# Channel Link Model (v2.3) Ad Hoc Activity Report

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# Current Status [1]

- Chartered tasks and status up to v2.2
  - see **3av_0801_hajduczenia_1.pdf**
- v2.3 of the spreadsheet was produced – a number of changes were introduced:
  - Added **IEEE_Rx_Sen_Ave** parameter to facilitate filling up the tables in Clause 91 (PMD parameters)
  - Added **Power Budget** field, which calculates the total available power budget

# Current 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 | MBd | 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 continous) | | |
| 23 | Channel_Length_Max | 10 | km | The length of the fibre channel between the OLT 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 continous) | | |
| 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 attenuation 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 | Power Budget | 21.00 | dB | Available power budget | | |
| 34 | Dispersion_Uo_Min | 1300.00 | nm | Minimum value of the zero dispersion wavelength | | |
| 35 | Dispersion_Uo_Max | 1300.00 | nm | Maximum value of the zero dispersion wavelength | | |
| 36 | Dispersion_So | 0.09 | ps/nm^2·km | Value of the dispersion curvature parameter | | |
| 37 | Dispersion_D_Max | 20.99 | ps/(nm·km) | Maximum calculated dispersion "D" parameter | | |
| 38 | Dispersion_D_Min | 19.90 | ps/(nm·km) | Minimum calculated dispersion "D" parameter | | |
| 39 | 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 | | |
| 40 | 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 |
| 41 | | | | | | |
| 42 | | | | Receiver parameters | | |
| 43 | 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 | | |
| 44 | 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 | | |
| 45 | 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 | | |
| 46 | IEEE_Rx_Stressed_Sensitivity_Ave | -23.00 | dBm | Stressed Rx sensitivity in average power form @ BER 1e-3 | | |
| 47 | IEEE_Rx_Stressed_Sensitivity_OMA | -21.09 | dBm | OMA stressed Rx sensitivity in average power form @ BER 1e-3 | | |
| 48 | IEEE_Rx_Stressed_Sensitivity_OMA | 7.78 | uW | OMA stressed Rx sensitivity in average power form @ BER 1e-3 | | |
| 49 | IEEE_Rx_Sen_Ave | -24.00 | dBm | Ideal Rx sensitivity in IEEE formalism in average power taking the TDP into account. | | |
| 50 | IEEE_Rx_Sen_Ave | 3.98 | uW | Ideal Rx sensitivity in IEEE formalism in average power taking the TDP into account. | | |
| 51 | IEEE_Rx_Sen_OMA | -22.09 | dBm | Ideal Rx sensitivity in IEEE formalism in OMA taking the TDP into account. | | |
| 52 | IEEE_Rx_Sen_OMA | 6.18 | uW | Ideal Rx sensitivity in IEEE formalism in OMA taking the TDP into account. | | |
| 53 | Rx_Overload | -9.00 | dBm | The Rx overload value for the given link | | |
| 54 | | | | | | |
| 55 | | | | Check Conditions | | |
| 56 | Dispersion_Penalty <= ITU_Optical_Path_Penalty | | | PASSED | | |

# Back-up slides

Motion

# Motion #MH1

**802.3av Task Force** adopts the **channel link model** (formulas, not particular values) included in **3av_0804_linkmodel_v2_3.xls**.

Moved by: Marek Hajduczenia
Seconded by:

Motion passes / fails