

Implementation of Spectrum Sensing Algorithm Based on Television White Space Scenarios for Spectrum Aggregation Applications

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Abstract: With the proliferation of mobile devices and diverse mobile applications, wireless operators are experiencing phenomenal growth in the demand for mobile services around the world. These demands have led to the technological responses such as the advancement in radio access, coding and modulation schemes as well as spectrum (carrier) aggregation and cognitive radio capabilities. The aspect of spectrum or carrier aggregation uses cognitive radio technology that implements the dynamic spectrum access for spectrum utilization by sensing and using the underutilized spectrum on co-primary basis without interference to the primary users. In this work, an energy-based, non-parametric TVWS spectrum sensing algorithm was implemented in MATLAB environment. The developed sensing algorithm was aimed at finding free TVWS frequency channel(s) that would be used during spectrum aggregation of channels from TVWS and LTE-A spectrums. The chosen free channel would be configured as the component carrier two (CC2) at the configuration management platform of the TVWS eNode B. The result showed the instantaneous TV channels statuses; free, busy and interfered by computing the PSD expressed in dB while the estimated received power level in dBm for free channels was computed for the UHF range from channel 21 through channel 69. The detectable TV signals' threshold value was set at -114 dBm. In the ten simulation five cycles carried out, the developed algorithm instantaneously selected channels: 68,34,48,60 and 28 corresponding to the centre (carrier) frequencies of 850MHz, 578MHz, 690MHz, 786MHz and 530MHz, would be dynamically configured as the component carrier two (CC2) in the TVWS eNode Bs during spectrum aggregation process.

Keywords: LTE-A, PSD, TVWS, UHF

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