

AN OVERVIEW OF THE KEY FEATURES OF FREQUENCY SYNTHESIZERS ARCHITECTURE USED IN MULTI-STANDARD MONOLITHIC TRANSCEIVERS

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Rezumat. *Lucrarea analizează arhitecturile sintetizoarelor de frecvență utilizate în transverele reconfigurabile de bandă largă, urmărind identificarea unei arhitecturi optime pentru sintetizatorul de frecvență, ținând cont de particularitățile proiectării de radiofrecvență. Lucrarea descrie atât topologia cât și particularitățile blocurilor componente circuitului care satisface cerințele stricte ale aplicațiilor wireless. Acest deziderat este realizat de sintetizorul de frecvență fracționar bazat pe un oscilator LC de bandă largă, comandat în tensiune. Lucrarea prezintă arhitectura sintetizorului de frecvență fracționar, descrierea și analiza principalelor aspecte legate de implementarea acesteia.*

Abstract. *This paper presents the analysis on frequency synthesizer architectures used in multi-standard re-configurable wide-band transceivers, focused on finding the optimum frequency synthesizer architecture, given the wide-band RF design specifics. The paper describes both the circuit's topology and specifics of circuit's building blocks that mitigate the stringent requirement of wireless applications. The architecture of the fractional-N frequency synthesizer based on a wide-band frequency range LC Voltage Controlled Oscillator (VCO), that accomplishes this task, is presented and its key design features are described and analyzed.*

Keywords: Multi-Standard Radio Transceiver, Frequency Synthesizer

1. Introduction

The common architecture of a multi-standard reconfigurable wide-band transceiver is the quadrature direct conversion RF front-end, see Fig. 1, [1]. The receiver (RX) is a zero-IF downconverter. The RF signal is amplified by the Low Noise Amplifier (LNA) and downconverted to the baseband by mixing with a Local Oscillator (LO) signal having the same frequency, in the mixer (RXMIX) block. Subsequently, the RX Low Pass Filter (RXLPF) provides the analog channel selection, removing all out-of-band blockers and interferers. Finally, the Variable Gain Amplifier (RXVGA) boosts the wanted signal providing the optimal RX Analog to Digital Converter (RXADC) loading.

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