du extends high-capacity microwave backhaul over long distance to Dubai World Islands

- Multiband microwave backhaul trial using Nokia Wavence Ultra Broadband Transceiver portfolio
- More than 6 Gbps throughput over a distance exceeding 5 km over water
- Optimal combination of performance and capacity enhanced by Carrier Aggregation solution

NOKIA | du

“At du, we strive to ensure a great 5G experience for our customers. The UAE is a competitive market, so we invest in reliable and innovative solutions that help enhance our 5G coverage.

Nokia offered a multiband microwave backhaul solution based on Wavence portfolio for a trial. With this solution, we were able to maintain high throughput microwave links over considerably longer distances than before. Based on the successful results, we subsequently chose Nokia as our deployment partner.

Reliable microwave backhaul for 5G opens the door for advanced mobile services in offshore locations like the World Islands in Dubai where the solution was deployed.”

Hasan Alshemeili
Vice President Technology Planning

As one of the leading telecommunications service providers in the United Arab Emirates (UAE), du has close to seven million mobile subscribers.

It also provides fixed telephony, broadband connectivity and IPTV services to consumers and enterprises. The vision of du is “to enhance your life, anytime, anywhere”.

Nokia has been providing du with microwave backhaul solutions for over seven years. Nokia also provides Radio Access Network (RAN) for all the major cities in the country.

This case study describes how Nokia helped du trial and subsequently deploy a multiband microwave backhaul solution combining high-capacity E-Band radios with the extended reach of lower frequency links.

World Islands is a man-made archipelago just off the coast of Dubai that consists of several artificial islands and replicates the world map in miniature.

The development of World Islands is ongoing with planned residential, shopping and entertainment areas, as well as transportation hubs, which will all require reliable, high-capacity 5G connections.

Objective: extending the reach of high-capacity microwave backhaul

With the evolution of its 5G network, du aims to provide high-speed connectivity to its subscribers throughout Dubai.

To maintain reliable service levels and a high quality of experience, du aimed to enhance its microwave backhaul capabilities and extend the reach of its high-capacity backhaul to off-shore locations including the artificial archipelago called Dubai World Islands.

In this type of deployments, fiber backhaul is not a cost-effective alternative. In addition, microwave backhaul is faster to deploy when building coverage for islands and other remote locations. Microwave transport technology also enables flexible and cost-efficient backhaul expansions for additional 5G coverage.

The objectives of du included:

- Enhancing microwave backhaul capacity to meet the increasing volumes of mobile traffic.
- Enabling a high-capacity microwave backhaul link to serve the off-shore World Islands, a capability also applicable to rural areas.
- Ensuring reliable connectivity on the islands, which requires stable performance over long links.

Several vendors had the opportunity to demonstrate their solutions. du chose Nokia's multiband microwave backhaul solution that leverages Carrier Aggregation for an optimal combination of performance and capacity using the available spectrum frequencies.

Deployment setup and results: reliable microwave backhaul for high performance and availability

In November 2022, Nokia helped du implement a multiband microwave backhaul trial and the subsequent deployment for connecting Dubai World Islands.

The microwave frequency bands used consisted of du's traditional 18 GHz band and the more recently allocated 80 GHz band, also known as the E-Band.

The solution combined the capabilities of these frequency bands: the higher frequency band enables wide channel bandwidths while the lower frequency band offers better propagation properties, resulting in greater link distances.

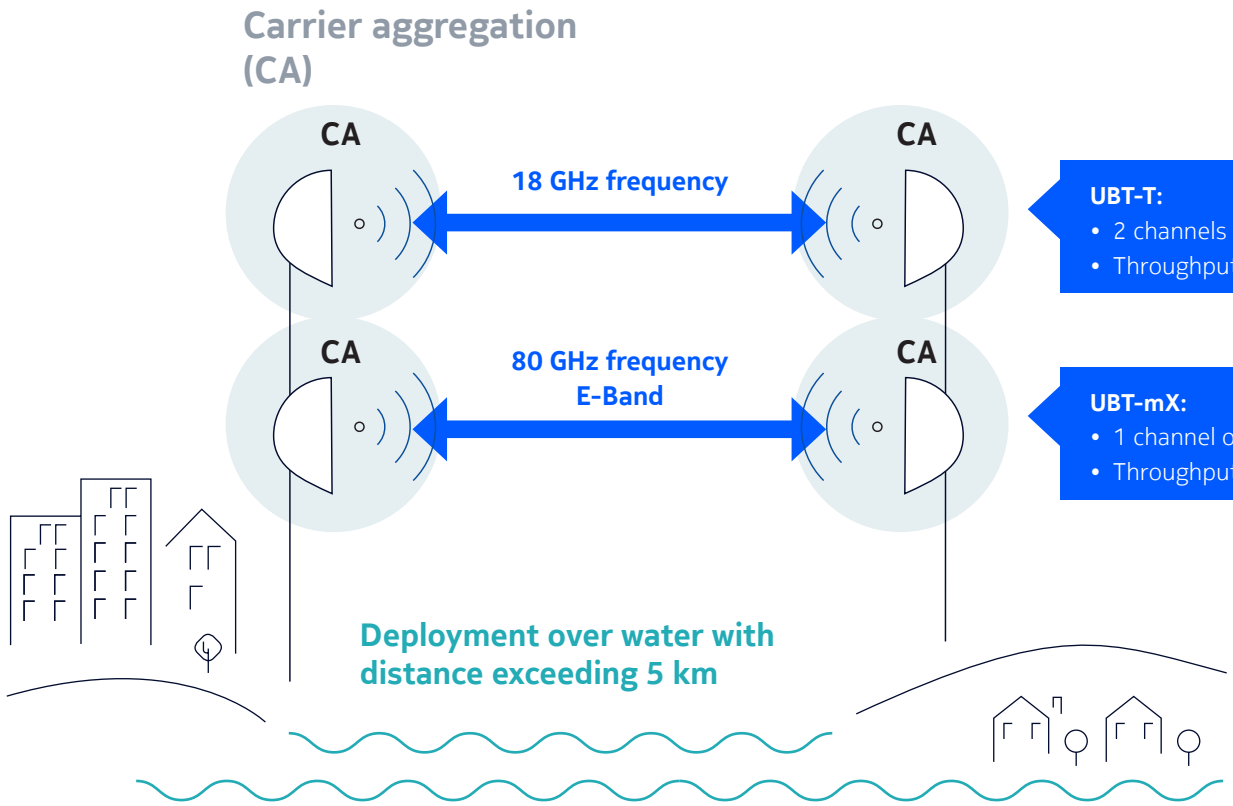
The solution included two types of radio units from the Wavence Ultra Broadband Transceiver (UBT) portfolio: the dual-carrier UBT-T and the high-power UBT-mX, as well as Carrier Aggregation software.

The result was a reliable microwave backhaul solution with deployment over water, exceeding 6 Gbps throughput over a distance of more than 5 km, and meeting the performance and availability requirements of advanced 5G services for both consumers and enterprises.

Carrier Aggregation was the key to enhancing spectral efficiency and maximizing the backhaul performance over long links. By leveraging this technology, du will be able to reduce the number of links needed to maintain a high-capacity backhaul connection also in other remote locations.

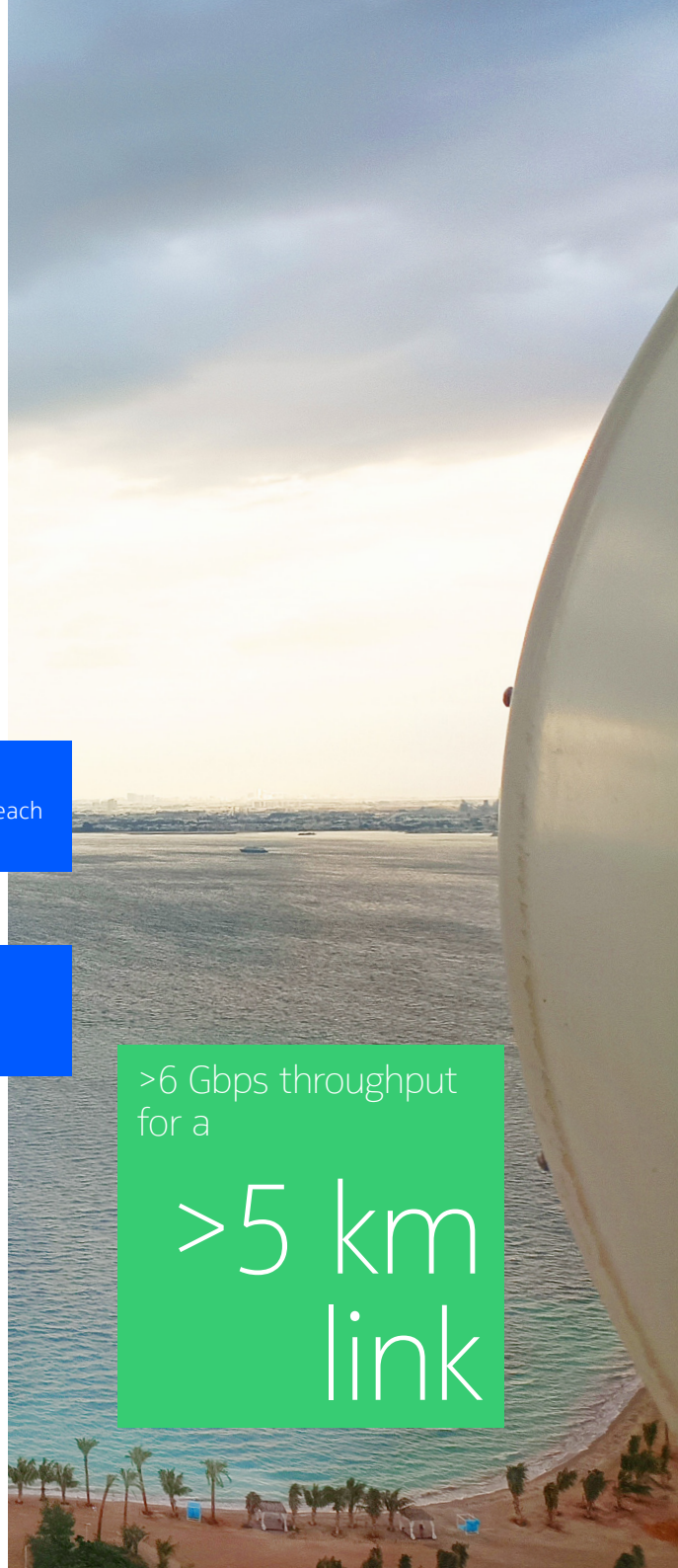
The following illustration shows the trial and deployment setup. Nokia's Wavence portfolio showed the best performance and technology among all the vendor solutions trialed by du.

Over 6 Gbps throughput with three channels



UBT-T:
- 2 channels of 112 MHz each
- Throughput 1.2 Gbps

UBT-mX:
- 1 channel of 2000 MHz
- Throughput 4.9 Gbps



>6 Gbps throughput for a

>5 km link

Microwave backhaul helps extend the reach of 5G to more locations

Microwave backhaul has a crucial role in telecommunications networks for transmitting and receiving data. Typically, wireless links are significantly more cost efficient and faster to deploy than fiber backhaul. Today, most mobile operators worldwide rely on microwave as the backhaul technology, in fact, nearly 70% of backhaul traffic travels over microwave links.

As operators transition to 5G, mobile networks must meet the requirements of more bandwidth-hungry services, which also drives demand for increased backhaul capacity.

Carrier Aggregation is the key technology for achieving the optimal combination of performance and capacity on combined frequency bands. It also reduces the number of links needed to maintain a high-capacity backhaul connection, enabling a faster roll-out of 5G services to more remote locations.

Microwave backhaul performance is dependent on the propagation characteristics of the available frequencies. In du's deployment, E-Band offers better throughput and enables the use of smaller antennas for the same antenna gain while the lower 18 GHz frequency band offers better coverage and more consistent performance.

Nokia Wavence multiband microwave backhaul solution described in this case study is based on the Ultra Broadband Transceiver portfolio. It provides the capabilities needed for du to maintain reliable backhaul throughput over long distances.

Nokia Wavence radio units are commercially available to implement reliable microwave backhaul networks that can leverage a variety of frequency bands.

Visit the Wavence Microwave Transmission webpage to learn more.

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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.