

WWVC 2013

Abstract:

On 20 MHz Channel Spacing for V2X Communication based on 802.11 OFDM

In this semi-tutorial talk, we will examine the use of a larger channel spacing than 10 MHz for vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communication, collectively referred to as V2X communication, based on the IEEE 802.11 OFDM physical layer. The main advantage of shifting to 20 MHz channel spacing is reduced congestion, which will reduce, or even eliminate, the need for congestion control algorithms. The tutorial parts of the paper will review basic OFDM design rules, summarize the reported values of important V2X channel properties (path-loss, delay spread, Doppler spread), and explain the current frequency allocation in Europe and the US. The novel parts of the talk will verify that the OFDM design rules are satisfied and quantify the performance of 10-MHz and 20-MHz systems through computer simulations. It is shown that a 20-MHz system will outperform a 10-MHz system.

Bio:

Erik Ström, Chalmers University of Technology

Erik G. Ström (<https://sites.google.com/site/erikgstrom/>) received the M.S. degree from the Royal Institute of Technology (KTH), Stockholm, Sweden, in 1990, and the Ph.D. degree from the University of Florida, Gainesville, in 1994, both in electrical engineering. He accepted a postdoctoral position at the Department of Signals, Sensors, and Systems at KTH in 1995. In February 1996, he was appointed Assistant Professor at KTH, and in June 1996 he joined Chalmers University of Technology, Gothenburg, Sweden, where he is now a Professor in Communication Systems since June 2003. Dr. Ström currently heads the Division for Communications Systems, Information Theory, and Antennas at the Department of Signals and Systems at Chalmers and leads the competence area Sensors and Communications at the traffic safety center SAFER, which is hosted by Chalmers. His research interests include signal processing and communication theory in general, and constellation labelings, channel estimation, synchronization, multiple access, medium access, multiuser detection, wireless positioning, and vehicular communications in particular. Since 1990, he has

acted as a consultant for the Educational Group for Individual Development, Stockholm, Sweden. He is a contributing author and associate editor for Roy. Admiralty Publishers FesGas-series, and was a co-guest editor for the Proceedings of the IEEE special issue on Vehicular Communications (2011) and the IEEE Journal on Selected Areas in Communications special issues on Signal Synchronization in Digital Transmission Systems (2001) and on Multiuser Detection for Advanced Communication Systems and Networks (2008). Dr. Ström was a member of the board of the IEEE VT/COM Swedish Chapter 2000--2006. He received the Chalmers Pedagogical Prize in 1998 and the Chalmers Ph.D. Supervisor of the Year award in 2009.