

# **TRACO POWER Model: TIW 12-112 EMC – Test Report**

**Amendment to EMC test report: EMC\_TIW\_12-112\_23.12.08**

**EUT:** TRACO POWER Model: TIW 12-112

**Serial No.:** 31245691348

**Manufacturer No.:** 012UWA182

**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 12-112  
**EUT Serial No.:** 31245691348  
**Customer Spec:** CS-XXXUWAXXX\_REV9  
**Date:** 20/12/2013  
**Standard:** IEC61000-6-2: 2005 referring to IEC 61000-4-6:2004

## Notes:

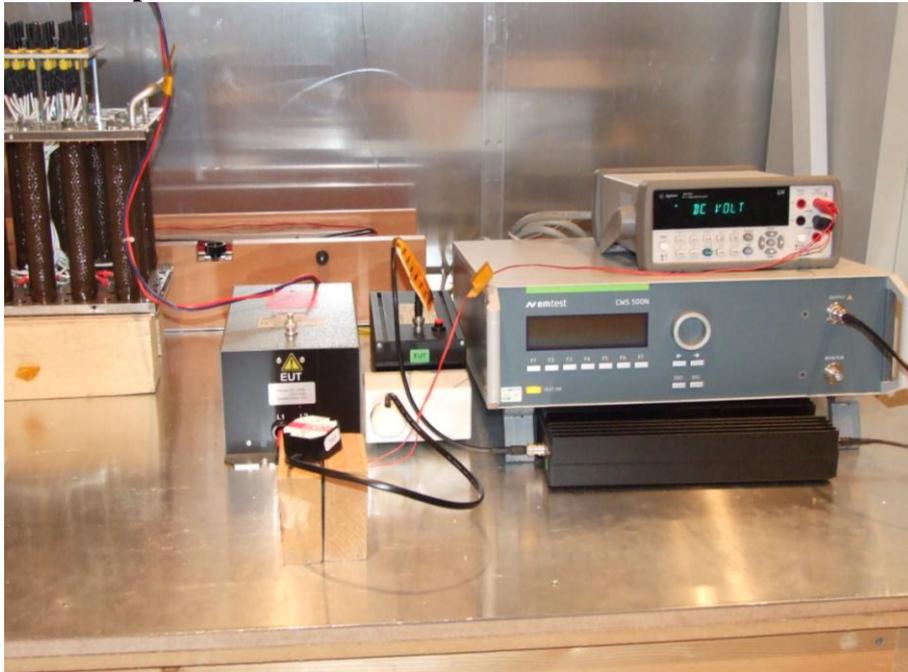
- EUT tested under normal operating conditions of 230V 50Hz input at full load (12V / 1.0A Resistive).
- Test carried out using test generator “EM Test CWS 500N”, Coupling/Decoupling network “EM Test CDN M2/M3”, an attenuator “EM Test ATT6/75” and measurement instrument “Agilent 34410A”
- Unit tested to IEC61000-4-6 test level 3

## 1.1. Test Setup

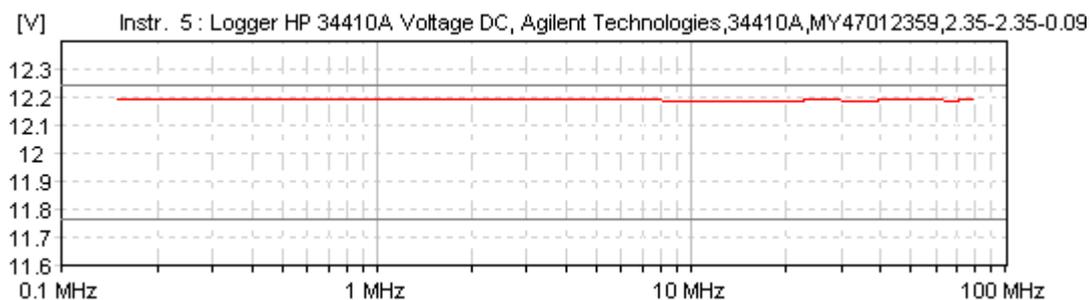
### Test Equipment Settings:

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-XXXUWAXXX\_REV9.doc and the output did not change by more than  $\pm 240\text{mV}$  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 12-112  
**EUT Serial No.:** 31245691348  
**Customer Spec:** CS-XXXUWAXXX\_REV9  
**Date:** 20/12/2013  
**Standard:** IEC61000-6-2: 2005 referring to IEC 61000-4-6:2008

### Notes:

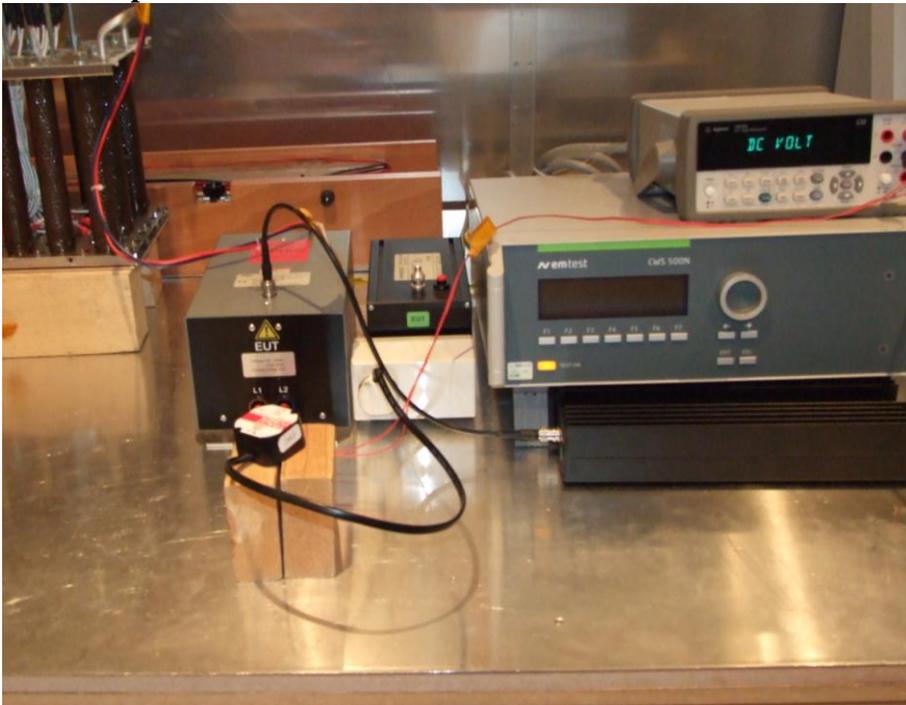
- EUT tested under normal operating conditions of 230V 50Hz input at full load (12V 1.0A Resistive).
- Test carried out using test generator “EM Test CWS 500N”, Coupling/Decoupling network “EM Test CDN M2/M3”, an attenuator “EM Test ATT6/75”, measurement instrument “Agilent 34410A” and FCC-801-M2-50A Coupling/Decoupling network.
- Unit tested to IEC61000-4-6 test level 3

### 2.1. Test Setup:

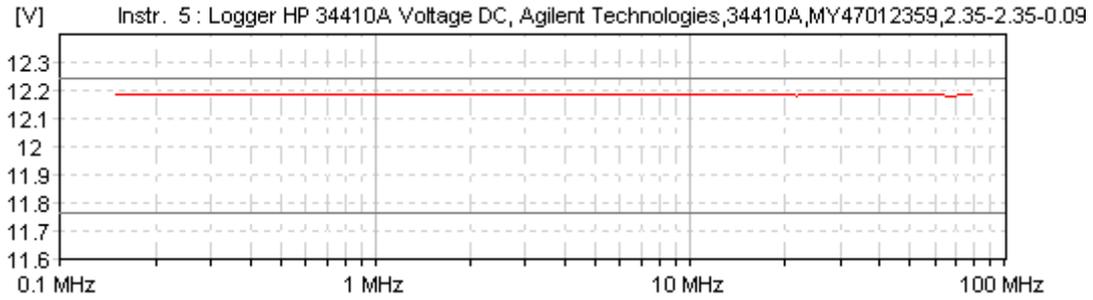
#### Test Equipment Settings:

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  $\pm 240\text{mV}$

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 12-112  
**EUT Serial No.:** 31245691348  
**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:**

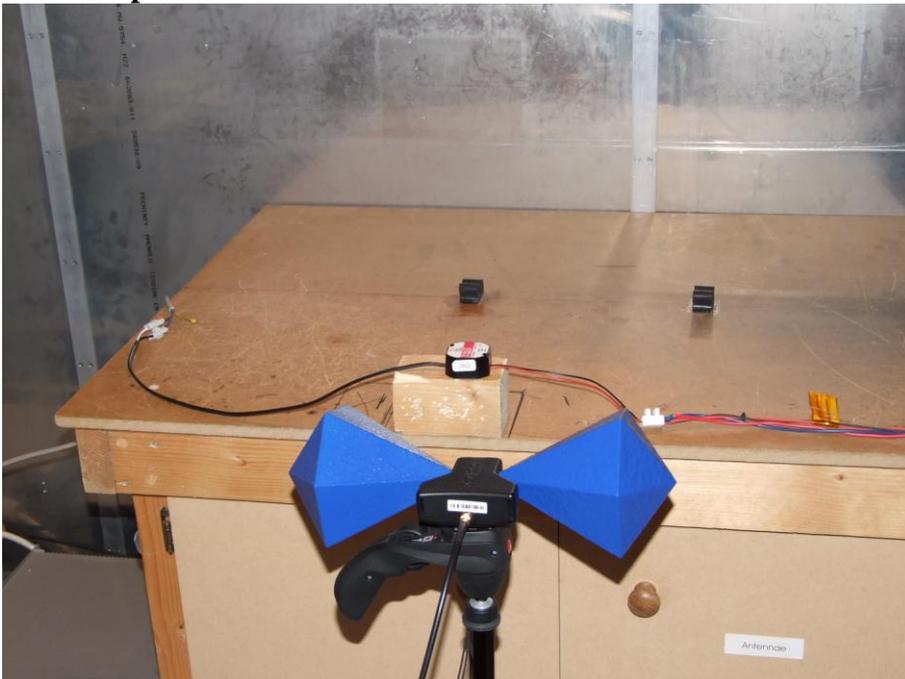
- EUT tested under normal operating conditions of 230V 50Hz input at full load (12V 1.0A Resistive).
- Test carried out using test generator “EM Test CWS 500N”, Antenna BicoLOG 30100 X and Digitizing Multi Meter “Agilent 34405A”
- Measurement was carried out in a shielded room
- The input power port 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

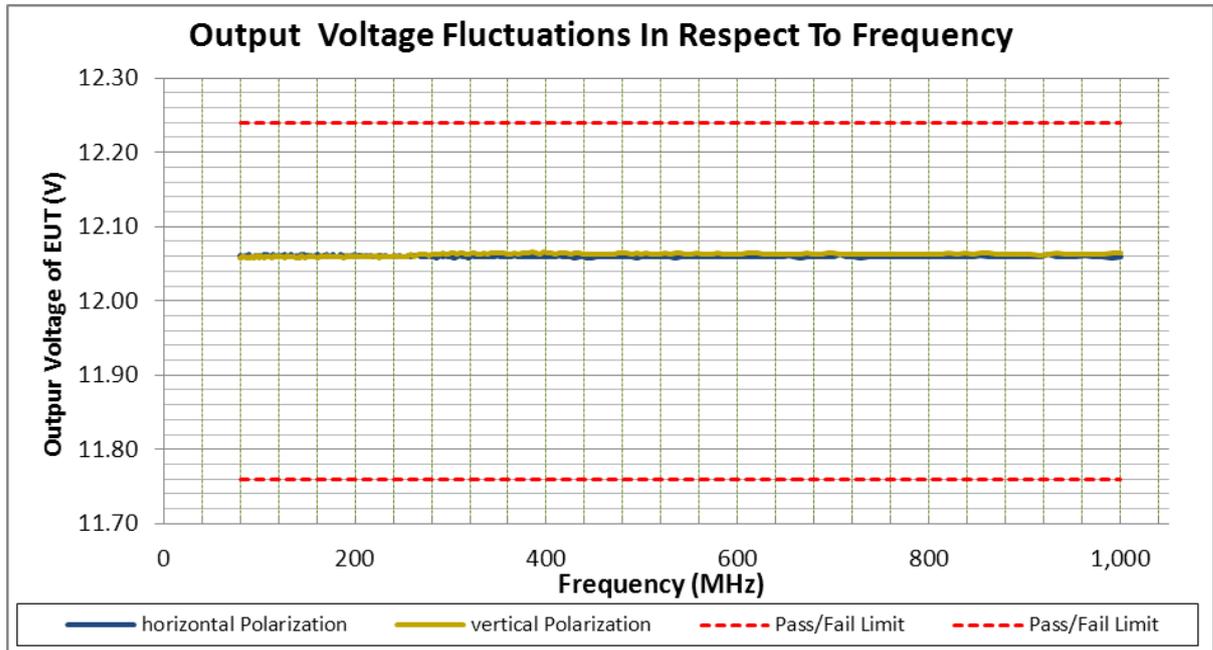
**Test Equipment Settings:**

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 240mV, 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 12-112  
**EUT Serial No.:** 31245691348  
**Customer Spec:** CS-XXXUWAXXX\_REV9  
**Date:** 02/01/2014  
**Standard:** IEC61000-6-2: 2005 referring to IEC61000-4-8: 2001

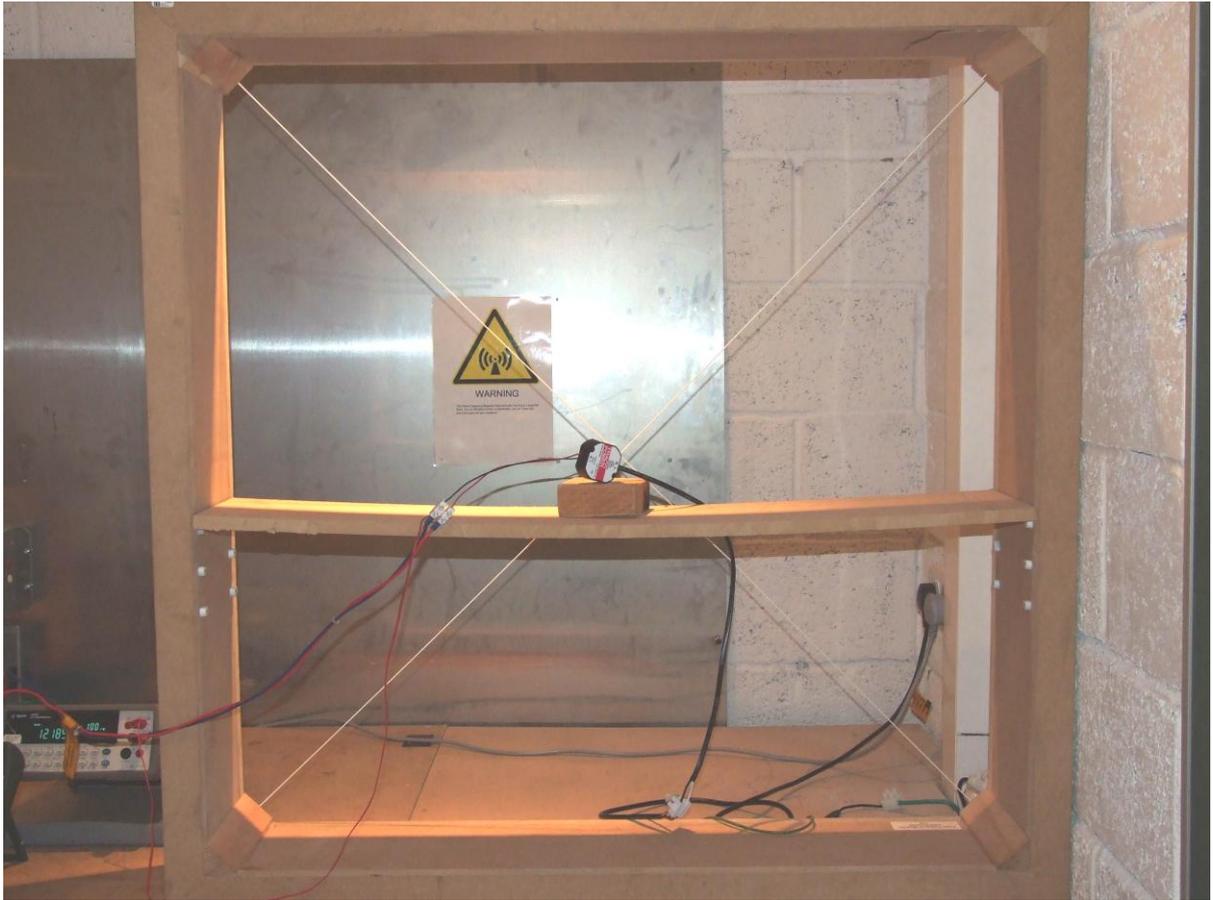
### Notes:

- EUT tested under normal operating conditions of 230V 50Hz input at full load (12V 1.0A 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

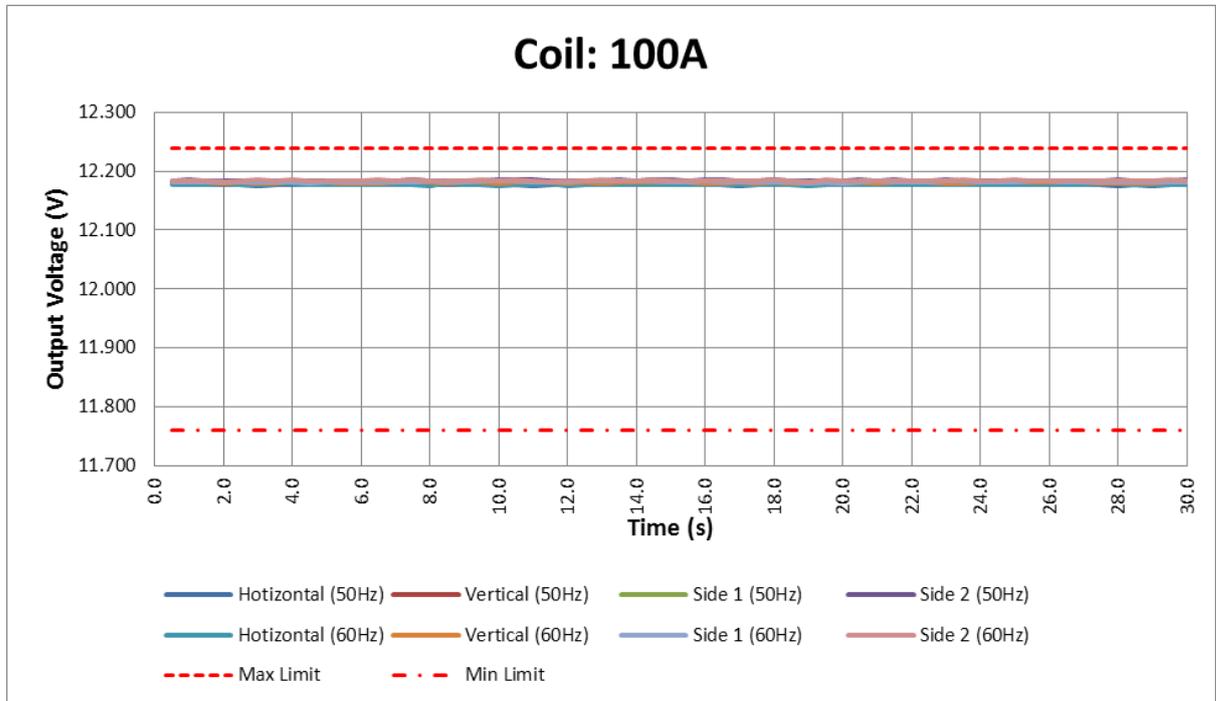
### 4.1. Test Setup

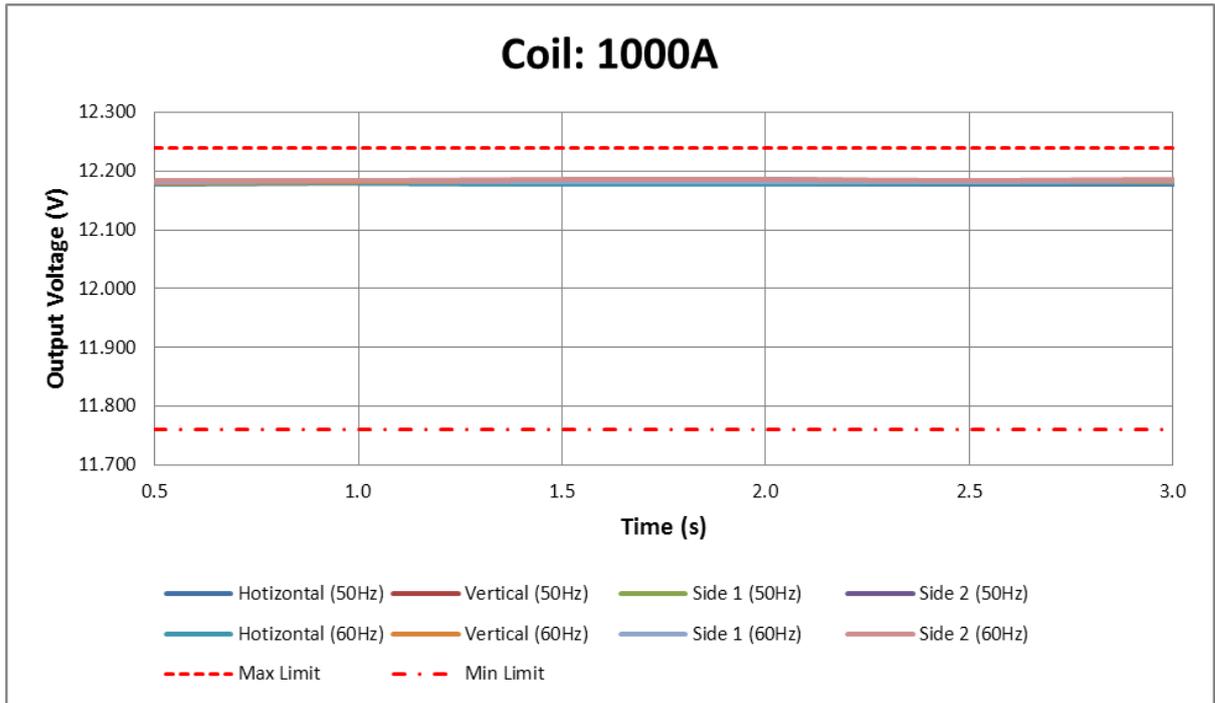
#### Test Equipment Settings:

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 12-112  
**EUT Serial No.:** 31245691348  
**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 (12V 1.0A 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 = 12V, 1.0A

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	12.17	0.0	90	A
187.2	10	500	12.17	0.0	90	A
166.4	10	500	12.17	0.0	80	A
166.4	1	50	12.17	0.0	80	A
166.4	0.5	25	12.17	0.0	80	A
145.6	0.5	25	12.17	0.0	70	A
145.6	0.5	10	12.17	0.0	70	A
104	0.2	10	11.65	4.3	50	B
104	0.02	1	12.17	0.0	50	A
0	0.02	1	12.17	0.0	0	A

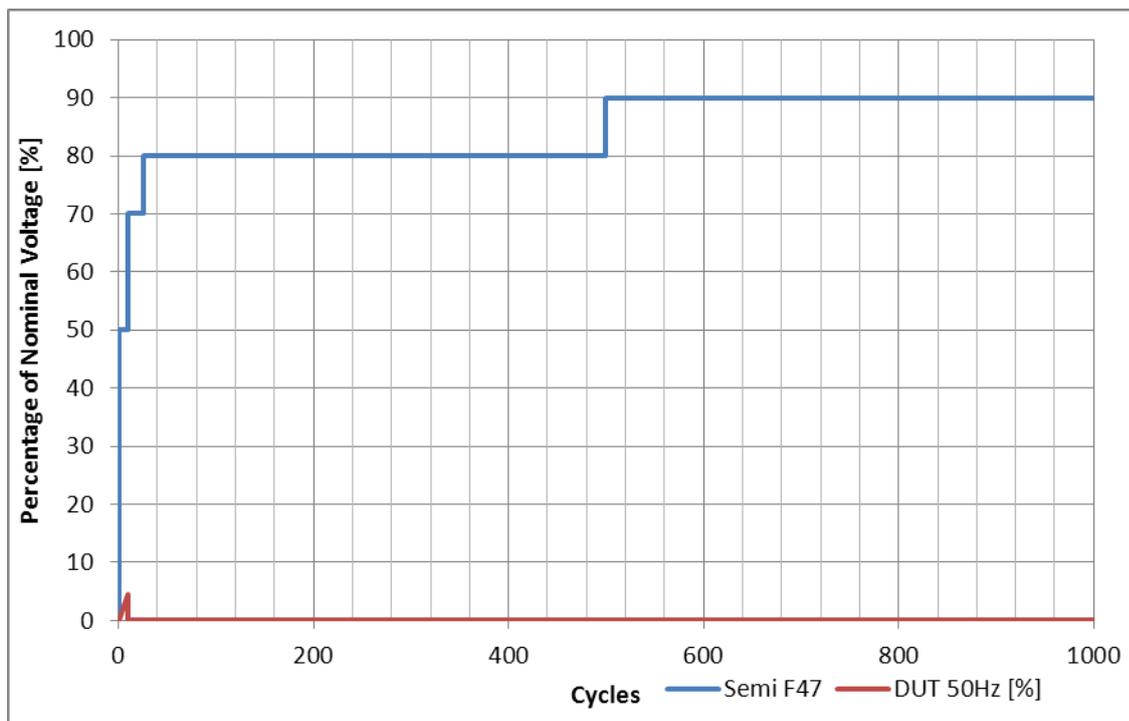


Figure 1 – TIW 12-112 / 0-1000 cycles

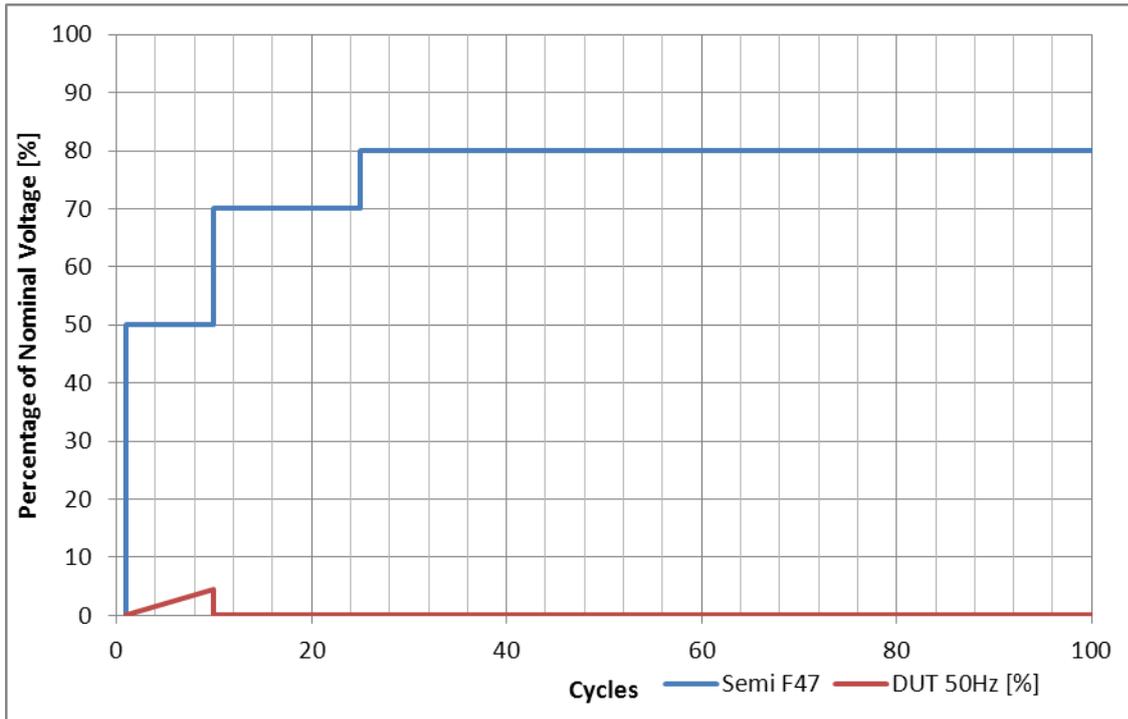
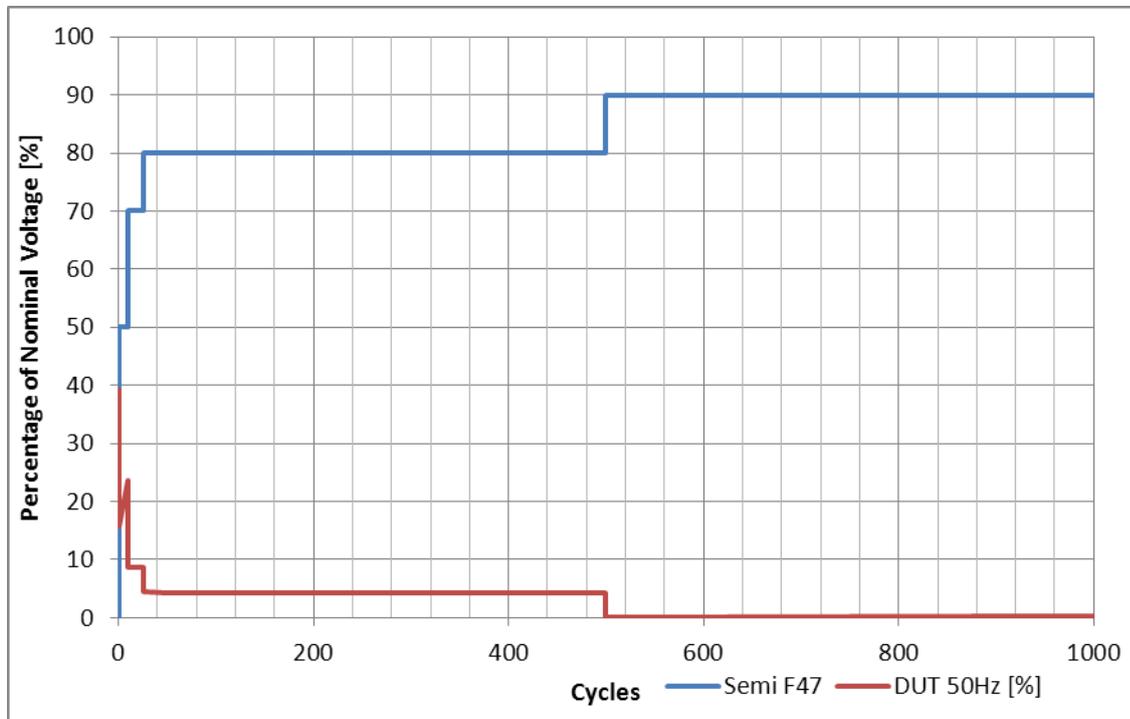


Figure 2- TIW 12-112 / 0-100 cycles

**Input Voltage = 100VAC, Output = 12V, 0.6A (8W)**

Voltage Sag	Duration	Duration	Output Voltage	% delta of nominal output voltage	Semi F47	Criteria
[V]	[s]	[cycles]	[V]	DUT 50Hz [%]	[%]	[Class]
90	20	1000	12.09	-0.8	90	A
90	10	500	12.12	-1.0	90	A
80	10	500	11.59	3.4	80	B
80	1	50	11.60	3.3	80	B
80	0.5	25	11.59	3.4	80	B
70	0.5	25	11.06	7.8	70	B
70	0.5	10	11.08	7.6	70	B
50	0.2	10	9.26	22.8	50	B
50	0.02	1	10.23	14.8	50	B
0	0.02	1	7.36	38.7	0	B



**Figure 3– TIW 12-112 / 0-1000 cycles**

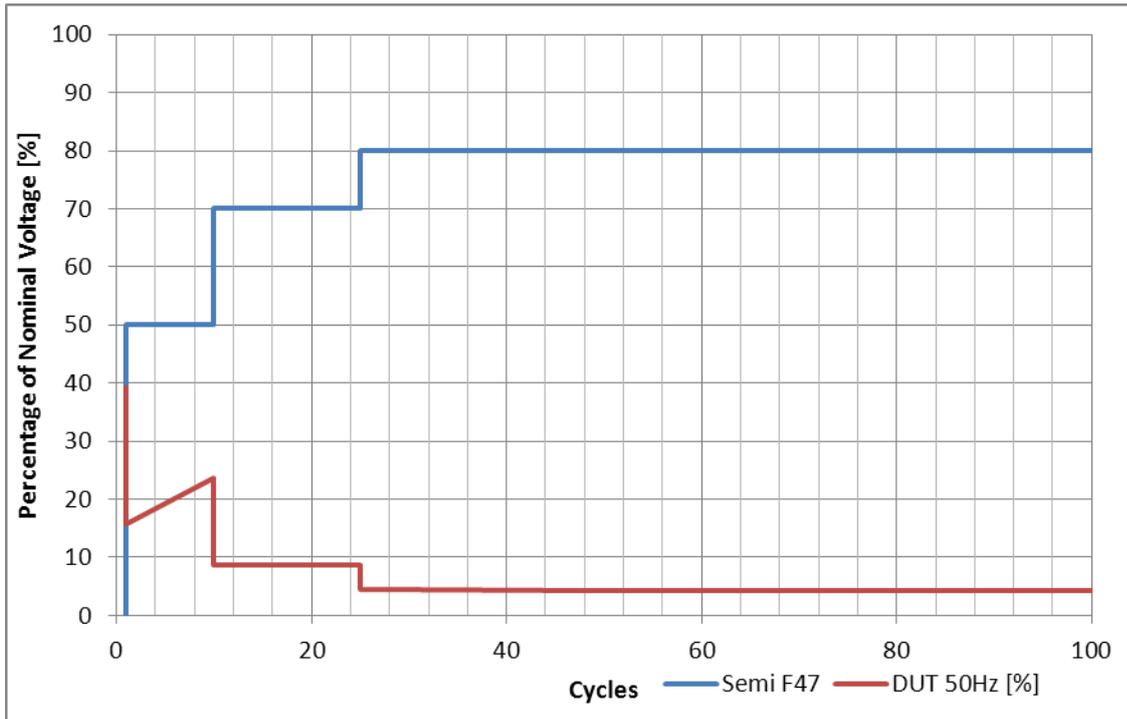


Figure 4– TIW 12-112 / 0-100 cycles

**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
<b>IEC61000-6-2: 2005 + IEC61000-4-6:2004</b>			
Conducted Input RF Immunity	Level III 10V (Class A)	PASS	
Conducted Output RF Immunity	Level III 10V (Class A)	PASS	
<b>IEC61000-6-2: 2005 + IEC61000-4-3:2004</b>			
Radiated RF Immunity	Level III 10V (Class A)	PASS	
<b>IEC61000-6-2: 2005 + IEC61000-4-8: 2001</b>			
Power Frequency Magnetic Field Immunity	Level 5 (Class A)	PASS	
<b>SEMI F47-0706</b>			
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
<b>Cables</b>	<b>Type</b>	<b>Length</b>	<b>Comments</b>
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