



**Universal Mobile Telecommunications System (UMTS);
UTRAN architecture for 3G Home Node B (HNB);
Stage 2
(3GPP TS 25.467 version 13.0.0 Release 13)**



Reference

RTS/TSGR-0325467vd00

Keywords

UMTS

ETSI

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1 Scope

The present document specifies the UTRAN architecture for 3G Home Node B (HNB).

It covers specification of the functions for UEs not supporting Closed Subscriber Groups (CSG) and UEs supporting CSGs. It also covers HNB specific requirements for O&M.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

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- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 25.468: "UTRAN Iuh Interface RUA signalling".
- [3] 3GPP TS 25.469: "UTRAN Iuh Interface HNBAP signalling".
- [4] 3GPP TS 25.401: "UTRAN overall description".
- [5] 3GPP TS 25.410: "UTRAN Iu Interface: general aspects and principles".
- [6] IETF RFC 4960 (September 2007): "Stream Control Transmission Protocol".
- [7] Broadband Forum TR-069 Amendment 2, *CPE WAN Management Protocol*, Broadband Forum Technical Report, 2007.
- [8] 3GPP TS 25.444: "Iuh data transport and transport signalling".
- [9] 3GPP TS 25.413: "UTRAN Iu Interface RANAP Signalling".
- [10] 3GPP TS 23.060: "General Packet Radio Service (GPRS); Service Description; Stage 2".
- [11] 3GPP TS 22.220: "Service requirements for Home Node Bs and Home eNode Bs".
- [12] 3GPP TS 25.419: "UTRAN Iu Interface: Service Area Broadcast Protocol SABP".
- [13] Void
- [14] Void
- [15] Void
- [16] 3GPP TS 33.320: "Security of Home Node B (HNB) / Home evolved Node B (HeNB)".
- [17] 3GPP TS 25.415: "UTRAN Iu Interface user plane protocols".
- [18] 3GPP TS 25.423: "UTRAN Iur interface Radio Network Subsystem Application Part (RNSAP) Signalling".
- [19] 3GPP TS 25.471: "UTRAN Iurh Interface RNSAP User Adaption (RNA) signalling".
- [20] Void