Technology Primer: LTE-M and NB-IoT

4.4/5 "The course covers a lot of things in only 4 hours. It is very interactive and encourages discussions."

Internet of Things (IoT) is expected to dominate the telecom market where machines exchange data for intelligent applications. Devices and networks supporting IoT pose unique challenges such as low power, low cost, low mobility, and long battery life. This course addresses several low power wide area (LPWA) network technologies defined by 3GPP to meet these requirements. 3GPP-defined LPWA technology options include LTE-M (or enhanced machine type communication) and Narrowband IoT (NB-IoT). This course provides a foundation for MTC, eMTC, NB-LTE, and EC-GSM. Fundamental concepts of IoT-centric optimizations for a wireless network are explained. IoT-specific characteristics of the wireless network and relevant UE categories (e.g., Category M1 and Category NB1) are described.

Intended Audience

Technical and product marketing personnel working for wireless operators, equipment and device manufacturers, as well as IoT architects and designers.

Objectives

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

- Give examples of IoT use cases
- Differentiate between 3GPP and non-3GPP IoT
- Explain wireless optimizations for IoT such as Power Save Mode and eDRX
- Distinguish among MTC, LTE-M, and NB-IoT
- Specify IoT-specific characteristics of the network and UE categories

Prerequisites

- LTE Overview (eLearning)

Required Equipment

- None

Course Outline

1. **Introduction to IoT**
   - 1.1 IoT: what and why
   - 1.2 Overview of MTC, eMTC, and NB-IoT
   - 1.3 Non-3GPP IoT solutions (SIGFOX, LoRa, Silver Spring Networks, and Ingenu)
   - 1.4 Cellular IoT vs. non-cellular IoT
2. **Wireless Optimizations for IoT**
   - 2.1 IoT requirements on wireless networks
   - 2.2 Extended Access Barring (EAB)
   - 2.3 Overload and congestion control
   - 2.4 Optimized NAS signaling
   - 2.5 Coverage enhancement (CE) techniques
   - 2.6 CE Mode A and CE Mode B
   - 2.7 Power Save Mode (PSM)
   - 2.8 eDRX for idle and connected modes
3. **Network and UE Characteristics**
   - 3.1 Network architecture enhancements (e.g., NIDD via SCEF)
   - 3.2 Overview of UE categories
   - 3.3 LTE-M and Cat M1: A closer look
   - 3.4 NB-IoT and Cat NB1: A closer look