

NTT DOCOMO Wins Best Paper Award at APCC 2012

Mr. Hiromasa Fujii, Mr. Shunji Miura (currently Network Department) and Dr. Hidetoshi Kayama (currently DOCOMO Beijing Communications Laboratories) of NTT DOCOMO Research Laboratories received the “Best Paper Award” at the 18th Asia-Pacific Conference on Communications (APCC 2012) held from 15 to 17 October 2012, Cheju Island, Korea.

This conference is held by the Institute of Electronics, Information and Communication Engineers-Communications Society (IEICE-CS), the Institute of Electrical and Electronics Engineers-Communications Society (IEEE-CS), the Korea Information and Communications Society (KICS) and the China Institute of Communications (CIC), and is a meeting where results of studies on wide-ranging technologies related to both wired and wireless communications are reported. At this year's APCC, 381 papers were submitted from 30 countries mainly in the Asian region, with 150 oral session papers and 55 poster session papers accepted (acceptance rate: 52% (total), 39% (oral sessions only)). From among these, the Best Paper Award is conferred for 3 articles assessed for their superior accomplishment.

Our award winning paper is entitled “Novel Cognitive Radio Technique for Using White Space in Public Cellular Network”.

Studies on cognitive wireless systems^{*1} up to now have mainly been concerned with technologies that use broadcast system frequency bands. This is because transmission stations of broadcast systems are basically fixed, and use a limited number of channels in a particular area, which makes it comparatively easy to identify unused frequency bands in the area in question (white space). In contrast, because white spaces in frequency bands used in cellular systems



The award certificate was presented by Prof. Hyung Jin Choi, APCC Steering Committee Chair.

are temporary and only occur in localized areas, it has been extremely difficult to detect them and determine allowable levels of transmission power so as not to interfere with primary devices. These white spaces have not been considered for application of cognitive wireless technology either.

This paper proposes a method for a new application of a cognitive radio technique, which makes it possible to utilize white spaces in the spectrum where cellular systems are operating. In the proposed method, the existing cellular system has to agree to support some inter-system control signals required for spectrum sharing, although the resulting additional processing burden and increased implementation complexity are minimized by using signal formats defined for existing cellular systems for introducing control signals. Moreover, the prototype devices equipped with the proposed scheme has been developed, and effectiveness of the method has been verified with indoor experiments.

This study won the award for its presentation of the new applicability of cognitive wireless technology, and verification of its effectiveness through indoor experiment.

The study was carried out within the framework of the research project “Research and development of radio resource control technologies among multiple radio systems on the same frequency band” (FY 2008 - FY 2011) organized by the Ministry of Internal Affairs and Communications of Japan. We would like to express our gratitude to all the persons concerned.



^{*1} **Cognitive Radio Systems:** Radio communications systems that share frequencies by selecting optimal radio parameters and radiocommunication methods for the radio environment.