

Editorial

Dear Readers,

Everyone is talking about 5G... but what is 5G really?

You will find many 5G related topics in this edition: planning solutions for the digitalization of industry/Industry 4.0 and vertical markets, how LS telcom assessed the UK nationwide 5G infrastructure requirements and the Sigfox Internet of Things (IoT) wireless survey.

Read about how LS telcom can help regulators, operators, vertical markets and industry associations and device manufacturers to get ready for 5G: spectrum consulting on 5G, technology and network roll-out, wireless network surveys, network planning and the real game changer for spectrum management and monitoring, the SpectrumMap™, to validate the real world radio coverage. It's all in here... Be prepared for 5G!

And don't forget to read the interview "All about 5G" with our spectrum experts Richard Womersley and Saul Friedner.

We hope you enjoy reading this Spectrum magazine!



Dr. Georg Schöne, Dr. Manfred Leberer, Roland Götz
Members of the Board

Latest

LS telcom UK launches report into nationwide 5G infrastructure requirements

LS telcom UK Ltd with its partners WHP Telecoms Ltd and InterDigital Europe Ltd have written a report on behalf of the National Infrastructure Commission, which examined the potential to enable existing telecommunications infrastructure for future networks.

The report was published on 14th December 2016, alongside the NIC's own report on 5G infrastructure, which has made some key recommendations to government on investment in telecommunications infrastructure.

The report assessed both the fixed and mobile telecommunications infrastructure deployed in the UK today with a view to enable future high-speed connectivity nationwide. The study focused, in particular, on

the nationwide road and rail telecommunications infrastructure to determine whether the available fixed fibre capacity could potentially be used for providing high-speed wireless connectivity to road users and rail passengers. The study determined the gaps in the required number of sites needed to fulfill the network performance targets and estimated the capital cost of the equipment deployments.

The study also considered the impact on network densification in urban areas, which would be needed for the future enhanced mobile broadband services of 5G. It further mentioned the need to fix the coverage gaps in rural areas in order to meet the overall 5G vision.

Some of the major challenges in deploying higher capable infrastruc-

ture were identified in the report including how access to fixed non-telecoms infrastructure and more fibre at these locations would be needed.

A spokesperson from the NIC said, "We chose LS telcom for their extensive experience and expertise in assessing telecommunications infrastructure and spectrum demand. Their study made a significant contribution to the evidence base underpinning our report, which provides advice to the government on 5G infrastructure challenges. LS telcom's work provides important input to informed decision-making on 5G infrastructure in the UK." ←

Further information here: www.gov.uk/government/publications/connected-future

CHIRplus_NGN: integrated indoor & outdoor network planning and optimization software

CHIRplus_NGN is a highly modern and flexible software system supporting 2G to 4G outdoor as well as indoor network coverage planning and interference analysis.

The software, which combines powerful engineering capabilities with

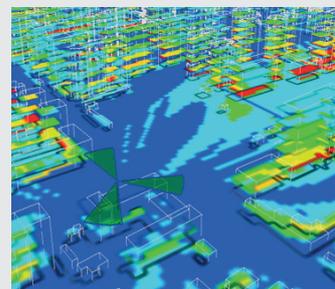
extraordinary network visualization functionality, helps operators cope with increasing traffic volumes, higher network density and service diversity coming along with 4G and 5G.

Network operators use the software for network wide calculations as well

as detailed local site analysis. Approximately 70% of LTE data services are used indoors. This is why CHIRplus_NGN features simulation for outdoor, indoor as well as combined indoor and outdoor calculations. As the user interface unites the planning functionality for all technologies and services, it provides high usability and convenience to the planner. Extensive 3D visualization lets the planner verify the coverage results for each floor level of a building. The user can adapt building transparency settings and zoom, as well as rotate the viewing angle. This way, no spot in the network remains uncovered. →



Picture: outdoor analysis



Picture: indoor analysis

... continued from page 1

CHIRplus_NGN is a browser-server based planning tool, which works on all current web browsers.

Users can connect to the tool from wherever they are. Calculation results are displayed quickly and are easily shared among multiple users.

Planning engineers can analyze individual cells of a single base station. They can add and remove stations to analyze the impact in terms of interference and coverage. On a network wide level, the user is able to analyze the number of overlapping cells and

maximum service cells. Besides simulation data the software supports MR and drive test data to obtain a real-time picture of the coverage situation. ←

European Union Agency for Railways publishes report by LS telcom on co-existence of GSM-R system with future LTE system

The European Union Agency for Railways has published a report by LS telcom on the possibility of using the ER/R-GSM spectrum by other radio communication systems for railways in co-existence with the existing GSM-R system operated in that frequency band.

The objective of the study was to find out whether new spectrum is required for a successor system or whether band sharing during migration from GSM-R to its successor would be feasible.

Thomas Chatelet, ERTMS Project Officer at the European Union Agency for Railways, said, "Their study will contribute to informed decision-making for the railway industry's future spectrum requirements. We were very satisfied with the work carried out by LS telcom and we look forward to working with them again."

LS telcom reviewed several technologies, which met the rail industry's needs, and identified LTE/LTE

Advanced as the only feasible technology currently available. The study further showed that the implementation of an LTE system within the R-GSM band in co-existence with the current radio system is unlikely to be feasible unless a number of mitigating measures are taken.

LS telcom carried out feasibility and compatibility analysis, which were complemented by capacity and coverage simulations and by laboratory measurements made by the Dresden University of Technology.

The study concluded that the extent and necessity of the mitigation methods should be tested through field trials. Furthermore, an evaluation of the potential degradation of

the quality and capacity of the existing GSM-R system should be conducted to identify whether the potential degradations caused by the implementation of an LTE carrier are acceptable. Future demand for data for rail services should also be examined to determine whether the resulting capacity is sufficient. ←

Further information here:

www.era.europa.eu/Document-Register/Pages/GSM-R-coexistence.aspx

LS telcom measures and monitors frequencies for you

You need to survey the frequency environment of critical sites or for special events? You need to geo-locate the source of interference? You are in dire need to know which frequencies are really in use? For successful radio monitoring you do not only need the suitable monitoring equipment and define the best locations to place your devices.

You also need monitoring data analysis and reporting software as well as monitoring experts for analyzing the huge amount of measured data to provide the results you're looking for.

If you don't have monitoring devices and monitoring experience in-house, have you thought about outsourcing to LS telcom?

We can provide you with everything you need for your monitoring exercise. We have monitoring experts to set up and operate the system, measure, store and analyze the data for you. We deliver complete reports,

which help you make informed decisions and take action immediately. Our turnkey monitoring service includes the leasing of all the hardware, software and expert staff as well as system maintenance. We provide our service for short-term and temporary measurement campaigns as well as for long-term and permanent measurements over several years. We supply all types and brands of monitoring units, from fixed units to portable, transportable, and airborne units depending on where and which frequencies you want to measure. If you have moni-

toring experts in-house, then we can just provide the monitoring hardware and vice versa, if you have the system in place, but no one to use it, our experts can operate your system. Above all, we help with monitoring training and capacity building. We assist in the selection of monitoring equipment best adapted to your specific monitoring needs. ←

Sigfox repeats order for Internet of Things wireless survey

Sigfox, the world's leading provider of Internet of Things (IoT) connectivity, commissioned LS telcom to carry out wireless surveys for its Internet of Things networks in several African and Middle Eastern countries.

LS telcom performed overall about 80 turnkey measurements.

The radio surveys proved that Sigfox radio technology can operate in excellent conditions and deliver optimal communication services for the Internet of Things within the coun-

tries under study. The Sigfox's network operates in the available license-free frequency bands in several countries all over the world. ←

Big Data Spectrum Analysis: the game changer in spectrum management and monitoring

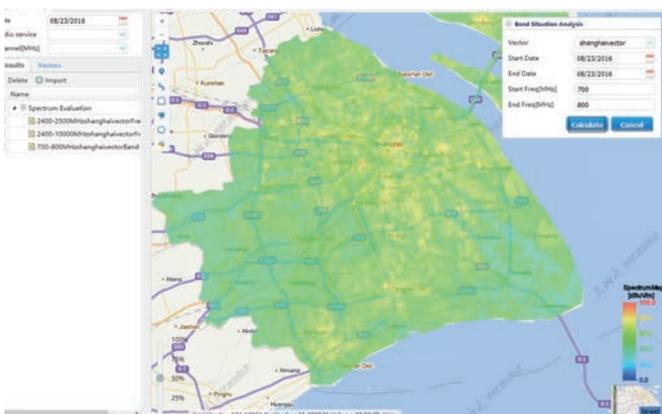
Imagine you could easily validate the real world radio coverage anywhere!

This is now possible with LS telcom's SpectrumMap™. Any regulator's staff, such as policy makers, licensing teams, engineering teams, enforcement and band planners can now access the real spectrum coverage utilizing SpectrumMap™. Spectrum Map™ is a cloud based big data system, which gathers real spectrum usage data from a monitoring network and presents it on a map in a fast, user-friendly way. The system collects and stores spectrum data from many sources, such as fixed sites, temporary sites, mobile, handheld and portable devices. It provides a range of analytical tools for users to access through web apps.

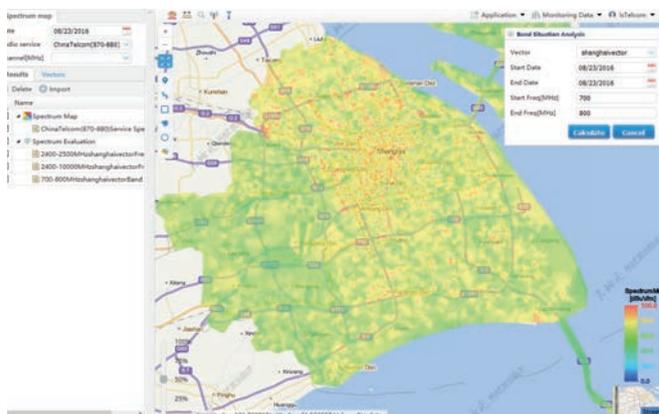
Users can zoom in on a map and display the real world coverage of an area of interest to them. They can display the data in many ways, for example, by band, by channel and by service type. The data is presented in a clean, quick and coherent way (see figure 1 and 2). Any business analyst or other non-technical operator can easily display the spectrum information they need. The operator does not need any knowledge of monitoring stations and does not need to know where the monitoring stations are located; as opposed to current Central Control Units of conventional monitoring systems, which can display usage data station by station only and it needs a moni-

toring expert to generate the data analysis. With the SpectrumMap™, real world reception data is made available in real-time for fast and effective spectrum decisions. A real game changer for investments in spectrum monitoring systems, don't you agree? SpectrumMap™ is in use by a large regulator to provide the human interface to a very large spectrum sensor network and to analytical tools to gain value for money from their investment. ←

Contact us for more information: Info@LStelcom.com



Picture: SpectrumMap™: band situation analysis, complete band



Picture: SpectrumMap™: band situation analysis, by operator

Efficient network planning for vertical markets and critical communications with CHIRplus_TC

CHIRplus_TC features extensive functionality for the planning of critical communications networks for diverse applications of the Internet of Things (IoT), Industry 4.0/smart factories, smart grid, SCADA, PMR, DMR (see list below).

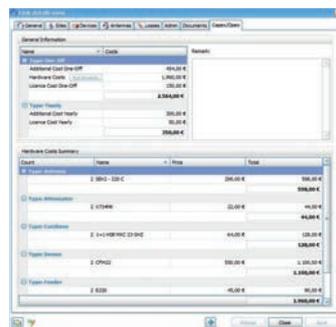
It is an integrated tool for microwave and cellular network design, planning and performance optimization. Planning engineers need flexible, resilient and easy-to-use software based on well-established engineering procedures and algorithms to plan secure and robust radio services for professional users. CHIRplus_TC stands for the planning of safe, high-performing, highly avail-

able, resilient, and cost-efficient network services. The unique and intuitive user interface of CHIRplus_TC guides the user through the entire planning process, from link planning, coverage, capacity and frequency planning, including the automated generation of frequency applications and bills of material (BoM).

and Fresnel zone can be visualized in Google Earth. Customizable query forms enable the user to sort, filter and search any kind of information needed for regular reporting and the tracking of Key Performance Indicators (KPIs). The user can determine search criteria with the advanced filter editor to extract company KPIs and managerial reports whenever needed. ←

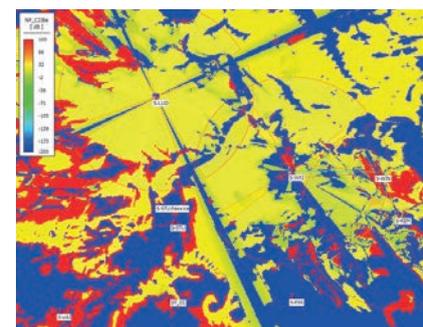
Use CHIRplus_TC for the planning of:

- Microwave backhaul networks
- Industry 4.0
- IoT
- LoRa specifications
- TETRA
- PMR
- DMR
- WiMAX
- SCADA
- Smart grid
- Telemetry



Picture: CHIRplus_TC: Display of costs per link

All relevant data for the planning process is stored in an integrated database. The customer can select the format, which fits best into the existing IT infrastructure. Standardized data formats such as NSMA or MSI for antenna characteristics can be directly imported into CHIRplus_TC. Data generated within CHIRplus_TC, on the other hand, can be exported via XML files and other applications. Links, including Line of Sight (LOS)



Picture: CHIRplus_TC: network performance analysis

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6th – 9th March 2017

IWCE
Las Vegas/USA
29th – 30th March 2017

NAB
Las Vegas/USA
24th – 27th April 2017

Critical Communications World
Hong Kong/China
16th – 18th May 2017

25 YEARS Innovation for a
Wireless World



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LS telcom UK joins world leading 5G Innovation Centre in the UK



LS telcom UK has joined the University of Surrey's 5G Innovation Centre (5GIC) as SME Technology Member. As such LS telcom will participate in the latest technology developments for 5G and contribute to research and white papers as well as test activities.

"As a leading supplier of products and services enabling greater spectrum efficiency, it is a natural step for LS telcom to join the 5GIC. Our membership will solidify our company's integration into the 5G ecosystem and underpins our effort to always stay at

the forefront of latest technology. We look forward to collaborating with the 5GIC to help define and develop the next generation of mobile and wireless communications," confirmed Richard Womersley, Director of Spectrum Consulting at LS telcom. ←

LS telcom is now member of RSSB's Technical Strategy Advisory Group in the UK



LS telcom is now a member of the Future Communications and Positioning Systems Advisory Group (FC&PS AG) which is facilitated and hosted by the Rail Safety and Standards Board (RSSB) in the UK. The FC&PS AG was established to encourage development and implementation of new

communications and positioning solutions that will meet and develop the needs of the rail industry's technical strategy. LS telcom will contribute to the group with expertise in wireless networks, future technology and spectrum related matters.

The group consists of suppliers, train

operating companies, infrastructure managers, the RSSB, the Department for Transport and the Office of Rail Regulation. ←

Further information here:
www.rssb.co.uk/groups-and-committees

22nd Annual Spectrum summit

"Driving Wireless Innovation"

Join us for Europe's largest Spectrum Summit on July 5th 2017 to hear about:

- Challenges of network deployment and future spectrum access for 5G
- Internet of Things: technology, regulation and spectrum
- DTT of the future – more or less?

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