07WA128 PSD estimation in Cognitive Radio systems: a performance analysis

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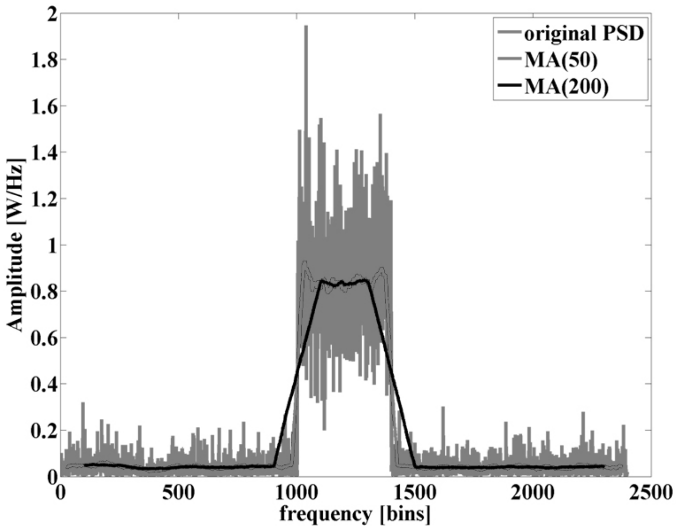
Nowadays, radio systems have to use the spectrum resource more intensely than in the past to meet the demanding expectations of the users. Several studies have demonstrated that portions of radio spectrum are not in use for significant periods of time. Cognitive radios systems have been conceived to overcome this limit, enabling a flexible spectrum allocation, and making a more intensive and efficient spectrum use by the users sharing spectrum access. To meet this goal, cognitive radio terminals have to dynamically select the appropriate operating frequency based on the sensing of signals from other transmitters. This capability is usually called frequency agility. In this framework the authors have already proposed a measurement method able to meet the frequency agility requirement. It is based on two sequential steps: the former performs the spectrum sensing, while the latter selects an operating frequency for the terminal that minimizes potential interference with a primary user. The paper focuses the attention on the improvement of the first step. Several power spectrum estimation methods are investigated in order to simplify the spectrum sensing stage, especially in terms of overall computational burden, without worsening the algorithm performance.
Keywords-Power spectrum, PSD estimation, spectrum sensing, cognitive radio.



Effect of the trace smoothing. The original PSD has been acquired considering a SNR equal to 5 dB.

07WA143 On compressed sensing and super-resolution in DFT-based spectral analysis

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The paper discusses a novel frequency interpolation and super-resolution method for multitone waveform analysis, where a compressive sensing algorithm is employed to process data. Each signal acquisition involves a short data record, whose DFT coefficients are computed and summed to obtain a single scalar quantity. A set of compressive measurements is obtained by taking records with different known starting instants, and employed to determine, by solving an l1-l2 convex problem, the set of frequency components of the analysed waveform. Interpolation is presented as a compressive sensing problem and algorithm performances discussed.