

# Voice over LTE (VoLTE) Fundamentals

Instructor Led Live Virtual Class

Duration: 2 Day (10-15 hours) | Course Number: LF-VOLTE-200

## Intended Audience

This course is intended for those seeking technical details of a typical VoLTE network architecture and its operations.

## Course Description:

VoLTE (Voice over LTE) is the preferred solution for delivering voice over LTE networks, based on the IP Multimedia Subsystem (IMS) architecture. This course is designed to present IMS/VoLTE architecture and call flow scenarios from the perspective of a typical wireless operator. The course starts with a detailed look at the end-to-end IMS core architecture in a wireless operator's typical VoLTE network then steps through the various stages of interactions of User Equipment (UE) and LTE Radio, EPC and IMS network elements. Discussions cover initial IMS/VoLTE registration, covers the details of key service scenario such as IMS registration, VoLTE to VoLTE call setup and VoLTE to PSTN/3G call setup. The role of key nodes during call setup such as ENUM and TAS is covered. Finally, the topics of VoLTE KPIs and impact to the UE, RAN and core networks are covered for VoLTE deployment.

## Course Objective:

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

- Sketch VoLTE architecture and describe the functions supported by each VoLTE network component
- Identify key interfaces and related protocols such as SIP, Diameter, RTP, H.248
- Step through the key VoLTE operations:
  - IMS registration
  - VoLTE to VoLTE call setup
  - New bearer setup for VoLTE QoS
  - VoLTE interworking with PSTN/3G
- Sketch an end-to-end signaling and traffic paths for VoLTE
- Describe how QoS is enforced in LTE network for VoLTE
- List the quality and capacity related KPIs for monitoring of VoLTE operations

## Pre Requisite

- Understanding of LTE and VoLTE networks

## Course Outline:

### 1. VoLTE Overview

- a. What is VoLTE?
- b. Role of LTE and IMS for VoLTE
- c. Voice and video features
- d. Enhancements for VoLTE

### 2. IP Multimedia Subsystem (IMS)

- a. Components
- b. CSCFs

- c. HSS & AAA
- d. Fixed & Wireless IMS Access
- e. IMS Registration Flow

### 3. VoLTE in LTE Networks

- a. VoLTE IMS architecture
- b. VoLTE call model
- c. Role of CSCFs
- d. Role of DRA and SLF

#### 4. Registration in VoLTE

- a. Default bearer connectivity to IMS
- b. P-CSCF discovery
- c. SIP, SDP, Diameter, H.248, RTP
- d. Private and public user identities
- e. User registration
- f. App servers such as TAS, PS, SCG
- g. Registrations with app servers
- h. Exercise: End-to-end message ladder

diagram of VoLTE registration

#### 5. VoLTE Call Setup

- a. End-to-end VoLTE to VoLTE call setup
- b. ENUM and TAS during VoLTE call setup
- c. VoLTE call release
- d. Exercise: End-to-end message ladder

diagram of VoLTE to VoLTE call

#### 6. SMS Support in IMS

#### 7. QoS for VoLTE Calls

- a. P-CSCF, PCRF, and P-GW for QoS enforcement
- b. Dedicated bearer setup
- c. QoS enforcement and scheduling
- d. Dedicated bearer release

#### 8. VoLTE Interworking Calls

- a. ENUM for PSTN/3G call setup
- b. SR/SBC, MRFC, MRFP
- c. Signaling and traffic paths
- d. Exercise: End-to-end message ladder

diagram of VoLTE to Non-VoLTE call

#### 9. VoLTE Deployment

- a. New network nodes for VoLTE in MTSO
- b. eNB, S-GW, P-GW enhancements
- c. Device impact
- d. VoLTE KPIs