



# How the fiber effective bandwidth impacts the receiver sensitivity

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# Introduction

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- In [1] a link budget analysis for each of the data-rates in the project's objectives was presented
- This contribution shows how the effective bandwidth affects the receiver sensitivity. The simulations are carried out with the same parameters presented in [1], just changing the  $BW_{\text{eff}}$  of the optical fiber

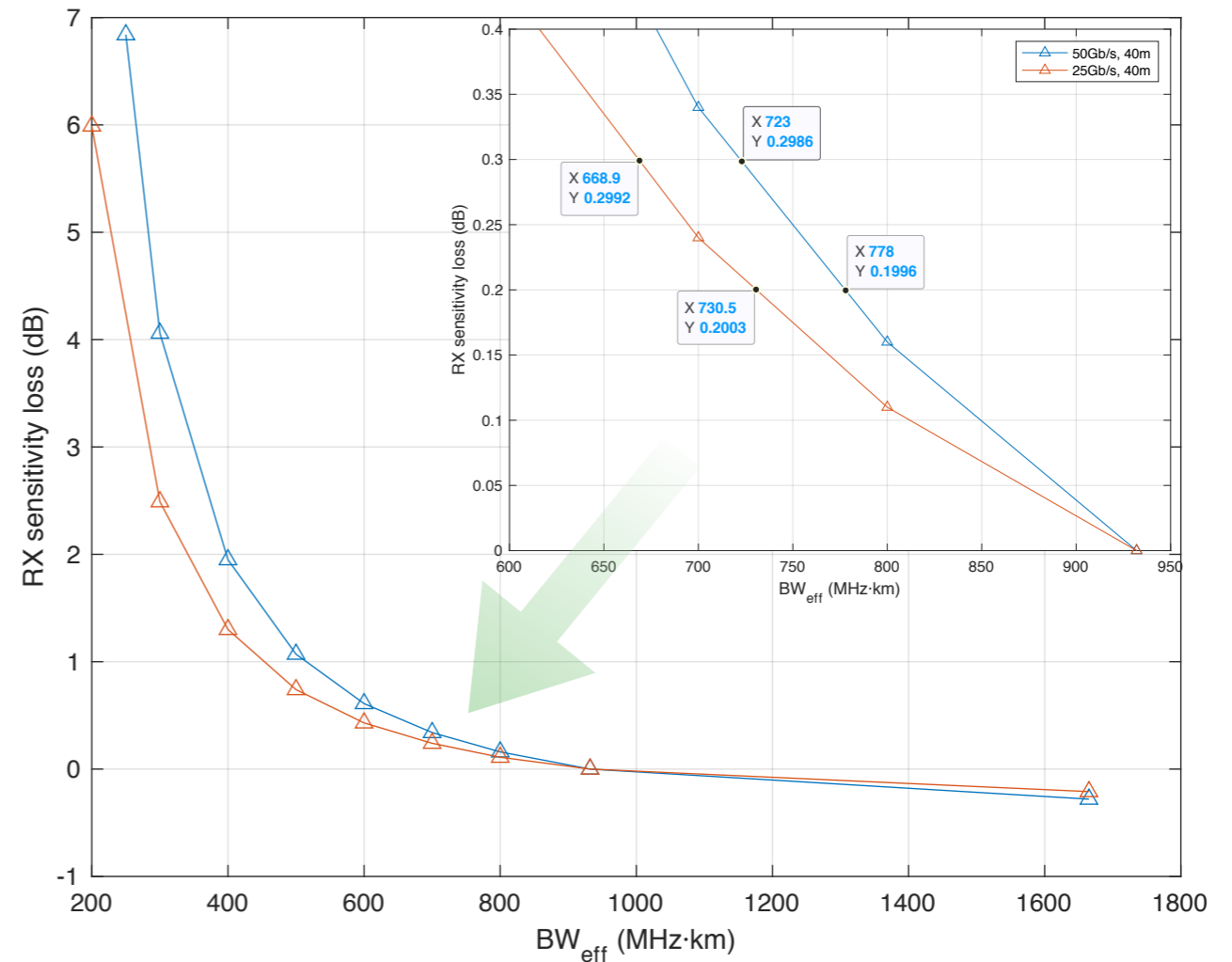
# RX sensitivity affected by fiber $BW_{eff}$

50 Gb/s, 40 meters

| $BW_{eff}$ (MHz·km) | RX min $OMA_{TP4}$ (dBm) | RX Sens. loss (dB) |
|---------------------|--------------------------|--------------------|
| 1665                | -13.28                   | -0.28              |
| 932                 | -13.00                   | 0.00               |
| 800                 | -12.84                   | 0.16               |
| 700                 | -12.66                   | 0.34               |
| 600                 | -12.39                   | 0.61               |
| 500                 | -11.93                   | 1.07               |
| 400                 | -11.05                   | 1.95               |
| 300                 | -8.94                    | 4.06               |
| 250                 | -6.16                    | 6.84               |

25 Gb/s, 40 meters

| $BW_{eff}$ (MHz·km) | RX min $OMA_{TP4}$ (dBm) | RX Sens. loss (dB) |
|---------------------|--------------------------|--------------------|
| 1665                | -17.71                   | -0.21              |
| 932                 | -17.50                   | 0.00               |
| 800                 | -17.39                   | 0.11               |
| 700                 | -17.26                   | 0.24               |
| 600                 | -17.07                   | 0.43               |
| 500                 | -16.76                   | 0.74               |
| 400                 | -16.20                   | 1.30               |
| 300                 | -15.01                   | 2.49               |
| 200                 | -11.51                   | 5.99               |



- 0.2 dB loss:  $BW_{eff} > 780$  MHz·km
- 0.3 dB loss:  $BW_{eff} > 720$  MHz·km

# References

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- [1] R. Pérez-Aranda, “Revised link budget assessment,” May 2021, [Online], Available: [https://www.ieee802.org/3/cz/public/11\\_may\\_2021/perezaranda\\_3cz\\_02\\_110521\\_revised\\_link\\_budget.pdf](https://www.ieee802.org/3/cz/public/11_may_2021/perezaranda_3cz_02_110521_revised_link_budget.pdf)



Thank you!