

# PSM4 & CWDM

## Link Budget Comparison

# Transmitter

Parameter	Unit	Proposed 100GBASE-nR4 500m	Proposed 100GBase- CWDM	Delta
Signaling rate, each lane (range)	GBd	25.78125 +/- 100 ppm	25.78125 +/- 100 ppm	0
Lane wavelengths (range)	nm	1295 to 1325	1264.5 to 1337.5 <sup>†</sup>	+43nm (30nm vs. 73 nm)
Side-mode suppression ratio (SMSR)(min)	dB	30	30	0
Total average launch power (max)	dBm	8.0	9.0	+1
Average launch power, each lane (max)	dBm	2.0	3.0	+ 1
Average launch power, each lane (min) <sup>a</sup>	dBm	-9.4	-4.3	+5.1
Optical Modulation Amplitude (OMA) (max)	dBm	2.2	3.0	+0.8
Transmitter and dispersion penalty (TDP), each lane (max)	dB	3.8	2.2	-1.6
Transmit OMA, each lane (min)	dBm	-7.25	-1.3	+5.95

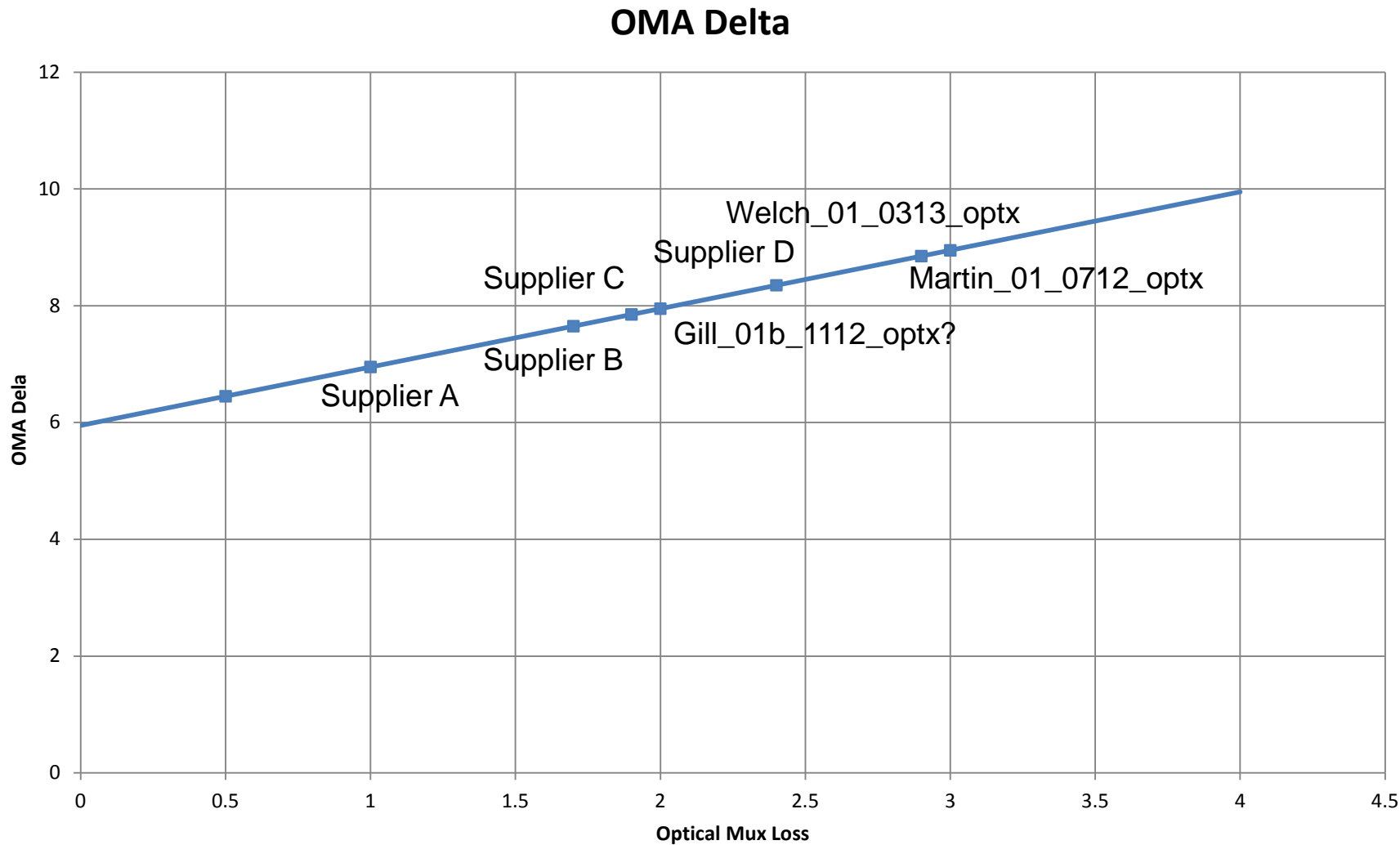
*† 13 nm per wavelength*

# Transmitter

Parameter	Unit	Proposed 100GBASE-nR4 500m	Proposed 100GBase-CWDM	Delta
Average launch power of OFF transmitter, each lane (max)	dBm	-30	-30	0
Extinction ratio (min)	dB	3.5	4.0	+0.5
Optical return loss tolerance (max)	dB	12	20	+8
Transmitter reflectance (max) <sup>c</sup>	dB	-12	-12	0
Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3}		TBD	{0.25,0.4,0.45,0.25,0.28,0.4}	

Note c: Transmitter reflectance is defined looking into the transmitter.

# Transmitter – Effect of Mux Losses



# Receiver

Parameter	Unit	Proposed 100GBASE-nR4 500m	Proposed 100GBase-CWDM	Delta
Signaling rate, each lane (range)	GBd	25.78125 +/- 100 ppm	25.78125 +/- 100 ppm	0
Lane wavelengths (range)	nm	1295 to 1325	1264.5 to 1337.5 <sup>†</sup>	+43nm (30nm vs. 73 nm)
Damage threshold <sup>a</sup>	dBm	3.0		
Average receive power, each lane (max)	dBm	2.0		
Average receive power, each lane (min) <sup>b</sup>	dBm	-12.76		
Receive power, each lane (OMA) (max)	dBm	2.2		
Receiver reflectance (max)	dB	-12		
Receiver sensitivity at target BER (OMA), each lane (max) <sup>c</sup>	dBm	-11.38	-6.3	
Receiver sensitivity at BER (OMA) 1e-12, each lane (max) <sup>c</sup>		-8.8	-6.3	+2.5

*† 13 nm per wavelength*

# Receiver

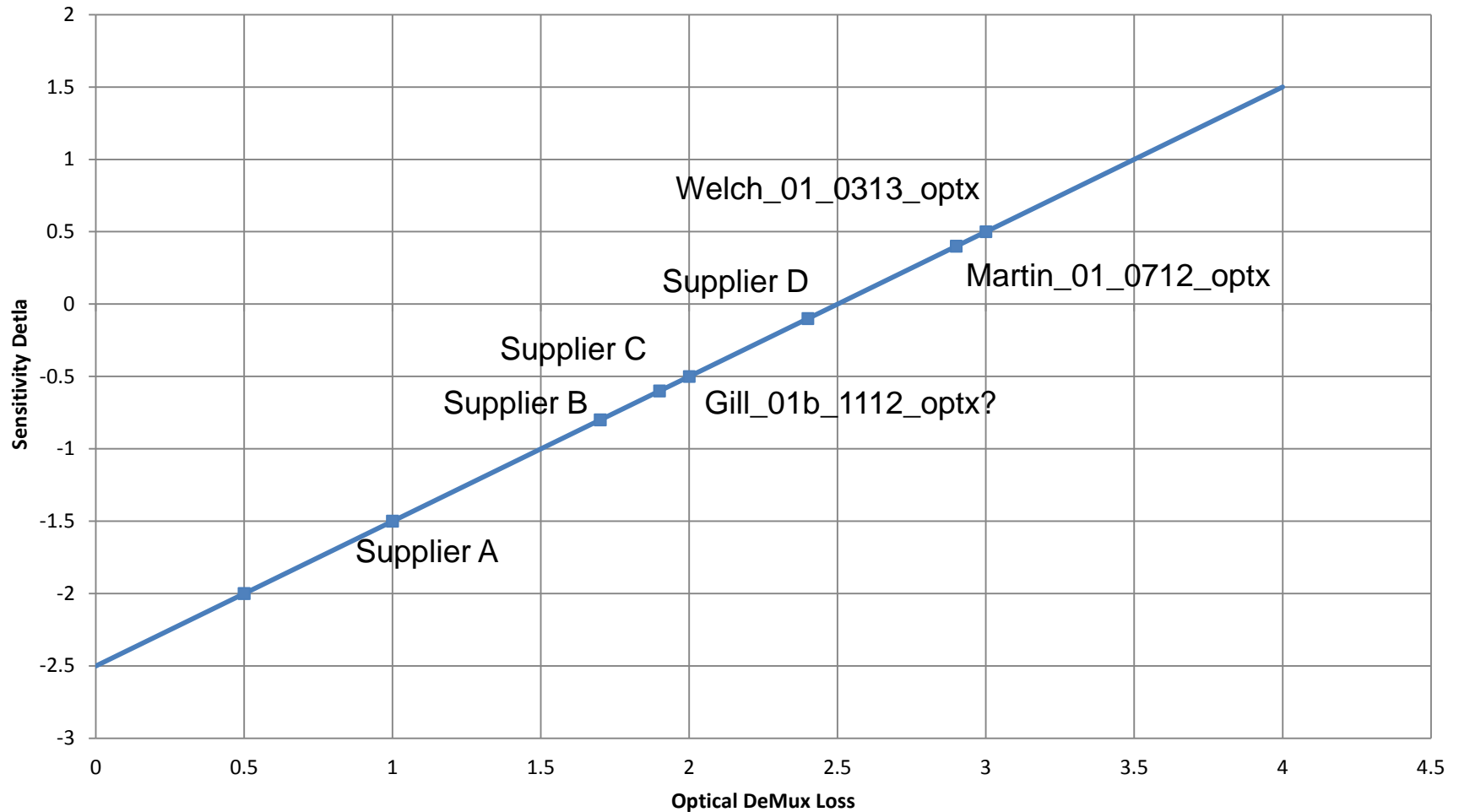
Parameter	Unit	Proposed 100GBASE-nR4 500m	Proposed 100GBase-CWDM	Delta
Stressed receiver sensitivity (OMA), each lane (max) <sup>d</sup>	(dBm)	TBD	N/A	
Conditions of stressed receiver sensitivity test:				
Vertical eye closure penalty, each lane <sup>e</sup>	(dB)	1.8	N/A	
Stressed eye jitter, each lane <sup>e</sup>	(UI)	TBD	N/A	

Note d: Measured with conformance test signal at TP3 (see 87.8.11) for BER = 5E-5.

Note e: Vertical eye closure penalty and stressed eye jitter are test conditions for measuring stressed receiver sensitivity. They are not characteristics of the receiver.

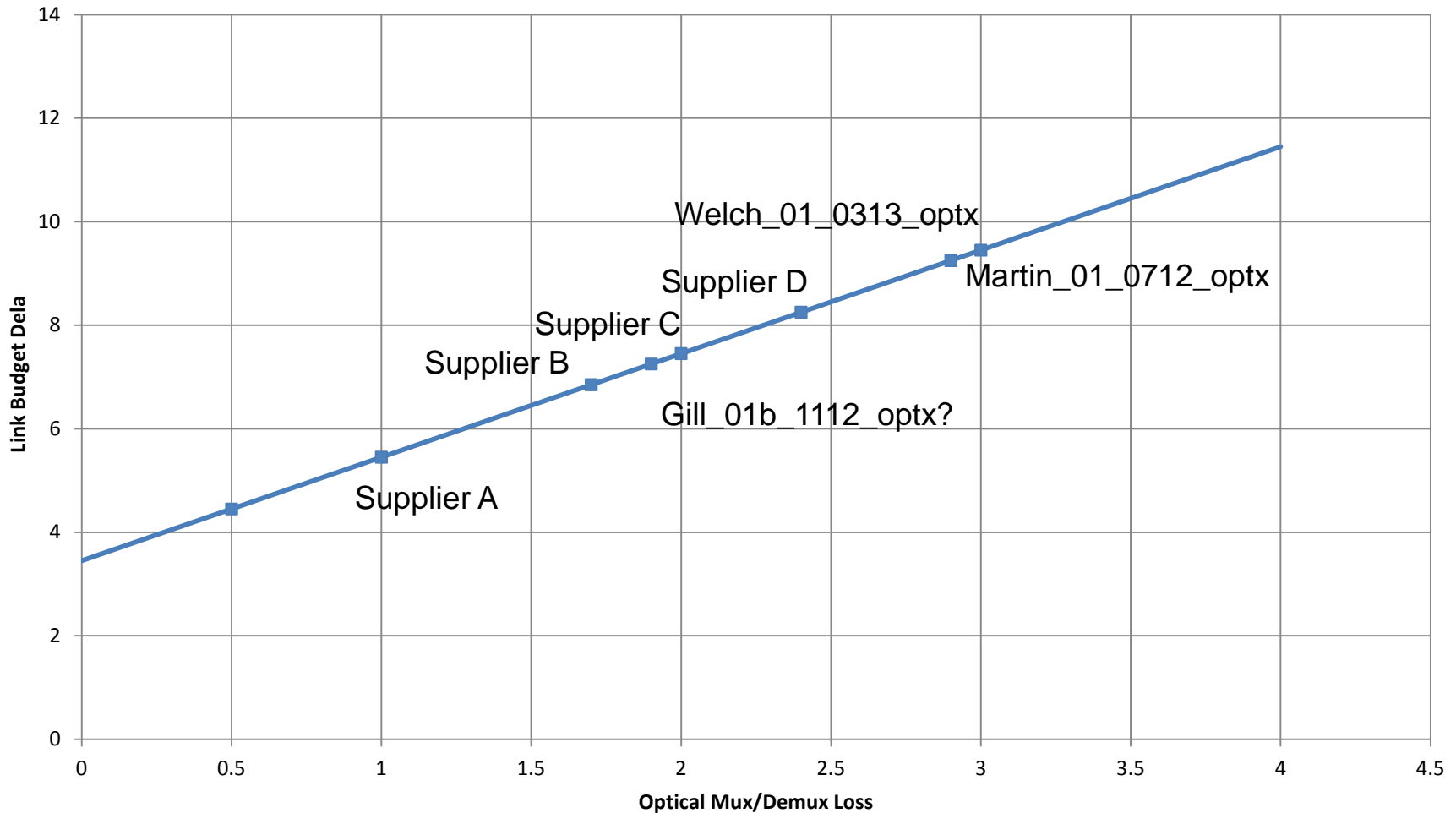
# Receiver – Effect of Demux Losses

## Sensitivity Delta



# Link Budget – Effect of Mux/Demux Losses

## Link Budget Delta





# Summary

- CWDM net optical transmitter power 6.5 to 9 dBm higher than PSM4
- CWDM receiver sensitivity ranges from 2 dB relaxation to 0.5 dB tightening relative to PSM4
- For 500m reach CWDM link budget 4.5 to 9.5 dB worse than PSM4 solution