



Test Report Number:	LCZE14090045					Total Page(s): 47
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:	2014-10-13					
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 EN 61547:2009 EN 61000-3-2:2006+A1:2009+A2:2009 EN 61000-3-3:2013					
Test Result:	Passed					
Compiled by:				Reviewed by:		
2014-10-13	Map He	<i>Map He</i>	2014-10-13	Gordon Xie	<i>Gordon Xie</i>	
<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 ELECTROMAGNETIC DISTURBANCES(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	3.004dB
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

3.2 Testing

Date of receipt of test item : 2014-09-25

Date (s) of performance of tests : 2014-10-09

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 (mm-dd-yy)	Cal.Due date (mm-dd-yy)
Radiated electromagnetic disturbances(30MHz to 300MHz) <input type="checkbox"/>						
1	EMI Test Receiver	R&S	ESCI 7	100965	2014-06-04	2015-06-03
2	Log-periodic Dipole Antenna	Schwarzbeck	VULB 9162	058	2014-05-30	2015-05-29
3	3m Semi-anechoic	Zhongshuo Electronics	9mx6mx6m	N/A	2014-01-05	2015-01-04
4	RF Cable	R&S	R01	10403	2014-06-04	2015-06-03
Mains Terminal Continuous Disturbance Voltage <input checked="" type="checkbox"/>						
5	EMI Test Receiver	Rohde&Schwarz	ESCI	100939	2014-08-29	2015-08-29
6	Artificial Mains Network	Rohde&Schwarz	ENV216	3560655012	2014-08-29	2015-08-29
7	Shield Room	ZhongYu Elertron	8X5X3.5	N/A	2014-08-29	2015-08-29
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	2014-08-29	2015-08-29
10	AC Power Source	CI	5001ix-CTS-400	59176	2014-08-29	2015-08-29
Radiated electromagnetic disturbances(9kHz to 30MHz) <input checked="" type="checkbox"/>						
11	EMI Test Receiver	Rohde&Schwarz	ESCI	100939	2014-08-29	2015-08-29
12	Triple-loop Antenna	SCHWARZBECK	HXYZ9170	HXYZ9170-171	2014-08-29	2015-08-29
Radiated disturbances(CDN) <input checked="" type="checkbox"/>						
13	EMI Test Receiver	Rohde&Schwarz	ESCI	100939	2014-08-29	2015-08-29
14	6dB Attenuator	Weinschel	WA59-6-33	2537	2014-08-29	2015-08-29
15	Coupling Decoupling Network	SCHWARZBECK	L-801M2/M3	2531	2014-08-29	2015-08-29
Click <input type="checkbox"/>						
16	Click Analyzer	AFJ	CL55C	55040929140	2014-08-29	2015-08-29
17	Artificial Mains Network	AFJ	LS16C	160108020208	2014-08-29	2015-08-29
Disturbance Power <input type="checkbox"/>						
18	EMI Test Receiver	Rohde&Schwarz	ESCI	100939	2014-08-29	2015-08-29
19	Absorbing Clamp	SCHWARZBECK	MDS-21	3892	2014-11-03	2015-11-03



Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
Electrostatic Discharge(ESD) <input checked="" type="checkbox"/>						
20	ESD Simulator	TESEQ AG	NSG 437	268	2014-08-31	2015-08-31
Electrical Fast Transient(EFT) <input checked="" type="checkbox"/>						
21	Ultra Compact Simulator	EM TEST	UCS 500N5	V0925104927	2014-08-29	2015-08-29
22	Single-Phase Toroidal Transformer with autowinding	EM TEST	V4780S2	2538	2014-08-29	2015-08-29
Surge <input checked="" type="checkbox"/>						
23	Ultra Compact Simulator	EM TEST	UCS 500N5	V0925104927	2014-08-29	2015-08-29
24	Single-Phase Toroidal Transformer with autowinding	EM TEST	V4780S2	2538	2014-08-29	2015-08-29
Conducted Susceptibility <input checked="" type="checkbox"/>						
25	Conducted Immunity Test System	Frankonia	CIT-10/75	12B1113	2014-08-29	2015-08-29
26	6dB Attenuator	Weinschel	WA59-6-33	2537	2014-08-29	2015-08-29
27	Coupling Decoupling Network	SCHWARZBECK	L-801M2/M3	2531	2014-08-29	2015-08-29
28	Coupling Decoupling Network	SCHWARZBECK	L-801AF2	2536	2014-08-29	2015-08-29
Voltage Dips and Interruptions <input checked="" type="checkbox"/>						
29	Ultra Compact Simulator	EM TEST	UCS 500N5	V0925104927	2014-08-29	2015-08-29
30	Single-Phase Toroidal Transformer with autowinding	EM TEST	V4780S2	2538	2014-08-29	2015-08-29
Radio-frequency electromagnetic fields(RS) <input checked="" type="checkbox"/>						
31	Signal generator	R&S	SMB 100A	102710	2014-08-29	2015-8-28
32	Power amplifier	BONN Elektronik	BLWA 0810-160/100D	149644	2014-06-25	2015-06-24
33	Isotropic Field Probe	Narda	EP-601	511WX30620	2014-07-25	2015-07-25
34	Log-periodic Antenna	SCHWARZBECK	STLP 9128D	078	2014-06-25	2015-06-24
35	Power Meter	FEANKONIA	PMS 1084	108B1289	2014-06-25	2015-06-24

☐ : Not Used

☒ : Used

4 General Product Information

According to the declaration from the applicant, this report covers the model see section 4.2 ratings and system details. These models have the same internal configuration and PCB layout, the difference of these models were power and surface, Therefore maximum and minimum power models EBR010U-0200-42, EBR020U-0700-30 were fully tested in the report.

4.1 Product Description and Intended Use

Refer to Constructional Data Form and user manual.

4.2 Ratings and System Details

ERP P/N	Input Voltage(Vac)	Frequency(Hz)	Input Current(A)	Max Output Power	Max output regulated current	Min output regulated current	Output Voltage Range (Vdc)	Potting(Y/N)
EBR0P PA-XXXX-30-YYY-ZZZ	A	50/60	0.27	21.0	700mA	100mA	20<Vout<30	Y
EBR0P PA-XXXX-30-YYY-ZZZ	A	50/60	0.27	15.0	500mA			N
EBR0P PA-XXXX-24-YYY-ZZZ	A	50/60	0.27	16.8	700mA	100mA	16<Vout<24	Y
EBR0P PA-XXXX-24-YYY-ZZZ	A	50/60	0.27	15.0	625mA			N
EBR0P PA-XXXX-32-YYY-ZZZ	A	50/60	0.27	21.0	650mA	100mA	20<Vout<32	Y
EBR0P PA-XXXX-32-YYY-ZZZ	A	50/60	0.27	15.0	465mA			N



ERP P/N	Input Voltage(Vac)	Frequency(Hz)	Input Current(A)	Max Output Power	Max output regulated current	Min output regulated current	Output Voltage Range (Vdc)	Potting(Y/N)
EBR0P PA-XXXX-36-YYY-ZZZ	A	50/60	0.27	21.0	580mA	100mA	24<Vout<36	Y
EBR0P PA-XXXX-36-YYY-ZZZ	A	50/60	0.27	15.0	415mA			N
EBR0P PA-XXXX-37-YYY-ZZZ	A	50/60	0.27	18.5	500mA	100mA	26<Vout<37	Y
EBR0P PA-XXXX-37-YYY-ZZZ	A	50/60	0.27	15.0	405mA			N
EBR0P PA-XXXX-42-YYY-ZZZ	A	50/60	0.27	21.0	500mA	80mA	30<Vout<42	Y
EBR0P PA-XXXX-42-YYY-ZZZ	A	50/60	0.27	15.0	355mA			N
EBR010 U-XXXX-28-YYY-ZZZ	120	50/60	0.27	7.6	300mA	80mA	22<Vout<28	N
EBR0Y YU-XXXX-21-YYY-ZZZ	120	50/60	0.27	11.1	530mA	100mA	14<Vout<21	N

- Notes: 1. PP designate: If $16W < P_{out} < 21W$, PP=20, If $11W < P_{out} < 16W$, PP=15, If $P_{out} < 11W$, PP=10
2. If AC input is 120VAC, A=U; If AC input is 120-277VAC, A=W; if AC input is 230VAC, A=E; If AC input is 277VAC, A=V
3. XXXX means regulated output current, which is not greater than max output regulated current within the output voltage range.
For last two models, if $10W < P_{out} < 15W$, YY=15, If $P_{out} < 10W$, YY=10
4. YYY(Y=0~9, A~Z or blank, for marketing purpose only)
5. ZZZ(Z=0~9, A~Z or blank, for marketing purpose only)



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 120V 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

Date of testing : 09 Oct 2014
Test procedure : EN61000-3-2:2006+A1:2009+A2:2009
Measured harmonics : 1 - 40
Equipment Class : C
Limits : EN61000-3-2:2006+A1:2009+A2:2009, clause 7.3

Test Setup

Input Voltage : 120Vac, 60Hz
Operation Mode : Test in lighting mode
Artificial Hand : Not applied
Earthing : Not applied
Temperature : 24°C
Humidity : 60%
Air pressure : 101KPA

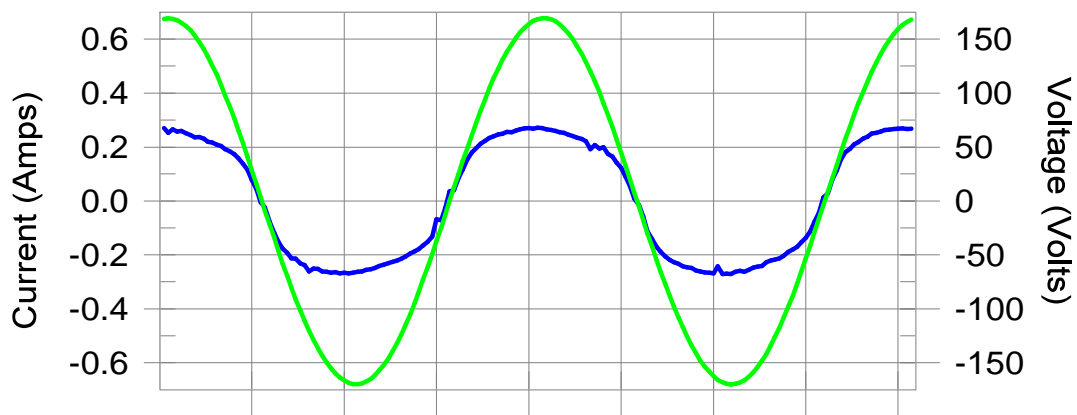
Test Data:
Model: EBR020U-0700-30

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

Test category: Class-A per Ed. 4.0 (2014) (European limits) Test Margin: 100
Test date: 2014-10-9 Start time: 13:56:41 End time: 13:59:33
Test duration (min): 2.5 Data file name: H-000178.cts_data

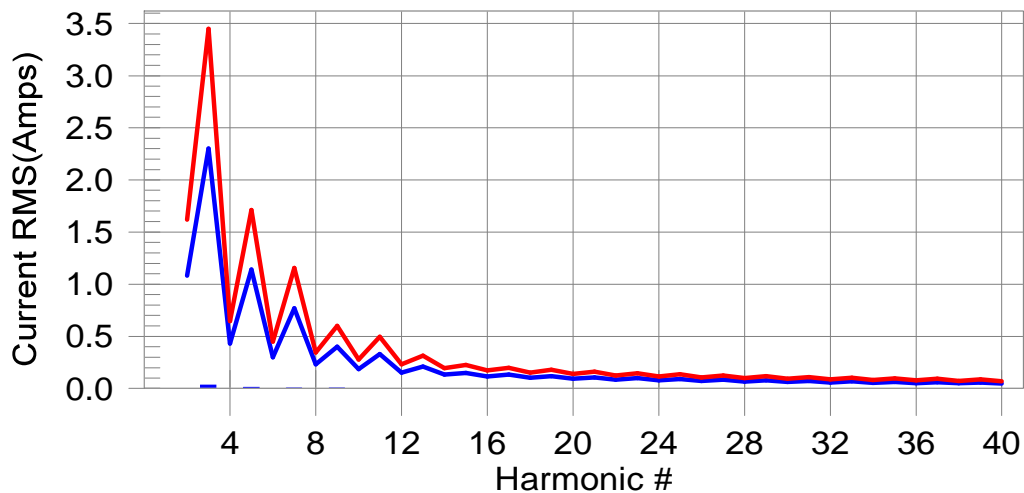
Test Result: Pass Source qualification: Normal

Current & voltage waveforms



Harmonics and Class A limit line

European Limits



Test result: Pass Worst harmonic was #3 with 1.4% of the limit.



Current Test Result Summary (Run time)

Test category: Class-A per Ed. 4.0 (2014) (European limits) Test Margin: 100
 Test date: 2014-10-9 Start time: 13:56:41 End time: 13:59:33
 Test duration (min): 2.5 Data file name: H-000178.cts_data

Test Result: Pass Source qualification: Normal
 THC(A): 0.034 I-THD(%): 16.3 POHC(A): 0.000 POHC Limit(A): 0.251
 Highest parameter values during test:

V_RMS (Volts): 120.09	Frequency(Hz): 60.00
I_Peak (Amps): 0.322	I_RMS (Amps): 0.214
I_Fund (Amps): 0.212	Crest Factor: 1.504
Power (Watts): 24.4	Power Factor: 0.985

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.000	1.080	N/A	0.000	1.620	N/A	Pass
3	0.032	2.300	1.4	0.032	3.450	0.9	Pass
4	0.000	0.430	N/A	0.000	0.645	N/A	Pass
5	0.012	1.140	1.0	0.012	1.710	0.7	Pass
6	0.000	0.300	N/A	0.000	0.450	N/A	Pass
7	0.004	0.770	N/A	0.004	1.155	N/A	Pass
8	0.000	0.230	N/A	0.000	0.345	N/A	Pass
9	0.001	0.400	N/A	0.001	0.600	N/A	Pass
10	0.000	0.184	N/A	0.000	0.276	N/A	Pass
11	0.000	0.330	N/A	0.001	0.495	N/A	Pass
12	0.000	0.153	N/A	0.000	0.230	N/A	Pass
13	0.001	0.210	N/A	0.001	0.315	N/A	Pass
14	0.000	0.131	N/A	0.000	0.197	N/A	Pass
15	0.001	0.150	N/A	0.001	0.225	N/A	Pass
16	0.000	0.115	N/A	0.000	0.173	N/A	Pass
17	0.001	0.132	N/A	0.001	0.198	N/A	Pass
18	0.000	0.102	N/A	0.000	0.153	N/A	Pass
19	0.001	0.118	N/A	0.001	0.178	N/A	Pass
20	0.000	0.092	N/A	0.000	0.138	N/A	Pass
21	0.001	0.107	N/A	0.001	0.161	N/A	Pass
22	0.000	0.084	N/A	0.000	0.125	N/A	Pass
23	0.001	0.098	N/A	0.001	0.147	N/A	Pass
24	0.000	0.077	N/A	0.000	0.115	N/A	Pass
25	0.001	0.090	N/A	0.001	0.135	N/A	Pass
26	0.000	0.071	N/A	0.000	0.107	N/A	Pass
27	0.001	0.083	N/A	0.001	0.125	N/A	Pass
28	0.000	0.066	N/A	0.000	0.099	N/A	Pass
29	0.001	0.078	N/A	0.001	0.116	N/A	Pass
30	0.000	0.061	N/A	0.000	0.092	N/A	Pass
31	0.000	0.073	N/A	0.001	0.109	N/A	Pass
32	0.000	0.058	N/A	0.000	0.086	N/A	Pass
33	0.000	0.068	N/A	0.000	0.102	N/A	Pass
34	0.000	0.054	N/A	0.000	0.081	N/A	Pass
35	0.000	0.064	N/A	0.000	0.096	N/A	Pass
36	0.000	0.051	N/A	0.000	0.077	N/A	Pass
37	0.000	0.061	N/A	0.000	0.091	N/A	Pass
38	0.000	0.048	N/A	0.000	0.073	N/A	Pass
39	0.000	0.058	N/A	0.001	0.087	N/A	Pass
40	0.000	0.046	N/A	0.000	0.069	N/A	Pass



Voltage Source Verification Data (Run time)

Test category: Class-A per Ed. 4.0 (2014) (European limits) Test Margin: 100
Test date: 2014-10-9 Start time: 13:56:41 End time: 13:59:33
Test duration (min): 2.5 Data file name: H-000178.cts_data

Test Result: Pass Source qualification: Normal

Highest parameter values during test:

Voltage (Vrms): 120.09 Frequency(Hz): 60.00
I_Peak (Amps): 0.322 I_RMS (Amps): 0.214
I_Fund (Amps): 0.212 Crest Factor: 1.504
Power (Watts): 24.4 Power Factor: 0.985

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.023	0.240	9.58	OK
3	0.235	1.081	21.73	OK
4	0.014	0.240	5.90	OK
5	0.024	0.480	4.97	OK
6	0.010	0.240	4.05	OK
7	0.016	0.360	4.57	OK
8	0.005	0.240	2.19	OK
9	0.007	0.240	3.08	OK
10	0.009	0.240	3.84	OK
11	0.005	0.120	4.25	OK
12	0.004	0.120	3.42	OK
13	0.005	0.120	3.89	OK
14	0.008	0.120	6.62	OK
15	0.009	0.120	7.25	OK
16	0.007	0.120	6.05	OK
17	0.005	0.120	3.78	OK
18	0.006	0.120	4.61	OK
19	0.005	0.120	3.76	OK
20	0.006	0.120	4.66	OK
21	0.004	0.120	3.29	OK
22	0.004	0.120	3.18	OK
23	0.004	0.120	3.15	OK
24	0.004	0.120	3.19	OK
25	0.004	0.120	3.62	OK
26	0.004	0.120	3.50	OK
27	0.005	0.120	3.89	OK
28	0.004	0.120	3.21	OK
29	0.004	0.120	3.22	OK
30	0.005	0.120	3.81	OK
31	0.004	0.120	3.32	OK
32	0.004	0.120	3.07	OK
33	0.004	0.120	2.99	OK
34	0.004	0.120	3.25	OK
35	0.004	0.120	3.38	OK
36	0.004	0.120	3.00	OK
37	0.004	0.120	3.53	OK
38	0.004	0.120	3.24	OK
39	0.005	0.120	4.06	OK
40	0.005	0.120	3.80	OK

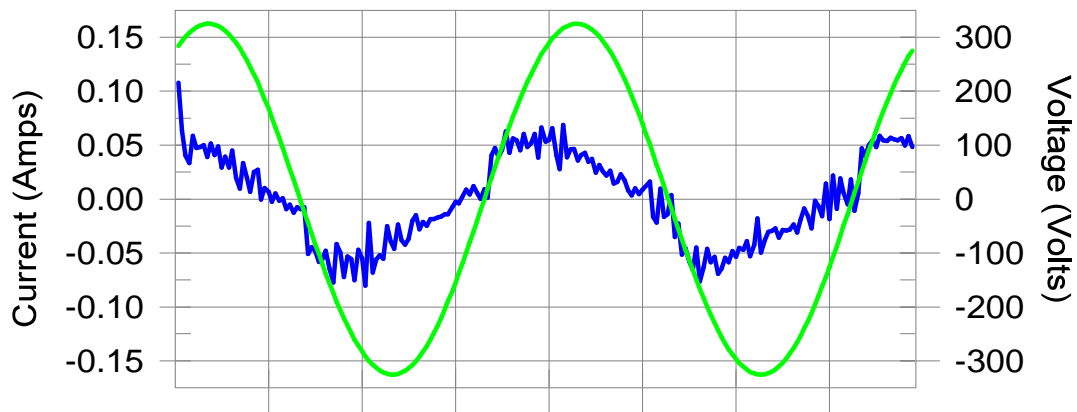
Model: EBR010U-0200-42

Harmonics – Class-A per Ed. 3.2 (2009)(Run time)

Test category: Class-A per Ed. 3.2 (2009) (European limits) Test Margin: 100
 Test date: 2014-10-9 Start time: 14:02:13 End time: 14:05:33
 Test duration (min): 2.5 Data file name: H-000179.cts_data

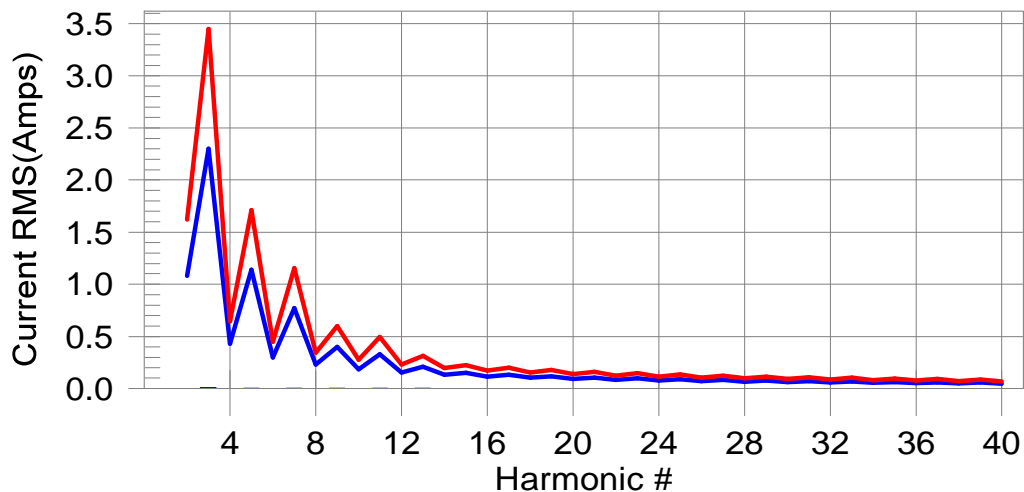
Test Result: Pass Source qualification: Normal

Current & voltage waveforms



Harmonics and Class A limit line

European Limits



Test result: Pass Worst harmonic was #3 with 0.27% of the limit.

Current Test Result Summary (Run time)

Test category: Class-A per Ed. 3.2 (2009) (European limits) Test Margin: 100
 Test date: 2014-10-9 Start time: 14:02:13 End time: 14:05:33
 Test duration (min): 2.5 Data file name: H-000179.cts_data

Test Result: Pass Source qualification: Normal
 THC(A): 0.01 I-THD(%): 17.16 POHC(A): 0.000 POHC Limit(A): 0.251
 Highest parameter values during test:

V_RMS (Volts): 120.20	Frequency(Hz): 60.00
I_Peak (Amps): 0.108	I_RMS (Amps): 0.039
I_Fund (Amps): 0.037	Crest Factor: 2.789
Power (Watts): 7.5	Power Factor: 0.849

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.001	1.080	0.0	0.001	1.620	0.05	Pass
3	0.006	2.300	0.3	0.007	3.450	0.21	Pass
4	0.000	0.430	0.0	0.001	0.645	0.09	Pass
5	0.003	1.140	0.0	0.003	1.710	0.20	Pass
6	0.000	0.300	0.0	0.000	0.450	0.06	Pass
7	0.002	0.770	0.0	0.003	1.155	0.22	Pass
8	0.000	0.230	0.0	0.000	0.345	0.05	Pass
9	0.002	0.400	0.0	0.002	0.600	0.32	Pass
10	0.000	0.184	0.0	0.000	0.276	0.07	Pass
11	0.001	0.330	0.0	0.002	0.495	0.32	Pass
12	0.000	0.153	0.0	0.000	0.230	0.09	Pass
13	0.001	0.210	0.0	0.001	0.315	0.42	Pass
14	0.000	0.131	0.0	0.000	0.197	0.16	Pass
15	0.001	0.150	0.0	0.001	0.225	0.46	Pass
16	0.000	0.115	0.0	0.000	0.173	0.13	Pass
17	0.001	0.132	0.0	0.001	0.199	0.43	Pass
18	0.000	0.102	0.0	0.000	0.153	0.10	Pass
19	0.001	0.118	0.0	0.001	0.178	0.49	Pass
20	0.000	0.092	0.0	0.000	0.138	0.14	Pass
21	0.001	0.107	0.0	0.001	0.161	0.46	Pass
22	0.000	0.084	0.0	0.000	0.125	0.11	Pass
23	0.001	0.098	0.0	0.001	0.147	0.44	Pass
24	0.000	0.077	0.0	0.000	0.115	0.20	Pass
25	0.001	0.090	0.0	0.001	0.135	0.52	Pass
26	0.000	0.071	0.0	0.000	0.106	0.32	Pass
27	0.000	0.083	0.0	0.001	0.125	0.46	Pass
28	0.000	0.066	0.0	0.000	0.099	0.22	Pass
29	0.000	0.078	0.0	0.001	0.116	0.51	Pass
30	0.000	0.061	0.0	0.000	0.092	0.33	Pass
31	0.000	0.073	0.0	0.001	0.109	0.57	Pass
32	0.000	0.058	0.0	0.000	0.086	0.24	Pass
33	0.001	0.068	0.0	0.001	0.102	0.63	Pass
34	0.000	0.054	0.0	0.000	0.081	0.18	Pass
35	0.000	0.064	0.0	0.000	0.096	0.51	Pass
36	0.000	0.051	0.0	0.000	0.077	0.24	Pass
37	0.000	0.061	0.0	0.001	0.091	0.55	Pass
38	0.000	0.048	0.0	0.000	0.073	0.64	Pass
39	0.000	0.058	0.0	0.000	0.087	0.43	Pass
40	0.000	0.046	0.0	0.000	0.069	0.30	Pass



Voltage Source Verification Data (Run time)

Test category: Class-A per Ed. 3.2 (2009) (European limits) Test Margin: 100
 Test date: 2014-10-9 Start time: 14:02:13 End time: 14:05:33
 Test duration (min): 2.5 Data file name: H-000179.cts_data

Test Result: Pass Source qualification: Normal

Highest parameter values during test:

Voltage (Vrms): 120.20 Frequency(Hz): 60.00
 I_Peak (Amps): 0.108 I_RMS (Amps): 0.039
 I_Fund (Amps): 0.037 Crest Factor: 2.789
 Power (Watts): 7.5 Power Factor: 0.849

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.062	0.460	13.45	OK
3	0.516	2.071	24.93	OK
4	0.066	0.460	14.38	OK
5	0.056	0.921	6.08	OK
6	0.019	0.460	4.18	OK
7	0.037	0.691	5.32	OK
8	0.012	0.460	2.55	OK
9	0.021	0.460	4.58	OK
10	0.013	0.460	2.76	OK
11	0.015	0.230	6.62	OK
12	0.012	0.230	5.21	OK
13	0.015	0.230	6.41	OK
14	0.007	0.230	3.13	OK
15	0.011	0.230	4.98	OK
16	0.010	0.230	4.49	OK
17	0.005	0.230	2.34	OK
18	0.010	0.230	4.34	OK
19	0.008	0.230	3.58	OK
20	0.014	0.230	5.99	OK
21	0.008	0.230	3.38	OK
22	0.004	0.230	1.68	OK
23	0.004	0.230	1.85	OK
24	0.005	0.230	2.04	OK
25	0.005	0.230	2.02	OK
26	0.005	0.230	2.15	OK
27	0.006	0.230	2.74	OK
28	0.005	0.230	2.26	OK
29	0.006	0.230	2.55	OK
30	0.005	0.230	2.02	OK
31	0.004	0.230	1.90	OK
32	0.005	0.230	1.97	OK
33	0.005	0.230	2.30	OK
34	0.004	0.230	1.77	OK
35	0.005	0.230	2.11	OK
36	0.005	0.230	1.99	OK
37	0.006	0.230	2.64	OK
38	0.006	0.230	2.46	OK
39	0.006	0.230	2.62	OK
40	0.007	0.230	3.20	OK



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.



5.3 Terminal Continuous Disturbance Voltage

Results:

Pass

Date of testing : 09 Oct 2014
Test procedure : EN 55015:2013
Frequency range : 0.009- 30MHz
Kind of test site : shielded room
Limits : EN 55015:2013 Clause4.3.1, Table 2a

Test setup

Input Voltage : 120Vac, 60Hz
Operation Mode : Test in lighting mode
Artificial Hand : Not applied
Earthing : Not applied
Temperature : 24°C
Humidity : 60%
Air pressure : 101KPA

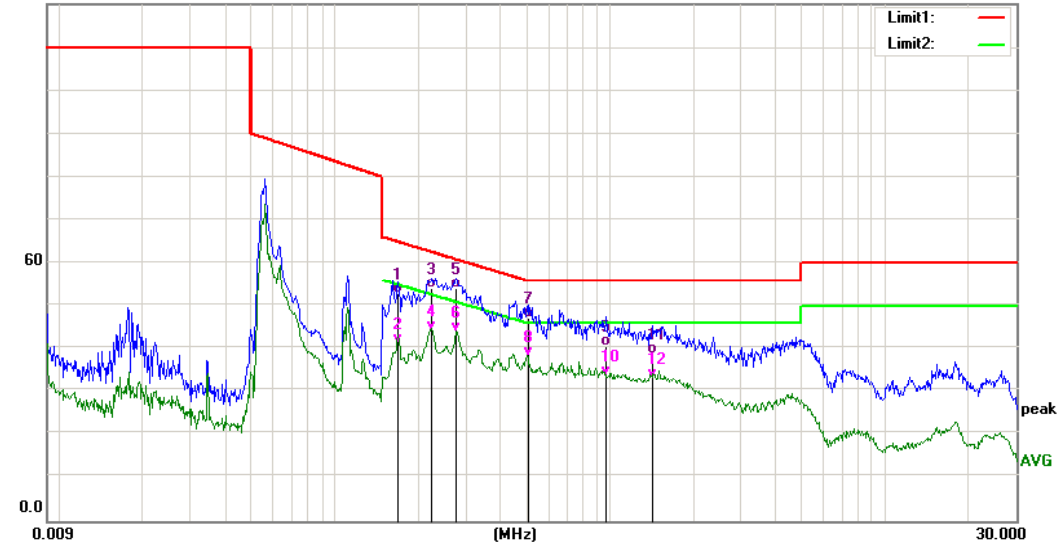
Test data

Model: EBR020U-0700-30

Peak and Average Scan:

Live:

120.0 dBuV



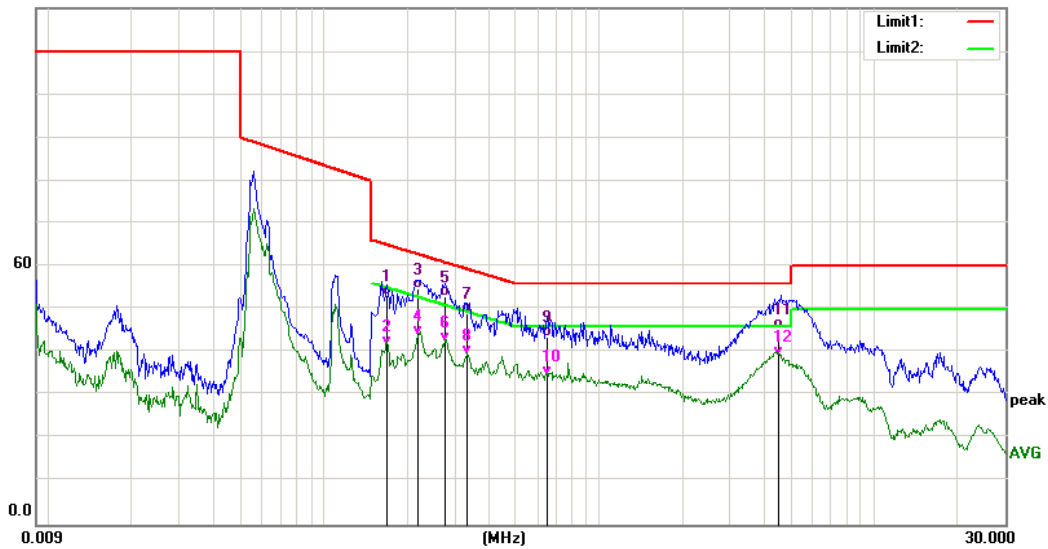
Quasi-peak and Average measurement:

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1700	43.81	9.23	53.04	64.96	-11.92	QP
2	0.1700	32.11	9.23	41.34	54.96	-13.62	AVG
3	0.2260	44.98	9.28	54.26	62.60	-8.34	QP
4	0.2260	34.94	9.28	44.22	52.60	-8.38	AVG
5	0.2780	44.74	9.31	54.05	60.88	-6.83	QP
6	0.2780	34.57	9.31	43.88	50.88	-7.00	AVG
7	0.5060	37.94	9.44	47.38	56.00	-8.62	QP
8	0.5060	28.77	9.44	38.21	46.00	-7.79	AVG
9	0.9740	31.22	9.53	40.75	56.00	-15.25	QP
10	0.9740	24.12	9.53	33.65	46.00	-12.35	AVG
11	1.4340	29.34	9.57	38.91	56.00	-17.09	QP
12	1.4340	23.62	9.57	33.19	46.00	-12.81	AVG

Peak and Average Scan:

Neutral:

120.0 dBuV



Quasi-peak and Average measurement:

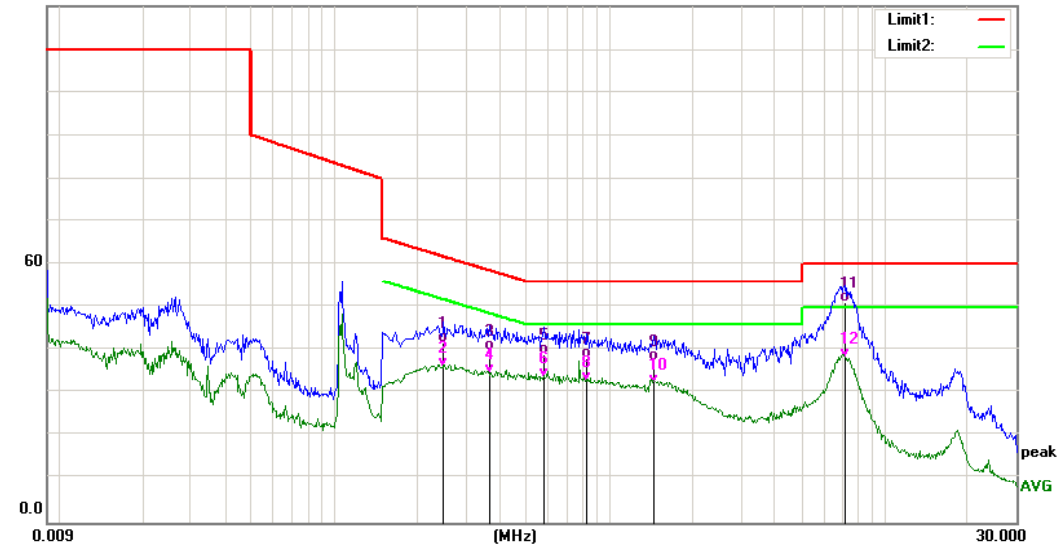
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1700	44.06	9.23	53.29	64.96	-11.67	QP
2	0.1700	32.21	9.23	41.44	54.96	-13.52	AVG
3	0.2260	45.47	9.28	54.75	62.60	-7.85	QP
4	0.2260	34.54	9.28	43.82	52.60	-8.78	AVG
5	0.2782	43.72	9.31	53.03	60.87	-7.84	QP
6	0.2782	33.12	9.31	42.43	50.87	-8.44	AVG
7	0.3353	39.82	9.35	49.17	59.32	-10.15	QP
8	0.3353	30.04	9.35	39.39	49.32	-9.93	AVG
9	0.6500	34.10	9.47	43.57	56.00	-12.43	QP
10	0.6500	25.30	9.47	34.77	46.00	-11.23	AVG
11	4.4780	35.72	9.72	45.44	56.00	-10.56	QP
12	4.4780	29.29	9.72	39.01	46.00	-6.99	AVG

Model: EBR010U-0200-42

Peak and Average Scan:

Live:

120.0 dBuV



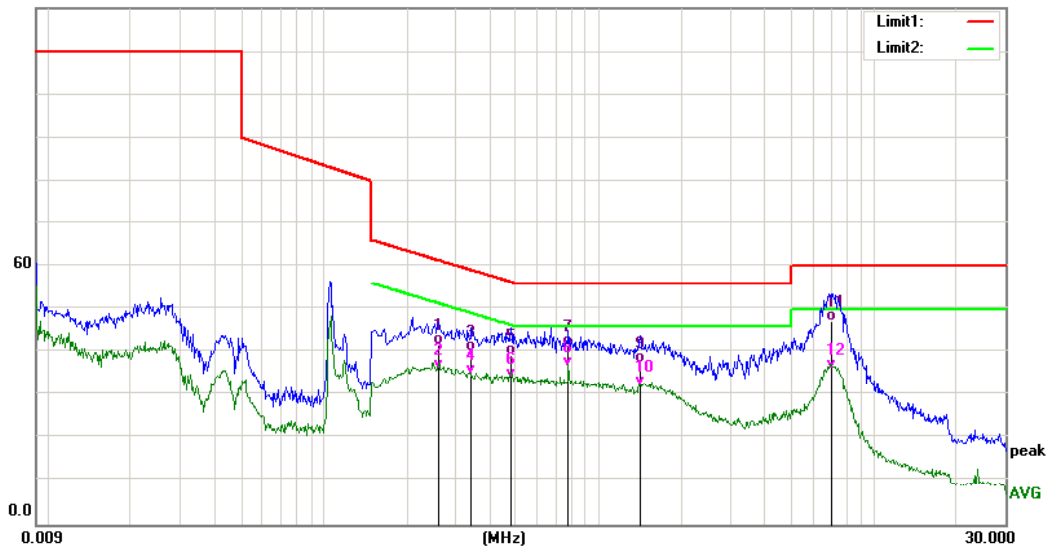
Quasi-peak and Average measurement:

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.2500	32.54	9.30	41.84	61.76	-19.92	QP
2	0.2500	26.95	9.30	36.25	51.76	-15.51	AVG
3	0.3660	30.76	9.36	40.12	58.59	-18.47	QP
4	0.3660	25.39	9.36	34.75	48.59	-13.84	AVG
5	0.5780	29.73	9.46	39.19	56.00	-16.81	QP
6	0.5780	24.28	9.46	33.74	46.00	-12.26	AVG
7	0.8260	28.77	9.51	38.28	56.00	-17.72	QP
8	0.8260	23.34	9.51	32.85	46.00	-13.15	AVG
9	1.4460	28.17	9.57	37.74	56.00	-18.26	QP
10	1.4460	22.77	9.57	32.34	46.00	-13.66	AVG
11	7.1900	41.36	9.89	51.25	60.00	-8.75	QP
12	7.1900	28.51	9.89	38.40	50.00	-11.60	AVG

Peak and Average Scan:

Neutral:

120.0 dBuV



Quasi-peak and Average measurement:

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.2620	32.45	9.31	41.76	61.37	-19.61	QP
2	0.2620	26.96	9.31	36.27	51.37	-15.10	AVG
3	0.3460	31.02	9.35	40.37	59.06	-18.69	QP
4	0.3460	25.65	9.35	35.00	49.06	-14.06	AVG
5	0.4820	29.98	9.43	39.41	56.30	-16.89	QP
6	0.4820	24.56	9.43	33.99	46.30	-12.31	AVG
7	0.7780	31.95	9.50	41.45	56.00	-14.55	QP
8	0.7780	27.23	9.50	36.73	46.00	-9.27	AVG
9	1.4140	28.21	9.56	37.77	56.00	-18.23	QP
10	1.4140	22.84	9.56	32.40	46.00	-13.60	AVG
11	7.0780	37.52	9.88	47.40	60.00	-12.60	QP
12	7.0780	26.25	9.88	36.13	50.00	-13.87	AVG



5.4 Radiated electromagnetic disturbances (9 kHz to 30 MHz)

Results:

Pass

Date of testing : 09 Oct 2014
Test procedure : EN 55015:2013
Frequency range : 0.009- 30MHz
Kind of test site : shielded room
Limits : EN 55015:2013, Clause4.4 Table 3a

Test setup:

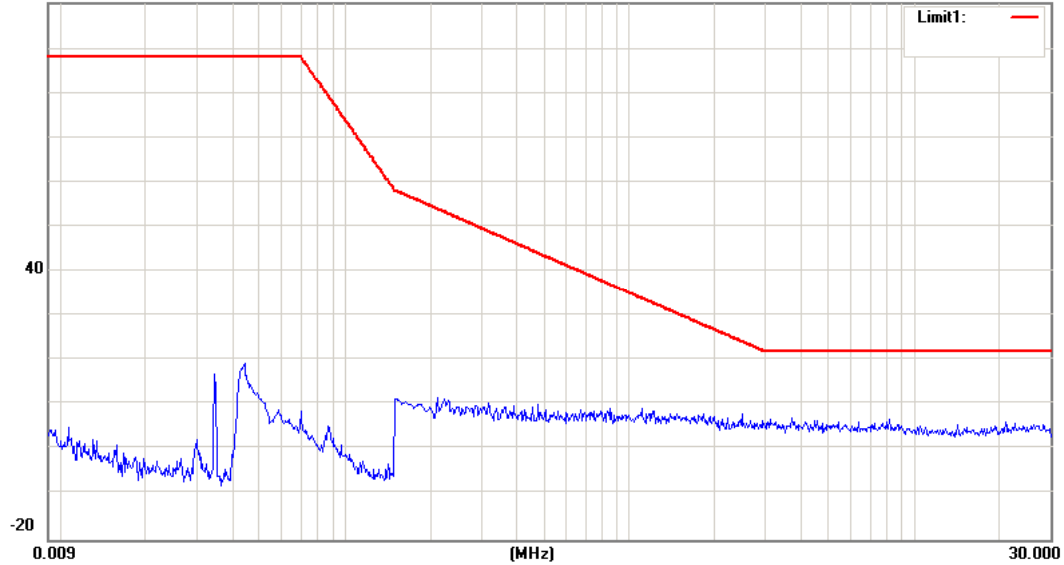
Input Voltage : 120Vac, 60Hz
Operation Mode : Test in lighting mode
Artificial Hand : Not applied
Earthing : Not applied
Temperature : 24°C
Humidity : 60%
Air pressure : 101KPA

Test Data:
Model: EBR020U-0700-30

Peak Scan:

X axis

100.0 dBuA



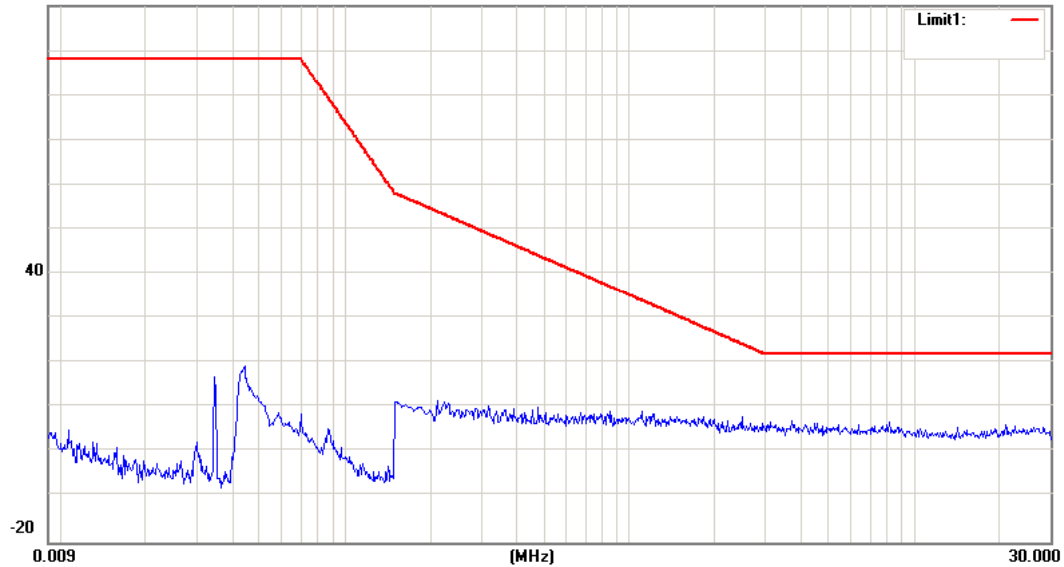
Quasi-peak measurement:

Note: Where PK reading is less than relevant limit decrease 10dB, the QP reading will not be recorded.

Peak Scan:

Y axis

100.0 dBuA



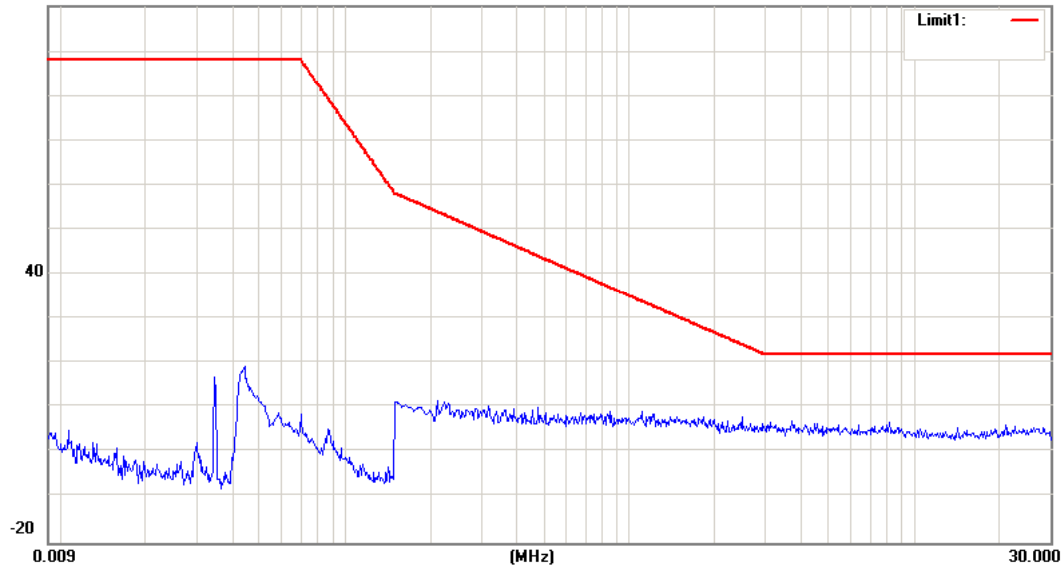
Quasi-peak measurement:

Note: Where PK reading is less than relevant limit decrease 10dB, the QP reading will not be recorded.

Peak Scan:

Z axis

100.0 dBuA



Quasi-peak measurement:

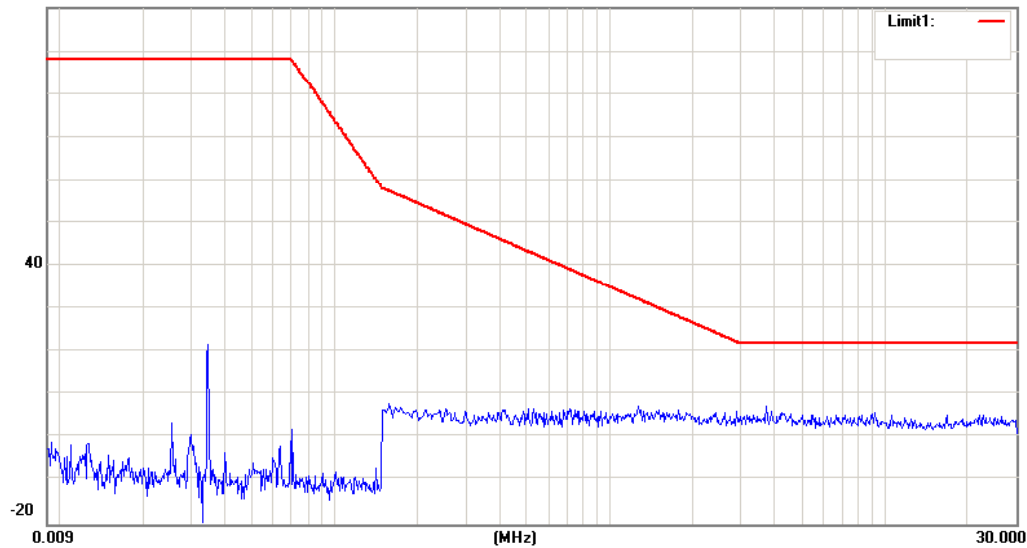
Note: Where PK reading is less than relevant limit decrease 10dB, the QP reading will not be recorded.

Model: EBR010U-0200-42

Peak Scan:

X axis

100.0 dBuA



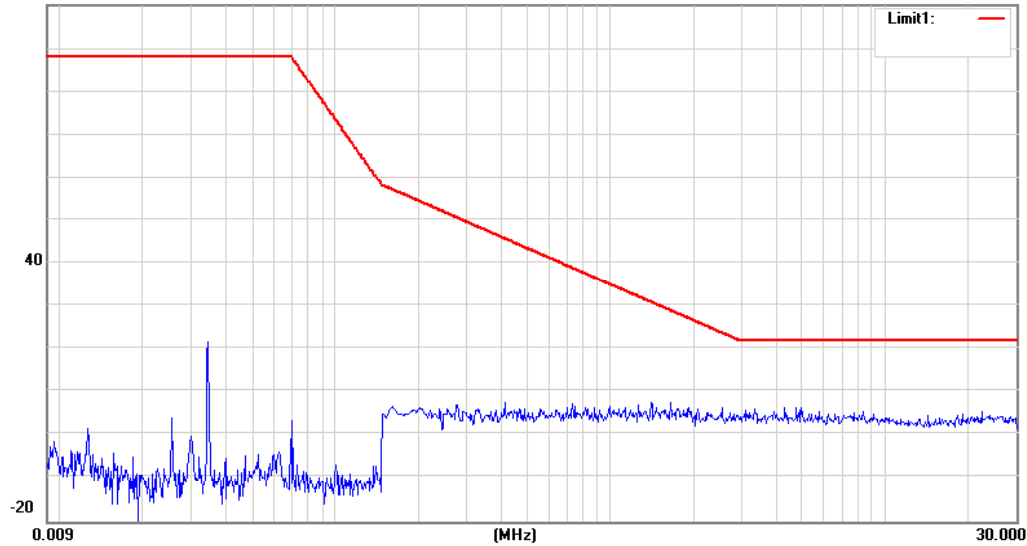
Quasi-peak measurement:

Note: Where PK reading is less than relevant limit decrease 10dB, the QP reading will not be recorded.

Peak Scan:

Y axis

100.0 dBuA



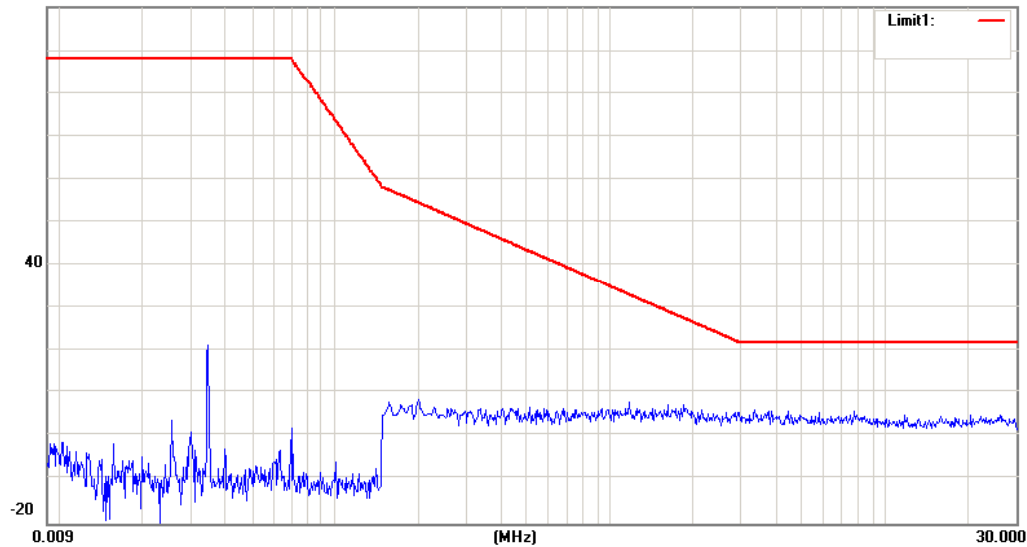
Quasi-peak measurement:

Note: Where PK reading is less than relevant limit decrease 10dB, the QP reading will not be recorded.

Peak Scan:

Z axis

100.0 dBuA



Quasi-peak measurement:

Note: Where PK reading is less than relevant limit decrease 10dB, the QP reading will not be recorded.



5.5 Radiated electromagnetic disturbances (30 M Hz to 300 MHz)

Results:

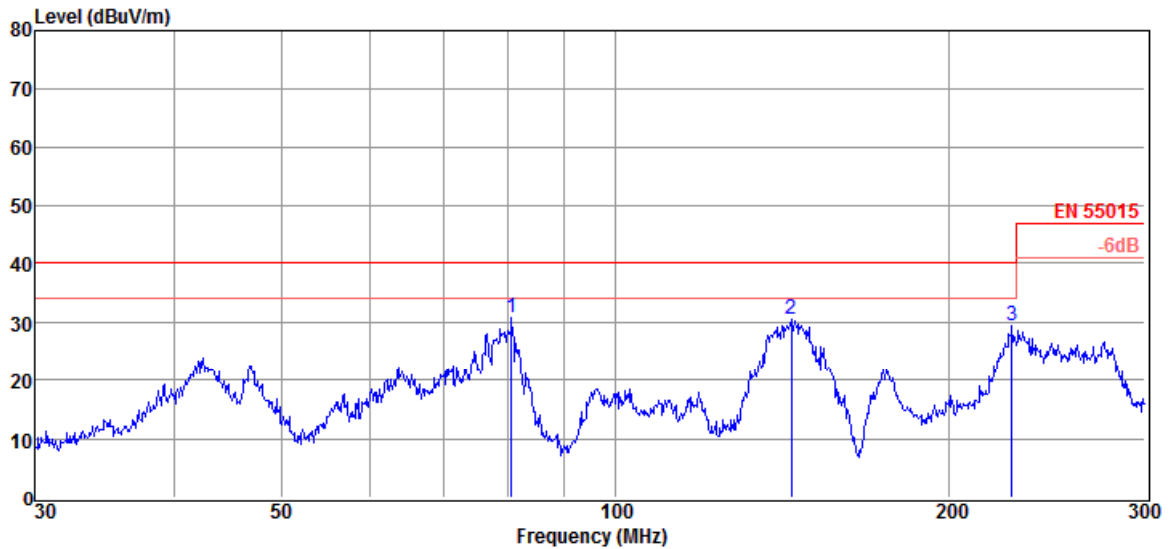
Pass

Date of testing : 09 Oct 2010
Test procedure : EN 55015:2013
Frequency range : 30- 300MHz
Kind of test site : semi-anechoic chamber
Limits : EN 55015:2013, Table 3b

Test setup:

Input Voltage : 120Vac, 60Hz
Operation Mode : Test in lighting mode
Artificial Hand : Not applied
Earthing : Not applied
Temperature : 24°C
Humidity : 60%
Air pressure : 101KPA

Test data:
Model: EBR020U-0700-30

HORIZONTAL :
Peak Scan


Quasi-peak and Average measurement:

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	80.56	52.06	6.60	28.29	0.54	30.91	40.00	-9.09	Peak	HORIZONTAL
2	143.92	49.65	7.72	28.00	1.14	30.51	40.00	-9.49	Peak	HORIZONTAL
3	227.57	45.60	10.82	28.00	1.12	29.54	40.00	-10.46	Peak	HORIZONTAL

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

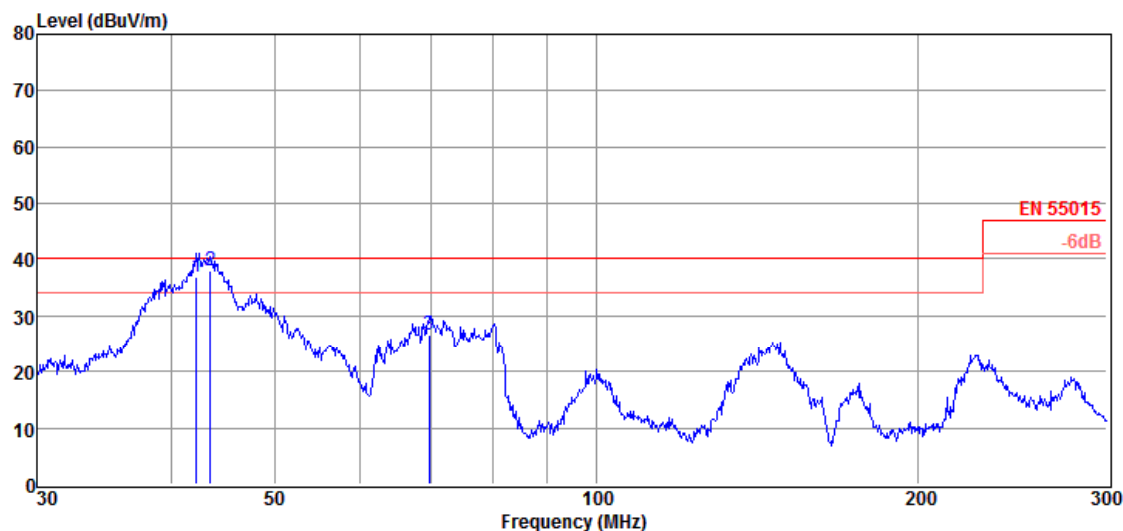
2. If Peak Result comply with QP limit, QP Result is deemed to comply with QP limit

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

Test data:

VERTICAL :

Peak Scan:



Quasi-peak and Average 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	42.28	48.50	15.71	27.80	0.51	36.92	40.00	-3.08	QP	VERTICAL
2	43.56	48.60	16.67	27.80	0.49	37.96	40.00	-2.04	QP	VERTICAL
3	69.68	46.19	7.80	28.09	0.67	26.57	40.00	-13.43	QP	VERTICAL

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

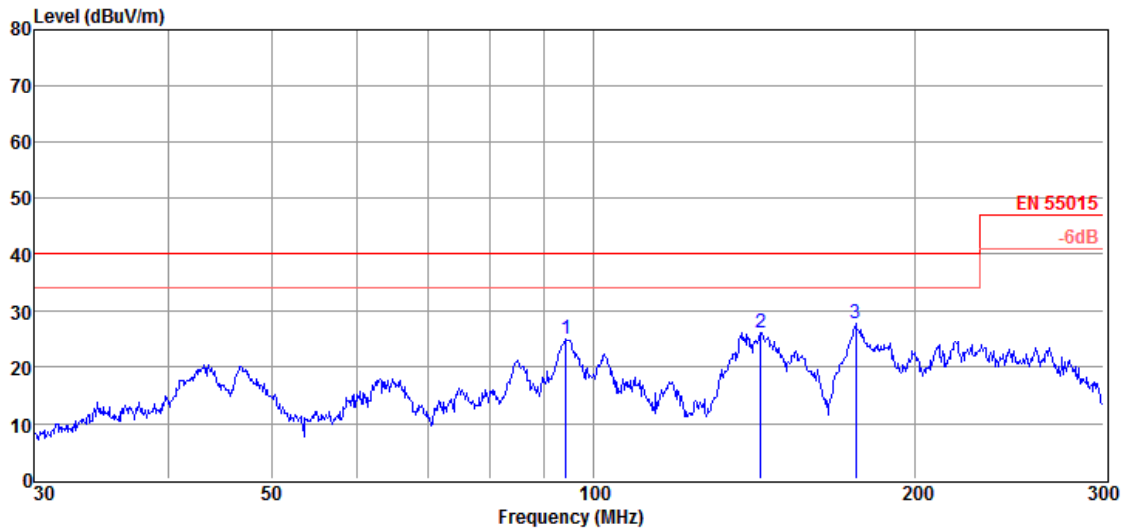
2. If Peak Result comply with QP limit, QP Result is deemed to comply with QP limit

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

Model: EBR010U-0200-42

HORIZONTAL :

Peak Scan



Quasi-peak and Average measurement:

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	94.22	41.75	10.52	28.06	0.80	25.01	40.00	-14.99	Peak	HORIZONTAL
2	143.26	45.34	7.73	28.00	1.14	26.21	40.00	-13.79	Peak	HORIZONTAL
3	175.84	47.38	6.97	27.90	1.24	27.69	40.00	-12.31	Peak	HORIZONTAL

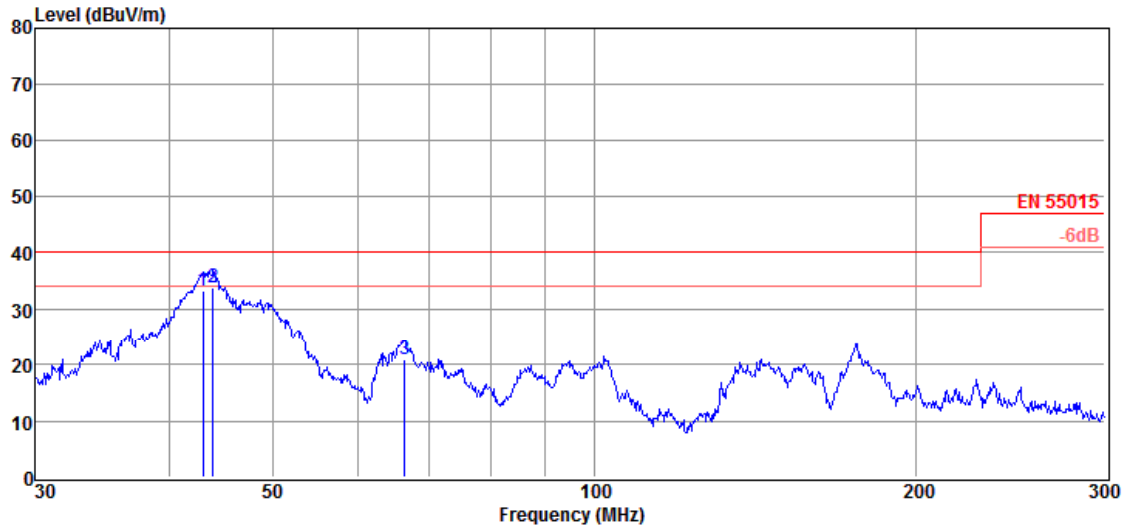
Note: 1. Result Level = Read Level + Antenna Factor + Cable loss

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

VERTICAL :

Peak Scan:



Quasi-peak and Average measurement:

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	43.07	44.19	16.30	27.80	0.50	33.19	40.00	-6.81	QP	VERTICAL
2	43.97	44.20	16.97	27.80	0.48	33.85	40.00	-6.15	QP	VERTICAL
3	66.39	39.51	8.85	28.03	0.63	20.96	40.00	-19.04	QP	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**

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 : 09 Oct 2014
 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 : 120Vac, 60Hz
 Operation Mode : Test in lighting mode
 Earthing : Not applied
 Temperature : 24°C
 Humidity : 55%
 Air pressure : 101KPA

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 : 09 Oct 2014
 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 : 120Vac, 60Hz
 Operation Mode : Test in lighting mode
 Earthing : Not applied
 Temperature : 24°C
 Humidity : 56%
 Air pressure : 101KPA

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				

6.3 Transient Disturbances

6.3.1 Electrical Fast Transients (EFT)

Results:

Pass

Date of testing : 09 Oct 2014
 Test Specification : EN 61547:2009, clause 5.5
 Basic Standard : IEC 61000-4-4
 Pulsform : $T_r/T_f=5/50\text{ns}$
 Repetition Freq : 5 kHz
 Test duration : 2 minute per level & polarity
 Performance criterion : B

Test Setup

Input Voltage : 120Vac, 60Hz
 Operation Mode : Test in lighting mode
 Earthing : Not applied
 Temperature : 24°C
 Humidity : 56%
 Air pressure : 101KPA

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 : 09 Oct 2014
 Test Specification : EN 61547:2009, clause 5.7
 Basic Standard : IEC 61000-4-5
 Pulsform : $T_r/T_f=1.2/50\mu s$
 Test voltages : $\pm 0.5Kv, \pm 1Kv$,
 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 : 120Vac, 60Hz
 Operation Mode : Test in lighting mode
 Earthing : Not applied
 Temperature : 24°C
 Humidity : 56%
 Air pressure : 101KPA

Table 5: Surge Immunity Tests, AC Power Supply

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



6.3.3 Electrostatic Discharges (ESD)

Results:

Pass

Date of testing	:	09 Oct 2014
Test Specification	:	EN 61547:2009, clause 5.2
Basic Standard	:	IEC 61000-4-2
Performance criterion	:	B
Charge voltage	:	±4.0kV (contact, VCP, HCP) ±8.0kV (air discharge)
Number of discharges	:	>10
Polarity	:	Positive / Negative

Test Setup:

Input Voltage	:	120Vac, 60Hz
Operation Mode	:	Test in lighting mode
Earthing	:	Not applied
Temperature	:	23°C
Humidity	:	55%
Air pressure	:	101KPA

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			

6.4 Power Supply Alterations

6.4.1 Voltage Dip and Interruptions

Results:

Pass

Date of testing : 09 Oct 2014
 Test Specification : EN 61547:2009, clause 5.8
 Basic Standard : IEC 61000-4-11
 Performance criterion : B+C

Test Setup:

Input Voltage : 120Vac, 60Hz
 Operation Mode : Test in lighting mode.
 Earthing : Not applied
 Temperature : 24°C
 Humidity : 40%
 Air pressure : 101KPA

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

Harmonics and flick on AC Mains:



Terminal Continuous Disturbance Voltage:



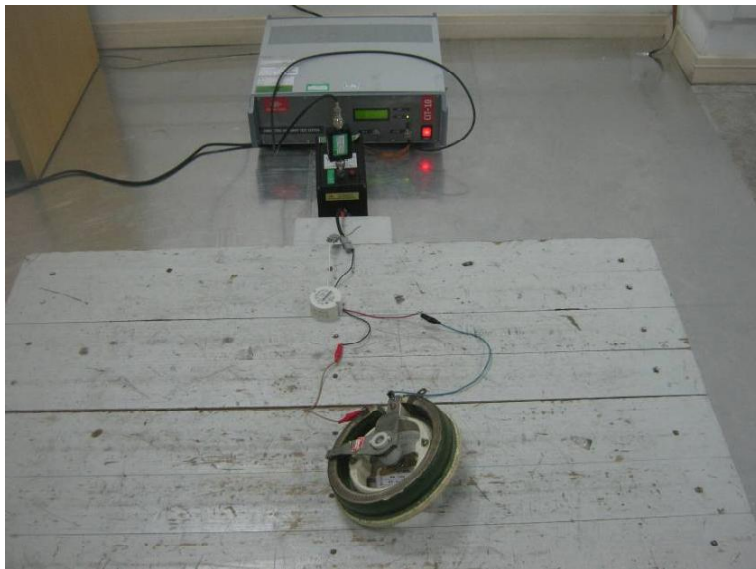
Radiated electromagnetic disturbances:



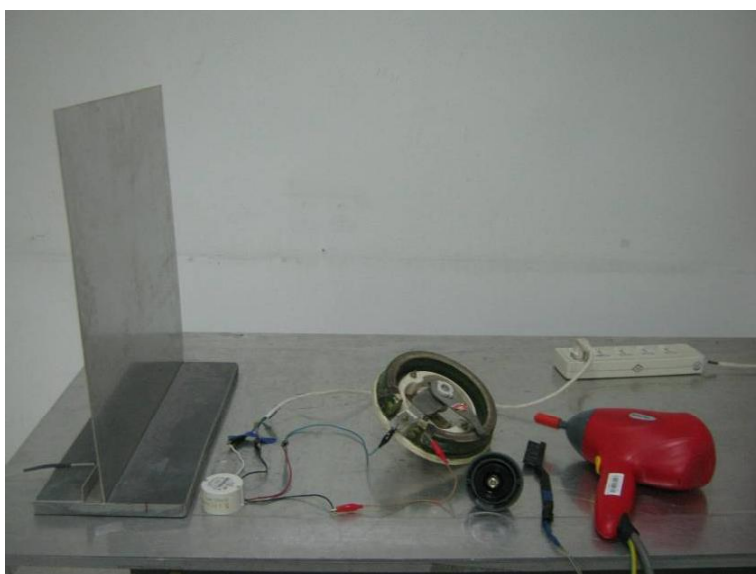
Radiated electromagnetic :



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



Electrostatic Discharges (ESD):



8 The photos of EUT

Model: EBR020U-0700-30



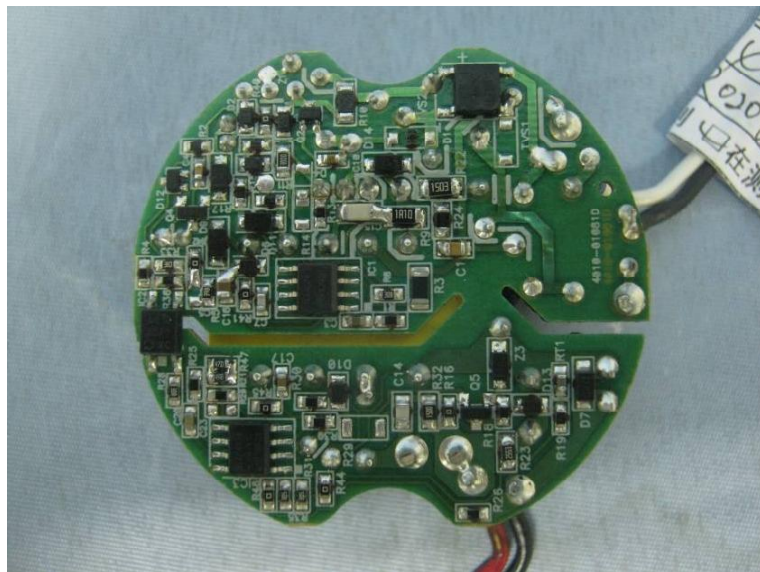
Picture 1



Picture 2



Picture 3



Picture 4

Model: EBR010U-0200-42



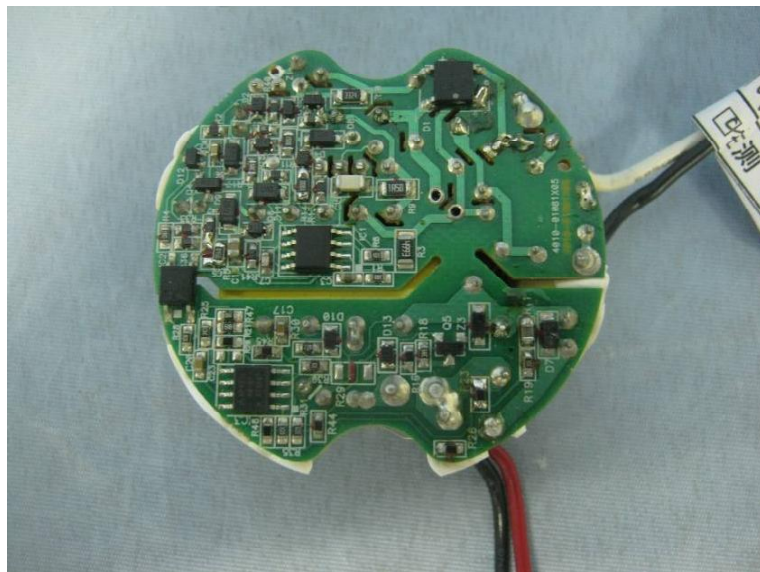
Picture 5



Picture 6



Picture 7



Picture 8

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