



**Rosenberger**

802.3ch screening- and coupling attenuation measurements

Thomas Müller

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

## Questions to discuss

- For Triaxial tube coupling attenuation measurements, should renormalizing to 150 ohms be performed?
- “Link Segment” measurements – should each component be measured individually and then be put together to create composite curves for IL, RL, MC, etc. or should a complete harness be measured including header connectors on PCBs?

## Renormalization

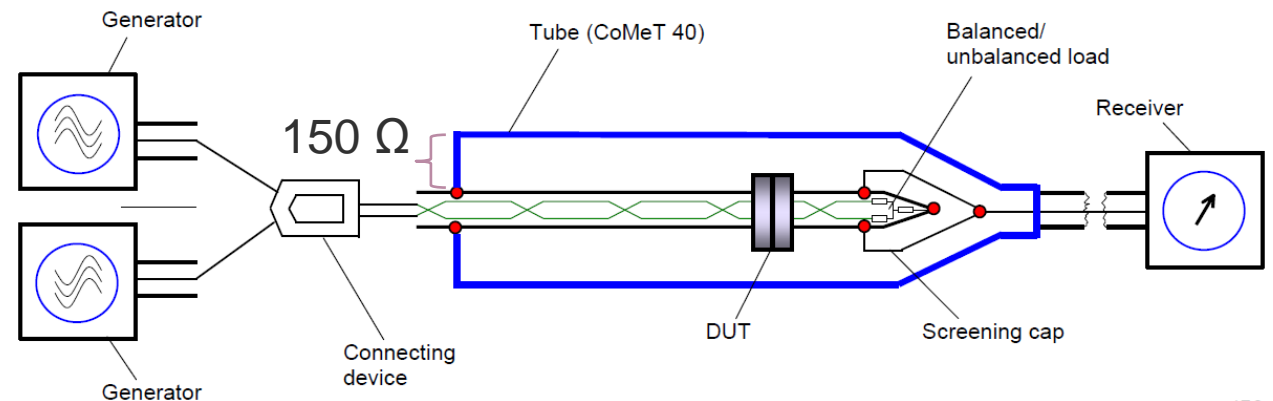
- For Triaxial tube coupling attenuation measurements, should renormalizing to 150 ohms be performed?
- YES.
- Renormalization is part of the test procedure as defined in IEC 62153-4-4 (-7)

### 9.2.2 Evaluation of test results with matched conditions

The screening attenuation  $a_s$  shall be calculated with the arbitrary determined normalised value  $Z_S = 150 \Omega^1$ .

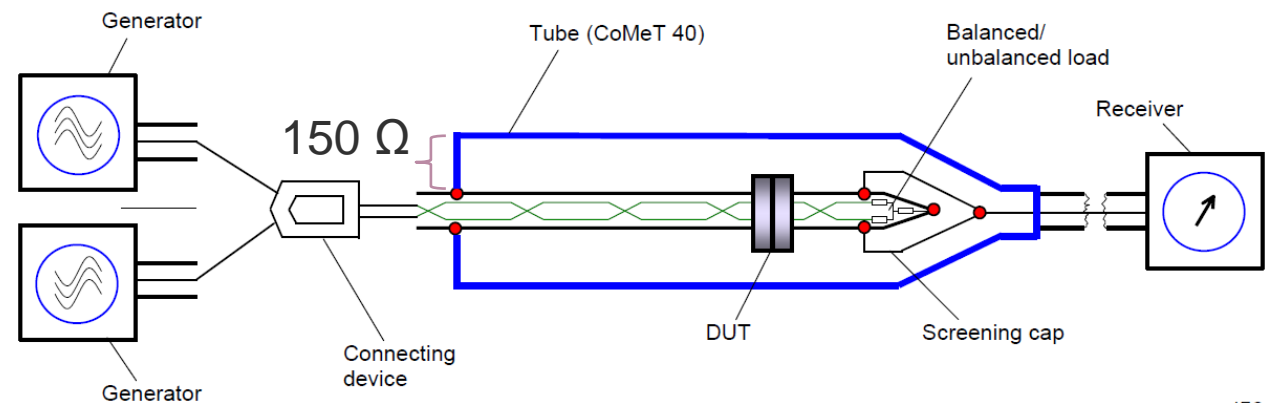
<sup>1</sup>  $Z_S$  is the normalised value of the characteristic impedance of the environment of a typical cable installation. It is not in relation to the impedance of the outer circuit of the test set-up.

- It emulated the coaxial impedance of the outer system (cable shield of the DUT to the conducting tube), similar to the 200  $\Omega$  common mode reference of an UTP cable over conducting ground defined in 802.3bp



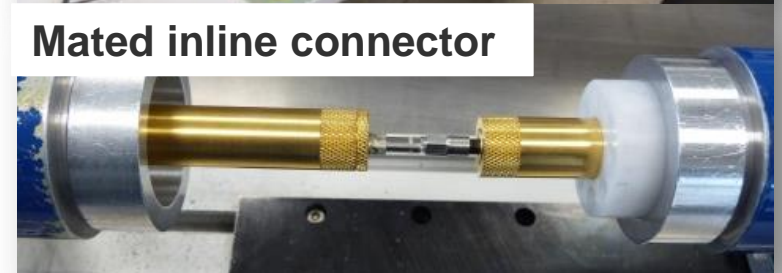
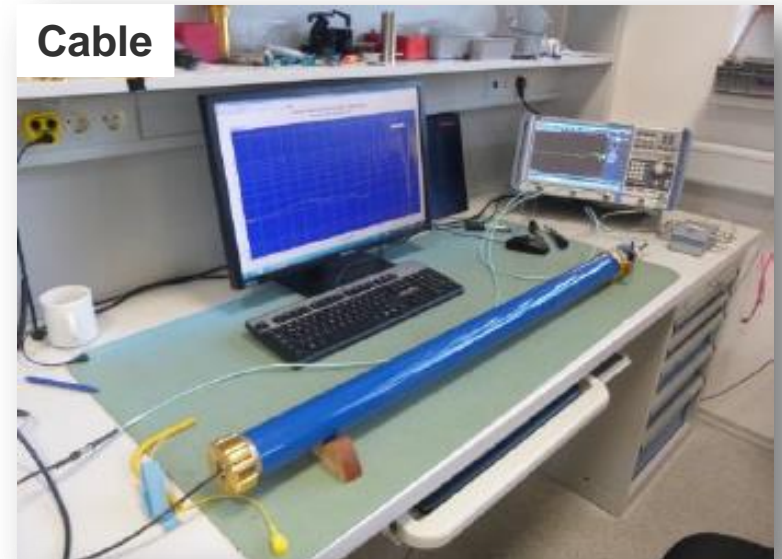
## Renormalization

- For Triaxial tube coupling attenuation measurements, should renormalizing to 150 ohms be performed?
- YES.
- Normalized reference for all measurements
- Correction for the resonances caused by the mismatch between the 50  $\Omega$  coaxial measurement cables and the 150  $\Omega$  of the outer system
- Does not have anything to do with the impedance of the inner system (channel impedance)



## Component measurements

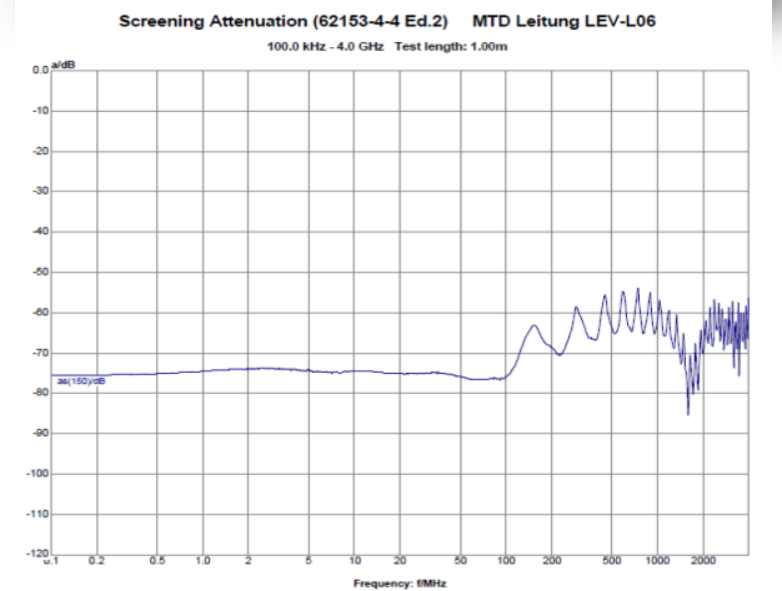
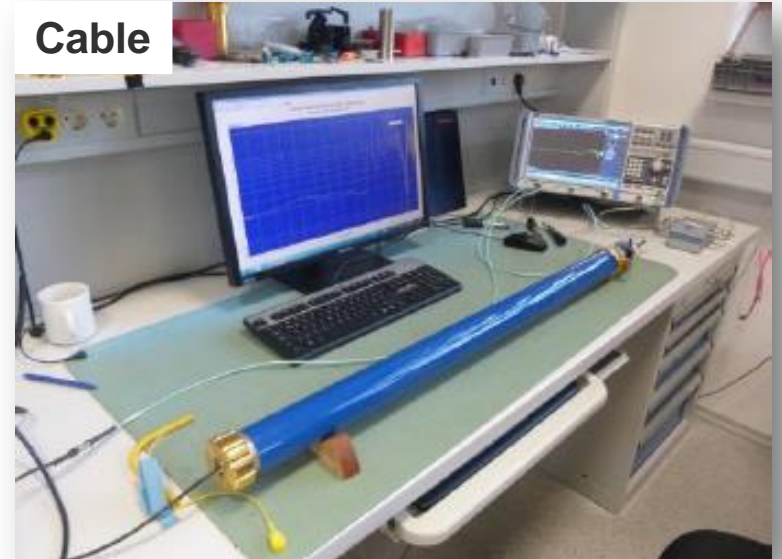
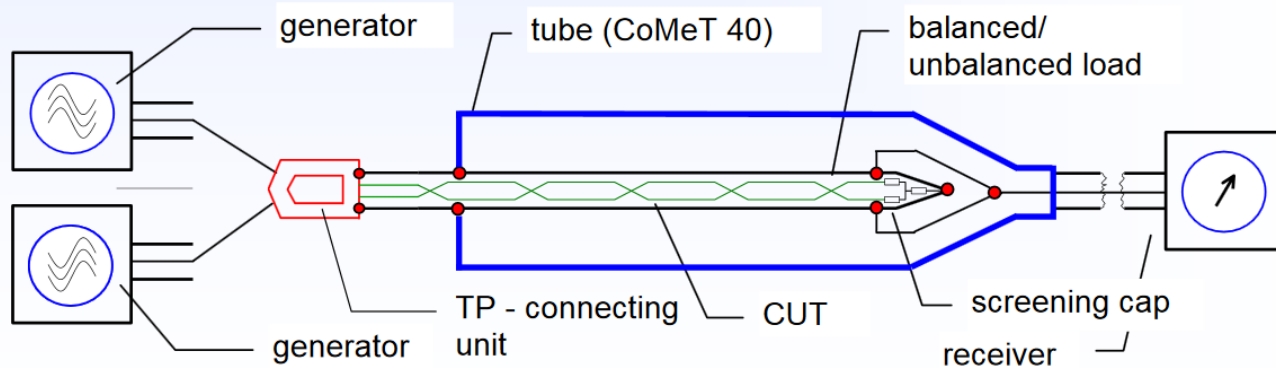
- “Link Segment” measurements – should each component be measured individually and then be put together to create composite curves for IL, RL, MC, etc. or should a complete harness be measured including header connectors on PCBs?
- Channel characteristics can be measured based on reference channels (complete link segment)
- EMC properties (shielding) based on components
- Screening and coupling attenuation of the cable can be measured according to IEC 62153-4-4
- PCB- and inline-connectors acc. to IEC 62153-4-7 (tube-in-tube)
- Measuring cable and connectors separately allows cable and connector manufacturers to evaluate their own components
- Overall performance is determined by weakest component in the link



# 802.3ch screening- and coupling attenuation measurement

## Component measurements

- Screening and coupling attenuation of the cable can be measured according to IEC 62153-4-4 (balun less method)
- Cable feed contact to shield with clamp of tube in tube
- Cable termination contact to shield via clamp, termination direct to cable
- DUT length 1 m or 3 m to be discussed



# 802.3ch screening- and coupling attenuation measurement

## Component measurements

- Screening and coupling attenuation of PCB- and inline-connectors acc. to IEC 62153-4-7 (tube-in-tube)
- Inline can be terminated at the cable, PCB connectors at foot point
- Measuring cable and connectors separately allows cable and connector manufacturers to evaluate their own components
- Overall performance is determined by weakest component in the link

