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A Wireless Covert Channel Based on Dirty Constellation with Phase Drift

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Abstract: Modern telecommunications systems require the use of various transmission techniques, which are either open or hidden. The open transmission system uses various security techniques against its unauthorized reception, and cryptographic solutions ensure the highest security. In the case of hidden transmissions, steganographic techniques are used, which are based on the so-called covert channels. In this case, the transparency and stealth of the transmission ensure its security against being picked up by an unauthorized user. These covert channels can be implemented in multimedia content, network protocols, or physical layer transmissions. This paper focuses on wireless covert channels. We present a novel method of steganographic transmission which is based on phase drift in phase-shift keying or quadrature amplitude modulation (QAM) and is included in the so-called dirty constellation techniques. The proposed approach is based on the drift correction modulation method, which was previously used in the watermarking of audio-signals. The developed solution is characterized by a variable bit rate, which can be adapted to the used modulation type and transmission conditions occurring in radio channels. In the paper, we present the method of generating and receiving hidden information, simulation research, and practical implementation of the proposed solution using the software-defined radio platform for selected QAM.

Keywords: [wireless communications](#), [covert channel](#); [steganography](#), [steganalysis](#), [dirty constellation](#), [wireless postmodulation steganography](#), [phase drift](#), [drift correction modulation](#), [undetectability](#), [security](#), [quadrature amplitude modulation](#)

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