# Analysis of 32AWG, 30AWG, 26AWG copper cables with IEEE802.3 Clause 74 FEC, Clause 91 FEC, and non-FEC conditions

01/2015
Erdem Matoglu – Amphenol

erdem.matoglu@amphenol-tcs.com

**Amphenol AHSP**

# Supporters

**Rich Mellitz – Intel Corporation**
**Rob Stone – Broadcom Corporation**
**Eric Baden – Broadcom Corporation**
**Mike Andrewartha - Microsoft**

**Amphenol AHSP**

# Cable Analysis Methodology

This presentation builds upon the cable assembly methods, measurement, and data presented in matoglu_25GE_01a_1114

For more cable and measurement details please refer to :
http://www.ieee802.org/3/25GSG/public/Nov14/matoglu_25GE_01a_1114.pdf

COM is computed per IEEE802.3bj Section 92.10.7 with parameters and Test1 & Test 2 specified in Table 93-8. The specification requirement is minimum 3dB

Test 1 and Test 2 differs by device package length *zp*. COM Test 2 models 30mm package length. COM Test 1 models 12mm device package length
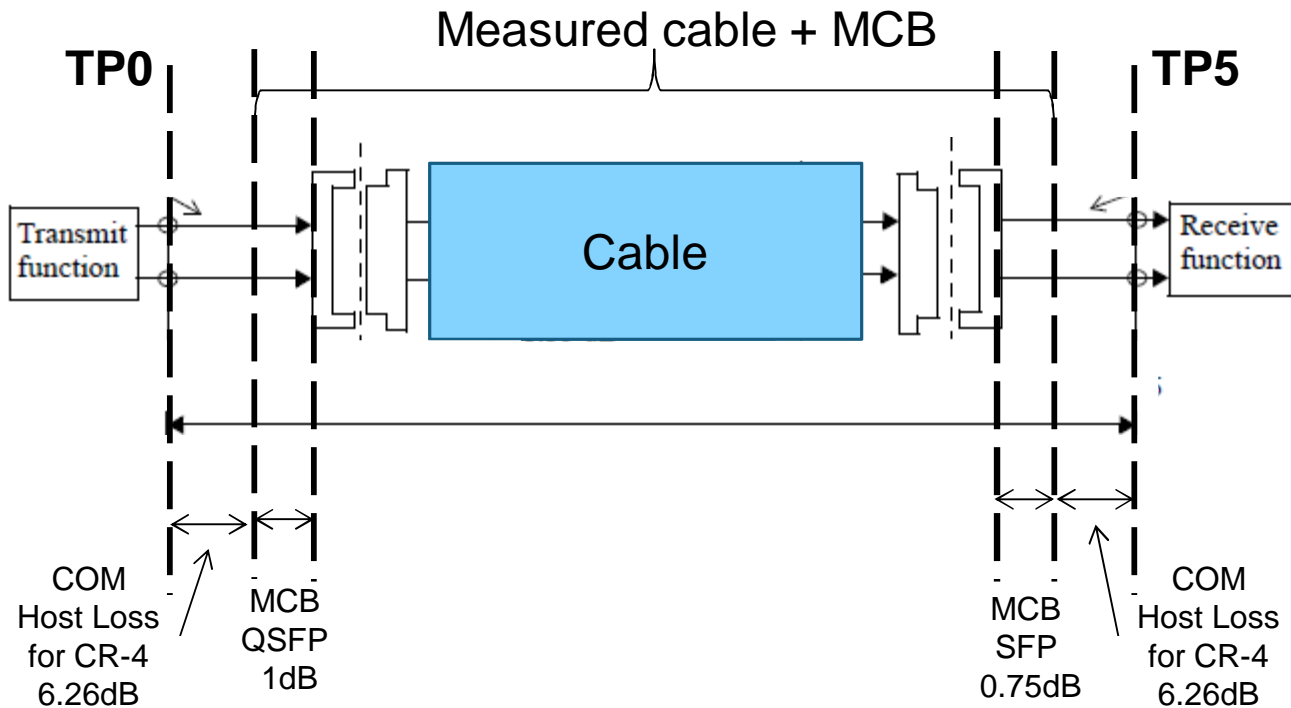
DER is set to:
1e-12 for Non-FEC
1e-8 for Clause 74 FEC
1e-5 for Clause 91 FEC

**Amphenol AHSP**

# Cable Analysis Methodology

**DER is set to 1e-12 for Non-FEC analysis, 1e-8 for Clause 74 FEC, and 1e-5 for Clause 91 FEC**

**Starting from the 802.3 CL92 CR4 Host loss of 6.81dB/side at 12.89GHz, the host loss is reduced until the COM>3dB is satisfied.**



**TP0 to TP5 insertion loss is the measured cable (including MCBs) + 12.52 (6.26*2)**

**Amphenol AHSP**

# QSFP-4SFP Cu Breakout Cables with FEC91, FEC74, and non-FEC to satisfy 3dB COM (per IEEE802.3 Section 92.10.7)

| QSFP-4SFP BO Cable | 1m 32AWG | 1m 30AWG | 2m 32AWG | 2m 30AWG | 2m 26AWG | 3m 26AWG | 3m 30AWG | 4m 26AWG | 5m 26AWG |
|---|---|---|---|---|---|---|---|---|---|
| With FEC Clause 91 | ✅ | ✅ | ✅ | ✅ | ✅ | ✅ | ✅ | ✅ | ✅ |
| With FEC Clause 74 | ✅ | ✅ | ✅ | ✅ | ✅ | ✅ | ✔️ Max8dB total host loss | ✔️ Max12dB total host loss | ✔️ Max7.5dB total host loss |
| Without FEC | ✅ | ✅ | ✔️ Max5.5dB total host loss | ✔️ Max7.3dB total host loss | ✔️ Max10.8dB total host loss | ✔️ Max7.3dB total host loss | − | − | − |

Seems feasible *(over 4m 26AWG, With FEC Clause 74)*

Seems feasible *(over 2m 26AWG, Without FEC)*

✅ **Passes COM spec with 100GBASE-CR4 Host Loss (13.62dB total @ 12.89GHz)**

✔️ **Passes COM spec with a reduction in host channel loss (@ 12.89GHz)**

**Amphenol AHSP**