10GBASE-T Supported Cabling

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by

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Cabling Types & Distances (802.3an D2.1)

55m Cat 6 unscreened with no AXT mitigation
55-100m Cat 6 unscreened with AXT mitigation
100m Cat 6 screened with no AXT mitigation

Cabling	Link segment length (max)	Cabling Reference
Class E/Cat 6	up to 100m[a]	ISO/IEC TR-24750/TIA TSB-155 D1.3
Class F	100m OK	ISO/IEC TR-24750
new Class E /Cat 6 Aug	100m OK	ISO/IEC 11801 Ed2.1/TIA 568-B.2-10 D1.4

[a] see AXT-to-IL requirements

Are we being fair to our readers? NO!

- there is uncertainty concerning 55m unmitigated Cat 6 UTP
- there is sensitivity in making overt reference to screening
- 802.3 has always stated supported cable types & distance
  - » twisted pair versions have exploited installed cabling
  - » generally oriented towards UTP, as this is worst case
  - » although…..100BASE-TX specifies 100m UTP + STP links
- unfair to expect readers to go elsewhere for fundamental data
- screened Class E is an obvious, high margin 100m solution
- we know this & the industry would not thank us for hiding it

100m Class E/Cat 6 Feasibility

Flatman_2_0503	AXT measurements by Corning, Germany indicate >40dB advantage for Cat 6 cable with overall foil+braid compared with UTP
Cohen_2_0503	AXT measurements of screened Cat 5e cable showing that >10Gbit/s possible
Vaden_1_0903	presentation of robust 10GBASE-T link segment based on screened Cat 6 system
Dove_1_0304	FTP cabling system proposed to give good AXT isolation for 10GBASE-T
Kasturia_2_0304	screened Class E featured for existing and future installations, as meeting the high-end (100m) objective for 10GBASE-T

Screening Standards

ISO/IEC 11801: 2002

9.2.2.7 Cable Coupling Attenuation:
refer to 3.3.9 of IEC 61156-5: 2002, with additional requirement, that for screened Cables, Type II shall be met

9.2.2.8 Cable Transfer Impedance:
screened cables shall meet requirements of Grade 2 in Table 2 of IEC 61156-5: 2002

10.2.4 Connector Transfer Impedance:
specified for screened Cat 6 connectors
Reference made to IEC 60603-7-5

≥ 55dB 30-100MHz
≥ 55-20log(f/100) 100MHz-f_{max}

same for Cat 6 + Cat 7 cables

Market Issues

- **screened Class E products have been launched by major suppliers as “10GBASE-T ready”**
- **substantial installed base of ISO/IEC-compliant screened Class E cabling (expected to be 100% re-usable)**
- **no significant cost or installation issues associated with screened Class E systems today**
- **specification of new Class E components and supporting test methods are expected to take some considerable time**

Proposed Cable Table

Table 55-8 Cabling Types and Distances

Cabling	AXT Mitigation	Max Distance	Cabling References
Class E screened	not required	100m	ISO/IEC TR-24750
Class E unscreened Cat 6 unscreened	not required not required	55m 55m	ISO/IEC TR-24750 TIA/EIA TSB-155
Class E unscreened Cat 6 unscreened	required required	100m 100m	ISO/IEC TR-24750 TIA/EIA TSB-155
Class F (screened)	not required	100m	ISO/IEC TR-24750
new Class E unscreened Augmented Cat 6 (unscreened)	not required not required	100m 100m	ISO/IEC 11801 Ed 2.1 TIA/EIA-568-B.2-10