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DOCUMENT SUBMITTED TO: IEEE 802.3cg Task Force



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802.3cg and TIA single pair	Overview of TIA-568.5 draft comparison to 802.3cg link segment parameters.	
PROJECT NUMBER (PN):	802.3cg	
DISTRIBUTION:	IEEE 802.3cg	
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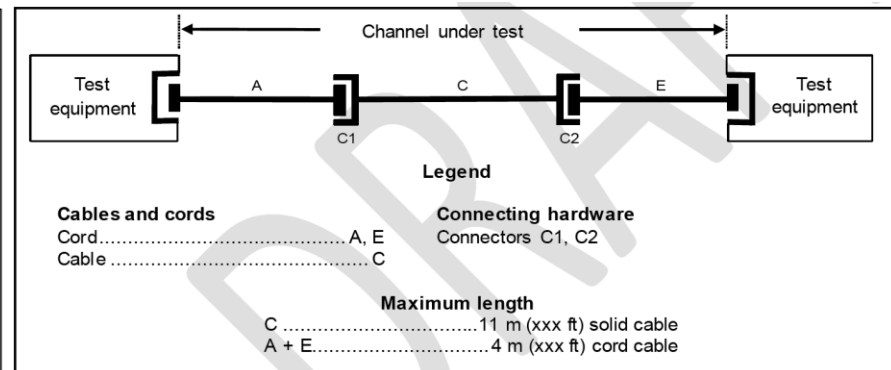
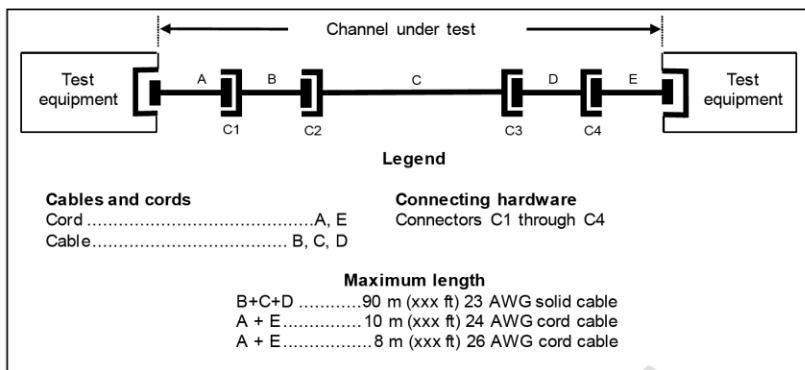
ABSTRACT: A comparison of the 802.3cg parameters to the draft TIA-568.5 Single Twisted Pair Cabling and Components initial draft.

Introduction to TIA 568.5 single pair cabling standard

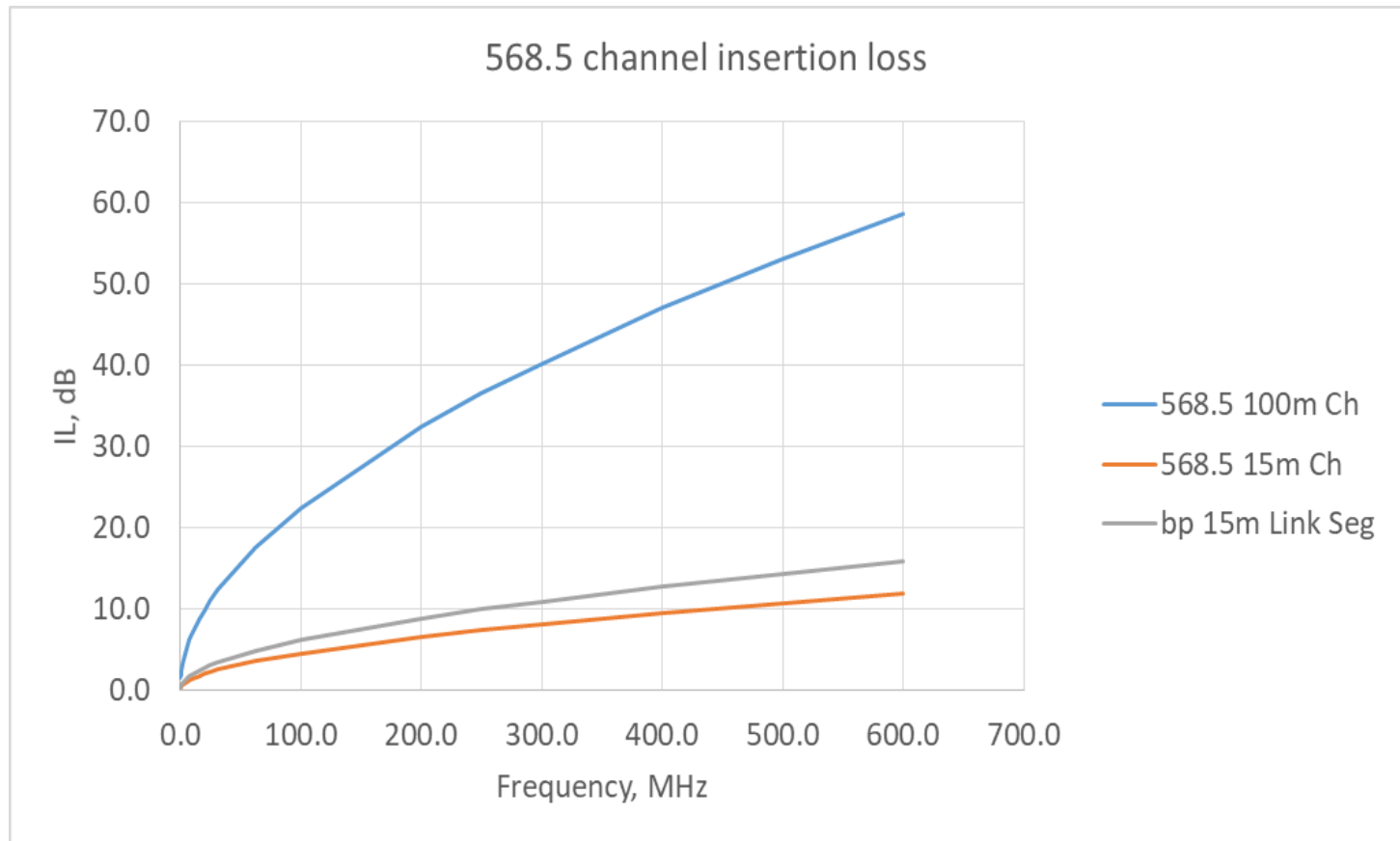
- The TIA TR-42.7 committee has authorized a task group to develop initial requirements for a single pair structured cabling standard.
- The standard is intended to be compatible with and support IEEE single pair applications including the 802.3cg application, both long and short link segments.
- Initially the draft specifies a single channel specification that is intended to broadly cover both the long reach low data rate objective and the short reach objectives.
- The frequency range initially is 100KHz to 600 MHz to accommodate both the 802.3cg frequency range of 0.1 MHz to 20 MHz and the 802.3bp frequency range of 1 MHz to 600 MHz.
- It might be advantageous to increase the lower frequency start point to 500 KHz as there are large characteristic impedance changes of a twisted pair from 100 KHz to 500 KHz.
- Scaling of insertion loss/attenuation by wire gauge uses the same metrics as diminico_01_0317.pdf. Scaling for stranded/solid conductors is under study.

568.5 Channel topology

- The TIA channel specification is divided into two specifications, a 15 m specification with two intermediate connectors and a 100 m specification with four intermediate connectors. This range is considered adequate for commercial building cabling applications. We welcome use case information that may broaden that range if necessary. (1000 m for industrial)
- The channel performance specifications are based upon category 6A requirements simplified for application to single pair.

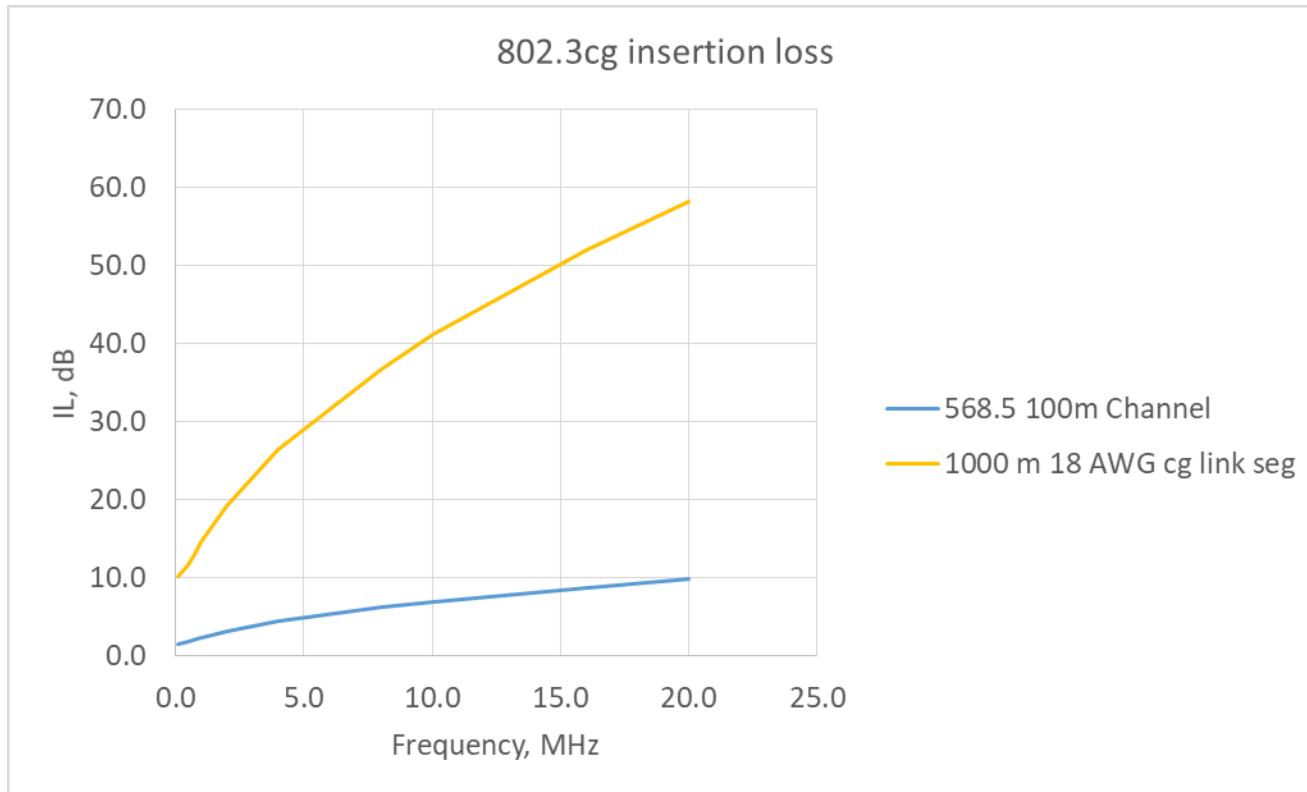


568.5 Channel Insertion loss



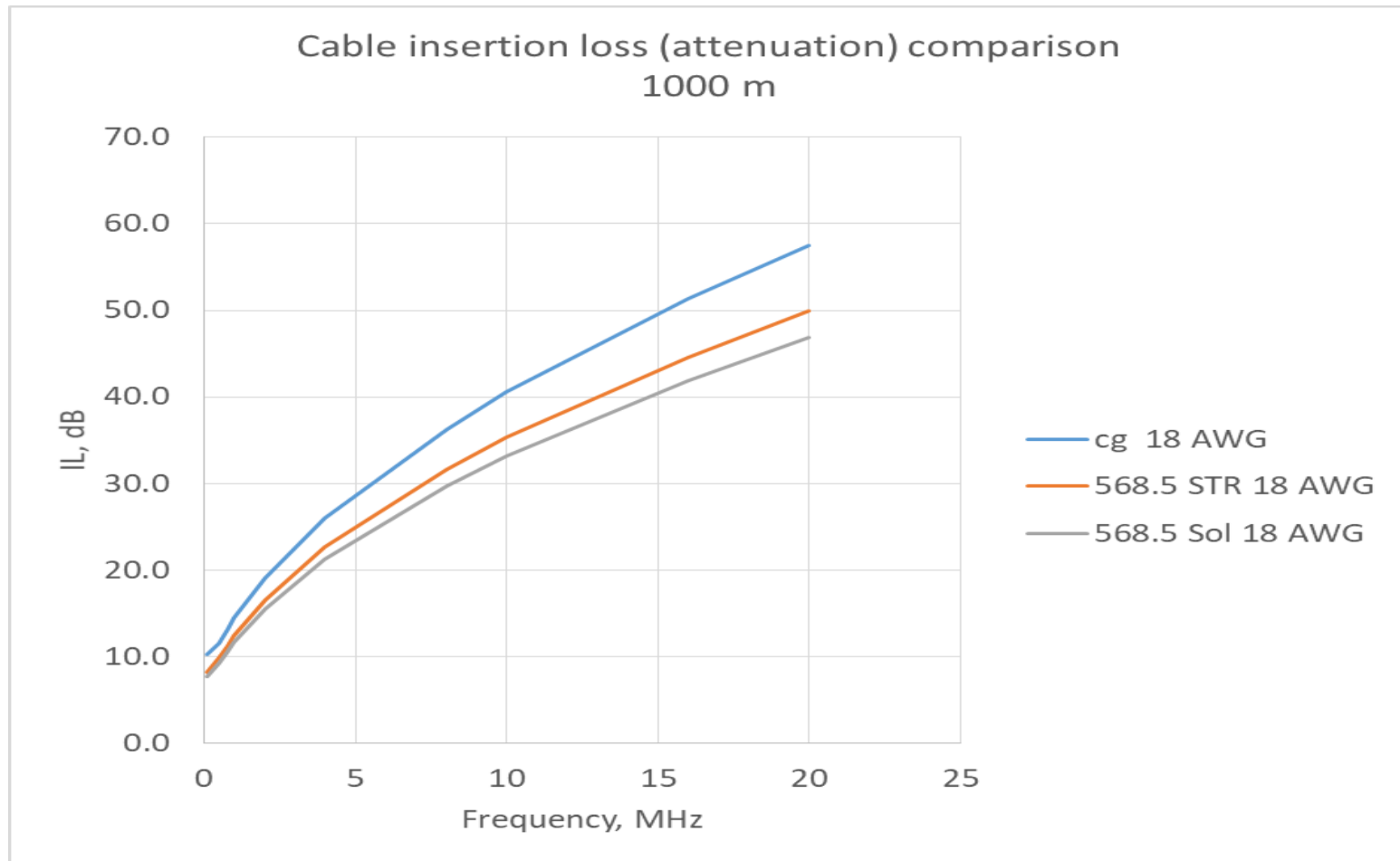
100 m channel insertion loss is derived from 24 AWG cable with 24 AWG cords.
15 m channel insertion loss is derived from 26 AWG cable and 26 AWG cords

802.3cg 1000m link insertion loss

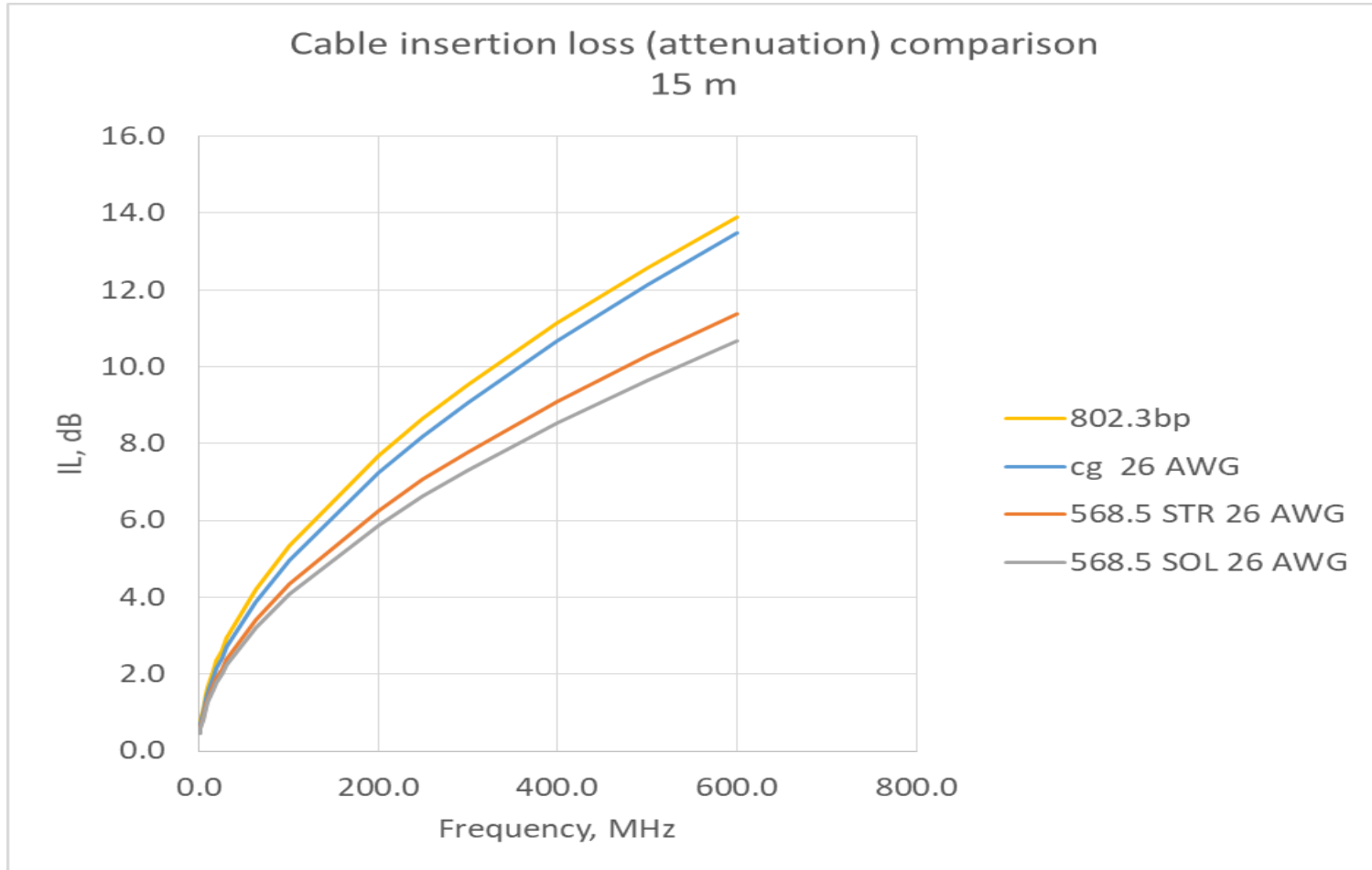


100 m channel insertion loss with four connectors, 24 AWG
802.3cg insertion loss with 10 connectors, 18 AWG.

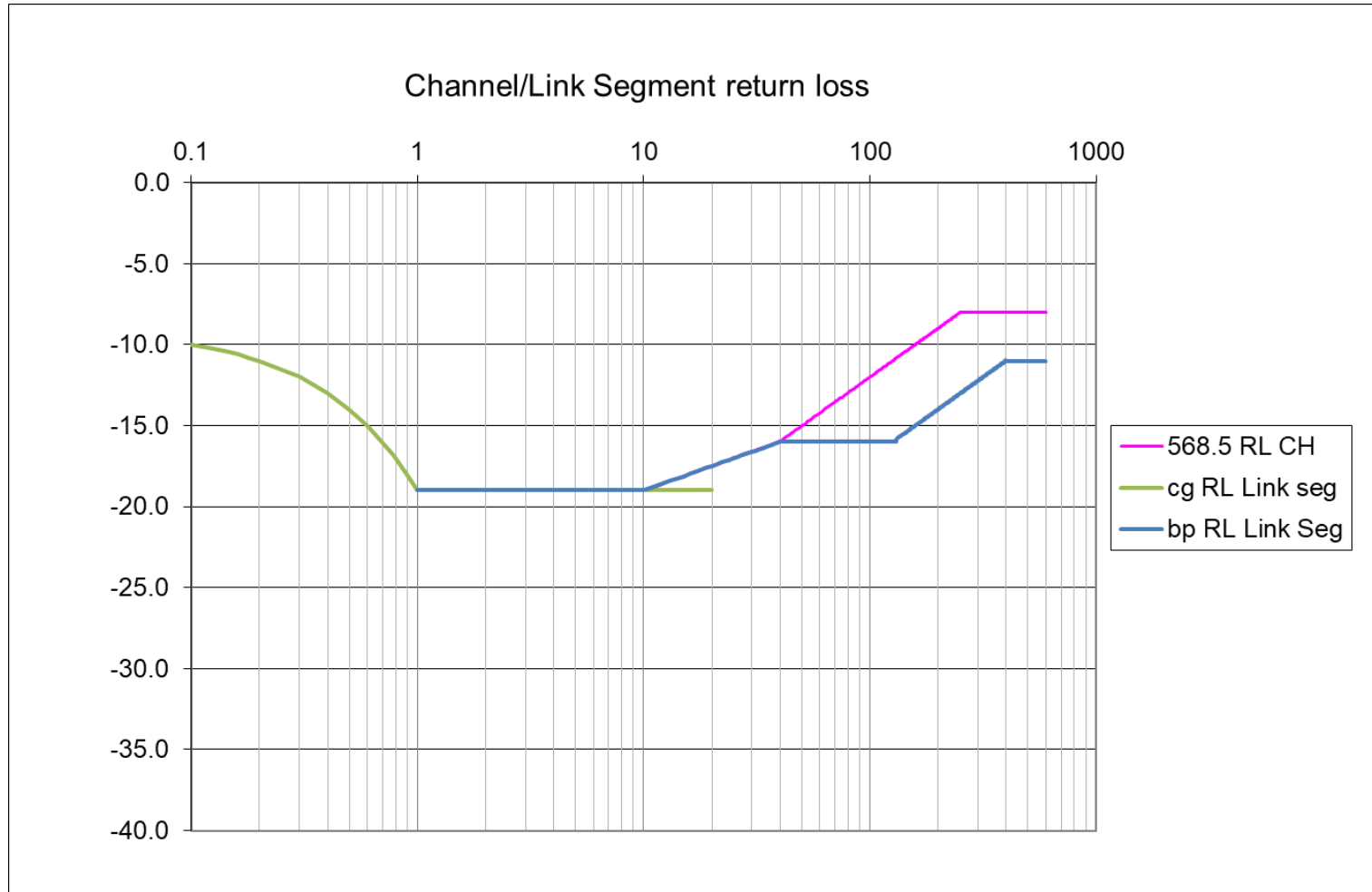
Cable Insertion loss Comparison 1000 m, 18 AWG



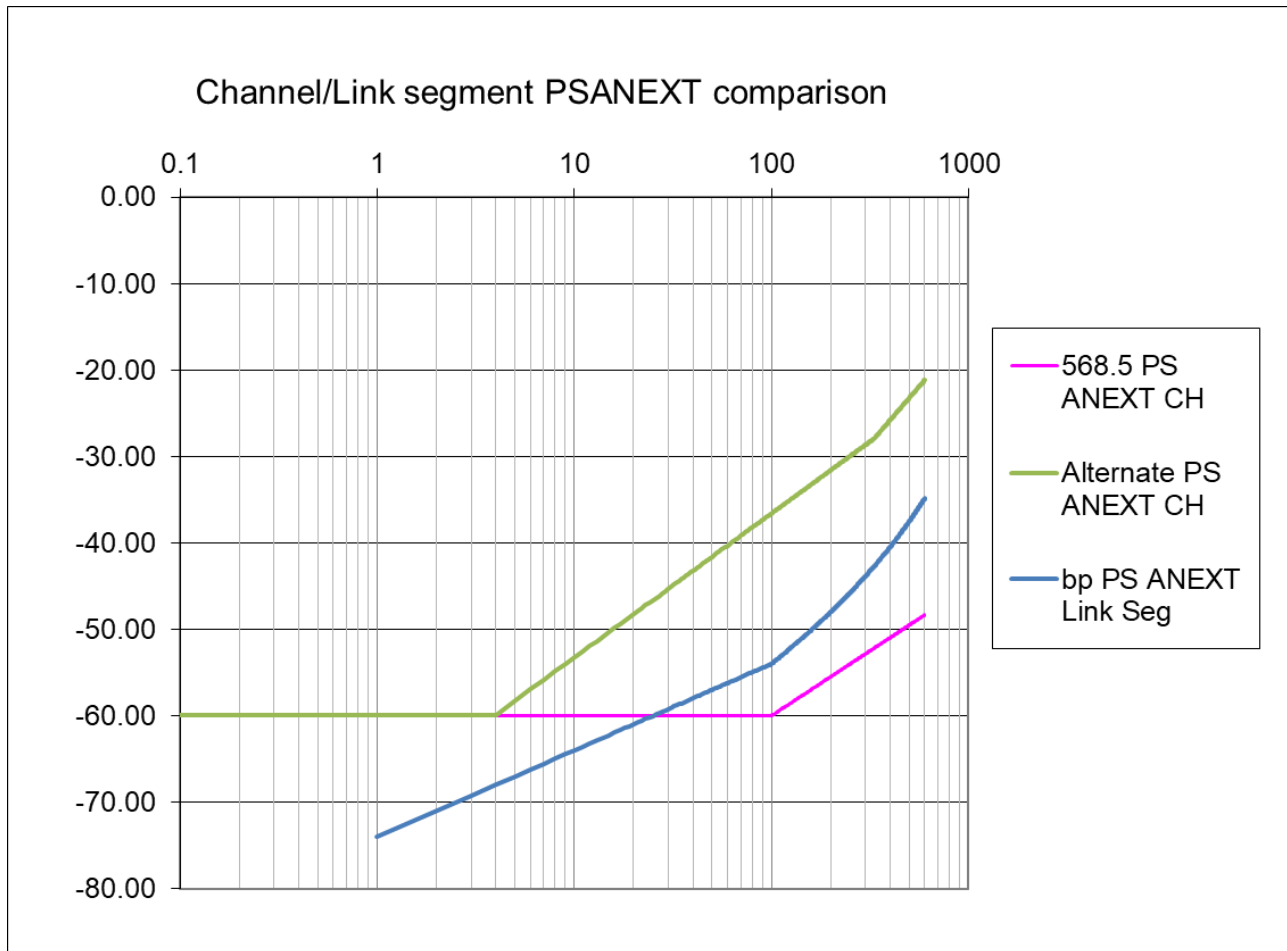
Cable insertion loss comparison 15 m 26 AWG.



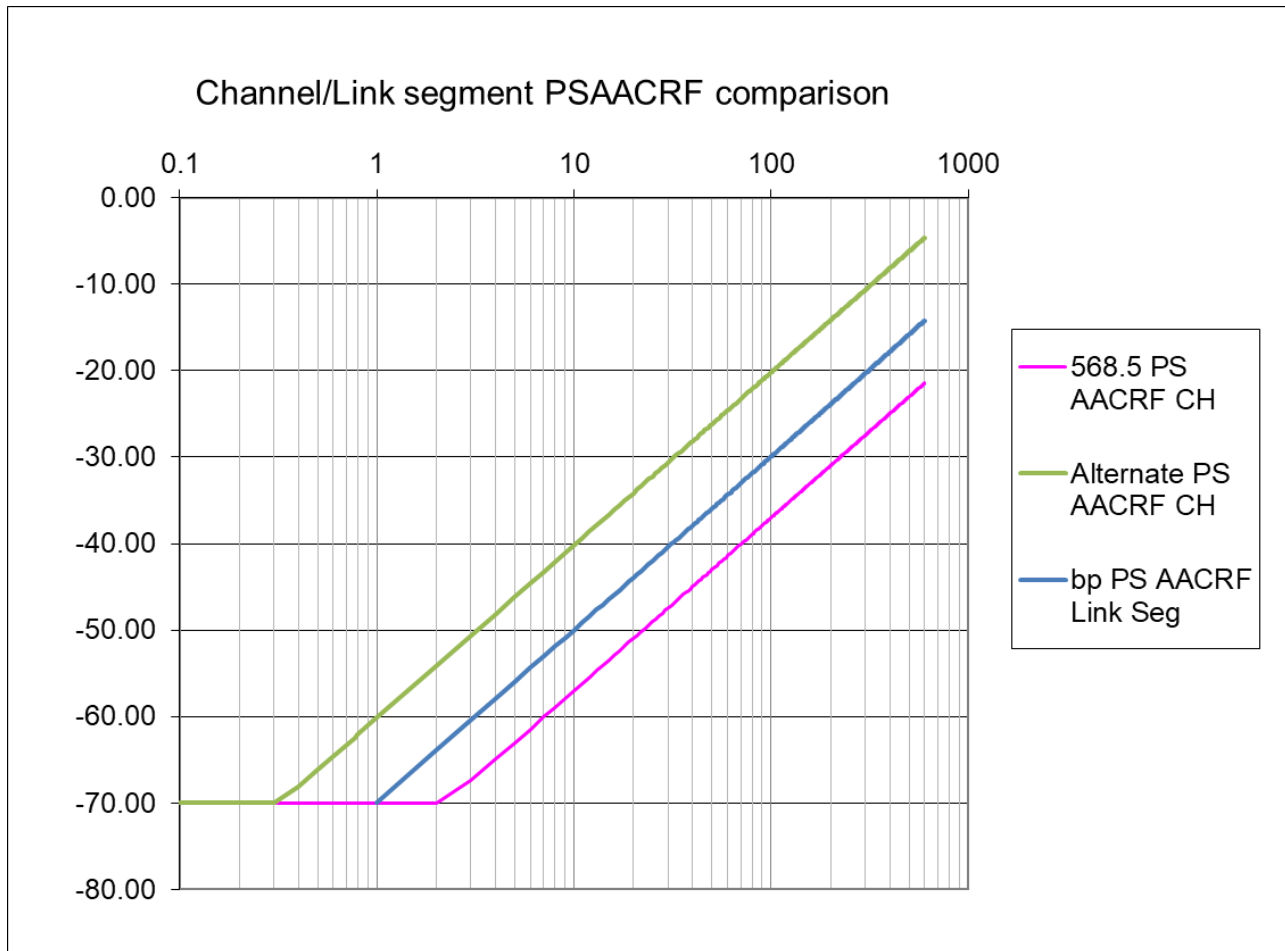
Channel Return Loss comparison



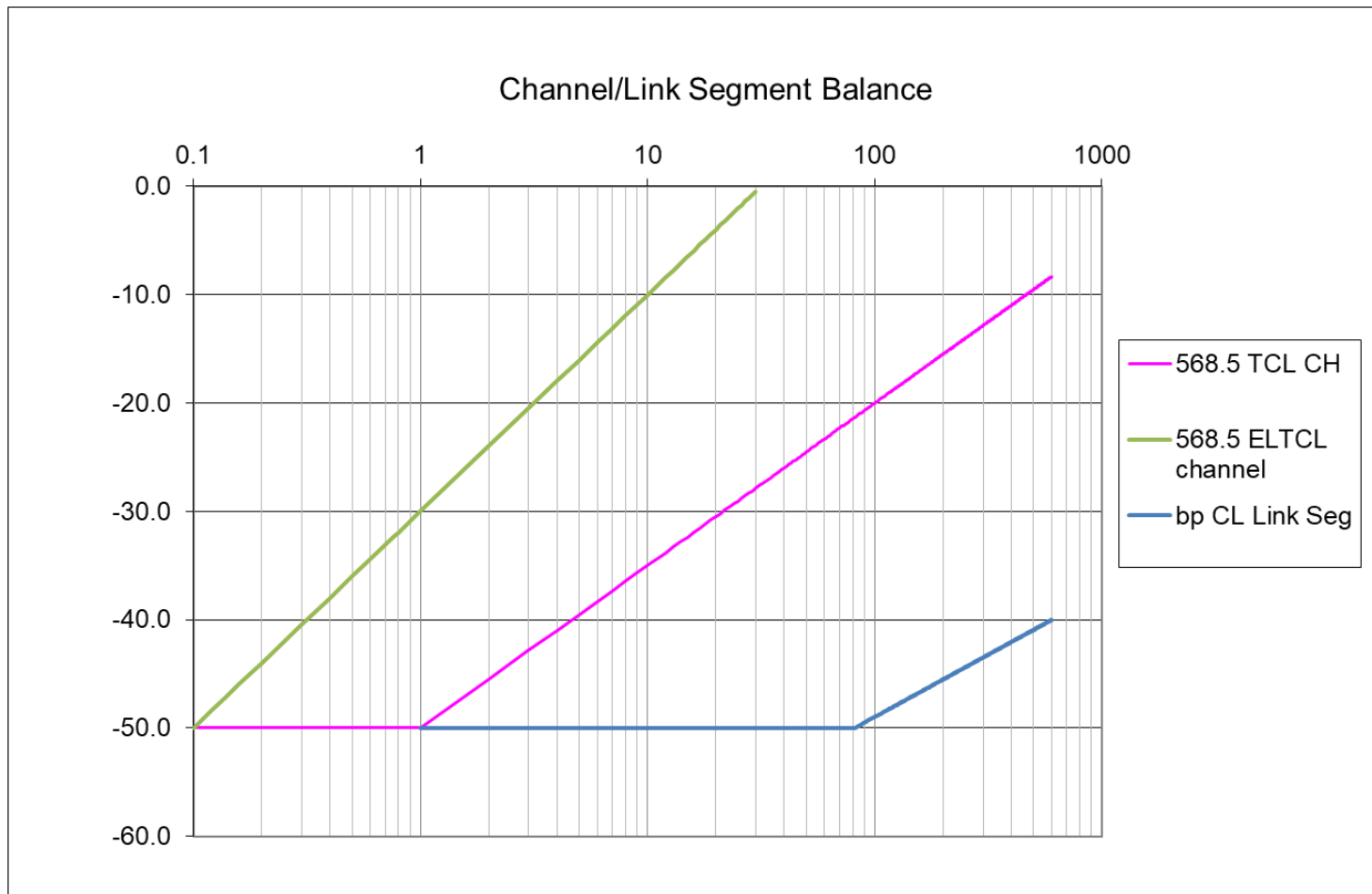
Alien crosstalk PSANEXT comparison



Alien crosstalk PSAACRF comparison.



Channel/Link Segment balance comparison



Summary

- The initial draft specifications are based upon existing structured cabling requirements and can be adjusted if necessary
- The initial specifications allow backward compatibility with existing four pair cabling
- Insertion loss scaling with wire gauge and stranding over wide ranges is a relatively new strategy for structured cabling standards. The principles are well established but have not previously been applied in a detailed and rigorous manner in structured cabling specifications.
- Some of the spec comparisons are apple/orange type comparisons due to existing 802.3bp single pair automotive application spaces.

Feedback is requested on:

- Return loss requirement. Is the bp return loss the model we should use?
- Alien crosstalk. The alternate alien crosstalk limits would allow use of multiple single pair instances on four pair cabling.
- Balance. This is a more complex subject because it is felt that the bp balance spec is based on a specific measurement configuration. Using the existing specification allows use of existing installed cabling without further characterization.