



Center for Quality Engineering

Test Report No.: B0250001

Order No.: B025**Pages:** 10**Munich,**

Client:	Infineon Technologies AG AIM QM RPT 2
Equipment Under Test:	RF ESD Protection Diode ESD0P4RFL
Manufacturer:	Infineon Technologies AG
Task:	Burst- und Surge-Tests according to customer specification
Test Specifications:	Burst test according to EN 61000-4-4: 2004 Surge test according to EN 61000-4-5: 1995 + A1:2001
Result:	Requirements of the above mentioned specifications are fulfilled for all test levels. EN 61000-4-4: withstand voltage 2.5 kV (burst) EN 61000-4-5: withstand current 5.0 A (8/20 μ s)

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The results relate only to the items tested as described in this test report.

edited by:**Date****Signature**Dr. Jung
Manager Overvoltage

Feb 28, 2008

approved by:**Date****Signature**Bauer
Manager EMC

Feb 28, 2008

This document was signed electronically.

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TELECOM CONFORMANCE TESTS

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1 Summary

Burst- und Surge-Tests according to customer specification were performed at the following type of RF ESD Protection Diode:

- ESD0P4RFL

1.1 Burst Test according to EN 61000-4-4

- Test of each diode separately,
– each 12* RF ESD Protection Diodes ESD0P4RFL per voltage level

Voltage	Impulse	Duration	Frequency	Result
±1000 V	5/50 ns	1 min.	5 kHz	passed
±1500 V	5/50 ns	1 min.	5 kHz	passed *
±2000 V	5/50 ns	1 min.	5 kHz	passed
±2500 V	5/50 ns	1 min.	5 kHz	passed

* Diode No. 1 (refer to Figure 4-1) on PCB p27KL #5 showed a damage during the initial functional tests before the measurements. This diode was not tested therefore.

Remark: Functional test after the Burst tests passed for all test levels.

1.2 Surge Test according to EN 61000-4-5

- Test of each diode separately,
– each 12 RF ESD Protection Diodes ESD0P4RFL per current level

Current	Impulse	Number of Surges	Repetition Rate	Result
±4.0 A	8/20 µs	10, alternating	1 surge / min.	passed
±4.5 A	8/20 µs	10, alternating	1 surge / min.	passed
±5.0 A	8/20 µs	10, alternating	1 surge / min.	passed

Remark: Functional test after the Surge tests passed for all test levels.

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Deutschen AkkreditierungsRat



Akkreditierung

The TGA GmbH, represented by the DATech Deutsche Akkreditierungsstelle Technik
in der TGA GmbH, confirms that the Testing Laboratory

Nokia Siemens Networks GmbH & Co. KG
Center for Quality Engineering
Hofmannstraße 51
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is competent under the terms of DIN EN ISO/IEC 17025:2005 to carry out testing in the
fields of

**Mobile Radio Communication (base stations), Signaling System No. 7, Signaling
Voice over IP, Interfaces of Telecommunication Equipment, Electromagnetical
Compatibility (EMC), Safety of Electrical Appliances, Electromechanical
Components, Passive Fiber Optic Components, Low-voltage Switchgear and
Controlgear Assemblies, Safety of Machinery, Functional Safety of
electronic/programmable electronic safety related systems, Basic Environmental
Testing Procedures**

according to the annexed list of standards and specifications.

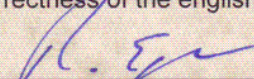
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The annex is deemed part of this certificate and comprises **51** pages.

DAR-Registration No.: **DAT-P-002/91-02**

Frankfurt/Main, 14.12.2007

Correctness of the english translation confirmed: Frankfurt/Main, 14.12.2007


i.V. Dipl.-Ing.(FH) R. Egner
Head of the Accreditation Body

Member in EA, ILAC, IAF

Translation for information purposes only. The German Accreditation Certificate is authoritative

See notes overleaf

2 References

2.1 Specifications

EN 61000-4-4: 2004
EN 61000-4-5: 1995 + A1:2001

2.2 Glossary of Terms

None

2.3 Bibliographical Data

None

3 General Information

3.1 Identification of Client

Infineon Technologies AG
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93049 Regensburg
Martina Mieth

3.2 Test Laboratory

Center for Quality Engineering
Nokia Siemens Networks GmbH & Co. KG
Hofmannstraße 51
81359 München

3.3 Time Schedule

Delivery of EUT: Jan 28, 2008
Start of test: Jan 31, 2008
End of test: Feb 06, 2008

3.4 Participants

Name	Function	Phone	E-Mail
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4 Equipment Under Test

EUT: RF ESD Protection Diode
Type: ESD0P4RFL
Die Name: D1343A
Charge/Lot: VC749851.12
Package: TSLP-4-7

The RF ESD Protection Diodes are assembled to each 3 pieces on 28 PCB's P-TSLP-4-4, which are marked with p27KL #1...8 respectively p27kl #9...16 (samples for burst tests) and p27MN #1...12 (samples for surge tests).

The CQE internal numbering of diodes on the PCB is given in the following Figure 4-1.



Figure 4-1: PCB with 3 pieces of RF ESD Protection Diode ESD0P4RFL

The short wire sections connect both diodes of a diode package together in an anti-parallel configuration according to the preliminary data sheet. A rail-to-rail configuration is also possible.

5 Test Equipment

5.1 Test Facility

The surge tests were performed in the Laboratory of Overvoltage, COO RTP CQE COC1 SDE. The burst tests were performed in the Laboratory of EMC, COO RTP CQE COC1 SDE.

The following table shows the environmental conditions:

Ambient temperature	Relative humidity	Barometric pressure
20 °C – 24 °C	30 % – 40 %	100 kPa – 103 kPa

5.2 Measuring Equipment

Label	Equipment	Type	Specifications / Remarks	Calibration		
				State	Last	Next
P0595	Burst Generator	SFT 4000	230 V / 16 A, programmable / 0.2 - 4.4 kV, 0.1 - 500 kHz Rep.	cal	03 / 2006	03 / 2009
N345	Impulse Generator	HVPG 10/500	1.2/50 µs; 8/20 µs; 0 - 10 kV; 2 Ω	cpu		
N767	Coupling Network	–	12x 100 Ω	cnn		
N871	Coupling Network	–	16x 8.3 Ω (8x 8.3 Ω used in parallel)	cnn		
N262	Oscilloscope	9304CM	200 MHz, printer, floppy disc	cal	03 / 2007	03 / 2008
N401	Current Probe	411	50 Ω ; 1 Hz - 20 MHz; 5 kA _{pk} ; 50 A _{rms}	cal	03 / 2006	03 / 2008
O602	Voltage Probe	PP006	500 MHz; 10 MΩ	cal	08 / 2007	08 / 2008

cal: calibrated – chk: checked – cpu: check prior to use – ind: for indication only – cnn: calibration not necessary

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5.3 Measurement Uncertainty

As far as the underlying standards include requirements concerning the uncertainty of measuring instruments or measuring methods, they are met.

The expanded measurement uncertainty of the measuring chain was calculated for all tests according to the “ISO Guide to the expression of uncertainty in measurement (GUM)”. The results are documented in an “internal controlled document” at CQE archives.

The measuring accuracy for all measuring devices is given in their technical description. The measuring instruments, including any accessories, are calibrated respectively verified to ensure the necessary accuracy. Depending on the kind of measuring equipment it is checked within regular intervals or directly before the measurement is performed. Adjustments are made and correction factors applied to measured data in accordance with the specifications of the specific instrument.

The expanded measurement instrumentation uncertainty of our Test Laboratory meets the requirements of IEC CISPR 16-4-2 (2003-11) “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-2: Uncertainties, statistics and limit modelling – Uncertainty in EMC measurements” for all listed tests.

6 Test Specifications and Results

The test results in the report refer exclusively to the test object described in section 0 and the test period in section 3.3.

6.1 Burst Test

- Test Set-up according to specification EN 61000-4-4 (refer to Figure 6-1)
 - Test of 16 samples
(PCB; each PCB contains 3 pieces of RF ESD Protection Diode ESD0P4RFL)
 - Test of 12 RF ESD Protection Diodes (4 samples) per voltage level
 - Test of each RF ESD Protection Diode separately

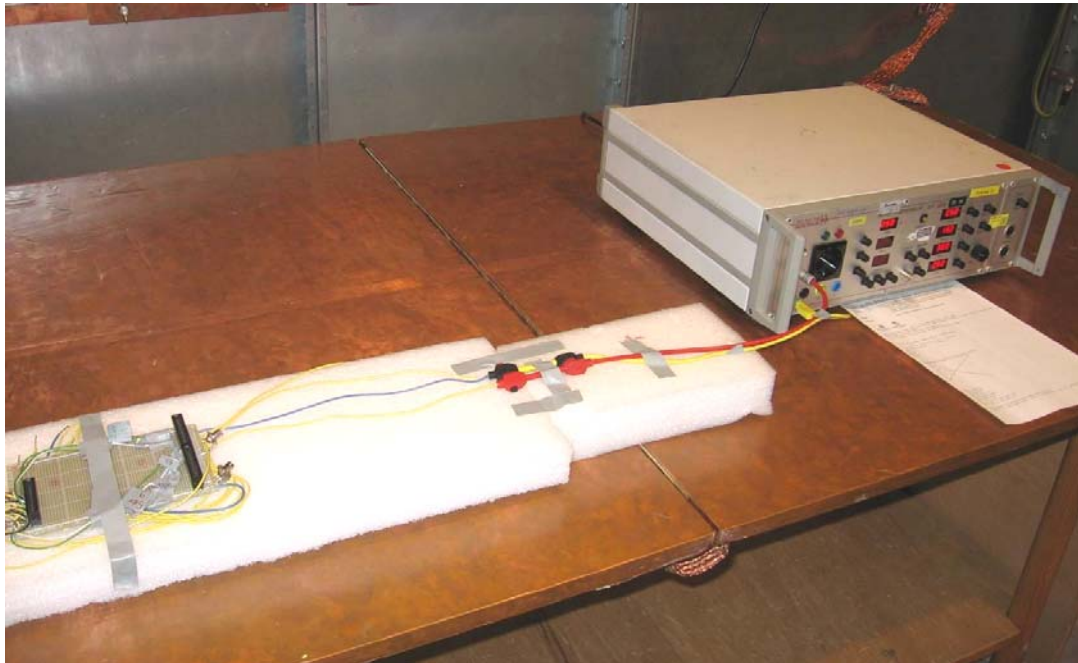


Figure 6-1: Test Set-up for Burst tests

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Result

Voltage	Impulse	Duration	Frequency	Piece	Failure
±1000 V	5/50 ns	1 min.	5 kHz	12	0
±1500 V	5/50 ns	1 min.	5 kHz	11 *	0
±2000 V	5/50 ns	1 min.	5 kHz	12	0
±2500 V	5/50 ns	1 min.	5 kHz	12	0

* Diode No. 1 (refer to Figure 4-1) on PCB p27KL #5 showed a damage during the initial functional tests before the measurements. This diode was not tested therefore.

Remark: Functional test after the burst tests passed for all RF ESD Protection Diodes.

6.2 Surge Test

- Test Set-up according to specification EN 61000-4-5
 - Test of 12 samples
(PCB; each PCB contains 3 pieces of RF ESD Protection Diode ESD0P4RFL)
 - Test of 12 RF ESD Protection Diodes (4 samples) per voltage level
 - Test of each RF ESD Protection Diode separately

Result

Current	Impulse	Repetition Rate	Number of Surges	Piece	Failure
4.0 A	8/20 μ s	1 surge / min.	10, alternating	12	0
4.5 A	8/20 μ s	1 surge / min.	10, alternating	12	0
5.0 A	8/20 μ s	1 surge / min.	10, alternating	12	0

Remark: Functional test after the surge tests passed for all RF ESD Protection Diodes.

