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Verification of the criterion and measures of interferences used in radio planning systems

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Abstract: One of the main concerns of the institutions dealing with the spectrum management as well as persons responsible for radio networks planning is the lack of electromagnetic resources. This is caused by various reasons. On the one hand, there is a very rapid increase in the number of radios used in modern military platforms. Another factor connected with it is the fact that modern radio communications systems, in order to meet the users' requirements, e.g. to be able to transmit video streaming in a real time, need wideband transmission channels. On the other hand, current static methods cause substantially suboptimal spectrum management. An average level of the spectrum resources utilization in a frequency band from 30 MHz to 2000 MHz very rarely exceeds 15%. Contemporary tools for frequency planning use so called Interference Conflict Margin (ICM). It is a measure of the protection against interference from potentially disrupting transmitter at receiver side. But ICM do not take into account features of the modern radios which have anti-interference mechanisms implemented. Since modern radios adjust modulation and coding schemes to the current state of the radio channel, these features should be taken into account. The same applies to the range of the network and level of power necessary to maintain communications. In this point, the protection criterion should be defined similarly to the protection ratio in ITU-R BT.1368, ITU-R P.372-9 documents. Another important factor is to take into account the way how considered radio network works. Is there only voice communications or data? In the second case, it is also important to determine the minimum transmission rate. In this paper a more flexible approach is presented. Adaptive modulation and coding schemes as well as power levels are taken into account. Presented results of experiments and simulations show benefits arising from proposed approach.

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