University of Victoria | Graduate Studies

Notice of the Final Oral Examination for the Degree of Master of Applied Science

of

CONGZHI LIU

BEng (Shanghai Jiao Tong University, Shanghai, China, 2009)

"Design and Analysis of Multi-antenna and Multi-user Transmitted Reference Pulse Cluster for Ultra-wideband Communications**"**

Department of Electrical and Computer Engineering

Wednesday, April 29, 2015
10:00 A.M.
Engineering Office Wing
Room 430

Supervisory Committee:
Dr. Xiaodai Dong, Department of Electrical and Computer Engineering, University of Victoria (Supervisor)
Dr. Lin Cai, Department of Electrical and Computer Engineering, UVic (Member)

External Examiner:
Dr. Yvonne Coady, Department of Computer Science, UVic

Chair of Oral Examination:
Dr. Brendan Burke, Department of Greek and Roman Studies, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies

Abstract

Antenna diversity for transmitted reference pulse cluster (TRPC) can mitigate the multipath interference and thus greatly improve the BER performance. Different receiver and transmitter diversity schemes have been studied in this thesis, including equal gain combining (EGC), selection combining (SC), delay combining and direct sum. By numerical analysis and simulation, the BER performance of many difference diversity schemes have been compared. For receiver diversity, selection based on simplified log likelihood ratio (SLLR) is the best candidate in terms of implementation complexity and also has the best performance with 2 receivers. For more than 2 receivers, EGC has the best performance at the cost of extra power consumption. For transmitter diversity, selection based on simplified channel quality indicator (SCQI) turns out to be the best choice considering both complexity and performance. In addition, we have also proposed a new multi-user downlink scheme, pulse pattern TRPC, which shows significant performance gain over time division TRPC.