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Cellular IoT Air Interface

Course Description

In a bid to support the growing IoT market, the 3GPP have introduced a number of enhancements to the existing 2G and 4G air interfaces in their Release 13 specifications. This course therefore addresses these modifications in terms of the three key Cellular IoT technologies; EC-GSM-IoT, LTE-M and NB-IoT.

Prerequisites: A good understanding of the GPRS and LTE air interfaces.

1 day
(LiveOnsite,
LiveOnline)

6 hours
learning
(OnlineAnytime)

6

CPD Learning
Credits



Level: 3
(Advanced)

This course will contain the following sections:

1. EC-GSM-IoT

Topic areas covered include:

- Fundamentals of EC-GSM-IoT.
- EC-GSM-IoT Air Interface:
 - Extended Coverage and Coverage Classes.
 - Logical Channels:
 - EC-CCCH, EC-BCCH, EC-PTCH.
 - Modulation and Coding Schemes.
 - Radio Link Control and Medium Access Control:
 - RLC / MAC Data Blocks.
 - RLC / MAC Control Blocks.
 - Overlaid CDMA.
- EC-GSM-IoT Operation:
 - Initial Procedures:
 - C1_EC, C1_GC.
 - Cell Selection.
 - Cell Reselection.
 - Coverage Class Selection.
 - Packet Transfer:
 - Mobile Originated Packet Transfer.
 - Mobile Terminated Packet Transfer.
 - Security Enhancements.
- Power Efficient Operation:
 - Power Save Mode.
 - Extended Discontinuous Reception.

2. LTE-M

Topic areas covered include:

- Fundamentals of LTE-M.
- LTE-M Device:
 - Handset Capabilities.

LTE-M (cont.)

- Category M1:
 - Bandwidth Reduced.
 - Bandwidth Reduced Low Complexity.
 - Coverage Enhancement.
- LTE-M Channels:
 - PBCH, MPDCCH, PDSCH (SIB1-BR), PUSCH, PUSCH, PUCCH, PRACH.
- LTE-M Operation:
 - RRC Connection Establishment:
 - Cell Information.
 - Cell Selection.
 - Access Procedure.
 - Session Establishment:
 - Attach and EPS Bearer Establishment.
 - Mobility.
- Power Efficient Features:
 - Power Save Mode.
 - Extended Discontinuous Reception.

3. NB-IoT

Topic areas covered include:

- Introducing NB-IoT:
 - NB-IoT Roadmap and Benefits.
 - NB-IoT and EPC (Evolved Packet Core).
 - NB-IoT and 5GC (5G Core).
- NB-IoT Deployment:
 - NB-IoT for Guard Band / Standalone Deployment.
 - NB-IoT and NR (New Radio) Coexistence.
 - Supported Bands.

6

CPD Learning
Credits

ITP

ITP accredited
course



LiveOnsite, LiveOnline,
OnlineAnytime

NB-IoT (cont.)

- NB-IoT Device Capabilities:
 - Subcarrier Spacing.
 - NB-IoT Duplexing.
 - Device Categories.
 - Power Category.
 - NB-IoT Limitations.
- NB-IoT Downlink Structure – Part 1:
 - NB-IoT Downlink Channels.
 - NB-IoT Downlink Frame Structure.
 - NB-IoT TDD (time Division Duplex) Support.
 - NB-IoT Downlink Reference Signals.
- NB-IoT Downlink Structure – Part 2:
 - Narrowband Primary Synchronization Signal.
 - Narrowband Secondary Synchronization Signal.
 - NPBCH (Narrowband Physical Broadcast Channel).
 - NPDSCH and NPDCCH Mapping.
- NB-IoT Uplink Channels and Structure:
 - NB-IoT Uplink Channels.
 - NB-IoT Uplink Frame Structure.
 - NPUSCH Resource Unit.
 - NPUSCH DMRS.
 - NPRACH.
- NB-IoT System Information:
 - NB-IoT System Information Types.
 - NB-IoT MIB/SIB and Scheduling.
- NB-IoT Access (EPC):
 - NB-IoT RRC.
 - Cell Selection for NB-IoT.
 - NB-IoT RRC Connection (EPC).
 - NB-IoT EPC Attach and PDN Connection.
 - RRC Connection Resume.
- NB-IoT Access (5GC):
 - NB-IoT RRC Connection (5GC).
 - RRC Connection Establishment – NB-IoT (NB-N1).
 - NB-IoT 5GC Registration and PDU Session.
- NB-IoT Resource Allocation:
 - NB-IoT Downlink Resource Allocation.
 - NB-IoT Uplink Resource Allocation.
 - NB-IoT Enhanced Coverage.
 - NB-IoT Multi Carrier.

- NB-IoT Optimization Features:
 - Key Features.
 - Extended Discontinuous Reception.
 - NB-IoT Power Save Mode.
 - Early Data Transmission.
 - Preconfigured Uplink Resource.



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Video Online**

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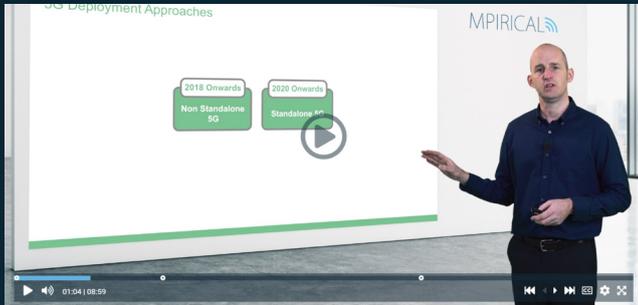
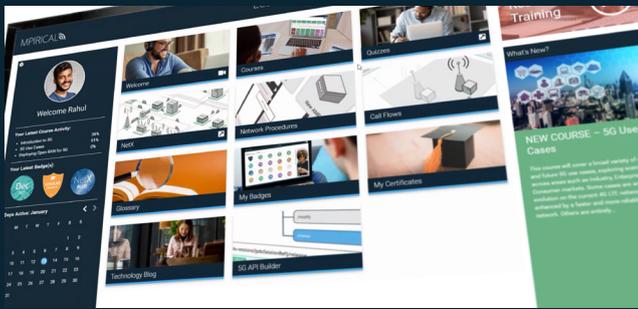
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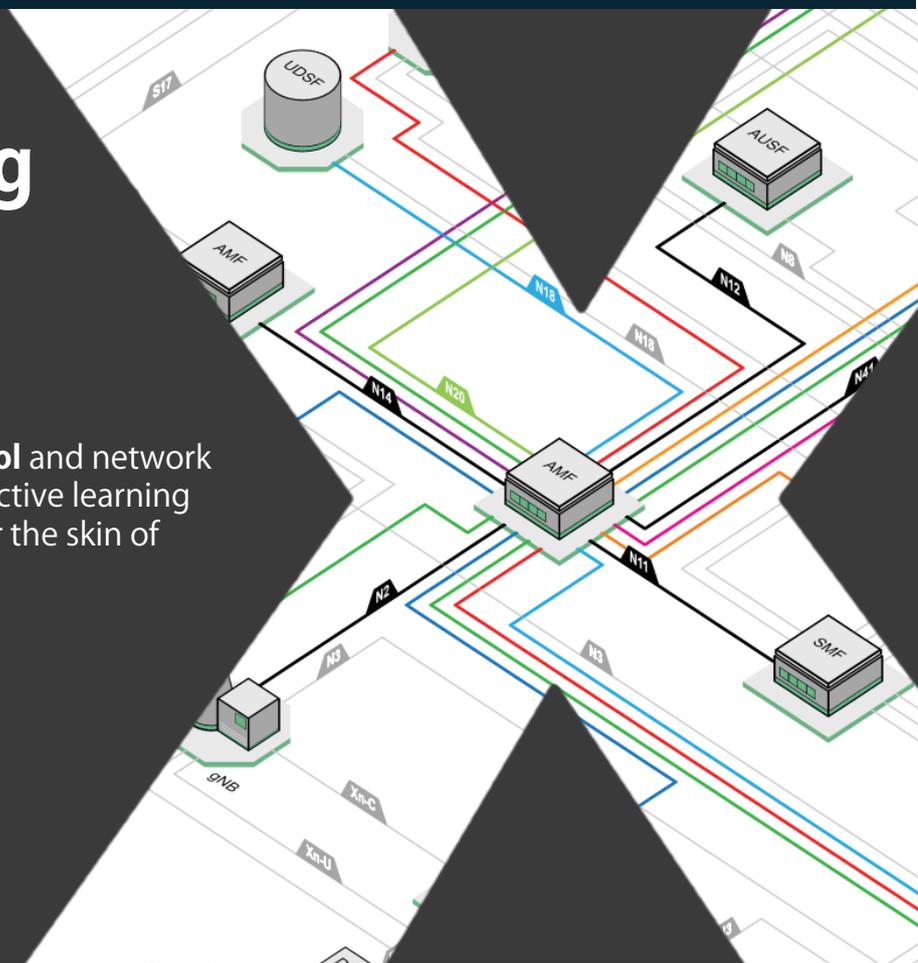


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