A Single PHY Specification Optimized For Multiple Applications

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One PHY, Two Modes of Operation

One PHY Specification:

- One defined signaling rate
- One defined PCS
- One defined PMA
- One defined PMD

Two Modes:

Different Channel Requirements (subset/superset)
Different Advertised Capabilities
Different Power Requirements

- TOR maximum ~3.5W
- EOR maximum ~6W

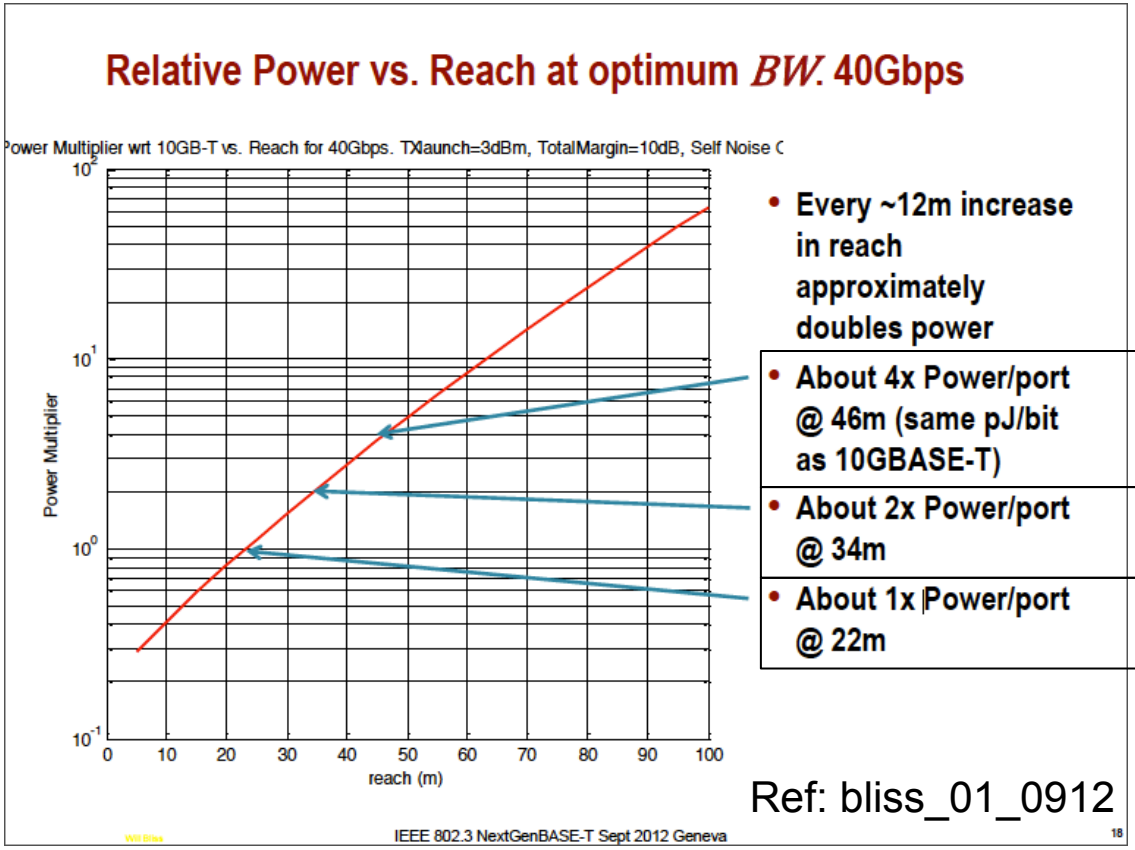
Short Reach Mode should be optional

A Single Operating Mode

(bound by power on its reach by SR density needs)

Power Versus Reach

Conclusion: 40GBASE-T challenged for Broad Market Potential to 22m @ 28nm or smaller geometry



Translated (1)

40nm	28nm
16W	13W
8W	6.5W
4W	3.25W

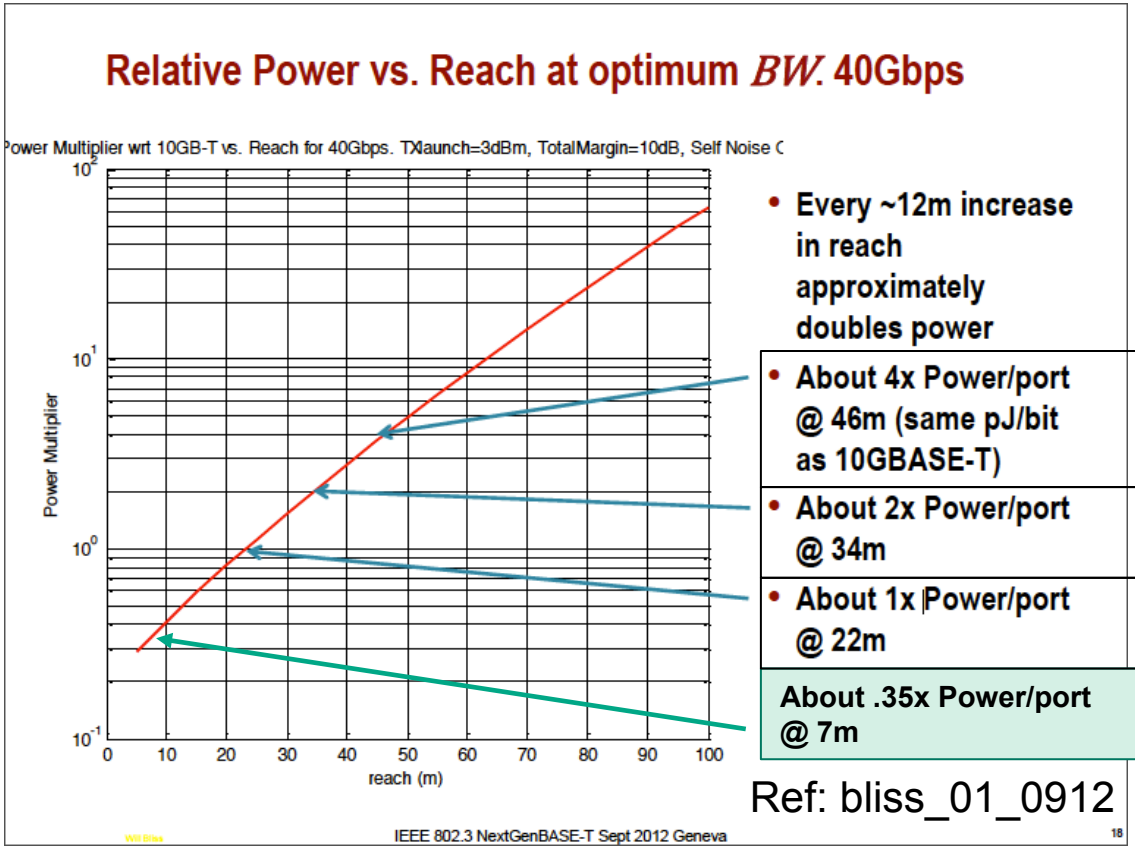
(1) 10GBASE-T Power Estimates – dove_01_0912

Two Operating Modes

(relieves power constraint on its reach, maintains SR density needs)

Power Versus Reach

Conclusion: Short Reach Mode enables very low power TOR solution, eases power requirements for EOR



- Every ~12m increase in reach approximately doubles power
- About 4x Power/port @ 46m (same pJ/bit as 10GBASE-T)
- About 2x Power/port @ 34m
- About 1x Power/port @ 22m
- About .35x Power/port @ 7m

Ref: bliss_01_0912

Translated (1)

40nm	28nm
16W	13W
8W	6.5W
4W	3.25W
1.3W	1W

(1) 10GBASE-T Power Estimates – dove_01_0912

Two Modes Offer Broader Market

When the power requirements for a PHY exceed the necessary market requirements for specific applications, your choices are the following;

1) Offer only a single solution and let the market choose an alternative solution that better fits its need
   - Splits market between different alternatives
   - (ex: QSFP+ DAC vs 40GBASE-T for <7m)
   - (ex: QSFP+ MMF vs 40GBASE-T for >22m)

2) Offer a single PHY with two modes that better fit customer application requirements
   - Consolidates market on single solution with different modes of operation
   - (ex: 40GBASE-TSR vs 40GBASE-T for <7m) (same parts)
   - (ex: 40GBASE-T vs QSFP+ MMF for <34m)

Single PHY Mode Constrains Market

Given the diverse power requirements shown in bliss_01_0912 (1W@10m, 4W@22m), we are going to be constrained to one of two options.

1) Create a single PHY mode with limited reach to keep power down.

2) Create a single PHY with two modes of operation
    1) Maximum reach can be longer to broaden market potential for longer reach applications.
    2) Short reach can be lower power to broaden market potential for higher density applications.

Defining Objectives

A Task Force does not require an objective to define a "Short Reach Mode" of operation.
(ex: 10GBASE-T had no "Short Reach Objective")

Its recommended that the Study Group carefully assess the power versus reach analysis including sensitivity analysis before setting the final reach objective(s).

While not required, an explicit objective to support a Short Reach Mode would broaden market potential.