

Memogram AB

WiFi Integration & Traffic Offload for 4G/LTE

Background and Course Description



The commercial roll out of LTE has been a true success story. With the introduction of new 4G radio technology and boosted by more radio spectrum, 4G/LTE is perfectly positioned to cope with the increasing demand from heavy data traffic.

However, in order to secure future traffic capacity demands in a cost efficient manner, the operators are establishing strategies for small/femto cell and HetNet deployments. In that context, the *WiFi traffic offload*, as specified by 3GPP, is considered to be an attractive complement.

WiFi access is already integrated in most client devices today. However, WiFi and 3GPP technologies are regarded as two separate devices in one box. The first initiative to integrate WLAN access in 3GPP specifications was taken in 3GPP R6, the Interworking WLAN (I-WLAN) specifications. In the 3GPP Evolved Packet Core (EPC) R8 specifications and later on, the integration of WLAN access with LTE includes major enhancements, among them being *RAN level integration, QoS based inter-access IP mobility, traffic offload optimization mechanisms and OSS/BSS enhancements*.

This course aims to deliver a deeper understanding on how the WiFi access is integrated to provide seamless connectivity, following the 3GPP specifications:

The starting point is the ongoing mobile data traffic explosion and the future demand for more capacity; Challenges related to LTE capacity upgrades are presented, and the 3GPP releases are clarified in terms of available and foreseen WiFi integration features. Furthermore, the WiFi/IEEE architectures and radio characteristics are presented and compared to the 3GPP LTE radio technology. The access network *selection principles* and operator *policies* are detailed, including important aspects on *QoS, authentication, charging and provisioning*. In addition, the *seamless mobility* options are explained, covering the client centric and network controlled scenarios. The key features of 3GPP's *ANDSF* are compared to the *WFA/Hotspot 2.0 defined ANQP* options, and exemplified with different traffic scenarios. Finally, references to available implementations from some major product vendors are given.

Who Should Attend

This course is relevant to mobile industry professionals who are responsible for business or product development, access and core network development as well as to those dealing with capacity planning and network optimisation.

Course Objectives

After completing the course, the participants will be able to describe in detail the following:

- How WiFi access is integrated into the mobile operator's LTE network
- Which enhancements are required by the devices, the mobile network and WiFi access network
- How the new capabilities are provisioned and managed
- Which benefits are achieved by introducing WiFi Offload according to 3GPP specifications

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Course Content

The following topics define the scope of the course:

- **Market expectations and Industry trends**
 - Current and future data traffic demands and characteristics
 - Mobile operators vs WiFi access service providers
 - 3GPP vs IEEE/WiFi Alliance/Wireless Broadband terminology & standardisation
 - 3GPP release plan on HetNet, Femtocells and WLAN integration
- **Wireless LAN architectures, Roaming and Radio Performances**
 - IEEE standards 802.x and ISM spectrum allocations
 - WiFi Alliance & Wireless Broadband Alliance guidelines
 - Public Operator WLAN system architecture
 - WiFi based mobility and WISP roaming principles
 - AAA, NGH/HotSpot 2.0, WiFi Direct and WiFi voice calling
 - Performance benchmark and WFA certifications
- **LTE architecture, Roaming and Radio Performances**
 - E-UTRAN architecture and radio performance
 - Similarities between LTE and WLAN radio: MIMO, OFDMA and Carrier Aggregation
 - EPC system architecture including interfaces to non-3GPP access
 - Intra-LTE/IRAT Handover & Idle mode mobility in LTE
 - IP session continuity vs. VoLTE service continuity in LTE
 - The role of P-GW, PCRF and HSS for access integration
- **The 3GPP Implementation of WiFi Integration and Traffic Offload**
 - Architecture enhancements for non-3GPP access integration ('Carrier WiFi')
 - Definition of 'trusted' and 'non-trusted' WiFi access
 - Discovery, Addressing and Authentication procedures for WiFi access
 - Controlling the WiFi/3GPP Access Selection by ANDSF mechanisms
 - Initial UE registration over WiFi access with/without SIM-based authentication
 - RAN level support for inter-system mobility and WiFi offload
 - Device configuration options & Service provisioning (OMA_DM and GBA_Push)
 - Device support for multiple network policies & ANDSF policy delegation
 - Inter System Routing and Mobility Policies for WiFi integration (ISRP and ISMP)
 - Subscription based tailoring of ISMP, ISRP and discovery information
 - Optimizing WiFi traffic flows: simultaneous multi-access connectivity
 - MAPCON, IFOM and non-seamless Offload implementation scenarios
 - 3GPP/ANDSF and WFA/HotSpot2.0 complementarities
 - OSS/BSS integration challenges
 - Example of current product implementations for WiFi integration
 - Deployment strategies: Summary

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(Course content cont.)

- **Traffic Cases and end to end scenarios for WiFi integration and traffic offload**
 - Scanning and access selection procedures
 - Initial Attach over trusted and non-trusted WLAN access
 - P-GW initiated Resource Allocation Activation/ Deactivation in WLAN
 - Network initiated bearer modification using dynamic PCRF procedures
 - UE Initiated packed data connectivity request procedure in WLAN - for Multi-connection Mode
 - Handover procedures: from 3GPP access to WLAN
 - Handover procedures: from WLAN to 3GPP access
 - Direct peering with Local Breakout

Prerequisites

Attending this course will require certain experience from ICT in general and preferably from mobile operator/vendor or Enterprise networking.

Duration

2-3 days full time. Three days length is recommended to the audience with no previous training on LTE technology.