

# PRIMEBIT SOLUTIONS

- START YOUR SUCCESS

## Advanced Diploma Protocol Testing Course Content

### MODULE 1 : UMTS (3G) AND GSM (2G) BASIC

- 2G and 3G Network Architecture - CS & PS domain.
- RAT- FDMA,TDMA,CDMA,WCDMA,DFDMA,SCFDMA.
- SDU,PDU,UMTS N/W Architecture
- UMTS Protocol Architecture
- UMTS Channel

### MODULE 2 : LTE STANDARDIZATION (3GPP)

- What is 3GPP?
- 3GPP release and process
- LTE Standardization Phase
- LTE Specification and 3GPP Structure

### MODULE 3 : LTE SYSTEMARCHITECTURE

- EUTRAN, EPC, SAE &EPC Architecture.
- Logical Elements and their Interfaces
- Roaming Architecture configuration
- LTE Architecture with legacy 3GPP interworking with an interface and their protocols. LTE
- identifier - UE Identifier, MME Identifier, TAI Architecture

### MODULE 4 : LTE PROTOCOL STACK ARCHITECTURE AND CHANNELS

- Control plane and User plane
- L1,L2,L3 Architecture
- Logical channel,Transport channel,Physical channel
- Control Information (CI), Channel Mapping
- Uu - Control/User plane S1
- - Control/User plane X2 -
- User/Control plane S6a -
- Control plane
- S3/S4/S5/S8/S10/S11- C plane/U plane
- LTE bearer - Default and Dedicated

## **MODULE 5 : PHYSICAL LAYER**

- EUTRA Air interface capability
- FDD Bands
- TDD Bands
- FDD and TDD Frame Architecture
- TDD UL/DL Configuration
- LTE UE Categories
- Resource grid and Resource block
- OFDMA, SCFDMA, MIMO
- Physical UL and DL Signaling
- Physical UL and DL Control Information
- Physical channels
- UE Power on procedure

## **MODULE 6 : PHYSICAL LAYER PROCEDURES**

- HARQ Procedure, Timing Advance, Power control, Random Access procedure Physical layer
- measurement, UE measurement, eNodeB measurement, Physical layer parameter configuration

## **MODULE 7 : RLC LAYER**

- RLC Architecture and function - TM, AM, UM
- Framing and reordering
- ARQ operation, Window operation
- RLC PDU Format
- SDU Discard and RLC Re-establishment

## **MODULE 8 : MAC LAYER AND PROCEDURES**

- MAC Architecture and function
- MAC PDU format, LCID, LCGID, MAC-CE
- MAC Procedures
  - a) Dynamic and SPS Scheduling
  - b) SR, BSR, and PHR
  - c) Logical channel prioritization
  - d) DRx
  - e) HARQ and TTI bundling
  - f) Measurement gap
  - g) RACH Procedure - Contention and Non-contention

## **MODULE 9 : PDCP LAYER AND PROCEDURE**

- PDCP function and architecture
- Header compression and security
- Data transfer, PDCP PDU format

## **MODULE 10 : RRC AND NAS LAYER**

- RRC states and state transition, SRB & DRB PLMN and cell Selection
- Cell Reselection and access verification
- RRC Layer Architecture and function
- RRC procedures -
  - a) RCC connection establishment
  - b) RCC connection release
  - c) System information
  - d) RCC connection re-establishment
  - e) paging
  - f) RCC connection re-configuration
  - g) Measurement Procedure

## **MODULE 11 : NAS LAYER - EPS MOBILITY MANAGEMENT PROCEDURE**

- NAS state - EMM and ESM
- NAS Authentication procedure
- Security mode control procedure
- Attach procedure
- Detach procedure, TAU procedure
- Service request and extended service request procedure
- Paging procedure

## **MODULE 12 : NAS - EPS SESSION MANAGEMENT PROCEDURE**

- Dedicated EPS bearer context activation
- EPS bearer context activation
- EPS bearer context deactivation
- UE requested PDN connectivity
- UE request PDN disconnect
- UE requested bearer resource allocation
- UE request bearer resource modification

## **MODULE 13 : UE MOBILITY AND HANDOVER**

- RCC connected mode mobility
  - a) Intra LTE H.0 within MME pool area
  - b) Intra LTE H.0 Inter MME pool area
  - c) Inter RAT H.0 - release with read direction
- RCC Idle mode mobility
- Cell Reselection

## **MODULE 14 : CSFB**

- CSFB system architecture
- Voice domain preference and UE usage setting
- CSFB call flow -
  - a) Mobile registration
  - b) Mobile originating call
  - c) Mobile terminating call

## **MODULE 15 : 3GPP SPECIFICATION , PROJECT AND TOOLS**

3GPP - 36 series for LTE layers

Analyse 3GPP log, LTE logs

Decoding 3GPP LTE messages and logs

ASN.1 compiler to describe 3GPP layer 3 message format

LTE protocol test lab setup and explanation Conformance testing

Different types of testing certification

PROJECT -

- Our technical expert will guide the project by explaining how to
- Develop test plans and test cases based on the marketing and design requirements for new features or update existing features.
- Validate the design and test new features, functionalities thoroughly providing thorough coverage to features testing.

- Conformance, IOT, regression, performance and stability testing.
- Discover the bugs, file them using bug tracking tool, verify bugs after the fix and track the bug status
- Reproduce the customer reported bugs, verify the fix and convert it to test case
- Write test cases using TTCN 3, PYTHON or any other tool selected.

#### TESTING TOOLS -

Qualcomm live tools -

QPST,QXPM,QCAT

Protocol Analyzer and Network Simulator.

Chipset and Log capture tool

3GPP Testing Specification