

# CREW: LTE/LTE-A testbed

## Introduction

The LTE/LTE-Advanced (LTE-A) testbed, developed by the Vodafone chair Mobile Communications Systems at TU Dresden, is an experimental wireless testbed to study cognitive radio (CR) in cellular systems, specifically physical layer aspects of LTE OFDM (4G) and candidate waveforms for future 5G cellular systems. The testbed is both, indoor and outdoor, and consists of up to two base stations and three user equipment devices. Its LTE-like cellular infrastructure allows to measure relevant network parameters, such as bit error rates, outage events, throughput or latency. Up to two base stations can reside at rooftop level at TU Dresden's faculty of Electrical Engineering and Information Technology.



Figure 1 LTE-LTE-A testbed equipment: a) mobile test UE, b) base station equipment, c) UE lab equipment.

## Typical Scenarios

A typical scenario for experiments in the LTE-LTE-A testbed is the experimental study of cognitive access of LTE and/or 5G in license-exempt spectrum bands, in particular in TV white space. Other scenarios include the evaluation of cognitive access in LTE licensed band for machine-type communication (e.g. smart meters) as well as dynamic spectrum load balancing using cognitive access. For these scenarios, the spectrum access in the testbed can be variably configured and different LTE load scenarios are feasible.

## Setup

In order to carry out experiments, a user of the LTE/LTE advanced testbed can install own equipment either in the laboratory or in a bicycle rickshaw for outdoor use (230V power supply available). GPS receivers are provided for position tracking and time synchronization.

The LTE network parameters are constantly monitored and recorded. The CR transceivers can be dynamically enabled, such that the LTE performance parameters are compared for the non-CR with the CR case. This allows benchmarking the impact of various cognitive radio schemes on the primary system.

## How to get started?

More information about how to use and to configure the LTE testbed is available at the [CREW-Portal](#), during the training days, through a demonstration video or via E-mail [crew@ifn.et.tu-dresden.de](mailto:crew@ifn.et.tu-dresden.de).