

Green Coexistence for 5G Waveform Candidates: A Review

There is a growing demand for 5G applications in all fields of knowledge. Current applications, such as the Internet of Things, smart homes, and clean energy, require sophisticated forms of 5G waveforms. Researchers and developers are investigating the requirements of 5G networks for better waveform types, which will result in high spectrum efficiency and lower latency with less complexity in systems. This paper proposes an assessment of various 5G waveform candidates [filtered orthogonal frequency-division multiplexing (OFDM), universal filtered multicarrier (UFMC), filter bank multicarrier (FBMC), and generalized frequency-division multiplexing] under the key performance indicators (KPIs). This paper assesses the main KPI factors (computational complexity, peak-to-average-power ratio, spectral efficiency, filter length, and latency). Moreover, this paper compares and evaluates all KPI factors in various 5G waveforms. Finally, this paper highlights the strengths and weaknesses of each waveform candidate based on the KPI factors for better outcomes in the industry. In conclusion, the current review suggests the use of optimized waveforms (FBMC and UFMC) for better flexibility to overcome the drawbacks encountered by previous works. Regarding coexistence, FBMC and UFMC showed better coexistence with CP-OFDM in 4G networks with a new radio spectrum. The rapprochement between the above-mentioned waveforms has been called green coexistence and is due to the mix between one waveform in 4G networks and two waveforms in 5G networks based on the subcarrier and subband shaping (FBMC and UFMC).