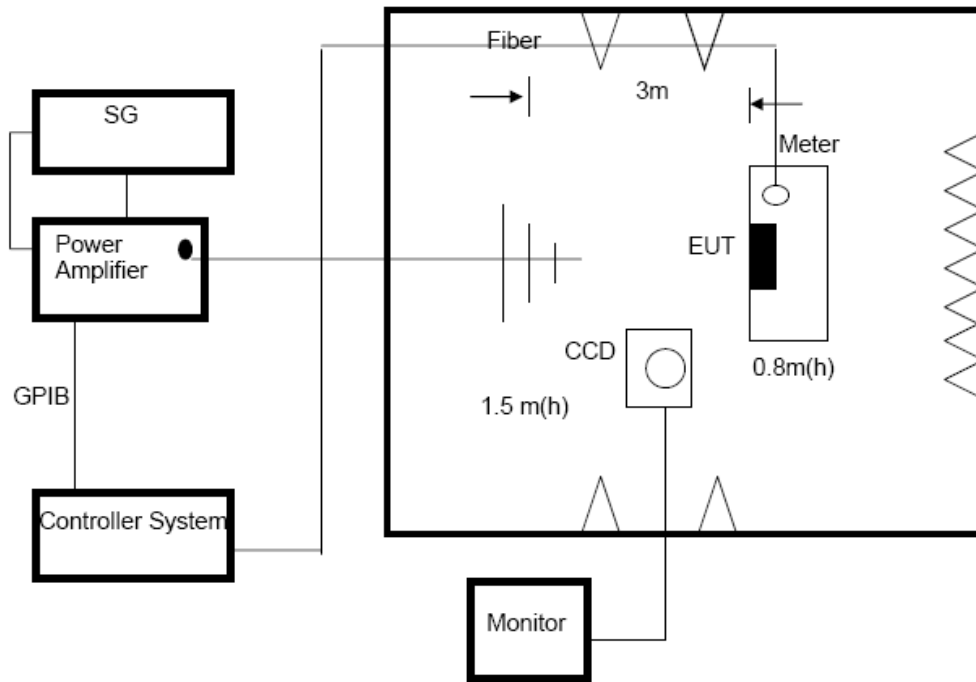


- d. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

**4.5.4 DEVIATION FROM TEST STANDARD**

No deviation

#### 4.5.5 TEST SETUP



Note:

##### TABLE-TOP EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

##### FLOOR-STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-3 was placed on a non-conductive wood support 0.1 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.



**4.5.6 TEST RESULTS**

Frequency Range (MHz)	Polarity of Antenna	R.F. Field Strength	Azimuth	Perform. Criteria	Results	Judgment
80MHz - 1000MHz	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	A	A	PASS
			Rear			
			Left			
			Right			

Frequency Range (MHz)	Polarity of Antenna	R.F. Field Strength	Azimuth	Perform. Criteria	Results	Judgment
1800, 2600, 3500, 5000 MHz	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	A	A	PASS
			Rear			
			Left			
			Right			

Note:

- 1) H/V denotes the Horizontal/Vertical polarity of Antenna.
- 2) N/A - denotes test is not applicable in this test report.
- 3) Criteria A: There was no change operated with initial operating during the test.
- 4) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
- 5) Criteria C: The system shut down during the test.

#### 4.6 EFT/BURST TESTING

##### 4.6.1 TEST SPECIFICATION

<b>Basic Standard:</b>	IEC/EN 61000-4-4
<b>Required Performance</b>	B
<b>Test Voltage:</b>	Power Line: $\pm 1$ kV
<b>Polarity:</b>	Positive & Negative
<b>Impulse Frequency:</b>	5 kHz
<b>Impulse Wave shape :</b>	5/50 ns
<b>Burst Duration:</b>	15 ms
<b>Burst Period:</b>	300 ms
<b>Test Duration:</b>	Not less than 1 min.

##### 4.6.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Electrical Intelligent Transient Generator	Everfine	EMS61000-4B	G114921CA134 1115	2019-05-23

Remark: " N/A" denotes No Model No. / Serial No. and No Calibration specified.

##### 4.6.3 TEST PROCEDURE

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.

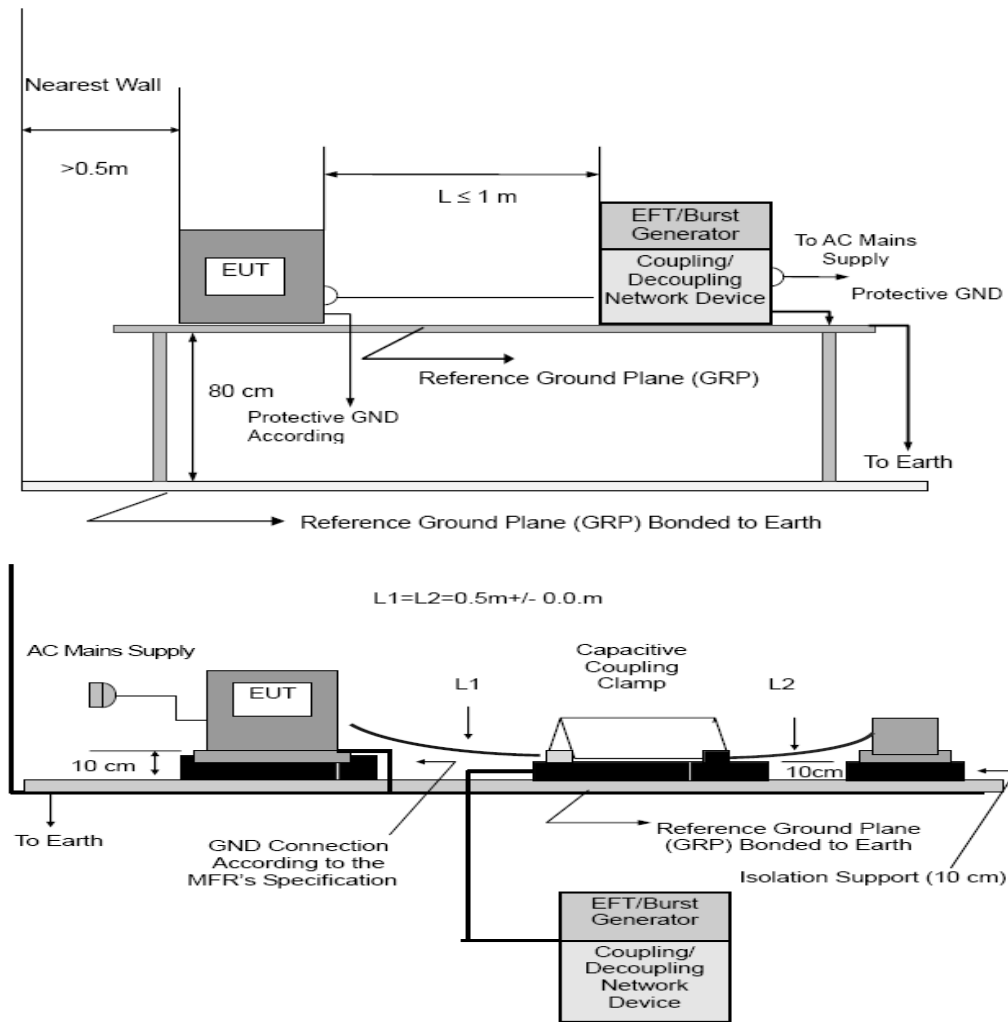
The other condition as following manner:

- a. The length of power cord between the coupling device and the EUT should not exceed 1 meter.
- b. Both positive and negative polarity discharges were applied.
- c. The duration time of each test sequential was 1 minute
- d. For the actual test configuration, please refer to the related Item –EUT Test Photos.

##### 4.6.4 DEVIATION FROM TEST STANDARD

No deviation

**4.6.5 TEST SETUP**



Note:

**TABLE-TOP EQUIPMENT**

The configuration consisted of a wooden table (0.8m high) standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system. A minimum distance of 0.5m was provided between the EUT and the walls of the laboratory or any other metallic structure.

**FLOOR-STANDING EQUIPMENT**

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-4 and its cables, were isolated from the Ground Reference Plane by an insulating support that is 0.1-meter thick. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system.

**4.6.6 TEST RESULTS**

Mode	AC Power Line		DC Power Line		Signal/Control Line	
Test Level	1KV		0.5KV		0.5KV	
Port(s)	Polarity	Results	Polarity	Results	Polarity	Results
Line (L)	P	A	P		P	
	N	A	N		N	
Neutral (N)	P	A	P		P	
	N	A	N		N	
Ground (PE)	P		P		P	
	N		N		N	
Signal/Control Line	P		P		P	
	N		N		N	
Criteria	<b>B</b>		<b>B</b>		<b>B</b>	
Result	<b>A</b>		<b>--</b>		<b>--</b>	
Judgment	<b>PASS</b>		<b>N/A</b>		<b>N/A</b>	

- 1) P/N denotes the Positive/Negative polarity of the output voltage.
- 2) N/A - denotes test is not applicable in this test report
- 3) Criteria A: There was no change operated with initial operating during the test.
- 4) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
- 5) Criteria C: The system shut down during the test.

## 4.7 SURGE TESTING

### 4.7.1 TEST SPECIFICATION

<b>Basic Standard:</b>	IEC/EN 61000-4-5
<b>Required Performance</b>	B
<b>Wave-Shape:</b>	Combination Wave 1.2/50 us Open Circuit Voltage 8 /20 us Short Circuit Current
<b>Test Voltage:</b>	Power Line: 0.5 kV, 1 kV, 2 kV
<b>Surge Input/Output:</b>	L-N, L-PE, N-PE
<b>Generator Source:</b>	2 ohm between networks
<b>Impedance:</b>	12 ohm between network and ground
<b>Polarity:</b>	Positive/Negative
<b>Phase Angle:</b>	0 /90/180/270
<b>Pulse Repetition Rate:</b>	1 time / min. (maximum)
<b>Number of Tests:</b>	5 positive and 5 negative at selected points

### 4.7.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Lightning surge generator	Prima	SUG61005CX	PR13065597	2019-05-23

Remark: " N/A" denotes No Model No. / Serial No. and No Calibration specified.

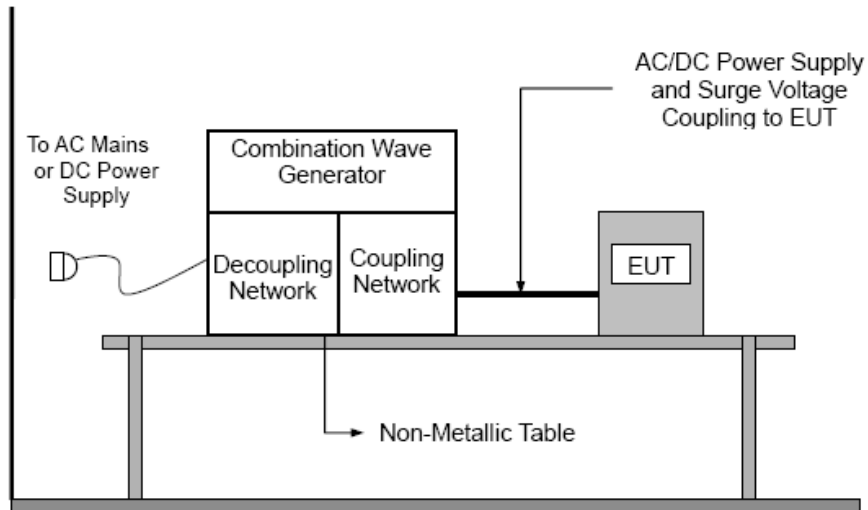
### 4.7.3 TEST PROCEDURE

- a. For EUT SWITCHING 4 ports USB AC ADAPTER:  
The surge is to be applied to the EUT SWITCHING 4 ports USB AC ADAPTER terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines, and to provide sufficient decoupling impedance to the surge wave. The power cord between the EUT and the coupling/decoupling networks shall be 2meters in length (or shorter).
- b. For test applied to unshielded unsymmetrically operated interconnection lines of EUT:  
The surge is applied to the lines via the capacitive coupling. The coupling /decoupling networks shall not influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).
- c. For test applied to unshielded symmetrically operated interconnection /telecommunication lines of EUT:  
The surge is applied to the lines via gas arrestors coupling. Test levels below the ignition point of the coupling arrestor cannot be specified. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).
- d. For the actual test configuration, please refer to the related Item –EUT Test Photos.

**4.7.4 DEVIATION FROM TEST STANDARD**

No deviation

**4.7.5 TEST SETUP**



**4.7.6 TEST RESULTS**

Wave Form EUT Ports Tested	1.2/50(8/20) us						Criteria	Judgment
	Polarity	Phase	Voltage					
			0.5kV	1kV	1.5kV	2kV		
L - N	+/-	0°		B			B	PASS
	+/-	90°		B				
	+/-	180°		B				
	+/-	270°		B				
L - PE	+/-	0°					B	N/A
	+/-	90°						
	+/-	180°						
	+/-	270°						
N - PE	+/-	0°					B	N/A
	+/-	90°						
	+/-	180°						
	+/-	270°						
Signal Line (N/A)	+/-	0°					B	N/A
	+/-	90°						
	+/-	180°						
	+/-	270°						
Signal Line (N/A)	+/-	0°					B	N/A
	+/-	90°						
	+/-	180°						
	+/-	270°						

Note:

- 1) N/A - denotes test is not applicable in this Test Report

#### 4.8 INJECTION CURRENT TESTING

##### 4.8.1 TEST SPECIFICATION

<b>Basic Standard:</b>	IEC/EN 61000-4-6
<b>Required Performance</b>	A
<b>Frequency Range:</b>	0.15 MHz - 80 MHz
<b>Field Strength:</b>	3 Vr.m.s.
<b>Modulation:</b>	1kHz Sine Wave, 80%, AM Modulation
<b>Frequency Step:</b>	1 % of fundamental
<b>Dwell Time:</b>	at least 3 seconds

##### 4.8.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	CONDUCTED IMMUNITY TEST SYSTEM	FRANKONIA	CIT-10	102D1253	2019-10-08
2	CDN	FRANKONIA	CDN M2+M3	A3011059	2019-10-08
3	Electromagnetic clamp	FRANKONIA	KEMZ-801	21044	2019-10-08

Remark: " N/A" denotes No Model No. / Serial No. and No Calibration specified.

##### 4.8.3 TEST PROCEDURE

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.

The other condition as following manner:

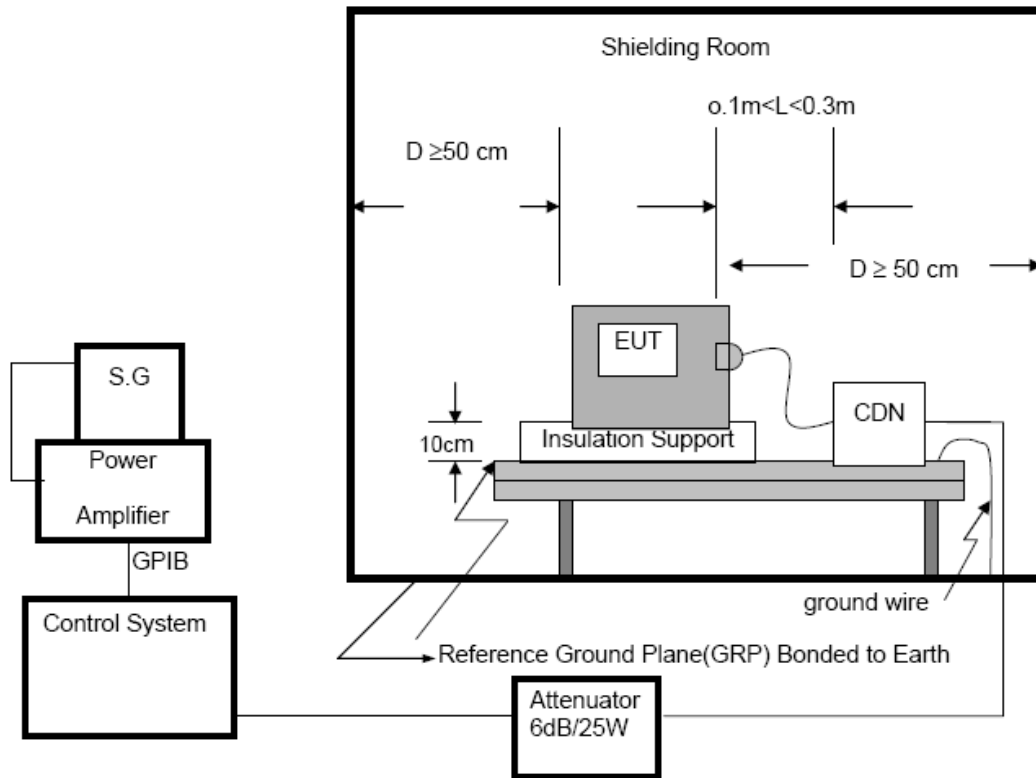
- a. The field strength level was 3V.
- b. The frequency range is swept from 150 KHz to 80 MHz, with the signal 80%amplitude modulated with a 1kHz sine wave. The rate of sweep did not exceed  $1.5 \times 10^{-3}$  decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
- c. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- d. For the actual test configuration, please refer to the related Item –EUT Test Photos.

##### 4.8.4 DEVIATION FROM TEST STANDARD

No deviation



**4.8.5 TEST SETUP**



For the actual test configuration, please refer to the related Item –EUT Test Photos.

**NOTE:**

**FLOOR-STANDING EQUIPMENT**

The equipment to be tested is placed on an insulating support of 0.1 meters height above a ground reference plane. All relevant cables shall be provided with the appropriate coupling and decoupling devices at a distance between 0.1 meters and 0.3 meters from the projected geometry of the EUT on the ground reference plane.

**4.8.6 TEST RESULTS**

Test Ports (Mode)	Freq. Range MHz)	Field Strength	Perform. Criteria	Results	Judgment
Input/ Output AC. Power Port	0.15 ---80	3V(rms) AM Modulated 1000Hz, 80%	<b>A</b>	<b>A</b>	<b>PASS</b>
Input/ Output DC. Power Port	0.15 --- 80		<b>A</b>	--	<b>N/A</b>
Signal Line ( N/A )	0.15 --- 80		<b>A</b>	--	<b>N/A</b>

Note:

- 1) N/A - denotes test is not applicable in this Test Report.

**4.9 VOLTAGE INTERRUPTION/DIPS TESTING**

**4.9.1 TEST SPECIFICATION**

<b>Basic Standard:</b>	IEC/EN 61000-4-11
<b>Required Performance:</b>	B (For >95% Voltage Dips) C (For 30% Voltage Dips) C (For >95% Voltage Interruptions)
<b>Test Duration Time:</b>	Minimum three test events in sequence
<b>Interval between Event:</b>	Minimum ten seconds
<b>Phase Angle:</b>	0°
<b>Test Cycle:</b>	3 times

**4.9.2 MEASUREMENT INSTRUMENTS**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Voltage Dips And Interruptions Generator	Everfine	EMS61000-11 K	G113317CA834 1117	2019-05-23

Remark: " N/A" denotes No Model No. / Serial No. and No Calibration specified.

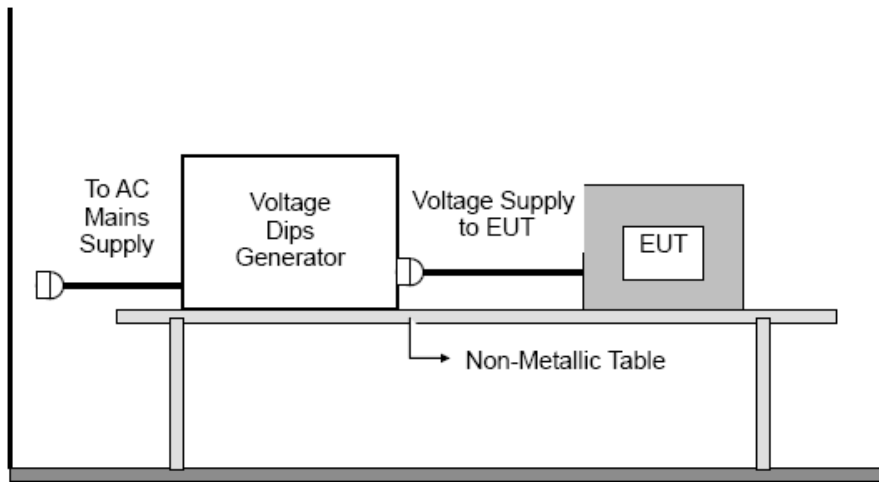
**4.9.3 TEST PROCEDURE**

The EUT shall be tested for each selected combination of test levels and duration with a sequence of three dips/interruptions with intervals of 10 s minimum (between each test event). Each representative mode of operation shall be tested. Abrupt changes in supply voltage shall occur at zero crossings of the voltage waveform.

**4.9.4 DEVIATION FROM TEST STANDARD**

No deviation

**4.9.5 TEST SETUP**



For the actual test configuration, please refer to the related Item –EUT Test Photos.

**4.9.6 TEST RESULTS**

Input Rating:230V/50Hz

Voltage Reduction	Periods	Perform Criteria	Results	Judgment
Voltage dip >95%	0.5	B	A	PASS
Voltage dip 30%	25	C	B	PASS
Interruption >95%	250	C	C	PASS

Input Rating:100V/60Hz

Voltage Reduction	Periods	Perform Criteria	Results	Judgment
Voltage dip >95%	0.5	B	A	PASS
Voltage dip 30%	30	C	B	PASS
Interruption >95%	300	C	C	PASS

Note:

- 1) N/A - denotes test is not applicable in this test report.

**4.10 POWER-FREQUENCY MAGNETIC FIELDS**

**4.10.1 MEASUREMENT INSTRUMENTS**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Magnetic Field Tester	EMC-PARTNER	MF1000-1	121	2019-10-08

Remark: " N/A" denotes No Model No. / Serial No. and No Calibration specified.

**4.10.2 TEST LEVEL AND PERFORMANCE CRITERION**

Level	Magnetic Field Strength A/m	Performance criterion
1	1	A

Performance criteria A description: During and after the test the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a minimum performance level specified by the manufacturer when the EUT is used as intended

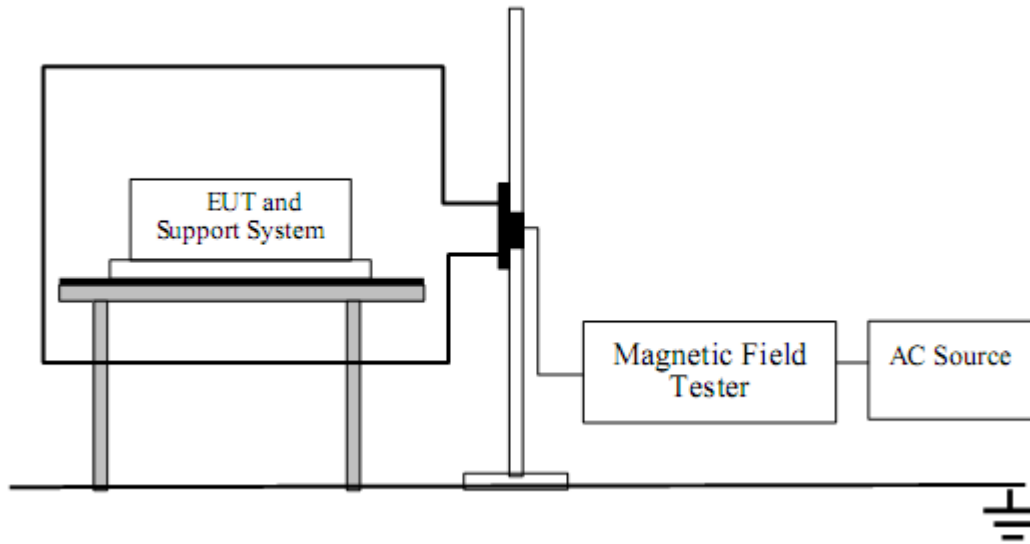
**4.10.3 TEST PROCEDURE**

The EUT shall be subjected to the test magnetic field by using the induction coil of standard dimensions (1m\*1m) and shown in Section 13.3 The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations. .

**4.10.4 DEVIATION FROM TEST STANDARD**

No deviation

**4.10.5 TEST SETUP**



**4.10.6 TEST RESULTS**

Operation Mode	Test Level	Testing Duration	Coil Orientation	Required	Observation	Result (Pass/Fail)
FULL LOAD	1A/m	5 min / coil	X	A	A	Pass
	1A/m	5 min / coil	Y	A	A	Pass
	1A/m	5 min / coil	Z	A	A	Pass

Note:

Operation as intend, no loss of function during test and after test

**5. ATTACHMENT**  
**5.1 EUT TEST PHOTO**

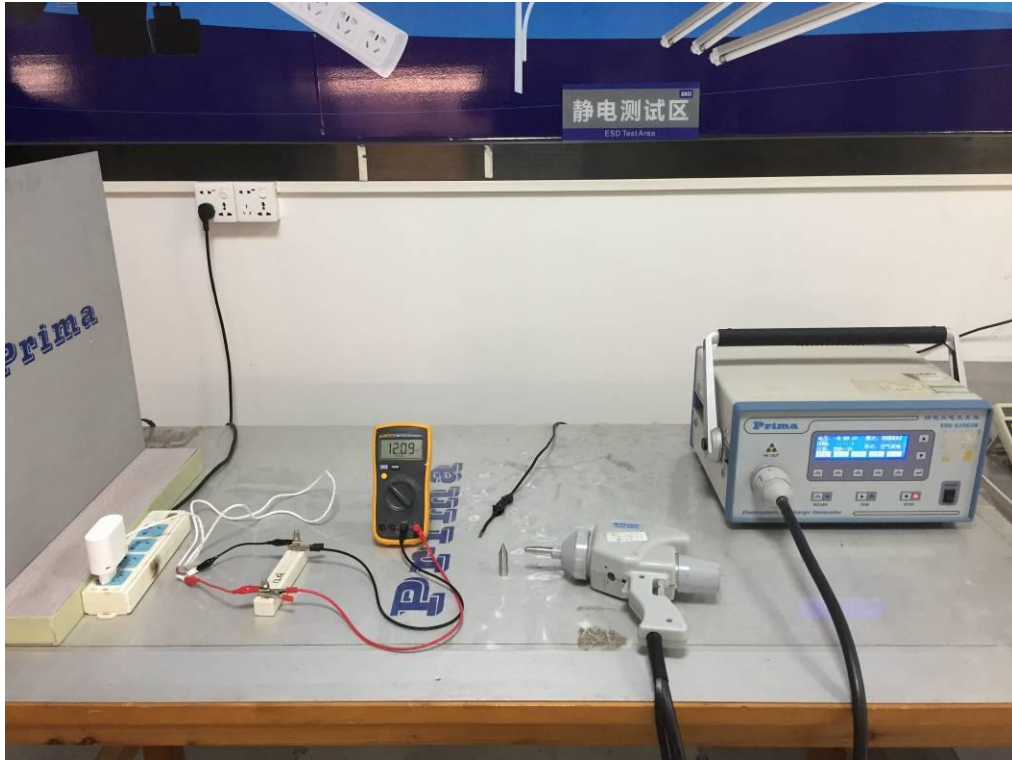
**Conducted Emission Measurement Photo**



**Radiated Measurement Photo**



**ESD Measurement Photos**

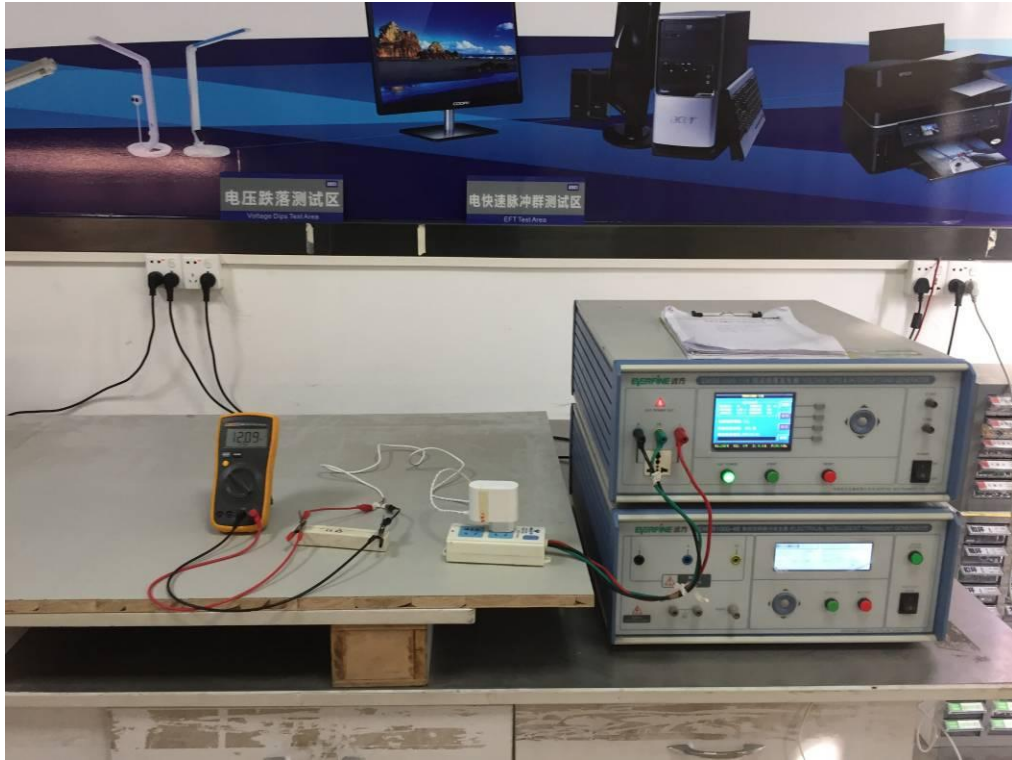


**Surge Measurement Photos**

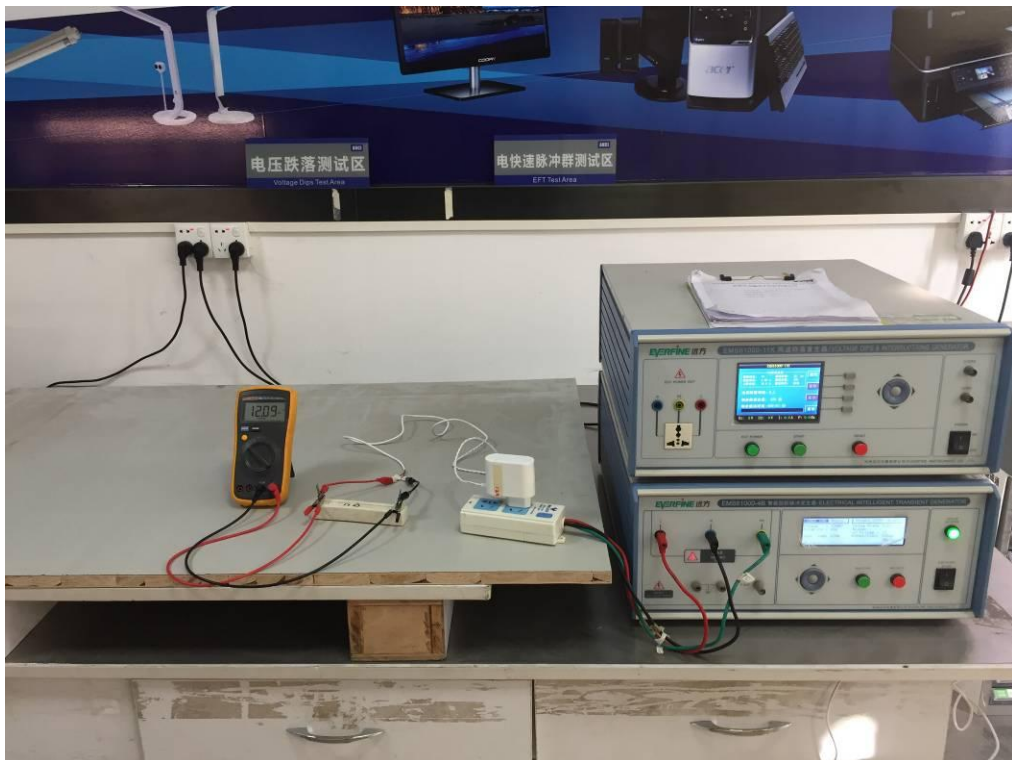




### EFT Measurement Photos



### Dips Measurement Photos



5.2 EUT PHOTO



Figure 1. Overall view of unit



Figure 2. Overall view of unit

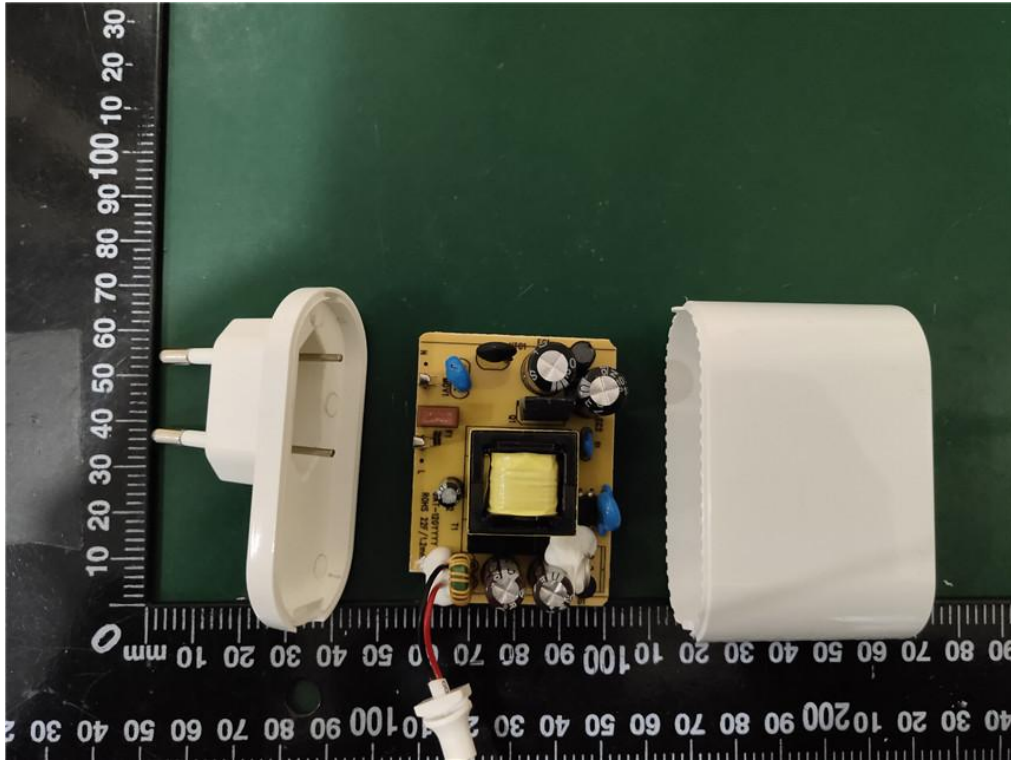


Figure 3. Inside view of unit

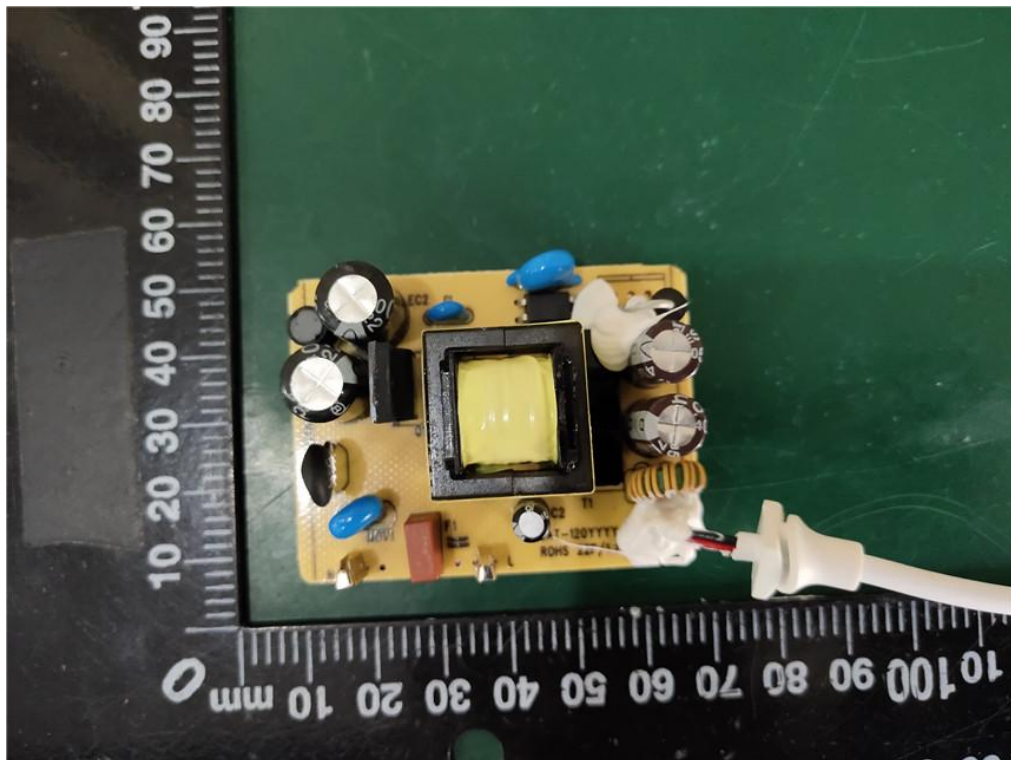


Figure 4. Top view of PCB

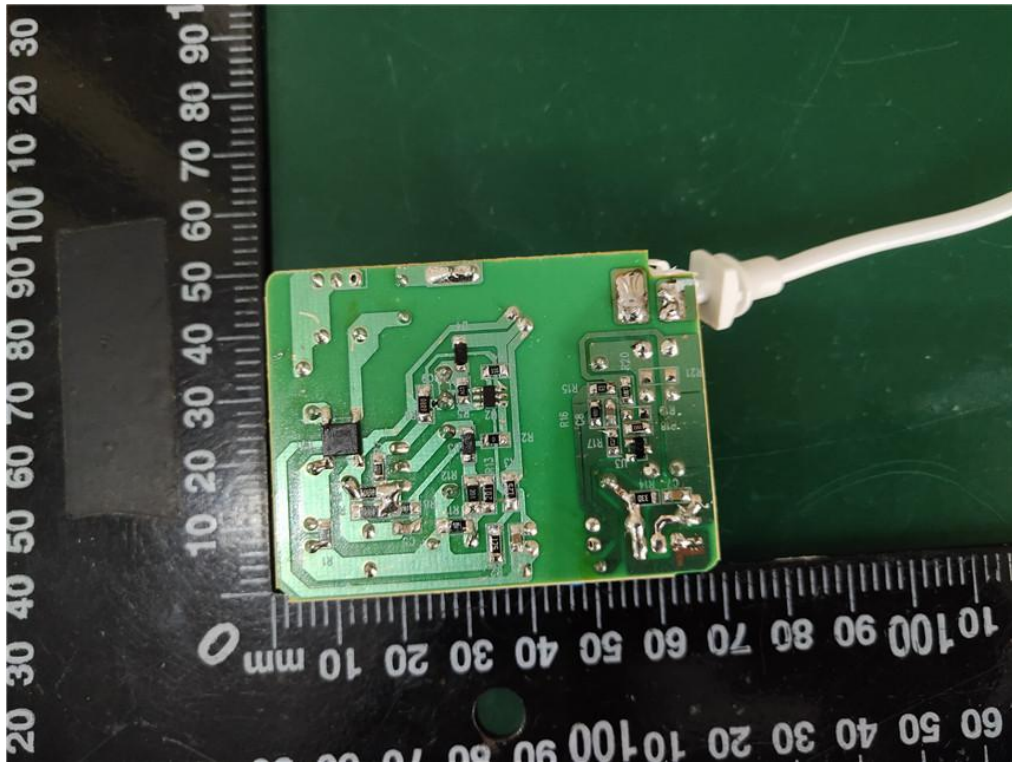


Figure 5. Bottom view of PCB