RF MEMS INTEGRATION IN RECONFIGURABLE BENT MONOPOLE ANTENNA DESIGN

Pan, Helen K.[1], Atkins, Phill[2], Nair, Vijay K.[1] , Bernhard, Jennifer T.[2]

[1]Intel Corporation, JF2-86, 2111 NE. 25th Ave, Hillsboro, OR 97124
[2]ECE Department, University of Illinois at Urbana-Champaign, Urbana, IL 61801

Abstract Submission Form

2006 National Radio Science Meeting

Abstract: pan18092

Date Received: September 18, 2005

The next-generation wireless communication devices are developing toward the multifunction systems−ones that provide users with options of connecting to different wireless services for different purposes at different times [M. Brandolini, P. Rossi, D. Manstretta and F. Svelto, *IEEE Trans. Microwave Theory and Techniques*, **53**, 1026-1038, 2005]. One of these emerging technologies is *software defined radio* (SDR). With SDR, multiple signaling and modulation schemes can be implemented in software as long as the radio hardware can operate within the desired bands. Another wireless technology of the future is *multiple-input multiple-output* (MIMO) systems. MIMO technology provides dramatic increases in throughput by using multiple antennas at both the transmitter and receiver. One of the most significant challenges to the maturation of SDR and MIMO technologies is the design of antennas that can be adjusted or tuned to deliver the desired functionality over a wide range of frequencies in a variety of packages or form factors. Reconfigurable antennas are good candidates to deliver the flexibility in frequency tunability, pattern formation [G. H. Huff, J. Feng, S. Zhang and J. T. Bernhard, *IEEE Microwave and Wireless Components Lett.*, **13**, 57-59, 2003] and polarization selection [F. Yang and Y. Rahmat-Samii, *IEEE Microwave and Wireless Components Lett.*,**12**, 96-98, 2002]. In many cases, reconfigurability is achieved with RF switches placed at various locations to change the dimension of the antenna structure [W.H. Weedon, W. J. Payne and G. M. Rebeiz,*IEEE AP-S International Symposium*, **3**, 654-657, 2001] or the current distribution on the structure [F. Yang, and Y. Rahmat-Samii, *IEEE AP-S International Symposium*, **1**, 462-465, 2002].

Various RF switch technologies can be integrated in reconfigurable antenna designs such as pin diodes MESFETs and RF MEMs switches. RF MEMs switches have the best characteristics for reconfigurable antenna designs in terms of insertion loss, high frequency range and low power consumption. While most of reconfigurable antenna system designs implement hard-wired or lumped equivalent circuit model for proof of concept, the actual RF MEMs switch integration with antenna designs are not usually addressed. In this paper, we will address the RF MEMs integration factor in terms of switch location, parasitic, size and 50 ohms characteristic impedance matching. This study is based on reconfigurable bent monopole antenna that incorporates three RF MEMs switches (Teravicta Technologies, Austin TX, USA) operated in 4 bands from 1.8 to 5 GHz. Simulated and measured results of frequency switching behavior will be shown during the presentation.

1. (a)
   Helen Pan
   Intel Corporation
   JF2-86
   2111 NE. 25th Ave.
   Hillsboro, OR
   97124 USA
   helen.k.pan@intel.com
   (b) (503)264-6042
   (c) (503)264-1544

2. B - Fields and Waves

3. (a)

4. C - Contributed Paper

5. No special instructions