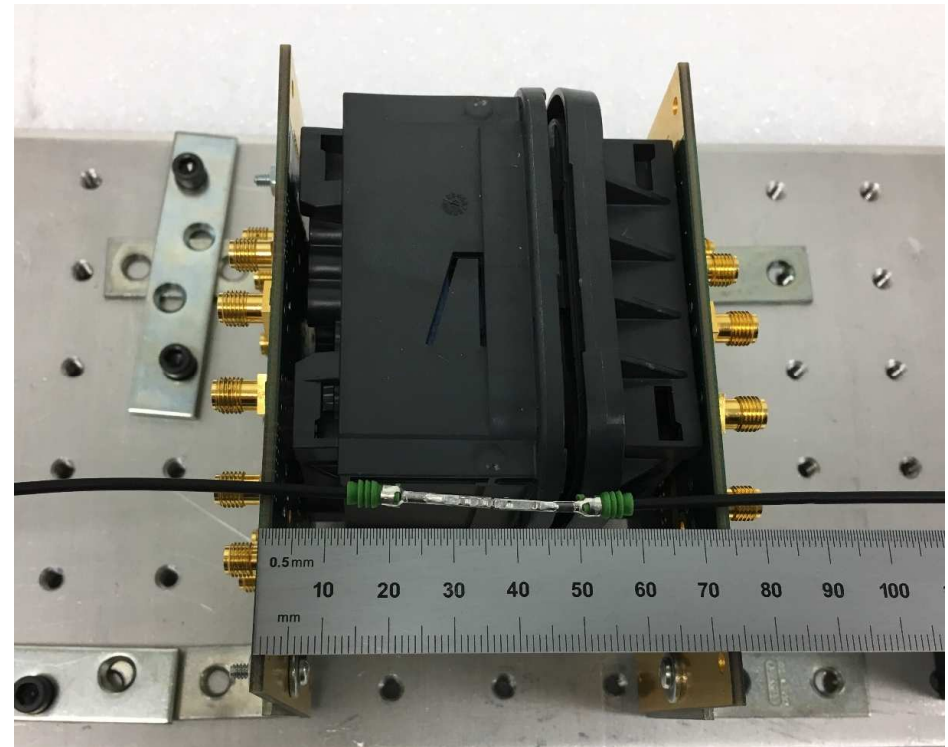
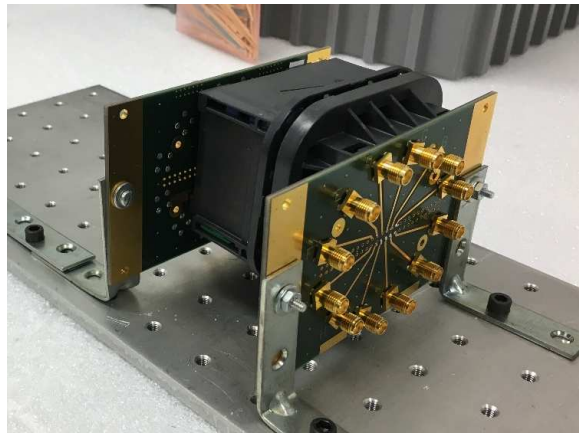
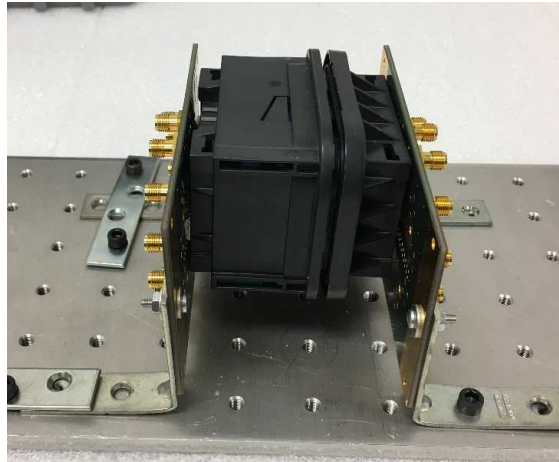
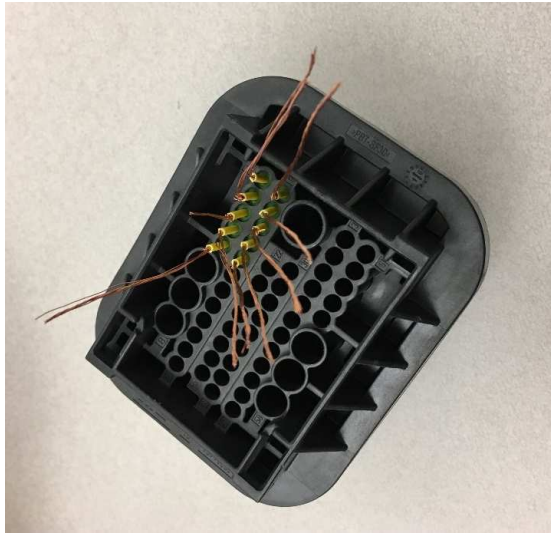


Analysis of Connector S-parameters for 10SPE

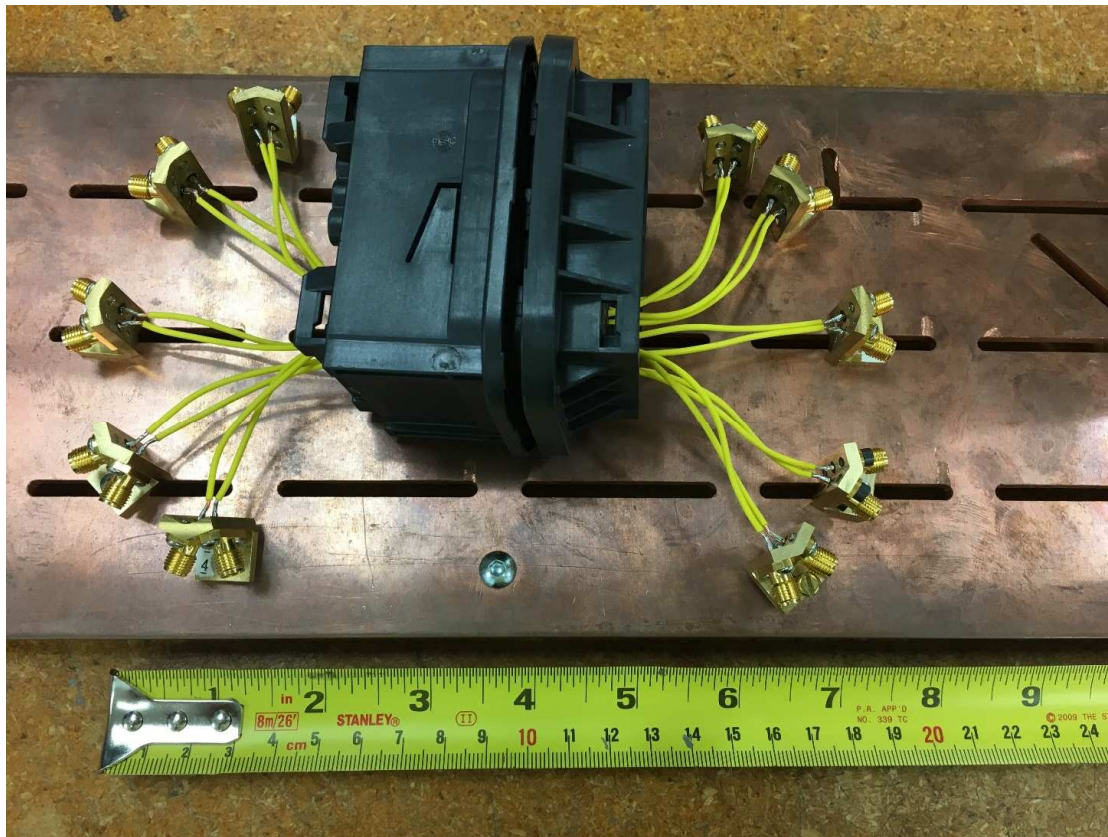
Bert Bergner, Eric DiBiaso
TE Connectivity

July 10, 2017 – Plenary Meeting – Berlin, Germany

4mm Pitch, Single wire seal Connector (Minimum Untwist Length)



4mm Pitch, Single wire seal Connector (Long Untwist Length)



- Termination requires 60-70mm untwist length on each side of the connector

← 180mm →

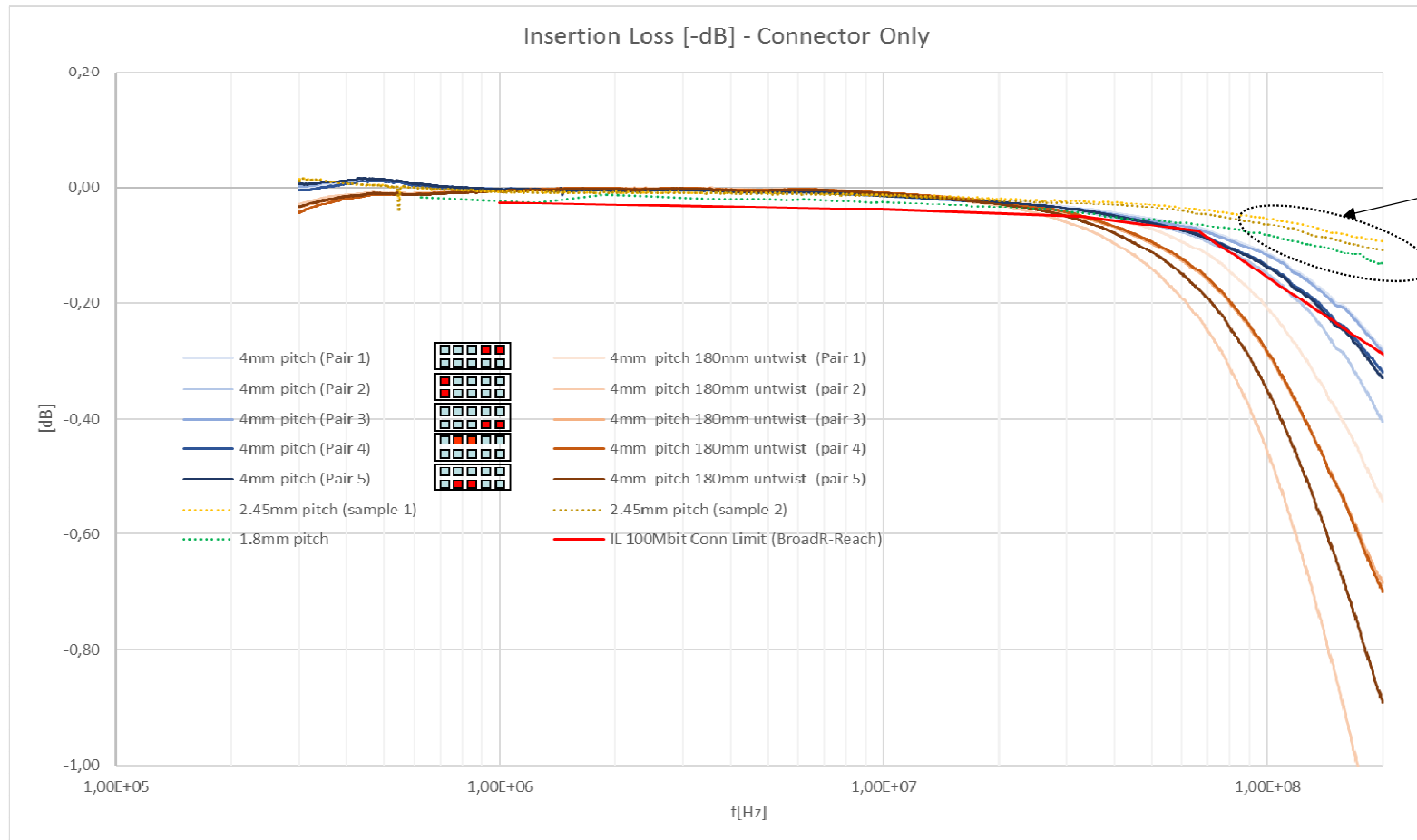


65mm

50mm

65mm

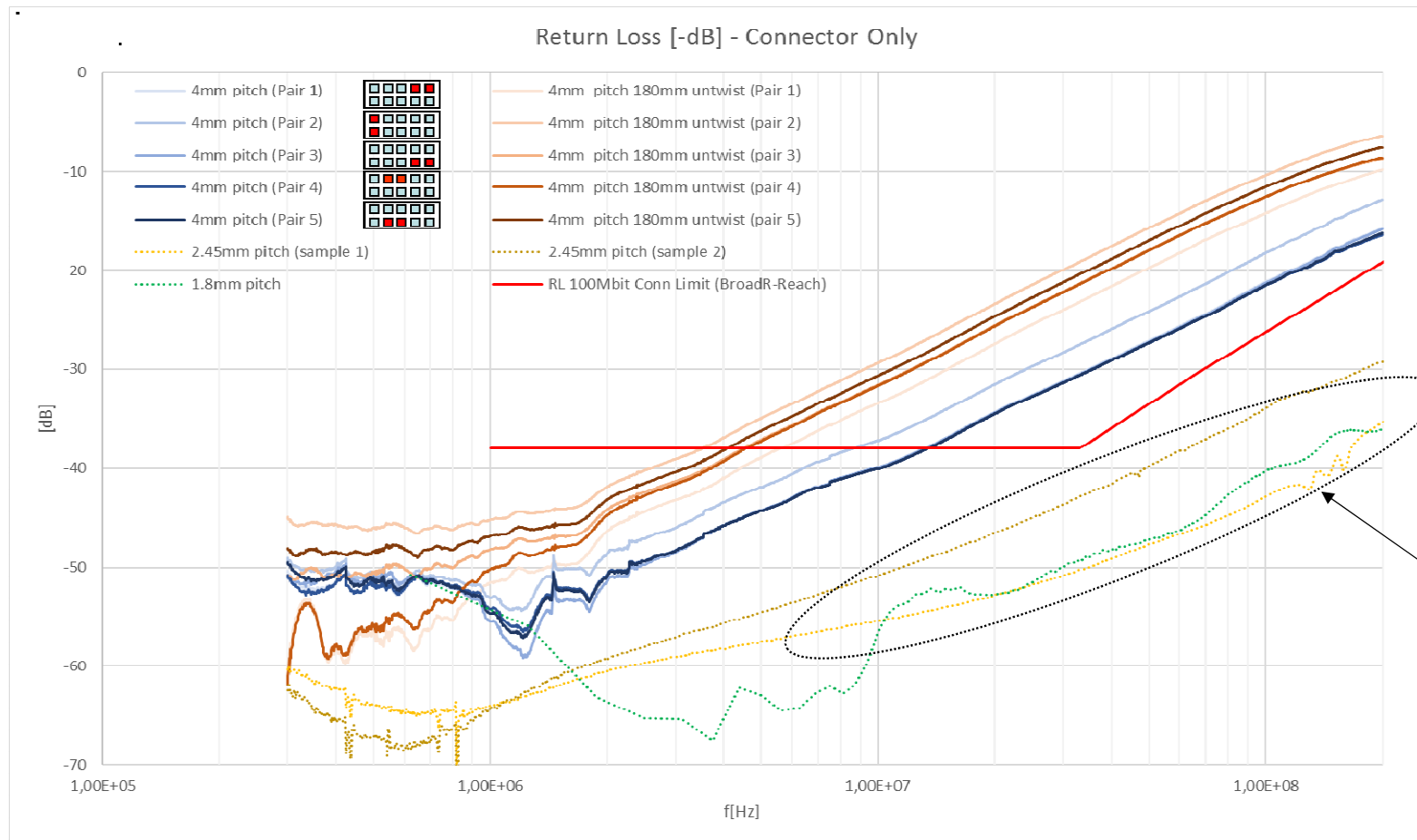
Insertion Loss of Automotive 4mm Pitch Connectors



See
http://www.ieee802.org/3/cg/public/Mar2017/DiBiaso_Bergner_01a_0314.pdf

- Accuracy at low frequencies strongly depends on VNA type, calibration, and VNA settings

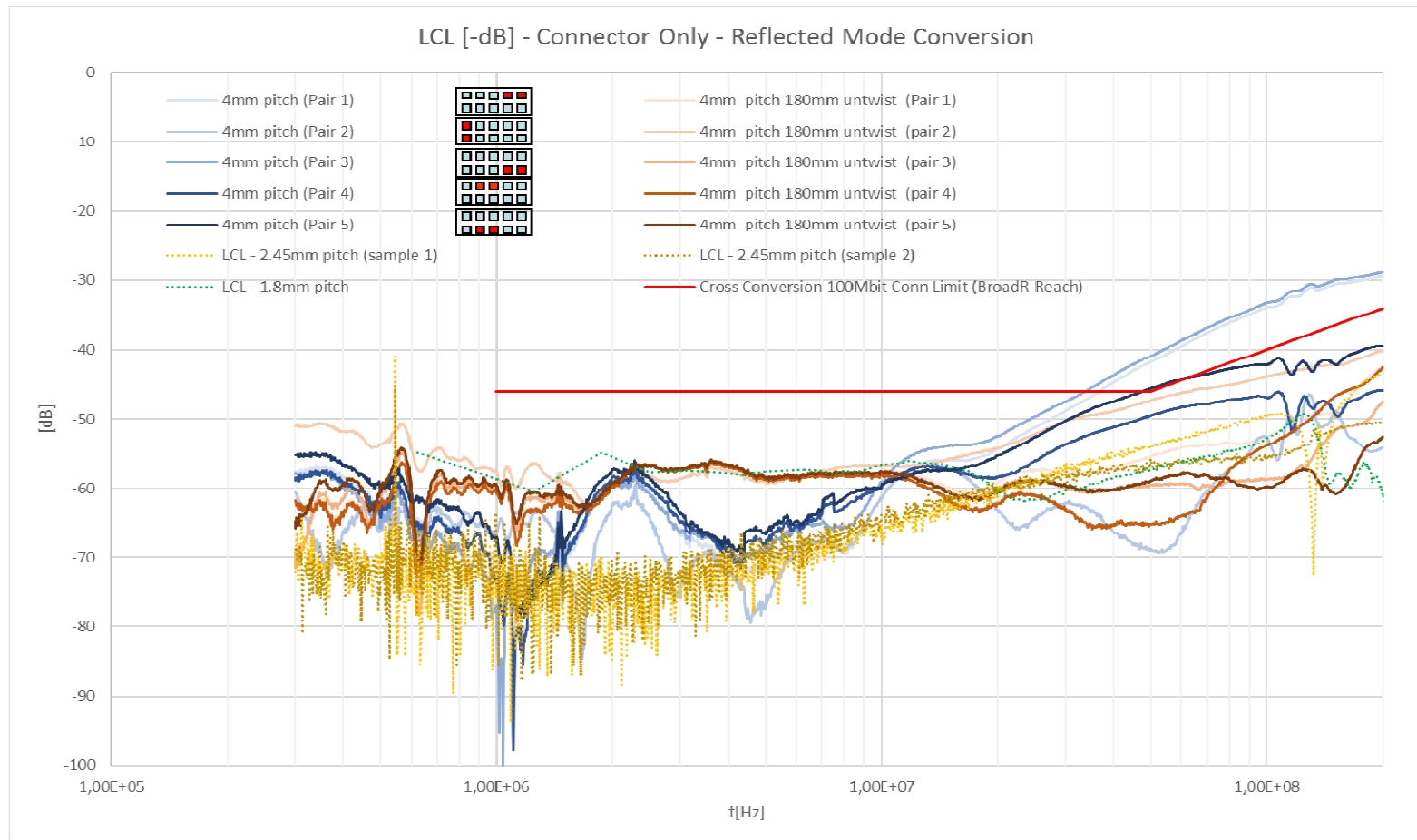
Return Loss of Automotive 4mm Pitch Connectors



- Accuracy at low frequencies strongly depends on VNA type, calibration, and VNA settings

See http://www.ieee802.org/3/cg/public/Mar2017/DiBiao_Bergner_01a_0314.pdf

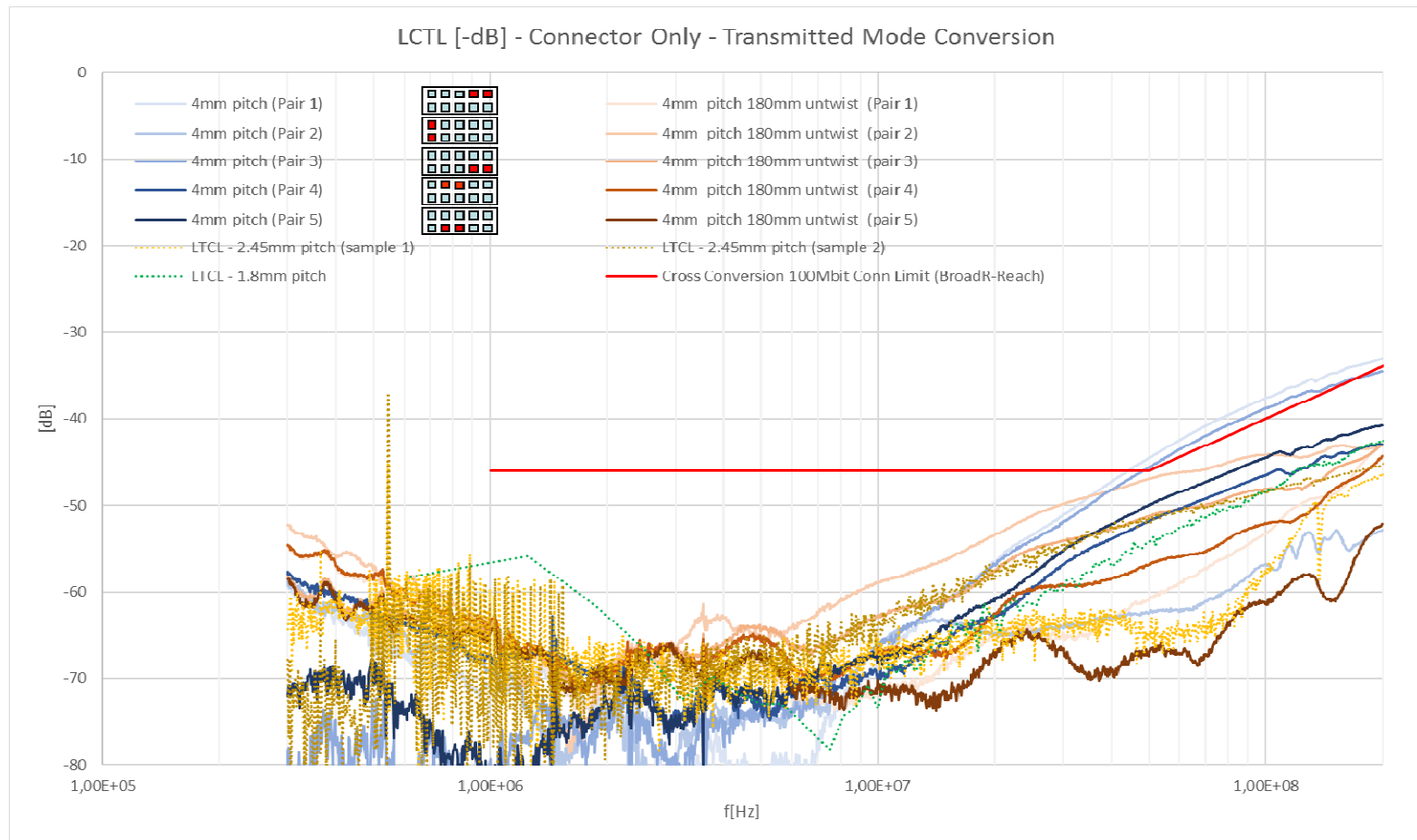
Mode Conversion (LCL) of Automotive 4mm Pitch Connectors



- Accuracy at low frequencies strongly depends on VNA type, calibration, and VNA settings
- Glitches possible depending on the individual equipment type and/or setting – This has nothing to do with the DUT!

Dotted lines see
http://www.ieee802.org/3/cg/public/Mar2017/DiBiaso_Bergner_01a_0314.pdf

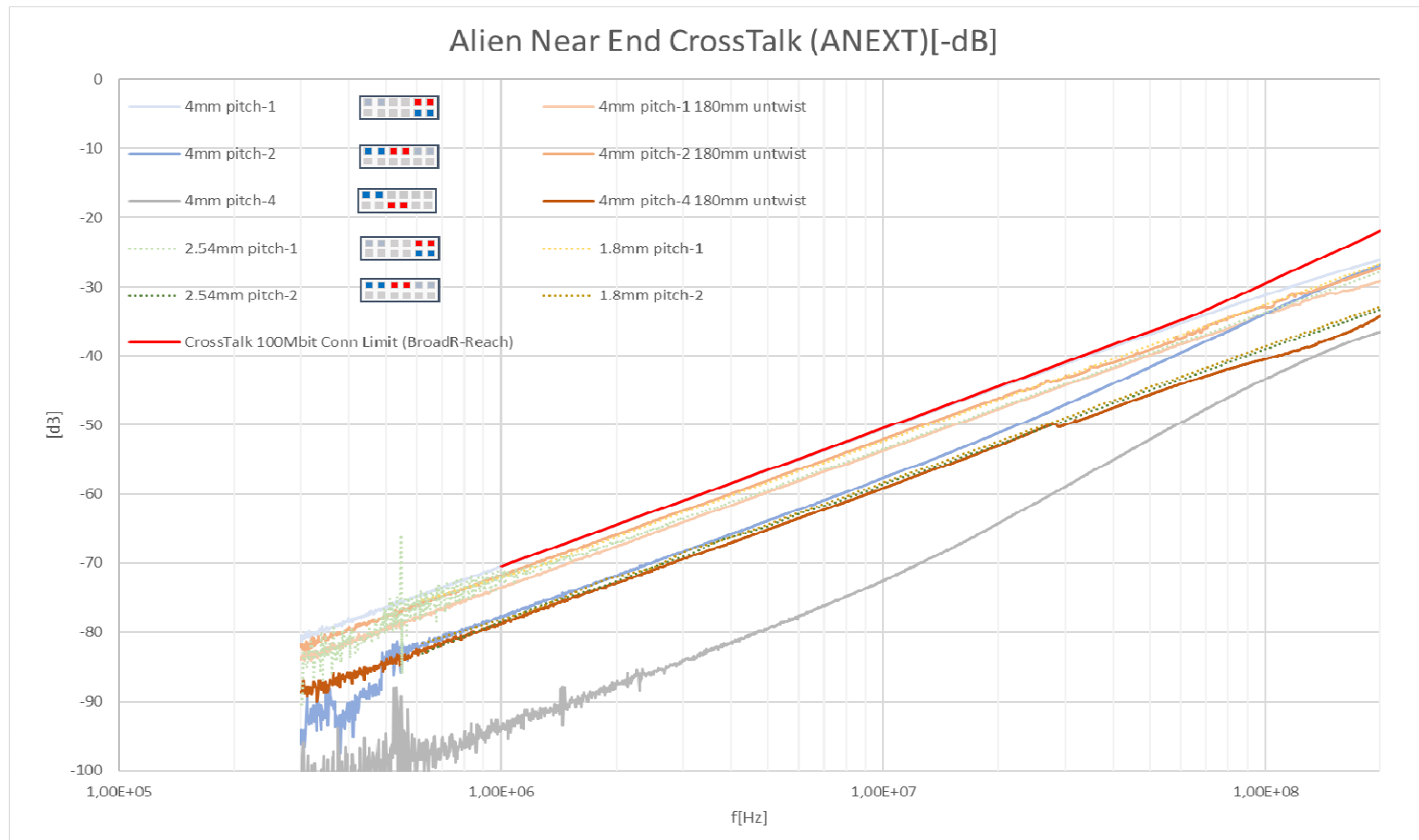
Mode Conversion (LCTL) of Automotive 4mm Pitch Connectors



- Accuracy at low frequencies strongly depends on VNA type, calibration, and VNA settings
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Dotted lines see
http://www.ieee802.org/3/cg/public/Mar2017/DiBiaso_Bergner_01a_0314.pdf

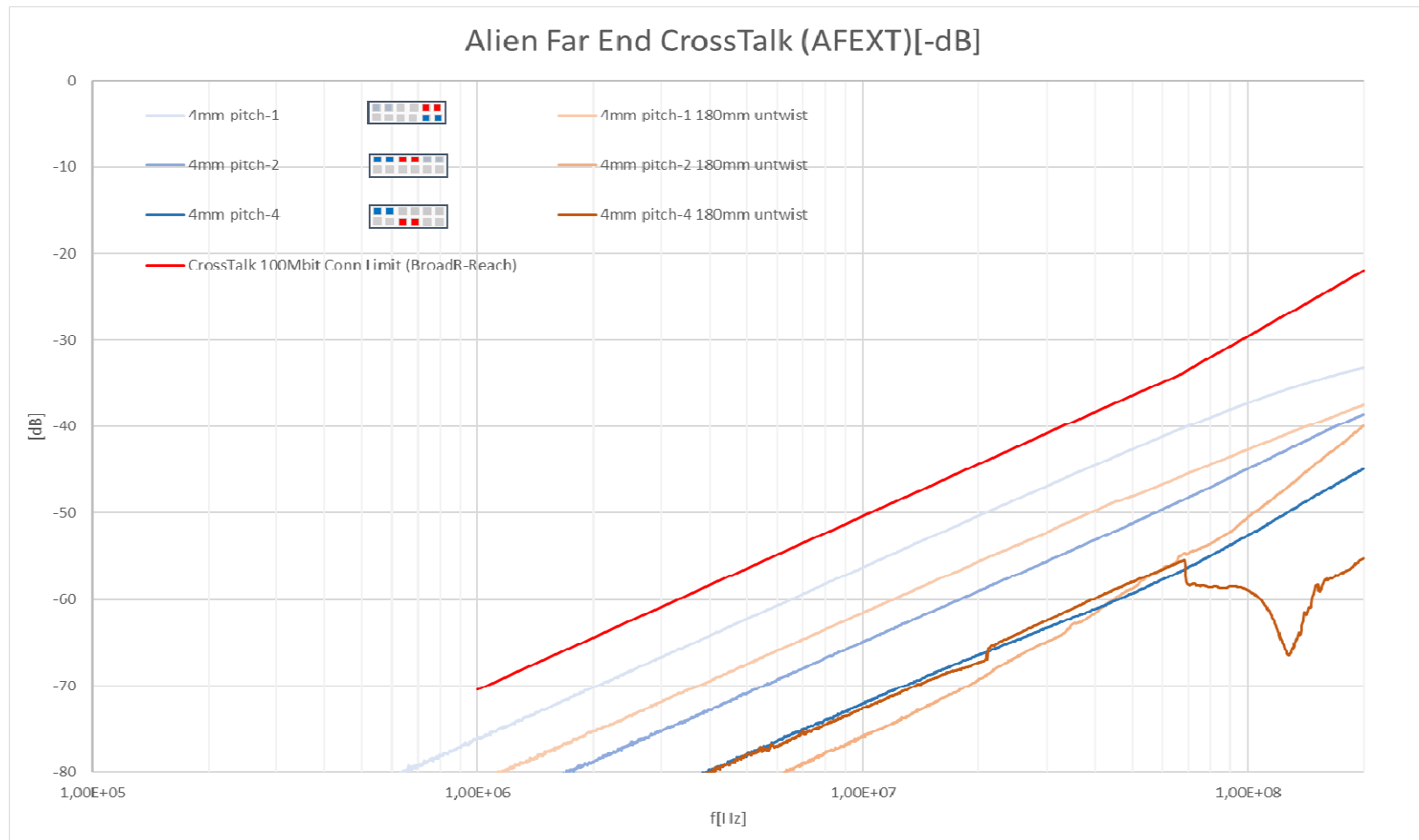
Cross Talk (NEXT) of Automotive 4mm Pitch Connectors



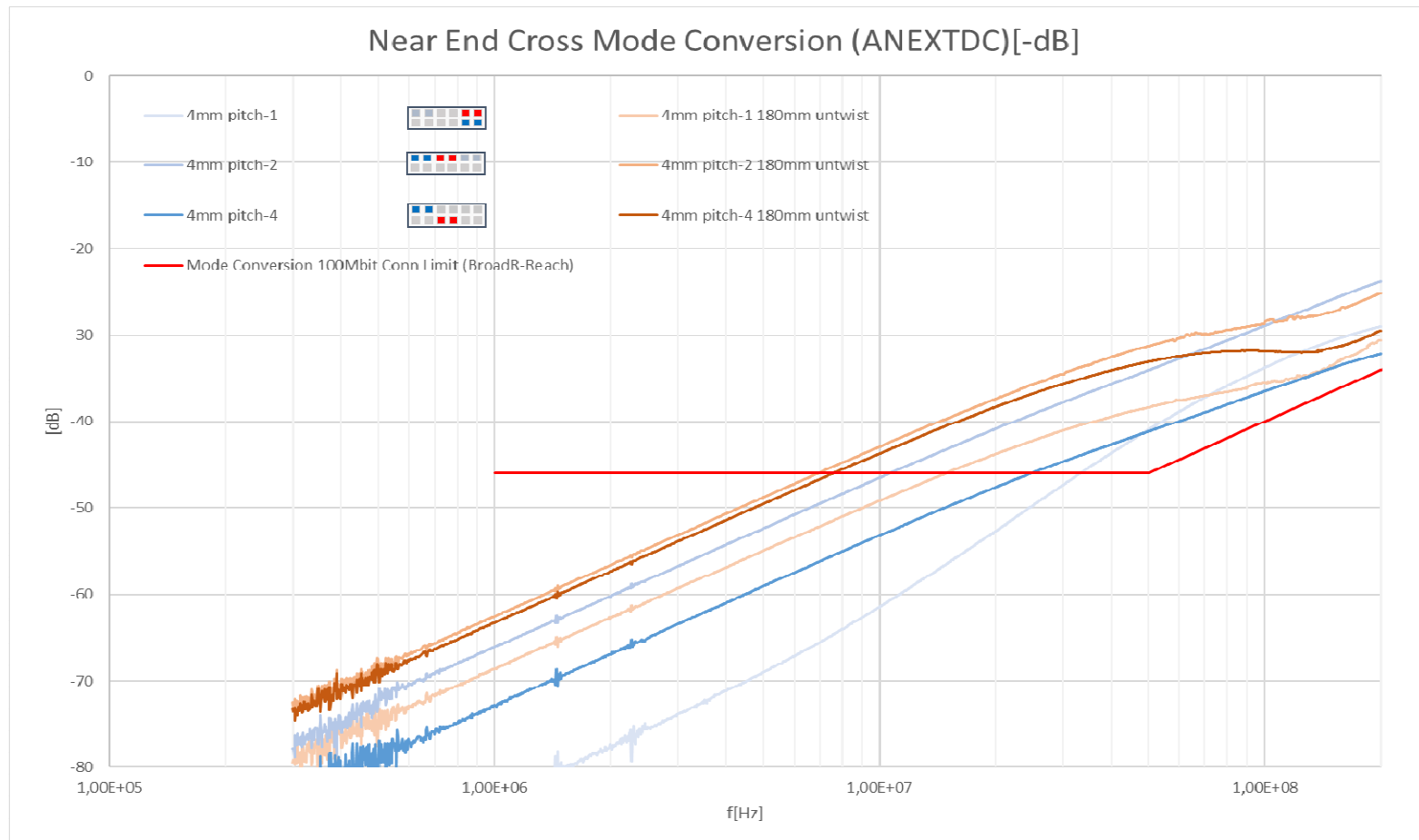
- Accuracy at low frequencies strongly depends on VNA type, calibration, and VNA settings
- Glitches possible depending on the individual equipment type and/or setting – This has nothing to do with the DUT!

Dotted lines see
http://www.ieee802.org/3/cg/public/Mar2017/DiBiaso_Bergner_01a_0314.pdf

Cross Talk (FEXT) of Automotive 4mm Pitch Connectors

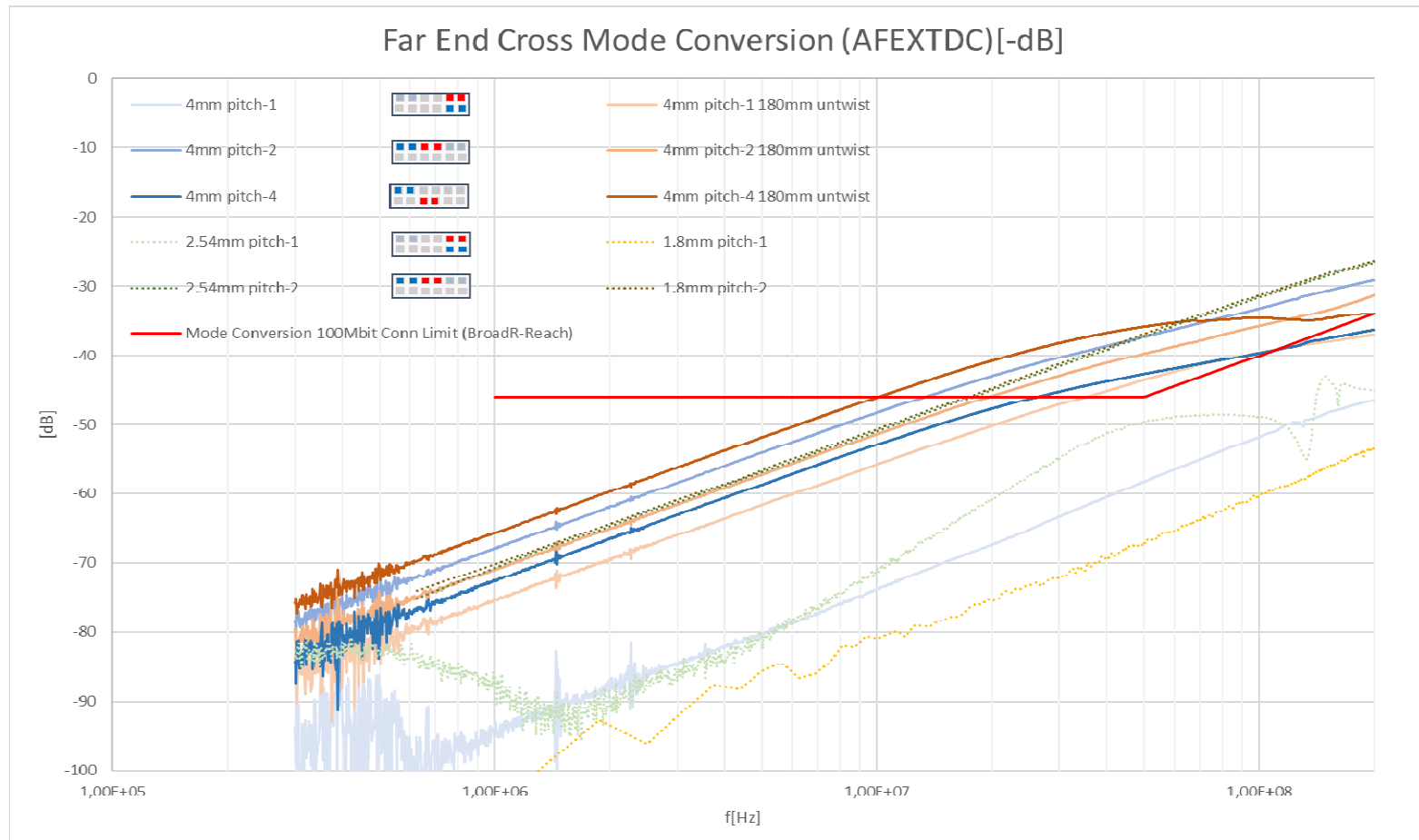


Cross Conversion (ANEXTDC) of Automotive 4mm Pitch Connectors



- Accuracy at low frequencies strongly depends on VNA type, calibration, and VNA settings

Cross Conversion (AFEXTDC) of Automotive 4mm Pitch Connectors



- Accuracy at low frequencies strongly depends on VNA type, calibration, and VNA settings
- Glitches possible depending on the individual equipment type and/or setting – This has nothing to do with the DUT!

Dotted lines see
http://www.ieee802.org/3/cg/public/Mar2017/DiBiasco_Bergner_01a_0314.pdf

Conclusion

- 4mm pitch connectors are used for CAN and FlexRay applications
- Such connectors were not designed for RF applications
- S-parameter such as return loss and mode conversion are worse compared to small pitch connectors (2.54mm, 1.8mm)
- If such connectors are to be used for 10SPE applications, the performance regarding return loss and mode conversion shall be considered
- Need to discuss if link segment parameters using similar 4mm pitch connectors shall be obtained and for what topologies

Thank You!!!