

論文 / 著書情報
Article / Book Information

題目(和文)	
Title(English)	Highly Reliable Wireless Communication Schemes on Shared Frequency Bands
著者(和文)	宗秀哉
Author(English)	Hideya Sou
出典(和文)	学位:博士(工学), 学位授与機関:東京工業大学, 報告番号:甲第11942号, 授与年月日:2021年3月26日, 学位の種別:課程博士, 審査員:府川 和彦,植松 友彦,山田 功,山岡 克式,松本 隆太郎
Citation(English)	Degree:Doctor (Engineering), Conferring organization: Tokyo Institute of Technology, Report number:甲第11942号, Conferred date:2021/3/26, Degree Type:Course doctor, Examiner:,,,,
学位種別(和文)	博士論文
Category(English)	Doctoral Thesis
種別(和文)	要約
Type(English)	Outline

Highly Reliable Wireless Communication Schemes on Shared Frequency Bands

Hideya So

Outline

This thesis proposes wireless communication schemes to improve the reliability when multiple wireless systems share the same frequency bands. To realize the highly reliable wireless communication, wireless communications in the licensed spectrum are promising but take a lot of costs. Since wireless communications in unlicensed spectrum are superior in terms of cost, this thesis focuses on the shared bands. The dynamic spectrum sharing (DSS), which shares the radio resources with multiple wireless systems, has been investigated and can improve frequency efficiency more drastically. Since multiple wireless systems share the same frequency bands, the interference from their own systems and other systems degrades the performance of highly reliable wireless communication. In order to improve the reliability of the wireless communication on the shared frequency bands, this thesis proposes and discusses the following techniques: 1) The metric-combining multiuser detection scheme employing RTS and enhanced CTS, which can decrease the transmission delay time with decentralized control: 2) The immediate transmission scheme for emergency packets, which can increase the system throughput without disturbing non-emergency packets: 3) The blind adaptive array with transmission power control, which can suppress the interference from unknown systems even when the received power of the interfering signal is almost the same as that of the desired signal: 4) The duplicate transmissions via multiple frequency channels, which can improve the reliability by exploiting the multiple channels: 5) The spectrum sensing scheme measuring packet lengths, which can measure the usage of the other systems more accurately: 6) The multiband antenna with multiple meta-material reflectors for the small antenna placement, which can reduce the size of the multiband antenna. Individual computer simulations and measurements demonstrate the effectiveness of the above-mentioned techniques and clarify the potential to realize the highly reliable wireless communication.