Best Paper Award at ISAP2016

Tetsuro Imai and Koshiro Kitao of 5G Laboratory received the Best Paper Award at the 2016 International Symposium on Antennas and Propagation (ISAP2016) held in Ginowan City, Okinawa Prefecture from October 24 to 28, 2016. ISAP2016 is an international conference on antennas and propagation held in the Asia region annually. This year, there were 545 papers listed in the final program from papers registered from 34 countries. The winning paper is entitled "Path Loss Characteristics between Different Floors from 0.8 to 37 GHz in Indoor Office." This paper clarified path loss characteristics in indoor office environments in the 0.8 to 37 GHz bands, based on results of experiments conducted jointly by NTT DOCOMO and NTT Access Network Service Systems Laboratories with the aim of evaluating the 5th Generation mobile communications systems (5G).

The clarification of path loss studied in this paper is crucial for the design and evaluation of mobile communications systems, and to date has included many studies such as the so-called Okumura - Hata model*1 [1]. While historically studies have focused on 6 GHz and below [2], recent years have seen the studies undertaken in academia and standardization organizations into 6 to 100 GHz frequencies, which are expected to be used in the future [3] - [5]. Studies on path loss characteristics mainly discuss loss increase related to distance between base and mobile stations, while studies on frequency characteristics of path loss are also important in deciding on frequencies to be used by services.


2016 INTERNATIONAL SYMPOSIUM ON ANTENNAS AND PROPAGATION
The Institute of Electronics, Information and Communication Engineers

IEICE Communications Society

ISAP 2016

Best Paper Award

is presented to

Motoharu Sasaki, Minoru Inomata, Wataru Yamada, Naoki Kita, Takeshi Onizawa, Masashi Nakatsugawa, Koshiro Kitao and Tetsuro Imai

for the paper entitled

Path Loss Characteristics between Different Floors from 0.8 to 37 GHz in Indoor Office Environments

October 27th, 2016

Toru Uno
General Chair of Steering Committee, ISAP 2016

Toru Uno

Jiro Hirokawa
Chair of Technical Program Committee, ISAP 2016

Jiro Hirokawa

This award-winning paper studied path loss between floors based on experiments conducted in indoor office environments with the aim of contributing to 5G design and evaluation. Specifically, this entailed measuring path loss on five frequencies, 0.8, 2.2, 4.7, 26 and 37 GHz in an NTT DOCOMO office building to analyze the relationship between path loss and frequency. As a result of these analyses, we found that in environments in which radio waves have to travel through more floors, the path loss increases related to frequency tended to be small, which meant that the effect of high frequency waves arriving at the receiver via the outside of the building was more dominant than waves traveling through floors. These results were acclaimed at ISAP2016. Please refer to the award-winning paper for details of the findings of this study.

References

[1] M. Hata: "Empirical formula for propagation loss in land mobile radio services," IEEE Trans. Veh. Technol., Vol.VT-29, No.3, pp.317-325, Aug. 1980.

[2] ITU-R Report M. 2135-1: "Guidelines for evaluation of radio interface technologies for IMT-Advanced," Dec. 2009.

[3] T. S. Rappaport, G. R. MacCartney, M. K. Samimi and S. Sun: "Wideband Millimeter-Wave Propagation Measurements and Channel Models for Future Wireless Communication System Design," IEEE Trans. Commun., Vol.63, No.9, pp.3029-3056, Sep. 2015.

[4] 3rd Workshop on Mobile Communications in Higher Frequency Bands (MCHFB): "White paper on '5G Channel Model for bands up to 100 GHz'."
http://www.5gworkshops.com/5GCM.html

[5] 3GPP TR38.900 V14.1.0: "Study on channel model for frequency spectrum above 6 GHz (Release 14)," Sep. 2016.

*1 **Okumura - Hata model:** Yoshihisa Okumura reported the so called "Okumura curve" which indicates the relationship between distance from a base station to a mobile station and received field strength based on the results of measurements in the 150 to 1,500 MHz bands taken in various environments such as urban, suburban and open areas. Using this curve, Masaharu Hata formulated the Okumura - Hata model using parameters such as base station height and distance between base and mobile stations.