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Mobile 5G Network KPIs & the DESI Index

How the Czech Republic performs on the EU's 5G connectivity indicators — and what it means for the Digital Decade

AT A GLANCE **Study 14 maps** the key performance indicators (KPIs) used to measure mobile 5G networks and the 5G-related indicators of the EU's DESI / State of the Digital Decade framework. It explains how 5G availability is calculated, assesses the current state of the Czech Republic, benchmarks it against Germany, and reviews network quality, socio-economic benefits and the environmental context of further roll-out.

What the study covers

DESI — the Digital Economy and Society Index — is the European Commission's tool for monitoring the digital transformation of EU Member States across five dimensions:

Connectivity (incl. 5G & VHCN)	Human capital & digital skills	Use of internet services	Integration of digital tech by business	Digital public services

The study examines the connectivity dimension in depth: the methodology for measuring 5G coverage, the position of the Czech Republic, a benchmark against Germany, qualitative parameters (speed, urban–rural gap, behaviour under heavy load), and the socio-economic and environmental implications of the roll-out.

Why it matters

Since 2023 the composite DESI index is no longer published as a single score — its indicators are now reported within the annual Reports on the State of the Digital Decade. Policymakers must therefore track individual indicators rather than one headline number. 5G coverage is among the most visible connectivity indicators, directly shaping investment decisions and Member States' progress towards the Digital Decade 2030 targets.

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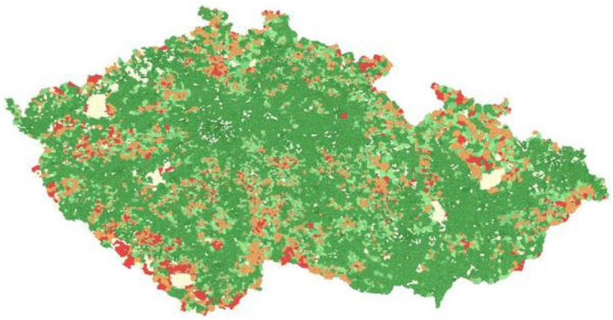
Key figures — 5G in the Czech Republic

96.8%	> EU avg	~25%	36%
of population covered by a 5G signal (CZ)	5G availability above EU average — first time, 2023	of population with 5G in the 3.4–3.8 GHz mid-band	household fibre (VHCN) coverage — 3rd lowest in the EU

Vodafone has the widest reach (93.2% of population); O2 the narrowest (84.1%) but more often in the higher-capacity mid-band. Five operators hold 3.4–3.8 GHz licences, yet mid-band roll-out remains limited.

5G availability across the Czech Republic



Availability of at least one 5G network, by population. Green = high coverage, amber/red = low or none. Source: study (CTU simulation, ITU-R P.1812).

Coverage is estimated through signal-propagation simulation (ITU-R P.1812) on base-station data, since stationary field measurements are not available.

- Two-thirds of basic settlement units have 100% 5G coverage.
- Towns: 99%+ reached by at least one operator. Rural areas: 87.3%.
- Gaps concentrate in low-density and border regions.
- Mostly delivered in the 700 MHz low band (except O2).

International inspiration — Germany

Czech Republic	Germany — benchmark Member State
96.8% of population reached by a 5G signal; >99% in towns, but 87.3% in rural areas (22% of people, 73% of the land). Fast rollout built largely on shared DSS cores; standalone (SA) 5G and the 3.4–3.8 GHz mid-band are still under-developed (~25% of people).	5G covers 92% of the territory and 99.66% of households — effectively no “white spots”; >99% reached by two or more operators. Standalone 5G already covers ~90% of households; operators now densify the mid-band in cities. The CZ must still make these investments.

Coverage is broadly comparable and above the EU average in both countries, but the Czech Republic lags Germany on network development — chiefly standalone 5G and mid-band capacity — which is where the next, more expensive investment phase lies.

Socio-economic benefits & environmental context

Economic upside

- EC (2017): up to €113 bn/year and ~23 m jobs across automotive, healthcare, transport and energy.
- ECA/Accenture (2021): up to €1 trillion added to EU GDP in 2021–2025 and up to 20 m jobs created or transformed.
- Sector example: precision agriculture can lift yields by up to 25% while cutting water and energy use.

Environmental considerations

- Higher per-bit energy efficiency, but total consumption can rise with dense small-cell networks.
- Manufacturing and installation add CO_2 emissions and e-waste across the supply chain.
- Public concerns over electromagnetic exposure can constrain network densification.

OUTLOOK — four priorities

- Shift from shared DSS cores to standalone (SA) 5G to unlock quality and capacity.
- Expand the 3.4–3.8 GHz mid-band, especially in dense urban areas.
- Prioritise fixed VHCN / fibre: at 36% coverage it is the Czech Republic’s weakest connectivity indicator.
- Treat further population coverage as near-saturation — marginal gains now carry disproportionate cost.

KEY TAKEAWAY The Czech Republic leads on 5G population coverage but trails on network quality (standalone 5G, mid-band) and, above all, on fixed very-high-capacity networks. Without sustained investment beyond coverage, its DESI connectivity standing is set to slip — a shared challenge for Member States balancing 5G reach with gigabit ambitions.