Abstracts

SAW front-end module for GSM-based dual-band cellular phones with direct-conversion demodulation

M. Hikita, N. Matsuura, K. Yokoyama, N. Shibagaki and K. Sakiyama. "SAW front-end module for GSM-based dual-band cellular phones with direct-conversion demodulation." 2002 Transactions on Microwave Theory and Techniques 50.11 (Nov. 2002 [T-MTT] (Mini-Special Issue on the 2002 IEEE Radio Frequency Integrated Circuit (RFIC) Symposium)): 2629-2638.

Assuming direct-conversion (DC) demodulation, the required characteristics for surface-acoustic-wave (SAW) front-end modules (FEMs) have been investigated. A new FEM configuration is described that consists of not only transmitter (Tx) switching p-i-n diodes and a diplexer with low-pass/high-pass filters, but also SAW filters and baluns. A direct parallel connection between a SAW filter and a p-i-n diode makes it possible to drastically reduce the number of circuit elements. A module developed for an extended global system for mobile communications (EGSM)/digital cellular system (DCS) dual-band cellular-phone transceiver achieved insertion losses in the receiver (Rx) portions as small as 3.0 and 3.3 dB for EGSM and DCS, respectively. The Rx portions had attenuation characteristics as high as 30-40 dB at harmonic frequencies up to several gigahertz and complete differential output signals with amplitude and phase imbalances less than /spl plusmn/0.5 dB and /spl plusmn/4/spl deg/, respectively. These characteristics are particularly required for DC demodulation. Small insertion losses in the Tx portions, 1.0 and 1.2 dB for EGSM and DCS, respectively, were also obtained.

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