

Abstract

Nowadays it is a typical trend to use more and more wireless communication systems. The former wired communication technologies are gradually replaced with wireless solutions in many applications, since there are low-priced devices, that we can easily connect to each other in a communication network, but they were not used in wireless systems a few years ago. Today in a smart home almost all the electronic devices are part of a wireless network, from the household appliances to the simple light switches. These networks perform controlling and monitoring functions too. It is an evident idea to organize the meters in a wireless network, which can facilitate the work of the utility companies with the possibility of remote meter reading. Furthermore the customers can get real datas of their consumer habits. There are smart meter projects worldwide, that make the remote reading of the meters, but unified standards are missing and compatibility problems can occur.

In my thesis I had to design and develop the hardware elements of a wireless smart meter network, that provides the same interface to the different types of meters. The system consists of two main type of hardware: smaller communication modules, which are installed next to the meters, and a gateway module, which is the concentrator of the network. A large number of communication modules can be found in a network, and their main function is to send the read measurement datas to the gateway through the radio link. The gateway unit manages the collection and transmission of these datas to a server, which represents the utility company.

I start my thesis with a survey in the subject of wireless communication protocols and their comparison. Then I continue with the development of the detailed specification, and I describe the specification for the functional subsystems. I implement these functions on separate boards and present the entire design process of each unit. The main steps of designing a hardware are as follows: component selection, schematic design, PCB (Printed Circuit Board) design and the production of the PCB. After the successful power-up tests on the manufactured boards, I present the testing methods of the basic features.