

# Iterative Frequency-Domain Packet Combining Techniques for UWB Systems with Strong Interference Levels

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**Abstract** UWB (Ultra Wideband) systems tend to suffer strong interference from signals that occupy a significant part of the transmission band. This is an important constraint, especially when the channel remains fixed for a long period of time. In order to overcome this limitation, this paper considers UWB systems employing Single-Carrier with Frequency-Domain Equalization techniques. We propose the corresponding receiver, which also allows the soft packet combining associated to different Automatic Repeat ReQuest transmission attempts, as a measure to improve the performance through the exploitation of diversity. Our techniques are able to cope with strong interference levels as well as deep fading, even for fixed channels.

**Keywords** ARQ techniques · Soft combining · Single-carrier modulations · Interference mitigation · Frequency-domain equalization · Ultra wide band systems

## 1 Introduction

UWB (Ultra Wideband) signals are characterized by bandwidths that can exceed 25 % of the central frequency of the spectrum [1]. Moreover, the low transmit powers combined with the

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