

Channel Link Model (v2.2)

Ad Hoc Activity Report

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Contributors

- Alphabetic list of current contributors to Channel Link Model ad hoc:
 - Frank Effenberger
 - Marek Hajduczenia
 - Pete Anslow
 - Piers Dawe

Current Status [1]

- Chartered tasks and status up to v2.1
 - see **3av_0711_hajduczenia_1.pdf**
- v2.2 of the spreadsheet was produced – a number of changes were introduced:
 - Added **IEEE_Tx_OMA_Min** and **IEEE_Tx_OMA_Max** parameters to facilitate the filling in tables in clause 91
 - Corrected error in the conversion between dBm OMA and uW OMA - cells affected: **B8, B10, B44, B47** and **B49**

Current Status [2]

- v2.2 of the spreadsheet was produced – a number of changes were introduced:
 - Added extended definitions of the individual parameter used in the channel link model
 - Moved the colour code description to an individual tab for improved clarity;
 - Prepared a set of new VB functions for the calculation of: fibre attenuation (**fibre_loss**), fibre dispersion (**fibre_dispersion**) and dispersion penalty (**dispersion_penalty**):
 - extended versions of the functions of Pete Anslow;
 - facilitate future development in the spreadsheet;

	A	B	C	D	E	F
1	Parameter name	Value	Unit	Description	Value min	Value max
2						
3	Transmitter parameters					
4	ITU_ERnom	9.00	dB	Nominal Extinction Ratio used to convert average power values to OMA values - for a test procedure, see 802.3, clause 52.9.5; for relation between OMA, ER and average power, see 802.3, clause 58.7.6	0.00	9.00
5	ITU_Tx_Ave_Min	-3.00	dBm	Average Tx launch power (minimum) equal to the minimum OMA at the maximum ER	-99.00	99.00
6	ITU_Tx_Ave_Max	-1.00	dBm	Average Tx launch power (maximum) equal to the maximum OMA at the nominal ER	-99.00	99.00
7	IEEE_Tx_OMA_Min	-1.09	dBm	Minimum OMA Tx launch power		
8	IEEE_Tx_OMA_Min	0.78	mW	Minimum OMA Tx launch power		
9	IEEE_Tx_OMA_Max	0.91	dBm	Maximum OMA Tx launch power		
10	IEEE_Tx_OMA_Max	1.23	mW	Maximum OMA Tx launch power		
11	Tx_Wavelength_Min	1580.00	nm	Transmitter wavelength (min)	1200.00	1600.00
12	Tx_Wavelength_Max	1600.00	nm	Transmitter wavelength (max)	1200.00	1600.00
13	Tx_Wavelength_Uc	1590.00	nm	Transmitter wavelength (central wavelength), calculated based on Tx_Wavelength_Min and Tx_Wavelength_Max	1580.00	1600.00
14	Tx_Chirp_Parameter_Max	0.00	-	The maximum (worst case) value of Chirp parameter used in the calculation of the dispersion penalty. (Normal DML's are negative)		
15	Tx_Data_Rate	10312.50	MEb	The effective data rate at the PMD level after encoding, scrambling i.e. fed to the PMA interface and transmitted on the fibre channel	9500	11500
16						
17	Link parameters					
18	Fibre_Attenuation_Curve	lambda^-4	-	Defines the type of the fibre attenuation curve which will be used for calculation of the fibre attenuation for the given operating wavelength. 3 types of curves are available i.e. lambda^-4, G652AB, G652CD		
19	Fibre_Attenuation_Curve_Type	min	-	Defines the variant of the fibre attenuation curve for G.652 SMF. Maximum and minimum attenuation curves are available only for G652AB and G652CD type of fibre.		
20	Fibre_Attenuation_Base_Value	0.35	dB/km	Base wavelength for fibre attenuation estimation - only applicable to the lambda^-4 model.	0	1
21	Fibre_Attenuation_Base_Wavelength	1550.00	nm	Base wavelength for fibre attenuation estimation		
22	Fibre_Attenuation_Value	0.34	dB/km	Calculated nominal attenuation of fibre in dB/km of ideal channel (no connectors, splices etc. i.e. the medium is considered to be continuous)		
23	Channel_Length_Max	10	km	The length of the fibre channel between the DLT and the most distant ONU	0.5	20
24	Fibre_Loss	3.44	dB	Calculated total attenuation of an ideal fibre channel (no connectors, splices etc. i.e. the medium is considered to be continuous)		
25	PSC_Split_count	16.00	-	The maximum number of ports on the Passive Splitter Combiner (powers of 2 are acceptable)	2	64
26	PSC_Loss_Curve	max	-	Defines the type of the PSC loss curve (best case [min], average [avg] and worst case [max]) for the FBT type PSC devices, based on the collected device loss data and approximated curves.		
27	PSC_Loss	14.93	dB	The total loss of the PSC device with the particular number of ports (PSC_Split_count) for the given loss curve (PSC_Loss_Curve), accounting for the ideal and excess loss		
28	SRS_Loss	1.00	dB	SRS induced nonlinear penalty (as resulting from the nonlinear interaction with any other transmission system e.g. 1550nm Analog video overlay operated on the PON fiber).		10
29	Excess_Loss	0.63	dB	The additional loss resulting from the non-ideal fibre channel elements i.e. connectors, splices and as well as other sources of extra loss		
30	ITU_Optical_Path_Penalty	1.00	dB	The penalty attributable to the optical path. Given a fixed set of transmitter and receiver, the optical path penalty is equal to the link margin measured with pure attenuated less the link margin measured with the worst case optical path.	0	5
31	Channel_Loss_Min	8.00	dB	Minimum channel insertion loss (user defined) to prevent the overload of the receiver on the receiving side of the link.	0	20.00
32	Channel_Loss_Max	20.00	dB	Maximum channel insertion loss (user defined), limited by the Tx power and Rx sensitivity		29
33	Dispersion_Uo_Min	1300.00	nm	Minimum value of the zero dispersion wavelength		
34	Dispersion_Uo_Max	1300.00	nm	Maximum value of the zero dispersion wavelength		
35	Dispersion_So	0.09	ps/nm ² ·km	Value of the dispersion curvature parameter		
36	Dispersion_D_Max	20.99	ps/(nm·km)	Maximum calculated dispersion "D" parameter		
37	Dispersion_D_Min	19.90	ps/(nm·km)	Minimum calculated dispersion "D" parameter		
38	Dispersion_Penalty	0.11	dB	Dispersion penalty, calculated for the worst case transmission wavelength in the allocated window (Tx_Wavelength_Min, Tx_Wavelength_Max), based on the dispersion penalty estimation model presented in 3av_0705_saeki_1.pdf		
39	TDP	1.00	dB	Transmitter and Dispersion Penalty (maximum) is equal to the link margin, measured with an ideal Tx and pure attenuation less the link margin measured with a worst case Tx and worst case optical path.	0	10
40						
41	Receiver parameters					
42	ITU_Rx_Sensitivity_Ave	-24.00	dBm	Average Rx sensitivity in ITU formalism, calculated as the difference between the minimum, average Tx launch power (ITU_Tx_Ave_Min) and the total power budget (Channel_Loss_Max + ITU_Optical_Path_Penalty) @ BER 1e-3		
43	ITU_Rx_Sensitivity_Ave_OMA	-22.09	dBm	Average Rx sensitivity (ITU_Rx_Sensitivity_Ave) in OMA, for the given nominal ER (ITU_ERnom) @ BER 1e-3		
44	ITU_Rx_Sensitivity_Ave_OMA	6.18	uW	Average Rx sensitivity (ITU_Rx_Sensitivity_Ave) in OMA, for the given nominal ER (ITU_ERnom) @ BER 1e-3		
45	IEEE_Rx_Stressed_Sensitivity_Ave	-23.00	dBm	Stressed Rx sensitivity in average power form @ BER 1e-3		
46	IEEE_Rx_Stressed_Sensitivity_OMA	-21.09	dBm	OMA stressed Rx sensitivity in average power form @ BER 1e-3		
47	IEEE_Rx_Stressed_Sensitivity_OMA	7.78	uW	OMA stressed Rx sensitivity in average power form @ BER 1e-3		
48	IEEE_Rx_Sen_OMA	-22.09	dBm	Ideal Rx sensitivity in IEEE formalism in OMA taking the TDP into account.		
49	IEEE_Rx_Sen_OMA	6.18	uW	Ideal Rx sensitivity in IEEE formalism in OMA taking the TDP into account.		
50	Rx_Overload	-9.00	dBm	The Rx overload value for the given link		
51						
52	Check Conditions					
53	Dispersion_Penalty <= ITU_Optical_Path_Penalty			PASSED		