

Neighbourcell Process ALR

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Author: **LE**

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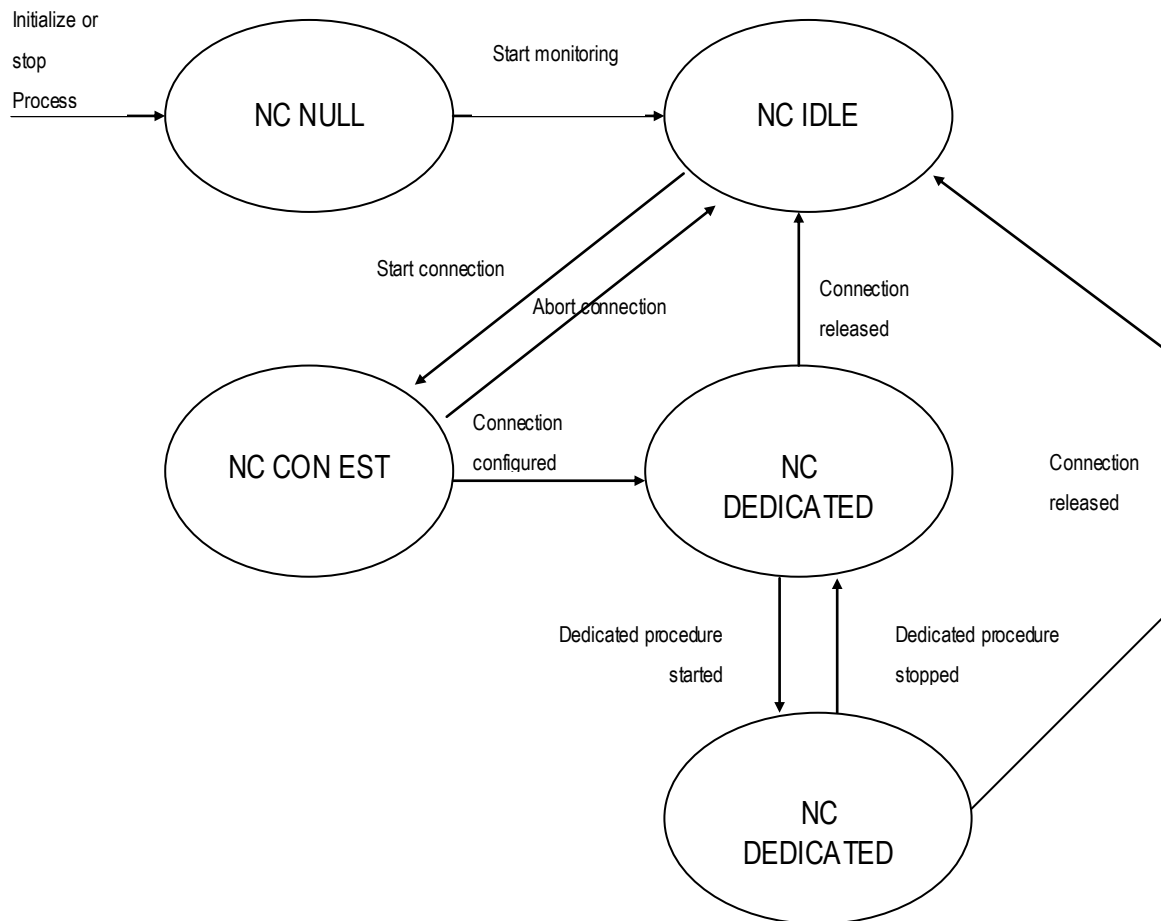
1 Overview

The neighbourcell process in ALR is a complex state machine with several parallel actions to layer 1. For historical reasons the ALR code is derived from the TIL-code with several adaptations. The main adaptation is to replace the bottleneck of one request at one time to layer 1 by up to six parallel requests to layer 1 with ALR in idle mode.

This document describes the state machine for the neighbourcell processes.

2 State Machine Neighbourcell Process

The following figure indicates the general states of the neighbourcell process.



2.1 State NC_NULL

The state NC_NULL is the initial state of the neighbourcell process. No neighbourcell activities are done. The state is leaved to NC_IDLE if a neighbourcell list is provided by the upper layer.

2.2 State NC_IDLE

The state NC_IDLE is the idle state of the neighbourcell process. The mobile synchronizes itself to the up to six strongest carrier for cell reselection purposes.

2.3 State NC_CON_EST¹

The state NC_CON_EST is entered during connection establishment. During this phase all neighbourcell related activities are suspended.

2.4 State NC_DEDICATED

The state NC_DEDICATED is used during a dedicated connection. No synchronisation attempt is ongoing.

2.5 State NC_DEDICATED_ACTIVE

The state NC_DEDICATED_ACTIVE is used during a dedicated connection. The mobile synchronizes itself to up to six strongest carrier for handover purposes.

¹ The state has been renamed from NC_SUSPEND to NC_CON_EST, because this name meets better what is the state of the neighbourcell process, and not what happens during this state.

3 Stati for Neighbourcell channels

For each channel of the neighbourcell list one of the following stati is assigned. There are several conditions and events which leads to state transitions of the changes. The general behaviour is:

In idle mode (state NC_IDLE) ALR selects the six strongest carrier. It synchronizes itself on this carrier, that means it reads the Frequency Correction Burst (FB) and Synchron Burst (SB) of this channel. Then it tries to read the BCCH message system information 3/4/7 or 8 to get the needed information for cell reselection purposes. BCCH messages shall be forwarded only if RR is already informed about a successful FB/SB reading.

In connection establishment mode (state NC_CON_EST) ALR suspends all neighbourcell activities.

In dedicated mode (state NC_DEDICATED) ALR selects the six strongest carrier. It synchronizes itself on this carrier, that means it reads the Frequency Correction Burst (FB) and Synchron Burst (SB) of this channel.

3.1 Status INACTIVE

A channel with the status INACTIVE has no measurement values stored from layer 1 and is excluded from all activities.

3.2 Status IDLE

Only fieldstrength of the channel is known. The mobile station is not synchronized and has no knowledge about the BCCH.

3.3 Status READ_FB_SB

This status is entered if a neighbour cell is one of the six strongest channels and the mobile station is not synchronized yet. It indicates that the mobile station shall read frequency correction burst and synchron burst as soon as possible.

3.4 Status FB_SB_SYNC

The channel is one of the six strongest neighbour cells and the mobile station is synchronized to the neighbour cell. RR is informed about the channel. F

3.5 Status FB_SB_SYNC_RR_NOT_INFORMED²

The channel is one of the six strongest neighbour cells and the mobile station is synchronized to the neighbour cell. RR is not yet informed about the channel.

² The status is renamed from FB_SB_SYNC_2 to FB_SB_SYNC_RR_NOT_INFORMED. This name identifies the sense of the status.

3.6 Status READ_SB

The channel is one of the six strongest neighbour cells and the mobile station must read the synchron burst again as soon as possible.

3.7 Status READ_BCCH

The channel is one of the six strongest neighbour cells, the mobile is synchronized to the channel and the BCCH of this channel shall be read as soon as possible.

3.8 Status IDLE_SYNC

The mobile station is synchronized to the channel, but the channel is not longer one of the six strongest neighbour cells.

3.9 Status FB_SB_FAILED

The attempt for synchronization failed, but the channel is one of the six strongest.

3.10 Status IDLE_NOT_SYNC³

The attempt for synchronization failed and the channel is not one of the six strongest.

3.11 Status EXCLUDED

After eight synchronization attempts the channel is excluded from further attempts.

3.12 Status READ_SB_BCCH

All five minutes the neighbour cell BCCH must be read. This is started with a synchronisation attempt to the synchron burst followed by reading of the BCCH. The synchronisation attempt is started as soon as possible.

3.13 Status READ_FB_SB_PENDING

The frequency correction and synchron burst is read for the channel. The response has not yet been received.

3.14 Status READ_SB_PENDING

The frequency correction and synchron burst is confirmed for the channel. The response has not yet been received.

3.15 Status READ_BCCH_PENDING

The BCCH is read for the channel. The response has not yet been received.

³ The status is renamed from FB_SB_FAILED2 to IDLE_NOT_SYNC. This name identifies the sense of the status.

3.16 Status READ_SB_BCCH_PENDING

The frequency correction and synchron burst is confirmed for the channel. The response has not yet been received.

3.17 Status READ_BCCH_RR_NOT_INFORMED⁴

The channel is one of the six strongest neighbour cells, the mobile is synchronized to the channel and the BCCH of this channel shall be read as soon as possible. RR is not informed yet about the synchronisation to the channel.

3.18 Status READ_BCCH_PENDING_RR_NOT_INFORMED⁵

The BCCH is read for the channel. The response has not yet been received. RR is not informed yet about the synchronisation to the channel.

⁴ The status is renamed from READ_BCCH_2 to READ_BCCH_RR_NOT_INFORMED. This name identifies the sense of the status.

⁵ The status is renamed from READ_BCCH_2_PENDING to READ_BCCH_PENDING_RR_NOT_INFORMED. This name identifies the sense of the status.

The following table indicates which stati are allowed in which neighbourcell state:

allowed not allowed



	NC_NULL	NC_IDLE	NC_CON_EST	NC_DEDICATED NC_DEDICATED_ACTIVE
INACTIVE				
IDLE				
IDLE_SYNC				
IDLE_NOT_SYNC				
READ_FB_SB				
READ_SB				
READ_SB_BCCH				
READ_BCCH				
READ_BCCH_RR_NOT_INFORMED				
READ_FB_SB_PENDING				
READ_SB_PENDING				
READ_SB_BCCH_PENDING				
READ_BCCH_PENDING				
READ_BCCH_PENDING_RR_NOT_INFORMED				
FB_SB_SYNC				
FB_SB_SYNC_RR_NOT_INFORMED				
FB_SB_FAILED				
EXCLUDED				

This implies clean-up procedures for the channels, if the neighbourcell process state changes.

4 State Transitions

4.1 State Transition * to NC_NULL

A state transition from any of the other states to the NC_NULL state means deactivation of the neighbourcell process.

	NC_NULL	Action
INACTIVE		---
IDLE		Status = INACTIVE
IDLE_SYNC		Status = INACTIVE
IDLE_NOT_SYNC		Status = INACTIVE
READ_FB_SB		Status = INACTIVE
READ_SB		Status = INACTIVE
READ_SB_BCCH		Status = INACTIVE
READ_BCCH		Status = INACTIVE
READ_BCCH_RR_NOT_INFORMED		Clean stored BCCH Status = INACTIVE
READ_FB_SB_PENDING		Stop sync request in layer 1 Status = INACTIVE
READ_SB_PENDING		Stop sync request in layer 1 Status = INACTIVE
READ_SB_BCCH_PENDING		Stop sync request in layer 1 Status = INACTIVE
READ_BCCH_PENDING		Stop BCCH request in layer 1 Status = INACTIVE
READ_BCCH_PENDING_RR_NOT_INFORMED		Clean stored BCCH Stop BCCH request in layer 1 Status = INACTIVE
FB_SB_SYNC		Status = INACTIVE
FB_SB_SYNC_RR_NOT_INFORMED		Status = INACTIVE
FB_SB_FAILED		Status = INACTIVE
EXCLUDED		Status = INACTIVE

4.2 State Transition NC_NULL to NC_IDLE

A state transition from NC_NULL to NC_IDLE means the activation of the neighbourcell process. It happens after reception of a neighbourcell list from RR. There are no conflicts expected, because all stati from NC_NULL are also valid in NC_IDLE and no interaction with lower or upper layer are possible.

4.3 State Transition NC_CON_EST to NC_IDLE

A state transition from NC_CON_EST to NC_IDLE means the abort of a connection establishment. The abort is requested from RR. There are no conflicts expected, because all stati from NC_CON_EST are also valid in NC_IDLE and no interaction with lower or upper layer is possible due to suspension of all neighbourcell activities during connection establishment.

4.4 State Transition NC_CON_EST to NC_DEDICATED

A state transition from NC_CON_EST to NC_DEDICATED means the configuration of a dedicated channel for the connection. The configuration is carried out by RR. Some of the stati are not allowed in dedicated mode and must be cleaned.

	NC_DEDICATED	Action
INACTIVE		---
IDLE		---
IDLE_SYNC		---
IDLE_NOT_SYNC		Status = IDLE
READ_FB_SB		---
READ_SB		---
READ_SB_BCCH		Status = READ_SB
READ_BCCH		Status = FB_SB_SYNC
READ_BCCH_RR_NOT_INFORMED		Clean stored BCCH Status = FB_SB_SYNC
READ_FB_SB_PENDING		Not applicable for NC_CON_EST Status = Idle
READ_SB_PENDING		Not applicable for NC_CON_EST Status = Idle
READ_SB_BCCH_PENDING		Not applicable for NC_CON_EST Status = Idle
READ_BCCH_PENDING		Not applicable for NC_CON_EST Status = Idle
READ_BCCH_PENDING_RR_NOT_INFORMED		Not applicable for NC_CON_EST Status = Idle
FB_SB_SYNC		---
FB_SB_SYNC_RR_NOT_INFORMED		Clean stored BCCH Status = FB_SB_SYNC
FB_SB_FAILED		---
EXCLUDED		---

4.5 State Transition NC_IDLE to NC_CON_EST

A state transition from NC_IDLE to NC_CON_EST means the start of a connection establishment. During this phase all neighbourcell activities for layer 1 must be suspended.

	NC_CON_EST	Action
INACTIVE		---
IDLE		---
IDLE_SYNC		---
IDLE_NOT_SYNC		---
READ_FB_SB		---
READ_SB		---
READ_SB_BCCH		---
READ_BCCH		---
READ_BCCH_RR_NOT_INFORMED		---
READ_FB_SB_PENDING		Stop sync request in layer 1 Status = READ_FB_SB
READ_SB_PENDING		Stop sync request in layer 1 Status = READ_SB
READ_SB_BCCH_PENDING		Stop sync request in layer 1 Status = READ_SB_BCCH
READ_BCCH_PENDING		Stop BCCH request in layer 1 Status = READ_BCCH
READ_BCCH_PENDING_RR_NOT_INFORMED		Stop BCCH request in layer 1 Status = READ_BCCH_RR_NOT_INFORMED
FB_SB_SYNC		---
FB_SB_SYNC_RR_NOT_INFORMED		---
FB_SB_FAILED		---
EXCLUDED		---

4.6 State Transition NC_DEDICATED to NC_IDLE

A state transition from NC_DEDICATED to NC_IDLE means coming back from dedicated mode to idle mode. The configuration is carried out by RR. Some of the stati are not allowed in dedicated mode and must be cleaned.

	NC_IDLE	Action
INACTIVE		---
IDLE		---
IDLE_SYNC		---
IDLE_NOT_SYNC		---
READ_FB_SB		---
READ_SB		Status = READ_BCCH_RR_NOT_INFORMED
READ_SB_BCCH		Not applicable for NC_DEDICATED
READ_BCCH		Not applicable for NC_DEDICATED
READ_BCCH_RR_NOT_INFORMED		Not applicable for NC_DEDICATED
READ_FB_SB_PENDING		Not applicable for NC_DEDICATED
READ_SB_PENDING		Not applicable for NC_DEDICATED
READ_SB_BCCH_PENDING		Not applicable for NC_DEDICATED
READ_BCCH_PENDING		Not applicable for NC_DEDICATED
READ_BCCH_PENDING_RR_NOT_INFORMED		Not applicable for NC_DEDICATED
FB_SB_SYNC		Status = READ_BCCH_RR_NOT_INFORMED
FB_SB_SYNC_RR_NOT_INFORMED		Not applicable for NC_DEDICATED
FB_SB_FAILED		---
EXCLUDED		---

5 Events in the Neighbourcell States

During the neighbourcell states several events will arrive. It can be differed between major events, which leads to a state transition of the neighbourcell process or normal events which force a status transition for a channel.

5.1 Initialisation of the neighbourcell process

During startup of the ALR the neighbourcell process is initialised. The neighbourcell list in ALR is cleared.

5.2 Stop of the neighbourcell process

If the mobile recovers with power measurements with PCH interruption, the neighbourcell process is stopped. This is a state transition to NC_NULL followed by an initialisation of the neighbourcell process.

5.3 Modified neighbourcell list

RR sends a new neighbourcell list to ALR. This is handled in the following states:

- NC_NULL and NC_IDLE for the idle mode and
- NC_DEDICATED and NC_DEDICATED_ACTIVE for the dedicated mode.

All channels which are not longer part of the neighbourcell list, will be removed. Depending on the current status of the channel the following procedure is called before removing:

	Action
READ_BCCH_RR_NOT_INFORMED	Clean stored BCCH
READ_FB_SB_PENDING	Stop Sync request
READ_SB_PENDING	Stop Sync request
READ_SB_BCCH_PENDING	Stop Sync Request
READ_BCCH_PENDING	Stop BCCH Request
READ_BCCH_PENDING_RR_NOT_INFORMED	Stop BCCH Request Clean stored BCCH
FB_SB_SYNC_RR_NOT_INFORMED	Clean Stored BCCH

Then all new channels are included to the list and get the status INACTIVE.

If the serving cell is not included in the neighbourcell list, it is included and the status is set to FB_SB_SYNC.

All channels with a status indicating failed synchronisation attempts (FB_SB_FAILED, IDLE_NOT_SYNC or EXCLUDED) will be reset to the status IDLE. Typically a modification of a neighbourcell list occurs after cell reselection and in the new cell the failed channels are maybe available.

5.4 Synchronisation Request possible in idle mode

If ALR is in the state NC_IDLE and there are less than 6 pending synchronisation attempts to layer 1, it will start a new synchronisation request if needed. A synchronisation request is needed if a channel has one of the stati READ_SB, READ_SB_BCCH or READ_FB_SB.

ALR looks for the channel with one the three stati and the highest fieldstrength. It sends synchronisation requests to layer 1 up to the limit of six pending requests.

The status of a channel changes from

- READ_SB to READ_SB_PENDING
- READ_SB_BCCH to READ_SB_BCCH_PENDING
- READ_FB_SB to READ_FB_SB_PENDING

5.5 BCCH Reading Request possible in idle mode

If ALR is in the state NC_IDLE and there are less than 6 pending BCCH reading attempts to layer 1, it will start a new BCCH reading request if needed. A BCCH reading request is needed if a channel has the status READ_BCCH or READ_BCCH_RR_NOT_INFORMED.

ALR looks for the channel with one the two stati and the highest fieldstrength. It sends BCCH reading requests to layer 1 up to the limit of six pending requests.

The status of a channel changes from

- READ_BCCH to READ_BCCH_PENDING
- READ_BCCH_RR_NOT_INFORMED to READ_BCCH_RR_NOT_INFORMED

The BCCH reading is needed to get the C2-reselection parameter for cell reselection purposes in RR. Therefore the system information messages 3 or 4 are read.

5.6 Synchronisation Request possible in dedicated mode

If ALR is in the state NC_DEDICATED it will start a new synchronisation request if needed. A synchronisation request is needed if a channel has the status READ_FB_SB or READ_SB.

ALR selects the channel with the highest fieldstrength and the status READ_FB_SB and start the synchronisation attempt.

Else ALR selects the channel with the highest fieldstrength and the status READ_SB and start the synchronisation attempt.

5.7 Measurement Report Sending to RR in idle mode

Nearly all five seconds a measurement report in idle mode is send to RR. A channel with the status FB_SB_SYNC_RR_NOT_INFORMED is synchronized and the BCCH information for cell reselection purposes is stored in ALR. Then this channel is included in the measurement report and the BCCH messages are forwarded to RR after sending the measurement report. The status changes to FB_SB_SYNC.

5.8 RR originated BSIC request

RR may perform a PLMN search. Therefore power measurements are performed. Then RR starts a BSIC request for a channel number, that means RR requests synchronisation to the Frequency Correction Burst (FB) and the Synchron Burst (SB) followed by BCCH reading for this channel.

This is done by RR for all needed channels one after the other.

If a new request receives from RR, ALR stops for the previous from RR requested channel all activities if needed (that means the previous channel request has the status READ_FB_SB_PENDING or READ_BCCH_PENDING).

If the channel number requested by RR is also member of the neighbourcell list, a pending activity of the neighbourcell is stopped. If a neighbourcell system information message is stored, it is not cleared because it can be used later.

If a synchronisation request is possible (that means less than six pending requests in layer 1) the synchronisation request is started immediately, else delayed until a pending requests is finished.

5.9 BCCH message for a RR originated PLMN search

After successful synchronisation to a RR originated BSIC request, reading of the BCCH for this channel is requested. Initially a bitmap is set indicating the messages which must be read. This messages are system information 2 and 3 or 4.

Layer 1 forwards a BCCH message for this channel to ALR.

If the read attempt in layer 1 has failed, an error primitive is forwarded to RR. This will be used in RR to decide to go to the next channel if needed. The bitmap with the required messages is unchanged.

If a valid message is received, the message is forwarded to RR. Depending on the message type the following must be configured:

After reception of a sys info 3 or 4 the bits for sys info 3 and 4 are cleared.

After reception of a sys info 2 the bits for sys info 2 is cleared.

If a message received unequal to system info 2,3 or 4 the bitmap with the required messages is unchanged.

If enough information is received in ALR (that means the bitmap is equal to zero), the pending request in layer 1 is stopped. This is necessary, because system info 2,3 and 4 was requested and after receiving 2 and 3 all needed information is available and the request for system info 4 is still pending.

If an invalid message or an unexpected message has been received, it is necessary to update the pending request in layer 1 to read this slot is read again. This means stop of the pending request and restart with the actual bitmap.

5.10 BCCH message for a neighbourcell

If a neighbourcell is one of the six strongest neighbourcell and the synchronisation attempt to this cell was successful, the BCCH message is read for this cell. The status of the channel is READ_BCCH_PENDING or READ_BCCH_PENDING_RR_NOT_INFORMED after starting the BCCH read request to layer 1. The state depends on whether RR is informed about the synchronized neighbourcell (via measurement report all five seconds) or not. The initial reading of a neighbourcell BCCH is started for system information type 3 and 4.

Depending on the received message the following is done:

System information type 3

A system information message type 3 contains ever all needed information for cell reselection purposes. Depending on whether RR is informed about the synchronized neighbourcell (status READ_BCCH_PENDING) the message is forwarded to RR or it is stored in ALR (status READ_BCCH_PENDING_RR_NOT_INFORMED) to be forwarded to RR after completion of BCCH reading and information with the next measurement report to RR.

The status of the channel is changed to FB_SB_SYNC or FB_SB_SYNC_RR_NOT_INFORMED. Two variables are initialized to realize re-synchronisation to the SB after thirty seconds and re-reading of the BCCH after five minutes.

The pending request for the channel is stopped in layer 1.

System information type 4

A system information message type 4 may contain all needed information for cell reselection purposes. This is indicated by the acs-flag inside the message (additional cell selection params) . If the system information message indicates all data is included then depending on whether RR is informed about the synchronized neighbourcell (status READ_BCCH_PENDING) the message is forwarded to RR or it is stored in ALR (status READ_BCCH_PENDING_RR_NOT_INFORMED) to be forwarded to RR after completion of BCCH reading and information with the next measurement report to RR.

The status of the channel is changed to FB_SB_SYNC or FB_SB_SYNC_RR_NOT_INFORMED. Two variables are initialized to realize re-synchronisation to the SB after thirty seconds and re-reading of the BCCH after five minutes.

The pending request for the channel is stopped in layer 1.

If the acs-flag indicates that system information type 4 message doesn't contain all needed data an additional reading must be started. This happens if the system information type 4 message contains a CBCH channel description maybe with frequency hopping and the rest octets of the message are too small to catch the cell reselection parameter needed by RR.

In this case the system information type 4 message is stored (status READ_BCCH_PENDING_RR_NOT_INFORMED) or forwarded to RR (status READ_BCCH_PENDING). The pending request is stopped and a new request is started for system information type 3 message on normal BCCH and system information type 7 and 8 on extended BCCH.

System information type 7 and 8

A system information message type 7 or 8 contains ever all needed information for cell reselection purposes. Depending on whether RR is informed about the synchronized neighbourcell (status READ_BCCH_PENDING) the message is forwarded to RR or it is stored in ALR (status READ_BCCH_PENDING_RR_NOT_INFORMED) to be forwarded to RR after completion of BCCH reading and information with the next measurement report to RR.

The status of the channel is changed to FB_SB_SYNC or FB_SB_SYNC_RR_NOT_INFORMED. Two variables are initialized to realize re-synchronisation to the SB after thirty seconds and re-reading of the BCCH after five minutes.

The pending request for the channel is stopped in layer 1.

Unexpected message type

If ALR receives a different message type, an error variable is incremented. The pending request for the channel is stopped in layer 1. If it is the fourth error the status is set to FB_SB_FAILED or to EXCLUDED depending on the failed attempt counter.

Else the pending request is stopped and the request is restarted for the same bitmap.

Invalid message block

If ALR receives an invalid block, an error variable is incremented. The pending request for the channel is stopped in layer 1. If it is the fourth error the status is set to FB_SB_FAILED or to EXCLUDED depending on the failed attempt counter.

Else the pending request is stopped and the request is restarted for the same bitmap.

5.11 Synchronisation result for a RR originated PLMN search

If the synchronisation to a RR originated BSIC request fails, an indication is forwarded to RR.

After successful synchronisation to a RR originated BSIC request, reading of the BCCH for this channel is requested (status transition to READ_BCCH if no BCCH request can be send to layer 1 or READ_BCCH_PENDING if a BCCH request to layer 1 is possible) and the synchronisation result is forwarded to RR.

If the channel requested by RR is also member of the neighbourcell list of the current serving cell the positive synchronisation result shall be also stored for the neighbourcell.

Therefore the BSIC of the channel is checked against the NCC permitted field or whether a change in the BSIC has occurred. Depending on the result of this check the following status transitions occur.

The check indicates no BSIC change and a pass for the NCC permitted check:

A channel with the status READ_FB_SB gets the new status READ_BCCH_RR_NOT_INFORMED. This channel is one of the six strongest, but the synchronisation was not executed until now. The positive synchronisation result is overtaken, RR is not informed yet about the synchronisation to this channel and BCCH reading shall be started as soon as possible to get the cell reselection parameter for RR.

A channel with the status READ_SB get the new status FB_SB_SYNC. This channel is one of the six strongest and previously a synchronisation request was successful. All thirty seconds in idle mode a re-synchronisation to the synchron burst (SB) is needed. Therefore the status of the channel has switched to READ_SB. This re-synchronisation was successful and The status is changed to FB_SB_SYNC. The counter for handling the thirty second condition is set.

A channel with the status FB_SB_FAILED gets the new status READ_BCCH_RR_NOT_INFORMED. This channel is one of the six strongest, but the synchronisation has failed before. The positive synchronisation result is overtaken, RR is not informed yet about the synchronisation to this channel and BCCH reading shall be started as soon as possible to get the cell reselection parameter for RR.

A channel with the status READ_SB_BCCH gets the new status READ_BCCH. This channel is one of the six strongest, and re-reading of the BCCH after five minutes shall be done. Therefore for security reasons this is started by re-synchronisation to the synchron burst followed by reading the BCCH. Re-synchronisation is already done, so the status transition to READ_BCCH can be done immediately.

It shall be not possible that the neighbourcell has one of the pending stati, because all pending synchronisation or BCCH reading requests in layer 1 for the neighbourcell are stopped if this channel is requested by RR for scanning.

If the check indicates a BSIC change and a pass for the NCC permitted check:

A channel with the status READ_SB gets the new status RR_BCCH_RR_NOT_INFORMED. This channel is one of the six strongest and previously a synchronisation request was successful. All thirty seconds in idle mode a re-synchronisation to the synchron burst (SB) is needed. Therefore the status of the channel has switched to READ_SB. This re-synchronisation was successful but with a different BSIC. This indicates that the channel has the same number as before, but it is a different physical cell. This means it is handled like a new cell with reading of the Neighbourcell BCCH.

A channel with the status FB_SB_FAILED gets the new status READ_BCCH_RR_NOT_INFORMED. This channel is one of the six strongest, but the synchronisation has failed before. The positive synchronisation result is overtaken, RR is not informed yet about the synchronisation to this channel and BCCH reading shall be started as soon as possible to get the cell reselection parameter for RR.

A channel with the status READ_SB_BCCH gets the new status READ_BCCH_RR_NOT_INFORMED. This channel is one of the six strongest, and re-reading of the BCCH after five minutes shall be done. Therefore for security reasons this is started by re-synchronisation to the synchron burst followed by reading the BCCH. This re-synchronisation was successful but with a different BSIC. This indicates that the channel has the same number as before, but it is a different physical cell. This means it is handled like a new cell with reading of the Neighbourcell BCCH.

It shall be not possible that the neighbourcell has one of the pending stati, because all pending synchronisation or BCCH reading requests in layer 1 for the neighbourcell are stopped if this channel is requested by RR for scanning.

If the check indicates a failed NCC permitted check:

A channel which fails for the NCC permitted check gets the new status EXCLUDED.

5.12 Synchronisation result for a neighbourcell in idle mode

If the synchronisation for a member of the neighbourcell list fails, an attempt counter is increased and depending on the value the status transition to FB_SB_FAILED or to EXCLUDED is carried out. to a RR originated BSIC request fails, an indication is forwarded to RR.

The status FB_SB_FAILED is used to exclude the channel for a time period from a new synchronisation attempt. After this time the status is resetted to READ_FB_SB for the next attempt.

For attempt 1,2,3 and 4 the time period between to synchronisation requests is ten seconds. For attempt 5,6,7, and 8 the time period is twenty seconds. After eight failed attempts the status is set to EXCLUDED. This means a permanent exclusion of the channel (until a cell reselection or fieldstrength jump over 6 dBm).

If the synchronisation request is successful, the BSIC of the channel is checked against changes of the BSIC and against the NCC permitted field.

The check indicates no BSIC change and a pass for the NCC permitted check:

A channel with the status READ_FB_SB_PENDING indicates that the channel is one of the six strongest and it is an initial synchronisation. The channel gets the new status READ_BCCH_RR_NOT_INFORMED. RR is not informed yet about the successful synchronisation, but the neighbourcell BCCH is still read to have the cell reselection parameter in RR as soon as possible.

A channel with the status READ_SB_PENDING get the new status FB_SB_SYNC. This channel is one of the six strongest and previously a synchronisation request was successful. All thirty seconds in idle mode a re-synchronisation to the synchron burst (SB) is needed. Therefore the status of the channel has switched to READ_SB. This re-synchronisation was successful and The status is changed to FB_SB_SYNC. The counter for handling the thirty second condition is set.

A channel with the status READ_SB_BCCH_PENDING gets the new status READ_BCCH. This channel is one of the six strongest, and re-reading of the BCCH after five minutes shall be done. Therefore for security reasons this is started by re-synchronisation to the synchron burst followed by reading the BCCH. Re-synchronisation is now carried out, so the status transition to READ_BCCH can be done immediately.

If the check indicates a BSIC change and a pass for the NCC permitted check:

A changed BSIC can be identified only for a channel which was synchronized before (that means a valid BSIC was stored).

So a changed BSIC can be identified for the status READ_SB_PENDING or READ_SB_BCCH_PENDING. The status of this channel is changed to RR_BCCH_RR_NOT_INFORMED. This re-synchronisation was successful but with a different BSIC. This indicates that the channel has the same number as before, but it is a different physical cell. This means it is handled like a new cell with reading of the Neighbourcell BCCH.

If the check indicates a failed NCC permitted check:

A channel which fails for the NCC permitted check gets the new status EXCLUDED.

5.13 Synchronisation result for a neighbourcell in dedicated mode

A response from layer 1 is expected in the state NC_DEDICATED_ACTIVE for a neighbourcell in dedicated mode. A first check is done whether the channel number of the response is equal to the requested channel number. If this is not equal, some kind of misalignment is detected and the status of the neighbourcell process is changed to NC_DEDICATED.

If the synchronisation request is successful, the BSIC of the channel is checked against the NCC permitted field.

If the NCC permitted check is passed, the status of the channel is changed to FB_SB_SYNC and the c_report variable is set to eight seconds for the next re-synchronisation attempt.

If the NCC permitted check fails, the status of the channel is changed to EXCLUDED.

If the synchronisation request has failed, the status of the channel is changed to FB_SB_FAILED and after eight seconds a new attempt is started.