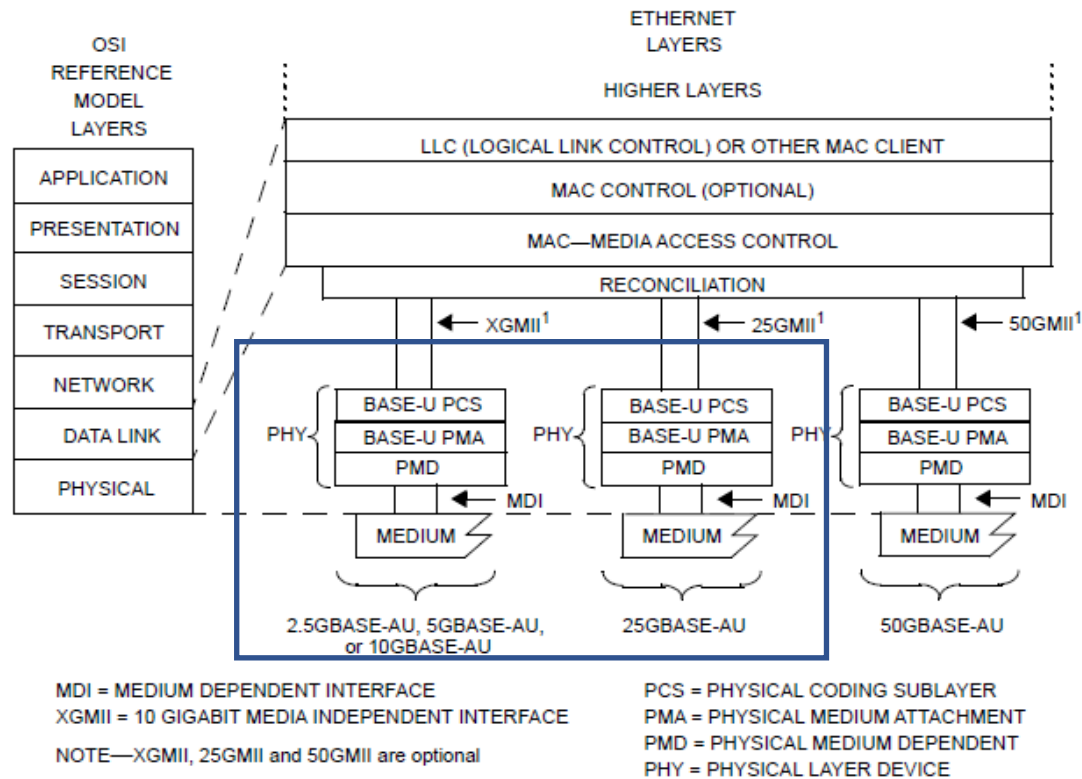


# Baseline proposal For 802.3dh

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# Proposal for revision of clause 166

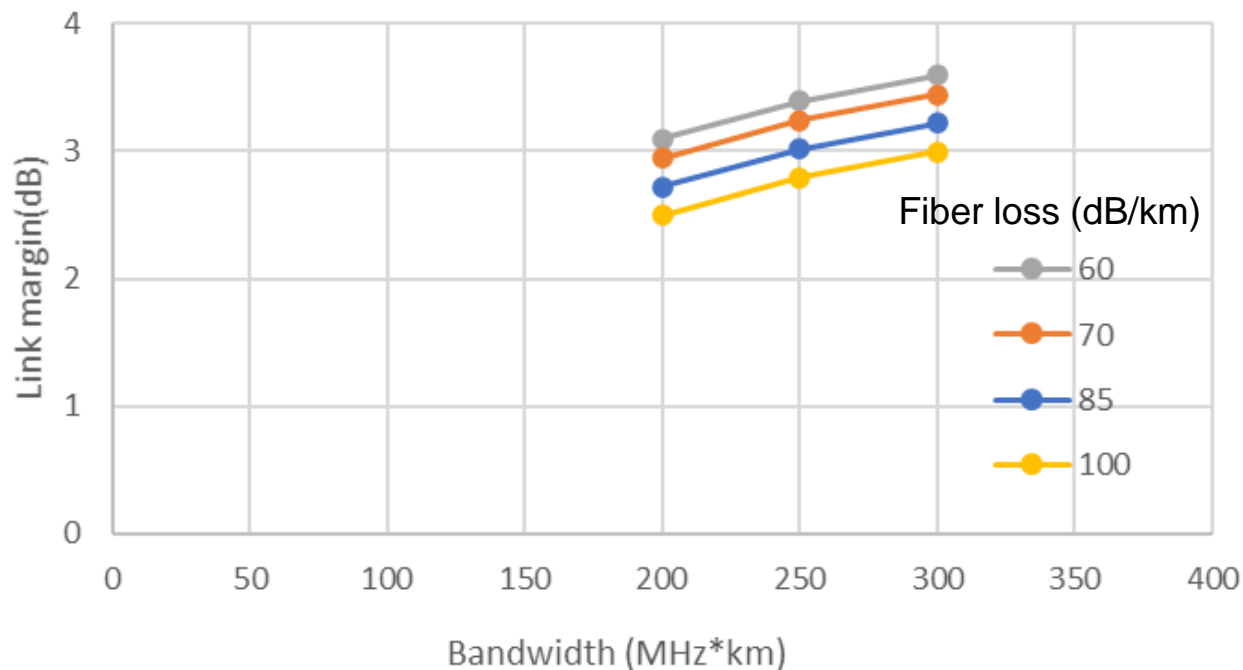
166. Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer, and Physical Medium Dependent (PMD), types **2.5GBASE-AU**, **5GBASE-AU**, **10GBASE-AU**, **25GBASE-AU**, and **50GBASE-AU**



**Figure 166–1—Relationship of BASE-AU PHYs to the ISO/IEC OSI reference model and the IEEE 802.3 Ethernet Model**

# 25Gbps Link budget estimation on GI-POF at 802.3cz Ad Hoc meeting on Feb 9<sup>th</sup> , 2021

25Gbps 15m 2dB x 2 connection



Objectives for 802.3dh

Data rate (bps)	Reach (m)	# of connections
2.5G	15	3
5G	15	3
10G	15	3
25G	15	2

[https://www.ieee802.org/3/cz/public/9\\_feb\\_2021/watanabe\\_3cz\\_01\\_090221\\_gipof.pdf](https://www.ieee802.org/3/cz/public/9_feb_2021/watanabe_3cz_01_090221_gipof.pdf)

This figure is calculated based on the contribution of:

[https://www.ieee802.org/3/cz/public/9\\_feb\\_2021/perezaranda\\_3cz\\_01\\_090221\\_gipof\\_linkbudget.pdf](https://www.ieee802.org/3/cz/public/9_feb_2021/perezaranda_3cz_01_090221_gipof_linkbudget.pdf)

$$200\text{MHz}\cdot\text{km}/0.015\text{km} = 13.3\text{GHz} \approx 13\text{GHz}$$

# No technical modification

(Editorial change may be needed if different PHY name is used)

166.1 Overview

166.2 Physical Coding Sublayer (PCS)

166.3 Physical Medium Attachment (PMA) sublayer

166.4 Energy-Efficient Ethernet (EEE)

166.5 Test Modes

166.7 BASE-U Operations, Administration, and Maintenance (BASE-U OAM) channel

166.8 Loopback modes

166.9 Management interface

166.10 Environmental specifications

166.11 Delay constraints

166.12 Protocol implementation conformance statement (PICS) proforma for Clause 166, Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer, and Physical Medium Dependent (PMD) sublayer, types 2.5GBASE-AU, 5GBASE-AU, 10GBASE-AU, 25GBASE-AU, and 50GBASE-AU8

Annex 166A, B (informative)

## 166.6 Physical Medium Dependent (PMD) sublayer

**Table 166-8B**

PMD type	Required operating range
2.5GBASE-?U	0.2 to 15m
5GBASE-?U	
10GBASE-?U	
25GBASE-?U	

# Table 166-9B

## BASE-?U PMD transmitter optical characteristics

Parameter	2.5GBASE-?U	5GBASE-?U	10GBASE-?U	25GBASE-?U	Unit
Signaling rate (range)	2.65625 ±100 ppm	5.3125 ±100 ppm	10.625 ±100 ppm	26.5625 ±100 ppm	GBd
Modulation format	NRZ				
Center wavelength (range)	TBD				nm
RMS spectral width (max)	TBD				nm
Average launch power (max)	TBD				dBm
Average launch power (min)	TBD	TBD	TBD	TBD	dBm
Optical Modulation Amplitude (OMA <sub>outer</sub> ) (max)	TBD	TBD	TBD	TBD	dBm
Optical Modulation Amplitude (OMA <sub>outer</sub> ) (min)	max (A, TDFOM + B)				
A	TBD	TBD	TBD	TBD	dBm
B	TBD	TBD	TBD	TBD	dBm

# Table 166-9B (Continued)

Parameter	2.5GBASE-?U	5GBASE-?U	10GBASE-?U	25GBASE-?U	Unit
Transmitter distortion figure of merit (TDFOM) (max)	TBD	TBD	TBD	TBD	dBm
Transmitter distortion figure of merit (TDFOM) (min)	TBD	TBD	TBD	TBD	dBm
Average launch power of OFF transmitter (max)	TBD	TBD	TBD	TBD	dBm
Extinction ratio (min)	TBD	TBD	TBD	TBD	dB
RIN <sub>12OMA</sub> (max)	TBD	TBD	TBD	TBD	dB/Hz
Optical return loss tolerance (max)	TBD	TBD	TBD	TBD	dB
Uncorrelated random jitter (tJ) (max)	TBD	TBD	TBD	TBD	UI
Encircled flux	≥ 86% at 19 μm, ≤ 30% at 4.5μm				

# Table 166-10B

## BASE-?U PMD receiver optical characteristics

Parameter	2.5GBASE-?U	5GBASE-?U	10GBASE-?U	25GBASE-?U	Unit
Signaling rate (range)	2.65625 ±100 ppm	5.3125 ±100 ppm	10.625 ±100 ppm	26.5625 ±100 ppm	GBd
Modulation format	NRZ				
Center wavelength (range)	TBD				nm
Damage threshold <sup>a</sup> (max)	TBD				dBm
Average receive power (max)	TBD				dBm
Average receive power <sup>b</sup> (min)	TBD	TBD	TBD	TBD	dBm
Receive power (OMA <sub>outer</sub> ) (max)	TBD	TBD	TBD	TBD	dBm
Receiver reflectance (max)	TBD				dBm
Stressed receiver sensitivity (OMA <sub>outer</sub> ), condition 1 (max)	TBD	TBD	TBD	TBD	dBm
Stressed receiver sensitivity (OMA <sub>outer</sub> ), condition 2 (max)	TBD	TBD	TBD	TBD	dBm



# Table 166-10B (Continued)

Parameter	2.5GBASE-?U	5GBASE-?U	10GBASE-?U	25GBASE-?U	Unit
Receiver sensitivitye (OMAouter) (max)	max (C, TDFOM + D)				dBm
C	TBD	TBD	TBD	TBD	dBm
D	TBD	TBD	TBD	TBD	dBm
Conditions of stressed receiver sensitivity test:					
Stressed TDFOM (STDFOM), condition 1	TBD	TBD	TBD	TBD	dB
Stressed TDFOM (STDFOM), condition 2	TBD	TBD	TBD	TBD	dB

**Table 166-11B**  
**BASE-?U illustrative link power budget**

Parameter	2.5GBASE-?U	5GBASE-?U	10GBASE-?U	25GBASE-?U	Unit
Effective modal bandwidth	13000				MHz@ 15m
Power budget	TBD	TBD	TBD	TBD	dB
Operating distance (max)	0.2 to 15				m
Channel insertion loss (max)	TBD	TBD	TBD	TBD	dB
Channel insertion loss (min)	0				dB
Allocation for penaltiesc	TBD	TBD	TBD	TBD	dB

**Table 166-19B****BASE-?U optical fiber and cable characteristics**

Parameter	A4j	Unit
Nominal wavelength	850, 980	nm
Cabled optical attenuation (max)	100	dB/km
Effective modal bandwidth (min)	13000 (195)	MHz@15m (MHz*km)
Zero dispersion wavelength $\lambda_0$	1200	nm
Chromatic dispersion slope (max) $S_0$	0.06	ps/(nm <sup>2</sup> ·km)

Parameter	2.5GBASE-?U	5GBASE-?U	10GBASE-?U	25GBASE-?U	Unit
Total connection insertion loss (max)	TBD	TBD	TBD	TBD	dB

**Thank you!**