A Simplifying 25Gb/s Cable Proposal

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IEEE 802.3 25 Gb/s Ethernet Task Force

Supporters
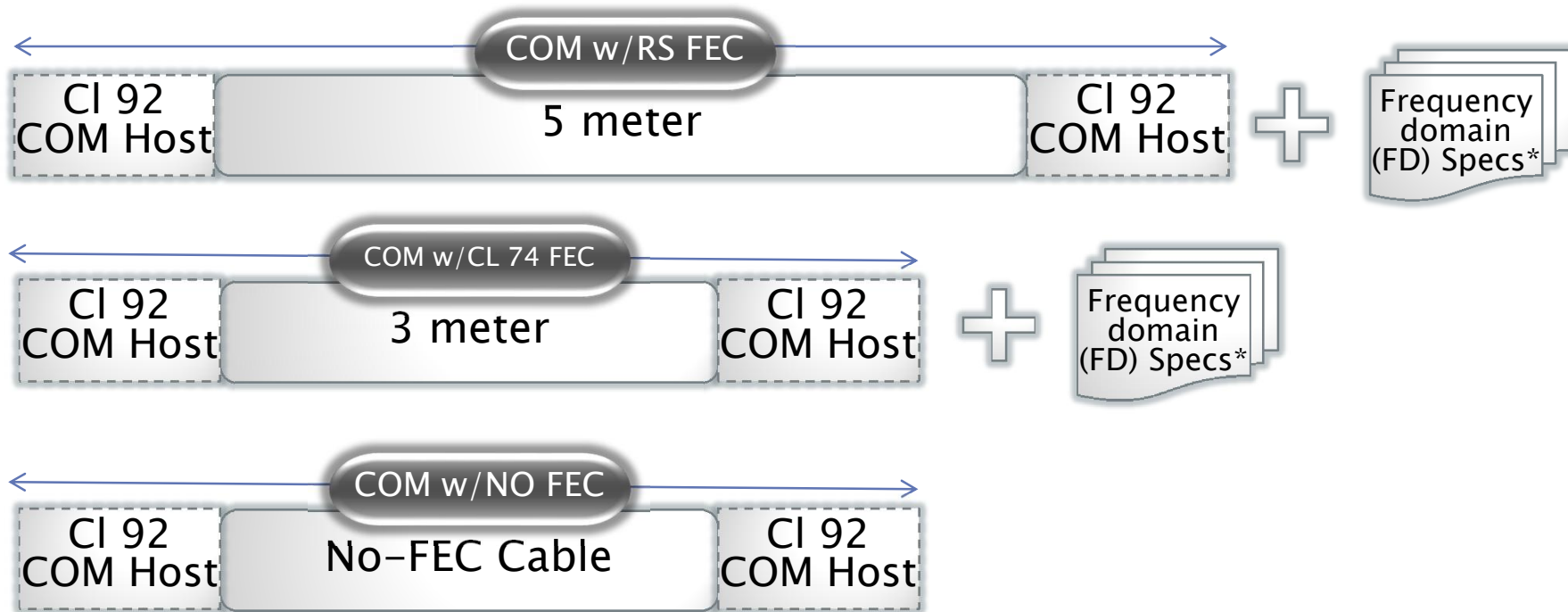
- Rob Stone – Broadcom
- Adee Ran – Intel

Overview

- One host board loss
- 3 cables tested with different FEC schemes
- Compatible with 100GBase CR4 switches

Cable COM tests

COM w/RS FEC

| Cl 92 COM Host | 5 meter | Cl 92 COM Host | + | Frequency domain (FD) Specs* |

COM w/CL 74 FEC

| Cl 92 COM Host | 3 meter | Cl 92 COM Host | + | Frequency domain (FD) Specs* |

COM w/NO FEC

| Cl 92 COM Host | No-FEC Cable | Cl 92 COM Host |

*Frequency domain (FD) specifications as in: diminico_120314_25GE_adhoc.pdf

What may we say about 5m and 3m cables specs?

- 5m cable
  - **COM computed with RS FEC and standard 'bj host board**
  - Support all 100GBase CR4 and related direct attach CAUI
- 3m cable
  - **COM computed with clause 74 FEC and standard 'bj host board**
  - Support all 100GBase CR4 and related direct attach CAUI
  - Keeps cable manufacturing and reflections controls consistent with 5m cables
- Align with Chris DiMinico's frequency domain proposals (diminico_120314_25GE_adhoc ff)

Review: Limits of 3 meter cables
(mellitz_25GE_01a_0914)

'bj CR4 Host
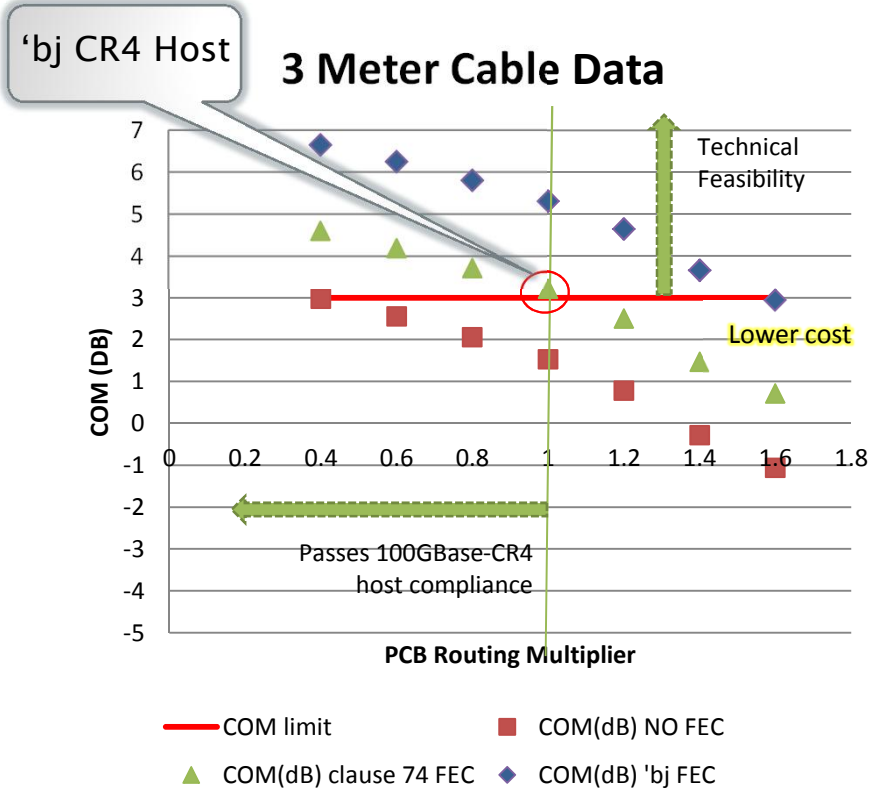
3 Meter Cable Data

3 meter cable just passes COM limit with a standard IEEE802.3 CR4 Clause 92 host board and a Clause 74 FEC.

2 meter cables may not pass COM limit with 100GBASE-CR4 Host Loss (13.62dB total @ 12.89GHz)

COM (dB) 2 Meter Cable*
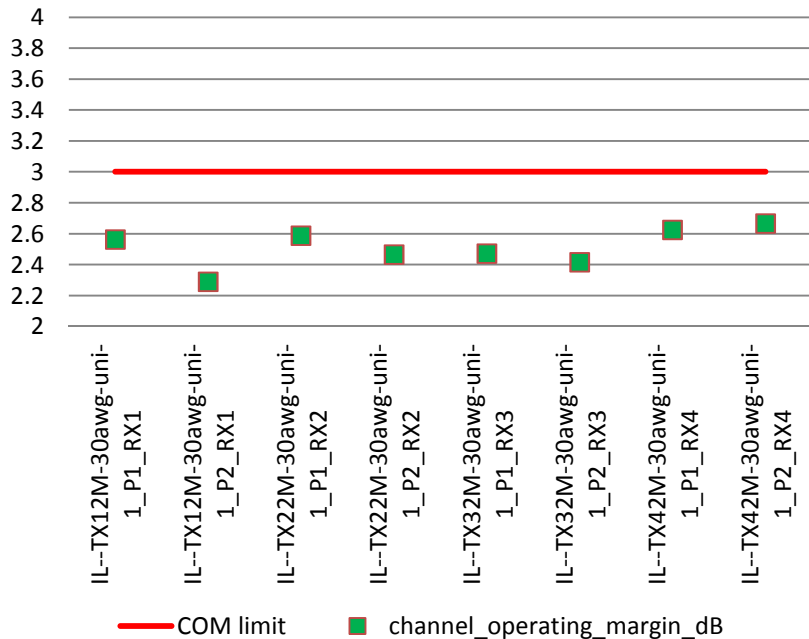
- No FEC cable posts a challenge because of reflections
- Recommendation:
  - Electrically specify a no-FEC cable with COM
  - Enable No FEC to be arbitrated with AN
  - Cable reach and enabling host options outside of IEEE standard scope

matoglu_25GE_01a_1114

	1m 30AWG QSFP-4SFP	2m 30AWG QSFP-4SFP	2 2 Q 4
With FEC	✔	✔	✔
Without FEC	✔	✔ Max7.3dB total host PCB loss	✔ M to P

* http://www.ieee802.org/3/100GCU/public/ChannelData/Molex_11_0516/bugg_02_0511.zip

What may we say about a no-FEC cable

▸ **COM computed with no FEC and standard 'bj host board**

▸ Supports all 100GBase CR4 and related direct attach CAUI

▸ Provides cable manufacturing flexibility

- ◦ Electrically compliance regardless of reach
- ◦ Cable reach outside of IEEE scope
  - · Caveat: Some similar reach cables may not pass COM

▸ Also align with Chris DiMinico's frequency domain proposals (diminico_120314_25GE_adhoc ff)

Proposal:

xx.yy.q Cable assembly Channel Operating Margin

The cable assembly Channel Operating Margin (COM) for each victim signal path (receive lane) is derived from measurements of the cable assembly victim signal path, the respective individual near–end crosstalk paths, and the respective far–end crosstalk paths that can couple into a victim signal path. COM for a 5 meter cable is computed using the procedure in 93A.1 with the Test 1 and Test 2 values in Table 93–8 and the signal paths defined in xx.yy.qq. Test 1 and Test 2 differ in the value of the device package model transmission line length z_p. COM for a 3 meter is the computed the same except the parameter DER_0 in Table 93–8 is set to 1e–8. COM for a no–FEC cable is computed with values in Table 93–9 expect DER_0 is assigned a value of 1e–12 and $b_{max}(n)$ is assigned a value of 0.3.