802.3cc Proposed changes for MPI penalty

6/16/2017

Background

- At the 802.3cc ad hoc on June 14th it was proposed that we add an allowance of 0.7 dB into the link budgets for 25GBASE-LR and –ER in order to allow for foreseeable MPI with realistic numbers of connectors
- 0.7 dB supports up to 3 connectors with -35 dB RL and 3 connectors with -26 dB RL. Other combinations are possible.
- This presentation lists the parameters that change

Transmitter Table 114-6

Table 114–6—25GBASE-LR and 25GBASE-ER transmit characteristics *(continued)*

Description	25GBASE-LR	25GBASE-ER	Unit
Average launch power of OFF transmitter (max)	–20		dBm
Extinction ratio (min)	3	4	dB
$RIN_{20}OMA$ (max)	–130		dB/Hz
Optical return loss tolerance (max)	20		dB
Transmitter reflectance[c] (max)	–12		dB
Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3} Hit ratio 5×10^{-5} hits per sample.	{0.31, 0.4, 0.45, 0.34, 0.38, 0.4}		

[a]Average launch power (min) is informative and not the principal indicator of signal strength. A transmitter with launch power below this value cannot be compliant; however, a value above this does not ensure compliance.
[b]Even if the TDP < 1 dB, the OMA (min) must exceed this value.
[c]Transmitter reflectance is defined looking into the transmitter.

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Receiver Table 114-7

Receive power (OMA), (max)	2.2	–4	dBm
Receiver reflectance (max)	–26		dB
Receiver sensitivity (OMA)[c], (max)	–11.3 -12	–19 -19.7	dBm
Stressed receiver sensitivity (OMA)[d], (max)	–8.8 -9.5	–16.5 -17.2	dBm
Conditions of stressed receiver sensitivity test			
Stressed eye closure[e]	2.5	2.5	dB
Stressed eye J2 Jitter[e]	0.27	0.27	UI

Illustrative link power budgets Table 114-8

Table 114–8—25GBASE-LR and 25GBASE-ER illustrative link power budgets

Parameter	25GBASE-LR	25GBASE-ER		Unit
Power budget (for maximum TDP)	9 9.7	20.7 21.4		dB
Operating distance	10	30	40[a]	km
Channel insertion loss (max)	6.3[b]	15	18	dB
Channel insertion loss (min)	0	10		dB
Maximum discrete reflectance	–26 See table	–26 See table		dB
Allocation for penalties[c] (for maximum TDP)	2.7 3.4	2.7 3.4		dB
Additional insertion loss allowed	0	3	0	dB

[a]Links longer than 30 km are considered engineered links. Attenuation for such links needs to be less than the worst case for cables containing IEC 60793-2-50 type B1.1, type B1.3, or type B6_a single-mode cabled optical fiber.
[b]The channel insertion loss is calculated using the maximum distance specified in Table 114–5 for 25GBASE-LR and fiber attenuation of 0.43 dB/km at 1295 nm plus an allocation for connection and splice loss given in 88.11.2.1.
[c]Link penalties are used for link budget calculations. They are not requirements and are not meant to be tested.

New Tables for maximum discrete reflectance

LR	3	dB ER						
Tx RL	26	dB RL						
	1E-06	35						
		0	1	2	3	4	5	6
26	0	0.018	0.045	0.07	0.1	0.14	0.18	0.22
	1	0.1	0.14	0.18	0.22	0.28	0.38	
	2	0.23	0.3	0.35	0.43	0.56		
	3	0.44	0.52	0.6	0.7			
	4							
	5							
	6							

26 c

25G-ER	4	dB ER						
Tx RL	26	dB RL						
	1E-06	35						
		0	1	2	3	4	5	6
26	0	0.005	0.03	0.05	0.08	0.1	0.14	0.16
	1	0.06	0.1	0.13	0.17	0.21	0.26	
	2	0.17	0.21	0.26	0.32	0.38		
	3	0.3	0.4	0.42	0.56			
	4	0.52	0.6					
	5							
	6							

26 dB