TSG-RAN Working Group 2 (Radio layer 2 and Radio layer 3) TSGR2#6(99)749
Sophia Antipolis, France, 16th –20th Aug., 1999

Agenda Item: 9

Source: SAMSUNG Electronics Co.

Title: Change Request to 25.303 for the clarification of control only substate

Document for: Discussion and Decision

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1. Introduction

Through this contribution, we would like to clarify the following issues related to control only substate.

- What is the relationship between logical channel based substates (User Data Active and Control Only Substate) and physical channel based substates (DCH/DCH, DCH/DCH+DSCH, and DCH/DSCH+DSCH ctrl)?
- Which substate does RRC enter into after RRC connection is established?
- Does the state transition from control only substate to RACH+(FAUSCH)/DSCH or RACH+(FAUSCH)+(CPCH) /FACH has meaning ?

2. Discussion

1) Relation between logical channel based substate and physical channel based substate

According to the definition of each substate, it is possible to classify each dedicated channel using substate into two broad categories, logical channel based substate (user data active and control only) and physical channel based substate (DCH/DCH, DCH/DCH+DSCH, and DCH/DSCH+DSCH ctrl).
Before DSCH was defined, the available physical channel configuration was DCH/DCH, and the control only and user data active substate were defined on this physical channel configuration. However, in current TS25.303, there is no clear description about the relationship between control only substate and DSCH using states.

Relation between control only substate and DSCH.
The advantage of DSCH comes from the use of one shared FAT pipe which is more efficient than that of several separated THIN pipes from the perspective of channel utilisation. If we consider that only signalling messages will be exchanged in control only substate, then it becomes obvious that there is no need to maintain the DSCH, shared FAT pipe, in control only substate. Therefore, we would like to clarify the relationship of control only substate and DSCH as follows;

- In user data active substate, the available physical channel configurations are DCH/DCH, DCH/DCH+DSCH, and DCH/DSCH+DSCH ctrl.
- In control only substate, only DCH/DCH is available.

Micro-state
In the current document, there are too many substates. The “DCH/DCH, DCH/DCH+DSCH, DCH/DSCH+DSCH ctrl substate” can be divided into two substates, user data active substate and control only substate, at the perspective of logical channel. In addition to this, the “DCH/DCH, DCH/DCH+DSCH, DCH/DSCH+DSCH ctrl substate” can be divided into three substates, DCH/DCH substate, DCH/DCH+DSCH substate, and DCH/DSCH+DSCH ctrl, from the perspective of the physical channel configuration. Since every state is called as “Substate”, it is too confused to figure out the hierarchy of RRC state. Therefore, we would like to modify as follows:

- Divide “DCH/DCH, DCH/DCH+DSCH, DCH/DSCH+DSCH ctrl substate” into “user data active substate” and “control only substate”.
- Define “DCH/DCH micro-state”, “DCH/DCH+DSCH micro-state”, and “DCH/DSCH+DSCH ctrl micro-state” in user data active substate.

2) Destination of RRC connection setup procedure.
If a dedicated channel is established between UE and UTRAN by the result of RRC connection setup procedure, then RRC enters “DCH/DCH…” substate. However, in the current document, it is unclear whether UE enters control only state or user data active substate. Since the RRC connection just provides signalling connection between UE and UTRAN, it is impossible to transmit user traffic immediately without establishment of RAB between UE and CN. Therefore, we would like to conclude as follows:

- After RRC connection is established, RRC enters control only substate.

3) State transition from control only to RACH+(FAUSCH)/DSCH, RACH+(FAUSCH)+(CPCH)/FACH, or PCH substate
The control only substate was designed to cope with relatively short idle duration between two continued packets. The expiration of the control only timer means that this intermittent duration is relatively longer than others of intermittent duration. Therefore, it seems most efficient to make transition from control only to PCH substate.

- Only permit state transition from control only to PCH substate.

3. Proposed Text

5.3 Transition from Idle Mode to Connecting State

The transition to the Connecting State from the Idle Mode can only be initiated by the UE by transmitting a request for an RRC Connection. The event is triggered either by a paging request from the network or by a request from upper layers in the UE.

5.4 Connecting State

In the Connecting State (Figure 1) the UE has transmitted a request for an RRC connection and it waits for a response. No mobility procedures take place in this state.

In this state, the UE transmits on RACH transport channel in the uplink and receives the FACH transport channel in the downlink. Only the logical channel CCCH can be used, since no RNTI is assigned. Connecting state is shown in Figure 1.

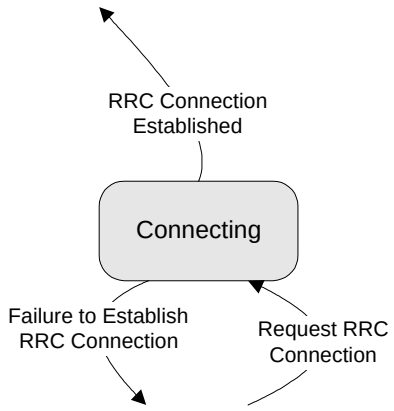


Figure 1: Connecting State

5.4.1 Transition to Connected Mode

When the UE receives a message from the network that confirms the RRC connection establishment, the UE enters the cell connected state. According to allocated transport channel type, UE enters RACH+(FAUSCH)+(CPCH)/FACH, RACH+(FAUSCH)/DSCH or Control only substate.

5.4.2 Transition to Idle Mode

In the case of a failure to establish the RRC Connection the UE goes back to Idle Mode. Possible causes are radio link failure, a received reject response from the network or lack of response from the network (timeout).

5.5 Connected Mode States and Transitions

5.5.1 Cell Connected State

In this state, the position of the UE is known on cell level. The RRC Connection mobility is handled by handover procedures including soft handover, hard handover and cell updates. Both uplink and downlink data transfer is possible.

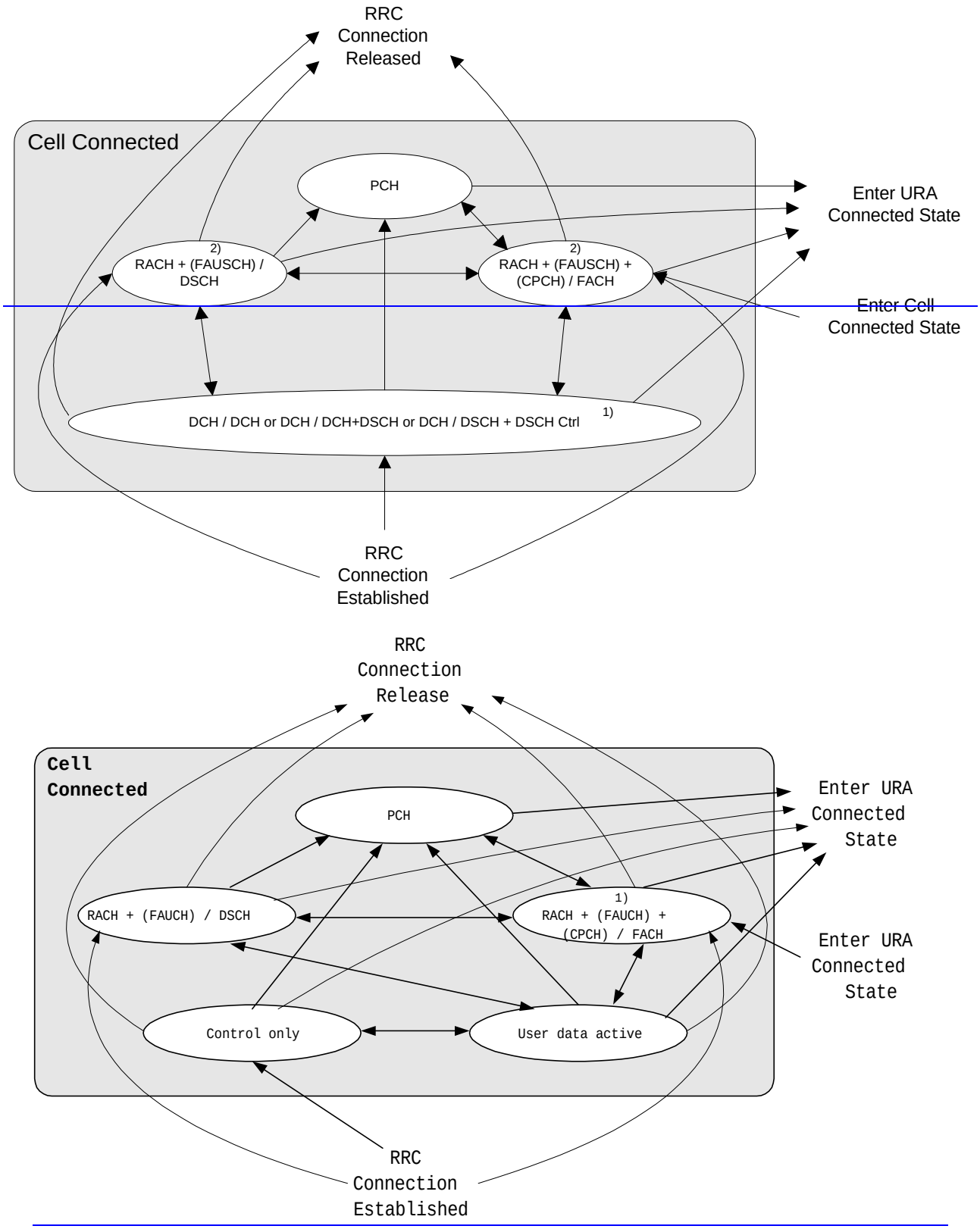


Figure 2: Substates within Cell Connected State

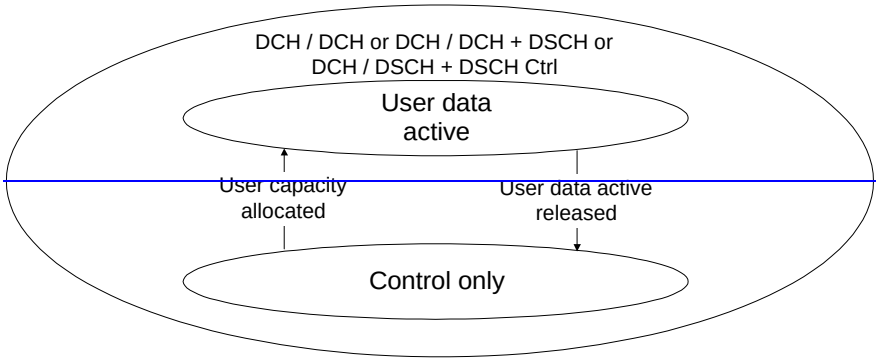
~~**[1): Inclusion of the DCH / DSCH + DSCH Ctrl substate is based on the assumption that DSCH Ctrl contains power control bits. If these PC bits don't exist, this substate is not needed.]**~~

[1): The channels shown in parenthesis (FAUSCH and CPCH) are available in these substates after allocation to the UE.]

~~5.5.1.1DCH / DCH, DCH / DCH + DSCH and DCH / DSCH + DSCH Ctrl substates~~

~~These substates are characterized by the allocation of a dedicated transport channel to the UE. The DCH states are entered from the Connecting State through the setup of an RRC connection, or by establishing a dedicated channel (DCH) from the RACH / FACH, RACH + FAUSCH / FACH, RACH + FAUSCH / DSCH or RACH / DSCH substates.~~

~~These substates are further divided depending on the type of information that is allowed to be transmitted on the dedicated channel(s) and the downlink shared channel. The substates are shown in Figure 5.~~



~~Figure 5: Substates in DCH / DCH, DCH / DCH + DSCH and DCH / DSCH + DSCH Ctrl substates~~

~~5.5.1.1.1~~5.5.1.1 Control only substate

[Editor's note: The applicability of the control only substate to the TDD-mode is FFS.]

In Control only substate, the uplink and downlink DCHs are allocated, but no user data frames can be exchanged with the exception of data that uses the signalling connection e.g. SMS. Signalling in this substate includes link maintenance and higher layer signalling. Only uplink and downlink DCHs are available in Control only substate.

The Control only substate is provided to save air interface capacity and provide efficient packet transfer capacity allocation.

5.5.1.1.1 Transition from Control only substate to User data active substate

This transition is realised by activating DTCH. According to the QoS parameter of user traffic data, proper modification such as establishment of DSCH or reconfiguration of DCH is performed during this transition. This transition can occur via explicit signalling.

5.5.1.1.2 Transition from Control only substate to PCH

This transition is realised through release of uplink and downlink DCHs and activating the cell update procedure. This transition can occur either

a) through the expiration of the inactivity timer(T_{COS}) or

b) via explicit signalling.

5.5.1.1.3 Transition from Control only substate to URA connected state

This transition is realised through release of uplink and downlink DCHs and activating the URA update procedure. This transition can occur either

a) through the expiration of the inactivity timer(T_{COS}) or

b) via explicit signalling.

5.5.1.1.4 Transition from Control only substate to Idle mode

This transition is realised through release of RRC connection.

~~5.5.1.1.2~~5.5.1.2 User data active substate

In this substate UTRAN has allocated transmission resources for the UE and it may transmit data without a prior request up to the peak capacity that is currently granted to that UE.

This substate is divided into three micro-states according to the type of assigned physical channels. In DCH/DCH+DSCH or DCH/DSCH+DSCH Ctrl micro-state some part or all of the DTCH resources can be allocated from the DSCH, whereas all of the DTCH resources are allocated from DCH in DCH/DCH micro-state.~~.~~

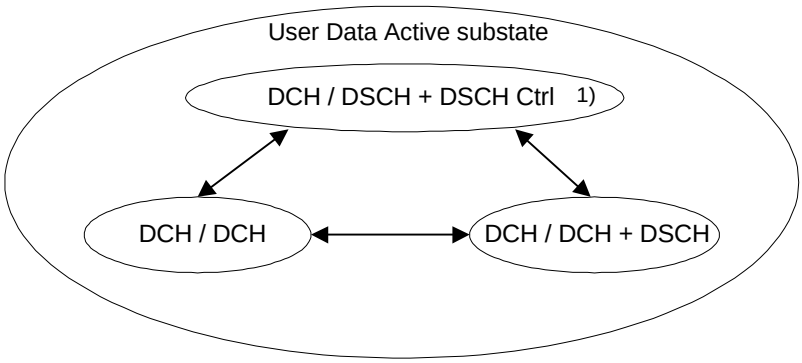


Figure 5. Mirco-states of User Data Active substate

[1): Inclusion of the DCH / DSCH + DSCH Ctrl micro-state is based on the assumption that DSCH Ctrl contains power control bits. If these PC bits don't exist, this substate is not needed.]

5.5.1.2.1 Transition from User data active substate to control only substate

This transition is realised by inactivating DTCH. The resource which has been allocated for user traffic data is released during this transition. This transition can occur either

a) through the expiration of the inactivity timer(T_{UDAS})

b) at the end of the time period for which the dedicate/shared channel was allocated or

c) via explicit signalling.

5.5.1.2.2 Transition from User data active substate to RACH + (FAUSCH) + (CPCH) / FACH or RACH + (FAUSCH) / DSCH

This transition is realised by replacing the dedicated transport channels with common transport channels. The cell update procedure is also activated during this transition. This transition can occur either

a) through the expiration of an inactivity timer (T_{UDAS})

b) at the end of the time period for which the dedicate/shared channel was allocated or

c) via explicit signalling.

5.5.1.2.3 Transition from User data active substate to PCH

This transition is realised by release of uplink/downlink DCHs, uplink/downlnk DCHs and DSCH, or uplink DCH and DSCH + DSCH ctrl. The cell update procedure is also activated. This transition can occur either

a) through the expiration of an inactivity timer (T_{UDAS}) or

b) via explicit signalling.

5.5.1.2.4 Transition from User data active substate to URA connected state

This transition is realised by release of uplink/downlink DCHs, uplink/downlnk DCHs and DSCH, or uplink DCH and DSCH + DSCH ctrl. The URA update procedure is also activated. This transition can occur either

a) through the expiration of an inactivity timer (T_{UDAS}) or

b) via explicit signalling.

5.5.1.2.5 Transition from User data active substate to Idle mode

This transition is realised by release of RRC connection.

5.5.1.2.6 Transition between micro-states

~~5.5.1.1.3~~5.5.1.2.6.1 Transition from DCH/DCH to DCH/DCH+DSCH micro-~~sub~~state

~~FFS.~~This transition is realised by establishment of DSCH.

~~5.5.1.1.4~~5.5.1.2.6.2 Transition from DCH/DCH+DSCH to DCH/DCH micro-~~sub~~state

~~FFS.~~This transition is realised by release of DSCH.

~~5.5.1.1.5~~5.5.1.2.6.3 Transition from DCH/DCH to DCH/DSCH+DSCH Ctrl micro-~~sub~~state

FFS.

~~5.5.1.1.6~~5.5.1.2.6.4 Transition from DCH/DSCH+DSCH Ctrl to DCH/DCH micro-~~sub~~state

FFS.

5.5.1.2.6.5 Transition from DCH/DCH+DSCH to DCH/DSCH+DSCH Ctrl micro-state

FFS

5.5.1.2.6.6 Transition from DCH/DSCH+DSCH Ctrl to DCH/DCH+DSCH

FFS

~~5.5.1.1.7Transition from DCH/DCH or DCH/DCH+DSCH or DCH / DSCH + DSCH Ctrl to Idle Mode~~

~~Transition to Idle Mode is realised through the release of the RRC connection.~~

~~5.5.1.1.8Transition from DCH/DCH or DCH/DCH+DSCH to RACH / FACH substate~~

~~Transition to RACH/FACH substate can occur either~~

~~a)through the expiration of an inactivity timer (T_{DCH}),~~

~~b)at the end of the time period for which the dedicated / shared channel was allocated or~~

~~c)via explicit signalling.~~

~~5.5.1.1.9Transition from DCH/DCH or DCH/DCH+DSCH to RACH+FAUSCH/FACH substate~~

~~Similar to 5.5.1.1.8, differences FFS.~~

~~5.5.1.1.10Transition from DCH/DCH or DCH/DCH+DSCH to RACH/DSCH or RACH+FAUSCH/DSCH substates~~

~~FFS.~~

~~5.5.1.1.11Transition from DCH/DCH or DCH/DCH+DSCH to PCH substate~~

~~FFS.~~

~~5.5.1.1.12Transition from DCH/DCH or DCH/DCH+DSCH to URA Connected state~~

~~FFS.~~

~~5.5.1.1.13~~5.5.1.2.7 Radio Resource Allocation tasks (Control only and User data active~~DCH/DCH and DCH/DCH+DSCH~~)

For the DCH, several physical channel allocation strategies may be applied. The allocations can be either permanent (needing a DCH release message) or based on time or amount-of-data.

Resource allocation can be done separately for each packet burst with fast signalling on the DCH. Transition out of the Control only state is either triggered by user capacity allocation or by timeout (no data transaction requests received within a specified time period).

For each radio frame the UE and the network indicate the current data rate (in uplink and downlink respectively) using the transport format combination indicator (TFCI). If the configured set of combinations (i.e. transport format set for one transport channel) are found to be insufficient to retain the QoS requirements for a transport channel, the network initiates a reconfiguration of the transport format set (TFS) for that transport channel. This reconfiguration can be done during or in between data transmission. Further, the network can reconfigure the physical channel allowing an increase or decrease of the peak data rate.

For the uplink data transmission, the UE reports the observed traffic volume to the network in order for the network to re-evaluate the current allocation of resources. This report contains e.g. the amount of data to be transmitted or the buffer status in the UE.

If during data transfer the UE is unable to transmit at the requested output power when using the peak allocated capacity, the UE shall reduce transmission rate within the current 10 ms radio frame in order to maintain the closed-loop power control.

~~5.5.1.1.14~~5.5.1.2.8 RRC Connection mobility tasks (Control only and User data active~~DCH/DCH and DCH/DCH+DSCH~~)

Depending on the amount and frequency of data macrodiversity (soft handover) may or may not be applied.

The RRC Connection mobility is handled by measurement reporting, soft handover and hard handover procedures.

~~5.5.1.1.14.1~~5.5.1.2.8.1 Localised Service Area (LSA) support

[Editor's note: A liaison statement to SMG12 has been sent to receive guidance on the functionalities that would need to be defined in UTRAN to support SoLSA-like (Support of LSA, GSM) services.]

In case of a network-controlled handover procedure, UTRAN shall take into account the local support of LSA service and the enventual subscription information of the UE to those LSA regarding the provision of service to the UE.

Regarding soft handover, the following principles are applied by UTRAN:

- For "LSA only" UE, the RRC connection shall be maintained by UTRAN as long as at least one cell of the active set belongs to a UE subscribed LSA.
- For "LSA exclusive access" cells, UTRAN shall prevent such cell from being part of the active set if the UE has not subscribed to the corresponding LSA

Regarding network controlled hard handover, the following principles are applied by UTRAN:

- For "LSA only" UE, UTRAN shall prevent the UE from being handed over a cell which does not belong to a UE subscribed LSA.

- For "LSA exclusive access" cells, UTRAN shall prevent the UE from being handed over such a cell if the UE has not subscribed to the corresponding LSA

~~5.5.1.2~~5.5.1.3 RACH + (FAUSCH) + (CPCH) / FACH substates

[Note: Channels in parenthesis available after allocation.]

The position of the UE is known by UTRAN on cell level. In the RACH / FACH substate the UE performs the following actions:

- listens to an FACH
- listens to the BCH transport channel of the serving cell for the decoding of system information messages (FFS)
- initiates a cell update procedure on cell change
- transmits uplink control signals and small data packets on the RACH.
- transmits uplink control signals and larger data packets on CPCH when resources are allocated to cell and UE is assigned use of those CPCH resources.

Furthermore, the UE can use the FAUSCH to trigger the allocation of a new DCH by RNC. Further rate adaptation can be done via the DCCH of the new DCH.

~~5.5.1.2.1~~5.5.1.3.1 Transition from RACH/FACH to RACH+FAUSCH/FACH substate

FFS.

~~5.5.1.2.2~~5.5.1.3.2 Transition from RACH+FAUSCH/FACH to RACH/FACH substate

FFS.

~~5.5.1.2.3~~5.5.1.3.3 Transition from RACH/FACH to User data active ~~DCH/DCH or DCH/DCH+DSCH~~ substate~~s~~

A transition occurs, when a dedicated transport channel is established via explicit signalling. Examples of these procedures are given in section 7.2.3.

Details of the transition to DCH/DCH+DSCH or DCH/DSCH+DSCH Ctrl micro-states of User data active substate FFS.

This transition can occur via explicit signalling.

~~5.5.1.2.4~~5.5.1.3.4 Transition from RACH+FAUSCH/FACH to User data active ~~DCH/DCH or DCH/DCH+DSCH~~ substate~~s~~

The state transition is done by using the FAUSCH. This transition can occur via explicit signalling.

~~5.5.1.2.5~~5.5.1.3.5 Transition from RACH/FACH or RACH+FAUSCH/FACH to PCH substate

Since the UE performs continuous reception of FACH in this substate, it should be moved to the PCH substate if the data service has not been active for a while. When an inactivity timer (T_{rf}) expires, the UE state is changed to PCH in order to decrease power consumption. Also, when coming from PCH substate, and after the cell update procedure has been performed, the UE state is changed back to PCH substate if neither the UE nor the network has any data to transmit.

When coming from the RACH+FAUSCH/FACH substate, the FAUSCH is still available in the PCH substate after the transition.

~~5.5.1.2.6~~5.5.1.3.6 Transition from RACH/FACH or RACH+FAUSCH/FACH to Idle Mode

The release of the RRC connection moves the UE to the idle mode.

~~5.5.1.2.7~~5.5.1.3.7 Transition from RACH/FACH or RACH+FAUSCH/FACH to RACH / DSCH state

FFS.

~~5.5.1.2.8~~5.5.1.3.8 Transition from RACH/FACH or RACH+FAUSCH/FACH to URA Connected State

To perform the URA update procedure, UE is moved temporarily from URA Connected to RACH / FACH or RACH + FAUSCH / FACH substate. After the URA update is completed, UE state is changed back to URA Connected.

If FAUSCH is intended to be used in URA Connected State, a FAUSCH transport channel needs to be allocated for the intended cells in the URA prior to this transition.

~~5.5.1.2.9~~5.5.1.3.9 Radio Resource Allocation Tasks (RACH/FACH and RACH+FAUSCH/FACH)

In the RACH / FACH substate the UE will monitor an FACH. It is enabled to transmit uplink control signals and it may be able to transmit small data packets on the RACH. The network can assign the UE stransport channel parameters (e.g. transport format sets) in advance, to be used when a DCH is used. When the physical channel for DCH is assigned, the transport channel type is switched to DCH and the assigned TFS can be used.

When there is either user or control data to transmit, a selection procedure determines whether the data should be transmitted on a common transport channel, or if a dedicated transport channel should be allocated. The selection should be dynamic and depend on traffic parameters (amount of data, packet burst frequency).

~~5.5.1.2.10~~5.5.1.3.10 Radio Resource Allocation Tasks (RACH+CPCH/FACH)

The UTRAN can assign CPCH resources to the UE in RACH/FACH substate. When CPCH resources are assigned, the UE will continue to monitor FACHs. The UE may use the RACH to transmit uplink control signals and small data packets. The UE also may choose to transmit data packets, larger than those carried on the RACH, on the CPCH channel. The UE selects either the RACH or one of the CPCH channels to make maximum use of the capacity available on that channel.

The UE provides the UTRAN with CPCH measurement data which includes data queue depth (current size of data buffers), average access time for each CPCH channel used, and average traffic volume on each CPCH channel used. With these measurands and the UTRAN MAC-d measurement reports, the UTRAN can reallocate network resources on a periodic basis. The UTRAN allocates CPCH Sets to each cell and assigns UEs to one of the cell's CPCH Sets. The UEs can dynamically access the CPCH resources without further UTRAN control.

~~5.5.1.2.11~~5.5.1.3.11 RRC Connection mobility tasks (RACH + (FAUSCH) + (CPCH) /FACH)

[Note: Channels in parenthesis available after allocation.]

In this substate the location of the UE is known on cell level. A cell update procedure is used to report to the UTRAN, when the UE selects a new cell to observe the common downlink channels of a new Node B. In this substate measurement reporting and hard handover procedures can be used. Downlink data transmission on the FACH can be started without prior paging.

In RACH / FACH substate an RACH / FACH cell set comparable to the active set of a dedicated channel in SHO is maintained both in the UE and in the network. The RACH / FACH cell set representes a list of cells which have the potential to serve the UE from radio signal strength perspective. The UE performs measurements and reporting for the RACH / FACH cell set using the same procedures as in DCH/DCH+DSCH substates. The thresholds required for triggering a measurement report may be different from those in DCH-based substates.

The RACH/FACH cell set information is used by the network to decide whether the user data can be routed directly via a cell to a specific UE or soft handover would be required when resuming the DCH operation. In addition, the

RACH/FACH cell set information provides the means for the network to evaluate potential interference conditions and select a suitable amount of capacity when moving the UE in the DCH active substate, for both uplink and downlink data transfer.

The UE monitors the broadcast channel and system information on BCCH of its own and neighbour cells and from this the need for the updating of cell location is identified.

~~5.5.1.3~~5.5.1.4 RACH/DSCH and RACH+FAUSCH/DSCH substates

FFS.

~~5.5.1.4~~5.5.1.5 PCH substate

The position of the UE is known by UTRAN on cell level. In this substate the UE performs the following actions:

- listens to the PCH transport channel for the decoding of paging and notification messages sent by the network
- listens to the BCH transport channel of the serving cell for the decoding of system information messages
- initiates a cell update procedure on cell change.

The DCCH logical channel cannot be used in this substate. If the network wants to initiate any activity, it needs to make a paging request on the PCCH logical channel in the known cell to initiate any downlink activity.

~~5.5.1.4.1~~5.5.1.5.1 Transition from PCH to URA Connected State

The only overhead in keeping a UE in the PCH substate is the potential possibility of cell updating, when the UE moves to other cells.

To reduce this overhead, the UE is moved to the URA Connected State when low activity is observed. This can be controlled with an inactivity timer, and optionally, with a counter which counts the number of cell updates. When the number of cell updates has exceeded certain limits (a network parameter), then the UE changes to the URA Connected State.

[Editor's note: If the coverage area of FAUSCH is expanded from one cell to several cells in the URA in relation to the execution of this transition, the new FAUSCH allocation information for each new cell in the URA needs to be exchanged either in RACH+FAUSCH/FACH or a DCH-based substate prior to a transition from PCH to URA connected state. For proper operation, this shouldn't be observed as increased activity.]

~~5.5.1.4.2~~5.5.1.5.2 Transition from PCH to RACH/FACH substate

The UE is transferred to RACH/FACH substate either by a command (packet paging) from UTRAN or through any uplink access.

~~5.5.1.4.3~~5.5.1.5.3 Transition from PCH to RACH+FAUSCH/FACH substate

If a valid FAUSCH transport channel is allocated for the current cell, the UE changes to RACH+FAUSCH/FACH substate as soon as it uses the FAUSCH to allocate a DCH.

~~5.5.1.4.4~~5.5.1.5.4 Transition from PCH to RACH/DSCH or RACH+FAUSCH/DSCH substates

FFS.

~~5.5.1.4.5~~5.5.1.5.5 Radio Resource Allocation Tasks (PCH)

In PCH substate no resources have been granted for data transmission. For this purpose, a transition to another substate has to be executed.

~~5.5.1.4.6~~5.5.1.5.6 RRC Connection mobility tasks (PCH)

In the PCH substate, the UE mobility is performed through cell reselection procedures, which may differ from the one defined in S2.04.

Cell updating is initiated by the UE which, upon the detection of the new cell, moves to RACH/FACH substate and initiates a cell update procedure in the new cell. After the cell update procedure has been performed, the UE state is changed back to PCH substate if neither the UE nor the network has any more data to transmit.

5.5.2 URA Connected State

In URA Connected State (Figure 4) the location of a UE is known on UTRAN Registration area level.

In this substate the UE performs the following actions:

- listens to the PCH transport channel for the decoding of paging and notification messages sent by the network
- listens to the BCH transport channel of the serving cell for the decoding of system information messages
- initiates a URA updating procedure on URA change.

The DCCH logical channel cannot be used in this substate. If the network wants to initiate any activity, it needs to make a paging request on the PCCH logical channel within the URA where the location of the UE is known. If the UE needs to transmit anything to the network, it goes to the RACH/FACH substate of the Cell Connected State. In addition, the UE can also use the FAUSCH for requesting a DCH in the whole URA or parts of it, if the UE has been allocated - on entering the connected mode or via explicit signalling later on - a FAUSCH channel for the cell, which the UE is currently camping on.

The transition to URA Connected State can be controlled with an inactivity timer, and optionally, with a counter which counts the number of cell updates. When the number of cell updates has exceeded certain limits (a network parameter), then the UE changes to the URA Connected State.

URA updating is initiated by the UE which, upon the detection of the Registration area, sends the network the Registration area update information on the RACH of the new cell.

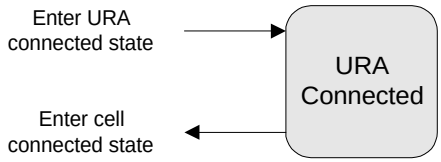


Figure 4: URA Connected State

5.5.2.1 Transition from URA Connected State to Cell Connected State

Any activity causes the UE to be transferred to RACH / FACH or RACH + FAUSCH / FACH substate of the Cell Connected State. Uplink access is performed by either RACH or FAUSCH, if a FAUSCH transport channel for the current cell has been allocated.

Note that the release of an RRC connection is not possible in the URA Connected State. The UE will first move to Cell Connected State to perform the release signalling.

5.5.2.2 Radio Resource Allocation Tasks (URA Connected)

In URA Connected State no resources have been granted for data transmission. For this purpose, a transition to a suitable substate of Cell Connected State has to be executed.

5.5.2.3 RRC Connection mobility tasks (URA Connected)

In URA Connected State the location of a UE is known on UTRAN Registration area level.

In this state, the UE mobility is performed through URA reselection procedures, which may differ from the definitions in S2.04. If the new cell belongs to a different URA, the UE moves to RACH/FACH substate of the cell connected state and initiates a URA update towards the network. After the URA update procedure has been performed, the UE state is changed back to URA connected state if neither the UE nor the network has any more data to transmit.