Guiding electromagnetic systems

Design project

Project no. 9

Group members: s282502, s282847, s282197, s288224, s288280

Layout due: **May 31, 2021**
(send it by e-mail to paola.pirinoli@polito.it and andrea.massaccesi@polito.it)

Report due: **July 18, 2021**

Using a circuit board dielectric material with $\varepsilon_r = 4.4$, $h = 1.6$ 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 the characteristic impedance of the transmission line segments between 15 Ω and 120 Ω. 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	Maximally flat
f_1 [GHz]	2.4
R_0 [Ω]	50
Insertion loss [dB] @ f = 5.28 [GHz]	> 30 dB