

Design project**Project no. 1**

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1 - stepped-impedance low-pass filter with equal electric length transmission line segments (45°)

Layout due :

June 8th, 2017(send it by e-mail to paola.pirinoli@polito.it and andrea.massaccesi@polito.it)**Report due:****End of the summer examination session (July 28th)**

Using a circuit board dielectric material with $\epsilon_r = 4$, $h = 2$ 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 AWR, print the GERBER file of both the top and the bottom layers of the microstrip circuit.
- 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