# Intelligently balance traffic between cells/bands

**Aglocell**

## Executive Summary

The case study focuses on a US tier 1 wireless carrier's trial of Aglocell Maximizer algorithms in their communication network. The case study demonstrated how to unlock underutilized mobile capacity by optimizing traffic distribution and inter-frequency handovers in a US tier 1 wireless carrier's network. Aglocell's Layer Maximizer calculated a more effective baseline for handover parameters. This enabled real-time network management

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and optimization systems to do an even better job. The case study documents how Aglocell created significant capacity and throughput improvements as well as opportunities for capex savings. The case study explored the implementation of Aglocell's Layer Maximizer algorithms in a Radio Access Network (RAN) to Intelligently balance traffic between cells/bands improving PRB utilization and "fast enough" speeds.

Key findings include:

1.    Identification of a threshold for Signal Interference plus Noise Ratio (SINR) in RAN cells, beyond which there is a noticeable decline in downlink (DL) throughput and overall network capacity.

2.    The application of Aglocell algorithms led to a significant reduction in interference and an enhancement in SINR. This was achieved through refined RF tuning and adjustments in layer management parameters.

3.    Notably, these algorithms boosted the measured SINR in low-band frequencies by 44%, which correspondingly decreased low-band exhaustion, improving network efficiency and performance.

## Challenges

The rapid increase in mobile data demand has led to denser wireless networks, particularly in cellular systems. This density, initially managed through carrier additions to macro cells, is shifting towards cost-effective software solutions that improve Signal to Interference plus Noise Ratio (SINR), crucial due to the limited spectrum and resulting interference. Interference, especially in low band frequencies, significantly limits performance.

## Algorithm Functionality

Unlike existing tools, Aglocell considers both signal and load conditions, as well as their combined effect on throughput across all frequencies and cells in a single mobile network. Working in the cloud and without direct integration into MNO's network data streams, the solution conducts millions of "what-if" comparisons, the solution establishes the optimal combination of baseline settings for the handover parameters. Periodic parameter setting updates keep demand growth and network changes in check. Aglocell Layer Maximizer fills a previous gap in mobile network management, complementing existing systems and tools.



Low Band Device Mean Average SINR
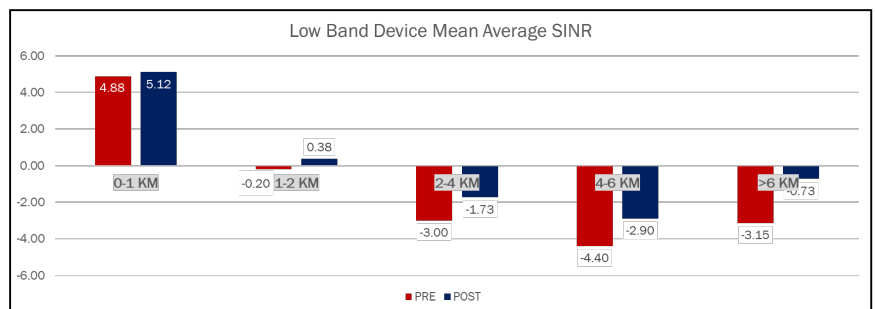
Current network management solutions only optimize select areas of a network at a time. Aglocell Layer Maximizer looks at the entire network and optimizes load across all deployed frequencies and cells. When a cell exceeds a load threshold, existing load balancing solutions change handover parameter This reduces the size of the overloaded cell The adjacent cells must take over the load in the white dotted line areas in the image, if they can. SON and network management systems work one cell at a time and must find neighbors that have capacity.

Aglocell's Layer Maximizer optimizes globally across all cells and frequencies. It can, therefore, adapt all of them to harness all underutilized reserves. This is done by finding the right combination of standard 3GPP individual offset parameters for handovers. Together, these globally optimized parameters bring a dramatic improvement in capital efficiency and network performance by overcoming the limitations in traditional tools.



Busy Hour PRB Utilization %

• No new hardware or costly implementation

• Best outcomes in dense urban areas

• Uses standard 3GPP handover
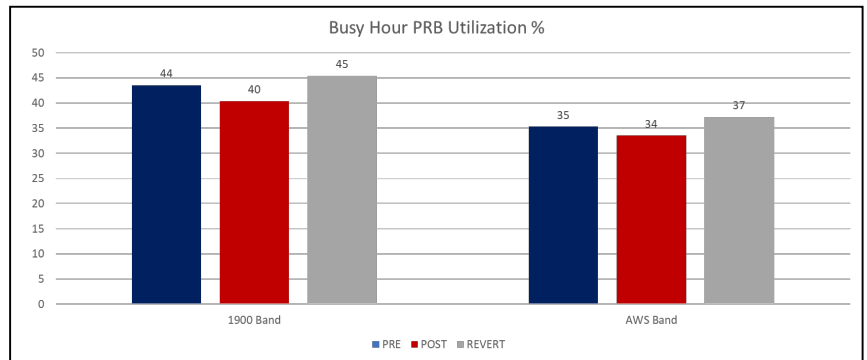
Aglocell Layer Maximizer algorithm benefits include:

• Reduces cost and improves user experience

• Optimizes network utilization and reduces overall network load

• Balances load and signal conditions in multiple frequency layers

• Immediate ROI impact