

26.16 Adaptive Multi Rate Signalling

The purpose of this subclause is to test the different procedures, which may be impacted by the multi rate codec.

26.16.0 Default contents of layer 3 messages for AMR signalling tests

Refer to table 26.6.

26.16.1 Void

26.16.2 Inband Signalling, Uplink Codec Adaptation

26.16.2.1 Conformance Requirement

The MS shall after reception of a Codec Mode Command apply the corresponding codec mode in the uplink direction for the next possible speech frame and no more than three speech frames later. This test is not intended to verify these conformance requirements, but to verify the correctness of the involved layer 1 and layer 3 signalling.

References:

3GPP TS 05.09 subclauses 3.3 and 3.4.

26.16.2.2 Test Purpose

This test is concerned with the link adaptation for AMR uplink and the related inband signalling. The test shall verify that the MS in the uplink direction applies the codec mode indicated by the network transmitted Codec Mode Commands, and that the MS correctly signals the used codec as Codec Mode Indication in the uplink inband signalling.

NOTE: The inband signals are L1 signalling transmitted every speech frame, as defined in 3GPP TS 05.09: In uplink directions Codec Mode Requests and Codec Mode Indications are transmitted alternately, whereas downlink signalling contains of alternately Codec Mode Commands and Codec Mode Indications.

26.16.2.3 Method of Test

Initial Conditions

The MS is "idle updated", with TMSI allocated.

Specific PICS statements:

- Speech supported for Half rate version 3 (HR AMR).

PIXIT statements:

-

Foreseen Final State of MS

"Idle, updated", with TMSI allocated.

Test Procedure

- A mobile originated call is initiated, following the CHANNEL REQUEST received from the MS the SS sends an IMMEDIATE ASSIGNMENT to the MS commanding it to go to a SDCCH. The MS indicates to the SS that it supports the multi-rate speech codec. The SS allocates the MS a TCH/AFS and signals the allowed codec subset and adaptation thresholds as part of the ASSIGNMENT COMMAND. DTX shall not be activated. Hopping is activated. The hopping band is centred around an ARFCN in the Mid ARFCN range. The hopping frequencies are chosen from those defined in clause 6.

The following active codec mode subset shall apply:

Codec Mode	TCH/AFS in kbit/s
CODEC_MODE_1	4,75
CODEC_MODE_2	5,9
CODEC_MODE_3	7,95
CODEC_MODE_4	12,2

The following decision threshold and hysteresis values in terms of normalized carrier to interference ratio (C/I_{nom}), shall apply for Codec Mode Command / Request (MC', MR'):

MC'/MR'	THR_MC_Dn(MC')/ THR_MR_Dn(MR')	THR_MC_Up(MC')/ THR_MR_Up(MR')
CODEC_MODE_4	16,5 dB	+ ∞
CODEC_MODE_3	11,5 dB	18,5 dB
CODEC_MODE_2	6,5 dB	13,5 dB
CODEC_MODE_1	- ∞	8,5 dB

- b) The SS signals that a new codec is wanted in uplink direction by changing the value of the Codec Mode Command. The MS shall apply the commanded mode in uplink by changing the mode and correspondingly the value of the Codec Mode Indication to match the used codec. This is repeated for all neighbouring mode transitions in the Active Codec Set.
- c) If the MS supports TCH/AHS the SS sends an ASSIGNMENT COMMAND allocating the MS a TCH/AHS and signals the allowed codec subset and adaptation thresholds as part of the ASSIGNMENT COMMAND. DTX shall not be activated. Hopping is activated. The hopping band is centred around an ARFCN in the Mid ARFCN range. The hopping frequencies are chosen from those defined in clause 6.

The following active codec mode subset shall apply:

Codec Mode	TCH/AHS in kbit/s
CODEC_MODE_1	5,15
CODEC_MODE_2	6,7
CODEC_MODE_3	7,95

The following decision threshold and hysteresis values in terms of normalized carrier to interference ratio (C/I_{nom}), shall apply for Codec Mode Command / Request (MC', MR'):

MC'/MR'	THR_MC_Dn(MC')/ THR_MR_Dn(MR')	THR_MC_Up(MC')/ THR_MR_Up(MR')
CODEC_MODE_3	12,5 dB	+ ∞
CODEC_MODE_2	11,0 dB	15,0 dB
CODEC_MODE_1	- ∞	13,0 dB

- d) Step b) is repeated for the settings given in step c).

Maximum Duration of Test

2 minutes

Expected Sequence in step b)

Step	Direction	Message	Comments
A1	SS->MS	Codec Mode Command change	Codec Mode 3 is commanded by inband signalling
A2	MS->SS	Codec Mode Indication change	Codec Mode Indication shows current active mode in uplink, thus changed when mode changes
3	SS->MS	Codec Mode Command change	Codec Mode 2 is commanded by inband signalling
4	MS->SS	Codec Mode Indication change	Codec Mode 2 is indicated in inband signalling with first frame using Codec Mode 2
5	SS->MS	Codec Mode Command change	Codec Mode 1 is commanded by changing inband signal
6	MS->SS	Codec Mode Indication change	Codec Mode 1 is indicated in inband signalling with first frame using Codec Mode 1.
7	SS->MS	Codec Mode Command change	Codec Mode 2 is commanded by changing inband signal
8	MS->SS	Codec Mode Indication change	Codec Mode 2 is indicated in inband signalling with first frame using Codec Mode 2.
9	SS->MS	Codec Mode Command change	Codec Mode 3 is commanded by changing inband signal
10	MS->SS	Codec Mode Indication change	Codec Mode 3 is indicated in inband signalling with first frame using Codec Mode 3.
A11	SS->MS	Codec Mode Command change	Codec Mode 4 is commanded by changing inband signal
A12	MS->SS	Codec Mode Indication change	Codec Mode 4 is indicated in inband signalling with first frame using Codec Mode 4

In TCH/AHS the Active Codec Set contains only three of four possible codecs, thus steps prefixing A are not implemented in this case.

Specific Message Contents

ASSIGNMENT COMMAND

Information Element	Value/remark
Assignment Command	In step a) of Test Procedure: codec mode 4 selected (codec mode 3 for TCH/AHS) (ref: 3GPP TS 04.08 / 3GPP TS 44.018 subclause 9.1.2)

Codec mode commands, downlink inband signalling

Information Element	Value/remark
Channel Mode to be used for uplink	In step a) of Test Procedure: Codec Mode 4 commanded in AFS and Codec Mode 3 in AHS In step 1-2: Codec Mode 3 commanded In step 3-4: Codec Mode 2 commanded In step 5-6: Codec Mode 1 commanded In step 7-8: Codec Mode 2 commanded In step 9-10: Codec Mode 3 commanded In step 11-12: Codec Mode 4 commanded

Codec mode indications, uplink inband signalling

Information Element	Value/remark
Indicating Codec Mode currently used uplink	In step a) of Test Procedure: Codec Mode 4 indicated in AFS and Codec Mode 3 in AHS In step 1: Codec Mode 4 indicated in AFS (step ignored in AHS) In step 2-3: Codec Mode 3 indicated In step 4-5: Codec Mode 2 indicated In step 6-7: Codec Mode 1 indicated In step 8-9: Codec Mode 2 indicated In step 10-11: Codec Mode 3 indicated In step 12: Codec Mode 4 indicated

26.16.3 Structured procedures / MS terminated call / early assignment / no initial codec mode

NOTE: This test is derived from the one described in subclause 26.12 and entitled: "Structured procedures / MS terminated call / early assignment"

26.16.3.1 Conformance requirement

- 1) In acceptance to a SETUP message indicating speech, the MS shall indicate and include in the CALL CONFIRMED message all the speech versions that it supports.
- 2) Upon receipt of the ASSIGNMENT COMMAND message specifying using CH_x-FR or CH_x/HR the Mobile Station continues a mobile terminating call establishment with early assignment of traffic channel:
 - a) by replying to the ASSIGNMENT command with an ASSIGNMENT COMPLETE message; and
 - b) by continuing the call establishment by through connecting TCH in both directions if it supports immediate connect or by sending an ALERTING message otherwise.
- 3) The ASSIGNMENT command will not specify which of the codec modes the MS should use, but allow the handset to select the default codec mode.
- 4) For speech calls, the mobile station shall attach the user connection at latest when sending the connect message, except if there is no compatible radio resource available at this time. In this case the attachment shall be delayed until such a resource becomes available.

CH_x: identifies any of the Channel Codec mode.

FR: full rate channel.

HR: half rate channel.

References:

3GPP TS 04.08 / 3GPP TS 44.018 subclauses 9.1.2 and 9.1.5.

3GPP TS 05.09 subclause 3.4.

26.16.3.2 Test purpose

- 1) To verify that, in acceptance to a SETUP message indicating speech, the MS indicates and includes in the CALL CONFIRMED message all the speech versions that it supports.
- 2) To verify that upon receipt of the ASSIGNMENT COMMAND message specifying using CH_x-FR or CH_x/HR the Mobile Station continues a mobile terminating call establishment with early assignment of traffic channel:
 - a) by replying to the ASSIGNMENT COMMAND with an ASSIGNMENT COMPLETE message; and
 - b) by continuing the call establishment by through connecting TCH in both directions if it supports immediate connect or by sending an ALERTING message otherwise.
- 3) To verify that upon receipt of an ASSIGNMENT COMMAND with no codec mode specified, the MS shall use the default codec mode.
- 4) To verify that for speech calls, the mobile station shall attach the user connection at latest when sending the connect message, except if there is no compatible radio resource available at this time. In this case the attachment shall be delayed until such a resource becomes available.

26.16.3.3 Method of Test

Initial Conditions

SS 1 cell, default parameters.

MS in MM-state "idle, updated" with valid TMSI and CKSN.

Specific PICS statements:

- Speech supported for Half rate version 3 (HR AMR).
- Immediate connect supported for all circuit switched basic services.

PIXIT statements:

- Way to indicate alerting.
- Way to make the MS accept an incoming call after alerting.

Foreseen Final State of MS

"Idle, updated", with TMSI allocated.

Test Procedure

The following test is performed for both channel modes of the multi-rate codec, i.e. full rate and half rate:

- A teleservice is selected that is supported by the MS; if the MS supports speech, the selected teleservice is speech. If necessary, the MS is configured for that teleservice.
- The MS is paged and the resulting call is established. Having reached the active state, the MS is made to clear the call.

Maximum Duration of Test

3 minutes

Expected Sequence

This test is repeated for $M = 1, 2, 3, 4$.

This test is repeated for $K=1$, and where the MS supports half rate version 3 $K=2$.

Step	Direction	Message	Comments	
1	SS->MS	PAGING REQUEST TYPE 1	Sent on the correct paging sub-channel	
2	MS->SS	CHANNEL REQUEST		
3	SS->MS	IMMEDIATE ASSIGNMENT		
4	MS->SS	PAGING RESPONSE		
5	SS->MS	AUTHENTICATION REQUEST		
6	MS->SS	AUTHENTICATION RESPONSE		
7	SS->MS	CIPHERING MODE COMMAND		
8	MS->SS	CIPHERING MODE COMPLETE	Message is contained in the SABM SRES specifies correct value SS starts deciphering after sending the message Shall be sent enciphered. All following messages shall be sent enciphered. SS starts ciphering	
9	SS			
10	SS->MS	SETUP		
11	MS->SS	CALL CONFIRMED		
			If the MS supports an Immediate connection then branch A applies. If the MS doesn't support an immediate connection then branch B applies.	
A12	MS->SS	CONNECT	sent on the old channel SS allocates allowed subset codec modes, but does not identify a mode for immediate operation.	
A13	SS->MS	ASSIGNMENT COMMAND		
A14	MS->SS	ASSIGNMENT COMPLETE		
B12	SS->MS	ASSIGNMENT COMMAND	Sent on the new channel. SS allocates allowed subset codec modes, but does not identify a mode for immediate operation. An alerting indication as defined in the PIXIT statement is given by the MS. The MS is made to accept the call.	
B13	MS->SS	ASSIGNMENT COMPLETE		
B14	MS->SS	ALERTING		
B15	MS			
B16	MS			
B17	MS->SS	CONNECT		
18	MS			
19	SS->MS	CONNECT ACK	The TCH shall be through connected by both directions in the dedicated mode, using the default codec mode specified. The MS is made to release the call.	
20	MS			
21	MS->SS	DISCONNECT		
22	SS->MS	RELEASE		
23	MS->SS	RELEASE COMPLETE		
24	SS->MS	CHANNEL RELEASE		
				The main signalling link is released.

Specific Message Content

M = 1

Assignment Command

Information Element	value/remark
Channel mode Mode Multi-Rate configuration	Speech full or half rate version 3 ICMI = 0 1 codec mode specified

M=2

Assignment Command

Information Element	value/remark
Channel mode Mode Multi-Rate configuration	Speech full or half rate version 3 ICMI = 0 2 codec modes and threshold values specified

M=3

Assignment Command

Information Element	value/remark
Channel mode Mode Multi-Rate configuration	Speech full or half rate version 3 ICMI = 0 3 codec modes and threshold values specified

M = 4

Assignment Command

Information Element	value/remark
Channel mode Mode Multi-Rate configuration	Speech full or half rate version 3 ICMI = 0 4 codec modes and threshold values specified

K = 1

Assignment Command

Information Element	value/remark
Channel description Channel mode Mode	TCH/F Speech full or half rate version 3

K = 2

This step is applicable only if the MS supports half rate version 3.

Assignment Command

Information Element	value/remark
Channel description Channel mode Mode	TCH/H Speech full or half rate version 3

26.16.3a Structured procedures / MS terminated call / early assignment / specified initial codec mode

NOTE: this test is derived from the one described in subclause 26.12 and entitled: "Structured procedures / MS terminated call / early assignment"

26.16.3a.1 Conformance requirement

- 1) In acceptance to a SETUP message indicating speech, the MS shall indicate and include in the CALL CONFIRMED message all the speech versions that it supports.
- 2) Upon receipt of the ASSIGNMENT COMMAND message specifying using CH_x-FR or CH_x/HR the Mobile Station continues a mobile terminating call establishment with early assignment of traffic channel:
 - a) by replying to the ASSIGNMENT command with an ASSIGNMENT COMPLETE message; and
 - b) by continuing the call establishment by through connecting TCH in both directions if it supports immediate connect or by sending an ALERTING message otherwise.
- 3) The ASSIGNMENT COMMAND will specify the subset of codec modes that the MS is allowed to use for the call, the thresholds and the initial codec mode for immediate use by the MS.

- 4) For speech calls, the mobile station shall attach the user connection at latest when sending the connect message, except if there is no compatible radio resource available at this time. In this case the attachment shall be delayed until such a resource becomes available.

CHx: identifies any of the Channel Codec mode.

FR: full rate channel.

HR: half rate channel.

References:

3GPP TS 04.08 / 3GPP TS 44.018 subclauses 9.12 and 9.1.5.

3GPP TS 05.09 subclause 3.4.

26.16.3a.2 Test purpose

- 1) To verify that, in acceptance to a SETUP message indicating speech, the MS indicates and includes in the CALL CONFIRMED message all the speech versions that it supports.
- 2) To verify that upon receipt of the ASSIGNMENT COMMAND message specifying using CHx-FR or CHx/HR the Mobile Station continues a mobile terminating call establishment with early assignment of traffic channel:
 - a) by replying to the ASSIGNMENT command with an ASSIGNMENT COMPLETE message; and
 - b) by continuing the call establishment by through connecting TCH in both directions if it supports immediate connect or by sending an ALERTING message otherwise.
- 3) To verify that upon receipt of an ASSIGNMENT COMMAND with codec mode specified, the MS shall use that specified codec mode.
- 4) To verify that for speech calls, the mobile station shall attach the user connection at latest when sending the connect message, except if there is no compatible radio resource available at this time. In this case the attachment shall be delayed until such a resource becomes available.

26.16.3a.3 Method of Test

Initial Conditions

SS 1 cell, default parameters

MS in MM-state "idle, updated" with valid TMSI and CKSN

Specific PICS statements:

- Speech supported for Half rate version 3 (HR AMR).
- Immediate connect supported for all circuit switched basic services.

PIXIT statements:

- Way to indicate alerting.
- Way to make the MS accept an incoming call after alerting.

Foreseen Final State of MS

"Idle, updated", with TMSI allocated.

Test Procedure

The following test is performed for both channel modes of the multi-rate codec, i.e. full rate and half rate:

A teleservice is selected that is supported by the MS; if the MS supports speech, the selected teleservice is speech. If necessary, the MS is configured for that teleservice.

The MS is paged and the resulting call is established. Having reached the active state, the MS is made to clear the call.

Maximum Duration of Test

3 minutes

Expected Sequence

This test is repeated for M=1,2,3,4.

This test is repeated for K=1, and where the MS supports half rate version 3 K=2.

Step	Direction	Message	Comments
1	SS->MS	PAGING REQUEST TYPE 1	Sent on the correct paging sub-channel Message is contained in the SABM SRES specifies correct value SS starts deciphering after sending the message Shall be sent enciphered. All following messages shall be sent enciphered. SS starts ciphering
2	MS->SS	CHANNEL REQUEST	
3	SS->MS	IMMEDIATE ASSIGNMENT	
4	MS->SS	PAGING RESPONSE	
5	SS->MS	AUTHENTICATION REQUEST	
6	MS->SS	AUTHENTICATION RESPONSE	
7	SS->MS	CIPHERING MODE COMMAND	
8	MS->SS	CIPHERING MODE COMPLETE	
9	SS		
10	SS->MS	SETUP	
11	MS->SS	CALL CONFIRMED	
			If the MS supports an Immediate connection then branch A applies. If the MS doesn't support an immediate connection then branch B applies.
A12	MS->SS	CONNECT	sent on the old channel SS allocates allowed subset codec modes and identifies a mode for immediate operation.
A13	SS->MS	ASSIGNMENT COMMAND	
A14	MS->SS	ASSIGNMENT COMPLETE	
B12	SS->MS	ASSIGNMENT COMMAND	SS allocates allowed subset codec modes and identifies a mode for immediate operation. An alerting indication as defined in the PIXIT statement is given by the MS. The MS is made to accept the call.
B13	MS->SS	ASSIGNMENT COMPLETE	
B14	MS->SS	ALERTING	
B15	MS		
B16	MS		
B17	MS->SS	CONNECT	
18	MS		
19	SS->MS	CONNECT ACK	The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified. The MS is made to release the call. The main signalling link is released.
20	MS		
21	MS->SS	DISCONNECT	
22	SS->MS	RELEASE	
23	MS->SS	RELEASE COMPLETE	
24	SS->MS	CHANNEL RELEASE	

Specific Message Content

M=1

Assignment Command

Information Element	value/remark
Channel mode Mode Multi-Rate configuration	Speech full or half rate version 3 ICMI = 1 Start Mode specified 1 codec mode specified

M=2

Assignment Command

Information Element	value/remark
Channel mode Mode Multi-Rate configuration	Speech full or half rate version 3 ICMI = 1 Start Mode specified 2 codec modes and threshold vales specified

M=3

Assignment Command

Information Element	value/remark
Channel mode Mode Multi-Rate configuration	Speech full or half rate version 3 ICMI = 1 Start Mode specified 3 codec modes and threshold vales specified

M=4

Assignment Command

Information Element	value/remark
Channel mode Mode Multi-Rate configuration	Speech full or half rate version 3 ICMI = 1 Start Mode specified 4 codec modes and threshold vales specified

K = 1

Assignment Command

Information Element	value/remark
Channel description Channel mode Mode	TCH/H Speech full or half rate version 3

K = 2

This step is applicable only if the MS supports half rate version 3.

Assignment Command

Information Element	value/remark
Channel description Channel mode Mode	TCH/H Speech full or half rate version 3

26.16.4 Structured procedures / MS originated call / late assignment / specified initial codec mode

NOTE: This test is derived from the one described in subclause 26.12 and entitled: "Structured procedures / MS terminated call / early assignment".

26.16.4.1 Conformance requirement

- 1) The MS shall indicate and include in the mobile originating SETUP for speech call all the speech versions that it supports.
- 2) Upon receipt of the ASSIGNMENT COMMAND message using full rate version 3 or half rate version 3, the Mobile Station starts a normal channel assignment procedure. It means that the MS initiates a local end release of link layer connections, disconnects the physical channels, commands the switching to the assigned channels and initiates the establishment of lower layer connections (this includes the activation of the channels, their connection and the establishment of the data links). After the main signalling link is successfully established, the MS returns an ASSIGNMENT COMPLETE message, specifying cause 'normal event', to the network on the main DCCH.

References:

3GPP TS 04.08 / 3GPP TS 44.018 subclauses 9.12 and 9.1.5.

3GPP TS 05.09 subclause 3.4.

26.16.4.2 Test purpose

- 1) To verify that the MS indicates and includes in the mobile originating SETUP for speech call all the speech versions that it supports.
- 2) To verify that subsequently after receipt of an IMMEDIATE ASSIGNMENT message allocating an SDCCH, after completion of establishment of the main signalling link, after having sent a CM SERVICE REQUEST message, after having successfully performed authentication and cipher mode setting procedures, after having sent a SETUP message, after having received a CALL PROCEEDING message followed by an ALERTING message and an ASSIGNMENT COMMAND message allocating using full rate version 3 or half rate version 3, the MS sends an ASSIGNMENT COMPLETE message. The ASSIGNMENT COMMAND message will also identify which codec mode the MS is allowed to use for the call, the threshold values and the initial codec mode for immediate use.

26.16.4.3 Method of Test

Initial Conditions

SS 1 cell, default parameters.

MS in MM-state "idle, updated" with valid TMSI and CKSN.

Specific PICS statements:

- Speech supported for Half rate version 3 (HR AMR).

PIXIT statements:

- Way to indicate mobile originated alerting.

Foreseen Final State of MS

The MS has a MO call in state U10, "active".

Test Procedure

The following test is performed for both channel modes of the multi-rate codec, i.e. full rate and half rate.

The MS is made to initiate a speech call. The call is established with a late assignment.

Maximum Duration of Test

3 minutes.

Expected Sequence

This test is repeated for M = 1, 2, 3, 4.

For each M, this test is repeated for K=1, and where the MS supports half rate version 3 K=2.

Step	Direction	Message	Comments
1	MS		The "called number" is entered
2	MS->SS	CHANNEL REQUEST	
3	SS->MS	IMMEDIATE ASSIGNMENT	
4	MS->SS	CM SERVICE REQUEST	Message is contained in SABM
5	SS->MS	AUTHENTICATION REQUEST	
6	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
7	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
8	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
9	SS		SS starts ciphering
10	MS->SS	SETUP	The MS indicates it supports the FR version 3 speech and if supported, HR version 3 speech also.
11	SS->MS	CALL PROCEEDING	
12	SS->MS	ALERTING	
13	MS		An alerting indication as defined in the PIXIT statement is given by the MS.
14	SS->MS	ASSIGNMENT COMMAND	SS allocates allowed subset codec modes, but does identifies a mode for immediate operation.
15	MS->SS	ASSIGNMENT COMPLETE	
16	SS->MS	CONNECT	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	MS->SS	CONNECT ACK	

Specific Message Content

M = 1

Assignment Command

Information Element	value/remark
Channel mode Mode	If K=1 Speech full rate version 3 If K=2 Speech half rate version 3
Multi-Rate configuration	ICMI = 1 Start mode specified 1 codec mode specified

M=2

Assignment Command

Information Element	value/remark
Channel mode Mode	If K=1 Speech full rate version 3 If K=2 Speech half rate version 3
Multi-Rate configuration	ICMI = 1 Start mode specified 2 codec modes and threshold vales specified

M=3

Assignment Command

Information Element	value/remark
Channel mode Mode	If K=1 Speech full rate version 3 If K=2 Speech half rate version 3
Multi-Rate configuration	ICMI = 1 Start mode specified 3 codec modes and threshold vales specified

M = 4

Assignment Command

Information Element	value/remark
Channel mode Mode	If K=1 Speech full rate version 3 If K=2 Speech half rate version 3
Multi-Rate configuration	ICMI = 1 Start mode specified 4 codec modes and threshold vales specified

26.16.4a Structured procedures / MS originated call / late assignment / no initial codec mode

NOTE: This test is derived from the one described in subclause 26.16.4 and entitled: "Structured procedures / MS originated call / late assignment / specified in itial codec mode".

26.16.4a.1 Conformance requirement

- 1) The MS shall indicate and include in the mobile originating SETUP for speech call all the speech versions that it supports.
- 2) Upon receipt of the ASSIGNMENT COMMAND message using full rate version 3 or half rate version 3, the Mobile Station starts a normal channel assignment procedure. It means that the MS initiates a local end release of link layer connections, disconnects the physical channels, commands the switching to the assigned channels and initiates the establishment of lower layer connections (this includes the activation of the channels, their connection and the establishment of the data links). After the main signalling link is successfully established, the MS returns an ASSIGNMENT COMPLETE message, specifying cause 'normal event', to the network on the main DCCH. The ASSIGNMENT COMMAND message will also specify the subset of codec modes that the MS is allowed to use for the call and the threshold values. The ASSIGNMENT COMMAND will not specify the initial codec mode but will, rather, allow the MS to select the default codec mode.

If the Initial Codec Mode is not signalled, then the default Initial Codec Mode is given by the following implicit rule. If the Active Codec Set contains:

- 1 mode, then this shall be the Initial Codec Mode.
- 2 or 3 modes, then the Initial Codec mode shall be the most robust mode of the set (with lowest bit rate).
- 4 modes, then the Initial Codec Mode shall be the second most robust mode of the set (with second lowest bit rate. If the Active Codec Set is changed during the call, then this default Initial Codec Mode shall used until an other ICM is explicitly signalled.

References

3GPP TS 04.08 / 3GPP TS 44.018 subclauses 9.12 and 9.1.5.

3GPP TS 05.09 subclause 3.4.

26.16.4a.2 Test purpose

- 1) To verify that the MS indicates and includes in the mobile originating SETUP for speech call all the speech versions that it supports.
- 2) To verify that subsequently after receipt of an IMMEDIATE ASSIGNMENT message allocating an SDCCH, after completion of establishment of the main signalling link, after having sent a CM SERVICE REQUEST message, after having successfully performed authentication and cipher mode setting procedures, after having sent a SETUP message, after having received a CALL PROCEEDING message followed by an ALERTING message and an ASSIGNMENT COMMAND message allocating using speech full rate version 3 or speech half rate version 3, the MS sends an ASSIGNMENT COMPLETE message. The ASSIGNMENT COMMAND message will also specify the subset of codec modes that the MS is allowed to use for the call and the threshold values. The ASSIGNMENT COMMAND will not specify the initial codec mode but will, rather, allow the MS to select the default codec mode.

26.16.4a.3 Method of Test

Initial Conditions

SS 1 cell, default parameters

MS in MM-state "idle, updated" with valid TMSI and CKSN

Specific PICS statements:

- Speech supported for Half rate version 3 (HR AMR).

PIXIT statements:

- Way to indicate mobile originated alerting.

Foreseen Final State of MS

The MS has a MO call in state U10, "active".

Test Procedure

The following test is performed for both channel modes of the multi-rate codec, i.e. full rate and half rate.

The MS is made to initiate a speech call. The call is established with a late assignment.

Maximum Duration of Test

3 minutes

Expected Sequence

This test is repeated for M=1,2,3,4.

For each M, this test is repeated for K=1, and where the MS supports half rate version 3 K=2.

Step	Direction	Message	Comments
1	MS		The "called number" is entered
2	MS->SS	CHANNEL REQUEST	
3	SS->MS	IMMEDIATE ASSIGNMENT	
4	MS->SS	CM SERVICE REQUEST	Message is contained in SABM
5	SS->MS	AUTHENTICATION REQUEST	
6	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
7	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
8	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
9	SS		SS starts ciphering
10	MS->SS	SETUP	The MS indicates its supports the FR version 3 speech and if supported, HR version 3 speech also.
12	SS->MS	CALL PROCEEDING	
13	SS->MS	ALERTING	
14	MS		An alerting indication as defined in the PIXIT statement is given by the MS.
15	SS->MS	ASSIGNMENT COMMAND	SS allocates allowed subset of codec modes and thresholds, but does not identify a mode for immediate operation.
16	MS->SS	ASSIGNMENT COMPLETE	
17	SS->MS	CONNECT	
18	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified (M=1 CMI=0, M=2 CMI=0, M=3 CMI=0, M=4 CMI=1).
19	MS->SS	CONNECT ACK	

Specific Message Content

M=1

Assignment Command

Information Element	value/remark
Channel mode Mode	If K=1 Speech full rate version 3 If K=2 Speech half rate version 3
Multi-Rate configuration	ICMI = 0 1 codec mode specified

M=2

Assignment Command

Information Element	value/remark
Channel mode Mode	If K=1 Speech full rate version 3 If K=2 Speech half rate version 3
Multi-Rate configuration	ICMI = 0 2 codec modes and threshold vales specified

M=3

Assignment Command

Information Element	value/remark
Channel mode Mode	If K=1 Speech full rate version 3 If K=2 Speech half rate version 3
Multi-Rate configuration	ICMI = 0 3 codec modes and threshold vales specified

M=4

Assignment Command

Information Element	value/remark
Channel mode Mode	If K=1 Speech full rate version 3 If K=2 Speech half rate version 3
Multi-Rate configuration	ICMI = 0 4 codec modes and threshold vales specified

26.16.5 AMR signalling / Handover / active call / successful case

NOTE: This test is derived from 26.12.2 – EFR Signalling/Handover/active call/successful case.

26.16.5.1 Conformance requirements

The MS shall correctly apply the handover procedure in the non-synchronised case when:

- a call is in progress; and
- handover is performed from a TCH/F with/without frequency hopping towards a TCH/F with/without frequency hopping;
- the mode of either the current or the target channel is set to full rate speech version 3.

The MS also supporting half rate speech version 3 shall correctly apply the handover procedure in the non-synchronized case when:

- a call is in progress; and
- a handover is performed between a TCH/H with/without frequency hopping and a TCH/F or TCH/H with/without frequency hopping; and
- the mode of either the current or the target channel is set to half rate speech version 3.

References

3GPP TS 04.08 / 3GPP TS 44.018 subclauses 3.4.4 and 9.1.15.

3GPP TS 04.13 subclause 5.2.6.2.

26.16.5.2 Test Purpose

To test that the MS shall correctly apply the handover procedure in the non-synchronized case when:

- a call is in progress; and
- handover is performed from a TCH/F with/without frequency hopping towards a TCH/F with/without frequency hopping; and
- the mode of either the current or the target channel is set to full rate speech version 3 (AMR full rate speech).

To test that the MS also supporting half rate shall correctly apply the handover procedure in the non-synchronized case when:

- a call is in progress; and
- a handover is performed between a TCH/H with/without frequency hopping and a TCH/F with/without frequency hopping; and
- the mode of either the current or the target channel is set to half rate speech version 3.

26.16.5.3 Method of Test

Initial Conditions

MS in call active state U10 on cell A.

SS 2 cells, A and B with same LAI, default parameters except:

Band	Cell A		Cell B		Both Cells Format
	BCCH ARFCN	Cell Allocation	BCCH ARFCN	Cell Allocation	
GSM 450	263	259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291	274	260, 262, 264, 266, 268, 270, 272, 274, 276, 279, 281, 283, 285, 287, 289, 291	Range 128
GSM 480	310	306, 308, 310, 312, 314, 316, 318, 320, 322, 324, 326, 328, 330, 332, 334, 336, 338	321	307, 309, 311, 313, 315, 317, 319, 321, 323, 326, 328, 330, 332, 334, 336, 338	Range 128
GSM 710	457	447, 454, 457, 463, 471, 479, 482, 483, 489, 496, 498, 500, 501, 502, 503, 506, 508	477	451, 455, 459, 461, 467, 468, 475, 477, 497, 498, 500, 501, 502, 503, 506, 508	Range 128
GSM 750	457	447, 454, 457, 463, 471, 479, 482, 483, 489, 496, 498, 500, 501, 502, 503, 506, 508	477	451, 455, 459, 461, 467, 468, 475, 477, 497, 498, 500, 501, 502, 503, 506, 508	Range 128
T-GSM810	457	447, 454, 457, 463, 471, 479, 482, 483, 489, 496, 498, 500, 501, 502, 503, 506, 508	477	451, 455, 459, 461, 467, 468, 475, 477, 497, 498, 500, 501, 502, 503, 506, 508	Range 128
GSM 850	147	137, 144, 147, 153, 161, 169, 172, 173, 179, 186, 193, 200, 201, 202, 203, 235, 241	167	141, 145, 149, 151, 157, 158, 165, 167, 187, 193, 200, 201, 202, 203, 235, 241	Range 128
GSM 900	20	10, 17, 20, 26, 34, 42, 45, 46, 52, 59, 66, 73, 74, 75, 76, 108, 114	40	14, 18, 22, 24, 30, 31, 38, 40, 60, 66, 73, 74, 75, 76, 108, 114	Bitmap 0
DCS 1 800	747	734, 741, 747, 754, 759, 762, 766, 767, 773, 775, 779, 782, 791, 798, 829, 832, 844	764	739, 743, 746, 749, 756, 758, 761, 764, 771, 779, 782, 791, 798, 829, 832, 844	Range 256
PCS 1 900	647	634, 641, 647, 654, 659, 662, 666, 667, 673, 675, 679, 682, 691, 698, 729, 732, 744	664	639, 643, 646, 649, 656, 658, 661, 664, 671, 679, 682, 691, 698, 729, 732, 744	Range 256

The frame numbers of cells A and B shall be different by 100.

The time base of cells A and B shall be such that the edges of their timeslots are not coincident at the antenna connector.

Specific PICS statements:

- Speech supported for Half rate version 3 (HR AMR) (TSPC_AddInfo_Half_rate_version_3)
- Speech supported for Full rate version 2 (GSM EFR) (TSPC_AddInfo_Full_rate_version_2)
- Speech supported for Half rate version 1 (GSM HR) (TSPC_AddInfo_Half_rate_version_1)

PIXIT statements:

-.

Foreseen Final State of MS

The MS has a MO call in state U10, "active".

Test Procedure

Table 1

Exec Counter	From	To	Timing Adv.	Start Time
1	TCH/F, sv3, no FH	TCH/F, sv3, no FH	20	none
2	TCH/F, sv3, no FH	TCH/F, sv3, FH	arbitrary	none
3	TCH/F, sv3, FH	TCH/F, sv3, FH	20	1,1s
4	TCH/F, sv3, FH	TCH/F, sv3, no FH	20	none
5	TCH/F, sv3, no FH	TCH/F, sv1, no FH	20	none
6	TCH/F, sv1, no FH	TCH/F, sv3, no FH	arbitrary	none
7	TCH/F, sv3, no FH	TCH/F, sv2, FH	arbitrary	none
8	TCH/F, sv2, FH	TCH/F, sv3, FH	20	1,1
9	TCH/F, sv3, FH	TCH/H, sv1, FH	arbitrary	none
10	TCH/H, sv1, FH	TCH/F, sv3, noFH	20	none
11	TCH/F, sv3, noFH	TCH/H, sv3, FH	arbitrary	1.1
12	TCH/H, sv3, FH	TCH/H, sv3, no FH	20	none
13	TCH/H, sv3, no FH	TCH/F, sv1, no FH	20	none
14	TCH/F, sv1, no FH	TCH/H, sv3, no FH	arbitrary	none
15	TCH/H, sv3, no FH	TCH/F, sv2, FH	arbitrary	none
16	TCH/F, sv2, FH	TCH/H, sv3, FH	20	1,1
17	TCH/H, sv3, FH	TCH/H, sv1, FH	arbitrary	none
18	TCH/H, sv1, FH	TCH/H, sv3, noFH	20	none
19	TCH/H, sv3, noFH	TCH/F, sv3, no FH	20	none

Note: for all execution counters: State of call is U10 and the handover procedure is non-synchronized
sv1 stands for speech full/half rate version 1.
sv2 stands for speech full rate version 2 (enhanced full rate).
sv3 stands for speech full/half rate version 3 (AMR).

Table 2

	TCH/FS	TCH/HS	SDCCH
n	10-20	5-10	2-5
n:	number of access bursts.		

The MS is in the active state (U10) of a call. The SS sends a HANDOVER COMMAND on the main DCCH. The MS shall (at the time defined by the Starting Time information element, if included in the message) begin to send access bursts on the new DCCH (and optionally on the SACCH) of the target cell. The SS observes the access bursts and after receiving n (n being arbitrarily chosen between values according to table 2) access bursts, the SS sends one PHYSICAL INFORMATION message with a Timing Advance as specified in table 1. The MS shall activate the channel in sending and receiving mode. The MS shall establish a signalling link. The MS shall be ready to transmit a HANDOVER COMPLETE message, before 'x' ms after the end of the PHYSICAL INFORMATION message, but not before a UA frame has been sent by the SS.

The term 'ready to transmit' is defined in 3GPP TS 04.13. The value of 'x' depends upon the target channel and is specified in the specific message contents section.

Maximum Duration of Test

10 minutes.

Expected Sequence

This sequence is performed for an execution counter M = 1, 2..10 for an MS that supports TCH/F and speech version 3, version 2 and version 1. Steps M=7 and M=8 are performed only if an MS supports full rate speech version 2. Steps M=9 and M=10 are performed only if an MS supports half rate speech version 1.

This sequence is performed for an execution counter $M = 1, 2..19$ for an MS that supports TCH/F and TCH/H and speech version 3, version 2 and version 1. Steps $M=7, M=8, M=15$ and $M=16$ are performed only if an MS supports speech version 2. Steps $M=9, M=10, M=17$ and $M=18$ are performed only if an MS supports half rate speech version 1.

Step	Direction	Message	Comments
0	MS -> SS		The MS and SS are in the active state of a call on the channel described below.
1	SS -> MS	HANDOVER COMMAND	See Specific message contents
2	MS -> SS	HANDOVER ACCESS	Repeated on every burst of the uplink main DCCH (and optionally on the SACCH) until reception of PHYSICAL INFORMATION. Handover Reference as included in the HANDOVER COMMAND. If the HANDOVER COMMAND includes a starting time IE then the first HANDOVER ACCESS message shall be transmitted in the indicated frame (unless the indicated frame is not used by that channel, in which case the next frame used by that channel shall be used)
3	SS -> MS	PHYSICAL INFORMATION	Sent after reception of n HANDOVER ACCESS messages. See specific message contents.
4	MS -> SS	SABM	Sent without information field
5	SS -> MS	UA	
6	MS -> SS	HANDOVER COMPLETE	The message shall be ready to be transmitted before 'x' ms after the completion of step 3.
7	MS -> SS		The MS and SS are in the active state of a call on the TCH described below. The SS checks that the TCH is through connected in the correct mode.

Specific Message Contents

For $M = 1$:

Step 0: The MS and SS are using a full rate TCH with speech full rate version 3 and in non-hopping mode on cell A.

HANDOVER COMMAND

Information Element	value/remarks
As default message contents, except:	
Cell Description	
- Network Colour Code	1
- Base Station Colour Code	5
- BCCH Carrier Number	GSM450: 274 GSM480: 321 GSM900: 40 GSM1800: 764 PCS1900: 664 GSM710: 477 GSM750: 477 T-GSM810: 477 GSM850: 167
Channel Description	
- Channel Type	TCH/F + ACCHs
- TDMA offset	Chosen arbitrarily
- Timeslot number	0
- Training Sequence Code	Chosen arbitrarily
- ARFCN	Chosen arbitrarily from the CA
Synchronisation Indication	
- Report Observed Time Difference	Shall not be included.
- Synchronisation Indication	'Non synchronised'.
- Normal Cell Indication	Ignore out of range timing advance.
Mode of the first channel.	
- Mode	speech full rate version 3
Multi-Rate configuration	ICMI = 0 Arbitrary set of codec modes, thresholds and hysteresis specified according to 3GPP TS 05.09 / 45.009

PHYSICAL INFORMATION

Information Element	value/remarks
As default message contents.	

Step 6: $x = 500$

Step 7: The MS and SS are using a full rate TCH with speech full rate version 3 and in non-hopping mode on cell B.

For $M = 2$:

Step 0: The MS and SS are using a full rate TCH with speech full rate version 3 and in non-hopping mode on cell B.

HANDOVER COMMAND

Information Element	value/remarks
As default message contents, except:	
Cell Description	
- Network Colour Code	1
- Base Station Colour Code	5
- BCCH Carrier Number	GSM450: 263 GSM480: 310 GSM900: 20 GSM1800: 747 PCS1900: 647 GSM710: 457 GSM750: 457 T-GSM 810: 457 GSM850: 147
Channel Description	
- Channel Type	TCH/F + ACCHs
- Timeslot number	Chosen arbitrarily, but not Zero
- Training Sequence Code	Chosen arbitrarily
- Hopping	RF hopping channel.
- MAIO	Chosen arbitrarily from the set (0, 1 to N-1), where N is the number of frequencies encoded in the Frequency List IE or Frequency Channel Sequence IE.
- HSN	Chosen arbitrarily from the set (1,2,..63)
Synchronisation Indication IE is not included.	
Channel Mode IE is not included.	
Frequency List after time	
- Frequency List	IE Present only for GSM450 and GSM480 GSM450: Allocates the following 12 frequencies (259, 261, 263, 265, 277, 279, 281, 283, 285, 287, 289, 291) GSM480: Allocates the following 12 frequencies (306, 308, 310, 312, 324, 326, 328, 330, 332, 334, 336, 338)
Frequency Channel Sequence after time	
- Frequency Channel Sequence	IE Present only for GSM900, GSM 710, GSM750 and T-GSM 810 GSM900: Allocates the following 12 frequencies (10, 17, 20, 26, 59, 66, 73, 74, 75, 76,108, 114) GSM710, GSM 750 and T-GSM 810: Allocates the following 12 frequencies (447, 454, 457, 463, 496, 498, 500, 501, 502, 503, 506, 508)
Frequency Short List after time	
- Frequency List	IE Present only for GSM1800, PCS1900 and GSM850 GSM1800: Use Range 256 to encode the following 9 frequencies: (747, 775, 779, 782, 791, 798, 829, 832, 844) PCS1900: Use Range 256 to encode the following 9 frequencies: (647, 675, 679, 682, 691, 698, 729, 732, 744) GSM850: Allocates the following 12 frequencies (137, 144, 147, 153, 186, 193, 200, 201, 202, 203, 235, 241)
Multi-Rate configuration IE is not included	

PHYSICAL INFORMATION

Information Element	value/remarks
As default message contents, except: Timing advance	Arbitrarily selected but different to default value.

Step 6: $x = 500$

Step 7: The MS and SS are using a full rate TCH with speech full rate version 3 and in hopping mode on cell A.

For $M = 3$:

Step 0: The MS and SS are using a full rate TCH with speech full rate version 3 and in hopping mode on cell A.

HANDOVER COMMAND

Information Element	value/remarks
As default message contents, except:	
Cell Description	
- Network Colour Code	1
- Base Station Colour Code	5
- BCCH Carrier Number	GSM450: 274 GSM480: 321 GSM900: 40 GSM1800: 764 PCS1900: 664 GSM710: 477 GSM750: 477 T-GSM810: 477 GSM850: 167
Channel Description	
- Channel Type	TCH/F + ACCHs
- Timeslot number	Chosen arbitrarily, but not Zero
- Training Sequence Code	Chosen arbitrarily
- Hopping	RF hopping channel.
- MAIO	1
- HSN	zero for cyclic
Synchronisation Indication	
- Report Observed Time Difference	Shall not be included.
- Synchronisation Indication	'Non synchronised'.
- Normal Cell Indication	Out of range timing advance shall trigger a handover failure procedure.
Frequency List after time	
- Frequency List	Use Range 128 to encode the following 2 frequencies: GSM450: (260, 291) GSM480: (307, 338) GSM900: (14, 114) GSM1800: (749, 844) PCS1900: (649, 744) GSM710: (451, 508) GSM750: (451, 508) T-GSM810: (451, 508) GSM850: (141, 241)
Mode of the first channel.	
- Mode	speech full rate version 3
Starting Time	Indicates the frame number of cell B that will occur approximately 1,1 seconds (238 frames have elapsed) after the HANDOVER COMMAND is sent by cell A.
Multi-Rate configuration	ICMI = 1 Arbitrary set of codec modes, thresholds and hysteresis specified according to 3GPP TS 05.09 / 45.009

PHYSICAL INFORMATION

Information Element	value/remarks
As default message contents.	

Step 6: $x = 500$

Step 7: The MS and SS are using a full rate TCH with speech full rate version 3 and in hopping mode on cell B.

For $M = 4$:

Step 0: The MS and SS are using a full rate TCH with full rate speech version 3 and in hopping mode on cell B.

HANDOVER COMMAND

Information Element	value/remarks
As default message contents, except:	
Cell Description	
- Network Colour Code	1
- Base Station Colour Code	5
- BCCH Carrier Number	GSM450: 263 GSM480: 310 GSM900: 20 GSM1800: 747 PCS1900: 647 GSM710: 457 GSM750: 457 T-GSM810: 457 GSM850: 147
Channel Description	
- Channel Type	TCH/F + ACCHs
- TDMA offset	Chosen arbitrarily
- Timeslot number	Chosen arbitrarily, but not Zero
- Training Sequence Code	Chosen arbitrarily
- ARFCN	The ARFCN of the BCCH Carrier
Synchronisation Indication	
- Report Observed Time Difference	Shall not be included.
- Synchronisation Indication	'Non synchronised'.
- Normal Cell Indication	Ignore out of range timing advance.
Mode of the first channel IE is not included	
Multi-Rate configuration IE is not included	

PHYSICAL INFORMATION

Information Element	value/remarks
As default message contents.	

Step 6: $x = 500$

Step 7: The MS and SS are using a full rate TCH with speech full rate version 3 and in non-hopping mode on cell A.

For $M = 5$:

Step 0: The MS and SS are using a full rate TCH with full rate speech version 3 and in non-hopping mode on cell A.

HANDOVER COMMAND

Information Element	value/remarks
As default message contents, except:	
Cell Description	
- Network Colour Code	1
- Base Station Colour Code	5
- BCCH Carrier Number	GSM450: 274 GSM480: 321 GSM900: 40 GSM1800: 764 PCS1900: 664 GSM710: 477 GSM750: 477 T-GSM810: 477 GSM850: 167
Channel Description	
- Channel Type	TCH/F + ACCHs
- TDMA offset	Chosen arbitrarily
- Timeslot number	Chosen arbitrarily, but not Zero
- Training Sequence Code	Chosen arbitrarily
- ARFCN	Chosen arbitrarily from the CA
Synchronisation Indication	
- Report Observed Time Difference	Shall not be included.
- Synchronisation Indication	'Non synchronised'.
- Normal Cell Indication	Ignore out of range timing advance.
Mode of the first channel.	
- Mode	speech full rate or half rate version 1

PHYSICAL INFORMATION

Information Element	value/remarks
As default message contents.	

Step 6: $x = 500$

Step 7: The MS and SS are using a full rate TCH with speech full rate version 1 and in non-hopping mode on cell B.

For $M = 6$:

Step 0: The MS and SS are using a full rate TCH with full rate speech version 1 and in non-hopping mode on cell B.

HANDOVER COMMAND

Information Element	value/remarks
As default message contents, except:	
Cell Description	
- Network Colour Code	1
- Base Station Colour Code	5
- BCCH Carrier Number	GSM450: 263 GSM480: 310 GSM900: 20 GSM1800: 747 PCS1900: 647 GSM710: 457 GSM750: 457 T-GSM810: 457 GSM850: 147
Channel Description	
- Channel Type	TCH/F + ACCHs
- TDMA offset	Chosen arbitrarily
- Timeslot number	Chosen arbitrarily, but not Zero
- Training Sequence Code	Chosen arbitrarily
- ARFCN	Chosen arbitrarily from the CA
Synchronisation Indication	
- Report Observed Time Difference	Shall not be included.
- Synchronisation Indication	'Non synchronised'.
- Normal Cell Indication	Ignore out of range timing advance.
Mode of the first channel	
- Mode	speech full rate version 3
Multi-Rate configuration	ICMI = 1 Arbitrary set of codec modes, thresholds and hysteresis specified according to 3GPP TS 05.09 / 45.009

PHYSICAL INFORMATION

Information Element	value/remarks
As default message contents, except:	
Timing advance	Arbitrarily selected but different to default value.

Step 6: $x = 500$

Step 7: The MS and SS are using a full rate TCH with speech full rate version 3 and in non-hopping mode on cell A.

For $M = 7$:

Step 0: The MS and SS are using a full rate TCH with full rate speech version 3 and in non-hopping mode on cell A.

HANDOVER COMMAND

Information Element	value/remarks
As default message contents, except:	
Cell Description	
- Network Colour Code	1
- Base Station Colour Code	5
- BCCH Carrier Number	GSM450: 274 GSM480: 321 GSM900: 40 GSM1800: 764 PCS1900: 664 GSM710: 477 GSM750: 477 T-GSM810: 477 GSM850: 167
Channel Description	
- Channel Type	TCH/F + ACCHs
- TDMA offset	Chosen arbitrarily
- Timeslot number	Chosen arbitrarily, but not Zero
- Training Sequence Code	Chosen arbitrarily
- Hopping	RF hopping channel.
- MAIO	Chosen arbitrarily from the set (0, 1 to N-1), where N is the number of frequencies encoded in the Frequency List IE.
- HSN	Chosen arbitrarily from the set (1,2,..63)
Frequency List after time	
- Frequency List	GSM450: use Range 128 to encode the following 12 frequencies: (260, 262, 264, 266, 276, 279, 281, 283, 285, 287, 289, 291) GSM480: use Range 128 to encode the following 12 frequencies: (307, 309, 311, 313, 323, 326, 328, 330, 332, 334, 336, 338) GSM900: use bit map 0 to allocates the following 12 frequencies: (14, 18, 22, 24, 60, 66, 73, 74, 75, 76,108, 114) GSM1800: Use Range 1024 to allocate the following 12 frequencies: (749, 758, 761, 764, 771, 779, 782, 791, 798, 829, 832, 844) PCS1900: Use Range 1024 to allocate the following 12 frequencies: (649, 658, 661, 664, 671, 679, 682, 791, 798, 729, 732, 744) GSM710, GSM 750 and T-GSM 810: Use 128 range to allocates the following 12 frequencies: (451, 455, 459, 461, 497, 498, 500, 501, 502, 503,506, 508) GSM850: Use 128 range to allocates the following 12 frequencies: (141, 145, 149, 151, 187, 193, 200, 201, 202, 203, 235, 241)
Synchronisation Indication	
- Report Observed Time Difference	Shall not be included.
- Synchronisation Indication	'Non synchronised'.
- Normal Cell Indication	Ignore out of range timing advance.
Mode of the first channel	
- Mode	speech full rate version 2

PHYSICAL INFORMATION

Information Element	value/remarks
As default message contents, except:	
Timing advance	Arbitrarily selected but different to default value.

Step 6: x = 500

Step 7: The MS and SS are using a full rate TCH with full rate speech version 2 and in hopping mode on cell B.

For M = 8:

Step 0: The MS and SS are using a full rate TCH with speech full rate version 2 and hopping mode on cell B.

HANDOVER COMMAND

Information Element	value/remarks
As default message contents, except:	
Cell Description	
- Network Colour Code	1
- Base Station Colour Code	5
- BCCH Carrier Number	GSM450: 263 GSM480: 310 GSM900: 20 GSM1800: 747 PCS1900: 647 GSM710: 457 GSM750: 457 T-GSM810: 457 GSM850: 147
Channel Description	
- Channel Type	TCH/F + ACCHs
- Timeslot number	Chosen arbitrarily, but not Zero
- Training Sequence Code	Chosen arbitrarily
- Hopping	RF hopping channel.
- MAIO	Chosen arbitrarily from the set (0, 1 to N-1), where N is the number of frequencies encoded in the Frequency List IE.
- HSN	Chosen arbitrarily from the set (1,2,..63)
Synchronisation Indication IE is not included.	
Mode of the first channel.	
- Mode	speech full rate version 3
Frequency List after time	IE Present only for GSM450, GSM480 and GSM850
- Frequency List	GSM450: Allocates the following 12 frequencies (259, 261, 263, 265, 277, 279, 281, 283, 285, 287, 289, 291) GSM480: Allocates the following 12 frequencies (306, 308, 310, 312, 324, 326, 328, 330, 332, 334, 336, 338) GSM850: Allocates the following 12 frequencies (137, 144, 147, 153, 186, 193, 200, 201, 202, 203, 235, 241)
Frequency Channel Sequence after time	IE Present only for GSM900, GSM 710, GSM750 and T-GSM 810
- Frequency Channel Sequence	GSM900: Allocates the following 12 frequencies (10, 17, 20, 26, 59, 66, 73, 74, 75, 76,108, 114) GSM710, GSM 750 and T-GSM810: Allocates the following 12 frequencies (447, 454, 457, 463, 496, 498, 500, 501, 502, 503, 506, 508)
Frequency Short List after time	IE Present only for GSM1800 and PCS1900
- Frequency List	GSM1800: Use Range 256 to encode the following 9 frequencies: (747, 775, 779, 782, 791, 798, 829, 832, 844) PCS1900: Use Range 256 to encode the following 9 frequencies: (647, 675, 679, 682, 691, 698, 629, 632, 644)
Starting Time	Indicates the frame number of cell B. that will occur approximately 1,1 seconds (238 frames have elapsed) after the HANDOVER COMMAND is sent by cell A.
Multi-Rate configuration	ICMI = 0 Arbitrary set of codec modes, thresholds and hysteresis specified according to 3GPP TS 05.09 / 45.009

PHYSICAL INFORMATION

Information Element	value/remarks
As default message contents	

Step 6: x = 500

Step 7: The MS and SS are using a full rate TCH with speech full rate version 3 and hopping mode on cell A.

For M = 9:

Step 0: The MS and SS are using a full rate TCH with full rate speech version 3 and in hopping mode on cell A.

HANDOVER COMMAND

Information Element	value/remarks
As default message contents, except:	
Cell Description	
- Network Colour Code	1
- Base Station Colour Code	5
- BCCH Carrier Number	GSM450: 274 GSM480: 321 GSM900: 40 GSM1800: 764 PCS1900: 664 GSM710: 477 GSM750: 477 T-GSM810: 477 GSM850: 167
Channel Description	
- Channel Type	TCH/H + ACCHs
- TDMA offset	Chosen arbitrarily
- Timeslot number	Chosen arbitrarily, but not Zero
- Training Sequence Code	Chosen arbitrarily
- Hopping	RF hopping channel.
- MAIO	Chosen arbitrarily from the set (0, 1 to N-1), where N is the number of frequencies encoded in the Frequency List IE.
- HSN	Chosen arbitrarily from the set (1,2,..63)
Frequency List after time	
- Frequency List	GSM450: use Range 128 to encode the following 12 frequencies: (260, 262, 264, 266, 276, 279, 281, 283, 285, 287, 289, 291) GSM480: use Range 128 to encode the following 12 frequencies: (307, 309, 311, 313, 323, 326, 328, 330, 332, 334, 336, 338) GSM900: use bit map 0 to allocates the following 12 frequencies: (14, 18, 22, 24, 60, 66, 73, 74, 75, 76,108, 114) GSM1800: Use Range 1024 to allocate the following 12 frequencies: (749, 758, 761, 764, 771, 779, 782, 791, 798, 829, 832, 844) PCS1900: Use Range 1024 to allocate the following 12 frequencies: (649, 658, 661, 664, 671, 679, 682, 791, 798, 729, 732, 744) GSM710, GSM 750 and T-GSM 810: Use 128 range to allocates the following 12 frequencies: (451, 455, 459, 461, 497, 498, 500, 501, 502, 503,506, 508) GSM850: Use 128 range to allocates the following 12 frequencies: (141, 145, 149, 151, 187, 193, 200, 201, 202, 203, 235, 241)
Synchronisation Indication	
- Report Observed Time Difference	Shall not be included.
- Synchronisation Indication	'Non synchronised'.
- Normal Cell Indication	Ignore out of range timing advance.
Mode of the first channel	
- Mode	speech half rate version 1

PHYSICAL INFORMATION

Information Element	value/remarks
As default message contents, except: Timing advance	Arbitrarily selected but different to default value.

Step 6: $x = 750$

Step 7: The MS and SS are using a half rate TCH with half rate speech version 1 and in hopping mode on cell B.

For $M = 10$:

Step 0: The MS and SS are using a half rate TCH with speech half rate version 1 and hopping mode on cell B.

HANDOVER COMMAND

Information Element	value/remarks
As default message contents, except:	
Cell Description	
- Network Colour Code	1
- Base Station Colour Code	5
- BCCH Carrier Number	GSM450: 263 GSM480: 310 GSM900: 20 GSM1800: 747 PCS1900: 647 GSM710: 457 GSM750: 457 T-GSM810: 457 GSM850: 147
Channel Description	
- Channel Type	TCH/F + ACCHs
- TDMA offset	Chosen arbitrarily
- Timeslot number	Chosen arbitrarily, but not Zero
- Training Sequence Code	Chosen arbitrarily
- ARFCN	Chosen arbitrarily from the CA
Synchronisation Indication IE is not included.	
Mode of the first channel.	
- Mode	speech full rate version 3
Multi-Rate configuration	ICMI = 0 Arbitrary set of codec modes, thresholds and hys teresis specified according to 3GPP TS 05.09 / 45.009

PHYSICAL INFORMATION

Information Element	value/remarks
As default message contents	

Step 6: $x = 500$

Step 7: The MS and SS are using a full rate TCH with speech full rate version 3 and non-hopping mode on cell A.

For $M = 11$:

Step 0: The MS and SS are using a full rate TCH with speech full rate version 3 and in non-hopping mode on cell A.

HANDOVER COMMAND

Information Element	value/remarks
As default message contents, except:	
Cell Description	
- Network Colour Code	1
- Base Station Colour Code	5
- BCCH Carrier Number	GSM450: 274 GSM480: 321 GSM900: 40 GSM1800: 764 PCS1900: 664 GSM710: 477 GSM750: 477 T-GSM810: 477 GSM850: 167
Channel Description	
- Channel Type	TCH/H + ACCHs
- TDMA offset	Chosen arbitrarily
- Timeslot number	Chosen arbitrarily, but not Zero
- Training Sequence Code	Chosen arbitrarily
- Hopping	RF hopping channel.
- MAIO	Chosen arbitrarily from the set (0, 1 to N-1), where N is the number of frequencies encoded in the Frequency List IE.
- HSN	Chosen arbitrarily from the set (1,2,..63)
Frequency List after time	
- Frequency List	GSM450: use Range 128 to encode the following 12 frequencies: (260, 262, 264, 266, 276, 279, 281, 283, 285, 287, 289, 291) GSM480: use Range 128 to encode the following 12 frequencies: (307, 309, 311, 313, 323, 326, 328, 330, 332, 334, 336, 338) GSM900: use bit map 0 to allocates the following 12 frequencies: (14, 18, 22, 24, 60, 66, 73, 74, 75, 76,108, 114) GSM1800: Use Range 1024 to allocate the following 12 frequencies: (749, 758, 761, 764, 771, 779, 782, 791, 798, 829, 832, 844) PCS1900: Use Range 1024 to allocate the following 12 frequencies: (649, 658, 661, 664, 671, 679, 682, 791, 798, 729, 732, 744) GSM710, GSM 750 and T-GSM 810: Use 128 range to allocates the following 12 frequencies: (451, 455, 459, 461, 497, 498, 500, 501, 502, 503,506, 508) GSM850: Use 128 range to allocates the following 12 frequencies: (141, 145, 149, 151, 187, 193, 200, 201, 202, 203, 235, 241)
Synchronisation Indication	
- Report Observed Time Difference	Shall not be included.
- Synchronisation Indication	'Non synchronised'.
- Normal Cell Indication	Ignore out of range timing advance.
Mode of the first channel	
- Mode	speech half rate version 3
Starting Time	Indicates the frame number of cell B. that will occur approximately 1,1 seconds (238 frames have elapsed) after the HANDOVER COMMAND is sent by cell A.
Multi-Rate configuration	ICMI = 0 Arbitrary set of codec modes, thresholds and hysteresis specified according to 3GPP TS 05.09 / 45.009

PHYSICAL INFORMATION

Information Element	value/remarks
As default message contents, except: Timing advance	Arbitrarily selected but different to default value.

Step 6: $x = 750$

Step 7: The MS and SS are using a half rate TCH with half rate speech version 3 and in hopping mode on cell B.

For $M = 12$:

Step 0: The MS and SS are using a half rate TCH with half rate speech version 3 and in hopping mode on cell B.

HANDOVER COMMAND

same as for $M = 4$ except:

Channel Description - Channel Type	TCH/H + ACCHs
---------------------------------------	---------------

PHYSICAL INFORMATION

same as for $M = 4$

Step 6: $x = 750$

Step 7: The MS and SS are using a half rate TCH with half rate speech version 3 and in non-hopping mode on cell A.

For $M = 13$:

Step 0: The MS and SS are using a half rate TCH with speech half rate version 3 and in non-hopping mode on cell A.

HANDOVER COMMAND

same as for $M = 5$

PHYSICAL INFORMATION

same as for $M = 5$

Step 6: $x = 500$

Step 7: The MS and SS are using a full rate TCH with speech full rate version 1 and in non-hopping mode on cell B.

For $M = 14$:

Step 0: The MS and SS are using a full rate TCH with speech full rate version 1 and in non-hopping mode on cell B.

HANDOVER COMMAND

same as for $M = 6$ except:

Channel Description - Channel Type	TCH/H + ACCHs
---------------------------------------	---------------

PHYSICAL INFORMATION

same as for $M = 6$

Step 6: $x = 750$

Step 7: The MS and SS are using a half rate TCH with speech half rate version 3 and in non-hopping mode on cell A.

For M = 15:

Step 0: The MS and SS are using a half rate TCH with speech half rate version 3 and in non-hopping mode on cell A.

HANDOVER COMMAND

same as for M = 7

PHYSICAL INFORMATION

same as for M = 7

Step 6: x = 500

Step 7: The MS and SS are using a full rate TCH with full rate speech version 2 and in hopping mode on cell B.

For M = 16:

Step 0: The MS and SS are using a full rate TCH with full rate speech version 2 and in hopping mode on cell B.

HANDOVER COMMAND

same as for M = 8 except:

Channel Description - Channel Type	TCH/H + ACCHs
---------------------------------------	---------------

PHYSICAL INFORMATION

same as for M = 8

Step 6: x = 750

Step 7: The MS and SS are using a half rate TCH with speech half rate version 3 and in hopping mode on cell A.

For M = 17:

Step 0: The MS and SS are using a half rate TCH with speech half rate version 3 and in hopping mode on cell A.

HANDOVER COMMAND

same as for M = 9

PHYSICAL INFORMATION

same as for M = 9

Step 6: x = 750

Step 7: The MS and SS are using a half rate TCH with speech half rate version 1 and in hopping mode on cell B.

For M = 18:

Step 0: The MS and SS are using a half rate TCH with speech half rate version 1 and in hopping mode on cell B.

HANDOVER COMMAND

same as for M = 10 except:

Channel Description - Channel Type	TCH/H + ACCHs
---------------------------------------	---------------

PHYSICAL INFORMATION

same as for M = 10

Step 6: x = 750

Step 7: The MS and SS are using a half rate TCH with speech half rate version 3 and in non-hopping mode on cell A.

For M = 19:

Step 0: The MS and SS are using a half rate TCH with speech half rate version 3 and in non-hopping mode on cell A.

HANDOVER COMMAND

same as for M = 1

PHYSICAL INFORMATION

same as for M = 1

Step 6: x = 500

Step 7: The MS and SS are using a full rate TCH with speech full rate version 3 and in non-hopping mode on cell B.

26.16.6 Structured procedures / emergency call

NOTE: this test is derived from subclause 26.15.5 - Structured procedures / emergency call.

26.16.6.1 Conformance requirement

- 1) The MS in the "idle, updated" state, after a successful location update, the number 112 (for GSM 900 and DCS 1800 MS), or 911 (for GSM 710, GSM 750, T_GSM 810, GSM 850 and PCS 1 900 MS in USA and Canada), or 08 (for GSM 710, GSM 750, T_GSM 810, GSM 850 and PCS 1 900 MS in Mexico) has been entered by user, shall send a CHANNEL REQUEST message with correct establishment cause ("emergency call").
- 2) After assignment of a dedicated channel the first layer message sent by the MS on the assigned dedicated channel shall be a CM SERVICE REQUEST message specifying the correct CKSN and TMSI, with CM Service Type "emergency call establishment".
- 3) Authentication and cipher mode setting shall be performed successfully.
- 4) After cipher mode setting acceptance by the network, the MS shall send an EMERGENCY SETUP message.
- 5) The AMR mobile station shall accept channel assignment to an AMR full-rate channel and if supported an AMR half rate channel depending what the network signals to the mobile and also select the correct codec mode. The call shall be set up using the AMR codec.
- 6) After receipt of a CONNECT ACKNOWLEDGE message during correct establishment of the emergency call the TCH/AF or TCH/AH shall be through connected in both directions if an appropriate channel is available.
- 7) The call shall be cleared correctly.

References:

3GPP TS 04.08 / 3GPP TS 44.018 subclauses 3.4.3.1, 3.4.6, 9.1.2 and 9.1.5.

26.16.6.2 Test purpose

- 1) To verify that an MS supporting speech in the MM state "idle, updated", when made to call the number 112 (for GSM 900 and DCS 1800 MS), or 911 (for GSM 710, GSM 750, T_GSM 810, GSM 850 and PCS 1 900 MS in USA and Canada), or 08 (for GSM 710, GSM 750, T_GSM 810, GSM 850 and PCS 1 900 MS in Mexico), sends a CHANNEL REQUEST message with establishment cause "emergency call".

- 2) To verify that after assignment of a dedicated channel the first layer message sent by the MS on the assigned dedicated channel is a CM SERVICE REQUEST message specifying the correct CKSN and TMSI, with CM Service Type "emergency call establishment".
- 3) To verify that authentication and cipher mode setting are performed successfully.
- 4) To verify that after cipher mode setting acceptance by the SS, the MS sends an EMERGENCY SETUP message.
- 5) To verify that the AMR mobile station shall accept channel assignment to a TCH/AF and if it supports half rate, also to a TCH/A depending what the network signals to the mobile and also select the correct codec mode. The call shall be set up using the AMR codec.
- 6) To verify that subsequently the MS has through connected the TCH in both directions.
- 7) To verify the call is cleared correctly.

26.16.6.3 Method of Test

Initial Conditions

SS: 1 cell default parameters.

MS: The MS is in the MM-state "idle, updated" with valid TMSI and CKSN.

Foreseen Final State of the MS

The MS is in the MM-state "idle, updated" with valid TMSI and CKSN.

Specific PICS statements:

- Speech supported for Half rate version 3 (HR AMR).

PIXIT statements:

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Test Procedure

The MS is made to initiate an emergency call. The call is established with late assignment. Having reached the active state, the call is cleared by the SS. This procedure is repeated so that the assignment is made with full rate and half rate speech versions as supported by the MS.

Maximum Duration of Test

3 minutes.

Expected Sequence

This test is repeated for $K=1$, and where the MS supports half rate version 3 $K=2$.

Step	Direction	Message	Comments
1	MS		The appropriate emergency call number is entered
2	MS->SS	CHANNEL REQUEST	Establishment cause is emergency call establishment.
3	SS->MS	IMMEDIATE ASSIGNMENT	
4	MS->SS	CM SERVICE REQUEST	Message is contained in SABM. The CM service type IE indicates "emergency call establishment".
5	SS->MS	AUTHENTICATION REQUEST	
6	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
7	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
8	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
9	SS		SS starts ciphering
10	MS->SS	EMERGENCY SETUP	The MS indicates it which speech it supports.
11	SS->MS	CALL PROCEEDING	
12	SS->MS	ALERTING	
13	SS->MS	ASSIGNMENT COMMAND	See specific message contents.
14	MS->SS	ASSIGNMENT COMPLETE	
15	SS->MS	CONNECT	
16	MS->SS	CONNECT ACK	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	SS->MS	DISCONNECT	
19	MS->SS	RELEASE	
20	SS->MS	RELEASE COMPLETE	
21	SS->MS	CHANNEL RELEASE	

Specific Message Contents:

K = 1

Assignment Command

Information Element	value/remark
Channel description	TCH/AF
Channel mode - Mode	Speech full rate version 3

K = 2

This step is applicable only if the MS supports half rate version 3.

Assignment Command

Information Element	value/remark
Channel description	TCH/AF
Channel mode - Mode	Speech half rate version 3

26.16.7 AMR Signalling / Directed Retry / Mobile Originated Call

NOTE: This test is derived from the one defined in subclause 26.12.6 and entitled "EFR Signalling / Directed Retry / Mobile Originated Call".

26.16.7.1 Conformance requirements

The MS shall correctly apply the Directed Retry procedure from SDCCH/8 (no frequency hopping) to TCH/AMR with frequency hopping in the non-synchronized case during call establishment. The call control entity of the Mobile Station in the "mobile originating call proceeding" state shall, upon receipt of a CONNECT message, attach the AMR speech connection to the radio path and return a CONNECT ACKNOWLEDGE message to the SS.

References

3GPP TS 04.08 / 3GPP TS 44.018, subclauses 3.4.4 and 9.1.15,
3GPP TS 04.08 / 3GPP TS 24.008, subclause 5.2.1.6.

3GPP TS 04.13, subclause 5.2.6.2.

26.16.7.2 Test purpose

To test that, when the MS is ordered to perform a non-synchronized handover after the CALL PROCEED message, it continuously sends access bursts on the main DCCH (and optionally on the SACCH) until it receives a PHYSICAL INFORMATION message from the SS. To test that the MS correctly takes the values of the Timing Advance information element in the PHYSICAL INFORMATION message into account. To test that the MS activates the new channel correctly and transmits the HANDOVER COMPLETE message without undue delay. To test that the call control entity of the Mobile Station in the "mobile originating call proceeding" state, upon receipt of a CONNECT message, attaches the AMR speech connection to the radio path and returns a CONNECT ACKNOWLEDGE message to the SS.

26.16.7.3 Method of test

Initial Conditions

System Simulator:

2 cells A and B with same LAI, default parameters, except:

Cell A has:

BCCH ARFCN = See the table below.

Cell Allocation = See the table below.

PLMN colour code, NCC = as defaults.

BS colour code, BCC = as defaults.

NCC_PERM = 00001010.

Cell B has:

BCCH ARFCN = See the table below.

Cell Allocation = See the table below.

PLMN colour code, NCC = 3.

BS colour code, BCC = 0.

Band	Cell A		Cell B		Both Cells
	BCCH ARFCN	Cell Allocation	BCCH ARFCN	Cell Allocation	Format
GSM 450	263	259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291	274	260, 262, 264, 266, 268, 270, 272, 274, 276, 279, 281, 283, 285, 287, 289, 291	Range 128
GSM 480	310	306, 308, 310, 312, 314, 316, 318, 320, 322, 324, 326, 328, 330, 332, 334, 336, 338	321	307, 309, 311, 313, 315, 317, 319, 321, 323, 326, 328, 330, 332, 334, 336, 338	Range 128
GSM 710	457	447, 454, 457, 463, 471, 479, 482, 483, 489, 496, 498, 500, 501, 502, 503, 506, 508	477	451, 455, 459, 461, 467, 468, 475, 477, 497, 498, 500, 501, 502, 503, 506, 508	Range 128
GSM 750	457	447, 454, 457, 463, 471, 479, 482, 483, 489, 496, 498, 500, 501, 502, 503, 506, 508	477	451, 455, 459, 461, 467, 468, 475, 477, 497, 498, 500, 501, 502, 503, 506, 508	Range 128
T-GSM810	457	447, 454, 457, 463, 471, 479, 482, 483, 489, 496, 498, 500, 501, 502, 503, 506, 508	477	451, 455, 459, 461, 467, 468, 475, 477, 497, 498, 500, 501, 502, 503, 506, 508	Range 128
GSM 850	147	137, 144, 147, 153, 161, 169, 172, 173, 179, 186, 193, 200, 201, 202, 203, 235, 241	167	141, 145, 149, 151, 157, 158, 165, 167, 187, 193, 200, 201, 202, 203, 235, 241	Range 128
GSM 900	20	10, 17, 20, 26, 34, 42, 45, 46, 52, 59, 66, 73, 74, 75, 76, 108, 114	40	14, 18, 22, 24, 30, 31, 38, 40, 60, 66, 73, 74, 75, 76, 108, 114	Bitmap 0
DCS 1 800	747	734, 741, 747, 754, 759, 762, 766, 767, 773, 775, 779, 782, 791, 798, 829, 832, 844	764	739, 743, 746, 749, 756, 758, 761, 764, 771, 779, 782, 791, 798, 829, 832, 844	Range 512
PCS 1 900	647	634, 641, 647, 654, 659, 662, 666, 667, 673, 675, 679, 682, 691, 698, 729, 732, 744	664	639, 643, 646, 649, 656, 658, 661, 664, 671, 679, 682, 691, 698, 729, 732, 744	Range 512

The time base of Cells A and B shall be such that the edges of their timeslots are not coincident at the antenna connector.

A non-combined SDCCH is used.

Mobile Station:

The MS is in the "idle, updated" state, with a TMSI allocated and camped on cell A.

Specific PICS statements:

- Speech supported for Half rate version 3 (HR AMR).

PIXIT statements:

- Way to indicate mobile originated alerting.

Foreseen Final State of the MS

"Idle, updated" with TMSI allocated and camped on cell B.

Test Procedure

The MS is made to initiate a speech call on Cell A. After the SS has sent the CALL PROCEEDING message the SS sends a HANOVER COMMAND message, ordering the MS to switch to cell B. The MS shall then begin to send access bursts on the new DCCH (and optionally on the SACCH) to cell B. The SS observes the access bursts and after receiving n (n being arbitrarily chosen between values according to table 26.6-2 of subclause 26.6.5) access bursts, the SS sends one PHYSICAL INFORMATION message with an arbitrarily chosen Timing Advance. The MS shall activate the channel in sending and receiving mode. The MS shall establish a signalling link. The MS shall be ready to transmit a HANOVER COMPLETE message before x ms after the end of the PHYSICAL INFORMATION message, but not before a UA frame has been sent by the SS. After the successful handover procedure the SS sends the ALERTING message. The correct alerting indication shall be given to the user (only applicable if the MS supports this feature). The SS sends the CONNECT message indicating that the call has been answered. The AMR speech channel shall be through connected in both directions. The MS shall send then the CONNECT ACKNOWLEDGE message as the response on the CONNECT message. Having reached the active state, the call is cleared by the SS.

The term "ready to transmit" is defined in 3GPP TS 04.13. The value of "x" depends upon the target channel and is specified in the specific message contents section.

Maximum Duration of Test

1 minute, including 30 s for any necessary operator actions.

Expected Sequence

Step	Direction	Message	Comments
1	-----	-----	A MO call is initiated on cell A.
2	MS -> SS	CHANNEL REQUEST	Establishment cause is "originating call and the network does not set the NECI bit to 1".
3	SS -> MS	IMMEDIATE ASSIGNMENT	See specific message contents.
4	MS -> SS	CM SERVICE REQUEST	CM Service Type = Mobile Originating Call Establishment.
5	SS -> MS	AUTHENTICATION REQUEST	
6	MS -> SS	AUTHENTICATION RESPONSE	SRES specifies correct value.
7	SS -> MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message.
8	MS -> SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
9	SS		SS starts ciphering.
10	MS -> SS	SETUP	AMR speech
11	SS -> MS	CALL PROCEEDING	
12	SS -> MS	HANOVER COMMAND	See specific message contents.
13	MS -> SS	HANOVER ACCESS	Repeated on every burst of the uplink main DCCH (and optionally on the SACCH) until reception of PHYSICAL INFORMATION. Handover Reference as included in the HANOVER COMMAND.
14	SS -> MS	PHYSICAL INFORMATION	Sent after reception of n HANOVER ACCESS message. Timing Advance is arbitrarily chosen.
15	MS -> SS	SABM	Sent without information field.
16	SS -> MS	UA	
17	MS -> SS	HANOVER COMPLETE	This message shall be ready to be transmitted before "x" ms after the completion of step 14.
18	SS -> MS	ALERTING	
19	MS		An alerting indication is given as described in the PIXIT.
20	SS -> MS	CONNECT	
21	MS -> SS	CONNECT ACKNOWLEDGE	
22	MS		The AMR speech channel is through connected in both directions.
23	SS -> MS	DISCONNECT	
24	MS -> SS	RELEASE	
25	SS -> MS	RELEASE COMPLETE	
26	SS -> MS	CHANNEL RELEASE	The main signalling link is released.

Specific Message Contents

IMMEDIATE ASSIGNMENT

Information Element	value/remark
As default message contents except: Channel Description - Channel Type - TDMA offset - Timeslot number - Training Sequence Code - Hopping - ARFCN	Channel Description. SDCCH/8 As default message contents. As default message contents. Chosen arbitrarily. Single RF Channel. Chosen arbitrarily from the Cell Allocation of Cell A.

HANDOVER COMMAND

Information Element	value/remarks
As default message contents, except: Cell Description - Network Colour Code - Base Station Colour Code - BCCH Carrier Number Channel Description - Channel Type - TDMA offset - Timeslot number - Training Sequence Code - Hopping - MAIO - HSN Synchronization Indication IE is not included Frequency list after time - Frequency List Channel Mode IE Multi-Rate configuration	 3 0 See the table below TCH/F + ACCHs Chosen arbitrarily. Chosen arbitrarily but not zero. Chosen arbitrarily. RF hopping channel. Chosen arbitrarily from the set (0, 1 to N-1), where N is the number of frequencies encoded in the Frequency List IE. Zero (this gives cyclic hopping). Allocate frequencies as per the table below Speech (multi rate version 1). ICMI = 1 Arbitrary set of codec modes, thresholds and hysteresis specified according to 3GPP TS 05.09 / 45.009

HANDOVER COMMAND			
Band	Frequency Short List		BCCH Carrier Number
	Format	ARFCNs	ARFCN
GSM 450	Range 128	260, 262, 264, 266, 268, 270, 272, 276, 279, 281, 283, 285, 287, 289, 291	274
GSM 480	Range 128	307, 309, 311, 313, 315, 317, 319, 323, 326, 328, 330, 332, 334, 336, 338	321
GSM 710	Range 128	451, 455, 459, 461, 467, 468, 475, 497, 498, 500, 501, 502, 503, 506, 508	477
GSM 750	Range 128	451, 455, 459, 461, 467, 468, 475, 497, 498, 500, 501, 502, 503, 506, 508	477
T-GSM 810	Range 128	451, 455, 459, 461, 467, 468, 475, 497, 498, 500, 501, 502, 503, 506, 508	477
GSM 850	Range 128	141, 145, 149, 151, 157, 158, 165, 187, 193, 200, 201, 202, 203, 235, 241	167
GSM 900	Range 128	14, 18, 22, 24, 30, 31, 38, 60, 66, 73, 74, 75, 76, 108, 114	40
DCS 1 800	Range 128	746, 779	764
PCS 1 900	Range 128	646, 679	664

Step 17: "x" = 500.

26.16.8 AMR Signalling / Directed Retry / Mobile Terminated Call

NOTE: This test is derived from the one defined in subclause 26.12.7 and entitled "EFR Signalling / Directed Retry / Mobile Terminated Call".

26.16.8.1 Conformance requirements

The MS shall correctly apply the Directed Retry procedure from SDCCH/8 with frequency hopping to TCH/AMR with frequency hopping and starting time in the non-synchronized case during call establishment. The call control entity of the Mobile Station in the "call delivered" state shall, if the MS supports immediate connect, continue the call establishment by through-connecting the AMR traffic channel in both directions, or if the MS does not support immediate connect, send an ALERTING message. The MS indicates acceptance of a MT call by sending CONNECT.

The mobile station shall attach the user connection at latest when sending the CONNECT message, except if there is no compatible radio resource available at this time. In this case the attachment shall be delayed until such a resource becomes available.

References

3GPP TS 04.08 / 3GPP TS 44.018, subclauses 3.4.4 and 9.1.15,
3GPP TS 04.08 / 3GPP TS 24.008, subclauses 5.2.2.5, 5.2.2.6 and 5.2.2.9.

3GPP TS 04.13, subclause 5.2.6.2.

26.16.8.2 Test purpose

To test that when the MS is ordered to perform a non-synchronized handover after the CALL CONFIRM message, it continuously sends access bursts on the main DCCH (and optionally on the SACCH) until it receives a PHYSICAL INFORMATION message from the SS. To test that the MS correctly takes the values of the Timing Advance information element in the PHYSICAL INFORMATION message into account. To test that the MS activates the new channel correctly and transmits the HANDOVER COMPLETE message without undue delay. To test that the call control entity of the Mobile Station in the "call delivered" state, if the MS supports immediate connect, continues the call establishment by through-connecting the AMR traffic channel in both directions, or if the MS does not support immediate connect, sends an ALERTING message. To test that the MS indicates acceptance of a MT call by sending CONNECT.

To test that the mobile station attaches the user connection at latest when sending the CONNECT message, except if there is no compatible radio resource available at this time. To test that in this case the attachment is delayed until such a resource becomes available.

26.16.8.3 Method of test

Initial Conditions

System Simulator:

2 cells A and B with same LAI, default parameters, except:

Cell A has:

BCCH ARFCN = See the table below.

Cell Allocation = See the table below. PLMN colour code, NCC = as defaults.

BS colour code, BCC = as defaults.

NCC_PERM = 00001010.

Cell B has:

BCCH ARFCN = See the table below.

Cell Allocation = See the table below.

PLMN colour code, NCC = 3.

BS colour code, BCC = 0.

Band	Cell A		Cell B		Both Cells
	BCCH ARFCN	Cell Allocation	BCCH ARFCN	Cell Allocation	Format
GSM 450	263	259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291	274	260, 262, 264, 266, 268, 270, 272, 274, 276, 279, 281, 283, 285, 287, 289, 291	Range 128
GSM 480	310	306, 308, 310, 312, 314, 316, 318, 320, 322, 324, 326, 328, 330, 332, 334, 336, 338	321	307, 309, 311, 313, 315, 317, 319, 321, 323, 326, 328, 330, 332, 334, 336, 338	Range 128
GSM 710	457	447, 454, 457, 463, 471, 479, 482, 483, 489, 496, 498, 500, 501, 502, 503, 506, 508	477	451, 455, 459, 461, 467, 468, 475, 477, 497, 498, 500, 501, 502, 503, 506, 508	Range 128
GSM 750	457	447, 454, 457, 463, 471, 479, 482, 483, 489, 496, 498, 500, 501, 502, 503, 506, 508	477	451, 455, 459, 461, 467, 468, 475, 477, 497, 498, 500, 501, 502, 503, 506, 508	Range 128
T-GSM810	457	447, 454, 457, 463, 471, 479, 482, 483, 489, 496, 498, 500, 501, 502, 503, 506, 508	477	451, 455, 459, 461, 467, 468, 475, 477, 497, 498, 500, 501, 502, 503, 506, 508	Range 128
GSM 850	147	137, 144, 147, 153, 161, 169, 172, 173, 179, 186, 193, 200, 201, 202, 203, 235, 241	167	141, 145, 149, 151, 157, 158, 165, 167, 187, 193, 200, 201, 202, 203, 235, 241	Range 128
GSM 900	20	10, 17, 20, 26, 34, 42, 45, 46, 52, 59, 66, 73, 74, 75, 76, 108, 114	40	14, 18, 22, 24, 30, 31, 38, 40, 60, 66, 73, 74, 75, 76, 108, 114	Bitmap 0
DCS 1 800	747	734, 741, 747, 754, 759, 762, 766, 767, 773, 775, 779, 782, 791, 798, 829, 832, 844	764	739, 743, 746, 749, 756, 758, 761, 764, 771, 779, 782, 791, 798, 829, 832, 844	Range 512
PCS 1 900	647	634, 641, 647, 654, 659, 662, 666, 667, 673, 675, 679, 682, 691, 698, 729, 732, 744	664	639, 643, 646, 649, 656, 658, 661, 664, 671, 679, 682, 691, 698, 729, 732, 744	Range 512

The time base of Cells A and B shall be such that the edges of their timeslots are not coincident at the antenna connector.

A non-combined SDCCH is used.

Mobile Station:

The MS is in the "idle, updated" state, with a TMSI allocated and camped on cell A.

Specific PICS statements:

- Speech supported for Half rate version 3 (HR AMR).
- Immediate connect supported for all circuit switched basic services.

PIXIT statements:

- Way to indicate alerting.
- Way to make the MS accept an incoming call after alerting.

Foreseen Final State of the MS

"Idle, updated" with TMSI allocated and camped on cell B.

Test Procedure

The MS is paged on Cell A. The MS responds to the PAGING REQUEST message and establishes a mobile terminated speech call on Cell A. If the MS supports immediate connect, it continues the call establishment by through-connecting the traffic channel in both directions, or if the MS does not support immediate connect, it sends an ALERTING message. The MS indicates acceptance of a MT call by sending CONNECT.

After the MS has sent the CALL CONFIRMED message (if the MS supports immediate connect then the MS sends the CONNECT message after the CALL CONFIRMED message on the old channel) the SS sends a HANDOVER COMMAND message, ordering the MS to switch to cell B. The MS shall then begin to send access bursts on the new

DCCH (and optionally on the SACCH) to cell B. The SS observes the access bursts and after receiving n (n being arbitrarily chosen between values according to table 26.6-2 of subclause 26.6.5) access bursts, the SS sends one PHYSICAL INFORMATION message with an arbitrarily chosen Timing Advance. The MS shall activate the channel in sending and receiving mode. The MS shall establish a signalling link. The MS shall be ready to transmit a HANDOVER COMPLETE message before x ms after the end of the PHYSICAL INFORMATION message, but not before a UA frame has been sent by the SS. After the successful handover procedure the MS sends the ALERTING message (if the MS runs the immediate connect procedure then the MS does not send an ALERTING message). The correct alerting indication shall be given to the user (only applicable if the MS supports the feature or if the MS is not using the immediate connect procedure). After the MS sent the CONNECT message the AMR speech channel shall be through connected in both directions. The SS sends then the CONNECT ACKNOWLEDGE message as the response on the CONNECT message. Having reached the active state, the call is cleared by the SS.

The term "ready to transmit" is defined in 3GPP TS 04.13. The value of " x " depends upon the target channel and is specified in the specific message contents section.

Maximum Duration of Test

1 minute, including 30 s for any necessary operator actions.

Expected Sequence

Step	Direction	Message	Comments
1	SS -> MS	PAGING REQUEST TYPE 1	Sent on the correct paging subchannel on cell A. See specific message contents. Message is contained in SABM. SRES specifies correct value. SS starts deciphering after sending the message. Shall be sent enciphered. All following messages shall be sent enciphered. SS starts ciphering. AMR speech. If the MS supports immediate connect then branch A applies. If the MS does not support immediate connect then branch B applies
2	MS -> SS	CHANNEL REQUEST	
3	SS -> MS	IMMEDIATE ASSIGNMENT	
4	MS -> SS	PAGING RESPONSE	
5	SS -> MS	AUTHENTICATION REQUEST	
6	MS -> SS	AUTHENTICATION RESPONSE	
7	SS -> MS	CIPHERING MODE COMMAND	
8	MS -> SS	CIPHERING MODE COMPLETE	
9	SS		
10	SS -> MS	SETUP	
11	MS -> SS	CALL CONFIRMED	
A12	MS -> SS	CONNECT	sent on the old channel See specific message contents. Repeated on every burst of the uplink main DCCH (and optionally on the SACCH) until reception of PHYSICAL INFORMATION. Handover Reference as included in the HANDOVER COMMAND. The first HANDOVER ACCESS message shall be transmitted in the indicated frame (unless the indicated frame is not used by that channel, in which case the next frame used by that channel shall be used). Sent after reception of n HANDOVER ACCESS message. Timing Advance is arbitrarily chosen. Sent without information field. This message shall be ready to be transmitted before "x" ms after the completion of step A15.
A13	SS -> MS	HANDOVER COMMAND	
A14	MS -> SS	HANDOVER ACCESS	
A15	SS -> MS	PHYSICAL INFORMATION	
A16	MS -> SS	SABM	
A17	SS -> MS	UA	
A18	MS -> SS	HANDOVER COMPLETE	
B12	SS -> MS	HANDOVER COMMAND	
B13	MS -> SS	HANDOVER ACCESS	
B14	SS -> MS	PHYSICAL INFORMATION	
B15	MS -> SS	SABM	
B16	SS -> MS	UA	
B17	MS -> SS	HANDOVER COMPLETE	
B18	MS -> SS	ALERTING	
B19	MS		
B20	MS		
B21	MS -> SS	CONNECT	
22	MS		The TCH/AMR channel shall be through connected in both directions.
23	SS -> MS	CONNECT ACKNOWLEDGE	The main signalling link is released.
24	SS -> MS	DISCONNECT	
25	MS -> SS	RELEASE	
26	SS -> MS	RELEASE COMPLETE	
27	SS -> MS	CHANNEL RELEASE	

Specific Message Contents

IMMEDIATE ASSIGNMENT

Information Element	value/remark
As default message contents except: L2 pseudo length Channel Description <ul style="list-style-type: none"> - Channel Type - TDMA offset - Timeslot number - Training Sequence Code - Hopping - MAIO - HSN 	14 octets (11 + contents of the MA). SDCCH/8 As default message contents. Arbitrary value, but not zero. Chosen arbitrarily. RF hopping channel. Chosen arbitrarily from the set (0, 1 to N-1), where N is the number of frequencies encoded in the Mobile Allocation. Chosen arbitrarily from the set (1,2,..63).
Mobile Allocation <ul style="list-style-type: none"> - Length - Contents 	3 octets. Indicates only three frequencies, as per the table below.

IMMEDIATE ASSIGNMENT	
Band	Mobile Allocation
GSM 450	281, 283, 285
GSM 480	328, 330, 332
GSM 710	500, 501, 502
GSM 750	500, 501, 502
T-GSM 810	500, 501, 502
GSM 850	200, 201, 202
GSM 900	73, 74, 75
DCS 1 800	773, 775, 779
PCS 1 900	673, 675, 679

HANDOVER COMMAND

Information Element	value/remarks
As default message contents, except: Cell Description <ul style="list-style-type: none"> - Network Colour Code - Base Station Colour Code - BCCH Carrier Number 	3 0 See the table below
Channel Description <ul style="list-style-type: none"> - Channel Type - TDMA offset - Timeslot number - Training Sequence Code - Hopping - MAIO - HSN 	TCH/F + ACCHs Chosen arbitrarily. Chosen arbitrarily, but not Zero. Chosen arbitrarily. RF hopping channel. Chosen arbitrarily from the set (0, 1 to N-1), where N is the number of frequencies encoded in the Frequency List IE. Chosen arbitrarily from the set (1,2,..63).
Frequency List after time <ul style="list-style-type: none"> - Frequency List 	Allocate frequencies as per the table below.
Synchronization Indication <ul style="list-style-type: none"> - Report Observed Time Difference - Synchronization Indication - Normal Cell Indication 	Shall not be included. "Non synchronized". Ignore out of range timing advance.
Mode of First Channel	Speech (multi rate version 1).
Starting Time	Indicates the frame number of cell B that will occur approximately 1,1 seconds (238 frames have elapsed) after the HANDOVER COMMAND is sent by cell A.
Multi-Rate configuration	ICMI = 1 Arbitrary set of codec modes, thresholds and hysteresis specified according to 3GPP TS 05.09 / 45.009

HANDOVER COMMAND			
Band	BCCH Carrier Number	Cell Channel Description	
	ARFCN	Format	ARFCNs
GSM 450	274	Range 128	260, 262, 264, 266, 276, 279, 281, 283, 285, 287, 289, 291
GSM 480	321	Range 128	307, 309, 311, 313, 323, 326, 328, 330, 332, 334, 336, 338
GSM 710	477	Range 128	451, 455, 459, 461, 497, 498, 500, 501, 502, 503, 506, 508
GSM 750	477	Range 128	451, 455, 459, 461, 497, 498, 500, 501, 502, 503, 506, 508
T-GSM 810	477	Range 128	451, 455, 459, 461, 497, 498, 500, 501, 502, 503, 506, 508
GSM 850	167	Range 128	141, 145, 149, 151, 187, 193, 200, 201, 202, 203, 235, 241
GSM 900	40	Bitmap 0	14, 18, 22, 24, 60, 66, 73, 74, 75, 76, 108, 114
DCS 1 800	764	Range 1024	749, 758, 761, 764, 771, 779, 782, 791, 798, 829, 832, 844
PCS 1 900	664	Range 1024	649, 658, 661, 664, 671, 679, 682, 691, 698, 729, 732, 744

Step A18 / B17: "x" =500.

26.16.9 AMR RATSCCH Protocol

26.16.9.1 AMR Configuration Change (normal)

26.16.9.1.1 Conformance requirements

The AMR_CONFIG_REQ message may be sent by the BTS during a call to change the AMR configuration on the radio interface without interruption of the speech transmission.

The ACK_OK message serves as an acknowledgement that a RATSCCH_REQ message has been detected, correctly decoded (no CRC error) and that it is defined for the Addressee. It defines the exact activation time in direction from Addressee to Initiator.

Reference

3GPP TS 05.09 sub-clauses: 3.2.2.3.1, 3.2.2.3.5

26.16.9.1.2 Test purpose

This test will verify that the MS is able to handle a properly formatted AMR_CONFIG_REQ message.

26.16.9.1.3 Method of test

Initial Conditions

System Simulator:

1 cell with default parameters

Mobile Station:

The MS is in the "idle, updated" state, with a TMSI allocated and camped on cell A.

Specific PICS statements:

- Speech supported for Half rate version 3 (HR AMR).

PIXIT statements:

-.

Foreseen Final State of the MS

Idle Updated, TMSI allocated and camped on cell A.

Test Procedure

This sequence is performed for execution counter, $k = 1, 2$.

When $k = 1$, DTX is not used:

- 1) User initiates a Mobile Originated call.
- 2) The network and the MS indicate Bearer capabilities IE with the AMR speech Full Rate and Half Rate (Version 3).
- 3) The network performs an assignment on a TCH channel with MultiRate configuration to the MS.
- 4) The call is maintained during a programmable time without variation of RxLev /RxQual.
- 5) The SS shall send a properly formatted AMR_CONFIG_REQ message during the call at a programmable time.
- 6) The MS answers with a ACK_OK message within 3 speech frames
- 7) The network initiates the call release.

When $k = 2$, DTX is used:

- 1) In the serving cell, the DTX indicator is set to "MS shall use discontinuous transmission".
- 2) User initiates a Mobile Originated call.
- 3) The network and the MS indicate Bearer capabilities IE with the AMR speech Full Rate and Half Rate (Version 3).
- 4) The network performs an assignment on a TCH channel with MultiRate configuration to the MS.
- 5) The call is maintained during a programmable time without variation of RxLev /RxQual.
- 6) The SS shall send a properly formatted AMR_CONFIG_REQ message during the call at a programmable time.
- 7) The MS answers with a ACK_OK message within 3 speech frames.
- 8) The network initiates the call release.

This test is repeated for $M=1$, and where the MS supports half rate version 3 $M=2$.

Maximum Duration of Test

5 minutes

Expected Sequence

When $k=1$:

Step	Direction	Message	Comments
1	MS		MS is in idle mode
2	MS		MS initiates Mobile Originated call
3	MS->SS	Channel Request	Establishment cause is "originating call and the network does not set the NECI bit to 1".
4	SS->MS	Immediate Assignment	See Default Messages for AMR
5	MS->SS	CM Service Request	CM Service Type = Mobile Originating Call Establishment.
6	SS->MS	AUTHENTICATION REQUEST	
7	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
8	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
9	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
10	MS->SS	Setup	MS indicates supported speech versions
11	SS->MS	Call Proceeding	
12	SS->MS	Alerting	
13	SS->MS	Assignment Command	See specific message contents.
14	MS->SS	Assignment Complete	
15	SS->MS	Connect	
16	MS->SS	Connect Acknowledge	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	SS->MS	AMR_CONFIG_REQ	See specific message contents.
19	MS->SS	ACK_OK	Message must be received within 3 speech frames
20	SS->MS	Disconnect	
21	MS->SS	Release	
22	SS->MS	Release Complete	
23	SS->MS	Channel Release	

When k=2:

Step	Direction	Message	Comments
1	MS		MS is in idle mode
2	MS		MS initiates Mobile Originated call
3	MS->SS	Channel Request	Establishment cause is "originating call and the network does not set the NECI bit to 1".
4	SS->MS	Immediate Assignment	See Default Messages for AMR
5	MS->SS	CM Service Request	CM Service Type = Mobile Originating Call Establishment.
6	SS->MS	AUTHENTICATION REQUEST	
7	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
8	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
9	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
10	MS->SS	Setup	MS indicates supported speech versions
11	SS->MS	Call Proceeding	
12	SS->MS	Alerting	
13	SS->MS	Assignment Command	See specific message contents.
14	MS->SS	Assignment Complete	
15	SS->MS	Connect	
16	MS->SS	Connect Acknowledge	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	SS->MS	AMR_CONFIG_REQ	Using DTX mode
19	MS->SS	ACK_OK	Message must be received within 3 speech frames
20	SS->MS	Disconnect	
21	MS->SS	Release	
22	SS->MS	Release Complete	
23	SS->MS	Channel Release	

Specific Message Contents

ASSIGNMENT COMMAND

Information Element	value/remarks
Channel description	M=1: TCH/F M=2: TCH/H
Mode of the first channel - Mode	Full rate of half rate version 3

AMR_CONFIG_REQ

Information Element	value/remarks
ICM	CODEC_MODE_1
ACS	2 codec modes
HYST2	Not defined (set to all 1s)
THRESH2	Not defined (set to all 1s)
HYST1	2 dB
THRESH1	12.5 dB

26.16.9.2 AMR Configuration Change (abnormal)

26.16.9.2.1 Conformance requirements

The AMR_CONFIG_REQ message may be sent by the BTS during a call to change the AMR configuration on the radio interface without interruption of the speech transmission.

The ACK_ERR message serves as a negative acknowledgement that a RATSCCH REQ message has been detected, i.e. the RATSCCH pattern was detected, but could not be decoded correctly (CRC error), or its content is not understandable by the addressee.

Reference:

3GPP TS 05.09 sub-clauses: 3.2.2.3.2, 3.2.2.3.5

26.16.9.2.2 Test purpose

This test will verify that the MS is able to handle an improperly formatted AMR_CONFIG_REQ message.

26.16.9.2.3 Method of test

Initial Conditions

System Simulator:

1 cell with default parameters

Mobile Station:

The MS is in the "idle, updated" state, with a TMSI allocated and camped on cell A.

Specific PICS statements:

- Speech supported for Half rate version 3 (HR AMR).

PIXIT statements:

..

Foreseen Final State of the MS

Idle Updated, TMSI allocated and camped on cell A.

Test Procedure

- 1) User initiates a Mobile Originated call.
- 2) The network and the MS indicate Bearer capabilities IE with the AMR speech Full Rate and Half Rate (Version 3).
- 3) The network performs an assignment on a TCH channel with MultiRate configuration to the MS.
- 4) The call is maintained during a programmable time without variation of RxLev /RxQual.
- 5) The SS shall send an AMR_CONFIG_REQ message, with an incorrect CRC, during the call at a programmable time.
- 6) The MS answers with a ACK_ERR message within 3 speech frames
- 7) The network initiates the call release.

This test is repeated for M=1, and where the MS supports half rate version 3 M=2.

Maximum Duration of Test

5 minutes

Expected Sequence

Step	Direction	Message	Comments
1	MS		MS is in idle mode
2	MS		MS initiates Mobile Originated call
3	MS->SS	Channel Request	Establishment cause is "originating call and the network does not set the NECI bit to 1".
4	SS->MS	Immediate Assignment	See Default Messages for AMR
5	MS->SS	CM Service Request	CM Service Type = Mobile Originating Call Establishment.
6	SS->MS	AUTHENTICATION REQUEST	
7	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
8	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
9	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
10	MS->SS	Setup	MS indicates supported speech versions
11	SS->MS	Call Proceeding	
12	SS->MS	Alerting	
13	SS->MS	Assignment Command	See specific message contents.
14	MS->SS	Assignment Complete	
15	SS->MS	Connect	
16	MS->SS	Connect Acknowledge	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	SS->MS	AMR_CONFIG_REQ	Message contains an incorrect CRC
19	MS->SS	ACK_ERR	Message must be received within 3 speech frames
20	SS->MS	Disconnect	
21	MS->22	Release	
22	SS->MS	Release Complete	
23	SS->MS	Channel Release	

Specific Message Contents

ASSIGNMENT COMMAND

Information Element	value/remarks
Channel description	M=1: TCH/F M=2: TCH/H
Mode of the first channel - Mode	Full rate or half rate version 3

AMR_CONFIG_REQ

Information Element	value/remarks
ICM	CODEC_MODE_1
ACS	2 codec modes
HYST2	Not defined (set to all 1s)
THRESH2	Not defined (set to all 1s)
HYST1	2 dB
THRESH1	12.5 dB

26.16.9.3 Codec Mode Phase Change (normal)

26.16.9.3.1 Conformance requirements

The CMI_PHASE_REQ message may be sent by the BTS to change the phase of the Codec Mode Indication in downlink.

The ACK_OK message serves as an acknowledgement that a RATSCCH_REQ message has been detected, correctly decoded (no CRC error) and that it is defined for the Addressee. It defines the exact activation time in direction from Addressee to Initiator.

Reference:

3GPP TS 05.09 sub-clauses: 3.2.2.3.1, 3.2.2.3.4

26.16.9.3.2 Test purpose

This test will verify that the MS can correctly handle a properly formatted CMI_PHASE_REQ message.

26.16.9.3.3 Method of test

Initial Conditions

System Simulator:

1 cell with default parameters

Mobile Station:

The MS is in the "idle, updated" state, with a TMSI allocated and camped on cell A.

Specific PICS statements:

- Speech supported for Half rate version 3 (HR AMR).

PIXIT statements:

-.

Foreseen Final State of the MS

Idle Updated, TMSI allocated and camped on cell A.

Test Procedure

- 1) User initiates a Mobile Originated call.
- 2) The network and the MS indicate Bearer capabilities IE with the AMR speech Full Rate and Half Rate (Version 3).
- 3) The network performs an assignment on a TCH channel with MultiRate configuration to the MS.
- 4) The call is maintained during a programmable time without variation of RxLev /RxQual.

- 5) The SS shall send the CMI_PHASE_REQ message during the call at a programmable time. The CMI_PHASE_REQ shall be sent either in place of a "CMI" speech frame, or in place of a "CMC" speech frame, to cover both kinds of changes.
- 6) The MS answers with a ACK_OK message within 3 speech frames.
- 7) The downlink CMI phase is changed (or not) according to the CMI_PHASE_REQ message starting with speech frame N+12.
- 8) The network initiates the call release.

This test is repeated for M=1, and where the MS supports half rate version 3 M=2.

Maximum Duration of Test

5 minutes

Expected Sequence

Step	Direction	Message	Comments
1	MS		MS is in idle mode
2	MS		MS initiates Mobile Originated call
3	MS->SS	Channel Request	Establishment cause is "originating call and the network does not set the NECI bit to 1".
4	SS->MS	Immediate Assignment	See Default Messages for AMR
5	MS->SS	CM Service Request	CM Service Type = Mobile Originating Call Establishment.
6	SS->MS	AUTHENTICATION REQUEST	
7	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
8	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
9	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
10	MS->SS	Setup	MS indicates supported speech versions
11	SS->MS	Call Proceeding	
12	SS->MS	Alerting	
13	SS->MS	Assignment Command	See specific message contents.
14	MS->SS	Assignment Complete	
15	SS->MS	Connect	
16	MS->SS	Connect Acknowledge	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	SS->MS	CMI_PHASE_REQ	See specific message contents.
19	MS->SS	ACK_OK	Message must be received within 3 speech frames
20	SS->MS	Disconnect	
21	MS->SS	Release	
22	SS->MS	Release Complete	
23	SS->MS	Channel Release	

Specific Message Contents

ASSIGNMENT COMMAND

Information Element	value/remarks
Channel description	M=1: TCH/F M=2: TCH/H
Mode of the first channel - Mode	Full rate or half rate version 3

CMI_PHASE_REQ

Information Element	value/remarks
CMP	1 (default)

26.16.9.4 Codec Mode Phase Change (abnormal)

26.16.9.4.1 Conformance requirements

The CMI_PHASE_REQ message may be sent by the BTS to change the phase of the Codec Mode Indication in downlink.

The ACK_ERR message serves as a negative acknowledgement that a RATSCCH REQ message has been detected, i.e. the RATSCCH pattern was detected, but could not be decoded correctly (CRC error), or its content is not understandable by the addressee.

Reference

3GPP TS 05.09 sub-clauses: 3.2.2.3.2, 3.2.2.3.4

26.16.9.4.2 Test purpose

This test will verify that the MS can correctly handle an improperly formatted CMI_PHASE_REQ message.

26.16.9.4.3 Method of test

Initial Conditions

System Simulator:

1 cell with default parameters

Mobile Station:

The MS is in the "idle, updated" state, with a TMSI allocated and camped on cell A.

Specific PICS statements:

- Speech supported for Half rate version 3 (HR AMR).

PIXIT statements:

-.

Foreseen Final State of the MS

Idle Updated, TMSI allocated and camped on cell A.

Test Procedure

- 1) User initiates a Mobile Originated call.
- 2) The network and the MS indicate Bearer capabilities IE with the AMR speech Full Rate and Half Rate (Version 3).
- 3) The network performs an assignment on a TCH channel with MultiRate configuration to the MS.
- 4) The call is maintained during a programmable time without variation of RxLev / RxQual.
- 5) The SS shall send the CMI_PHASE_REQ message, with an incorrect CRC, during the call at a programmable time. The CMI_PHASE_REQ shall be sent either in place of a "CMI" speech frame, or in place of a "CMC" speech frame, to cover both kinds of changes.
- 6) The MS answers with a ACK_ERR message within 3 speech frames.
- 7) The network initiates the call release.

This test is repeated for M=1, and where the MS supports half rate version 3 M=2.

Maximum Duration of Test

5 minutes

Expected Sequence

Step	Direction	Message	Comments
1	MS		MS is in idle mode
2	MS		MS initiates Mobile Originated call
3	MS->SS	Channel Request	Establishment cause is "originating call and the network does not set the NECI bit to 1".
4	SS->MS	Immediate Assignment	See Default Messages for AMR
5	MS->SS	CM Service Request	CM Service Type = Mobile Originating Call Establishment.
6	SS->MS	AUTHENTICATION REQUEST	
7	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
8	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
9	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
10	MS->SS	Setup	MS indicates supported speech versions
11	SS->MS	Call Proceeding	
12	SS->MS	Alerting	
13	SS->MS	Assignment Command	See specific message contents.
14	MS->SS	Assignment Complete	
15	SS->MS	Connect	
16	MS->SS	Connect Acknowledge	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	SS->MS	CMI_PHASE_REQ	Message contains an incorrect CRC
19	MS->SS	ACK_ERR	Message must be received within 3 speech frames
20	SS->MS	Disconnect	
21	MS->SS	Release	
22	SS->MS	Release Complete	
23	SS->MS	Channel Release	

Specific Message Contents

ASSIGNMENT COMMAND

Information Element	value/remarks
Channel description	M=1: TCH/F M=2: TCH/H
Mode of the first channel - Mode	Full rate or half rate version 3

CMI_PHASE_REQ

Information Element	value/remarks
CMIP	1 (default)

26.16.9.5 Threshold Change (normal)

26.16.9.5.1 Conformance requirements

The THRESH_REQ message may be sent by the BTS to change the thresholds in the DL Mode Request Generator.

The ACK_OK message serves as an acknowledgement that a RATSCCH_REQ message has been detected, correctly decoded (no CRC error) and that it is defined for the Addressee. It defines the exact activation time in direction from Addressee to Initiator.

Reference:

3GPP TS 05.09 sub-clauses: 3.2.2.3.1, 3.2.2.3.6

26.16.9.5.2 Test purpose

This test will verify that an RATSCCH capable MS is able to handle a properly formatted THRESH_REQ message

26.16.9.5.3 Method of test

Initial Conditions

System Simulator:

1 cell with default parameters

Mobile Station:

The MS is in the "idle, updated" state, with a TMSI allocated and camped on cell A.

Specific PICS statements:

- Speech supported for Half rate version 3 (HR AMR).

PIXIT statements:

-.

Foreseen Final State of the MS

Idle Updated, TMSI allocated and camped on cell A.

Test Procedure

- 1) User initiates a Mobile Originated call.
- 2) The network and the MS indicate Bearer capabilities IE with the AMR speech Full Rate and Half Rate (Version 3).
- 3) The network performs an assignment on a TCH channel with MultiRate configuration to the MS.
- 4) The call is maintained during a programmable time without variation of RxLev / RxQual.
- 5) The SS shall send a properly formatted THRESH_REQ message during the call at a programmable time.
- 6) The MS answers with a ACK_OK message within 3 speech frames
- 7) The network initiates the call release.

This test is repeated for M=1, and where the MS supports half rate version 3 M=2.

Maximum Duration of Test

5 minutes

Expected Sequence

Step	Direction	Message	Comments
1	MS		MS is in idle mode
2	MS		MS initiates Mobile Originated call
3	MS->SS	Channel Request	Establishment cause is "originating call and the network does not set the NECI bit to 1".
4	SS->MS	Immediate Assignment	See Default Messages for AMR
5	MS->SS	CM Service Request	CM Service Type = Mobile Originating Call Establishment.
6	SS->MS	AUTHENTICATION REQUEST	
7	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
8	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
9	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
10	MS->SS	Setup	MS indicates supported speech versions
11	SS->MS	Call Proceeding	
12	SS->MS	Alerting	
13	SS->MS	Assignment Command	See specific message contents.
14	MS->SS	Assignment Complete	
15	SS->MS	Connect	
16	MS->SS	Connect Acknowledge	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	SS->MS	THRESH_REQ	See specific message contents.
19	MS->SS	ACK_OK	Message must be received within 3 speech frames
20	SS->MS	Disconnect	
21	MS->SS	Release	
22	SS->MS	Release Complete	
23	SS->MS	Channel Release	

Specific Message Contents

ASSIGNMENT COMMAND

Information Element	value/remarks
Channel description	M=1: TCH/F M=2: TCH/H
Mode of the first channel - Mode	Full rate or half rate version 3
Multi-Rate configuration	2 codec modes specified

THRESH_REQ

Information Element	value/remarks
HYST3	Not defined (set to all 1s)
THRESH3	Not defined (set to all 1s)
HYST2	Not defined (set to all 1s)
THRESH2	Not defined (set to all 1s)
HYST1	2 dB
THRESH1	12.5 dB

26.16.9.6 Threshold Change (abnormal)

26.16.9.6.1 Conformance requirements

The THRESH_REQ message may be sent by the BTS to change the thresholds in the DL Mode Request Generator.

The ACK_ERR message serves as a negative acknowledgement that a RATSCCH REQ message has been detected, i.e. the RATSCCH pattern was detected, but could not be decoded correctly (CRC error), or its content is not understandable by the addressee.

Reference:

3GPP TS 05.09 sub-clauses: 3.2.2.3.2, 3.2.2.3.6

26.16.9.6.2 Test purpose

This test will verify that an RATSCCH capable MS is able to handle an improperly formatted THRESH_REQ message.

26.16.9.6.3 Method of test

Initial Conditions

System Simulator:

1 cell with default parameters

Mobile Station:

The MS is in the "idle, updated" state, with a TMSI allocated and camped on cell A.

Specific PICS statements:

- Speech supported for Half rate version 3 (HR AMR).

PIXIT statements:

-.

Foreseen Final State of the MS

Idle Updated, TMSI allocated and camped on cell A.

Test Procedure

- 1) User initiates a Mobile Originated call.
- 2) The network and the MS indicate Bearer capabilities IE with the AMR speech Full Rate and Half Rate (Version 3).
- 3) The network performs an assignment on a TCH channel with MultiRate configuration to the MS.
- 4) The call is maintained during a programmable time without variation of RxLev / RxQual.
- 5) The SS shall send an improperly formatted THRESH_REQ message, with an incorrect CRC, during the call at a programmable time.
- 6) The MS answers with a ACK_ERR message within 3 speech frames
- 7) The network initiates the call release.

This test is repeated for M=1, and where the MS supports half rate version 3 M=2.

Maximum Duration of Test

5 minutes

Expected Sequence

Step	Direction	Message	Comments
1	MS		MS is in idle mode
2	MS		MS initiates Mobile Originated call
3	MS->SS	Channel Request	Establishment cause is "originating call and the network does not set the NECI bit to 1".
4	SS->MS	Immediate Assignment	See Default Messages for AMR
5	MS->SS	CM Service Request	CM Service Type = Mobile Originating Call Establishment.
6	SS->MS	AUTHENTICATION REQUEST	
7	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
8	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
9	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
10	MS->SS	Setup	MS indicates supported speech versions
11	SS->MS	Call Proceeding	
12	SS->MS	Alerting	
13	SS->MS	Assignment Command	See specific message contents.
14	MS->SS	Assignment Complete	
15	SS->MS	Connect	
16	MS->SS	Connect Acknowledge	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	SS->MS	THRESH_REQ	Message contains an incorrect CRC
19	MS->SS	ACK_ERR	Message must be received within 3 speech frames
20	SS->MS	Disconnect	
21	MS->SS	Release	
22	SS->MS	Release Complete	
23	SS->MS	Channel Release	

Specific Message Contents

ASSIGNMENT COMMAND

Information Element	value/remarks
Channel description	M=1: TCH/F M=2: TCH/H
Mode of the first channel - Mode	Full rate or half rate version 3

THRESH_REQ

Information Element	value/remarks
HYST3	Not defined (set to all 1s)
THRESH3	Not defined (set to all 1s)
HYST2	Not defined (set to all 1s)
THRESH2	Not defined (set to all 1s)
HYST1	2 dB
THRESH1	12.5 dB

26.16.9.7 Unknown RATSCCH REQ Message

26.16.9.7.1 Conformance requirements

The ACK_UNKNOWN message serves as an acknowledgement that a RATSCCH REQ message has been detected and correctly decoded, but was unknown to the Addressee.

Reference:

3GPP TS 05.09 sub-clause: 3.2.2.3.3

26.16.9.7.2 Test purpose

This test will verify that the MS can correctly handle an unknown RATSCCH REQ message.

26.16.9.7.3 Method of test

Initial Conditions

System Simulator:

1 cell with default parameters

Mobile Station:

The MS is in the "idle, updated" state, with a TMSI allocated and camped on cell A.

Specific PICS statements:

- Speech supported for Half rate version 3 (HR AMR).

PIXIT statements:

-.

Foreseen Final State of the MS

Idle Updated, TMSI allocated and camped on cell A.

Test Procedure

- 1) User initiates a Mobile Originated call.
- 2) The network and the MS indicate Bearer capabilities IE with the AMR speech Full Rate and Half Rate (Version 3).
- 3) The network performs an assignment on a TCH channel with MultiRate configuration to the MS.
- 4) The call is maintained during a programmable time without variation of RxLev /RxQual.
- 5) The SS shall send an unknown RATSCCH_REQ message, with message content as all zeros, during the call at a programmable time.
- 6) The MS answers with a ACK_UNKNOWN message within 3 speech frames
- 7) The network initiates the call release.

This test is repeated for M=1, and where the MS supports half rate version 3 M=2.

Maximum Duration of Test

5 minutes

Expected Sequence

Step	Direction	Message	Comments
1	MS		MS is in idle mode
2	MS		MS initiates Mobile Originated call
3	MS->SS	Channel Request	Establishment cause is "originating call and the network does not set the NECI bit to 1".
4	SS->MS	Immediate Assignment	See Default Messages for AMR
5	MS->SS	CM Service Request	CM Service Type = Mobile Originating Call Establishment.
6	SS->MS	AUTHENTICATION REQUEST	
7	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
8	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
9	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
10	MS->SS	Setup	MS indicates supported speech versions
11	SS->MS	Call Proceeding	
12	SS->MS	Alerting	
13	SS->MS	Assignment Command	See specific message contents.
14	MS->SS	Assignment Complete	
15	SS->MS	Connect	
16	MS->SS	Connect Acknowledge	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	SS->MS	Unknown RATSCCH message	Message contents all 0's
19	MS->SS	ACK_UNKNOWN	Message must be received within 3 speech frames
20	SS->MS	Disconnect	
21	MS->SS	Release	
22	SS->MS	Release Complete	
23	SS->MS	Channel Release	

Specific Message Contents

ASSIGNMENT COMMAND

Information Element	value/remarks
Channel description	M=1: TCH/F M=2: TCH/H
Mode of the first channel - Mode	Full rate or half rate version 3

RATSCCH_REQ

Information Element	value/remarks
all bits	0

26.16.9.8 Ignore subsequent REQ prior to expiry of REQ_Activation counter

26.16.9.8.1 Conformance requirements

If another REQ message is received by the MS before the REQ_Activation counter has elapsed, the MS shall ignore the message.

Reference:

3GPP TS 45.009 sub-clause: 3.2.2.2

26.16.9.8.2 Test purpose

This test will verify that the MS ignores a REQ message which is received before the REQ_Activation counter has elapsed. The test will verify that both the following conditions are satisfied:

- the MS ignores a subsequent REQ message received after it has sent the ACK_OK but before the REQ_Activation counter has elapsed.

26.16.9.8.3 Method of test

Initial Conditions

System Simulator:

1 cell with default parameters

Mobile Station:

The MS is in the "idle, updated" state, with a TMSI allocated and camped on cell A.

Specific PICS statements:

- Speech supported for Half rate version 3 (HR AMR).

PIXIT statements:

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Foreseen Final State of the MS

Idle Updated, TMSI allocated and camped on cell A.

Test Procedure

- 1) User initiates a Mobile Originated call.
- 2) The network and the MS indicate Bearer capabilities IE with the AMR speech Full Rate and Half Rate (Version 3).
- 3) The network performs an assignment on a TCH channel with MultiRate configuration to the MS.
- 4) The call is maintained during a programmable time without variation of RxLev / RxQual.
- 5) The SS shall send an AMR_CONFIG_REQ message during the call at a programmable time.
- 6) The MS answers the AMR_CONFIG_REQ with an ACK_OK message within 3 speech frames of the AMR_CONFIG_REQ.
- 7) The SS shall send a second AMR_CONFIG_REQ message within 11 speech frames of sending the first AMR_CONFIG_REQ message .
- 8) The SS shall verify that the codec mode used by the MS after the REQ_Activation counter has elapsed is consistent with the first AMR_CONFIG_REQ message, and not the second AMR_CONFIG_REQ message.
- 9) The SS initiates the call release.

This test is repeated for M=1, and where the MS supports half rate version 3 M=2.

Maximum Duration of Test

5 minutes

Expected Sequence

Step	Direction	Message	Comments
1	MS		MS is in idle mode
2	MS		MS initiates Mobile Originated call
3	MS->SS	Channel Request	Establishment cause is "originating call and the network does not set the NECI bit to 1".
4	SS->MS	Immediate Assignment	See Default Messages for AMR
5	MS->SS	CM Service Request	CM Service Type = Mobile Originating Call Establishment.
6	SS->MS	AUTHENTICATION REQUEST	
7	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
8	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
9	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
10	MS->SS	Setup	MS indicates supported speech versions
11	SS->MS	Call Proceeding	
12	SS->MS	Alerting	
13	SS->MS	Assignment Command	See specific message contents.
14	MS->SS	Assignment Complete	
15	SS->MS	Connect	
16	MS->SS	Connect Acknowledge	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	SS->MS	AMR_CONFIG_REQ	See specific message contents.
19	MS->SS	ACK_OK	Message must be received within 3 speech frames
20	SS->MS	AMR_CONFIG_REQ	See specific message contents. To be sent to MS within 11 speech frames of having sent the first message in step 18.
21	MS		Verify that the codec mode used by the MS is that specified in step 18.
22	SS->MS	Disconnect	
23	MS->SS	Release	
24	SS->MS	Release Complete	
25	SS->MS	Channel Release	

Specific Message Contents

ASSIGNMENT COMMAND

Information Element	value/remarks
Channel description	M=1: TCH/F M=2: TCH/H
Mode of the first channel - Mode	Full rate or half rate version 3.

AMR_CONFIG_REQ

In step 18:

Information Element	value/remarks
ICM	CODEC_MODE_1
ACS	2 codec modes
HYST2	Not defined (set to all 1s)
THRESH2	Not defined (set to all 1s)
HYST1	2 dB
THRESH1	12.5 dB

In step 20:

Information Element	value/remarks
ICM	CODEC_MODE_1
ACS	1 codec mode – different to any codec mode specified in the ACS in step 18.
HYST2	Not defined (set to all 1s)
THRESH2	Not defined (set to all 1s)
HYST1	Not defined (set to all 1s)
THRESH1	Not defined (set to all 1s)

26.16.9.9 Initiation of Transaction with ACK_ERR or ACK_UNKNOWN

26.16.9.9.1 Conformance requirements

If at either side an ACK_ERR or ACK_UNKNOWN is received although no corresponding REQ has been sent before, the ACK message shall be ignored.

Reference:

3GPP TS 45.009 sub-clause: 3.2.2.2

26.16.9.9.2 Test purpose

This test will verify that the MS ignores any ACK_ERR or ACK_UNKNOWN which is received without a corresponding REQ having been sent.

26.16.9.9.3 Method of test

Initial Conditions

System Simulator:

1 cell with default parameters

Mobile Station:

The MS is in the "idle, updated" state, with a TMSI allocated and camped on cell A.

Specific PICS statements:

- Speech supported for Half rate version 3 (HR AMR).

PIXIT statements:

..

Foreseen Final State of the MS

Idle Updated, TMSI allocated and camped on cell A.

Test Procedure

- 1) User initiates a Mobile Originated call.
- 2) The network and the MS indicate Bearer capabilities IE with the AMR speech Full Rate and Half Rate (Version 3).
- 3) The network performs an assignment on a TCH channel with MultiRate configuration to the MS.
- 4) The call is maintained during a programmable time without variation of RxLev / RxQual.
- 5) The SS shall send an ACK_ERR message during the call at a programmable time.
- 6) The SS verifies that no message is received from the MS on the RATSCCH within 12 speech frames.
- 7) The SS shall send an ACK_UNKNOWN message during the call at a programmable time.

- 8) The SS verifies that no message is received from the MS on the RATSCCH within 12 speech frames.
 9) The network initiates the call release.

This test is repeated for M=1, and where the MS supports half rate version 3 M=2.

Maximum Duration of Test

5 minutes

Expected Sequence

Step	Direction	Message	Comments
1	MS		MS is in idle mode
2	MS		MS initiates Mobile Originated call
3	MS->SS	Channel Request	Establishment cause is "originating call and the network does not set the NECI bit to 1".
4	SS->MS	Immediate Assignment	See Default Messages for AMR
5	MS->SS	CM Service Request	CM Service Type = Mobile Originating Call Establishment.
6	SS->MS	AUTHENTICATION REQUEST	
7	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
8	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
9	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
10	MS->SS	Setup	MS indicates supported speech versions
11	SS->MS	Call Proceeding	
12	SS->MS	Alerting	
13	SS->MS	Assignment Command	See specific message contents for codec modes.
14	MS->SS	Assignment Complete	
15	SS->MS	Connect	
16	MS->SS	Connect Acknowledge	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	SS->MS	ACK_ERR	
19	MS		Wait at least 12 speech frames to ensure that no message is received from the MS.
20	SS->MS	ACK_UNKNOWN	
21	MS		Wait at least 12 speech frames to ensure that no message is received from the MS.
22	SS->MS	Disconnect	
23	MS->SS	Release	
24	SS->MS	Release Complete	
25	SS->MS	Channel Release	

Specific Message Contents

ASSIGNMENT COMMAND

Information Element	value/remarks
Channel description	M=1: TCH/F M=2: TCH/H
Mode of the first channel - Mode	Full rate or half rate version 3

26.16.9.10 Inversion of the Phase of the CMR/CMI

26.16.9.10.1 Conformance requirements

The phase of the Codec Mode Indication in the downlink can be changed during a call by using a CMI_PHASE_REQ message sent on the RATSCCH.

The CMI_PHASE_REQ message may be sent by the BTS during a call to change the phase of the Codec Mode Indication in the downlink without interruption of the speech transmission.

The ACK_OK message serves as an acknowledgement that a RATSCCH REQ message has been detected, correctly decoded (no CRC error) and that it is defined for the Addressee.

References:

3GPP TS 05.09 clauses 3.2.1.3 and 3.2.2.3.4.

26.16.9.10.2 Test purpose

This test shall verify that the MS is able to change the phase of the Codec Mode Indication in the downlink using the RATSCCH protocol.

26.16.9.10.3 Method of test

Initial Conditions

System Simulator:

1 cell with default parameters

Mobile Station:

The MS is in the "idle, updated" state, with a TMSI allocated and camped on cell A.

Specific PICS statements:

- Speech supported for Half rate version 3 (HR AMR).

PIXIT statements:

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Foreseen Final State of the MS

Idle Updated, TMSI allocated and camped on cell A.

Test Procedure

- 1) User initiates a Mobile Originated call.
- 2) The network and the MS indicate Bearer capabilities IE with the AMR speech Full Rate and Half Rate (Version 3).
- 3) The network performs an assignment on a TCH channel with MultiRate configuration to the MS.
- 4) The network shall indicate Codec Mode Command = 0 and Codec Mode Indication = 1.
- 5) The SS sends a series of CMI_PHASE_REQ messages during the call to change the phase of the Codec Mode Indication in the downlink.
- 6) The MS responds to each CMI_PHASE_REQ message with an ACK_OK message on the RATSCCH.
- 7) The SS shall ensure that the phase request has been handled correctly by checking the Uplink CMI = 0 for 20 speech frames following the receipt of the ACK_OK.
- 8) The network initiates the call release.

This test is repeated for M=1, and where the MS supports half rate version 3 M=2.

Maximum Duration of Test

5 minutes

Expected Sequence

Step	Direction	Message	Comments
1	MS		MS is in idle mode
2	MS		MS initiates Mobile Originated call
3	MS->SS	Channel Request	Establishment cause is "originating call and the network does not set the NECI bit to 1".
4	SS->MS	Immediate Assignment	See Default Messages for AMR
5	MS->SS	CM Service Request	CM Service Type = Mobile Originating Call Establishment.
6	SS->MS	AUTHENTICATION REQUEST	
7	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
8	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
9	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
10	SS->MS	Setup	AMR speech
11	MS->SS	Call Proceeding	
12	MS->SS	Alerting	
13	SS->MS	Assignment Command	Multirate Configuration for 2 codec modes
14	MS->SS	Assignment Complete	
15	SS->MS	Connect	
16	MS->SS	Connect Acknowledge	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	SS->MS	CMI_PHASE_REQ	See specific message contents
19	MS->SS	ACK_OK	
20	MS		Wait 20 speech frames, then check that UL CMI = 0
21	SS->MS	CMI_PHASE_REQ	See specific message contents
22	MS->SS	ACK_OK	
23	MS		Wait 20 speech frames, then check that UL CMI = 0
24	SS->MS	CMI_PHASE_REQ	See specific message contents
25	MS->SS	ACK_OK	
26	MS		Wait 20 speech frames, then check that UL CMI = 0
27	SS->MS	CMI_PHASE_REQ	See specific message contents
28	MS->SS	ACK_OK	
29	MS		Wait 20 speech frames, then check that UL CMI = 0
30	SS->MS	Disconnect	
31	MS->SS	Release	
32	SS->MS	Release Complete	
33	SS->MS	Channel Release	

Specific Message Contents

ASSIGNMENT COMMAND

Information Element	value/remarks
Channel description	M=1: TCH/F M=2: TCH/H
Mode of the first channel - Mode	Full rate or half rate version 3.

In step 18:

CMI_PHASE_REQ

Information Element	value/remark
CMIP	0: CMI transmitted in even speech frames

This message should be sent in a RATSCCH frame where the RATSCCH frame (or RATSCCH_DATA part for AHS) replaces a speech frame which would have carried a Codec Mode Command.

In step 21:

CMI_PHASE_REQ

Information Element	value/remark
CMIP	1: CMI transmitted in odd speech frames (back to default)

This message should be sent in a RATSCCH frame where the RATSCCH frame (or RATSCCH_DATA part for AHS) replaces a speech frame which would have carried a Codec Mode Command.

In step 24:

CMI_PHASE_REQ

Information Element	value/remark
CMIP	0: CMI transmitted in even speech frames

This message should be sent in a RATSCCH frame where the RATSCCH frame (or RATSCCH_DATA part for AHS) replaces a speech frame which would have carried a Codec Mode Indication.

In step 27:

CMI_PHASE_REQ

Information Element	value/remark
CMIP	1: CMI transmitted in odd speech frames (back to default)

This message should be sent in a RATSCCH frame where the RATSCCH frame (or RATSCCH_DATA part for AHS) replaces a speech frame which would have carried a Codec Mode Indication.

26.16.9.11 Change of Active Codec Set

26.16.9.11.1 Conformance requirements

AMR codec mode adaptation is done within a set of 4 codec modes. The codec mode set (Active Codec Set) to be used by the BSS and the MS is defined during call setup and/or handover by layer 3 signalling. The ACS can be changed during a call using an AMR_CONFIG_REQ message sent on the RATSCCH.

The AMR_CONFIG_REQ message may be sent by the BTS during a call to change the AMR configuration on the radio interface without interruption of the speech transmission.

The ACK_OK message serves as an acknowledgement that a RATSCCH REQ message has been detected, correctly decoded (no CRC error) and that it is defined for the Addressee.

If the ACS consists of four modes, then the complete set of thresholds/hysteresis can not be sent with this message. In that case, all THRESH_j and HYST_j fields are reserved for future use and shall be set to "1". Similar, if the BTS has no threshold and hysteresis parameters for the given configuration, then all THRESH_j and HYST_j field bits shall be set to "1" to indicate that they are undefined. The THRESH_REQ message shall be used to transmit these parameters at a later point in time. As long as the MS has no defined threshold and hysteresis parameters it shall use the Initial Codec Mode for the Codec Mode Request.

References:

3GPP TS 05.09 clauses 3.2.2.3.5 and 3.4.

26.16.9.11.2 Test purpose

This test shall verify that the MS is able to change its Active Codec Set using the RATSCCH protocol, with change of thresholds, and with non-specification of thresholds.

26.16.9.11.3 Method of test

Initial Conditions

System Simulator:

1 cell with default parameters

Mobile Station:

The MS is in the "idle, updated" state, with a TMSI allocated and camped on cell A.

Specific PICS statements:

- Speech supported for Half rate version 3 (HR AMR).

PIXIT statements:

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Foreseen Final State of the MS

Idle Updated, TMSI allocated and camped on cell A.

Test Procedure

- 1) User initiates a Mobile Originated call.
- 2) The network and the MS indicate Bearer capabilities IE with the AMR speech Full Rate and Half Rate (Version 3).
- 3) The network performs an assignment on a TCH channel with MultiRate configuration to the MS.
- 4) The SS uses the codec with the highest bit-rate in the current ACS for the Codec Mode Indication, and that with the lowest bit-rate for the Codec Mode Command.
- 5) The SS sends an AMR_CONFIG_REQ message during the call to reconfigure the Multirate settings.
- 6) The MS responds to each AMR_CONFIG_REQ message with an ACK_OK message on the RATSCCH.
- 7) The SS shall ensure that the change occurs correctly for downlink (12 speech frames after AMR_CONFIG_REQ message was sent), and for uplink (12 speech frames after ACK_OK was received) by checking parity of received speech frames, and correct implementation of Uplink Codec mode Request.
- 8) The SS shall ensure that each of the codecs in the ACS have been implemented correctly by setting the CMC to each of the applicable modes, and ensuring that the UL frames with each CMI are received without parity error. The SS shall then set the CMI and CMC to the codec with highest and lowest bit rates respectively.
- 9) Steps 4 to 8 shall be repeated for differing AMR_CONFIG_REQ parameters and sending conditions.
- 10) The network initiates the call release.

This test is repeated for M=1, and where the MS supports half rate version 3 M=2.

Maximum Duration of Test

5 minutes

Expected Sequence

Step	Direction	Message	Comments
1	MS		MS is in idle mode
2	MS		MS initiates Mobile Originated call
3	MS->SS	Channel Request	Establishment cause is "originating call and the network does not set the NECI bit to 1".
4	SS->MS	Immediate Assignment	See Default Messages for AMR
5	MS->SS	CM Service Request	CM Service Type = Mobile Originating Call Establishment.
6	SS->MS	AUTHENTICATION REQUEST	
7	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
8	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
9	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
10	MS->SS	Setup	AMR speech
11	SS->MS	Call Proceeding	
12	SS->MS	Alerting	
13	SS->MS	Assignment Command	Multirate Configuration for 2 codec modes
14	MS->SS	Assignment Complete	
15	SS->MS	Connect	
16	MS->SS	Connect Acknowledge	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	SS->MS	AMR_CONFIG_REQ	See specific message contents.
19	MS->SS	ACK_OK	
20	MS		Check that ACS changes have been implemented correctly. Expected CMR = 0.
21	SS->MS	AMR_CONFIG_REQ	See specific message contents.
22	MS->SS	ACK_OK	
23	MS		Check that ACS changes have been implemented correctly. Expected CMR = 0 or 1.
24	SS->MS	AMR_CONFIG_REQ	See specific message contents.
25	MS->SS	ACK_OK	
26	MS		Check that ACS changes have been implemented correctly. Expected CMR = 0, 1 or 2.
27	SS->MS	AMR_CONFIG_REQ	See specific message contents.
28	MS->SS	ACK_OK	
29	MS		Check that ACS changes have been implemented correctly. Expected CMR = 0, 1, 2 or 3.
30	SS->MS	AMR_CONFIG_REQ	See specific message contents.
31	MS->SS	ACK_OK	
32	MS		Check that ACS changes have been implemented correctly. Expected CMR = 2 (special case where CMR = ICM).
33	SS->MS	Disconnect	
34	MS->SS	Release	
35	SS->MS	Release Complete	
36	SS->MS	Channel Release	

Specific Message Contents

In all cases, the Active Codec Set field of the AMR_CONFIG_REQ messages should be programmed to ensure that the codec rate changes when the new configuration takes effect.

ASSIGNMENT COMMAND

Information Element	value/remarks
Channel description	M=1: TCH/F M=2: TCH/H
Mode of the first channel - Mode Multi-Rate configuration	Full rate or half rate version 3. Arbitrary set of codec modes, thresholds and hysteresis specified according to 3GPP TS 05.09 / 45.009

In step 18:

AMR_CONFIG_REQ

Information Element	value/remark
ICM	CODEC_MODE_1
ACS	1 codec mode (different from that in Assignment Command)
HYST2	n/a – set to all 1's
THRESH2	n/a – set to all 1's
HYST1	n/a – set to all 1's
THRESH1	n/a – set to all 1's

This message should be sent in a RATSCCH frame where the RATSCCH frame (or RATSCCH_DATA part for AHS) replaces a speech frame which would have carried a Codec Mode Command.

In step 21:

AMR_CONFIG_REQ

Information Element	value/remark
ICM	CODEC_MODE_1
ACS	2 codec modes
HYST2	n/a – set to all 1's
THRESH2	n/a – set to all 1's
HYST1	2 dB
THRESH1	12.5 dB

This message should be sent in a RATSCCH frame where the RATSCCH frame (or RATSCCH_DATA part for AHS) replaces a speech frame which would have carried a Codec Mode Command.

In step 24:

AMR_CONFIG_REQ

Information Element	value/remark
ICM	CODEC_MODE_2
ACS	3 codec modes
HYST2	2 dB
THRESH2	13 dB
HYST1	2 dB
THRESH1	7 dB

This message should be sent in a RATSCCH frame where the RATSCCH frame (or RATSCCH_DATA part for AHS) replaces a speech frame which would have carried a Codec Mode Indication.

In step 27:

AMR_CONFIG_REQ

Information Element	value/remark
ICM	CODEC_MODE_3
ACS	4 codec modes
HYSTc	2 dB
THRESH3	18 dB
THRESH2	12 dB
THRESH1	6.5 dB

This message should be sent in a RATSCCH frame where the RATSCCH frame (or RATSCCH_DATA part for AHS) replaces a speech frame which would have carried a Codec Mode Indication.

In step 30:

AMR_CONFIG_REQ

Information Element	value/remark
ICM	CODEC_MODE_3
ACS	4 codec modes
HYST2	Undefined – set to all 1's
THRESH2	Undefined – set to all 1's
HYST1	Undefined – set to all 1's
THRESH1	Undefined – set to all 1's

This message should be sent in a RATSCCH frame where the RATSCCH frame (or RATSCCH_DATA part for AHS) replaces a speech frame which would have carried a Codec Mode Command.

26.16.9.12 Void

26.16.10 AMR signalling/ test of the channel mode modify procedure

NOTE: This test is derived from the test in sub-clause 26.12.1 entitled "EFR signalling / Test of the channel mode modify procedure".

26.16.10.1 AMR signalling/ test of the channel mode modify procedure/ full rate

26.16.10.1.1 Conformance requirement

The MS with a TCH/F allocated acknowledges a CHANNEL MODE MODIFY message by sending a CHANNEL MODE MODIFY ACKNOWLEDGE message specifying the new mode and by switching to this mode.

References

3GPP TS 04.08 / 3GPP TS 44.018, subclauses 3.4.6.1.1 and 3.4.6.1.2

26.16.10.1.2 Test purpose

To verify that the MS with a TCH/F allocated acknowledges a CHANNEL MODE MODIFY message by sending a CHANNEL MODE MODIFY ACKNOWLEDGE message specifying the new mode and by switching to this mode.

26.16.10.1.3 Method of test

Initial Conditions

System Simulator: 1 cell, default parameters.

Mobile Station: The MS is "idle updated", with TMSI allocated.

Specific PICS statements:

–.

PIXIT statements:

-.

Foreseen Final State of the MS

"Idle, updated", with TMSI allocated.

Test procedure

A Mobile Terminated call is initiated, however following the CHANNEL REQUEST received from the Mobile Station, the SS sends an IMMEDIATE ASSIGNMENT to the MS commanding it to go to a TCH/F. This sets the Channel Mode automatically to "Signalling Only".

The SS then sends a series of CHANNEL MODE MODIFY messages to the MS. Each time it is checked that the MS responds with a CHANNEL MODE MODIFY ACKNOWLEDGE message specifying the channel mode that has been specified in the CHANNEL MODE MODIFY message

Maximum Duration of Test

30 seconds.

Expected Sequence

Step	Direction	Message	Comments
1	SS->MS	PAGING REQUEST TYPE 1	Sent on correct paging subchannel
2	MS->SS	CHANNEL REQUEST	Establishment cause indicates "answer to paging"
3	SS->MS	IMMEDIATE ASSIGNMENT	Assignment to a non hopping TCH/F signalling only
4	MS->SS	PAGING RESPONSE	Message is contained in the SABM
5	SS->MS	AUTHENTICATION REQUEST	
6	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
7	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
8	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
9	SS		SS starts ciphering
10	SS->MS	CHANNEL MODE MODIFY	
11	MS->SS	CHANNEL MODE MODIFY ACKNOWLEDGE	Verify that Channel description = TCH/F, Channel mode = speech full or half rate version 3
12	SS->MS	CHANNEL MODE MODIFY	
13	MS->SS	CHANNEL MODE MODIFY ACKNOWLEDGE	Verify that Channel description = TCH/F, Channel mode = speech full or half rate version 3
14	SS->MS	CHANNEL MODE MODIFY	
15	MS->SS	CHANNEL MODE MODIFY ACKNOWLEDGE	Verify that Channel description = TCH/F, Channel mode = speech full or half rate version 3
16	SS->MS	CHANNEL MODE MODIFY	
17	MS->SS	CHANNEL MODE MODIFY ACKNOWLEDGE	Verify that Channel description = TCH/F, Channel mode = speech full or half rate version 3
18	SS->MS	CHANNEL RELEASE	

Specific Message Contents

In steps 10 – 16:

CHANNEL MODE MODIFY

Information Element	value/remark
Channel description	in steps 10, 12, 14, 16: same as for step 3
Channel mode	speech full or half rate version 3
Mode	
Multi-Rate configuration	in steps 10: change of MR configuration, no initial codec mode in steps 12: change of MR configuration, initial codec mode specified in steps 14: change of MR thresholds, no initial codec mode in steps 16: initial codec mode specified

26.16.10.2 AMR signalling/ test of the channel mode modify procedure/ half rate

26.16.10.2.1 Conformance requirement

The MS with a TCH/H allocated acknowledges a CHANNEL MODE MODIFY message by sending a CHANNEL MODE MODIFY ACKNOWLEDGE message specifying the new mode and by switching to this mode.

References

3GPP TS 04.08 / 3GPP TS 44.018, subclauses 3.4.6.1.1 and 3.4.6.1.2

26.16.10.2.2 Test purpose

To verify that the MS with a TCH/H allocated acknowledges a CHANNEL MODE MODIFY message by sending a CHANNEL MODE MODIFY ACKNOWLEDGE message specifying the new mode and by switching to this mode.

26.16.10.2.3 Method of test

Initial Conditions

System Simulator: 1 cell, default parameters.

Mobile Station: The MS is "idle updated", with TMSI allocated.

Specific PICS statements:

..

PIXIT statements:

..

Foreseen Final State of the MS

"Idle, updated", with TMSI allocated.

Test procedure

A Mobile Terminated call is initiated, however following the CHANNEL REQUEST received from the Mobile Station, the SS sends an IMMEDIATE ASSIGNMENT to the MS commanding it to go to a TCH/H. This sets the Channel Mode automatically to "Signalling Only".

The SS then sends a series of CHANNEL MODE MODIFY messages to the MS. Each time it is checked that the MS responds with a CHANNEL MODE MODIFY ACKNOWLEDGE message specifying the channel mode that has been specified in the CHANNEL MODE MODIFY message

Maximum Duration of Test

30 seconds.

Expected Sequence

Step	Direction	Message	Comments
1	SS->MS	PAGING REQUEST TYPE 1	Sent on correct paging subchannel
2	MS->SS	CHANNEL REQUEST	Establishment cause indicates "answer to paging"
3	SS->MS	IMMEDIATE ASSIGNMENT	Assignment to a non hopping TCH/H signalling only
4	MS->SS	PAGING RESPONSE	Message is contained in the SABM
5	SS->MS	AUTHENTICATION REQUEST	
6	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
7	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
8	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
9	SS		SS starts ciphering
10	SS->MS	CHANNEL MODE MODIFY	
11	MS->SS	CHANNEL MODE MODIFY ACKNOWLEDGE	Verify that Channel description = TCH/H, Channel mode = speech full or half rate version 3
12	SS->MS	CHANNEL MODE MODIFY	
13	MS->SS	CHANNEL MODE MODIFY ACKNOWLEDGE	Verify that Channel description = TCH/H, Channel mode = speech full or half rate version 3
14	SS->MS	CHANNEL MODE MODIFY	
15	MS->SS	CHANNEL MODE MODIFY ACKNOWLEDGE	Verify that Channel description = TCH/H, Channel mode = speech full or half rate version 3
16	SS->MS	CHANNEL MODE MODIFY	
17	MS->SS	CHANNEL MODE MODIFY ACKNOWLEDGE	Verify that Channel description = TCH/H, Channel mode = speech full or half rate version 3
18	SS->MS	CHANNEL RELEASE	

Specific Message Contents

In steps 10 – 16:

CHANNEL MODE MODIFY

Information Element	value/remark
Channel description	in steps 10, 12, 14, 16: same as for step 3
Channel mode	
Mode	speech full or half rate version 3
Multi-Rate configuration	in steps 10: change of MR configuration, no initial codec mode
	in steps 12: change of MR configuration, initial codec mode specified
	in steps 14: change of MR thresholds, no initial codec mode
	in steps 16: initial codec mode specified

26.16.11 Handover / layer 1 failure

Note: This test is derived from 26.6.5.9 Handover / layer 1 failure.

26.16.11.1 Conformance requirements

The MS shall return to the old channel in the case of a handover failure caused by a layer 1 failure on the target cell. On the old channel the MS shall use the AMR Parameters that it was previously using on that channel.

References

3GPP TS 04.08 / 3GPP TS 44.018 section 3.4.4.

26.16.11.2 Test purpose

To verify the contents in the message HANDOVER FAILURE .

To verify the mobile returns to the correct channel configuration prior to handover following the handover failure.

26.16.11.3 Method of test

Initial Conditions

System Simulator:

2 cells with same LAI, default parameters.

Mobile Station:

The MS is in the active state (U10) of a call (on cell A). Used power level is the maximum supported by the MS.

Specific PICS statements:

- Speech supported for Half rate version 3 (HR AMR).
- Speech supported for Full rate version 2 (GSM EFR)
- Speech supported for Half rate version 1 (GSM HR)

PIXIT statements:

-.

Foreseen Final State of the MS

The active state (U10) of a mobile call (on cell A). Used power level is the maximum supported by the MS.

Test Procedure

The MS is in the active state (U10) of a call on cell A. The SS sends a HANOVER COMMAND on the main DCCH. The MS shall begin to send access bursts at the commanded power level on the new DCCH (and optionally on the SACCH) to cell B. With the exception of normal BCCH signalling, the SS does not transmit anything on cell B (thus causing a time-out of T3124). The MS shall re-establish the old link on cell A and send a HANOVER FAILURE within 3 seconds from the transmission of HANOVER COMMAND.

Maximum Duration of Test

10 minutes

Expected Sequence

This test is repeated for M=1, M=2 (only if MS supports half rate version 3), M=3, M=4, M=5 (only if MS supports half rate version 3), M=6 (only if MS supports half rate version 3), M=7 (only if MS supports full rate version 2), M=8 (only if MS supports half rate version 1).

This test is repeated for K=1, K=2 (only if MS supports half rate version 3).

Step	Direction	Message	Comments
1	SS	-	The MS and SS are in the active state of a call on a Multirate channel (full rate version 3 where K=1 or half rate version 3 where K=2).
2	SS -> MS	HANOVER COMMAND	Channel description: non-hopping. Synchronization Indication: non synchronized.
3	MS -> SS	HANOVER ACCESS	Several messages are sent, all with correct Handover References.
4	MS -> SS	HANOVER FAILURE	Sent on old channel, RR cause value = "Abnormal release, unspecified", "Abnormal release, channel unacceptable", "Abnormal release, timer expired", "Abnormal release, no activity on the radio path" or "Protocol error unspecified". Shall be sent within 3 seconds from the transmission of HANOVER COMMAND.
5	MS	-	The SS checks that the codec mode used by the MS is the same as in step 1.

Specific Message Contents

M=1

HANDOVER COMMAND

Information Element	value/remark
Channel description	TCH/F
Channel mode	
Mode	Speech full or half rate version 3
Multi-Rate configuration	Not specified

M=2

This sequence shall not be performed when $K = 1$. This step is applicable only if the MS supports half rate version 3.

HANDOVER COMMAND

Information Element	value/remark
Channel description	TCH/H
Channel mode	
Mode	Speech full or half rate version 3
Multi-Rate configuration	Not specified

M=3

HANDOVER COMMAND

Information Element	value/remark
Channel description	TCH/F
Channel mode	
Mode	Speech full or half rate version 3
Multi-Rate configuration	ICMI = 0 Arbitrary set of codec modes, thresholds and hysteresis specified according to 3GPP TS 05.09 / 45.009

M=4

HANDOVER COMMAND

Information Element	value/remark
Channel description	TCH/F
Channel mode	
Mode	Speech full or half rate version 3
Multi-Rate configuration	ICMI = 1 Arbitrary set of codec modes, thresholds and hysteresis specified according to 3GPP TS 05.09 / 45.009

M=5

This step is applicable only if the MS supports half rate version 3.

HANDOVER COMMAND

Information Element	value/remark
Channel description	TCH/H
Channel mode	
Mode	Speech full or half rate version 3
Multi-Rate configuration	ICMI = 0 Arbitrary set of codec modes, thresholds and hysteresis specified according to 3GPP TS 05.09 / 45.009

M=6

This step is applicable only if the MS supports half rate version 3.

HANDOVER COMMAND

Information Element	value/remark
Channel description Channel mode Mode Multi-Rate configuration	TCH/H Speech full or half rate version 3 ICMI = 1 Arbitrary set of codec modes, thresholds and hysteresis specified according to 3GPP TS 05.09 / 45.009

M=7

This step is applicable only if the MS supports full rate version 2.

HANDOVER COMMAND

Information Element	value/remark
Channel description Channel mode Mode	TCH/F Speech full or half rate version 2

M=8

This step is applicable only if the MS supports half rate version 1.

HANDOVER COMMAND

Information Element	value/remark
Channel description Channel mode Mode	TCH/H Speech full or half rate version 1

K=1

ASSIGNMENT COMMAND

Information Element	value/remark
Channel description Channel mode Mode Multi-Rate configuration	TCH/F Speech full or half rate version 3 Arbitrary set of codec modes, thresholds and hysteresis specified according to 3GPP TS 05.09 / 45.009

K=2

This step is applicable only if the MS supports half rate version 3.

ASSIGNMENT COMMAND

Information Element	value/remark
Channel description Channel mode Mode Multi-Rate configuration	TCH/H Speech full or half rate version 3 Arbitrary set of codec modes, thresholds and hysteresis specified according to 3GPP TS 05.09 / 45.009

26.17 Adaptive Multi Rate Signalling – 8PSK

26.17.1 Void

26.17.2 Inband Signalling, Uplink Codec Adaptation

26.17.2.1 Conformance Requirement

The MS shall after reception of a Codec Mode Command apply the corresponding codec mode in the uplink direction for the next possible speech frame and no more than three speech frames later.

NOTE: This test is not intended to verify these conformance requirements, but to verify the correctness of the involved layer 1 and layer 3 signalling.

References:

3GPP TS 45.009 subclauses 3.3 and 3.4.

26.17.2.2 Test Purpose

This test is concerned with the link adaptation for AMR uplink and the related inband signalling. The test shall verify that the MS in the uplink direction applies the codec mode indicated by the network transmitted Codec Mode Commands, and that the MS correctly signals the used codec as Codec Mode Indication in the uplink inband signalling.

NOTE: The inband signals are L1 signalling transmitted every speech frame, as defined in 3GPP TS 45.009: In uplink directions Codec Mode Requests and Codec Mode Indications are transmitted alternately, whereas downlink signalling contains of alternately Codec Mode Commands and Codec Mode Indications.

26.17.2.3 Method of Test

Initial Conditions

The MS is "idle updated", with TMSI allocated.

Specific PICS statements:

-

PIXIT statements:

-

Foreseen Final State of MS

"Idle, updated", with TMSI allocated.

Test Procedure

- a) A mobile originated call is initiated, following the CHANNEL REQUEST received from the MS the SS sends an IMMEDIATE ASSIGNMENT to the MS commanding it to go to a SDCCH. The MS indicates to the SS that it supports the multi-rate speech codec. The SS allocates the MS a O-TCH/AHS and signals the allowed codec subset and adaptation thresholds as part of the ASSIGNMENT COMMAND. DTX shall not be activated. Hopping is activated. The hopping band is centred around an ARFCN in the Mid ARFCN range. The hopping frequencies are chosen from those defined in clause 6.

The following active codec mode subset shall apply:

Codec Mode	O-TCH/AHS in kbit/s
CODEC_MODE_1	4,75
CODEC_MODE_2	5,9
CODEC_MODE_3	7,95
CODEC_MODE_4	12,2

The following decision threshold and hysteresis values in terms of normalized carrier to interference ratio (C/I_{nom}), shall apply for Codec Mode Command / Request (MC', MR'):

MC'MR'	THR_MC_Dn(MC')/ THR_MR_Dn(MR')	THR_MC_Up(MC')/ THR_MR_Up(MR')
CODEC_MODE_4	16,5 dB	+ ∞
CODEC_MODE_3	11,5 dB	18,5 dB
CODEC_MODE_2	6,5 dB	13,5 dB
CODEC_MODE_1	- ∞	8,5 dB

- b) The SS signals that a new codec is wanted in uplink direction by changing the value of the Codec Mode Command. The MS shall apply the commanded mode in uplink by changing the mode and correspondingly the value of the Codec Mode Indication to match the used codec. This is repeated for all neighbouring mode transitions in the Active Codec Set.

Maximum Duration of Test

2 minutes

Expected Sequence in step b)

Step	Direction	Message	Comments
1	SS->MS	Codec Mode Command change	Codec Mode 3 is commanded by inband signalling
2	MS->SS	Codec Mode Indication change	Codec Mode Indication shows current active mode in uplink, thus changed when mode changes
3	SS->MS	Codec Mode Command change	Codec Mode 2 is commanded by inband signalling
4	MS->SS	Codec Mode Indication change	Codec Mode 2 is indicated in inband signalling with first frame using Codec Mode 2
5	SS->MS	Codec Mode Command change	Codec Mode 1 is commanded by changing inband signal
6	MS->SS	Codec Mode Indication change	Codec Mode 1 is indicated in inband signalling with first frame using Codec Mode 1.
7	SS->MS	Codec Mode Command change	Codec Mode 2 is commanded by changing inband signal
8	MS->SS	Codec Mode Indication change	Codec Mode 2 is indicated in inband signalling with first frame using Codec Mode 2.
9	SS->MS	Codec Mode Command change	Codec Mode 3 is commanded by changing inband signal
10	MS->SS	Codec Mode Indication change	Codec Mode 3 is indicated in inband signalling with first frame using Codec Mode 3.
11	SS->MS	Codec Mode Command change	Codec Mode 4 is commanded by changing inband signal
12	MS->SS	Codec Mode Indication change	Codec Mode 4 is indicated in inband signalling with first frame using Codec Mode 4

Specific Message Contents

ASSIGNMENT COMMAND

Information Element	Value/remark
Assignment Command	In step a) of Test Procedure: codec mode 4 selected (ref: 3GPP TS 44.018 subclause 9.1.2)

Codec mode commands, downlink inband signalling

Information Element	Value/remark
Channel Mode to be used for uplink	In step a) of Test Procedure: Codec Mode 4 commanded In step 1-2: Codec Mode 3 commanded In step 3-4: Codec Mode 2 commanded In step 5-6: Codec Mode 1 commanded In step 7-8: Codec Mode 2 commanded In step 9-10: Codec Mode 3 commanded In step 11-12: Codec Mode 4 commanded

Codec mode indications, uplink inband signalling

Information Element	Value/remark
Indicating Codec Mode currently used uplink	In step a) of Test Procedure: Codec Mode 4 indicated In step 1: Codec Mode 4 indicated In step 2-3: Codec Mode 3 indicated In step 4-5: Codec Mode 2 indicated In step 6-7: Codec Mode 1 indicated In step 8-9: Codec Mode 2 indicated In step 10-11: Codec Mode 3 indicated In step 12: Codec Mode 4 indicated

26.17.3 8-PSK AMR HR / Structured procedures / MS terminated call / early assignment / no initial codec mode

NOTE: this test is derived from the one described in subclause 26.16 and entitled: "Structured procedures / MS terminated call / early assignment / no initial codec mode"

26.17.3.1 Conformance requirement

- 1) In acceptance to a SETUP message indicating speech, the MS shall indicate and include in the CALL CONFIRMED message all the speech versions that it supports.
- 2) Upon receipt of the ASSIGNMENT COMMAND message specifying using CHx/HR the Mobile Station continues a mobile terminating call establishment with early assignment of traffic channel:
 - a) by replying to the ASSIGNMENT command with an ASSIGNMENT COMPLETE message; and
 - b) by continuing the call establishment by through connecting TCH in both directions if it supports immediate connect or by sending an ALERTING message otherwise.
- 3) The ASSIGNMENT command will not specify which of the codec modes the MS should use, but allow the handset to select the default codec mode.
- 4) For speech calls, the mobile station shall attach the user connection at latest when sending the connect message, except if there is no compatible radio resource available at this time. In this case the attachment shall be delayed until such a resource becomes available.

CHx: identifies any of the Channel Codec mode.

HR: half rate channel.

References:

3GPP TS 44.018 subclauses 9.1.2 and 9.1.5.

3GPP TS 45.009 subclause 3.4.

26.17.3.2 Test purpose

- 1) To verify that, in acceptance to a SETUP message indicating speech, the MS indicates and includes in the CALL CONFIRMED message all the speech versions that it supports.
- 2) To verify that upon receipt of the ASSIGNMENT COMMAND message specifying using CHx/HR the Mobile Station continues a mobile terminating call establishment with early assignment of traffic channel:
 - a) by replying to the ASSIGNMENT COMMAND with an ASSIGNMENT COMPLETE message; and
 - b) by continuing the call establishment by through connecting TCH in both directions if it supports immediate connect or by sending an ALERTING message otherwise.
- 3) To verify that upon receipt of an ASSIGNMENT COMMAND with no codec mode specified, the MS shall use the default codec mode.

- 4) To verify that for speech calls, the mobile station shall attach the user connection at latest when sending the connect message, except if there is no compatible radio resource available at this time. In this case the attachment shall be delayed until such a resource becomes available.

26.17.3.3 Method of Test

Initial Conditions

SS 1 cell, default parameters.

MS in MM-state "idle, updated" with valid TMSI and CKSN.

Specific PICS statements:

- Immediate connect supported for all circuit switched basic services.

PIXIT statements:

- Way to indicate alerting.
- Way to make the MS accept an incoming call after alerting.

Foreseen Final State of MS

"Idle, updated", with TMSI allocated.

Test Procedure

The following test is performed for the half rate channel mode of the multi-rate codec:

- A teleservice is selected that is supported by the MS; if the MS supports speech, the selected teleservice is speech. If necessary, the MS is configured for that teleservice.
- The MS is paged and the resulting call is established. Having reached the active state, the MS is made to clear the call.

Maximum Duration of Test

3 minutes

Expected Sequence

This test is repeated for $M = 1, 2, 3, 4$.

Step	Direction	Message	Comments	
1	SS->MS	PAGING REQUEST TYPE 1	Sent on the correct paging sub-channel	
2	MS->SS	CHANNEL REQUEST		
3	SS->MS	IMMEDIATE ASSIGNMENT		
4	MS->SS	PAGING RESPONSE		
5	SS->MS	AUTHENTICATION REQUEST		
6	MS->SS	AUTHENTICATION RESPONSE		
7	SS->MS	CIPHERING MODE COMMAND		
8	MS->SS	CIPHERING MODE COMPLETE		
9	SS			
10	SS->MS	SETUP		
11	MS->SS	CALL CONFIRMED		
			If the MS supports an Immediate connection then branch A applies. If the MS doesn't support an immediate connection then branch B applies.	
A12	MS->SS	CONNECT	sent on the old channel SS allocates allowed subset codec modes, but does not identify a mode for immediate operation.	
A13	SS->MS	ASSIGNMENT COMMAND		
A14	MS->SS	ASSIGNMENT COMPLETE		
B12	SS->MS	ASSIGNMENT COMMAND	Sent on the new channel. SS allocates allowed subset codec modes, but does not identify a mode for immediate operation. An alerting indication as defined in the PIXIT statement is given by the MS. The MS is made to accept the call.	
B13	MS->SS	ASSIGNMENT COMPLETE		
B14	MS->SS	ALERTING		
B15	MS			
B16	MS			
B17	MS->SS	CONNECT		
18	MS			
19	SS->MS	CONNECT ACK	The TCH shall be through connected by both directions in the dedicated mode, using the default codec mode specified. The MS is made to release the call.	
20	MS			
21	MS->SS	DISCONNECT		
22	SS->MS	RELEASE		
23	MS->SS	RELEASE COMPLETE		
24	SS->MS	CHANNEL RELEASE		
				The main signalling link is released.

Specific Message Content

M = 1

Assignment Command

Information Element	value/remark
Channel mode Mode Multi-Rate configuration	Half rate speech version 6 ICMI = 0 1 codec mode specified

M = 2

Assignment Command

Information Element	value/remark
Channel mode Mode Multi-Rate configuration	Half rate speech version 6 ICMI = 0 2 codec modes and threshold values specified

M = 3

Assignment Command

Information Element	value/remark
Channel mode Mode Multi-Rate configuration	Half rate speech version 6 ICMI = 0 3 codec modes and threshold values specified

M = 4

Assignment Command

Information Element	value/remark
Channel mode Mode Multi-Rate configuration	Half rate speech version 6 ICMI = 0 4 codec modes and threshold values specified

26.17.3a 8-PSK AMR HR / Structured procedures / MS terminated call / early assignment / specified initial codec mode

NOTE: this test is derived from the one described in subclause 26.16.3a and entitled: "Structured procedures / MS terminated call / early assignment / specified initial codec mode"

26.17.3a.1 Conformance requirement

- 1) In acceptance to a SETUP message indicating speech, the MS shall indicate and include in the CALL CONFIRMED message all the speech versions that it supports.
- 2) Upon receipt of the ASSIGNMENT COMMAND message specifying using CHx/HR the Mobile Station continues a mobile terminating call establishment with early assignment of traffic channel:
 - a) by replying to the ASSIGNMENT command with an ASSIGNMENT COMPLETE message; and
 - b) by continuing the call establishment by through connecting TCH in both directions if it supports immediate connect or by sending an ALERTING message otherwise.
- 3) The ASSIGNMENT COMMAND will specify the subset of codec modes that the MS is allowed to use for the call, the thresholds and the initial codec mode for immediate use by the MS.
- 4) For speech calls, the mobile station shall attach the user connection at latest when sending the connect message, except if there is no compatible radio resource available at this time. In this case the attachment shall be delayed until such a resource becomes available.

CHx: identifies any of the Channel Codec mode.

HR: half rate channel.

References:

3GPP TS 44.018 subclauses 9.12 and 9.1.5.

3GPP TS 45.009 subclause 3.4.

26.17.3a.2 Test purpose

- 1) To verify that, in acceptance to a SETUP message indicating speech, the MS indicates and includes in the CALL CONFIRMED message all the speech versions that it supports.
- 2) To verify that upon receipt of the ASSIGNMENT COMMAND message specifying using CHx/HR the Mobile Station continues a mobile terminating call establishment with early assignment of traffic channel:

- a) by replying to the ASSIGNMENT command with an ASSIGNMENT COMPLETE message; and
 - b) by continuing the call establishment by through connecting TCH in both directions if it supports immediate connect or by sending an ALERTING message otherwise.
- 3) To verify that upon receipt of an ASSIGNMENT COMMAND with codec mode specified, the MS shall use that specified codec mode.
 - 4) To verify that for speech calls, the mobile station shall attach the user connection at latest when sending the connect message, except if there is no compatible radio resource available at this time. In this case the attachment shall be delayed until such a resource becomes available.

26.17.3a.3 Method of Test

Initial Conditions

SS 1 cell, default parameters

MS in MM-state "idle, updated" with valid TMSI and CKSN

Specific PICS statements:

- Immediate connect supported for all circuit switched basic services.

PIXIT statements:

- Way to indicate alerting.
- Way to make the MS accept an incoming call after alerting.

Foreseen Final State of MS

"Idle, updated", with TMSI allocated.

Test Procedure

The following test is performed for the half rate channel mode of the multi-rate codec:

A teleservice is selected that is supported by the MS; if the MS supports speech, the selected teleservice is speech. If necessary, the MS is configured for that teleservice.

The MS is paged and the resulting call is established. Having reached the active state, the MS is made to clear the call.

Maximum Duration of Test

3 minutes

Expected Sequence

This test is repeated for M=1,2,3,4.

Step	Direction	Message	Comments
1	SS->MS	PAGING REQUEST TYPE 1	Sent on the correct paging sub-channel Message is contained in the SABM SRES specifies correct value SS starts deciphering after sending the message Shall be sent enciphered. All following messages shall be sent enciphered. SS starts ciphering
2	MS->SS	CHANNEL REQUEST	
3	SS->MS	IMMEDIATE ASSIGNMENT	
4	MS->SS	PAGING RESPONSE	
5	SS->MS	AUTHENTICATION REQUEST	
6	MS->SS	AUTHENTICATION RESPONSE	
7	SS->MS	CIPHERING MODE COMMAND	
8	MS->SS	CIPHERING MODE COMPLETE	
9	SS		
10	SS->MS	SETUP	
11	MS->SS	CALL CONFIRMED	
			If the MS supports an Immediate connection then branch A applies. If the MS doesn't support an immediate connection then branch B applies.
A12	MS->SS	CONNECT	sent on the old channel SS allocates allowed subset codec modes and identifies a mode for immediate operation.
A13	SS->MS	ASSIGNMENT COMMAND	
A14	MS->SS	ASSIGNMENT COMPLETE	
B12	SS->MS	ASSIGNMENT COMMAND	SS allocates allowed subset codec modes and identifies a mode for immediate operation. An alerting indication as defined in the PIXIT statement is given by the MS. The MS is made to accept the call.
B13	MS->SS	ASSIGNMENT COMPLETE	
B14	MS->SS	ALERTING	
B15	MS		
B16	MS		
B17	MS->SS	CONNECT	
18	MS		
19	SS->MS	CONNECT ACK	The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified. The MS is made to release the call.
20	MS		
21	MS->SS	DISCONNECT	
22	SS->MS	RELEASE	
23	MS->SS	RELEASE COMPLETE	
24	SS->MS	CHANNEL RELEASE	

Specific Message Content

M = 1

Assignment Command

Information Element	value/remark
Channel mode Mode Multi-Rate configuration	Half rate speech version 6 ICMI = 1 Start Mode specified 1 codec mode specified

M = 2

Assignment Command

Information Element	value/remark
Channel mode Mode Multi-Rate configuration	Half rate speech version 6 ICMI = 1 Start Mode specified 2 codec modes and threshold vales specified

M = 3

Assignment Command

Information Element	value/remark
Channel mode Mode Multi-Rate configuration	Half rate speech version 6 ICMI = 1 Start Mode specified 3 codec modes and threshold vales specified

M = 4

Assignment Command

Information Element	value/remark
Channel mode Mode Multi-Rate configuration	Half rate speech version 6 ICMI = 1 Start Mode specified 4 codec modes and threshold vales specified

26.17.4 8-PSK AMR HR / Structured procedures / MS originated call / late assignment / specified initial codec mode

NOTE: This test is derived from the one described in subclause 26.16.4 and entitled: "Structured procedures / MS originated call / late assignment / specified initial codec mode".

26.17.4.1 Conformance requirement

- 1) The MS shall indicate and include in the mobile originating SETUP for speech call all the speech versions that it supports.
- 2) Upon receipt of the ASSIGNMENT COMMAND message using half rate speech version 6, the Mobile Station starts a normal channel assignment procedure. It means that the MS initiates a local end release of link layer connections, disconnects the physical channels, commands the switching to the assigned channels and initiates the establishment of lower layer connections (this includes the activation of the channels, their connection and the establishment of the data links). After the main signalling link is successfully established, the MS returns an ASSIGNMENT COMPLETE message, specifying cause 'normal event', to the network on the main DCCH.

References:

3GPP TS 44.018 subclauses 9.12 and 9.1.5.

3GPP TS 45.009 subclause 3.4.

26.17.4.2 Test purpose

- 1) To verify that the MS indicates and includes in the mobile originating SETUP for speech call all the speech versions that it supports.

- 2) To verify that subsequently after receipt of an IMMEDIATE ASSIGNMENT message allocating an SDCCH, after completion of establishment of the main signalling link, after having sent a CM SERVICE REQUEST message, after having successfully performed authentication and cipher mode setting procedures, after having sent a SETUP message, after having received a CALL PROCEEDING message followed by an ALERTING message and an ASSIGNMENT COMMAND message allocating using half rate speech version 6, the MS sends an ASSIGNMENT COMPLETE message. The ASSIGNMENT COMMAND message will also identify which codec mode the MS is allowed to use for the call, the threshold values and the initial codec mode for immediate use.

26.17.4.3 Method of Test

Initial Conditions

SS 1 cell, default parameters.

MS in MM-state "idle, updated" with valid TMSI and CKSN.

Specific PICS statements:

-

PIXIT statements:

- Way to indicate alerting.
- Way to make the MS accept an incoming call after alerting.

Foreseen Final State of MS

The MS has a MO call in state U10, "active".

Test Procedure

The following test is performed for the half rate channel mode of the multi-rate codec.

The MS is made to initiate a speech call. The call is established with a late assignment.

Maximum Duration of Test

3 minutes.

Expected Sequence

This test is repeated for $M = 1, 2, 3, 4$.

Step	Direction	Message	Comments
1	MS		The "called number" is entered
2	MS->SS	CHANNEL REQUEST	
3	SS->MS	IMMEDIATE ASSIGNMENT	
4	MS->SS	CM SERVICE REQUEST	Message is contained in SABM
5	SS->MS	AUTHENTICATION REQUEST	
6	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
7	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
8	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
9	SS		SS starts ciphering
10	MS->SS	SETUP	The MS indicates its supports the HR speech version 6.
11	SS->MS	CALL PROCEEDING	
12	SS->MS	ALERTING	
13	MS		An alerting indication as defined in the PIXIT statement is given by the MS.
14	SS->MS	ASSIGNMENT COMMAND	SS allocates allowed subset codec modes, but does identifies a mode for immediate operation.
15	MS->SS	ASSIGNMENT COMPLETE	
16	SS->MS	CONNECT	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	MS->SS	CONNECT ACK	

Specific Message Content

M = 1

Assignment Command

Information Element	value/remark
Channel mode Mode Multi-Rate configuration	Half rate speech version 6 ICMI = 1 Start mode specified 1 codec mode specified

M = 2

Assignment Command

Information Element	value/remark
Channel mode Mode Multi-Rate configuration	Half rate speech version 6 ICMI = 1 Start mode specified 2 codec modes and threshold vales specified

M = 3

Assignment Command

Information Element	value/remark
Channel mode Mode Multi-Rate configuration	Half rate speech version 6 ICMI = 1 Start mode specified 3 codec modes and threshold vales specified

M = 4

Assignment Command

Information Element	value/remark
Channel mode Mode Multi-Rate configuration	Half rate speech version 6 ICMI = 1 Start mode specified 4 codec modes and threshold vales specified

26.17.4a 8-PSK AMR HR / Structured procedures / MS originated call / late assignment / no initial codec mode

NOTE: This test is derived from the one described in subclause 26.16.4a and entitled: "Structured procedures / MS originated call / late assignment / no initial codec mode".

26.17.4a.1 Conformance requirement

- 1) The MS shall indicate and include in the mobile originating SETUP for speech call all the speech versions that it supports.
 - 2) Upon receipt of the ASSIGNMENT COMMAND message using half rate speech version 6, the Mobile Station starts a normal channel assignment procedure. It means that the MS initiates a local end release of link layer connections, disconnects the physical channels, commands the switching to the assigned channels and initiates the establishment of lower layer connections (this includes the activation of the channels, their connection and the establishment of the data links). After the main signalling link is successfully established, the MS returns an ASSIGNMENT COMPLETE message, specifying cause 'normal event', to the network on the main DCCH. The ASSIGNMENT COMMAND message will also specify the subset of codec modes that the MS is allowed to use for the call and the threshold values. The ASSIGNMENT COMMAND will not specify the initial codec mode but will, rather, allow the MS to select the default codec mode.
- If the Initial Codec Mode is not signalled, then the default Initial Codec Mode is given by the following implicit rule. If the Active Codec Set contains:
- 1 mode then this shall be the Initial Codec Mode.
 - 2 or 3 modes then the Initial Codec mode shall be the most robust mode of the set (with lowest bit rate).
 - 4 modes then the Initial Codec Mode shall be the second most robust mode of the set (with second lowest bit rate. If the Active Codec Set is changed during the call, then this default Initial Codec Mode shall used until an other ICM is explicitly signalled.

References

3GPP TS 44.018 subclauses 9.12 and 9.1.5.

3GPP TS 45.009 subclause 3.4.

26.17.4a.2 Test purpose

- 1) To verify that the MS indicates and includes in the mobile originating SETUP for speech call all the speech versions that it supports.
- 2) To verify that subsequently after receipt of an IMMEDIATE ASSIGNMENT message allocating an SDCCH, after completion of establishment of the main signalling link, after having sent a CM SERVICE REQUEST message, after having successfully performed authentication and cipher mode setting procedures, after having sent a SETUP message, after having received a CALL PROCEEDING message followed by an ALERTING message and an ASSIGNMENT COMMAND message allocating using speech half rate speech version 6, the MS sends an ASSIGNMENT COMPLETE message. The ASSIGNMENT COMMAND message will also specify the subset of codec modes that the MS is allowed to use for the call and the threshold values. The ASSIGNMENT COMMAND will not specify the initial codec mode but will, rather, allow the MS to select the default codec mode.

26.17.4a.3 Method of Test

Initial Conditions

SS 1 cell, default parameters

MS in MM-state "idle, updated" with valid TMSI and CKSN

Specific PICS statements:

-

PIXIT statements:

- Way to indicate alerting.
- Way to make the MS accept an incoming call after alerting.

Foreseen Final State of MS

The MS has a MO call in state U10, "active".

Test Procedure

The following test is performed for the half rate channel mode of the multi-rate codec.

The MS is made to initiate a speech call. The call is established with a late assignment.

Maximum Duration of Test

3 minutes

Expected Sequence

This test is repeated for M=1,2,3,4.

Step	Direction	Message	Comments
1	MS		The "called number" is entered
2	MS->SS	CHANNEL REQUEST	
3	SS->MS	IMMEDIATE ASSIGNMENT	
4	MS->SS	CM SERVICE REQUEST	Message is contained in SABM
5	SS->MS	AUTHENTICATION REQUEST	
6	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
7	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
8	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
9	SS		SS starts ciphering
10	MS->SS	SETUP	The MS indicates support of the HR speech version 6.
12	SS->MS	CALL PROCEEDING	
13	SS->MS	ALERTING	
14	MS		An alerting indication as defined in the PIXIT statement is given by the MS.
15	SS->MS	ASSIGNMENT COMMAND	SS allocates allowed subset of codec modes and thresholds, but does not identify a mode for immediate operation.
16	MS->SS	ASSIGNMENT COMPLETE	
17	SS->MS	CONNECT	
18	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified (M=1 CMI=0, M=2 CMI=0, M=3 CMI=0, M=4 CMI=1).
19	MS->SS	CONNECT ACK	

Specific Message Content

M = 1

Assignment Command

Information Element	value/remark
Channel mode Mode Multi-Rate configuration	Half rate speech version 6 ICMI = 0 1 codec mode specified

M = 2

Assignment Command

Information Element	value/remark
Channel mode Mode Multi-Rate configuration	Half rate speech version 6 ICMI = 0 2 codec modes and threshold vales specified

M = 3

Assignment Command

Information Element	value/remark
Channel mode Mode Multi-Rate configuration	Half rate speech version 6 ICMI = 0 3 codec modes and threshold vales specified

M =4

Assignment Command

Information Element	value/remark
Channel mode Mode Multi-Rate configuration	Half rate speech version 6 ICMI = 0 4 codec modes and threshold vales specified

26.17.5 Void

26.17.6 8-PSK AMR HR / Structured procedures / emergency call

NOTE: this test is derived from subclause 26.16.6 - Structured procedures / emergency call.

26.17.6.1 Conformance requirement

- 1) For R97/R98 MS: The MS in the "idle, updated" state, after a successful location update, the number 112 (for GSM 900 and DCS 1800 MS), or 911 (for GSM 710, GSM 750, T_GSM 810, GSM 850 and PCS 1 900 MS in USA and Canada), or 08 (for GSM 710, GSM 750, T_GSM 810, GSM 850 and PCS 1 900 MS in Mexico) has been entered by user, shall send a CHANNEL REQUEST message with correct establishment cause ("emergency call").

For R99 and later MS: When a SIM/USIM containing stored emergency numbers is present, those numbers are identified as emergency numbers. As an optional requirement, the ME shall also identify 112 and 911 as emergency numbers irrespective of whether these are stored in the SIM/USIM. Any other emergency numbers stored in the ME shall be ignored.

When no emergency numbers are stored within the SIM the following numbers shall be stored in the ME for use as emergency numbers: 112, and 911.

When no emergency numbers are stored within the USIM the following numbers shall be stored in the ME for use as emergency numbers: 112, and 911.

- 2) After assignment of a dedicated channel the first layer message sent by the MS on the assigned dedicated channel shall be a CM SERVICE REQUEST message specifying the correct CKSN and TMSI, with CM Service Type "emergency call establishment".
- 3) Authentication and cipher mode setting shall be performed successfully.
- 4) After cipher mode setting acceptance by the network, the MS shall send an EMERGENCY SETUP message.
- 5) The AMR mobile station shall accept channel assignment to an 8-PSK AMR half rate channel and also select the correct codec mode. The call shall be set up using the 8-PSK AMR HR codec.
- 6) After receipt of a CONNECT ACKNOWLEDGE message during correct establishment of the emergency call the O-TCH/AHS shall be through connected in both directions if an appropriate channel is available.
- 7) The call shall be cleared correctly.

References:

3GPP TS 44.018 subclauses 3.4.3.1, 3.4.6, 9.1.2 and 9.1.5.

3GPP TS 02.30, clause 4.

3GPP TS 22.101, clause 8.

26.17.6.2 Test purpose

- 1) To verify that a R97/R98 MS supporting speech in the MM state "idle, updated", when made to call the number 112 (for GSM 900 and DCS 1800 MS), or 911 (for GSM 710, GSM 750, T_GSM 810, GSM 850 and PCS 1 900 MS in USA and Canada), or 08 (for GSM 710, GSM 750, T_GSM 810, GSM 850 and PCS 1 900 MS in Mexico), sends a CHANNEL REQUEST message with establishment cause "emergency call".

To verify that a R99 and later MS supporting speech in the MM state "idle, updated", when made to call the number 112 or 911, sends a CHANNEL REQUEST message with establishment cause "emergency call".

- 2) To verify that after assignment of a dedicated channel the first layer message sent by the MS on the assigned dedicated channel is a CM SERVICE REQUEST message specifying the correct CKSN and TMSI, with CM Service Type "emergency call establishment".
- 3) To verify that authentication and cipher mode setting are performed successfully.
- 4) To verify that after cipher mode setting acceptance by the SS, the MS sends an EMERGENCY SETUP message.
- 5) To verify that the AMR mobile station shall accept channel assignment to a O-TCH/AHS and also select the correct codec mode. The call shall be set up using the 8-PSK AMR HR codec.
- 6) To verify that subsequently the MS has through connected the TCH in both directions.
- 7) To verify the call is cleared correctly.

26.17.6.3 Method of Test

Initial Conditions

SS: 1 cell default parameters.

MS: The MS is in the MM-state "idle, updated" with valid TMSI and CKSN.

Foreseen Final State of the MS

The MS is in the MM-state "idle, updated" with valid TMSI and CKSN.

Specific PICS statements:

-

PIXIT statements:

-

Test Procedure

The MS is made to initiate an emergency call. The call is established with late assignment. Having reached the active state, the call is cleared by the SS.

Maximum Duration of Test

3 minutes.

Expected Sequence

Step	Direction	Message	Comments
1	MS		The appropriate emergency call number is entered
2	MS->SS	CHANNEL REQUEST	Establishment cause is emergency call establishment.
3	SS->MS	IMMEDIATE ASSIGNMENT	Message is contained in SABM. The CM service type IE indicates "emergency call establishment".
4	MS->SS	CM SERVICE REQUEST	
5	SS->MS	AUTHENTICATION REQUEST	SRES specifies correct value
6	MS->SS	AUTHENTICATION RESPONSE	
7	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
8	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
9	SS		SS starts ciphering
10	MS->SS	EMERGENCY SETUP	The MS indicates which speech it supports.
11	SS->MS	CALL PROCEEDING	
12	SS->MS	ALERTING	See specific message contents.
13	SS->MS	ASSIGNMENT COMMAND	
14	MS->SS	ASSIGNMENT COMPLETE	
15	SS->MS	CONNECT	
16	MS->SS	CONNECT ACK	The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
17	MS		
18	SS->MS	DISCONNECT	
19	MS->SS	RELEASE	
20	SS->MS	RELEASE COMPLETE	
21	SS->MS	CHANNEL RELEASE	

Specific Message Contents:

Assignment Command

Information Element	value/remark
Channel description	O-TCH/AHS
Channel mode - Mode	Half rate speech version 6

26.17.7 Void

26.17.8 Void

26.17.9 8-PSK AMR HR / RATSCCH Protocol

26.17.9.1 AMR Configuration Change (normal)

26.17.9.1.1 Conformance requirements

The AMR_CONFIG_REQ message may be sent by the BTS during a call to change the AMR configuration on the radio interface without interruption of the speech transmission.

The ACK_OK message serves as an acknowledgement that a RATSCCH REQ message has been detected, correctly decoded (no CRC error) and that it is defined for the Addressee. It defines the exact activation time in direction from Addressee to Initiator.

Reference

3GPP TS 45.009 sub-clauses: 3.2.2.3.1, 3.2.2.3.5

26.17.9.1.2 Test purpose

This test will verify that the MS is able to handle a properly formatted AMR_CONFIG_REQ message.

26.17.9.1.3 Method of test

Initial Conditions

System Simulator:

1 cell with default parameters

Mobile Station:

The MS is in the "idle, updated" state, with a TMSI allocated and camped on cell A.

Specific PICS statements:

-

PIXIT statements:

-

Foreseen Final State of the MS

Idle Updated, TMSI allocated and camped on cell A.

Test Procedure

This sequence is performed for execution counter, $k = 1, 2$.

When $k = 1$, DTX is not used:

- 1) User initiates a Mobile Originated call.
- 2) The network and the MS indicate Bearer capabilities IE with the AMR speech Half Rate (Version 6).
- 3) The network performs an assignment on a TCH channel with MultiRate configuration to the MS.
- 4) The call is maintained during a programmable time without variation of RxLev / RxQual.
- 5) The SS shall send a properly formatted AMR_CONFIG_REQ message during the call at a programmable time.
- 6) The MS answers with a ACK_OK message within 3 speech frames
- 7) The network initiates the call release.

When $k = 2$, DTX is used:

- 1) In the serving cell, the DTX indicator is set to "MS shall use discontinuous transmission".

- 2) User initiates a Mobile Originated call.
- 3) The network and the MS indicate Bearer capabilities IE with the AMR speech Half Rate (Version 6).
- 4) The network performs an assignment on a TCH channel with MultiRate configuration to the MS.
- 5) The call is maintained during a programmable time without variation of RxLev / RxQual.
- 6) The SS shall send a properly formatted AMR_CONFIG_REQ message during the call at a programmable time.
- 7) The MS answers with a ACK_OK message within 3 speech frames.
- 8) The network initiates the call release.

Maximum Duration of Test

5 minutes

Expected Sequence

When k=1:

Step	Direction	Message	Comments
1	MS		MS is in idle mode
2	MS		MS initiates Mobile Originated call
3	MS->SS	Channel Request	Establishment cause is "originating call and the network does not set the NECI bit to 1".
4	SS->MS	Immediate Assignment	See Default Messages for AMR
5	MS->SS	CM Service Request	CM Service Type = Mobile Originating Call Establishment.
6	SS->MS	AUTHENTICATION REQUEST	
7	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
8	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
9	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
10	MS->SS	Setup	MS indicates supported speech versions
11	SS->MS	Call Proceeding	
12	SS->MS	Alerting	
13	SS->MS	Assignment Command	See specific message contents.
14	MS->SS	Assignment Complete	
15	SS->MS	Connect	
16	MS->SS	Connect Acknowledge	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	SS->MS	AMR_CONFIG_REQ	See specific message contents.
19	MS->SS	ACK_OK	Message must be received within 3 speech frames
20	SS->MS	Disconnect	
21	MS->SS	Release	
22	SS->MS	Release Complete	
23	SS->MS	Channel Release	

When k=2:

Step	Direction	Message	Comments
1	MS		MS is in idle mode
2	MS		MS initiates Mobile Originated call
3	MS->SS	Channel Request	Establishment cause is "originating call and the network does not set the NECI bit to 1".
4	SS->MS	Immediate Assignment	See Default Messages for AMR
5	MS->SS	CM Service Request	CM Service Type = Mobile Originating Call Establishment.
6	SS->MS	AUTHENTICATION REQUEST	
7	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
8	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
9	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
10	MS->SS	Setup	MS indicates supported speech versions
11	SS->MS	Call Proceeding	
12	SS->MS	Alerting	
13	SS->MS	Assignment Command	See specific message contents.
14	MS->SS	Assignment Complete	
15	SS->MS	Connect	
16	MS->SS	Connect Acknowledge	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	SS->MS	AMR_CONFIG_REQ	Using DTX mode
19	MS->SS	ACK_OK	Message must be received within 3 speech frames
20	SS->MS	Disconnect	
21	MS->SS	Release	
22	SS->MS	Release Complete	
23	SS->MS	Channel Release	

Specific Message Contents

ASSIGNMENT COMMAND

Information Element	value/remarks
Channel description	O-TCH/AHS
Mode of the first channel - Mode	Half rate version 6

AMR_CONFIG_REQ

Information Element	value/remarks
ICM	CODEC_MODE_1
ACS	2 codec modes
HYST2	Not defined (set to all 1s)
THRESH2	Not defined (set to all 1s)
HYST1	2 dB
THRESH1	12.5 dB

26.17.9.2 AMR Configuration Change (abnormal)

26.17.9.2.1 Conformance requirements

The AMR_CONFIG_REQ message may be sent by the BTS during a call to change the AMR configuration on the radio interface without interruption of the speech transmission.

The ACK_ERR message serves as a negative acknowledgement that a RATSCCH REQ message has been detected, i.e. the RATSCCH pattern was detected, but could not be decoded correctly (CRC error), or its content is not understandable by the addressee.

Reference:

3GPP TS 45.009 sub-clauses: 3.2.2.3.2, 3.2.2.3.5

26.17.9.2.2 Test purpose

This test will verify that the MS is able to handle an improperly formatted AMR_CONFIG_REQ message.

26.17.9.2.3 Method of test

Initial Conditions

System Simulator:

1 cell with default parameters

Mobile Station:

The MS is in the "idle, updated" state, with a TMSI allocated and camped on cell A.

Specific PICS statements:

-

PIXIT statements:

-

Foreseen Final State of the MS

Idle Updated, TMSI allocated and camped on cell A.

Test Procedure

- 1) User initiates a Mobile Originated call.
- 2) The network and the MS indicate Bearer capabilities IE with the AMR speech Half Rate (Version 6).
- 3) The network performs an assignment on a TCH channel with MultiRate configuration to the MS.
- 4) The call is maintained during a programmable time without variation of RxLev / RxQual.
- 5) The SS shall send an AMR_CONFIG_REQ message, with an incorrect CRC, during the call at a programmable time.
- 6) The MS answers with a ACK_ERR message within 3 speech frames
- 7) The network initiates the call release.

Maximum Duration of Test

5 minutes

Expected Sequence

Step	Direction	Message	Comments
1	MS		MS is in idle mode
2	MS		MS initiates Mobile Originated call
3	MS->SS	Channel Request	Establishment cause is "originating call and the network does not set the NECI bit to 1".
4	SS->MS	Immediate Assignment	See Default Messages for AMR
5	MS->SS	CM Service Request	CM Service Type = Mobile Originating Call Establishment.
6	SS->MS	AUTHENTICATION REQUEST	
7	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
8	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
9	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
10	MS->SS	Setup	MS indicates supported speech versions
11	SS->MS	Call Proceeding	
12	SS->MS	Alerting	
13	SS->MS	Assignment Command	See specific message contents.
14	MS->SS	Assignment Complete	
15	SS->MS	Connect	
16	MS->SS	Connect Acknowledge	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	SS->MS	AMR_CONFIG_REQ	Message contains an incorrect CRC
19	MS->SS	ACK_ERR	Message must be received within 3 speech frames
20	SS->MS	Disconnect	
21	MS->SS	Release	
22	SS->MS	Release Complete	
23	SS->MS	Channel Release	

Specific Message Contents

ASSIGNMENT COMMAND

Information Element	value/remarks
Channel description	O-TCH/AHS
Mode of the first channel - Mode	Half rate version 6

AMR_CONFIG_REQ

Information Element	value/remarks
ICM	CODEC_MODE_1
ACS	2 codec modes
HYST2	Not defined (set to all 1s)
THRESH2	Not defined (set to all 1s)
HYST1	2 dB
THRESH1	12.5 dB

26.17.9.3 Codec Mode Phase Change (normal)

26.17.9.3.1 Conformance requirements

The CMI_PHASE_REQ message may be sent by the BTS to change the phase of the Codec Mode Indication in downlink.

The ACK_OK message serves as an acknowledgement that a RATSCCH_REQ message has been detected, correctly decoded (no CRC error) and that it is defined for the Addressee. It defines the exact activation time in direction from Addressee to Initiator.

Reference:

3GPP TS 45.009 sub-clauses: 3.2.2.3.1, 3.2.2.3.4

26.17.9.3.2 Test purpose

This test will verify that the MS can correctly handle a properly formatted CMI_PHASE_REQ message.

26.17.9.3.3 Method of test

Initial Conditions

System Simulator:

1 cell with default parameters

Mobile Station:

The MS is in the "idle, updated" state, with a TMSI allocated and camped on cell A.

Specific PICS statements:

-

PIXIT statements:

-

Foreseen Final State of the MS

Idle Updated, TMSI allocated and camped on cell A.

Test Procedure

- 1) User initiates a Mobile Originated call.
- 2) The network and the MS indicate Bearer capabilities IE with the AMR speech Half Rate (Version 6).
- 3) The network performs an assignment on a TCH channel with MultiRate configuration to the MS.
- 4) The call is maintained during a programmable time without variation of RxLev / RxQual.
- 5) The SS shall send the CMI_PHASE_REQ message during the call at a programmable time. The CMI_PHASE_REQ shall be sent either in place of a "CMI" speech frame, or in place of a "CMC" speech frame, to cover both kinds of changes.
- 6) The MS answers with a ACK_OK message within 3 speech frames.
- 7) The downlink CMI phase is changed (or not) according to the CMI_PHASE_REQ message starting with speech frame N+12.
- 8) The network initiates the call release.

Maximum Duration of Test

5 minutes

Expected Sequence

Step	Direction	Message	Comments
1	MS		MS is in idle mode
2	MS		MS initiates Mobile Originated call
3	MS->SS	Channel Request	Establishment cause is "originating call and the network does not set the NECI bit to 1".
4	SS->MS	Immediate Assignment	See Default Messages for AMR
5	MS->SS	CM Service Request	CM Service Type = Mobile Originating Call Establishment.
6	SS->MS	AUTHENTICATION REQUEST	
7	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
8	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
9	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
10	MS->SS	Setup	MS indicates supported speech versions
11	SS->MS	Call Proceeding	
12	SS->MS	Alerting	
13	SS->MS	Assignment Command	See specific message contents.
14	MS->SS	Assignment Complete	
15	SS->MS	Connect	
16	MS->SS	Connect Acknowledge	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	SS->MS	CMI_PHASE_REQ	See specific message contents.
19	MS->SS	ACK_OK	Message must be received within 3 speech frames
20	SS->MS	Disconnect	
21	MS->SS	Release	
22	SS->MS	Release Complete	
23	SS->MS	Channel Release	

Specific Message Contents

ASSIGNMENT COMMAND

Information Element	value/remarks
Channel description	O-TCH/AHS
Mode of the first channel - Mode	Half rate version 6

CMI_PHASE_REQ

Information Element	value/remarks
CMIP	1 (default)

26.17.9.4 Codec Mode Phase Change (abnormal)

26.17.9.4.1 Conformance requirements

The CMI_PHASE_REQ message may be sent by the BTS to change the phase of the Codec Mode Indication in downlink.

The ACK_ERR message serves as a negative acknowledgement that a RAT SCCH REQ message has been detected, i.e. the RATSCCH pattern was detected, but could not be decoded correctly (CRC error), or its content is not understandable by the addressee.

Reference

3GPP TS 45.009 sub-clauses: 3.2.2.3.2, 3.2.2.3.4

26.17.9.4.2 Test purpose

This test will verify that the MS can correctly handle an improperly formatted CMI_PHASE_REQ message.

26.17.9.4.3 Method of test

Initial Conditions

System Simulator:

1 cell with default parameters

Mobile Station:

The MS is in the "idle, updated" state, with a TMSI allocated and camped on cell A.

Specific PICS statements:

-

PIXIT statements:

-

Foreseen Final State of the MS

Idle Updated, TMSI allocated and camped on cell A.

Test Procedure

- 1) User initiates a Mobile Originated call.
- 2) The network and the MS indicate Bearer capabilities IE with the AMR speech Half Rate (Version 6).
- 3) The network performs an assignment on a TCH channel with MultiRate configuration to the MS.
- 4) The call is maintained during a programmable time without variation of RxLev /RxQual.
- 5) The SS shall send the CMI_PHASE_REQ message, with an incorrect CRC, during the call at a programmable time. The CMI_PHASE_REQ shall be sent either in place of a "CMI" speech frame, or in place of a "CMC" speech frame, to cover both kinds of changes.
- 6) The MS answers with a ACK_ERR message within 3 speech frames.
- 7) The network initiates the call release.

Maximum Duration of Test

5 minutes

Expected Sequence

Step	Direction	Message	Comments
1	MS		MS is in idle mode
2	MS		MS initiates Mobile Originated call
3	MS->SS	Channel Request	Establishment cause is "originating call and the network does not set the NECI bit to 1".
4	SS->MS	Immediate Assignment	See Default Messages for AMR
5	MS->SS	CM Service Request	CM Service Type = Mobile Originating Call Establishment.
6	SS->MS	AUTHENTICATION REQUEST	
7	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
8	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
9	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
10	MS->SS	Setup	MS indicates supported speech versions
11	SS->MS	Call Proceeding	
12	SS->MS	Alerting	
13	SS->MS	Assignment Command	See specific message contents.
14	MS->SS	Assignment Complete	
15	SS->MS	Connect	
16	MS->SS	Connect Acknowledge	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	SS->MS	CMI_PHASE_REQ	Message contains an incorrect CRC
19	MS->SS	ACK_ERR	Message must be received within 3 speech frames
20	SS->MS	Disconnect	
21	MS->SS	Release	
22	SS->MS	Release Complete	
23	SS->MS	Channel Release	

Specific Message Contents

ASSIGNMENT COMMAND

Information Element	value/remarks
Channel description	O-TCH/AHS
Mode of the first channel - Mode	Half rate version 6

CMI_PHASE_REQ

Information Element	value/remarks
CMIP	1 (default)

26.17.9.5 Threshold Change (normal)

26.17.9.5.1 Conformance requirements

The THRESH_REQ message may be sent by the BTS to change the thresholds in the DL Mode Request Generator.

The ACK_OK message serves as an acknowledgement that a RATSCCH REQ message has been detected, correctly decoded (no CRC error) and that it is defined for the Addressee. It defines the exact activation time in direction from Addressee to Initiator.

Reference:

3GPP TS 45.009 sub-clauses: 3.2.2.3.1, 3.2.2.3.6

26.17.9.5.2 Test purpose

This test will verify that an RATSCCH capable MS is able to handle a properly formatted THRESH_REQ message

26.17.9.5.3 Method of test

Initial Conditions

System Simulator:

1 cell with default parameters

Mobile Station:

The MS is in the "idle, updated" state, with a TMSI allocated and camped on cell A.

Specific PICS statements:

-

PIXIT statements:

-

Foreseen Final State of the MS

Idle Updated, TMSI allocated and camped on cell A.

Test Procedure

- 1) User initiates a Mobile Originated call.
- 2) The network and the MS indicate Bearer capabilities IE with the AMR speech Half Rate (Version 6).
- 3) The network performs an assignment on a TCH channel with MultiRate configuration to the MS.
- 4) The call is maintained during a programmable time without variation of RxLev /RxQual.
- 5) The SS shall send a properly formatted THRESH_REQ message during the call at a programmable time.
- 6) The MS answers with a ACK_OK message within 3 speech frames
- 7) The network initiates the call release.

Maximum Duration of Test

5 minutes

Expected Sequence

Step	Direction	Message	Comments
1	MS		MS is in idle mode
2	MS		MS initiates Mobile Originated call
3	MS->SS	Channel Request	Establishment cause is "originating call and the network does not set the NECI bit to 1".
4	SS->MS	Immediate Assignment	See Default Messages for AMR
5	MS->SS	CM Service Request	CM Service Type = Mobile Originating Call Establishment.
6	SS->MS	AUTHENTICATION REQUEST	
7	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
8	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
9	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
10	MS->SS	Setup	MS indicates supported speech versions
11	SS->MS	Call Proceeding	
12	SS->MS	Alerting	
13	SS->MS	Assignment Command	See specific message contents.
14	MS->SS	Assignment Complete	
15	SS->MS	Connect	
16	MS->SS	Connect Acknowledge	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	SS->MS	THRESH_REQ	See specific message contents.
19	MS->SS	ACK_OK	Message must be received within 3 speech frames
20	SS->MS	Disconnect	
21	MS->SS	Release	
22	SS->MS	Release Complete	
23	SS->MS	Channel Release	

Specific Message Contents

ASSIGNMENT COMMAND

Information Element	value/remarks
Channel description	O-TCH/AHS
Mode of the first channel - Mode	Half rate version 6
Multi-Rate configuration	2 codec modes specified

THRESH_REQ

Information Element	value/remarks
HYST3	Not defined (set to all 1s)
THRESH3	Not defined (set to all 1s)
HYST2	Not defined (set to all 1s)
THRESH2	Not defined (set to all 1s)
HYST1	2 dB
THRESH1	12.5 dB

26.17.9.6 Threshold Change (abnormal)

26.17.9.6.1 Conformance requirements

The THRESH_REQ message may be sent by the BTS to change the thresholds in the DL Mode Request Generator.

The ACK_ERR message serves as a negative acknowledgement that a RATSCCH REQ message has been detected, i.e. the RATSCCH pattern was detected, but could not be decoded correctly (CRC error), or its content is not understandable by the addressee.

Reference:

3GPP TS 45.009 sub-clauses: 3.2.2.3.2, 3.2.2.3.6

26.17.9.6.2 Test purpose

This test will verify that an RATSCCH capable MS is able to handle an improperly formatted THRESH_REQ message.

26.17.9.6.3 Method of test

Initial Conditions

System Simulator:

1 cell with default parameters

Mobile Station:

The MS is in the "idle, updated" state, with a TMSI allocated and camped on cell A.

Specific PICS statements:

-

PIXIT statements:

-

Foreseen Final State of the MS

Idle Updated, TMSI allocated and camped on cell A.

Test Procedure

- 1) User initiates a Mobile Originated call.
- 2) The network and the MS indicate Bearer capabilities IE with the AMR speech Half Rate (Version 6).
- 3) The network performs an assignment on a TCH channel with MultiRate configuration to the MS.
- 4) The call is maintained during a programmable time without variation of RxLev /RxQual.
- 5) The SS shall send an improperly formatted THRESH_REQ message, with an incorrect CRC, during the call at a programmable time.
- 6) The MS answers with a ACK_ERR message within 3 speech frames
- 7) The network initiates the call release.

Maximum Duration of Test

5 minutes

Expected Sequence

Step	Direction	Message	Comments
1	MS		MS is in idle mode
2	MS		MS initiates Mobile Originated call
3	MS->SS	Channel Request	Establishment cause is "originating call and the network does not set the NECI bit to 1".
4	SS->MS	Immediate Assignment	See Default Messages for AMR
5	MS->SS	CM Service Request	CM Service Type = Mobile Originating Call Establishment.
6	SS->MS	AUTHENTICATION REQUEST	
7	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
8	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
9	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
10	MS->SS	Setup	MS indicates supported speech versions
11	SS->MS	Call Proceeding	
12	SS->MS	Alerting	
13	SS->MS	Assignment Command	See specific message contents.
14	MS->SS	Assignment Complete	
15	SS->MS	Connect	
16	MS->SS	Connect Acknowledge	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	SS->MS	THRESH_REQ	Message contains an incorrect CRC
19	MS->SS	ACK_ERR	Message must be received within 3 speech frames
20	SS->MS	Disconnect	
21	MS->SS	Release	
22	SS->MS	Release Complete	
23	SS->MS	Channel Release	

Specific Message Contents

ASSIGNMENT COMMAND

Information Element	value/remarks
Channel description	O-TCH/AHS
Mode of the first channel - Mode	Half rate version 6

THRESH_REQ

Information Element	value/remarks
HYST3	Not defined (set to all 1s)
THRESH3	Not defined (set to all 1s)
HYST2	Not defined (set to all 1s)
THRESH2	Not defined (set to all 1s)
HYST1	2 dB
THRESH1	12.5 dB

26.17.9.7 Unknown RATSCCH REQ Message

26.17.9.7.1 Conformance requirements

The ACK_UNKNOWN message serves as an acknowledgement that a RATSCCH REQ message has been detected and correctly decoded, but was unknown to the Addressee.

Reference:

3GPP TS 45.009 sub-clause: 3.2.2.3.3

26.17.9.7.2 Test purpose

This test will verify that the MS can correctly handle an unknown RATSCCH REQ message.

26.17.9.7.3 Method of test

Initial Conditions

System Simulator:

1 cell with default parameters

Mobile Station:

The MS is in the "idle, updated" state, with a TMSI allocated and camped on cell A.

Specific PICS statements:

-

PIXIT statements:

-

Foreseen Final State of the MS

Idle Updated, TMSI allocated and camped on cell A.

Test Procedure

- 1) User initiates a Mobile Originated call.
- 2) The network and the MS indicate Bearer capabilities IE with the AMR speech Half Rate (Version 6).
- 3) The network performs an assignment on a TCH channel with MultiRate configuration to the MS.
- 4) The call is maintained during a programmable time without variation of RxLev / RxQual.
- 5) The SS shall send an unknown RATSCCH_REQ message, with message content as all zeros, during the call at a programmable time.
- 6) The MS answers with a ACK_UNKNOWN message within 3 speech frames
- 7) The network initiates the call release.

Maximum Duration of Test

5 minutes

Expected Sequence

Step	Direction	Message	Comments
1	MS		MS is in idle mode
2	MS		MS initiates Mobile Originated call
3	MS->SS	Channel Request	Establishment cause is "originating call and the network does not set the NECI bit to 1".
4	SS->MS	Immediate Assignment	See Default Messages for AMR
5	MS->SS	CM Service Request	CM Service Type = Mobile Originating Call Establishment.
6	SS->MS	AUTHENTICATION REQUEST	
7	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
8	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
9	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
10	MS->SS	Setup	MS indicates supported speech versions
11	SS->MS	Call Proceeding	
12	SS->MS	Alerting	
13	SS->MS	Assignment Command	See specific message contents.
14	MS->SS	Assignment Complete	
15	SS->MS	Connect	
16	MS->SS	Connect Acknowledge	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	SS->MS	Unknown RATSCCH message	Message contents all 0's
19	MS->SS	ACK_UNKNOWN	Message must be received within 3 speech frames
20	SS->MS	Disconnect	
21	MS->SS	Release	
22	SS->MS	Release Complete	
23	SS->MS	Channel Release	

Specific Message Contents

ASSIGNMENT COMMAND

Information Element	value/remarks
Channel description	O-TCH/AHS
Mode of the first channel - Mode	Half rate version 6

RATSCCH_REQ

Information Element	value/remarks
all bits	0

26.17.9.8 Ignore subsequent REQ prior to expiry of REQ_Activation counter

26.17.9.8.1 Conformance requirements

If another REQ message is received by the MS before the REQ_Activation counter has elapsed, the MS shall ignore the message.

Reference:

3GPP TS 45.009 sub-clause: 3.2.2.2

26.17.9.8.2 Test purpose

This test will verify that the MS ignores a REQ message which is received before the REQ_Activation counter has elapsed. The test will verify that both the following conditions are satisfied:

- the MS ignores a subsequent REQ message received after it has sent the ACK_OK but before the REQ_Activation counter has elapsed.

26.17.9.8.3 Method of test

Initial Conditions

System Simulator:

1 cell with default parameters

Mobile Station:

The MS is in the "idle, updated" state, with a TMSI allocated and camped on cell A.

Specific PICS statements:

-

PIXIT statements:

-

Foreseen Final State of the MS

Idle Updated, TMSI allocated and camped on cell A.

Test Procedure

- 1) User initiates a Mobile Originated call.
- 2) The network and the MS indicate Bearer capabilities IE with the AMR speech Half Rate (Version 6).
- 3) The network performs an assignment on a TCH channel with MultiRate configuration to the MS.
- 4) The call is maintained during a programmable time without variation of RxLev /RxQual.
- 5) The SS shall send an AMR_CONFIG_REQ message during the call at a programmable time.
- 6) The MS answers the AMR_CONFIG_REQ with an ACK_OK message within 3 speech frames of the AMR_CONFIG_REQ.
- 7) The SS shall send a second AMR_CONFIG_REQ message within 11 speech frames of sending the first AMR_CONFIG_REQ message .
- 8) The SS shall verify that the codec mode used by the MS after the REQ_Activation counter has elapsed is consistent with the first AMR_CONFIG_REQ message, and not the second AMR_CONFIG_REQ message.
- 9) The SS initiates the call release.

Maximum Duration of Test

5 minutes

Expected Sequence

Step	Direction	Message	Comments
1	MS		MS is in idle mode
2	MS		MS initiates Mobile Originated call
3	MS->SS	Channel Request	Establishment cause is "originating call and the network does not set the NECI bit to 1".
4	SS->MS	Immediate Assignment	See Default Messages for AMR
5	MS->SS	CM Service Request	CM Service Type = Mobile Originating Call Establishment.
6	SS->MS	AUTHENTICATION REQUEST	
7	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
8	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
9	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
10	MS->SS	Setup	MS indicates supported speech versions
11	SS->MS	Call Proceeding	
12	SS->MS	Alerting	
13	SS->MS	Assignment Command	See specific message contents.
14	MS->SS	Assignment Complete	
15	SS->MS	Connect	
16	MS->SS	Connect Acknowledge	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	SS->MS	AMR_CONFIG_REQ	See specific message contents.
19	MS->SS	ACK_OK	Message must be received within 3 speech frames
20	SS->MS	AMR_CONFIG_REQ	See specific message contents. To be sent to MS within 11 speech frames of having sent the first message in step 18.
21	MS		Verify that the codec mode used by the MS is that specified in step 18.
22	SS->MS	Disconnect	
23	MS->SS	Release	
24	SS->MS	Release Complete	
25	SS->MS	Channel Release	

Specific Message Contents

ASSIGNMENT COMMAND

Information Element	value/remarks
Channel description	O-TCH/AHS
Mode of the first channel - Mode	Half rate version 6.

AMR_CONFIG_REQ

In step 18:

Information Element	value/remarks
ICM	CODEC_MODE_1
ACS	2 codec modes
HYST2	Not defined (set to all 1s)
THRESH2	Not defined (set to all 1s)
HYST1	2 dB
THRESH1	12.5 dB

In step 20:

Information Element	value/remarks
ICM	CODEC_MODE_1
ACS	1 codec mode – different to any codec mode specified in the ACS in step 15.
HYST2	Not defined (set to all 1s)
THRESH2	Not defined (set to all 1s)
HYST1	Not defined (set to all 1s)
THRESH1	Not defined (set to all 1s)

26.17.9.9 Initiation of Transaction with ACK_ERR or ACK_UNKNOWN

26.17.9.9.1 Conformance requirements

If at either side an ACK_ERR or ACK_UNKNOWN is received although no corresponding REQ has been sent before, the ACK message shall be ignored.

Reference:

3GPP TS 45.009 sub-clause: 3.2.2.2

26.17.9.9.2 Test purpose

This test will verify that the MS ignores any ACK_ERR or ACK_UNKNOWN which is received without a corresponding REQ having been sent.

26.17.9.9.3 Method of test

Initial Conditions

System Simulator:

1 cell with default parameters

Mobile Station:

The MS is in the "idle, updated" state, with a TMSI allocated and camped on cell A.

Specific PICS statements:

-

PIXIT statements:

-

Foreseen Final State of the MS

Idle Updated, TMSI allocated and camped on cell A.

Test Procedure

- 1) User initiates a Mobile Originated call.
- 2) The network and the MS indicate Bearer capabilities IE with the AMR speech Half Rate (Version 6).
- 3) The network performs an assignment on a TCH channel with MultiRate configuration to the MS.
- 4) The call is maintained during a programmable time without variation of RxLev / RxQual.
- 5) The SS shall send an ACK_ERR message during the call at a programmable time.
- 6) The SS verifies that no message is received from the MS on the RATSCCH within 12 speech frames.
- 7) The SS shall send an ACK_UNKNOWN message during the call at a programmable time.
- 8) The SS verifies that no message is received from the MS on the RATSCCH within 12 speech frames.

- 9) The network initiates the call release.

Maximum Duration of Test

5 minutes

Expected Sequence

Step	Direction	Message	Comments
1	MS		MS is in idle mode
2	MS		MS initiates Mobile Originated call
3	MS->SS	Channel Request	Establishment cause is "originating call and the network does not set the NECI bit to 1".
4	SS->MS	Immediate Assignment	See Default Messages for AMR
5	MS->SS	CM Service Request	CM Service Type = Mobile Originating Call Establishment.
6	SS->MS	AUTHENTICATION REQUEST	
7	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
8	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
9	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
10	MS->SS	Setup	MS indicates supported speech versions
11	SS->MS	Call Proceeding	
12	SS->MS	Alerting	
13	SS->MS	Assignment Command	See specific message contents for codec modes.
14	MS->SS	Assignment Complete	
15	SS->MS	Connect	
16	MS->SS	Connect Acknowledge	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	SS->MS	ACK_ERR	
19	MS		Wait at least 12 speech frames to ensure that no message is received from the MS.
20	SS->MS	ACK_UNKNOWN	
21	MS		Wait at least 12 speech frames to ensure that no message is received from the MS.
22	SS->MS	Disconnect	
23	MS->SS	Release	
24	SS->MS	Release Complete	
25	SS->MS	Channel Release	

Specific Message Contents

ASSIGNMENT COMMAND

Information Element	value/remarks
Channel description	O-TCH/AHS
Mode of the first channel	
- Mode	Half rate version 6

26.17.9.10 Inversion of the Phase of the CMR/CMI

26.17.9.10.1 Conformance requirements

The phase of the Codec Mode Indication in the downlink can be changed during a call by using a CMI_PHASE_REQ message sent on the RATSCCH.

The CMI_PHASE_REQ message may be sent by the BTS during a call to change the phase of the Codec Mode Indication in the downlink without interruption of the speech transmission.

The ACK_OK message serves as an acknowledgement that a RATSCCH REQ message has been detected, correctly decoded (no CRC error) and that it is defined for the Addressee.

References:

3GPP TS 45.009 clauses 3.2.1.3 and 3.2.2.3.4.

26.17.9.10.2 Test purpose

This test shall verify that the MS is able to change the phase of the Codec Mode Indication in the downlink using the RATSCCH protocol.

26.17.9.10.3 Method of test

Initial Conditions

System Simulator:

1 cell with default parameters

Mobile Station:

The MS is in the "idle, updated" state, with a TMSI allocated and camped on cell A.

Specific PICS statements:

-

PIXIT statements:

-

Foreseen Final State of the MS

Idle Updated, TMSI allocated and camped on cell A.

Test Procedure

- 1) User initiates a Mobile Originated call.
- 2) The network and the MS indicate Bearer capabilities IE with the AMR speech Half Rate (Version 6).
- 3) The network performs an assignment on a TCH channel with MultiRate configuration to the MS.
- 4) The network shall indicate Codec Mode Command = 0 and Codec Mode Indication = 1.
- 5) The SS sends a series of CMI_PHASE_REQ messages during the call to change the phase of the Codec Mode Indication in the downlink.
- 6) The MS responds to each CMI_PHASE_REQ message with an ACK_OK message on the RATSCCH.
- 7) The SS shall ensure that the phase request has been handled correctly by checking the Uplink CMI = 0 for 20 speech frames following the receipt of the ACK_OK.
- 8) The network initiates the call release.

Maximum Duration of Test

5 minutes

Expected Sequence

Step	Direction	Message	Comments
1	MS		MS is in idle mode
2	MS		MS initiates Mobile Originated call
3	MS->SS	Channel Request	Establishment cause is "originating call and the network does not set the NECI bit to 1".
4	SS->MS	Immediate Assignment	See Default Messages for AMR
5	MS->SS	CM Service Request	CM Service Type = Mobile Originating Call Establishment.
6	SS->MS	AUTHENTICATION REQUEST	
7	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
8	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
9	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
10	SS->MS	Setup	AMR speech
11	MS->SS	Call Proceeding	
12	MS->SS	Alerting	
13	SS->MS	Assignment Command	Multirate Configuration for 2 codec modes
14	MS->SS	Assignment Complete	
15	SS->MS	Connect	
16	MS->SS	Connect Acknowledge	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	SS->MS	CMI_PHASE_REQ	See specific message contents
19	MS->SS	ACK_OK	
20	MS		Wait 20 speech frames, then check that UL CMI = 0
21	SS->MS	CMI_PHASE_REQ	See specific message contents
22	MS->SS	ACK_OK	
23	MS		Wait 20 speech frames, then check that UL CMI = 0
24	SS->MS	CMI_PHASE_REQ	See specific message contents
25	MS->SS	ACK_OK	
26	MS		Wait 20 speech frames, then check that UL CMI = 0
27	SS->MS	CMI_PHASE_REQ	See specific message contents
28	MS->SS	ACK_OK	
29	MS		Wait 20 speech frames, then check that UL CMI = 0
30	SS->MS	Disconnect	
31	MS->SS	Release	
32	SS->MS	Release Complete	
33	SS->MS	Channel Release	

Specific Message Contents

ASSIGNMENT COMMAND

Information Element	value/remarks
Channel description Mode of the first channel - Mode	O-TCH/AHS Half rate version 6.

In step 15:

CMI_PHASE_REQ

Information Element	value/remark
CMIP	0: CMI transmitted in even speech frames

This message should be sent in a RATSCCH frame where the RATSCCH_DATA part for AHS replaces a speech frame which would have carried a Codec Mode Command.

In step 18:

CMI_PHASE_REQ

Information Element	value/remark
CMIP	1: CMI transmitted in odd speech frames (back to default)

This message should be sent in a RATSCCH frame where the RATSCCH_DATA part for AHS replaces a speech frame which would have carried a Codec Mode Command.

In step 21:

CMI_PHASE_REQ

Information Element	value/remark
CMIP	0: CMI transmitted in even speech frames

This message should be sent in a RATSCCH frame where the RATSCCH_DATA part for AHS replaces a speech frame which would have carried a Codec Mode Indication.

In step 24:

CMI_PHASE_REQ

Information Element	value/remark
CMIP	1: CMI transmitted in odd speech frames (back to default)

This message should be sent in a RATSCCH frame where the RATSCCH_DATA part for AHS replaces a speech frame which would have carried a Codec Mode Indication.

26.17.9.11 Change of Active Codec Set

26.17.9.11.1 Conformance requirements

AMR codec mode adaptation is done within a set of 4 codec modes. The codec mode set (Active Codec Set) to be used by the BSS and the MS is defined during call setup and/or handover by layer 3 signalling. The ACS can be changed during a call using an AMR_CONFIG_REQ message sent on the RATSCCH.

The AMR_CONFIG_REQ message may be sent by the BTS during a call to change the AMR configuration on the radio interface without interruption of the speech transmission.

The ACK_OK message serves as an acknowledgement that a RATSCCH REQ message has been detected, correctly decoded (no CRC error) and that it is defined for the Addressee.

If the ACS consists of four modes, then the complete set of thresholds/hysteresis can not be sent with this message. In that case, all THRESH_j and HYST_j fields are reserved for future use and shall be set to "1". Similar, if the BTS has no threshold and hysteresis parameters for the given configuration, then all THRESH_j and HYST_j field bits shall be set to "1" to indicate that they are undefined. The THRESH_REQ message shall be used to transmit these parameters at a later point in time. As long as the MS has no defined threshold and hysteresis parameters it shall use the Initial Codec Mode for the Codec Mode Request.

References:

3GPP TS 45.009 clauses 3.2.2.3.5 and 3.4.

26.17.9.11.2 Test purpose

This test shall verify that the MS is able to change its Active Codec Set using the RATSCCH protocol, with change of thresholds, and with non-specification of thresholds.

26.17.9.11.3 Method of test

Initial Conditions

System Simulator:

1 cell with default parameters

Mobile Station:

The MS is in the "idle, updated" state, with a TMSI allocated and camped on cell A.

Specific PICS statements:

-

PIXIT statements:

-

Foreseen Final State of the MS

Idle Updated, TMSI allocated and camped on cell A.

Test Procedure

- 1) User initiates a Mobile Originated call.
- 2) The network and the MS indicate Bearer capabilities IE with the AMR speech Half Rate (Version 6).
- 3) The network performs an assignment on a TCH channel with MultiRate configuration to the MS.
- 4) The SS uses the codec with the highest bit-rate in the current ACS for the Codec Mode Indication, and that with the lowest bit-rate for the Codec Mode Command.
- 5) The SS sends an AMR_CONFIG_REQ message during the call to reconfigure the Multirate settings.
- 6) The MS responds to each AMR_CONFIG_REQ message with an ACK_OK message on the RATSCCH.
- 7) The SS shall ensure that the change occurs correctly for downlink (12 speech frames after AMR_CONFIG_REQ message was sent), and for uplink (12 speech frames after ACK_OK was received) by checking parity of received speech frames, and correct implementation of Uplink Codec mode Request.
- 8) The SS shall ensure that each of the codecs in the ACS have been implemented correctly by setting the CMC to each of the applicable modes, and ensuring that the UL frames with each CMI are received without parity error. The SS shall then set the CMI and CMC to the codec with highest and lowest bit rates respectively.
- 9) Steps 4 to 8 shall be repeated for differing AMR_CONFIG_REQ parameters and sending conditions.
- 10) The network initiates the call release.

Maximum Duration of Test

5 minutes

Expected Sequence

Step	Direction	Message	Comments
1	MS		MS is in idle mode
2	MS		MS initiates Mobile Originated call
3	MS->SS	Channel Request	Establishment cause is "originating call and the network does not set the NECI bit to 1".
4	SS->MS	Immediate Assignment	See Default Messages for AMR
5	MS->SS	CM Service Request	CM Service Type = Mobile Originating Call Establishment.
6	SS->MS	AUTHENTICATION REQUEST	
7	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
8	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
9	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
10	MS->SS	Setup	AMR speech
11	SS->MS	Call Proceeding	
12	SS->MS	Alerting	
13	SS->MS	Assignment Command	Multirate Configuration for 2 codec modes
14	MS->SS	Assignment Complete	
15	SS->MS	Connect	
16	MS->SS	Connect Acknowledge	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	SS->MS	AMR_CONFIG_REQ	See specific message contents.
19	MS->SS	ACK_OK	
20	MS		Check that ACS changes have been implemented correctly. Expected CMR = 0.
21	SS->MS	AMR_CONFIG_REQ	See specific message contents.
22	MS->SS	ACK_OK	
23	MS		Check that ACS changes have been implemented correctly. Expected CMR = 0 or 1.
24	SS->MS	AMR_CONFIG_REQ	See specific message contents.
25	MS->SS	ACK_OK	
26	MS		Check that ACS changes have been implemented correctly. Expected CMR = 0, 1 or 2.
27	SS->MS	AMR_CONFIG_REQ	See specific message contents.
28	MS->SS	ACK_OK	
29	MS		Check that ACS changes have been implemented correctly. Expected CMR = 0, 1, 2 or 3.
30	SS->MS	AMR_CONFIG_REQ	See specific message contents.
31	MS->SS	ACK_OK	
32	MS		Check that ACS changes have been implemented correctly. Expected CMR = 2 (special case where CMR = ICM).
33	SS->MS	Disconnect	
34	MS->SS	Release	
35	SS->MS	Release Complete	
36	SS->MS	Channel Release	

Specific Message Contents

In all cases, the Active Codec Set field of the AMR_CONFIG_REQ messages should be programmed to ensure that the codec rate changes when the new configuration takes effect.

ASSIGNMENT COMMAND

Information Element	value/remarks
Channel description Mode of the first channel - Mode Multi-Rate configuration	O-TCH/AHS Half rate version 6. Arbitrary set of codec modes, thresholds and hysteresis specified according to 3GPP TS 45.009

In step 18:

AMR_CONFIG_REQ

Information Element	value/remark
ICM	CODEC_MODE_1
ACS	1 codec mode (different from that in Assignment Command)
HYST2	n/a – set to all 1's
THRESH2	n/a – set to all 1's
HYST1	n/a – set to all 1's
THRESH1	n/a – set to all 1's

This message should be sent in a RATSCCH frame where the RATSCCH_DATA part for AHS replaces a speech frame which would have carried a Codec Mode Command.

In step 21:

AMR_CONFIG_REQ

Information Element	value/remark
ICM	CODEC_MODE_1
ACS	2 codec modes
HYST2	n/a – set to all 1's
THRESH2	n/a – set to all 1's
HYST1	2 dB
THRESH1	12.5 dB

This message should be sent in a RATSCCH frame where the RATSCCH_DATA part for AHS replaces a speech frame which would have carried a Codec Mode Command.

In step 24:

AMR_CONFIG_REQ

Information Element	value/remark
ICM	CODEC_MODE_2
ACS	3 codec modes
HYST2	2 dB
THRESH2	13 dB
HYST1	2 dB
THRESH1	7 dB

This message should be sent in a RATSCCH frame where the RATSCCH_DATA part for AHS replaces a speech frame which would have carried a Codec Mode Indication.

In step 27:

AMR_CONFIG_REQ

Information Element	value/remark
ICM	CODEC_MODE_3
ACS	4 codec modes
HYSTc	2 dB
THRESH3	18 dB
THRESH2	12 dB
THRESH1	6.5 dB

This message should be sent in a RATSCCH frame where the RATSCCH_DATA part for AHS replaces a speech frame which would have carried a Codec Mode Indication.

In step 30:

AMR_CONFIG_REQ

Information Element	value/remark
ICM	CODEC_MODE_3
ACS	4 codec modes
HYST2	Undefined – set to all 1's
THRESH2	Undefined – set to all 1's
HYST1	Undefined – set to all 1's
THRESH1	Undefined – set to all 1's

This message should be sent in a RATSCCH frame where the RATSCCH_DATA part for AHS replaces a speech frame which would have carried a Codec Mode Command.

26.17.108-PSK AMR HR signalling/ test of the channel mode modify procedure

NOTE: This test is derived from the test in sub-clause 26.16.10 entitled "AMR signalling/ test of the channel mode modify procedure".

26.17.10.1 Void

26.17.10.2 8-PSK AMR HR signalling/ test of the channel mode modify procedure/ half rate

26.17.10.2.1 Conformance requirement

The MS with a TCH/H allocated acknowledges a CHANNEL MODE MODIFY message by sending a CHANNEL MODE MODIFY ACKNOWLEDGE message specifying the new mode and by switching to this mode.

References

3GPP TS 04.08 / 3GPP TS 44.018, subclauses 3.4.6.1.1 and 3.4.6.1.2

26.17.10.2.2 Test purpose

To verify that the MS with a TCH/H allocated acknowledges a CHANNEL MODE MODIFY message by sending a CHANNEL MODE MODIFY ACKNOWLEDGE message specifying the new mode and by switching to this mode.

26.17.10.2.3 Method of test

Initial Conditions

System Simulator: 1 cell, default parameters.

Mobile Station: The MS is "idle updated", with TMSI allocated.

Specific PICS statements:

-

PIXIT statements:

-

Foreseen Final State of the MS

"Idle, updated", with TMSI allocated.

Test procedure

A Mobile Terminated call is initiated, however following the CHANNEL REQUEST received from the Mobile Station, the SS sends an IMMEDIATE ASSIGNMENT to the MS commanding it to go to a TCH/H. This sets the Channel Mode automatically to "Signalling Only".

The SS then sends a series of CHANNEL MODE MODIFY messages to the MS. Each time it is checked that the MS responds with a CHANNEL MODE MODIFY ACKNOWLEDGE message specifying the channel mode that has been specified in the CHANNEL MODE MODIFY message (i.e. Half Rate version 6)

Maximum Duration of Test

30 seconds.

Expected Sequence

Step	Direction	Message	Comments
1	SS->MS	PAGING REQUEST TYPE 1	Sent on correct paging sub channel
2	MS->SS	CHANNEL REQUEST	Establishment cause indicates "answer to paging"
3	SS->MS	IMMEDIATE ASSIGNMENT	Assignment to a non hopping TCH/H signalling only
4	MS->SS	PAGING RESPONSE	Message is contained in the SABM
5	SS->MS	AUTHENTICATION REQUEST	
6	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
7	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
8	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
9	SS		SS starts ciphering
10	SS->MS	CHANNEL MODE MODIFY	
11	MS->SS	CHANNEL MODE MODIFY ACKNOWLEDGE	Verify that Channel description = TCH/H, Channel mode = Half rate version 6
12	SS->MS	CHANNEL MODE MODIFY	
13	MS->SS	CHANNEL MODE MODIFY ACKNOWLEDGE	Verify that Channel description = TCH/H, Channel mode = Half rate version 6
14	SS->MS	CHANNEL MODE MODIFY	
15	MS->SS	CHANNEL MODE MODIFY ACKNOWLEDGE	Verify that Channel description = TCH/H, Channel mode = Half rate version 6
16	SS->MS	CHANNEL MODE MODIFY	
17	MS->SS	CHANNEL MODE MODIFY ACKNOWLEDGE	Verify that Channel description = TCH/H, Channel mode = Half rate version 6
18	SS->MS	CHANNEL RELEASE	

Specific Message Contents

In steps 10– 16:

CHANNEL MODE MODIFY

Information Element	value/remark
Channel description	in steps 10, 12, 14, 16: same as for step 3
Channel mode	
Mode	Speech Full or Half rate version 6
Multi-Rate configuration	in steps 10: change of MR configuration, no initial codec mode
	in steps 12: change of MR configuration, initial codec mode specified
	in steps 14: change of MR thresholds, no initial codec mode
	in steps 16: initial codec mode specified

26.18 Dynamic ARFCN mapping tests

26.18.1 Control of dynamic ARFCN mapping with SI14 and SI15

26.18.1.1 Conformance Requirement

The dynamic mapping of ARFCN to carrier frequencies is specified as follow in 3GPP TS 45.005:

“The carrier frequency is designated by the absolute radio frequency channel number (ARFCN). If we call $F_l(n)$ the frequency value of the carrier ARFCN n in the lower band, and $F_u(n)$ the corresponding frequency value in the upper band, we have for the dynamically mapped ARFCNs:

T-GSM 380	$F_l(n) = 380.2 + 0.2*(n-x+y)$	$x \leq n \leq x+z$	$F_u(n)=F_l(n) + 10$
T-GSM 410	$F_l(n) = 410.2 + 0.2*(n-x+y)$	$x \leq n \leq x+z$	$F_u(n)=F_l(n) + 10$
T-GSM 810	$F_l(n) = 806.2 + 0.2*(n-x+y)$	$x \leq n \leq x+z$	$F_u(n)=F_l(n) + 45$
GSM 710	$F_l(n) = 698.2 + 0.2*(n-x+y)$	$x \leq n \leq x+z$	$F_u(n) = F_l(n) + 30$
GSM 750	$F_l(n) = 747.2 + 0.2*(n-x+y)$	$x \leq n \leq x+z$	$F_u(n) = F_l(n) + 30$
DCS 1 800	$F_l(n) = 1710.2 + 0.2*(n-x+y)$	$x \leq n \leq x+z$	$F_u(n) = F_l(n) + 95$
PCS 1 900	$F_l(n) = 1850.2 + 0.2*(n-x+y)$	$x \leq n \leq x+z$	$F_u(n) = F_l(n) + 80$

where the applicable band is indicated by the GSM_Band parameter, $x = \text{ARFCN_FIRST}$, $y = \text{BAND_OFFSET}$ and $z = \text{ARFCN_RANGE}$ (See 3GPP TS 44.018). Parameters defining carrier frequencies not belonging to the indicated band shall not be considered erroneous.

Information about dynamic mapping is provided by System Information type 15 or Packet System Information type 8 if PBCCH exists, and optionally by System Information type 14. Dynamic ARFCN mapping shall be valid for the whole PLMN. Dynamic mapping has priority over the fixed designation of carrier frequencies. The support of dynamic ARFCN mapping is optional for all other mobile stations except those supporting GSM 700 and T-GSM.”

The frequency band for T-GSM and GSM 700 (dynamic ARFCN mapping is mandatory for these frequencies bands as there is no physical mapping specified) are defined as follow in 3GPP TS 45.005:

i) T-GSM 380 band:

- for T-GSM 380, the system is required to operate in the following band:
 - 380,2 MHz to 389,8 MHz: mobile transmit, base receive;
 - 390,2 MHz to 399,8 MHz base transmit, mobile receive.

ii) T-GSM 410 band:

- for T-GSM 410, the system is required to operate in the following band:
 - 410,2 MHz to 419,8 MHz: mobile transmit, base receive;
 - 420,2 MHz to 429,8 MHz base transmit, mobile receive.

...

v) GSM 710 Band:

- for GSM 710, the system is required to operate in the following band:
 - 698 MHz to 716 MHz: base transmit, mobile receive;
 - 728 MHz to 746 MHz: mobile transmit, base receive.

vi) GSM 750 Band:

- for GSM 750, the system is required to operate in the following band:
 - 747 MHz to 762 MHz: base transmit, mobile receive;
 - 777 MHz to 792 MHz: mobile transmit, base receive.

vii) T-GSM 810 Band:

- for T-GSM 810, the system is required to operate in the following band:
 - 806 MHz to 821 MHz: mobile transmit, base receive;
 - 851 MHz to 866 MHz: base transmit, mobile receive.

...

The way to change dynamic ARFCN mapping is specified as follow in 3GPP TS 44.018:

“SYSTEM INFORMATION TYPE 15 message is broadcast if dynamic ARFCN mapping is used in the PLMN. In this case ARFCN values are allocated and dynamically mapped to physical frequencies, see 3GPP TS 45.005. The presence of dynamic ARFCN mapping shall be indicated in Cell Options (BCCH) IE. When the value of the parameter DM_CHANGE_MARK is changed in the SYSTEM INFORMATION TYPE 15 message, the mobile station shall re-read information on dynamic mapping in a full set of SYSTEM INFORMATION 15 messages.

After the release of a dedicated connection, when returning to idle mode or packet idle mode, the mobile station may keep the dynamic ARFCN mapping information for the PLMN of the chosen cell under the following conditions:

- there has not been any handover during the connection; or
- the mobile station chooses the last cell (identified by the BCCH carrier and BSIC) that was used during the connection and there has not been any handover including dynamic ARFCN mapping information after reception of the dynamic ARFCN mapping information.

Otherwise, the mobile station shall acquire new dynamic ARFCN mapping information.”

References:

3GPP TS 45.005, subclause 2.

3GPP TS 44.018, subclauses 3.2.2.1, 9.1.43i, 9.1.43j, 10.5.2.3, 10.5.2.11b, 10.5.2.37j, 10.5.2.37k.

26.18.1.2 Test Purpose

To verify that for the frequencies bands for which Dynamic ARFCN mapping is mandatory, the MS:

- 1) detects that dynamic ARFCN mapping is supported in the cell (signalled via the DN-IND field of the Cell Options (BCCH) IE in the SI3)
- 2) decodes and interprets correctly the parameters $x = \text{ARFCN_FIRST}$, $y = \text{BAND_OFFSET}$ and $z = \text{ARFCN_RANGE}$ transmitted in the SI15 message broadcast on the BCCH.
- 3) decodes and interprets correctly the parameters $x = \text{ARFCN_FIRST}$, $y = \text{BAND_OFFSET}$ and $z = \text{ARFCN_RANGE}$ transmitted in the SI14 message broadcast on the SACCH.
- 4) detects a change of dynamic ARFCN mapping in the SI15 message broadcast on the BCCH (signalled via the DM_CHANGE_MARK field in SI15)

26.18.1.3 Method of Test

Initial Conditions

MS:

Switched off

MS operating in a band for which support of Dynamic ARFCN mapping is mandatory.

System Simulator:

1 cell, default setting for the frequency band to be tested.

Cell Options (BCCH) IE shall indicate that Dynamic ARFCN is supported

Specific PICS statements:

-

PIXIT statements:

-

Test Procedure

Two dynamic ARFCN mapping of the carrier frequencies of the band to be tested are defined (the two mappings shall not overlap):

- a) the first mapping referred as DM1 maps the N carrier frequencies of the band to be tested to the ARFCNs 438 to 438 + N.
- b) the second mapping referred as DM2 maps N - 1 carrier frequencies (the first frequency is excluded) of the band to be tested to the ARFCNs 438 + N + 1 to 438 + N + N

The parameters of the SI14/SI15 rest octets corresponding to these mapping are defined in the following table:

SI14/SI15 rest octets parameters	DM1 mapping	DM2 mapping
GSM_Band	GSM T 380 or GSM T 410 or GSMT 810 or GSM 710	GSM T 380 or GSM T 410 or GSMT 810 or GSM 710
ARFCN_FIRST	438	438 + N
ARFCN_OFFSET	0	1
ARFCN_RANGE	N	N - 1

With:

N = 47 for T-GSM 380,

N = 47 for T-GSM 410,

N = 89 for GSM 710,

N = 74 for GSM 750,

N = 74 for T-GSM 810.

The default layer 3 messages of the section 26.6.19 shall be used but when the DM2 mapping is used, the ARFCN numbers shall be modified by adding N.

The test is done in 3 steps:

- 1) Checking that the MS takes into account the ARFCN mapping defined in SI15

The SS broadcasts on the BCCH the default SIs and the SI15 containing the DM1 parameters. The MS is switched on. The MS shall trigger a IMSI Attach procedure. The SS assigns a SDCCH channel according to the dynamic ARFCN mapping defined in DM1. It is checked that the MS uses the frequency assigned in the

IMMEDIATE ASSIGNMENT message. Before releasing the SDCCH channel, the SS sends to the MS on the SACCH the SI14 containing the DM2 parameters.

- 2) Checking that the MS takes into account the ARFCN mapping defined in SI14

When the channel has been released and before the MS receives on the BCCH the SI14 containing the DM2 parameters, the SS establishes a SDCCH by assigning a channel according to the dynamic ARFCN mapping defined in DM2. It is checked that the MS uses the frequency assigned in the IMMEDIATE ASSIGNMENT message.

- 3) Checking that the MS takes into account a change of dynamic ARFCN mapping in SI15

When the channel has been released by the MS the SS broadcasts on the BCCH the SI15 containing the DM2 parameters and then the DM1 parameters. The SS establishes a SDCCH by assigning a channel according to the dynamic ARFCN mapping defined in DM1. It is checked that the MS uses the frequency assigned in the IMMEDIATE ASSIGNMENT message.

Maximum Duration of Test

1 minutes

Expected Sequence

Step	Direction	Message	Comments
1	SS -> MS		The SS broadcasts the SI15 containing the DM1 parameters.
2	MS		The MS is switched on.
3	MS -> SS	CHANNEL REQUEST	The MS initiates an IMSI attach procedure.
4	SS -> MS	IMMEDIATE ASSIGNMENT	The assigned carrier frequency is set using the dynamic ARFCN mapping defined with the DM1 parameters.
5	MS -> SS	LOCATION UPDATING REQUEST	It is checked that the LOCATION UPDATING REQUEST message is received on the carrier frequency assigned with the IMMEDIATE ASSIGNMENT message sent in step 4.
6	SS -> MS	LOCATION UPDATING ACCEPT	The SS allocates a new TMSI.
7	MS -> SS	TMSI REALLOCATION COMPLETE	
8	SS -> MS		The SS sends to the MS on the SACCH the SI14 containing the DM2 parameters.
9	SS -> MS	CHANNEL RELEASE	After the sending of this message, the SS waits the disconnection of the main signalling link.
10	MS		The MS shall stay in "idle" state for a short time and shall not receive the SI15 with the DM2 parameters during this time.
11	SS -> MS	PAGING REQUEST TYPE 1	
12	MS -> SS	CHANNEL REQUEST	"Establishment cause ": answer to paging.
13	SS -> MS	IMMEDIATE ASSIGNMENT	The assigned carrier frequency is set using the dynamic ARFCN mapping defined with the DM2 parameters.
14	MS -> SS	PAGING RESPONSE	It is checked that the PAGING RESPONSE message is received on the carrier frequency assigned with the IMMEDIATE ASSIGNMENT message sent in step 13.
15	SS -> MS	CHANNEL RELEASE	After the sending of this message, the SS waits the disconnection of the main signalling link.
16	SS -> MS		The SS broadcasts the SI15 containing the DM2 parameters during 5 seconds and then the SI15 containing the DM1 parameters.
17	SS -> MS	PAGING REQUEST TYPE 1	
18	MS -> SS	CHANNEL REQUEST	"Establishment cause ": answer to paging.
19	SS -> MS	IMMEDIATE ASSIGNMENT	The assigned carrier frequency is set using the dynamic ARFCN mapping defined with the DM1 parameters.
20	MS -> SS	PAGING RESPONSE	It is checked that the PAGING RESPONSE message is received on the carrier frequency assigned with the IMMEDIATE ASSIGNMENT message sent in step 19.
21	SS -> MS	CHANNEL RELEASE	

26.19 AMR WB - signalling

26.19.1 Reserved for future use

26.19.2 Reserved for future use

26.19.3 Reserved for future use

26.19.3a WB AMR / Structured procedures / MS terminated call / early assignment / specified initial codec mode

NOTE: this test is derived from the one described in subclause 26.16.3a and entitled: "Structured procedures / MS terminated call / early assignment / specified initial codec mode"

26.19.3a.1 Conformance requirement

- 1) In acceptance to a SETUP message indicating speech, the MS shall indicate and include in the CALL CONFIRMED message all the speech versions that it supports.
- 2) Upon receipt of the ASSIGNMENT COMMAND message specifying using CHx-FR or CHx/HR the Mobile Station continues a mobile terminating call establishment with early assignment of traffic channel:
 - a) by replying to the ASSIGNMENT command with an ASSIGNMENT COMPLETE message; and
 - b) by continuing the call establishment by through connecting TCH in both directions if it supports immediate connect or by sending an ALERTING message otherwise.
- 3) The ASSIGNMENT COMMAND will specify the subset of codec modes that the MS is allowed to use for the call, the thresholds and the initial codec mode for immediate use by the MS.
- 4) For speech calls, the mobile station shall attach the user connection at latest when sending the connect message, except if there is no compatible radio resource available at this time. In this case the attachment shall be delayed until such a resource becomes available.

CHx: identifies any of the Channel Codec modes.

FR: full rate channel.

HR: half rate channel.

References:

3GPP TS 04.08 / 3GPP TS 44.018 subclauses 9.12 and 9.1.5.

3GPP TS 05.09 subclause 3.4.

26.19.3a.2 Test purpose

- 1) To verify that, in acceptance to a SETUP message indicating speech, the MS indicates and includes in the CALL CONFIRMED message all the speech versions that it supports.
- 2) To verify that upon receipt of the ASSIGNMENT COMMAND message specifying using CHx-FR or CHx/HR the Mobile Station continues a mobile terminating call establishment with early assignment of traffic channel:
 - a) by replying to the ASSIGNMENT command with an ASSIGNMENT COMPLETE message; and
 - b) by continuing the call establishment by through connecting TCH in both directions if it supports immediate connect or by sending an ALERTING message otherwise.
- 3) To verify that upon receipt of an ASSIGNMENT COMMAND with codec mode specified, the MS shall use that specified codec mode.

- 4) To verify that for speech calls, the mobile station shall attach the user connection at latest when sending the connect message, except if there is no compatible radio resource available at this time. In this case the attachment shall be delayed until such a resource becomes available.

26.19.3a.3 Method of Test

Initial Conditions

SS 1 cell, default parameters

MS in MM-state "idle, updated" with valid TMSI and CKSN

Specific PICS statements:

- Support of GSM speech full rate version 4 (O-TCH/WFS).
- Support of GSM speech Half rate version 4 (O-TCH/WHS).
- Support of GSM Speech Full Rate version 5 (TCH/WFS).
- Immediate connect supported for all circuit switched basic services.

PIXIT statements:

- Way to indicate alerting.
- Way to make the MS accept an incoming call after alerting.

Foreseen Final State of MS

"Idle, updated", with TMSI allocated.

Test Procedure

The following test is performed for both channel modes of the multi-rate codec, i.e. full rate and half rate:

A teleservice is selected that is supported by the MS; if the MS supports speech, the selected teleservice is speech. If necessary, the MS is configured for that teleservice.

The MS is paged and the resulting call is established. Having reached the active state, the MS is made to clear the call.

Maximum Duration of Test

3 minutes

Expected Sequence

This test is repeated for M=1, 2, 3, 4 (M=4 only when k=2 and 3).

This test is repeated for

- k=1 if full rate speech version 5 is supported, and
- k=2 if full rate speech version 4 is supported, and
- k=3 if half rate speech version 4 is supported.

Step	Direction	Message	Comments
1	SS->MS	PAGING REQUEST TYPE 1	Sent on the correct paging sub-channel Message is contained in the SABM SRES specifies correct value SS starts deciphering after sending the message Shall be sent enciphered. All following messages shall be sent enciphered. SS starts ciphering
2	MS->SS	CHANNEL REQUEST	
3	SS->MS	IMMEDIATE ASSIGNMENT	
4	MS->SS	PAGING RESPONSE	
5	SS->MS	AUTHENTICATION REQUEST	
6	MS->SS	AUTHENTICATION RESPONSE	
7	SS->MS	CIPHERING MODE COMMAND	
8	MS->SS	CIPHERING MODE COMPLETE	
9	SS		
10	SS->MS	SETUP	
11	MS->SS	CALL CONFIRMED	
			If the MS supports an Immediate connection then branch A applies. If the MS doesn't support an immediate connection then branch B applies.
A12	MS->SS	CONNECT	sent on the old channel SS allocates allowed subset codec modes and identifies a mode for immediate operation.
A13	SS->MS	ASSIGNMENT COMMAND	
A14	MS->SS	ASSIGNMENT COMPLETE	
B12	SS->MS	ASSIGNMENT COMMAND	SS allocates allowed subset codec modes and identifies a mode for immediate operation. An alerting indication as defined in the PIXIT statement is given by the MS. The MS is made to accept the call.
B13	MS->SS	ASSIGNMENT COMPLETE	
B14	MS->SS	ALERTING	
B15	MS		
B16	MS		
B17	MS->SS	CONNECT	
18	MS		
19	SS->MS	CONNECT ACK	The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified. The MS is made to release the call.
20	MS		
21	MS->SS	DISCONNECT	
22	SS->MS	RELEASE	
23	MS->SS	RELEASE COMPLETE	
24	SS->MS	CHANNEL RELEASE	
			The main signalling link is released.

Specific Message Content

M=1

Assignment Command

Information Element	value/remark
Channel mode Mode	Speech full or half rate version 4, or speech full rate version 5
Multi-Rate configuration	ICMI = 1 Start Mode specified 1 codec mode specified

M=2

Assignment Command

Information Element	value/remark
Channel mode Mode	Speech full or half rate version 4, or speech full rate version 5 ICMI = 1 Start Mode specified 2 codec modes and threshold vales specified
Multi-Rate configuration	

M=3

Assignment Command

Information Element	value/remark
Channel mode Mode	Speech full or half rate version 4, or speech full rate version 5 ICMI = 1 Start Mode specified 3 codec modes and threshold vales specified
Multi-Rate configuration	

M=4

This step is applicable only if the MS supports full or half rate version 4.

Assignment Command

Information Element	value/remark
Channel mode Mode	Speech full or half rate version 4 ICMI = 1 Start Mode specified 4 codec modes and threshold vales specified
Multi-Rate configuration	

K = 1

This step is applicable only if the MS supports full rate version 5.

Assignment Command

Information Element	value/remark
Channel description	TCH/F
Channel mode Mode	Speech full rate version 5

K = 2

This step is applicable only if the MS supports full rate version 4.

Assignment Command

Information Element	value/remark
Channel description	TCH/F
Channel mode Mode	Speech full rate version 4

K = 3

This step is applicable only if the MS supports half rate version 4.

Assignment Command

Information Element	value/remark
Channel description	TCH/H
Channel mode Mode	Speech half rate version 4

26.19.4 Reserved for future use

26.19.5 WB AMR / Adaptive Multi Rate Signalling / AMR signalling / Handover / active call / successful case

NOTE: This test is derived from 26.16.5 – AMR signalling / Handover / active call / successful case.

26.19.5.1 Conformance requirements

The MS shall correctly apply the handover procedure in the non-synchronised case when:

- a call is in progress; and
- handover is performed from a TCH/F with/without frequency hopping towards a TCH/F with/without frequency hopping;
- the mode of either the current or the target channel is set to full rate speech version 4 or 5.

The MS also supporting half rate speech version 3 shall correctly apply the handover procedure in the non-synchronized case when:

- a call is in progress; and
- a handover is performed between a TCH/H with/without frequency hopping and a TCH/F or TCH/H with/without frequency hopping; and
- the mode of either the current or the target channel is set to half rate speech version 4.

References

3GPP TS 04.08 / 3GPP TS 44.018 subclauses 3.4.4 and 9.1.15.

3GPP TS 04.13 subclause 5.2.6.2.

26.19.5.2 Test Purpose

To test that the MS shall correctly apply the handover procedure in the non-synchronized case when:

- a call is in progress; and
- handover is performed from a TCH/F with/without frequency hopping towards a TCH/F with/without frequency hopping; and
- the mode of either the current or the target channel is set to full rate speech version 4 or 5 (AMR WB full rate speech).

To test that the MS also supporting half rate shall correctly apply the handover procedure in the non-synchronized case when:

- a call is in progress; and
- a handover is performed between a TCH/H with/without frequency hopping and a TCH/F with/without frequency hopping; and

- the mode of either the current or the target channel is set to half rate speech version 4.

26.19.5.3 Method of Test

Initial Conditions

MS in call active state U10 on cell A.

SS 2 cells, A and B with same LAI, default parameters except:

Band	Cell A		Cell B		Both Cells Format
	BCCH ARFCN	Cell Allocation	BCCH ARFCN	Cell Allocation	
GSM 450	263	259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291	274	260, 262, 264, 266, 268, 270, 272, 274, 276, 279, 281, 283, 285, 287, 289, 291	Range 128
GSM 480	310	306, 308, 310, 312, 314, 316, 318, 320, 322, 324, 326, 328, 330, 332, 334, 336, 338	321	307, 309, 311, 313, 315, 317, 319, 321, 323, 326, 328, 330, 332, 334, 336, 338	Range 128
GSM 710	457	447, 454, 457, 463, 471, 479, 482, 483, 489, 496, 498, 500, 501, 502, 503, 506, 508	477	451, 455, 459, 461, 467, 468, 475, 477, 497, 498, 500, 501, 502, 503, 506, 508	Range 128
GSM 750	457	447, 454, 457, 463, 471, 479, 482, 483, 489, 496, 498, 500, 501, 502, 503, 506, 508	477	451, 455, 459, 461, 467, 468, 475, 477, 497, 498, 500, 501, 502, 503, 506, 508	Range 128
T-GSM 810	457	447, 454, 457, 463, 471, 479, 482, 483, 489, 496, 498, 500, 501, 502, 503, 506, 508	477	451, 455, 459, 461, 467, 468, 475, 477, 497, 498, 500, 501, 502, 503, 506, 508	Range 128
GSM 850	147	137, 144, 147, 153, 161, 169, 172, 173, 179, 186, 193, 200, 201, 202, 203, 235, 241	167	141, 145, 149, 151, 157, 158, 165, 167, 187, 193, 200, 201, 202, 203, 235, 241	Range 128
GSM 900	20	10, 17, 20, 26, 34, 42, 45, 46, 52, 59, 66, 73, 74, 75, 76, 108, 114	40	14, 18, 22, 24, 30, 31, 38, 40, 60, 66, 73, 74, 75, 76, 108, 114	Bit Map 0
DCS 1 800	747	734, 741, 747, 754, 759, 762, 766, 767, 773, 775, 779, 782, 791, 798, 829, 832, 844	764	739, 743, 746, 749, 756, 758, 761, 764, 771, 779, 782, 791, 798, 829, 832, 844	Range 256
PCS 1 900	647	634, 641, 647, 654, 659, 662, 666, 667, 673, 675, 679, 682, 691, 698, 729, 732, 744	664	639, 643, 646, 649, 656, 658, 661, 664, 671, 679, 682, 691, 698, 729, 732, 744	Range 256

The frame numbers of cells A and B shall be different by 100.

The time base of cells A and B shall be such that the edges of their timeslots are not coincident at the antenna connector.

Specific PICS statements:

- Support of GSM speech full rate version 4 (O-TCH/WFS).
- Support of GSM speech Half rate version 4 (O-TCH/WHS).
- Support of GSM Speech Full Rate version 5 (TCH/WFS).
- Support of GSM Speech Full Rate Version 3 (TCH/AFS)
- Support of GSM Speech Half Rate Version 3 (TCH/AHS)
- Speech supported for Full rate version 2 (GSM EFR)

- Speech supported for Half rate version 1 (GSM HR)

PIXIT statements:

-

Foreseen Final State of MS

The MS has a MO call in state U10, "active".

Test Procedure

Table 1

Exec Counter	From	To	Timing Adv.	Start Time
1	TCH/F, sv4, no FH	TCH/F, sv4, no FH	20	none
2	TCH/F, sv4, no FH	TCH/F, sv4, FH	arbitrary	none
3	TCH/F, sv4, FH	TCH/F, sv4, FH	20	1,1s
4	TCH/F, sv4, FH	TCH/F, sv4, no FH	20	none
5	TCH/F, sv4, no FH	TCH/F, sv1, no FH	20	none
6	TCH/F, sv1, no FH	TCH/F, sv4, no FH	arbitrary	none
7	TCH/F, sv4, no FH	TCH/F, sv2, FH	arbitrary	none
8	TCH/F, sv2, FH	TCH/F, sv4, FH	20	1,1s
9	TCH/F, sv4, FH	TCH/H, sv1, FH	arbitrary	none
10	TCH/H, sv1, FH	TCH/F, sv4, no FH	20	none
11	TCH/F, sv4, no FH	TCH/H, sv4, FH	arbitrary	1.1s
12	TCH/H, sv4, FH	TCH/H, sv4, no FH	20	none
13	TCH/H, sv4, no FH	TCH/F, sv1, no FH	20	none
14	TCH/F, sv1, no FH	TCH/H, sv4, no FH	arbitrary	none
15	TCH/H, sv4, no FH	TCH/F, sv2, FH	Arbitrary	none
16	TCH/F, sv2, FH	TCH/H, sv4, FH	20	1,1s
17	TCH/H, sv4, FH	TCH/H, sv1, FH	Arbitrary	none
18	TCH/H, sv1, FH	TCH/H, sv4, no FH	20	none
19	TCH/H, sv4, no FH	TCH/F, sv4, no FH	20	None
20	TCH/F, sv4, no FH	TCH/F, sv5, no FH	20	None
21	TCH/F, sv5, no FH	TCH/F, sv5, no FH	20	None
22	TCH/F, sv5, no FH	TCH/F, sv5, FH	Arbitrary	None
23	TCH/F, sv5, FH	TCH/F, sv5, FH	20	1.1s
24	TCH/F, sv5, FH	TCH/F, sv5, no FH	20	None
25	TCH/F, sv5, no FH	TCH/F, sv1, no FH	20	None
26	TCH/F, sv1, no FH	TCH/F, sv5, no FH	Arbitrary	None
27	TCH/F, sv5, no FH	TCH/F, sv2, FH	Arbitrary	None
28	TCH/F, sv2, FH	TCH/F, sv5, FH	20	1.1s
29	TCH/F, sv5, FH	TCH/H, sv1, FH	Arbitrary	None
30	TCH/H, sv1, FH	TCH/F, sv5, no FH	20	None
31	TCH/F, sv5, no FH	TCH/F, sv3, no FH	20	None
32	TCH/F, sv3, no FH	TCH/F, sv5, FH	Arbitrary	None
33	TCH/F, sv5, FH	TCH/H, sv3, FH	20	1,1s
34	TCH/H, sv3, FH	TCH/F, sv5, no FH	20	None

Note: for all execution counters: State of call is U10 and the handover procedure is non-synchronized
 sv1 stands for speech full/half rate version 1.
 sv2 stands for speech full rate version 2 (enhanced full rate).
 sv3 stands for speech full/half rate version 3 (AMR)
 sv4 stands for speech full/half rate version 4 (AMR WB 8PSK).
 sv5 stands for speech full rate version 5 (AMR WB GMSK)

Table 2

	TCH/FS	TCH/HS	SDCCH
n	10-20	5-10	2-5
n:	number of access bursts.		

The MS is in the active state (U10) of a call. The SS sends a HANDOVER COMMAND on the main DCCH. The MS shall (at the time defined by the Starting Time information element, if included in the message) begin to send access

bursts on the new DCCH (and optionally on the SACCH) of the target cell. The SS observes the access bursts and after receiving n (n being arbitrarily chosen between values according to table 2) access bursts, the SS sends one PHYSICAL INFORMATION message with a Timing Advance as specified in table 1. The MS shall activate the channel in sending and receiving mode. The MS shall establish a signalling link. The MS shall be ready to transmit a HANDOVER COMPLETE message, before ' x ' ms after the end of the PHYSICAL INFORMATION message, but not before a UA frame has been sent by the SS.

The term 'ready to transmit' is defined in 3GPP TS 04.13. The value of ' x ' depends upon the target channel and is specified in the specific message contents section.

Maximum Duration of Test

10 minutes.

Expected Sequence

This sequence is performed for an execution counter $M = 1, 2 \dots 10$ for an MS that supports TCH/F and speech version 4, version 2 and version 1. Steps $M=7$ and $M=8$ are performed only if an MS supports full rate speech version 2. Steps $M=9$ and $M=10$ are performed only if an MS supports half rate speech version 1.

This sequence is performed for an execution counter $M = 1, 2 \dots 19$ for an MS that supports TCH/F and TCH/H and speech version 4, version 2 and version 1. Steps $M=7, M=8, M=15$ and $M=16$ are performed only if an MS supports speech version 2. Steps $M=9, M=10, M=17$ and $M=18$ are performed only if an MS supports half rate speech version 1.

This sequence is performed for an execution counter $M = 20, 21 \dots 30$ for an MS that supports TCH/F and speech version 5, version 2 and version 1. Steps $M=27$ and $M=28$ are performed only if an MS supports full rate speech version 2. Steps $M=29$ and $M=30$ are performed only if an MS supports half rate speech version 1.

Step	Direction	Message	Comments
0	MS -> SS		The MS and SS are in the active state of a call on the channel described below.
1	SS -> MS	HANDOVER COMMAND	See Specific message contents
2	MS -> SS	HANDOVER ACCESS	Repeated on every burst of the uplink main DCCH (and optionally the SACCH) until reception of PHYSICAL INFORMATION. Handover Reference as included in the HANDOVER COMMAND. If the HANDOVER COMMAND includes a starting time IE then the first HANDOVER ACCESS message shall be transmitted in the indicated frame (unless the indicated frame is not used by that channel, in which case the next frame used by that channel shall be used)
3	SS -> MS	PHYSICAL INFORMATION	Sent after reception of n HANDOVER ACCESS messages. See specific message contents.
4	MS -> SS	SABM	Sent without information field
5	SS -> MS	UA	
6	MS -> SS	HANDOVER COMPLETE	The message shall be ready to be transmitted before ' x ' ms after the completion of step 3.
7	MS -> SS		The MS and SS are in the active state of a call on the TCH described below. The SS checks that the TCH is through connected in the correct mode.

Specific Message Contents

For $M = 1$:

Step 0: The MS and SS are using a full rate TCH with speech full rate version 4 and in non-hopping mode on cell A.

HANDOVER COMMAND

Information Element	value/remarks
As default message contents, except:	
Cell Description	
- Network Colour Code	1
- Base Station Colour Code	5
- BCCH Carrier Number	See table below
Channel Description	
- Channel Type	TCH/F + ACCHs
- TDMA offset	Chosen arbitrarily
- Timeslot number	0
- Training Sequence Code	Chosen arbitrarily
- ARFCN	Chosen arbitrarily from the CA
Synchronisation Indication	
- Report Observed Time Difference	Shall not be included.
- Synchronisation Indication	'Non synchronised'.
- Normal Cell Indication	Ignore out of range timing advance.
Mode of the first channel.	
- Mode	speech full rate version 4
Multi-Rate configuration	ICMI = 0
	Arbitrary set of codec modes, thresholds and hysteresis specified according to 3GPP TS 05.09 / 45.009

Band	BCCH Carrier Number
GSM 450	274
GSM 480	321
GSM 710	477
GSM 750	477
T-GSM 810	477
GSM 850	167
GSM 900	40
DCS 1 800	764
PCS 1 900	664

PHYSICAL INFORMATION

Information Element	value/remarks
As default message contents.	

Step 6: $x = 500$

Step 7: The MS and SS are using a full rate TCH with speech full rate version 4 and in non-hopping mode on cell B.

For $M = 2$:

Step 0: The MS and SS are using a full rate TCH with speech full rate version 4 and in non-hopping mode on cell B.

HANDOVER COMMAND

Information Element	value/remarks
As default message contents, except:	
Cell Description	
- Network Colour Code	1
- Base Station Colour Code	5
- BCCH Carrier Number	See table below
Channel Description	
- Channel Type	TCH/F + ACCHs
- Timeslot number	Chosen arbitrarily, but not Zero
- Training Sequence Code	Chosen arbitrarily
- Hopping	RF hopping channel.
- MAIO	Chosen arbitrarily from the set (0, 1 to N-1), where N is the number of frequencies encoded in the Frequency List IE or Frequency Channel Sequence IE.
- HSN	Chosen arbitrarily from the set (1,2,..63)
Synchronisation Indication IE is not included.	
Channel Mode IE is not included.	
Frequency List after time	IE Present only for GSM450 and GSM480
- Frequency List	See table below
Frequency Channel Sequence after time	IE Present only for GSM900, GSM 710, GSM750 and T-GSM810
- Frequency Channel Sequence	See table below
Frequency Short List after time	IE Present only for GSM1800, PCS1900 and GSM850
- Frequency List	See table below
Multi-Rate configuration IE is not included	

HANDOVER COMMAND			
Band	Frequency List		BCCH Carrier Number
	Format	ARFCNs	ARFCN
GSM 450	Range 128	259, 261, 263, 265, 277, 279, 281, 283, 285, 287, 289, 291	263
GSM 480	Range 128	306, 308, 310, 312, 324, 326, 328, 330, 332, 334, 336, 338	310
GSM 710	Range 256	447, 454, 457, 463, 496, 498, 500, 501, 502, 503, 506, 508	457
GSM 750	Range 256	447, 454, 457, 463, 496, 498, 500, 501, 502, 503, 506, 508	457
T-GSM810	Range 256	447, 454, 457, 463, 496, 498, 500, 501, 502, 503, 506, 508	457
GSM 850	Variable bitmap	137, 144, 147, 153, 186, 193, 200, 201, 202, 203, 235, 241	147
GSM 900	Variable bitmap	10, 17, 20, 26, 59, 66, 73, 74, 75, 76, 108, 114	20
DCS 1 800	Range 256	747, 775, 779, 782, 791, 798, 829, 832, 844	747
PCS 1 900	Range 256	647, 675, 679, 682, 691, 698, 729, 732, 744	647

PHYSICAL INFORMATION

Information Element	value/remarks
As default message contents, except:	
Timing advance	Arbitrarily selected but different to default value.

Step 6: $x = 500$

Step 7: The MS and SS are using a full rate TCH with speech full rate version 4 and in hopping mode on cell A.

For $M = 3$:

Step 0: The MS and SS are using a full rate TCH with speech full rate version 4 and in hopping mode on cell A.

HANDOVER COMMAND

Information Element	value/remarks
As default message contents, except:	
Cell Description	
- Network Colour Code	1
- Base Station Colour Code	5
- BCCH Carrier Number	See table below
Channel Description	
- Channel Type	TCH/F + ACCHs
- Timeslot number	Chosen arbitrarily, but not Zero
- Training Sequence Code	Chosen arbitrarily
- Hopping	RF hopping channel.
- MAIO	1
- HSN	zero for cyclic
Synchronisation Indication	
- Report Observed Time Difference	Shall not be included.
- Synchronisation Indication	'Non synchronised'.
- Normal Cell Indication	Out of range timing advance shall trigger a handover failure procedure.
Frequency List after time	
- Frequency List	See table below
Mode of the first channel.	
- Mode	speech full rate version 4
Starting Time	Indicates the frame number of cell B that will occur approximately 1,1 seconds (238 frames have elapsed) after the HANDOVER COMMAND is sent by cell A.
Multi-Rate configuration	ICMI = 1 Arbitrary set of codec modes, thresholds and hysteresis specified according to 3GPP TS 05.09 / 45.009

HANDOVER COMMAND			
Band	Frequency List		BCCH Carrier Number
	Format	ARFCNs	ARFCN
GSM 450	Range 128	260, 291	274
GSM 480	Range 128	307, 338	321
GSM 710	Range 128	451, 508	477
GSM 750	Range 128	451, 508	477
T-GSM 810	Range 128	451, 508	477
GSM 850	Range 128	141, 241	167
GSM 900	Range 128	14, 114	40
DCS 1 800	Range 128	749, 844	764
PCS 1 900	Range 128	649, 744	664

PHYSICAL INFORMATION

Information Element	value/remarks
As default message contents.	

Step 6: $x = 500$

Step 7: The MS and SS are using a full rate TCH with speech full rate version 4 and in hopping mode on cell B.

For $M = 4$:

Step 0: The MS and SS are using a full rate TCH with full rate speech version 4 and in hopping mode on cell B.

HANDOVER COMMAND

Information Element	value/remarks
As default message contents, except:	
Cell Description	
- Network Colour Code	1
- Base Station Colour Code	5
- BCCH Carrier Number	See table below
Channel Description	
- Channel Type	TCH/F + ACCHs
- TDMA offset	Chosen arbitrarily
- Timeslot number	Chosen arbitrarily, but not Zero
- Training Sequence Code	Chosen arbitrarily
- ARFCN	The ARFCN of the BCCH Carrier
Synchronisation Indication	
- Report Observed Time Difference	Shall not be included.
- Synchronisation Indication	'Non synchronised'.
- Normal Cell Indication	Ignore out of range timing advance.
Mode of the first channel IE is not included	
Multi-Rate configuration IE is not included	

Band	BCCH Carrier Number
GSM 450	263
GSM 480	310
GSM 710	457
GSM 750	457
T-GSM 810	457
GSM 850	147
GSM 900	20
DCS 1 800	747
PCS 1 900	647

PHYSICAL INFORMATION

Information Element	value/remarks
As default message contents.	

Step 6: $x = 500$

Step 7: The MS and SS are using a full rate TCH with speech full rate version 4 and in non-hopping mode on cell A.

For $M = 5$:

Step 0: The MS and SS are using a full rate TCH with full rate speech version 4 and in non-hopping mode on cell A.

HANDOVER COMMAND

Information Element	value/remarks
As default message contents, except:	
Cell Description	
- Network Colour Code	1
- Base Station Colour Code	5
- BCCH Carrier Number	See table below
Channel Description	
- Channel Type	TCH/F + ACCHs
- TDMA offset	Chosen arbitrarily
- Timeslot number	Chosen arbitrarily, but not Zero
- Training Sequence Code	Chosen arbitrarily
- ARFCN	Chosen arbitrarily from the CA
Synchronisation Indication	
- Report Observed Time Difference	Shall not be included.
- Synchronisation Indication	'Non synchronised'.
- Normal Cell Indication	Ignore out of range timing advance.
Mode of the first channel.	
- Mode	speech full rate or half rate version 1

Band	BCCH Carrier Number
GSM 450	274
GSM 480	321
GSM 710	477
GSM 750	477
T-GSM 810	477
GSM 850	167
GSM 900	40
DCS 1 800	764
PCS 1 900	664

PHYSICAL INFORMATION

Information Element	value/remarks
As default message contents.	

Step 6: $x = 500$

Step 7: The MS and SS are using a full rate TCH with speech full rate version 1 and in non-hopping mode on cell B.

For $M = 6$:

Step 0: The MS and SS are using a full rate TCH with full rate speech version 1 and in non-hopping mode on cell B.

HANDOVER COMMAND

Information Element	value/remarks
As default message contents, except:	
Cell Description	
- Network Colour Code	1
- Base Station Colour Code	5
- BCCH Carrier Number	See table below
Channel Description	
- Channel Type	TCH/F + ACCHs
- TDMA offset	Chosen arbitrarily
- Timeslot number	Chosen arbitrarily, but not Zero
- Training Sequence Code	Chosen arbitrarily
- ARFCN	Chosen arbitrarily from the CA
Synchronisation Indication	
- Report Observed Time Difference	Shall not be included.
- Synchronisation Indication	'Non synchronised'.
- Normal Cell Indication	Ignore out of range timing advance.
Mode of the first channel	
- Mode	speech full rate version 4
Multi-Rate configuration	ICMI = 1
	Arbitrary set of codec modes, thresholds and hysteresis specified according to 3GPP TS 05.09 / 45.009

Band	BCCH Carrier Number
GSM 450	263
GSM 480	310
GSM 710	457
GSM 750	457
T-GSM 810	457
GSM 850	147
GSM 900	20
DCS 1 800	747
PCS 1 900	647

PHYSICAL INFORMATION

Information Element	value/remarks
As default message contents, except:	
Timing advance	Arbitrarily selected but different to default value.

Step 6: $x = 500$

Step 7: The MS and SS are using a full rate TCH with speech full rate version 4 and in non-hopping mode on cell A.

For $M = 7$:

Step 0: The MS and SS are using a full rate TCH with full rate speech version 4 and in non-hopping mode on cell A.

HANDOVER COMMAND

Information Element	value/remarks
As default message contents, except:	
Cell Description	
- Network Colour Code	1
- Base Station Colour Code	5
- BCCH Carrier Number	See table below
Channel Description	
- Channel Type	TCH/F + ACCHs
- TDMA offset	Chosen arbitrarily
- Timeslot number	Chosen arbitrarily, but not Zero
- Training Sequence Code	Chosen arbitrarily
- Hopping	RF hopping channel.
- MAIO	Chosen arbitrarily from the set (0, 1 to N-1), where N is the number of frequencies encoded in the Frequency List IE.
- HSN	Chosen arbitrarily from the set (1,2,..63)
Frequency List after time	
- Frequency List	See table below
Synchronisation Indication	
- Report Observed Time Difference	Shall not be included.
- Synchronisation Indication	'Non synchronised'.
- Normal Cell Indication	Ignore out of range timing advance.
Mode of the first channel	
- Mode	speech full rate version 2

HANDOVER COMMAND			
Band	Frequency Short List		BCCH Carrier Number
	Format	ARFCNs	ARFCN
GSM 450	Range 128	260, 262, 264, 266, 276, 279, 281, 283, 285, 287, 289, 291	274
GSM 480	Range 128	307, 309, 311, 313, 323, 326, 328, 330, 332, 334, 336, 338	321
GSM 710	Range 128	451, 455, 459, 461, 497, 498, 500, 501, 502, 503, 506, 508	477
GSM 750	Range 128	451, 455, 459, 461, 497, 498, 500, 501, 502, 503, 506, 508	477
T-GSM 810	Range 128	451, 455, 459, 461, 497, 498, 500, 501, 502, 503, 506, 508	477
GSM 850	Range 128	141, 145, 149, 151, 187, 193, 200, 201, 202, 203, 235, 241	167
GSM 900	Bit map 0	14, 18, 22, 24, 60, 66, 73, 74, 75, 76, 108, 114	40
DCS 1 800	Range 1024	749, 758, 761, 764, 771, 779, 782, 791, 798, 829, 832, 844	764
PCS 1 900	Range 1024	649, 658, 661, 664, 671, 679, 682, 791, 798, 729, 732, 744	664

PHYSICAL INFORMATION

Information Element	value/remarks
As default message contents, except:	
Timing advance	Arbitrarily selected but different to default value.

Step 6: $x = 500$

Step 7: The MS and SS are using a full rate TCH with full rate speech version 2 and in hopping mode on cell B.

For $M = 8$:

Step 0: The MS and SS are using a full rate TCH with speech full rate version 2 and hopping mode on cell B.

HANDOVER COMMAND

Information Element	value/remarks
As default message contents, except:	
Cell Description	
- Network Colour Code	1
- Base Station Colour Code	5
- BCCH Carrier Number	See table below
Channel Description	
- Channel Type	TCH/F + ACCHs
- Timeslot number	Chosen arbitrarily, but not Zero
- Training Sequence Code	Chosen arbitrarily
- Hopping	RF hopping channel.
- MAIO	Chosen arbitrarily from the set (0, 1 to N-1), where N is the number of frequencies encoded in the Frequency List IE.
- HSN	Chosen arbitrarily from the set (1,2,..63)
Synchronisation Indication IE is not included.	
Mode of the first channel.	
- Mode	speech full rate version 4
Frequency List after time	IE Present only for GSM450, GSM480 and GSM850
- Frequency List	See table below
Frequency Channel Sequence after time	IE Present only for GSM900, GSM 710, GSM750 and T-GSM 810
- Frequency Channel Sequence	See table below
Frequency Short List after time	IE Present only for GSM1800 and PCS1900
- Frequency List	See table below
Starting Time	Indicates the frame number of cell B. that will occur approximately 1,1 seconds (238 frames have elapsed) after the HANDOVER COMMAND is sent by cell A.
Multi-Rate configuration	ICMI = 0 Arbitrary set of codec modes, thresholds and hysteresis specified according to 3GPP TS 05.09 / 45.009

HANDOVER COMMAND			
Band	Frequency Short List		BCCH Carrier Number
	Format	ARFCNs	ARFCN
GSM 450		259, 261, 263, 265, 277, 279, 281, 283, 285, 287, 289, 291	274
GSM 480		306, 308, 310, 312, 324, 326, 328, 330, 332, 334, 336, 338	321
GSM 710		447, 454, 457, 463, 496, 498, 500, 501, 502, 503, 506, 508	477
GSM 750		447, 454, 457, 463, 496, 498, 500, 501, 502, 503, 506, 508	477
T-GSM810		447, 454, 457, 463, 496, 498, 500, 501, 502, 503, 506, 508	477
GSM 850		137, 144, 147, 153, 186, 193, 200, 201, 202, 203, 235, 241	167
GSM 900		10, 17, 20, 26, 59, 66, 73, 74, 75, 76, 108, 114	40
DCS 1 800	Range 256	747, 775, 779, 782, 791, 798, 829, 832, 844	764
PCS 1 900	Range 256	647, 675, 679, 682, 691, 698, 629, 632, 644	664

PHYSICAL INFORMATION

Information Element	value/remarks
As default message contents	

Step 6: $x = 500$

Step 7: The MS and SS are using a full rate TCH with speech full rate version 4 and hopping mode on cell A.

For $M = 9$:

Step 0: The MS and SS are using a full rate TCH with full rate speech version 4 and in hopping mode on cell A.

HANDOVER COMMAND

Information Element	value/remarks
As default message contents, except:	
Cell Description	
- Network Colour Code	1
- Base Station Colour Code	5
- BCCH Carrier Number	See table below
Channel Description	
- Channel Type	TCH/H + ACCHs
- TDMA offset	Chosen arbitrarily
- Timeslot number	Chosen arbitrarily, but not Zero
- Training Sequence Code	Chosen arbitrarily
- Hopping	RF hopping channel.
- MAIO	Chosen arbitrarily from the set (0, 1 to N-1), where N is the number of frequencies encoded in the Frequency List IE.
- HSN	Chosen arbitrarily from the set (1,2,..63)
Frequency List after time	
- Frequency List	See table below
Synchronisation Indication	
- Report Observed Time Difference	Shall not be included.
- Synchronisation Indication	'Non synchronised'.
- Normal Cell Indication	Ignore out of range timing advance.
Mode of the first channel	
- Mode	speech half rate version 1

HANDOVER COMMAND			
Band	Frequency Short List		BCCH Carrier Number
	Format	ARFCNs	ARFCN
GSM 450	Range 128	260, 262, 264, 266, 276, 279, 281, 283, 285, 287, 289, 291	274
GSM 480	Range 128	307, 309, 311, 313, 323, 326, 328, 330, 332, 334, 336, 338	321
GSM 710	Range 128	451, 455, 459, 461, 497, 498, 500, 501, 502, 503, 506, 508	477
GSM 750	Range 128	451, 455, 459, 461, 497, 498, 500, 501, 502, 503, 506, 508	477
T-GSM 810	Range 128	451, 455, 459, 461, 497, 498, 500, 501, 502, 503, 506, 508	477
GSM 850	Range 128	141, 145, 149, 151, 187, 193, 200, 201, 202, 203, 235, 241	167
GSM 900	Bit map 0	14, 18, 22, 24, 60, 66, 73, 74, 75, 76, 108, 114	40
DCS 1 800	Range 1024	749, 758, 761, 764, 771, 779, 782, 791, 798, 829, 832, 844	764
PCS 1 900	Range 1024	649, 658, 661, 664, 671, 679, 682, 791, 798, 729, 732, 744	664

PHYSICAL INFORMATION

Information Element	value/remarks
As default message contents, except:	
Timing advance	Arbitrarily selected but different to default value.

Step 6: $x = 750$

Step 7: The MS and SS are using a half rate TCH with half rate speech version 1 and in hopping mode on cell B.

For $M = 10$:

Step 0: The MS and SS are using a half rate TCH with speech half rate version 1 and hopping mode on cell B.

HANDOVER COMMAND

Information Element	value/remarks
As default message contents, except:	
Cell Description	
- Network Colour Code	1
- Base Station Colour Code	5
- BCCH Carrier Number	See table below
Channel Description	
- Channel Type	TCH/F + ACCHs
- TDMA offset	Chosen arbitrarily
- Timeslot number	Chosen arbitrarily, but not Zero
- Training Sequence Code	Chosen arbitrarily
- ARFCN	Chosen arbitrarily from the CA
Synchronisation Indication IE is not included.	
Mode of the first channel.	
- Mode	speech full rate version 4
Multi-Rate configuration	ICMI = 0
	Arbitrary set of codec modes, thresholds and hysteresis specified according to 3GPP TS 05.09 / 45.009

Band	BCCH Carrier Number
GSM 450	263
GSM 480	310
GSM 710	457
GSM 750	457
T-GSM 810	457
GSM 850	147
GSM 900	20
DCS 1 800	747
PCS 1 900	647

PHYSICAL INFORMATION

Information Element	value/remarks
As default message contents	

Step 6: $x = 500$

Step 7: The MS and SS are using a full rate TCH with speech full rate version 4 and non-hopping mode on cell A.

For $M = 11$:

Step 0: The MS and SS are using a full rate TCH with speech full rate version 4 and in non-hopping mode on cell A.

HANDOVER COMMAND

Information Element	value/remarks
As default message contents, except:	
Cell Description	
- Network Colour Code	1
- Base Station Colour Code	5
- BCCH Carrier Number	See table below
Channel Description	
- Channel Type	TCH/H + ACCHs
- TDMA offset	Chosen arbitrarily
- Timeslot number	Chosen arbitrarily, but not Zero
- Training Sequence Code	Chosen arbitrarily
- Hopping	RF hopping channel.
- MAIO	Chosen arbitrarily from the set (0, 1 to N-1), where N is the number of frequencies encoded in the Frequency List IE.
- HSN	Chosen arbitrarily from the set (1,2,..63)
Frequency List after time	
- Frequency List	See table below
Synchronisation Indication	
- Report Observed Time Difference	Shall not be included.
- Synchronisation Indication	'Non synchronised'.
- Normal Cell Indication	Ignore out of range timing advance.
Mode of the first channel	
- Mode	speech half rate version 4
Starting Time	Indicates the frame number of cell B. that will occur approximately 1,1 seconds (238 frames have elapsed) after the HANDOVER COMMAND is sent by cell A.
Multi-Rate configuration	ICMI = 0 Arbitrary set of codec modes, thresholds and hysteresis specified according to 3GPP TS 05.09 / 45.009

HANDOVER COMMAND			
Band	Frequency Short List		BCCH Carrier Number
	Format	ARFCNs	ARFCN
GSM 450	Range 128	260, 262, 264, 266, 276, 279, 281, 283, 285, 287, 289, 291	274
GSM 480	Range 128	307, 309, 311, 313, 323, 326, 328, 330, 332, 334, 336, 338	321
GSM 710	Range 128	451, 455, 459, 461, 497, 498, 500, 501, 502, 503, 506, 508	477
GSM 750	Range 128	451, 455, 459, 461, 497, 498, 500, 501, 502, 503, 506, 508	477
T-GSM 810	Range 128	451, 455, 459, 461, 497, 498, 500, 501, 502, 503, 506, 508	477
GSM 850	Range 128	141, 145, 149, 151, 187, 193, 200, 201, 202, 203, 235, 241	167
GSM 900	Bit map 0	14, 18, 22, 24, 60, 66, 73, 74, 75, 76, 108, 114	40
DCS 1 800	Range 1024	749, 758, 761, 764, 771, 779, 782, 791, 798, 829, 832, 844	764
PCS 1 900	Range 1024	649, 658, 661, 664, 671, 679, 682, 791, 798, 729, 732, 744	664

PHYSICAL INFORMATION

Information Element	value/remarks
As default message contents, except:	
Timing advance	Arbitrarily selected but different to default value.

Step 6: $x = 750$

Step 7: The MS and SS are using a half rate TCH with half rate speech version 4 and in hopping mode on cell B.

For $M = 12$:

Step 0: The MS and SS are using a half rate TCH with half rate speech version 4 and in hopping mode on cell B.

HANDOVER COMMAND

same as for M = 4 except:

Channel Description - Channel Type	TCH/H + ACCHs
---------------------------------------	---------------

PHYSICAL INFORMATION

same as for M = 4

Step 6: $x = 750$

Step 7: The MS and SS are using a half rate TCH with half rate speech version 4 and in non-hopping mode on cell A.

For M = 13:

Step 0: The MS and SS are using a half rate TCH with speech half rate version 4 and in non-hopping mode on cell A.

HANDOVER COMMAND

same as for M = 5

PHYSICAL INFORMATION

same as for M = 5

Step 6: $x = 500$

Step 7: The MS and SS are using a full rate TCH with speech full rate version 1 and in non-hopping mode on cell B.

For M = 14:

Step 0: The MS and SS are using a full rate TCH with speech full rate version 1 and in non-hopping mode on cell B.

HANDOVER COMMAND

same as for M = 6 except:

Channel Description - Channel Type	TCH/H + ACCHs
---------------------------------------	---------------

PHYSICAL INFORMATION

same as for M = 6

Step 6: $x = 750$

Step 7: The MS and SS are using a half rate TCH with speech half rate version 4 and in non-hopping mode on cell A.

For M = 15:

Step 0: The MS and SS are using a half rate TCH with speech half rate version 4 and in non-hopping mode on cell A.

HANDOVER COMMAND

same as for M = 7

PHYSICAL INFORMATION

same as for M = 7

Step 6: x = 500

Step 7: The MS and SS are using a full rate TCH with full rate speech version 2 and in hopping mode on cell B.

For M = 16:

Step 0: The MS and SS are using a full rate TCH with full rate speech version 2 and in hopping mode on cell B.

HANDOVER COMMAND

same as for M = 8 except:

Channel Description - Channel Type	TCH/H + ACCHs
---------------------------------------	---------------

PHYSICAL INFORMATION

same as for M = 8

Step 6: x = 750

Step 7: The MS and SS are using a half rate TCH with speech half rate version 4 and in hopping mode on cell A.

For M = 17:

Step 0: The MS and SS are using a half rate TCH with speech half rate version 4 and in hopping mode on cell A.

HANDOVER COMMAND

same as for M = 9

PHYSICAL INFORMATION

same as for M = 9

Step 6: x = 750

Step 7: The MS and SS are using a half rate TCH with speech half rate version 1 and in hopping mode on cell B.

For M = 18:

Step 0: The MS and SS are using a half rate TCH with speech half rate version 1 and in hopping mode on cell B.

HANDOVER COMMAND

same as for M = 10 except:

Channel Description - Channel Type	TCH/H + ACCHs
---------------------------------------	---------------

PHYSICAL INFORMATION

same as for M = 10

Step 6: x = 750

Step 7: The MS and SS are using a half rate TCH with speech half rate version 4 and in non-hopping mode on cell A.

For M = 19:

Step 0: The MS and SS are using a half rate TCH with speech half rate version 4 and in non-hopping mode on cell A.

HANDOVER COMMAND

same as for M = 1

PHYSICAL INFORMATION

same as for M = 1

Step 6: x = 500

Step 7: The MS and SS are using a full rate TCH with speech full rate version 4 and in non-hopping mode on cell B.

For M = 20:

Step 0: The MS and SS are using a full rate TCH with speech half rate version 4 and in non-hopping mode on cell B.

HANDOVER COMMAND

same as for M = 1 except:

Mode of the first channel. - Mode	speech full rate version 5
--------------------------------------	----------------------------

PHYSICAL INFORMATION

same as for M = 1

Step 6: x = 500

Step 7: The MS and SS are using a full rate TCH with speech full rate version 5 and in non-hopping mode on cell A.

For M = 21:

Step 0: The MS and SS are using a full rate TCH with speech full rate version 5 and in non-hopping mode on cell A.

HANDOVER COMMAND

same as for M = 1 except:

Mode of the first channel. - Mode	speech full rate version 5
--------------------------------------	----------------------------

PHYSICAL INFORMATION

same as for M = 1

Step 6: x = 500

Step 7: The MS and SS are using a full rate TCH with speech full rate version 5 and in non-hopping mode on cell B.

For M = 22:

Step 0: The MS and SS are using a full rate TCH with speech full rate version 5 and in non-hopping mode on cell B.

HANDOVER COMMAND

same as for M = 2 except:

Mode of the first channel. - Mode	Speech full rate version 5
--------------------------------------	----------------------------

PHYSICAL INFORMATION

same as for M = 2

Step 6: x = 500

Step 7: The MS and SS are using a full rate TCH with speech full rate version 5 and in hopping mode on cell A.

For M = 23:

Step 0: The MS and SS are using a full rate TCH with speech full rate version 5 and in hopping mode on cell A.

HANDOVER COMMAND

same as for M = 3 except:

Mode of the first channel. - Mode	Speech full rate version 5
--------------------------------------	----------------------------

PHYSICAL INFORMATION

same as for M = 3

Step 6: x = 500

Step 7: The MS and SS are using a full rate TCH with speech full rate version 5 and in hopping mode on cell B.

For M = 24:

Step 0: The MS and SS are using a full rate TCH with speech full rate version 5 and in hopping mode on cell B.

HANDOVER COMMAND

same as for M = 4 except:

Mode of the first channel. - Mode	Speech full rate version 5
--------------------------------------	----------------------------

PHYSICAL INFORMATION

same as for M = 4

Step 6: x = 500

Step 7: The MS and SS are using a full rate TCH with speech full rate version 5 and in non-hopping mode on cell A.

For M = 25:

Step 0: The MS and SS are using a full rate TCH with speech full rate version 5 and in non-hopping mode on cell A.

HANDOVER COMMAND

same as for M = 5 except:

Mode of the first channel. - Mode	Speech full rate version 1
--------------------------------------	----------------------------

PHYSICAL INFORMATION

same as for M = 5

Step 6: x = 500

Step 7: The MS and SS are using a full rate TCH with speech full rate version 1 and in non-hopping mode on cell B.

For M = 26:

Step 0: The MS and SS are using a full rate TCH with speech full rate version 1 and in non-hopping mode on cell B.

HANDOVER COMMAND

same as for M = 6 except:

Mode of the first channel. - Mode	Speech full rate version 5
--------------------------------------	----------------------------

PHYSICAL INFORMATION

same as for M = 6

Step 6: x = 500

Step 7: The MS and SS are using a full rate TCH with speech full rate version 5 and in non-hopping mode on cell A.

For M = 27:

Step 0: The MS and SS are using a full rate TCH with speech full rate version 5 and in non-hopping mode on cell A.

HANDOVER COMMAND

same as for M = 7 except:

Mode of the first channel. - Mode	Speech full rate version 2
--------------------------------------	----------------------------

PHYSICAL INFORMATION

same as for M = 7

Step 6: x = 500

Step 7: The MS and SS are using a full rate TCH with speech full rate version 2 and in hopping mode on cell B.

For M = 28:

Step 0: The MS and SS are using a full rate TCH with speech full rate version 2 and in hopping mode on cell B.

HANDOVER COMMAND

same as for M = 8 except:

Mode of the first channel. - Mode	Speech full rate version 5
--------------------------------------	----------------------------

PHYSICAL INFORMATION

same as for M = 8

Step 6: $x = 500$

Step 7: The MS and SS are using a full rate TCH with speech full rate version 5 and in hopping mode on cell A.

For $M = 29$:

Step 0: The MS and SS are using a full rate TCH with speech full rate version 5 and in hopping mode on cell A.

HANDOVER COMMAND

same as for $M = 9$ except:

Mode of the first channel. - Mode	speech half rate version 1
--------------------------------------	----------------------------

PHYSICAL INFORMATION

same as for $M = 9$

Step 6: $x = 500$

Step 7: The MS and SS are using a half rate TCH with speech half rate version 1 and in hopping mode on cell B.

For $M = 30$:

Step 0: The MS and SS are using a half rate TCH with speech half rate version 1 and in hopping mode on cell B.

HANDOVER COMMAND

same as for $M = 10$ except:

Mode of the first channel. - Mode	speech full rate version 5
--------------------------------------	----------------------------

PHYSICAL INFORMATION

same as for $M = 10$

Step 6: $x = 500$

Step 7: The MS and SS are using a full rate TCH with speech full rate version 5 and in non-hopping mode on cell A.

For $M = 31$:

Step 0: The MS and SS are using a full rate TCH with speech full rate version 5 and in non-hopping mode on cell A.

HANDOVER COMMAND

same as for $M = 1$ except:

Mode of the first channel. - Mode	speech full rate version 3
--------------------------------------	----------------------------

PHYSICAL INFORMATION

same as for $M = 1$

Step 6: $x = 500$

Step 7: The MS and SS are using a full rate TCH with speech full rate version 3 and in non-hopping mode on cell B.

For M = 32:

Step 0: The MS and SS are using a full rate TCH with speech full rate version 3 and in non-hopping mode on cell B.

HANDOVER COMMAND

same as for M = 2 except:

Mode of the first channel. - Mode Multi-Rate configuration	Speech full rate version 5 ICMI = 0 Arbitrary set of codec modes, thresholds and hysteresis specified according to 3GPP TS 05.09 / 45.009
--	---

PHYSICAL INFORMATION

same as for M = 2

Step 6: x = 500

Step 7: The MS and SS are using a full rate TCH with speech full rate version 5 and in hopping mode on cell A.

For M = 33:

Step 0: The MS and SS are using a full rate TCH with speech full rate version 5 and in hopping mode on cell A.

HANDOVER COMMAND

same as for M = 3 except:

Channel Description - Channel Type Mode of the first channel. - Mode	TCH/H + ACCHs Speech full rate version 3
---	---

PHYSICAL INFORMATION

same as for M = 3

Step 6: x = 500

Step 7: The MS and SS are using a half rate TCH with speech full rate version 3 and in hopping mode on cell B.

For M = 34:

Step 0: The MS and SS are using a half rate TCH with speech full rate version 3 and in hopping mode on cell B.

HANDOVER COMMAND

same as for M = 4 except:

Mode of the first channel. - Mode	Speech full rate version 5
--------------------------------------	----------------------------

PHYSICAL INFORMATION

same as for M = 4

Step 6: x = 500

Step 7: The MS and SS are using a full rate TCH with speech full rate version 5 and in non-hopping mode on cell A.

26.19.6 Reserved for future use

26.19.7 Reserved for future use

26.19.8 Reserved for future use

26.19.9 WB AMR RATSCCH Protocol

26.19.9.1 WB AMR Configuration Change (normal)

NOTE: this test is derived from the one described in subclause 26.16.9.1 and entitled: "AMR Configuration Change (normal)"

26.19.9.1.1 Conformance requirements

The AMR_CONFIG_REQ message may be sent by the BTS during a call to change the AMR WB configuration on the radio interface without interruption of the speech transmission.

The ACK_OK message serves as an acknowledgement that a RATSCCH REQ message has been detected, correctly decoded (no CRC error) and that it is defined for the Addressee. It defines the exact activation time in direction from Addressee to Initiator.

Reference

3GPP TS 05.09 sub-clauses: 3.2.2.3.1, 3.2.2.3.5

26.19.9.1.2 Test purpose

This test will verify that the MS is able to handle a properly formatted AMR_CONFIG_REQ message.

26.19.9.1.3 Method of test

Initial Conditions

System Simulator:

1 cell with default parameters

Mobile Station:

The MS is in the "idle, updated" state, with a TMSI allocated and camped on cell A.

Specific PICS statements:

- Support of GSM speech full rate version 4 (O-TCH/WFS).
- Support of GSM speech Half rate version 4 (O-TCH/WHS).
- Support of GSM Speech Full Rate version 5 (TCH/WFS).

PIXIT statements:

-

Foreseen Final State of the MS

Idle Updated, TMSI allocated and camped on cell A.

Test Procedure

This sequence is performed for execution counter, k = 1, 2.

When k = 1, DTX is not used:

- 1) User initiates a Mobile Originated call.
- 2) The network and the MS indicate Bearer capabilities IE with the AMR speech Full Rate (Version 4 or 5) and Half Rate (Version 4).
- 3) The network performs an assignment on a TCH channel with MultiRate configuration to the MS.
- 4) The call is maintained during a programmable time without variation of RxLev /RxQual.
- 5) The SS shall send a properly formatted AMR_CONFIG_REQ message during the call at a programmable time.
- 6) The MS answers with an ACK_OK message within 3 speech frames
- 7) The network initiates the call release.

When $k = 2$, DTX is used:

- 1) In the serving cell, the DTX indicator is set to "MS shall use discontinuous transmission".
- 2) User initiates a Mobile Originated call.
- 3) The network and the MS indicate Bearer capabilities IE with the AMR speech Full Rate (Version 4 or 5) and Half Rate (Version 4).
- 4) The network performs an assignment on a TCH channel with MultiRate configuration to the MS.
- 5) The call is maintained during a programmable time without variation of RxLev /RxQual.
- 6) The SS shall send a properly formatted AMR_CONFIG_REQ message during the call at a programmable time.
- 7) The MS answers with an ACK_OK message within 3 speech frames.
- 8) The network initiates the call release.

This test is repeated for

- $M = 1$ if full rate speech version 5 is supported, and
- $M = 2$ if full rate speech version 4 is supported, and
- $M = 3$ if half rate speech version 4 is supported.

Maximum Duration of Test

5 minutes

Expected Sequence

When k=1:

Step	Direction	Message	Comments
1	MS		MS is in idle mode
2	MS		MS initiates Mobile Originated call
3	MS->SS	Channel Request	Establishment cause is "originating call and the network does not set the NECI bit to 1".
4	SS->MS	Immediate Assignment	See Default Messages for AMR
5	MS->SS	CM Service Request	CM Service Type = Mobile Originating Call Establishment.
6	SS->MS	AUTHENTICATION REQUEST	
7	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
8	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
9	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
10	MS->SS	Setup	MS indicates supported speech versions
11	SS->MS	Call Proceeding	
12	SS->MS	Alerting	
13	SS->MS	Assignment Command	See specific message contents.
14	MS->SS	Assignment Complete	
15	SS->MS	Connect	
16	MS->SS	Connect Acknowledge	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	SS->MS	AMR_CONFIG_REQ	See specific message contents.
19	MS->SS	ACK_OK	Message must be received within 3 speech frames
20	SS->MS	Disconnect	
21	MS->SS	Release	
22	SS->MS	Release Complete	
23	SS->MS	Channel Release	

When k=2:

Step	Direction	Message	Comments
1	MS		MS is in idle mode
2	MS		MS initiates Mobile Originated call
3	MS->SS	Channel Request	Establishment cause is "originating call and the network does not set the NECI bit to 1".
4	SS->MS	Immediate Assignment	See Default Messages for AMR
5	MS->SS	CM Service Request	CM Service Type = Mobile Originating Call Establishment.
6	SS->MS	AUTHENTICATION REQUEST	
7	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
8	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
9	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
10	MS->SS	Setup	MS indicates supported speech versions
11	SS->MS	Call Proceeding	
12	SS->MS	Alerting	
13	SS->MS	Assignment Command	See specific message contents.
14	MS->SS	Assignment Complete	
15	SS->MS	Connect	
16	MS->SS	Connect Acknowledge	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	SS->MS	AMR_CONFIG_REQ	Using DTX mode
19	MS->SS	ACK_OK	Message must be received within 3 speech frames
20	SS->MS	Disconnect	
21	MS->SS	Release	
22	SS->MS	Release Complete	
23	SS->MS	Channel Release	

Specific Message Contents

ASSIGNMENT COMMAND

Information Element	value/remarks
Channel description	M=1: TCH/F M=2: TCH/F M=3: TCH/H
Mode of the first channel - Mode	M= 1: Full rate version 5 M= 2: Full rate version 4 M= 3: Half rate version 4

AMR_CONFIG_REQ

Information Element	value/remarks
ICM	CODEC_MODE_1
ACS	2 codec modes
HYST2	Not defined (set to all 1s)
THRESH2	Not defined (set to all 1s)
HYST1	2 dB
THRESH1	10 dB

26.19.9.2 AMR WB Configuration Change (abnormal)

NOTE: this test is derived from the one described in subclause 26.16.9.2 and entitled: "AMR Configuration Change (abnormal)"

26.19.9.2.1 Conformance requirements

The AMR_CONFIG_REQ message may be sent by the BTS during a call to change the AMR WB configuration on the radio interface without interruption of the speech transmission.

The ACK_ERR message serves as a negative acknowledgement that a RATSCCH REQ message has been detected, i.e. the RATSCCH pattern was detected, but could not be decoded correctly (CRC error), or its content is not understandable by the addressee.

Reference:

3GPP TS 05.09 sub-clauses: 3.2.2.3.2, 3.2.2.3.5

26.19.9.2.2 Test purpose

This test will verify that the MS is able to handle an improperly formatted AMR_CONFIG_REQ message.

26.19.9.2.3 Method of test

Initial Conditions

System Simulator:

1 cell with default parameters

Mobile Station:

The MS is in the "idle, updated" state, with a TMSI allocated and camped on cell A.

Specific PICS statements:

- Support of GSM speech full rate version 4 (O-TCH/WFS).
- Support of GSM speech Half rate version 4 (O-TCH/WHS).
- Support of GSM Speech Full Rate version 5 (TCH/WFS).

PIXIT statements:

-

Foreseen Final State of the MS

Idle Updated, TMSI allocated and camped on cell A.

Test Procedure

- 1) User initiates a Mobile Originated call.
- 2) The network and the MS indicate Bearer capabilities IE with the AMR speech Full Rate (Version 4 or 5) and Half Rate (Version 4).
- 3) The network performs an assignment on a TCH channel with MultiRate configuration to the MS.
- 4) The call is maintained during a programmable time without variation of RxLev /RxQual.
- 5) The SS shall send an AMR_CONFIG_REQ message, with an incorrect CRC, during the call at a programmable time.
- 6) The MS answers with a ACK_ERR message within 3 speech frames
- 7) The network initiates the call release.

This test is repeated for

- M =1 if full rate speech version 5 is supported, and
- M = 2 if full rate speech version 4 is supported, and
- M = 3 if half rate speech version 4 is supported..

Maximum Duration of Test

5 minutes

Expected Sequence

Step	Direction	Message	Comments
1	MS		MS is in idle mode
2	MS		MS initiates Mobile Originated call
3	MS->SS	Channel Request	Establishment cause is "originating call and the network does not set the NECI bit to 1".
4	SS->MS	Immediate Assignment	See Default Messages for AMR
5	MS->SS	CM Service Request	CM Service Type = Mobile Originating Call Establishment.
6	SS->MS	AUTHENTICATION REQUEST	
7	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
8	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
9	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
10	MS->SS	Setup	MS indicates supported speech versions
11	SS->MS	Call Proceeding	
12	SS->MS	Alerting	
13	SS->MS	Assignment Command	See specific message contents.
14	MS->SS	Assignment Complete	
15	SS->MS	Connect	
16	MS->SS	Connect Acknowledge	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	SS->MS	AMR_CONFIG_REQ	Message contains an incorrect CRC
19	MS->SS	ACK_ERR	Message must be received within 3 speech frames
20	SS->MS	Disconnect	
21	MS->SS	Release	
22	SS->MS	Release Complete	
23	SS->MS	Channel Release	

Specific Message Contents

ASSIGNMENT COMMAND

Information Element	value/remarks
Channel description	M=1: TCH/F M=2: TCH/F M=3: TCH/H
Mode of the first channel - Mode	M= 1: Full rate version 5 M= 2: Full rate version 4 M= 3: Half rate version 4

AMR_CONFIG_REQ

Information Element	value/remarks
ICM	CODEC_MODE_1
ACS	2 codec modes
HYST2	Not defined (set to all 1s)
THRESH2	Not defined (set to all 1s)
HYST1	2 dB
THRESH1	10 dB

26.19.9.3 Codec Mode Phase Change (normal)

NOTE: this test is derived from the one described in subclause 26.16.9.3 and entitled: "Codec Mode Phase Change (normal)"

26.19.9.3.1 Conformance requirements

The CMI_PHASE_REQ message may be sent by the BTS to change the phase of the Codec Mode Indication in downlink.

The ACK_OK message serves as an acknowledgement that a RATSCCH REQ message has been detected, correctly decoded (no CRC error) and that it is defined for the Addressee. It defines the exact activation time in direction from Addressee to Initiator.

Reference:

3GPP TS 05.09 sub-clauses: 3.2.2.3.1, 3.2.2.3.4

26.19.9.3.2 Test purpose

This test will verify that the MS can correctly handle a properly formatted CMI_PHASE_REQ message.

26.19.9.3.3 Method of test

Initial Conditions

System Simulator:

1 cell with default parameters

Mobile Station:

The MS is in the "idle, updated" state, with a TMSI allocated and camped on cell A.

Specific PICS statements:

- Support of GSM speech full rate version 4 (O-TCH/WFS).
- Support of GSM speech Half rate version 4 (O-TCH/WHS).
- Support of GSM Speech Full Rate version 5 (TCH/WFS).

PIXIT statements:

-

Foreseen Final State of the MS

Idle Updated, TMSI allocated and camped on cell A.

Test Procedure

- 1) User initiates a Mobile Originated call.
- 2) The network and the MS indicate Bearer capabilities IE with the AMR speech Full Rate (Version 4 or 5) and Half Rate (Version 4).
- 3) The network performs an assignment on a TCH channel with MultiRate configuration to the MS.
- 4) The call is maintained during a programmable time without variation of RxLev / RxQual.
- 5) The SS shall send the CMI_PHASE_REQ message during the call at a programmable time. The CMI_PHASE_REQ shall be sent either in place of a "CMI" speech frame, or in place of a "CMC" speech frame, to cover both kinds of changes.
- 6) The MS answers with an ACK_OK message within 3 speech frames.
- 7) The downlink CMI phase is changed (or not) according to the CMI_PHASE_REQ message starting with speech frame N+12.
- 8) The network initiates the call release.

This test is repeated for

- M = 1 if full rate speech version 5 is supported, and
- M = 2 if full rate speech version 4 is supported, and

- M = 3 if half rate speech version 4 is supported.

Maximum Duration of Test

5 minutes

Expected Sequence

Step	Direction	Message	Comments
1	MS		MS is in idle mode
2	MS		MS initiates Mobile Originated call
3	MS->SS	Channel Request	Establishment cause is "originating call and the network does not set the NECI bit to 1".
4	SS->MS	Immediate Assignment	See Default Messages for AMR
5	MS->SS	CM Service Request	CM Service Type = Mobile Originating Call Establishment.
6	SS->MS	AUTHENTICATION REQUEST	
7	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
8	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
9	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
10	MS->SS	Setup	MS indicates supported speech versions
11	SS->MS	Call Proceeding	
12	SS->MS	Alerting	
13	SS->MS	Assignment Command	See specific message contents.
14	MS->SS	Assignment Complete	
15	SS->MS	Connect	
16	MS->SS	Connect Acknowledge	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	SS->MS	CMI_PHASE_REQ	See specific message contents.
19	MS->SS	ACK_OK	Message must be received within 3 speech frames
20	SS->MS	Disconnect	
21	MS->SS	Release	
22	SS->MS	Release Complete	
23	SS->MS	Channel Release	

Specific Message Contents

ASSIGNMENT COMMAND

Information Element	value/remarks
Channel description	M=1: TCH/F M=2: TCH/F M=3: TCH/H
Mode of the first channel - Mode	M = 1: Full rate version 5 M = 2: Full rate version 4 M = 3: Half rate version 4

CMI_PHASE_REQ

Information Element	value/remarks
CMP	1 (default)

26.19.9.4 Reserved for future use

26.19.9.5 Threshold Change (normal)

NOTE: this test is derived from the one described in subclause 26.16.9.5 and entitled: "Threshold Change (normal)"

26.19.9.5.1 Conformance requirements

The THRESH_REQ message may be sent by the BTS to change the thresholds in the DL Mode Request Generator.

The ACK_OK message serves as an acknowledgement that a RATSCCH REQ message has been detected, correctly decoded (no CRC error) and that it is defined for the Addressee. It defines the exact activation time in direction from Addressee to Initiator.

Reference:

3GPP TS 05.09 sub-clauses: 3.2.2.3.1, 3.2.2.3.6

26.19.9.5.2 Test purpose

This test will verify that an RATSCCH capable MS is able to handle a properly formatted THRESH_REQ message

26.19.9.5.3 Method of test

Initial Conditions

System Simulator:

1 cell with default parameters

Mobile Station:

The MS is in the "idle, updated" state, with a TMSI allocated and camped on cell A.

Specific PICS statements:

- Support of GSM speech full rate version 4 (O-TCH/WFS).
- Support of GSM speech Half rate version 4 (O-TCH/WHS).
- Support of GSM Speech Full Rate version 5 (TCH/WFS).

PIXIT statements:

-

Foreseen Final State of the MS

Idle Updated, TMSI allocated and camped on cell A.

Test Procedure

- 1) User initiates a Mobile Originated call.
- 2) The network and the MS indicate Bearer capabilities IE with the AMR speech Full Rate (Version 4 or 5) and Half Rate (Version 4).
- 3) The network performs an assignment on a TCH channel with MultiRate configuration to the MS.
- 4) The call is maintained during a programmable time without variation of RxLev / RxQual.
- 5) The SS shall send a properly formatted THRESH_REQ message during the call at a programmable time.
- 6) The MS answers with a ACK_OK message within 3 speech frames
- 7) The network initiates the call release.

This test is repeated for

- M = 1 if full rate speech version 5 is supported, and
- M = 2 if full rate speech version 4 is supported, and
- M = 3 if half rate speech version 4 is supported.

Maximum Duration of Test

5 minutes

Expected Sequence

Step	Direction	Message	Comments
1	MS		MS is in idle mode
2	MS		MS initiates Mobile Originated call
3	MS->SS	Channel Request	Establishment cause is "originating call and the network does not set the NECI bit to 1".
4	SS->MS	Immediate Assignment	See Default Messages for AMR
5	MS->SS	CM Service Request	CM Service Type = Mobile Originating Call Establishment.
6	SS->MS	AUTHENTICATION REQUEST	
7	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
8	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
9	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
10	MS->SS	Setup	MS indicates supported speech versions
11	SS->MS	Call Proceeding	
12	SS->MS	Alerting	
13	SS->MS	Assignment Command	See specific message contents.
14	MS->SS	Assignment Complete	
15	SS->MS	Connect	
16	MS->SS	Connect Acknowledge	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	SS->MS	THRESH_REQ	See specific message contents.
19	MS->SS	ACK_OK	Message must be received within 3 speech frames
20	SS->MS	Disconnect	
21	MS->SS	Release	
22	SS->MS	Release Complete	
23	SS->MS	Channel Release	

Specific Message Contents

ASSIGNMENT COMMAND

Information Element	value/remarks
Channel description	M=1: TCH/F M=2: TCH/F M=3: TCH/H
Mode of the first channel - Mode	M = 1: Full rate version 5 M = 2: Full rate version 4 M = 3: Half rate version 4
Multi-Rate configuration	2 codec modes specified

THRESH_REQ

Information Element	value/remarks
HYST3	Not defined (set to all 1s)
THRESH3	Not defined (set to all 1s)
HYST2	Not defined (set to all 1s)
THRESH2	Not defined (set to all 1s)
HYST1	2 dB
THRESH1	10 dB

- 26.19.9.6 Reserved for future use
- 26.19.9.7 Reserved for future use
- 26.19.9.8 Reserved for future use
- 26.19.9.9 Reserved for future use
- 26.19.9.10 Inversion of the Phase of the CMR/CMI

NOTE: this test is derived from the one described in subclause 26.16.9.10 and entitled: "Inversion of the Phase of the CMR/CMI"

26.19.9.10.1 Conformance requirements

The phase of the Codec Mode Indication in the downlink can be changed during a call by using a CMI_PHASE_REQ message sent on the RATSCCH.

The CMI_PHASE_REQ message may be sent by the BTS during a call to change the phase of the Codec Mode Indication in the downlink without interruption of the speech transmission.

The ACK_OK message serves as an acknowledgement that a RATSCCH REQ message has been detected, correctly decoded (no CRC error) and that it is defined for the Addressee.

References:

3GPP TS 05.09 clauses 3.2.1.3 and 3.2.2.3.4.

26.19.9.10.2 Test purpose

This test shall verify that the MS is able to change the phase of the Codec Mode Indication in the downlink using the RATSCCH protocol.

26.19.9.10.3 Method of test

Initial Conditions

System Simulator:

1 cell with default parameters

Mobile Station:

The MS is in the "idle, updated" state, with a TMSI allocated and camped on cell A.

Specific PICS statements:

- Support of GSM speech full rate version 4 (O-TCH/WFS).
- Support of GSM speech Half rate version 4 (O-TCH/WHS).
- Support of GSM Speech Full Rate version 5 (TCH/WFS).

PIXIT statements:

-

Foreseen Final State of the MS

Idle Updated, TMSI allocated and camped on cell A.

Test Procedure

- 1) User initiates a Mobile Originated call.
- 2) The network and the MS indicate Bearer capabilities IE with the AMR speech Full Rate (Version 4 or 5) and Half Rate (Version 4).

- 3) The network performs an assignment on a TCH channel with MultiRate configuration to the MS.
- 4) The network shall indicate Codec Mode Command = 0 and Codec Mode Indication = 1.
- 5) The SS sends a series of CMI_PHASE_REQ messages during the call to change the phase of the Codec Mode Indication in the downlink.
- 6) The MS responds to each CMI_PHASE_REQ message with an ACK_OK message on the RATSCCH.
- 7) The SS shall ensure that the phase request has been handled correctly by checking the Uplink CMI = 0 for 20 speech frames following the receipt of the ACK_OK.
- 8) The network initiates the call release.

This test is repeated for

- M = 1 if full rate speech version 5 is supported, and
- M = 2 if full rate speech version 4 is supported, and
- M = 3 if half rate speech version 4 is supported.

Maximum Duration of Test

5 minutes

Expected Sequence

Step	Direction	Message	Comments
1	MS		MS is in idle mode
2	MS		MS initiates Mobile Originated call
3	MS->SS	Channel Request	Establishment cause is "originating call and the network does not set the NECI bit to 1".
4	SS->MS	Immediate Assignment	See Default Messages for AMR
5	MS->SS	CM Service Request	CM Service Type = Mobile Originating Call Establishment.
6	SS->MS	AUTHENTICATION REQUEST	
7	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
8	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
9	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
10	SS->MS	Setup	AMR speech
11	MS->SS	Call Proceeding	
12	MS->SS	Alerting	
13	SS->MS	Assignment Command	Multirate Configuration for 2 codec modes
14	MS->SS	Assignment Complete	
15	SS->MS	Connect	
16	MS->SS	Connect Acknowledge	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	SS->MS	CMI_PHASE_REQ	See specific message contents
19	MS->SS	ACK_OK	
20	MS		Wait 20 speech frames, then check that UL CMI = 0
21	SS->MS	CMI_PHASE_REQ	See specific message contents
22	MS->SS	ACK_OK	
23	MS		Wait 20 speech frames, then check that UL CMI = 0
24	SS->MS	CMI_PHASE_REQ	See specific message contents
25	MS->SS	ACK_OK	
26	MS		Wait 20 speech frames, then check that UL CMI = 0
27	SS->MS	CMI_PHASE_REQ	See specific message contents
28	MS->SS	ACK_OK	
29	MS		Wait 20 speech frames, then check that UL CMI = 0
30	SS->MS	Disconnect	
31	MS->SS	Release	
32	SS->MS	Release Complete	
33	SS->MS	Channel Release	

Specific Message Contents

ASSIGNMENT COMMAND

Information Element	value/remarks
Channel description	M=1: TCH/F M=2: TCH/F M=3: TCH/H
Mode of the first channel - Mode	M = 1: Full rate version 5 M = 2: Full rate version 4 M = 3: Half rate version 4

In step 18:

CMI_PHASE_REQ

Information Element	value/remark
CMIP	0: CMI transmitted in even speech frames

This message should be sent in a RATSCCH frame where the RATSCCH frame (or RATSCCH_DATA part for O-TCH/AHS) replaces a speech frame which would have carried a Codec Mode Command.

In step 21:

CMI_PHASE_REQ

Information Element	value/remark
CMIP	1: CMI transmitted in odd speech frames (back to default)

This message should be sent in a RATSCCH frame where the RATSCCH frame (or RATSCCH_DATA part for O-TCH/AHS) replaces a speech frame which would have carried a Codec Mode Command.

In step 24:

CMI_PHASE_REQ

Information Element	value/remark
CMIP	0: CMI transmitted in even speech frames

This message should be sent in a RATSCCH frame where the RATSCCH frame (or RATSCCH_DATA part for O-TCH/AHS) replaces a speech frame which would have carried a Codec Mode Indication.

In step 27:

CMI_PHASE_REQ

Information Element	value/remark
CMIP	1: CMI transmitted in odd speech frames (back to default)

This message should be sent in a RATSCCH frame where the RATSCCH frame (or RATSCCH_DATA part for O-TCH/AHS) replaces a speech frame which would have carried a Codec Mode Indication.

26.19.9.11 Change of Active Codec Set

NOTE: this test is derived from the one described in subclause 26.16.9.11 and entitled: "Change of Active Codec Set"

26.19.9.11.1 Conformance requirements

AMR codec mode adaptation is done within a set of 4 codec modes. The codec mode set (Active Codec Set) to be used by the BSS and the MS is defined during call setup and/or handover by layer 3 signalling. The ACS can be changed during a call using an AMR_CONFIG_REQ message sent on the RATSCCH.

The AMR_CONFIG_REQ message may be sent by the BTS during a call to change the AMR WB configuration on the radio interface without interruption of the speech transmission.

The ACK_OK message serves as an acknowledgement that a RATSCCH REQ message has been detected, correctly decoded (no CRC error) and that it is defined for the Addressee.

If the ACS consists of four modes, then the complete set of thresholds/hysteresis can not be sent with this message. In that case, all THRESH_j and HYST_j fields are reserved for future use and shall be set to "1". Similar, if the BTS has no threshold and hysteresis parameters for the given configuration, then all THRESH_j and HYST_j field bits shall be set to

"1" to indicate that they are undefined. The THRESH_REQ message shall be used to transmit these parameters at a later point in time. As long as the MS has no defined threshold and hysteresis parameters it shall use the Initial Codec Mode for the Codec Mode Request.

References:

3GPP TS 05.09 clauses 3.2.2.3.5 and 3.4.

26.19.9.11.2 Test purpose

This test shall verify that the MS is able to change its Active Codec Set using the RATSCCH protocol, with change of thresholds, and with non-specification of thresholds.

26.19.9.11.3 Method of test

Initial Conditions

System Simulator:

1 cell with default parameters

Mobile Station:

The MS is in the "idle, updated" state, with a TMSI allocated and camped on cell A.

Specific PICS statements:

- Support of GSM speech full rate version 4 (O-TCH/WFS).
- Support of GSM speech Half rate version 4 (O-TCH/WHS).
- Support of GSM Speech Full Rate version 5 (TCH/WFS).

PIXIT statements:

-

Foreseen Final State of the MS

Idle Updated, TMSI allocated and camped on cell A.

Test Procedure

- 1) User initiates a Mobile Originated call.
- 2) The network and the MS indicate Bearer capabilities IE with the AMR speech Full Rate (Version 4 or 5) and Half Rate (Version 4).
- 3) The network performs an assignment on a TCH channel with MultiRate configuration to the MS.
- 4) The SS uses the codec with the highest bit-rate in the current ACS for the Codec Mode Indication, and that with the lowest bit-rate for the Codec Mode Command.
- 5) The SS sends an AMR_CONFIG_REQ message during the call to reconfigure the Multirate settings.
- 6) The MS responds to each AMR_CONFIG_REQ message with an ACK_OK message on the RATSCCH.
- 7) The SS shall ensure that the change occurs correctly for downlink (12 speech frames after AMR_CONFIG_REQ message was sent), and for uplink (12 speech frames after ACK_OK was received) by checking parity of received speech frames, and correct implementation of Uplink Codec mode Request.
- 8) The SS shall ensure that each of the codecs in the ACS have been implemented correctly by setting the CMC to each of the applicable modes, and ensuring that the UL frames with each CMI are received without parity error. The SS shall then set the CMI and CMC to the codec with highest and lowest bit rates respectively.
- 9) Steps 4 to 8 shall be repeated for differing AMR_CONFIG_REQ parameters and sending conditions.
- 10) The network initiates the call release.

This test is repeated for

- M = 1 if full rate speech version 5 is supported, and
- M = 2 if full rate speech version 4 is supported, and
- M = 3 if half rate speech version 4 is supported.

In case of full rate speech version 5 and half rate speech version 4,, the maximum number of codec is 3 then the step 27 to 29 are skipped.

Maximum Duration of Test

5 minutes

Expected Sequence

Step	Direction	Message	Comments
1	MS		MS is in idle mode
2	MS		MS initiates Mobile Originated call
3	MS->SS	Channel Request	Establishment cause is "originating call and the network does not set the NECI bit to 1".
4	SS->MS	Immediate Assignment	See Default Messages for AMR
5	MS->SS	CM Service Request	CM Service Type = Mobile Originating Call Establishment.
6	SS->MS	AUTHENTICATION REQUEST	
7	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
8	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
9	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
10	MS->SS	Setup	AMR speech
11	SS->MS	Call Proceeding	
12	SS->MS	Alerting	
13	SS->MS	Assignment Command	Multirate Configuration for 2 codec modes
14	MS->SS	Assignment Complete	
15	SS->MS	Connect	
16	MS->SS	Connect Acknowledge	
17	MS		The TCH shall be through connected by both directions in the dedicated mode, using the codec mode specified.
18	SS->MS	AMR_CONFIG_REQ	See specific message contents.
19	MS->SS	ACK_OK	
20	MS		Check that ACS changes have been implemented correctly. Expected CMR = 0.
21	SS->MS	AMR_CONFIG_REQ	See specific message contents.
22	MS->SS	ACK_OK	
23	MS		Check that ACS changes have been implemented correctly. Expected CMR = 0 or 1.
24	SS->MS	AMR_CONFIG_REQ	See specific message contents.
25	MS->SS	ACK_OK	
26	MS		Check that ACS changes have been implemented correctly. Expected CMR = 0, 1 or 2.
27(for M=2)	SS->MS	AMR_CONFIG_REQ	See specific message contents.
28(for M=2)	MS->SS	ACK_OK	
29(for M=2)	MS		Check that ACS changes have been implemented correctly. Expected CMR = 0, 1, 2 or 3.
30	SS->MS	AMR_CONFIG_REQ	See specific message contents.
31	MS->SS	ACK_OK	
32	MS		Check that ACS changes have been implemented correctly. Expected CMR = 2 (special case where CMR = ICM).
33	SS->MS	Disconnect	
34	MS->SS	Release	
35	SS->MS	Release Complete	
36	SS->MS	Channel Release	

Specific Message Contents

In all cases, the Active Codec Set field of the AMR_CONFIG_REQ messages should be programmed to ensure that the codec rate changes when the new configuration takes effect.

ASSIGNMENT COMMAND

Information Element	value/remarks
Channel description	M=1: TCH/F M=2: TCH/F M=3: TCH/H
Mode of the first channel - Mode	M = 1: Full rate version 5 M = 2: Full rate version 4 M = 3: Half rate version 4.
Multi-Rate configuration	Arbitrary set of codec modes, thresholds and hysteresis specified according to 3GPP TS 05.09 / 45.009

In step 18:

AMR_CONFIG_REQ

Information Element	value/remark
ICM	CODEC_MODE_1
ACS	1 codec mode (different from that in Assignment Command)
HYST2	n/a – set to all 1's
THRESH2	n/a – set to all 1's
HYST1	n/a – set to all 1's
THRESH1	n/a – set to all 1's

This message should be sent in a RATSCCH frame where the RATSCCH frame (or RATSCCH_DATA part for O-TCH/AHS) replaces a speech frame which would have carried a Codec Mode Command.

In step 21:

AMR_CONFIG_REQ

Information Element	value/remark
ICM	CODEC_MODE_1
ACS	2 codec modes
HYST2	n/a – set to all 1's
THRESH2	n/a – set to all 1's
HYST1	2 dB
THRESH1	10 dB

This message should be sent in a RATSCCH frame where the RATSCCH frame (or RATSCCH_DATA part for O-TCH/AHS) replaces a speech frame which would have carried a Codec Mode Command.

In step 24:

AMR_CONFIG_REQ

Information Element	value/remark
ICM	CODEC_MODE_2
ACS	3 codec modes
HYST2	2 dB
THRESH2	10 dB
HYST1	2 dB
THRESH1	7 dB

This message should be sent in a RATSCCH frame where the RATSCCH frame (or RATSCCH_DATA part for O-TCH/AHS) replaces a speech frame which would have carried a Codec Mode Indication.

In step 27:

This step is applicable only if the MS supports full rate version 4

AMR_CONFIG_REQ for M = 2

Information Element	value/remark
ICM	CODEC_MODE_3
ACS	4 codec modes
HYSTc	2 dB
THRESH3	12 dB
THRESH2	10 dB
THRESH1	6.5 dB

This message should be sent in a RATSCCH frame where the RATSCCH frame (or RATSCCH_DATA part for O-TCH/AHS) replaces a speech frame which would have carried a Codec Mode Indication.

In step 30:

AMR_CONFIG_REQ for M = 1 (MS supports full rate version 5) and M = 3 (MS supports half rate version 4)

Information Element	value/remark
ICM	CODEC_MODE_3
ACS	3 codec modes
HYST2	Undefined – set to all 1's
THRESH2	Undefined – set to all 1's
HYST1	Undefined – set to all 1's
THRESH1	Undefined – set to all 1's

AMR_CONFIG_REQ for M = 2 (MS supports full rate version 4)

Information Element	value/remark
ICM	CODEC_MODE_3
ACS	4 codec modes
HYST2	Undefined – set to all 1's
THRESH2	Undefined – set to all 1's
HYST1	Undefined – set to all 1's
THRESH1	Undefined – set to all 1's

This message should be sent in a RATSCCH frame where the RATSCCH frame (or RATSCCH_DATA part for O-TCH/AHS) replaces a speech frame which would have carried a Codec Mode Command.

26.19.10 AMR signalling/ test of the channel mode modify procedure

26.19.10.1 WB AMR signalling test of the channel mode modify procedure / full rate

NOTE: this test is derived from the one described in subclause 26.16.10.1 and entitled: "AMR signalling/ test of the channel mode modify procedure/full rate"

26.19.10.1.1 Conformance requirement

The MS with a TCH/F allocated acknowledges a CHANNEL MODE MODIFY message by sending a CHANNEL MODE MODIFY ACKNOWLEDGE message specifying the new mode and by switching to this mode.

References

3GPP TS 04.08 / 3GPP TS 44.018, subclauses 3.4.6.1.1 and 3.4.6.1.2

26.19.10.1.2 Test purpose

To verify that the MS with a TCH/F allocated acknowledges a CHANNEL MODE MODIFY message by sending a CHANNEL MODE MODIFY ACKNOWLEDGE message specifying the new mode and by switching to this mode.

26.19.10.1.3 Method of test

Initial Conditions

System Simulator:

1 cell, default parameters.

Mobile Station:

The MS is "idle updated", with TMSI allocated.

Specific PICS statements:

- Support of GSM speech full rate version 4 (O-TCH/WFS).
- Support of GSM Speech Full Rate version 5 (TCH/WFS).

PIXIT statements:

-

Foreseen Final State of the MS

"Idle, updated", with TMSI allocated.

Test procedure

A Mobile Terminated call is initiated, however following the CHANNEL REQUEST received from the Mobile Station, the SS sends an IMMEDIATE ASSIGNMENT to the MS commanding it to go to a TCH/F. This sets the Channel Mode automatically to "Signalling Only".

The SS then sends a series of CHANNEL MODE MODIFY messages to the MS. Each time it is checked that the MS responds with a CHANNEL MODE MODIFY ACKNOWLEDGE message specifying the channel mode that has been specified in the CHANNEL MODE MODIFY message

This test is repeated for

- M = 1 if full rate speech version 5 is supported, and
- M = 2 if full rate speech version 4 is supported

Maximum Duration of Test

30 seconds.

Expected Sequence

Step	Direction	Message	Comments
1	SS->MS	PAGING REQUEST TYPE 1	Sent on correct paging subchannel
2	MS->SS	CHANNEL REQUEST	Establishment cause indicates "answer to paging"
3	SS->MS	IMMEDIATE ASSIGNMENT	Assignment to a non hopping TCH/F signalling only
4	MS->SS	PAGING RESPONSE	Message is contained in the SABM
5	SS->MS	AUTHENTICATION REQUEST	
6	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
7	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
8	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
9	SS		SS starts ciphering
10	SS->MS	CHANNEL MODE MODIFY	
11	MS->SS	CHANNEL MODE MODIFY ACKNOWLEDGE	Verify that Channel description = TCH/F, Channel mode = speech full or half rate version 5 for M= 1 or speech full or half rate version 4 for M= 2.
12	SS->MS	CHANNEL MODE MODIFY	
13	MS->SS	CHANNEL MODE MODIFY ACKNOWLEDGE	Verify that Channel description = TCH/F, Channel mode = speech full or half rate version 5 for M= 1 or speech full or half rate version 4 for M= 2.
14	SS->MS	CHANNEL MODE MODIFY	
15	MS->SS	CHANNEL MODE MODIFY ACKNOWLEDGE	Verify that Channel description = TCH/F, Channel mode = speech full or half rate version 5 for M= 1 or speech full or half rate version 4 for M= 2.
16	SS->MS	CHANNEL MODE MODIFY	
17	MS->SS	CHANNEL MODE MODIFY ACKNOWLEDGE	Verify that Channel description = TCH/F, Channel mode = speech full or half rate version 5 for M= 1 or speech full or half rate version 4 for M= 2.
18	SS->MS	CHANNEL RELEASE	

Specific Message Contents

In steps 10, 12, 14, 16:

CHANNEL MODE MODIFY

Information Element	value/remark
Channel description	in steps 10, 12, 14, 16: same as for step 3
Channel mode Mode	speech full or half rate version 4 or 5
Multi-Rate configuration	in steps 10: change of MR configuration, no initial codec mode in steps 12: change of MR configuration, initial codec mode specified in steps 14: change of MR thresholds, no initial codec mode in steps 16: initial codec mode specified

26.20 Enhanced Power Control

26.20.1 Enhanced Power Control / MS Supports EPC

26.20.1.1 Conformance requirements

The purpose of the *Mobile Station Classmark 3* information element is to provide the network with information concerning aspects of the mobile station. The contents might affect the manner in which the network handles the operation of the mobile station. The Mobile Station Classmark information indicates general mobile station characteristics and it shall therefore, except for fields explicitly indicated, be independent of the frequency band of the channel it is sent on.

<Classmark 3 Value part> ::=

{ 0 | 1 < High Multislot Capability : bit(2) > }

---Release 5 starts here.

{ 0 | 1 < GERAN Iu Mode Capabilities > } -- '1' also means support of GERAN Iu mode
< GERAN Feature Package 2 : bit >

GERAN Feature Package 2 (1 bit field)

This field indicates the MS support of the GERAN Feature Package 2. The GERAN Feature Package 2 includes **Enhanced Power Control (EPC)** (see 3GPP TS 45.008).

- 0 GERAN feature package 2 not supported.
- 1 GERAN feature package 2 supported.

In *A/Gb mode*, when assigned a TCH or O-TCH, the MS shall configure the channel in enhanced power control (EPC) mode if so commanded by BSS in the channel assignment (see 3GPP TS 44.018). On such a channel, EPC may be used for uplink power control and/or downlink power control.

When on a channel in EPC mode,

- the MS shall use the EPCCH in the uplink for EPC measurement reporting (see subclause 8.4.1b).
- the MS shall, depending on what is signalled in the L1 header of the downlink SACCH (see 3GPP TS 44.004) and during channel assignment (see 3GPP TS 44.018), obey either the EPC Uplink Power Control Command (sent on the EPCCH in the downlink) or the Ordered MS Power Level (sent in the L1 header of the downlink SACCH).
 - If the signalling indicates that EPC shall be used in the uplink, the MS shall employ the most recently commanded EPC power control level, as indicated by the EPC Uplink Power Control Command sent on the corresponding EPCCH in the downlink. The EPC Uplink Power Control Command is sent once every EPC reporting period (see subclause 8.4.1b). The MS shall ignore the Ordered MS Power Level sent in the SACCH L1 header in the downlink.
 - If the signalling indicates that normal power control shall be used in the uplink, the MS shall ignore the EPC Uplink Power Control Command and use normal power control.

When in enhanced power control (EPC) mode, the MS shall for uplink power control obey either the EPC Uplink Power Control Commands or the Ordered MS Power Level. This is controlled by signalling via the SACCH L1 header in the downlink (see 3GPP TS 44.004) and during channel assignment (see 3GPP TS 44.018 and 3GPP TS 44.118). The type of power control commands to be obeyed by the MS during one SACCH period is determined by what is signalled in the L1 header during the previous SACCH period and, before any SACCH block has been correctly decoded, by what is signalled during channel assignment.

NOTE: This signalling via the SACCH L1 header and during channel assignment only controls the uplink power control mechanism. In *A/Gb mode*, EPC measurement procedures shall always be followed by the MS when on a TCH or O-TCH in EPC mode. Similarly in *Iu mode*, EPC measurement procedures shall always be followed by the MS when on a DBPSCH in EPC mode.

When the MS is ordered to obey the Ordered MS Power Level, the timing according to subclause 4.7.1 applies.

When the MS is ordered to obey the EPC Uplink Power Control Command, it shall, upon receipt of an EPC Uplink Power Control Command on an EPCCH in the downlink, change to the new power level on the corresponding uplink channel at the first TDMA frame belonging to the next EPC reporting period (as specified in subclause 8.4.1b).

References

3GPP TS 24.008, subclause 10.5.1.7

3GPP TS 45.008, subclause 4.2, subclause 4.7.3

26.20.1.2 Test purpose

To verify that a MS that supports EPC indicates to the network that it supports GERAN feature package 2.

To verify that when commanded to do so the MS shall configure the assigned TCH or O-TCH channel in EPC mode.

To verify that when on a channel in EPC mode the MS ignores the EPC Uplink Power Control command if the signalling indicates that normal power control shall be used in the uplink.

To verify that when in EPC mode, the MS shall for uplink power control obey either the EPC Uplink Power Control Commands or the Ordered MS Power Level.

26.20.1.3 Method of test

Initial Conditions

System Simulator:

1 cell, default parameters except IMSI Attach-detach shall be applied.

Mobile Station:

MS is switched off.

Specific PICS Statements:

-

PIXIT Statements:

-

Test Procedure

The MS is switched on (or its power is re-applied). After the start of the LOCATION UPDATING procedure the SS initiates a CLASSMARK ENQUIRY procedure. The MS shall report in the CLASSMARK CHANGE that it supports "GERAN FEATURES PACKAGE 2". The SS then completes the LOCATION UPDATING procedure assignment a mobile identity.

The MS is paged and a MT speech call (TCH) is established with an early assignment (before CONNECT). The MS is assigned a channel that supports "Enhanced Power Control" with the power level set to the maximum allowed. The MS shall send EPCCH Message block on the EPCCH channel. The reported power level is the one set in the ASSIGNMENT COMMAND.

The SS checks that the MS is using the enhanced power control mechanism by commanding it to lower its power level. This is checked on the subsequent EPCCH Message blocks sent by the MS on the EPCCH.

"Enhanced Power Control" is disabled and the SS checks that the MS goes back to using the normal power control mechanism in MEASUREMENT REPORT messages on SACCH.

Maximum Duration of Test

Expected Sequence

Step	Direction	Message	Comments
1	MS		The MS is switched on (or its power is re-applied).
2	MS -> SS	CHANNEL REQUEST	
3	SS -> MS	IMMEDIATE ASSIGNMENT	
4	MS -> SS	LOCATION UPDATING REQUEST	
5	SS -> MS	CLASSMARK ENQUIRY	
6	MS -> SS	CLASSMARK CHANGE	Classmark 3 should be present indicating that the MS supports GERAN Feature Package 2.
7	SS -> MS	LOCATION UPDATING ACCEPT	Assign a TMSI
8	MS -> SS	LOCATION UPDATE COMPLETE	
9	SS -> MS	CHANNEL RELEASE	
10	SS -> MS	PAGING REQUEST TYPE 1	Sent on the correct paging subchannel. "Mobile Identity" IE contains the TMSI allocated to the MS
11	MS -> SS	CHANNEL REQUEST	
12	SS -> MS	IMMEDIATE ASSIGNMENT	
13	MS -> SS	PAGING RESPONSE	
14	SS -> MS	SETUP	Message does not contain the signal IE.
15	MS -> SS	CALL CONFIRMED	
16	SS -> MS	ASSIGNMENT COMMAND	Set the power level to the maximum allowed for the class of MS being tested and enable EPC.
17	MS -> SS	ASSIGNMENT COMPLETE	Sent on the new channel.
18	SS		Change the SACCH L1 header to indicate "EPC in use for MS power control".
19	SS -> MS	ALERTING	
20	MS		An alert indication is given by the MS.
21	MS		The MS is made to accept the call.
22	MS -> SS	CONNECT	
23	MS		The TCH shall be through connected by both directions in the dedicated mode.
24	SS -> MS	CONNECT ACKNOWLEDGE	
25	MS -> SS	EPCCH MESSAGE BLOCK	Message is sent on EPCCH. Determine the RF power control level being used from the SACCH L1 header.
26	SS		Command the MS to lower its power level by 2 dB (setting Ordered MS power level in the SACCH header) using the EPC UPLINK POWER CONTROL COMMAND. Sent on the EPCCH.
27	MS -> SS	EPCCH MESSAGE BLOCK	Message is sent on EPCCH. Confirm that the reported power level used by the MS is 2dB lower.
28	SS -> MS	ASSIGNMENT COMMAND	Disable EPC, using normal power control. Set power level to value seen in step 27.
29	MS -> SS	ASSIGNMENT COMPLETE	
30	SS		Change the SACCH L1 header to indicate "EPC not in use for MS power control".
31	SS		Command the MS to lower its power level by 2 dB using the EPC UPLINK POWER CONTROL COMMAND. Sent on the EPCCH.
32	MS -> SS	MEASUREMENT REPORT	Message is sent on SACCH. Report power level used by MS should not have changed from that used in step 27.
33	SS		Change the SACCH L1 header to indicate the MS to lower its power by 4 dB.
34	MS -> SS	MEASUREMENT REPORT	Message is sent on SACCH. Confirm that the reported power level used by the MS is 4 dB lower than that reported at step 27.

26.21 VAMOS Signalling

26.21.0 General

VAMOS signalling test cases in this section are performed with SCPIR = 0 if not otherwise defined in the test case.

For MS supporting VAMOS type II the VAMOS signalling test cases are performed in VAMOS type II mode which implies testing of shifted SACCH channel.

Table 26.21-1 lists the VAMOS TSC sets and channel types used to achieve a good coverage for the possible TSC sets and channel types within the test procedures of the VAMOS signalling test cases.

Table 26.21-1

Test Case	Execution counter M	call establishment	Cell A channel type	Cell A TSC set	Handover	Cell B channel type	Cell B TSC set
26.21.1	1	MO (late assign.)	TCH/FS	1 (Set 2)	-	-	-
26.21.1	2	MO (late assign.)	TCH/EFS	3 (Set 2)	-	-	-
26.21.1	3	MO (late assign.)	TCH/AFS	5 (Set 2)	-	-	-
26.21.2	1	MT (very early assign.)	TCH/FS	2 (Set 2)	-	-	-
26.21.2	2	MT (very early assign.)	TCH/EFS	3 (Set 2)	-	-	-
26.21.2	3	MT (very early assign.)	TCH/AFS	4 (Set 2)	-	-	-
26.21.2	4	MT (very early assign.)	TCH/HS	6 (Set 2)	-	-	-
26.21.2	5	MT (very early assign.)	TCH/AHS	7 (Set 2)	-	-	-
26.21.4	1	MT (late assign.)	TCH/FS	1 (Set 2)	non synced	TCH/FS	2 (Set 2)
26.21.4	2	MT (late assign.)	TCH/EFS	3 (Set 2)	non synced	TCH/EFS	4 (Set 2)
26.21.4	3	MT (late assign.)	TCH/AFS	5 (Set 2)	non synced	TCH/AFS	5 (Set 2)
26.21.4	4	MT (late assign.)	TCH/FS	2 (Set 2)	finely synced	TCH/FS	3 (Set 2)
26.21.4	5	MT (late assign.)	TCH/EFS	4 (Set 2)	finely synced	TCH/EFS	5 (Set 2)
26.21.4	6	MT (late assign.)	TCH/AFS	6 (Set 2)	finely synced	TCH/AFS	7 (Set 2)
26.21.5	-	DTM	TCH/FS	3 (Set 2)	-	-	-
26.21.6	1	MO (late assign.)	TCH/HS	1 (Set 2)	non synced	TCH/FS	2 (Set 1)
26.21.6	2	MO (late assign.)	TCH/AHS	3 (Set 2)	non synced	TCH/EFS	4 (Set 1)
26.21.6	3	MO (late assign.)	TCH/AHS	5 (Set 2)	non synced	TCH/AFS	5 (Set 1)
26.21.6	4	MO (late assign.)	TCH/HS	0 (Set 2)	finely synced	TCH/FS	1 (Set 1)
26.21.6	5	MO (late assign.)	TCH/AHS	2 (Set 2)	finely synced	TCH/EFS	5 (Set 1)
26.21.6	6	MO (late assign.)	TCH/AHS	4 (Set 2)	finely synced	TCH/AFS	7 (Set 1)
26.21.7	1	Emergency call	TCH/FS	5 (Set 2)	-	-	-
26.21.7	2	Emergency call	TCH/EFS	6 (Set 2)	-	-	-
26.21.7	3	Emergency call	TCH/AFS	7 (Set 2)	-	-	-
26.21.7	4	Emergency call	TCH/HS	0 (Set 2)	-	-	-
26.21.7	5	Emergency call	TCH/AHS	1 (Set 2)	-	-	-
26.21.8	1	MO (early assign.)	TCH/AFS 12.2	1 (Set 2)	finely synced	TCH/AFS 10.2	2 (Set 2)
26.21.8	2	MO (early assign.)	TCH/AFS 7.95	3 (Set 2)	finely synced	TCH/AHS 7.4	4 (Set 2)
26.21.8	3	MO (early assign.)	TCH/AHS 6.7	5 (Set 2)	finely synced	TCH/AFS 5.9	5 (Set 2)
26.21.8	4	MO (early assign.)	TCH/AHS 5.15	0 (Set 2)	finely synced	TCH/AHS 4.75	1 (Set 2)

NOTE: When procedures in the table are modified or added the affected test case definitions need to be aligned or enhanced.

Editor's Notes: Classmark checking has to be added to one of the VAMOS signalling test cases or checked in section 26.6.11.

Additional execution counter M for other speech modes (e.g. TCH/WFS) could be added to the table and test cases.

26.21.1 VAMOS Signalling / MS originated call FR / TSC assignment in ASSIGNMENT COMMAND

26.21.1.1 Conformance requirements

- 1) VAMOS allows multiplexing of two users simultaneously on the same physical resource in the circuit switched mode both in downlink and in uplink, using the same timeslot number, ARFCN and TDMA frame number. Hence, a basic physical channel capable of VAMOS supports up to 4 TCH channels along with their associated control channels (FACCH and SACCH).

The channel organization for TCH, FACCH and SACCH/T in VAMOS mode shall be done as described in 3GPP TS 45.002.

- 2) Upon receipt of the ASSIGNMENT COMMAND message, the mobile station initiates a local end release of link layer connections and packet resources, if in dual transfer mode, disconnects the physical channels, commands the switching to the assigned channels and initiates the establishment of lower layer connections (this includes the activation of the channels, their connection and the establishment of the main signalling links).

Table 26.21.1.1: Channel Description 2 information element

Channel type and TDMA offset (octet 2)	
Bits	
8 7 6 5 4	
0 0 0 0 0	TCH/F + FACCH/F and SACCH/M at the timeslot indicated by TN, and additional bidirectional or unidirectional TCH/Fs and SACCH/Ms according to the multislot allocation information element
0 0 0 0 1	TCH/F + FACCH/F and SACCH/F
0 0 0 1 T	TCH/H + ACCHs
0 0 1 T T	SDCCH/4 + SACCH/C4 or CBCH (SDCCH/4)
0 1 T T T	SDCCH/8 + SACCH/C8 or CBCH (SDCCH/8)
1 1 0 0 0	TCH/F + ACCHs using TSC Set 2
1 1 1 0 T	TCH/H + ACCHs using TSC Set 2
The T bits indicate the subchannel number coded in binary.	
In the description below "n" is the timeslot number indicated by TN. The description is valid only if all the indicated timeslot numbers are in the range 0 to 7.	

References

3GPP TS 45.001 subclause 13.1.

3GPP TS 44.018 subclauses 3.4.3.1, .10.5.2.5

26.21.1.2 Test purpose

To verify for MO call setup procedure that the MS applies the correct VAMOS TSC set allocated by ASSIGNMENT COMMAND message for full rate speech channels.

26.21.1.3 Method of Test

Initial Conditions

System Simulator:

1 cell, default parameters, TSC as defined in table 26.21-1 Cell A TSC set for execution counter M.

Mobile Station:

in MM-state "idle, updated" with valid TMSI and CKSN

Specific PICS statements:

- VAMOS II supported (TSPC VAMOS Type 2)
- Speech supported for Full rate version 2 (TSPC_AddInfo_Full_rate_version_2).
- Speech supported for Full rate version 3 (TSPC_AddInfo_Full_rate_version_3)

PIXIT statements:

- Way to indicate mobile originated alerting.

Foreseen Final State of MS

"Idle, updated", with TMSI allocated.

Test Procedure

The MS is made to initiate a speech call. The network and the MS indicate Bearer capabilities IE with supported Full Rate channels. The call is established with a late assignment. VAMOS TSC set 2 according to table 26.21-1 is assigned in ASSIGNMENT COMMAND. It is checked that the TCH is through connected in both directions. The network initiates the call release.

The test is repeated for all full rate channel modes supported by the MS (see table 26.21-1).

Maximum Duration of Test

3 minutes

Expected Sequence

The test is executed for execution counter M = 1, 2 (optional), 3 (optional).

Step	Direction	Message	Comments
1	MS		The "called number" is entered
2	MS->SS	CHANNEL REQUEST	
3	SS->MS	IMMEDIATE ASSIGNMENT	
4	MS->SS	CM SERVICE REQUEST	Message is contained in SABM
5	SS->MS	AUTHENTICATION REQUEST	
6	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
7	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
8	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
9	SS		SS starts ciphering
10	MS->SS	SETUP	The MS indicates the supported speech versions.
11	SS->MS	CALL PROCEEDING	
12	SS->MS	ALERTING	
13	MS		An alerting indication as defined in the PIXIT statement is given by the MS.
14	SS->MS	ASSIGNMENT COMMAND	SS allocates full rate speech channel: M = 1: FS M = 2: EFS M = 3: AFS
15	MS->SS	ASSIGNMENT COMPLETE	SS allocates TSC from TSC set 2. TSC set 2 is used in uplink and downlink for this and the following messages.
16	SS -> MS	CONNECT	
17	MS -> SS	CONNECT ACKNOWLEDGE	
18	MS		The appropriate bearer channel is through connected in both directions.
19	SS -> MS	DISCONNECT	
20	MS -> SS	RELEASE	
21	SS -> MS	RELEASE COMPLETE	
22	SS -> MS	CHANNEL RELEASE	The main signalling link is released.

Specific Message Content

Assignment Command (step 14)

Information Element	value/remark
CHANNEL DESCRIPTION 2	Channel Type and TDMA Offset Bits 8 7 6 5 4 1 1 0 0 0 TCH/F + ACCHs using TSC Set 2
CHANNEL MODE	M=1: 0 0 0 0 0 0 0 1 speech full rate or half rate version 1 M=2: 0 0 1 0 0 0 0 1 speech full rate or half rate version 2 M=3: 0 1 0 0 0 0 0 1 speech full rate or half rate version 3

26.21.2 VAMOS Signalling / MS Terminated call / Channel mode assignment in Channel Mode Modify

26.21.2.1 Conformance requirements

- 1) VAMOS allows multiplexing of two users simultaneously on the same physical resource in the circuit switched mode both in downlink and in uplink, using the same timeslot number, ARFCN and TDMA frame number. Hence, a basic physical channel capable of VAMOS supports up to 4 TCH channels along with their associated control channels (FACCH and SACCH).

The channel organization for TCH, FACCH and SACCH/T in VAMOS mode shall be done as described in 3GPP TS 45.002.

- 2) The channel mode modify procedure allows the network to request the mobile station to set the channel mode for one channel or one channel set. The procedure shall not be used if the multislot configuration contains more than one channel set. The channel mode covers the coding, decoding and transcoding mode used on the indicated channel.

Table 26.21.2.1: Channel Description information element

Channel type and TDMA offset (octet 2)	
Bits	
8 7 6 5 4	
S 0 0 0 1	TCH/F + ACCHs
S 0 0 1 T	TCH/H + ACCHs
0 0 1 T T	SDCCH/4 + SACCH/C4 or CBCH (SDCCH/4); TSC Set 1 shall be used
0 1 T T T	SDCCH/8 + SACCH/C8 or CBCH (SDCCH/8); TSC Set 1 shall be used
The T bits indicate the subchannel number coded in binary.	
S, TSC set	
Bit	
8	
0	TSC Set 1 shall be used
1	TSC Set 2 shall be used
All other values are reserved.	

Table 26.21.2.2: Channel Mode information element

The mode field is encoded as follows:

(octet 2)

Bits

8 7 6 5 4 3 2 1	
0 0 0 0 0 0 0 0	signalling only
0 0 0 0 0 0 0 1	speech full rate or half rate version 1
1 1 0 0 0 0 0 1	speech full rate or half rate version 1 in VAMOS mode (Note 3)
0 0 1 0 0 0 0 1	speech full rate or half rate version 2
1 1 0 0 0 0 1 0	speech full rate or half rate version 2 in VAMOS mode (Note 3)
0 1 0 0 0 0 0 1	speech full rate or half rate version 3
1 1 0 0 0 0 1 1	speech full rate or half rate version 3 in VAMOS mode (Note 3)
1 0 0 0 0 0 0 1	speech full rate or half rate version 4
1 0 0 0 0 0 1 0	speech full rate or half rate version 5
1 1 0 0 0 1 0 1	speech full rate or half rate version 5 in VAMOS mode (Note 3)
1 0 0 0 0 0 1 1	speech full rate or half rate version 6
0 1 1 0 0 0 0 1	data, 43.5 kbit/s (downlink)+14.5 kbps (uplink)
0 1 1 0 0 0 1 0	data, 29.0 kbit/s (downlink)+14.5 kbps (uplink)
0 1 1 0 0 1 0 0	data, 43.5 kbit/s (downlink)+29.0 kbps (uplink)
0 1 1 0 0 1 1 1	data, 14.5 kbit/s (downlink)+43.5 kbps (uplink)
0 1 1 0 0 1 0 1	data, 14.5 kbit/s (downlink)+29.0 kbps (uplink)
0 1 1 0 0 1 1 0	data, 29.0 kbit/s (downlink)+43.5 kbps (uplink)
0 0 1 0 0 1 1 1	data, 43.5 kbit/s radio interface rate
0 1 1 0 0 0 1 1	data, 32.0 kbit/s radio interface rate
0 1 0 0 0 0 1 1	data, 29.0 kbit/s radio interface rate
0 0 0 0 1 1 1 1	data, 14.5 kbit/s radio interface rate
0 0 0 0 0 0 1 1	data, 12.0 kbit/s radio interface rate
0 0 0 0 1 0 1 1	data, 6.0 kbit/s radio interface rate
0 0 0 1 0 0 1 1	data, 3.6 kbit/s radio interface rate
0 0 0 1 0 0 0 0	data, 64.0 kbit/s Transparent Data Bearer (Note 2)

Other values are reserved for future use.

Note 1: The speech versions are also referred as follows (see 3GPP TS 26.103):

full rate or half rate version 1:	GSM FR or GSM HR
full rate or half rate version 2:	GSM EFR (half rate version 2 not defined in this version of the protocol)
full rate or half rate version 3:	FR AMR or HR AMR
full rate or half rate version 4:	OFR AMR-WB or OHR AMR-WB
full rate or half rate version 5:	FR AMR-WB (half rate version 5 not defined in this version of the protocol)
full rate or half rate version 6:	OHR AMR (full rate version 6 not defined in this version of the protocol)

Note 2: This code point is only used for channel assignments made in GAN mode

Note 3: This code point is only used for a mobile station that indicates support for VAMOS-II (see 3GPP TS 24.008)

References

3GPP TS 45.001 subclause 13.1.

3GPP TS 44.018 subclauses 3.4.6 .10.5.2.5

26.21.2.2 Test purpose

To verify for MT call setup procedure that the MS applies the correct VAMOS TSC Set allocated by IMMEDIATE ASSIGNMENT message also check that channel mode modify configure a VAMOS II channel correctly.

26.21.2.3 Method of Test

Initial Conditions

System Simulator:

1 cell, default parameters, TSC as defined in table 26.21-1 Cell A TSC set for execution counter M.

Mobile Station:

in MM-state "idle, updated" with valid TMSI and CKSN

Specific PICS statements:

- VAMOS II supported (TSPC_VAMOS Type 2)
- Speech supported for Full rate version 2 (TSPC_AddInfo_Full_rate_version_2).
- Speech supported for Full rate version 3 (TSPC_AddInfo_Full_rate_version_3)
- Speech supported for Half rate version 1 (TSPC_AddInfo_Half_rate_version_1)
- Speech supported for Half rate version 3 (TSPC_AddInfo_Half_rate_version_3)
- Immediate connect supported for all circuit switched basic services. (TSPC_AddInfo_ImmConn)

PIXIT statements:

- Way to make the MS accept an incoming call after alerting.

Foreseen Final State of MS

CC state U10-call active.

Test Procedure

The MS is paged and the resulting a speech call is established. The network and the MS indicate Bearer capabilities IE with supported Half Rate channels. The call is established with a late assignment using channel mode modify. It is checked that the TCH is through connected in both directions. The network . The channel mode modify command includes a channel mode for a VAMOS-II mobile.

The test is repeated for all half rate channel modes supported by the MS.

Maximum Duration of Test

3 minutes

Expected Sequence

The test is executed for execution counter M = 1 , 2 (optional) , 3 (optional) , 4 (optional) , 5 (optional).

Step	Direction	Message	Comments
1	SS -> MS	PAGING REQUEST TYPE 1	Sent on the correct paging subchannel.
2	MS -> SS	CHANNEL REQUEST	Establishment cause indicates "answer to paging".
3	SS -> MS	IMMEDIATE ASSIGNMENT	Assignment to if M=1 to 3 TCH/F if M=4 to 5 TCH/HS, SS allocates TSC and TSC set according to table 26.21-1
4	MS -> SS	PAGING RESPONSE	Message is contained in SABM.
5	SS -> MS	AUTHENTICATION REQUEST	
6	MS -> SS	AUTHENTICATION RESPONSE	SRES specifies correct value.
7	SS -> MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message.
8	MS -> SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
9	SS		SS starts ciphering.
10	SS -> MS	SETUP	Message contains the signal IE.
11	MS -> SS	CALL CONFIRMED	
A12	MS -> SS	CONNECT	
B12	MS -> SS	ALERTING	
B13	MS		An alerting indication as defined in an PIXIT statement is given by the MS.
B14	MS		The MS is made to accept the call in the way described in a PIXIT statement.
B15	MS -> SS	CONNECT	
16	SS -> MS	CHANNEL MODE MODIFY	SS allocates half rate speech channel: M= 1: FS M= 2: EFS M= 3: AFS M= 4: HS M= 5: AHS
17	MS -> SS	CHANNEL MODE MODIFY ACKNOWLEDGE	
18	MS		If the call is a speech call, the TCH shall be through connected in both directions.
19	SS -> MS	CONNECT ACKNOWLEDGE	
20	MS		The appropriate bearer channel is through connected in both directions.

Specific Message Content

Channel Mode Modify (Step 16)

For MS supporting VAMOS II:

Information Element	value/remark
CHANNEL MODE	M=1: 1 1 0 0 0 0 0 1 speech full rate or half rate version 1 in VAMOS mode (Note 3, Table 26.21.2.2) M=2: 1 1 0 0 0 0 1 0 speech full rate or half rate version 2 in VAMOS mode (Note 3, Table 26.21.2.2) M=3: 1 0 0 0 0 1 1 speech full rate or half rate version 3 in VAMOS mode (Note 3, Table 26.21.2.2) M=4: 1 1 0 0 0 0 0 1 speech full rate or half rate version 1 in VAMOS mode (Note 3, Table 26.21.2.2) M=5: 1 0 0 0 0 1 1 speech full rate or half rate version 3 in VAMOS mode (Note 3, Table 26.21.2.2)

For MS supporting VAMOS I only:

Information Element	value/remark
CHANNEL MODE	M=1 and 4: 0 0 0 0 0 0 0 1 speech full rate or half rate version 1 M=2 and 5: 0 0 1 0 0 0 0 1 speech full rate or half rate version 2 M=3 and 6: 0 1 0 0 0 0 0 1 speech full rate or half rate version 3 M=4 and 4: 0 0 0 0 0 0 0 1 speech full rate or half rate version 1 M=5 and 6: 0 1 0 0 0 0 0 1 speech full rate or half rate version 3

26.21.3

26.21.4 VAMOS Signalling / MS terminated call / Handover to VAMOS mode

26.21.4.1 Conformance requirements

- 1) VAMOS allows multiplexing of two users simultaneously on the same physical resource in the circuit switched mode both in downlink and in uplink, using the same timeslot number, ARFCN and TDMA frame number. Hence, a basic physical channel capable of VAMOS supports up to 4 TCH channels along with their associated control channels (FACCH and SACCH).

The channel organization for TCH, FACCH and SACCH/T in VAMOS mode shall be done as described in 3GPP TS 45.002.

- 2) Upon receipt of the ASSIGNMENT COMMAND message, the mobile station initiates a local end release of link layer connections and packet resources, if in dual transfer mode, disconnects the physical channels, commands the switching to the assigned channels and initiates the establishment of lower layer connections (this includes the activation of the channels, their connection and the establishment of the main signalling links).
- 3) Upon receipt of the HANDOVER COMMAND message, the mobile station initiates, as described in sub-clause 3.1.4, the release of link layer connections, disconnects the physical channels (including the packet resources, if in class A mode of operation), commands the switching to the assigned channels and initiates the establishment of lower layer connections (this includes the activation of the channels, their connection and the establishment of the data links).

Table 26.21.4.1: Channel Description 2 information element

Channel type and TDMA offset (octet 2)	
Bits	
8 7 6 5 4	
0 0 0 0 0	TCH/F + FACCH/F and SACCH/M at the timeslot indicated by TN, and additional bidirectional or unidirectional TCH/Fs and SACCH/Ms according to the multislot allocation information element
0 0 0 0 1	TCH/F + FACCH/F and SACCH/F
0 0 0 1 T	TCH/H + ACCHs
0 0 1 T T	SDCCH/4 + SACCH/C4 or CBCH (SDCCH/4)
0 1 T T T	SDCCH/8 + SACCH/C8 or CBCH (SDCCH/8)
1 1 0 0 0	TCH/F + ACCHs using TSC Set 2
1 1 1 0 T	TCH/H + ACCHs using TSC Set 2
The T bits indicate the subchannel number coded in binary.	
In the description below "n" is the timeslot number indicated by TN. The description is valid only if all the indicated timeslot numbers are in the range 0 to 7.	

References

3GPP TS 45.001 subclause 13.1.

3GPP TS 44.018 subclauses 3.4.4.1, .10.5.2.5, .10.5.2.5a

26.21.4.2 Test purpose

To verify for mobile terminated call setup procedure (late assignment) and handover procedure that the MS applies correctly the assigned VAMOS TSC set.

26.21.4.3 Method of Test

Initial Conditions

System Simulator:

2 cells, default parameters.

Cell A: TSC as defined in table 26.21-1 Cell A TSC set for execution counter M.

Cell B: TSC as defined in table 26.21-1 Cell B TSC set for execution counter M.

Mobile Station:

in MM-state "idle, updated" with valid TMSI and CKSN

Specific PICS statements:

- VAMOS II supported (TSPC VAMOS Type 2)
- Speech supported for Full rate version 2 (TSPC_AddInfo_Full_rate_version_2).
- Speech supported for Full rate version 3 (TSPC_AddInfo_Full_rate_version_3)

PIXIT statements:

- Way to indicate alerting.
- Way to make the MS accept an incoming call after alerting.

Foreseen Final State of MS

"Idle, updated", with TMSI allocated.

Test Procedure

A mobile terminated speech call is established. The network and the MS indicate Bearer capabilities IE with supported Full Rate channels. The call is established with a late assignment. VAMOS TSC set 2 according to table 26.21-1 (cell A) is assigned in ASSIGNMENT COMMAND. It is checked that the TCH is through connected in both directions. The SS sends HANDOVER COMMAND to a VAMOS channel with TSC set 2 according to table 26.21-1 (cell B). It is checked that the TCH is through connected in both directions on the new cell. The network initiates the call release.

The test is repeated for all full rate channel modes supported by the MS and non synchronized and finely synchronized handover procedure (see table 26.21-1).

Maximum Duration of Test

12 minutes

Expected Sequence

The test is executed for execution counter M = 1, 2 (optional), 3 (optional), 4, 5 (optional), 6 (optional).

Step	Direction	Message	Comments
1	SS -> MS	PAGING REQUEST TYPE 1	Sent on the correct paging subchannel.
2	MS -> SS	CHANNEL REQUEST	Establishment cause indicates "answer to paging".
3	SS -> MS	IMMEDIATE ASSIGNMENT	
4	MS -> SS	PAGING RESPONSE	Message is contained in SABM.
5	SS -> MS	AUTHENTICATION REQUEST	
6	MS -> SS	AUTHENTICATION RESPONSE	SRES specifies correct value.
7	SS -> MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message.
8	MS -> SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
9	SS		SS starts ciphering.
10	SS -> MS	SETUP	Message contains the signal IE.
11	MS -> SS	CALL CONFIRMED	
A12	MS -> SS	CONNECT	
B12	MS -> SS	ALERTING	
B13	MS		An alerting indication as defined in an PIXIT statement is given by the MS.
B14	MS		The MS is made to accept the call in the way described in a PIXIT statement.
B15	MS -> SS	CONNECT	
16	SS -> MS	ASSIGNMENT COMMAND	SS allocates full rate speech channel: M = 1, 4: FS M = 2, 5: EFS M = 3, 6: AFS SS allocates TSC from TSC set 2.
17	MS -> SS	ASSIGNMENT COMPLETE	TSC set 2 according to table 26.21.4-1 (cell A) is used in uplink and downlink for this and the following messages.
18	MS		If the call is a speech call, the TCH shall be through connected in both directions.
19	SS -> MS	CONNECT ACKNOWLEDGE	
20	MS		The appropriate bearer channel is through connected in both directions.
			According to table 26.21-1 'non synced' (steps 21A to 23A) or 'finely synced' (steps 21B to 25B) handover are performed.
21A	SS -> MS	HANDOVER COMMAND	See Specific message contents.
22A	MS -> SS	HANDOVER ACCESS	Transmitted on cell B. Repeated on every burst of the uplink main DCCH (and optionally the SACCH) until reception of PHYSICAL INFORMATION. Handover Reference as included in the HANDOVER COMMAND.
23A	SS -> MS	PHYSICAL INFORMATION	Sent after reception of n HANDOVER ACCESS messages.
21B	SS -> MS	HANDOVER COMMAND	See Specific Message Contents.
22B	MS -> SS	HANDOVER ACCESS	Transmitted on Cell B
23B	MS -> SS	HANDOVER ACCESS	Before completion of the 4 access bursts on the new DCCH, additional access bursts may also be sent on the SACCH
24B	MS -> SS	HANDOVER ACCESS	
25B	MS -> SS	HANDOVER ACCESS	
26	MS -> SS	SABM	Sent without information field.
27	SS -> MS	UA	
28	MS -> SS	HANDOVER COMPLETE	TSC set 2 according to table 26.21-1 (cell B) is used in uplink and downlink for this and the following messages.
29	SS -> MS	DISCONNECT	
30	MS -> SS	RELEASE	
31	SS -> MS	RELEASE COMPLETE	
32	SS -> MS	CHANNEL RELEASE	The main signalling link is released.

Specific Message Content

Assignment Command (step 16)

Information Element	value/remark
CHANNEL DESCRIPTION 2	Channel Type and TDMA Offset Bits 8 7 6 5 4 1 1 0 0 0 TCH/F + ACCHs using TSC Set 2
CHANNEL MODE	M=1 and 4: 0 0 0 0 0 0 1 speech full rate or half rate version 1 M=2 and 5: 0 0 1 0 0 0 1 speech full rate or half rate version 2 M=3 and 6: 0 1 0 0 0 0 1 speech full rate or half rate version 3

Handover Command (step 21A)

Information Element	value/remark
CHANNEL DESCRIPTION 2	Channel Type and TDMA Offset Bits 8 7 6 5 4 1 1 0 0 0 TCH/F + ACCHs using TSC Set 2
CHANNEL MODE	M=1: 0 0 0 0 0 0 1 speech full rate or half rate version 1 M=2: 0 0 1 0 0 0 1 speech full rate or half rate version 2 M=3: 0 1 0 0 0 0 1 speech full rate or half rate version 3
Synchronization Indication IE	Not included

Handover Command (step 21B)

Information Element	value/remark
CHANNEL DESCRIPTION 2	Channel Type and TDMA Offset Bits 8 7 6 5 4 1 1 0 0 0 TCH/F + ACCHs using TSC Set 2
CHANNEL MODE	M=4: 0 0 0 0 0 0 1 speech full rate or half rate version 1 M=5: 0 0 1 0 0 0 1 speech full rate or half rate version 2 M=6: 0 1 0 0 0 0 1 speech full rate or half rate version 3
Synchronization Indication - Report Observed Time Difference - Synchronization Indication - Normal Cell Indication	Shall not be included "Synchronized" Ignore out of range timing advance

26.21.5 VAMOS Signalling / MT VAMOS call / TSC assignment in DTM Assignment Command

26.21.5.1 Conformance requirements

- 1) VAMOS allows multiplexing of two users simultaneously on the same physical resource in the circuit switched mode both in downlink and in uplink, using the same timeslot number, ARFCN and TDMA frame number. Hence, a basic physical channel capable of VAMOS supports up to 4 TCH channels along with their associated control channels (FACCH and SACCH).

The channel organization for TCH, FACCH and SACCH/T in VAMOS mode shall be done as described in 3GPP TS 45.002.

- 2) Upon receipt of the ASSIGNMENT COMMAND message, the mobile station initiates a local end release of link layer connections and packet resources, if in dual transfer mode, disconnects the physical channels, commands the switching to the assigned channels and initiates the establishment of lower layer connections (this includes the activation of the channels, their connection and the establishment of the main signalling links).
- 3) A mobile station indicating support for either VAMOS I or VAMOS II level (see 3GPP TS 24.008) shall support VAMOS mode of operation while in dual transfer mode. In case of DTM in *A/Gb mode* the training sequence for the packet data traffic channels (PDTCH) together with associated control channels shall have the same training sequence code (TSC) as the TSC of the traffic channel together with the associated control channels and shall be selected from TSC Set 1.

- 4) The mobile station shall act on the DTM ASSIGNMENT COMMAND message as specified in 3GPP TS 44.018.

Table 26.21.5.1: Channel Description information element

Channel type and TDMA offset (octet 2)	
Bits	
8 7 6 5 4	
S 0 0 0 1	TCH/F + ACCHs
S 0 0 1 T	TCH/H + ACCHs
0 0 1 T T	SDCCH/4 + SACCH/C4 or CBCH (SDCCH/4); TSC Set 1 shall be used
0 1 T T T	SDCCH/8 + SACCH/C8 or CBCH (SDCCH/8); TSC Set 1 shall be used
The T bits indicate the subchannel number coded in binary.	
S, TSC set	
Bit	
8	
0	TSC Set 1 shall be used
1	TSC Set 2 shall be used
All other values are reserved.	

References

3GPP TS 45.001 subclause 13.1.

3GPP TS 44.018 subclauses 10.5.2.5

3GPP TS 44.060 subclauses 7.1, 8.9.2.1

3GPP TS 45.002 subclauses 6.4.2.3

26.21.5.2 Test purpose

To verify that a VAMOS I mobile is able to operate in DTM mode and packet data traffic channels together with associated control channels shall have the same TSC as TSC of the traffic channel together with associated control channels and shall be selected from TSC set 1

26.21.5.3 Method of Test

Initial Conditions

System Simulator:

1 cell, default parameters, DTM supported, TSC as defined in table 26.21-1 Cell A TSC set.

Mobile Station:

MS is GPRS attached and PDP Context 2 activated.

Specific PICS statements:

- - VAMOS II supported (TSPC VAMOS Type 2)

PIXIT statements:

- Way to indicate alerting.
- Way to make the MS accept an incoming call after alerting.

Foreseen Final State of MS

"Idle, updated", with TMSI allocated.

Test Procedure

A mobile terminated speech call is established. The network and the MS indicate Bearer capabilities IE with supported Full Rate channels. The call is established with a late assignment. VAMOS TSC set 2 according to table 26.21 -1 (cell

A) is assigned in ASSIGNMENT COMMAND. It is checked that the TCH is through connected in both directions. MS initiates a data transfer for 5000 octets. The SS sends DTM ASSIGNMENT COMMAND with uplink resources and channel description set to a VAMOS channel with TSC set 2 according to table 26.21-1 (cell A). It is checked that the TCH is through connected in both directions and the packet data traffic channels together with associated control channels shall have the same TSC as TSC of the traffic channel together with associated control channels and shall be selected from TSC set 1 The mobile initiates the call release after the completion of data transfer.

Maximum Duration of Test

10 minutes

Expected Sequence

Step	Direction	Message	Comments
1	SS -> MS	PAGING REQUEST TYPE 1	Sent on the correct paging subchannel.
2	MS -> SS	CHANNEL REQUEST	Establishment cause indicates "answer to paging".
3	SS -> MS	IMMEDIATE ASSIGNMENT	
4	MS -> SS	PAGING RESPONSE	Message is contained in SABM.
5	MS -> SS	CLASSMARK CHANGE	
6	MS -> SS	GPRS INFORMATION	The MS send this message to indicate Cell Update
7	SS -> MS	AUTHENTICATION REQUEST	
8	MS -> SS	AUTHENTICATION RESPONSE	SRES specifies correct value.
9	SS -> MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message.
10	MS -> SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
11	SS		SS starts ciphering.
12	SS -> MS	SETUP	Message contains the signal IE.
13	MS -> SS	CALL CONFIRMED	
A14	MS -> SS	CONNECT	
B14	MS -> SS	ALERTING	
B15	MS		An alerting indication as defined in an PIXIT statement is given by the MS.
B16	MS		The MS is made to accept the call in the way described in a PIXIT statement.
B17	MS -> SS	CONNECT	
18	SS -> MS	ASSIGNMENT COMMAND	SS allocates full rate speech channel: SS allocates TSC from TSC set 2.
19	MS -> SS	ASSIGNMENT COMPLETE	TSC set 2 according to table 26.21.1 (cell A) is used in uplink and downlink for this and the following messages.
20	MS		If the call is a speech call, the TCH shall be through connected in both directions.
21	SS -> MS	CONNECT ACKNOWLEDGE	The appropriate bearer channel is through connected in both directions.
22	MS		Trigger MS to initiate UL data transfer of 5000 octets
23	MS -> SS	DTM REQUEST	
24	SS -> MS	DTM ASSIGNMENT COMMAND	SS allocates TSC from TSC set 2 for the CS channel
25	MS -> SS	ASSIGNMENT COMPLETE	
26	MS -> SS	{Completion of uplink RLC data block transfer}	Macro as per section 40.4.3.10.
27	SS		Verify during step 26 that the MS is using the TSC assigned in step 24 but from the TSC set 1
28	SS -> MS	DISCONNECT	
29	MS -> SS	RELEASE	
30	SS -> MS	RELEASE COMPLETE	
31	SS -> MS	CHANNEL RELEASE	The main signalling link is released.

Specific Message Content

Assignment Command (step 18)

Information Element	value/remark
CHANNEL DESCRIPTION 2	Channel Type and TDMA Offset Bits 8 7 6 5 4 1 1 0 0 0 TCH/F + ACCHs using TSC Set 2
CHANNEL MODE	0 0 0 0 0 0 0 1 speech full rate or half rate version 1

DTM ASSIGNMENT COMMAND (Step 24):

As default message contents except: Description of the CS Channel - Timeslot number - Channel Type and TDMA offset - Training Sequence Code RR Packet Uplink Assignment IE - TIMESLOT_ALLOCATION RR Packet Downlink Assignment IE	N (chosen arbitrarily) 1 0 0 0 1 TCH/F + ACCHs using TSC set 2 As defined in table 26.21.1 (N ± 1) MOD 8 Not included
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26.21.6 VAMOS Signalling / MS originated call / Handover between different traffic rates

26.21.6.1 Conformance requirements

- 1) VAMOS allows multiplexing of two users simultaneously on the same physical resource in the circuit switched mode both in downlink and in uplink, using the same timeslot number, ARFCN and TDMA frame number. Hence, a basic physical channel capable of VAMOS supports up to 4 TCH channels along with their associated control channels (FACCH and SACCH).

The channel organization for TCH, FACCH and SACCH/T in VAMOS mode shall be done as described in 3GPP TS 45.002.

- 2) Upon receipt of the ASSIGNMENT COMMAND message, the mobile station initiates a local end release of link layer connections and packet resources, if in dual transfer mode, disconnects the physical channels, commands the switching to the assigned channels and initiates the establishment of lower layer connections (this includes the activation of the channels, their connection and the establishment of the main signalling links).
- 3) Upon receipt of the HANDOVER COMMAND message, the mobile station initiates, as described in sub-clause 3.1.4, the release of link layer connections, disconnects the physical channels (including the packet resources, if in class A mode of operation), commands the switching to the assigned channels and initiates the establishment of lower layer connections (this includes the activation of the channels, their connection and the establishment of the data links).

Table 26.21.6.2: Channel Description 2 information element

Channel type and TDMA offset (octet 2)	
Bits	
8 7 6 5 4	
0 0 0 0 0	TCH/F + FACCH/F and SACCH/M at the timeslot indicated by TN, and additional bidirectional or unidirectional TCH/Fs and SACCH/Ms according to the multislot allocation information element
0 0 0 0 1	TCH/F + FACCH/F and SACCH/F
0 0 0 1 T	TCH/H + ACCHs
0 0 1 T T	SDCCH/4 + SACCH/C4 or CBCH (SDCCH/4)
0 1 T T T	SDCCH/8 + SACCH/C8 or CBCH (SDCCH/8)
1 1 0 0 0	TCH/F + ACCHs using TSC Set 2
1 1 1 0 T	TCH/H + ACCHs using TSC Set 2
The T bits indicate the subchannel number coded in binary.	
In the description below "n" is the timeslot number indicated by TN. The description is valid only if all the indicated timeslot numbers are in the range 0 to 7.	

References

3GPP TS 45.001 subclause 13.1.

3GPP TS 44.018 subclauses 3.4.4.1, .10.5.2.5, .10.5.2.5a

26.21.6.2 Test purpose

To verify that during a mobile originated call, the MS applies TSC set and different channel rates during handover from VAMOS to non VAMOS mode

26.21.6.3 Method of Test

Initial Conditions

System Simulator:

2 cells, default parameters.

Cell A: TSC as defined in table 26.21-1 Cell A TSC set for execution counter M.

Cell B: TSC as defined in table 26.21-1 Cell B TSC set for execution counter M.

Mobile Station:

in MM-state "idle, updated" with valid TMSI and CKSN

Specific PICS statements:

- VAMOS II supported (TSPC VAMOS Type 2)
- Speech supported for Full rate version 2 (TSPC_AddInfo_Full_rate_version_2).
- Speech supported for Full rate version 3 (TSPC_AddInfo_Full_rate_version_3)
- Speech supported for Half rate version 1 (TSPC_AddInfo_Half_rate_version_1).
- Speech supported for Half rate version 3 (TSPC_AddInfo_Half_rate_version_3).

PIXIT statements:

- Way to indicate mobile originated alerting.

Foreseen Final State of MS

"Idle, updated", with TMSI allocated.

Test Procedure

A mobile originated speech call is established. The network and the MS indicate Bearer capabilities IE with supported Half Rate channels. The call is established with a late assignment. VAMOS TSC set 2 according to table 26.21-1 (cell A) is assigned in ASSIGNMENT COMMAND. It is checked that the TCH is through connected in both directions. The SS sends HANDOVER COMMAND to a non VAMOS TSC according to table 26.21-1 (cell B). It is checked that the TCH is through connected in both directions on the new cell. The network initiates the call release.

The test is repeated for all half rate channel modes supported by the MS and non synchronized and finely synchronized handover procedure (see table 26.21-1).

Maximum Duration of Test

12 minutes

Expected Sequence

The test is executed for execution counter M = 1, 2, 3, 4, 5, 6 according to the channels supported by the MS.

Step	Direction	Message	Comments
1	MS		The "called number" is entered
2	MS->SS	CHANNEL REQUEST	
3	SS->MS	IMMEDIATE ASSIGNMENT	
4	MS->SS	CM SERVICE REQUEST	Message is contained in SABM
5	SS->MS	AUTHENTICATION REQUEST	
6	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
7	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
8	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
9	SS		SS starts ciphering
10	MS->SS	SETUP	The MS indicates the supported speech versions.
11	SS->MS	CALL PROCEEDING	
12	SS->MS	ALERTING	
13	MS		An alerting indication as defined in the PIXIT statement is given by the MS.
14	SS->MS	ASSIGNMENT COMMAND	SS allocates half rate speech channel: M = 1,4: HS M = 2,3,5,6: AHS SS allocates TSC from TSC set 2.
15	MS->SS	ASSIGNMENT COMPLETE	TSC set 2 is used in uplink and downlink for this and the following messages.
16	SS -> MS	CONNECT	
17	MS -> SS	CONNECT ACKNOWLEDGE	
18	MS		The appropriate bearer channel is through connected in both directions.
			According to table 26.21-1 'non synced' (steps 19A to 21A) or 'finely synced' (steps 19B to 23B) handover are performed.
19A	SS -> MS	HANDOVER COMMAND	See Specific message contents.
20A	MS -> SS	HANDOVER ACCESS	Transmitted on cell B. Repeated on every burst of the uplink main DCCH (and optionally the SACCH) until reception of PHYSICAL INFORMATION. Handover Reference as included in the HANDOVER COMMAND.
21A	SS -> MS	PHYSICAL INFORMATION	Sent after reception of n HANDOVER ACCESS messages.
19B	SS -> MS	HANDOVER COMMAND	See Specific Message Contents.
20B	MS -> SS	HANDOVER ACCESS	Transmitted on Cell B
21B	MS -> SS	HANDOVER ACCESS	Before completion of the 4 access bursts on the new DCCH, additional access bursts may also be sent on the SACCH
22B	MS -> SS	HANDOVER ACCESS	
23B	MS -> SS	HANDOVER ACCESS	
24	MS -> SS	SABM	Sent without information field.
25	SS -> MS	UA	
26	MS -> SS	HANDOVER COMPLETE	TSC set 1 according to table 26.21-1 (cell B) is used in uplink and downlink for this and the following messages.
27	SS -> MS	DISCONNECT	
28	MS -> SS	RELEASE	
29	SS -> MS	RELEASE COMPLETE	
30	SS -> MS	CHANNEL RELEASE	The main signalling link is released.

Specific Message Content

Assignment Command (step 14)

Information Element	value/remark
CHANNEL DESCRIPTION 2	Channel Type and TDMA Offset Bits 8 7 6 5 4 1 1 1 0 T TCH/H + ACCHs using TSC Set 2 M=1, 3, 5: T = 0 (subchannel 0) M=2, 4, 6: T = 1 (subchannel 1)
CHANNEL MODE	M=1, 4: 0 0 0 0 0 0 0 1 speech full rate or half rate version 1 M=2, 3, 5, 6: 0 1 0 0 0 0 0 1 speech full rate or half rate version 3

Handover Command (step 19A)

Information Element	value/remark
CHANNEL DESCRIPTION 2	Channel Type and TDMA Offset Bits 8 7 6 5 4 0 0 0 0 1 TCH/F + FACCH/F and SACCH/F
CHANNEL MODE	M=1: 0 0 0 0 0 0 0 1 speech full rate or half rate version 1 M=2: 0 0 1 0 0 0 0 1 speech full rate or half rate version 2 M=3: 0 1 0 0 0 0 0 1 speech full rate or half rate version 3
Synchronization Indication IE	Not included

Handover Command (step 19B)

Information Element	value/remark
CHANNEL DESCRIPTION 2	Channel Type and TDMA Offset Bits 8 7 6 5 4 0 0 0 0 1 TCH/F + FACCH/F and SACCH/F
CHANNEL MODE	M=4: 0 0 0 0 0 0 0 1 speech full rate or half rate version 1 M=5: 0 0 1 0 0 0 0 1 speech full rate or half rate version 2 M=6: 0 1 0 0 0 0 0 1 speech full rate or half rate version 3
Synchronization Indication - Report Observed Time Difference - Synchronization Indication - Normal Cell Indication	Shall not be included. "Synchronized". Ignore out of range timing advance.

26.21.7 VAMOS Signalling / Emergency call

26.21.7.1 Conformance requirements

- 1) VAMOS allows multiplexing of two users simultaneously on the same physical resource in the circuit switched mode both in downlink and in uplink, using the same timeslot number, ARFCN and TDMA frame number. Hence, a basic physical channel capable of VAMOS supports up to 4 TCH channels along with their associated control channels (FACCH and SACCH).

The channel organization for TCH, FACCH and SACCH/T in VAMOS mode shall be done as described in 3GPP TS 45.002.

- 2) Upon receipt of the ASSIGNMENT COMMAND message, the mobile station initiates a local end release of link layer connections and packet resources, if in dual transfer mode, disconnects the physical channels, commands the switching to the assigned channels and initiates the establishment of lower layer connections (this includes the activation of the channels, their connection and the establishment of the main signalling links).

Table 26.21.7.1: Channel Description 2 information element

Channel type and TDMA offset (octet 2)	
Bits	
8 7 6 5 4	
0 0 0 0 0	TCH/F + FACCH/F and SACCH/M at the timeslot indicated by TN, and additional bidirectional or unidirectional TCH/Fs and SACCH/Ms according to the multislot allocation information element
0 0 0 0 1	TCH/F + FACCH/F and SACCH/F
0 0 0 1 T	TCH/H + ACCHs
0 0 1 T T	SDCCH/4 + SACCH/C4 or CBCH (SDCCH/4)
0 1 T T T	SDCCH/8 + SACCH/C8 or CBCH (SDCCH/8)
1 1 0 0 0	TCH/F + ACCHs using TSC Set 2
1 1 1 0 T	TCH/H + ACCHs using TSC Set 2
The T bits indicate the subchannel number coded in binary.	
In the description below "n" is the timeslot number indicated by TN. The description is valid only if all the indicated timeslot numbers are in the range 0 to 7.	

References

3GPP TS 45.001 subclause 13.1.

3GPP TS 44.018 subclauses 3.4.3.1, .10.5.2.5

26.21.7.2 Test purpose

To verify for emergency call setup procedure that the MS applies the correct VAMOS TSC set allocated by ASSIGNMENT COMMAND message.

26.21.7.3 Method of Test

Initial Conditions

System Simulator:

1 cell, default parameters, TSC as defined in table 26.21-1 Cell A TSC set for execution counter M.

Mobile Station:

in MM-state "idle, updated" with valid TMSI and CKSN

Specific PICS statements:

- VAMOS II supported (TSPC VAMOS Type 2)
- Speech supported for Full rate version 2 (TSPC_AddInfo_Full_rate_version_2).
- Speech supported for Full rate version 3 (TSPC_AddInfo_Full_rate_version_3)
- Speech supported for Half rate version 1 (TSPC_AddInfo_Half_rate_version_1).
- Speech supported for Half rate version 3 (TSPC_AddInfo_Half_rate_version_3).

PIXIT statements:

- Way to indicate mobile originated alerting.

Foreseen Final State of MS

"Idle, updated", with TMSI allocated.

Test Procedure

The MS is made to initiate an emergency call. The network and the MS indicate Bearer capabilities IE with supported full rate and half rate channels. The emergency call is established with a late assignment. VAMOS TSC set 2 according

to table 26.21-1 is assigned in ASSIGNMENT COMMAND. It is checked that the TCH is through connected in both directions. The network initiates the call release.

The test is repeated for all channel modes supported by the MS (see table 26.21-1).

Maximum Duration of Test

10 minutes

Expected Sequence

The test is executed for execution counter M = 1, 2 (optional), 3 (optional), 4 (optional), 5 (optional).

Step	Direction	Message	Comments
1	MS		The appropriate emergency call number is entered.
2	MS->SS	CHANNEL REQUEST	Establishment cause is emergency call establishment.
3	SS->MS	IMMEDIATE ASSIGNMENT	
4	MS->SS	CM SERVICE REQUEST	Message is contained in SABM. The CM service type IE indicates "emergency call establishment".
5	SS->MS	AUTHENTICATION REQUEST	
6	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
7	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
8	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
9	SS		SS starts ciphering
10	MS->SS	EMERGENCY SETUP	The MS indicates the supported speech versions.
11	SS->MS	CALL PROCEEDING	
12	SS->MS	ALERTING	
13	SS->MS	ASSIGNMENT COMMAND	SS allocates a speech channel: M = 1: FS M = 2: EFS M = 3: AFS M = 4: HS M = 5: AHS SS allocates TSC from TSC set 2.
14	MS->SS	ASSIGNMENT COMPLETE	TSC set 2 is used in uplink and downlink for this and the following messages.
15	SS -> MS	CONNECT	
16	MS -> SS	CONNECT ACKNOWLEDGE	
17	MS		The appropriate bearer channel is through connected in both directions.
18	SS -> MS	DISCONNECT	
19	MS -> SS	RELEASE	
20	SS -> MS	RELEASE COMPLETE	
21	SS -> MS	CHANNEL RELEASE	The main signalling link is released.

Specific Message Content

Assignment Command (step 13)

Information Element	value/remark
CHANNEL DESCRIPTION 2	Channel Type and TDMA Offset For M = 1, 2, 3: Bits 8 7 6 5 4 1 1 0 0 0 TCH/F + ACCHs using TSC Set 2 For M = 4: Bits 8 7 6 5 4 1 1 1 0 1 TCH/H + ACCHs using TSC Set 2 (subchannel 1) For M = 5: Bits 8 7 6 5 4 1 1 1 0 0 TCH/H + ACCHs using TSC Set 2 (subchannel 0)
CHANNEL MODE	M=1,4: 0 0 0 0 0 0 0 1 speech full rate or half rate version 1 M=2: 0 0 1 0 0 0 0 1 speech full rate or half rate version 2 M=3,5: 0 1 0 0 0 0 0 1 speech full rate or half rate version 3

26.21.8 VAMOS Signalling / MS Originated call / Early assignment / Handover to different AMR codec rates

26.21.8.1 Conformance requirements

- 1) VAMOS allows multiplexing of two users simultaneously on the same physical resource in the circuit switched mode both in downlink and in uplink, using the same timeslot number, ARFCN and TDMA frame number. Hence, a basic physical channel capable of VAMOS supports up to 4 TCH channels along with their associated control channels (FACCH and SACCH).

The channel organization for TCH, FACCH and SACCH/T in VAMOS mode shall be done as described in 3GPP TS 45.002.

- 2) Upon receipt of the ASSIGNMENT COMMAND message, the mobile station initiates a local end release of link layer connections and packet resources, if in dual transfer mode, disconnects the physical channels, commands the switching to the assigned channels and initiates the establishment of lower layer connections (this includes the activation of the channels, their connection and the establishment of the main signalling links).
- 3) Upon receipt of the HANDOVER COMMAND message, the mobile station initiates, as described in sub-clause 3.1.4, the release of link layer connections, disconnects the physical channels (including the packet resources, if in class A mode of operation), commands the switching to the assigned channels and initiates the establishment of lower layer connections (this includes the activation of the channels, their connection and the establishment of the data links).

Table 26.21.6.2: Channel Description 2 information element

Channel type and TDMA offset (octet 2)	
Bits	
8 7 6 5 4	
0 0 0 0 0	TCH/F + FACCH/F and SACCH/M at the timeslot indicated by TN, and additional bidirectional or unidirectional TCH/Fs and SACCH/Ms according to the multislot allocation information element
0 0 0 0 1	TCH/F + FACCH/F and SACCH/F
0 0 0 1 T	TCH/H + ACCHs
0 0 1 T T	SDCCH/4 + SACCH/C4 or CBCH (SDCCH/4)
0 1 T T T	SDCCH/8 + SACCH/C8 or CBCH (SDCCH/8)
1 1 0 0 0	TCH/F + ACCHs using TSC Set 2
1 1 1 0 T	TCH/H + ACCHs using TSC Set 2
The T bits indicate the subchannel number coded in binary.	
In the description below "n" is the timeslot number indicated by TN. The description is valid only if all the indicated timeslot numbers are in the range 0 to 7.	

References

3GPP TS 45.001 subclause 13.1.

3GPP TS 44.018 subclauses 3.4.4.1, .10.5.2.5, .10.5.2.5a

26.21.8.2 Test purpose

To verify that during a mobile originated call and after handover procedure the MS applies TSC set and different AMR codec rates in VAMOS mode.

26.21.8.3 Method of Test

Initial Conditions

System Simulator:

2 cells, default parameters.

Cell A: TSC as defined in table 26.21-1 Cell A TSC set for execution counter M.

Cell B: TSC as defined in table 26.21-1 Cell B TSC set for execution counter M.

Mobile Station:

in MM-state "idle, updated" with valid TMSI and CKSN

Specific PICS statements:

- VAMOS II supported (TSPC VAMOS Type 2)
- Speech supported for Full rate version 3 (TSPC_AddInfo_Full_rate_version_3)
- Speech supported for Half rate version 3 (TSPC_AddInfo_Half_rate_version_3).

PIXIT statements:

- Way to indicate mobile originated alerting.

Foreseen Final State of MS

"Idle, updated", with TMSI allocated.

Test Procedure

A mobile originated speech call is established. The network and the MS indicate Bearer capabilities IE with supported Half Rate channels. The call is established with a early assignment. VAMOS TSC set 2 and AMR codec rate according to table 26.21-1 (cell A) is assigned in ASSIGNMENT COMMAND. It is checked that the TCH is through connected in both directions. The SS sends HANDOVER COMMAND to another VAMOS TSC and different AMR codec rate according to table 26.21-1 (cell B). It is checked that the TCH is through connected in both directions on the new cell. The network initiates the call release.

The test is repeated for AMR half rate channel modes if supported by the MS (see table 26.21 -1).

Maximum Duration of Test

12 minutes

Expected Sequence

The test is executed for execution counter M = 1, 2, 3, 4 according to the channels supported by the MS.

Step	Direction	Message	Comments
1	MS		The "called number" is entered
2	MS->SS	CHANNEL REQUEST	
3	SS->MS	IMMEDIATE ASSIGNMENT	
4	MS->SS	CM SERVICE REQUEST	Message is contained in SABM
5	SS->MS	AUTHENTICATION REQUEST	
6	MS->SS	AUTHENTICATION RESPONSE	SRES specifies correct value
7	SS->MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
8	MS->SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
9	SS		SS starts ciphering
10	MS->SS	SETUP	The MS indicates the supported speech versions.
11	SS->MS	CALL PROCEEDING	
12	SS->MS	ASSIGNMENT COMMAND	SS allocates speech channel: M = 1,2: AFS M = 3,4: AHS SS allocates TSC from TSC set 2.
13	MS->SS	ASSIGNMENT COMPLETE	TSC set 2 is used in uplink and downlink for this and the following messages.
14	SS->MS	ALERTING	
15	MS		An alerting indication as defined in the PIXIT statement is given by the MS.
16	SS -> MS	CONNECT	
17	MS -> SS	CONNECT ACKNOWLEDGE	
18	MS		The appropriate bearer channel is through connected in both directions.
19	SS -> MS	HANDOVER COMMAND	See Specific Message Contents.
20	MS -> SS	HANDOVER ACCESS	Transmitted on Cell B
21	MS -> SS	HANDOVER ACCESS	Before completion of the 4 access bursts on the new DCCH, additional access bursts may also be sent on the SACCH
22	MS -> SS	HANDOVER ACCESS	
23	MS -> SS	HANDOVER ACCESS	
24	MS -> SS	SABM	Sent without information field.
25	SS -> MS	UA	
26	MS -> SS	HANDOVER COMPLETE	TSC set 2 according to table 26.21-1 (cell B) is used in uplink and downlink for this and the following messages.
27	MS		The appropriate bearer channel is through connected in both directions.
28	SS -> MS	DISCONNECT	
29	MS -> SS	RELEASE	
30	SS -> MS	RELEASE COMPLETE	
31	SS -> MS	CHANNEL RELEASE	The main signalling link is released.

Specific Message Content

Assignment Command (step 12)

Information Element	value/remark
CHANNEL DESCRIPTION 2	Channel Type and TDMA Offset M=1, 2: Bits 8 7 6 5 4 1 1 0 0 0 TCH/F + ACCHs using TSC Set 2 M=3, 4: Bits 8 7 6 5 4 1 1 1 0 1 TCH/H + ACCHs using TSC Set 2
CHANNEL MODE	0 1 0 0 0 0 0 1 speech full rate or half rate version 3
Multi-Rate configuration	codec rate according to table 26.21-1 (cell A)

Handover Command (step 19)

Information Element	Value/remark
CHANNEL DESCRIPTION 2	Channel Type and TDMA Offset M=1, 3: Bits 8 7 6 5 4 1 1 0 0 0 TCH/F + ACCHs using TSC Set 2 M=2, 4: Bits 8 7 6 5 4 1 1 1 0 0 TCH/H + ACCHs using TSC Set 2
CHANNEL MODE	0 1 0 0 0 0 0 1 speech full rate or half rate version 3
Synchronization Indication IE	Shall not be included.
- Report Observed Time Difference	"Synchronized".
- Synchronization Indication	Ignore out of range timing advance.
- Normal Cell Indication	codec rate according to table 26.21-1 (cell B)
Multi-Rate configuration	

26.22.1 Layer 2 fill bits randomisation

26.22.1.1 Conformance requirements

The end of the useful part of the frame, i.e. the octets following the length indicator field in type A frames and the octets following the information field in type B frames, is determined by a length indicator contained in the length indicator field. The useful part of a Bbis frames takes all N201 octets of that frame. The useful part of a Bter frame takes all N201 octets of that frame except those bits of octet 1 which contain the short L2 header type 1. The useful part of a B4 frame takes all N201 octets of that frame except those octets which contain the address field and the control field.

If a frame contains a length indicator that has a value less than N201, the frame contains fill bits. Each fill bit shall be set to a random value when sent by the mobile station. Except for the first octet containing fill bits which shall be set to the binary value "00101011", each fill bit should be set to a random value when sent by the network. Otherwise, the network shall set all octets containing fill bits to the binary value "00101011".

References

3GPP TS 44.006 subclause 5.2.

26.22.1.2 Test purpose

An MS shall correctly decode all LAPDm frames with randomised fill bits.

An MS supporting randomisation of fill bits in the Uplink direction shall a) correctly encode the first octet of a frame containing fill bytes and b) send a random sequence of bits during a signalling sequence.

26.22.1.3 Method of Test

Initial Conditions

System Simulator:

1 cell, default parameters.

Mobile Station:

The MS is switched off.

Specific PICS statements:

- L2 fill bits randomisation in uplink (TSPC_UL_L2_Fill_Bits_Randomisation)
- at least one short message service (TSPC_AddInfo_SMS)
- MS supporting at least one bearer capability service (TSPC_Addinfo_CCprotocol_oneBC)
- Immediate connect supported for all circuit switched basic services. (TSPC_AddInfo_ImmConn)

PIXIT statements:

- Way to indicate alerting.
- Way to make the MS accept an incoming call after alerting.

Foreseen Final State of MS

"Idle, updated", with TMSI allocated.

Test Procedure

During the following procedures:

- the SS randomises the fill bits in all layer 2 frames in downlink frames sent to the MS.
- If MS supports fill bits randomisation in uplink all fill bits from l2 frames sent from the MS are recorded by the SS.

MS is powered on. A normal location updating with TMSI reallocation is performed on Cell A. The channel is released.

If the MS supports SMS, the MS triggers MO-SMS. The SS responds to the channel request message by allocating an SDCCH. The SS answers correctly to the SABM on SAPI 0 and then performs the authentication and ciphering procedures. The SS responds with a UA frame SAPI 3 to the MS and continues with the SMS procedures. The SS sends a channel release message.

If the MS supports CC protocol for at least one Bearer Capability, the MS is paged and MT-call is established. Having reached the active state, the MS is made to clear the call.

If the MS supports L2 fill bits randomisation in uplink, the SS will

- Verify that the L2 fill bits in uplink message do not contain only "00101011" pattern
- Concatenate all random fill bits sent by MS into sequence buffer
- Verify in this buffer, that there is no repeated occurrence of 32 bit pattern

Maximum Duration of Test

3 minutes

Expected Sequence

Step	Direction	Message	Comments
	SS	The SS sends random fill bytes as specified in 44.006 sub-clause 5.2 on SDCCH and/or FACCH channels throughout the test.	
	MS	If the MS supports randomisation of fill bits, during the expected sequence, the MS sends random fill bytes as specified in 44.006 sub-clause 5.2. The SS records all random fill bits in the sequence on the SDCCH and/or FACCH from all L2 frames with coded fill bits where $L < N_{201}$ (UI, I, RR, etc) and stores for post analysis.	
1	MS		The MS is switched on.
2	MS -> SS	CHANNEL REQUEST	
3	SS -> MS	IMMEDIATE ASSIGNMENT	
4	MS -> SS	LOCATION UPDATING REQUEST	Message is contained in SABM. Location Updating Type = "Normal location updating" or "IMSI Attach".
5	SS -> MS	AUTHENTICATION REQUEST	
6	MS -> SS	AUTHENTICATION RESPONSE	SRES specifies correct value
7	SS -> MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message
8	MS -> SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
9			SS starts ciphering
10	SS -> MS	LOCATION UPDATING ACCEPT	
11	MS -> SS	TMSI REALLOCATION COMPLETE	
12	SS -> MS	CHANNEL RELEASE	
13	SS		If the MS supports randomisation of fill bits, the SS verifies the received fill bits are random for this signalling sequence.
14a			Steps 14b - 30 will be executed only if the MS supports at least one short message service
14b	MS		MS is made to initiate a MO SMS.
15	MS->SS	CHANNEL REQUEST	Establishment cause indicates the relevant cause value (see 3GPP TS 44.018 Table 9.1.8.1).
16	SS->MS	IMMEDIATE ASSIGNMENT	
17	MS -> SS	CM SERVICE REQUEST	CM Service Type = "Short message service".
18	SS -> MS	AUTHENTICATION REQUEST	
19	MS -> SS	AUTHENTICATION RESPONSE	SRES specifies correct value.
20	SS -> MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message.
21	MS -> SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered.
22	SS		SS starts ciphering.
23	MS -> SS	SABM (SAPI=3)	MS establishes SAPI 3
24	SS -> MS	UA (SAPI=3)	
25	MS -> SS	CP-DATA	Contains RP-DATA RPDU (SMS SUBMIT TPDU)
26	SS -> MS	CP-ACK	
27	SS -> MS	CP-DATA	Contains RP-ACK RPDU.
28	MS -> SS	CP-ACK	
29	SS -> MS	CHANNEL RELEASE	The main signalling link is released.
30	SS		If the MS supports randomisation of fill bits, the SS verifies the received fill bits are random for this signalling sequence.
31			Steps 32 -55 will be executed only if the MS supports mobile terminating calls.
32	SS -> MS	PAGING REQUEST TYPE 1	Sent on the correct paging sub-channel.
33	MS -> SS	CHANNEL REQUEST	Establishment cause indicates the relevant answer to paging cause value (see 3GPP TS 44.018 Table 9.1.8.1).
34	SS -> MS	IMMEDIATE ASSIGNMENT	

35	MS -> SS	PAGING RESPONSE	Message is contained in SABM
36	SS -> MS	AUTHENTICATION REQUEST	
37	MS -> SS	AUTHENTICATION RESPONSE	SRES specifies correct value.
38	SS -> MS	CIPHERING MODE COMMAND	SS starts deciphering after sending the message.
39	MS -> SS	CIPHERING MODE COMPLETE	Shall be sent enciphered. All following messages shall be sent enciphered
40	SS		SS starts ciphering
41	SS -> MS	SETUP	Message contains the signal IE.
42	MS -> SS	CALL CONFIRMED	
43A	MS -> SS	CONNECT	
43B	MS -> SS	ALERTING	
44B	MS		An alerting indication as defined in a PICS/PIXIT statement given by the MS
45B	MS		The MS is made to accept the call in a way described in a PICS/PIXIT statement
46B	MS -> SS	CONNECT	
47	SS -> MS	ASSIGNMENT COMMAND	
48	MS -> SS	ASSIGNMENT COMPLETE	
49	SS -> MS	CONNECT ACKNOWLEDGE	
50	MS		The MS is made to release the call.
51	MS -> SS	DISCONNECT	
52	SS -> MS	RELEASE	
53	MS -> SS	RELEASE COMPLETE	
54	SS -> MS	CHANNEL RELEASE	The main signalling link is released.
55	SS		If the MS supports randomisation of fill bits, the SS verifies the received fill bits are random for this signalling sequence.