

TRACO POWER Model: TIW 12-124 EMC – Test Report

Amendment to EMC test report: EMC_TIW_12-124_23.12.08

EUT: TRACO POWER Model: TIW 12-124

Serial No.: 31321808220

Manufacturer No.: 012UWA184

Manufacturer: Convertec Ltd.
Whitemill Industrial Estate
Wexford
Republic of Ireland

Tester: Gunnar Tapper, Convertec

Date: 03/01/2014

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.

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1. Conducted RF Immunity Test at AC Mains Terminals

Equipment under Test: TIW 12-124
EUT Serial No.: 31321808220
Customer Spec: CS-XXXUWAXXX_REV9
Date: 02/01/2014
Standard: IEC61000-6-2: 2005 referring to IEC 61000-4-6:2004

Notes:

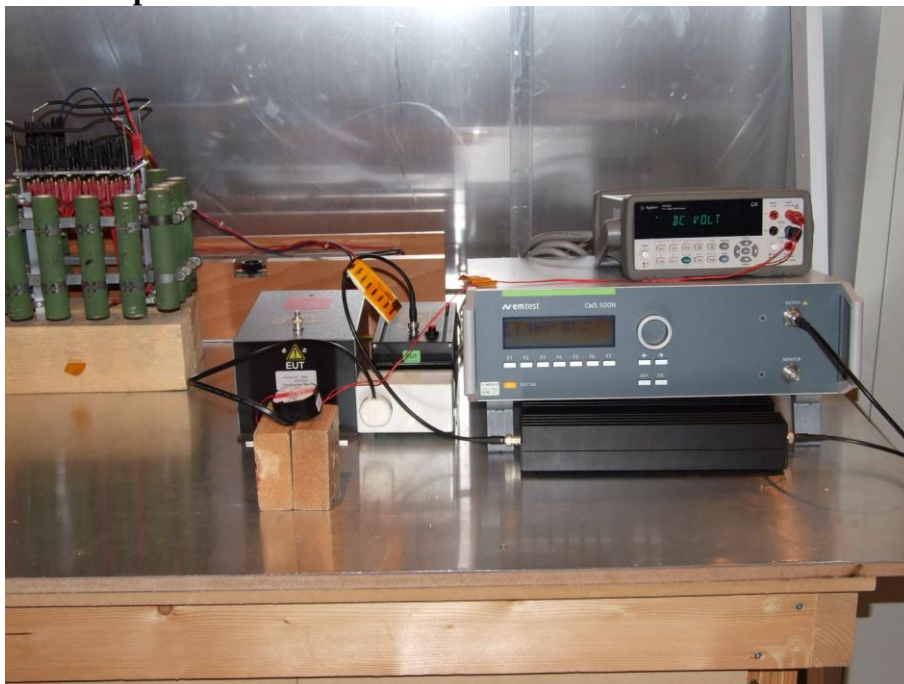
- EUT tested under normal operating conditions of 230V 50Hz input at full load (24V / 0.5A Resistive).
- Test carried out using test generator “EM Test CWS 500N”, Coupling/Decoupling network “EM Test CDN M2/M3”, an attenuator “EM Test ATT6/75” and measurement instrument “Agilent 34410A”
- Unit tested to IEC61000-4-6 test level 3

1.1. Test Setup

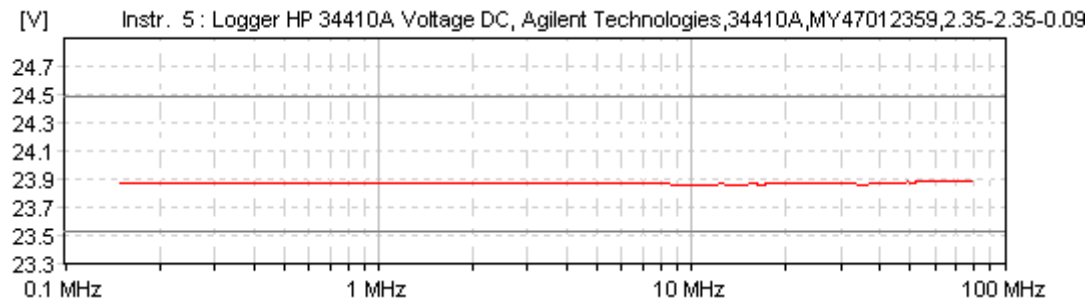
Test Equipment Settings:

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:



1.2. 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-XXXUWXXX_REV9.doc and the output did not change by more than $\pm 480\text{mV}$ therefore EUT was considered to have PASSED the tests.

PASS

Environmental conditions

Temperature: 15-30°C

Humidity: 30-60%

Air Pressure: 860-1060 hPa

Environmental conditions during the test:

☒ kept

☐ not kept

2. Conducted RF Immunity Test at DC Output Terminals

Equipment under Test: TIW 12-124
EUT Serial No.: 31321808220
Customer Spec: CS-XXXUWAXXX_REV9
Date: 02/01/2014
Standard: IEC61000-6-2: 2005 referring to IEC 61000-4-6:2008

Notes:

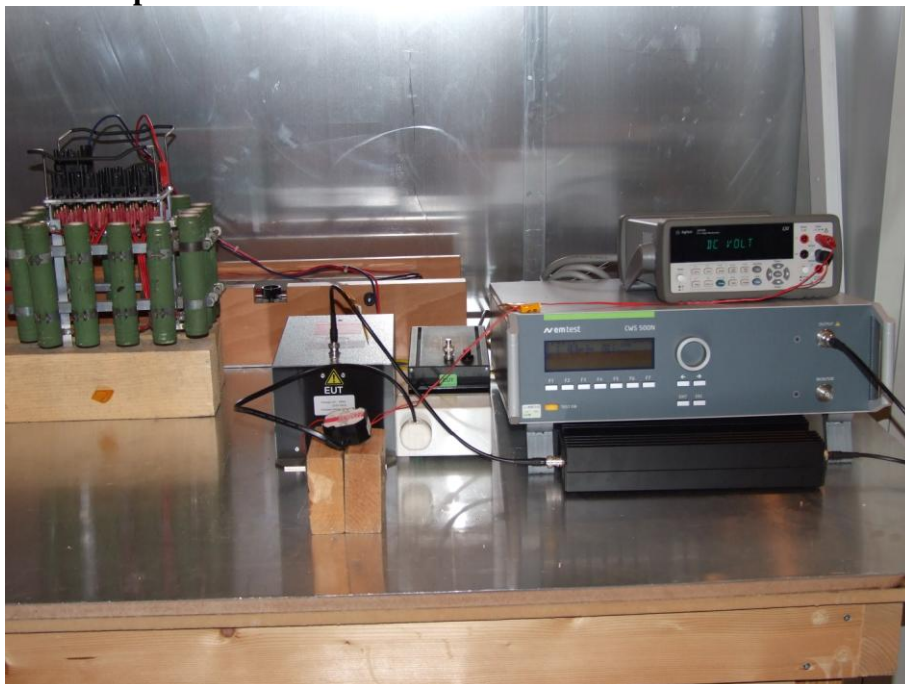
- EUT tested under normal operating conditions of 230V 50Hz input at full load (24V 0.5A Resistive).
- Test carried out using test generator “EM Test CWS 500N”, Coupling/Decoupling network “EM Test CDN M2/M3”, an attenuator “EM Test ATT6/75”, measurement instrument “Agilent 34410A” and FCC-801-M2-50A Coupling/Decoupling network.
- Unit tested to IEC61000-4-6 test level 3

2.1. Test Setup:

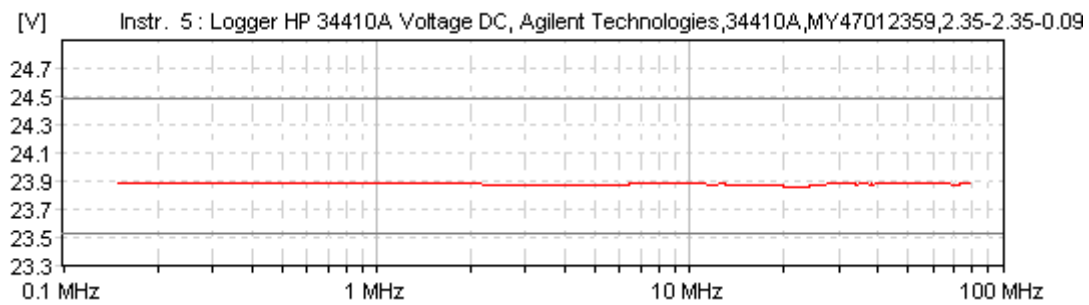
Test Equipment Settings:

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:



2.2. 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-XXXUWXXX_REV9 and the output did not change by more than $\pm 480\text{mV}$ therefore the EUT was considered to have PASSED the tests.

PASS

Environmental conditions

Temperature: 15-30°C

Humidity: 30-60%

Air Pressure: 860-1060 hPa

Environmental conditions during the test:

☒ kept

☐ not kept

3. Radiated RF Immunity Test

Equipment under Test: TIW 12-124
EUT Serial No.: 31321808220
Customer Spec: CS-XXXUWAXXX_REV9
Date: 02/01/2014
Standard: IEC61000-6-2: 2005 referring to IEC 61000-4-3:2006 + A1:2007, A2:2010

Notes:

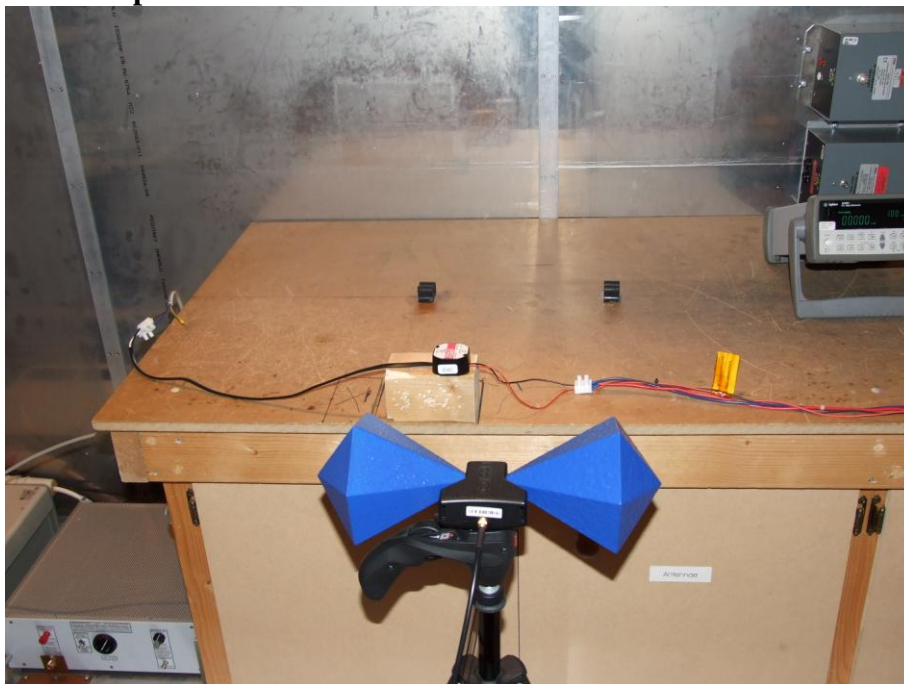
- EUT tested under normal operating conditions of 230V 50Hz input at full load (24V 0.5A Resistive).
- Test carried out using test generator “EM Test CWS 500N”, Antenna BicoLOG 30100 X and Digitizing Multi Meter “Agilent 34405A”
- Measurement was carried out in a shielded room
- The input power port 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

3.1. Test Setup

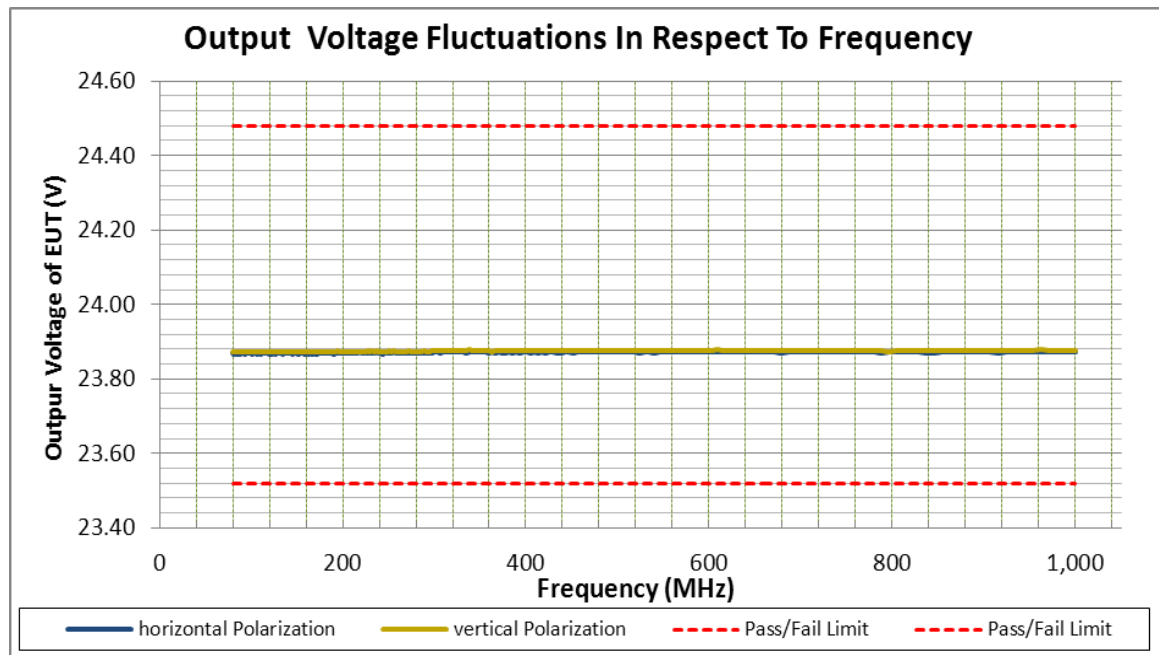
Test Equipment Settings:

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:



3.2. Radiated 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-XXXUWAXXX_REV9. The output of the EUT did not change more than 480mV, therefore the EUT was considered to have PASSED the tests.

PASS

Environmental conditions

Temperature: 15-30°C

Humidity: 30-60%

Air Pressure: 860-1060 hPa

Environmental conditions during the test:

☒ kept

☐ not kept

4. Power Frequency Magnetic Field Immunity Test

Equipment under Test: TIW 12-124
EUT Serial No.: 31321808220
Customer Spec: CS-XXXUWAXXX_REV9
Date: 02/01/2014
Standard: IEC61000-6-2: 2005 referring to IEC61000-4-8: 2001

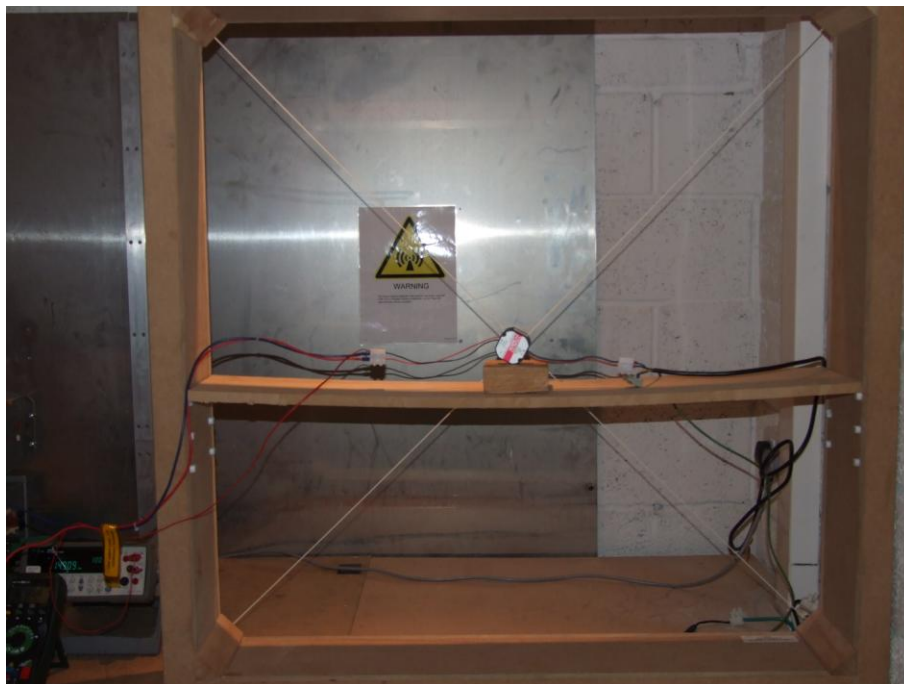
Notes:

- EUT tested under normal operating conditions of 230V 50Hz input at full load (24V 0.5A 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

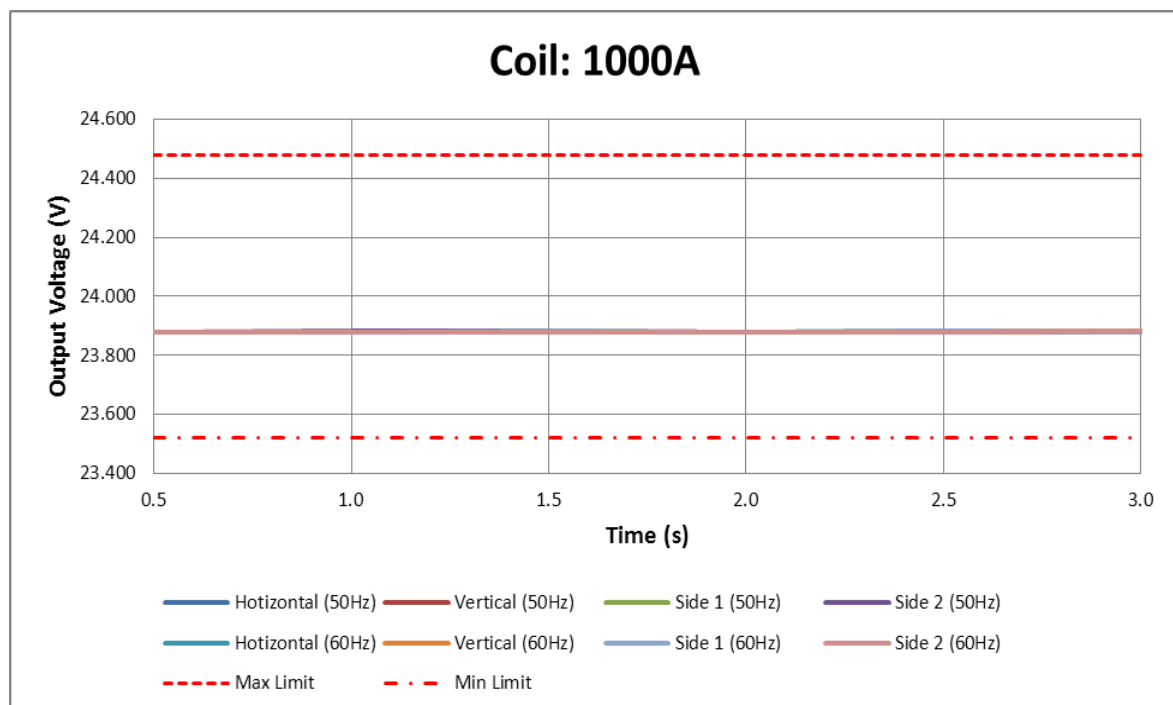
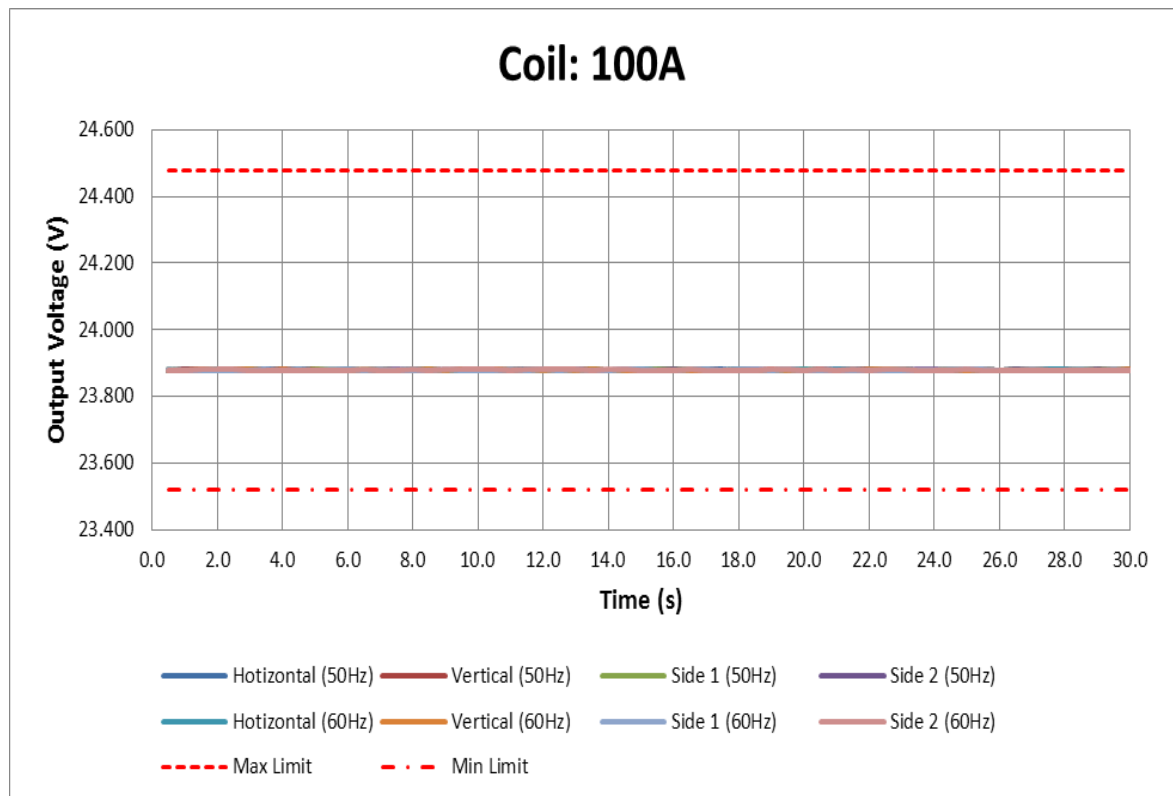
4.1. Test Setup

Test Equipment Settings:

Test generator settings			
Frequency	AC Current through Induction Coil (A_{rms})	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



4.2. Power Frequency Magnetic Field Immunity Test Results



Conclusion:

Meets Classification A (Ref. Section 9, IEC 61000-4-8)

Test Results were evaluated in relation to the Customer Specification

CS-XXXUWAXXX_REV9 and the EUT was considered to have PASSED the tests.

PASS

Environmental conditions

Temperature: 15-30°C

Humidity: 30-60%

Air Pressure: 860-1060 hPa

Environmental conditions during the test:

☒ kept

☐ not kept

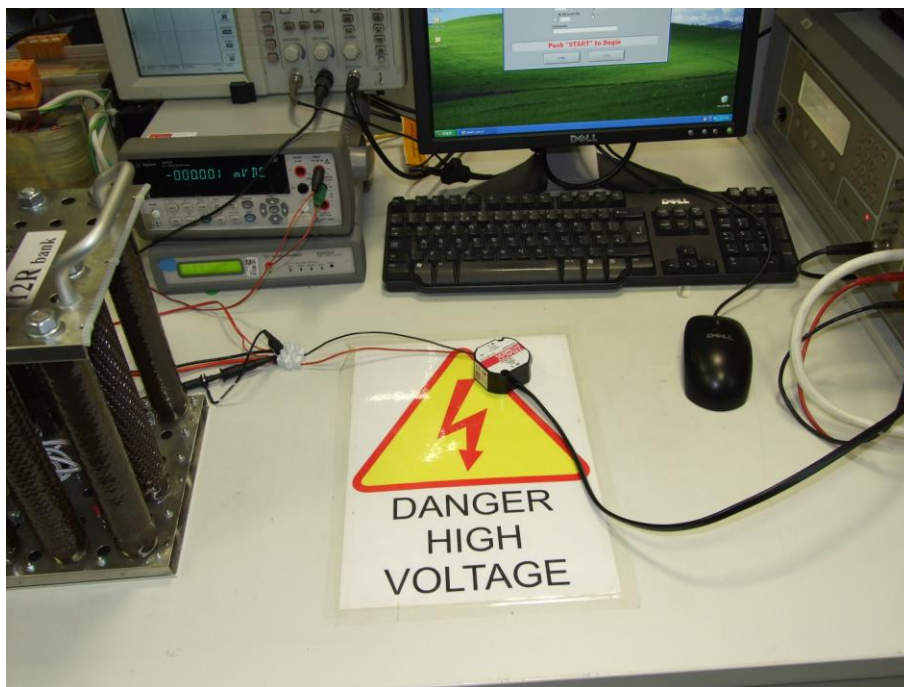
5. Voltage Sag Immunity Test (Semi F47)

Equipment under Test: TIW 12-124
EUT Serial No.: 31321808220
Customer Spec: CS-XXXUWAXXX_REV9
Date: 02/01/2014
Standard: SEMI F47-0706

Notes:

- EUT tested under operating conditions of 208V/100V 50Hz input at full load (24V 0.5A Resistive).
- Test carried out using test generator using Voltage Sag Generator: Schaffner NSG1003: Dropout and Variation Simulator and Oscilloscope Tektronix: TDS2014C
- The test setup has peak inrush current capability of $\leq 200A$ at 230V ac and phase angles of 90 and 270°

5.1. Test Setup



5.2. Voltage Sag Immunity test Results (Semi F47)

Input Voltage = 208VAC, Output = 24V, 0.5A

Voltage Sag	Duration	Duration	Output Voltage	% delta of nominal output voltage	Semi F47	Criteria
[V]	[s]	[cycles]	[V]	DUT 50Hz [%]	[%]	[Class]
187.2	20	1000	23.85	0.6	90	A
187.2	10	500	23.85	0.6	90	A
166.4	10	500	23.85	0.6	80	A
166.4	1	50	23.85	0.6	80	A
166.4	0.5	25	23.85	0.6	80	A
145.6	0.5	25	23.86	0.6	70	A
145.6	0.5	10	23.86	0.6	70	A
104	0.2	10	23.69	1.3	50	A
104	0.02	1	23.86	0.6	50	A
0	0.02	1	23.86	0.6	0	A

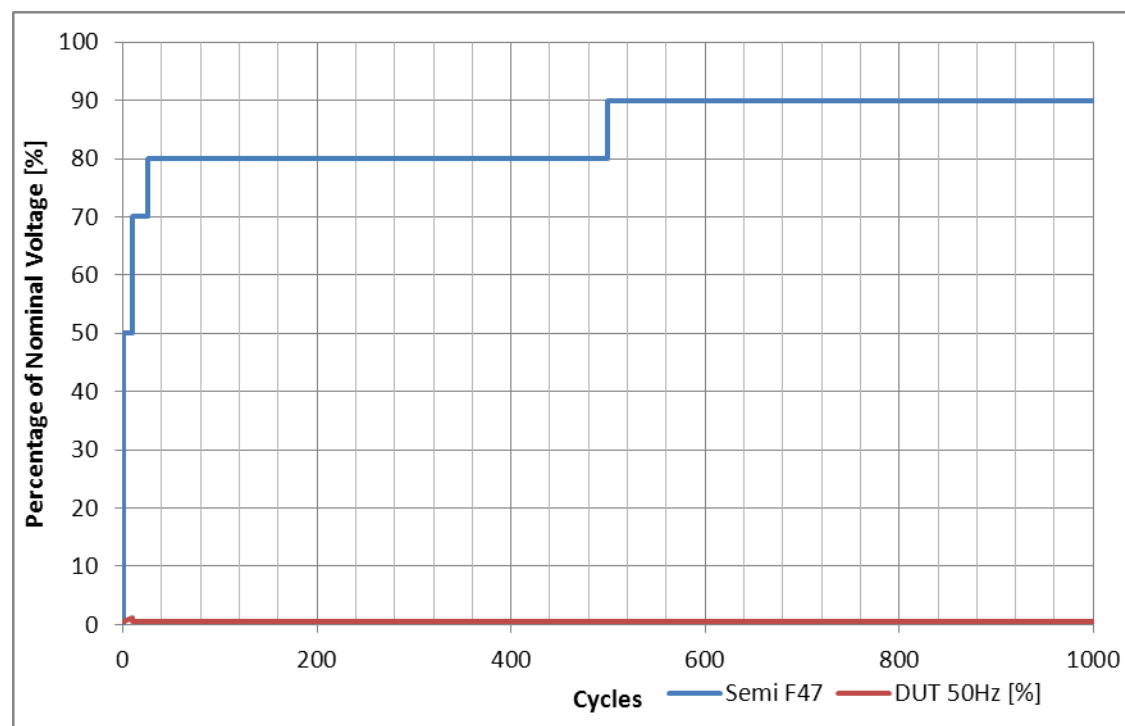


Figure 1 – TIW 12-124 / 0-1000 cycles

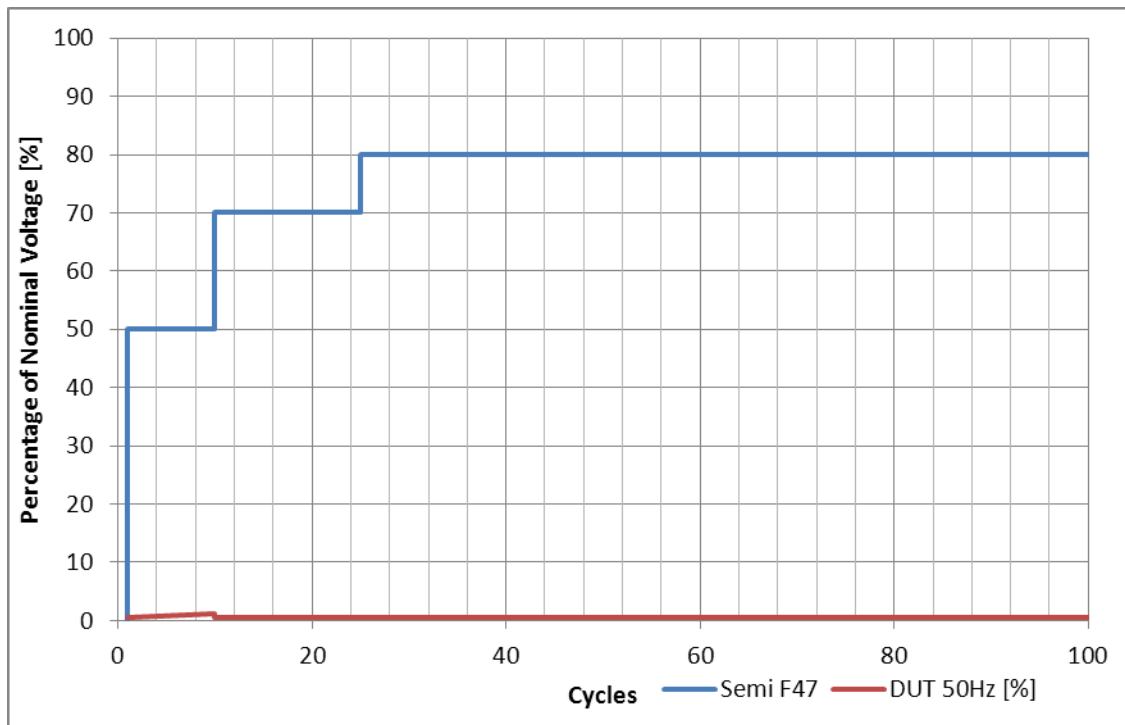


Figure 2– TIW 12-124 / 0-100 cycles

Input Voltage = 100VAC, Output = 24V, 0.33A

Voltage Sag	Duration	Duration	Output Voltage	% delta of nominal output voltage	Semi F47	Criteria
[V]	[s]	[cycles]	[V]	DUT 50Hz [%]	[%]	[Class]
90	20	1000	23.78	0.9	90	A
90	10	500	23.77	1.0	90	A
80	10	500	23.24	3.2	80	B
80	1	50	23.28	3.0	80	B
80	0.5	25	23.27	3.0	80	B
70	0.5	25	22.68	5.5	70	B
70	0.5	10	22.69	5.5	70	B
50	0.2	10	19.27	19.7	50	B
50	0.02	1	21.39	10.9	50	B
0	0.02	1	17.62	26.6	0	B

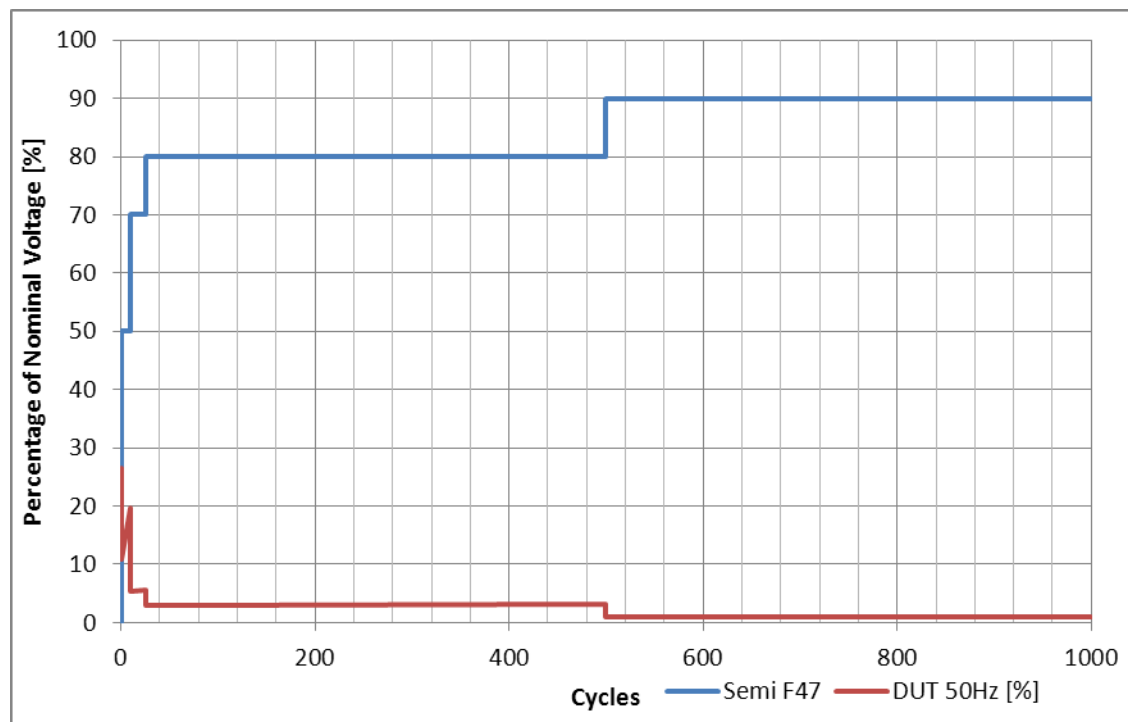


Figure 3– TIW 12-124 / 0-1000 cycles

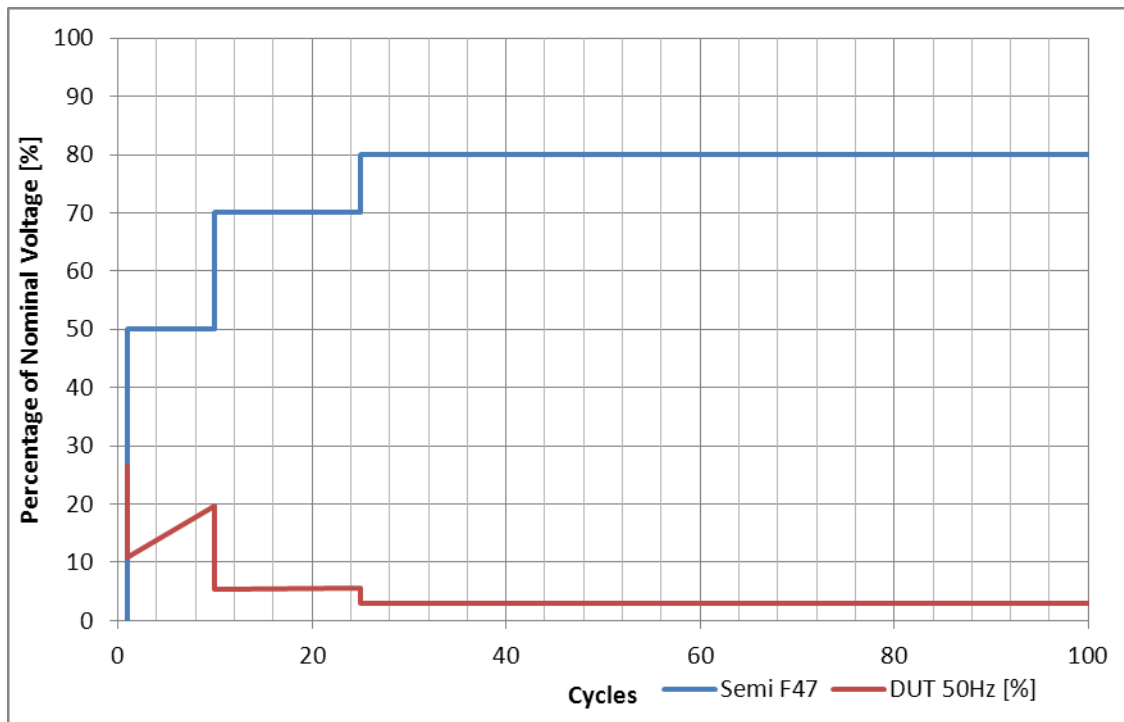


Figure 4– TIW 12-124 / 0-100 cycles

Conclusion:

Meets Classification B (Ref. SEMI F47-0706)

Test Results were evaluated in relation to the Customer Specification

CS-XXXUWAXXX_REV9 and the EUT was considered to have PASSED the tests.

Environmental conditions

Temperature: 15-30°C

Humidity: 30-60%

Air Pressure: 860-1060 hPa

Environmental conditions during the test:

☒ kept

☐ not kept

6. Summary

Regulation	Class/Test Level	Result	Comments
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	
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	
SEMI F47-0706			
Semi F47 Voltage SAG Immunity			
-AC Supply (208VAC and 100VAC)	(Class C)	PASS	

7. 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