

# ISO/IEC 11801-1 standard cabling system characteristics

IEEE P802.3bq 25GBASE-T Study Group

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Dave Hess, CORD DATA; Dieter Schicketanz, LEONI

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- Abstract: ISO/IEC 11801-1 standard cabling system simulated SNR is calculated for Class- $E_A$ , Class- $F_A$ , Class-I, and Class-II, for various link segment distances, using the ISO/IEC 11801-9901 standard cabling system model. A comparison of the cabling system classes is illustrated using multiple views, e.g. margin-over-reach. A brief explanation of the analysis method is covered in the background data.
- Presenter, Affiliation: Dave Hess, Cord Data
- Co-Author, Affiliation: Dieter Schicketanz, LEONI

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## **Supporters:**

Yakov Belopolsky, Stewart Connector

Yvan Engels, LEONI

Valerie Maguire, The Siemon Company

Martin Rossbach, Nexans Cabling Solutions

# Overview

## ISO/IEC 11801-1 standard cabling system characteristics

- Channel capacity analysis for ISO/IEC Class- $F_A$  30 m channel, standard implementation
- Comparison of ISO/IEC Classes  $E_A$ ,  $F_A$ , I, II: reach over bandwidth

# Channel capacity analysis

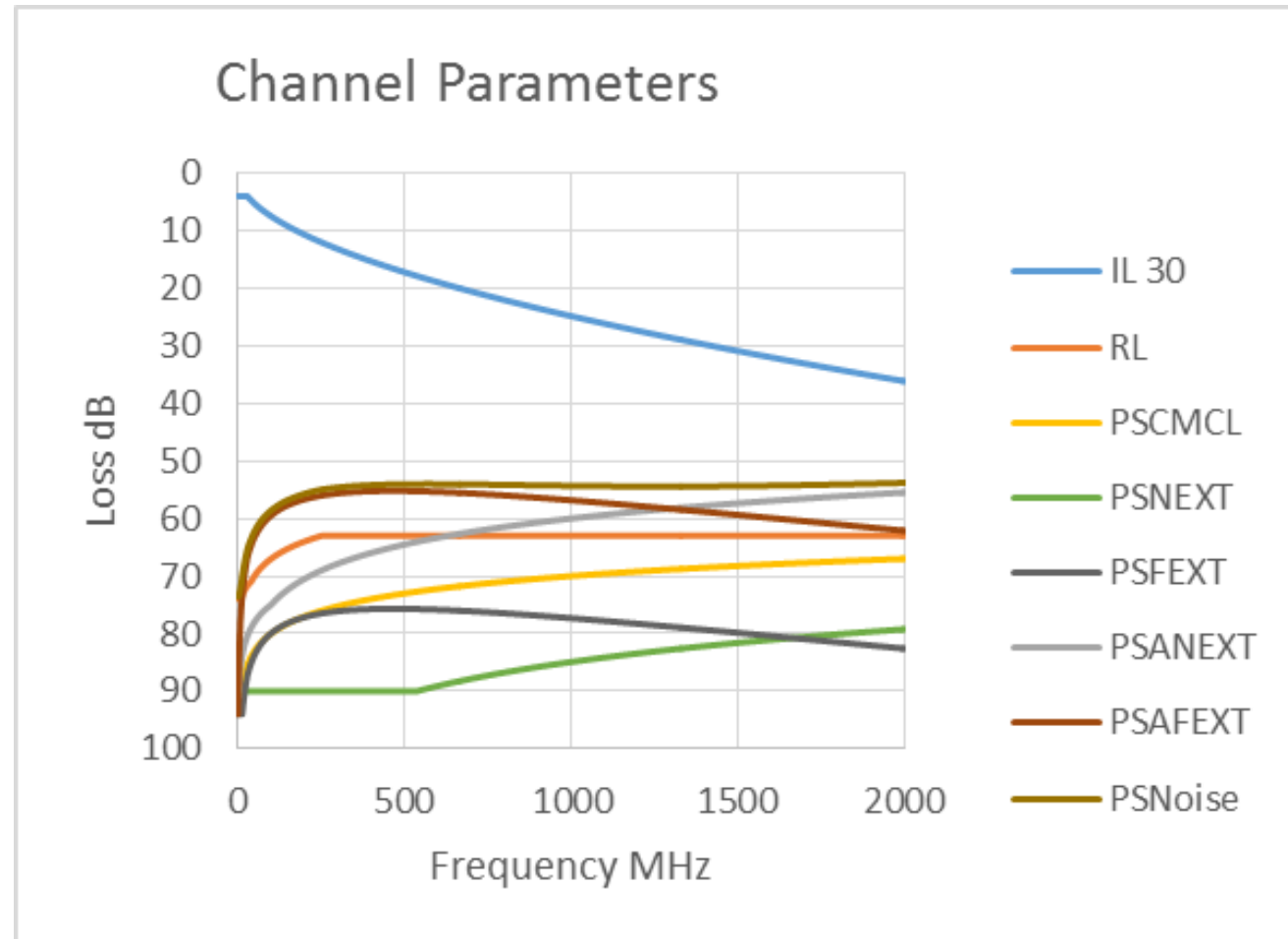
## ISO/IEC 11801-1 standard cabling system characteristics

- ISO/IEC Class F<sub>A</sub> channel specifications:
  - ISO/IEC 11801-1: INFORMATION TECHNOLOGY – GENERIC CABLING FOR CUSTOMER PREMISES, PART 1: GENERAL REQUIREMENTS
- Channel capacity analysis method:
  - ISO/IEC TR 11801-9901, Guidance for balanced cabling in support of at least 40 Gbit/s data transmission,
    - Annex A (informative) Assessment of cabling capacity for 40 Gbit/s
- Channel capacity analysis assumptions:
  - Channel implementations:
    - Class E<sub>A</sub> & Class F<sub>A</sub>: 4-connectors, 10m-cord with 50% derating
    - Class I & Class II: 2-connectors, 6m-cord with 20% derating
  - Cancellation factors: NEXT, -40 dB; FEXT, -25 dB; RL, -55 dB, same for all classes
  - Equalization and FEC factors are not included.
  - Modulation scheme is the same for all rates.

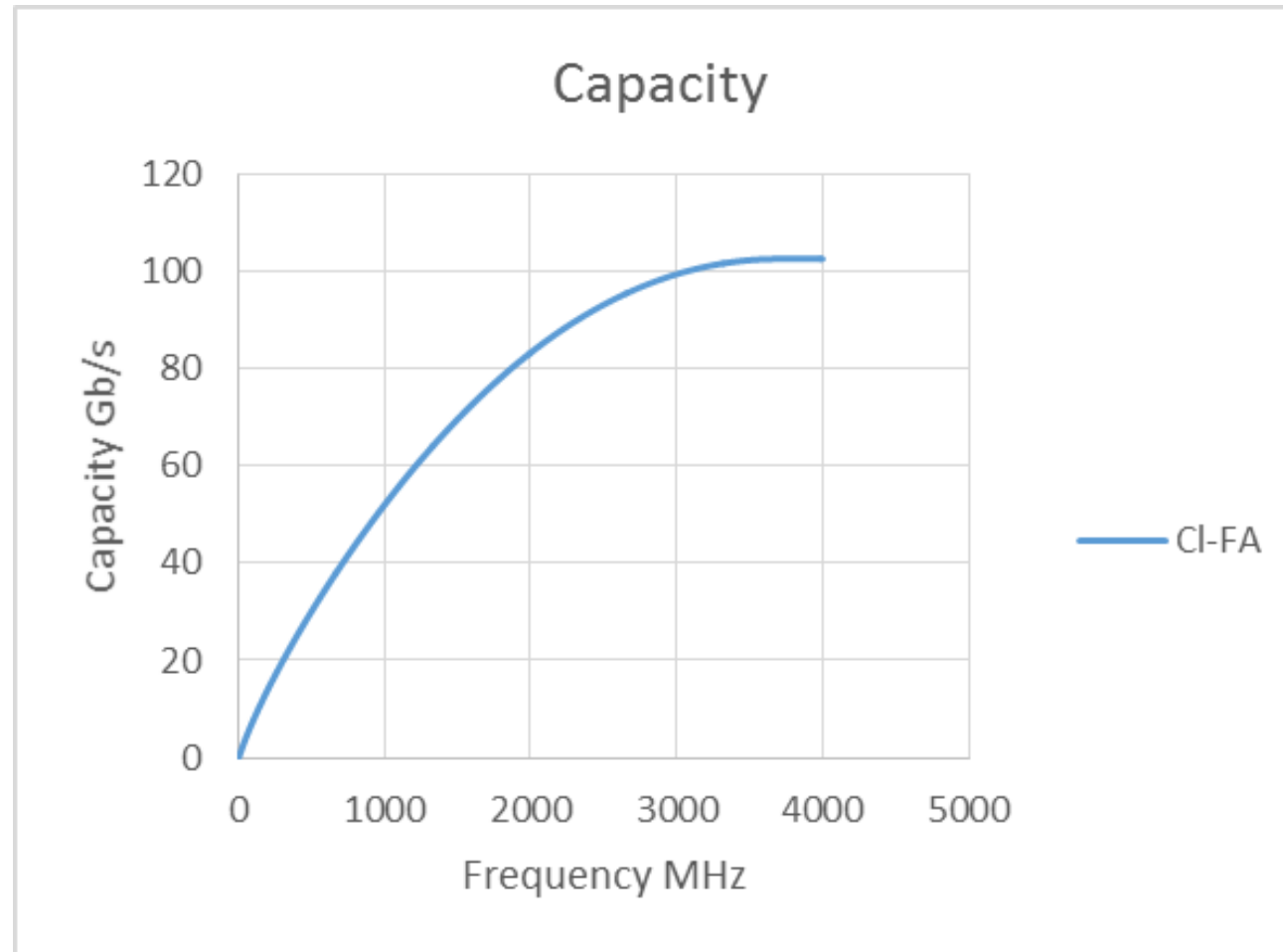
# Results

- The same analysis used in the past to verify technical feasibility for
  - 10GBASE-T over Class-E<sub>A</sub> 100 m channel and
  - 40GBASE-T over Class-I 30 m channel;
- Shows equal or greater capacity and margins for
  - 25GBASE-T over Class-F<sub>A</sub> 30 m channel.

# Class $F_A$ : channel parameters, 30 meters

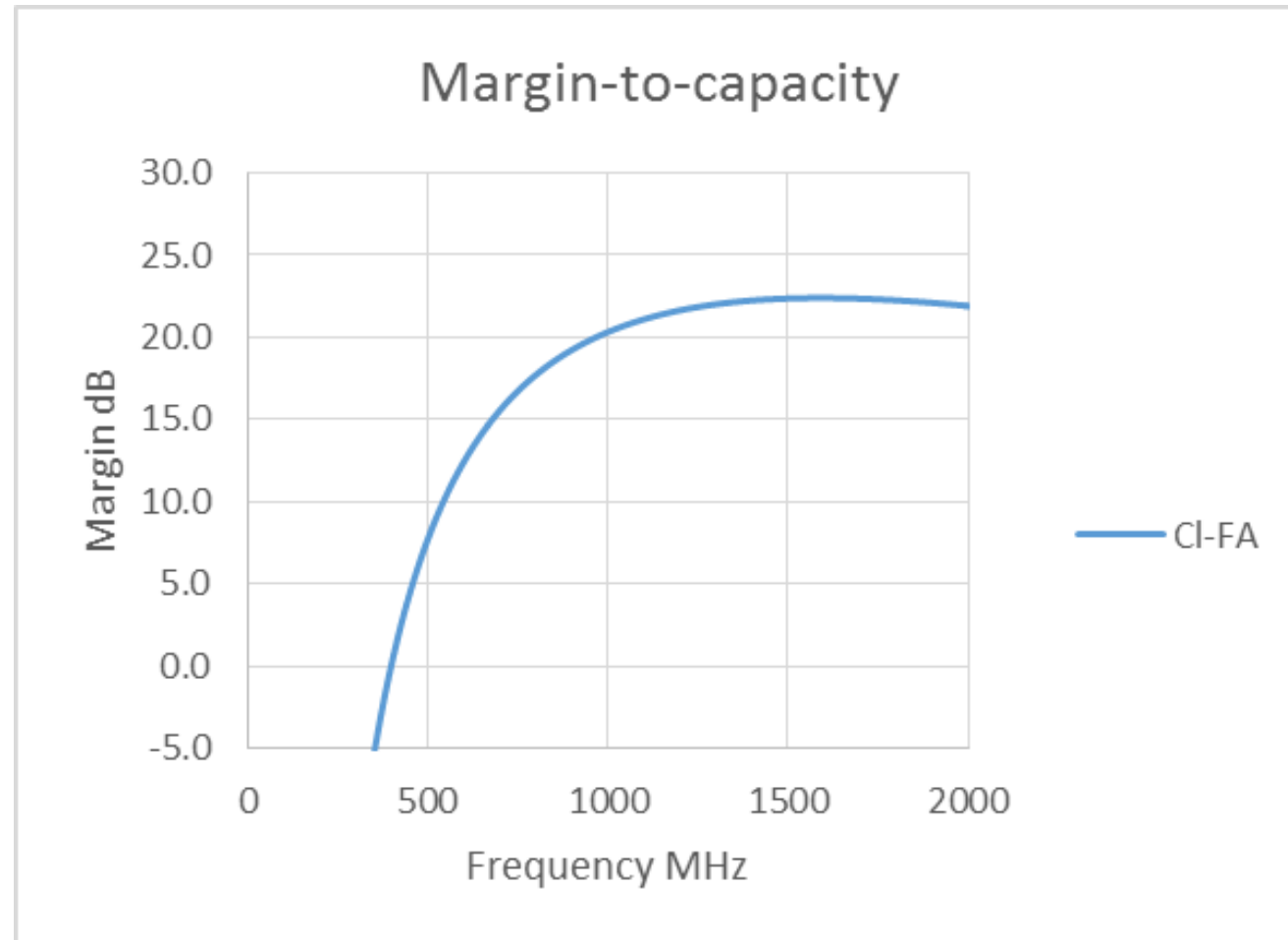


# Class $F_A$ : capacity, 30 meters

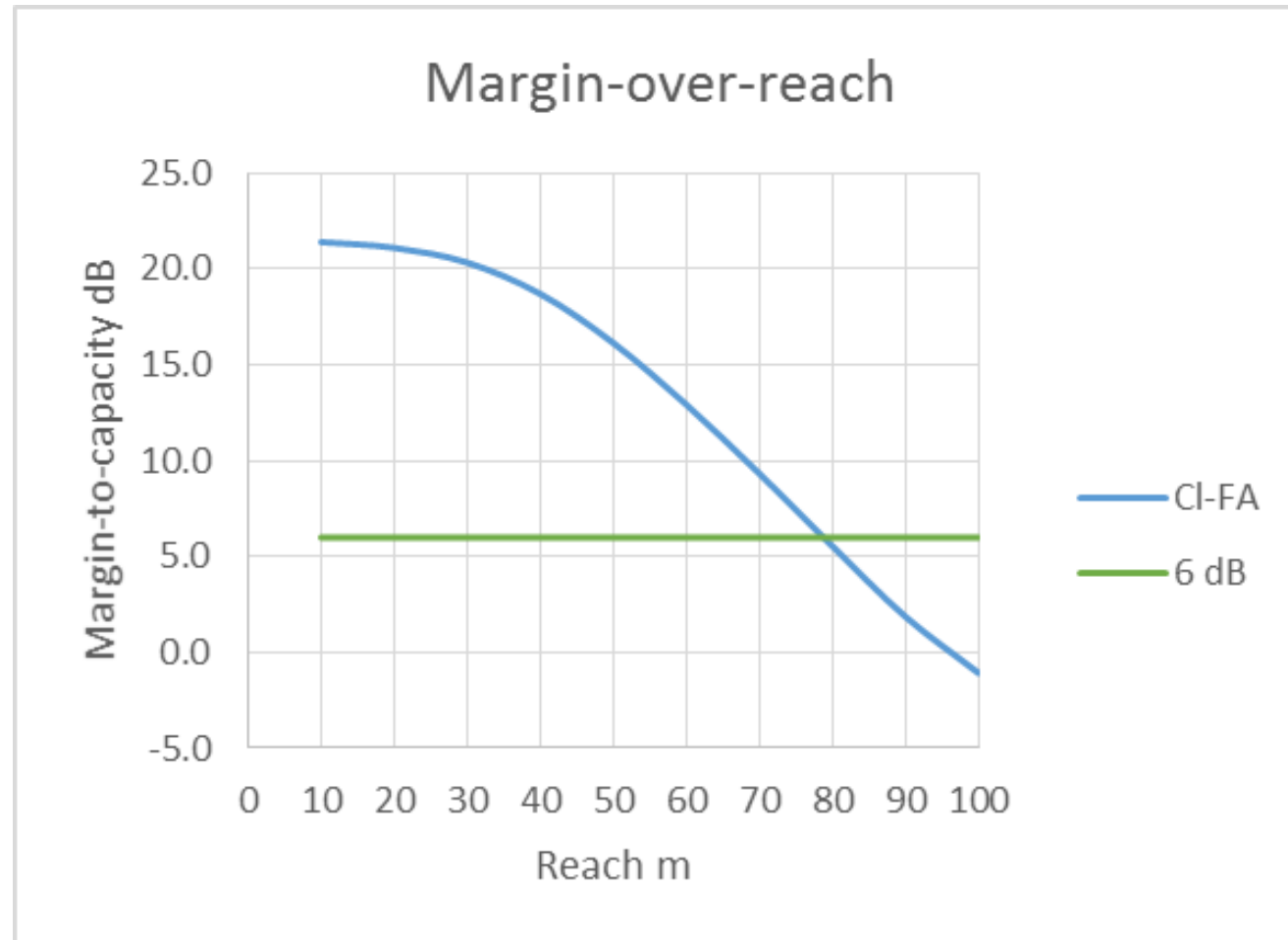




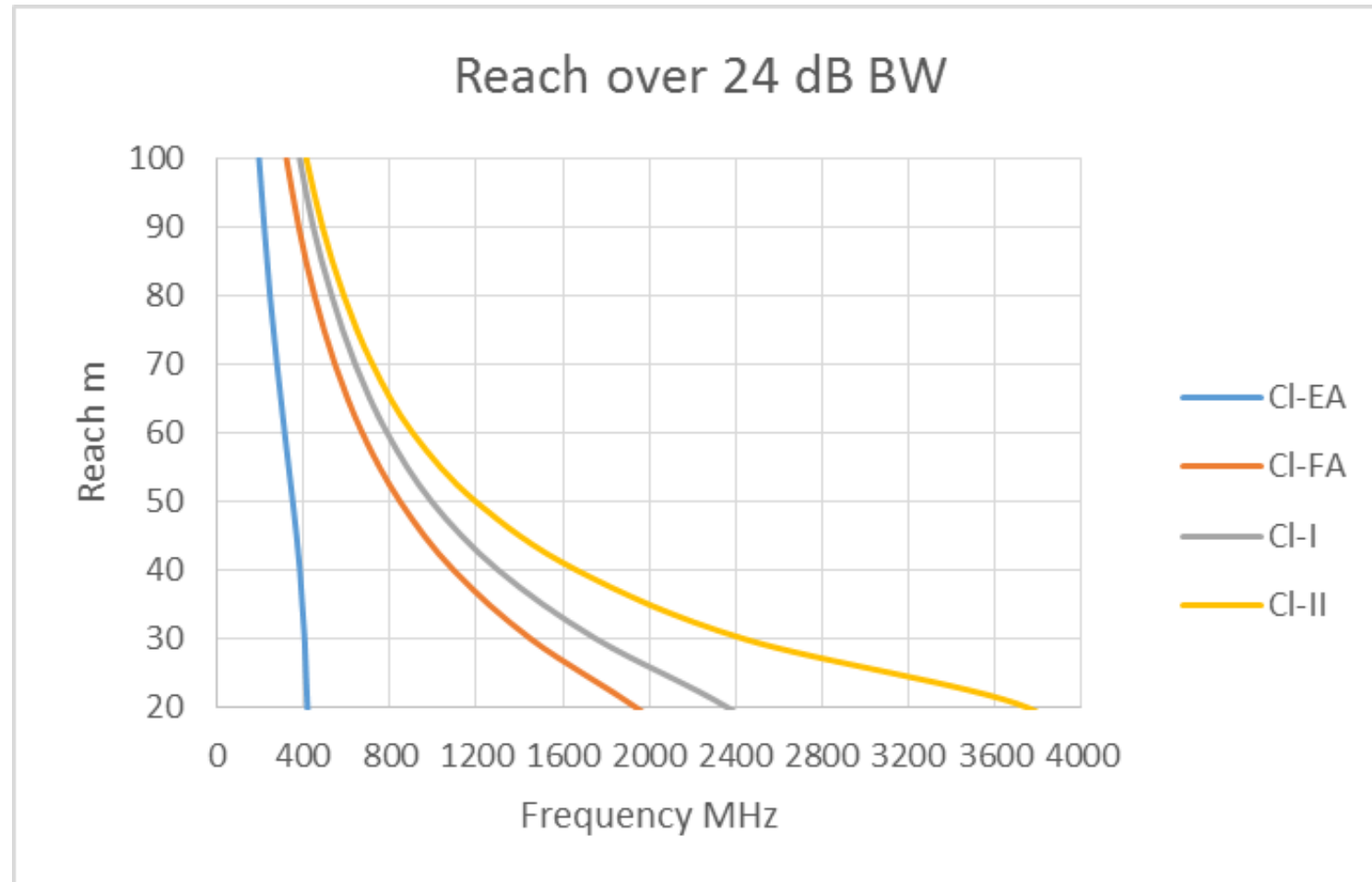
# Class $F_A$ : margin-to-capacity, 30 meters



# Class $F_A$ : margin-over-reach, 25GBASE-T



# Classes $E_A$ , $F_A$ , I, II: comparison, Reach over bandwidth, SNR 24dB



# Conclusion

- 25GBASE-T over 30 m Class-F<sub>A</sub> has superior margin compared to 40GBASE-T over 30 m Class-I.
- ISO/IEC Classes E<sub>A</sub>, F<sub>A</sub>, I, II reach over bandwidth comparison results confirm feasibility for 25GBASE-T over 30 m, Class-F<sub>A</sub>.
- Results support the motion that 30m of category 7A cabling be incorporated into clause 113.7 of the next IEEE P802.3bq draft for support of 25GBASE-T.