
# Adding a No FEC cable (CA-N) to 25GBASE-CR.

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# Supporters of Proposal.

| | | |
|---|---|---|
| Eric | Baden | Broadcom |
| Vittal | Balasubramanian | Dell |
| Erdem | Matoglu | Amphenol |
| Richard | Mellitz | Intel |
| Gary | Nicholl | Cisco |
| Tom | Palkert | Molex |
| Vineet | Salunke | Cisco |
| Kapil | Shrikhande | Dell |
| Scott | Sommers | Molex |
| Rob | Stone | Broadcom |
| Nathan | Tracy | TE |
| Pavel | Zivny | Tektronix |

# Introduction.

- A no-FEC cable option that will allow for minimal latency 25G communication is a desirable mode of operation.
- It is a service to the industry to have a specification for a cable that will operate in a plug and play manner for this no-FEC mode of operation.
- This proposal creates a specification for this cable which will operate with host IC's that meet the Clause 93 802.3bj specifications with the host traces and connectors assumed for Clause 92 of 802.3bj.  Ie with the existing host specs in the 802.3by draft.
- The proposal also provides the detailed changes needed to add it to the 802.3by draft.
- The presentation is in support of comment # 54 and also addresses comments 14 and 147.

# Key Aspects of the No FEC cable specification

- Proposed name for the cable is CA-N
- All frequency domain specifications (other than lower max loss) are identical to the specifications for CA-L and CA-S.
- No specific cable length is indicated (although it is expected that 2m cables can be made compliant to the CA-N specification). See Mellitz_3by_01_0315
- The key specification is the COM test with a DER of 1e-12
- The measured cable attenuation (including cable test fixtures) is specified as 13dB. (Agreed with a small group of interested parties and is an update to the numbers proposed in comment 54)
- Note that with these specifications a CA-N cable is fully compliant to the CA-S and CA-L specifications.

# Detailed Changes (1).

**Page 144 line 47.**

**Change**

A device that uses the 25GBASE-CR PMD may support either the BASE-R FEC sublayer (Clause 74) or the 25GBASE-R RS-FEC sublayer (Clause 108). This creates two possible FEC modes:

a) When the BASE-R FEC sublayer is used, the PHY is defined to operate in BASE-R FEC mode.

b) When the 25GBASE-R RS-FEC sublayer is used, the PHY is defined to operate in RS-FEC mode.

**To**

A device that uses the 25GBASE-CR PMD may support either the BASE-R FEC sublayer (Clause 74) or the 25GBASE-R RS-FEC sublayer (Clause 108), or no FEC. This creates ~~two~~ three possible FEC modes:

a) When the BASE-R FEC sublayer is used, the PHY is defined to operate in BASE-R FEC mode.

b) When the 25GBASE-R RS-FEC sublayer is used, the PHY is defined to operate in RS-FEC mode.

c) When neither the BASE-R FEC nor the 25GBASE-R RS-FEC sublayer is used the PHY is defined to operate in the no-FEC mode.

# Detailed Changes (2).

**Page 149 line 35.**

**Change**

Table 110–5 defines the parameters for interference tolerance tests. When the RS-FEC mode is used, the receiver shall comply with tests 1 and 2. When the BASE-R FEC mode is used, the receiver shall comply with test 3.

**To**

Table 110–5 defines the parameters for interference tolerance tests. When the RS-FEC mode is used, the receiver shall comply with tests 1 and 2. When the BASE-R FEC mode is used, the receiver shall comply with test 3. When the no-FEC mode is used the receiver shall comply with test 4.

**Page 153 line 30**

**Delete the editor's note.**

**In Table 110-7 add an additional column that is titled CA-N and has the same values as CA-L and CA-S except for the maximum insertion loss row which is 13dB.**

# Detailed Changes (3).

**Page 153 line 20.**

**Change**

Two cable assembly types are specified for 25GBASE-CR, with different COM requirements:

a) Cable assembly that supports links between two PHYs that include the 25GBASE-R RS-FEC sublayer (Clause 108) with error correction enabled on both receivers, with cable length up to 5 m. This cable assembly type is designated as “cable assembly long” (CA-L).

b) Cable assembly that supports links between two PHYs that include the BASE-R FEC sublayer (Clause 74) with error correction enabled on both receivers, with cable length up to 3 m. This cable assembly type is designated as “cable assembly short” (CA-S).

**To**

~~Two~~ Three cable assembly types are specified for 25GBASE-CR, with different COM requirements:

a) Cable assembly that supports links between two PHYs that include the 25GBASE-R RS-FEC sublayer (Clause 108) with error correction enabled on both receivers, with cable length up to 5 m. This cable assembly type is designated as “cable assembly long” (CA-L).

b) Cable assembly that supports links between two PHYs that include the BASE-R FEC sublayer (Clause 74) with error correction enabled on both receivers, with cable length up to 3 m. This cable assembly type is designated as “cable assembly short” (CA-S).

c) Cable assembly that supports links between two PHYs that includes no FEC sublayer. This cable assembly type is designated as “cable assembly no-FEC” (CA-N)

# Detailed Changes (4).

**Page 149 line 35.**

**Change**

Table 110–7 provides a summary of the cable assembly characteristics for CA-L and CA-S and references to the subclauses addressing each parameter. Due to the improved error correction capability provided by the RS-FEC sublayer, the specified maximum insertion loss for CA-L is larger than that of CA-S. All other parameters are identically specified.

**To**

Table 110–7 provides a summary of the cable assembly characteristics for CA-L ~~and~~ CA-S, and CA-N and references to the subclauses addressing each parameter. Due to the improved error correction capability provided by the RS-FEC sublayer, the specified maximum insertion loss for CA-L is larger than that of CA-S. Likewise due to the error correction capability provided by the Base-R FEC sublayer, the specified maximum insertion loss for CA-S is larger than that of CA-N. All other parameters are identically specified .

**Or To (If comment 55 is accepted).**

Table 110–7 provides a summary of the cable assembly characteristics for CA-L ~~and~~ CA-S, and CA-N and references to the subclauses addressing each parameter. Due to the improved error correction capability provided by the RS-FEC sublayer, the specified maximum insertion loss for CA-L is larger than that of CA-S. Likewise due to the error correction capability provided by the Base-R FEC sublayer, the specified maximum insertion loss for CA-S is larger than that of CA-N. All other parameters except for some of the input parameters for the COM calculation are identically specified .

# Detailed Changes (5).

**Page 154 line 13.**

**Change**

The measured insertion loss at 12.8906 GHz of the CA-L cable assembly shall be less than or equal to 22.48 dB. The measured insertion loss at 12.8906 GHz of the CA-S cable assembly shall be less than or equal to **TBD** dB.

**To**

The measured insertion loss at 12.8906 GHz of the CA-L cable assembly shall be less than or equal to 22.48 dB. The measured insertion loss at 12.8906 GHz of the CA-S cable assembly shall be less than or equal to TBD dB. The measured insertion loss at 12.8906 GHz of the CA-N cable assembly shall be less than or equal to 13 dB

**Page 154 line 40.**

**Change**

Specific COM parameter values for the two cable assembly types, CA-S and CA-L, are provided in Table 110–8.

**To**

Specific COM parameter values for the ~~two~~ three cable assembly types, CA-L, CA-S and CA-N, are provided in Table 110–8.

# Detailed Changes (5).

**Page 155 line 7.**

**Add a column to table 110-8.**

Column heading CA-N

Same values as CA-S (including the value for bmax being inserted by a different comment) except for DER0. DER0 = $10^{\wedge -12}$

**Page 160 line 45.**

**Add an addition PICS row for CAN.**

**Page 223 line 16.**

**Annex 110A needs amendment. Suggest this is generalized as below .**

This subclause provides information on channel insertion losses for intended topologies ranging from 0.5 m to 5 m ~~and 3 m~~ in length. The maximum channel insertion loss ~~associated with the 5 m topology~~ is determined using Equation (110A–1). The channel insertion loss budget at 12.8906 GHz ~~for the 5 m topology~~ is illustrated in Figure 110A–1.

**And in equation 110A-1 change “IL Chmax35dB” to “IL Chmax” and “IL Camax5m” to “IL Camax” and define generally the new parameters.**

# Detailed Changes (6).

**Page 255 in Figure 110A. Replace 35dB with ydB, Replace 22.48dB with xdB. Add the following table to the figure.**

| | CA-L | CA-S | CA-N |
|---|---|---|---|
| y | 35 | 29 (See other comment) | 25.52 |
| x | 22.48 | 16.48 (See other comment) | 13 |