RDL-6000 OPERATION, CONFIGURATION, INSTALLATION

TRN-RDL-6K-ICM

Course Specifics

Duration:	4 days
Class capacity:	10 students
Materials provided:	Student Handbook (e-Book)

Course Description

The RDL-6000 Overview, Operation and Configuration course consists of 5 modules focusing on the RDL-6000 operation and configuration. The course content is aligned with the training objectives and learning needs of Level-2 support groups, engineers, and technicians.

This program is designed to achieve an optimum balance between slide coverage and hands-on work

Courses are **conducted by AVIAT expert trainers** in a mentoring environment backed by their deep technology expertise and experience in implementation of microwave wireless and IP/MPLS networks.

The course is **conducted at Aviat Training locations or can be arranged at customer sites**.

Target Audience

This course is intended for Level-2 support groups, engineers, and technicians.

Pre-requisites

- Working knowledge of the TCP/IP protocol suite,
- Basic understanding and knowledge of RF and telecommunications systems

Objectives

Upon successfully completing this course, trainees shall understand and acquire hands-on knowledge of the following:

- LTE as a 4G technology platform
- E-UTRAN and EPC core building blocks
- LTE PHY and MAC functions within the EPS system
- DL and UL PHY in LTE (OFDMA and SC-FDMA)
- LTE RF interface, MIMO and Diversity systems and how things work in LTE with examples based on features supported in RDL-6000 systems based on feature available in RDL-6000 1.3.x
- RDL-6000 operation in compliance with the CBRS band requirements using Federated Wireless SAS
- FlexCore EPC and its building blocks (MME/SGW/PGW/HSS/PCRF) features and functions based FlexCore 13.3
- Basic and advanced operational parameters of FlexCore nodes
- Configuring the FlexCore EPC to support LTE core functions for the RDL-6000 systems.
- FlexCore NMS to manage the system and support for Network/subscriber admin functions.
- Configuring subscriber profiles in FlexCore EPC
- QoS and QoS class indicators (QCI) for the user traffic in RDL-6000
- LTE QoS continuity through QCI to DSCP mapping for UL and DL traffic
- Understanding the different components of the FlexCore EPC system

- Defining data paths from the PGW to the RDL-6000 UE
- FlexCore management attributes
- RDL-6000 as a system (eNB and UE) and its building blocks
- Overview of DL and UL transmission in RDL-6000 -OFDMA in DL and SC-FDMA in UL
- Operational features of the Ellipse-4G eNB
- RDL-6000 base station deployment configurations using sectorized and Omni antennas
- Range and capacity overview of RDL-6000 and applicable configuration parameters
- Mobility management in the RRC-Connected and Idle states operation and configuration parameters
- LTE SON parameters and the RDL-6000 implementation and features – ANR, MLB and MRO
- Cell edge interference mitigation and UE performance enhancement using ICIC
- Security and authentication in RDL-6000
- Managing RDL-6000 systems using HTTP, CLI (Telnet/SSH) and SNMP
- Understanding the backhauling requirements of Ellipse-4G eNB including the use of RDL-3100.
- Installation of RDL-6000 systems: Ellipse-4G and RDL-6000 UE
- Grounding/ bonding of systems and tower elements based on industry best practices including R56 recommendations.
- Alignment procedures of RDL-6000 RF links and performance evaluation of each link using product KPIs
- Understanding the configuration requirements of LTE UEs
- UE management and UE connectivity and performance monitoring
- Voice and SMS over the RDL-6000 network: VoIP as OTT service, VoLTE/ViLTE and IMS system parameters.
- Understanding the building block so Flex Talk as an OTT service on RDL-6000 networks

EDUCATION SERVICES

Course Outline

Module-1: LTE System and Technology Overview:

- Overview of the 4G/LTE technology from transmission, networking, architecture, and deployment model
- Evolution of the cellular systems from 1G to 4G
- Features and capabilities supported in RDL-6000
- User plane and control plane components and functional building blocks in LTE
- Logical and physical architecture of the EPS system (E-UTRAN and EPC) are considered with focus on RDL-6000 capabilities
- Access Stratum (AS) and non-access stratum (NAS) messaging and signaling
- Channel equalization in LTE UL
- Wireless frame from QoS
- Packet inspection
- Logical, transport and logical channels as user traffic channeling mechanisms
- Error detection and correction in RDL-6000 (ARQ, HARQ and FEC)
- Packet encapsulation protocols
- Default and user defined bearers and their applicable parameters from the PGW to the UE, LTE QoS and the concept of bundling QoS parameters in QoS Class Indicator (QCI)
- GBR and non-GBR traffic types and traffic flow templates (TFT)
- CBRS spectrum
- RDL-6000 features for the CBRS band

Module-2: RDL-6000 System Overview and Configuration

- Managing RDL-6000 system with detailed GUI walkthrough
- Device management
- User authentication
- SNMP and security parameters
- Mutual authentication configuration
- Firmware upgrades and roll back
- Configuration backup and restore
- Static and dynamic IP addressing and system logs
- eNB interfaces configuration
- RDL-6000 Radio parameters configuration
- Core access (EPC) parameters
- Ranges and PRACH (random access parameters for UE) configuration
- Mobility management in RRC-Connected and RRC-Idle modes
- Mobility triggering events (A1/A2…A5)
- Neighbors' configuration for handover
- Mobility and handover thresholds and event trigger configuration
- Synchronization configuration
- LTE SON functionality and architecture
- Features related to the support of VoLTE/ViLTE in the RDL-6000 system
- Generic UE configuration

Module-3: FlexCore EPC Overview and Configuration

- FlexCore EPC system from LTE networks point of view, services to the eNB and UEs
- EPC nodes: MME, SGW, PGW, PCRF and HSS basic/advanced configurations, interfaces, and protocol parameter configuration
- 3GPP interfaces and the protocols used for inter-node communications
- FlexCore deployment configurations (centralized, distributed, and synchronized HSS configurations) in a private LTE network
- FlexCore management
- Network configuration and subscriber management
- subscriber data connectivity to a PDN
- IP addressing schemes and connectivity monitoring from FlexCore
- Registering (adding) subscribers to the FlexCore
- FlexCore services and their applicable parameters

Module-4: System Installation and Link Alignment

- Complete physical installation of the Ellipse-4G and the applicable UEs
- eNB system installation
- System outdoor and indoor installation components assembling
- Antenna installation
- GPS system installation
- eNB installation
- Cabling preparation and installation (Ethernet, power, GPS)
- System and site grounding and bonding

Hands-on Exercises and System Troubleshooting

- Basic hands-on exercises (for in-class session).
- Checking the operational status of different system such eNB, UE and EPC, UE data path set up in EPC, inter-node, and intra-node transactions in EPC logs, testing the RRC connectivity mode for the UE (connected vs idle), checking the LTE signal metrics (such RSRP and RSRQ).

Required Equipment for Training Sessions at Customer Sites

RADIO	RDL-6000
OTHER EQUIPMENT	▪ eNBs and UEs as discussed with your Aviat Rep. There should be at least one eNB and 2-3 UEs per group of 4 trainees - with applicable cabling and power supplies ▪ CAT-5 cables: 6 per group of 4 trainees ▪ USIM cards: one per UE - USIM card authentication and security parameters must be supplied to the class otherwise UEs cannot be registered with HSS and hence no LTE link can be established
CLASSROOM SET UP	▪ Sufficient in size to handle all participants, instructor, desks, chairs, classroom equipment. The room must have enough 110 AC (220) AC power and air conditioning to operate equipment, all student's client's PCs and the server or radio as required. ▪ At least one LAN port in the training venue to be dedicated to the NUC used by Aviat training instructor-this provides registered UEs access to the internet ▪ The training venue must have an access point which would allow the Aviat trainer to VPN to the Aviat corporate network -this enables use of the LTE systems for purpose of demonstrations and in case the local class LTE network fails to route to internet. Hands-on participation of the trainees is subject to hardware availability in on-site sessions. **Classroom Equipment** Marker board, SVGA or Overhead projector and screen. **Desk and Chairs** Desks or workstations with enough room for each student to write have open books, client PC and / or, keyboard and monitor. **Internet Access** Internet access through the server or through client PC.

Pricing & Scheduling

Please contact your Aviat local sales team for a quote or email aviatcareeducate@aviatnet.com and request pricing for the following items:

- TRN-RDL-6K-ICM RDL-6000 Operation, Configuration, Installation and Maintenance Course (4-days)