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Traco Power
Model: TBLC 06-105
EMC – Test Report

EUT:	Traco Power - Model: TBLC 06-105
Serial No.:	31621320515
Manufacturer No.:	006ECO181
Manufacturer:	Traco Power Solutions Ltd. Whitemill Industrial Estate Wexford Republic of Ireland
Tester:	Kevin Burke, Traco Power Solutions Ltd
Date:	28/06/2016

It should be noted, that combining two or more CE compliant finished appliances does not automatically produce a compliant system. The manufacturer of an apparatus or a fixed installation as defined in the “Guide for the EMC Directive 2004/108EC, 21. May 2007” is responsible for the EMC-compliance of the final apparatus.

TRACO POWER

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1. Conducted Emissions Measurement at Mains Terminals

Equipment under Test: TBLC 06-105
EUT Serial No.: 31621320515
Customer Spec: CS-ECO-Standard
Date: 28/06/2016
Standards: IEC61000-6-3: 2011 referring to CISPR 16-2-1: 2005

Notes:

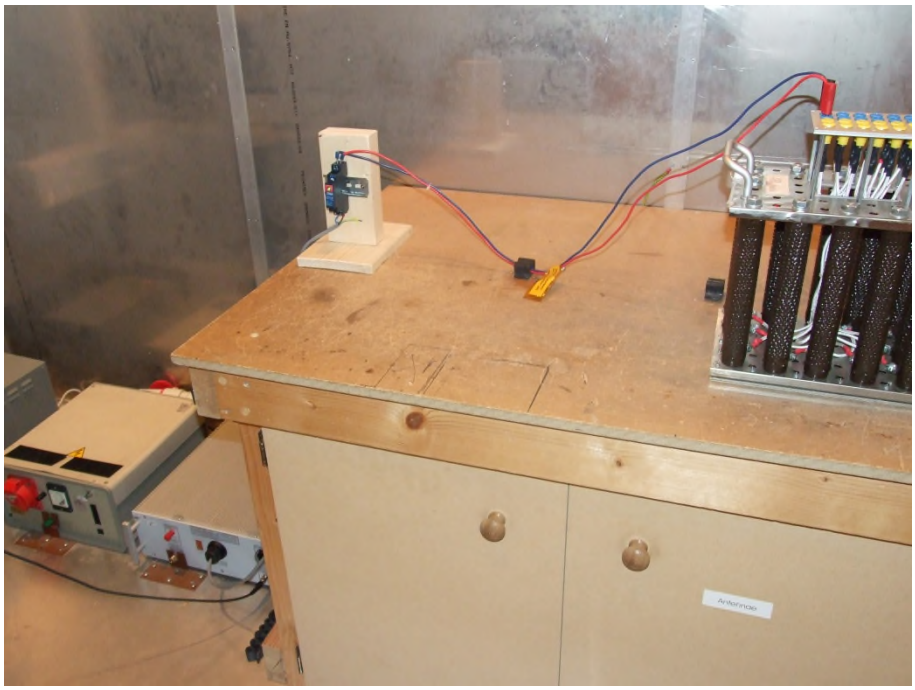
- EUT tested under normal operating conditions of 230V 50Hz input at full nominal load (5V/1.2A Resistive).
- Emissions measured using Agilent E7402A EMC Analyzer and LISN Schwarzbeck NSLK 8127.
- Tested to IEC 61000-6-3:Ed 2.1 Class B limits.
- Transient limiter is used to protect the Agilent E7402A, with appropriate correction factors applied.
- Tests carried out in a shielded room.

1.1. Test Setup

Test Equipment Settings:

Start Freq.	Stop Freq.	Pk Time	Qpk Time	Avg Time
150kHz	30MHz	200ms	200ms	200ms

Test Setup:



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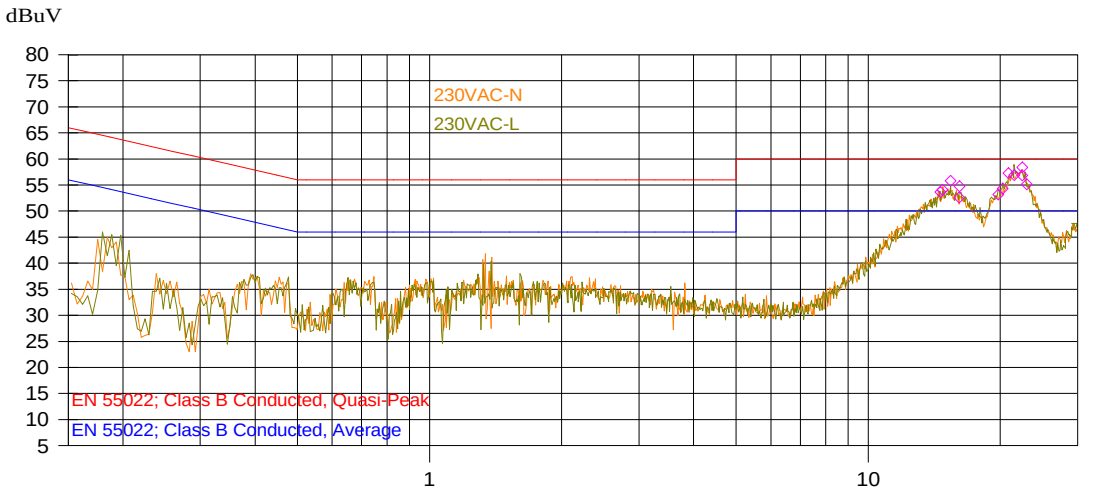
1.2. Conducted Emissions Test Results (Mains Terminals)

L and N



23/06/2016 12:06:03 (Start = 0.15, Stop = 30.00) MHz

Measurement-List

Frequency	Peak	Avg	QP	Delta Pk-QP Limit	Delta Avg-Avg Limit	Delta QP-QP Limit	Trace Name
MHz	dBuV	dBuV	dBuV	dB	dB	dB	
14.78	53.2	30.1	48.6	6	-19.9	-11.4	230VAC-N
15.19	54.3	30.1	48.6	6.5	-19.9	-11.4	230VAC-N
21.01	57	33.7	50.9	3	-16.3	-9.1	230VAC-N
22.31	57.9	34	51.3	3.2	-16	-8.7	230VAC-N
22.99	55.5	32.6	49	4.4	-17.4	-11	230VAC-N
14.78	54.1	30.6	49.3	6.4	-19.4	-10.7	230VAC-L
15.39	55.8	31.4	48.9	6.2	-18.6	-11.1	230VAC-L
20.87	57.3	33.7	50.7	3.3	-16.3	-9.3	230VAC-L
22.44	58.4	34.4	51.4	4.1	-15.6	-8.6	230VAC-L
23.01	55.1	31.9	48.8	5.5	-18.1	-11.2	230VAC-L

Table 1 - Average and Quasi Peak Measurements of the TBLC 06-105

Remarks:

The green graph represents peak measurements of Live and the orange graph represents peak measurements of Neutral. Quasi peak and average measurements are measured if the peak measurement is above the relevant limit. See Table 1.

PASS

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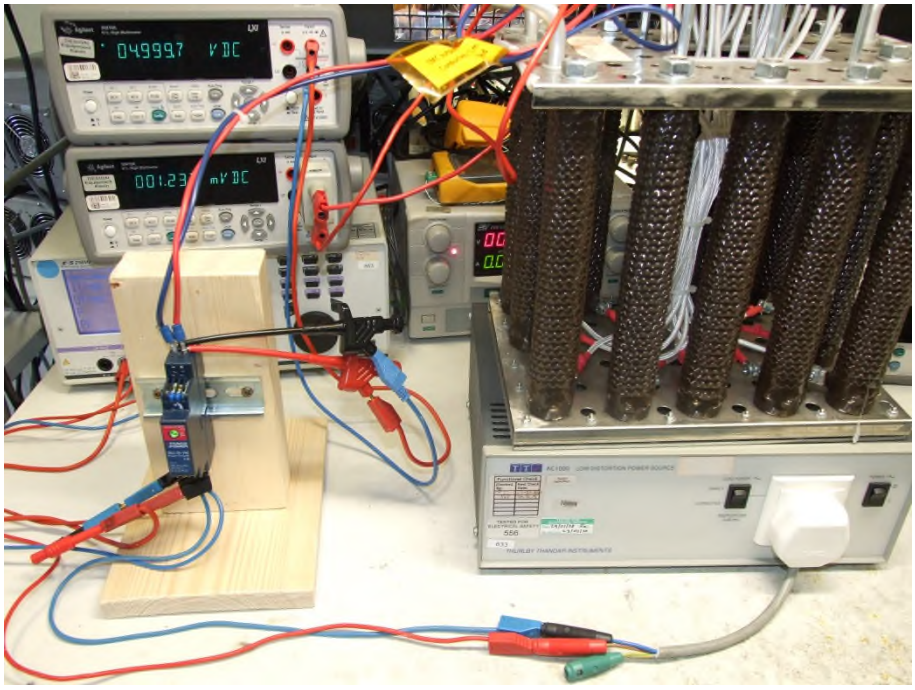
2. Harmonic Current Emissions Measurement at Mains Terminal

Equipment under Test: TBLC 06-105
EUT Serial No.: 31621320515
Customer Spec: CS-ECO-Standard
Date: 28/06/2016
Standards: IEC61000-6-3: 2006 referring to IEC 61000-3-2: 2005

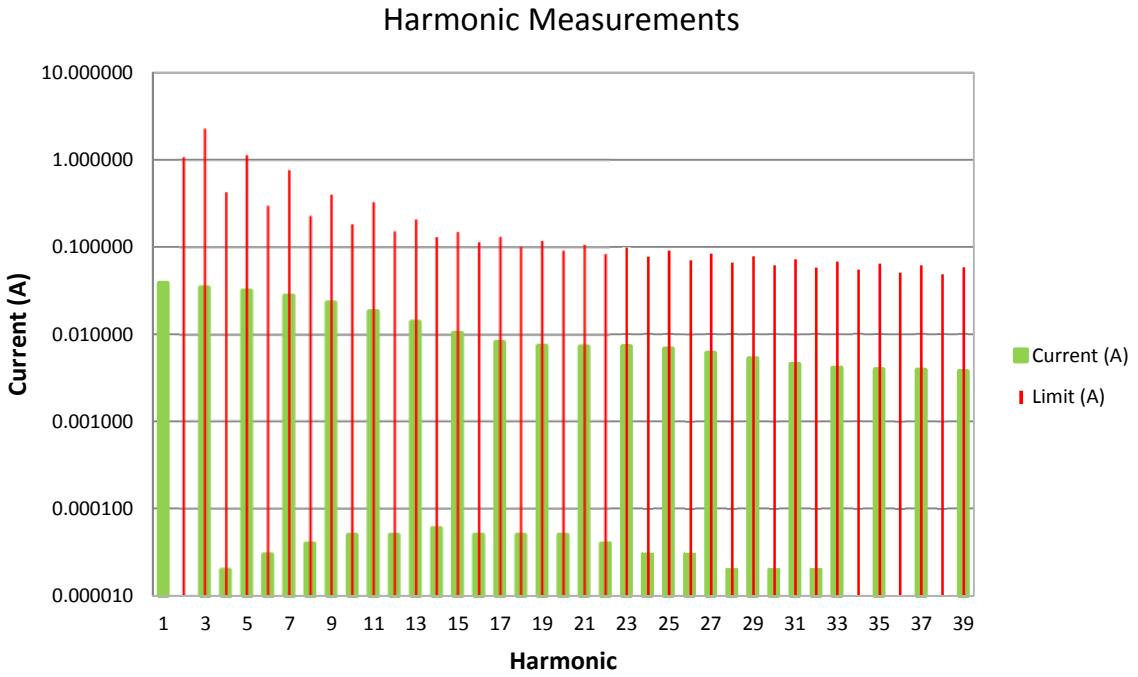
Notes:

- EUT tested under normal operating conditions of 230V 50Hz input at full nominal load (5V/1.2A Resistive).
- EUT powered by low-distortion AC Voltage Source, TTI AC-1000.
- Harmonic Limits measured using LMG 95 Power Meter.
- Tested to IEC61000-3-2 Table 1 Class A.

2.1. Test Setup:



2.2. Harmonic Current Emissions Test Results



Harmonic	Current (A)	Limit (A)	Harmonic	Current (A)	Limit (A)
0	0.001710		20	0.000050	0.092000
1	0.038710		21	0.007300	0.107143
2	0.000010	1.080000	22	0.000040	0.083636
3	0.034550	2.300000	23	0.007210	0.097826
4	0.000020	0.430000	24	0.000030	0.076667
5	0.031710	1.140000	25	0.006780	0.090000
6	0.000030	0.300000	26	0.000030	0.070769
7	0.027810	0.770000	27	0.006080	0.083333
8	0.000040	0.230000	28	0.000020	0.065714
9	0.023210	0.400000	29	0.005260	0.077586
10	0.000050	0.184000	30	0.000020	0.061333
11	0.018440	0.330000	31	0.004550	0.072581
12	0.000050	0.153333	32	0.000020	0.057500
13	0.014000	0.210000	33	0.004110	0.068182
14	0.000060	0.131429	34	0.000010	0.054118
15	0.010410	0.150000	35	0.003940	0.064286
16	0.000050	0.115000	36	0.000010	0.051111
17	0.008200	0.132353	37	0.003880	0.060811
18	0.000050	0.102222	38	0.000010	0.048421
19	0.007390	0.118421	39	0.003740	0.057692

PASS

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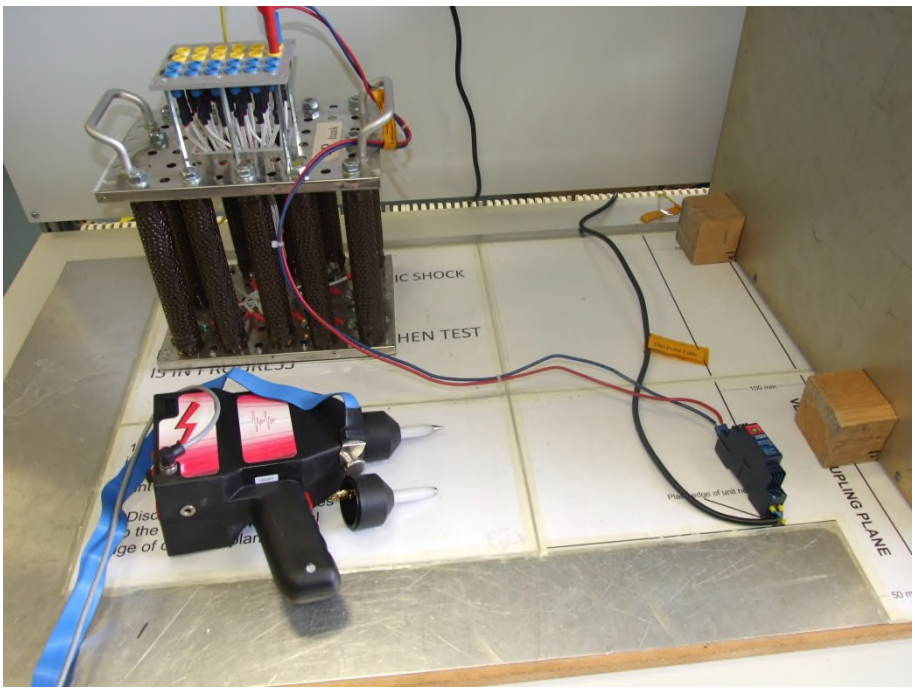
3. Electrostatic Discharge Immunity Test

Equipment under Test: TBLC 06-105
EUT Serial No.: 31621320515
Customer Spec: CS-ECO-Standard
Date: 28/06/2016
Standards: IEC61000-6-2: 2005 referring to IEC 61000-4-2: 2000

Notes:

- EUT tested under normal operating conditions of 230V 50Hz input at full nominal load (5V/1.2A Resistive).
- Since the EUT output is isolated from earth, a 470K HV resistor was placed between output and Earth to provide a discharge path between spikes.
- Contact discharge tests shall be applied to all areas exposed to the end user under final installation using ESD gun SESD 200.
- Test voltage shall be increased from 2kV up to the max 8kV/4kV (air/contact) as required by the standard IEC/EN 61000-4-2.
- At least 10 discharges were applied per test point (in both polarities).
- A time interval between discharges of a least 1s was used.
- The ESD generator was held perpendicular to the test point wherever possible for repeatability of results.
- In the case of air discharges, the trigger is engaged at about 20cm and the tester is moved quickly toward the test point until a spark occurs and trigger is released.

3.1. Test Set-Up:



3.2. Electrostatic Discharge Immunity Test Results

All exposed metal screw heads and ground planes were tested as contact test points and also as air test points. The connector pins and all vents and inlets were also tested as air test points.

	Contact Test points:	Air Test points:
EUT	PASS	PASS

Conclusion:
The EUT still functions as expected after tests therefore it meets classification B in accordance with IEC61000-4-2.

PASS

Environmental conditions during ESD Test

	Environmental condition required according IEC61000-4-2	Environmental conditions measured
Ambient Temperature in [°C]	15 - 35	23.3
Air Humidity in [%]	30 - 60	43.4
Atmospheric Pressure in [kPa]	86.0 - 106.0	101.1

Environmental conditions during the test: ☒ kept ☐ not kept

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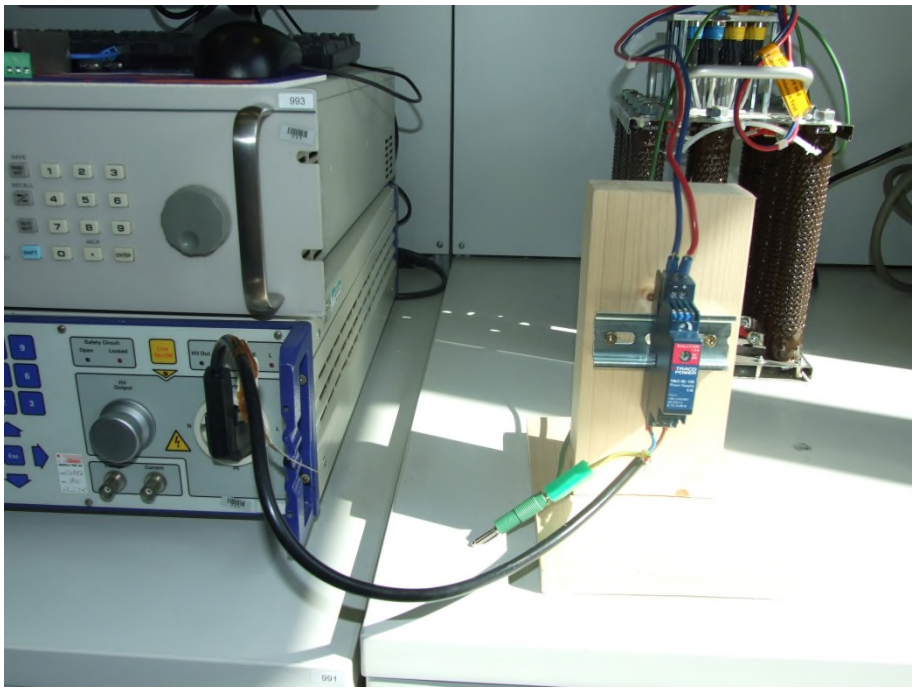
4. Surge Voltage Immunity Test

Equipment under Test: TBLC 06-105
EUT Serial No.: 31621320515
Customer Spec: CS-ECO-Standard
Date: 28/06/2016
Standards: IEC61000-6-2: 2005 referring to IEC 61000-4-5: 2005

Notes:

- EUT tested under normal operating conditions of 230V 50Hz input at full nominal load (5V/1.2A Resistive).
- Used Haefely Surge generator PSURGE 4010.
- Voltage test level: AC port Line-Line +/- 1kV, AC port Line-Earth +/- 2kV (installation class 3).
- DC ports Line-Line & DC ports Line-Earth +/-0,5kV & Signal Ports Line-Earth +/- 1kV (Not tested due to lack of suitable equipment).
- No. of Surges per set: 5 tests Positive and 5 tests Negative.
- Interval Between Surges: 10s.

4.1. Test Setup



4.2. Surge Voltage Immunity Test Results

	L+VE to L-VE	L+VE to PE	L-VE to PE
EUT	PASS	PASS	PASS

Conclusion:
The EUT meets classification B as required per Table 4, IEC 61000-6-2.

PASS

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5. Fast Transient Voltage Immunity Test (Burst)

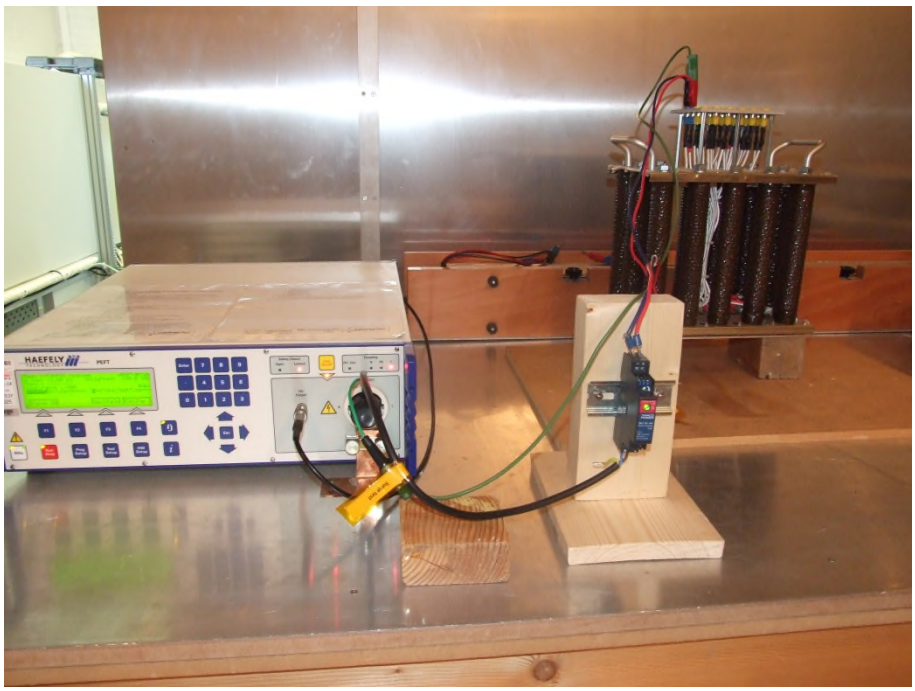
Equipment under Test: TBLC 06-105
EUT Serial No.: 31621320515
Customer Spec: CS-ECO-Standard
Date: 28/06/2016
Standard: IEC61000-6-2: 2005 referring to IEC 61000-4-4: 2004

Notes:

- EUT tested under normal operating conditions of 230V 50Hz input at full nominal load (5V/1.2A Resistive).
- Units tested to IEC61000-4-4 test level 3.
- Used Haefely Burst tester PEFT 4010.
- AC & DC Power ports Voltage test level:+/-2kV.
- Signal Ports Voltage test level:+/-1kV.
- Burst Duration: 0.75ms.
- Spike frequency: 100kHz.
- Burst Period: 300ms.
- Individual test time: 1 min.
- Polarity: Positive and Negative.

The Output lines and Signal lines were tested to the above mentioned limits with Haefely coupling capacitor IP4A.

5.1. Test Setup



5.2. Fast Transient Voltage (Burst) Test Results.

EUT:	+VE-G	-VE-G	PE-G	+VE, -VE-G	+VE,PE-G	-VE,PE-G	+VE, -VE,PE-G	Outputs -G	Signals -G
Positive	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Negative	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

Conclusion:
The EUT meets classification B as required per Table 2, 3 & 4, IEC 61000-6-2.

PASS

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6. Voltage Dips and Short Interruptions Test at AC Input Terminals

Equipment under Test: TBLC 06-105
EUT Serial No.: 31621320515
Customer Spec: CS-ECO-Standard
Date: 28/06/2016
Standard: IEC61000-6-2:2005 referring to IEC 61000-4-11:2004

Notes:

- EUT tested at full nominal load (5V/1.2A Resistive).
- Test carried out using 2 Variacs and dropout simulator NSG 1003.
- Tested according to class 3 IEC61000-4-11 (as per Annex B).
- Unit tested with input voltages 115V and 230V in accordance with IEC61000-4-11 section 5.
- Interval between dropouts and short interruptions was 10s.
- Phase angle was set to 0°, 90°, 180°, 270° for each voltage level tested.
- Voltage Dips were tested from 100%-80% for 250 Mains cycles in accordance with IEC61000-4-11 table 1.
- Voltage Dips were tested from 100%-70% for 25 Mains cycles in accordance with IEC61000-4-11 table 1.
- Voltage Dips were tested from 100%-40% for 10 Mains cycles in accordance with IEC61000-4-11 table 1.
- Voltage Dips were tested from 100%-0% for 1 Mains cycle in accordance with IEC61000-4-11 table 1.
- Voltage Dips were tested from 100%-0% for ½ Mains cycle in accordance with IEC61000-4-11 table 1.
- 3 Voltage dips and 3 Short Interruptions were carried out per test.
- Short interruptions tests were carried out at 100% to 0% for each duration 0.1s, 0.2s, 0.5s, 1s, 2s, and 5s. Voltage interruption of 250 cycles @ 50Hz (5s) required for Class 3, IEC61000-4-11 table 2.
- Short interruptions were done at worst case 0° phase angle.
- Classification of performance in accordance to IEC61000-4-11 Section 9.
- Pass/Fail. The test results shall be classified in terms of loss of function or degradation of performance of the equipment under test. The recommended classification is as follows.

  A. Normal performance within limits specified by the manufacturer, requestor or purchaser (Pass).
  B. Temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the equipment under test recovers its normal performance, without operator intervention (Pass).
  C. Temporary loss of function or degradation of performance, the correction of which requires operator intervention (Pass).
  D. Loss of function or degradation of performance which is not recoverable, owing to damage to hardware or software, or loss of data (Fail).

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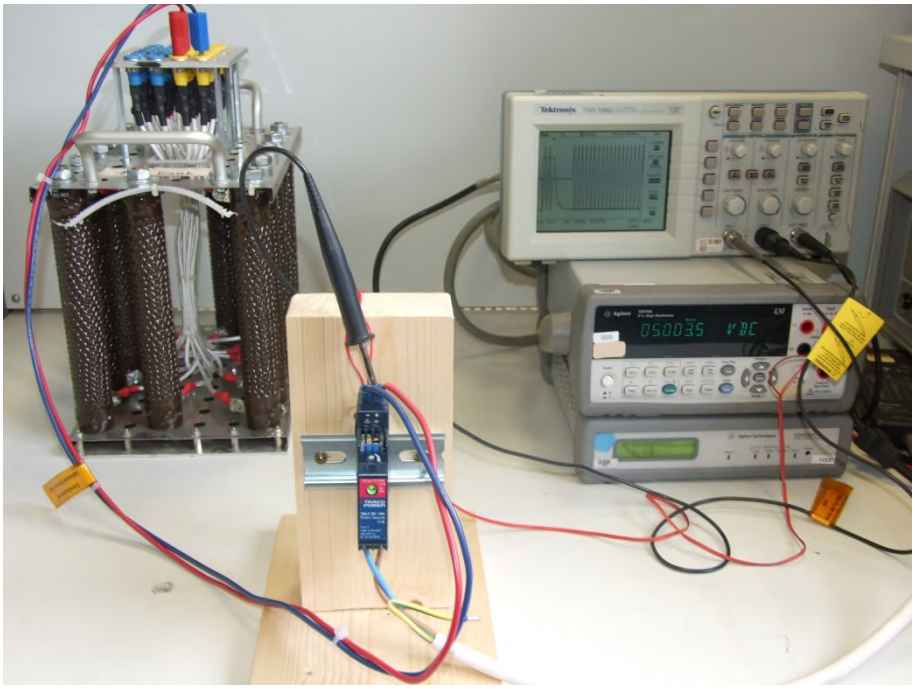
6.1. Test Setup



6.2. Voltage Dips & Short Interruptions Results (Classifications)

Voltage Dips Test Results						
230VAC						
Input Voltage		Phase Angle				Mains Cycles (50Hz)
		0°	90°	180°	270°	
100% - 80%	184VAC	A	A	A	A	250
100% - 70%	161VAC	A	A	A	A	25
100% - 40%	92VAC	B	B	B	B	10
100% - 0%	0VAC	A	A	A	A	1
100% - 0%	0VAC	A	A	A	A	0.5

115VAC						
Input Voltage		Phase Angle				Mains Cycles (50Hz)
		0°	90°	180°	270°	
100% - 80%	92VAC	B	B	B	B	250
100% - 70%	80.5VAC	B	B	B	B	25
100% - 40%	46VAC	B	B	B	B	10
100% - 0%	0VAC	B	B	B	B	1
100% - 0%	0VAC	B	A	B	A	0.5

Voltage Interruptions Test Results						
Mains Cycles	5	10	25	50	100	250
100% - 0%	0.1s	0.2s	0.5s	1s	2s	5s
115VAC	B	B	B	B	B	B
230VAC	B	B	B	B	B	B

Conclusion:
The test results were evaluated in relation to the Customer Specification CS-ECO-Standard and the EUT was considered to have PASSED the tests.

PASS

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7. Conducted RF Immunity Test at AC Mains Terminals

Equipment under Test: TBLC 06-105
EUT Serial No.: 31621320515
Customer Spec: CS-ECO-Standard
Date: 28/06/2016
Standard: IEC61000-6-2: 2005 referring to IEC 61000-4-6:2004

Notes:

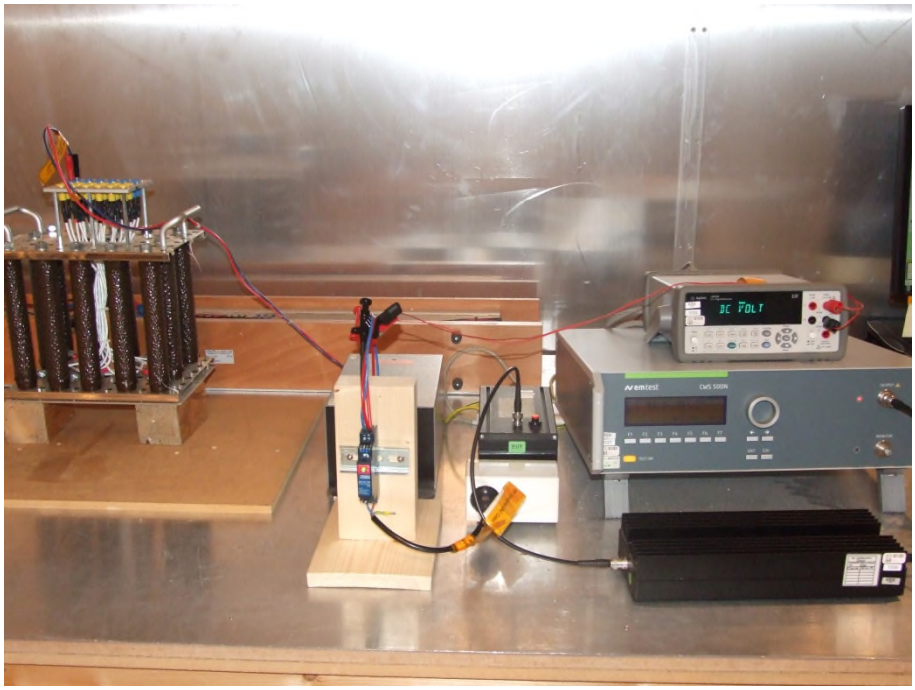
- EUT tested under normal operating conditions of 230V 50Hz input at full nominal load (5V/1.2A Resistive).
- Test carried out using test generator “EM Test CWS 500N”, Coupling/Decoupling network “EM Test CDN M2/M3”, an attenuator “EM Test ATT6/75” and measurement instrument “Agilent 34410A”.
- Unit tested to IEC61000-4-6 test level 3.

7.1. Test Setup

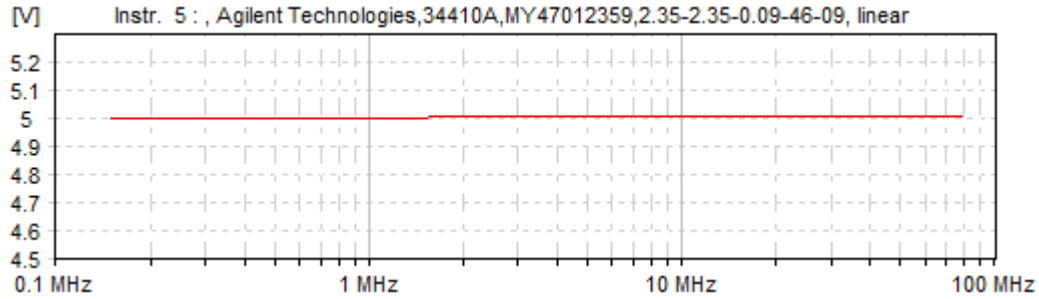
Test Equipment Settings:

Frq. start [MHz]	Level start [V]	Frq. stop [MHz]	Level stop [V]	Frq. step	td [s]	tp [s]	Modulation
0.150	10.0	80.000	10.0	1.0 %	0.5	0.0	AM 1kHz 80%

Test Setup:



7.2. Conducted RF Immunity Test Results



Conclusion:

The EUT meets Classification A (Ref. Section 9, IEC 61000-4-3).
The test results were evaluated in relation to the Customer Specification CS-ECO-Standard and the output did not change by more than +/-15mV therefore the EUT was considered to have PASSED the tests.

PASS

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8. Conducted RF Immunity Test at DC Output Terminals

Equipment under Test: TBLC 06-105
EUT Serial No.: 31621320515
Customer Spec: CS-ECO-Standard
Date: 28/06/2016
Standard: IEC61000-6-2: 2005 referring to IEC 61000-4-6:2004

Notes:

- EUT tested under normal operating conditions of 230V 50Hz input at full nominal load (5V/1.2A Resistive).
- Test carried out using test generator “EM Test CWS 500N”, Coupling/Decoupling network “EM Test CDN M2/M3”, an attenuator “EM Test ATT6/75”, measurement instrument “Agilent 34410A” and FCC-801-M2-50A Coupling/Decoupling network.
- Unit tested to IEC61000-4-6 test level 3.

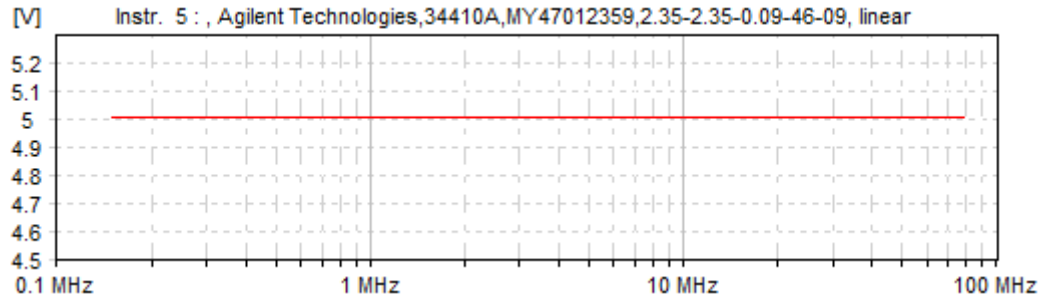
8.1. Test Setup:

Test Equipment Settings:

Frq. start [MHz]	Level start [V]	Frq. stop [MHz]	Level stop [V]	Frq. step	td [s]	tp [s]	Modulation
0.150	10.0	80.000	10.0	1.0 %	0.5	0.0	AM 1kHz 80%

Test Setup:

8.2. Conducted RF Immunity Test Results



Conclusion:
Meets Classification A (Ref. Section 9, IEC 61000-4-3)
Test Results were evaluated in relation to the Customer Specification CS-ECO-Standard and the output did not change by more than +/-15mV therefore the EUT was considered to have PASSED the tests.

PASS

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9. Radiated RF Immunity Test

Equipment under Test: TBLC 06-105
EUT Serial No.: 31621320515
Customer Spec: CS-ECO-Standard
Date: 28/06/2016
Standard: IEC61000-6-2: 2005 referring to IEC61000-4-3: 2004

Notes:

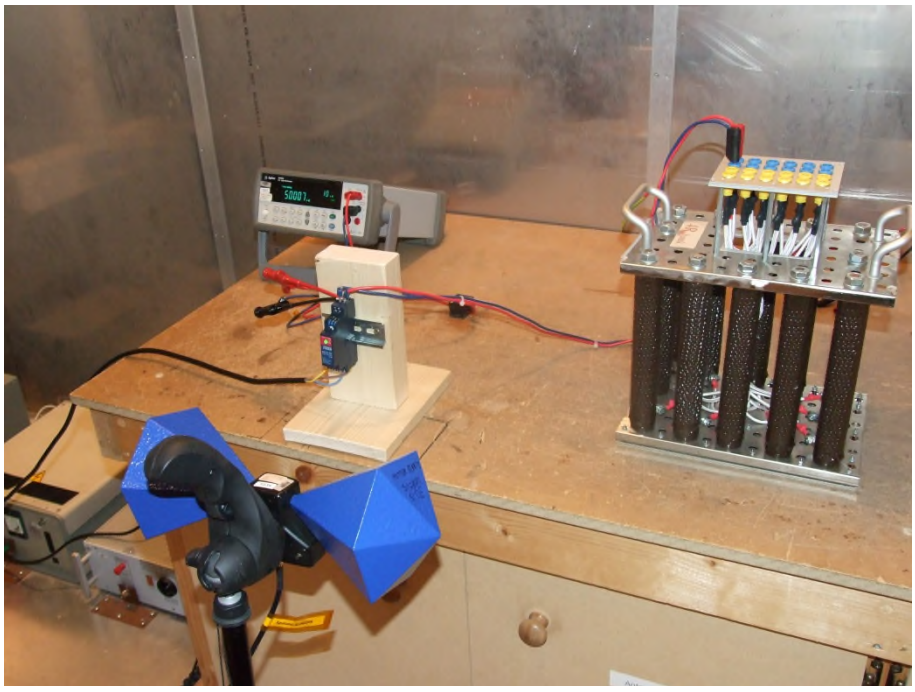
- EUT tested under normal operating conditions of 230V 50Hz input at full nominal load (5V/1.2A Resistive).
- Test carried out using test generator “EM Test CWS 500N”, Antenna BicoLOG 30100 X and Digitizing Multi Meter “Agilent 34405A”
- Measurement was carried out in a shielded room
- The input power port of the EUT was connected to mains via a 1.5m 3-core cable
- The output power port of the EUT was connected to the resistor bank via 1.5m long single core wires –wire size 14AWG

9.1. Test Setup

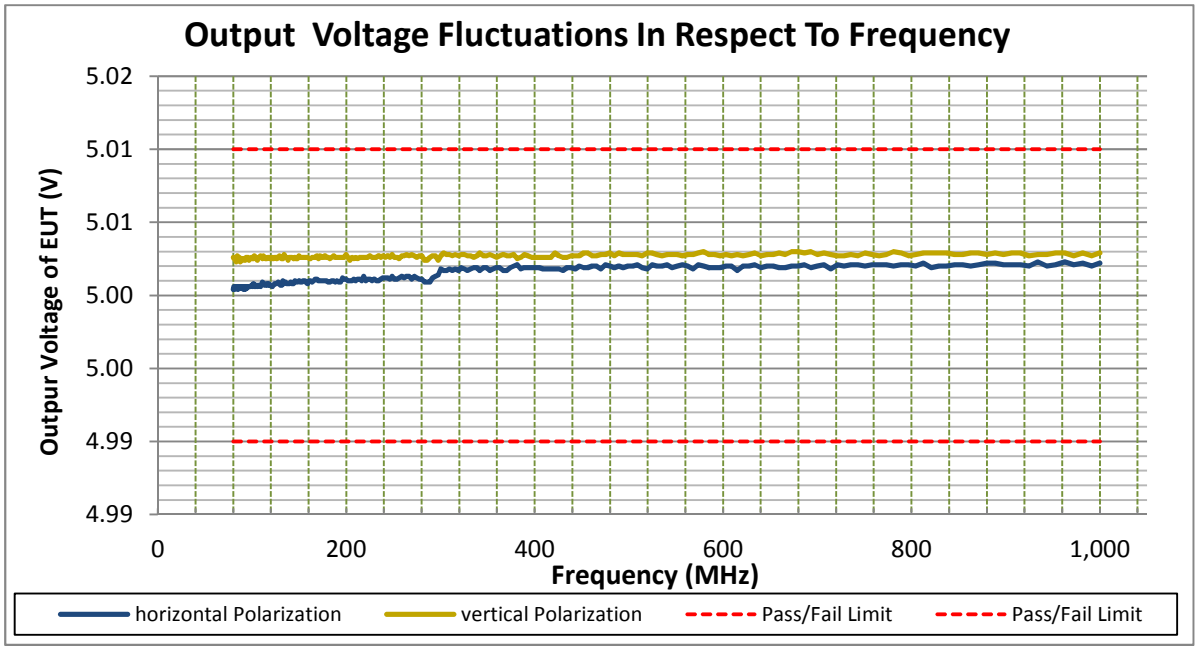
Test Equipment Settings:

Frq. start [MHz]	Level start [V]	Frq. stop [MHz]	Level stop [V]	Frq. step	td [s]
80.0	10.0	1000.0	10.0	1.0 %	1

Test Setup:



9.2. Radiated RF Immunity Test Results



Conclusion:
The EUT meets classification A (Ref. Section 9, IEC 61000-4-3). The test results were evaluated in relation to the Customer Specification CS-ECO-Standard and the output did not change by more than +/-15mV therefore the EUT was considered to have PASSED the tests.

PASS

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10. Power Frequency Magnetic Field Immunity Test

Equipment under Test: TBLC 06-105
EUT Serial No.: 31621320515
Customer Spec: CS-ECO-Standard
Date: 28/06/2016
Standard: IEC61000-6-2: 2005 referring to IEC61000-4-8: 2001

Notes:

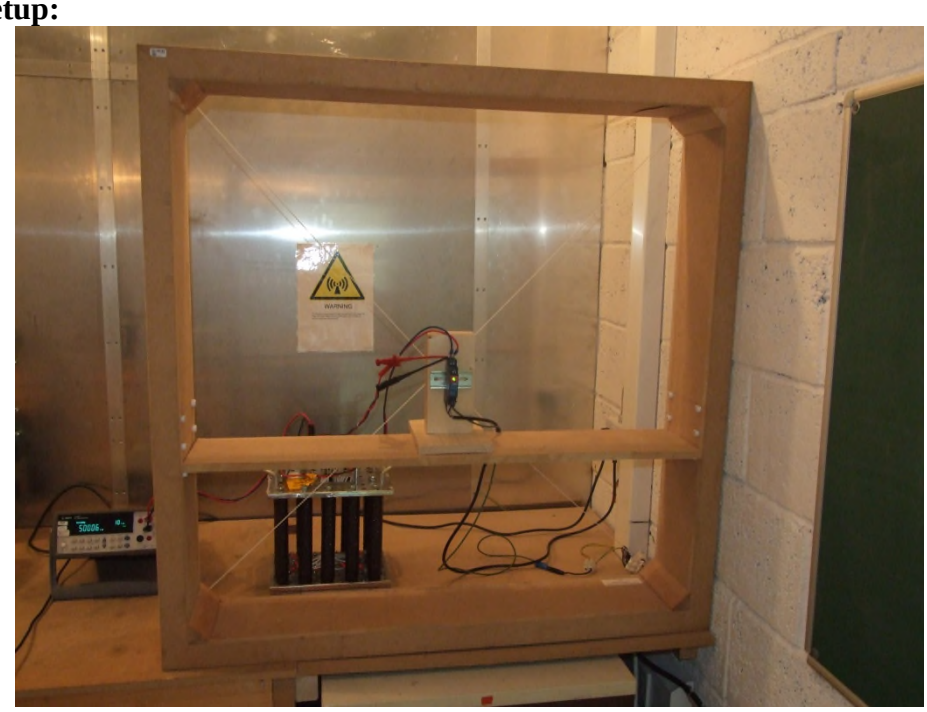
- EUT tested under normal operating conditions of 230V 50Hz input at full nominal load (5V/1.2A Resistive).
- Test carried out using test generator “Chroma Programmable AC Source”, “1meter x 1meter 100 turn Induction Coil" and measurement instrument “Agilent 34405A”.
- Unit only required to meet test level 4 but tested to IEC61000-4-8 test levels 5.

10.1. Test Setup

Test Equipment Settings:

Test generator settings			
Frequency	**AC Current through Induction Coil (Arms)**	**Magnetic Field Strength (A/m)**	**Applied Field duration [s]**
50Hz	1	100	Continuous
60Hz	1	100	Continuous
50Hz	10	1000	3
60Hz	10	1000	3

Test Setup:



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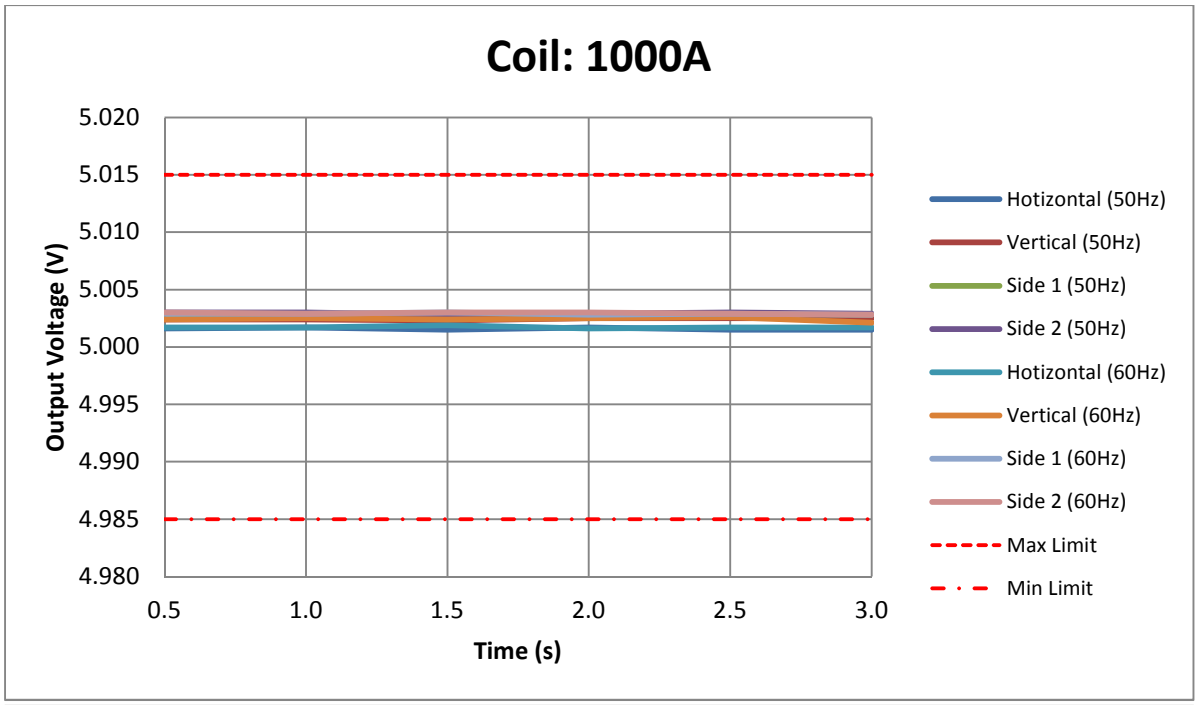
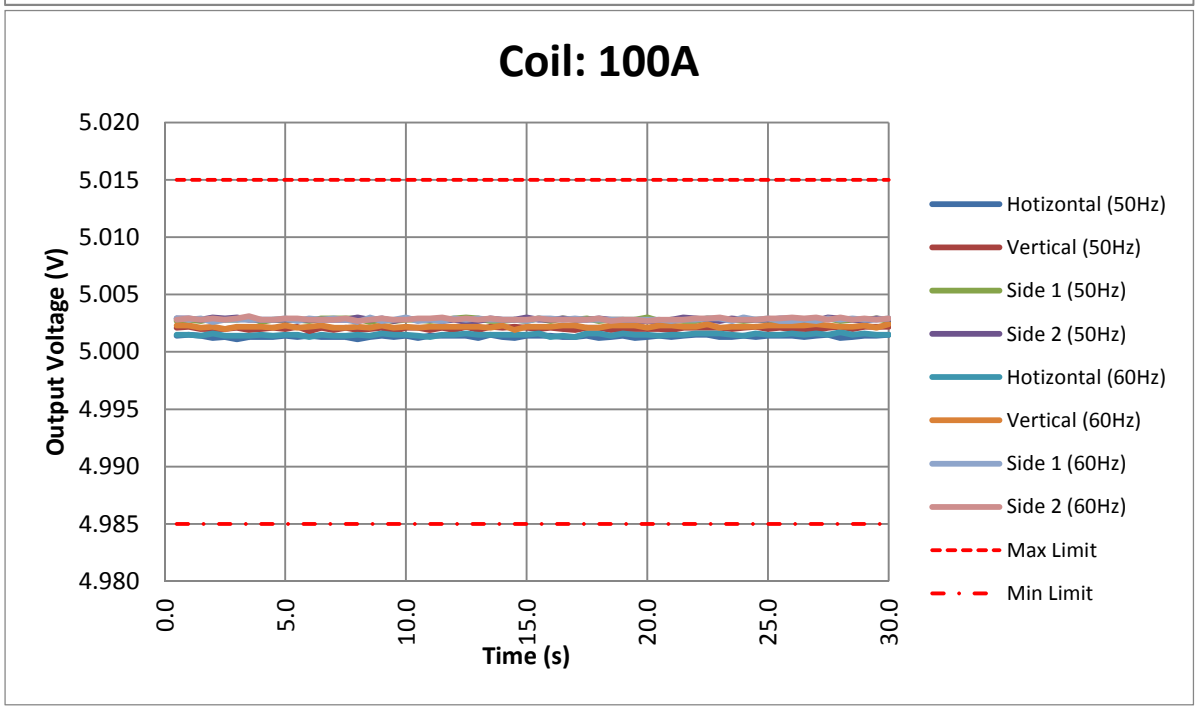
10.2. Power Frequency Magnetic Field Immunity Test Results





Conclusion:
The EUT meets classification A (Ref. Section 9, IEC 61000-4-8). The test results were evaluated in relation to the Customer Specification CS-ECO-Standard and the output did not change by more than +/-15mV therefore the EUT was considered to have PASSED the tests.

PASS

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11. Voltage Sag Immunity Test (Semi F47)

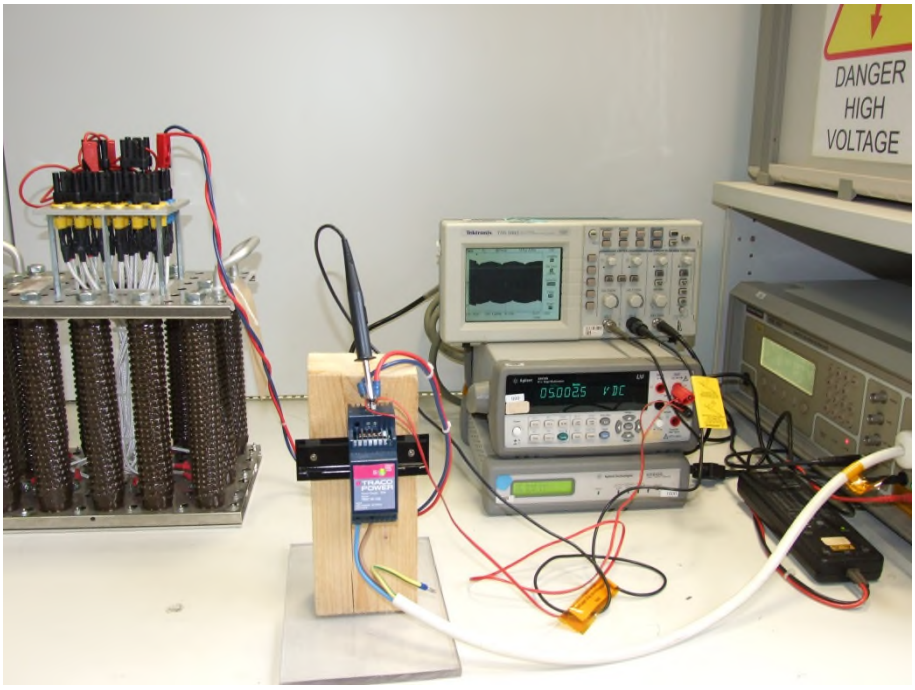
Equipment under Test: TBLC 06-105
EUT Serial No.: 31621320515
Customer Spec: CS-ECO-Standard Range
Date: 28/06/2016
Standard: SEMI F47-0706

Notes:

- EUT tested under operating conditions of 230V and 115V 50Hz input at full load (5V/4A Resistive).
- Test carried out using test generator using Voltage Sag Generator: Schaffner NSG1003: Dropout and Variation Simulator and Oscilloscope Tektronix: TDS2014C.
- Pass/Fail Criteria for Subsystems and Components-Voltage sag immunity testing of subsystems and components should meet the following as required by Semi-F47:

A. Performs at full rated operation.
B. May not perform at full rated operation but recovers operation without operator and/or host controller intervention. Must not send error signals to the equipment host controller indicating when full rated operation is not achieved.
C. May not perform at full rated operation but recovers operation without operator and/or host controller intervention. May send signals to the equipment host controller indicating when full rated operation is not achieved.
D. Does not perform at full rated operation and requires an operator and/or host controller intervention for recovering.

11.1. Test Setup



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11.2. Voltage Sag Immunity Test Results (Semi F47)

Input Voltage = 230VAC, Output = 5V, 1.2A

Voltage Sag	Duration	Duration	Output Voltage	% delta of nominal output voltage	Semi F47	Criteria
[V]	[s]	[cycles]	[V]	DUT 50Hz [%]	[%]	[Class]
207	20	1000	5.00	0.1	90	A
207	10	500	5.00	0.1	90	A
184	10	500	5.00	0.1	80	A
184	1	50	5.00	0.1	80	A
184	0.5	25	5.00	0.1	80	A
161	0.5	25	5.00	0.1	70	A
161	0.5	10	5.00	0.1	70	A
115	0.2	10	5.00	0.1	50	A
115	0.02	1	5.00	0.1	50	A
0	0.02	1	5.00	0.0	0	A

*Yellow indicates the required Voltage SAG Immunity Levels. Other levels are recommended.

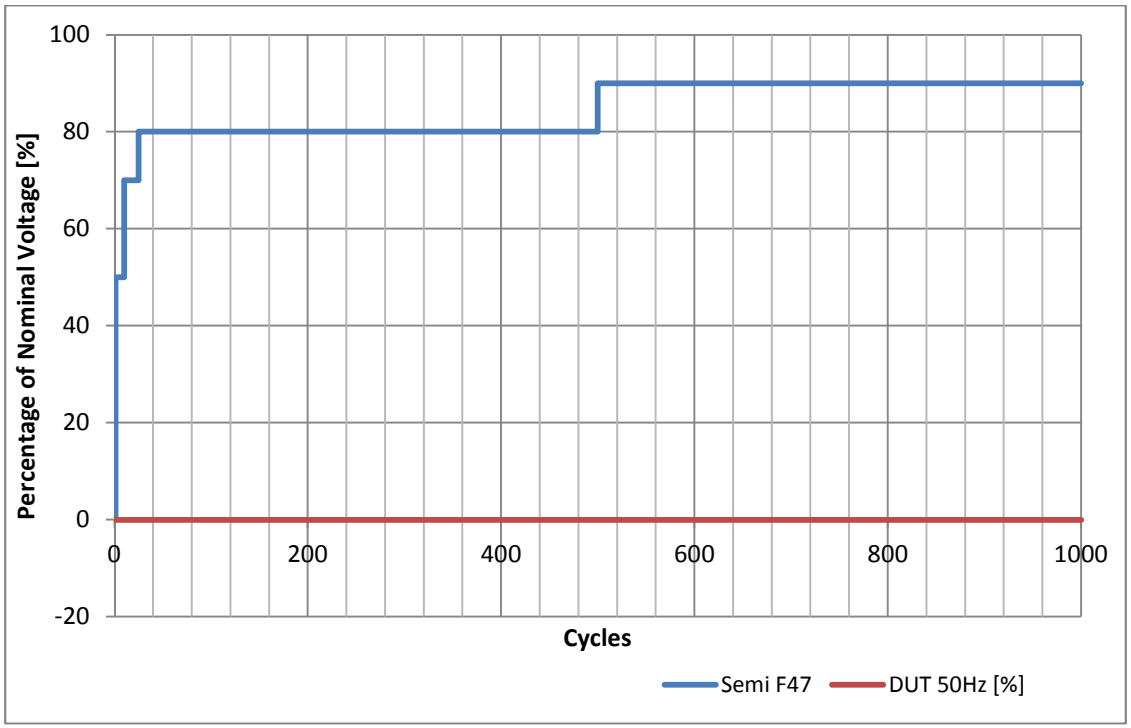

Figure 1: TBLC 06-105/ 0-1000 cycles

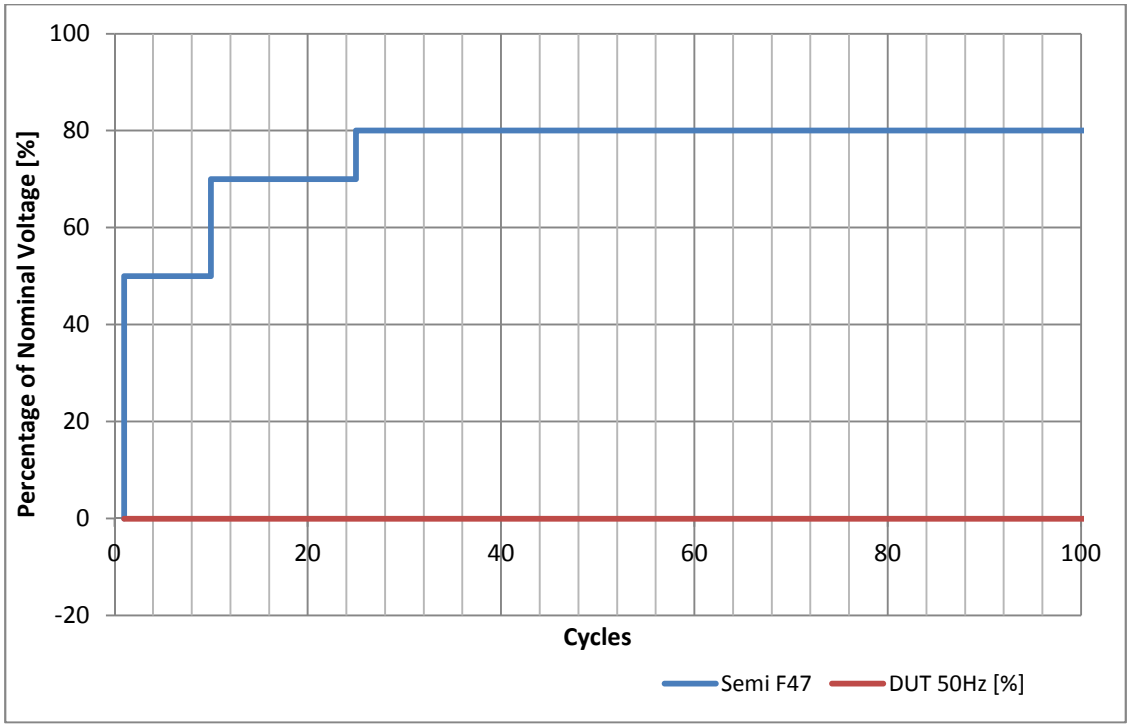

Figure 2: TBLC 06-105/ 0-100 cycles

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Input Voltage = 115VAC, Output = 5V, 1.2A

Voltage Sag	Duration	Duration	Output Voltage	% delta of nominal output voltage	Semi F47	Criteria[1]
[V]	[s]	[cycles]	[V]	DUT 50Hz [%]	[%]	[Class]
103.5	20	1000	5.00	0.0	90	A
103.5	10	500	5.00	0.0	90	A
92	10	500	4.97	0.5	80	B
92	1	50	4.97	0.5	80	B
92	0.5	25	4.97	0.5	80	B
80.5	0.5	25	4.75	4.9	70	B
80.5	0.5	10	4.76	4.9	70	B
57.5	0.2	10	0.00	99.9	50	B
57.5	0.02	1	4.02	19.7	50	B
0	0.02	1	2.04	59.2	0	B

***1: The EUT has no DC-OK signal**

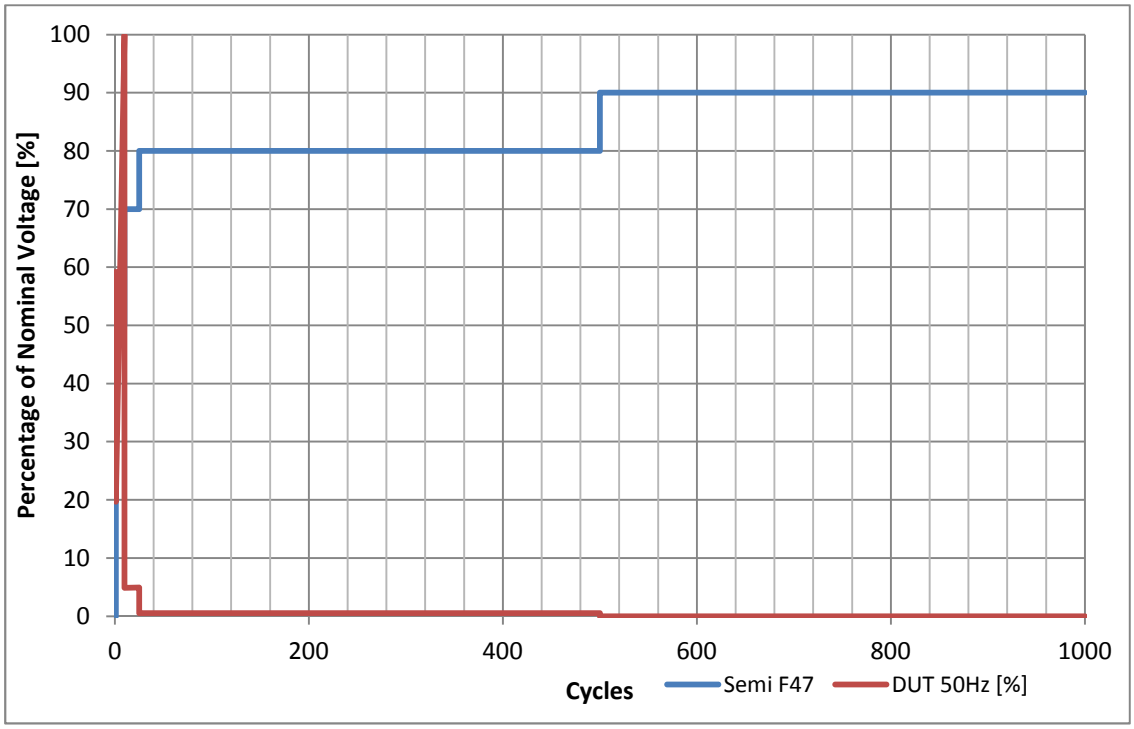

Figure 3: TBLC 06-105/ 0-1000 cycles

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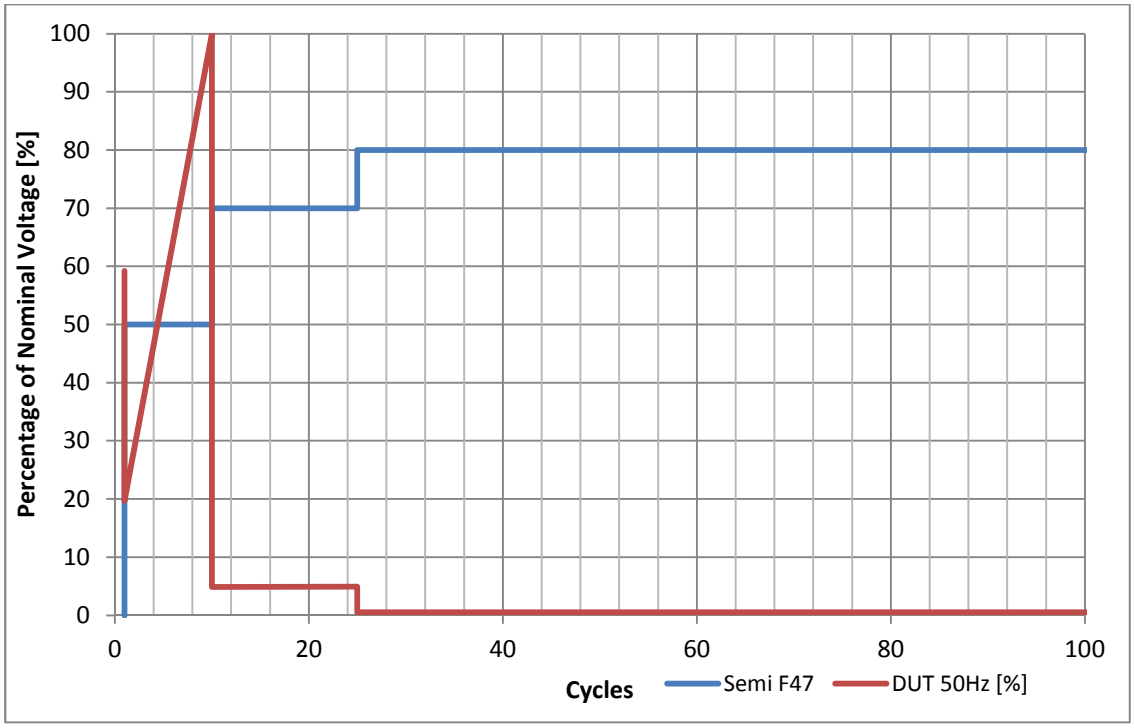

Figure 4: TBLC 06-105/ 0-100 cycles

Conclusion:

The EUT meets classification B (Ref. SEMI F47-0706). The test results were evaluated in relation to the Customer Specification CS-ECO-Standard Range and the EUT was considered to have PASSED the tests.

PASS

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12. Summary

Regulation	Class/Test Level	Result	Comments
IEC61000-6-3: 2006 + CISPR 16-1-2: 2003 + CISPR 16-2-3: 2003			
Conducted Input (0.15-30MHz)	Class B	PASS	
Conducted Output (0.15-30MHz)		N/A	
Radiated (30-300MHz)	See separate report		
IEC61000-6-3: 2011 + IEC 61000-3-2: 2005			
Harmonic Current Emissions Measurement at Mains Terminal	Class A	PASS	
IEC61000-6-2: 2005 + IEC 61000-4-2:2005			
Electrostatic Discharge			
- Air Discharge	+/- 2/8kV (Class B)	PASS	
- Contact Discharge	+/- 2/4kV (Class B)	PASS	
IEC61000-6-2: 2005 + IEC 61000-4-5:2005			
Surge			
- AC Power Ports	+/- 1kV (Class B) +VE to –VE	PASS	
- AC Power Ports	+/- 2kV (Class B) +VE to PE	PASS	
- AC Power Ports	+/- 2kV (Class B) –VE to PE	PASS	
IEC61000-6-2: 2005 + IEC 61000-4-4: 2004			
Fast Transient (Burst)			
- AC & DC Power Ports	+/- 2kV (Class B) between all lines and ground plane	PASS	
- Signal Ports	+/- 1kV (Class B) between all lines and ground plane	PASS	
IEC61000-6-2: 2005 + IEC61000-4-6:2004			
Conducted Input RF Immunity	Level III 10V **(**Class **A)**	PASS	
Conducted Output RF Immunity	Level III 10V **(**Class **A)**	PASS	
Signal Ports RF Immunity	Level III 10V **(**Class **A)**	N/A	
IEC61000-6-2: 2005 + IEC61000-4-3:2004			
Radiated RF Immunity	Level III 10V **(**Class **A)**	PASS	
IEC61000-6-2: 2005 + IEC61000-4-8: 2001			
Power Frequency Magnetic Field Immunity	Level 5 **(**Class **A)**	PASS	

IEC61000-6-2:2005 + IEC 61000-4-11:2004			
Voltage Dips			
-AC Supply (230VAC and 115VAC)	100%-0% (Class B)	PASS	
	100%-40% (Class C)	PASS	
	100%-70% (Class C)	PASS	
	100%-80% (Class C)	PASS	
Short Interruptions (100%-0% for: 0.1s, 0.2s, 0.5s, 1s, 2s and 5s)	100%-0% (Class C)	PASS	
SEMI F47-0706			
Semi F47 Voltage SAG Immunity			
-AC Supply (230VAC and 115VAC)	(Class B)	PASS	
IEC61000-6-2:2005 + IEC 61000-4-11:2004			
Voltage Dips			
DC Supply (240VDC and 115VDC)	100%-70% (Class B)	N/A	
	100%-40% (Class B)	N/A	
Short Interruptions (100%-0% for: 1mS, 3mS, 10mS, 30mS, 100mS, 300mS, 1S)	100%-0% (Class B)	N/A	

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TRACO POWER

List of Equipment Used:

Description	Model No.	Manufacturer	Serial No.
EMC Analyzer	E7402A	Agilent	MY45119210
LISN 1	PMM L2-16	PMM	1230L00301
LISN 2	FCC-801-M2-50A	FCC	3035
LISN 3	NSLK 8127	Schwarzbeck	8127683
RF Current Probe	F-33-1	FCC	759
Transient Limiter	11947A	Agilent	3107A03645
Precision Power Meter	LMG95	Zimmer	10790709
ESD Gun	SESD 200	Schloder	142261
Surge Generator	PSURGE 4010	Haefely	583 334-63
Burst generator	PEFT 4010	Haefely	080 981-08
Coupling Capacitor	IP4A	Haefely	171241
Electronic Load	ELA 500	Zentro-Electrik	63145803
High Power Resistors	n/a	n/a	n/a
Multimeter	34405A	Agilent	TW46290007
Multimeter	34405A	Agilent	TW46290015
Multimeter	34410A	Agilent	MY47012359
Multimeter	1906	TTI	n/a
High frequency generator	CWS 500N	EM Test	V0847104427
Coupling/Decoupling Network	CDN M2/M3	EM Test	1108-34
Attenuator	ATT6/75	EM Test	1107-53
Oscilloscope	TDS1002	Tektronix	C016388
Oscilloscope	TDS2014C	Tektronix	C010602
Programmable AC Source	61604	Chroma	ABR000000672
DC power supply	SM 7020 - D	Delta electronika	014604000011
DC power supply	SM 7020 - D	Delta electronika	014604000024
Pulse Generator	33220A	AGILENT	MY44044002
Biconical Antenna	BicoLOG 30100 X	AARONIA	79479
Cables	**Type**	**Length**	**Comments**
Mains Supply Cable	3-wire	1m	Unshielded
Mains Supply Cable	3-wire	1.5m	Unshielded
DC Lines Cable	2-wire	1m	Unshielded
DC Lines Cable	2-wire	1.5m	Unshielded

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