

INTERFACING ELECTRONIC FOR MEASUREMENT,  
SIGNAL PROCESSING AND WIRELESS  
COMMUNICATION



Edited by

Sheroz Khan, International Islamic University Malaysia

AHM Zahirul Alam, International Islamic University Malaysia

Anis Nurashikin Nordin, International Islamic University Malaysia



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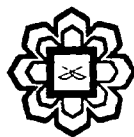
# **INTERFACING ELECTRONIC FOR MEASUREMENT, SIGNAL PROCESSING AND WIRELESS COMMUNICATION**

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## Chapter 24

# UWB PULSE GENERATION FOR BIOMEDICAL IMPLANTS

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

UWB pulse generation is one of the most challenging aspects of UWB communications, given the short duration and the tight requirements set by the FCC. This chapter provides a description of the requirements in UWB pulses, the preferred UWB pulse shape, and a description of common pulse generation techniques for low power applications.

### 24.1. INTRODUCTION

The process of generating UWB pulse is a very crucial part of the UWB communications system. Pulses have to be very short (sub-nanosecond) to satisfy the conditions of UWB. The generation of such short pulses requires components which can operate at very high frequencies. The main characteristics of the signal were set by the FCC in 2002.

The FCC is the Federal communications commission in the United States of America which is responsible for regulating the national and international communications in the states. The FCC regulations have been adopted by international researchers because it was the first regulation for UWB open usage for commercial purposes. Other regulatory bodies and the ITU-R are working on international recommendations for UWB. A somewhat similar regulation was set in Japan and in the UK.

The FCC has set very firm restriction on the radiation power as shown in Fig. 24.1. The FCC also defined the UWB signals as the signals of 500MHz bandwidth or more, which corresponds to a fractional bandwidth of 20 percent at the -10 dB boundaries (Martel, 2001).