IMPEDANCE

The proposed change in Return loss specification for 100 Mbit HSTR is large, and a change of this magnitude is not required for allowing simple dual impedance designs. In the following is the minimum change in return loss requirements estimated.

I almost all cases is the return loss at high frequencies limited by parasitic capacitance in the circuit. With this assumption is the maximum allowed capacitance for meeting the return loss requirements in a 150 Ohm design is 8 pF. (figure 1)

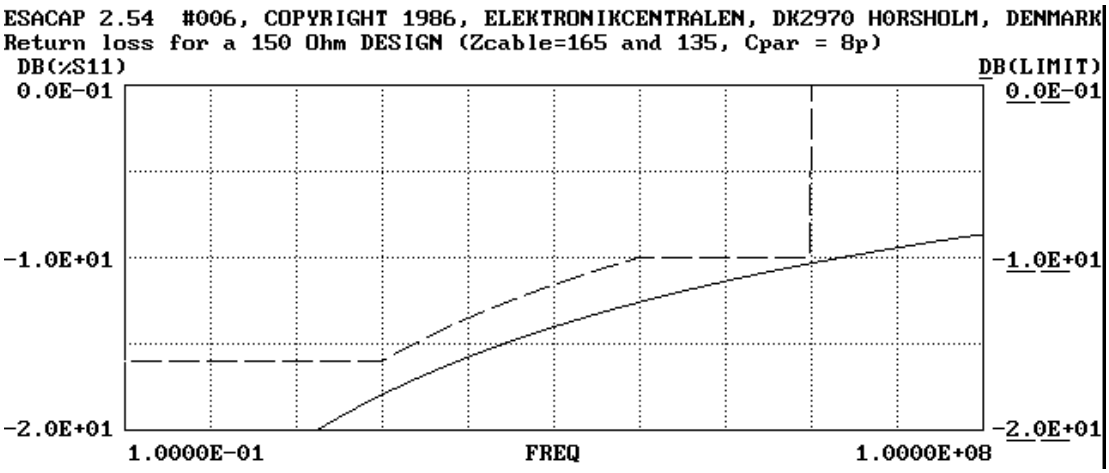



**Figure 1 Return loss for a 150 Ohm design with 8pF stray capacitance**

If a 150 Ohm design with less than 8pF stray capacitance's is possible, is a compromise impedance design with the same stray capacitance also possible !. If the HSTR standard shall allow up to 8 pF stray capacitance (Read: A compliant compromise design is not more difficult than a compliant 150 Ohm only design !!!!!!): The return loss limits are then:

| | |
|---|---|
| Greater than 14 dB | from 2MHz to 37.8MHz |
| Greater than (14-20 log(f/37.8MHz) | from 37.8MHz to 60MHz |
| Greater than 10 dB | from 60MHz to 80MHz |

The return loss for a 122 Ohm design at the impedance extremes (85 Ohm and 165 Ohm) with 8pF stray capacitance are given in figure 2 and 3.

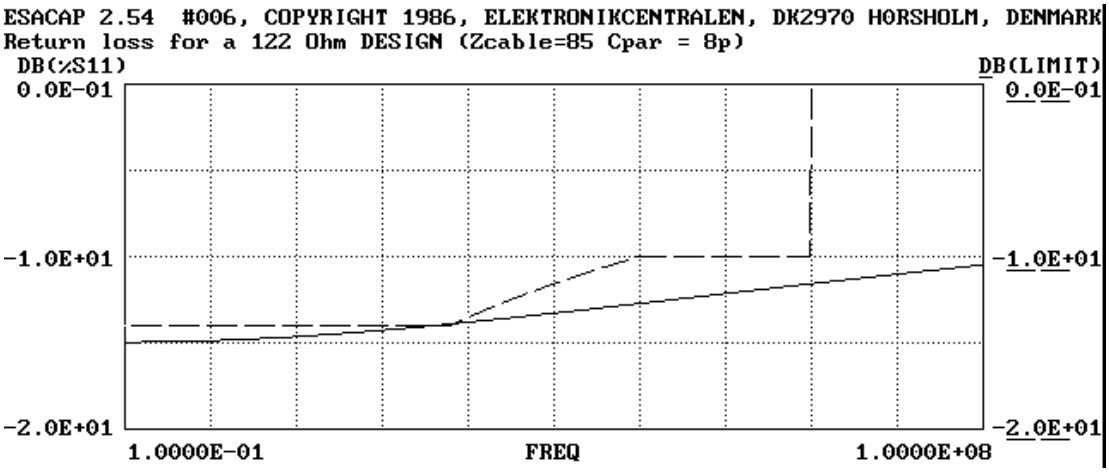



**Figure 2**

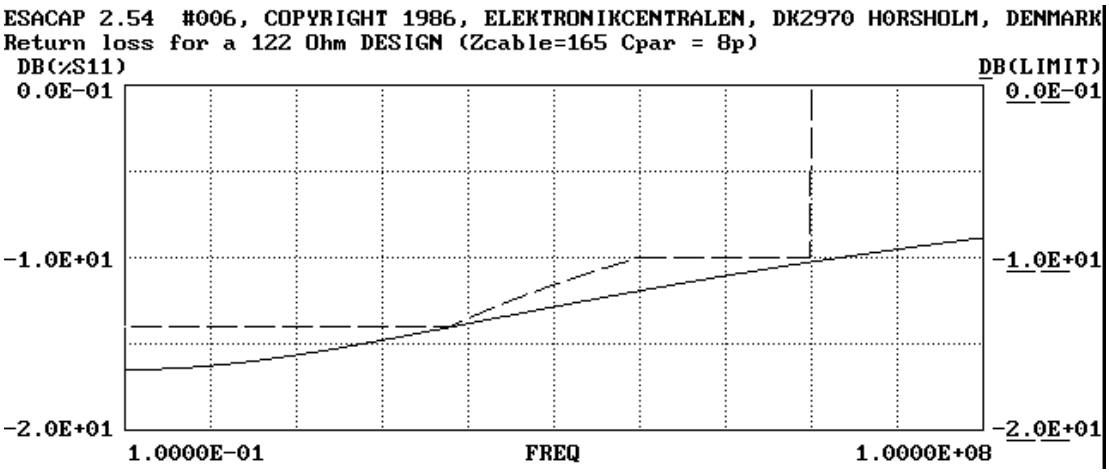
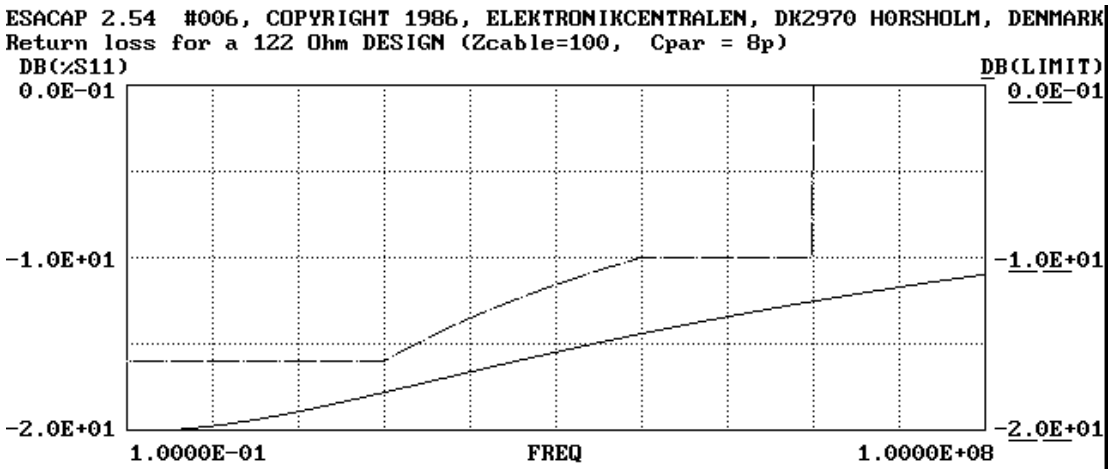
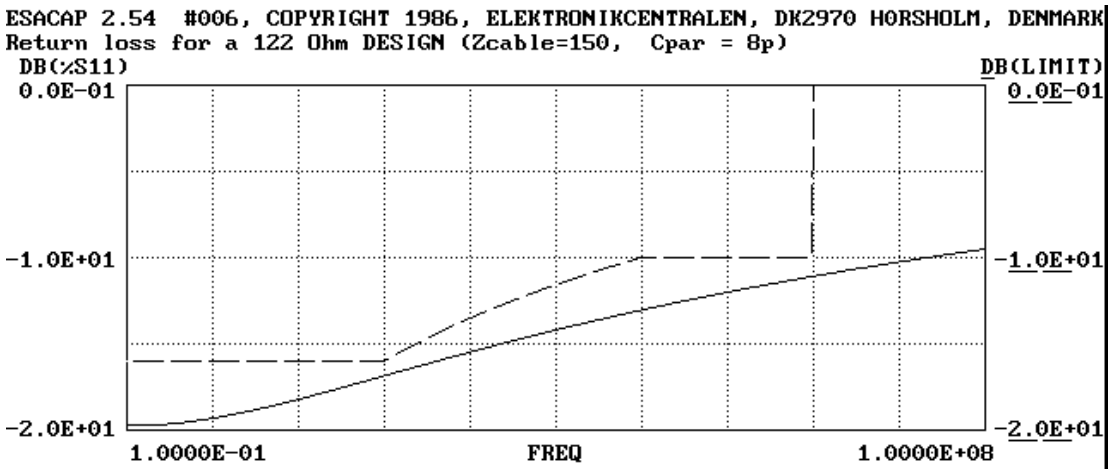

ESACAP 2.54 #006, COPYRIGHT 1986, ELEKTRONIKCENTRALEN, DK2970 HORSHOLM, DENMARK
Return loss for a 122 Ohm DESIGN (Zcable=165 Cpar = 8p)
DB(%S11)
DB(LIMIT)
0.0E-01
-1.0E+01
-2.0E+01
1.0000E-01
FREQ
1.0000E+08

**Figure 3**

## Reference impedance for return loss measurements.

In the two following figures is the return loss for 118.5 Ohm design shown. The reference impedance used for the simulation is the nominal impedance (100 and 150 Ohm)




The figures shows that the dual impedance design is OK if the return loss is only measured at the nominal impedance.