



Updates on 10GBase-T Magnetics

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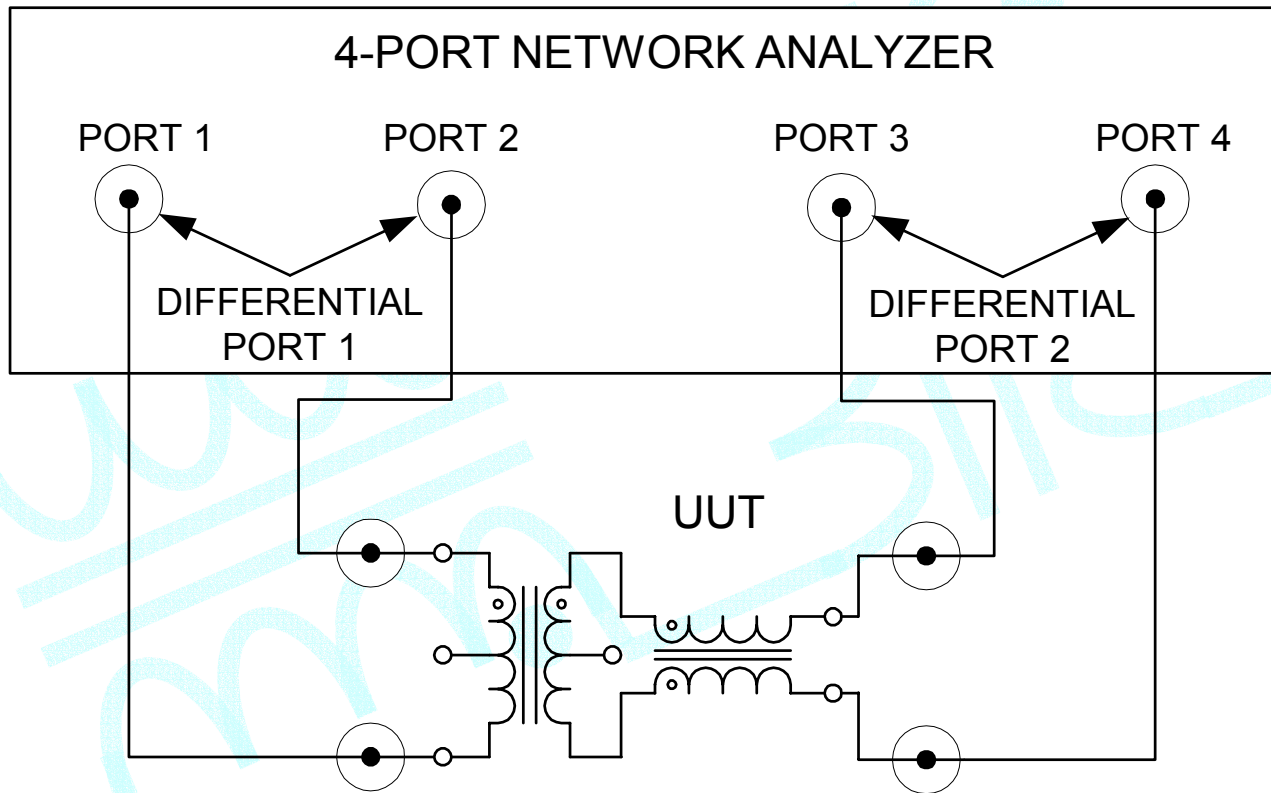
Objectives

- Provide updates on magnetics with sufficient bandwidth (>450 MHz) for 10GBase-T.
- Test data in differential modes will be presented. Single-ended test data are already posted on IEEE web site, under “10GBase-T Material”.
- Discuss possibility of adding a low-pass filter to help reduce RF radiation from transmitter and improve signal-to-noise ratio on receiver.

Latest 10GBase-T magnetics

- Characteristics:
 - 1CT:1CT turns ratio (center tap on each side).
 - Insulation to meet 1500 VAC.
 - OCL of about 80 μH @ 100 kHz, which results in a lower 3-dB point of about 100 kHz.
 - With a common-mode choke similar to those used in earlier LAN magnetics.
 - Each package has 4 channels, with size similar to those for a typical 1000Base-T part.

Test set up

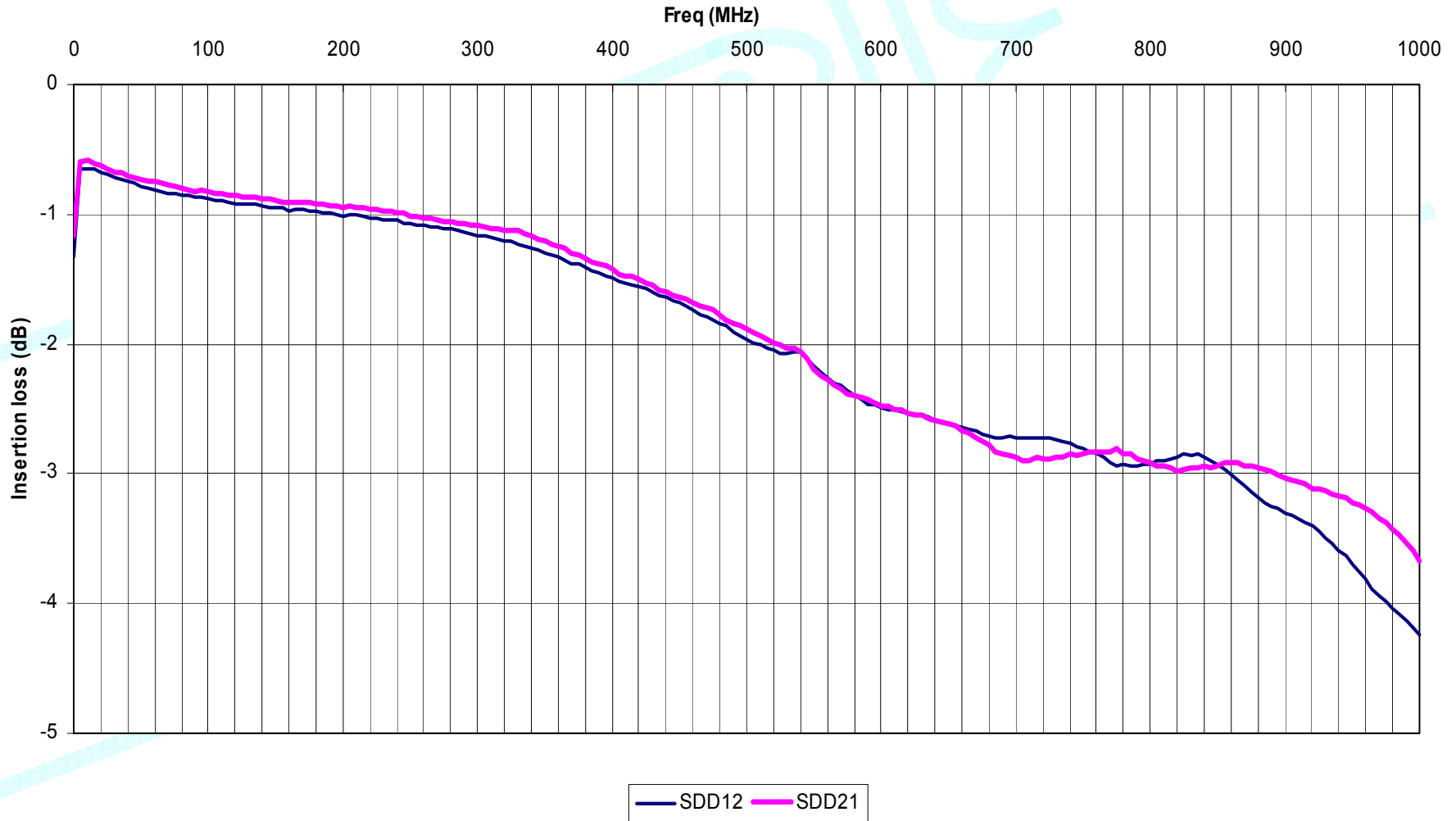


TEST SET UP



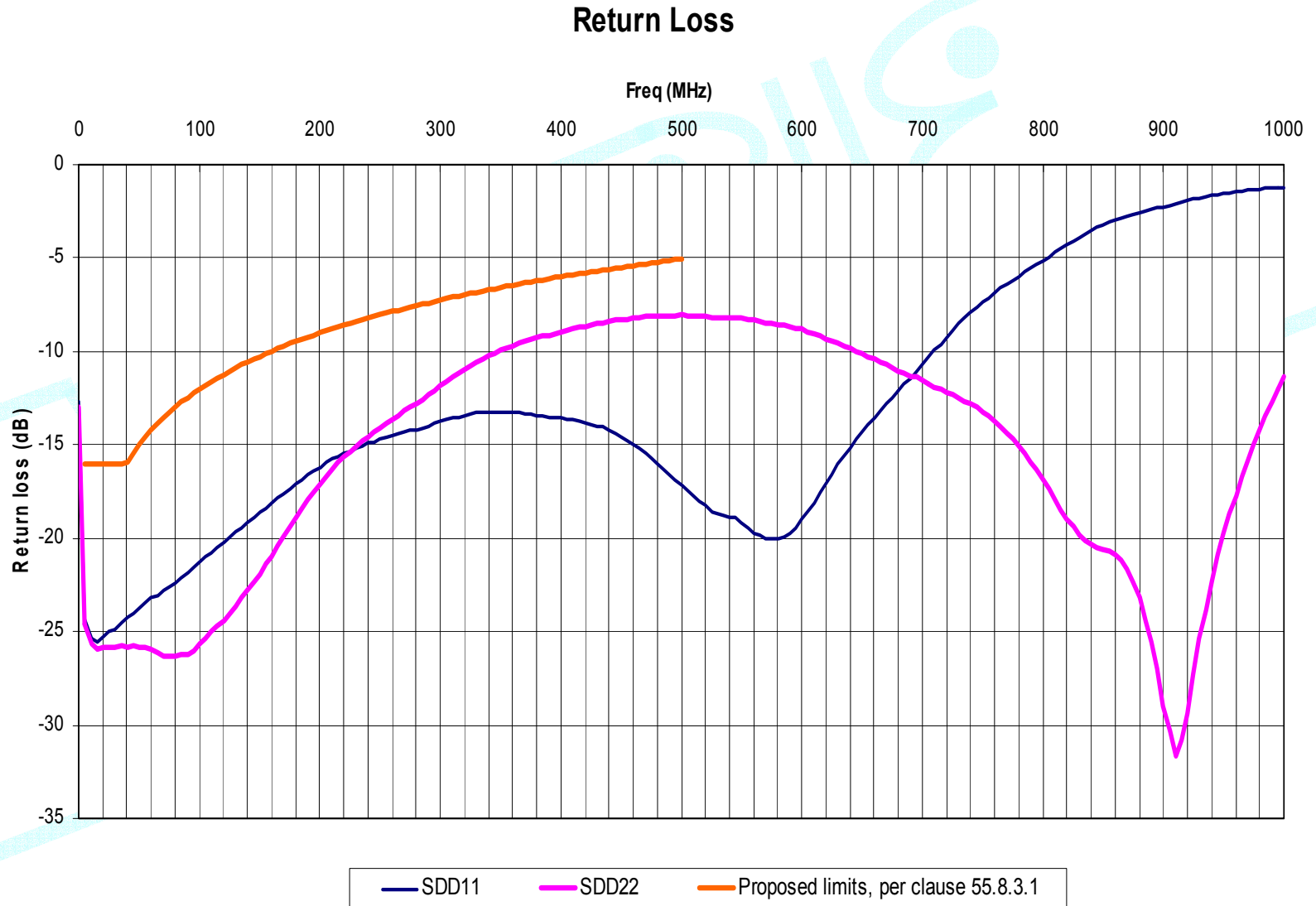
Test results

Insertion Loss





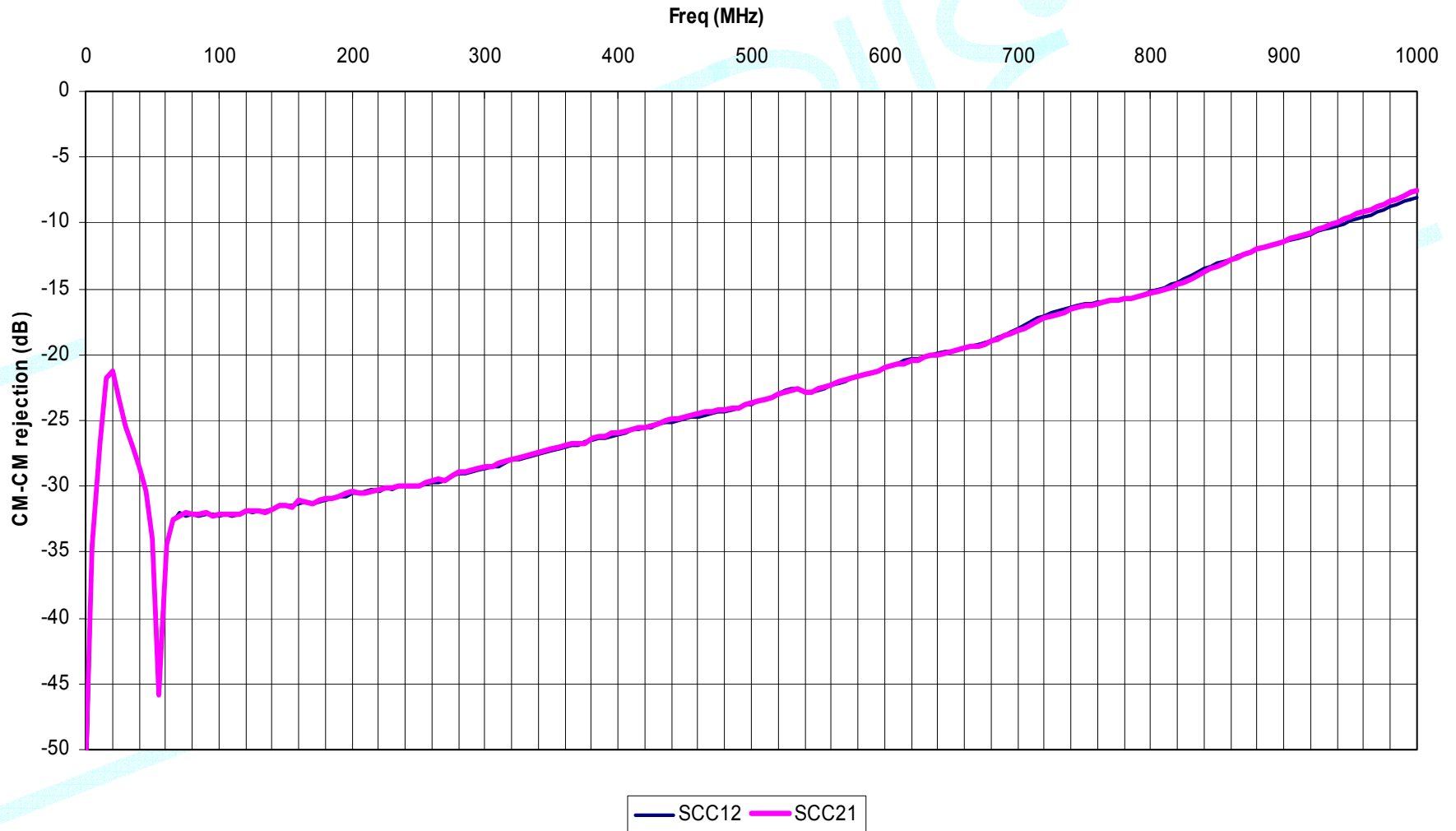
Test results (continued)





Test results (continued)

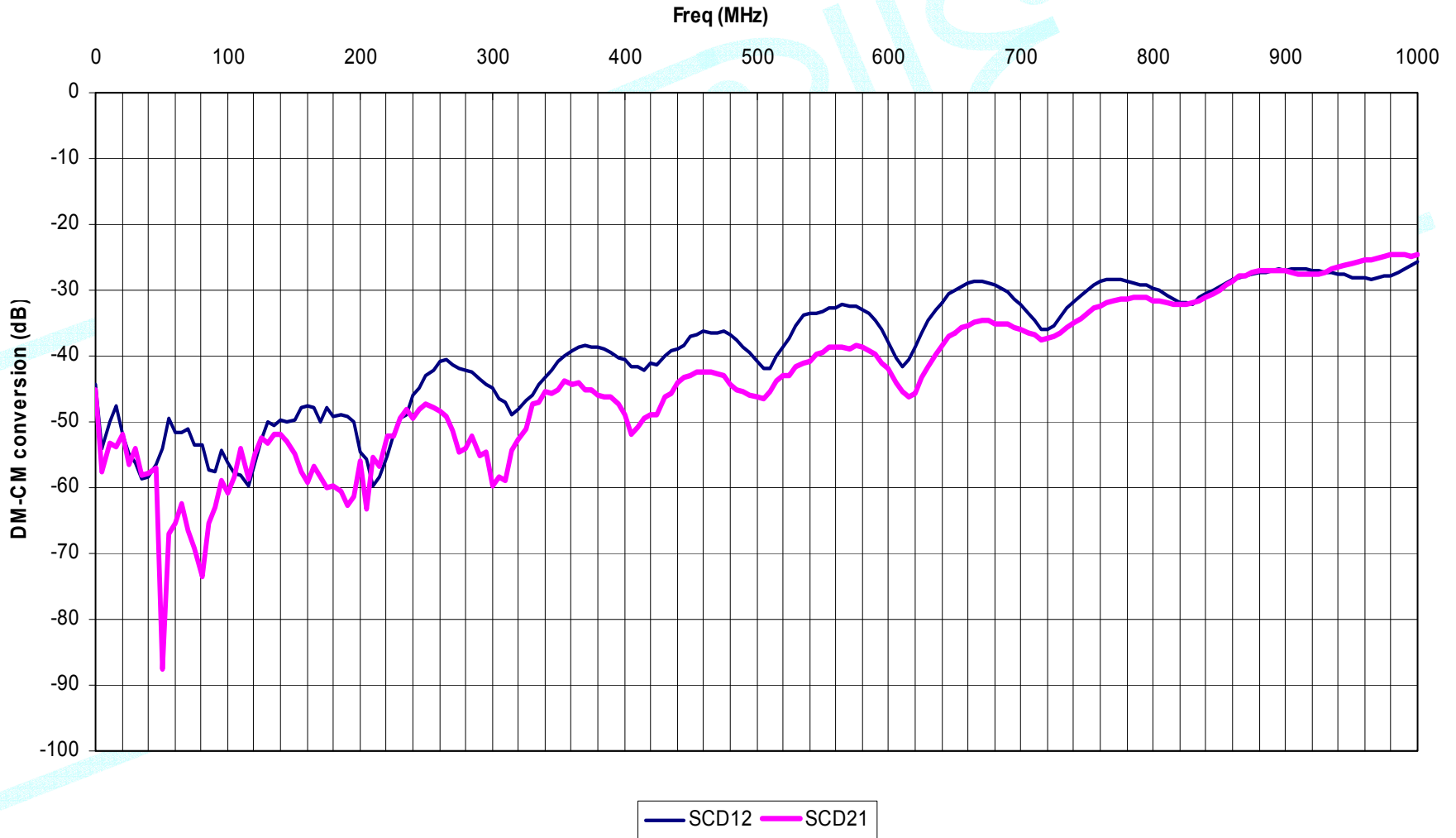
Common- to Common-mode Rejection





Test results (continued)

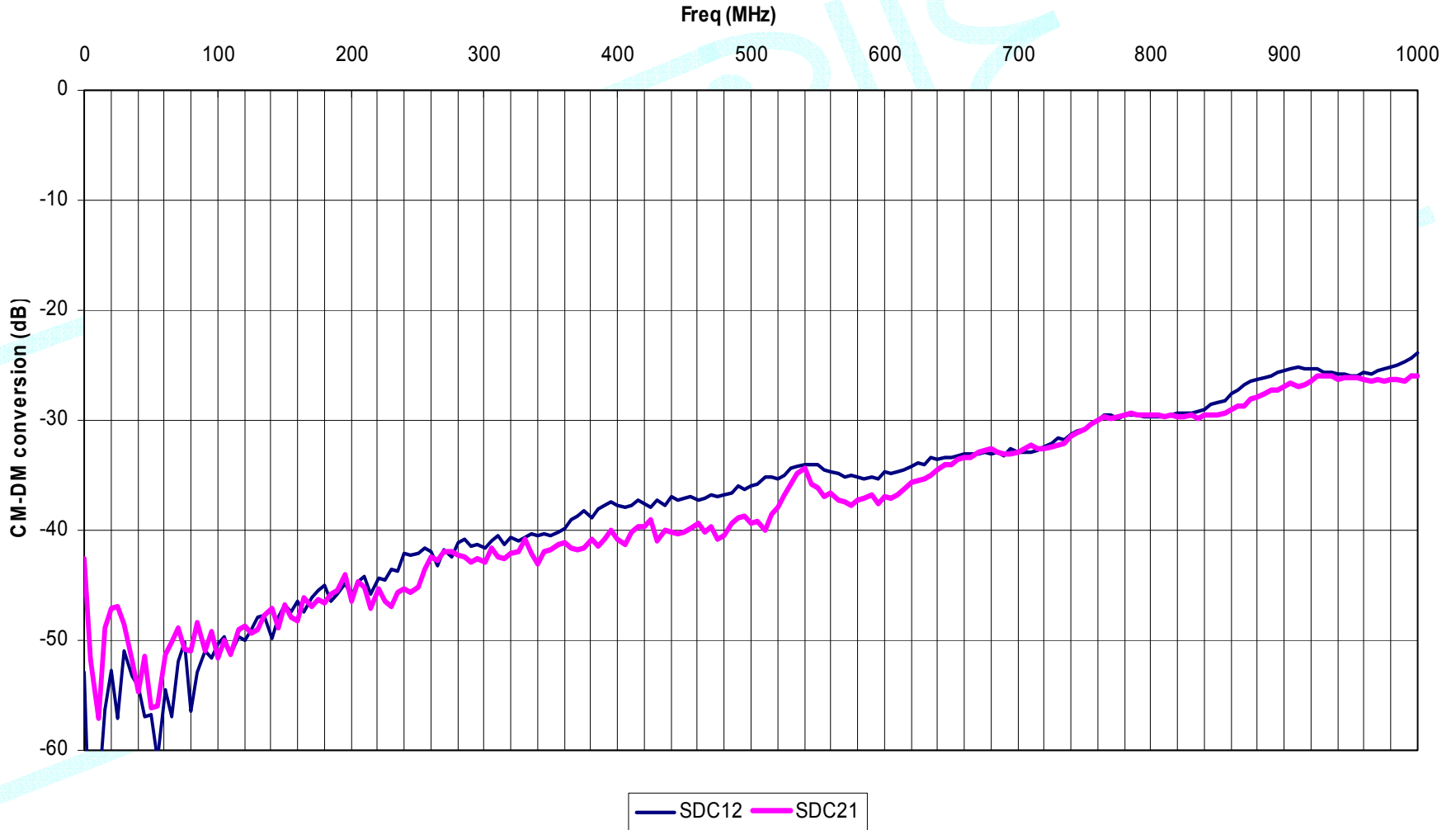
Differential- to Common-mode Conversion





Test results (continued)

Common- to Differential-mode Conversion





Summary

- Bandwidth (3dB) from less than 100 kHz to more than 450 MHz is feasible.
- Parasitic components such as leakage inductance, capacitance, etc. are very difficult to control, and may vary widely.
- It is not practical to take advantage of these parasitic components to make up a low-pass filter with a reasonably good roll-off slope and a good tolerance on cut-off frequency.