5G Open RAN Fronthaul & Midhaul Network Impairment Emulation
Precise sub-milisecond delays AND packet capture capability at 10GbE and 25GbE

Customer:	**A large 5G RAN Equipment Vendor (Customer)**
Aukua's Solution:	**XGA4250 Network Impairment Emulator - 10GbE and 25GbE**

Problem

Customer's 5G Client Support Team was in the process of testing and verifying 5G cell site configurations and topologies for one of their key 5G Mobile Operator customers (Operator). As part of the official Acceptance Testing, a mandatory interoperability test that had to be performed was emulation of a longer Cell Site Router (CSR) to Distributed Unit (DU) Fronthaul connection . The required test delay was **sub-millisecond per the O-RAN Alliance Interoperability Test Plan**. The CSR to DU operates at a speed of 10GbE. In addition the customer needed to do the same type of testing at up to **20ms** of delay for the DU to Centralized Unit (CU) Midhaul connection which operates at 25GbE. Finally, it was highly desired that the same test solution also have the capability of capturing the traffic to assist in troubleshooting issues.

Solution

Aukua offered a pair of XGA4250s with the 25GbE Network Impairment Emulator. The XGA4250 was able to accurately provide the required delay scenarios for both the Fronthaul and Midhaul links. In addition, the Aukua platform through its Packet Capture Analyzer provided greater visibility and capture capabilities to troubleshoot issues at 10GbE and 25GbE speeds.

Aukua Advantage

Customer chose Aukua for several reasons:

1. Our ability to offer accurate small and large delays with fine precision control for both 10GbE and 25GbE.
2. Our ability to provide line rate packet capture at those same Ethernet speeds
3. Customer really appreciated the intuitive easy-to-use graphical user interface

Customer initially tried using two Network Emulators from another T&M vendor. Despite repeated attempts, and help from the vendor, the customer equipment was never able to achieve end to end link when the other T&M vendor was placed inline. It is believed this was likely due to the minimum link delay being too high and too much delay variation noise for 5G O-RAN applications. In addition the other T&M vendor equipment did not support packet capture capability.

Overall Result (ROI) for this Customer

This O-RAN interoperability test was a required milestone with our Customer's 5G Mobile Operator end customer that failing it would trigger penalties. Until the customer contacted Aukua, they were NOT able to complete their customer-required testing and were in jeopardy of losing their customer all together! The customer also stated *"The Aukua was much faster and easier to use compared to your competitor"*.

Aukua Systems
www.gch-services.com

+44 1628 559980
sales@gch-services.com

© 2015-2023 Aukua Systems, Inc. All rights reserved.
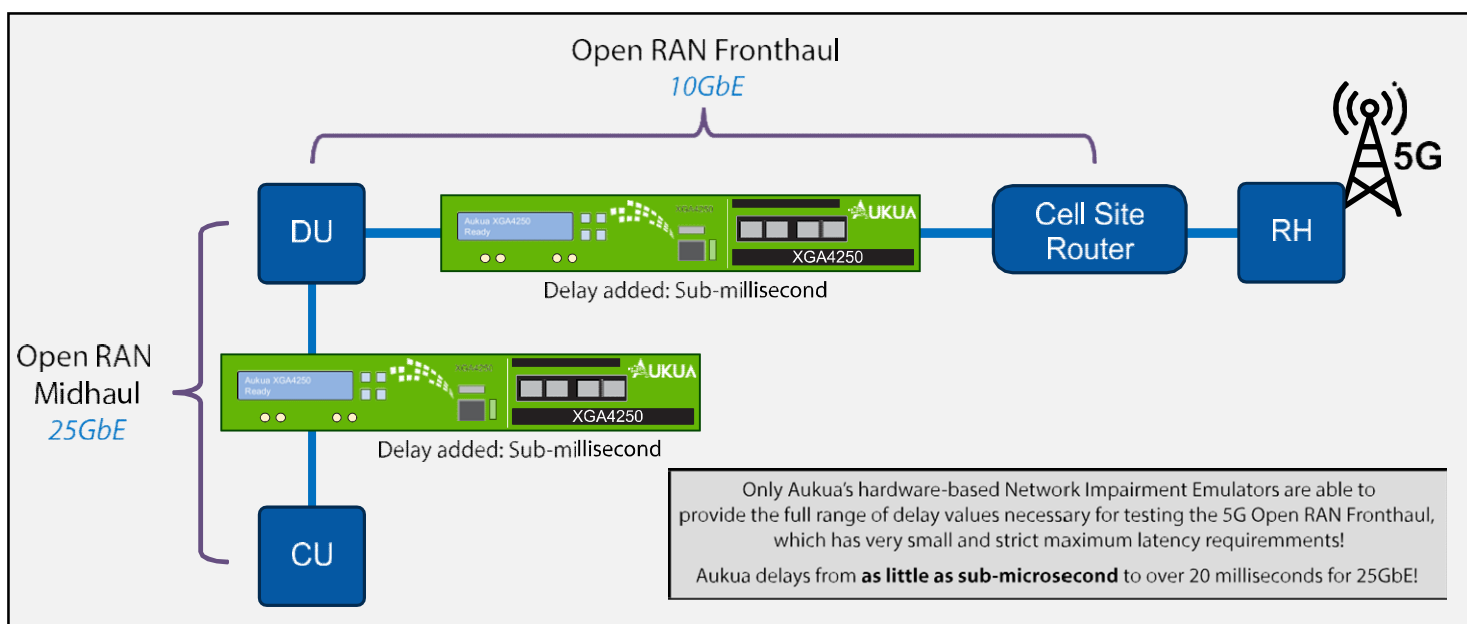CS5GR-1223A

Network Test Bed Topology

As part of the Operator's acceptance testing requirements, Aukua's Customer placed an Aukua Network Impairment Emulator (NIE) between the DU and CSR devices in their lab to precisely emulate the required sub-millisecond delay in the Operators Fronthaul network. Customer also placed a second Aukua NIE between the DU and CU devices to emulate delays up to 20ms for the Operators Midhaul network.

The primary goal for our Customer was to pass their Operator client's acceptance test requirements. And for this, the Aukua NIE was fundamentally required! Aukua's Customer needed a way to **prove** their solution can provide the expected functional and performance levels even in the presence of this Operator's unique delay requirements.

And additionally, Customer now has a proven test methodology that can be easily leveraged for their many other customer engagements. Further, the Aukua NIE enables it's Customer to test and characterize the performance limits of their 5G Open RAN solutions beyond the limits of just this Operator's delay requirements.

Finally, Customer was excited to choose Aukua because this same test solution is capable of providing industry-unique Layer 1 and Layer 2+ visibility which helps simplify and speed up troubleshooting those hard to find issues.

Others that can benefit from Aukua's Solution

All 5G mobile equipment/RAN vendors and related System Integrators (SI). As well as mobile network operators evaluating competing 5G mobile network technologies or solutions. All of these customers **will require** a lab-based test solution that can accurately and repeatably emulate the delay and impairments scenarios that will be present in all real-world 5G Fronthaul, Midhaul and Backhaul networks.