

Design project

Group no. 1

Assigned:

Tuesday, May 21st, 2013

Report due:

First written examination

Using a circuit board dielectric material with $\epsilon_r = 2.55$, $h = 0.8 \text{ mm}$, design a microstrip filter according to the specifications in Table 1. In particular:

- Design the prototype filter and apply the required frequency and impedance transformations (consider both a T and π network).
- Design the filter using the *stepped-impedance* technique with equal electric length transmission line segments (45°). Please allow a segment of input and output microstrip line for the connection to the connectors.
- Simulate the frequency response of the filter.
- Using a CAD tool, print the filter full scale layout in the PDF file format (please check carefully all the dimensions on the paper printed layout).
- Measure the frequency response of the filter (S11 and S21).

Table 1

Filter type	Low-pass
Response type	Equal-ripple (0.5 dB)
f_1 [GHz]	2.4
R_0 [Ω]	50
Insertion loss [dB] @ $f = 4.8$ [GHz]	> 30 dB