802.3ba CR4/10, SR4/SR10 loss budgets Draft 2.2 review

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What we asked for (from gustlin_04_0709)

Proposed Changes

1. Change the reach objective for CR4/10 to 7m (from 10m) to allow for more loss to be assigned to the PCB, keeping constant the channel loss budget (26.3dB)

   Comment: **achieved**, the objective was changed, the total channel loss budget has been reduced to 24.44dB (see 85A.5).
2. Change clause 85A.4 from 4.74dB total loss for tx / rx host boards to 5dB per side for the PCB + connector + impairments budget

   Comment: **achieved**, change reflected into Host IL (85-14) and Test fixture loss (85-16) formulas, which makes the total loss = 5.24dB for each side.
3. Change clause 86A.6 to 5dB per side for the PCB + connector + impairments. Note that this is a change in a recommendation since the PCB budget is a recommendation, and this channel is jitter limited.

   Comment: **achieved**, change reflected into nPPI recommended electrical channel (86A-19) and HCB Loss (excluding connector) (86A-4) formulas, which makes the total loss = 5.24dB for each side.
4. Change Equation 86A-20 to reflect 3.5dB (Host trace) + 0.87dB (connector) + 1.26dB (HCB trace) + 0.63dB (impairments) = 6.26dB at 5.15625 GHZ

   Comment: **achieved**, change reflected into nPPI recommended electrical channel (86A-19), which makes the total loss = 6.5dB for each side.

Mismatches that should be corrected in Draft 2.3

• The CR4/10 Host IL (85-14) and the nPPI recommended electrical channel (86A-19) both defined with connector and test fixtures) should be IDENTICAL also for low frequencies (see next slide).

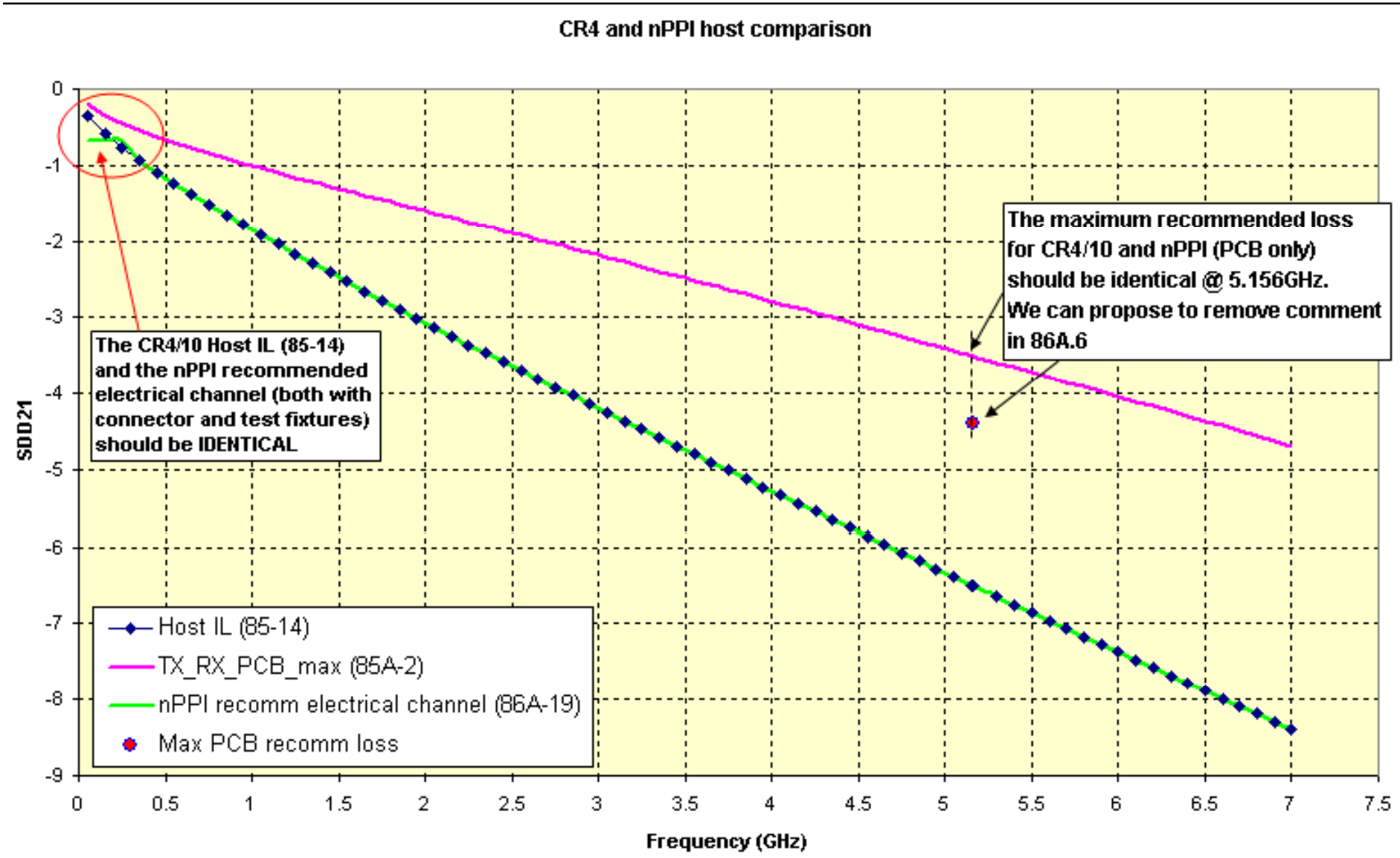
• The recommended maximum loss for the PCB only (without connector) (Draft 2.2, page 446, row 51), should be aligned with formula 85A-2 (Transmitter and receiver differential printed circuit board trace loss) that gives maximum PCB loss @5.156GHz = 3.5dB (see next slide).

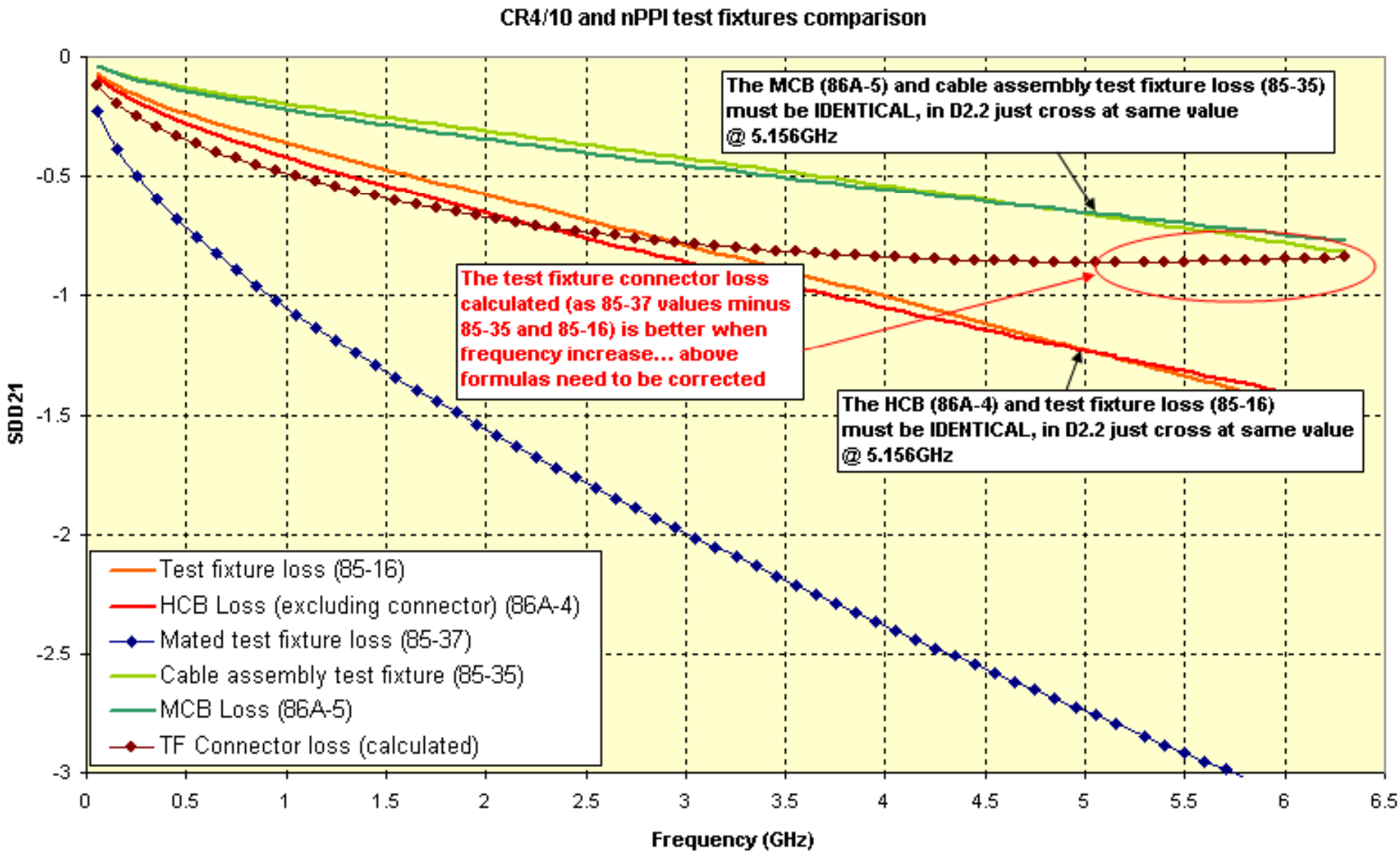
• The cable assembly test fixture (85-35) and the MCB (86A-5) loss formulas must be IDENTICAL. In D2.2 losses just cross at same value @ 5.165GHz (see slide 5).

• The test fixture (85-16) and the HCB (86A-4) loss formulas must be IDENTICAL.
In D2.2 losses just cross at same value @ 5.165GHz. (see slide 5).

• The connector loss (calculated as 85-37 values minus 85-35 and 85-16) of the test fixture improves when frequency increase (see slide 5). Above formulas should be corrected to avoid this.

• Formula 86A-19 seems incorrect from in the range from 0.2 to 7GHz, should be
= -0.114-0.8914*√f-0.846*f


CR4 and nPPI host comparison
SDD21
Frequency (GHz)
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
6.5
7
7.5
The CR4/10 Host IL (85-14) and the nPPI recommended electrical channel (both with connector and test fixtures) should be IDENTICAL
The maximum recommended loss for CR4/10 and nPPI (PCB only) should be identical @ 5.156GHz. We can propose to remove comment in 86A.6
Host IL (85-14)
TX_RX_PCB_max (85A-2)
nPPI recomm electrical channel (86A-19)
Max PCB recomm loss


CR4/10 and nPPI test fixtures comparison
The MCB (86A-5) and cable assembly test fixture loss (85-35) must be IDENTICAL, in D2.2 just cross at same value @ 5.156GHz
The test fixture connector loss calculated (as 85-37 values minus 85-35 and 85-16) is better when frequency increase... above formulas need to be corrected
The HCB (86A-4) and test fixture loss (85-16) must be IDENTICAL, in D2.2 just cross at same value @ 5.156GHz
Test fixture loss (85-16)
HCB Loss (excluding connector) (86A-4)
Mated test fixture loss (85-37)
Cable assembly test fixture (85-35)
MCB Loss (86A-5)
TF Connector loss (calculated)
SDD21
Frequency (GHz)
0
-0.5
-1
-1.5
-2
-2.5
-3
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
6.5