INTERFACING ELECTRONIC FOR MEASUREMENT, SIGNAL PROCESSING AND WIRELESS COMMUNICATION

Edited by

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Chapter 22

UWB PULSE GENERATION AND MODULATION CIRCUITS FOR BIOMEDICAL IMPLANTS

MOKHALED M., MOHAMMED, SHEROZ KHAN, JALEL CHEBIL, KHALED A. S. AL-KHATEEB, IMRAN MOEZ KHAN

22.1. INTRODUCTION

A UWB communications system consists of a number of building blocks similar to those of conventional narrow band systems. There are two main approaches to transmit data using UWB pulses. The first approach is to generate a continuous stream of pulses and modulate the pulses based on the data. The second approach is to modulate the data and then pass the modulated data through the pulse generator to generate the corresponding pulses. The latter is more popular in literature as the main focus of researchers, in general, is to minimize power consumption and following this approach the pulse generator circuit can be switched off during the idle operation period. Those to approaches are illustrated in Fig. 22.1 below:

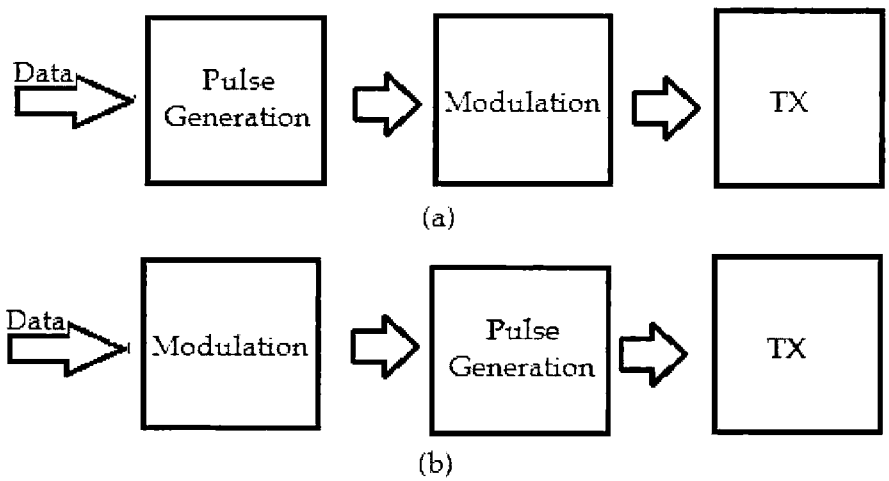

Fig. 22.1: (a). UWB system outline 1. (b) UWB system outline 2.

The FCC (The Federal Communications Commission) has set a very firm restriction on the radiation power. The bandwidth was limited to the frequency band between 3.1-10.6 GHz. The maximum emitted power was also limited to -41.3 dBm/MHz. The FCC also defined the UWB signals as the signals of 500MHz bandwidth or more. That is equivalent to a fractional bandwidth of 20 percent at the -10 dB boundary (Martel, 2001).