The European 5G Fairy Tale

The 20th European Spectrum Management Conference

Brussels, 18-19th of June 2025

Stefan Zehle
CEO, Coleago Consulting
stefan.zehle@coleago.com

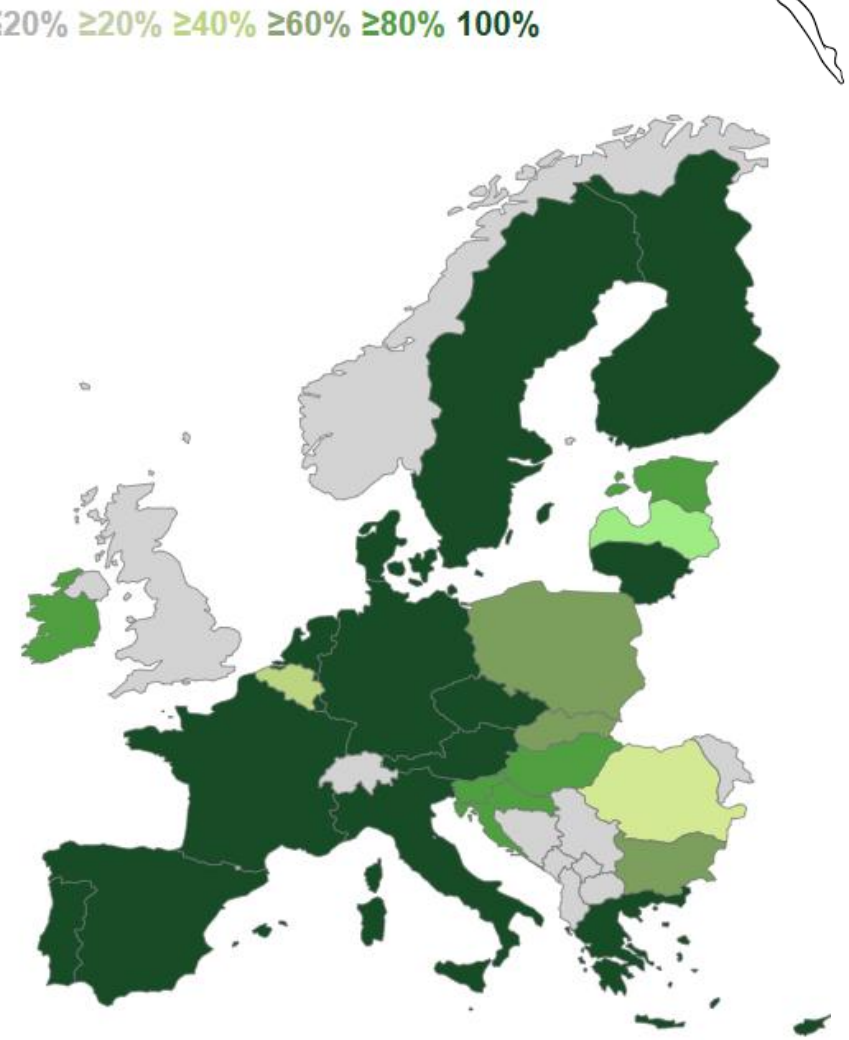
coleagoconsulting

The 5G coverage fairy tale

European 5G Observatory

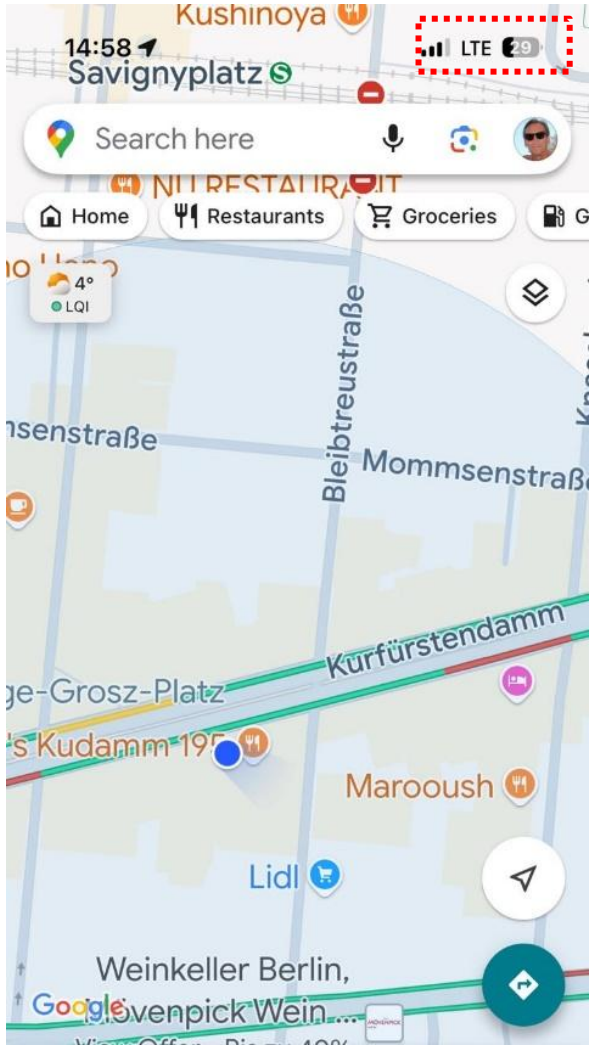
89% 5G coverage of populated areas

Reporting period: Mid 2023

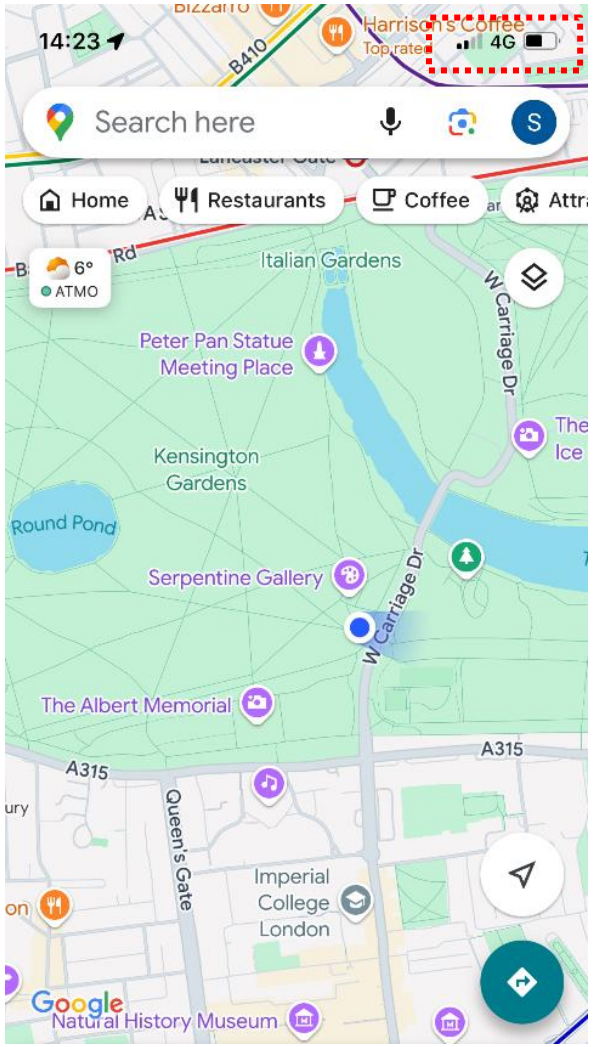


Most European cities do not have contiguous outdoor 5G coverage

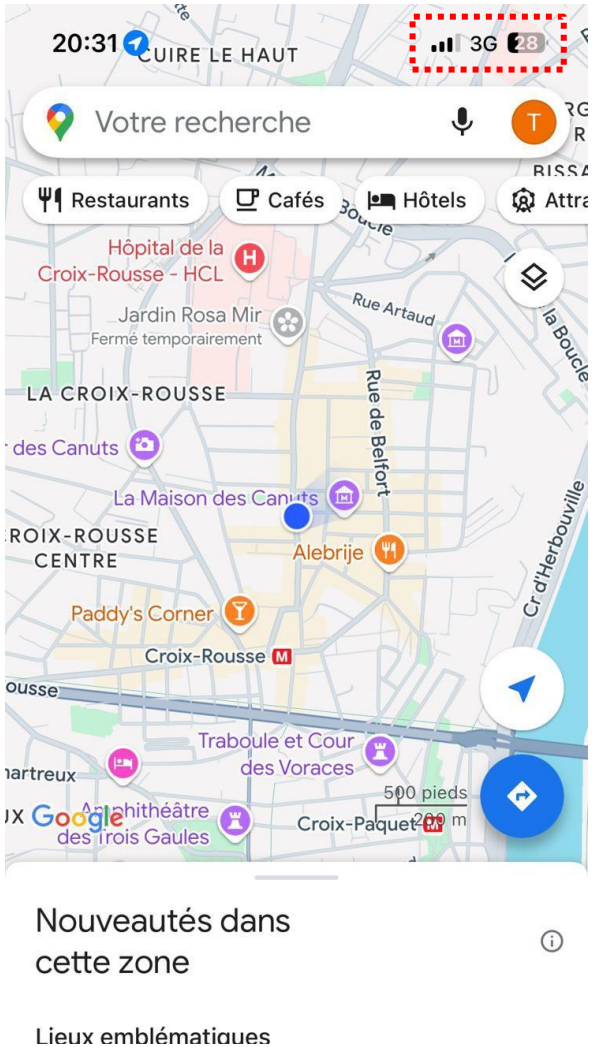
Berlin



London



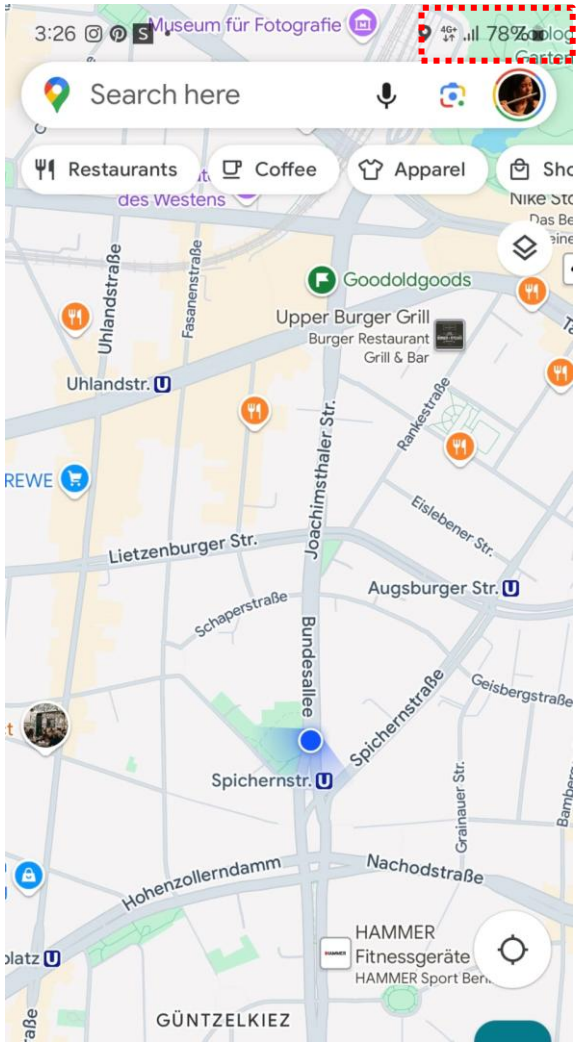
Lyon



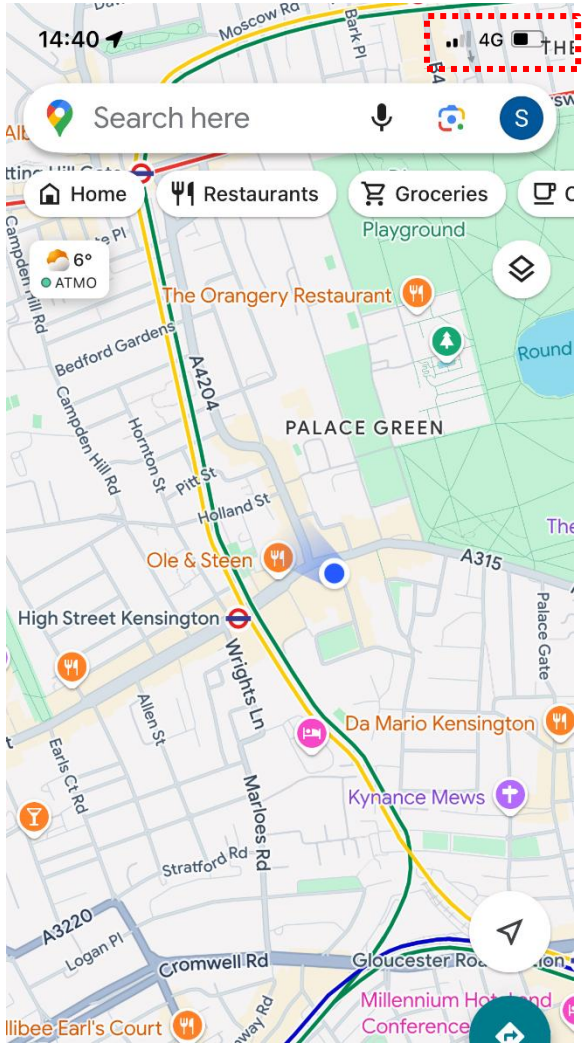
Source: Screenshots from 5G enabled smartphones, January 2025

5G indoor coverage in public places ranges from poor to non-existent

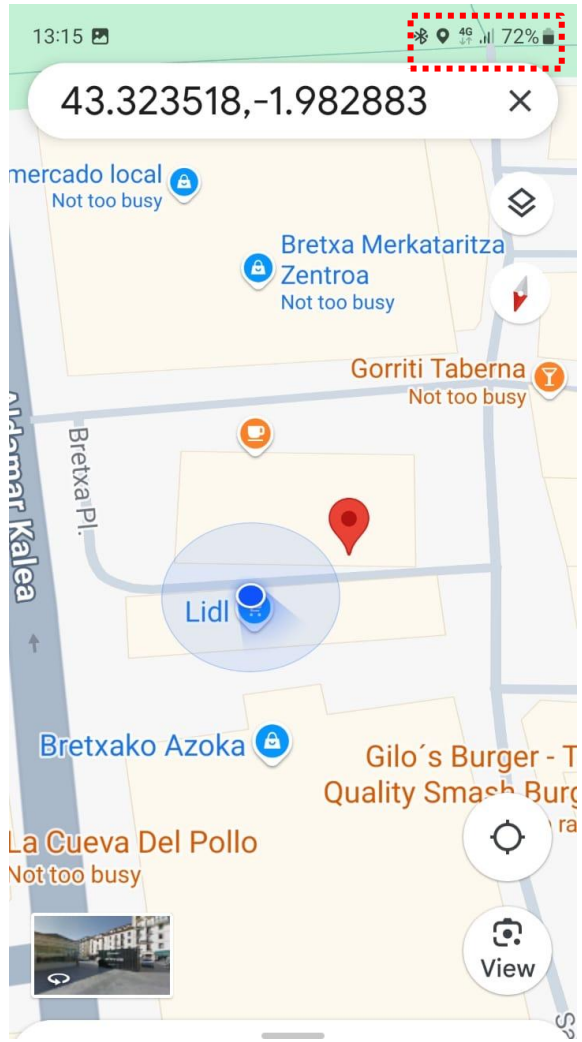
Berlin Underground



London Wholefood Kensington



San Sebastin Lidl Supermarket



Source: Screenshots from 5G enabled smartphones, January 2025

Claimed 5G coverage is based on assuming a whole city is covered

5G should cover places people visit when away from home or offices, including public and semi-public places such as shops, transport stops, restaurants, etc.

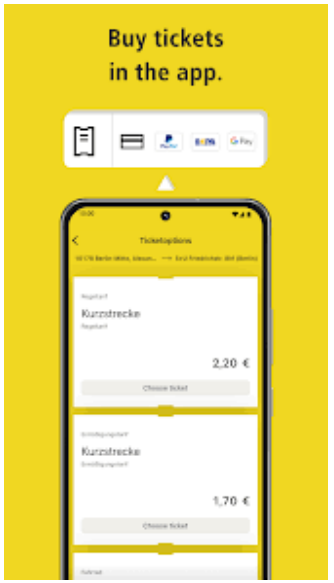
Many people spend a 40 minutes per day commuting by underground but in most cities in underground tunnels and stations there is no 5G coverage.

For companies, how can a business process be designed which relies on 5G coverage if there is not contiguous coverage?

Even if there is 5G coverage, area traffic capacity is often poor, leading to long download times

Example of an everyday problem

Activating a ticket prior to boarding a bus in Berlin may take more than a minute because people waiting at the bus stop are watching video and hog the available bandwidth.



You may not board the bus without an activated ticket.

Chapter II of the 5G fairy tale

The 89% 5G coverage claim is for 5G Non-standalone, i.e. without a 5G core, i.e. a 4G / 5G hybrid

- No native network slicing
  - Any slicing in NSA is rudimentary and more of a workaround.
- uRLLC not fully supported
  - uRLLC support (e.g., for industrial automation or autonomous vehicles) needs 5G SA and the ability to manage Quality of Service (QoS) natively in the 5G core.

Real

To deliver true 5G, operators need 5G Standalone coverage

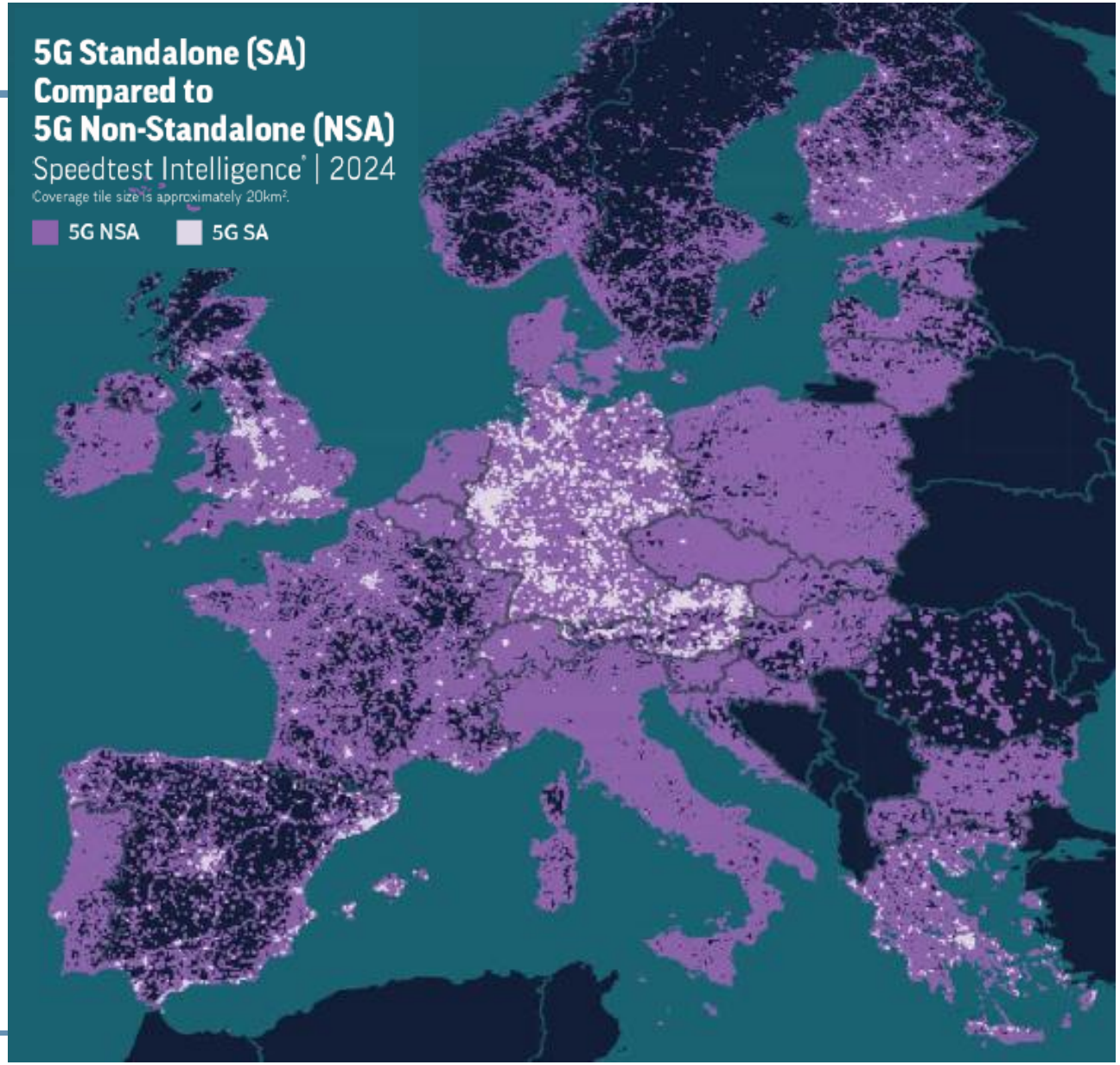
- True network slicing (virtual private networks per use case)
- Full uRLLC capabilities with low latency and high reliability
- Native QoS support
- Edge computing integration with lower latencies

5G Standalone pop coverage is below 50%

5G-SA population coverage in Europe is only around 40% and this coverage is not contiguous

At the regional level, Europe lags behind its peers on several 5G SA performance indicators, raising concerns about the bloc's competitiveness in the technology.

Source: Europe 5G SA 2025 Report, Ookla



Seamless outdoor and indoor 5G-SA coverage is a prerequisite to deliver full 5G services

- A security application on a network slice such as body cam is useless if the video stream stops or stalls when the wearer walks into a building, for example a shopping centre.
- An Augmented Reality application, for example a building layout or instruction manual, needs to work outdoors and indoors.
- Other applications which require a particular QoS need to have this available seamlessly without coverage holes.

European policy makers should take action to ensure that the vision of real 5G can be delivered in an economically feasible manner

Focus on consistent 5G-SA outdoor and indoor speed coverage in urban areas

- Facilitate small cell deployment on lampposts, street furniture, etc. with low site rental fees.
  - The London borough of Lewisham charges £50 per year per lamppost.
- Encourage or mandate shops, restaurants, transport hubs, etc. to grant operators permission to install indoor neutral host small cells free of charge.
- Give mobile operators way-leave rights
  - In 2024, Hong Kong effectively granted mobile operators way leave rights.

Make 6415-7125 MHz at full power available for 5G mobile

- Deployment on 3.5Ghz grid ensures lower cost of area traffic capacity
- Provides some indoor penetration

Rethink rural deployment obligations

- A Euro spent in cities benefits more people and businesses more of the time compared to a Euro spend on rural coverage.

Measure 5G-SA coverage

- Non-stand-alone 5G is hybrid 4G/5G and can't deliver slicing, QoS differentiation, nor uRLLC.

Free information and papers on spectrum topics

Coleago Consulting Ltd – a specialist telecoms management consulting firm established in 2001

Coleago is a telecommunications consulting and training firm.

We offer an experience-based consulting approach, with project teams entirely made up of partner-level consultants, each with a minimum of 20 years' experience in the telecoms sector.

Spectrum Valuation and Pricing

Spectrum Auction Bidding Strategy and Auction Design

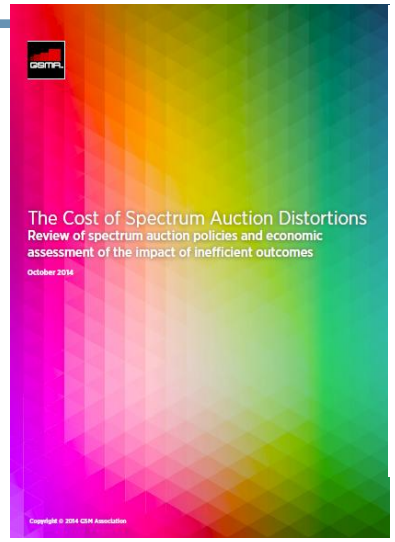
Telecoms Policy and Regulation

Strategy and Business Planning

A sample of Coleago reports in the public domain

Report on Coleago spectrum demand model for the GSMA to estimate mid-bands spectrum demand for 5G as an input to the WRC-23.

Meeting low-band needs requires long-term planning from policymakers. Low-band spectrum is the cornerstone of digital equality and a driver of broad and affordable connectivity. This Coleago report for the GSMA was published in June 2022.



The cost of spectrum auction distortions, a Coleago report for the GSMA to highlight how flawed spectrum auction rules result in inefficient outcomes and adverse consequences for a country's economy

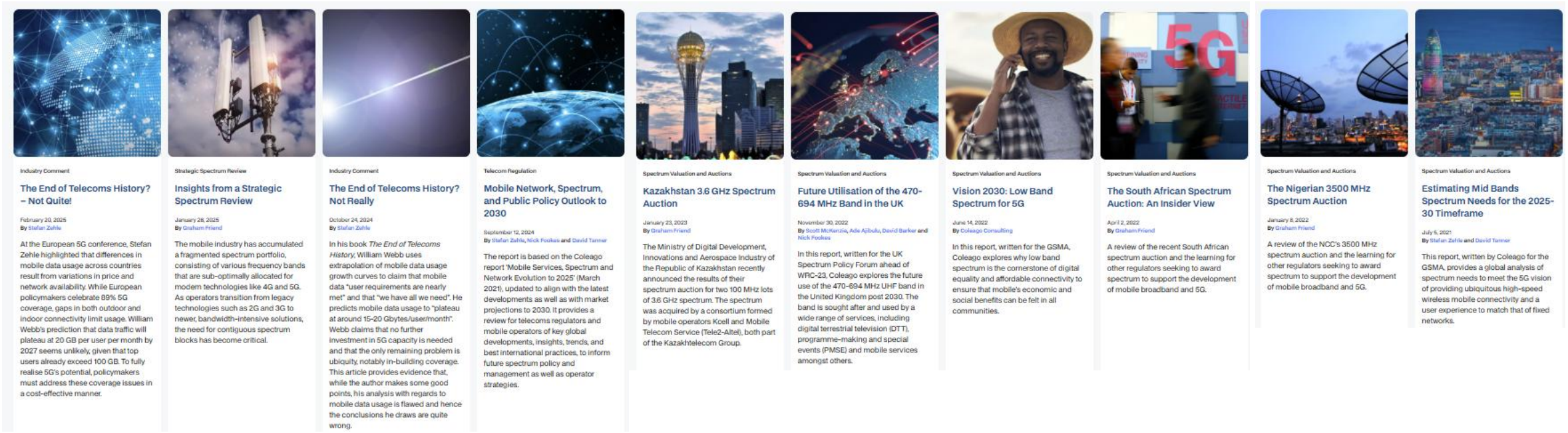
Sustainable spectrum pricing, providing policy makers with a methodology to assess spectrum pricing, taking account of the increased spectrum needs for 5G without endangering operator's ability to deliver the 5G vision.

The benefits of technology neutral spectrum licences, a Coleago report for the GSMA showing clear evidence that technology neural spectrum licences produce benefits for mobile services development and efficient use of spectrum.

Mobile Services, Spectrum and Network Evolution to 2025, a review for telecoms regulators and operators of global developments, insights, trends, and best practices, to inform spectrum policy and management and operator strategies

Download spectrum related articles and papers from Coleago's website

www.coleago.com/insights/



Industry Comment

The End of Telecoms History? – Not Quite!

February 20, 2025
By Stefan Zehle

At the European 5G conference, Stefan Zehle highlighted that differences in mobile data usage across countries result from variations in price and network availability. While European policymakers celebrate 89% 5G coverage, gaps in both outdoor and indoor connectivity limit usage. William Webb's prediction that data traffic will plateau at 20 GB per user per month by 2027 seems unlikely, given that top users already exceed 100 GB. To fully realise 5G's potential, policymakers must address these coverage issues in a cost-effective manner.

Strategic Spectrum Review

Insights from a Strategic Spectrum Review

January 28, 2025
By Graham Friend

The mobile industry has accumulated a fragmented spectrum portfolio, consisting of various frequency bands that are sub-optimally allocated for modern technologies like 4G and 5G. As operators transition from legacy technologies such as 2G and 3G to newer, bandwidth-intensive solutions, the need for contiguous spectrum blocks has become critical.

Industry Comment

The End of Telecoms History? Not Really

October 24, 2024
By Stefan Zehle

In his book *The End of Telecoms History*, William Webb uses extrapolation of mobile data usage growth curves to claim that mobile data "user requirements are nearly met" and that "we have all we need". He predicts mobile data usage to "plateau at around 15-20 Gbytes/user/month". Webb claims that no further investment in 5G capacity is needed and that the only remaining problem is ubiquity, notably in-building coverage. This article provides evidence that, while the author makes some good points, his analysis with regards to mobile data usage is flawed and hence the conclusions he draws are quite wrong.

Telecom Regulation

Mobile Network, Spectrum, and Public Policy Outlook to 2030

September 12, 2024
By Stefan Zehle, Nick Pookes and David Tanner

The report is based on the Coleago report 'Mobile Services, Spectrum and Network Evolution to 2025' (March 2021), updated to align with the latest developments as well as with market projections to 2030. It provides a review for telecoms regulators and mobile operators of key global developments, insights, trends, and best international practices, to inform future spectrum policy and management as well as operator strategies.

Spectrum Valuation and Auctions

Kazakhstan 3.6 GHz Spectrum Auction

January 23, 2023
By Graham Friend

The Ministry of Digital Development, Innovations and Aerospace Industry of the Republic of Kazakhstan recently announced the results of their spectrum auction for two 100 MHz lots of 3.6 GHz spectrum. The spectrum was acquired by a consortium formed by mobile operators Kcell and Mobile Telecom Service (Tele2-Altel), both part of the Kazakhtelecom Group.

Spectrum Valuation and Auctions

Future Utilisation of the 470-694 MHz Band in the UK

November 30, 2022
By Scott McKenzie, Ade Ajibulu, David Barker and Nick Pookes

In this report, written for the UK Spectrum Policy Forum ahead of WRC-23, Coleago explores the future use of the 470–694 MHz UHF band in the United Kingdom post 2030. The band is sought after and used by a wide range of services, including digital terrestrial television (DTT), programme-making and special events (PMSE) and mobile services amongst others.

Spectrum Valuation and Auctions

Vision 2030: Low Band Spectrum for 5G

June 14, 2022
By Coleago Consulting

In this report, written for the GSMA, Coleago explores why low band spectrum is the cornerstone of digital equality and affordable connectivity to ensure that mobile's economic and social benefits can be felt in all communities.

Spectrum Valuation and Auctions

The South African Spectrum Auction: An Insider View

April 2, 2022
By Graham Friend

A review of the recent South African spectrum auction and the learning for other regulators seeking to award spectrum to support the development of mobile broadband and 5G.

Spectrum Valuation and Auctions

The Nigerian 3500 MHz Spectrum Auction

January 8, 2022
By Graham Friend

A review of the NCC's 3500 MHz spectrum auction and the learning for other regulators seeking to award spectrum to support the development of mobile broadband and 5G.

Spectrum Valuation and Auctions

Estimating Mid Bands Spectrum Needs for the 2025-30 Timeframe

July 5, 2021
By Stefan Zehle and David Tanner

This report, written by Coleago for the GSMA, provides a global analysis of spectrum needs to meet the 5G vision of providing ubiquitous high-speed wireless mobile connectivity and a user experience to match that of fixed networks.