

# EMC

WHEN QUALITY IS AN ISSUE, THE CHOICE IS HAEFELY EMC

BELLCORE GR-1089



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SURGE PLATFORM<sup>®</sup> TEST SYSTEM SOLUTION

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## BELLCORE GR-1089 TEST SYSTEM

### GENERAL

GR-1089-Core (1999) relates to testing of lightning and AC power fault surges in a telecommunications central office environment. Section 4 deals with the design and calibration of test equipment plus definition of test levels on telecommunication ports such as line cards.

Test impulses are applied with the system in an idle condition, that is not transmitting or receiving data. However dc voltages may be present on the lines.

### FEATURES

- Full hybrid waveforms according to the latest GR-1089-Core section 4
- First & second-level lightning surges (Telecom port)
- Intra-building lightning surges (Telecom port)
- First & second-level lightning surges (AC power port)
- Integrated automatic coupling for 2 and 4 wire telecom systems
- True 3 and 5 terminal surges
- 12 Pair surges
- Single connect solution
- Reliable semiconductor discharge switch
- Flexible test parameter programming
- State of the art PC based operating terminal
- Automatic test connection switching by software
- Automatic coupling component switching by software
- New Control & Reporting software WinFEAT-R®

### RECOMMENDED EQUIPMENT

Recommended equipment from section 4 of GR-1089-CORE for testing network systems:

- 10/360  $\mu$ s, True 3 Terminal
- 10/360  $\mu$ s, 12 pair
- 10/1000  $\mu$ s, True 3 Terminal
- 2/10  $\mu$ s, True 5 Terminal
- 2 wire Tip and Ring coupler
- 4 wire Tip and Ring coupler
- 1.2/50  $\mu$ s , 8/20  $\mu$ s Hybrid
- AC mains coupler

Fully automatic coupler and single connect waveform switching

### BENEFITS

- Ease of use
- Plug and play technology
- Totally reproducible test results
- Easy verification of impulse
- A modular expandable system that grows with your application needs
- Faster testing
- Shorter test time
- Cost effective investment
- No reconfiguration during testing all 3 EUTs "Single Connect® Testing"
- Integrated personnel & test object safety
- Automatic test report generation
- Investment can be shared between compliance and development departments



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## SYSTEM DESCRIPTION

Surge Platform GR-1089-Core system comprises a PSURGE 8000 mainframe, 10/360  $\mu$ s 12 pair hybrid wave module with integrated Tip and Ring coupler and all other waveforms called in section 4 routed automatically to a 2 / 4 wire Tip and Ring coupling unit. The system is rack mounted for mobility within the test lab. All modules and CDNs are configured using Plug and Play technology on the Haefely Bus. Special time saving features of the system include automatic coupling path switching

In addition, coupling elements can be selected, which protect the test equipment from voltages present on the tip and ring pairs.

Possible coupling choices are:

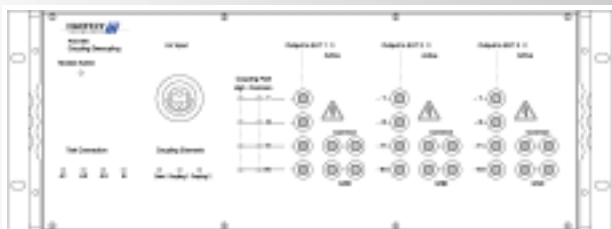
- direct to EUT
- via coupling element
- open circuit (no connection between generator and EUT)

### Single Connect Testing

Apart from the Plug and Play aspects of system hardware, the EUT can also be connected in a Plug and Play configuration. The Tip and Ring coupling unit has inputs for ALL of the required telecom impulses so they can be simultaneously connected and sequentially selected under program control without the necessity of unplugging hardware and reconfiguring the system. This means that all of the 3 and 5 terminal impulse tests from tables 4-2, 4-3 and 4-4 can be programmed according to the configuration in Table 4-1 as a single sequence without the need to remove the EUT or reconfigure system hardware in any way.

### Reduce Test Time

In line with Haefely's Single Connect<sup>®</sup> philosophy, PCD 900 coupling unit with 3 multiplex outputs, eliminates reconnection to the 3 EUT samples requested in Bellcore 1089



2 and 4 wire systems require surge impulses to be applied to the Tip and Ring pairs in all of the 11 possible combinations.

Test connection	output Tip	output Ring	output Tip1	output Ring1
A1/2wire	Gen	GND		
A2/2wire	GND	Gen		
A3/2wire	Gen	Gen		
A1/4wire	Gen	GND	GND	GND
A1/4wire	GND	Gen	GND	GND
A1/4wire	GND	GND	Gen	GND
A1/4wire	GND	GND	GND	Gen
A2/4wire	Gen	Gen	GND	GND
A3/4wire	GND	GND	Gen	Gen
B/2wire	Gen	Gen		
B/4wire	Gen	Gen	Gen	Gen

Gen = Output connected to surge generator  
GND = Output connected to ground

The 1089 coupling unit performs switching sequences under program control.



A Central office Telecom rack  
a typical test object for  
BELLCORE GR-1089 testing

## TECHNICAL SYSTEM SPECIFICATION

### First-Level Lightning Surges (Telecom port)

Surge	Rise (U+l)	Decay (U+l)	Voltage	Current / conductor	Polarity	Terminals
1	<10µs	>1000µs	600 V	100 A	+ / -	3
2	<10µs	>360µs	1000 V	100 A	+ / -	3
3	<10µs	>1000µs	1000 V	100 A	+ / -	3
4	<2µs	>10µs	2500 V	500 A	+ / -	5
5	<10µs	>360µs	1000 V	25 A	+ / -	25 (12 pair)

### Second-Level Lightning Surges (Telecom port)

Surge	Rise (U+l)	Decay (U+l)	Voltage	Current / conductor	Polarity	Terminals
1	<2µs	>10µs	5000 V	500A	+ / -	5

### Intra Building Lightning Surges (Telecom port)

Surge	Rise (U+l)	Decay (U+l)	Voltage	Current / conductor	Polarity	Terminals
1	<2µs	>10µs	800 V	100 A	+ / -	3
2	<2µs	>10µs	1500 V	100 A	+ / -	5

### Coupling Networks (Telecom port)

Test	2 Wire	4 Wire	Max. Impulse	Max. line dc voltage
A1	Yes	Yes	5000 V / 500 A	user selectable
A2	Yes	Yes		
A3	Yes	Yes		
B	Yes	Yes		

### First & Second-Level Lightning Surges (AC power port)

Impulse	Voltage 1.2/50µs	Current 8/20µs	Repetition rate Polarity	up to 12 pulses / minute + / -
Output	up to 7.4 kV	up to 3.7 kA	Floating output	max 460 Vac
Impedance	2Ω		Phase synchro	± 1°
			Pulse undershoot	30% max

#### Haefely Test AG

#### Business Unit EMC

Bernstrasse 90, P.O. Box  
CH-8953 Dietikon - Zurich  
Switzerland

[www.haefely.com](http://www.haefely.com)

Phone: +41.61. 373 41 11

Fax.: +41.61. 373 45 99

e-mail: EMCsales@haefely.com

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