1. Super-PON Updated Black Link Parameters

1.1. PMD to MDI Optical Specifications for OLT PMDs

Table 1 - OLT Transmit Characteristics

Parameter	10GBASE-SP1-Dx 10/2.5GBASE-SP1-Dx	Unit
Signaling speed (range)	10.3125 ± 100 ppm	GBd
Central channel frequencies	see table 200-4, L-band 1	THz
Maximum spectral excursion	± 12.5	GHz
Maximum mean channel output power	2	dBm
Minimum mean channel output power	-3	dBm
Minimum side mode suppression ratio (SMSR)	35	dB
Minimum channel extinction ratio	8.2	dB
Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3}	{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}	UI
Transmitter and dispersion power penalty (TDP) 0 to 1000 ps/nm residual CD	0*	dB
$RIN_{15}OMA$ (max)	-120	dB/Hz
Average launch power of OFF transmitter (max)	-39	dBm
Optical return loss tolerance (max)	15	dB
* A negative chirp transmitter is assumed, which results in a negative dispersion penalty in the positive dispersion region.		

Table 2 - OLT Receive Characteristics

Parameter	10GBASE-SP1-Dx	10/2.5GBASE-SP1-Dx	Unit
Signaling speed (range)	10.3125 ± 100 ppm	2.578125 ± 100 ppm	GBd
Channel frequency range	191.990 to 193.510		THz
Bit error ratio (max)	10^{-3}		
Maximum mean input power	-6	-6	dBm
Minimum mean input power			dBm
Minimum OSNR			dB (0.1 nm)
Receiver OSNR tolerance			dB (0.1 nm)
Maximum reflectance of receiver	-12	-12	dB
Damage Threshold	-5	-5	dBm
Signal detect threshold (min)	-45	-45	dBm
$T_{receiver\_settling}$ (max)			ns

1.2. PMD to MDI Optical Specifications for ONU PMDs

Table 3 - ONU Transmit Characteristics

Parameter	10GBASE-SP1-Ux	10/2.5GBASE-SP1-Ux	Unit
Signaling speed (range)	10.3125 ± 100 ppm	2.578125 ± 100 ppm	GBd
Central channel frequencies	see table 200-4 C-band 1		THz
Maximum spectral excursion	± 10		GHz
Maximum mean channel output power			dBm
Minimum mean channel output power			dBm
Minimum side-mode suppression ratio (SMSR)*	38	38	dB
Minimum channel extinction ratio			dB
Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3}	{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}		UI
Maximum transmitter (residual) dispersion OSNR penalty -XXX to +YYY ps/nm residual CD	1	0.5	dB
Average launch power of OFF transmitter (max)	-45	-45	dBm
$RIN_{15}OMA$ (max)	-128	-128	dB/Hz
Turn-on time (max)	128		ns
Turn-off time (max)	128		ns
* It is assumed the SMSR is measured with only the DC laser bias (no data modulation).			

Table 4 - ONU Receive Characteristics

Parameter	10GBASE-SP1-Ux 10/2.5GBASE-SP1-Ux	Unit
Signaling speed (range)	10.3125 ± 100 ppm	GBd
Channel frequency range	187.600 to 189.092	THz
Bit error ratio (max)	10^{-3}	
Maximum mean input power	-8	dBm
Minimum mean input power		dBm
Minimum OSNR		dB (0.1 nm)
Receiver OSNR tolerance		dB (0.1 nm)
Maximum reflectance of receiver	-12	dB
Damage Threshold	-2	dBm
Signal detect threshold (min)	-44	dBm

1.3. Black Link Specification

Table 5 - Optical Path OLT to ONU

Parameter	10Gb/s	Unit
Maximum ripple		dB
Maximum (residual) chromatic dispersion		ps/nm
Minimum (residual) chromatic dispersion		ps/nm
Minimum optical return loss at transmitter		dB
Maximum discrete reflectance between transmitter and receiver		dB
Maximum differential group delay		ps
Maximum inter-channel crosstalk		dB
Maximum optical path power penalty		dB
Max link length		km
Maximum power excursion		dB

Table 6 - Optical Path ONU to OLT

Parameter	10Gb/s	2.5Gb/s	Unit
Maximum ripple			dB
Maximum (residual) chromatic dispersion			ps/nm
Minimum (residual) chromatic dispersion			ps/nm
Minimum optical return loss at transmitter			dB
Maximum discrete reflectance between transmitter and receiver			dB
Maximum differential group delay			ps
Maximum inter-channel crosstalk			dB
Maximum optical path OSNR penalty			dB
Max link length			km
Maximum power excursion			dB