

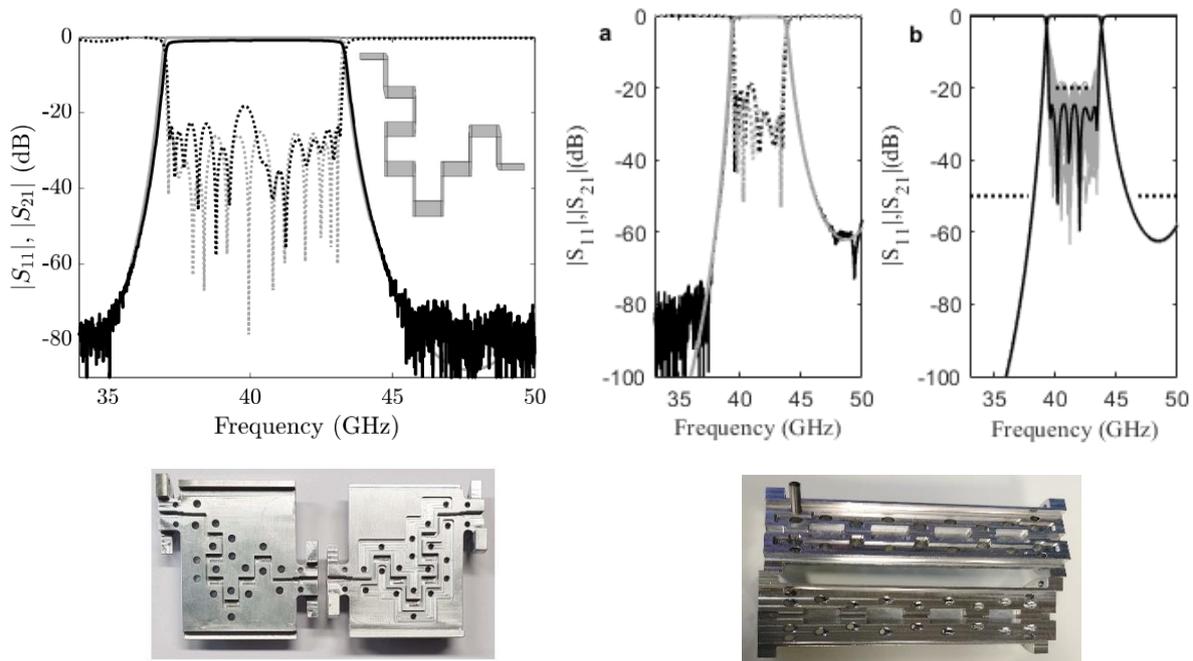


## High-Performance Stepped-impedance Bandpass Filters for Millimeter-wave Applications

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Rectangular waveguide bandpass filters (BPFs) based on the use of the first passband replica of commensurate-line stepped-impedance low-pass filters will be presented in this conference. This approach permits to bend filters as desired, adapting its layout to the available space and reducing the footprint [1]. It also allows us the design of millimeter-wave BPFs with relaxed tolerances to avoid the use of tuning screws to compensate for manufacturing inaccuracies [2].

Examples of BPFs for space applications will be presented by employing both strategies (Figure 1 and Figure 2). Moreover, practical considerations for the design and fabrication of these components will be explained at the conference to improve the frequency response of the devices. This work has been supported by the Spanish Ministerio de Ciencia e Innovación – Agencia Estatal de Investigación (MCIN/AEI/ 10.13039/501100011033) under Project PID2020-112545RB-C53 and in part by the European Union’s Horizon 2020 Research and Innovation Program under Grant 811232-TESLA-H2020-MSCA-ITN-2018.



**Figure 1.** Simulated (grey) and measured (black) response of the meandered BPF.  $|S_{11}|$  in dotted line and  $|S_{21}|$  in solid line. Photograph of the unassembled prototype

**Figure 2.** (a) Simulated (grey) and measured (black) response of the BPF robust to fabrication inaccuracies.  $|S_{11}|$  in dotted line and  $|S_{21}|$  in solid line, (b) fabrication yield results. Photograph of the unassembled prototype

1. F. Teberio et al., “Rectangular Waveguide Filters with Meandered Topology,” *IEEE Transactions on Microwave Theory and Techniques*, **66**, 8, Aug. 2018, pp. 3632-3643, doi: 10.1109/TMTT.2018.2845872.
2. A. Sami et al., “Robust Tolerance Design of Bandpass Filter With Improved Frequency Response for Q-Band Satellite Applications,” *IEEE Microw. Wirel. Compon. Lett.*, **31**, 11, Nov. 2021, pp. 1183-1186, doi: 10.1109/LMWC.2021.3090218.