Microstrip dualband filter

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Projet ANR-13-ASTR-14 COCORAM

1 System structure

After concluding the polynomial synthesis, the obtained system corresponds to the structure shown in Fig. 1

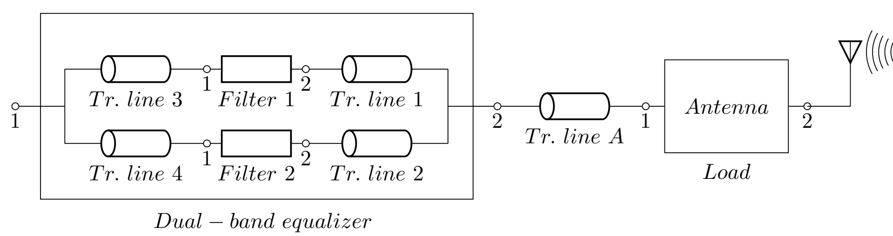

Figure 1: System structure

The target for each channel-filter is given by the matrices— M_1 and M_2 plus the touchstones:

- 02-Sep-2016_Phase_portX_bandX_N2_LOSS.s2p

that corresponds to the phase shifting due to the input and output coupling as shown in Fig. 2

$$M_1 = \begin{bmatrix} 0 & 0.9560 & 0 & 0 \\ 0.9560 & -0.0330 & 0.9606 & 0 \\ 0 & 0.9606 & 0.9125 & 0.5202 \\ 0 & 0 & 0.5202 & 0 \end{bmatrix}$$

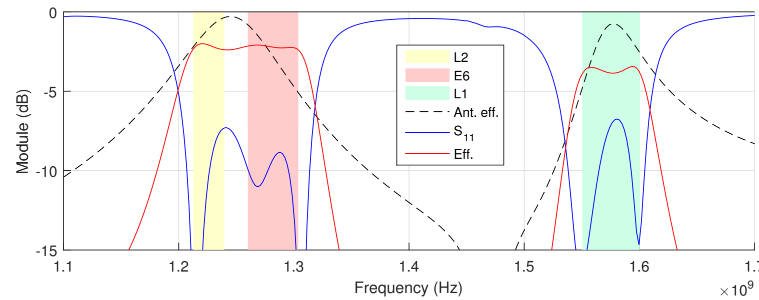

Figure 3: Dualband circuital response.

Finally, the transmission lines *Tr. line* 1 and *Tr. line* 1 correspond to:

- 02-Sep-2016_Transmission_line_band1_N2_LOSS.s2p
- 02-Sep-2016_Transmission_line_band2_N2_LOSS.s2p

of 12 and 48 mm respectively. The response of this model is shown in Fig. 3

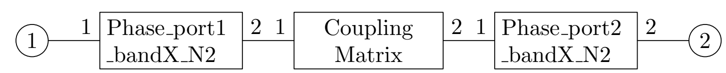

Figure 2: Model of the microstrip filter (Filter 1 and Filter 2 in Fig. 1).

2 Microstrip dualband filter.

The microstrip filter (Fig. 5) consist on two single band 2-poles filters, an input and output junction and a transmission line of 40 mm that connect the dual-band filter to the antenna. The equivalent layout is shown in Fig. 4. The EM response of the microstrip filter is located in the touchstone:

- 02-Sep-2016_Microstrip_dualband_4poles_plus_line.s2p

$$M_2 = \begin{bmatrix} 0 & 1.2168 & 0 & 0 \\ 1.2168 & 0.6471 & 1.1624 & 0 \\ 0 & 1.1624 & -0.4229 & 0.7192 \\ 0 & 0 & 0.7192 & 0 \end{bmatrix}$$

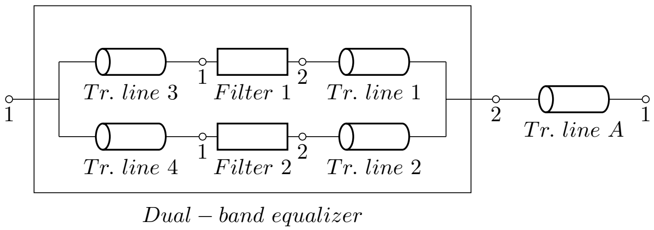

Figure 4: Schematic of the microstrip filter.

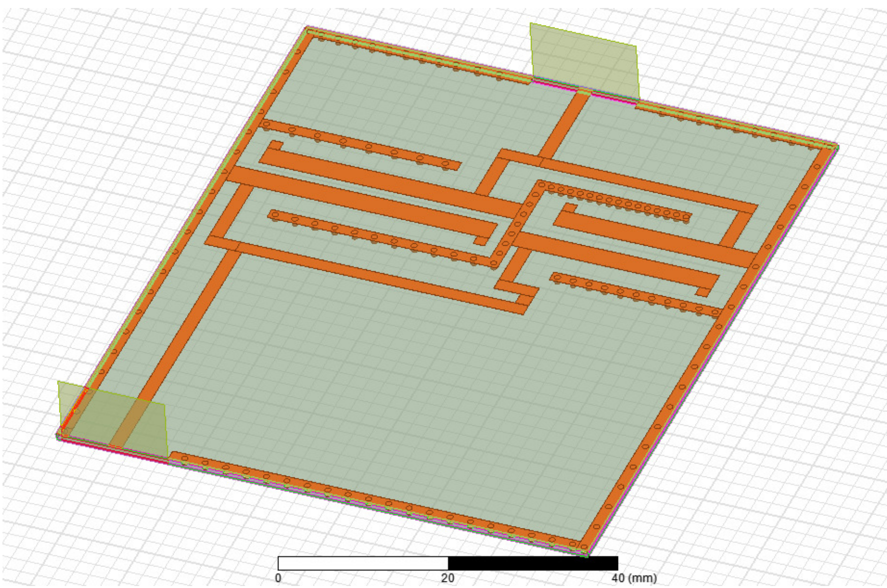

Figure 5: Microstrip filter

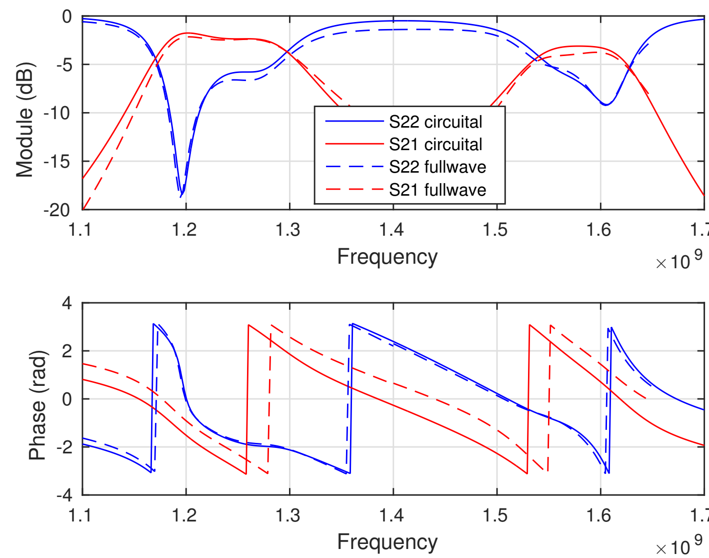

Figure 6: Tuning of the dualband filter.

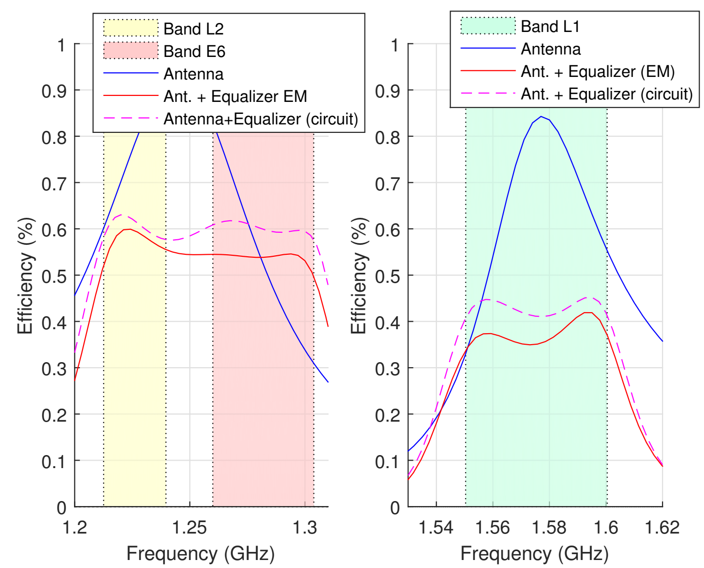

Figure 7: Efficiency comparison (circuital model vs EM)