Guiding electromagnetic systems

Design project

Project no. 1

Layout due: **June 8th, 2017**
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Report due: **End of the summer examination session (July 28th)**

Using a circuit board dielectric material with $\varepsilon_r = 4$, $h = 2$ mm, design a microstrip filter according to the specifications in Table 1. In particular:

a) Design the prototype filter and apply the required frequency and impedance transformations (consider both a T and π network).
b) 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.
c) Simulate the frequency response of the filter.
d) Using AWR, print the GERBER file of both the top and the bottom layers of the microstrip circuit.
e) Measure the frequency response of the filter (amplitude of S_{11} and S_{21}).

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