

A multiband 130nm CMOS second order band pass filter for LTE bands

ABSTRACT

With increasing consumer demand for wireless devices to support multiple air standards and applications, there have been increased trends for implementation multimode multiband (MMMB) devices in the RF front-end of wireless handsets. This paper presents a design of multiband band pass filter (BPF) in 130nm standard CMOS technology that can operate in 12 different LTE bands (band 1, 2, 3, 4, 5, 8, 9, 11, 18, 19, 21 and 25). The filter response is tuned by employing switched capacitors in parallel with LC resonant circuit; and Q-factor of the filter is tuned using cross-coupled differential pair connected across the resonant circuit. The gain of 30dB with maximum bandwidth of 145 MHz at 900MHz center frequency, 328MHz at 1.5GHz center frequency and 594MHz at 2GHz center frequency is achieved at 3.3V supply. The Q-factor of the filter is tunable through 2.1 to 8.1. The 1-dB compression point (P1dB), third order intercept point (IP3), and noise figure achieved are -39dBm, -25dBm and 3.83dB respectively. The designed filter has the features of less BOM count and smaller area making it suitable for integration in modern wireless applications.

Keyword: Band pass filter; Bandwidth; Gain; Multiband; Q-factor