

25GSMF Study Group: Thoughts on specifications and interoperability with PSM4

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Outline

- Some strawman tables
- Interoperability with 100G-PSM4 MSA with breakout connections

Physical Layer Clauses

Associated clause	25GBASE-LR/ER
106—RS	Required
106—25GMII ^a	Optional
107—PCS for 25GBASE-R	Required
108—RS-FEC ^b	Required
109—PMA for 25GBASE-R	Required
109A—25GAUI C2C	Optional
109B—25GAUI C2M	Optional
78—Energy Efficient Ethernet	Optional

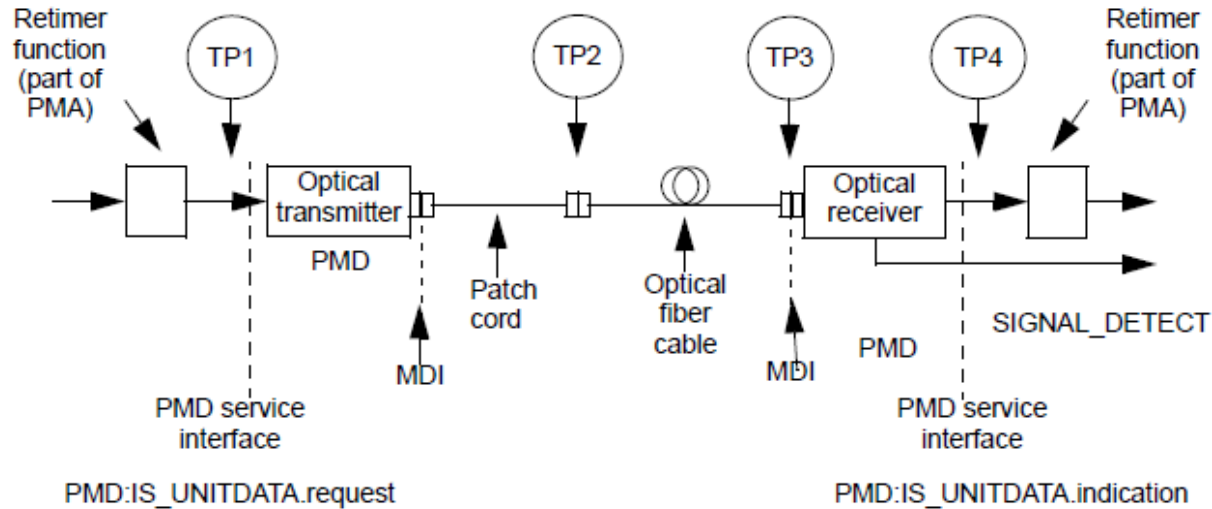
Pluggable module
will use this interface



^aThe 25GMII is an optional interface. However, if the 25GMII is not implemented, a conforming implementation must behave functionally as though the RS and 25GMII were present.

^bThe option to bypass the Clause 108 RS-FEC correction function is not supported.

25GBASE-LR/ER PMD Block Diagram



For clarity, only one direction of transmission is shown

Fibre optic cabling (channel) characteristics

Description	25GBASE-LR	25GBASE-ER		Unit
Operating distance (max)	10	30	40	km
Channel insertion loss ^{a, b} (max)	6.3	18	18	dB
Channel insertion loss (min)	0	10		dB
Positive dispersion ^b (max)				ps/nm
Negative dispersion ^b (min)				ps/nm
DGD_max ^c	8	10.3	10.3	ps
Optical return loss (min)	21	21	21	dB

These need to be calculated based on wavelength range

^aThese channel insertion loss values include cable, connectors, and splices.

^bOver the wavelength range **TBD** nm

^cDifferential Group Delay (DGD) is the time difference at reception between the fractions of a pulse that were transmitted in the two principal states of polarization of an optical signal. DGD_max is the maximum differential group delay that the system must tolerate.

25GBASE-LR Transmitter Strawman

Description	Value	Unit
Signaling rate (range)	25.78125 +/- 100 ppm	GBd
Center wavelength (range)	1295 to 1325	nm
SMSR (min)	30	dB
Average power (max)	2	dBm
Average power (min)	-6.3	dBm
OMA (max)	4.1	dBm
OMA (min)	-4.2	dBm
OMA minus TDP (min)	-5	dBm
TDP (max)	TBD	dB
Extinction ratio (min)	4	dB
Optical return loss tolerance (max)	20	dB
Transmitter reflectance (max)	-12	dB
Transmitter eye mask {X1, X2, X3, Y1, Y2, Y3}	{TBD}	

25GBASE-LR Receiver Strawman

Description	Value	Unit
Signaling rate (range)	25.78125 +/- 100 ppm	GBd
Center wavelength (range)	1295 to 1325	nm
Damage threshold (min)	TBD	dBm
Average receive power (max)	2	dBm
Average receive power (min)	-12.6	dBm
Receive power (OMA)(max)	4.1	dBm
Receiver reflectance (max)	-26	dB
Receiver sensitivity (OMA) (max)	-11.3	dBm
Stressed receiver sensitivity (OMA) (max)	TBD	dBm
Conditions of stressed receiver sensitivity test		
Vertical eye closure penalty	TBD	dB
Stressed eye J2 Jitter	TBD	dB
Stressed eye J4 Jitter	TBD	

Interoperability with PSM4 MSA

Case	Transmitter	Channel	Signal at Receiver	Receiver Spec Limits
A	25 GbE	500m SMF		1 lane of PSM4 MSA
	AOP: -6.3 to +2	ChIL: 0 to 3.3 dB	ROP: -9.6 to +2	ROP: -12.66 to +2
	OMA: -4.2 to +4.1		ROMA: -7.5 to +4.1	ROMA: -10.55 to +2.2
				SensOMA: -11.35
B	1 lane of PSM4 MSA	500m SMF		25 GbE
	AOP: -9.4 to +2	ChIL: 0 to 3.3 dB	ROP: -12.7 to +2	ROP: -12.6 to +2
	OMA: -7.25 to +2.2		ROMA: -10.55 to +2.2	ROMA: -10.5 to +4.1
				SensOMA: -11.3

Issues to consider:

1. Does 25 GbE Tx OMA max, overload the PSM4 MSA receiver?
2. Is the PSM4 MSA Tx too weak for the 25 GbE Rx?

Summary

- This is just to stimulate contributions when we become a task force.
- Addressed the possibility of interoperability with shorter reach PMDs (PSM4)
- Focus is still on getting approval to move to a task force.