Bartłomiej Gołębiowski[1]

Dariusz Więcek[1]

Paweł Winkel[1]

Dariusz Wypiór[1]

Platform IT for an Analysis of Systems in Telecommunications: propagation computation, electromagnetic compatibility and optimization of wireless telecommunication networks.
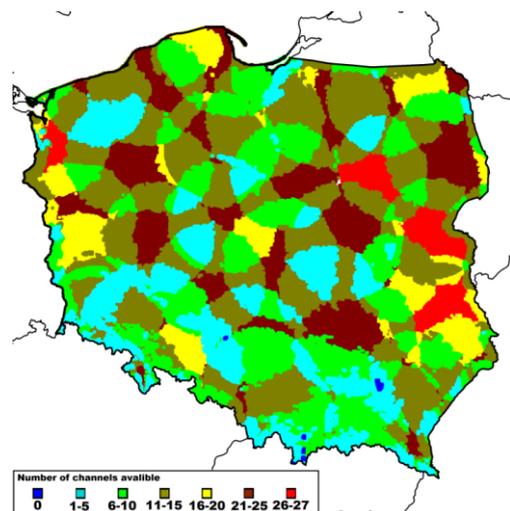
Nowadays a number of devices required variety frequency bands for transmitting radio signals are increasing while radio spectrum resources are limited and shared among different users. For example mobile operators and broadcasters are incessantly set out to gain a network capacity and an availability of their services attempting to minimize harmful interference simultaneously. Besides them, international organisations conduct a standardization process relative to rolling out new radiocommunication services, the government offices and national institutions carry out contiguous work on spectrum policy e.g. an analogue-to-digital television conversion or the digital dividend and LTE services in the 790-862 MHz band. Thus, there is an expectation for developing an advanced IT solution with an up-to-date databases and software which uses a great deal of sophisticated algorithms for radiocommunication systems planning, optimization, coordinating purposes. Consider above "PIAST" platform is being developed by National Institute of Telecommunications (NIT) within the project called „Platform IT for an Analysis of Systems in Telecommunications: propagation computation, electromagnetic compatibility analyses and an optimization of wireless telecommunication networks".

PIAST Platform allows carrying out numerous analyses of existing and currently developing telecommunication systems. Applications, incorporated in it, will be available via a website or a desktop application for research and educational institutions, commercial users and the NIT

staff. The Platform for analysis includes different services: an analysis of spectrum occupancy and parameters selection of new proposed stations, search for white spaces spectrum, planning coverage of networks, an intersystem compatibility analysis and so on. PIAST platform carries out computation using digital maps with diversified layers: terrain elevation (DEM), obstacles and buildings (DTM) and administrative data. Everyone will be able to conduct a few free of charge calculations and analyses at PIAST official website using developed dedicated software. e.g.: ITU-R P.1546 propagation curves calculator, propagation models implementations, diffraction attenuation simulators, a units converters and simple engineering calculators and so on. All services will be deployed on high-performance computing servers, which allow execution of specialized calculations in a proper short time.

Example analysis using PIAST platform – White Space Spectrum availability

The illustration shows result of one example analysis: availability of White Space Spectrum in the TV band in Poland for fixed type transmissions, i.e. at 10 m a.g.l. with an Radiated Power of 30 dBm using methodology developing in NIT. An availability of White Spaces in the TV band was estimated for all TV channels (21-60) within Polish territory at approximately 600,000 points, i.e. using a 1km x 1km raster with DEM/DTM. Using the methodology based on a certain interference levels into DVB-T channels/reception, results in a higher number of TV channels potentially available. Based on that methodology it can be expected that an average 10-15 channels (in a range from 0 to 27 channels) might be available in Poland, providing also protection for adjacent DTT .

[1]National Institute of Telecommunications (Poland), EMC Department

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