Abstracts

Balanced subharmonic mixers for retrodirective-array applications

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The drawback of conventional Pon retrodirective antenna systems is the requirement of a local oscillator (LO) working at approximately twice the receive frequency. This limits the use of these systems to rather moderate frequencies where such an oscillator can be obtained. To overcome this problem, a new phase conjugate mixer topology is proposed, whereby the use of a harmonic mixer instead of the conventional fundamental type effectively halves the LO frequency requirement. Another significant problem of conventional Pon phase conjugate mixers is the small spacing in frequency, typically only a few 0.1% of the carrier frequency, between RF, IF, and LO frequency. In this paper, we have overcome this problem by introducing a double balanced structure with a novel phasing strategy. The phasing circuit automatically cancels the RF and LO signal at the system's output port, giving 36-dB RF/IF, and 34-dB LO/IF isolation for a 970-MHz IF and 990-MHz RF signal. The new mixer structure proposed here is an attractive proposition for use in retrodirective antenna arrays significantly enhancing their potential for application in the millimeter-wave frequency range.

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