Amendment to Test Report

This Amendment is valid only together with the main Test Report

Report No . ..... :	**270270**
Main Report No . ..... :	246847
Date of issue ..... :	September 23, 2014
Total number of pages ..... :	6
Applicant's Name ..... :	Power Integrations, Inc.
Address ..... :	5245 Hellyer Avenue, San Jose, CA 95138, U.S.A.
Test specification	
Standard ..... :	IEC 60065:2001 (Seventh Edition) + A1:2005 + A2:2010 with CTL Decision, DSH 1080
Test procedure ..... :	CB scheme
Non-standard test method ..... :	N/A

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

Test item description ..... :	IC including capacitor discharge function (ICX)
Trade Mark ..... :	CAPZero
Manufacturer ..... :	Power Integrations, Inc.
Model/Type reference ..... :	CAP002DG; CAP003DG; CAP004DG; CAP005DG; CAP006DG; CAP007DG; CAP008DG; CAP009DG; CAP012DG; CAP013DG; CAP014DG; CAP015DG; CAP016DG; CAP017DG; CAP018DG; CAP019DG; SC1143
Ratings..... :	230V AC nominal (tested for 85-265V AC, 47-63Hz)

Testing procedure and testing location:			
☒	**CB Testing Laboratory**:	Nemko A/S	
Testing location/ address ..... :		Gaustadalléen 30, NO - 0373 Oslo, Norway	
☐	**Associated CB Laboratory:**		
Testing location/ address ..... :			
	Tested by (name + signature) ..... :	Ole Morten Aaslund	Ole Morten Aaslund
	Approved by (name + signature) .. :	Hans-Eirik Lie	
☐	**Testing procedure: TMP**		
Testing location/ address ..... :			
	Tested by (name + signature) ..... :		
	Approved by (name + signature) .. :		
☐	**Testing procedure: WMT**		
Testing location/ address ..... :			
	Tested by (name + signature) ..... :		
	Witnessed by (name + signature). :		
	Approved by (name + signature) .. :		
☐	**Testing procedure: SMT**		
Testing location/ address ..... :			
	Tested by (name + signature) ..... :		
	Approved by (name + signature) .. :		
	Supervised by (name + signature) :		
☐	**Testing procedure: RMT**		
Testing location/ address ..... :			
	Tested by (name + signature) ..... :		
	Approved by (name + signature) .. :		
	Supervised by (name + signature) :		

List of Attachments (including a total number of pages in each attachment):

Photos (2 pages)

Summary of testing:

The following additional tests were performed as per *DSH 1080* due to the introduction of different minimum and maximum X-capacitance and resistance values:

- 100 positive impulses and 100 negative impulses between line and neutral using a capacitor with the largest capacitance and a resistor with the smallest resistance specified by the manufacturer of the ICX; and repeated with a capacitor with the smallest capacitance and the resistor with the largest resistance. The time between any two impulses shall not be less than 1 s. The impulse shall be as specified in circuit 2 of Table N.1 (60950-1) / 1.2/50µs in Table K.1 (60065), with Uc equal to the transient voltage.

Impulse tests as described performed on models CAP002DG, CAP009DG, CAP012DG and CAP019DG. Uc = 2500Vpeak.

- 10 000 cycles of power on and off using a capacitor with the smallest capacitance and a resistor with the largest resistance as specified by the manufacturer of ICX. The power on and off cycles time shall not be less than 1 s.

10 000 cycles of power on and off (cycle time is 1 s) performed on models CAP002DG and CAP012DG.

After above additional tests the capacitor discharge tests were performed according to clause 9.1.6 on models CAP002DG, CAP009DG, CAP012DG and CAP019DG. The circuit tested continue to comply with 9.1.6, refer 9.1.6 for details. Note that compliance with 9.1.6 also must be checked when the ICX forms part of an end product.

Tests performed (name of test and test clause):	**Testing location:**
9.1.1.1/9.1.6 Discharge of capacitors in equipment	Nemko A/S Gaustadalléen 30, NO-0373 Oslo, Norway

Summary of compliance with National Differences

Samples tested comply with the applicable requirements covered by CTL Decision, DSH 1080.

Copy of marking plate

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

Refer main report.

Calibration	All instruments used in the tests given in this test report are calibrated and traceable to national or international standards. Further information about traceability will be given on request.
Measurement uncertainty	Measurement uncertainties are calculated for all instruments and instrument set-ups given in this report. Calculations are based on the principles given in the standard EA-4/02 (Dec. 1999), IEC Guide 115:2007 and other relevant internal Nemko-procedures. Further information about measurement uncertainties will be given on request.
Evaluation of results	If not explicitly stated otherwise in the standard, the test is passed if the measured value is equal to or below (above) the limit line, regardless of the measurement uncertainty. If the measured value is above (below) the limit line, the test is not passed - ref IEC Guide 115:2007. The instrumentation accuracy is within limits agreed by IECEE-CTL.

Possible test case verdicts:

- test case does not apply to the test object ..... : Not Applicable (N/A)

- test object does meet the requirement..... : Pass (P)

- test object does not meet the requirement ..... : Fail (F)

Testing ..... :

Date of receipt of test item ..... : September 17, 2014

Date(s) of performance of tests ..... : September 17 – September 23, 2014

General remarks:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.
"(see Enclosure #)" refers to additional information appended to the report.
"(see appended table)" refers to a table appended to the report.

Throughout this report a ☐ comma / ☒ point is used as the decimal separator.

Manufacturer's Declaration per sub-clause 6.2.5 of IECEE 02:

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided..... :

☐ **Yes**

☒ **Not applicable**

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies) ..... : Millenium Microtech Shanghai
No. 351 Guo Shou Jing Rd., Z.J. Hi Tech Park
Pudong New Area, Shanghai,
201203 CHINA

General product information:

The update concerned in this amendment report covers the introduction of different minimum and maximum X-capacitance and resistance values as follows:
X-capacitance: Min. 100nF, max. 6µF
Resistance: Min. 142kΩ, max. 7.5MΩ

Models covered by this amendment report are listed in table below. Models CAP002DG, CAP009DG, CAP012DG and CAP019DG were chosen to represent all models. During testing the ICX was mounted on a PCB together with a mains fuse (1A), X-capacitor and discharge resistors, refer attached photos. Values of X-capacitor and discharge resistors are as per recommendation from the manufacturer. Refer table below.

Model/Part No. (ICX)	BV_{DSS}	Total X-capacitance - range	Total series resistance - range (R1+R2)
CAP002DG	825V	100nF–600nF	7.5MΩ–1.42MΩ
CAP003DG	825V	100nF–900nF	7.5MΩ–970kΩ
CAP004DG	825V	100nF–1.2µF	7.5MΩ–740kΩ
CAP005DG	825V	100nF–1.8µF	7.5MΩ–456kΩ
CAP006DG	825V	100nF–2.4µF	7.5MΩ–342kΩ
CAP007DG	825V	100nF–3.0µF	7.5MΩ–285kΩ
CAP008DG	825V	100nF–4.2µF	7.5MΩ–190kΩ
CAP009DG	825V	100nF–6µF	7.5MΩ–142kΩ
CAP012DG	1000V	100nF–600nF	7.5MΩ–1.42MΩ
CAP013DG	1000V	100nF–900nF	7.5MΩ–970kΩ
CAP014DG	1000V	100nF 1.2µF	7.5MΩ–740kΩ
CAP015DG	1000V	100nF–1.8µF	7.5MΩ–456kΩ
CAP016DG	1000V	100nF–2.4µF	7.5MΩ–342kΩ
CAP017DG	1000V	100nF–3.0µF	7.5MΩ–285kΩ
CAP018DG	1000V	100nF–4.2µF	7.5MΩ–190kΩ
CAP019DG	1000V	100nF–6µF	7.5MΩ–142kΩ
SC1143	1000V	100nF–6µF	7.5MΩ–142kΩ

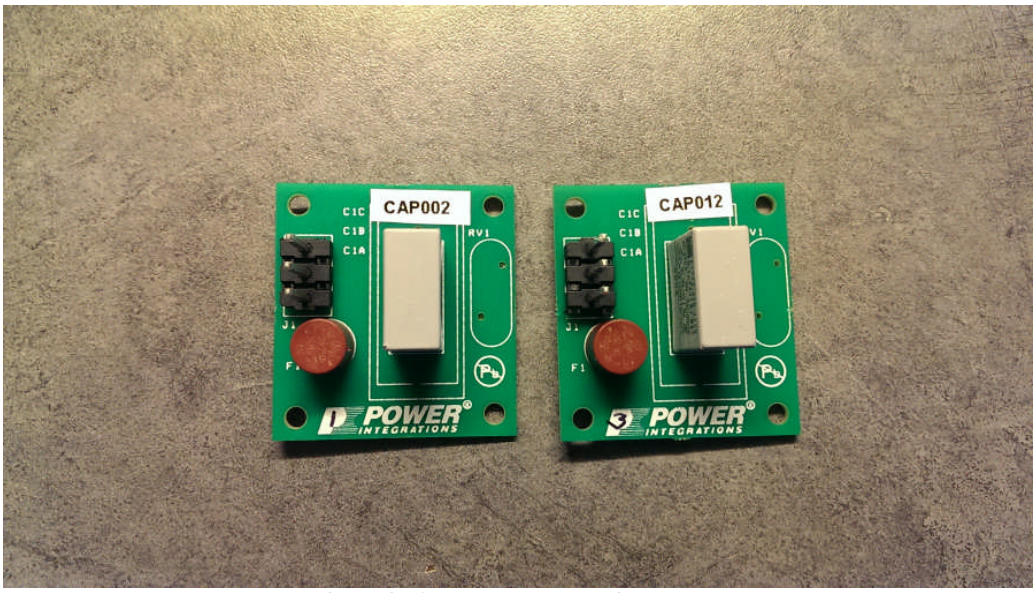
Project history:		
Nemko Report/ Order No.:	Modification to the appliances:	Changes/ Modifications in clause(s):
246847	Main Test Report	N/A
247609	Adding of voltage and frequency range; 85-265V AC, 47-63Hz. Note that DSH 1080 only covers Installation Category II (2.5kV transients), and end products using the ICX covered by this report must follow the same Installation Category.	Summary of testing, General product information, 9.1.1.1 and 9.1.6
270270	Introduction of different minimum and maximum X-capacitance and resistance values: X-capacitance: Min. 100nF, max. 6µF Resistance: Min. 142kΩ, max. 7.5MΩ Refer also General product information.	Summary of testing, General product information, 9.1.1.1 and 9.1.6

9.1.1.1	a) Open circuit voltages	Not exceeding 35Vpeak or 60Vdc.	P
	b) Touch current measured from terminal devices using the network in annex D .....:	-	N/A
	c) Discharge not exceeding 45 µC	-	N/A
	d) Energy of discharge not exceeding 350 mJ	-	N/A

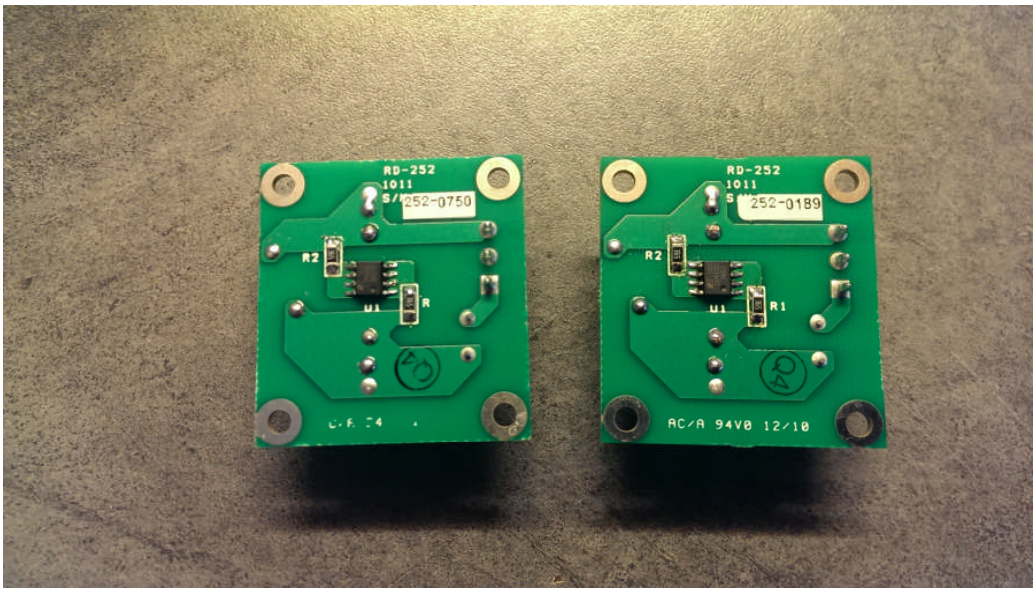
9.1.6	No shock hazard due to stored charge on withdrawal of the mains plug; voltage (V) after 2 s .....:	Capacitor discharge tests performed on models CAP002DG, CAP009DG, CAP012DG and CAP019DG after tests described in Summary of testing were perfomed. Refer test results below. Discharge tests must also be performed when the ICX forms part of an end product. CAP002DG: Vpeak: 358V Vpeak, after 2 sec: 19V CAP009DG: Vpeak: 352V Vpeak, after 2 sec: 32V CAP012DG: Vpeak: 356V Vpeak, after 2 sec: 22V CAP019DG: Vpeak: 355V Vpeak, after 2 sec: 33V	P
	If C is not greater than 0,1 µF no test needed	-	N/A

Photos

Report No. 270270



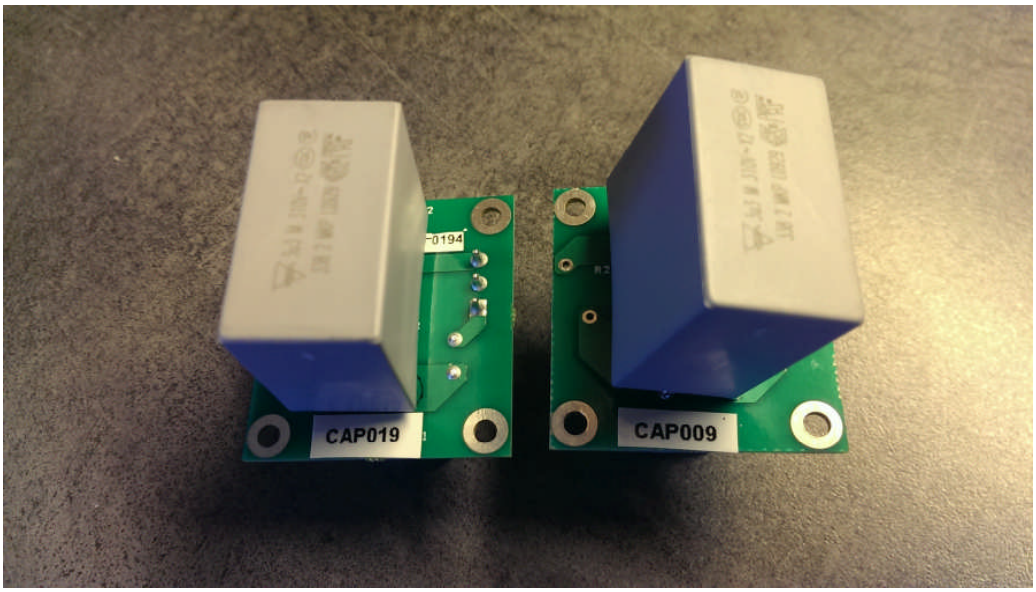
Test board of CAP002DG and CAP012DG



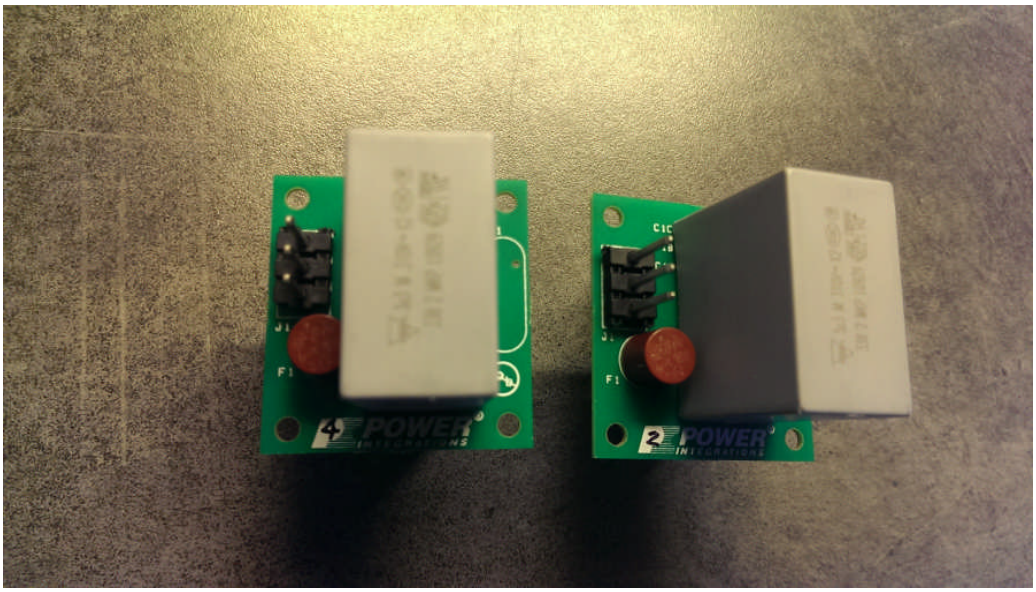
Test board of CAP002DG and CAP012DG

Photos

Report No. 270270



Test board of CAP009DG and CAP019DG



Test board of CAP009DG and CAP019DG