Abstracts

Broad-band (/spl ges/20 GHz) laser-diode-based optoelectronic microwave phase shifter

Gong-Ru Lin, Tzung-Shi Hwang, Y.-H. Chuang, S.C. Wang and Ci-Ling Pan. "Broad-band (/spl ges/20 GHz) laser-diode-based optoelectronic microwave phase shifter." 1998 Transactions on Microwave Theory and Techniques 46.10 (Oct. 1998, Part I [T-MTT]): 1419-1426.

We demonstrate a new type of broad-band microwave phase shifter with superior performance at frequencies up to 20 GHz. This is implemented by simply adding an offset voltage prior to the loop filter (LF) in a laser-diode-based digital optoelectronic phase-locked loop (OEPLL). Accurate control of the phase of microwave signals with a continuously tunable range exceeding 640/spl deg/ (/spl sim/3.6 /spl pi/) is achieved. The phase fluctuation and long-term drift of any desired phase shift are as small as /spl plusmn/0.40/spl deg/ and 0.08/spl deg/, respectively, at 20 GHz. The relative phase instability can be maintained within 0.09/spl deg/ while operating in a phase-shift-keying (PSK) scheme. We also demonstrate accurate control of relative phase difference between dual phase-locked microwave sources using the phase shifter. Our results indicate potential application of this broad-band optoelectronic phase shifter in a phased-array antenna system.

❑ Return to main document.