

Field Intensity Measure in Medium Waves for Broadcasting Digitalization Planning in Brazil

F.F. Lima, A. J. M. Soares, H. A. Júnior, and L. M. da Silva
University of Brasília, <http://www.ene.unb.br>

In the digitalization of sound broadcasting with the use of the in-band technology, the radio frequency signals are compatible with the canalization used in different countries. Digital Radio Mondiale (DRM) and High Definition Radio (HD Radio) are, currently, the systems considered below the 30 MHz frequency band. Thus, to implement such systems, it is not necessary to place a new and exclusive band of frequency. The analogical and digital signals can occupy the bands already destined to the sound broadcasting in the on-channel simulcast project. On the other hand, adopting the on-channel simulcast project, it is important to have knowledge of the actual intensity of electric field (E-field) radiated by the existing analogical radios, in order to minimize the occurrences of interference between broadcasters operating in adjacent bands of frequency.

In this work, measurements of the E-field have been carried in Brazil's central region, around the city of Brasília, with the objective of assisting in the planning of the implantation of the digital radio. The data have been collected from eight broadcasters operating in medium waves and throughout six radial routes, uniformly distributed, with 180 km radius each. With these data, the coverage area can be analyzed for the broadcasters who currently are transmitting using an analogical signal. For the accomplishment of the measures, it was used a mobile unit of the National Agency of Telecommunications (ANATEL), which is responsible for the regulation of the telecommunications services in Brazil. This vehicle possesses calibrated equipment that makes possible the acquisition of samples of the field intensity at each 500 ms, with the respective geographic coordinates.

The measured values of the E-field have been compared with the values obtained from simulation, inside the coverage area of the broadcasters in test. These simulations have been performed using a methodology proposed by the ITU-R P.368-7 recommendation. This allows us to analyze the main electric ground parameters, which affect the prediction accuracy and possible shortcomings. In the Brazilian case, the conductivity of the ground used in the prediction of the coverage signal is extracted from the ITU-R P.832-2 Recommendation. The measured values of the E-field have been superior to the theoretical values, which allow us to conclude that the electric conductivity, in the considered rural environments, is different from the recommended one. This increase in the field value means that the area of current coverage of the AM broadcasters is greater than the one estimated by the regulating agency. This information must be considered in the definition of the operation of the simulcast broadcasting system.