



INVENTORS

DR. SOHIFUL ANUAR ZAINOL MURAD
DR. RIZALAFANDE CHE ISMAIL
DR. MOHD MAZRIN MD ISA
DR. MAJKIZER MOHAMAD SHAHIMIN
DR. ASRAL BAHARI JAMBEK
DR. NORHAWATI AHMAD
AMIZA RASMI

CONTACT DETAILS

Integrated Circuits and
Systems Design (ICASE) Group,
School of Microelectronic Engineering
Kampus Pauh Putra, Universiti Malaysia Perlis,
02600, Arau, Perlis.
E-mail: sohifal@unimap.edu.my

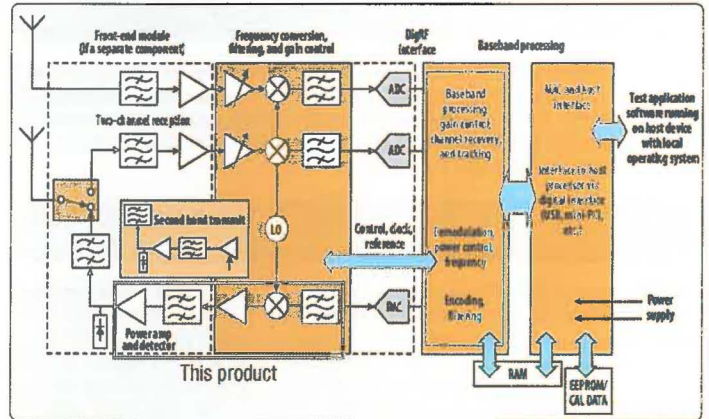
HIGH LINEARITY ON-CHIP MIXER FOR 4G LTE WIRELESS COMMUNICATION

UK COPYRIGHT No. : 284675744
NOVELTY SEARCH No. : PT4853



PRODUCT DESCRIPTIONS

The growth of 4G wireless communication system, a high performances, simple circuitry and low cost wireless transmitters are required. One of the main radio frequency (RF) circuits in the wireless communication transmitter is a mixer. The mixer linearity dominates the overall linearity in the transmitter design. This product is an up converted double balanced mixer at 5.2 GHz that offers high linearity, high bandwidth and low cost. In addition, high port-to-port isolation greatly reducing the need for output filtering to meet LO suppression requirements. This product is implemented using CMOS technology which is cost effective and can easily integrate with digital CMOS ICs to form a wireless system on chip (SoC).



Typical 4G LTE Mobile radio

NOVELTIES

- Novel circuit design (source degeneration).
- High LO-RF isolation (reduce of output filtering).

ADVANTAGES

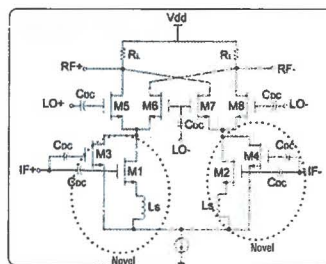
- Low cost process.
- Wide Bandwidth 500 MHz.
- High linearity +13.5 dBm.
- Low power consumption 5.4 mW.
- Low LO drive level 2.0 dBm.
- High port-to-port isolation.

APPLICATIONS

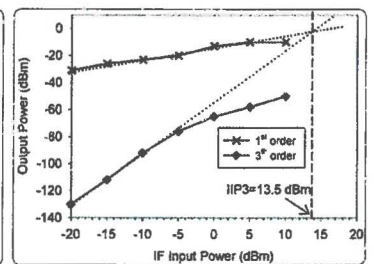
- 4G modem, cellular.
- 4G portable devices.
- WiMAX radios.
- RF Instrumentation.

COMMERCIAL POTENTIALS

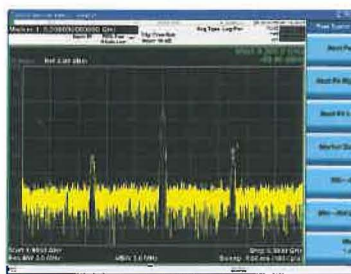
- Surface mount component.
- Integratable in a system on chip (SoC) transceiver.



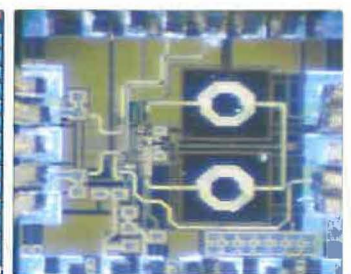
Novel Circuit Design



High Linearity Performance



RF Frequency Spectrum at 5.2 GHz



Prototype of Mixer

PUBLICATIONS

1. S.A.Z Murad, M. Mohamad Shahimin, R.K. Pokharel, H. Kanaya and K. Yoshida, "A Fully Integrated CMOS Up-Conversion Mixer with Input Active Balun for Wireless Applications", 2011 IEEE Regional Symposium on Micro & Nanoelectronics (IEEE-RSM2011) (Scopus Cited).
2. S.A.Z Murad, M. Mohamad Shahimin, R.K. Pokharel, H. Kanaya and K. Yoshida, "Linearity Improvement of 5.2-GHz CMOS Up-Conversion Mixer for Wireless Applications", Microwave and Optical Technology Letters, Vol. 54, No. 4, pp. 923-925, April 2012 (IF=0.585, Q3).