

Evolution of Clauses 154.8.13 and 154.8.15

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Text from D1.0

- **154.8.13 Average input power [unamplified]**
 - The average input power [unamplified] shall be within the limits given in Table 154–9 for a black link that does not contain any optical amplifiers. Note that this parameter is paired with OSNR(193.6) [unamplified].
- **154.8.15 OSNR(193.6) [unamplified]**
 - OSNR(193.6) [unamplified] shall be within the limit given in Table 154–9 for a black link that does not contain any optical amplifiers.

D1.0 Comment #24 against 154.8.13 (expanded)

- It's good that we point out that there is a linkage/pairing between this parameter and OSNR(193.6) [unamplified]. However, we don't explain what that linkage is and how it applies, which could leave a reader confused as to what that means.
 - Suggestion: Add an explanation of how they're linked. This could be an extensive one -- probably in a separate section -- that includes a diagram along the lines of what was presented to the TF in a previous contribution, or it could even be some simple text added here (or both). Some possible example text of an extension to the existing sentence might be along the lines of: "Note that this parameter is paired with OSNR(193.6) [unamplified], in that it defines the average input power at which the OSNR(193.6) [unamplified] is measured."

Resolution of D1.0 Comment #24

- Replace the current clause text for 154.8.13:
 - “The average input power [unamplified] shall be within the limits given in Table 154–9 for a black link that does not contain any optical amplifiers. Note that this parameter is paired with OSNR(193.6) [unamplified].”
- By:
 - “The average input power [unamplified] shall be within the limits given in Table 154–9 for a black link that does not contain any optical amplifiers. Note that this parameter is paired with OSNR(193.6) [unamplified], which is defined in 154.8.15. The average input power [unamplified] defines the range over which the requirement for OSNR(193.6) [unamplified] needs to be met.”
- And to add to the end of Clause 154.8.15:
 - “The requirement for OSNR(193.6) [unamplified] is intended to specify usage of the same receiver for unamplified applications with likely shorter links than 80 km, without including requirements for the associated medium.”

Resulting Text in D1.1

- **154.8.13 Average input power [unamplified]**
 - The average input power [unamplified] shall be within the limits given in Table 154–9 for a black link that does not contain any optical amplifiers. Note that this parameter is paired with OSNR(193.6) [unamplified], which is defined in 154.8.15. The average input power [unamplified] defines the range over which the requirement for OSNR(193.6) [unamplified] needs to be met.
- **154.8.15 OSNR(193.6) [unamplified]**
 - OSNR(193.6) [unamplified] shall be within the limit given in Table 154–9 for a black link that does not contain any optical amplifiers. The requirement for OSNR(193.6) [unamplified] is intended to specify usage of the same receiver for unamplified applications with likely shorter links than 80 km, without including requirements for the associated medium.

D1.1 Comment #97 (and resolution)

- Comment on 154.8.12
 - Text reading "defines the range over which the requirement for OSNR(193.6) needs to be met" is misleading. This applies to 154.8.13 as well.
- Suggestion
 - Change wording to "defines the input power range over which the BER requirement must be met at the minimum OSNR defined by OSNR(193.6)".
- Response
 - ACCEPT IN PRINCIPLE.
 - Apply suggested remedy in 154.8.12 and 154.8.13.

D1.1 Comment #99 (and resolution)

- Comment on 154.8.15
 - Text reading " with likely shorter links than 80 km" is awkward.
- Suggestion
 - Change wording to "The requirement for OSNR(193.6) [unamplified] is intended to specify usage of the same receiver for unamplified applications. DWDM channel loss will likely limit the maximum reach of these applications to less than the 80km maximum reach specified."
- Response
 - ACCEPT IN PRINCIPLE.
 - Change the wording of 154.8.15 to: "The requirement for OSNR(193.6) [unamplified] is intended to specify usage of the same receiver for unamplified applications. The associated channel loss will likely limit the maximum reach of these applications to less than 80km specified for amplified applications."

Resulting Text in D1.2

- **154.8.13 Average input power [unamplified]**
 - The average input power [unamplified] shall be within the limits given in Table 154–9 for a black link that does not contain any optical amplifiers. Note that this parameter is paired with OSNR(193.6) [unamplified], which is defined in 154.8.15. The average input power [unamplified] defines the input power range over which the BER requirement must be met at the minimum OSNR defined by OSNR(193.6) [unamplified] .
- **154.8.15 OSNR(193.6) [unamplified]**
 - OSNR(193.6) [unamplified] shall be within the limit given in Table 154–9 for a black link that does not contain any optical amplifiers. The requirement for OSNR(193.6) [unamplified] is intended to specify usage of the same receiver for unamplified applications. The associated channel loss will likely limit the maximum reach of these applications to less than 80 km specified for amplified applications.

D1.2 Comment #89

- Comment on 154.8.13
 - The reach will likely be limited to $< 80\text{km}$ for the unamplified case due to the input power restriction, not the OSNR. So the comment "The associated channel loss will likely limit the maximum reach of these applications to less than 80 km specified for amplified applications." should be in clause 154.8.13 rather than 154.8.15.
- Suggestion
 - Move the text "The associated channel loss will likely limit the maximum reach of these applications to less than 80 km specified for amplified applications." from clause 154.8.15 to 154.8.13.

D1.2 Comment #89 Proposed Response (revised)

- ACCEPT IN PRINCIPAL
- Create a Note in 154.8.15: In the case of an unamplified link the value of “OSNR(193.6) [unamplified]” is identical to the value of “Transmitter OSNR(193.6)”. The associated channel loss will be determined by the value of “Minimum average input power [unamplified]” resulting in a maximum reach of these applications to less than 80 km specified for amplified applications.
- Create a Note in 154.8.13 “The value of “Minimum average input power [unamplified]” will determine the channel loss for unamplified applications, resulting in a maximum reach of these applications to less than 80 km specified for amplified applications.”

154.8.13 Average input power [unamplified]

Proposal Comparison

- Eric's proposal
 - The average input power [unamplified] shall be within the limits given in Table 154–9 for a black link that does not contain any optical amplifiers. Note that this parameter is paired with OSNR(193.6) [unamplified], which is defined in 154.8.15. The average input power [unamplified] defines the input power range over which the BER requirement must be met at the minimum OSNR defined by OSNR(193.6) [unamplified]. The associated channel loss will likely limit the maximum reach of these applications to less than 80 km specified for amplified applications.
- Peter's proposal
 - The average input power [unamplified] shall be within the limits given in Table 154–9 for a black link that does not contain any optical amplifiers. Note that this parameter is paired with OSNR(193.6) [unamplified], which is defined in 154.8.15. The average input power [unamplified] defines the input power range over which the BER requirement must be met at the minimum OSNR defined by OSNR(193.6) [unamplified].
 - Note: The value of “Minimum average input power [unamplified]” will determine the channel loss for unamplified applications, resulting in a maximum reach of these applications to less than 80 km specified for amplified applications.

154.8.15 OSNR(193.6) [unamplified]

Proposal Comparison

- Eric's proposal
 - OSNR(193.6) [unamplified] shall be within the limit given in Table 154–9 for a black link that does not contain any optical amplifiers. The requirement for OSNR(193.6) [unamplified] is intended to specify usage of the same receiver for unamplified applications. ~~The associated channel loss will likely limit the maximum reach of these applications to less than 80 km specified for amplified applications.~~
- Peter's proposal
 - OSNR(193.6) [unamplified] shall be within the limit given in Table 154–9 for a black link that does not contain any optical amplifiers. The requirement for OSNR(193.6) [unamplified] is intended to specify usage of the same receiver for unamplified applications. ~~The associated channel loss will likely limit the maximum reach of these applications to less than 80 km specified for amplified applications.~~
 - Note: In the case of an unamplified link the value of “OSNR(193.6) [unamplified]” is identical to the value of “Transmitter OSNR(193.6)”. The associated channel loss will be determined by the value of “Minimum average input power [unamplified]” resulting in a maximum reach of these applications to less than 80 km specified for amplified applications.

Some Thoughts

- Eric's proposed change appears to be tied to the fact that in an unamplified case reach is power limited, not OSNR limited
 - As a result, he proposes moving the text about the unamplified case being limited by loss from the OSNR section to the Input Power section
- At its core, Peter's proposal appears to do the following:
 - Adding text along those lines to the Input Power section (in a Note)
 - Keeping text about being loss limited in the OSNR section (in a Note)
- Peter's text also makes one other potentially significant change
 - Instead of stating that the channel loss will limit the reach, his text states that the channel loss is determined by the Minimum Average Input Power
 - I don't believe this is entirely correct, as the channel loss is what it is; that channel loss in combination with the Minimum Average Input Power will determine the reach

Some Proposed Options for Comment #89

- Option 1: Accept Eric's proposed change as is
 - Doesn't modify any text; merely moves text about power/loss limits from the OSNR section to the Minimum Average Input Power section
 - Doesn't appear to impact the intent of previous comments and associated changes, since all text is still present
- Option 2: Accept Eric's proposed change, but in the form of a Note
 - Probably a bit cleaner than having that text directly inline.
- Option 3: Keep text about loss limits in both sections (likely as Notes) per Peter's suggestion, but with modified text on reach limitations, for example:
 - Note for 154.8.13: The associated channel loss will likely limit the maximum reach of these applications to less than 80 km specified for amplified applications.
 - Note for 154.8.15: In the case of an unamplified link the value of "OSNR(193.6) [unamplified]" is identical to the value of "Transmitter OSNR(193.6)". As a result, the maximum reach of this application is determined by the value of "Minimum average input power [unamplified]" and the associated channel loss, which will likely be less than 80 km specified for amplified applications.