LIST OF FIGURES

Figure 1.1. Spectrum hole in cognitive radio 1
Figure 2.1. OFDM Diagram 5
Figure 2.2. A conceptual illustration of spectrum holes over time and frequency 7
Figure 2.3. The hidden terminal problem occurs when a CR user experiences shadowing or lies outside coverage area of the transmitter of a primary user (licensed user) 8
Figure 2.4. Hypothesis test and possible outcomes with their corresponding probabilities 9
Figure 2.5. Primary transmitter detection 10
Figure 2.6. Transmitter detection problem: (a) receiver uncertainty and (b) shadowing uncertainty 13
Figure 2.7. Cooperative transmitter detection under highly faded and shadowed environment 13
Figure 2.8. Cooperative transmitter detection using fusion center 14
Figure 2.9. Collaborative spectrum sensing 14
Figure 2.10. Primary receiver detection 15
Figure 2.11. Interference temperature management 16
Figure 2.12. An OFDM Block. A CP of Tc symbols is copied in front of the data Block 16
Figure 2.13. Parallel topology with fusion center used for distributed signal processing 19
Figure 2.14. Data distribution at each sensor under hypotheses H_1 and H_0, and confidence regions. Threshold is indicated by T. The intervals $(-\infty, T_L)$ and (T_U, ∞) are designated "confidence" regions. Interval (T_L, T_U) is designated "no confidence" region 20
Figure 2.15. Data distribution at each sensor under hypotheses H_1 and H_0, and confidence regions 21
Figure 3.1. System configuration of distributed detection 24
Figure 3.2. Data distribution at each sensor under hypotheses H_1 and H_0 and confidence regions 25
Figure 3.3. The Process Flow of Detection System Model 30
Figure 4.1. Distribution data of detection result by single local detector at SNR= -10dB 31
Figure 4.2. Distribution data of detection result by single local detector at SNR= 0 dB 32
Figure 4.3. ROC graphic of detection result by single local detector at SNR= -10dB 32
Figure 4.4. ROC graphic of detection result by single local detector at SNR= 0 dB 33
Figure 4.5. ROC graphic of detection result by single detector with various SNR 33
Figure 4.6. Probability of detection by single local detector with various SNR 34
Figure 4.7. ROC of global decision with 32 local detectors 34
Figure 4.8. ROC of global decision with various number of local detectors at SNR=-10dB 35
Figure 4.9. ROC of global decision with various SNR 35
Figure 4.10. Probability of detection of global decision with various number of local detectors at SNR= -10dB 36
Figure 4.11. Probability of detection of global decision with various number of local detectors and SNR 36
Figure 4.12. ROC of global decision using SDC and HDC at SNR = -10dB 37
Figure 4.13. Probability of detection of global decision with various SNR using HDC and SDC 37
Figure 4.14. ROC of global decision using SDC, HDC, and HDC 2-bit at SNR = -10dB 38
Figure 4.15. Probability of detection of global decision with various SNR using SDC, HDC, and HDC 2-bit 39
Figure 4.16. Probability of detection of global decision with various number of local detectors using SDC, HDC 1-bit, and HDC 2-bit 40