Introduction to V2X

Course Description
As LTE Advanced Pro technologies become more prevalent on the road to 5G, vehicular based communication is seen as a key element of the future network ecosystem. This short course is designed to introduce the main concepts behind V2X technology. As such, V2X will be considered on a high-level basis, with focus on the architecture required, as well as key aspects such as authorization, operation over both the PC5 and LTE-Uu interfaces, network procedures and also the intended approach to V2X security.

This course has no prerequisites.
This course will contain the following sections:

1. Introduction to V2X

**Topic areas covered include:**

- **V2X Concepts and Drivers:**
  - Concept and drivers.
  - V2X communication types (V2V, V2P, V2I, V2N).
  - Use cases.

- **V2X Architecture:**
  - Modes of operation.
  - V2X subsystem architecture.
  - Reference points, identities and functions.

- **V2X Authorization and Provisioning:**
  - Authorization process and parameter provisioning.
  - Sidelink communication overview.

- **V2X over PC5:**
  - Direct communication enhancements and key characteristics.
  - V2X over PC5 identities.
  - Direct communication overview.
  - QoS handling and charging support.

- **V2X over LTE:**
  - V2X message delivery methods and MBMS service area mapping.
  - V2X communication with eMBMS.
  - V2X Application Server discovery.
  - QoS handling and charging support.

- **V2X over LTE Network Procedures:**
  - Attach procedure.
  - Service Request procedure.
  - S1 Handover and X2 Handover procedures.
  - Tracking Area Update procedure.

- **V2X Security:**
  - V2X security approach.
  - V2X security requirements and security solutions.
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