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Measurement method for construction of the radio environment maps supporting cognitive radios

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Abstract: In the paper we discuss the issue of creation of Radio Environment Maps (REM). In the literature REMs are considered as an enabler for the spectral awareness and support cognitive radios and frequency management systems. We present the functional architecture of the system and describe the role of main components. Next, we present the problem of the map creation. We describe the most suitable interpolation techniques and analyze their complexity. Some interpolation techniques require high computational power and consequently created maps better reflect the signal level. Next, we focus on the problem of measurements of the signal level in sensor networks. In the literature on the topic the sensor network usually is composed of many of sensors deployed within the area of a few square kilometers. Density and regularity of sensors arrangement impacts the quality of maps. On the other hand, the number of sensors used for tests conducted in a real environment usually is significantly limited. We discuss the problem how to model the sensor network and we describe the method which we used to measure the signal level in the sensor network operating in VHF/UHF bands in scenarios with one transmitter and two simultaneous transmitters. The received signal level measured by sensors was used as an input data for the interpolation and then maps were created for the Zegrze area. The quality of maps was assessed in terms of the correctness of the signal level estimation and transmitter localization.

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