CELLULAR NETWORKS AND WIFI MEASUREMENTS

Mobile telephony and WiFi are getting increasingly business critical for both private and public companies. In order for the cell phones to operate correctly, a good cellular network is required, and it should work both outdoor and indoor, and both when the user is standing still and moving around.

DAS consultancy
There are several types of DAS (Distribute Antenna System) facilities: passive, hybrid and active. Each comes with their up- and downsides, which prompts us to question which one to use. Ramboll can help you decide on the right solution if you need to install a DAS facility in your building(s), or if your existing DAS facility has reached its end of life and needs to be replaced. We can also assist you with procurement and supervision during the installation process and approval testing to verify whether the DAS system fulfills the requirements.

Measurements on DAS facilities and WiFi
The many different network technologies, i.e. 2G (GSM), 3G (UMTS) and 4G (LTE), create challenges when they have to work together on many different frequency bands and particularly, when an indoor cellular network (DAS facility) has to work together with the outdoor (macro) network. The first step on the way to improving mobile coverage is to perform coverage verification with specialised equipment, operated by experts. This way coverage holes and/or malfunctioning cellular networks are mapped.

As a facility manager it can be an enormous task to establish whether an indoor cellular network is operating properly. Does it have the correct coverage? Is there interference? How does it work with the outdoor network? And is there an issue with poor mobile phones?
A DAS facility is not something to simply ‘install and forget’. Mobile operators are constantly fine-tuning and re-arranging their networks, which can cause problems for the indoor networks. Additionally, times change and consequently, user requirements change too. Fixed phones (i.e. landline/IP) were the primary phone a few years ago but now mobile phones take the lead, meaning that the old DAS facilities may not meet the new requirements.
Outdoor measurements (drive tests)
Ramboll’s portable equipment can be used in cars and trains where measurement data are positioned using GPS. The measurements don’t require special kinds of trains and can be performed in regular public trains.

Indoor measurements (walk tests)
Using portable equipment, it is possible to perform coverage control and reveal problems with indoor cellular networks. Signals coming from both the indoor and the outdoor systems can be measured. Measurements are visualised on floorplans to better clarify problematic areas.

01 Indoor measurements (walk test)
Using portable equipment, it is possible to perform coverage control and reveal problems with indoor cellular networks.

02 Example of indoor measurements
The image shows an indoor measurement that highlights several areas with poor coverage (low signal strength). Users with cell phones with good radio capabilities might experience failed call/dropped call problems, while users with cell phones with poor radio capabilities will probably experience failed call/dropped call problems in the highlighted areas.

03 Example of indoor measurements
The image shows that the signal quality is very good and without interference. A good signal quality helps the cell phones to operate at low coverage.