**OTT Aggregation Webinar Q&A**

**Q - Can OTT aggregation work with 5G and Wi-Fi?**

A - Using the same principle as demonstrated with LTE and Wi-Fi, the OTT aggregation solution should work with both 5G and Wi-Fi.

**Q - Can OTT aggregation be used to aggregate two separate cellular networks?**

A - Not unless the device has two separate LTE radios. The underlying principle of OTT aggregation is to use inherently separate interfaces for LTE and Wi-Fi, which is due to the separate radios for both technologies on mobile phones.

**Q - What should operators be aware of while implementing OTT aggregation?**

A - If an MSO decides to implement OTT aggregation on select Wi-Fi SSIDs that are being broadcasted by the MSO, then OTT aggregation should be enabled only when the solution detects certain SSIDs. The dynamic enabling and disabling of OTT aggregation means that a change in IP address could introduce noticeable interruptions for certain applications. The enabling and disabling of OTT aggregation thus should be handled carefully, taking users’ real-time activity into consideration.

**Q - Can the OTT vendor implement the solution on his or her own without any operator involvement?**

A – Certainly! However, selling the OTT aggregation solution as an application may present a challenge for the OTT vendor—specifically, getting a large subscriber database in a short period of time. Many OTT vendors prefer to work with wireless operators to implement and embed the OTT applications within phones. Implementing the solution through operators eliminates the need to expose the application to the end-user, and the policies on the server side can be based on operator preferences, giving more control to the operators to make dynamic changes.

**Q- Why is OTT aggregation important from a CBRS perspective?**

A - Many MSOs are looking to enter the cellular space with CBRS. However, because CBRS is a shared spectrum solution, it may not guarantee a fixed allocation of spectrum, transmit power and bandwidth in the case of CBRS General Authorized Access (GAA) deployments. With increased GAA deployments, there will be an increase in interference. Even with Priority Access License (PAL) deployments, the bandwidth and coverage will be limited, and the spectrum allocation may change if the PAL deployments are close to the coast, where the Environmental Sensing Capability (ESC) detects naval radar. Under such conditions, OTT aggregation could benefit MSOs to increase the data rates in overlapping coverage areas of CBRS and Wi-Fi hotspots.

**Q - Does OTT aggregation solution aggregate both flow-based and packet-based traffic?**

A - Some OTT aggregation solutions currently support only flow-based aggregation, whereas others support both flow-based and packet-based aggregation.

**Q - The testing that was described in the webinar focused on downlink. Can OTT be used on uplink and downlink simultaneously? Which operational mode would be best suited to support this?**

A – Yes, the testing focused on downlink, but the benefits of OTT are not limited to downlink. The increase in data rates can be on both uplink and downlink simultaneously. There are no specific modes for uplink, but maximum or target throughput modes can benefit uplink data rates, assuming the uplink data rates on the cellular network are high enough to meet user demands.

**Q - Where is the best location (e.g., cloud, operator network) for an aggregation server to support OTT? What use cases best support the location?**

A – OTT aggregation performance should not be affected by server location, whether physically in the operator’s network or in cloud. Any use case should be able to use either deployments. The key factor is to assess the performance of the OTT aggregation solution with different delays when travelling through the cellular and Wi-Fi network.

**Q - Are any mobile or Wi-Fi operators using OTT today? If no, why not?**

A – Currently, many wireless operators are exploring OTT aggregation, but they do not seem to have formally implemented them. However, OTT aggregation solutions are gaining traction with wireless operators.

**Q - How sophisticated are the user interfaces for OTT? That is, how much decision-making does a user have while using OTT? Can it be customized to a user’s behavior or habits (e.g., switch OTT on while at an airport before boarding a plane to download a movie)?**

A – The user interfaces for OTT aggregation solutions are sophisticated. If the operator implements OTT aggregation and has the client embedded on the end-user device, the end-user will not have to be involved in decision making. The policies on the server will be based on operator preferences. The user’s behavior or habits can be studied to further enhance the solution with Artificial Intelligence (AI). However, the implementation of the solution will depend on how the operator wants to implement the solution.

**Q: Does OTT aggregation affect latency?**

A – No. In a way, it improves the latency. Instead of sending packets over a single network interface, the OTT aggregation solution sends packets simultaneously on both LTE and Wi-Fi, increasing data rates and decreasing latency. Latency can be an issue in which either the LTE or Wi-Fi link is significantly faster than the other. The OTT aggregation algorithm should be able to dynamically adjust the number of packets sent on each link based on the latency.

**Q: Is a VPN required to do OTT aggregation on iOS and Android?**

A: Without aggregation, both LTE and Wi-Fi networks assign an IP address to the end device. The device uses one of the IP addresses for data communication. As part of the OTT aggregation solution, there is a VPN tunnel (IPSec) created between the OTT client and the OTT aggregation server, and a new tunneling IP is assigned to the devices. Using the tunneling IP, the packets are routed to the OTT aggregation server using both LTE and Wi-Fi links simultaneously.