

# DUAL GSM/WLAN MOBILE TERMINAL: MODEL BUILDING AND ITS VALIDATION

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Cet ouvrage présente les principes de modélisation d'une station mobile qui fonctionne simultanément dans un réseau locale wireless (WLAN) 802.11b pour une transmission des données et dans une réseau GSM pour une transmission vocale, aussi que le modèle élaboré. On utilise la représentation à la machine d'état fini d'un station mobile avec seulement un bloc récepteur et un bloc émetteur. On rapporte aussi la validation du modèle dans un réseau simulé.

*Mots-clés:* GSM; réseau WLAN 802.11; modélisation; simulation

## 1. INTRODUCTION

The present paper is intended for the modelling of a mobile terminal operating simultaneously in a wireless 802.11b local area network (WLAN) for a data traffic and in a GSM network for a voice communication (DualSTA). The model uses a finite state machine representation of the mobile terminal that has one single receiver and one single transmitter, thus not being possible receiving and/or transmitting simultaneously in both of the networks. The simultaneous communications in both of the networks is only apparent to the user; actually, the communications take part separately in interleaved disjoint time slots.

The paper is organized as follows: in the first part the GSM features are summarized and a Simulink stateflow model is presented for the GSM part of the DualSTA. Then the relevant 802.11b standard specifications are introduced and Simulink stateflow model is presented for the WLAN part of the DualSTA. Necessary interactions between the two parts and their caption into the model are also described. Finally, the operational checking of the model in a simulated network environment is made and the results are analyzed.

## 2. OVERVIEW OF THE GSM SPECIFICATIONS

There are very strict rules [1] of communications in a GSM network and every communication entity is required to unconditionally obey them. The two disjoint equal frequency bands allocated for the GSM networks are divided in 200 KHz narrowband channels. The full duplex feature of a communication is