Standards Update

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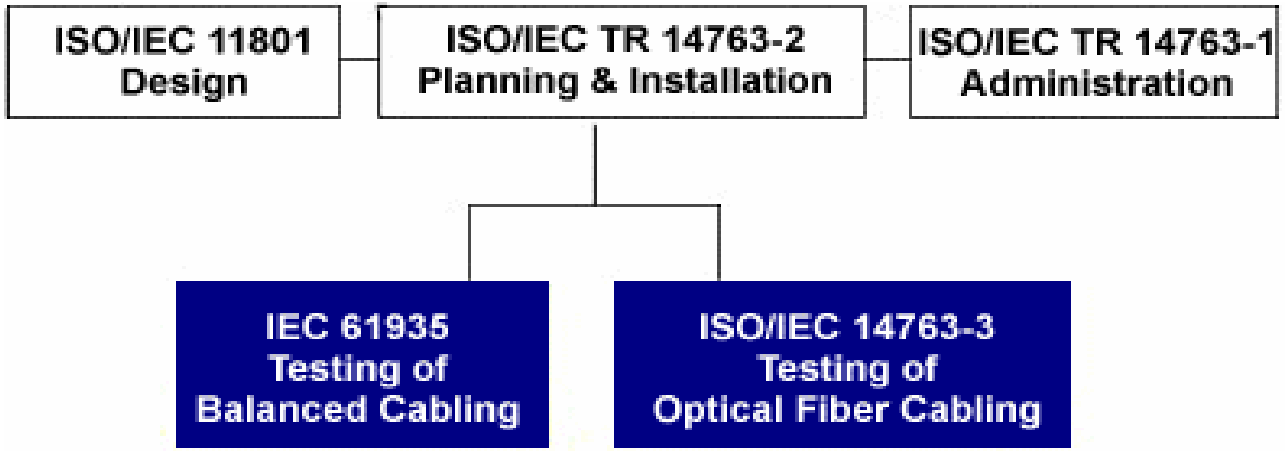
Emerging Standards

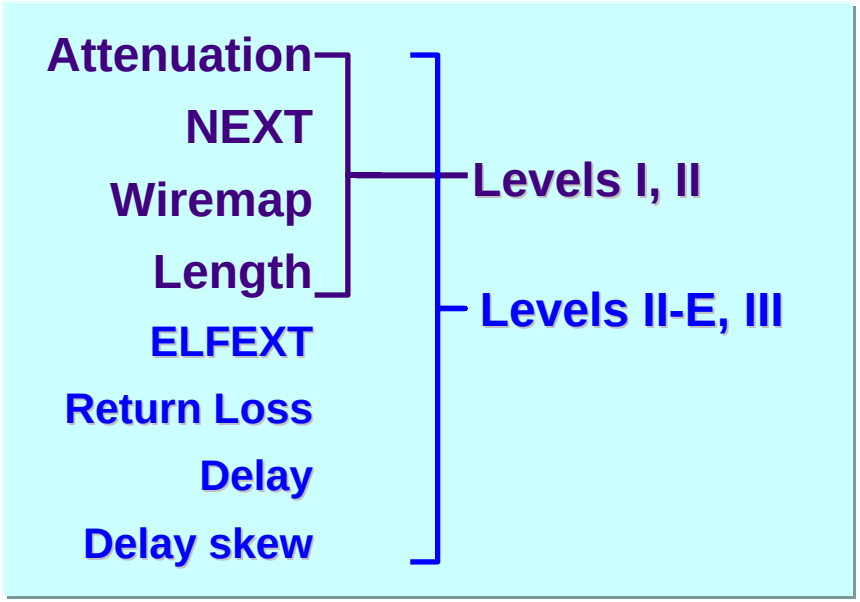
TIA	ISO/IEC	IEEE
TIA-568-A-5 **Q3 99** - Cat 5e - Level II-E **TSB95** **Q3 99** - Cat 5 FEXT, RL, delay, skew - Level II-E **Draft Cat 6** **Q1 01**	**PDAM 3** **Q4 99** - Class D FEXT, RL, delay, skew - field testing per IEC 61935 **IEC 61935** **Q1 00** - Field testing **ISO11801** **2nd edition** **Q1 01** - Classes A - F (class E = cat 6)	**IEEE802.3z** **done 6/98** - 1 Gb Ethernet over fiber / twinax **IEEE802.3ab** **Q3 99** - 1 Gb Ethernet over cat 5(E) **10 Gb Ethernet** **2002** - work started

International Standards

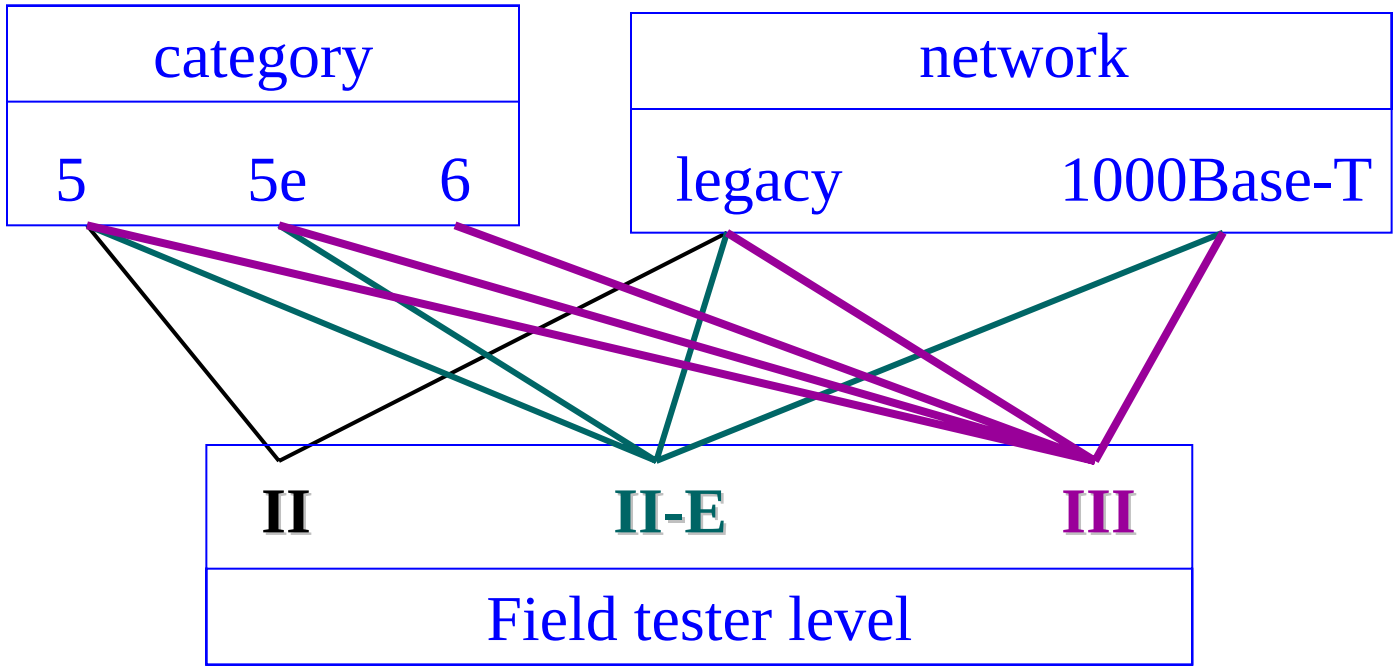


- ISO/IEC 11801 PDAM 3 (Proposed Draft Amendment 3) - Q4/1999
  - Addresses 1000Base-T requirements
  - References IEC 61935 for field testing specifications
- IEC 61935 - field testing spec compatible with TIA Level II-E
- ISO/IEC 11801 Amendment 2 - Q1/2001
  - Cat 6 defined to 250 MHz; positive PSACR to 200 MHz
  - Cat 7 defined to 600 MHz

Field Testing Levels
Levels I to III



Copper Field Testing



Level II-E Accuracy

	Level II-E Baseline	WireScope Baseline	Level II-E Adapter	WireScope Adapter
Attenuation	**1.3 dB**	**0.55 dB**	**1.9 dB**	**0.55 dB**
NEXT	**1.8 dB**	**0.75 dB**	**3.6 dB**	**1.40 dB**
ELFEXT	**2.4 dB**	**1.50 dB**	**4.4 dB**	**2.00 dB**
Return Loss	**2.0 dB**	**1.70 dB**	**2.7 dB**	**2.50 dB**

WireScope 155 exceeds all requirements of Level II-E

- Level II-E accuracy specifications are per TIA default ballot and ISO/IEC 61935 field testing document

Level III Accuracy

- To be specified in TIA Category 6 standard and in the future revision of IEC 61935
- Early draft - to be revised at the TIA meeting this month (5/99)
- Targeting the same accuracy specifications as for Level II-E but at 250 MHz instead of at 100 MHz

1000Base-X Attenuation Fix

Gigabit Ethernet Specification	Type of Fiber	Fiber Core Size (microns)	Bandwidth (MHz * km)	Maximum Distance (m)	Attenuation (dB)	Attenuation + unallocated margin (dB)
1000Base-SX (850 nm)	MMF	50	400	500	3.37	3.9
			500	550	3.56	
		62.5	160	220	2.38	3.2
			200	275	2.60	
1000Base-LX (1310 nm)	MMF	50	400, 500	550	2.35	4.0
		62.5	500	550	2.35	4.0
	SMF	10		5,000	4.57	

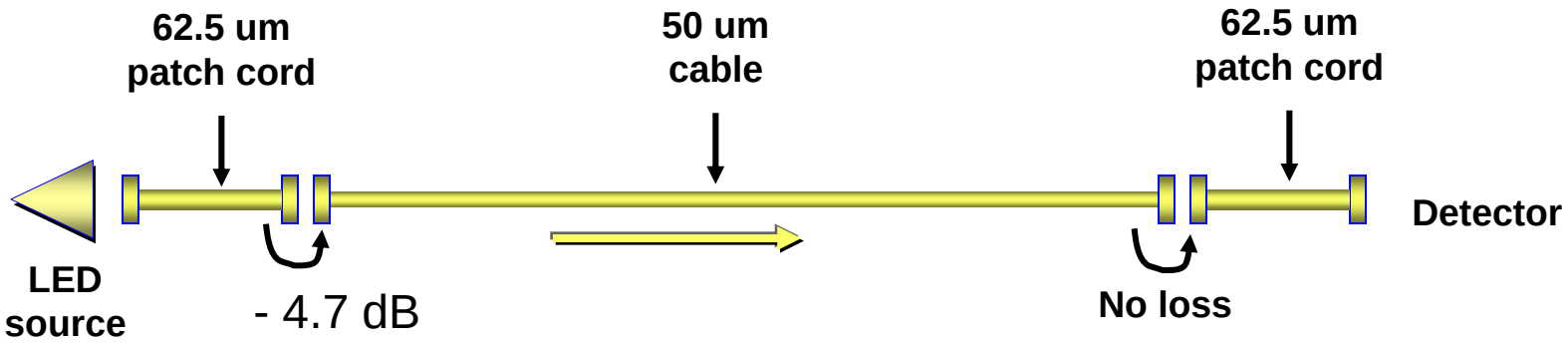
- TIA proposal (for TIA-568-B.1 informational annex) to relax 1000 Base-X attenuation limits by the amount of IEEE unallocated margin

Fiber Optic Networks

- 50 um fiber is increasingly used in new installations
  - Being considered for optimum 10 Gb Ethernet performance
  - Bandwidth and attenuation superior to 62.5 um fiber
  - Compatible with 62.5 um fiber in laser based systems
  - Compatible with LED legacy systems
    - LED power budget analysis shows that 50 um fiber supports Fast Ethernet and FDDI systems
- Loss and length limits of LED-based networks are different for 50 um fiber
  - New limits for 50 um are now available from TIA
  - More variables for fiber field testing

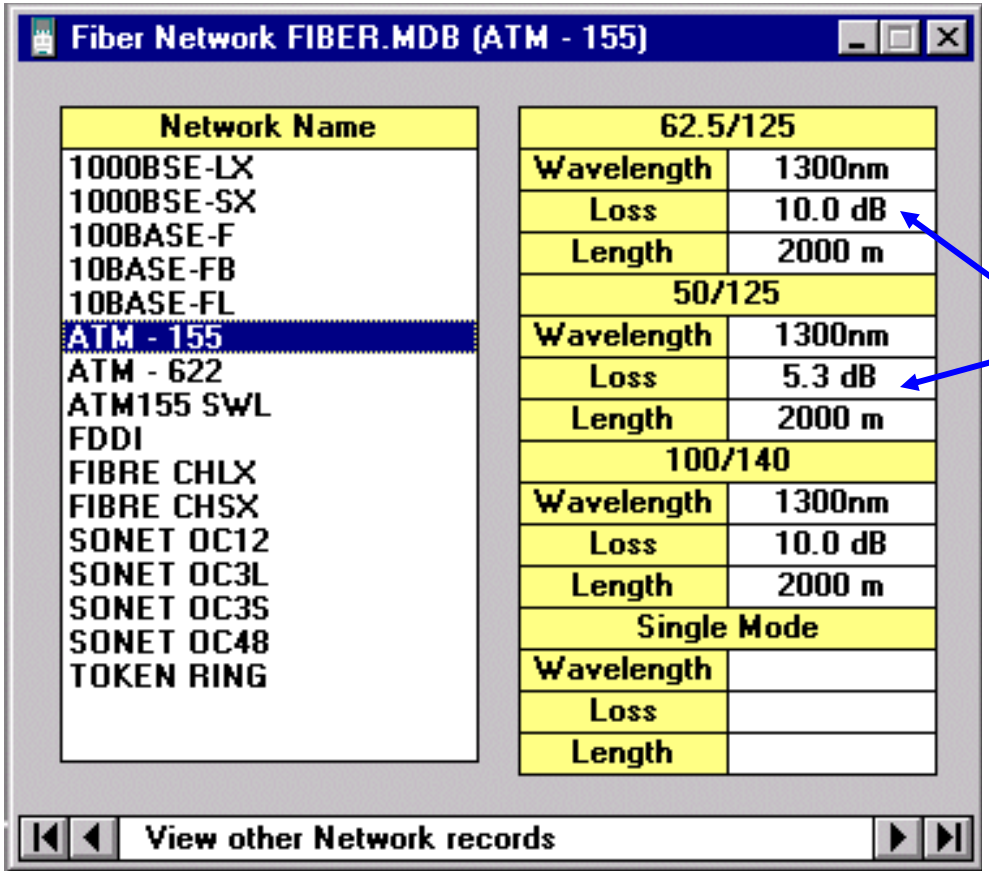
Loss 50um vs. 62.5 um

- Worst-case source coupling loss from 62.5 um to 50 um for LED-based systems is **4.7 dB**



WS155 and ScopeData Support for Fiber Networks

Selecting the right cable for the test ensures testing to correct loss and length limits



Loss limit difference is 4.7 dB 62.5 vs. 50 um cable

WireScope Supports all Required Field Testing

- **Level II-E**
- **IEC 61935 - European Level II-E**
- **TSB95 - Additional Cat 5**
- **TIA-568-A-5 - Cat 5E**
- **ISO/IEC 11801 PDAM3 - European Cat 5E**