

400GbE draft proposal for 10km based on 4 x 100G DMT

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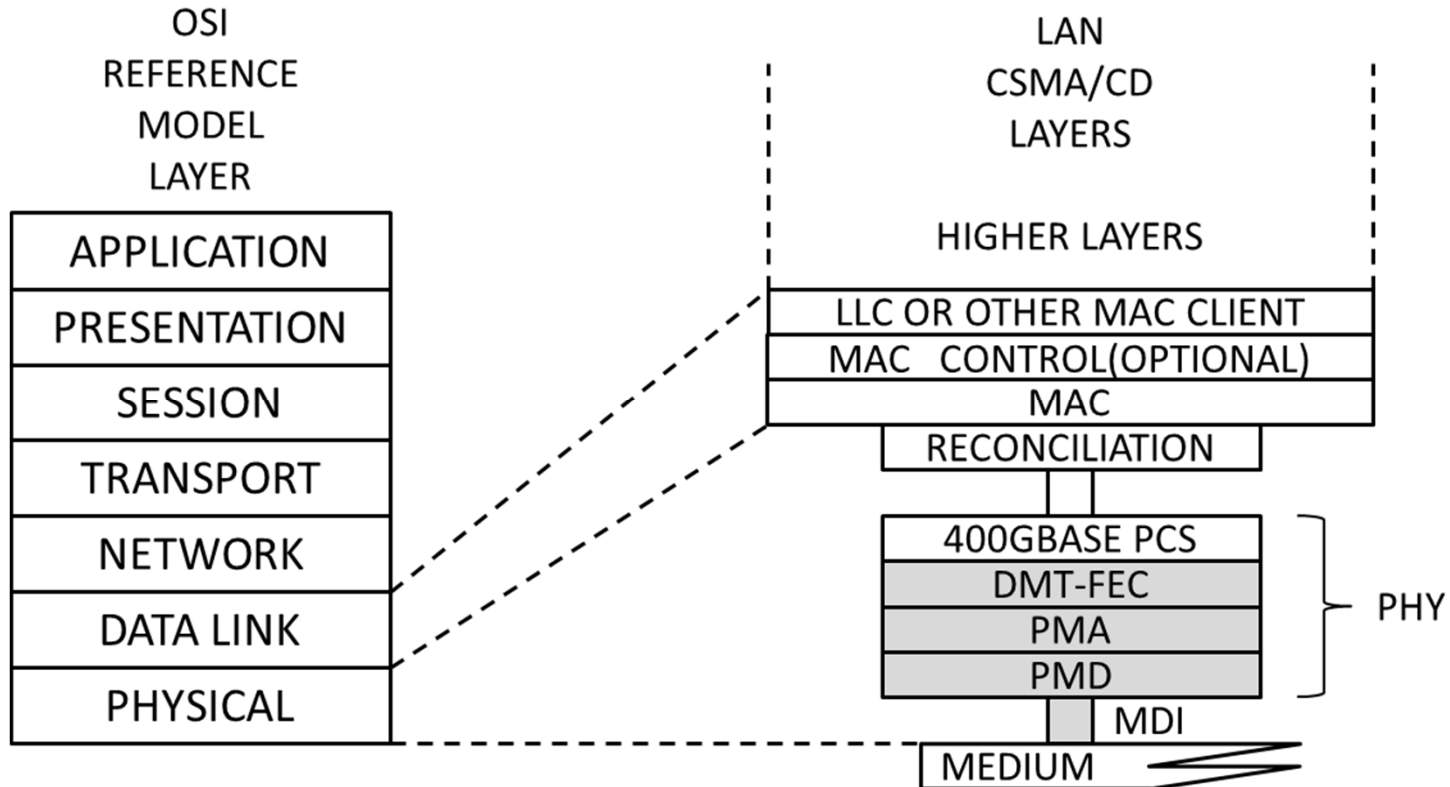
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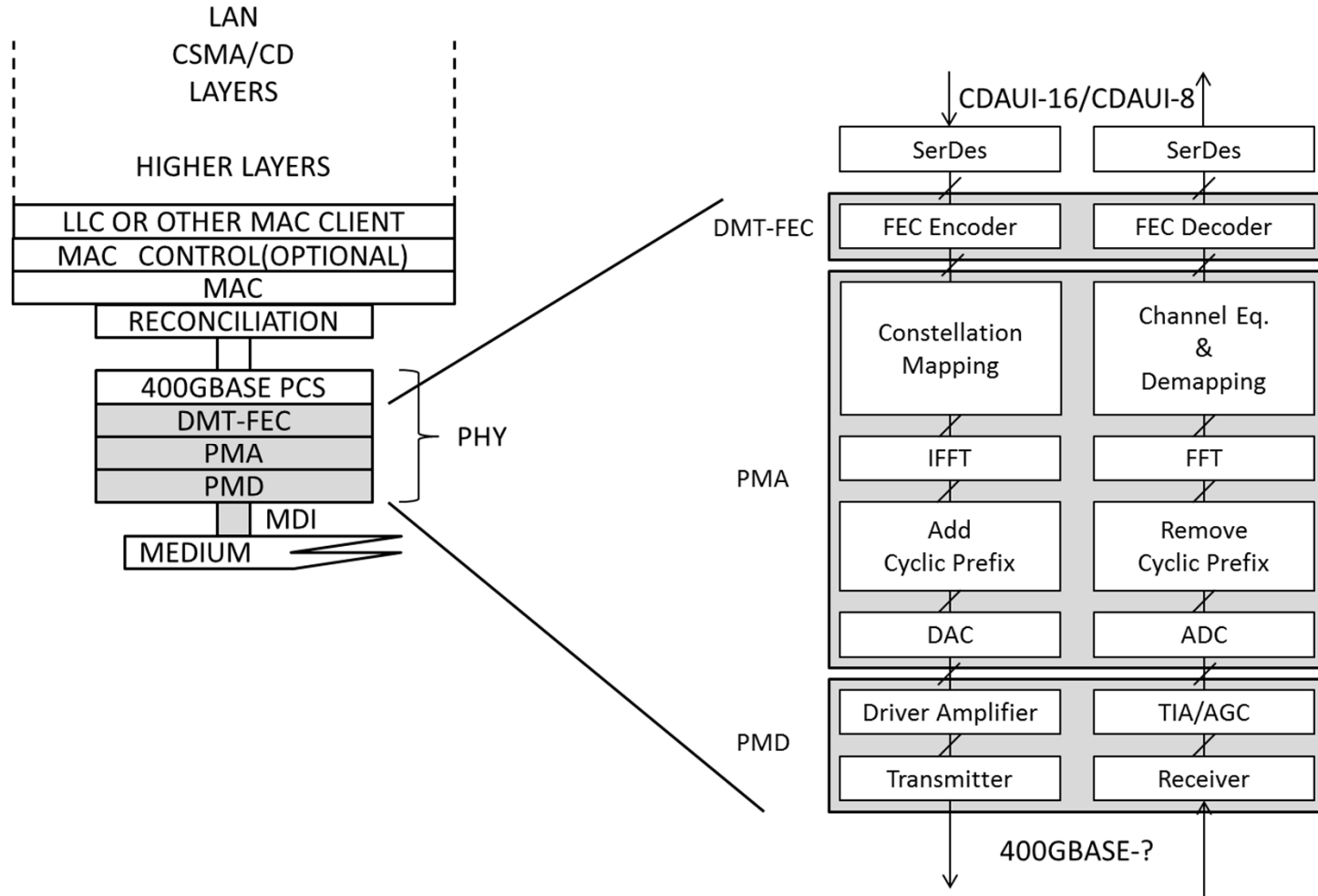
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- PMA and PMD relation ship to the OSI reference model and IEEE 802.3 CSMA/CD LAN model



Function Diagram of DMT

■ DATA LINK sublayer



DMT-FEC and PMA Functional Specifications

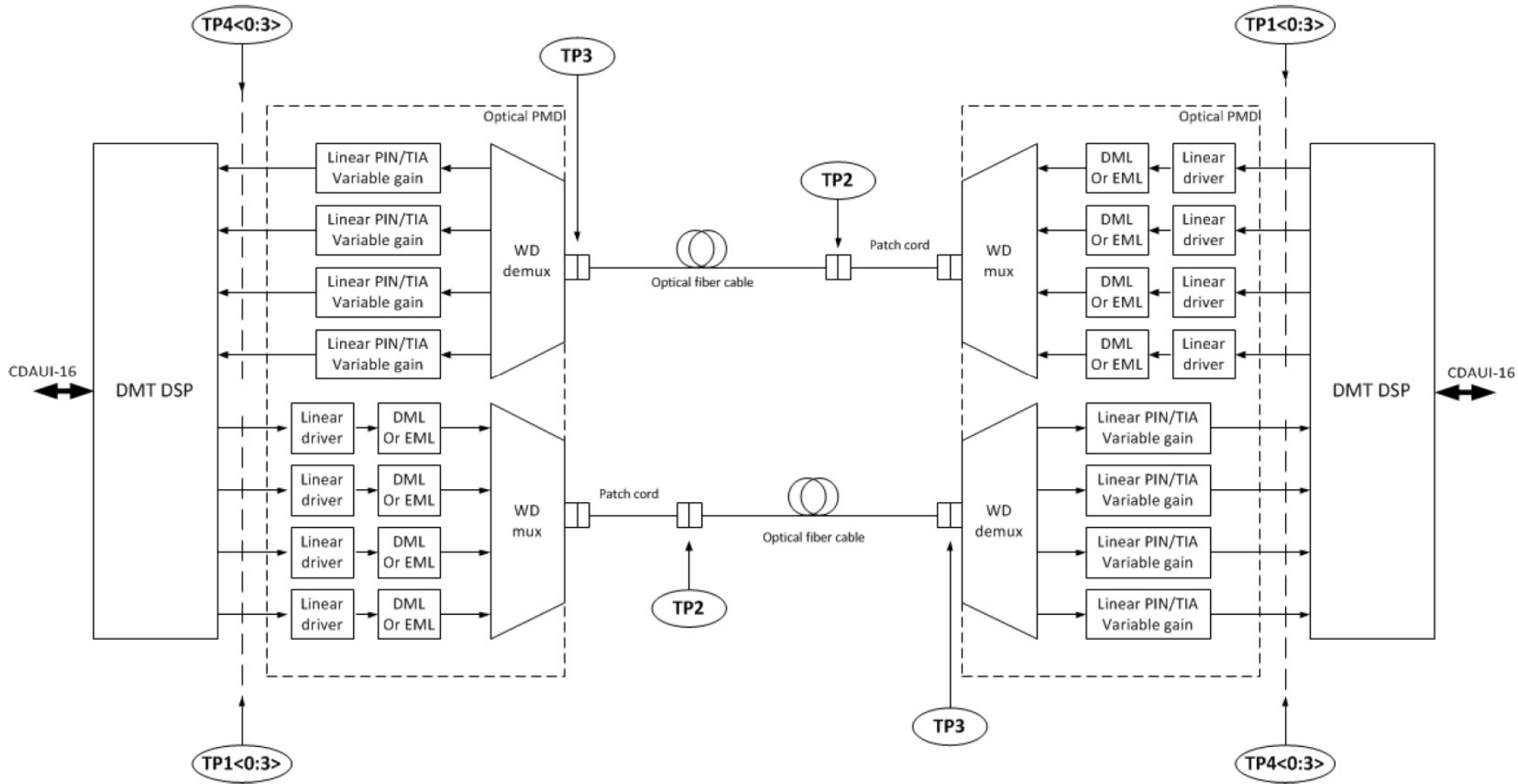
- Main parameter for DMT-FEC (Related to “FEC sublayer of DMT”)

FEC code	BCH(9193,8192)
FEC target input BER for 10^{-13} output BER	$3.3 \cdot 10^{-3}$
Latency target	< 450 ns
Overhead	12.5%

- DMT detail table for each λ of 400GbE

100G Lane Bit-Rate	B_R	$103.1250 + 12.5\% = 116.0156$ Gbps
Sample Rate	F_S	63.907 GS/s
Number of Subcarriers	$N_{FFT} / 2$	256
Subcarrier Spacing	ΔF	124.818 MHz
Highest Subcarriers	$F_S / 2$	31.953 GHz
Cyclic Prefix Length	CP	8
#Samples / DMT – symbol	$N_{FFT} + CP$	520
Symbol Rate	$F_F = F_S / (N_{FFT} + CP)$	122.898 MHz
#Bits / DMT-Symbol	$b_F = B_R / F_F$	944

PMD Block Diagram



lewis_3bs_01_0714

■ Wavelength assignment

4ch LAN-WDM

Channel	Nominal wavelength [nm]
#1	1295.56
#2	1300.05
#3	1304.58
#4	1309.14

■ Operating range

PMD-type	Minimum operating range
TBD	Up to 10 km

Transmit Optical Specifications

Description	Value	Unit	Note
Input signaling rate, each lane (range)	25.78125±100 ppm	Gbps	
Output signaling rate	116.015625	Gbps	
Average launch power ,each lane(max.)	TBD	dBm	
Average launch power ,each lane (min.)	2.8	dBm	
Transmitter and dispersion penalty (max.)	1	dB	
RIN	-148	dB/Hz	
Transmitter reflectance (max)	-26	dB	
Optical modulation index	0.45(TBR)		
Clipping ratio	3.16		
Cascaded Tx bandwidth (min.)	15	GHz	informative
Total harmonic distortion	2(TBR)	%	informative
DAC ENOB	6(TBR)	bit	informative

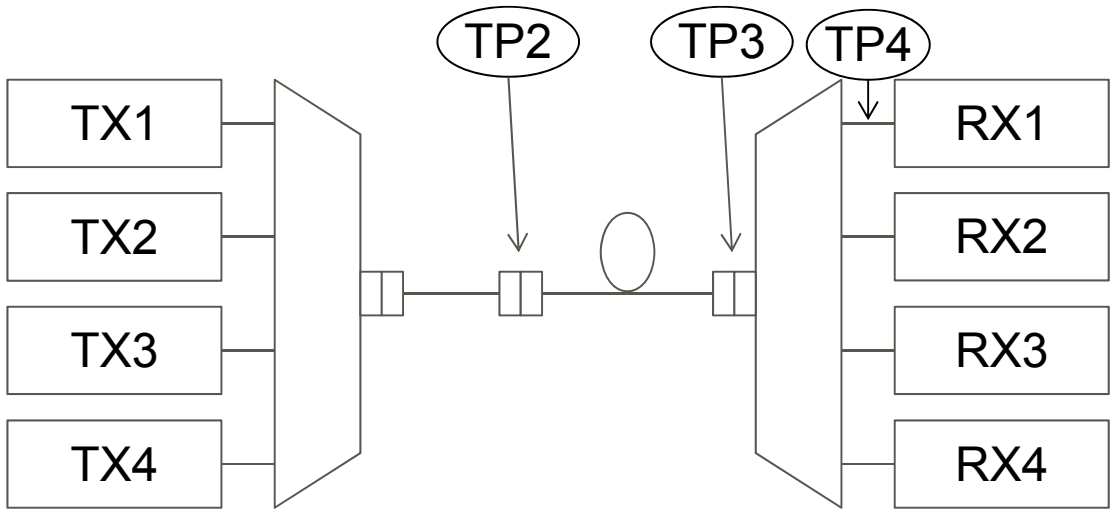
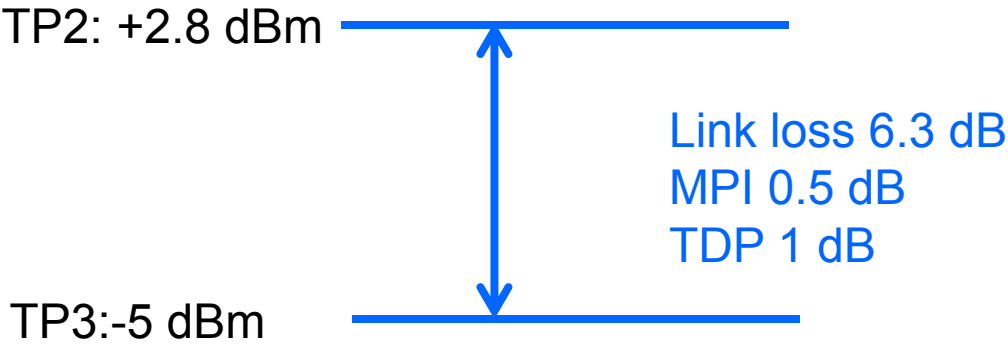
Receive Optical Specifications

Description	Value	Unit	Note
Input signaling rate	116.015625	Gbps	
Output signaling rate, each lane (range)	25.78125 ± 100 ppm	Gbps	
Receiver reflectance (max.)	-26	dB	
Average receive power (min.)	-5.0	dBm	
Cascaded Rx bandwidth (min.)	15	GHz	informative
Total harmonic distortion	2(TBR)	%	informative
Effective number of bit for ADC	5.5(TBR)	bit	informative

Link Power Budget

Average output power, each lane

Maximum power is below allowable power of +14.1dBm for laser safety.



- We explained the main point of DMT draft including the DMT baseline proposal.
 - Overview
 - Function diagram of DMT
 - Main parameter in FEC sublayer
 - Main parameter in PMA sublayer
 - Main parameter in PMD sublayer
 - Block diagram
 - Wavelength assignment and operating range
 - Transmit optical specification
 - Receive optical specification
 - Link power budget

Thank you