Ranplan WIRELESS

Case Study

Rostelecom

Designing a brand new Wi-Fi network system to provide guests, staff and visitors at a luxury hotel in Sochi, Russia with seamless connectivity.

Overview

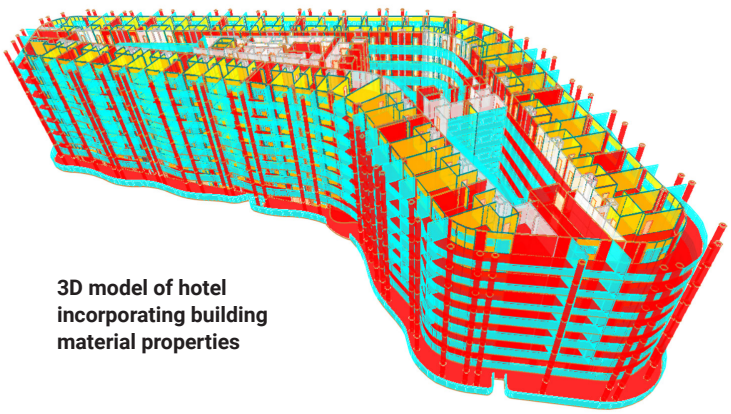
Hotels are a destination for business travellers and holiday makers coming for a short stay. This hotel is located in Sochi, a Russian city in a popular holiday destination on the Black sea coast and once host to the 2014 Winter Olympics.

In recent years the hotel has received significant investment and has been transformed into a much sought-after location for holidaymakers.

The hotel occupies 24,000 sqm of floor space over eight floors and is designed to accommodate 2,000 guests as well as host meeting and events in their 5 spacious conference rooms.

The building structure is centred around three separate atriums with a main reception area and double lift access to the upper floors containing lounge and restaurant areas.

To attract guests, part of the hotel upgrade included a specification for an indoor Wi-Fi network system to deliver a seamless connectivity experience during their stay.



3D model of hotel incorporating building material properties

Challenge

The unique shape, size and open spaces inside the hotel introduced a number of network planning challenges for the designers.

Wi-Fi Access Points could only be installed in the hotel rooms but needed to provide connectivity along the corridor. Therefore the Access Points had to be installed inside the entrance of the rooms but this posed a high risk of cross signal interference from adjoining rooms which could cause poor user experience for guests.

Other challenges included the limited number of channels available in the 2.4 GHz band, of which there were only three. This was a particular problem for the atrium areas because the open design meant signals from Access Points on nearby floors could easily cause interference, which would effect the service received by guests in those areas.

Lastly, for this project to be deemed successful, the system needed to meet the KPI of -75dBm indoor coverage, excluding the balconies and reception area.

Atriums with double lifts in the middle of the hotel

The purpose of this project was to optimise the Wi-Fi network design to achieve the maximum coverage and signal strength through the reduction of interference.

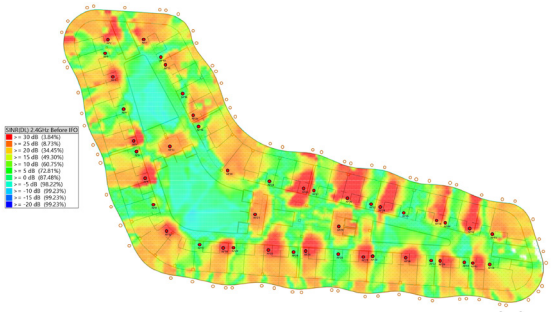
Solution

The key to minimising signal interference was the precise placement and attributed power antennas throughout the interior of the building. Rostelecom, a digital services and solutions integrator chose Ranplan Professional to help them plan the optimum configuration for this project.

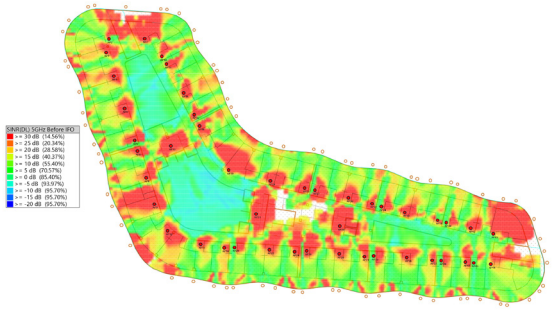
The building schematic was imported into Ranplan Professional using the Smart Extract tool, where the building was re-created into a comprehensive 3D model. Rostelecom then designed the network on top of the model, placing Access Points inside the rooms and antennas throughout the corridors in zig-zag formation to reduce cross cell interference.

Ranplan's 3D ray-tracing propagation engine was used to simulate and evaluate signal strength and coverage throughout the hotel, and identify any areas of interference that needed adjust prior to deployment.

Hotel 5th Floor: Pre-IFO Simulation Predictions



2.4 GHz - SINR - Pre-IFO



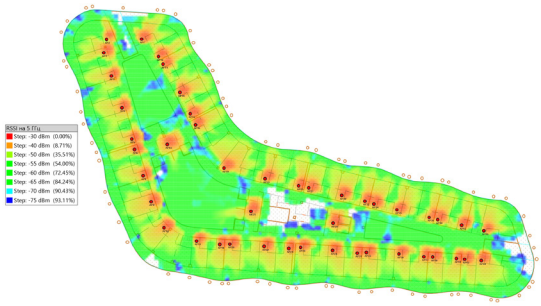
5 GHz - SINR - Pre - IFO

Rostelecom used Ranplan's Intelligent Frequency Optimisation (IFO) tool to choose the most suitable frequency channels for each Access Point. With the limited channels in the 2.4 GHz band, Rostelecom added channels from the 5 GHz band. This helped maximise the signal distance and minimised signal interference caused by too many signals on the same frequency.

Results

Ranplan's heatmap simulations revealed good Wi-Fi coverage in the key areas of the hotel, such as the bedrooms, corridors and also in the atriums, despite the latter being excluded from the project brief.

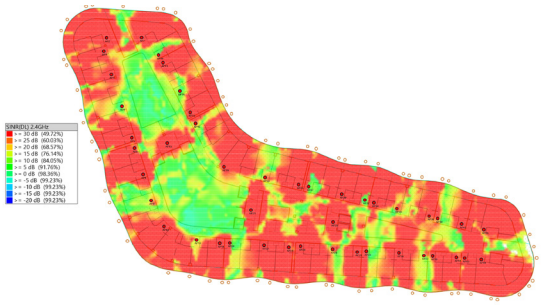
Strategic placement of the antennas in zig-zag formation along the corridors together with use of Ranplan's IFO helped achieve 97% indoor coverage at -75dBm.



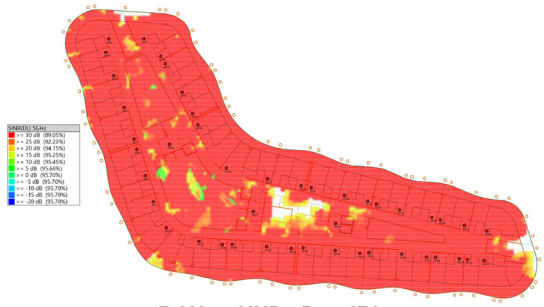
5 GHz - Coverage Prediction

The built-in frequency optimisation tool helped Rostelecom's designers ensure that each antenna leverage the right amount of power to transmit signals across multiple frequencies, at equal strength thereby avoiding or minimising signal interference. This resulted in guests enjoying greater connectivity and overall a positive hotel experience.

Hotel 5th Floor: Post-IFO Simulation Predictions



2.4 GHz - SINR - Post IFO



5 GHz - SINR - Post IFO

"Our design time was greatly reduced thanks to Ranplan Professional's rapid modelling tools. The accuracy of the IFO module enabled us to optimise the indoor Wi-Fi network which helped us exceed our KPIs".

- Genrikh Bakhman, Senior Wireless Architect
- Edward Polyansky, Project Manager
- Dmitriy Yarmak, Project Designer

Rostelecom South

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