

REPORT OF RADIATION SAFETY EVALUATION FOR OUTDOOR MOBILE BASE STATIONS IN MACAO

Summary

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Nowadays the mobile phone has become an indispensable part of modern life, as it has brought a lot of convenience to people. In Macao, the mobile communication subscribers are more than 1,895,900 by the end of September 2016, a growth of 282,500 users compared with the end of 2012. The high penetration of the local mobile communication leads to a concern about the exposure of human on electromagnetic radiation from base station. As such, the Bureau of Telecommunications Regulation (DSRT) has invited Wireless Communication Laboratory (WCL) of Faculty of Science and Technology of University of Macau to investigate and measure the radio-frequency electromagnetic radiation in Macao in 2006, 2007 and 2012. The results provided DSRT the background information of the radio-frequency electromagnetic field strengths due to the mobile communication in the public area of Macao, and also the compliance with the standard of the International Commission on Non-Ionizing Radiation Protection (ICNIRP).

Taking into account the continued increase in the deployment of 3G, and the 4G service are also launched in the year of 2015 in Macao, it is believed that the radiation emitted by mobile communication base stations may be increased. This year, the evaluation of radio-frequency electromagnetic radiation in Macao is carried out once again. Therefore, Wireless Communication Laboratory of Faculty of Science and Technology of University of Macau was retained by DSRT to undertake the project of radiation safety evaluation of outdoor mobile base stations in Macao.

In this study, the electric field strengths of total 150 outdoor locations in Macao were measured. In reference to the ICNIRP standard, the electric field strengths were measured at a height of 1.5 m for duration of 6 minutes at each frequency band of 870-890MHz, 935-969MHz, 1805-1880MHz, 2110-2170MHz, 2300-2400MHz and 2620-2690MHz, total 36 minutes at each location. As the focus of this study was on the radiation emitted by 2G, 3G and 4G base stations, the signal levels of communication downlinks are measured.

In these 150 locations, only 3 locations' electric field strength measurements exceeded 10% of the exposure thresholds of ICNIRP standard. There are 35 locations' measurements were between 3%-10% and 112 locations' measurements reported less than 3% of thresholds. Compared with the measurement data in 2006, 2007 and 2012, the electric field strength level higher than 10% or between 3-10% were dropped down; while the electric field

strength level Radiation Safety Evaluation for Outdoor Mobile Base Stations in Macao below than 3% were enhanced.

It is believed that with the deployment of 4G networks, the frequency band for mobile communication is broaden so the mobile users are spread out. Due to this reason, the percentage number of high electric field strength is decreased, and the percentage number of low electric field strength is increased.

Therefore, no measurement points were found to be against the threshold defined by the ICNIRP radiation safety standard, and thus should be safe for the public.