Background

- HSSG 100GE SMF reach objectives
  - 10km
  - 40km
- 10km objective was approved in 2006 as a single SMF reach
- 40km objective was approved in 2007 as a second SMF reach
- Optics analysis has shown 100GE 4x25G SMF technology cost knee is below 10km, unlike for 10GE 1x10G SMF technology
  - Higher noise bandwidth due to 25GBaud versus 10GBaud
  - Additional losses through 4λ WDM Mux and DeMux
- End user input has shown that most 100GE SMF Data Center & Enterprise applications are covered by reaches below 10km
  - High percentage are covered by 2km
  - Remainder are covered by 3km or 4km
### 4x25G SMF PMD Link Budget

<table>
<thead>
<tr>
<th></th>
<th>3km</th>
<th>4km</th>
<th>10km</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiber Loss</td>
<td>1.2</td>
<td>1.6</td>
<td>4.1</td>
</tr>
<tr>
<td>Connector Loss</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Penalties (CD, Xtalk, )</td>
<td>2.1</td>
<td>2.2</td>
<td>2.7</td>
</tr>
<tr>
<td>Total budget</td>
<td>5.2</td>
<td>5.8</td>
<td>8.8</td>
</tr>
</tbody>
</table>

- There is a large cost delta between 3km/4km and 10km
- There is some cost delta between 3km and 4km
- Penalty values are approximate and further work is required to accurately reflect all impairments and λ grid
Discussion

- 10km reach versus 3km/4km reach requires:
  - Higher output power EAM-DFBs
  - or higher output power DM-DFBs
  - Higher sensitivity PIN receivers
- 3km reach versus 4km reach
  - 3km has some cost advantage and is aligned with a standard (TIA)
  - 4km addresses some high end data center applications
- Recommend that 10km reach be changed to 3km or 4km
  - 10km reach applications addressed by the 40km reach
- Request end user input on importance of 3km versus 4km reach