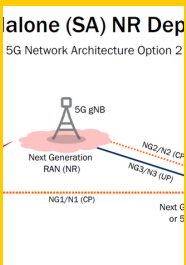# 5G PROTOCOL TESTING

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MODULE 1

INTRODUCTION TO NG-RAN

Network Elements:
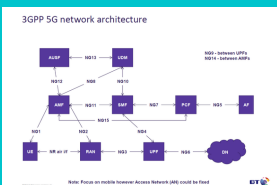- gNB . ng-eNB
- en-gNB

Functions:
- gNB-CU . gNB-DU
- gNB-CU-CP . gNB-CU-UP

Interfaces:
- F1-C . F1-U . E1
- NG-C . NG-U
- Xn-C . Xn-U

MODULE 2

Introduction to 5GC

Network Functions:
- AMF . UPF . SMF
- AUSF . UDM . UDR . UDSF. 5G-EIR
- PCF . AF
- NEF . NRF . NSSF . LMF . SEPP. SMSF
- N3IWF

Reference Points
- N1-N37, N40, N50

MODULE 3

5G PROTOCOLS

Radio:
- PHY
- Massive-MIMO . LTE-NB
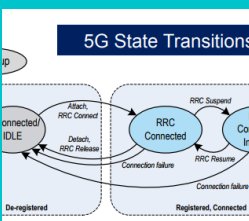- MAC . RLC . PDCP . SDAP . RRC . NAS

Core:
- Xn-AP . NG-AP . GTP-U .
- N-3GPP:
- EAP-5G . IKEv2 . IPsec . GRE

5G Call Flows

MODULE 4

RRC Layer Introduction

- RRC idle mode procedure
- SRB usage and relation with RLC
- RRC idle-RRC connected procedure
- Idle -connected message format -information element
- RRC reconfiguration and complete - non handover
- Call flow introduction along with RRC dealing for information

LEARN MORE AT WWW.APEKSHATELECOM.IN
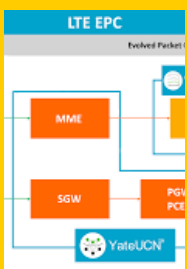CALL US+91-9886577992

4G/5G PROTOCOL TESTING

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MODULE 5

Introduction to NAS

- 3gpp and NON access stratum and EPC architecture 24.301 and 24.501 references
- Overview of non access stratum functions
- Authentication and Security
- New security parameter with 50 and adaptability
- 5GSM/ESM capability
- Failure scenario 24.301 and 24.501 references

MODULE 6

Introduction to layer 2

- SADP: New QOS workflow and design changes 37.324
- Pdcp layer in details testing perspective 36.323 / 38.323
- MAC layer in details testing perspective 36.321/38.321
- RLC layer in details testing perspective 36.322 /38.322

MODULE 7

Feature validations

- 5G Call flow analysis with NSA and dual connectivity
- VOLTE log analysis
- Carrier Aggregation analysis
- Throughput log analysis include single layer MIMO.
- Handover Analysis

MODULE 8

Testing environment

- Log analysis will be done on proprietary tools like QXDM and QCAT
- Real time video experience with detailed explanation for simulator while modem sanity testing
- Understanding different sanity test cases and real implications to execute the results.
- Test cases development
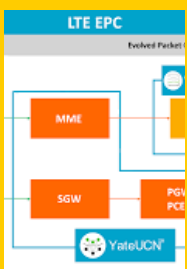- gNodeB Virtualization-based learning with NFV structure

4G/5G PROTOCOL TESTING

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FREE WITH THIS COURSE

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- 50 Hour recorded Video of 4G Protocol and Log Analysis (INR 25000)
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- PPT Theme for professional presentation (INR 7000)
- OpenStack, NFV and Kubernetes 20 hour video (INR 12000)

PRE-REQUISITE:

- Basic Understanding of Telecom Domain.
- Basic Understanding of 4G and 5G Technology
- You must understand English.

FEES AND DURATION

Fee   : INR 50000
Duration   : 3 Month (60 Hour)
Installment   : 30k+20k

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