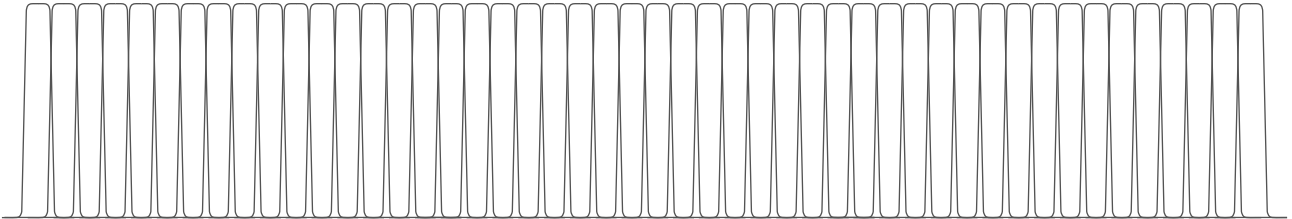


# Massive Multi-Carrier



## A breakthrough radio technology

X-Series is transmitting a very large number of narrow-band microwave sub-carriers. Each sub-carrier offers intrinsically superior transmission performance compared to a single carrier, wide-band channel.

All RF sub-carriers are then aggregated into a single virtual Layer 1 circuit, creating a super low-latency, high-capacity transmission channel.

Massive Multi-Carrier is a revolutionary digital RF aggregation technology, developed by Spectronite. It is shaking the foundations of the microwave industry at the convergence of traditional short-haul and long-haul.

## Long-haul turns digital

X-Series is re-defining long-haul.

While traditional long-haul relies on channel aggregation in the analog domain, Massive Multi-Carrier does it all in digital.

Trunk radios require highly complex hardware filters and branching units to combine RF carriers at the final microwave frequency, X-Series does it all in baseband, in a single full-outdoor unit.

Furthermore, the number of aggregated channels is impressive, going far beyond typical 8+0 setup to achieve a record 256+0.

X-Series also breaks the frequency limits of long-haul radios, opening up the upper bands at 13, 15 and 18 GHz to achieve multi-gigabit capacity in the 20 km to 50 km distance range.

## Full spectrum agility

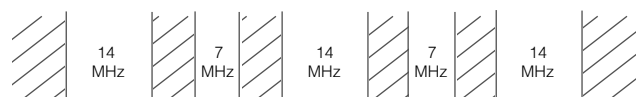
Spectrum is scarce. Every slot counts.

With Massive Multi-Carrier, each sub-carrier can be positioned to fill in even the tiniest gaps in between existing frequency blocks.

Each bandwidth and center frequency is fully software configurable, allowing for the aggregation of any non-adjacent white-space even in the highly occupied and lower frequency bands.

A true re-generation of the lower frequency spectrum.

Massive Multi-Carrier allows spectrum aggregation over a scattered RF band



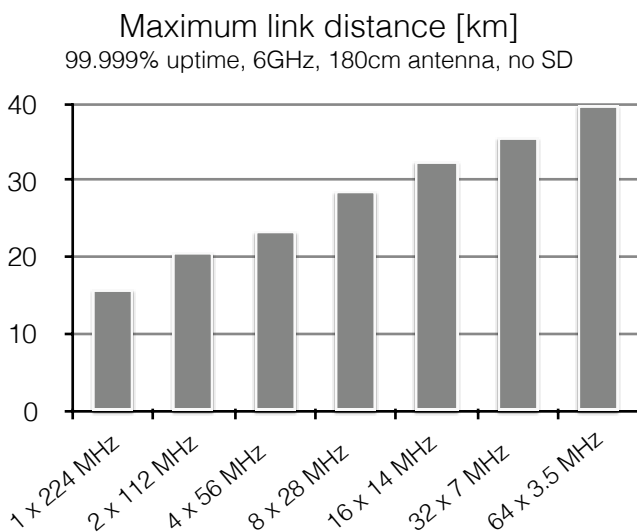
## Decouple distance from capacity

When planning for a microwave link, RF engineers define a transmission system to meet a specific capacity over a given distance. Any further capacity increase will then impact strongly this system, with the need for larger antennas at best case, or the dismantling and switch to a lower frequency system otherwise.

At the opposite, with Massive Multi-Carrier, capacity depends solely on the number of RF sub-carriers. For the first time, RF links become forward compatible, with pure software capacity provisioning.

With X-Series, deploy today a network that grows as your capacity needs evolve.

# How superior?



## Twice the distance

Today's highest capacity radios use monolithic channels of 112 or 224 MHz.

The larger the channel, the shorter the distance.

The graph (left) shows the benefits of multi-carriers on maximum link distance.

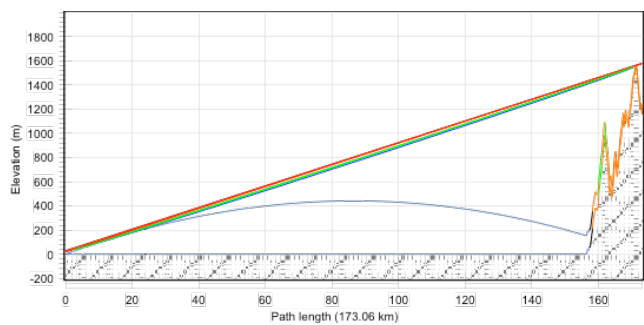
Using sub-carriers of 3.5 MHz allow for twice the distance of a 112 MHz radio and even more compared to 224 MHz.

## 173km, 2 Gbps

6 GHz, 180cm, Space Diversity,  
2 Gbps with 99.999% uptime.

X-Series was benchmarked on one of the longest links on the planet, against the solution of a competitor. Current product is a long-haul radio with N+0 analog aggregation, providing 40 Mbps capacity.

With 160+0 digital aggregation, X-Series brings it up to 2.5 Gbps in just one single full-outdoor unit.



## Share your RF challenge

80% of network requirements can be met with traditional microwave products. Usually, difficulties lies in the remaining 20%.

The challenge can be to cover the extra few miles without which a costly new tower would be needed. The difficulty lies in getting that additional Gigabit required by your planning team to serve a remote eNodeB or this new corporate customer.

We invite you to share your most difficult planning scenario. If a solution exists, X-Series has it.