Investigation of TWP with Losses

Problem Definition

Aim of this application note is to show how dielectric losses influence on simulation results and comparison with measurements.

TWP having lossy dielectric covering and cable length about 4.325 m is investigated (see Fig.1 – Fig.4). The insulation of the cable with following parameters is considered $\tan\delta=0.04$ and $\varepsilon_r=3.8$.

Fig. 1. Measurement setup for investigation of long (4.325 m) TWP cable

Fig. 2. Active termination

Fig. 3. Passive termination

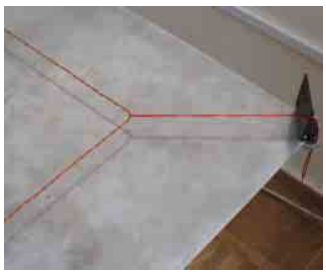

Fig. 4. Cable corner fixing

Crosstalk between wires is measured in EMCoS measurement laboratory. Simulation model is represented in the figure below.

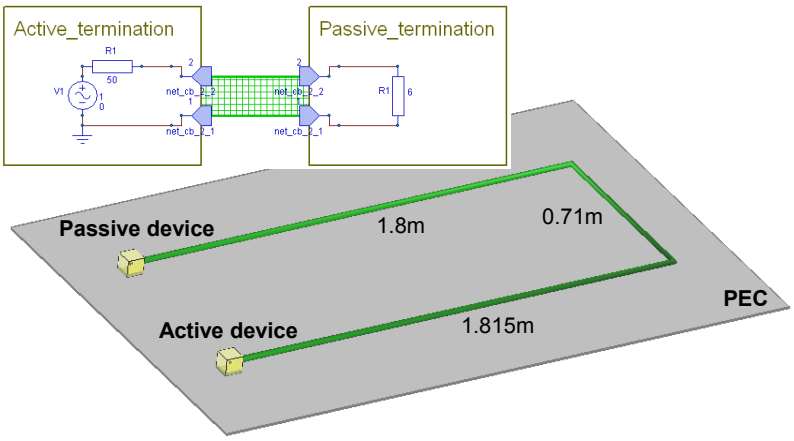

Fig. 5. Simulation model for investigation of TWP cable

Numerical Results

Simulation is performed using tanδ=0.04 and ε_r=3.8. Comparison of simulation result with measurement is shown in the following figures.

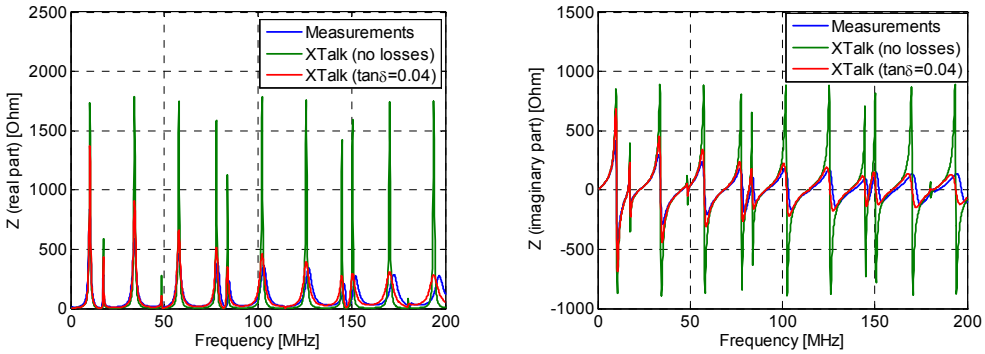

Fig. 6. Input impedance vs. frequency

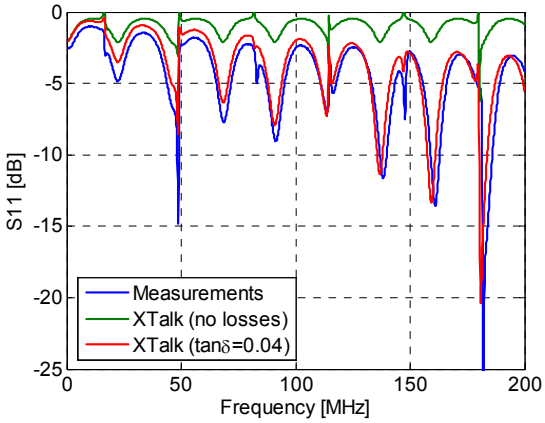

Fig. 7. S11 parameter vs. frequency

Conclusions

- The investigation of cable bundles with lossy insulation materials are available within EMC Studio Hybrid Analysis Type
- The consideration of dielectric losses in simulation improves agreement with measurement results