

Technology Overview 2

Radio Wave Propagation Analysis Tool

Power utilities use microwave lines as an essential means of communication with distant power stations and substations, and mobile radio communications for power line maintenance and inspection work. When erecting or laying power lines, it is also necessary to consider the effect on TV broadcast transmissions. CRIEPI is therefore developing predictive tools for analyzing, in detail, the propagation characteristics of radio waves taking into consideration the features of the geography and structures.

Mobile Radio Reception Area Design Tool

- High-precision estimation of reception field strength

To date, it has been difficult to obtain accurate estimates since the area in which mobile radio is receivable varies depending on the geography between the base and mobile stations. Using this tool, appropriate calculation models, namely, the plane earth propagation model, the geometric model, and the Okumura (statistical) model, are used optimally, depending on the geography between the transmission and reception points and the type of land use. In addition, its corrective calculation function, based on actual data on various topographies at 1,387 points in Japan, allows highly precise predictions.

- Optimal frequency allocation design capability

Frequency allocation is computed to eliminate the interference of radio waves used between base stations and minimize the number of frequency channels used. This can be determined quickly using a genetic algorithm (GA).

Microwave Line Interference Prediction Tool

Equipment such as cranes used in construction work can impinge on propagation routes. Using this tool, it is possible to accurately predict the transmission characteristics (such as the scope of effect on digital microwave lines and coding error rate) in such situations.

TV Broadcast Interference Prediction Tool

This tool is used to predict blind zones where TV transmissions cannot be received and the effects of reflection and masking by buildings and other structures. While terrestrial digital TV broadcasts beginning in 2003 are expected to reduce the impact of reflection

and masking, this technique will allow the effects to be assessed more rigorously.