



Dito, the unique intelligent ESD Simulator

Standard library

Automatic testpoint management

Report generation



Current waveshape
according new draft

Calibrated acc. new draft
- new calibration target
- new adapter line
available

New modules
radiated field according
human model described
in annex E of the new draft



New ESD Simulator : the ultimative solution for the professional ESD-Tester

EM TEST

www.emtest.com



Dito and accessories

Discharge tip (AD & CD)

Discharge module

- normal
- low radiation (acc. New draft)
- For IEC, ISO etc...

Power mains adaptor

Battery

(min 50'000 disch. With one load)

Battery charger

Software and optic fiber

Adapter optic fiber to RS232

grounding set



Why is Dito a intelligent simulator?

Automatic Testpoint management

Apply the discharge on the test point you see on the display.

Dito switch automatically

- from positive to negative polarity
- after x discharges
- from test point to test point
- to the next test level

Two buttons allow you to give in the fail-information

- Fail 1
- Fail 2

At the end of the tests, you load the test results on your PC and you print your report.

This special functions allow you:

- to test faster
- to avoid mistakes
- to record all the parameters automatically in your report



New Discharge Module for Dito: LRF Low ESD field radiation

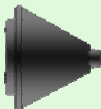
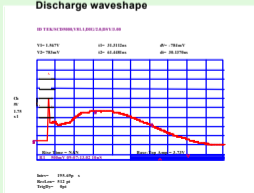
comparable to human body discharge according draft IEC 61000-4-2.2

Contact discharge mode , current and current derivative specification

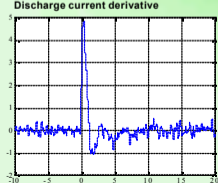
Oscilloscope Bandwidth [GHz]	Peak Current [A/kV]	Tolerance [%]	Current at 30 ns [A/kV]	Tolerance [%]	Current at 60 ns [A/kV]	Tolerance [%]
2	3.75	± 10	2	± 30	1	± 30

Target and oscilloscope bandwidth [GHz]	Peak current derivative [A / (ns * kV)]	Tolerance [%]
≥ 2	4.2	+30

Discharge waveshape



Discharge current derivative





CTR2 New calibration target according draft IEC 61000-4-2.2



Technical data CTR 2:

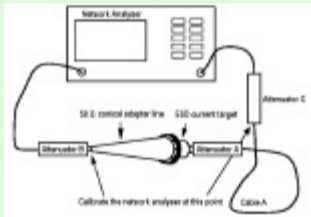
Measuring resistor:	$2\Omega \pm 2\%$
Design:	as per Draft revision IEC 61000-4-2
Installation:	The target shall be mounted into the wall of a shielded room or into a metal plate of at least 1.2 x 1.2m size
Output:	Coaxial SMA connector
Attenuator:	An additional attenuator must be connected to the output of the CTR 2 depending on the input capability of the oscilloscope .
Insertion loss	$\pm 0.3\text{dB}$ up to 1 GHz and $\pm 1\text{dB}$ up to 4GHz. This must always be measured as a "Target-Attenuator-Cable" chain. The target itself must not be measured.



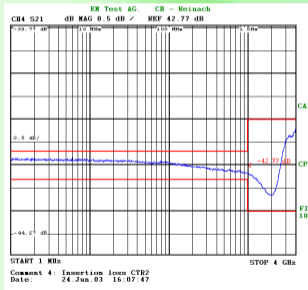
CTR2 New calibration target according draft IEC 61000-4-2.2

The current targets are tested to meet the required insertion loss of $\pm 0.3\text{dB}$ up to 1 GHz and $\pm 1\text{dB}$ up to 4GHz. In addition to the current monitor, a Huber&Suhner 2W/20db attenuator with a 1m Huber&Suhner coaxial cable with type "SMA" connectors are used.

Verification setup for the CTR 2 current monitor



The ESD current target, Attenuator A and Cable A are the target –attenuator-cable chain which is calibrated using this setup. Attenuator B and C may not be needed.

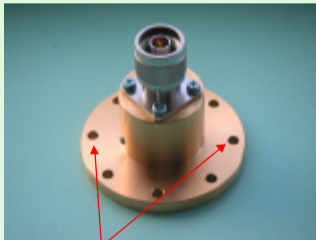


The S21 measurement of the ESD current target.

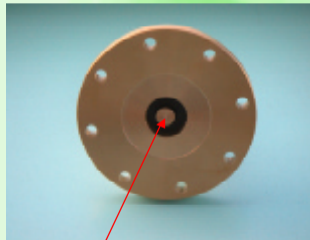
Note: The target is measured with a cable: according to the standard the cable should be part of the target-attenuator chain measurement.



50W conical adapter line to calibrate the CTR 2 current monitor



Same dimensions as CTR 2



Internal conductor to make contact to the CTR2



50W conical adapter line to calibrate the CTR 2 current monitor



CTR 2 and 50 Ω conical adapter line fixed together.

Connect to network analyzer as shown in the diagram of the previous page

The target adapter line shown above connects a 50- coaxial cable to the input of the ESD current target. Geometrically it smoothly expands from the diameter of the coaxial cable to the target diameter .

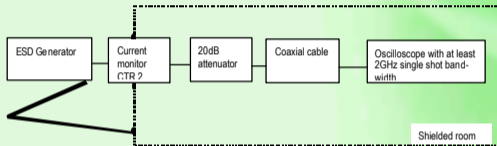
The target adapter line maintain **500 \pm 2% within a 4 GHz bandwidth.**

The **reflection coefficient** of two target adapter lines placed face-to-face is **better than 30 dB up to 1 GHz and better than 20 dB up to 4 GHz.**

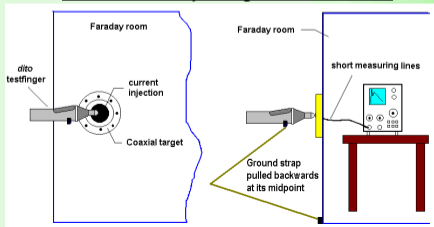
The **insertion loss** of the two target adapter lines placed face to face are **less than 0,3 dB up to 4 GHz.**



Block diagram of the "Target – Attenuator – Cable" chain



Calibration setup using a shielded room





Calibration setup using a shielded room



Wooden support
scope

For max ground loop

CTR 2

Discharge point



CTR 2 - Attenuator - Cable - Oscillo-

The photo above shows a typical test setup. Note the return cable on the ESD generator. The return cable is laid around a wooden support table to ensure the ground loop is as large as possible. There are no curls or loops in the cable to reduce oscillations seen by the scope. In case the floor at the calibration setup includes massive metallic structures, the ground cable layout can create oscillations in the 30ns and 60ns part of the current waveshape. To avoid such oscillations the ground cable must have sufficient distance (same as to metallic walls) to the floor or the floor must be covered by lossy materials.



ESD waveform verification

EM TEST recommends the following test equipment :

- Digital oscilloscope with at least 2GHz single shot bandwidth
- Faraday cage
- EM TEST CTR-2 Coaxial Target including 20dB attenuator and high quality coaxial cable

Capturing the waveform on the scope can only be achieved with the proper setup on the Digital Oscilloscope (DSO).

The setup must be chosen to measure waveforms at $\pm 2KV$, $\pm 4KV$, $\pm 6KV$ and $\pm 8KV$.

There are five measurements required for each voltage .

- Initial peak current
- Risetime at 10% to 90% of initial peak current
- Current derivative di/dt
- Current level at 30ns
- Current level at 60ns

The time domain for the initial peak and rise time measurement is 1ns/Div and 10ns/Div for the measurement of the current at 30ns and 60ns.



EM TEST

www.emtest.com

More information on

www.emtest.com