Abstracts

Low-loss analog and digital micromachined impedance tuners at the Ka-band

Hong-Teuk Kim, Sanghwa Jung, Kyungteh Kang, Jae-Hyoung Park, Yong-Kweon Kim and Youngwoo Kwon. "Low-loss analog and digital micromachined impedance tuners at the Ka-band." 2001 Transactions on Microwave Theory and Techniques 49.12 (Dec. 2001 [T-MTT] (Special Issue on 2001 International Microwave Symposium)): 2394-2400.

Presents new types of analog and digital micromachined impedance tuners. Analog impedance tuners using resonant unit cells realized by tunable micromachined capacitors showed a wide tuning range equivalent to almost two quadrants of the Smith chart with a maximum voltage standing-wave ratio (VSWR) of 21.2 at the Ka-band. Frequency variability is also provided through the use of J-inverters with tunable capacitors. Also presented is a digital micromachined tuner, where the short-circuited shunt stubs are loaded with microelectromechanical system (MEMS) capacitive switches. The electrical length of the stub and the overall impedance of the tuner are thus controlled according to the switching states of the MEMS capacitors. The digital tuner presented impedance ranges suitable for load impedances of the RF power transistors and showed a high maximum VSWR of 32.3. Compared with the state-of-the art tuners using field-effect transistors, micromachined tuners of this paper show superior VSWR ranges as well as wide impedance ranges. Micromachined tuners are very promising for low-loss tuning of the monolithic circuits as well as for accurate noise and power characterization.

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