

Balanced single-pair cabling channel specifications

IEEE P802.3cg 10SPE Task Force

July 9, 2018

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Overview

This contribution reflects the views of the presenter as an individual and is not a liaison from ISO/IEC JTC1 SC25 WG3.

- JMTG organization and scope
- JMTG projects related to SPE
- Summary of current status of TR 11801-9906
- Summary of related projects status

JMTG: Joint Modeling Task Group

- ISO/IEC JTC1 SC25 WG3 ad hoc: “JMTG”
 - Official designation: ISO/IEC JTC1 SC25 JPT1, Joint Project Team
- JOINT group constituents, experts from:
 - ISO/IEC SC25 WG3, LAN cabling systems
 - IEC SC46C, balanced cable
 - IEC SC48B, electrical connectors
- Scope: copper cabling channels and cable assembly modeling
- Members, common to ISO/IEC JMTG and IEEE 802.3:
 - Dave Hess
 - Dieter Schicketanz
 - Masood Shariff
 - James Withey

JMTG ISO/IEC coordinated projects

Current projects:

- ISO/IEC TR 11801-9906 ED1
 - Title: INFORMATION TECHNOLOGY – GENERIC CABLING FOR CUSTOMER PREMISES – Part 9906 - TECHNICAL REPORT: Balanced 1-pair cabling channels up to 600 MHz
 - Balanced single-pair cabling channels specifications
- ISO/IEC TR 11801-9903 ED2
 - Title: Information technology - Generic cabling systems for customer premises - Part 9903: Matrix modelling of channels and links
 - Length scalable model for channels and links, passive segments

JMTG IEC coordinated projects

- IEC SC46C, Cables
 - IEC TR 61156-1-3/AMD1 ED1
 - Multicore and symmetrical pair/quad cables for digital communications - Part 1-3: Electrical transmission parameters for modelling cable assemblies using symmetrical pair/quad cables
 - 4-port model, “Mixed-mode parameters”
- IEC SC48B, Connectors
 - IEC 60512-28-100 ED2
 - Connectors for electronic equipment - Tests and measurements - Part 28-100: Signal integrity tests up to 2 000 MHz ...
 - 4-port measurements, “balunless testing”

ISO/IEC TR 11801-9906

Balanced 1-pair cabling channels up to 600 MHz

Draft scope (SC25 confirmed, March 2, 2018):

- Characteristics of channels constructed from cabling components, which support Single-Pair Ethernet (SPE), intended for use primarily in general purpose industrial process control and IoT applications.
- For supporting IEEE 802.3 single-pair Ethernet (SPE) PHYs:
 - 802.3 bp, 1000BASE-T1,
 - 802.3 bw, 100BASE-T1,
 - 802.3 cg, 10BASE-T1,
 - 802.3 bu, 1-pair PoDL.
- Functional space ranges:
 - Rate: 10 Mb/s to 1000 Mb/s
 - Reach: 15 m to 1000 m
 - Frequency range: 0.1 MHz to 600 MHz
 - Cable size: including AWG 24, 22, 20, 18; others TBD

ISO/IEC TR 11801-9906

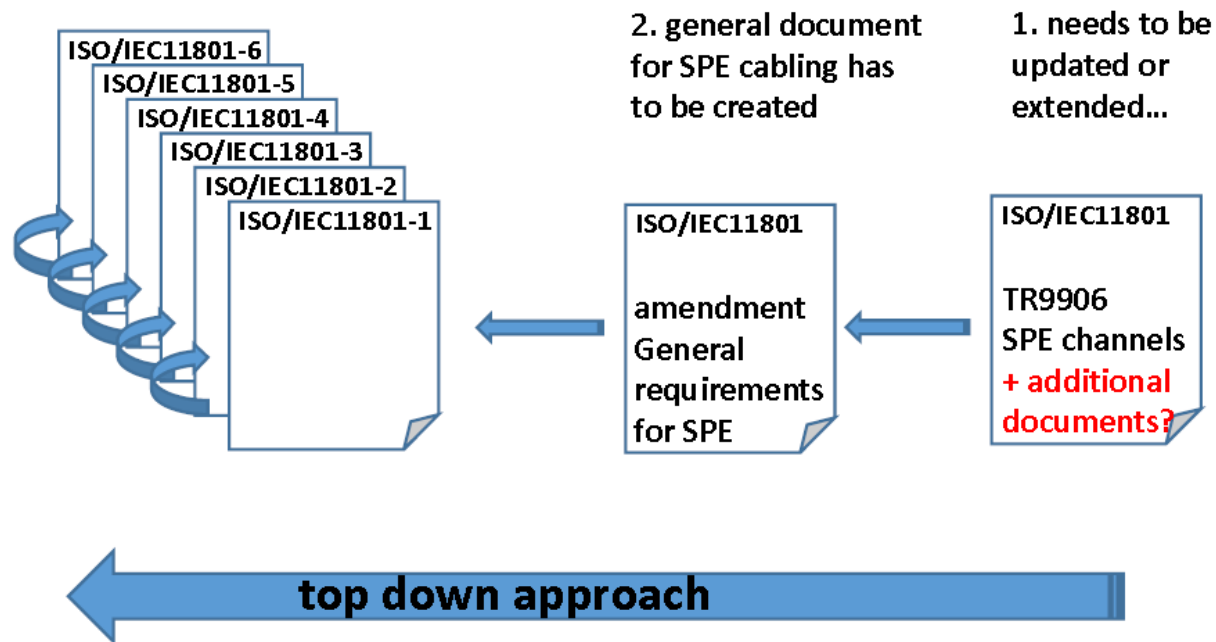
Balanced 1-pair cabling channels up to 600 MHz

Draft content (WD4):

- IEEE 802.3 single-pair Ethernet (SPE) PHYs, link segment specifications information.
- Channel(s) specifications for supporting SPE, including IL, RL, TCL, ELTCTL, PSANEXT, PSAACRF, and aC, parameters specifications.
- Interoperability specifications for supporting SPE, using adaptations to Balanced twisted-4-pair cabling.

Balanced 1-pair cabling media from ISO/IEC TR11801-9906,
to be added to ISO/IEC 11801-1,
and reference implementations in ISO/IEC 11801-2,-3,-4,-5,-6

General document for SPE
cabling described in 2. has to
be implemented in 11801-1 to
allow further implantation of
SPE cabling into 11801-2 up to
11801-6



ISO/IEC TR 11801-9906

Balanced 1-pair cabling component references

Cables

- Current reference cables
 - IEC 61156-11: 1-pair cables for 1 Gbps over 40m application, CDV pending.
- New reference cables
 - IEC 61156-12: 1-pair (flexible) cables related to IEC 61156-11, CD pending
 - IEC 61156-13: 1-pair cables for 10Mb/s over 1km application, NP pending
 - IEC 61156-14: 1-pair (flexible) cables related to IEC 61156-13, NP pending

ISO/IEC TR 11801-9906

Balanced 1-pair cabling component references

Connectors

- Current reference connectors
 - IEC 61076-3-125: 1-pair, shielded and unshielded, free and fixed connectors for data transmission up to 600MHz, CDV pending; (ISO/IEC variant-2)
- New reference connectors for Balanced 1-pair cabling channels
 - IEC 63171-1: Connector, LC style, CD pending; (ISO/IEC variant-1)
 - IEC 63171-2: Connector, MSP-type, NP pending; (ISO/IEC variant-3, variant-4)
 - IEC 63171-3: Connector, TERA-type, NP pending; (ISO/IEC variant-5)
 - IEC 63171-4: Connector, MMC-type, NP pending; (ISO/IEC variant-1)
 - IEC 63171-5: Connector, 4XMSP-M12-type, NP pending; (ISO/IEC variant-3)
 - IEC 63171-x: Connector, general specifications, preliminary stage

Conclusions

- ISO/IEC TR 11801-9906 Balanced 1-pair cabling channels up to 600 MHz, in support of SPE:
 - Is in preparatory stage, “WD” working draft; currently open for comment
 - Scope covers:
 - 802.3 bp, 1000BASE-T1,
 - 802.3 bw, 100BASE-T1,
 - 802.3 cg, 10BASE-T1,
 - 802.3 bu, 1-pair PoDL;
- Balanced 1-pair cabling component reference standards, projects’ NPs, are circulated for approval.

Back-up info

MICE overview (ISO/IEC 11801-1)

Comparison SPE link segment vs Balanced twisted-4-pair cabling specifications

MICE overview (ISO/IEC 11801-1)

6.2.2 Environmental classification

This document classifies the environment for generic cabling as defined in Table 1.

Certain environments (e.g. nuclear, chemical, fire, explosive, damage risk from animals, salt mist) demand additional requirements beyond those of 6.2. Further details on specific environments are given in ISO/IEC TR 29106.

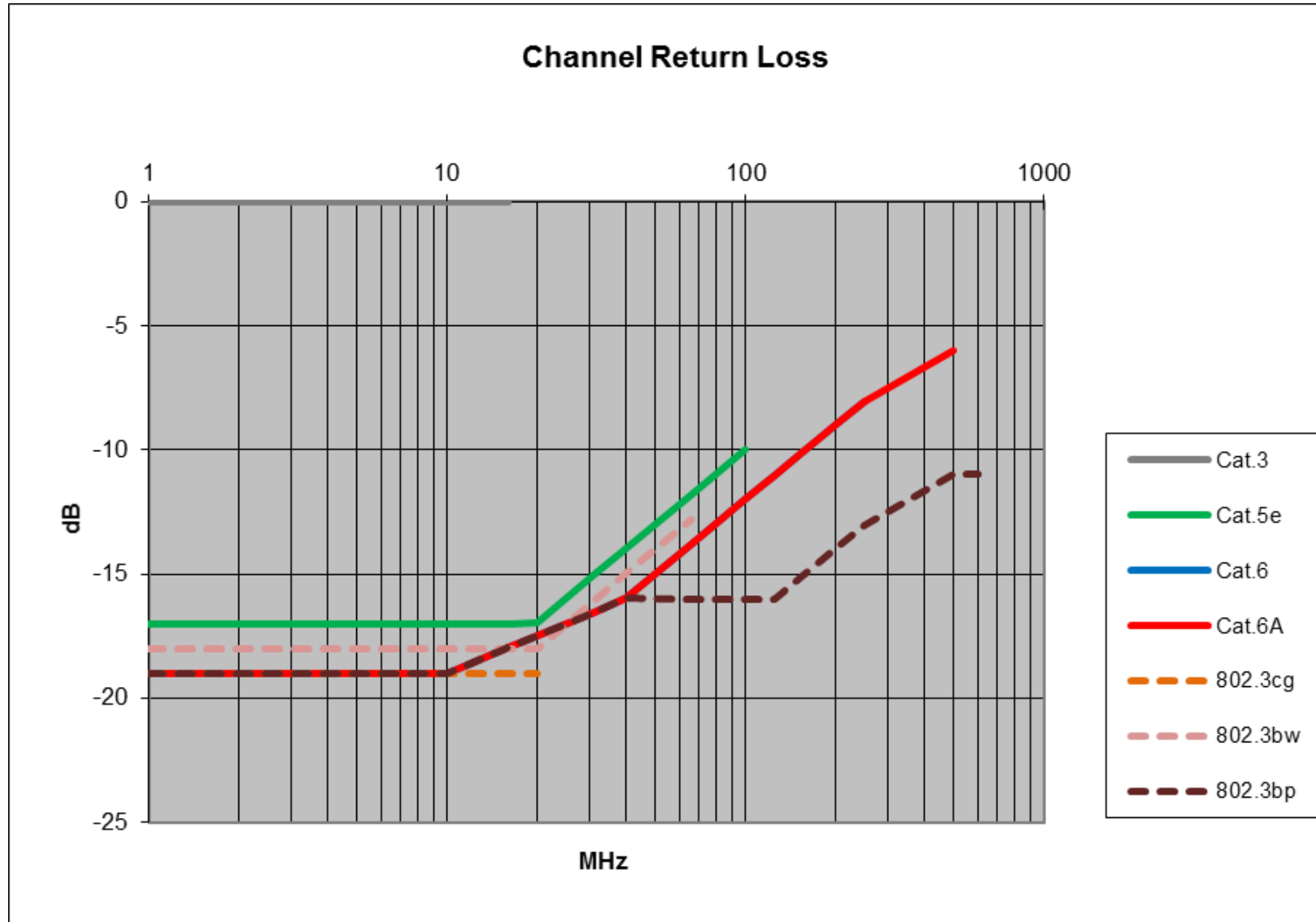
Table 1 – Channel environments

	1	2	3
Mechanical rating	M ₁	M ₂	M ₃
Ingress rating	I ₁	I ₂	I ₃
Climatic rating	C ₁	C ₂	C ₃
Electromagnetic rating	E ₁	E ₂	E ₃

Comparison IEEE Link Segment vs. TIA Channel

Matthias Gerber
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Return Loss



MDNEXT

