ISO/IEC SC25/WG3 Meeting
Bordeaux: 23-27 February 2004
- Structured Cabling Systems -

report for IEEE 802 by Alan Flatman

**Highlights**

- residential cabling FDIS planned
- industrial cabling 1\textsuperscript{st} draft by 12/04
- WAP cabling guide approved as TR
- mid-span powering guide to be TS
- cabling EM performance progress
- 10GBASE-T cabling being defined
ISO/IEC 24702
Industrial Premises Cabling

- being developed with CENELEC + TIA
- connector choice dominated agenda
  - issue is the outer shell/sealing interface
  - 2-pair, 4-pair copper and optical required
  - numerous variants being standardised
  - a selection process is being established
- **MICE** tables are now largely complete
  - electromagnetic performance strawman
- CD is expected to be released 4Q04
- earliest date of approval is start 2006
ISO/IEC 24702
Industrial Premises Cabling
Environmental Classification

<table>
<thead>
<tr>
<th>Class I</th>
<th>Class II</th>
<th>Class III</th>
</tr>
</thead>
<tbody>
<tr>
<td>(commercial)</td>
<td>(light industrial)</td>
<td>(heavy industrial)</td>
</tr>
<tr>
<td>Mechanical</td>
<td>M₁</td>
<td>M₂</td>
</tr>
<tr>
<td>Ingress (IP rating)</td>
<td>I₁</td>
<td>I₂</td>
</tr>
<tr>
<td>Climatic</td>
<td>C₁</td>
<td>C₂</td>
</tr>
<tr>
<td>Electromagnetic</td>
<td>E₁</td>
<td>E₂</td>
</tr>
</tbody>
</table>

- environmental classes may be mixed (e.g., M₁I₂C₃E₂)
- environmental classes apply to cabling + containment
- MICE requirements are fulfilled by component choice and channel requirements are met “by design”
- only EMC immunity applies, not RF emission
ISO/IEC TR 24704
Cabling Guide for Wireless Access Points

features:
• additional cabling as grid in/on ceiling
• support 802.11-series, DECT, Bluetooth
• grid spacing recommended to be 12m
• TO cabling to be Class D (5e) minimum
• elec power may be provided from a TR

status:
• now approved for publication as a TR
Cabling Guide for Mid-Span Power Insertion

- implementation details to support IEEE 802.3af
- to be defined as ISO/IEC Technical Specification
- based on March 2002 liaison statement to 802.3af

1. When mid-span power insertion equipment replaces a generic cabling component, it shall meet the performance requirements of the component(s) it replaces, regardless of the interfaces used for input/output connections.

2. Placement of mid-span power insertion equipment shall be external to the permanent link.
Electromagnetic Performance of Balanced Cabling

- generic specification for all cable constructions
  - need to define cabling for industrial applications
  - need to manage alien crosstalk for 10GBASE-T
- 10BT/100BTX/1000BT data to determine immunity
- EMC analysis presented for 10BT/100BTX/1000BT
  - immunity requirements more stringent than emission
- strawman channel spec to be affirmed June 2004
- strawman to IEEE 802.3 for information/comment
Balanced Cabling EM Performance $E_1$

<table>
<thead>
<tr>
<th>crosstalk parameters</th>
<th>UTP</th>
<th>FTP</th>
<th>STP</th>
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</thead>
<tbody>
<tr>
<td>alien crosstalk</td>
<td>$\geq \text{channel PSNEXT (ffs)}$</td>
<td>$\geq \text{channel PSNEXT (ffs)}$</td>
<td>$\geq \text{channel PSNEXT (ffs)}$</td>
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<tr>
<td>unbalance attenuation</td>
<td>TCL</td>
<td>40-10log(f) 1MHz to max f for Class</td>
<td>40-10log(f) 1MHz to max f for Class</td>
</tr>
<tr>
<td></td>
<td>ELTCTL</td>
<td>30-20log(f) 1-30MHz</td>
<td>30-20log(f) 1-30MHz</td>
</tr>
<tr>
<td>screen parameters</td>
<td>screening attenuation</td>
<td>not applicable</td>
<td>not specified</td>
</tr>
<tr>
<td></td>
<td>coupling attenuation</td>
<td>not specified</td>
<td>40-20log(f/100) 30-1000MHz</td>
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</tbody>
</table>
Balanced Cabling EM Performance $E_2$

<table>
<thead>
<tr>
<th>Parameter Type</th>
<th>UTP</th>
<th>FTP</th>
<th>STP</th>
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<tr>
<td><strong>Crosstalk Parameters</strong></td>
<td>Alien Crosstalk &amp; $&gt;$ channel PSNEXT (ffs)</td>
<td>$&gt;$ channel PSNEXT (ffs)</td>
<td>$&gt;$ channel PSNEXT (ffs)</td>
</tr>
<tr>
<td><strong>Unbalance Attenuation</strong></td>
<td>50-10log(f) 1MHz to max f for Class</td>
<td>45-10log(f) 1MHz to max f for Class</td>
<td>to be considered</td>
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<tr>
<td>ELTCTL</td>
<td>40-20log(f) 1-30MHz</td>
<td>35-20log(f) 1-30MHz</td>
<td>to be considered</td>
</tr>
<tr>
<td><strong>Screen Parameters</strong></td>
<td>Screening Attenuation: not applicable</td>
<td>not specified</td>
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<tr>
<td>Coupling Attenuation</td>
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<td>50-20log(f/100) 30-1000MHz</td>
<td>60-20log(f/100) 30-1000MHz</td>
</tr>
</tbody>
</table>

TCL: 40-20log(f) 1-30MHz

ELTCTL: 40-20log(f) 1-30MHz

Screening: not applicable

Coupling: not specified
**Balanced Cabling EM Performance E₃**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>UTP</th>
<th>FTP</th>
<th>STP</th>
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</thead>
<tbody>
<tr>
<td><strong>Crosstalk</strong></td>
<td>alien crosstalk</td>
<td>≥ channel PSNEXT (ffs)</td>
<td>≥ channel PSNEXT (ffs)</td>
</tr>
<tr>
<td><strong>Unbalance</strong></td>
<td><strong>TCL</strong></td>
<td>60-10log(f)</td>
<td>45-10log(f)</td>
</tr>
<tr>
<td></td>
<td>1MHz to max f for Class</td>
<td>1MHz to max f for Class</td>
<td></td>
</tr>
<tr>
<td><strong>ELTCTL</strong></td>
<td>50-20log(f)</td>
<td>35-20log(f)</td>
<td>to be considered</td>
</tr>
<tr>
<td></td>
<td>1-30MHz</td>
<td>1-30MHz</td>
<td></td>
</tr>
<tr>
<td><strong>Screen</strong></td>
<td><strong>Screening</strong></td>
<td>not applicable</td>
<td>not specified</td>
</tr>
<tr>
<td></td>
<td>attenuation</td>
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<tr>
<td></td>
<td><strong>Coupling</strong></td>
<td></td>
<td>60-20log(f/100)</td>
</tr>
<tr>
<td></td>
<td>attenuation</td>
<td></td>
<td>30-1000MHz</td>
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</table>
10GBASE-T Cabling

• Nov 2003 10GBASE-T liaison requests welcomed
• 16 expert/12 nation ad hoc group briefed by WG3 to:
  » define tentative cabling channel for 10GBASE-T
  » identify any shortfalls of ISO/IEC 11801:2002
  » consider implementation-specific criteria
• set of channel parameters were agreed by ad hoc
• agreed to adopt upper freq required by IEEE 802.3an
  » currently recognised as 625 MHz
• agreed to adopt single formula for each parameter
• agreed to consider extrapolated Class E & F limits
• agreed to study PSANEXT limit of $90 - 15\log(f)$ dB
10GBASE-T Channel Parameters

- **Alien Crosstalk (AXT)**
- **AXT-to-Insertion Loss Ratio (AXTIR)**
- **EM Parameters (SA, CA, TCL, ELTCTL)**
- **Insertion Loss**
- **Return Loss**
- **PSNEXT**
- **PSELFEXT**

Both near- and far-end alien crosstalk need to be defined.

ISO/IEC 11801 parameters to be extended to 625 MHz (TBC).

New parameters to be defined up to 625 MHz (TBC).
Future Meetings

ISO/IEC SC25 WG3  
21 - 24 June 2004  
Hokaido, Japan

ISO/IEC SC25 Plenary  
25 June 2004  
Hokaido, Japan

Industrial Cabling  
30 Sep - 02 Oct  
USA

ISO/IEC SC25 WG3  
10-14 January 2005  
Mexico (TBC)
Questions?