

# **50GBASE-FR & -LR Specification Proposal**

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50 Gb/s Ethernet Over a Single Lane Task Force

802.3 Interim Meeting

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# Transmit Characteristics

| Description (PAM4)  | 50GBASE-FR | 50GBASE-LR | Unit  |
|---|------------|------------|-------|
| Reach   | 2          | 10         | km    |
| Signaling Rate, each lane                                       | 26.5625    | 26.5625    | GBd   |
| Operating BER   | 2.0E-04    | 2.0E-04    |       |
| Total average launch power (max)                                | 3.0        | 4.2        | dBm   |
| OMA <sub>outer</sub> , each lane (max)                          | 2.8        | 4.0        | dBm   |
| OMA <sub>outer</sub> , each lane (min)                          | -2.0       | -1.0       | dBm   |
| Launch Power in OMA <sub>outer</sub> minus TDP, each lane (min) | -3.0       | -2.0       | dBm   |
| Transmitter and dispersion penalty, (TDP) each lane (max)       | 2.3        | 2.5        | dB    |
| Extinction ratio (ER) (min)                                     | 4.5        | 4.5        | dB    |
| RIN OMA (max)   | TBD        | TBD        | dB/Hz |

# Receive Characteristics

| Description (PAM4)  | 50GBASE-FR | 50GBASE-LR | Unit |
|---|------------|------------|------|
| Signaling Rate, each lane   | 26.5625    | 26.5625    | GBd  |
| Operating BER   | 2.0E-04    | 2.0E-04    |      |
| Receiver reflectance (max)  | TBD        | TBD        | dB   |
| Receiver Sensitivity ( $OMA_{inner}$ ),<br>each lane (max)          | -12.1      | -13.6      | dBm  |
| Stressed receiver sensitivity<br>( $OMA_{inner}$ ), each lane (max) | TBD        | TBD        | dBm  |
| Conditions of stressed receiver<br>sensitivity test                 | TBD        | TBD        |      |

# Illustrative Link Power Budgets

| Description (PAM4)                            | 50GBASE-FR | 50GBASE-LR | Unit |
|---|------------|------------|------|
| Power Budget<br>(for maximum TDP)             | 6.6        | 9.3        | dB   |
| Operating Distance                            | 2          | 10         | km   |
| Channel Insertion Loss                        | 4.0        | 6.3        | dB   |
| Maximum Discrete Reflectance                  | TBD        | TBD        | dB   |
| Allocation for Penalties<br>(for maximum TDP) | 2.6        | 3.0        | dB   |
| Modulation Penalty                            | 4.8        | 4.8        | dB   |
| MPI Penalty                                   | 0.3        | 0.5        | dB   |

The proposed link budgets are consistent with 802.3bs specs.

# WDM Lane Assignment

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| <b>50GBASE<br/>CWDM Lane</b> | <b>Center Wavelength<br/>nm</b> | <b>Wavelength Range<br/>nm</b> |
|------------------------------|---------------------------------|--------------------------------|
| L0                           | 1311                            | 1304.5 to 1317.5               |

# Optical Margin

| Description  | 50GBASE-FR | 50GBASE-LR | Unit |
|--|------------|------------|------|
| Receiver Sensitivity ( $OMA_{inner}$ ),<br>each lane, pre-DeMux (max)    | -12.1      | -13.6      | dBm  |
| DeMux Loss   | 0.0        | 0.0        | dB   |
| Cross-talk penalty<br>(PSM config. only)                                 | 0.3        | 0.3        | dB   |
| Receiver Sensitivity ( $OMA_{inner}$ ),<br>each lane, post-DeMux (max)   | -12.4      | -13.9      | dBm  |
| Receiver Sensitivity ( $OMA_{inner}$ )<br>single lane (typical measured) | -17.0      | -17.0      | dBm  |
| Optical Margin   | 4.6        | 3.1        | dB   |

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Thank you