

Technology Primer: Licensed Assisted Access (LAA)

Instructor Led Live Virtual Class | Duration: 0.5 Day | Course Number: TPR1032

Technology Primers

Exponentially rising data traffic, scarcity of spectrum, and expectations of enhanced user experience are leading operators to explore the use of unlicensed spectrum to carry traffic. 3GPP has defined specific approaches for using the unlicensed spectrum. In one approach, some or all of the traffic is carried by the Wi-Fi network in the unlicensed spectrum. Example mechanisms of such approach include Wi-Fi offload and LTE-Wi-Fi Link Aggregation (LWA). In another approach, the traffic is carried by LTE and its evolutionary technologies (e.g., LTE-Advanced) simultaneously on licensed spectrum and unlicensed spectrum. Example mechanisms of such approach include Licensed Assisted Access (LAA), LTE-Unlicensed (LTE-U), and enhanced LAA (eLAA). Operators around the globe are in the process of deploying LAA. The course first provides an overview of these mechanisms. The course then provides a closer look at key components of LAA, LTE-U, and eLAA such as Small Cells, Carrier Aggregation, and spectrum-sharing techniques. Operational similarities and differences between LTE and LAA (e.g., RRC configuration and data transfer) are also highlighted.

Intended Audience

This is a basic overview course, primarily intended for those in system integration and test, systems engineering, operations and support, LTE network planners, design engineers and managers.

Learning Objectives

After completing this course, the student will be able to:

- Explain the motivation behind the use of unlicensed spectrum
- Distinguish among Wi-Fi offload, LWA, LTE-U, LAA, and eLAA
- List benefits of using LTE in unlicensed spectrum instead of Wi-Fi
- Identify key technology components for LAA, LTE-U, and eLAA
- Describe the mechanisms that LAA uses to share the unlicensed spectrum with Wi-Fi networks
- Summarize how downlink data transfer occurs in LAA
- Summarize required changes in the UE and the network to support LAA

Suggested Prerequisite

- Working knowledge of LTE and LTE-Advanced
- [LTE_102] LTE Overview (eLearning)

Course Outline

1. LTE in Unlicensed Spectrum

- 1.1. Motivation for unlicensed spectrum
- 1.2. Evolution of unlicensed LTE
- 1.3. LTE-Wi-Fi interworking
 - 1.3.1 Wi-Fi offload
 - 1.3.2 LWA
- 1.4. Carrier aggregation with unlicensed spectrum
 - 1.4.1 LTE-U
 - 1.4.2 LAA and eLAA

2. Key Technology Components

- 2.1. LTE vs. Wi-Fi
- 2.2. Unlicensed spectrum: bands and FCC regulations
- 2.3. Small Cells
- 2.4. Carrier aggregation
- 2.5. Spectrum-sharing mechanisms
 - 2.5.1. Dynamic channel selection
 - 2.5.2. CSAT
 - 2.5.3. Opportunistic SDL
- 2.6. Listen before Talk (LBT)
- 2.7. Channel access priority classes
- 2.8. Hidden node discovery
- 2.9. Discovery Reference Signals

3. LAA Operations

- 3.1. Bearer setup
- 3.2. UE capability exchange
- 3.3. SCell configuration and activation
- 3.4. DL data transfer
- 3.5. UE and network changes for LAA