Proposed Link Segment Configuration Test results.
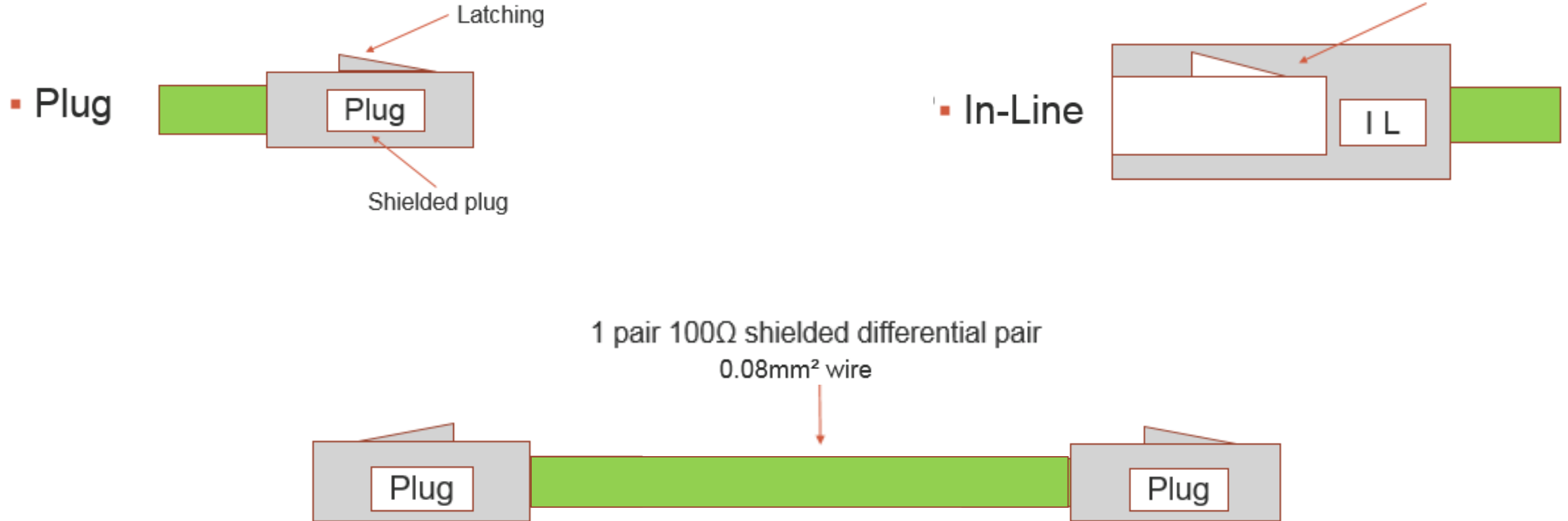
Ali Javed (Molex, LLC), Mike Gardner (Molex, LLC)

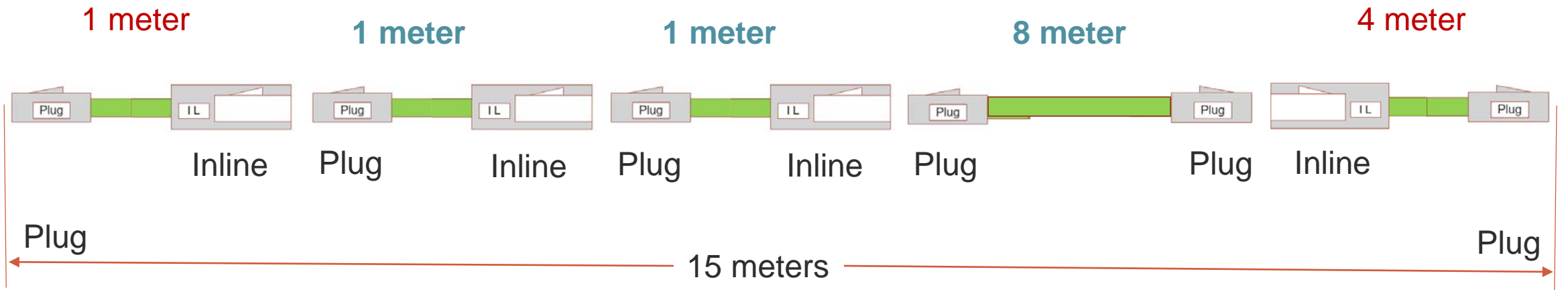IEEE [802.3_NGAUTO] 802.3ch September Interim

Scope

- Build and test one link segment.

- Total link length to be 15m with 4 inline connections.

- Use of existing off-the-shelf multi-pin automotive grade connection system for PCB to cable (plug) and cable to cable (inline) connections.

- Evaluate performance of Shielded differential link segment with off-the-shelf multi-pin connection system for Next Generation Automotive Multi-gig Ethernet.

- Propose the signal integrity performance characteristics for a shielded differential link segment.

  - Data presented with a maximum frequency up to 3GHz.

Link Segment Elements / Definition (Illustrations)

Link Segment Configuration under test

1 meter   **1 meter**   **1 meter**   **8 meter**   4 meter

Inline   Plug   Inline   Plug   Inline   Plug   Plug   Inline

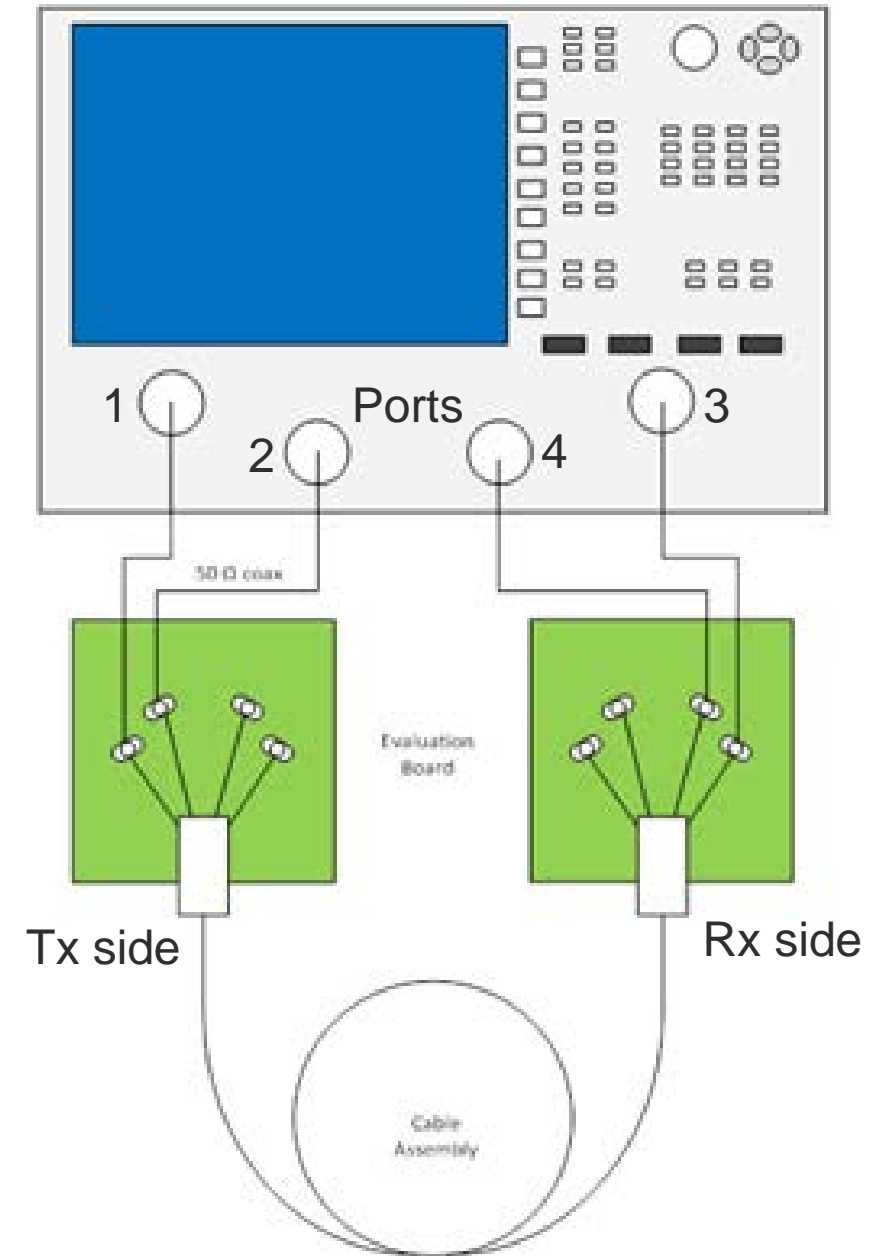Plug   Plug
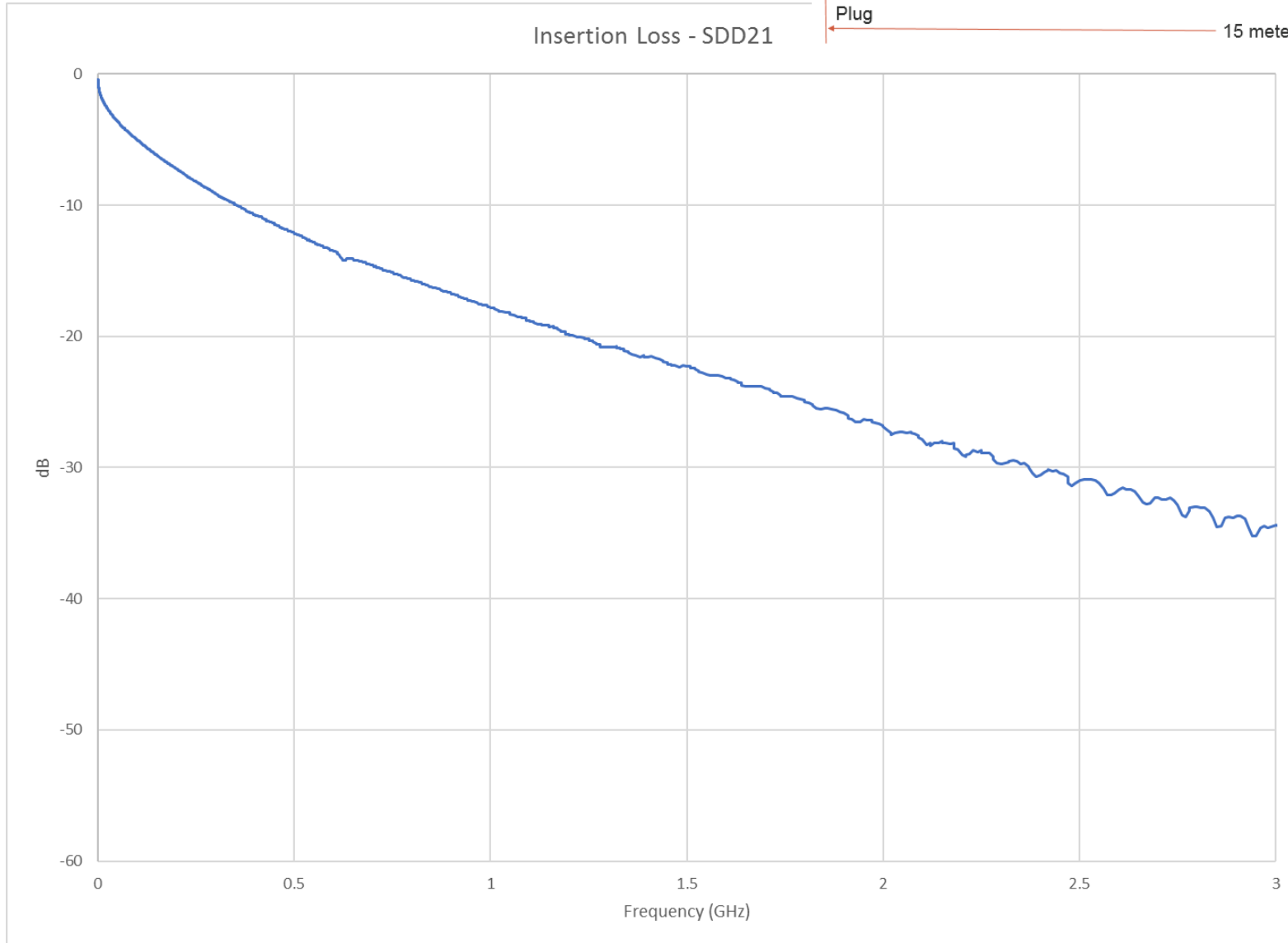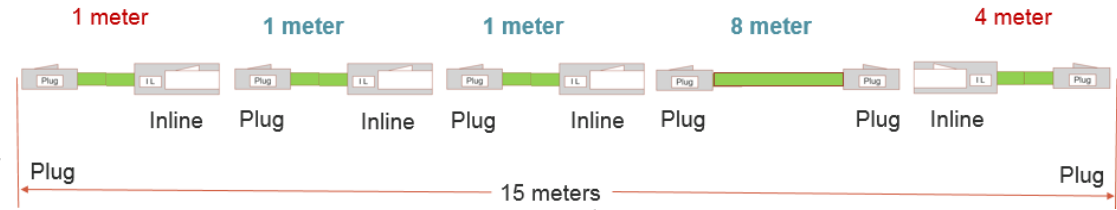
← 15 meters →

Reference Link Segment Proposed:

http://www.ieee802.org/3/ch/public/adhoc/Gardner_3NGAUTO_01a_061417.pdf
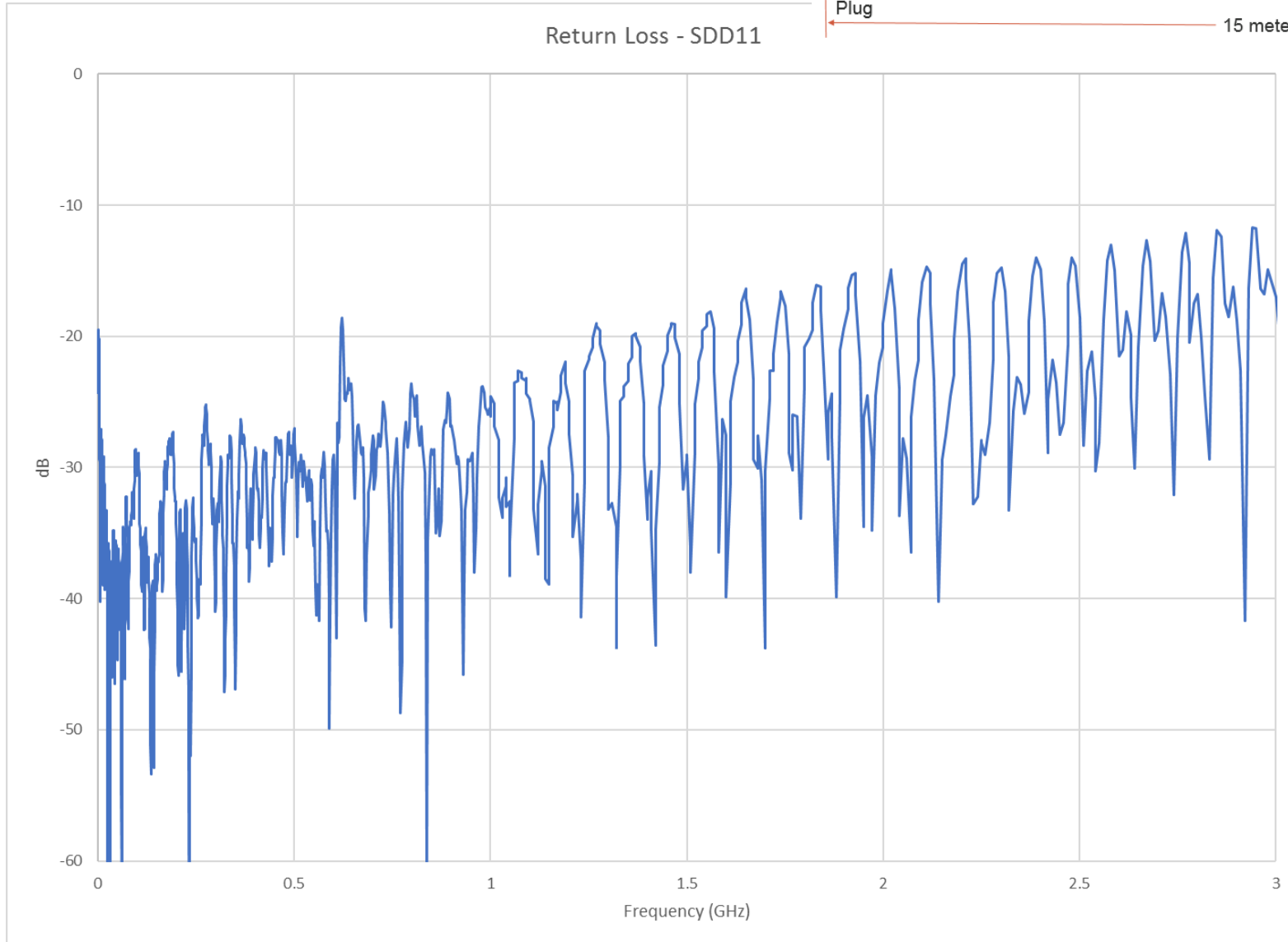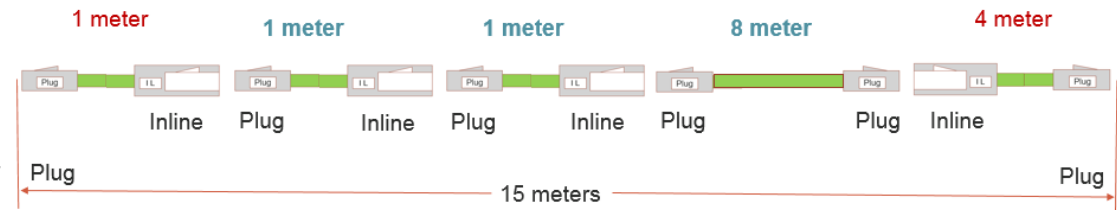
VNA test setup

- Vector Network Analyzer model
  - Agilent N5230C 300 kHz - 20 GHz PNA-L

- Port Calibration
  - M-Cal calibration was used.

- Frequency range
  - Start Frequency: 300kHz
  - Stop Frequency: 3GHz

- Port selection
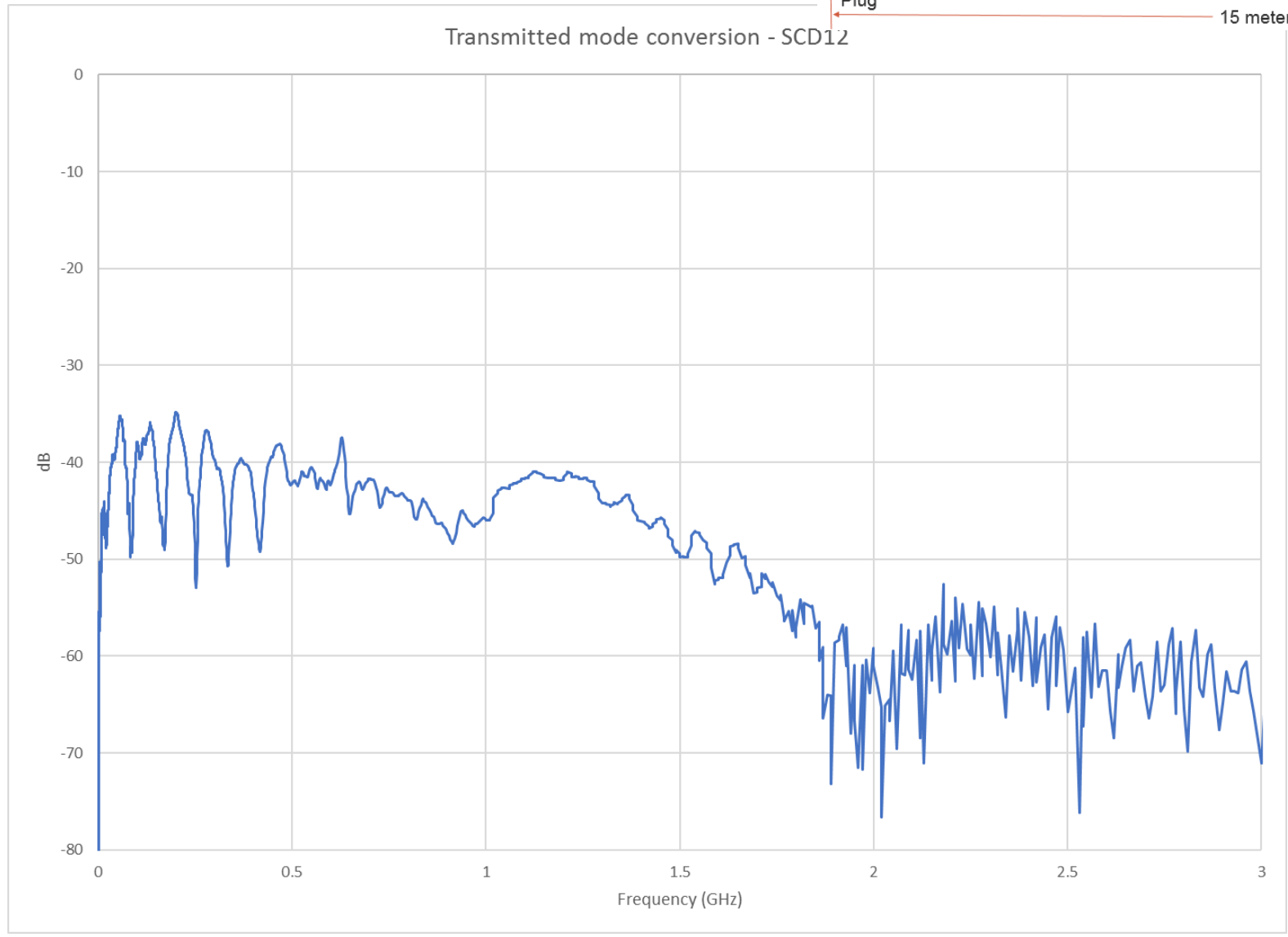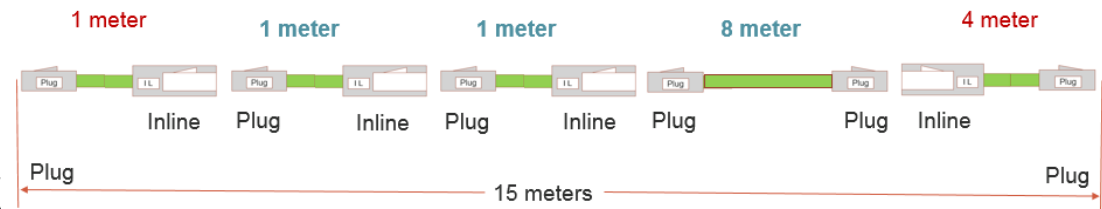 - Tx Ports: 1&3
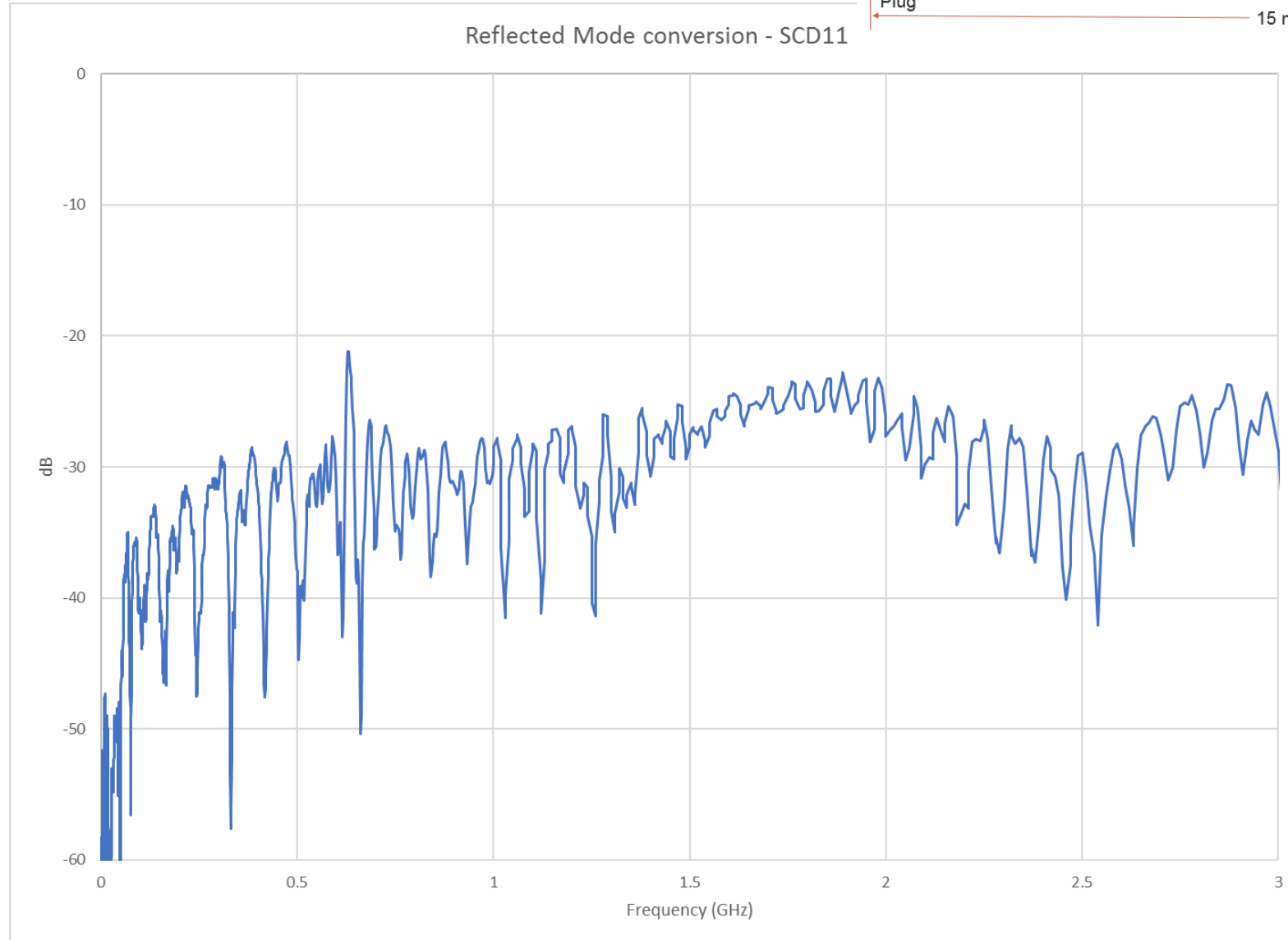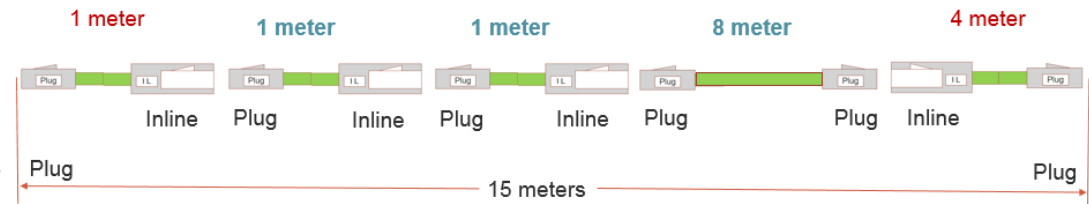 - Rx Ports: 2&4

Insertion loss (0.08mm² wire)

Insertion Loss - SDD21

Return loss

Return Loss - SDD11

Transmitted Mode Conversion

Transmitted mode conversion - SCD12

Reflected Mode Conversion

Reflected Mode conversion - SCD11

Summary

- Performance limits for link segment configurations should be evaluated with respect to existing off the shelf Multi-pin connections systems.

- Multi-pin systems offer the options for multiple links in a single bundled cable, but drive needs for smaller size wires to accommodate lighter weight and greater cable flexibility.
    - Most likely smallest wire size 0.08mm² wire (as shown in this report)

- Incase the performance of existing connection systems does not meet the required channel budgets, new products will need to be developed and evaluated.

Thank You!
Questions?