

A Fully Distributed Coordination Scheme Based on Orthogonal Requests and Responses

Seungkwon Cho***, Sungcheol Chang*, Youngnam Han**

* ETRI(Electronics and Telecommunications Research Institute), Korea

** Department of Electrical Engineering, KAIST(Korea Advanced Institute of Science and Technology), Korea
skcho@etri.re.kr

Abstract—Device-to-device (D2D) communication is a communication technology that enables one device to transmit data directly to the other device in proximity instead of conveying data via infrastructure. Without the coordination of infrastructure, multiple access for D2D communication is performed in a distributed manner. Even though contention-based distributed multiple access scheme is widely adopted in the existing D2D systems, the excessive contention overhead with a large number of devices makes contention-based scheme lose scalability. In this paper, we present the rationale behind the design of a new fully distributed multiple access scheme based on contention-free resource request and response message exchange, which is proposed for IEEE 802.15.8. Through the results of simulations with full buffer and VoIP traffic model, we show that the presented scheme achieves scalability with the help of orthogonal requests and responses.

Keyword— D2D, Multiple access, Distributed Scheduling, IEEE 802.15.8, PAC.



Seungkwon Cho received the B.S. degree in electronics engineering from Pusan National University, Pusan, Korea, in 1992, and the M.S. degree in information and communication engineering from Gwangju Institute of Science and Technology (GIST), Gwangju, Korea, in 2001, respectively. He is with the Electronics and Telecommunications Research Institute (ETRI) as a senior member of engineering staff and with the department of electrical engineering of Korea Advanced Institute of Science and Technology (KAIST) as a Ph.D. candidate. He is currently participating in IEEE 802.15.8 Task Group PAC(Peer Aware Communication) as a secretary pro tem. His research interests are in the area of resource allocation in wireless networks.



Sungcheol Chang received the B.S. degree in electronics engineering from Kyungpook National University, Daegu, Korea, in 1992, and the M.S. and Ph. D. degrees in electrical engineering from Korea Advanced Institute of Science and Technology (KAIST), Taejeon, Korea, in 1994 and 1999, respectively. He is currently a principal member of engineering staff at the Electronics and Telecommunications Research Institute (ETRI). His current research interests are in the areas of protocols in cellular system and distributed systems.



Youngnam Han received his B.S and M.S. in Electrical Engineering from Seoul National University in 1978 and 1980, respectively. He received his Ph.D. from the University of Massachusetts, Amherst in 1992. He had been working as a principal engineer at ETRI during 1992 to 1997 managing the project of design and performance analysis of radio transmission technology for DCN, PCS and IMT2000. He was actively engaged in R&D for IS95 digital cellular system in Korea deployed nationwide in 1995 and as a member for IMT2000 standards activities as a delegate at ITU-R representing Korea. He joined ICU as a faculty since 1998, and was a principal engineer at Qualcomm, Inc. San Diego during 2001~2001, where he worked on the standards cdma20001xEV. He had been served many conferences as a TPC member and organizing chairs. And TPC chair for VTC2003 Spring. He had been a Chairman of BoG, IEEE VTS APWCS (Asia Pacific Wireless Communication Symposium) during 2009~2010. He will serve as a general chair for VTC2014 Spring in Seoul. He is currently with the Department of Electrical Engineering at KAIST as a Professor. His research interests include performance evaluation of mobile communication systems, radio resource management, optimization of mobile systems operations and cognitive radio systems. He is a recipient of a best paper Award in IEEE VTC2000, Tokyo. He is a life-long member of KICS, and a senior member of IEEE. Since June 2013, He has been working as Chair, Steering Committee, 5G Forum in Korea.