

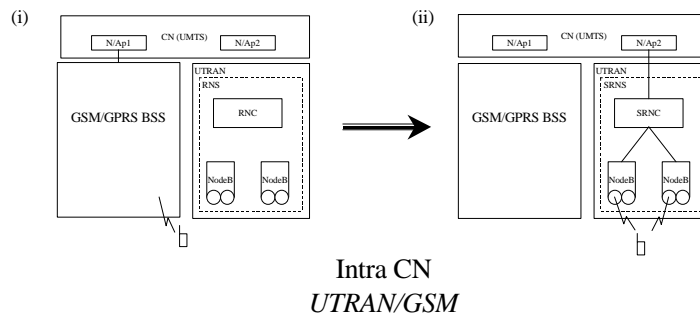
Agenda Item: 6.4
Source: Telecom Modus
Title: GSM/BSS ⇒ UMTS Handover
Document for: Approval

1 Introduction

Telecom Modus introduces the possibility of moving straight into soft handover in case of GSM to UMTS Handover.

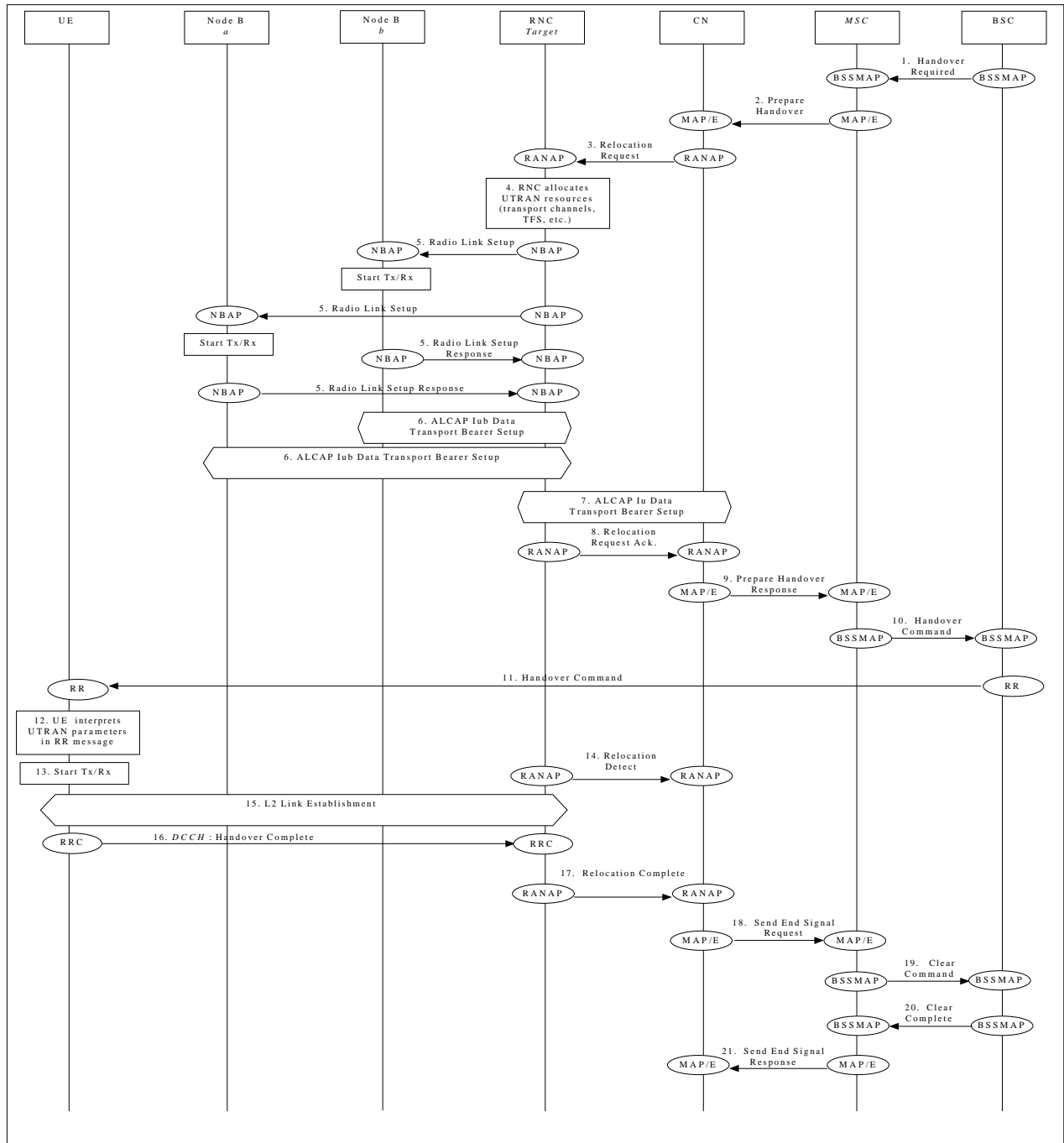
2 GSM to UMTS Handover Scenario

The following figure shows the possibility of going directly into macro-diversity in UTRAN in case of GSM to UMTS handover.



3 Sequence Chart

The example below shows the sequence of events between GSM to UMTS handover via a MAP/E interface. This will also be applicable via the IWU.



1. The BSC sends **Handover Required** message to the GSM MSC. This includes the GSM information elements {service information rate, service type, etc.} and the UMTS cell/Node-B information on which good radio quality is achievable.
2. The GSM MSC sends MAP/E message **Prepare Handover** to the UMTS CN forwarding the UMTS cell-ids transparently
3. The CN sends RANAP message **Relocation Request** to the Target RNC. This message will contain information elements indicating from which network type this handover is taking place e.g. 'handover-type' = 'from GSM'. It will also contain information elements allowing transparent transfer of GSM Parameters to the RNC, e.g. GSM Bearer Capability, version number and other relevant parameters relating to the GSM call. Additionally, the relevant UMTS cell/Node-B information provided by the MS/UE is also transferred transparently to the RNC.
4. The RNC maps GSM appropriate call parameters to the relevant UMTS logical channel, transport channel and allocates radio resource parameters as appropriate (e.g. DL channelization code, UL spreading factor, UL scrambling code, Radio Frequency, Radio Link ID, Link Reference, S-RNTI, Transport Format Sets, Transport Format Combination Set, Initial DL Power). This function can only be done at this stage, since only the RNC knows the status of the radio resources.
5. Since dedicated transport channels are selected, the **GSM call can go into immediate soft-handover.**
 - i) The RNC sends NBAP message **Radio Link Setup** to all relevant Node Bs.
 - ii) All relevant Node Bs start transmission/reception.

- iii) All relevant Node Bs send NBAP message **Radio Link Setup Response** to the RNC.
- 6. The RNC sets up Iub transport bearer to all relevant Node Bs. The RNC is in a condition to set up the Transport Bearer across Iub since it knows if the UTRAN resources have been set up successfully.
- 7. The RNC sets up Iu transport bearer. The RNC is in a condition to set up the Transport Bearer across Iu since it knows if the UTRAN resources have been set up successfully.
- 8. The RNC sends **Relocation Request Acknowledge** passing the appropriate UMTS parameters to the CN (e.g. DL channelization code, UL Spreading Factor, UL Scrambling Code, etc.) which are destined for the UE allowing the successful handover of the UE to UMTS.
- 9. The CN sends **Prepare Handover Response** to the GSM MSC (forwarding the UMTS parameters).
- 10. The GSM MSC sends **Handover Command** to the BSC (forwarding the UMTS parameters).
- 11. BSC sends the RR message **Handover Command** to the UE. This contains the necessary UMTS parameters.
- 12. The UE interprets the UMTS parameters within the RR message and is able to switch the call from a GSM call into a UMTS call with single or multiple diversity branches as indicated in the UMTS parameters. At this stage, the mobile unit is simultaneously receiving information from the GSM network using its GSM capabilities and uses this information to communicate with the UMTS network or simultaneously communicate with the UMTS network and GSM network using its UMTS and GSM capabilities.
- 13. The UE starts Tx/Rx.
- 14. The RNC sends RANAP message **Relocation Detect** to the CN.
- 15. L2 link establishment is performed between UE and RNC.
- 16. The UE sends RRC message **Handover Complete** to the RNC.
- 17. The RNC sends RANAP message **Relocation Complete** to the CN.
- 18. The CN sends MAP/E message **Send End Signal Request** to the MSC.
- 19. The MSC sends BSSMAP message **Clear Command** to the BSC.
- 20. The BSC sends BSSMAP message **Clear Complete** to the MSC.
- 21. The MSC sends MAP/E message **Send End Signal Response** to the CN.

4 Proposal

It is proposed that section 5.7 of [1] is updated with the contents of chapter 2 and that section 9.15.2 of [2] is updated with the contents of chapter 3.

5 References

- [1] UMTS 25.832, Manifestations of Handover and SRNS Relocation
- [2] UMTS 25.931, UTRAN Functions, Examples on Signalling Procedures