INTERNATIONAL EMF PROJECT
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National Report (Republic of Korea)

1. EMF regulations and standards

The EMF exposure limits in Republic of Korea were established in 2001 (MISP Notification No. 2015-18) and enforced since April 2002. Ministry of Science, ICT & Future Planning (MSIP) is responsible for EMF regulations, except power lines which is regulated by MOTIE (Ministry of Trade, Industry and Energy). Radio Research Agency (RRA) is in charge of the standards. The EMF exposure limits of SAR in Korea are referred to the international standards developed by IEEE (FCC guideline). Until Dec. 2012, only the limit of local SAR for head had been mandated. The SAR limits for workers and for body, limbs and whole-body average were adopted and effective from January 2013. The limits of electromagnetic field level are referred to the international standards developed by ICNIRP in 1998. The new ELF EMF guideline adopted by ICNIRP in 2010 is not adopted yet in Korea.

There are two measurement standards for electromagnetic field strength and SAR (RRA Notifications No. 2014-2, 2015-23). The devices and installations regulated for SAR and electromagnetic field strength are described in the separate notification (MSIP Notification No. 2016-66). The assessment results for the electromagnetic field level for the broadcasting stations (aggregated antenna power > 60 W) and the base stations (aggregated antenna power > 30 W or 60 W, depending on the type of the communication system) before putting into service or during the periodic inspection (5-year terms) (Clause 65 of Presidential Decree of Radio Wave Act) shall be reported.

The regulation for EMF rating and labelling was enforced from August 1, 2014 (MSIP Notification No. 2015-16). The operators of radio stations should affix the labels for EMF strength rating in an appropriate place. For portable devices used in direct contact with the user's ear, those who manufacture or import such devices should affix the labels for SAR rating, and/or display the highest SAR values appropriately.

2. Public Concerns and Risk Communications

The public concerns about EMF are still very high in Korea. Over 500 public appeals against the radiation of electro-magnetic energy from base stations have been submitted to government offices and operators in a year. Regarding power lines and substations, about 170 complaints have been filed to KEPCO (Korea Electric Power Corporation). Government offices, operators and KEPCO are actively taking care of such complaints.

EMF web sites for interactive and bilateral communication (www.rra.go.kr/emf, www.emf.or.kr, www.emf60hz.com, home.kepco.co.kr) have been providing EMF related information, including the guidelines for the safe use of home appliances and mobile phones, Q&A, videos for education and forum RRA offered last year. Especially, from 2012 the information on the SAR values of each mobile-phone model, including the kid's phone and watch phone from April 2015, was opened to the public through this website. RRA also endeavors to provide the correct information on electromagnetic waves and to alleviate the concerns of the general public through interactive communications. In 2015, RRA offered education programs on electromagnetic wave safety and runs ran forums to enhance the bilateral risk communication with the public.

KEPCO also operates the Public Information Dissemination Center since 2006. From 2004, two kinds of Newsletters, one for EMF measurement standards and the other one for biological effects, exposure limits and policies are published biannually. Every other year, a survey on "perception for EMF exposure and its hazard" for general public or experts is performed.

3. Researches on the biological effects of EMF

To scientifically identify the effects of the electromagnetic fields on human health, the research project has been performed since 2013, which is titled as "A Study on the EMF exposure control in smart society with total 2.151 billion KRW per year funded by MSIP. Under the superintendence of ETRI (Electronics and Telecommunications Research Institute), several universities as well as an academic society (KIEES, Korean Institute of Electromagnetic Engineering and Science) are joined for the project. Main research topics of the project are as follows:

- Development of anatomically realistic human body model (adult male/female) and head model for simulating exposure assessment, development and maintenance of RF exposure system for *in-vivo/in-vitro* study, performed by ETRI (Electronics and Telecommunications Research Institute)
- WP1, WP2, and WP6 of GERoNiMO Project (ETRI and DKU)

  WP1 (Birth cohort study), WP2 (Cancer risk in young people Mobi-Kids), WP6 (Cumulative and integrated exposure assessment)
- Korea-Japan Joint Case-control Study (ETRI and DKU)

  Phone Tx power analysis in urban and rural areas, cumulative exposure assessment of study subjects, Korean head model development, consideration of environmental exposure other than RF
- Cohort study on the relation between mobile-phone use and behavioral cognitive development of pregnant women and children, Epidemiological study on mobile phone use and cognitive function in elderly people (DKU)
- *In vivo* and *in vitro* study to investigate the effect of RF exposure on Alzheimer's disease (EWU)
- *In vivo* study to investigate the biological effects of RF(CDMA, RFID, etc.) exposure (AJU)
- *In vivo* study to investigate the biological effects of ELF exposure, performed by Hallym University

The project on ELF EMF, "Research of Pattern Analysis related to Environmental EMF" launched in 2013 with total 1.34 billion KRW funded by MOTIE (Ministry of Trade, Industry and Energy) was completed successfully in 2016. Ulsan university, KERI(Korea Electro-technology Research Institute) and KIEE(The Korean Institute of Electrical Engineers) were joined for this project. The objective of this project was to perform the epidemiological study for the effect of ELF EMF exposure based on the pattern analysis of electromagnetic field in the vicinity of power lines. Especially from the retrospective cohort study, it was found that there is no trend of increasing risk of stomach and liver cancer with the exposure to magnetic field generated by overhead transmission lines,.

A project in ELF frequency band launched in 2015 is ongoing. KEPCO (Korea Electric Power Corporation) funded this project. One of the main research objectives is to investigate worker exposure to 60 Hz magnetic field in the working environments(substation), to set the worker exposure limit value to 60 Hz magnetic field and to establish ELF EMF management planning for workers. The research period is 38 months. KERI, KESRI(Korea Electrical Engineering & Science Research Institute), Inje University, Hoseo University and Soon Chun Hyang University are participating in this project.

Another project was launched in 2016 funded by KEPCO and is still ongoing. It will end this year. The objective of this project is to establish a policy to minimize the exposure to electromagnetic fields generated by transmission and substation facilities and to be easily accepted by people

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