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Development of a universal receiver dedicated to UWB system based on M-OAM modulation

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The communication plays decisive role in the evolution of the transport domain, and during the last years, a request to have the safest and most efficient transport has been expressed by the users of transport. The adoption of the technique ultra wideband (UWB) satisfies such a need. UWB offers numerous advantages, such as bandwidth offered, the flexibility of the signals, the quality of service, the transmission power and the limited cost. The implementation of the new modulation M-OAM (Orthogonal Amplitude Modulation) which is based on the use of original mathematical tools called Modified Gegenbauer function (MGF) increases the data rate flow and enhances the robustness ensured by UWB communication for multimedia and transports applications. With the purpose of improving the functioning of our system and ensuring the very high data rate, our work consists in developing a more adapted and efficient universal receiver which is able to detect the arrival of the signal so as to identify the parameters used in the transmission in order to adapt itself to it automatically. It is a receiver which requires intelligent capacities of observation, learning and decision, therefore, our conception will be based on the concept of the cognitive radio; it is characterized by capacity of detection of the presence of the signal. In this paper, we present the principle of the modulation M-OAM, the waveforms used in our system, and the method which allows the receiver to identify the type of the used modulation.

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Modulation diversity to control the effects of fading in wireless channels

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The wireless channel suffers from attenuation and multipath fading, which result from multipath transmission, and also from propagation effects, that include reflection, diffraction and scattering. Multipath fading is a major cause of performance degradation in mobile communications systems. Modulation diversity is a bandwidth-efficient diversity technique that consists of the rotation of a digital signal constellation, associated with the interleaving between the in-phase and quadrature components. It is intended to reduce the effects of fading in wireless communications. In this presentation a scenario is considered in which multiple paths are simulated, with associated random multiplicative noise and delay. The evaluation of the multipath fading effect in this scenario is done by comparing BER values for 4-PSK and 8-PSK transmissions, to obtain the gain provided by the modulation diversity. An analysis of the optimum rotation angle is provided, which consider several multipath scenarios, and include cases with a more severe fading effect.

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