TPG Telecom pioneers Carrier Aggregation in 5G Standalone

- 5G Carrier Aggregation across Australia major cities
- Leveraging 700 MHz coverage and 3.6 GHz capacity
- 5G Standalone for all subscribers with compatible devices

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“We are aiming to deliver best mobile solutions to our customers with Australia’s smartest 5G network. One of the key steps is transitioning to 5G Standalone.

Nokia’s 5G Carrier Aggregation technology helped us combine the benefits of our low and mid band spectrum assets.

Now we can offer extended coverage and increased capacity to subscribers with devices supporting 5G SA mode.”

David Yeo

TPG Telecom General Manager of Wireless Access Network

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In Australia’s Communications Alliance Awards (The ACOMMS), TPG Telecom and Nokia won the Best Mobile Solution award for #1 global 5G Standalone network

TPG Telecom is one of the biggest telecommunications providers in Australia, serving both mobile and fixed-line broadband customers.

TPG Telecom invests in the latest and most innovative technologies to enable new services and products targeting consumers, enterprises and businesses across Australia.
In autumn 2022, it had around 5.2 million mobile customers, more than 5600 cell sites, and over 85 percent population coverage with 5G across Australia’s top ten largest cities and regions.

Nokia is a Radio Access Network (RAN) provider for TPG Telecom, including the major metropolitan areas of Sydney, Melbourne, Perth, Adelaide, Brisbane and Canberra.

TPG Telecom is widely recognized as a pioneer in adopting 5G Standalone (5G SA) architecture in its mobile network. This case study provides a closer look at how 5G Carrier Aggregation on 5G SA provides better user experience for TPG Telecom’s mobile subscribers.

Objective: providing market-leading 5G SA user experience

TPG Telecom took the strategic initiative to be the first in the market with 5G Standalone. The drivers behind this decision included:

- To realize 5G's full potential and expand 5G coverage to most of the population in Australia's largest cities and regions.
- 5G SA enables low latency and high reliability, which are critical for advanced mobile broadband. and new innovative use cases.
- 5G SA also allows for efficient 5G rural rollout on single low-band frequency carrier.

TPG Telecom wanted to make sure that its mobile subscribers with 5G SA devices have the best possible user experience by offering an attractive combination of network availability and data rates. Its spectrum assets include 3.6 GHz band (n78), which provides capacity in the cities and 700 MHz band (n28), which provides the coverage foundation both in the cities and in rural areas.

With the help of Nokia's 5G Carrier Aggregation solution, TPG Telecom is able to optimize the use of its spectrum assets for the benefit of 5G SA users.

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> ## Carrier Aggregation is critical for 5G Standalone
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> In 5G NSA, user data rates are typically boosted with EN-DC that leverages throughput from 4G LTE frequency carriers. As EN-DC is not an option in 5G SA, the entire bandwidth needs to be provided through 5G frequency carriers. Carrier Aggregation is essential for achieving high 5G SA data rates.

Solution: 5G Carrier Aggregation for improved capacity and coverage

TPG Telecom has partnered with Nokia to deploy the 5G network since 2019. Nokia's 5G Carrier Aggregation solution enables the combination of high data rates of the mid band frequency carrier with the reliable coverage of the low band frequency carrier.

The operator rolled out the solution in Australia's top ten major cities – including: Sydney, Melbourne, Perth, Adelaide, Brisbane and Canberra – to reach 85% of the Australian population.

Nokia's software activation services introduced the feature smoothly in the network while the planning and optimization team accelerated the 5G Carrier Aggregation rollout.

The aggregated carriers included:

- Between 40 MHz and 60 MHz of bandwidth on TDD 3.6 GHz frequency depending on the location, which translates into single carrier peak data rates of about 600 – 900 Mbps.
- 15 MHz of bandwidth on FDD 700 MHz frequency, allowing for a peak data rate contribution of about 300 Mbps.

In the future, when more subscribers will have 5G SA capable smartphones, TPG Telecom will be able to meet the growing 5G capacity demand by refarming 4G LTE frequency carriers to 5G. With a simple software upgrade, Nokia's 5G Carrier Aggregation feature can support 3, 4 and later even more component carriers to enable a smooth evolution path for TPG Telecom.

> Nokia's Carrier Aggregation solution is a software feature of AirScale baseband, optimized for enabling best CA performance

Key results: Higher data rates and extended coverage

With the combination of its mid band and low band carriers, TPG Telecom achieved up to **50% higher 5G data rates** compared to a single mid band carrier.

When utilizing the 3.6 GHz band, 5G users can experience challenges with uplink availability at the edge of cell coverage. With Nokia's 5G Carrier Aggregation solution, the 700 MHz band provided a **robust uplink channel**, which extended the useful range of the aggregated 3.6 GHz cells.

The end result was seamless 5G user experience for TPG Telecom's subscribers with constantly high data rates from cell center to cell edge. They also benefit from extended 5G coverage in more locations.

In the future, TPG Telecom can further upgrade its 5G Carrier Aggregation solution for a continuous evolution of supported data rates and enable advanced use cases such as virtual and augmented reality services.

5G SA **50%** higher data rates with extended coverage

Visit Carrier Aggregation webpage to learn more

5G Carrier Aggregation enables better user experience and higher resource efficiency

Operators throughout the world have different spectrum assets. The most widely used 5G frequency band globally is the n78, which enables high data rates. Many operators complement the mid-band frequencies with a low frequency band for better coverage. The n28 band is the 5G low band choice in many parts of the world.

The 5G Standalone Carrier Aggregation solution discussed in this case study can be seen as a blueprint for a successful 5G SA introduction. TPG Telecom has proven that 5G SA can be launched and operated in combination with existing 5G NSA and 4G LTE networks.

Carrier Aggregation helps make best use of the spectrum assets and deployed cell sites, increasing the resource efficiency in the radio network. It also enables faster time-to-market for the launch of 5G while bringing cost savings for the operator.

Nokia's 5G Carrier Aggregation solution is widely available for operators throughout the world. It is the key to enabling constantly high user data rates and extended coverage for a seamless user experience.

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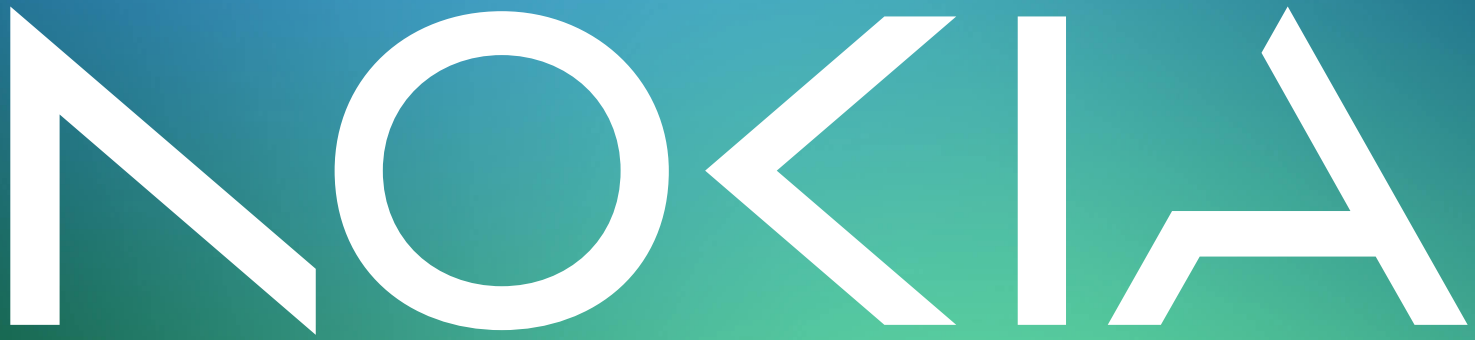

At Nokia, we create technology that helps the world act together.

As a B2B technology innovation leader, we are pioneering the future where networks meet cloud to realize the full potential of digital in every industry.

Through networks that sense, think and act, we work with our customers and partners to create the digital services and applications of the future.