



# Elisa lays the foundation for superior 5G Standalone experience with Carrier Aggregation

- 700 MHz coverage and 3.5 GHz capacity
- 5G NSA Carrier Aggregation with 1 Gbps data rates
- Future-proof foundation for superior 5G SA performance

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“Elisa is one of the early adopters of 5G technology globally and leading the development of 5G services in Finland. Our aim is to bring the fastest speeds and most exciting wireless experiences to our subscribers.

We want to utilize our 5G spectrum and network assets as efficiently as possible, which also contributes to our ambitious climate targets. For our 5G network, we are leveraging Carrier Aggregation for optimized performance. We have already tested CA with Nokia using three component carriers, and our aim is to boost the performance even further with four aggregated component carriers.

We see Nokia as a trusted partner with a long history in developing industry-leading Carrier Aggregation solutions for 4G and now 5G. Together with Nokia, we are able to make the promises of 5G technology true for our Finnish customers.”

## Dr. Jarno Niemelä

Head of Mobile Access Technology, Elisa



**Elisa is the market-leading telecommunications operator in Finland. Elisa's mission is a sustainable future through digitalization. A pioneer in telecommunications, digital services, and in 5G, Elisa provides sustainable solutions for over 2.8 million consumer, corporate and public administration customers in Finland and Estonia, as well as in over 100 countries internationally. Elisa is a carbon-neutral company.**

In autumn 2022, Elisa offers fast data rates for its 5G mobile broadband subscribers with tiers ranging from 300 Mbps all the way to 1 Gbps.

Nokia is a Radio Access Network (RAN) provider for Elisa, including the major political and economic centers: the capital area of Helsinki, nearby Espoo – Finland's second largest city by population – and Oulu – the economic center in the North.

This case study provides a closer look at how 5G Carrier Aggregation helps meet the high expectations of 5G subscribers for enhanced data rates on the path to reaching superior user experience with 5G Standalone.

## Objective: delivering outstanding 5G user experience

The Finnish mobile market has one of the world's highest mobile data consumptions per subscriber. The ever-increasing data volumes create a heavy load on the mobile network. Elisa is constantly evolving its network and optimizing the performance to deliver high mobile broadband data rates even at times of peak load.

Elisa has a wide range of spectrum assets:

- 4G LTE carriers on FDD 800 MHz, FDD 1800 MHz and TDD 2.6 GHz bands
- 5G carriers on FDD 700 MHz, FDD 2600 MHz and TDD 3.5 GHz band
- Additionally, Elisa will leverage its FDD 2100 MHz band for 4G and 5G with dynamic spectrum sharing.

Already in the 4G era, Elisa implemented Carrier Aggregation to make best use of its spectrum pool. The operator was able to reach very competitive data rates and offer subscription packages based on connection speed rather than data volumes.

In autumn 2022, Elisa was running 5G both in Non-Standalone (NSA) and Standalone (SA) modes while a majority of its consumer subscribers were using smartphones in the NSA mode. This means that the operator could leverage its strong 4G foundation with Enhanced UTRAN New Radio – Dual Connectivity (EN-DC) technology, aggregating data transmitted over 4G and 5G carriers. With the objective to deliver outstanding experience for its 5G users, Elisa turned to Nokia for a future-proof 5G Carrier Aggregation solution.



## Solution: 5G Carrier Aggregation for boosting subscriber data rates and coverage

Elisa chose Nokia's 5G Carrier Aggregation technology based on its industry-leading capabilities, optimized for enabling best 5G performance. 5G Carrier Aggregation is a software feature of Nokia AirScale baseband and easy to activate in a live network.

Elisa implemented 5G Carrier Aggregation on top of its 4G-5G Dual Connectivity (EN-DC) solution. Its subscribers will benefit from fast data rates boosted by three component carriers aggregated on 4G spectrum and two component carriers combined with 5G Carrier Aggregation, all

bundled through EN-DC.

Elisa's 100 MHz allocation on mid-band 3.5 GHz TDD layer is the key foundation for outstanding subscriber data speeds. It enables the operator to confidently offer 5G subscription tiers of up to 1 Gbps guaranteed data rates.

Additionally, Carrier Aggregation has a very high impact on achieving consistent user experience from cell center to cell edge. Typically, the cell range of 3.5 GHz is more than 30% higher in downlink compared to uplink, which means that the cell

coverage is limited by the uplink reach. When Elisa aggregated the 700 MHz low-band carrier with the 3.5 GHz mid-band carrier, it was able to overcome the potential limitation of the uplink coverage as the 5G uplink signaling is transmitted over the low-band primary channel. This enabled Elisa to double 5G throughput rates at the cell edge.

The end result is a double booster to 5G user experience of Elisa's subscribers, achieved with the high bandwidth and robust coverage of the combined spectrum assets.



Double throughput rates at the cell edge with mid-band coverage extension





## 5G Carrier Aggregation is the key to superior user experience with higher resource efficiency

Operators throughout the world have different spectrum assets based on their legacy with earlier generations of wireless technologies. With the introduction of 5G, many operators are relying on the mid-band frequencies for superior data rates, but they also need a solid coverage foundation provided by low-band spectrum.

For better resource efficiency and cost savings, operators are aiming to leverage the existing grid of cell sites. This also enables faster time-to-market for the launch of 5G.

The 5G FDD-TDD Carrier Aggregation solution from Nokia discussed in this case study is widely available for operators throughout the world. Similarly to Elisa, they will be able to reach constantly high data rates for a seamless user experience from cell center to cell edge.

The evolution to Carrier Aggregation with three and later four component carriers will also ensure that Elisa's subscribers are on a path towards Multi-Gigabit speeds enabled by 5G Standalone networks and compatible smartphones.



Visit [Carrier Aggregation webpage](#) to learn more

Nokia OYJ  
Karakaari 7  
02610 Espoo  
Finland

Tel. +358 (0) 10 44 88 000

CID: 212869  
nokia.com

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