

Test Report Number:	LCZE17010038				
Applicant Name:	Energy Recovery Products (Zhuhai) Co., Ltd				
Applicant Address:	F building No.8, Pingdong Road 2, Nanping Science Park, Zhuhai, Guangdong China 519060				
Test item:	LED Driver				
Model / Type Reference:	See section 4.2 ratings and system details				
Date of Issue:	2017-03-30				
Testing Laboratory:	LCTECH (Zhongshan) Testing Service Co., Ltd 2/F., Technology and Enterprise Development Center, Guangyuan Road, Xiaolan, Zhongshan, Guangdong, China				
Test Specification:	EN 55015:2013+A1:2015 EN 61547:2009 EN 61000-3-2:2014 EN 61000-3-3:2013				
Test Result:	Passed				
Compiled by:	Reviewed by:				
2017-03-30	Mike		2017-03-30	Gordon Xie	
<i>Date</i>	<i>Name</i>	<i>Signature</i>	<i>Date</i>	<i>Name</i>	<i>Signature</i>
Remark:					
N/A					
<p>The duplication of this report or parts of it and its use for advertising purposes is only allowed with permission of the testing laboratory. This report contains the result of the examination of the product sample submitted by the applicant. A general statement concerning the quality of the products from the series manufacture cannot be derived therefore.</p>					

TEST SUMMARY

- 5.1 HARMONICS ON AC MAINS
RESULT: Pass
- 5.2 VOLTAGE FLUCTUATIONS ON AC MAINS
RESULT: Pass
- 5.3 MAINS TERMINAL CONTINUOUS DISTURBANCE VOLTAGE
RESULT: Pass
- 5.4 RADIATED ELECTROMAGNETIC DISTURBANCES(9KHZ TO 30MHZ)
RESULT: Pass
- 5.5 RADIATED EMISSION(30MHZ TO 300MHZ)
RESULT: Pass
- 6.2.1 RADIATED RADIO-FREQUENCY ELECTROMAGNETIC FIELDS(RS),AMPLITUDE MODULATION
RESULT: Pass
- 6.2.2 RADIO-FREQUENCY COMMON MODE / CONDUCTED SUSCEPTIBILITY (CS)
RESULT: Pass
- 6.3.1 ELECTRICAL FAST TRANSIENTS (EFT)
RESULT: Pass
- 6.3.2 SURGE
RESULT: Pass
- 6.3.3 ELECTROSTATIC DISCHARGES (ESD)
RESULT: Pass
- 6.4.1 VOLTAGE DIP AND INTERRUPTIONS
RESULT: Pass

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1 General Remarks

1.1 Complementary Materials

Constructional Data form

2 Measurement Uncertainty

Test Item	Uncertainty
Uncertainty for Terminal Continuous Disturbance Voltage	3.26dB
Uncertainty for Radiated electromagnetic disturbances	3.04dB
Uncertainty for Radiated disturbance	3.14 dB (Polarize: V)
	3.16 dB (Polarize: H)

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3 Test Sites

3.1 Test Facilities

A. LCTECH (Zhongshan) Testing Service Co.,Ltd

Add: 2/F.,Technology and Enterprise Development Center, Guangyuan Road, Xiaolan, Zhongshan,
Guangdong, China

FCC Registration Number: 899311

Industry Canada site registration number: 12114A-1

3.2 Testing

Date of receipt of test item : 2017-01-17

Date (s) of performance of tests : 2017-03-23 to 2017-03-24

3.3 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Date (yyyy-mm-dd)	Cal.Due date (yyyy-mm-dd)
Radiated Emission(30MHz to 1000MHz) <input checked="" type="checkbox"/>						
1	EMI Test Receiver	R&S	ESCI 7	100965	2016-08-04	2017-08-03
2	Log-periodic Dipole Antenna	Schwarzbeck	VULB 9162	058	2017-01-11	2018-01-11
3	3m Semi-anechoic	Zhongshuo Electronics	9mx6mx6m	N/A	2017-01-11	2018-01-11
4	RF Cable	R&S	R01	10403	2017-01-11	2018-01-11
Mains Terminal Continuous Disturbance Voltage <input checked="" type="checkbox"/>						
5	EMI Test Receiver	Rohde&Schwarz	ESCI	100939	2017-01-11	2018-01-11
6	Artificial Mains Network	Rohde&Schwarz	ENV216	3560655012	2016-08-04	2017-08-03
7	Shield Room	ZhongYu Elertron	8X5X3.5	N/A	2016-08-04	2017-08-03
8	Conducted Emission Software	FALA	EZ-EMC	N/A	N/A	N/A
Harmonics & Flicker <input checked="" type="checkbox"/>						
9	Harmonic and Flicker Analyzer	CI	PACS-1	S59176	2016-08-04	2017-08-03
10	AC Power Source	CI	5001ix-CTS-400	59176	2016-08-04	2017-08-03
Radiated electromagnetic disturbances(9kHz to 30MHz) <input checked="" type="checkbox"/>						
11	EMI Test Receiver	Rohde&Schwarz	ESCI	100939	2017-01-11	2018-01-11
12	Triple-loop Antenna	SCHWARZBECK	HXYZ9170	HXYZ9170-171	2016-08-04	2017-08-03
Radiated disturbances(CDN) <input type="checkbox"/>						
13	EMI Test Receiver	Rohde&Schwarz	ESCI	100939	2017-01-11	2018-01-11
14	6dB Attenuator	Weinschel	WA59-6-33	2537	2016-08-04	2017-08-03
15	Coupling Decoupling Network	SCHWARZBECK	L-801M2/M3	2531	2016-08-04	2017-08-03
Click <input type="checkbox"/>						
16	Click Analyzer	AFJ	CL55C	55040929140	2016-08-04	2017-08-03
17	Artificial Mains Network	AFJ	LS16C	160108020208	2016-08-04	2017-08-03
Disturbance Power <input type="checkbox"/>						
18	EMI Test Receiver	Rohde&Schwarz	ESCI	100939	2017-01-11	2018-01-11
19	Absorbing Clamp	SCHWARZBECK	MDS-21	3892	2016-08-04	2017-08-03

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Date (yyyy-mm-dd)	Cal.Due date (yyyy-mm-dd)
Electrostatic Discharge(ESD) <input checked="" type="checkbox"/>						
20	ESD Simulator	TESEQ AG	NSG 437	268	2016-08-04	2017-08-03
Electrical Fast Transient(EFT) <input checked="" type="checkbox"/>						
21	Ultra Compact Simulator	EM TEST	UCS 500N5	V0925104927	2016-08-04	2017-08-03
22	Single-Phase Toroidal Transformer with autowinding	EM TEST	V4780S2	2538	2016-08-04	2017-08-03
Surge <input checked="" type="checkbox"/>						
23	Ultra Compact Simulator	EM TEST	UCS 500N5	V0925104927	2016-08-04	2017-08-03
24	Single-Phase Toroidal Transformer with autowinding	EM TEST	V4780S2	2538	2016-08-04	2017-08-03
Conducted Susceptibility <input checked="" type="checkbox"/>						
25	Conducted Immunity Test System	Frankonia	CIT-10/75	12B1113	2016-08-04	2017-08-03
26	6dB Attenuator	Weinschel	WA59-6-33	2537	2016-08-04	2017-08-03
27	Coupling Decoupling Network	SCHWARZBECK	L-801M2/M3	2531	2016-08-04	2017-08-03
28	Coupling Decoupling Network	SCHWARZBECK	L-801AF2	2536	2016-08-04	2017-08-03
Voltage Dips and Interruptions <input checked="" type="checkbox"/>						
29	Ultra Compact Simulator	EM TEST	UCS 500N5	V0925104927	2016-08-04	2017-08-03
30	Single-Phase Toroidal Transformer with autowinding	EM TEST	V4780S2	2538	2016-08-04	2017-08-03
Radio-frequency electromagnetic fields(RS) <input checked="" type="checkbox"/>						
31	Signal generator	R&S	SMB 100A	102710	2017-01-11	2018-01-11
32	Power amplifier	BONN Elektronik	BLWA 0810-160/100D	149644	2017-01-11	2018-01-11
33	Isotropic Field Probe	Narda	EP-601	511WX30620	2017-01-11	2018-01-11
34	Log-periodic Antenna	SCHWARZBECK	STLP 9128D	078	2017-01-11	2018-01-11
35	Power Meter	FEANKONIA	PMS 1084	108B1289	2017-01-11	2018-01-11

☐ : Not Used

☒ : Used

4 General Product Information

According to the declaration from the applicant, this report covers the model as below: see section 4.2 ratings and system details. These models have the same internal configuration and PCB layout, the difference of these models was power. Therefore two models EBR020E-0500-42 and EBR020E-0700-30 were fully tested in the report.

EBR0PPE-XXXX-VV-YYYYY-ZZZZZ:

PP represented the output power. can be 10, 15 or 20. The 10 denotes 10W. The 15 denotes 15W. The 20 denotes 20W.

XXXX represented the output current. can be 0170, 0200, 0250, 0285, 0300, 0350, 0440, 0500, 0700.

The 0170 denotes 170mA. The 0200 denotes 200mA. The 0250 denotes 250mA. The 0280 denotes 280mA. The 0300 denotes 300mA. The 0350 denotes 350mA. The 0440 denotes 440mA. The 0500 denotes 500mA. The 0700 denotes 700mA.

VV represented the output voltage. can be 24, 30, 32, 36, 37, 42. The 24 denotes 24Vdc. The 30 denotes 30Vdc. The 32 denotes 32Vdc. The 36 denotes 36Vdc. The 37 denotes 37Vdc. The 42 denotes 42Vdc.

YYYYY represented the different customers. Y can be 0~9, A~Z or blank.

ZZZZZ represented the different customers. Z can be 0~9, A~Z or blank.

4.1 Product Description and Intended Use

Refer to Constructional Data Form and user manual.

4.2 Ratings and System Details

Model	Input voltage	Output Voltage (VDC)	Output Current (mA)	Max. rated output power(W)	No Load Voltage (VDC)	TC (°C)
EBR010E-0170-42-YYYYY-ZZZZZ	220-240VAC, 50Hz	30-42	170	7.14	50	90
EBR010E-0200-42-YYYYY-ZZZZZ	220-240VAC, 50Hz	30-42	200	8.4	50	90
EBR010E-0250-42-YYYYY-ZZZZZ	220-240VAC, 50Hz	30-42	250	10.5	50	90
EBR010E-0440-24-YYYYY-ZZZZZ	220-240VAC, 50Hz	16-24	440	10.56	31	90
EBR015E-0285-42-YYYYY-ZZZZZ	220-240VAC, 50Hz	30-42	285	11.97	50	90
EBR015E-0350-32-YYYYY-ZZZZZ	220-240VAC, 50Hz	21-32	350	11.2	42	90
EBR015E-0350-42-YYYYY-ZZZZZ	220-240VAC, 50Hz	30-42	350	14.7	50	90
EBR015E-0300-42-YYYYY-ZZZZZ	220-240VAC, 50Hz	30-42	300	12.6	50	90

EBR015E-0350-42 -YYYYY-ZZZZZ	220-240VAC, 50Hz	30-42	350	14.7	50	90
EBR015E-0440-36 -YYYYY-ZZZZZ	220-240VAC, 50Hz	24-36	440	15.84	47	90
EBR020E-0380-42 -YYYYY-ZZZZZ	220-240VAC, 50Hz	30-42	380	15.96	50	90
EBR020E-0400-42 -YYYYY-ZZZZZ	220-240VAC, 50Hz	30-42	400	16.8	50	90
EBR020E-0500-32 -YYYYY-ZZZZZ	220-240VAC, 50Hz	21-32	500	16	42	90
EBR020E-0500-37 -YYYYY-ZZZZZ	220-240VAC, 50Hz	25-37	500	18.5	48	90
EBR020E-0500-42 -YYYYY-ZZZZZ	220-240VAC, 50Hz	30-42	500	21	50	90
EBR020E-0700-24 -YYYYY-ZZZZZ	220-240VAC, 50Hz	16-24	700	16.8	31	90
EBR020E-0700-30 -YYYYY-ZZZZZ	220-240VAC, 50Hz	20-30	700	21	38	90

4.3 Independent Operation Modes

The basic operation modes are:

A. Test in lighting mode

Refer of user manual for further information.

Pre-test the EUT supply voltage shall be within $\pm 2\%$ of the rated voltage. In the case of a voltage range, measurement shall be carried out within $\pm 2\%$ of each of the nominal supply voltages of that range.

In order to check the level of disturbance varies considerably with the supply voltage, compliance test at AC 230V as no worse case was found.

4.4 Noise Generating and Noise Suppressing Parts

Refer to the Constructional Data Form

4.5 Submitted Documents

Difference declaration
Rating Label
Circuit diagram
User manual
PCB layout

4.6 Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

Immunity: The equipment under test (EUT) was configured to have its highest possible susceptibility against the tested phenomena. The test modes were adapted accordingly in reference to the instructions for use.

4.7 Physical Configuration for Testing

Refer to the related chapter in this test report.

4.8 Test Operation and Test Software

Refer to test set up in chapter 5 and chapter 6.

4.9 Special Accessories and Auxiliary Equipment

None

4.10 Countermeasures to achieve EMC Compliance

None

5 Test Results EMISSION

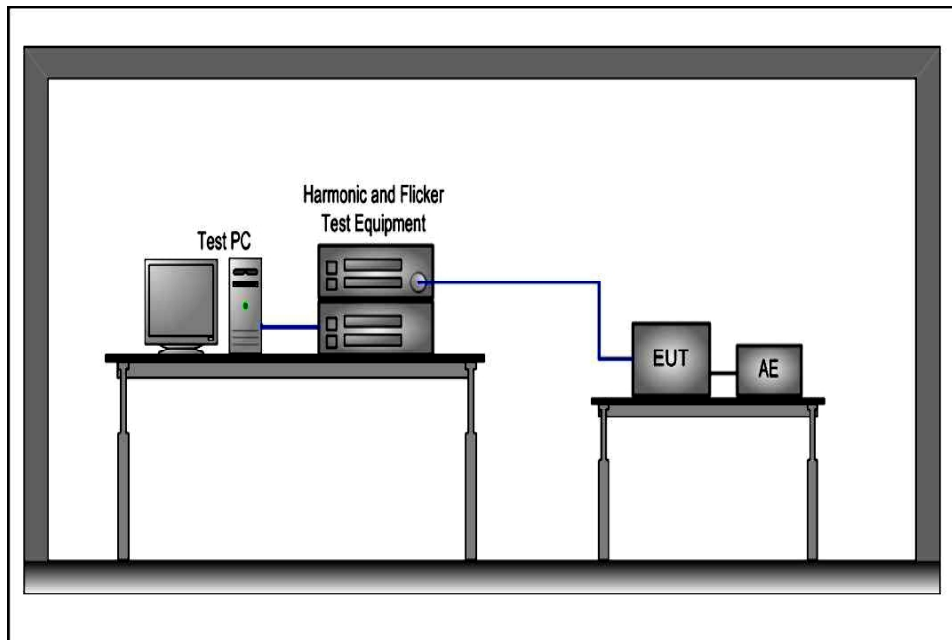
5.1 Harmonics on AC Mains

Results:

Pass

There is no limit described in EN 61000-3-2:2014 for class C equipment below 25W other than discharge lighting equipment, so this test is not applicable.

Test Connection Diagram



5.2 Voltage Fluctuations on AC Mains

Results:

Pass

Note: "Pst and Plt requirements shall not be applied to voltage changes caused by manual switching.

The limits shall not be applied to voltage changes associated with emergency switching or emergency interruptions."

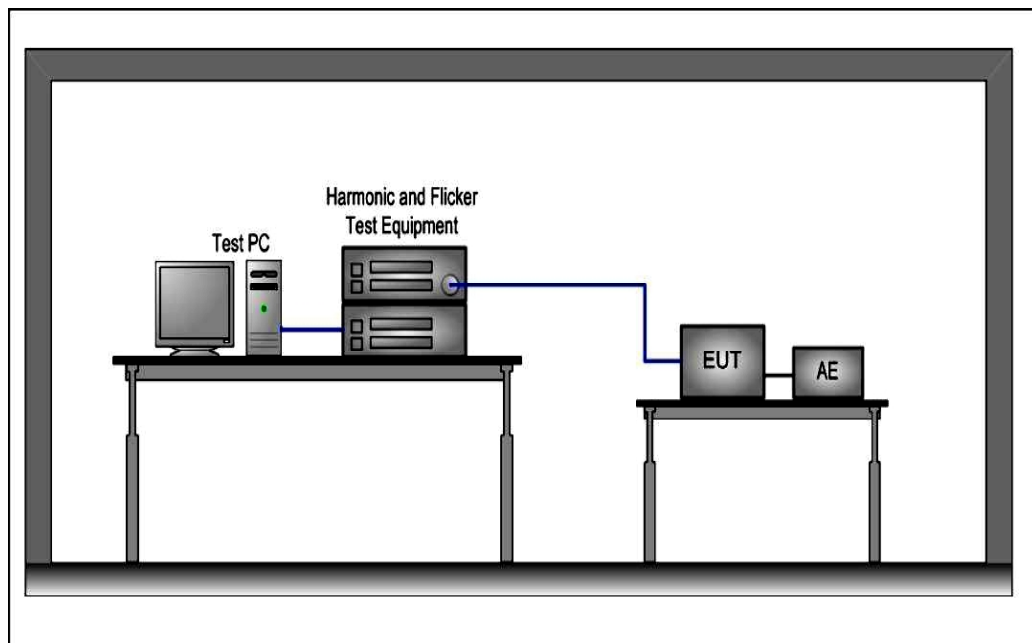
Please also refer to Annex A (Application of limits and type test conditions) for details in EN 61000-3-3.

--No limits shall apply to lamps.

--Incandescent lamp luminaries with ratings less than or equal to 1 000 W and discharge lamp luminaries with ratings less than or equal to 600 W, are deemed to comply with the dmax limits in this standard and are not required to be tested.

--Ballasts are deemed to be part of luminaries and are not required to be tested.

Test Connection Diagram



5.3 Terminal Continuous Disturbance Voltage

Results:

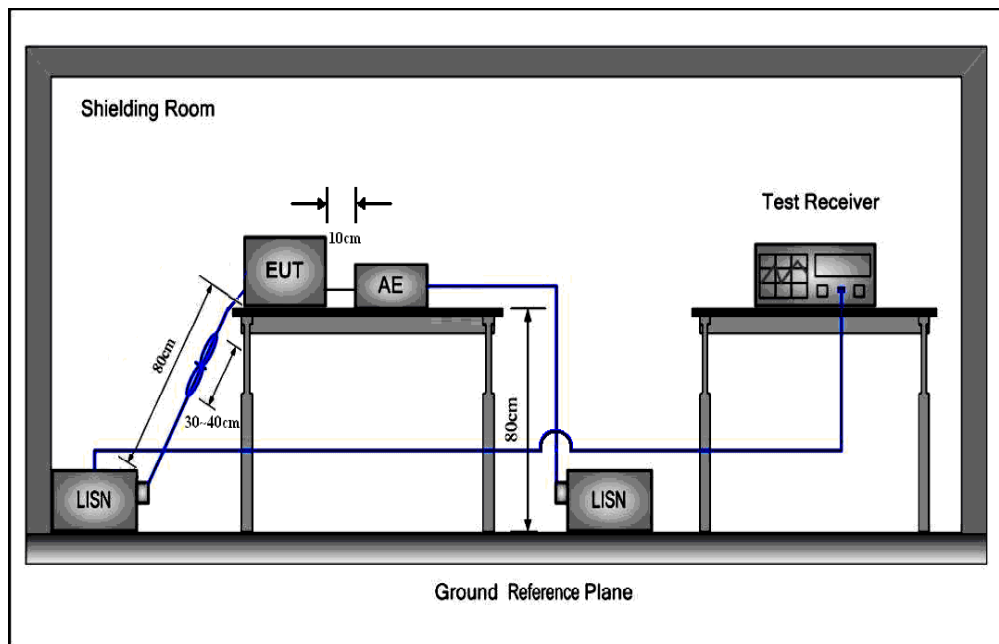
Pass

Date of testing : March. 23, 2017
 Test procedure : EN 55015:2013+A1:2015
 Frequency range : 0.009- 30MHz
 Kind of test site : shielded room
 Limits : EN 55015:2013+A1:2015 Clause4.3.1, Table 2a

Test setup

Input Voltage : 230Vac, 50Hz
 Operation Mode : Test in lighting mode
 Artificial Hand : Not applied
 Earthing : Not applied
 Temperature : 24°C
 Humidity : 60%
 Air pressure : 101KPA

Test Connection Diagram



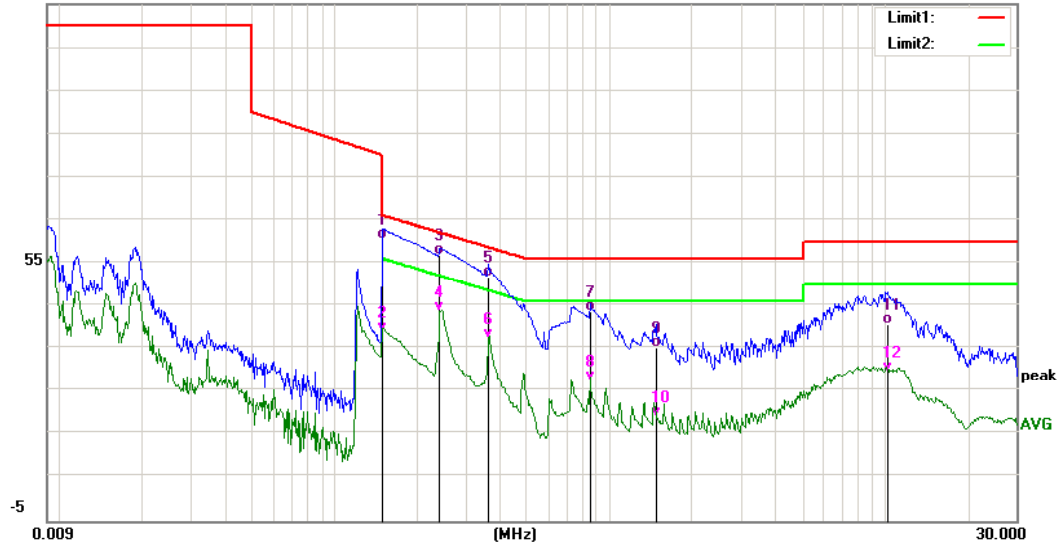
Test data

Model: EBR020E-0500-42

Peak and Average Scan:

Live:

115.0 dBuV



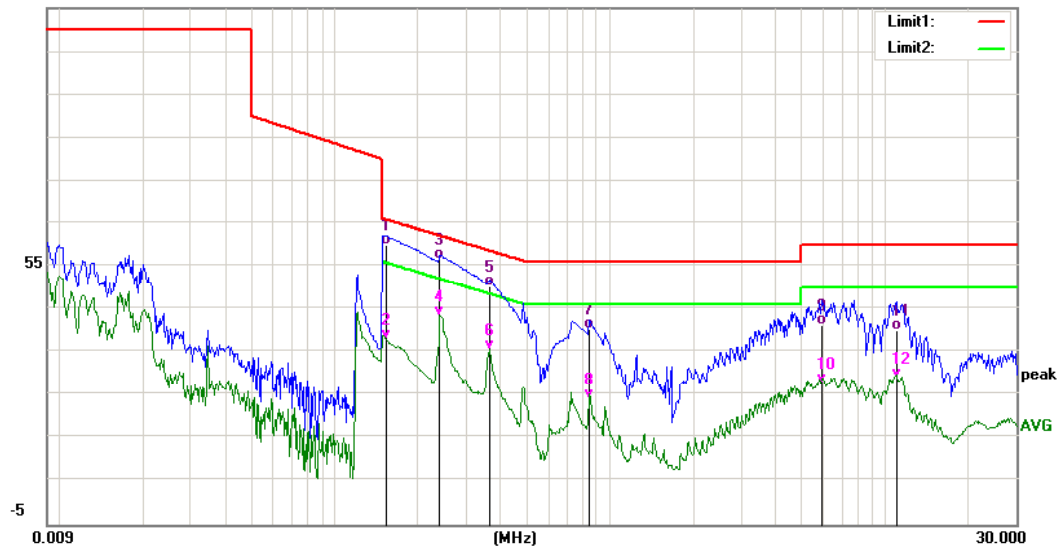
Quasi-peak and Average measurement:

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1527	50.87	9.73	60.60	65.85	-5.25	QP
2	0.1527	29.25	9.73	38.98	55.85	-16.87	AVG
3	0.2460	47.30	9.76	57.06	61.89	-4.83	QP
4	0.2460	34.05	9.76	43.81	51.89	-8.08	AVG
5	0.3666	42.04	9.77	51.81	58.58	-6.77	QP
6	0.3666	27.63	9.77	37.40	48.58	-11.18	AVG
7	0.8460	33.84	9.81	43.65	56.00	-12.35	QP
8	0.8460	17.85	9.81	27.66	46.00	-18.34	AVG
9	1.4700	25.52	9.84	35.36	56.00	-20.64	QP
10	1.4700	9.43	9.84	19.27	46.00	-26.73	AVG
11	10.2260	29.65	11.16	40.81	60.00	-19.19	QP
12	10.2260	18.46	11.16	29.62	50.00	-20.38	AVG

Peak and Average Scan:

Neutral:

115.0 dBuV



Quasi-peak and Average measurement:

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1540	50.17	9.73	59.90	65.78	-5.88	QP
2	0.1540	28.21	9.73	37.94	55.78	-17.84	AVG
3	0.2424	46.92	9.76	56.68	62.01	-5.33	QP
4	0.2424	33.64	9.76	43.40	52.01	-8.61	AVG
5	0.3666	40.64	9.77	50.41	58.58	-8.17	QP
6	0.3666	25.97	9.77	35.74	48.58	-12.84	AVG
7	0.8420	30.65	9.81	40.46	56.00	-15.54	QP
8	0.8420	14.29	9.81	24.10	46.00	-21.90	AVG
9	5.8900	30.99	10.42	41.41	60.00	-18.59	QP
10	5.8900	17.52	10.42	27.94	50.00	-22.06	AVG
11	10.9980	28.89	11.26	40.15	60.00	-19.85	QP
12	10.9980	17.93	11.26	29.19	50.00	-20.81	AVG

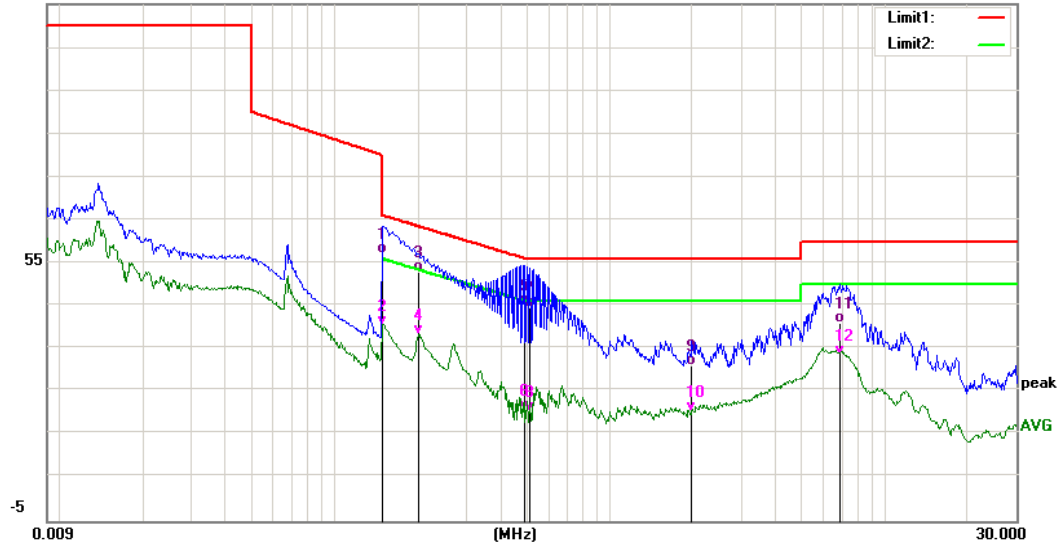
Test data

Model: EBR020E-0700-30

Peak and Average Scan:

Live:

115.0 dBuV



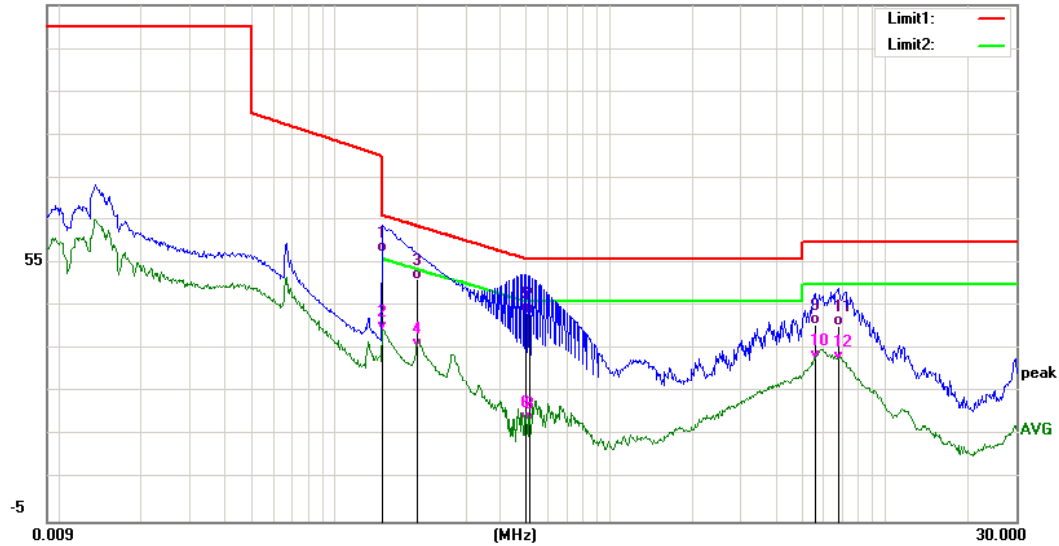
Quasi-peak and Average measurement:

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1500	47.66	9.73	57.39	65.99	-8.60	QP
2	0.1500	30.67	9.73	40.40	55.99	-15.59	AVG
3	0.2020	43.36	9.74	53.10	63.52	-10.42	QP
4	0.2020	28.72	9.74	38.46	53.52	-15.06	AVG
5	0.4940	35.58	9.78	45.36	56.10	-10.74	QP
6	0.4940	10.86	9.78	20.64	46.10	-25.46	AVG
7	0.5140	35.00	9.78	44.78	56.00	-11.22	QP
8	0.5140	10.43	9.78	20.21	46.00	-25.79	AVG
9	1.9900	21.29	9.85	31.14	56.00	-24.86	QP
10	1.9900	10.39	9.85	20.24	46.00	-25.76	AVG
11	6.8940	30.48	10.61	41.09	60.00	-18.91	QP
12	6.8940	23.00	10.61	33.61	50.00	-16.39	AVG

Peak and Average Scan:

Neutral:

115.0 dBuV



Quasi-peak and Average measurement:

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1500	47.93	9.73	57.66	66.00	-8.34	QP
2	0.1500	29.64	9.73	39.37	56.00	-16.63	AVG
3	0.2060	41.53	9.74	51.27	63.37	-12.10	QP
4	0.2060	25.72	9.74	35.46	53.37	-17.91	AVG
5	0.4980	33.60	9.78	43.38	56.03	-12.65	QP
6	0.4980	8.60	9.78	18.38	46.03	-27.65	AVG
7	0.5140	33.41	9.78	43.19	56.00	-12.81	QP
8	0.5140	8.13	9.78	17.91	46.00	-28.09	AVG
9	5.5940	30.24	10.37	40.61	60.00	-19.39	QP
10	5.5940	22.28	10.37	32.65	50.00	-17.35	AVG
11	6.7940	29.88	10.59	40.47	60.00	-19.53	QP
12	6.7940	21.87	10.59	32.46	50.00	-17.54	AVG

5.4 Radiated electromagnetic disturbances (9 kHz to 30 MHz)

Results:

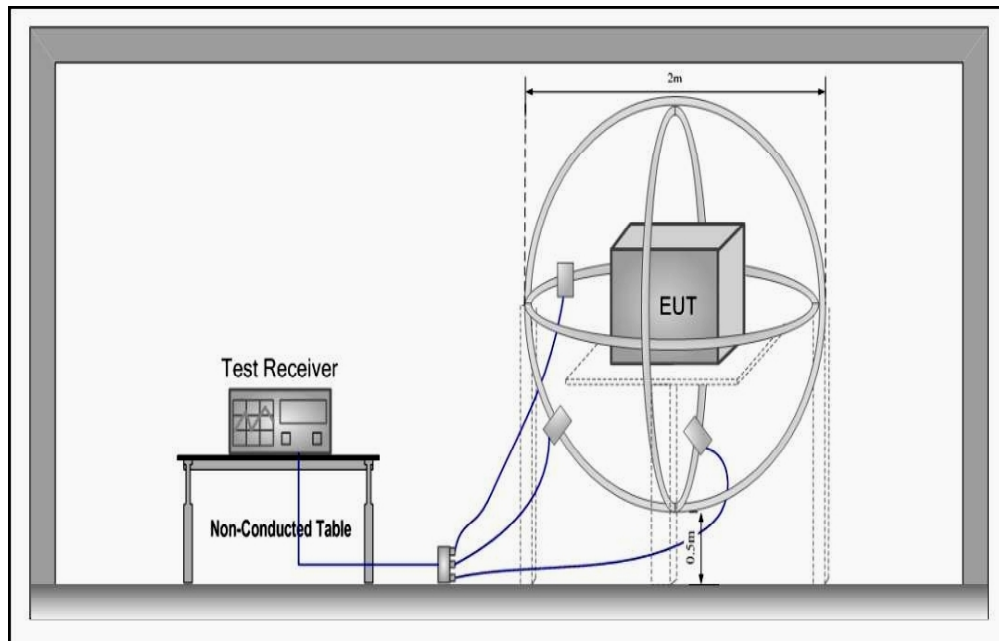
Pass

Date of testing : March. 23, 2017
 Test procedure : EN 55015:2013+A1:2015
 Frequency range : 0.009- 30MHz
 Kind of test site : shielded room
 Limits : EN 55015:2013+A1:2015, Clause4.4.1 Table 3a

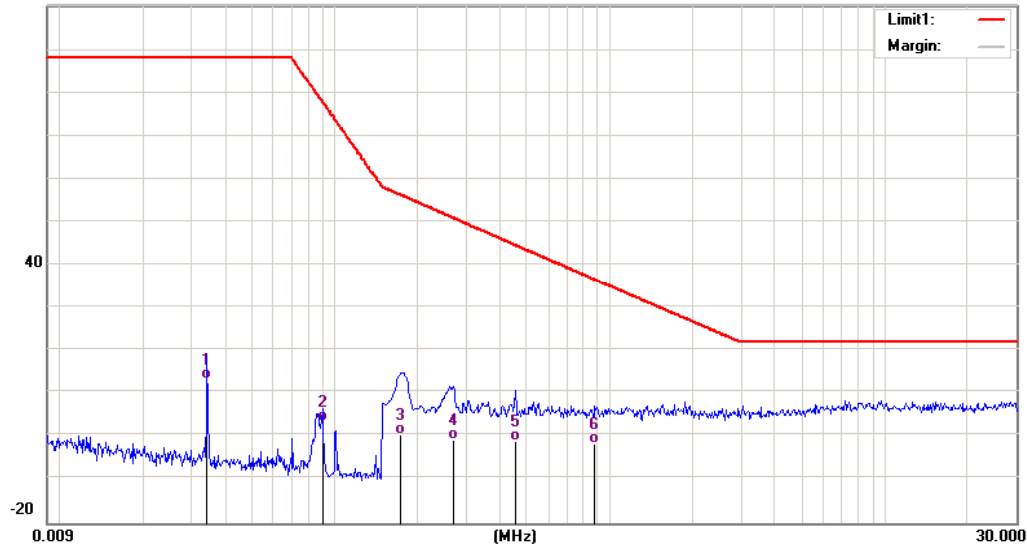
Test setup:

Input Voltage : 230Vac, 50Hz
 Operation Mode : Test in lighting mode
 Artificial Hand : Not applied
 Earthing : Not applied
 Temperature : 24°C
 Humidity : 60%
 Air pressure : 101KPA

Test Connection Diagram



Test Data:
Model: EBR020E-0500-42
 Peak Scan:
 X axis
 100.0 dBuA



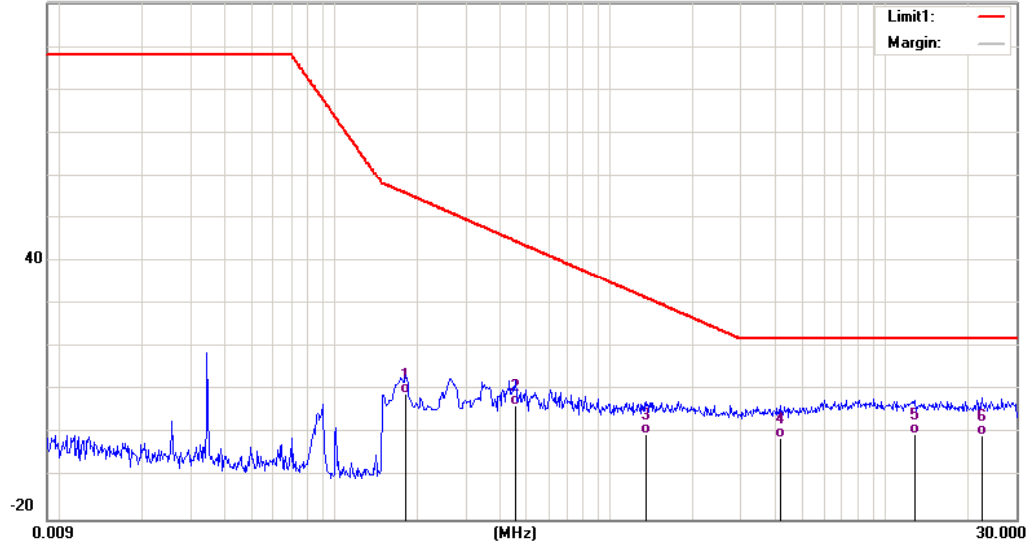
Quasi-peak measurement:

No.	Frequency (MHz)	Reading (dBuA)	Correct Factor(dB)	Result (dBuA)	Limit (dBuA)	Margin (dB)	Remark
1	0.0345	13.13	0.23	13.36	88.00	-74.64	QP
2	0.0901	3.58	0.02	3.60	78.06	-74.46	QP
3	0.1740	0.79	-0.15	0.64	56.21	-55.57	QP
4	0.2700	-0.37	-0.20	-0.57	50.93	-51.50	QP
5	0.4540	-0.84	-0.25	-1.09	44.69	-45.78	QP
6	0.8860	-1.25	-0.33	-1.58	36.65	-38.23	QP

Peak Scan:

Y axis

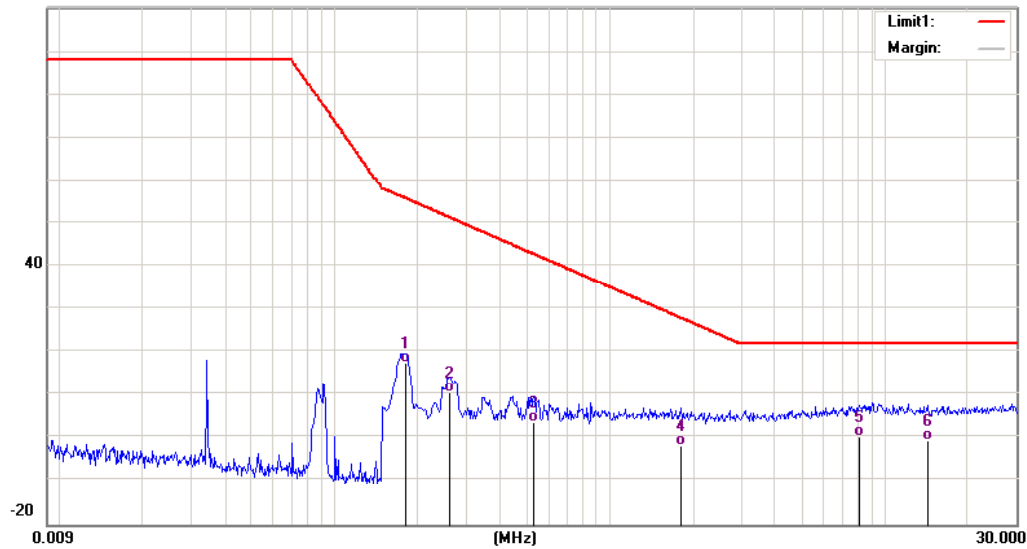
100.0 dBuA



Quasi-peak measurement:

No.	Frequency (MHz)	Reading (dBuA)	Correct Factor(dB)	Result (dBuA)	Limit (dBuA)	Margin (dB)	Remark
1	0.1819	9.38	-0.15	9.23	55.68	-46.45	QP
2	0.4540	6.94	-0.25	6.69	44.69	-38.00	QP
3	1.3619	0.30	-0.28	0.02	31.49	-31.47	QP
4	4.1700	-0.66	-0.20	-0.86	22.00	-22.86	QP
5	12.8700	-0.58	0.56	-0.02	22.00	-22.02	QP
6	22.5140	-0.40	0.17	-0.23	22.00	-22.23	QP

Peak Scan:
Z axis
100.0 dBuA



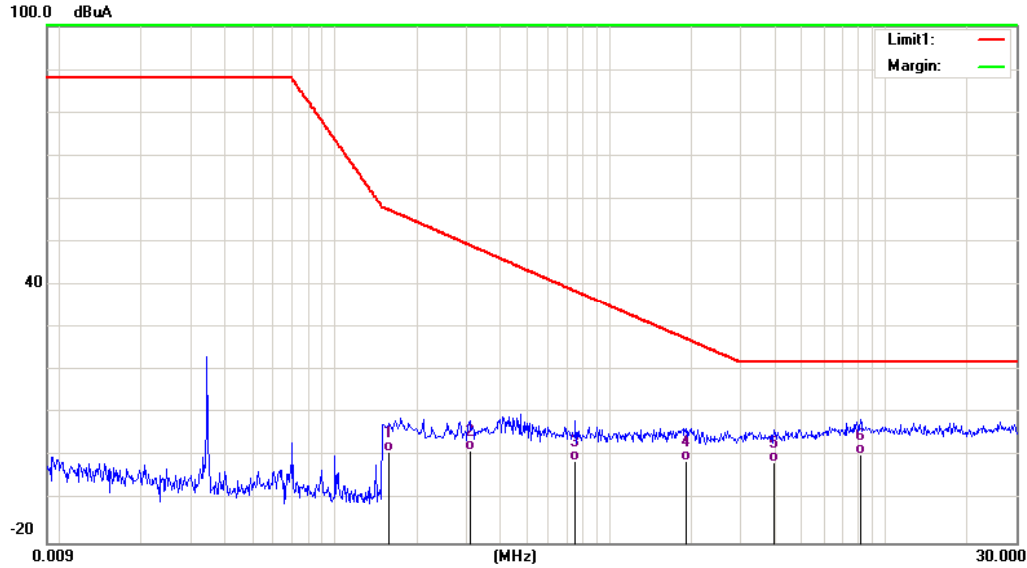
Quasi-peak measurement:

No.	Frequency (MHz)	Reading (dBuA)	Correct Factor(dB)	Result (dBuA)	Limit (dBuA)	Margin (dB)	Remark
1	0.1819	17.73	-0.15	17.58	55.68	-38.10	QP
2	0.2620	10.89	-0.20	10.69	51.29	-40.60	QP
3	0.5299	4.20	-0.24	3.96	42.83	-38.87	QP
4	1.8260	-1.16	-0.24	-1.40	27.96	-29.36	QP
5	8.1020	-0.01	0.64	0.63	22.00	-21.37	QP
6	14.2700	-0.73	0.50	-0.23	22.00	-22.23	QP

Test Data:
Model: EBR020E-0700-30

Peak Scan:

X axis



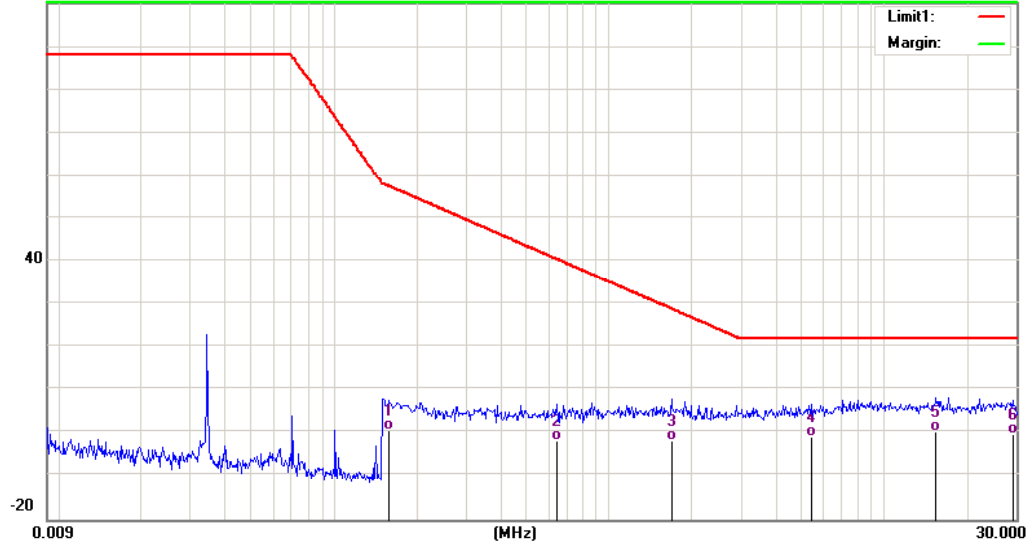
Quasi-peak measurement:

No.	Frequency (MHz)	Reading (dBuA)	Correct Factor(dB)	Result (dBuA)	Limit (dBuA)	Margin (dB)	Remark
1	0.1580	1.79	-0.55	1.24	57.38	-56.14	QP
2	0.3100	2.24	-0.66	1.58	49.28	-47.70	QP
3	0.7500	-0.20	-0.71	-0.91	38.66	-39.57	QP
4	1.8900	-0.53	-0.52	-1.05	27.55	-28.60	QP
5	3.9660	-0.25	-0.86	-1.11	22.00	-23.11	QP
6	8.1740	0.71	-0.07	0.64	22.00	-21.36	QP

Peak Scan:

Y axis

100.0 dBuA

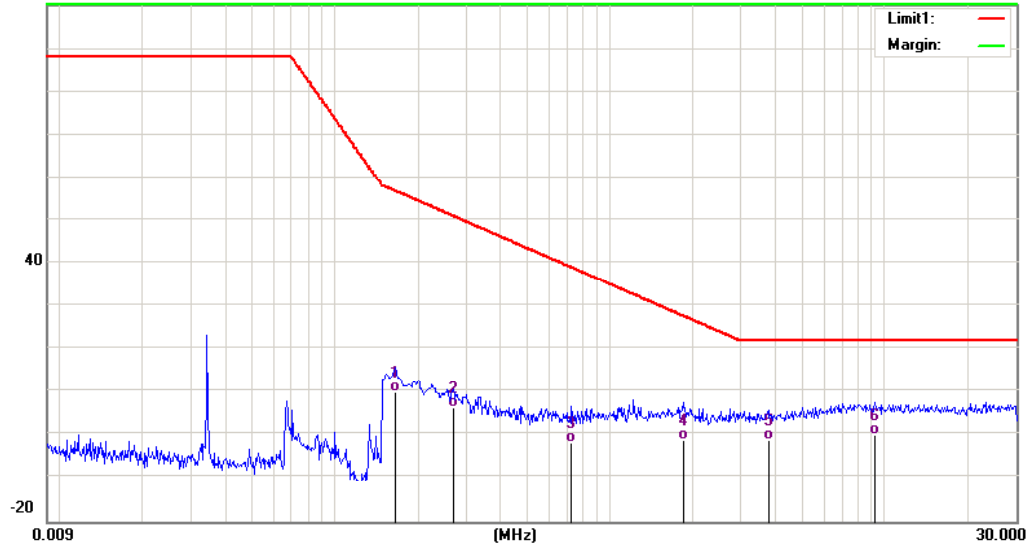


Quasi-peak measurement:

No.	Frequency (MHz)	Reading (dBuA)	Correct Factor(dB)	Result (dBuA)	Limit (dBuA)	Margin (dB)	Remark
1	0.1580	1.27	-0.55	0.72	57.38	-56.66	QP
2	0.6420	-0.76	-0.65	-1.41	40.53	-41.94	QP
3	1.6740	-1.05	-0.52	-1.57	29.01	-30.58	QP
4	5.4060	-0.11	-0.41	-0.52	22.00	-22.52	QP
5	15.3980	0.63	0.01	0.64	22.00	-21.36	QP
6	29.0460	-0.52	0.60	0.08	22.00	-21.92	QP

Peak Scan:
Z axis

100.0 dBuA



Quasi-peak measurement:

No.	Frequency (MHz)	Reading (dBuA)	Correct Factor(dB)	Result (dBuA)	Limit (dBuA)	Margin (dB)	Remark
1	0.1660	10.79	-0.57	10.22	56.78	-46.56	QP
2	0.2700	7.31	-0.67	6.64	50.94	-44.30	QP
3	0.7300	-0.77	-0.70	-1.47	38.98	-40.45	QP
4	1.8500	-0.37	-0.52	-0.89	27.81	-28.70	QP
5	3.7820	-0.24	-0.83	-1.07	22.00	-23.07	QP
6	9.2420	0.33	-0.01	0.32	22.00	-21.68	QP

5.5 Radiated Emission(30 M Hz to 300 MHz)

Results:

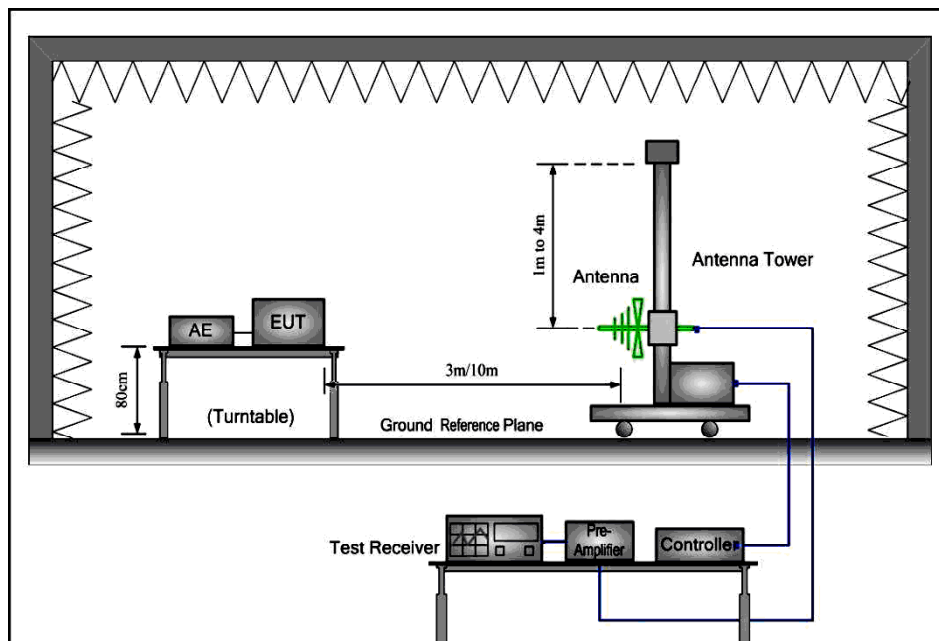
Pass

Date of testing : March. 23, 2017
 Test procedure : EN 55015:2013+A1:2015
 Frequency range : 30- 300MHz
 Kind of test site : semi-anechoic chamber
 Limits : EN 55015:2013+A1:2015, Clause4.4.2, Table 3b

Test setup:

Input Voltage : 230Vac, 50Hz
 Operation Mode : Test in lighting mode
 Artificial Hand : Not applied
 Earthing : Not applied
 Temperature : 24°C
 Humidity : 60%
 Air pressure : 101KPA

Test Connection Diagram(RE)

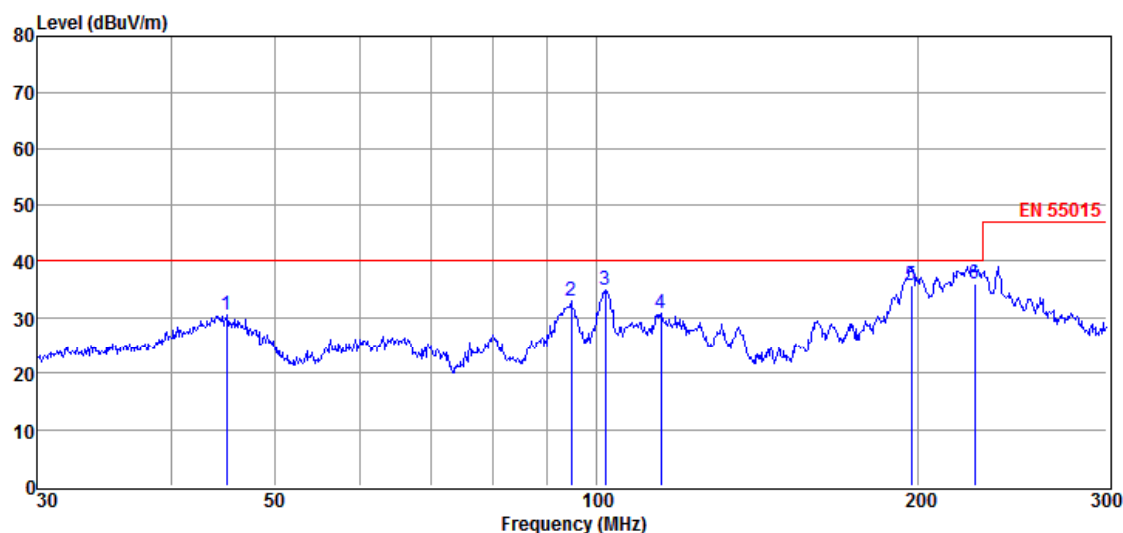


Test data:

Model: EBR020E-0500-42

HORIZONTAL:

Peak Scan



Quasi-peak measurement:

Item (Mark)	Freq (MHz)	Read Level (dB μ V)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dB μ V/m)	Limit Line (dB μ V/m)	Over Limit (dB)	Detector	Polarization
1	45.09	13.71	16.25	0.00	0.56	30.52	40.00	-9.48	Peak	HORIZONTAL
2	94.65	21.76	10.50	0.00	0.82	33.08	40.00	-6.92	Peak	HORIZONTAL
3	101.89	22.36	11.77	0.00	0.86	34.99	40.00	-5.01	Peak	HORIZONTAL
4	114.85	19.26	10.63	0.00	0.92	30.81	40.00	-9.19	Peak	HORIZONTAL
5	196.84	24.90	9.56	0.00	1.30	35.76	40.00	-4.24	QP	HORIZONTAL
6	225.49	24.10	10.51	0.00	1.41	36.02	40.00	-3.98	QP	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss

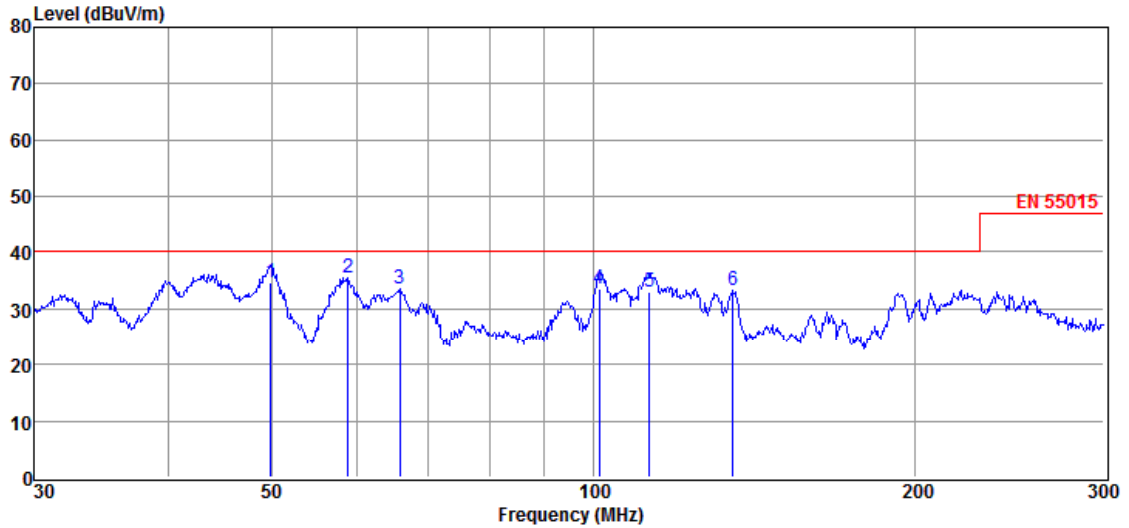
2. If Peak Result comply with QP limit, QP Result is deemed to comply with QP limit

3. Test setup: RBW: 120kHz, VBW: 300kHz, Sweep time: auto

Test data:

VERTICAL :

Peak Scan:



Quasi-peak measurement:

Item (Mark)	Freq (MHz)	Read Level (dB μ V)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dB μ V/m)	Limit Line (dB μ V/m)	Over Limit (dB)	Detector	Polarization
1	49.90	23.10	10.82	0.00	0.59	34.51	40.00	-5.49	QP	VERTICAL
2	58.90	23.99	10.82	0.00	0.64	35.45	40.00	-4.55	Peak	VERTICAL
3	65.94	23.73	9.17	0.00	0.68	33.58	40.00	-6.42	Peak	VERTICAL
4	101.19	21.10	11.67	0.00	0.86	33.63	40.00	-6.37	QP	VERTICAL
5	112.75	21.10	11.09	0.00	0.91	33.10	40.00	-6.90	QP	VERTICAL
6	134.93	23.98	8.30	0.00	1.01	33.29	40.00	-6.71	Peak	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss

2. If Peak Result comply with QP limit, QP Result is deemed to comply with QP limit

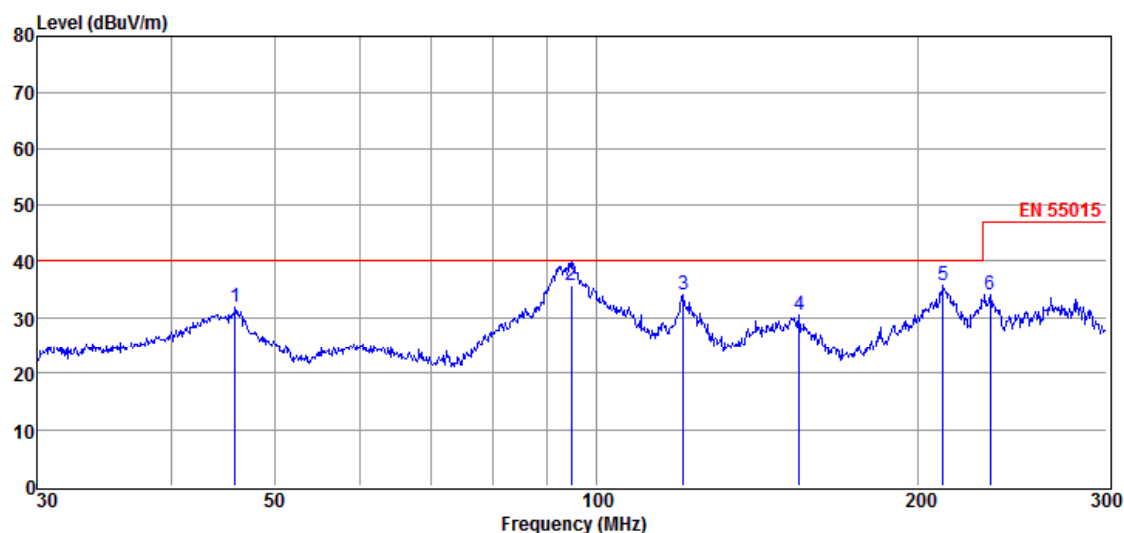
3. Test setup: RBW: 120kHz, VBW: 300kHz, Sweep time: auto

Test data:

Model: EBR020E-0700-30

HORIZONTAL:

Peak Scan



Quasi-peak measurement:

Item (Mark)	Freq (MHz)	Read Level (dB μ V)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dB μ V/m)	Limit Line (dB μ V/m)	Over Limit (dB)	Detector	Polarization
1	45.93	15.42	15.83	0.00	0.56	31.81	40.00	-8.19	Peak	HORIZONTAL
2	94.65	24.41	10.50	0.00	0.82	35.73	40.00	-4.27	QP	HORIZONTAL
3	120.54	23.69	9.42	0.00	0.95	34.06	40.00	-5.94	Peak	HORIZONTAL
4	154.57	21.80	7.62	0.00	1.10	30.52	40.00	-9.48	Peak	HORIZONTAL
5	210.92	24.85	9.62	0.00	1.35	35.82	40.00	-4.18	Peak	HORIZONTAL
6	233.41	20.87	11.71	0.00	1.44	34.02	47.00	-12.98	Peak	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss

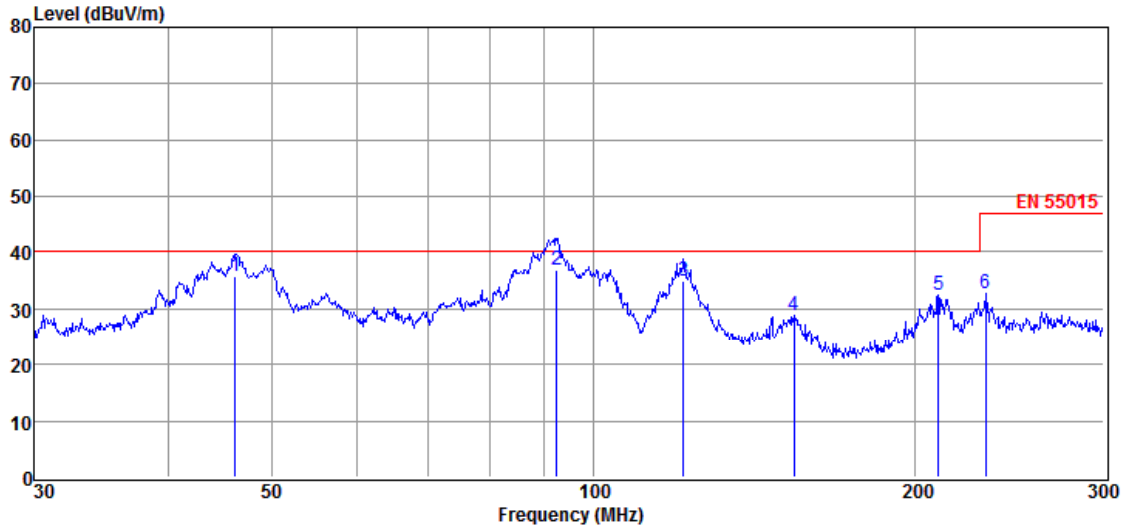
2. If Peak Result comply with QP limit, QP Result is deemed to comply with QP limit

3. Test setup: RBW: 120kHz, VBW: 300kHz, Sweep time: auto

Test data:

VERTICAL :

Peak Scan:



Quasi-peak measurement:

Item (Mark)	Freq (MHz)	Read Level (dB μ V)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dB μ V/m)	Limit Line (dB μ V/m)	Over Limit (dB)	Detector	Polarization
1	46.25	19.60	15.48	0.00	0.56	35.64	40.00	-4.36	QP	VERTICAL
2	92.28	26.10	9.85	0.00	0.81	36.76	40.00	-3.24	QP	VERTICAL
3	121.37	24.60	9.30	0.00	0.96	34.86	40.00	-5.14	QP	VERTICAL
4	153.86	20.20	7.65	0.00	1.10	28.95	40.00	-11.05	Peak	VERTICAL
5	209.95	21.56	9.60	0.00	1.35	32.51	40.00	-7.49	Peak	VERTICAL
6	232.34	19.63	11.64	0.00	1.43	32.70	47.00	-14.30	Peak	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss

2. If Peak Result comply with QP limit, QP Result is deemed to comply with QP limit

3. Test setup: RBW: 120kHz, VBW: 300kHz, Sweep time: auto

6 Test Results IMMUNITY

6.1 Classification of Apparatus

According to EN 61547:2009, clause 6.3.1 the EUT shall be tested in accordance with clause 6.3.1 and compliance with the performance criteria of table 13.

The immunity against power frequency magnetic field was not tested because the EUTs do not contain components, which are susceptible to magnetic fields. According to EN 61547, clause 5.4: "these tests need only to be applied to equipment containing components susceptible to magnetic fields"

Criterion A:

During the test no change of the luminous intensity shall be observed and the regulating control, if any, shall operate during the test as intended.

Criterion B:

During the test the luminous intensity may change to any value. After the test the luminous intensity shall be restored to its initial value within 1 min.

Regulating controls need not function during the test, but after the test the mode of the control shall be the same as before the test provided that during the test no mode changing commands were given.

Criterion C:

During and after the test any change of the luminous intensity is allowed and the lamp(s) may be extinguished. After the test, within 30 min, all functions shall return to normal if necessary by temporary interruption of the mains supply and/or operating the regulating control.

Continuous Disturbances

Radiated Radio-Frequency Electromagnetic Fields (RS)	Criterion A
-------------------------------------------------------------	--------------------

Radio-Frequency Common Mode / Conducted Susceptibility (C/S)	Criterion A
---------------------------------------------------------------------	--------------------

Transient Disturbances

Electrical Fast Transients (EFT)	Criterion B
-----------------------------------------	--------------------

Surge	Criterion C
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Electrostatic Discharges (ESD)	Criterion B
---------------------------------------	--------------------

Power Supply Alterations	
---------------------------------	--

Voltage Dips and Interruptions	Criterion B+C
---------------------------------------	----------------------

6.2 Continuous Disturbances

6.2.1 Radiated Radio-Frequency Electromagnetic Fields (RS), Amplitude Modulation

Results:

Pass

Date of testing : March. 24, 2017
 Test Specification : EN 61547:2009, clause 5.3
 Basic Standard : IEC 61000-4-3
 Frequency range : 80-1000MHz
 Test level : 3V/m (un-modulated, rms.)
 Modulation : 80%AM, 1kHz
 Criterion : A

Test Setup:

Input Voltage : 230Vac, 50Hz
 Operation Mode : Test in lighting mode
 Earthing : Not applied
 Temperature : 24°C
 Humidity : 55%
 Air pressure : 101KPA

Test Connection Diagram

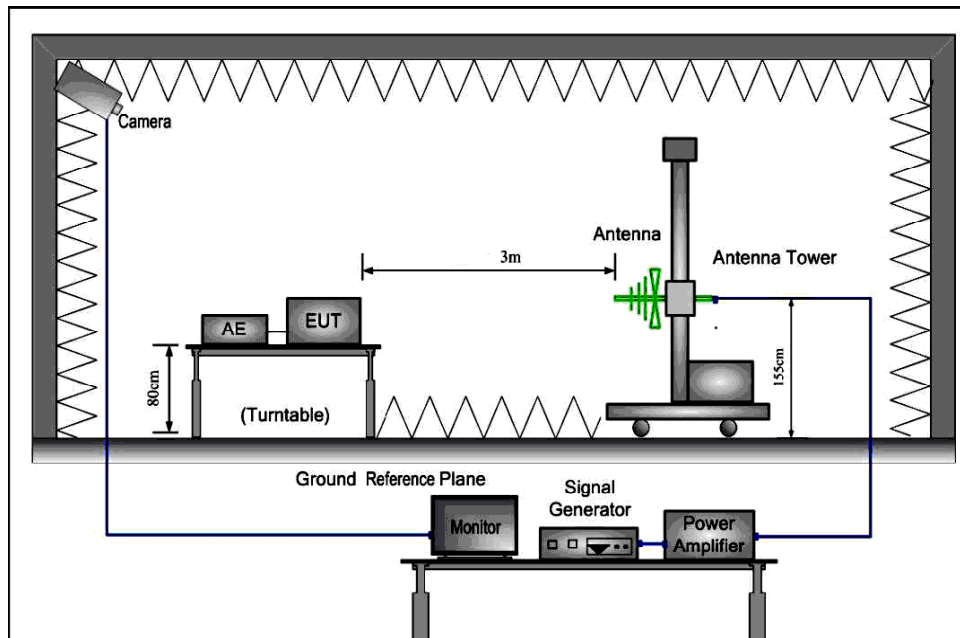


Table 2: Immunity against Radiated Radio-frequency Electromagnetic Fields (RS), Amplitude Modulation

Field polarization	Side of EUT	Result	Remarks
Horizontal	left	Pass	A
	right	Pass	
	front	Pass	
	rear	Pass	
Vertical	left	Pass	A
	right	Pass	
	front	Pass	
	rear	Pass	
A:Equipment operated as intended, no degradation of function			

6.2.2 Radio-frequency Common Mode / Conducted Susceptibility (CS)

Results:

Pass

Date of testing	:	March. 24, 2017
Test Specification	:	EN 61547:2009, clause 5.6
Basic Standard	:	IEC 61000-4-6
Source impedance	:	150Ω
Frequency range	:	150 kHz – 80 MHz
Modulation	:	AM 80%, 1kHz sine-wave
Sweep mode	:	automatic
Sweep rate	:	< 1.5×10 ⁻³ decade / sec.
Performance criterion	:	A

Test Setup:

Input Voltage	:	230Vac, 50Hz
Operation Mode	:	Test in lighting mode
Earthing	:	Not applied
Temperature	:	24°C
Humidity	:	56%
Air pressure	:	101KPA

Test Connection Diagram

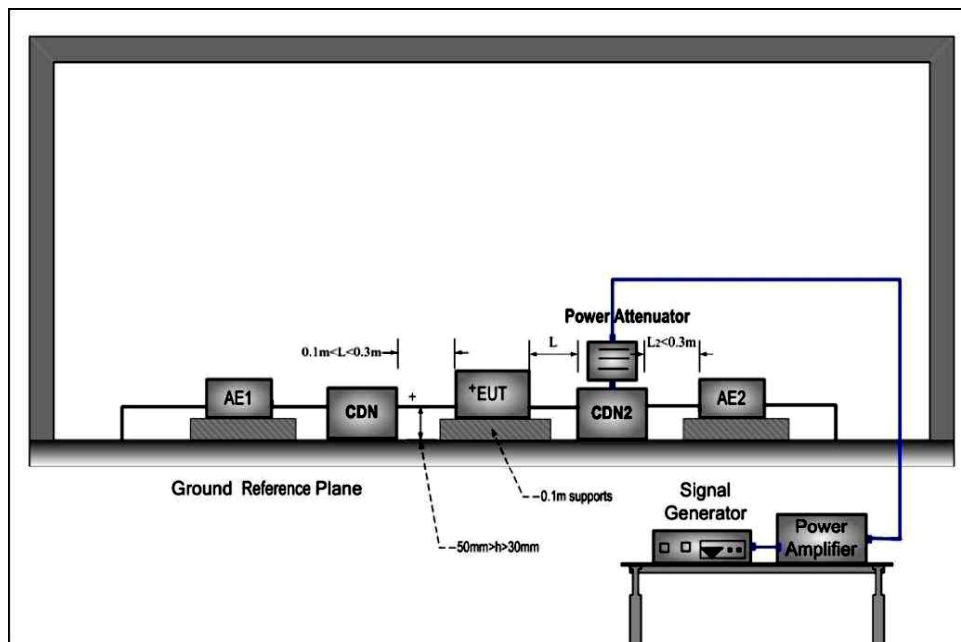


Table 3: Immunity against Radio-frequency Common Mode/ Conducted Susceptibility

Coupling port	Coupling method:	Strength	Result	Remarks
AC mains: L+N	CDN M-2	3V(r.m.s.)	Pass	A
A:Equipment operated as intended, no degradation of function				

A: Equipment operated as intended, no degradation of function

6.3 Transient Disturbances

6.3.1 Electrical Fast Transients (EFT)

Results:

Pass

Date of testing : March. 24, 2017
 Test Specification : EN 61547:2009, clause 5.5
 Basic Standard : IEC 61000-4-4
 Pulsform : $T_r/T_h=5/50\text{ns}$
 Repetition Freq : 5 kHz
 Test duration : 2 minute per level & polarity
 Performance criterion : B

Test Setup

Input Voltage : 230Vac, 50Hz
 Operation Mode : Test in lighting mode
 Earthing : Not applied
 Temperature : 24°C
 Humidity : 56%
 Air pressure : 101KPA

Test Connection Diagram

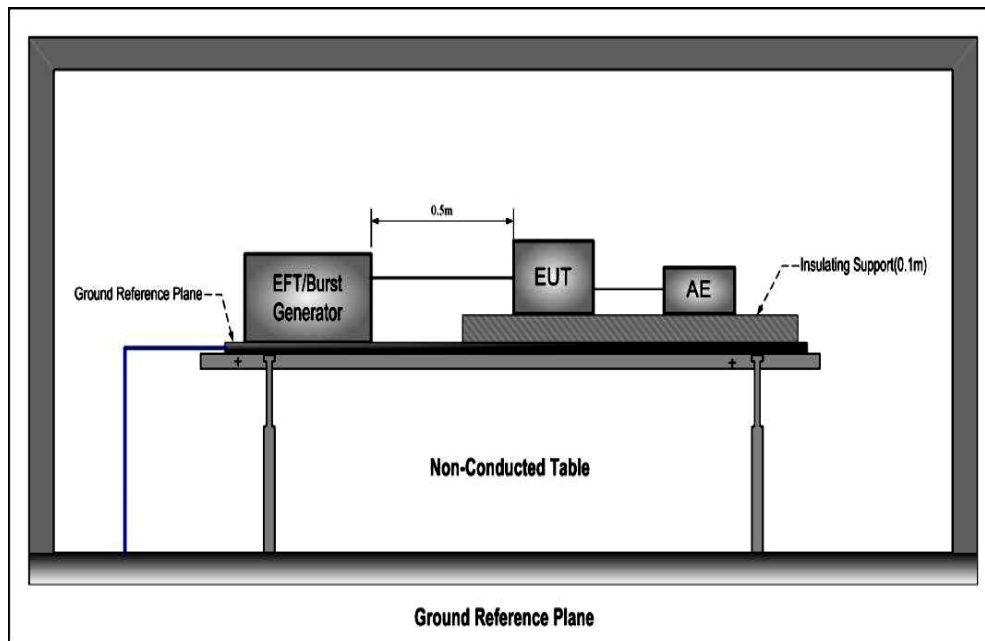


Table 4: Immunity against Electrical Fast Transients (EFT) on AC mains

Coupling method: direct injection & Capacitor clamp		Inject time: 120s
Coupling port	Test voltage / result	Remarks
AC mains L+N	±1000V Pass	A
A: Equipment operated as intended, no degradation of function		

6.3.2 Surge

Results:

Pass

Date of testing : March. 24, 2017
 Test Specification : EN 61547:2009, clause 5.7
 Basic Standard : IEC 61000-4-5
 Pulsform : $T_r/T_h=1.2/50\mu s$
 Test voltages : $\pm 0.5Kv$
 Coupling : Coupling Network for AC Mains
 Coupling phases : $\pi/2, 3\pi/2$
 Number of surges : 5 (for each combination of parameters)
 Repetition rate : max. 1/min
 Performance criterion : C

Test Setup:

Input Voltage : 230Vac, 50Hz
 Operation Mode : Test in lighting mode
 Earthing : Not applied
 Temperature : 24°C
 Humidity : 56%
 Air pressure : 101KPA

Test Connection Diagram

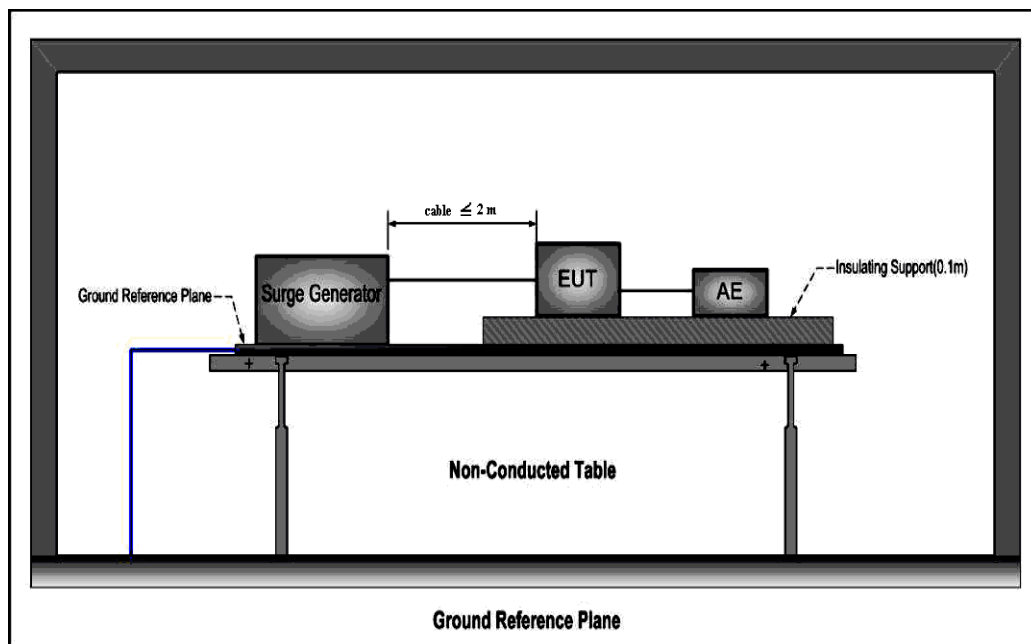


Table 5: Surge Immunity Tests, AC Power Supply

Coupling port	Test voltage	Coupling phase / result	Remarks
L – N	+500V -500V	$\pi/2$ Pass $3\pi/2$ Pass	A
A: Equipment operated as intended, no degradation of function			

6.3.3 Electrostatic Discharges (ESD)

Results:

Pass

Date of testing : March. 24, 2017
 Test Specification : EN 61547:2009, clause 5.2
 Basic Standard : IEC 61000-4-2
 Charge voltage : $\pm 4.0\text{kV}$ (contact, VCP, HCP)
 $\pm 2.0\text{kV}, \pm 4.0\text{kV}, \pm 8.0\text{kV}$ (air discharge)
 Number of discharges : >10
 Polarity : Positive / Negative
 Performance criterion : B

Test Setup:

Input Voltage : 230Vac, 50Hz
 Operation Mode : Test in lighting mode
 Earthing : Not applied
 Temperature : 23°C
 Humidity : 55%
 Air pressure : 101KPA

Test Connection Diagram

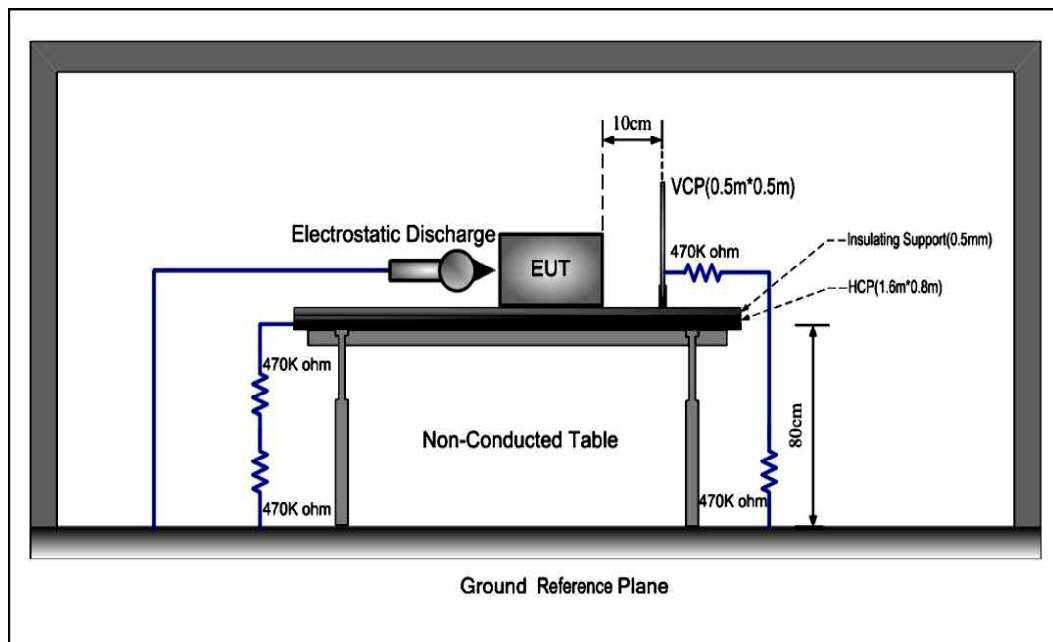


Table 6: Electrostatic Discharge, both Polarities

Discharge points	type of discharge	Result	remarks
HCP	Contact	Pass	A
VCP	Contact	Pass	
Non-conductive enclosure	Air	Pass	
Conductive enclosure	Contact	Pass	
A:Equipment operated as intended, no degradation of function			

LCTECH (Zhongshan) Testing Service Co., Ltd
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 Guangyuan Road, Xiaolan, Zhongshan, Guangdong, China

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E-mail: Service@lccert.com

<http://www.lccert.com>

6.4 Power Supply Alterations

6.4.1 Voltage Dip and Interruptions

Results:

Pass

Date of testing : March. 24, 2017
 Test Specification : EN 61547:2009, clause 5.8
 Basic Standard : IEC 61000-4-11
 Performance criterion : B+C

Test Setup:

Input Voltage : 230Vac, 50Hz
 Operation Mode : Test in lighting mode.
 Earthing : Not applied
 Temperature : 24°C
 Humidity : 40%
 Air pressure : 101KPA

Test Connection Diagram

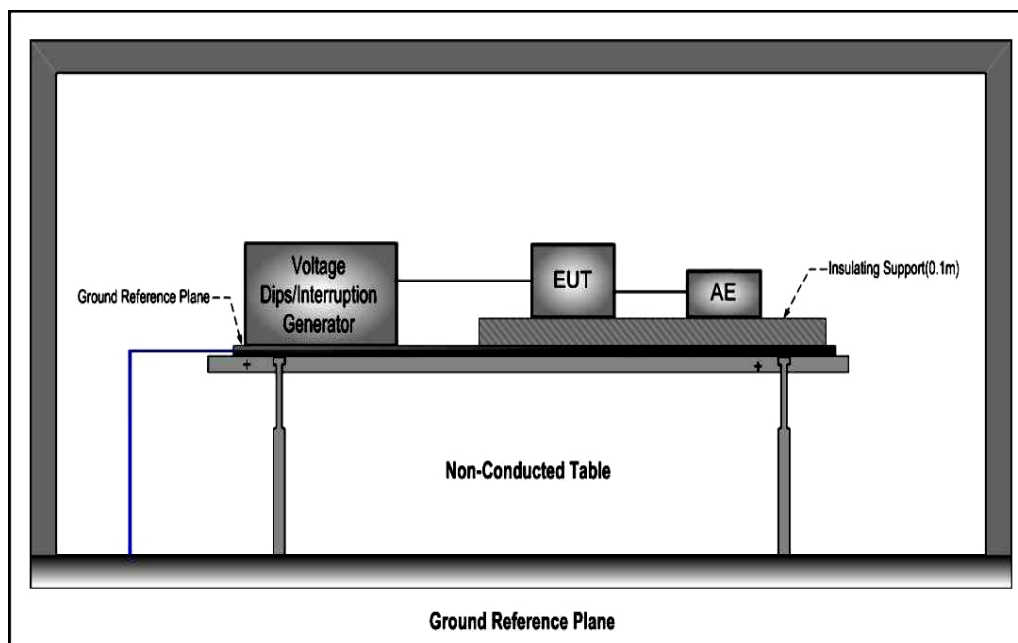


Table 7: Voltage Dip and Interruptions Immunity

Voltage reduction [%, appl. voltage V]	Number of periods	Results	Criterion	Remarks
100% (Interruption)	0.5	Pass	B	A
30%	10	Pass	C	A
A: Equipment operated as intended, no degradation of function				

7 The photos of test setting

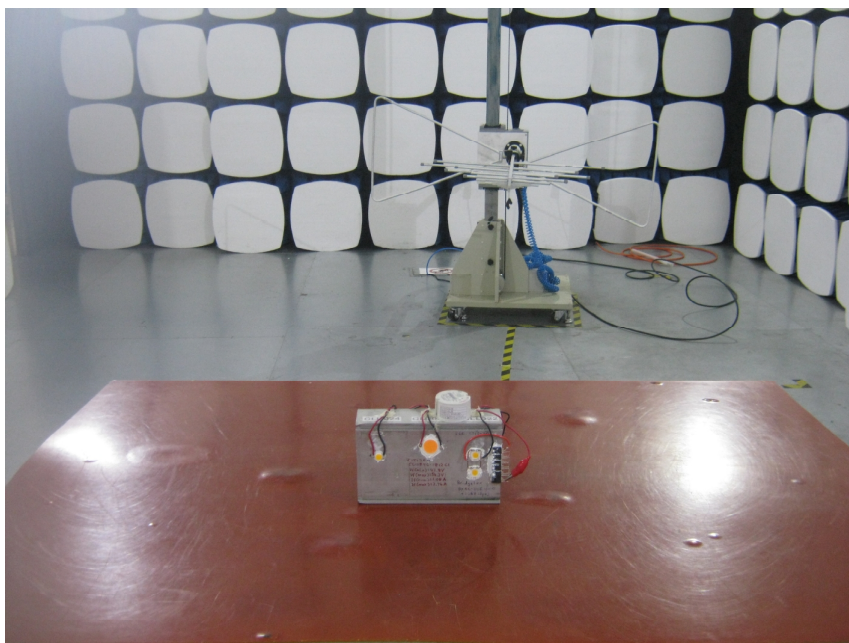
Terminal Continuous Disturbance Voltage:



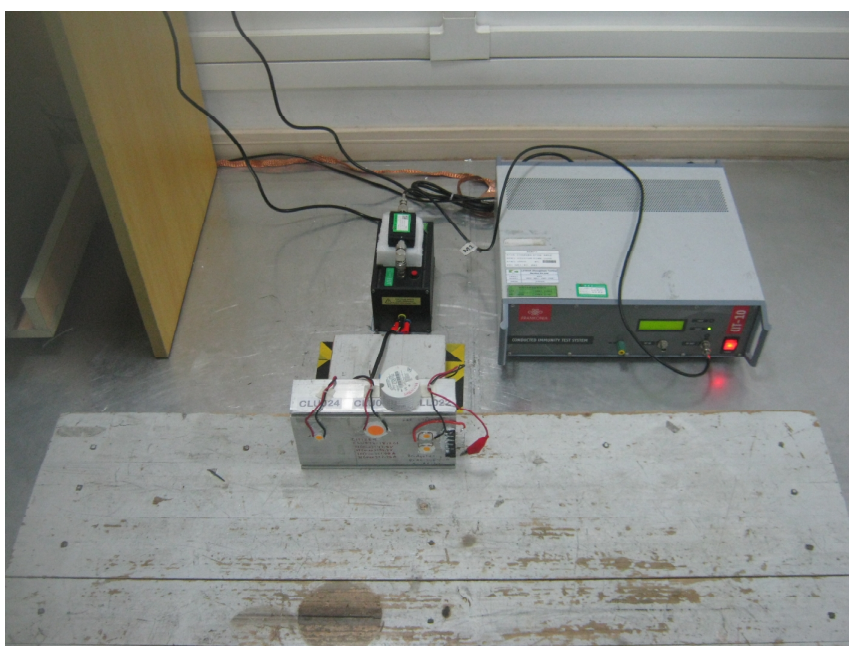
Radiated electromagnetic disturbances:



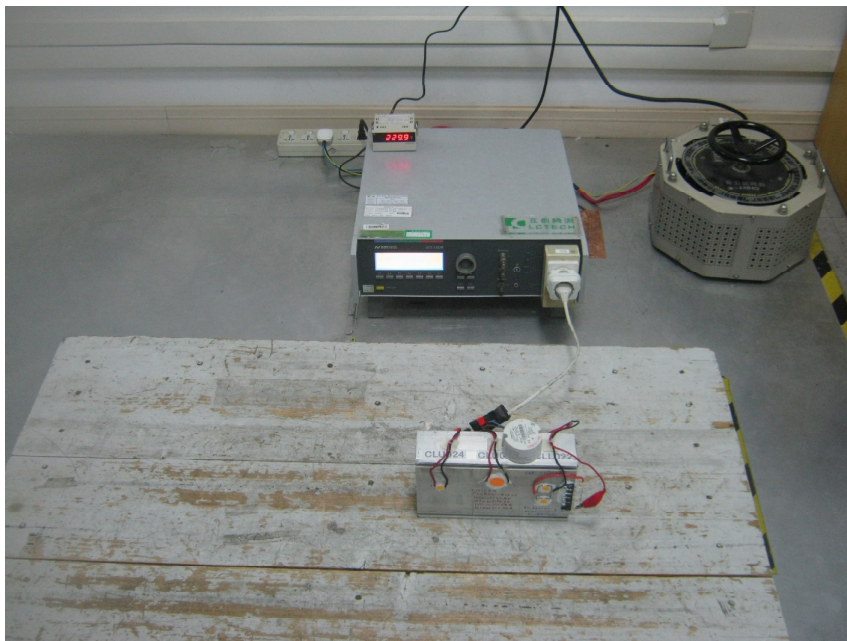
Radiated Emission:



Radio-frequency Common Mode / Conducted Susceptibility (CS):



Electrical Fast Transients (EFT)/ Surge/ Voltage Dip and Interruptions:

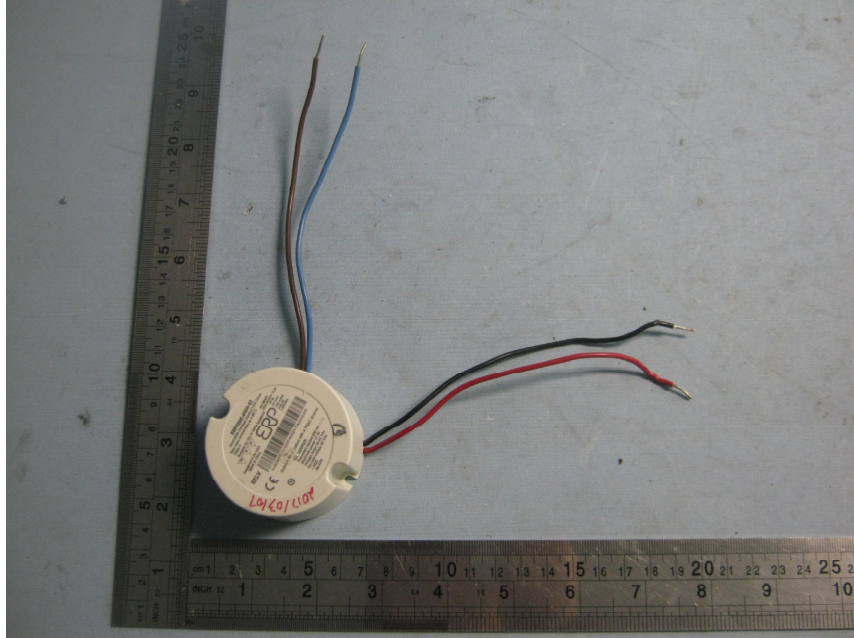


Electrostatic Discharges (ESD):

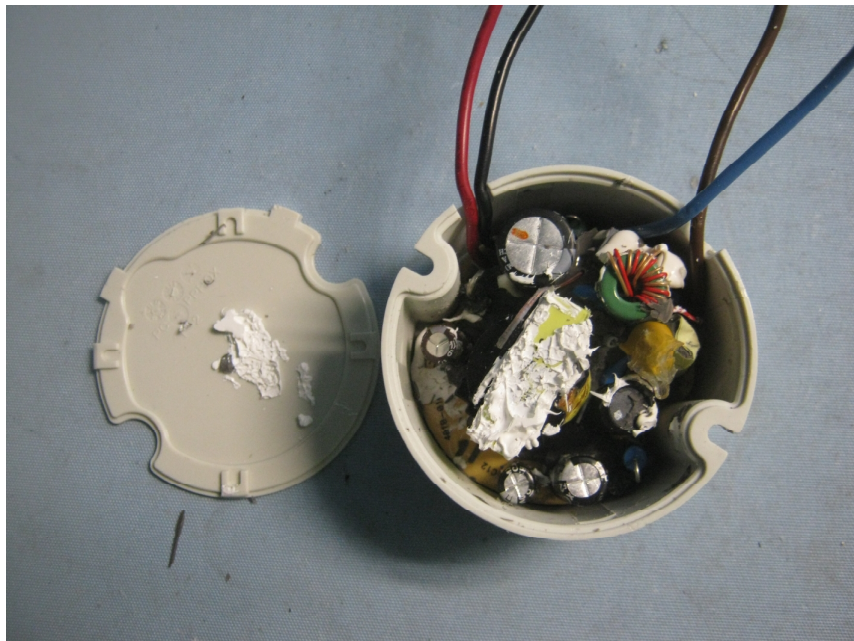


8 The photos of EUT

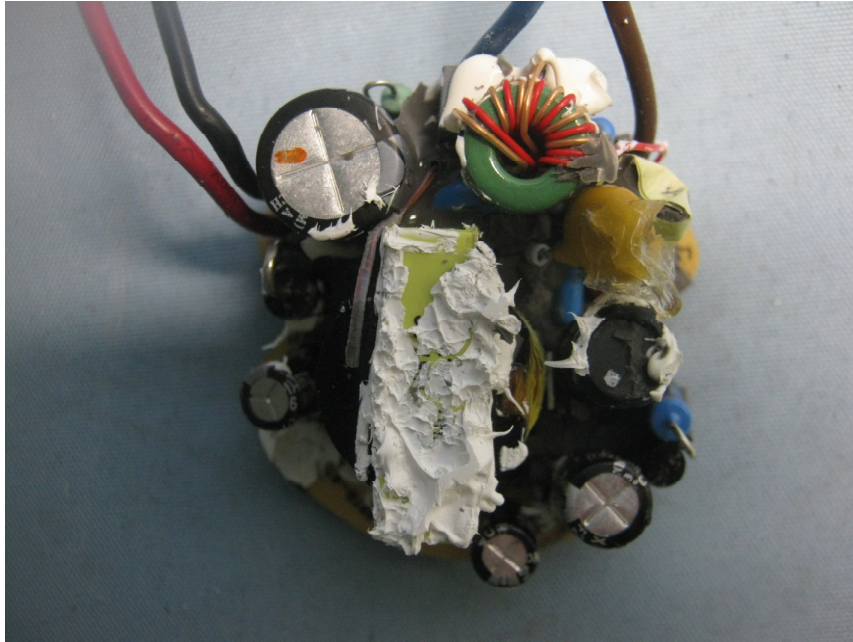
Model: EBR020E-0500-42



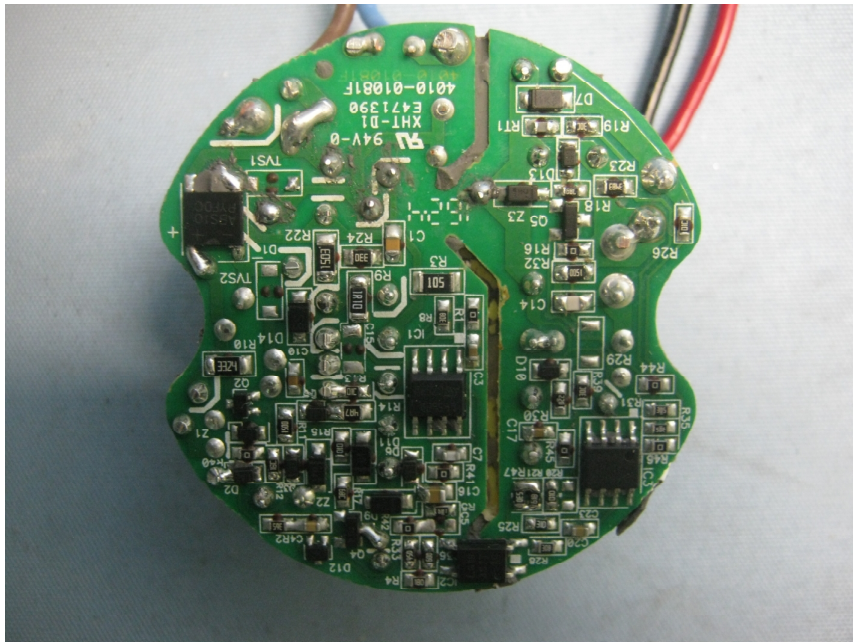
Picture 1



Picture 2

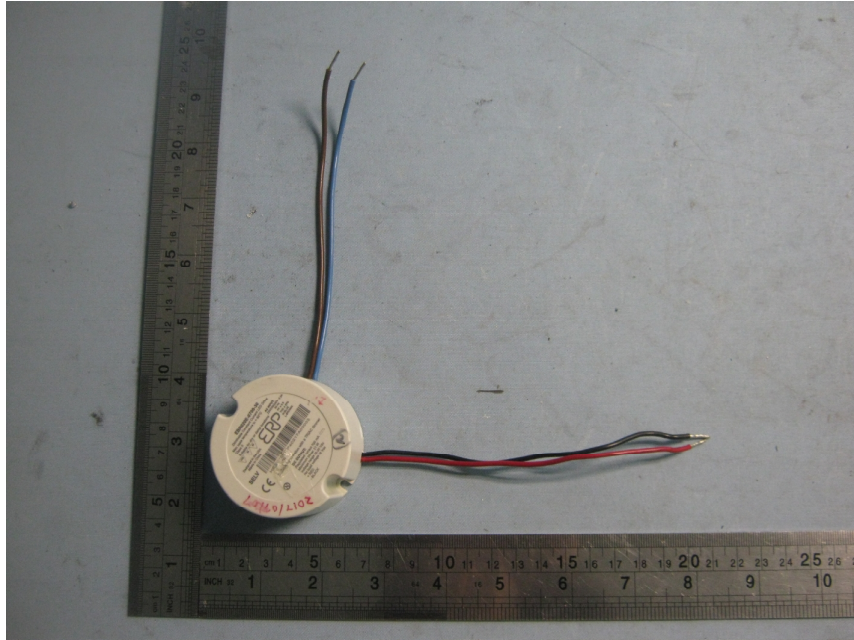


Picture 3



Picture 4

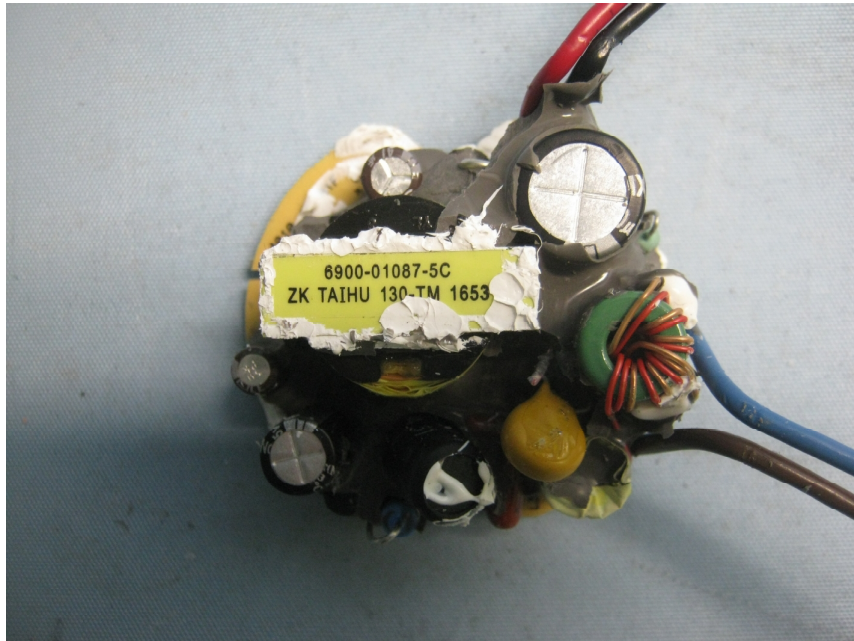
Model: EBR020E-0700-30



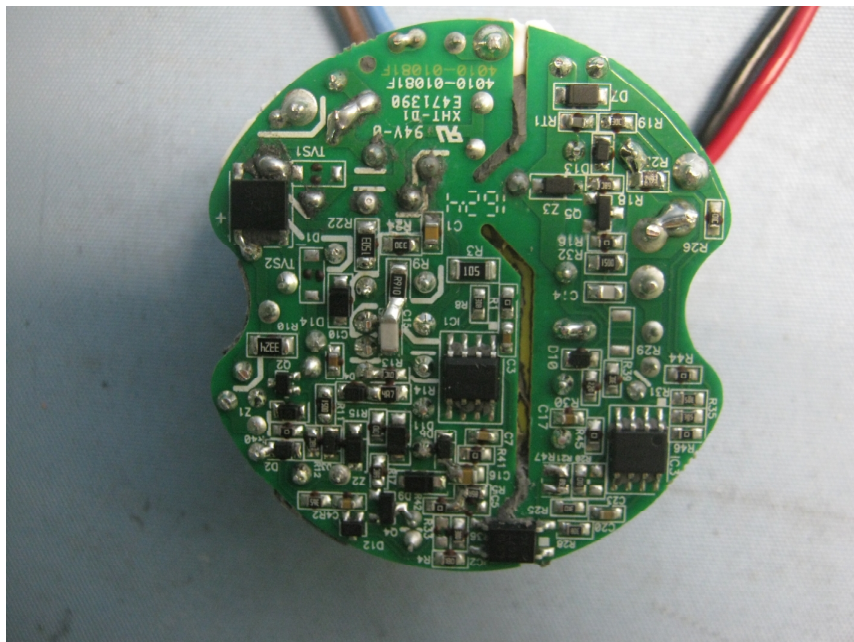
Picture 5



Picture 6



Picture 7



Picture 8

-----End of test report-----