Screening Attn. Clauses for –V1 191.10.1.5 and 192.8.1.5

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Scope

- Contribution addresses issue with screening attenuation limit in clause 192.8.1.5 (TDD –V1)
- Contribution addresses issue with reference to clause 149A in clauses 191.10.1.5 (ACT –V1) and 192.8.1.5 (TDD –V1)

Clause 192.8.1.5 Requirement

192.8.1.5 Screening attenuation

The screening attenuation of a -V1 link segment, measured in accordance with ISO 19642–11, shall meet the values determined using Equation (192–27). Additional screening attenuation test methodologies are defined in Annex 149A.

$$\text{Screening attenuation}(f) \geq \begin{cases} 64 & 10 \leq f < 3000 \\ 54 & 3000 \leq f \leq 5000 \end{cases} \text{ (dB)} \qquad (192\text{–}27)$$

where

f is the frequency in MHz; $10 \leq f \leq 5000$

Equation (192–27) is plotted in Figure 192–43, which is provided for information only.

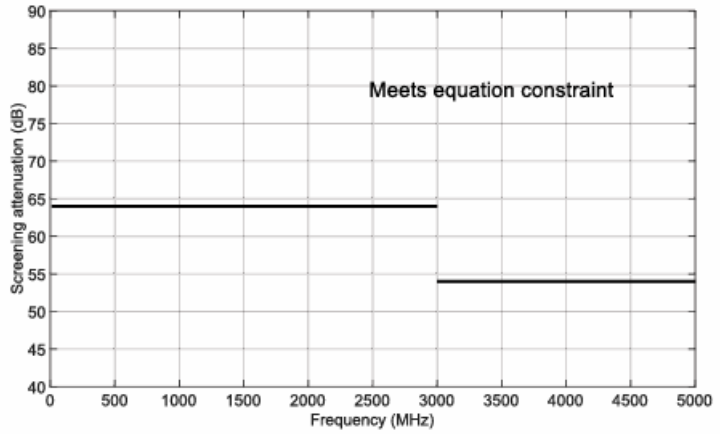
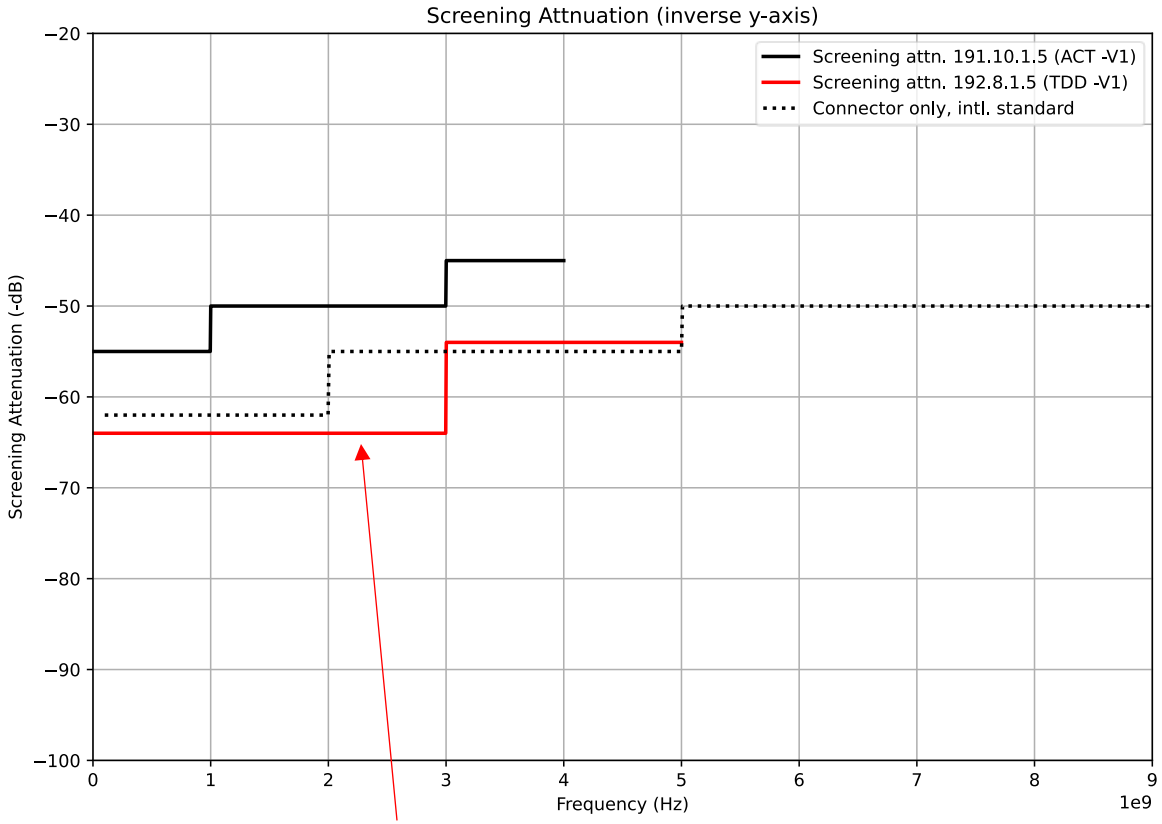
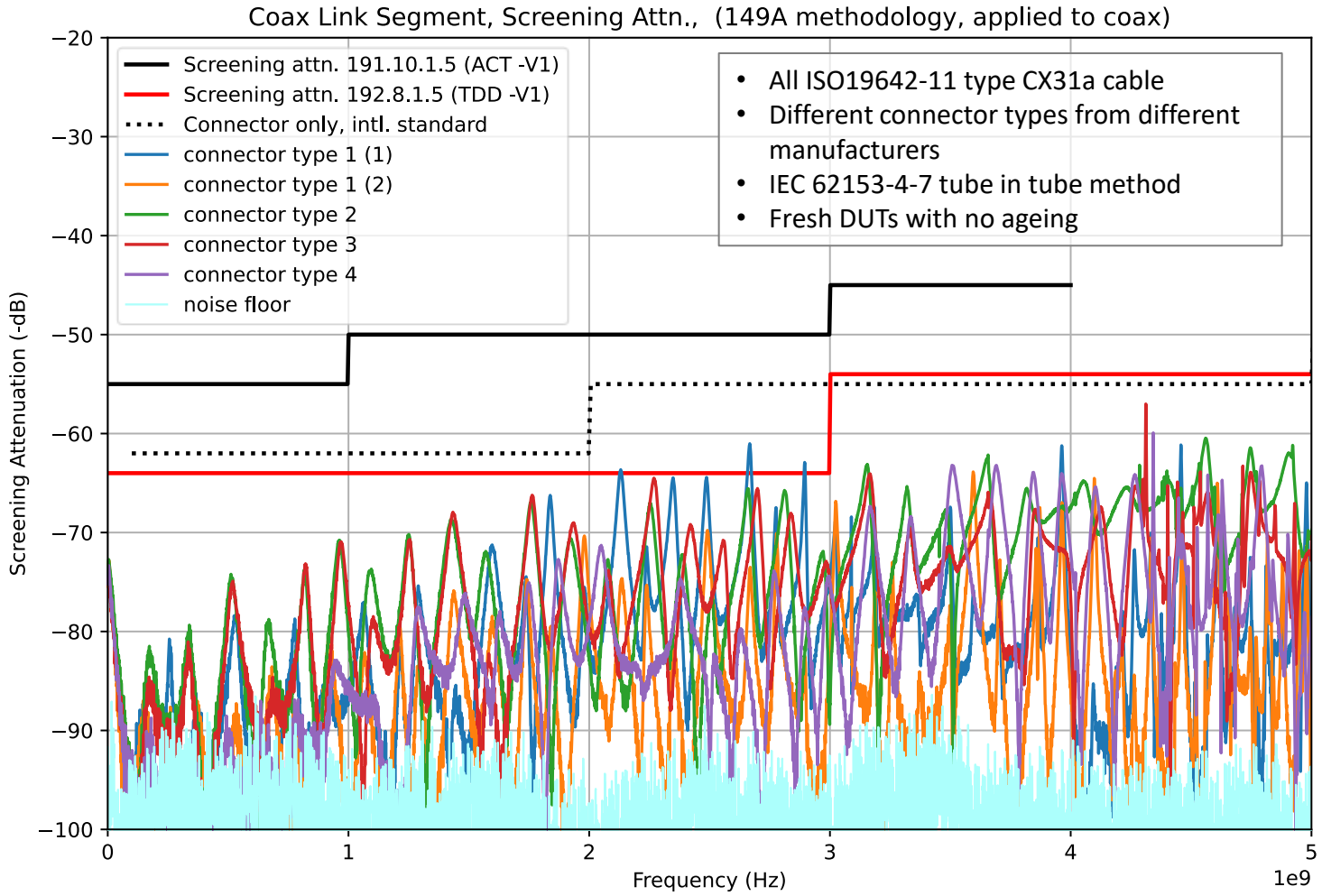


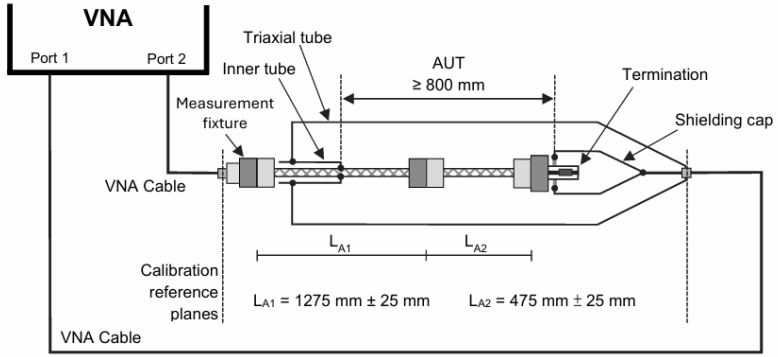
Figure 192–43—V1 link segment screening attenuation

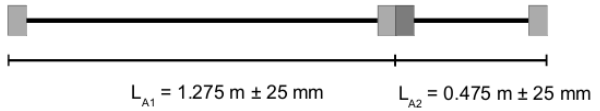


192.8.1.5 requirement for complete link segment more severe than requirement for a single automotive coax connector. Thus, the 802.3dm objective "Define ... link segments suitable for use with ... automotive unbalanced coaxial cabling supporting use of up to 4 inline connectors ..." cannot be fulfilled. → Propose same requirement as for 191.10.1.5

Example Measurements (Coax, method similar to 149A)







See 149A:

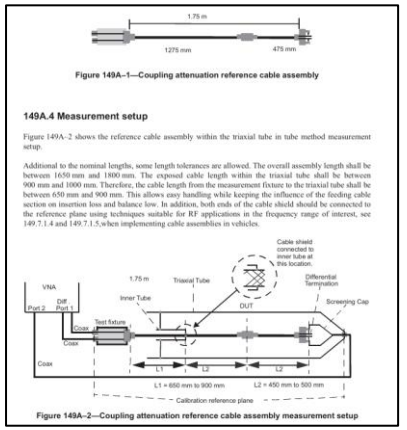


Figure 149A–1—Coupling attenuation reference cable assembly

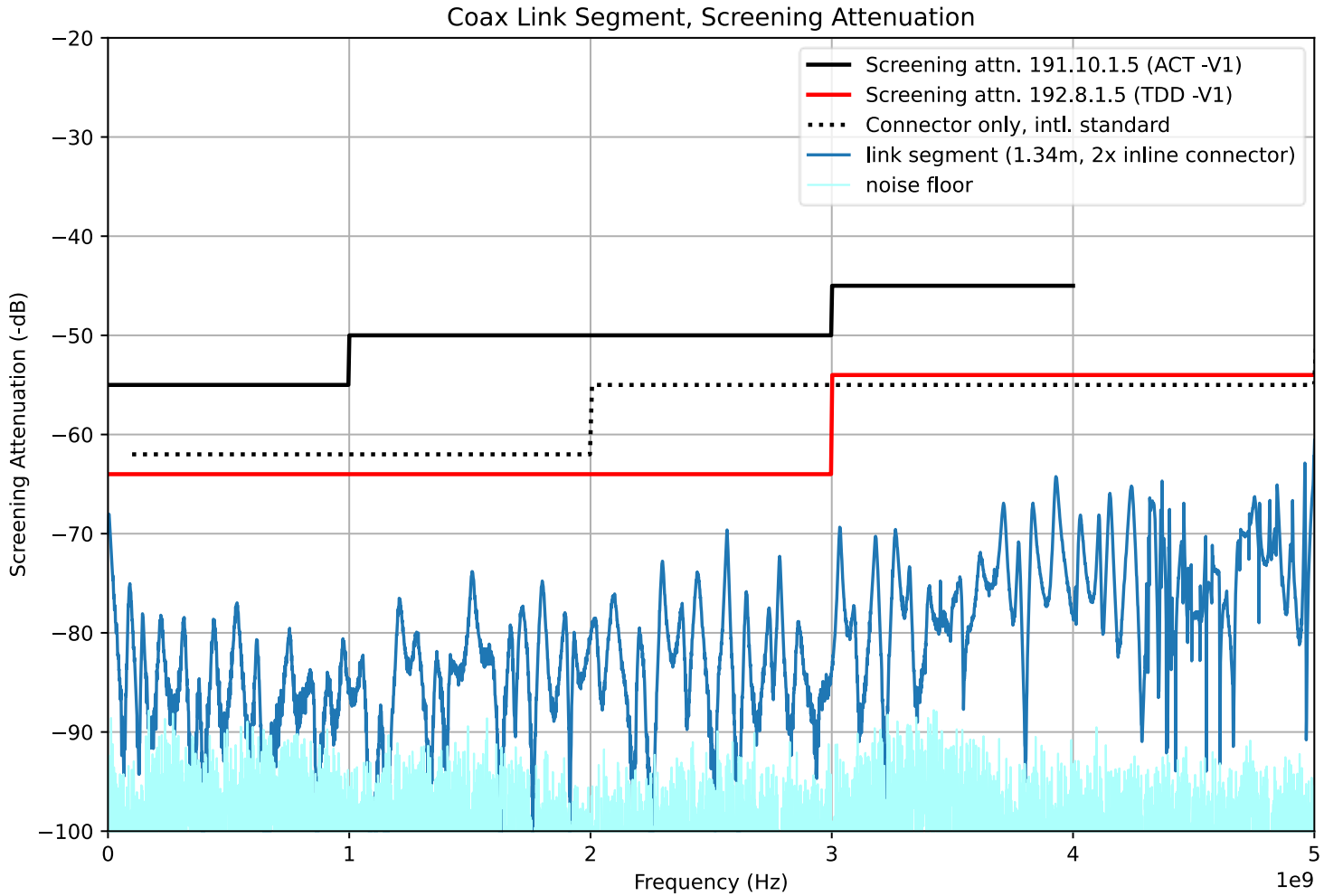
149A.4 Measurement setup

Figure 149A–2 shows the reference cable assembly within the triaxial tube in tube method measurement setup.

Additional to the nominal lengths, some length tolerances are allowed. The overall assembly length shall be between 1650 mm and 1800 mm. The exposed cable length within the triaxial tube shall be between 900 mm and 1000 mm. Therefore, the cable length from the measurement fixture to the triaxial tube shall be between 650 mm and 900 mm. This allows easy handling while keeping the influence of the feeding cable section on insertion loss and balance low. In addition, both ends of the cable shield should be connected to the reference plane using techniques suitable for RF applications in the frequency range of interest, see 149.7.1.4 and 149.7.1.5,when implementing cable assemblies in vehicles.

Figure 149A–2—Coupling attenuation reference cable assembly measurement setup

Example Measurement (link segment 1.34m / 2x inline connector)



- All segments ISO19642-11 type CX31a cable
- Fresh DUTs with no ageing
- IEC 62153-4-7 tube in tube method (2 m length)

Reference to ISO 19642-11

192.8.1.5 Screening attenuation

The screening attenuation of a -V1 link segment, measured in accordance with ISO 19642–11, shall meet the values determined using Equation (192–27). Additional screening attenuation test methodologies are defined in Annex 149A.

$$\text{Screening attenuation}(f) \geq \begin{cases} 64 & 10 \leq f < 3000 \\ 54 & 3000 \leq f \leq 5000 \end{cases} \text{ (dB)} \qquad (192\text{–}27)$$

where

f is the frequency in MHz; $10 \leq f \leq 5000$

Equation (192–27) is plotted in Figure 192–43, which is provided for information only.

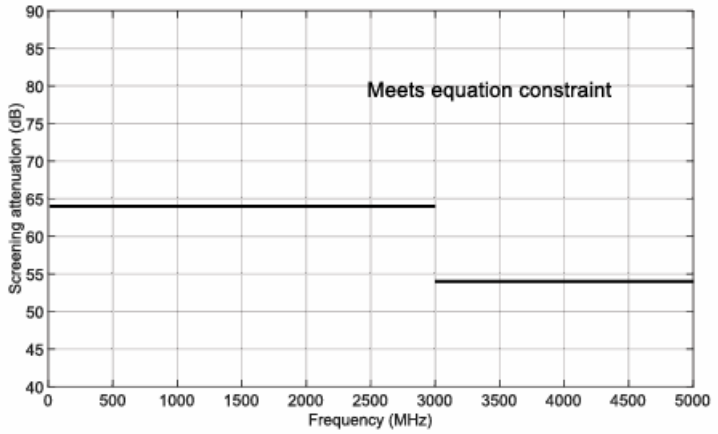


Figure 192–43—V1 link segment screening attenuation

ISO 19642-11: “Road vehicles – Automotive cables – Part 11: Dimensions and requirements for coaxial RF cables with a specified analogue bandwidth up to 6 GHz (20 GHz)”

→ This standard is related to the cable component only without connectors. Clause 192.8.1.5 is supposed to specify a link segment that includes connectors.

→ Propose to delete the reference to ISO 19642-11

Reference to clause 149A

149A.4 Measurement setup

Figure 149A–2 shows the reference cable assembly within the triaxial tube in tube method measurement setup.

Additional to the nominal lengths, some length tolerances are allowed. The overall assembly length shall be between 1650 mm and 1800 mm. The exposed cable length within the triaxial tube shall be between 900 mm and 1000 mm. Therefore, the cable length from the measurement fixture to the triaxial tube shall be between 650 mm and 900 mm. This allows easy handling while keeping the influence of the feeding cable section on insertion loss and balance low. In addition, both ends of the cable shield should be connected to the reference plane using techniques suitable for RF applications in the frequency range of interest, see 149.7.1.4 and 149.7.1.5,when implementing cable assemblies in vehicles.

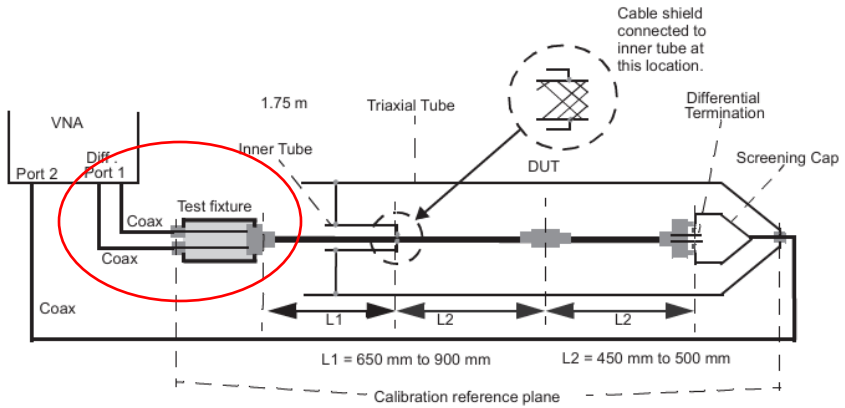


Figure 149A–2—Coupling attenuation reference cable assembly measurement setup

A 3-port vector network analyzer (VNA) measurement setup shall be used without baluns. Two ports of the VNA act as generator and the third port is used as single-ended receiver. For coupling attenuation measurements, the generator port-pair is operated in differential mode. For screening attenuation measurements, the generator port-pair is operated in common mode.

The measurement setup shall be optimized with respect to balance. This includes VNA, accurate and well-balanced test fixture and termination designs, as well as the use of phase stable coaxial cables.

The termination shall be nominal 100 Ω in differential mode and 25 Ω in common mode. The requirements on the single-ended termination of every conductor of the differential pair shall be 50 Ω ± 1% to ground. The two resistors of the differential pair shall be matched to within ±0.1 Ω at DC. The resistors need to be suitable for RF applications in the frequency range under test.

191.10.1.5 Screening attenuation

The screening attenuation for each -V1 link segment shall meet the values determined using Equation (191–19). Screening attenuation is tested as specified in IEC 62153-4-7 using triaxial tube-in-tube method. Additional screening attenuation test methodologies are defined in Annex 149A.

… same issue in clause 192.8.1.5

- Clause 149A describes a well-defined method for measuring screening and coupling attenuation of link segments
- Clause 149A allows comparison of link segments made of different components.
- Clause 149A enables comparison of results from different test houses

→ These advantages shall be preserved.

Issue related to clauses 191.10.1.5 (screening attn. ACT –V1) and 192.8.1.5 (screening attn, TDD –V1):

- Clause 149A specifically describes balanced pair only – see red marked sentences in the screen shot.

→ This may cause confusion or miss-interpretation

Proposal: Change sentences in line 33 on page 147 and in lines 4-5 on page 239 as follows explaining, that the method in 149A shall be used in general but has to be applied to coaxial cabling:

“Additional screening attenuation test methodologies are defined in Annex 149A. These methodologies shall be applied with adaptation to unbalanced coaxial cabling and shall use a single 50 Ω termination to ground.”

Proposals - Summary

- Change requirement for clause 192.8.1.5 to be the same as for clause 191.10.1.5
- Delete reference to ISO 19642-11
- Mention that the 149A methods need to be adapted to unbalanced coaxial cabling.

→Proposed text for 192.8.1.5:

192.8.1.5 Screening attenuation

The screening attenuation of a –V1 link segment shall meet the values determined using Equation (191-19). Screening attenuation is tested as specified in IEC 62153-4-7 using triaxial tube-in-tube method. Additional screening attenuation test methodologies are defined in Annex 149A. These methodologies shall be applied with adaptation to unbalanced coaxial cabling and shall use a single 50 Ω termination to ground.

→Proposed to add the following sentence in 191.10.1.5 after line 33 on page 147 (D2.0):

… These methodologies shall be applied with adaptation to unbalanced coaxial cabling and shall use a single 50 Ω termination to ground.