Issues with OMA specification versus “traditional “ average power /extinction specification

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Issues with OMA specification versus “traditional “ average power /extinction specification

- **IEEE has moved to concept of specifying for the transmitter side signal the optical modulation amplitude as key transmitter side parameter**
  - **This is perfect in case of linear , AC coupled front end with stationary noise only**
  - **Additional issue with receiver side evaluation if signal is in range**
  - **Due to this method low extinction ratio signals are possible also, what has several implications**

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- **Receiver side signal evaluation**
  - **Normally receiver side test are done using receiver power measurements for evaluating if signal is in range**
  - **This receiver power measurement corresponds to Average power definition of transmitter side specification**
    - The Average power definition is most appropriate as the power control algorithm of transmitters is based normally based on average power
  - **A receiver side OMA spec requires to measure the receive signal as OMA to check whether the path attenuation is in allowed range.**
    - OMA measurement means a precise receive side Eye measurement

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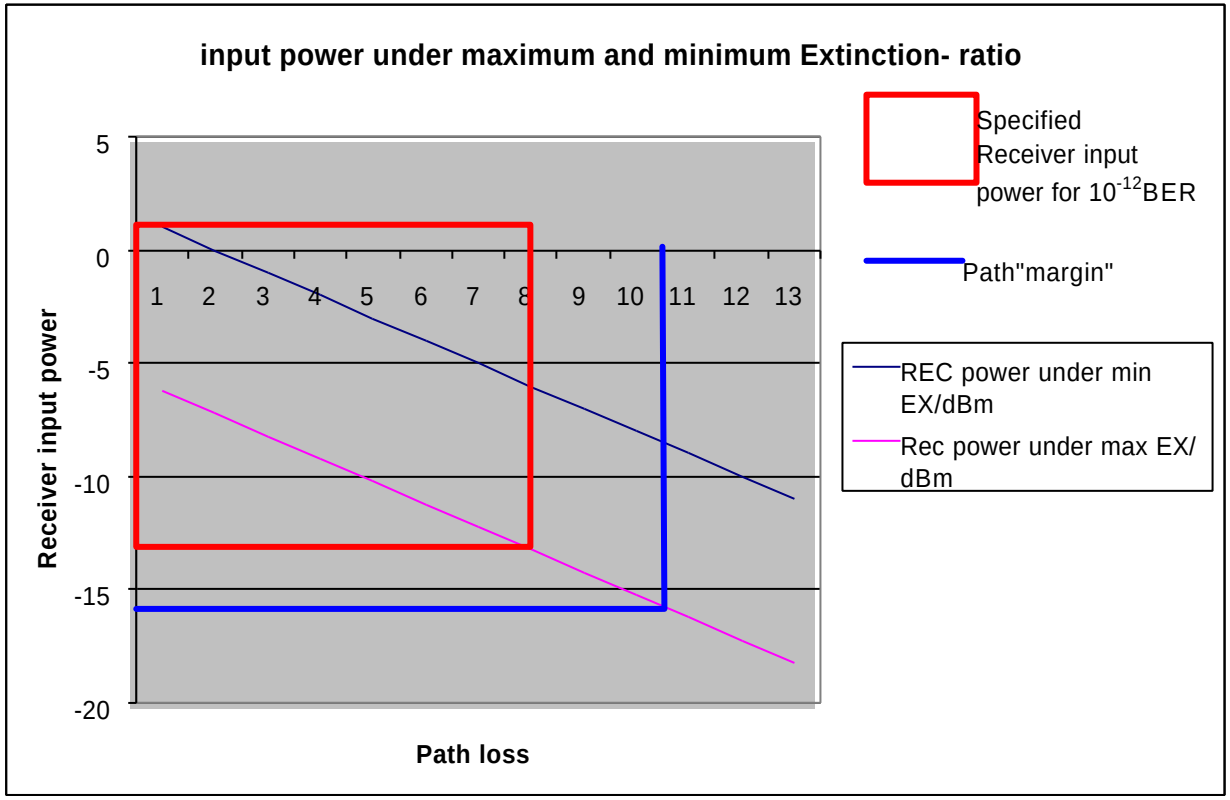
Input receiver power for MIN and MAX extinction following OMA over path budget



Issues with OMA specification versus “traditional “ average power /extinction specification

- **Consideration about influence of low extinction ratio signals**
  - **The direct front end is normally DC coupled (Photo diode to first Amplifier)**
  - **This generates issue with high possible DC at the front end**
    - Means to get away with this DC without influencing amplifier is required
    - This means will make design more complex and is probable source of additional noise
    - The high DC due to low extinction will generate additional noise that will cause additional penalty, against implementations with higher extinction
    - The low extinction ratio will decrease possible gain of APD (or optical amplification) due to increased multiplication noise

Issues with OMA specification versus “traditional “ average power /extinction specification

- **Consideration about influence of low extinction ratio signals**

  - **Extinction ratio lowered to 3 dB with OMA at minimum 0.477mW leads to a requirement of transmitter output power control of less than 3 dB.**
  - **This is an issue at reasonable yield and cost as it has also to contain margins for lifetime maximum tracking error, measurement accuracy , connector loss, ...**

Conclusion

- **OMA specification makes optical interface specification:**
  - **More difficult to be verified**
    - Power measurement on receiver side is no criteria anymore
    - OMA measurement equipment to verify signals required
  - **Puts additional stress on designs**
    - High variance in possible receiver input signals
    - Stringent control requirement on low ER transmitter
- **Traditional method of Average power and ER should be supported**
- **Minimum ER of 6 dB should be specified**