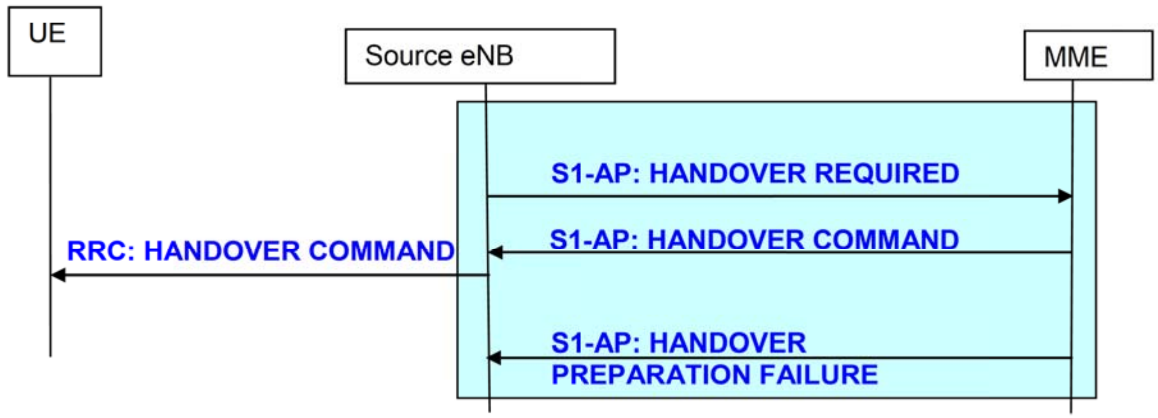

Figure 19.2.2.5.1-1: Handover preparation procedure

The handover preparation comprises the following steps:

- The HANDOVER REQUIRED message is sent to the MME.
- The handover preparation phase is finished upon the reception of the HANDOVER COMMAND in the source eNB, which includes at least radio interface related information (HO Command for the UE), successfully established EPS Bearer(s) and EPS bearer(s) which failed to setup.
- In case the handover resource allocation is not successful (e.g. no resources are available on the target side) the MME responds with the HANDOVER PREPARATION FAILURE message instead of the HANDOVER COMMAND message.

19.2.2.5.2 Handover Resource Allocation procedure

The handover resource allocation comprises the following steps:

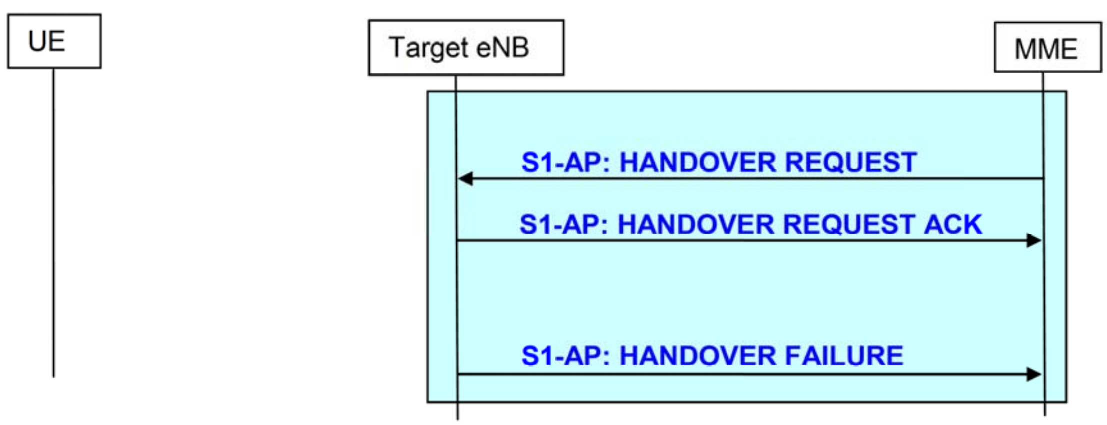

Figure 19.2.2.5.2-1: Handover resource allocation procedure

- The MME sends the HANDOVER REQUEST message including the EPS Bearer(s) which needs to be setup by the target eNB.
- The target eNB responds with the HANDOVER REQUEST ACK message after the required resources for all accepted EPS Bearers are allocated. The HANDOVER REQUEST ACK message contains successfully established EPS bearer(s), EPS Bearer(s) which failed to setup and radio interface related information (HO Command for the UE), which is later sent transparently via the EPC/CN from the target RAT to the source RAT.

  If no resources are available on the target side, the target eNB responds with the HANDOVER FAILURE message instead of the HANDOVER REQUEST ACK message.

19.2.2.5.3 Handover Notification procedure

The Handover Completion for S1 initiated handovers comprises the following steps:

- The HANDOVER NOTIFY message is sent by the target eNB to the MME when the UE has successfully been transferred to the target cell.

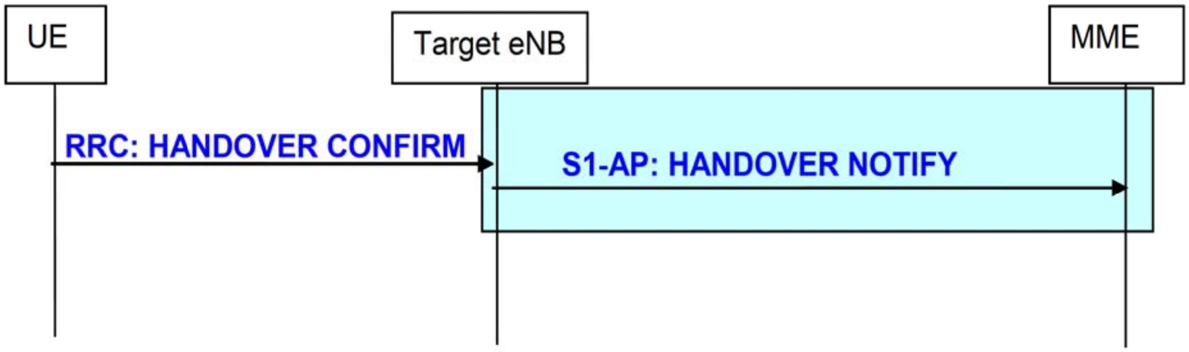

Figure 19.2.2.5.3-1: Handover completion procedure

19.2.2.5.4 Handover Cancellation

This functionality is located in the source eNB to allow a final decision regarding the outcome of the handover, i.e. either to proceed or to cancel the handover procedure.

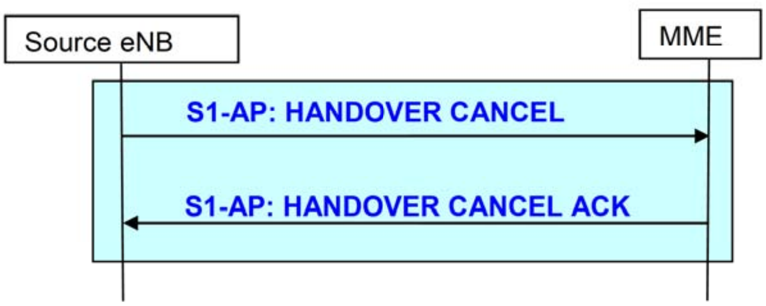

Figure 19.2.2.5.4-1: Handover cancellation procedure

- The source eNB sends a HANDOVER CANCEL message to the MME indicating the reason for the handover cancellation.
- The MME confirms the reception of the HANDOVER CANCEL message by returning the HANDOVER CANCEL ACK message.

19.2.2.5.5 Path Switch procedure

The handover completion phase for X2 initiated handovers comprises the following steps:

- The PATH SWITCH message is sent by the target eNB to the MME when the UE has successfully been transferred to the target cell. The PATH SWITCH message includes the outcome of the resource allocation: successfully established EPS Bearer(s).
- The MME responds with the PATH SWITCH ACK message which is sent to the eNB.
- The MME responds with the PATH SWITCH FAILURE message in case a failure occurs in the EPC.

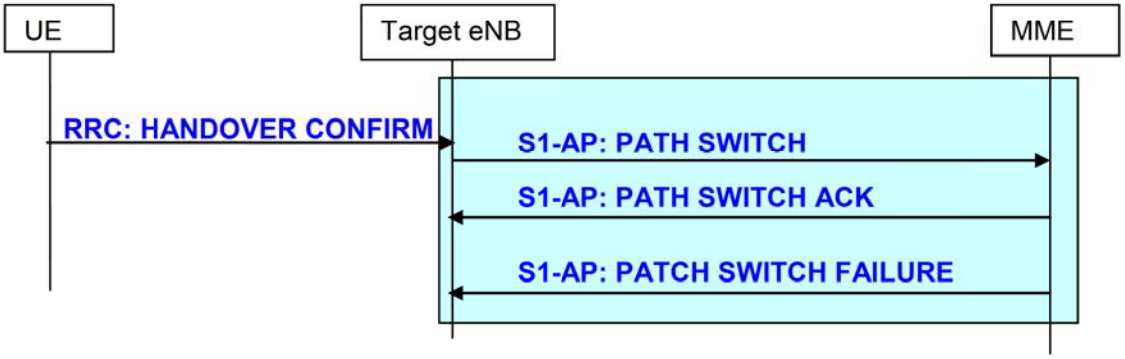

Figure 19.2.2.5.5-1: Path Switch procedure

19.2.2.6 NAS transport procedures

A NAS signalling message is transferred on the S1 interface in both directions. The procedures providing this functionality are

- Initial UE Message procedure (eNB initiated)
- Uplink NAS transport procedure (eNB initiated)
- Downlink NAS transport procedure (MME initiated)
- Downlink NAS non delivery indication procedure

i) Initial UE Message procedure

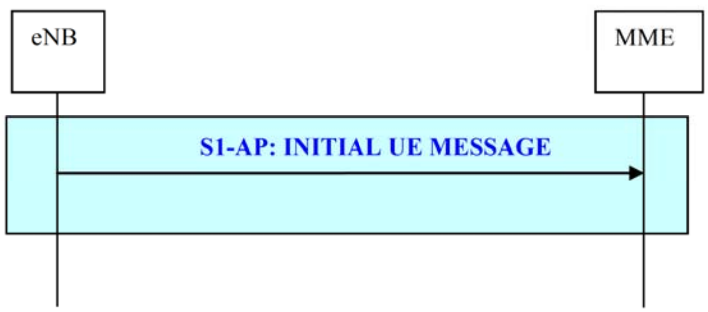

Figure 19.2.2.6-1: Initial UE Message procedure

- The INITIAL UE MESSAGE procedure is initiated by the eNB by sending the INITIAL UE MESSAGE message to the MME. The INITIAL UE MESSAGE contains a NAS message (e.g. Service Request), the UE signalling reference ID and other S1 addressing information.

ii) NAS Transport procedure (eNB initiated).

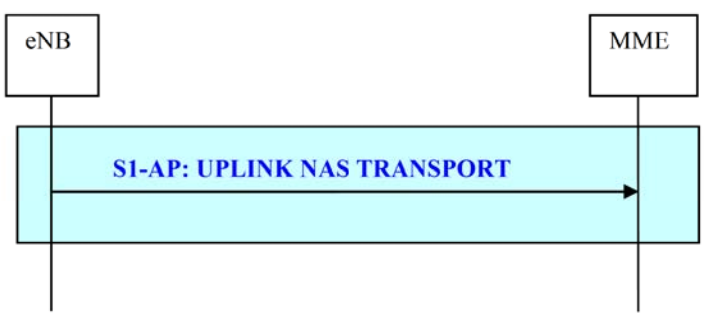

Figure 19.2.2.6-2: Uplink NAS Transport procedure

- The Uplink NAS Transport procedure is initiated by the eNB by sending the UPLINK NAS TRANSPORT message to the MME. The UPLINK NAS TRANSPORT message contains a NAS message, UE identification and other S1 related addressing information.

iii) NAS Transport procedure (MME initiated)

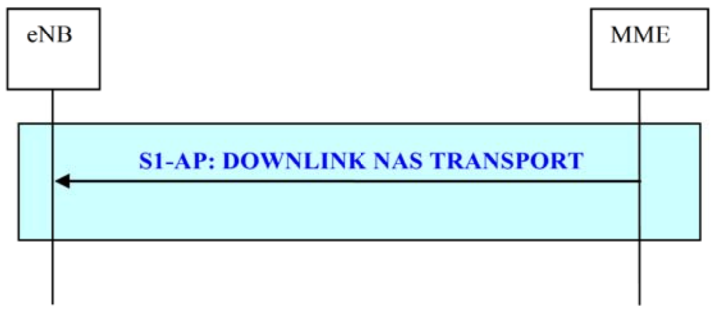

Figure 19.2.2.6-3: Downlink NAS Transport procedure

- The Downlink NAS Transport procedure is initiated by the MME by sending the DOWNLINK NAS TRANSPORT message to the eNB. The DOWNLINK NAS TRANSPORT contains a NAS message, UE identification and other S1 related addressing information.

iv) Downlink NAS non delivery procedure

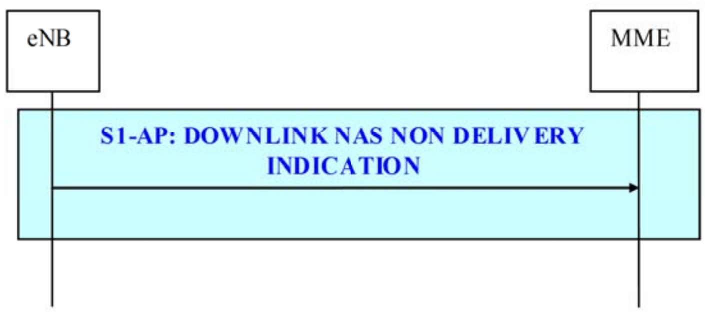

Figure 19.2.2.6-4: Downlink NAS Non Delivery Indication procedure

- When the eNB decides to not start the delivery of a NAS message that has been received from MME, it shall report the non-delivery of this NAS message by sending a DOWNLINK NAS NON DELIVERY INDICATION message to the MME including the non-delivered NAS message and an appropriate cause value.

19.2.2.7 S1 interface Management procedures

19.2.2.7.1 Reset procedure

The purpose of the Reset procedure is to initialize the peer entity after node setup and after a failure event occurred. This procedure is initiated by both the eNB and MME.

19.2.2.7.1a eNB initiated Reset procedure

SAMSUNG 1017-0144

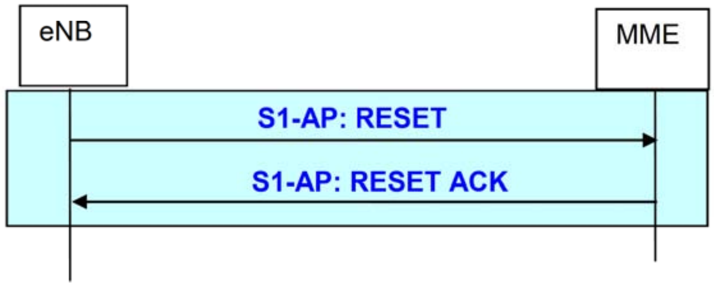

Figure 19.2.2.7.1a-1: eNB initiated Reset procedure

- The eNB triggers the RESET message to indicate that an initialisation in the MME is required. The MME releases the corresponding references and resources.
- Afterwards the MME sends the RESET ACK message to confirm that the resources and references are cleared.

19.2.2.7.1b MME initiated Reset procedure

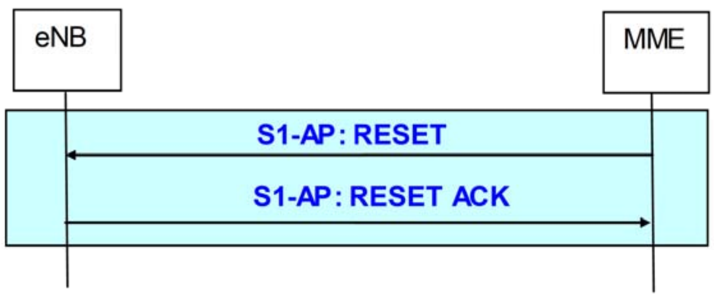

Figure 19.2.2.7.1b-1: MME initiated Reset procedure

- The MME triggers the RESET message to indicate that an initialisation in the eNB is required. The eNB releases the corresponding references and resources.
- Afterwards the eNB sends the RESET ACK message to confirm that the resources and references are cleared.

19.2.2.7.2 Error Indication functions and procedures

The Error Indication procedure is initiated by the eNB and the MME, to report detected errors in one incoming message, if an appropriate failure message cannot be reported to the sending entity.

19.2.2.7.2a eNB initiated error indication

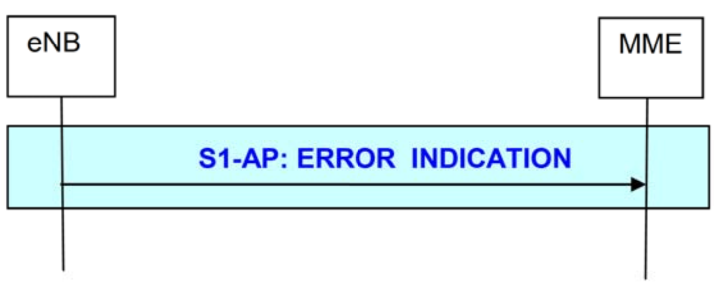

Figure 19.2.2.7.2a-1: eNB initiated Error Indication procedure

- The eNB sends the ERROR INDICATION message to report the peer entity which kind of error occurs.

19.2.2.7.2b MME initiated error indication

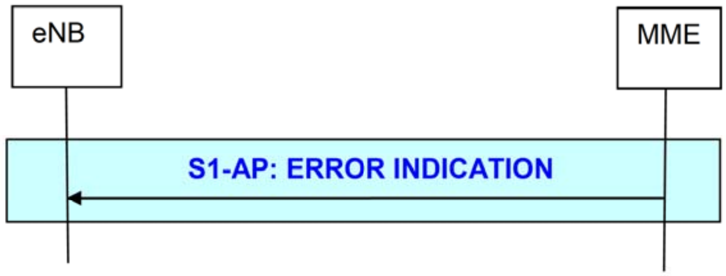

Figure 19.2.2.7.2b-1: MME initiated Error Indication procedure

- The MME sends the ERROR INDICATION message to report the peer entity which kind of error occurs.

20 X2 Interface

20.1 User Plane

The X2 user plane interface (X2-U) is defined between eNBs. The X2-U interface provides non guaranteed delivery of user plane PDUs. The user plane protocol stack on the X2 interface is shown in Figure 20.1-1. The transport network layer is built on IP transport and GTP-U is used on top of UDP/IP to carry the user plane PDUs.

The X2-UP interface protocol stack is identical to the S1-UP protocol stack.

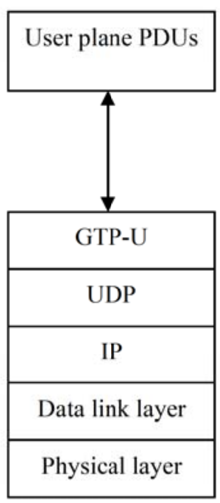

Figure 20.1-1: X2 Interface User Plane (eNB-eNB)

20.2 Control Plane

The X2 control plane interface (X2-CP) is defined between two neighbour eNBs. The control plane protocol stack of the X2 interface is shown on Figure 20.2-1 below. The transport network layer is built on SCTP on top of IP. The application layer signalling protocol is referred to as X2-AP (X2 Application Protocol).

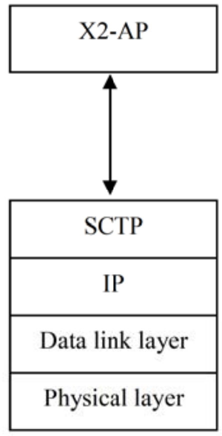

Figure 20.2-1: X2 Interface Control Plane

A single SCTP association per X2-C interface instance shall be used with one pair of stream identifiers for X2-C common procedures. Only a few pairs of stream identifiers should be used for X2-C dedicated procedures. The upper limit for the number of stream identifiers for dedicated procedures is FFS and will be decided during the stage 3 work.

Source-eNB communication context identifiers that are assigned by the source-eNB for X2-C dedicated procedures, and target-eNB communication context identifiers that are assigned by the target-eNB for X2-C dedicated procedures, shall be used to distinguish UE specific X2-C signalling transport bearers. The communication context identifiers are conveyed in the respective X2AP messages.

20.2.1 X2-CP Functions

The X2AP protocol supports the following functions:

- Intra LTE-Access-System Mobility Support for UE in ECM-CONNECTED:
  - Context transfer from source eNB to target eNB;
  - Control of user plane tunnels between source eNB and target eNB;
  - Handover cancellation.
- Uplink Load Management;
- General X2 management and error handling functions:
  - Error indication.

20.2.2 X2-CP Procedures

The elementary procedures supported by the X2AP protocol are listed in Table 20.2.2-1 below:

SAMSUNG 1017-0147

Table 20.2.2-1: X2-CP Procedures

Elementary Procedure	Initiating Message	Response Message of Successful Outcome	Response Message of Unsuccessful Outcome	Description & comments
Handover Preparation	HANDOVER REQUEST	HANDOVER REQUEST ACKNOWLEDGE	HANDOVER PREPARATION FAILURE	Used by source eNB to request a handover to the target eNB
Handover Cancellation	HANDOVER CANCEL			Used by the source eNB to cancel a previously requested handover in a target eNB
Release Resource	RELEASE RESOURCE	-	-	Used by the target eNB to signal to source eNB that control plane resources for the handed over UE context can be released.
Error Indication	ERROR INDICATION	-	-	Used by the eNB to report errors in a received message provided they cannot be reported by an appropriate response message.
Load Management	LOAD INDICATOR	-	-	Used by the eNB to report its load conditions to its neighbour eNBs.

Note: this initial list might be extended.

20.2.2.1 Handover Preparation procedure

The Handover preparation procedure is initiated by the source eNB if it determines the necessity to initiate the handover via the X2 interface.

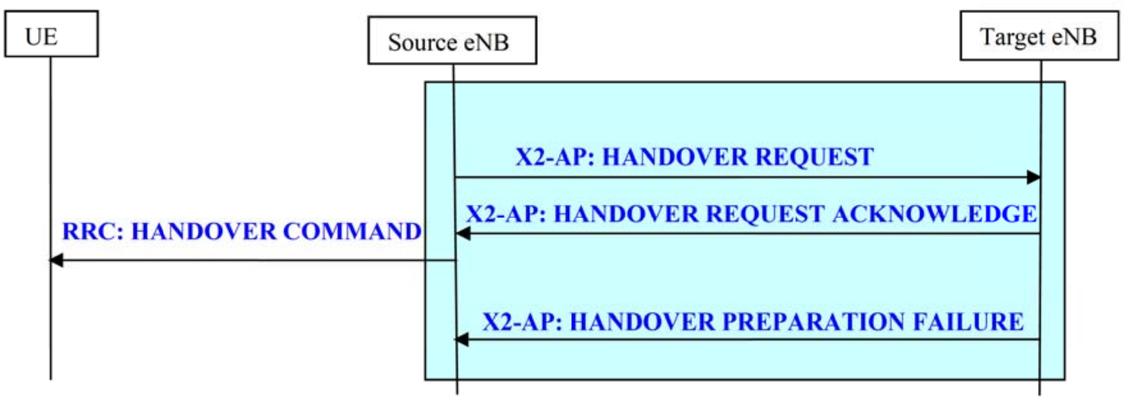

Figure 20.2.2.1-1: Handover Preparation procedure

The source eNB sends a HANDOVER REQUEST to the target eNB including the bearers to be setup by the target ENB.

The handover preparation phase is finished upon the reception of the HANDOVER REQUEST ACKNOWLEDGE in the source eNB, which includes at least radio interface related information (HO Command for the UE), successfully established EPS Bearer(s) and failed established EPS Bearer(s).

In case the handover resource allocation is not successful (e.g. no resources are available on the target side) the target eNB responds with the HANDOVER PREPARATION FAILURE message instead of the HANDOVER REQUEST ACKNOWLEDGE message.

If eNB received NAS message from MME during X2 handover procedure, it shall be acted as specified in subclause 19.2.2.6.

20.2.2.2 Handover Cancellation procedure

This functionality is located in the source eNB to allow cancellation of the handover procedure.

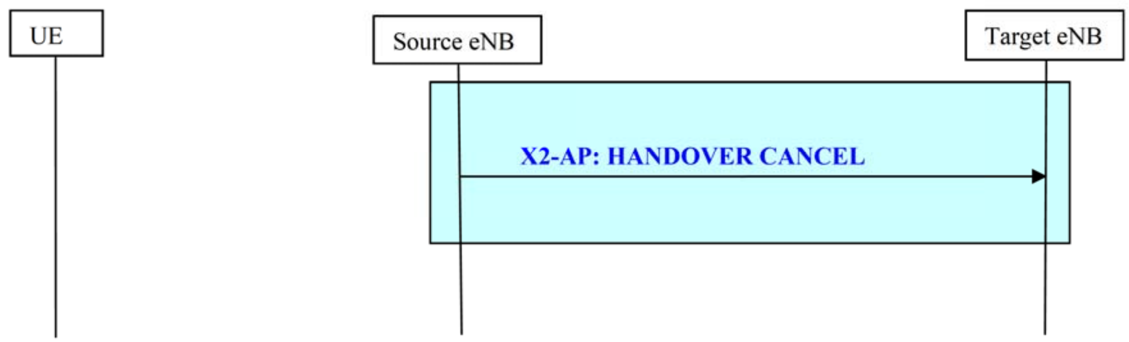

Figure 20.2.2.2-1: Handover Cancellation procedure

The source eNB sends a HANDOVER CANCEL message to the target eNB indicating the reason for the handover cancellation.

20.2.3 Inter-cell Load Management

Inter-cell load management in E-UTRAN is performed through the X2 interface. In case of variation in the load condition, the eNodeB signals the new load condition to its neighbour eNodeBs e.g. the neighbour eNodeBs for which an X2 interface is configured due to mobility reasons.

The LOAD INDICATOR message is used to signal the load conditions between eNodeBs.

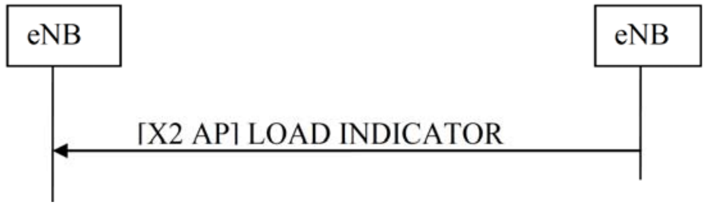

Figure 20.2.3-1: LOAD INDICATOR message over X2

21 System and Terminal complexity

21.1 Overall System complexity

21.2 Physical layer complexity

21.3 UE complexity

22 Support for self-configuration and self-optimisation

22.1 Definitions

This concept includes several different functions from eNB activation to radio parameter tuning. Figure 22.1-1 is a basic framework for all self-configuration /self-optimization functions.

Self-configuration process is defined as the process where newly deployed nodes are configured by automatic installation procedures to get the necessary basic configuration for system operation.

This process works in pre-operational state. Pre-operational state is understood as the state from when the eNB is powered up and has backbone connectivity until the RF transmitter is switched on.

As described in Figure 21.1, functions handled in the pre-operational state like:

- Basic Setup and
- Initial Radio Configuration

are covered by the Self Configuration process.

NOTE: depending on the final chosen functional distribution in RAN, the feasibility of following items should be studied e.g.:

- To obtain the necessary interface configuration;
- Automatic registration of nodes in the system can be provided by the network;
- Alternative possibilities for nodes to obtain a valid configuration;
- The required standardization scope.

Self-optimization process is defined as the process where UE & eNB measurements and performance measurements are used to auto-tune the network.

This process works in operational state. Operational state is understood as the state where the RF interface is additionally switched on.

As described in Figure 21.1, functions handled in the operational state like:

- Optimization / Adaptation

are covered by the Self Optimization process.

NOTE: depending on the final chosen functional distribution in RAN the feasibility of following items should be studied e.g.:

- The distribution of data and measurements over interfaces relevant to RAN3;
- Functions/entities/nodes in charge of data aggregation for optimization purpose;
- Dependencies with O&M and O&M interfaces, in the self optimization process;
- The required standardization scope.

The architecture of logical self-configuration/optimization functionality is FFS.

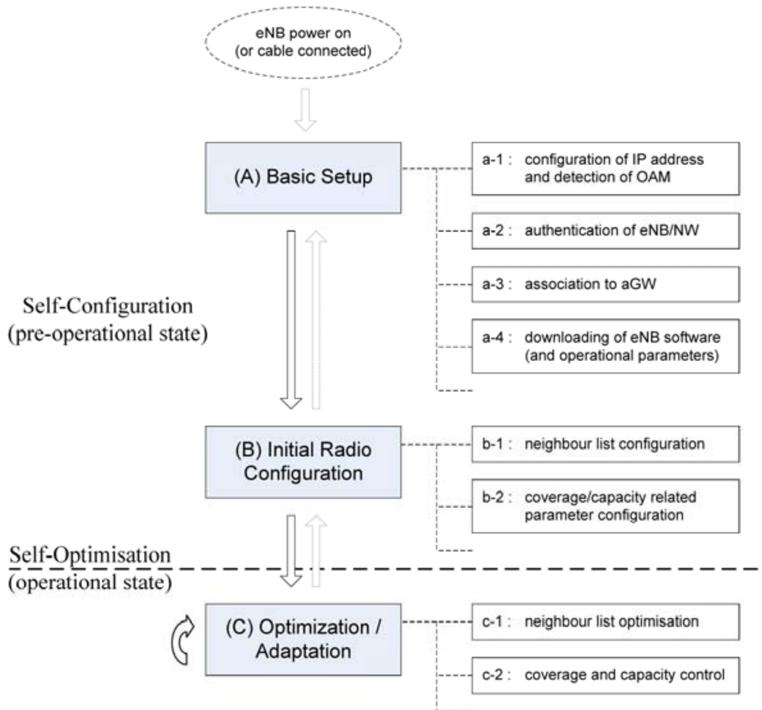

Figure 22.1-1: Ramifications of Self-Configuration /Self-Optimization functionality

22.2 UE Support for self-configuration and self-optimisation

UE shall support measurements and procedures which can be used for self-configuration and self-optimisation of the E-UTRAN system.

- UE shall support measurements and measurement reporting to support self-optimisation of the E-UTRAN system. Measurements and reports used for the normal system operation, should be used as input for the self-optimisation process as far as possible.

NOTE: the UE impact should be carefully investigated and taken into account.

- The network is able to configure the measurements and the reporting for self-optimisation support by RRC signalling messages.
- It shall be possible to associate measurements for self-optimisation purpose with location information depending on UE capability (details are [FFS]).

22.3 Self-configuration

22.3.1 Dynamic configuration of the S1-MME interface

22.3.1.1 Prerequisites

The following prerequisites are assumed:

- An initial remote IP end point to be used for SCTP initialisation is provided to the eNB for each MME in the pre operational state.

How the eNB gets the remote IP end point(s) and its own IP address are FFS.

- Other relevant information from/to eNB to/from MME to self-configure S1-MME are FFS

22.3.1.2 SCTP initialization

- For each MME the eNodeB tries to initialize a SCTP association as described in RFC2960 [8], using a known initial remote IP Endpoint as the starting point, until SCTP connectivity is established.

22.3.1.3 Application layer initialization

Once SCTP connectivity has been established, the eNodeB and MME are in a position to exchange application level configuration data over the S1-MME application protocol needed for the two nodes to interwork correctly on the S1 interface. The details of the information exchange outlined below are FFS, and dependent on the further standardization of the S1 interface.

- The eNodeB provides the relevant information to the MME , which may include node ID, list of supported TA(s), etc. Details of the relevant information needed to setup the S1-MME interface is subject to stage3 discussion and is left FFS.
- The MME provides the relevant information to the eNodeB, which may include node ID, PLMN ID, etc. Details of the relevant information needed to setup the S1-MME interface is subject to stage3 discussion and is left FFS.
- When the application layer initialization is successfully concluded, and has been mutually acknowledged by the two peer nodes, the dynamic configuration procedure is completed, and the S1-MME interface is operational.

22.3.2 Dynamic Configuration of the X2 interface

Editors Note: The Dynamic configuration of the X2 interface is expected to work in a similar manner as the Dynamic Configuration of the S1-MME interface (section 22.3.1).

22.3.2.1 Prerequisites

22.3.2.2 SCTP initialization

22.3.2.3 Application layer initialization

22.3.3 Automatic Neighbour Relation Function

The ANR (Automatic Neighbor Relation) function relies on cells broadcasting their identity on global level, Cell Global-Cell-Identifier (Global-CID).

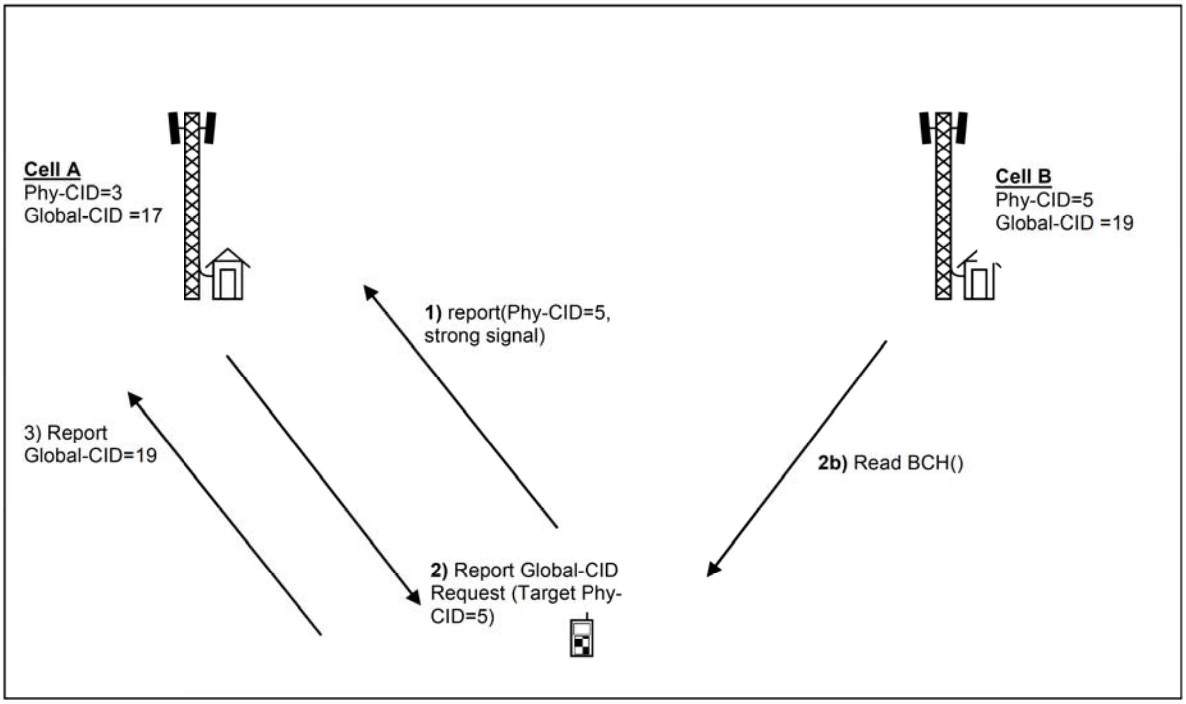

Figure 22.3.3-1: Automatic Neighbor Relation Function

It is assumed that this function executes under the constraints of the O&M system which can manage:

ANR Blacklist: List of cells to which the eNB shall neither establish nor keep a neighbour relation.

ANR Whitelist: List of cells to which the eNB shall always establish and maintain a neighbour relation.

It is also assumed that the O&M system is informed about changes in the eNB neighbour relation list.

The function works as follows:

The eNodeB serving cell A has an ANR function. As a part of the normal call procedure, the eNodeB instructs each UEs to perform measurements on neighbor cells. The eNodeB may use different policies for instructing the UE to do measurements, and when to report them to the eNodeB.

1. The UE sends a measurement report regarding cell B. This report contains Cell B's Phy-CID, but not its Global-CID.

When the eNodeB receives a UE measurement report containing Phy-CID, the following sequence may be used.

2. The eNodeB instructs the UE, using the newly discovered Phy-CID as parameter, to read the Global-CID of the related neighbor cell. It is FFS how this is achieved.
3. When the UE has found out the new cell's Global-CID, the UE reports the detected Global-CID to the serving cell eNodeB.
4. The eNodeB decides to add this neighbor relation, and can use Phy-CID and Global-CID to:
   a Lookup a transport layer address to the new eNodeB (FFS if this needs to be standardized by 3GPP).
   b Update its Neighbor Relation List.
   c If needed, setup a new X2 interface towards this eNodeB. The setup of the X2 interface is described in section 22.3.2.

The exchange of further information for ANR optimisation purposes is FFS.

23 Others

23.1 Support for real time IMS services

23.2 Subscriber and equipment trace

Support for subscriber and equipment trace for LTE and SAE shall be as specified in 3GPP specifications 32.421, 32. 422, 32.423 and 3GPP Trace IRP 32.441, 32.442 and 32.443.

All traces are initiated by the core network, even if the trace shall be carried out in the radio network.

The following functionality is needed on the S1 and X2 interface:

- Support for inclusion of subscriber and equipment trace information in INITIAL CONTEXT SETUP REQUEST and EPS BEARER SETUP REQUEST messages over the S1 interface.

- Support for inclusion of subscriber and equipment trace information in the HANDOVER REQUEST message over the X2 interface.

A trace setup in the radio network will be propagated on the X2 interface at handover and on the S1 interface if the handover is carried out between MMEs.

Annex A (informative): NAS Overview

This subclause provides for information an overview on services and functions provided by the NAS control protocol..

A.1 Services and Functions

The main services and functions of the NAS sublayer include:

- EPS Bearer control (see 3GPP TR 23.401 [17]);
- ECM-IDLE mobility handling;
- Paging origination;
- Configuration and control of Security.

A.2 NAS protocol states & state transitions

The NAS state model is based on a two-dimensional model which consists of EPS Mobility Management (EMM) states describing the mobility management states that result from the mobility management procedures e.g. Attach and Tracking Area Update procedures, and of EPS Connection Management (ECM) states describing the signalling connectivity between the UE and the EPC (see 3GPP TS 23.401 [17]).

NOTE: The ECM and EMM states are independent of each other and when the UE is in EMM-CONNECTED state this does not imply that the user plane (radio and S1 bearers) is established.

The relation between NAS and AS states is characterised by the following principles:

- EMM-DEREGISTERED & ECM-IDLE ⇒ RRC_IDLE:
  - Mobility: PLMN selection:
  - UE Position: not known by the network.
- EMM-REGISTERED & ECM-IDLE ⇒ RRC_IDLE:
  - Mobility: cell reselection;
  - UE Position: known by the network at tracking area level.
- EMM-REGISTERED & ECM-CONNECTED with radio bearers established ⇒ RRC_CONNECTED.
  - Mobility: handover;
  - UE Position: known by the network at cell level.

Annex B (informative): MAC and RRC Control

The E-UTRA supports control signalling in terms of MAC control signalling (L1/L2 control channel and MAC control PDU) and RRC control signalling (RRC message).

B.1 Difference between MAC and RRC control

The different characteristics of MAC and RRC control are summarized in the table below.

Table B.1-1: Summary of the difference between MAC and RRC control

	MAC control		RRC control
Control entity	**MAC**		**RRC**
Signalling	L1/L2 control channel	MAC control PDU	RRC message
Signalling reliability	~ 10^{-2} (no retransmission)	~ 10^{-3} (after HARQ)	~ 10^{-6} (after ARQ)
Control delay	Very short	Short	Longer
Extensibility	None or very limited	Limited	High
Security	No integrity protection No ciphering	No integrity protection No ciphering	Integrity protected Ciphering (FFS)

The main difference between MAC and RRC control lies in the signalling reliability. Due to the signalling reliability, signalling involving state transitions and radio bearer configurations should be performed by RRC. Basically, all signalling performed by RRC in UTRA should also be performed by RRC also for E-UTRA.

B.2 Classification of MAC and RRC control functions

The table below illustrates the classification of MAC and RRC control functions for E-UTRAN.

Table B.2-1: Classification of MAC and RRC control functions

		Controlled configuration/parameters
MAC control signalling	**L1/L2 control channel**	Short-lived (PRB) and dynamic (MCS) allocation Long-lived (PRB) and fixed (MCS) allocation (FFS) Timing Advance (FFS)
	MAC control PDU	Timing Advance (FFS) RLC related control PDU (FFS)
RRC control signalling	**RRC message**	Long-lived (PRB) and fixed (MCS) allocation (FFS) Activation/deactivation of long-lived (PRB) and/or fixed (MCS) allocation (FFS) TTI configuration for variable TTI length control (FFS) Static parameter configuration for UE inactivity control within RRC_ACTIVE (e.g. DRX/DTX periods)

Annex C (informative): System Information

This annex provides an overview of the classification and division of system information between static and flexible parts. Considerations about dedicated distribution of system information are also included.

C.1 SI classification

Five categories are identified for system information classification:

1. Information valid across multiple cells;
2. Information needed at cell/PLMN search;
3. Information needed prior to cell camping;
4. Information needed before cell access;
5. Information needed while camping on a cell.

From UEs' point of view, the information that is needed at cell selection and prior to camping are very similar. Before a UE can camp on a cell, it needs to know if the access is allowed in that cell. Thus it would be very beneficial to know all access restrictions already at cell search phase.

C.1.1 Information valid across multiple cells

The pieces of information that can be valid across multiple cells are:

- A-GNSS assistance data;
- PLMN identity(ies);
- Tracking area identity;

Note: the above text will be revised if it is agreed that a cell can be a member of more than one tracking area.

- Predefined configuration information;
- System Frame Number if it does not change from cell to cell (in case of synchronized network);
- Some measurement/mobility information (FFS).

C.1.2 Information needed at cell/PLMN search

In order to support full mobility within the serving frequency layer, the UEs need to perform cell search rather often and thus it is seen very important that the information needed in cell search phase is readily available, thereby improving cell search times and minimizing UE power consumption. If system information decoding is needed for identifying a cell, fast system information reception is needed in order to avoid too long identification times. For optimising PLMN search and make PLMN search fast and non-complex, the information needed for PLMN search should be easily available. The pieces of information that are needed at cell/PLMN search are:

- PLMN identity(ies): in order to acquire information to which PLMN the cell belongs, UEs need to receive PLMN identity(ies);

NOTE: There may be multiple PLMN identities for one cell.

- Measurement cell identity (FFS): there needs to be a cell identity in the system information, in order to allow UEs to identify the cell reliably for measurement purposes.

NOTE: UEs may identify the cell also based on the reference sequence detection; There is another cell identity that identifies the cell within e.g. PLMN.

NOTE: UEs may have to check possible cell access restrictions before selecting cell/PLMN; For cell/PLMN search UEs might need some L1 parameters.

C.1.3 Information needed prior to cell camping

Before a UE can camp on a cell, it needs to know any access related parameters in order to avoid camping on cells where access is forbidden. Thus prior to camping on a cell, a UE needs to know the following information:

- Any cell access restriction parameters, e.g.:
  - Tracking area identity: if the forbidden TA concept is adopted from legacy systems, then the UE needs to know whether the cell belongs to such forbidden TA.

Note: the above text will be revised if it is agreed that a cell can be a member of more than one tracking area.

  - Cell barring status and cell reservation status (FFS if needed per PLMN): the UE needs to know whether the cell is barred or reserved in order to avoid camping on a barred cell. Possibly also barring time might be needed in order to avoid UE to poll barring time frequently from the system information. Another option is that barring status is indicated also in the neighbour cell list.
  - Radio access limitation parameters:
    - Any radio condition parameters that limit the access to the cell e.g. similar to GSM C1/S criteria;
    - It is FFS if we need to have some band information indication also, in order to allow UEs to check possible band support before camping on the cell.

NOTE: UE may need some L1 parameters prior to camping.

C.1.4 Information needed prior to cell access

Once a UE has camped on a cell, the information needed prior to cell access (transmission/reception) includes at least:

- System Frame Number (SFN) (FFS)
  - SFN is probably needed by the UE to understand the scheduling parameters (e.g. scheduling information for secondary SI, RACH, PCH, E-MBMS etc.)
- L1 information, example set of needed L1 parameters:

Note: RAN1 needs to define what parameters are needed at this phase.

  - Carrier Bandwidth: FFS if separate bandwidths for UL and DL are needed;
  - Carrier center frequency (FFS);
  - Cyclic Prefix parameters: in order to decode DL-SCH UE needs to know the CP length arrangements;
  - MIMO related parameters: in order to take advantage of the multi-antenna transmissions like MIMO, the UE needs to know parameters of number of TX antennas, DL/UL pre-coding matrices, etc...;
  - Band Information: may be needed if the same DL carrier frequency has variable UL carrier frequency;
  - L1/L2 signalling channel structure parameters: if L1/L2 signalling channel has variable configurations, the UE may need to know its channel structure at least partly. L1/L2 signalling is crucial to receive any allocation information. If Random Access Response is transmitted without L1/L2 signalling (e.g. synchronous transmission with Random Access Preamble), this information might not be required;
- RACH parameters (needed by the UE to start usage of RACH):

- RACH scheduling information: UE needs to know where in time (sub-frame) and frequency (Physical Resource Units) the RACH channel is located;
- RACH sequences: UE needs to know the RACH set of sequences to choose from. The sequences may not be fully of equal meaning (e.g. CQI can be classified for the sequences in a specific way);
- Access class restrictions: access class restrictions might be needed to limit the number of possible UEs using RACH;
- Persistence values: possible persistence value scheme parameters are needed for RACH usage;
- Other parameters related to RACH: UE needs to know the timers and parameters related to RACH e.g. how often the UE retransmits RACH and how many times the retransmission is allowed etc;
- RACH power control parameters: UE needs to know parameters related to UL power control.

C.1.5 Information needed while camping on a cell

When a UE has camped on a cell, it needs to continue measuring the neighbouring cells in order to stay camped. The pieces of information required for that are:

- Measurement parameters:
  - In order for the UE to start mobility procedures, it needs to receive parameters e.g. of reporting periods, reporting event parameters, time to trigger etc. UEs in RRC_IDLE state need cell reselection parameters. UEs in RRC_CONNECTED state need parameters of the neighbour cells e.g. for handover and for error recovery cases.
  - Neighbour cell lists are needed to start neighbour cell measurements. UEs in different states may use different sets of neighbour cell lists. Neighbour cell list may contain following parameters:
    - Some L1 parameters: FFS what parameters are needed in the neighbour cell list;
    - All information that is needed for camping: see sub-clauses C.2.2 and C.2.3 (FFS);
    - Synchronization information: indicating whether the neighbouring cell is synchronized to the current cell i.e. the cell sending the neighbour cell list (FFS);
    - PLMN identity(ies) & tracking area identity (FFS);

Note: The above text will be revised if it is agreed that a cell can be a member of more than one tracking area.

  - Other 3GPP RAT information: e.g. neighbour cell information of GERAN/UTRAN cells;
  - Information of non-3GPP access systems (e.g. WIMAX).
- Secondary NAS parameters:
  - An y NAS parameters that were not presented earlier e.g. cell identity uniquely identifying cell within wide area e.g. PLMN;
  - Cell identity (PLMN level) (FFS if this should be in category "Information needed prior to cell access").
- Secondary UE timer values: any timer values that affect UE's behaviour.
- Paging parameters: UEs in ECM-IDLE state need to receive paging parameters e.g. DRX periods and scheduling.
- Clock time (FFS): the network might send system clock in order to let UEs update their clock time e.g. in the user interface;
- MBMS service parameters: any parameters needed for MBMS reception e.g. MBMS multiplexing parameters, MBMS frequency;

NOTE: the presence of these parameters also indicate the presence of MBMS service in the cell (dedicated or mixed cell).

- Signalling Radio Bearer parameters: may be broadcasted unless they are standardized.

C.1.6 Thoughts about category division

From UEs' point of view the categories in sub-clauses C.1.2 and C.1.3 are very similar. Thus it is questionable whether we need to differentiate procedures between cell search/selection/camping and PLMN search.

From UEs' point of view, the difference between the procedure for cell search during RRC_CONNECTED and the procedure for cell search during RRC_IDLE state maybe small. When the UE is in RRC_CONNECTED state, it measures the neighbour cell and executes handovers commanded by the network.

C.2 Division of SI between static and flexible parts

System information distribution can be classified into two distinctive parts: static and flexible. Static part is sent more often, say once per frame, in the cell and has quite a limited capacity for information transfer. The flexible part has flexible amount of scheduled resources available and thus most of the SI information is contained there.

C.2.1 Static part

The static parts of the System Information are:

- L1 information in order to decode the rest of the information

Note: detailed information on the required information will be defined by RAN1;

- Measurement Cell identity (FFS): it may be possible that L1 channels do not identify the cell. Then some Cell identity needs to be sent on system information part;
- Any cell access restriction parameters e.g.:
  - Tracking area identity: if forbidden TA concept is adopted from legacy systems then UEs need to know whether the cell belongs to forbidden TA;

Note: the above text will be revised if it is agreed that a cell can be a member of more than one tracking area.

  - Cell barring and cell reservation status (FFS if needed per PLMN): UEs need to know whether cell is barred or reserved in order to avoid camping on barred cell. Possibly also barring time might be needed in order to avoid UEs to poll barring time frequently from the system information;
  - Radio access limitation parameters: any radio condition parameters that limit the access to the cell e.g. similar to GSM C1/S criteria;
  - PLMN identity(ies): in order to acquire information to which PLMN cell belongs, UEs need to receive PLMN identity(ies).

NOTE: there may be multiple PLMN identities for one cell.

- Scheduling parameters:
  - All of the scheduling information of flexible part or part of scheduling information (e.g. scheduling block) of flexible part. If static part consists of multiple SI blocks then it may be necessary to have scheduling information of those blocks in the static part.
    - Scheduling block defines, from where (time and frequency resources) to decode the SI blocks of the scheduled flexible part. It may be possible that scheduling of scheduling block is standardized, then this information can be omitted from the static part. If several types of scheduling blocks are defined , scheduling information might be sent for each scheduling block.
- Value_tag(s): informs whether the information transmitted on the flexible part has changed. This is needed in order to avoid UEs from reading any unchanged information repeatedly. Another possibility is to send this information in L1/L2 signalling channel, but possibly it would cause too much overhead.

NOTE: It also is possible to include Value_tag for SI on the flexible part indicating more precisely what changes have occurred in the system information.

NOTE: There may be a need for indicating changes in static part with value tag also, if static part consists of multiple SI blocks.

Table C.2.1-1 gives an estimate of the size of the elements mentioned above.

Table C.2.1-1: Initial rough estimates for static part capacity requirement

Information element	Bits
Cyclic Prefix (FFS)	2
Carrier BW (FFS)	3-8
MIMO parameters (FFS)	2 (+ 3)
Cell Id (FFS)	9
Tracking Area Id (+ FFS how many additional)	[16-28]
Cell Barring status+ possible Time of barring	1+4
Cell reservation status	[2]
Radio access limitation parameters	12
PLMN id(s) maximum of 5 (24 bits per one) - see Note	120
Scheduling parameters	(12-108)
Value Tag	4
SFN (FFS)	11

NOTE: It might not be necessary to send the Mobile Country Code part of the PLMN identity for each indicated PLMN to limit the number of bits.

C.2.2 Flexible part

The flexible part has different types of Information Elements which require independent scheduling in order to allow fast enough reception and not to waste transmission capacity. For example, the requirement to receive cell access parameters is very different than e.g. the clock time. Thus following flexible part division should be considered:

- Scheduling block: scheduling information of the secondary part of the System Information.
- Access parameters:
  - All parameters not present in the primary part (e.g. some L1 parameters);
  - RACH parameters;
  - Power control parameters;
  - Paging parameters;
  - Any timer values needed for operating in the cell and in the network.
- Measurement related parameters:
  - Neighbour cell lists;
  - Cell selection/reselection parameters;

NOTE: Some of these parameters are included in the static part element “Radio access limitation parameters.”

  - Measurement control information;
- Non vital information:
  - Clock time;
  - Positioning (A-GNSS etc.) information;

- Service parameters (e.g. MBMS parameters);
- Secondary NAS parameters.

C.2.3 Information whose location is FFS

The location of the following information is FFS:

- System Frame Number: SFN might be needed very fast i.e. for HO purposes. SFN might be needed also for decoding scheduling block parameters, but on the other hand it might be requested not to send often changing information on the static part in order to be able to make time soft combining. Further investigation on the SFN broadcasting is thus needed.

C.2.4 Dedicated part

The dedicated part is embedded in the RRC message that is meant for sending System Information Elements in unicast mode e.g. for HO purposes, positioning purposes …. The UE needs some information for the neighbouring cell to access it, this is needed to limit the interruption times caused by HO execution. When a UE receives a HO COMMAND it needs at least following information from the target cell:

- All information in the static part (see sub-clause C.2.1): may be received by the UE by itself;
- Most of the information from the access parameters (see sub-clause C.2.2): is favourably delivered by dedicated manner via the source cell, because the UE might not have time to get all the necessary secondary SI from the target cell;
- System Frame Number is needed to minimize the interruption times during the HO procedure. Most probably the UE needs to receive (at least confirm) the SFN directly by the neighbour cell SI reading, because giving the SFN via source cell may cause some inaccuracy to the SFN.

Annex D (informative): MBMS

D.1 MBMS control & functions

The E-UTRAN supporting MBMS comprises eNBs and co-ordinating functions.

The functions hosted by the eNB may be:

- Scheduling and transmission of MBMS control information;
- Scheduling of single-cell MBMS transmissions;
- Transmission of single-cell and multi-cell MBMS services;
- Radio bearer control for MBMS.

The co-ordinating functions may include:

- Distribution of MBMS services;
- Co-ordination of multi-cell MBMS transmissions;
- MBMS EPS bearer control.

It is FFS which node in E-UTRAN performs the co-ordination functions.

D.2 MBMS transmission

A point-to-multipoint radio bearer is used to carry MBMS traffic. It is FFS whether a point-to-point radio bearer is also used to carry MBMS traffic or not. Improvements for single-cell MBMS transmission (e.g. HARQ) and MCS that would enable potential removal of p-t-p transmissions for MBMS are FFS.

A frequency layer can be dedicated to MBMS transmissions:

- When a cell belongs to a frequency layer dedicated to MBMS transmissions (MBMS-dedicated cell):
    - The MBMS transmission (MTCH and MCCH) occurs on MCH or DL-SCH;
    - No uplink or counting mechanism supported;
    - No support for unicast data transfer in the cell;
    - The occurrence of paging messages on the frequency layer dedicated to MBMS transmission is FFS:
        - If paging messages were allowed, the UE could answer in a non-E-UTRA cell e.g. UTRA cell (FFS);
    - The possible multi-cell p-t-m transmission with MBSFN operation on the MCH of the MBSFN area is semi-statically configured e.g. by O&M.
    - Single-cell p-t-m transmission is possible.
- When a cell does not belong to a frequency layer dedicated to MBMS transmissions (MBMS/Unicast-mixed cell):
    - Transmission of both unicast and MBMS transmissions in the cell is done in a co-ordinated manner on DL-SCH and or MCH+DL-SCH (FFS);
    - The possible MBSFN operation on the MCH of the MBSFN area is semi-statically configured e.g. by O&M; or the SFN area is dynamic and may be based on counting mechanisms (FFS).
    - Counting is possible (FFS);

- P-t-p transmission on DL-SCH is FFS.

There are two types of MBMS transmissions in E-UTRA/E-UTRAN:

a) Single-cell transmission (no MBSFN operation):

  - The MBMS service, e.g. message distribution, is transmitted only on the coverage of a specific cell;
  - The MBMS service (MTCH and MCCH) may be transmitted on DL-SCH or MCH (FFS);
  - Combining of MBMS transmission from multiple cells is not supported;
  - Counting for switching between p-t-p and p-t-m radio bearer may be supported (FFS);
  - The p-t-m/p-t-p switching points are either dynamically decided based on counting mechanism or semi-statically configured by O&M (FFS).

b) Multi-cell transmission (MBSFN operation):

  - The MBMS service (MTCH and MCCH) is transmitted on MCH;
  - Combining is supported with SFN;
  - Synchronous transmission.

The BCCH indicates where the MCCH(s) are:

- One (or none) MCCH per cell for cell specific transmission;
- MCCH(s) sent in MBSFN area for non-cell specific transmission.

Having a feedback mechanism for MTCH transmission is FFS: statistical feedback, TTI based NACK or something else. Also is FFS if the re-transmission is a single cell transmission in all cases.

D.3 Deployment Scenarios

In terms of deployment scenarios of MBMS in E-UTRAN, the following alternatives can be listed:

- Carrier type: dedicated vs. mixed carrier;
- MBSFN transmission: multi-cell vs. single-cell transmission;
- Radio bearer type: p-t-m vs. p-t-p;
- Counting: yes or no;
- Audience measurement: yes or no;
- ON/OFF control of MBMS service delivery: yes or no;
- PTP / PTM radio bearer switching: yes or no;

Table D.3-1 below lists the combinations of the above alternatives that are specifically supported in E-UTRAN:

Table D.3-1: MBMS Deployment Scenarios

#	Carrier	Transmission	RB	Counting	Comments
1	dedicated	multi-cell	p-t-m	no	From 1 to n cells Audience measurement (FFS)
2	mixed	multi-cell	p-t-m	no	Audience measurement (FFS)
3	mixed	single-cell	p-t-m	yes	

D.4 MCCH Information

The following information types are proposed as candidates for inclusion on MCCH. Stage 3 work may group certain information into, for example, modified services information and unmodified services information, and to avoid duplication and reduce transmission size, group parameter sets into, for example, indexed common services information. It is FFS whether the information of the same type will map to the same IE. The information types described here are linked to the following use cases:

1. UE camping in a cell monitoring for session start(s).
2. UE powering up, entering a cell or on activation of a service, seeking to detect whether a service that it requires is ongoing in the cell.
3. UE commencing to receive a service or required to change parameters following reconfiguration.
4. UE receiving an MBMS service and monitoring for session stop, recounting indication, reconfiguration indication and revised parameters. Possibly also dynamic scheduling.
5. UE performing a cell reselection seeking information that aids service continuity.

Table D.4-1: Potential MCCH Information Types

Information Type	Use Case
Service and session identities	
Session start – own layer	1
Session start – another (mixed or dedicated) layer (FFS)	1
Ongoing or by request (FFS) - own layer	2
Ongoing or by request - another (mixed or dedicated) layer (FFS)	2, 5[3]
Short identities indexing service identities	2,3,4,5
Service parameters – radio bearer information, physical channel configuration information, scheduling information (Note 1)	
For services (MTCH) transmitted on DL-SCH	3, 4, 5
For services (MTCH) transmitted on MCH	3, 4, 5
Required action – whilst receiving a service	
Session stop indication	4
Reconfiguration indication	4
Recounting indication (FFS)	4
Change state (FFS)	4[2], 5[2]
Required action – service access	
Make service request (FFS)	3
Change state (FFS)	3[2]
Counting control information:	
For services transmitted on DL-SCH	3, 4
For services transmitted on MCH (FFS)	3, 4
Single-cell MTCH feedback control (FFS)	3, 4
Indication of the existence of other layers (dedicated, mixed) (FFS)	1, 2,5[3]
Other frequency layer parameters (FFS)	1, 2, 5[3]
Neighbour cell information e.g. service existence, MTCH or MCCH parameters (FFS)	5
MBSFN area edge cell indication or identity (FFS)	5
Parameters that identify how to receive scheduling information(FFS)	3, 4, 5
S-MCCH parameters and scheduling (on P-MCCH)	2, 4, 3, 5
MCCH modification indication (FFS)	1, 4

Note 1: Scheduling information may take two forms, e.g. semi-static scheduling of the TTIs in which MTCH transmissions can take place and short-term scheduling which indicates whether transmissions take place within these TTI, e.g. for DRX (FFS).

Note 2: The case represented here is the FFS scenario where an eNB requires a UE to enter RRC Connected state in order to receive a service. This relates to a single-cell transmission e.g. to perform feedback. A UE might be required to do this on taking up the service, on transferring into a cell whilst receiving the service or whilst receiving the service when in a cell.

Note 3: The use case represents case 2 of the service continuity requirements as described in section 15.4.

Annex E (informative): Drivers for Mobility Control

Table E-1 lists the drivers, limitations, and their applicability to intra-frequency, inter-frequency, and inter-RAT scenarios. Each driver and limitation is described in Section E.1 and E.2, respectively. For inter-frequency and inter-RAT scenarios, the applicable drivers are shown in detail for IDLE/ACTIVE modes and their transitions in Section E.3.

Table E-1: Drivers and limitations for mobility control and applicability to mobility scenarios.

	#	Drivers/limitations	Intra-frequency	Inter-frequency	Inter-RAT
Drivers	1	Best radio condition	X	X	X
	2	Camp load balancing		X	X
	3	Traffic load balancing		X	X
	4	UE capability		X	X
	5	Hierarchical cell structures		X	X
	6	Network sharing		X	X
	7	Private neworks/home cells		X	X
	8	Subscription based mobility control		X	X
	9	Service based mobility control		X	X
	10	MBMS		X	X
Limitations	11	UE battery saving	X	X	X
	12	Network signalling/processing load	X	X	X
	13	U-plane interruption and data loss	X	X	X
	14	OAM complexity	X	X	X

As shown in Table E.1, the applicable drivers depend on the mobility scenario, i.e., intra-frequency, inter-frequency, and inter-RAT:

- **Intra-frequency mobility**: intra-frequency mobility is the most fundamental, indispensable, and frequent scenario. With the frequency reuse being one in E-UTRAN, applying any driver other than the "best radio condition" to intra-frequency mobility control incur increased interference and hence degraded performance. As such, only the "best radio condition" driver is applicable to intra-frequency mobility. Note that the exact definition of "intra-frequency mobility" is yet unclear, and shall be clarified with RAN1.

- **Inter-frequency mobility**: as in UTRAN, an operator may have multiple carriers/bands for E-UTRAN working in parallel. The use of these frequency layers may be diverse. For example, some of these frequency layers may utilise the same eNB sites and antenna locations (i.e., co-located configuration), whereas some may be used to form a hierarchical cell structure (HCS), or even be used for private networks. Some frequency layers may provide MBMS services, while some may not. Moreover, E-UTRAN carriers/bands may be extended in the future to increase capacity. For example, as E-UTRAN gains popularity, an operator may decide to convert existing UTRAN carriers into E-UTRAN ones. The operator may also acquire additional carriers/bands, that are not necessarily contiguous. As a consequence, different UE band capabilities may coexist and different carriers/bands may operate at different areas within a network. The E-UTRAN standard should readily support such carrier/band extensions and diverse network configurations, providing flexibility and efficiency. Therefore, a number of drivers apply to inter-frequency mobility control, in addition to the "best radio condition" driver.

- **Inter-RAT mobility**: the aspects that need to be considered for inter-RAT are similar to those for inter-frequency. For mobility solutions to be complete with the inter-RAT drivers, relevant updates would be necessary on the legacy (UTRAN/GERAN) specifications. This will add to the limitations, which are evidently more effective in inter-RAT. Although the drivers/limitations need to be assessed per objective RAT (UTRAN/GERAN), the solutions should be made common as much as possible to reduce any complexity.

E.1 Drivers

The drivers for mobility control are described in the following sections.

E.1.1 Best radio condition

The primary purpose of cell reselection, regardless of intra-frequency, inter-frequency, or inter-RAT, is to ensure that the UE camps on/connects to the best cell in terms of radio condition, e.g., path loss, received reference symbol power, or received reference symbol Es/I0. The UE should support measurements to suffice this aspect. For E-UTRAN cells, the frequency domain scheduling and channel/symbol mapping may have some implications to designing the measurements and reselection/reporting criteria. The UE would also have to check that the selected cell falls within the accessible range (in terms of signal strength and possibly also in terms of propagation delay, i.e., check if it falls within the dynamic range of timing advance, FFS).

E-UTRAN should support good mobility even when the radio environment changes suddenly, e.g., when the UE enters a tunnel or in a Manhattan-like street cell scenario. It should be discussed whether a special mechanism is needed to cope with such sudden changes in radio environment or it can be handled with good radio network planning practices. In either case, the system design should minimise any side effects of counteracting the sudden changes in the radio environment (e.g., ping-pongs).

For inter-frequency/RAT mobility, the UE needs idle gaps to perform measurements on other frequency layers/RATs. In addition, for inter-RAT, E-UTRAN measurements while the UE is in another RAT (UTRAN/GERAN) need to be supported. It should be discussed whether in certain cases (e.g., co-located E-UTRAN cells within the same frequency band) the measurements can be omitted.

E.1.2 Camp load balancing

This is to distribute idle state UEs among the available bands/carriers/RATs, such that upon activation, the traffic loading of the bands/carriers/RATs would be balanced. At least the path loss difference between different bands should be compensated to avoid UEs concentrating to a certain frequency layer (e.g., lower frequency bands due to the propagation nature). A deliberate mechanism would be necessary to avoid UEs concentrating to a certain RAT (e.g., E-UTRAN). Various solutions have been presented including the use of Qoffset and an approach of limiting the frequency layers for camping.

For inter-RAT, this driver also includes the aspect of balancing the loading of core network nodes of different RATs. Nevertheless, for intra- E-UTRAN, the core network load aspect is out of scope, since MME/Serving Gateway relocation by itself should not cause any radio mobility procedure (but only NAS procedures like NAS ID and security updates).

E.1.3 Traffic load balancing

This is to balance the loading of active state UEs, using redirection for example. In E-UTRAN, traffic load balancing is essential because of the shared channel nature. That is, the user throughput decreases as the number of active UEs in the cell increases, and the loading directly impacts on the user perception. A solution is desired that causes minimum impact on the user perception. This implies that inter-layer transitions are preferably done during data inactivity (e.g., DRX) or transition to the idle state. Although this driver is also applicable to inter-RAT, for inter-RAT, the "service dependent control" driver may be more dominant than the load balancing aspect.

E.1.4 UE capability

As E-UTRAN bands/carriers may be extended in the future, UEs having different band capabilities may coexist within a network. It is also likely that roaming UEs have different band capabilities. Overlaying different RATs adds to this variety. The mobility solution should cope with the coexistence of various UE capabilities in an efficient manner.

E.1.5 Hierarchical cell structures

As in UTRAN, hierarchical cell structures (HCS) may be utilised in E-UTRAN to cover for example, indoors and hot spots efficiently. It is possible that E-UTRAN is initially deployed only at hot spots, in which case this driver becomes essential for inter-RAT, not just for inter-frequency. Another use case would be to deploy a large umbrella cell to cover a vast area without having to deploy a number of regular cells, while providing capacity by the regular cells on another frequency. While HCS can be seen as a solution to reduce measurement and signalling loads, to optimise HCS usage, mobility control should take into account the UE mobility (e.g., speed). This however implies that sufficient mobility detection is also required. Although HCS is not addressed as a mobility driver for intra-frequency mobility, intra-frequency HCS deployment should not be restricted.

E.1.6 Network sharing

At the edge of a shared portion of a network, it will be necessary to direct UEs belonging to different PLMNs to different target cells. The mobility solutions in both idle and active states should therefore support differentiation between UEs of different operators.

E.1.7 Private networks/home cells

Cells that are part of a sub-network should prioritise the camping on that sub-network. UEs that do not belong to private sub-networks should not attempt to camp or access them. Although this could be resolved by the use of forbidden TAs as in UTRAN, a more deliberate mechanism may be needed as some of these sub-networks could be very small, e.g., one home.

E.1.8 Subscription based mobility control

This mobility driver aims to limit the inter-RAT mobility for certain UEs, e.g., based on subscription or other operator policies. The system should provide means to disallow access on certain RATs (including E-UTRAN) as done with "LA reject" in legacy systems. It should be possible for the operator to trigger a subsequent UE action such as a cell or PLMN selection.

E.1.9 Service based mobility control

An operator may have different policies in allocating frequencies to certain services. For example, the operator may concentrate VoIP UEs to a certain frequency layer or RAT (e.g., UTRAN or GERAN), if evaluations prove this effective. UEs requiring higher data rates may better be served on a frequency layer or RAT (e.g., E-UTRAN) having a larger bandwidth. The operator may also want to accommodate premium services on a certain frequency layer or RAT, that has better coverage or larger bandwidth.

This driver is essential for inter-RAT, due to the different QoS levels provided by different RATs. The nature of the service being requested (e.g., QoS and traffic behaviour) should be considered in controlling mobility, so that services are accommodated in the best suitable RAT. Note that such service dependent control shall only be based on network decisions and not on UE decisions (i.e., no UE based service dependent cell reselection), except for MBMS scenarios.

E.1.10 MBMS

As MBMS services may be provided only in certain frequency layers, it may be beneficial/necessary to control inter-frequency/RAT mobility depending on whether the UE receives a particular MBMS service or not. For MBMS scenarios only, UE based service dependent cell reselection might be considered acceptable. This aspect also depends on the UE capability for simultaneous reception of MBMS and unicast.

E.2 Limitations for mobility control

While the issues mentioned above drive E-UTRAN towards “aggressive” mobility control, the limiting factors also have to be considered. The factors listed below apply to all intra-frequency, inter-frequency, and inter-RAT mobility scenarios.

E.2.1 UE battery saving

The mobility solution should not consume excessive UE battery, e.g., due to measurements, measurement reporting, BCH reception, or TA update signalling. This could be achieved for example by setting appropriate measurement rules such as S-criteria, hysteresis, and time-to-trigger. Adaptive control of some measurement/mobility parameters (e.g., based on DRX, cell size, or mobility) may also be considered as a countermeasure. To reduce TA update signalling, TA allocations can be differentiated depending on the UE speed or the mobility vector, on top of appropriate TA planning. Effects on additional delays (e.g., paging) should also be investigated if means such as "long DRX" are used to achieve these savings.

It should be investigated together with RAN4 if a coupling between measurements accuracy and DRX (as in UTRAN) is also acceptable for E-UTRAN.

E.2.2 Network signalling/processing load

The mobility solution should not cause excessive network signalling/processing load. This includes over-the-air signalling, S1/X2 signalling, and processing load at network nodes. Unnecessary handovers and cell reselections should be avoided, and PCH and BCH signalling, as well as dedicated signallings, should be limited. This could be achieved by similar countermeasures as for UE battery saving.

E.2.3 U-plane interruption and data loss

U-plane interruption and data loss caused by the mobility solution should be limited. The required QoS should be satisfied in any case.

E.2.4 OAM complexity

The mobility solution should not demand excessive efforts in operating/maintaining a network. For example, when a new eNB is added or an existing eNB fails, the mobility solution should not incur excessive efforts to set up or modify the parameters. Means should be studied to integrate the mobility solutions in the concept of "self-optimisation" to minimise manual processes. Reducing the neighbour list information in E-UTRAN would also be a countermeasure to this requirement.

E.3 Inter-frequency/RAT drivers

E.3.1 Mobility control during IDLE mode

This is to control the mobility of UEs during IDLE mode, i.e., cell reselection. Table E.3.1-1 summarises applicability of the drivers for different inter-frequency/RAT scenarios and necessary features to support the drivers. Note that in Tables E.3.1-1, E.3.2-1, E.3.3-1, E.3.4-1, an "X" in the table indicates that the driver is essential, whereas an "(X)" indicates that the driver may be reduced in support depending on the complexity incurred. Furthermore in Tables E.3.1-1, E.3.2-1, E.3.3-1, E.3.4-1, the following abbreviations are used:

- L→L: LTE to LTE inter-frequency mobility;
- L→U: LTE to UTRAN inter-RAT mobility;
- U→L: UTRAN to LTE inter-RAT mobility;
- L→G: LTE to GERAN inter-RAT mobility;
- G→L: GERAN to LTE inter-RAT mobility.

Table E.3.1-1: Mobility control during IDLE (cell reselection).

#	Drivers	Applicability					Necessary features to support drivers
		L→L	L→U	U→L	L→G	G→L	
1	Radio condition	X	X	X	X	X	Inter-frequency/RAT measurements (solutions to

							mitigate measurement load should be considered, e.g., S-criteria); Cell reselection and reselection criteria.
2	Camp load balancing	X	X	X	(X)	(X)	Mechanism to prioritise cell reselection to certain layer/RAT, depending on the loading of layers/RATs; Load information exchange (not needed if balancing is inadaptive, i.e., only based on subscriber penetration on each band/RAT.).
3	Traffic load balancing						N/A
4	UE capability	(X)	X	X	X	X	Mechanism to prioritise cell reselection to certain layer/RAT, depending on the UE capability.
5	HCS	(X)	(X)	(X)	(X)	(X)	Mobility detection (e.g., number of crossed cells); Mechanism to prioritise cell reselection to certain layer/RAT, depending on the UE speed (e.g., HCS mechanism as in UTRAN).
6	Network sharing	X	X	X	X	(X)	Mechanism to direct the UE to the appropriate PLMN at a network sharing border; Mechanism to restrict UE measurements and reselection to cells that are entitled to access.
7	Private networks / home cells	X	(X)	X		(X)	Mechanism to prioritise reselection to private/home cells that are entitled to access; Mechanism to restrict UE measurements and reselection to cells that are entitled to access; Other unidentified features, FFS.
8	Subscription / Policy based mobility control	X	X	X	(X)	(X)	Mechanism to prioritise cell reselection to certain layer/RAT, depending on the subscription information or any other operator policy (e.g., for L→L there may be cases where an operator has policy in allocating UEs to certain frequencies due to different carrier bandwidths).
9	Service based mobility control						N/A
10	MBMS	X	(X)	X			Mechanism to prioritise cell reselection to the layer/RAT, depending on whether the UE requires reception of a certain MBMS transmission.

E.3.2 Mobility control upon IDLE to ACTIVE transition

This is to control the mobility of UEs upon IDLE to ACTIVE transition, i.e., redirection upon RRC or U-plane establishment. Table E.3.2-1 summarises applicability of the drivers for different inter-frequency/RAT scenarios and necessary features to support the drivers.

Table E.3.2-1: Mobility control upon IDLE to ACTIVE transition (redirection upon RRC/U-plane establishment)

#	Drivers	Applicability					Necessary features to support drivers
		L→L	L→U	U→L	L→G	G→L	
1	Radio condition	(X)	(X)				Inter-frequency/RAT measurements (during IDLE mode or upon IDLE to ACTIVE transition) and measurement reporting upon RRC establishment (it should be investigated whether measurements can be omitted in some or all cases, e.g., co-located cells).
2	Camp load balancing						N/A
3	Traffic load balancing	X	(X)	(X)	(X)		Redirection to a certain layer/RAT (cell) upon RRC establishment, depending on the loading of layers/RATs; Load information exchange (not needed if balancing is inadaptive, i.e., only based on subscriber penetration on each band/RAT).

SAMSUNG 1017-0170

4	UE capability	X	(X)		(X)		Redirection to a certain layer/RAT (cell) upon RRC establishment, depending on the UE capability.
5	HCS						N/A
6	Network sharing	(X)	(X)	(X)	(X)		Redirection to a certain layer/RAT (cell) of the preferred PLMN, upon RRC establishment.
7	Private neworks / home cells	(X)					Redirection from a certain private/home cell.
8	Subscription / Policy based mobility control	X	X	(X)	(X)	(X)	Redirection to a certain layer/RAT (cell) upon RRC establishment, depending on the subscription information (if available upon establishment) or any other operator policy.
9	Service based mobility control	X	X	(X)	(X)	(X)	Redirection to a certain layer/RAT (cell) upon RRC establishment, depending on the requested service (if the service information is available upon establishment).
10	MBMS						N/A

E.3.3 Mobility control during ACTIVE mode

This is to control the mobility of UEs during ACTIVE mode (ECM-CONNECTED or UTRAN RRC Connected), i.e., handover. Table E.3.3-1 summarises applicability of the drivers for different inter-frequency/RAT scenarios and necessary features to support the drivers.

Table E.3.3-1: Mobility control during ACTIVE (handover)

#	Drivers	Applicability					Necessary features to support drivers
		L→L	L→U	U→L	L→G	G→L	
1	Radio condition	X	X	X	X	(X)	Gap assisted inter-frequency/RAT measurements (network controlled); Measurement reporting and reporting criteria; Inter-frequency/RAT handover (UE assisted network controlled).
2	Camp load balancing						N/A
3	Traffic load balancing	X	(X)	(X)	(X)		Inter-frequency/RAT handover (network controlled); Load information exchange (not needed if balancing is inadaptive, i.e., only based on subscriber penetration on each band/RAT).
4	UE capability	(X)	(X)	(X)	(X)		Inter-frequency/RAT handover (network controlled), depending on the UE capability.
5	HCS	(X)	(X)	(X)			Mobility detection (e.g., number of crossed cells); Inter-frequency/RAT handover (network controlled), depending on the UE speed.
6	Network sharing	X	X	X	X		Inter-frequency/RAT handover (network controlled) to a cell of the appropriate PLMN at network sharing border; Mechanism to restrict UE measurements to cells that are entitled to access.
7	Private networks /home cells	X	X	X	X	X	Inter-frequency/RAT handover (network controlled) to a private/home cell on another layer/RAT, where the UE is entitled to access; Mechanism to restrict UE measurements and reselection to cells that are entitled to access; Other unidentified features, FFS.
8	Subscription / Policy based mobility control	(X)	X	X	X	X	Inter-frequency/RAT handover (network controlled), depending on the subscription information or any other operator policy.
9	Service based mobility control	(X)	X	X	X	X	Inter-frequency/RAT handover (network controlled), depending on the service or combination of services being used or requested.
10	MBMS	X	X	X			Inter-frequency/RAT handover (network

SAMSUNG 1017-0171

							controlled), depending on whether the UE requires reception of a certain MBMS transmission.

E.3.4 Mobility control upon ACTIVE to IDLE transition

This is to control the mobility of UEs upon ACTIVE to IDLE transition, i.e., redirection upon RRC or U-plane release. Table E.3.4-1 summarises applicability of the drivers for different inter-frequency/RAT scenarios and necessary features to support the drivers.

Table E.3.4-1: Mobility control upon ACTIVE to IDLE transition (redirection upon RRC/U-plane release)

#	Drivers	Applicability					Necessary features to support the driver
		L→L	L→U	U→L	L→G	G→L	
1	Radio condition	X	X	X	X	X	Gap assisted inter-frequency/RAT measurements (it should be investigated whether measurements can be omitted in some or all cases, e.g., co-located cells), OR Cell search upon redirection.
2	Camp load balancing	X	X	X	(X)	(X)	Redirection to a certain layer/RAT upon RRC release, depending on the loading of layers/RATs; Load information exchange (not needed if balancing is inadaptive, i.e., only based on subscriber penetration on each band/RAT).
3	Traffic load balancing						N/A
4	UE capability	X	X	X	(X)	(X)	Redirection to a certain layer/RAT upon RRC release, depending on the UE capability.
5	HCS						N/A
6	Network sharing	X	X	X	X		Redirection to a certain layer/RAT of the preferred PLMN, upon RRC release.
7	Private networks / home cells						N/A
8	Subscription / Policy based mobility control	X	X	X	(X)	(X)	Redirection to a certain layer/RAT upon RRC release, depending on the subscription information or any other operator policy.
9	Service based mobility control	(X)	(X)		(X)		Redirection (or maintaining) to a certain layer/RAT upon RRC release, depending on the service that has been used (predicting that the UE uses the same service in the future).
10	MBMS	(X)	(X)		(X)		Redirection to a certain layer/RAT upon stop of an MBMS service reception.

Annex F (informative): Mobility and Access Control Requirements associated with Closed Subscriber Group (CSG) Cells

F.1 Access Control

The following description is provided from the perspective of the Home cell deployment, and is used as an example to understand the general requirements of Closed Subscriber Group (**CSG**) Cells.

If an operator uses the 2G or 3G systems for a deployment in a home, there are some limitations imposed by mandating that only a UE from a specific User Group can access the cell. This access restriction is needed because some backhaul links for this type of deployment are not considered to provide adequate QoS to support a large numbers of UEs, or there may be regulatory issues with sharing the backhaul link/eNB access in that location, and additionally the backhaul maybe owned by the subscriber and they may not be happy to share the link with other subscribers.

In 3G, the Access Control would work based on the Location Updating or Routing Area Updating Reject for the LA or RA which is being signalled on the cell. Each unique User Group would require its Location Area ID, however the LAC of the LA ID is only 2 octets, which needs to be shared with the normal LAs of the PLMN.

There is an additional drawback with this solution in 3G, which is that all terminals would attempt to perform the Location Updating procedure on a cell advertising a LA not on the list of forbidden LAs in the UE. The network would reject the location updating procedure of those UEs which are not in the User Group associated with the LA. This would lead to the scenario in a densely populated area, where a UE moving down the street could attempt to access a home cell at each house, before being rejected causing a wastage of battery in the terminal, and unnecessary signalling/processing load in the core network.

1. **A UE should not camp on or access a CSG Cell if it is not part of the User Group which is allowed to access that CSG Cell.**

It shall be possible to update the User Group associated with a specific Home-eNB, e.g. based on request by the registered owner of the Home-eNB, under the supervision of the network operator. When a subscriber is added to the User Group for the Home-eNB, the UE of the newly added subscriber should be able to (almost) immediately camp on the cell(s) of Home-eNB and then may acquire service through the Home-eNB. This is especially important in the deployment scenario where this subscriber has no other means to access the network, i.e. there is no Macro-layer coverage available. For this it might be necessary to update the list of allowed CSG cells for a particular UE by network signalling or other means.

2. **The subscriber registered as the owner of a CSG Cell or group of Cells, under supervision of the operator, shall be able to control/modify quickly which other subscribers form part of the User Group associated with its CSG Cell(s).**

F.2 Mobility

The Home-eNB/CSG cells should form part of the network of the operator, and therefore the design needs to support mobility of UEs between the Macro-Layer network and the Home-eNB/CSG cells. In the following text, what is called Macro layer encompasses all the cells which are not from the CSG being considered i.e. it is not about their size/coverage but the fact that they are not closed.

3. **The system shall support bidirectional handover between CSG Cells and any eNodeB (E-UTRAN) or RNC (UTRAN) or BSS (GERAN) or with another CSG Cell of the same or different CSG.**

The Home-eNBs will be deployed to improve network coverage, improve network capacity as well as offer differential billing models. As the User billing could be dependent on whether the UE is using the Home-eNB, it is important that the UE when it is range of the Home-eNB automatically camps on the Home-eNB.

4. **It shall be possible to allow UEs which are allowed to access a given CSG cell, to prioritise their camping towards the CSG Cells when in coverage of the CSG cells. To achieve this it should be possible either to set the reselection parameters accordingly or other means should allow this.**

It is important that UEs camped on the Home-eNB do not cause excessive signalling load or processing load if/when the UE moves frequently between the Macro-Layer network and the Home-eNB.

5. **The system shall avoid excessive signalling and processing load from a UE frequently reselecting in LTE Idle between the CSG Cells and the non-CSG cells of eNodeB (E-UTRAN) or RNC (UTRAN) or BSS (GERAN).**

As discussed above, the Home-eNBs will have an associated User Group describing which UEs can access the Home-eNB. The handover procedures needs to take the User Group of the Target Home-eNB into account when deciding whether to handover a UE to a specific Home-eNB. The solution for the mobility to/from the Home-eNB should avoid unnecessary signalling between the RAN nodes.

6. **The handover procedures shall take into account whether a UE is part of the User Group of the target CSG Cell. The mobility procedures should allow for prioritisation of the CSG Cells in ECM-CONNECTED when the UE enters coverage of a CSG Cell and the UE is part of the User Group of this cell.**

As the number of Home-eNBs in the network will become large, the proportion of measurements made by a UE which could be wasted may become large, to the point where it affects the mobility performance of the UE/system, as well as draining the battery of the UE. It is therefore necessary for the UE to be able to avoid unnecessary measurements of Home-eNBs where the UE does not belong to the User Group of the Home-eNB.

7. **It shall be possible to minimise the quantity of measurements which UEs perform on CSG Cells, if the UE does not belong to the User Group of a specific CSG Cell.**

Due to the high number of Home-eNBs and the nature of their deployment, it would not be practical to change the configuration for the mobility procedures (measurements, handover, etc.) in the macro layer nodes when a Home-eNB is deployed/dismissed.

8. **The mobility procedures shall allow a large number of (small) CSG Cells to be deployed within the coverage of e-UTRAN, UTRAN and GERAN macro-layer cells. Deployment of (additional) CSG Cells shall not require reconfiguration of other eNodeB (E-UTRAN) or RNC (UTRAN) or BSS (GERAN).**

In order to minimise the impact on UEs not allowed to use CSG cells or not allowed to use a particular CSG cell, means shall be provided which allow the UE to either identify prior to cell reselection that the configured neighbour cell is a CSG cell or means shall be provided which do not impact the UEs on the macro cells.

9. **The mobility procedures for moving UEs to CSG cells shall minimise impact to other UEs on the same macro cells not entitled to use CSG cells or a given CSG cell.**

Annex G (informative): Guideline for E-UTRAN UE capabilities

Each radio access technology has defined specific "classes" of terminals in terms of radio capabilities. E.g. in GPRS the "multislot classes" are defined, in UMTS R'99 different dedicated bearer classes are defined and for HSDPA and HSUPA 12 respectively 6 physical layer categories are defined. The definition of UMTS R'99 UE classes lead to 7 DL classes and 7 UL classes for FDD out of which only 2 DL and 3 UL classes were commercially realized. Furthermore the lower end classes (e.g. 64 UL and 64 DL) disappeared from the market with commercialization of the UMTS networks quite soon. Besides these class definitions a huge number of possible parameter combinations (to achieve certain data rates) exist with UMTS R'99 which lead to the huge number of RAB and RB combinations defined. Further activities in the early phase of UMTS standardization aimed to reduce the number of possible combinations significantly.

For HSDPA two "simple" DL categories (11 & 12) with lowered complexity were defined with the intent to speed up commercialization of HSDPA. Originally those categories should have been removed for Rel-6. Out of the 12 defined categories only approx. 4 will be realized in commercial HSDPA platform products. A similar situation is likely for HSUPA as well as for the combinations of HSDPA/HSUPA.

Generally the aim to mandate certain essential functions/requirements can help to simplify the system definition as well as the realization options (e.g. mandating 20 MHz of DL reception as well as 20 MHz UL transmission bandwidth significantly reduced the E-UTRAN system complexity). Especially mandating certain terminal functions could be useful for the system design if a defined subset of parameter combinations are also supported by the systems, e.g. the eNB scheduler. However, there is also a risk that not all the defined E-UTRA features are deployed in the networks at the time when terminals are made commercially available on the market place. Some features are likely to be rather large and complex, which further increases the risk of interoperability problems unless these features have undergone sufficient interoperability testing (IOT) on real network equipment, and preferably with more than one network in order to improve the confidence of the UE implementation. Thus, avoiding unnecessary UE mandatory features but instead defining a limited set of UE radio classes allows simplification for the interoperability testing.

Given the discussion above, it seems beneficial for the introduction of E-UTRAN to limit the combination of radio capabilities to a clearly defined subset and ensure that a given set of parameters is supported by certain UE classes as well as networks for rapid E-UTRAN deployment. It seems unrealistic to mandate only one single UE class which always mandates the maximum capability.

In order to address the different market requirements (low end, medium and high end), the definition of the following UE classes are proposed:

Table G-1: E-UTRAN UE Classes

Class	UL	DL
A	[50] Mbps	[100] Mbps
B	[25] Mbps	[50] Mbps
C	[2] Mbps	[2] Mbps

NOTE: For simplification reasons, the table only depict the UE capabilities in terms of uplink and downlink peak data rates supported. However, it should be noted that further discussion on other features is expected once the work progresses.

It may require further discussion whether there be a need for an additional terminal class between 2 Mbps and 50 Mbps classes. It might make sense, since up to 5 MHz band allocations may be rather common in real deployments for several years. This would point to bit rate class of 25 Mbps in DL and 10 Mbps in UL.

The above given data rates are indicative and should be subject for further discussions in 3GPP RAN working groups. Depending on the different solutions to reach those data rates, the target should be to define [3..4] UE classes in different data rate ranges, and other parameters affecting device complexity and cost. The definition of the required parameters/features is for further study for each of the classes. For instance, half-duplex UEs form a specific category that may be frequency band specific.

NOTE: the support of half-duplex UEs is mandatory for the eNB where such a category is allowed in the frequency band supported by the eNB.

The aim is to ensure on the one hand that high end E-UTRAN UEs, supporting data rates representing state of the art level and competitive with other radio technologies are defined, while the medium and lower data rates aim to reduce implementation cost for chipset/terminal vendors and allow adoption of most cost efficient solutions for different market segments. It is expected that the support of the high end data rate terminals is ensured from the very beginning.

Another clear exception from this exercise is that on the low end very cheap product implementation is possible (e.g. for the machine-to-machine market or the voice and very low data rate only segment – to substitute GSM in the medium term) while top end performance is needed for data applications in notebooks, wireless gateways ("wireless DSL"), etc.

Another important aspect that must be ensured is that a higher capability UE can be treated in exactly the same way as for a lower capability UE, if the network wishes to do so, e.g., in case the network does not support some higher capability features. In HSDPA, there has been problems in this respect due to 2-stage rate matching in HARQ. Such problems should be avoided in E-UTRAN, and E-UTRAN UE capabilities should provide the compatibility to ease implementation and interoperability testing.

Annex H (informative): L1/L2 Control Signalling Performance

The target quality on L1/L2 control channels of E-UTRAN is summarized in the two tables below:

Table H-1: DL control signalling

Event	Target quality
DL scheduling information miss detection	(10^{-2})
UL scheduling grant miss detection	(10^{-2})
NACK to ACK error (for UL-SCH)	(10^{-4} – 10^{-3})
ACK to NACK error (for UL-SCH)	(10^{-4} – 10^{-3})

Table H-2: UL control signalling

Event	Target quality
ACK miss detection (for DL-SCH)	(10^{-2})
DTX to ACK error (for DL-SCH)	(10^{-2} – 10^{-1})
NACK to ACK error (for DL-SCH)	(10^{-4} – 10^{-3})
CQI block error rate	FFS (10^{-2} – 10^{-1})

SAMSUNG 1017-0176

Annex I (informative): Change history

Change history (before approval)							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
2006-06	RAN2 Ad.	R2-062020			First version.		0.0.0
2006-06	RAN2 Ad.	R2-062026			RLC operation clarified; High priority and low priority SRBs listed in RRC; New section on RRC procedures; Organisation of paging groups explained; New section on Support for self-configuration and self-optimisation.	0.0.0	0.0.1
2006-06	RAN2 Ad.	R2-062036			Four possible types of allocation added to section 11; New section for the support for real time IMS services.	0.0.1	0.0.2
2006-08	RAN2#54	R2-062206			Annex B on RRC and MAC control added. Minor editorial clarifications.	0.0.2	0.0.3
2006-09	RAN#34	RP-060603			Section 4 on "Overall Architecture" reorganised; Details on RLC operation included (segmentation, PDU size); Overview of System Information and RACH procedure added.	0.0.3	0.0.4
2006-10	RAN2#55	R2-063012			Ciphering for RRC signalling required in eNB as agreed in SA3; Agreements on RLC operation included: concatenation, discard, polling and status reports; Agreed text proposal in R3-061428 on Self Configuration added to section 19; Context transfer of header compression at UPE relocation listed as FFS. Outline of the RACH procedure described.	0.0.4	0.0.5
2006-10	RAN2#55	R2-063039			Miscellaneous editorial corrections; Agreed text proposal R3-061606 on Current status of E-UTRAN Architecture description added to section 4; Agreed text proposal in R3-061613 on Support for self-configuration and self-optimisation added to section 19. Agreed Physical layer model R2-063031 added to section 5	0.0.5	0.1.0
2006-11	RAN2#56	R2-063656			Annex C on system information classification added (R2-063064); Integrity protection for the control plane only (SA3 agreement); Agreements on PDCP and RLC PDU structure/handling reflected; Decisions on mobility aspects such as load balancing, handover, radio link failure and random access procedure added; Agreed MBMS deployment scenarios listed together with MBMS transmissions and principles from 25.813; Agreed text proposal R3-061936 on Radio Resource Management added to section 15; Agreed text proposal R3-061940 on RAN Sharing added to section 10; Agreed text proposal R3-061943 on Roaming/Area Restrictions in SAE/LTE added to section 10; Agreed text proposal R3-062008 on S1 C-Plane Functions and procedures added to section 18; Agreed text proposal R3-062011 on X2 interface added to section 19.	0.1.0	0.2.0
2006-11	RAN2#56	R2-063680			Incorporation of RAN1 agreement regarding the mandatory support of 20Mhz DL bandwidth for UEs i.e. removal of sub-clause 16.1; Editorial corrections.	0.2.0	0.3.0
2006-11	RAN2#56	R2-063681			Removal of the SA3 agreement on integrity protection for the user plane; Addition of Annex D on MBMS Transmission; Editorial corrections.	0.3.0	0.3.1
2006-11	RAN#34	RP-060806			Clean version	0.3.1	0.3.1
2007-01	RAN2#56 bis	R2-070403			SA3 agreement on integrity protection for the user plane included (R2-070016); Annex E on drivers for mobility control added (R2-070276); Agreements on the details of the random access procedure added in section 10.1.5 (R2-070365); New section on UL rate control included (R2-070410); RRC security principles listed in section 13.1 (R2-070044); Agreement on MAC security added to section 13 (R2-062100); Basis for DL scheduling put in section 11.1; Assumptions on neighbour cell list included in section 10.	0.3.1	0.4.0
2007-02	RAN2#57	R2-070451			Number of bits for RACH in TDD clarified; Miscellaneous editorial corrections.	0.4.0	0.5.0
2007-02	RAN2#57	R2-071073			Architecture updated according to R3-070397; Agreements from R2-070802.	0.5.0	0.6.0

2007-02	RAN2#57	R2-071120			RACH model for initial access described; Mapping of the BCCH and System Information principles added; Agreements on DRX included in section 12.	0.6.0	0.7.0
2007-02	RAN2#57	R2-071122			Miscellaneous clarifications	0.7.0	0.7.1
2007-02	RAN2#57	R2-071123			CCCH in DL listed as FFS; SAE Gateway ID removed from section 8.2; PDCP for the control plane listed as FFS in section 4.3.2; Agreements on intra-E-UTRAN handover procedure included in section 10.1.2 (R3-062020).	0.7.1	0.8.0
2007-03	RAN2#57	R2-071124			Agreement on Radio Access Network Sharing (R2-070551) added to section 10.1.7; Overview of the physical layer (R1-071251) included to section 5; Agreed text proposals on *S1 interface* included in Section 19 (R3-070289, R3-070402); Agreed text proposal R3-070409 on *network sharing* included in section 10.1.7; Agreed text proposal R3-070411 on *Area Restrictions* included in section 10.4; Agreed text proposal R3-070448 on *Assembly of Intra-E-UTRAN handover command* included in section 10.1.2.1.1; Agreed text proposal R3-070451 on *inter RAT HO principles* included in section 10.2.2; Agreed text proposal R3-070472 on *Addressing on S1-C and X2-C* added to sections 19.2 and 20.2; Agreed text proposal R3-070494 on *Initial Context Setup Function and Procedure* added to section 19; Agreed text proposal R3-070495 on *S1 Paging function and procedure* added to section 19 Figures for mapping between channels split into Uplink and Downlink parts in section 5.3.1 and 6.1.3.	0.8.0	0.9.0
2007-03	RAN#35	RP-070136			S1-U and S1-MME used throughout the document; aGW replaced by EPC when still used; Clean version for information	0.9.0	1.0.0

Change history (after approval)							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
2007-03	RP-35	RP-070136	-		Approved at TSG-RAN #35 and placed under Change Control	1.0.0	8.0.0
2007-06	RP-36	RP-070399	0001	1	Changes to management-, handover-, paging- and NAS functions, node- synchronization, X2 UP protocol stack, X2 inter cell load management, IP fragmentation, intra-LTE HO, and TA relation to cells in eNB	8.0.0	8.1.0
	RP-36	RP-070494	0002	1	Update on Mobility, Security, Random Access Procedure, etc…	8.0.0	8.1.0
	RP-36	RP-070399	0003	-	Update on MBMS	8.0.0	8.1.0
2007-09	RP-37	RP-070637	0004	1	Update on Security, System Information, Mobility, MBMS and DRX	8.1.0	8.2.0
	RP-37	RP-070637	0005	1	Correction of synchronization, handover, trace, eMBMS architecture, and S1 common functions and procedures	8.1.0	8.2.0
2007-12	RP-38	RP-070913	0006	1	Clean up and update on security, scheduling, mobility, MBMS and DRX	8.2.0	8.3.0
	RP-38	RP-070913	0007		Mobility management	8.2.0	8.3.0
	RP-38	RP-070913	0008		Correction of eMBMS functions and NAS handling during X2 handover	8.2.0	8.3.0
	RP-38	RP-071048	0009		Update of Stage 2 to incorporate Interworking with cdma2000	8.2.0	8.3.0
2008-03	RP-39	RP-080192	0010		CR to 36.300 on NAS States, Persistent Scheduling, C-RNTI Allocation at Handover…	8.3.0	8.4.0
	RP-39	RP-080192	0011		RAN3 corrections to 36.300 (CR0011)	8.3.0	8.4.0

EXHIBIT 5

www.3gpp.org - /ftp/tsg_ran/WG2_RL2/TSGR2_61bis/Docs/

[To Parent Directory]

3/19/2008	8:56 AM	22400	R2-081400.zip
4/4/2008	4:25 PM	350347	R2-081401.zip
3/19/2008	10:30 AM	24234	R2-081402.zip
3/19/2008	8:59 AM	7398	R2-081403.zip
3/19/2008	9:00 AM	20440	R2-081404.zip
3/19/2008	9:00 AM	10588	R2-081405.zip
3/19/2008	9:00 AM	7848	R2-081406.zip
3/19/2008	9:00 AM	67842	R2-081407.ZIP
3/19/2008	9:00 AM	36122	R2-081408.ZIP
3/19/2008	9:00 AM	8286	R2-081409.zip
3/19/2008	9:00 AM	40386	R2-081410.zip
3/19/2008	9:00 AM	9544	R2-081411.zip
3/19/2008	9:00 AM	112634	R2-081412.zip
3/19/2008	9:00 AM	12594	R2-081413.zip
3/19/2008	9:00 AM	335483	R2-081414.zip
3/19/2008	9:00 AM	13118	R2-081415.zip
3/19/2008	9:00 AM	18441	R2-081416.zip
3/19/2008	9:00 AM	9018	R2-081417.zip
3/19/2008	9:00 AM	8661	R2-081418.zip
3/19/2008	9:00 AM	51383	R2-081419.zip
3/19/2008	9:00 AM	75025	R2-081420.zip
3/19/2008	9:00 AM	5398	R2-081421.ZIP
3/19/2008	9:00 AM	35210	R2-081422.ZIP
3/19/2008	9:00 AM	59646	R2-081423.zip
3/19/2008	9:00 AM	10562	R2-081424.ZIP
3/19/2008	9:00 AM	11093	R2-081425.ZIP
3/19/2008	9:00 AM	9066	R2-081426.zip
3/19/2008	9:00 AM	11034	R2-081427.ZIP
3/19/2008	9:00 AM	11750	R2-081428.ZIP
3/19/2008	9:00 AM	9581	R2-081429.zip
3/19/2008	9:00 AM	9419	R2-081430.zip
3/19/2008	9:00 AM	10080	R2-081431.zip
3/19/2008	9:00 AM	10189	R2-081432.zip
3/19/2008	9:00 AM	10642	R2-081433.zip
3/19/2008	9:00 AM	9650	R2-081434.zip
3/19/2008	9:00 AM	24047	R2-081435.zip
3/19/2008	9:00 AM	8076	R2-081436.zip
3/19/2008	9:01 AM	7903	R2-081437.zip
3/19/2008	9:01 AM	9538	R2-081438.zip
3/19/2008	9:01 AM	487180	R2-081439.zip
3/19/2008	9:01 AM	52270	R2-081440.zip
4/4/2008	4:25 PM	490478	R2-081441.zip
4/11/2008	9:12 AM	468602	R2-081445.zip
3/25/2008	8:31 AM	234943	R2-081446.zip
3/25/2008	8:33 AM	93496	R2-081447.zip
3/25/2008	9:34 AM	30520	R2-081448.zip
3/20/2008	2:25 PM	199470	R2-081449.zip
3/25/2008	5:32 AM	24980	R2-081450.zip
3/25/2008	5:32 AM	17397	R2-081451.zip
3/25/2008	5:32 AM	17672	R2-081452.zip
3/20/2008	7:28 PM	55690	R2-081453.zip

3/20/2008	7:29 PM	14633	R2-081454.zip
3/25/2008	7:42 AM	16027	R2-081455.zip
3/25/2008	7:11 AM	17249	R2-081456.zip
3/24/2008	10:01 PM	39006	R2-081457.zip
3/24/2008	10:03 PM	52193	R2-081458.zip
3/25/2008	12:39 PM	25279	R2-081459.zip
3/24/2008	10:04 PM	67345	R2-081460.zip
3/27/2008	10:36 AM	15029	R2-081461.zip
3/24/2008	10:07 PM	284366	R2-081462.zip
3/24/2008	10:07 PM	30168	R2-081463.zip
3/29/2008	10:58 AM	441762	R2-081464.zip
3/25/2008	7:31 AM	102012	R2-081465.zip
3/25/2008	7:31 AM	36326	R2-081466.zip
3/25/2008	7:28 AM	12474	R2-081467.zip
3/25/2008	1:09 PM	15633	R2-081468.zip
3/20/2008	7:30 PM	10155	R2-081469.zip
3/20/2008	7:30 PM	16428	R2-081470.zip
3/25/2008	7:38 AM	19798	R2-081471.zip
3/25/2008	7:38 AM	25808	R2-081472.zip
3/24/2008	10:35 PM	15743	R2-081473.zip
3/24/2008	10:35 PM	407052	R2-081474.zip
3/24/2008	10:54 PM	16261	R2-081475.zip
3/24/2008	7:29 PM	16945	R2-081476.zip
3/25/2008	7:12 AM	83667	R2-081477.zip
3/24/2008	10:36 PM	31162	R2-081478.zip
3/24/2008	10:40 PM	29327	R2-081479.zip
3/24/2008	10:41 PM	30342	R2-081480.zip
3/24/2008	10:43 PM	31336	R2-081481.zip
3/24/2008	7:29 PM	37431	R2-081482.zip
3/22/2008	5:15 AM	24434	R2-081483.zip
3/22/2008	5:15 AM	36666	R2-081484.zip
3/22/2008	5:15 AM	14528	R2-081485.zip
3/24/2008	10:57 PM	66782	R2-081486.zip
3/29/2008	6:09 AM	25756	R2-081487.zip
3/24/2008	10:57 PM	11345	R2-081488.zip
3/24/2008	7:30 PM	27169	R2-081489.zip
3/25/2008	7:44 AM	17799	R2-081490.zip
3/22/2008	5:14 AM	14289	R2-081491.zip
3/22/2008	5:14 AM	19585	R2-081492.zip
3/24/2008	10:58 PM	34952	R2-081493.zip
3/24/2008	10:58 PM	11482	R2-081494.zip
3/20/2008	7:31 PM	16100	R2-081495.zip
3/20/2008	7:31 PM	15997	R2-081496.zip
3/20/2008	7:31 PM	21159	R2-081497.zip
3/20/2008	7:32 PM	17838	R2-081498.zip
3/24/2008	10:41 PM	28562	R2-081499.zip
3/25/2008	7:53 AM	22924	R2-081500.zip
3/25/2008	1:49 PM	17787	R2-081501.zip
3/25/2008	9:03 AM	15266	R2-081502.zip
3/24/2008	7:31 PM	22897	R2-081503.zip
3/24/2008	10:36 PM	24690	R2-081504.zip
3/24/2008	7:31 PM	28496	R2-081505.zip
3/24/2008	7:31 PM	23770	R2-081506.zip
3/25/2008	7:51 AM	26375	R2-081507.zip
3/25/2008	7:51 AM	25619	R2-081508.zip
3/25/2008	7:01 AM	27811	R2-081509.zip
3/25/2008	7:48 AM	25454	R2-081511.zip
3/25/2008	7:02 AM	35600	R2-081512.zip
3/25/2008	1:32 AM	35890	R2-081513.zip
3/24/2008	10:10 PM	81510	R2-081514.zip
3/24/2008	10:14 PM	73890	R2-081515.zip

3/24/2008	10:14 PM	41050	R2-081516.zip
3/24/2008	10:14 PM	73555	R2-081517.zip
3/24/2008	10:05 PM	41057	R2-081518.zip
3/24/2008	10:14 PM	38523	R2-081519.zip
3/24/2008	8:30 PM	11227	R2-081520.zip
3/25/2008	9:47 AM	10663	R2-081521.zip
3/22/2008	5:17 AM	62187	R2-081522.zip
3/25/2008	7:42 AM	21571	R2-081523.zip
3/25/2008	5:38 AM	24611	R2-081524.zip
3/25/2008	5:38 AM	25645	R2-081525.zip
3/25/2008	1:59 AM	16870	R2-081526.zip
3/25/2008	3:52 AM	21809	R2-081527.zip
3/25/2008	2:01 AM	200864	R2-081528.zip
3/25/2008	2:08 AM	17105	R2-081529.zip
3/25/2008	2:04 AM	22361	R2-081530.zip
3/25/2008	2:10 AM	17669	R2-081531.zip
3/25/2008	2:36 AM	27311	R2-081532.zip
3/25/2008	2:31 AM	68972	R2-081533.zip
3/25/2008	5:23 AM	58994	R2-081534.zip
3/25/2008	5:23 AM	73780	R2-081535.zip
3/25/2008	2:31 AM	73488	R2-081536.zip
3/25/2008	5:24 AM	27322	R2-081537.zip
3/25/2008	5:24 AM	27893	R2-081538.zip
3/25/2008	5:25 AM	25039	R2-081539.zip
3/25/2008	2:32 AM	30599	R2-081540.zip
3/24/2008	11:39 PM	18100	R2-081541.zip
3/24/2008	11:41 PM	70369	R2-081542.zip
3/24/2008	11:42 PM	46369	R2-081543.zip
3/21/2008	1:16 PM	43085	R2-081544.zip
3/21/2008	1:17 PM	90216	R2-081545.zip
3/21/2008	1:17 PM	89739	R2-081546.zip
3/21/2008	1:17 PM	112168	R2-081547.zip
3/21/2008	1:18 PM	112186	R2-081548.zip
3/25/2008	3:30 AM	19795	R2-081549.zip
3/25/2008	3:30 AM	46351	R2-081550.zip
3/25/2008	3:30 AM	71588	R2-081551.zip
3/25/2008	3:30 AM	74471	R2-081552.zip
3/25/2008	3:31 AM	18226	R2-081553.zip
3/21/2008	2:16 PM	41619	R2-081554.zip
3/21/2008	2:21 PM	8655	R2-081555.zip
3/24/2008	1:22 PM	17792	R2-081556.zip
3/24/2008	10:09 PM	154210	R2-081557.zip
3/25/2008	4:59 AM	7935	R2-081558.zip
3/25/2008	5:14 AM	66011	R2-081559.zip
3/25/2008	7:04 AM	91195	R2-081560.zip
3/25/2008	7:07 AM	62858	R2-081561.zip
3/25/2008	7:08 AM	70514	R2-081562.zip
3/25/2008	7:09 AM	13896	R2-081563.zip
3/25/2008	7:11 AM	13354	R2-081564.zip
3/25/2008	4:59 AM	36759	R2-081565.zip
3/25/2008	5:39 AM	62649	R2-081566.zip
3/25/2008	6:34 AM	127919	R2-081567.zip
3/25/2008	6:34 AM	21975	R2-081568.zip
3/25/2008	4:14 AM	27544	R2-081569.zip
3/25/2008	4:15 AM	50902	R2-081570.zip
3/25/2008	6:13 AM	31692	R2-081571.zip
3/25/2008	5:34 AM	16843	R2-081572.zip
3/25/2008	4:17 AM	14785	R2-081573.zip
3/25/2008	7:56 AM	81110	R2-081574.zip
3/25/2008	9:57 AM	31123	R2-081575.zip
3/25/2008	4:18 AM	13931	R2-081576.zip

3/25/2008	4:19 AM	35913	R2-081577.zip
3/25/2008	6:49 AM	17825	R2-081578.zip
3/25/2008	4:21 AM	15226	R2-081579.zip
3/25/2008	5:37 AM	21712	R2-081580.zip
3/25/2008	6:35 AM	26598	R2-081581.zip
3/24/2008	6:38 PM	22353	R2-081582.zip
3/28/2008	5:28 PM	31795	R2-081584.zip
3/27/2008	10:01 AM	118277	R2-081585.zip
3/25/2008	5:33 AM	24438	R2-081586.zip
3/25/2008	5:45 AM	100348	R2-081587.zip
3/24/2008	11:49 PM	32427	R2-081588.zip
3/25/2008	12:00 AM	21403	R2-081589.zip
3/24/2008	11:51 PM	99632	R2-081590.zip
3/25/2008	12:01 AM	25891	R2-081591.zip
3/24/2008	11:52 PM	109454	R2-081592.zip
3/24/2008	11:53 PM	521213	R2-081593.zip
3/24/2008	11:54 PM	111706	R2-081594.zip
3/24/2008	11:54 PM	24874	R2-081595.zip
3/25/2008	12:01 AM	32120	R2-081596.zip
3/24/2008	11:55 PM	154865	R2-081597.zip
3/24/2008	11:58 PM	85108	R2-081598.zip
3/25/2008	5:40 AM	332530	R2-081599.zip
3/25/2008	12:02 AM	30879	R2-081600.zip
3/24/2008	11:56 PM	22910	R2-081601.zip
3/25/2008	6:32 AM	86277	R2-081602.zip
3/25/2008	6:33 AM	49601	R2-081603.zip
3/25/2008	6:36 AM	45533	R2-081605.zip
3/25/2008	6:37 AM	95136	R2-081606.zip
3/25/2008	6:39 AM	78722	R2-081607.zip
3/25/2008	6:40 AM	115606	R2-081608.zip
3/25/2008	6:42 AM	77538	R2-081609.zip
3/25/2008	6:43 AM	43836	R2-081610.zip
3/25/2008	4:14 AM	30944	R2-081613.zip
3/25/2008	4:14 AM	17272	R2-081614.zip
3/25/2008	4:18 AM	51860	R2-081615.zip
3/25/2008	4:15 AM	51860	R2-081616.zip
3/25/2008	4:19 AM	31519	R2-081617.zip
3/25/2008	4:19 AM	75303	R2-081618.zip
3/25/2008	6:36 AM	59130	R2-081619.zip
3/25/2008	4:21 AM	30868	R2-081620.zip
3/27/2008	6:35 AM	16765	R2-081621.zip
3/25/2008	4:21 AM	101545	R2-081622.zip
3/25/2008	4:23 AM	39754	R2-081623.zip
3/25/2008	4:23 AM	134098	R2-081624.zip
3/25/2008	4:23 AM	22050	R2-081625.zip
3/25/2008	4:24 AM	34210	R2-081626.zip
3/25/2008	4:34 AM	100019	R2-081627.zip
3/25/2008	4:24 AM	16568	R2-081628.zip
3/25/2008	4:24 AM	93145	R2-081629.zip
3/25/2008	5:34 AM	31238	R2-081630.zip
3/25/2008	8:29 AM	21249	R2-081631.zip
3/25/2008	8:37 AM	250749	R2-081632.zip
3/26/2008	9:46 AM	48020	R2-081633.zip
3/25/2008	6:15 AM	35490	R2-081634.zip
3/25/2008	1:19 AM	34136	R2-081635.zip
3/25/2008	6:43 AM	44660	R2-081636.zip
3/25/2008	1:21 AM	19978	R2-081637.zip
3/25/2008	1:22 AM	20978	R2-081638.zip
3/25/2008	6:38 AM	15820	R2-081640.zip
3/25/2008	6:44 AM	33493	R2-081641.zip
3/25/2008	6:45 AM	51273	R2-081642.zip

3/25/2008	6:46 AM	17490	R2-081643.zip
3/25/2008	6:47 AM	70479	R2-081644.zip
3/25/2008	6:48 AM	18565	R2-081645.zip
3/25/2008	6:49 AM	16672	R2-081646.zip
3/25/2008	6:51 AM	19213	R2-081647.zip
3/25/2008	6:52 AM	16376	R2-081648.zip
3/25/2008	6:52 AM	14570	R2-081649.zip
3/25/2008	6:54 AM	39862	R2-081650.zip
3/25/2008	6:58 AM	44734	R2-081651.zip
3/25/2008	6:59 AM	80347	R2-081652.zip
3/25/2008	7:01 AM	85382	R2-081653.zip
3/25/2008	7:02 AM	53036	R2-081654.zip
3/25/2008	7:04 AM	81626	R2-081655.zip
3/25/2008	7:05 AM	14363	R2-081656.zip
3/25/2008	7:15 AM	14831	R2-081657.zip
3/25/2008	7:08 AM	28324	R2-081658.zip
3/25/2008	7:48 AM	24702	R2-081659.zip
3/25/2008	7:10 AM	28696	R2-081660.zip
3/25/2008	7:12 AM	106659	R2-081661.zip
3/25/2008	7:22 AM	558299	R2-081662.zip
3/25/2008	6:13 AM	53734	R2-081663.zip
3/25/2008	4:06 AM	19345	R2-081665.zip
3/25/2008	5:26 AM	68733	R2-081666.zip
3/25/2008	7:07 AM	48918	R2-081667.zip
3/25/2008	7:10 AM	32603	R2-081668.zip
3/25/2008	6:01 AM	18801	R2-081669.zip
3/25/2008	6:02 AM	18733	R2-081670.zip
3/25/2008	6:09 AM	52412	R2-081671.zip
3/25/2008	7:59 AM	65130	R2-081672.zip
3/25/2008	8:00 AM	58992	R2-081673.zip
3/25/2008	8:02 AM	173030	R2-081674.zip
3/25/2008	8:03 AM	16986	R2-081675.zip
3/25/2008	8:04 AM	17134	R2-081676.zip
3/25/2008	6:07 AM	14144	R2-081677.zip
3/25/2008	6:08 AM	12130	R2-081678.zip
3/25/2008	12:02 AM	30503	R2-081679.zip
3/25/2008	4:56 AM	19890	R2-081680.zip
3/25/2008	12:03 AM	32782	R2-081681.zip
3/25/2008	4:56 AM	19400	R2-081682.zip
3/25/2008	7:02 AM	16237	R2-081683.zip
3/24/2008	8:40 PM	28452	R2-081684.zip
3/24/2008	8:42 PM	39118	R2-081685.zip
3/24/2008	8:45 PM	23382	R2-081686.zip
3/24/2008	8:45 PM	30956	R2-081687.zip
3/24/2008	8:47 PM	25675	R2-081688.zip
3/24/2008	8:48 PM	46299	R2-081689.zip
3/25/2008	9:10 PM	416570	R2-081690.zip
3/24/2008	8:49 PM	11829	R2-081691.zip
3/24/2008	8:50 PM	23350	R2-081692.zip
3/25/2008	7:24 AM	346492	R2-081693.zip
3/25/2008	7:25 AM	69427	R2-081694.zip
3/25/2008	7:27 AM	39663	R2-081695.zip
3/25/2008	7:28 AM	30550	R2-081696.zip
3/25/2008	7:29 AM	44374	R2-081697.zip
3/25/2008	7:47 AM	53830	R2-081698.zip
3/24/2008	8:00 PM	19871	R2-081699.zip
3/25/2008	8:14 AM	109162	R2-081700.zip
3/26/2008	6:44 AM	65933	R2-081701.zip
3/25/2008	12:25 PM	21879	R2-081702.zip
3/25/2008	12:26 PM	21798	R2-081703.zip
3/25/2008	2:11 AM	15252	R2-081704.zip

3/25/2008	11:53 AM	23056	R2-081705.zip
3/25/2008	11:55 AM	31694	R2-081706.zip
3/25/2008	11:56 AM	17319	R2-081707.zip
3/25/2008	12:02 PM	35958	R2-081708.zip
3/26/2008	1:57 AM	101616	R2-081709.zip
3/25/2008	10:53 AM	14290	R2-081710.zip
3/25/2008	7:29 AM	9512	R2-081712.zip
3/25/2008	7:32 AM	34172	R2-081713.zip
3/25/2008	7:40 AM	42204	R2-081714.zip
3/25/2008	6:57 AM	490124	R2-081715.zip
3/25/2008	6:57 AM	197547	R2-081716.zip
3/25/2008	7:40 AM	20326	R2-081717.zip
3/25/2008	7:05 AM	32193	R2-081718.zip
3/25/2008	7:07 AM	334986	R2-081719.zip
3/25/2008	7:08 AM	99993	R2-081720.zip
3/25/2008	7:09 AM	11792	R2-081721.zip
3/25/2008	7:09 AM	12720	R2-081722.zip
3/25/2008	7:10 AM	13496	R2-081723.zip
3/25/2008	7:11 AM	12489	R2-081724.zip
3/25/2008	7:13 AM	12998	R2-081725.zip
3/25/2008	7:12 AM	18701	R2-081726.zip
3/25/2008	8:04 AM	144378	R2-081727.zip
3/25/2008	7:28 AM	29138	R2-081729.zip
3/25/2008	7:36 AM	24417	R2-081730.zip
3/25/2008	7:09 AM	71191	R2-081731.zip
3/25/2008	7:26 AM	27527	R2-081732.zip
3/25/2008	7:11 AM	18501	R2-081733.zip
3/25/2008	7:14 AM	14506	R2-081734.zip
3/25/2008	7:35 AM	26800	R2-081735.zip
3/25/2008	11:45 AM	27031	R2-081736.zip
3/25/2008	7:16 AM	263188	R2-081737.zip
3/25/2008	7:58 AM	20903	R2-081738.zip
3/25/2008	7:19 AM	24320	R2-081739.zip
3/25/2008	7:22 AM	173594	R2-081740.zip
3/25/2008	7:58 AM	30258	R2-081741.zip
3/25/2008	7:31 AM	18725	R2-081742.zip
3/25/2008	7:33 AM	17823	R2-081743.zip
3/25/2008	7:24 AM	22932	R2-081744.zip
3/25/2008	10:52 AM	21941	R2-081745.zip
3/25/2008	10:53 AM	77602	R2-081746.zip
3/25/2008	7:42 AM	24000	R2-081747.zip
3/25/2008	7:43 AM	27185	R2-081748.zip
3/25/2008	7:45 AM	25340	R2-081749.zip
3/25/2008	11:31 AM	25472	R2-081750.zip
3/25/2008	11:32 AM	21973	R2-081751.zip
3/25/2008	11:33 AM	24351	R2-081752.zip
3/25/2008	9:36 AM	30987	R2-081753.zip
3/25/2008	9:37 AM	25222	R2-081754.zip
3/25/2008	9:38 AM	32283	R2-081755.zip
3/25/2008	8:05 AM	40529	R2-081756.zip
3/24/2008	10:38 PM	29686	R2-081758.zip
3/25/2008	5:25 AM	20824	R2-081759.zip
3/24/2008	7:47 PM	15706	R2-081760.zip
3/25/2008	5:30 AM	19279	R2-081761.zip
3/24/2008	7:45 PM	16259	R2-081762.zip
3/25/2008	5:35 AM	34197	R2-081763.zip
3/24/2008	10:39 PM	137378	R2-081764.zip
3/25/2008	5:38 AM	8158	R2-081765.zip
3/24/2008	10:41 PM	39028	R2-081766.zip
3/24/2008	10:42 PM	7998	R2-081767.zip
3/24/2008	10:43 PM	78889	R2-081768.zip

3/25/2008	12:09 PM	47963	R2-081769.zip
3/25/2008	7:33 AM	34227	R2-081770.zip
3/25/2008	7:36 AM	1343620	R2-081771.zip
3/24/2008	10:42 PM	26265	R2-081772.zip
3/25/2008	7:37 AM	771094	R2-081773.zip
3/25/2008	7:39 AM	1614878	R2-081774.zip
3/25/2008	7:42 AM	488043	R2-081775.zip
3/25/2008	7:43 AM	23448	R2-081776.zip
3/25/2008	12:20 AM	30838	R2-081777.zip
3/25/2008	12:23 AM	12897	R2-081778.zip
3/26/2008	7:47 AM	29153	R2-081779.zip
3/25/2008	8:54 AM	8703	R2-081780.zip
3/25/2008	7:15 AM	17557	R2-081781.zip
3/24/2008	8:17 PM	26340	R2-081783.zip
3/25/2008	12:00 AM	26516	R2-081784.zip
3/25/2008	12:02 AM	14623	R2-081785.zip
3/25/2008	8:35 AM	17154	R2-081786.zip
3/25/2008	12:03 AM	31447	R2-081787.zip
3/25/2008	12:04 AM	14688	R2-081788.zip
3/25/2008	12:05 AM	7818	R2-081789.zip
3/25/2008	12:06 AM	116114	R2-081790.zip
3/25/2008	12:06 AM	9690	R2-081791.zip
3/25/2008	9:33 AM	26897	R2-081792.zip
3/25/2008	12:07 AM	5521	R2-081793.zip
3/25/2008	12:07 AM	166904	R2-081794.zip
3/25/2008	8:02 AM	21637	R2-081795.zip
3/25/2008	8:05 AM	14767	R2-081797.zip
3/25/2008	6:39 AM	11014	R2-081799.zip
3/25/2008	6:40 AM	12957	R2-081800.zip
3/25/2008	6:41 AM	30613	R2-081801.zip
3/25/2008	9:00 AM	13411	R2-081802.zip
3/25/2008	8:42 AM	83465	R2-081803.zip
3/25/2008	9:10 AM	10111	R2-081804.zip
3/25/2008	8:37 AM	36878	R2-081805.zip
3/25/2008	8:38 AM	64289	R2-081806.zip
3/25/2008	8:39 AM	145419	R2-081807.zip
3/25/2008	8:40 AM	14078	R2-081808.zip
3/25/2008	8:34 AM	18432	R2-081809.zip
3/25/2008	8:35 AM	18346	R2-081810.zip
3/25/2008	3:08 PM	16927	R2-081811.zip
3/25/2008	8:51 AM	12738	R2-081812.zip
3/24/2008	11:02 PM	31326	R2-081813.zip
3/25/2008	2:21 PM	18499	R2-081814.zip
3/25/2008	9:19 AM	14018	R2-081815.zip
3/25/2008	6:42 AM	23648	R2-081816.zip
3/25/2008	6:42 AM	11439	R2-081817.zip
3/25/2008	6:43 AM	19677	R2-081818.zip
3/25/2008	6:44 AM	19736	R2-081819.zip
3/25/2008	6:45 AM	14199	R2-081820.zip
3/25/2008	3:56 AM	14089	R2-081821.zip
3/25/2008	5:13 AM	7344	R2-081822.zip
3/25/2008	3:31 AM	21689	R2-081823.zip
3/25/2008	7:06 AM	33444	R2-081824.zip
3/25/2008	3:31 AM	53657	R2-081825.zip
3/25/2008	3:31 AM	6046	R2-081826.zip
3/25/2008	5:00 AM	9218	R2-081827.zip
3/25/2008	5:10 AM	19930	R2-081828.zip
3/25/2008	8:03 AM	278184	R2-081829.zip
3/25/2008	8:05 AM	30874	R2-081830.zip
3/25/2008	5:25 AM	71102	R2-081831.zip
3/25/2008	1:28 AM	17983	R2-081832.zip

3/25/2008	1:30 AM	15747	R2-081833.zip
3/25/2008	1:41 AM	13173	R2-081834.zip
3/25/2008	4:01 AM	83375	R2-081835.zip
3/25/2008	6:02 AM	16408	R2-081836.zip
3/25/2008	6:03 AM	18469	R2-081837.zip
3/25/2008	5:52 AM	18780	R2-081838.zip
3/25/2008	6:46 AM	18691	R2-081839.zip
3/25/2008	5:50 AM	20309	R2-081840.zip
3/25/2008	6:48 AM	11580	R2-081841.zip
3/25/2008	6:49 AM	30078	R2-081843.zip
3/25/2008	6:49 AM	17594	R2-081844.zip
3/25/2008	3:27 AM	17093	R2-081845.zip
3/25/2008	6:59 AM	82298	R2-081846.zip
3/25/2008	7:56 AM	20961	R2-081847.zip
3/25/2008	4:45 AM	25365	R2-081848.zip
3/25/2008	5:52 AM	20061	R2-081849.zip
3/25/2008	5:29 AM	20785	R2-081850.zip
3/25/2008	5:33 AM	20956	R2-081851.zip
3/25/2008	6:01 AM	25262	R2-081852.zip
3/25/2008	6:02 AM	39136	R2-081853.zip
3/25/2008	6:03 AM	39284	R2-081854.zip
3/25/2008	6:05 AM	26280	R2-081855.zip
3/25/2008	7:31 AM	25726	R2-081856.zip
3/25/2008	3:10 PM	160353	R2-081857.zip
3/25/2008	6:06 AM	39902	R2-081858.zip
3/25/2008	8:00 AM	25368	R2-081859.zip
3/25/2008	6:51 AM	90829	R2-081860.zip
3/25/2008	5:36 AM	28990	R2-081861.zip
3/25/2008	5:40 AM	22434	R2-081862.zip
3/25/2008	7:57 AM	246823	R2-081863.zip
3/25/2008	7:53 AM	68134	R2-081864.zip
3/25/2008	7:59 AM	41891	R2-081865.zip
3/25/2008	5:46 AM	56284	R2-081866.zip
3/25/2008	5:46 AM	42627	R2-081867.zip
3/25/2008	5:46 AM	11662	R2-081868.zip
3/25/2008	5:47 AM	6038	R2-081869.zip
3/25/2008	5:47 AM	20715	R2-081870.zip
3/25/2008	5:48 AM	120296	R2-081871.zip
3/25/2008	8:07 AM	94592	R2-081872.zip
3/25/2008	8:08 AM	238158	R2-081873.zip
3/25/2008	8:09 AM	92110	R2-081874.zip
3/25/2008	8:09 AM	185861	R2-081875.zip
3/25/2008	6:51 AM	16588	R2-081876.zip
3/25/2008	7:35 AM	22447	R2-081877.zip
3/25/2008	7:35 AM	19859	R2-081878.zip
3/25/2008	8:11 AM	247736	R2-081879.zip
3/25/2008	8:12 AM	29499	R2-081880.zip
3/25/2008	8:13 AM	166939	R2-081881.zip
3/25/2008	8:15 AM	81498	R2-081882.zip
3/25/2008	6:30 AM	20961	R2-081883.zip
3/25/2008	7:02 AM	25794	R2-081884.zip
3/25/2008	10:07 AM	17791	R2-081887.zip
3/25/2008	6:52 AM	146194	R2-081888.zip
3/25/2008	7:20 AM	19835	R2-081892.zip
3/27/2008	8:20 PM	24045	R2-081893.zip
3/25/2008	7:19 AM	32299	R2-081894.zip
3/25/2008	7:09 AM	30276	R2-081895.zip
3/25/2008	8:51 AM	235760	R2-081896.zip
3/25/2008	7:19 AM	17419	R2-081897.zip
3/25/2008	7:12 AM	35520	R2-081898.zip
3/25/2008	7:37 AM	17496	R2-081899.zip

3/25/2008	8:20 AM	15209	R2-081900.zip
3/25/2008	10:25 AM	43086	R2-081901.zip
3/25/2008	8:19 AM	15041	R2-081902.zip
3/25/2008	8:17 AM	14765	R2-081903.zip
3/26/2008	4:16 AM	21704	R2-081904.zip
3/25/2008	8:16 AM	20893	R2-081905.zip
3/25/2008	8:14 AM	35249	R2-081906.zip
3/25/2008	8:42 AM	15884	R2-081907.zip
3/25/2008	10:00 AM	14732	R2-081908.zip
3/25/2008	11:34 AM	24137	R2-081910.zip
3/25/2008	11:34 AM	27214	R2-081911.zip
3/25/2008	11:35 AM	25525	R2-081912.zip
3/25/2008	2:02 PM	1553299	R2-081913.zip
3/25/2008	1:56 PM	204190	R2-081914.zip
3/25/2008	12:49 PM	14128	R2-081915.zip
3/26/2008	4:33 PM	9456	R2-081916.zip
3/26/2008	4:33 PM	9629	R2-081917.zip
3/26/2008	4:33 PM	10229	R2-081918.zip
3/26/2008	4:33 PM	11250	R2-081919.zip
3/26/2008	4:33 PM	8499	R2-081920.zip
3/26/2008	4:33 PM	137327	R2-081921.zip
3/27/2008	8:48 AM	28368	R2-081922.zip
3/27/2008	10:41 PM	26318	R2-081923.zip
3/30/2008	8:49 AM	71848	R2-081924.zip
3/30/2008	8:49 AM	61156	R2-081925.zip
4/4/2008	4:25 PM	8151	R2-081926.zip
4/4/2008	4:25 PM	15135	R2-081930.zip
4/4/2008	4:25 PM	11257	R2-081931.zip
4/4/2008	4:25 PM	20324	R2-081932.zip
4/4/2008	4:26 PM	5868	R2-081933.zip
4/4/2008	4:26 PM	457326	R2-081934.zip
4/4/2008	4:26 PM	108646	R2-081935.zip
4/4/2008	4:26 PM	108594	R2-081936.zip
4/4/2008	4:26 PM	89308	R2-081937.zip
4/4/2008	4:26 PM	88775	R2-081938.zip
4/4/2008	4:26 PM	30587	R2-081939.zip
4/4/2008	4:27 PM	81791	R2-081940.zip
4/4/2008	4:27 PM	25614	R2-081941.zip
4/4/2008	4:27 PM	31642	R2-081942.zip
4/4/2008	4:27 PM	24436	R2-081943.zip
4/4/2008	4:27 PM	32596	R2-081944.zip
4/4/2008	4:27 PM	24337	R2-081945.zip
4/4/2008	4:27 PM	27190	R2-081946.zip
4/4/2008	4:27 PM	25593	R2-081947.zip
4/4/2008	4:27 PM	27741	R2-081948.zip
4/4/2008	4:27 PM	66156	R2-081949.zip
4/4/2008	4:27 PM	22078	R2-081950.zip
4/4/2008	4:27 PM	21901	R2-081951.zip
4/4/2008	4:28 PM	9265	R2-081952.zip
4/4/2008	4:28 PM	11288	R2-081953.zip
4/4/2008	4:28 PM	44435	R2-081954.zip
4/4/2008	4:28 PM	7521	R2-081955.zip
4/4/2008	4:28 PM	7591	R2-081956.zip
4/4/2008	4:28 PM	39338	R2-081957.zip
4/4/2008	4:28 PM	9397	R2-081958.zip
4/4/2008	4:28 PM	9119	R2-081959.zip
4/4/2008	4:28 PM	8370	R2-081960.zip
4/4/2008	4:28 PM	15350	R2-081961.zip
4/4/2008	4:28 PM	44325	R2-081962.zip
4/4/2008	4:28 PM	85039	R2-081963.zip
4/11/2008	7:12 PM	11991	R2-081964.zip

4/4/2008	4:28 PM	39125	R2-081965.zip
4/4/2008	4:29 PM	172101	R2-081966.zip
4/4/2008	4:29 PM	28607	R2-081967.zip
4/4/2008	4:29 PM	10078	R2-081968.zip
4/4/2008	4:29 PM	11026	R2-081969.zip
4/4/2008	4:29 PM	9285	R2-081970.zip
4/4/2008	4:29 PM	5855	R2-081971.zip
4/4/2008	4:29 PM	17857	R2-081972.zip
4/4/2008	4:29 PM	10363	R2-081973.zip
4/4/2008	4:29 PM	10424	R2-081974.zip
4/4/2008	4:29 PM	23717	R2-081986.zip
4/4/2008	4:29 PM	17756	R2-081987.zip
4/4/2008	4:29 PM	17837	R2-081989.zip
4/4/2008	4:29 PM	9002	R2-081990.zip
4/4/2008	4:29 PM	16495	R2-081991.zip
4/4/2008	4:29 PM	20482	R2-081992.zip
4/4/2008	4:29 PM	24470	R2-081993.zip
4/4/2008	4:30 PM	235024	R2-081995.zip
4/4/2008	4:30 PM	88181	R2-081996.zip
4/4/2008	4:30 PM	43097	R2-081997.zip
4/4/2008	4:30 PM	53352	R2-081998.zip
4/4/2008	4:30 PM	112073	R2-081999.zip
4/4/2008	4:30 PM	24755	R2-082000.zip
4/4/2008	4:30 PM	27201	R2-082003.zip
4/4/2008	4:30 PM	38203	R2-082004.zip
4/4/2008	4:30 PM	17319	R2-082005.zip
4/4/2008	4:30 PM	42976	R2-082007.zip
4/4/2008	4:30 PM	37142	R2-082008.zip
4/4/2008	4:30 PM	31360	R2-082011.zip
4/4/2008	4:31 PM	29079	R2-082012.zip
4/4/2008	4:31 PM	29808	R2-082013.zip
4/4/2008	4:31 PM	12450	R2-082014.zip
4/4/2008	4:31 PM	131111	R2-082015.zip
4/4/2008	4:31 PM	23098	R2-082016.zip
4/4/2008	4:31 PM	30321	R2-082017.zip
4/4/2008	4:31 PM	29368	R2-082018.zip
4/4/2008	4:31 PM	48895	R2-082019.zip
4/4/2008	4:31 PM	109683	R2-082020.zip
4/11/2008	7:57 AM	130694	R2-082021.zip
4/4/2008	4:31 PM	180130	R2-082022.zip
4/4/2008	4:31 PM	12949	R2-082024.zip
4/4/2008	4:31 PM	11485	R2-082025.zip
4/4/2008	4:31 PM	82639	R2-082026.zip
4/4/2008	4:31 PM	10167	R2-082027.zip
4/4/2008	4:32 PM	39129	R2-082028.zip
4/4/2008	4:32 PM	16465	R2-082029.zip
4/4/2008	4:32 PM	18413	R2-082030.zip
4/4/2008	4:32 PM	8160	R2-082031.zip
4/4/2008	4:32 PM	15103	R2-082032.zip
4/4/2008	4:32 PM	7556	R2-082033.zip
4/4/2008	4:32 PM	7533	R2-082034.zip
4/4/2008	4:32 PM	9692	R2-082035.zip
4/4/2008	4:32 PM	8974	R2-082036.zip
4/4/2008	4:32 PM	9400	R2-082037.zip
4/11/2008	7:53 AM	9535	R2-082038.zip
4/4/2008	4:32 PM	17752	R2-082039.zip
4/11/2008	7:56 AM	163487	R2-082040.zip
4/11/2008	7:09 PM	11327	R2-082041.zip
4/11/2008	7:13 PM	86299	R2-082042.zip
4/11/2008	7:23 PM	180692	R2-082043.zip
4/11/2008	7:25 PM	49684	R2-082044.zip

4/4/2008	4:32 PM	8600	R2-082045.zip
4/4/2008	4:32 PM	9362	R2-082046.zip
4/4/2008	4:32 PM	8481	R2-082047.zip
4/29/2008	9:26 AM	9058	R2-082048.zip
4/17/2008	2:14 PM	388148	R2-082049.zip
4/17/2008	2:14 PM	875788	R2-082050.zip

EXHIBIT 6

3GPP TSG-RAN WG2#61bis **Tdoc R2-081764**
Shenzhen, China, March 31-April 4, 2008

Agenda item: **5.1.1.10**

Source: **Philips, NXP Semiconductors**

Title: **Control of HARQ for RACH message 3**

Document for: **Discussion and Decision**

1. Introduction

The current contention based RACH procedure is as shown in figure 1:

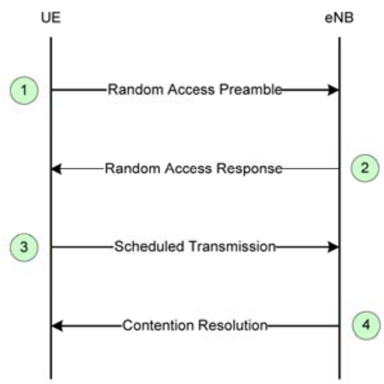

Figure 1 RACH Procedure

RACH message 1 comprises the transmission of a randomly selected signature ("preamble"). A "collision" is said to have occurred if more than one UE transmits the same preamble signature in the same time-frequency resource.

In case of a collision, all the colliding UEs interpret message 2 (which is transmitted by the eNB in response to a preamble and contains an identifier of the preamble, an UL resource grant for the transmission of message 3, and a Temporary C-RNTI) as being for them, and all transmit a message 3 (conveying at least a NAS UE Identifier) in the same UL resources.

The eNB will transmit "ACK" if it successfully decodes message 3, while if it fails to decode message 3 it will transmit "NACK" and the UE(s) will retransmit up to the configured maximum number of retransmissions.

2. HARQ for Message 3

If the eNB succeeds in decoding message 3, HARQ ACK is sent and any collision is resolved when message 4 is received.

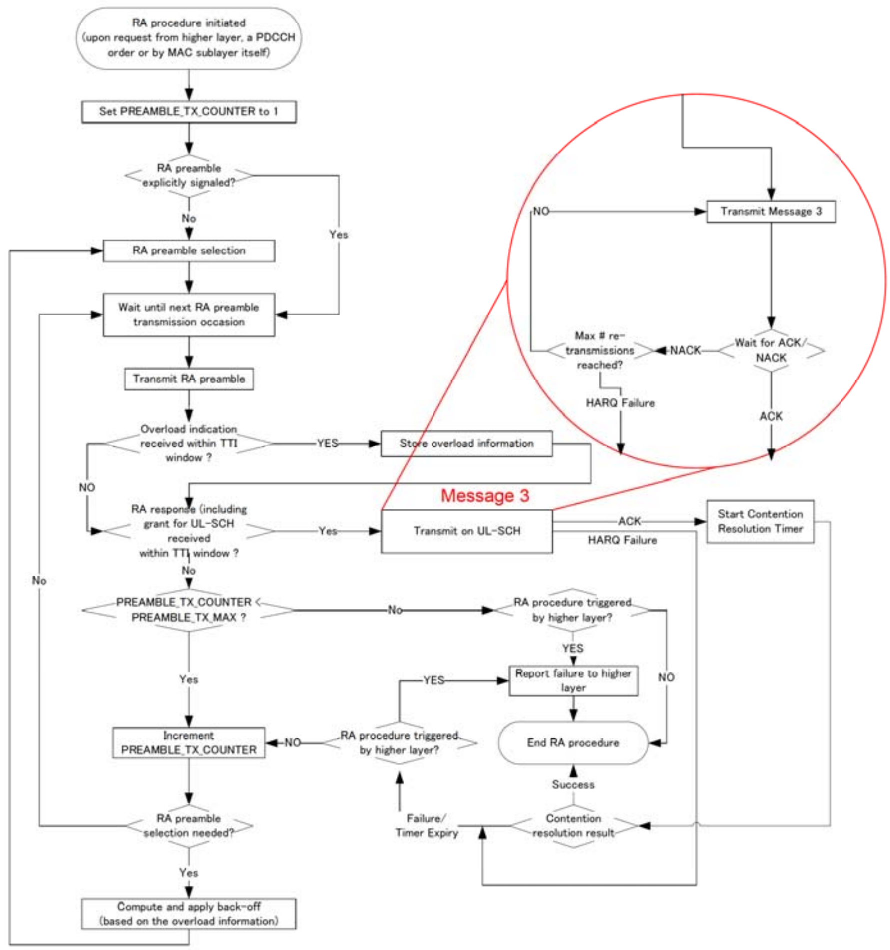

Figure 2 MAC Random Access Procedure

Figure 2 shows how the HARQ procedure for Message 3 is included in the random access procedure. In this diagram we assume the contention resolution timer is not started until after an ACK has been received for message 3. HARQ failure in message 3 leads to the same result as contention resolution timer expiry.

However, in practice if a collision occurs, the likelihood is that no number of retransmissions will succeed, as all the colliding UEs will retransmit at the same time.The maximum number of HARQ retransmissions of message 3 should therefore be tightly limited, as a high maximum number of retransmissions will simply increase the delay before the collided UEs can start again.

Moreover, if the transmit power is set appropriately after the last power-ramped preamble transmission, a large number of retransmissions should be unnecessary.

2.1 RRC_IDLE and Connection Re-establishment cases

UEs which are RRC_CONNECTED already have a valid C-RNTI for transmission in message 3.

For UEs which are repeatedly or regularly accessing the network, it is undesirable for them to have to start the RACH access procedure again from the beginning every time a collision occurs. Some delay can be avoided for these UEs by allowing a larger number of HARQ retransmissions for message 3 if the UE already has a C-RNTI. In this case the eNB could flush its message 3 reception buffer when it reaches the maximum number of retransmissions for UEs which do ***not*** have a C-RNTI, and then still receive the message 3 from the UE with a C-RNTI. This would mean that the Node B would in any case NACK the first retransmission, but UE's with only a temporary C-RNTI would not be allowed to retransmit, while UEs with a C-RNTI would retransmit again.

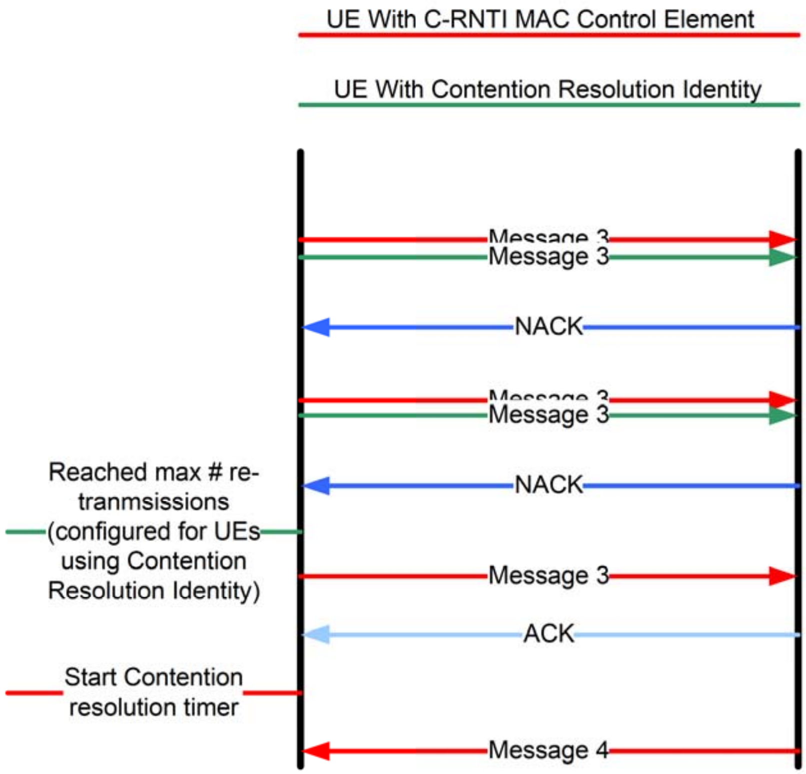

Figure 3 HARQ control for UEs with and without C-RNTI

Figure 3 shows a case of 2 collided UEs transmitting message 3, one including a C-RNTI MAC control element and one with RRC UE Contention resolution Identity. In this example, the eNB sends back NACK twice, then the maximum number of re-transmissions is reached for the UE using the Contention Resolution Identity (as it does not yet have a C-RNTI). The Message 3 from the UE using C-RNTI is then received successfully at the eNB and the eNB sends ACK to the UE. The UE then starts the contention resolution timer and, in this example, successfully receives message 4.

Although setting a different maximum number of retransmissions would not help in the case of a collision between two UEs both with C-RNTIs, it would effectively give priority to the UE with a C-RNTI in the case of a collision with a UE without a C-RNTI.

5. Conclusions

In this contribution, we have presented our views on HARQ control for message 3.

- the maximum number of HARQ retransmissions should be kept reasonably low, in order to limit the delay in case of a collision;
- it should configure a higher maximum number of message-3 HARQ retransmissions for UEs which already have a C-RNTI than for UEs which do not already have a C-RNTI.

6. References

[1] TS36.321 3GPP TS 36.321 V8.1.0 (2008-03) MAC Protocol Specification

7. Text Proposal for 36.321

5.4.2.2 HARQ process

Each HARQ process is associated with a HARQ buffer.

Each HARQ process shall maintain a state variable CURRENT_TX_NB, which indicates the number of transmissions that have taken place for the MAC PDU currently in the buffer. When the HARQ process is established, CURRENT_TX_NB shall be initialized to 0.

The UE is configured with a maximum number of transmissions that is identical across all HARQ Processes and all Logical Channels.

If the HARQ entity provides a new PDU, the HARQ process shall:

- set CURRENT_TX_NB to 0;
- set CURRENT_IRV to 0;
- store the MAC PDU in the associated HARQ buffer;
- generate a transmission as described below.

If the HARQ entity requests a re-transmission, the HARQ process shall:

- if there is a measurement gap at the time of the re-transmission:
    - increment CURRENT_TX_NB by 1;
        - else:
    - if an uplink grant for this was received on [PDCCH]:
        - set CURRENT_IRV to the value indicated in the uplink grant;
        - generate a transmission as described below;
    - if no uplink grant for this was received on [PDCCH]:
        - if a HARQ ACK was received for the last preceding transmission of the same data:
            - increment CURRENT_TX_NB by 1.
        - if no HARQ ACK was received for the last preceding transmission of the same data:
            - generate a transmission as described below.

To generate a transmission, the HARQ process shall:

- instruct the physical layer to generate a transmission with the redundancy version corresponding to the CURRENT_IRV value and the transmission timing;
- if CURRENT_IRV < [Y] [FFS]:
    - increment CURRENT_IRV by 1;
- increment CURRENT_TX_NB by 1;

The HARQ process shall:

- if CURRENT_TX_NB = maximum number of transmissions configured (where in the case of the uplink grant having been received in a Random Access Response, the maximum number of transmissions depends on whether the UE already has a C-RNTI):
  - flush the HARQ buffer;
  - if the transmission corresponds to a transmission of CCCH and no HARQ ACK is received for this process:
    - notify RRC that the transmission of the corresponding MAC SDU failed.

The HARQ process may:

- if CURRENT_TX_NB = maximum number of transmissions configured (where in the case of the uplink grant having been received in a Random Access Response, the maximum number of transmissions depends on whether the UE already has a C-RNTI) and no HARQ ACK is received for this process:
  - notify the relevant ARQ entities in the upper layer that the transmission of the corresponding RLC PDUs failed.

Editor's note: Demultiplexing of multiple positive or negative acknowledgements and the time of reception relative to the transmission of data in a HARQ process is handled by L1.

EXHIBIT 7

3GPP_TSG_RAN_WG2 Archives

3GPP_TSG_RAN_WG2@LIST.ETSI.ORG

Subject: Re: Tdoc allocation tool for RAN2 #62 started Reply
From: Joern Krause <[log in to unmask]>
Reply-To: Joern Krause <[log in to unmask]>
Date: Wed, 23 Apr 2008 10:52:02 +0200
Content-Type: multipart/mixed
Parts/Attachments: text/plain (395 lines) , text/html (597 lines) , message/rfc822 (597 lines) , R2-08xxxx_draft_report_RAN2_61bis_Shenzhen.zip (597 lines)

Dear all,
I need to apologize for the corrupted table in my previous email
(obviously the reflector refomatted my email in an unintended way).
Please look instead into annex E of the attached draft report
which will be distributed later this week as R2-082061
(still working on the final Tdoc list).
BR

Joern

P.S.: In fact there are 92 endorsed CRs instead of 91.

Joern Krause
ETSI MCC
[log in to unmask]

From: Joern Krause [mailto:[log in to unmask]]
Sent: 23 April 2008 10:15
To: 3GPP_TSG_RAN_WG2
Subject: Tdoc allocation tool for RAN2 #62 started

Dear all,
You can reserve a Tdoc number and upload the corresponding Tdoc for RAN2 #62 in Kansas City under:
http://webapp.etsi.org/MeetingCalendar/MeetingDetails.asp?mid=26789
Please find at the end of this email the list of **endorsed CRs of RAN2 #61bis**.

September 2015, Week 1
August 2015, Week 5
August 2015, Week 4
August 2015, Week 3
August 2015, Week 2
August 2015, Week 1
July 2015, Week 5
July 2015, Week 4
July 2015, Week 3
July 2015, Week 2
July 2015, Week 1
June 2015, Week 5
June 2015, Week 4
June 2015, Week 3
June 2015, Week 2
June 2015, Week 1
May 2015, Week 5
May 2015, Week 4
May 2015, Week 3
May 2015, Week 2
May 2015, Week 1
April 2015, Week 5
April 2015, Week 4
April 2015, Week 3
April 2015, Week 2
April 2015, Week 1
March 2015, Week 5
March 2015, Week 4
March 2015, Week 3
March 2015, Week 2
March 2015, Week 1
February 2015, Week 4
February 2015, Week 3
February 2015, Week 2
February 2015, Week 1
January 2015, Week 5
January 2015, Week 4
January 2015, Week 3
January 2015, Week 2
January 2015, Week 1
December 2014, Week 5
December 2014, Week 4
December 2014, Week 3
December 2014, Week 2
December 2014, Week 1
November 2014, Week 5
November 2014, Week 4
November 2014, Week 3
November 2014, Week 2
November 2014, Week 1
October 2014, Week 5
October 2014, Week 4
October 2014, Week 3
October 2014, Week 2
October 2014, Week 1
September 2014, Week 5
September 2014, Week 4
September 2014, Week 3
September 2014, Week 2
September 2014, Week 1
August 2014, Week 5
August 2014, Week 4
August 2014, Week 3
August 2014, Week 2
August 2014, Week 1
July 2014, Week 5
July 2014, Week 4
July 2014, Week 3
July 2014, Week 2
July 2014, Week 1
June 2014, Week 5
June 2014, Week 4
June 2014, Week 3
June 2014, Week 2

June 2014, Week 1
May 2014, Week 5
May 2014, Week 4
May 2014, Week 3
May 2014, Week 2
May 2014, Week 1
April 2014, Week 5
April 2014, Week 4
April 2014, Week 3
April 2014, Week 2
April 2014, Week 1
March 2014, Week 5
March 2014, Week 4
March 2014, Week 3
March 2014, Week 2
March 2014, Week 1
February 2014, Week 4
February 2014, Week 3
February 2014, Week 2
February 2014, Week 1
January 2014, Week 5
January 2014, Week 4
January 2014, Week 3
January 2014, Week 2
January 2014, Week 1
December 2013, Week 5
December 2013, Week 4
December 2013, Week 3
December 2013, Week 2
December 2013, Week 1
November 2013, Week 5
November 2013, Week 4
November 2013, Week 3
November 2013, Week 2
November 2013, Week 1
October 2013, Week 5
October 2013, Week 4
October 2013, Week 3
October 2013, Week 2
October 2013, Week 1
September 2013, Week 5
September 2013, Week 4
September 2013, Week 3
September 2013, Week 2
September 2013, Week 1
August 2013, Week 5
August 2013, Week 4
August 2013, Week 3
August 2013, Week 2
August 2013, Week 1
July 2013, Week 5
July 2013, Week 4
July 2013, Week 3
July 2013, Week 2
July 2013, Week 1
June 2013, Week 5
June 2013, Week 4
June 2013, Week 3
June 2013, Week 2
June 2013, Week 1
May 2013, Week 5
May 2013, Week 4
May 2013, Week 3
May 2013, Week 2
May 2013, Week 1
April 2013, Week 5
April 2013, Week 4
April 2013, Week 3
April 2013, Week 2
April 2013, Week 1
March 2013, Week 5
March 2013, Week 4
March 2013, Week 3
March 2013, Week 2

March 2013, Week 1
February 2013, Week 4
February 2013, Week 3
February 2013, Week 2
February 2013, Week 1
January 2013, Week 5
January 2013, Week 4
January 2013, Week 3
January 2013, Week 2
January 2013, Week 1
December 2012, Week 5
December 2012, Week 4
December 2012, Week 3
December 2012, Week 2
December 2012, Week 1
November 2012, Week 5
November 2012, Week 4
November 2012, Week 3
November 2012, Week 2
November 2012, Week 1
October 2012, Week 5
October 2012, Week 4
October 2012, Week 3
October 2012, Week 2
October 2012, Week 1
September 2012, Week 5
September 2012, Week 4
September 2012, Week 3
September 2012, Week 2
September 2012, Week 1
August 2012, Week 5
August 2012, Week 4
August 2012, Week 3
August 2012, Week 2
August 2012, Week 1
July 2012, Week 5
July 2012, Week 4
July 2012, Week 3
July 2012, Week 2
July 2012, Week 1
June 2012, Week 5
June 2012, Week 4
June 2012, Week 3
June 2012, Week 2
June 2012, Week 1
May 2012, Week 5
May 2012, Week 4
May 2012, Week 3
May 2012, Week 2
May 2012, Week 1
April 2012, Week 5
April 2012, Week 4
April 2012, Week 3
April 2012, Week 2
April 2012, Week 1
March 2012, Week 5
March 2012, Week 4
March 2012, Week 3
March 2012, Week 2
March 2012, Week 1
February 2012, Week 5
February 2012, Week 4
February 2012, Week 3
February 2012, Week 2
February 2012, Week 1
January 2012, Week 5
January 2012, Week 4
January 2012, Week 3
January 2012, Week 2
January 2012, Week 1
December 2011, Week 5
December 2011, Week 4
December 2011, Week 3
December 2011, Week 2

July 2007
June 2007
May 2007, Week 4
May 2007, Week 3
May 2007, Week 2
May 2007, Week 1
April 2007
March 2007, Week 4
March 2007, Week 3
March 2007, Week 2
March 2007, Week 1
February 2007, Week 4
February 2007, Week 3
February 2007, Week 2
February 2007, Week 1
January 2007
December 2006
November 2006
October 2006
September 2006
August 2006, Week 4
August 2006, Week 3
August 2006, Week 2
August 2006, Week 1
July 2006
June 2006
May 2006, Week 4
May 2006, Week 3
May 2006, Week 2
May 2006, Week 1
April 2006
March 2006
February 2006
January 2006
December 2005
November 2005
October 2005
September 2005
August 2005
July 2005
June 2005
May 2005
April 2005
March 2005
February 2005
January 2005
December 2004
November 2004
October 2004
September 2004
August 2004
July 2004
June 2004
May 2004
April 2004
March 2004
February 2004
January 2004
December 2003
November 2003
October 2003
September 2003
August 2003
July 2003
June 2003
May 2003
April 2003
March 2003
February 2003
January 2003
December 2002
November 2002
October 2002
September 2002

EXHIBIT 8

TSG-RAN Working Group 2 meeting #62 **R2-08xxxx**
Shenzhen, China, March 31 – April 4, 2008

Agenda Item: 3

Source: ETSI MCC

Title: Draft Report of 3GPP TSG RAN WG2 meeting #61bis,

Shenzhen, China, March 31 – April 4, 2008

Document for: Approval

Draft Report of 3GPP TSG RAN WG2 meeting #61bis

held in Shenzhen, China
March 31 – April 4, 2008

ETSI Mobile Competence Centre (MCC) April 7th, 2008

3GPP

Postal address

3GPP support office address

650 Route des Lucioles - Sophia Antipolis
Valbonne - FRANCE
Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Internet

http://www.3gpp.org

Contents

SAMSUNG 1017-0209