SDP Screening & Coupling Attenuation for 802.3ch

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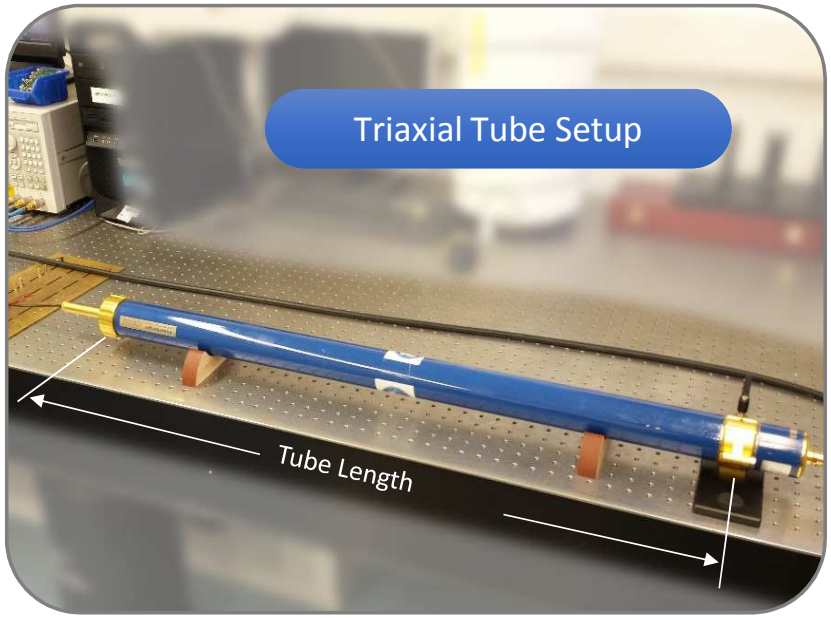
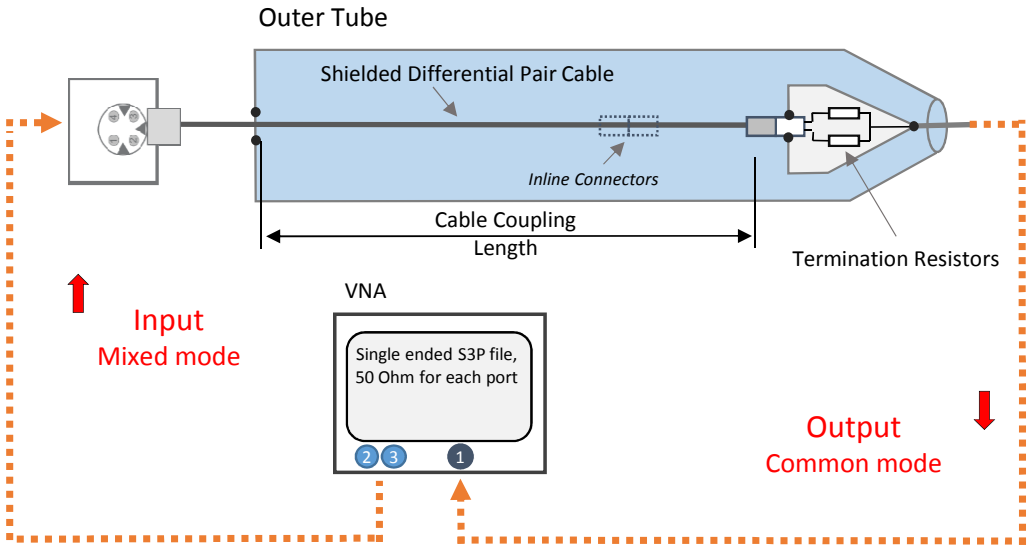
Motivation

- Demonstrate screening and coupling attenuation of shielded differential pair (SDP) cable assemblies
- Test Setup as agreed upon in previous EMI Adhoc meetings
- Goal of this testing is to set a baseline for EMI performance
- Measured Frequency range 3MHz to 4.8GHz
  - Lower cutoff frequency – 100 MHz (3m tube), 300MHz (1m tube)

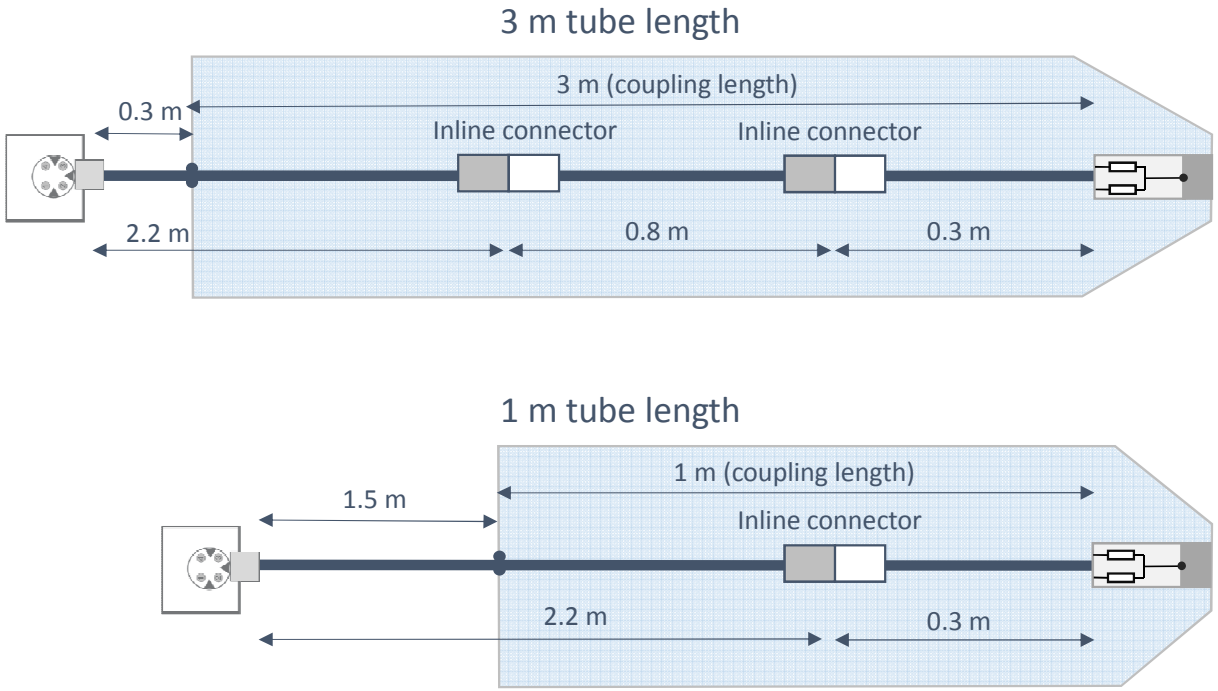
Triaxial Tube Setup (IEC 62153-4-7)





Ssd → (-) Coupling Attenuation
Ssc → (-) Screening Attenuation

Test setup



Cable assemblies:

2.2m – Connector – 0.8m – Connector – 0.3m

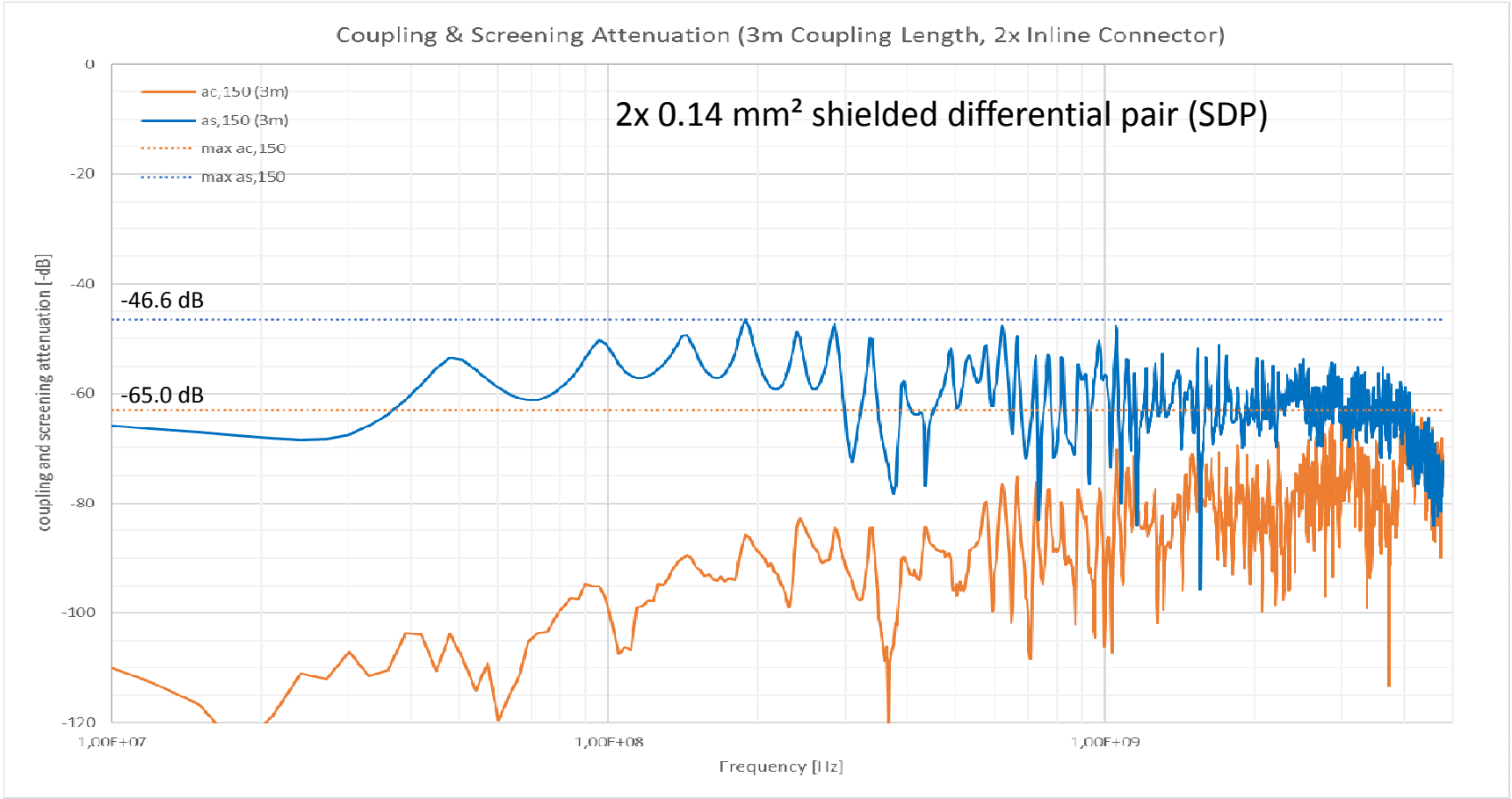
(use same segments)

2.2m – Connector – 0.3m

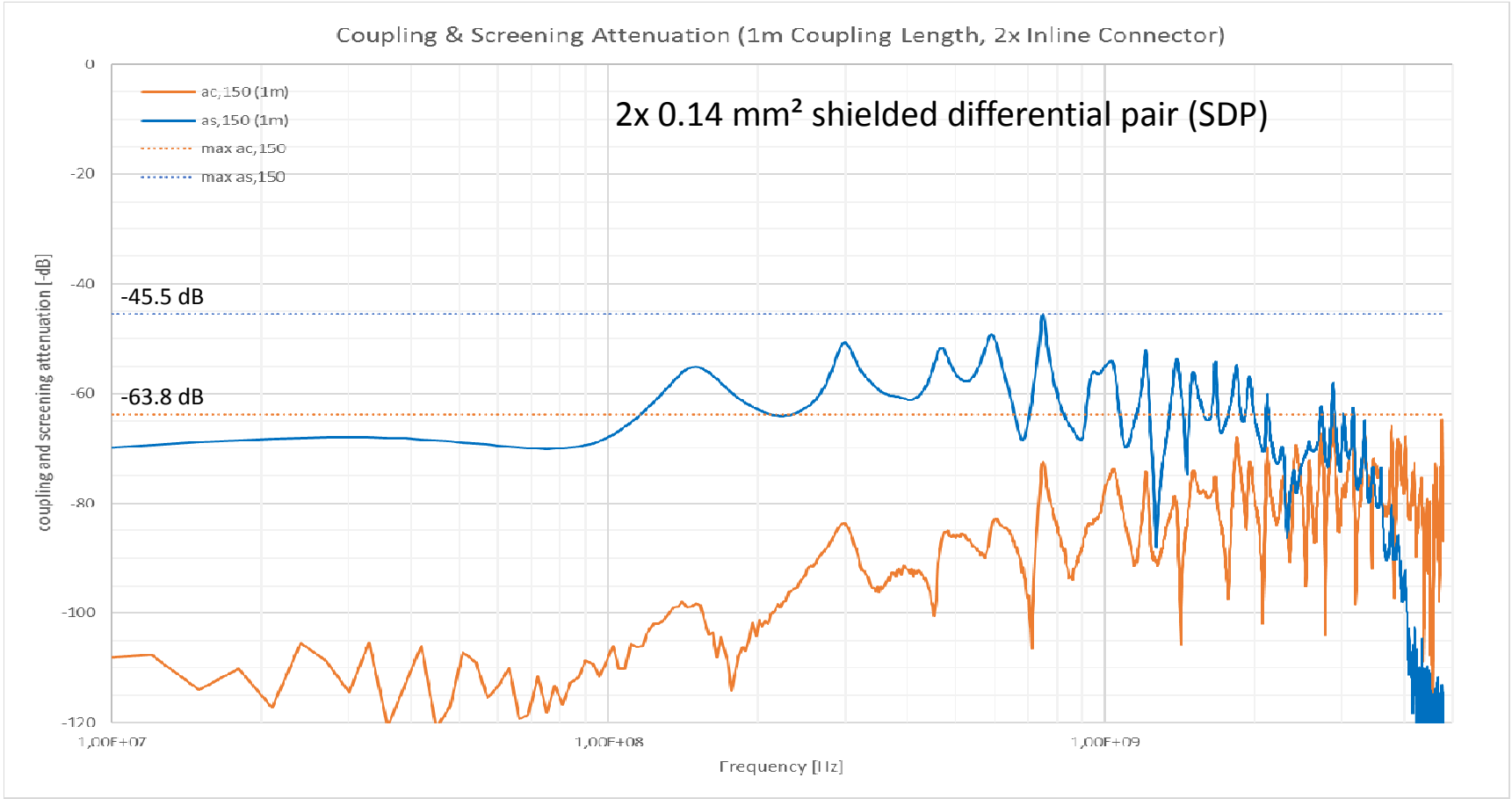
Setup Description

- 3m tube with 2x inline coupler
- 1m tube with 1x inline coupler
- Assembly with 2 inline connectors is the same one as with 1 inline connector and middle segment removed
- Termination within the tube done at the bare cable end in the same way as somebody would test a cable without connectors
- Signal injection outside the tube is done with a well balanced connector based test jig
- No inner tube used
- Results re-normalized to 150 Ohm reference impedance as required in the IEC standard

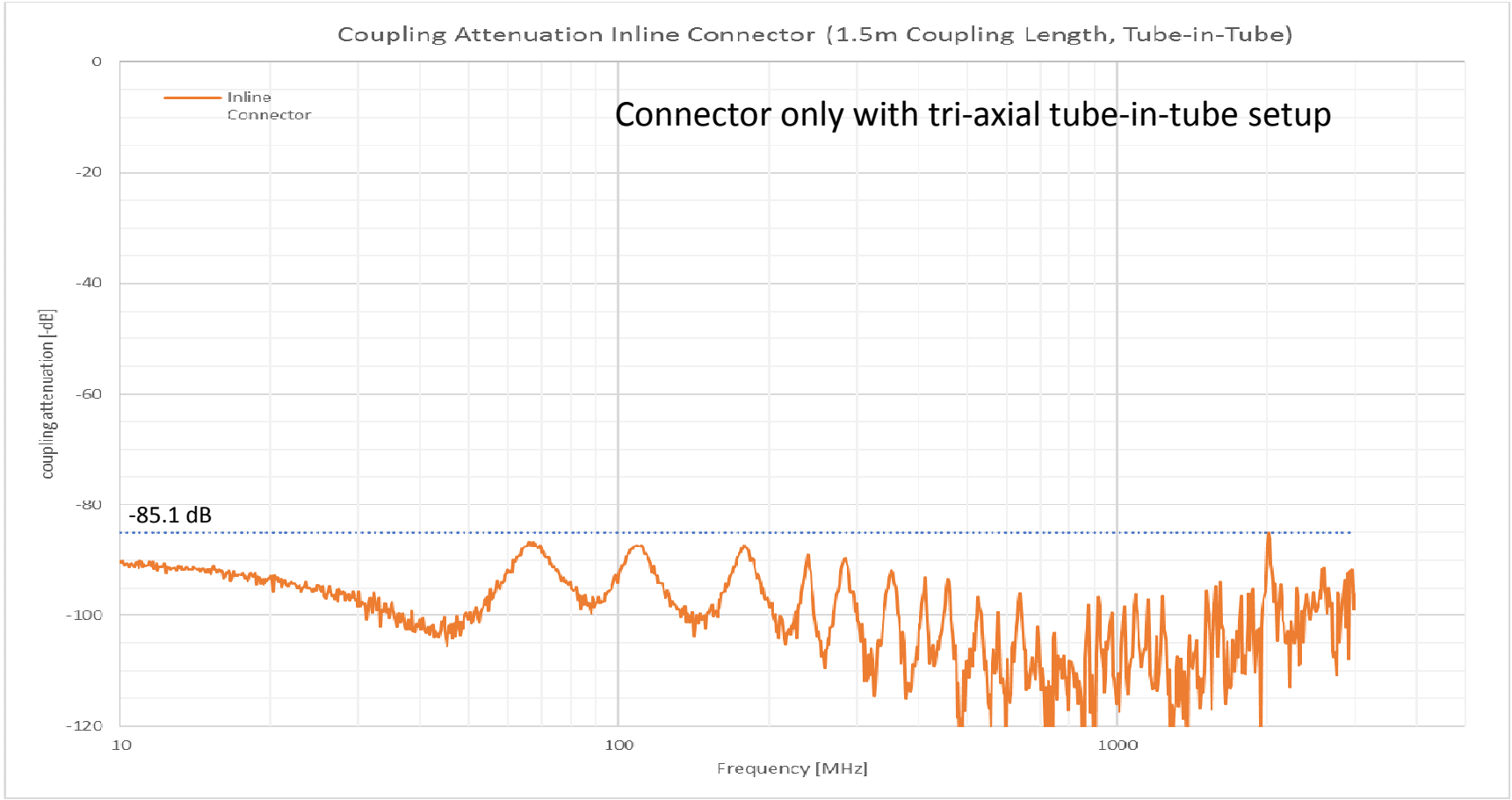
3m Coupling Length Test Results



1m Coupling Length Test Results



Connector Coupling Attenuation (Reference)



Conclusions

- Coupling attenuation better than 63dB for the selected SDP cable assembly
- No significant difference of the maximum coupling values between both setups (1m vs. 3m / 1 inline vs. 2 inline connectors)
- Connector only coupling attenuation is ~20dB better than complete assembly → Assembly transfer functions are dominated by the cable.
- Large difference between coupling and shielding attenuation at lower frequencies due to conversion loss
- No difference or even inverse relationship between coupling and shielding attenuation at higher frequencies
  - Higher mode conversion of cable, fixture and termination at higher frequencies
  - Higher insertion loss for common mode than for differential mode at higher frequencies

Thank You!!