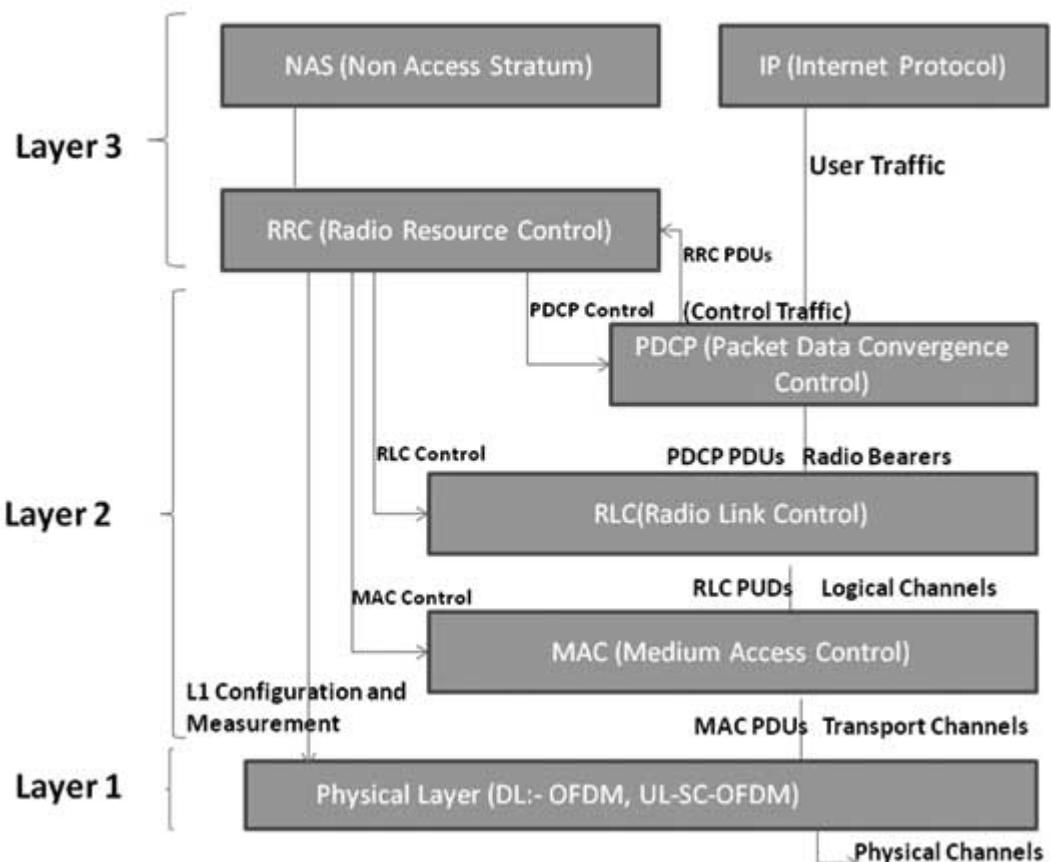


LTE PROTOCOL STACK LAYERS

Let's have a close look at all the layers available in E-UTRAN Protocol Stack which we have seen in previous chapter. Below is a more elaborated diagram of E-UTRAN Protocol Stack:



Physical Layer Layer1

Physical Layer carries all information from the MAC transport channels over the air interface. Takes care of the link adaptation *AMC*, power control, cell search for initial synchronization and handover purposes and other measurements *inside the LTE system and between systems* for the RRC layer.

Medium Access Layer MAC

MAC layer is responsible for Mapping between logical channels and transport channels, Multiplexing of MAC SDUs from one or different logical channels onto transport blocks *TB* to be delivered to the physical layer on transport channels, de multiplexing of MAC SDUs from one or different logical channels from transport blocks *TB* delivered from the physical layer on transport channels, Scheduling information reporting, Error correction through HARQ, Priority handling between UEs by means of dynamic scheduling, Priority handling between logical channels of one UE, Logical Channel prioritization.

Radio Link Control RLC

RLC operates in 3 modes of operation: Transparent Mode *TM*, Unacknowledged Mode *UM*, and Acknowledged Mode *AM*.

RLC Layer is responsible for transfer of upper layer PDUs, error correction through ARQ *Only for AM data transfer*, Concatenation, segmentation and reassembly of RLC SDUs *Only for UM and AM data transfer*.

RLC is also responsible for re-segmentation of RLC data PDUs *Only for AM data transfer*, reordering of

RLC data PDUs *OnlyforUMandAMdatatransfer*, duplicate detection *OnlyforUMandAMdatatransfer*, RLC SDU discard *OnlyforUMandAMdatatransfer*, RLC re-establishment, and protocol error detection *OnlyforAMdatatransfer*.

Radio Resource Control *RRC*

The main services and functions of the RRC sublayer include broadcast of System Information related to the non-access stratum *NAS*, broadcast of System Information related to the access stratum *AS*, Paging, establishment, maintenance and release of an RRC connection between the UE and E-UTRAN, Security functions including key management, establishment, configuration, maintenance and release of point to point Radio Bearers.

Packet Data Convergence Control *PDCP*

PDCP Layer is responsible for Header compression and decompression of IP data, Transfer of data *userplaneorcontrolplane*, Maintenance of PDCP Sequence Numbers *SNs*, In-sequence delivery of upper layer PDUs at re-establishment of lower layers, Duplicate elimination of lower layer SDUs at re-establishment of lower layers for radio bearers mapped on RLC AM, Ciphering and deciphering of user plane data and control plane data, Integrity protection and integrity verification of control plane data, Timer based discard, duplicate discarding, PDCP is used for SRBs and DRBs mapped on DCCH and DTCH type of logical channels.

Non Access Stratum *NAS* Protocols

The non-access stratum *NAS* protocols form the highest stratum of the control plane between the user equipment *UE* and *MME*.

NAS protocols support the mobility of the UE and the session management procedures to establish and maintain IP connectivity between the UE and a PDN GW.

Loading [MathJax]/jax/output/HTML-CSS/jax.js