In this paper, active synthetic band-stop filter (BSF) for interference rejection at 2-4, 4-8, and 8-16 GHz are presented. In the designs, a sharp notch, typically less than -50 dB for the entire frequency bands, is synthesized by subtracting the bandpass filter output from the all-pass (AP) output. The proposed synthetic notch filters allow optimization of filter dynamic range (DR) in the AP amplifier and frequency selectivity in the BPF independently, breaking the tradeoff between selectivity and DR ingrained in passive filters. In addition, the notch attenuation can be controlled independently of the filter bandwidth and center frequency tuning, providing more operational flexibility in suppressing blocker under a dynamic interference environment. The notch filters are fabricated in a 0.13-μm SiGe BiCMOS technology. The measured gain is 0-1 dB for all three filters. The 2-4 GHz notch filter shows a 12-13 dB noise figure (NF) and a -2~-1.5 dBm input 1-dB compression point (IP_{-1dB}) in the passband while drawing 20-30 mA from a 3.3-V supply. For the 4-8-GHz design, the measurement shows a 8-10-dB NF and a -1-1 dBm IP_{-1dB} in the passband at the expense of 20-27.6 mA from a 3.3 V supply. For the 8-16 GHz filter, the measured NF is 14-17 dB and the IP_{-1dB} is 0-4 dBm with a 70-90 mW dc power dissipation. The die areas are 0.68×0.72 mm^2, 0.63×0.63 mm^2, and 0.62×0.57 mm^2 for the S-band, C-band, and X-/Ku-band filters, respectively.