Major Comments to D1.2

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Group A: 10GBASE-BR40

- Align 10BGASE-BR40 specs with industry defacto numbers
- Contribution “Nering_3cp_1_2001.pdf” in Jan 2020
- Commented by Ray Nering

Proposed changes by Ray (1) Comment #110

Table 158–6—10GBASE-BRx transmit characteristics

Description	10GBASE-BR10	10GBASE-BR20	10GBASE-BR40	10GBASE-BR40+	Unit
Signaling speed (nominal)		10.3125			GBd
Signaling speed variation from nominal (max)		± 100			ppm
10GBASE-BRx-D center wavelength (range)		1320 to 1340			nm
10GBASE-BRx-U center wavelength (range)		1260 to 1280			nm
Side Mode Suppression Ratio (min)		30			dB
Average launch power (max)	0.5	5.4	~~0.6~~5	4.6	dBm
Average launch power[a] (min)	–8.2	0.4	~~-6.6~~-2.7	-1.4	dBm
Launch power (min) in OMA minus TDP[b]	–6.2	2.4	~~-4.6~~-0.5	0.6	dBm
Optical Modulation Amplitude[c] (min)	–5.2	3.4	~~-3.6~~0.3	1.6	dBm
Transmitter and dispersion penalty (max)	3.2		~~3.0~~2.6		dB
Average launch power of OFF transmitter[d] (max)		–30			dBm
Extinction ratio (min)	3.5		~~3~~5.5		dB
$RIN_{12}OMA$ (max)		–128			dB/Hz

Editor's question: How to adjust other columns in the table?

Proposed changes by Ray (2) Comment #111

Table 158–7—10GBASE-BRx receive characteristics

Description	10GBASE-BR10	10GBASE-BR20	10GBASE-BR40	10GBASE-BR40+	Unit
Signaling speed (nominal)		10.3125			GBd
Signaling speed variation from nominal (max)		± 100			ppm
10GBASE-BRx-D center wavelength (range)		1320 to 1340			nm
10GBASE-BRx-U center wavelength (range)		1260 to 1280			nm
Average receive power[a] (max)	0.5	5.4	~~-5.6~~-9	-5.6	dBm
Average receive power[b] (min)	–14.4	-14.4	~~-24.4~~-21.2	-24.4	dBm
Maximum receive power (for damage)	4.0	4.0	4.0	4.0	dBm
Receiver sensitivity (max) in OMA[c]	–12.6	–12.6	~~-22.6~~-19	-22.6	dBm
Receiver Reflectance (max)	–12	-26	–26	-26	dB
Stressed receiver sensitivity (max) in OMA[d,e]	–10.3	–10.3	~~-20.3~~-16.8	-20.3	dBm
Vertical eye closure penalty[f] (min)	2.2	2.7	2.7	2.7	dB
Stressed eye jitter[g] (min)		0.3			UI pk-pk
Receive electrical 3 dB upper cutoff frequency (max)		12.3			GHz

Editor's question: How to adjust other columns in the table?

Group B: 25GBASE-BR40

- Reuse 25GBASE-ER spec for 25GBASE-BR40
- Commented by Tom Palkert

Proposed changes by Tom (1) Comment #89

Table 159–6—25GBASE-BRx transmit characteristics

Description	25GBASE-BR10	25GBASE-BR20	25GBASE-BR40	25GBASE-BR40+	Unit
Signaling rate (range)		25.78125 ± 100 ppm			GBd
25GBASE-BRx-D center wavelength (range)	1320 to 1340		1306 to 1322		nm
25GBASE-BRx-U center wavelength (range)	1260 to 1280		1281 to 1297		nm
Side-mode suppression ratio (SMSR), (min)		30			dB
Average launch power (max)	2	0	~~3~~6	8	dBm
Average launch power[a] (min)	–7	-6	–3	2	dBm

Editor's question: How to adjust average launch power (min) and other columns in the table?

Proposed changes by Tom (2) Comments #90. 91

Table 159–7—25GBASE-BRx receive characteristics

Description	25GBASE-BR10	25GBASE-BR20	25GBASE-BR40	25GBASE-BR40+	Unit
Signaling rate (range)		25.78125 ± 100 ppm			GBd
25GBASE-BRx-D center wavelength (range)	1320 to 1340		1306 to 1322		nm
25GBASE-BRx-U center wavelength (range)	1260 to 1280		1281 to 1297		nm
Damage threshold[a] (min)	3	1	~~-1~~ -3	-1	dBm
Average receive power (max)	2	0	~~-2~~ -4	-2	dBm
Average receive power[b] (min)	–13.3		-21		dBm
Receive power (OMA), (max)	2.2		-4		dBm
Receiver reflectance (max)		–26			dB
Receiver sensitivity (OMA)[c], (max)	–12		-19		dBm
Stressed receiver sensitivity (OMA)[d], (max)	–9.5		-16.5		dBm
Conditions of stressed receiver sensitivity test					
Stressed eye closure[e]		2.5			dB

Editor's question: How to adjust other columns in the table?

Group C: 50GBASE-BR40

- Reuse 50GBASE-ER spec for 50GBASE-BR40
- Commented by Tom Palkert and Ruoxu Wang

Proposed changes by Tom and Ruoxu (1) Comments #92, 93, 112

Table 160–7—50GBASE-BRx receive characteristics

Description	50GBASE-BR10	50GBASE-BR20	50GBASE-BR40	50GBASE-BR40+	Unit
Signaling rate (range)		26.5625 ± 100 ppm			GBd
Modulation format		PAM4			—
50GBASE-BRx-D center wavelengths (range)	1320 to 1340		1306 to 1322		nm
50GBASE-BRx-U center wavelengths (range)	1260 to 1280		1281 to 1297		nm
Damage threshold[a]	5.2	4.6	~~2.6~~ -2.4	2.6	dBm
Average receive power (max)	4.2	3.6	~~1.6~~ -3.4	1.6	dBm
Average receive power[b] (min)	–10.8		–17.6		dBm
Receive power (OMA_{outer}) (max)	4		–2.6		dBm
Receiver reflectance (max)		–26			dB

Editor's question: How to adjust other columns in the table?

Proposed changes by Ruoxu (2), Comment #113

Suggested remedy:
Table 160-10 should be modified as Table 159-10. The channel insertion loss should be 10dB in 40km cases. And add a footnote: Channel insertion loss (min) may be implemented with an optical attenuator.

Table 160–10—Optical fiber and cable characteristics

Description	Value	Unit
Nominal fiber specification wavelength	1310	nm
Cabled optical fiber attenuation (max)	0.43[a] or 0.5[b]	dB/km
Zero dispersion wavelength (λ_0)	$1300 \le \lambda_0 \le 1324$	nm
Dispersion slope (max) (S_0)	0.093	ps/nm^2 km

[a]The 0.43 dB/km at 1304.5 nm attenuation for optical fiber cables is derived from Appendix I of ITU-T G.695.
[b]The 0.5 dB/km attenuation is provided for Outside Plant cable as defined in ANSI/TIA 568-C.3. Using 0.5 dB/km may not support operation 10 km for 50GBASE-BR40.

Table 159–10—Fiber optic cabling (channel) characteristics

Description	Type B1.1, B1.3 SMF								Unit
Nominal wavelength	1270	1289			1330	1314			nm
Operating distance (max)	10	20	40	40+	10	20	40	40+	km
Channel insertion loss (max)[a,b,c]	6.2	15	18	23	6.2	15	18	23	dB
Channel insertion loss (min)	0	0	5	10	0	0	5	10	dB
Dispersion (max)	See Table 158–9								ps/nm
Dispersion (min)									ps/nm
DGD_max[d]	8	10.3			8	10.3			ps
Optical return loss	21								dB

[a]Channel insertion losses include cable, connectors, and splices.
[b]These channel insertion loss numbers are based on the nominal wavelength.
[c]Operating distances used to calculate channel insertion loss are those listed in this table.
[d]DGD_max is the maximum differential group delay that the system must tolerate.

Editor's question:
This changes BR40 loss range from 5~18 dB into 10~18 dB. Do we agree? How to update the Tx and Rx tables?
Note that Table 158-10 also uses 5 dB as the 40km min loss.