Radio Propagation Characteristics in the Large City and LTE protection from STL interference

YoungKeun Yoon, JongHo Kim, MyoungWon Jung, YoungJun Chong

Radio Technology Research Department, ETRI, Republic of Korea

ykyoon@etri.re.kr, jonghkim@etri.re.kr, mwjung@etri.re.kr, yjchong@etri.re.kr

***(Pt9)Abstract*— This paper describes composite propagation effects of both the median pathloss and shadow fading in the large city. In general, the propagation characteristic for the power profile of received signal has the relative power reduction and fluctuation according to distance to the receiver's location far away from the transmitter. The result of these channel propagation losses is due to the reduction of electric field in the air according to the separated distance between a transmitter and receiver, and due to the multipath effect such as the plane reflection and edge diffraction of the propagated radio signals at the plane of buildings and roads or vehicles etc. Propagated multipath radio signals via different paths may be simultaneously received to a target receiver with different field strength and phases. Actually, it is not easy to how to predict the optimum radio propagation characteristics in the large city from a transmitter to target receiver at the specific mobile or fixed communication link, because the outdoor environment have the different height of transceivers and various structure factors such as buildings, roads, and vehicles in the large city including the urban, suburban and rural area. Therefore, the measurement is currently candidate solution for predicting the radio propagation characteristics in the novel environments. In this paper, two different stations between a fixed and mobile station are considered. Measurement results are compared with the general radio propagation model of 3GHz frequency and lower. As another issue, we discuss and propose on the closed form of the interfering received signal strength intensity when two different stations like a fixed system as the repeater and a mobile system as Long Term Evolution coexist in the same area. In the coexisting environment, two different stations overlap the cell coverage and are assigned in the adjacent channel frequency. Therefore, the potential interference may cause to their reception each other. Here, it is important to analyze the interference impact to the victim station as a receiver from the interfering station as a transmitter to get out of the interference. In this paper, it is assumed that an interfering station as a transmitter is fixed repeater and a victim station as a receiver is a mobile Long Term Evolution system. For estimating interfering received signal strength intensity, it is issued to figure out a radio propagation characteristic. However, it is unknown for the available median pathloss model to apply for analyzing the performance of Long Term Evolution system from interfering fixed repeater in the large city with none line of sight in the coexisting environment. Finally, we propose the median pathloss characteristic from measuring the electric field strength of a fixed repeater as an interfering transmitter and calculated interfering received signal strength intensity to a victim station. Using both the measurement and the theoretic calculation results, the separated distance between an interfering transmitter and victim receiver is discussed for the protection of a victim station.instructions give you guidelines for preparing papers for IEEE TRANSACTIONS and JOURNALS. Use this document as a template if you are using Microsoft *Word* 6.0 or later. Otherwise, use this document as an instruction set. The electronic file of your paper will be formatted further at IEEE. Define all symbols used in the abstract. Do not cite references in the abstract. Do not delete the blank line immediately above the abstract; it sets the footnote at the bottom of this column.**

***(Pt9)Keyword*—interference, wave, pathloss, fading**

YoungKeun Yoon received B.S, M.S, and PhD degrees in radio engineering from National Chungbuk University, Korea, in 1997, 1999, and 2007, respectively. Since 2000, he has been working Electronics and Telecommunications Research Institute (ETRI). He has been involved in the research of radio resource management and propagation since 2003. His main interests are radio propagation and spectrum engineering study in indoor and outdoor environments

JongHo Kim received B.S, M.S, and PhD degrees in electronic engineering from Chungnam National University, Daejeon, Korea, in 1986, 1988, and 2006, respectively. Since 1989, he has been working for ETRI, Daejeon, Korea, where he is a principal member of the engineering staff of the Radio Technology Department. His main interests are radio propagation and spectrum engineering.

MyoungWon Jung received B.S, M.S, and PhD degrees in electronic engineering from Chungnam National University, Korea, in 2006, 2008, and 2014, respectively. Since 2009, he has been working for ETRI, where he is a senior member of research staff of the radio technology department. His main interests are radio propagation study for mobile communication and millimeter wave propagation study in indoor and outdoor environments.

YoungJun Chong received the B.S degree from the Jeju University, Jeju island, Korea, in 1992, and the M.S degree in electronics engineering in 1994 from Sogang University, PhD degree in electronic engineering from Chungnam National University, Korea, in 2005, respectively. Since 1994, he has been with ETRI, Korea, where he is a leader of spectrum engineering section and principle member of the research staff of the radio technology department. He is currently involved in the development of the digital ultra-narrow band walky-talky. His research interests include RF circuit and stations development