COM based ITOL spec for 100GBASE_KR4

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Introduction.

This presentation is in support of comment 90 related to the 100GBASE-KR4 receiver testing.

Proposed change

Replace the interference tolerance measurement described in clause 93.8.2.3 based on annex 69A including a fixed applied broadband noise, with a test similar to the test defined in clause 94.3.13.3 with an applied broadband noise computed using COM.

Reasons.

- Ties the transmitter specs, the channel spec, and the receiver specs together in a way that should guarantee interoperability.
- Adding the option of using a Tx that incorporates training simplifies testing.
- This will better align 100GBASE-KR4 and 100GBASE-KP4

Implementation summary

- Create an annex that is referred to from both clauses 93 and 94
  - Creates an aligned pair of specs
  - Provides best hooks for future use
  - 802.3bj Chief editors past and future agree with this method.
- Move most of Clause 94.3.13.3 into this new annex with rewording as necessary with editorial license.
- Table 94-17 stays in Clause 94.
- Table 93-7 stays in Clause 93 but the Applied RMS broadband noise row is replaced with COM. Values for all tests to be 1.5dB.
- Refer to the appropriate table (94-19 and 93-9) for the parameters to use for COM but see “details” for the existing exceptions which should be extended to clause 93 as well, and including an exception for clause 93 tests 1 and 2 where the “Target detector error ratio for COM calculation is 1e-12 for tests 1 and 2.

Details for new annex to allow use for clause 93 with compliant Tx

1. Create a new annex
2. Modify 94.3.13.3.2 point 8) :
    1. Change reference to σ_{RJ} and A_{DD} to say that measured values of the transmitter block parameters are used in the COM code if the transmitter block does not provide the specified value of jitter.
3. In 94.3.13.3.2 point 10) change “scrambled idle pattern” to “test pattern specified in the relevant clause”
4. Move current clauses 94.3.13.3.1 Test setup and 94.3.13.3.2 Test method to the new annex

Details for new annex to allow use of test equipment instead of compliant Tx

5. Change second paragraph of 94.3.13.1 to include a statement that either a device compliant to the specification or equivalent test equipment can be used.
6. Add note that if transmitter provides all needed noise the summer block can be dispensed with.
7. Add note that if transmitter noise is specified and the transmitter cannot provide it, noise can be added as shown in figure 94-18. The combined transmitter assembly when measured at TPta should be compliant to any specifications which apply to the product at TP0a.

Details for new annex to allow use of test equipment instead of compliant Tx

8. Add verbiage to make it clear that when a Tx noise summer is used the channel used in COM still extends from TPt to TP5 replica trace. As shown in figure 94-19. If addition of the summer block forces a higher launch amplitude to be used at TP0 to meet specs at TP0a, the victim launch amplitude "A_v" should be adjusted accordingly.
9. State that in the COM computation the transmitter package model is included only if a compliant transmitter is used. Otherwise the termination is modeled in COM as ideal and a Gaussian low pass filter is added to equation 93A-17 which has the same 20-80 rise time as the transmitter has.

Detailed changes to what remains in Clause 94

- In 94.3.13.3 include a reference to the new annex
- Also in 94.3.13.3 state that FEC symbol error ratio should be measure using scrambled idle pattern

Details changes in Clause 93

- In 93.8.2.3 replace reference to annex 69A with a reference to the new annex
- In 93.8.2.3 add to table 93-7 a row of target COM of 1.5dB and delete Applied RMS broad band noise row.
- In 93.8.2.3 state the BER is measured using either PRBS31 or scrambled idle pattern